ACOPOSinverter P74
ACOPOSinverter P74New

User's Manual

Version: **2.60 (December 2018)**
Model no.: **MAACPIP74-ENG**

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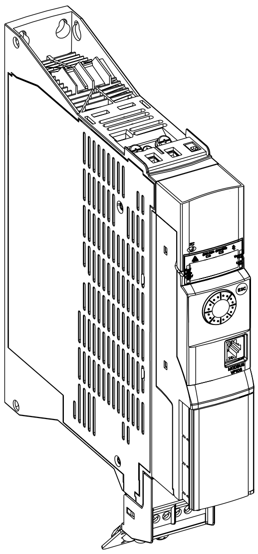
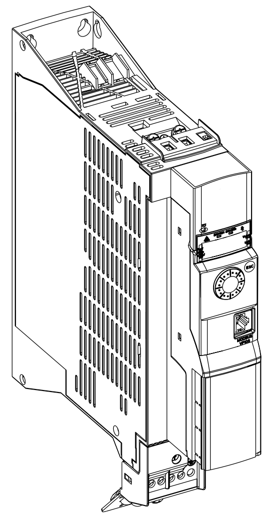
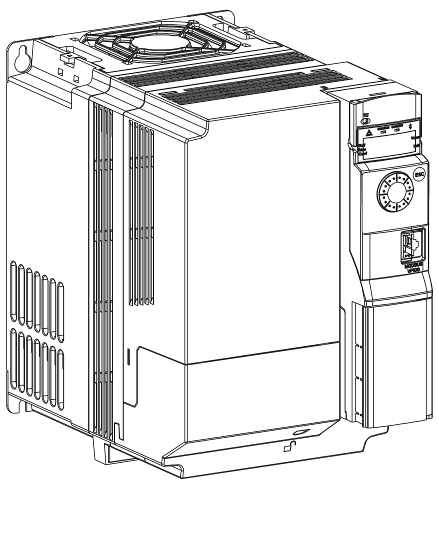
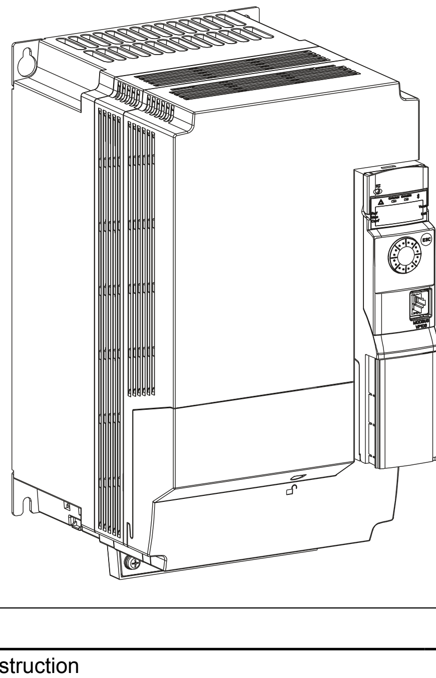
1 ACOPOSinverter P74

1.1 Equipment overview

The ACOPOSinverter P74 family of products encompasses four drive sizes (A, B, C and D) and is ideally suited for integration in compact, powerful drive solutions with high performance requirements.

Four sizes

Size A 8I74S200018.01P-1, 8I74S200037.01P-1, 8I74S200055.01P-1, 8I74S200075.01P-1, 8I74T400037.01P-1, 8I74T400055.01P-1, 8I74T400075.01P-1, 8I74T400110.01P-1, 8I74T400150.01P-1, 8I74S200018.00-000, 8I74S200037.00-000, 8I74S200055.00-000, 8I74S200075.00-000, 8I74T400037.00-000, 8I74T400055.00-000, 8I74T400075.00-000, 8I74T400110.00-000, 8I74T400150.00-000	**Size B** 8I74S200110.01P-1, 8I74S200150.01P-1, 8I74S200220.01P-1, 8I74T400220.01P-1, 8I74T400300.01P-1, 8I74T400400.01P-1, 8I74S200110.00-000, 8I74S200150.00-000, 8I74S200220.00-000, 8I74T400220.00-000, 8I74T400300.00-000, 8I74T400400.00-000
• 240 V 1-phase from 0.18 kW to 0.75 kW (0.25 to 1 HP) • 400 V 3-phase 0.37 to 1.5 kW (0.5 to 2 HP) 	• 240 V 1-phase 1.1 to 2.2 kW ($1^{1/2}$ to 5 HP) • 400 V 3-phase 2.2 to 4 kW (3 to 5 HP) 
Size C 8I74T400550.01P-1, 8I74T400750.01P-1, 8I74T400550.00-000, 8I74T400750.00-000	**Size D** 8I74T401100.01P-1, 8I74T401500.01P-1, 8I74T401100.00-000, 8I74T401500.00-000
• 400 V 3-phase 5.5 and 7.5 kW ($7^{1/2}$ and 10 HP) 	• 400 V 3-phase 11 to 15 kW (15 and 20 HP) 

1.2 Model number key

Product area														
8														Motion group
	Product family													
	I													ACOPOSinverter
		Model												
		74												ACOPOSinverter P74 & P74New
			Number of phases											
			S											1-phase
			T											3-phase
				Voltage range										
				2										200 to 240 V
				4										380 to 500 V
					Nominal power									
					0-9									W x 10^5
						0-9								W x 10^4
							0-9							W x 10^3
								0-9						W x 10^2
									0-9					W x 10
											Interface			
										.	010			ACOPOSinverter P74
										.	01P			POWERLINK ACOPOSinverter P74
										.	00			ACOPOSinverter P74New
										.	0P			POWERLINK ACOPOSinverter P74New
													Version	
												-	1	Version control ACOPOSinverter P74
												-	000	Version control ACOPOSinverter P74New
Examples														
8	I	74	S	2	0	0	0	1	8	.	010	-	1	ACOPOSinverter P74, 1x 200 to 240 V, 0.18 kW, integrated EMC filter and brake chopper, shield plate included with delivery
8	I	74	S	2	0	0	0	1	8	.	01P	-	1	ACOPOSinverter P74, 1x 200 to 240 V, 0.18 kW, integrated EMC filter and brake chopper, shield plate included with delivery, POWERLINK Interface
8	I	74	S	2	0	0	0	1	8	.	00	-	000	ACOPOSinverter P74,New 1x 200 to 240 V, 0.18 kW, integrated EMC filter and brake chopper, shield plate included with delivery
8	I	74	S	2	0	0	0	1	8	.	0P	-	000	ACOPOSinverter P74New, 1x 200 to 240 V, 0.18 kW, integrated EMC filter and brake chopper, shield plate included with delivery, POWERLINK Interface
8	I	74	T	4	0	0	3	0	0	.	010	-	1	ACOPOSinverter P74, 3x 380 to 500 V, 3 kW, integrated EMC filter and brake chopper, shield plate included with delivery
8	I	74	T	4	0	0	3	0	0	.	01P	-	1	ACOPOSinverter P74, 3x 380 to 500 V, 3 kW, integrated EMC filter and brake chopper, shield plate included with delivery, POWERLINK Interface
8	I	74	T	4	0	0	3	0	0	.	00	-	000	ACOPOSinverter P74New, 3x 380 to 500 V, 3 kW, integrated EMC filter and brake chopper, shield plate included with delivery
8	I	74	T	4	0	0	3	0	0	.	0P	-	000	ACOPOSinverter P74New, 3x 380 to 500 V, 3 kW, integrated EMC filter and brake chopper, shield plate included with delivery, POWERLINK Interface

1.3 Order Data

1.3.1 8I74S200018.01P-1, 8I74S200037.01P-1, 8I74S200055.01P-1, 8I74S200018.00-000, 8I74S200037.00-000, 8I74S200055.00-000

Model number	Short description	Figure
	ACOPOSinverter P74 - 1-phase 200 to 240 V	
8I74S200018.01P-1	ACOPOSinverter P74, 1x 200 to 240 V, 0.18 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74S200037.01P-1	ACOPOSinverter P74, 1x 200 to 240 V, 0.37 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74S200055.01P-1	ACOPOSinverter P74, 1x 200 to 240 V, 0.55 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
	ACOPOSinverter P74new - 1-phase 200 to 240 V	
8I74S200018.00-000	ACOPOSinverter P74new, 1 x 200-240 V, 0.18 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74S200037.00-000	ACOPOSinverter P74new, 1 x 200-240 V, 0.37 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74S200055.00-000	ACOPOSinverter P74new, 1 x 200-240 V, 0.55 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
	Optional accessories	
	ACOPOSinverter P74/P76 - Additional EMC input filters	
8I0FS009.200-2	EMC filter 1-phase 9 A, side installation, for ACOPOSinverter P74/P76 1x 200 to 240 V, 0.18 to 0.75 kW	
	ACOPOSinverter P74/P76 - DC bus cable	
8I0XC003.400-1	ACPi P74/P76 DC bus cable, 0.18 m, 5 pcs.	
	ACOPOSinverter P74/P76 - Fan	
8I0XF074.010-1	Fan for ACOPOSinverter P74/P76 1x 200 to 240 V, 0.18 to 0.75 kW and 3x 380 to 500 V, 0.37 to 1.5 kW	
	ACOPOSinverter P74/P76/P84 - Line chokes	
8I0CS004.000-1	Mains choke 1-phase 4 A, for ACOPOSinverter P74/P76 1x 200 to 240 V, 0.18 to 0.37 kW	
8I0CS007.000-1	Mains choke 1-phase 7 A, for ACOPOSinverter P74/P76 1x 200 to 240 V, 0.55 to 0.75 kW	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR100.000-1	Braking resistor 100 Ω, continuous braking power 0.05 kW, for ACOPOSinverter P74/P76 1x200 to 240 V, 0.18 to 1.5 kW and 3x 380 to 500 V, 0.37 to 4 kW for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 4 kW	

Table 1: 8I74S200018.01P-1, 8I74S200037.01P-1, 8I74S200055.01P-1, 8I74S200018.00-000, 8I74S200037.00-000, 8I74S200055.00-000 - Order data

1.3.2 8I74S200075.01P-1, 8I74S200110.01P-1, 8I74S200150.01P-1, 8I74S200220.01P-1, 8I74S200075.00-000, 8I74S200110.00-000, 8I74S200150.00-000, 8I74S200220.00-000

Model number	Short description	Figure
	ACOPOSinverter P74 - 1-phase 200 to 240 V	
8I74S200075.01P-1	ACOPOSinverter P74, 1x 200 to 240 V, 0.75 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74S200110.01P-1	ACOPOSinverter P74, 1x 200 to 240 V, 1.1 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74S200150.01P-1	ACOPOSinverter P74, 1x 200 to 240 V, 1.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74S200220.01P-1	ACOPOSinverter P74, 1x 200 to 240 V, 2.2 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
	ACOPOSinverter P74new - 1-phase 200 to 240 V	
8I74S200075.00-000	ACOPOSinverter P74new, 1 x 200-240 V, 0.75 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74S200110.00-000	ACOPOSinverter P74, 1 x 200-240 V, 1.1 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74S200150.00-000	ACOPOSinverter P74new, 1 x 200-240 V, 1.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74S200220.00-000	ACOPOSinverter P74, 1 x 200-240 V, 2.2 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
	Optional accessories	
	ACOPOSinverter P74/P76 - Additional EMC input filters	
8I0FS009.200-2	EMC filter 1-phase 9 A, side installation, for ACOPOSinverter P74/P76 1x 200 to 240 V, 0.18 to 0.75 kW	
8I0FS016.200-1	EMC filter 1-phase 16 A, side installation, for ACOPOSinverter P74/P76 1x 200 to 240 V, 1.1 to 1.5 kW	
8I0FS022.200-1	EMC filter 1-phase 22 A, side installation, for ACOPOSinverter P74/P76 1x 200 to 240 V, 2.2 kW	
	ACOPOSinverter P74/P76 - DC bus cable	
8I0XC003.400-1	ACPi P74/P76 DC bus cable, 0.18 m, 5 pcs.	
	ACOPOSinverter P74/P76 - Fan	
8I0XF074.010-1	Fan for ACOPOSinverter P74/P76 1x 200 to 240 V, 0.18 to 0.75 kW and 3x 380 to 500 V, 0.37 to 1.5 kW	
8I0XF074.020-1	Fan for ACOPOSinverter P74/P76 1x 200 to 240 V, 1.1 to 2.2 kW and 3x 380 to 500 V, 2.2 to 4 kW	
	ACOPOSinverter P74/P76/P84 - Line chokes	
8I0CS007.000-1	Mains choke 1-phase 7 A, for ACOPOSinverter P74/P76 1x 200 to 240 V, 0.55 to 0.75 kW	
8I0CS018.000-1	Mains choke 1-phase 18 A, for ACOPOSinverter P74 1x 200 to 240 V, 1.1 to 2.2 kW	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR060.000-1	Braking resistor 60 Ω, continuous braking power 0.1 kW, for ACOPOSinverter P74 1x200 to 240 V, 2.2 kW and 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0BR100.000-1	Braking resistor 100 Ω, continuous braking power 0.05 kW, for ACOPOSinverter P74/P76 1x200 to 240 V, 0.18 to 1.5 kW and 3x 380 to 500 V, 0.37 to 4 kW for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 4 kW	

Table 2: 8I74S200075.01P-1, 8I74S200110.01P-1, 8I74S200150.01P-1, 8I74S200220.01P-1, 8I74S200075.00-000, 8I74S200110.00-000, 8I74S200150.00-000, 8I74S200220.00-000 - Order data

1.3.3 8I74T400037.01P-1, 8I74T400055.01P-1, 8I74T400075.01P-1, 8I74T400110.01P-1, 8I74T400037.00-000, 8I74T400055.00-000, 8I74T400075.00-000, 8I74T400110.00-000

Model number	Short description	Figure
	ACOPOSinverter P74 - 3-phase 380 to 500 V	
8I74T400037.01P-1	ACOPOSinverter P74, 3x 380 to 500 V, 0.37 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74T400055.01P-1	ACOPOSinverter P74, 3x 380 to 500 V, 0.55 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74T400075.01P-1	ACOPOSinverter P74, 3x 380 to 500 V, 0.75 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74T400110.01P-1	ACOPOSinverter P74, 3x 380 to 500 V, 1.1 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
	ACOPOSinverter P74new - 3-phase 380 to 500 V	
8I74T400037.00-000	ACOPOSinverter P74new, 3 x 380-500 V, 0.37 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74T400055.00-000	ACOPOSinverter P74new, 3 x 380-500 V, 0.55 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74T400075.00-000	ACOPOSinverter P74new, 3 x 380-500 V, 0.75 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74T400110.00-000	ACOPOSinverter P74new, 3 x 380-500 V, 1.1 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
	Optional accessories	
	ACOPOSinverter P74/P76 - Additional EMC input filters	
8I0FT015.200-1	EMC filter 3-phase 15 A, side installation, for ACOPOSinverter P74/P76 3x 380 to 500 V, 0.37 to 1.5 kW	
	ACOPOSinverter P74/P76 - DC bus cable	
8I0XC003.400-1	ACPi P74/P76 DC bus cable, 0.18 m, 5 pcs.	
	ACOPOSinverter P74/P76 - Fan	
8I0XF074.010-1	Fan for ACOPOSinverter P74/P76 1x 200 to 240 V, 0.18 to 0.75 kW and 3x 380 to 500 V, 0.37 to 1.5 kW	
	ACOPOSinverter P74/P76/P84 - Line chokes	
8I0CT004.000-1	Mains choke 3-phase 4 A, for ACOPOSinverter P74 3x 380 to 500 V, 0.37 to 1.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 1.5 kW	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR100.000-1	Braking resistor 100 Ω, continuous braking power 0.05 kW, for ACOPOSinverter P74/P76 1x200 to 240 V, 0.18 to 1.5 kW and 3x 380 to 500 V, 0.37 to 4 kW for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 4 kW	

Table 3: 8I74T400037.01P-1, 8I74T400055.01P-1, 8I74T400075.01P-1, 8I74T400110.01P-1, 8I74T400037.00-000, 8I74T400055.00-000, 8I74T400075.00-000, 8I74T400110.00-000 - Order data

1.3.4 8I74T400150.01P-1, 8I74T400220.01P-1, 8I74T400300.01P-1, 8I74T400400.01P-1, 8I74T400150.00-000, 8I74T400220.00-000, 8I74T400300.00-000, 8I74T400400.00-000

Model number	Short description	Figure
	ACOPOSinverter P74 - 3-phase 380 to 500 V	
8I74T400150.01P-1	ACOPOSinverter P74, 3x 380 to 500 V, 1.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74T400220.01P-1	ACOPOSinverter P74, 3x 380 to 500 V, 2.2 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74T400300.01P-1	ACOPOSinverter P74, 3x 380 to 500 V, 3 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74T400400.01P-1	ACOPOSinverter P74, 3x 380 to 500 V, 4 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
	ACOPOSinverter P74new - 3-phase 380 to 500 V	
8I74T400150.00-000	ACOPOSinverter P74new, 3 x 380-500 V, 1.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74T400220.00-000	ACOPOSinverter P74new, 3 x 380-500 V, 2.2 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74T400300.00-000	ACOPOSinverter P74new, 3 x 380-500 V, 3.0 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74T400400.00-000	ACOPOSinverter P74new, 3 x 380-500 V, 4.0 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
	Optional accessories	
	ACOPOSinverter P74/P76 - Additional EMC input filters	
8I0FT015.200-1	EMC filter 3-phase 15 A, side installation, for ACOPOSinverter P74/P76 3x 380 to 500 V, 0.37 to 1.5 kW	
8I0FT025.200-1	EMC filter 3-phase 25 A, side installation for ACOPOSinverter P74 3x 380 to 500 V, 2.2 to 4 kW	
	ACOPOSinverter P74/P76 - DC bus cable	
8I0XC003.400-1	ACPi P74/P76 DC bus cable, 0.18 m, 5 pcs.	
	ACOPOSinverter P74/P76 - Fan	
8I0XF074.010-1	Fan for ACOPOSinverter P74/P76 1x 200 to 240 V, 0.18 to 0.75 kW and 3x 380 to 500 V, 0.37 to 1.5 kW	
8I0XF074.020-1	Fan for ACOPOSinverter P74/P76 1x 200 to 240 V, 1.1 to 2.2 kW and 3x 380 to 500 V, 2.2 to 4 kW	
	ACOPOSinverter P74/P76/P84 - Line chokes	
8I0CT004.000-1	Mains choke 3-phase 4 A, for ACOPOSinverter P74 3x 380 to 500 V, 0.37 to 1.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 1.5 kW	
8I0CT010.000-1	Mains choke 3-phase 10 A, for ACOPOSinverter P74 3x 380 to 500 V, 2.2 to 4 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 2.2 to 4 kW	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR100.000-1	Braking resistor 100 Ω, continuous braking power 0.05 kW, for ACOPOSinverter P74/P76 1x200 to 240 V, 0.18 to 1.5 kW and 3x 380 to 500 V, 0.37 to 4 kW for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 4 kW	

Table 4: 8I74T400150.01P-1, 8I74T400220.01P-1, 8I74T400300.01P-1, 8I74T400400.01P-1, 8I74T400150.00-000, 8I74T400220.00-000, 8I74T400300.00-000, 8I74T400400.00-000 - Order data

1.3.5 8I74T400550.01P-1, 8I74T400750.01P-1, 8I74T401100.01P-1, 8I74T401500.01P-1, 8I74T400550.00-000, 8I74T400750.00-000, 8I74T401100.00-000, 8I74T401500.00-000

Model number	Short description	Figure
	ACOPOSinverter P74 - 3-phase 380 to 500 V	
8I74T400550.01P-1	ACOPOSinverter P74, 3x 380 to 500 V, 5.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74T400750.01P-1	ACOPOSinverter P74, 3x 380 to 500 V, 7.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74T401100.01P-1	ACOPOSinverter P74, 3x 380 to 500 V, 11 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I74T401500.01P-1	ACOPOSinverter P74, 3x 380 to 500 V, 15 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
	ACOPOSinverter P74new - 3-phase 380 to 500 V	
8I74T400550.00-000	ACOPOSinverter P74new, 3 x 380-500 V, 5.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74T400750.00-000	ACOPOSinverter P74new, 3 x 380-500 V, 7.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74T401100.00-000	ACOPOSinverter P74new, 3 x 380-500 V, 11 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
8I74T401500.00-000	ACOPOSinverter P74new, 3 x 380-500 V, 15 kW, integrated EMC filter and brake chopper, shield plate included in delivery	
	Optional accessories	
	ACOPOSinverter P74/P76 - Additional EMC input filters	
8I0FT047.200-1	EMC filter 3-phase 47 A, bottom or side installation for ACOPOSinverter P74/P76 3x 380 to 500 V, 5.5 to 7.5 kW	
8I0FT049.200-1	EMC filter 3-phase 49 A, bottom or side installation for ACOPOSinverter P74/P76 3x 380 to 500 V, 11 to 15 kW	
	ACOPOSinverter P74/P76 - DC bus cable	
8I0XC003.400-1	ACPi P74/P76 DC bus cable, 0.18 m, 5 pcs.	
	ACOPOSinverter P74/P76 - Fan	
8I0XF074.030-1	Fan for ACOPOSinverter P74/P76 3x 380 to 500 V, 5.5 to 7.5 kW	
8I0XF074.040-1	Fan for ACOPOSinverter P74/P76 3x 380 to 500 V, 11 to 15 kW	
	ACOPOSinverter P74/P76/P84 - Line chokes	
8I0CT016.000-1	Mains choke, 3-phase 17 A, for ACOPOSinverter P74 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0CT030.000-1	Mains choke 3-phase 30 A, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 4 to 5.5 kW and 3x 380 to 480 V, 11 to 15 kW	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR028.000-1	Braking resistor 28 Ω, continuous braking power 0.2 kW, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 to 4 kW and 3x 380 to 480 V, 11 to 15 kW	
8I0BR060.000-1	Braking resistor 60 Ω, continuous braking power 0.1 kW, for ACOPOSinverter P74 1x200 to 240 V, 2.2 kW and 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	

Table 5: 8I74T400550.01P-1, 8I74T400750.01P-1, 8I74T401100.01P-1, 8I74T401500.01P-1, 8I74T400550.00-000, 8I74T400750.00-000, 8I74T401100.00-000, 8I74T401500.00-000 - Order data

1.4 Technical Data

1.4.1 8I74S200018.01P-1, 8I74S200037.01P-1, 8I74S200055.01P-1

Model number	8I74S200018.01P-1	8I74S200037.01P-1	8I74S200055.01P-1
General information			
Certification			
CE	Yes		
KC	Yes		
UL	UL E225616 Power conversion equipment		
Motor power			
Listed on nameplate	0.18 kW (0.25 HP)	0.37 kW (0.5 HP)	0.55 kW (0.75 HP)
Mains connection			
Mains input voltage	1x 200 VAC -15% to 240 VAC +10%		
Frequency	50 to 60 Hz ±5%		
Apparent power (at 240 VAC)	0.7 kVA	1.2 kVA	1.6 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	1 kA [1]		
Inrush current	Max. 9.6 A [2]		
Mains current			
At 200 VAC	3.4 A [3]	6 A [3]	7.9 A [3]
At 240 VAC	2.8 A [3]	5 A [3]	6.7 A [3]
Power dissipation at nominal load and nominal clock frequency	25 W	38 W	42 W
Integrated EMC filter	Yes [4]		
Line-conducted and radiated emissions			
With integrated filter			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-		
Motor cable length in accordance with IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level from 2 to 4 kHz with 10 m cable C2 level from 4 to 12 kHz with 5 m cable		
Motor cable length in accordance with IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	10 m [5]		
With add-on filter	8I0FS009.200-2		
With add-on filter			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	C1 level from 2 to 16 kHz with 20 m cable		
Motor cable length in accordance with IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level from 2 to 6 kHz with 50 m cable C2 level at 2 kHz with 100 m cable		
Motor cable length in accordance with IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	50 m [5]		
Motor connection			
Nominal output current	1.5 A [6]	3.3 A [6]	3.7 A [6]
Derating of continuous output current depending on ambient temperature			
At nominal clock frequency (4 kHz)	No derating (up to 50°C)		
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).		
Derating of the continuous output current depending on the installation elevation			
Starting at 1000 m above sea level	1%, per 100 m		
Max. transient current for 60 s	2.3 A	5 A	5.6 A
Max. transient current for 2 s	2.5 A	5.5 A	6.1 A
Output frequency range	0.1 to 599 Hz		
Nominal clock frequency	4 kHz		
Clock frequency			
Min.	2 kHz		
Max.	16 kHz		
Braking torque			
With braking resistor	Up to 170% of the rated motor torque		
Max. motor cable length			
Shielded cable	50 m		
Non-shielded cable	100 m		
Closed-loop motor control profiles			
Induction motor	Flux vector control without an encoder Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) Pump/fan profile (quadratic curve Kn^2) Energy saving profile (especially for ventilation)		
Synchronous motor	Vector control without speed feedback		

Table 6: 8I74S200018.01P-1, 8I74S200037.01P-1, 8I74S200055.01P-1 - Technical data

Model number	8I74S200018.01P-1	8I74S200037.01P-1	8I74S200055.01P-1
Main protective functions on the inverter	Thermal protection against the power stage overheating Protection against: Short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the limit for rotary speed. Safety function for: Overvoltage and undervoltage on the mains supply, mains phase failure on a 3-phase supply		
Brake chopper			
Integrated dynamic brake transistors	Yes		
Min. resistance value (external)	40 Ω		
24 VDC supply			
Input voltage	24 VDC (-15%/+20%)		
Current	Max. 1.1 A		
Available internal power supplies			
Output voltage 24 VDC	24 VDC (-15%/+20%)		
Output voltage 24 VDC			
Max. output current at 24 VDC	100 mA		
Output voltage 10 VDC	10 VDC (-0%/+10%)		
Output voltage 10 VDC			
Max. output current at 10 VDC	10 mA		
Interfaces			
Type	POWERLINK		
Digital inputs			
Quantity	6 [7)]		
Nominal voltage	24 VDC (max. 30 V)		
Input circuit	Source or sink		
Input circuit			
Current consumption	7 mA		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Sampling time	8 ms ±0.7 ms		
Input impedance	3.5 kΩ		
Digital input 5			
Max. input frequency	20 kHz		
Safe input - STO (Safe Torque Off)			
Quantity	1		
Nominal voltage	24 VDC		
Input impedance	1.5 kΩ		
Input impedance			
Current consumption	16 mA		
Switching threshold			
Low	<2 V		
High	>17 V		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Input circuit	Sink		
Sampling time	4 ms		
Analog inputs			
Quantity	3		
Electrical isolation			
Input - Input	No		
Input - ACOPOSinverter	Yes		
Input			
Voltage	0 to 10 V, ±10 V		
Current	0 to 20 mA (or 4 to 20 mA)		
Resolution	10-bit		
Sampling time	2 ms		
Input impedance			
Voltage	30 kΩ		
Current	250 Ω		
Digital outputs			
Quantity	1		
Nominal voltage	24 VDC		
Max. voltage	30 VDC		
Output circuit	Source or sink		
Sampling time	2 ms		
Max. current	100 mA		
Relay outputs			
Quantity	2		
Nominal voltage	30 VDC / 250 VAC		
Design			
Relay 1	1 changeover contact		
Relay 2	1 normally open contact		

Table 6: 8I74S200018.01P-1, 8I74S200037.01P-1, 8I74S200055.01P-1 - Technical data

Model number	8I74S200018.01P-1	8I74S200037.01P-1	8I74S200055.01P-1
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Response time (max.)	2 ms		
Analog outputs			
Quantity	1		
Output	0 to 10 V or 0 to 20 mA		
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Max. load impedance			
Voltage	470 Ω		
Current	800 Ω		
Update time	2 ms		
Resolution	10-bit		
Operating conditions			
EN 60529 protection	IP20		
Relative humidity in accordance with IEC 60068-2-3	5 to 95%, non-condensing No dripping water		
Maximum installation elevation	Up to 2000 m [8]		
Max. pollution degree in accordance with IEC/EN 61800-5-1	2 (non-conductive pollution)		
Environmental conditions in accordance with IEC 60721-3-3	Class 3C3 and 3S3		
Operating position	Vertical installation ±10%		
Environmental conditions			
Temperature			
Operation	-10 to 50°C without derating 50 to 60°C with derating		
Storage	-25 to 70°C		
Max. vibration resistance	1 g_n 13 to 200 Hz EN/IEC 60068-2-6 1.5 mm peak to peak 3 to 13 Hz EN/IEC 60068-2-6		
Mechanical characteristics			
Dimensions [9]			
Width	45 mm		
Height	317 mm		
Depth	245 mm		
Weight	1.59 kg	1.646 kg	

Table 6: 8I74S200018.01P-1, 8I74S200037.01P-1, 8I74S200055.01P-1 - Technical data

1) With line choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10%)
3) Typical value for 4-pole motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter supplied with an integrated Category C2 EMC filter. This filter can be turned off.
5) The selection table for the filters specifies the maximum length of the shielded cables between motors and inverters. These maximum cable lengths only serve as a reference point since they depend on the capacity of the motors and the cables being used. The total length should be taken into consideration when motors are connected in parallel. These values apply at a rated clock frequency of 4 kHz.
6) These values apply at a rated clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the rated drive current. The motor current is not permitted to exceed this value.
7) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short circuit protection <50 Ω
8) Over 2000 m, load reduced by 1% per 100 m
9) With shield plate

1.4.2 8I74S200018.00-000, 8I74S200037.00-000, 8I74S200055.00-000

Model number	8I74S200018.00-000	8I74S200037.00-000	8I74S200055.00-000
General information			
Certifications			
CE	Yes		
CSA	Yes		
Motor power			
Listed on nameplate	0.18 kW (0.25 HP)	0.37 kW (0.5 HP)	0.55 kW (0.75 HP)
Mains connection			
Mains input voltage	1x 200 VAC -15% to 240 VAC +10%		
Frequency	50 to 60 Hz ±5%		
Apparent power (at 240 VAC)	0.7 kVA	1.2 kVA	1.6 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	1 kA [1]		
Inrush current	Max. 9.6 A [2]		
Mains current			
At 200 VAC	3.4 A [3]	6 A [3]	7.9 A [3]
At 240 VAC	2.8 A [3]	5 A [3]	6.7 A [3]
Power dissipation at nominal load and nominal clock frequency	25 W	38 W	42 W
Integrated EMC filter	Yes [4]		
Line-conducted and radiated emissions			
With integrated filter			
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-		
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level of 2 to 4 kHz with 10 m cable C2 level of 4 to 12 kHz with 5 m cable		
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	10 m [5]		
With add-on filter	8I0FS009.200-2		
With add-on filter			
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	C1 level of 2 to 16 kHz with 20 m cable		
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level of 2 to 6 kHz with 50 m cable C2 level at 2 kHz with 100 m cable		
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	50 m [5]		
Motor connection			
Nominal output current	1.5 A [6]	3.3 A [6]	3.7 A [6]
Derating of continuous output current depending on ambient temperature			
At nominal clock frequency (4 kHz)	No derating (up to 50°C)		
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).		
Derating of continuous output current depending on installation elevation			
Starting at 1000 m above sea level	1%, per 100 m		
Max. transient current for 60 s	2.3 A	5 A	5.6 A
Max. transient current for 2 s	2.5 A	5.5 A	6.1 A
Output frequency range	0.1 to 599 Hz		
Nominal clock frequency	4 kHz		
Clock frequency			
Min.	2 kHz		
Max.	16 kHz		
Braking torque			
With braking resistor	Up to 170% of the rated motor torque		
Max. motor cable length			
Shielded cable	50 m		
Non-shielded cable	100 m		
Closed-loop motor control profiles			
Induction motor	Vector control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile 2. With V/f characteristic curve for quadratically increasing torque → Energy-saving profile e.g. for fans and pumps Slip control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile 2. With V/f characteristic curve for constant torque (6 f ranges) → Profile for individual special applications 3. With V/f characteristic curve for quadratically increasing torque → Energy-saving profile e.g. for fans and pumps		
Synchronous motor	Vector control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile		

Table 7: 8I74S200018.00-000, 8I74S200037.00-000, 8I74S200055.00-000 - Technical data

Model number	8I74S200018.00-000	8I74S200037.00-000	8I74S200055.00-000
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply		
Brake chopper			
Integrated dynamic brake transistors	Yes		
Min. resistance value (external)	40 Ω		
24 VDC power supply			
Input voltage	24 VDC (-15%/+20%)		
Current	Max. 1.1 A		
Available internal power supplies			
Output voltage 24 VDC	24 VDC (-15%/+20%)		
Output voltage 24 VDC			
Max. output current at 24 VDC	100 mA		
Output voltage 10 VDC	10 VDC (-0%/+10%)		
Output voltage 10 VDC			
Max. output current at 10 VDC	10 mA		
Interfaces			
POWERLINK			
Type	Type 2 [7)]		
Digital inputs			
Quantity	6 [8)]		
Nominal voltage	24 VDC (max. 30 V)		
Input circuit	Source or sink		
Input circuit			
Current consumption	7 mA		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Sampling time	8 ms ±0.7 ms		
Input impedance	3.5 kΩ		
Digital input 5			
Max. input frequency	20 kHz		
Safe input - STO (Safe Torque Off)			
Quantity	1		
Nominal voltage	24 VDC		
Input impedance	1.5 kΩ		
Input impedance			
Current consumption	16 mA		
Switching threshold			
Low	<2 V		
High	>17 V		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Input circuit	Sink		
Sampling time	4 ms		
Analog inputs			
Quantity	3		
Electrical isolation			
Input - Input	No		
Input - ACOPOSinverter	Yes		
Input			
Voltage	0 to 10 V, ±10 V		
Current	0 to 20 mA (or 4 to 20 mA)		
Resolution	10-bit		
Sampling time	2 ms		
Input impedance			
Voltage	30 kΩ		
Current	250 Ω		
Digital outputs			
Quantity	1		
Nominal voltage	24 VDC		
Max. voltage	30 VDC		
Output circuit	Source or sink		
Sampling time	2 ms		
Max. current	100 mA		
Relay outputs			
Quantity	2		
Nominal voltage	30 VDC / 250 VAC		

Table 7: 8I74S200018.00-000, 8I74S200037.00-000, 8I74S200055.00-000 - Technical data

Model number	8I74S200018.00-000	8I74S200037.00-000	8I74S200055.00-000
Switching capacity	R1, with resistive load (cos phi = 1): 3 A at 250 VAC, R1, with resistive load (cos phi = 1): 4 A at 30 VDC, R1, R2, with inductive load (cos = 0.4 and L/R = 7 ms): 2 A at 250 VAC, R1, R2, with inductive load (cos = 0.4 and L/R = 7 ms): 2 A at 30 VDC, R2, with resistive load (cos phi = 1): 5 A at 250 VAC, R2, with resistive load (cos phi = 1): 5 A at 30 VDC		
Design			
Relay 1	1 changeover contact		
Relay 2	1 normally open contact		
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Response time (max.)	2 ms		
Analog outputs			
Quantity	1		
Output	0 to 10 V or 0 to 20 mA		
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Max. load impedance			
Voltage	470 Ω		
Current	800 Ω		
Update time	2 ms		
Resolution	10-bit		
Operating conditions			
Degree of protection per EN 60529	IP20		
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water		
Maximum installation elevation	Up to 2000 m [9]		
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)		
Environmental conditions per IEC 60721-3-3	Class 3C3 and 3S3		
Operating position	Vertical mounting orientation ±10%		
Environmental conditions			
Temperature			
Operation	-10 to 50°C without derating 50 to 60°C with derating		
Storage	-25 to 70°C		
Max. vibration resistance	1 g_n 13 to 200 Hz EN/IEC 60068-2-6 1.5 mm peak to peak 3 to 13 Hz EN/IEC 60068-2-6		
Mechanical properties			
Dimensions [10]			
Width	45 mm		
Height	317 mm		
Depth	245 mm		
Weight	1.59 kg	1.646 kg	

Table 7: 8I74S200018.00-000, 8I74S200037.00-000, 8I74S200055.00-000 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) The selection table for the filters specifies maximum length for the shielded cables between motors and inverters. These maximum cable lengths only serve as a reference point since they depend on the capacity of the motors and the cables being used. The total length must be taken into account when motors are connected in parallel. These values apply at a nominal clock frequency of 4 kHz.
6) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
7) See Automation Help under "Communication / POWERLINK / General information / Hardware - IF/LS" for more information.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 2000 m, load reduced by 1% per 100 m
10) With shield plate

1.4.3 8I74S200075.01P-1, 8I74S200110.01P-1, 8I74S200150.01P-1, 8I74S200220.01P-1

Model number	8I74S200075.01P-1	8I74S200110.01P-1	8I74S200150.01P-1	8I74S200220.01P-1
General information				
Certification				
CE	Yes			
KC	Yes			
UL	UL E225616 Power conversion equipment			
Motor power				
Listed on nameplate	0.75 kW (1 HP)	1.1 kW (1 1/2 HP)	1.5 kW (2 HP)	2.2 kW (3 HP)
Mains connection				
Mains input voltage	1x 200 VAC -15% to 240 VAC +10%			
Frequency	50 to 60 Hz ±5%			
Apparent power (at 240 VAC)	2.0 kVA	2.8 kVA	3.6 kVA	4.8 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	1 kA [1]			
Inrush current	Max. 9.6 A [2]	Max. 19.1 A [2]		
Mains current				
At 200 VAC	10.1 A [3]	13.6 A [3]	17.6 A [3]	23.9 A [3]
At 240 VAC	8.5 A [3]	11.5 A [3]	14.8 A [3]	20.1 A [3]
Power dissipation at nominal load and nominal clock frequency	51 W	64 W	81 W	102 W
Integrated EMC filter	Yes [4]			
Line-conducted and radiated emissions				
With integrated filter				
Motor cable length in accordance with IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level from 2 to 4 kHz with 10 m cable C2 level from 4 to 12 kHz with 5 m cable			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	10 m [5]			
With add-on filter	8I0FS009.200-2	8I0FS016.200-1		8I0FS022.200-1
With add-on filter				
Motor cable length in accordance with IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	C1 level from 2 to 16 kHz with 20 m cable			C1 level from 2 to 16 kHz with 10 m cable C1 level from 2 to 6 kHz with 20 m cable
Motor cable length in accordance with IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level from 2 to 6 kHz with 50 m cable C2 level at 2 kHz with 100 m cable			C2 level from 2 to 6 kHz with 50 m cable C2 level from 2 to 4 kHz with 100 m cable
Motor cable length in accordance with IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	50 m [5]			
Motor connection				
Nominal output current	4.8 A [6]	6.9 A [6]	8 A [6]	11 A [6]
Derating of continuous output current depending on ambient temperature				
At nominal clock frequency (4 kHz)	No derating (up to 50°C)			
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).			
Derating of the continuous output current depending on the installation elevation				
Starting at 1000 m above sea level	1%, per 100 m			
Max. transient current for 60 s	7.2 A	10.4 A	12 A	16.5 A
Max. transient current for 2 s	7.9 A	11.4 A	13.2 A	18.2 A
Output frequency range	0.1 to 599 Hz			
Nominal clock frequency	4 kHz			
Clock frequency				
Min.	2 kHz			
Max.	16 kHz			
Braking torque				
With braking resistor	Up to 170% of the rated motor torque			
Max. motor cable length				
Shielded cable	50 m			
Non-shielded cable	100 m			

Table 8: 8I74S200075.01P-1, 8I74S200110.01P-1, 8I74S200150.01P-1, 8I74S200220.01P-1 - Technical data

Model number	8I74S200075.01P-1	8I74S200110.01P-1	8I74S200150.01P-1	8I74S200220.01P-1
Closed-loop motor control profiles				
Induction motor	Flux vector control without an encoder Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) Pump/fan profile (quadratic curve Kn²) Energy saving profile (especially for ventilation)			
Synchronous motor	Vector control without speed feedback			
Main protective functions on the inverter	Thermal protection against the power stage overheating Protection against: Short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the limit for rotary speed. Safety function for: Overvoltage and undervoltage on the mains supply, mains phase failure on a 3-phase supply			
Brake chopper				
Integrated dynamic brake transistors	Yes			
Min. resistance value (external)	40 Ω	27 Ω		25 Ω
24 VDC supply				
Input voltage	24 VDC (-15%/+20%)			
Current	Max. 1.1 A			
Available internal power supplies				
Output voltage 24 VDC	24 VDC (-15%/+20%)			
Output voltage 24 VDC				
Max. output current at 24 VDC	100 mA			
Output voltage 10 VDC	10 VDC (-0%/+10%)			
Output voltage 10 VDC				
Max. output current at 10 VDC	10 mA			
Interfaces				
Type	POWERLINK			
Digital inputs				
Quantity	6 [7)]			
Nominal voltage	24 VDC (max. 30 V)			
Input circuit	Source or sink			
Input circuit				
Current consumption	7 mA			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Sampling time	8 ms ±0.7 ms			
Input impedance	3.5 kΩ			
Digital input 5				
Max. input frequency	20 kHz			
Safe input - STO (Safe Torque Off)				
Quantity	1			
Nominal voltage	24 VDC			
Input impedance	1.5 kΩ			
Input impedance				
Current consumption	16 mA			
Switching threshold				
Low	<2 V			
High	>17 V			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Input circuit	Sink			
Sampling time	4 ms			
Analog inputs				
Quantity	3			
Electrical isolation				
Input - Input	No			
Input - ACOPOSinverter	Yes			
Input				
Voltage	0 to 10 V, ±10 V			
Current	0 to 20 mA (or 4 to 20 mA)			
Resolution	10-bit			
Sampling time	2 ms			
Input impedance				
Voltage	30 kΩ			
Current	250 Ω			
Digital outputs				
Quantity	1			
Nominal voltage	24 VDC			
Max. voltage	30 VDC			
Output circuit	Source or sink			
Sampling time	2 ms			
Max. current	100 mA			

Table 8: 8I74S200075.01P-1, 8I74S200110.01P-1, 8I74S200150.01P-1, 8I74S200220.01P-1 - Technical data

Model number	8I74S200075.01P-1	8I74S200110.01P-1	8I74S200150.01P-1	8I74S200220.01P-1
Relay outputs				
Quantity	2			
Nominal voltage	30 VDC / 250 VAC			
Design				
Relay 1	1 changeover contact			
Relay 2	1 normally open contact			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Response time (max.)	2 ms			
Analog outputs				
Quantity	1			
Output	0 to 10 V or 0 to 20 mA			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Max. load impedance				
Voltage	470 Ω			
Current	800 Ω			
Update time	2 ms			
Resolution	10-bit			
Operating conditions				
EN 60529 protection	IP20			
Relative humidity in accordance with IEC 60068-2-3	5 to 95%, non-condensing No dripping water			
Maximum installation elevation	Up to 2000 m [8]			
Max. pollution degree in accordance with IEC/EN 61800-5-1	2 (non-conductive pollution)			
Environmental conditions in accordance with IEC 60721-3-3	Class 3C3 and 3S3			
Operating position	Vertical installation ±10%			
Environmental conditions				
Temperature				
Operation	-10 to 50°C without derating 50 to 60°C with derating			
Storage	-25 to 70°C			
Max. vibration resistance	1 g_n 13 to 200 Hz EN/IEC 60068-2-6 1.5 mm peak to peak 3 to 13 Hz EN/IEC 60068-2-6			
Mechanical characteristics				
Dimensions [9]				
Width	45 mm	60 mm		
Height	317 mm			
Depth	245 mm			
Weight	1.646 kg	1.952 kg		2.066 kg

Table 8: 8I74S200075.01P-1, 8I74S200110.01P-1, 8I74S200150.01P-1, 8I74S200220.01P-1 - Technical data

1) With line choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10%)
3) Typical value for 4-pole motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter supplied with an integrated Category C2 EMC filter. This filter can be turned off.
5) The selection table for the filters specifies the maximum length of the shielded cables between motors and inverters. These maximum cable lengths only serve as a reference point since they depend on the capacity of the motors and the cables being used. The total length should be taken into consideration when motors are connected in parallel. These values apply at a rated clock frequency of 4 kHz.
6) These values apply at a rated clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the rated drive current. The motor current is not permitted to exceed this value.
7) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short circuit protection <50 Ω
8) Over 2000 m, load reduced by 1% per 100 m
9) With shield plate

1.4.4 8I74S200075.00-000, 8I74S200110.00-000, 8I74S200150.00-000, 8I74S200220.00-000

Model number	8I74S200075.00-000	8I74S200110.00-000	8I74S200150.00-000	8I74S200220.00-000
General information				
Certifications				
CE	Yes			
CSA	Yes			
Motor power				
Listed on nameplate	0.75 kW (1 HP)	1.1 kW (1½ HP)	1.5 kW (2 HP)	2.2 kW (3 HP)
Mains connection				
Mains input voltage	1x 200 VAC -15% to 240 VAC +10%			
Frequency	50 to 60 Hz ±5%			
Apparent power (at 240 VAC)	2.0 kVA	2.8 kVA	3.6 kVA	4.8 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	1 kA [1]			
Inrush current	Max. 9.6 A [2]	Max. 19.1 A [2]		
Mains current				
At 200 VAC	10.1 A [3]	13.6 A [3]	17.6 A [3]	23.9 A [3]
At 240 VAC	8.5 A [3]	11.5 A [3]	14.8 A [3]	20.1 A [3]
Power dissipation at nominal load and nominal clock frequency	51 W	64 W	81 W	102 W
Integrated EMC filter	Yes [4]			
Line-conducted and radiated emissions				
With integrated filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level of 2 to 4 kHz with 10 m cable C2 level of 4 to 12 kHz with 5 m cable			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	10 m [5]			
With add-on filter	8I0FS009.200-2	8I0FS016.200-1		8I0FS022.200-1
With add-on filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	C1 level of 2 to 16 kHz with 20 m cable			C1 level of 2 to 16 kHz with 10 m cable C1 level of 2 to 6 kHz with 20 m cable
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level of 2 to 6 kHz with 50 m cable C2 level at 2 kHz with 100 m cable			C2 level of 2 to 6 kHz with 50 m cable C2 level of 2 to 4 kHz with 100 m cable
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	50 m [5]			
Motor connection				
Nominal output current	4.8 A [6]	6.9 A [6]	8 A [6]	11 A [6]
Derating of continuous output current depending on ambient temperature				
At nominal clock frequency (4 kHz)	No derating (up to 50°C)			
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).			
Derating of continuous output current depending on installation elevation				
Starting at 1000 m above sea level	1%, per 100 m			
Max. transient current for 60 s	7.2 A	10.4 A	12 A	16.5 A
Max. transient current for 2 s	7.9 A	11.4 A	13.2 A	18.2 A
Output frequency range	0.1 to 599 Hz			
Nominal clock frequency	4 kHz			
Clock frequency				
Min.	2 kHz			
Max.	16 kHz			
Braking torque				
With braking resistor	Up to 170% of the rated motor torque			
Max. motor cable length				
Shielded cable	50 m			
Non-shielded cable	100 m			

Table 9: 8I74S200075.00-000, 8I74S200110.00-000, 8I74S200150.00-000, 8I74S200220.00-000 - Technical data

Model number	8I74S200075.00-000	8I74S200110.00-000	8I74S200150.00-000	8I74S200220.00-000
Closed-loop motor control profiles				
Induction motor	Vector control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile 2. With V/f characteristic curve for quadratically increasing torque → Energy-saving profile e.g. for fans and pumps Slip control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile 2. With V/f characteristic curve for constant torque (6 f ranges) → Profile for individual special applications 3. With V/f characteristic curve for quadratically increasing torque → Energy-saving profile e.g. for fans and pumps			
Synchronous motor	Vector control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile			
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply			
Brake chopper				
Integrated dynamic brake transistors	Yes			
Min. resistance value (external)	40 Ω	27 Ω		25 Ω
24 VDC power supply				
Input voltage	24 VDC (-15%/+20%)			
Current	Max. 1.1 A			
Available internal power supplies				
Output voltage 24 VDC	24 VDC (-15%/+20%)			
Output voltage 24 VDC				
Max. output current at 24 VDC	100 mA			
Output voltage 10 VDC	10 VDC (-0%/+10%)			
Output voltage 10 VDC				
Max. output current at 10 VDC	10 mA			
Interfaces				
POWERLINK				
Type	Type 2 [7)]			
Digital inputs				
Quantity	6 [8)]			
Nominal voltage	24 VDC (max. 30 V)			
Input circuit	Source or sink			
Input circuit				
Current consumption	7 mA			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Sampling time	8 ms ±0.7 ms			
Input impedance	3.5 kΩ			
Digital input 5				
Max. input frequency	20 kHz			
Safe input - STO (Safe Torque Off)				
Quantity	1			
Nominal voltage	24 VDC			
Input impedance	1.5 kΩ			
Input impedance				
Current consumption	16 mA			
Switching threshold				
Low	<2 V			
High	>17 V			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Input circuit	Sink			
Sampling time	4 ms			
Analog inputs				
Quantity	3			
Electrical isolation				
Input - Input	No			
Input - ACOPOSinverter	Yes			
Input				
Voltage	0 to 10 V, ±10 V			
Current	0 to 20 mA (or 4 to 20 mA)			
Resolution	10-bit			
Sampling time	2 ms			

Table 9: 8I74S200075.00-000, 8I74S200110.00-000, 8I74S200150.00-000, 8I74S200220.00-000 - Technical data

Model number	8I74S200075.00-000	8I74S200110.00-000	8I74S200150.00-000	8I74S200220.00-000
Input impedance				
Voltage	30 kΩ			
Current	250 Ω			
Digital outputs				
Quantity	1			
Nominal voltage	24 VDC			
Max. voltage	30 VDC			
Output circuit	Source or sink			
Sampling time	2 ms			
Max. current	100 mA			
Relay outputs				
Quantity	2			
Nominal voltage	30 VDC / 250 VAC			
Switching capacity	R1, with resistive load (cos phi = 1): 3 A at 250 VAC, R1, with resistive load (cos phi = 1): 4 A at 30 VDC, R1, R2, with inductive load (cos = 0.4 and L/R = 7 ms): 2 A at 250 VAC, R1, R2, with inductive load (cos = 0.4 and L/R = 7 ms): 2 A at 30 VDC, R2, with resistive load (cos phi = 1): 5 A at 250 VAC, R2, with resistive load (cos phi = 1): 5 A at 30 VDC			
Design				
Relay 1	1 changeover contact			
Relay 2	1 normally open contact			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Response time (max.)	2 ms			
Analog outputs				
Quantity	1			
Output	0 to 10 V or 0 to 20 mA			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Max. load impedance				
Voltage	470 Ω			
Current	800 Ω			
Update time	2 ms			
Resolution	10-bit			
Operating conditions				
Degree of protection per EN 60529	IP20			
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water			
Maximum installation elevation	Up to 2000 m [9]			
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)			
Environmental conditions per IEC 60721-3-3	Class 3C3 and 3S3			
Operating position	Vertical mounting orientation ±10%			
Environmental conditions				
Temperature				
Operation	-10 to 50°C without derating 50 to 60°C with derating			
Storage	-25 to 70°C			
Max. vibration resistance	1 g_n 13 to 200 Hz EN/IEC 60068-2-6 1.5 mm peak to peak 3 to 13 Hz EN/IEC 60068-2-6			
Mechanical properties				
Dimensions [10]				
Width	45 mm	60 mm		
Height	317 mm			
Depth	245 mm			
Weight	1.646 kg	1.952 kg		2.066 kg

Table 9: 8I74S200075.00-000, 8I74S200110.00-000, 8I74S200150.00-000, 8I74S200220.00-000 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) The selection table for the filters specifies maximum length for the shielded cables between motors and inverters. These maximum cable lengths only serve as a reference point since they depend on the capacity of the motors and the cables being used. The total length must be taken into account when motors are connected in parallel. These values apply at a nominal clock frequency of 4 kHz.
6) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
7) See Automation Help under "Communication / POWERLINK / General information / Hardware - IF/LS" for more information.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 2000 m, load reduced by 1% per 100 m
10) With shield plate

1.4.5 8I74T400037.01P-1, 8I74T400055.01P-1, 8I74T400075.01P-1, 8I74T400110.01P-1

Model number	8I74T400037.01P-1	8I74T400055.01P-1	8I74T400075.01P-1	8I74T400110.01P-1
General information				
Certification				
CE	Yes			
KC	Yes			
UL	UL E225616 Power conversion equipment			
Motor power				
Listed on nameplate	0.37 kW (0.5 HP)	0.55 kW (0.75 HP)	0.75 kW (1 HP)	1.1 kW (1 1/2 HP)
Mains connection				
Mains input voltage	3x 380 VAC -15% to 500 VAC +10%			
Frequency	50 to 60 Hz ±5%			
Apparent power (at 500 VAC)	1.4 kVA	1.9 kVA	2.3 kVA	3.3 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	5 kA 1)			
Inrush current	Max. 10 A 2)			
Mains current				
At 380 VAC	2.1 A 3)	2.8 A 3)	3.6 A 3)	5 A 3)
At 500 VAC	1.6 A 3)	2.2 A 3)	2.7 A 3)	3.8 A 3)
Power dissipation at nominal load and nominal clock frequency	27 W	31 W	37 W	50 W
Integrated EMC filter	Yes 4)			
Line-conducted and radiated emissions				
With integrated filter				
Motor cable length in accordance with IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level from 4 to 12 kHz with 5 m cable			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	5 m 5)			
With add-on filter	8I0FT015.200-1			
With add-on filter				
Motor cable length in accordance with IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	C1 level from 2 to 16 kHz with 20 m cable			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level from 2 to 16 kHz with 50 m cable			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	50 m 5)			
Motor connection				
Nominal output current	1.5 A 6)	1.9 A 6)	2.3 A 6)	3 A 6)
Derating of continuous output current depending on ambient temperature				
At nominal clock frequency (4 kHz)	No derating (up to 50°C)			
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).			
Derating of the continuous output current depending on the installation elevation				
Starting at 1000 m above sea level	1%, per 100 m			
Max. transient current for 60 s	2.3 A	2.9 A	3.5 A	4.5 A
Max. transient current for 2 s	2.5 A	3.1 A	3.8 A	5 A
Output frequency range	0.1 to 599 Hz			
Nominal clock frequency	4 kHz			
Clock frequency				
Min.	2 kHz			
Max.	16 kHz			
Braking torque				
With braking resistor	Up to 170% of the rated motor torque			
Max. motor cable length				
Shielded cable	50 m			
Non-shielded cable	100 m			

Table 10: 8I74T400037.01P-1, 8I74T400055.01P-1, 8I74T400075.01P-1, 8I74T400110.01P-1 - Technical data

Model number	8I74T400037.01P-1	8I74T400055.01P-1	8I74T400075.01P-1	8I74T400110.01P-1
Closed-loop motor control profiles				
Induction motor	Flux vector control without an encoder Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) Pump/fan profile (quadratic curve Kn^2) Energy saving profile (especially for ventilation)			
Synchronous motor	Vector control without speed feedback			
Main protective functions on the inverter	Thermal protection against the power stage overheating Protection against: Short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the limit for rotary speed. Safety function for: Overvoltage and undervoltage on the mains supply, mains phase failure on a 3-phase supply			
Brake chopper				
Integrated dynamic brake transistors	Yes			
Min. resistance value (external)	80 Ω			54 Ω
24 VDC supply				
Input voltage	24 VDC (-15%/+20%)			
Current	Max. 1.1 A			
Available internal power supplies				
Output voltage 24 VDC	24 VDC (-15%/+20%)			
Output voltage 24 VDC				
Max. output current at 24 VDC	100 mA			
Output voltage 10 VDC	10 VDC (-0%/+10%)			
Output voltage 10 VDC				
Max. output current at 10 VDC	10 mA			
Interfaces				
Type	POWERLINK			
Digital inputs				
Quantity	6 [7)]			
Nominal voltage	24 VDC (max. 30 V)			
Input circuit	Source or sink			
Input circuit				
Current consumption	7 mA			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Sampling time	8 ms ±0.7 ms			
Input impedance	3.5 kΩ			
Digital input 5				
Max. input frequency	20 kHz			
Safe input - STO (Safe Torque Off)				
Quantity	1			
Nominal voltage	24 VDC			
Input impedance	1.5 kΩ			
Input impedance				
Current consumption	16 mA			
Switching threshold				
Low	<2 V			
High	>17 V			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Input circuit	Sink			
Sampling time	4 ms			
Analog inputs				
Quantity	3			
Electrical isolation				
Input - Input	No			
Input - ACOPOSinverter	Yes			
Input				
Voltage	0 to 10 V, ±10 V			
Current	0 to 20 mA (or 4 to 20 mA)			
Resolution	10-bit			
Sampling time	2 ms			
Input impedance				
Voltage	30 kΩ			
Current	250 Ω			
Digital outputs				
Quantity	1			
Nominal voltage	24 VDC			
Max. voltage	30 VDC			
Output circuit	Source or sink			
Sampling time	2 ms			
Max. current	100 mA			

Table 10: 8I74T400037.01P-1, 8I74T400055.01P-1, 8I74T400075.01P-1, 8I74T400110.01P-1 - Technical data

Model number	8I74T400037.01P-1	8I74T400055.01P-1	8I74T400075.01P-1	8I74T400110.01P-1
Relay outputs				
Quantity	2			
Nominal voltage	30 VDC / 250 VAC			
Design				
Relay 1	1 changeover contact			
Relay 2	1 normally open contact			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Response time (max.)	2 ms			
Analog outputs				
Quantity	1			
Output	0 to 10 V or 0 to 20 mA			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Max. load impedance				
Voltage	470 Ω			
Current	800 Ω			
Update time	2 ms			
Resolution	10-bit			
Operating conditions				
EN 60529 protection	IP20			
Relative humidity in accordance with IEC 60068-2-3	5 to 95%, non-condensing No dripping water			
Maximum installation elevation	Up to 2000 m [8]			
Max. pollution degree in accordance with IEC/EN 61800-5-1	2 (non-conductive pollution)			
Environmental conditions in accordance with IEC 60721-3-3	Class 3C3 and 3S3			
Operating position	Vertical installation ±10%			
Environmental conditions				
Temperature				
Operation	-10 to 50°C without derating 50 to 60°C with derating			
Storage	-25 to 70°C			
Max. vibration resistance	1 g_n 13 to 200 Hz EN/IEC 60068-2-6 1.5 mm peak to peak 3 to 13 Hz EN/IEC 60068-2-6			
Mechanical characteristics				
Dimensions [9]				
Width	45 mm			
Height	317 mm			
Depth	245 mm			
Weight	1.618 kg	1.715 kg		1.705 kg

Table 10: 8I74T400037.01P-1, 8I74T400055.01P-1, 8I74T400075.01P-1, 8I74T400110.01P-1 - Technical data

1) With line choke max. Isc 65 kA for 380/500 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10%)
3) Typical value for 4-pole motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter supplied with an integrated Category C2 EMC filter. This filter can be turned off.
5) The selection table for the filters specifies the maximum length of the shielded cables between motors and inverters. These maximum cable lengths only serve as a reference point since they depend on the capacity of the motors and the cables being used. The total length should be taken into consideration when motors are connected in parallel. These values apply at a rated clock frequency of 4 kHz.
6) These values apply at a rated clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the rated drive current. The motor current is not permitted to exceed this value.
7) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short circuit protection <50 Ω
8) Over 2000 m, load reduced by 1% per 100 m
9) With shield plate

1.4.6 8I74T400037.00-000, 8I74T400055.00-000, 8I74T400075.00-000, 8I74T400110.00-000

Model number	8I74T400037.00-000	8I74T400055.00-000	8I74T400075.00-000	8I74T400110.00-000
General information				
Certifications				
CE	Yes			
CSA	Yes			
Motor power				
Listed on nameplate	0.37 kW (0.5 HP)	0.55 kW (0.75 HP)	0.75 kW (1 HP)	1.1 kW (1½ HP)
Mains connection				
Mains input voltage	3x 380 VAC -15% to 500 VAC +10%			
Frequency	50 to 60 Hz ±5%			
Apparent power (at 500 VAC)	1.4 kVA	1.9 kVA	2.3 kVA	3.3 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	5 kA [1]			
Inrush current	Max. 10 A [2]			
Mains current				
At 380 VAC	2.1 A [3]	2.8 A [3]	3.6 A [3]	5 A [3]
At 500 VAC	1.6 A [3]	2.2 A [3]	2.7 A [3]	3.8 A [3]
Power dissipation at nominal load and nominal clock frequency	27 W	31 W	37 W	50 W
Integrated EMC filter	Yes [4]			
Line-conducted and radiated emissions				
With integrated filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level of 4 to 12 kHz with 5 m cable			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	5 m [5]			
With add-on filter	8I0FT015.200-1			
With add-on filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	C1 level of 2 to 16 kHz with 20 m cable			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level of 2 to 16 kHz with 50 m cable			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	50 m [5]			
Motor connection				
Nominal output current	1.5 A [6]	1.9 A [6]	2.3 A [6]	3 A [6]
Derating of continuous output current depending on ambient temperature				
At nominal clock frequency (4 kHz)	No derating (up to 50°C)			
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).			
Derating of continuous output current depending on installation elevation				
Starting at 1000 m above sea level	1%, per 100 m			
Max. transient current for 60 s	2.3 A	2.9 A	3.5 A	4.5 A
Max. transient current for 2 s	2.5 A	3.1 A	3.8 A	5 A
Output frequency range	0.1 to 599 Hz			
Nominal clock frequency	4 kHz			
Clock frequency				
Min.	2 kHz			
Max.	16 kHz			
Braking torque				
With braking resistor	Up to 170% of the rated motor torque			
Max. motor cable length				
Shielded cable	50 m			
Non-shielded cable	100 m			

Table 11: 8I74T400037.00-000, 8I74T400055.00-000, 8I74T400075.00-000, 8I74T400110.00-000 - Technical data

Model number	8I74T400037.00-000	8I74T400055.00-000	8I74T400075.00-000	8I74T400110.00-000
Closed-loop motor control profiles				
Induction motor	Vector control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile 2. With V/f characteristic curve for quadratically increasing torque → Energy-saving profile e.g. for fans and pumps Slip control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile 2. With V/f characteristic curve for constant torque (6 f ranges) → Profile for individual special applications 3. With V/f characteristic curve for quadratically increasing torque → Energy-saving profile e.g. for fans and pumps			
Synchronous motor	Vector control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile			
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply			
Brake chopper				
Integrated dynamic brake transistors	Yes			
Min. resistance value (external)	80 Ω			54 Ω
24 VDC power supply				
Input voltage	24 VDC (-15%/+20%)			
Current	Max. 1.1 A			
Available internal power supplies				
Output voltage 24 VDC	24 VDC (-15%/+20%)			
Output voltage 24 VDC				
Max. output current at 24 VDC	100 mA			
Output voltage 10 VDC	10 VDC (-0%/+10%)			
Output voltage 10 VDC				
Max. output current at 10 VDC	10 mA			
Interfaces				
POWERLINK				
Type	Type 2 [7)]			
Digital inputs				
Quantity	6 [8)]			
Nominal voltage	24 VDC (max. 30 V)			
Input circuit	Source or sink			
Input circuit				
Current consumption	7 mA			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Sampling time	8 ms ±0.7 ms			
Input impedance	3.5 kΩ			
Digital input 5				
Max. input frequency	20 kHz			
Safe input - STO (Safe Torque Off)				
Quantity	1			
Nominal voltage	24 VDC			
Input impedance	1.5 kΩ			
Input impedance				
Current consumption	16 mA			
Switching threshold				
Low	<2 V			
High	>17 V			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Input circuit	Sink			
Sampling time	4 ms			
Analog inputs				
Quantity	3			
Electrical isolation				
Input - Input	No			
Input - ACOPOSinverter	Yes			
Input				
Voltage	0 to 10 V, ±10 V			
Current	0 to 20 mA (or 4 to 20 mA)			
Resolution	10-bit			
Sampling time	2 ms			

Table 11: 8I74T400037.00-000, 8I74T400055.00-000, 8I74T400075.00-000, 8I74T400110.00-000 - Technical data

Model number	8I74T400037.00-000	8I74T400055.00-000	8I74T400075.00-000	8I74T400110.00-000
Input impedance				
Voltage	30 kΩ			
Current	250 Ω			
Digital outputs				
Quantity	1			
Nominal voltage	24 VDC			
Max. voltage	30 VDC			
Output circuit	Source or sink			
Sampling time	2 ms			
Max. current	100 mA			
Relay outputs				
Quantity	2			
Nominal voltage	30 VDC / 250 VAC			
Switching capacity	R1, with resistive load (cos phi = 1): 3 A at 250 VAC, R1, with resistive load (cos phi = 1): 4 A at 30 VDC, R1, R2, with inductive load (cos = 0.4 and L/R = 7 ms): 2 A at 250 VAC, R1, R2, with inductive load (cos = 0.4 and L/R = 7 ms): 2 A at 30 VDC, R2, with resistive load (cos phi = 1): 5 A at 250 VAC, R2, with resistive load (cos phi = 1): 5 A at 30 VDC			
Design				
Relay 1	1 changeover contact			
Relay 2	1 normally open contact			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Response time (max.)	2 ms			
Analog outputs				
Quantity	1			
Output	0 to 10 V or 0 to 20 mA			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Max. load impedance				
Voltage	470 Ω			
Current	800 Ω			
Update time	2 ms			
Resolution	10-bit			
Operating conditions				
Degree of protection per EN 60529	IP20			
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water			
Maximum installation elevation	Up to 2000 m [9]			
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)			
Environmental conditions per IEC 60721-3-3	Class 3C3 and 3S3			
Operating position	Vertical mounting orientation ±10%			
Environmental conditions				
Temperature				
Operation	-10 to 50°C without derating 50 to 60°C with derating			
Storage	-25 to 70°C			
Max. vibration resistance	1 g_n 13 to 200 Hz EN/IEC 60068-2-6 1.5 mm peak to peak 3 to 13 Hz EN/IEC 60068-2-6			
Mechanical properties				
Dimensions [10]				
Width	45 mm			
Height	317 mm			
Depth	245 mm			
Weight	1.618 kg	1.715 kg		1.705 kg

Table 11: 8I74T400037.00-000, 8I74T400055.00-000, 8I74T400075.00-000, 8I74T400110.00-000 - Technical data

1) With mains choke max. Isc 65 kA for 380/500 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) The selection table for the filters specifies maximum length for the shielded cables between motors and inverters. These maximum cable lengths only serve as a reference point since they depend on the capacity of the motors and the cables being used. The total length must be taken into account when motors are connected in parallel. These values apply at a nominal clock frequency of 4 kHz.
6) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
7) See Automation Help under "Communication / POWERLINK / General information / Hardware - IF/LS" for more information.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 2000 m, load reduced by 1% per 100 m
10) With shield plate

1.4.7 8I74T400150.01P-1, 8I74T400220.01P-1, 8I74T400300.01P-1, 8I74T400400.01P-1

Model number	8I74T400150.01P-1	8I74T400220.01P-1	8I74T400300.01P-1	8I74T400400.01P-1
General information				
Certification				
CE	Yes			
KC	Yes			
UL	UL E225616 Power conversion equipment			
Motor power				
Listed on nameplate	1.5 kW (2 HP)	2.2 kW (3 HP)	3 kW (- HP)	4 kW (5 HP)
Mains connection				
Mains input voltage	3x 380 VAC -15% to 500 VAC +10%			
Frequency	50 to 60 Hz ±5%			
Apparent power (at 500 VAC)	4.2 kVA	5.7 kVA	7.3 kVA	9.1 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	5 kA [1]			
Inrush current	Max. 10 A [2]			
Mains current				
At 380 VAC	6.5 A [3]	8.7 A [3]	11.1 A [3]	13.7 A [3]
At 500 VAC	4.9 A [3]	6.6 A [3]	8.4 A [3]	10.5 A [3]
Power dissipation at nominal load and nominal clock frequency	63 W	78 W	100 W	125 W
Integrated EMC filter	Yes [4]			
Line-conducted and radiated emissions				
With integrated filter				
Motor cable length in accordance with IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level from 4 to 12 kHz with 5 m cable			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	5 m [5]			
With add-on filter	8I0FT015.200-1			
With add-on filter				
Motor cable length in accordance with IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	C1 level from 2 to 16 kHz with 20 m cable			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level from 2 to 16 kHz with 50 m cable			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	50 m [5]			
Motor connection				
Nominal output current	4.1 A [6]	5.5 A [6]	7.1 A [6]	9.5 A [6]
Derating of continuous output current depending on ambient temperature				
At nominal clock frequency (4 kHz)	No derating (up to 50°C)			
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).			
Derating of the continuous output current depending on the installation elevation				
Starting at 1000 m above sea level	1%, per 100 m			
Max. transient current for 60 s	6.2 A	8.3 A	10.7 A	14.3 A
Max. transient current for 2 s	6.8 A	9 A	11.7 A	15.7 A
Output frequency range	0.1 to 599 Hz			
Nominal clock frequency	4 kHz			
Clock frequency				
Min.	2 kHz			
Max.	16 kHz			
Braking torque				
With braking resistor	Up to 170% of the rated motor torque			
Max. motor cable length				
Shielded cable	50 m			
Non-shielded cable	100 m			

Table 12: 8I74T400150.01P-1, 8I74T400220.01P-1, 8I74T400300.01P-1, 8I74T400400.01P-1 - Technical data

Model number	8I74T400150.01P-1	8I74T400220.01P-1	8I74T400300.01P-1	8I74T400400.01P-1
Closed-loop motor control profiles				
Induction motor	Flux vector control without an encoder Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) Pump/fan profile (quadratic curve Kn^2) Energy saving profile (especially for ventilation)			
Synchronous motor	Vector control without speed feedback			
Main protective functions on the inverter	Thermal protection against the power stage overheating Protection against: Short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the limit for rotary speed. Safety function for: Overvoltage and undervoltage on the mains supply, mains phase failure on a 3-phase supply			
Brake chopper				
Integrated dynamic brake transistors	Yes			
Min. resistance value (external)	54 Ω			36 Ω
24 VDC supply				
Input voltage	24 VDC (-15%/+20%)			
Current	Max. 1.1 A			
Available internal power supplies				
Output voltage 24 VDC	24 VDC (-15%/+20%)			
Output voltage 24 VDC				
Max. output current at 24 VDC	100 mA			
Output voltage 10 VDC	10 VDC (-0%/+10%)			
Output voltage 10 VDC				
Max. output current at 10 VDC	10 mA			
Interfaces				
Type	POWERLINK			
Digital inputs				
Quantity	6 [7)]			
Nominal voltage	24 VDC (max. 30 V)			
Input circuit	Source or sink			
Input circuit				
Current consumption	7 mA			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Sampling time	8 ms ±0.7 ms			
Input impedance	3.5 kΩ			
Digital input 5				
Max. input frequency	20 kHz			
Safe input - STO (Safe Torque Off)				
Quantity	1			
Nominal voltage	24 VDC			
Input impedance	1.5 kΩ			
Input impedance				
Current consumption	16 mA			
Switching threshold				
Low	<2 V			
High	>17 V			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Input circuit	Sink			
Sampling time	4 ms			
Analog inputs				
Quantity	3			
Electrical isolation				
Input - Input	No			
Input - ACOPOSinverter	Yes			
Input				
Voltage	0 to 10 V, ±10 V			
Current	0 to 20 mA (or 4 to 20 mA)			
Resolution	10-bit			
Sampling time	2 ms			
Input impedance				
Voltage	30 kΩ			
Current	250 Ω			
Digital outputs				
Quantity	1			
Nominal voltage	24 VDC			
Max. voltage	30 VDC			
Output circuit	Source or sink			
Sampling time	2 ms			
Max. current	100 mA			

Table 12: 8I74T400150.01P-1, 8I74T400220.01P-1, 8I74T400300.01P-1, 8I74T400400.01P-1 - Technical data

Model number	8I74T400150.01P-1	8I74T400220.01P-1	8I74T400300.01P-1	8I74T400400.01P-1
Relay outputs				
Quantity	2			
Nominal voltage	30 VDC / 250 VAC			
Design				
Relay 1	1 changeover contact			
Relay 2	1 normally open contact			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Response time (max.)	2 ms			
Analog outputs				
Quantity	1			
Output	0 to 10 V or 0 to 20 mA			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Max. load impedance				
Voltage	470 Ω			
Current	800 Ω			
Update time	2 ms			
Resolution	10-bit			
Operating conditions				
EN 60529 protection	IP20			
Relative humidity in accordance with IEC 60068-2-3	5 to 95%, non-condensing No dripping water			
Maximum installation elevation	Up to 2000 m [8]			
Max. pollution degree in accordance with IEC/EN 61800-5-1	2 (non-conductive pollution)			
Environmental conditions in accordance with IEC 60721-3-3	Class 3C3 and 3S3			
Operating position	Vertical installation ±10%			
Environmental conditions				
Temperature				
Operation	-10 to 50°C without derating 50 to 60°C with derating			
Storage	-25 to 70°C			
Max. vibration resistance	1 g_n 13 to 200 Hz EN/IEC 60068-2-6 1.5 mm peak to peak 3 to 13 Hz EN/IEC 60068-2-6			
Mechanical characteristics				
Dimensions [9]				
Width	45 mm	60 mm		
Height	317 mm			
Depth	245 mm			
Weight	1.705 kg	2.320 kg	2.122 kg	2.176 kg

Table 12: 8I74T400150.01P-1, 8I74T400220.01P-1, 8I74T400300.01P-1, 8I74T400400.01P-1 - Technical data

1) With line choke max. Isc 65 kA for 380/500 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10%)
3) Typical value for 4-pole motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter supplied with an integrated Category C2 EMC filter. This filter can be turned off.
5) The selection table for the filters specifies the maximum length of the shielded cables between motors and inverters. These maximum cable lengths only serve as a reference point since they depend on the capacity of the motors and the cables being used. The total length should be taken into consideration when motors are connected in parallel. These values apply at a rated clock frequency of 4 kHz.
6) These values apply at a rated clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the rated drive current. The motor current is not permitted to exceed this value.
7) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short circuit protection <50 Ω
8) Over 2000 m, load reduced by 1% per 100 m
9) With shield plate

1.4.8 8I74T400150.00-000, 8I74T400220.00-000, 8I74T400300.00-000, 8I74T400400.00-000

Model number	8I74T400150.00-000	8I74T400220.00-000	8I74T400300.00-000	8I74T400400.00-000
General information				
Certifications				
CE	Yes			
CSA	Yes			
Motor power				
Listed on nameplate	1.5 kW (2 HP)	2.2 kW (3 HP)	3 kW (- HP)	4 kW (5 HP)
Mains connection				
Mains input voltage	3x 380 VAC -15% to 500 VAC +10%			
Frequency	50 to 60 Hz ±5%			
Apparent power (at 500 VAC)	4.2 kVA	5.7 kVA	7.3 kVA	9.1 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	5 kA [1)]			
Inrush current	Max. 10 A [2)]			
Mains current				
At 380 VAC	6.5 A [3)]	8.7 A [3)]	11.1 A [3)]	13.7 A [3)]
At 500 VAC	4.9 A [3)]	6.6 A [3)]	8.4 A [3)]	10.5 A [3)]
Power dissipation at nominal load and nominal clock frequency	63 W	78 W	100 W	125 W
Integrated EMC filter	Yes [4)]			
Line-conducted and radiated emissions				
With integrated filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level of 4 to 12 kHz with 5 m cable			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	5 m [5)]			
With add-on filter	8I0FT015.200-1			
With add-on filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	C1 level of 2 to 16 kHz with 20 m cable			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level of 2 to 16 kHz with 50 m cable			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	50 m [5)]			
Motor connection				
Nominal output current	4.1 A [6)]	5.5 A [6)]	7.1 A [6)]	9.5 A [6)]
Derating of continuous output current depending on ambient temperature				
At nominal clock frequency (4 kHz)	No derating (up to 50°C)			
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).			
Derating of continuous output current depending on installation elevation				
Starting at 1000 m above sea level	1%, per 100 m			
Max. transient current for 60 s	6.2 A	8.3 A	10.7 A	14.3 A
Max. transient current for 2 s	6.8 A	9 A	11.7 A	15.7 A
Output frequency range	0.1 to 599 Hz			
Nominal clock frequency	4 kHz			
Clock frequency				
Min.	2 kHz			
Max.	16 kHz			
Braking torque				
With braking resistor	Up to 170% of the rated motor torque			
Max. motor cable length				
Shielded cable	50 m			
Non-shielded cable	100 m			

Table 13: 8I74T400150.00-000, 8I74T400220.00-000, 8I74T400300.00-000, 8I74T400400.00-000 - Technical data

Model number	8I74T400150.00-000	8I74T400220.00-000	8I74T400300.00-000	8I74T400400.00-000
Closed-loop motor control profiles				
Induction motor	Vector control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile 2. With V/f characteristic curve for quadratically increasing torque → Energy-saving profile e.g. for fans and pumps Slip control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile 2. With V/f characteristic curve for constant torque (6 f ranges) → Profile for individual special applications 3. With V/f characteristic curve for quadratically increasing torque → Energy-saving profile e.g. for fans and pumps			
Synchronous motor	Vector control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile			
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply			
Brake chopper				
Integrated dynamic brake transistors	Yes			
Min. resistance value (external)	54 Ω			36 Ω
24 VDC power supply				
Input voltage	24 VDC (-15%/+20%)			
Current	Max. 1.1 A			
Available internal power supplies				
Output voltage 24 VDC	24 VDC (-15%/+20%)			
Output voltage 24 VDC				
Max. output current at 24 VDC	100 mA			
Output voltage 10 VDC	10 VDC (-0%/+10%)			
Output voltage 10 VDC				
Max. output current at 10 VDC	10 mA			
Interfaces				
POWERLINK				
Type	Type 2 [7)]			
Digital inputs				
Quantity	6 [8)]			
Nominal voltage	24 VDC (max. 30 V)			
Input circuit	Source or sink			
Input circuit				
Current consumption	7 mA			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Sampling time	8 ms ±0.7 ms			
Input impedance	3.5 kΩ			
Digital input 5				
Max. input frequency	20 kHz			
Safe input - STO (Safe Torque Off)				
Quantity	1			
Nominal voltage	24 VDC			
Input impedance	1.5 kΩ			
Input impedance				
Current consumption	16 mA			
Switching threshold				
Low	<2 V			
High	>17 V			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Input circuit	Sink			
Sampling time	4 ms			
Analog inputs				
Quantity	3			
Electrical isolation				
Input - Input	No			
Input - ACOPOSinverter	Yes			
Input				
Voltage	0 to 10 V, ±10 V			
Current	0 to 20 mA (or 4 to 20 mA)			
Resolution	10-bit			
Sampling time	2 ms			

Table 13: 8I74T400150.00-000, 8I74T400220.00-000, 8I74T400300.00-000, 8I74T400400.00-000 - Technical data

Model number	8I74T400150.00-000	8I74T400220.00-000	8I74T400300.00-000	8I74T400400.00-000
Input impedance				
Voltage	30 kΩ			
Current	250 Ω			
Digital outputs				
Quantity	1			
Nominal voltage	24 VDC			
Max. voltage	30 VDC			
Output circuit	Source or sink			
Sampling time	2 ms			
Max. current	100 mA			
Relay outputs				
Quantity	2			
Nominal voltage	30 VDC / 250 VAC			
Switching capacity	R1, with resistive load (cos phi = 1): 3 A at 250 VAC, R1, with resistive load (cos phi = 1): 4 A at 30 VDC, R1, R2, with inductive load (cos = 0.4 and L/R = 7 ms): 2 A at 250 VAC, R1, R2, with inductive load (cos = 0.4 and L/R = 7 ms): 2 A at 30 VDC, R2, with resistive load (cos phi = 1): 5 A at 250 VAC, R2, with resistive load (cos phi = 1): 5 A at 30 VDC			
Design				
Relay 1	1 changeover contact			
Relay 2	1 normally open contact			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Response time (max.)	2 ms			
Analog outputs				
Quantity	1			
Output	0 to 10 V or 0 to 20 mA			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Max. load impedance				
Voltage	470 Ω			
Current	800 Ω			
Update time	2 ms			
Resolution	10-bit			
Operating conditions				
Degree of protection per EN 60529	IP20			
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water			
Maximum installation elevation	Up to 2000 m 9)			
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)			
Environmental conditions per IEC 60721-3-3	Class 3C3 and 3S3			
Operating position	Vertical mounting orientation ±10%			
Environmental conditions				
Temperature				
Operation	-10 to 50°C without derating 50 to 60°C with derating			
Storage	-25 to 70°C			
Max. vibration resistance	1 g_n 13 to 200 Hz EN/IEC 60068-2-6 1.5 mm peak to peak 3 to 13 Hz EN/IEC 60068-2-6			
Mechanical properties				
Dimensions 10)				
Width	45 mm	60 mm		
Height	317 mm			
Depth	245 mm			
Weight	1.705 kg	2.320 kg	2.122 kg	2.176 kg

Table 13: 8I74T400150.00-000, 8I74T400220.00-000, 8I74T400300.00-000, 8I74T400400.00-000 - Technical data

1) With mains choke max. Isc 65 kA for 380/500 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) The selection table for the filters specifies maximum length for the shielded cables between motors and inverters. These maximum cable lengths only serve as a reference point since they depend on the capacity of the motors and the cables being used. The total length must be taken into account when motors are connected in parallel. These values apply at a nominal clock frequency of 4 kHz.
6) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
7) See Automation Help under "Communication / POWERLINK / General information / Hardware - IF/LS" for more information.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 2000 m, load reduced by 1% per 100 m
10) With shield plate

1.4.9 8I74T400550.01P-1, 8I74T400750.01P-1, 8I74T401100.01P-1, 8I74T401500.01P-1

Model number	8I74T400550.01P-1	8I74T400750.01P-1	8I74T401100.01P-1	8I74T401500.01P-1
General information				
Certification				
CE	Yes			
KC	Yes			
UL	UL E225616 Power conversion equipment			
Motor power				
Listed on nameplate	5.5 kW (7 1/2 HP)	7.5 kW (10 HP)	11 kW (15 HP)	15 kW (20 HP)
Mains connection				
Mains input voltage	3x 380 VAC -15% to 500 VAC +10%			
Frequency	50 to 60 Hz ±5%			
Apparent power (at 500 VAC)	12.6 kVA	16.2 kVA	22.2 kVA	28.8 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	22 kA [1]			
Inrush current	Max. 27.6 A [2]		Max. 36.7 A [2]	
Mains current				
At 380 VAC	20.7 A [3]	26.5 A [3]	36.6 A [3]	47.3 A [3]
At 500 VAC	14.5 A [3]	18.7 A [3]	25.6 A [3]	33.3 A [3]
Power dissipation at nominal load and nominal clock frequency	233 W	263 W	403 W	480 W
Integrated EMC filter	Yes [4]			
Line-conducted and radiated emissions				
With integrated filter				
Motor cable length in accordance with IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level from 4 to 12 kHz with 5 m cable			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	5 m [5]			
With add-on filter	8I0FT047.200-1		8I0FT049.200-1	
With add-on filter				
Motor cable length in accordance with IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	C1 level from 2 to 16 kHz with 10 m cable		C1 level from 2 to 16 kHz with 5 m cable C1 level from 2 to 8 kHz with 10 m cable C1 level from 2 to 4 kHz with 20 m cable	
Motor cable length in accordance with IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level from 2 to 16 kHz with 50 m cable C2 level from 2 to 12 kHz with 100 m cable			
Motor cable length in accordance with IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	50 m [5]			
Motor connection				
Nominal output current	14.3 A [6]	17 A [6]	27.7 A [6]	33 A [6]
Derating of continuous output current depending on ambient temperature				
At nominal clock frequency (4 kHz)	No derating (up to 50°C)			
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).			
Derating of the continuous output current depending on the installation elevation				
Starting at 1000 m above sea level	1%, per 100 m			
Max. transient current for 60 s	21.5 A	25.5 A	41.6 A	49.5 A
Max. transient current for 2 s	23.6 A	28 A	45.7 A	54.5 A
Output frequency range	0.1 to 599 Hz			
Nominal clock frequency	4 kHz			
Clock frequency				
Min.	2 kHz			
Max.	16 kHz			
Braking torque				
With braking resistor	Up to 170% of the rated motor torque			
Max. motor cable length				
Shielded cable	50 m			
Non-shielded cable	100 m			

Table 14: 8I74T400550.01P-1, 8I74T400750.01P-1, 8I74T401100.01P-1, 8I74T401500.01P-1 - Technical data

Model number	8I74T400550.01P-1	8I74T400750.01P-1	8I74T401100.01P-1	8I74T401500.01P-1
Closed-loop motor control profiles				
Induction motor	Flux vector control without an encoder Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) Pump/fan profile (quadratic curve Kn^2) Energy saving profile (especially for ventilation)			
Synchronous motor	Vector control without speed feedback			
Main protective functions on the invert-er	Thermal protection against the power stage overheating Protection against: Short circuits between motor phases, overcurrent between output phas-es and ground, overvoltages on the DC bus, exceeding the limit for rotary speed. Safety function for: Overvoltage and undervoltage on the mains supply, mains phase failure on a 3-phase supply			
Brake chopper				
Integrated dynamic brake transistors	Yes			
Min. resistance value (external)	27 Ω		16 Ω	
24 VDC supply				
Input voltage	24 VDC (-15%/+20%)			
Current	Max. 1.1 A			
Available internal power supplies				
Output voltage 24 VDC	24 VDC (-15%/+20%)			
Output voltage 24 VDC				
Max. output current at 24 VDC	100 mA			
Output voltage 10 VDC	10 VDC (-0%/+10%)			
Output voltage 10 VDC				
Max. output current at 10 VDC	10 mA			
Interfaces				
Type	POWERLINK			
Digital inputs				
Quantity	6 [7)]			
Nominal voltage	24 VDC (max. 30 V)			
Input circuit	Source or sink			
Input circuit				
Current consumption	7 mA			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Sampling time	8 ms ±0.7 ms			
Input impedance	3.5 kΩ			
Digital input 5				
Max. input frequency	20 kHz			
Safe input - STO (Safe Torque Off)				
Quantity	1			
Nominal voltage	24 VDC			
Input impedance	1.5 kΩ			
Input impedance				
Current consumption	16 mA			
Switching threshold				
Low	<2 V			
High	>17 V			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Input circuit	Sink			
Sampling time	4 ms			
Analog inputs				
Quantity	3			
Electrical isolation				
Input - Input	No			
Input - ACOPOSinverter	Yes			
Input				
Voltage	0 to 10 V, ±10 V			
Current	0 to 20 mA (or 4 to 20 mA)			
Resolution	10-bit			
Sampling time	2 ms			
Input impedance				
Voltage	30 kΩ			
Current	250 Ω			
Digital outputs				
Quantity	1			
Nominal voltage	24 VDC			
Max. voltage	30 VDC			
Output circuit	Source or sink			
Sampling time	2 ms			
Max. current	100 mA			

Table 14: 8I74T400550.01P-1, 8I74T400750.01P-1, 8I74T401100.01P-1, 8I74T401500.01P-1 - Technical data

Model number	8I74T400550.01P-1	8I74T400750.01P-1	8I74T401100.01P-1	8I74T401500.01P-1
Relay outputs				
Quantity	2			
Nominal voltage	30 VDC / 250 VAC			
Design				
Relay 1	1 changeover contact			
Relay 2	1 normally open contact			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Response time (max.)	2 ms			
Analog outputs				
Quantity	1			
Output	0 to 10 V or 0 to 20 mA			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Max. load impedance				
Voltage	470 Ω			
Current	800 Ω			
Update time	2 ms			
Resolution	10-bit			
Operating conditions				
EN 60529 protection	IP20			
Relative humidity in accordance with IEC 60068-2-3	5 to 95%, non-condensing No dripping water			
Maximum installation elevation	Up to 2000 m 8)			
Max. pollution degree in accordance with IEC/EN 61800-5-1	2 (non-conductive pollution)			
Environmental conditions in accordance with IEC 60721-3-3	Class 3C3 and 3S3			
Operating position	Vertical installation ±10%			
Environmental conditions				
Temperature				
Operation	-10 to 50°C without derating 50 to 60°C with derating			
Storage	-25 to 70°C			
Max. vibration resistance	1 g_n 13 to 200 Hz EN/IEC 60068-2-6 1.5 mm peak to peak 3 to 13 Hz EN/IEC 60068-2-6			
Mechanical characteristics				
Dimensions 9)				
Width	150 mm		180 mm	
Height	308 mm		404 mm	
Height without shield plate	232 mm		330 mm	
Depth	232 mm			
Weight	4.20 kg		6.750 kg	

Table 14: 8I74T400550.01P-1, 8I74T400750.01P-1, 8I74T401100.01P-1, 8I74T401500.01P-1 - Technical data

1) With line choke max. Isc 65 kA for 380/500 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10%)
3) Typical value for 4-pole motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter supplied with an integrated Category C2 EMC filter. This filter can be turned off.
5) The selection table for the filters specifies the maximum length of the shielded cables between motors and inverters. These maximum cable lengths only serve as a reference point since they depend on the capacity of the motors and the cables being used. The total length should be taken into consideration when motors are connected in parallel. These values apply at a rated clock frequency of 4 kHz.
6) These values apply at a rated clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the rated drive current. The motor current is not permitted to exceed this value.
7) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short circuit protection <50 Ω
8) Over 2000 m, load reduced by 1% per 100 m
9) With shield plate

1.4.10 8I74T400550.00-000, 8I74T400750.00-000, 8I74T401100.00-000, 8I74T401500.00-000

Model number	8I74T400550.00-000	8I74T400750.00-000	8I74T401100.00-000	8I74T401500.00-000
General information				
Certifications				
CE	Yes			
CSA	Yes			
Motor power				
Listed on nameplate	5.5 kW (7 1/2 HP)	7.5 kW (10 HP)	11 kW (15 HP)	15 kW (20 HP)
Mains connection				
Mains input voltage	3x 380 VAC -15% to 500 VAC +10%			
Frequency	50 to 60 Hz ±5%			
Apparent power (at 500 VAC)	12.6 kVA	16.2 kVA	22.2 kVA	28.8 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	22 kA [1]			
Inrush current	Max. 27.6 A [2]		Max. 36.7 A [2]	
Mains current				
At 380 VAC	20.7 A [3]	26.5 A [3]	36.6 A [3]	47.3 A [3]
At 500 VAC	14.5 A [3]	18.7 A [3]	25.6 A [3]	33.3 A [3]
Power dissipation at nominal load and nominal clock frequency	233 W	263 W	403 W	480 W
Integrated EMC filter	Yes [4]			
Line-conducted and radiated emissions				
With integrated filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level of 4 to 12 kHz with 5 m cable			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	5 m [5]			
With add-on filter	8I0FT047.200-1		8I0FT049.200-1	
With add-on filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	C1 level of 2 to 16 kHz with 10 m cable		C1 level of 2 to 16 kHz with 5 m cable C1 level of 2 to 8 kHz with 10 m cable C1 level of 2 to 4 kHz with 20 m cable	
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	C2 level of 2 to 16 kHz with 50 m cable C2 level of 2 to 12 kHz with 100 m cable			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	50 m [5]			
Motor connection				
Nominal output current	14.3 A [6]	17 A [6]	27.7 A [6]	33 A [6]
Derating of continuous output current depending on ambient temperature				
At nominal clock frequency (4 kHz)	No derating (up to 50°C)			
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).			
Derating of continuous output current depending on installation elevation				
Starting at 1000 m above sea level	1%, per 100 m			
Max. transient current for 60 s	21.5 A	25.5 A	41.6 A	49.5 A
Max. transient current for 2 s	23.6 A	28 A	45.7 A	54.5 A
Output frequency range	0.1 to 599 Hz			
Nominal clock frequency	4 kHz			
Clock frequency				
Min.	2 kHz			
Max.	16 kHz			
Braking torque				
With braking resistor	Up to 170% of the rated motor torque			
Max. motor cable length				
Shielded cable	50 m			
Non-shielded cable	100 m			

Table 15: 8I74T400550.00-000, 8I74T400750.00-000, 8I74T401100.00-000, 8I74T401500.00-000 - Technical data

Model number	8I74T400550.00-000	8I74T400750.00-000	8I74T401100.00-000	8I74T401500.00-000
Closed-loop motor control profiles				
Induction motor	Vector control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile 2. With V/f characteristic curve for quadratically increasing torque → Energy-saving profile e.g. for fans and pumps Slip control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile 2. With V/f characteristic curve for constant torque (6 f ranges) → Profile for individual special applications 3. With V/f characteristic curve for quadratically increasing torque → Energy-saving profile e.g. for fans and pumps			
Synchronous motor	Vector control without speed feedback: 1. With V/f characteristic curve for constant torque → Default profile			
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply			
Brake chopper				
Integrated dynamic brake transistors	Yes			
Min. resistance value (external)	27 Ω		16 Ω	
24 VDC power supply				
Input voltage	24 VDC (-15%/+20%)			
Current	Max. 1.1 A			
Available internal power supplies				
Output voltage 24 VDC	24 VDC (-15%/+20%)			
Output voltage 24 VDC				
Max. output current at 24 VDC	100 mA			
Output voltage 10 VDC	10 VDC (-0%/+10%)			
Output voltage 10 VDC				
Max. output current at 10 VDC	10 mA			
Interfaces				
POWERLINK				
Type	Type 2 [7)]			
Digital inputs				
Quantity	6 [8)]			
Nominal voltage	24 VDC (max. 30 V)			
Input circuit	Source or sink			
Input circuit				
Current consumption	7 mA			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Sampling time	8 ms ±0.7 ms			
Input impedance	3.5 kΩ			
Digital input 5				
Max. input frequency	20 kHz			
Safe input - STO (Safe Torque Off)				
Quantity	1			
Nominal voltage	24 VDC			
Input impedance	1.5 kΩ			
Input impedance				
Current consumption	16 mA			
Switching threshold				
Low	<2 V			
High	>17 V			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Input circuit	Sink			
Sampling time	4 ms			
Analog inputs				
Quantity	3			
Electrical isolation				
Input - Input	No			
Input - ACOPOSinverter	Yes			
Input				
Voltage	0 to 10 V, ±10 V			
Current	0 to 20 mA (or 4 to 20 mA)			
Resolution	10-bit			
Sampling time	2 ms			

Table 15: 8I74T400550.00-000, 8I74T400750.00-000, 8I74T401100.00-000, 8I74T401500.00-000 - Technical data

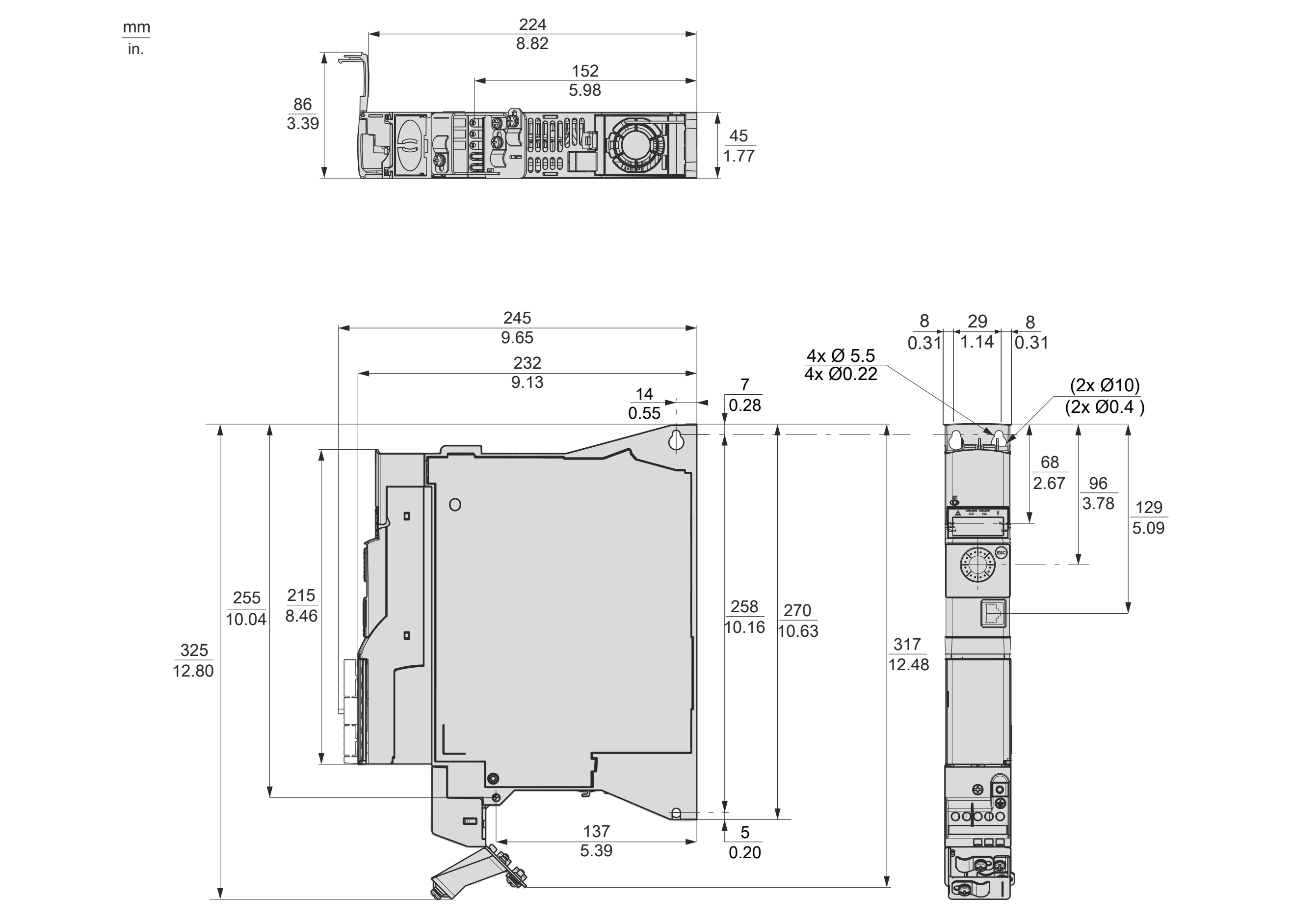
Model number	8I74T400550.00-000	8I74T400750.00-000	8I74T401100.00-000	8I74T401500.00-000
Input impedance				
Voltage	30 kΩ			
Current	250 Ω			
Digital outputs				
Quantity	1			
Nominal voltage	24 VDC			
Max. voltage	30 VDC			
Output circuit	Source or sink			
Sampling time	2 ms			
Max. current	100 mA			
Relay outputs				
Quantity	2			
Nominal voltage	30 VDC / 250 VAC			
Switching capacity	R1, with resistive load (cos phi = 1): 3 A at 250 VAC, R1, with resistive load (cos phi = 1): 4 A at 30 VDC, R1, R2, with inductive load (cos = 0.4 and L/R = 7 ms): 2 A at 250 VAC, R1, R2, with inductive load (cos = 0.4 and L/R = 7 ms): 2 A at 30 VDC, R2, with resistive load (cos phi = 1): 5 A at 250 VAC, R2, with resistive load (cos phi = 1): 5 A at 30 VDC			
Design				
Relay 1	1 changeover contact			
Relay 2	1 normally open contact			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Response time (max.)	2 ms			
Analog outputs				
Quantity	1			
Output	0 to 10 V or 0 to 20 mA			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Max. load impedance				
Voltage	470 Ω			
Current	800 Ω			
Update time	2 ms			
Resolution	10-bit			
Operating conditions				
Degree of protection per EN 60529	IP20			
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water			
Maximum installation elevation	Up to 2000 m [9]			
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)			
Environmental conditions per IEC 60721-3-3	Class 3C3 and 3S3			
Operating position	Vertical mounting orientation ±10%			
Environmental conditions				
Temperature				
Operation	-10 to 50°C without derating 50 to 60°C with derating			
Storage	-25 to 70°C			
Max. vibration resistance	1 g_n 13 to 200 Hz EN/IEC 60068-2-6 1.5 mm peak to peak 3 to 13 Hz EN/IEC 60068-2-6			
Mechanical properties				
Dimensions [10]				
Width	150 mm		180 mm	
Height	308 mm		404 mm	
Height without shield plate	232 mm		330 mm	
Depth	232 mm			
Weight	4.20 kg		6.750 kg	

Table 15: 8I74T400550.00-000, 8I74T400750.00-000, 8I74T401100.00-000, 8I74T401500.00-000 - Technical data

1) With mains choke max. Isc 65 kA for 380/500 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) The selection table for the filters specifies maximum length for the shielded cables between motors and inverters. These maximum cable lengths only serve as a reference point since they depend on the capacity of the motors and the cables being used. The total length must be taken into account when motors are connected in parallel. These values apply at a nominal clock frequency of 4 kHz.
6) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
7) See Automation Help under "Communication / POWERLINK / General information / Hardware - IF/LS" for more information.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 2000 m, load reduced by 1% per 100 m
10) With shield plate

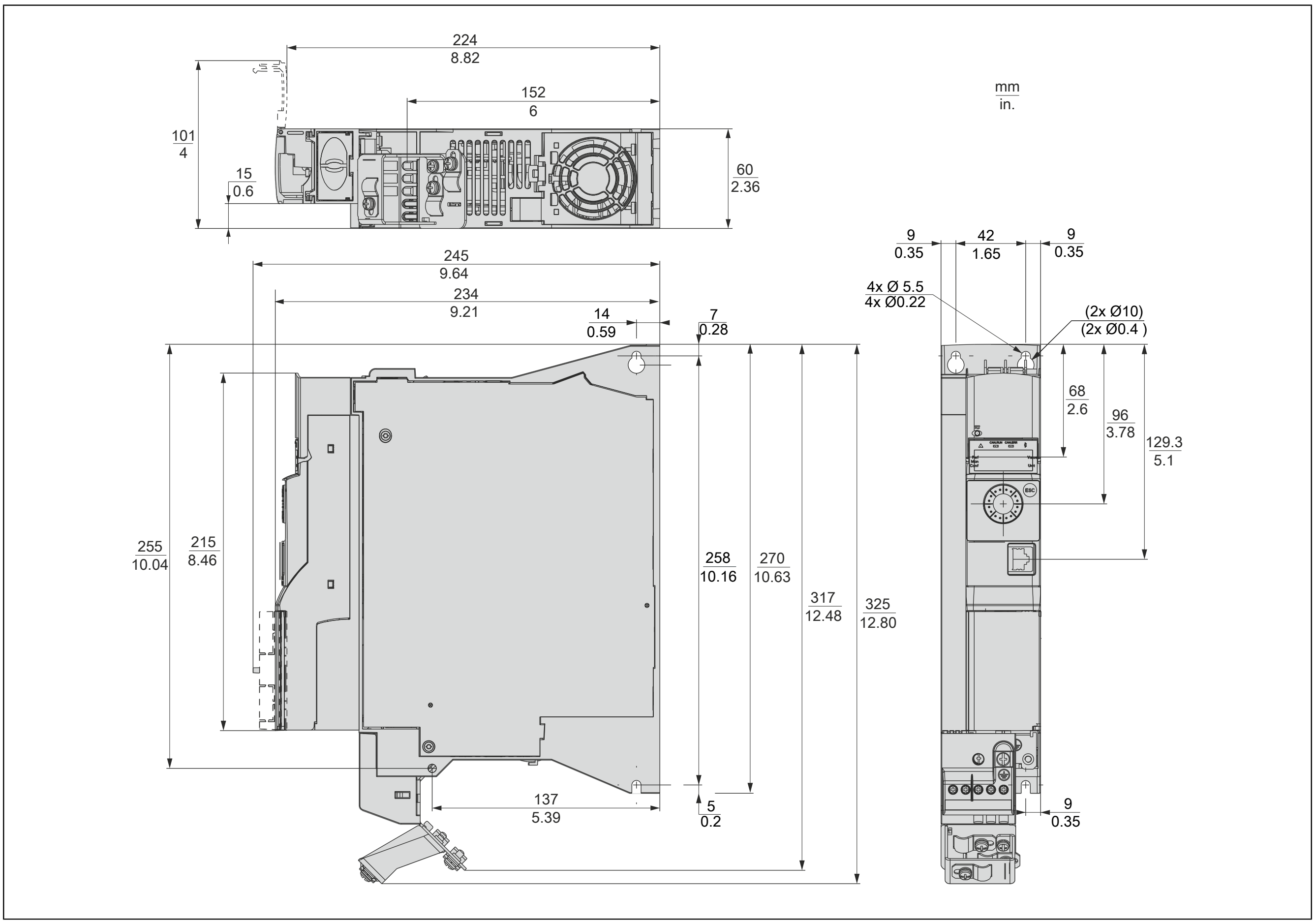
1.5 Mechanical Data

Size A - Dimensions and weights



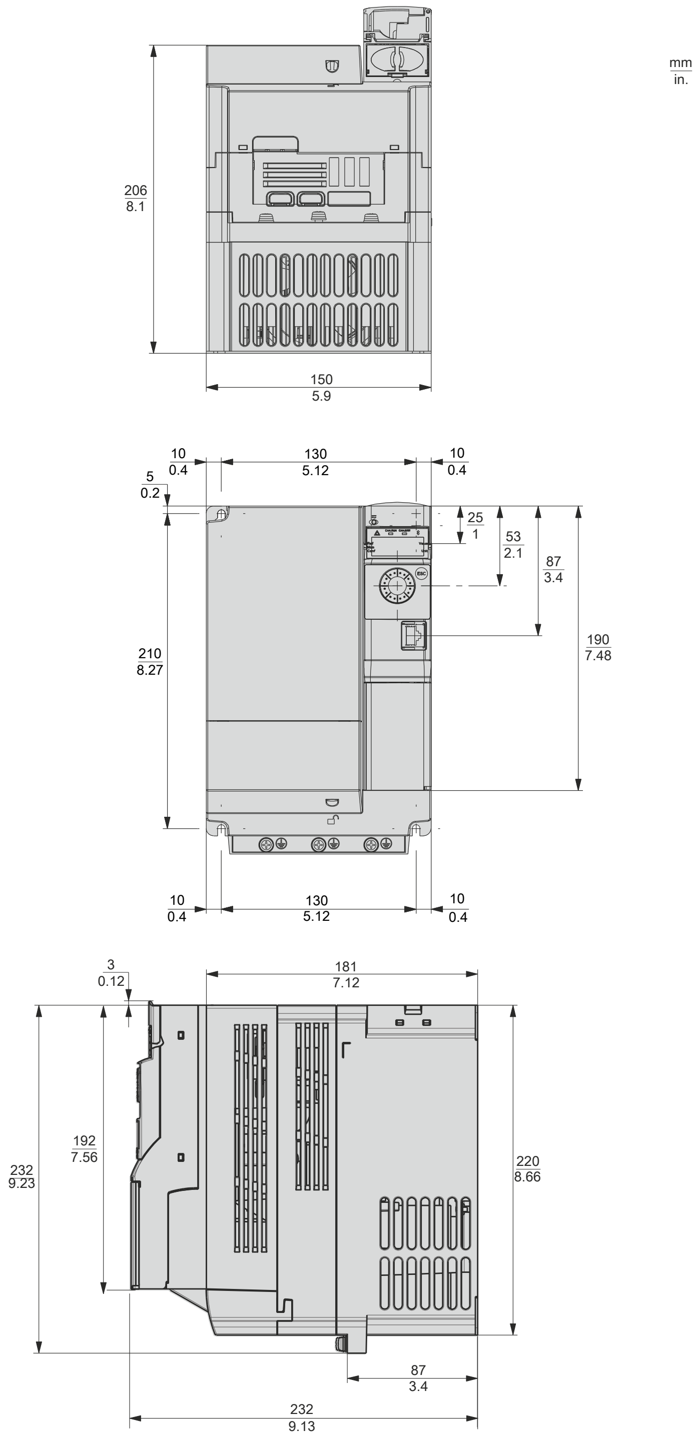
Reference	Weight (kg)	Weight (lb)
8I74S200018.01P-1 , 8I74S200018.00-000	1.590	3.50
8I74S200037.01P-1, 8I74S200037.00-000, 8I74S200055.01P-1, 8I74S200055.00-000, 8I74S200075.01P-1, 8I74S200075.00-000	1.646	3.63
8I74T400037.01P-1, 8I74T400037.00-000	1.618	3.57
8I74T400055.01P-1, 8I74T400055.00-000, 8I74T400075.01P-1, 8I74T400075.00-000	1.715	3.78
8I74T400110.01P-1, 8I74T400110.00-000, 8I74T400150.01P-1, 8I74T400150.00-000	1.705	3.76

Size B - Dimensions and weights



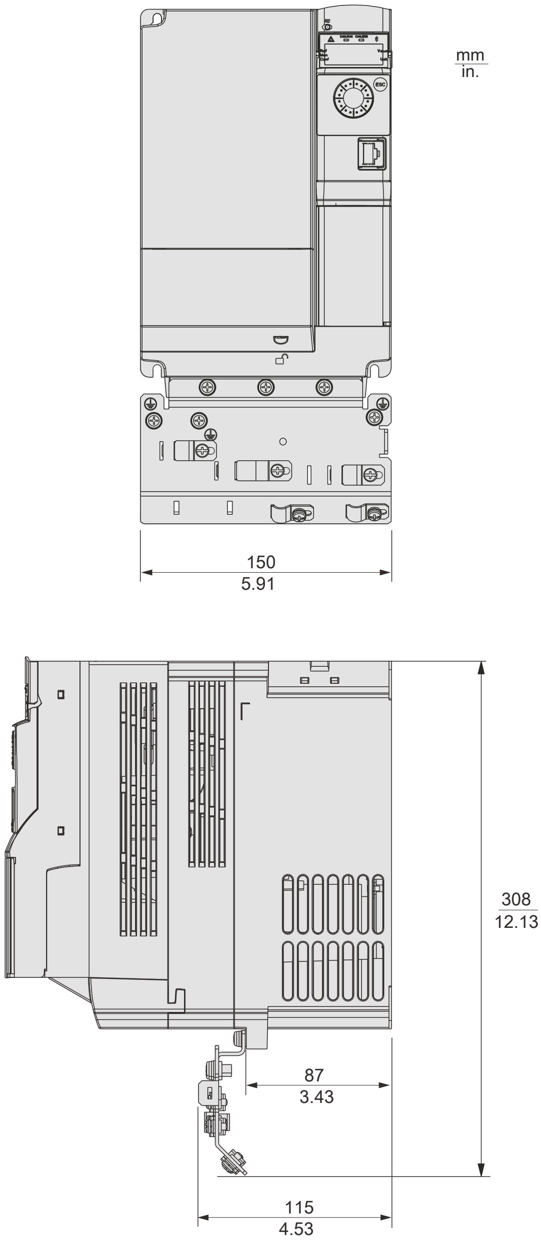
Reference	Weight (kg)	Weight (lb)
8I74S200110.01P-1, 8I74S200110.00-000, 8I74S200150.01P-1, 8I74S200150.00-000	1.952	4.30
8I74S200220.01P-1, 8I74S200220.00-000	2.066	4.55
8I74T400220.01P-1, 8I74T400220.00-000	2.320	5.11
8I74T400300.01P-1, 8I74T400300.00-000	2.122	4.68
8I74T400400.01P-1, 8I74T400400.00-000	2.176	4.80

Size C - Dimensions and weights



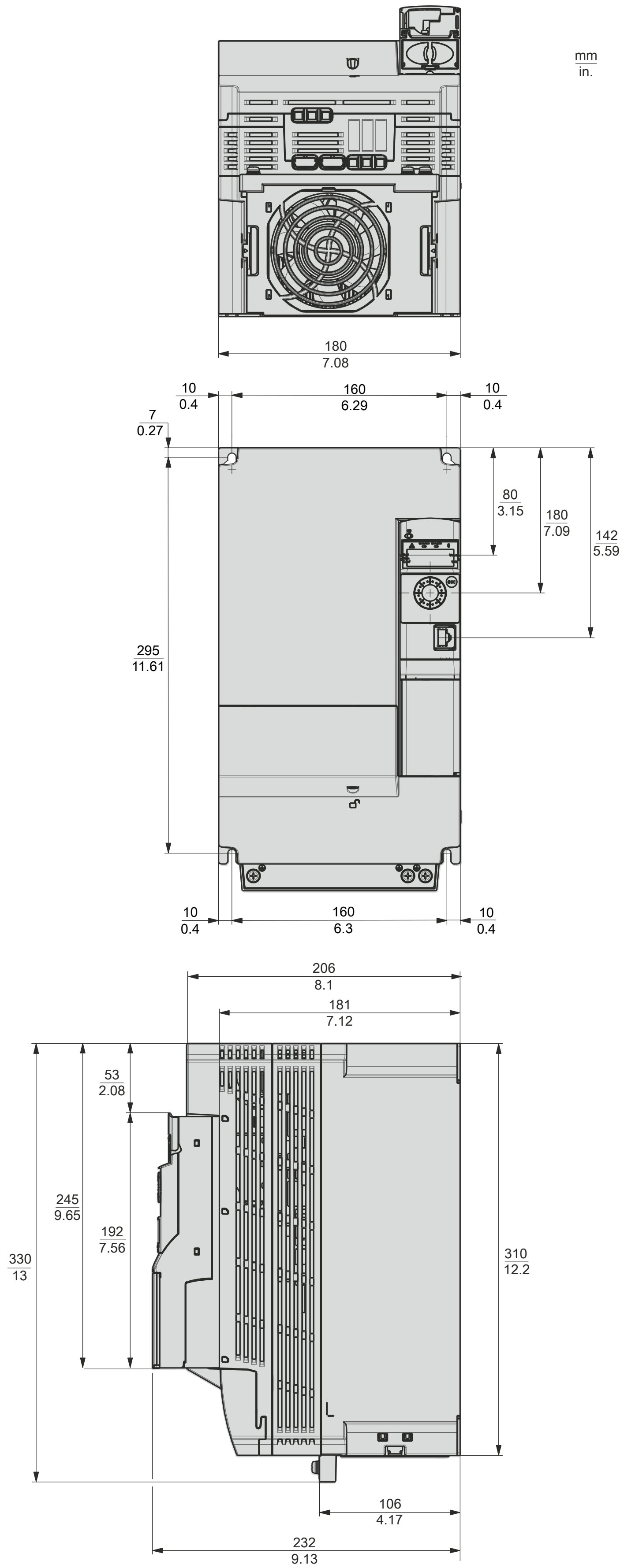
Reference	Weight (kg)	Weight (lb)
8I74T400550.01P-1, 8I74T400550.00-000, 8I74T400750.01P-1, 8I74T400750.00-000	4.20	9.26

Size C with EMC plate - Dimensions and weights



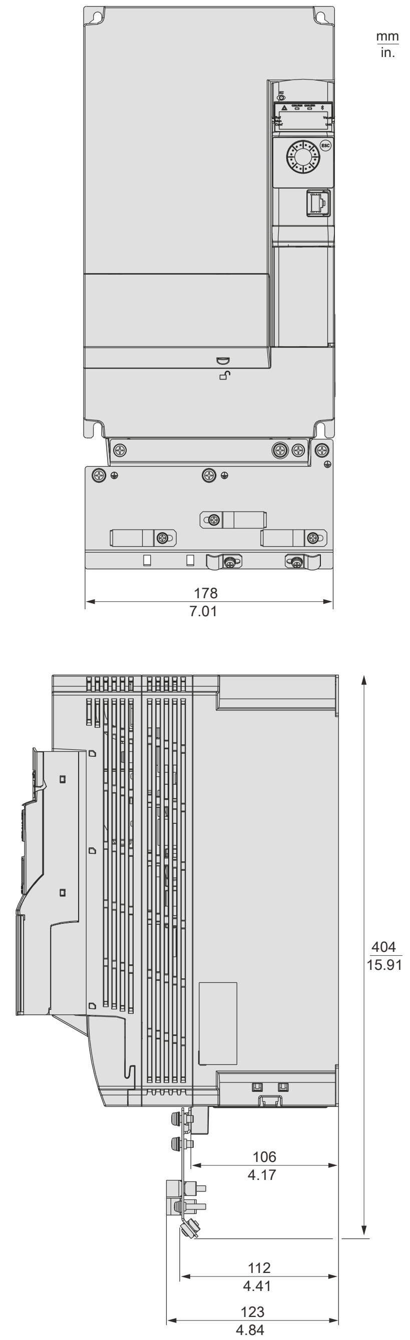
Reference	Weight (kg)	Weight (lb)
8I74T400550.01P-1, 8I74T400550.00-000, 8I74T400750.01P-1, 8I74T400750.00-000	4.41	9.72

Size D - Dimensions and weights



Reference	Weight (kg)	Weight (lb)
8I74T401100.01P-1, 8I74T401100.00-000, 8I74T401500.01P-1, 8I74T401500.00-000	6.75	14.88

Size D with EMC plate - Dimensions and weights

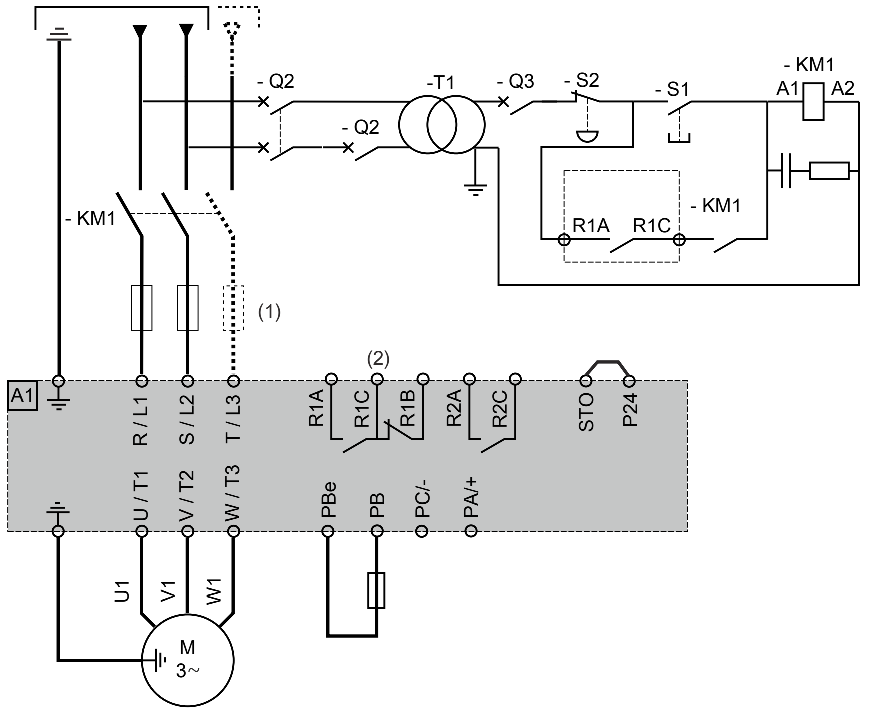


Reference	Weight (kg)	Weight (lb)
8I74T401100.01P-1, 8I74T401100.00-000, 8I74T401500.01P-1, 8I74T401500.00-000	7.00	15.40

1.6 Connection diagrams

1.6.1 1- or 3-phase power supply – Connection diagram with input contactor

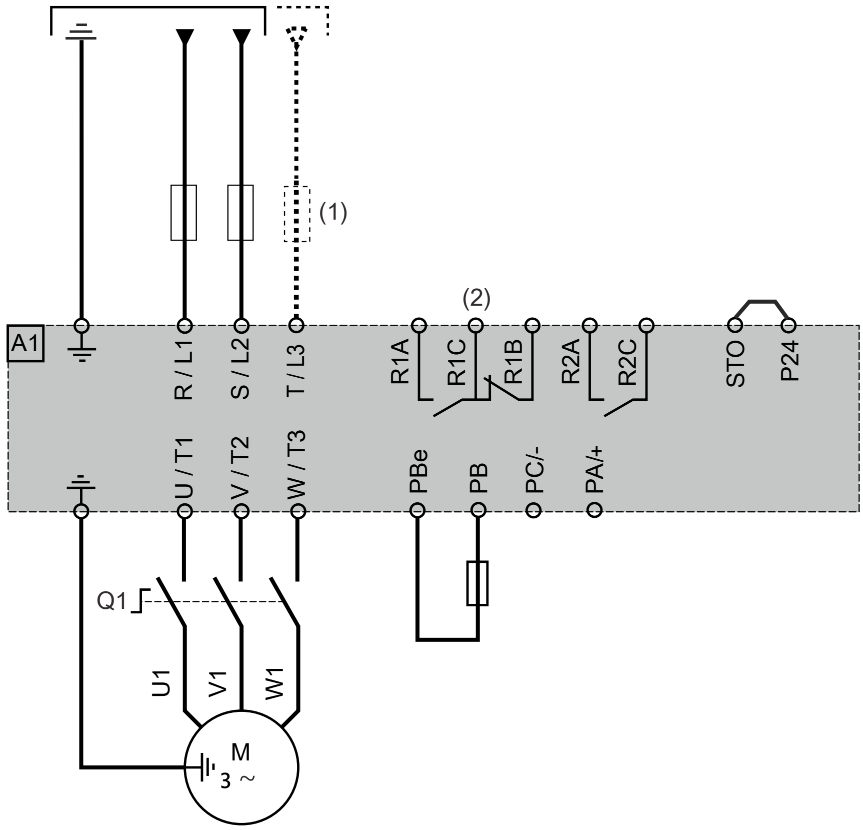
Connection diagrams conforming to standards EN 954-1 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1.



(1) Line choke (if used)
(2) Fault relay contacts, for remote signaling of drive status

1.6.2 1- or 3-phase power supply – Connection diagram with switch disconnecter

Connection diagrams conforming to standards EN 954-1 category 1 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1.



(1) Line choke (if used)

(2) Fault relay contacts, for remote signaling of drive status

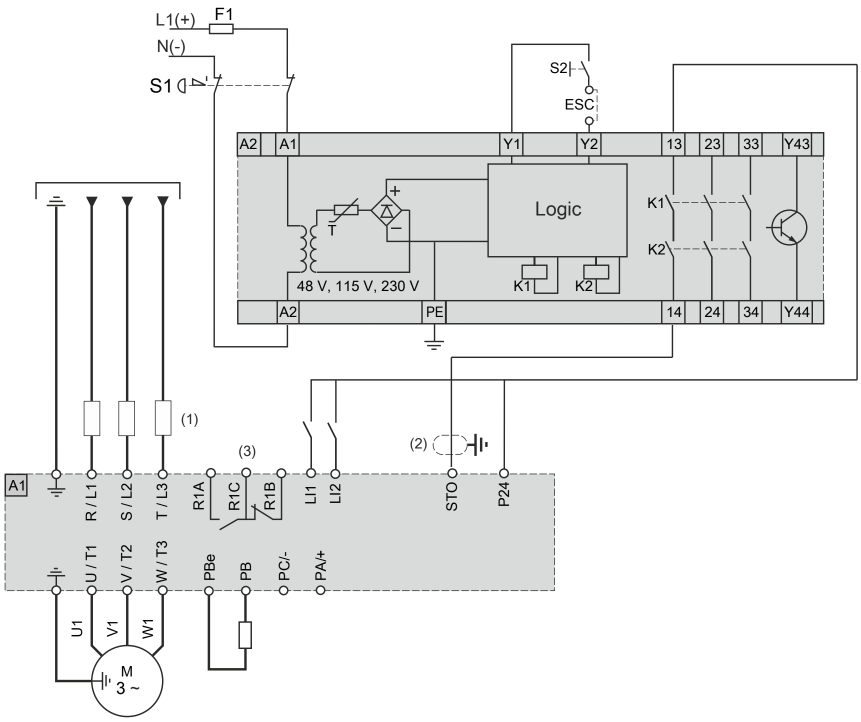
1.6.3 Connection diagram with safety relay

Connection diagrams conforming to standards EN 954-1 category 3 and IEC/EN 61508 capacity SIL2, stopping category 0 in accordance with standard IEC/EN 60204-1.

The following connection diagram is suitable for use with machines with a short freewheel stop time (machines with low inertia or high resistive torque).

When the emergency stop is activated, the drive power supply is cut immediately and the motor stops in freewheel, according to category 0 of standard IEC/EN 60204-1.

A contact on the Preventa XPS AC module must be inserted in the brake control circuit to engage the module safely when the STO (safe torque off) safety function is activated.



(1) Line choke (if used)
(2) The shielding must be grounded!
(3) Fault relay contacts, for remote signaling of drive status

The STO safety function integrated into the product can be used to implement an emergency stop (IEC 60204-1) for category 0 stops. With an approved emergency stop module, it is also possible to implement category 1 stops.

STO function

The STO safety function is activated via two redundant inputs (A1 and A2 of the safety relay). The circuits of the two inputs must be separate so that two channels are always available. The switching process must occur simultaneously for both inputs (offset <1 s).

The power stage is disabled and an error message is generated. The motor can no longer generate torque and coasts down without braking. The error message must be reset with a "Fault reset" before restarting.

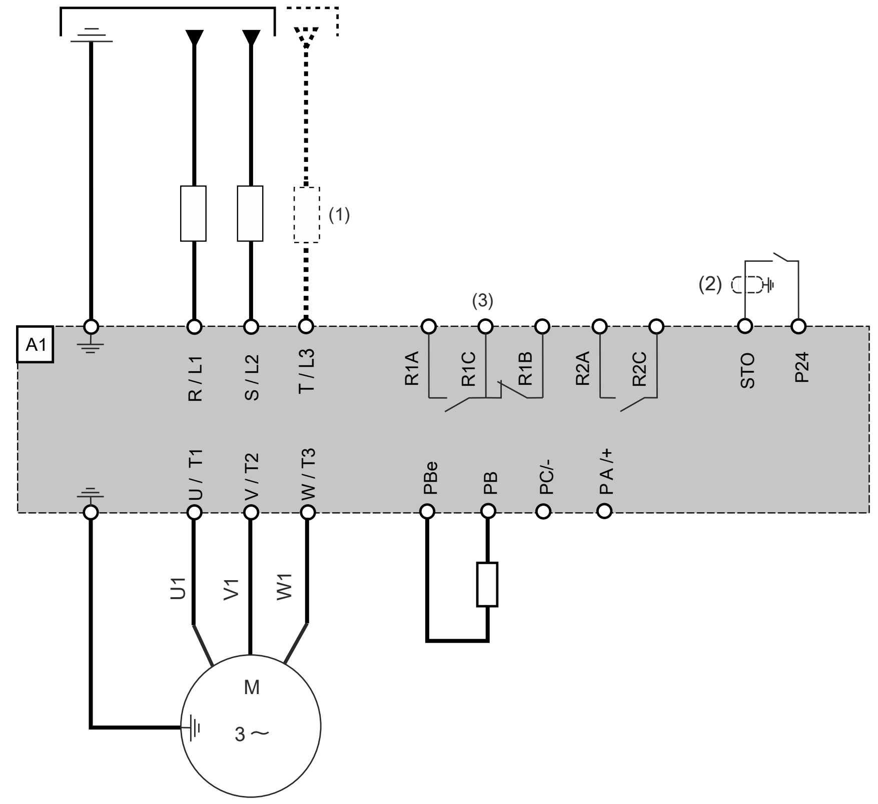
The power stage is disabled and an error message is generated if only one of the two inputs is switched off or if the time offset is too great. This error message can only be reset by switching off the product.

1.6.4 Connection diagram without safety relay

Connection diagrams conforming to standards EN 954-1 category 2 and IEC/EN 61508 capacity SIL1, stopping category 0 in accordance with standard IEC/EN 60204-1.

The following connection diagram is suitable for use with machines with a short freewheel stop time (machines with low inertia or high resistive torque).

When the emergency stop is activated, the drive power supply is cut immediately and the motor stops in freewheel, according to category 0 of standard IEC/EN 60204-1.



(1) Line choke (if used)
(2) The shielding must be grounded!
(3) Fault relay contacts, for remote signaling of drive status

The STO safety function integrated into the product can be used to implement an emergency stop (IEC 60204-1) for category 0 stops.

2 Installation

2.1 Drive installation

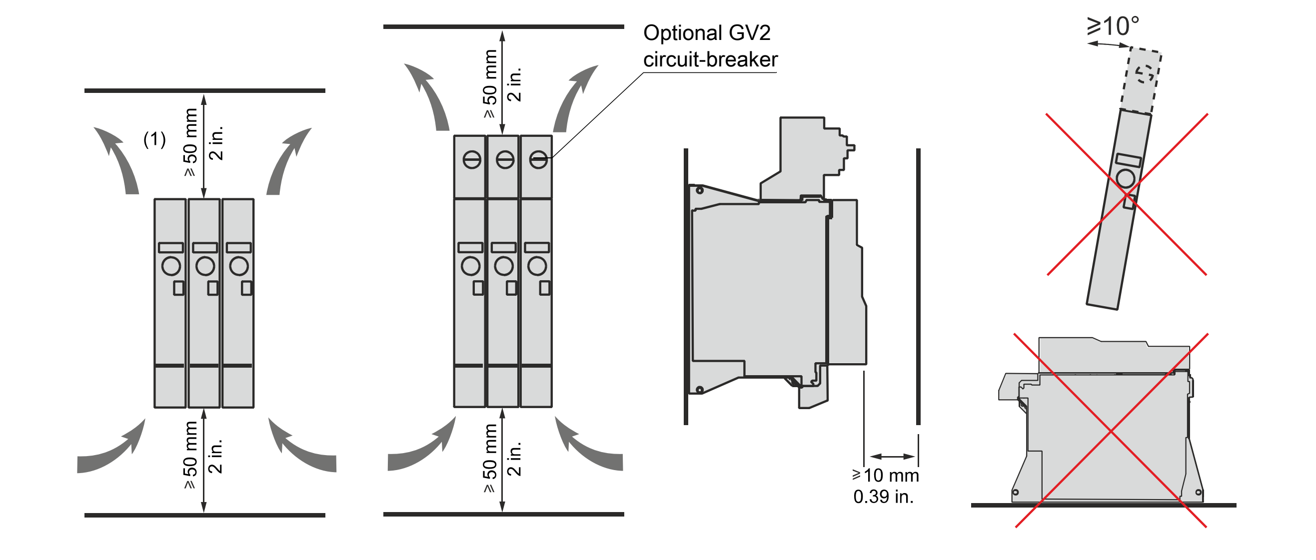
Caution!

RISK OF DAMAGE TO DRIVE

Follow the installation instructions in this document carefully.

Failure to follow this instruction can result in equipment damage.

Mounting and temperature conditions



(1) Minimum value corresponding to thermal constrainst. On sizes A and B, a 150 mm (5.9 in.) clearance may help to connect the ground.

Minimum value corresponding to heat conditions. For sizes A and B, a clearance of 150 mm (5.9 in.) is recommended to relieve strain on the grounding connection.

- Install the drive vertically at ±10°.
- Do not install the drive near heat sources.
- Leave sufficient clearance so that the air required for cooling purposes can circulate from the bottom to the top of the drive.
- Leave at least 10 mm (0.39 in.) clearance in front of the drive.
- Washers should be used with all mounting fasteners.

Mounting procedure

This drive is designed for operation at an ambient air temperature of 50°C (122°F) and for continuous operation at a switching frequency of 4 kHz.

When operating in higher temperatures (up to 60°C (140°F)) or operating continuously at a switching frequency higher than 4 kHz, then the nominal drive current should be reduced according to the derating curves.

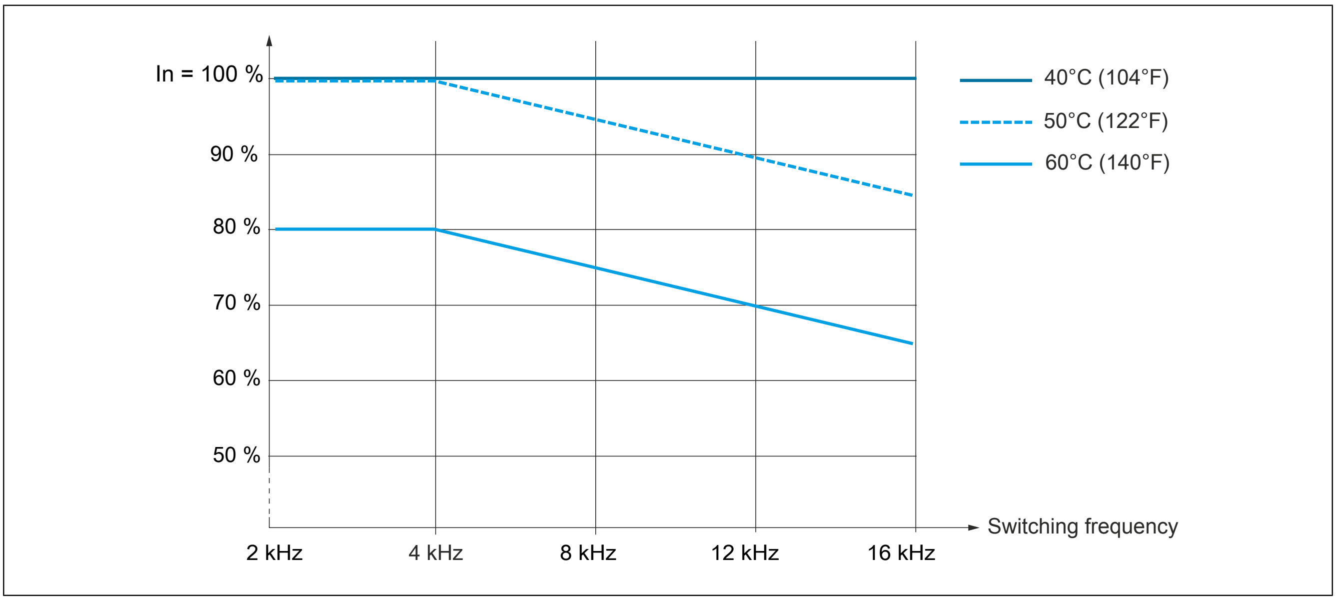
If the temperature rises dramatically while the drive is operating at a switching frequency higher than 4 kHz, the drive will automatically reduce the rate.

Size A and B drives can also be equipped with an optional GV2 circuit breaker.

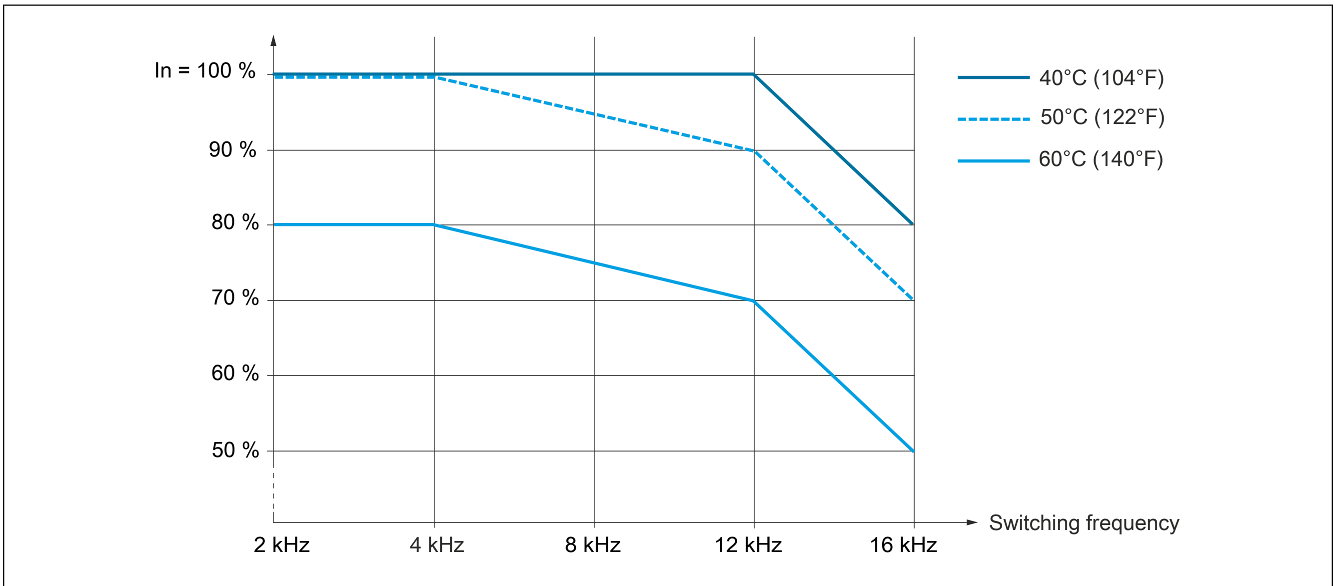
Derating curves

Derating curves for the drive current (In) as a function of temperature and switching frequency.

8I74S200xxx.01P-1 and 8I74S200xxx.00-000



8I74T40xxxx.01P-1 and 8I74T40xxxx.00-000



2.2 Wiring recommendations

Danger!

RISK OF ELECTRIC SHOCK

- **To avoid overheating and contact interruptions, use the cable sizes and starting torques specified in this document when making connections.**
- **The network connection must not be made with a multi-conductor cable with no terminal.**
- **The output cables and braking resistance cables for sizes A and B must not have more than 10 mm (0.39 in.) of insulation stripped.**
- **Perform a tensile test to ensure that the terminal screws are properly tightened.**

Failure to follow these instructions can result in death or serious injury.

Power and circuit protection

The drive must be grounded to conform with the regulations concerning high leakage currents (over 3.5 mA).

Where local and national codes require upstream protection by means of a residual current device, you must use a "Type A" device for 1-phase drives and a "Type B" device for 3-phase drives as defined in the IEC Standard 60755.

Choose a suitable model incorporating:

- High frequency current filtering
- A time delay which prevents tripping caused by the load from stray capacitance on power-up. The time delay is not possible for 30 mA devices. In this case, choose devices with immunity against nuisance tripping.

If the installation includes several drives, provide one "residual current device" per drive.

Keep the power cables separate from low-voltage signal cables in the installation (proximity switches, PLCs, measuring apparatus, video, telephone).

If you are using cables longer than 50 m (164 ft) between the drive and the motor, add output filters.

Control

Keep control circuits and power circuits separate. For control and reference conductors, we recommend using shielded twisted cables with a pitch of between 25 and 50 mm (1 and 2 in.) at each end.

Equipment grounding

Ground the drive according to local and national code requirements. A minimum wire size of 10 mm² (6 AWG) may be required to meet standards limiting leakage current.

Danger!

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- **The drive panel must be properly grounded before power is applied.**
- **Use the provided ground connecting point as shown in the figure.**

Failure to follow these instructions can result in death or serious injury.

Warning!

PROTECTION AGAINST OVER CURRENT

- **Over current protective devices must be properly coordinated.**
- **The Canadian Electrical Code and the National Electrical Code (USA) require branch circuit protection. Use the fuses recommended in this manual.**
- **Do not connect the drive to a power supply whose short-circuit capacity exceeds the maximum assumed line supply Ik listed in this manual.**

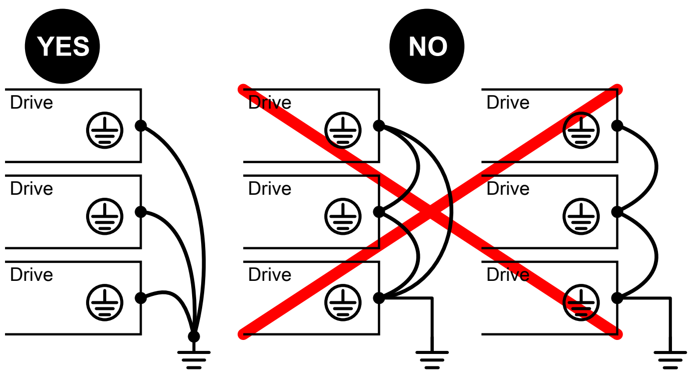
Failure to follow these instructions can result in death, serious injury or equipment damage.

Caution!

RISK OF DAMAGE TO DRIVE

- **The drive will be damaged if input line voltage is applied to the output terminals (U/T1,V/T2,W/T3).**
- **Check the power connections before energizing the drive.**
- **If replacing one drive with another, verify that the new drive's electrical requirements comply with the wiring instructions in this manual.**

Failure to follow these instructions can result in equipment damage!



- Ensure that the resistance of the ground is 1 Ω or less.
- If several drives are being grounded, each drive must be linked directly to the grounding connection (as shown above).
- Do not loop ground cables in and do not connect them in series.

2.3 Input installation

Access to the power terminals – Sizes A and B

Danger!

HAZARD OF ELECTRIC SHOCK, ECPLOSION OR ARC FLASH

- **Before switching on the power supply, reattach all wire terminals.**

Failure to follow these instructions can result in death or serious injury.

The power terminals are located on the top of the unit.

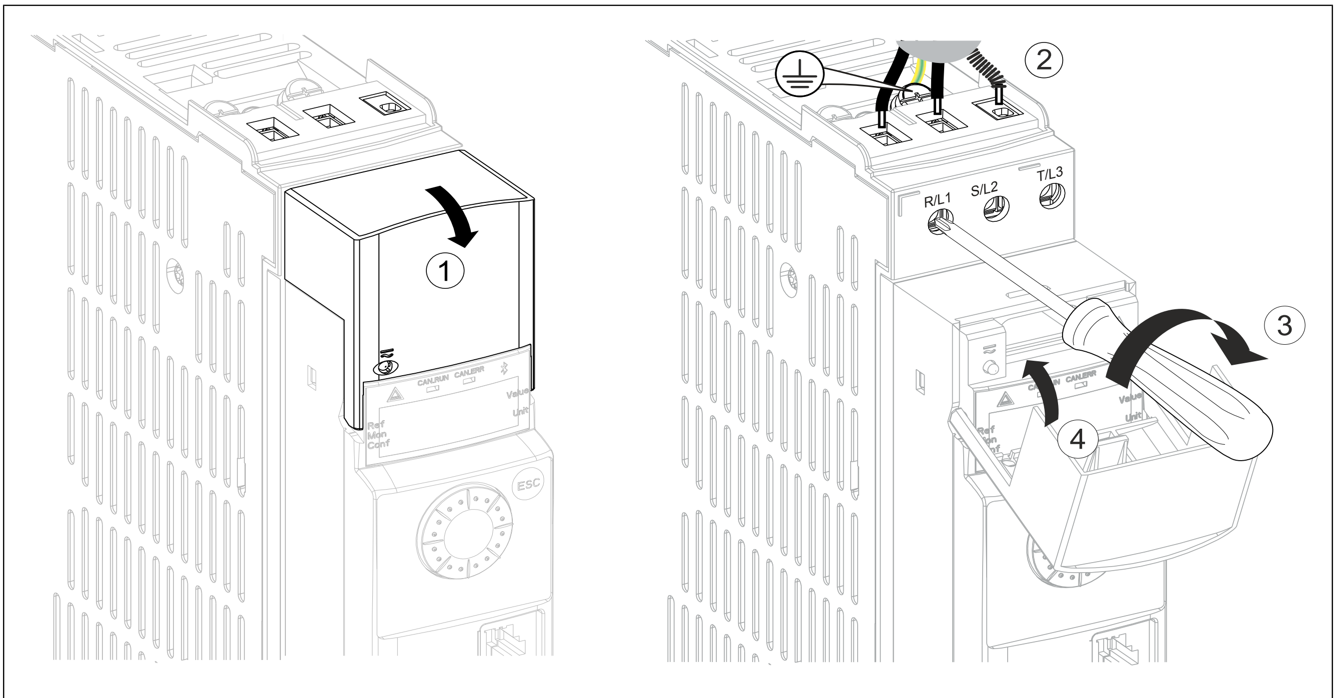
The terminals for the motor and braking resistance are located on the bottom of the unit.

To access the input terminals (1), pull out the wire terminals by hand and fold them up.

(2) Insert the wires into the terminals and connect the ground wire with the grounding screw.

(3) Tighten the terminal screws.

(4) Reattach the wire terminals. The terminals for output and braking resistance are directly accessible at the plug-in connection. See detailed connector installation and cable layout under installation of output plug-in connection and EMC plate.



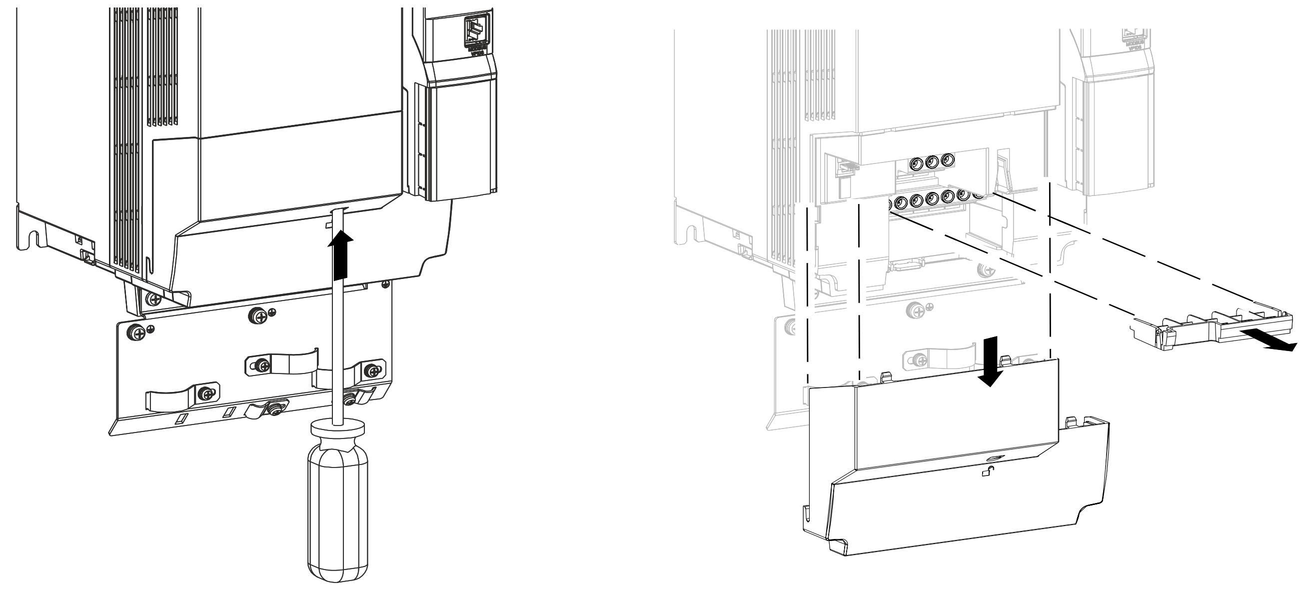
Access to the power terminals – Sizes C and D

The power terminals and terminals for the motor and braking resistance are located on the bottom of the unit.

Remove the cover (1) to access the terminals.

Push in the safety tab with a screwdriver (see below).

Now remove the terminal cover (3).



Access to the braking resistance terminals – All sizes

Access to the braking resistance terminals is guarded by breakable plastic components. Remove these safety components with a screwdriver.

2.4 Output installation

Installation of the output plug-and-socket connection and EMC plate - Size A and B drives

The EMC plate, the pluggable output connection terminal and the braking resistance terminal are inseparably linked to one another.

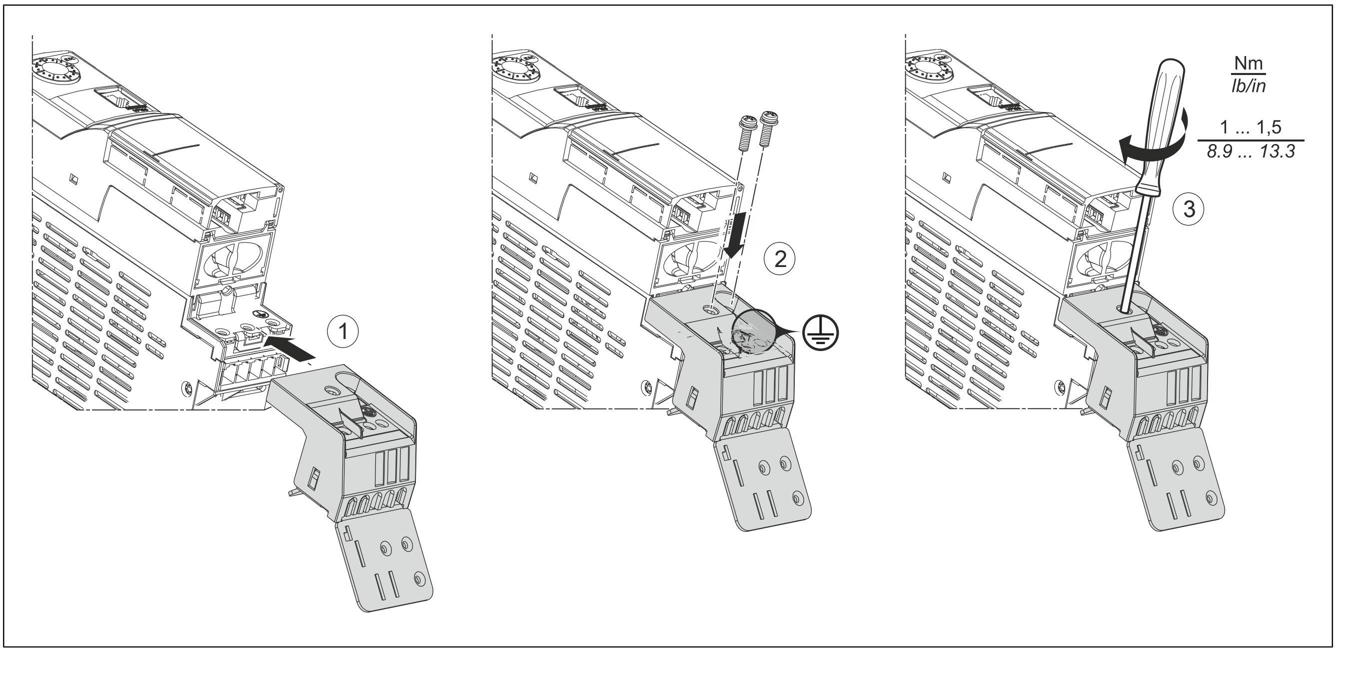
The input terminals are located on the top of the unit.

(1) Plug in the output power terminal.

(2) Insert the retaining and grounding screws (Shape: Plus or minus HS screwdriver type 2).

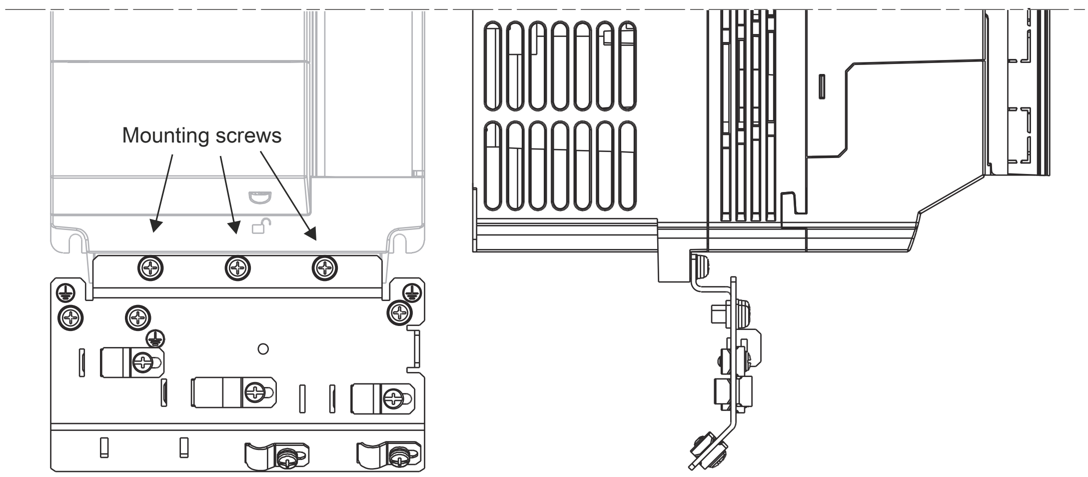
(3) Tighten the screws to a torque of between 1 and 1.5 Nm (8.9 to 13.3 lb.in). For cabling purposes, it is immaterial whether the connection is mounted to the drive or not.

The cabling process is simplest when done in the following order: Brakes (1), motor and ground (2). Finally, mount the bridge for installing the control wires (3).



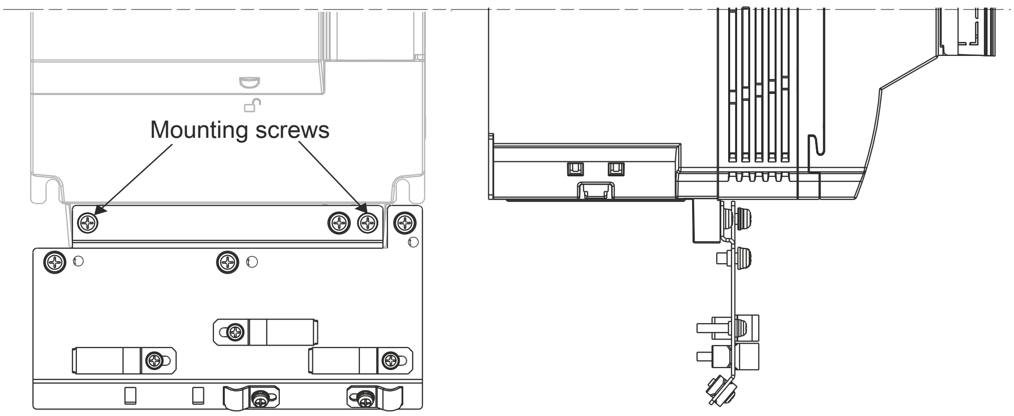
Installation of the output plug-and-socket connection and EMC plate - Size C drives

Attach the EMC plate included in your delivery packet to the underside of the drive using three M5 HS type 2 screws.



Installation of the output plug-and-socket connection and EMC plate - Size D drives

Attach the EMC plate included in your delivery packet to the underside of the drive using two M5 HS type 2 screws.



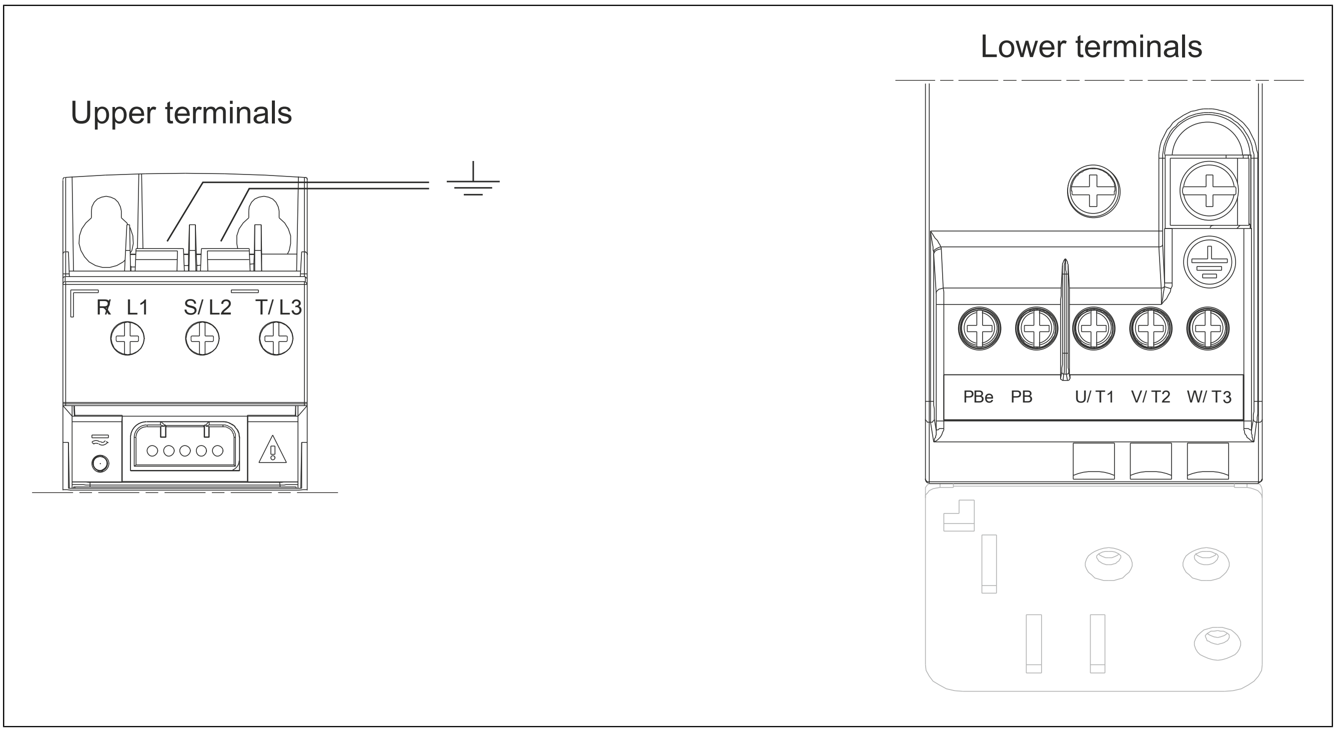
2.4.1 Functions of the power terminals

Terminal	Function	For ACOPOSinverter P74
⏚	Ground terminal	All ratings
R/L1 - S/L2/N	Supply voltage	8I74S200018.01P-1, 8I74S200018.00-000, 8I74S200037.01P-1, 8I74S200037.00-000, 8I74S200055.01P-1, 8I74S200055.00-000, 8I74S200075.01P-1, 8I74S200075.00-000, 8I74S200110.01P-1, 8I74S200110.00-000, 8I74S200150.01P-1, 8I74S200150.00-000, 8I74S200220.01P-1, 8I74S200220.00-000
R/L1 - S/L2 - T/L3	Supply voltage	8I74T400037.01P-1, 8I74T400037.00-000, 8I74T400055.01P-1, 8I74T400055.00-000, 8I74T400075.01P-1, 8I74T400075.00-000, 8I74T400110.01P-1, 8I74T400110.00-000, 8I74T400150.01P-1, 8I74T400150.00-000, 8I74T400220.01P-1, 8I74T400220.00-000, 8I74T400300.01P-1, 8I74T400300.00-000, 8I74T400400.01P-1, 8I74T400400.00-000, 8I74T400550.01P-1, 8I74T400550.00-000, 8I74T400750.01P-1, 8I74T400750.00-000, 8I74T401100.01P-1, 8I74T401100.00-000, 8I74T401500.01P-1, 8I74T401500.00-000
PB	Output to braking resistor (1)	All ratings
PBe	Output to braking resistor (+ polarity)(1)	All ratings
PA/+	DC bus (+) polarity	Sizes C and D
PC/-	DC bus (-) polarity	Sizes C and D
U/T1 - V/T2 - W/T3	Motor feeder	All ratings

(1) You can find additional information about braking resistor options at www.br-automation.com

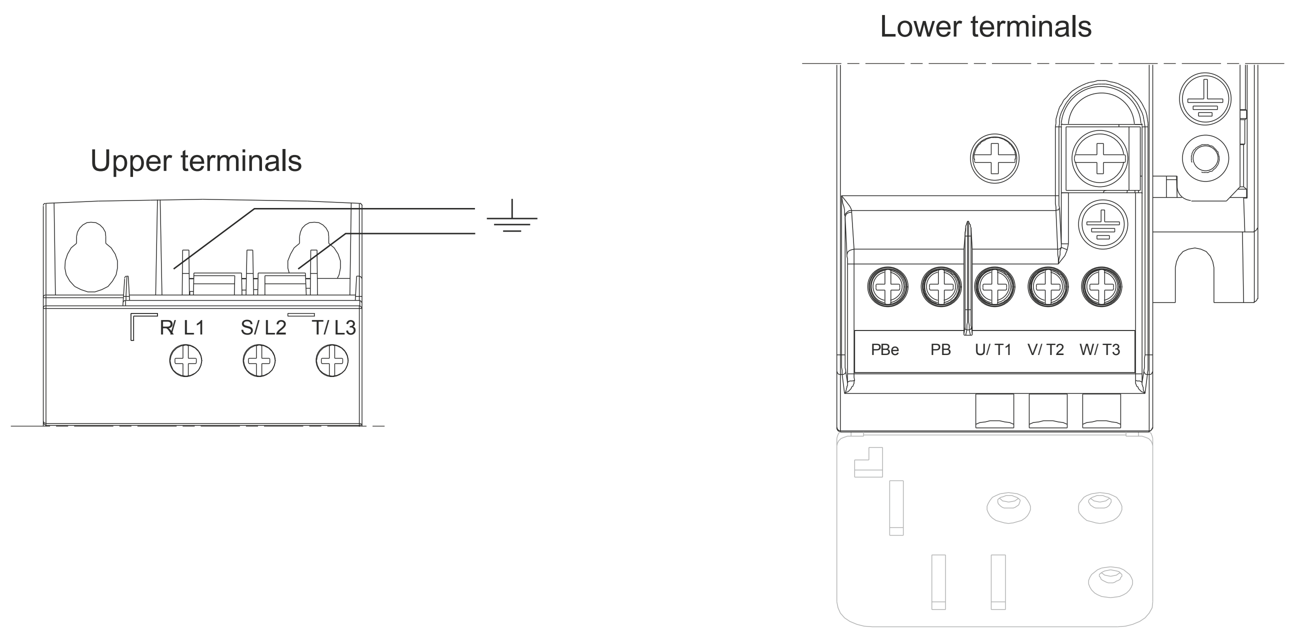
2.4.2 Arrangement and characteristics of the power terminals

Size A



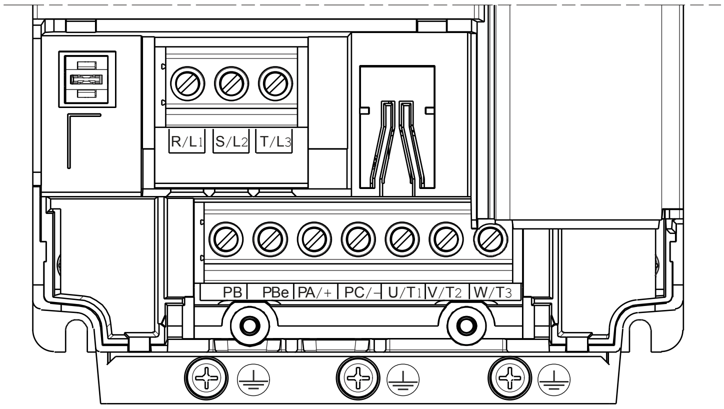
Size A	Input power			Output power and braking resistance		
	Wire cross-section/gauge		Fastening torque	Wire cross-section/gauge		Fastening torque
	min.	max.	Rating	min.	max.	min. to max.
	mm² (AWG)	mm² (AWG)	Nm (lb, in)	mm² (AWG)	mm² (AWG)	Nm (lb, in)
8I74S200018.01P-1, 8I74S200018.00-000, 8I74S200037.01P-1, 8I74S200037.00-000, 8I74S200055.01P-1, 8I74S200055.00-000, 8I74S200075.01P-1, 8I74S200075.00-000, 8I74T400037.01P-1, 8I74T400037.00-000, 8I74T400055.01P-1, 8I74T400055.00-000, 8I74T400075.01P-1, 8I74T400075.00-000, 8I74T400110.01P-1, 8I74T400110.00-000, 8I74T400150.01P-1, 8I74T400150.00-000	1,5 (14)	4 (10)	0,6 (5,3)	1,5 (14)	2,5 (12)	0,7 bis 0,8 (6,2 bis 7,1)

Size B



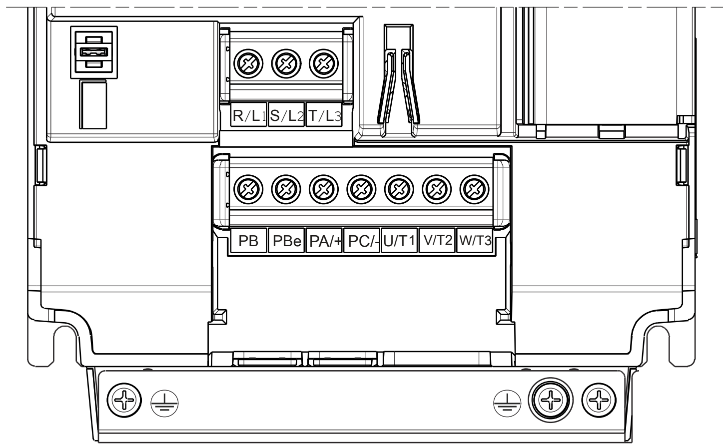
Size B	Input power			Output power and braking resistance		
	Wire cross-section/gauge		Fastening torque	Wire cross-section/gauge		Fastening torque
	min.	max.	Rating	min.	max.	min. to max.
	mm² (AWG)	mm² (AWG)	Nm (lb, in)	mm² (AWG)	mm² (AWG)	Nm (lb, in)
8I74T400220.01P-1, 8I74T400220.00-000, 8I74T400300.01P-1, 8I74T400300.00-000	1,5 (14)	4 (10)	0,6 (5,3)	1,5 (14)	2,5 (12)	0,7 bis 0,8 (6,2 bis 7,1)
8I74S200110.01P-1, 8I74S200110.00-000, 8I74T400400.01P-1, 8I74T400400.00-000	2,5 (12)	4 (10)	0,6 (5,3)	1,5 (14)	2,5 (12)	0,7 bis 0,8 (6,2 bis 7,1)
8I74S200150.01P-1, 8I74S200150.00-000	2,5 (10)	4 (10)	0,6 (5,3)	1,5 (14)	2,5 (12)	0,7 bis 0,8 (6,2 bis 7,1)
8I74S200220.01P-1, 8I74S200220.00-000	4 (10)	4 (10)	0,6 (5,3)	1,5 (14)	2,5 (12)	0,7 bis 0,8 (6,2 bis 7,1)

Size C



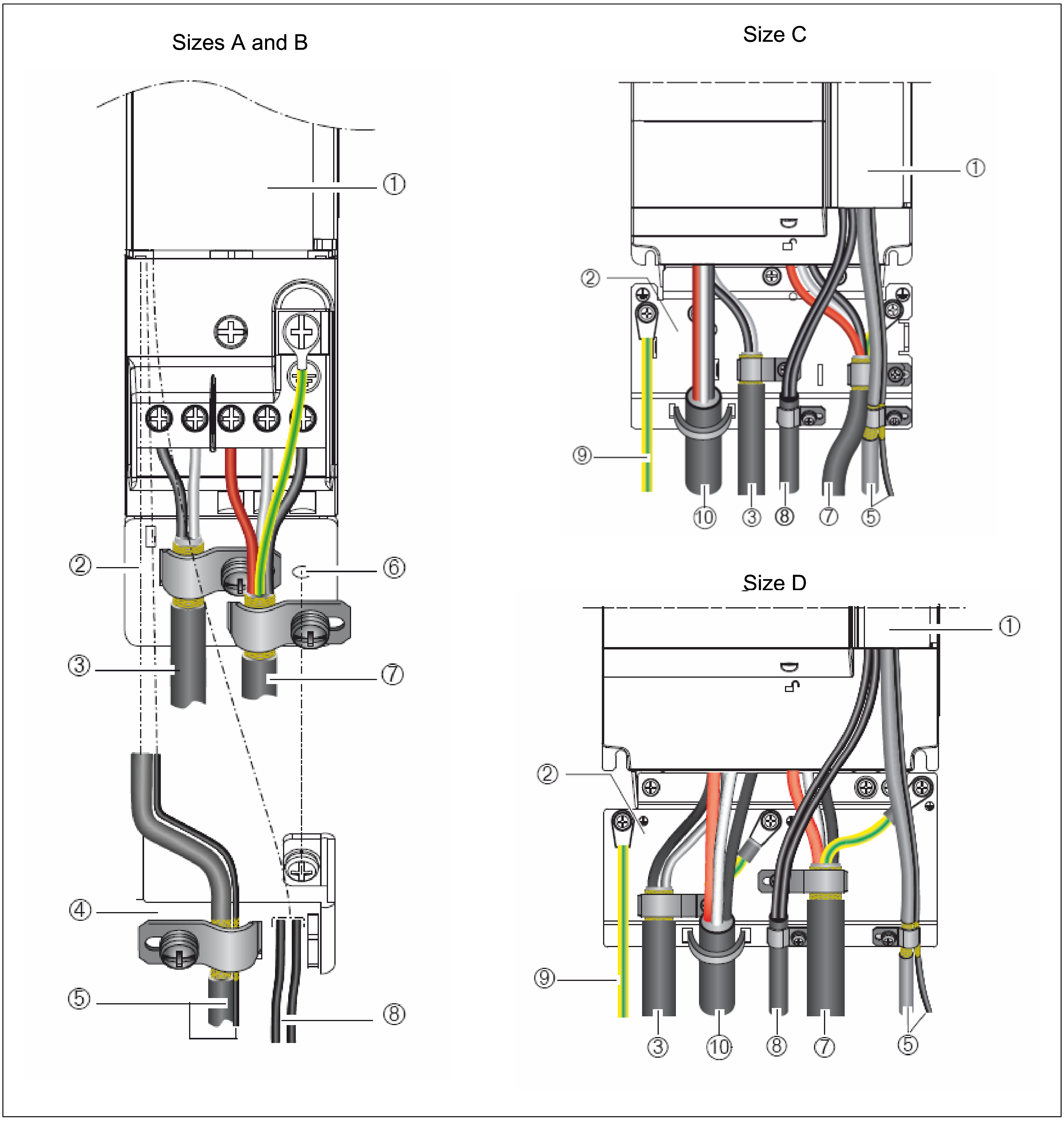
Size C	Input power			Output power and braking resistance		
	Wire cross-section/gauge		Fastening torque	Wire cross-section/gauge		Fastening torque
	min.	max.	min. to max.	min.	max.	min. to max.
	mm² (AWG)	mm² (AWG)	Nm (lb, in)	mm² (AWG)	mm² (AWG)	Nm (lb, in)
8I74T400550.01P-1, 8I74T400550.00-000	4 (10)	16 (6)	1,2 bis 1,5 (10,6 bis 13,3)	2,5 (12)	16 (6)	1,2 bis 1,5 (10,6 bis 13,3)
8I74T400750.01P-1, 8I74T400750.00-000	6 (8)	16 (6)	1,2 bis 1,5 (10,6 bis 13,3)	2,5 (10)	16 (6)	1,2 bis 1,5 (10,6 bis 13,3)

Size D



Size D	Input power			Output power and braking resistance		
	Wire cross-section/gauge		Fastening torque	Wire cross-section/gauge		Fastening torque
	min.	max.	min. to max.	min.	max.	min. to max.
	mm² (AWG)	mm² (AWG)	Nm (lb, in)	mm² (AWG)	mm² (AWG)	Nm (lb, in)
8I74T401100.01P-1, 8I74T401100.00-000	10 (8)	16 (6)	1,2 bis 1,5 (10,6 bis 13,3)	6 (8)	16 (6)	1,2 bis 1,5 (10,6 bis 13,3)
8I74T401500.01P-1, 8I74T401500.00-000	16 (6)	16 (6)	1,2 bis 1,5 (10,6 bis 13,3)	6 (8)	16 (6)	1,2 bis 1,5 (10,6 bis 13,3)

2.4.3 EMC plate cable topology



(1) ACOPOSinverter P74

(2) Grounded steel EMC plate

(3) Shielded cable for connecting the braking resistor (if used). This shielding must be continuous.

(4) EMC plate for the control system

(5) Shielded control conductors and conductors to the input-side STO safety function.

(6) Holes for mounting the EMC plate for the control system.

(7) Shielded cable for motor connection with shielding connected to ground at both ends. This shielding must be continuous and intermediate terminals must be located on the EMC plate.

(8) Non-shielded wires for relay contact output.

(9) Protective ground connection.

(10) Unshielded drive power supply cable.

2.5 Electromagnetic compatibility (EMC)

Note:

Despite the equipotent bonding between the drive, motor and cable shielding, each product must still be individually grounded.

2.5.1 Principles and precautions

- Grounds between the drive, motor and cable shielding must have high frequency equipotentiality.
- When a shielded cable is used for the motor, it must be a four-wire cable so that one of the wires can be used for the ground between the motor and the actuator. The size/gauge of the ground conductor must be chosen in compliance with local and national code requirements. The shield can then be grounded at both ends. Metal ducting or conduit can be used for part or all of the shielding length, provided there is no break in continuity.
- When using shielded cable for control signals, both ends of the shielding can be grounded, so long as the cable is connecting drives that are close together and have equal ground potential. If the cable is connected to equipment that may have a different ground potential, then ground the shielding at one end only to prevent large equalizing currents from flowing in the shield. The shielding on the ungrounded end may be tied to ground with a capacitor (for example: 10 nF, 100 V or higher) in order to provide a path for the higher frequency noise. The control circuits must be kept separate from the power circuits. For control and reference conductors, we recommend using shielded twisted cables with a pitch of between 25 and 50 mm (1 and 2 in.) at each end. Install the control circuits at a distance from the power circuits.
- Ensure maximum separation between the power cable (line supply) and the motor cable.
- The motor cables must be at least 0.5 m (20 in.) long.
- Do not use overvoltage protectors or compensation capacitors on the drive output.
- If using an additional input filter, it should be mounted as close as possible to the drive and connected directly to the line supply via an unshielded cable. Connection to the drive is via the filter output cable.

Danger!

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- **Do not expose cable shielding except where connected to ground at the metal cable glands and underneath the grounding clamps.**
- **Ensure that there is no risk of the shielding coming into contact with live components.**

Failure to follow these instructions can result in death or serious injury.

Mains impedance

Caution!

RISK OF REDUCED SERVICE LIFE AND DEGRADED EMC PERFORMANCE

- **Do not connect the drive to a low-impedance mains supply.**
- **The maximum assumed input short-circuit current must not exceed the value see "Recommended fuse ratings for UL and CSA requirements".**
- **An installation with a supply above this value requires additional inductance.**

Failure to follow these instructions can result in equipment damage!

2.5.2 Operation on an IT system

IT network: Isolated or high-impedance grounded neutral conductor. Use a permanent insulation monitor compatible with non-linear loads (e.g., type XM200 or equivalent).

Danger!

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

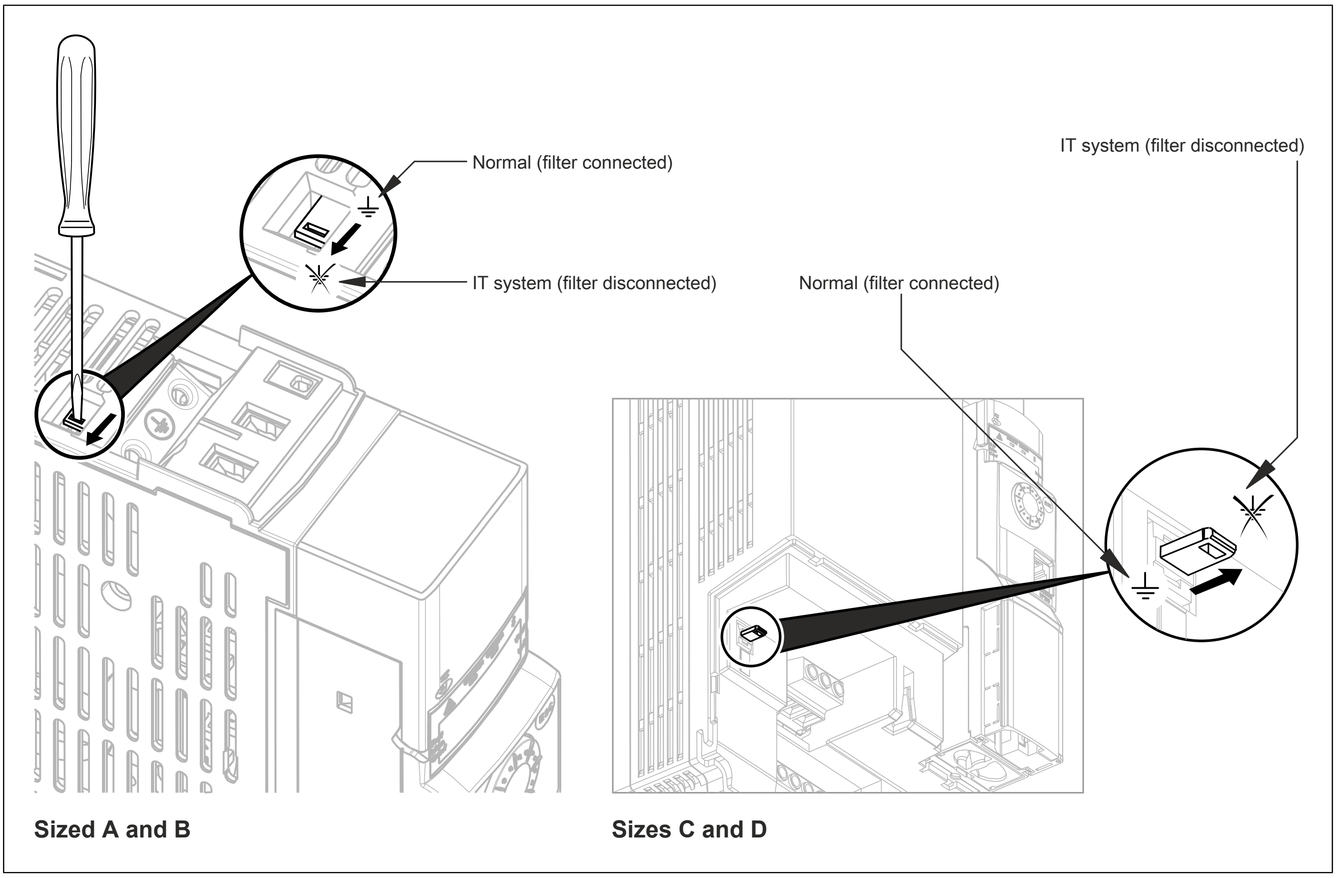
Read the safety notes in the chapter entitled "Before you begin" completely and carefully before performing the procedure explained in this section.

Failure to follow these instructions can result in death or serious injury.

ACOPOSinverter P74 units have a built-in EMC filter. As a result they exhibit leakage current to ground. If the leakage current creates compatibility problems with your installation (residual current device or the like), then you can reduce the leakage current by opening the IT jumper as shown below. In this configuration EMC compliance is not guaranteed.

For sizes A and B, the IT jumper is located on the top of the product.

For sizes C and D, the jumper is located on the front side behind the protective cover that guards the power terminals (on the left, next to the input power terminals).



Max. leakage current

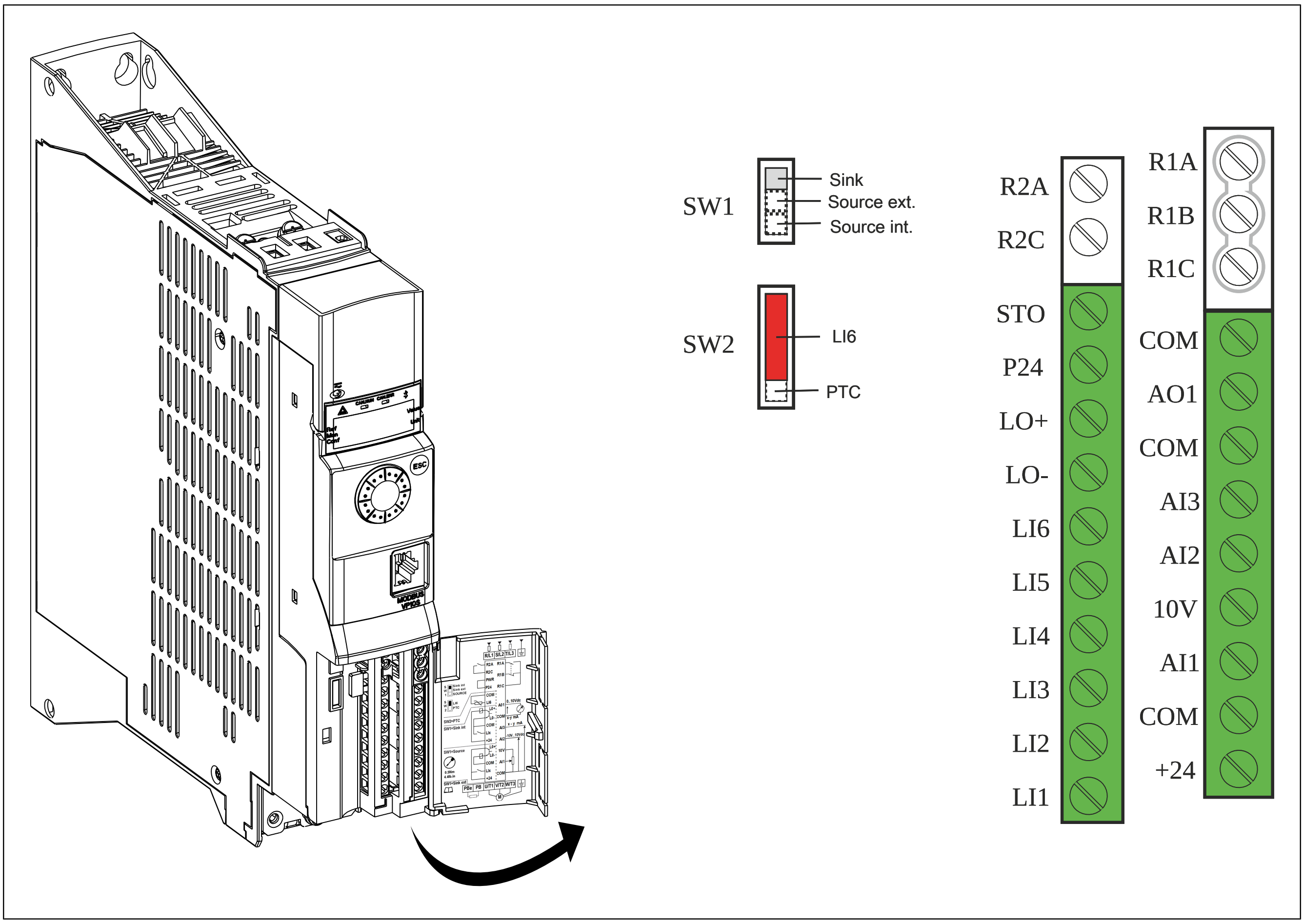
Voltage	Model number	IT jumper closed	IT jumper open
200 V range	8I74S200018.01P-1, 8I74S200018.00-000	7.49 mA	2.63 mA
	8I74S200037.01P-1, 8I74S200037.00-000		
	8I74S200055.01P-1, 8I74S200055.00-000		
	8I74S200075.01P-1, 8I74S200075.00-000		
	8I74S200110.01P-1, 8I74S200110.00-000	11.29 mA	2.9 mA
	8I74S200150.01P-1, 8I74S200150.00-000		
	8I74S200220.01P-1, 8I74S200220.00-000		
400 V range	8I74T400037.01P-1, 8I74T400037.00-000	6.43 mA	<0.5 mA
	8I74T400055.01P-1, 8I74T400055.00-000		
	8I74T400075.01P-1, 8I74T400075.00-000		
	8I74T400110.01P-1, 8I74T400110.00-000		
	8I74T400150.01P-1, 8I74T400150.00-000		
	8I74T400220.01P-1, 8I74T400220.00-000	9.81 mA	
	8I74T400300.01P-1, 8I74T400300.00-000		
	8I74T400400.01P-1, 8I74T400400.00-000		
	8I74T400550.01P-1, 8I74T400550.00-000	9.88 mA	
	8I74T400750.01P-1, 8I74T400750.00-000		
	8I74T401100.01P-1, 8I74T401100.00-000	10.16 mA	
	8I74T401500.01P-1, 8I74T401500.00-000		

2.6 Installation of the control components

2.6.1 Access to the control terminals

Access to the control terminals is identical for all products. Simply open the cover as shown in the following example.

All screws are M3 slotted screws with a diameter of 3.8 mm (0.15 in).



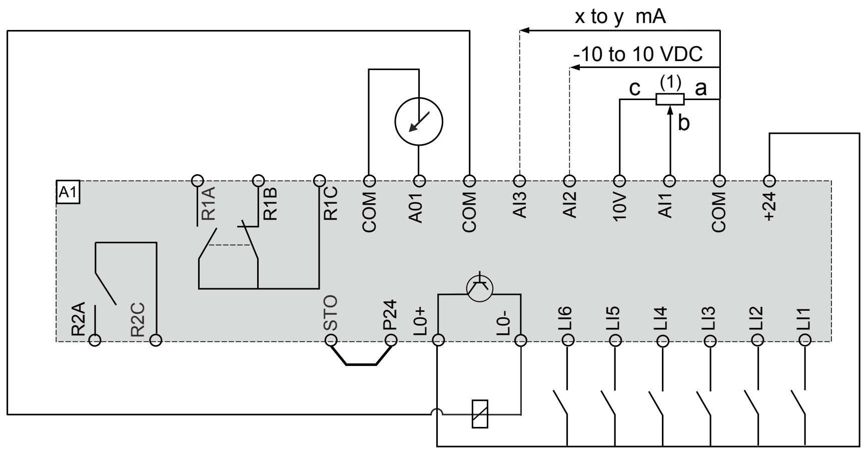
Danger!

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Read the safety notes in the chapter entitled "Before you begin" completely and carefully before performing the procedure explained in this section.

Failure to follow these instructions can result in death or serious injury.

2.6.2 Connection diagram of the control system in sink mode



(1) Reference potentiometer SZ1RV1202 (2.2 kΩ) or comparable (max. 10 kΩ)

2.6.3 Arrangement of the control terminals

P74 control terminals	Wire cross-section/gauge		Fastening torque
	Minimum (1)	Maximum	
	mm² (AWG)	mm² (AWG)	NM (lb, in)
R1A, R1B, R1C, R2A, R2C	0.75 (18)	1.5 (16)	0.5 (4.4)
All other terminals	0.5 (20)	1.5 (16)	0.5 (4.4)

(1) The value in bold corresponds to the minimum wire gauge to permit secureness

2.6.4 Characteristics and functions of the control terminals

Terminal	Functionality	Type	Electrical characteristics
R1A	NO contact of the relay	I/O	• Min. switching capacity: 5 mA for 24 VDC • Maximum switching power with a resistive load: (cos ϕ = 1) 3 A for 250 VAC and 4 A for 30 VDC • Maximum switching power with an inductive load: (cos ϕ = 0.4 and L/R = 7 ms): 2 A for 250 VAC and 30 VDC • Refresh time: 2 ms • Operating life: 100,000 operations at maximum switching power
R1B	NC contact of the relay	I/O	
R1C	Common point contact of programmable relay R1	I/O	
COM	Analog I/O common	I/O	0 V
AO1	Voltage or current analog output (collector)	A	Analog output 0 to 10 V, minimum load impedance 470 Ω or analog output 0 to 20 mA, maximum load impedance 800 Ω • Resolution: 10 bits • Precision ±1% at 50/60 Hz and 25°C ±10°C, ±2% at 50/60 Hz and -10 to +60°C • Linearity ±0.3% • Sampling time 2 ms
COM	Analog I/O common	I/O	0 V
AI3	Analog input as current	E	Analog input 0 to 20 mA (or 4 to 20 mA, X to 20 mA, 20 to Y mA). X and Y can be programmed to values from 0 to 20 mA. • Impedance 250 Ω • Resolution: 10 bits • Precision ±0.5% at 50/60 Hz and 25°C ±10°C, ±0.2% at 50/60 Hz and -10 to 60°C with Δθ = 60°C • Linearity ±0.2% (max. ±0.5%), of the maximum value • Sampling time 2 ms AI2 Analog input as voltage E Bipolar analog input 0 ±10 V
AI2	Analog input as voltage	E	Bipolar analog input 0 ±10 V (maximum voltage ±30 V). The polarity (+ or -) of the voltage at AI2 influences the reference direction and thereby the direction of rotation. • Impedance 30 Ω • Resolution: 10 bits • Precision: ±0.5% at 50/60 Hz and 25°C ±10°C, ±0.2% at 50/60 Hz and -10 to 60°C with Δθ = 60°C • Linearity ±0.2% (max. ±0.5%), of the maximum value • Scan time: 2 ms
10 V	Power supply for the reference potentiometer	A	10 VDC • Tolerance: 0 to 10% • Current: 10 mA max.

Terminal	Functionality	Type	Electrical characteristics
AI1	Analog input as voltage	E	Analog input: 0 + 10 V • Impedance: 30 kΩ • Resolution: 10-bit converter • Precision: ±0.5% at 50/60 Hz and 25°C ±10°C, ±2% at 50/60 Hz and -10 to 60°C with Δθ = 60°C • Linearity ±0.2% (max. ±0.5%) of the maximum value • Scan time: 2 ms
COM	Analog I/O, logic I/O and STO	I/O	0 V
+24	Logic input power supply	A	24 VDC • Tolerance: -15 to 20% • Current: 100 mA
R2A R2C	Normally-open (NO) contact of programmable relay R2	I/O	• Min. switching capacity: 5 mA for 24 VDC • Maximum switching power with a resistive load: (cos ϕ = 1) 5 A for 250 VAC and 30 VDC • Maximum switching power with an inductive load: (cos ϕ = 0.4 and L/R = 7 ms): 2 A for 250 VAC and 30 VDC • Refresh time: 2 ms • Operating life: ° 100,000 operations at maximum switching power ° 1,000,000 operations with a current of 500 mA and an inductive load of 58 VAC or 30 VDC
STO	STO (safe torque off) safety function input	E	24 VDC • Impedance 1.5 kΩ • State 0 if <2 V, state 1 if >17 V (sink mode) • Response time 4 ms
P24	External power supply for control circuit and POWERLINK interface / Internal power supply for STO	I/O	24 VDC • Tolerance: -15 to 20% • Current: Max. 1.1 A
LO+ LO-	Logic output	A	Output with open collector, configurable via SW1 as sink or source • Refresh time: 2 ms • Maximum current: 100 mA • Maximum voltage: 30 V
LI6 LI5	Logic input	E	When programming as logic inputs, the characteristics are identical to those of LI1 to LI4 • LI5 can be programmed as an impulse input with a rate of 20 kbps (impulses per second) • Positive edges on LI5 are counted in register "HSC". HSC can be read on PLK-address index 0x2067/subindex 0x09. (requirements: LI5 must be fed with push/pull signal ACPi-FW 2.3IE14, PLK-FW 407) • LI6 can be used as a PTC via SW2 • Trigger threshold 3 kΩ, reset threshold 1.8 kΩ • Short-circuit detection threshold <50 Ω
LI4 LI3 LI2 LI1	Logic input	E	Four programmable logic inputs, configurable via SW1 as sink or source • 24 V power supply (max. 30 V) • Impedance 3.5 kΩ • State 0 if <5 V, state 1 if >11 V (sink mode) • State 0 if >19 V, state 1 if <13 V (source mode) • Response time 8 ms with stop

2.6.5 RJ45 communication port

Connection options are as follows:

- PC with configuration software for expanded safety functions
- Graphic display terminal

Note:

Check the RJ45 cable for damage before connecting to the product. Connecting a damaged cable can result in a control system power failure.

2.6.6 Configuration as sink/source (SW1)

Danger!

UNINTENTIONAL OPERATION OF DEVICES

- **When SW1 is set to Source Int or Source Ext, the COM terminal must not be connected to a ground or protective ground. Otherwise, there is the risk of unintentional operation of the device due to an insulation fault.**
- **Prevent accidental grounding of logic inputs configured for source logic. Accidental grounding can result in unintentional activation of drive functions.**
- **Protect the signal conductors against damage that could result in unintentional conductor grounding.**
- **Follow NFPA 79 and EN 60204 guidelines for proper control circuit grounding practices.**

Failure to follow these instructions can result in death or serious injury.

Caution!

DANGER OF INJURY

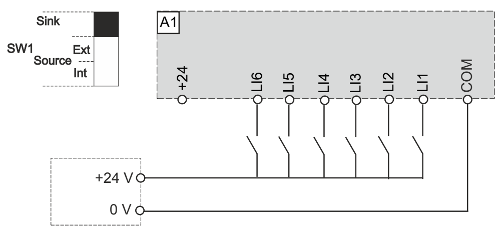
Change the switch setting with a screwdriver.

Failure to follow these instructions can result in injury or equipment damage.

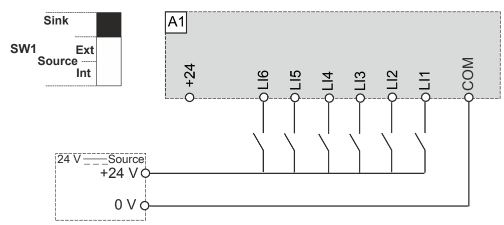
The logic input switch (SW1) is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs. Open the control terminal panel to access SW1. SW1 is located left of the control terminals.

- When using SPS outputs with PNP transistors, set the switch to "Sink" (factory setting).
- When using SPS outputs with NPN transistors, set the switch to Source Int or Source Ext.

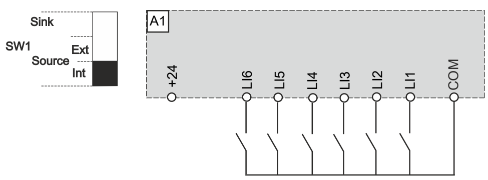
SW1 in Sink position



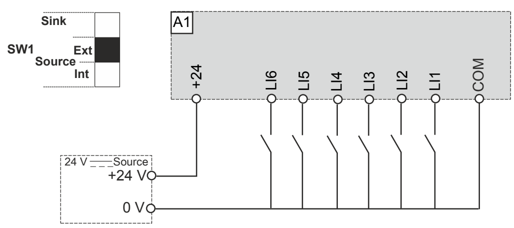
SW1 in Source position and use of an external power supply for the logic inputs



SW1 in Source Int position



SW1 in Source Ext position



2.7 POWERLINK interface P74

2.7.1 8I0IF108.400-1

2.7.1.1 Order data

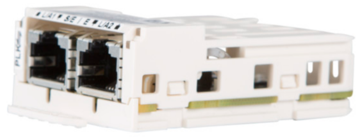
Model number	Short description	Figure
	ACOPOSinverter P74 - Interface module	
8I0IF108.400-1	ACOPOSinverter P74 interface module POWERLINK V2 interface, integrated 2x hub, 2x RJ45 connection	

Table 16: 8I0IF108.400-1 - Order data

2.7.1.2 Technical data

Model number	8I0IF108.400-1
General information	
B&R ID code	0xC29B
LED status indicators	
Quantity	4
Diagnostics	
Module status	Yes, using LED status indicators
Network status	Yes, using LED status indicators
Data transfer	Yes, using LED status indicators (port 1 and port 2)
Certifications	
KC	Yes
Interfaces	
POWERLINK	
Quantity	2
Design	2x shielded RJ45 port (hub)
Transfer rate	100 Mbit/s
Transfer	10/100 Base-TX
Cable length	Max. 100 m between two stations (segment length)
Mechanical properties	
Dimensions	
Width	41 mm
Length	74 mm
Height	21 mm
Weight	300 g
General information	
Module type	Communication module

Table 17: 8I0IF108.400-1 - Technical data

2.7.1.3 Firmware

The module comes with preinstalled firmware. The firmware is also part of the B&R Automation Runtime operating system for the PLC. If the two versions are different, the Automation Runtime firmware is loaded to the module. The latest 8I0IF108.400-1 firmware is made available automatically when updating B&R Automation Runtime.

Note:

After updating the firmware on module 8I0IF108.400-1, ACOPOSinverter P74 devices with Revision A0 must be restarted (switch power supply on/off).

2.7.1.4 POWERLINK interface (8I0IF108.400-1)

Caution!

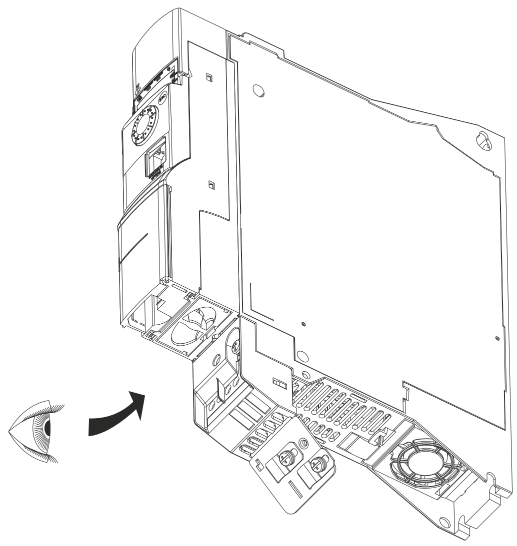
RISK OF DAMAGE TO FREQUENCY INVERTER

- **Only communication modules designed for the inverter are permitted to be installed.**
- **Only one communication module is permitted to be used in the inverter.**

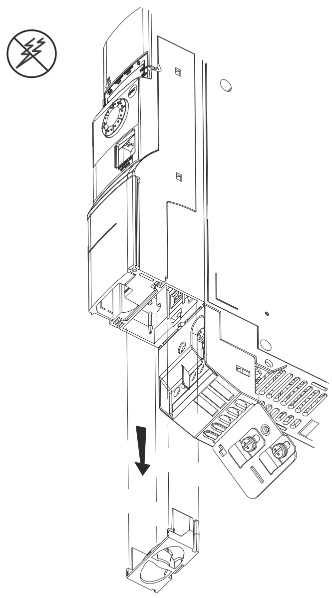
Failure to observe these instructions can result in damage to property.

The ACOPOSinverter P74 comes with a POWERLINK interface. This interface is inserted directly in the control unit (see following image). Install the POWERLINK interface into the ACOPOSinverter P74 as follows:

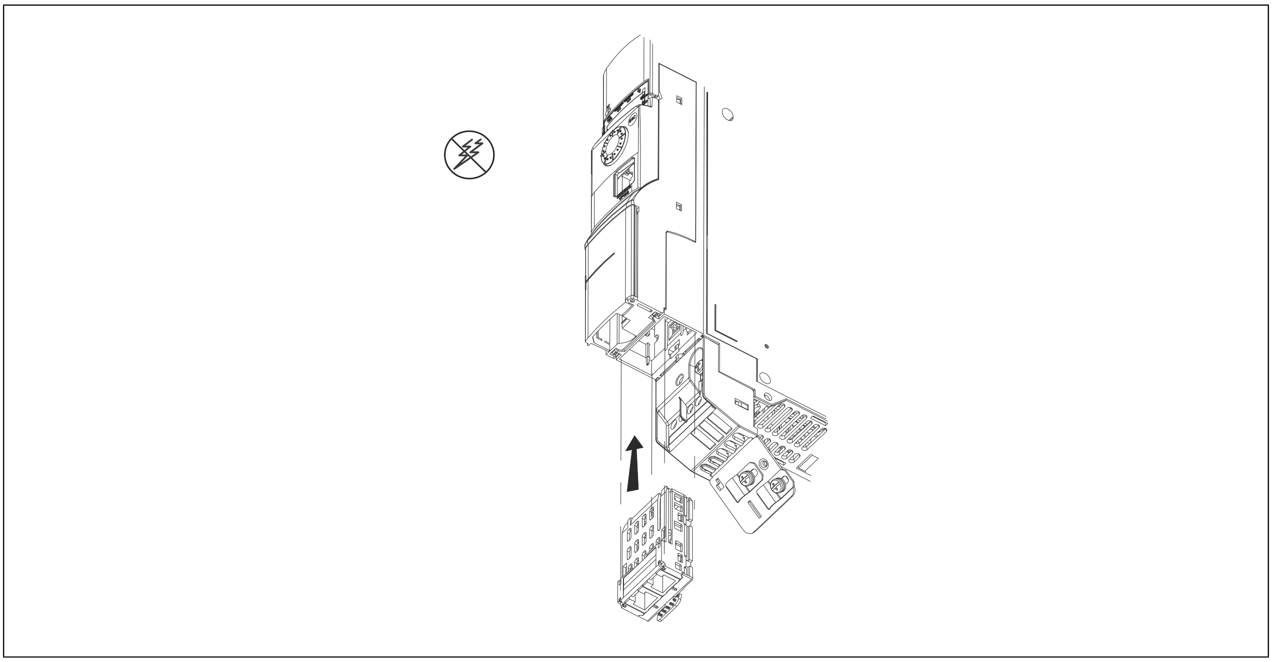
1. Ensure that the power supply is disconnected. Check the position of the module on the ACOPOSinverter P74.



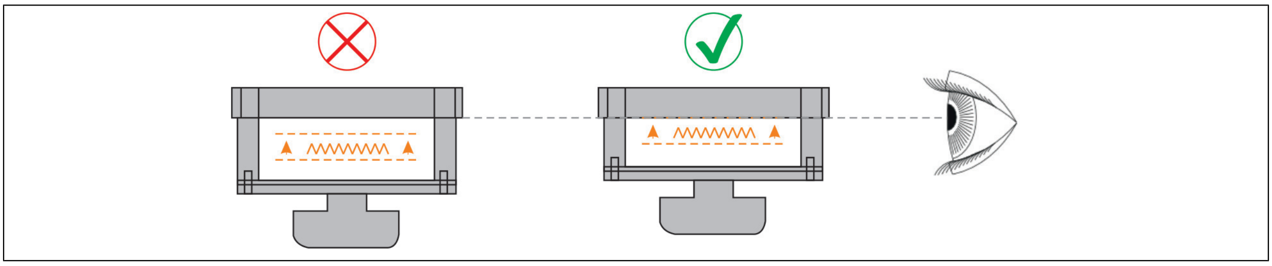
2. Remove the cover.



3. Insert the optional module.

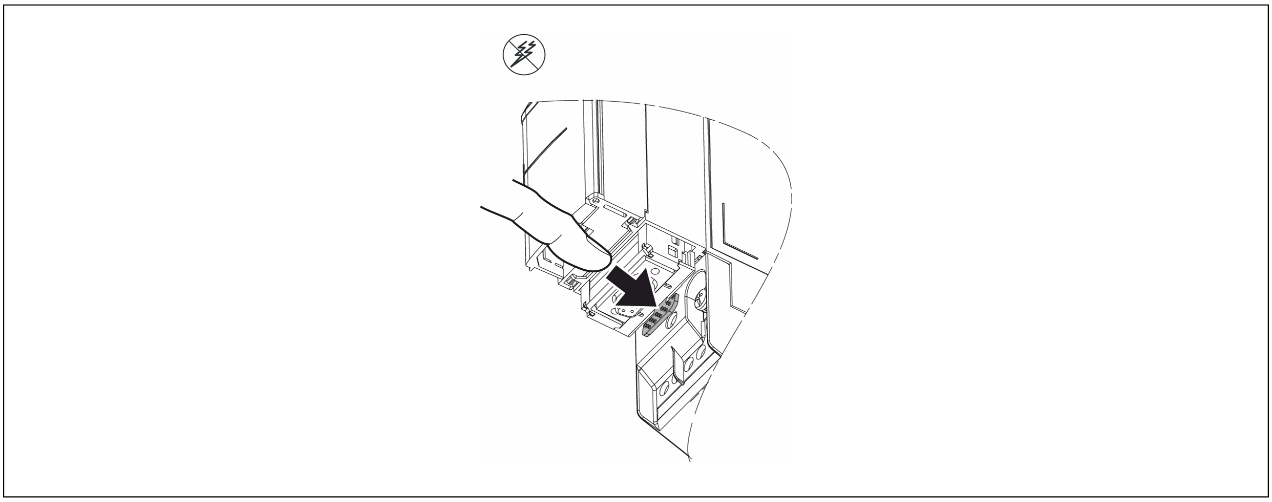


4. Check that the module is completely inserted and mechanically locked in the inverter. Ensure that the module is in the correct position.

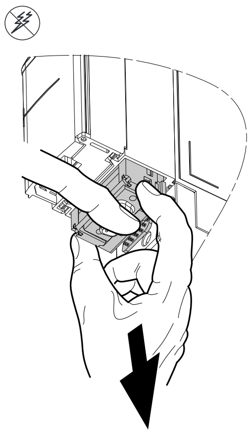


Remove the communication module as follows:

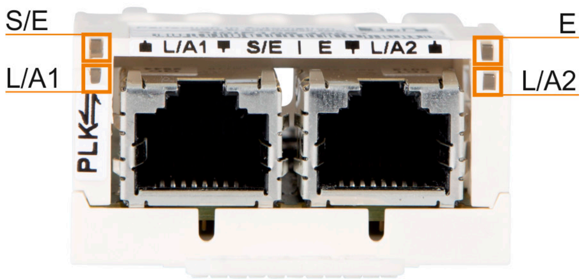
1. Ensure that the power supply is disconnected. Press on the bar.



2. Remove the module while pressing down on the bar.



2.7.1.4.1 Status LED



LED	Color	Status	Description
S/E	Green/Red		Status/Error LED.
E	Red	Red	Faulty boot procedure of optional card. State NOT_ACTIVE could not be achieved (restart required).
L/A1, L/A2	Green	Green	A link to the peer station has been established.
		Blinking	A link to the peer station has been established. The LED blinks when Ethernet activity is taking place on the bus.

2.7.1.4.1.1 POWERLINK

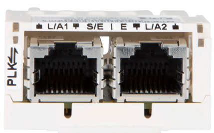
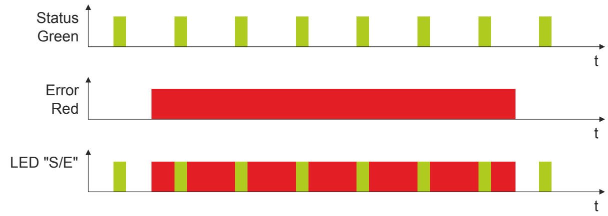
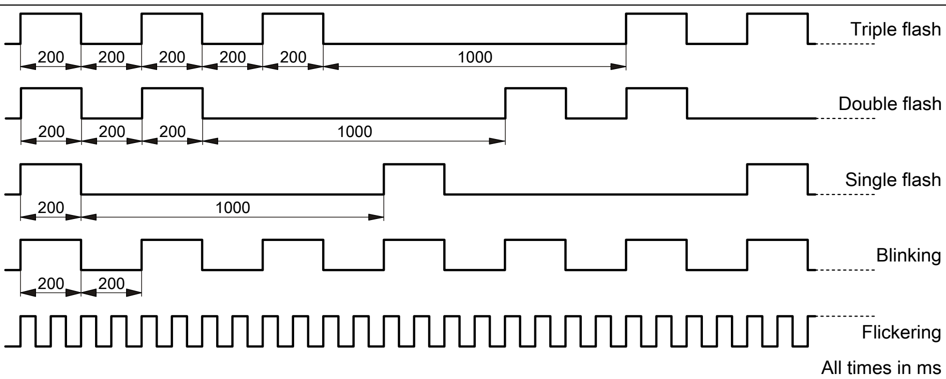
Figure	LED	Color	Status	Description
	S/E[1)]	Green	Off	No power supply or mode NOT_ACTIVE. The controlled node (CN) is either not supplied with power, or it is in state NOT_ACTIVE. The CN waits in this state for about 5 seconds after a restart. Communication is not possible with the CN. If no POWERLINK communication is detected during these 5 seconds, the CN enters state BASIC_ETHERNET (flickering). If POWERLINK communication is detected before this time expires, however, the CN immediately enters state PRE_OPERATIONAL_1.
			Flickering	Mode BASIC_ETHERNET. The CN has not detected any POWERLINK communication. In this state, it is possible to communicate directly with the CN (e.g. with UDP, IP, etc.) If communication POWERLINK is detected in this state, the CN switches to PRE_OPERATIONAL_1.
			Single flash	Mode PRE_OPERATIONAL_1. When operating on a POWERLINK V1 manager, the CN switches directly to PRE_OPERATIONAL_2. When operated on a POWERLINK V2 manager, the CN waits until an SoC frame is received and then switches to the PRE_OPERATIONAL_2 state.
			Double flash	Mode PRE_OPERATIONAL_2. The CN is normally configured by the manager in this state. It is then switched to state READY_TO_OPERATE by command (POWERLINK V2) or by setting the "data valid" flag in the output data (POWERLINK V1).
			Triple flash	Mode READY_TO_OPERATE. In network POWERLINK V1, the CN switches automatically to OPERATIONAL as soon as input data is present. In a POWERLINK V2 network, the manager switches to the OPERATIONAL state by issuing a command.
			On	Mode OPERATIONAL. The PDO mapping is active and cyclic data is evaluated.

Figure	LED	Color	Status	Description
			Blinking	Mode STOPPED. Output data is not being output, and no input data is being provided. It is only possible to switch to or leave this state after the manager has given the appropriate command.
		Red	On	The controlled node (CN) is in an error state (failed Ethernet frames, increased number of collisions on the network, etc.). If an error occurs in the following states, then the green LED blinks over the red LED: • PRE_OPERATIONAL_1 • PRE_OPERATIONAL_2 • READY_TO_OPERATE  Note: • Several red blinking signals are displayed immediately after the device is switched on. This is not an error, however. • The LED is lit red for CNs with configured physical node number 0 but that have not yet been assigned a node number via dynamic node allocation (DNA).
	L/A IFx	Green	On	Link established to the peer station
			Blinking	A link to the peer station has been established and there is activity on bus.

1) The Status/Error LED "S/E" is a green/red dual LED.

LED status indicators - Blink times



2.7.1.4.2 POWERLINK station number

Node numbers between $01 and $EF are permitted.

The POWERLINK node number is configured using the integrated operator terminal or handwheel.

Parameters are called as follows:

[INVERTERMENU](DRI),

[CONF](CONF-),

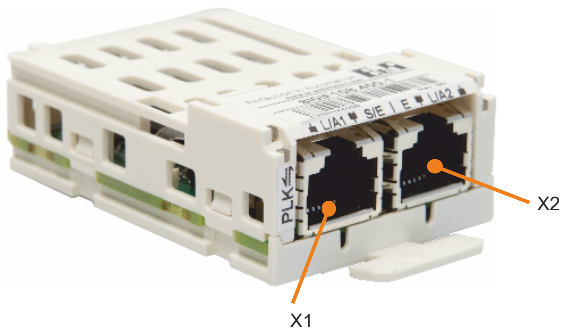
[FULLST.](FULL-),

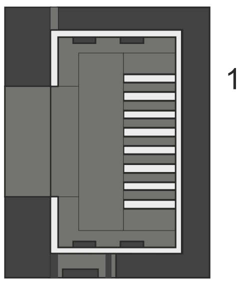
[COMMUNICATION](COM-),

[COMMUNICATIONCARD](Cbd-):

Code	Name/Description	Adjustment range	Factory setting
(ADRC)	**[Address]**	1 to 239	1

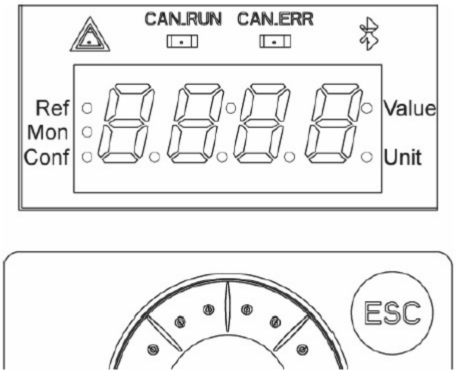
2.7.1.4.3 POWERLINK interface (X1 and X2)

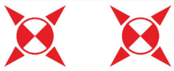


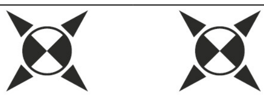
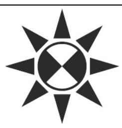
Interface	Pinout		
Application interface POWERLINK  Shielded RJ45 port	Pin	Ethernet	
	1	RxD	Receive data
	2	RxD\	Receive data\
	3	TxD	Transmit data
	4	Termination	
	5	Termination	
	6	TxD\	Transmit data\
	7	Termination	
	8	Termination	

2.8 LED status indicators

Those LED are used when CANopen is configured on the drive (Embeded CANopen or CANopen with option card). The LEDs give you the information of communication state. WIth this verification, you will know if there is activity or not on the network.



LED state		CANopen state
CAN_RUN		The CANopen controller is in "OFF" state.
		The ACOPOSinverter P74 is in "STOPPED" state.
		The ACOPOSinverter P74 is in "PRE-OPERATIONAL" state.
		The ACOPOSinverter P74 is in "OPERATIONAL" state.
CAN_ERR		No detected error reported.
		Detected error reported by the CANopen controller of the ACOPOSinverter P74 (example: too many detected error frames).
		Detected error due to the occurrence of a node-guarding event or a heartbeat event.
		The CANopen controller is in "bus-off" state.

LED state	Visual description of the LED state
	The LED is off.
	The LED is single flshing (200 ms on and 1 second off).
	The LED is double flashing (200 ms on, 200 ms off, 200 ms on and 1 second off).
	The LED is blinking at 2.5 Hz (200 ms on and 200 ms off).
	The LED is on.

2.9 Maintenance

Danger!

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Read the safety notes in the chapter entitled "Before you begin" completely and carefully before performing the procedure explained in this section.

Failure to follow these instructions can result in death or serious injury.

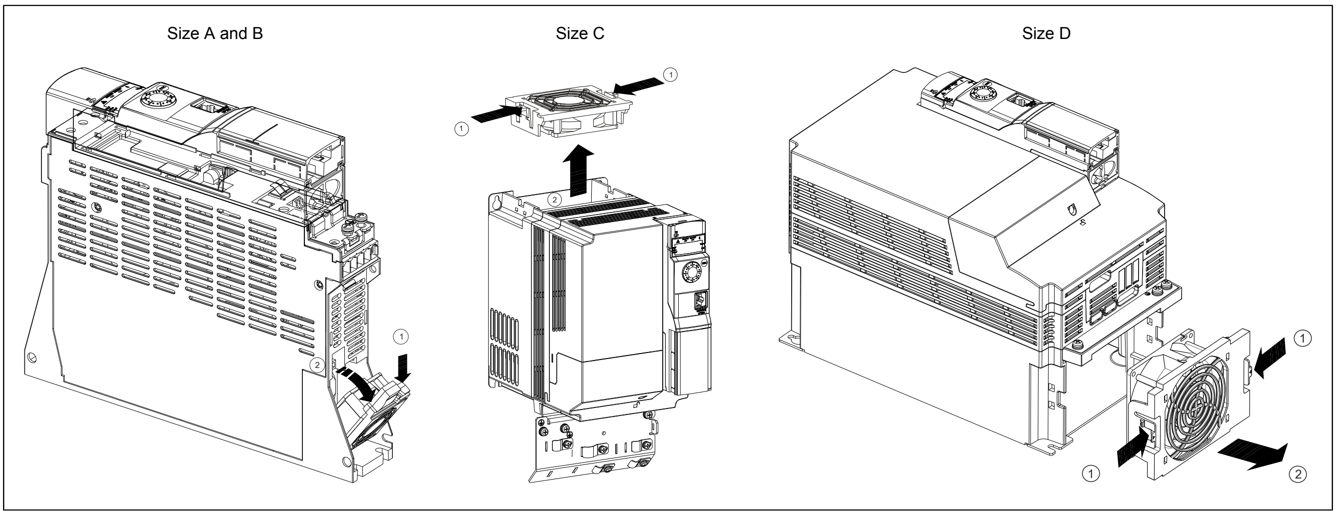
Warranty limitation

The warranty is voided if anyone other than a B&R service employee opens the product.

Fan replacement

A new fan can be ordered for purposes of maintaining the P74. See trade reference numbers on www.br-automation.com.

1. Press the safety tab in.
2. Disconnect the plug and remove the fan.



2.10 Power grid short-circuit capacity and short-circuit protection

Power grid short-circuit capacity at the drive supply point and short-circuit protection of the power feeder

Recommended fuse ratings for UL and CSA requirements

Reference	Voltage (Y)	Short-circuit capacity at the drive supply point(1)	Short-circuit capacity at the drive output (X) (2)	Power feeder (Z1)	Power range (Z2)
	V	kA	kA		A
8I74S200018.01P-1, 8I74S200018.00-000	200-240	1	5	Fast Acting or Class DC Ferraz ATDR	7
8I74S200037.01P-1, 8I74S200037.00-000	200-240	1	5	Fast Acting or Class J Ferraz HSJ	15
8I74S200055.01P-1, 8I74S200055.00-000	200-240	1	5	Fast Acting or Class J Ferraz HSJ	25
8I74S200075.01P-1, 8I74S200075.00-000	200-240	1	5	Fast Acting or Class J Ferraz HSJ	25
8I74S200110.01P-1, 8I74S200110.00-000	200-240	1	5	Fast Acting or Class J Ferraz HSJ	25
8I74S200150.01P-1, 8I74S200150.00-000	200-240	1	5	Fast Acting or Class J Ferraz HSJ	40
8I74S200220.01P-1, 8I74S200220.00-000	200-240	1	5	Fast Acting or Class J Ferraz HSJ	45
8I74T400037.01P-1, 8I74T400037.00-000	380-500	5	5	Fast Acting or Class DC Ferraz ATDR	6
8I74T400055.01P-1, 8I74T400055.00-000	380-500	5	5	Fast Acting or Class DC Ferraz ATDR	6
8I74T400075.01P-1, 8I74T400075.00-000	380-500	5	5	Fast Acting or Class DC Ferraz ATDR	6
8I74T400110.01P-1, 8I74T400110.00-000	380-500	5	5	Fast Acting or Class DC Ferraz ATDR	12
8I74T400150.01P-1, 8I74T400150.00-000	380-500	5	5	Fast Acting or Class DC Ferraz ATDR	12
8I74T400220.01P-1, 8I74T400220.00-000	380-500	5	5	Fast Acting or Class J Ferraz HSJ	15
8I74T400300.01P-1, 8I74T400300.00-000	380-500	5	5	Fast Acting or Class J Ferraz HSJ	17.5
8I74T400400.01P-1, 8I74T400400.00-000	380-500	5	5	Fast Acting or Class J Ferraz HSJ	25
8I74T400550.01P-1, 8I74T400550.00-000	380-500	22	22	Fast Acting or Class J Ferraz HSJ	40
8I74T400750.01P-1, 8I74T400750.00-000	380-500	22	22	Fast Acting or Class J Ferraz HSJ	40
8I74T401100.01P-1, 8I74T401100.00-000	380-500	22	22	Fast Acting or Class J Ferraz HSJ	60
8I74T401500.01P-1, 8I74T401500.00-000	380-500	22	22	Fast Acting or Class J Ferraz HSJ	70

(1) The power grid short-circuit capacity at the drive supply point corresponds to the thermal rating of the drive. Additional inductance is required in installations with a higher short-circuit capacity.

(2) Output interrupt rating relies on Integral solid state short circuit protection. This does not provide power feeder protection. Branch circuit protection must be provided in accordance with the National Electrical Code (USA) and any additional local codes. This is dependent on the type of installation.

Recommended fuse rating to meet UL and CSA requirements Components for use in conformance with the UL508 standard.

Suitable for use on a power supply grid with a short-circuit capacity of no more than ___X____ A rms, symmetrical, no more than ___Y____ Volts, when protected by __Z 1____ with a maximum rating of__Z 2___.

2.11 Common DC bus

2.11.1 Introduction

Whether to produce accelerated or constant motion, a drive system requires energy that must be supplied to the system. By retarding a motion, a motor can function as a generator. A large part of the kinetic energy is resupplied to the system as electrical energy.

Since electrical energy can only be stored in limited quantities in drive amplifiers, the extra energy in a single drive amplifier is converted to thermal energy by a brake resistor.

Usefulness of the electrical energy

When an application requires several drive systems, the resupplied energy can be used to power other motors. In countercyclical operations, where one motor slows while another simultaneously accelerates, resupplied energy is used very efficiently. The energy exchange can succeed if the DC bus is connected to the drive amplifier.

2.11.2 Before you begin - Safety information

The information in this document is a supplement to the manuals. First, read and understand the manuals for the products in your application.

2.11.2.1 Basic information

Danger!

DANGER OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH.

- **Only specialists who have thoroughly read and understood the content of this and all other applicable manuals should undertake any work on this product. Installation, adjustment, repairs and maintenance must by performed by qualified personnel only.**
- **The builder is responsible for obtaining all necessary permits and complying with all national and local codes and regulations with respect to grounding the drive system.**
- **Many components of the product, including circuit boards, work with line power. DO NOT TOUCH. Use only electrically insulated tools.**
- **Do not touch uninsulated parts or contacts while under voltage.**
- **The motor produces voltage when the shaft is turned. Secure the motor shaft against accidental drive before working on any part of the system.**
- **AC volts in the motor cable can over-couple to unused conductors. Insulate unused wires at both ends of the motor cable.**
- **Do not short circuit DC bus and DC bus capacitors.**
- **Before working on the drive system:**
    - **Make all connections while disconnected from the power supply; including possible external control signals.**
    - **Mark all switches "DO NOT TURN ON".**
    - **Secure all switches against accidental power-on.**
    - **Wait 15 minutes (to give DC bus capacitors time to discharge). Measure the voltage on the DC bus according to the chapter titled "Voltage measurements on the DC bus" and verify that it is <42 VDC. The DC bus LED by itself does not constitute verification of discharge of the DC bus voltage.**
- **Install and close all covers before restoring power.**

Failure to follow these instructions can result in death or serious injury.

Warning!

LOSS OF CONTROLLER FUNCTION

- **When designing the control system, the builder must take into account potential control path failures and make adequate provisions to protect critical functions in such a way that both during and after a control path failure, conditions remain safe. Examples of critical control functions: EMERGENCY STOP, limit of travel, power loss, and restarts.**
- **Separate or redundant control paths must be present for critical functions.**
- **Plant controls can include communication links. The builder must anticipate and take into consideration the potential consequences of network lag-time or outages in the context of taking the control system "on-line".**
- **Observe all accident prevention rules as well as all relevant safety specifications.** [1)]
- **Every facility that uses the product described in this manual must be thoroughly examined on the correct function of the system, before bringing it into operation.**

Failure to observe these precautions can result in death or serious injury.

2.11.2.2 Voltage measurement at the DC bus

Before working on the product, all connections to the power supply must be switched off.

Danger!

DANGER OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- **This measurement should only be performed by specialists who have read and understand "Before you begin - Safety information" on page 84.**

Failure to follow these instructions can result in death or serious injury.

Voltage at the DC bus can exceed 800 VDC. Use an appropriately rated voltmeter for the measurement.

Procedure:

- Switch off all connections to the power supply.
- Wait 15 minutes (to allow the DC bus capacitors time to discharge).
- Measure the DC bus voltage between the DC bus terminals and verify that it is <42 VDC.
- If the DC bus capacitors do not properly discharge, contact your local B&R representative. Do not attempt to repair the product yourself and do not put it into operation.

The DC bus LED by itself does not constitute verification of discharge of the DC bus voltage.

2.11.2.3 Standards and terminology

Technical concepts, terminology and descriptions in this manual should be representative of the terms and definitions used in the respective standards and norms.

In the domain of drive technology, these include terms such as "safety function", "secure state", "fault", "fault reset", "outage", "error", "error message", "warning", "warning message", etc.

Among the relevant standards are:

- IEC 61800 Series: "Electrical drive systems with adjustable speed"
- IEC 61158 Series: "Digital data communication in control technology - Field bus for industrial control systems"
- IEC 61784 Series: "Industrial communications networks - Profile"
- IEC 61508 Series: "Functional safety of electrical/electronic/programmable electronic safety related systems"

[1)] For USA: see NEMA ICS 1.1 (newest edition), “Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control” and NEMA ICS 7.1 (newest edition), “Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems”.

2.11.3 Technical data

2.11.3.1 Drive amplifier data

2.11.3.1.1 Permissible device types for a shared/common DC bus

The DC bus of the following driver amplifiers can be connected:

200 to 240 V		380 to 500 V	
8I74S200018.01P-1	8I74S200018.00-000	8I74T400037.01P-1	8I74T400037.00-000
8I74S200037.01P-1	8I74S200037.00-000	8I74T400055.01P-1	8I74T400055.00-000
8I74S200055.01P-1	8I74S200055.00-000	8I74T400075.01P-1	8I74T400075.00-000
8I74S200075.01P-1	8I74S200075.00-000	8I74T400110.01P-1	8I74T400110.00-000
8I74S200110.01P-1	8I74S200110.00-000	8I74T400150.01P-1	8I74T400150.00-000
8I74S200150.01P-1	8I74S200150.00-000	8I74T400220.01P-1	8I74T400220.00-000
8I74S200220.01P-1	8I74S200220.00-000	8I74T400300.01P-1	8I74T400300.00-000
		8I74T400400.01P-1	8I74T400400.00-000
		8I74T400550.01P-1	8I74T400550.00-000
		8I74T400750.01P-1	8I74T400750.00-000
		8I74T401100.01P-1	8I74T401100.00-000
		8I74T401500.01P-1	8I74T401500.00-000

2.11.3.1.2 ACOPOSinverter P74 Data DC bus

ACOPOSinverter P74 - 1-phase 200 to 240V

8I74... (1~)		S200018.01P-1		S200037.01P-1		S200055.01P-1		S200075.01P-1	
Nominal voltage (1~)	[VAC]	200	240	200	240	200	240	200	240
Nominal voltage DC bus	[V]	283	339	283	339	283	339	283	339
Undervoltage limit	[V]	200	200	200	200	200	200	200	200
Overvoltage limit	[V]	415	415	415	415	415	415	415	415
Maximum continuous power output (DC bus)(1)	[kW]	0.3	0.3	0.58	0.58	0.84	0.84	1.1	1.1
Maximum continuous current (DC bus)	[A]	3.4	2.8	6.0	5	7.9	6.7	10.1	8.5

(1) Parameter dCCC **[DC bus compat.]** has no effect on 1-phase drive amplifiers

8I74... (1~)		S200018.01P-1	S200037.01P-1	S200055.01P-1	S200075.01P-1
Capacity of internal capacitors	[µF]	220	440	880	880
External braking resistance minimum	[Ω]	40	40	40	
Parameter dCCC [DC bus compat.] = NO (Default value)					
Power-on voltage braking resistance	[V]	395	395	395	395
Energy absorption of internal capacitors E_{var} at nominal 200 V	[Ws]	8	17	33	33
Energy absorption of internal capacitors E_{var} at nominal 240 V	[Ws]	5	9	18	18

8I74... (1~)		S200110.01P-1		S200150.01P-1		S200220.01P-1	
Nominal voltage (1~)	[VAC]	200	240	200	240	200	240
Nominal voltage DC bus	[V]	283	339	283	339	283	339
Undervoltage limit	[V]	200	200	200	200	200	200
Overvoltage limit	[V]	415	415	415	415	415	415
Maximum continuous power output (DC bus)	[kW]	1.56	1.56	2.08	2.08	2.9	2.9
Maximum continuous current (DC bus)	[A]	13.6	11.5	17.6	14.8	23.9	20.1

8I74... (1~)		S200110.01P-1	S200150.01P-1	S200220.01P-1
Capacity of internal capacitors	[µF]	1680	1680	2240
External braking resistance minimum	[Ω]	27	27	25
Parameter dCCC [DC bus copat.] = N (Default value)(1)				
Power-on voltage braking resistance	[V]	395	395	395
Energy absorption of internal capacitors E_{var} at nominal 200 V	[Ws]	64	64	85
Energy absorption of internal capacitors E_{var} at nominal 240 V	[Ws]	35	35	46

(1) Parameter dCCC [DC bus compat.] has no effect on 1-phase drive amplifiers

ACOPOSinverter P74 - 3-phase 380 to 500V

8I74... (3~)		T400037.01P-1		T400055.01P-1		T400075.01P-1		T400110.01P-1		T400150.01P-1	
Nominal voltage (3~)	[VAC]	380	500	380	500	380	500	380	500	380	500
Nominal voltage DC bus	[V]	537	707	537	707	537	707	537	707	537	707
Undervoltage limit	[V]	390	390	390	390	390	390	390	390	390	390
Overvoltage limit	[V]	825	825	825	825	825	825	825	825	825	825
Maximum continuous power output (DC bus)	[kW]	0.6	0.6	0.84	0.84	1.1	1.1	1.6	1.6	2.1	2.1
Maximum continuous current (DC bus)	[A]	2.5	2.0	3.4	2.6	4.4	3.4	6.1	4.6	8.0	6.0

8I74... (3~)		T400037.01P-1	T400055.01P-1	T400075.01P-1	T400110.01P-1	T400150.01P-1
Capacity of internal capacitors	[µF]	110	220	220	220	220
External braking resistance minimum	[Ω]	80	80	80	54	54
Parameter dCCC [DC bus compat.] = NO (Default value)						
Power-on voltage braking resistance	[V]	785	785	785	785	785
820$_{var}$ at nominal 380 V	[Ws]	21	42	42	42	42
Energy absorption of internal capacitors E_{var} at nominal 500 V	[Ws]	9	19	19	19	19
Parameter dCCC [DC bus compat.] = Main or dCCC [DC bus compat.] = bus (Reduced power-on voltage)						
Power-on voltage braking resistance	[V]	780	780	780	780	780
Energy absorption of internal capacitors E_{var} at nominal 380 V	[Ws]	18	35	35	35	35
Energy absorption of internal capacitors E_{var} at nominal 500 V	[Ws]	6	12	12	12	12

8I74... (3~)		T400220.01P-1		T400300.01P-1		T400400.01P-1		T400550.01P-1		T400750.01P-1	
Nominal voltage (3~)	[VAC]	380	500	380	500	380	500	380	500	380	500
Nominal voltage DC bus	[V]	537	707	537	707	537	707	537	707	537	707
Undervoltage limit	[V]	390	390	390	390	390	390	390	390	390	390
Overvoltage limit	[V]	820	820	820	820	820	820	820	820	820	820
Maximum continuous power output (DC bus)	[kW]	2.9	2.9	3.9	3.9	5.07	5.07	6.8	6.8	9.1	9.1
Maximum continuous current (DC bus)	[A]	10.6	8.1	13.6	10.3	16.8	12.9	25.2	19.4	32.2	24.8

8I74... (3~)		T400220.01P-1	T400300.01P-1	T400400.01P-1	T400550.01P-1	T400750.01P-1
Capacity of internal capacitors	[µF]	280	390	550	780	1110
External braking resistance minimum	[Ω]	54	54	36	27	27
Parameter dCCC [DC bus compat.] = NO (Default value)						
Power-on voltage braking resistance	[V]	820	820	820	820	820
Energy absorption of internal capacitors E_{var} at nominal 380 V	[Ws]	54	75	106	150	213
Energy absorption of internal capacitors E_{var} at nominal 500 V	[Ws]	24	34	47	67	96
Parameter dCCC [DC bus compat.] = Main or dCCC [DC bus compat.] = bus (Reduced power-on voltage)						
Power-on voltage braking resistance	[V]	780	780	780	780	780
Energy absorption of internal capacitors E_{var} at nominal 380 V	[Ws]	45	62	88	125	178
Energy absorption of internal capacitors E_{var} at nominal 500 V	[Ws]	15	21	30	42	60

8I74... (3~)		T401100.01P-1		T401500.01P-1	
Nominal voltage (3~)	[VAC]	380	500	380	500
Nominal voltage DC bus	[V]	537	707	537	707
Undervoltage limit	[V]	390	390	390	390
Overvoltage limit	[V]	820	820	820	820
Maximum continuous power output (DC bus)	[kW]	12.9	12.9	17.2	17.2
Maximum continuous current (DC bus)	[A]	43.8	33.6	56.7	43.5

8I74... (3~)		T401100.01P-1	T401500.01P-1
Capacity of internal capacitors	[µF]	1410	1660
External braking resistance minimum	[Ω]	16	16
Parameter dCCC [DC bus compat.] = NO (Default value)			
Power-on voltage braking resistance	[V]	820	820
Energy absorption of internal capacitors E_{var} at nominal 380 V	[Ws]	271	319
Energy absorption of internal capacitors E_{var} at nominal 500 V	[Ws]	122	143
Parameter dCCC [DC bus compat.] = Main or dCCC [DC bus compat.] = bus (Reduced power-on voltage)			
Power-on voltage braking resistance	[V]	780	780
Energy absorption of internal capacitors E_{var} at nominal 380 V	[Ws]	226	266
Energy absorption of internal capacitors E_{var} at nominal 500 V	[Ws]	77	90

2.11.3.2 Fuses

The common DC busing of several drive amplifiers can be realized in many different ways. Depending on the application, you will need a mains fuse and a fuse for the DC bus.

Mains fuse

Choose your fuse size based on the power of the drive amplifier and the gauge/cross-sectional area of the conductor. Observe the guidelines in the chapter "Installation" on page 54.

The maximum allowable fuse values must be used.

Maximum allowable values of the mains fuses

Maximum fuse value for 1-phase drive amplifiers:

- 25 [A]

Maximum fuse value for 3-phase drive amplifiers:

- 32 [A]

Fuse for DC bus

Use appropriate fuses for the common DC bus.

Choose your fuse size as small as possible based on the power of the drive amplifier and the gauge/cross-sectional area of the conductor.

The maximum permissible fuse sizes must be maintained.

Example

One drive amplifier has a maximum continuous current via the DC bus of 6 A. For the DC bus fuses for this drive amplifier, 10 A fuses are chosen.

Maximum allowable values for fuses for the DC bus

Maximum value of fuses for the DC bus for 1-phase drive amplifiers:

- 25 [A]

Maximum value of fuses for the DC bus for 3-phase drive amplifiers:

- 32 [A]

2.11.3.3 Cable for DC bus

Minimum requirement for a cable for the common/shared DC bus

A cable for the common DC bus must possess the following characteristics.

- Shielded for cable lengths >0.2 m
- Twisted pair for cable lengths >0.2 m
- Cables: two-wire, shielded
- Maximum cable length of a connection cable for DC bus: 3 m
- Special features:
  - Insulation must be designed for DC bus voltage.
  - Conductor cross-sectional area corresponding to the calculated current, but at least 2x 6 mm^2(2x AWG 10).

> **Note:**
>
> **The connection of fuses for the DC bus must be designed for the entire DC bus current of all drive amplifiers. Consider the worst case scenario (e.g., Emerg stop) and choose an appropriate gauge/ cross-sectional area.**

Cable properties for DC bus 8I0XC003.415-1

- Shielded
- Twisted pair
- Cables: 2x 6mm^2 (2x AWG 10)

Crimp contact 8I0XC004.400-1

- Connection cross section: 3 to 6 mm^2 (AWG 12 to AWG 10)

2.11.3.4 Braking resistors

The minimum values for external brake resistance given in the list of drive amplifiers must not be undershot.

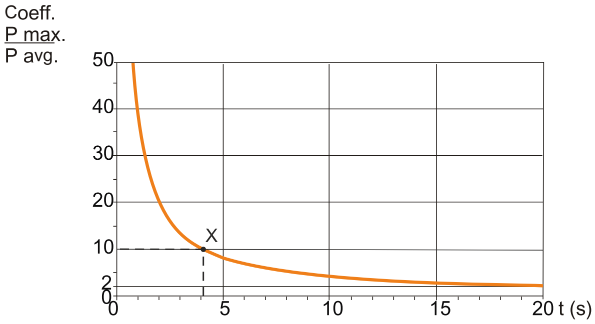
The ACOPOSinverter P74 drive amplifiers have a connection for an external brake resistor. Depending on the dynamics of the application, one or more external brake resistors might have to be attached.

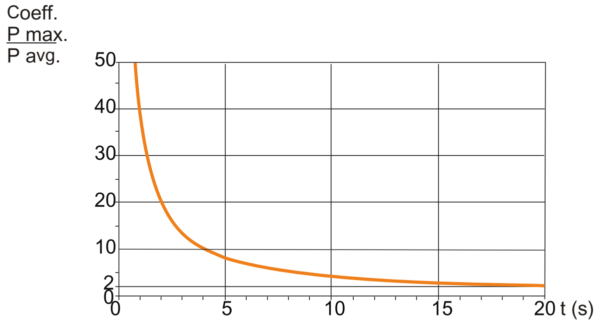
External brake resistors (Acces.)

8I0BR		100.000-1	060.000-1	028.000-1	015.000-1	010.000-1
Resistance value	[Ω]	100	60	28	15	10
Continuous power P_{BR}	[W]	50	100	200	1000	1000
Protection class		IP20	IP20	IP20	IP20	IP20
UL-certified (File nr.)		E221095	E221095	E221095	E221095	E221095

8I0BR100.000-1 (P continuous = 0.05 kW) for 100 Ω at 20°C

For a 120 second cycle, the 100 Ω resistor can handle an overload of 10 x 0.05 kW (continuous power) for 4 s, i.e. braking power equaling 0.5 kW every 120 s.





2.11.3.5 Line filter

The value of the fuse before the common external line filter must not be greater than the nominal current of the external line filter.

Note:

3-phase line filters have no connection for the neutral conductor and so are only permitted for 3-phase drives.

You can find information about external line filters in the chapter "Installation" on page 54.

2.11.3.6 Mains choke

If one drive amplifier requires a mains choke, then all drive amplifiers linked via the DC bus must be outfitted with mains chokes.

The value of the fuse before the common mains choke must not be greater than the rated current of the mains choke.

You can find information about mains chokes in the chapter "Installation" on page 54.

2.11.4 Project development

In this chapter you will find information on planning a project to link the DC bus to several drive amplifiers.

The information in the "Installation" on page 54 chapter must also be taken into account.

> ## Warning!
>
> **DESTRUCTION OF PROPERTY AND LOSS OF THE CONTROL SYSTEM**
>
> **Incorrect use of the parallel switches of the DC bus can destroy the drive amplifiers immediately or over time.**
>
> - **Pay careful attention to the instructions for using the parallel circuit of the DC bus.**
>
> **Failure to follow these instructions can result in death, serious injury or material damages.**

2.11.4.1 Special notes: EMC - Electromagnetic Compatibility

When drive amplifiers share a common DC bus, there are a few things to be aware of regarding EMC:

- Keep the DC bus cables as short as possible.
- For any cable over 0.2 m in length, shielded cable must be used. In case of screened DC bus fix the cable screen over a large area on the screen mounting.

2.11.4.2 Mounting spacing

Be sure to leave enough space for the DC bus cable when determining mounting clearances.

2.11.4.3 Energy Equation

In order to estimate the effect of a planned DC bus assemblage of boosters, the positioning of an energy balance of individual attributes over a movement cycle is helpful. Each movement cycle includes the phases acceleration, similar movement and delay.

The energy discharged at the time of delay can be used with a common DC bus by other boosters. Excessive energy must be accepted over brake resistance.

Energy acceptance

The energy acceptance is influenced by following points:

- DC bus capacitors $E_{var\ in}$ booster
- Electrical loss of drive system E_{el}
- Mechanical loss of equipment and drive system E_{mech}
- Brake resistance E_B

The energy E_{var} depends quadratically on the difference between the DC bus voltage before the delay and reaction point.

The energy acceptance by the DC bus capacitors is minimum at highest network voltage. For the calculation use the values of highest network voltage.

Electrical loss E_{el}

The electrical loss E_{el} of drive can be estimated from the peak output of the booster. In case of a typical degree of efficiency of 90% the maximum loss performance is approximately 10% of peak output. If in case of delay a lower current is flowing, the loss performance reduces accordingly.

Mechanical loss E_{mech}

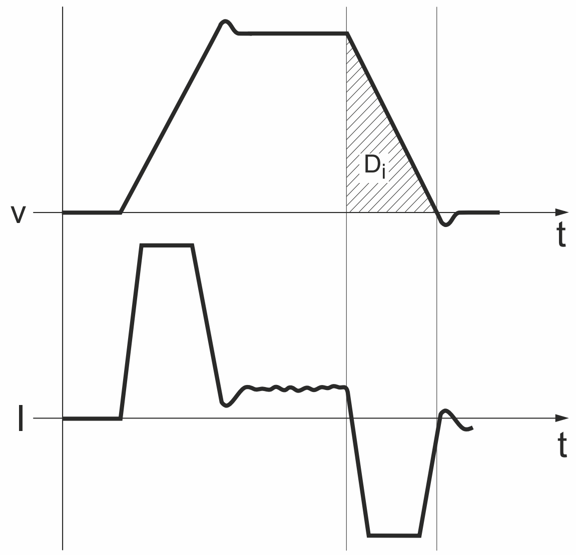
The mechanical loss results from the friction, which occurs at the time of operation of equipment. The mechanical loss is negligible, if the equipment requires longer time for idleness than required without propulsive force, in which the equipment should be braked. The mechanical loss can be calculated from the load moment and the speed, from which the engine must come to idleness.

Braking resistors

Two parameters are authoritative for the energy acceptance of a brake resistance.

- The continuous output P_{PR} shows how much energy can be conducted in the long run, without overloading the brake resistance.
- The maximum energy ECR restricts the short term expendable, higher performance.

Dimensioning



This profile with the speed (v) and engine phase current (I) is also used in case of dimensioning of engine and brake resistance. The segment to be considered, in which the movement is delayed, is identified with D_i.

Calculation of energy in case of constant delay:

For this the total torque of inertia (J_t) should be known.

For J_t following is valid:

$J_t = J_m + J_c$

J_m: Motor torque of inertia with or without holding brake

J_c: Load inertia

Energy for every delay segment is calculated as follows: $E_i = \frac{1}{2} J_t \times \omega_i^2 = \frac{1}{2} J_t \times \left[\frac{2\pi n_1}{60}\right]^2$

Units: E_i in Ws (Watt seconds), J_t in kgm², ω in wheel and n_i in min^{-1}. The energy acceptance E_{var} of device (without consideration of an internal or external brake resistance) can be taken from the technical data.

In the further calculation consider only the segments D_i, whose energy E_i exceeds the energy acceptance of devices. This additional energy E_{Di} should be discharged over the brake resistance (internal or external).

Calculation of E_{Di} takes place with the formula:

$E_{Di} = E_i - E_{var}$ (in Ws)

The continuous output P_c is calculated for each machine cycle: $P_c = \frac{\Sigma E_{Di}}{Cycle\ \ time}$

Units: P_c in [W], E_{Di} in [Ws] and cycle time T in [s]

With the help of this calculation you can select the required brake resistance.

2.11.4.4 Prerequisites for the common DC bus

Only ACOPOSinverter P74 should be connected to each other.

The following conditions must be adhered to:

- Only booster with similar nominal voltage should be connected with a common DC bus.
- Only booster with similar phase number should be connected with a common DC bus. Connect only 3-phase booster with 3-phase boosters or 1-phase booster with 1-phase booster.
- 1-phase booster can be only connected to the same phase of network supply.
- Use only DC bus cable with the characteristics.

2.11.4.5 Structure of a common DC bus

A common DC bus can be structured depending upon requirement. Following concepts are described:

- Common network security
- Separate Network security
- DC supply over a booster
- DC supply over DC network portion

2.11.4.5.1 Common network securities

All boosters are connected over common network securities with the network supply.

Conditions

For the DC bus connection of boosters with common network securities following conditions must be fulfilled:

- All boosters have common network securities.

1-phase booster 8I74S200xxx.01P-1/8I74S200xxx.00-000	3-phase booster 8I74T40xxxx.01P-1/8I74T40xxxx.00-000
Maximum current acceptance of all connected booster: 25 A	Maximum current acceptance of all connected booster: 32 A

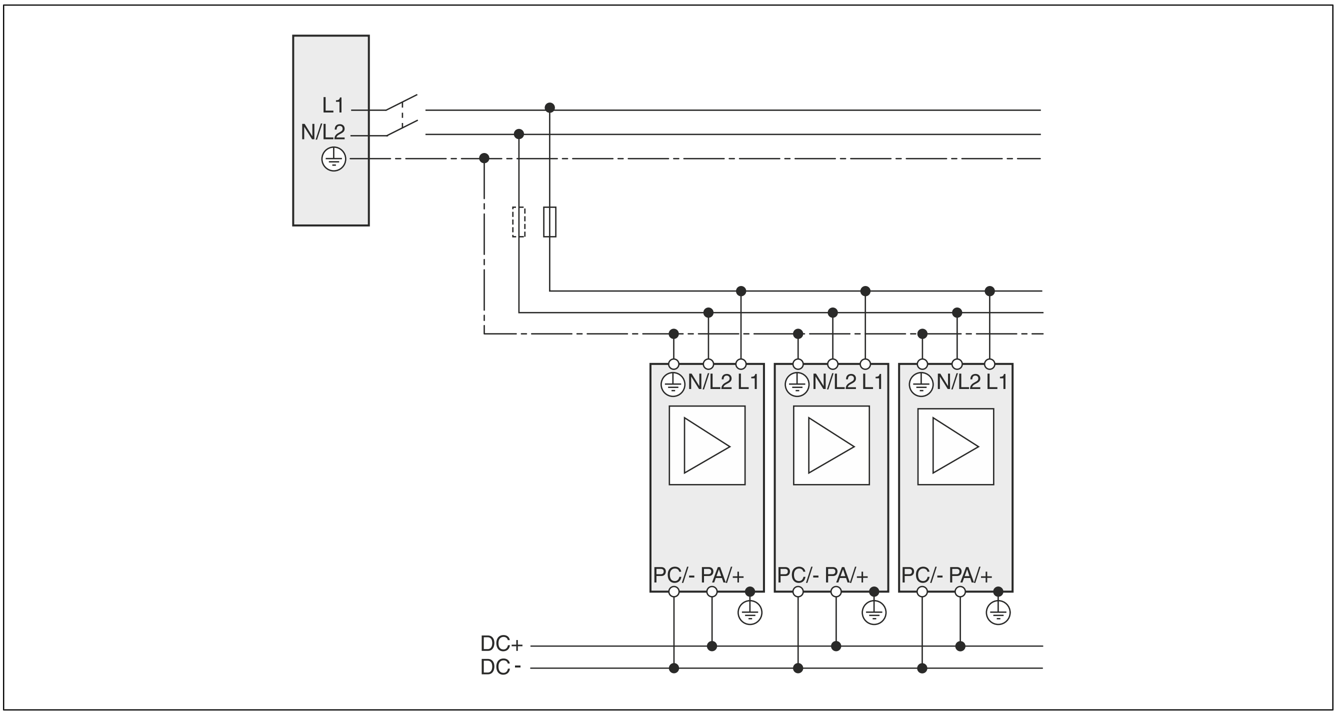
- The current of all booster provided over the DC bus should not exceed the maximum values given in the following table even through energy recovery. If the following maximum values are exceeded, DC security must be used.

1-phase booster 8I74S200xxx.01P-1/8I74S200xxx.00-000	3-phase booster 8I74T40xxxx.01P-1/8I74T40xxxx.00-000
Maximum DC bus current: 25 A	Maximum DC bus current: 32 A

- Only booster with similar phase number can be connected with the common DC bus. Connect only 3-phase booster with 3-phase boosters or 1-phase booster with 1-phase booster.
- Only booster with similar nominal voltage can be connected with a common DC bus.
- Booster 8I74S200xxx.01P-1/8I74S200xxx.00-000: Connect the 1-phase booster exclusively to the same phase.
- Activate on each booster the network phase monitoring.
- Activate on each device the parameter dCCC**[DC-bus compat.]**
- The performance of booster connected with a common DC bus can vary maximum by one level in the continuous output.
- Set the type of DC bus connection in parameter dCCM**[DC-bus chaining]**. This parameter can require further conditions.

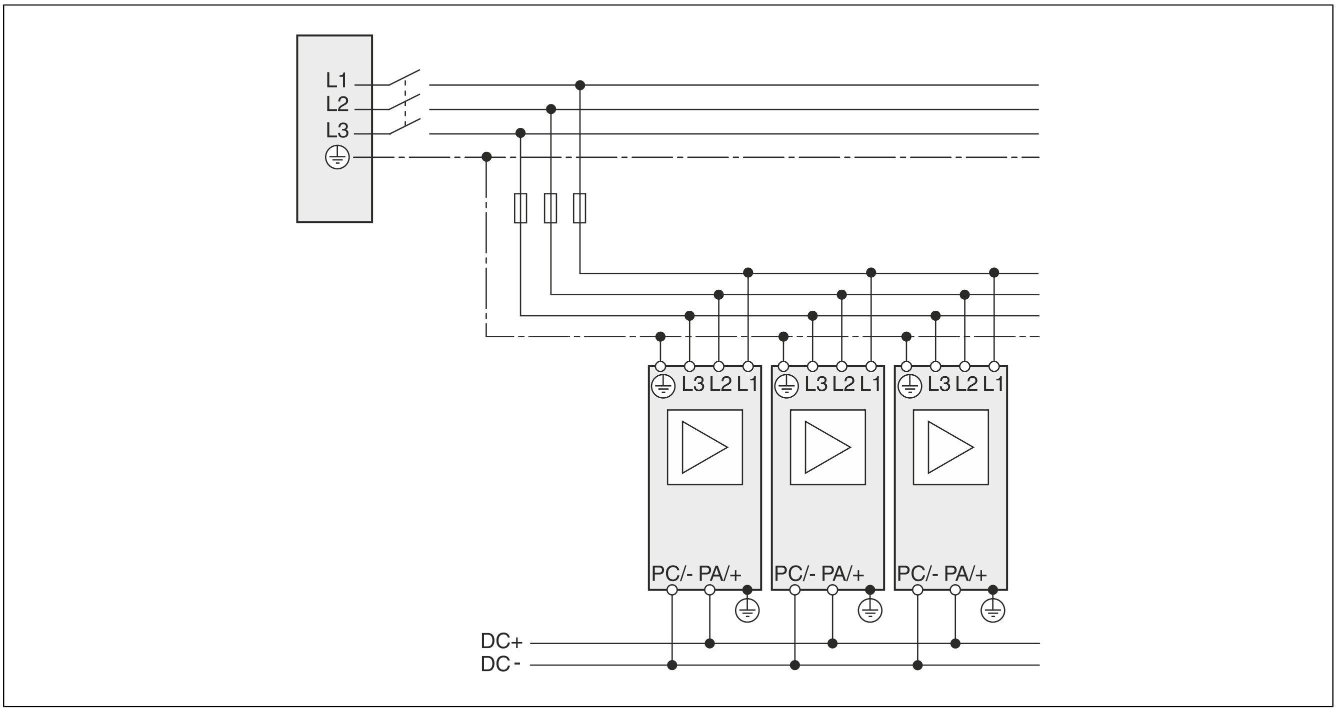
1-phase drive amplifiers

Joint mains fuse: 8I74S200xxx.01P-1/8I74S200xxx.00-000



3-phase drive amplifiers

Joint mains fuse: 8I74T40xxxx.01P-1/8I74T40xxxx.00-000



2.11.4.5.2 Separate mains fuse

Each drive amplifier is connected to the mains supply by own mains fuses.

Conditions

For the DC bus connection of drive amplifiers with separate mains fuses, the following conditions have to be met:

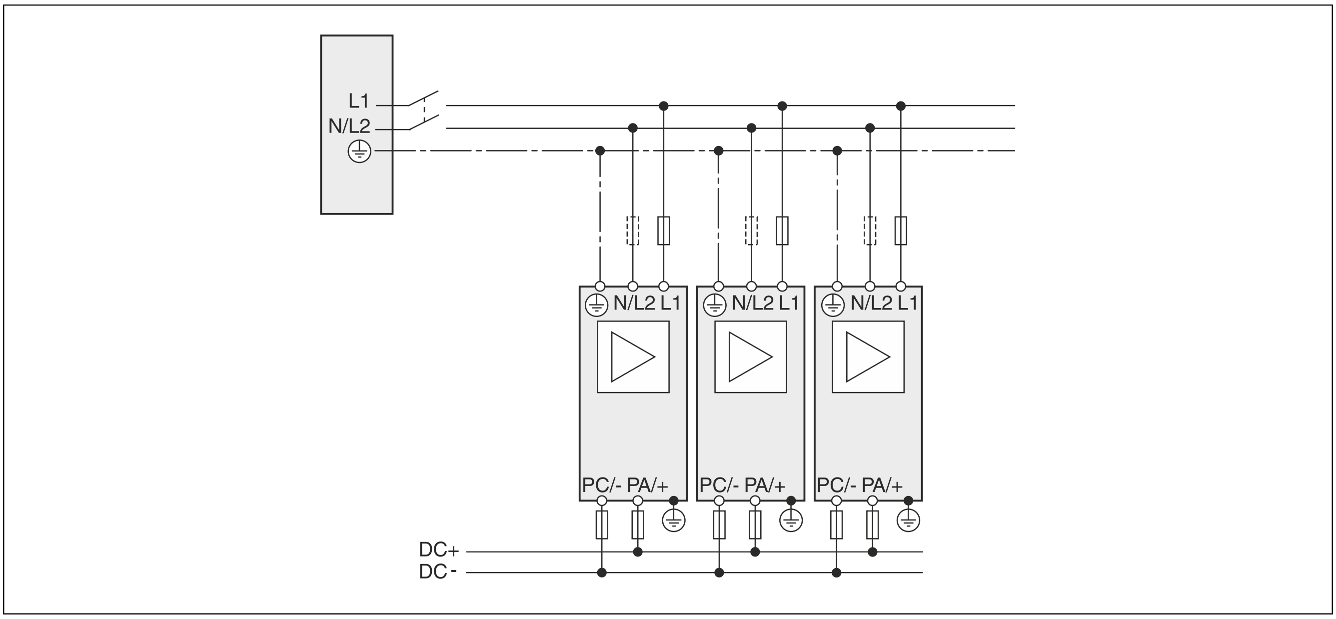
- Each drive amplifier requires its own mains fuses.
- For each drive amplifier, the fuses for the DC bus have to be used.
- Only drive amplifiers with an equal number of phases may be connected to a joint DC bus. Connect only 3-phase drive amplifiers to 3-phase drive amplifiers or 1-phase drive amplifiers to 1-phase drive amplifiers.
- Only drive amplifiers with an equal nominal voltage may be connected to a joint DC bus.
- Drive amplifier 8I74S200xxx.01P-1/8I74S200xxx.00-000: Connect 1-phase drive amplifier only to an equal phase.
- Activate the mains phase monitoring at each drive amplifier.
- The output of drive amplifiers connected to one joint DC bus may only differ in maximally one level regarding the continuous output.
- Set the type of DC bus connection in the parameter dCCM**[DC-Bus chaining]**. This parameter can require further conditions.

Note:

The connection of the fuses for the DC bus must be construed for the complete power of the DC bus of all drive amplifiers. Consider the critical case of application (for example EMERGENCY STOP) and select a corresponding wire cross section.

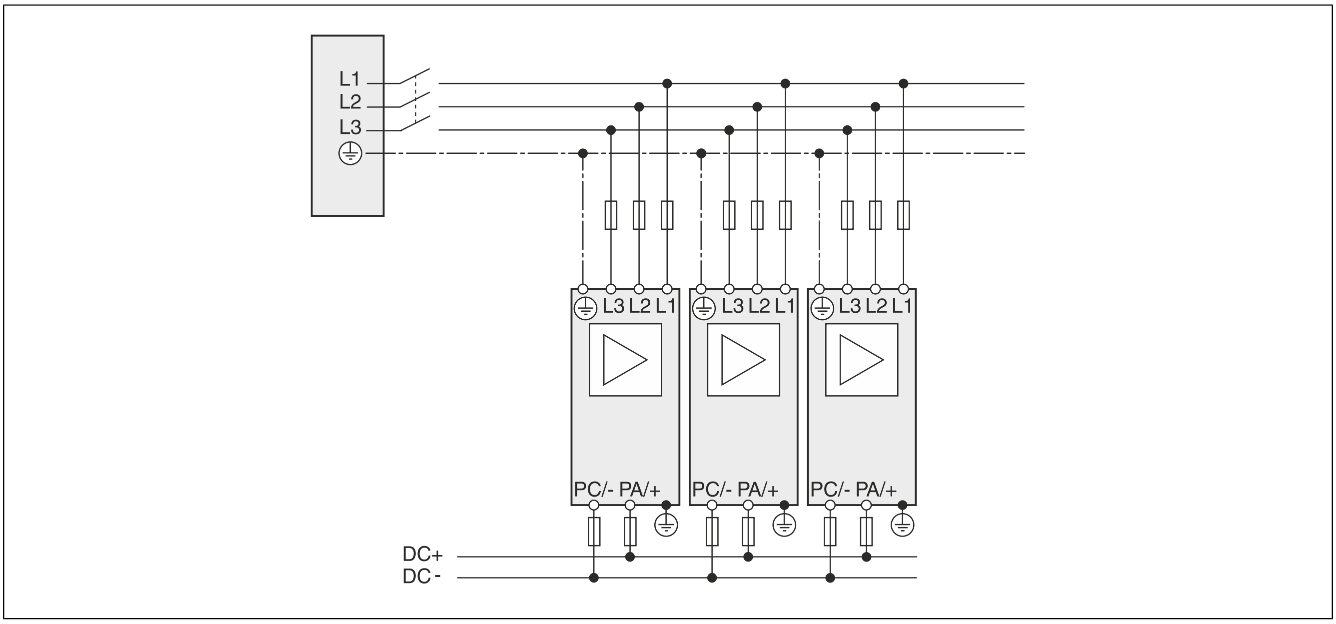
1-phase drive amplifier

Separate mains fuse: 8I74S200xxx.01P-1/8I74S200xxx.00-000



3-phase drive amplifiers

Separate mains fuse: 8I74T40xxxx.01P-1/8I74T40xxxx.00-000



2.11.4.5.3 DC supply via one drive amplifier

The drive amplifiers are supplied by a correspondingly huge drive amplifier via the DC bus.

Conditions

For the DC bus connection of drive amplifiers to a supplying drive amplifier, the following conditions have to be met:

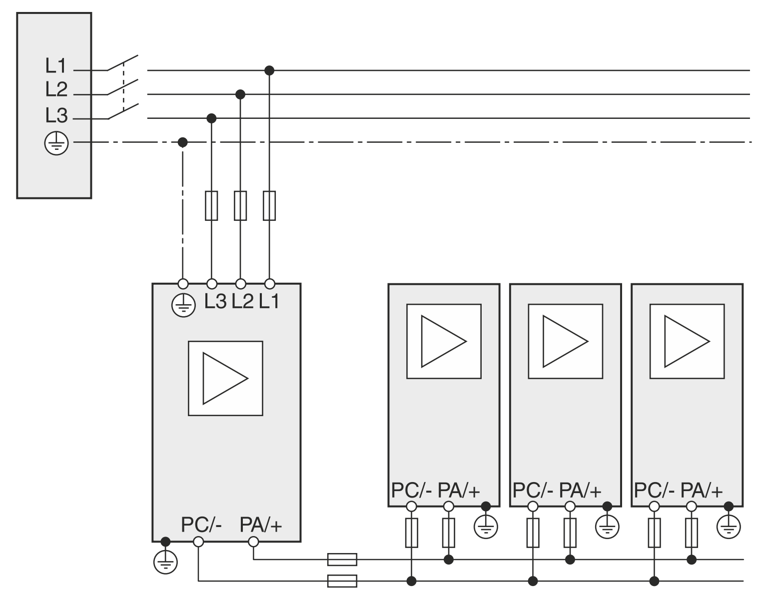
- Fuses have to be used for the DC bus.
- Only drive amplifiers with an equal number of phases may be connected to a joint DC bus. Connect only 3-phase drive amplifiers to 3-phase drive amplifiers or 1-phase drive amplifiers to 1-phase drive amplifiers.
- Only drive amplifiers with an equal nominal voltage may be connected to a joint DC bus.
- Set in the parameters dCCM**[DC Bus chaining]**, which is a type of DC bus connection. This parameter can require further conditions.

Note:

The connection of the fuses for the DC bus must be construed for the complete power of the DC bus of all drive amplifiers. Consider the critical case of application (for example EMERGENCY STOP) and select a corresponding wire cross section.

DC supply via one drive amplifier

For each drive amplifier, fuses for the DC bus have to be used.

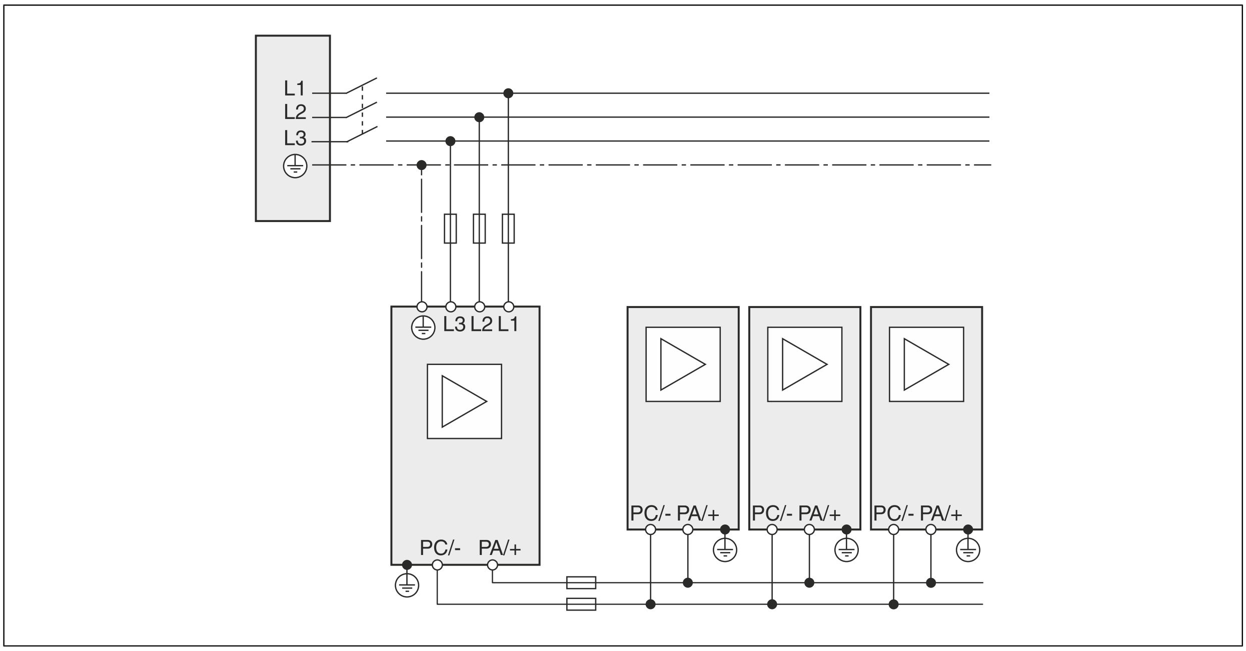


Special case

If the additional condition has been met, fuses between the supplying drive amplifier and the supplied DC bus are sufficient:

- The power of all drive amplifiers supplied by the DC bus does not exceed the values listed in the following table:

1-phase drive amplifier 8I74S200xxx.01P-1/8I74S200xxx.00-000	3-phase drive amplifier 8I74T40xxxx.01P-1/8I74T40xxxx.00-000
Maximum power consumption of all connected drive amplifiers: 25 A	Maximum power consumption of all connected drive amplifiers: 32 A
Maximum fuse value of the fuse for the DC bus: 25 A	Maximum fuse value of the fuse for the DC bus: 32 A
Maximum DC bus power: 25 A	Maximum DC bus power: 32 A



2.11.4.5.4 DC supply via DC power supply unit

The drive amplifiers are supplied by a DC power supply unit via the DC bus.

Conditions

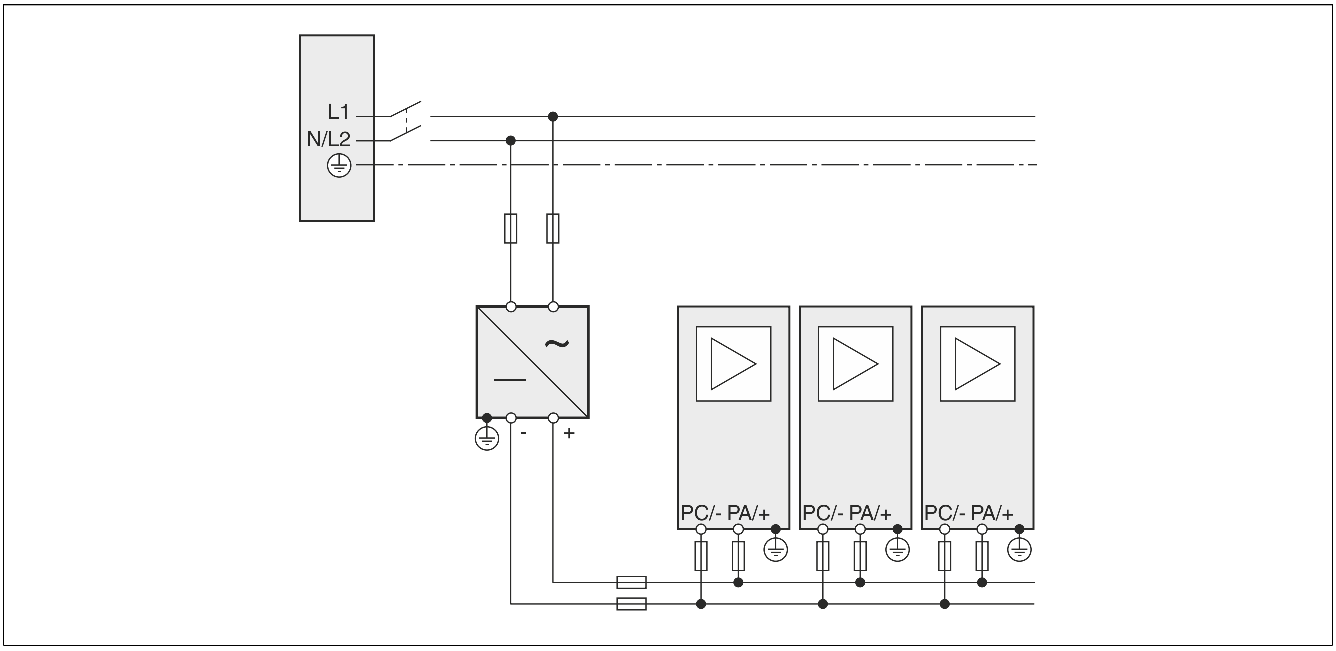
For the DC bus connection of drive amplifiers by means of a supplying DC power supply unit, the following conditions have to be met:

- Fuses have to be used for the DC bus.
- Only drive amplifiers with the same number of phases may be connected to a common DC bus. Connect only 3-phase drive amplifiers with 3-phase drive amplifiers or 1-phase drive amplifiers with 1-phase drive amplifiers.
- Only drive amplifiers with the same rated voltage may be connected to a common DC bus.
- The supplying DC power supply must be selected according to the supplied power amplifiers.
- Set in the parameters dCCM**[DC Bus chaining]**, which is a type of DC bus connection. This parameter may require additional conditions.

Note:

The connection of the fuses for the DC bus must be designed for the entire DC bus power of all drive amplifiers. Consider the most critical application case (e.g. emergency stop) and select a corresponding cross section area.

For each drive amplifier, fuses for the DC bus must be used.



2.11.4.6 Accessories for common DC bus

2.11.4.6.1 Braking resistors

Excess energy in the common DC bus must be received by braking resistors depending on the application, one or more braking resistors are connected.

Note:

If drive amplifiers are connected with a different nominal power via the DC bus, you need to connect external braking resistors to the drive amplifiers with the highest rated output. Refer to the manual for each product

2.11.4.6.1.1 Sizing the braking resistor

Warning!

UNBRAKED MOTOR

An insufficient braking resistor causes overvoltage on the DC bus and shuts down the amplifier. The motor is no longer actively braked.

- **Make sure that the brake resistor is sufficiently dimensioned.**
- **Check the setting of the parameters for the braking resistor.**
- **Check the I^2t-value in the critical condition by trial operation. With a I2 value of over 100% the device switches off.**
- **Consider the following when calculating and testing that at higher mains voltages less braking energy can be stored in the capacitors of the DC bus.**

Failure to follow these instructions can result in death, serious injury or material damages.

Warning!

HOT SURFACES

The braking resistor may heat up to over 250°C (482°F)

- **Avoid touching the hot braking resistor.**
- **Do not place flammable or heat-sensitive components in the vicinity of the braking resistor.**
- **Provide good heat dissipation.**
- **Check the temperature of the braking resistor in critical condition by trial operation**

Failure to follow these instructions can result in death, serious injury or material damages.

Braking resistors are required for dynamic applications. During the delay, kinetic energy in the motor is converted into electrical energy. The electric power increases the voltage of the DC bus. The braking resistor is connected at a predetermined threshold value. Electrical energy is converted into heat in the brake resistor. If high dynamic braking is required, the braking resistor must be well adapted to the system.

External braking resistor

An external braking resistor is required for applications in which the brake power is greater than the energy which can be absorbed by the driving amplifiers to the common DC bus. Remember when calculating the braking energy the extreme applications of their uses.

Example: With an emergency stop all drive amplifiers are braked simultaneously, the braking energy must be absorbed by the braking resistors.

Calculation of external brake resistor:

The size of an external braking resistor is determined by the required peak and continuous power, with which the braking resistor can be used.

The resistance value R is obtained from the required peak power and the DC bus voltage.

$$R = \frac{U^2}{P_{\mathrm{max}}}$$

U: Switching threshold [V]

P_{max}: Required peak power [W]

R: Resistance [Ω]

If two or more braking resistors are connected on one drive amplifier, consider the following criteria:

- The braking resistors must be connected in rows or in series, so that the required resistance value is achieved. Turn on only equal resistances in rows to charge all braking resistors evenly.
- The total resistance of all external braking resistors connected to a drive amplifier must not fall below a lower limit.
- The continuous output of the interconnected brake resistor network must be calculated. The result must be greater than or equal to the actually required continuous power.

Use only resistors, which are specified as braking resistors.

Connection of braking resistor:

With the accessories listed for the external braking resistors, there is an information sheet containing further details on mounting.

Further measures to be taken:

- Connect the braking resistors to the drive amplifier.
- Test under realistic conditions when commissioning the operation of the braking resistors.

Information:

FERRULES

If you use wire ferrules, use for these connection terminals only ferrules with collars.

2.11.4.6.1.2 Dimensioning optimization

For dimensioning, the components are calculated which contribute to absorbing braking energy.

An external braking resistor is required if the absorbed kinetic energy exceeds the sum of the internal components (DC bus capacitors).

The energy E_{var} depends quadratically on the difference between the voltage before the braking process and the response threshold.

The voltage before the braking operation depends on the mains voltage. The energy absorption by the DC bus capacitors is, at the highest voltage, at the lowermost. Use the values for the highest supply voltage when calculating.

Energy consumption braking resistor

Two parameters are decisive for the energy consumption of the braking resistor.

- The continuous power P_{PR} indicates how much energy can be dissipated in the long run, without overloading the braking resistor.
- The maximum energy E_{CR} limits the short dissipated, higher performance.

If the continuous power for a certain time interval is exceeded, the brake resistor for a corresponding period shall remain unloaded.

The characteristics P_{PR} and E_{CR} of the external braking resistors can be found in the chapter.

The estimation of electrical and mechanical losses.

Example

Braking of a rotary motor with the following data:

- Start speed: n = 4000 min^{-1}
- Rotary moment of inertia: J_R = 4 $kgcm^2$
- Load moment of inertia: J_L = 6 $kgcm^2$

The energy absorbed results in:

EB = 1/2 x J x $(2 \times \pi \times n \times 1/60)^2$

to 88 Ws

The electrical and mechanical losses are neglected.

In the DC bus capacitors, in this example 42 Ws are received (value depends on the device type).

The external braking resistor must absorb the remaining 46 Ws.

If the brake operation is repeated cyclically, the continuous power must be considered.

2.11.4.6.2 Line choke

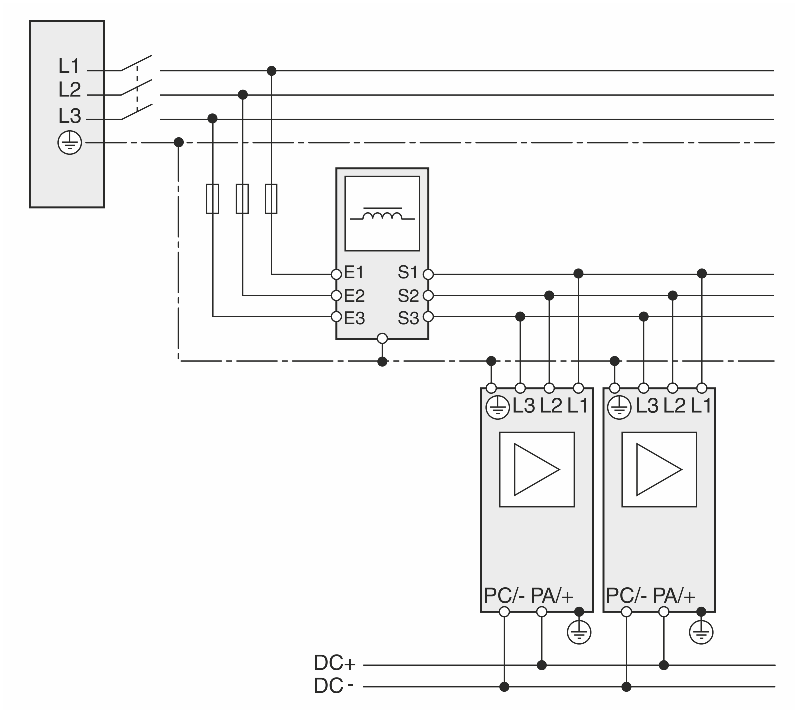
A line choke is required if at least one of the following apply:

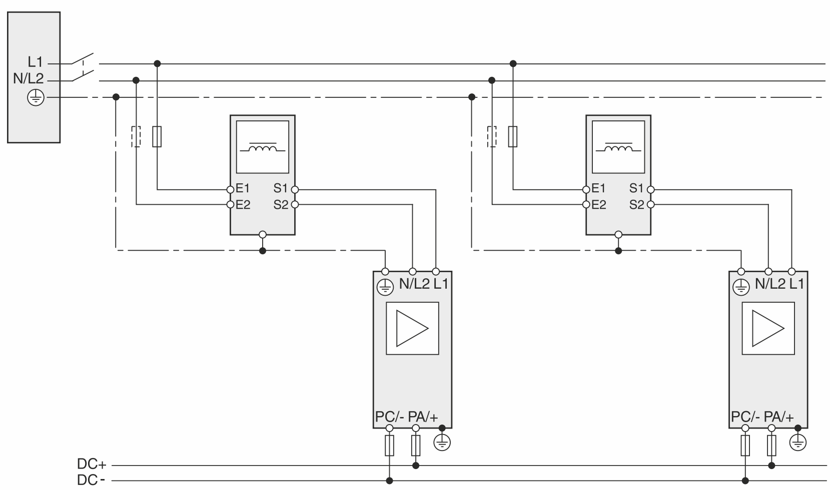
- Output of the drive amplifier is to be increased.
- Short-circuit current rating (SCCR) of the supply network is larger than required for the drive amplifier.
- Current harmonics on the mains are to be reduced.

Observe when choosing a line choke for several drive amplifier with a common AC fuse that the rated current of the line choke is greater than the sum of the input currents of all drive amplifier.

You can find information about mains chokes in the chapter "Installation" on page 54.

The fuse rating of the fuse before the line choke cannot be greater than the rated current of the line choke.





2.11.4.6.3 Cable for DC bus

The connection for the DC bus connection is made via a plug connector or via screw terminals.

2.11.5 Installation

Before starting the mechanical or electrical installation, a projection has to be executed.

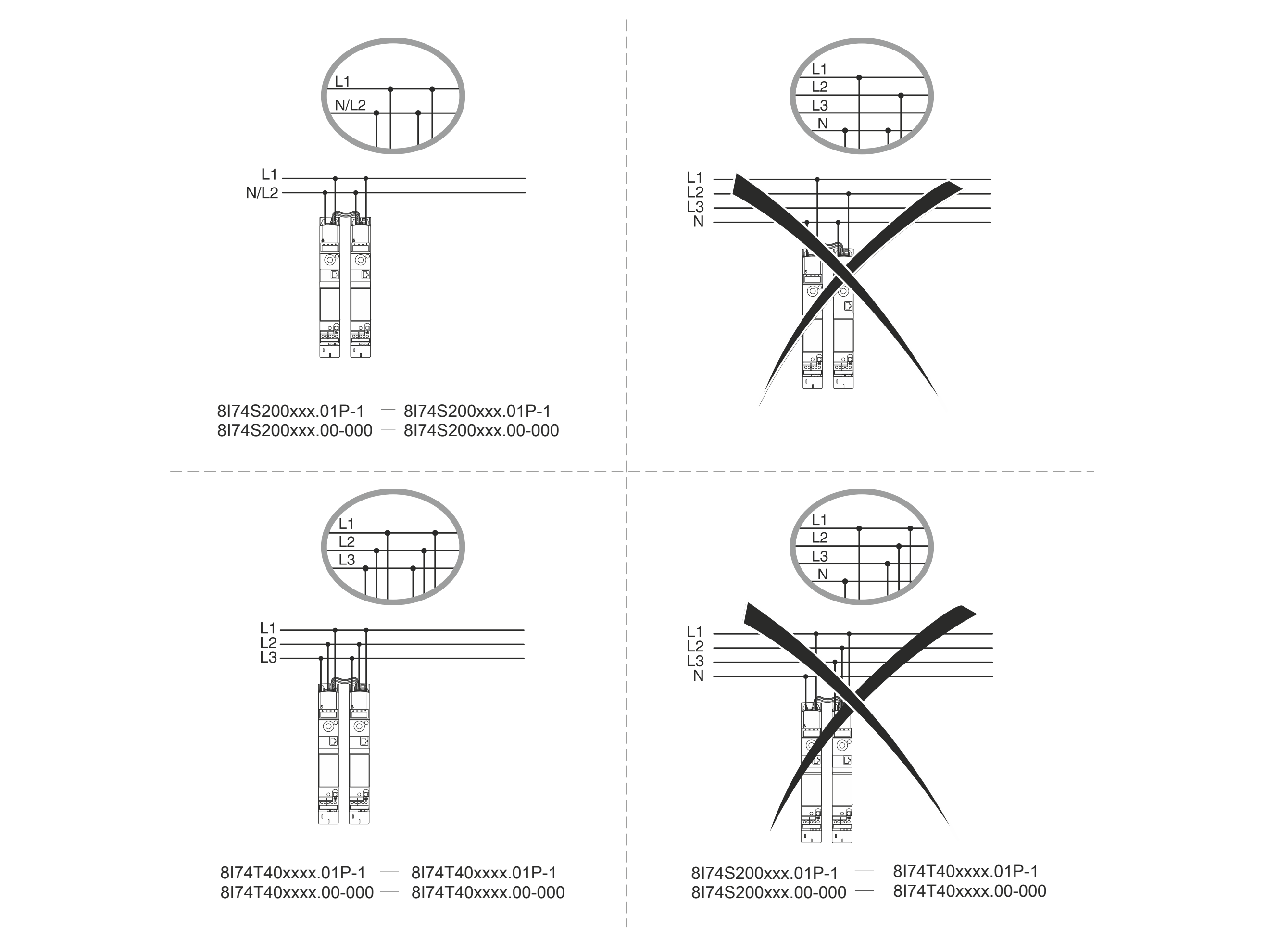
Warning!

DESTRUCTION OF PROPERTY AND LOSS OF THE CONTROL SYSTEM

Incorrect use of the parallel switches of the DC bus can destroy the drive amplifiers immediately or over time.

- **Pay careful attention to the instructions for using the parallel circuit of the DC bus.**

Failure to follow these instructions can result in death, serious injury or material damages.



2.11.5.1 Cable for DC bus

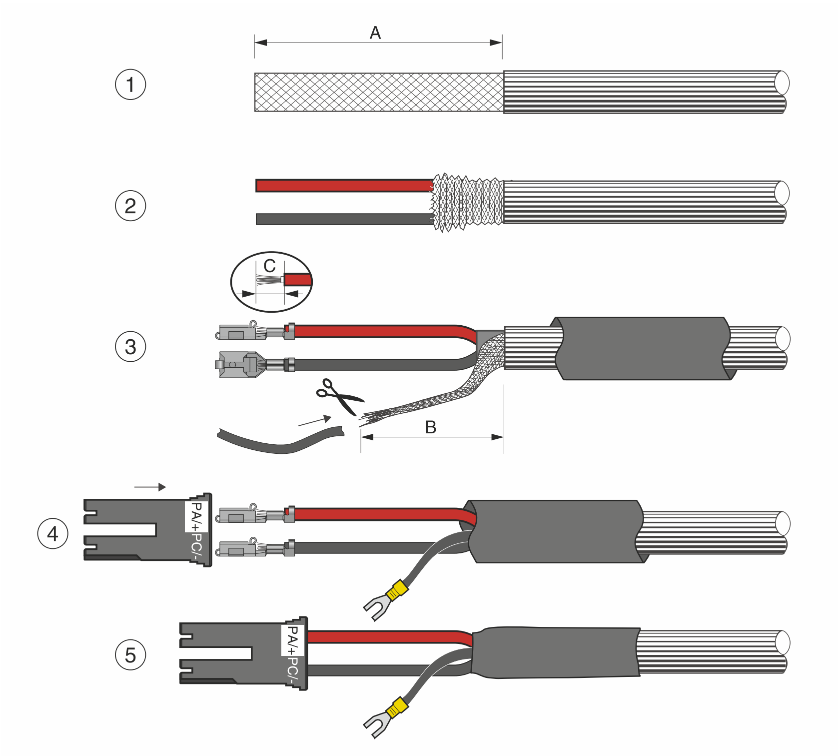
There are pre-assembled cables for the joint DC bus. If the pre-assembled cable does not comply with the required length, cables as reel material and crimp terminals are available.

Characteristics of the DC bus cable

Characteristics of the DC bus cable: Cable for DC bus

Assemble DC bus cable

The following instructions are effective for ACOPOSinverter P74 with plug connection for the DC bus.



	Section	Length in mm (inch)
A	Cable sheath	130 (5.2)
B	Length of shield connection	60 (2.5)
C	Wire stripping length crimp terminal	6 (0.25)
	Diameter of ring cable shoe / fork gable shoe	for screw M5

1. Strip the cable by length A.
2. Push the shield braiding back. Ladder the shield braiding and twist the shield to a shield connection strand.
3. Shorten the twisted shield connection strand up to length B and insulate the shield braiding by means of a shrinking hose.
   Crimp the crimp terminals onto the two stripped conductors.
   The wire stripping length has to have the dimension C.
4. Crimp a fork cable shoe to the shield connection strand.
   Push the crimp terminals into the connector housing. Please pay attention to the polarity: the red cable is PA/+, the black cable is PC/-.
5. Protect the shield by help of a shrinking hose.

2.11.5.2 Wire the DC bus

Caution!

DAMAGE OF DEVICE BY INCORRECT POLARITY

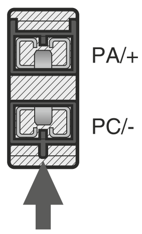
- **Take care of the correct polarity when connecting the bus.**

In observance of these precautions may lead to material damage.

The connection of the DC bus connection is effected via a plug connection or via screw terminals.

Polarizing key

The plugs are polarized If you do not implement pre-assembled cables, please take care that the crimp terminals snap in the plug correctly. When plugging, ensure that PA/+ is connected to PA/+ and PC/- is connected to PC/-. Incorrect wiring leads to destruction of the devices.



Connector locking mechanism

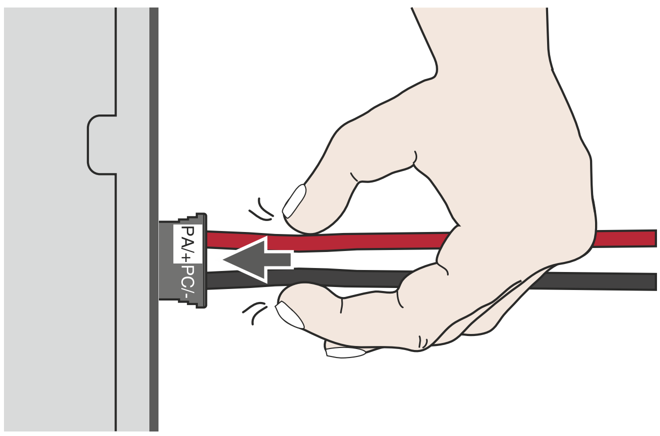
The connector has a locking device that snaps in perceptibly. In order to unlock it, you have to pull at the connector housing.

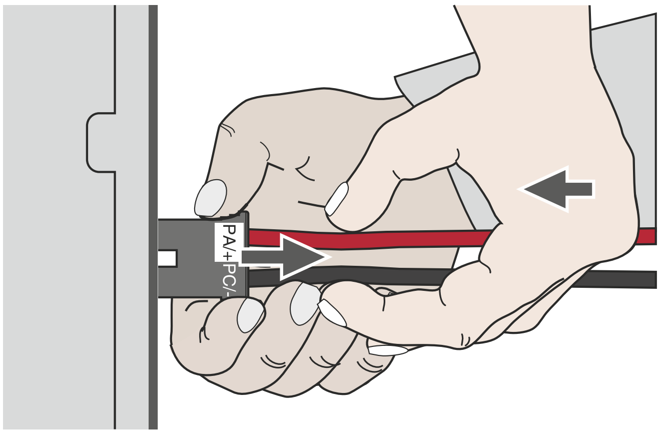
Note:

Both cables have to move about freely inside the connector housing for being unlocked.

Information:

If you want to remove the DC bus connecting cable, you have to loosen the locking device by pulling at the connector housing.

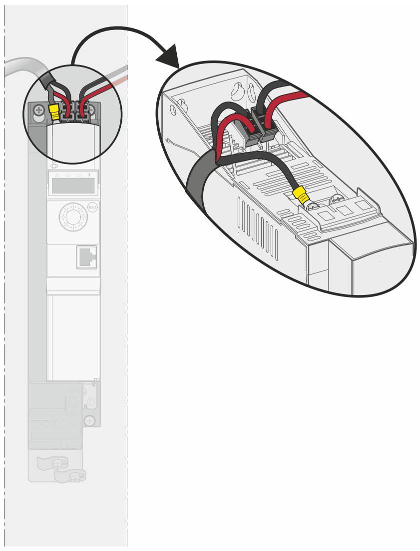




If the two cables cannot move about freely, the unlocking of the DC bus connecting cable will not be loosened.

- Push the two cables towards the plug.
- Whilst pushing the cables towards the plug, pull at the connector housing with the other hand at the same time. The unlocking device is opened and the DC bus connecting cable can be removed.

Connect DC bus



- Ensure that the preconditions for the joint DC bus are met
- If possible, use pre-assembled cables in order to reduce to risk of errors in wiring
- Connect the devices only to the indicated accessories. The push-on connectors are polarized. Connect PA/+ to PA/+ and PC/- to PC/-

2.11.5.3 Check installation

- Check, if the preconditions for a joint DC bus are met
- Check, if the IT jumper is closed (factory adjustment)
- Check if the wiring has been executed according to the indications
- Check the applied fuses. The maximally permitted fuse values may not be exceeded
- Check the wiring. Check, if PA/+ is only connected to PA/+. Check, if PC/- is only connected to PC/-
- In case of a shielded DC bus cable check, if the shield is connected extensively
- Check, if the connector latching's have snapped in

2.11.6 Commissioning

The commissioning is effected according to the commissioning of single devices.

Warning!

DESTRUCTION OF PROPERTY AND LOSS OF THE CONTROL SYSTEM

Incorrect use of the parallel switches of the DC bus can destroy the drive amplifiers immediately or over time.

- **Pay careful attention to the instructions for using the parallel circuit of the DC bus.**

Failure to follow these instructions can result in death, serious injury or material damages.

Steps for the commissioning

Please take the following steps for the commissioning:

- Check the complete installation of the drive amplifiers and the connections of the joint DC bus
- Switch on the control supply at the same time for all devices, as the selection of the breaking resistors needs the control supply
- Activate the mains monitoring at each drive amplifier with mains supply
- Check, if only drive amplifiers of an equal nominal voltage are connected
- Set the type of DC bus connection in the parameter dCCM**[DC-Bus chaining]**. This parameter can require further conditions

Drives	Parameter
ACOPOSinverter P74	dCCM**[DC-Bus chaining]**

- Execute the commissioning of the drive amplifiers

2.11.7 Accessories and spare parts

DC bus accessories

Description	Model number
DC bus connecting cable pre-assembled, 0.1 m, 5 pcs.	8I0XC003.400-1
Cable for DC bus, 2x 6 mm² (2x AWG 10), shielded 15 m	8I0XC003.415-1
DC bus connector set, connector housing and contacts, 10 pcs.	8I0XC004.400-1

A crimping tool is needed for the crimp terminals of the connector set.

Manufacturer: Tyco Electronics, Heavy Head Hand Tool, Tool Pt. No 18025

DC fuses

The following DC fuses are offered by the company SIBA.

www.siba-fuses.com

Description	Order number SIBA
DC fuse, DC 700 V, 10 A	50 201 06.10
DC fuse, DC 700 V, 16 A	50 201 06.16
DC fuse, DC 700 V, 25 A	50 201 06.25
DC fuse, DC 700 V, 32 A	50 201 06.32
DC fuse, DC 700 V, 40 A	50 201 06.40
DC fuse, DC 700 V, 50 A	50 201 06.50
DC fuse, DC 700 V, 63 A	50 201 06.63

External braking resistors

Description	Model number
Brake resistor 100 Ω, continuous brake power 0,05 kW	8I0BR100.000-1
Brake resistor 60 Ω, continuous brake power 0,1 kW	8I0BR060.000-1
Brake resistor 28 Ω, continuous brake power 0,2 kW	8I0BR028.000-1
Brake resistor 15 Ω, continuous brake power 1 kW	8I0BR015.000-1
Brake resistor 10 Ω, continuous brake power 1 kW	8I0BR010.000-1

2.11.8 Units and conversion tables

Value in the unit specified (left column) is calculated by the formula (in the box) for the unit that is needed (upper line).

Example: Conversion of 5 meters [m] to yards [yd] 5 m / 0.9144 = 5.468 yd

Length

	in	ft	yd	m	cm	mm
in	-	/ 12	/ 36	x 0.0254	x 2.54	x 25.4
ft	x 12	-	/ 3	x 0.30479	x 30.479	x 304.79
yd	x 36	x 3	-	x 0.9144	x 91.44	x 914.4
m	/ 0.0254	/ 0.30479	/ 0.9144	-	x 100	x 1000
cm	/ 2.54	/ 30.479	/ 91.44	/ 100	-	x 10
mm	/ 25.4	/ 304,79	/ 914,4	/ 1000	/ 10	-

Mass

	lb	oz	slug	kg	g
lb	-	x 16	x 0.03108095	x 0.4535924	x 453.5924
oz	/ 16	-	x 1.942559 x 10^{-3}	x 0.02834952	x 28.34952
slug	/ 0.03108095	/ 1.942559 x 10^{-3}	-	x 14.5939	x 14593.9
kg	/ 0.453592370	/ 0.02834952	/ 14.5939	-	x 1000
g	/ 453.592370	/ 28.34952	/ 14593.9	/ 1000	-

Force

	lb	oz	p	Dyne	N
lb	-	x 16	x 453.55358	x 444822.2	x 4.448222
oz	/ 16	-	x 28.349524	x 27801	x 0.27801
p	/ 453.55358	/ 28.349524	-	x 980.7	x 9.807 x 10^{-3}
Dyne	/ 444822.2	/ 27801	/ 980.7	-	/ 100 x 10^{-3}
N	/ 4.448222	/ 0.27801	/ 9.807 x 10^{-3}	x 100 x 10^{-3}	-

Power

	HP	W
HP	-	x 746
W	/ 746	-

Rotation

	min^{-1} (RPM)	rad/s	deg./s
min^{-1} (RPM)	-	x π/30	x 6
rad/s	x 30/π	-	x 57.295
deg./s	/ 6	/ 57.295	-

Torque

	lb·in	lb·ft	oz·in	Nm	kp·m	kp·cm	dyne·cm
lb·in	-	/ 12	x 16	x 0.112985	x 0.011521	x 1.1521	x 1.129 x 10^{6}
lb·ft	/ 12	-	x 192	x 1.355822	x 0.138255	x 13.8255	x 13.558 x 10^{6}
oz·in	/ 16	/ 192	-	x 7.0616 x 10^{-3}	x 720.07 x 10^{-6}	x 72.007 x 10^{-3}	x 70615.5
Nm	/ 0.112985	/ 1.355822	/ 7.0616 x 10^{-3}	-	x 0.101972	x 10.1972	x 10 x 10^{6}
kp·m	/ 0.011521	/ 0.138255	/ 720.07 x 10^{-6}	/ 0.101972	-	/ 100	x 98.066 x 10^{6}
kp·cm	/ 1.1521	/ 13.8255	/ 72.007 x 10^{-3}	/ 10.1972	x 100	-	x 0.9806 x 10^{6}
dyne·cm	/ 1.129 x 10^{6}	/ 13.558 x 10^{6}	/ 70615.5	/ 10 x 10^{6}	/ 98.066 x 10^{6}	x 0.9806 x 10^{6}	-

Moment of inertia

	lb·in²	lb·ft²	kg·m²	kg·cm²	kp·cm·s²	oz·in²
lb·in²	-	/ 144	/ 3417.16	/ 0.341716	/ 335.109	/ 16
lb·ft²	x 144	-	x 0.04214	x 421.4	x 0.429711	x 2304
kg·m²	x 3417.16	/ 0.04214	-	x 10 x 10^{3}	x 10.1972	x 54674
kg·cm²	x 0.341716	/ 421.4	/ 10 x 10^{3}	-	/ 980.665	x 5.46
kp·cm·s²	x 335.109	/ 0.429711	/ 10.1972	x 980.665	-	x 5361.74
oz·in²	/ 16	/ 2304	/ 54674	/ 5.46	/ 5361.74	-

Temperature

	°F	°C	K
°F	-	(°F - 32) x 5/9	(°F - 32) x 5/9 + 273.15
°C	°C x 9/5 + 32	-	°C + 273.15
K	(K - 273.15) x 9/5 + 32	K - 273.15	-

Conductor cross section

AWG	1	2	3	4	5	6	7	8	9	10	11	12	13
mm²	42.2	33.6	26.7	21.2	16.8	13.3	10.5	8.4	6.6	5.3	4.2	3.3	2.6

AWG	14	15	16	17	18	19	20	21	22	23	24	25	26
mm²	2.1	1.7	1.3	1.0	0.82	0.65	0.52	0.41	0.33	0.26	0.20	0.16	0.13

3 Programming

3.1 General Overview

3.1.1 Safety Information

Important Information

> **Note:**
>
> **Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.**

> **Danger!**
>
> **DANGER indicates an imminently hazardous situation, which, if not avoided, will result in death or serious bodily injury.**

> **Warning!**
>
> **WARNING indicates a potentially hazardous situation, which, if not avoided, can result in death, serious injury or equipment damage.**

> **Caution!**
>
> **CAUTION indicates a potentially hazardous situation, which, if not avoided, can result in injury or equipment damage.**

> **Note:**
>
> **NOTICE, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, can result in equipment damage.**

> **Note:**
>
> **The word "drive" as used in this manual refers to the controller portion of the adjustable speed drive as defined by NEC. Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by B&R for any consequences arising out of the use of this product.**

Product related information

Read and understand these instructions before performing any procedure on this drive.

Danger!

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- **Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation and who have received safety training to recognize and avoid hazards involved are authorized to work on and with this drive system. Installation, adjustment, repair and maintenance must be performed by qualified personnel.**
- **The system integrator is responsible for compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.**
- **Many components of the product, including the printed circuit boards, operate with mains voltage. Do not touch. Use only electrically insulated tools.**
- **Do not touch unshielded components or terminals with voltage present.**
- **Motors can generate voltage when the shaft is rotated. Before performing any type of work on the drive system, block the motor shaft to prevent rotation.**
- **AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors of the motor cable.**
- **Do not short across the DC bus terminals or the DC bus capacitors or the braking resistor terminals.**
- **Before performing work on the drive system:**
    - **Disconnect all power, including external control power that may be present.**
    - **Place a "Do Not Turn On" label on all power switches.**
    - **Lock all power switches in the open position.**
    - **Wait 15 minutes to allow the DC bus capacitors to discharge. The DC bus LED is not an indicator of the absence of DC bus voltage that can exceed 800 VDC.**
    - **Measure the voltage on the DC bus between the DC bus terminals using a properly rated voltmeter to verify that the voltage is <42 VDC.**
    - **If the DC bus capacitors do not discharge properly, contact your local B&R representative.**
- **Install and close all covers before applying voltage.**

Failure to follow these instructions will result in death or serious injury.

Danger!

UNINTENDED EQUIPMENT OPERATION

- **Read and understand this manual before installing or operating the ACOPOSinverter P74 drive.**
- **Any changes made to the parameter settings must be performed by qualified personnel.**

Failure to follow these instructions will result in death or serious injury.

Warning!

DAMAGE DRIVE EQUIPMENT

Do not operate or install any drive or drive accessory that appears damaged.

Failure to follow these instructions can result in death, serious injury or equipment damage.

Warning!

LOSS OF CONTROL

- **The designer of any control scheme must consider the potential failure modes of control paths and, for critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop, overtravel stop, power outage and restart.**
- **Separate or redundant control paths must be provided for critical control functions.**
- **System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.**
- **Observe all accident prevention regulations and local safety guidelines**[1)]
- **Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service.**

Failure to follow these instructions can result in death, serious injury or equipment damage.

Caution!

INCOMPATIBLE LINE VOLTAGE

Before turning on and configuring the drive, ensure that the line voltage is compatible with the supply voltage range shown on the drive nameplate. The drive may be damaged if the line voltage is not compatible.

Failure to follow these instructions can result in injury or equipment damage.

Dual use

Servo drives, inverter modules and frequency inverters from B&R are not dual-use goods in accordance with EC regulation 428/2009 | 3A225.

User comments

The word "drive" as used in this manual refers to the controller portion of the adjustable speed drive as defined by NEC.

Standards and Terminology

The technical terms, terminology and the corresponding descriptions in this manual normally use the terms or definitions in the relevant standards.

In the area of drive systems this includes, but is not limited to, terms such as error, error message, failure, fault, fault reset, protection, safe state, safety function, warning, warning message and so on.

Among others, these standards include:

- IEC 61800 series: Adjustable speed electrical power drive systems
- IEC 61508 Ed.2 series: Functional safety of electrical/electronic/programmable electronic safety-related
- EN 954-1 Safety of machinery - Safety related parts of control systems
- EN ISO 13849-1 & 2 Safety of machinery - Safety related parts of control systems.
- IEC 60204-1: Safety of machinery - Electrical equipment of machines – Part 1: General requirements

3.1.1.1 Forming DC bus capacitors

Electrolytic capacitors are installed in B&R servo drives, power inverters, stepper motor module and power supplies. The oxide layer serving as the dielectric can be weakened by electrochemical processes when stored over a long period of time without voltage applied. In the worst case, this can cause a short circuit and subsequent destruction of the capacitor and irreparable damage to B&R modules.

1) For USA: Additional information, refer to NEMA ICS 1.1 (latest edition), “Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control” and to NEMA ICS 7.1 (latest edition), “Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable Speed Drive Systems.”)

When stored for periods over 1 year, the electrolytic capacitors may be destroyed during commissioning if not preconditioned. If preconditioning takes place using a forming process defined for B&R modules, then proper operation can be guaranteed. Forming is performed by applying a defined voltage over a defined period of time. This reforms the oxide layer to ensure the functionality of the electrolytic capacitors.

Caution!

DC bus capacitors can become damaged or destroyed when switching on at the nominal voltage after being stored for periods over 1 year.

Forming B&R modules stored over a long period of time before commissioning avoids damage to the capacitors.

Procedure for modules stored for a long period of time

If stored over a long period of time without nominal voltage applied from the servo drive, the DC bus capacitors must be formed as follows.

The nominal voltage is the voltage permitted at the mains connections on the respective module.

Power is only supplied to the module; the output stage or controller is NOT permitted to be switched on during this!

Storage time up to 1 year: → No action required

Storage time 1 to 2 years: → Supply the module with nominal voltage 1 hour before commissioning.

Storage time 2 to 3 years: Supply the module with an adjustable power supply and increase the voltage in steps. Observe the following sequence:

1. Supply with 25% of the nominal voltage for 30 minutes.
2. Supply with 50% of the nominal voltage for 30 minutes.
3. Supply with 75% of the nominal voltage for 30 minutes.
4. Supply with 100% of the nominal voltage for 30 minutes.

Total forming time: >2 hours
The module is now ready for operation.

Storage time 3 or more years: Supply the module with an adjustable power supply and increase the voltage in steps. Observe the following sequence:

1. Supply with 25% of the nominal voltage for 2 hours.
2. Supply with 50% of the nominal voltage for 2 hours.
3. Supply with 75% of the nominal voltage for 2 hours.
4. Supply with 100% of the nominal voltage for 2 hours.

Total forming time: >8 hours
The module is now ready for operation.

B&R recommends forming at nominal voltage for 1 hour once a year. B&R modules that have been stored for more than 5 years without forming should no longer be put into operation.
Storage time begins from the moment goods are delivered by B&R.

3.1.1.2 Software enhancements

Since it was first marketed, the ACOPOSinverter P74 has been equipped with additional functions. Software version V2.1 IE 15 has now been updated to V2.3 IE 19. This documentation relates to version V2.3 IE 19. The software version appears on the rating plate attached to the side of the drive.

Enhancements made to version V1.8 IE 11 in comparison to V1.5 IE 08

New parameters

(MOn-) **[1.2 MONITORING]** menu:

- (StFr) **[Stator Frequency]**
- (SPd1), (SPd2), (SPd3) **[Cust. output value]**
- (SFFE) **[Safety fault reg.]** added in the **[MORE FAULT INFO]** (AFI) function
- (SAF1), (SAF2) **[Safety fault Reg x]**
- (SF00) to (SF11) **[SAFF Subcode X]**
- (ntJ) **[IGBT alarm NB]**
- (I2tM) **[I²t overload level]**

(COnF-) **[1.3 CONFIGURATION]** menu:

- (SdS) **[Scale factor display]**
- (rdAE) **[% error EMF sync]**
- (MStP) **[Memo Stop]**
- (prSt) **[Priority restart]**

New fault detection codes

- (SpF) **[Speed fdback loss]**
- (AnF) **[Load slipping]**

Enhancements made to version V2.1 IE 15 in comparison to V1.8 IE 11

New parameters

(COnF-) **[1.3 CONFIGURATION]** menu:

- (AI2L) **[AI2 range]**

Enhancements made to version V2.3 IE 17 in comparison to V2.3 IE 19

New parameters

(COnF-) **[1.3 CONFIGURATION]** menu:

- (HrFC) **[Extended Fault reset]**
- (r1F) **[R1 FallBack Enable]**
- (r2F) **[R2 FallBack Enable]**

3.1.2 Overview

3.1.2.1 Factory configuration

The ACOPOSinverter P74 is factory-set for common operating conditions:

- Display: drive ready **[Ready]**(rdY) when motor is ready to run and motor frequency when motor is running.
- The LI3 to LI6 logic inputs, AI2 and AI3 analog inputs, LO1 logic output, AO1 analog output and R2 relay are unassigned.
- Stop mode when fault detected: freewheel.

Note:

To simplify the use of the POWERLINK insert card, the current POWERLINK node number setting is displayed after the initial startup. To reach the current status from this submenu, the "ESC" button must be pressed several times.

Code	Description	Factory settings values
bFr	**[Standard mot. freq]**	**[50Hz IEC]**
tCC	**[2/3 wire control]**	**[2 wire]**(2C): 2-wire control
Ctt	**[Motor control type]**	**[Standard]**(Std): standard motor law
ACC	**[Acceleration]**	3 seconds
dEC	**[Deceleration]**	3 seconds
LSP	**[Low speed]**	0 Hz
HSP	**[High speed]**	50 Hz
ItH	**[Mot. therm. current]**	Nominal motor current (value depending on drive rating)
SdC1	**[Auto DC inj. level 1]**	0.7 x nominal drive current for 0.5 seconds
SFr	**[Switching freq.]**	4 kHz
Frd	**[Forward]**	**[LI1]**(LI1): Logic input LI1
rrS	**[Reverse assign.]**	**[LI2]**(LI2): Logic input LI2
Fr1	**[Ref.1 channel]**	**[AI1]**(AI1): Analog input AI1
r1	**[R1 Assignment]**	**[No drive flt]**(FLt): The contact opens when a fault is detected or when the drive has been switched off
brA	**[Dec ramp adapt.]**	**[Yes]**(YES): Function active (automatic adaptation of deceleration ramp)
Atr	**[Automatic restart]**	**[No]**(nO): Function inactive
Stt	**[Type of stop]**	**[Ramp stop]**(rMP): On ramp
CFG	**[Macro configuration]**	**[Start/Stop]**(StS)

Note:

If you want to keep the drive presettings to a minimum, select the macro configuration [Macro configuration](CFG) = [Start/stop](StS) followed by [Restore config.](FCS) = [Config. CFG](Inl).

Check whether the values above are compatible with the application.

3.1.2.2 Application functions

The tables on the following pages show the combinations of functions and applications, in order to guide your selection.

The applications in these tables relate to the following machines, in particular:

- **Hoisting:** cranes, overhead cranes, gantries (vertical hoisting, translation, slewing), lifting platforms
- **Handling:** palletizers/depalletizers, conveyors, roller tables
- **Packing:** carton packers, labeling machines
- **Textiles:** weaving looms, carding frames, washing machines, spinners, drawing frames
- **Wood:** automatic lathes, saws, milling
- **Process**

Each machine has its own special features and the combinations listed here are neither mandatory nor exhaustive.

Some functions are designed specifically for a particular application. In this case, the application is identified by a tab in the margin on the relevant programming pages.

Motor control functions

Functions	Applications					
	Hoisting	Handling	Packing	Textiles	Wood	Process
V/f ratio		■			■	
Sensorless flux vector control	■	■	■	■	■	■
2-point vector control	■			■		
Open-loop synchronous motor				■		
Output frequency up to 599 Hz				■	■	
Motor overvoltage limiting				■	■	
DC bus connection				■		■
Motor fluxing using a logic input	■	■	■			
Switching frequency of up to 16 kHz				■	■	

Functions on speed references

Functions	Applications					
	Hoisting	Handling	Packing	Textiles	Wood	Process
Differential bipolar reference	■	■	■			
Reference delinearization (magnifying glass effect)	■	■				
Frequency control input				■		■
Reference switching			■			
Reference summing			■			
Reference subtraction			■			
Reference multiplication			■			
Adjustable profile ramp	■	■				
Jog operation		■		■		■
Preset speeds	■	■	■			
+speed / -speed using single action pushbuttons (1 step)						■
+speed / -speed using double action pushbuttons (2 steps)	■					
+/- speed around a reference				■		■
Save reference						■

Application-Specific functions

Functions	Applications					
	Hoisting	Handling	Packing	Textiles	Wood	Process
Fast stop					■	
Brake control	■	■				
Load measurement	■					
High-speed hoisting	■					
Rope slack	■					
PID regulator						■
Motor/generator torque limit		■		■		■
Load sharing	■	■				
Line contactor control	■	■				
Output contactor control	■					
Positioning by limit switches or sensors	■	■	■			
Stop at distance calculated after deceleration limit switch		■	■			
Parameter switching	■	■	■	■	■	■
Motor or configuration switching	■	■	■			
Traverse control				■		
Stop configuration		■		■	■	
Safety Integrated functions	■	■	■	■	■	■

Safety functions/Fault management

Functions	Applications					
	Hoisting	Handling	Packing	Textiles	Wood	Process
Safe Torque Off (STO) (Safety function, see dedicated document)	■	■	■	■	■	■
Deferred stop on thermal alarm	■					■
Alarm handling	■	■	■	■	■	■
Fault management	■	■	■	■	■	■
IGBT tests	■	■	■	■	■	■
Catch a spinning load				■	■	
Motor protection with PTC probes	■	■	■	■	■	■
Undervoltage management				■	■	
4-20 mA loss	■	■		■	■	■
Uncontrolled output cut (output phase loss)		■				
Automatic restart		■				
Use of the "Pulse input" input to measure the speed of rotation of the motor	■	■				
Load variation detection	■					
Underload detection						■
Overload detection						■
Safety Integrated functions		■	■	■	■	■

3.1.2.3 Basic functions

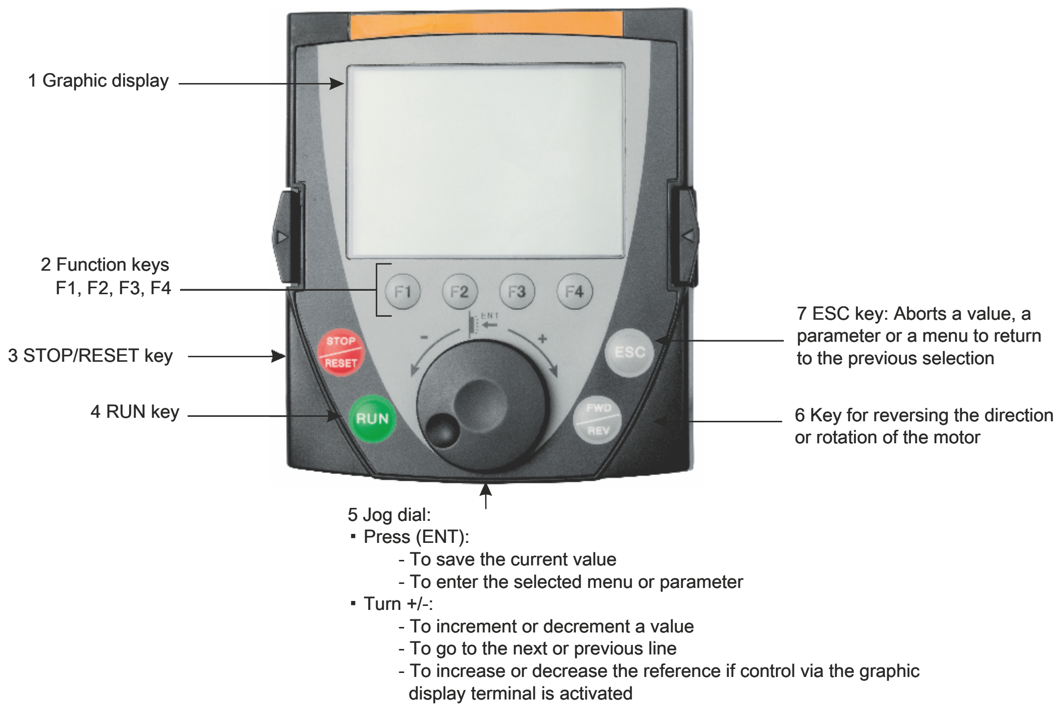
Drive ventilation

The fan starts automatically when the drive thermal state reaches 70% of the maximum thermal state and if the **[Fan Mode]**(FFM) is set to **[Standard]**(Std).

3.1.2.4 Graphic display terminal option

Description of the graphic display terminal

With the graphic display terminal, which works with FLASH V1.1IE26 or higher, it is possible to display more detailed information than can be shown on the integrated display terminal.



Note:

Keys 3, 4, 5 and 6 can be used to control the drive directly, if control via the graphic display terminal is activated.

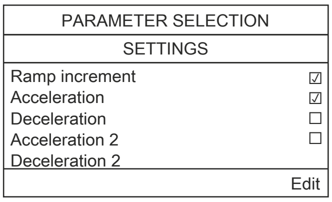
To activate the keys on the remote display terminal, you first have to configure **[Ref.1 channel]**(Fr1) = **[HMI]**(LCC).

Example configuration windows:

Single selection

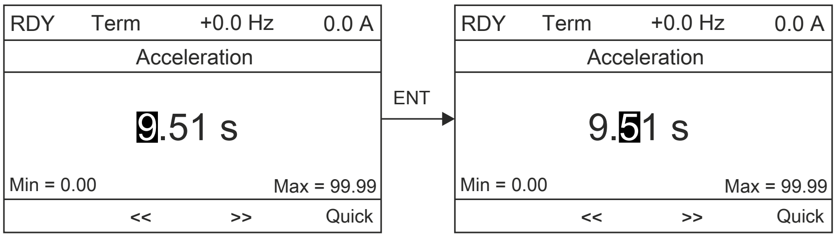
When powering up the graphic display terminal for the first time, the user has to select the required language. When only one selection is possible, the selection made is indicated by ✓. Example: Only one language can be chosen.

Multiple selection



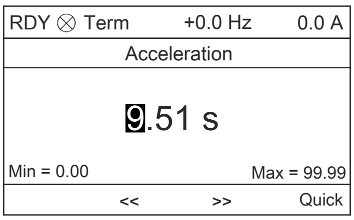
When multiple selection is possible, the selections made are indicated by ✓.
Example: A number of parameters can be chosen to form the **[USER MENU]**.

Example configuration window for one value:



The << and >> arrows (keys F2 and F3) are used to select the digit to be modified and the jog dial is rotated to increase or decrease this number.

Example visualization of function blocks state:



⊗ OFF light: A valid function blocks program is in the ACOPOSinverter P74 in stop mode.

ON light: A valid function blocks program is in the ACOPOSinverter P74 in run mode. The drive is considered as being in running state and configuration parameters cannot be modified.

Powering up the drive with Graphic display terminal for the first time

When powering up the graphic display terminal for the first time, the user has to select the required language.

LANGUAGE English Français ✓ Deutsch Italiano Español Chinese Русский Türkçe	Display after the graphic display terminal has been powered up for the first time. Select the language and press ENT.
↓ ENT	
8I74 0.75 kW 200M Config 0	The drive's rating details will now appear.
↓ 3 seconds	
RDY Term 0.0 Hz 0.0 A ACCESS LEVEL Basic Standard ✓ Advanced Expert	
↓ ENT	
RDY Term 0.0 Hz 0.0 A 1 DRIVE MENU 1.1 SPEED REFERENCE 1.2 MONITORING 1.3 CONFIGURATION Code << >> Quick	

3.1.2.5 Powering up the drive for the first time

With the integrated display terminal, when powering up the drive for the first time, the user immediately accesses to **[Standard mot. freq]**(bFr) in the menu (COnF > FULL > SIM).

8I74 0.75 kW 200M Config 0	Display after the drive has been powered up for the first time.

↓ 3 seconds

RDY Term 0.0 Hz 0.0 A ACCESS LEVEL Basic Standard Advanced Expert	The **[ACCESS LEVEL]** screen follows automatically.

↓ ENT

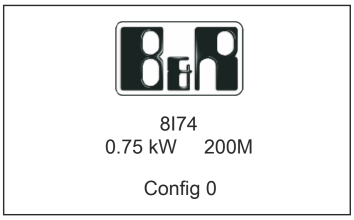
RDY Term 0.0 Hz 0.0 A 1 DRIVE MENU 1.1 SPEED REFERENCE 1.2 MONITORING 1.3 CONFIGURATION Code << >> Quick	Automatically switches to the **[1 DRIVE MENU]** menu after 3 seconds. Select the menu and press ENT.

↓ ESC

MAIN MENU 1 DRIVE MENU 2 IDENTIFICATION 3 INTERFACE 4 OPEN / SAVE AS 5 PASSOWRD	The MAIN MENU appears on the graphic display terminal if you press the ESC key.

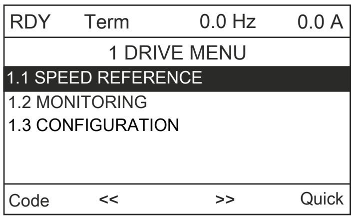
Subsequent power-ups

With the integrated display terminal, at subsequent power-ups of the drive for the first time, the user immediately accesses to the drive state (Same list than **[Drive state]**(HS1)). Example: Ready (rdY).



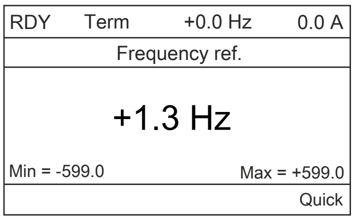
Display after powering up.

↓ 3 seconds



Automatically switches to the **[1 DRIVE MENU]** menu after 3 seconds. Select the menu and press ENT.

↓ 10 seconds

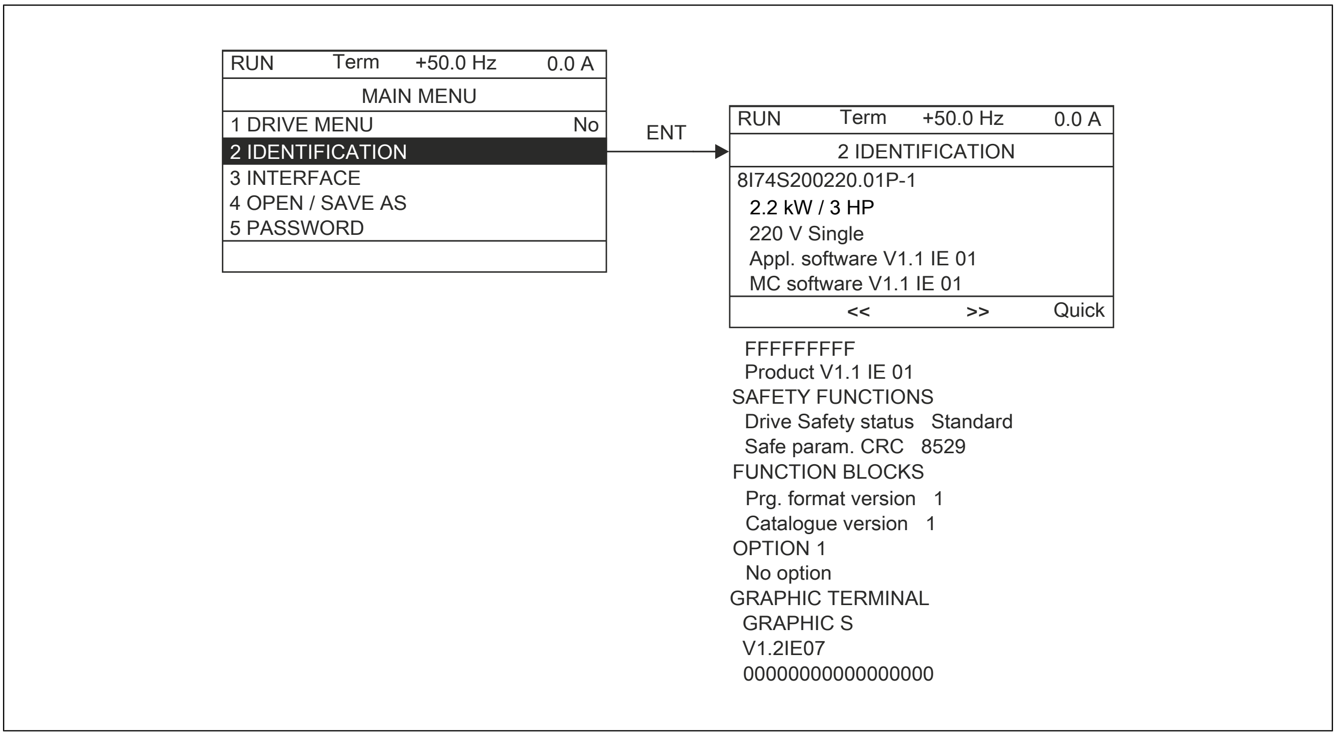


Automatically switches to the monitoring screen after 10 seconds.

Identification menu

The **[IDENTIFICATION]**(OId-) menu can only be accessed on the graphic display terminal. This is a read-only menu that cannot be configured. It enables the following information to be displayed:

- Drive reference, power rating and voltage
- Drive software version
- Drive serial number
- Safety function status and checksum
- Function blocks program and catalogue version
- Type of options present, with their software version
- Graphic display terminal type and version



3.1.2.6 Structure of the parameter tables

The parameter tables contained in the descriptions of the various menus are organized as follows.

Example:

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > PId-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
PId-	[PID REGULATOR] **Note:** **This function cannot be used with certain other functions.**		
PIF	[PID feedback ass.]		[No](nO)
nO	[No](nO): Not assigned		
AI1	[AI1](AI1): Analog input A1		
AI2	[AI2](AI2): Analog input A2		
AI3	[AI3](AI3): Analog input A3		
PI	[RP](PI): Pulse input		
AIU1	[AI virtual 1](AIU1): Virtual analog input 1 by the communication bus		
AIU2	[AI virtual 2](AIU2): Virtual analog input 2 by the communication bus		
OA01	[OA01](OA01): Function blocks: Analog output 01		
...	...		
OA10	[OA10](OA10): Function blocks: Analog output 10		

1. Way to access the parameters described in this page
2. Submenu code on 4-digit 7-segment display
3. Parameter code on 4-digit 7-segment display
4. Parameter value on 4-digit 7-segment display
5. Name of submenu on graphic display terminal
6. Name of parameter on graphic display terminal
7. Value of parameter on graphic display terminal

> **Note:**
>
> **The text in square brackets [ ] indicates what you will see on the graphic display terminal.**

A menu followed by the mention "**(continued)**" appears sometimes to locate you in the structure.

Example:

Parameters described in this page can be accessed by: DRI- > MOn-	
Code	**Name / Description**
MOn-	[1.2 MONITORING]**(continued)**
CnFS	[Config. active] View of the active configuration.

In this case, the mention "**(continued)**" indicates that the [APPLICATION FUNCT.] submenu is above the [PID REGULATOR] submenu in the structure.
A parameter can contain some pictograms. Each pictogram has its legend at the end of the table. Main pictograms:

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

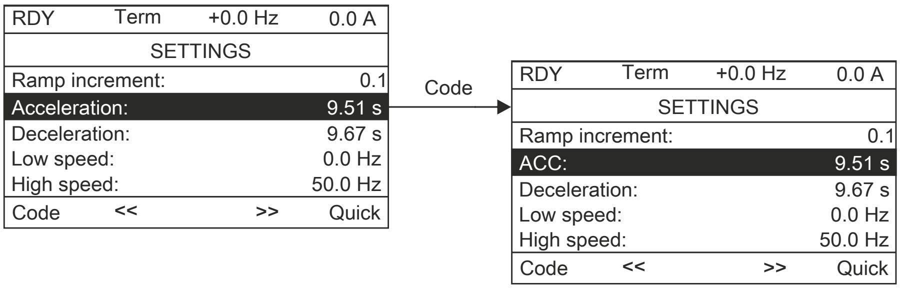
To change the assignment of this parameter, press the ENT key for 2 seconds.

3.1.2.7 Finding a parameter in this document

The following assistance with finding explanations on a parameter is provided:

- With the integrated display terminal and the remote display terminal: Direct use of the parameter code index to find the page giving details of the displayed parameter.
- With the graphic display terminal: Select the required parameter and press F1: **[Code]**. The parameter code is displayed instead of its name while the key is held down.

Example: ACC

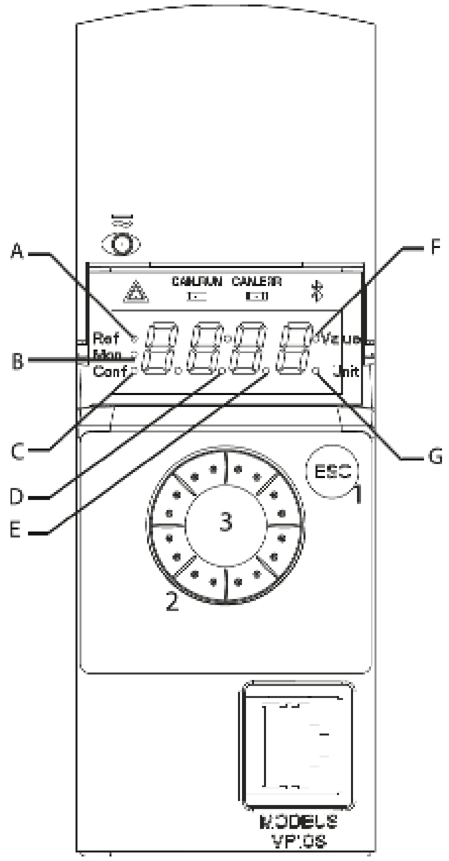


- Then use the parameter code index to find the page giving details of the displayed parameter.

3.1.2.8 Description of the HMI

Functions of the Display and the Keys

1	The **ESC** key is used for menu navigation (backward) and parameters adjustment (cancel)
2	The **Jog dial** is used for menu navigation (up or down) and parameters adjustment (increase/decrease value or element choice). It can be used as Virtual logic input 1 for drive frequency reference
3	The **ENT** key (push on the Jog dial) is used for menu navigation (forward) and parameters adjustment (validate)
A	REF mode selected (rEF-)
B	MON mode selected (MOn-)
C	CONF mode selected (COnF)
D	Dot used to display parameter value (1/100 unit)
E	Dot used to display parameter value (1/10 unit)
F	Current display is parameter value
G	Current display is parameter unit



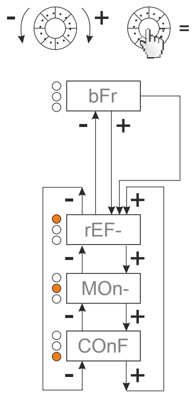
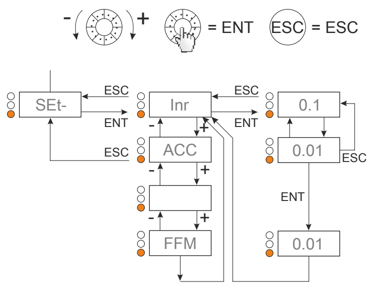
Normal display, with no fault code displayed and no startup:

Displays the parameter selected in the **[1.2 MONITORING]**(MOn-) menu (default: **[Frequency ref.]**(FrH)).

- InIt: Initialization sequence (only on remote display terminal)
- tUN: AutoTuning
- dCb: Injection braking
- rdY: Drive ready
- nSt: Freewheel stop control
- CLI: Current limit
- FSt: Fast stop
- FLU: Fluxing function is activated
- nLP: Control is powered on but the DC bus is not loaded
- CtL: Controlled stop
- Obr: Adapted deceleration
- SOC: Stand by output cut
- USA: Undervoltage alarm
- SS1: Safety SS1 level
- SLS: Safety SLS level
- StO: Safety STO level

In the event of a detected fault, the display will flash to notify the user accordingly. If a graphic display terminal is connected, the name of the detected fault will be displayed.

3.1.2.9 Structure of the menus

Powering up		Parameter selection
	This parameter is only visible when the drive is powered up for the first time. The setting can be amended subsequently in the menu **[MOTOR CONTROL]**(drC-) for **[Standard mot. freq]**(bFr) . **[1.1 SPEED REFERENCE]**(rEF-) **[1.2 MONITORING]**(MOn-) **[1.3 CONFIGURATION]**(COnF)	

On the 7-segment display, a dash after menu and submenu codes is used to differentiate them from parameter codes.

Example: **[APPLICATION FUNCT.]**(FUn-) menu, **[Acceleration]**(ACC) parameter

Selection of multiple assignments for one parameter

Example: List of group 1 alarms in **[INPUTS / OUTPUTS CFG]**(I_O-) menu.

A number of alarms can be selected by "checking" them as follows.

The digit on the right indicates:

selected   not selected

The same principle is used for all multiple selections.

3.1.2.10 Operation with SDC

Timing behavior

The ACOPOSinverter P74 can be controlled by B&R's ACP10 manager. The ACP10SDC interface and its libraries therefore have to be used. When an ACOPOSinverter P74 is added to an Automation Studio project, the Drive Configuration wizard is shown in order to generate an axis object. The Drive Configuration wizard adds a task called "ncsdcctrl", several global variables and some necessary libraries to your project. Furthermore, it changes the cycle time of the POWERLINK master that is being used to 2000 µs. The ncsdcctrl task is necessary to ensure proper communication between the ACP10 manager and its axis objects. If communication is interrupted, the axis has to be set to an error state and needs to be reinitialized again. The cycle time of the ncsdcctrl task has to be set according to the POWERLINK cycle.

> **Caution!**
>
> **The cycle time of the POWERLINK master can be adapted between 400 µs and 100 000 µs. If the POWERLINK cycle is changed, the cycle time of Task class #1 needs to be adapted the same way!**

> **Note:**
>
> **The ACOPOSinverter P74 refreshes its parameters with different cycle times. On an Option board (e.g. POWERLINK), the fastest parameters are exchanged with a 2000 µs cycle. Other information need up to 100 000 µs to be called once.**

PLC - Open components

The following motion functions are for use with the ACOPOSinverter P74:

- MC_MoveVelocity
- MC_BR_EventMoveVelocity
- MC_BR_MoveCyclicVelocity

Quick stop/ Emergency stop

When the ACOPOSinverter P74 is operating with the ACP10SDC library, the QSTD parameter (quick stop option code) is set to 2 automatically.

> **Note:**
>
> **This value should not be changed if the ACOPOSinverter P74 is integrated with the ACP10SDC.**
>
> **If the parameter is changed, the motor of the ACOPOSinverter P74 will stop in the event of an active Quick stop or Emergency stop, but the ACP10SDC library will continue running.**

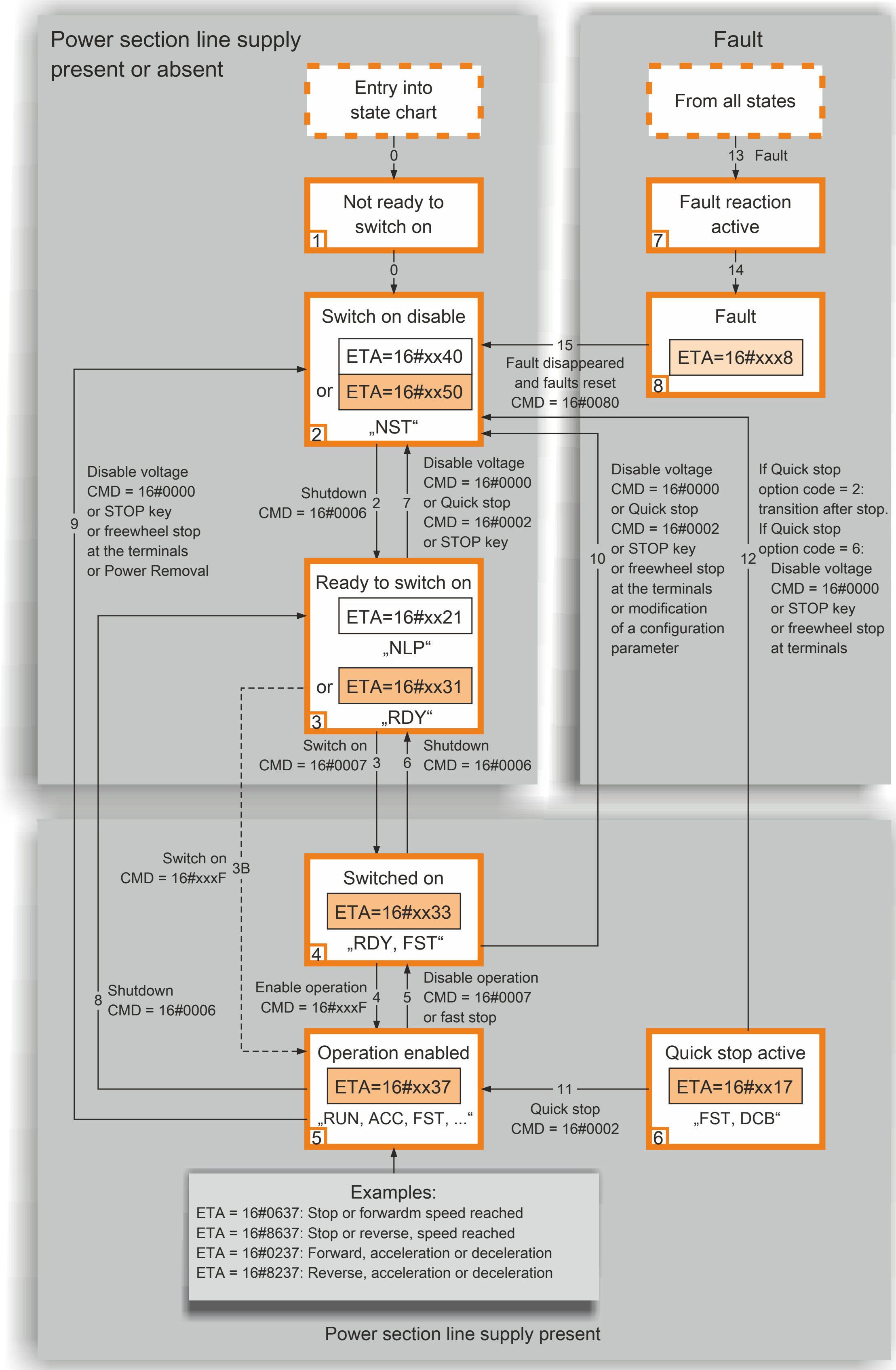
QSDT

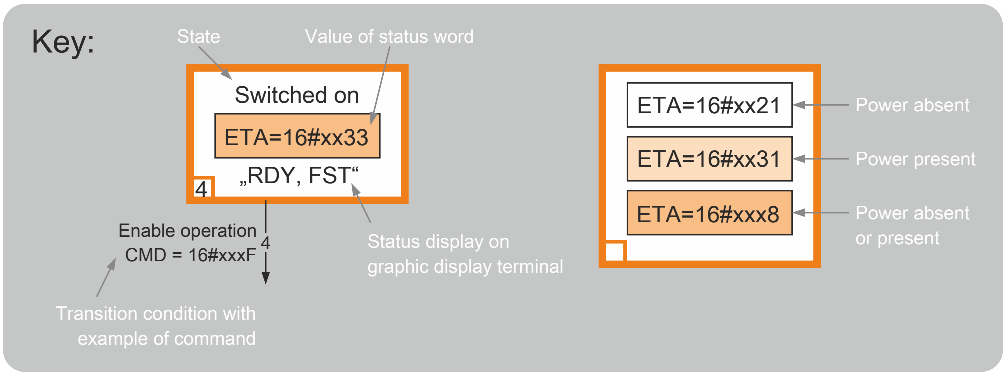
To resume the QSTD will define the drivecom status when the fast stop will be finished.

If the "Quick stop option code" parameter has the value 2, the drive stops according to the fast stop ramp and then changes to state "2 - Switch on disabled".

If the "Quick stop option code" parameter has the value 6, the drive stops according to the fast stop ramp and then remains in state "6 - Quick stop active" until:

- A "Disable voltage" command is received
  or
- The STOP key is pressed
  or
- There is a freewheel stop command via the terminals


Power section line supply present or absent
Entry into state chart
0
Not ready to switch on
1
0
Switch on disable
ETA=16#xx40
or ETA=16#xx50
„NST“
2
Fault
From all states
13 Fault
Fault reaction active
7
14
Fault
ETA=16#xxx8
8
15
Fault disappeared and faults reset CMD = 16#0080
Disable voltage CMD = 16#0000 or STOP key or freewheel stop at the terminals or Power Removal
9
Shutdown CMD = 16#0006
2
7
Disable voltage CMD = 16#0000 or Quick stop CMD = 16#0002 or STOP key
Disable voltage CMD = 16#0000 or Quick stop CMD = 16#0002 or STOP key or freewheel stop at the terminals or modification of a configuration parameter
10
If Quick stop option code = 2: transition after stop. If Quick stop option code = 6: Disable voltage CMD = 16#0000 or STOP key or freewheel stop at terminals
12
Ready to switch on
ETA=16#xx21
„NLP“
or ETA=16#xx31
„RDY“
3
Switch on CMD = 16#0007
3
6
Shutdown CMD = 16#0006
Switch on CMD = 16#xxxF
3B
Switched on
ETA=16#xx33
„RDY, FST“
4
Shutdown CMD = 16#0006
8
Enable operation CMD = 16#xxxF
4
5
Disable operation CMD = 16#0007 or fast stop
Operation enabled
ETA=16#xx37
„RUN, ACC, FST, ...“
5
11
Quick stop CMD = 16#0002
Quick stop active
ETA=16#xx17
„FST, DCB“
6
Examples:
ETA = 16#0637: Stop or forwardm speed reached
ETA = 16#8637: Stop or reverse, speed reached
ETA = 16#0237: Forward, acceleration or deceleration
ETA = 16#8237: Reverse, acceleration or deceleration
Power section line supply present



For CMDD bit 2, the ramp used is the fast stop ramp. It's the same ramp than if you used FST parmeters assigned to an logic input. The FST ramp will be: DEC (or DE2) divided by DCF parameter (per default 4). With default value DEC = 3 s and DCF = 4 -> FST ramp will be 750 ms

Description of states

Each state represents an internal reaction by the drive. This chart will change depending on whether the control word is sent (CMD) or an event occurs (a fault, for example). The drive state can be identified by the value of the status word (ETA).

1 - Not ready to switch on

Initialization starts. This is a transient state invisible to the communication network.

2 - Switch on disabled

The drive is inactive.

The drive is locked, no power is supplied to the motor.

For a separate control section, it is not necessary to supply AC power to the power section.

For a separate control section with line contactor, the contactor is not controlled.

The configuration and adjustment parameters can be modified.

3 - Ready to switch on

Awaiting power section line supply.

For a separate control section, it is not necessary to supply AC power to the power section, but the system will expect it in order to change to state "**4 - Switched on**".

For a separate control section with line contactor, the contactor is not controlled.

The drive is locked, no power is supplied to the motor.

The configuration and adjustment parameters can be modified.

4 - Switched on

The drive is supplied with AC power but is stationary.

For a separate control section, the power section line supply must be present.

For a separate control section with line contactor, the contactor is controlled.

The drive is locked, no power is supplied to the motor.

The power stage of the drive is ready to operate, but voltage has not yet been applied to the output.

The adjustment parameters can be modified.

Modification of a configuration parameter returns the drive to state "**2 - Switch on disabled**".

5 - Operation enabled

The drive is running.

For a separate control section, the power section line supply must be present.

For a separate control section with line contactor, the contactor is controlled.

The drive is unlocked, power is supplied to the motor.

The drive functions are activated and voltage is applied to the motor terminals.

However, in the case of an open-loop drive, if the reference is zero or the "Halt" command is applied, no power is supplied to the motor and no torque is applied.

Auto-tuning (tUn) requires an injection of current into the motor. The drive must therefore be in state "**5 - Operation enabled**" for this command.

The adjustment parameters can be modified.

The configuration parameters cannot be modified.

Note:

The command "4 - Enable operation" must be taken into consideration only if the channel is valid. In particular, if the channel is involved in the command and the reference, transition 4 will take place only after the reference has been received for the first time.

The reaction of the drive to a "Disable operation" command depends on the value of the "Disable operation option code" (DOTD) parameter:

- If the "Disable operation option code" parameter has the value 0, the drive changes to "**4 - Switched on**" and stops in freewheel stop.
- If the "Disable operation option code" parameter has the value 1, the drive stops on ramp and then changes to "**4 - Switched on**".

6 - Quick stop active

Emergency stop.

The drive performs a fast stop, after which restarting will only be possible once the drive has changed to the "**2 - Switch on disabled**" state.

During fast stop, the drive is unlocked and power is supplied to the motor.

The configuration parameters cannot be modified.

The condition for transition 12 to state "**2 - Switch on disabled**" depends on the value of the parameter "Quick stop option code" (QSTD):

- If the "Quick stop option code" parameter has the value 2, the drive stops according to the fast stop ramp and then changes to state "**2 - Switch on disabled**".
- If the "Quick stop option code" parameter has the value 6, the drive stops according to the fast stop ramp and then remains in state "**6 - Quick stop active**" until:
    - A "Disable voltage" command is received
    - Or the STOP key is pressed
    - Or there is a freewheel stop command via the terminals

7 - Fault reaction active

Transient state during which the drive performs an action appropriate to the type of fault.

The drive function is activated or deactivated according to the type of reaction configured in the fault management parameters.

8 - Fault

Drive faulty.

The drive is locked, no power is supplied to the motor.

Summary

State	Power section line supply for separate control section	Power supplied to motor	Modification of configuration parameters
1 - Not ready to switch on	Not required	No	Yes
2 - Switch on disabled	Not required	No	Yes
3 - Ready to switch on	Not required	No	Yes
4 - Switched on	Required	No	Yes, return to "**2 - Switch on disabled**" state
5 - Operation enabled	Required	Yes, apart from an open-loop drive with a zero reference or in the event of a "Halt" command for an open-loop drive	No
6 - Quick stop active	Required	Yes, during fast stop	No
7 - Fault reaction active	Depends on fault management configuration	Depends on fault management configuration	-
8 - Fault	Not required	No	Yes

Control word (CMD)

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Fault reset	Reserved (=0)	Reserved (=0)	Reserved (=0)	Enable operation	Quick stop	Enable voltage	Switch on
Ack. fault				Run command	Emergency stop	Authorization to supply AC power	Contactor control

Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Assignable	Assignable	Assignable	Assignable	By default, direction of rotation command	Reserved (=0)	Reserved (=0)	Halt
							Halt

Command	Transition address	Final state	Bit 7	Bit 3	Bit 2	Bit 1	Bit 0	Example value
			Fault reset	Enable operation	Quick stop	Enable voltage	Switch on	
Shutdown	2, 6, 8	3 - Ready to switch on	x	x	1	1	0	16#0006
Switch on	3	4 - Switched on	x	x	1	1	1	16#0007
Enable operation	4	5 - Operation enabled	x	1	1	1	1	16#000F
Disable operation	5	4 - Switched on	x	0	1	1	1	16#0007
Disable voltage	7, 9, 10, 12	2 - Switch on disabled	x	x	x	0	x	16#0000
Quick stop	11	6 - Quick stop active	x	x	0	1	x	16#0002
	7, 10	2 - Switch on disabled						
Fault reset	15	2 - Switch on disabled	0 > 1	x	x	x	x	16#0080

x: Value is of no significance for this command.

0 > 1: Command on rising edge.

Acceleration and deceleration ramps

When an ACOPOSserver P74 is integrated with SDC, the ACC and DEC ramp parameters are set to 0.1 ms automatically. This corresponds to the fastest acceleration/deceleration.

Note:

These values should not be modified if the ACOPOSinverter P74 is integrated with the ACP10SDC library.

Total delay (t_total) and Predict time (t_predict)

These two axial parameters are automatically set to 5x SDC cycle time when the ACOPOSinverter P74 is integrated with the ACP10SDC library.

For improved performance, these values should be set to 1x SDC cycle time.

Operation of the ACOPOSinverter P74 in rpm or Hertz

The standard entry for speed is read in revolutions per minute (rpm).

Conversion formula of the ACP10SDC parameter, SERVO_V_MAX_OUTPUT, for units/sec in rpm:

$$max\,Output \;=\; 32767 \quad \rightarrow \quad max\,Speed\;\;RPM \;=\; 32767\;\left[rpm\right]$$

$$SERVO\_V\_MAX\_OUTPUT \;=\; max\;\;Speed\;\;RPM\left[\frac{U}{Min}\right] \;\times\; \frac{SCALE\_LOAD\_UNITS\;\left[E\right]}{SCALE\_LOAD\_MOTOR\_REV\;\left[U\right]} \;\times\; \frac{1}{60\left[S\right]}$$

Example

SCALE_LOAD_UNIT = 1000

SCAL_LOAD_MOTOR_REV = 1

$$SERVO\_V\_MAX\_OUTPUT \;=\; \left(32767\;\times\;\frac{1000}{60}\right)\;\left[E/s\right]$$

$$SERVO\_V\_MAX\_OUTPUT \;=\; 546116.666\;\left[E/s\right] \cong\; 546116.67$$

$$SERVO\_V\_MAX\_OUTPUT \;=\; 546116.6875\;\left[E/s\right] \;\rightarrow\; due\;\;to\;\;quantization\;\;float$$

Conversion formula of the ACP10SDC parameter, SERVO_V_MAX_OUTPUT for units/sec in Hertz (Resolution 0.1 Hz)

$$max\,Output \;=\; 32767 \quad \rightarrow \quad max\,electrSpeed\;\;Hz \;=\; 3276.7\;\left[Hz\right]$$

$$max\,mechSpeed \;=\; \frac{max\,electrSpeedHz}{Number\_Polepairs}\;\left[U/s\right]$$

$$SERVO\_V\_MAX\_OUTPUT \;=\; max\,mechSpeed\left[\frac{U}{s}\right] \;\times\; \frac{SCALE\_LOAD\_UNITS\;\left[E\right]}{SCALE\_LOAD\_MOTOR\_REV\;\left[U\right]}$$

Example

SCALE_LOAD_UNITS = 1000

SCALE_LOAD_MOTOR_REV = 1

Number_Polepairs = 2

$$max\,mechSpeed \;=\; \frac{3276.7}{2} \;=\; 1638.35\;\left[U/s\right]$$

$$SERVO\_V\_MAX\_OUTPUT \;=\; \left(1638.35\;\times\;\frac{1000}{1}\right)\;\left[E/s\right]$$

$$SERVO\_V\_MAX\_OUTPUT \;=\; 1638350\;\left[E/s\right]$$

Conversion formula of the ACP10SDC parameter, SERVO_V_MAX_OUTPUT for units/sec in Hertz (Resolution 0-TFR)

In this configuration, the default value is specified in Hertz [Hz].

The resolution is not predefined in this case; however, it can be influenced by the user. This is done by setting the "TFR Max frequency [0.1 Hz]" configuration parameter in the ACOPOSinverter I/O under "ACOPOSinverter ➜ DRC - Motor control".

The default value is a data point of type "INT" for this configuration as well; however, it corresponds to a frequency of 0 up to the value of the TFR parameter.

> **Note:**
>
> **In order for the default value to be scaled from 0 to TFR, it is necessary for the user to set the bit "CMI_Output_09 → Definition of the frequency reference (LFr) and output frequency (rFr) unit (0 = 0.1 Hz; 1 = Standardized value 16 signed bits based on the maximum frequency)" to "TRUE".**

$$TFR = 600 \quad \rightarrow \quad max \quad electrSpeed = 60 \ [Hz]$$

The remainder of the calculation is identical to the configuration described above with the default value in Hertz.

Example

SCALE_LOAD_UNITS = 1000

SCALE_LOAD_MOTOR_REV = 1

Number_Polepairs = 2

$$TFR = 600 \quad \rightarrow \quad max\ electrSpeed = 60 \ [Hz]$$
$$max \quad mechanicalSpeed = \frac{60}{2} = 30 \ [U/s]$$
$$SERVO\_V\_MAX\_OUTPUT = \left(30 \times \frac{1000}{1}\right) [E/s]$$
$$SERVO\_V\_MAX\_OUTPUT = 30000 \ [E/s]$$

TUN parameter

The TUN parameter cannot be configured via Automation Studio. To adapt the TUN parameter see "[MOTOR CONTROL]" on page 188.

> **Note:**
>
> **The current configuration can be found at the ACOPOSinverter P74 at the following path:**
>
> **DRI > CONF > FULL > DRC > ASY > TUN**

3.1.3 Setup

3.1.3.1 Steps for setting-up the drive

INSTALLATION

- Please refer to the installation chapter.

PROGRAMMING

- Apply input power to the drive, but do not give a run command.
- Configure:
    - The nominal frequency of the motor **[Standard mot. freq]**(bFr) if this is not 50 Hz.
    - The motor parameters in the **[MOTOR CONTROL]**(drC-) menu only if the factory configuration of the drive is not suitable.
    - The application functions in the **[INPUTS / OUTPUTS CFG]**(I_O-) menu the **[COMMAND]**(CtL-) menu and the **[APPLICATION FUNCT.]**(FUn-) menu only if the factory configuration of the drive is not suitable.
- In the **[SETTINGS]**(SEt-) menu, adjust the following parameters:
    - **[Acceleration]** (ACC) and **[Deceleration]** (dEC)
    - **[Low speed]**(LSP) and **[High speed]** (HSP)
    - **[Mot. therm. current]**(ItH)
- Start the drive.

Tips:

- Before beginning programming, complete the customer setting tables
- Use the **[Restore config.]**(FCS) parameter to return to the factory settings at any time.
- To locate the description of a function quickly, use the index of functions.

Note:

The following operations must be performed for optimum drive performance in terms of accuracy and response time:

- **Enter the values indicated on the motor rating plate in the [MOTOR CONTROL](drC-) menu**
- **Perform auto-tuning with the motor cold and connected using the [Auto-tuning] (tUn) parameter**

3.1.3.2 Preliminary recommendations

Before powering up the drive

> ## Danger!
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> **Read and understand this manual before installing or operating the ACOPOSinverter P74.**
>
> **Any changes made to the parameter settings must be performed by qualified personnel.**
>
> **Check that all logic inputs are inactive to avoid any unintended operation.**
>
> **Failure to follow these instructions will result in death or serious injury.**

Start-up

> ## Note:
>
> **When factory settings apply and during power-up/manual reset or after a stop command, the motor can only be powered once the "forward", "reverse" and "DC injection stop" commands have been reset. If they have not been reset, the drive will display [Freewheel stop](nSt) but will not start. If the automatic restart function has been configured ([Automatic restart](Atr) parameter in the [FAULT MANAGEMENT](FLt-) menu), these commands are taken into account without a reset (to zero) being necessary.**

Line contactor

> ## Caution!
>
> **RISK OF DAMAGE TO DRIVE**
>
> **Frequent use of the contactor will cause premature aging to the charge circuit of the filter capacitors.**
>
> **Do not power-up the drive less than every 60 seconds.**
>
> **Failure to follow these instructions can result in equipment damage.**

Using a motor with a lower rating or dispensing with a motor altogether

With the factory settings, motor output phase loss detection is active (**[Output Phase Loss]**(OPL) = **[Yes]**(YES)). To avoid having to use a motor with the same rating as the drive when testing the drive or during a maintenance phase, deactivate the motor output phase loss detection (**[Output Phase Loss]**(OPL) = **[No]**(nO)). This can prove particularly useful if very large drives are being tested with a small motor. Set **[Motor control type]**(Ctt) to **[Standard]**(Std) in **[Motor control menu]**(drC-).

> ## Caution!
>
> **RISK OF DAMAGE TO THE MOTOR**
>
> **Motor thermal protection will not be provided by the drive if the motor 's nominal current is 20% lower than that of the drive.**
>
> **In this case, find an alternative source of thermal protection.**
>
> **Failure to follow these instructions can result in equipment damage.**

> ## Danger!
>
> **HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH**
>
> **If [Output Phase Loss](OPL) is set to [No](nO), Loss of cable is not detected.**
>
> **Check that this action will not endanger personnel or equipment in any way.**
>
> **Failure to follow these instructions will result in death or serious injury.**

3.2 Programming description

3.2.1 Reference Mode (rEF)

3.2.1.1 Introduction

Use the reference mode to monitor and, if the reference channel is the analog input 1 (**[Ref.1 channel]**(Fr1) set to **[AI virtual 1]**(AIU1)), adjust the actual reference value by modifying the analog input voltage value.

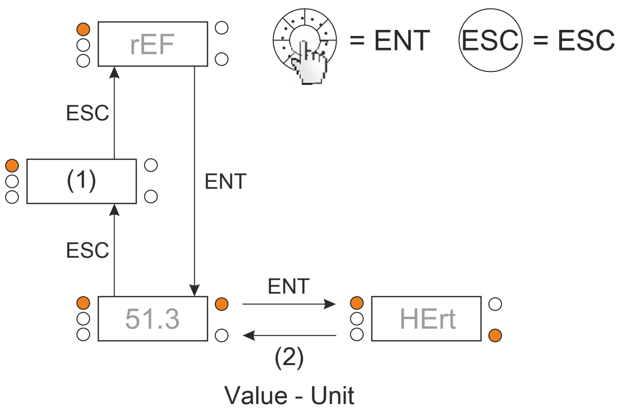
If local control is enabled (**[Ref.1 channel]**(Fr1) set to **[HMI]**(LCC)), the jog dial on the remote display terminal or the Up/Down Navigation keys on the remote display terminal acts as a potentiometer to change the reference value up and down within the limits preset by other parameters (**[Low speed]**(LSP) or **[High speed]**(HSP)).

There is no need to press the ENT key to confirm the change of the reference.

3.2.1.2 Organization tree

(1) Depending on the active reference channel
Possible values:
(AIU1)
(LFr)
(MFr)
(rPI)
(FrH)
(rPC)

(2) 2 seconds or ESC
Displayed parameter value and unit of the diagram are given as examples.



3.2.1.3 Menu

Parameters described in this page can be accessed by: DRI- > rEF-			
Code	**Name / Description**	**Adjustment range**	**Factory settings**
rEF-	**[1.1 SPEED REFERENCE]** Displayed parameters depend on drive settings.		
AIV1 (1)	**[Image input AIV1]** First virtual AI value. This parameter allows to modify the frequency reference with the embedded jog dial.	0.0 to 100.0% of HSP-LSP	0.0%
LFr (1)	**[HMI Frequency ref.]** HMI frequency reference (signed value). This parameter allows to modify the frequency reference with the remote HMI.	-599.0 to 599.0 Hz	0.0 Hz
MFr (1)	**[Multiplying coeff.]** Multiply frequency variable. Multiplying coefficient, can be accessed if **[Multiplier ref.-]**(MA2,MA3) has been assigned to the graphic terminal.	0 to 100%	100%
rPI (1)	**[Internal PID ref.]** PID: Internal reference PI. This parameter allows to modify the PID internal reference with the jog dial. Internal PID reference is visible if **[PID feedback]**(PIF) is not set to **[No]**(nO).	0 to 32767	150
FrH	**[Frequency ref.]** Frequency reference before ramp (signed value). Actual frequency reference applied to the motor regardless of which reference channel has been selected. This parameter is in read-only mode. Frequency reference is visible if the command channel is not HMI or virtual AI.	-599.0 to 599.0 Hz	-
rPC	**[PID reference]** PID: Setpoint value. PID reference is visible if **[PID feedback]** (PIF) is not set to **[No]** (nO).	0 to 65535	-

(1) It is not necessary to press the ENT key to confirm the modification of the reference.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.2 Monitoring Mode (MOn)

3.2.2.1 Introduction

The parameters can be accessed when the drive is running or stopped.

Some functions have numerous parameters. In order to clarify programming and avoid having to scroll through endless parameters, these functions have been grouped in submenus. Like menus, submenus are identified by a dash after their code.

When the drive is running, the value displayed is one of the monitoring parameters. By default, the value displayed is the input frequency reference (**[Frequency ref.]**(FrH) parameter).

While the value of the new monitoring parameter required is being displayed, press a second time on the jog dial key to display the units or press and hold down the jog dial (ENT) again (for 2 seconds) to confirm the change of monitoring parameter and store it. From then on, it is the value of this parameter that will be displayed during operation (even after powering down).

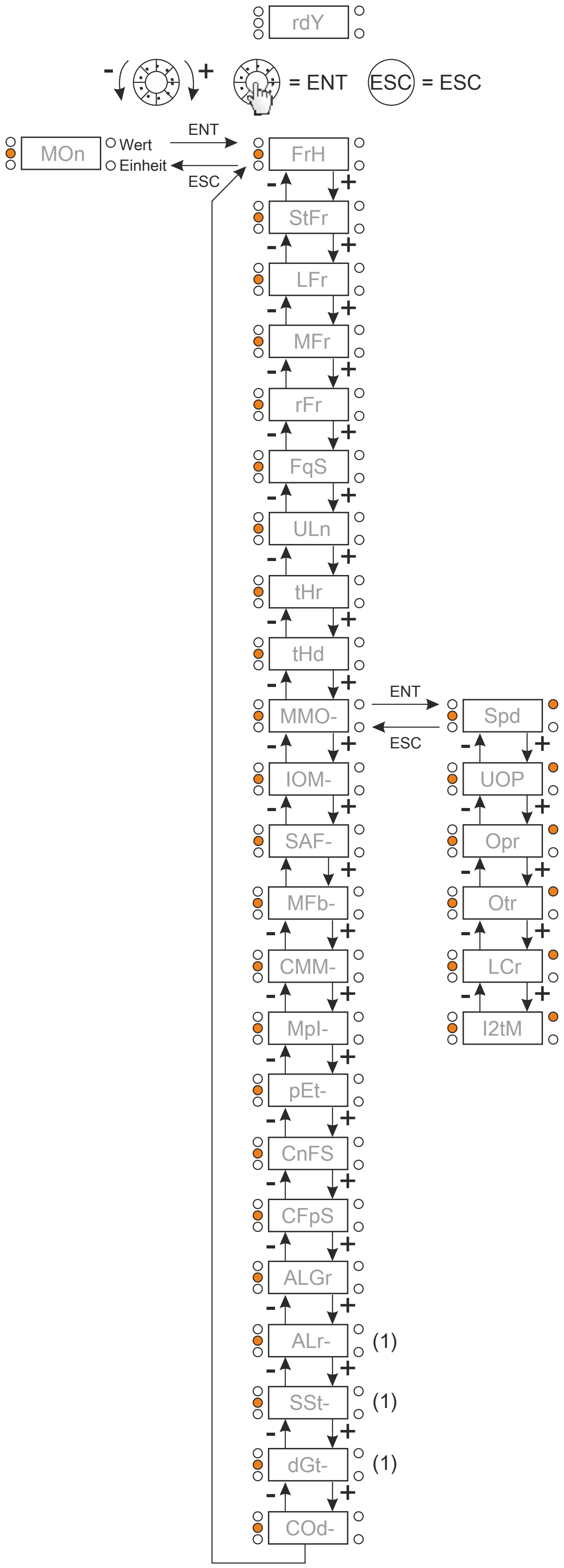
Unless the new choice is confirmed by pressing and holding down ENT again, the display will revert to the previous parameter after powering down.

> **Note:**
>
> **After the drive has been turned off or following a loss of line supply, the parameter displayed is the drive status (example: [Ready](rdY)). The selected parameter is displayed following a run command.**

3.2.2.2 Organization tree

Displayed parameters of the diagram are given as examples.

(1) Visible only with graphic display terminal



3.2.2.3 Menu

Parameters described in this page can be accessed by: DRI- > MOn-		
Code	**Name / Description**	**Unit**
MOn-	[1.2 MONITORING]	
AIV1	[Image input AIV1] First virtual AI value. This parameter is read-only. It enables you to display the speed reference applied to the motor.	%
FrH	[Frequency ref.] Frequency reference before ramp (signed value). This parameter is read-only. It enables you to display the speed reference applied to the motor, regardless of which reference channel has been selected.	Hz
StFr	[Stator Frequency] Displays the estimated stator frequency in Hz (signed value).	Hz
LFr	[HMI Frequency ref.] HMI frequency reference (signed value). This parameter only appears if the function has been enabled. It is used to change the speed reference from the remote control. ENT does not have to be pressed to enable a change of reference. The speed in rpm is calculated in the following way: LFRD = LFR * 60 / zp LFRD ... speed in rpm LFR ... speed in Hz zp ... number of pole pairs If you use for example a motor with 2 pole pairs and enter for LFRD = 60 rpm the motor moves with 2 Hz.	Hz
MFr	[Multiplying coeff.] Multiply frequency variable. Multiplying coefficient, can be accessed if **[Multiplier ref. -]**(MA2,MA3) has been assigned.	%
rFr	[Output frequency] Estimated motor frequency (signed value).	Hz
FqS	[Pulse in. work. freq.] Measured frequency of the "Pulse input" input.	Hz
ULn	[Mains voltage] Main voltage (from DC bus). Line voltage based on DC bus measurement, motor running or stopped.	V
tHr	[Motor thermal state] Motor thermal state. 100% = Nominal thermal state, 118% = "OLF" threshold (motor overload).	%
tHd	[Drv.thermal state] Drive thermal state. 100% = Nominal thermal state, 118% = "OHF" threshold (drive overload).	%

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

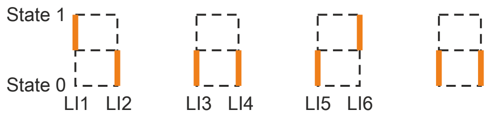
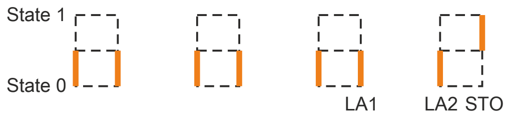
Parameter that can be modified during operation or when stopped.

3.2.2.3.1 [MONIT. MOTOR]

Parameters described in this page can be accessed by: DRI- > MOn- > MMO-		
Code	**Name / Description**	**Unit**
MMO-	**[MONIT. MOTOR]**	
Spd	**[Motor speed]** Motor speed in rpm (estimated value).	rpm
UOP	**[Motor voltage]** Motor voltage (estimated value).	V
Opr	**[Motor power]** Output power monitoring (100% = nominal motor power, estimated value based on current measure).	%
Otr	**[Motor torque]** Output torque value (100% = nominal motor torque, estimated value based on current measure).	%
LCr	**[Motor current]** Estimated motor current (value measured).	A
I2tM	**[I²t overload level]** Monitoring of I²t overload level. This parameter can be accessed if **[I²t model activation]** (I2tA) is set to **[Yes]** (YES).	%

3.2.2.3.2 [I/O MAP]

Parameters described in this page can be accessed by: DRI- > MOn- > IOM-

Code	Name / Description
IOM-	[I/O MAP]
LIA-	[LOGIC INPUT CONF.] Logic input functions.
LIS1	[State of logic inputs LI1 to LI6] Can be used to visualize the state of logic inputs LI1 to LI6 (display segment assignment: high = 1, low = 0).  Example above: LI1 and LI6 are at 1; LI2 to LI5 are at 0.
LIS2	[State of Safe Torque Off] Can be used to visualize the state of LA1, LA2 and STO (Safe Torque Off) (display segment assignment: high = 1, low = 0).  Example above: LA1 and LA2 are at 0; STO (Safe Torque Off) is at 1.
AIA-	[ANALOG INPUTS IMAGE]**(continued)** Analog input functions.
AOA-	[ANALOG OUTPUTS IMAGE] Analog output functions. Following parameters are visible on the graphic display terminal by pressing the ENT key on the parameter.
FSI-	[FREQ. SIGNAL IMAGE] Frequency signal image. This menu is visible only on graphic display terminal.

Parameters described in this page can be accessed by: DRI- > MOn- > IOM- > LIA-

Code	Name / Description
LIA-	[LOGIC INPUT CONF.] Logic input functions.
LIA	[LI1 assignment] Read-only parameters, cannot be configured. It displays all the functions that are assigned to the logic input in order to check for multiple assignments. If no functions have been assigned, [No](nO) is displayed. Use the jog dial to scroll through the functions. The use of graphic display terminal allows to see the delay [LI1 On Delay](L1d). Possible values are the same than in configuration menu.
L2A to L6A	[L-- assignment] All the logic inputs available on the drive are processed as in the example for LI1 above.
LA1A LA2A	

Parameters described in this page can be accessed by: DRI- > MOn- > IOM- > AIA-

Code	Name / Description	Unit
AIA-	[ANALOG INPUTS IMAGE] Analog input functions.	
AI1C	[AI1] AI1 customer image: Value of analog input 1.	V
AI1A	[AI1 assignment] AI1 functions assignment. If no functions have been assigned, [No](nO) is displayed. Following parameters are visible on the graphic display terminal by pressing the ENT key on the parameter.	
nO	[No](nO): Not assigned	
Fr1	[Ref.1 channel](Fr1): Reference source 1	
Fr2	[Ref.2 channel](Fr2): Reference source 2	
SA2	[Summing ref. 2](SA2): Summing reference 2	
PIF	[PID feedback](PIF): PI feedback (PI control)	
tAA	[Torque limitation](tAA): Torque limitation: Activation by an analog value	
dA2	[Subtract. ref. 2](dA2): Subtracting reference 2	
PIM	[Manual PID ref.](PIM): Manual speed reference of the PI(D) regulator (auto-man)	
FPI	[PID speed ref.](FPI): Speed reference of the PI(D) regulator (predictive reference)	
SA3	[Summing ref. 3](SA3): Summing reference 3	
Fr1b	[Ref.1B channel](Fr1b): Reference source 1B	
dA3	[Subtract. ref. 3](dA3): Subtracting reference 3	
FLOC	[Forced local](FLOC): Forced local reference source	
MA2	[Ref. 2 multiplier](MA2): Multiplying reference 2	
MA3	[Ref. 3 multiplier](MA3): Multiplying reference 3	
PES	[Weight input](PES): External weight measurement function	
IA01	[IA01](IA01): Functions blocks: Analog Input 01	
...	...	
IA10	[IA10](IA10): Functions blocks: Analog Input 10	

Parameters described in this page can be accessed by: DRI- > MOn- > IOM- > AIA-		
Code	**Name / Description**	**Unit**
UIL1	**[AI1 min value]** Voltage scaling parameter of 0%.	V
UIH1	**[AI1 max value]** Voltage scaling parameter of 100%.	V
AI1F	**[AI1 filter]** Interference filtering cut-off time of the low-filter.	s
AI2C	**[AI2]** AI2 customer image: Value of analog input 2.	V
AI2A	**[AI2 assignment]** AI2 functions assignment. If no functions have been assigned, **[No]**(nO) is displayed. Following parameters are visible on the graphic display terminal by pressing the ENT key on the parameter. Identical to **[AI1 assignment]**(AI1A).	
UIL2	**[AI2 min value]** Voltage scaling parameter of 0%.	V
UIH2	**[AI2 max value]** Voltage scaling parameter of 100%.	V
AI2F	**[AI2 filter]** Interference filtering cutoff time of the low-filter.	s
AI3C	**[AI3]** AI3 customer image: Value of analog input 3.	mA
AI3A	**[AI3 assignment]** AI3 functions assignment. If no functions have been assigned, **[No]**(nO) is displayed. Following parameters are visible on the graphic display terminal by pressing the ENT key on the parameter. Identical to **[AI1 assignment]**(AI1A).	
CrL3	**[AI3 min value]** Current scaling parameter of 0%.	mA
CrH3	**[AI3 max value]** Current scaling parameter of 100%.	mA
AI3F	**[AI3 filter]** Interference filtering cutoff time of the low-filter.	s

Parameters described in this page can be accessed by: DRI- > MOn- > IOM- > AOA-		
Code	**Name / Description**	**Unit**
AOA-	**[ANALOG OUTPUTS IMAGE]** Analog output functions. Following parameters are visible on the graphic display terminal by pressing the ENT key on the parameter.	
AO1C ⟳	**[AO1C]** AO1 customer image: Value of analog output 1.	
AO1	**[AO1 assignment]** AO1 functions assignment. If no functions have been assigned, **[No]**(nO) is displayed. Identical to **[AO1 assignment]**(AOl).	
UOL1 ★	**[AO1 min Output]** Voltage scaling parameter of 0%. Can be accessed if **[AO1 Type]**(AO1t) is set to **[Voltage]**(10U).	V
UOH1 ★	**[AO1 max Output]** Voltage scaling parameter of 100%. Can be accessed if **[AO1 Type]**(AO1t) is set to **[Voltage]**(10U).	V
AOL1 ★	**[AO1 min output]** Current scaling parameter of 0%. Can be accessed if **[AO1 Type]**(AO1t) is set to **[Current]**(0A).	mA
AOH1 ★	**[AO1 max output]** Current scaling parameter of 100%. Can be accessed if **[AO1 Type]**(AO1t) is set to **[Current]**(0A).	mA
ASL1	**[Scaling AO1 max]** Minimum scaling value for AO1.	%
ASH1	**[Scaling AO1 min]** Maximum scaling value for AO1.	%
AO1F	**[AO1 filter]** Cutoff time of the low-filter.	s

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

⟳ Parameter that can be modified during operation or when stopped.

Parameters described in this page can be accessed by: DRI- > MOn- > IOM- > FSI-		
Code	**Name / Description**	**Unit**
FSI-	**[FREQ. SIGNAL IMAGE]** Frequency signal image. This menu is visible only on graphic display terminal.	
PFrC	**[RP input]** Filtered customer pulse input frequency reference. Following parameters are visible on the graphic display terminal by pressing the ENT key on the parameter.	Hz
PIA	**[RP assignment]** Pulse input assignment. If no functions have been assigned, **[No]**(nO) is displayed. Identical to **[AI1 assignment]**(AI1A).	
PIL	**[RP min value]** RP minimum value. Pulse input scaling parameter of 0%.	kHz
PFr	**[RP max value]** RP maximum value. Pulse input scaling parameter of 100%.	kHz
PFI	**[RP filter]** Interference filtering pulse input cutoff time of the low-filter.	ms

3.2.2.3.3 [MONIT. SAFETY]

Parameters described in this page can be accessed by: DRI- > MOn- > SAF-	
Code	**Name / Description**
SAF-	**[MONIT. SAFETY]** For more details on Integrated Safety Functions, please refer to dedicated chapter "Safety Functions".
StOS	**[STO status]** Status of the Safe Torque Off safety function.
IdLE	**[Idle]**(IdLE): STO not in progress
StO	**[Safe stop]**(StO): STO in progress
FLt	**[Fault]**(FLt): STO fault detected
SLSS	**[SLS status]** Status of the Safely-limited speed safety function
nO	**[Not config.]**(nO): SLS not configured
IdLE	**[Idle]**(IdLE): SLS not in progress
?Alt	**[SLS wait time]**(?Alt): SLS waiting for activation
Strt	**[SLS start]**(Strt): SLS in transient state
SS1	**[Safe ramp]**(SS1): SLS ramp in progress
SLS	**[Spd limited]**(SLS): SLS speed limitation in progress
StO	**[Safe stop]**(StO): SLS safe torque off request in progress
FLt	**[Fault]**(FLt): SLS fault detected
SS1S	**[SS1 status]** Status of the Safe Stop 1 safety function.
nO	**[Not config.]**(nO): SS1 not configured
IdLE	**[Idle]**(IdLE): SS1 not in progress
SS1	**[Safe ramp]**(SS1): SS1 ramp in progress
StO	**[Safe stop]**(StO): SS1 safe torque off request in progress
FLt	**[Fault]**(FLt): SS1 fault detected
SFFE	**[Safety fault reg.]** Safety function fault error register. Bit0 = 1: Logic inputs debounce time-out (verify value of debounce time LIDT according to the application) Bit1: Reserved Bit2 = 1: Motor speed sign has changed during SS1 ramp Bit3 = 1: Motor speed has reached the frequency limit threshold during SS1 ramp Bit4: Reserved Bit5: Reserved Bit6 = 1: Motor speed sign has changed during SLS limitation Bit7 = 1: Motor speed has reached the frequency limit threshold during SS1 ramp Bit8: Reserved Bit9: Reserved Bit10: Reserved Bit11: Reserved Bit12: Reserved Bit13 = 1: Not possible to measure the motor speed (verify the motor wiring connection) Bit14 = 1: Motor ground short-circuit detected (verify the motor wiring connection) Bit15 = 1: Motor phase to phase short-circuit detected (verify the motor wiring connection)

3.2.2.3.4 [MONIT. FUN. BLOCKS]

Parameters described in this page can be accessed by: DRI- > MOn > MFb-	
Code	**Name / Description**
MFb-	[MONIT. FUN. BLOCKS]
FbSt	[FB status] Function Block Status.
IdLE	[Idle] (IdLE): Idle state
CHEC	[Check prog.] (CHEC): Check program state
StOP	[Stop] (StOP): STOP state
InIt	[Init] (InIt): Initialization state
rUn	[Run] (rUn): RUN state
Err	[Error] (Err): Error state
FbFt	[FB fault] Status of the function blocks execution.
nO	[No] (nO): No fault detected
Int	[Internal] (Int): Internal fault detected
bIn	[Binary file] (bIn): Binary fault detected
InP	[Intern para.] (InP): Internal parameter fault detected
PAr	[Para. RW] (PAr): Parameter access fault detected
CAL	[Calculation] (CAL): Calculation fault detected
tOAU	[TO AUX] (tOAU): TimeOut AUX task
tOPP	[TO synch] (tOPP): TiTitlemeOut in PRE/POST task
AdL	[Bad ADLC] (AdL): ADLC with bad parameter
In	[Input assign.] (In): Input not configured

Parameters described in this page can be accessed by: DRI- > MOn > MFb- > FbI-	
Code	**Name / Description**
FbI-	[FB IDENTIFICATION]
bUEr ★	[Program version] Program user version. Can be accessed if [FB status] (FbSt) is not set to [Idle] (IdLE).
bnS ★	[Program size] Program file size. Can be accessed if [FB status] (FbSt) is not set to [Idle] (IdLE).
bnU	[Prg. format version] Binary format version of the drive. Can be accessed if [FB status] (FbSt) is not set to [Idle] (IdLE).
CtU	[Catalogue version] Catalog version of the drive.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.2.3.5 [COMMUNICATION MAP]

Code	Name / Description	Unit
Parameters described in this page can be accessed by: DRI- > MOn- > CMM-		
CMM-	**[COMMUNICATION MAP]** This menu is visible only on graphic display terminal, except for **[COM. SCANNER INPUT MAP]**(ISA-) and **[COM SCANMAP]**(OSA-) menus.	
CMdC	**[Command channel]** Active command channel.	
tErM	**[Terminals]**(tErM): Terminals	
HMI	**[HMI]**(HMI): Graphic display terminal or remote display terminal	
Mdb	**[Modbus]**(Mdb): Integrated Modbus	
CAn	**[CANopen]**(CAn): Integrated CANopen®	
tUd	**[+/- speed]**(tUd): +/- speed command	
nEt	**[Com. card]**(nEt): POWERLINK communication card (if inserted)	
P S	**[PC tool]**(P S): PC software	
CMd	**[Cmd value]** DRIVECOM command register value. **[Profile]**(CHCF) is not set to **[I/O profile]**(IO). Possible values in CiA402 profile, separate or not separate mode. Bit 0: "Switch on"/Contactor command Bit 1: "Disable voltage"/Authorization to supply AC power Bit 2: "Quick stop"/Emergency stop Bit 3: "Enable operation"/Run command Bit 4 to Bit 6: Reserved (set to 0) Bit 7: "Fault reset"/Fault acknowledgment active on 0 to 1 rising edge Bit 8: Stop according to the **[Type of stop]**(Stt) parameter without leaving the Operation enabled state Bit 9: Reserved (set to 0) Bit 10: Reserved (set to 0) Bit 11 to Bit 15: Can be assigned to a command Possible values in the I/O profile. On state command **[2 wire]**(2C). Bit 0: Forward (on state) command • 0: No forward command • 1: Forward command The assignment of bit 0 cannot be modified. It corresponds to the assignment of the terminals. It can be switched. Bit 0 (Cd00) is only active if the channel of this control word is active. Bit 1 to Bit 15: Can be assigned to commands. On edge command **[3 wire]**(3C). Bit 0: Stop (run authorization): • 0: Stop • 1: Run is authorized on a forward or reverse command Bit 1: Forward (on 0 to 1 rising edge) command The assignment of bits 0 and 1 cannot be modified. It corresponds to the assignment of the terminals. It can be switched. Bits 0 (Cd00) and 1 (Cd01) are only active if the channel of this control word is active. Bit 2 to Bit 15: Can be assigned to commands	
rFCC	**[Active ref. channel]** HMI reference channel.	
tErM	**[Terminals]**(tErM): Terminals	
LOC	**[Local]**(LOC): Jog dial	
HMI	**[HMI]**(HMI): Graphic display terminal or remote display terminal	
Mdb	**[Modbus]**(Mdb): Integrated Modbus	
CAn	**[CANopen]**(CAn): Integrated CANopen®	
tUd	**[tUd]**(tUd): +/- speed command	
nEt	**[Com. card]**(nEt): POWERLINK communication card (if inserted)	
P S	**[PC tool]**(P S): PC software	
FrH	**[Frequency ref.]** Frequency reference before ramp.	Hz

Parameters described in this page can be accessed by: DRI- > MOn- > CMM-		
Code	**Name / Description**	**Unit**
EtA	**[ETA state word]** DRIVECOM status word. Possible values in CiA402 profile, separate or not separate mode. Bit 0: "Ready to switch on", awaiting power section line supply Bit 1: "Switched on", ready Bit 2: "Operation enabled", running Bit 3: "Fault" • 0: No fault • 1: Fault Bit 4: "Voltage enabled", power section line supply present • 0: Power section line supply absent • 1: Power section line supply present When the drive is powered by the power section only, this bit is always at 1. Bit 5: Quick stop/Emergency stop Bit 6: "Switched on disabled", power section line supply locked Bit 7: Alarm • 0: No alarm • 1: Alarm Bit 8: Reserved (= 0) Bit 9: Remote: command or reference via the network • 0: Command or reference via the graphic display terminal or the remote display terminal • 1: Command or reference via the network Bit 10: Target reference reached • 0: The reference is not reached • 1: The reference has been reached When the drive is in speed mode, this is the speed reference. Bit 11: "Internal limit active", reference outside limits • 0: The reference is within the limits • 1: The reference is not within the limits When the drive is in speed mode, the limits are defined by the **[Low speed]**(LSP) and **[High speed]** (HSP) parameters. Bit 12 and Bit 13: Reserved (= 0) Bit 14: "Stop key", STOP via stop key • 0: STOP key not pressed • 1: Stop triggered by the STOP key on the graphic display terminal or the remote display terminal Bit 15: "Direction", direction of rotation • 0: Forward rotation at output • 1: Reverse rotation at output The combination of bits 0, 1, 2, 4, 5 and 6 defines the state in the DSP 402 state chart.	

Parameters described in this page can be accessed by: DRI- > MOn- > CMM-		
Code	**Name / Description**	**Unit**
	Possible values in the I/O profile. **Note:** **The value is identical in the CiA402 profile and the I/O profile. In the I/O profile, the description of the values is simplified and does not refer to the CiA402 (Drivecom) state chart.** Bit 0: Reserved (= 0 or 1) Bit 1: Ready • 0: Not ready • 1: Ready Bit 2: Running • 0: The drive will not start if a reference other than zero is applied • 1: Running, if a reference other than zero is applied, the drive can start Bit 3: Fault • 0: No fault • 1: Fault Bit 4: Power section line supply present • 0: Power section line supply absent • 1: Power section line supply present Bit 5: Reserved (= 1) Bit 6: Reserved (= 0 or 1) Bit 7: Alarm • 0: No alarm • 1: Alarm Bit 8: Reserved (= 0) Bit 9: Command via a network • 0: Command via the terminals or the graphic display terminal • 1: Command via a network Bit 10: Reference reached • 0: The reference is not reached • 1: The reference has been reached Bit 11: Reference outside limits • 0: The reference is within the limits • 1: The reference is not within the limits When the drive is in speed mode, the limits are defined by LSP and HSP parameters. Bit 12 and Bit 13: Reserved (= 0) Bit 14: Stop via STOP key • 0: STOP key not pressed • 1: Stop triggered by the STOP key on the graphic display terminal or the remote display terminal Bit 15: Direction of rotation • 0: Forward rotation at output • 1: Reverse rotation at output	

Parameters described in this page can be accessed by: DRI- > MOn- > CMM- > Mnd-	
Code	**Name / Description**
Mnd-	[MODBUS NETWORK DIAG] Modbus network diagnostic.
Mdb1	[COM LED] View of the Modbus Communication.
M1Ct	[Mb NET frames nb.] Modbus network frame counter: Number of processed frames.
M1EC	[Mb NET CRC errors] Modbus network CRC error counter: Number of CRC errors.

Parameters described in this page can be accessed by: DRI- > MOn- > CMM- > ISA-	
Code	**Name / Description**
ISA-	[COM. SCANNER INPUT MAP] Used for CANopen® and Modbus Network.
nM1	[Com Scan In1 val.] Value of the 1st input word.
nM2	[Com Scan In2 val.] Value of the 2nd input word.
nM3	[Com Scan In3 val.] Value of the 3rd input word.
nM4	[Com Scan In4 val.] Value of the 4th input word.

Parameters described in this page can be accessed by: DRI- > MOn- > CMM- > ISA-	
Code	**Name / Description**
nM5	**[Com Scan In5 val.]** Value of the 5th input word.
nM6	**[Com Scan In6 val.]** Value of the 6th input word.
nM7	**[Com Scan In7 val.]** Value of the 7th input word.
nM8	**[Com Scan In8 val.]** Value of the 8th input word.

Parameters described in this page can be accessed by: DRI- > MOn- > CMM- > OSA-	
Code	**Name / Description**
OSA-	**[COM SCAN MAP]**
nC1	**[Com Scan Out1 val.]** Value of the 1st output word.
nC2	**[Com Scan Out2 val.]** Value of the 2nd output word.
nC3	**[Com Scan Out3 val.]** Value of the 3rd output word.
nC4	**[Com Scan Out4 val.]** Value of the 4th output word.
nC5	**[Com Scan Out5 val.]** Value of the 5th output word
nC6	**[Com Scan Out6 val.]** Value of the 6th output word.
nC7	**[Com Scan Out7 val.]** Value of the 7th output word.
nC8	**[Com Scan Out8 val.]** Value of the 8th output word.

Parameters described in this page can be accessed by: DRI- > MOn- > CMM- > C I-	
Code	**Name / Description**
C I-	**[CMD. WORD IMAGE]** Command word image: Only accessible via graphic display terminal.
CMd1	**[Modbus cmd.]** Modbus command word image.
CMd2	**[CANopen cmd.]** CANopen® command word image.
CMd3	**[COM. card cmd.]** Communication card command word image.

Parameters described in this page can be accessed by: DRI- > MOn- > CMM- > r I-		
Code	**Name / Description**	**Unit**
r I-	**[FREQ. REF. WORD MAP]** Frequency reference image: Only accessible via graphic display terminal.	
LFr1	**[Modbus ref.]** Modbus frequency reference image.	Hz
LFr2	**[CANopen ref.]** CANopen® frequency reference image.	Hz
LFr3	**[Com. card ref.]** Communication card frequency reference image.	Hz

Parameters described in this page can be accessed by: DRI- > MOn- > CMM- > CnM-	
Code	**Name / Description**
CnM-	**[CANopen MAP]** CANopen® image: Only accessible via graphic display terminal.
COn	**[RUN LED]** View of the CANopen® RUN LED Status
CAnE	**[ERR LED]** View of the CANopen® Error LED Status.

Parameters described in this page can be accessed by: DRI- > MOn- > CMM- > CnM- > PO1-	
Code	**Name / Description**
PO1-	**[PDO1 IMAGE]** View of the RPDO1 and TPDO1.
rp11 ★	**[Received PDO1-1]** 1st frame of the received PDO1.
rp12 ★	**[Received PDO1-2]** 2nd frame of the received PDO1.
rp13 ★	**[Received PDO1-3]** 3rd frame of the received PDO1.
rp14 ★	**[Received PDO1-4]** 4th frame of the received PDO1.
tp11 ★	**[Transmit PDO1-1]** 1st frame of the transmit PDO1.
tp12 ★	**[Transmit PDO1-2]** 2nd frame of the transmit PDO1.
tp13 ★	**[Transmit PDO1-3]** 3rd frame of the transmit PDO1.
tp14 ★	**[Transmit PDO1-4]** 4th frame of the transmit PDO1.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameters described in this page can be accessed by: DRI- > MOn- > CMM- > CnM- > PO2-	
Code	**Name / Description**
PO2-	**[PDO2 IMAGE]** View of the RPDO2 and TPDO2: Same structure as **[PDO1 IMAGE]**(PO1-).
rp21 ★	**[Received PDO2-1]** 1st frame of the received PDO2.
rp22 ★	**[Received PDO2-2]** 2nd frame of the received PDO2.
rp23 ★	**[Received PDO2-3]** 3rd frame of the received PDO2.
rp24 ★	**[Received PDO2-4]** 4th frame of the received PDO2.
tp21 ★	**[Transmit PDO2-1]** 1st frame of the transmit PDO2.
tp22 ★	**[Transmit PDO2-2]** 2nd frame of the transmit PDO2.
tp23 ★	**[Transmit PDO2-3]** 3rd frame of the transmit PDO2.
tp24 ★	**[Transmit PDO2-4]** 4th frame of the transmit PDO2.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameters described in this page can be accessed by: DRI- > MOn- > CMM- > CnM- > PO3-	
Code	**Name / Description**
PO3-	**[PDO3 IMAGE]** View of the RPDO3 and TPDO3: Same structure as **[PDO1 IMAGE]**(PO1-).
rp31 ★	**[Received PDO3-1]** 1st frame of the received PDO3.
rp32 ★	**[Received PDO3-2]** 2nd frame of the received PDO3.
rp33 ★	**[Received PDO3-3]** 3rd frame of the received PDO3.
rp34 ★	**[Received PDO3-4]** 4th frame of the received PDO3.
tp31 ★	**[Transmit PDO3-1]** 1st frame of the transmit PDO3.
tp32 ★	**[Transmit PDO3-2]** 2nd frame of the transmit PDO3.
tp33 ★	**[Transmit PDO3-3]** 3rd frame of the transmit PDO3.
tp34 ★	**[Transmit PDO3-4]** 4th frame of the transmit PDO3.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameters described in this page can be accessed by: DRI- > MOn- > CMM- > CnM- > nMtS	
Code	**Name / Description**
nMtS	**[Canopen NMT state]** Drive NMT State of the CANopen® slave.
bOOt	**[Boot]**(bOOt): Bootup
StOP	**[Stopped]**(StOP): Stopped
OPE	**[Operation]**(OPE): Operational
POPE	**[Pre-op]**(POPE): Pre-Operational
nbtp	**[Number of TX PDO]** Number of transmit PDO.
nbrp	**[Number of RX PDO]** Number of receive PDO.
ErCO	**[Error code]** CANopen® error register (from 1 to 5).
rEC1	**[RX Error Counter]** Controller Rx error counter (not memorized at power off).
tEC1	**[TX error counter]** Controller Tx error counter (not memorized at power off).

3.2.2.3.6 [MONIT. PI]

Parameters described in this page can be accessed by: DRI- > MOn- > MPI-		
Code	**Name / Description**	**Unit**
MPI-	**[MONIT. PI]** PID management. Visible if **[PID feedback ass.]**(PIF) is not set to **[No]**(nO).	
rPI	**[Internal PID ref.]** Internal PID reference: As a process value.	
rpE	**[PID error]** PID error value.	
rpF	**[PID feedback]** PID feedback value.	
rpC	**[PID reference]** PID setpoint value via graphic display terminal.	
rpO	**[PID Output]** PID output value with limitation.	Hz

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.2.3.7 [MONIT. POWER TIME]

Parameters described in this page can be accessed by: DRI- > MOn- > pEt-		
Code	**Name / Description**	**Unit**
pEt-	**[MONIT. POWER TIME]**	
ApH	**[Consumption]** Energy consumption in Wh, kWh or MWh (accumulated consumption).	Wh, kWh, MWh
rtH	**[Run time]** Run elapsed time display (resettable) in seconds, minutes or hours (length of time the motor has been switched on).	s, min, h
ptH	**[Power on time]** Power elapsed time display in seconds, minutes or hours (length of time the drive has been switched on).	s, min, h
rpr	**[Operating t. reset]** Reset of run elapsed time.	
nO	**[No]**(nO): Reset operation not in progress	
APH	**[Reset kWh]**(APH): Clear **[Reset kWh]**(APH)	
rtH	**[rst. runtime]**(rtH): Clear **[rst. runtime]**(rtH)	
PtH	**[rst. P On t.]**(PtH): Clear **[rst. P On t.]**(PtH)	

Parameter that can be modified during operation or when stopped.

3.2.2.3.8 [Config. active]

Parameters described in this page can be accessed by: DRI- > MOn-	
Code	**Name / Description**
MOn-	**[1.2 MONITORING]** **(continued)**
CnFS	**[Config. active]** View of the active configuration.
nO	**[In progress]**(nO): Transitory state (configuration changing)
CnF0	**[Config. n°0]**(CnF0): Configuration 0 active
CnF1	**[Config. n°1]**(CnF1): Configuration 1 active
CnF2	**[Config. n°2]**(CnF2): Configuration 2 active
CFpS ★	**[Utilised param. set]** Configuration parameter status (can be accessed if parameter switching has been enabled).
nO	**[None]**(nO): Not assigned
CFP1	**[Set N°1]**(CFP1): Parameter set 1 active
CFP2	**[Set N°2]**(CFP2): Parameter set 2 active
CFP3	**[Set N°3]**(CFP3): Parameter set 3 active
ALGr	**[Alarm groups]** Current impacted alarm group numbers. Group of alarms could be user defined in **[INPUTS / OUTPUTS CFG]**(I_O-).
---	**[---]**(---): No alarm group impacted
1--	**[1--]**(1--): Alarm group 1
-2-	**[-2-]**(-2-): Alarm group 2
12-	**[12-]**(12-): Alarm group 1 and 2
--3	**[--3]**(--3): Alarm group 3
1-3	**[1-3]**(1-3): Alarm group 1 and 3
-23	**[-23]**(-23): Alarm group 2 and 3
123	**[123]**(123): Alarm group 1, 2 and 3
SPd1 or SPd2 or ?SPd3	**[Cust. output value]** **[Cust. output value]**(SPd1), **[Cust. output value]**(SPd2) or **[Cust. output value]**(SPd3) depending on the **[Scale factor display]**(SdS) parameter (**[Cust. output value]**(SPd3) in the factory setting).

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.2.3.9 [ALARMS]

Parameters described in this page can be accessed by: DRI- > MOn- > ALGr-	
Code	**Name / Description**
ALGr-	**[ALARMS]** List of current alarms. If an alarm is present, a ✓ appears on the graphic display terminal.
nOAL	**[No alarm]**(nOAL)
PtCL	**[PTC alarm]**(PtCL)
EtF	**[External fault]**(EtF)
USA	**[UnderV. al.]**(USA)
CtA	**[I attained]**(CtA)
FtA	**[Freq. Th. attain.]**(FtA)
F2A	**[Freq. Th. 2 attained]**(F2A)
SrA	**[Freq.ref.att]**(SrA)
tSA	**[Th.mot. att.]**(tSA)
tS2	**[Th.mot2 att.]**(tS2)
tS3	**[Th.mot3 att.]**(tS3)
UPA	**[Underv. prev.]**(UPA)
FLA	**[HSP attain.]**(FLA)
tHA	**[Al. °C drv]**(tHA)
AG1	**[Alarm group 1]**(AG1)
AG2	**[Alarm group 2]**(AG2)
AG3	**[Alarm group 3]**(AG3)
PEE	**[PID error al]**(PEE)
PFA	**[PID fdbk al.]**(PFA)
AP3	**[AI3 Al. 4-20mA]**(AP3)
SSA	**[Lim T/I att.]**(SSA)
tAd	**[Th.drv.att.]**(tAd)
tJA	**[IGBT alarm]**(tJA)
bOA	**[Brake R. al.]**(bOA)
ULA	**[Underload. Proc. Al.]**(ULA)
OLA	**[Overload. Proc. Al.]**(OLA)
rSdA	**[Rope slack alarm]**(rSdA)
ttHA	**[High torque alarm]**(ttHA)
ttLA	**[Low torque alarm]**(ttLA)
dLdA	**[Dynamic load alarm]**(dLdA)
FqLA	**[Freq. meter Alarm]**(FqLA)

3.2.2.3.10 [OTHER STATE]

Parameters described in this page can be accessed by: DRI- > MOn- > SSt-	
Code	**Name / Description**
SSt-	**[OTHER STATE]** List of secondary states. This menu is visible only on graphic display terminal.
FL	**[In motor fluxing]**(FL)
PtCL	**[PTC Alarm]**(PtCL)
FSt	**[Fast stop in prog.]**(FSt)
CtA	**[Current Th. attained]**(CtA)
FtA	**[Freq. Th. attained]**(FtA)
F2A	**[Freq. Th. 2 attained]**(F2A)
SrA	**[Frequency ref. att.]**(SrA)
tSA	**[Motor th. state att.]**(tSA)
EtF	**[External fault alarm]**(EtF)
AUtO	**[Auto restart]**(AUtO)
FtL	**[Remote]**(FtL)
tUn	**[Auto-tuning]**(tUn)
USA	**[Undervoltage]**(USA)
CnF1	**[Config. 1 act.]**(CnF1)
CnF2	**[Config. 2 act.]**(CnF2)
FLA	**[HSP attained]**(FLA)
AnA	**[Load calculated]**(AnA)
CFP1	**[Set 1 active]**(CFP1)
CFP2	**[Set 2 active]**(CFP2)
CFP3	**[Set 3 active]**(CFP3)
brS	**[In braking]**(brS)
dbL	**[DC bus loading]**(dbL)
ttHA	**[High torque alarm]**(ttHA)
ttLA	**[Low torque alarm]**(ttLA)
MFrd	**[Forward]**(MFrd)
MrrS	**[Reverse]**(MrrS)
FqLA	**[Freq. metre Alarm]**(FqLA)

3.2.2.3.11 [DIAGNOSTICS]

Parameters described in this page can be accessed by: DRI- > MOn- > dGt- > pFH-		
Code	**Name / Description**	**Unit**
pFH-	**[FAULT HISTORY]** Shows the 8 last detected faults.	
dP1	**[Past fault 1]** Fault record 1 (1 is last).	
nOF	**[No fault]**(nOF): No detected fault memorized	
ASF	**[Angle error]**(ASF): Angle setting detected fault	
bLF	**[Brake control]**(bLF): Brake's motor 3-phases loss	
brF	**[Brake feedback]**(brF): Brake contactor detected error	
CFF	**[Incorrect config.]**(CFF): Invalid configuration at power on	
CFI2	**[Bad conf]**(CFI2): Configuration transfer detected error	
CnF	**[Com. network]**(CnF): NET option communication interruption	
COF	**[CAN com.]**(COF): CANopen® communication interruption	
CrF	**[Capa.charg]**(CrF): Load relay detected fault	
CSF	**[Ch.sw. fault]**(CSF): Channel switching detected error	
dCF	**[Diff. I fault]** (dCF): Residual current fault	
dLF	**[Load fault]**(dLF): Dynamic load detected error	
EEF1	**[Control EEprom]**(EEF1): Control EEprom detected error	
EEF2	**[Power Eeprom]**(EEF2): Power EEprom detected error	
EPF1	**[External fault LI/Bit]**(EPF1): External detected fault from LI or local link	
EPF2	**[External fault com.]**(EPF2): External interruption from communication board	
FbE	**[FB fault]**(FbE): Function block detected error	
FbES	**[FB stop fly.]**(FbES): Function block stop detected error	
FCF1	**[Out. contact. stuck]**(FCF1): Output contactor: closed contactor	
FCF2	**[Out. contact. open.]**(FCF2): Output contactor: opened contactor	
HCF	**[Cards pairing]**(HCF): Hardware configuration detected error	
HdF	**[IGBT desaturation]**(HdF): Hardware detected error	
ILF	**[Option int link]**(ILF): Option internal link interruption	
InF1	**[Rating error]**(InF1): Unknown drive rating	
InF2	**[PWR Calib.]**(InF2): Unknown or incompatible power board	
InF3	**[Int.serial link]**(InF3): Internal serial link communication interruption	
InF4	**[Int.Mfg area]**(InF4): Invalid industrialization zone	
InF6	**[Internal-option]**(InF6): Unknown or incompatible option board	
InF9	**[Internal- I measure]**(InF9): Current measurement circuit detected error	
InFA	**[Internal-mains circuit]**(InFA): Input phase loss circuit detected error	
InFb	**[Internal- th. sensor]**(InFb): Thermal sensor detected error (OC or SC)	
InFE	**[Internal-CPU]**(InFE): CPU detected fault (ram, flash, task ...)	
LCF	**[Input contactor]**(LCF): Line contactor detected error	
LFF3	**[AI3 4-20mA loss]**(LFF3): AI3 4 to 20 mA loss	
ObF	**[Overbraking]**(ObF): Overbraking	
OCF	**[Overcurrent]**(OCF): Overcurrent	
OHF	**[Drive overheat]**(OHF): Drive overheating	
OLC	**[Proc.Overload Flt]**(OLC): Torque overload	
OLF	**[Motor overload]**(OLF): Motor overload	
OPF1	**[1 output phase loss]**(OPF1): Motor 1-phase loss	
OPF2	**[3out ph loss]**(OPF2): Motor 3-phases loss	
OSF	**[Mains overvoltage]**(OSF): Oversupply detected fault	
OtFL	**[PTC fault]**(OtFL): Motor overheating detected error from PTCL: standard product	
PHF	**[Input phase loss]**(PHF): Main input 1-phase loss	
PtFL	**[LI6=PTC probe]**(PtFL): PTCL detected error (OC or SC)	
SAFF	**[Safety]**(SAFF): Safety function trip	
SCF1	**[Motor short circuit]**(SCF1): Motor short circuit (hard detection)	
SCF3	**[Ground short circuit]**(SCF3): Direct ground short-circuit trip (hard detection)	
SCF4	**[IGBT short circuit]**(SCF4): IGBT short-circuit (hard detection)	
SCF5	**[Motor short circuit]**(SCF5): Short-circuit at drive output	
SLF1	**[Modbus com.]**(SLF1): Modbus local serial communication interruption	
SLF2	**[PC com.]**(SLF2): PC Software communication interruption	
SLF3	**[HMI com.]**(SLF3): Remote terminal communication interruption	
SOF	**[Overspeed]**(SOF): Overspeed	
SPF	**[Speed fdback loss]**(SPF): Speed feedback loss	
SrF	**[Torque time-out]**(SrF): Timeout during speed regulation	
SSF	**[Torque/current lim]**(SSF): Torque current limitation detected fault	
tJF	**[IGBT overheat]**(tJF): IGBT overheating	
tnF	**[Auto-tuning]**(tnF): Tune detected fault	
ULF	**[Pr.Underload Flt]**(ULF): Torque underload	
USF	**[Undervoltage]**(USF): Undervoltage	
HS1	**[Drive state]** HMI Status of the detected fault record 1.	
tUn	**[Auto-tuning]**(tUn): Auto-tuning	
dCb	**[In DC inject.]**(dCb): Injection braking	
rdY	**[Ready]**(rdY): Drive ready	
nSt	**[Freewheel]**(nSt): Freewheel stop control	
rUn	**[Drv running]**(rUn): Motor in steady state or run command present and zero reference	
ACC	**[In accel.]**(ACC): Acceleration	

Parameters described in this page can be accessed by: DRI- > MOn- > dGt- > pFH-		
Code	**Name / Description**	**Unit**
dEC CLI FSt FLU nLP CtL Obr SOC USA tC St FA YES EP FLt SS1 SLS StO	**[In decel.]**(dEC): Deceleration **[Current lim.]**(CLI): Current limit (in case of using a synchronous motor) **[Fast stop]**(FSt): Fast stop **[Mot. fluxing]**(FLU): Fluxing function is activated **[no mains V.]**(nLP): Control is powered on but the DC bus is not loaded **[control.stop]**(CtL): Controlled stop **[Dec. adapt.]**(Obr): Adapted deceleration **[Output cut]**(SOC): Stand by output cut **[UnderV. al.]**(USA): Undervoltage alarm **[In mfg. test]**(tC): TC indus mode activated **[in autotest]**(St): Self test in progress **[autotest err]**(FA): Self test detected error **[Autotest OK]**(YES): Self test OK **[eeprom test]**(EP): Self test Eeprom detected error **[In fault]**(FLt): Product has detected a fault **[SS1 active]**(SS1): Safety SS1 level **[SLS active]**(SLS): Safety SLS level **[STO active]**(StO): Safety STO level	
Ep1	**[ETA state word]** DRIVECOM status register of detected fault record 1 (same as **[ETA state word]**(EtA)).	
IP1	**[ETI state word]** Extended status register of detected fault record 1 (see the communication parameters file).	
CMP1	**[Cmd word]** Command register of detected fault record 1 (same as **[Cmd word]**(CMd)).	
LCP1	**[Motor current]** Estimated motor current of detected fault record 1 (same as **[Motor current]**(LCr)).	A
rFp1	**[Output frequency]** Estimated motor frequency of detected fault record 1 (same as **[Output frequency]**(rFr)).	Hz
rtp1	**[Elapsed time]** Elapsed run time of detected fault record 1 (same as **[Elapsed time]**(rtH)).	h
ULp1	**[Mains voltage]** Main voltage of detected fault record 1 (same as **[Mains voltage]**(ULn)).	V
tHP1	**[Motor thermal state]** Motor thermal state of detected fault record 1 (same as **[Motor thermal state]**(tHr)).	%
dCC1	**[Command Channel]** Command channel of detected fault record 1 (same as **[Command channel]**(CMdC)).	
drC1	**[Channel ref. active]** Reference channel of detected fault record 1 (same as **[Channel ref. active]**(rFCC)).	
Sr11	**[Saf01 Reg n-1]** SAF1 Register x (1 is last).	
Sr21	**[Saf02 Reg n-1]** SAF2 Register x (1 is last).	
SrA1	**[SF00 Reg n-1]** SF00 Register x (1 is last).	
Srb1	**[SF01 Reg n-1]** SF01 Register x (1 is last).	
SrC1	**[SF02 Reg n-1]** SF02 Register x (1 is last).	
Srd1	**[SF03 Reg n-1]** SF03 Register x (1 is last).	
SrE1	**[SF04 Reg n-1]** SF04 Register x (1 is last).	
SrF1	**[SF05 Reg n-1]** SF05 Register x (1 is last).	
SrG1	**[SF06 Reg n-1]** SF06 Register x (1 is last).	
SrH1	**[SF07 Reg n-1]** SF07 Register x (1 is last).	
SrI1	**[SF08 Reg n-1]** SF08 Register x (1 is last).	
SrJ1	**[SF09 Reg n-1]** SF09 Register x (1 is last).	
Sr?1	**[SF10 Reg n-1]** SF10 Register x (1 is last).	
SrL1	**[SF11 Reg n-1]** SF11 Register x (1 is last).	
dP2	**[Past fault 2]** **[Saf1 Reg n-2]**(Sr12), **[Saf2 Reg n-2]**(Sr22), **[SF00 Reg n-2]**(SrA2), **[SF01 Reg n-2]**(Srb2) and **[SF02 Reg n-2]**(SrC2) to **[SF11 Reg n-2]**(SrL2) may be visible with this parameter. Identical to **[Past fault 1]**(dP1).	
dP3	**[Past fault 3]** **[Saf1 Reg n-3]**(Sr13), **[Saf2 Reg n-3]**(Sr23), **[SF00 Reg n-3]**(SrA3), **[SF01 Reg n-3]**(Srb3) and **[SF02 Reg n-3]**(SrC3) to **[SF11 Reg n-3]**(SrL3) may be visible with this parameter. Identical to **[Past fault 1]**(dP1).	

Parameters described in this page can be accessed by: DRI- > MOn- > dGt- > pFH-		
Code	**Name / Description**	**Unit**
dP4	**[Past fault 4]** **[Saf1 Reg n-4]**(Sr14), **[Saf2 Reg n-4]**(Sr24), **[SF00 Reg n-4]**(SrA4), **[SF01 Reg n-4]**(Srb4) and **[SF02 Reg n-4]**(SrC4) to **[SF11 Reg n-4]**(SrL4) may be visible with this parameter. Identical to **[Past fault 1]**(dP1).	
dP5	**[Past fault 5]** **[Saf1 Reg n-5]**(Sr15), **[Saf2 Reg n-5]**(Sr25), **[SF00 Reg n-5]**(SrA5), **[SF01 Reg n-5]**(Srb5) and **[SF02 Reg n-5]**(SrC5) to **[SF11 Reg n-5]**(SrL5) may be visible with this parameter. Identical to **[Past fault 1]**(dP1).	
dP6	**[Past fault 6]** **[Saf1 Reg n-6]**(Sr16), **[Saf2 Reg n-6]**(Sr26), **[SF00 Reg n-6]**(SrA6), **[SF01 Reg n-6]**(Srb6) and **[SF02 Reg n-6]**(SrC6) to **[SF11 Reg n-6]**(SrL6) may be visible with this parameter. Identical to **[Past fault 1]**(dP1).	
dP7	**[Past fault 7]** **[Saf1 Reg n-7]**(Sr17), **[Saf2 Reg n-7]**(Sr27), **[SF00 Reg n-7]**(SrA7), **[SF01 Reg n-7]**(Srb7) and **[SF02 Reg n-7]**(SrC7) to **[SF11 Reg n-7]**(SrL7) may be visible with this parameter. Identical to **[Past fault 1]**(dP1).	
dP8	**[Past fault 8]** **[Saf1 Reg n-8]**(Sr18), **[Saf2 Reg n-8]**(Sr28), **[SF00 Reg n-8]**(SrA8), **[SF01 Reg n-8]**(Srb8) and **[SF02 Reg n-8]**(SrC8) to **[SF11 Reg n-8]**(SrL8) may be visible with this parameter. Identical to **[Past fault 1]**(dP1).	

Parameters described in this page can be accessed by: DRI- > MOn- > dGt- > pFL-	
Code	**Name / Description**
PFL-	**[CURRENT FAULT LIST]**
nOF	**[No fault]**(nOF): No detected fault memorized
ASF	**[Angle error]**(ASF): Angle setting detected fault
bLF	**[Brake control]**(bLF): Brake's motor 3-phases loss
brF	**[Brake feedback]**(brF): Brake contactor detected error
CFF	**[Incorrect config.]**(CFF): Invalid configuration at power on
CFI2	**[Bad conf]**(CFI2): Configuration transfer detected error
CnF	**[Com. network]**(CnF): NET option communication interruption
COF	**[CAN com.]**(COF): CANopen® communication interruption
CrF	**[Capa.charg]**(CrF): Load relay detected fault
CSF	**[Ch.sw. fault]**(CSF): Channel switching detected error
dCF	**[Diff. I fault]**(dCF): Residual current fault
dLF	**[Load fault]**(dLF): Dynamic load detected error
EEF1	**[Control EEprom]**(EEF1): Control EEprom detected error
EEF2	**[Power Eeprom]**(EEF2): Power EEprom detected error
EPF1	**[External fault LI/Bit]**(EPF1): External detected fault from LI or local link
EPF2	**[External fault com.]**(EPF2): External interruption from communication board
FbE	**[FB fault]**(FbE): Function block detected error
FbES	**[FB stop fly.]**(FbES): Function block stop detected error
FCF1	**[Out. contact. stuck]**(FCF1): Output contactor: closed contactor
FCF2	**[Out. contact. open.]**(FCF2): Output contactor: opened contactor
HCF	**[Cards pairing]**(HCF): Hardware configuration detected error
HdF	**[IGBT desaturation]**(HdF): Hardware detected error
ILF	**[Option int link]**(ILF): Option internal link interruption
InF1	**[Rating error]**(InF1): Unknown drive rating
InF2	**[PWR Calib.]**(InF2): Unknown or incompatible power board
InF3	**[Int.serial link]**(InF3): Internal serial link communication interruption
InF4	**[Int.Mfg area]**(InF4): Invalid industrialization zone
InF6	**[Internal-option]**(InF6): Unknown or incompatible option board
InF9	**[Internal- I measure]**(InF9): Current measurement circuit detected error
InFA	**[Internal-mains circuit]**(InFA): Input phase loss circuit detected error
InFb	**[Internal- th. sensor]**(InFb): Thermal sensor detected error (OC or SC)
InFE	**[Internal-CPU]**(InFE): CPU detected fault (ram, flash, task ...)
LCF	**[Input contactor]**(LCF): Line contactor detected error
LFF3	**[AI3 4-20mA loss]**(LFF3): AI3 4 to 20 mA loss
ObF	**[Overbraking]**(ObF): Overbraking
OCF	**[Overcurrent]**(OCF): Overcurrent
OHF	**[Drive overheat]**(OHF): Drive overheating
OLC	**[Proc.Overload Flt]**(OLC): Torque overload
OLF	**[Motor overload]**(OLF): Motor overload
OPF1	**[1 output phase loss]**(OPF1): Motor 1-phase loss
OPF2	**[3out ph loss]**(OPF2): Motor 3-phases loss
OSF	**[Mains overvoltage]**(OSF): Oversupply detected fault
OtFL	**[PTC fault]**(OtFL): Motor overheating detected error from PTCL: standard product
PHF	**[Input phase loss]**(PHF): Main input 1-phase loss
PtFL	**[LI6=PTC probe]**(PtFL): PTCL detected error (OC or SC)
SAFF	**[Safety]**(SAFF): Safety function trip
SCF1	**[Motor short circuit]**(SCF1): Motor short circuit (hard detection)
SCF3	**[Ground short circuit]**(SCF3): Direct ground short-circuit trip (hard detection)
SCF4	**[IGBT short circuit]**(SCF4): IGBT short-circuit (hard detection)
SCF5	**[Motor short circuit]**(SCF5): Short-circuit at drive output
SLF1	**[Modbus com.]**(SLF1): Modbus local serial communication interruption
SLF2	**[PC com.]**(SLF2): PC Software communication interruption
SLF3	**[HMI com.]**(SLF3): Remote terminal communication interruption
SOF	**[Overspeed]**(SOF): Overspeed
SPF	**[Speed fdback loss]**(SPF): Speed feedback loss

Parameters described in this page can be accessed by: DRI- > MOn- > dGt- > pFL-	
Code	**Name / Description**
SrF	**[Torque time-out]**(SrF): Timeout during speed regulation
SSF	**[Torque/current lim]**(SSF): Torque current limitation detected fault
tJF	**[IGBT overheat]**(tJF): IGBT overheating
tnF	**[Auto-tuning]**(tnF): Tune detected fault
ULF	**[Pr.Underload Flt]**(ULF): Torque underload
USF	**[Undervoltage]**(USF): Undervoltage

Parameters described in this page can be accessed by: DRI- > MOn- > dGt- > AFI-	
Code	**Name / Description**
AFI-	**[MORE FAULT INFO]** Additional detected fault information.
CnF	**[Network fault]** Communication option card fault code. This parameter is read-only. The fault code remains saved in the parameter, even if the cause disappears. The parameter is reset after the drive is disconnected and then reconnected. The values of this parameter depend on the network card. Consult the manual for the corresponding card.
ILF1	**[Internal link fault 1]** Communication interruption between option card 1 and drive. This parameter is read-only. The fault code remains saved in the parameter, even if the cause disappears. The parameter is reset after the drive is disconnected and then reconnected.
SFFE	**[Safety fault reg.]**(1) Safety function fault error register. Bit0 = 1: Logic inputs debounce time-out (verify value of debounce time LIDT according to the application) Bit1: Reserved Bit2 = 1: Motor speed sign has changed during SS1 ramp Bit3 = 1: Motor speed has reached the frequency limit threshold during SS1 ramp Bit4: Reserved Bit5: Reserved Bit6 = 1: Motor speed sign has changed during SLS limitation Bit7 = 1: Motor speed has reached the frequency limit threshold during SS1 ramp Bit8: Reserved Bit9: Reserved Bit10: Reserved Bit11: Reserved Bit12: Reserved Bit13 = 1: Not possible to measure the motor speed (verify the motor wiring connection) Bit14 = 1: Motor ground short-circuit detected (verify the motor wiring connection) Bit15 = 1: Motor phase to phase short-circuit detected (verify the motor wiring connection)
SAF1	**[Safety fault Reg1]** (1) Safety fault register 1. Application control error register. Bit0 = 1: PWRM consistency detected error Bit1 = 1: Safety functions parameters detected error Bit2 = 1: Application auto test has detected an error Bit3 = 1: Diagnostic verification of safety function has detected an error Bit4 = 1: Logical input diagnostic has detected an error Bit5 = 1: Application hardware watchdog active Bit6 = 1: Application watchdog management active Bit7 = 1: Motor control detected error Bit8 = 1: Internal serial link core detected error Bit9 = 1: Logical input activation detected error Bit10 = 1: Safe Torque Off function has triggered an error Bit11 = 1: Application interface has detected an error of the safety functions Bit12 = 1: Safe Stop 1 function has detected an error of the safety functions Bit13 = 1: Safely Limited Speed function has triggered an error Bit14 = 1: Motor data is corrupted Bit15 = 1: Internal serial link data flow detected error
SAF2	**[Safety fault Reg2]** (1) Safety fault register 2. Motor Control error register. Bit0 = 1: Consistency stator frequency verification has detected an error Bit1 = 1: Stator frequency estimation detected error Bit2 = 1: Motor control watchdog management is active Bit3 = 1: Motor control hardware watchdog is active Bit4 = 1: Motor control auto test has detected an error Bit5 = 1: Chain testing detected error Bit6 = 1: Internal serial link core detected error Bit7 = 1: Direct short-circuit detected error Bit8 = 1: PWM driver detected error Bit9: Reserved Bit10: Reserved Bit11 = 1: Application interface has detected an error of the safety functions Bit12: Reserved Bit13: Reserved Bit14 = 1: Motor data is corrupted Bit15 = 1: Internal serial link data flow detected error

Parameters described in this page can be accessed by: DRI- > MOn- > dGt- > AFI-	
Code	**Name / Description**
SF00	**[SAFF Subcode 0]** (1) Safety fault subregister 00. Application auto test error register. Bit0: Reserved Bit1 = 1: Ram stack overflow Bit2 = 1: Ram address integrity error Bit3 = 1: Ram data access error Bit4 = 1: Flash Checksum error Bit5: Reserved Bit6: Reserved Bit7: Reserved Bit8: Reserved Bit9 = 1: Fast task overflow Bit10 = 1: Slow task overflow Bit11 = 1: Application task overflow Bit12: Reserved Bit13: Reserved Bit14 = 1: PWRM line is not activated during initialization phase Bit15 = 1: Application hardware Watch Dog is not running after initialization
SF01	**[SAFF Subcode 1]** (1) Safety fault subregister 01. Logical input diagnostics error register. Bit0 = 1: Management - state machine error Bit1 = 1: Data required for test management are corrupted Bit2 = 1: Channel selection detected error Bit3 = 1: Testing - state machine detected error Bit4 = 1: Test request is corrupted Bit5 = 1: Pointer to test method is corrupted Bit6 = 1: Incorrect test action provided Bit7 = 1: Detected error in results collecting Bit8 = 1: LI3 detected error. Cannot activate safe function Bit9 = 1: LI4 detected error. Cannot activate safe function Bit10 = 1: LI5 detected error. Cannot activate safe function Bit11 = 1: LI6 detected error. Cannot activate safe function Bit12 = 1: Test sequence updated while a diagnostic is in progress Bit13 = 1: Detected error in test pattern management Bit14: Reserved Bit15: Reserved
SF02	**[SAFF Subcode 2]** (1) Safety fault subregister 02. Application Watchdog Management detected error register. Bit0 = 1: Fast task detected error Bit1 = 1: Slow task detected error Bit2 = 1: Application task detected error Bit3 = 1: Background task detected error Bit4 = 1: Safety fast task/input detected error Bit5 = 1: Safety slow task/input detected error Bit6 = 1: Safety app task/input detected error Bit7 = 1: Safety app task/treatment detected error Bit8 = 1: Safety background task detected error Bit9: Reserved Bit10: Reserved Bit11: Reserved Bit12: Reserved Bit13: Reserved Bit14: Reserved Bit15: Reserved
SF03	**[SAFF Subcode 3]** (1) Safety fault subregister 03. Bit0 = 1: Debounce time out Bit1 = 1: Input not consistent Bit2 = 1: Consistency check - state machine detected error Bit3 = 1: Consistency check - debounce timeout corrupted Bit4 = 1: Response time data detected error Bit5 = 1: Response time corrupted Bit6 = 1: Undefined consumer queried Bit7 = 1: Configuration detected error Bit8 = 1: Inputs are not in nominal mode Bit9: Reserved Bit10: Reserved Bit11: Reserved Bit12: Reserved Bit13: Reserved Bit14: Reserved Bit15: Reserved

Parameters described in this page can be accessed by: DRI- > MOn- > dGt- > AFI-	
Code	**Name / Description**
SF04	**[SAFF Subcode 4]** (1) Safety fault subregister 04. **[Safe Torque Off]** StO detected error register. Bit0 = 1: No signal configured Bit1 = 1: State machine detected error Bit2 = 1: Internal data detected error Bit3: Reserved Bit4: Reserved Bit5: Reserved Bit6: Reserved Bit7: Reserved Bit8: Reserved Bit9: Reserved Bit10: Reserved Bit11: Reserved Bit12: Reserved Bit13: Reserved Bit14: Reserved Bit15: Reserved
SF05	**[SAFF Subcode 5]** (1) Safety fault subregister 05. **[Safe Stop 1]** SS1 detected error register. Bit0 = 1: State machine detected error Bit1 = 1: Motor speed sign changed during stop Bit2 = 1: Motor speed reached trip area Bit3 = 1: Theoretical motor speed corrupted Bit4 = 1: Unauthorized configuration Bit5 = 1: Theoretical motor speed computation detected error Bit6: Reserved Bit7 = 1: Speed sign check: consistency detected error Bit8 = 1: Internal SS1 request corrupted Bit9: Reserved Bit10: Reserved Bit11: Reserved Bit12: Reserved Bit13: Reserved Bit14: Reserved Bit15: Reserved
SF06	**[SAFF Subcode 6]**(1) Safety fault subregister 06. **[Safely Limited Speed]** SLS detected error register. Bit0 = 1: State machine error register Bit1 = 1: Motor speed sign changed during limitation Bit2 = 1: Motor speed has reached the frequency limit threshold Bit3 = 1: Data corruption Bit4: Reserved Bit5: Reserved Bit6: Reserved Bit7: Reserved Bit8: Reserved Bit9: Reserved Bit10: Reserved Bit11: Reserved Bit12: Reserved Bit13: Reserved Bit14: Reserved Bit15: Reserved

Parameters described in this page can be accessed by: DRI- > MOn- > dGt- > AFI-	
Code	**Name / Description**
SF07	**[SAFF Subcode 7]** (1) Safety fault subregister 07. Application Watchdog Management detected error register. Bit0: Reserved Bit1: Reserved Bit2: Reserved Bit3: Reserved Bit4: Reserved Bit5: Reserved Bit6: Reserved Bit7: Reserved Bit8: Reserved Bit9: Reserved Bit10: Reserved Bit11: Reserved Bit12: Reserved Bit13: Reserved Bit14: Reserved Bit15: Reserved
SF08	**[SAFF Subcode 8]** (1) Safety fault subregister 08. Application Watchdog Management detected error register. Bit0 = 1: PWM task detected error Bit1 = 1: Fixed task detected error Bit2 = 1: ATMC watchdog detected error Bit3 = 1: DYNFCT watchdog detected error Bit4: Reserved Bit5: Reserved Bit6: Reserved Bit7: Reserved Bit8: Reserved Bit9: Reserved Bit10: Reserved Bit11: Reserved Bit12: Reserved Bit13: Reserved Bit14: Reserved Bit15: Reserved
SF09	**[SAFF Subcode 9]** (1) Safety fault subregister 09. Motor control Auto Test detected error register. Bit0: Reserved Bit1 = 1: Ram stack overflow Bit2 = 1: Ram address integrity detected error Bit3 = 1: Ram data access detected error Bit4 = 1: Flash Checksum detected error Bit5: Reserved Bit6: Reserved Bit7: Reserved Bit8: Reserved Bit9 = 1: 1 ms task overflow Bit10 = 1: PWM task overflow Bit11 = 1: Fixed task overflow Bit12: Reserved Bit13: Reserved Bit14 = 1: Unwanted interruption Bit15 = 1: Hardware WD is not running after initialization
SF10	**[SAFF Subcode 10]** (1) Safety fault subregister 10. Motor control direct short-circuit detected error register. Bit0 = 1: Ground short circuit - Configuration detected error Bit1 = 1: Phase to phase short circuit - Configuration detected error Bit2 = 1: Ground short circuit Bit3 = 1: Phase to phase short circuit Bit4: Reserved Bit5: Reserved Bit6: Reserved Bit7: Reserved Bit8: Reserved Bit9: Reserved Bit10: Reserved Bit11: Reserved Bit12: Reserved Bit13: Reserved Bit14: Reserved Bit15: Reserved
SF11	**[SAFF Subcode 11]** (1) Safety fault subregister 11. Motor Control dynamic check of activity detected error register. Bit0 = 1: Application requested a diagnostic of direct short circuit Bit1 = 1: Application requested consistency verification of stator frequency estimation (voltage and current)

Parameters described in this page can be accessed by: DRI- > MOn- > dGt- > AFI-	
Code	**Name / Description**
	Bit2 = 1: Application requested diagnostic of SpdStat provided by Motor Control Bit3: Reserved Bit4: Reserved Bit5: Reserved Bit6: Reserved Bit7: Reserved Bit8 = 1: Motor Control safe diagnostic of direct short circuit is enabled Bit9 = 1: Motor Control consistency check of stator frequency estimation is enabled Bit10 = 1: Motor Control diagnostic of SpdStat provided by Motor Control is enabled Bit11: Reserved Bit12: Reserved Bit13: Reserved Bit14: Reserved Bit15: Reserved

(1) Hexadecimal values are displayed on the Graphic display terminal

Example:

SFFE = 0x0008 in Hexadecimal

SFFE = Bit 3

Parameters described in this page can be accessed by: DRI- > MOn- > dGt-	
Code	**Name / Description**
dGt-	[DIAGNOSTICS] **(continued)**
tAC	[IGBT alarm counter] Transistor alarm time counter (length of time the "IGBT temperature" alarm has been active).
tAC2	[Min. freq time] Transistor alarm time counter at minimum switching frequency (length of time the "IGBT temperature" alarm has been active after the drive has automatically reduced the switching frequency to the minimum value).
ntJ ★	[IGBT alarm Nb] Transistor alarm counter: number detected during lifecycle. Visible if [3.1 ACCESS LEVEL](LAC) is set to [Expert](Epr).
SEr-	[SERVICE MESSAGE]
rFLt	[Reset past faults] Reset all resettable previous detected faults.
nO YES	[No](nO): Reset not active [YES](YES): Reset in progress

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.2.3.12 [PASSWORD]

Parameters described in this page can be accessed by: DRI- > MOn- > COd-	
Code	**Name / Description**
COd-	**[PASSWORD]** HMI Password. If you have lost your code, please contact B&R.
CSt	**[State]** Status of the drive (lock/unlock). Information parameter, cannot be modified.
LC	**[Locked]**(LC): The drive is locked by a password
ULC	**[Unlocked]**(ULC): The drive is not locked by a password
COd	**[PIN code 1]** Confidential code. Enables the drive configuration to be protected using an access code. When access is locked by means of a code, only the parameters in the **[1.2 MONITORING]**(MOn-) and **[1.1 SPEED REFERENCE]**(rEF-) menus can be accessed. The MODE key can be used to switch between menus. **Note:** **Before entering a code, do not forget to make a careful note of it.**
OFF	**[OFF]**(OFF): No access locking codes • To lock access, enter a code (2 to 9999). The display can be incremented using the jog dial. Then press ENT. **[ON]**(On) appears on the screen to indicate that access has been locked.
On	**[ON]**(On): A code is locking access (2 to 9999) • To unlock access, enter the code (incrementing the display using the jog dial) and press ENT. The code remains on the display and access is unlocked until the next time the drive is turned off. Access will be locked again the next time the drive is turned on. • If an incorrect code is entered, the display changes to **[ON]**(On) and access remains locked. Access is unlocked (the code remains on the screen) • To reactivate locking with the same code when access has been unlocked, return to **[ON]**(On) using the jog dial and then press ENT. **[ON]**(On) remains on the screen to indicate that access has been locked. • To lock access with a new code when access has been unlocked, enter the new code (increment the display using the jog dial) and then press ENT. **[ON]**(On) appears on the screen to indicate that access has been locked. • To clear locking when access has been unlocked, return to **[OFF]**(OFF) using the jog dial and then press ENT. **[OFF]**(OFF) remains on the display. Access is unlocked and will remain so until the next restart.
COd2 ★	**[PIN code 2]** Confidential code 2. Visible if **[3.1 ACCESS LEVEL]**(LAC) is set to **[Expert]**(Epr).
OFF	The value **[OFF]**(OFF) indicates that no password has been set **[Unlocked]**(ULC).
On	The value **[ON]**(On) indicates that the drive configuration is protected and an access code must be entered in order to unlock it. Once the correct code has been entered, it remains on the display and the drive is unlocked until the next time the power supply is disconnected.
8888	PIN code 2 is an unlock code known only to B&R Product Support.
ULr	**[Upload rights]**
ULr0	**[Permitted]**(ULr0): The current drive configuration can always be uploaded to the graphic display terminal or PC software.
ULr1	**[Not allowed]**(ULr1): The current drive configuration can only be uploaded to the graphic display terminal or PC software, if the drive is not protected by an access code or if the correct code has been entered.
dLr	**[Download rights]**
dLr0	**[Locked drv]**(dLr0): Locked drive: means that the configuration can be downloaded only in a locked drive which configuration has the same password. If the passwords are different, download is not permitted.
dLr1	**[Unlock. drv]**(dLr1): Unlocked drive: means that the configuration can be downloaded only in a drive without active password
dLr2	**[Not allowed]**(dLr2): Not allowed: the configuration cannot be downloaded
dLr3	**[Lock/unlock]**(dLr3): Lock. + Not: download is permitted following case 0 or case 1

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.3 Configuration Mode (ConF)

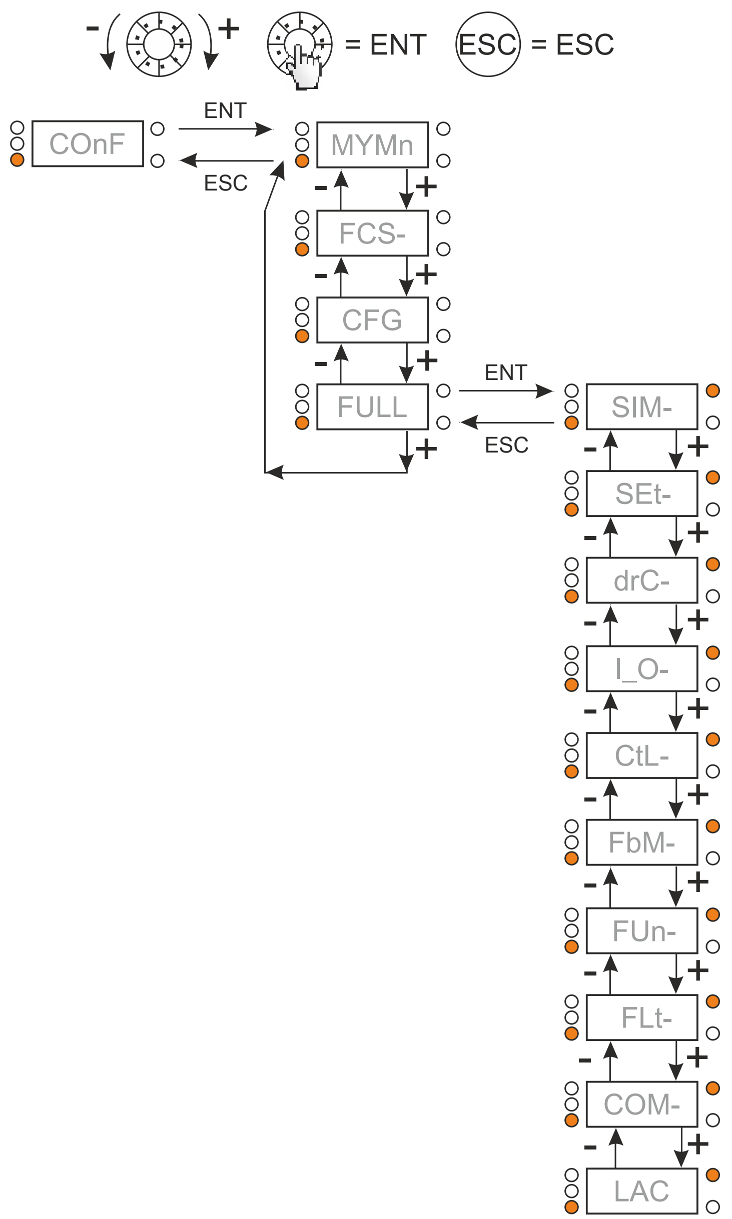
3.2.3.1 Introduction

Configuration mode includes 4 parts:

- "My Menu" menu includes up to 25 parameters available for user customization using the graphic display terminal.
- Store/recall parameter set: These 2 functions are used to store and recall customer settings.
- **[Macro configuration]**(CFG) parameter which allows to load predefined values for applications.
- FULL: This menu provides access to all other parameters. It includes 10 sub-menus:
  - **[SIMPLY START]**(SIM-)
  - **[SETTINGS]**(SEt-)
  - **[MOTOR CONTROL]**(drC-)
  - **[INPUTS / OUTPUTS CFG]**(I_O-)
  - **[COMMAND]**(CtL-)
  - **[FUNCTION BLOCK]**(FbM-)
  - **[APPLICATION FUNCT.]**(FUn-)
  - **[FAULT MANAGEMENT]**(FLt-)
  - **[COMMUNICATION]**(COM-)
  - **[ACCESS LEVEL]**(LAC)

3.2.3.2 Organization tree

Displayed parameter values are given as examples only.



3.2.3.3 My Menu

Parameters described in this page can be accessed by: DRI- > COnF > MYMn	
Code	**Name / Description**
MYMn	[MY MENU] This menu contains the parameters selected in the [3.4 DISPLAY CONFIG.](dCF-) menu.

3.2.3.4 Factory Settings

Parameters described in this page can be accessed by: DRI- > COnF > FCS-		
Code	**Name / Description**	**Factory setting**
FCS-	[FACTORY SETTINGS]	
FCSI	[Config. Source] Choice of source configuration. If the configuration switching function is configured, it will not be possible to access [Config 1](CFG1) and [Config 2](CFG2). **Note:** **To load the drive's presettings previously memorized ([Config 1](Str1) or [Config 2](Str2)), select the source configuration [Config. Source](FCSI) = [Config 1](CFG1) or [Config 2](CFG2) followed by a factory setting [Goto FACTORY SETTINGS](GFS) = [YES](YES).**	[Macro-Conf](InI)
InI	[Macro-Conf](InI): Factory configuration, return to selected macro configuration	
CFG1	[Config 1](CFG1): Configuration 1	
CFG2	[Config 2](CFG2): Configuration 2	
FrY-	[PARAMETER GROUP LIST] Selection of menus to be loaded. **Note:** **In factory configuration and after a return to "factory settings", [PARAMETER GROUP LIST] will be empty.**	
ALL	[All](ALL): All parameters (the function blocks program will also be erased)	
drM	[Drive configuration](drM): The [1 DRIVE MENU](drI-) menu without [COMMUNICATION](COM-). In the [2.4 DISPLAY CONFIG.] menu, [Return std name](GSP) returns to [No](nO).	
MOt	[Motor param](MOt): Motor parameters. The following selections can only be accessed if [Config. Source](FCSI) is set to [Macro-Conf.](InI).	
COM	[Comm. menu](COM): The [COMMUNICATION](COM-) menu without either [Scan. In1 address](nMA1) to [Scan. In8 address](nMA8) or [Scan.Out1 address](nCA1) to [Scan.Out8address](nCA8).	
dIS	[Display config.](dIS): The [3.3 MONITORING CONFIG.](MCF-) menu.	
GFS ★ ⌛ 2 s	[Goto FACTORY SETTINGS] **Danger!** **UNINTENDED EQUIPMENT OPERATION** **Check that the modification of the current configuration is compatible with the wiring diagram used.** **Failure to follow these instructions will result in death or serious injury.** It is only possible to revert to the factory settings if at least one group of parameters has previously been selected.	
nO	[No](nO): No	
YES	[Yes](YES): The parameter changes back to [No](nO) automatically as soon as the operation is complete.	
SCSI ★	[Save config] The active configuration to be saved does not appear for selection. For example, if it is [Config 0](Str0), only [Config 1](Str1) and [Config 2](Str2) appear. The parameter changes back to [No](nO) as soon as the operation is complete.	[No](nO)
nO	[No](nO): No	
Str0	[Config 0](Str0): Press and hold down the ENT key for 2 s	
Str1	[Config 1](Str1): Press and hold down the ENT key for 2 s	
Str2	[Config 2](Str2): Press and hold down the ENT key for 2 s	

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

⌛ 2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

3.2.3.5 Macro Configuration

Parameters described in this page can be accessed by: DRI- > COnF > CFG

Code	Name / Description	Factory setting
CFG 2 s	[Macro configuration]	[Start/Stop](StS)

Danger!

UNINTENDED EQUIPMENT OPERATION

Check that the selected macro configuration is compatible with the wiring diagram used.

Failure to follow these instructions will result in death or serious injury.

Note:

When using the ACOPOSinverter P74 with POWERLINK and the B&R Automation Studio, the standard [Start/Stop](StS) setting cannot be changed

Code	Name / Description
StS	[Start/Stop](StS): Start/stop
HdG	[M. handling](HdG): Handling
HSt	[Hoisting](HSt): Hoisting
GEn	[Gen. Use](GEn): General use
PId	[PID regul.](PId): PID regulation
nEt	[Network C.](nEt): Communication bus

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

Example of total return to factory settings

- [Config. Source](FCSI) is set to [Macro-Conf](InI)
- [PARAMETER GROUP LIST](FrY-) is set to [All](ALL)
- [Goto FACTORY SETTINGS](GFS) is set to [Yes](YES)

Assignment of the inputs/outputs

Input/output	[Start/Stop]	[M. handling]	[Gen. Use]	[Hoisting]	[PID regul.]	[Network C.]
[AI1]	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel] (PID reference)	[Ref.2 channel] ([Ref.1 channel] = integrated Modbus) (1)
[AI2]	[No]	[Summing ref. 2]	[Summing ref. 2]	[No]	[PID feedback]	[No]
[AI3]	[No]	[No]	[No]	[No]	[No]	[No]
[AO1]	[No]	[No]	[No]	[No]	[No]	[No]
[R1]	[No drive flt]	[No drive flt]	[No drive flt]	[No drive flt]	[No drive flt]	[No drive flt]
[R2]	[No]	[No]	[No]	[Brk control]	[No]	[No]
[LI1] (2-wire)	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]
[LI2] (2-wire)	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]
[LI3] (2-wire)	[No]	[2 preset speeds]	[Jog]	[Fault reset]	[PID integral reset]	[Ref. 2 switching]
[LI4] (2-wire)	[No]	[4 preset speeds]	[Fault reset]	[External fault]	[2 preset PID ref.]	[Fault reset]
[LI5] (2-wire)	[No]	[8 preset speeds]	[Torque limitation]	[No]	[4 preset PID ref.]	[No]
[LI6] (2-wire)	[No]	[Fault reset]	[No]	[No]	[No]	[No]
[LI1] (3-wire)	[Drive running]	[Drive running]	[Drive running]	[Drive running]	[Drive running]	[Drive running]
[LI2] (3-wire)	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]
[LI3] (3-wire)	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]	[Reverse]
[LI4] (3-wire)	[No]	[2 preset speeds]	[Jog]	[Fault reset]	[PID integral reset]	[Ref. 2 switching]
[LI5] (3-wire)	[No]	[4 preset speeds]	[Fault reset]	[External fault]	[2 preset PID ref.]	[Fault reset]
[LI6] (3-wire)	[No]	[8 preset speeds]	[Torque limitation]	[No]	[4 preset PID ref.]	[No]
[LO1]	[No]	[No]	[No]	[No]	[No]	[No]
Graphic display terminal keys						
F1 key	[No]	[No]	[No]	[No]	[No]	Control via graphic display terminal
F2, F3, F4 keys	[No]	[No]	[No]	[No]	[No]	[No]

(1) To start with, integrated Modbus [Modbus Address](Add) must first be configured.

	In 3-wire control, the assignment of inputs LI1 to LI6 shifts.

Note:

These assignments are reinitialized every time the macro configuration changes.

Other configurations and settings

In addition to the assignment of inputs/outputs, other parameters are assigned **only in the Hoisting macro configuration**.

Hoisting:

- **[Movement type]**(bSt) is set to **[Hoisting]**(UEr)
- **[Brake contact]**(bCI) is set to **[No]**(nO)
- **[Brake impulse]**(bIP) is set to **[Yes]**(YES)
- **[Brake release I FW]**(Ibr) is set to 0 A
- **[Brake Release time]**(brt) is set to 0 s
- **[Brake release freq]**(bIr) is set to **[Auto]**(AUtO)
- **[Brake engage freq]**(bEn) is set to **[Auto]**(AUtO)
- **[Brake engage time]**(bEt) is set to 0 s
- **[Engage at reversal]**(bEd) is set to **[No]**(nO)
- **[Jump at reversal]**(JdC) is set to **[Auto]**(AUtO)
- **[Time to restart]**(ttr) is set to 0 s
- **[Current ramp time]**(brr) is set to 0 s
- **[Low speed]**(LSP) is set to Rated motor slip calculated by the drive
- **[Output Phase Loss]**(OPL) is set to **[Yes]**(YES)
  No further modifications can be made to this parameter.
- **[Catch on the fly]**(FLr) is set to **[No]**(nO)
  No further modifications can be made to this parameter.

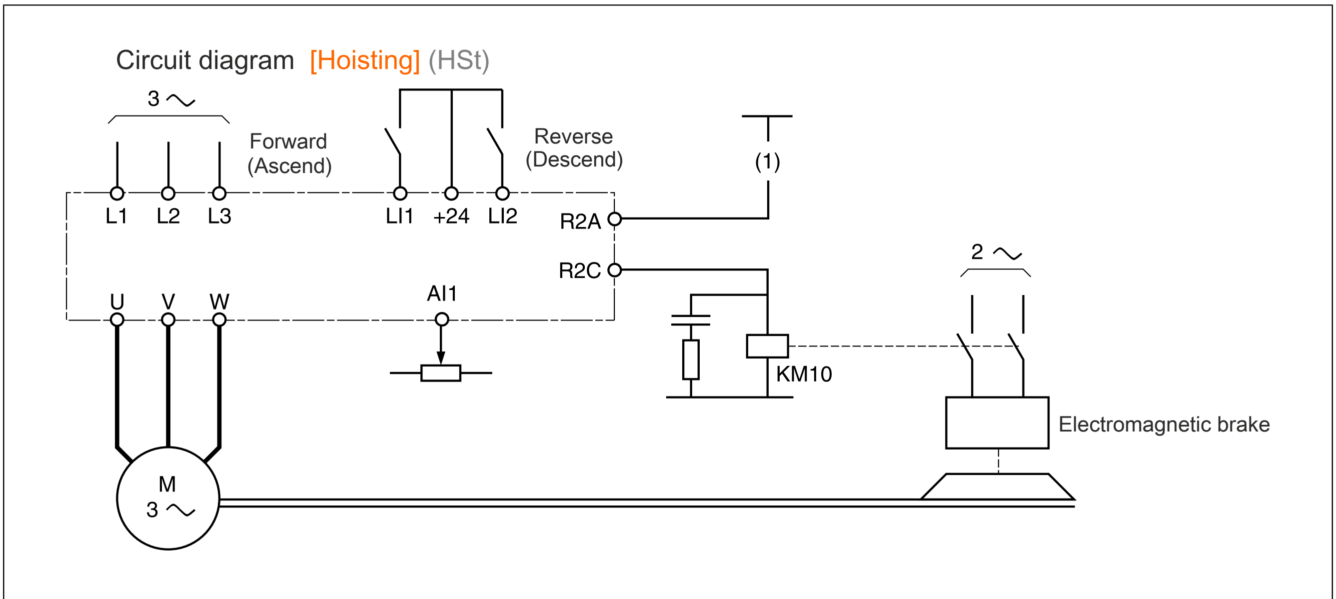
Return to factory settings:

Returning to factory settings with **[Config. Source]**(FCSI) is set to **[Macro-Conf]**(InI) will return the drive to the selected macro configuration. The **[Macro configuration]**(CFG) parameter does not change, although **[Customized macro]**(CCFG) disappears.

Note:

The factory settings that appear in the parameter tables correspond to [Macro configuration](CFG) = [Start/Stop](StS). This is the macro configuration set at the factory.

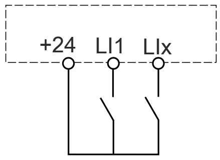
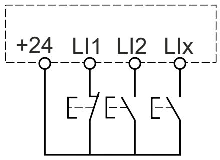
Example diagrams for use with the macro configurations



(1) Without integrated safety function, a contact on the Safety module must be inserted in the brake control circuit to engage it when the "Safe Torque Off" safety function is activated (see wiring diagrams in the Installation chapter).

3.2.3.6 Full

3.2.3.6.1 [SIMPLY START]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > SIM-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
SIM-	[SIMPLY START]		
tCC 2 s	[2/3 wire control] **Danger!** **UNINTENDED EQUIPMENT OPERATION** **When this parameter is changed, [Reverse assign.](rrS) and [2 wire type](tCt) parameters and all the assignments involving the logic inputs will revert to their default values.** **Check that this change is compatible with the wiring diagram used.** **Failure to follow these instructions will result in death or serious injury.**		[2 wire](2C)
2C	[2 wire](2C) **2-wire control (level commands):** This is the input state (0 or 1) or edge (0 to 1 or 1 to 0), which controls running or stopping.  LI1: forward LIx: reverse		
3C	[3 wire](3C) **3-wire control (pulse commands):** A "forward" or "reverse" pulse is sufficient to command starting, a "stop" pulse is sufficient to command stopping. Example of "source" wiring:  LI1: stop LI2: forward LIx: reverse		
CFG 2 s	[Macro configuration] **Danger!** **UNINTENDED EQUIPMENT OPERATION** **Check that the selected macro configuration is compatible with the wiring diagram used.** **Failure to follow these instructions will result in death or serious injury.**		[Start/Stop](StS)
StS	[Start/Stop](StS): Start/stop		
HdG	[M. handling](HdG): Handling		
HSt	[Hoisting](HSt): Hoisting		
GEn	[Gen. Use](GEn): General use		
PId	[PID regul.](PId): PID regulation		
nEt	[Network C.](nEt): Communication bus		
CCFG	[Customized macro] Read-only parameter, only visible if at least one macro configuration parameter has been modified.		
nO	[No](nO): No		
YES	[Yes](YES): Yes		
bFr	[Standard mot. freq] This parameter modifies the presets of the following parameters: [Rated motor volt.](UnS) below, [High speed](HSP), [Freq. threshold](Ftd), [Rated motor freq.](FrS), [Max frequency](tFr), [Rated mot. current](nCr), [Rated motor speed](nSP) and [Brake release I FW](Ibr).		[50Hz IEC](50)
50	[50Hz IEC](50): Drive 50 Hz		
60	[60Hz NEMA](60): Drive 60 Hz		
IPL	[Input phase loss] This parameter is only accessible in this menu on 3-phase drives. If one phase disappears, the drive switches to fault mode [Input phase loss](PHF), but if 2 or 3 phases disappear, the drive continues to operate until it trips on an undervoltage detected fault (the drive trips in [Input phase loss](PHF) if there is an input phase loss and if this leads to performance decrease).		Yes or No, according to drive rating
nO	[Ignore](nO): Detected fault ignored. To be used when the drive is supplied via a 1-phase supply or by the DC bus		
YES	[Freewheel](YES): With freewheel stop		
nPr	[Rated motor power] Rated motor power given on the nameplate in kW, if [Standard mot. freq](bFr) is set to [50Hz IEC](50) and in HP, if [Standard mot. freq](bFr) is set to [60Hz NEMA](60).		According to drive rating

Code	Name / Description	Adjustment range	Factory setting
	Parameters described in this page can be accessed by: DRI- > COnF > FULL > SIM-		
UnS	**[Rated motor volt.]** Rated motor voltage given on the nameplate. 8I74S200xxx.01P-1/8I74S200xxx.00-000: 100 to 240 V – 8I74T40xxxx.01P-1/8I74T40xxxx.00-000: 200 to 480 V	100 to 690 V	According to drive rating
nCr	**[Rated mot. current]** Rated motor current given on the nameplate.	0.25 to 1.5 INV (1)	According to drive rating and **[Standard mot. freq]**(bFr)
FrS	**[Rated motor freq.]** Rated motor frequency given on the nameplate. The factory setting is 50 Hz or preset to 60 Hz if **[Standard mot. freq]**(bFr) is set to 60 Hz. This parameter is not visible if **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn).	10.0 to 800.0 Hz	50.0 Hz
nSP	**[Rated motor speed]** Rated motor speed given on the nameplate. This parameter is not visible if **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn). 0 to 9999 rpm then 10.00 to 60.00 krpm on the integrated display terminal. If, rather than the rated speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows: $Nominal\ speed = Synchronous\ speed \times \frac{100 - slip\ as\ a\ \%}{100}$ or $Nominal\ speed = Synchronous\ speed \times \frac{50 - slip\ in\ Hz}{50} (50\ Hz\ motors)$ or $Nominal\ speed = Synchronous\ speed \times \frac{60 - slip\ in\ Hz}{60} (60\ Hz\ motors)$	0 to 65535 rpm	According to drive rating
tFr	**[Max frequency]** The factory setting is 60 Hz or preset to 72 Hz if **[Standard mot. freq]**(bFr) is set to 60 Hz. The maximum value is limited by the following conditions: It must not exceed 10 times the value of **[Rated motor freq.]**(FrS).	10.0 to 599.0 Hz	60.0 Hz
tUn	**[Auto tuning]**		**[No action]**(nO)
tUS	**[Auto tuning state]** This parameter is not saved at drive power off. It shows the Autotuning status since last power on.		**[Not done]**(tAb)
tAb	**[Not done]**(tAb): Autotune is not done		
PEnd	**[Pending]**(PEnd): Autotune has been requested but not yet performed		
PrOG	**[In Progress]**(PrOG): Autotune is in progress		
FAIL	**[Failed]**(FAIL): Autotune has detected a fault		
dOnE	**[Done]** (dOnE): The stator resistance measured by the auto-tuning function is used to control the motor		
StUn	**[Tune selection]**		**[Default]**(tAb)
tAb	**[Default]**(tAb): The default stator resistance value is used to control the motor		
MEAS	**[Measure]**(MEAS): The stator resistance measured by the auto-tuning function is used to control the motor		
CUS	**[Custom]**(CUS): The stator resistance set manually is used to control the motor		
ItH	**[Mot. therm. current]** Motor thermal protection current, to be set to the rated current indicated on the motor nameplate.	0.2 to 1.5 INV (1)	According to drive rating
ACC	**[Acceleration]** Time to accelerate from 0 to the **[Rated motor freq.]**(FrS). To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.	0.00 to 6000 s (2)	3.0 s
dEC	**[Deceleration]** Time to decelerate from the **[Rated motor freq.]**(FrS) to 0. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.	0.00 to 6000 s (2)	3.0 s
LSP	**[Low speed]** Motor frequency at minimum reference, can be set between 0 and **[High speed]**(HSP).	0.0 to 599.0 Hz	0.0 Hz
HSP	**[High speed]** Motor frequency at maximum reference, can be set between **[Low speed]**(LSP) and **[Max frequency]**(tFr). The factory setting changes to 60 Hz if **[Standard mot. freq]**(bFr) is set to **[60Hz NEMA]**(60).	0.0 to 599.0 Hz	50.0 Hz

(1) In corresponds to the rated drive current indicated in the Installation chapter and on the drive nameplate.
(2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to **[Ramp increment]**(Inr).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

3.2.3.6.2 [SETTINGS]

Settings - With integrated display terminal

Danger!

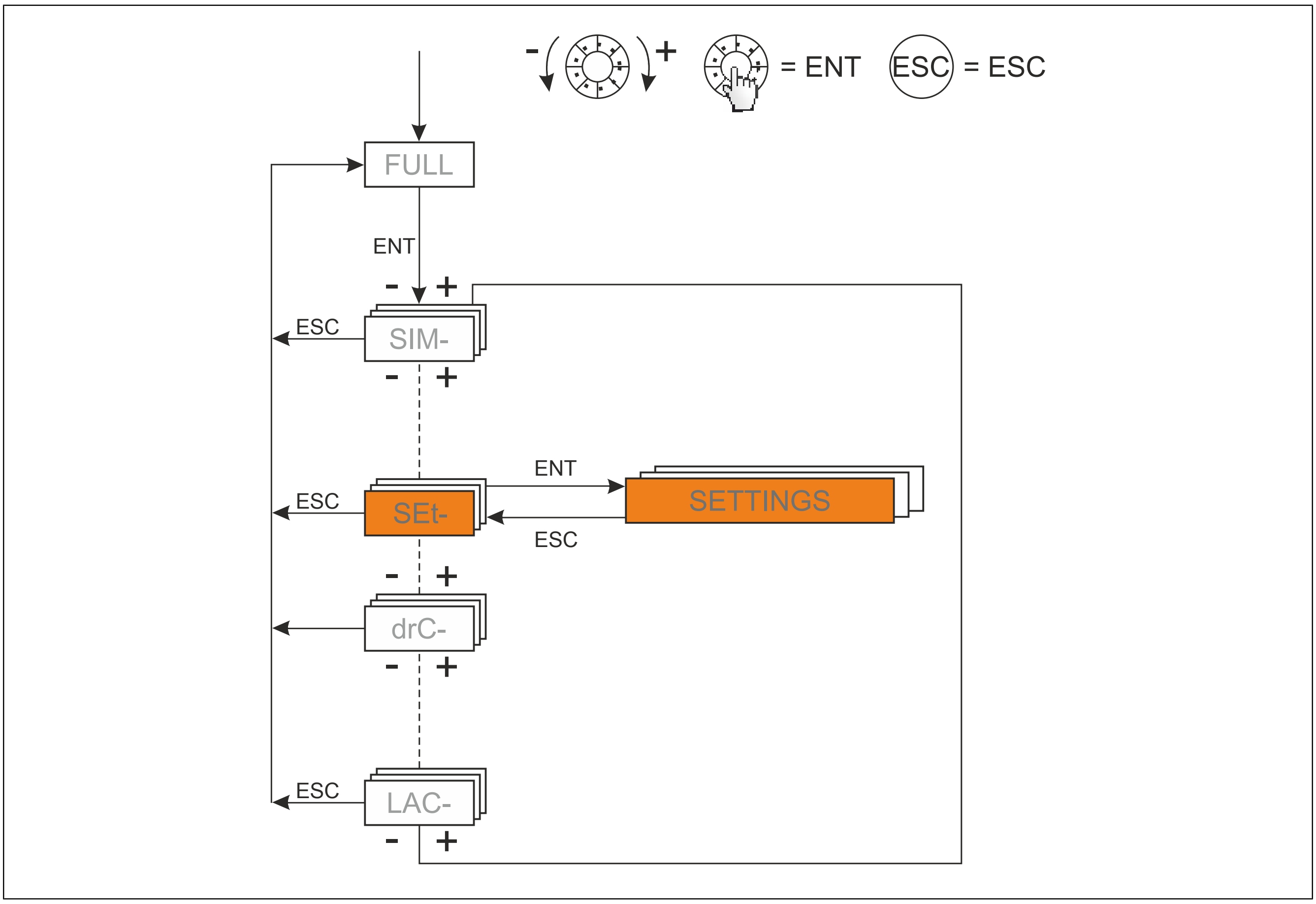
UNINTENDED EQUIPMENT OPERATION

Check that changes made to the settings during operation do not present any danger.

We recommend stopping the drive before making any changes.

Failure to follow these instructions will result in death or serious injury.

From COnF menu



The adjustment parameters can be modified with the drive running or stopped.

Code	Name / Description	Adjustment range	Factory setting
Parameters described in this page can be accessed by: DRI- > COnF > FULL > SEt-			
SEt-	**[SETTINGS]**		
Inr	**[Ramp increment]**		0.1
	This parameter is valid for **[Acceleration]**(ACC), **[Deceleration]**(dEC), **[Acceleration 2]**(AC2) and **[Deceleration 2]**(dE2).		
0.01	**[0,01]**: Ramp up to 99.99 seconds		
0.1	**[0,1]**: Ramp up to 999.9 seconds		
1	**[1]**: Ramp up to 6000 seconds		
ACC	**[Acceleration]**	0.00 to 6000 s (1)	3.0 s
	Time to accelerate from 0 to the **[Rated motor freq.]**(FrS). To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.		
dEC	**[Deceleration]**	0.00 to 6000 s (1)	3.0 s
	Time to decelerate from the **[Rated motor freq.]**(FrS) to 0. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.		
AC2	**[Acceleration 2]**	0.00 to 6000 s (1)	5.0 s
	Time to accelerate from 0 to the **[Rated motor freq.]**(FrS). To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.		

Parameters described in this page can be accessed by: DRI- > COnF > FULL > SEt-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
dE2	**[Deceleration 2]** Time to decelerate from the **[Rated motor freq.]**(FrS) to 0. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.	0.00 to 6000 s (1)	5.0 s
tA1	**[Begin Acc round]** Rounding of start of acceleration ramp as a % of the **[Acceleration]**(ACC) or **[Acceleration 2]**(AC2) ramp time. Visible if **[Ramp type]**(rPt) is set to **[Customized]**(CUS).	0 to 100%	10%
tA2	**[End Acc round]** Rounding of end of acceleration ramp as a % of the **[Acceleration]**(ACC) or **[Acceleration 2]**(AC2) ramp time. Can be set between 0 and 100% - **[Begin Acc round]**(tA1). Visible if **[Ramp type]**(rPt) is set to **[Customized]**(CUS).	0 to 100%	10%
tA3	**[Begin Dec round]** Rounding of start of deceleration ramp as a % of the **[Deceleration]**(dEC) or **[Deceleration 2]**(dE2) ramp time. Visible if **[Ramp type]**(rPt) is set to **[Customized]**(CUS).	0 to 100%	10%
tA4	**[End Dec round]** Rounding of end of deceleration ramp as a % of the **[Deceleration]**(dEC) or **[Deceleration 2]**(dE2) ramp time. Can be set between 0 and 100% - **[Begin Dec round]**(tA3). Visible if **[Ramp type]**(rPt) is set to **[Customized]**(CUS).	0 to 100%	10%
LSP	**[Low speed]** Motor frequency at minimum reference, can be set between 0 and **[High speed]**(HSP).	0.0 to 599.0 Hz	0.0 Hz
HSP	**[High speed]** Motor frequency at maximum reference, can be set between **[Low speed]**(LSP) and **[Max frequency]**(tFr). The factory setting changes to 60 Hz if **[Standard mot. freq]**(bFr) is set to **[60Hz NEMA]**(60).	0.0 to 599.0 Hz	50.0 Hz
HSP2	**[High speed 2]** Visible if **[2 High speed]**(SH2) is not set to **[No]**(nO).	0.0 to 599.0 Hz	50.0 Hz
HSP3	**[High speed 3]** Visible if **[4 High speed]**(SH4) is not set to **[No]**(nO).	0.0 to 599.0 Hz	50.0 Hz
HSP4	**[High speed 4]** Visible if **[4 High speed]**(SH4) is not set to **[No]**(nO).	0.0 to 599.0 Hz	50.0 Hz
ItH	**[Mot. therm. current]** Motor thermal protection current, to be set to the rated current indicated on the motor nameplate.	0.2 to 1.5 INV (2)	According to drive rating
UFr	**[IR compensation]** IR compensation.	0 to 200%	100%
SLP	**[Slip compensation]** Slip compensation.	0 to 300%	100%

Parameters described in this page can be accessed by: DRI- > COnF > FULL > SEt-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
SFC	**[K speed loop filter]** Speed filter coefficient.	0 to 100	65
SIt	**[Speed time integral]** Speed loop integral time constant.	1 to 65535 ms	63 ms
SPG	**[Speed prop. gain]** Speed loop proportional gain.	0 to 1000%	40%
SPGU	**[UF inertia comp.]** Inertia factor.	0 to 1000%	40%

(1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to **[Ramp increment]**(Inr).
(2) In corresponds to the rated drive current indicated in the Installation chapter or on the drive nameplate.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.2.1 Parameter settings

Parameter settings for [K speed loop filter](SFC), [Speed prop. gain](SPG) and [Speed time integral](SIt)

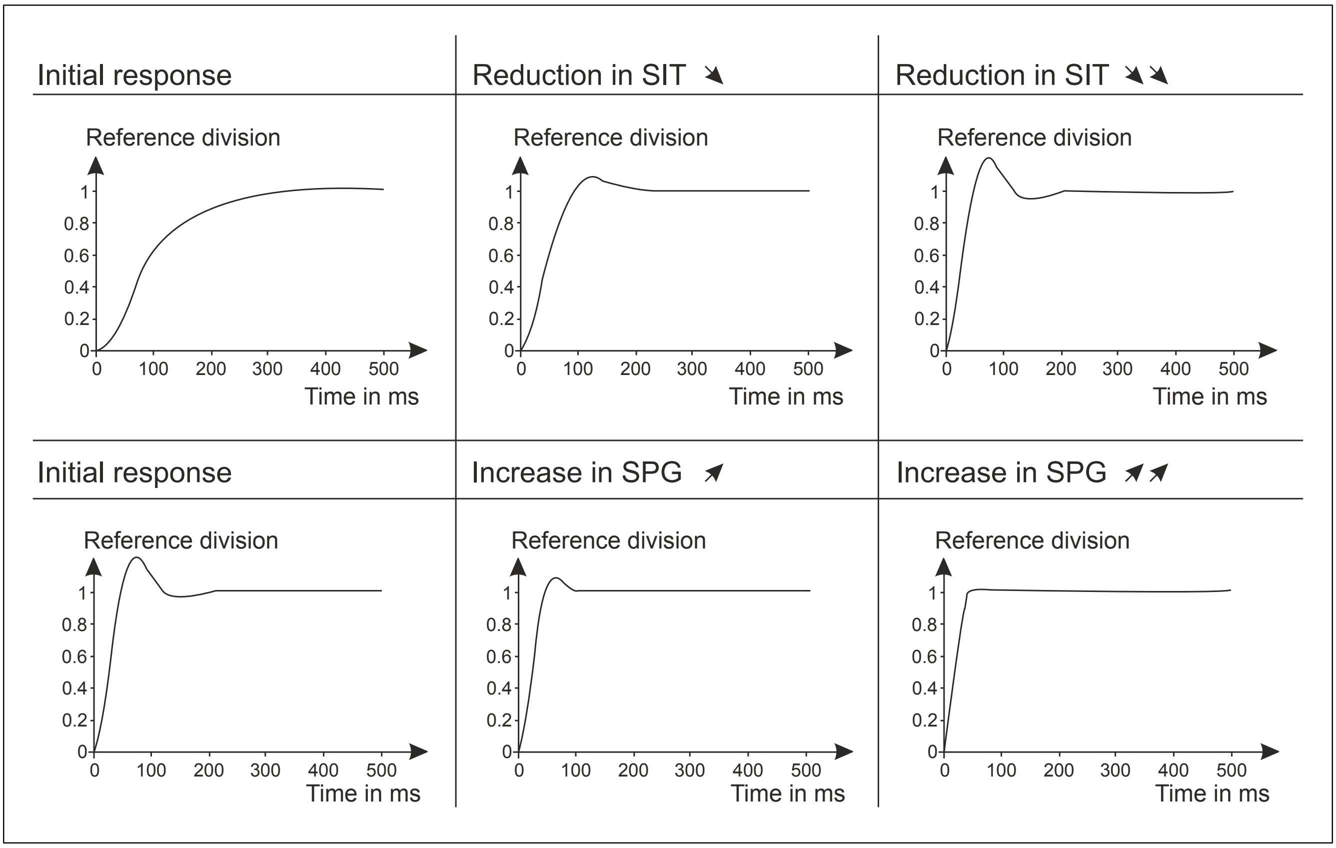
> **Warning!**
>
> **LOSS OF CONTROL**
>
> **Bad parameter settings of the speed loop with High Inertia application may cause a Ramp non consistent with application.**
>
> **Failure to follow these instructions will result in death, serious injury or equipment damage.**

The following parameters can be accessed if **[Motor control type]**(Ctt) is set to **[SVC V]**(UUC), **[Sync. mot.]**(SYn) or **[Energy Sav.]**(nLd).

General Case: Setting for [K speed loop filter](SFC) = 0

The regulator is an "IP" type with filtering of the speed reference, for applications requiring flexibility and stability (hoisting or high inertia, for example).

- **[Speed prop. gain]**(SPG) affects excessive speed.
- **[Speed time integral]**(SIt) affects the passband and response time.



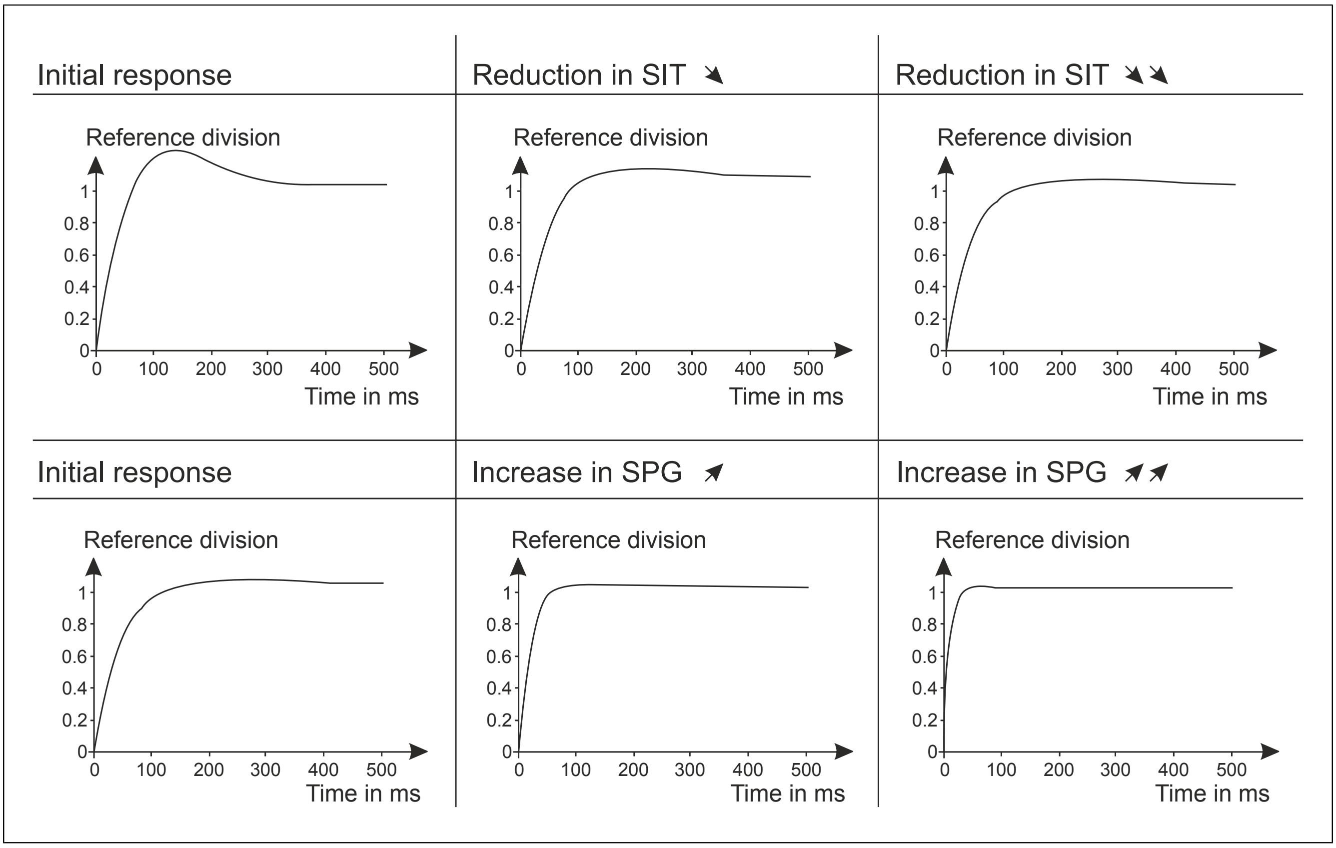
Special case: Parameter [K speed loop filter](SFC) is not 0

This parameter must be reserved for specific applications that require a short response time (trajectory positioning or servo control).

- When set to 100 as described above, the regulator is a “PI” type, without filtering of the speed reference.
- Settings between 0 and 100 will obtain an intermediate function between the settings below and those on the previous page.

Example: Setting for **[K speed loop filter]**(SFC) = 100

- **[Speed prop. gain]**(SPG) affects the passband and response time.
- **[Speed time integral]**(SIt) affects excessive speed.



Parameters described in this page can be accessed by: DRI- > COnF > FULL > SEt-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
SEt-	**[SETTINGS]**		
dCF	**[Ramp divider]** Deceleration ramp time reduction.	0 to 10	4
IdC	**[DC inject. level 1]** Level of DC injection braking current activated via logic input or selected as stop mode.	0.1 to $^{176}/_{125}$ INV (1)	$^{16}/_{25}$ INV (1)
tdI	**[DC injection time 1]** Maximum current injection time **[DC inject. level 1]**(IdC). After this time, the injection current becomes **[DC inject. level 2]**(IdC2).	0.1 to 30.0 s	0.5 s
IdC2	**[DC inject. level 2]** Injection current activated by logic input or selected as stop mode, once period of time **[DC injection time 1]**(tdI) has elapsed.	0.1 to **[DC inject. level 1]**(IdC)(1)	$^{1}/_{2}$ INV (1)
tdC	**[DC injection time 2]** Maximum injection time **[DC inject. level 2]**(IdC2) for injection selected as stop mode only.	0.1 to 30.0 s	0.5 s
SdC1	**[Auto DC inj. level 1]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.** Level of standstill DC injection current **[Auto DC injection]**(AdC) is not **[No]**(nO).	0.0 to $^{12}/_{10}$ INV (1)	$^{7}/_{10}$ INV (1)
tdC1	**[Auto DC inj. time 1]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** • **Long periods of DC injection braking can cause overheating and damage the motor.** • **Protect the motor by avoiding long periods of DC injection braking.** **Failure to follow these instructions can result in equipment damage.** Standstill injection time. This parameter can be accessed if **[Auto DC injection]**(AdC) is not set to **[No]**(nO). If **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn), this time corresponds to the zero speed maintenance time.	0.1 to 30.0 s	0.5 s
SdC2	**[Auto DC inj. level 2]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.** 2nd level of standstill DC injection current. This parameter can be accessed if **[Auto DC injection]**(AdC) is not **[No]**(nO).	0.0 to $^{12}/_{10}$ INV (1)	$^{5}/_{10}$ INV (1)
tdC2	**[Auto DC inj. time 2]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** • **Long periods of DC injection braking can cause overheating and damage the motor.** • **Protect the motor by avoiding long periods of DC injection braking.** **Failure to follow these instructions can result in equipment damage.** 2nd standstill injection time. This parameter can be accessed if **[Auto DC injection]**(AdC) is set to **[Yes]**(YES).	0.0 to 30.0 s	0.0 s

Parameters described in this page can be accessed by: DRI- > COnF > FULL > SEt-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
SFr	[Switching freq.] **Caution!** **RISK OF DAMAGE TO THE DRIVE** **On 8I74S200xxx.01P-1/8I74S200xxx.00-000 ratings, if the RFI filters are disconnected (operation on an IT system), the drive's switching frequency must not exceed 4 kHz.** **Failure to follow these instructions can result in equipment damage.** Switching frequency setting. **Adjustment range:** The maximum value is limited to 4 kHz if [Motor surge limit](SUL) parameter is configured. **Note:** **In the event of excessive temperature rise, the drive will automatically reduce the switching frequency and reset it once the temperature returns to normal.**	2.0 to 16.0 kHz	4.0 kHz
CLI	[Current Limitation] **Caution!** **RISK OF DAMAGE TO THE MOTOR AND THE DRIVE** • **Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.** • **Check that the profile mission complies with the derating curve given in Installation.** **Failure to follow these instructions can result in equipment damage.** Used to limit the motor current. **Note:** **If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss](OPL) fault mode if this has been enabled. If it is less than the no-load motor current, the motor cannot run.**	0.0 to $^3/_2$ INV (1)	$^3/_2$ INV (1)
CL2	[I Limit. 2 value] **Caution!** **RISK OF DAMAGE TO THE MOTOR AND THE DRIVE** • **Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.** • **Check that the profile mission complies with the derating curve given in Installation.** **Failure to follow these instructions can result in equipment damage.** **Note:** **If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss](OPL) fault mode if this has been enabled. If it is less than the no-load motor current, the motor cannot run.**	0.0 to $^3/_2$ INV (1)	$^3/_2$ INV (1)
FLU 2 s	[Motor fluxing] **Danger!** **HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH** **When [Motor fluxing](FLU) is set to [Continuous](FCt), the drive automatically builds up flux.** **Check this action will not endanger personnel or equipment in any way.** **Failure to follow these instructions will result in death or serious injury.** **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.** The parameter is visible if [Motor control type](Ctt) is not set to [Sync. mot.](SYn). In order to obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor. In [Continuous](FCt) mode, the drive automatically builds up flux when it is powered up. In [Not cont.](FnC) mode, fluxing occurs when the motor starts up. The flux current is greater than [Rated mot. current](nCr) when the flux is established and is then adjusted to the motor magnetizing current.		[No](FnO)
FnC	[Not cont.](FnC): Non-continuous mode		
FCt	[Continuous](FCt): Continuous mode. This option is not possible if [Auto DC injection](AdC) is [Yes](YES) or if [Type of stop](Stt) is [Freewheel](nSt).		
FnO	[No](FnO): Function inactive. This option is not possible if [Brake assignment](bLC) is not [No](nO).		

Parameters described in this page can be accessed by: DRI- > COnF > FULL > SEt-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
tLS	[Low speed time out]	0.0 to 999.9 s	0.0 s
	Maximum operating time at [Low speed](LSP).Following operation at LSP for a defined period, a motor stop is requested automatically. The motor will restart if the reference is greater than LSP and if a run command is still present. **Note:** **A value of 0 indicates an unlimited period of time.** **Note:** **If [Low speed time out](tLS) is not 0, [Type of stop](Stt) is forced to [Ramp stop](rMP) (only if a ramp stop can be configured).**		
JGF	[Jog frequency]	0.0 to 10.0 Hz	10.0 Hz
	Reference in jog operation.		
JGt	[Jog delay]	0.0 to 2.0 s	0.5 s
	Anti-repeat delay between 2 consecutive jog operations.		
SP2	[Preset speed 2]	0.0 to 599.0 Hz	10.0 Hz
	Preset speed 2.		
SP3	[Preset speed 3]	0.0 to 599.0 Hz	15.0 Hz
	Preset speed 3.		
SP4	[Preset speed 4]	0.0 to 599.0 Hz	20.0 Hz
	Preset speed 4.		
SP5	[Preset speed 5]	0.0 to 599.0 Hz	25.0 Hz
	Preset speed 5.		
SP6	[Preset speed 6]	0.0 to 599.0 Hz	30.0 Hz
	Preset speed 6.		
SP7	[Preset speed 7]	0.0 to 599.0 Hz	35.0 Hz
	Preset speed 7.		
SP8	[Preset speed 8]	0.0 to 599.0 Hz	40.0 Hz
	Preset speed 8.		
SP9	[Preset speed 9]	0.0 to 599.0 Hz	45.0 Hz
	Preset speed 9.		
SP10	[Preset speed 10]	0.0 to 599.0 Hz	50.0 Hz
	Preset speed 10.		
SP11	[Preset speed 11]	0.0 to 599.0 Hz	55.0 Hz
	Preset speed 11.		
SP12	[Preset speed 12]	0.0 to 599.0 Hz	60.0 Hz
	Preset speed 12.		

Parameters described in this page can be accessed by: DRI- > COnF > FULL > SEt-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
SP13	**[Preset speed 13]** Preset speed 13.	0.0 to 599.0 Hz	70.0 Hz
SP14	**[Preset speed 14]** Preset speed 14.	0.0 to 599.0 Hz	80.0 Hz
SP15	**[Preset speed 15]** Preset speed 15.	0.0 to 599.0 Hz	90.0 Hz
SP16	**[Preset speed 16]** Preset speed 16.	0.0 to 599.0 Hz	100.0 Hz
MFr	**[Multiplying coeff.]** Multiplying coefficient, can be accessed if **[Multiplier ref.]**(MA2, MA3) has been assigned to the graphic display terminal.	0 to 100%	100%
SrP	**[+/-Speed limitation]** Limitation of +/- speed variation.	0 to 50%	10%
rPG	**[PID prop. gain]** Proportional gain.	0.01 to 100.00	1.00
rIG	**[PID integral gain]** Integral gain.	0.01 to 100.00	1.00
rdG	**[PID derivative gain]** Derivative gain.	0.00 to 100.00	0.00
PrP	**[PID ramp]** PID acceleration/deceleration ramp, defined to go from **[Min PID reference]**(PIP1) to **[Max PID reference]**(PIP2) and vice versa.	0.0 to 99.9 s	0.0 s
POL	**[Min PID output]** Minimum value of regulator output in Hz.	-599.0 to 599.0 Hz	0.0 Hz
POH	**[Max PID output]** Maximum value of regulator output in Hz.	0.0 to 599.0 Hz	60.0 Hz
PAL	**[Min fbk alarm]** Minimum monitoring threshold for regulator feedback.	(2)	100
PAH	**[Max fbk alarm]** Maximum monitoring threshold for regulator feedback.	(2)	1000
PEr	**[PID error Alarm]** Regulator error monitoring threshold.	0 to 65535 (2)	100

Parameters described in this page can be accessed by: DRI- > COnF > FULL > SEt-

Code	Name / Description	Adjustment range	Factory setting
PSr	[Speed input %] Multiplying coefficient for predictive speed input.	1 to 100%	100%
rP2	[Preset ref. PID 2] Preset PID reference.	[Min PID reference](PIP1) to [Max PID reference](PIP2)(2)	300
rP3	[Preset ref. PID 3] Preset PID reference.	[Min PID reference](PIP1) to [Max PID reference](PIP2)(2)	600
rP4	[Preset ref. PID 4] Preset PID reference.	[Min PID reference](PIP1) to [Max PID reference](PIP2)(2)	900
Ibr	[Brake release I FW] Brake release current threshold for lifting or forward movement.	0.0 to $^{34}/_{25}$ INV (1)	0.0 A
Ird	[Brake release I Rev] Brake release current threshold for lowering or reverse movement.	0.0 to $^{34}/_{25}$ INV (1)	0.0 A
brt	[Brake Release time] Brake release time delay.	0.00 to 5.00 s	0.00 s
bIr	[Brake release freq]	[Auto](AUtO) to 10.0 Hz	[Auto](AUtO)
AUtO	[Auto](AUtO): Nominal value		
bEn	[Brake engage freq] Brake engage frequency threshold.	[Auto](AUtO) to 10.0 Hz	[Auto](AUtO)
tbE	[Brake engage delay] **Warning!** **LOSS OF CONTROL** **Modify the Brake engage delay for horizontal movement only otherwise the control of the load can be lost.** **Failure to follow these instructions can result in death, serious injury or equipment damage.** Time delay before request to engage brake.	0.00 to 5.00 s	0.00 s
bEt	[Brake engage time] Brake engage time (brake response time).	0.00 to 5.00 s	0.00 s
JdC	[Jump at reversal]	[Auto](AUtO) to 10.0 Hz	[Auto](AUtO)
AUtO	[Auto](AUtO): Nominal value		
ttr	[Time to restart] Time between the end of a brake engage sequence and the start of a brake release sequence.	0.00 to 15.00 s	0.00 s
tLIM	[Motoring torque lim] Torque limitation in motor mode as a % or in 0.1% increments of the rated torque in accordance with the [Torque increment](IntP) parameter.	0.0 to 300%	100%

Parameters described in this page can be accessed by: DRI- > COnF > FULL > SEt-

Code	Name / Description	Adjustment range	Factory setting
tLIG	**[Gen. torque lim]** Torque limitation in generator mode as a % or in 0.1% increments of the rated torque in accordance with the **[Torque increment]**(IntP) parameter	0.0 to 300%	100%
trH	**[Traverse freq. high]** Traverse high.	0.0 to 10.0 Hz	4.0 Hz
trL	**[Traverse freq. low]** Traverse low.	0.0 to 10.0 Hz	4.0 Hz
qSH	**[Quick step High]** Quick step high.	0.0 to **[Traverse freq. high]**(trH)	0.0 Hz
qSL	**[Quick step Low]** Quick step low.	0.0 to **[Traverse freq. low]**(trL)	0.0 Hz
Ctd	**[Current threshold]** Current threshold for **[I attained]**(CtA) function assigned to a relay or a logic output.	0.0 to $^3/_2$ INV (1)	1 INV (1)
ttH	**[High torque thd.]** High torque threshold for **[High tq. att.]**(ttHA) function assigned to a relay or a logic output as a % of the rated motor torque.	-300 to 300%	100%
ttL	**[Low torque thd.]** Low torque threshold for **[Low tq. att.]**(ttLA) function assigned to a relay or a logic output as a % of the rated motor torque.	-300 to 300%	50%
FqL	**[Pulse warning thd.]** Speed threshold measured by the **[FREQUENCY METER]**(FqF-) function assigned to a relay or a logic output.	0 Hz to 20000 kHz	0 Hz
Ftd	**[Freq. threshold]** Motor frequency threshold for **[Freq.Th.att.]**(FtA) function assigned to a relay or a logic output or used by the **[PARAM. SET SWITCHING]**(MLP-) function.	0.0 to 599.0 Hz	**[High speed]**(HSP)
F2d	**[Freq. threshold 2]** Motor frequency threshold for **[Freq. th.2 attained]**(F2A) function assigned to a relay or a logic output or used by the **[PARAM. SET SWITCHING]**(MLP-) function.	0.0 to 599.0 Hz	**[High speed]**(HSP)
FFt	**[Freewheel stop Thd]** Speed threshold below which the motor will switch to freewheel stop. This parameter supports switching from a ramp stop or a fast stop to a freewheel stop below a low speed threshold. It can be accessed if **[Type of stop]**(Stt) is set to **[Fast stop]**(FSt) or **[Ramp stop]**(rMP) and if **[Brake assignment]**(bLC) or **[Auto DC injection]**(AdC) are configured.	0.2 to 3.2 Hz	$^1/_{250}$ **[Rated motor freq.]**(FrS) or $^1/_{250}$ **[Nominal freq sync.]**(FrSS)
ttd	**[Motor therm. level]** Trip threshold for motor thermal alarm (logic output or relay).	0 to 118%	100%
JPF	**[Skip Frequency]** Skip frequency. This parameter helps to prevent prolonged operation within an adjustable range around the regulated frequency. This function can be used to help to prevent a speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.	0.0 to 599.0 Hz	0.0 Hz
JF2	**[Skip Frequency 2]** 2nd skip frequency. This parameter helps to prevent prolonged operation within an adjustable range around the regulated frequency. This function can be used to help to prevent a speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.	0.0 to 599.0 Hz	0.0 Hz
JF3	**[3rd Skip Frequency]** 3rd skip frequency. This parameter helps to prevent prolonged operation within an adjustable range around the regulated frequency. This function can be used to help to prevent a speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.	0.0 to 599.0 Hz	0.0 Hz
JFH	**[Skip.Freq.Hysteresis]** Parameter visible if at least one skip frequency **[Skip Frequency]**(JPF), **[Skip Frequency 2]**(JF2) or **[3rd Skip Frequency]**(JF3) is different from 0. Skip frequency range: between (JPF – JFH) and (JPF + JFH) for example. This adjustment is common to the 3 frequencies (JPF, JF2, JF3).	0.1 to 10.0 Hz	1.0 Hz
LUn	**[Unld.Thr.Nom.Speed]** Underload threshold at rated motor frequency (**[Rated motor freq.]**(FrS)) as a % of the rated motor torque. Visible only if **[Unld T. Del. Detect]**(ULt) is not set to 0.	20 to 100% (referring to **[Rated mot. current]**(nCr))	60%

Parameters described in this page can be accessed by: DRI- > COnF > FULL > SEt-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
LUL	[Unld.Thr.0.Speed] Underload threshold at zero frequency as a % of the rated motor torque. Visible only if [Unld T. Del. Detect](ULt) is not set to 0.	0% to [Unld.Thr.Nom.Speed](LUn) (referring to [Rated mot. current](nCr))	0%
rMUd	[Unld. Freq.Thr. Det.] Underload detection minimum frequency threshold.	0.0 to 599.0 Hz	0.0 Hz
Srb	[Hysteresis Freq.Att.] Maximum deviation between the frequency reference and the motor frequency, which defines steady state operation.	0.3 to 599.0 Hz	0.3 Hz
FtU	[Underload T.B.Rest.] Minimum time permitted between an underload being detected and any automatic restart. In order for an automatic restart to be possible, the value of [Max. restart time](tAr) must exceed that of this parameter by at least one minute.	0 to 6 min	0 min
LOC	[Ovld Detection Thr.] Overload detection threshold as a % of the rated motor current [Rated mot. current](nCr). This value must be less than the limit current in order for the function to work. Visible only if [Ovld Time Detect.](tOL) is not set to 0. This parameter is used to detect an "application overload". This is not a motor or drive thermal overload.	70 to 150% of [Rated mot. current](nCr)	110%
FtO	[Overload T.B.Rest.] Minimum time permitted between an overload being detected and any automatic restart. In order for an automatic restart to be possible, the value of [Max. restart time](tAr) must exceed that of this parameter by at least one minute.	0 to 6 min	0 min
LbC	[Load correction] Rated correction in Hz.	0.0 to 599.0 Hz	0.0 Hz
FFM	[Fan Mode] **Caution!** **RISK OF EQUIPMENT DAMAGE** **If [Fan Mode](FFM) is set to [Never](Stp), the fan of the drive will not be active.** **Life time of Electronic component will be reduced. Check that the ambient temperature will be limited to 40°C.** **Failure to follow these instructions can result in equipment damage.**		[Standard](Std)
Std	[Standard](Std): The fan starts and stops automatically according to the drive thermal state		
rUn	[Always](rUn): The fan is started		
StP	[Never](Stp): The fan is stopped		
SdS	[Scale factor display] Used to display a value in proportion to the output frequency [Output frequency](rFr): the machine speed, the motor speed, etc. The display will show $[Cust.\ output\ value](SPd3) = \frac{[Scale\ factor\ display](SdS) \times [Output\ frequency](rFr)}{1000}\ to\ 2\ decimal\ places$ • If [Scale factor display](SdS) ≤ 1, [Cust. output value](SPd1) is displayed (possible definition = 0.01) • If 1 < [Scale factor display](SdS) ≤ 10, [Cust. output value](SPd2) is displayed (possible definition = 0.1) • If [Scale factor display](SdS) > 10, [Cust. output value](SPd3) is displayed (possible definition = 1) • If [Scale factor display](SdS) > 10 and [Scale factor display](SdS) x [Output frequency](rFr) > 9999: **Example:** for 24223, display will show 24.22 If [Scale factor display](SdS) > 10 and [Scale factor display](SdS) x [Output frequency](rFr) > 65535, display locked at 65.54 . **Example:** Display motor speed for 4-pole motor, 1500 rpm at 50 Hz (synchronous speed): [Scale factor display](SdS) = 30 and [Cust. output value](SPd3) = 1500 at [Output frequency](rFr) = 50 Hz	0.1 to 200.0	30.0

(1) In corresponds to the rated drive current indicated in the Installation chapter or on the drive nameplate.
(2) If a graphic display terminal is not in use, values greater than 9999 will be displayed on the 4-digit display with a period mark after the thousand digit, example: 15.65 for 15650.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

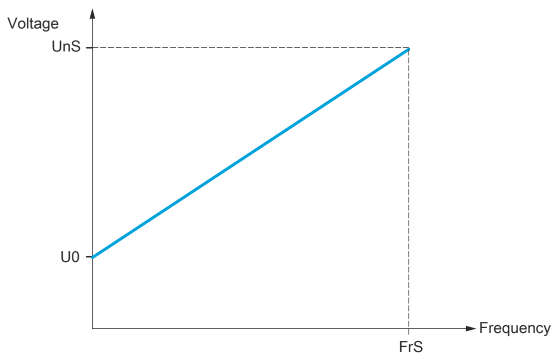
3.2.3.6.3 [MOTOR CONTROL]

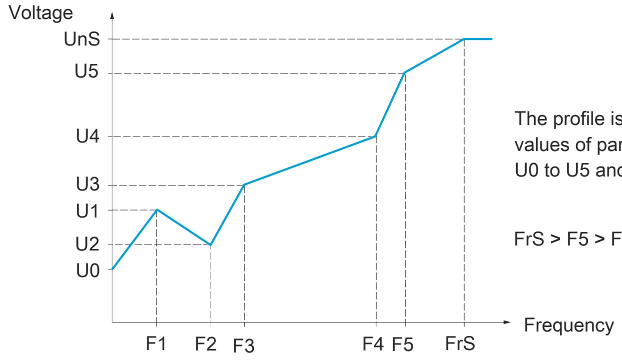
The parameters in the **[MOTOR CONTROL]**(drC-) menu can only be modified when the drive is stopped and no run command is present with the following exceptions:

- **[Auto tuning]**(tUn), which may cause the motor to start up.
- Parameters containing the arrow-sign in the code column, which can be modified with the drive running or stopped.

Note:

We recommend to perform auto-tuning if one of the following parameters are modified from their factory setting.

Code	Name / Description	Adjustment range	Factory setting
Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC-			
drC-	**[MOTOR CONTROL]**		
bFr	**[Standard mot. freq]**		**[50 Hz IEC]**(50)
	This parameter modifies the presets of the following parameters: **[High speed]**(HSP), **[Freq. threshold]**(Ftd), **[Rated motor volt.]**(UnS), **[Rated motor freq.]**(FrS), **[Max frequency]**(tFr), **[Rated mot. current]**(nCr), **[Rated motor speed]**(nSP) and **[Brake release I FW]**(Ibr).		
50	**[50 Hz IEC]**(50): IEC		
60	**[60 Hz NEMA]**(60): NEMA		
tFr	**[Max frequency]**	10.0 to 599.0 Hz	60.0 Hz
	The factory setting is 60 Hz or preset to 72 Hz if **[Standard mot. freq]**(bFr) is set to 60 Hz. The maximum value is limited by the following conditions: It must not exceed 10 times the value of **[Rated motor freq.]**(FrS).		
Ctt	**[Motor control type]**		**[Standard]**(Std)
	Note: **Select law before entering parameter values.**		
UUC	**[SVC V]**(UUC): Sensorless vector control with internal speed loop based on voltage feedback calculation. For applications needing high performance during starting or operation.		
Std	**[Standard]**(Std): Standard motor law. For simple applications that do not require high performance. Simple motor control law keeping a constant Voltage Frequency ratio with a possible adjustment of the curve bottom. This law is generally used for motors connected in parallel. Some specific applications with motors in parallel and high performance levels may require **[SVC V]**(UUC).  **Note:** **U0 is the result of an internal calculation based on motor parameters and multiplied by UFr (%). U0 can be adjusted by modifying UFr value.**		

Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
UF5	[V/F 5pts](UF5): 5-segment V/F profile: As [Standard](Std) profile but also supports the avoidance of resonance (saturation).  The profile is defined by the values of parameters UnS, FrS, U0 to U5 and F1 to F5. FrS > F5 > F4 > F3 > F2 > F1 **Note:** **U0 is the result of an internal calculation based on motor parameters and multiplied by UFr (%). U0 can be adjusted by modifying UFr value.**		
SYn	[Sync. mot.](SYn): For synchronous permanent magnet motors with sinusoidal electromotive force (EMF) only. This selection makes the asynchronous motor parameters inaccessible, and the synchronous motor parameters accessible.		
UFq	[V/F Quad.](UFq): Variable torque. For pump and fan applications.		
nLD	[Energy Sav.](nLd): Energy saving. For applications that do not require high dynamics.		

3.2.3.6.3.1 Asynchronous motor parameters

Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC- > ASY-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
ASY-	**[ASYNC. MOTOR]** Only visible if **[Motor control type]**(Ctt) is not set to **[Sync. mot.]**(SYn).		
nPr	**[Rated motor power]** This parameter cannot be accessed if **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn). Rated motor power given on the nameplate, in kW if **[Standard mot. freq]**(bFr) is set to **[50Hz IEC]**(50), in HP if **[Standard mot. freq]**(bFr) is set to **[60Hz NEMA]**(60).	According to drive rating	According to drive rating
COS	**[Motor 1 Cosinus Phi]** Nominal motor cos phi. This parameter can be accessed if **[Motor param choice]**(MPC) is set to **[Mot Cos]**(COS).	0.50 to 1.00	According to drive rating
UnS	**[Rated motor volt.]** This parameter cannot be accessed if **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn). Rated motor voltage given on the nameplate.	100 to 690 V	According to drive rating and **[Standard mot. freq]** (bFr)
nCr	**[Rated mot. current]** This parameter cannot be accessed if **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn). Rated motor current given on the nameplate.	$^1/_4$ to $^3/_2$ INV (1)	According to drive rating and **[Standard mot. freq]** (bFr)
FrS	**[Rated motor freq.]** This parameter cannot be accessed if **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn). Rated motor frequency given on the nameplate. The factory setting is 50 Hz or preset to 60 Hz if **[Standard mot. freq]**(bFr) is set to 60 Hz.	10.0 to 800.0 Hz	50.0 Hz
nSP	**[Rated motor speed]** This parameter cannot be accessed if **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn). 0 to 9999 rpm then 10.00 to 65.53 krpm on the integrated display terminal. If, rather than the rated speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows: $Nominal\ speed = Synchronous\ speed \times \frac{100 - slip\ as\ a\ \%}{100}$ or $Nominal\ speed = Synchronous\ speed \times \frac{50 - slip\ in\ Hz}{50} (50\ Hz\ motors)$ or $Nominal\ speed = Synchronous\ speed \times \frac{60 - slip\ in\ Hz}{60} (60\ Hz\ motors)$	0 to 65535 rpm	According to drive rating

Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC- > ASY-

Code	Name / Description	Adjustment range	Factory setting
tUn	[Auto tuning]		[No](nO)

2 s

Danger!

HAZARD OF ELECTRIC SHOCK OR ARC FLASH

- **During auto-tuning the motor operates at rated current.**
- **Do not service the motor during auto-tuning.**

Failure to follow these instructions will result in death or serious injury.

Warning!

LOSS OF CONTROL

- **It is essential that the following parameters [Rated motor volt.](UnS), [Rated motor freq.](FrS), [Rated mot. current](nCr), [Rated motor speed](nSP) and [Rated motor power](nPr) or [Motor 1 Cosinus Phi](COS) are correctly configured before starting auto-tuning.**
- **When one or more of these parameters have been changed after auto-tuning has been performed, [Auto tuning](tUn) will return [No action](nO) and the procedure will have to be repeated.**

Failure to follow these instructions can result in death, serious injury or equipment damage.

Note:

When using the ACOPOSinverter P74 with POWERLINK and the B&R Automation Studio, the standard [No](nO) setting can only be changed in the application via asynchronous writing of the parameter.

- Auto-tuning is only performed if no stop command has been activated. If a "freewheel stop" or "fast stop" function has been assigned to a logic input, this input must be set to 1 (active at 0).
- Auto-tuning takes priority over any run or prefluxing commands, which will be taken into account after the auto-tuning sequence.
- If auto-tuning detects a fault, the drive displays [No action](nO) and, depending on the configuration of [Autotune fault mgt](tnL), may switch to [Auto-tuning](tnF) fault mode.
- Auto-tuning may last for 1 to 2 seconds. Do not interrupt the process. Wait for the display to change to [No action](nO).

Process:
CMD Bit 8 = 1 (Stop command active)
CMD Bit 1 = 1 (Switch on regulator)
CMD Bit 2 = 1 (Switch on regulator)
CMD Bit 0 = 1 (Switch on regulator)
CMD Bit 3 = 1 (Switch on regulator)
TUN = 1 (Tuning is executed)
CMD Bit 8 = 0 (Stop command inactive)

Note:

Motor thermal state has a big influence on tune result. Make the tune with the motor stopped and cold.

To redo a tune of the motor, wait that it is completely stopped and cold. Set first [Auto tuning](tUn) to [Erase tune](CLr), then redo the motor tuning.

The use of the motor tuning without doing a [Erase tune](CLr) first is used to get the thermal state estimation of the motor.

In any case, the motor has to be stopped before performing a tune operation.

Cable length has an influence on the Tune result. If the cabling is modified, it is necessary to redo the tune operation.

Code	Name / Description	Adjustment range	Factory setting
nO	[No action](nO): Auto-tuning not in progress		
YES	[Do tune](YES): Auto-tuning is performed immediately if possible, then the parameter automatically changes to [No action](nO). If the drive state does not allow the tune operation immediately, the parameter changes to [No](nO) and the operation must be done again.		
CLr	[Erase tune](CLr): The motor parameters measured by the auto-tuning function have been reset. The default motor parameters values are used to control the motor. [Auto tuning status](tUS) is set to [Not done](tAb).		
tUS	[Auto tuning state] (for information only, cannot be modified) This parameter is not saved at drive power off. It shows the Autotuning status since last power on.		[Not done](tAb)
tAb	[Not done](tAb): Autotune is not done		
PEnd	[Pending](PEnd): Autotune has been requested but not yet performed		
PrOG	[In Progress](PrOG): Autotune is in progress		
FAIL	[Failed](FAIL): Autotune has detected a fault		
dOnE	[Done](dOnE): The motor parameters measured by the auto-tuning function are used to control the motor		
StUn	[Tune selection] (for information only, cannot be modified)		[Default](tAb)
tAb	[Default](tAb): The default values are used to control the motor		
MEAS	[Measure](MEAS): The values measured by the auto-tuning function are used to control the motor		

Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC- > ASY-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
CUS	**[Custom]**(CUS): The values set manually are used to control the motor **Note:** **Tune of the motor will increase significantly the performances.**		
tUnU	**[Auto tuning usage]** This parameter shows the way used to modify the motor parameters according to its estimated thermal state.		**[Therm Mot]**(tM)
nO	**[No]**(nO): No thermal state estimation		
tM	**[Therm Mot]**(tM): Statoric thermal state estimation based on nominal current and current consumed by the motor		
FLU ★ (1) 2 s	**[Motor fluxing]** **Danger!** **HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH** **When [Motor fluxing](FLU) is set to [Continuous](FCt), the drive automatically builds up flux.** **Check this action will not endanger personnel or equipment in any way.** **Failure to follow these instructions will result in death or serious injury.** **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.** If **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn), the factory setting is replaced by **[Not cont.]**(FnC). In order to obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor. In **[Continuous]**(FCt) mode, the drive automatically builds up flux when it is powered up. In **[Not cont.]**(FnC) mode, fluxing occurs when the motor starts up. The flux current is greater than **[Rated mot. current]**(nCr) (configured rated motor current) when the flux is established and is then adjusted to the motor magnetizing current.		**[No]**(FnO)
FnC	**[Not cont.]**(FnC): Non-continuous mode		
FCt	**[Continuous]**(FCt): Continuous mode. This option is not possible if **[Auto DC injection]**(AdC) is **[Yes]**(YES) or if **[Type of stop]**(Stt) is **[Freewheel]**(nSt).		
FnO	**[No]**(FnO): Function inactive. This option is not possible if **[Brake assignment]**(bLC) is not **[No]**(nO). If **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn), the **[Motor fluxing]**(FLU) parameter causes the alignment of the rotor and not the fluxing. If **[Brake assignment]**(bLC) is not **[No]**(nO), the **[Motor fluxing]**(FLU) parameter has no effect.		
MPC ★	**[Motor param choice]**		**[Mot Power]**(nPr)
nPr	**[Mot Power]**(nPr)		
COS	**[Mot Cos]**(COS)		

(1) In corresponds to the rated drive current indicated in the Installation chapter and on the drive nameplate.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

3.2.3.6.3.2 Asynchronous motor parameters: Expert mode

Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC- > ASY-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
ASY-	[ASYNC. MOTOR]		
rSA ★ (1)	[Cust stator resist.] Cold state stator resistance (per winding), modifiable value. The factory setting is replaced by the result of the auto-tuning operation, if it has been performed.	0 to 65535 mΩ	0 mΩ
LFA ★	[Lfw] Cold state leakage inductance, modifiable value. The factory setting is replaced by the result of the auto-tuning operation, if it has been performed.	0.00 to 655.35 mH	0.00 mH
IdA ★	[Idw] Customer adjusted magnetizing current. The factory setting is replaced by the result of the auto-tuning operation, if it has been performed.	0.0 to 6553.5 A	0.0 A
trA ★	[Cust. rotor t const.] Customer adjusted rotor time constant. The factory setting is replaced by the result of the auto-tuning operation, if it has been performed.	0 to 65535 ms	0 ms

(1) On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65535).

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.3.6.3.3 Synchronous motor parameters

Synchronous motor parameters

These parameters can be accessed if **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn).

In this case, the asynchronous motor parameters cannot be accessed.

Once the drive is chosen:

1- Enter the motor nameplate

2 - Perform the tune

- Do an **[Auto tuning]**(tUn)
- Check the state of the synchronous motor saliency

If **[Saliency mot. state]**(SMOt) displays **[Med salient]**(MLS) or **[High salient]**(HLS).

- Follow the procedure below **"3 - Improve the tune result"**

and

- Follow the procedure below **"4 - Adjust PHS"**

Or if **[Saliency mot. state]**(SMOt) displays **[Low salient]**(LLS)

- Follow the procedure below **"4 - Adjust PHS"**

3 - Improve the tune results

Caution!

RISK OF DAMAGE TO THE MOTOR AND THE DRIVE

- **Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.**
- **Check that the profile mission complies with the derating curve given in Installation.**

Failure to follow these instructions can result in equipment damage.

- Set **[PSI align curr. max]**(MCr) conforming to the maximum motor current. The maximum value of **[PSIalign curr. max]**(MCr) is limited by **[Current Limitation]**(CLI). Without information set **[PSI align curr.max]**(MCr) to **[Auto]**(AUtO)
- Do a second (tUn) after the (MCr) modification.

4 - Adjust PHS

Adjust **[Syn. EMF constant]**(PHS) to have optimal behavior.

- Start the motor at minimal stable frequency available on the machine (without load).
- Check and note the **[% error EMF sync]**(rdAE) value.
    - If the **[% error EMF sync]**(rdAE) value is lower to 0%, then **[Syn. EMF constant]**(PHS) may be increased.
    - If the **[% error EMF sync]**(rdAE) value is upper to 0%, then **[Syn. EMF constant]**(PHS) may be reduced.
      [% error EMF sync](rdAE) value should be closed to 0%.
- Stop the motor for modify PHS in accordance with the value of the rdAE (previously noted).

Advices:

The drive must be chosen to have enough current according to the need of behavior, but not too much, to have enough accuracy in the current measurement, especially with the high frequency signal injection.

Performances may be higher on high saliency motors by activating high frequency injection function.

Note:

The drive must be selected so as to have sufficient current to meet performance requirements, but not too much, in order that the current can be precisely measured, especially during signal injection.

When the drive is selected:

- **Enter the data from the motor nameplate.**
- **Execute the auto-tuning function.**
- **Adjust [Syn. EMF constant](PHS) to achieve optimal performance (low current in the motor if no load).**

Note:

Activating signal injection can improve the performance values of motors with high cogging torque.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC- > SYN-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
SYN-	[SYNCHRONOUS MOTOR]		
nCrS ★	[Nominal I sync.] Rated synchronous motor current given on the nameplate.	$^1/_4$ to $^3/_2$ INV (1)	According to drive rating
PPnS ★	[Pole pairs] Number of pairs of poles on the synchronous motor.	1 to 50	According to drive rating
nSPS ★ (1)	[Nom motor spdsync] Rated motor speed given on the nameplate.	0 to 65535 rpm	According to drive rating
tqS ★	[Motor torque] Rated motor torque given on the nameplate.	0.1 to 6553.5 Nm	According to drive rating

Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC- > SYN-

Code	Name / Description	Adjustment range	Factory setting
tUn 2 s	[Auto tuning]		[No](nO)

Danger!

HAZARD OF ELECTRIC SHOCK OR ARC FLASH

- **During auto-tuning the motor operates at rated current.**
- **Do not service the motor during auto-tuning.**

Failure to follow these instructions will result in death or serious injury.

Warning!

LOSS OF CONTROL

- **It is essential that the following parameters [Nominal I sync.](nCrS), [Nom motor spdsync](nSPS), [Pole pairs](PPnS), [Syn. EMF constant](PHS), [Autotune L d-axis](LdS) and [Autotune L q-axis](LqS) are correctly configured before starting auto-tuning.**
- **When one or more of these parameters have been changed after auto-tuning has been performed, [Auto tuning](tUn) will return [No action](nO) and the procedure will have to be repeated.**

Failure to follow these instructions can result in death, serious injury or equipment damage.

Note:

When using the ACOPOSinverter P74 with POWERLINK and the B&R Automation Studio, the standard [No](nO) setting can only be changed in the application via asynchronous writing of the parameter.

- Auto-tuning is only performed if no stop command has been activated. If a "freewheel stop" or "fast stop" function has been assigned to a logic input, this input must be set to 1 (active at 0).
- Auto-tuning takes priority over any run or prefluxing commands, which will be taken into account after the auto-tuning sequence.
- If auto-tuning detects a fault, the drive displays [No action](nO) and depending on the configuration of [Autotune fault mgt](tnL), may switch to [Auto-tuning](tnF) fault mode.
- Auto-tuning may last for 1 to 2 seconds. Do not interrupt the process. Wait for the display to change to [No action](nO).

Process:
CMD Bit 8 = 1 (Stop command active)
CMD Bit 1 = 1 (Switch on regulator)
CMD Bit 2 = 1 (Switch on regulator)
CMD Bit 0 = 1 (Switch on regulator)
CMD Bit 3 = 1 (Switch on regulator)
TUN = 1 (Tuning is executed)
CMD Bit 8 = 0 (Stop command inactive)

Note:

Motor thermal state has a big influence on tune result. Make the tune with the motor stopped and cold.

To redo a tune of the motor, wait that it is completely stopped and cold. Set first [Auto tuning](tUn) to [Erase tune](CLr), then redo the motor tuning.

The use of the motor tuning without doing a [Erase tune](CLr) first is used to get the thermal state estimation of the motor.

In any case, the motor has to be stopped before performing a tune operation.

Cable length has an influence on the Tune result. If the cabling is modified, it is necessary to redo the tune operation.

Code	Name / Description	Adjustment range	Factory setting
nO	[No action](nO): Auto-tuning not in progress		
YES	[Do tune](YES): Auto-tuning is performed immediately if possible, then the parameter automatically changes to [No action](nO). If the drive state does not allow the tune operation immediately, the parameter changes to [No](nO) and the operation must be done again.		
CLr	[Erase tune](CLr): The motor parameters measured by the auto-tuning function have been reset. The default motor parameters values are used to control the motor. [Auto tuning status](tUS) is set to [Not done](tAb).		
tUS	[Auto tuning state] (for information only, cannot be modified) This parameter is not saved at drive power off. It shows the Autotuning status since last power on.		[Not done](tAb)
tAb	[Not done](tAb): Autotune is not done		
PEnd	[Pending](PEnd): Autotune has been requested but not yet performed		
PrOG	[In Progress](PrOG): Autotune is in progress		
FAIL	[Failed](FAIL): Autotune has detected a fault		
dOnE	[Done](dOnE): The motor parameters measured by the auto-tuning function are used to control the motor		

Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC- > SYN-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
StUn	[Tune selection] (for information only, cannot be modified)		[Default](tAb)
tAb MEAS CUS	[Default](tAb): The default values are used to control the motor [Measure](MEAS): The values measured by the auto-tuning function are used to control the motor [Custom](CUS): The values set manually are used to control the motor **Note:** **Tune of the motor will increase significantly the performances.**		
tUnU	[Auto tuning usage] This parameter shows the way used to modify the motor parameters according to its estimated thermal state.		[Therm Mot](tM)
nO tM	[No](nO): No thermal state estimation [Therm Mot](tM): Statoric thermal state estimation based on nominal current and current consumed by the motor		
SMOt ★	[Saliency mot. state] (for information only, cannot be modified) Information on synchronous motor saliency. This parameter can be accessed if [Tune selection](StUN) is set to [Measure](MEAS). **Note:** **In case of motor with low saliency, the standard control law is advised.**		
nO LLS MLS HLS	[No](nO): Tune not done [Low salient](LLS): Low saliency level (Recommended configuration: [Angle setting type](ASt) = [PSI align](PSI) or [PSIO align](PSIO) and [HF inj. activation](HFI) = [No](nO)). [Med salient](MLS): Medium saliency level ([Angle setting type](ASt) = [SPM align](SPMA) is possible. [HF inj. activation](HFI) = [Yes](YES) could work). [High salient](HLS): High saliency level ([Angle setting type](ASt) = [IPM align](IPMA) is possible. [HF inj. activation](HFI) = [Yes](YES) is possible).		
ASt ★	[Angle setting type] Mode for measuring the phase-shift angle. Visible only if [Motor control type](Ctt) is set to [Sync. mot.](SYn). [PSI align](PSI) and [PSIO align](PSIO) are working for all type of synchronous motors. [SPM align](SPMA) and [IPM align](IPMA) increase performances depending on the type of synchronous motor.		[PSIO align.](PSIO)
IPMA SPMA PSI PSIO nO	[IPM align](IPMA): Alignment for IPM motor. Alignment mode for Interior-buried Permanent Magnet motor (usually, this kind of motor has a high saliency level). It uses high frequency injection, which is less noisy than standard alignment mode. [SPM align](SPMA): Alignment for SPM motor. Mode for Surface-mounted Permanent Magnet motor (usually, this kind of motor has a medium or low saliency level). It uses high frequency injection, which is less noisy than standard alignment mode. [PSI align](PSI): Pulse signal injection. Standard alignment mode by pulse signal injection. [PSIO align](PSIO): Pulse signal injection - Optimized. Standard optimized alignment mode by pulse signal injection. The phase shift angle measurement time is reduced after the first run order or tune operation, even if the drive has been turned off. [No align](nO): No alignment		
HFI ★	[HF inj. activation] Activation of high frequency signal injection in RUN. This function allows to estimate the motor speed in a view to have torque at low speed without speed feedback. **Note:** **The more the saliency is high, the more the [HF inj. activation](HFI) function will be efficient.** In order to ensure the performances, it could be necessary to adjust the speed loop parameters ([K speed loop filter](SFC), [Speed time integral](SIt) and [Speed prop. gain](SPG)) and the speed estimation phase locked loop (Expert parameters [HF pll bandwidth](SPb) and [HF pll dump. factor](SPF)). High frequency injection is not efficient with low saliency motors. It is advised to have 4 kHz of pwm frequency ([Switching freq.](SFr)). In case of instability with no load, it is advised to decrease [Speed prop. gain](SPG) and [HF pll bandwidth](SPb). Then, adjust the speed loop parameters to have the dynamic behavior and the PLL gains to have a good speed estimation at low speed. In case of instability with load, it could help to increase the [Angle error Comp.](PEC) parameter (mainly for SPM motor).		[No](nO)
nO YES	[No](nO): Function deactivated [Yes](YES): High frequency injection is used for speed estimation		

(1) On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

3.2.3.6.3.4 Synchronous motor: Expert mode

Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC- > SYN-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
SYN-	**[SYNCHRONOUS MOTOR]**		
rSAS (1)	**[Cust. stator R syn]** Cold state stator resistance (per winding). The factory setting is replaced by the result of the auto-tuning operation, if it has been performed. The value can be entered by the user, if he knows it.	0 to 65535 mΩ	0 mΩ
LdS	**[Autotune L d-axis]** Axis "d" stator inductance in mH (per phase). On motors with smooth poles **[Autotune L d-axis]**(LdS) = **[Autotune L q-axis]**(LqS) = Stator inductance L. The factory setting is replaced by the result of the auto-tuning operation, if it has been performed.	0.00 to 655.35 mH	0.00 mH
LqS	**[Autotune L q-axis]** Axis "q" stator inductance in mH (per phase). On motors with smooth poles **[Autotune L d-axis]**(LdS) = **[Autotune L q-axis]**(LqS) = Stator inductance L. The factory setting is replaced by the result of the auto-tuning operation, if it has been performed.	0.00 to 655.35 mH	0.00 mH
PHS (1)	**[Syn. EMF constant]** Synchronous motor EMF constant in mV per rpm (peak voltage per phase). PHS adjustment allows to reduce the current in operation without load.	0.0 to 6553.5 mV/rpm	0.0 mV/rpm
FrSS	**[Nominal freq sync.]** Nominal motor frequency for synchronous motor in Hz unit. Automatically updated according to **[Nom motor spdsync]**(nSPS) and **[Pole pairs]**(PPnS) data.	10.0 to 800.0 Hz	**[Nom motor spdsync]** (nSPS)* **[Pole pairs]**(PPnS) / 6
SPb	**[HF pll bandwidth]** Bandwidth of the stator frequency Pll.	0 to 100 Hz	25 Hz
SPF	**[HF pll dump. factor]** Dumping factor of the stator frequency Pll.	0 to 200%	100%
PEC	**[Angle error Comp.]** Error compensation of the angle position in high frequency mode. It increases performances at low speed in generator and motor mode, particularly for SPM motors.	0 to 500%	0%
AUtO	**[Auto]**(AUtO): The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters.		
FrI	**[HF injection freq.]** Frequency of the high frequency injection signal. It has an influence on the noise during angle shift measurement and speed estimation accuracy.	250 to 1000 Hz	500 Hz
HIr	**[HF current level]** Ratio for the current level of the high frequency injection signal. It has an influence on the noise during angle shift measurement and speed estimation accuracy.	0 to 200%	25%
MCr	**[PSI align curr. max]** Current level in % of **[Nominal I sync.]**(nCrS) for **[PSI align]**(PSI) and **[PSIO align]**(PSIO) angle shift measurement modes. This parameter has an impact on the inductor measurement. **[PSI align curr. max]**(MCr) is used for tune operation. This current must be equal or higher than the maximum current level of the application, otherwise instability may occur. If **[PSI align curr. max]**(MCr) is set to **[Auto]**(AUtO), **[PSI align curr. max]**(MCr) = 150% of **[Nominal I sync.]**(nCrS) during the tune operation and 100% of **[Nominal I sync.]**(nCrS) during angle shift measurement in case of standard alignment (**[PSI align]**(PSI) or **[PSIO align]**(PSIO)).	**[Auto]**(AUtO) to 300%	**[Auto]**(AUtO)
ILr	**[Injection level align]** Current level in % of **[Nominal I sync.]**(nCrS) for high frequency phase-shift angle measurement IPMA type.	0 to 200%	50%
SIr	**[Boost level align.]** Current level in % of **[Nominal I sync.]**(nCrS) for high frequency phase-shift angle measurement SPMA type.	0 to 200%	100%
rdAE	**[% error EMF sync.]** Ratio D-Axis Current. Use rdAE to adjust **[Syn. EMF constant]**(PHS), rdAE should be closed to 0. If the **[% error EMF sync]**(rdAE) value is lower to 0%, then **[Syn. EMF constant]**(PHS) may be increased. If the **[% error EMF sync]**(rdAE) value is upper to 0%, then **[Syn. EMF constant]**(PHS) may be reduced.	-3276.7 to 3275.7%	-

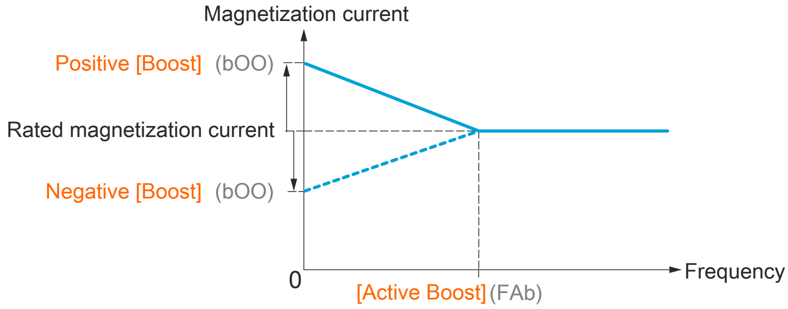
(1) On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
drC-	[MOTOR CONTROL](continued)		
SPG	[Speed prop. gain] Speed loop proportional gain. Visible if [Motor control type](Ctt) is not set to [Standard](Std), [V/F 5pts](UFS) or [V/F Quad.](UFq).	0 to 1000%	40%
SPGU	[UF inertia comp.] Inertia factor for following motor control laws. Visible if [Motor control type](Ctt) is set to [Standard](Std), [V/F 5pts](UFS) or [V/F Quad.](UFq).	0 to 1000%	40%
SIt	[Speed time integral] Speed loop integral time constant. Visible if [Motor control type](Ctt) is not set to [Standard](Std), [V/F 5pts](UFS) or [V/F Quad.](UFq).	1 to 65535 ms	63 ms
SFC	[K speed loop filter] Speed filter coefficient (0(IP) to 100(PI)).	0 to 100	65
FFH	[Spd est. filter time] Accessible in Expert mode only. Frequency to filter the estimated speed.	0.0 to 100.0 ms	6.4 ms
CrtF	[Cur. ref. filter time] Accessible in Expert mode only. Filter time of the current reference filter of control law (if [No](nO): stator natural frequency).	0.0 to 100.0 ms	3.2 ms
UFr	[IR compensation] Used to optimize torque at very low speed or to adapt to special cases (for example: for motors connected in parallel, decrease [IR compensation](UFr)). If there is insufficient torque at low speed, increase [IR compensation](UFr). A too high value can avoid the motor to start (locking) or change the current limiting mode.	0 to 200%	100%
SLP	[Slip compensation] This parameter cannot be accessed if [Motor control type](Ctt) is set to [Sync. mot.](SYn). This parameter is written at 0% when [Motor control type](Ctt) is set to [V/F Quad.](UFq). Adjusts the slip compensation around the value set by the rated motor speed. The speeds given on motor nameplates are not necessarily exact. If slip setting is lower than actual slip: The motor is not rotating at the correct speed in steady state, but at a speed lower than the reference. If slip setting is higher than actual slip: The motor is overcompensated and the speed is unstable.	0 to 300%	100%
U1	[U1] V/F profile setting. This parameter can be accessed if [Motor control type](Ctt) is set to [V/F 5pts](UF5).	0 to 800 V according to rating	0 V
F1	[F1] V/F profile setting. This parameter can be accessed if [Motor control type](Ctt) is set to [V/F 5pts](UF5).	0.0 to 599.0 Hz	0.0 Hz
U2	[U2] V/F profile setting. This parameter can be accessed if [Motor control type](Ctt) is set to [V/F 5pts](UF5).	0 to 800 V according to rating	0 V
F2	[F2] V/F profile setting. This parameter can be accessed if [Motor control type](Ctt) is set to [V/F 5pts](UF5).	0.0 to 599.0 Hz	0.0 Hz
U3	[U3] V/F profile setting. This parameter can be accessed if [Motor control type](Ctt) is set to [V/F 5pts](UF5).	0 to 800 V according to rating	0 V
F3	[F3] V/F profile setting. This parameter can be accessed if [Motor control type](Ctt) is set to [V/F 5pts](UF5).	0.0 to 599.0 Hz	0.0 Hz
U4	[U4] V/F profile setting. This parameter can be accessed if [Motor control type](Ctt) is set to [V/F 5pts](UF5).	0 to 800 V according to rating	0 V
F4	[F4] V/F profile setting. This parameter can be accessed if [Motor control type](Ctt) is set to [V/F 5pts](UF5).	0.0 to 599.0 Hz	0.0 Hz
U5	[U5] V/F profile setting. This parameter can be accessed if [Motor control type](Ctt) is set to [V/F 5pts](UF5).	0 to 800 V according to rating	0 V

Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
F5	**[F5]** V/F profile setting. This parameter can be accessed if **[Motor control type]**(Ctt) is set to **[V/F 5pts]**(UF5).	0.0 to 599.0 Hz	0.0 Hz
CLI	**[Current Limitation]** **Caution!** **RISK OF DAMAGE TO THE MOTOR AND THE DRIVE** • **Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.** • **Check that the profile mission complies with the derating curve given in Installation.** **Failure to follow these instructions can result in equipment damage.** First current limitation. **Note:** **If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss](OPL) fault mode if this has been enabled. If it is less than the no-load motor current, the motor cannot run.**	0.0 to $^{3}/_{2}$ INV	$^{3}/_{2}$ INV
SFt	**[Switch. freq type]** The motor switching frequency will be modified (reduced) when the internal temperature of the drive will be too high.		**[SFR type 1]**(HF1)
HF1	**[SFR type 1]**(HF1): Heating optimization Allows the system to adapt the switching frequency according to the motor frequency.		
HF2	**[SFR type 2]**(HF2): Motor noise optimization (for high switching frequency) Allows the system to keep a constant chosen switching frequency **[Switching freq.]**(SFr) whatever the motor frequency **[Output frequency]**(rFr). In the event of overheating, the drive automatically decreases the switching frequency. It is restored to its original value when the temperature returns to normal.		
SFr	**[Switching freq.]** **Caution!** **RISK OF DAMAGE TO THE DRIVE** **On 8I74S200xxx.01P-1/8I74S200xxx.00-000 ratings, if the RFI filters are disconnected (operation on an IT system), the drive's switching frequency must not exceed 4 kHz.** **Failure to follow these instructions can result in equipment damage.** Switching frequency setting. Adjustment range: The maximum value is limited to 4 kHz if **[Motor surge limit]**(SUL) parameter is configured. **Note:** **In the event of excessive temperature rise, the drive will automatically reduce the switching frequency and reset it once the temperature returns to normal.** In case of high speed motor, it is advised to increase the Pulse Width Modulation (PWM) frequency **[Switching freq.]**(SFr) at 8, 12 or 16 kHz.	2.0 to 16.0 kHz	4.0 kHz
nrd	**[Noise reduction]** Random frequency modulation helps to prevent any resonance, which may occur at a fixed frequency.		**[No]**(nO)
nO	**[No]**(nO): Fixed frequency		
YES	**[Yes]**(YES): Frequency with random modulation		
bOA	**[Boost activation]**		**[Dynamic]**(dYnA)
nO	**[Inactive]**(nO): No boost		
dYnA	**[Dynamic]**(dYnA): Dynamic boost		
StAt	**[Static]**(StAt): Static boost		

<table>
<tr><th colspan="4">Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC-</th></tr>
<tr><th>Code</th><th>Name / Description</th><th>Adjustment range</th><th>Factory setting</th></tr>
<tr><td>bOO</td><td>[Boost]
This parameter can be accessed if [Boost activation](bOA) is not set to [No](nO).
Adjustment of the motor magnetizing current at low speed as a % of the rated magnetizing current. This parameter is used to increase or reduce the time taken to establish the torque. It allows gradual adjustment up to the frequency set by [Action Boost](FAb). Negative values apply particularly to tapered rotor motors.

</td><td>-100 to 100%</td><td>0%</td></tr>
<tr><td>FAb</td><td>[Action Boost]
This parameter can be accessed if [Boost activation](bOA) is not set to [No](nO).
Frequency above which the magnetizing current is no longer affected by [Boost](bOO).</td><td>0.0 to 599.0 Hz</td><td>0.0 Hz</td></tr>
<tr><td>SUL

nO
YES</td><td>[Motor surge limit.]
This function limits motor overvoltages and is useful in the following applications:
• NEMA motors
• Japanese motors
• Spindle motors
• Rewound motors
This parameter can remain set to [No](nO) for 230/400 V motors used at 230 V or if the length of cable between the drive and the motor does not exceed:
• 4 m with unshielded cables
• 10 m with shielded cables
Note:
When [Motor surge limit.](SUL) is set to [Yes](YES), the maximum switching frequency [Switching freq.](SFr) is modified.
[No](nO): Function inactive
[Yes](YES): Function active</td><td></td><td>[No](nO)</td></tr>
<tr><td>SOP

6
8
10</td><td>[Volt surge limit. opt]
Optimization parameter for transient overvoltages at the motor terminals. This parameter can be accessed if [Motor surge limit.](SUL) is set to [Yes](YES).
Set to 6, 8 or 10 µs, according to the following table.
[6 µs](6)
[8 µs](8)
[10 µs](10)
Note:
This parameter is useful for 8I74T40xxxx.01P-1/8I74T40xxxx.00-000 drives.</td><td></td><td>[10 µs](10)</td></tr>
</table>

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

The value of the **[Volt surge limit. opt]**(SOP) parameter corresponds to the attenuation time of the cable used. It is defined to help to prevent the superimposition of voltage wave reflections resulting from long cable lengths. It limits overvoltages to twice the DC bus rated voltage.

The tables on the following page give examples of correspondence between the **[Volt surge limit. opt]**(SOP) parameter and the length of the cable between the drive and the motor. For longer cable lengths, an output of the filter or a dV/dt protection filter must be used.

For motors in parallel, the sum of all the cable lengths must be taken into consideration. Compare the length given in the table row corresponding to the power for one motor with that corresponding to the total power and select the shorter length.

Example: Two 7.5 kW (10 HP) motors

Take the lengths on the 15 kW (20 HP) table row, which are shorter than those on the 7.5 kW (10 HP) row and divide by the number of motors to obtain the length per motor (with unshielded "GORSE" cable and SOP = 6, the result is 40/2 = 20 m maximum for each 7.5 kW (10 HP) motor).

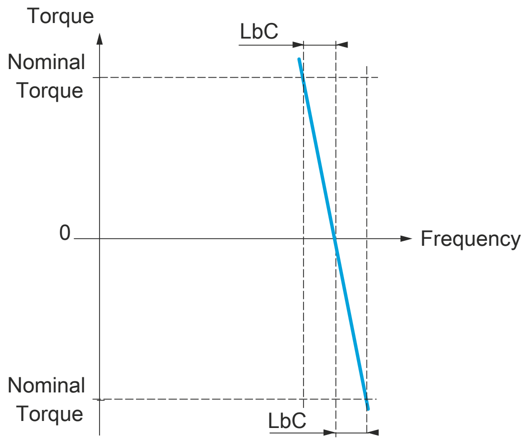
In special cases (for example, different types of cable, different motor powers in parallel, different cable lengths in parallel, etc.), we recommend using an oscilloscope to check the overvoltage values obtained at the motor terminals.

To retain the overall drive performance, do not increase the SOP value unnecessarily.

Tables giving the correspondence between the SOP parameter and the cable length for 400 V line supply

P74	Motor		Cable cross-section (min)		Maximum cable length in meters								
Reference	Power				Unshielded "GORSE" cable Type H07 RN-F 4Gxx			Shielded "GORSE" cable Type GVCSTV-LS/LH			Shielded "BELDEN" cable Type 2950x		
	kW	HP	in mm^2	AWG	SOP = 10	SOP = 8	SOP = 6	SOP = 10	SOP = 8	SOP = 6	SOP = 10	SOP = 8	SOP = 6
8I74T400037.01P-1, 8I74T400037.00-000	0.37	0.50	1.5	14	100 m	70 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
8I74T400055.01P-1, 8I74T400055.00-000	0.55	0.75	1.5	14	100 m	70 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
8I74T400075.01P-1, 8I74T400075.00-000	0.75	1	1.5	14	100 m	70 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
8I74T400110.01P-1, 8I74T400110.00-000	1.1	1.5	1.5	14	100 m	70 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
8I74T400150.01P-1, 8I74T400150.00-000	1.5	2	1.5	14	100 m	70 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
8I74T400220.01P-1, 8I74T400220.00-000	2.2	3	1.5	14	110 m	65 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
8I74T400300.01P-1, 8I74T400300.00-000	3	-	1.5	14	110 m	65 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
8I74T400400.01P-1, 8I74T400400.00-000	4	5	2.5	12	110 m	65 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
8I74T400550.01P-1, 8I74T400550.00-000	5.5	7.5	4	10	120 m	65 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
8I74T400750.01P-1, 8I74T400750.00-000	7.5	10	6	8	120 m	65 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
8I74T401100.01P-1, 8I74T401100.00-000	11	15	10	8	115 m	60 m	45 m	100 m	75 m	55 m	50 m	40 m	30 m
8I74T401500.01P-1, 8I74T401500.00-000	15	20	16	6	105 m	60 m	40 m	100 m	70 m	50 m	50 m	40 m	30 m

For 230/400 V motors used at 230 V, the **[Motor surge limit.]**(SUL) parameter can remain set to **[No]**(nO).

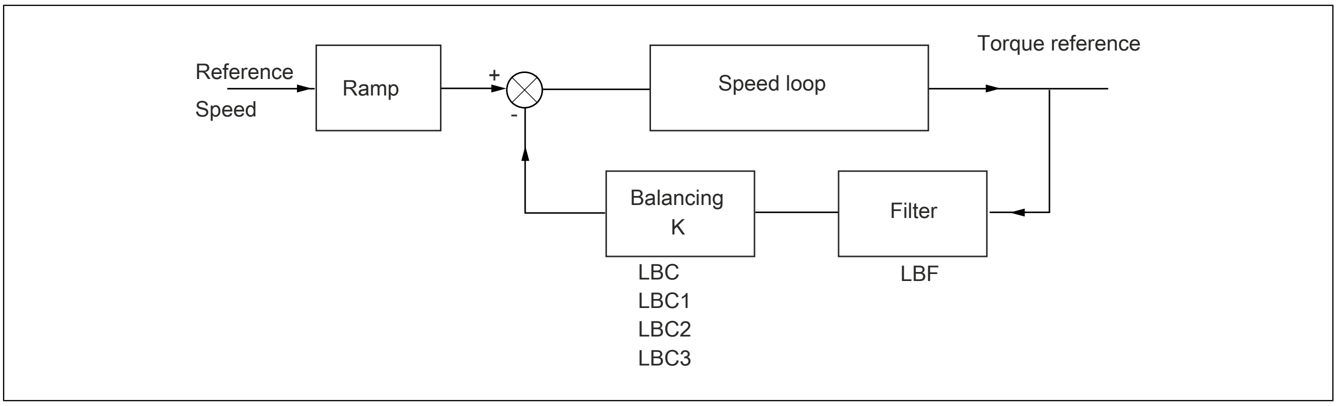
Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
drC-	**[MOTOR CONTROL]** **(continued)**		
Vbr	**[Braking level]** Braking transistor command level.	335 to 820 V	According to drive rating voltage
LbA	**[Load sharing]** When two motors are connected mechanically and therefore at the same speed and each is controlled by a drive, this function can be used to improve torque distribution between the two motors. To do this, it varies the speed based on the torque. This parameter can only be accessed if **[Motor control type]**(Ctt) is set to **[SVC V]**(UUC).		**[No]**(nO)
nO YES	**[No]**(nO): Function inactive **[Yes]**(YES): Function active		
LbC	**[Load correction]** Rated correction in Hz. This parameter can be accessed if **[Load sharing]**(LbA) is set to **[Yes]**(YES). 	0.0 to 599.0 Hz	0.0 Hz

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

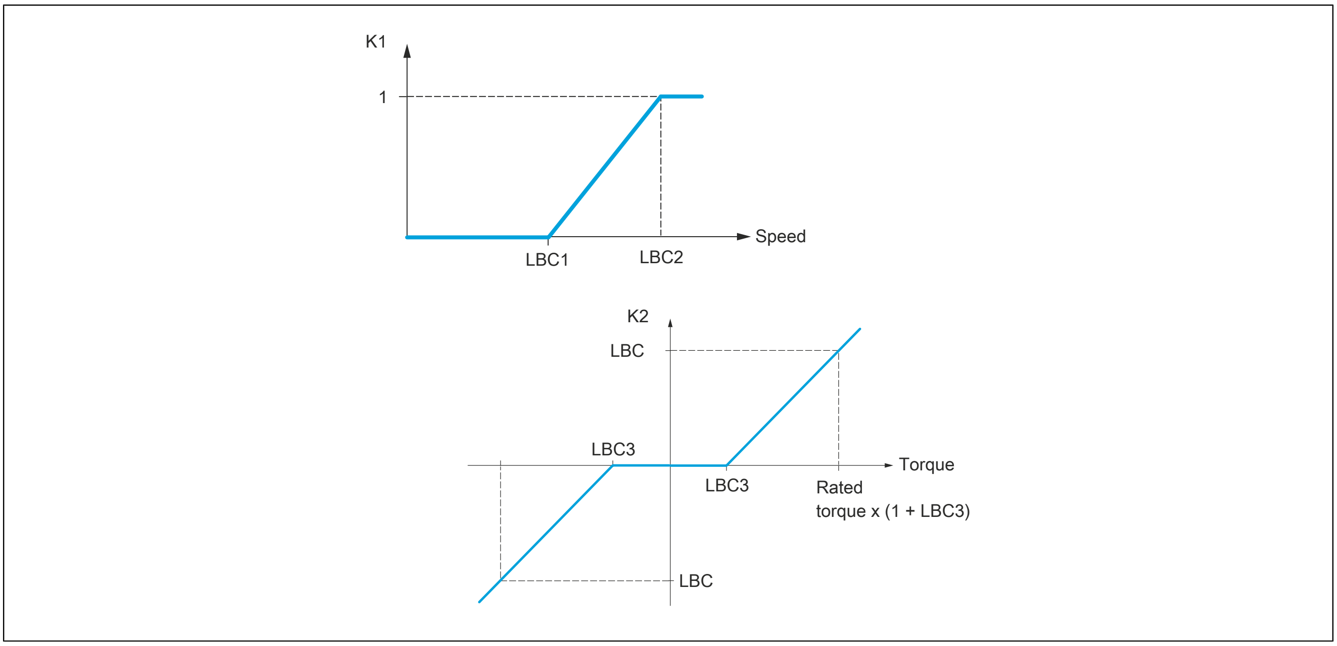
Parameter that can be modified during operation or when stopped.

3.2.3.6.3.5 Load sharing, parameters that can be accessed at expert level

Principle:



The load sharing factor K is determined by the torque and speed with two factors K1 and K2 (K = K1 x K2).



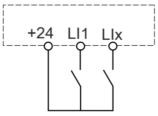
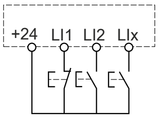
Parameters described in this page can be accessed by: DRI- > COnF > FULL > drC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
drC-	**[MOTOR CONTROL]** (continued)		
LbC1 ★	**[Correction min spd]** This parameter can be accessed if [Load sharing] (LbA) is set to [Yes] (YES). Minimum speed for load correction in Hz. Below this threshold, no corrections are made. Used to cancel correction at very low speed if this would hamper rotation of the motor.	0.0 to 598.9 Hz	0.0 Hz
LbC2 ★	**[Correction max spd]** This parameter can be accessed if [Load sharing] (LbA) is set to [Yes] (YES). Speed threshold in Hz above which maximum load correction is applied.	[Correction min spd] (LbC1) + 0.1 at 599.0 Hz	0.1 Hz
LbC3 ★	**[Torque offset]** This parameter can be accessed if [Load sharing] (LbA) is set to [Yes] (YES). Minimum torque for load correction as a % of the rated torque. Below this threshold, no corrections are made. Used to avoid torque instabilities when the torque direction is not constant.	0 to 300%	0%
LbF ★	**[Sharing filter]** This parameter can be accessed if [Load sharing] (LbA) is set to [Yes] (YES). Time constant (filter) for correction in ms. Used in the event of flexible mechanical coupling in order to avoid instabilities.	0 to 20000 ms	100 ms

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.4 [INPUTS / OUTPUTS CFG]

The parameters in the **[INPUTS / OUTPUTS CFG]**(I_O-) menu can only be modified when the drive is stopped and no run command is present.

Code	Name / Description	Adjustment range	Factory setting
Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O-			
I_O-	**[INPUTS / OUTPUTS CFG]**		
tCC 2 s	**[2/3 wire control]** **Danger!** **UNINTENDED EQUIPMENT OPERATION** **When this parameter is changed, [Reverse assign.](rrS) and [2 wire type](tCt) parameters and all the assignments involving the logic inputs will revert to their default values.** **Check that this change is compatible with the wiring diagram used.** **Failure to follow these instructions will result in death or serious injury.**		**[2 wire]**(2C)
2C	**[2 wire]**(2C) **2-wire control (level commands):** This is the input state (0 or 1) or edge (0 to 1 or 1 to 0) which controls running or stopping. Example of "source" wiring:  LI1: forward LIx: reverse		
3C	**[3 wire]**(3C) **3-wire control (pulse commands):** A "forward" or "reverse" pulse is sufficient to command starting, a "stop" pulse is sufficient to command stopping. Example of "source" wiring:  LI1: stop LI2: forward LIx: reverse		
tCt ★ 2 s	**[2 wire type]** **Danger!** **UNINTENDED EQUIPMENT OPERATION** **Check that the modification of the 2 wire type controls is compatible with the wiring diagram used.** **Failure to follow these instructions will result in death or serious injury.**		**[Transition]**(trn)
LEL	**[Level]**(LEL): State 0 or 1 is taken into account for run (1) or stop (0)		
trn	**[Transition]**(trn): A change of state (transition or edge) is necessary to initiate operation, in order to avoid accidental restarts after a break in the power supply		
PFO	**[Fwd priority]**(PFO): State 0 or 1 is taken into account for run or stop, but the "forward" input takes priority over the "reverse" input		
rUn ★	**[Drive Running]** Assignment of the stop command. Visible only if **[2/3 wire control]**(tCC) is set to **[3 wire]**(3C).		**[No]**(nO)
LI1	**[LI1]**(LI1): Logical input LI1 if not in **[I/O profile]**(IO)		
Cd00	**[Cd00]**(Cd00): In **[I/O profile]**(IO), can be switched with possible logic inputs		
OL01	**[OL01]**(OL01): Function blocks: Logical Output 01		
...	**...**		
OL10	**[OL10]**(OL10): Function blocks: Logical Output 10		
Frd	**[Forward]** Assignment of the forward direction command.		**[LI1]**(LI1)
LI1	**[LI1]**(LI1): Logical input LI1 if not in **[I/O profile]**(IO)		
Cd00	**[Cd00]**(Cd00): In **[I/O profile]**(IO), can be switched with possible logic inputs		
OL01	**[OL01]**(OL01): Function blocks: Logical Output 01		
...	**...**		
OL10	**[OL10]**(OL10): Function blocks: Logical Output 10		
rrS	**[Reverse assign.]** Assignment of the reverse direction command.		**[LI2]**(LI2)
nO	**[No]**(nO): Not assigned		
LI1	**[LI1]**(LI1): Logical input LI1		
...	**[...]**(...)		

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

3.2.3.6.4.1 [LI CONFIGURATION]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > L1-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
L1-	[LI1 CONFIGURATION]		
L1A	[LI1 assignment] Read-only parameter, cannot be configured. It displays all the functions that are assigned to input LI1 in order to check for multiple assignments.		
nO	[No](nO): Not assigned		
rUn	[Run](rUn): Run Enable		
Frd	[Forward](Frd): Forward operation		
rrS	[Reverse](rrS): Reverse operation		
rPS	[Ramp switching](rPS): Ramp switching		
JOG	[Jog](JOG): Jog operation		
USP	[+Speed](USP): +speed		
dSP	[- speed](dSP): -speed		
PS2	[2 preset speeds](PS2): 2 preset speeds		
PS4	[4 preset speeds](PS4): 4 preset speeds		
PS8	[8 preset speeds](PS8): 8 preset speeds		
rFC	[Ref. 2 switching](rFC): Reference switching		
nSt	[Freewheel stop](nSt): Freewheel stop		
dCI	[DC injection](dCI): Injection DC stop		
FSt	[Fast stop](FSt): Fast stop		
FLO	[Forced local](FLO): Forced local mode		
rSF	[Fault reset](rSF): Fault reset		
tUL	[Auto-tuning](tUL): Auto-tuning		
SPM	[Ref. memo.](SPM): Save reference		
FLI	[Pre Fluxing](FLI): Motor fluxing		
PAU	[Auto / manual](PAU): PI(D) auto-manu		
PIS	[PID integral reset](PIS): Integral shunting PI(D)		
Pr2	[2 preset PID ref.](Pr2): 2 Preset PI(D) references		
Pr4	[4 preset PID ref.](Pr4): 4 Preset PI(D) references		
tLA	[Torque limitation](tLA): Permanent torque limitation		
EtF	[External fault](EtF): External fault		
rCA	[Output contact. fdbk](rCA): Downstream contactor feedback		
CnF1	[2 config. switching](CnF1): Configuration switching 1		
CnF2	[3 config. switching](CnF2): Configuration switching 2		
CHA1	[2 parameter sets](CHA1): Parameter switching 1		
CHA2	[3 parameter sets](CHA2): Parameter switching 2		
tLC	[Activ. Analog torque limitation](tLC): Torque limitation: Activation (analog input) by a logic input		
CCS	[Cmd switching](CCS): Command channel switching		
InH	[Fault inhibition](InH): Fault inhibition		
PS16	[16 preset speeds](PS16): 16 preset speeds		
LC2	[Current limit 2](LC2): Current limitation switching		
LAF	[Stop FW limit sw.](LAF): Forward limit attained		
LAr	[Stop RV limit sw.](LAr): Reverse limit attained		
rCb	[Ref 1B switching](rCb): Reference channel switching (1 to 1B)		
trC	[Traverse control](trC): Traverse control		
bCI	[Brake contact](bCI): Brake logic input contact		
SAF	[Stop FW limit sw.](SAF): Stop switch forward		
SAr	[Stop RV limit sw.](SAr): Stop switch reverse		
dAF	[Slowdown forward](dAF): Slowdown attained forward		
dAr	[Slowdown reverse](dAr): Slowdown attained reverse		
CLS	[Disable limit sw.](CLS): Limits switches clearing		
LES	[Drive lock (Line contact. ctrl)](LES): Emergency stop		
rtr	[Init. traverse ctrl.](rtr): Reload traverse control		
SnC	[Counter wobble](SnC): Counter wobble synchronization		
rPA	[Prod. reset](rPA): Reset Product		
SH2	[2 HSP](SH2): High Speed 2		
SH4	[4 HSP](SH4): High Speed 4		
LO1	[LO1](LO1): Logic output LO1		
r1	[R1](r1): Relay R1		
r2	[R2](r2): Relay R2		
dO1	[DO1](dO1): Analog/logic output DO1		
btUC	[Bth visibilit.](btUC): Bluetooth visibility		
OIr	[Regen connect](OIr): Operation with power regeneration		
FJOG	[Jog](FJOG): Function key for assignment of jog operation		
FPS1	[Preset spd2](FPS1): Function key preset speed 1 assignment		
FPS2	[Preset spd3](FPS2): Function key preset speed 2 assignment		
FPr1	[PID ref. 2](FPr1): Function key preset PI 1 assignment		
FPr2	[PID ref. 3](FPr2): Function key preset PI 2 assignment		
FUSP	[+Speed](FUSP): Function key faster assignment		
FdSP	[-Speed](FdSP): Function key slower assignment		
Ft	[T/K](Ft): Function key bumpless assignment		
USI	[+speed around ref.](USI): +speed around ref		
dSI	[-speed around ref.](dSI): -speed around ref		
IL01	[IL01](IL01): Function blocks: Logical input 1		
...	...		

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > L1-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
IL10 FbrM SLS1 SLS2 SS11 SS12 StO1 StO2	[IL10](IL10): Function blocks: Logical input 10 [FB start](FbrM): Function blocks: Run mode [SLS ch.1](SLS1): Safety: false consumer [SLS ch.2](SLS2): Safety: false consumer [SS1 ch.1](SS11): Safety: false consumer [SS1 ch.2](SS12): Safety: false consumer [STO ch.1](St01): Safety: false consumer [STO ch.2](St02): Safety: false consumer		
L1d	[LI1 On Delay] This parameter is used to take account of the change of the logic input to state 1 with a delay that can be adjusted between 0 and 200 milliseconds, in order to filter out possible interference. The change to state 0 is taken into account without delay.	0 to 200 ms	0 ms

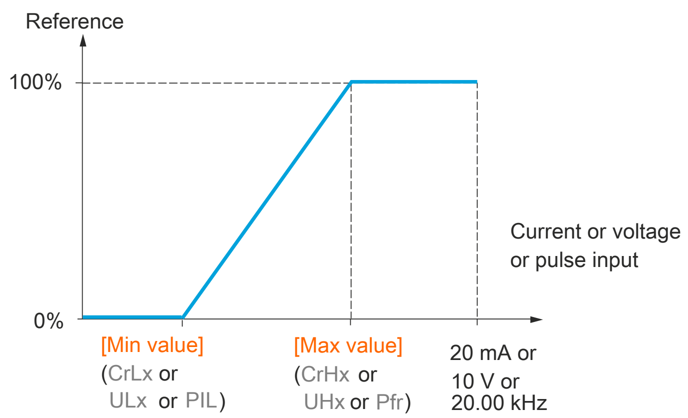
Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
I_O-	[INPUTS / OUTPUTS CFG]**(continued)**		
L2- to L6-	[LIx CONFIGURATION] All the logic inputs available on the drive are processed as in the example for LI1 above, up to LI6.		
L5-	[LI5 CONFIGURATION] Specific parameters for LI5 used as a pulse input.		
PIA	[RP assignment] Read-only parameter, cannot be configured. It displays all the functions associated with the Pulse input in order to check, for example, for compatibility problems. Identical to [AI1 assignment](AI1A).		
PIL	[RP min value] Pulse input scaling parameter of 0% in Hz * 10 unit.	0.00 to 20.00 kHz	0.00 kHz
PFr	[RP max value] Pulse input scaling parameter of 100% in Hz * 10 unit.	0.00 to 20.00 kHz	20.00 kHz
PFI	[RP filter] I/O ext Pulse input cutoff time of the low-filter.	0 to 1000 ms	0 ms
LA1- LA2-	[LAx CONFIGURATION] The two analog inputs AI1 and AI2 on the drive could be used as LI inputs and are processed as in the example for LI1 above.		

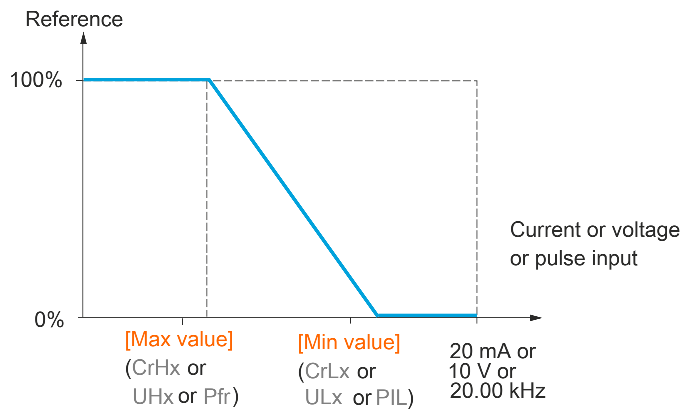
Configuration of analog inputs and pulse input

The minimum and maximum input values (in volts, mA, etc.) are converted to % in order to adapt the references to the application.

Minimum and maximum input values:

The minimum value corresponds to a reference of 0% and the maximum value to a reference of 100%. The minimum value may be greater than the maximum value:

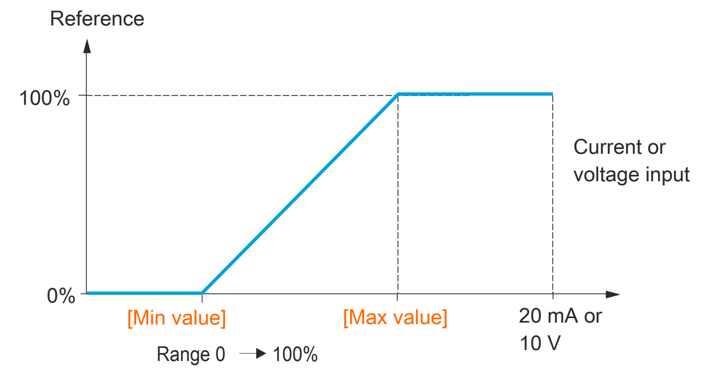


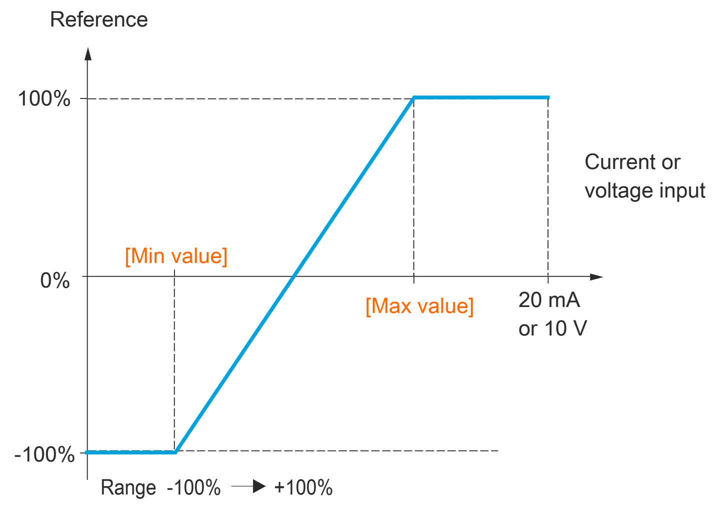


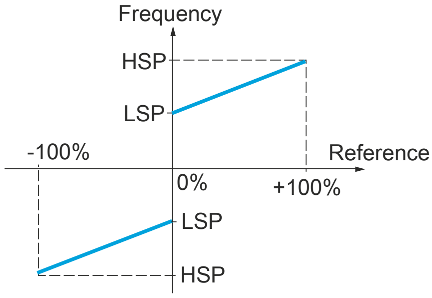
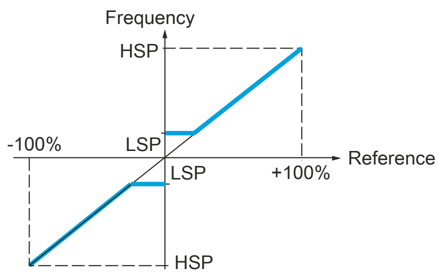
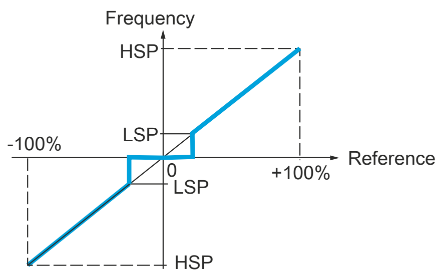
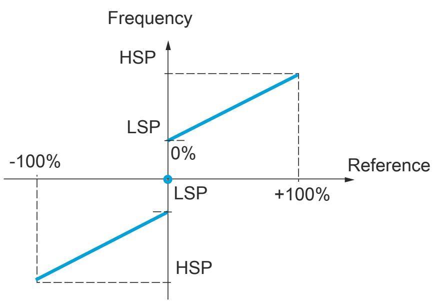
For ± bidirectional inputs, the min. and max. are relative to the absolute value, for example ± 2 to 8 V.

Range (output values): For analog inputs only:

This parameter is used to configure the reference range to [0% → 100%] or [-100% → +100%] in order to obtain a bidirectional output from a unidirectional input.





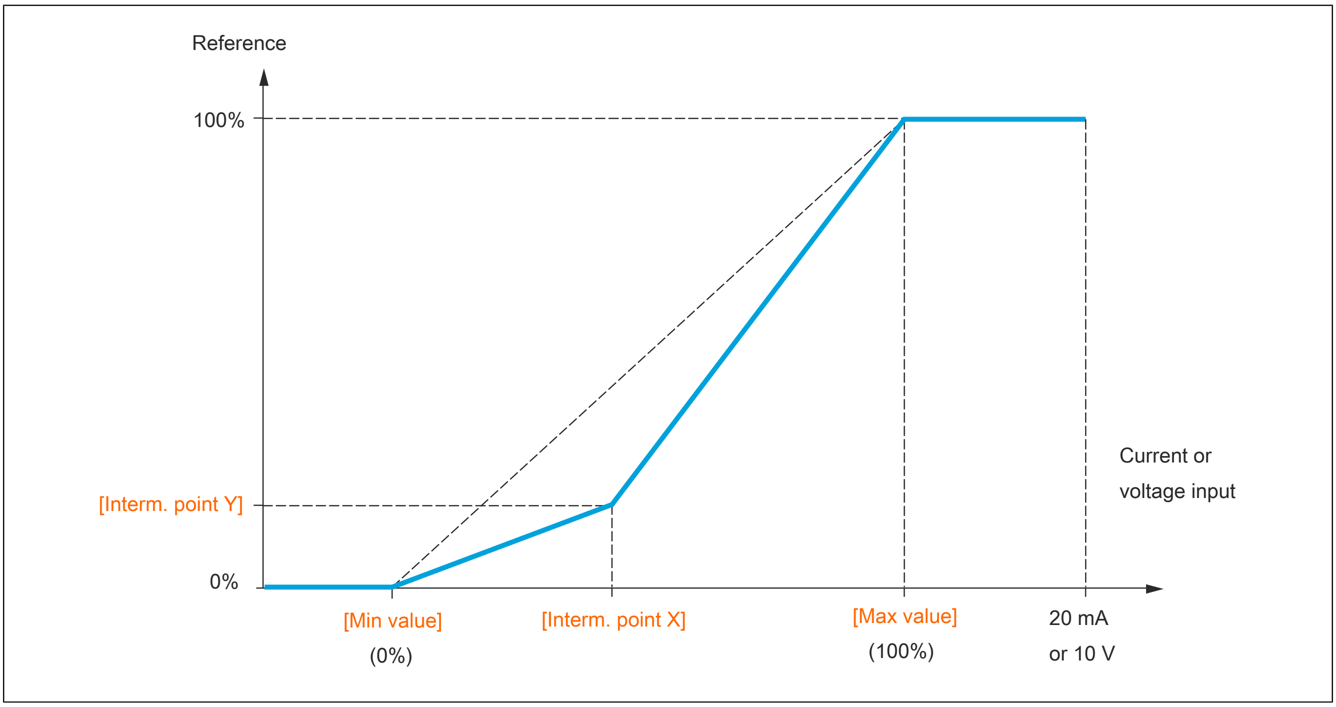
Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > bSP			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
bSP	**[Reference template]**		**[Standard]** (bSd)
bSd	**[Standard]**(bSd)  At zero reference the frequency = LSP		
bLS	**[Pedestal]**(bLS)  At reference = 0 to LSP the frequency = LSP		
bnS	**[Deadband]**(bnS)  At reference = 0 to LSP the frequency = 0		
bnS0	**[Deadband 0]**(bnS0)  This operation is the same as **[Standard]**(bSd), except that in the following cases at zero reference, the frequency = 0: The signal is less than **[Min value]**, which is greater than 0 (example 1 V on a 2 - 10 V input) The signal is greater than **[Min value]**, which is greater than **[Max value]** (example: 11 V on a 10 - 0 V input). If the input range is configured as "bidirectional", operation remains identical to **[Standard]**(bSd). This parameter defines how the speed reference is taken into account for analog inputs and pulse input only. In the case of the PID regulator, this is the PID output reference. The limits are set by the **[Low speed]**(LSP) and **[High speed]**(HSP) parameters.		

Parameter that can be modified during operation or when stopped.

Delinearization: For analog inputs only:

The input can be delinearized by configuring an intermediate point on the input/output curve of this input:

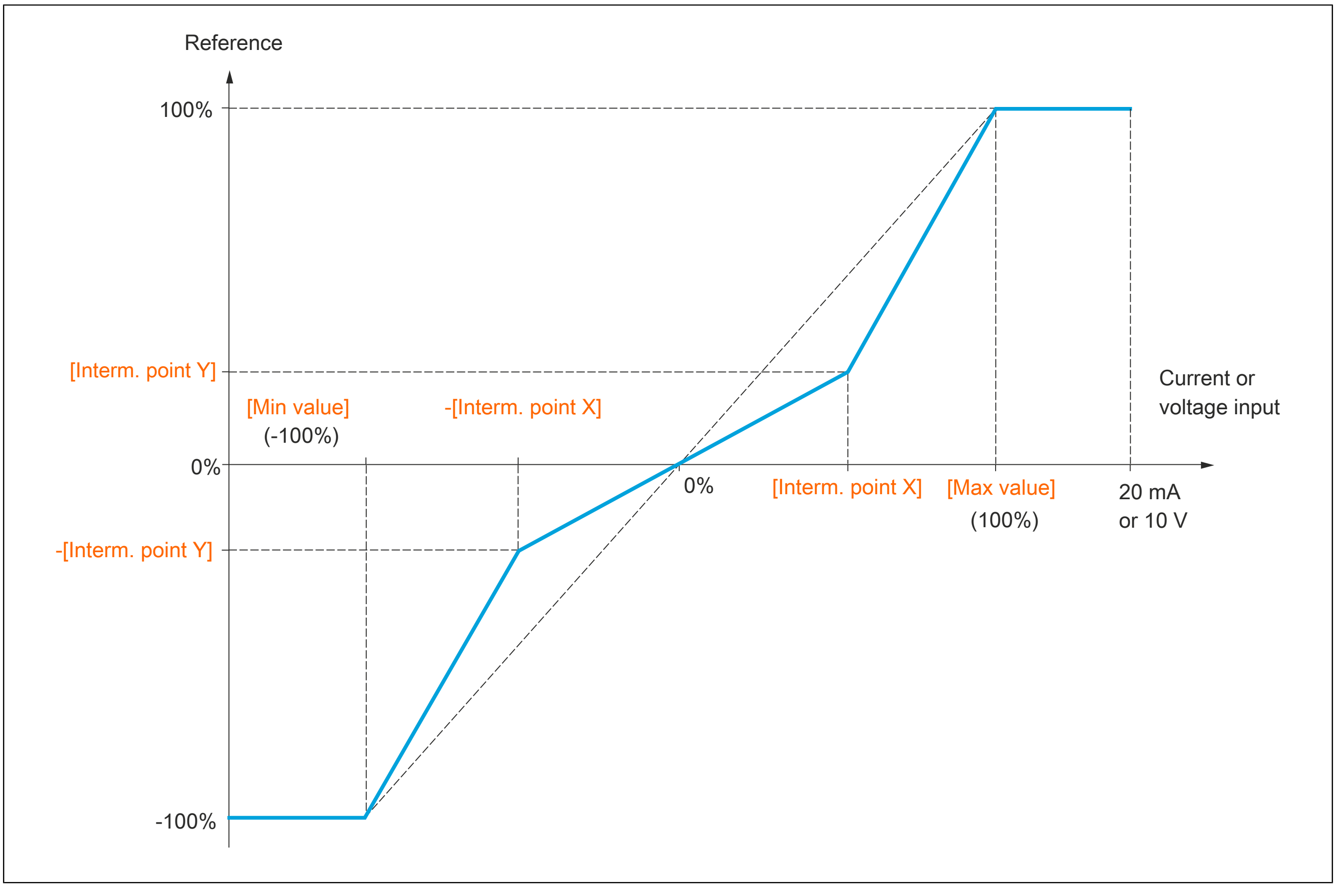
For range 0 → 100%



Note:

For [Interm. point X], 0% corresponds to [Min value] and 100% to [Max value].

For range -100% → 100%



3.2.3.6.4.2 [AI CONFIGURATION]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > AI1-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
AI1-	**[AI1 CONFIGURATION]**		
AI1A	**[AI1 assignment]** Read-only parameter, cannot be configured. It displays all the functions associated with input AI1 in order to check, for example, for compatibility problems.		
nO	**[No]**(nO): Not assigned		
AO1	**[AO1 assignment]**(AO1): Analog output AO1		
Fr1	**[Ref.1 channel]**(Fr1): Reference source 1		
Fr2	**[Ref.2 channel]**(Fr2): Reference source 2		
SA2	**[Summing ref. 2]**(SA2): Summing reference 2		
PIF	**[PID feedback]**(PIF): PI feedback (PI control)		
tAA	**[Torque limitation]**(tAA): Torque limitation: Activation by an analog value		
dA2	**[Subtract. ref. 2]**(dA2): Subtracting reference 2		
PIM	**[Manual PID ref.]**(PIM): Manual speed reference of the PI(D) regulator (auto-man)		
FPI	**[PID speed ref.]**(FPI): Speed reference of the PI(D) regulator (predictive reference)		
SA3	**[Summing ref. 3]**(SA3): Summing reference 3		
Fr1b	**[Ref.1B channel]**(Fr1b): Reference source 1B		
dA3	**[Subtract. ref. 3]**(dA3): Subtracting reference 3		
FLOC	**[Forced local]**(FLOC): Forced local reference source		
MA2	**[Ref.2 multiplier]**(MA2): Multiplying reference 2		
MA3	**[Ref. 3 multiplier]**(MA3): Multiplying reference 3		
PES	**[Weight input]**(PES): Hoisting: External weight measurement function		
IA01	**[IA01]**(IA01): Function blocks: Analog Input 01		
...	**...**		
IA10	**[IA10]**(IA10): Function blocks: Analog Input 10		
AI1t	**[AI1 Type]**		**[Voltage]**(10U)
10U	**[Voltage]**(10U): Positive voltage input 0 to 10 V (negative values are interpreted as zero: the input is unidirectional)		
UIL1	**[AI1 min value]** AI1 voltage scaling parameter of 0%.	0.0 to 10.0 V	0.0 V
UIH1	**[AI1 max value]** AI1 voltage scaling parameter of 100%.	0.0 to 10.0 V	10.0 V
AI1F	**[AI1 filter]** Interference filtering.	0.00 to 10.00 s	0.00 s
AI1L	**[AI1 range]**		**[0 - 100%]**(POS)
POS	**[0 - 100%]**(POS): Positive logical		
nEG	**[+/- 100%]**(nEG): Positive and negative logical		
AI1E	**[AI1 Interm. point X]** Input delinearization point coordinate. Percentage of the physical input signal. 0% corresponds to **[AI1 min value]**(UIL1). 100% corresponds to **[AI1 max value]**(UIH1).	0 to 100%	0%
AI1S	**[AI1 Interm. point Y]** Output delinearization point coordinate (frequency reference). Percentage of the internal frequency reference corresponding to the **[AI1 Interm. point X]**(AI1E) percentage of physical input signal.	0 to 100%	0%

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > AI2-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
AI2-	**[AI2 CONFIGURATION]**		
AI2A	**[AI2 assignment]** Identical to **[AI1 assignment]**(AI1A)		
AI2t 10U n10U	**[AI2 Type]** **[Voltage]**(10U): Positive voltage input 0 to 10 V (negative values are interpreted as zero: the input is unidirectional) **[Voltage +/-]**(n10U): Positive and negative voltage input +/- 10 V (the input is bidirectional)		**[Voltage +/-]**(n10U)
UIL2	**[AI2 min value]** AI2 voltage scaling parameter of 0%.	0.0 to 10.0 V	0.0 V
UIH2	**[AI2 max. value]** AI2 voltage scaling parameter of 100%.	0.0 to 10.0 V	10.0 V
AI2F	**[AI2 filter]** Interference filtering.	0.00 to 10.00 s	0.00 s
AI2L POS nEG	**[AI2 range]** **[0 - 100%]**(POS): Positive logical **[+/- 100%]**(nEG): Positive and negative logical **[+/- 100%]**(nEG) available if **[AI2 Type]**(AI2t) is set to **[Voltage +/-]**(n10U).		**[0 - 100%]**(POS)
AI2E	**[AI2 Interm. point X]** Input delinearization point coordinate. Percentage of the physical input signal. 0% corresponds to **[Min value]** if the range is 0 → 100%. 0% corresponds to $\frac{[Max\ value] + [Min\ value]}{2}$ if the range is -100% → + 100%. 100% corresponds to **[Max value]**.	0 to 100%	0%
AI2S	**[AI2 Interm. point Y]** Output delinearization point coordinate (frequency reference). Percentage of the internal frequency reference corresponding to the **[AI2 Interm. point X]**(A12E) percentage of physical input signal.	0 to 100%	0%

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > AI3-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
AI3-	**[AI3 CONFIGURATION]**		
AI3A	**[AI3 assignment]** Identical to **[AI1 assignment]**(AI1A).		
AI3t 0A	**[AI3 Type]** **[Current]**(0A): Current input 0 to 20 mA		**[Current]**(0A)
CrL3	**[AI3 min. value]** AI3 current scaling parameter of 0%.	0.0 to 20.0 mA	0.0 mA
CrH3	**[AI3 max. value]** AI3 current scaling parameter of 100%.	0.0 to 20.0 mA	20.0 mA
AI3F	**[AI3 filter]** Interference filtering.	0.00 to 10.00 s	0.00 s
AI3L POS nEG	**[AI3 range]** **[0 - 100%]**(POS): Unidirectional input **[+/- 100%]**(nEG): Bidirectional input Example: On a 4 to 20 mA input. 4 mA corresponds to reference -100%. 12 mA corresponds to reference 0%. 20 mA corresponds to reference +100%. Since AI3 is, in physical terms, a bidirectional input, the **[+/- 100%]**(nEG) configuration must only be used if the signal applied is unidirectional. A bidirectional signal is not compatible with a bidirectional configuration.		**[0 - 100%]**(POS)
AI3E	**[AI3 Interm. point X]** Input delinearization point coordinate. Percentage of the physical input signal. 0% corresponds to **[Min value]**(CrL3) if the range is 0 → 100%. 0% corresponds to $\frac{[AI3\ max.\ value]\ (CrH3) - [AI3\ min.\ value]}{(CrL3)}$ if the range is -100% → +100%. 100% corresponds to **[AI3 max. value]**(CrH3).	0 to 100%	0%
AI3S	**[AI3 Interm. point Y]** Output delinearization point coordinate (frequency reference). Percentage of the internal frequency reference corresponding to the **[AI3 Interm. point X]**(A13E) percentage of physical input signal.	0 to 100%	0%

3.2.3.6.4.3 [VIRTUAL AI]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > AU1-	
Code	**Name / Description**
AU1-	[VIRTUAL AI1]
AU1A	[AIV1 assignment] Virtual analog input 1 via the jog dial available on the front side of the product. Identical to [AI1 assignment](AI1A).

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > AU2-		
Code	**Name / Description**	**Factory setting**
AU2-	[VIRTUAL AI2]	
AU2A	[AIV2 assignment] Possible assignments for [AI virtual 2](AIU2): Virtual analog input 2 via communication channel, to be configured with [AI2 net. Channel](AIC2). Identical to [AIV1 assignment](AU1A).	
AIC2 ★	[AI2 net. Channel] [VIRTUAL AI2](AU2A) source channel. This parameter can also be accessed in the [PID REGULATOR](PId-) submenu. Scale: The value 8192 transmitted by this input is equivalent to 10 V on a 10 V input.	[No](nO)
nO	[No](nO): Not assigned	
Mdb	[Modbus](Mdb): Integrated Modbus	
CAn	[CANopen](CAn): Integrated CANopen®	
nEt	[Com. card](nEt): POWERLINK card	

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.3.6.4.4 [R CONFIGURATION]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > r1- > r1		
Code	**Name / Description**	**Factory setting**
r1	[R1 Assignment]	[No drive flt](FLt)
nO	[No](nO): Not assigned	
FLt	[No drive flt](FLt): Drive fault detection status (relay normally energized and de-energized if there is a trip)	
rUn	[Drv running](rUn): Drive running	
FtA	[Freq. Th. attain.](FtA): Frequency threshold attained ([Freq. threshold](Ftd))	
FLA	[HSP attain.](FLA): High speed attained	
CtA	[I attained](CtA): Current threshold attained ([Current threshold](Ctd))	
SrA	[Freq.ref.att](SrA): Frequency reference attained	
tSA	[Th.mot. att.](tSA): Motor 1 thermal state attained	
PEE	[PID error al](PEE): PID error alarm	
PFA	[PID fdbk al](PFA): PID feedback alarm	
F2A	[Freq. Th. 2 attained](F2A): Frequency threshold 2 attained ([Freq. threshold 2](F2d))	
tAd	[Th. drv. att.](tAd): Drive thermal state attained	
ULA	[Pro.Undload](ULA): Underload alarm	
OLA	[Ovld.P.Alrm](OLA): Overload alarm	
rSdA	[Rope slack](rSdA): Rope slack ([Rope slack config.](rSd) parameter)	
ttHA	[High tq. att.](ttHA): Motor torque overshooting high threshold [High torque thd.](ttH)	
ttLA	[Low tq. att.](ttLA): Motor torque undershooting low threshold [Low torque thd.](ttL)	
MFrd	[Forward](MFrd): Motor in forward rotation	
MrrS	[Reverse](MrrS): Motor in reverse rotation	
tS2	[Th.mot2 att](tS2): Motor 2 thermal threshold (TTD2) reached	
tS3	[Th.mot3 att](tS3): Motor 3 thermal threshold (TTD3) reached	
AtS	[Neg Torque](AtS): Negative torque (braking)	
CnF0	[Cnfg.0 act.](CnF0): Configuration 0 active	
CnF1	[Cnfg.1 act.](CnF1): Configuration 1 active	
CnF2	[Cnfg.2 act.](CnF2): Configuration 2 active	
CFP1	[Set 1 active](CFP1): Parameter set 1 active	
CFP2	[Set 2 active](CFP2): Parameter set 2 active	
CFP3	[Set 3 active](CFP3): Parameter set 3 active	
dbL	[DC charged](dbL): DC bus charging	
brS	[In braking](brS): Drive braking	
PrM	[P. removed](PrM): Drive locked by "Safe Torque Off" input	
FqLA	[Fr.met. alar.](FqLA): Measured speed threshold attained [Pulse warning thd.](FqL)	
MCP	[I present](MCP): Motor current present	
LSA	[Limit sw. att](LSA): Limit switch attained	
dLdA	[Load alarm](dLdA): Load variation detection	
AG1	[Alarm Grp 1](AGI): Alarm group 1	
AG2	[Alarm Grp 2](AG2): Alarm group 2	
AG3	[Alarm Grp 3](AG3): Alarm group 3	
PLA	[LI6=PTC al.](PLA): LI6 = PTCL alarm	
EFA	[Ext. fault al](EFA): External fault alarm	
USA	[Under V. al.](USA): Undervoltage alarm	
UPA	[Uvolt warn](UPA): Undervoltage threshold	
tHA	[Al. °C drv](tHA): Drive overheating	
SSA	[Lim T/I att.](SSA): Torque limit alarm	
tJA	[IGBT al.](tJA): Thermal function alarm	
bOA	[Brake R. al.](bOA): Torque control timeout alarm	
AP3	[AI3 Al. 4-20](AP3): AI3 4-20 mA loss alarm	
rdY	[Ready](rdY): Ready to start	

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > r1-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
r1-	[R1 CONFIGURATION]**(continued)**		
r1d (1)	[R1 Delay time] The change in state only takes effect once the configured time has elapsed, when the information becomes true. The delay cannot be set for the [No drive flt](FLt) assignment and remains at 0.	0 to 60000 ms	0 ms
r1S	[R1 Active at] Configuration of the operating logic:		[1](POS)
POS	[1](POS): State 1 when the information is true		
nEG	[0](nEG): State 0 when the information is true Configuration [1](POS) cannot be modified for the [No drive flt](FLt) assignment		
r1H	[R1 Holding time] The change in state only takes effect once the configured time has elapsed, when the information becomes false. The holding time cannot be set for the [No drive flt](FLt) assignment and remains at 0.	0 to 9999 ms	0 ms
r1F	[R1 FallBack Enable] Available if [R1 Assignment](r1) is set [No](nO): Not assigned		[No](nO)
YES	[YES](YES): Relays controlled by OL1R only if the drive is in operating state "Fault", the relay is de-energized.		
nO	[No](nO): Relays controlled by OL1R only if the drive is in operative state "Fault", the relay continues to be energized.		

(1) 0 to 9999 ms then 10.00 to 60.00 s on the integrated display terminal.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > r2-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
r2-	[R2 CONFIGURATION]		
r2	[R2 Assignment]		[No](nO)
	Identical to [R1 Assignment](r1) with the addition of:		
bLC	[Brk control](bLC): Brake contactor control		
LLC	[Input cont.](LLC): Line contactor control		
OCC	[Output cont](OCC): Output contactor control		
EbO	[End reel](EbO): End of reel (traverse control function)		
tSY	[Sync. wobble](tSY): "Counter wobble" synchronization		
dCO	[DC charging](dCO): DC bus precharging contactor control		
OL01	[OL01](OL01): Function blocks: Logical output 01		
...	...		
OL10	[OL10](OL10): Function blocks: Logical output 10		
r2d (1)	[R2 Delay time]	0 to 60000 ms	0 ms
	The delay cannot be set for the [No drive flt](FLt), [Brk control](bLC), [Output cont.](OCC) and [Input cont.](LLC) assignments and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.		
r2S	[R2 Active at]		[1](POS)
	Configuration of the operating logic:		
POS	[1](POS): State 1 when the information is true		
nEG	[0](nEG): State 0 when the information is true The configuration [1](POS) cannot be modified for the [No drive flt](FLt), [Brk control](bLC), [DC charging](dCO) and [Input cont.](LLC) assignments.		
r2H	[R2 Holding time]	0 to 9999 ms	0 ms
	The holding time cannot be set for the [No drive flt](FLt), [Brk control](bLC) and [Input cont](LLC) assignments and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.		
r2F	[R2 FallBack Enable]		[No](nO)
	Available if [R2 Assignment](r1) is set [No](nO): Not assigned		
YES	[YES](YES): Relays controlled by OL1R only if the drive is in operating state "Fault", the relay is de-energized.		
nO	[No](nO): Relays controlled by OL1R only if the drive is in operative state "Fault", the relay continues to be energized.		

(1) 0 to 9999 ms then 10.00 to 60.00 s on the integrated display terminal.

3.2.3.6.4.5 [LO1 CONFIGURATION]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > LO1-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
LO1-	[LO1 CONFIGURATION]		
LO1	[LO1 assignment]		[No](nO)
	Identical to [R1 Assignment](r1) with the addition of (shown for information only as these selections can only be configured in the [APPLICATION FUNCT.](FUn-)) menu:		
bLC	[Brk control](bLC): Brake contactor control		
LLC	[Input cont.](LLC): Line contactor control		
OCC	[Output cont](OCC): Output contactor control		
EbO	[End reel](EbO): End of reel (traverse control function)		
tSY	[Sync. wobble](tSY): "Counter wobble" synchronization		
dCO	[DC charging](dCO): DC bus precharging contactor control		
OL01	[OL01](OL01): Function blocks: Logical output 01		
...	...		
OL10	[OL10](OL10): Function blocks: Logical output 10		
LO1d	[LO1 delay time]	0 to 60000 ms (1)	0 ms
	The delay cannot be set for the [No drive flt](FLt), [Brk control](bLC), [Output cont.](OCC) and [Input cont.](LLC) assignments and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.		
LO1S	[LO1 active at]		[1](POS)
	Configuration of the operating logic:		
POS	[1](POS): State 1 when the information is true		
nEG	[0](nEG): State 0 when the information is true The configuration [1](POS) cannot be modified for the [No drive flt](FLt), [Brk control](bLC) and [Input cont.](LLC) assignments.		
LO1H	[LO1 holding time]	0 to 9999 ms	0 ms
	The holding time cannot be set for the [No drive flt](FLt), [Brk control](bLC) and [Input cont](LLC) assignments and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.		

(1) 0 to 9999 ms then 10.00 to 60.00 s on the integrated display terminal.

Use of analog output AO1 as a logic output

Analog output AO1 can be used as a logic output by assigning DO1. In this case, when set to 0, this output corresponds to the AO1 min. value (0 V or 0 mA for example) and when set to 1 to the AO1 max. value (10 V or 20 mA for example).

The electrical characteristics of this analog output remain unchanged. As these characteristics are different from logic output characteristics, check that it is still compatible with the intended application.

3.2.3.6.4.6 [DO1 CONFIGURATION]

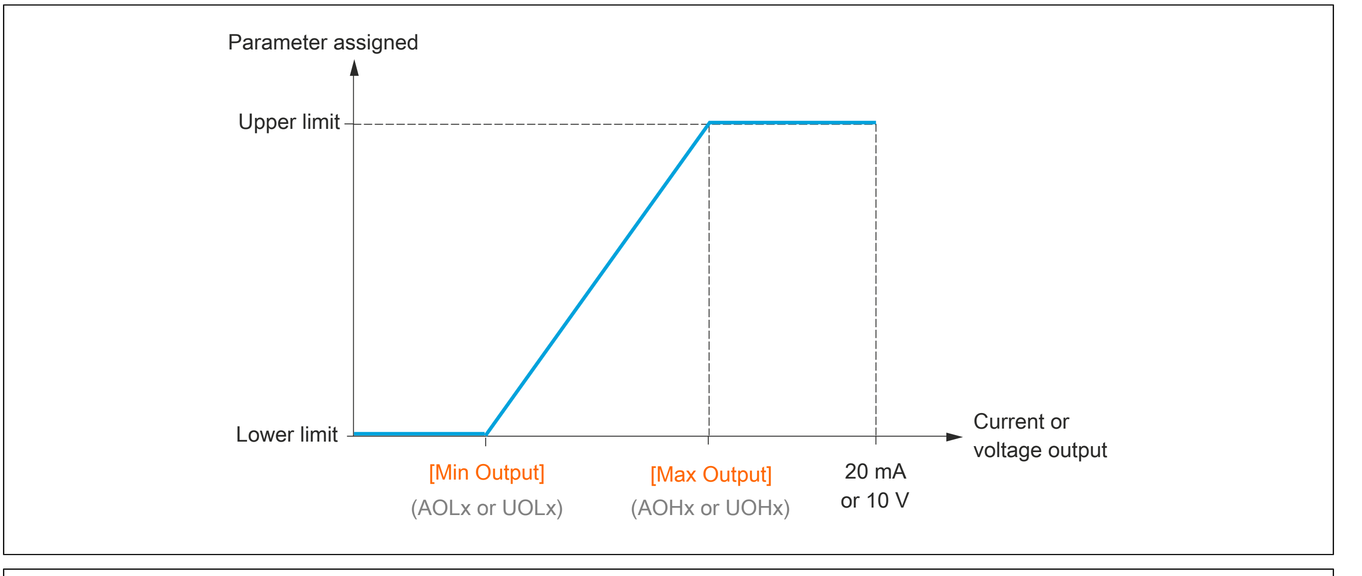
Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > dO1-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
dO1-	[DO1 CONFIGURATION]		
dO1	[DO1 assignment]		[No](nO)
	Identical to [R1 Assignment](r1) with the addition of (shown for information only as these selections can only be configured in the [APPLICATION FUNCT.](FUn-)) menu:		
bLC	[Brk control](bLC): Brake contactor control		
LLC	[Input cont.](LLC): Line contactor control		
OCC	[Output cont](OCC): Output contactor control		
EbO	[End reel](EbO): End of reel (traverse control function)		
tSY	[Sync. wobble](tSY): "Counter wobble" synchronization		
dCO	[DC charging](dCO): DC bus precharging contactor control		
OL01	[OL01](OL01): Function blocks: Logical output 01		
...	...		
OL10	[OL10](OL10): Function blocks: Logical output 10		
dO1d	[DO1 delay time]	0 to 60000 ms (1)	0 ms
	The delay cannot be set for the [No drive flt](FLt), [Brk control](bLC), [Output cont.](OCC) and [Input cont.](LLC) assignments and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.		
dO1S	[DO1 active at]		[1](POS)
	Configuration of the operating logic:		
POS	[1](POS): State 1 when the information is true		
nEG	[0](nEG): State 0 when the information is true The configuration [1](POS) cannot be modified for the [No drive flt](FLt), [Brk control](bLC) and [Input cont.](LLC) assignments.		
dO1H	[DO1 holding time]	0 to 9999 ms	0 ms
	The holding time cannot be set for the [No drive flt](FLt), [Brk control](bLC) and [Input cont](LLC) assignments and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.		

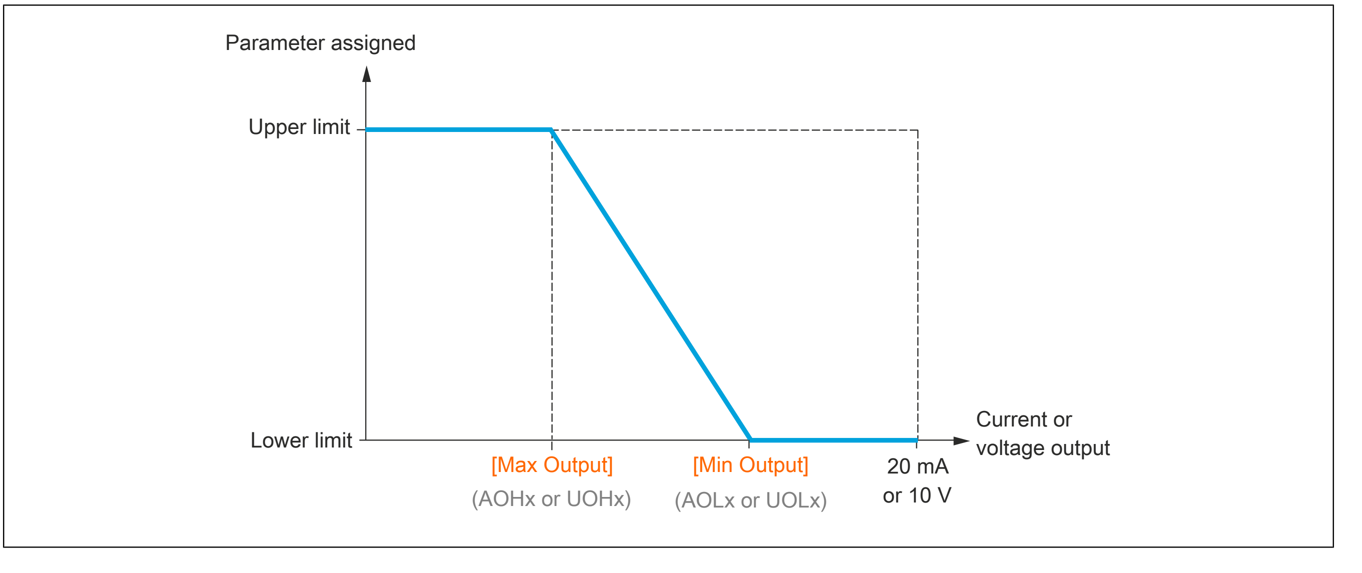
(1) 0 to 9999 ms then 10.00 to 60.00 s on the integrated display terminal.

3.2.3.6.4.7 Configuration of analog output

Minimum and maximum values (output values):

The minimum output value, in volts, corresponds to the lower limit of the assigned parameter and the maximum value corresponds to its upper limit. The minimum value may be greater than the maximum value.





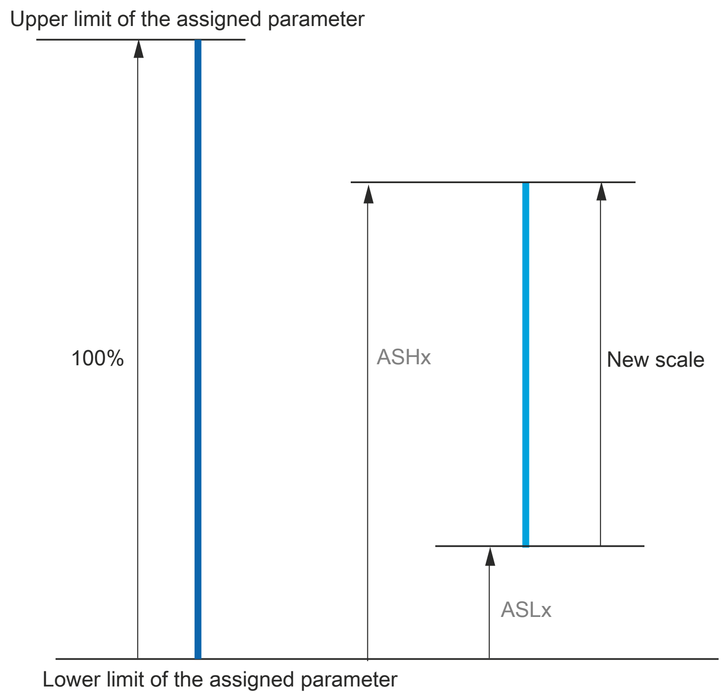
Scaling of the assigned parameter

The scale of the assigned parameter can be adapted in accordance with requirements by modifying the values of the lower and upper limits by means of two parameters for each analog output.

These parameters are given in %. 100% corresponds to the total variation range of the configured parameter, so: 100% = upper limit - lower limit.

For example, **[Sign. torque]**(Stq) which varies between -3 and +3 times the rated torque, 100% corresponds to 6 times the rated torque.

- The **[Scaling AOx min]**(ASLx) parameter modifies the lower limit: new value = lower limit + (range x ASLx). The value 0% (factory setting) does not modify the lower limit.
- The **[Scaling AOx max]**(ASHx) parameter modifies the upper limit: new value = lower limit + (range x ASLx). The value 100% (factory setting) does not modify the upper limit.
- **[Scaling AOx min]**(ASLx) must always be lower than **[Scaling AOx max]**(ASHx).



Application example 2

The value of the motor current at the AO1 output has to be transferred with 0 to 20 mA, range 2 In motor, being the equivalent of a 0.8 In drive.

The **[I motor]**(OCr) parameter varies between 0 and 2 times the rated drive current or a range of 2.5 times the rated drive current.

[Scaling AO1 min](ASL1) must not modify the lower limit, which therefore remains at its factory setting of 0%.

[Scaling AO1 max](ASH1) must modify the upper limit by 0.5x the rated motor torque, or 100 - 100/5 = 80% (new value = lower limit + (range x ASH1)).

3.2.3.6.4.8 [AO1 CONFIGURATION]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O- > AO1-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
AO1-	[AO1 CONFIGURATION]		
AO1	[AO1 assignment]		[No](nO)
nO	[No](nO): Not assigned		
OCr	[I motor](OCr): Current in the motor, between 0 and 2 In (In = rated drive current indicated in the Installation chapter and on the drive nameplate)		
OFr	[Motor freq.](OFr): Output frequency, from 0 to [Max frequency](tFr)		
OFS	[Sig. o/p frq.](OFS): Signed output frequency, between -[Max frequency](tFr) and +[Max frequency](tFr)		
OrP	[Ramp out.](OrP): From 0 to [Max frequency](tFr)		
trq	[Motor torq.](trq): Motor torque, between 0 and 3 times the rated motor torque		
Stq	[Sign. torque](Stq): Signed motor torque, between -3 and +3 times the rated motor torque. The + sign corresponds to the motor mode and the - sign to the generator mode (braking).		
OrS	[sign ramp](OrS): Signed ramp output, between -[Max frequency](tFr) and +[Max frequency](tFr).		
OPS	[PID ref.](OPS): PID regulator reference between [Min PID reference](PIP1) and [Max PID reference](PIP2).		
OPF	[PID feedbk](OPF): PID regulator feedback between [Min PID feedback](PIF1) and [Max PID feedback](PIF2)		
OPE	[PID error](OPE): PID regulator error between -5% and +5% of ([Max PID feedback](PIF2) - [Min PID feedback](PIF1))		
OPI	[PID output](OPI): PID regulator output between [Low speed](LSP) and [High speed](HSP)		
OPr	[Mot. power](OPr): Motor power, between 0 and 2.5 times [Rated motor power](nPr)		
UOP	[Motor volt.](UOP): Voltage applied to the motor, between 0 and [Rated motor volt.](UnS)		
tHr	[Mot thermal](tHr): Motor thermal state, between 0 and 200% of the rated thermal state		
tHr2	[Mot therm2](tHr2): Motor thermal state 2, between 0 and 200 % of the rated thermal state		
tHr3	[Mot therm3](tHr3): Motor thermal state 3, between 0 and 200% of the rated thermal state		
tHd	[Drv thermal](tHd): Drive thermal state, between 0 and 200% of the rated thermal state		
tqL	[Torque lim.](tqL): Torque limit, between 0 and 3 times the rated motor torque		
d01	[dO1](dO1): Assignment to a logic output. This assignment can only appear if [DO1 assignment](dO1) has been assigned. This is the only possible choice in this case and is only displayed for informational purposes.		
tqMS	[Torque 4Q](tqMS): Signed motor torque, between -3 and +3 times the rated motor torque. The + sign and the - sign correspond to the physical direction of the torque, regardless of mode (motor or generator).		
OA01	[OA01](OA01): Function blocks: Analog output 01		
...	...		
OA10	[OA10](OA10): Function blocks: Analog output 10		
AO1t	[AO1 Type]		[Current](0A)
10U	[Voltage](10U): Voltage output		
0A	[Current](0A): Current output		
AOL1	[AO1 min Output] This parameter can be accessed if [AO1 Type](AO1t) is set to [Current](0A).	0.0 to 20.0 mA	0.0 mA
AOH1	[AO1 max Output] This parameter can be accessed if [AO1 Type](AO1t) is set to [Current](0A).	0.0 to 20.0 mA	20.0 mA
UOL1	[AO1 min Output] This parameter can be accessed if [AO1 Type](AO1t) is set to [Voltage](10U).	0.0 to 10.0 V	0.0 V
UOH1	[AO1 max Output] This parameter can be accessed if [AO1 Type](AO1t) is set to [Voltage](10U).	0.0 to 10.0 V	10.0 V
ASL1	[Scaling AO1 min] Scaling of the lower limit of the assigned parameter as a % of the maximum possible variation.	0.0 to 100.0%	0.0%
ASH1	[Scaling AO1 max] Scaling of the upper limit of the assigned parameter as a % of the maximum possible variation.	0.0 to 100.0%	100.0%
AO1F	[AO1 Filter] Interference filtering. This parameter is forced to 0 if [AO1 assignment](AO1) is set to [dO1](dO1).	0.00 to 10.00 s	0.00 s

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.3.6.4.9 [ALARM GRP1 DEFINITION]

The following submenus group the alarms into 1 to 3 groups, each of which can be assigned to a relay or a logic output for remote signaling. These groups can also be displayed on the graphic display terminal **[3.3 MONITORING CONFIG.]**((MCF-) menu) and viewed via the **[1.2 MONITORING]**(MOn-) menu.

When one or a number of alarms selected in a group occurs, this alarm group is activated.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > I_O-	
Code	**Name / Description**
I_O-	**[INPUTS / OUTPUTS CFG]**(continued)
A1C-	**[ALARM GRP1 DEFINITION]** Selection to be made from the following list:
PLA	**[LI6=PTC al.]**(PLA): LI6 = PTCL alarm
EFA	**[Ext. fault al.]**(EFA): External fault alarm
USA	**[Under V. al.]**(USA): Undervoltage alarm
CtA	**[I attained]**(CtA): Current threshold attained (**[Current threshold]**(Ctd))
FtA	**[Freq.Th.att.]**(FtA): Frequency threshold attained (**[Freq. threshold]**(Ftd))
F2A	**[Freq. th.2 attained]**(F2A): Frequency threshold 2 attained (**[Freq. threshold 2]**(F2d))
SrA	**[Freq.ref.att]**(SrA): Frequency reference attained
tSA	**[Th.mot. att.]**(tSA): Motor 1 thermal state attained
tS2	**[Th.mot2 att]**(tS2): Motor 2 thermal state attained
tS3	**[Th.mot3 att]**(tS3): Motor 3 thermal state attained
UPA	**[Uvolt warn]**(UPA): Undervoltage threshold
FLA	**[HSP attain.]**(FLA): High speed attained
tHA	**[Al. °C drv]**(tHA): Drive overheating
PEE	**[PID error al]**(PEE): PID error alarm
PFA	**[PID fdbk al.]**(PFA): PID feedback alarm
AP3	**[AI3 Al. 4-20]**(AP3): Alarm indicating absence of 4 to 20 mA signal on input AI3
SSA	**[Lim T/I att.]**(SSA): Torque limit alarm
tAd	**[Th. drv. att.]**(tAd): Drive thermal state attained
tJA	**[IGBT alarm]**(tJA): IGBT alarm
ULA	**[Underload. Proc. Al.]**(ULA): Underload alarm
OLA	**[Overload. Proc. Al.]**(OLA): Overload alarm
rSdA	**[Rope slack alarm]**(rSdA): Rope slack
ttHA	**[High torque alarm]**(ttHA): Motor torque overshooting high threshold **[High torque thd.]**(ttH).
ttLA	**[Low torque alarm]**(ttLA): Motor torque undershooting low threshold **[Low torque thd.]**(ttL).
FqLA	**[Freq. meter Alarm]**(FqLA): Measured speed threshold attained: **[Pulse warning thd.]**(FqL).
dLdA	**[Dynamic load alarm]**(dLdA): Load variation detection (**[DYNAMIC LOAD DETECT.]**(dLd-)).
A2C-	**[ALARM GRP2 DEFINITION]** Identical to **[ALARM GRP1 DEFINITION]**(A1C-).
A3C-	**[ALARM GRP3 DEFINITION]** Identical to **[ALARM GRP1 DEFINITION]**(A1C-).

3.2.3.6.4.10 [COMMAND]

Command

The parameters in the [COMMAND](CtL-) menu can only be modified when the drive is stopped and no run command is present.

Command and reference channels

Run commands (forward, reverse, stop, etc.) and references can be sent using the following channels:

Command	Reference
Terminals: logic inputs LI or analog inputs used as logic inputs LA Function blocks Remote display terminal Graphic display terminal Integrated Modbus Integrated CANopen® POWERLINK card	Terminals: analog inputs AI, pulse input Function blocks Remote display terminal Graphic display terminal Integrated Modbus Integrated CANopen® POWERLINK card +/- speed via the terminals +/- speed via the graphic display terminal

Danger!

UNINTENDED EQUIPMENT OPERATION

When analog inputs [AI1](AI1) or [AI2](AI2) are used as logic inputs ([LAI1](LAI1) or [LAI2](LAI2)) in a configuration, they remain active in their behaviors in analog input mode (example: [Ref.1 channel](Fr1) is still set to [AI1](AI1)).

- **Remove the configuration of [AI1](AI1) or [AI2](AI2) in analog input mode or**
- **Check this behavior will not endanger personnel or equipment in any way**

Failure to follow these instructions will result in death or serious injury.

Note:

[LA1](LA1) and [LA2](LA2) can be used as two logic inputs in source mode only.

- **24 V power supply (max. 30 V)**
- **State 0 if <7.5 V, state 1 if >8.5 V**

Note:

The stop keys on the graphic display terminal or remote display can be programmed as non-priority keys. A stop key can only have priority if the [Stop Key priority](PSt) parameter in the [COMMAND](CtL-) menu is set to [Yes](YES).

The behavior of the ACOPOSinverter P74 can be adapted according to requirements:

- [Not separ.](SIM): Command and reference are sent via the same channel.
- [Separate](SEP): Command and reference may be sent via different channels.

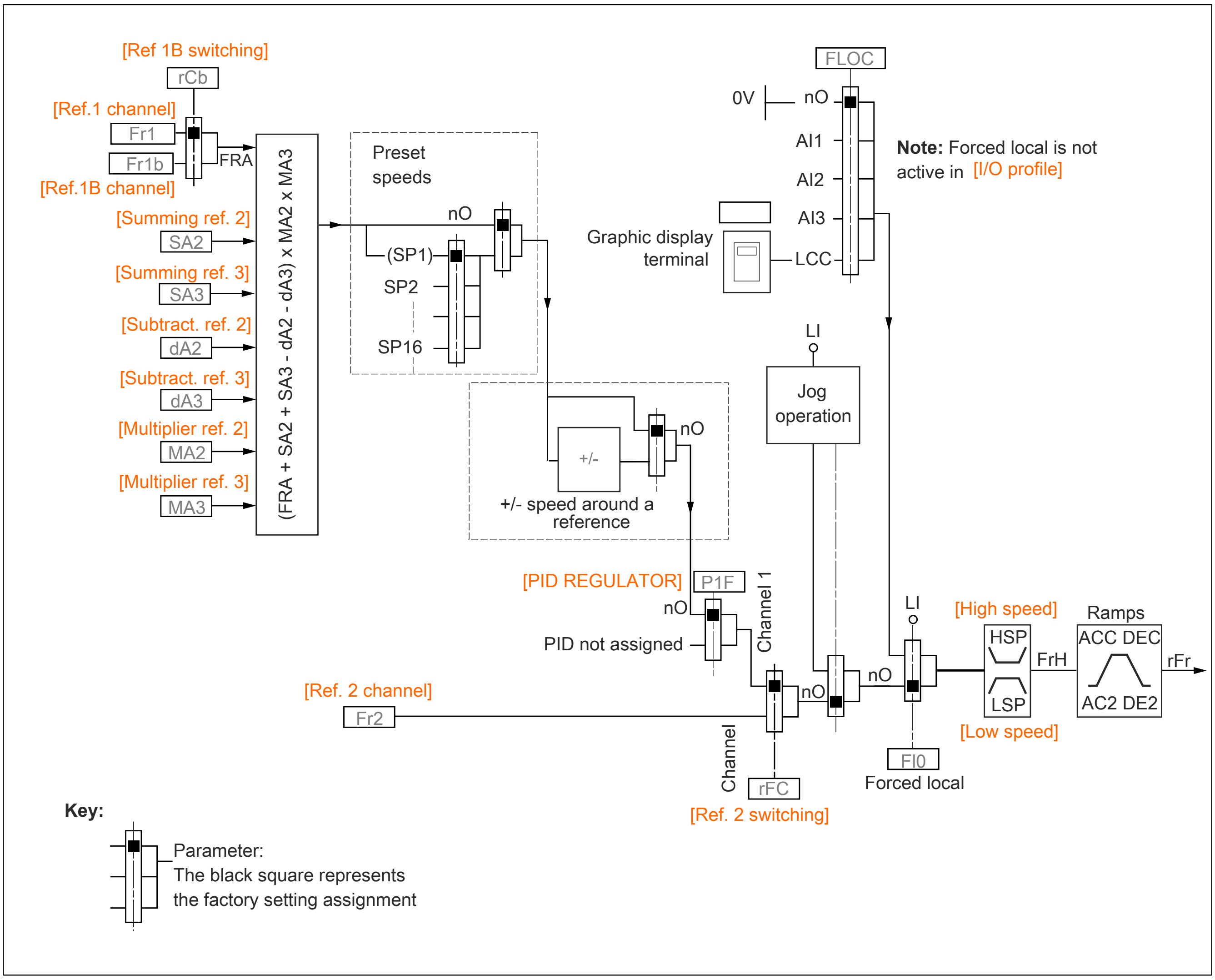
In these configurations, control via the communication bus is performed in accordance with the DRIVECOM standard with only 5 freely-assignable bits (see ACOPOSinverterP74Communication_parameters). The application functions cannot be accessed via the communication interface.

- [I/O profile](IO): The command and the reference can come from different channels. This configuration both simplifies and extends use via the communication interface. Commands may be sent via the logic inputs on the terminals or via the communication bus. When commands are sent via a bus, they are available on a word, which acts as virtual terminals containing only logic inputs. Application functions can be assigned to the bits in this word. More than one function can be assigned to the same bit.

Note:

Stop commands from the graphic display terminal or remote display terminal remain active even if the terminals are not the active command channel.

Reference channel for [Not separ.](SIM), [Separate](SEP) and [I/O profile](IO) configurations, PID not configured



Fr1, SA2, SA3, dA2, dA3, MA2, MA3:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen® and POWERLINK communication card

Fr1b for SEP and IO:

- Terminals, only available if Fr1 = terminals

Fr1b for SIM:

- Terminals, only accessible if Fr1 = terminals

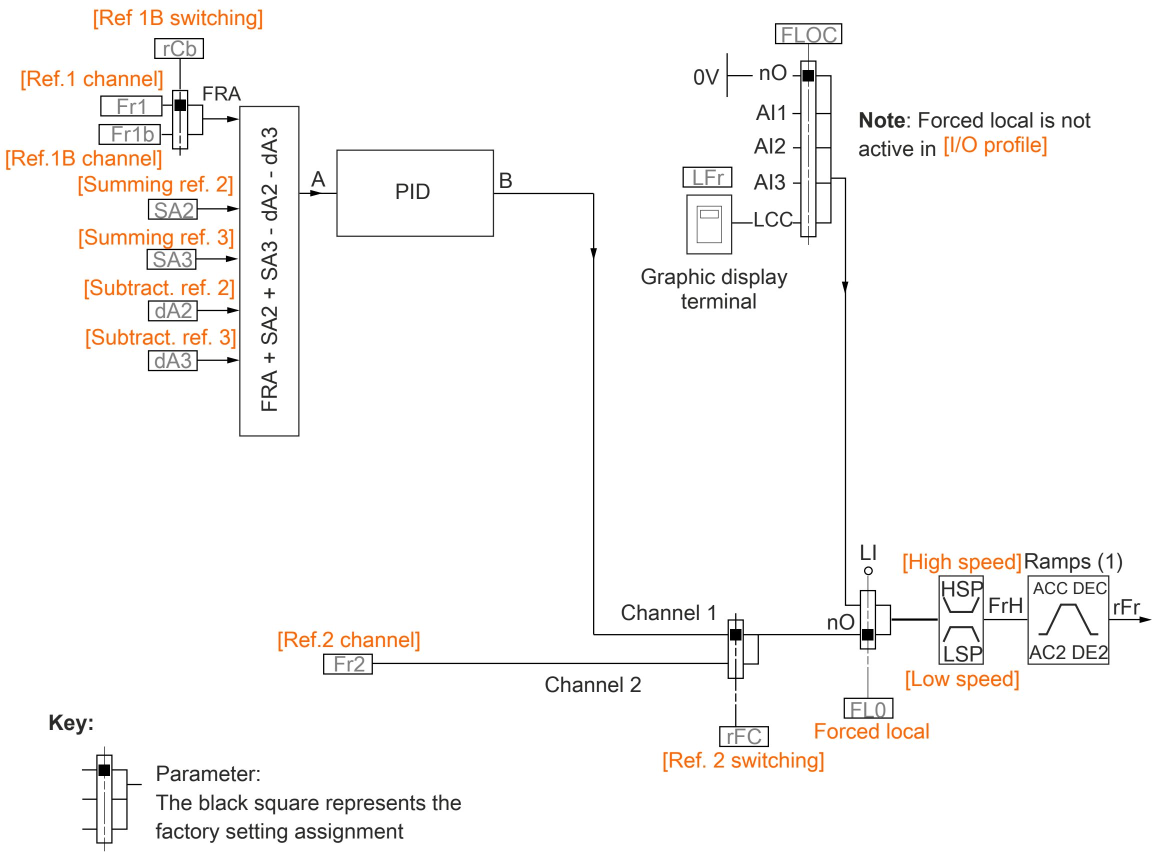
Fr2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, POWERLINK communication card and +/- speed

Note:

[Ref.1B channel](Fr1b) and [Ref 1B switching](rCb) must be configured in the [APPLICATION FUNCT.](Fun-) menu.

Reference channel for [Not separ.](SIM), [Separate](SEP) and [I/O profile](IO) configurations, PID configured with PID references at the terminals



(1) Ramps not active if the PID function is active in automatic mode.

Fr1:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen® and POWERLINK communication card

Fr1b for SEP and IO:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen® and POWERLINK communication card

Fr1b for SIM:

- Terminals, only accessible if Fr1 = terminals

SA2, SA3, dA2, dA3:

- Terminals only

Fr2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, POWERLINK communication card **and +/- speed**

Note:

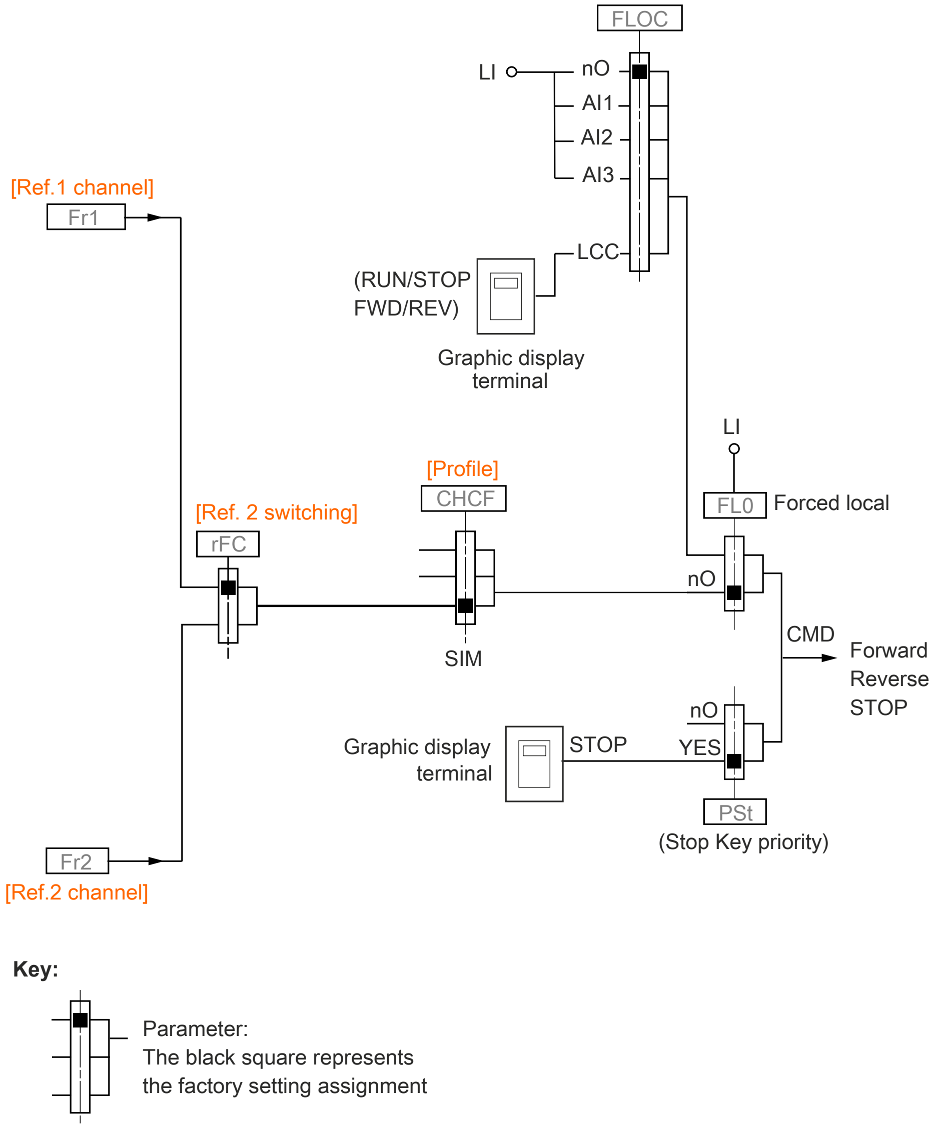
[Ref.1B channel](Fr1b) and [Ref 1B switching](rCb) must be configured in the [APPLICATION FUNCT.](Fun-) menu.

Command channel for [Not separ.](SIM) configuration

Reference and command, not separate.

The command channel is determined by the reference channel. Parameters Fr1, Fr2, rFC, FLO and FLOC are common to reference and command.

Example: If the reference is Fr1 = AI1 (analog input at the terminals), control is via LI (logic input at the terminals).



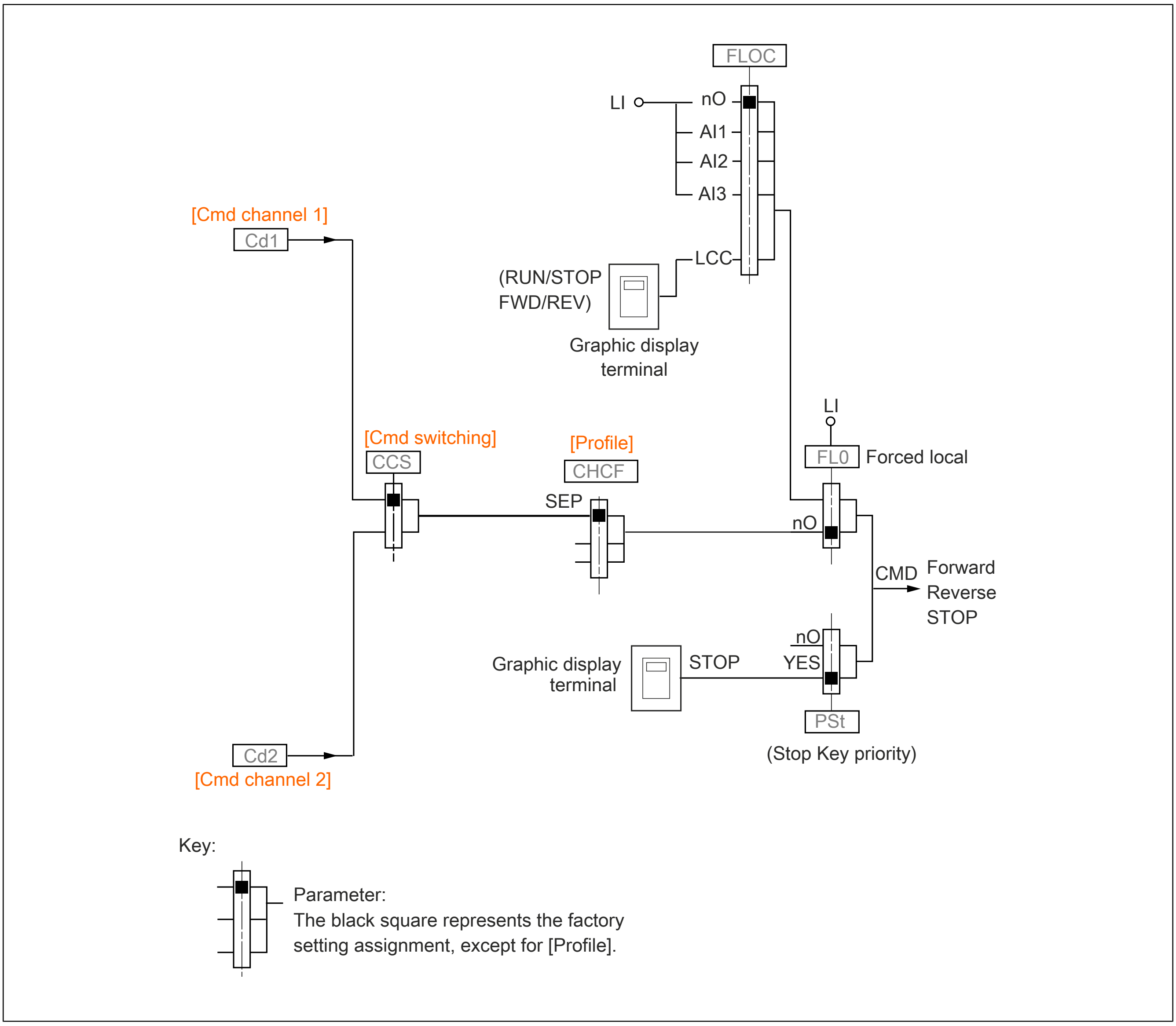
Command channel for [Separate](SEP) configuration

Separate reference and command.

Parameters FLO and FLOC are common to reference and command.

Example: If the reference is in forced local mode via AI1 (analog input at the terminals), command in forced local mode is via LI (logic input at the terminals).

The command channels Cd1 and Cd2 are independent of the reference channels Fr1, Fr1b and Fr2.



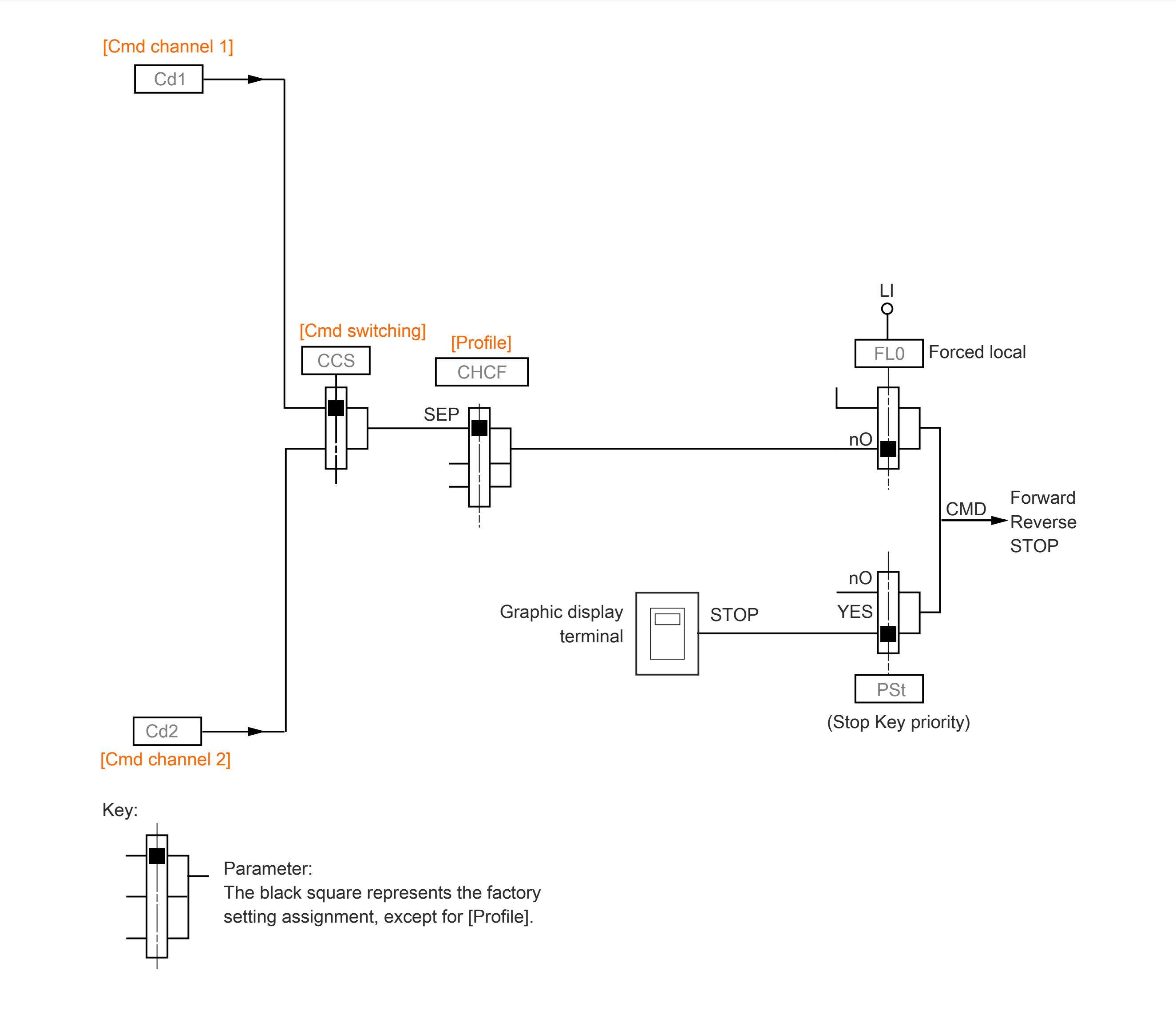
Cd1, Cd2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen® and POWERLINK communication card

Command channel for [I/O profile](IO) configuration

Separate reference and command, as in **[Separate]**(SEP) configuration.

The command channels Cd1 and Cd2 are independent of the reference channels Fr1, Fr1b and Fr2.



Cd1, Cd2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen® and POWERLINK communication card

A command or an action can be assigned:

- To a fixed channel by selecting an LI input or a Cxxx bit:
  - By selecting, for example, LI3, this action will be triggered by LI3 regardless of which command channel is switched.
  - By selecting, for example, C214, this action will be triggered by integrated CANopen® with bit 14 regardless of which command channel is switched
- To a switchable channel by selecting a CDxx bit:
  - By selecting, for example, Cd05, this action will be triggered by
    LI6 if the terminals channel is active
    C105 if the integrated Modbus channel is active
    C205 if the integrated CANopen® channel is active
    C305 if the communication card channel is active

If the active channel is the graphic display terminal, the functions and commands assigned to CDxx switchable internal bits are inactive.

Note:

Cd06 to Cd13 can only be used for switching between two networks. They do not have equivalent logic inputs.

Terminals	Integrated Modbus	Integrated CANopen®	POWERLINK communication card	Internal bit, can be switched
				CD00
LI2 (1)	C101 (1)	C201 (1)	C301 (1)	CD01
LI3	C102	C202	C302	CD02
LI4	C103	C203	C303	CD03
LI5	C104	C204	C304	CD04
LI6	C105	C205	C305	CD05
-	C106	C206	C306	CD06
-	C107	C207	C307	CD07
-	C108	C208	C308	CD08
-	C109	C209	C309	CD09
-	C110	C210	C310	CD10
-	C111	C211	C311	CD11
-	C112	C212	C312	CD12
LAI1	C113	C213	C313	CD13
LAI2	C114	C214	C314	CD14
-	C115	C215	C315	CD15
OL01 to OL10				

(1) If **[2/3 wire control]**(tCC) is set to **[3 wire]**(3C), LI2, C101, C201 and C301 cannot be accessed.

Assignment conditions for logic inputs and control bits

The following elements are available for every command or function that can be assigned to a logic input or a control bit:

[LI1](LI1) to **[LI6]**(LI6)	Drive with or without option
[LAI1](LAI1) to **[LAI2]**(LAI2)	Logical inputs
[C101](C101) to **[C110]**(C110)	With integrated Modbus in **[I/O profile]**(IO) configuration
[C111](C111) to **[C115]**(C115)	With integrated Modbus regardless of configuration
[C201](C201) to **[C210]**(C210)	With integrated CANopen® in **[I/O profile]**(IO) configuration
[C211](C211) to **[C215]**(C215)	With integrated CANopen® regardless of configuration
[C301](C301) to **[C310]**(C310)	With a POWERLINK communication card in **[I/O profile]**(IO) configuration
[C311](C311) to **[C315]**(C315)	With a POWERLINK communication card regardless of configuration
[CD00](Cd00) to **[CD10]**(Cd10)	In **[I/O profile]**(IO) configuration
[CD11](Cd11) to **[CD15]**(Cd15)	Regardless of configuration
[OL01](OL01) to **[OL10]**(OL10)	Regardless of configuration

Note:

In [I/O profile](IO) configuration, LI1 cannot be accessed and if [2/3 wire control](tCC) is set to [3 wire](3C), LI2, C101, C201 and C301 cannot be accessed either.

Warning!

LOSS OF CONTROL

Inactive communication channels are not monitored (no trip in the event of a communication bus interruption).

Check that the commands and functions assigned to bits C101 to C315 will not pose a risk in the event of the interruption of the associated communication bus.

Failure to follow these instructions can result in death, serious injury or equipment damage.

3.2.3.6.5 [COMMAND]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > CtL-		
Code	**Name / Description**	**Factory setting**
CtL-	[COMMAND]	
Fr1	[Ref.1 channel]	[AI1](AI1)
AI1	[AI1](AI1): Analog input A1	
AI2	[AI2](AI2): Analog input A2	
AI3	[AI3](AI3): Analog input A3	
LCC	[HMI](LCC): Graphic display terminal or remote display terminal source	
Mdb	[Modbus](Mdb): Integrated Modbus	
CAn	[CANopen](CAn): Integrated CANopen®	
nEt	[Com. card](nEt): POWERLINK communication card (if inserted)	
PI	[RP](PI): Pulse input	
AIU1	[AI virtual 1](AIU1): Virtual analog input 1 with the jog dial (only available if [Profile](CHCF) is not set to [Not separ.](SIM))	
0A01	[OA01](OA01): Function blocks: Analog output 01	
...	...	
OA10	[OA10](OA10): Function blocks: Analog output 10	
	Note: **When using the ACOPOSinverter P74 with POWERLINK and the B&R Automation Studio, the standard [Ref.1 channel] (Fr1) setting is automatically changed to [COMMUNICATION CARD](net).**	
rIn	[RV Inhibition]	[No](nO)
	Inhibition of movement in reverse direction, does not apply to direction requests sent by logic inputs. Reverse direction requests sent by logic inputs are taken into account. Reverse direction requests sent by the graphic display terminal are not taken into account. Reverse direction requests sent by the line are not taken into account. Any reverse speed reference originating from the PID, summing input, etc., is interpreted as a zero reference (0 Hz).	
nO	[No](nO)	
YES	[Yes](YES)	
PSt	[Stop Key priority]	[Yes](YES)
2 s	**Warning!** **LOSS OF CONTROL** **You are going to disable the stop key located on the remote displays.** **Do not select [No](nO) unless exterior stopping methods exist.** **Failure to follow these instructions can result in death, serious injury or equipment damage.**	
	This will be a freewheel stop. If the active command channel is the graphic display terminal, the stop will be performed according to the [Type of stop](Stt) irrespective of the configuration of [Stop Key priority](PSt).	
nO	[No](nO)	
YES	[Yes](YES): Gives priority to the STOP key on the graphic display terminal when the graphic display terminal is not enabled as the command channel.	
CHCF	[Profile]	[Not separ.](SIM)
2 s	**Danger!** **UNINTENDED EQUIPMENT OPERATION** **When [I/O profile](IO) is deselected, the drive automatically returns to the factory setting.** **Check that the modification of the current configuration is compatible with the wiring diagram used.** **Failure to follow these instructions will result in death or serious injury.**	
SIM	[Not separ.](SIM): Reference and command, not separate	
SEP	[Separate](SEP): Separate reference and command.	
IO	[I/O profile](IO): I/O profile	
	It is not possible to switch the CHCF parameter directly from [I/O profile](IO) to [Separate](SEP).	
CCS	[Cmd switching]	[ch1 active](Cd1)
	This parameter can be accessed if [Profile](CHCF) is set to [Separate](SEP) or [I/O profile](IO). If the assigned input or bit is at 0, channel [Cmd channel 1](Cd1) is active. If the assigned input or bit is at 1, channel [Cmd channel 2](Cd2) is active.	
Cd1	[ch1 active](Cd1): [Cmd channel 1](Cd1) active (no switching)	
Cd2	[ch2 active](Cd2): [Cmd channel 2](Cd2) active (no switching)	
LI1	[LI1](LI1): Logical input LI1	
...	[...](...): See the assignment conditions (not Cd00 to Cd15)	

Parameters described in this page can be accessed by: DRI- > COnF > FULL > CtL-		
Code	**Name / Description**	**Factory setting**
Cd1	**[Cmd channel 1]**	**[Terminals]**(tEr)
	This parameter can be accessed if **[Profile]**(CHCF) is set to **[Separate]**(SEP) or **[I/O profile]**(IO).	
tEr	**[Terminals]**(tEr): Terminals	
LCC	**[HMI]**(LCC): Graphic display terminal or remote display terminal	
Mdb	**[Modbus]**(Mdb): Integrated Modbus	
CAn	**[CANopen]**(CAn): Integrated CANopen®	
nEt	**[Com. card]**(nEt): POWERLINK communication card (if inserted)	
	Note: **When using the ACOPOSinverter P74 with POWERLINK and the B&R Automation Studio, the standard [Cmd channel 1l] (Cd1) setting is automatically changed to [COMMUNICATION CARD](net).**	
Cd2	**[Cmd channel 2]**	**[Modbus]**(Mdb)
	This parameter can be accessed if **[Profile]**(CHCF) is set to **[Separate]**(SEP) or **[I/O profile]**(IO).	
tEr	**[Terminals]**(tEr): Terminals	
LCC	**[HMI]**(LCC): Graphic display terminal or remote display terminal	
Mdb	**[Modbus]**(Mdb): Integrated Modbus	
CAn	**[CANopen]**(CAn): Integrated CANopen®	
nEt	**[Com. card]**(nEt): Communication card (if inserted)	
	Note: **When using the ACOPOSinverter P74 with POWERLINK and the B&R Automation Studio, the standard [Cmd channel 2l] (Cd2) setting is automatically changed to [COMMUNICATION CARD](net).**	
rFC	**[Ref. 2 switching]**	**[Ref.1 channel]**(Fr1)
	This parameter can be accessed if **[Profile]**(CHCF) is set to **[Separate]**(SEP) or **[I/O profile]**(IO). If the assigned input or bit is at 0, channel **[Cmd channel 1]**(Cd1) is active. If the assigned input or bit is at 1, channel **[Cmd channel 2]**(Cd2) is active.	
Fr1	**[Ref. 1 channel]**(Fr1): **[Cmd channel 1]**(Cd1) active (no switching)	
Fr2	**[Ref. 2 channel]**(Fr2): **[Cmd channel 2]**(Cd2) active (no switching)	
LI1	**[LI1]**(LI1): Logical input LI1	
...	**[...]**(...): See the assignment conditions (not Cd00 to Cd15)	
Fr2	**[Ref.2 channel]**	**[No]**(nO)
nO	**[No]**(nO): Not assigned. If **[Profile]**(CHCF) is set to **[Not separ.]**(SIM), the command is at the terminals with a zero reference. If **[Profile]**(CHCF) is set to **[Separate]**(SEP) or **[I/O profile]**(IO), the reference is zero.	
AI1	**[AI1]**(AI1): Analog input A1	
AI2	**[AI2]**(AI2): Analog input A2	
AI3	**[AI3]**(AI3): Analog input A3	
Updt	**[+/-Speed]**(Updt): +/- speed command	
LCC	**[HMI]**(LCC): Graphic display terminal or remote display terminal	
Mdb	**[Modbus]**(Mdb): Integrated Modbus	
CAn	**[CANopen]**(CAn): Integrated CANopen®	
nEt	**[Com. card]**(nEt): POWERLINK communication card (if inserted)	
PI	**[RP]**(PI): Pulse input	
AIU1	**[AI virtual 1]**(AIU1): Virtual analog input 1 with the jog dial	
0A01	**[OA01]**(OA01): Function blocks: Analog output 01	
...	**...**	
OA10	**[OA10]**(OA10): Function blocks: Analog output 10	
COP 2 s	**[Copy channel 1 <> 2]**	**[No]**(nO)
	Danger! **UNINTENDED EQUIPMENT OPERATION** **Copying the command and/or reference can change the direction of rotation.** **Check that this is safe.** **Failure to follow these instructions will result in death or serious injury.**	
	Can be used to copy the current reference and/or the command by means of switching, in order to avoid speed surges, for example. If **[Profile]**(CHCF) is set to **[Not separ.]**(SIM) or **[Separate]**(SEP), copying will only be possible from channel 1 to channel 2. If **[Profile]**(CHCF) is set to **[I/O profile]**(IO), copying will be possible in both directions. A reference or a command cannot be copied to a channel on the terminals. The reference copied is **[Frequency ref.]**(FrH) (before ramp) unless the destination channel reference is set via +/- speed. In this case, the reference copied is **[Output frequency]**(rFr) (after ramp).	
nO	**[No]**(nO): No copy	
SP	**[Reference]**(SP): Copy reference	
Cd	**[Command]**(Cd): Copy command	
ALL	**[Cmd + ref.]**(ALL): Copy command and reference	

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

As the graphic display terminal may be selected as the command and/or reference channel, its action modes can be configured.

The parameters on this page can only be accessed on the graphic display terminal, and not on the integrated display terminal.

Comments:

- The display terminal command/reference is only active if the command and/or reference channels from the terminal are active with the exception of **[T/K]**(Ft) (command via the display terminal), which takes priority over these channels. Press **[T/K]**(Ft) (command via the display terminal) again to revert control to the selected channel.
- Command and reference via the display terminal are impossible if the latter is connected to more than one drive.
- The JOG, preset speed and +/- speed functions can only be accessed if **[Profile]**(CHCF) is set to **[Not separ.]**(SIM).
- The preset PID reference functions can only be accessed if **[Profile]**(CHCF) is set to **[Not separ.]**(SIM) or **[Separate]**(SEP).
- The **[T/K]**(Ft) (command via the display terminal) can be accessed regardless of the **[Profile]**(CHCF).

Parameters described in this page can be accessed by: DRI- > COnF > FULL > CtL-

Code	Name / Description	Factory setting
CtL-	**[COMMAND]**	
Fn1	**[F1 key assignment]**	**[No]**(nO)
nO	**[No]**(nO): Not assigned	
FJOG	**[Jog]**(FJOG): JOG operation	
FPS1	**[Preset spd2]**(FPS1): Press the key to run the drive at the 2nd preset speed **[Preset speed 2]**(SP2). Press STOP to stop the drive.	
FPS2	**[Preset spd3]**(FPS2): Press the key to run the drive at the 3rd preset speed **[Preset speed 3]**(SP3). Press STOP to stop the drive.	
FPr1	**[PID ref. 2]**(FPr1): Sets a PID reference equal to the 2nd preset PID reference **[Preset ref. PID 2]**(rP2) without sending a run command. Only operates if **[Ref.1 channel]**(Fr1) is set to **[HMI]**(LCC). Does not operate with the **[T/K]**(Ft) function.	
FPr2	**[PID ref. 3]**(FPr2): Sets a PID reference equal to the 3rd preset PID reference **[Preset ref. PID 3]**(rP3) without sending a run command. Only operates if **[Ref.1 channel]**(Fr1) is set to **[HMI]**(LCC). Does not operate with the **[T/K]**(Ft) function.	
FUSP	**[+speed]**(FUSP): Faster, only operates if **[Ref.2 channel]**(Fr2) is set to **[HMI]**(LCC). Press the key to run the drive and increase the speed. Press STOP to stop the drive.	
FdSP	**[- speed]**(FdSP): Slower, only operates if **[Ref.2 channel]**(Fr2) is set to **[HMI]**(LCC) and if a different key has been assigned to **[+ speed]**. Press the key to run the drive and decrease the speed. Press STOP to stop the drive.	
Ft	**[T/K]**(Ft): Command via the display terminal: Takes priority over **[Cmd switching]**(CCS) and over **[Ref. 2 switching]**(rFC).	
Fn2	**[F2 key assignment]** Identical to **[F1 key assignment]**(Fn1).	**[No]**(nO)
Fn3	**[F3 key assignment]** Identical to **[F1 key assignment]**(Fn1).	**[No]**(nO)
Fn4	**[F4 key assignment]** Identical to **[F1 key assignment]**(Fn1).	**[No]**(nO)
bMp	**[HMI cmd.]** When the **[T/K]**(Ft) function is assigned to a key and that function is active, this parameter defines the behavior at the moment when control returns to the graphic display terminal or remote display terminal.	**[Stop]**(StOP)
StOP	**[Stop]**(StOP): Stops the drive (although the controlled direction of operation and reference of the previous channel are copied (to be taken into account on the next RUN command)).	
bUMF	**[Bumpless]**(bUMF): Does not stop the drive (the controlled direction of operation and the reference of the previous channel are copied).	

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.3.6.6 [APPLICATION FUNCT.]

Summary of functions:

Code	Name
(rEF-)	[REFERENCE SWITCH.]
(OAI-)	[REF. OPERATIONS]
(rPt-)	[RAMP]
(Stt-)	[STOP CONFIGURATION]
(AdC-)	[AUTO DC INJECTION]
(JOG-)	[JOG]
(PSS-)	[PRESET SPEEDS]
(UPd)	[+/- SPEED]
(SrE-)	[+/-SPEED AROUND REF.]
(SPM-)	[MEMO REFERENCE]
(FLI-)	[FLUXING BY LI]
(bLC-)	[BRAKE LOGIC CONTROL]
(ELM-)	[EXTERNAL WEIGHT MEAS.]
(HSH-)	[HIGH SPEED HOISTING]
(PId-)	[PID REGULATOR]
(Pr1-)	[PID PRESET REFERENCES]
(tOL-)	[TORQUE LIMITATION]
(CLI-)	[2nd CURRENT LIMIT.]
(I2t-)	[DYN CURRENT LIMIT]
(LLC-)	[LINE CONTACTOR COMMAND]
(OCC-)	[OUTPUT CONTACTOR CMD]
(LPO-)	[POSITIONING BY SENSORS]
(MLP-)	[PARAM. SET SWITCHING]
(MMC-)	[MULTIMOTORS/CONFIG.]
(tnL-)	[AUTO TUNING BY LI]
(trO-)	[TRAVERSE CONTROL]
(CHS-)	[HSP SWITCHING]
(dCC-)	[DC BUS]

The parameters in the **[APPLICATION FUNCT.]**(Fun-) menu can only be modified when the drive is stopped and there is no run command, except for parameters with an arrow symbol in the code column, which can be modified with the drive running or stopped.

Note:

COMPATIBILITY OF FUNCTIONS

The choice of application functions may be limited by the number of I/O and by the fact that some functions are incompatible with others. Functions that are not listed in the table below are fully compatible.

If there is an incompatibility between functions, the first function configured will help to prevent the others being configured.

Each of the functions on the following pages can be assigned to one of the inputs or outputs.

Danger!

UNINTENDED EQUIPMENT OPERATION

A single input can activate several functions at the same time (reverse and 2nd ramp for example).

Ensure that these functions can be used at the same time.

Failure to follow these instructions will result in death or serious injury.

It is only possible to assign one input to several functions at **[Advanced]**(AdU) and **[Expert]**(EPr) levels.

Before assigning a command, reference or function to an input or output, the user must check that this input or output has not already been assigned and that another input or output has not been assigned to an incompatible function.

The drive factory setting or macro configurations automatically configure functions, **which may help to prevent other functions being assigned**.

In some case, it is necessary to unconfigure one or more functions in order to be able to enable another. Check the compatibility table below.

Stop functions have priority over run commands.

Speed references via logic command have priority over analog references.

Note:

This compatibility table does not affect commands that can be assigned to the keys of the graphic display terminal.

Compatibility table

	Reference operations	+/- speed	Preset speeds	PID regulator	Traverse control	JOG operation	Reference switching	Skip frequency	Brake logic control	Auto DC injection	Catch on the fly	Output contactor command	DC injection stop	Fast stop	Freewheel stop	+/- speed around a reference	High speed hoisting	Load sharing	Positioning by sensors
Reference operations			↑	• (2)		↑	↑	↑											
+/- speed					•	•	↑	↑											
Preset speeds	←					↑	↑	↑											
PID regulator	• (2)				•	•	↑	↑	•							•	•	•	•
Traverse control		•		•		•	↑	↑								•	•		
JOG operation	←	•	←	•	•			↑	•	←						•	•		
Reference switching	←	←	←	←	←			↑								↑			
Skip frequency	←	←	←	←	←	←	←									←			
Brake logic control				•		•					•	•	•						
Auto DC injection						↑							↑		↑				
Catch on the fly									•										
Output contactor command									•										
DJ injection stop									•	←				• (1)	↑				
Fast stop													• (1)		↑				
Freewheel stop										←			←	←					
+/- speed around a reference				•	•	•	←	↑											
High speed hoisting				•	•	•													
Load sharing				•															
Positioning by sensor				•															

(1) Priority is given to the first of these two stop modes to be activated.
(2) Only the multiplier reference is incompatible with the PID regulator.

• Incompatible functions

Compatible functions

Not applicable

Priority functions (functions which cannot be active at the same time):

← ↑ The function indicated by the arrow has priority over the other.

Incompatible Functions

The following function will be inaccessible or deactivated after an automatic restart.

This is only possible for control type if **[2/3 wire control]**(tCC) is set to **[2 wire]**(2C) and if **[2 wire type]**(tCt) is set to **[Level]**(LEL) or **[Fwd priority]**(PFO).

The **[1.2 MONITORING]**(MOn-) menu can be used to display the functions assigned to each input in order to check their compatibility.

When a function is assigned, a ✓ appears on the graphic display terminal, as illustrated in the example below:

RDY	Term	0,0 Hz	0 A
APPLICATION FUNCT.			
REFERENCE SWITCH.			
REF. OPERATIONS			
RAMP			
STOP CONFIGURATION			
AUTO DC INJECTION			
Code	<<	>>	Quick

If you attempt to assign a function that is incompatible with another function that has already been assigned, an alarm message will appear:

- With the graphic display terminal:

RDY	Term	+0,0 Hz	0.0 A
INCOMPATIBILITY			
The function can't be assigned because an incompatible function is already selected. See programming book. ENT or ESC to continue			

- With the integrated display terminal and the remote display terminal:

COMP flashes until ENT or ESC is pressed.

When you assign a logic input, an analog input, a reference channel or a bit to a function, pressing the HELP key will display the functions that may already have been activated by this input, bit or channel.

When a logic input, an analog input, a reference channel or a bit that has already been assigned is assigned to another function, the following screens appear:

- With the graphic display terminal:

RUN	Term	0,0 Hz	0.0 A
WARNING - ASSIGNED TO			
Forward			
ENT-Valid.			ESC-Abort

If the access level permits this new assignment, pressing ENT confirms the assignment.

If the access level does not permit this new assignment, pressing ENT results in the following display:

RUN	Term	0,0 Hz	0.0 A
ASSIGNMENT FORBIDDEN			
Un-assign the present functions, or select "Advanced" access level			

- With the integrated display terminal:

The code for the first function, which is already assigned, is displayed flashing.

If the access level permits this new assignment, pressing ENT confirms the assignment.

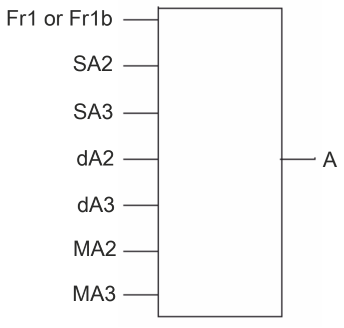
If the access level does not permit this new assignment, pressing ENT has no effect and the message continues to flash. It is only possible to exit by pressing ESC.

3.2.3.6.6.1 REFERENCE SWITCHING

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > rEF-		
Code	**Name / Description**	**Factory setting**
rEF-	**[REFERENCE SWITCH.]**	
rCb	**[Ref 1B switching]** If the assigned input or bit is at 0, **[Ref.1 channel]**(Fr1) is active. If the assigned input or bit is at 1, **[Ref.1B channel]**(Fr1b) is active. **[Ref 1B switching]**(rCb) is forced to **[ch1 active]**(Fr1) if **[Profile]**(CHCF) is set to **[Not separ.]**(SIM) with **[Ref.1 channel]**(Fr1) assigned via the terminals (analog inputs, pulse input).	**[ch1 active]**(Fr1)
Fr1	**[ch1 active]**(Fr1): No switching, **[Ref.1 channel]**(Fr1) active	
Fr1b	**[ch1B active]**(Fr1b): No switching, **[Ref.1B channel]**(Fr1b) active	
LI1	**[LI1]**(LI1): Logical input LI1	
...	**[...]**(...): See the assignment conditions (not **[Cd00]**(Cd00) to **[Cd15]**(Cd15)).	
Fr1b	**[Ref.1B channel]**	**[No]**(nO)
nO	**[No]**(nO): Not assigned	
AI1	**[AI1]**(AI1): Analog input A1	
AI2	**[AI2]**(AI2): Analog input A2	
AI3	**[AI3]**(AI3): Analog input A3	
LCC	**[HMI]**(LCC): Graphic display terminal or remote display terminal source	
Mdb	**[Modbus]**(Mdb): Integrated Modbus	
CAn	**[CANopen]**(CAn): Integrated CANopen®	
nEt	**[Com. card]**(nEt): Communication option board source	
PI	**[RP]**(PI): Pulse input	
AIU1	**[AI virtual 1]**(AIU1): Virtual analog input 1 with the jog dial (only available if **[Profile]**(CHCF) is not set to **[Not separ.]**(SIM))	
OA01	**[OA01]**(OA01): Function blocks: Analog output 01	
...	**...**	
OA10	**[OA10]**(OA10): Function blocks: Analog output 10	

3.2.3.6.6.2 REFERENCE OPERATIONS

Summing input / Subtracting input / Multiplier



A = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3

- If SA2, SA3, dA2 and dA3 are not assigned, they are set to 0.
- If MA2 and MA3 are not assigned, they are set to 1.
- A is limited by the minimum LSP and maximum HSP parameters.
- For multiplication, the signal on MA2 or MA3 is interpreted as a %. 100% corresponds to the maximum value of the corresponding input. If MA2 or MA3 is sent via the communication bus or graphic display terminal, an MFr multiplication variable must be sent via the bus or graphic display terminal.
- Reversal of the direction of operation in the event of a negative result can be inhibited (**[RV Inhibition]**(SIn)).

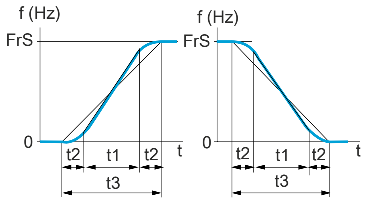
Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > OAI-

Code	Name / Description	Factory setting
OAI-	**[REF. OPERATIONS]** Reference = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3. **Note:** **This function cannot be used with certain other functions.**	
SA2	**[Summing ref. 2]** Selection of a reference to be added to **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b).	**[No]**(nO)
nO	**[No]**(nO): Not assigned	
AI1	**[AI1]**(AI1): Analog input A1	
AI2	**[AI2]**(AI2): Analog input A2	
AI3	**[AI3]**(AI3): Analog input A3	
LCC	**[HMI]**(LCC): Graphic display terminal or remote display terminal source	
Mdb	**[Modbus]**(Mdb): Integrated Modbus	
CAn	**[CANopen]**(CAn): Integrated CANopen®	
nEt	**[Com. card]**(nEt): Communication option board source	
PI	**[RP]**(PI): Motor voltage	
AIU1	**[AI virtual 1]**(AIU1): Virtual analog input 1 with the jog dial	
AIU2	**[AI virtual 2]**(AIU2): Virtual analog input 2 by the communication bus	
OA01	**[OA01]**(OA01): Function blocks: Analog output 01	
...	**...**	
OA10	**[OA10]**(OA10): Function blocks: Analog output 10	
SA3	**[Summing ref. 3]** Selection of a reference to be added to **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b). Identical to **[Summing ref. 2]**(SA2).	**[No]**(nO)
dA2	**[Subtract. ref. 2]** Selection of a reference to be subtracted from **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b). Identical to **[Summing ref. 2]**(SA2).	**[No]**(nO)
dA3	**[Subtract. ref. 3]** Selection of a reference to be subtracted from **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b). Identical to **[Summing ref. 2]**(SA2).	**[No]**(nO)
MA2	**[Multiplier ref. 2]** Selection of a multiplier reference **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b). Identical to **[Summing ref. 2]**(SA2).	**[No]**(nO)
MA3	**[Multiplier ref. 3]** Selection of a multiplier reference **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b). Identical to **[Summing ref. 2]**(SA2).	**[No]**(nO)

3.2.3.6.6.3 RAMP

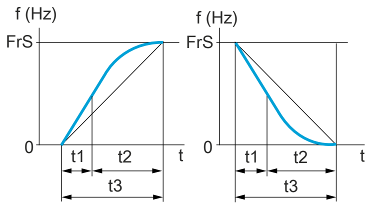
Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > rPt-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
rPt-	**[RAMP]**		
rPt	**[Ramp type]**		**[Linear]**(LIn)
LIn	**[Linear]**(LIn)		
S	**[S ramp]**(S)		
U	**[U ramp]**(U)		
CUS	**[Customized]**(CUS)		

S ramps



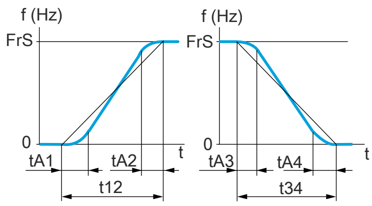
The rounding coefficient is fixed,
t1 = 0.6 set ramp time (linear)
t2 = 0.4 set ramp time (round)
t3 = 1.4 set ramp time

U ramps



The rounding coefficient is fixed,
t1 = 0.5 set ramp time (linear)
t2 = 1.0 set ramp time (round)
t3 = 1.5 set ramp time

Customized ramps



tA1: adjustable from 0 to 100%
tA2: adjustable from 0 to (100% - tA1)
tA3: adjustable from 0 to 100%
tA4: adjustable from 0 to (100% - tA3)

t12 = ACC * (tA1(%) / 100 + tA2(%) / 100 + 1)
t34 = DEC * (tA3(%) / 100 + tA4(%) / 100 + 1)

Code	Name / Description	Adjustment range	Factory setting
Inr (1)	**[Ramp increment]** This parameter is valid for **[Acceleration]**(ACC), **[Deceleration]**(dEC), **[Acceleration 2]**(AC2) and **[Deceleration 2]**(dE2).		**[0,1]**(0.1)
0.01	**[0,1]**: Ramp up to 999.9 seconds		
0.1	**[0,1]**: Ramp up to 999.9 seconds		
1	**[1]**: Ramp up to 6000 seconds		
ACC (1)	**[Acceleration]** Time to accelerate from 0 to the **[Rated motor freq.]**(FrS). To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.	0.00 to 6000 s (2)	3.0 s
dEC (1)	**[Deceleration]** Time to accelerate from 0 to the **[Rated motor freq.]**(FrS). To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.	0.00 to 6000 s (2)	3.0 s
tA1 (1)	**[Begin Acc round]** Rounding of start of acceleration ramp as a % of the **[Acceleration]**(ACC) or **[Acceleration 2]**(AC2) ramp time. Can be set between 0 and 100%. This parameter can be accessed if the **[Ramp type]**(rPt) is **[Customized]**(CUS).	0 to 100%	10%
tA2 (1)	**[End Acc round]** Rounding of end of acceleration ramp as a % of the **[Acceleration]**(ACC) or **[Acceleration 2]**(AC2) ramp time. Can be set between 0 and (100% - **[Begin Acc round]**(tA1)). This parameter can be accessed if the **[Ramp type]**(rPt) is **[Customized]**(CUS).	0 to 100%	10%

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > rPt-

Code	Name / Description	Adjustment range	Factory setting
tA3 (1)	**[Begin Dec round]** Rounding of start of deceleration ramp as a % of the **[Deceleration]**(dEC) or **[Deceleration 2]**(dE2) ramp time. Can be set between 0 and 100%. This parameter can be accessed if the **[Ramp type]**(rPt) is **[Customized]**(CUS).	0 to 100%	10%
tA4 (1)	**[End Dec round]** Rounding of end of deceleration ramp as a % of the **[Deceleration]**(dEC) or **[Deceleration 2]**(dE2) ramp time. Can be set between 0 and (100% - **[Begin Dec round]**(tA3)). This parameter can be accessed if the **[Ramp type]**(rPt) is **[Customized]**(CUS).	0 to 100%	10%
Frt	**[Ramp 2 threshold]** Ramp switching threshold. The 2nd ramp is switched if the value of **[Ramp 2 threshold]**(Frt) is not 0 (0 deactivates the function) and the output frequency is greater than **[Ramp 2 threshold]**(Frt). Threshold ramp switching can be combined with **[Ramp switch ass.]**(rPS) switching as follows:	0.0 to 599.0 Hz according to rating	0.0 Hz

LI or bit	Frequency	Ramp
0	<Frt	ACC, dEC
0	>Frt	AC2, dE2
1	<Frt	AC2, dE2
1	>Frt	AC2, dE2

Code	Name / Description	Adjustment range	Factory setting
rPS	**[Ramp switch ass.]** Identical to **[Ref.1B channel]**(Fr1b).		**[No]**(nO)
AC2 (1)	**[Acceleration 2]** Time to accelerate from 0 to the **[Rated motor freq.]**(FrS). To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. This parameter can be accessed if **[Ramp 2 threshold]**(Frt) is greater than 0 or if **[Ramp switch ass.]**(rPS) is assigned.	0.00 to 6000 s (2)	5.0 s
dE2 (1)	**[Deceleration 2]** Time to decelerate from **[Rated motor freq.]**(FrS) to 0. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. This parameter can be accessed if **[Ramp 2 threshold]**(Frt) is greater than 0 or if **[Ramp switch ass.]**(rPS) is assigned.	0.00 to 6000 s (2)	5.0 s
brA	**[Dec ramp adapt.]**		**[Yes]**(YES)

Caution!

RISK OF DAMAGE TO THE MOTOR

Choose only [Dec ramp adapt.](brA) = [Yes](YES) or [No](nO) if the motor is a permanent magnet synchronous motor, otherwise it will be demagnetized.

Failure to follow these instructions can result in equipment damage.

Activating this function automatically adapts the deceleration ramp, if this has been set at a too low value according to the inertia of the load, which can cause an overvoltage detected fault.
[Dec ramp adapt.](brA) is forced to **[No]**(nO) if the brake logic control **[Brake assignment]**(bLC) is assigned.
The function is incompatible with applications requiring:

- Positioning on a ramp
- The use of a braking resistor (the resistor would not operate correctly)

This function will be deactivated if the value of parameter DCF is set to 0.

nO — **[No]**(nO): Function inactive

YES — **[Yes]**(YES): Function active for applications that do not require strong deceleration
The following selections appear depending on the rating of the drive and **[Motor control type]**(Ctt). They enable stronger deceleration to be obtained than with **[Yes]**(YES). Use comparative testing to determine your selection.

dYnA — **[High torq. A]**(dYnA): Addition of a constant current flow component
When **[Dec ramp adapt.]**(brA) is configured on **[High torq. x]**(dYnx), the dynamic performances for braking are improved by the addition of a current flow component. The aim is to increase the iron loss and magnetic energy stored in the motor.

(1) The parameter can also be accessed in the **[SETTINGS]**(SEt-) menu.
(2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to **[Ramp increment]**(Inr).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.6.4 STOP CONFIGURATION

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > Stt-

Code	Name / Description	Adjustment range	Factory setting
Stt-	**[STOP CONFIGURATION]** **Note:** **Some types of stops cannot be used with all other functions.**		
Stt	**[Type of stop]** Stop mode on disappearance of the run command or appearance of a stop command. **Note:** **If the "brake logic" function has been enabled or if [Low speed time out](tLS) is not 0, only ramp type stops may be configured.**		**[Ramp stop]**(rMP)
rMP FSt nSt dCI	**[Ramp stop]**(rMP): Stop on ramp **[Fast stop]**(FSt): Fast stop **[Freewheel]**(nSt): Freewheel stop **[DC injection]**(dCI): DC injection stop. Available only if **[Motor control type]**(Ctt) is not set to **[Sync. mot.]**(SYn).		
FFt (1)	**[Freewheel stop Thd.]** Speed threshold below which the motor will switch to freewheel stop. This parameter supports switching from a ramp stop or a fast stop to a freewheel stop below a low speed threshold. This parameter can be accessed if **[Type of stop]**(Stt) is set to **[Fast stop]**(FSt) or **[Ramp stop]**(rMP) and if **[Brake assignment]**(bLC) or **[Auto DC injection]**(AdC) are configured.	0.2 to 3.2 Hz	$^1/_{250}$ **[Rated motor freq.]**(FrS) or $^1/_{250}$ **[Nominal freq sync.]**(FrSS)
nSt	**[Freewheel stop ass.]** The stop is activated when the input or the bit changes to 0. If the input returns to state 1 and the run command is still active, the motor will only restart if **[2/3 wire control]**(tCC) is set to **[2 wire]**(2C) and if **[2 wire type]**(tCt) is set to **[Level]**(LEL) or **[Fwd priority]**(PFO). If not, a new run command must be sent.		**[No]**(nO)
nO LI1 ...	**[No]**(nO): Not assigned **[LI1]**(LI1): Logical input LI1 **[...]**(...): See the assignment conditions		
FSt	**[Fast stop assign.]** The stop is activated when the input changes to 0 or the bit changes to 1 (bit in **[I/O profile]**(IO) at 0). If the input returns to state 1 and the run command is still active, the motor will only restart if **[2/3 wire control]**(tCC) is set to **[2 wire]**(2C) and if **[2 wire type]**(tCt) is set to **[Level]**(LEL) or **[Fwd priority]**(PFO). If not, a new run command must be sent. **Note:** **This function cannot be used with certain other functions.**		**[No]**(nO)
nO LI1 ...	**[No]**(nO): Not assigned **[LI1]**(LI1): Logical input LI1 **[...]**(...): See the assignment conditions		
dCF (1)	**[Ramp divider]** This parameter can be accessed if **[Type of stop]**(Stt) is set to **[Fast stop]**(FSt) and if **[Fast stop assign.]**(FSt) is not **[No]**(nO) and if **[Stop type]**(PAS) is set to **[Fast stop]**(FSt). The ramp that is enabled (**[Deceleration]**(dEC) or **[Deceleration 2]**(dE2)) is then divided by this coefficient when stop requests are sent. Value 0 corresponds to a minimum ramp time.	0 to 10	4
dCI	**[DC injection assign.]** **Warning!** **NO HOLDING TORQUE** • **DC injection braking does not provide any holding torque at zero speed.** • **DC injection braking does not work when there is a loss of power or when the drive detects a fault.** • **Where necessary, use a separate brake to maintain torque levels** **Failure to follow these instructions can result in death, serious injury or equipment damage.** DC injection braking is initiated when the assigned input or bit changes to state 1. If the input returns to state 0 and the run command is still active, the motor will only restart if **[2/3 wire control]**(tCC) is set to **[2 wire]**(2C) and if **[2 wire type]**(tCt) is set to **[Level]**(LEL) or **[Fwd priority]**(PFO). If not, a new run command must be sent. **Note:** **This function cannot be used with certain other functions.**		**[No]**(nO)
nO LI1 ...	**[No]**(nO): Not assigned **[LI1]**(LI1): Logical input LI1 **[...]**(...): See the assignment conditions		

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > Stt-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
IdC (1)(3)	**[DC inject. level 1]** **Warning!** **NO HOLDING TORQUE** • **DC injection braking does not provide any holding torque at zero speed.** • **DC injection braking does not work when there is a loss of power or when the drive detects a fault.** • **Where necessary, use a separate brake to maintain torque levels** **Failure to follow these instructions can result in death, serious injury or equipment damage.** **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.** Level of DC injection braking current activated via logic input or selected as stop mode. This parameter can be accessed if **[Type of stop]**(Stt) is set to **[DC injection]**(dCI) or if **[DC injection assign.]**(dCI) is not **[No]**(nO).	0.1 to $^{176}/_{125}$ INV (2)	$^{16}/_{25}$ INV (2)
tdI (1)(3)	**[DC injection time 1]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** • **Long periods of DC injection braking can cause overheating and damage the motor.** • **Protect the motor by avoiding long periods of DC injection braking.** **Failure to follow these instructions can result in equipment damage.** Maximum current injection time **[DC inject. level 1]**(IdC). After this time, the injection current becomes **[DC inject. level 2]**(IdC2). This parameter can be accessed if **[Type of stop]**(Stt) is set to **[DC injection]**(dCI) or if **[DC injection assign.]**(dCI) is not set to **[No]**(nO).	0.1 to 30.0 s	0.5 s
IdC2 (1)(3)	**[DC inject. level 2]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.** Injection current activated by logic input or selected as stop mode, once period of time **[DC injection time 1]**(tdI) has elapsed. This parameter can be accessed if **[Type of stop]**(Stt) is set to **[DC injection]**(dCI) or if **[DC injection assign.]**(dCI) is not set to **[No]**(nO).	0.1 to **[DC inject. level 1]**(IdC) (2)	$^{1}/_{2}$ INV (2)
tdC (1)(3)	**[DC injection time 2]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** • **Long periods of DC injection braking can cause overheating and damage the motor.** • **Protect the motor by avoiding long periods of DC injection braking.** **Failure to follow these instructions can result in equipment damage.** Maximum injection time **[DC inject. level 2]**(IdC2) for injection, selected as stop mode only. This parameter can be accessed if **[Stop type]**(Stt) is set to **[DC injection]**(dCI).	0.1 to 30.0 s	0.5 s
dOtd	**[Dis. operat opt code]** Disable operation stop mode.		
nSt	**[Freewheel]**(nSt): Disable drive function		
rMp	**[Ramp stop]**(rMp): Ramp stop then disable drive function		

(1) The parameter can also be accessed in the **[SETTINGS]**(SEt-) menu.
(2) In corresponds to the rated drive current indicated in the Installation chapter and on the drive nameplate.
(3) These settings are independent of the **[AUTO DC INJECTION]**(AdC-) function.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.6.5 AUTO DC INJECTION

<table>
<tr><td colspan="4">Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > AdC-</td></tr>
<tr><td>Code</td><td>Name / Description</td><td>Adjustment range</td><td>Factory setting</td></tr>
<tr><td>AdC-</td><td>[AUTO DC INJECTION]</td><td></td><td></td></tr>
<tr><td>AdC
2 s</td><td>[Auto DC injection]

Danger!
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH
When [Auto DC injection](AdC) is set to [Continuous](Ct), the injection of current is done even if a run command has not been sent.
Check this action will not endanger personnel or equipment in any way.
Failure to follow these instructions will result in death or serious injury.

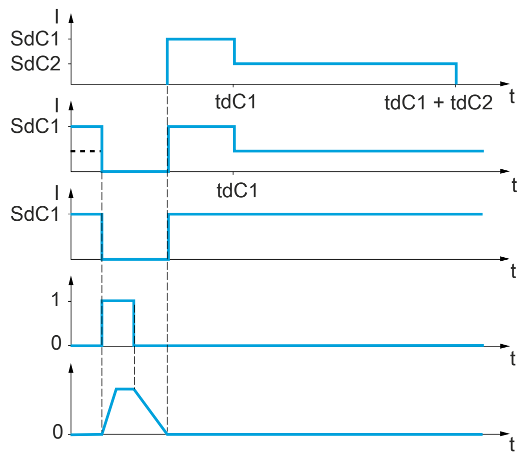
Warning!
NO HOLDING TORQUE
• DC injection braking does not provide any holding torque at zero speed.
• DC injection braking does not work when there is a loss of power or when the drive detects a fault.
• Where necessary, use a separate brake to maintain torque levels
Failure to follow these instructions can result in death, serious injury or equipment damage.

Automatic current injection on stopping (at the end of the ramp).

Note:
[Auto DC injection](AdC) is set to [No](nO) when [Motor control type](Ctt) is set to [Sync. mot.](SYn). [Auto DC injection](AdC) is forced to [No](nO) when [Brake assignment](bLC) is not set to [No](nO). This parameter gives rise to the injection of current even if a run command has not been sent. It can be accessed with the drive running.</td><td></td><td>[Yes](YES)</td></tr>
<tr><td>nO
YES
Ct</td><td>[No](nO): No injection
[Yes](YES): Adjustable injection time
[Continuous](Ct): Continuous standstill injection</td><td></td><td></td></tr>
</table>

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > AdC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
SdC1 (1)	**[Auto DC inj. level 1]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.** Level of standstill DC injection current. **[Auto DC injection]**(AdC) is not **[No]**(nO).	0.0 to $^{12}/_{10}$ INV (2)	$^{7}/_{10}$ INV (2)
tdC1 (1)	**[Auto DC inj. time 1]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** • **Long periods of DC injection braking can cause overheating and damage the motor.** • **Protect the motor by avoiding long periods of DC injection braking.** **Failure to follow these instructions can result in equipment damage.** Standstill injection time. This parameter can be accessed if **[Auto DC injection]**(AdC) is not set to **[No]**(nO). If **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn), this time corresponds to the zero speed maintenance time.	0.1 to 30.0 s	0.5 s
SdC2 (1)	**[Auto DC inj. level 2]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.** 2nd level of standstill DC injection current. This parameter can be accessed if **[Auto DC injection]**(AdC) is not **[No]**(nO).	0.0 to $^{12}/_{10}$ INV (2)	$^{5}/_{10}$ INV (2)
tdC2 (1)	**[Auto DC inj. time 2]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** • **Long periods of DC injection braking can cause overheating and damage the motor.** • **Protect the motor by avoiding long periods of DC injection braking.** **Failure to follow these instructions can result in equipment damage.** 2nd standstill injection time. This parameter can be accessed if **[Auto DC injection]**(AdC) is set to **[Yes]**(YES).	0.0 to 30.0 s	0.0 s

AdC	SdC2
YES	x
Ct	≠ 0
Ct	= 0
Run command	
Speed	



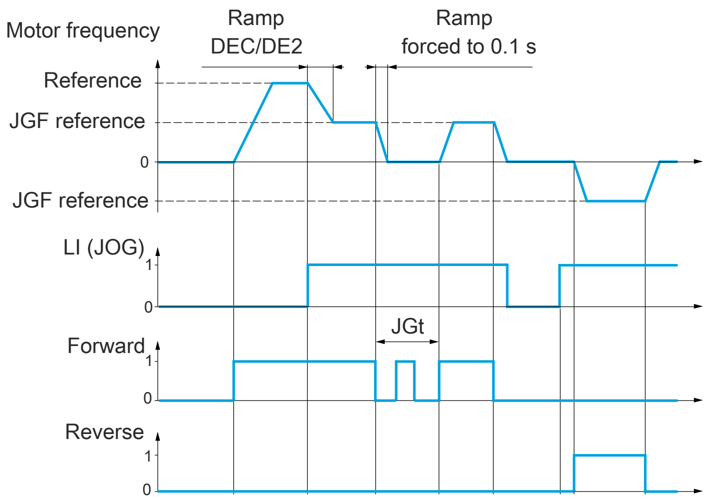
(1) The parameter can also be accessed in the **[SETTINGS]**(SEt-) menu.
(2) In corresponds to the rated drive current indicated in the Installation chapter and on the drive nameplate.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

3.2.3.6.6.6 JOG

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > JOG-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
JOG-	[JOG] **Note:** **This function cannot be used with certain other functions.**		
JOG	[JOG] Pulse operation. The JOG function is only active if the command channel and the reference channels are on the terminals. The function is active when the assigned input or bit is at 1. Example: 2-wire control operation (tCC = 2C).  		[LI3](LI3)
nO LI1 ...	[No](nO): Not assigned [LI1](LI1): Logical input LI1 [...](...): See the assignment conditions (not [Cd00](Cd00) to [Cd15](Cd15)) (If [Profile](CHCF) is set to [Not Separ.](SIM) or [Separate](SEP) then [CD11](Cd11) up to [CD15](Cd15), [C111](C111) up to [C115](C115), [C211](C211) up to [C215](C215) and [C311](C311) up to [C315](C315) are not available).		
JGF ★ (1)	[Jog frequency] Reference in jog operation. This parameter can be accessed if [JOG](JOG) is not set to [No](nO).	0.0 to 10.0 Hz	10.0 Hz
JGt ★ (1)	[Jog delay] Anti-repeat delay between 2 consecutive jog operations. This parameter can be accessed if [JOG](JOG) is not set to [No](nO).	0.0 to 2.0 s	0.5 s

(1) The parameter can also be accessed in the [SETTINGS](SEt-) menu.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.6.7 PRESET SPEEDS

2, 4, 8 or 16 speeds can be preset, requiring 1, 2, 3 or 4 logic inputs respectively.

Note:

You must configure 2 and 4 speeds in order to obtain 4 speeds.

You must configure 2, 4 and 8 speeds in order to obtain 8 speeds.

You must configure 2, 4, 8 and 16 speeds in order to obtain 16 speeds.

Combination table for preset speed inputs

16 speeds LI (PS16)	8 speeds LI (PS8)	4 speeds LI (PS4)	2 speeds LI (PS2)	Speed reference
0	0	0	0	Reference (1)
0	0	0	1	SP2
0	0	1	0	SP3
0	0	1	1	SP4
0	1	0	0	SP5
0	1	0	1	SP6
0	1	1	0	SP7
0	1	1	1	SP8
1	0	0	0	SP9
1	0	0	1	SP10
1	0	1	0	SP11
1	0	1	1	SP12
1	1	0	0	SP13
1	1	0	1	SP14
1	1	1	0	SP15
1	1	1	1	SP16

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > PSS-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
PSS-	[PRESET SPEEDS] **Note:** **This function cannot be used with certain other functions.**		
PS2 nO LI1 ...	[2 preset speeds] [No](nO): Not assigned [LI1](LI1): Logical input LI1 [...](...): See the assignment conditions		[No](nO)
PS4	[4 preset speeds] Identical to [2 preset speeds](PS2). To obtain 4 speeds, you must also configure 2 speeds.		[No](nO)
PS8	[8 preset speeds] Identical to [2 preset speeds](PS2). To obtain 8 speeds, you must also configure 2 and 4 speeds.		[No](nO)
PS16	[16 preset speeds] Identical to [2 preset speeds](PS2). To obtain 16 speeds, you must also configure 2, 4 and 8 speeds.		[No](nO)
SP2 (1)	[Preset speed 2] Preset speed 2.	0.0 to 599.0 Hz	10.0 Hz
SP3 (1)	[Preset speed 3] Preset speed 3.	0.0 to 599.0 Hz	15.0 Hz
SP4 (1)	[Preset speed 4] Preset speed 4.	0.0 to 599.0 Hz	20.0 Hz
SP5 (1)	[Preset speed 5] Preset speed 5.	0.0 to 599.0 Hz	25.0 Hz
SP6 (1)	[Preset speed 6] Preset speed 6.	0.0 to 599.0 Hz	30.0 Hz
SP7 (1)	[Preset speed 7] Preset speed 7.	0.0 to 599.0 Hz	35.0 Hz
SP8 (1)	[Preset speed 8] Preset speed 8.	0.0 to 599.0 Hz	40.0 Hz
SP9 (1)	[Preset speed 9] Preset speed 9.	0.0 to 599.0 Hz	45.0 Hz
SP10 (1)	[Preset speed 10] Preset speed 10.	0.0 to 599.0 Hz	50.0 Hz

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > PSS-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
SP11 (1)	**[Preset speed 11]** Preset speed 11.	0.0 to 599.0 Hz	55.0 Hz
SP12 (1)	**[Preset speed 12]** Preset speed 12.	0.0 to 599.0 Hz	60.0 Hz
SP13 (1)	**[Preset speed 13]** Preset speed 13.	0.0 to 599.0 Hz	70.0 Hz
SP14 (1)	**[Preset speed 14]** Preset speed 14.	0.0 to 599.0 Hz	80.0 Hz
SP15 (1)	**[Preset speed 15]** Preset speed 15.	0.0 to 599.0 Hz	90.0 Hz
SP16 (1)	**[Preset speed 16]** Preset speed 16. The appearance of these **[Preset speed x]**(SPx) parameters is determined by the number of speeds configured.	0.0 to 599.0 Hz	100.0 Hz
JPF	**[Skip Frequency]** Skip frequency. This parameter helps to prevent prolonged operation within an adjustable range around the regulated frequency. This function can be used to help to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.	0.0 to 599.0 Hz	0.0 Hz
JF2	**[Skip Frequency 2]** 2nd skip frequency. This parameter helps to prevent prolonged operation within an adjustable range around the regulated frequency. This function can be used to help to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.	0.0 to 599.0 Hz	0.0 Hz
JF3	**[3rd Skip Frequency]** 3rd skip frequency. This parameter helps to prevent prolonged operation within an adjustable range around the regulated frequency. This function can be used to help to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.	0.0 to 599.0 Hz	0.0 Hz
JFH	**[Skip.Freq.Hysteresis]** This parameter is visible if at least one skip frequency **[Skip Frequency]**(JPF), **[Skip Frequency 2]**(JF2) or **[3rd Skip Frequency]**(JF3) is different from 0. Skip frequency range: between (JPF – JFH) and (JPF + JFH), for example. This adjustment is common to the 3 frequencies (JPF, JF2, JF3).	0.1 to 10.0 Hz	1.0 Hz

(1) The parameter can also be accessed in the **[SETTINGS]**(SEt-) menu.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.6.8 +/- SPEED

Two types of operations are available:

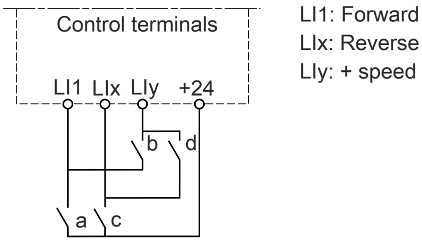
- **Use of single action keys:** Two logic inputs are required in addition to the operating direction(s). The input assigned to the “+speed” command increases the speed, the input assigned to the “-speed” command decreases the speed.
- **Use of double action keys:** Only one logic input assigned to “+speed” is required.

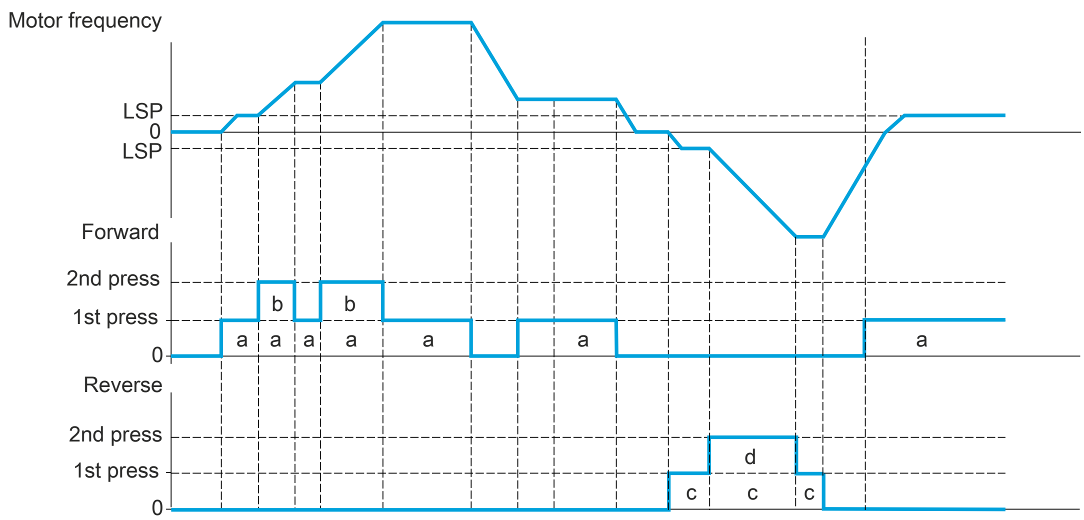
+/- speed with double-press buttons:

Description: 1 button pressed twice (2 steps) for each direction of rotation. A contact closes each time the button is pressed.

	Released (- speed)	1st press (speed maintained)	2nd press (faster)
Forward button	-	a	a and b
Reverse button	-	c	c and d

Example of wiring:





Do not use this +/- speed type with 3-wire control.

Whichever type of operation is selected, the max. speed is set by [High speed](HSP).

Note:

If the reference is switched via [Ref. 2 switching](rFC) from any one reference channel to another reference channel with "+/- speed", the value of reference [Output frequency](rFr) (after ramp) may be copied at the same time in accordance with the [Copy channel 1 --> 2](COP) parameter.

If the reference is switched via [Ref. 2 switching](rFC) from one reference channel to any other reference channel with "+/- speed", the value of reference [Output frequency](rFr) (after ramp) is copied at the same time.

This helps to prevent the speed being incorrectly reset to zero when switching takes place.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > UPd-		
Code	**Name / Description**	**Factory setting**
UPd-	**[+/- SPEED]** This function can be accessed if reference channel **[Ref.2 channel]**(Fr2) is set to **[+/-Speed]**(UPdt). **Note:** **This function cannot be used with certain other functions.**	
USP	**[+ speed assignment]** Function active if the assigned input or bit is at 1.	**[No]**(nO)
nO LI1 ...	**[No]**(nO): Not assigned **[LI1]**(LI1): Logical input LI1 **[...]**(...): See the assignment conditions (Cd00 to Cd15 applicable when **[Profile]**(CHCF) = **[I/O profile]**(IO))	
dSP	**[-Speed assignment]** Function active if the assigned input or bit is at 1.	**[No]**(nO)
Str ★	**[Reference saved]** Associated with the "+/- speed" function, this parameter can be used to save the reference: • When the run commands disappear (saved to RAM) • When the line supply or the run commands disappear (saved to EEPROM) Therefore, the next time the drive starts up, the speed reference is the last reference saved.	**[No]**(nO)
nO rAM EEP	**[No]**(nO): No save (the next time the drive starts up, the speed reference is **[Low speed]**(LSP) **[RAM]**(rAM): Saved in RAM **[EEprom]**(EEP): Saved in EEPROM	

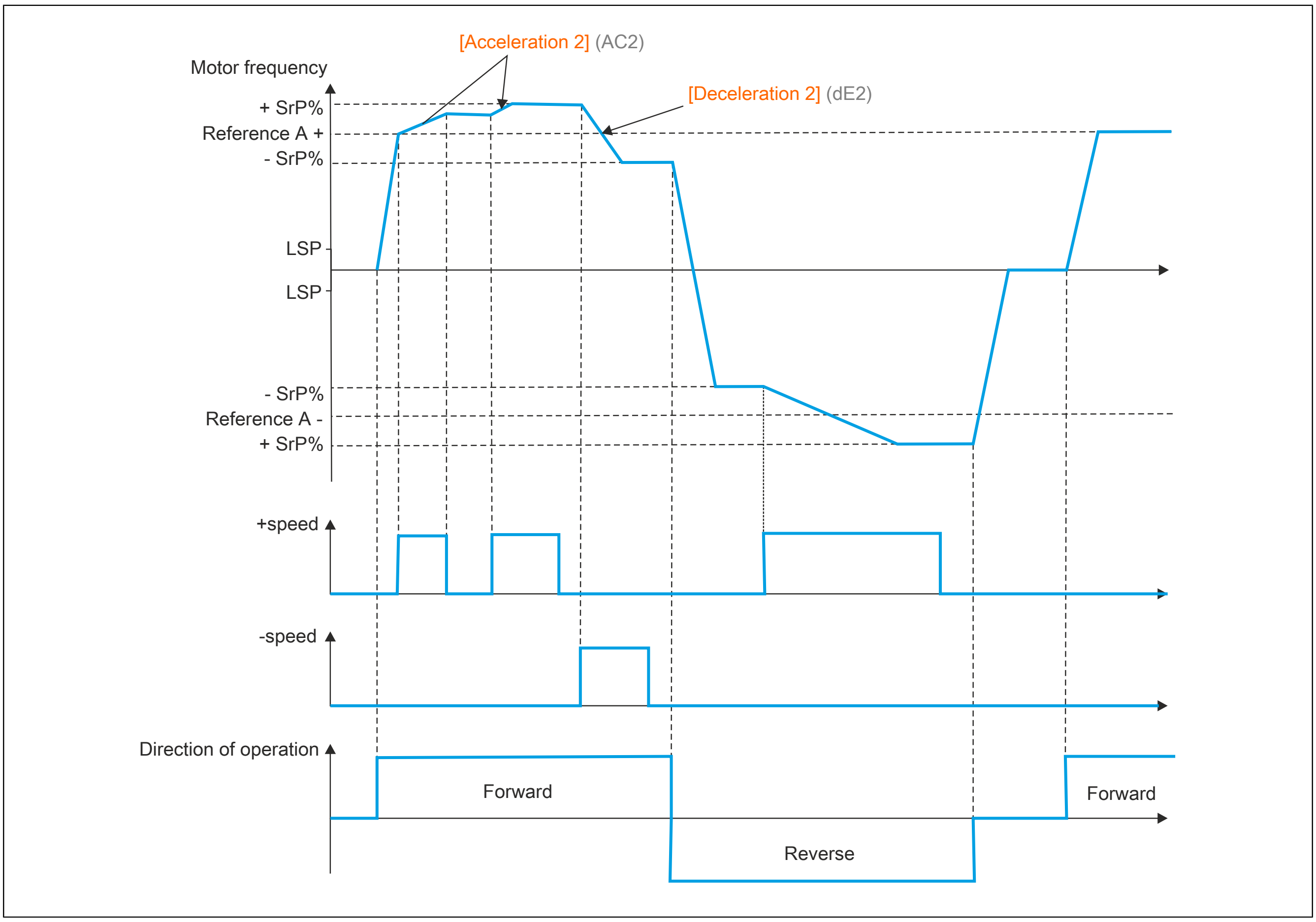
★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.3.6.6.9 +/- SPEED AROUND A REFERENCE

The reference is given by **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b) with summing/subtraction/multiplication functions and preset speeds if relevant. For improved clarity, we will call this reference A. The action of the +speed and -speed keys can be set as a % of this reference A. On stopping, the reference (A +/- speed) is not saved, so the drive restarts with reference A+ only.

The maximum total reference is limited by **[High speed]**(HSP) and the minimum reference by **[Low speed]**(LSP).

Example of 2-wire control:



Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > SrE-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
SrE-	**[+/-SPEED AROUND REF.]** The function can be accessed for reference channel **[Ref.1 channel]**(Fr1). **Note:** **This function cannot be used with certain other functions.**		
USI	**[+ speed assignment]**		**[No]**(nO)
nO	**[No]**(nO): Not assigned		
LI1	**[LI1]**(LI1): Logical input LI1		
...	**[...]**(...): See the assignment conditions		
dSI	**[-Speed assignment]** Function active if the assigned input or bit is at 1.		**[No]**(nO)
SrP	**[+/-Speed limitation]** This parameter limits the variation range with +/- speed as a % of the reference. The ramps used in this function are **[Acceleration 2]**(AC2) and **[Deceleration 2]**(dE2). This parameter can be accessed if +/- speed is assigned.	0 to 50%	10%
AC2 (1)	**[Acceleration 2]** Time to accelerate from 0 to the **[Rated motor freq.]**(FrS). To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. This parameter can be accessed if **[+/- speed]**(tUd) is assigned.	0.00 to 6000 s (2)	5.0 s
dE2 (1)	**[Deceleration 2]** Time to decelerate from the **[Rated motor freq.]**(FrS) to 0. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. This parameter can be accessed if **[+/- speed]**(tUd) is assigned.	0.00 to 6000 s (2)	5.0 s

(1) The parameter can also be accessed in the **[SETTINGS]**(SEt-) menu.
(2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to **[Ramp increment]**(Inr).

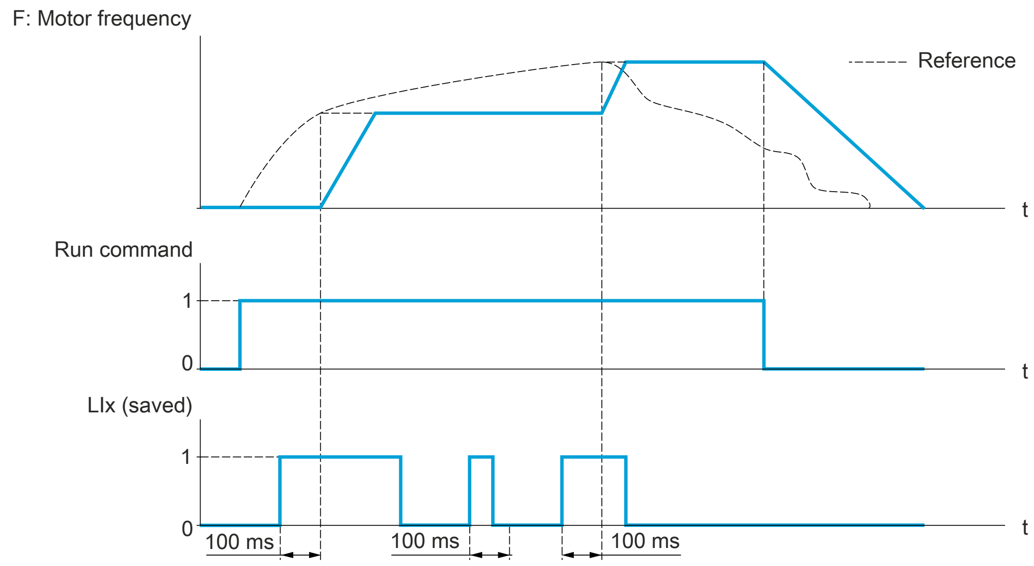
These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.6.10 REFERENCE MEMORIZING

Saving a speed reference value using a logic input command lasting longer than 0.1 s.

- This function is used to control the speed of several drives alternately via a single analog reference and one logic input for each drive.
- It is also used to confirm a line reference (communication bus or network) on several drives via a logic input. This allows movements to be synchronized by getting rid of variations when the reference is set.
- The reference is acquired 100 ms after the rising edge of the request. A new reference is not then acquired until a new request is made.



Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > SPM-		
Code	**Name / Description**	**Factory setting**
SPM-	**[MEMO REFERENCE]**	
SPM	**[Ref. memo ass.]** Assignment to a logic input. Function active if the assigned input is at active state.	**[No]**(nO)
nO	**[No]**(nO): Not assigned	
LI1	**[LI1]**(LI1): Logical input LI1	
...	**[...]**(...): See the assignment conditions	

3.2.3.6.6.11 FLUXING BY LOGIC INPUT

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > FLI-		
Code	**Name / Description**	**Factory setting**
FLI-	**[FLUXING BY LI]**	
FLU ★ ⟳ ⧗ 2 s (1)	**[Motor fluxing]** **Danger!** **HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH** **When [Motor fluxing](FLU) is set to [Continuous](FCt), the drive automatically builds up flux.** **Check this action will not endanger personnel or equipment in any way.** **Failure to follow these instructions will result in death or serious injury.** **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.**	**[No]**(FnO)
FnC	**[Not cont.]**(FnC): Non-continuous mode	
FCt	**[Continuous]**(FCt): Continuous mode This option is not possible if **[Auto DC injection]**(AdC) is **[Yes]**(YES) or if **[Type of stop]**(Stt) is **[Freewheel]**(nSt).	
FnO	**[No]**(FnO): Function inactive In order to obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor. In **[Continuous]**(FCt) mode, the drive automatically builds up flux when it is powered up. In **[Not cont.]**(FnC) mode, fluxing occurs when the motor starts up. The flux current is greater than **[Rated mot. current]**(nCr) (configured rated motor current) when the flux is established and is then adjusted to the motor magnetizing current. If **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn), the **[Motor fluxing]**(FLU) parameter causes the alignment of the rotor and not the fluxing. If **[Brake assignment]**(bLC) is not **[No]**(nO), the **[Motor fluxing]**(FLU) parameter has no effect.	
FLI ★	**[Fluxing assignment]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.** Assignment is only possible if **[Motor fluxing]**(FLU) is set to **[Not cont.]**(FnC). If an LI or a bit is assigned to the motor fluxing command, flux is built up when the assigned input or bit is at 1. If an LI or a bit has not been assigned or if the assigned LI or bit is at 0 when a run command is sent, fluxing occurs when the motor starts.	**[No]**(nO)
nO	**[No]**(nO): Not assigned	
LI1	**[LI1]**(LI1): Logical input LI1	
...	**[...]**(...): See the assignment conditions	
ASt ★	**[Angle setting type]** Mode for measuring the phase-shift angle. Visible only if **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn). **[PSI align]**(PSI) and **[PSIO align]**(PSIO) are working for all type of synchronous motors. **[SPM align]**(SPMA) and **[IPM align]**(IPMA) increase performances depending on the type of synchronous motor.	**[PSIO align.]**(PSIO)
IPMA	**[IPM align]**(IPMA): Alignment for IPM motor. Alignment mode for Interior-buried Permanent Magnet motor (usually, this kind of motor has a high saliency level). It uses high frequency injection, which is less noisy than standard alignment mode.	
SPMA	**[SPM align]**(SPMA): Alignment for SPM motor. Mode for Surface-mounted Permanent Magnet motor (usually, this kind of motor has a medium or low saliency level). It uses high frequency injection, which is less noisy than standard alignment mode.	
PSI	**[PSI align]**(PSI): Pulse signal injection. Standard alignment mode by pulse signal injection.	
PSIO	**[PSIO align]**(PSIO): Pulse signal injection - Optimized. Standard optimized alignment mode by pulse signal injection. The phase-shift angle measurement time is reduced after the first run order or tune operation, even if the drive has been turned off.	
nO	**[No align]**(nO): No alignment	

(1) The parameter can also be accessed in the **[SETTINGS]**(SEt-) menu.

★	These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.
⟳	Parameter that can be modified during operation or when stopped.
⧗ 2 s	To change the assignment of this parameter, press the ENT key for 2 seconds.

3.2.3.6.6.12 BRAKE LOGIC CONTROL

Used to control an electromagnetic brake by the drive for horizontal and vertical hoisting applications and for unbalanced machines.

Principle:

- Vertical hoisting movement:
  Maintain motor torque in the driving load holding direction during brake opening and closing, in order to hold the load, start smoothly when the brake is released and stop smoothly when the brake is engaged.
- Horizontal movement:
  Synchronize brake release with the build-up of torque during startup and brake engage at zero speed on stopping, to help to prevent jolting.

Recommended settings for brake logic control for a vertical hoisting application:

Warning!

LOSS OF CONTROL

- **Check that the selected settings and configurations will not result in the dropping or loss of control of the load being lifted.**
- **Follow the recommendations below.**

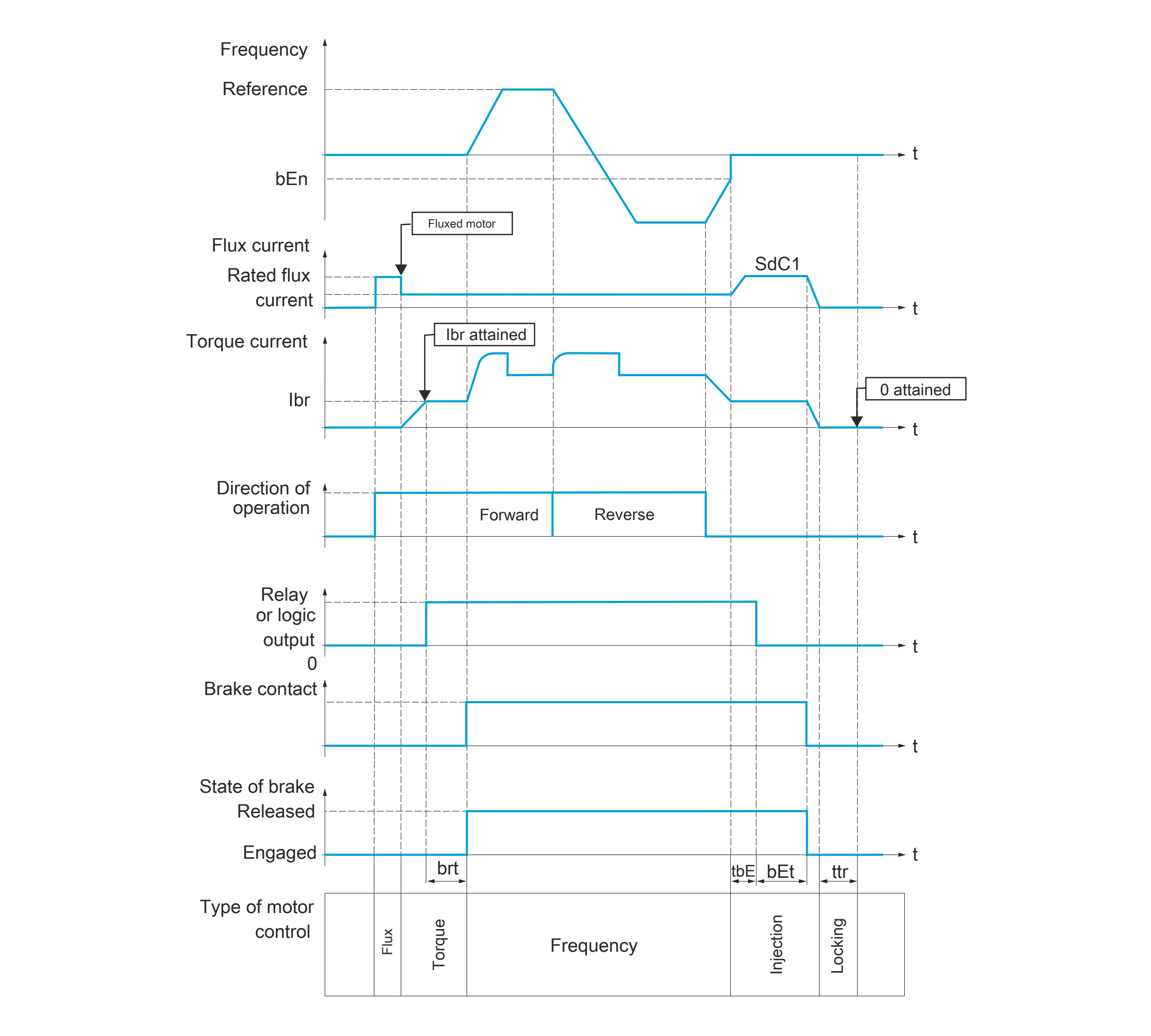
Failure to follow these instructions can result in death, serious injury or equipment damage.

- **[Brake impulse]**(bIP): **[Yes]**(YES). Ensure that the direction of rotation FW corresponds to lifting the load. For applications in which the load being lowered is very different from the load being lifted, set bIP = 2 Ibr (for example, ascent always with a load and descent always without a load).
- Brake release current (**[Brake release I FW]**(Ibr) and **[Brake release I Rev]**(Ird) if **[Brake impulse]**(bIP) = 2 Ibr): Adjust the brake release current to the rated current indicated on the motor.
  During testing, adjust the brake release current in order to hold the load smoothly.
- Acceleration time: For hoisting applications, it is advisable to set the acceleration ramps to more than 0.5 seconds. Ensure that the drive does not exceed the current limit.
  The same recommendation applies for deceleration.
  Reminder: For a hoisting movement, a braking resistor should be used.
- **[Brake Release time]**(brt): Set according to the type of brake. It is the time required for the mechanical brake to release.
- **[Brake release frequency]**(bIr), in open-loop mode only: Leave in **[Auto]**(AUtO), adjust if necessary.
- **[Brake engage frequency]**(bEn): Leave in **[Auto]**(AUtO), adjust if necessary.
- **[Brake engage time]**(bEt): Set according to the type of brake. It is the time required for the mechanical brake to engage.

Recommended settings for brake logic control for a horizontal hoisting application:

- **[Brake impulse]**(bIP): No
- **[Brake release I FW]**(Ibr): Set to 0.
- **[Brake Release time]**(brt): Set according to the type of brake. It is the time required for the mechanical brake to release.
- **[Brake engage frequency]**(bEn), in open-loop mode only: Leave in **[Auto]**, adjust if necessary.
- **[Brake engage time]**(bEt): Set according to the type of brake. It is the time required for the mechanical brake to engage.

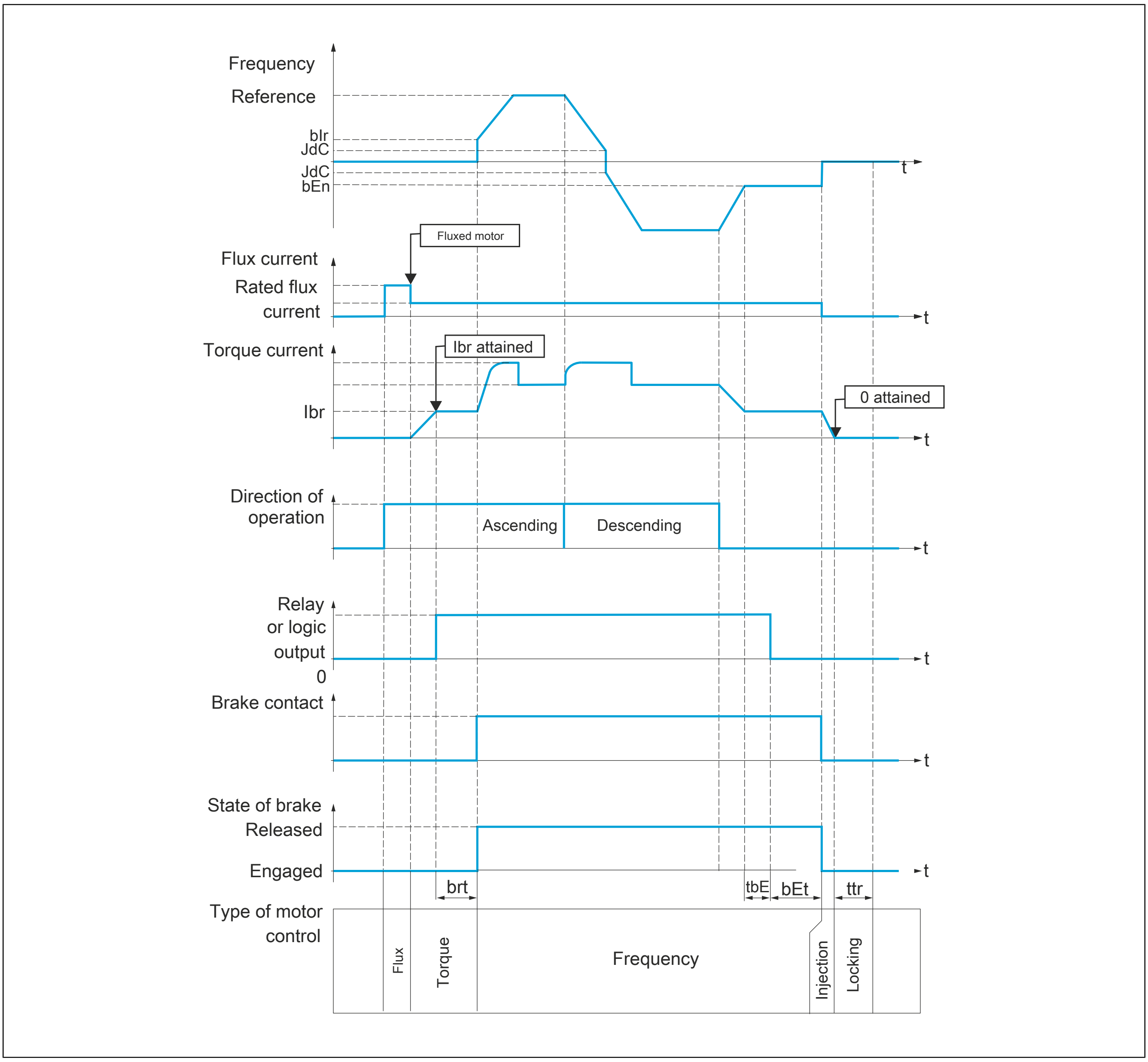
Brake logic control, horizontal movement in open-loop mode



Key:

- (bEn): **[Brake engage freq]**
- (bEt): **[Brake engage time]**
- (brt): **[Brake Release time]**
- (Ibr): **[Brake release I FW]**
- (SdC1): **[Auto DC inj. level 1]**
- (tbE): **[Brake engage delay]**
- (ttr): **[Time to restart]**

Brake logic control, vertical movement in open-loop mode



Key:

- (bEn): **[Brake engage freq]**
- (bEt): **[Brake engage time]**
- (bIr): **[Brake release freq]**
- (brt): **[Brake Release time]**
- (Ibr): **[Brake release I FW]**
- (JdC): **[Jump at reversal]**
- (tbE): **[Brake engage delay]**
- (ttr): **[Time to restart]**

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > bLC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
bLC-	**[BRAKE LOGIC CONTROL]** **Note:** **This function cannot be used with certain other functions.**		
bLC	**[Brake assignment]** Logic output or control relay. **Note:** **If the brake is assigned, only a ramp stop is possible. Check the [Type of stop](Stt).** Brake logic control can only be assigned if **[Motor control type]**(Ctt) is not set to **[Standard]**(Std), **[V/F 5pts]**(UF5), **[V/F Quad.]**(UFq) or **[Sync. mot]**(SYn).		**[No]**(nO)
nO r2 LO1 dO1	**[No]**(nO): Function not assigned (in this case, none of the function parameters can be accessed) **[R2]**(r2): Relay **[LO1]**(LO1): Logic output **[dO1]**(dO1): Analog output AO1 functioning as a logic output. Selection can be made if **[AO1 assignment]**(AO1) is set to **[No]**(nO).		
bSt	**[Movement type]**		**[Hoisting]**(UEr)
HOr	**[Traveling]**(HOr): Resistive-load movement (translational motion of overhead crane, for example) **Note:** **If [Motor control type](Ctt) is set to [Standard](Std) or [V/F 5pts](UF5), [Movement type](bSt) is forced to [Traveling](HOr).**		
UEr	**[Hoisting]**(UEr): Driving-load movement (hoisting winch, for example) **Note:** **If [Weight sensor ass.](PES) is not [No](nO), [Movement type](bSt) is forced to [Hoisting](UEr).**		
bCI	**[Brake contact]** If the brake has a monitoring contact (closed for released brake).		**[No]**(nO)
nO LI1 ...	**[No]**(nO): Not assigned **[LI1]**(LI1): Logical input LI1 **[...]**(...): See the assignment conditions		
bIP	**[Brake impulse]** Brake impulse. This parameter can be accessed if **[Weight sensor ass.]**(PES) is set to **[No]**(nO). It is set to **[Yes]**(YES) if **[Movement type]**(bSt) is set to **[Hoisting]**(UEr).		**[Yes]**(YES)
nO YES 2Ibr	**[No]**(nO): The motor torque is given in the required operating direction at current **[Brake release I FW]**(Ibr) **[Yes]**(YES): The motor torque is in forward direction (check that this direction corresponds to ascending) at current **[Brake release I FW]**(Ibr) **[2 IBR]**(2Ibr): The torque is in the required direction at current **[Brake release I FW]**(Ibr) for Forward and **[Brake release I Rev]**(Ird) for Reverse, for certain specific applications		
Ibr (1)	**[Brake release I FW]** Brake release current threshold for ascending or forward movement. This parameter can be accessed if **[Weight sensor ass.]**(PES) is set to **[No]**(nO).	0.0 to $^{34}/_{25}$ INV (2)	0.0 A
Ird	**[Brake release I Rev]** Brake release current threshold for descending or reverse movement. This parameter can be accessed if **[Brake impulse]**(bIP) is set to **[2 IBR]**(2Ibr).	0.0 to $^{34}/_{25}$ INV (2)	0.0 A
brt (1)	**[Brake Release time]** Brake release time delay.	0.00 to 5.00 s	0.00 s
bIr (1)	**[Brake release freq]** Brake release frequency threshold (initialization of acceleration ramp). This parameter can be accessed if **[Movement type]**(bSt) is set to **[Hoisting]**(UEr).	**[Auto]**(AUtO) to 10.0 Hz	**[Auto]**(AUtO)
AUtO	**[Auto]**(AUtO): The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters **0 to 10 Hz**: Manual control		

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > bLC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
bEn ★ (1)	**[Brake engage freq]** Brake engage frequency threshold. **Note:** **[Brake engage freq](bEn) cannot be higher than [Low speed](LSP).**	[Auto](AUtO) to 10.0 Hz	[Auto](AUtO)
AUtO	[Auto](AUtO): The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters 0 to 10 Hz: Manual control.		
tbE ★ (1)	**[Brake engage delay]** **Warning!** **LOSS OF CONTROL** **Modify the Brake engage delay for horizontal movement only otherwise the control of the load can be lost.** **Failure to follow these instructions can result in death, serious injury or equipment damage.** Time delay before request to engage brake.	0.00 to 5.00 s	0.00 s
bEt ★ (1)	**[Brake engage time]** Brake engage time (brake response time).	0.00 to 5.00 s	0.00 s
SdC1 ★ (1)	**[Auto DC inj. level 1]** **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.** Level of standstill DC injection current. **Note:** **This parameter can be accessed if [Movement type](bSt) is set to [Traveling](HOr).**	0.0 to $^{12}/_{10}$ INV (2)	$^{7}/_{10}$ INV (2)
bEd ★	**[Engage at reversal]** Can be used to select whether or not the brake engages on transition to zero speed when the operating direction is reversed.		[No](nO)
nO	[No](nO): The brake does not engage		
YES	[Yes](YES): The brake engages		
JdC ★ (1)	**[Jump at reversal]** This parameter can be accessed if [Movement type](bSt) is set to [Hoisting](UEr).	[Auto](AUtO) to 10.0 Hz	[Auto](AUtO)
AUtO	[Auto](AUtO): The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters		
-	0 to 10 Hz: Manual control When the reference direction is reversed, this parameter can be used to avoid loss of torque (and consequential release of load) on transition to zero speed. Parameter is not applicable if [Engage at reversal](bEd) = [Yes](YES).		
ttr ★ (1)	**[Time to restart]** Time between the end of a brake engage sequence and the start of a brake release sequence.	0.00 to 15.00 s	0.00 s

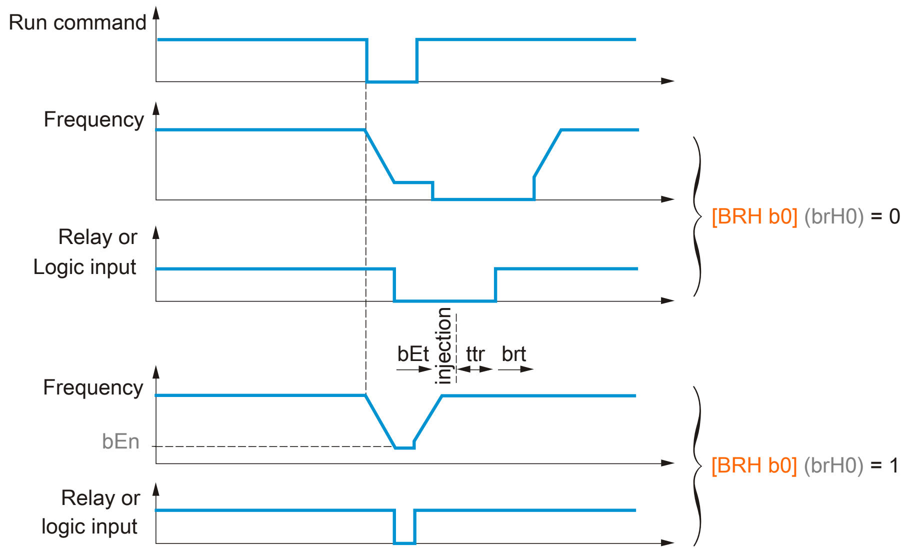
(1) The parameter can also be accessed in the [SETTINGS](SEt-) menu.
(2) In corresponds to the rated drive current indicated in the Installation chapter and on the drive nameplate.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

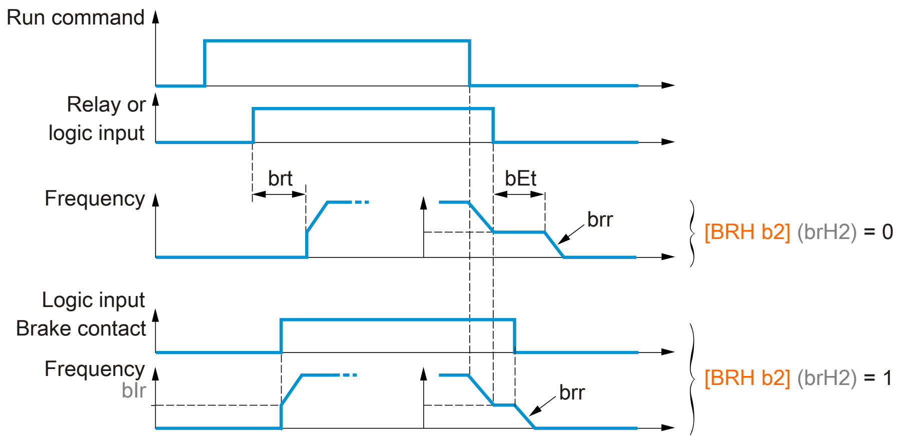
Parameter that can be modified during operation or when stopped.

Brake control logic expert parameters

Following parameters for brake logic sequence are accessible in expert mode only.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > bLC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
bLC-	**[BRAKE LOGIC CONTROL]** **Note:** **This function cannot be used with certain other functions.**		
brH0 0 1	**[BRH b0]** Selection of the brake restart sequence if a run command is repeated while the brake is engaging. **[0]**(0): The engage/release sequence is completely executed **[1]**(1): The brake is released immediately A run command may be requested during the brake engagement phase. Whether or not the brake release sequence is executed depends on the value selected for **[BRH b0]**(brH0).  **Note:** **If a run command is requested during the "ttr" phase, the complete brake control sequence is initialized.**		0
brH1 0 1	**[BRH b1]** Deactivation of the brake contact in steady state fault. **[0]**(0): The brake contact in steady state fault is active (fault state if the contact is open during operation). The **[Brake feedback]**(brF) brake contact fault is monitored in all operating phases. **[1]**(1): The brake contact in steady state fault is inactive. The **[Brake feedback]**(brF) brake contact fault is only monitored during the brake release and engage phases.		0

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > bLC-

Code	Name / Description	Adjustment range	Factory setting
brH2	**[BRH b2]**		0
	Taking the brake contact into account for the brake control sequence.		
0 1	**[0]**(0): The brake contact is not taken into account **[1]**(1): The brake contact is taken into account		
	If a logic input is assigned to the brake contact: • **[BRH b2]**(brH2) = 0: During the brake release sequence, the reference is enabled at the end of the time **[Brake Release time]**(brt). During the brake engage sequence, the current changes to 0 according to the ramp **[Current ramp time]**(brr) at the end of the **[Brake engage time]**(bEt). • **[BRH b2]**(brH2) = 1: When the brake is released, the reference is enabled when the logic input changes to 1. When the brake is engaged, the current changes to 0 according to the ramp **[Current ramp time]**(brr) when the logic input changes to 0.		
			
brr	**[Current ramp time]**	0.00 to 5.00 s	0.00 s
	Torque current ramp time (increase and decrease) for a current variation equal to **[Brake release I FW]**(Ibr).		

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

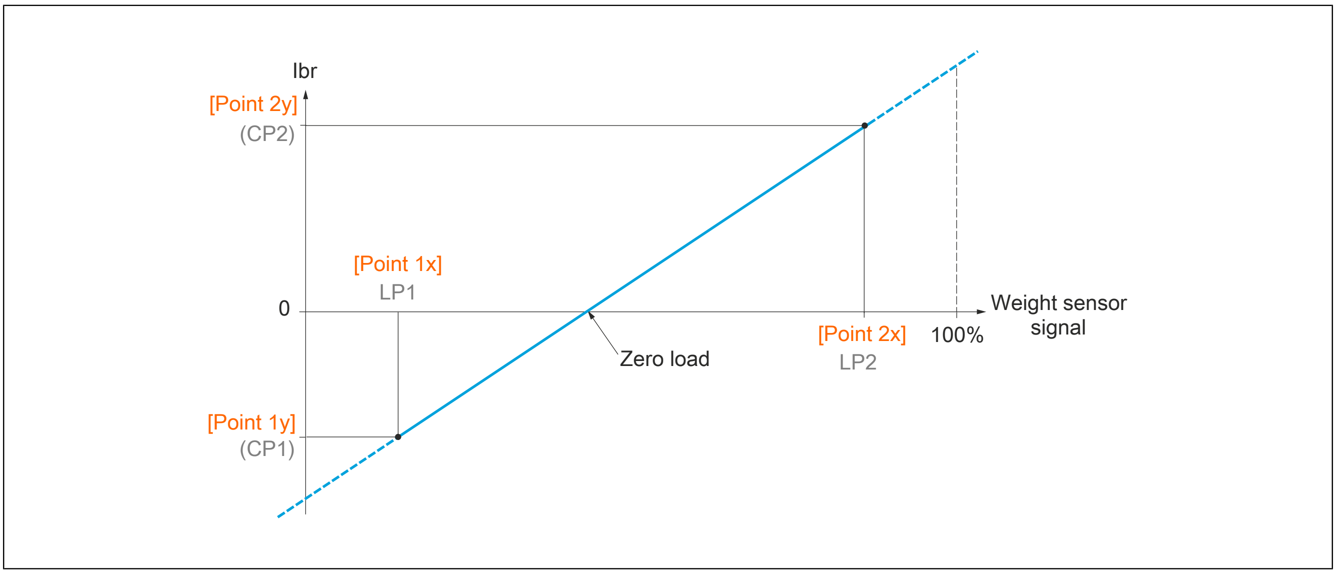
3.2.3.6.6.13 EXTERNAL WEIGHT MEASUREMENT

Load measurement

This function uses the information supplied by a weight sensor to adapt the current **[Brake release I FW]**(Ibr) of the **[BRAKE LOGIC CONTROL]**(bLC-) function. The signal from the weight sensor can be assigned to an analog input (usually a 4 to 20 mA signal) or to the pulse-in input, according to the type of weight sensor.

Example: Measurement of the total weight of a hoisting winch and its load.

The current **[Brake release I FW]**(Ibr) is adapted in accordance with the curve below.



Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > ELM-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
ELM-	**[EXTERNAL WEIGHT MEAS.]**		
PES	**[Weight sensor ass.]** **Warning!** **LOSS OF CONTROL** **Check that [Point 1 X](LP1), [Point 2x](LP2), [Point 1Y](CP1) and [Point 2Y](CP2) are correctly set to avoid loss of control of the load being lifted.** **Failure to follow these instructions can result in death, serious injury or equipment damage.** This parameter can be configured if **[BRAKE LOGIC CONTROL]**(bLC-) is not set to **[No]**(nO).		**[No]**(nO)
nO	**[No]**(nO): Not assigned		
AI1	**[AI1]**(AI1): Analog input A1		
AI2	**[AI2]**(AI2): Analog input A2		
AI3	**[AI3]**(AI3): Analog input A3		
PI	**[RP]**(PI): Pulse input		
AIU1	**[AI virtual 1]**(AIU1): Virtual analog input 1 with the jog dial		
AIU2	**[AI virtual 2]**(AIU2): Virtual analog input 2 by the communication bus		
OA01	**[OA01]**(OA01): Function blocks: Analog output 01		
...	**...**		
OA10	**[OA10]**(OA10): Function blocks: Analog output 10		
LP1	**[Point 1X]** 0 to 99.99% of signal on assigned input. **[Point 1x]**(LP1) must be less than **[Point 2x]**(LP2). This parameter can be accessed if **[Weight sensor ass.]**(PES) is assigned.	0.00 to **[Point 2X]**(LP2) - 0.01%	0.00%
CP1	**[Point 1Y]** Current corresponding to load **[Point 1 X]**(LP1) in A. This parameter can be accessed if **[Weight sensor ass.]**(PES) is assigned.	-$^{34}/_{25}$ to $^{34}/_{25}$ INV (1)	-1.0 INV (1)
LP2	**[Point 2X]** 0.01 to 100% of signal on assigned input. **[Point 2x]**(LP2) must be greater than **[Point 1x]**(LP1). This parameter can be accessed if **[Weight sensor ass.]**(PES) is assigned.	**[Point 1X]**(LP1) + 0.01 to 100.00%	50.00%
CP2	**[Point 2Y]** Current corresponding to load **[Point 2x]**(LP2) in A. This parameter can be accessed if **[Weight sensor ass.]**(PES) is assigned.	-$^{34}/_{25}$ to $^{34}/_{25}$ INV (1)	0.0 A
IbrA	**[Ibr 4-20 mA loss]** Brake release current in the event of the loss of the weight sensor information. This parameter can be accessed if the weight sensor is assigned to an analog current input and the 4 to 20 mA loss is deactivated. Recommended settings: Rated motor current for a hoisting application.	0.0 to $^{34}/_{25}$ INV (1)	0.0 A

(1) In corresponds to the rated drive current indicated in the Installation chapter and on the drive nameplate.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

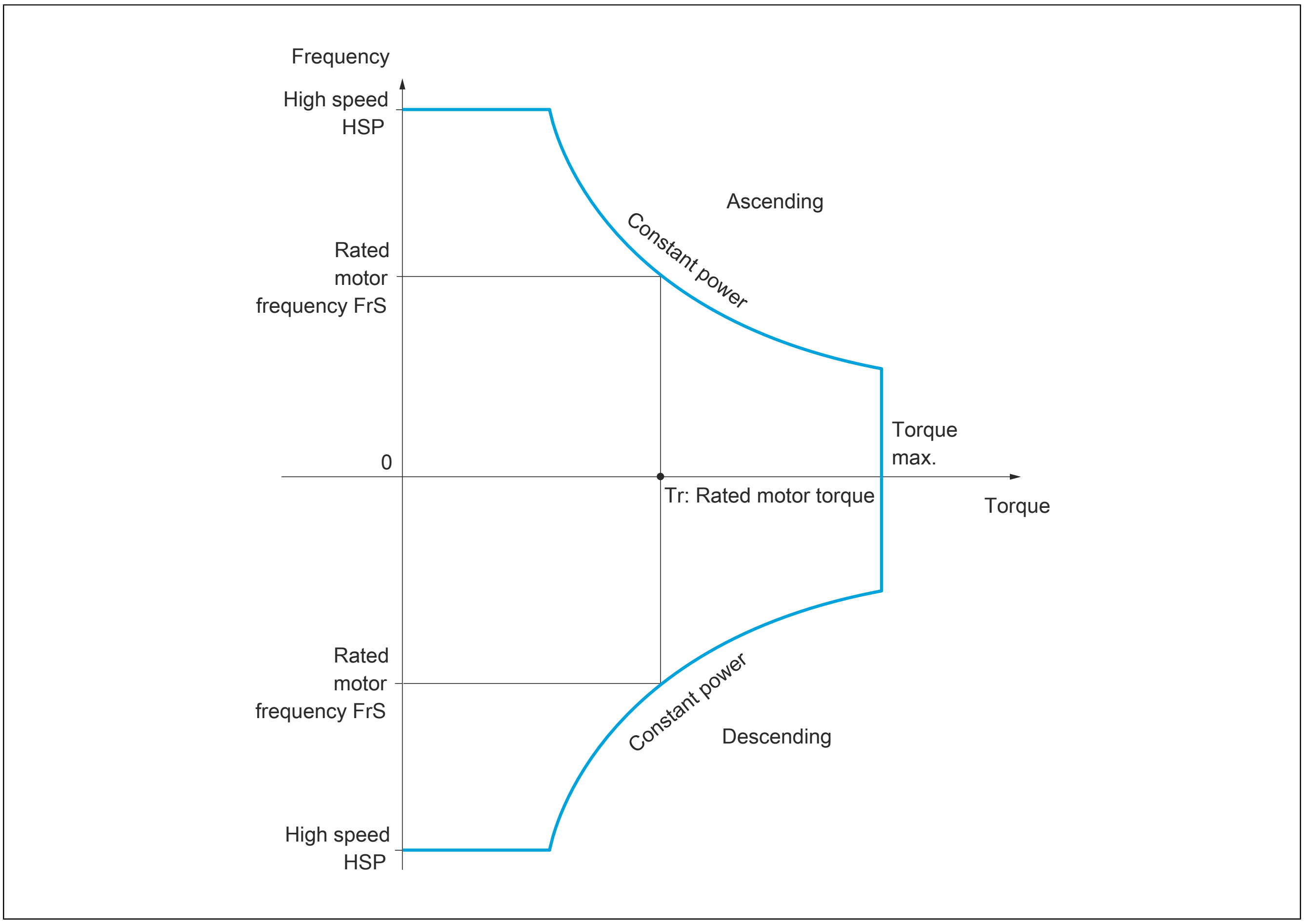
3.2.3.6.6.14 HIGH SPEED HOISTING

This function can be used to optimize the cycle times for hoisting movements for zero or lightweight loads. It authorizes operation at "constant power" in order to reach a speed greater than the rated speed without exceeding the rated motor current.

The speed remains limited by the **[High speed]**(HSP) parameter.

The function acts on the speed reference pedestal and not on the reference itself.

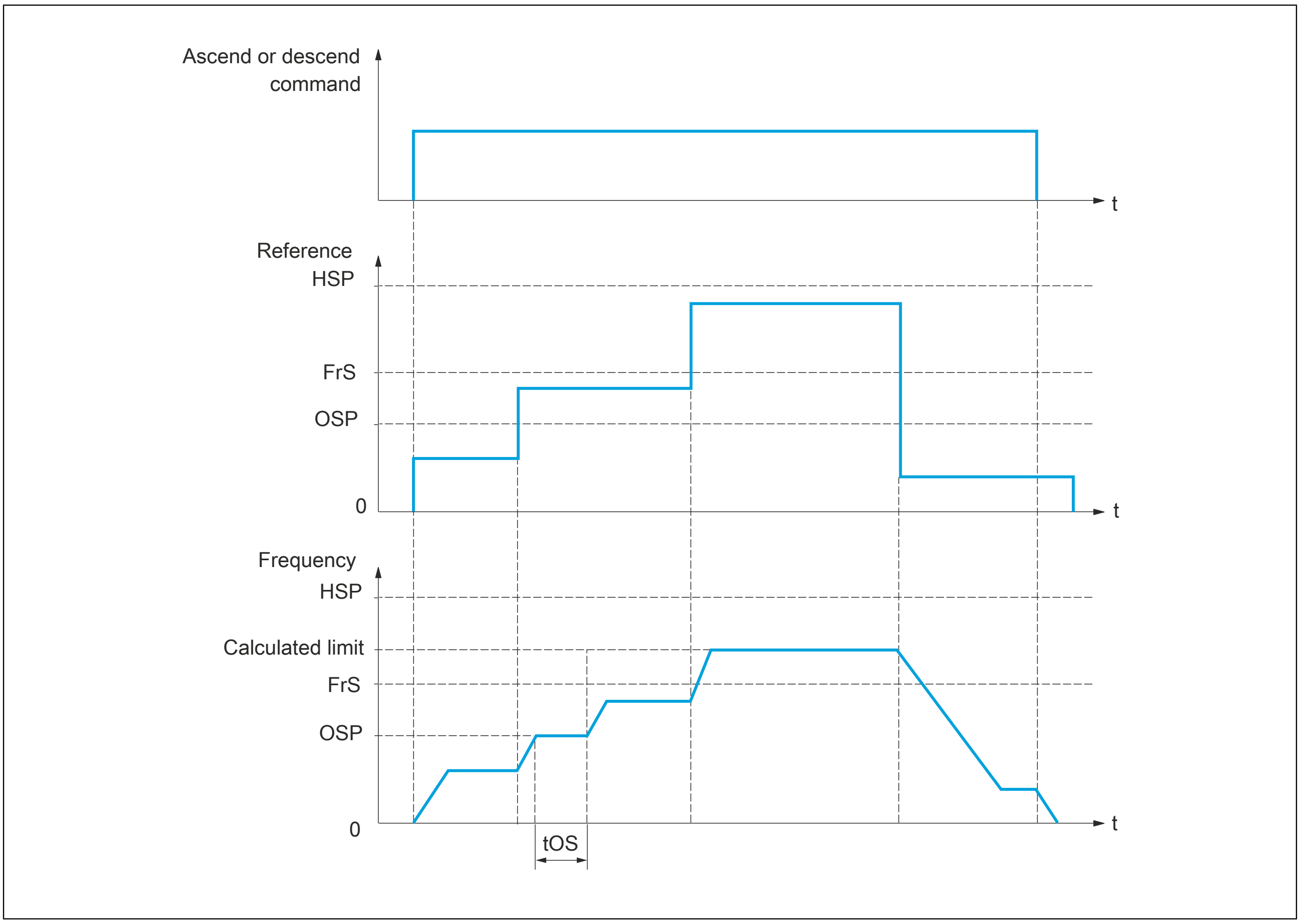
Principle:



There are two possible operating modes:

- Speed reference mode: The maximum permissible speed is calculated by the drive during a speed step that is set so that the drive can measure the load.
- Current limitation mode: The maximum permissible speed is the speed that supports current limitation in motor mode in the "ascending" direction only. For the "descending" direction, operation is in Speed reference mode.

Speed reference mode

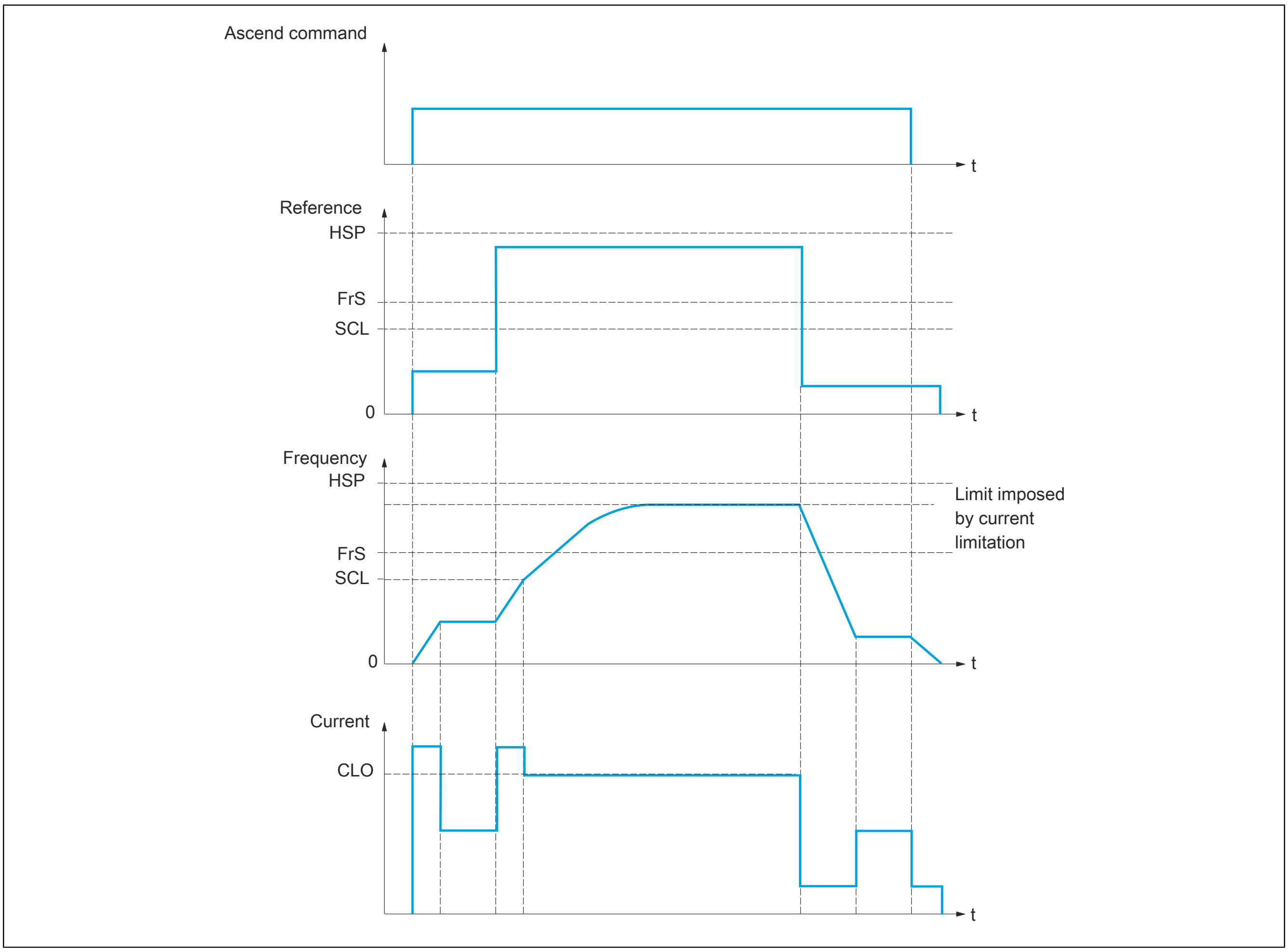


OSP: Adjustable speed step for load measurement

tOS: Load measuring time

Two parameters are used to reduce the speed calculated by the drive, for ascending and descending.

Current limiting mode



SCL: Adjustable speed threshold, above which current limitation is active

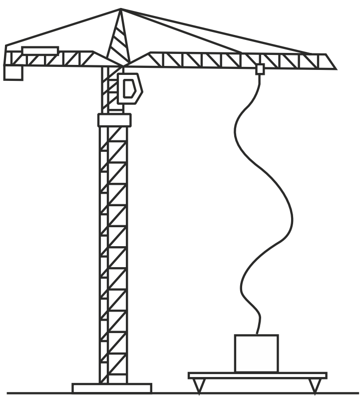
CLO: Current limitation for high-speed function

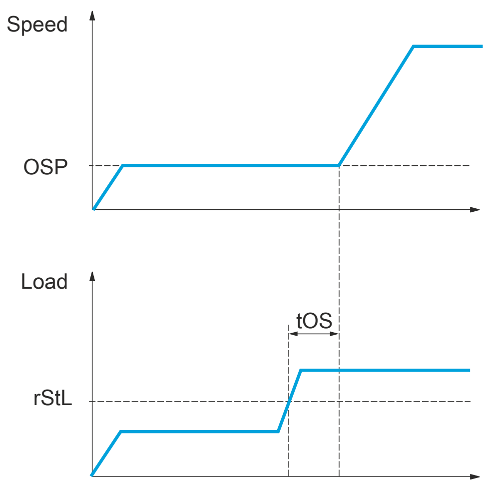
Note:

The speed reached for a specific current will be lower in case of network undervoltage in comparison with nominal network voltage.

Rope slack

The Rope slack function can be used to help to prevent starting up at high speed when a load has been set down ready for lifting but the rope is still slack (as illustrated below).





The speed step (OSP parameters) is used to measure the load. The effective measurement cycle will not be triggered until the load reaches the adjustable threshold **[Rope slack trq level]**(rStL), which corresponds to the weight of the hook.

A logic output or a relay can be assigned to the indication of the rope slack state in the **[INPUTS / OUTPUTS CFG]**(I_O-) menu.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > HSH-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
HSH-	**[HIGH SPEED HOISTING]** **Note:** **This function cannot be used with certain other functions.**		
HSO nO SSO CSO	**[High speed hoisting]** **[No]**(nO): Function inactive **[Speed ref]**(SSO): Speed reference mode **[I Limit]**(CSO): Current limitation mode		**[No]**(nO)
COF ★ ↻	**[Motor speed coeff.]** Speed reduction coefficient calculated by the drive for Ascending direction. This parameter can be accessed if **[High speed hoisting]**(HSO) is set to **[Speed ref]**(SSO).	0 to 100%	100%
COr ★ ↻	**[Gen. speed coeff]** Speed reduction coefficient calculated by the drive for Descending direction. This parameter can be accessed if **[High speed hoisting]**(HSO) is not set to **[No]**(nO).	0 to 100%	50%
tOS ★ ↻	**[Load measuring tm.]** Duration of speed step for measurement. This parameter can be accessed if **[High speed hoisting]**(HSO) is not set to **[No]**(nO).	0.10 s to 65.00 s	0.50 s
OSP ★ ↻	**[Measurement spd]** Speed stabilized for measurement. This parameter can be accessed if **[High speed hoisting]**(HSO) is not set to **[No]**(nO).	0.0 to **[Rated motor freq.]**(FrS) (max. 599.0 Hz)	40.0 Hz
CLO ★ ↻	**[High speed I Limit]** Current limitation at high speed. This parameter can be accessed if **[High speed hoisting]**(HSO) is set to **[I Limit]**(CSO). **Note:** **If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss](OPL) fault mode if this has been enabled.**	0.0 to $^3/_2$ INV (1)	1.0 INV (1)
SCL ★ ↻	**[I Limit. frequency]** Frequency threshold, above which the high-speed limitation current is active. This parameter can be accessed if **[High speed hoisting]**(HSO) is set to **[I Limit]**(CSO).	0.0 to 599.0 Hz according to rating	40.0 Hz
rSd ★ nO drI PES	**[Rope slack config.]** Rope slack function. This parameter can be accessed if **[High speed hoisting]**(HSO) is not set to **[No]**(nO). **[No]**(nO): Function inactive **[Drive estim.]**(drI): Measurement of the load by estimating the torque generated by the drive **[Ext. sensor]**(PES): Measurement of the load using a weight sensor, can only be assigned if **[Weight sensor ass.]**(PES) is not **[No]**(nO)		**[No]**(nO)
rStL ★	**[Rope slack trq level]** Adjustment threshold corresponding to a load weighing slightly less than the hook when off-load as a % of the rated load. This parameter can be accessed if **[Rope slack trq level]**(rSd) has been assigned.	0 to 100%	0%

(1) In corresponds to the rated drive current indicated in the Installation chapter and on the drive nameplate.

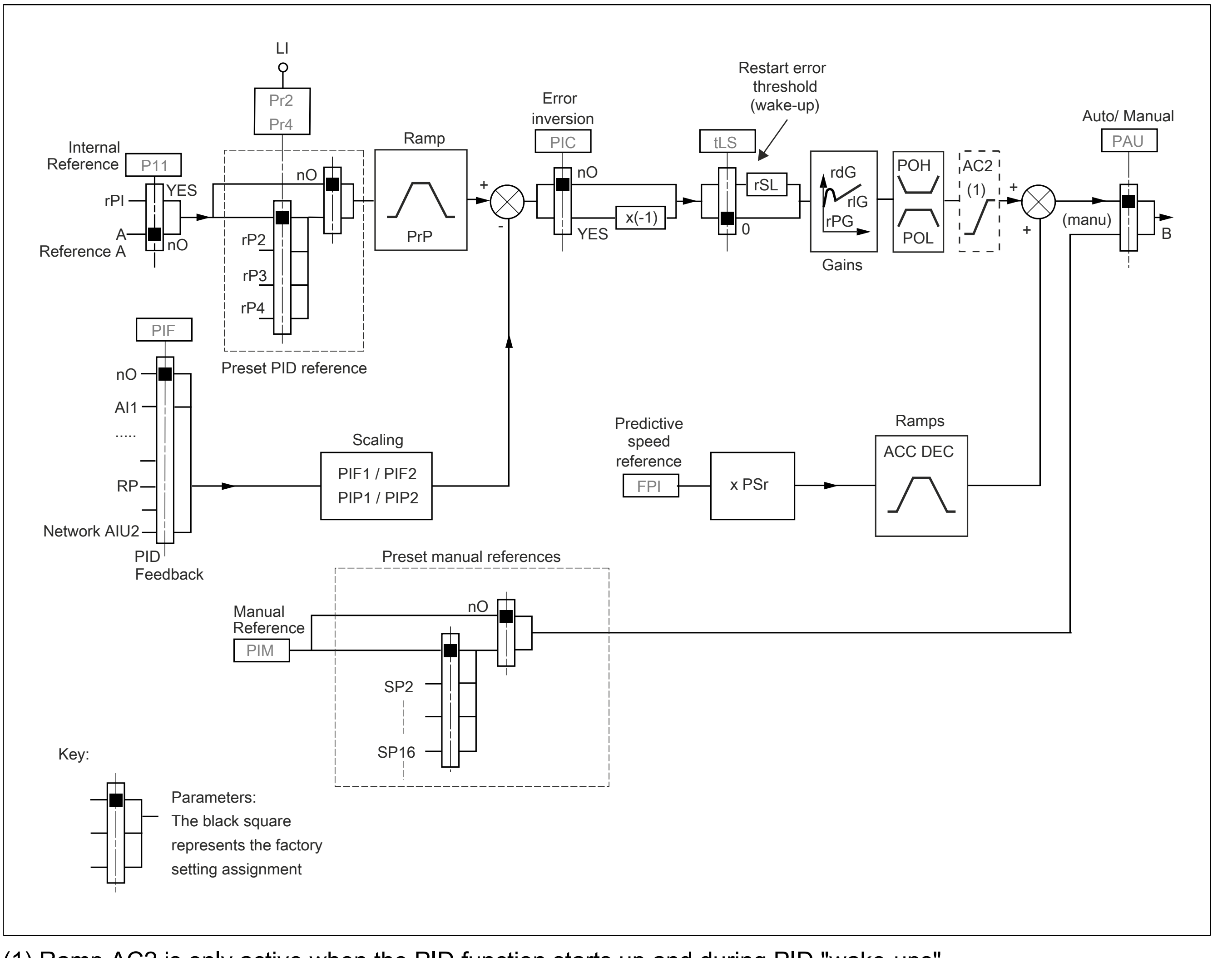
★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

↻ Parameter that can be modified during operation or when stopped.

3.2.3.6.6.15 PID REGULATOR

Block diagram

The function is activated by assigning an analog input to the PID feedback (measurement).



(1) Ramp AC2 is only active when the PID function starts up and during PID "wake-ups".

PID feedback:

The PID feedback must be assigned to one of the analog inputs AI1 to AI3, to the pulse input, according to whether any extension cards have been inserted.

PID reference:

The PID reference must be assigned to the following parameters: Preset references via logic inputs (rP2, rP3, rP4).

In accordance with the configuration of **[Act. internal PID ref.]**(PII):

Internal reference (rPI) or

Reference A (**[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b)).

Combination table for preset PID references:

LI (Pr4)	LI (Pr2)	Pr2 = nO	Reference
			rPI or A
0	0		rPI or A
0	1		rP2
1	0		rP3
1	1		rP4

A predictive speed reference can be used to initialize the speed on restarting the process.

Scaling of feedback and references:

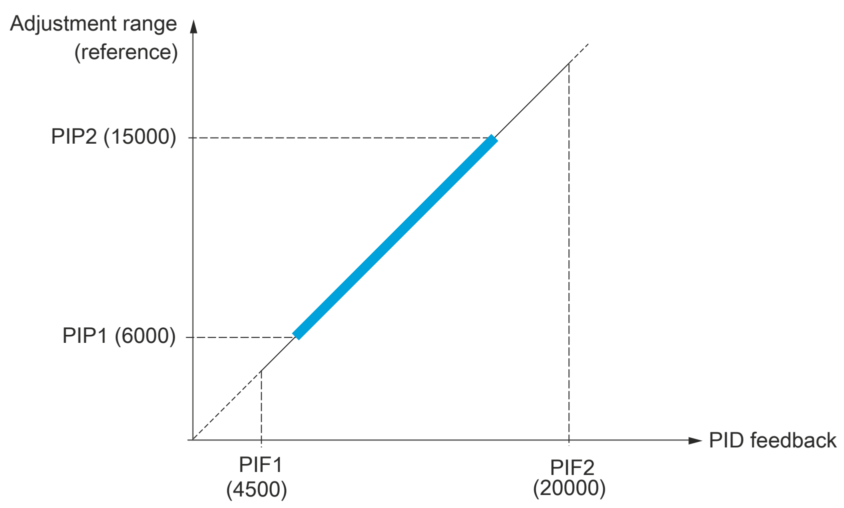
- **[Min PID feedback]**(PIF1), **[Max PID feedback]**(PIF2) parameters can be used to scale the PID feedback (sensor range). **This scale MUST be maintained for all other parameters.**
- **[Min PID reference]**(PIP1), **[Max PID reference]**(PIP2) parameters can be used to scale the adjustment range, for example the reference. **The adjustment range MUST remain within the sensor range.**

The maximum value of the scaling parameters is 32767. To facilitate installation, we recommend using values as close as possible to this maximum level, while retaining powers of 10 in relation to the actual values.

Example (see graph below): Adjustment of the volume in a tank, between 6 and 15 m^3.

- Sensor used 4 to 20 mA, 4.5 m^3 for 4 mA and 20 m^3 for 20 mA, with the result that PIF1 = 4500 and PIF2 = 20000.
- Adjustment range 6 to 15 m^3, with the result that PIP1 = 6000 (min. reference) and PIP2 = 15000 (max. reference).
- Example references:
  - rP1 (internal reference) = 9500
  - rP2 (preset reference) = 6500
  - rP3 (preset reference) = 8000
  - rP4 (preset reference) = 11200

The **[3.4 DISPLAY CONFIG.]** menu can be used to customize the name of the unit displayed and its format.



Other parameters:

- [PID wake up thresh.](rSL) parameter: Can be used to set the PID error threshold, above which the PID regulator will be reactivated (wake-up) after a stop due to the max. time threshold being exceeded at low speed [Low speed time out](tLS).
- Reversal of the direction of correction [PID correct. reverse](PIC): If [PID correct. reverse](PIC) is set to [No](nO), the speed of the motor will increase when the error is positive (for example: pressure control with a compressor). If [PID correct. reverse](PIC) is set to [Yes](YES), the speed of the motor will decrease when the error is positive (for example: temperature control using a cooling fan).
- The integral gain may be short-circuited by a logic input.
- An alarm on the PID feedback may be configured and indicated by a logic output.
- An alarm on the PID error may be configured and indicated by a logic output.

"Manual - Automatic" Operation with PID

This function combines the PID regulator, the preset speeds and a manual reference. Depending on the state of the logic input, the speed reference is given by the preset speeds or by a manual reference input via the PID function.

Manual reference [Manual reference](PIM):

- Analog inputs AI1 to AI3
- Pulse input

Predictive speed reference [Speed ref. assign.](FPI):

- [AI1](AI1): Analog input
- [AI2](AI2): Analog input
- [AI3](AI3): Analog input
- [RP](PI): Pulse input
- [HMI](LCC): Graphic display terminal or remote display terminal
- [Modbus](Mdb): Integrated Modbus
- [CANopen](CAn): Integrated CANopen®
- [Com. card](nEt): POWERLINK communication card

Setting up the PID regulator

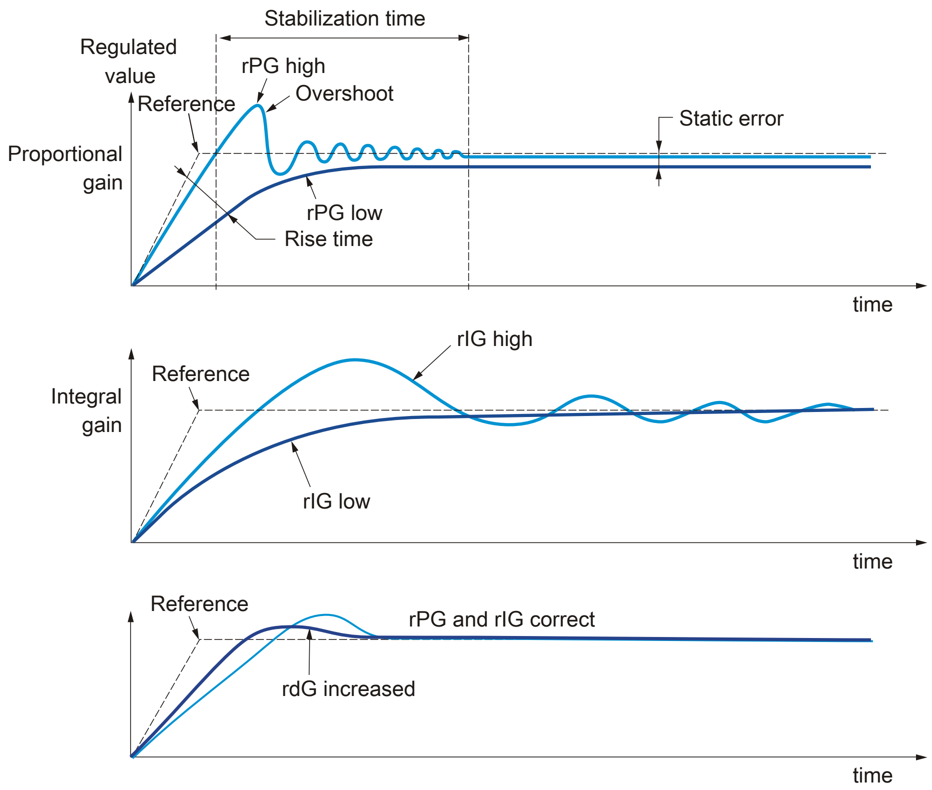
1. Configuration in PID mode.

2. Perform a test in factory settings mode.

To optimize the drive, adjust **[PID prop. gain]**(rPG) or **[PID integral gain]**(rIG) gradually and independently, and observe the effect on the PID feedback in relation to the reference.

3. If the factory settings are unstable or the reference is incorrect.

- Perform a test with a speed reference in Manual mode (without PID regulator) and with the drive on load for the speed range of the system:
  - In steady state, the speed must be stable and comply with the reference and the PID feedback signal must be stable.
  - In transient state, the speed must follow the ramp and stabilize quickly and the PID feedback must follow the speed. If this is not the case, see the settings for the drive and/or sensor signal and wiring.
- Switch to PID mode.
- Set **[Dec ramp adapt.]**(brA) to **[No]**(nO) (no auto-adaptation of the ramp).
- Set **[PID ramp]**(PrP) to the minimum permitted by the mechanism without triggering an **[Overbraking]**(ObF).
- Set the integral gain **[PID integral gain]**(rIG) to minimum.
- Leave the derivative gain **[PID derivative gain]**(rdG) at 0.
- Observe the PID feedback and the reference.
- Switch the drive ON/OFF a number of times or vary the load or reference rapidly a number of times.
- Set the proportional gain **[PID prop. gain]**(rPG) in order to ascertain the compromise between response time and stability in transient phases (slight overshoot and 1 to 2 oscillations before stabilizing).
- If the reference varies from the preset value in steady state, gradually increase the integral gain **[PID integral gain]**(rIG), reduce the proportional gain **[PID prop. gain]**(rPG) in the event of instability (pump applications), find a compromise between response time and static precision (see diagram).
- Lastly, the derivative gain may permit the overshoot to be reduced and the response time to be improved, although this will be more difficult to obtain a compromise in terms of stability, as it depends on 3 gains.
- Perform in-production tests over the whole reference range.



The oscillation frequency depends on the system kinematics.

Parameter	Rise time	Overshoot	Stabilization time	Static error
rPG ↗	↘ ↘	↗	=	↘
rIG ↗	↘	↗ ↗	↗	↘ ↘
rdG ↗	=	↘	↘	=

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > PId-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
PId-	**[PID REGULATOR]** **Note:** **This function cannot be used with certain other functions.**		
PIF nO AI1 AI2 AI3 PI AIU1 AIU2 OA01 ... OA10	**[PID feedback ass.]** **[No]**(nO): Not assigned **[AI1]**(AI1): Analog input A1 **[AI2]**(AI2): Analog input A2 **[AI3]**(AI3): Analog input A3 **[RP]**(PI): Pulse input **[AI virtual 1]**(AIU1): Virtual analog input 1 by the communication bus **[AI virtual 2]**(AIU2): Virtual analog input 2 by the communication bus **[OA01]**(OA01): Function blocks: Analog output 01 **...** **[OA10]**(OA10): Function blocks: Analog output 10		**[No]**(nO)
AIC2 ★ nO Mdb CAn nEt	**[AI2 net. channel]** This parameter can be accessed if **[PID feedback ass.]**(PIF) is set to **[AI virtual 2]**(AIU2). This parameter can also be accessed in the **[INPUTS / OUTPUTS CFG]**(I_O-) menu. **[No]**(nO): Not assigned **[Modbus]**(Mdb): Integrated Modbus **[CANopen]**(CAn): Integrated CANopen® **[Com. card]**(nEt): POWERLINK communication card		**[No]**(nO)
PIF1 ★ (1)	**[Min PID feedback]** Value for minimum feedback.	0 to **[Max PID feedback]**(PIF2)(2)	100
PIF2 ★ (1)	**[Max PID feedback]** Value for maximum feedback.	**[Min PID feedback]**(PIF1) to 32767(2)	1000
PIP1 ★ (1)	**[Min PID reference]** Minimum process value.	**[Min PID feedback]**(PIF1) to **[Max PID reference]**(PIP2)(2)	150
PIP2 ★ (1)	**[Max PID reference]** Maximum process value.	**[Min PID reference]**(PIP1) to **[Max PID feedback]**(PIF2)(2)	900
PII ★ nO YES	**[Act. internal PID ref.]** Internal PID regulator reference. **[No]**(nO): The PID regulator reference is given by **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b) with summing/subtraction/multiplication functions **[Yes]**(YES): The PID regulator reference is internal via **[Internal PID ref.]**(rPI)		**[No]**(nO)
rPI ★	**[Internal PID ref.]** Internal PID regulator reference. This parameter can also be accessed in the **[1.2 MONITORING]**(MOn-) menu.	**[Min PID reference]**(PIP1) to **[Max PID reference]**(PIP2)	150
rPG ★	**[PID prop. gain]** Proportional gain.	0.01 to 100.00	1.00
rIG ★	**[PID integral gain]** Integral gain.	0.01 to 100.00	1.00
rdG ★	**[PID derivative gain]** Derivative gain.	0.00 to 100.00	0.00

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > PId-

Code	Name / Description	Adjustment range	Factory setting
PrP (1)	**[PID ramp]** PID acceleration/deceleration ramp, defined to go from **[Min PID reference]**(PIP1) to **[Max PID reference]**(PIP2) and vice versa.	0.0 to 99.9 s	0.0 s
PIC	**[PID correct. reverse]** Reversal of the direction of correction **[PID correct. reverse]**(PIC): If **[PID correct. reverse]**(PIC) is set to **[No]**(nO), the speed of the motor will increase when the error is positive (example: pressure control with a compressor) If **[PID correct. reverse]**(PIC) is set to **[Yes]**(YES), the speed of the motor will decrease when the error is positive (example: temperature control using a cooling fan).		**[No]**(nO)
nO	**[No]**(nO): No		
YES	**[Yes]**(YES): Yes		
POL (1)	**[Min PID output]** Minimum value of regulator output in Hz.	-599.0 to 599.0 Hz	0.0 Hz
POH (1)	**[Max PID output]** Maximum value of regulator output in Hz.	0.0 to 599.0 Hz	60.0 Hz
PAL (1)	**[Min fbk alarm]** Minimum monitoring threshold for regulator feedback.	**[Min PID feedback]**(PIF1) to **[Max PID feedback]**(PIF2)(2)	100
PAH (1)	**[Max fbk alarm]** Maximum monitoring threshold for regulator feedback.	**[Min PID feedback]**(PIF1) to **[Max PID feedback]**(PIF2)(2)	1000
PEr (1)	**[PID error Alarm]** Regulator error monitoring threshold.	0 to 65535 (2)	100
PIS	**[PID integral reset]** If the assigned input or bit is at 0, the function is inactive (the PID integral is enabled). If the assigned input or bit is at 1, the function is active (the PID integral is disabled).		**[No]**(nO)
nO	**[No]**(nO): Not assigned		
LI1	**[LI1]**(LI1): Logical input LI1		
...	**[...]**(...): See the assignment conditions		
FPI	**[Speed ref. assign.]** PID regulator predictive speed input.		**[No]**(nO)
nO	**[No]**(nO): Not assigned		
AI1	**[AI1]**(AI1): Analog input A1		
AI2	**[AI2]**(AI2): Analog input A2		
AI3	**[AI3]**(AI3): Analog input A3		
LCC	**[HMI]**(LCC): Graphic display terminal or remote display terminal source		
Mdb	**[Modbus]**(Mdb): Integrated Modbus		
CAn	**[CANopen]**(CAn): Integrated CANopen®		
nEt	**[Com. card]**(nEt): POWERLINK communication option board source		
PI	**[RP]**(PI): Pulse input		
AIU1	**[AI virtual 1]**(AIU1): Virtual analog input 1 with the jog dial		
OA01	**[OA01]**(OA01): Function blocks: Analog output 01		
...	...		
OA10	**[OA10]**(OA10): Function blocks: Analog output 10		
PSr (1)	**[Speed input %]** Multiplying coefficient for predictive speed input. This parameter cannot be accessed if **[Speed ref. assign.]**(FPI) is set to **[No]**(nO).	0 to 100%	100%

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > PId-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
PAU nO LI1 ...	**[Auto/Manual assign.]** If the assigned input or bit is at 0, the PID is active. If the assigned input or bit is at 1, manual operation is active. **[No]**(nO): Not assigned **[LI1]**(LI1): Logical input LI1 **[...]**(...): See the assignment conditions		**[No]**(nO)
AC2 (1)	**[Acceleration 2]** Time to accelerate from 0 to the **[Rated motor freq.]**(FrS). To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. Ramp AC2 is only active when the PID function starts up and during PID "wake-ups".	0.00 to 6000 s (3)	5.0 s
PIM nO AI1 AI2 AI3 PI AIU1 OA01 ... OA10	**[Manual reference]** Manual speed input. This parameter can be accessed if **[Auto/Manual assign.]**(PAU) is not set to **[No]**(nO). The preset speeds are active on the manual reference if they have been configured. **[No]**(nO): Not assigned **[AI1]**(AI1): Analog input A1 **[AI2]**(AI2): Analog input A2 **[AI3]**(AI3): Analog input A3 **[RP]**(PI): Pulse input **[AI virtual 1]**(AIU1): Virtual analog input 1 with the jog dial **[OA01]**(OA01): Function blocks: Analog output 01 **...** **[OA10]**(OA10): Function blocks: Analog output 10		**[No]**(nO)
tLS (1)	**[Low speed time out]** Maximum operating time at **[Low speed]**(LSP). Following operation at **[Low speed]**(LSP) for a defined period, a motor stop is requested automatically. The motor will restart if the reference is greater than **[Low speed]**(LSP) and if a run command is still present. **Note:** **A value of 0 indicates an unlimited period of time.** If **[Low speed time out]**(tLS) is not 0, **[Type of stop]**(Stt) is forced to **[Ramp stop]**(rMP) (only if a ramp stop can be configured).	0.0 to 999.9 s	0.0 s
rSL 2 s	**[PID wake up thresh.]** **Danger!** **UNINTENDED EQUIPMENT OPERATION** **Check that unintended restarts will not present any danger.** **Failure to follow these instructions will result in death or serious injury.** If the "PID" and "Low speed operating time" **[Low speed time out]**(tLS) functions are configured at the same time, the PID regulator may attempt to set a speed lower than **[Low speed]**(LSP). This results in unsatisfactory operation, which consists of starting, operating at low speed then stopping and so on… Parameter **[PID wake up thresh.]**(rSL) (restart error threshold) can be used to set a minimum PID error threshold for restarting after a stop at prolonged **[Low speed]**(LSP). **[PID wake up thresh.]**(rSL) is a percentage of the PID error (value depends on **[Min PID feedback]**(PIF1) and **[Max PID feedback]**(PIF2)). The function is inactive if **[Low speed time out]**(tLS) = 0 or if **[PID wake up thresh.]**(rSL) = 0.	0.0 to 100.0	0.0

(1) The parameter can also be accessed in the **[SETTINGS]**(SEt-) menu.
(2) If a graphic display terminal is not in use, values greater than 9999 will be displayed on the 4-digit display with a period mark after the thousand digit, for example, 15.65 for 15650.
(3) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to **[Ramp increment]**(Inr).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

PID management

Description of the problem

A position reference is sent to the inverter (PISP parameter).

An analog potentiometer that is read in AI1 (PIF is set to AI1) is used as a feedback value.

If the stop command (CMDD bit 8) is now triggered, the PISP parameter changes and the stop command is released. In this case the control does not compensate for the full difference between the position reference and the actual position.

The movement only occurs for a certain distance, resulting in a difference between the position reference and the actual value.

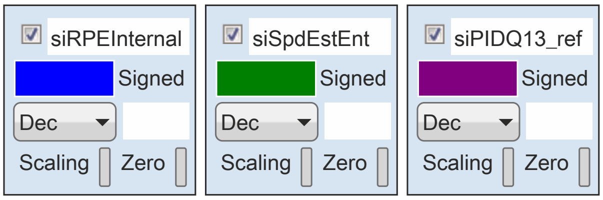
If the stop command is now triggered again and then removed, the delay fault is compensated and the motor moves into the correct position (it is really only the stop command that is triggered and reset - there is no other control - and the PID of the inverter compensates for the difference between the reference and the actual position).

Test case 1: The PID response corresponds to the response time of the PID feedback.

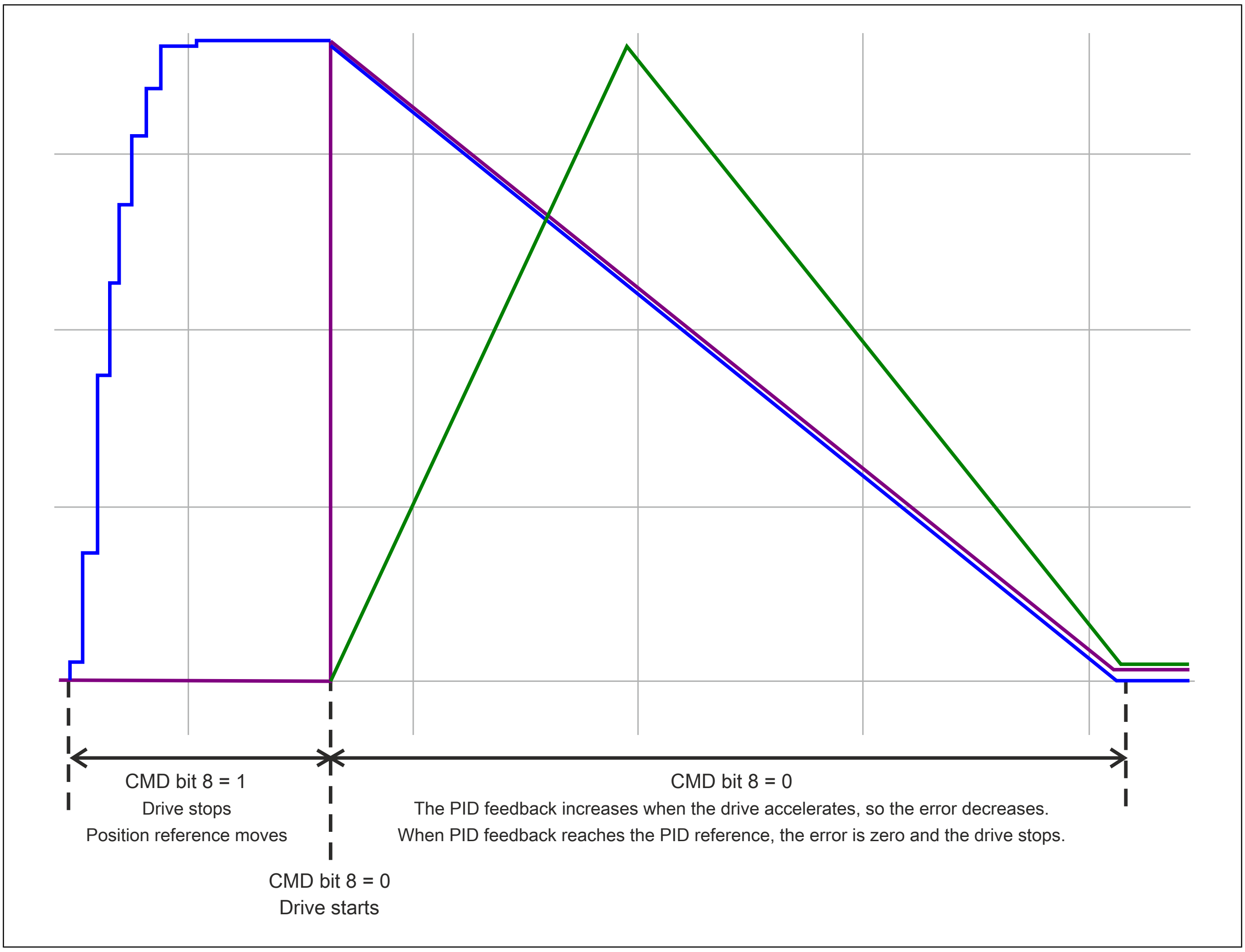
ACOPOSinverter PID configuration:

ACC:	1			PIF1:	0	RPG:	1.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	0.01	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	30
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

Test results:



siRPEInternal = PID Error
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



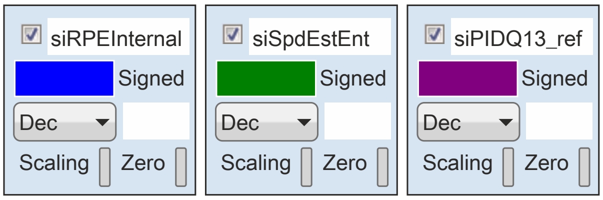
This is the expected behavior The fault remains positive, the inverter accelerates. As a result, the PID feedback increases (the fault decreases), so the PID reference size is reached. The motor is in the run mode, but with a speed of 0.

Test case 2: The PID response is faster than the response time of the PID feedback.

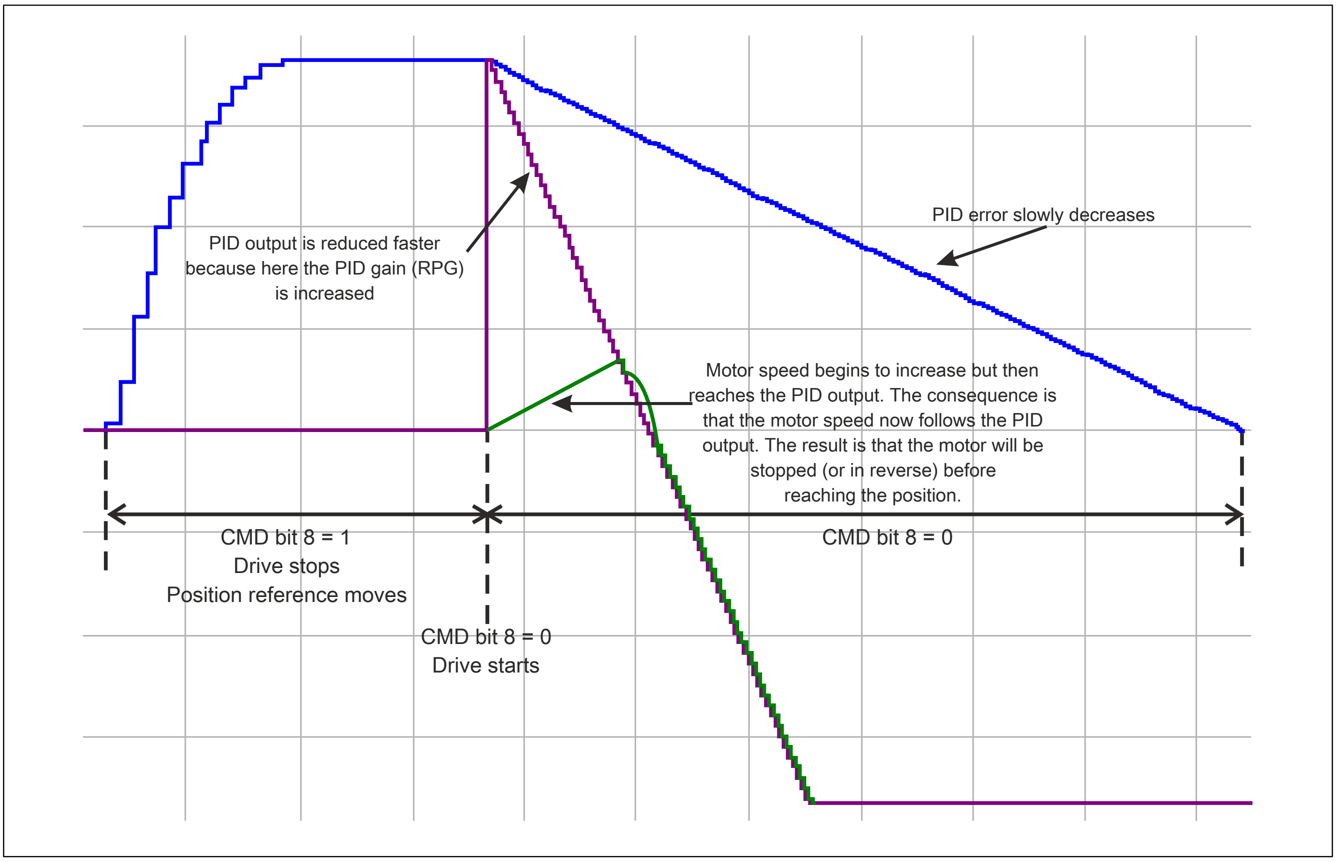
ACOPOSinverter PID configuration:

ACC:	1			PIF1:	0	RPG:	7.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	0.01	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	30
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

Test results:



siRPEInternal = PID Error
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



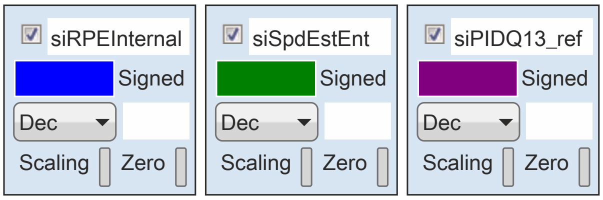
In this case the PID gain (RPG) is set to a higher value to obtain a higher PID responsiveness. With this setting the PID output reacts faster in comparison to the motor speed and the PID feedback. The motor speed is therefore reaches the PID output, which has already reduced before reaching the position. This leads to a positioning fault.

Test case 3: PID response to STOP with stop bit.

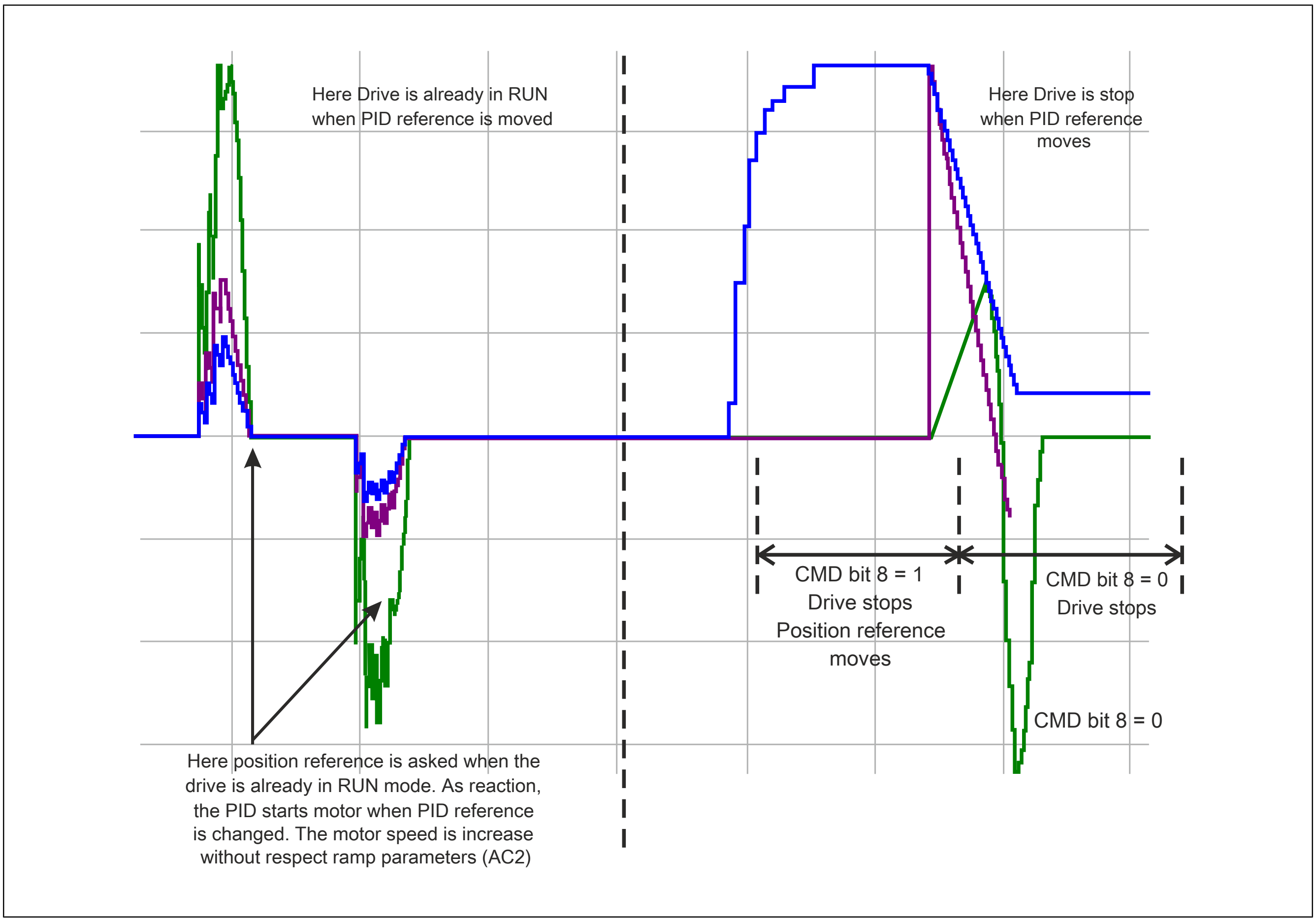
ACOPOSinverter PID configuration:

ACC:	1			PIF1:	0	RPG:	7.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	0.01	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	30
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

Test results:



siRPEInternal = PID Error
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



If the inverter is already in the RUN mode if the PID reference variable is changed, the motor responds without subsequent gain. The response is immediate.

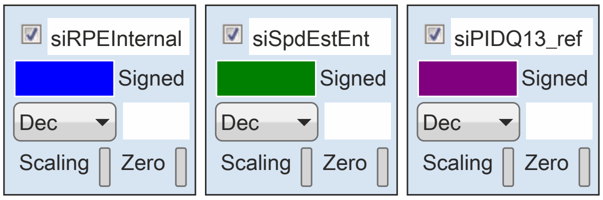
If the inverter stops (e.g. by CMD-bit 8), the motor responds, but accelerates on the basis of the AC2 parameter. The result would be that the motor physically reaches the PID output via the tracking of the AC2 ramp and loses time during this. This results in a positioning error compared to the start without AC2 tracking.

Test case 4: Reset time

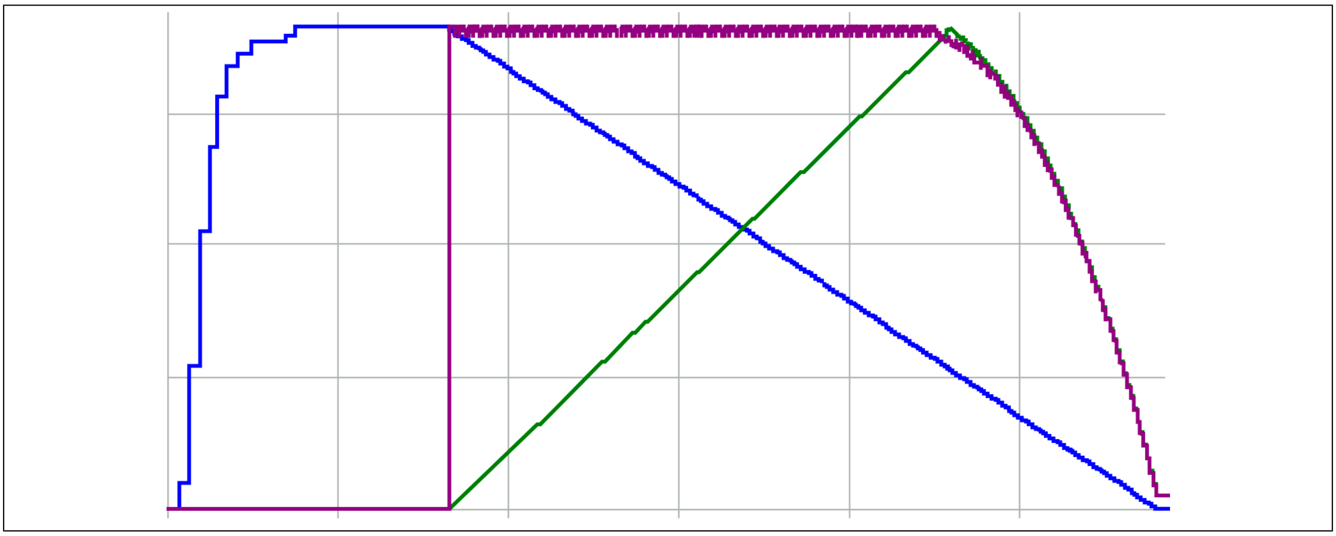
ACOPOSinverter PID configuration:

ACC:	1			PIF1:	0	RPG:	7.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	5.00	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	30
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

Test results:



siRPEInternal = PID Error
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



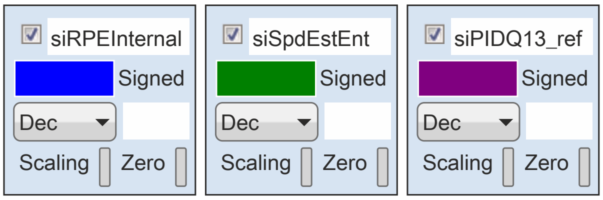
If the PID reference variable has been moved, the inverter is stopped (CMD bit 8 = 1). The AC2 parameter has the same effect as previously when starting in this example. For this reason, the motor speed will be adapted according to the ramp so that the PID output is achieved. This integral intervention allows the generation of the average value for the PID fault and then adds it to the PID output. This produces a PID output that does not only follow a linear ramp.

Test case 5: Reset time + AC2 ramp reduction

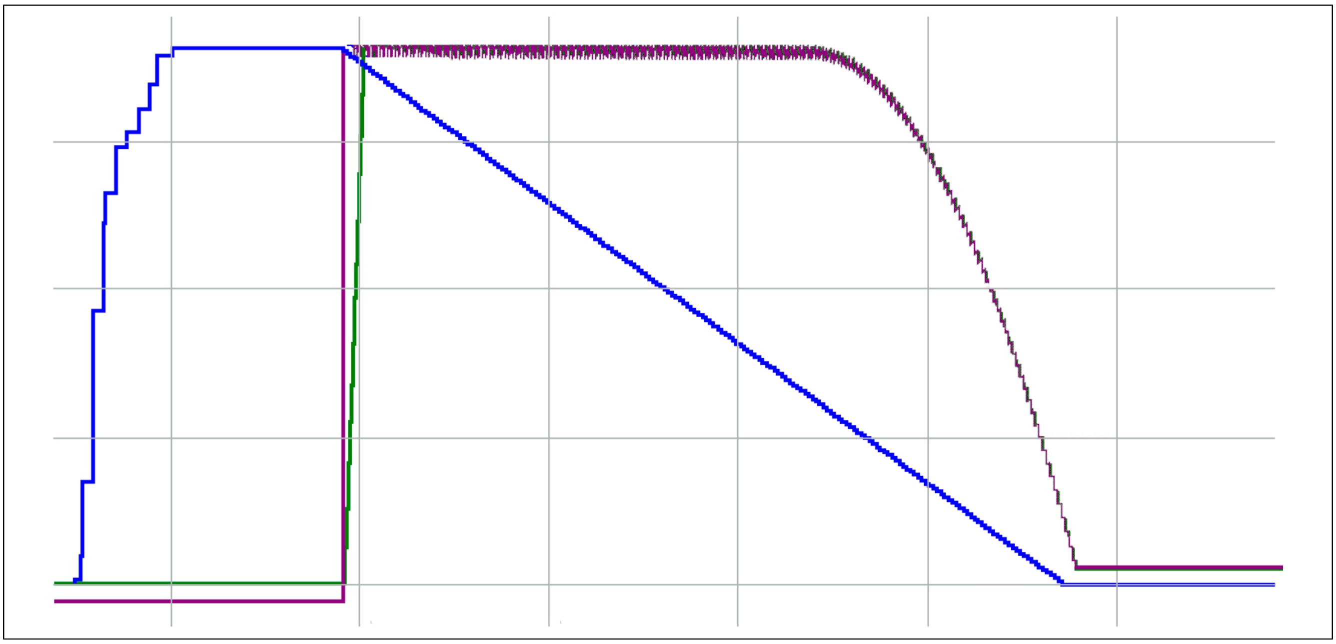
ACOPOSinverter PID configuration:

ACC:	1			PIF1:	0	RPG:	7.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	5.00	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	1
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

Test results:



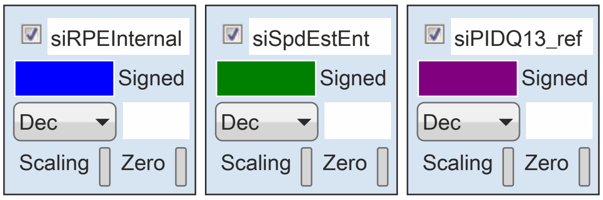
siRPEInternal = PID Error
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



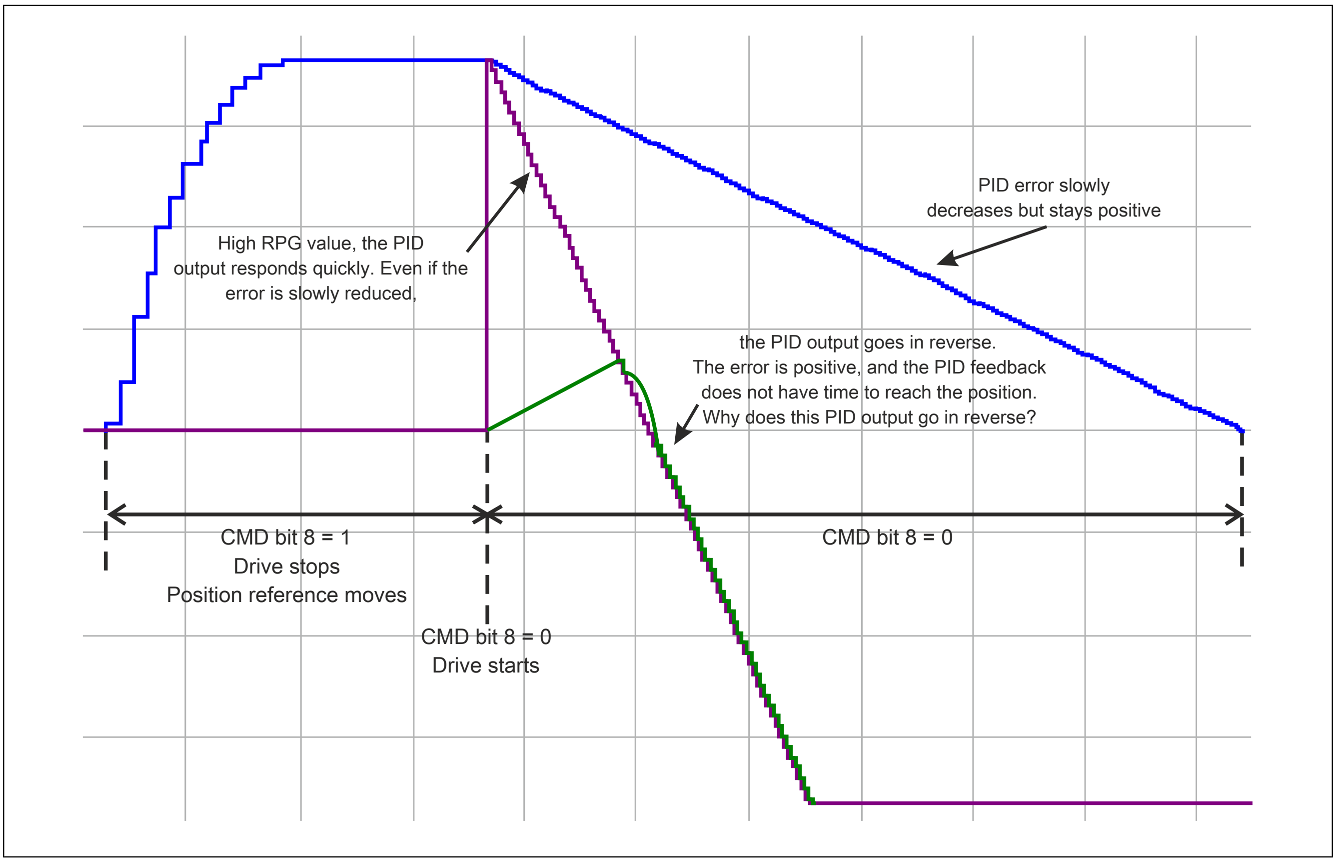
If the PID reference variable has been moved, the inverter is stopped (CMD bit 8 = 1). The AC2 parameter has the same effect as previously when starting in this example. With AC2 = 0.1 s, the PID output is reached more quickly. This reset time allows the generation of the average value for the PID fault and then adds it to the PID output. This produces a PID output that does not only follow a linear ramp.

What results in a falling ramp (with reversing direction) with proportional gain and a continually positive error?

This needs to be studied.



siRPEInternal = PID Error
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



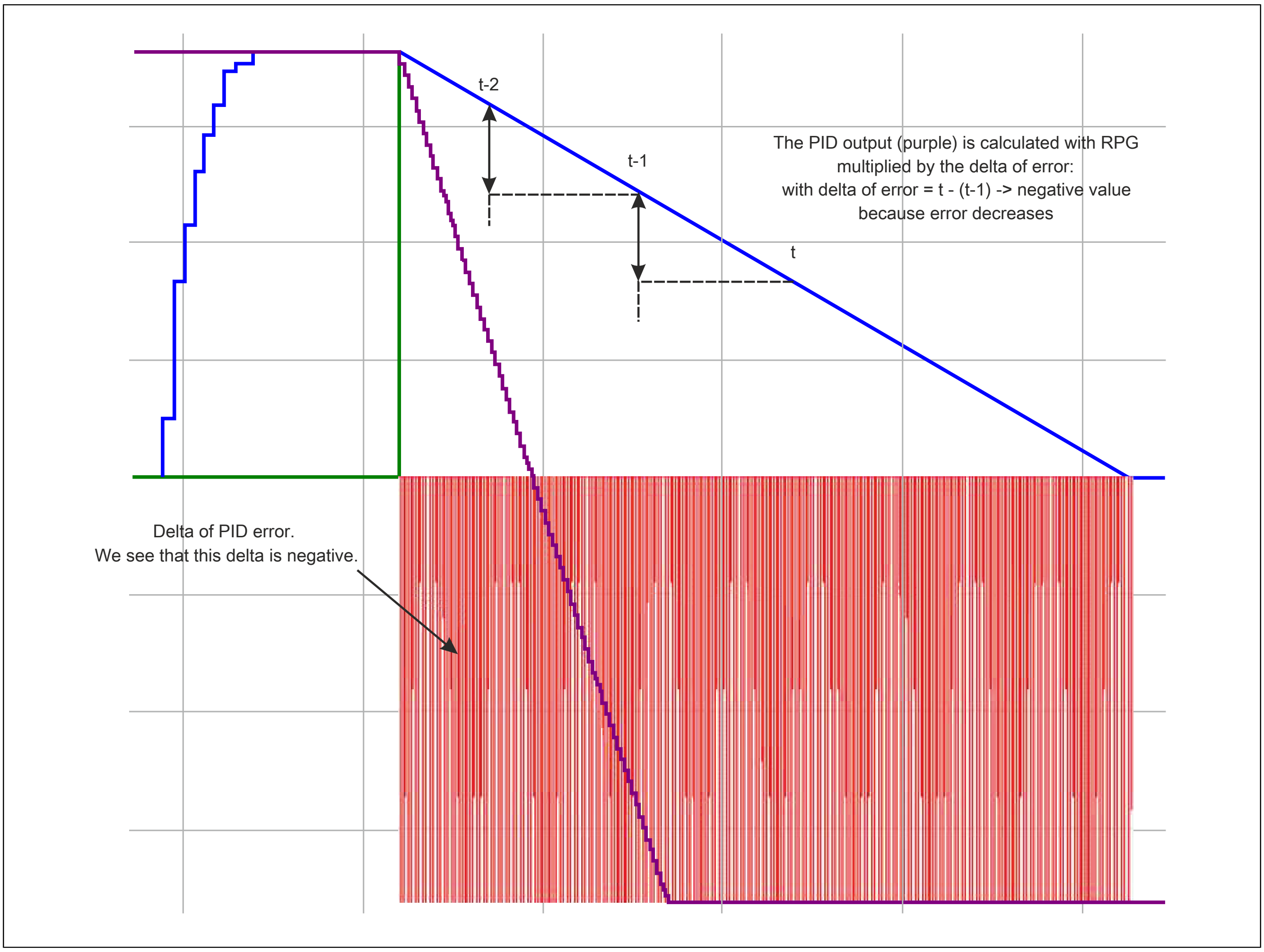
In the case of a high RPG-value the PID output responds more rapidly. This PID output is even reversed in the case of a positive fault. The PID Feedback does not have enough time to reach the PID reference variable, but the inverter turns round. In practical use, this means that this position is never reached.

The behavior is also similar to when the inverter is in RUN mode and the PID reference variable changes.

Explanation:

Taking into account the inverter settings.

ACC:	1			PIF1:	0	RPG:	7.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	0.01	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	1
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

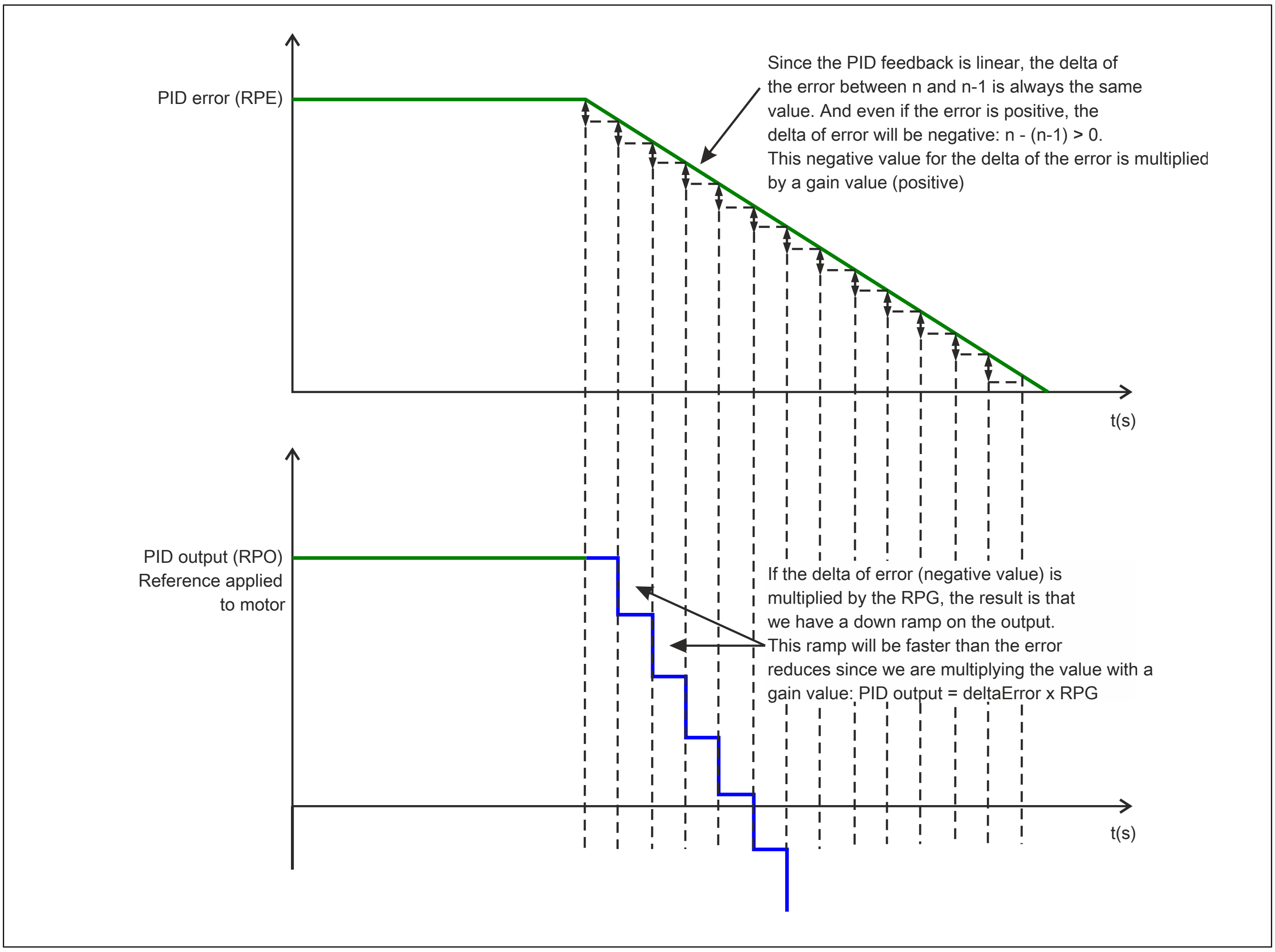


In our inverters PID output is calculated by multiplying the RPG-value (gain) with the delta of the error. Since the PID feedback is linear, the delta value for the fault between t and t-1 will always be the same value. And even in the case of a positive error, the delta value of the error is negative: t-(t-1) < 0. This negative delta value of the error is multiplied by a gain (positive) value.

The result: The error is positive, but the delta value of the error is negative. Multiplied by the gain, the PID output decreases.

If POL = 0, the PID output is limited to 0. If POL permits a negative value, the PID output is negative and the motor can be run in reverse.

Diagram



Conclusion and recommendation

- In our inverters PID output is calculated by multiplying the RPG-value (gain) with the delta value of the error. Even in the case of a positive error, the delta value of the error is negative if this error reduces. The delta value of the error is multiplied by the RPG-value. For this reason with a high RPG-value the PID output is a falling ramp up to 0 (or reversal operation at POL < 0).
- If the motor has also been stopped in the event of a change of the PID reference, the motor starts, but follows the AC2 parameters. This is not the case if the inverter is in RUN mode and the PID reference variable is moved.
- For correct behavior, the PID must be adjusted. Proportional gain cannot be used alone. The same applies for the integral gain - it cannot be completely suppressed. You can have a minimum value of 0.01 for it, but it is always present.

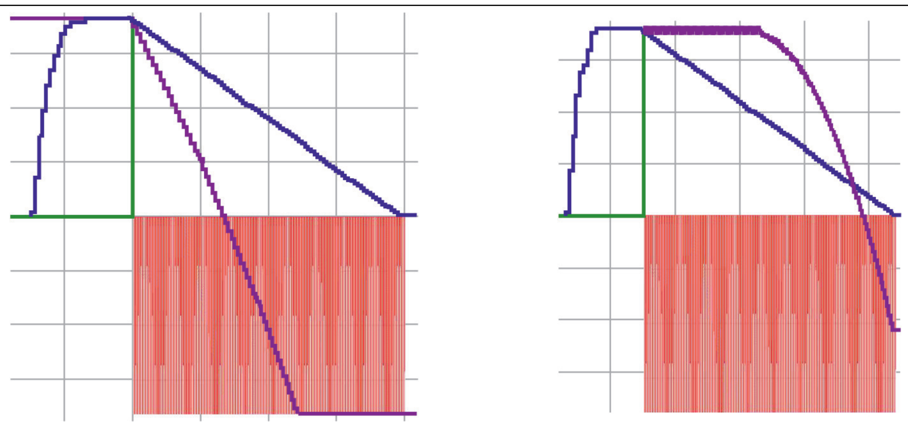
The points 1 and/or 2 may be the result of a poor positioning at the customer site.

Our recommendation:

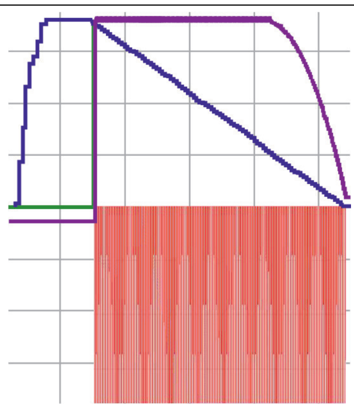
- **In the first step, the AC2 value should be reduced to a minimum.** This reduces the difference in behavior when starting of the motor when the inverter is already in the RUN mode and the motor is started at the stopping of the inverter.
- **Adjust the PID values RPG and RIG in the second step** (and, if possible, also RDG). The objective is to find the best compromise of dynamics and precision at the stop.

RPG:	7.00
RIG:	1.00
RDG:	0.00
PRP:	0.0 s

RPG:	7.00
RIG:	3.00
RDG:	0.00
PRP:	0.0 s



RPG:	7.00
RIG:	5.00
RDG:	0.00
PRP:	0.0 s



- The specified reference must be used in the third step. Using the specified reference, a reference speed can be sent directly to the output of the PID controller.

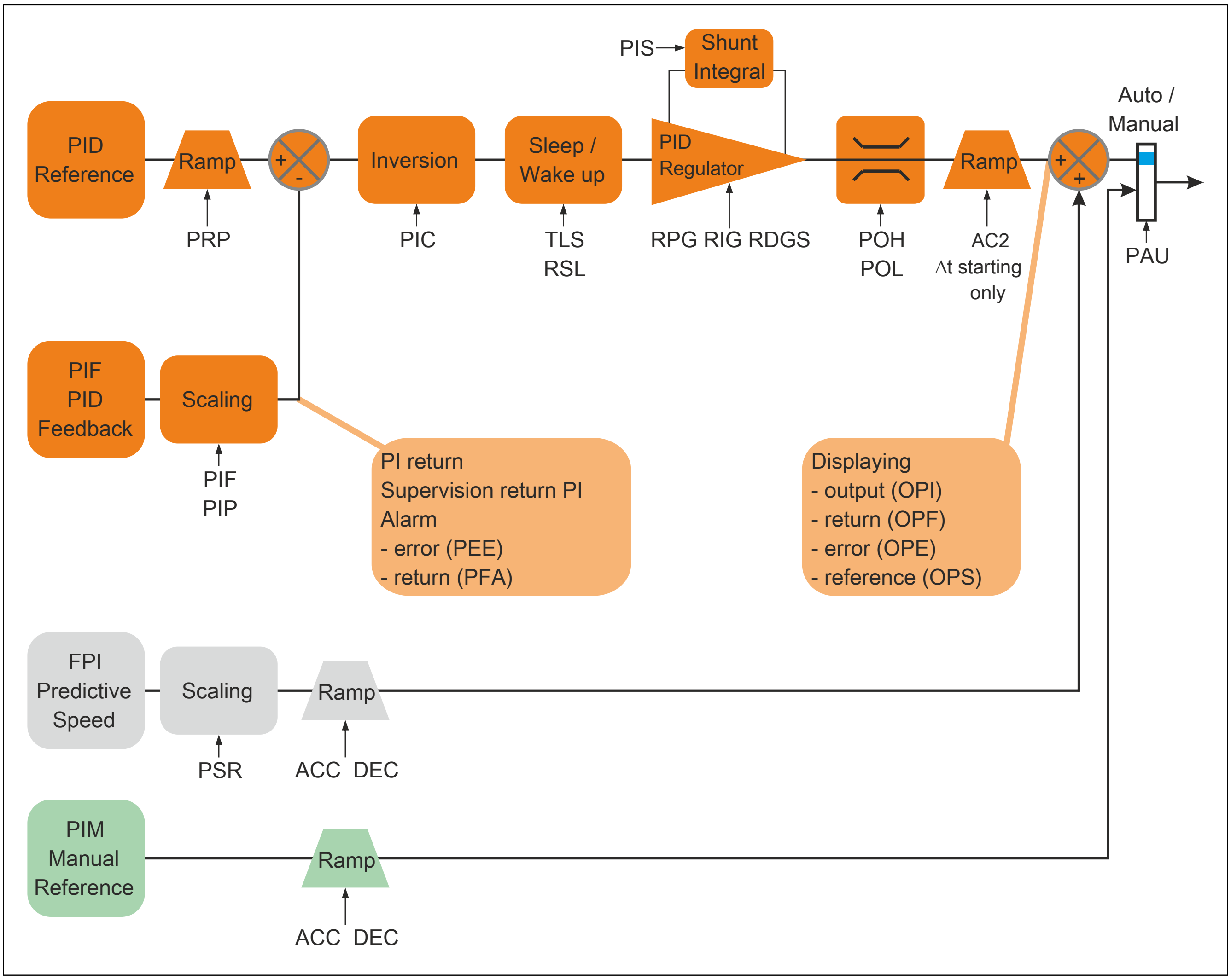
The parameters described below are accessed as follows: DRI- > COnF > FULL > FUn- > PId-			
Code	**Description**	**Adjustment range**	**Factory setting**
PId-	**[PID REGULATOR]**		
FPI	**[PID ref. assign.]**		
	PID controller specified speed input		
nO	Not assigned (function inactive)		
AI1	Analog input		
AI2	Analog input		
AI3	Analog input		
AI4	Analog input		
LCC	Graphic display terminal		
Mdb	Integrated Modbus		
CAn	Integrated CANopen		
nEt	POWERLINK communication card (if used)		
APP	Integrated control card (if used)		
PI	Frequency input		
PSr	**[Speed input %]**	1 to 100%	100%
	Multiplication factor for the specified frequency input. The parameter is not accessible when **[assign ref of PID]** (FPI) = **[No]** (nO).		

Parameter that can be modified during operation or when stopped.

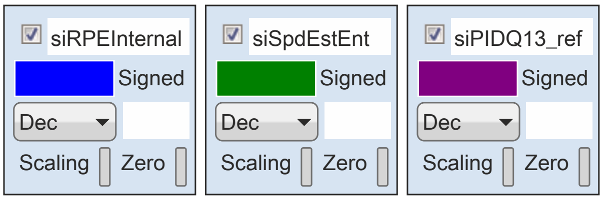
In order to use the FPI, this must be configured on the reference channel and the PSR value defined.

Send the target speed for the speed specification via the configured channel.

With the reference for the speed specification, you can add a frequency reference to this PID output.



Below you will find a configuration example for the given reference.

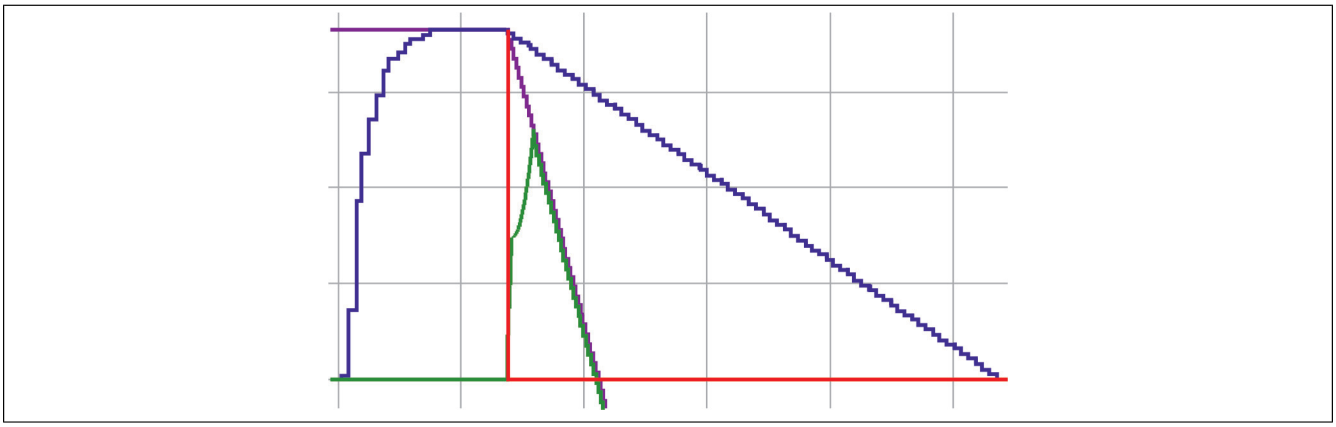


siRPEInternal = PID Error
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output

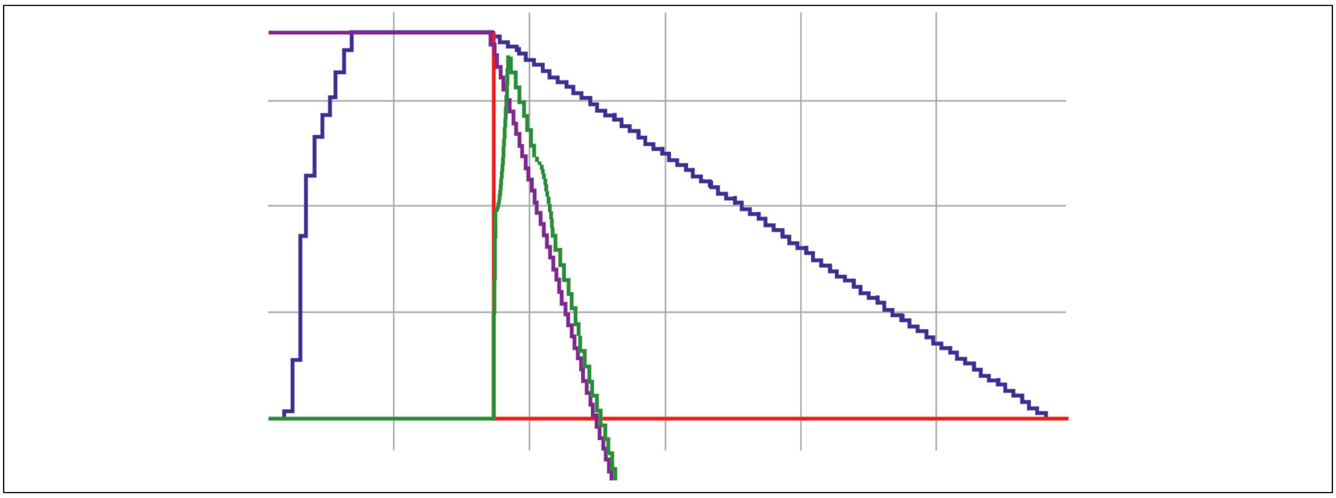
Drive configuration

ACC:	1			PIF1:	0	RPG:	7.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	0.01	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	1
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

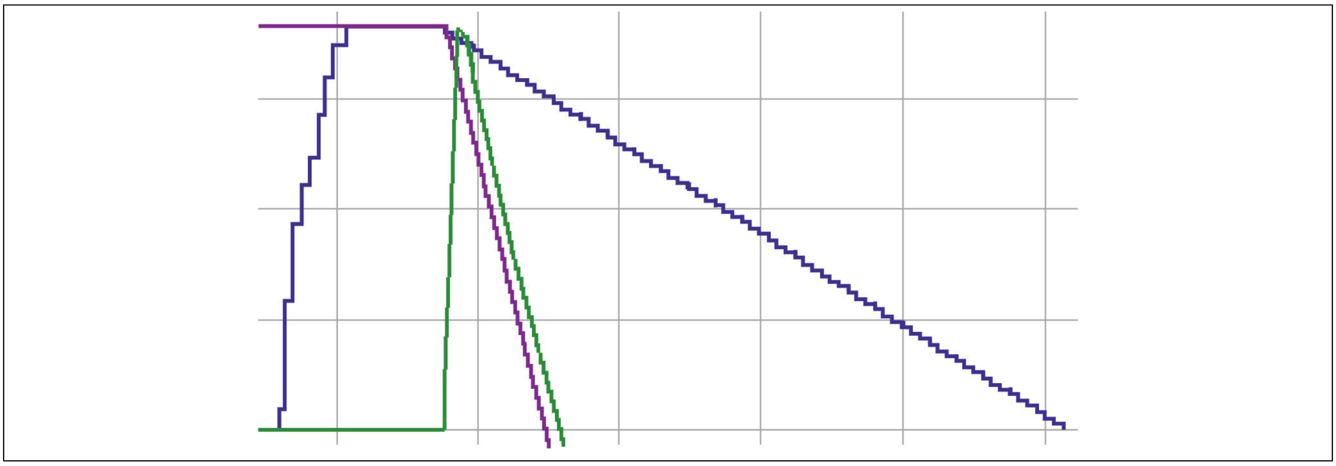
PSR = 1% – Target speed 0 rpm



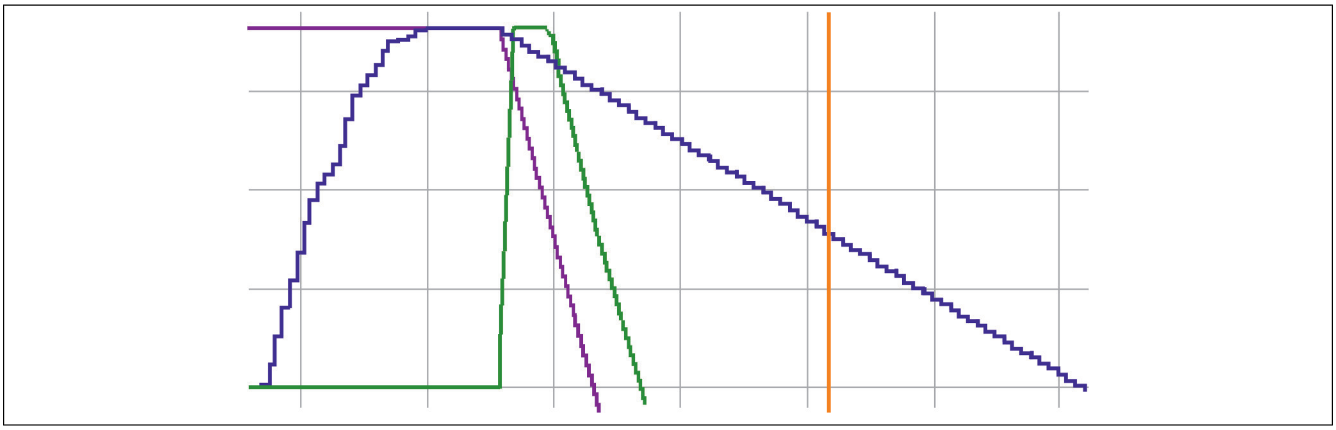
PSR = 1% – Target speed 1500 rpm



PSR = 10% – Target speed 1500 rpm



PSR = 50% – Target speed 1500 rpm



3.2.3.6.6.16 PID PRESET REFERENCES

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > PrI-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
PrI-	**[PID PRESET REFERENCES]** Function can be accessed if **[PID feedback ass.]**(PIF) is assigned.		
Pr2	**[2 preset PID ref.]** If the assigned input or bit is at 0, the function is inactive. If the assigned input or bit is at 1, the function is active.		**[No]**(nO)
nO	**[No]**(nO): Not assigned		
LI1	**[LI1]**(LI1): Logical input LI1		
...	**[...]**(...): See the assignment conditions		
Pr4	**[4 preset PID ref.]** Check that **[2 preset PID ref.]**(Pr2) has been assigned before assigning this function. Identical to **[2 preset PID ref.]**(Pr2). If the assigned input or bit is at 0, the function is inactive. If the assigned input or bit is at 1, the function is active.		**[No]**(nO)
rP2 (1)	**[Preset ref. PID 2]** This parameter can be accessed if **[2 preset PID ref.2]**(Pr2) is assigned.	**[Min PID reference]**(PIP1) to **[Max PID reference]**(PIP2)(2)	300
rP3 (1)	**[Preset ref. PID 3]** This parameter can be accessed if **[3 preset PID ref.]**(Pr3) is assigned.	**[Min PID reference]**(PIP1) to **[Max PID reference]**(PIP2)(2)	600
rP4 (1)	**[Preset ref. PID 4]** This parameter can be accessed if **[4 preset PID ref.]**(Pr4) is assigned.	**[Min PID reference]**(PIP1) to **[Max PID reference]**(PIP2)(2)	900

(1) The parameter can also be accessed in the **[SETTINGS]**(SEt-) menu.

(2) If a graphic display terminal is not in use, values greater than 9999 will be displayed on the 4-digit display with a period mark after the thousand digit, for example, 15.65 for 15650.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

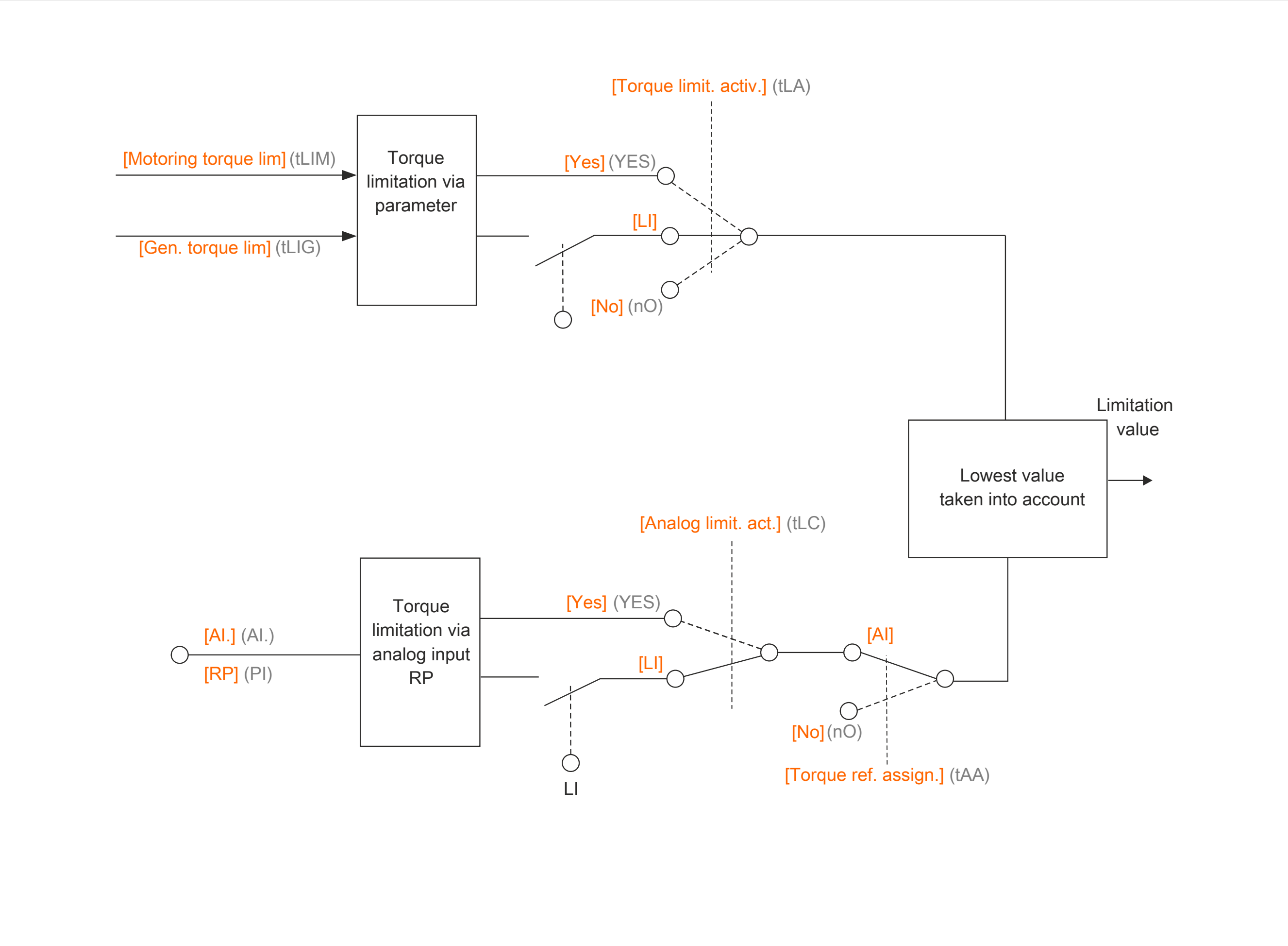
Parameter that can be modified during operation or when stopped.

3.2.3.6.6.17 TORQUE LIMITATION

There are two types of torque limitation:

- With a value that is fixed by a parameter
- With a value that is set by an analog input (AI or pulse)

If both types are enabled, the lowest value is taken into account. The two types of limitation can be configured or switched remotely using a logic input or via the communication bus.



Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > tOL-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
tOL-	[TORQUE LIMITATION]		
tLA	[Torque limit. activ.] If the assigned input or bit is at 0, the function is inactive. If the assigned input or bit is at 1, the function is active.		[No](nO)
nO	[No](nO): Function inactive		
YES	[Yes](YES): Function always active		
LI1	[LI1](LI1): Logical input LI1		
...	[...](...): See the assignment conditions		
IntP	[Torque increment] This parameter cannot be accessed if [Torque limit. activ.](tLA) is set to [No](nO). Selection of units for the [Motoring torque lim](tLIM) and [Gen. torque lim](tLIG) parameters.		[1%](1)
0.1	[0,1%](0.1): Unit 0.1%		
1	[1%](1): Unit 1%		
tLIM (1)	[Motoring torque lim] This parameter cannot be accessed if [Torque limit. activ.](tLA) is set to [No](nO). Torque limitation in motor mode as a % or in 0.1% increments of the rated torque in accordance with the [Torque increment](IntP) parameter.	0 to 300%	100%
tLIG (1)	[Gen. torque lim] This parameter cannot be accessed if [Torque limit. activ.](tLA) is set to [No](nO). Torque limitation in generator mode as a % or in 0.1% increments of the rated torque in accordance with the [Torque increment](IntP) parameter.	0 to 300%	100%
tAA	[Torque ref. assign.] If the function is assigned, the limitation varies between 0 and 300% of the rated torque on the basis of the 0 to 100% signal applied to the assigned input. Examples: 12 mA on a 4 to 20 mA input results in limitation to 150% of the rated torque. 2.5 V on a 10 V input results in 75% of the rated torque.		[No](nO)
nO	[No](nO): Not assigned (function inactive)		
AI1	[AI1](AI1): Analog input		
AI2	[AI2](AI2): Analog input		
AI3	[AI3](AI3): Analog input		
PI	[RP](PI): Pulse input		
AIU1	[AI Virtual 1](AIU1): Virtual analog input 1 with the jog dial		
AIU2	[AI Virtual 2](AIU2): Virtual input via communication bus, to be configured via [AI2 net. channel](AIC2).		
OA01	[OA01](OA01): Function blocks: Analog output 01		
...	...		
OA10	[OA10](OA10): Function blocks: Analog output 10		
tLC	[Analog limit. act.] This parameter cannot be accessed if [Torque limit. activ.](tLA) is set to [No](nO). Identical to [Torque limit. activ.](tLA). If the assigned input or bit is at 0: The limitation is specified by the [Motoring torque lim](tLIM) and [Gen. torque lim.](tLIG) parameters if [Torque limit. activ.](tLA) is not [No](nO). No limitation if [Torque limit. activ.](tLA) is set to [No](nO). If the assigned input or bit is at 1: The limitation depends on the input assigned by [Torque ref. assign.](tAA). **Note:** **If [Torque limitation](tLA) and [Torque ref. assign.](tAA) are enabled at the same time, the lowest value will be taken into account.**		[Yes](YES)

(1) The parameter can also be accessed in the [SETTINGS](SEt-) menu.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.6.18 2ND CURRENT LIMITATION

Code	Name / Description	Adjustment range	Factory setting
	Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > CLI-		
CLI-	**[2nd CURRENT LIMIT.]**		
LC2	**[Current limit 2]** If the assigned input or bit is at 0, the first current limitation is active. If the assigned input or bit is at 1, the second current limitation is active.		**[No]**(nO)
nO LI1 ...	**[No]**(nO): Function inactive **[LI1]**(LI1): Logical input LI1 **[...]**(...): See the assignment conditions		
CL2 ★ ⟳	**[I Limit. 2 value]** **Caution!** **RISK OF DAMAGE TO THE MOTOR AND THE DRIVE** • **Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.** • **Check that the profile mission complies with the derating curve given in Installation.** **Failure to follow these instructions can result in equipment damage.** Second current limitation. This parameter can be accessed if **[Current limit 2]**(LC2) is not set to **[No]**(nO). The adjustment range is limited to 1.5 In. **Note:** **If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss](OPL) fault mode if this has been enabled. If it is less than the no-load motor current, the motor cannot run.**	0.0 to $^{3}/_{2}$ INV (1)	$^{3}/_{2}$ INV (1)
CLI ★ ⟳	**[Current limitation]** **Caution!** **RISK OF DAMAGE TO THE MOTOR AND THE DRIVE** • **Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.** • **Check that the profile mission complies with the derating curve given in Installation.** **Failure to follow these instructions can result in equipment damage.** First current limitation. This parameter can be accessed if **[Current limit 2]**(LC2) is not set to **[No]**(nO). The adjustment range is limited to 1.5 In. **Note:** **If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss](OPL) fault mode if this has been enabled. If it is less than the no-load motor current, the motor cannot run.**	0.0 to $^{3}/_{2}$ INV (1)	$^{3}/_{2}$ INV (1)

(1) In corresponds to the rated drive current indicated in the Installation chapter and on the drive nameplate.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

⟳ Parameter that can be modified during operation or when stopped.

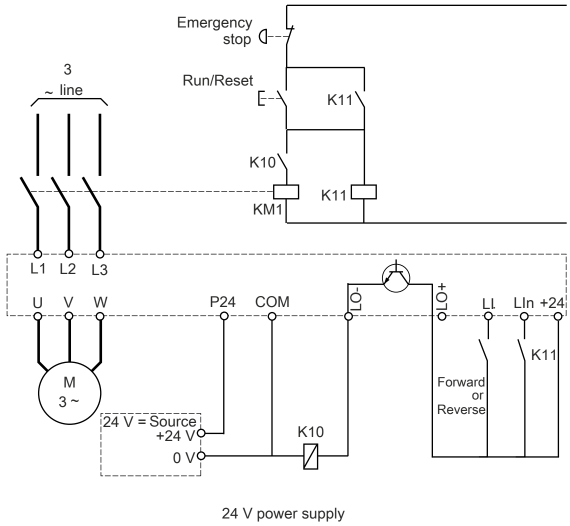
3.2.3.6.6.19 LINE CONTACTOR COMMAND

The line contactor closes every time a run command (forward or reverse) is sent and opens after every stop, as soon as the drive is locked. For example, if the stop mode is stop on ramp, the contactor will open when the motor reaches zero speed.

Note:

The drive control power supply must be provided via an external 24 V source.

Example circuit:



Note:

The "Run/Reset" key must be pressed once the "Emergency stop" key has been released.

LI. = Run command **[Forward]**(Frd) or **[Reverse]**(rrS)

LO-/LO+ = **[Line contactor ass.]**(LLC)

LIn = **[Drive lock]**(LES)

Caution!

RISK OF DAMAGE TO THE MOTOR

This function can only be used for a small number of consecutive operations with a cycle time longer than 60 s (in order to avoid premature aging of the filter capacitor charging circuit).

Failure to follow these instructions can result in equipment damage.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > LLC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
LLC-	**[LINE CONTACTOR COMMAND]**		
LLC	**[Line contactor ass.]** Logic output or control relay.		**[No]**(nO)
nO	**[No]**(nO): Function not assigned (in this case, none of the function parameters can be accessed)		
LO1	**[LO1]**(LO1): Logical output LO1		
r2	**[R2]**(r2): Relay r2		
dO1	**[d01]**(dO1): Analog output AO1 functioning as a logic output. Selection can be made if **[AO1 assignment]**(AO1) is set to **[No]**(nO).		
LES ★	**[Drive lock]** This parameter can be accessed if **[Line contactor ass.]**(LLC) is not set to **[No]**(nO). The drive locks when the assigned input or bit changes to 0.		**[No]**(nO)
nO	**[No]**(nO): Function inactive		
LI1	**[LI1]**(LI1): Logical input LI1		
...	**[...]**(...): See the assignment conditions		
LCt ★	**[Mains V. time out]** Monitoring time for closing of line contactor. If, once this time has elapsed, there is no voltage on the drive power circuit, the drive will lock with a **[Line contactor]**(LCF) detected fault.	5 to 999 s	5 s

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.3.6.6.20 OUTPUT CONTACTOR COMMAND

This allows the drive to control a contactor located between the drive and the motor. The request for the contactor to close is made when a run command is sent. The request for the contactor to open is made when there is no longer any current in the motor.

Caution!

RISK OF DAMAGE TO THE MOTOR

If a DC injection braking function has been configured, it should not be left operating too long in stop mode, as the contactor only opens at the end of braking.

Failure to follow these instructions can result in equipment damage.

Output contactor feedback

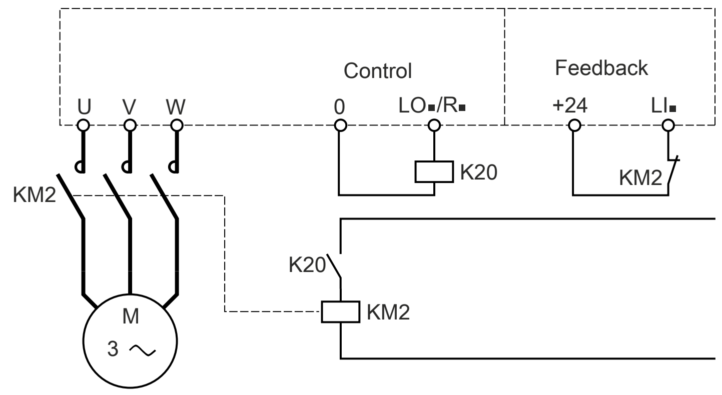
The corresponding logic input should be at 1 when there is no run command and at 0 during operation.

In the event of an inconsistency, the drive trips in FCF2 if the output contactor fails to close (LIx at 1) and in FCF1 if it is stuck (LIx at 0).

The **[Delay to motor run]**(dbS) parameter can be used to delay tripping in fault mode when a run command is sent and the **[Delay to open cont.]**(dAS) parameter delays the detected fault when a stop command is set.

Note:

FCF2 (contactor failing to close) can be reset by the run command changing state from 1 to 0 (0 --> 1 - -> 0 in 3-wire control).



The **[Out. contactor ass.]**(OCC) and **[Output contact. fdbk]**(rCA) functions can be used individually or together.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > OCC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
OCC-	**[OUTPUT CONTACTOR CMD]**		
OCC	**[Out. contactor ass.]** Logic output or control relay.		**[No]**(nO)
nO	**[No]**(nO): Function not assigned (in this case, none of the function parameters can be accessed)		
LO1	**[LO1]**(LO1): Logical output LO1		
r2	**[R2]**(r2): Relay r2		
dO1	**[dO1]**(dO1): Analog output AO1 functioning as a logic output. Selection can be made if **[AO1 assignment]**(AO1) is set to **[No]**(nO).		
rCA	**[Output contact. fdbk]** The motor starts up when the assigned input or bit changes to 0.		**[No]**(nO)
nO	**[No]**(nO): Function inactive		
LI1	**[LI1]**(LI1): Logical input LI1		
...	**[...]**(...): See the assignment conditions		
dbS	**[Delay to motor run]** Time delay for: Motor control following the sending of a run command Output contactor state monitoring, if the feedback is assigned. If the contactor fails to close at the end of the set time, the drive will lock in FCF2 mode. This parameter can be accessed if **[Out. contactor ass.]**(OCC) is assigned or if **[Output contact. fdbk]**(rCA) is assigned. The time delay must be greater than the closing time of the output contactor.	0.05 to 60.00 s	0.15 s
dAS	**[Delay to open cont.]** Time delay for output contactor opening command following motor stop. This parameter can be accessed if **[Output contact. fdbk]**(rCA) is assigned. The time delay must be greater than the opening time of the output contactor. If it is set to 0, the detected fault will not be monitored. If the contactor fails to open at the end of the set time, the drive will lock in FCF1 fault mode.	0.00 to 5.00 s	0.10 s

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.6.21 POSITIONING BY SENSORS

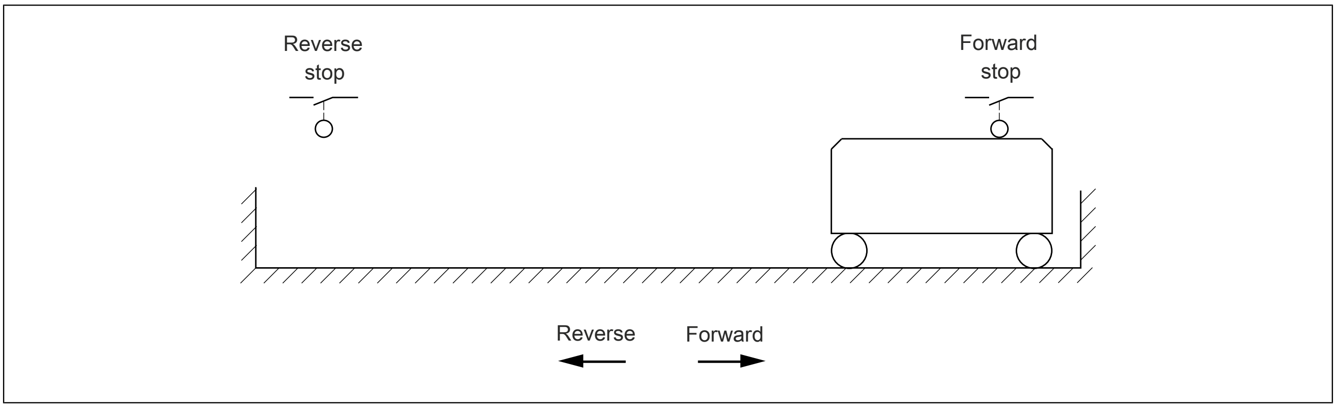
This function is used for managing positioning using position sensors or limit switches linked to logic inputs or using control word bits:

- Slowing down
- Stopping

The drive monitors and save the rising edge and falling edge of sensor. So it's important to be sure that the position of sensor and the use is correct.

When the drive is in run, he monitor the rising and falling edge of stop sensor (SAF and SAR), in order to know where he is.

For example: The trolley is stop on the forward sensor.



You give the reverse order and so the trolley goes in reverse.

But now if the forward sensor is broken, the drive will not see the rising (or falling) edge.

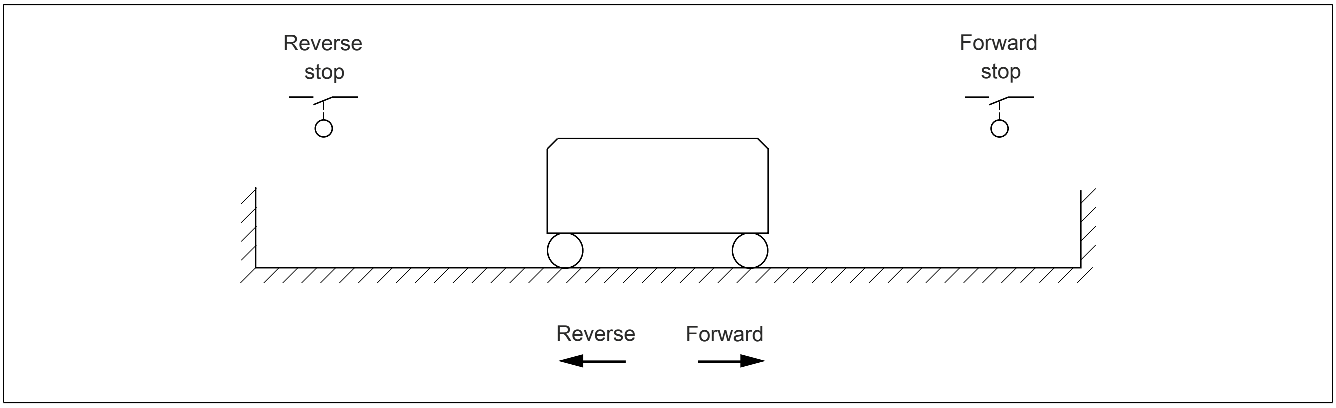
When the trolley will reach the reverse stop sensor, the drive will stop the trolley, but when you will try to give a forward order, the drive will not start because it consider that in the previously sequence it should detected a rising edge of this forward sensor and it was not the case.

Moreover, in case of command by transition, it's also necessary to take care to the forward and reverse order. You have to suppress the forward order before send the reverse order. Same in other direction: suppress the reverse order before send the forward order.

Description of the point to respect

With long sensor

Initial condition:



Give the forward order (transition 1)

- The drive will start in forward.

The forward stop sensor is reach (transition 2)

- The drive will stop. Like its long sensor, the sensor stays active.

Suppress the forward order (transition 3)

- If you let the forward direction and TCT=TRN, the reverse order will not be take into account.
- If you want avoid this you can put TCT=LEL

Give the reverse order (transition 4)

- The drive will start in reverse direction
- Like the drive start in reverse direction, the forward stop sensor is release. So the drive detects and memorizes the falling edge of this sensor (transition 5)

The Reverse stop sensor is reach (transition 6)

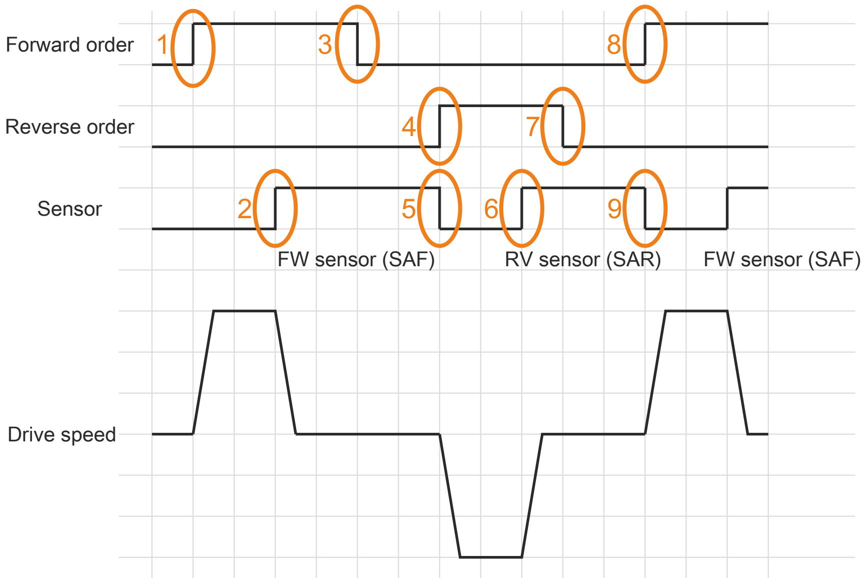
- The drive will stop. Like its long sensor, the sensor stays active.

Suppress the reverse order (transition 7).

- If you let the reverse direction and TCT=TRN, the forward order will not be take into account.
- If you want avoid this you can put TCT=LEL

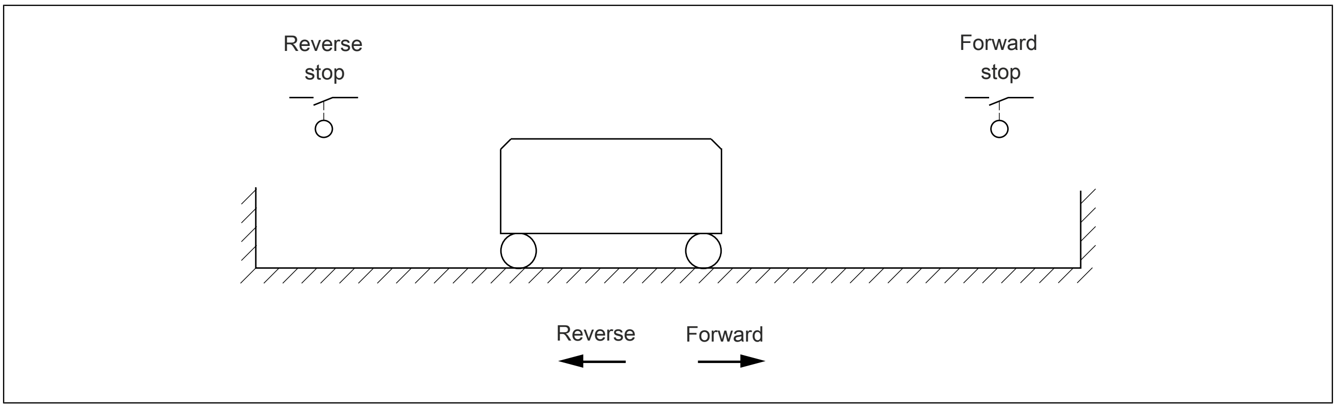
Give the forward order (transition 8)

- The drive will start in forward.
- Like the drive start in forward direction, the reverse stop sensor is release. So the drive detects and memorizes the falling edge of this sensor (transition 9)



With short sensor

Initial condition:



Give the forward order (transition 1)

- The drive will start in forward.

The forward stop sensor is reach (transition 2)

- The drive will stop. Like the sensor is short, the sensor is release just after.

Suppress the forward order (transition 3)

- If you let the forward direction and TCT=TRN, the reverse order will not be take into account.
- If you want avoid this you can put TCT=LEL.

Give the reverse order (transition 4)

- The drive will start in reverse direction.
- Like the drive start in reverse direction, the trolley reach the forward sensor and so the drive see and memorize this pulse (transition 5).

The Reverse stop sensor is reach (transition 6)

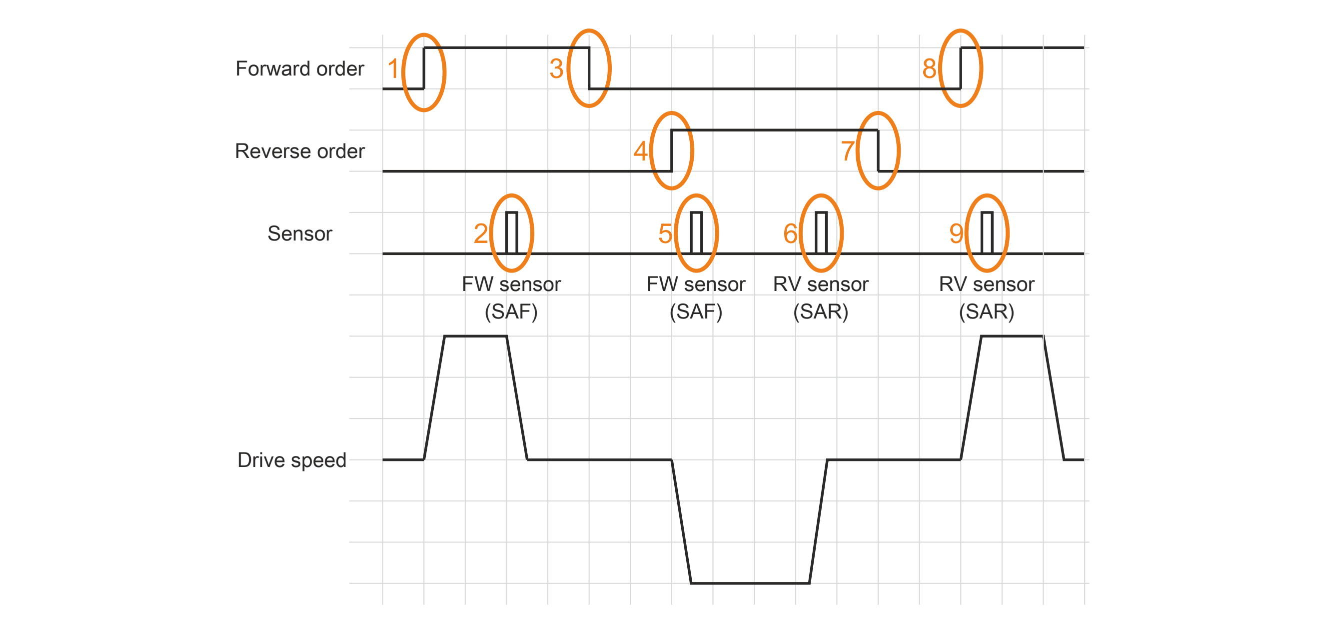
- The drive will stop. Like the sensor is short, the sensor is release just after.

Suppress the reverse order (transition 7)

- If you let the reverse direction and TCT=TRN, the forward order will not be take into account.
- If you want avoid this you can put TCT=LEL.

Give the forward order (transition 8)

- The drive will start in forward.
- Like the drive start in forward direction, the trolley reach the reverse sensor and so the drive see and memorize this pulse (transition 9).



So in case of long sensor or short sensor, it's necessary that the drive see the entire sensor. If one of sensor is not see by the drive, the drive will not start. In this case it's necessary to use CLS parameter in order to initialize the function and restart.

For example if you miss the transition 5, the drive can restart in reverse, but after it' will be impossible to restart in forward.

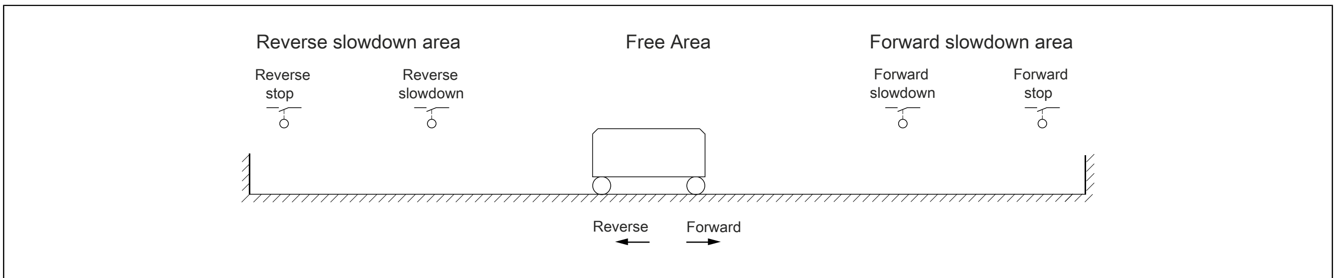
Specific case

With the positioning by sensor, the drive monitors always his position compare to the sensor. In terminal control if the two sensors are deactivated at the same time, the drive stay stop because, physically, the both sensor cannot be deactivated in same time. So the drive detects an issue with the sensor, the drive is not able to know where it situated between the both sensor so you cannot start. The drive will memorized this state even after power off. The only way is to disable the limit switch with CLS parameter. This disabling is like a reset of position for the drive.

Note:

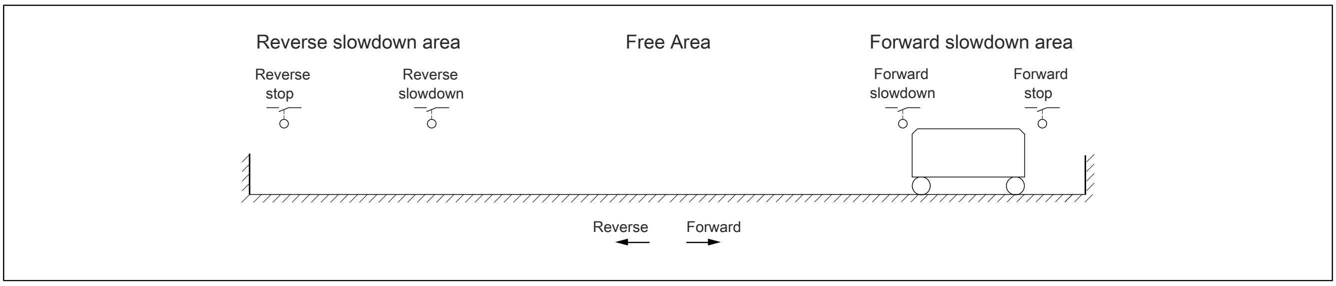
- **When operating for the first time or after restoring the factory settings, the drive must initially be started outside the slowdown and stop zones in order to initialize the function**
- **The current zone is memorized at power off.**
- **In case of manual modification of the system position, the drive must be started at the same position at the next power up of the drive.**

Trolley in free Area



- The trolley can move in forward or reverse at full speed. Up to reach one of slowdown sensor.
- When the trolley is moving inside this area, it can be stop by removing the run order.
- Possibility to disable the sensor (slowdown and stop) with CLS parameter. When the sensors are disabling with the CLS parameter, the trolley can move in forward or reverse at full speed.

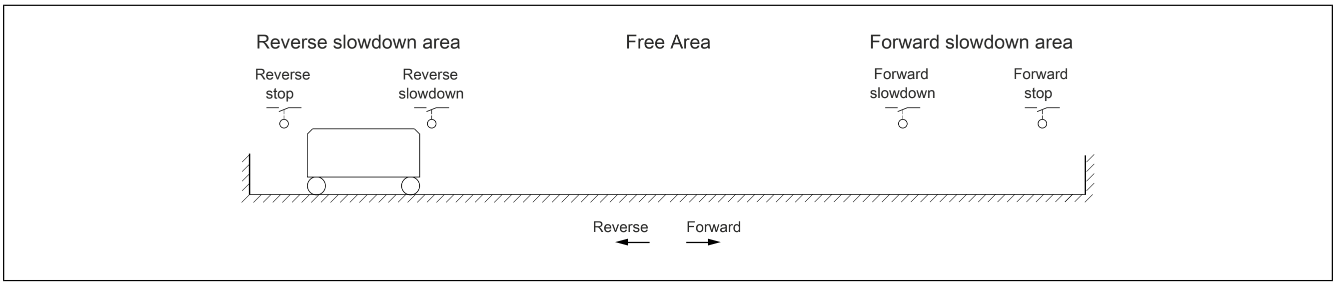
Trolley in Forward slowdown area



When the slowdown sensor is reach the trolley goes back to the slowdown frequency.

- The trolley can move in forward at low speed.
- The trolley can move in reverse at full speed.
- A stop order can be given by removing the run order. In this case a restart is possible in forward but at low speed and a restart is possible in reverse at full speed.
- Possibility to disable the sensor (slowdown and stop) with CLS parameter. When the sensors are disabling with the CLS parameter, the trolley can move in forward or reverse at full speed.

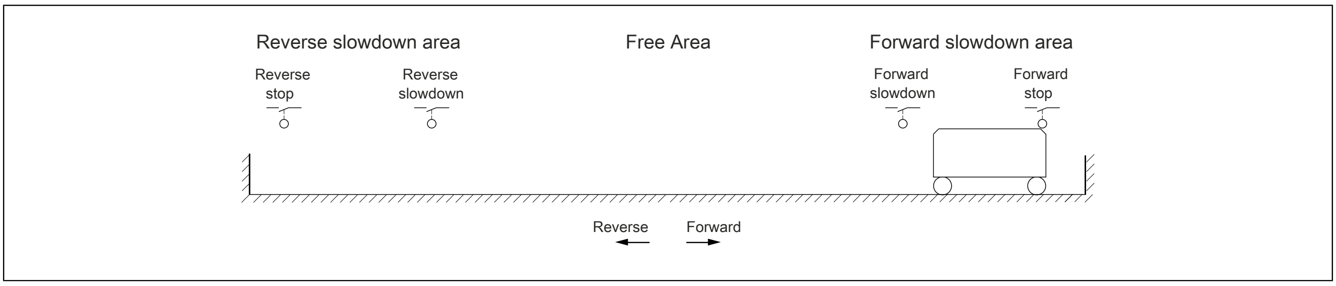
Trolley in Reverse slowdown area



When the slowdown sensor is reach the trolley goes back to the slowdown frequency.

- The trolley can move in reverse at low speed.
- The trolley can move in forward at full speed.
- A stop order can be given by removing the run order. In this case a restart is possible in reverse but at low speed and a restart is possible in forward at full speed.
- Possibility to disable the sensor (slowdown and stop) with CLS parameter. When the sensors are disabling with the CLS parameter, the trolley can move in forward or reverse at full speed.

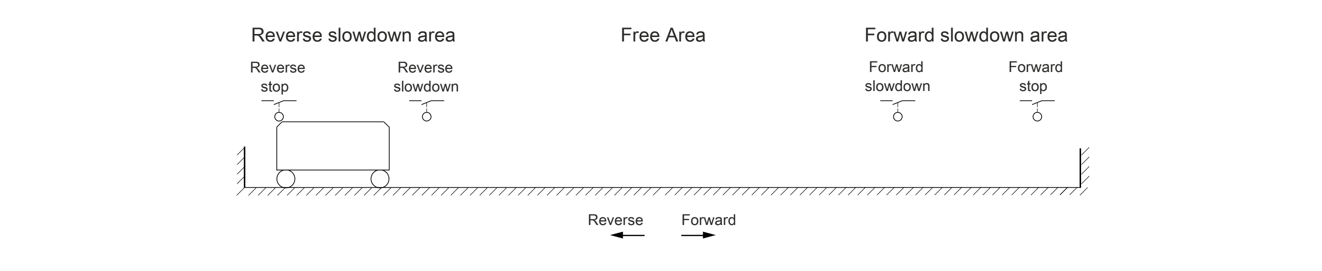
Trolley on the Forward stop sensor



When the stop sensor is reach, the trolley is stop.

- The trolley can no more moving in forward direction.
- The trolley can move in reverse at full speed.
- Possibility to disable the sensor (slowdown and stop) with CLS parameter. When the sensors are disabling with the CLS parameter, the trolley can move in forward or reverse at full speed.

Trolley on the Reverse stop sensor



When the stop sensor is reach, the trolley is stop.

- The trolley can no more moving in reverse direction.
- The trolley can move in forward at full speed.
- Possibility to disable the sensor (slowdown and stop) with CLS parameter. When the sensors are disabling with the CLS parameter, the trolley can move in forward or reverse at full speed.

To summarize

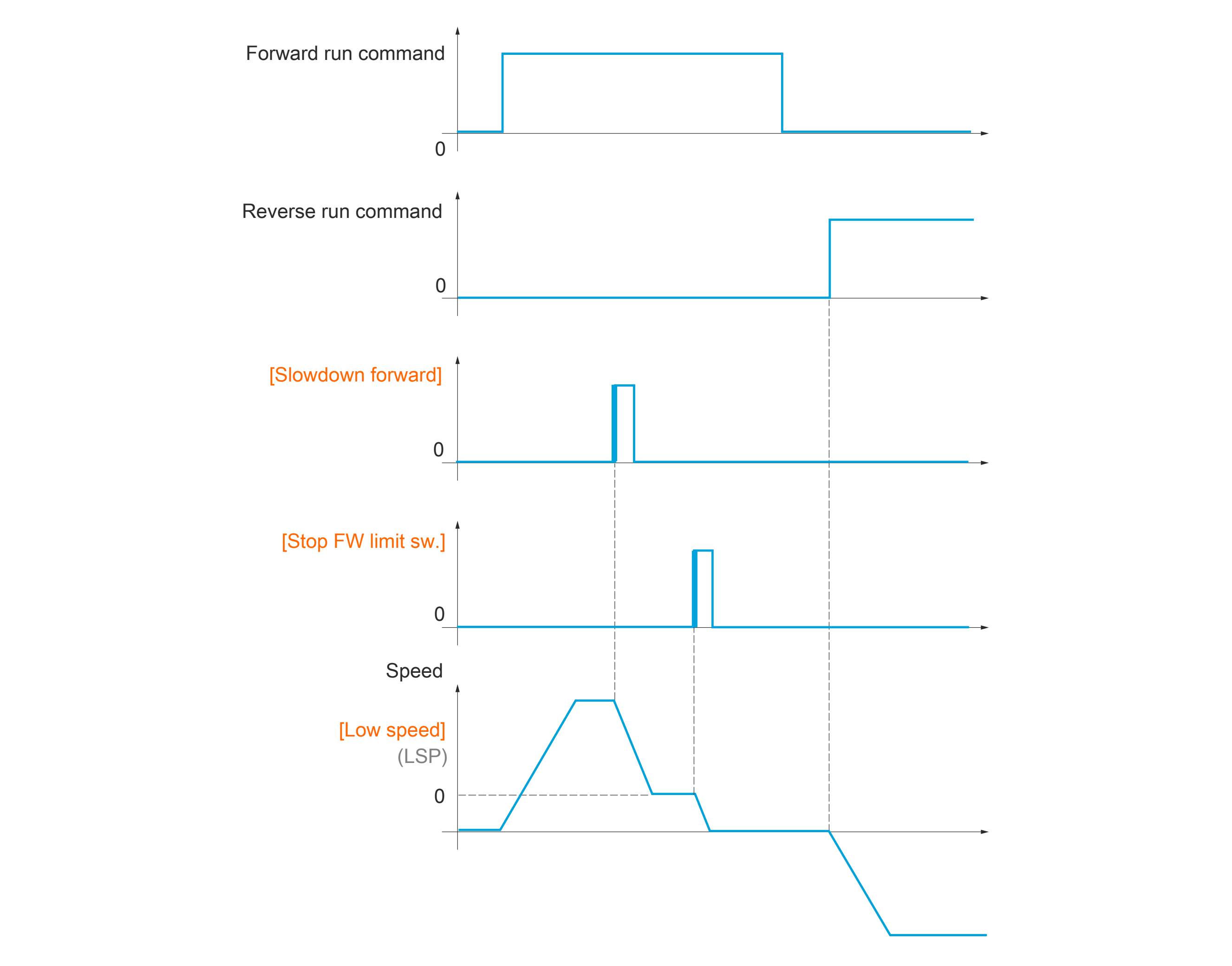
If in your sequence you don't respect the sensor sequence, the drive can be stay is RDY because it detect a bad position.

So to avoid being block in RDY:

- If TCT=TRN, take care to suppress forward or reverse direction before send the opposite command direction. To avoid this you can configure TCT=LEL.
- Take cares that on installation, all the transition are respected. The drive always monitors his position compare to the sensor. The sequences have to be respected.

The important thing to know about the function positioning on sensor, is that the drive monitor always where the trolley is. The drive checks that the sensors are detect (even sensors for opposite direction) and check the order of these sensors. For example after stop on forward stop sensor, you go back in reverse. If the drive does not see the slowdown forward sensor, the next forward order will be not taking into account.

The action logic for the inputs and bits can be configured on a rising edge (change from 0 to 1) or a falling edge (change from 1 to 0). The example below has been configured on a rising edge:



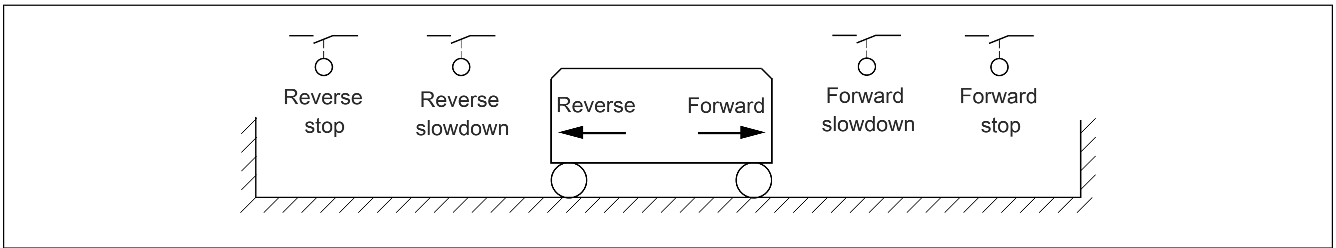
The slowdown mode and stop mode can be configured.

The operation is identical for both directions of operation. Slowdown and stopping operate according to the same logic, described below.

Example: Forward slowdown, on rising edge

- Forward slowdown takes place on a rising edge (change from 0 to 1) of the input or bit assigned to forward slowdown if this rising edge occurs in forward operation. The slowdown command is then memorized, even in the event of a power outage. Operation in the opposite direction is authorized at high speed. The slowdown command is deleted on a falling edge (change from 1 to 0) of the input or bit assigned to forward slowdown if this falling edge occurs in reverse operation.
- A bit or a logic input can be assigned to disable this function.
- Although forward slowdown is disabled while the disable input or bit is at 1, sensor changes continue to be monitored and saved.

Example: Positioning on a limit switch, on rising edge



Operation with short cams:

Warning!

LOSS OF CONTROL

When operating for the first time or after restoring the factory settings, the drive must initially be started outside the slowdown and stop zones in order to initialize the function.

Failure to follow these instructions can result in death, serious injury or equipment damage.

Warning!

LOSS OF CONTROL

The current zone is memorized at power off.

In case of manual modification of the system position, the drive must be started at the same position at the next power up of the drive.

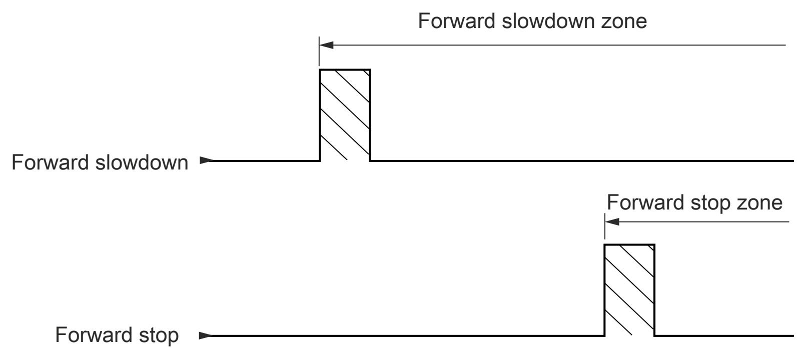
Failure to follow these instructions can result in death, serious injury or equipment damage.

Warning!

If the LPO function is used with default settings (limit switches are set to the falling edge), going beyond the limit switches is not permitted. The user must ensure that the carrier can be slowed down quickly enough.

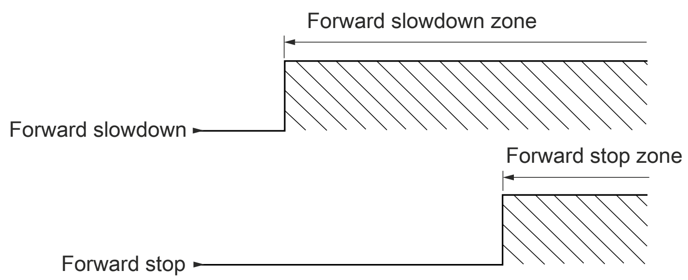
Otherwise the ACOPOSinverter P74 will show RDY even though the actual position is invalid. In this case, the drive is locked and the user needs to use the CLS parameters to move the carrier back to a valid position.

In this instance, when operating for the first time or after restoring the factory settings, the drive must initially be started outside the slowdown and stop zones in order to initialize the function.



Operation with long cams:

In this instance, there is no restriction, which means that the function is initialized across the whole trajectory.



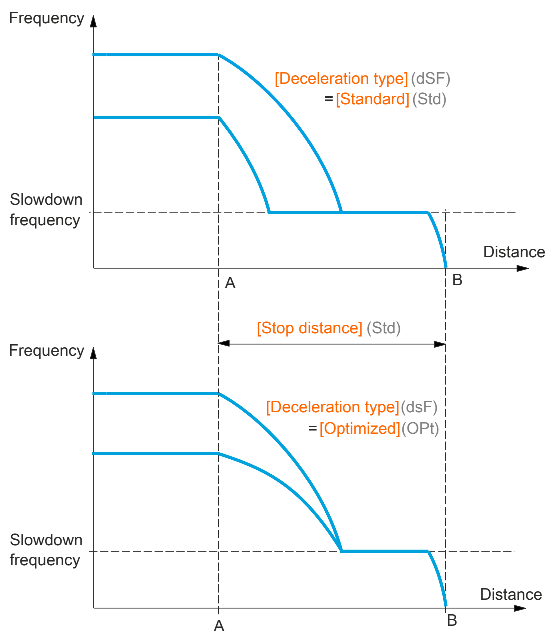
Stop at distance calculated after deceleration limit switch

This function can be used to control the stopping of the moving part automatically once a preset distance has been traveled after the slowdown limit switch.

On the basis of the rated linear speed and the speed estimated by the drive when the slowdown limit switch is tripped, the drive will induce the stop at the configured distance.

This function is useful in applications where one manual-reset overtravel limit switch is common to both directions. It will then only respond to help management if the distance is exceeded. The stop limit switch retains priority in respect of the function.

The **[Deceleration type]**(dSF) parameter can be configured to obtain either of the functions described below:



A: Slowdown limit switch reached
B: Automatic stop at a distance

Note:

- **If the deceleration ramp is modified while stopping at a distance is in progress, this distance will not be observed.**
- **If the direction is modified while stopping at a distance is in progress, this distance will not be observed.**

Warning!

LOSS OF CONTROL

- **Check that the parameters configured are consistent (in particular, you should check that the required distance is possible).**
- **This function does not replace the stop limit switch, which remains necessary for safety reasons**

Failure to follow these instructions will result in death, serious injury or equipment damage.

<table>
<tr><th colspan="4">Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > LPO-</th></tr>
<tr><th>Code</th><th>Name / Description</th><th>Adjustment range</th><th>Factory setting</th></tr>
<tr><td>LPO-</td><td colspan="3">[POSITIONING BY SENSORS]
Note:
This function cannot be used with certain other functions.</td></tr>
<tr><td>SAF</td><td>[Stop FW limit sw.]
Stop switch forward.</td><td></td><td>[No](nO)</td></tr>
<tr><td>nO
LI1
...</td><td colspan="3">[No](nO): Not assigned
[LI1](LI1): Logical input LI1
[...](...): See the assignment conditions</td></tr>
<tr><td>SAr</td><td>[Stop RV limit sw.]
Stop switch reverse.
Identical to [Stop FW limit sw.](SAF) above.</td><td></td><td>[No](nO)</td></tr>
<tr><td>SAL
★</td><td>[Stop limit config.]
Warning!
LOSS OF CONTROL
If [Stop limit config.](SAL) is set to [Active high](HIG), the stop command will be activated on active signal (stop order will not be given if signal is not applied for any reason).
Do not select [Active high](HIG) unless you are sure that your signal will be present in any case.
Failure to follow these instructions can result in death, serious injury or equipment damage.
Stop switch activation level.
This parameter can be accessed if at least one limit switch or one stop sensor has been assigned. It defines the positive or negative logic of the bits or inputs assigned to the stop.</td><td></td><td>[Active low](LO)</td></tr>
<tr><td>LO
HIG</td><td colspan="3">[Active low](LO): Stop controlled on a falling edge (change from 1 to 0) of the assigned bits or inputs
[Active high](HIG): Stop controlled on a rising edge (change from 0 to 1) of the assigned bits or inputs</td></tr>
<tr><td>dAF</td><td>[Slowdown forward]
Slowdown attained forward.
Identical to [Stop FW limit sw.](SAF) above.</td><td></td><td>[No](nO)</td></tr>
<tr><td>dAr</td><td>[Slowdown reverse]
Slowdown attained reverse.
Identical to [Stop FW limit sw.](SAF) above.</td><td></td><td>[No](nO)</td></tr>
<tr><td>dAL
★</td><td>[Slowdown limit cfg.]
Caution!
RISK OF DAMAGE TO THE EQUIPMENT
If [Slowdown limit cfg.](dAL) is set to [Active high](HIG), the slowdown command will be activated on active signal (slow-down order will not be given if signal is not applied for any reason).
Do not select [Active high](HIG) unless you are sure that your signal will be present in any case.
Failure to follow these instructions can result in equipment damage.
This parameter can be accessed if at least one limit switch or one slowdown sensor has been assigned. It defines the positive or negative logic of the bits or inputs assigned to the slowdown.</td><td></td><td>[Active low](LO)</td></tr>
<tr><td>LO
HIG</td><td colspan="3">[Active low](LO): Slowdown controlled on a falling edge (change from 1 to 0) of the assigned bits or inputs
[Active high](HIG): Slowdown controlled on a rising edge (change from 0 to 1) of the assigned bits or inputs</td></tr>
<tr><td>CLS
★</td><td>[Disable limit sw.]
Warning!
LOSS OF CONTROL
If [Disable limit sw.](CLS) is set to an input and activated, the limit switch management will be inhibited.
Check that this configuration will not endanger personnel or equipment in any way.
Failure to follow these instructions can result in death, serious injury or equipment damage.
This parameter can be accessed if at least one limit switch or one sensor has been assigned.
The action of the limit switches is disabled when the assigned bit or input is at 1. If, at this time, the drive is stopped or being slowed down by limit switches, it will restart up to its speed reference.</td><td></td><td>[No](nO)</td></tr>
<tr><td>nO
LI1
...</td><td colspan="3">[No](nO): Function inactive
[LI1](LI1): Logical input LI1
[...](...): See the assignment conditions</td></tr>
</table>

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > LPO-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
PAS ★	[Stop type]		[Ramp stop](rMP)
	This parameter can be accessed if at least one limit switch or one sensor has been assigned.		
rMP FSt nSt	[Ramp stop](rMP): Follow ramp [Fast stop](FSt): Fast stop (ramp time reduced by [Ramp divider](dCF) [Freewheel](nSt): Freewheel stop		
dSF ★	[Deceleration type]		[Standard](Std)
	This parameter can be accessed if at least one limit switch or one sensor has been assigned.		
Std OPt	[Standard](Std): Uses the [Deceleration](dEC) or [Deceleration 2](dE2) ramp (depending on which has been enabled) [Optimized](OPt): The ramp time is calculated on the basis of the actual speed when the slowdown contact switches, in order to limit the operating time at low speed (optimization of the cycle time: the slowdown time is constant regardless of the initial speed)		
Std ★	[Stop distance]	[No](nO) ≙ 0.00 to 10.00 m	[No](nO)
	This parameter can be accessed if at least one limit switch or one sensor has been assigned. Activation and adjustment of the "Stop at distance calculated after the slowdown limit switch" function.		
nO -	[No](nO): Function inactive (the next two parameters will, therefore, be inaccessible) 0.01 to 10.00: Stop distance range in meters		
nLS ★	[Rated linear speed]	0.20 to 5.00 m/s	1.00 m/s
	This parameter can be accessed if at least one limit switch or one sensor has been assigned and [Stop distance](Std) is not set to [No](nO). Rated linear speed in meters/second.		
SFd ★	[Stop corrector]	50 to 200%	100%
	This parameter can be accessed if at least one limit switch or one sensor has been assigned and [Stop distance](Std) is not set to [No](nO). Scaling factor applied to the stop distance to compensate, for example, a non-linear ramp.		
MStP ★	[Memo Stop]		[Yes](YES)
	This parameter can be accessed if at least one limit switch or one sensor has been assigned. With or without memorization stop switch.		
nO YES	[No](nO): No memorization of limit switch [YES](YES): Memorization of limit switch		
PrSt ★	[Priority restart]		[No](nO)
	This parameter can be accessed if at least one limit switch or one sensor has been assigned. Priority given to the starting even if switch stop is activated.		
nO YES	[No](nO): No priority restart if stop switch is activated [YES](YES): Priority to restart even if stop switch is activated This parameter is forced to [No](nO) if [Memo Stop](MStP) is set to [YES](YES).		

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.3.6.6.22 PARAMETER SET SWITCHING

A set of 1 to 15 parameters from the **[SETTINGS]**(SEt-) menu can be selected and 2 or 3 different values assigned. These 2 or 3 sets of values can then be switched using 1 or 2 logic inputs or control word bits. This switching can be performed during operation (motor running).

It can also be controlled on the basis of 1 or 2 frequency thresholds, whereby each threshold acts as a logic input (0 = threshold not reached, 1 = threshold reached).

	Values 1	Values 2	Values 3
Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15	Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15	Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15	Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15
Input LI or bit or frequency threshold 2 values	0	1	0 or 1
Input LI or bit or frequency threshold 3 values	0	0	1

Note:

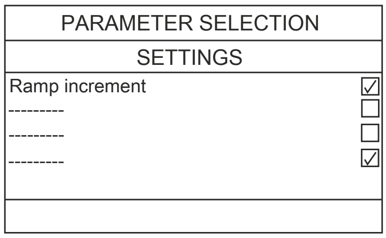
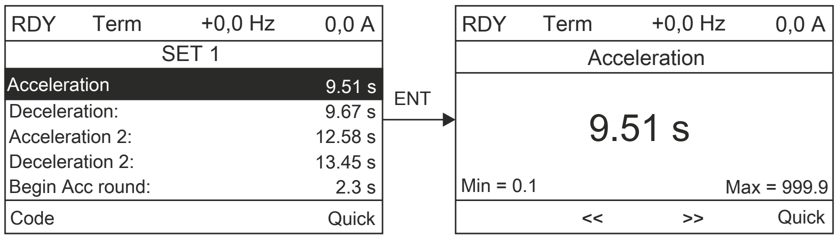
Do not modify the parameters in the [SETTINGS](SEt-) menu, because any modifications made in this menu ([SETTINGS](SEt-)) will be lost on the next power-up. The parameters can be adjusted during operation in the [PARAM. SET SWITCHING](MLP-) menu on the active configuration.

Note:

Parameter set switching cannot be configured from the integrated display terminal.

Parameters can only be adjusted on the integrated display terminal if the function has been configured previously via the graphic display terminal or via the bus or communication network. If the function has not been configured, the **[PARAM. SET SWITCHING]**(MLP-) menu and the **[SET 1]**(PS1-), **[SET 2]**(PS2-) and **[SET 3]**(PS3-) submenus will not appear.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > MLP-		
Code	**Name / Description**	**Factory setting**
MLP-	**[PARAM. SET SWITCHING]**	
CHA1	**[2 parameter sets]** Switching 2 parameter sets.	**[No]**(nO)
nO FtA F2A LI1 ...	**[No]**(nO): Not assigned **[Freq. Th.att.]**(FtA): Switching via **[Freq. threshold]**(Ftd) **[Freq. Th. 2 attained]**(F2A): Switching via **[Freq. threshold 2]**(F2d) **[LI1]**(LI1): Logical input LI1 **[...]**(...): See the assignment conditions	
CHA2	**[3 parameter sets]** Identical to **[2 parameter sets]**(CHA1). Switching 3 parameter sets. **Note:** **In order to obtain 3 parameter sets, [2 parameter sets](CHA1) must also be configured.**	**[No]**(nO)

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > MLP-		
Code	**Name / Description**	**Factory setting**
SPS	**[PARAMETER SELECTION]** This parameter can only be accessed on the graphic display terminal if **[2 parameter sets]**(CHA1) is not set to **[No]**(nO). Making an entry in this parameter opens a window containing all the adjustment parameters that can be accessed. Select 1 to 15 parameters using ENT (a ✓ then appears next to the parameter). Parameter(s) can also be deselected using ENT. Example: 	
PS1- S101 ... S115	**[SET 1]** This parameter can be accessed if at least one parameter has been selected in **[PARAMETER SELECTION]**. Making an entry in this parameter opens a settings window containing the selected parameters in the order in which they were selected. With the graphic display terminal:  With the integrated display terminal: Proceed as in the Settings menu using the parameters that appear.	
PS2- S201 ... S215	**[SET 2]** This parameter can be accessed if at least one parameter has been selected in **[PARAMETER SELECTION]**. Identical to **[SET 1]**(PS1-).	
PS3- S301 ... S315	**[SET 3]** This parameter can be accessed if **[3 parameter sets]**(CHA2) is not **[No]**(nO) and if at least one parameter has been selected in **[PARAMETER SELECTION]**. Identical to **[SET 1]**(PS1-).	

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

Note:

We recommend that a parameter set switching test is carried out while stopped and a check is made to verify that it has been performed correctly.

Some parameters are interdependent and in this case may be restricted at the time of switching.

Interdependencies between parameters must be respected, **even between different sets**.

Example: The highest **[Low speed]**(LSP) must be below the lowest **[High speed]**(HSP).

3.2.3.6.6.23 MULTIMOTORS / MULTICONFIGURATION

Motor or configuration switching [MULTIMOTORS/CONFIG.](MMC-)

The drive may contain up to three configurations, which can be saved using the **[FACTORY SETTINGS]**(FCS-) menu.

Each of these configurations can be activated remotely, enabling adaptation to:

- Two or three different motors or mechanisms (multimotor mode)
- Two or three different configurations for a single motor (multiconfiguration mode)

The two switching modes cannot be combined.

> **Note:**
>
> **The following conditions MUST be observed:**
>
> - **Switching may only take place when stopped (drive locked). If a switching request is sent during operation, it will not be executed until the next stop.**
> - **In the event of motor switching, the following additional conditions apply:**
>   - **When the motors are switched, the power and control terminals concerned must also be switched as appropriate.**
>   - **The maximum power of the drive must not be exceeded by any of the motors.**
> - **All the configurations to be switched must be set and saved in advance in the same hardware configuration, this being the definitive configuration (option and communication cards). Failure to follow this instruction can cause the drive to lock on an [Incorrect config.](CFF) state.**

Menus and parameters switched in multimotor mode

- **[SETTINGS]**(SEt-)
- **[MOTOR CONTROL]**(drC-)
- **[INPUTS / OUTPUTS CFG]**(I_O-)
- **[COMMAND]**(CtL-)
- **[APPLICATION FUNCT.]**(Fun-) with the exception of the **[MULTIMOTORS/CONFIG.]** function (to be configured once only)
- **[FAULT MANAGEMENT]**(FLt)
- **[MY MENU]**
- **[USER CONFIG.]**: The name of the configuration specified by the user in the **[FACTORY SETTINGS]**(FCS-) menu

Menus and parameters switched in multiconfiguration mode

As in multimotor mode, except for the motor parameters that are common to the three configurations:

- Rated current
- Thermal current
- Rated voltage
- Rated frequency
- Rated speed
- Rated power
- IR compensation
- Slip compensation
- Synchronous motor parameters
- Type of thermal protection
- Thermal state
- The auto-tuning parameters and motor parameters that can be accessed in expert mode
- Type of motor control

Note:

No other menus or parameters can be switched.

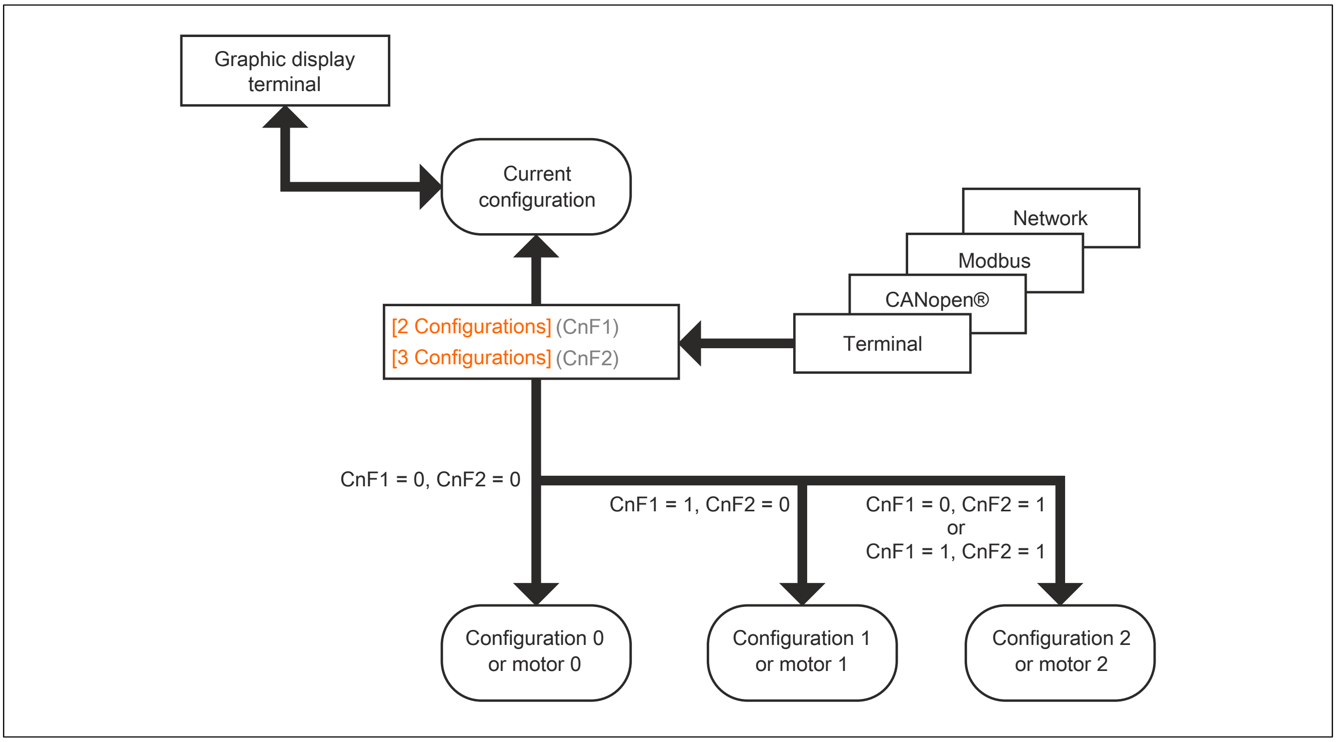
Transfer of a drive configuration to another one, with graphic display terminal, when the drive uses [MULTIMOTORS/CONFIG.](MMC-) function

Let A be the source drive and B the drive addressed. In this example, switching is controlled by logic input.

1 Connect graphic display terminal to the drive A.
2 Put logic input LI ([2 Configurations](CnF1)) and LI ([3 Configurations](CnF2)) to 0.
3 Download configuration 0 in a file of graphic display terminal (example: file 1 of the graphic display terminal).
4 Put logic input LI ([2 Configurations](CnF1)) to 1 and leave logic input LI ([3 Configurations](CnF2)) to 0.
5 Download configuration 1 in a file of graphic display terminal (example: file 2 of the graphic display terminal).
6 Put logic input LI ([3 Configurations](CnF2)) to 1 and leave logic input LI ([2 Configurations](CnF1)) to 1.
7 Download configuration 2 in a file of graphic display terminal (example: file 3 of the graphic display terminal).
8 Connect graphic display terminal to the drive B.
9 Put logic input LI ([2 Configurations](CnF1)) and LI ([3 Configurations](CnF2)) to 0.
10 Make a factory setting of the drive B.
11 Download the configuration file 0 in the drive (file 1 of graphic display terminal in this example).
12 Put logic input LI ([2 Configurations](CnF1)) to 1 and leave logic input LI ([3 Configurations](CnF2)) to 0.
13 Download the configuration file 1 in the drive (file 2 of graphic display terminal in this example).
14 Put logic input LI ([3 Configurations](CnF2)) to 1 and leave logic input LI ([2 Configurations](CnF1)) to 1.
15 Download the configuration file 2 in the drive (file 3 of graphic display terminal in this example).

Note:

Steps 6, 7, 14 and 15 are necessary only if [MULTIMOTORS/CONFIG.](MMC-) function is used with three configurations or three motors.

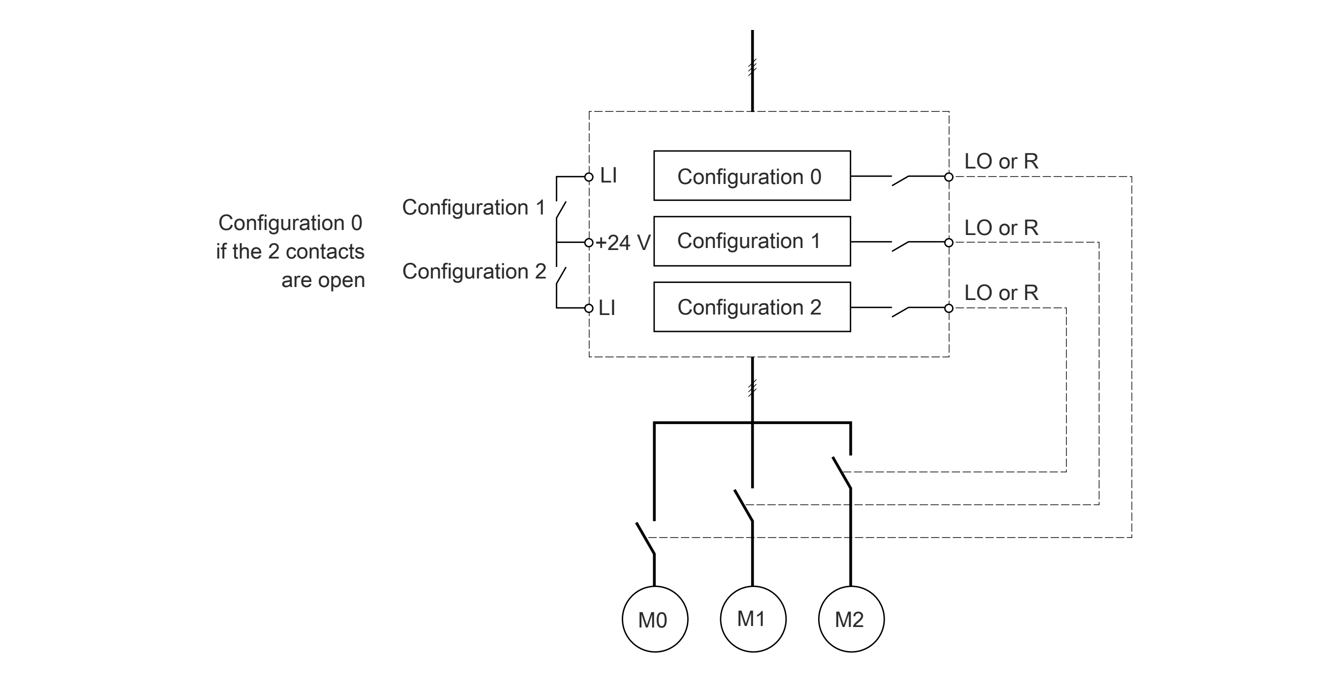


Switching command

Depending on the number of motors or selected configurations (two or three), the switching command is sent using one or two logic inputs. The table below lists the possible combinations.

LI 2 motors or configurations	LI 3 motors or configurations	Number of configurations or active motors
0	0	0
1	0	1
0	1	2
1	1	2

Schematic diagram for multimotor mode



Motor thermal states in multimotor mode:

The drive helps to protect the three motors individually. Each thermal state takes into account all stop times, if the drive power is not switched off.

Configuration information output

Caution!

RISK OF DAMAGE TO THE MOTOR

The motor thermal state of each motor is not memorized when power is switched off.

To continue to protect the motors, it is required to:

- **Perform auto-tuning on each motor every time the power is switched on**
  or
- **Use an external overload protection on each motor.**

Failure to follow these instructions can result in equipment damage.

In the **[INPUTS / OUTPUTS CFG]**(I_O-) menu, a logic output can be assigned to each configuration or motor (two or three) for remote information transmission.

Note:

As the [INPUTS / OUTPUTS CFG](I_O-) menu is switched, these outputs must be assigned in all configurations in which information is required.

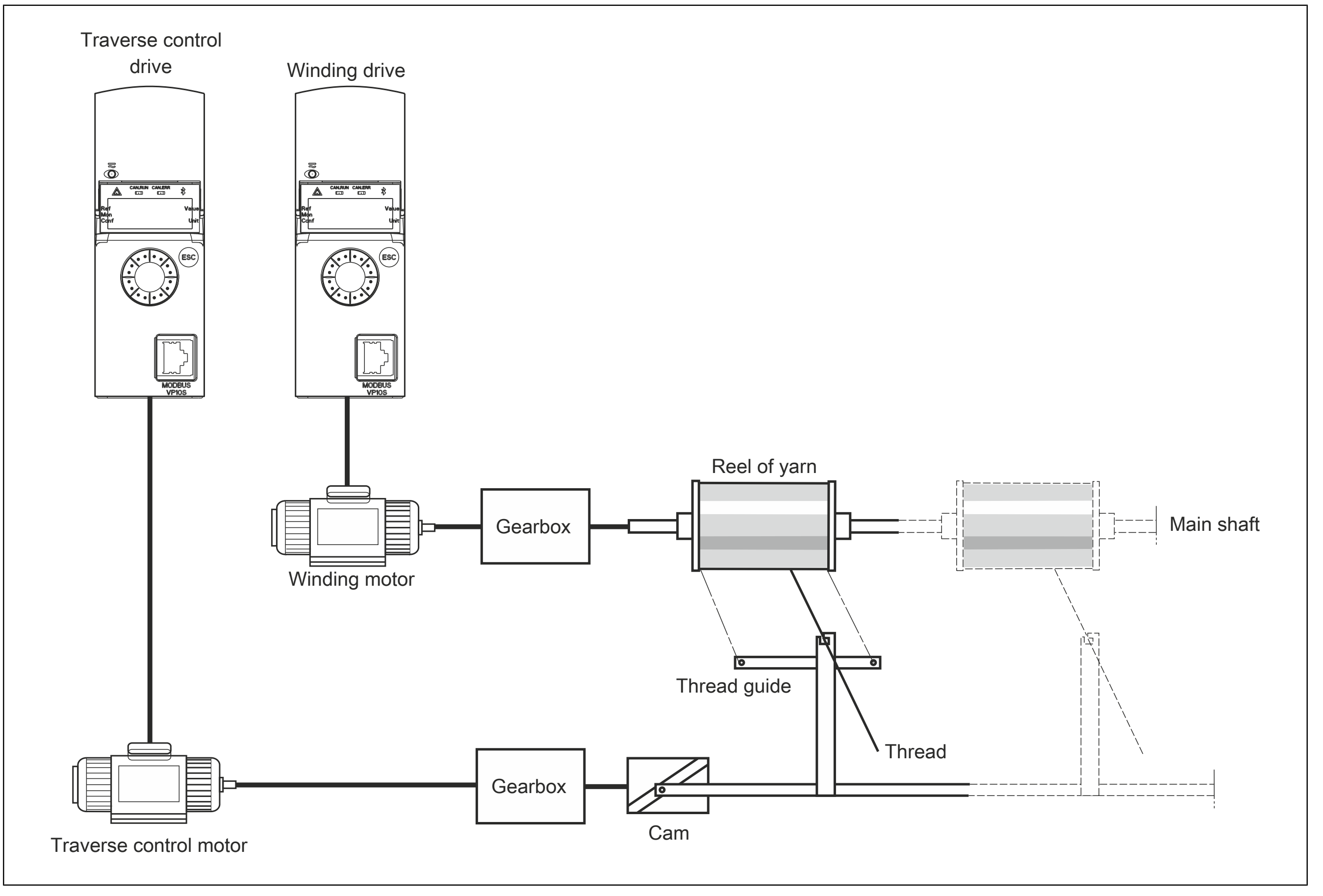
Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > MMC-		
Code	**Name / Description**	**Factory setting**
MMC-	[MULTIMOTORS/CONFIG.]	
CHM	[Multimotors] **Caution!** **When [Multimotors](CHM) is set to [Yes](YES), the motor thermal state of each motor is not memorized when power is switched off.** **To continue to protect the motors, it is required to :** • **Perform auto-tuning on each motor every time the power is switched on** **or** • **Use an external overload protection on each motor** **Failure to follow these instructions can result in equipment damage.**	[No](nO)
nO YES	[No](nO): Multiconfiguration possible [Yes](YES): Multimotor possible	
CnF1	[2 Configurations] Switching of two motors or two configurations.	[No](nO)
nO LI1 ...	[No](nO): No switching [LI1](LI1): Logical input LI1 [...](...): See the assignment conditions	
CnF2	[3 Configurations] Switching of three motors or three configurations. Identical to [2 Configurations](CnF1). **Note:** **In order to obtain three motors or three configurations, [2 Configurations](CnF1) must also be configured.**	[No](nO)

3.2.3.6.6.24 AUTO TUNING BY LOGIC INPUT

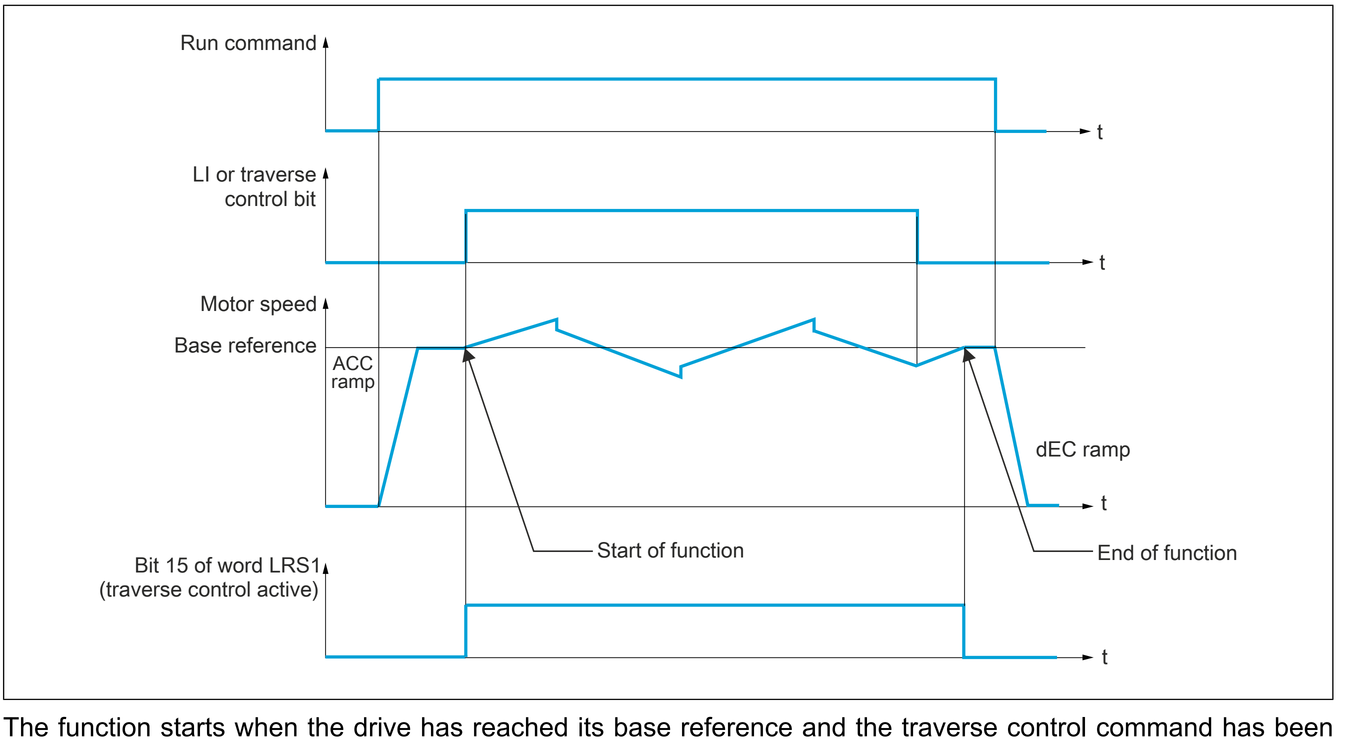
Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > tnL-		
Code	**Name / Description**	**Factory setting**
tnL-	**[AUTO TUNING BY LI]**	
tUL	**[Auto-tune assign.]** Auto-tuning is performed when the assigned input or bit changes to 1. Auto-tuning is only performed if no stop command has been activated. If a "freewheel stop" or "fast stop" function has been assigned to a logic input, this input must be set to 1 (active at 0). **Danger!** **DANGER OF ELECTRIC SHOCK OR EXPLOSION** • **During auto-tuning, the motor is supplied with rated current.** • **Do not service the motor during the auto-tuning.** **Failure to follow these instructions can result in death or serious injury.** **Note:** **Auto-tuning causes the motor to start up.**	**[No]**(nO)
nO	**[No]**(nO): Not assigned	
LI1	**[LI1]**(LI1): Logical input LI1	
...	**[...]**(...): See the assignment conditions	

3.2.3.6.6.25 TRAVERSE CONTROL

Function for winding reels of yarn (in textile applications):



The speed of rotation of the cam must follow a precise profile to ensure that the reel is steady, compact and linear



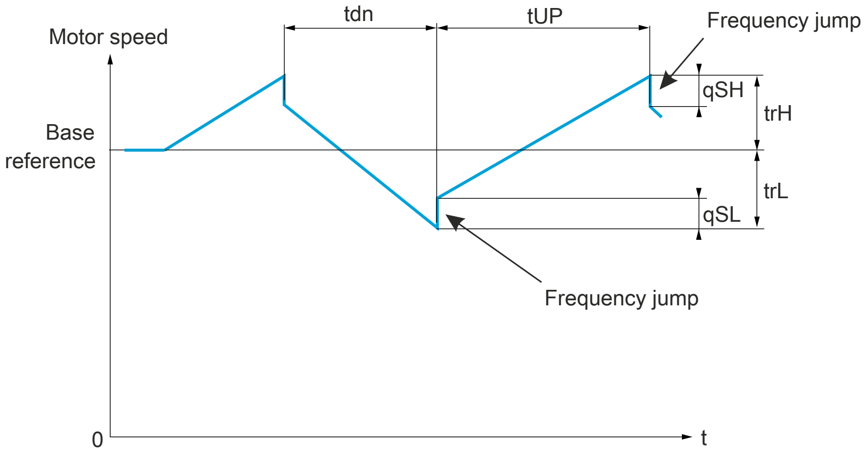
The function starts when the drive has reached its base reference and the traverse control command has been enabled.

When the traverse control command is disabled, the drive returns to its base reference, following the ramp determined by the traverse control function. The function then stops, as soon as it has returned to this reference.

Bit 15 of word LRS1 is at 1 while the function is active.

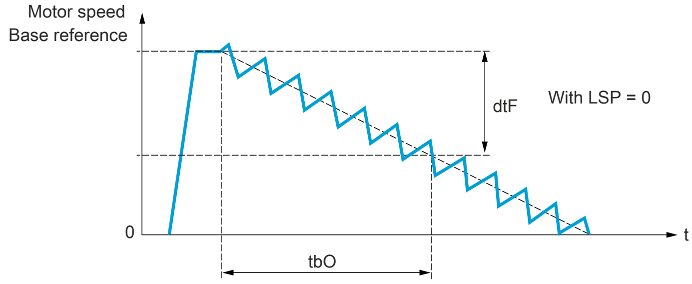
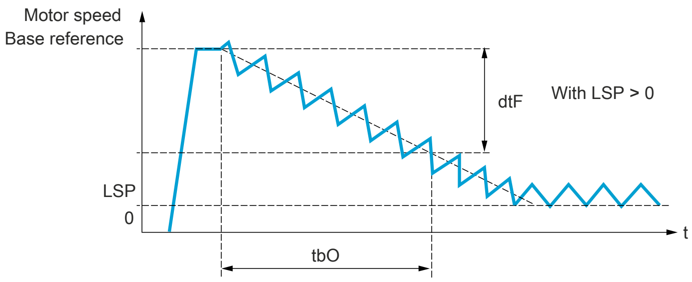
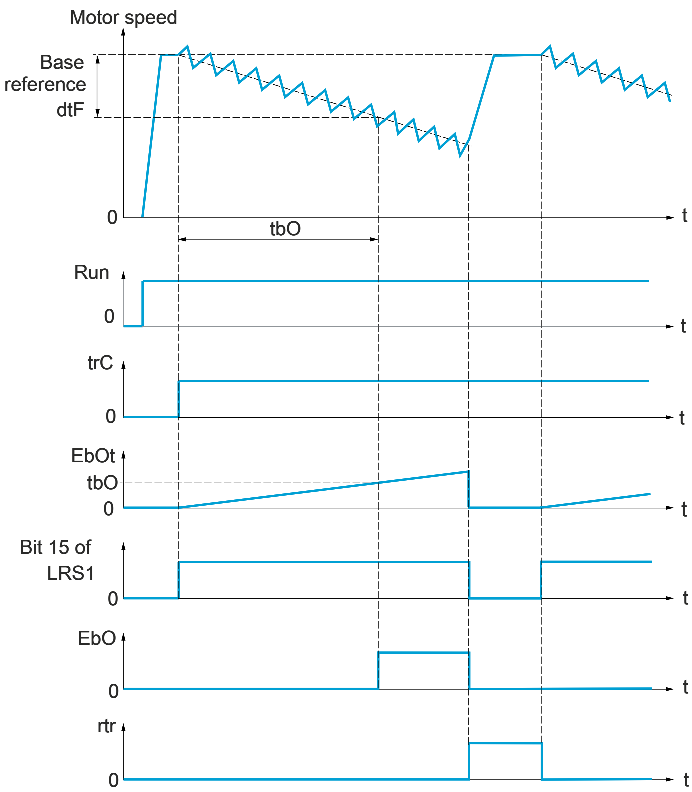
Function parameters

These define the cycle of frequency variations around the base reference, as shown in the diagram below:

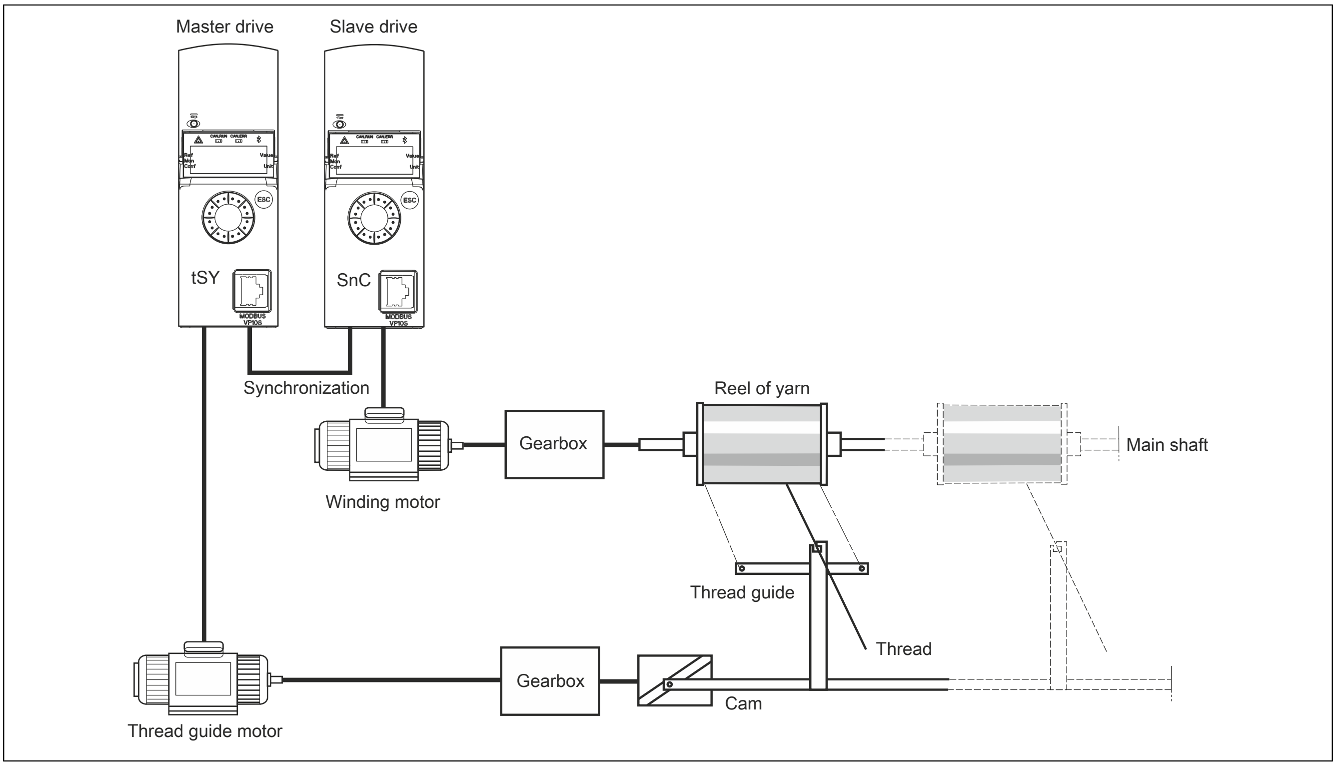


trC	**[Yarn control]**(trC): Assignment of the traverse control command to a logic input or to a communication bus control word bit
trH	**[Traverse freq. high]**(trH): in Hertz
trL	**[Traverse Freq. Low]**(trL): in Hertz
qSH	**[Quick step High]**(qSH): in Hertz
qSL	**[Quick step Low]**(qSL): in Hertz
tUP	**[Traverse ctrl. accel.]**(tUP): time, in seconds
tdn	**[Traverse ctrl. decel]**(tdn): time, in seconds

Reel parameters:

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > tr0-	
Code	**Name / Description**
tr0-	**[TRAVERSE CONTROL]**
tbO	**[Reel time]**(tbO): Time taken to make a reel, in minutes. This parameter is intended to signal the end of winding. When the traverse control operating time since command **[Yarn control]**(trC) reaches the value of **[Reel time]**(tbO), the logic output or one of the relays changes to state 1, if the corresponding function **[End reel]**(EbO) has been assigned. The traverse control operating time EbOt can be monitored online by a communication bus.
dtF	**[Decrease ref. speed]**(dtF): Decrease in the base reference. In certain cases, the base reference has to be reduced as the reel increases in size. The **[Decrease ref. speed]**(dtF) value corresponds to time **[Reel time]**(tbO). Once this time has elapsed, the reference continues to fall, following the same ramp. If low speed **[Low speed]**(LSP) is at 0, the speed reaches 0 Hz, the drive stops and must be reset by a new run command. If low speed **[Low speed]**(LSP) is not 0, the traverse control function continues to operate above **[Low speed]**(LSP).  
rtr	**[Init. traverse ctrl]** Reinitialize traverse control. This command can be assigned to a logic input or to a communication bus control word bit. It resets the EbO alarm and the EbOt operating time to 0 and reinitializes the reference to the base reference. As long as rtr remains at 1, the traverse control function is disabled and the speed remains the same as the base reference. This command is used primarily when changing reels. 

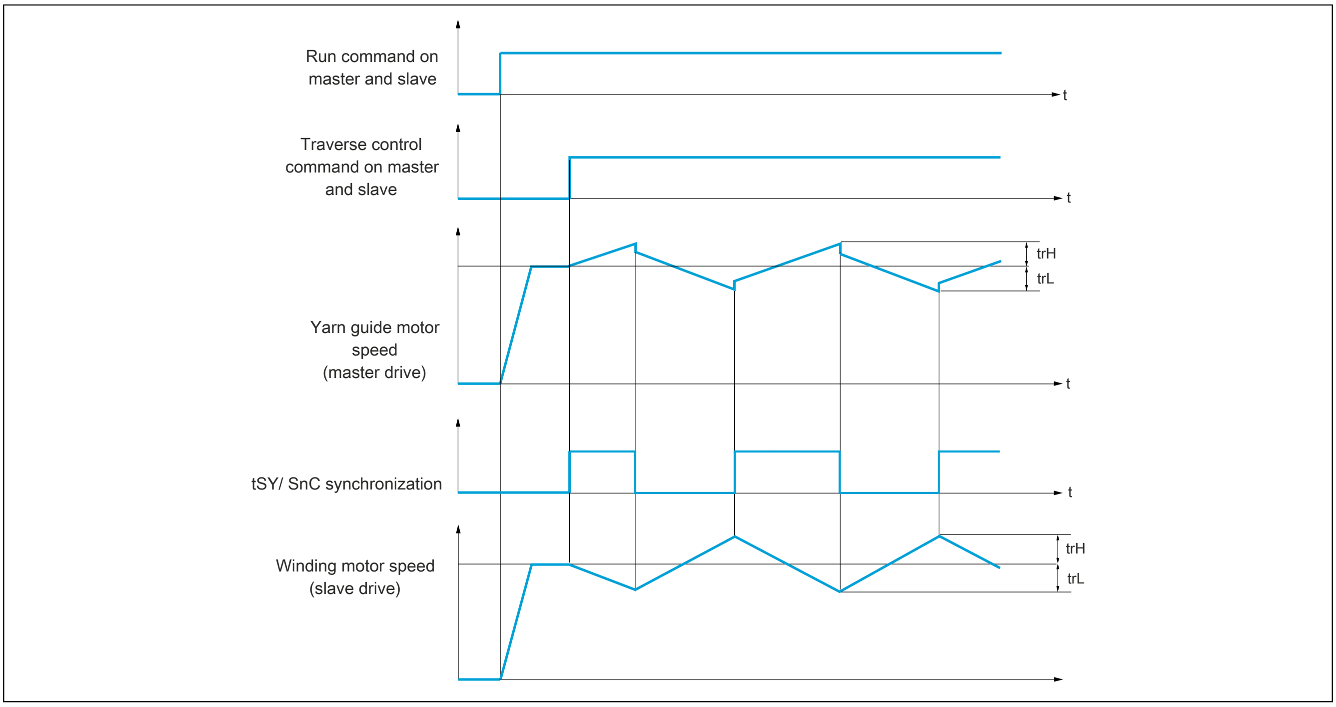
Counter wobble



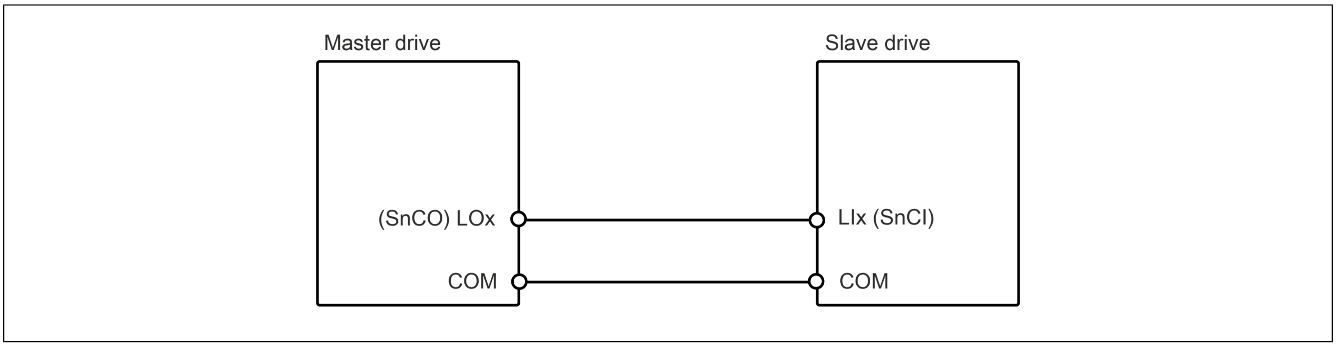
The Counter wobble function is used in certain applications to obtain a constant yarn tension when the traverse control function is producing considerable variations in speed on the yarn guide motor (**[Traverse freq. high]**(trH) and **[Traverse Freq. low]**(trL)).

Two motors must be used (one master and one slave).

The master controls the speed of the yarn guide, the slave controls the winding speed. The function assigns the slave a speed profile, which is in antiphase to that of the master. This means that synchronization is required, using one of the master's logic outputs and one of the slave's logic inputs.



Connection of synchronization I/O



The starting conditions for the function are:

- Base speeds reached on both drives
- [Yarn control](trC) input activated
- Synchronization signal present

Note:

The [Quick step High](qSH) and [Quick step Low](qSL) parameters should generally be kept at 0.

Code	Name / Description	Adjustment range	Factory setting
Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > tr0-			
tr0-	[TRAVERSE CONTROL] **Note:** **This function cannot be used with certain other functions.**		
trC	[Yarn control] The traverse control cycle starts when the assigned input or bit changes to 1 and stops when it changes to 0.		[No](nO)
nO LI1 ...	[No](nO): Function inactive, thereby helping to prevent access to other parameters [LI1](LI1): Logical input LI1 [...](...): See the assignment conditions		
trH (1)	[Traverse freq. high] Traverse frequency high.	0.0 to 10.0 Hz	4.0 Hz
trL (1)	[Traverse Freq. Low] Traverse frequency low.	0.0 to 10.0 Hz	4.0 Hz
qSH (1)	[Quick step High] Quick step high.	0.0 to [Traverse freq. high] (trH)	0.0 Hz
qSL (1)	[Quick step Low] Quick step low.	0.0 to [Traverse Freq. Low] (trL)	0.0 Hz
tUP	[Traverse ctrl. accel.] Acceleration traverse control.	0.1 to 999.9 s	4.0 s

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > tr0-

Code	Name / Description	Adjustment range	Factory setting
tdn	**[Traverse ctrl. decel]** Deceleration traverse control.	0.1 to 999.9 s	4.0 s
tbO	**[Reel time]** Reel execution time.	0 to 9999 min	0 min
EbO	**[End reel]** The assigned output or relay changes to state 1 when the traverse control operating time reaches the **[Reel time]**(tbO).		**[No]**(nO)
nO	**[No]**(nO): Not assigned		
LO1	**[LO1]**(LO1): Logical output LO1		
r2	**[R2]**(r2): Relay R2		
dO1	**[DO1]**(dO1): Analog output AO1 functioning as a logic output. Selection can be made if **[AO1 assignment]**(AO1) is set to **[No]**(nO).		
SnC	**[Counter wobble]** Synchronization input. To be configured on the winding drive (slave) only.		**[No]**(nO)
nO	**[No]**(nO): Function inactive, thereby helping to prevent access to other parameters		
LI1	**[LI1]**(LI1): Logical input LI1		
...	**[...]**(...): See the assignment conditions		
tSY	**[Sync. wobble]** Synchronization output. To be configured on the yarn guide drive (master) only.		**[No]**(nO)
nO	**[No]**(nO): Function not assigned		
LO1	**[LO1]**(LO1)		
r2	**[R2]**(r2)		
dO1	**[DO1]**(dO1): Analog output AO1 functioning as a logic output. Selection can be made if **[AO1 assignment]**(AO1) is set to **[No]**(nO).		
dtF	**[Decrease ref. speed]** Decrease in the base reference during the traverse control cycle.	0.0 to 599.0 Hz	0.0 Hz
rtr	**[Init. traverse ctrl]** When the state of the assigned input or bit changes to 1, the traverse control operating time is reset to 0, along with **[Decrease ref. speed]**(dtF).		**[No]**(nO)
nO	**[No]**(nO): Function not assigned		
LI1	**[LI1]**(LI1): Logical input LI1		
...	**[...]**(...): See the assignment conditions		

(1) The parameter can also be accessed in the **[SETTINGS]**(SEt-) menu.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.6.26 HIGH SPEED SWITCHING

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > CHS-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
CHS-	**[HSP SWITCHING]**		
SH2 nO FtA F2A LI1 ...	**[2 High speed]** High Speed Switching. **[No]**(nO): Function not assigned **[Freq. Th. attain.]**(FtA): Frequency threshold attained **[Freq. Th. 2 attained]**(F2A): Frequency threshold 2 attained **[LI1]**(LI1): Logical input LI1 **[...]**(...): See the assignment conditions		**[No]**(nO)
SH4	**[4 High speed]** High Speed Switching. **Note:** **In order to obtain 4 High speed, [2 High speed](SH2) must also be configured.** Identical to **[2 High speed]**(SH2).		**[No]**(nO)
HSP	**[High speed]** Motor frequency at maximum reference, can be set between **[Low speed]**(LSP) and **[Max frequency]**(tFr). The factory setting changes to 60 Hz if **[Standard mot. freq]**(bFr) is set to **[60Hz NEMA]**(60).	0.0 to 599.0 Hz	50.0 Hz
HSP2	**[High speed 2]** Visible if **[2 High speed]**(SH2) is not set to **[No]**(nO). Identical to **[High speed]**(HSP).	0.0 to 599.0 Hz	50.0 Hz
HSP3	**[High speed 3]** Visible if **[4 High speed]**(SH4) is not set to **[No]**(nO). Identical to **[High speed]**(HSP).	0.0 to 599.0 Hz	50.0 Hz
HSP4	**[High speed 4]** Visible if **[4 High speed]**(SH4) is not set to **[No]**(nO). Identical to **[High speed]**(HSP).	0.0 to 599.0 Hz	50.0 Hz

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.6.27 DC bus

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > dCC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
dCC-	[DC Bus]		
dCCM nO MAIn bUS	[DC-Bus chaining] DC bus chaining configuration [No](nO): Not assigned [Bus & Main](MAIn): The drive is supplied by both DC bus and Line. [Only Bus](bUS): The drive is supplied by DC bus only. Line is not wired. **Note:** **LOSS OF PERSONNEL AND EQUIPMENT PROTECTION** **Enabling [DC-Bus chaining](dCCM) to [Bus & Main](MAIn) will disable the ground fault detection on 8I74T400550.01P-1/8I74T400550.00-000 and 8I74T401500.01P-1/8I74T401500.00-000.** • **Do not select this configuration unless external ground fault protection exists for each of these drives.** **Failure to follow these instructions will result in death or serious injury.**		[No](nO)
dCCC	[DC-Bus compat.] Not applicatable.		[Altivar](AtU)
IPL nO YES	[Input phase loss] Drive behaviour in case of input phase loss detected fault. This parameter is only accessible in this menu when using 3-phase drives. If one phase fails, the drive switches to the [Input phase loss](PHF) fault mode. If two or three phases fail, the drive continues operating until an undervoltage fault is triggered (the drive triggers [Input phase loss](PHF) when one line supply phase fails and results in a power drop). Visible if [3.1 ACCESS LEVEL](LAC) is set to [Expert](Epr) and [DC-Bus chaining](dCCM) above is set to [No](nO). [Ignore](nO): Detected fault ignored [Freewheel](YES): Detected fault with freewheel stop [Input phase loss](IPL) is forced to [Ignore](nO) if [DC-Bus chaining](dCCM) above is set to [Only Bus](bUS). See [Input phase loss](IPL) in the Programming Manual (DRI- > CONF > FULL > FLT- > IPL-).		According to drive rating.
SCL3 nO YES	[Ground short circuit] Direct ground short-circuit fault detection behaviour. Can be accessed for drives rating 8I74T400550.01P-1/8I74T400550.00-000 and 8I74T401500.01P-1/8I74T401500.00-000. Visible if [3.1 ACCESS LEVEL](LAC) is set to [Expert](Epr) and [DC-Bus chaining](dCCM) above is not set to [No](nO). [Ignore](nO): Detected fault ignored [Freewheel](YES): Detected fault with freewheel stop [Ground short circuit](SCL3) is forced to [Ignore](nO) for 8I74T400550.01P-1/8I74T400550.00-000 and 8I74T401500.01P-1/8I74T401500.00-000 drives if [DC-Bus chaining](dCCM) above is set to [Bus & Main](MAIn). **Note:** **If [Ground short circuit](SCL3) is set to [Ignore](nO), integrated safety functions (except Safe Torque Off) for 8I74T400550.01P-1/8I74T400550.00-000 and 8I74T401500.01P-1/8I74T401500.00-000 drives cannot be used, otherwise the drive will trip in [Safe function fault](SAFF) state.** **Danger!** **LOSS OF PERSONNEL AND EQUIPMENT PROTECTION** **Enabling [Ground short circuit](SCL3) to [No](No) will disable the ground fault detection.** • **Do not select this configuration unless external ground fault protection exists for each of these drives.** **Failure to follow these instructions will result in death or serious injury.**		[Freewheel](YES)

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FUn- > dCC-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
UrES	**[Mains Voltage]** Rated voltage of the line supply in VAC. Visible if **[3.1 ACCESS LEVEL]**(LAC) is set to **[Expert]**(Epr) and **[DC-Bus chaining]**(dCCM) above is set to **[No]**(nO). For 8I74S200xxx.01P-1/8I74S200xxx.00-000:	According to drive voltage rating	According to drive voltage rating
200	**[200V ac]**(200): 200 Volts AC		
220	**[220V ac]**(220): 220 Volts AC		
230	**[230V ac]**(230): 230 Volts AC		
240	**[240V ac]**(240): 240 Volts AC (factory setting)		
LHM	Not applicatable		
	For 8I74T40xxxx.01P-1/8I74T40xxxx.00-000		
380	**[380V ac]**(380): 380 Volts AC		
400	**[400V ac]**(400): 400 Volts AC		
440	**[440V ac]**(440): 440 Volts AC		
460	**[460V ac]**(460): 460 Volts AC		
500	**[500V ac]**(500): 500 Volts AC (factory setting)		
LHM	Not applicatable		
USL	**[Undervoltage level]** Undervoltage fault level setting in Volts. Visible if **[3.1 ACCESS LEVEL]**(LAC) is set to **[Expert]**(Epr), **[DC-Bus chaining]**(dCCM) above is set to **[No]**(nO) and **[Mains voltage]**(UrES) is not set to (LHM). The factory setting is determined by the drive voltage rating: • For 8I74S200xxx.01P-1/8I74S200xxx.00-000: 141 VAC • For 8I74T40xxxx.01P-1/8I74T40xxxx.00-000: 276 VAC The adjustment range is determined by the **[Mains voltage]**(UrES) value. See **[Undervoltage level]**(USL) in the Programming Manual (DRI- > CONF > FULL > FLT- > USB-).	100 to 276 VAC	According to drive rating
Vbr	**[Braking level]** Braking transistor command level. Visible if **[3.1 ACCESS LEVEL]**(LAC) is set to **[Expert]**(Epr) and **[DC-Bus chaining]**(dCCM) above is set to **[No]**(nO). The factory setting is determined by the drive voltage rating: • For 8I74S200xxx.01P-1/8I74S200xxx.00-000: 395 VDC (UrES = 240 VDC) If UrES ≤ 240 VDC you can modify Vbr from 335 to 395 VDC • For 8I74T40xxxx.01P-1/8I74T40xxxx.00-000: 820 VDC (UrES = 500 VDC) If UrES ≤ 500 VDC you can modify Vbr from 698 to 820 VDC The adjustment range is determined by the **[Mains voltage]**(UrES) value. See **[Braking level]**(Vbr) in the Programming Manual (DRI- > CONF > FULL > DRC-).	335 or 820 VDC	According to drive rating

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

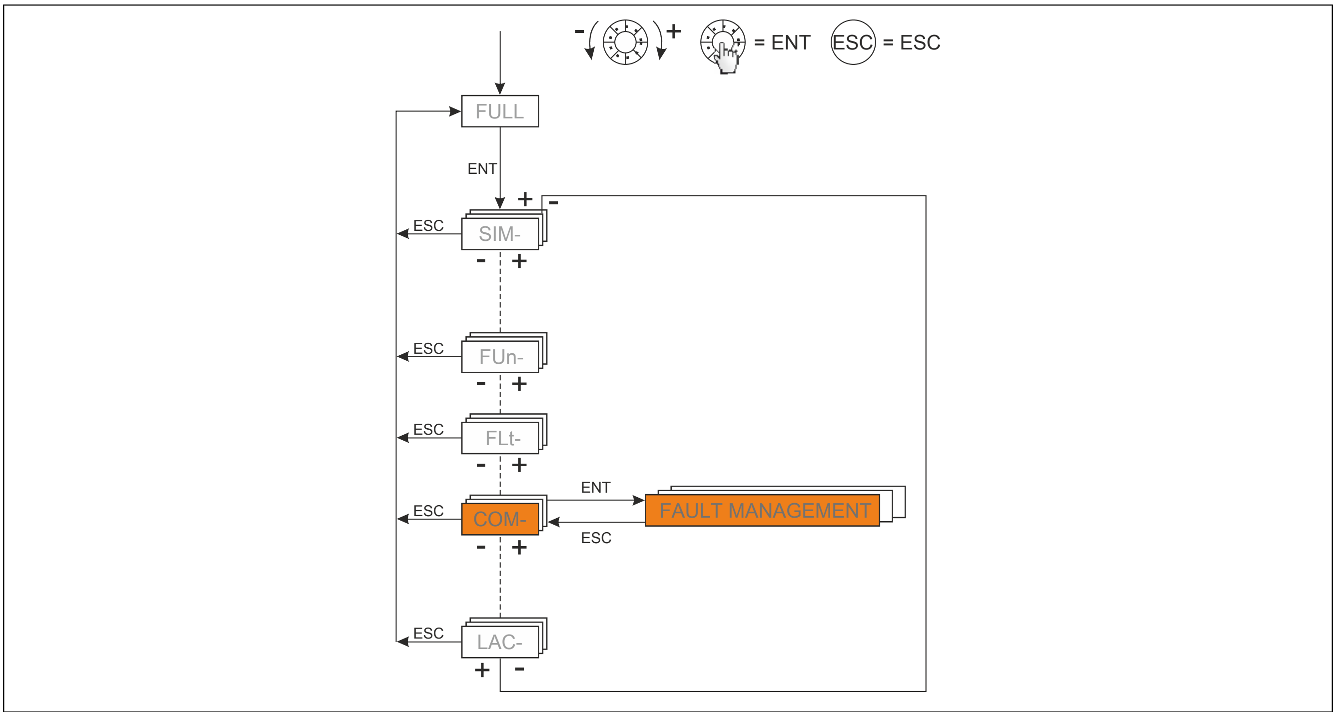
3.2.3.6.7 [FAULT MANAGEMENT]

With integrated display terminal:

Summary of functions:

Code	Name
PtC	[PTC MANAGEMENT]
rSt	[FAULT RESET]
Atr	[AUTOMATIC RESTART]
AlS	[ALARMS SETTING]
FLr	[CATCH ON THE FLY]
tHt	[MOTOR THERMAL PROT.]
OPL	[OUTPUT PHASE LOSS]
IPL	[INPUT PHASE LOSS]
OHL	[DRIVE OVERHEAT]
SAt	[THERMAL ALARM STOP]
EtF	[EXTERNAL FAULT]
USb	[UNDERVOLTAGE MGT]
tIt	[IGBT TESTS]
LFL	[4-20mA LOSS]
InH	[FAULT INHIBITION]
CLL	[COM. FAULT MANAGEMENT]
tId	[TORQUE OR I LIM. DETECT]
FqF	[FREQUENCY METER]
dLd	[DYNAMIC LOAD DETECT.]
tnF	[AUTO TUNING FAULT]
PPI	[CARDS PAIRING]
ULd	[PROCESS UNDERLOAD]
OLd	[PROCESS OVERLOAD]
LFF	[FALLBACK SPEED]
FSt	[RAMP DIVIDER]
dCI	[DC INJECTION]

From ConF menu



The parameters in the [FAULT MANAGEMENT](FLt-) menu can only be modified when the drive is stopped and there is no run command, except for parameters with an arrow symbol in the code column, which can be modified with the drive running or stopped.

3.2.3.6.7.1 [PTC MANAGEMENT]

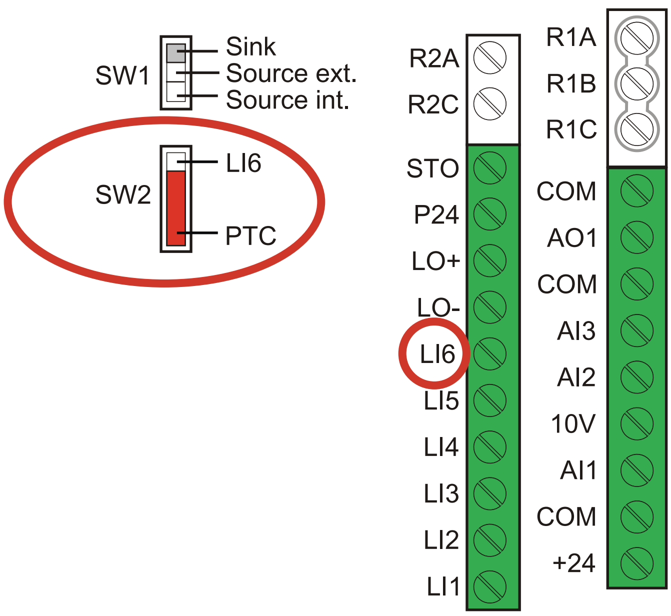
PTC probe

1 set of PTC probe can be managed by the drive in order to help to protect the motor: on logic input LI6 converted for this use by switch SW2 on the control block.

The PTC probe is monitored for the following detected faults:

- Motor overheating
- Sensor break
- Sensor short-circuit

Protection via PTC probe does not disable protection via I^2t calculation performed by the drive (the two types of protection can be combined).



Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > PtC-		
Code	**Name / Description**	**Factory setting**
PtC-	[PTC MANAGEMENT]	
PtCL	[LI6 = PTC probe] Check first that the switch SW2 on the control block is set to PTC.	[No](nO)
nO	[No](nO): Not used	
AS	[Always](AS): PTC probe are monitored permanently, even if the power supply is not connected (as long as the control remains connected to the power supply)	
rdS	[Power ON](rdS): PTC probe are monitored while the drive power supply is connected	
rS	[Motor ON](rS): PTC probe are monitored while the motor power supply is connected	

3.2.3.6.7.2 [FAULT RESET]

Code	Name / Description	Factory setting
Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > rSt-		
rSt-	[FAULT RESET]	
rSF	[Fault reset] Detected faults are cleared manually when the assigned input or bit changes to 1, if the cause of the detected fault has disappeared. The STOP/RESET key on the graphic display terminal performs the same function. Following detected faults can be cleared manually: ASF, brF, bLF, CnF, COF, dLF, EPF1, EPF2, FbES, FCF2, InF9, InFA, InFb, LCF, LFF3, ObF, OHF, OLC, OLF, OPF1, OPF2, OSF, OtFL, PHF, PtFL, SCF4, SCF5, SLF1, SLF2, SLF3, SOF, SPF, SSF, tJF, tnF and ULF **Note:** **If [Extended Fault reset](HrFC) is set to [Yes](YES), the additional following detected fault can be cleared manually: OCF, SCF1 and SCF3.**	[No](nO)
nO LI1 ...	[No](nO): Function inactive [Yes](YES): Logical input LI1 [...](...): See the assignment conditions.	
rPA ★	[Product reset assig.] **Danger!** **UNINTENDED EQUIPMENT OPERATION** **This configuration enables to reset the drive.** **Check this action will not endanger personnel or equipment in any way.** **Failure to follow these instructions will result in death or serious injury.** This parameter can only be modified if [3.1 ACCESS LEVEL](LAC) is set to [Expert](EPr) mode. Drive reinitialization via logic input. Can be used to reset all detected faults without having to disconnect the drive from the power supply. The drive is reinitialized on a rising edge (change from 0 to 1) of the assigned input. The drive can only be reinitialized when locked. To assign reinitialization press and hold down the ENT key for 2 s.	[No](nO)
nO LI1 ... LI6 LAI1 LAI2 OL01 ... OL10	[No](nO): Function inactive [LI1](LI1): Logical input LI1 ... [LI6](LI6): Logical input LI6 [LAI1](LAI1): Logical input AI1 [LAI2](LAI2): Logical input AI2 [OL01](OL01): Function blocks: Logical output 01 ... [OL10](OL10): Function blocks: Logical output 10	
rP ★	[Product reset] **Danger!** **UNINTENDED EQUIPMENT OPERATION** **You are going to reset the drive.** **Check this action will not endanger personnel or equipment in any way.** **Failure to follow these instructions will result in death or serious injury.** This parameter can only be accessed if [3.1 ACCESS LEVEL](LAC) is set to [Expert](EPr) mode. Drive reinitialization. Can be used to reset all detected faults without having to disconnect the drive from the power supply.	[No](nO)
nO YES	[No](nO): Function inactive [Yes](YES): Reinitialization. Press and hold down the ENT key for 2 seconds. The parameter changes back to [No](nO) automatically as soon as the operation is complete. The drive can only be reinitialized when locked.	
HrFC ★	[Extended Fault reset] This parameter can only be accessed if [3.1 ACCESS LEVEL](LAC) is set to [Expert](EPr) mode. Can be used to select the access level of [Fault reset](rSF) to reset detected faults without having to disconnect the drive from the power supply. **Note:** **If [Extended Fault reset](HrFC) is set to [Yes](YES), the additional following detected fault can be cleared manually: OCF, SCF1 and SCF3.**	[No](nO)
nO YES	[No](nO): Function inactive [Yes](YES): Function active	

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.3.6.7.3 [AUTOMATIC RESTART]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > Atr-		
Code	**Name / Description**	**Factory setting**
Atr-	[AUTOMATIC RESTART]	
Atr 2 s	[Automatic restart] **Danger!** **UNINTENDED EQUIPMENT OPERATION** • **The automatic restart can only be used on machines or installations which do not pose any danger to either personnel or equipment.** • **If the automatic restart is activated, R1 will only indicate a fault has been detected once the time-out period for the restart sequence has expired.** • **The equipment must be used in compliance with national and regional safety regulations.** **Failure to follow these instructions will result in death or serious injury.** The drive fault relay remains activated if this function is active. The speed reference and the operating direction must be maintained. Use 2-wire control ([2/3 wire control](tCC) is set to [2 wire](2C) and [2 wire type](tCt) is set to [Level](LEL)). If the restart has not taken place once the configurable time tAr has elapsed, the procedure is aborted and the drive remains locked until it is turned off and then on again.	[No](nO)
nO	[No](nO): Function inactive	
YES	[Yes](YES): Automatic restart after locking in fault state, if the detected fault has disappeared and the other operating conditions permit the restart. The restart is performed by a series of automatic attempts separated by increasingly longer waiting periods: 1 s, 5 s, 10 s, then 1 minute for the following attempts.	
tAr ★	[Max. restart time] This parameter appears if [Automatic restart](Atr) is set to [Yes](YES). It can be used to limit the number of consecutive restarts on a recurrent detected fault.	[5 minutes](5)
5	[5 min](5): 5 minutes	
10	[10 minutes](10): 10 minutes	
30	[30 minutes](30): 30 minutes	
1h	[1 hour](1h): 1 hour	
2h	[2 hours](2h): 2 hours	
3h	[3 hours](3h): 3 hours	
Ct	[Unlimited](Ct): Unlimited	

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

3.2.3.6.7.4 [ALARM SETTING]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > ALS-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
ALS-	[ALARM SETTING]		
Ctd (1)	[Current threshold] Motor current threshold.	0 to $^3/_2$ INV (1)	INV
Ftd	[Freq. threshold] Motor frequency threshold.	0.0 to 599.0 Hz	50.0 Hz
F2d	[Freq. threshold 2] Motor frequency threshold.	0.0 to 599.0 Hz	50.0 Hz
ttH	[High torque thd.] High torque frequency threshold.	-300 to 300%	100%
ttL	[Low torque thd.] Low torque frequency threshold.	-300 to 300%	50%
FqL ★	[Pulse warning thd.] Frequency level. Visible if [Frequency meter](FqF) is not [No](nO).	0 to 20000 Hz	0 Hz

(1) In corresponds to the rated drive current indicated in the Installation chapter and on the drive nameplate.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.7.5 [CATCH ON THE FLY]

Code	Name / Description	Factory setting
Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > FLr-		
FLr-	**[CATCH ON THE FLY]** **Note:** **This function cannot be used with certain other functions.**	
FLr	**[Catch on the fly]** Used to enable a smooth restart if the run command is maintained after the following events: • Loss of line supply or disconnection • Clearance of current detected fault or automatic restart • Freewheel stop The speed given by the drive resumes from the estimated speed of the motor at the time of the restart, then follows the ramp to the reference speed. This function requires 2-wire level control. When the function is operational, it activates at each run command, resulting in a slight delay of the current (max. 0.5 s). **[Catch on the fly]**(FLr) is forced to **[No]**(nO) if brake logic control **[Brake assignment]**(bLC) is assigned or if **[Auto DC injection]**(AdC) is set to **[Continuous]**(Ct).	**[No]**(nO)
nO	**[No]**(nO): Function inactive	
YES	**[Yes]**(YES): Function active	

3.2.3.6.7.6 [MOTOR THERMAL PROT.]

Function

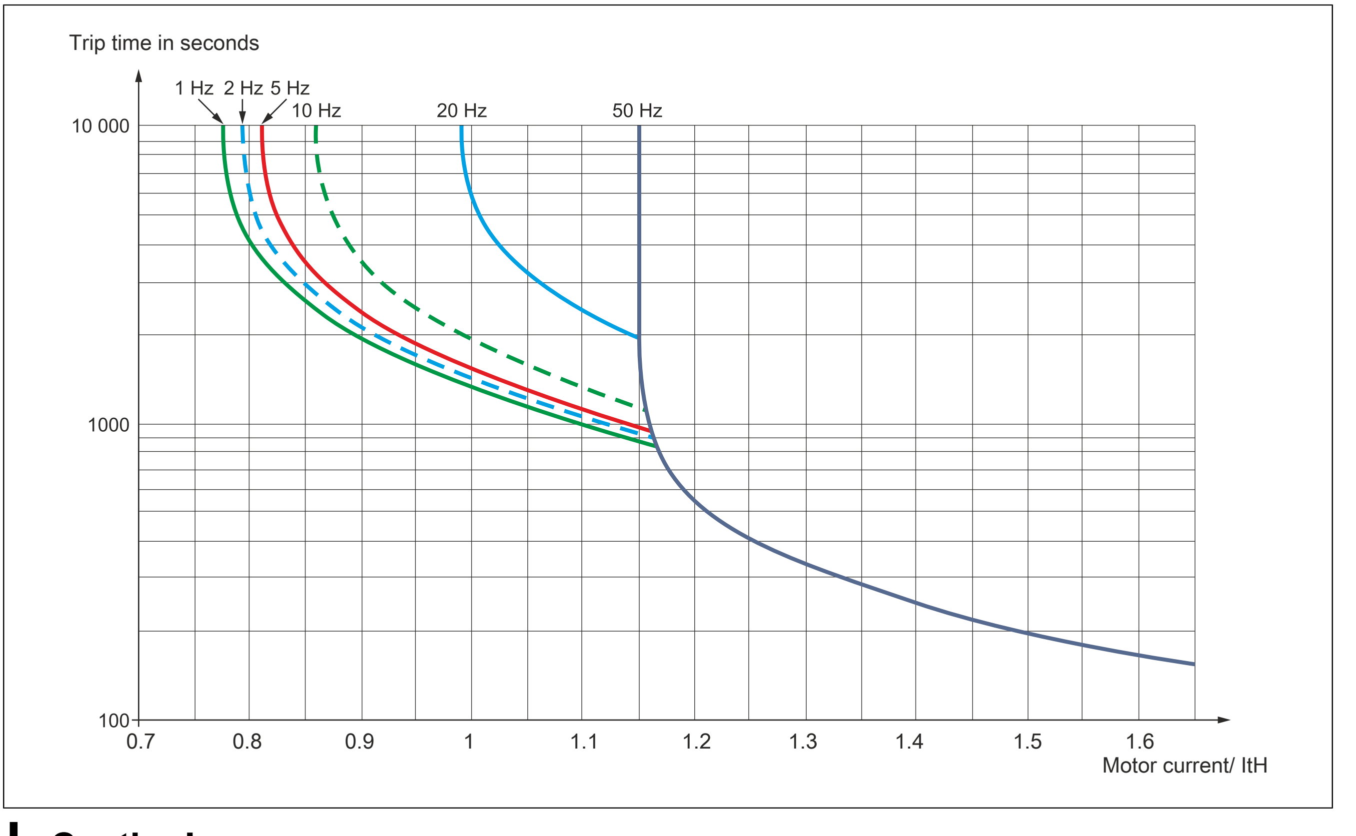
Thermal protection by calculating the I^2t.

Note:

The motor thermal state is not saved when the drive is switched off

- Self-cooled motors: The tripping curves depend on the motor frequency
- Force-cooled motors: Only the 50 Hz tripping curve needs to be considered, regardless of the motor frequency

The following curves represent the trip time in seconds:



Caution!

RISK OF DAMAGE TO THE MOTOR

External protection against overloads is required under the following circumstances:

- **When the product is being switched on again, as there is no memory to record the motor thermal state**
- **When supplying more than one motor**
- **When supplying motors with ratings less than 0.2 times the nominal drive current**
- **When using motor switching**

Failure to follow these instructions can result in equipment damage.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > tHt-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
tHt-	**[MOTOR THERMAL PROT.]**		
tHt	**[Motor protect. type]**		**[Self cooled]**(ACL)
	Note: **A trip will occur when the thermal state reaches 118% of the rated state and reactivation will occur when the state falls back below 100%.**		
nO	**[No]**(nO): No protection		
ACL	**[Self cooled]**(ACL): For self-cooled motors		
FCL	**[Force-cool]**(FCL): For force-cooled motors		
ttd (1)	**[Motor therm. level]** Trip threshold for motor thermal alarm (logic output or relay).	0 to 118%	100%
ttd2	**[Motor2 therm. level]** Trip threshold for motor 2 thermal alarm (logic output or relay).	0 to 118%	100%
ttd3	**[Motor3 therm. level]** Trip threshold for motor 3 thermal alarm (logic output or relay).	0 to 118%	100%
OLL	**[Overload fault mgt]**		**[Freewheel]**(YES)
	Caution! **RISK OF DAMAGE TO THE MOTOR** **If [Overload fault mgt](OLL) is set to [Ignore](nO), motor thermal protection is no longer provided by the drive. Provide an alternative means of thermal protection.** **Failure to follow these instructions can result in equipment damage.**		
	Type of stop in the event of a motor thermal trip.		
nO	**[Ignore]**(nO): Detected fault ignored		
YES	**[Freewheel]**(YES): Freewheel stop		
Stt	**[Per STT]**(Stt): Stop according to configuration of **[Type of stop]**(Stt), without tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected fault disappears, according to the restart conditions of the active command channel (for example, according to **[2/3 wire control]**(tCC) and **[2 wire type]**(tCt) if control is via the terminals). Configuring an alarm for this detected fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.		
LFF	**[fallback spd]**(LFF): Change to fallback speed, maintained as long as the detected fault persists and the run command has not been removed (2)		
rLS	**[Spd maint.]**(rLS): The drive maintains the speed being applied when the detected fault occurred, as long as the detected fault is present and the run command has not been removed (2)		
rMP	**[Ramp stop]**(rMP): Stop on ramp		
FSt	**[Fast stop]**(FSt): Fast stop		
dCI	**[DC injection]**(dCI): DC injection stop. This type of stop cannot be used with certain other functions.		
MtM	**[Mot THR memo]** Motor thermal state memorization.		**[No]**(nO)
nO	**[No]**(nO): Motor thermal state is not stored at power off		
YES	**[Yes]**(YES): Motor thermal state is stored at power off		

(1) The parameter can also be accessed in the **[SETTINGS]**(SEt-) menu.
(2) Because, in this case, the detected fault does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

Parameter that can be modified during operation or when stopped.

3.2.3.6.7.7 [OUTPUT PHASE LOSS]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > OPL-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
OPL-	[OUTPUT PHASE LOSS]		
OPL 2 s	[Output Phase Loss] **Danger!** **HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH** **If [Output phase loss](OPL) is set to [No](nO) or [Output cut](OAC), loss of cable is not detected.** **Check this action will not endanger personnel or equipment in any way.** **Failure to follow these instructions will result in death or serious injury.** **Note:** **[Output phase loss](OPL) is set to [No](nO) when [Motor control type](Ctt) is set to [Sync. mot.](SYn). For other [Motor control type](Ctt) configurations, [Output phase loss](OPL) is forced to [Yes](YES) if brake logic control is configured.**		[Yes](YES)
nO YES OAC	[No](nO): Function inactive [Yes](YES): Tripping on [Output phase loss](OPL) with freewheel stop [Output cut](OAC): No fault triggered, but management of the output voltage in order to avoid an overcurrent when the link with the motor is re-established and catch on the fly performed (even if this function has not been configured). The drive switches to [Output cut](SOC) state after [OutPh time detect](Odt) time. Catch on fly is possible as soon as the drive is in Standby output cut [Output cut](SOC) state.		
Odt	[OutPh time detect] Time delay for taking the [Output Phase Loss](OPL) detected fault into account.	0.5 to 10.0 s	0.5 s

Parameter that can be modified during operation or when stopped.

2 s — To change the assignment of this parameter, press the ENT key for 2 seconds.

3.2.3.6.7.8 [INPUT PHASE LOSS]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > IPL-		
Code	**Name / Description**	**Factory setting**
IPL-	**[INPUT PHASE LOSS]**	
IPL ★ ⌛ 2 s	**[Input phase loss]** Cannot be accessed if drive rating is 8I74S200xxx.01P-1/8I74S200xxx.00-000. In this case, no factory settings value. Factory setting : **[Freewheel]**(YES) for drive rating 8I74T40xxxx.01P-1/8I74T40xxxx.00-000. If one phase disappears and if this leads to performance decrease, the drive switches to fault mode **[Input phase loss]**(PHF). If two or three phases disappear, the drive trips in **[Input phase loss]**(PHF).	According to drive rating
nO	**[Ignore]**(nO): Detected fault ignored	
YES	**[Freewheel]**(YES): Detected fault with freewheel stop	

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

⌛ 2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

3.2.3.6.7.9 [DRIVE OVERHEAT]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > OHL-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
OHL-	[DRIVE OVERHEAT]		
OHL	[Overtemp fault mgt] **Caution!** **RISK OF EQUIPMENT DAMAGE** **Inhibiting drive overheating fault detection results in the drive not being protected. This invalidates the warranty.** **Check that the possible consequences do not present any risk.** **Failure to follow these instructions can result in injury or equipment damage.** Behavior in the event of the drive overheating. **Note:** **A trip will occur when the thermal state reaches 118% of the rated state and reactivation will occur when the state falls back below 90%.**		[Freewheel](YES)
nO	[Ignore](nO): Detected fault ignored		
YES	[Freewheel](YES): Freewheel stop		
Stt	[Per STT](Stt): Stop according to configuration of [Type of stop](Stt) without tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected fault disappears, according to the restart conditions of the active command channel (for example, according to [2/3 wire control](tCC) and [2 wire type](tCt) if control is via the terminals). Configuring an alarm for this detected fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.		
LFF	[fallback spd](LFF): Change to fallback speed, maintained as long as the detected fault persists and the run command has not been removed (1)		
rLS	[Spd maint.](rLS): The drive maintains the speed being applied when the detected fault occurred, as long as the detected fault is present and the run command has not been removed (1)		
rMP	[Ramp stop](rMP): Stop on ramp		
FSt	[Fast stop](FSt): Fast stop		
dCI	[DC injection](dCI): DC injection stop. This type of stop cannot be used with certain other functions.		
tHA	[Drv therm. state al] Trip threshold for drive thermal alarm (logic output or relay).	0 to 118%	100%

(1) Because, in this case, the detected fault does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

3.2.3.6.7.10 [THERMAL ALARM STOP]

Deferred stop on thermal alarm

This function helps to prevent the drive stopping between two steps of the process if the drive or motor overheats, by authorizing operation until the next stop. At the next stop, the drive is locked until the thermal state falls back to a value, which undershoots the set threshold by 20%. Example: A trip threshold set at 80% enables reactivation at 60%.

One thermal state threshold must be defined for the drive and one thermal state threshold for the motor(s), which will trip the deferred stop.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > SAt-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
SAt-	[THERMAL ALARM STOP]		
SAt	[Thermal alarm stop] Thermal alarm stop function allow to set a custom alarm thermal level for the drive or the motor. When one of these levels is reached, the drive trips in freewheel stop.		[No](nO)
nO YES	[No](nO): Function inactive (in this case, the following parameters cannot be accessed) [Yes](YES): Freewheel stop on drive or motor thermal alarm		
tHA	[Drv therm. state al] Thermal state threshold of the drive tripping the deferred stop.	0 to 118%	100%
ttd	[Motor therm. level] Thermal state threshold of the motor tripping the deferred stop.	0 to 118%	100%
ttd2	[Motor2 therm. level] Thermal state threshold of the motor 2 tripping the deferred stop.	0 to 118%	100%
ttd3	[Motor3 therm. level] Thermal state threshold of the motor 3 tripping the deferred stop.	0 to 118%	100%

Parameter that can be modified during operation or when stopped.

3.2.3.6.7.11 [EXTERNAL FAULT]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > EtF-		
Code	**Name / Description**	**Factory setting**
EtF-	[EXTERNAL FAULT]	
EtF	[External fault ass.] If the assigned bit is at 0, there is no external fault. If the assigned bit is at 1, there is an external fault. Logic can be configured via [External fault config](LEt) if a logic input has been assigned.	[No](nO)
nO	[No](nO): Function inactive	
LI1	[LI1](LI1): Logical input LI1	
...	[...](...): See the assignment conditions	
LEt ★	[External fault config] Parameter can be accessed if the external fault has been assigned to a logic input. It defines the positive or negative logic of the input assigned to the detected fault.	[Active high](HIG)
LO	[Active low](LO): Trip on falling edge (change from 1 to 0) of the assigned input	
HIG	[Active high](HIG): Trip on rising edge (change from 0 to 1) of the assigned input	
EPL	[External fault mgt] Type of stop in the event of an external fault.	[Freewheel](YES)
nO	[Ignore](nO): External fault ignored	
YES	[Freewheel](YES): Freewheel stop	
Stt	[Per STT](Stt): Stop according to configuration of [Type of stop](Stt) without tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected fault disappears, according to the restart conditions of the active command channel (for example, according to [2/3 wire control](tCC) and [2 wire type](tCt) if control is via the terminals). Configuring an alarm for this detected fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	[fallback spd](LFF): Change to fallback speed, maintained as long as the detected fault persists and the run command has not been removed (1)	
rLS	[Spd maint.](rLS): The drive maintains the speed being applied when the detected fault occurred, as long as the detected fault is present and the run command has not been removed (1)	
rMP	[Ramp stop](rMP): Stop on ramp	
FSt	[Fast stop](FSt): Fast stop	
dCI	[DC injection](dCI): DC injection stop. This type of stop cannot be used with certain other functions.	

(1) Because, in this case, the detected fault does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.3.6.7.12 [UNDERVOLTAGE MGT]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > USb-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
USb-	[UNDERVOLTAGE MGT]		
USb 0 1 2	[UnderV. fault mgt] Behavior of the drive in the event of an undervoltage. [Std fault](0): The drive trips and the external fault signal is triggered (the fault relay assigned to [No drive flt](FLt) will be opened) [Flt wo relay](1): The drive trips but the external fault signal is not triggered (the fault relay assigned to [No drive flt](FLt) remains closed) [Alarm](2): Alarm and fault relay remain closed. The alarm can be assigned to a logic output or a relay		[Std fault](0)
UrES 200 220 230 240 380 400 440 460 500	[Mains voltage] Rated voltage of the line supply in V. For 8I74S200xxx.01P-1/8I74S200xxx.00-000: [200V ac](200): 200 Volts AC [220V ac](220): 220 Volts AC [230V ac](230): 230 Volts AC [240V ac](240): 240 Volts AC For 8I74T40xxxx.01P-1/8I74T40xxxx.00-000: [380V ac](380): 380 Volts AC [400V ac](400): 400 Volts AC [440V ac](440): 440 Volts AC [460V ac](460): 460 Volts AC [500V ac](500): 500 Volts AC (factory setting)	According to drive voltage rating	According to drive voltage rating
USL	[Undervoltage level] Undervoltage fault level setting in Volts. The factory setting is determined by the drive voltage rating.	100 to 276 V	According to drive rating
USt	[Undervolt. time out] Time delay for taking undervoltage detected fault into account.	0.2 s to 999.9 s	0.2 s
StP nO MMS rMP LnF	[UnderV. prevention] Behavior in the event of the undervoltage prevention level being reached. [No](nO): No action [DC Maintain](MMS): This stop mode uses the inertia to maintain the DC bus voltage as long as possible [Ramp stop](rMP): Stop following an adjustable ramp [Max stop time](StM) [Lock-out](LnF): Lock (freewheel stop) without trip		[No](nO)
tSM	[UnderV. restart tm] Time delay before authorizing the restart after a complete stop for [UnderV. prevention](StP) = [Ramp stop](rMP), if the voltage has returned to normal.	1.0 s to 999.9 s	1.0 s
UPL	[Prevention level] Undervoltage prevention level setting in Volts, which can be accessed if [UnderV. prevention](StP) is not [No](nO). The adjustment range and factory setting are determined by the drive voltage rating and the [Mains voltage](UrES) value.	133 to 318 V	According to drive rating
StM	[Max stop time] Ramp time if [UnderV. prevention](StP) is set to [Ramp stop](rMP).	0.01 to 60.00 s	1.00 s
tbS	[DC bus maintain tm] DC bus maintain time if [UnderV. prevention](StP) is set to [DC Maintain](MMS).	1 to 9999 s	9999 s

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.7.13 [IGBT TESTS]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > tIt-		
Code	**Name / Description**	**Factory setting**
tIt-	**[IGBT TESTS]**	
Strt	**[IGBT test]**	**[No]**(nO)
nO	**[No]**(nO): No test	
YES	**[Yes]**(YES): The IGBTs are tested on power up and every time a run command is sent. These tests cause a slight delay (a few ms). In the event of a detected fault, the drive will lock. The following faults can be detected: • Drive output short-circuit (terminals U-V-W): SCF display • IGBT inoperable: xtF, where x indicates the number of the IGBT concerned • IGBT short-circuited: x2F, where x indicates the number of the IGBT concerned	

3.2.3.6.7.14 [4-20mA LOSS]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > LFL-		
Code	**Name / Description**	**Factory setting**
LFL-	[4-20mA LOSS]	
LFL3	[AI3 4-20mA loss]	[Ignore](nO)
nO	[Ignore](nO): Detected fault ignored. This is the only possible configuration if [AI3 min. value](CrL3) is not greater than 3 mA	
YES	[Freewheel](YES): Freewheel stop	
Stt	[Per STT](Stt): Stop according to configuration of [Type of stop](Stt) without fault tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected fault disappears, according to the restart conditions of the active command channel (for example, according to [2/3 wire control](tCC) and [2 wire type](tCt) if control is via the terminals). Configuring an alarm for this detected fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop	
LFF	[Fallback spd](LFF): Change to fallback speed, maintained as long as the detected fault persists and the run command has not been removed (1)	
rLS	[Spd maint.](rLS): The drive maintains the speed being applied when the detected fault occurred, as long as the detected fault is present and the run command has not been removed (1)	
rMP	[Ramp stop](rMP): Stop on ramp	
FSt	[Fast stop](FSt): Fast stop	
dCI	[DC injection](dCI): DC injection stop. This type of stop cannot be used with certain other functions.	

(1) Because, in this case, the detected fault does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

3.2.3.6.7.15 [FAULT INHIBITION]

Parameter can be accessed in [Expert] mode

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > InH-		
Code	**Name / Description**	**Factory setting**
InH-	**[FAULT INHIBITION]**	
InH	**[Fault inhibit assign.]** **Danger!** **LOSS OF PERSONNEL AND EQUIPMENT PROTECTION** **Enabling [Fault inhibit assign.](InH) will disable the drive controller protection features.** • **[Fault inhibit assign.](InH) should not be enabled for typical applications of this equipment.** • **[Fault inhibit assign.](InH) should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection poses a greater risk than personnel injury or equipment damage** **Failure to follow these instructions will result in death or serious injury.** If the assigned input or bit is at 0, detected fault monitoring is active. If the assigned input or bit is at 1, fault monitoring is inactive. Active detected faults are cleared on a rising edge (change from 0 to 1) of the assigned input or bit. **Note:** **The Safe Torque Off function and any detected faults that help to prevent any form of operation are not affected by this function.** Following faults can be inhibited: AnF, CnF, COF, CrF1, dLF, EnF, EPF1, EPF2, FCF2, InFA, InFb, LFF3, ObF, OHF, OLC, OLF, OPF1, OPF2, OSF, OtFL, PHF, PtFL, SLF1, SLF2, SLF3, SOF, SPF, SSF, tJF, tnF and ULF	**[No]**(nO)
nO	**[No]**(nO): Function inactive	
LI1	**[LI1]**(LI1): Logical input LI1	
...	**[...]**(...): See the assignment conditions	

3.2.3.6.7.16 [COM. FAULT MANAGEMENT]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > CLL-		
Code	**Name / Description**	**Factory setting**
CLL-	[COM. FAULT MANAGEMENT]	
CLL	[Network fault mgt]	[Freewheel](YES)
	Warning! **LOSS OF CONTROL** **If Network fault management [Network fault mgt](CLL) is set to [Ignore](nO), communication control will be inhibited.** **For safety reasons, inhibiting the communication interruption detection should be restricted to the debug phase or to special applications.** **Failure to follow these instructions can result in death, serious injury or equipment damage.** Behavior of the drive in the event of a communication interruption with a communication card.	
nO	[Ignore](nO): Detected fault ignored	
YES	[Freewheel](YES): Freewheel stop	
Stt	[Per STT](Stt): Stop according to configuration of [Type of stop](Stt) without fault tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected fault disappears, according to the restart conditions of the active command channel (for example, according to [2/3 wire control](tCC) and [2 wire type](tCt) if control is via the terminals). Configuring an alarm for this detected fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	[Fallback spd](LFF): Change to fallback speed, maintained as long as the detected fault persists and the run command has not been removed [1]	
rLS	[Spd maint.](rLS): The drive maintains the speed being applied when the detected fault occurred, as long as the detected fault is present and the run command has not been removed [1] **Note:** **The ACOPOSinverter P74 is reconfigured when the CPU is restarted. By setting CLL = rLS, it is not possible for the CPU to configure the inverter.** **→ This causes an error (Module OK = FALSE). Troubleshooting: Download parameter = 0 → With this configuration, the inverter will be configured when the CPU is restarted.**	
rMP	[Ramp stop](rMP): Stop on ramp	
FSt	[Fast stop](FSt): Fast stop	
dCI	[DC injection](dCI): DC injection stop. This type of stop cannot be used with certain other functions.	
COL	[CANopen fault mgt]	[Freewheel](YES)
	Warning! **LOSS OF CONTROL** **If CANopen® fault management [CANopen fault mgt](COL) is set to [Ignore](nO), communication control will be inhibited.** **For safety reasons, inhibiting the communication interruption detection should be restricted to the debug phase or to special applications.** **Failure to follow these instructions can result in death, serious injury or equipment damage.** Behavior of the drive in the event of a communication interruption with integrated CANopen®.	
nO	[Ignore](nO): Detected fault ignored	
YES	[Freewheel](YES): Freewheel stop	
Stt	[Per STT](Stt): Stop according to configuration of [Type of stop](Stt) without fault tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected fault disappears, according to the restart conditions of the active command channel (for example, according to [2/3 wire control](tCC) and [2 wire type](tCt) if control is via the terminals). Configuring an alarm for this detected fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	[fallback spd](LFF): Change to fallback speed, maintained as long as the detected fault persists and the run command has not been removed [1]	
rLS	[Spd maint.](rLS): The drive maintains the speed being applied when the detected fault occurred, as long as the detected fault is present and the run command has not been removed [1]	
rMP	[Ramp stop](rMP): Stop on ramp	
FSt	[Fast stop](FSt): Fast stop	
dCI	[DC injection](dCI): DC injection stop. This type of stop cannot be used with certain other functions.	

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > CLL-		
Code	**Name / Description**	**Factory setting**
SLL	**[Modbus fault mgt]** **Warning!** **LOSS OF CONTROL** **If Modbus fault management [Modbus fault mgt](SLL) is set to [Ignore](nO), communication control will be inhibited.** **For safety reasons, inhibiting the communication interruption detection should be restricted to the debug phase or to special applications.** **Failure to follow these instructions can result in death, serious injury or equipment damage.** Behavior of the drive in the event of a communication interruption with integrated Modbus.	**[Freewheel]**(YES)
nO	**[Ignore]**(nO): Detected fault ignored	
YES	**[Freewheel]**(YES): Freewheel stop	
Stt	**[Per STT]**(Stt): Stop according to configuration of **[Type of stop]**(Stt) without fault tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected fault disappears, according to the restart conditions of the active command channel (for example, according to **[2/3 wire control]**(tCC) and **[2 wire type]**(tCt) if control is via the terminals). Configuring an alarm for this detected fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	**[fallback spd]**(LFF): Change to fallback speed, maintained as long as the detected fault persists and the run command has not been removed [1)]	
rLS	**[Spd maint.]**(rLS): The drive maintains the speed being applied when the detected fault occurred, as long as the detected fault is present and the run command has not been removed [1)]	
rMP	**[Ramp stop]**(rMP): Stop on ramp	
FSt	**[Fast stop]**(FSt): Fast stop	
dCI	**[DC injection]**(dCI): DC injection stop. This type of stop cannot be used with certain other functions.	

1) Because, in this case, the detected fault does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

3.2.3.6.7.17 [TORQUE OR I LIM. DETECT]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > tld-		
Code	**Name / Description**	**Factory setting**
tld-	**[TORQUE OR I LIM. DETECT]**	
SSb	**[Trq/I limit. stop]** Behavior in the event of switching to torque or current limitation.	**[Ignore]**(nO)
nO	**[Ignore]**(nO): Detected fault ignored	
YES	**[Freewheel]**(YES): Freewheel stop	
Stt	**[Per STT]**(Stt): Stop according to configuration of **[Type of stop]**(Stt) without fault tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected fault disappears, according to the restart conditions of the active command channel (for example, according to **[2/3 wire control]**(tCC) and **[2 wire type]**(tCt) if control is via the terminals). Configuring an alarm for this detected fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	**[fallback spd]**(LFF): Change to fallback speed, maintained as long as the detected fault persists and the run command has not been removed (1)	
rLS	**[Spd maint.]**(rLS): The drive maintains the speed being applied when the detected fault occurred, as long as the detected fault is present and the run command has not been removed (1)	
rMP	**[Ramp stop]**(rMP): Stop on ramp	
FSt	**[Fast stop]**(FSt): Fast stop	
dCI	**[DC injection]**(dCI): DC injection stop. This type of stop cannot be used with certain other functions.	
StO	**[Trq/I limit. time out]** 0 to 9999 ms (If trip has been configured) Time delay for taking SSF limitation into account.	1000 ms

(1) Because, in this case, the detected fault does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

Parameter that can be modified during operation or when stopped.

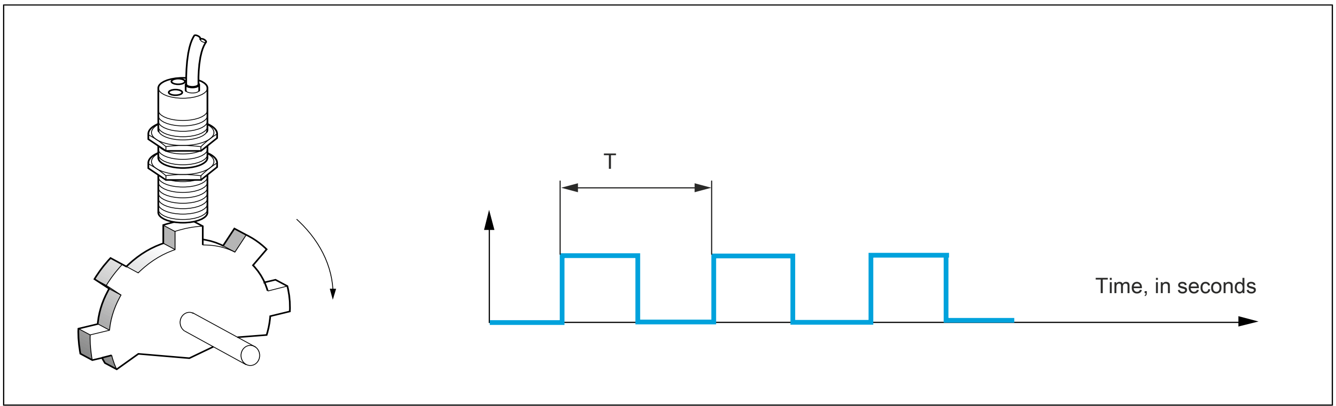
3.2.3.6.7.18 [FREQUENCY METER]

Use of the "Pulse input" input to measure the speed of rotation of the motor

This function uses the "Pulse input" input and can only be used if the "Pulse input" input is not being used for another function.

Example of use

An indexed disk driven by the motor and connected to a proximity sensor can be used to generate a frequency signal that is proportional to the speed of rotation of the motor.



When applied to the "Pulse input" input, this signal supports:

- Measurement and display of the motor speed: signal frequency = 1/T. This frequency is displayed by means of the **[Pulse in. work. freq.]**(FqS) parameter.
- Overspeed detection (if the measured speed exceeds a preset threshold, the drive will trip).
- Brake failure detection, if brake logic control has been configured: If the speed does not drop sufficiently quickly following a command to engage the brake, the drive will trip. This function can be used to detect worn brake linings.
- Detection of a speed threshold that can be adjusted using **[Pulse warning thd.]**(FqL) and is assignable to a relay or logic output.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > FqF-

Code	Name / Description	Adjustment range	Factory setting
FqF-	**[FREQUENCY METER]**		
FqF	**[Frequency meter]**		**[No]**(nO)
	Activation of the speed measurement function.		
nO	**[No]**(nO): Function inactive. In this case, none of the function parameters can be accessed		
YES	**[Yes]**(YES): Function active, assignment only possible if no other functions have been assigned to the "Pulse input" input		
FqC	**[Pulse scal. divisor]**	1.0 to 100.0	1.0
	Scaling factor for the "Pulse input" input (divisor). The frequency measured is displayed by means of the **[Pulse in. work. freq.]**(FqS) parameter.		
FqA	**[Overspd. pulse thd.]**	**[No]**(nO) ≙ 0 to 20000 Hz	**[No]**(nO)
	Activation and adjustment of overspeed monitoring: **[Overspeed]**(SOF).		
nO	**[No]**(nO): No overspeed monitoring		
-	**1 Hz to 20.00 kHz**: Adjustment of the frequency tripping threshold on the "Pulse input" input divided by **[Pulse scal. divisor]**(FqC)		
tdS	**[Pulse overspd delay]**	0.0 s to 10.0 s	0.0 s
	Time delay for taking overspeed detected fault into account.		
Fdt	**[Level fr. pulse ctrl]**	**[No]**(nO) ≙ 0.0 to 599.0 Hz	**[No]**(nO)
	Activation and adjustment of monitoring for the Pulse input (speed feedback): **[Speed fdback loss]**(SPF).		
nO	**[No]**(nO): No monitoring of speed feedback		
-	**0.1 Hz to 599 Hz**: Adjustment of the motor frequency threshold for tripping a speed feedback detected fault (difference between the estimated frequency and the measured speed)		
Fqt	**[Pulse thd. wo Run]**	**[No]**(nO) ≙ 0 to 1000 Hz	**[No]**(nO)
	Activation and adjustment of brake failure monitoring: **[Brake feedback]**(brF). If brake logic control **[Brake assignment]**(bLC) is not configured, this parameter is forced to **[No]**(nO).		
nO	**[No]**(nO): No brake monitoring		
-	**1 Hz to 1,000 Hz**: Adjustment of the motor frequency threshold for tripping a brake failure trip (detection of speeds other than 0)		
tqb	**[Pulse wo Run delay]**	0.0 s to 10.0 s	0.0 s
	Time delay for taking brake failure trip into account.		

Parameter that can be modified during operation or when stopped.

3.2.3.6.7.19 [DYNAMIC LOAD DETECT.]

Load variation detection

This detection is only possible with the High-speed hoisting function. It can be used to detect if an obstacle has been reached, triggering a sudden (upward) increase or (downward) decrease in the load.

Load variation detection triggers a [Dynamic load fault](dLF). The [Dyn. load Mgt.](dLb) parameter can be used to configure the response of the drive in the event of this detected fault.

Load variation detection can also be assigned to a relay or a logic output.

There are two possible detection modes, depending on the configuration of high-speed hoisting:

- Speed reference mode
  [High speed hoisting](HSO) is set to [Speed ref](SSO).
  Torque variation detection.
  During high-speed operation, the load is compared to that measured during the speed step. The permissible load variation and its duration can be configured. If exceeded, the drive switches to fault mode.
- Current limitation mode
  [High speed hoisting](HSO) is set to [Current Limit](CSO).
  On ascend, during high-speed operation, an increase in load will result in a drop in speed. Even if highspeed operation has been activated, if the motor frequency drops below the [I Limit Frequency](SCL) threshold, the drive will switch to fault mode. The detection is realized only for a positive variation of the load and only in the high speed area (area upper to [I Limit Frequency](SCL)).
  On descend, operation takes the form of speed reference mode.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > dLd-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
dLd-	[DYNAMIC LOAD DETECT.] Load variation detection. This can be accessed if [High speed hoisting](HSO) is not [No](nO).		
tLd	[Dynamic load time]	[No](nO) ≙ 0.00 to 10.00 s	[No](nO)
	Activation of load variation detection and adjustment of time delay for taking load variation detected fault [Dynamic load fault](dLF) into account.		
nO	[No](nO): No load variation detection		
-	0.00 s to 10.00 s: Adjustment of the time delay for taking detected fault into account		
dLd	[Dynamic load threshold]	1 to 100%	100%
	Adjustment of the trip threshold for load variation detection as a % of the load measured during the speed step.		
dLb	[Dyn. load Mgt.]		[Freewheel](YES)
	Behavior of the drive in the event of a load variation detected fault.		
nO	[Ignore](nO): Detected fault ignored		
YES	[Freewheel](YES): Freewheel stop		
Stt	[Per STT](Stt): Stop according to configuration of [Type of stop](Stt) without tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected fault disappears, according to the restart conditions of the active command channel (for example, according to [2/3 wire control](tCC) and [2 wire type](tCt) if control is via the terminals). Configuring an alarm for this detected fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.		
LFF	[Fallback spd](LFF): Change to fallback speed, maintained as long as the detected fault persists and the run command has not been removed (1)		
rLS	[Spd maint.](rLS): The drive maintains the speed at the time the detected fault occurred, as long as the detected fault persists and the run command has not been removed (1)		
rMP	[Ramp stop](rMP): Stop on ramp		
FSt	[Fast stop](FSt): Fast stop		

(1) Because, in this case, the detected fault does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

3.2.3.6.7.20 [AUTO TUNING FAULT]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > tnF-		
Code	**Name / Description**	**Factory setting**
tnF-	**[AUTO TUNING FAULT]**	
tnL	**[Autotune fault mgt]**	**[Freewheel]**(YES)
nO	**[Ignore]**(nO): Detected fault ignored	
YES	**[Freewheel]**(YES): Freewheel stop	

3.2.3.6.7.21 [CARDS PAIRING]

Function can only be accessed in **[Expert]**(EPr) mode.

This function is used to detect whenever a card has been replaced or the software has been modified in any way. When a pairing password is entered, the parameters of the card currently inserted are stored. On every subsequent power-up, these parameters are verified and, in the event of a discrepancy, the drive locks in HCF fault mode. Before the drive can be restarted, you must revert to the original situation or re-enter the pairing password. The following parameters are verified:

- The type of card for: all cards
- The software version for: the control block, the communication cards
- The serial number for: the control block

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > PPI-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
PPI-	**[CARDS PAIRING]**		
PPI ★ OFF -	**[Pairing password]** The **[OFF]**(OFF) value signifies that the card pairing function is inactive. The **[ON]**(On) value signifies that card pairing is active and that an access code must be entered in order to start the drive in the event of a card pairing detected fault. As soon as the code has been entered, the drive is unlocked and the code changes to **[ON]**(On). The PPI code is an unlock code known only to B&R Product Support.	**[OFF]**(OFF) to 9999	**[OFF]**(OFF)

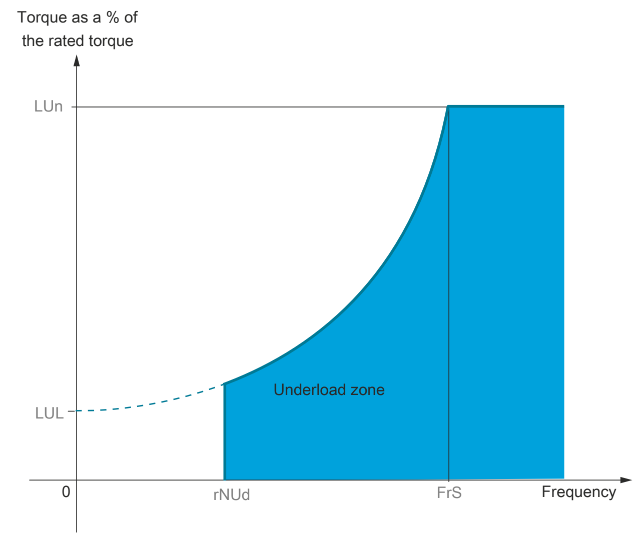
★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.3.6.7.22 [PROCESS UNDERLOAD]

Process underload detected fault

A process underload is detected when the next event occurs and remains pending for a minimum time **[Unld T.Del. Detect]**(ULt), which is configurable:

- The motor is in steady state and the torque is below the set underload limit (**[Unld. Thr. 0. Speed.]**(LUL), **[Unld. Thr. Nom. Speed.]**(LUn) and **[Unld. Freq. Thr. Det.]**(rMUd) parameter).
- The motor is in steady state when the offset between the frequency reference and motor frequency falls below the configurable threshold **[Hysteresis Freq. Att.]**(Srb).



Between zero frequency and the rated frequency, the curve reflects the following equation:

$$Torque = LUL + \frac{(LUn - LUL) \times (frequency)^2}{(ratedfrequency)^2}$$

The underload function is not active for frequencies below **[Unld. Freq. Thr. Det.]**(rMUd).

A relay or a logic output can be assigned to the signaling of this detected fault in the **[INPUTS / OUTPUTSCFG]**(I_O-) menu.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > ULd-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
ULd-	**[PROCESS UNDERLOAD]**		
ULt	**[Unld T. Del. Detect.]** Underload detection time delay. A value of 0 deactivates the function and makes the other parameters inaccessible.	0 to 100 s	0 s
LUn ★ ⟲	**[Unld. Thr. Nom. Speed.]** Underload threshold at rated motor frequency (**[Rated motor freq.]**(FrS)) as a % of the rated motor torque.	20 to 100% (referring to **[Rated mot. current]**(nCr))	60%
LUL ★ ⟲	**[Unld. Thr. 0. Speed.]** Underload threshold at zero frequency as a % of the rated motor torque.	0 to **[Unld.Thr.Nom.Speed]**(LUn) (referring to **[Rated mot. current]**(nCr))	0%
rMUd ★ ⟲	**[Unld. Freq. Thr. Det.]** Minimum frequency underload detection threshold.	0.0 to 599.0 Hz	0.0 Hz
Srb ★ ⟲	**[Hysteresis Freq. Att.]** Maximum deviation between the frequency reference and the motor frequency, which defines steady state operation.	0.3 to 599.0 Hz	0.3 Hz
UdL ★	**[Underload Managmt.]** Behavior on switching to underload detection.		**[Freewheel]**(YES)
nO YES rMP FSt	**[Ignore]**(nO): Detected fault ignored **[Freewheel]**(YES): Freewheel stop **[Ramp stop]**(rMP): Stop on ramp **[Fast stop]**(FSt): Fast stop		
FtU ★ ⟲	**[Underload T.B. Rest.]** This parameter cannot be accessed if **[Underload Managmt.]**(UdL) is set to **[Ignore]**(nO). Minimum time permitted between an underload being detected and any automatic restart. In order to allow an automatic restart, the value of **[Max. restart time]**(tAr) must exceed this parameter by at least one minute.	0 to 6 min	0 min

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

⟲ Parameter that can be modified during operation or when stopped.

3.2.3.6.7.23 [PROCESS OVERLOAD]

Process overload detected fault

A process overload is detected when the next event occurs and remains pending for a minimum time **[Ovld TimeDetect.]**(tOL), which is configurable:

- The drive is in current limitation mode
- The motor is in steady state and the current is above the set overload threshold **[Ovld DetectionThr.]**(LOC)

The motor is in steady state when the offset between the frequency reference and motor frequency falls below the configurable threshold **[Hysteresis Freq. Att.]**(Srb).

A relay or a logic output can be assigned to the signaling of this detected fault in the **[INPUTS / OUTPUTSCFG]**(I_O-) menu.

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > OLd-

Code	Name / Description	Adjustment range	Factory setting
OLd-	**[PROCESS OVERLOAD]**		
tOL	**[Ovld Time Detect.]** Overload detection time delay. A value of 0 deactivates the function and makes the other parameters inaccessible.	0 to 100 s	0 s
LOC (1)	**[Ovld Detection Thr.]** Overload detection threshold as a % of the rated motor current **[Rated mot. current]**(nCr). This value must be less than the limit current in order for the function to work.	70 to 150% of **[Rated mot. current]**(nCr)	110%
Srb (1)	**[Hysteresis Freq.Att.]** Maximum deviation between the frequency reference and the motor frequency, which defines steady state operation.	0.3 to 599.0 Hz	0.3 Hz
OdL	**[Ovld.Proces.Mngmt]** Behavior on switching to overload detection.		**[Freewheel]**(YES)
nO	**[Ignore]**(nO): Detected fault ignored		
YES	**[Freewheel]**(YES): Freewheel stop		
rMP	**[Ramp stop]**(rMP): Stop on ramp		
FSt	**[Fast stop]**(FSt): Fast stop		
FtO (1)	**[Overload T.B.Rest.]** This parameter cannot be accessed if **[Ovld.Proces.Mngmt]**(OdL) is set to **[Ignore]**(nO). Minimum time permitted between an overload being detected and any automatic restart. In order to allow an automatic restart, the value of **[Max. restart time]**(tAr) must exceed this parameter by at least one minute.	0 to 6 min	0 min

(1) The parameter can also be accessed in the **[SETTINGS]**(SEt-) and **[APPLICATION FUNCT.]**(FUn-) menus.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.7.24 [FALLBACK SPEED]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > LFF-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
LFF-	**[FALLBACK SPEED]**		
LFF	**[Fallback speed]** Selection of the fallback speed.	0.0 to 599.0 Hz	0.0 Hz

3.2.3.6.7.25 [RAMP DIVIDER]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > FSt-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
FSt-	[RAMP DIVIDER]		
dCF (1)	[Ramp divider] The ramp that is enabled ([Deceleration](dEC) or [Deceleration 2](dE2)) is then divided by this coefficient when stop requests are sent. Value 0 corresponds to a minimum ramp time.	0 to 10	4

(1) The parameter can also be accessed in the [SETTINGS](SEt-) and [APPLICATION FUNCT.](FUn-) menus.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.7.26 [DC INJECTION]

Parameters described in this page can be accessed by: DRI- > COnF > FULL > FLt- > dCI-

Code	Name / Description	Adjustment range	Factory setting
dCI-	[DC INJECTION]		
IdC (1)(3)	[DC inject. level 1] **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.** Level of DC injection braking current activated via logic input or selected as stop mode.	0.1 to $^{176}/_{125}$ INV (2)	$^{16}/_{25}$ INV (2)
tdI (1)(3)	[DC injection time 1] **Caution!** **RISK OF DAMAGE TO THE MOTOR** • **Long periods of DC injection braking can cause overheating and damage the motor** • **Protect the motor by avoiding long periods of DC injection braking** **Failure to follow these instructions can result in equipment damage.** Maximum current injection time [DC inject. level 1](IdC). After this time the injection current becomes [DC inject. level 2](IdC2).	0.1 to 30.0 s	0.5 s
IdC2 (1)(3)	[DC inject. level 2] **Caution!** **RISK OF DAMAGE TO THE MOTOR** **Check that the motor will withstand this current without overheating.** **Failure to follow these instructions can result in equipment damage.** Injection current activated by logic input or selected as stop mode, once period of time [DC injection time 1](tdI) has elapsed.	0.1 to [DC inject.level 1](IdC)(2)	$^{1}/_{2}$ INV (2)
tdC (1)(3)	[DC injection time 2] **Caution!** **RISK OF DAMAGE TO THE MOTOR** • **Long periods of DC injection braking can cause overheating and damage the motor** • **Protect the motor by avoiding long periods of DC injection braking** **Failure to follow these instructions can result in equipment damage.** Maximum injection time [DC inject. level 2](IdC2) for injection, selected as stop mode only. This parameter can be accessed if [Type of stop](Stt) is set to [DC injection](dCI).	0.1 to 30.0 s	0.5 s

(1) The parameter can also be accessed in the [SETTINGS](SEt-) and [APPLICATION FUNCT.](FUn-) menus.
(2) In corresponds to the rated drive current indicated in the Installation chapter and on the drive nameplate.
(3) These settings are independent of the [AUTO DC INJECTION](AdC-) function.

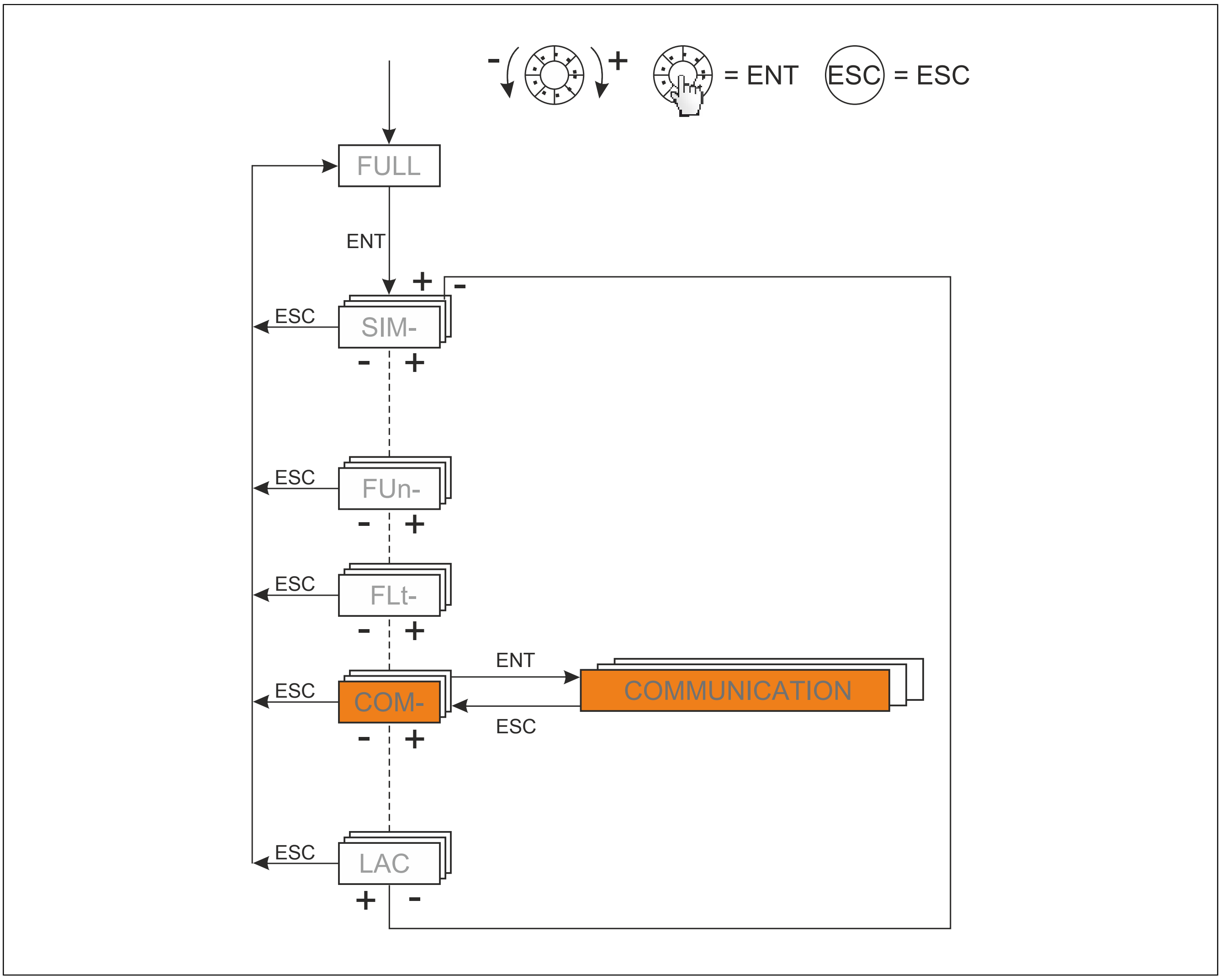
These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

3.2.3.6.8 [COMMUNICATION]

With integrated display terminal:

From COnF menu:



Parameters described in this page can be accessed by: DRI- > COnF > FULL > COM- > ICS-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
ICS-	**[COM. SCANNER INPUT]** **[Scan. IN1 address]**(nMA1) to **[Scan. IN4 address]**(nMA4) could be used for Fast Task of the communication scanner.		
nMA1	**[Scan. IN1 address]** Address of the 1st input word.	According to ACOPOSinverter P74 - Communication parameters	3201
nMA2	**[Scan. IN2 address]** Address of the 2nd input word.	According to ACOPOSinverter P74 - Communication parameters	8604
nMA3	**[Scan. IN3 address]** Address of the 3rd input word.	According to ACOPOSinverter P74 - Communication parameters	0
nMA4	**[Scan. IN4 address]** Address of the 4th input word.	According to ACOPOSinverter P74 - Communication parameters	0
nMA5	**[Scan. IN5 address]** Address of the 5th input word.	According to ACOPOSinverter P74 - Communication parameters	0
nMA6	**[Scan. IN6 address]** Address of the 6th input word.	According to ACOPOSinverter P74 - Communication parameters	0
nMA7	**[Scan. IN7 address]** Address of the 7th input word.	According to ACOPOSinverter P74 - Communication parameters	0
nMA8	**[Scan. IN8 address]** Address of the 8th input word.	According to ACOPOSinverter P74 - Communication parameters	0

Parameters described in this page can be accessed by: DRI- > COnF > FULL > COM- > OCS-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
OCS-	**[COM. SCANNER OUTPUT]** **[Scan. Out1 address]**(nCA1) to **[Scan. Out4 address]**(nCA4) could be used for Fast Task of the communication scanner.		
nCA1	**[Scan.Out1 address]** Address of the 1st output word.	According to ACOPOSinverter P74 - Communication parameters	8501
nCA2	**[Scan.Out2 address]** Address of the 2nd output word.	According to ACOPOSinverter P74 - Communication parameters	8602
nCA3	**[Scan.Out3 address]** Address of the 3rd output word.	According to ACOPOSinverter P74 - Communication parameters	0
nCA4	**[Scan.Out4 address]** Address of the 4th output word.	According to ACOPOSinverter P74 - Communication parameters	0

Parameters described in this page can be accessed by: DRI- > COnF > FULL > COM- > OCS-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
nCA5	[Scan.Out5 address] Address of the 5th output word.	According to ACOPOSinverter P74 - Communication parameters	0
nCA6	[Scan.Out6 address] Address of the 6th output word.	According to ACOPOSinverter P74 - Communication parameters	0
nCA7	[Scan.Out7 address] Address of the 7th output word.	According to ACOPOSinverter P74 - Communication parameters	0
nCA8	[Scan.Out8 address] Address of the 8th output word.	According to ACOPOSinverter P74 - Communication parameters	0

Parameters described in this page can be accessed by: DRI- > COnF > FULL > COM- > Md1-	
Code	**Name / Description**
Md1-	[MODBUS NETWORK] Not applicable.

BLUETOOTH

Parameters described in this page can be accessed by: DRI- > COnF > FULL > COM- > btH-	
Code	**Name / Description**
btH-	[BLUETOOTH] Not applicable.

CANopen card (default)

Parameters described in this page can be accessed by: DRI- > COnF > FULL > COM- > CnO-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
CnO-	[CANopen]		
AdCO OFF -	[CANopen address] [OFF](OFF): OFF 1 to 127	[OFF](OFF) to 127	[OFF](OFF)
bdCO 50 125 250 500 IM	[CANopen bit rate] [50 kbps](50): 50,000 Bauds [125 kbps](125): 125,000 Bauds [250 kbps](250): 250,000 Bauds [500 kbps](500): 500,000 Bauds [1 Mbps](1M): 1 MBauds		[250 kbps](250)
ErCO	[Error code] Read-only parameter, cannot be modified.	0 to 5	-

POWERLINK card

Parameters described in this page can be accessed by: DRI- > COnF > FULL > COM- > Cbd-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
Cbd-	[COMMUNICATION CARD] See the specific documentation for the card used.		
ADRC	[Address](ADRC) POWERLINK station number.	0 to 239	0
MAC	[MAC@](MAC): MAC address of the POWERLINK card.		
OCA1	[OCA1](OCA1) [Scan.Out1 address]: Address of the first output word.	According to ACOPOSinverter P74 - Communication parameters	8501
OCA2	[OCA2](OCA2) [Scan.Out2 address]: Address of the second output word.	According to ACOPOSinverter P74 - Communication parameters	8602
OCA3	[OCA3](OCA3) [Scan.Out3 address]: Address of the third output word.	According to ACOPOSinverter P74 - Communication parameters	0

Parameters described in this page can be accessed by: DRI- > COnF > FULL > COM- > Cbd-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
OCA4	**[OCA4]**(OCA4) **[Scan.Out4 address]**: Address of the fourth output word.	According to ACOPOSinverter P74 - Communi-cation parameters	0
OMA1	**[OMA1]**(OMA1) **[Scan. IN1 address]**: Address of the first input word.	According to ACOPOSinverter P74 - Communi-cation parameters	3201
OMA2	**[OMA2]**(OMA2) **[Scan. IN2 address]**: Address of the second input word.	According to ACOPOSinverter P74 - Communi-cation parameters	8604
OMA3	**[OMA3]**(OMA3) **[Scan. IN3 address]**: Address of the third input word.	According to ACOPOSinverter P74 - Communi-cation parameters	0
OMA4	**[OMA4]**(OMA4) **[Scan.Out4 address]**: Address of the fourth input word.	According to ACOPOSinverter P74 - Communi-cation parameters	0
ILF1	**[Internal link fault 1]**(ILF1) Internal communication interruption between drive and POWERLINK card Error codes:		

ILF			
ILF code (decimal)	**ILF code (hexadecimal)**	**Name**	**Description**
1	0x01	RS3_ERROR_GENERAL	Unspecified error on drive
2	0x02	EPL_ERROR_AP_STATE_ERROR_EVENT	Error when changing current state
19	0x13	NVS_STORAGE_FAILURE	EEPROM; NVS detected failure
21	0x15	RS3_ERROR_IOC_WATCHDOG_TIMEOUT	No memory or backround
22	0x16	RS3_ERROR_SCANNER_UP-DATE_FAILURE	Scanner update failure
103	0x67	RS3_INITIALIZED_OPTION_CARD_UN-AVAILABLE	Timeout on driveinternal bus (2 s)

Code	Name / Description
CNF	**[Network fault]**(CNF) Communication interruption between POWERLINK card and POWERLINK master Error codes:

CNF			
CNF code (decimal)	**CNF code (hexadecimal)**	**Name**	**Description**
17	0x11	EPL_ERROR_LINK_LOSS	Link loss; physical connection lost (e.g. PLK cable unplugged)
27	0x1B	EPL_ERROR_MISSING_SYNC_SIGNAL	PCP signal for synchronization missing
34	0x22	EPL_ERROR_PDO_MAPPING_FAILED	Error in PDO mapping
35	0x23	EPL_ERROR_RECEIVE_LINK_PDO_MSG_FAILED	Faulty PDO message received (LinkPdosReq)
36	0x24	EPL_ERROR_TO_MANY_IN-PUTS_MAPPED	Invalid mapping (too many inputs mapped)
37	0x25	EPL_ERROR_TO_MANY_OUT-PUTS_MAPPED	Invalid mapping (too many outputs mapped)
38	0x26	RS3_ERROR_INVALID_INPUT_MAPPING	Invalid mapping (drive memory not accessible as input)
39	0x27	RS3_ERROR_INVALID_OUTPUT_MAP-PING	Invalid mapping (drive memory not accessible as output)
40	0x28	RS3_ERROR_REGISTER_SCANNER	Invalid configuration of register scanner
41	0x29	RS3_ERROR_UNABLE_TO_READ_DMN	DMN parameter not accessible
48	0x30	RS3_ERROR_OBJECT_ACCESS	Drive parameter cannot be accessed
96	0x60	EPL_ERROR_DRIVE_INVALID_S-TATE_CHANGE	EPL state changed from OPERATIONAL to PRE-OP1 or PRE-OP2

Forced local

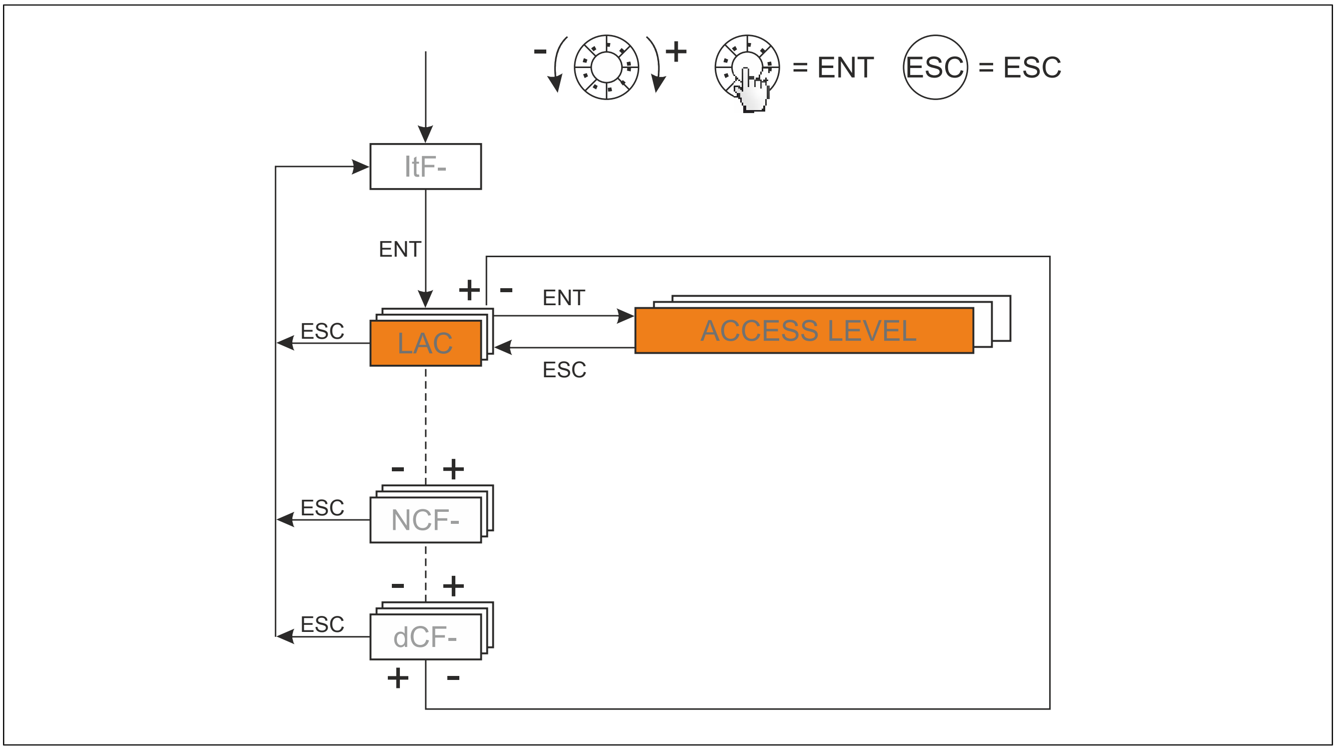
Parameters described in this page can be accessed by: DRI- > COnF > FULL > COM- > LCF-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
LCF-	**[FORCED LOCAL]**		
FLO	**[Forced local assign.]** **Warning!** **LOSS OF CONTROL** **If the equipment switches to forced local mode, virtual input used in the current configuration will remain fixed at the last value transmitted.** **Do not use the virtual input and forced local mode in the same configuration.** **Failure to follow these instructions can result in death, serious injury or equipment damage.** Forced local assignment. Forced local mode is active when the input is at state 1. **[Forced local assign.]**(FLO) is forced to **[No]**(nO) if **[Profile]**(CHCF) is set to **[I/O profile]**(IO).		**[No]**(nO)
nO	**[No]**(nO): Function inactive		
LI1	**[LI1]**(LI1): Logical input LI1		
...	**...**		
LI6	**[LI6]**(LI6): Logical input LI6		
LAI1	**[LAI1]**(LAI1): Logical input AI1		
LAI2	**[LAI2]**(LAI2): Logical input AI2		
OL01	**[OL01]**(OL01): Function blocks: Logical output 01		
...	**...**		
OL10	**[OL10]**(OL10): Function blocks: Logical output 10		
FLOC	**[Forced local Ref.]** Forced local reference source assignment.		**[No]**(nO)
nO	**[No]**(nO): Not assigned (control via the terminals with zero reference)		
AI1	**[AI1]**(AI1): Analog input		
AI2	**[AI2]**(AI2): Analog input		
AI3	**[AI3]**(AI3): Analog input		
LCC	**[HMI]**(LCC): Assignment of the reference and command to the graphic display terminal or remote display terminal Reference: **[HMI Frequency ref.]**(LFr) Command: RUN/STOP/FWD/REV keys		
PI	**[RP]**(PI): Pulse input		
OA01	**[OA01]**(OA01): Function blocks: Analog output 01		
...	**...**		
OA10	**[OA10]**(OA10): Function blocks: Analog output 10		
FLOt ★	**[Time-out forc. local]** 0.1 to 30 s. This parameter can be accessed if **[Forced local assign.]**(FLO) is not set to **[No]**(nO). Time delay before communication monitoring is resumed on leaving forced local mode.	0.1 to 30.0 s	10.0 s

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

3.2.4 Interface (ItF)

3.2.4.1 Access Level (LAC)

With integrated display terminal:



Parameters described in this page can be accessed by: DRI- > COnF > FULL > LAC Graphic display terminal: Main Menu > ITF > LAC		
Code	**Name / Description**	**Factory setting**
LAC	**[3.1 ACCESS LEVEL]**	**[Standard]**(Std)
bAS	**[Basic]**(bAS): Limited access to **[SIMPLY START]**(SIM-), **[1.2 MONITORING]**(MOn-), **[SETTINGS]**(SEt-), **[FACTORY SETTINGS]**(FCS-), **[5 PASSWORD]**(COd) and **[3.1 ACCESS LEVEL]**(LAC-) menus. Only one function can be assigned to each input.	
Std	**[Standard]**(Std): Access to all menus on the integrated display terminal. Only one function can be assigned to each input.	
AdU	**[Advanced]**(AdU): Access to all menus on the integrated display terminal. Several functions can be assigned to each input.	
Epr	**[Expert]**(EPr): Access to all menus on the integrated display terminal and access to additional parameters. Several functions can be assigned to each input.	

Parameter that can be modified during operation or when stopped.

Comparison of the menus that can be accessed on the graphic display terminal/integrated display terminal

				Access level
[1 DRIVE MENU] (drI-)				Basic bAS
	[1.1 SPEED REFERENCE] (rEF-)			Basic bAS
	[1.2 MONITORING] (Mon-)			Basic bAS
		MMO - (Motor monitoring)		Basic bAS
		IOM - (I/O MAP)		Basic bAS
		SAF - (Safety monitoring)		Basic bAS
		Mfb - (Function Block monitoring)		Basic bAS
		CMM - (Communication Map)		Basic bAS
		MPI - (PI monitoring)		Basic bAS
		Pet - (Consumption monitoring)		Basic bAS
		Alr - (Alarms) (1)		Basic bAS
		Sst - (Other state) (1)		Basic bAS
		Cod - (Access code) (2)		Basic bAS
	[1.3 CONFIGURATION] (COnF)			Basic bAS
		MYMn - (My Menu)		Basic bAS
		FCS - (Factory Settings)		Basic bAS
		FULL - (All parameters)		Basic bAS
			SIM - (Simple start)	Basic bAS
			Set - (Settings)	Basic bAS
			FbM - (Function blocks)	Basic bAS
[2 IDENTIFICATION] (OId-) (1)				Basic bAS
[3 INTERFACE] (ItF-) (1)				Basic bAS
	[3.1 ACCESS LEVEL] (LAC)			Basic bAS
	[3.2 LANGUAGE] (LnG)			Basic bAS
[4 LOAD/SAVE AS] (trA-) (1)				Basic bAS
[5 ACCESS CODE] (Cod-) (1)				Basic bAS
A single function can be assigned to each input.				Standard Std
[1 DRIVE MENU] (drI-)	[1.2 MONITORING] (Mon-)	dGt - (Diagnostics)		Standard Std
	[1.3 CONFIGURATION] (COnF)	FULL - (All parameters)		Standard Std
			drC - (Drive data)	Standard Std
			I_O - (Inputs / Outputs CFG)	Standard Std
			CtL - (Control)	Standard Std
			Fun - (Application function)	Standard Std
			Flt - (Error Management)	Standard Std
			COM - (Communication)	Standard Std
[3 INTERFACE] (ItF-)(1)	[3.3 MONITORING CONFIG.] (MCF-)			Standard Std
A single function can be assigned to each input.				Advanced AdU
	[3.4 DISPLAY CONFIG.] (dCF-) (1)			Advanced AdU
A single function can be assigned to each input.				Expert Epr
Expert parameters				Expert Epr
A single function can be assigned to each input.				Expert Epr

(1) Can be accessed only with graphic display terminal
(2) Can be accessed only with handheld (7 segment display)

				Access level
[3 INTERFACE] (ItF-)				
[3.4 DISPLAY CONFIG.] (dCF-) (1)				
	CUP - (User Parameters)			
		SCP - (Parameter Selection)		
		CPM - (Customized Selection)		
			(My Menu)	
			(Device Name)	
		SER - (Service Message)		
			(Configuration 0)	
			(Configuration 1)	
			(Configuration 2)	
			(Serial Number)	
	MUC - (My Menu Config.)			
		UMP - (Parameter Selection)		
		UML - (Selected List)		
	PAC - (Parameter Access)			
		PRO - (Protection)		
		VIS - (Visibility)		
	CNL - (Keypad Parameters)			
	Several functions can be assigned to each input.			Advanced AdU
Expert parameters	Several functions can be assigned to each input.			Expert Epr

(1) Can be accessed only with graphic display terminal

3.2.4.2 Language (LnG)

LANGUAGE	
English	
Français	✓
Deutsch	
Italiano	
Español	
Chinese	
Русский	
Türkçe	

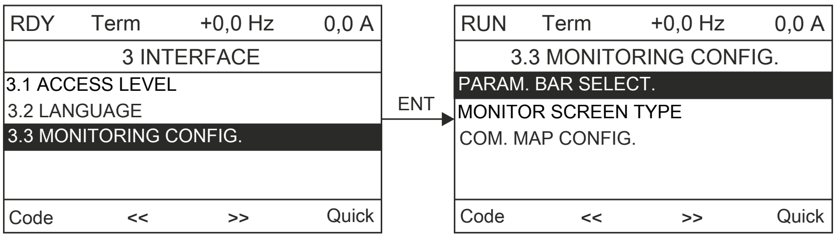
When only one selection is possible, the selection made is indicated by ✓.
Example: Only one language can be chosen.

Parameters described in this page can be accessed by: Graphic display terminal: Main Menu > ITF > LnG		
Code	**Name / Description**	**Factory setting**
LnG	**[3.2 LANGUAGE]** Current language index.	**[Language 0]**(LnG0)

Parameter that can be modified during operation or when stopped.

3.2.4.3 Monitoring Configuration (MCF)

This menu can only be accessed with the graphic display terminal.



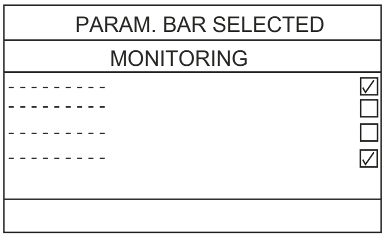
This can be used to configure the information displayed on the graphic display screen during operation.

[PARAM. BAR SELECT]: Selection of one to two parameters displayed on the top line (the first two parameters cannot be modified)

[MONITOR SCREEN TYPE]: Selection of parameters displayed in the center of the screen and the display mode (digital values or bar graph format)

[COM. MAP CONFIG.] : Selection of the words displayed and their format

Parameters described in this page can be accessed by:
Graphic display terminal: Main Menu > ITF > MCF-

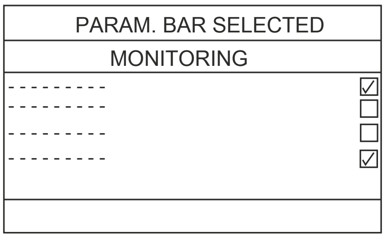
Code	Name / Description
MCF-	**[3.3 MONITORING CONFIG]**
PbS-	**[PARAM. BAR SELECT]** **[AI1]** in V **[AI2]** in V **[AI3]** in mA **[AO1]** in V **[ETA state word]** **[Alarm groups]** **[Frequency ref.]** in Hz: parameter displayed in factory configuration **[Output frequency]** in Hz **[Motor current]** in A: parameter displayed in factory configuration **[Motor speed]** in rpm **[Motor voltage]** in V **[Motor power]** in W **[Motor torque]** as a % **[Mains voltage]** in V **[Motor thermal state]** as a % **[Drv. thermal state]** as a % **[Consumption]** in Wh or kWh depending on drive rating **[Run time]** in hours (length of time the motor has been switched on) **[Power on time]** in hours (length of time the drive has been switched on) **[IGBT alarm counter]** in seconds (total time of IGBT overheating alarms) **[Min. freq time]** in seconds **[PID reference]** as a % **[PID feedback]** as a % **[PID error]** as a % **[PID Output]** in Hz **[Config. active]** CNF0, 1 or 2 **[Utilised param. set]** SET1, 2 or 3 Select the parameter using ENT (a ✓ then appears next to the parameter). Parameter(s) can also be deselected using ENT. One or two parameters can be selected. Example: 

Monitor screen type

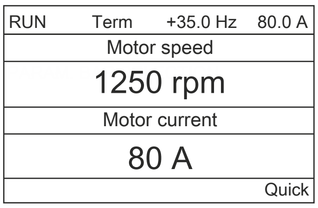
<table>
<tr><td colspan="3">Parameters described in this page can be accessed by:
Graphic display terminal: Main Menu > ITF > MCF- > MSC-</td></tr>
<tr><th>Code</th><th>Name / Description</th><th>Factory setting</th></tr>
<tr><td>MSC-</td><td>[MONITOR SCREEN TYPE]</td><td></td></tr>
<tr><td>Mdt</td><td>[Display value type]

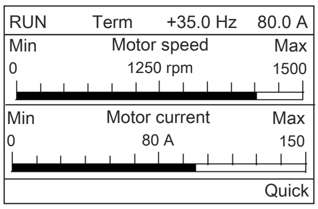
[Digital](dEC)
[Bar graph](bAr)
[List](LISt)</td><td>[Digital](dEC)</td></tr>
<tr><td>MPC</td><td>[PARAMETER SELECTION]
[AI1] in V
[AI2] in V
[AI3] in mA
[AO1] in V
[ETA state word]
[Alarm groups]
[Frequency ref.] in Hz: parameter displayed in factory configuration
[Output frequency] in Hz
[Pulse in. work. freq.] in A: parameter displayed in factory configuration
[Motor current] in Hz
[Motor speed] in rpm
[Motor voltage] in V
[Motor power] in W
[Motor torque] as a %
[Mains voltage] in V
[Motor thermal state] as a %
[Drv. thermal state] as a %
[Consumption] in Wh or kWh depending on drive rating
[Run time] in hours (length of time the motor has been switched on)
[Power on time] in hours (length of time the drive has been switched on)
[IGBT alarm counter] in seconds (total time of IGBT overheating alarms)
[Min. freq time] in seconds
[PID reference] as a %
[PID feedback] as a %
[PID error] as a %
[PID Output] in Hz

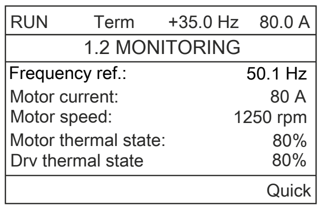
Select the parameter(s) using ENT (a ✓ then appears next to the parameter). Parameter(s) can also be deselected using ENT.



Examples include:

Display of two digital values


Display of two bar graphs


Display of a list of five values


</td><td></td></tr>
</table>

Parameter that can be modified during operation or when stopped.

Communication map configuration

Code	Name / Description	Adjustment range	Factory setting
Parameters described in this page can be accessed by: **Graphic display terminal: Main Menu > ITF > MCF- > AdL-**			
AdL-	**[COM. MAP CONFIG.]**		
IAd1	**[Word 1 add. select.]** Select the address of the word to be displayed by pressing the << and >> (F2 and F3) keys and rotating the jog dial.	According to ACOPOSinverter P74 - Communication parameters	0
FAd1	**[Format word 1]** Format of word 1.		**[Hex]**(HE)
HE	**[Hex]**(HE)		
SIG	**[Signed]**(SIG)		
nSG	**[Unsigned]**(nSG)		
IAd2	**[Word 2 add. select.]** Select the address of the word to be displayed by pressing the << and >> (F2 and F3) keys and rotating the jog dial.	According to ACOPOSinverter P74 - Communication parameters	0
FAd2	**[Format word 2]** Format of word 2.		**[Hex]**(HE)
HE	**[Hex]**(HE)		
SIG	**[Signed]**(SIG)		
nSG	**[Unsigned]**(nSG)		
IAd3	**[Word 3 add. select.]** Select the address of the word to be displayed by pressing the << and >> (F2 and F3) keys and rotating the jog dial.	According to ACOPOSinverter P74 - Communication parameters	0
FAd3	**[Format word 3]** Format of word 3.		**[Hex]**(HE)
HE	**[Hex]**(HE)		
SIG	**[Signed]**(SIG)		
nSG	**[Unsigned]**(nSG)		
IAd4	**[Word 4 add. select.]** Select the address of the word to be displayed by pressing the << and >> (F2 and F3) keys and rotating the jog dial.	According to ACOPOSinverter P74 - Communication parameters	0
FAd4	**[Format word 4]** Format of word 4.		**[Hex]**(HE)
HE	**[Hex]**(HE)		
SIG	**[Signed]**(SIG)		
nSG	**[Unsigned]**(nSG) Then, it will be possible to view the selected words in the **[COMMUNICATION MAP]** submenu of the **[1.2 MONITORING]** menu. Example:		

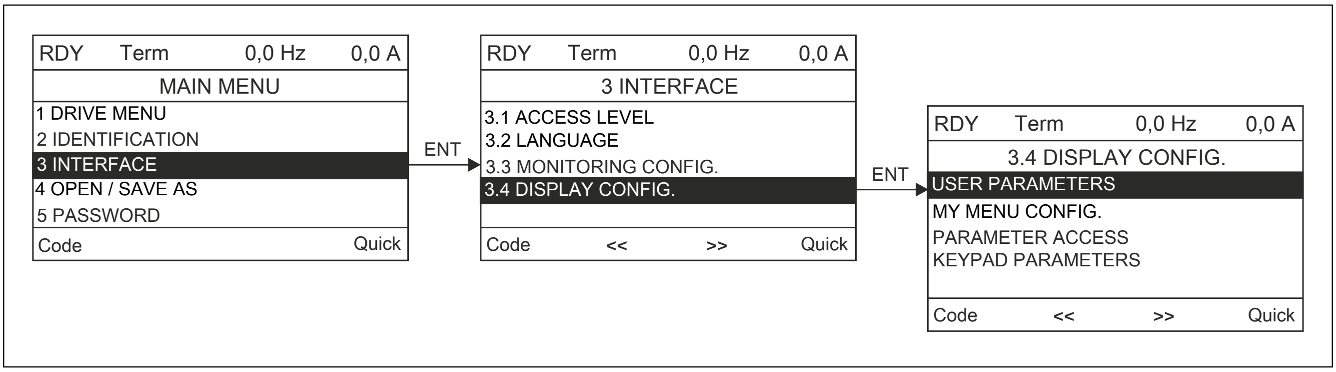
```
RUN      Term      +35.0 Hz   80.0 A
       COMMUNICATION MAP
---------
---------
W3141:                   F230 Hex


             <<        >>      Quick
```

Parameter that can be modified during operation or when stopped.

3.2.4.4 Display configuration (dCF)

This menu can only be accessed with the graphic display terminal. It can be used to customize parameters or a menu and to access parameters.

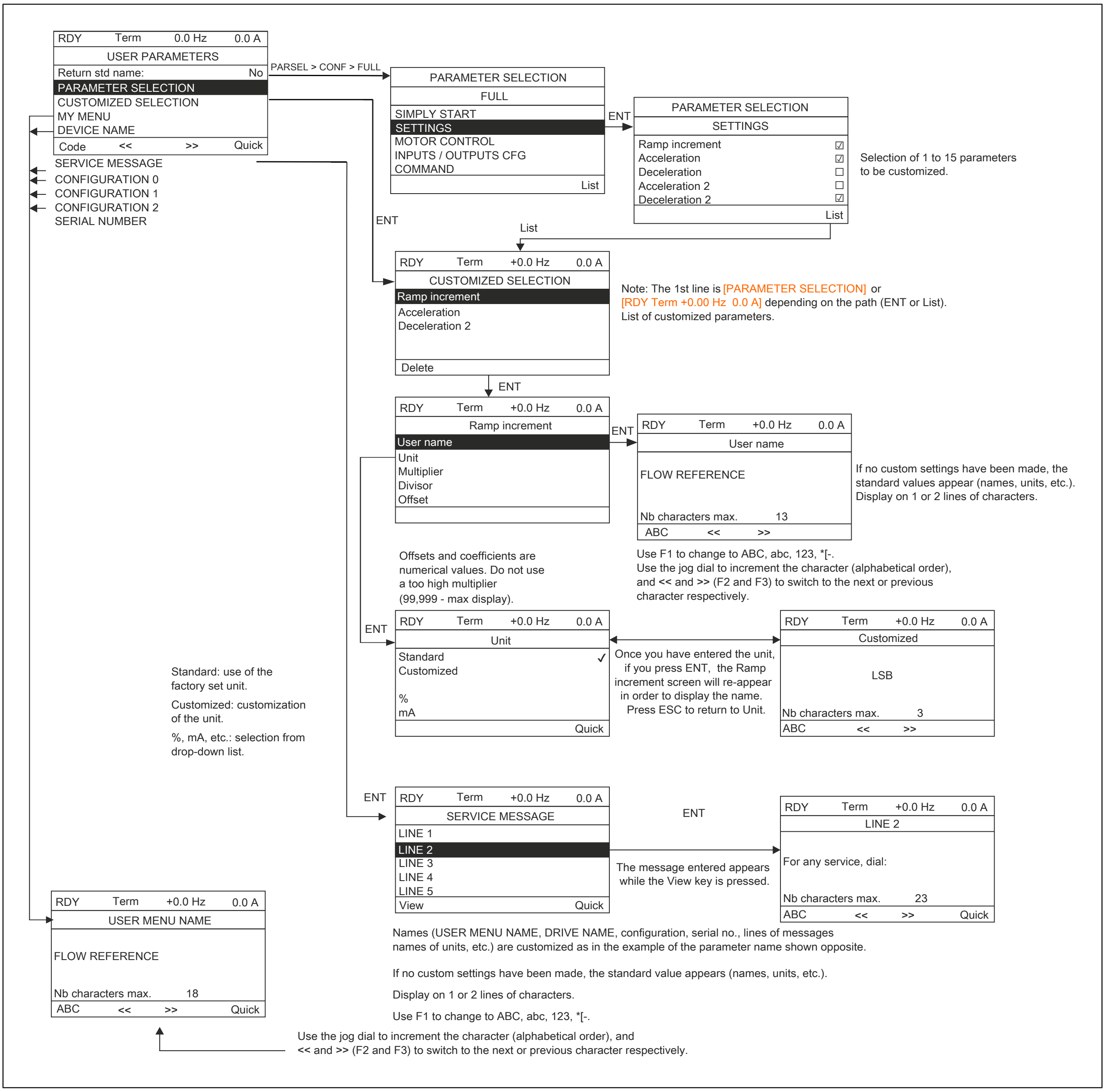


- USER PARAMETERS: Customization of 1 to 15 parameters
- MY MENU: Creation of a customized menu
- PARAMETER ACCESS: Customization of the visibility and protection mechanisms of menus and parameters
- KEYPAD PARAMETERS: Adjustment of the contrast and stand-by mode of the graphic display terminal (parameters stored in the terminal)

Parameters described in this page can be accessed by: **Graphic display terminal: Main Menu > ITF > dCF-**	
Code	**Name / Description**
dCF-	**[3.4 DISPLAY CONFIG]**

User parameters

If **[Return std name]** is set to **[Yes]**, the display reverts to standard but the custom settings remain stored.

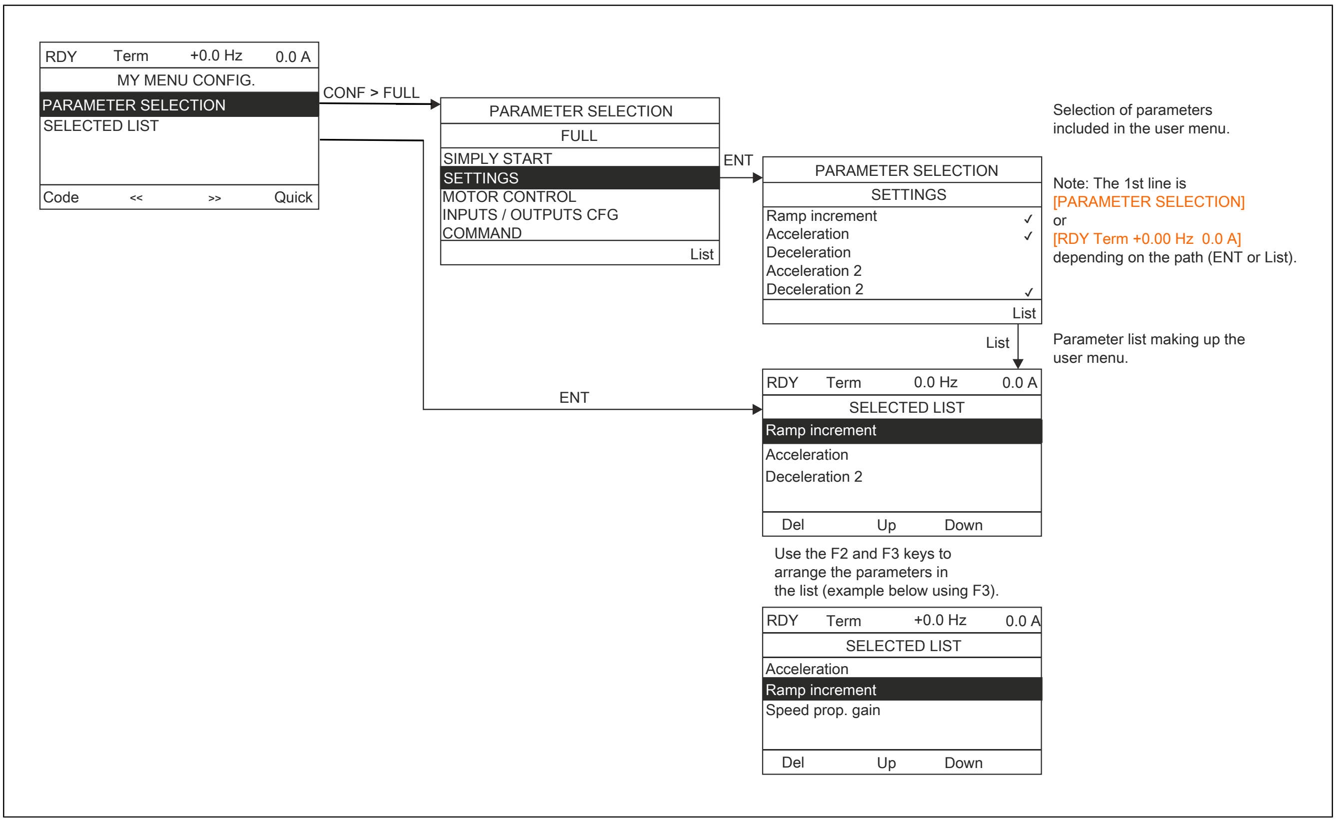


Parameters described in this page can be accessed by:
Graphic display terminal: Main Menu > ITF > dCF- > CUP-

Code	Name / Description	Factory setting
CUP-	**[USER PARAMETERS]**	
GSP	**[Return std name]** (Only handheld) Display standard parameters instead of customized ones.	**[No]**(nO)
nO	**[No]**(nO)	
YES	**[Yes]**(YES)	
MYMN	**[MY MENU]**	
PAn	**[DEVICE NAME]**	
SEr-	**[SERVICE MESSAGE]**	
SML01	**[LINE 1]**	
SML02	**[LINE 2]**	
SML03	**[LINE 3]**	
SML04	**[LINE 4]**	
SML05	**[LINE 5]**	
CFN01	**[CONFIGURATION 0]**	
CFN02	**[CONFIGURATION 1]**	
CFN03	**[CONFIGURATION 2]**	
PSn	**[SERIAL NUMBER]**	

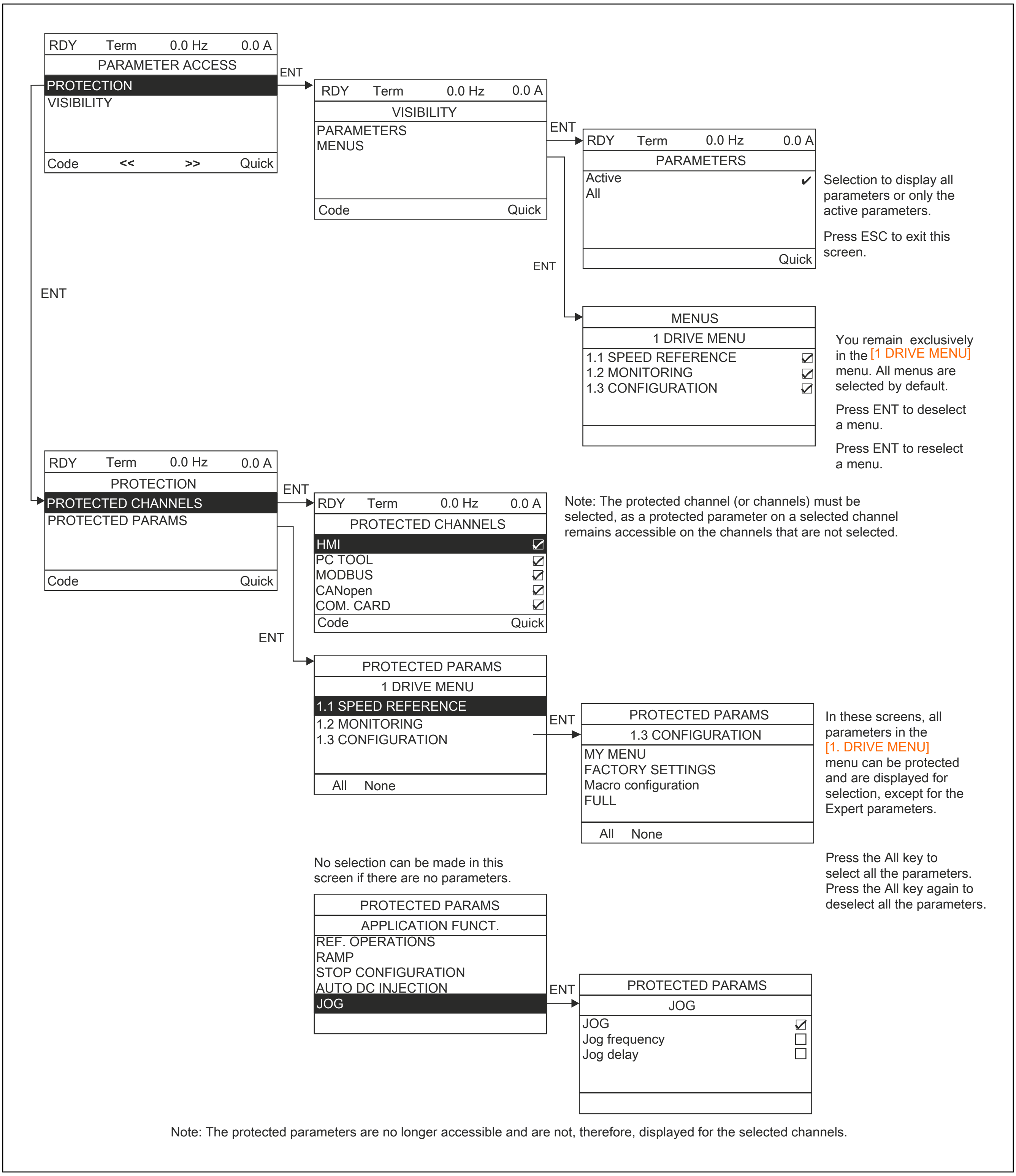
Parameter that can be modified during operation or when stopped.

My Menu config.



Parameters described in this page can be accessed by: Graphic display terminal: Main Menu > ITF > dCF- > MYC-	
Code	**Name / Description**
MYC-	**[MY MENU CONFIG.]**

Parameter access



Parameters described in this page can be accessed by: Graphic display terminal: Main Menu > ITF > dCF- > pAC- > prO-	
Code	**Name / Description**
prO-	[PROTECTION]
pCd-	[PROTECTED CHANNELS]
COn P S Mdb CAn nEt	[HMI](COn): Graphic display terminal or remote display terminal [PC Tool](P S): PC Software [Modbus](Mdb): Integrated Modbus [CANopen](CAn): Integrated CANopen® [Com. card](nEt): POWERLINK communication card
PPA-	[Protected Params](COn): In PPA, the parameters to be protected can be defined. Allieded to the Drive Menu, the parameters can be chosen.

Parameters described in this page can be accessed by: Graphic display terminal: Main Menu > ITF > dCF- > pAC- > VIS-		
Code	**Name / Description**	**Factory setting**
VIS-	[VISIBILITY]	
PVIS	[PARAMETERS] Parameter visibility: only active ones or all parameters.	[Active](ACt)
ACt ALL	[Active](ACt) [All](ALL)	

Parameter that can be modified during operation or when stopped.

Keypad parameters

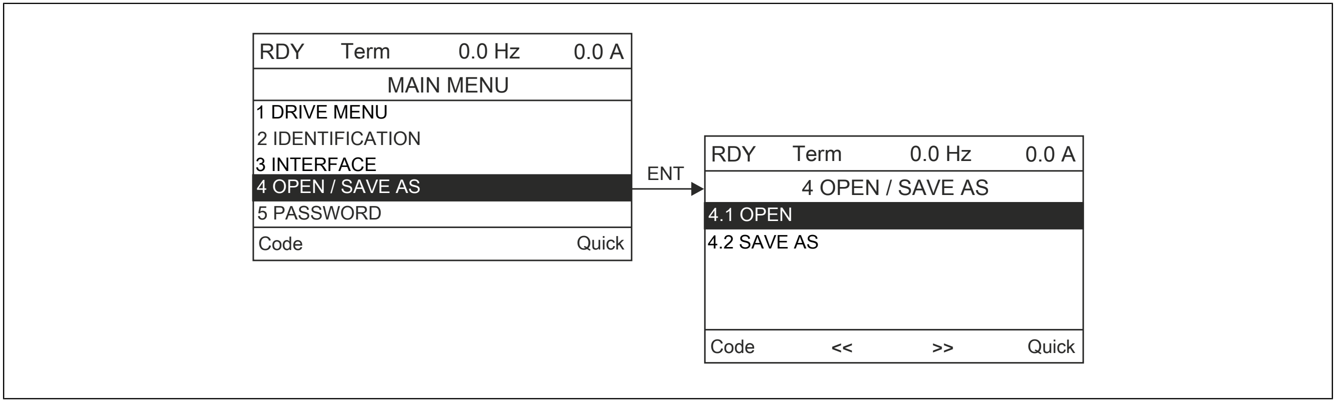
RDY	Term	0.0 Hz	0.0 A
KEYPAD PARAMETERS			
Keypad contrast:			50%
Keypad stand-by:			5 min
Code	<<	>>	Quick

Parameters described in this page can be accessed by: Graphic display terminal: Main Menu > ITF > dCF- > CnL-			
Code	**Name / Description**	**Adjustment range**	**Factory setting**
CnL-	[KEYPAD PARAMETERS]		
CrSt	[Keypad contrast] Contrast of the keypad.	0 to 100%	50%
CSbY	[Keypad stand-by] Graphic keypad standby delay.	[No](nO) ≙ 0 to 10 min	5 min
nO	[No](nO): No		

Parameter that can be modified during operation or when stopped.

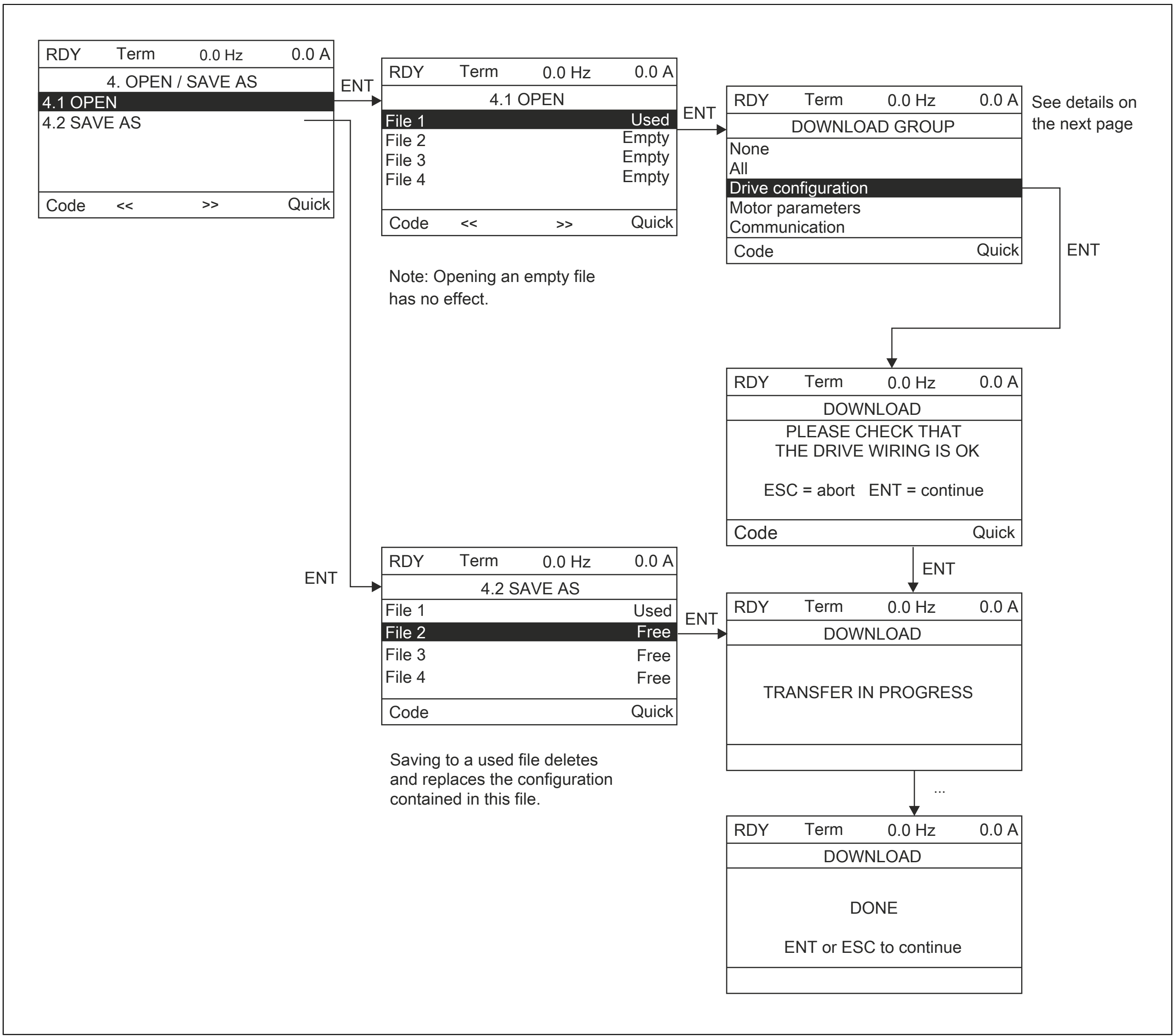
3.2.5 Open / Save as (trA)

This menu can only be accessed with the graphic display terminal.



[4.1 OPEN]: To download one of the four files from the graphic display terminal to the drive.

[4.2 SAVE AS]: To download the current drive configuration to the graphic display terminal.



Various messages may appear when the download is requested:

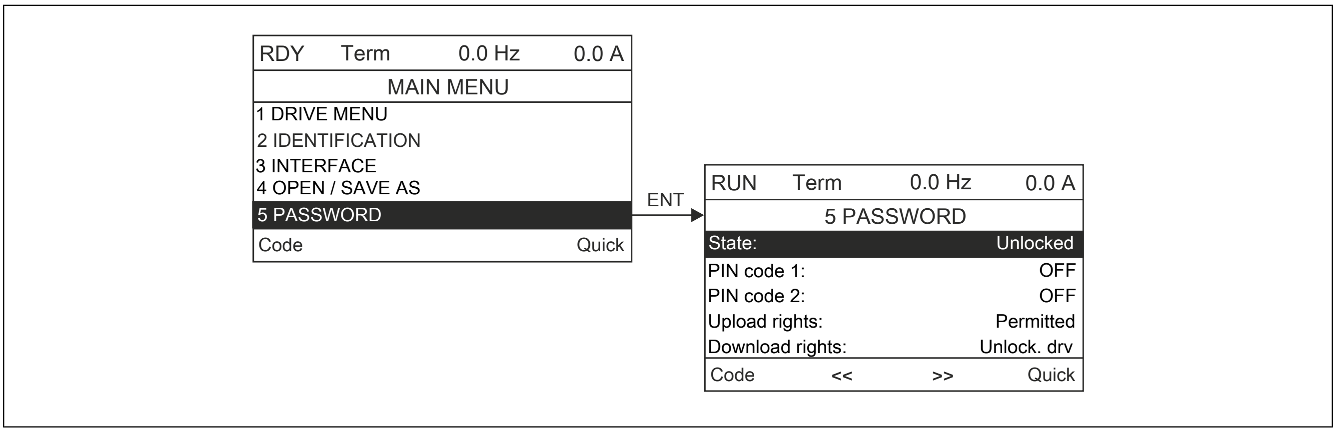
- **[TRANSFER IN PROGRESS]**
- **[DONE]**
- Error messages if download not possible
- **[Motor parameters are NOT COMPATIBLE. Do you want to continue?]**: In this case, the download is possible, but the parameters will be restricted

DOWNLOAD GROUP

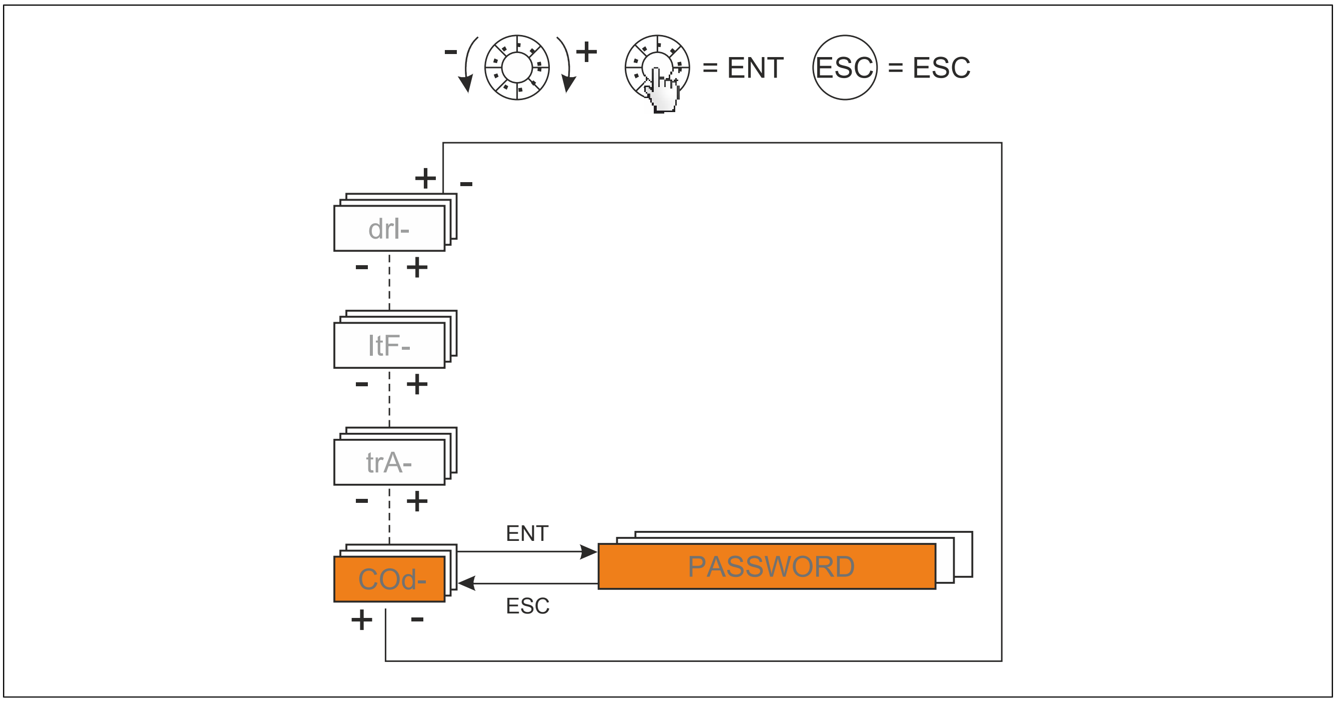
[None]:		No parameters
[All]:		All parameters in all menus
[Drive configuration]:		The entire **[1 DRIVE MENU]** without **[COMMUNICATION]**
[Motor parameters]:	**[Rated motor volt.]**(UnS)	In the **[MOTOR CONTROL]**(drC-) menu
	[Rated motor freq.](FrS)	
	[PSI align curr. max](NCr)	
	[Rated motor speed](nSP)	
	[Motor 1 Cosinus phi](COS)	
	[Rated motor power](nPr)	
	[Motor param choice](MPC)	
	[Tune selection](StUn)	
	[Mot. therm. current](ItH)	
	[IR compensation](UFr)	
	[Slip compensation](SLP)	
	[Cust stator resist.](rSA)	
	[Lfw](LFA)	
	[Cust. rotor t const.](trA)	
	[Nominal I sync.](nCrS)	
	[Nom motor spdsync](nSPS)	
	[Pole pairs](PPnS)	
	[Syn. EMF constant](PHS)	
	[Autotune L d-axis](LdS)	
	[Autotune L q-axis](LqS)	
	[Nominal freq sync.](FrSS)	
	[Cust. stator R syn](rSAS)	
	[Motor torque](tqS)	
	[U1](U1)	
	[F1](F1)	
	[U2](U2)	
	[F2](F2)	
	[U3](U3)	
	[F3](F3)	
	[U4](U4)	
	[F4](F4)	
	[U5](U5)	
	[F5](F5)	
	The motor parameters that can be accessed in **[Expert]**(EPr) mode	
	[Mot. therm. current](ItH)	In the **[SETTINGS]**(SEt-) menu
[Communication]:		All the parameters in the **[COMMUNICATION]** menu

3.2.6 Password (COd)

With graphic display terminal

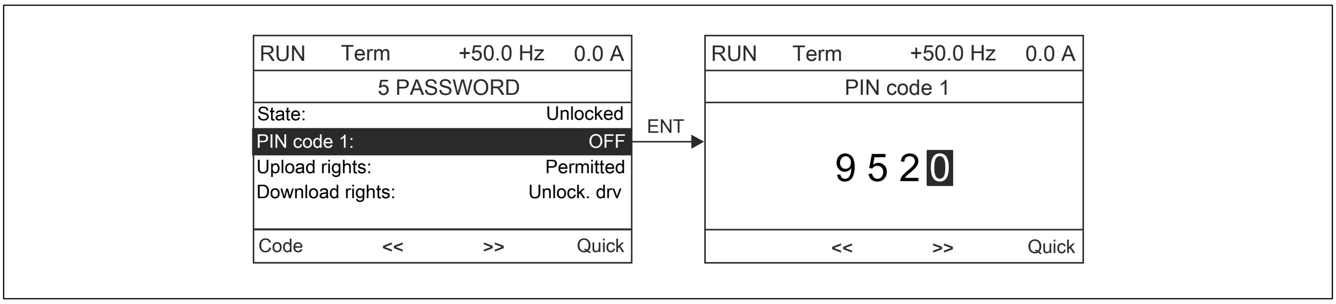


With integrated display terminal



Enables the configuration to be protected with an access code or a password to be entered in order to access a protected configuration.

Example with graphic display terminal:



- The drive is unlocked when the PIN codes are set to **[Unlocked]**(OFF) (no password) or when the correct code has been entered. All menus are visible.
- Before protecting the configuration with an access code, you must:
  - Define the **[Upload rights]**(ULr) and **[Download rights]**(dLr)
  - Make a careful note of the code and keep it in a place where you will be able to find it
- The drive has two access codes, enabling two access levels to be set up:
  - PIN code 1 is a public unlock code: 6969
  - PIN code 2 is an unlock code known only to B&R Product Support. It can only be accessed in **[Expert]**(EPr) mode.
  - Only one PIN1 or PIN2 code can be used, the other must remain set to **[OFF]**(OFF).

Note:

When the unlock code is entered, the user access code appears.

The following items are access-protected:

- Return to factory settings **[FACTORY SETTINGS]**(FCS-) menu
- The channels and parameters protected by the **[MY MENU]**(MYMn-) as well as the menu itself
- The custom display settings (**[3.4 DISPLAY CONFIG.]**(dCF-) menu)

Parameters described in this page can be accessed by:
Graphic display terminal: Main Menu > COd-

Code	Name / Description	Adjustment range	Factory setting
COd-	**[5 PASSWORD]**		
CSt	**[State]** Information parameter, cannot be modified.		**[Unlocked]**(ULC)
LC	**[Locked]**(LC): The drive is locked by a password		
ULC	**[Unlocked]**(ULC): The drive is not locked by a password		
COd	**[PIN code 1]** First access code. The value **[OFF]**(OFF) indicates that no password has been set **[Unlocked]**(ULC). The value **[ON]**(On) indicates that the drive is protected and an access code must be entered in order to unlock it. Once the correct code has been entered, it remains on the display and the drive is unlocked until the next time the power supply is disconnected. PIN code 1 is a public unlock code: 6969.	**[OFF]**(OFF) ≙ 0 to 9999	**[OFF]**(OFF)
COd2	**[PIN code 2]** This parameter can only be accessed in **[Expert]**(EPr) mode. Second access code. The value **[OFF]**(OFF) indicates that no password has been set **[Unlocked]**(ULC). The value **[ON]**(On) indicates that the drive is protected and an access code must be entered in order to unlock it. Once the correct code has been entered, it remains on the display and the drive is unlocked until the next time the power supply is disconnected. PIN code 2 is an unlock code known only to B&R Product Support. When **[PIN code 2]**(COd2) is not set to **[OFF]**(OFF), the **[1.2 MONITORING]**(MOn-) menu is the only one visible. Then if **[PIN code 2]**(COd2) is set to **[OFF]**(OFF) (drive unlocked), all menus are visible. If the display settings are modified in **[3.4 DISPLAY CONFIG.]**(dCF-) menu and if **[PIN code 2]**(COd2) is not set to **[OFF]**(OFF), the visibility configured is kept. Then if **[PIN code 2]**(COd2) is set to OFF (drive unlocked), the visibility configured in **[3.4 DISPLAY CONFIG.]**(dCF-) menu is kept.	**[OFF]**(OFF) ≙ 0 to 9999	**[OFF]**(OFF)
ULr	**[Upload rights]** Reads or copies the current configuration to the drive.		**[Permitted]**(ULr0)
ULr0	**[Permitted]**(ULr0): The current drive configuration can be uploaded to the graphic display terminal or PC Software		
ULr1	**[Not allowed]**(ULr1): The current drive configuration can only be uploaded to the graphic display terminal or PC Software if the drive is not protected by an access code or if the correct code has been entered		
dLr	**[Download rights]** Writes the current configuration to the drive or downloads a configuration to the drive.		**[Unlock. drv]**(dLr1)
dLr0	**[Locked drv]**(dLr0): A configuration file can only be downloaded to the drive if the drive is protected by an access code, which is the same as the access code for the configuration to be downloaded		
dLr1	**[Unlock. drv]**(dLr1): A configuration file can be downloaded to the drive or a configuration in the drive can be modified if the drive is unlocked (access code entered) or is not protected by an access code		
dLr2	**[Not allowed]**(dLr2): Download not authorized		
dLr3	**[Lock/unlock]**(dLr3): Combination of **[Locked drv.]**(dLr0) and **[Unlock. drv]**(dLr1)		

3.3 Maintenance and Diagnostics

Limitation of Warranty

The warranty does not apply if the product has been opened, except by B&R services.

Servicing

Caution!

RISK OF DAMAGE TO THE DRIVE

Adapt the following recommendations according to the environment conditions: temperature, chemical and dust.

Failure to follow these instructions can result in equipment damage.

It is recommended to do the following in order to optimize continuity of operation.

Environment	Part concerned	Action	Periodicity
Impact on the product	Housing - control block (LED - display)	Check the drive visual aspect	At least each year
Corrosion	Terminals - connector - screws - EMC plate	Inspect and clean if required	
Dust	Terminals - fans - blowholes		
Temperature	Around the product	Check and correct if required	
Cooling	Fan	Check the fan operation	
		Replace the fan	After 3 to 5 years, depending on the operating conditions.
Vibration	Terminal connections	Check tightening at recommended torque	At least each year

Note:

The fan operation depends on the drive thermal state. The drive may be running and the fan not.

Spares and repairs

Serviceable product. Please refer to your local B&R branch office.

Long time storage

The product capacitor performances after a long time storage above 2 years can be degraded.

Fan replacement

It is possible to order a new fan for the ACOPOSinverter P74 maintenance, see the commercial references on www.br-automation.com.

Please refer to Installation chapter to replace the fan.

3.3.1 Diagnostics and Troubleshooting

Error code

- If the display does not light up, check the power supply to the drive.
- The assignment of the Fast stop or Freewheel functions will help to prevent the drive starting if the corresponding logic inputs are not powered up. The ACOPOSinverter P74 then displays **[Freewheel]**(nSt) in free spin down and **[Fast stop]**(FSt) in fast stop. This is normal since these functions are active at zero so that the drive will be stopped if there is a wire break.
- Check that the run command input is activated in accordance with the selected control mode (**[2/3 wire control]**(tCC) and **[2 wire type]**(tCt) parameters).
- If an input is assigned to the limit switch function and this input is at zero, the drive can only be started up by sending a command for the opposite direction.
- If the reference channel or command channel is assigned to a communication bus when the power supply is connected, the drive will display **[Freewheel]**(nSt) and remain in stop mode until the communication bus sends a command.

Code	Name / Description
dGt-	**[DIAGNOSTICS]** This menu can only be accessed with the graphic display terminal. It displays detected faults and their cause in plain text and can be used to carry out tests.

Clearing the detected fault

In the event of a non resettable detected fault:

- Disconnect all power, including external control power that may be present.
- Lock all power disconnects in the open position.
- Wait 15 minutes to allow the DC bus capacitors to discharge (the drive LEDs are not indicators of the absence of DC bus voltage).
- Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the voltage is less than 42 VDC.
- If the DC bus capacitors do not discharge completely, contact your local B&R representative. Do not repair or operate the drive.
- Find and correct the detected fault.
- Restore power to the drive to confirm the detected fault has been rectified.

In the event of a resettable detected fault, the drive can be reset after the cause is cleared:

- By switching off the drive until the display disappears completely, then switching on again.
- Automatically in the scenarios described for the **[AUTOMATIC RESTART]**(Atr-) function.
- By means of a logic input or control bit assigned to the **[FAULT RESET]**(rSt-) function.
- By pressing the STOP/RESET key on the graphic display keypad if the active channel command is the HMI (**[Cmd channel 1]**(Cd1)).

Fault detection codes which require a power reset after the detected fault is cleared

The cause of the detected fault must be removed before resetting by turning off and then back on.

ASF, brF, SOF, SPF and tnF detected faults can also be cleared remotely by means of a logic input or control bit (**[Fault reset]**(rSF) parameter).

Detected Fault	Name	Probable cause	Remedy
AnF	[Load slipping]	• The difference between the output frequency and the speed feedback is not correct	• Check the motor, gain and stability parameters • Add a braking resistor • Check the size of the motor/drive/load • Check the setting of parameters
ASF	[Angle Error]	• This occurs during the phase-shift angle measurement, if the motor phase is disconnected or if the motor inductance is too high	• Check the motor phases and the maximum current allowed by the drive
brF	[Brake feedback]	• The brake feedback contact does not match the brake logic control • The brake does not stop the motor quickly enough (detected by measuring the speed on the "Pulse input" input)	• Check the feedback circuit and the brake logic control circuit • Check the mechanical state of the brake • Check the brake linings
CrF1	[Precharge]	• Charging relay control detected fault or charging resistor damaged	• Turn the drive off and then turn on again • Check the internal connections • Contact B&R Product Support
EEF1	[Control Eeprom]	• Internal memory detected fault, control block	• Check the environment (electromagnetic compatibility) • Turn off, reset, return to factory settings • Contact B&R Product Support
EEF2	[Power Eeprom]	• Internal memory detected fault, power card	
FCF1	[Out. contact. stuck]	• The output contactor remains closed although the opening conditions have been met	• Check the contactor and its wiring • Check the feedback circuit
HdF	[IGBT desaturation]	• Short-circuit or grounding at the drive output	• Check the cables connecting the drive to the motor and the motor insulation
ILF	[internal com. link]	• Communication interruption between POWERLINK card and drive	• Check the environment (electromagnetic compatibility) • Check the connections • Replace the option card • Power off/on ACPi (intermediate circuit must be discharged) • Contact B&R Product Support
InF1	[Rating error]	• The power card is different from the card stored	• Check the reference of the power card
InF2	[Incompatible PB]	• The power card is incompatible with the control block	• Check the reference of the power card and its compatibility
InF3	[Internal serial link]	• Communication interruption between the internal cards	• Check the internal connections • Contact B&R Product Support
InF4	[Internal-mftg zone]	• Internal data inconsistent	• Recalibrate the drive (performed by B&R Product Support)
InF6	[Internal-faultoption]	• The POWERLINK card installed in the drive is not recognized	• Check the reference and compatibility of the POWERLINK card • Check that the POWERLINK card is well inserted into the ACOPOSinverter P74
InF9	[Internal-Imeasure]	• The current measurements are incorrect	• Replace the current sensors or the power card • Contact B&R Product Support
InFA	[Internal-mainscircuit]	• The input stage is not operating correctly	• Contact B&R Product Support
InFb	[Internal-th.sensor]	• The drive temperature sensor is not operating correctly	• Replace the drive temperature sensor • Contact B&R Product Support
InFE	[internal-CPU]	• Internal microprocessor detected fault	• Turn off and reset • Contact B&R Product Support
OCF	[Overcurrent]	• Parameters of menus [SETTINGS](SEt-) and [MOTOR CONTROL](drC-) are not correct • Inertia or load too high • Mechanical locking	• Check parameters • Check dimensioning of motor/drive/load • Check the state of the mechanism • Reduce [Overcurrent](CLI) value • Raise clock frequency
SAFF	[Safety fault]	• Debounce time exceeded • SS1 trip threshold exceeded • Wrong configuration • SLS type trip overspeed detected	• Check the safety functions configuration • Check the chapter Safety Functions • Contact B&R Product Support
SCF1	[Motor short circuit]	• Short-circuit or grounding at the drive output	• Check connecting cable between the drive and the motor and check the motor's insulation • Reduce clock frequency • Connect the motor chokes in series • Check over speed control and brake configuration • [Time to restart](ttr) Increase time to restart • Raise clock frequency

Detected Fault	Name	Probable cause	Remedy
SCF3	[Ground short circuit]	• Significant earth leakage current at the drive output if several motors are connected in parallel	• Check connecting cable between the drive and the motor and check the motor's insulation • Reduce clock frequency • Connect the motor chokes in series • Check over speed control and brake configuration • [Time to restart](ttr) Increase time to restart • Reduce clock frequency
SOF	[Overspeed]	• Instability or driving load too high	• Check the motor, gain and stability parameters • Add a braking resistor • Check the size of the motor/drive/load • Check the parameters settings for the [FREQUENCY METER](FqF-) function if it is configured
SPF	[Speed fdbackloss]	• Signal on "Pulse input" missing, if the input is used for speed measurement	• Check the wiring of the input cable and the detector used
tnF	[Auto tuning]	• Special motor or motor whose power is not suitable for the drive • Motor not connected to the drive • Motor not stopped	• Check that the motor/drive are compatible • Check that the motor is present during auto-tuning • If using an output contactor, make sure it is closed during the measuring • Check that the motor is stopped during auto-tuning

Fault detection codes that can be acknowledged with the automatic restart function after the cause has disappeared

These detected faults can also be cleared by turning on and off or by means of a logic input or control bit ([Fault reset](rSF) parameter).

Detected Fault	Name	Probable cause	Remedy
bLF	[Brake control]	• Brake release current not reached • Brake engage frequency threshold [Brake engage freq](bEn) only regulated when brake logic control is assigned	• Check the drive/motor connection • Check the motor windings • Check the [Brake release I FW](Ibr) and [Brake release I Rev](Ird) settings • Apply the recommended settings for [Brake engage freq](bEn)
CnF1)	[Com. network]	• Communication interruption due to Restart of PLC • Communication interruption on POWERLINK network • Communication interruption on communication card	• Check if PLC was restarted • Check if POWERLINK network was interrupted • Check the environment (electromagnetic compatibility) • Check the wiring • Check the time-out • Replace the option card • Contact B&R Product Support
COF	[CANopen com.]	• Communication interruption on the CANopen® bus	• Check the communication bus • Check the time-out • Refer to the CANopen® user's manual
EPF1	[External flt-LI/Bit]	• Event triggered by an external device, depending on user	• Check the device which caused the trip and reset
EPF2	[External fault com.]	• Event triggered by a communication network	• Check for the cause of the trip and reset
FbES	[FB stop flt.]	• Function blocks have been stopped while motor was running	• Check [Stop FB Stop motor](FbSM) configuration
FCF2	[Out. contact. open.]	• The output contactor remains open although the closing conditions have been met	• Check the contactor and its wiring • Check the feedback circuit
LCF	[input contactor]	• The drive is not turned on even though [Mains V. time out](LCt) has elapsed	• Check the contactor and its wiring • Check the time-out • Check the line/contactor/drive connection
LFF3	[AI3 4-20mA loss]	• Loss of the 4 to 20 mA reference on analog input AI3.	• Check the connection on the analog inputs
ObF	[Overbraking]	• Breaking too strong • Driving load or line voltage too high	• Increase the deceleration time • Install a braking resistor if necessary • Activate the [Dec ramp adapt.](brA) function if it is compatible with the application • Check the line voltage • Parameter DCF to small. DCF = 0: Value 0 corresponds to a minimum ramp time
OCF	[Overcurrent]	• Parameters in the [SETTINGS](SEt-) and [MOTOR CONTROL](drC-) menus are not correct • Inertia or load too high • Mechanical locking	• Check the parameters • Check the size of the motor/drive/load • Check the state of the mechanism • Decrease [Current limitation](CLI) • Increase the switching frequency

Detected Fault	Name	Probable cause	Remedy
OHF	[Drive overheat]	• Drive temperature too high	• Check the motor load, the drive ventilation and the ambient temperature. Wait for the drive to cool down before restarting
OLL	[Proc. overload flt]	• Process overload	• Check and remove the cause of the overload • Check the parameters of the [PROCESS OVERLOAD](OLd-) function
OLF	[Motor overload]	• Triggered by excessive motor current	• Check the setting of the motor thermal protection, check the motor load. Wait for the motor to cool down before restarting
OPF1	[1 output phase loss]	• Loss of 1-phase at drive output	• Check the connections from the drive to the motor
OPF2	[3 motor phase loss]	• Motor not connected or motor power too low • Output contactor open • Instantaneous instability in the motor current	• Check the connections from the drive to the motor • If an output contactor is being used, set [Output Phase Loss](OPL) to [Output cut](OAC) • Test on a low power motor or without a motor: In factory settings mode, motor phase loss detection is active [Output Phase Loss](OPL) = [Yes](YES). To check the drive in a test or maintenance environment, without having to use a motor with the same rating as the drive (in particular for high power drives), deactivate motor phase loss detection [Output Phase Loss](OPL) = [No](nO) • Check and optimize the following parameters: [IR compensation](UFr), [Rated motor volt.](UnS) and [Rated mot. current](nCr) and perform [Auto tuning](tUn)
OSF	[Mains overvoltage]	• Line voltage too high • Disturbed mains supply	• Check the line voltage
OtFL	[LI6=PTC overheat]	• Overheating of PTC probes detected on input LI6	• Check the motor load and motor size • Check the motor ventilation • Wait for the motor to cool down before restarting • Check the type and state of the PTC probes
PtFL	[LI6=PTC probe]	• PTC probe on input LI6 open or short-circuited	• Check the PTC probe and the wiring between it and the motor/drive
SCF1	[Motor short circuit]	• Short-circuit or grounding at the drive output	• Check the cables connecting the drive to the motor and the motor insulation • Reduce the switching frequency • Connect chokes in series with the motor • Check the adjustment of speed loop and brake • Increase the [Time to restart](ttr) • Increase the switching frequency
SCF3	[Ground shortcircuit]	• Significant earth leakage current at the drive output if several motors are connected in parallel	• Check the cables connecting the drive to the motor and the motor insulation • Reduce the switching frequency • Connect chokes in series with the motor • Check the adjustment of speed loop and brake • Increase the [Time to restart](ttr) • Reduce the switching frequency
SCF4	[IGBT short circuit]	• Power component detected fault	• Contact B&R Product Support
SCF5	[Motor short circuit]	• Short-circuit at drive output	• Check the cables connecting the drive to the motor and the motor's insulation • Contact B&R Product Support
SLF1	[Modbus com.]	• Communication interruption on the Modbus bus	• Check the communication bus • Check the time-out
SLF2	[PC com.]	• Communication interruption with PC Software	• Check the PC Software connecting cable • Check the time-out
SLF3	[HMI com.]	• Communication interruption with the graphic display terminal or remote display terminal	• Check the terminal connection • Check the time-out

Detected Fault	Name	Probable cause	Remedy
SSF	[Torque/current lim]	• Switch to torque or current limitation	• Check if there are any mechanical problems • Check the parameters of [TORQUE LIMITATION](tOL-) and the parameters of the [TORQUE OR I LIM. DETECT.](tId-)
tJF	[IGBT overheat]	• Drive overheated	• Check the size of the load/motor/drive • Reduce the switching frequency • Wait for the motor to cool before restarting
tnF	[Auto-tuning]	• Special motor or motor whose power is not suitable for the drive • Motor not connected to the drive • Motor not stopped	• Check that the motor/drive are compatible • Check that the motor is present during auto-tuning • If an output contactor is being used, close it during auto-tuning • Check that the motor is stopped during tune operation
ULF	[Proc. underload Flt]	• Process underload	• Check and remove the cause of the underload • Check the parameters of the [PROCESS UNDERLOAD](ULd-) function

1) Occurs with each restart of the control.

Fault detection codes that are cleared as soon as their cause disappears

Detected Fault	Name	Probable cause	Remedy
CFF	[Incorrect config.]	• POWERLINK card changed or removed • Option card replaced by an option card configured on a drive with a different rating • The current configuration is inconsistent	• Check that there are no card errors • In the event of the option card (POWERLINK) being changed deliberately, see the remarks below • Return to factory settings or retrieve the backup configuration, if it is valid
CFI CFI2	[Invalid config.]	• Invalid configuration. The configuration loaded in the drive via the bus or communication network is inconsistent	• Check the configuration loaded previously • Load a compatible configuration
CSF	[Ch. Sw. fault]	• Switch to not valid channels	• Check the function parameters
dLF	[Dynamic load fault]	• Abnormal load variation	• Check that the load is not blocked by an obstacle • Removal of a run command causes a reset
FbE	[FB fault]	• Function blocks error	• See [FB Fault](FbFt) for more details
HCF	[Cards pairing]	• The [CARDS PAIRING](PPI-) function has been configured and a drive card has been changed	• In the event of a card error, reinsert the original card • Confirm the configuration by entering the [Pairing password](PPI) if the card was changed deliberately
PHF	[Input phase loss]	• Drive incorrectly supplied or a fuse blown • 1-phase missing • 3-phase ACOPOSinverter P74 used on a 1-phase line supply • Unbalanced load. This protection only operates with the drive on load	• Check the power connection and the fuses. • Use a 3-phase line supply. • Disable the detected fault by [Input phase loss](IPL) = [No](nO).
USF	[Undervoltage]	• Line supply too low • Transient voltage dip	• Check the voltage and the parameters of [UNDERVOLTAGE MGT](USb-)

Option card changed or removed

When an option card is removed or replaced by another, the drive locks in [Incorrect config.](CFF) fault mode on power-up. If the card has been deliberately changed or removed, the detected fault can be cleared by pressing the ENT key twice, which causes the factory settings to be restored for the parameter groups affected by the card. These are as follows:

Card replaced by a card of the same type

- Communication cards: only the parameters that are specific to communication cards

Control block changed

When a control block is replaced by a control block configured on a drive with a different rating, the drive locks in [Incorrect config.](CFF) fault mode on power-up. If the control block has been deliberately changed, the detected fault can be cleared by pressing the ENT key twice, which **causes all the factory settings to be restored.**

Fault detection codes displayed on the remote display terminal

Code	Name	Description
InIt	[Initialization in progress]	The microcontroller is initializing. Search underway for communication configuration.
COM.E (1)	[Communication error]	Time-out detected fault (50 ms). This message is displayed after 20 attempts at communication.
A-17 (1)	[Alarm button]	A key has been held down for more than 10 s. The keypad is disconnected. The keypad wakes up when a key is pressed.
CLr (1)	[Confirmation of detected fault reset]	This is displayed when the STOP key is pressed once if the active command channel is the remote display terminal.
dEU.E (1)	[Drive disparity]	The drive brand does not match that of the remote display terminal.
rOM.E (1)	[ROM anomaly]	The remote display terminal detects a ROM anomaly on the basis of checksum calculation.
rAM.E (1)	[RAM anomaly]	The remote display terminal detects a RAM anomaly.
CPU.E (1)	[Other detected faults]	Other detected faults.

(1) Flashing

4 Safety Functions

Product Related Information

The information provided in this manual supplements the product manuals.

Carefully read the product manuals before using the product.

Read and understand these instructions before performing any procedure with this drive.

Danger!

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- **Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation and who have received safety training to recognize and avoid hazards involved are authorized to work on and with this drive system. Installation, adjustment, repair and maintenance must be performed by qualified personnel.**
- **The system integrator is responsible for compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.**
- **Many components of the product, including the printed circuit boards, operate with mains voltage. Do not touch. Use only electrically insulated tools.**
- **Do not touch unshielded components or terminals with voltage present.**
- **Motors can generate voltage when the shaft is rotated. Before performing any type of work on the drive system, block the motor shaft to prevent rotation.**
- **AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors of the motor cable.**
- **Do not short across the DC bus terminals or the DC bus capacitors or the braking resistor terminals.**
- **Before performing work on the drive system:**
    - **Disconnect all power, including external control power that may be present.**
    - **Place a "Do Not Turn On" label on all power switches.**
    - **Lock all power switches in the open position.**
    - **Wait 15 minutes to allow the DC bus capacitors to discharge. The DC bus LED is not an indicator of the absence of DC bus voltage that can exceed 800 VDC.**
    - **Measure the voltage on the DC bus between the DC bus terminals using a properly rated voltmeter to verify that the voltage is <42 VDC.**
    - **If the DC bus capacitors do not discharge properly, contact your local B&R representative.**
- **Install and close all covers before applying voltage.**

Failure to follow these instructions will result in death or serious injury.

Danger!

UNINTENDED EQUIPMENT OPERATION

- **Read and understand this manual before installing or operating the drive.**
- **Any changes made to the parameter settings must be performed by qualified personnel.**

Failure to follow these instructions will result in death or serious injury.

Warning!

DAMAGED DRIVE EQUIPMENT

Do not operate or install any drive or drive accessory that appears damaged.

Failure to follow these instructions can result in death, serious injury or equipment damage.

Warning!

LOSS OF CONTROL

- **The designer of any control scheme must consider the potential failure modes of control paths and, for critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop, overtravel stop, power outage and restart.**
- **Separate or redundant control paths must be provided for critical control functions. System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.**
- **Observe all accident prevention regulations and local safety guidelines.** [1)]
- **Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service.**

Failure to follow these instructions can result in death, serious injury or equipment damage.

Caution!

INCOMPATIBLE LINE VOLTAGE

Before turning on and configuring the drive, ensure that the line voltage is compatible with the supply voltage range shown on the drive nameplate. The drive may be damaged if the line voltage is not compatible.

Failure to follow these instructions can result in injury or equipment damage.

Qualification of personnel

Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation are authorized to work on and with this product. In addition, these persons must have received safety training to recognize and avoid hazards involved. These persons must have sufficient technical training, knowledge and experience and be able to foresee and detect potential hazards that may be caused by using the product, by changing the settings and by the mechanical, electrical and electronic equipment of the entire system in which the product is used.

All persons working on and with the product must be fully familiar with all applicable standards, directives and accident prevention regulations when performing such work.

Intended use

The functions described in this manual are only intended for use with the basic product; you must read and understand the appropriate product manual. The product may only be used in compliance with all applicable safety regulations and directives, the specified requirements and the technical data. Prior to using the product, you must perform a risk assessment in view of the planned application. Based on the results, the appropriate safety measures must be implemented. Since the product is used as a component in an entire system, you must ensure the safety of persons by means of the design of this entire system (for example, machine design).

Operate the product only with the specified cables and accessories. Use only genuine accessories and spare parts. Any use other than the use explicitly permitted is prohibited and can result in hazards. Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. The product must NEVER be operated in explosive atmospheres (hazardous locations, Ex areas).

1) For USA: Additional information, refer to NEMA ICS 1.1 (latest edition), “Safety guidelines for the application, installation, and maintenance of solid-State control” and to NEMA ICS 7.1 (latest edition),“Safety standards for construction and guide for selection, installation, and operation of adjustable speed drive systems.”

4.1 Generalities

4.1.1 Introduction

Overview

The safety functions incorporated in ACOPOSinverter P74 are intended to maintain the safe condition of the installation or prevent hazardous conditions arising at the installation. In some cases, further safety-related systems external to the drive (for example a mechanical brake) may be necessary to maintain the safe condition when electrical power is removed.

The safety functions are configured with ACPi Parameter Tool.

Integrated safety functions provide the following benefits:

- Additional standards-compliant safety functions
- No need for external safety-related devices
- Reduced wiring effort and space requirements
- Reduced costs

The ACOPOSinverter P74 drives are compliant with the requirements of the standards in terms of implementation of safety functions.

Safety Functions as Defined by IEC 61800-5-2

Definitions

Acronym	Description
STO	**Safe Torque Off** No power that could cause torque or force is supplied to the motor
SLS	**Safely-Limited Speed** The SLS function prevents the motor from exceeding the specified speed limit. If the motor speed exceeds the specified speed limit value, safety function STO is triggered.
SS1	**Safe Stop 1** • Initiates and monitors the motor deceleration rate within set limits to stop the motor • Initiates the Safe Operating Stop function when the motor speed is below the specified limit

Connection examples

Note:

You can find connection examples of the ACOPOSinverter P74 and Safety modules in the "Integrated Safety Technology User's manual" - MASAFETY:

- **Connection examples**

Warning!

It is strictly forbidden to connect/wire the STO from different drives in parallel.

Configuration N°1:

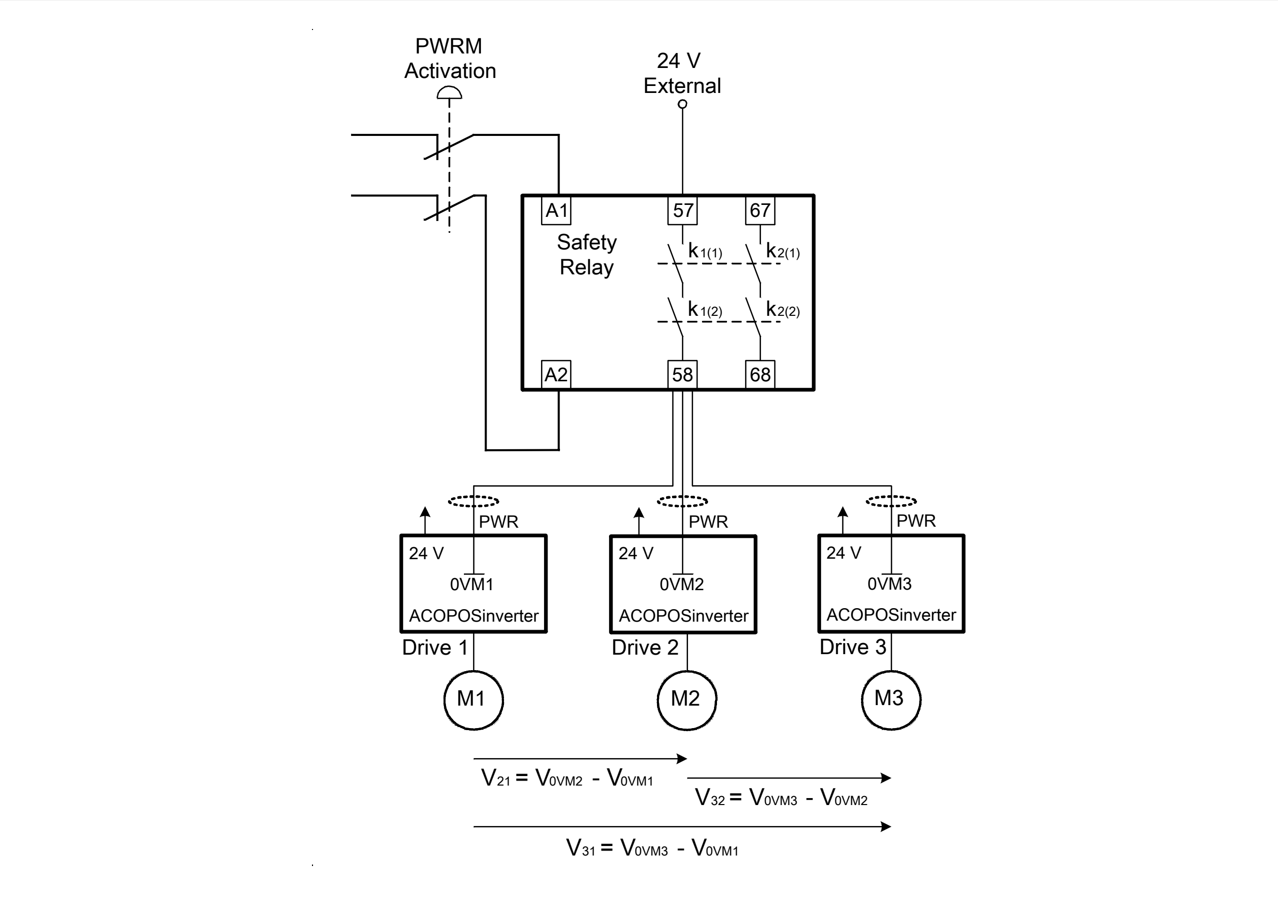
Only one double safety contact used for activation of several drives' Power Removal safety functions, with a common external 24 V supply.

Purpose: Following this configuration N°1, when activation of the PWRM safety function is carried out, objective is to remove power from the motors M1,M2 and M3 with the same double contact included in the safety relay.

Recording: Some voltage could appear between 0 VMx used in reference for each safety functions of drives: $V_{32} \neq 0$ V, $V_{31} \neq 0$ V, $V_{21} \neq 0$ V. These voltage values could appear because of Electromagnetic phenomena or system network management in order to maintain the safety function inactive instead of active.

Outcome: Failure of the safety function would result in a dangerous fault, undetected by the internal diagnostic function of Drive1, Drive2 or Drive3. This cabling diagram is not allowed when used for the PWRM safety function.

Remark: This cabling diagram is not allowed even if internal 24 V from drives are used to supply the safety function through the double contact k1 from the safety relay.



4.1.2 Standards and Terminology

Overview

The technical terms, terminology and the corresponding descriptions in this manual normally use the terms or definitions in the relevant standards.

In the area of drive systems this includes, but is not limited to, terms such as **safety function, safe state, fault, fault reset, failure, error, error message, warning, warning message** and so on.

Among others, these standards include:

- IEC 61800 series: Adjustable speed electrical power drive systems
- IEC 61508 Ed.2 series: Functional safety of electrical/electronic/programmable electronic safety-related systems
- EN 954-1 Safety of machinery - Safety related parts of control systems
- EN ISO 13849-1 & 2 Safety of machinery - Safety related parts of control systems
- IEC 61158 series: Industrial communication networks - Fieldbus specifications
- IEC 61784 series: Industrial communication networks - Profiles
- IEC 60204-1: Safety of machinery - Electrical equipment of machines – Part 1: General requirements

EC Declaration of Conformity

The EC Declaration of Conformity for the EMC Directive can be obtained on www.br-automation.com.

Functional Safety Certification

The integrated safety functions are compatible and certified according to IEC 61800-5-2 Ed.1 Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional.

IEC 61800-5-2, as a product standard, sets out safety-related considerations of Power Drive System Safety Related PDS (SR)s in terms of the framework of the IEC 61508 Ed.2 series of standards.

Compliance with the IEC 61800-5-2 standard, for the safety functions described below, will facilitate incorporation of a PDS (SR) (Power Drive System suitable for use in safety-related applications) into a safety-related control system using the principles of IEC 61508 or ISO 13849, as well as IEC 62061 for process systems and machinery.

The defined safety functions are:

- SIL2 and SIL3 capability in compliance with IEC 61800-5-2 and the IEC 61508 Ed.2 series
- Performance Level d and e in compliance with ISO 13849-1
- Compliant with Category 3 and 4 of European standard ISO 13849-1 (EN 954-1)

Also refer to safety function capability.

The safety demand operating mode is considered to be high demand or continuous mode of operation according to the IEC 61800-5-2 standard.

The functional safety certificate is accessible on www.br-automation.com.

Functional safety data and specifications

Specifications are calculated based on a proof test interval of maximum 20 years. Since a proof test cannot be carried out for B&R drive systems, the proof test interval is the same as the system's mission time.

4.1.3 Basics

Functional Safety

Automation and safety engineering are two areas that were completely separate in the past but have recently become more and more integrated.

The engineering and installation of complex automation solutions are greatly simplified by integrated safety functions.

Usually, the safety engineering requirements depend on the application.

The level of requirements results from the risk and the hazard potential arising from the specific application.

IEC 61508 Standard

The standard IEC 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems covers the safety-related function.

Instead of a single component, an entire function chain (for example, from a sensor through the logical processing units to the actuator) is considered as a unit.

This function chain must meet the requirements of the specific safety integrity level as a whole.

Systems and components that can be used in various applications for safety tasks with comparable risk levels can be developed on this basis.

SIL - Safety Integrity Level

The standard IEC 61508 defines four safety integrity levels (SIL) for safety functions.

SIL1 is the lowest level and SIL4 is the highest level.

A hazard and risk analysis serves as a basis for determining the required safety integrity level.

This is used to decide whether the relevant function chain is to be considered as a safety function and which hazard potential it must cover.

PFH - Probability of a Dangerous Hardware Failure Per Hour

To maintain the safety function, the IEC 61508 standard requires various levels of measures for avoiding and controlling detected faults, depending on the required SIL.

All components of a safety function must be subjected to a probability assessment to evaluate the effectiveness of the measures implemented for controlling detected faults.

This assessment determined the PFH (Probability of a dangerous Failure per Hour) for a safety system.

This is the probability per hour that a safety system fails in a hazardous manner and the safety function cannot be correctly executed.

Depending on the SIL, the PFH must not exceed certain values for the entire safety system.

The individual PFH values of a function chain are added. The result must not exceed the maximum value specified in the standard.

Performance level	Probability of a dangerous failure per hour (PFH) at high demand or continuous demand
4	$\geq 10^{-9}$ to $<10^{-8}$
3	$\geq 10^{-8}$ to $<10^{-7}$
2	$\geq 10^{-7}$ to $<10^{-6}$
1	$\geq 10^{-6}$ to $<10^{-5}$

PL - Performance Level

The standard IEC 13849-1 defines five performance levels (PL) for safety functions.

a is the lowest level and e is the highest level.

Five levels (a, b, c, d and e) correspond to different values of average probability of dangerous failure per hour.

Performance level	Probability of a dangerous hardware failure per hour
e	$\geq 10^{-8}$ to $<10^{-7}$
d	$\geq 10^{-7}$ to $<10^{-6}$
c	$\geq 10^{-6}$ to $<3x\ 10^{-6}$
b	$\geq 3x\ 10^{-6}$ to $<10^{-5}$
a	$\geq 10^{-5}$ to $<10^{-4}$

HFT - Hardware Fault Tolerance and SFF - Safe Failure Fraction

Depending on the SIL for the safety system, the IEC 61508 standard requires a specific hardware fault tolerance HFT in connection with a specific proportion of safe failures SFF (Safe Failure Fraction).

The hardware fault tolerance is the ability of a system to execute the required safety function in spite of the presence of one or more hardware faults.

The SFF of a system is defined as the ratio of the rate of safe failures to the total failure rate of the system.

According to IEC 61508, the maximum achievable SIL of a system is partly determined by the hardware fault tolerance HFT and the safe failure fraction SFF of the system.

IEC 61508 distinguishes two types of subsystem (type A subsystem, type B subsystem).

These types are specified on the basis of criteria which the standard defines for the safety-relevant components.

SFF	HFT type A subsystem			HFT type B subsystem		
	0	1	2	0	1	2
<60%	SIL1	SIL2	SIL3	-	SIL1	SIL2
60% to <90%	SIL2	SIL3	SIL4	SIL1	SIL2	SIL3
60% to <99%	SIL3	SIL4	SIL4	SIL2	SIL3	SIL4
≥60%	SIL3	SIL4	SIL4	SIL3	SIL4	SIL4

PFD - Probability of Failure on Demand

The standard IEC 61508 defines SIL using requirements grouped into two broad categories: hardware safety integrity and systematic safety integrity. A device or system must meet the requirements for both categories to achieve a given SIL.

The SIL requirements for hardware safety integrity are based on a probabilistic analysis of the device. To achieve a given SIL, the device must meet targets for the maximum probability of dangerous failure and a minimum Safe Failure Fraction. The concept of "dangerous failure" must be rigorously defined for the system in question, normally in the form of requirement constraints whose integrity is verified throughout system development. The actual targets required vary depending on the likelihood of a demand, the complexity of the device(s) and types of redundancy used.

The PFD (Probability of Failure on Demand) and RRF (Risk Reduction Factor) of low demand operation for different SILs are defined in IEC 61508 are as follows:

SIL	PFD	PFD (power)	RRF
1	0.1 to 0.01	10^{-1} to 10^{-2}	10 to 100
2	0.01 to 0.001	10^{-2} to 10^{-3}	100 to 1000
3	0.001 to 0.0001	10^{-3} to 10^{-4}	1000 to 10.000
4	0.0001 to 0.00001	10^{-4} to 10^{-5}	10.000 to 100.000

In continuous operation, these changes to the following:

SIL	PFD	PFD (power)	RRF
1	0.00001 to 0.000001	10^{-5} to 10^{-6}	100.000 to 1.000.000
2	0.000001 to 0.0000001	10^{-6} to 10^{-7}	1.000.000 to 10.000.000
3	0.0000001 to 0.00000001	10^{-7} to 10^{-8}	10.000.000 to 100.000.000
4	0.00000001 to 0.000000001	10^{-8} to 10^{-9}	100.000.000 to 1.000.000.000

The hazards of a control system must be identified then analyzed in a risk analysis. These risks are gradually mitigated until their overall contribution to the hazard is deemed to be acceptable. The tolerable level of these risks is specified as a safety requirement in the form of a target probability of a dangerous failure over a given period, stated as a discrete SIL level.

Fault Avoidance Measures

Systematic errors in the specifications, in the hardware and the software, usage faults and maintenance faults in the safety system must be avoided to the maximum degree possible. To meet these requirements, IEC 61508 specifies a number of measures for fault avoidance that must be implemented depending on the required SIL. These measures for fault avoidance must cover the entire life cycle of the safety system, i.e. from design to de-commissioning of the system.

4.2 Calculation of Safety Related Parameters

4.2.1 Overview

This function is used to limit the speed of a motor.

There are 6 types of SLS function:

- SLS type 1: Limits the motor speed to the actual motor speed.
- SLS type 2: Limits the motor speed to a value set using a parameter.
- SLS type 3: Same as type 2 with specific behavior if the motor speed is above threshold value set using a parameter.
- SLS type 4: Limits the motor speed to a value set using a parameter. The direction of rotation can be changed while the safety function is active.
- SLS type 5: Same as type 4 with the specific behavior if the motor speed is above threshold value set using a parameter.
- SLS type 6: Same as type 4 with specific behavior if the motor speed is above threshold value set using a parameter.

Note:

SLS types 2 and 3 use (SLwt)[SLS Wait time] parameter to allow the motor to run under the [standstill level]SSSL for a given time after the safety function SLS has been activated. The safety function SLS is configured with the commissioning software.

The status of the safety function SLS can be displayed using the HMI of the drive or using the commissioning software.

4.2.2 SLS Type 1

Collect Application Data

Before starting to configure the SLS function, you must collect the following data:

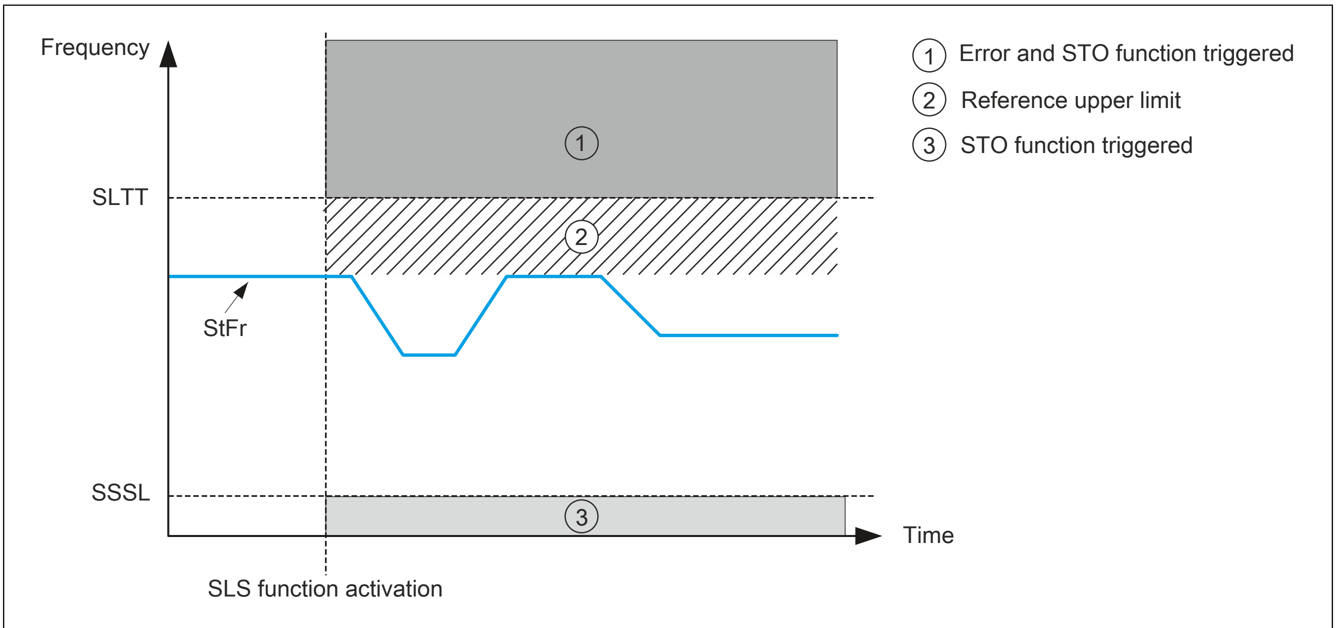
Code	Description	Unit	Comment
FrS	[Rated motor freq.]	Hz	See motor nameplate
nSp	[Rated motorspeed]	rpm	See motor nameplate
ppn	Motor pole pair number	-	See motor nameplate
Max. Frequency	Maximum motor frequency for normal operation	Hz	This value is equal to [High speed]HSP or lower

Calculate the rated motor slip frequency Fslip (Hz):

$$Fslip = FrS - \frac{Nsp \times ppn}{60}$$

To Configure the Function of Type 1

Overview of diagram



When the safety function is activated:

- If the [Stator Frequency](StFr) is above the [SLS tolerance threshold](SLtt), the safety function STO is triggered and an error is triggered with the error code [Safety function fault](SAFF).
- If the [Stator Frequency](StFr) is under the [SLS tolerance threshold](SLtt), the stator frequency is limited to the actual stator frequency. The reference frequency will only vary between this value and the standstill level SSSL.

While the function is activated:

- If the [Stator Frequency](StFr) decreases and reaches the [Standstill level](SSSL) frequency, the safety function STO is triggered.
- If the [Stator Frequency](StFr) increases and reaches [SLS tolerance threshold](SLtt), the safety function STO is triggered and an error is triggered with the error code [Safety function fault](SAFF).

Standstill Level

The recommended standstill level is: SSSL = Fslip

If the application requires a different standstill level, it can be set accordingly with the SSSL parameter.

Motor Frequency Limit Threshold

The recommended value of the parameter is SLtt = 1.2 x Max Frequency + Fslip

Testing and Adjusting the Configuration

When configuration is complete, test the SLS function to verify it behaves as expected.

If an error is triggered with the error code **[Safety function fault]**SAFF apply the following troubleshooting rules.

Context	Drive Status	Adjustment
SLS activated and motor running at the fixed setpoint frequency	• SAFF error code • SFFE.7 = 1	Motor frequency has reached the motor frequency limit threshold. The cause of the detected error can be due to frequency instability. Investigate and correct the cause. The value of SLtt can be modified to increase the tolerance threshold to the instability of the drive system.

Example

Code	Description	Unit
FrS	**[Rated motor freq.]**	50 Hz
nSp	**[Rated motorspeed]**	1350 rpm
ppn	Motor pole pair number	2
Max Frequency	Maximum motor frequency on normal operation. This value is generally equal to **[High speed]**HSP or lower	50 Hz

With these numerical values the configuration of SLS type 1 is:

$$Fslip = 50 - \frac{1350 \times 2}{60} = 5\ Hz$$

SSSL = Fslip = 5 Hz

SLtt = 1.2 x Max Frequency + Fslip = 1.2 x 50 + 5 = 65 Hz

4.2.3 SLS Type 2, Type 3, Type 4, Type 5 and Type 6

Collect Application Data

Before starting to configure the SLS function, you must collect the following data:

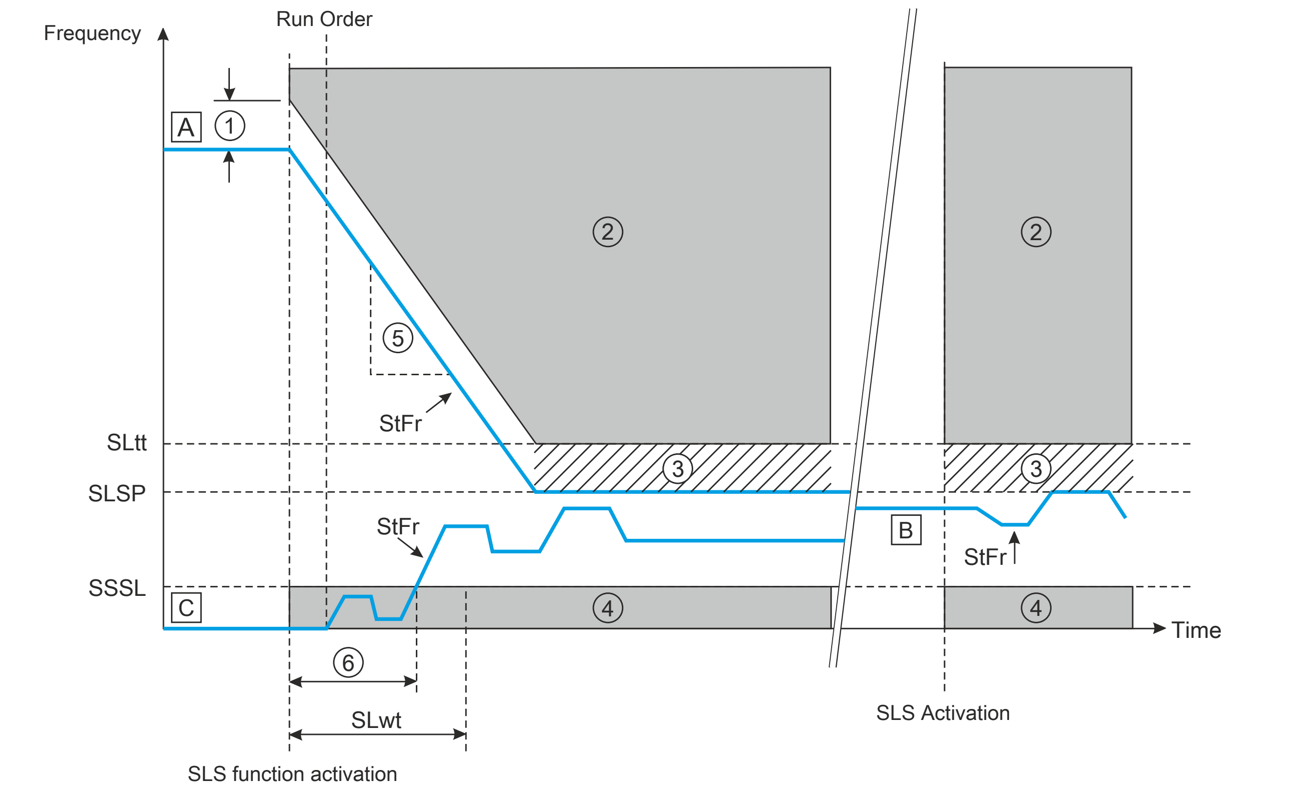
Code	Description	Unit	Comment
FrS	**[Rated motor freq.]**	Hz	See motor nameplate
nSp	**[Rated motor speed]**	rpm	See motor nameplate
ppn	Motor pole pair number	-	See motor nameplate
Max Frequency	Maximum motor frequency on normal operation	Hz	This value is equal to **[High speed]**HSP or lower
SS1 deceleration ramp	Deceleration ramp to apply when SS1 ramp is triggered	Hz	-

Calculate the rated motor slip frequency Fslip (Hz).

$$Fslip = FrS - \frac{Nsp \times ppn}{60}$$

To Configure the Function of Type 2

Overview of diagram



1 SS1 trip threshold
2 Error and STO function triggered
3 Reference upper limit
4 STO function triggeredt
5 SS1 deceleration ramp (dV/dT)
6 Time taken for the [Stator Frequency] (StFr) to become greater than SSSL

[A]: **[Stator Frequency]**(StFr) is above **[Set Point]**(SLSP)

[B]: **[Stator Frequency]**(StFr) is between **[Standstill level]**(SSSL) and **[Set Point]**(SLSP)

[C]: **[Stator Frequency]**(StFr) is below **[Standstill level]**(SSSL) and **[SLS wait time]**(SLwt) ≠ 0

When the function is activated:

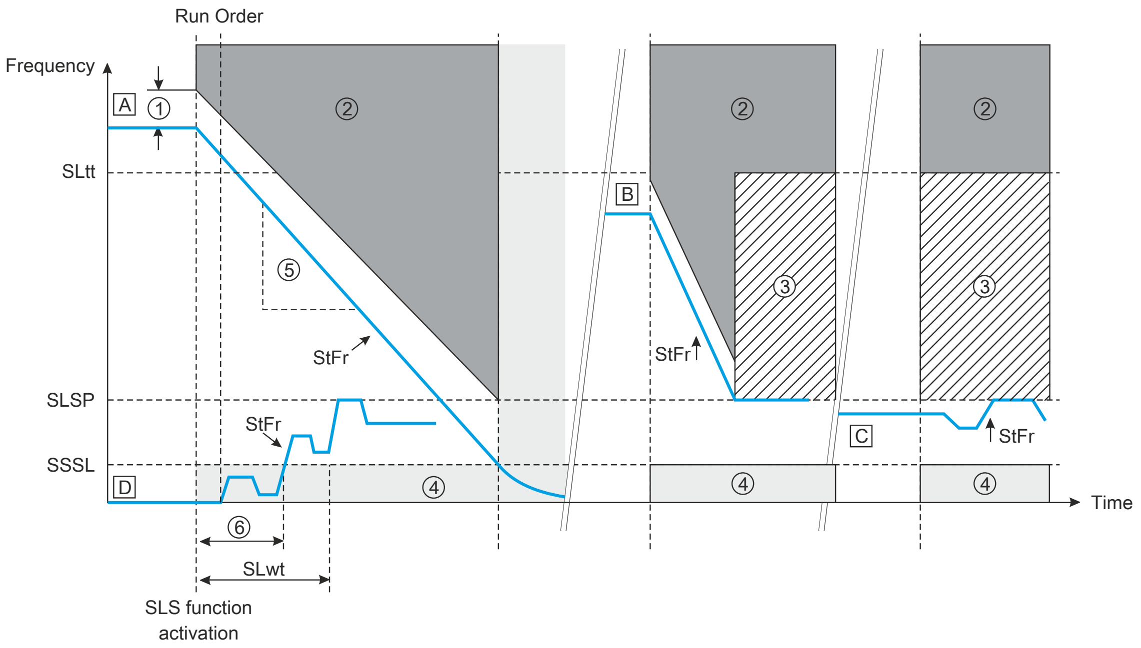
- If the **[Stator Frequency]**(StFr) is above the **[Set point]**(SLSP), the drive decelerates according to SS1 deceleration ramp until the **[Set point]**(SLSP) is reached (see case A)
- If the **[Stator Frequency]**(StFr) is below the (SLSP) the current reference is not changed but limited to the **[Set point]**(SLSP) (see case B)
- If the **[Stator Frequency]**(StFr) is still below the **[Standstill level]**(SSSL) frequency after **[SLSwait time]**(SLwt) has elapsed, the safety function STO will be triggered (see case C)

While the function is activated:

- The reference frequency can only vary between the **[Set point]**(SLSP) and the standstill level (SSSL).
- If the **[Stator Frequency]**(StFr) decreases and reaches the **[Standstill level]**(SSSL) frequency, safety function STO is triggered
- If the **[Stator Frequency]**(StFr) increases and reaches the **[SLS tolerance threshold]**(SLtt), the safety function STO is triggered and an error is triggered with the error code **[Safety function fault]**(SAFF)

To Configure the Function of Type 3

SLS type 3 has the same behavior as SLS type 2 except that If the **[Stator Frequency]**(StFr) is above the **[SLS tolerance threshold]**(SLtt), the safety function SS1 is triggered instead of decelerating to the **[Set point]**(SLSP) (see case A)



1 SS1 trip threshold
2 Error and STO function triggered
3 Reference upper limit
4 STO function triggered
5 SS1 deceleration ramp (dV/dT)
6 Time taken for the **[Stator Frequency]**(StFr) to become greater than SSSL

[A]: **[Stator Frequency]**(StFr) is above **[SLS tolerance threshold]**(SLtt)

[B]: **[Stator Frequency]**(StFr) is between **[Set Point]**(SLSP) and **[SLS tolerance threshold]**(SLtt)

[C]: **[Stator Frequency]**(StFr) is between **[Standstill level]**(SSSL) and **[Set Point]**(SLSP)

[D]: **[Stator Frequency]**(StFr) is below **[Standstill level]**(SSSL) and **[SLS wait time]**(SLwt) ≠ 0

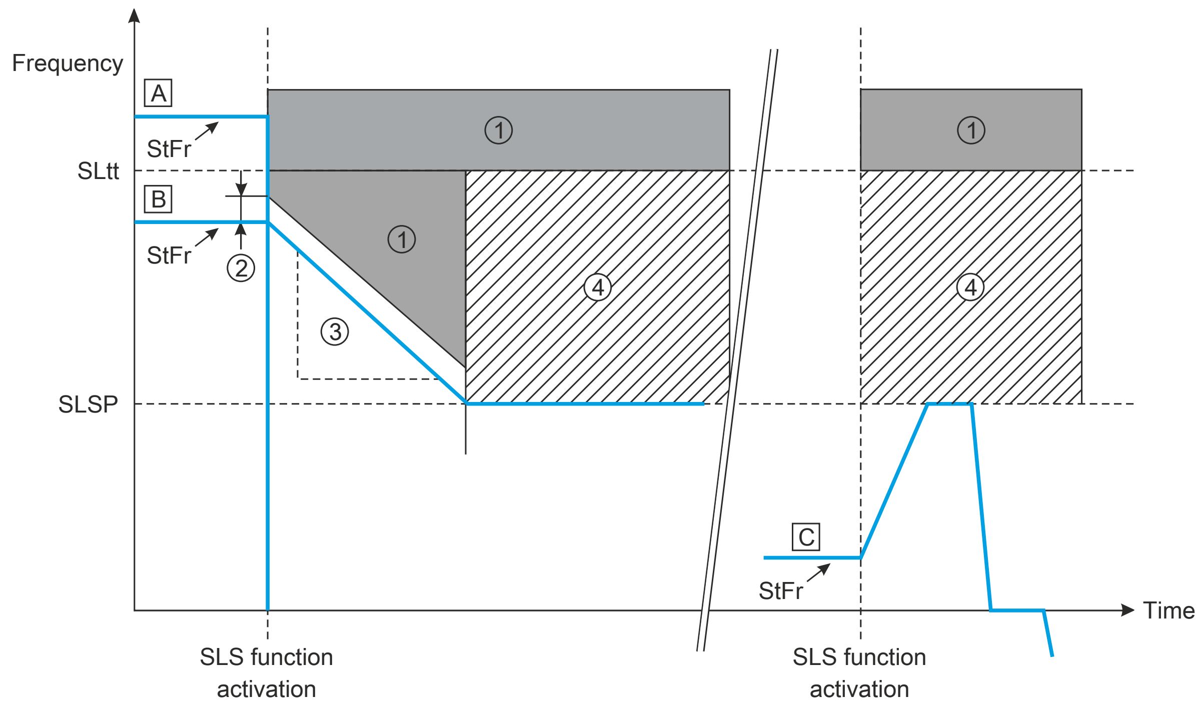
When the function is activated:

- If the **[Stator Frequency]**(StFr) is above the **[SLS tolerance threshold]**(SLtt), the safety function SS1 is triggered (see case A)
- If the **[Stator Frequency]**(StFr) is between the **[SLS tolerance threshold]**(SLtt) and the **[Setpoint]**(SLSP), the drive decelerates according to SS1 deceleration ramp until the **[Set point]**(SLSP) has been reached (see case B)
- If the **[Stator Frequency]**(StFr) is below the **[Set point]**(SLSP) the current reference is not changed but limited to the **[Set point]**(SLSP) (see case C)
- If the **[Stator Frequency]**(StFr) is still below the **[Standstill level]**(SSSL) frequency after **[SLS waittime]**(SLwt) has elapsed, the safety function STO will be triggered (see case D)

While the function is activated:

- The reference frequency can only vary between the **[Set point]**(SLSP) and the **[Standstill level]**(SSSL).
- If the **[Stator Frequency]**(StFr) decreases and reaches the **[Standstill level]**(SSSL) frequency, the safety function STO is triggered.
- If the **[Stator Frequency]**(StFr) increases and reaches the **[SLS tolerance threshold]**(SLtt), the safety function STO is triggered and an error is triggered with the error code **[Safety function fault]**(SAFF).

To Configure the Function of Type 4



① Error and STO function triggered
② SS1 trip threshold
③ SS1 deceleration ramp (dV/dt)
④ Reference upper limit

[A]: **[Stator Frequency]**(StFr) is above **[SLS tolerance threshold]**(SLtt)

[B]: **[Stator Frequency]**(StFr) is between **[Set Point]**(SLSP) and **[SLS tolerance threshold]**(SLtt)

[C]: **[Stator Frequency]**(StFr) is below **[Set Point]**(SLSP)

Note:

If the (SLtt) ≤ (SLSP) for SLS type 4, (SAFF) fault is triggered.

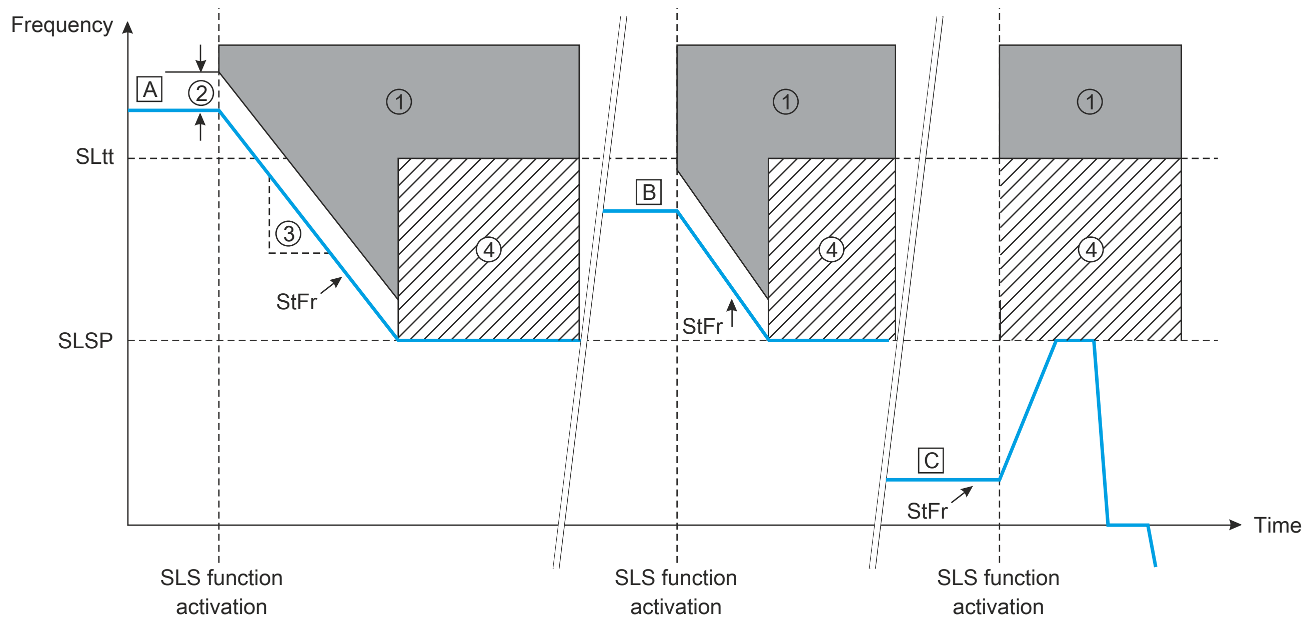
When the function is activated:

- If the **[Stator Frequency]**(StFr) is above the **[SLS tolerance threshold]**(SLtt), the safety function STO is triggered with the error code **[Safety function fault]**(SAFF) (see case A)
- If the **[Stator Frequency]**(StFr) is between the **[SLS tolerance threshold]**(SLtt) and the **[Setpoint]**(SLSP), the drive decelerates according to SS1 deceleration ramp until the **[Set point]**(SLSP) has been reached (see case B)
- If the **[Stator Frequency]**(StFr) is below the **[Set point]**(SLSP), the current reference is not changed but limited to the **[Set point]**(SLSP) (see case C)

While the function is activated:

- The reference frequency can vary between the **[Set point]**(SLSP) in both forward and reverse directions.
- If the **[Stator Frequency]**(StFr) increases and reaches **[SLS tolerance threshold]**(SLtt), the safety function STO is triggered and an error is triggered with the error code **[Safety function fault]**(SAFF).

To Configure the Function of Type 5



1. Error and STO function triggered
2. SS1 trip threshold
3. SS1 deceleration ramp (dV/dt)
4. Reference upper limit

[A]: **[Stator Frequency]**(StFr) is above **[SLS tolerance threshold]**(SLtt)

[B]: **[Stator Frequency]**(StFr) is between **[Set Point]**(SLSP) and **[SLS tolerance threshold]**(SLtt)

[C]: **[Stator Frequency]**(StFr) is below **[Set Point]**(SLSP)

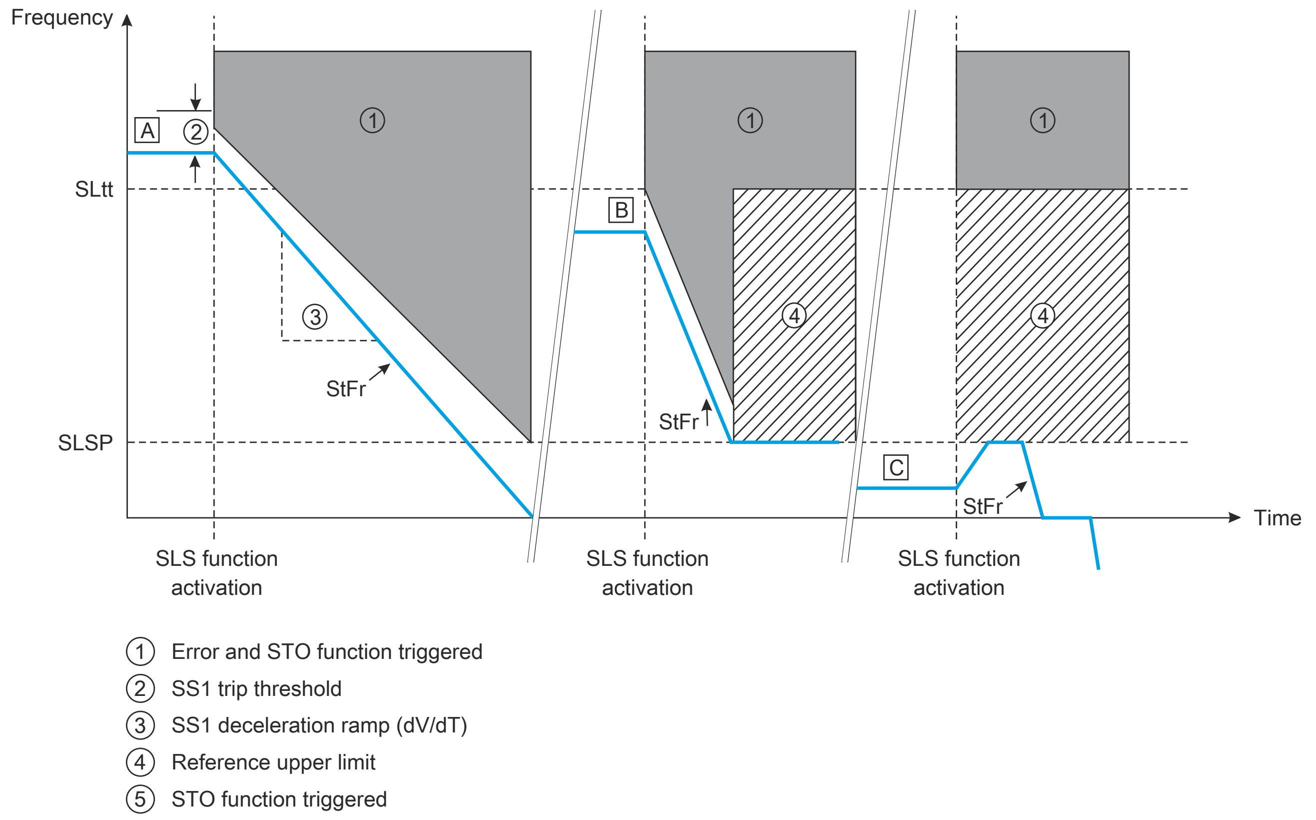
When the function is activated:

- If the **[Stator Frequency]**(StFr) is above the **[SLS tolerance threshold]**(SLtt), the drive decelerates according to SS1 deceleration ramp until the **[Set point]**(SLSP) has been reached (see case A)
- If the **[Stator Frequency]**(StFr) is between the **[SLS tolerance threshold]**(SLtt) and the **[Setpoint]**(SLSP), the drive decelerates according to SS1 deceleration ramp until the **[Set point]**(SLSP) has been reached (see case B)
- If the **[Stator Frequency]**(StFr) is below the **[Set point]**(SLSP), the current reference is not changed but limited to the **[Set point]**(SLSP) (see case C)

While the function is activated:

- The reference frequency can vary between the **[Set point]**(SLSP) in both forward and reverse directions.
- If the **[Stator Frequency]**(StFr) increases and reaches **[SLS tolerance threshold]**(SLtt), the safety function STO is triggered and an error is triggered with the error code **[Safety function fault]**(SAFF).

To Configure the Function of Type 6



[A]: **[Stator Frequency]**(StFr) is above **[SLS tolerance threshold]**(SLtt)

[B]: **[Stator Frequency]**(StFr) is between **[Set Point]**(SLSP) and **[SLS tolerance threshold]**(SLtt)

[C]: **[Stator Frequency]**(StFr) is below **[Set Point]**(SLSP)

When the function is activated:

- If the **[Stator Frequency]**(StFr) is above the **[SLS tolerance threshold]**(SLtt), the drive decelerates according to SS1 deceleration ramp until 0 Hz has been reached (see case A)
- If the **[Stator Frequency]**(StFr) is between the **[SLS tolerance threshold]**(SLtt) and the **[Setpoint]**(SLSP), the drive decelerates according to SS1 deceleration ramp until the **[Set point]**(SLSP) has been reached (see case B)
- If the **[Stator Frequency]**(StFr) is below the **[Set point]**(SLSP), the current reference is not changed but limited to the **[Set point]**(SLSP) (see case C)

While the function is activated:

- The reference frequency can vary between the **[Set point]**(SLSP) in both forward and reverse directions.
- If the **[Stator Frequency]**(StFr) increases and reaches **[SLS tolerance threshold]**(SLtt), the safety function STO is triggered and an error is triggered with the error code **[Safety function fault]**(SAFF).

Standstill Level

The recommended standstill level is: (SSSL) = Fslip

If the application requires a different standstill level, it can be set accordingly with the (SSSL) parameter.

Ramp Value and Ramp Unit

Set (SSrt) (ramp value) and (SSrU) (ramp unit) parameters according to the deceleration ramp to apply when the safety function SS1 is triggered.

Ramp calculation: Ramp = (SSrU) x (SSrt)

Example 1: If (SSrU) = 1 Hz/s and (SSrt) = 500 the deceleration ramp is 500 Hz/s and the accuracy is 0.1 Hz

Example 2: If (SSrU) = 10 Hz/s and (SSrt) = 50 the deceleration ramp is 500 Hz/s and the accuracy is 1 Hz

Use the table to set the correct accuracy according to the deceleration ramp to apply when the safety function SS1 is triggered:

Min	Max	Accuracy	SSrt	SSrU
0.1 Hz/s	599 Hz/s	0.1 Hz/s	1 Hz/s	SS1 deceleration ramp
599 Hz/s	5990 Hz/s	1 Hz/s	10 Hz/s	SS1 deceleration ramp/10
5990 Hz/s	59900 Hz/s	10 Hz/s	100 Hz/s	SS1 deceleration ramp/100

SLS Setpoint

Set the (SLS) setpoint parameter (SLSP) to: (SLSP) = Fsetpoint (SLS)

Motor Frequency and ramp Limit Threshold

The recommended motor frequency limit threshold is (SLtt) = 1.2 x (SLSP) + Fslip and the recommended SS1 ramp limit threshold is: (SStt) = 0.2 x Max Frequency

SLS Wait time

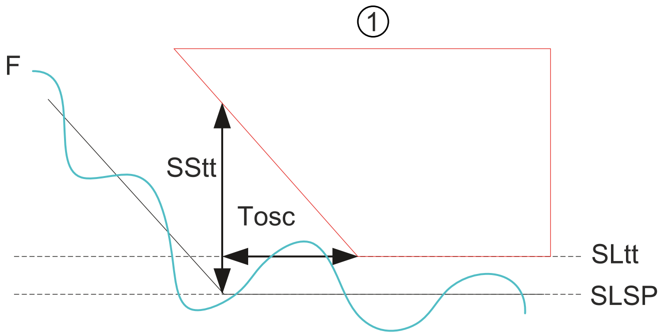
Set the **[SLS wait time]**(SLwt) greater than 0 ms to allow the motor to run under the **[standstill level]**SSSL for a given time after the safety function SLS has been activated.

> ## Note:
>
> **When SLS Type 4 is configured, [SLS wait time](SLwt) must be set to 0 otherwise an error is triggered and the error code [Safety function fault]SAFF is displayed.**

Testing and Adjusting the Configuration

When configuration is complete, test the SLS function to verify that it behaves as expected.

If an error is triggered with the error code **[Safety function fault]**SAFF, apply the following troubleshooting rules

Context	Drive Status	Adjustment
SLS activated and deceleration ramp in progress	• SAFF error code • SFFE.3 = 1	Motor frequency has reached the motor frequency limit threshold. The cause of the detected error can be due to frequency instability. Investigate and correct the cause. The value of SLtt can be modified to increase the tolerance threshold to the instability of the drive system.
SLS activated and end of ramp at SLSP frequency	• SAFF error code • SFFE.3 = 1 or • SFFE.7 = 1	Motor frequency stabilization at SLSP takes too long and has reached the safety function error detection condition.  ① Safety function error detection Tosc: T oscillation F: Frequency The oscillations must be lower than SLtt before the time T(oscillation) elapses. If the condition is not followed, an error is triggered and the error code **[Safety function fault]**SAFF is displayed. The relationship between SStt and T(oscillation) is: $T(osc) = \frac{SSTT - (SLTT - SLSP - Fslip)}{SSRT \times SSRU}$ Motor frequency has reached the motor frequency limit threshold. The cause of the detected error can be due to frequency instability. Investigate and correct the cause. The value of SStt can be modified to increase the tolerance threshold to the oscillations of the drive system.
SLS activated and motor running at SLSP frequency	• SAFF error code • SFFE.7 = 1	Motor frequency has reached the motor frequency limit threshold. The cause of the detected error can be due to frequency instability. Investigate and correct the cause. The value of SLtt can be modified to increase the tolerance threshold to the instability of the drive system.

Example

Code	Description	Unit
FrS	Rated motor frequency	50 Hz
nSp	Rated motor speed	1350 rpm
ppn	Motor pole pair number	2
Max Frequency	Maximum motor frequency on normal operation. This value is equal to **[High speed]**(HSP) or lower	50 Hz
Fsetpoint (SLS)	Motor frequency setpoint	15 Hz
SS1 deceleration ramp	Deceleration ramp to apply when SS1 is triggered	20 Hz/s

With these numerical values the configuration of SLS type 2, 3 and 4 is:

$$Fslip = 50 - \frac{1350 \times 2}{60} = 5 \ Hz$$

(SSSL) = Fslip = 5 Hz

(SSrU) = 1 Hz/s and (SSrt) = 20 for SS1 deceleration ramp = 20 Hz/s (accuracy is 0.1 Hz)

(SLSP) = Fsetpoint (SLS) = 15 Hz

(SLtt) = 1.2 x (SLSP) + Fslip = 1.2 x 15 + 5 = 23 Hz

(SStt) = 0.2 x Max Frequency = 0.2 x 50 = 10 Hz

$$T\left(oscillation\right) = \frac{SSSt - \left(SLtt - SLSP - Fslip\right)}{SSrt \times SSrU} = \frac{10 - \left(23 - 15 - 5\right)}{20 \times 1} = 350 \ ms$$

In this example, the frequency oscillations are allowed to be higher than (SLtt) for 350 ms.

4.2.4 SS1

Collect Application Data

Before configuring the SS1 function, you must collect the following data:

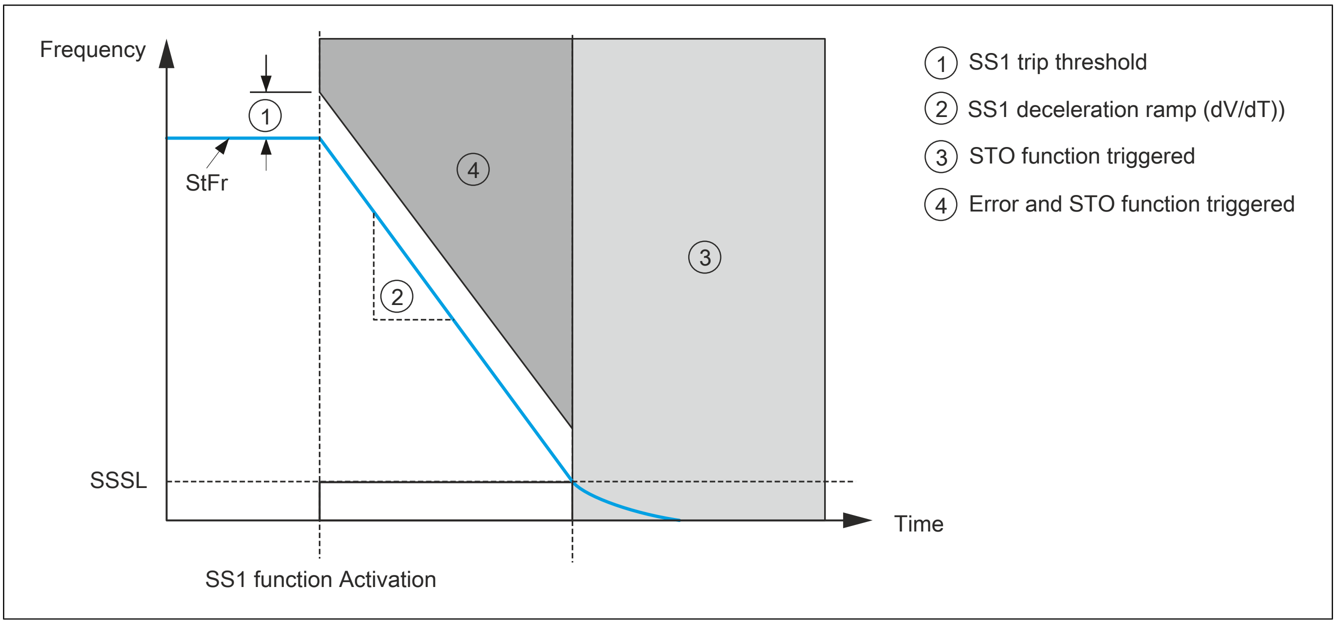
Code	Description	Unit	Comment
FrS	Rated motor frequency	Hz	From motor
nSp	Rated motor speed	rpm	From motor
ppn	Motor pole pair number	-	From motor
Max Frequency	Maximum motor frequency on normal operation	Hz	This value is equal to **[High speed]**HSP or lower

Calculate the rated motor slip frequency Fslip (Hz).

$$Fslip = FrS - \frac{Nsp \times ppn}{60}$$

To Configure the Function

Overview of diagram



Standstill Level

The recommended standstill level is: SSSL = Fslip

If the application requires a different standstill level, it can be set accordingly with the SSSL parameter.

Ramp Value and Ramp Unit

Set SSrt (ramp value) and SSrU (ramp unit) parameters according to the deceleration ramp to apply when the safety function SS1 is triggered.

Ramp Calculation: Ramp = SSrU x SSrt

Example 1: If SSrU = 1 Hz/s and SSrt = 500 the deceleration ramp is 500 Hz/s and the accuracy is 0.1 Hz

Example 2: If SSrU = 10 Hz/s and SSrt = 50 the deceleration ramp is 500 Hz/s and the accuracy is 1 Hz

Use the table to set the correct accuracy according to the deceleration ramp to apply when the safety function SS1 is triggered:

Min	Max	Accuracy	SSrU	SSrt
0.1 Hz/s	599 Hz/s	0.1 Hz/s	1 Hz/s	SS1 deceleration ramp
599 Hz/s	5990 Hz/s	1 Hz/s	10 Hz/s	SS1 deceleration ramp/10
5990 Hz/s	59900 Hz/s	10 Hz/s	100 Hz/s	SS1 deceleration ramp/100

Ramp Limit Threshold

The SS1 ramp trip threshold is calculated by: SStt = 0.2 x Max Frequency

This value is equal to **[High speed]**HSP or lower

Testing and Adjusting the Configuration

When configuration is complete, test the safety function SS1 to verify that it behaves as expected.

If an error is triggered with the error code **[Safety function fault]**SAFF, apply the following troubleshooting rules

Context	Drive Status	Adjustment
SS1 activated and the **[Standstill level]** SSSL has not yet been reached	• SAFF error code • SFFE.3 = 1	Motor frequency has reached the motor frequency limit threshold. The cause of the detected error can be due to frequency instability. Investigate and correct the cause. The value of SStt can be modified to increase the tolerance threshold to the instability of the drive system.

Example

Code	Description	Unit
FrS	Rated motor frequency	50 Hz
nSp	Rated motor speed	1350 rpm
ppn	Motor pole pair number	2
Max Frequency	Maximum motor frequency on normal operation	50 Hz
SS1 deceleration ramp	Deceleration ramp to apply when SS1 is triggered	20 Hz/s

With these numerical values the configuration of SS1 is:

$$Fslip = 50 - \frac{1350 \times 2}{60} = 5 \ Hz$$

SSSL = Fslip = 5 Hz

SSrU = 1 Hz/s and SSrt = 20 for SS1 deceleration ramp = 20 Hz/s (accuracy is 0.1 Hz)

SStt = 0.2 x Max Frequency = 0.2 x 50 = 10 Hz

4.2.5 Behavior on Deactivation of the Safety Function SLS for all SLS Types

If ...	Then ...
The drive is still running when the function is deactivated	The reference frequency of the active channel is applied.
Safety function STO has been triggered and the drive is not in fault state.	A new run command must be applied.
The safety function SLS type 2, 3, 4 is deactivated while the drive decelerates to the **[Set point]** (SLSP) according to SS1 deceleration ramp. The safety function SLS type 3 is deactivated while the safety function SS1 has been triggered	The safety function SLS remains activated until the **[Set point]** (SLSP) has been reached. STO is triggered when **[Standstill level]** (SSSL) is reached and a new run command must be applied.
a stop command is applied	The safety function SLS remains active and the drive decelerates until standstill is reached. For SLS type 1, 2, or 3 STO function is triggered when the **[Stator Frequency]**(StFr) decreases and reaches the **[Standstill level]** (SSSL) frequency.
an error is detected	The safety function SLS remains active and the drive stops according to the configured error response. For SLS type 1, 2, or 3 STO function will be triggered after the **[Standstill level]**(SSSL) frequency has been reached.The drive can be reset after the cause is cleared.

4.2.6 SLS Standards References

The safety function SLS is defined in section 4.2.3.4 of standard IEC 61800-5-2 The SLS function helps to prevent the motor from exceeding the specified speed limit.

4.2.7 Safety Function (SF) Level for Safety Function SLS

Configuration	SIL Safety Integrity Level According to IEC 61-508	PL Performance level According to ISO-13849
LI3 and LI4	SIL2	PL d
LI5 and LI6	SIL2	PL d

4.3 Behavior of safety functions

4.3.1 Limitations

Type Of Motor

The safety functions SLS and SS1 on ACOPOSinverter P74 are only applicable for asynchronous motors with openloop control profile. The safety function STO can be used with synchronous and asynchronous motors.

Prerequisites for Using Safety Functions

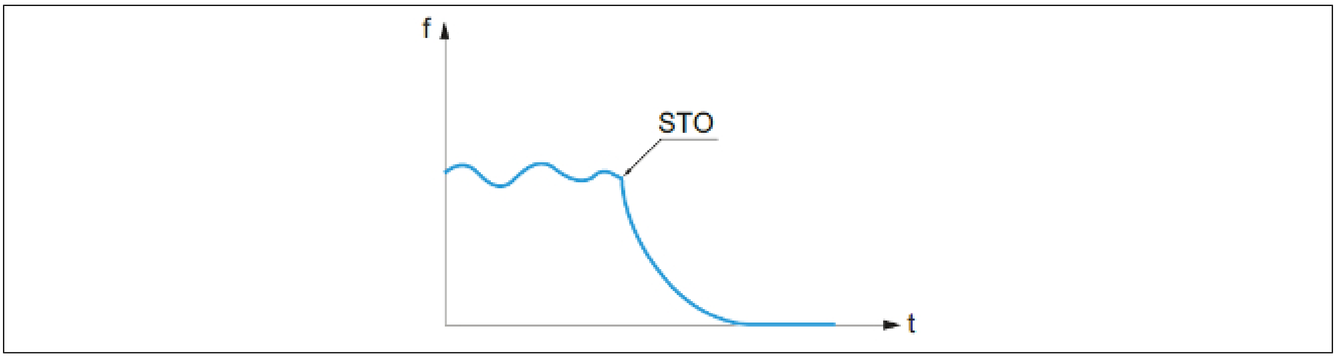
Following conditions have to be fulfilled for correct operation:

- The motor size is adequate for the application and is not at the limit of its capacity.
- The drive size has been correctly chosen for the line supply, sequence, motor and application and is not at the limit of their capacities.
- If required, the appropriate options are used.
  Example: dynamic braking resistor or motor choke.
- The drive is correctly set up with the correct speed loop and torque characteristics for the application; the reference frequency profile applied to the drive control loop is followed.

Permitted and impermissible applications for the safety function

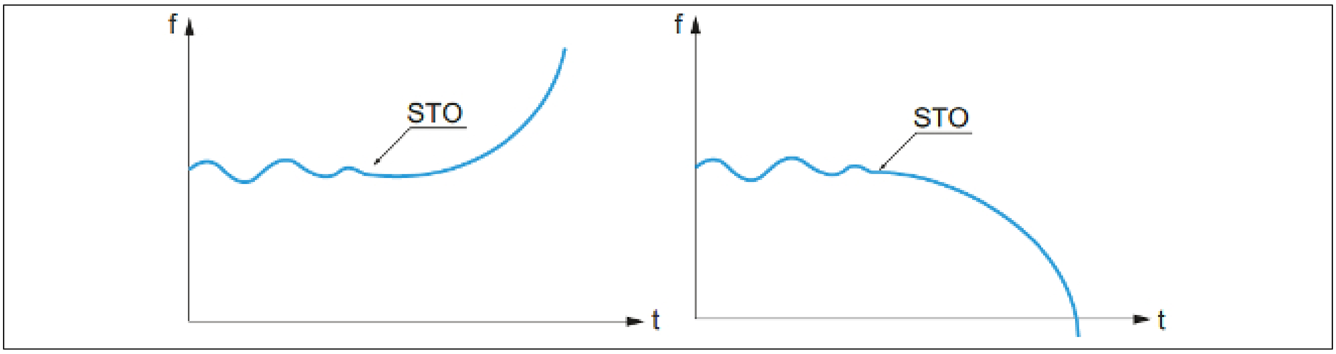
Permitted application

Fast stop after an STO request or coasting to a stop is permitted.



Impermissible application

An application with load delay after the frequency is cut off or with long/permanently regenerative brake cycles is not permitted. Fast stop after an STO request or coasting to a stop is not permitted.



Examples: Vertical conveyor belt, vertical draw gear, lifting equipment or flushing device.

Requirements on Logical Inputs

- Source mode must not been used with the safety function. If you use the safety function, you need to wire the logic inputs in sink mode.
- PTC on LI6 is incompatible with the safety function set on this input. If you are using the safety function on LI6, do not set the PTC switch to PTC.
- If you are using the pulse input, you cannot set the safety function on LI5 at the same time.

4.3.2 Detected Fault Inhibition

When a safety function has been configured, the error **[Safety Function Fault]**SAFF cannot be inhibited by the function **[Fault Inhibit assign.]**InH.

4.3.3 Priority Between Safety Functions

- The safety function STO has the highest priority. If the safety function STO is triggered, a Safe Torque Off is performed regardless of which other functions are active.
- The safety function SS1 has medium priority in relation to the other safety functions.
- The safety function SLS has the lowest priority.

4.3.4 Factory Settings

If the safety functions are configured and you restore the factory settings, only the parameters which are not safety-related will be reset to the factory setting. The settings of safety-related parameters can only be reset using the commissioning software, for more information see Commissioning.

4.3.5 Configuration Download

You can transfer a configuration in all situations. If a safety function has been configured, the functions using these same logic inputs will not be configured.

For example: If the downloaded configuration has functions (Preset speed,...) on LI3-4-5-6 and if the drive has a safety function configured on these logic inputs, safety function will not be erased. It is the functions that have the same logic input as safety functions that are not transferred. Multiconfiguration/multimotor and macro configuration obey the same rules.

4.3.6 Priority Between Safety Functions and No Safety-Related Functions

Priority Table

o: Compatible functions

x: Incompatible functions

▲◄ : The function indicated by the arrow has priority over the other.

Drive Function	SLS	SS1	STP
[HIGH SPEED HOISTING]HSH-	▲	▲	▲
[+/- SPEED]UPd-	▲	▲	▲
[Skip Frequency]JPF	▲	o	o
[Low speed time out]tLS	▲	▲	▲
[MULTIMOTORS]MMC-	Configuration must be consistent with the three motors		o
[PRESET SPEEDS]PSS-	▲	▲	▲
[PID REGULATOR]PId-	▲	o	o
[RAMP]rPt-	▲	▲	▲
[Freewheel stop ass.]nSt	◄	◄	▲
[Fast stop assign.]FSt	◄	▲	▲
[TRAVERSE CONTROL]tr0-	o: both function configurations should not overlap o: motor frequency can exceed SLS set-point (but not the motor frequency limit threshold)	▲	▲
[EXTERNAL FAULT]EtF-	◄: NST x: DCI ▲: fast, ramp, fallback, maintain	◄: NST x: DCI ▲: fast, ramp, fallback, maintain	◄: NST ▲: DCI ▲: fast, ramp, fallback, maintain
[AUTOMATIC RESTART]Atr-	▲	▲	▲
[FAULT RESET]rSt-	▲	▲	▲
[JOG]JOG-	▲	▲	▲
[STOP CONFIGURATION]Stt-			
[Ramp stop]rMP	▲: SLS ramp ◄: SLS steady	▲	▲
[Fast stop]FSt	▲: SLS ramp ◄: SLS steady	▲	▲
[DC injection]dCI	x	x	▲
[Freewheel]nSt	◄	◄	▲
[+/-SPEED AROUND REF.]SrE-	▲	▲	▲
[POSITIONING BY SENSORS]LPO-	▲: SLS ramp & position is not respected	▲: Position is not respected	▲

Drive Function	SLS	SS1	STP
[RP input]PFrC	o: if the safety function is not assigned to LI5	o: if the safety function is not assigned to LI5	o: if the safety function is not assigned to LI5
[Underload Detection]ULF	▲	▲	▲
[Overload Detection]OLC	▲	▲	▲
[Rope slack config.]rSd	x	x	x
[UnderV. prevention]StP	x	x	▲
[AUTO DC INJECTION]AdC-	x	x	▲
[DC injection assign.]dCI	x	x	▲
[Load sharing]LbA	o: If the [Stator Frequency]StFr is above the frequency limit threshold, the error SAFF is triggered.	▲	▲
[Motor control type]Ctt			
[Standard]Std	x	x	o
[SVC V]UUC	o	o	o
[V/F Quad.]UFq	x	x	o
[Energy Sav.]nLd	x	x	o
[Sync. mot.]SYn	x	x	o
[V/F 5pts]UF5	x	x	o
[OUTPUT PHASE LOSS]OPL	x: Motor output phase loss is detected by the safety function	x: Motor output phase loss is detected by the safety function	o
[Output cut]OAC	x	x	x
[Dec ramp adapt.]brA	o: If the [Stator Frequency]StFr is above the Frequency limit threshold, the error SAFF is triggered.	o: If the [Stator Frequency]StFr is above the Frequency limit threshold, the error SAFF is triggered.	▲
[REF. OPERATIONS] OAI-	▲	▲	o
[2 wire]2C	o: Run command on transition ▲: Run command on level is not compatible	o: Run command on transition ▲: Run command on level is not compatible	o: Run command on transition ▲: Run command on level is not compatible
[PTC MANAGEMENT]PtC-	o: inactive if the safety function is not assigned to LI6	o: inactive if the safety function is not assigned to LI6	o: inactive if the safety function is not assigned to LI6
[FORCED LOCAL]LCF-	▲	▲	o
[LI CONFIGURATION]	o: inactive if the safety function is assigned to logic input	o: inactive if the safety function is assigned to logic input	o: inactive if the safety function is assigned to logic input
[MULTIMOTORS/CONFIG]MMC	o: except safety-related parameters	o: except safety-related parameters	o: except safety-related parameters
[FAULT INHIBITION]InH	x	x	x
[Profile]CHCF	Logic input used by safety function cannot be switched	Logic input used by safety function cannot be switched	Logic input used by safety function cannot be switched
[Macro configuration]CFG	▲ Macro configuration could be overlapped if safety function use a logical input requested by the macro configuration	▲ Macro configuration could be overlapped if safety function use a logical input requested by the macro configuration	▲ Macro configuration could be overlapped if safety function use a logical input requested by the macro configuration
[RAMP]rPt-	▲: SLS ramp ◄: SLS steady	▲	o
[Motor short circuit]SCF1	▲	▲	o
[Ground short circuit]SCF3	▲	▲	o
[Overspeed]SOF	▲	▲	o
[Sync. mot.]SYn	x	x	o
[Configuration Transfer]	o: except safety-related parameters	o: except safety-related parameters	o: except safety-related parameters
[Energy Sav.]nLd	x	x	o

4.4 Safety Functions Visualization by HMI

4.4.1 Status of Safety Functions

Description

The status of the safety functions can be displayed using the HMI of the drive or using the commissioning software. HMI of the drive can be the local HMI on the product or the graphic display terminal or the remote display terminal. There is one register for each safety function. See introduction for more information about the safety functions.

To access these registers with an HMI: **[2 MONITORING]**MOn- --> **[MONIT. SAFETY]**SAF-

- **[STO status]**StOS: Status of the safety function STO (Safe Torque Off)
- **[SLS status]**SLSS: Status of the safety function SLS (Safely-Limited Speed)
- **[SS1 status]**SS1S: Status of the safety function SS1 (Safe Stop 1)

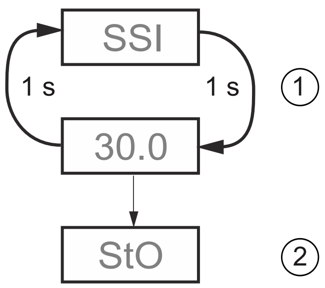
The status registers are not approved for any type of safety-related use.

4.4.2 Dedicated HMI

Description

When a safety function has been triggered, some information is displayed.

Example with the local HMI of the product when the safety function SS1 has been triggered:



1 Display alternately the name of the safety function SS1 and the current display parameters as long as the motor decelerates according to the specified monitoring ramp until standstill is reached
2 After the [Standstill level] SSSL has been reached, the safety function STO is triggered and displayed

4.4.3 Error Code Description

Description

When an error is detected by the safety function, the drive displays **[Safety function fault]**(SAFF). This detected error can only be reset after powering the drive OFF/ON.

For more information, you can access to the registers to find out the possible reasons for triggering.

These registers can be displayed using the graphic display terminal or the commissioning software:

[DRIVE MENU] --> **[MONITORING]** --> **[DIAGNOSTICS]** --> **[MORE FAULT INFO]**

SFFE [Safety Function Error Register]

Bit	Description
Bit0 = 1	Logic inputs debounce time-out (verify value of debounce time LIDT according to the application)
Bit1	Reserved
Bit2 = 1	Motor speed sign has changed during SS1 ramp
Bit3 = 1	Motor speed has reached the frequency limit threshold during SS1 ramp
Bit4	Reserved
Bit5	Reserved
Bi6 = 1	Motor speed sign has changed during SLS limitation
Bit7 = 1	Motor speed has reached the frequency limit threshold during SS1 ramp
Bit8	Reserved
Bit9	Reserved
Bit10	Reserved
Bit11	Reserved
Bit12	Reserved
Bit13 = 1	Not possible to measure the motor speed (verify the motor wiring connection)
Bit14 = 1	Motor ground short-circuit detected (verify the motor wiring connection)
Bit15 = 1	Motor phase to phase short-circuit detected (verify the motor wiring connection)

This register is reset after powering OFF/ON.

This register can also be accessed from **[DRIVE MENU]** --> **[MONITORING]** --> **[MONIT. SAFETY]**

SAF1 [Safety Fault Register 1]

This is an application control error register.

Bit	Description
Bit0=1	PWRM consistency detected error
Bit1=1	Safety functions parameters detected error
Bit2=1	Application auto test has detected an error
Bit3=1	Diagnostic verification of safety function has detected an error
Bit4=1	Logical input diagnostic has detected an error
Bit5=1	Application hardware watchdog active
Bit6=1	Application watchdog management active
Bit7=1	Motor control detected error
Bit8=1	Internal serial link core detected error
Bit9=1	Logical input activation detected error
Bit10=1	Safe Torque Off function has triggered an error
Bit11=1	Application interface has detected an error of the safety functions
Bit12=1	Safe Stop 1 function has detected an error of the safety functions
Bit13=1	Safely Limited Speed function has triggered an error
Bit14=1	Motor data is corrupted
Bit15=1	Internal serial link data flow detected error

This register is reset after powering OFF/ON.

SAF2 [Safety Fault Register 2]

This is a motor control error register.

Bit	Description
Bit0=1	Consistency stator frequency verification has detected an error
Bit1=1	Stator frequency estimation detected error
Bit2=1	Motor control watchdog management is active
Bit3=1	Motor control hardware watchdog is active
Bit4=1	Motor control auto test has detected an error
Bit5=1	Chain testing detected error
Bit6=1	Internal serial link core detected error
Bit7=1	Direct short-circuit detected error
Bit8=1	PWM driver detected error
Bit9	Reserved
Bit10	Reserved
Bit11=1	Application interface has detected an error of the safety functions
Bit12	Reserved
Bit13	Reserved
Bit14=1	Motor data is corrupted
Bit15=1	Internal serial link data flow detected error

This register is reset after powering OFF/ON.

SF00 [Safety Fault Subregister 00]

This is an application auto test error register.

Bit	Description
Bit0	Reserved
Bit1=1	Ram stack overflow
Bit2=1	Ram address integrity detected error
Bit3=1	Ram data access detected error
Bit4=1	Flash checksum detected error
Bit5	Reserved
Bit6	Reserved
Bit7	Reserved
Bit8	Reserved
Bit9=1	Fast task overflow
Bit10=1	Slow task overflow
Bit11=1	Application task overflow
Bit12	Reserved
Bit13	Reserved
Bit14=1	PWRM line is not activated during initialization phase
Bit15=1	Application hardware watchdog is not running after initialization

This register is reset after powering OFF/ON.

SF01 [Safety Fault Subregister 01]

This is a logical input diagnostics error register.

Bit	Description
Bit0=1	Management - state machine detected error
Bit1=1	Data required for test management are corrupted
Bit2=1	Channel selection detected error
Bit3=1	Testing - state machine detected error
Bit4=1	Test request is corrupted
Bit5=1	Pointer to test method is corrupted
Bit6=1	Incorrect test action provided
Bit7=1	Detected error in results collecting
Bit8=1	LI3 detected error - cannot activate safety function
Bit9=1	LI4 detected error - cannot activate safety function
Bit10=1	LI5 detected error - cannot activate safety function
Bit11=1	LI6 detected error - cannot activate safety function
Bit12=1	Test sequence updated while a diagnostic is in progress
Bit13=1	Detected error in test pattern management
Bit14	Reserved
Bit15	Reserved

This register is reset after powering OFF/ON.

SF02 [Safety Fault Subregister 02]

This is an application watchdog management detected error register.

Bit	Description
Bit0=1	Fast task detected error
Bit1=1	Slow task detected error
Bit2=1	Application task detected error
Bit3=1	Background task detected error
Bit4=1	Safety function fast task/input detected error
Bit5=1	Safety function slow task/input detected error
Bit6=1	Safety function application task/inputs detected error
Bit7=1	Safety function application task/treatment detected error
Bit8=1	Safety function background task detected error
Bit9	Reserved
Bit10	Reserved
Bit11	Reserved
Bit12	Reserved
Bit13	Reserved
Bit14	Reserved
Bit15	Reserved

This register is reset after powering OFF/ON.

SF03 [Safety Fault Subregister 03]

Bit	Description
Bit0=1	Debounce time out
Bit1=1	Input not consistent
Bit2=1	Consistency verification - state machine detected error
Bit3=1	Consistency verification - debounce timeout corrupted
Bit4=1	Response time data detected error
Bit5=1	Response time corrupted
Bit6=1	Undefined consumer queried
Bit7=1	Configuration detected error
Bit8=1	Inputs are not in nominal mode
Bit9	Reserved
Bit10	Reserved
Bit11	Reserved
Bit12	Reserved
Bit13	Reserved
Bit14	Reserved
Bit15	Reserved

This register is reset after powering OFF/ON.

SF04 [Safety Fault Subregister 04]

This is a **[Safe Torque Off]**STO detected error register.

Bit	Description
Bit0=1	No signal configured
Bit1=1	State machine detected error
Bit2=1	Internal data detected error
Bit3	Reserved
Bit4	Reserved
Bit5	Reserved
Bit6	Reserved
Bit7	Reserved
Bit8	Reserved
Bit9	Reserved
Bit10	Reserved
Bit11	Reserved
Bit12	Reserved
Bit13	Reserved
Bit14	Reserved
Bit15	Reserved

This register is reset after powering OFF/ON.

SF05 [Safety Fault Subregister 05]

This is a **[Safe Stop 1]**SS1 detected error register.

Bit	Description
Bit0=1	State machine detected error
Bit1=1	Motor speed sign has changed during stop
Bit2=1	Motor speed has reached the frequency limit threshold
Bit3=1	Theoretical motor speed corrupted
Bit4=1	Unauthorized configuration
Bit5=1	Theoretical motor speed computation detected error
Bit6	Reserved
Bit7=1	Speed sign verification: consistency detected error
Bit8=1	Internal SS1 request corrupted
Bit9	Reserved
Bit10	Reserved
Bit11	Reserved
Bit12	Reserved
Bit13	Reserved
Bit14	Reserved
Bit15	Reserved

This register is reset after powering OFF/ON.

SF06 [Safety Fault Subregister 06]

This is a **[Safely Limited Speed]**SLS detected error register.

Bit	Description
Bit0=1	State machine detected error
Bit1=1	Motor speed sign changed during limitation
Bit2=1	Motor speed has reached the frequency limit threshold
Bit3=1	Data corruption
Bit4	Reserved
Bit5	Reserved
Bit6	Reserved
Bit7	Reserved
Bit8	Reserved
Bit9	Reserved
Bit10	Reserved
Bit11	Reserved
Bit12	Reserved
Bit13	Reserved
Bit14	Reserved
Bit15	Reserved

This register is reset after powering OFF/ON.

SF07 [Safety Fault Subregister 07]

This is an application watchdog management detected error register.

Bit	Description
Bit0	Reserved
Bit1	Reserved
Bit2	Reserved
Bit3	Reserved
Bit4	Reserved
Bit5	Reserved
Bit6	Reserved
Bit7	Reserved
Bit8	Reserved
Bit9	Reserved
BIt10	Reserved
Bit11	Reserved
Bit12	Reserved
Bit13	Reserved
Bit14	Reserved
Bit15	Reserved

This register is reset after powering OFF/ON.

SF08 [Safety Fault Subregister 08]

This is an application watchdog management detected error register.

Bit	Description
Bit0=1	PWM task detected error
Bit1=1	Fixed task detected error
Bit2=1	ATMC watchdog detected error
Bit3=1	DYNFCT watchdog detected error
Bit4	Reserved
Bit5	Reserved
Bit6	Reserved
Bit7	Reserved
Bit8	Reserved
Bit9	Reserved
Bit10	Reserved
Bit11	Reserved
Bit12	Reserved
Bit13	Reserved
Bit14	Reserved
Bit15	Reserved

This register is reset after powering OFF/ON.

SF09 [Safety Fault Subregister 09]

This is a motor control auto test detected error register.

Bit	Description
Bit0	Reserved
Bit1=1	Ram stack overflow
Bit2=1	Ram address integrity detected error
Bit3=1	Ram data access detected error
Bit4=1	Flash checksum error
Bit5	Reserved
Bit6	Reserved
Bit7	Reserved
Bit8	Reserved
Bit9=1	1 ms task overflow
Bit10=1	PWM task overflow
Bit11=1	Fixed task overflow
Bit12	Reserved
Bit13	Reserved
Bit14=1	Unwanted interruption
Bit15=1	Hardware WD is not running after initialization

This register is reset after powering OFF/ON.

SF10 [Safety Fault Subregister 10]

This is a motor control direct short-circuit detected error register.

Bit	Description
Bit0=1	Ground short circuit - configuration detected error
Bit1=1	Phase to phase short circuit - configuration detected error
Bit2=1	Ground short circuit
Bit3=1	Phase to phase short circuit
Bit4	Reserved
Bit5	Reserved
Bit6	Reserved
Bit7	Reserved
Bit8	Reserved
Bit9	Reserved
Bit10	Reserved
Bit11	Reserved
Bit12	Reserved
Bit13	Reserved
Bit14	Reserved
Bit15	Reserved

This register is reset after powering OFF/ON.

SF11 [Safety Fault Subregister 11]

This is a motor control dynamic verification of activity detected error register

Bit	Description
Bit0=1	Application requested a diagnostic of direct short-circuit
Bit1=1	Application requested consistency verification of stator frequency estimation (voltage and current)
Bit2=1	Application requested diagnostic of SpdStat provided by motor control
Bit3	Reserved
Bit4	Reserved
Bit5	Reserved
Bit6	Reserved
Bit7	Reserved
Bit8=1	Motor control diagnostic of direct short circuit is enabled
Bit9=1	Motor control consistency verification of stator frequency estimation is enabled
Bit10=1	Motor control diagnostic of SpdStat provided by motor control is enabled
Bit11	Reserved
Bit12	Reserved
Bit13	Reserved
Bit14	Reserved
Bit15	Reserved

This register is reset after powering OFF/ON.

4.5 Technical Data

4.5.1 Electrical data

Logic type

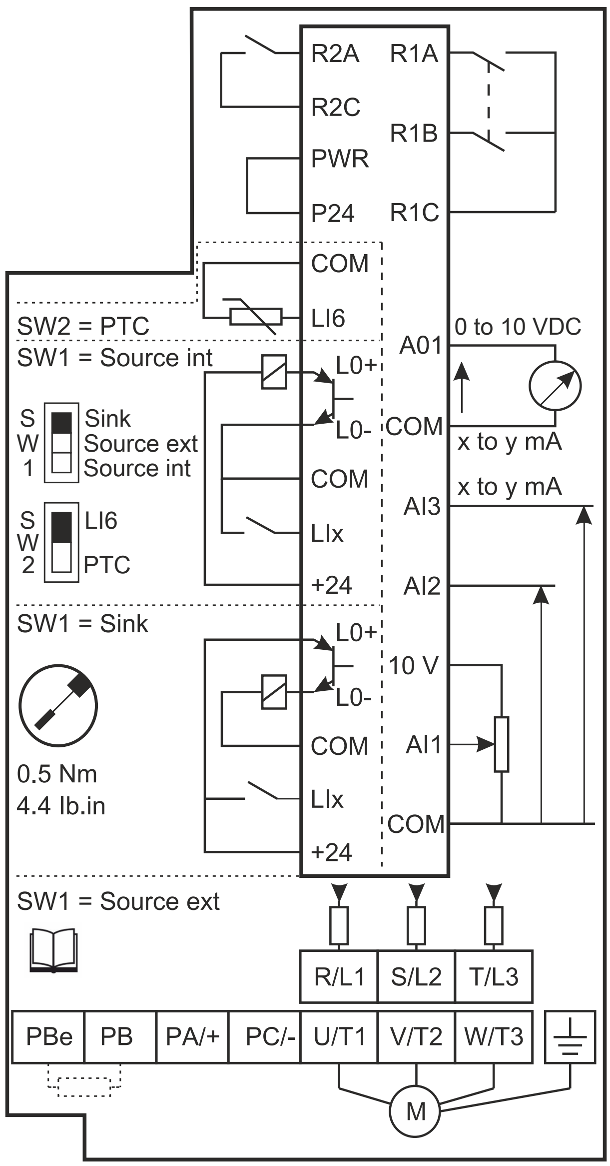
The drive logic inputs and logic outputs can be wired for logic type 1 or logic type 2.

Logic type	Active state
1	The output draws current (Sink) Current flows to the input
2	The output supply flows from the input current Current (Source)

Safety functions must only be used in source mode.

Signal inputs are protected against reverse polarity, outputs are protected against short-circuits. The inputs and outputs are galvanically isolated.

Cabling label



4.5.2 Getting and operating the Safety Function

Logic input

General-purpose logic inputs can be used to trigger a safety function. Logic inputs have to be combined in pairs to obtain a redundant request. There are only four general-purpose logic inputs that can be linked to safety functions (LI3, LI4, LI5 and LI6).The pairs of logic inputs are fixed and are:

- LI3 and LI4
- LI5 and LI6
- Another combination is only possible for the STO function: LI3 and STO

Pairs of logic inputs can only be assigned once when they are linked to a safety function. When you set a safety function on an logic input you cannot set another function (safety or other) on this logic input. If you set a non-safety function on an logic input you cannot set a safety function on this logic input.

4.5.3 Safety Function Capability

PDS (SR) safety functions are part of an overall system

If the qualitative and quantitative safety objectives determined by the final application require some adjustments to ensure safe use of the safety functions, the integrator of the BDM (Basic Drive Module) is responsible for these additional changes (for example, managing the mechanical brake on the motor).

Also, the output data generated by the use of safety functions (fault relay activation, error codes or information on the display, etc.) is not considered to be safety-related data.

Machine Application Function Configuration

		STO		**SS1 type C (5)**		**SLS/STO/ SS1 type B(6)**	
		STO	STO and LI1	STO with safety relay or comparable module	STO and LI3 with safety relay or com-parable module	LI3 LI4	LI5 LI6
Standard	IEC 61800-5-2 / IEC 61508	SIL2	SIL3	SIL2	SIL3	SIL2	
	IEC 62061 (1)	SIL2	SIL3 CL	SIL2 CL	SIL3 CL	SIL2 CL	
	EN 954-1(2)	Category 3	Category 4	Category 3	Category 4	Category 3	
	ISO 13849-1(3)	Category 3 PL d	Category 4 PL e	Category 3 PL d	Category 4 PL e	Category 3 PL d	
	IEC 60204-1(4)	Category stop 0	Category stop 0	Category stop 1	Category stop 1		

(1) Because the IEC 62061 standard concerns integration, this standard distinguishes the overall safety function (which is classified SIL2 or SIL3 for ACOPOSinverter P74 according to the diagrams Process system SF - Case 1 and Process system SF - Case 2 from components which constitute the safety function (which is classified SIL2 CL or SIL3 CL for ACOPOSinverter P74).

(2) According to table 6 of IEC 62061 (2005).

(3) According to table 4 of EN 13849-1 (2008).

(4) If protection against supply interruption or voltage reduction and subsequent restoration is needed according to IEC 60204-1, a safety module type Preventa XPS AF or equivalent must be used.

(5) SS1 type C: the power drive initiates the motor deceleration and initiates the STO function after an application specific time delay.

(6) SS1 type B: the power drive initiates and monitors the motor deceleration rate within set limits to stop the motor and initiates the STO function when the motor speed is below a specified limit.

Process Application Function Configuration

		STO		**SS1 type C (2)**		**SLS/STO/ SS1 type B (3)**	
		STO	STO and LI3	STO with safety relay or comparable module	STO and LI3 with safety relay or com-parable module	LI3 LI4	LI5 LI6
Standard	IEC 61800-5-2 IEC 61508	SIL2	SIL3	SIL2	SIL3	SIL2	
	IEC 62061(1)	SIL2 CL	SIL3 CL	SIL2 CL	SIL3 CL	SIL2 CL	

(1) Because the IEC 62061 standard concerns integration, this standard distinguishes the overall safety function (which is classified SIL2 or SIL3 for ACOPOSinverter P74 according to diagrams CASE 1 and CASE 2 from components which constitute the safety function (which is classified SIL2 CL or SIL3 CL for ACOPOSinverter P74).

(2) SS1 type C: the power drive initiates the motor deceleration and initiates the STO function after an application specific time delay.

(3) SS1 type B: the power drive initiates and monitors the motor deceleration rate within set limits to stop the motor and initiates the STO function when the motor speed is below a specified limit.

Input Signal Safety Functions

Input signals safety functions	Units	Value for LI3 to LI6	Value for STO
Logic 0 (Ulow)	V	<5	<2
Logic 1 (Uhigh)	V	>11	>17
Impedance (24 V)	kΩ	3.5	1.5
Debounce time	ms	<1	<1
Response time of safety function	ms	<10	<10

Summary of the Reliability Study

Function	Standard	Input	STO input	STO input & LI3	LI3 & LI4 or LI5 & LI6
STO	IEC 61508 Ed.2	SFF	96.7%	96%	94.8%
		PFD10y	7.26×10^{-1}	4.00×10^{-4}	2.44×10^{-1}
		PFD1y	7.18×10^{-5}	3.92×10^{-5}	2.33×10^{-4}
		PFHequ_1y	8.20 FIT [1]	4.47 FIT [1]	26.6 FIT [1]
		Type	B	B	B
		HFT	1	1	0
		DC	93.1%	91.5%	90%
		SIL capability	**2**	**3**	**2**
	IEC 62061 [1]	SIL CL capability	2	3	2
	EN 954-1 [2]	Category	3	4	3
	ISO 13849-1 [3]	PL	d	e	d
		Category	3	4	3
		MTTFd in years	13900	L1 3850[5] L2 29300[6]	4290
SS1 type BS LS	IEC 61508 Ed.2	SFF			93.3%
		PFD10y			2.72×10^{-3}
		PFHequ_10y			31.1 FIT [1]
		Type			B
		HFT			0
		DC			78.7%
		SIL capability			2
	IEC 62061[2]	SIL CL capability			2
	EN 954-1 [3]	Category			3
	ISO 13849-1 [4]	PL			d
		Category			3
		MTTFd in years			3670

(1) FIT: Failure In Time = Failure/10^{-9} hours.
(2) Because the IEC 62061 standard concerns integration, this standard distinguishes the overall safety function (which is classified SIL2 or SIL3 for ACOPOSinverter P74 according to diagrams Process system SF - Case 1 and Process system SF - Case 2, from components which constitute the safety function (which is classified SIL2 CL or SIL3 CL for ACOPOSinverter P74).
(3) According to table 6 of IEC 62061 (2005).
(4) According to table 4 of EN 13849-1 (2008).
(5) MTTFd in years software STO (LI3)
(6) MTTFd in years hardware STO (STO input)

Preventive annual activation of the safety function is recommended.

However, the safety levels can be obtained (with lower margins) without annual activation.

For the machine environment, a safety module is required for the STO function.

To avoid the use of a safety module, the Restart function parameters must be part of the safety function.

Please refer to the description of advantages of the safety module.

> # Note:
> **The table above is not sufficient to evaluate the PL of a PDS. The PL evaluation has to be done at the system level. The fitter or the integrator of the BDM (Basic Drive Module) has to do the system PL evaluation by including sensors data with numbers from the table above.**

Mean time to failure

The MTTF (mean time to failure) values of the ACOPOSinverter P74 are listed in the following section.

MTTF based on IEC 62380

These values are specified for operation at an ambient temperature of 30°C.

The fan in the ACOPOSinverter P74 is subject to wear and tear and must be replaced in the course of maintenance. For this reason, the fan is not taken into account in the MTTF evaluation.

Model number	Fan	MTTF value for intermittent operation[1)]	MTTF value for continuous operation
8I74S200018.01P-1, 8I74S200018.00-000 8I74S200037.01P-1, 8I74S200037.00-000 8I74S200055.01P-1, 8I74S200055.00-000 8I74S200075.01P-1, 8I74S200075.00-000	Yes	190 000 h	115 000 h
8I74S200110.01P-1, 8I74S200110.00-000 8I74S200150.01P-1, 8I74S200150.00-000 8I74S200220.01P-1, 8I74S200220.00-000	Yes	190 000 h	115 000 h
8I74T400037.01P-1, 8I74T400037.00-000 8I74T400055.01P-1, 8I74T400055.00-000 8I74T400075.01P-1, 8I74T400075.00-000 8I74T400110.01P-1, 8I74T400110.00-000 8I74T400150.01P-1, 8I74T400150.00-000	Yes	190 000 h	115 000 h
8I74T400220.01P-1, 8I74T400220.00-000 8I74T400300.01P-1, 8I74T400300.00-000 8I74T400400.01P-1, 8I74T400400.00-000	Yes	195 000 h	115 000 h
8I74T400550.01P-1, 8I74T400550.00-000 8I74T400750.01P-1, 8I74T400750.00-000	Yes	75 000 h	50 000 h
8I74T401100.01P-1, 8I74T401100.00-000 8I74T401500.01P-1, 8I74T401500.00-000	Yes	75 000 h	50 000 h

1) Intermittent operation: 4020 operating hours and 335x on/off cycles per year

MTTF values from the field

MTTF values for the ACOPOSinverter P74 are between 1,000,000 and 3,000,000 hours.

Note:

- **MTTF: Mean time to failure (in hours, corresponds to the average failure interval)**
- **MTBF: Mean time between two failures = MTTF + MTTR**
- **MTTR: Mean time to repair (average repair time)**

Recommended circuit breaker for IEC applications

ACOPOSinverter P74			Circuit breaker		
Motor power		Product ID	Model number	Rating	Max. short circuit Icu
kW	HP			A	kA
1-phase 200-240 V 50/60 Hz					
0.18	0.25	8I74S200018.01P-1, 8I74S200018.00-000	GV2 L08	4	>100
0.37	0.5	8I74S200037.01P-1, 8I74S200037.00-000	GV2 L10	6.3	>100
0.55	0.75	8I74S200055.01P-1, 8I74S200055.00-000	GV2 L14	10	>100
0.75	1	8I74S200075.01P-1, 8I74S200075.00-000	GV2 L16	14	>100
1.1	1.5	8I74S200110.01P-1, 8I74S200110.00-000	GV2 L16	14	>100
1.5	2	8I74S200150.01P-1, 8I74S200150.00-000	GV2 L20	18	>100
2.2	3	8I74S200220.01P-1, 8I74S200220.00-000	GV2 L22	25	50
3-phase 380-500 V 50/60 Hz					
0.37	0.5	8I74T400037.01P-1, 8I74T400037.00-000	GV2 L07	2.5	>100
0.55	0.75	8I74T400055.01P-1, 8I74T400055.00-000	GV2 L08	4	>100
0.75	1	8I74T400075.01P-1, 8I74T400075.00-000	GV2 L08	4	>100
1.1	1.5	8I74T400110.01P-1, 8I74T400110.00-000	GV2 L10	6.3	>100
1.5	2	8I74T400150.01P-1, 8I74T400150.00-000	GV2 L14	10	>100
2.2	3	8I74T400220.01P-1, 8I74T400220.00-000	GV2 L14	10	>100
3	-	8I74T400300.01P-1, 8I74T400300.00-000	GV2 L16	14	50
4	5	8I74T400400.01P-1, 8I74T400400.00-000	GV2 L16	14	50
5.5	7.5	8I74T400550.01P-1, 8I74T400550.00-000	GV2 L22	25	50
7.5	10	8I74T400750.01P-1, 8I74T400750.00-000	GV2 L32	32	50
11	15	8I74T401100.01P-1, 8I74T401100.00-000	GV2 L40	40	50
15	20	8I74T401500.01P-1, 8I74T401500.00-000	GV2 L50	50	50

1) This product is not included in B&R's product portfolio and can be obtained from Schneider Electric. Additional information can be found online at www.schneider-electric.com.

4.5.4 Debounce Time and Response Time

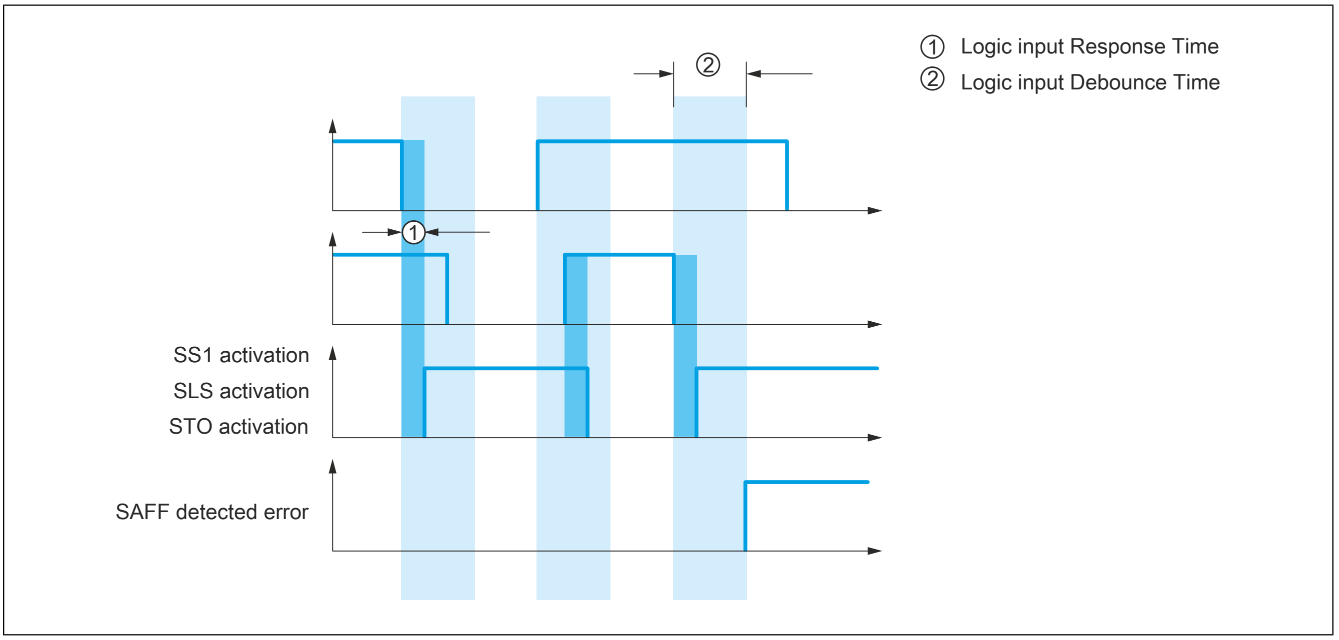
Description

On the ACOPOSinverter P74 there are two parameters to configure logic inputs for safety function (LI3, LI4, LI5 and LI6).

The consistency of each pair of logical input is verified continuously.

[LI debounce time]LIdt: A logical state difference between LI3/LI4 or LI5/LI6 is allowed during debounce time, otherwise a detected error is activated.

[LI response time]LIrt: The logic input response time manages the safety function activation shift.



4.6 Certified Architectures

4.6.1 Introduction

Certified Architectures

> **Note:**
>
> **For certification relating to functional aspects, only the PDS(SR) (Power Drive System suitable for use in safety-related applications) will be considered, not the complete system into which it is integrated to help to ensure the functional safety of a machine or a system/process.**

These are the certified architectures:

- "Multi-drive with safety relay - Scenario 1"
- "Multi-drive with safety relay - Scenario 2"
- "Multi-drive without safety relay"
- "Process control system - Scenario 1 - Example A"
- "Process control system - Scenario 1 - Example B"
- Process control system - Scenario 2 - Example A
- Process control system - Scenario 2 - Example B
- Safety in accordance with IEC 61508 and IEC 60204-1 - Scenario 1
- Safety in accordance with IEC 61508 and IEC 60204-1 - Scenario 2

The safety functions of a PDS(SR) (Power Drive System suitable for use in safety-related applications) are part of an overall system.

If the qualitative and quantitative safety-related objectives determined by the final application require some adjustments to ensure safe use of the safety functions, the integrator of the BDM (Basic Drive Module) is responsible for these additional changes (for example, managing the mechanical brake on the motor).

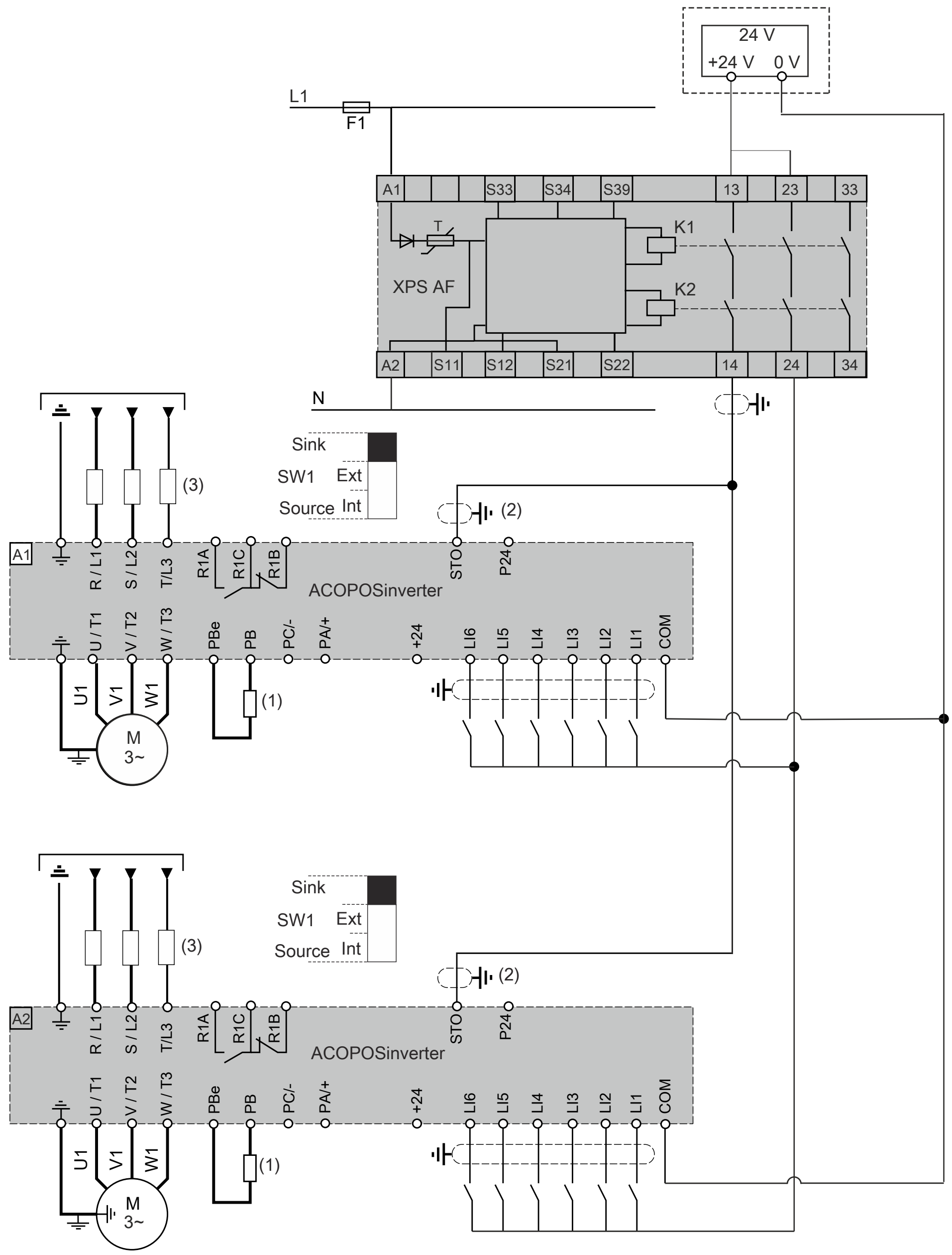
Also, the output data generated by the use of safety functions (fault relay activation, error codes or information on the display, etc.) is not considered to be a safety-related data.

4.6.2 Multi-drive with safety relay - Scenario 1

Safety in accordance with EN 954-1, ISO 13849-1 and IEC 60204-1

The following configurations apply to the diagram:

- STO category 4, PL e / SIL3: Machine with safety controller using a safety relay, LI3 = STO
- SLS category 3, PL d / SIL2 or SS1 type B category 3 on LI5/LI6
  or
- STO category 4, PL e / SIL3: Machine with safety controller using a safety relay, LI3 = STO
- LI4/LI5 not set to a safety function



(1) Bremswiderstand (sofern verwendet)

(2) Standardisiertes Koaxialkabel vom Typ RG174/U gemäß MIL-C17 oder KX3B gemäß NF C 93-550 mit 2,54 mm (0,09 in.) Durchmesser, max. Länge 15 m (49,21 ft). Die Kabelabschirmung muss geerdet sein.

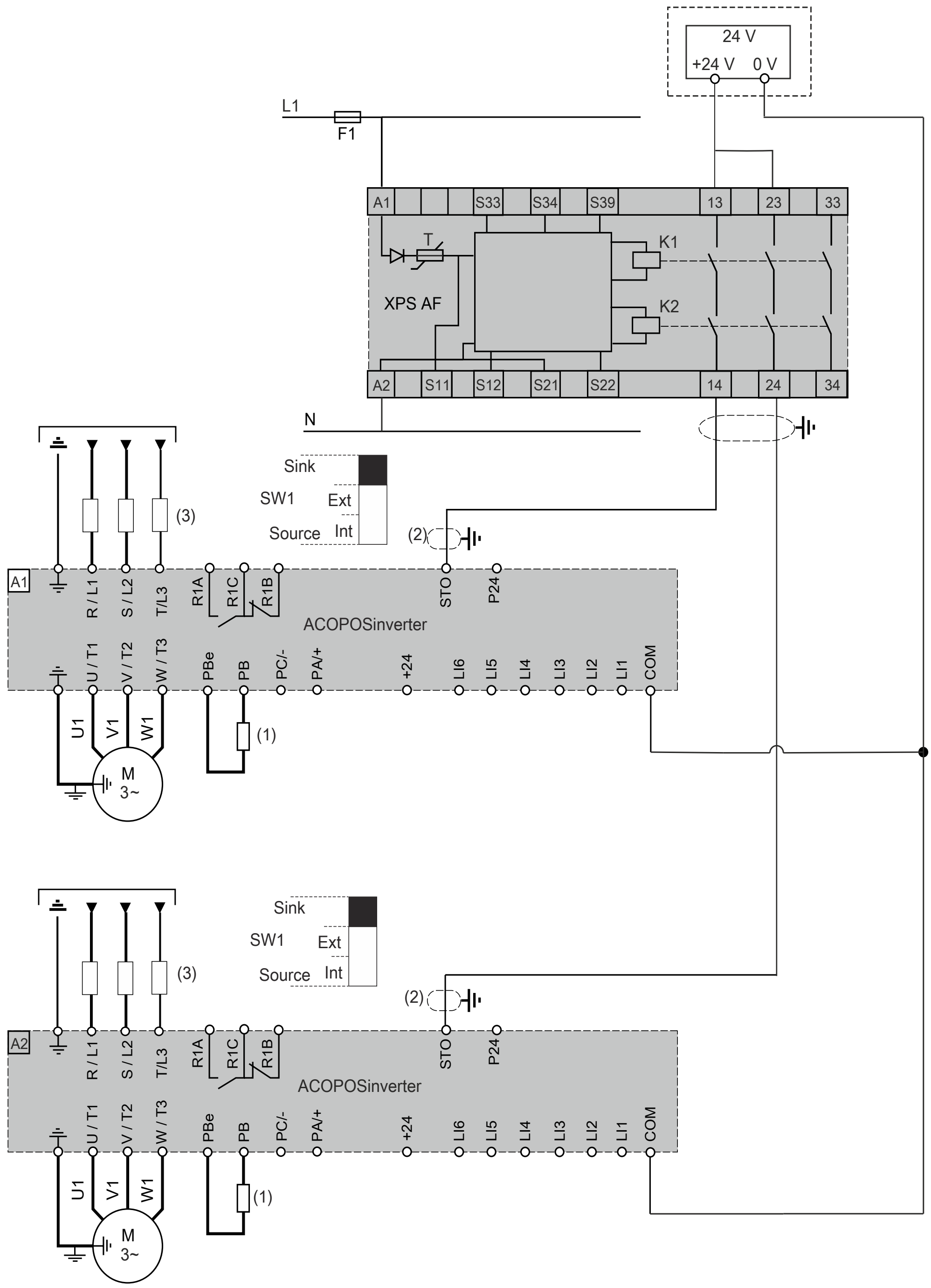
(3) Netzdrossel (sofern verwendet)

4.6.3 Multi-drive with safety relay - Scenario 2

Safety in accordance with EN 954-1, ISO 13849-1 and IEC 60204-1 (machine)

The following configurations apply to the diagram below:

- STO category 3, PL d / SIL2: Machine with safety controller using a safety relay
- SLS category 3, PL d / SIL2 or SS1 type B category 3 on LI3/LI4 or LI5/LI6



(1) Bremswiderstand (sofern verwendet)

(2) Standardisiertes Koaxialkabel vom Typ RG174/U gemäß MIL-C17 oder KX3B gemäß NF C 93-550 mit 2,54 mm (0,09 in.) Durchmesser, max. Länge 15 m (49,21 ft). Die Kabelabschirmung muss geerdet sein

(3) Netzdrossel (sofern verwendet)

4.6.4 Multi-drive without safety relay

Multi-drive without safety relay in accordance with IEC 61508

The following configurations apply to the diagram below:

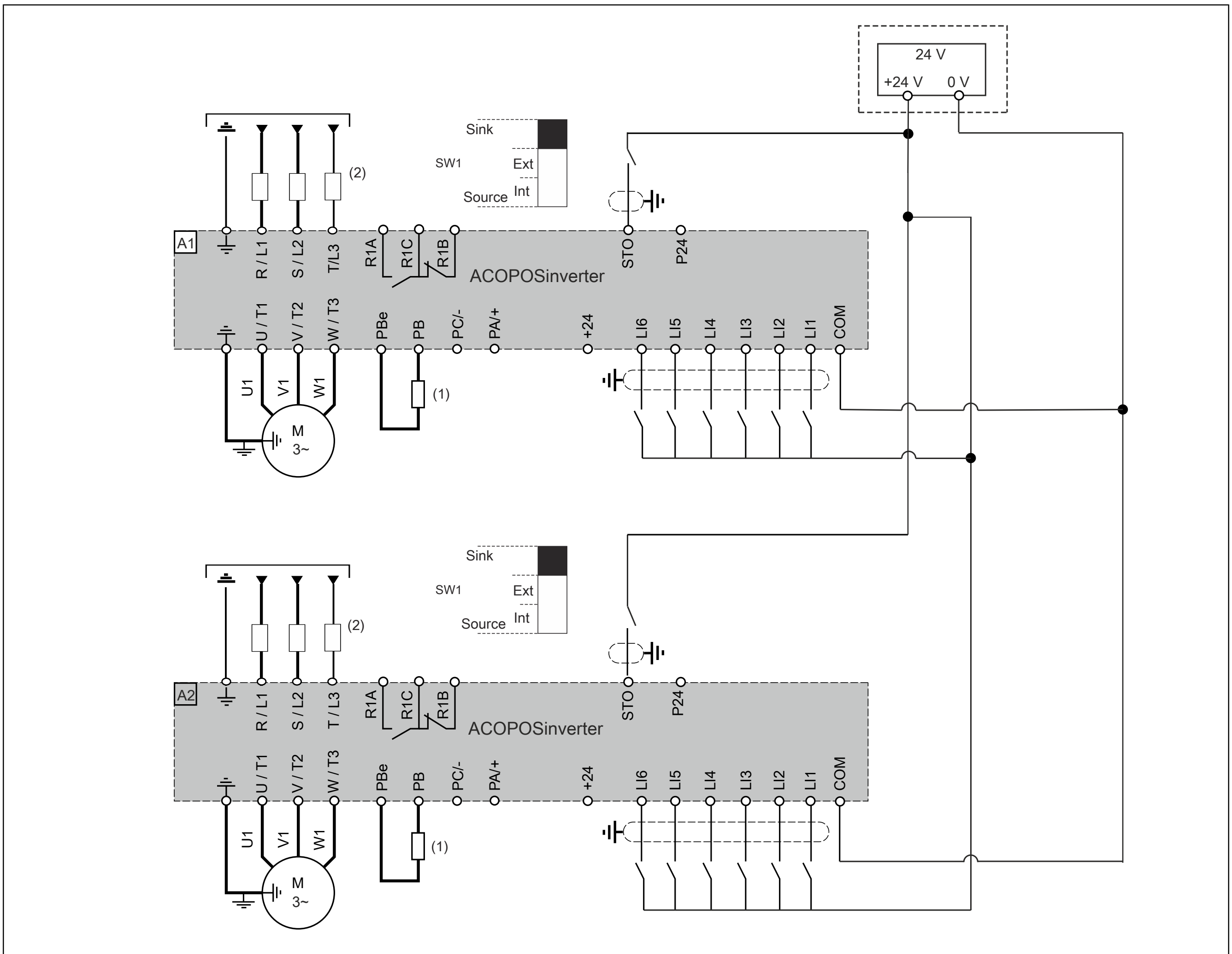
- STO SIL2 on STO
- SLS SIL2 or SS1 type B SIL2 on LI3/LI4 or LI5/LI6

  or
- STO SIL2 on STO
- SLS or SS1 type B on LI3/LI4
- LI5/LI6 not set to a safety function

  or
- STO SIL2 on STO
- LI3/LI4 and LI5/LI6 not set to a safety function

  or
- STO SIL3 on STO and LI3
- SLS SIL2 or SS1 type B SIL2 on LI5/LI6
- LI4 not set to a safety function

  or
- STO SIL3 on STO and LI3
- LI4 and LI5/LI6 not set to a safety function



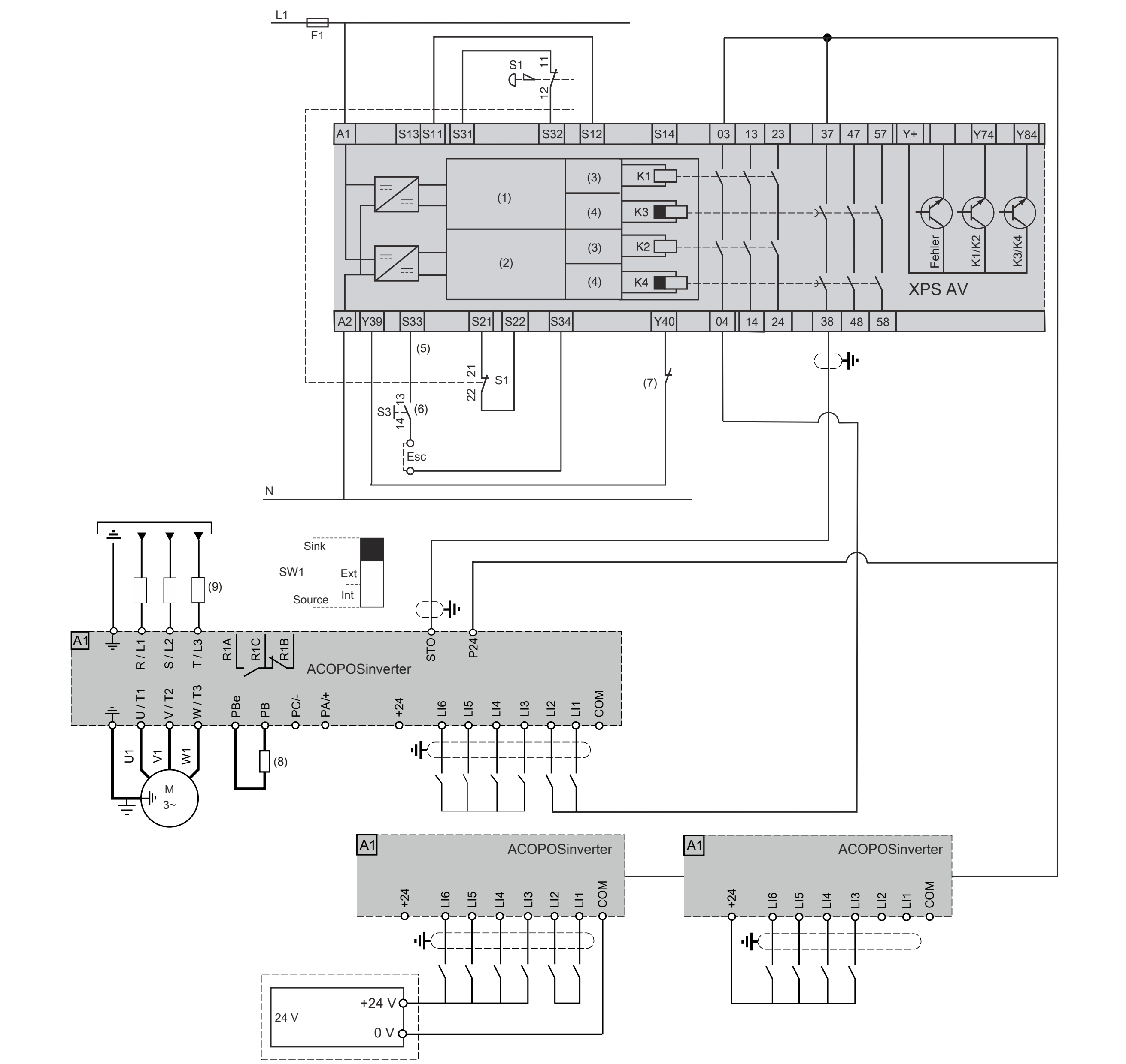
(1) Bremswiderstand (sofern verwendet)
(2) Netzdrossel (sofern verwendet)

4.6.5 Process control system - Scenario 1 - Example A

Safety in accordance with EN 954-1, ISO 13849-1 and IEC 60204-1 (machine)

The following configurations apply to the diagram below:

- SS1 type C category 3, PL d/SIL2 on STO with safety relay
  or
- SS1 type C category 3, PL d/SIL2 on STO with safety relay
- SLS category 3, PL d/SIL2 or SS1 type B category 3 on LI3/LI4
- LI5/LI6 not set to a safety function
  or
- SS1 type C category 3, PL d/SIL2 on STO and LI3 with safety relay
- LI3/LI4 and LI5/LI6 not set to a safety function



(1) Kanal 1 Logik

(2) Kanal 2 Logik

(3) Ausgang 1

(4) Ausgang 2

(5) Not-Aus

(6) Start

(7) Verzögerung Stopp

(8) Bremswiderstand (sofern verwendet)

(9) Netzdrosseln (sofern verwendet)

4.6.6 Process control system - Scenario 1 - Example B

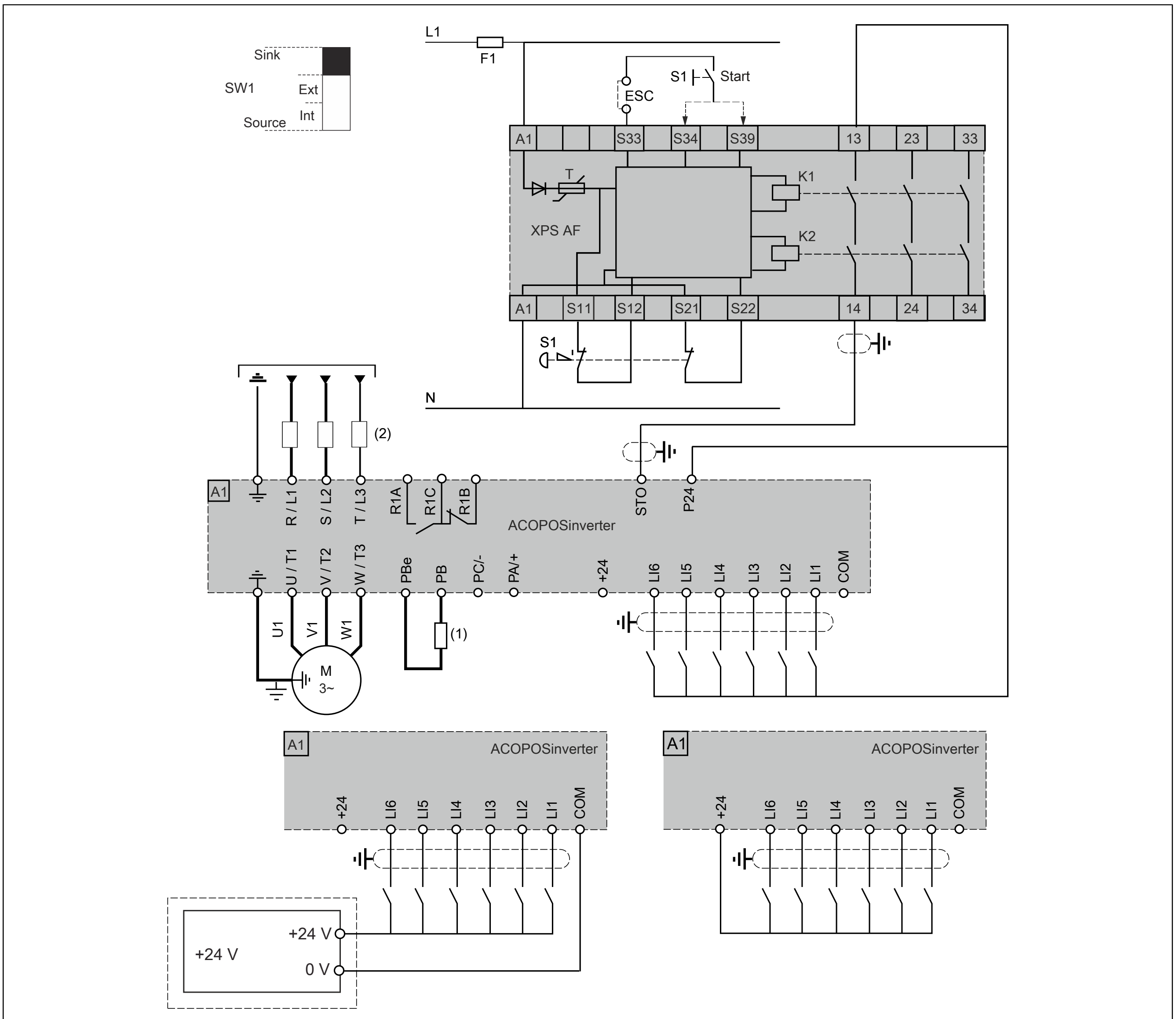
Safety in accordance with EN 954-1, ISO 13849-1 and IEC 60204-1 (machine)

The following configurations apply to the diagram below:

- STO category 3, PL d/SIL2 on STO with safety relay
- SLS category 3, PL d/SIL2 or SS1 type B category 3 on LI3/LI4 or LI5/LI6

  or
- STO category 3, PL d / SIL2 on STO with safety relay
- SLS category 3, PL d / SIL2 or SS1 type B category 3 on LI3/LI4
- LI5/LI6 not set to a safety function

  or
- STO category 3, PL d/SIL2 on STO with safety relay
- LI3/LI4 and LI5/LI6 not set to a safety function



(1) Braking resistor, if used

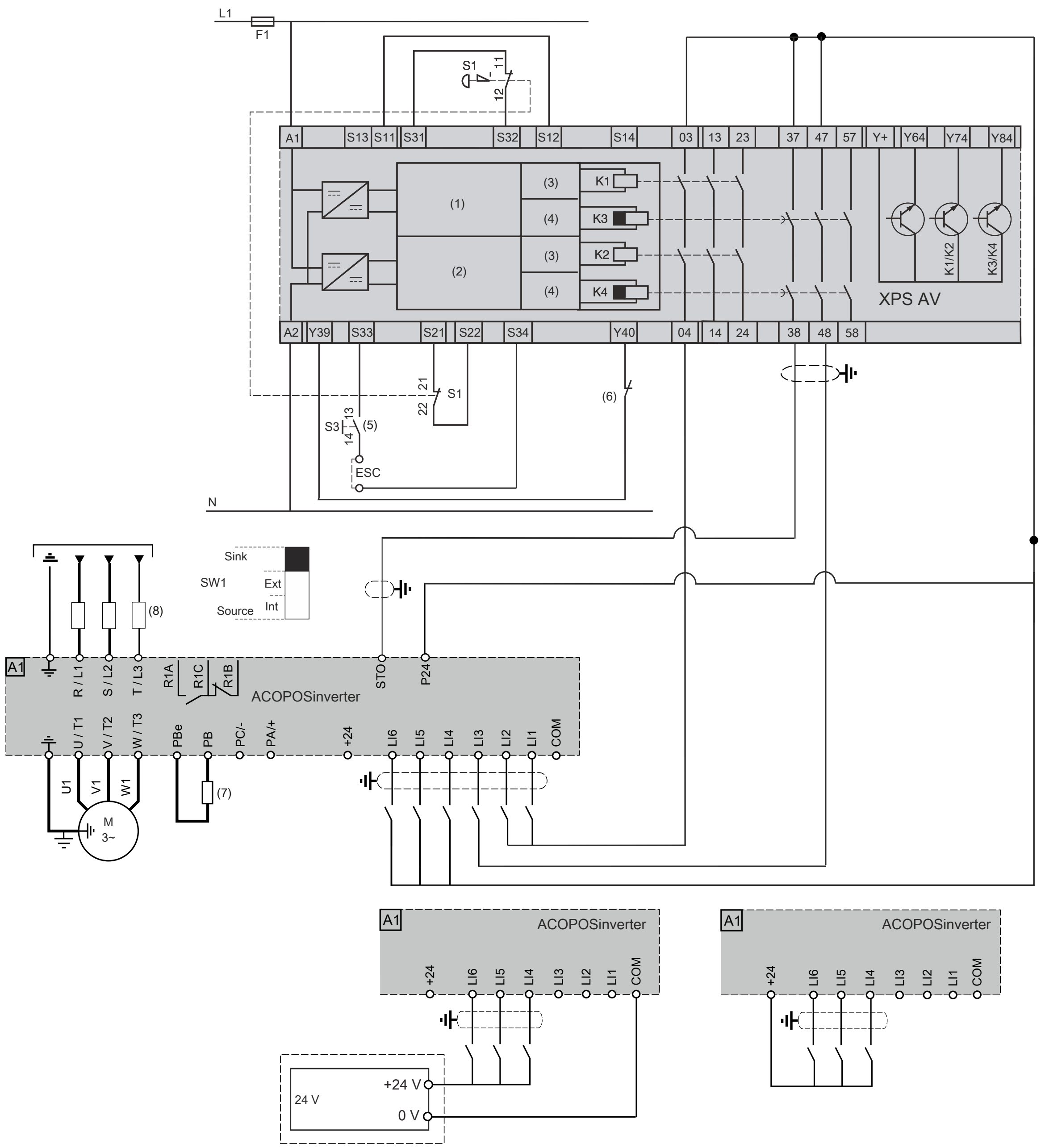
(2) Line chokes, if used

4.6.7 Process control system - Scenario 2 - Example A

Safety in accordance with EN 954-1, ISO 13849-1 and IEC 60204-1 (machine)

The following configurations apply to the diagram below:

- SS1 type C category 4, PL d / SIL3 on STO and LI3 with safety relay
  or
- SS1 type C category 3, PL d / SIL2 on STO with safety relay
- SLS category 3, PL d / SIL2 or SS1 type B category 3 PL d / SIL2 on LI5/LI6
- LI3/LI4 not set to a safety function



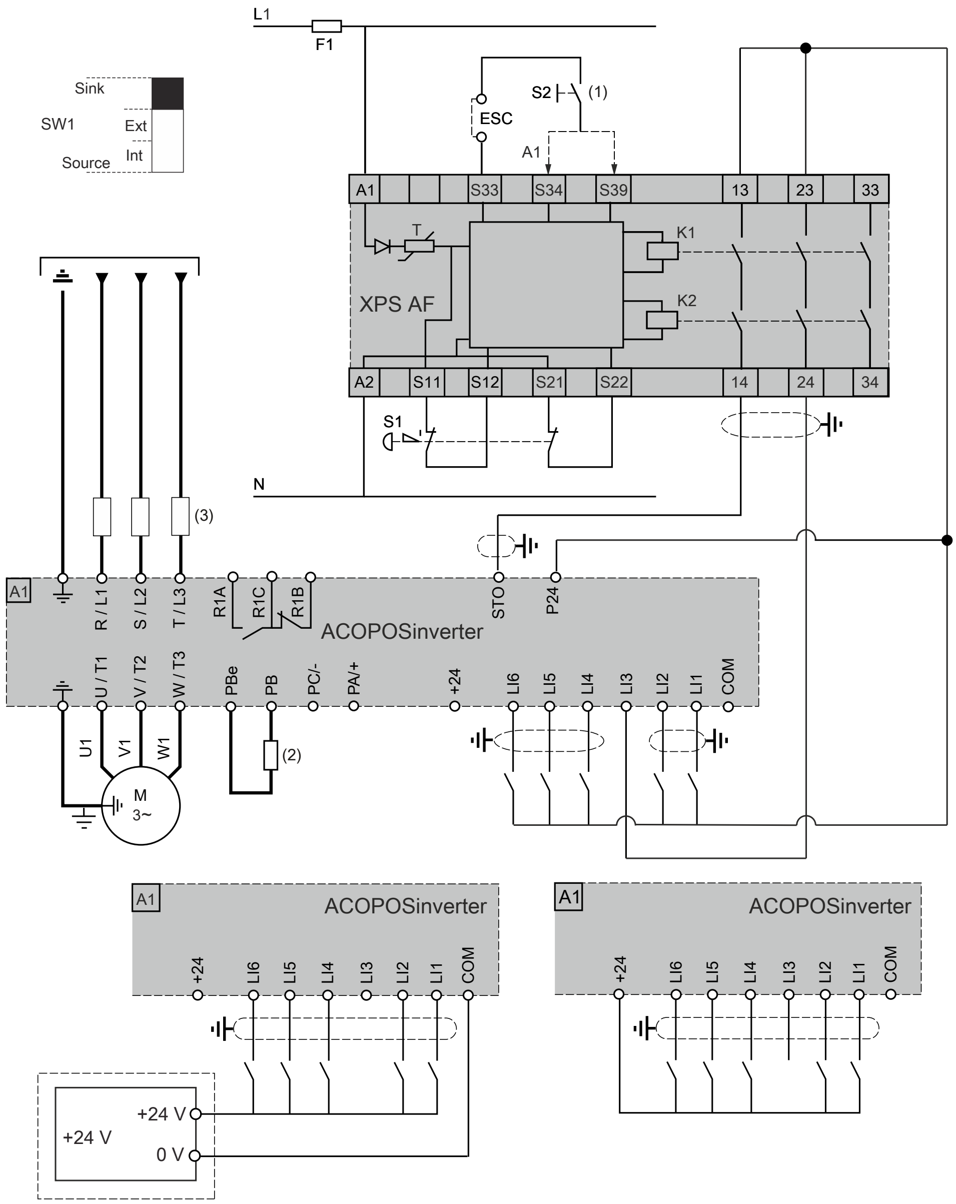
(1) Channel 1 logic
(2) Channel 2 logic
(3) Output 1
(4) Output 2
(5) Emergency stop
(6) Time delay stop
(7) Braking resistor, if used
(8) Line chokes, if used

4.6.8 Process control system - Scenario 2 - Example B

Safety in accordance with EN 954-1, ISO 13849-1, IEC 62061 and IEC 60204-1 (machine)

The following configurations apply to the diagram below:

- STO category 4, PL e/SIL3 on STO with safety relay and LI3 = STO
- SLS category 3, PL d/SIL2 or SS1 type B category 3 on LI5/LI6
- LI4 not set to a safety function



(1) Start

(2) Braking resistor, if used

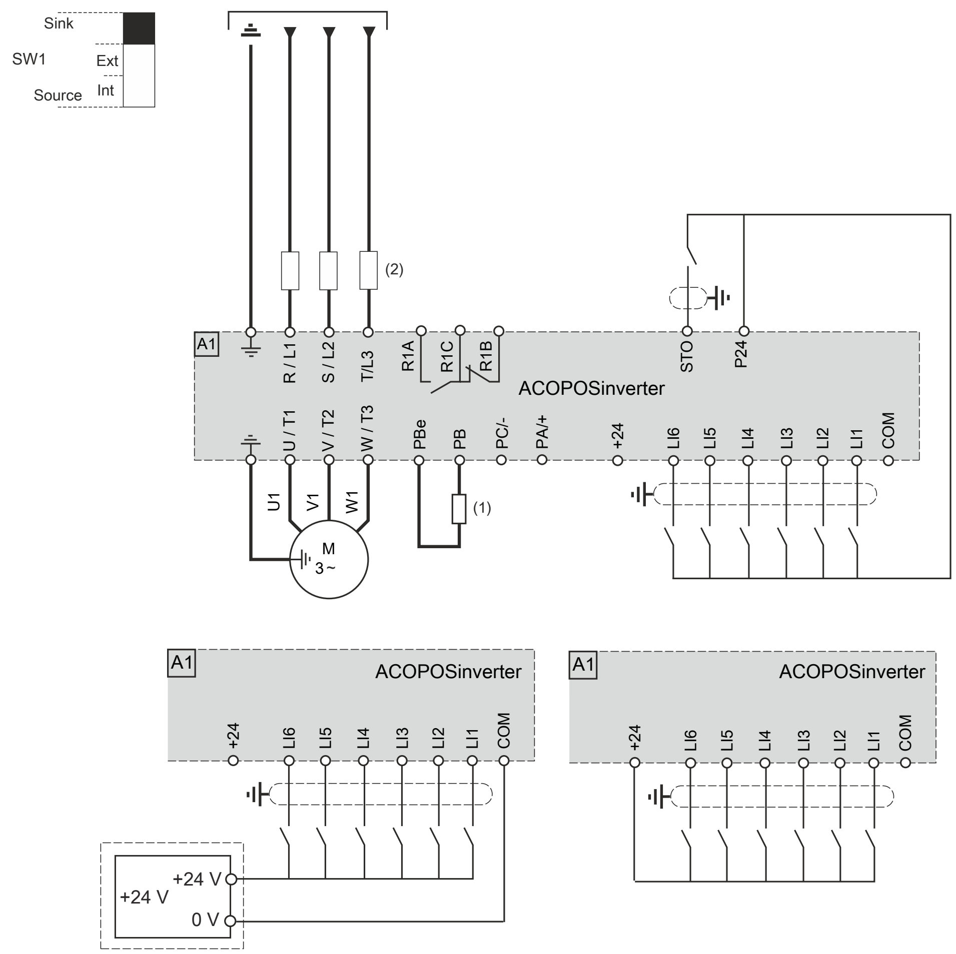
(3) Line chokes if used

4.6.9 Safety in accordance with IEC 61508 and IEC 60204-1 - Scenario 1

Without protection against power supply interruption or voltage reduction and subsequent rotation

The following configurations apply to the diagram below:

- STO SIL2 on STO
- STO or SLS SIL2 or SS1 type B SIL2 on LI3/LI4 or LI5/LI6
  or
- STO SIL2 on STO
- STO or SLS or SS1 type B on LI3/LI4
- LI5/LI6 not set to a safety function
  or
- STO SIL2 on STO
- LI3/LI4 and LI5/LI6 not set to a safety function
  or
- STO SIL3 on STO and LI3
- SLS SIL2 or SS1 type B SIL2 on LI5/LI6
- LI4 not set to a safety function
  or
- STO SIL3 on STO and LI3
- LI4 and LI5/LI6 not set to a safety function



(1) Bremswiderstand (sofern verwendet)

(2) Netzdrosseln (sofern verwendet)

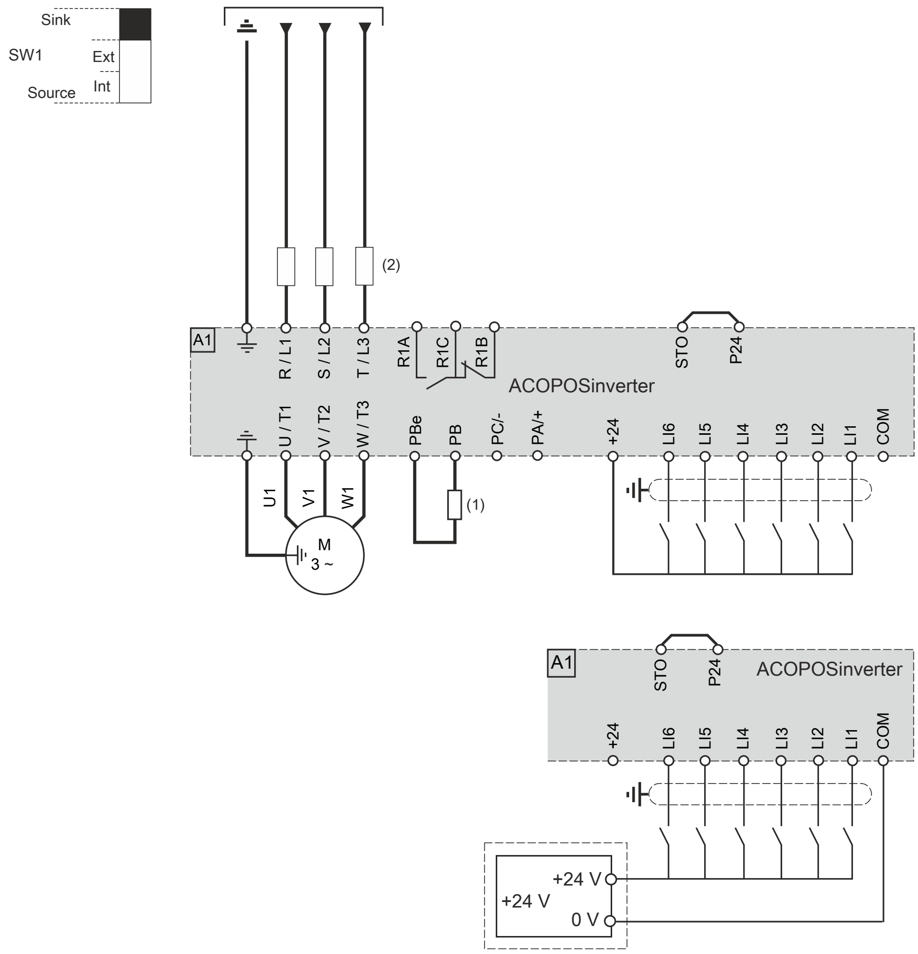
4.6.10 Safety in accordance with IEC 61508 and IEC 60204-1 - Scenario 2

Without protection against power supply interruption or voltage reduction and subsequent rotation

The following configurations apply to the diagram below:

- STO SIL2 on LI3 and LI4
- SLS SIL2 or SS1 type B SIL2 on LI5/LI6
  or
- STO SIL2 on LI3 and LI4
- LI5/LI6 not set to a safety function

Wiring Diagram



(1) Braking resistor, if used
(2) Line chokes if used

4.7 Commissioning

4.7.1 Safety Functions Tab

Introduction

To access the safety function configuration, click the Safety Functions tab. This screen is read-only, allowing you to see all current safety function configurations.

The Safety Functions tab provides access to:

- An outline of the safety function features available on the ACOPOSinverter P74 (accessible online/offline)
- The status of all I/O in connected mode
- General information about the machine (online/offline)

It also provides access to the following dialog boxes:

- **Configuration**
    - **Configure** (only available in connected mode)
    - **Reset Configuration**
    - **Copy from DEVICE to PC**
    - **Copy from PC to DEVICE**
- **Password Configuration**
    - **Modify Password**
    - **Reset Password**

Steps to Configure the Safety Functions

If you are not in online mode then click **Communication -> Connect to Device** in the menu bar or click the **Connect to Device** icon.

If you are in online mode then click the **Configure** button in the **Safety Functions** tab.

1. Click the **Configure** button in the **Safety Function** tab
   A **Define Configuration Password** dialog box appears:
    - Type the new configuration password in **Enter NewPassword** box
    - Retype the new configuration password in **Confirm NewPassword** box.
    - Click **Ok**

> **Note:**
>
> **Your password:**
>
> - **Should have only numeric value, choose the value between 1 and 65535**
> - **Should not exceed more than five digits**
> - **Should not have the value 0**

Result: Opens the **Configuration of Safety Functions** window.

If you have already defined the password then type your safety function configuration password in **Enter Configuration Password** box, click **Ok**.

Result: Opens the **Configuration of Safety Functions** window.

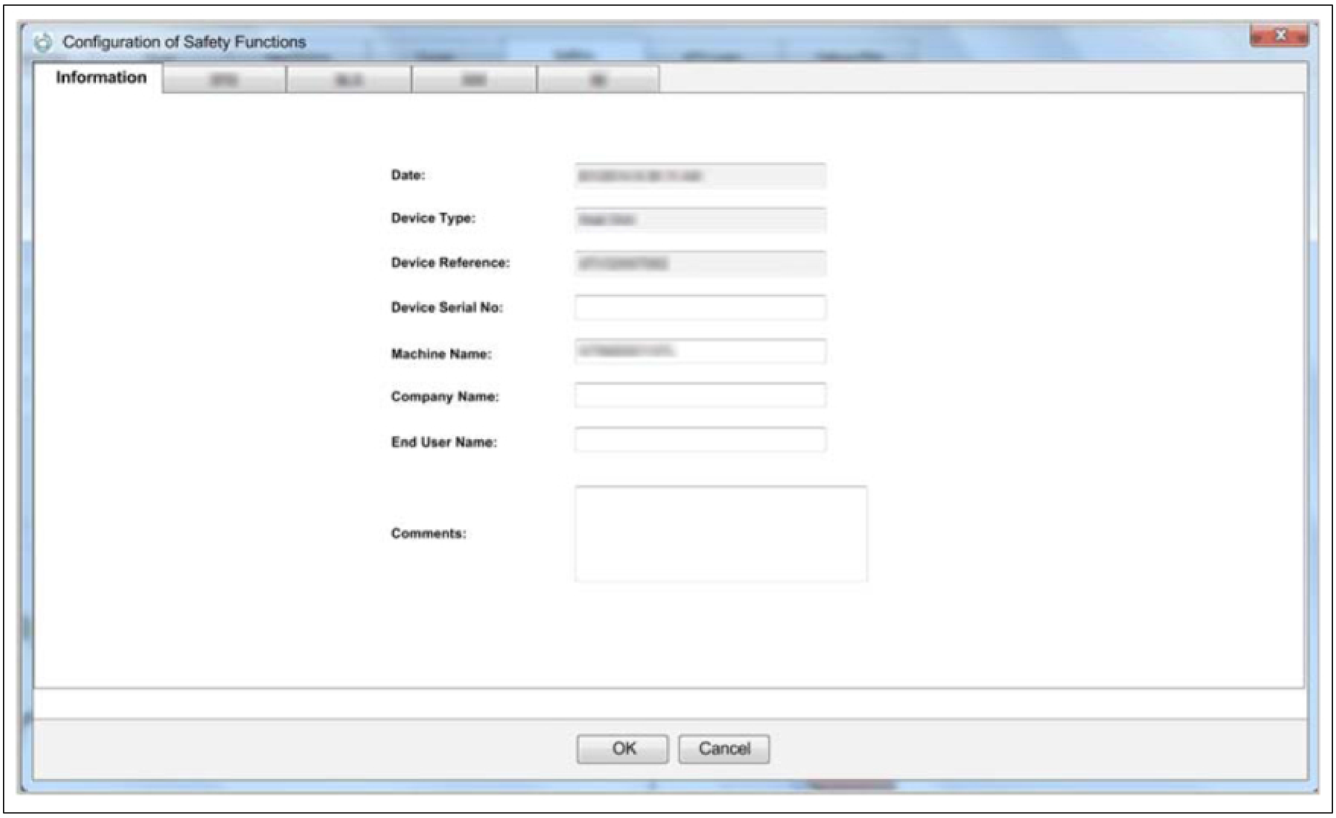
4.7.2 Configure Safety Functions Panel

Overview

The **Configuration of Safety Functions** panel includes the **Information, STO, SLS, SS1** and **Input/Output** tabs.

Information Tab

The information tab allows you to define and display product system information.



Information filled in automatically by ACPi Parameter Tool:

- **Date** (format depends on the PC local and linguistic options)
- **Device Type**
- **Drive Reference**

Information filled in manually:

- **Device Serial No** (number)
- **Machine Name**
- **Company Name**
- **End-User Name**
- **Comments**

Safe Torque Off (STO) Tab

For this function, only the associated set of inputs should be selected in the box. The parameter to be managed is: STOA.

Code	Name / Description	Factory setting
StO	**[Safe Torque Off]**	
StOA nO L34 L56 L3PW	**[STO function activation]** **[No: Not assigned]** **[LI3 and LI4]**: Logic input 3/4 low state **[LI5 and LI6]**: Logic input 5/6 low state **[LI3 and STO]**: Logic input 3/STO low state This parameter is used to configure the channel used to trigger the STO function. If you set STOA = No, STO function is always active but just on STO input.	**[No]** (nO)

Safely Limited Speed (SLS) Tab

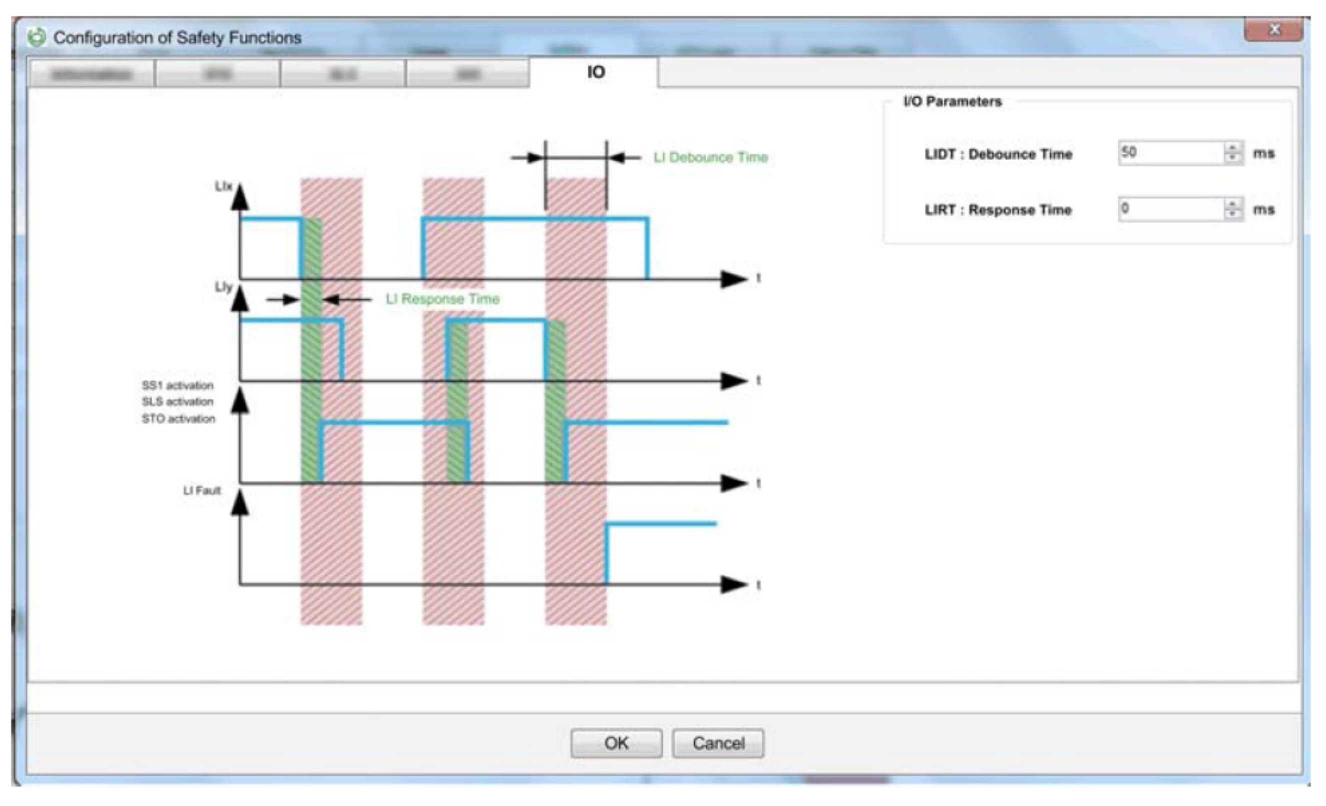
Code	Name / Description	Adjustment range	Factory setting
SLS	[Safely-Limited Speed]		
SLSA nO L34 L56	[SLS function activation] [No]: Not assigned [LI3 and LI4]: Logic input 3/4 low state [LI5 and LI6]: Logic input 5/6 low state This parameter is used to configure the channel used to trigger the SLS function.		[No] (nO)
SLt tYp1 tYp2 tYp3 tYp4	[Safely Limited speed Type Element] This parameter is used to select the SLS type. [Type1]: SLS type 1 [Type2]: SLS type 2 [Type3]: SLS type 3 [Type4]: SLS type 4 Refer to function description to have information about behavior of different type.		[Type1] (tYp1)
SLSP	[SLS set point] This parameter is only visible if SLT = Type2 or SLT = Type3 or SLT = Type 4. SLSP is used to set the maximum speed.	0.0 to 599.0 Hz	0.0 Hz
SLtt	[SLS tolerance threshold] The behavior of this parameter depends on the value of SLT.	0.0 to 599.0 Hz	0.0 Hz
SLwt	[SLS Wait Time] This parameter is used to set the maximum time for StFr to be greater than SSSL. When SLwt is reached, STO function is triggered. Unit of this parameter is 1 ms. For example: If the value is set to 2000 units, then the SLS wait time in second is: 2000 x 1 ms = 2 s This parameter can be modified only if SLT = Type 2 or SLT = Type 3 For SLS type 1 and SLS type 4, SLwt is always set to 0.	0 to 5000 ms	0 ms
SSrt	[SS1 ramp value] The unit depends on the SSRU parameter. Use this parameter to set the value of the SS1 deceleration ramp. SS1 ramp = SSRT x SSRU example: If SSRT = 250 and SSRU = 1 Hz/s then the deceleration ramp = 25 Hz/s. This parameter is similar to the SS1 safety function.	0.1 to 599.0 Hz	0.1 Hz
SSrU 1H 10H 100H	[SS1 ramp unit] [1 Hz/s] [10 Hz/s] [100 Hz/s] This parameter is used to set the SSrt unit. This parameter is similar to the SS1 safety function configured.		[1 Hz/s] (1H)
SStt	[SS1 trip threshold] This parameter sets the tolerance zone around the deceleration ramp in which the frequency may vary. This parameter is similar to the SS1 safety function configured in another tab.	0.0 to 599.0 Hz	0.0 Hz
SSSL	[SLS/SS1 standstill level] This parameter adjusts the frequency at which the drive should go into STO state at the end of the SS1 ramp. This parameter is similar to the SS1 safety function configured in another tab.	0.0 to 599.0 Hz	0.0 Hz

Safe Stop 1 (SS1) Tab

Code	Name / Description	Adjustment range	Factory setting
SS1	[Safe Stop 1]		
SS1A nO L56	[Safe Stop 1] [No]: Not assigned [LI5 and LI6]: Logic input 5/6 low state This parameter is used to configure the channel used to trigger the SS1 function.		[No] (nO)
SSrt	[SS1 ramp value] The unit depends on the SSRU parameter. Use this parameter to set the value of the SS1 deceleration ramp. SS1 ramp = SSRT x SSRU example: If SSRT = 250 and SSRU = 1 Hz/s then the deceleration ramp = 25 Hz/s. This parameter is similar to the SLS safety function configured in another tab.	0.1 to 599.0 Hz	0.1 Hz
SSrU 1H 10H 100H	[SS1 ramp unit] [1 Hz/s] [10 Hz/s] [100 Hz/s] This parameter is used to set the SSRT unit. This parameter is similar to the SLS safety function configured in another tab.		[1 Hz/s] (1H)
SStt	[SS1 trip threshold] This parameter sets the tolerance zone around the deceleration ramp in which the frequency may vary. This parameter is similar to the SLS safety function configured.	0.0 to 599.0 Hz	0.0 Hz
SSSL	[SLS/SS1 standstill level] This parameter adjusts the frequency at which the drive should go into STO state at the end of the SS1 ramp. This parameter is similar to the SLS safety function configured in another tab.	0.0 to 599.0 Hz	0.0 Hz

Input/Output Configuration

The figure shows the **Input/Output** tab:



Code	Name / Description	Adjustment range	Factory setting
IO	[Input/Output]		
LIdt	[LI debounce time]	0 to 2000 ms	50 ms
	In most cases, the two logic inputs in a pair used for a safety function (LI3-LI4 or LI5-LI6 or STO-LI3) will not be 100% synchronized. They will not change state at the same time. There is a small delta between the two logic input transitions. LIdt is the parameter used to set this delta. If the two logic inputs change state with a delta lasting less than LIdt it is considered to be simultaneous transition of the logic inputs. If the delta lasts longer than LIdt, the drive considers the logic Inputs are no longer synchronized and detected error is triggered.		
LIrt	[LI response time]	0 to 50 ms	0 ms
	This parameter is used to filter short impulses on the logic input (only for LI3-LI4 or LI5-LI6, STO not concerned). Some applications send short impulses on the line to test it. This parameter is used to filter these short impulses. Commands are only taken into account if the duration is longer than LIrt. If the duration is shorter the drive considers that there is no command: the command is filtered.		

Password Configuration - Modify Password

This function allows you to modify the configuration password in the drive.

To modify the configuration password

1. In **Safety Functions** tab, click the **Modify Password** button.
   Result: opens the **Modify Configuration Password** dialog box.
2. In the **Modify Configuration Password** dialog box:
   - Type the existing configuration password in **Enter Current Password** box
   - Type the new configuration password in **Enter New Password** box
   - Retype the new configuration password in **Confirm New Password** box
   - Click **Ok**

   > **Note:**
   >
   > **The password typed in Enter New Password box and Confirm New Password box should be same.**

   > **Note:**
   >
   > **Your password:**
   >
   > - **Should contain only numeric value, choose the value between 1 and 65535**
   > - **Should not exceed more than five digits**
   > - **Should not have the value 0**

   Result: Modifies the configuration password.

Password Configuration - Reset Password

If you cannot remember the configuration password defined in the drive, you need to know the universal password to reset the drive. To obtain this password, contact your B&R contact.

After this operation, the device reverts to no defined configuration password and the session is automatically closed.

However, the function configuration remains unchanged.

Reset Configuration

This function is used to reset the configuration of the safety function to the factory settings.

To access the function, click the **Reset Configuration** button in the **Safety Functions** tab.

First enter the password, then confirm your choice.

After this action, all safety-related parameters are set to factory settings.

4.7.3 Visualization and Status of Safety Functions

Code	Name / Description
SAF-	**[MONIT. SAFETY]** Visible on ACPi Parameter Tool and keypad.
StFr	**[Stator Frequency]** Displays the estimated stator frequency in Hz.
StOS IdLE StO FLt	**[STO status]** Status of the Safe Torque Off safety function. **[IdLE]**: STO not in progress **[Safe torque off]**: STO in progress **[Fault]**: STO in detected error
SLSS nO IdLE SSI StO FLt WAIt Strt	**[SLS status]** Status of the Safely limited speed safety function. **[Not config]**: SLS not configured **[IdLE]**: SLS not in progress **[Safe stop 1]**: SLS ramp in progress **[Safe torque off]**: SLS safe torque off request in progress **[Fault]**: SLS in detected error **[wAIT]**: SLS waiting for activation **[Started]**: SLS in transient state
SS1S nO IdLE SSI StO FLt	**[SS1 status]** Status of the Safe Stop 1 safety function. **[Not config]**: SS1 not configured **[IdLE]**: SS1 not in progress **[Safe stop 1]**: SS1 ramp in progress **[Safe torque off]**: SS1 safe torque off request in progress **[Fault]**: SS1 in detected error
SAF-	**[MONIT. SAFETY]** Visible ONLY on ACPi Parameter Tool.
SFtY IStd SAFE	**[Safety drive status]** Safety function status of the drive. **[Standard drive]**: Standard product without safety function configured **[Safety drive]**: product with at least one safety function configured

4.7.4 Copying Safety Related Configuration from device to PC and from PC to device

Overview

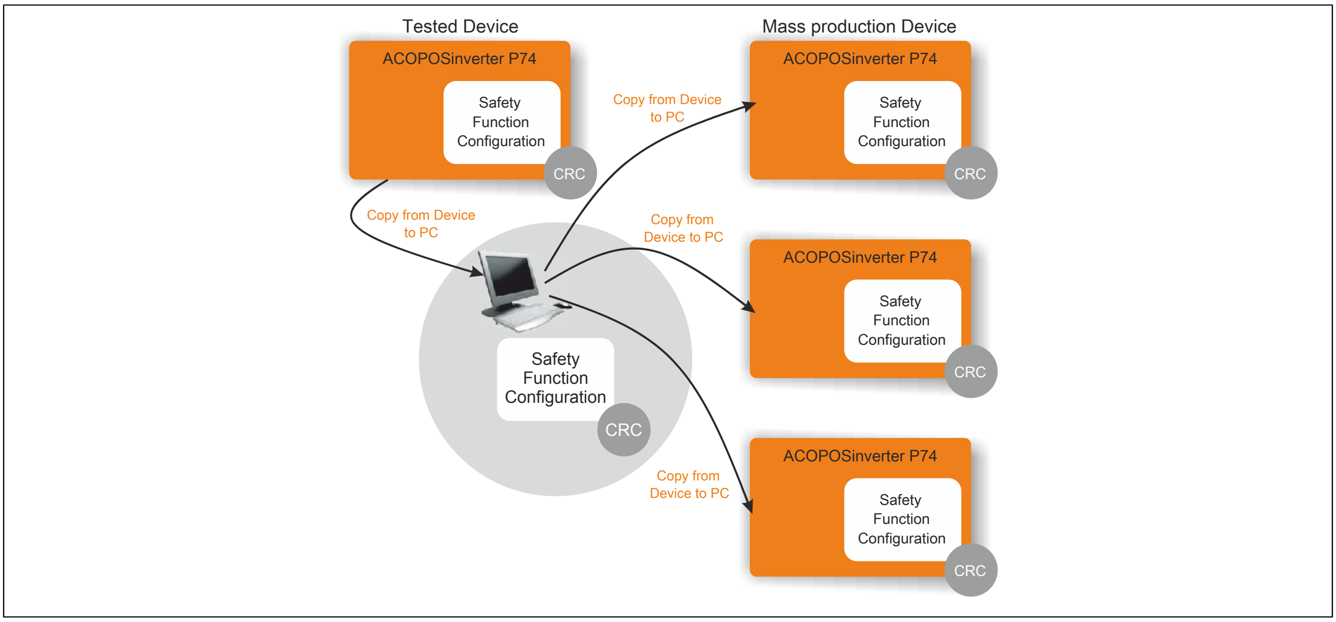
This feature is used to copy/paste the tested safety-related configuration in several ACOPOSinverter P74 drives.

This feature allows you to:

- Identify unique safety-related configuration on the drive
- Copy the safety-related configuration file from ACOPOSinverter P74 drive to PC
- Copy the safety-related configuration file from PC to ACOPOSinverter P74 drives

Architecture

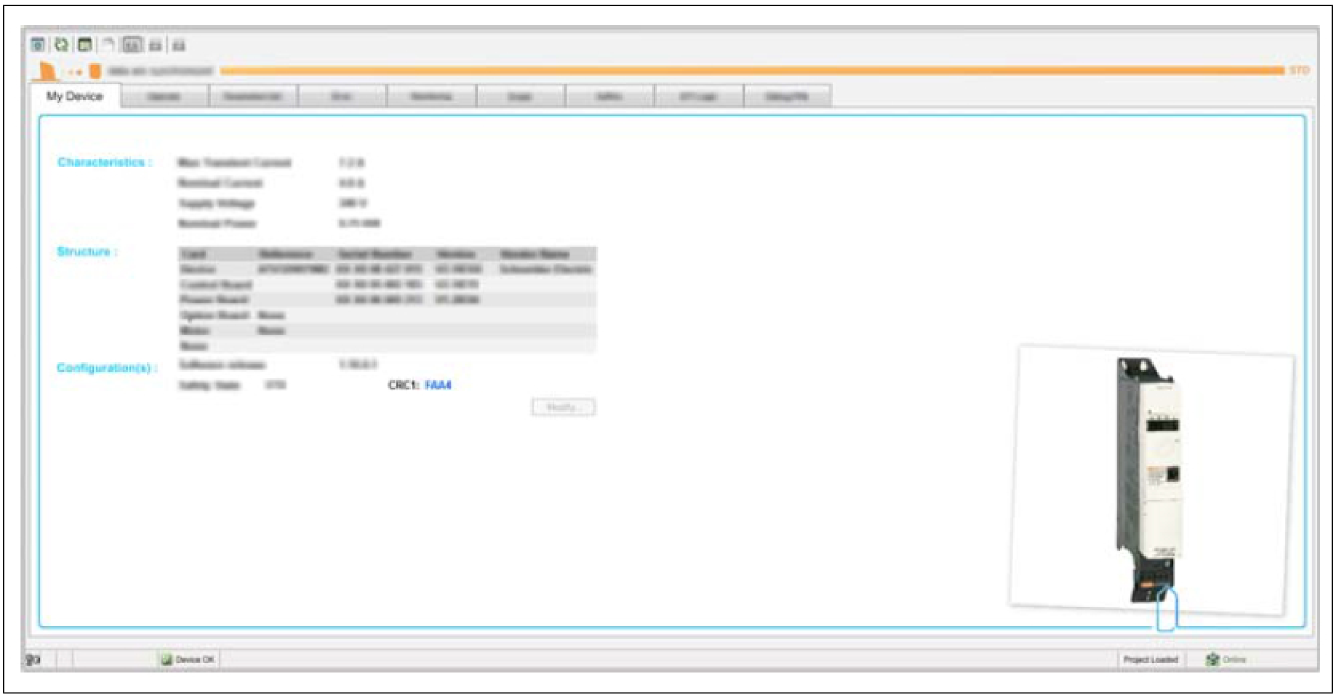
The figure shows the architecture for copying the safety-related configuration from device to PC and PC to device:



Identify Unique Safety Related Configuration

The identification of the safety-related configuration is done by using CRC, calculated using all safety related parameters.

You can get the CRC value from **My Device** tab. Note down the CRC value after the drive is fully tested.



Copy from device to PC

To copy a configuration file from device to PC:

1. In the **Safety Functions** tab, click the **Copy from DEVICE to PC** button

   Result: Opens the **Copy from Device to PC** dialog box.
2. Type the configuration password in **Enter configuration Password** box, click **Ok**.
   Result: Displays the CRC1 value.
3. Note the CRC1 value, click **Save**.
   Result: Opens the Save File... window.
4. In the **Save File..** Window:
   - Select/create the folder
   - Type the name of the file in **File name** box.
   - Click **Save**

   Result: Safety-related Parameters Successfully saved message appears on the screen, which confirms that the file has been saved successfully in the desired path.

Note:

You cannot copy the configuration from device to PC if:

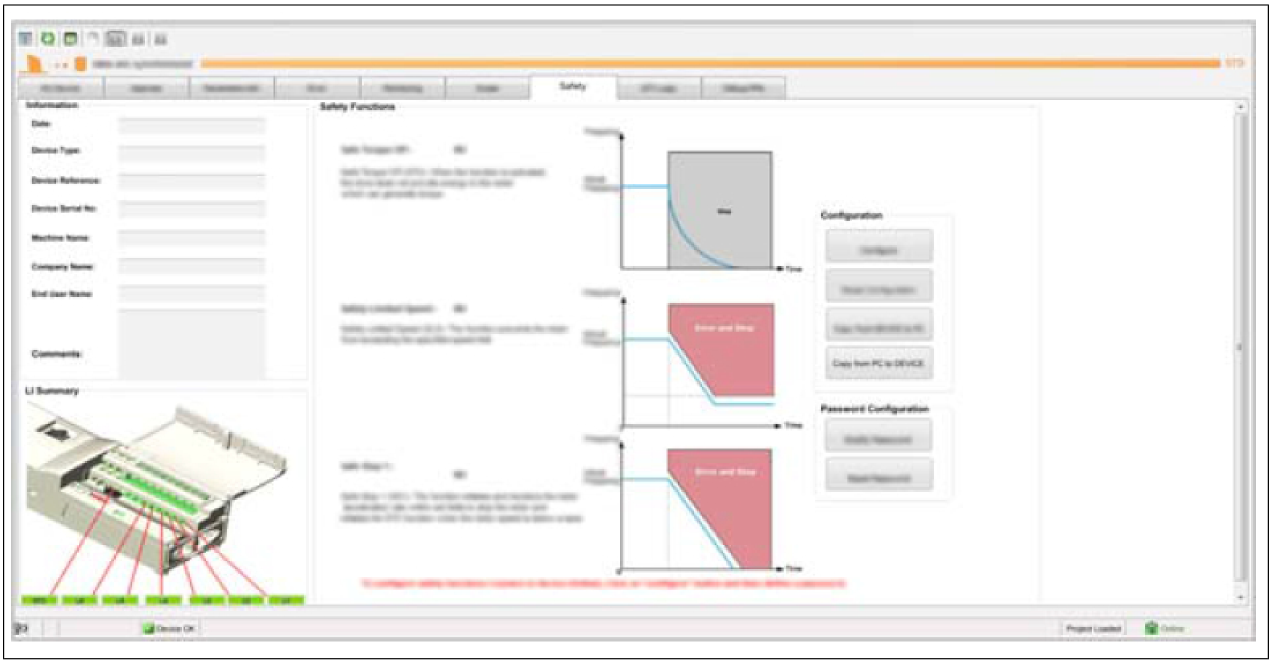
- **The motor is powered**
- **A function block is in Run state**
- **The function Forced Local is active**
- **A safety function is triggered**

Copy from PC to device

> ## Warning!
>
> **UNEXPECTED EQUIPMENT OPERATION**
>
> - **Connect the PC using point-to-point connection**
> - **Copy from PC to device operation should be performed only by qualified IEC61800-5-2 personnel**
> - **Test the safety function configuration after copying the configuration from PC to device**
>
> **Failure to follow these instructions can result in death, serious injury or equipment damage.**

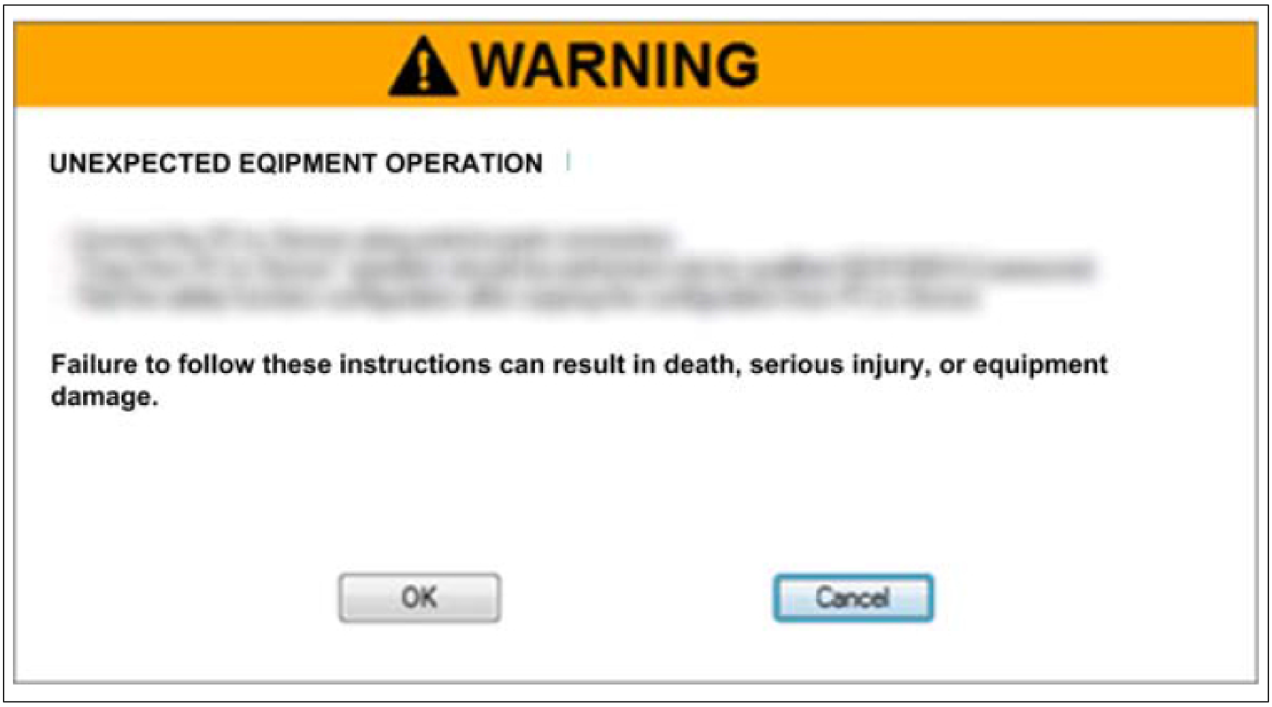
To copy a file from PC to device:

1. In the Safety Functions tab, click the Copy from PC to DEVICE button

   Result: Warning box appears, read the following instruction before proceeding with copy from PC to device operation.

2. Click **OK**

   Result: Opens the **Open File...** window.

3. In the **Open File...** Window:
   - Select .sfty file.
   - Click **Open**

   Result: Displays the CRC1 value.
4. Verify whether the CRC1 value is same as the CRC1 value noted while copying the configuration from device to PC if both CRC1 values are same then click **Continue**.
   Result: Opens the **Copy from PC to Device** dialog box.
5. Type the password (49157) in the **Enter copy password** box, click **Ok**.
   Result: Configuration is successfully copied from PC to device. A commissioning test must be done on the safety function.

Note:

You cannot copy the configuration from PC to device if:

- **The motor is powered**
- **A function block is in Run state**
- **The function Forced Local is active**
- **The configuration of the safety function is already present in the device**

4.7.5 Machine Signature

Overview

The purpose of the test is to verify proper configuration of the defined safety functions and test mechanisms and to examine the response of dedicated monitoring functions to explicit input of values outside the tolerance limits.

The test must cover all drive-specific Safety configured monitoring functions and global Safety integrated functionality in ACOPOSinverter P74.

Condition Prior to Acceptance Test

- The machine is wired up correctly
- All safety-related devices such as protective door monitoring devices, light barriers and emergency stop switches are connected and ready for operation
- All motor parameters and command parameters must be correctly set on the drive

Acceptance Test Process

The acceptance test is configured with ACPi Parameter Tool.

1. Select the **Device -> Safety Function -> MachineSignature** menu and follow the five steps below
2. **General Information**
   To add this step to the final report select **Add to the machine signature**
   Click **Next**
   The information displayed here corresponds to the **Identification** section in the **Safety Functions** tab
3. **Function Summary**
   To add a function to the final report select **Add** to the machine signature
   Click **Next**
   This step is composed of sub-steps. Each sub-step relates to one of the following safety functions:
   STO, SLS, SS1

   In a function, sub-step the function diagram and parameters values are displayed.
   A text box allows you to enter additional text in this step.
4. **I/O Summary**
   To add a function to the final report select **Add** to the machine signature
   Click **Next**
   The information displayed here corresponds to the **Logic Input summary** folder of the **SafetyFunctions** tab:
   The logic input that is assigned to a safety function are displayed in red and show the related safety function
   The logic input that is not assigned to a safety function do not show any assignment and are displayed in green
5. **Test**
   To add a function to the final report select **Add** to the machine signature
   Click **Next**
   In this step, you tick the box when you have tested the safety functions to confirm that you have verified the correct behavior of the functions for all devices.
6. **Key**
   Click **Finish** to create the report
   The checksum of the safety-related configuration is displayed as it is calculated for transmission to the connected device when you click **Apply**.
7. This allows you to compare the checksum value with the one displayed in the identification menu on the graphic display terminal.

Acceptance Report

ACPi Parameter Tool creates the acceptance report.

This function provides a final report when one or several safety functions have been configured and verified. This report is deemed to be a machine signature and certifies that all the safety functions are operational. The acceptance report has been added as an optional document to be printed to a printer or to a PDF file.

If the drive configuration is modified (not only applicable on the safety related parameters), you must repeat the acceptance test.

4.8 Installation

4.8.1 ACPi Parameter Tool

Note:

Safety functions are configured using the ACPi Parameter Tool.

4.8.1.1 Installation

Required installation files

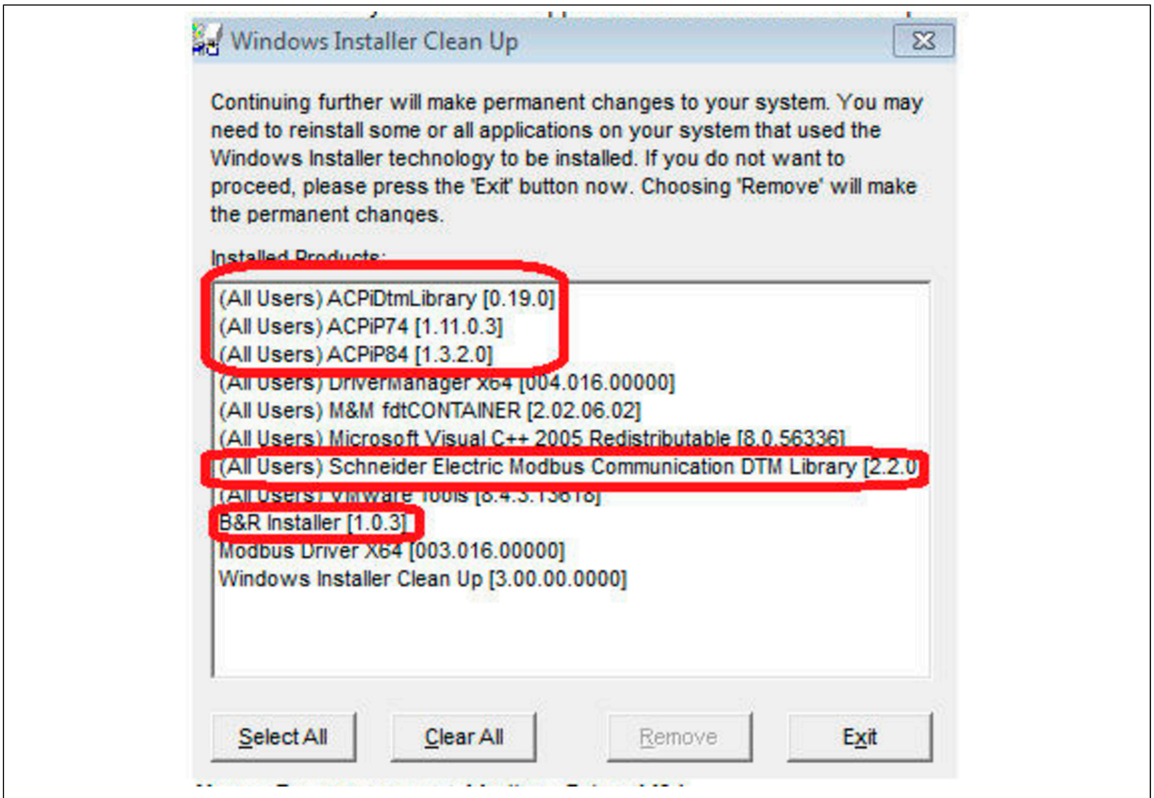
Microsoft .NET Framework 3.5 SP1 or higher is required to install this software.

Note:

Installation must take place in the order specified here to ensure that the process goes smoothly and safely.

If steps are performed out of order, installations may have to be repeated or even carried out manually!

- If an old version of the ACPiDtmLibary was installed, you have to remove this from your computer. Use the “01_uninstall_Tool” to be sure that all files are removed. (You can skip this point, if it is a new installation of the program at your computer)
  - Install this Windows installer clan up tool and launch it:
    See attached file: msicuu2.exe
  - Check for any/all of these applications listed in the clean-up tool and remove them



Note:

Do not remove Modubus Driver X64

  - After this, the B&R package gets installed without any problem

- Install the “02_FDT Container 2.4.3.0
  Execute the “setup” file
- Install the “03_One Setup B&R V1.11.0.6_20150917
  Execute the “setup” file

4.8.1.2 Configuring the ACPi Parameter Tool

Open the ACPi Parameter Tool.

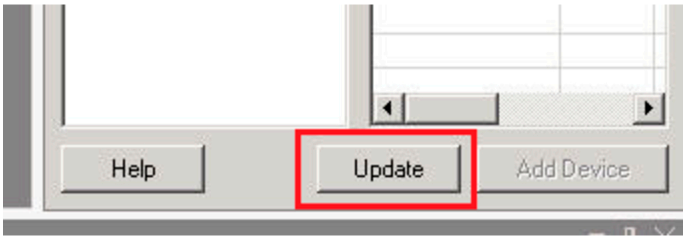
The container usually recognizes when new DTMs have been installed but have not yet been added to the device catalog.

Click on "Yes" to confirm this message.

If this message doesn't appear at startup, then the update must be carried out manually.

On the right side of the program is a window entitled "Device catalog". If it is not there, it can be displayed by selecting "View ➔ Device catalog" from the menu.

This window has a button for updating the DTMs.



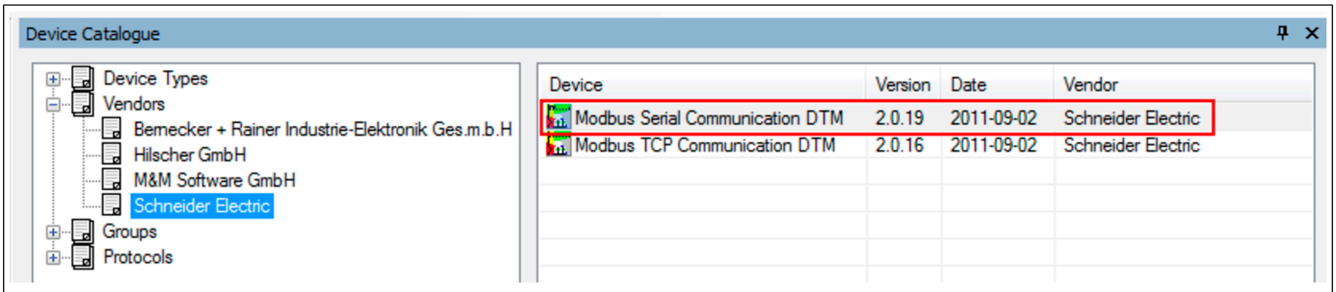
4.8.1.3 Creating a project

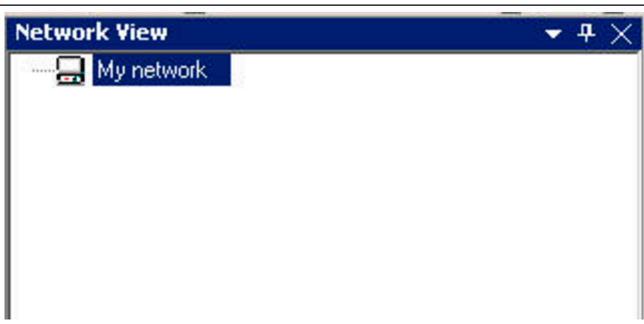
After the ACPi Parameter Tool has been configured, a new project can be created.

To start, move the DTM "Modbus Serial Communication DTM" found under "Vendors Schneider Electric" to the root node of the network view using drag-and-drop.

The network view is docked to the left side of the application.

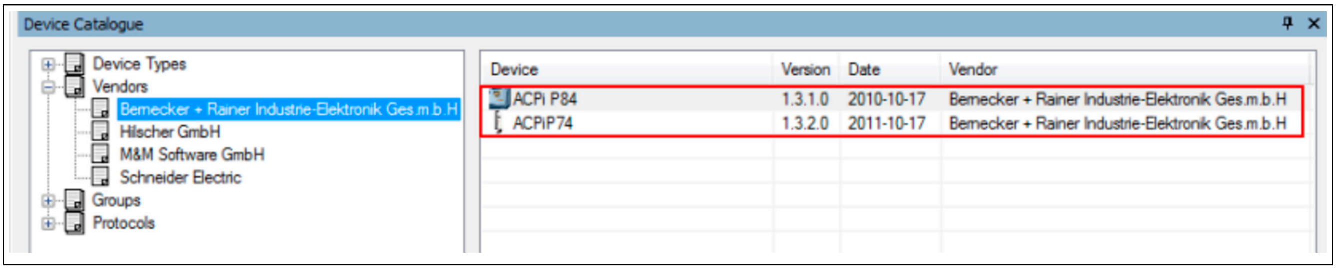
If it is not there, it can be displayed by selecting "View ➔ Network view" from the menu.





Now the DTM for the drive will be attached to the communication DTM using drag-and-drop.

The drives can be found under "Bernecker + Rainer Industrie-Elektronik Ges.m.b.H".



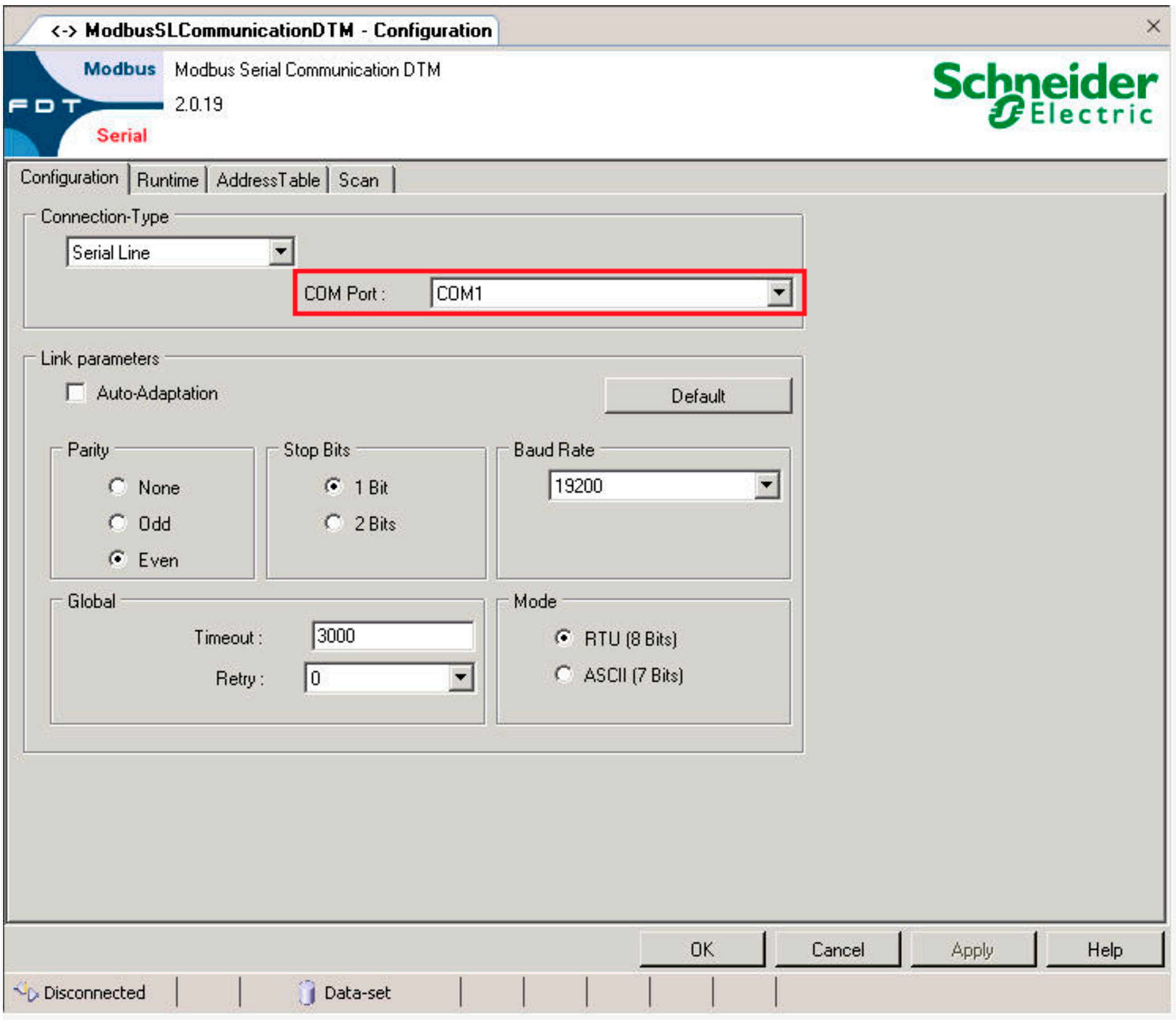
The network view should then appear depending on the drive selected.

The ACOPOSinverter P74 is being used in this example.

Now double-click on the communication DTM to open up the dialog box.

This is where the settings are made for the serial connection.

Choose the correct COM port for the adapter in the "Configuration" tab.



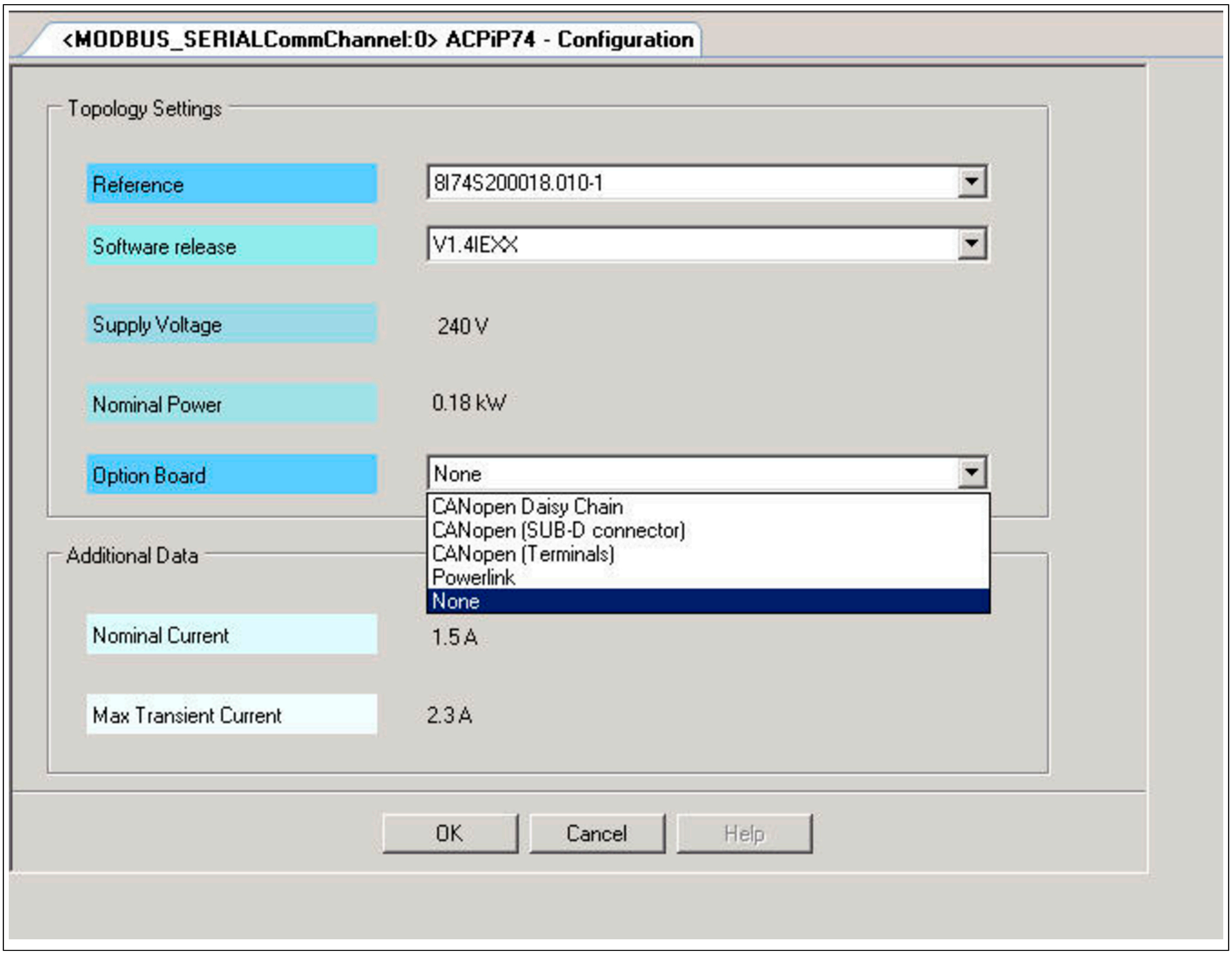
You can find the corresponding COM port in the Device Manager under "Ports (COM and LPT)".

You will now select your ACOPOSinverter P74 and its option board.

To do so, double-click on the drive DTM.

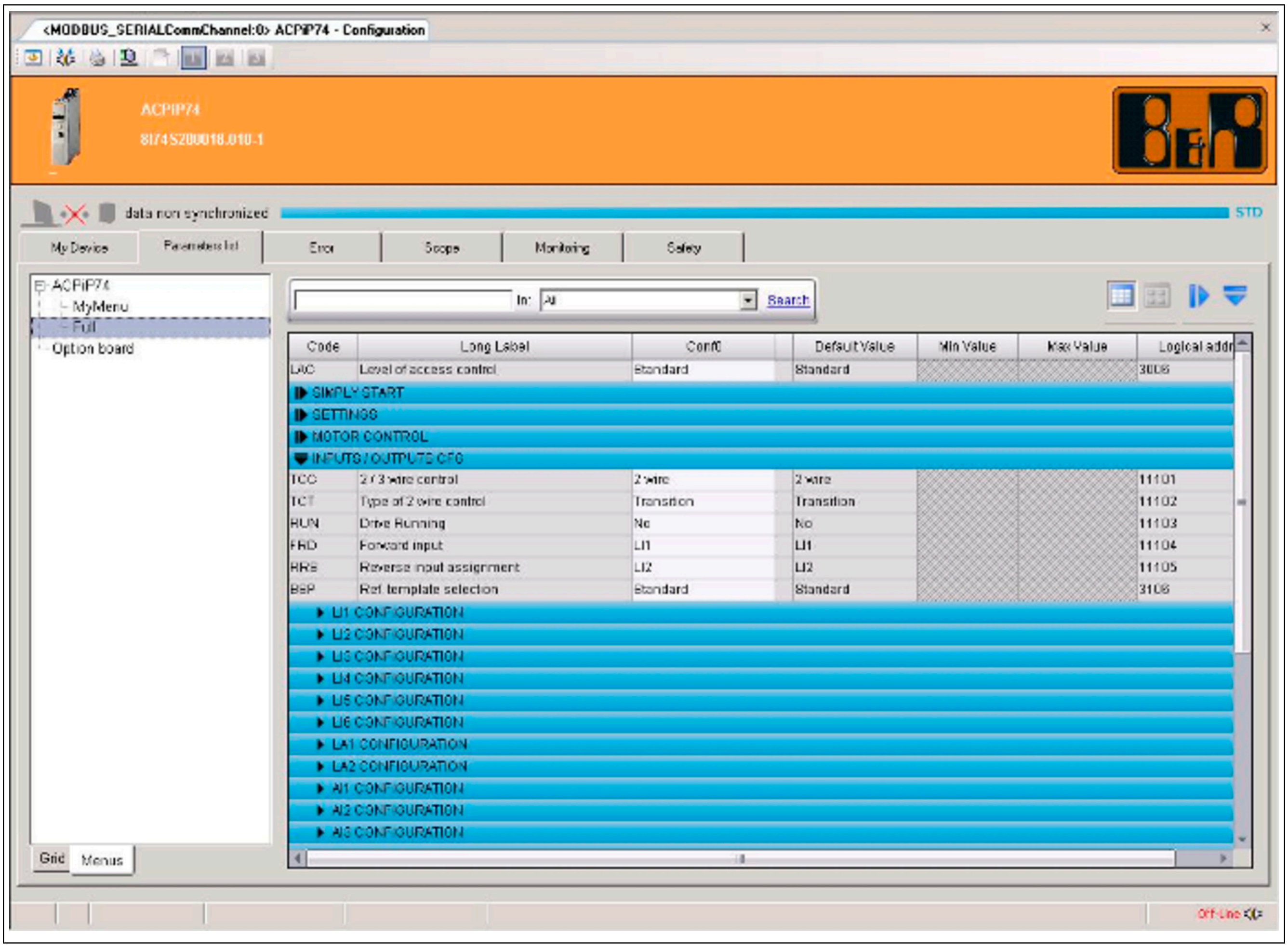
The window opens for the ACOPOSinverter P74.

After you have selected your drive and option board, click on "OK".



The configuration window for setting up and monitoring the drive opens automatically.

Now that all of the basic settings have been made, the project can be saved.

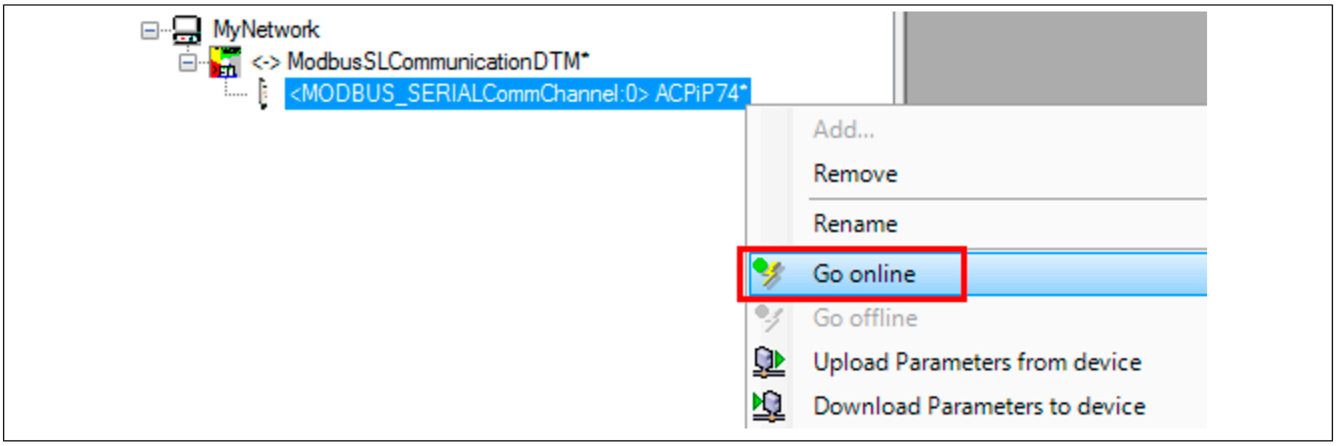


4.8.1.4 Establishing drive communication

Now the online connection to the drive will be enabled.

To do so, right-click on the drive DTM.

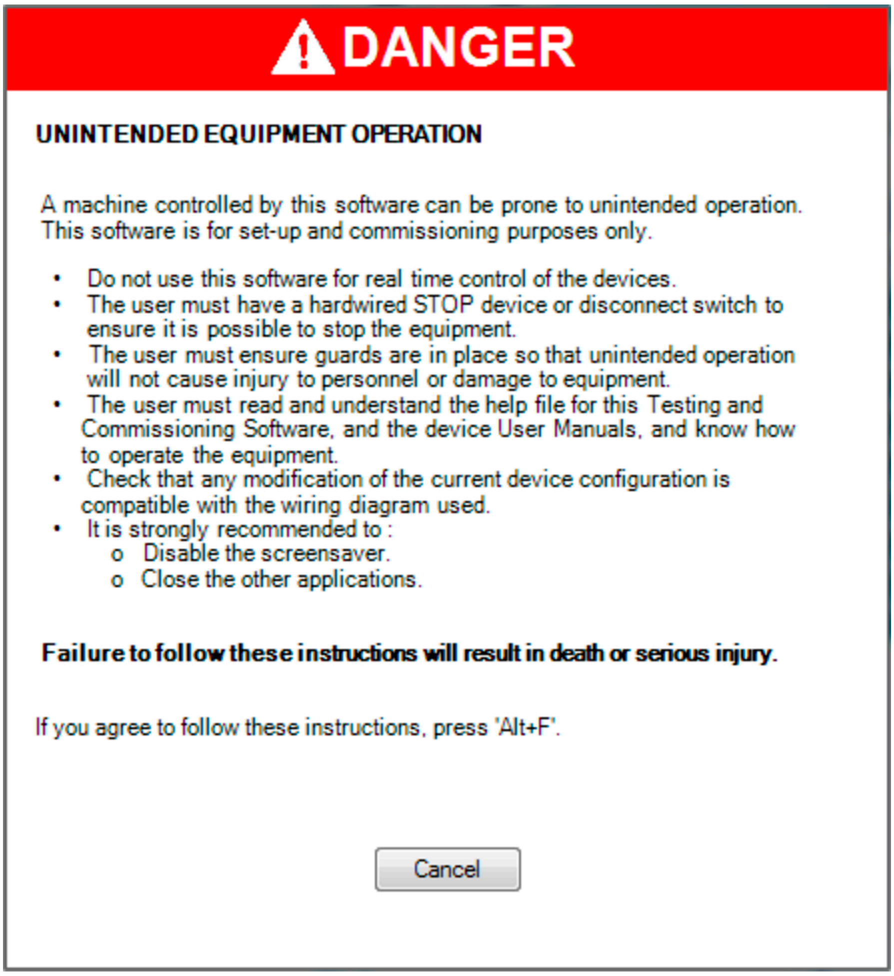
From the shortcut menu, select "Go online".



Whether or not the online connection has been established is indicated by the bold lettering in the network view.

To transfer data, click on the button "Parameter download to device".

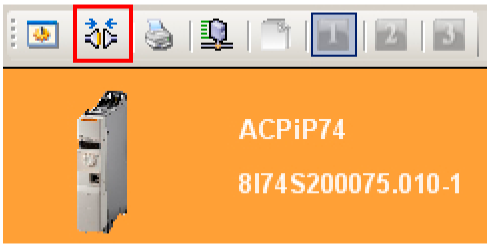
A warning notice opens that can be closed again by pressing Alt+F.



Click the button "Switch to synchronized mode" at the top left edge of the "ACPiP74 - Configuration" tab to switch the program to synchronization mode.

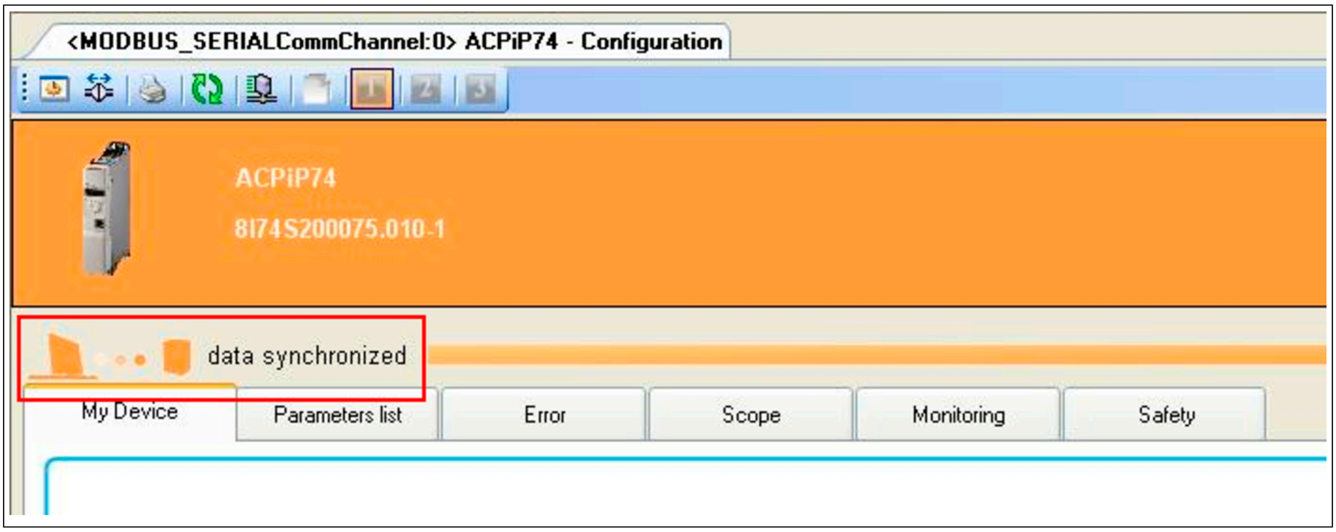
From this point on, the parameters on the device can be changed online.

First the warning notice must also be confirmed with Alt+F.



The red box shows where to look to see if synchronization mode has been enabled successfully.

Values are transferred to the device as soon as they are confirmed.

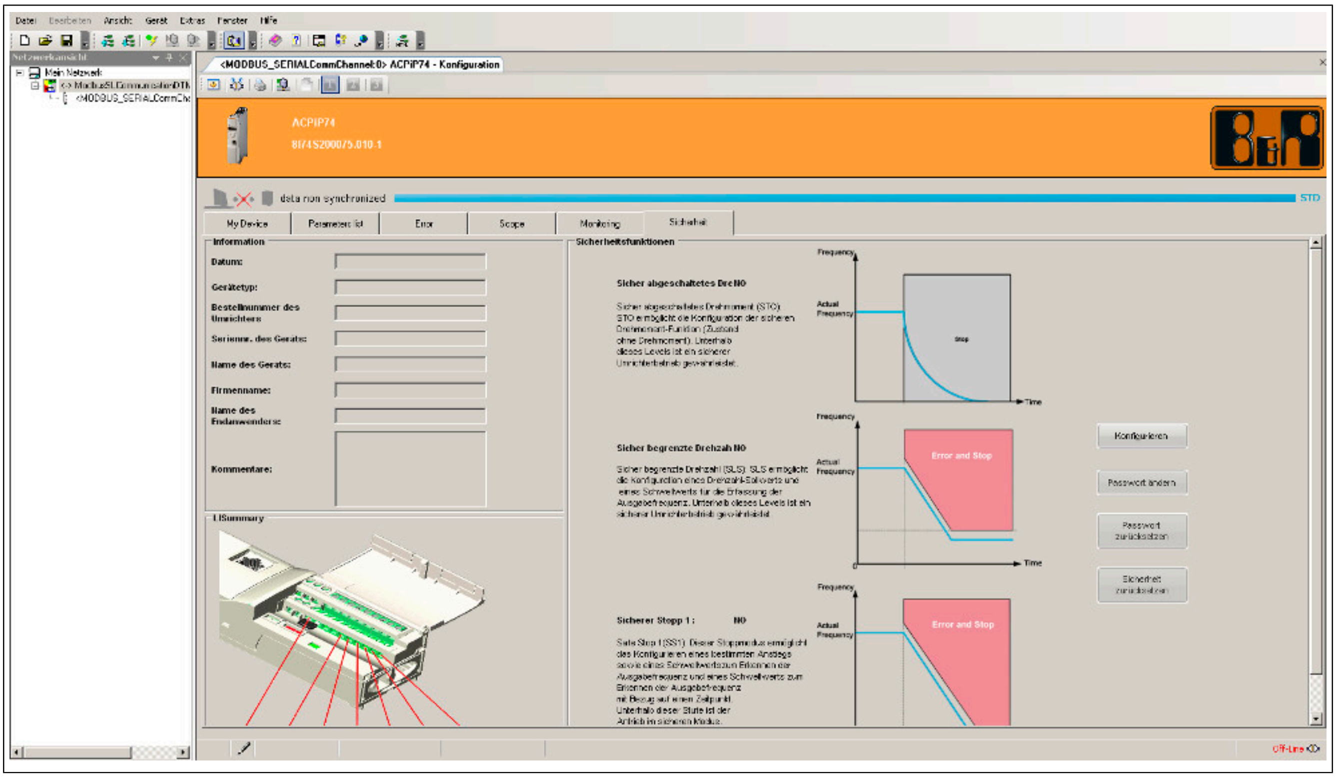


The "Parameter upload from device" option allows you to load the configuration from the drive.

"Safety" tab

To access the safety configuration, click on the "Safety" tab.

This window is write-protected and is used to display all current safety configurations.



The "Safety" tab allows you to access the following information:

- An overview of the available safety functions of the ACOPOSinverter P74 (available online/offline)
- The status of all inputs/outputs in online mode
- General information about the machine (online/offline)

You can also access the following buttons:

Configure (only available in online mode)

- Safety password (define/edit)
- Reset password
- Reset safety

How to configure safety functions

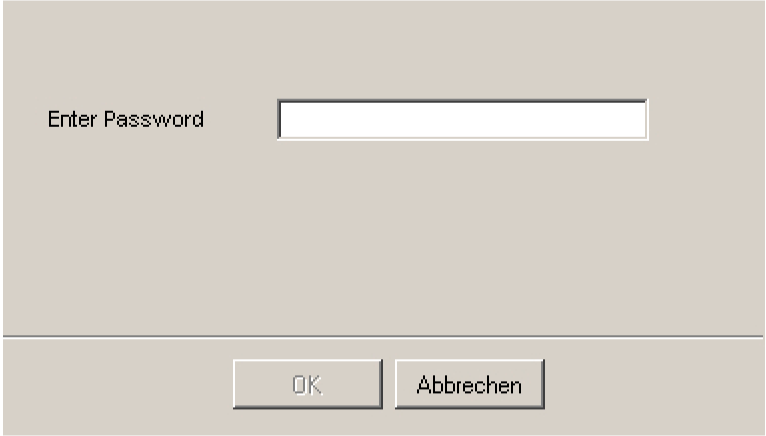
You must first make sure that you are in online mode.

If you are in online mode, click on the "Configure" button under the "Safety" tab.

This will open a dialog box where you can enter or define your password.

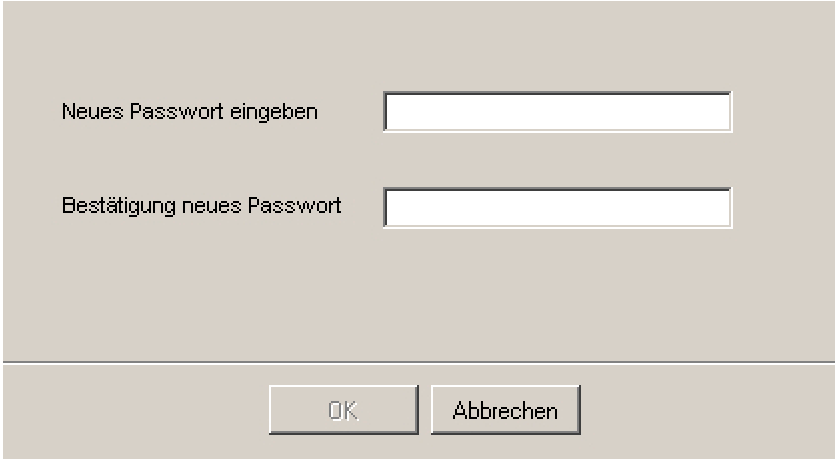
Initial scenario

You have already defined a password. Enter the password here:



Second scenario

You have not yet defined a password. In this case, you must select a value between 1 and 65535. The value 0 is not permitted for passwords.

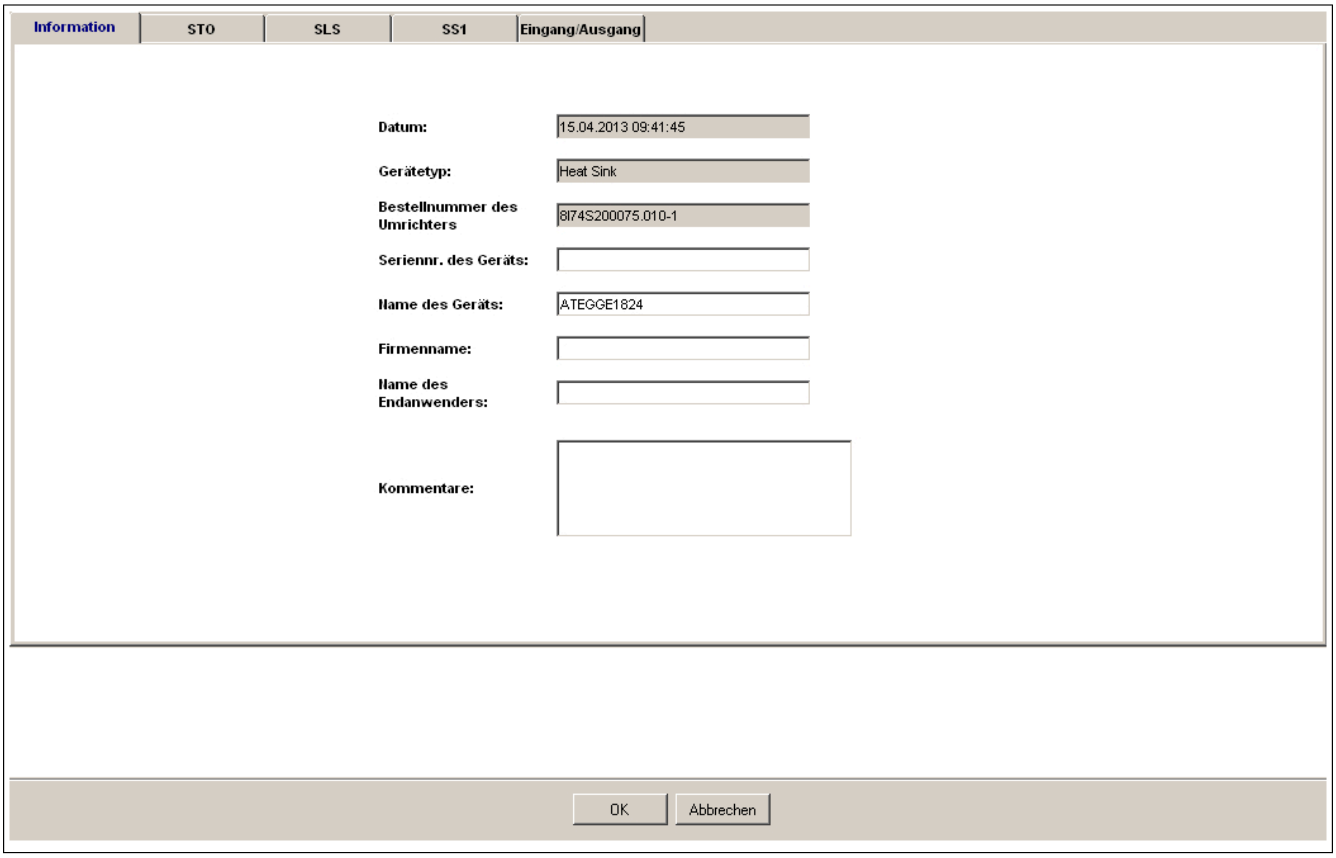


The "Configure safety" window will now be displayed.

4.8.2 "Configure safety" window

The "Configure safety" window contains the following tabs: "Information", "STO", "SLS", "SS1" and "I/O".

"Information" tab



The "Information" tab allows safety information to be defined.

This safety information is displayed under the "Information" tab of the "safe" HMI system.

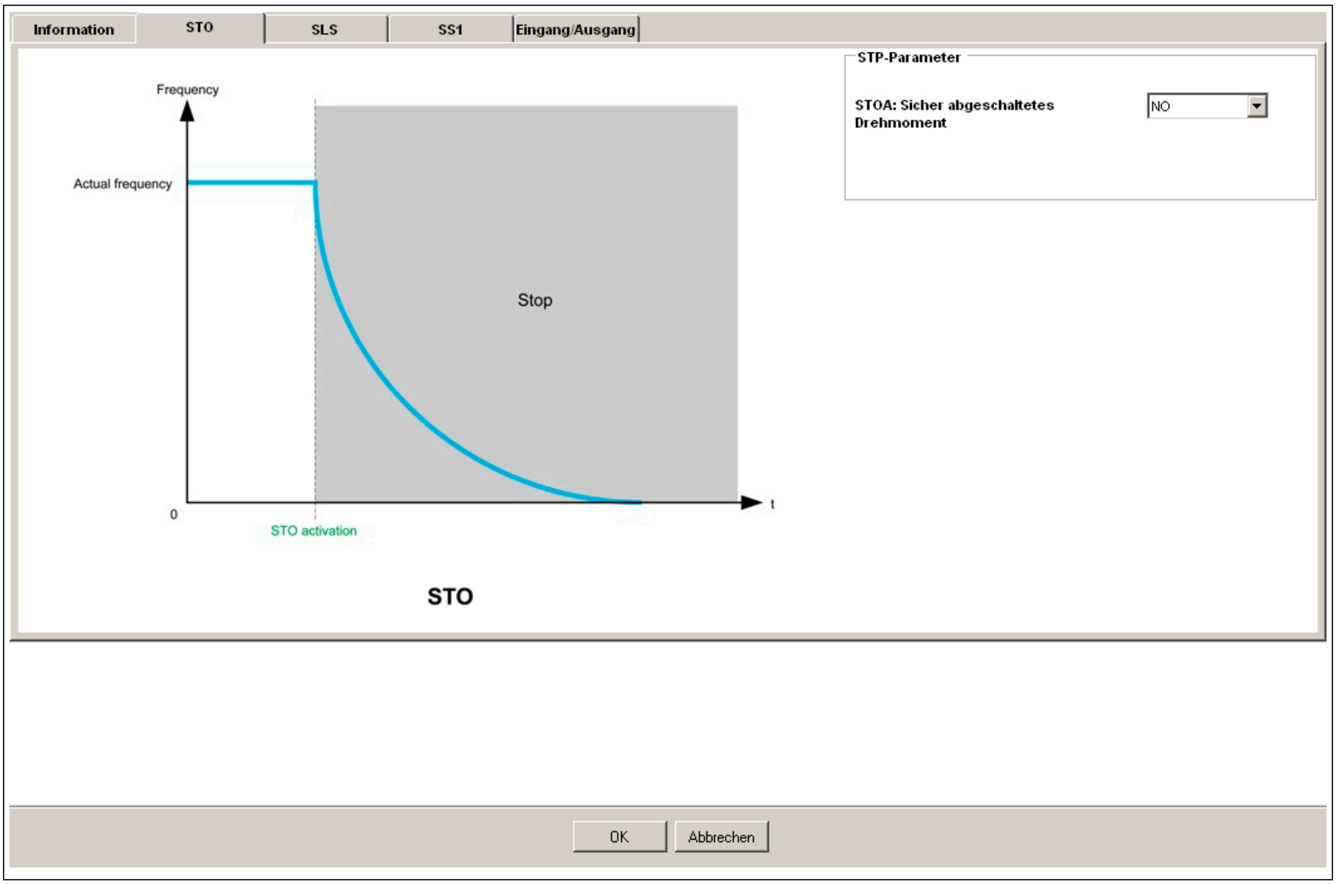
The following information is provided automatically by the ACPi Parameter Tool.

- Date (and time) – the format depends on the PC's regional settings
- Device type
- Model number of the inverter

Information to be entered manually:

- Serial number of the device
- Name of the device
- Company name
- Name of the end user
- Comments

"STO" tab

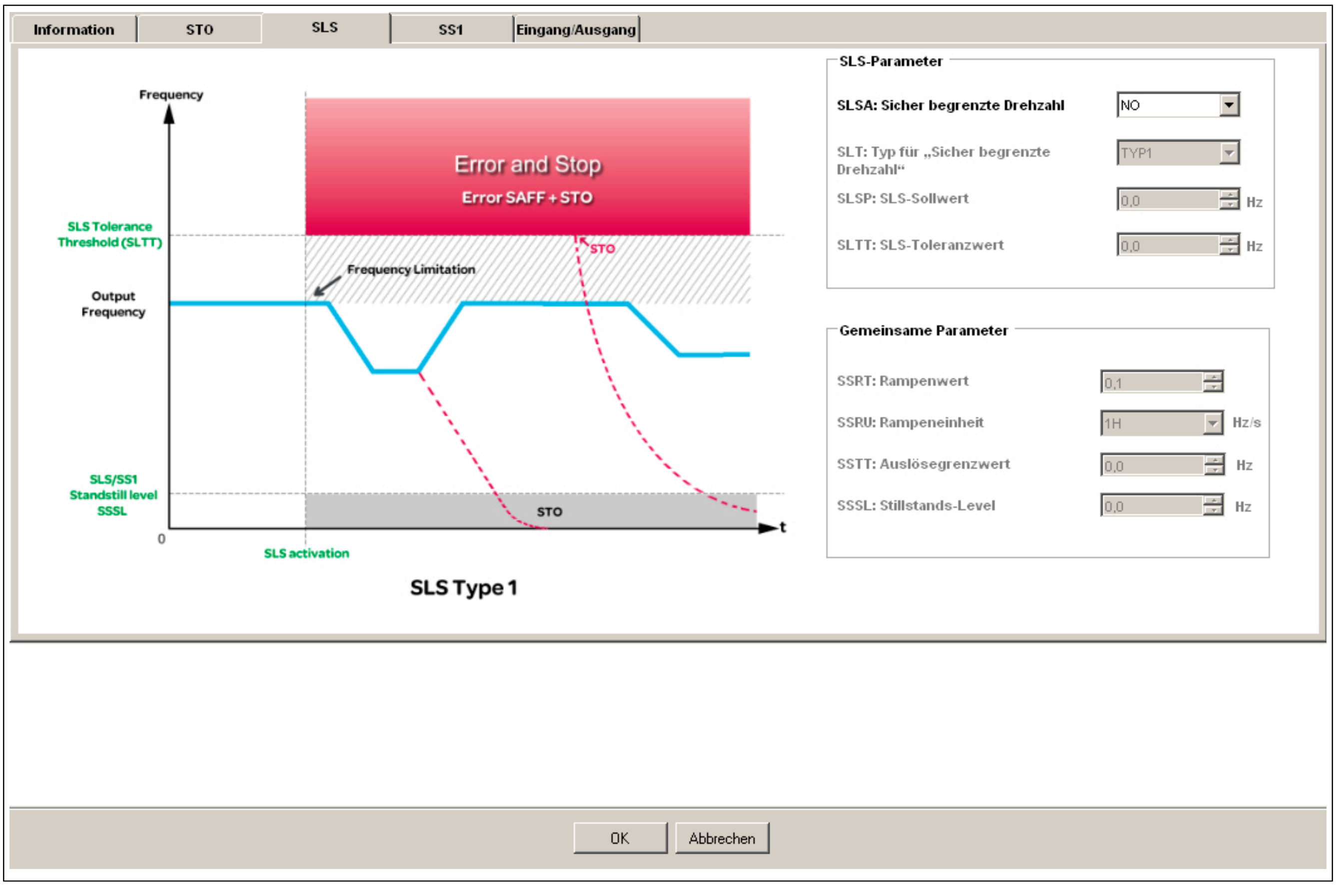


For the STO function (Safe Torque Off), it is only necessary to select the assigned input pairs in the combo box.

The following parameters must be managed: STOA.

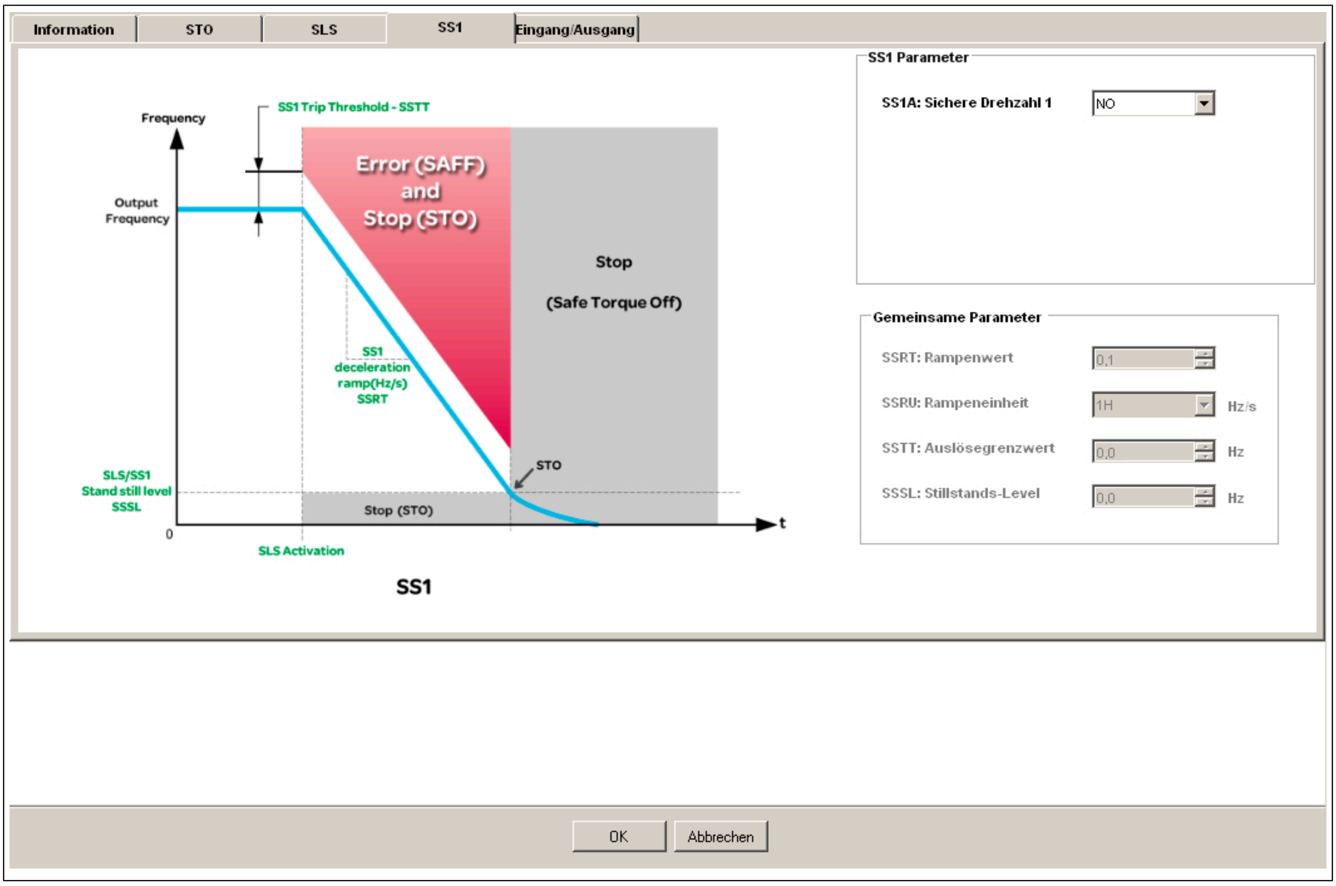
Code	Name / Description	Factory setting
StO	[Safe stop]	
StOA nO L3PW LI34 LI56	[STO assignment] [No]: Not assigned [LI3 and STO]: LI 3/STO – Status low [LI3 and LI4]: LI 3/4 – Status low [LI5 and LI6]: LI 5/6 – Status low This parameter configures the channel that is used to activate the STO function. If STOA = No is set, the STO function is always active, but only on the STO input.	[No] (nO)

"SLS" tab



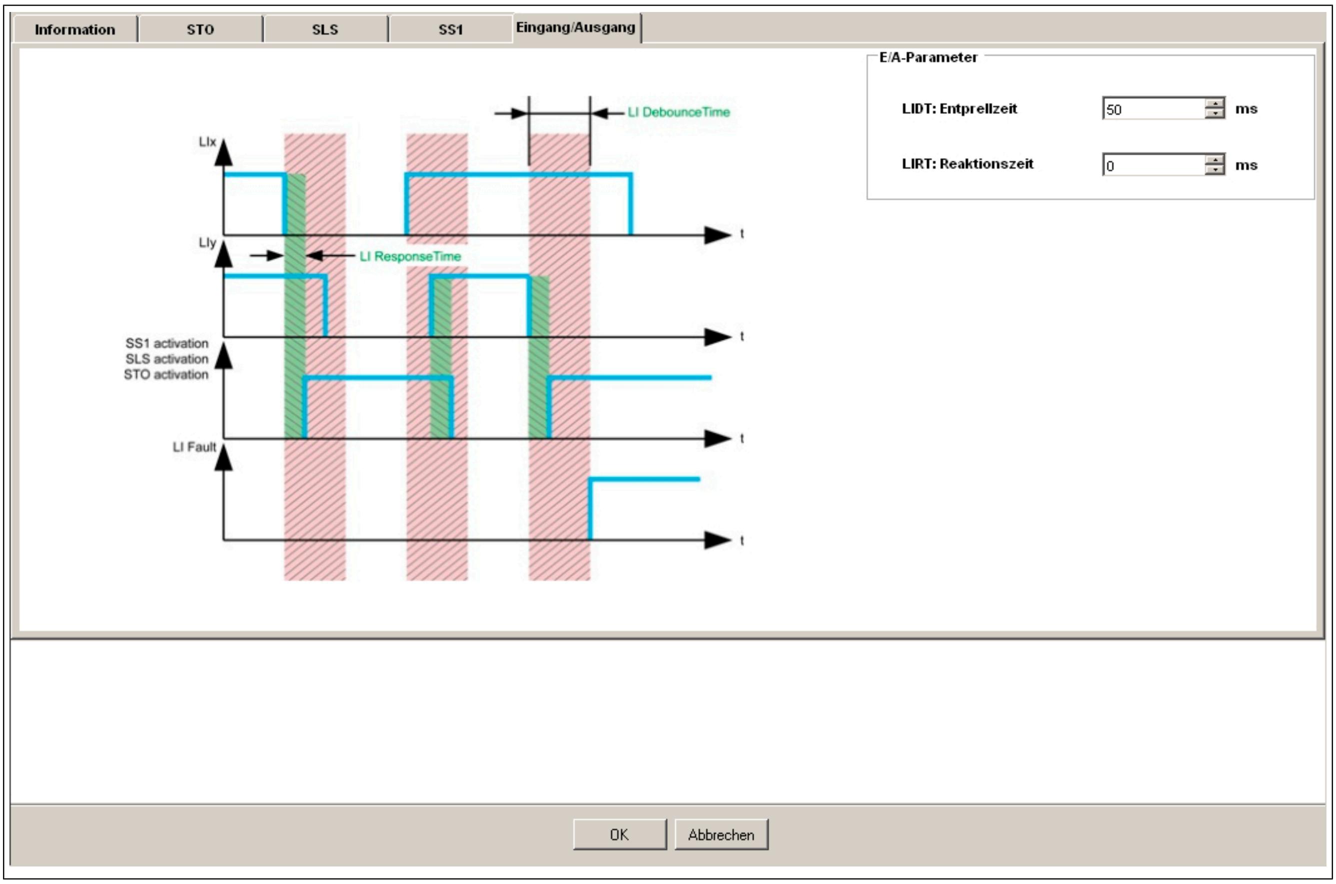
Code	Name / Description	Adjustment range	Factory setting
SLS	[Speed limited]		
SLSA nO LI3_4 LI5_6	[SLS assignment] [No]: Not assigned [LI3 and LI4]: LI 3/4 – Status low [LI5 and LI6]: LI 5/6 – Status low This parameter configures the channel that is used to activate the SLS function.		[No] (nO)
SLt tYp1 tYp2 tYp3	[SL1 ramp unit] [Type 1]: SLS type 1 [Type 2]: SLS type 2 [Type 3]: SLS type 3 This parameter is used to select the SLS type. Information about the behavior of the different types is available in the function description.		[Type1] (tYp1)
SLSP	[Set point] This parameter is only displayed if SLT = TYP2 or SLT = TYP3. SLSP is used to set the speed limit.	0.0 to 599.0 Hz	0.0 Hz
SLtt	[SLS tolerance threshold] The behavior of this parameter depends on the SLT value.	0.0 to 599.0 Hz	0.0 Hz
SSrt	[SS1 Ramp Value] The unit depends on the SSRU parameter. Use this parameter to determine the value of the SS1 ramp. SS1 ramp = SSRT x SSRU Example: If SSRT = 250 and SSRU = 1 Hz/s, then the ramp speed = 25 Hz/s. This parameter is specific. It is identical to the SS1 safety function configured under a different tab.	0.1 to 599.0	0.1
SSrU 1H 10H 100H	[SL1 ramp unit] [1 Hz/s] [10 Hz/s] [100 Hz/s] This parameter can be used to predefine the unit for the SSRT value. This parameter is specific. It is identical to the SS1 safety function configured under a different tab.		[1 Hz/s] (1H)
SStt	[SS1 cutoff value] This parameter defines the tolerance range of the deceleration ramp, inside of which the frequency can vary. This parameter is specific. It is identical to the SS1 safety function configured under a different tab.	0.0 to 599.0 Hz	0.0 Hz
SSSL	[SLS/SS1 standstill level] This parameter specifies the frequency at which the inverter should switch to the STO state at the end of the SS1 ramp. This parameter is specific. It is identical to the SS1 safety function configured under a different tab.	0.0 to 599.0 Hz	0.0 Hz

"SS1" tab



Code	Name / Description	Adjustment range	Factory setting
SS1	[Safe ramp]		
SS1A nO LI3_4 LI5_6	[SS1 assignment] [No]: Not assigned [LI3 and LI4]: LI 3/4 – Status low [LI5 and LI6]: LI 5/6 – Status low This parameter configures the channel that is used to activate the SS1 function.		[No] (nO)
SSrt	[SS1 Ramp Value] The unit depends on the SSRU parameter. Use this parameter to determine the value of the SS1 ramp. SS1 ramp = SSRT x SSRU Example: If SSRT = 250 and SSRU = 1 Hz/s, then the ramp speed = 25 Hz/s. This parameter is specific. It is identical to the SLS safety function configured under a different tab.	1 to 599	1
SSrU 1H 10H 100H	[SL1 ramp unit] [1 Hz/s] [10 Hz/s] [100 Hz/s] This parameter can be used to predefine the unit for the SSRT value. This parameter is specific. It is identical to the SLS safety function configured under a different tab.		[1 Hz/s] (1H)
SStt	[SS1 cutoff value] This parameter defines the tolerance range of the deceleration ramp, inside of which the frequency can vary. This parameter is specific. It is identical to the SLS safety function configured under a different tab.	0.0 to 599.0 Hz	0.0 Hz
SSSL	[SLS/SS1 standstill level] This parameter specifies the frequency at which the inverter should switch to the STO state at the end of the SS1 ramp. This parameter is specific. It is identical to the SLS safety function configured under a different tab.	0.0 to 599.0 Hz	0.0 Hz

"I/O" tab

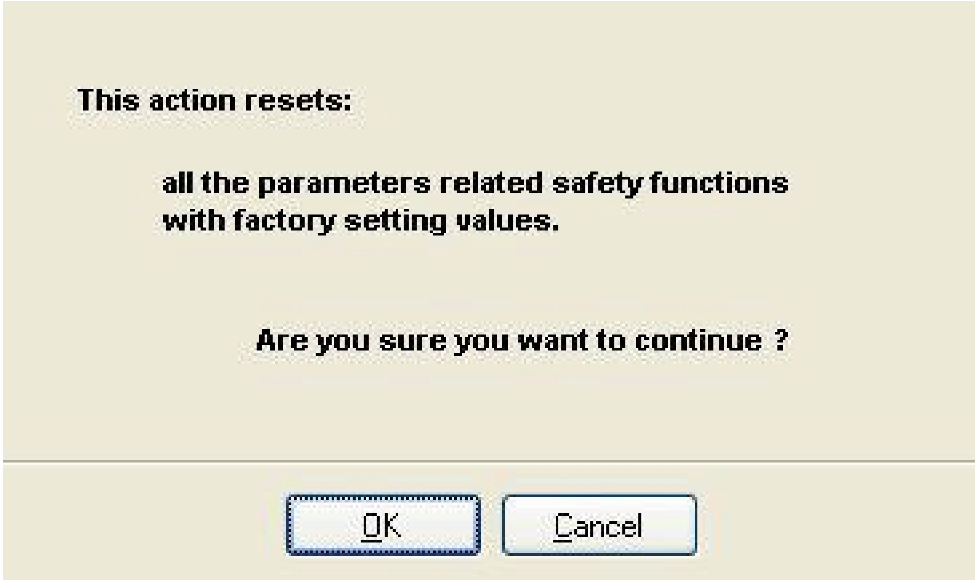


Code	Name / Description	Adjustment range	Factory setting
IO	[I/O parameters]		
LIdt	[LI debounce time]	1 to 2000 ms	50 ms
	In most cases, the two LIs in a LI safety pair (LI3 and LI4, LI5 and LI6) are not 100% synchronized. This means that they do not change their state at exactly the same time. A slight deviation exists when both of the LIs change their state. LIDT is the parameter that can be used to define this deviation. If both LIs change their state within a time period that is shorter than LIDT, then the inverter assumes that the LI transition is simultaneous. If the deviation is longer than the LIDT, then the inverter assumes that the LIs are no longer synchronized and a safety fault is triggered.		
LIrt	[LI response time]	0 to 50 ms	0 ms
	This parameter is used to filter short pulses on the LI. In certain applications, the controller transmits short pulses over the wire to test the LI. This parameter can be used to filter out these short pulses. Commands are only considered if their duration is longer than that of the LIRT value. If the duration is shorter, the inverter assumes that it is not dealing with a command. In this case, the command is filtered out.		

4.8.3 Safety reset

The "Reset safety" function makes it possible to remove the safety function from the device. To access this function, click on the "Reset safety" button under the "Safety" tab.

Enter your password once and then again for confirmation.



All safety parameters will then be reset to their corresponding factory settings.

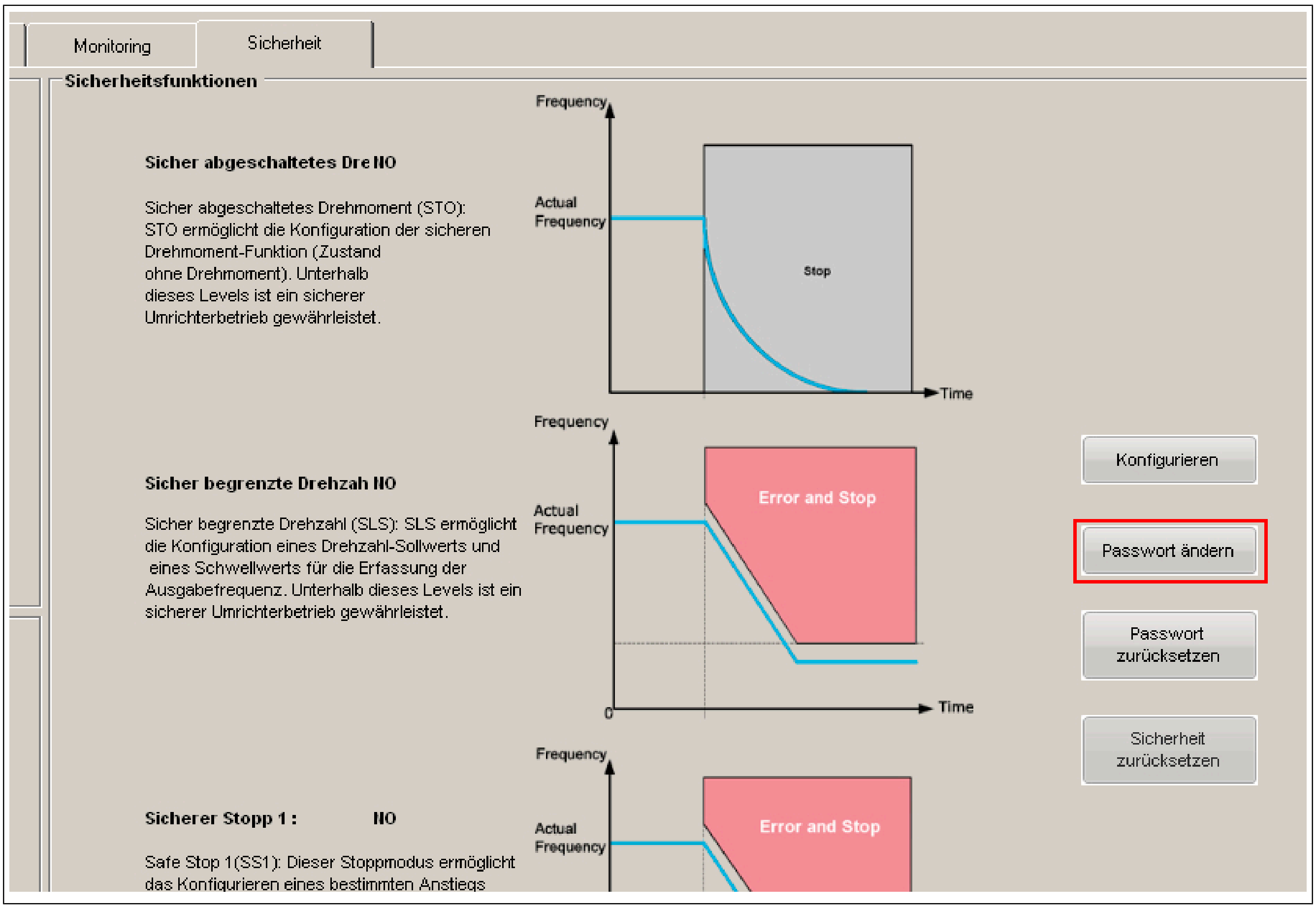
4.8.4 Password management

Changing the password

The "Change password" function makes it possible to change the password in the inverter.

This is done by selecting the "Change password" button under the "Safety" tab.

In order for the safety password to be changed, a session must be opened in the inverter. When a safety session is opened, the valid safety password is passed to the inverter.



You will have to select a value between 1 and 65535. The value 0 is not permitted for this password. Only numbers are permitted to be used when creating the password. All other characters are not accepted.

Resetting the password

It is possible that you will forget the safety password defined in the inverter.

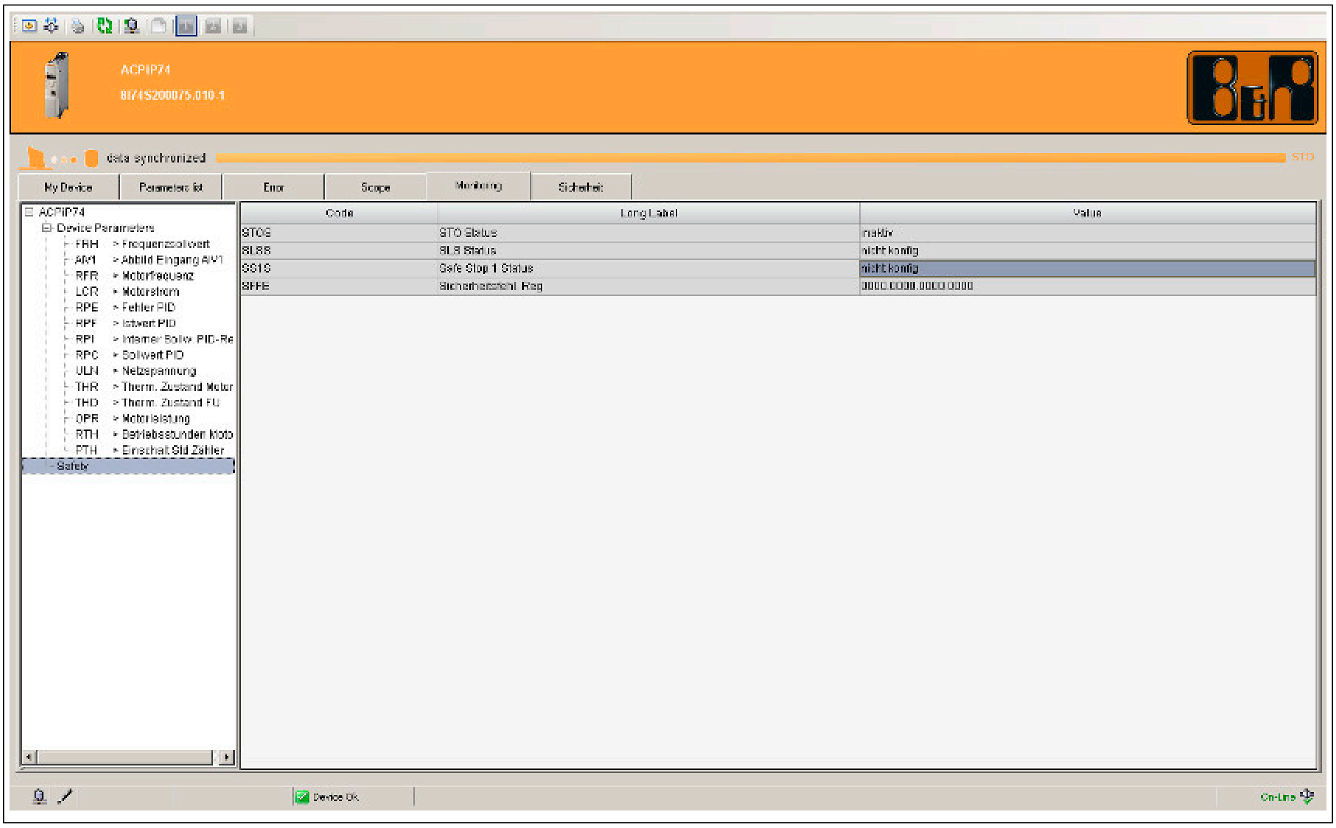
In order to reset the inverter in this case, you will have to know the universal password.

This password can be obtained from B&R Support.

At the end of this procedure, the device reverts back to a state with an undefined safety password and the safety session is closed automatically.

The function configuration remains unchanged, however.

4.8.5 Safety function monitoring and status



Note:

These parameters can also be read in the I/O mapping in Automation Studio.

One parameter specifies whether the inverter is in a safe or non-safe state (safety function configured):

- No safety function configured: STD
- Safety function configured: SFTY

Safety status

Code	Name / Description
SAF-	[MONIT. SAFETY]
StOS IdLE StO FLt	[STO status] Status of the STO (Safe Torque Off) safety function. [Inactive]: STO not active [Safe stop]: STO active [Fault]: STO in error state
SLSS nO IdLE SS1 SLS StO FLt	[SLS status] Status of the SLS (Safely Limited Speed) safety function. [Not config.]: SLS not configured [Inactive]: SLS not active [Safe ramp]: SLS ramp active [Speed limited]: SLS speed limit active [Safe stop]: SLS request for safe torque cutoff active [Fault]: SLS in error state
SSIS nO IdLE SS1 StO FLt	[SLS status] Status of the SS1 (Safe Stop 1) safety function. [Not config.]: SS1 not configured [Inactive]: SS1 not active [Safe ramp]: SS1 ramp active [Safe stop]: SS1 request for safe torque cutoff active [Fault]: SS1 in error state
SFtY IStO SAFE	[Drive status safe.] Safety status of the inverter. [Standard]: Standard device without a configured safety function [Safe]: Safe device with at least one configured safety function

4.9 Device signature

During acceptance testing for systems with integrated safety functions, the focus is primarily on the validation of the safety-specific monitoring and stop functions configured in the inverter.

The configuration of the defined safety functions and test mechanisms are checked for adequacy and the reaction of specific monitoring functions is tested by explicitly entering values outside the tolerance limits. Testing covers all of the safety-related monitoring functions as well as the globally integrated safety function configured in the ACOPOSinverter P74.

Requirements for acceptance testing

- The machine has been wired properly
- All safety features such as safety door monitoring equipment, light curtains and E-stop buttons must be connected and ready for operation
- All motor and command parameters must be configured as needed in the inverter

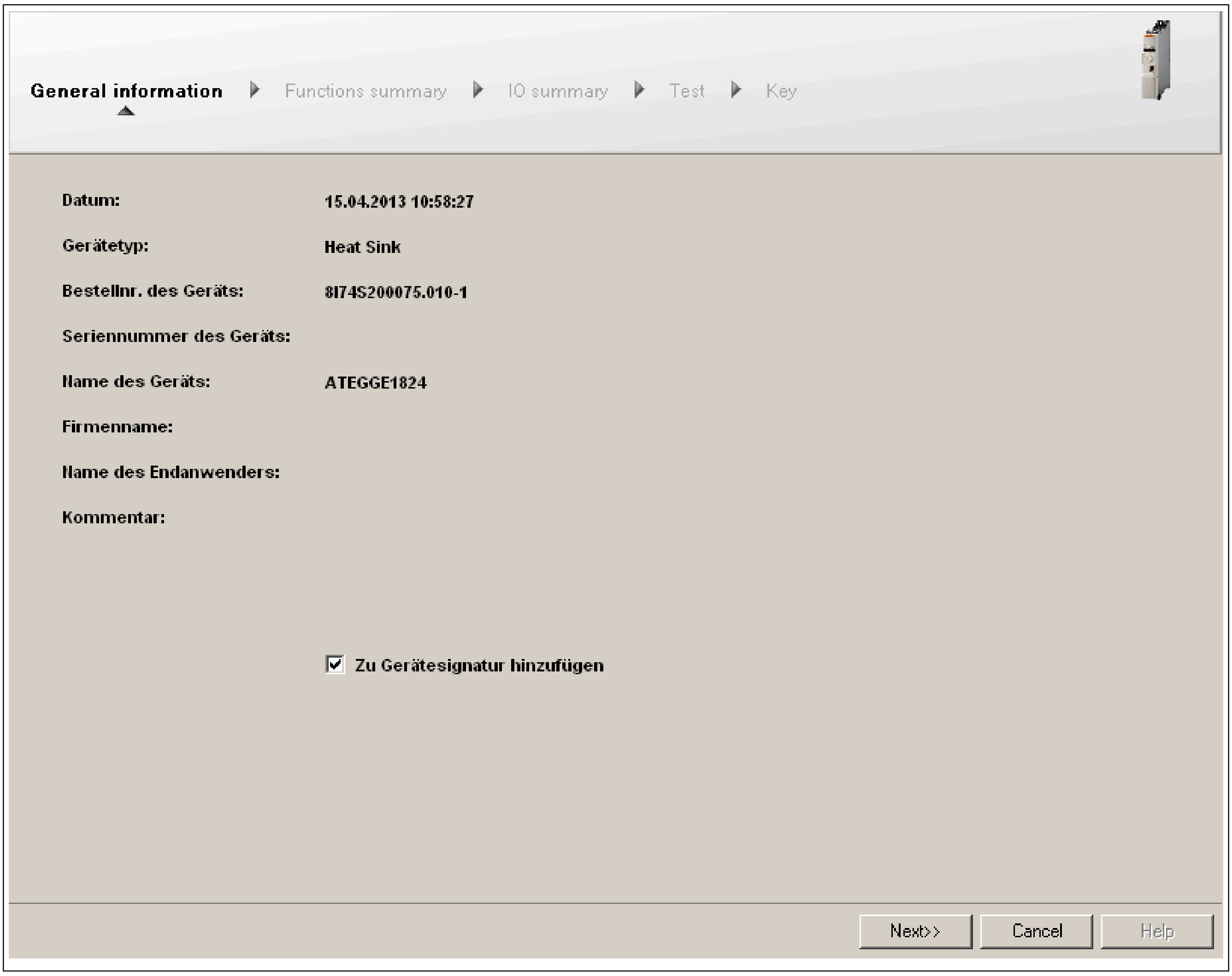
4.9.1 Acceptance testing procedure

Acceptance testing is configured using the ACPi Parameter Tool.

Select the following menu item: "Device ➔ Additional functions ➔ Safety function ➔ Machine signature".

Now perform the five steps listed below.

Step 1: General information



The information displayed here is defined in the "Identification" folder under the "Safety" tab. It cannot be changed here.

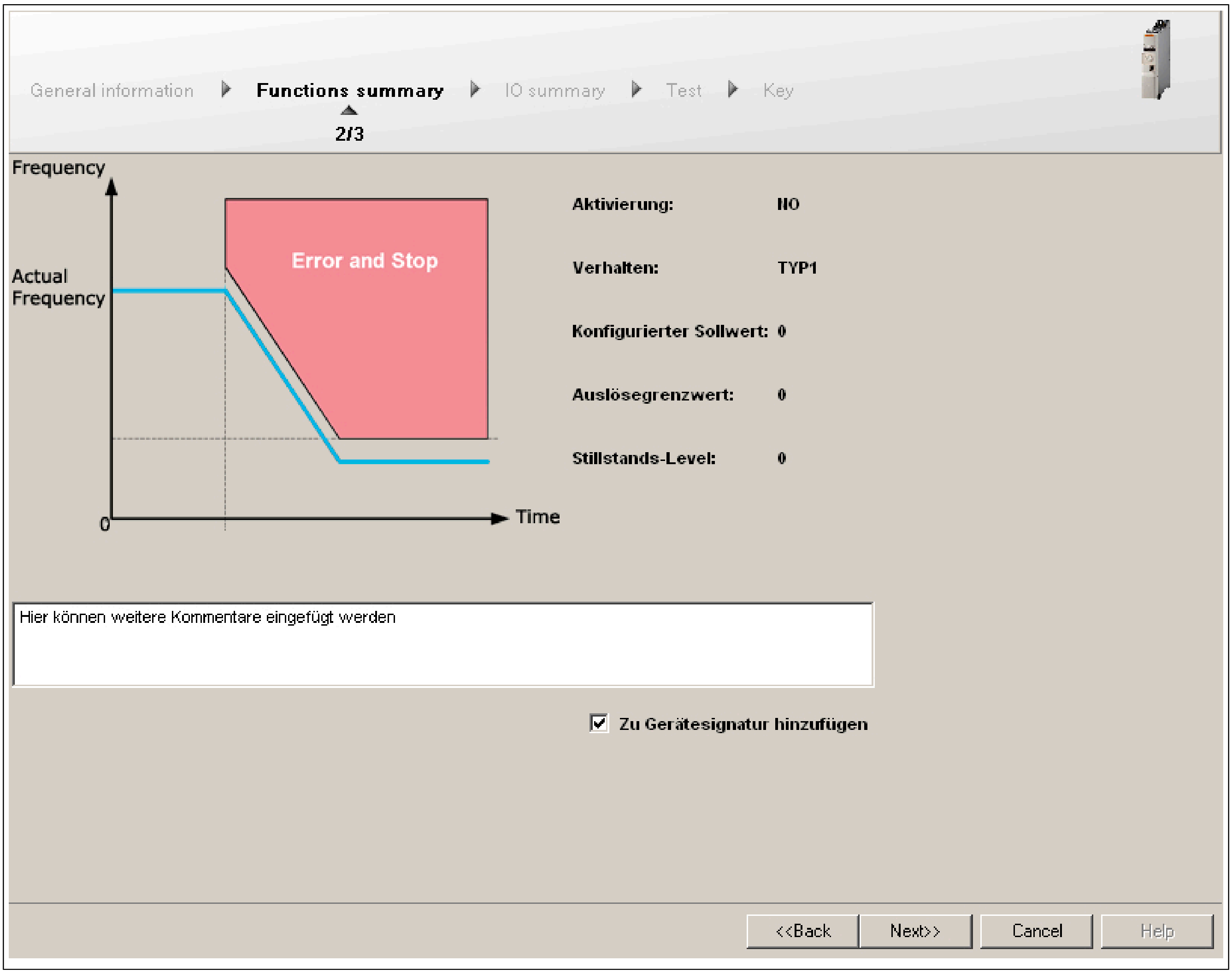
To include this step in the final report, select "Add to device signature". Then click on "Next".

Step 2: Function summary

This step is composed of a number of sub-steps.

Each sub-step affects a safety function:

- STO
- SLS
- SS1

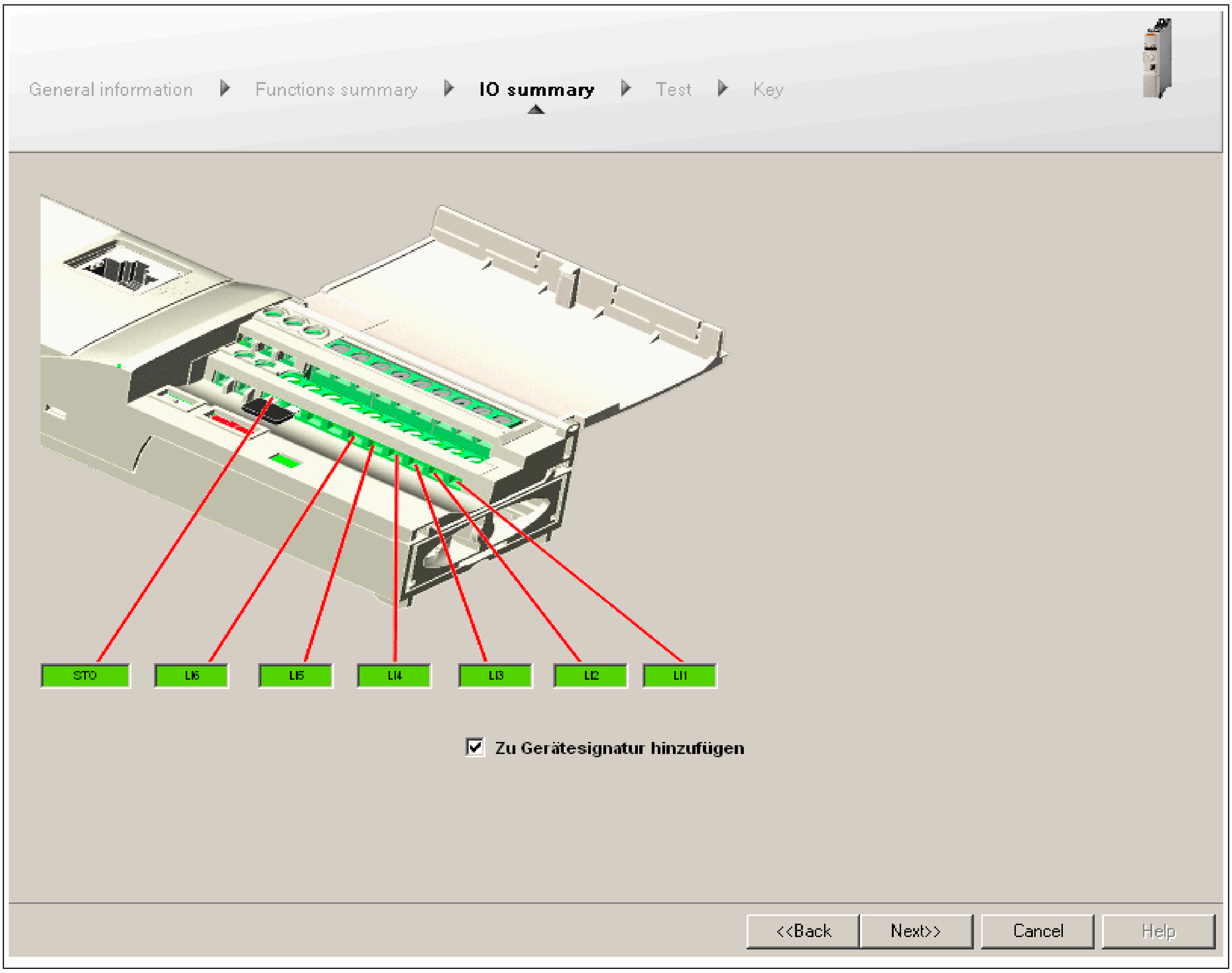


A function diagram and parameter values are displayed in the sub-step of a function. A text field allows you to enter additional text in this step.

To include a function in the final report, select "Add to device signature".

Then click on "Next".

Step 3: I/O summary



The information displayed here is defined in the "IOSummary" folder under the "Safety" tab.

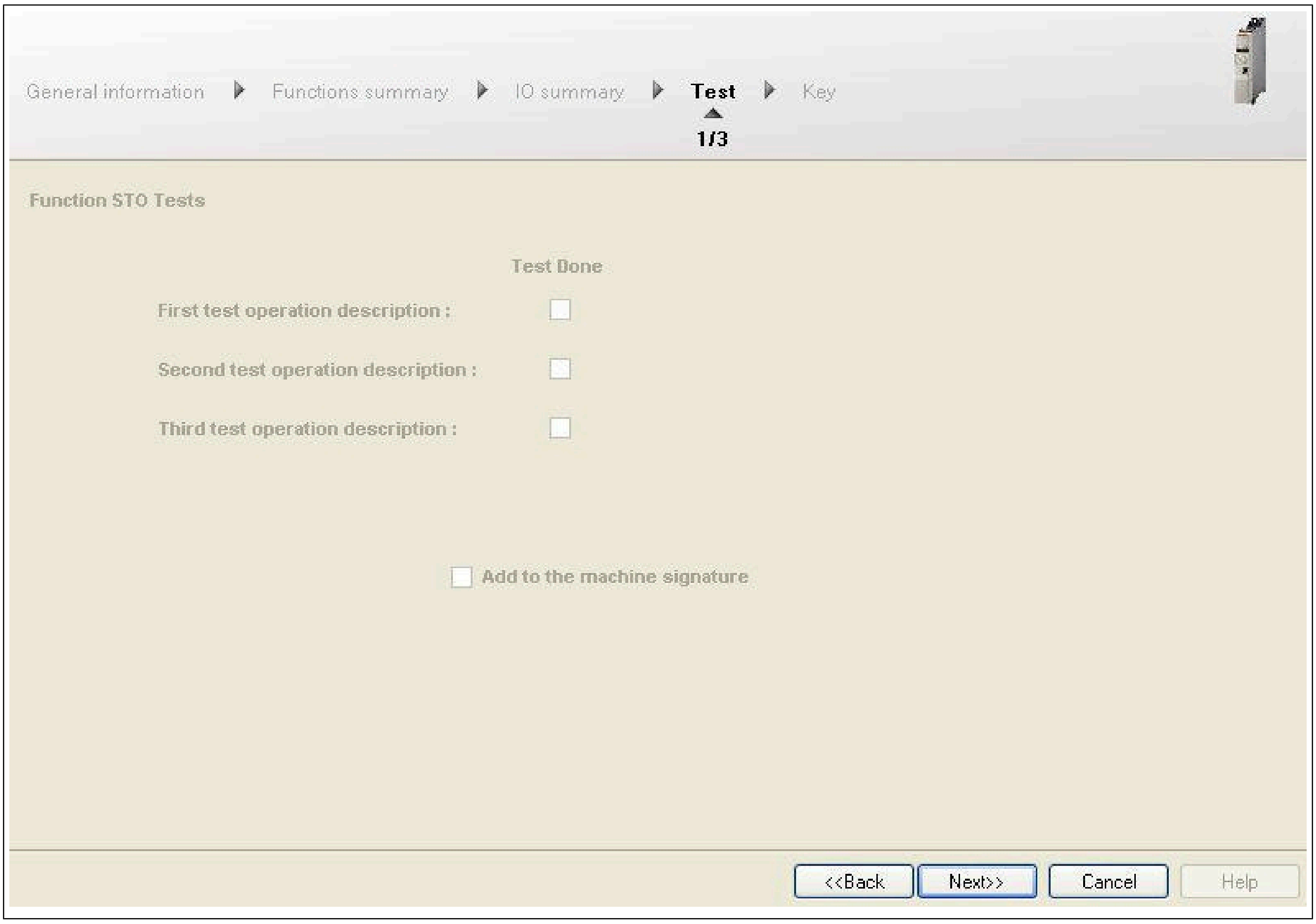
- The LIs assigned to a safety function are shown in red and make reference to the associated safety function
- LIs that are not assigned to a safety function show no such mapping and are displayed in green

To include this step in the final report, select "Add to device signature".

Then click on "Next".

Step 4: Test

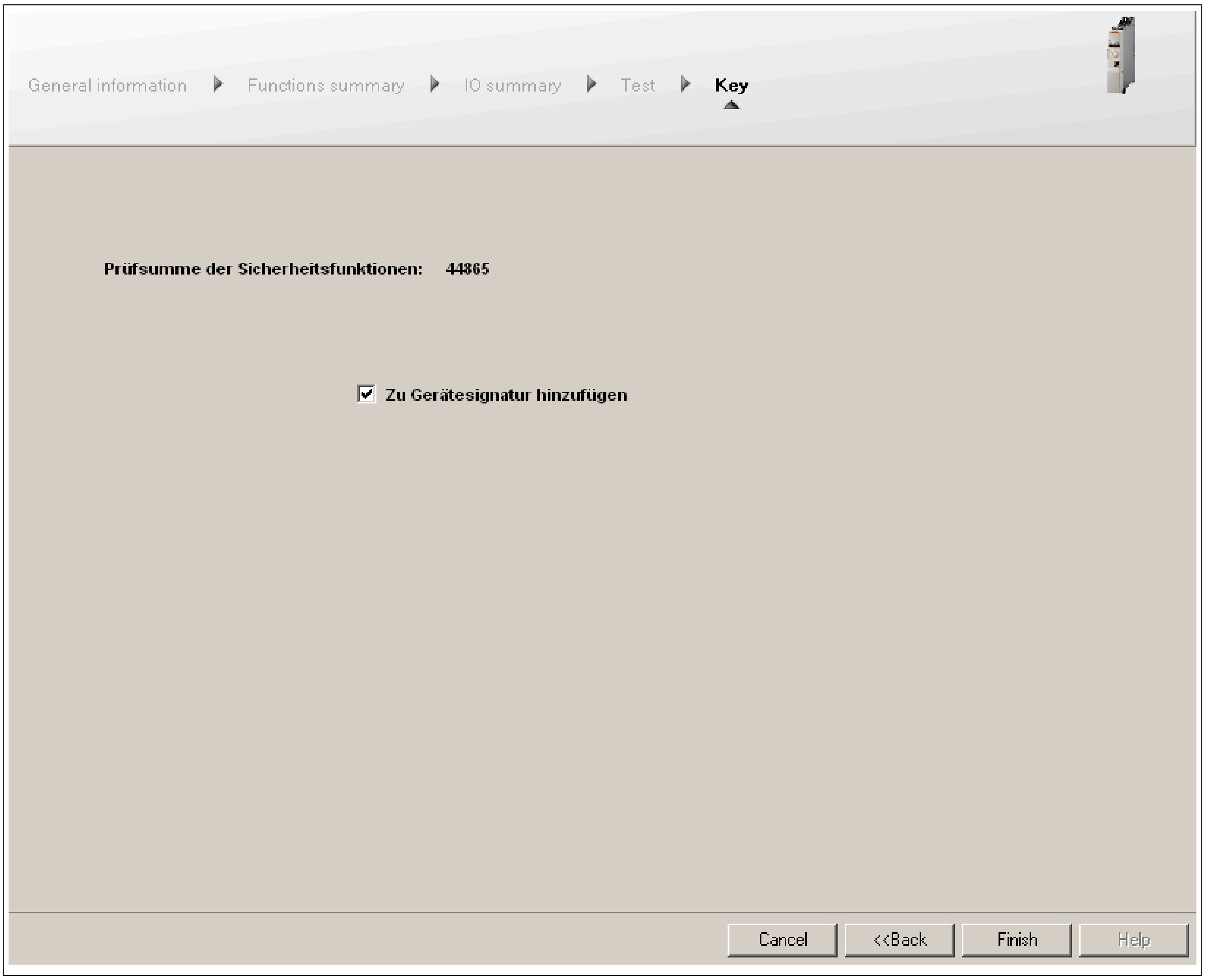
In this step, enable the checkbox when the test of the safety functions is completed to ensure that you have checked for the correct behavior of the functions for all devices.



To include this step in the final report, select "Add to device signature".

Then click on "Next".

Step 5: Key



The checksum of the safety parameters is displayed at the same time as editing and can be transmitted to the connected device by clicking on "Apply".

This allows you to compare the checksum value with the one on the graphic display terminal in the "Identification" menu.

Click on the "Finish" button to create the report.

4.9.2 Acceptance report

The ACPi Parameter Tool creates the acceptance report.

The software can generate the safety signature of the inverter. This function creates a final report for internal informational purposes if the inverter is configured as "safe" and has been declared "operationally safe".

This report is considered a device signature and certifies the proper operation of all "safety functions".

The safety report can be sent to a printer or saved in PDF format.

Whenever changes are made to the inverter configuration (not just to the safety parameters), acceptance testing must be performed again.

4.10 Service and maintenance

Additional information can be found in the installation and programming chapters.

Preventive maintenance

It is recommended to check the safety functions annually.

Example: Open the safety door to ensure that the inverter stops in accordance with the configured safety function.

Replacing the power supply and motor controller

You can replace the motor controllers (APP and HMI card) and the power supply. Depending on its configuration (safety function active or inactive), the inverter's response to switching out these modules will vary.

If the power supply module is replaced while keeping the motor controller unit, then the safety configuration is not lost. You only have to perform acceptance testing again in order to avoid incorrect wiring or improper behavior of the safety function.

When replacing the motor controller unit, the safety configuration will be lost. You will then need to reconfigure the motor controller and then perform acceptance testing again.

Replacing machine components

> **Note:**
>
> **If a machine component outside of the ACOPOSinverter P74 (motor, E-stop, etc.) has to be replaced, then acceptance testing must be repeated.**

5 Accessories

5.1 Overview

Model number	Short description	Page
Graphic Display		
8I0XD301.300-1	ACPi P74/P84 graphic display	459
8I0XD302.300-1	ACPi P74/P84 graphic display - remote kit	
8I0XD303.300-1	ACPi P74/P84 graphic display - front cover	
8I0XD304.301-1	ACPi P74/P84 graphic display - cable 1 m	
8I0XD304.303-1	ACPi P74/P84 graphic display - cable 3 m	
8I0XD304.305-1	ACPi P74/P84 graphic display - cable 5 m	
8I0XD304.310-1	ACPi P74/P84 graphic display - cable 10 m	
8I0XD305.300-1	ACPi P74/P84 graphic display - RJ45adapter	
Smoothing coils		
8I0CS004.000-1	ACPi line choke 1-phase 4 A	460
8I0CS007.000-1	ACPi line choke 1-phase 7 A	
8I0CS018.000-1	ACPi line choke 1-phase 18 A	
8I0CT004.000-1	ACPi line choke 3-phase 4 A	
8I0CT010.000-1	ACPi line choke 3-phase 10 A	
8I0CT016.000-1	ACPi line choke 3-phase 17 A	
8I0CT030.000-1	ACPi line choke 3-phase 30 A	
Additional EMC filters		
8I0FS009.200-2	ACPi P74 EMC filter 1-phase 9 A	466
8I0FS016.200-1	ACPi P74 EMC filter 1-phase 16 A	
8I0FS022.200-1	ACPi P74 EMC filter 1-phase 22 A	
8I0FT015.200-1	ACPi P74 EMC filter 3-phase 15 A	
8I0FT047.200-1	ACPi P74 EMC filter 3-phase 47 A	
8I0FT049.200-1	ACPi P74 EMC filter 3-phase 49 A	
Fan		
8I0XF074.010-1	Fan ACOPOS Inverter P74 Size 1	471
8I0XF074.020-1	Fan ACOPOS Inverter P74 Size 2	
8I0XF074.030-1	Fan ACOPOS Inverter P74 Size 3	
8I0XF074.040-1	Fan ACOPOS Inverter P74 Size 4	
Brake resistors		
8I0BR028.000-1	ACPi braking resistor 28 Ω 0.2 kW	475
8I0BR060.000-1	ACPi braking resistor 60 Ω 0.1 kW	
8I0BR100.000-1	ACPi braking resistor 100 Ω 0.05 kW	
USB accessories		
8I0XC001.003-1	ACPI USB Modbus universal cable	478
DC bus cable		
8I0XC003.400-1	ACPi P74 DC bus cable, 0.18 m, 5 pieces	478

5.2 Graphic Display

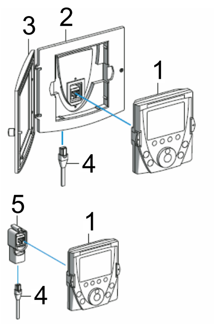
The optional graphic display can be used with ACOPOSinverter P74. It enables the following:

- Control, adjustment and configuration of the converter
- Display of current values (engine, values of input and output and so on)
- Save and download configurations (up to four configuration files can be saved)

The following accessories are available:

- A remote mounting kit for mounting in the door of a control cabinet with IP54 protection
- A transparent cover that can be fastened to the remote mounting mechanism for IP65 protection
- A cable for the connection of the graphic display to the ACOPOSinverter P74 converter
- A RJ45 adapter for the connection of the graphic display to the remote cable

(1) 8I0XD301.300-1
(2) 8I0XD302.300-1
(3) 8I0XD303.300-1
(4) 8I0XD304.301-1, 8I0XD304.303-1, 8I0XD304.305-1, 8I0XD304.310-1
(5) 8I0XD305.300-1



5.2.1 Order data

Model number	Short description
	ACOPOSinverter P74/P84 - Graphics display
8I0XD301.300-1	ACOPOSinverter P74/P84 graphics display, 8 lines, 240 x 160 pixels, backlight, function keys, navigation keys, IP54 protection
8I0XD302.300-1	Remote installation kit for graphics display, IP54 protection
8I0XD303.300-1	Front cover for the remote installation kit for graphics display, IP65 protection
8I0XD304.301-1	Graphics display remote cable 1 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)
8I0XD304.303-1	Graphics display remote cable 3 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)
8I0XD304.305-1	Graphics display remote cable 5 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)
8I0XD304.310-1	Graphics display remote cable 10 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)
8I0XD305.300-1	RJ45 adapter for graphic display

Table 18: 8I0XD301.300-1, 8I0XD302.300-1, 8I0XD303.300-1, 8I0XD304.301-1, 8I0XD304.303-1, 8I0XD304.305-1, 8I0XD304.310-1, 8I0XD305.300-1 - Order data

5.3 Smoothing coils

- Improved protection against over voltages in the mains supply and reduction of the distortion factor in the power produced by the inverter.
- Limitation of the mains current.
- Using smoothing coils is recommended under the following conditions:
    - Connection of several parallel converters in low distances.
    - Mains supply with disturbances by other devices (interferences, over voltages).
    - Mains supply with voltage unbalance between phased >1,8% of the nominal voltage.
    - Converter supplied by one cable with very low impedance (near power transformers 10 times higher than the nominal value of the converter).
    - Connection of a high number of converters to one cable.
    - Reduction of overload of the capacitors for the cosine correction, if the plant comprises an appliance for performance factor correction.

5.3.1 Order data

Model number	Short description
	ACOPOSinverter P74/P76/P84 - Line chokes
8I0CS004.000-1	Mains choke 1-phase 4 A, for ACOPOSinverter P74 1x 200-240 V, 0.18-0.37 kW
8I0CS007.000-1	Mains choke 1-phase 7 A, for ACOPOSinverter P74 1x 200-240 V, 0.55-0.75 kW
8I0CS018.000-1	Mains choke 1-phase 18 A, for ACOPOSinverter P74 1x 200-240 V, 1.1-2.2 kW
8I0CT004.000-1	Mains choke 3-phase 4 A, for ACOPOSinverter P74 3x 380-500 V, 0.37-1.5 kW, for ACOPOSinverter P84 3x 200-240 V, 0.37-0.75 kW and 3x 380-480 V, 0.75-1.5 kW
8I0CT010.000-1	Mains choke 3-phase 10 A, for ACOPOSinverter P74 3x 380 to 500 V, 2.2 to 4 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 2.2 to 4 kW
8I0CT016.000-1	Mains choke, 3-phase 17 A, for ACOPOSinverter P74 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 kW and 3x 380 to 480 V, 5.5 to 7.5 kW
8I0CT030.000-1	Mains choke 3-phase 30 A, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 4 to 5.5 kW and 3x 380 to 480 V, 11 to 15 kW

Table 19: 8I0CS004.000-1, 8I0CS007.000-1, 8I0CS018.000-1, 8I0CT004.000-1, 8I0CT010.000-1, 8I0CT016.000-1, 8I0CT030.000-1 - Order data

5.3.2 Technical data

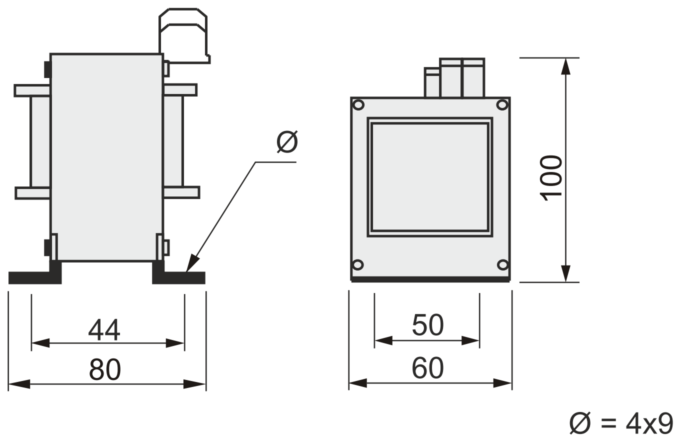
Model number	8I0CS004.000-1	8I0CS007.000-1	8I0CS018.000-1	8I0CT004.000-1	8I0CT010.000-1	8I0CT016.000-1	8I0CT030.000-1
General information							
Certification							
CE	Yes						
KC	Yes						
Mains connection							
Power loss	17 W	20 W	30 W	45 W	65 W	75 W	90 W
Inductance	10 mH	5 mH	2 mH	10 mH	4 mH	2 mH	1 mH
Nominal current	4 A	7 A	18 A	4 A 1)	10 A 1)	17 A 1)	30 A 1)
Voltage drop	From 3 to 5% of the rated supply voltage. Higher values result in torque loss.						
Saturation current	-						
Operating conditions							
Installation at elevations above sea level	0 to 1000 m						
Protection							
Choke	IP00						
Terminals	IP20						IP10
Max. relative humidity	95%, non-condensing No dripping water						
Ambient temperature	0 to 45°C						
Max. ambient temperature	Up to 55°C 2)						
Maximum installation elevation	3000 m 3)						
Environmental conditions							
Temperature							
Storage	-25 to 70°C						
Mechanical characteristics							
Weight	0.63 kg	0.88 kg	1.99 kg	1.5 kg	3.0 kg	3.5 kg	6.0 kg
General information							
Conformity to standard	IEC 61800-5-1 (protection level 1 regarding overvoltages in the mains supply according to VDE 0160)						

Table 20: 8I0CS004.000-1, 8I0CS007.000-1, 8I0CS018.000-1, 8I0CT004.000-1, 8I0CT010.000-1, 8I0CT016.000-1, 8I0CT030.000-1 - Technical data

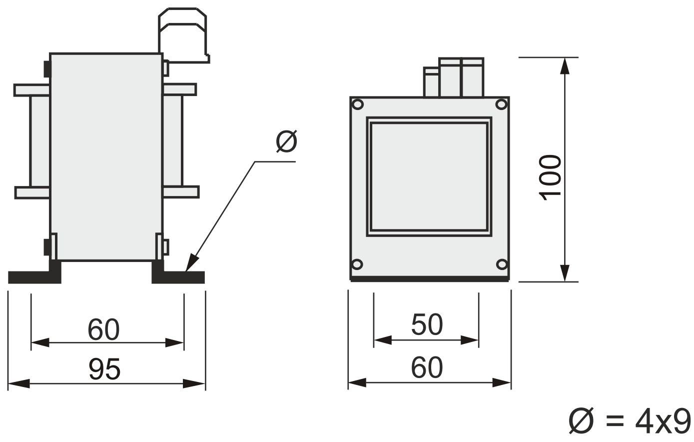
1) Max. current = 1.65 x rated current for 60 seconds.
2) With current reduction of 2% per °C above 45°C.
3) From 1000 to 3000 m, current reduced by 1% per 100 m

5.3.3 Dimensions

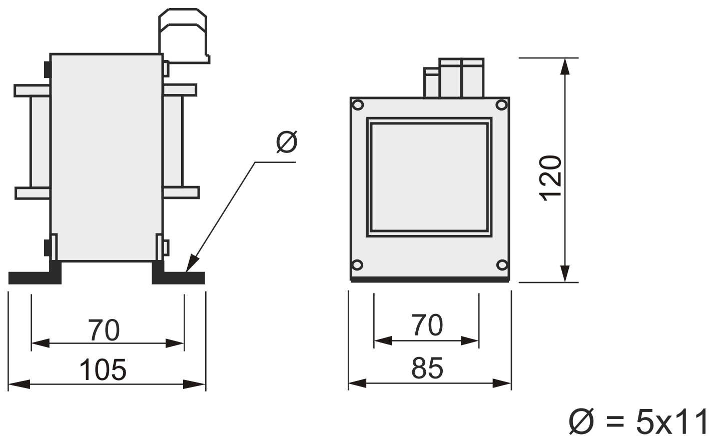
8I0CS004.000-1



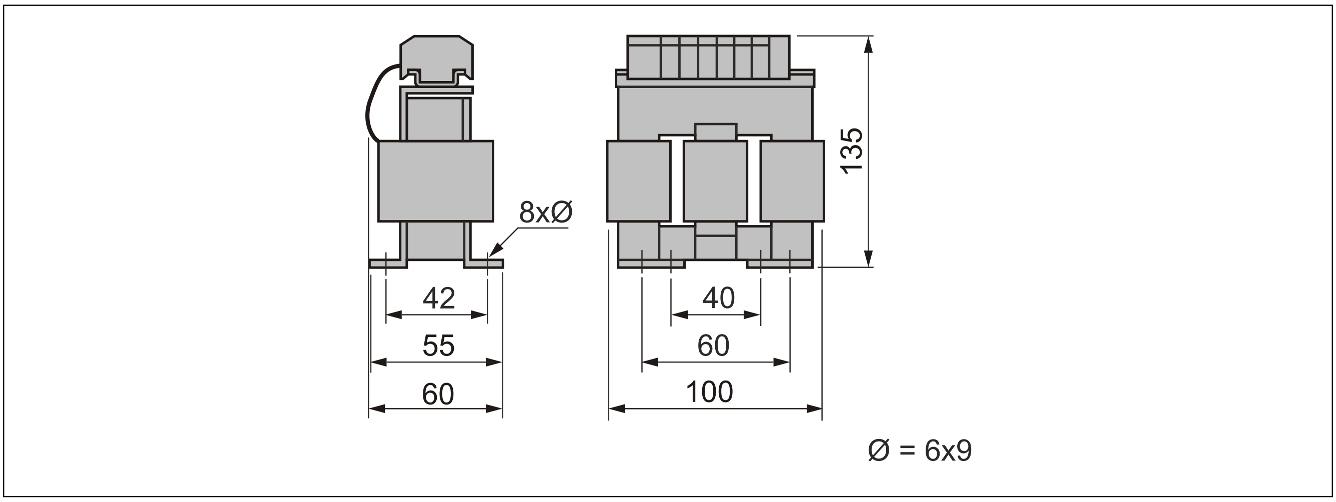
8I0CS007.000-1



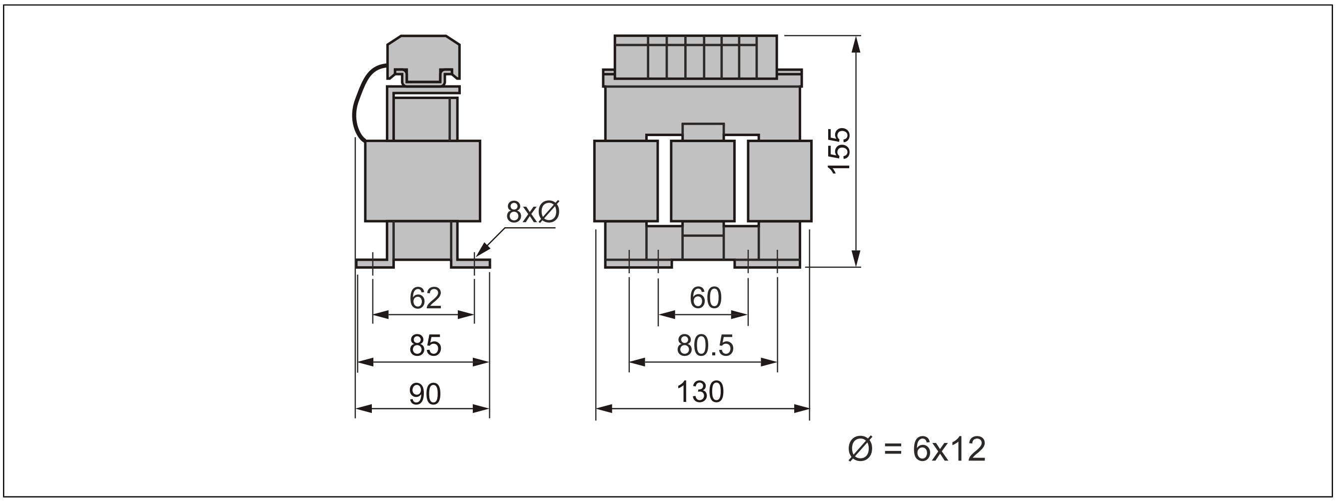
8I0CS018.000-1



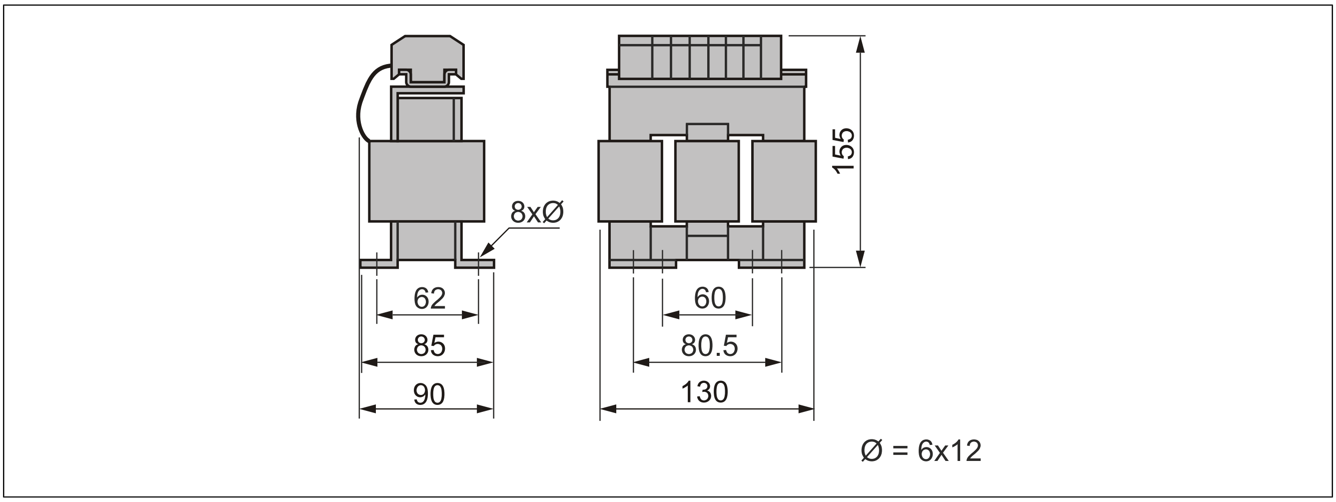
8I0CT004.000-1



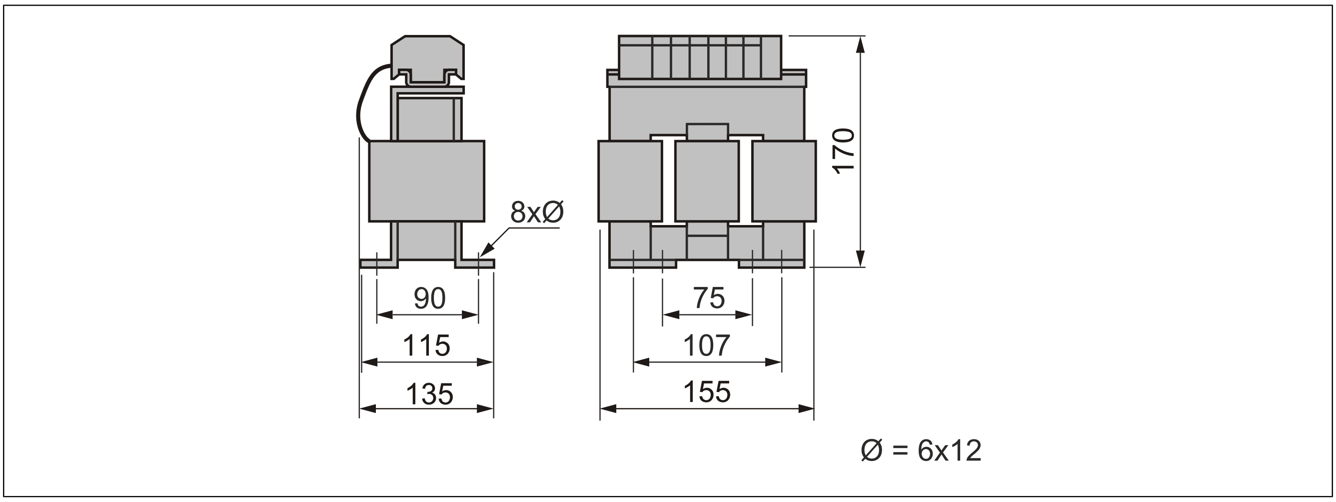
8I0CT010.000-1



8I0CT016.000-1

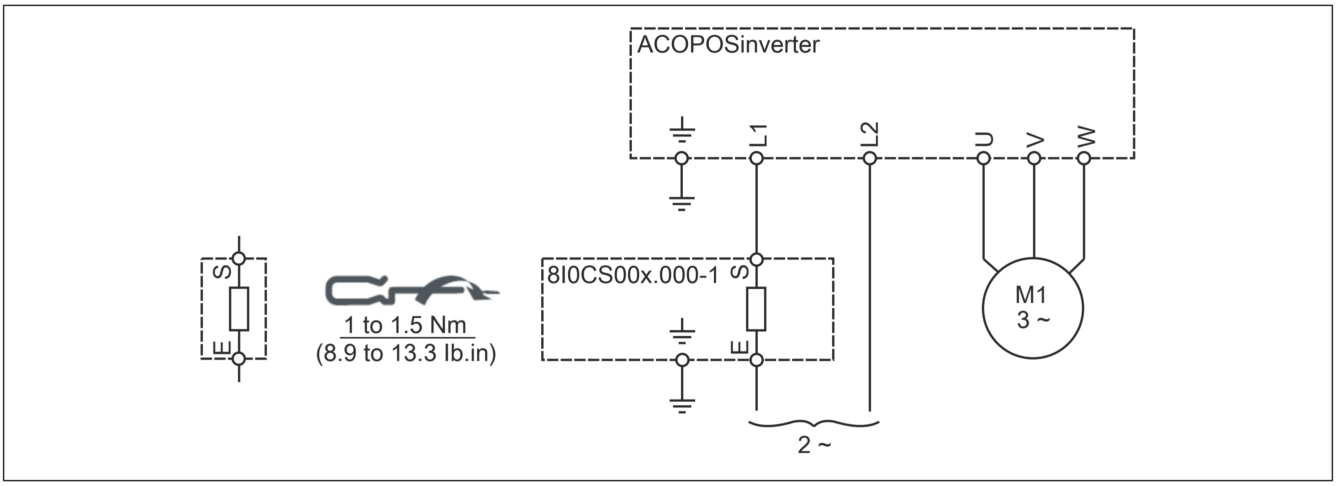


8I0CT030.000-1

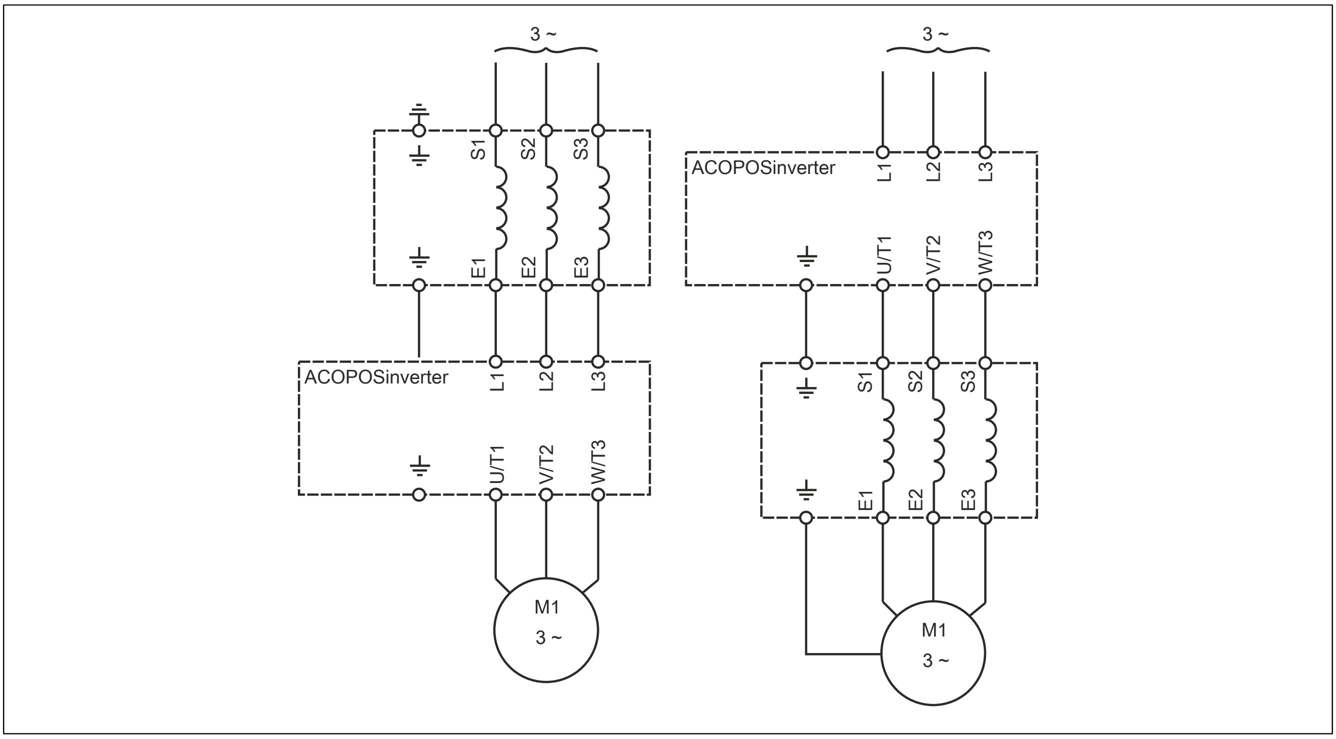


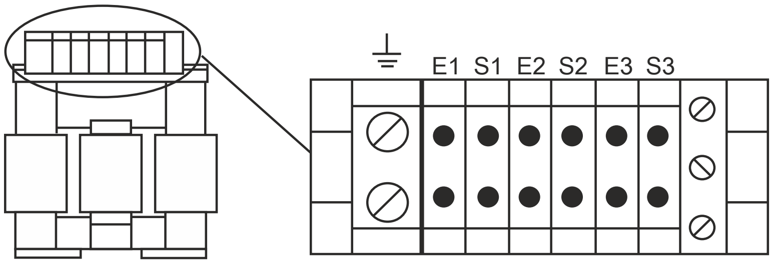
5.3.4 Installation

8I0CS0xx.000-1



8I0CT0xx.000-1




E1 S1 E2 S2 E3 S3

5.4 Additional EMC filters

- Additional EMC filters are intended to reduce line-conducted emissions from the mains supply to a level under the limits specified in IEC/EN 61800-3, category C1, C2 or C3 in environment 1 (public mains) or 2 (industrial mains) depending on the inverter power.
- Data for detecting permitted length of the shielded engine cable can be found in the characteristics of the ACOPOSinverter P74 in “Cable-related and radiated interference emission”.
- Additional EMC filters can only be used for TN (neutral) and TT (neutral-ground) connection types.

5.4.1 Order data

Model number	Short description
	ACOPOSinverter P74/P76 - Additional EMC input filters
8I0FS009.200-2	EMC filter 1-phase 9 A, side installation, for ACOPOSinverter P74/P76 1x 200 to 240 V, 0.18 to 0.75 kW
8I0FS016.200-1	EMC filter 1-phase 16 A, side installation, for ACOPOSinverter P74/P76 1x 200 to 240 V, 1.1 to 1.5 kW
8I0FS022.200-1	EMC filter 1-phase 22 A, side installation, for ACOPOSinverter P74/P76 1x 200 to 240 V, 2.2 kW
8I0FT015.200-1	EMC filter 3-phase 15 A, side installation, for ACOPOSinverter P74/P76 3x 380 to 500 V, 0.37 to 1.5 kW
8I0FT025.200-1	EMC filter 3-phase 25 A, side installation for ACOPOSinverter P74 3x 380 to 500 V, 2.2 to 4 kW
8I0FT047.200-1	EMC filter 3-phase 47 A, bottom or side installation for ACOPOSinverter P74/P76 3x 380 to 500 V, 5.5 to 7.5 kW
8I0FT049.200-1	EMC filter 3-phase 49 A, bottom or side installation for ACOPOSinverter P74/P76 3x 380 to 500 V, 11 to 15 kW

Table 21: 8I0FS009.200-2, 8I0FS016.200-1, 8I0FS022.200-1, 8I0FT015.200-1, 8I0FT025.200-1, 8I0FT047.200-1, 8I0FT049.200-1 - Order data

5.4.2 Technical data

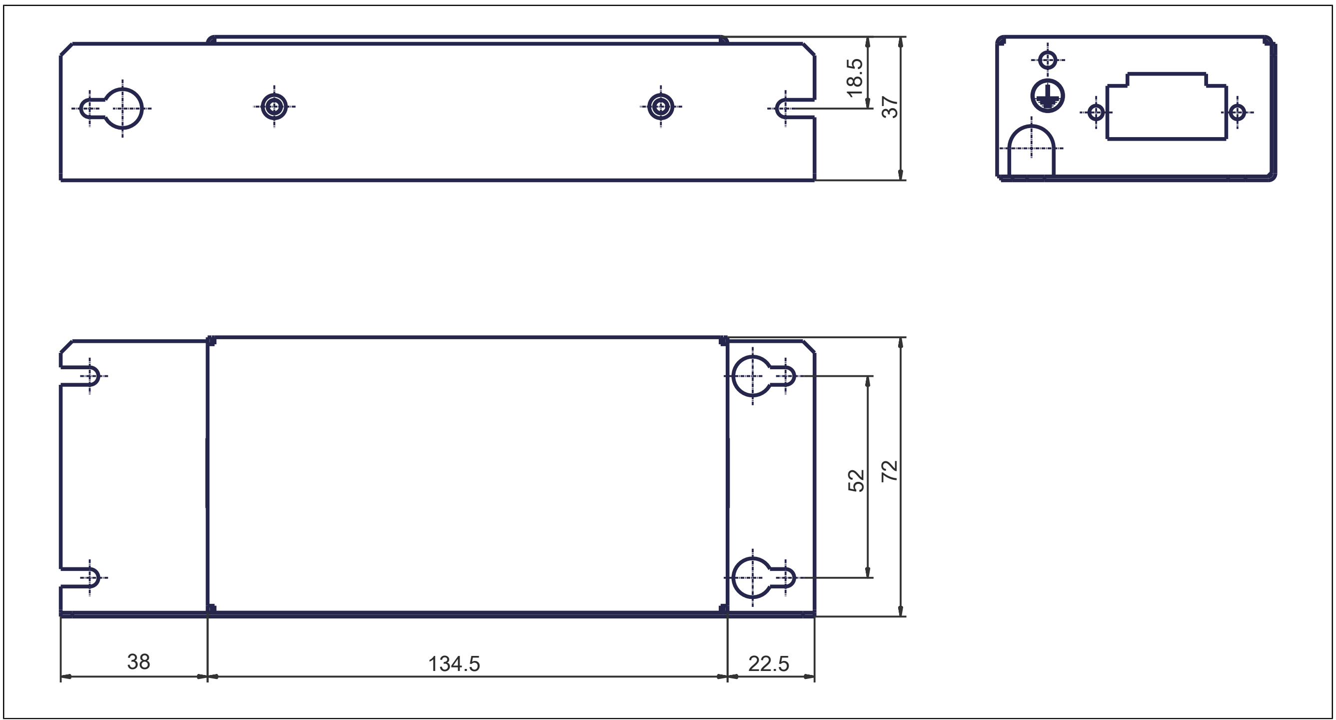
Model number	8I0FS009.200-2	8I0FS016.200-1	8I0FS022.200-1	8I0FT015.200-1	8I0FT025.200-1	8I0FT047.200-1	8I0FT049.200-1
General information							
Certifications							
CE	-	Yes					
KC	-	Yes					
Mains connection							
Power dissipation	3.7 W	6.9 W	7.5 W	9.9 W	15.8 W	19.3 W	27.4 W
Max. nominal voltage	1x 240 VAC +10%			3x 500 VAC +10%			
Nominal filter current	9 A	16 A	22 A	15 A	25 A	47 A	49 A
Max. fault current	100 mA	150 mA	80 mA	15 mA	35 mA	45 mA	
Operating conditions							
Installation elevation above sea level	0 to 1000 m [1]						
Degree of protection per EN 60529	Upper part: IP20 and IP41	IP21 and IP41 on the upper part					
Max. relative humidity per IEC 60068-2-3	93%, non-condensing No dripping water	95%, non-condensing No dripping water		95%, non-condensing No dripping water			
Ambient temperature	-10 to 50°C	-10 to 60°C					
Environmental conditions							
Temperature							
Storage	-25 to 70°C						
Mechanical properties							
Weight	0.6 kg	0.775 kg	1.13 kg	1.0 kg	1.65 kg	3.15 kg	4.75 kg
Installation	Below or next to the inverter						
General information							
Conformity to standard	EN 133200						

Table 22: 8I0FS009.200-2, 8I0FS016.200-1, 8I0FS022.200-1, 8I0FT015.200-1, 8I0FT025.200-1, 8I0FT047.200-1, 8I0FT049.200-1 - Technical data

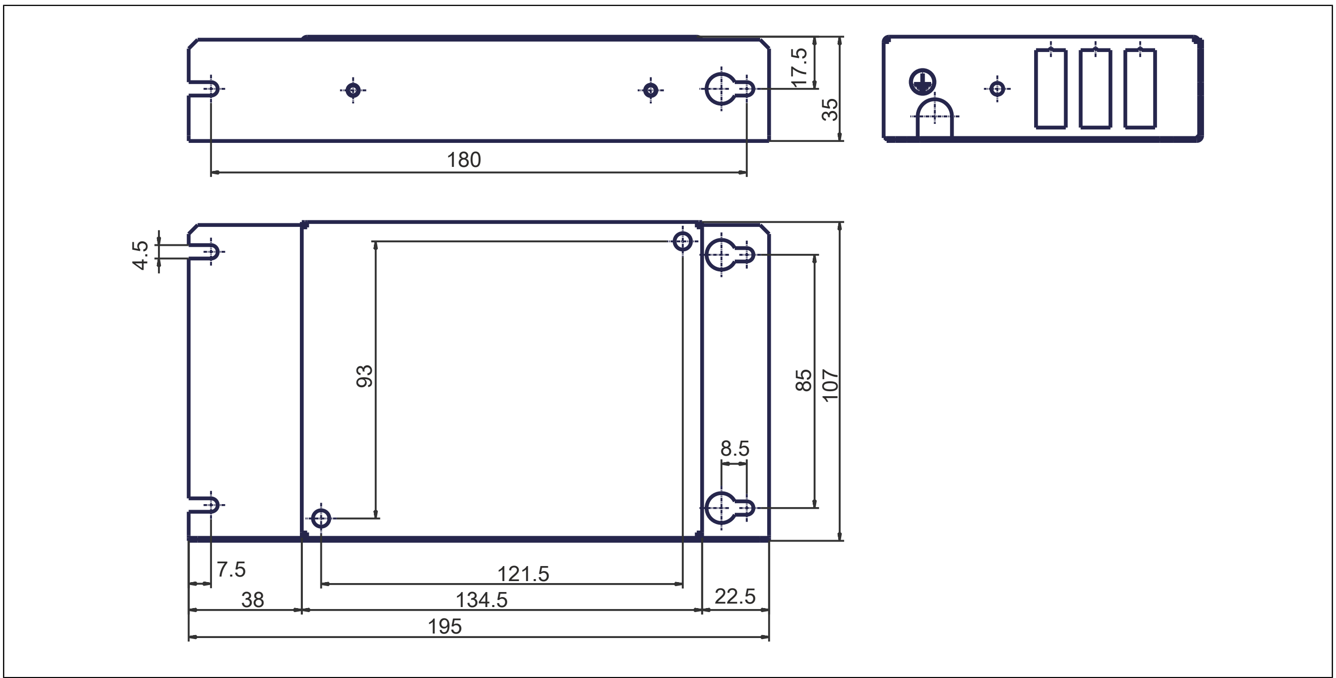
1) Over 1000 m, current reduced by 1% per 100 m

5.4.3 Dimensions

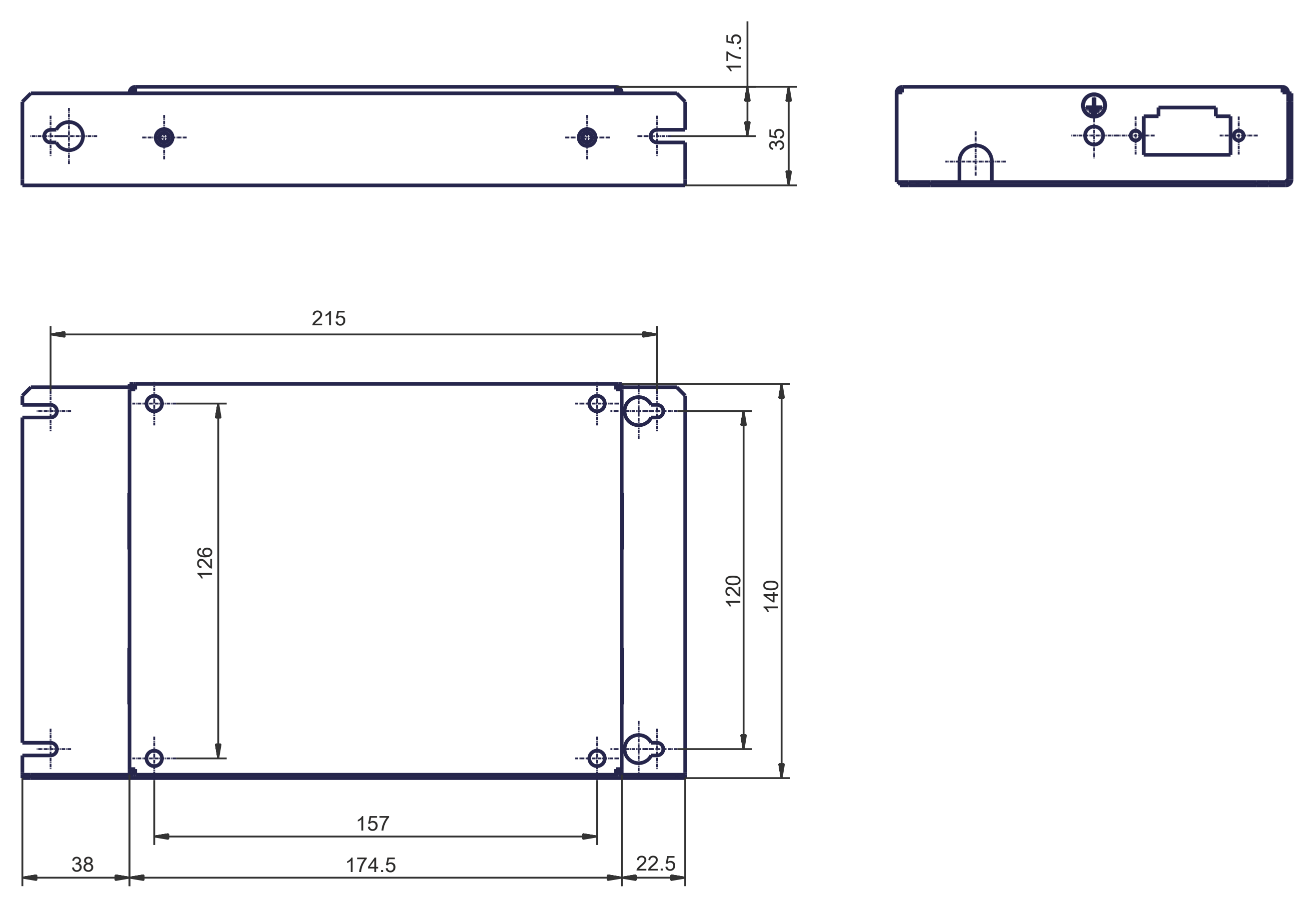
8I0FS009.200-2



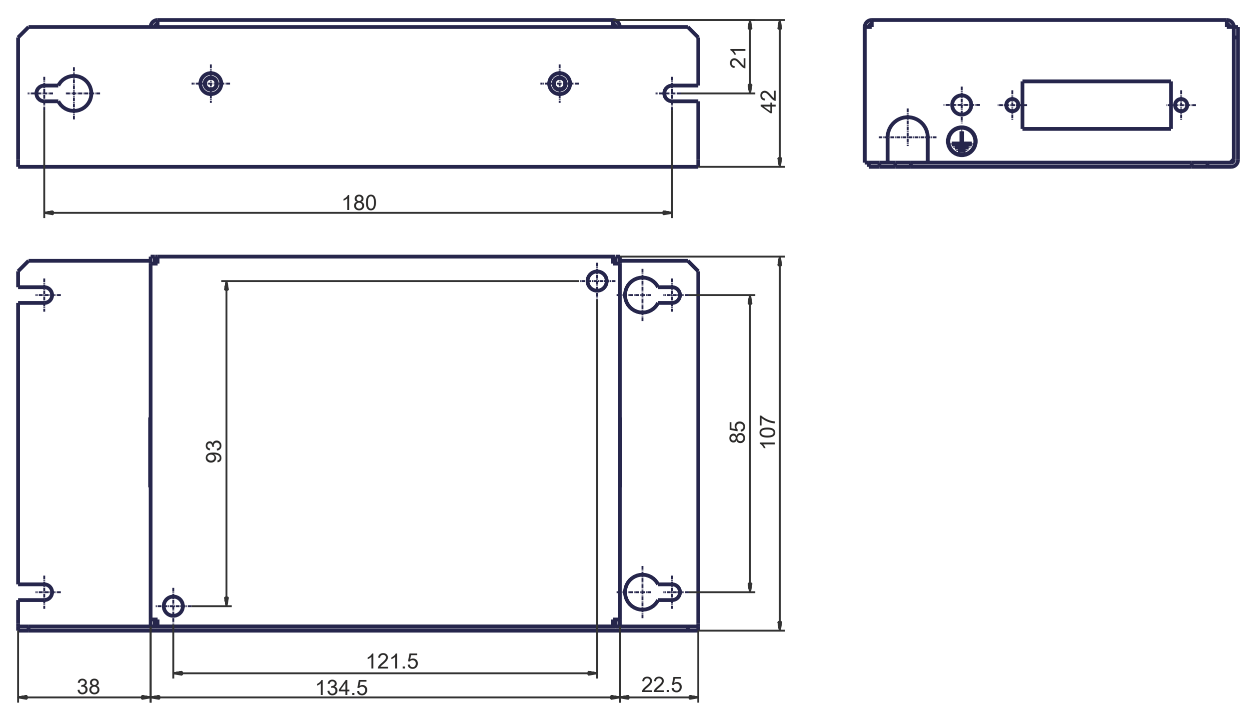
8I0FS016.200-1



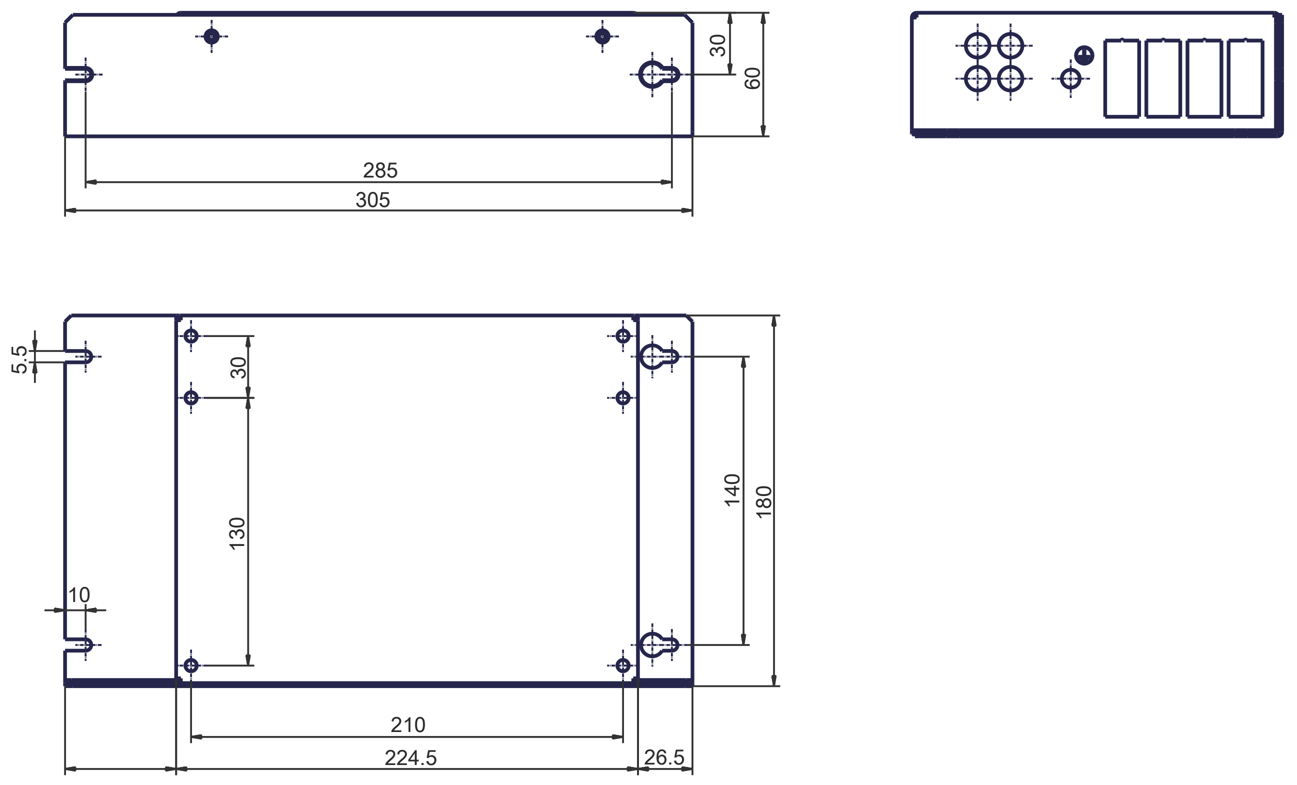
8I0FS022.200-1



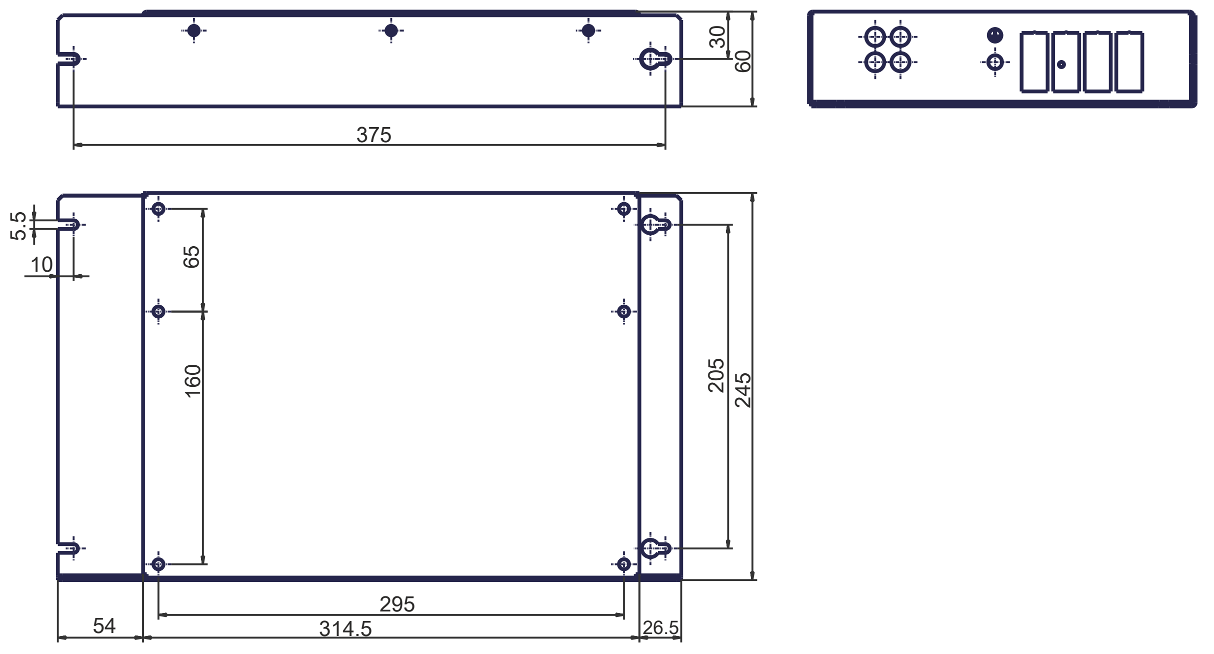
8I0FT015.200-1



8I0FT047.200-1

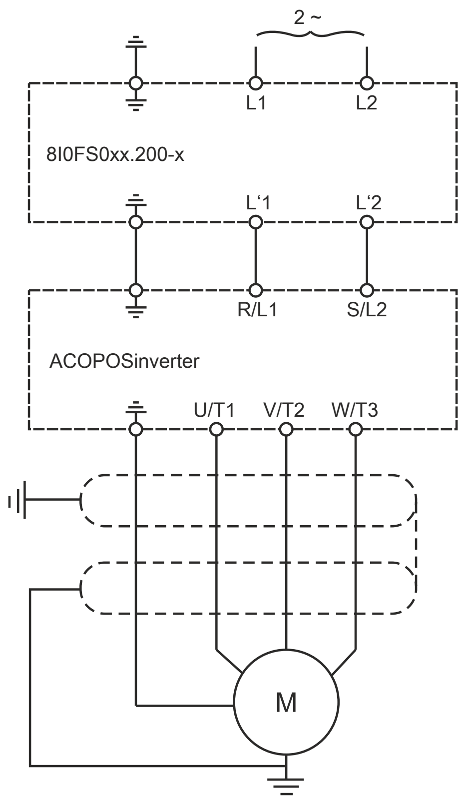


8I0FT049.200-1

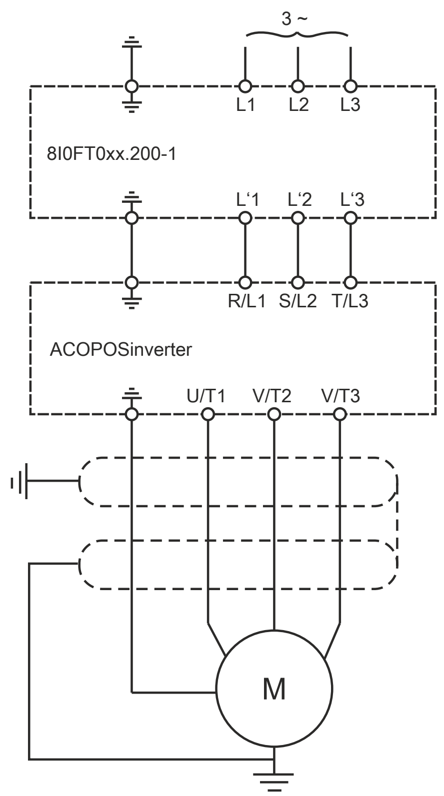


5.4.4 Installation

8I0FS0xx.200-x



8I0FT0xx.200-1



5.5 Fan

Danger!

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- **Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation and who have received safety training to recognize and avoid hazards involved are authorized to work on and with this drive system. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.**
- **The system integrator is responsible for compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.**
- **Many components of the product, including the printed circuit boards, operate with mains voltage. Do not touch. Use only electrically insulated tools.**
- **Do not touch unshielded components or terminals with voltage present.**
- **Motors can generate voltage when the shaft is rotated. Prior to performing any type of work on the drive system, block the motor shaft to prevent rotation.**
- **AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors of the motor cable.**
- **Do not short across the DC bus terminals or the DC bus capacitors or the braking resistor terminals.**
- **Before performing work on the drive system:**
    - **Disconnect all power, including external control power that may be present.**
    - **Place a "Do Not Turn On" label on all power switches.**
    - **Lock all power switches in the open position.**
    - **Wait 15 minutes to allow the DC bus capacitors to discharge. The DC bus LED is not an indicator of the absence of DC bus voltage that can exceed 800 Vdc.**
    - **Measure the voltage on the DC bus between the DC bus terminals (PA/+ and PC/-) using a properly rated voltmeter to verify that the voltage is <42 Vdc.**
    - **If the DC bus capacitors do not discharge properly, contact your local Schneider Electric representative. Do not repair or operate the product.**
- **Install and close all covers before applying voltage.**

Failure to follow these instructions will result in death or serious injury.

5.5.1 Order data

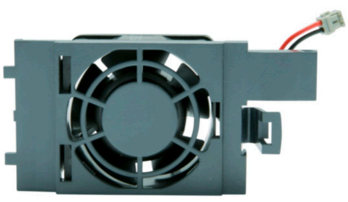
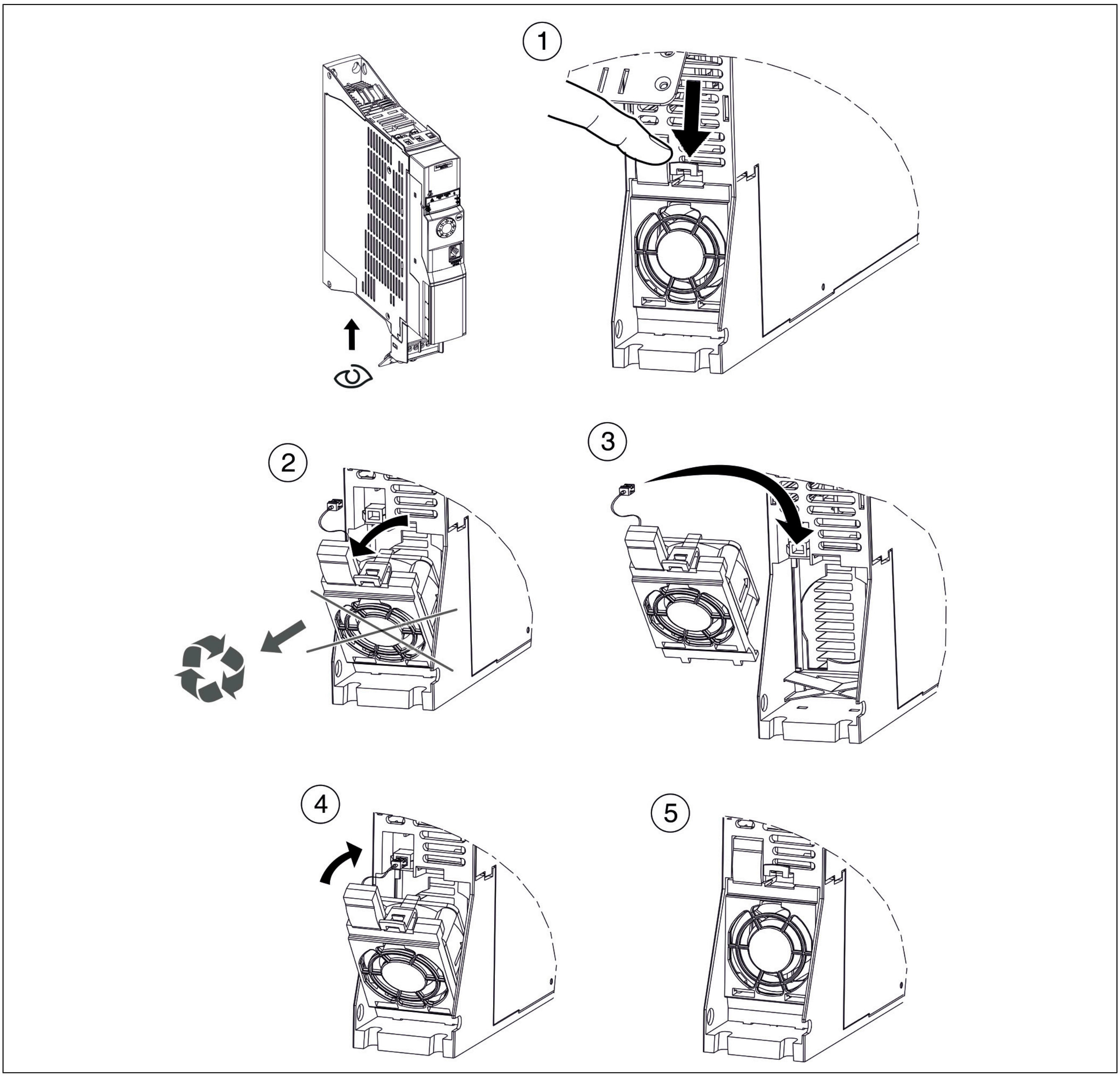
Model number	Short description	Figure
	Undefined	
8I0XF074.010-1	Fan for ACOPOSinverter P74 1x 200 to 240 V, 0.18 to 0.75 kW and 3x 380 to 500 V, 0.37 to 1.5 kW	
8I0XF074.020-1	Fan for ACOPOSinverter P74 1x 200 to 240 V, 1.1 to 2.2 kW and 3x 380 to 500 V, 2.2 to 4 kW	
8I0XF074.030-1	Fan for ACOPOSinverter P74 3x 380 to 500 V, 5.5 to 7.5 kW	
8I0XF074.040-1	Fan for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW	

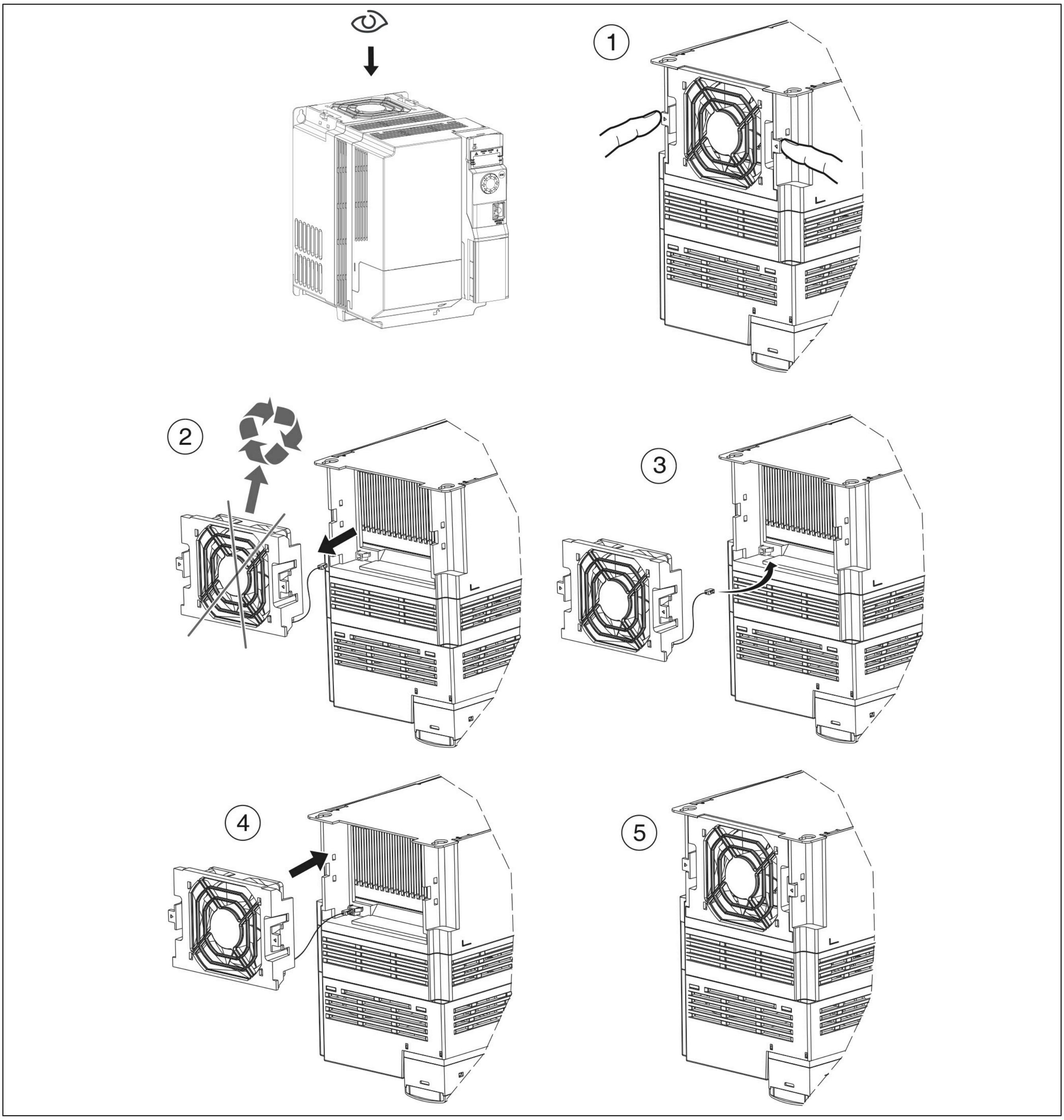
Table 23: 8I0XF074.010-1, 8I0XF074.020-1, 8I0XF074.030-1, 8I0XF074.040-1 - Order data

5.5.2 Installation

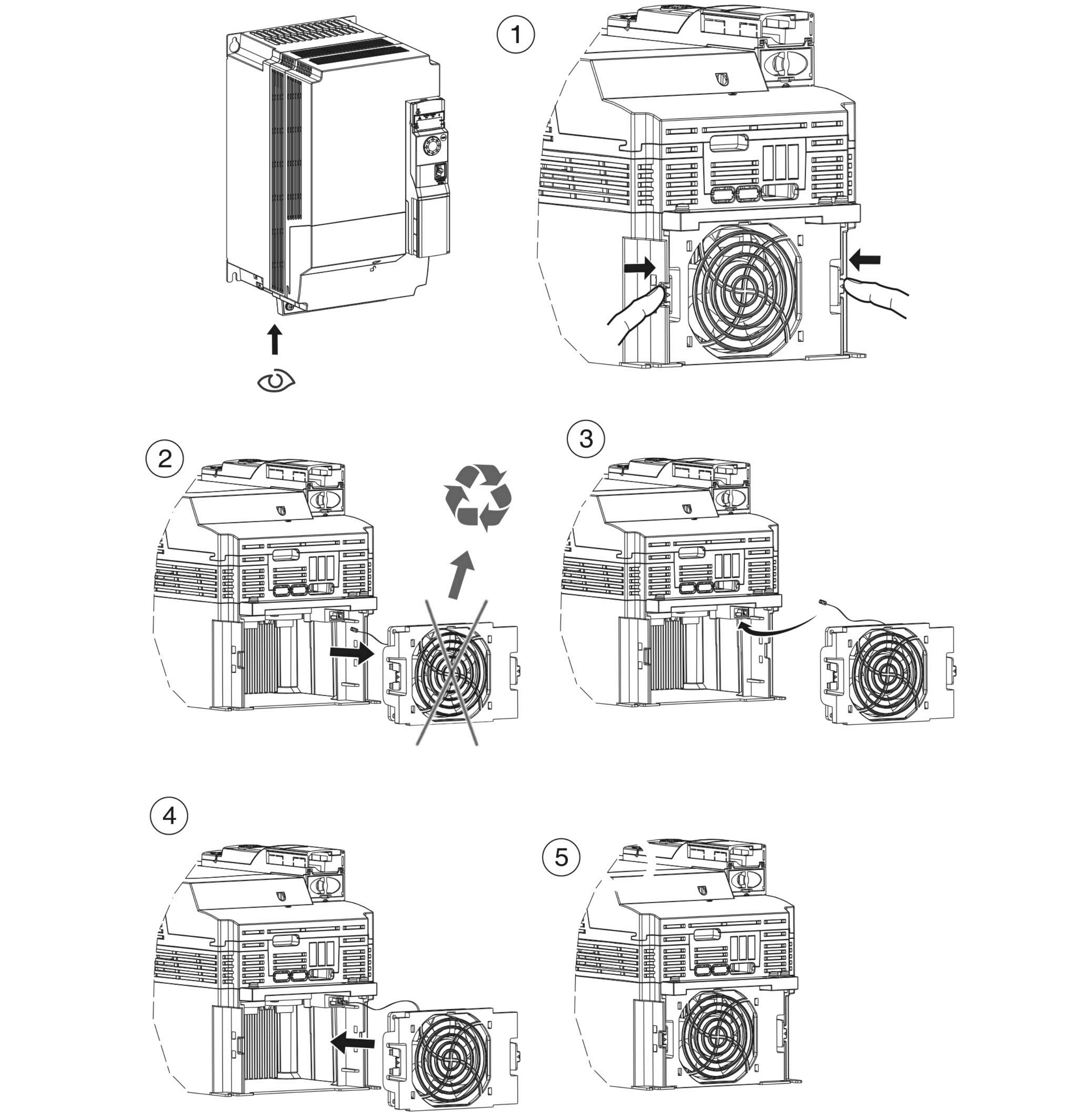
8I0XF074.010-1, 8I0XF074.020-1



8I0XF074.030-1



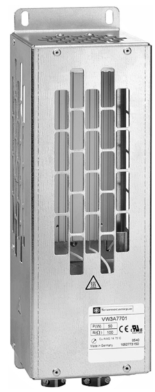
8I0XF074.040-1



5.6 Brake resistors

- The brake resistor enables the ACOPOSinverter P74 to run braking or slowly braking by conducting away brake energy.
- It permits a maximum short-term braking torque.
- The resistors are intended for being assembled outside of the housing, but they may not influence natural cooling. Air inlets and outlets may not be blocked.
- The air has to be free of dust, condensation and corrosive gases.

5.6.1 Order data



Model number	Short description
	ACOPOSinverter P74/P84 - Braking resistors
8I0BR028.000-1	Braking resistor 28 Ω, continuous braking power 0.2 kW, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 to 4 kW and 3x 380 to 480 V, 11 to 15 kW
8I0BR060.000-1	Braking resistor 60 Ω, continuous braking power 0.1 kW, for ACOPOSinverter P74 1x200 to 240 V, 2.2 kW and 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 5.5 to 7.5 kW
8I0BR100.000-1	Braking resistor 100 Ω, continuous braking power 0.05 kW, for ACOPOSinverter P74/P76 1x200 to 240 V, 0.18 to 1.5 kW and 3x 380 to 500 V, 0.37 to 4 kW for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 4 kW

Table 24: 8I0BR028.000-1, 8I0BR060.000-1, 8I0BR100.000-1 - Order data

5.6.2 Technical data

Model number	8I0BR028.000-1	8I0BR060.000-1	8I0BR100.000-1
General information			
Certifications			
CE	Yes		
KC	Yes		
Operating conditions			
Rated protection of housing	IP20		
Ambient temperature	0 to 50°C		
Environmental conditions			
Temperature			
Storage	-25 to 70°C		
Mechanical properties			
Weight	3.5 kg	2.4 kg	2 kg
Properties			
Resistance value at 20°C	28 Ω	60 Ω	100 Ω
Average available power at 50°C	0.2 kW 1)	0.1 kW 1)	0.05 kW 1)
Thermal protection	Using temperature-controlled switches or the inverter		
Temperature controlled switch			
Activation temperature	120°C		
Max. voltage / Max. current	250 VAC / 1 A		
Min. voltage / Min. current	24 VDC / 0.1 A		
Max. contact resistance	60 mΩ		
Connection recommendation	The switch should be connected within the sequence (so it can be used for signaling or line contactor control)		

Table 25: 8I0BR028.000-1, 8I0BR060.000-1, 8I0BR100.000-1 - Technical data

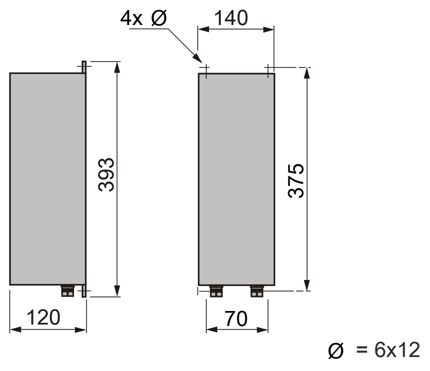
1) Load factors for resistances: The value for the average power that can be transfered from the resistor to the housing at 50°C is aligned to a brake load factor that corresponds to most standard applications.
For 8I0BR100.000-1 to 8I0BR003.000-1:

- Braking for 2 s with a braking torque of 0.6 Tn for a 40 second cycle
- Braking for 0.8 s with a braking torque of 1.5 Tn for a 40 second cycle

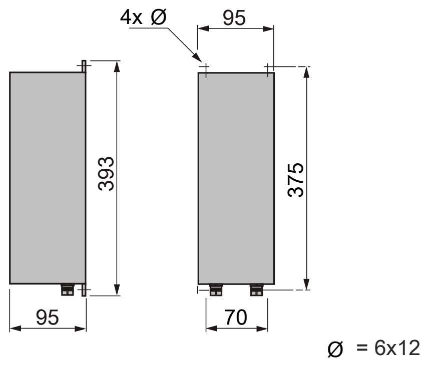
For 8I0BR003.001-1 to 8I0BR001.004-1:
- Braking for 10 s with a braking torque of 2 Tn for a 30 second cycle

5.6.3 Dimensions

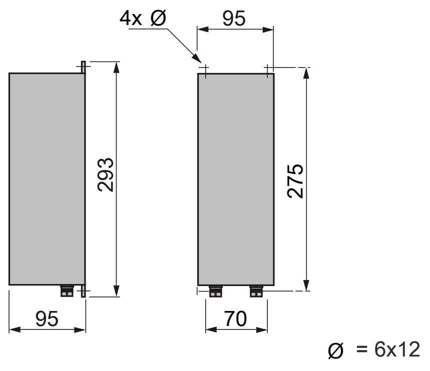
8I0BR028.000-1



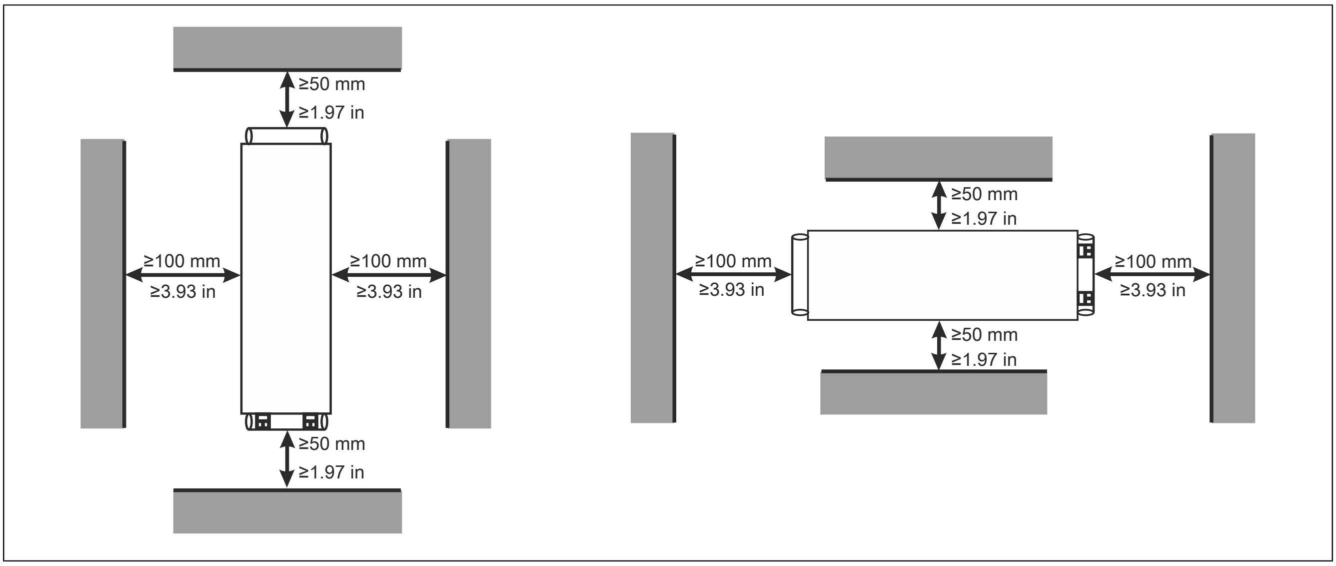
8I0BR060.000-1

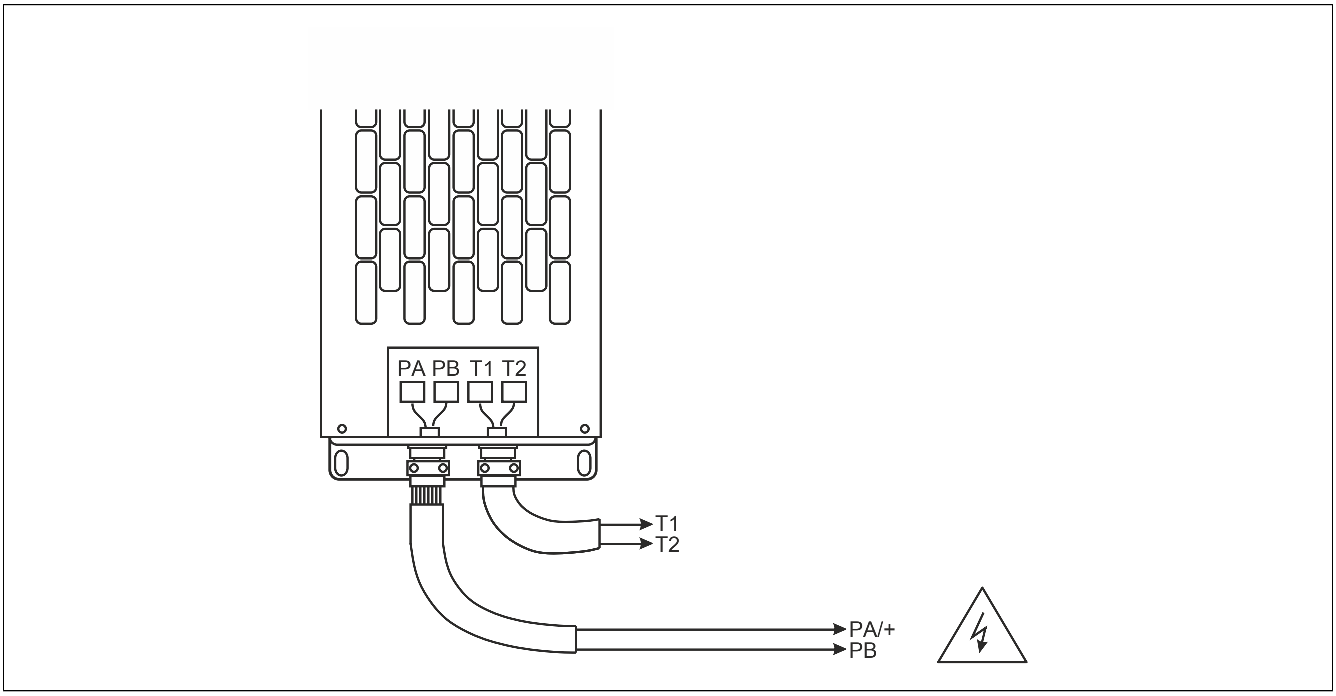


8I0BR100.000-1



5.6.4 Installation





5.7 USB accessories

5.7.1 Order data

Model number	Short description	Figure
	ACOPOSinverter P74/P76 - USB accessories	
8I0XC001.003-1	ACOPOSinverter USB Modbus universal cable 3 m, PC - ACOPOSinverter connection	

Table 26: 8I0XC001.003-1 - Order data

5.8 DC bus cable

5.8.1 Order data

Model number	Short description	Figure
	ACOPOSinverter P74/P76 - DC bus cable	
8I0XC003.400-1	ACPi P74 DC bus cable, 0.18 m, 5 pcs.	

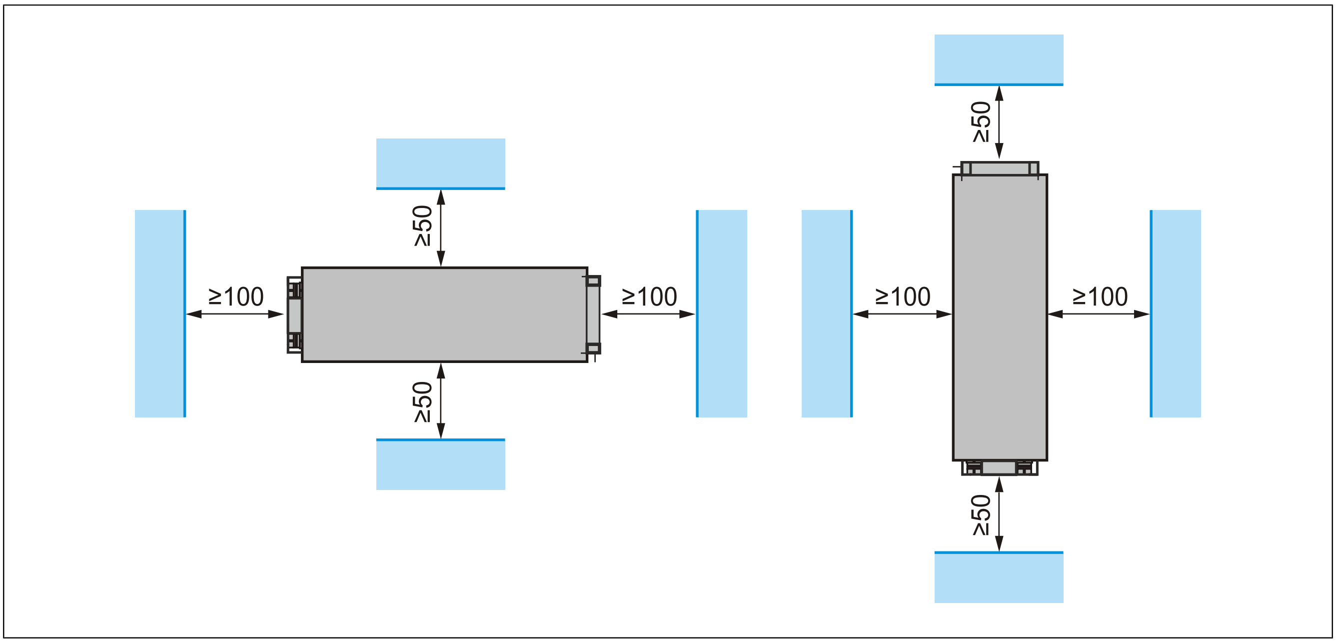
Table 27: 8I0XC003.400-1 - Order data

5.8.2 Technical data

Model number	8I0XC003.400-1
Short description	
Accessories	ACPi P74 DC bus cable
Mechanical characteristics	
Dimensions	
Length	0.18 m
Brief overview	
Content of delivery	5 pcs.

Table 28: 8I0XC003.400-1 - Technical data

5.9 Recommendations for installation



6 EC declaration of conformity

This document was originally written in the English language. The English edition therefore represents the original instruction manual in accordance with the 2006/42/EC machinery directive. Documents in other languages are to be viewed as translations of the original instruction manual.

Product manufacturer

B&R Industrial Automation GmbH

B&R Strasse 1

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AUSTRIA

The EC declarations of conformity can be downloaded from the B&R website www.br-automation.com.

7 Register description

The complete description of register for the ACOPOSinverter P74 can be taken form the Excel file (attachment). Please follow the link to open the file "ACOPOSinverter P74 - Communication Parameters".

- ACOPOSinverterP74Communication_parameters