SEW EURODRIVE

PROFIBUS DP-V1 UFP11A Fieldbus Interface

Edition

02/2004

Manual

11254416 / EN

SEW
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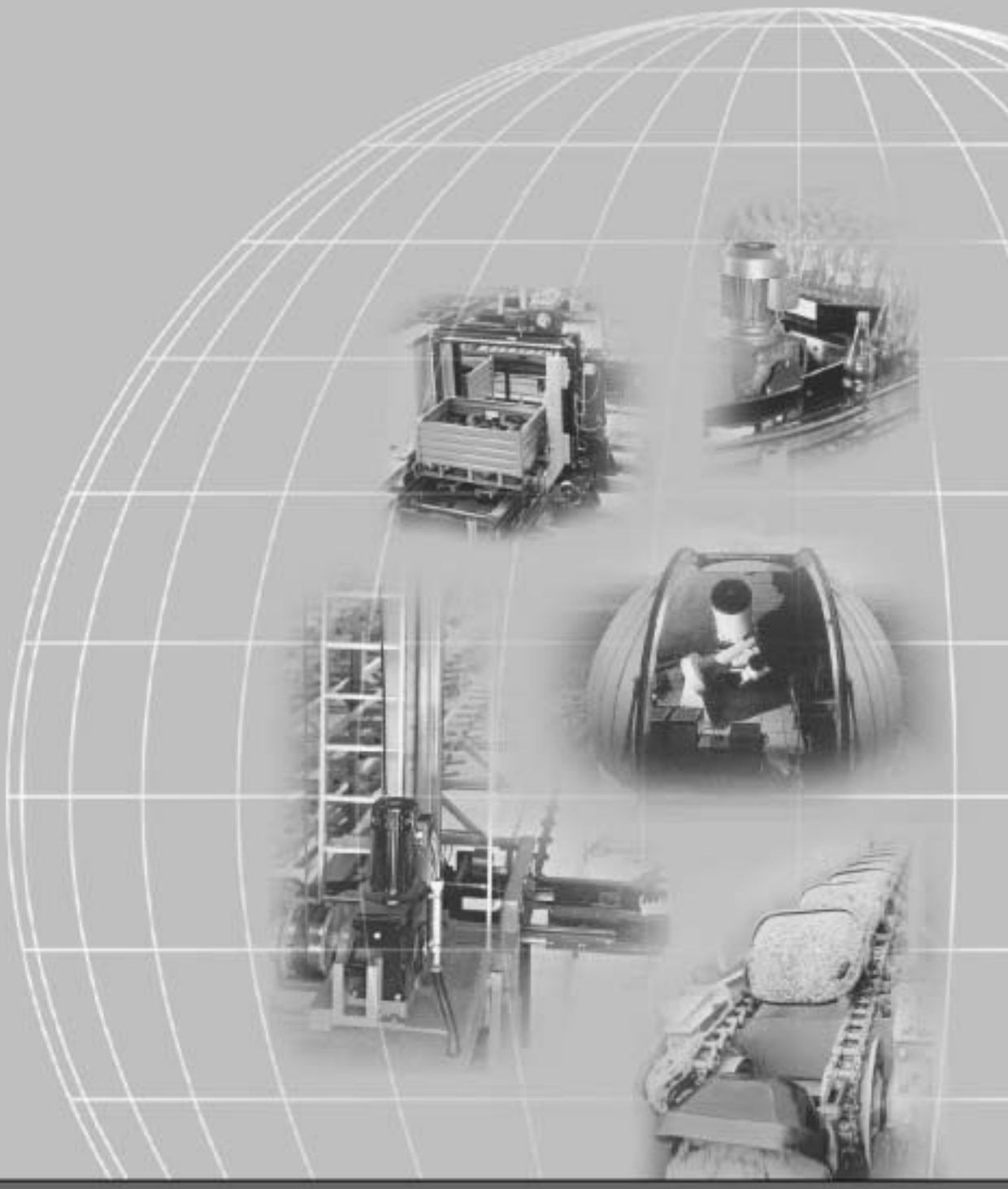

SEW-EURODRIVE

1 System Overview

The UFP11A PROFIBUS DP-V1 fieldbus interface is used for connecting inverters with the PROFIBUS DP-V1. Several inverters can be connected to the UFP11A PROFIBUS DP-V1 interface via the SBus. The UFP11A PROFIBUS interface establishes the connection between PROFIBUS DP-VI and SBus.

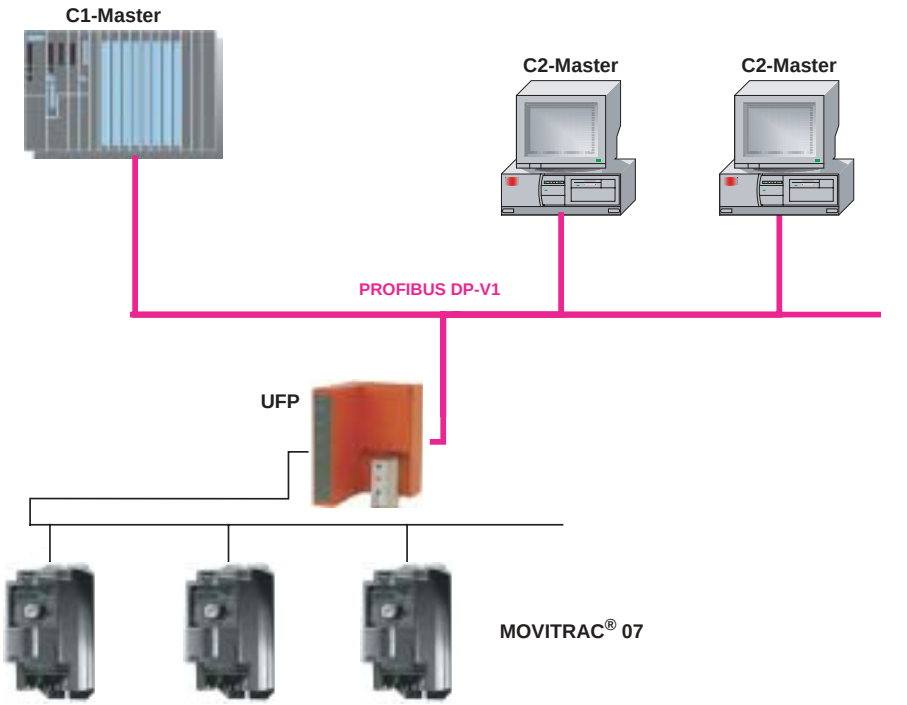

Figure 1: System overview DP-V1 master – UFP – inverter

2 Unit Design

2.1 Front view

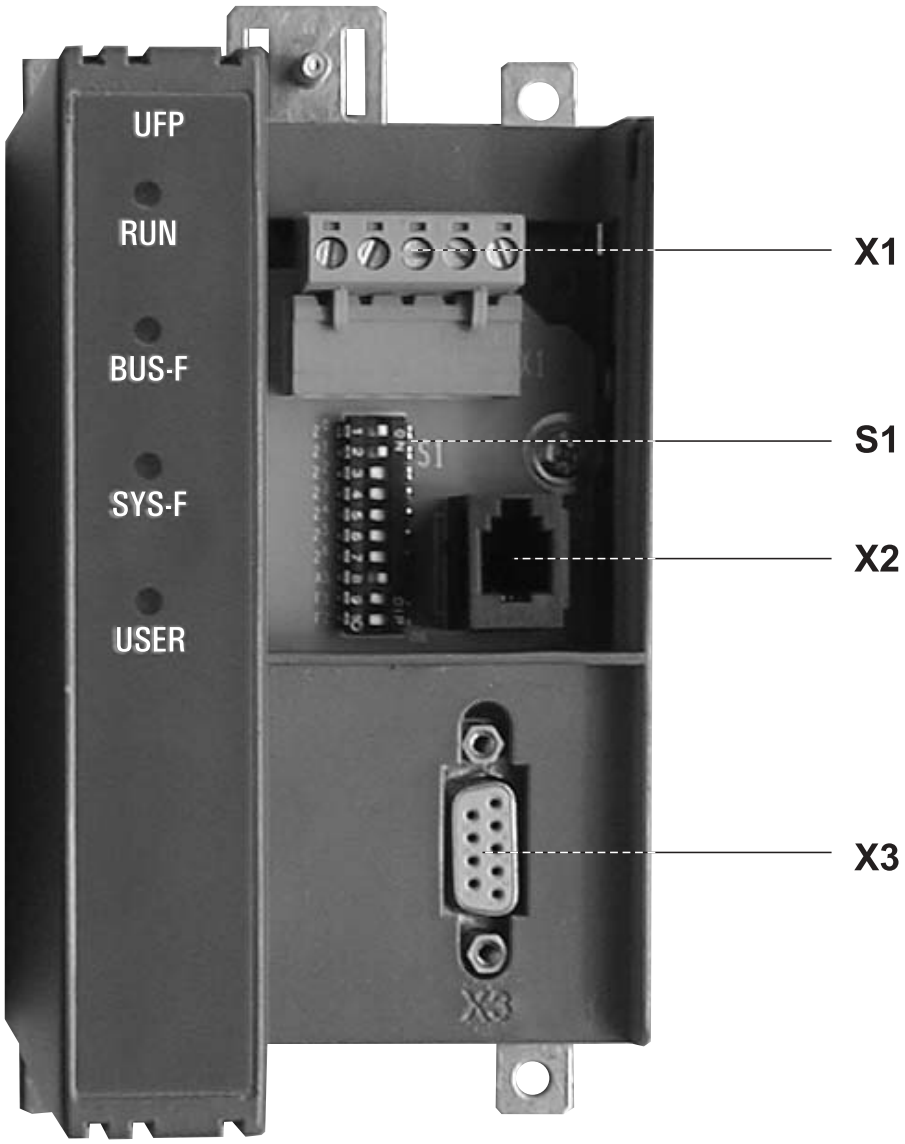

Figure 2: Arrangement of LEDs, connectors and DIP switches

X1	SBus and 24 V connector
X2	Diagnostic interface
X3	PROFIBUS
S1	DIP switch
RUN	Operating status
BUS-F	Bus fault
SYS-F	System fault
USER	Expert mode

3 Installation and Operation without PC

3.1 Installation notes

Installation

The unit can be installed directly onto the wall of a control cabinet by using the pre-installed DIN rail mounting or the four drilled holes on the back of the housing. Basically, there are no restrictions regarding the spatial arrangement of the units to be connected (e.g. MOVITRAC® 07). The maximum line length and the fact that the gateway must be installed at the end or the beginning of the system bus (SBus) must be taken into consideration. For this reason, we recommend you take the spatial aspects into account.

The UFP must have additional HF-compliant grounding if the DIN rail mounting option is used with SBus cables of more than 1 m in length.

Pin assignment

The UFP11A fieldbus interface is connected to the PROFIBUS network by means of a 9-pin sub D connector in accordance with EN 50170. The T-bus connection must be implemented with an appropriately designed plug.

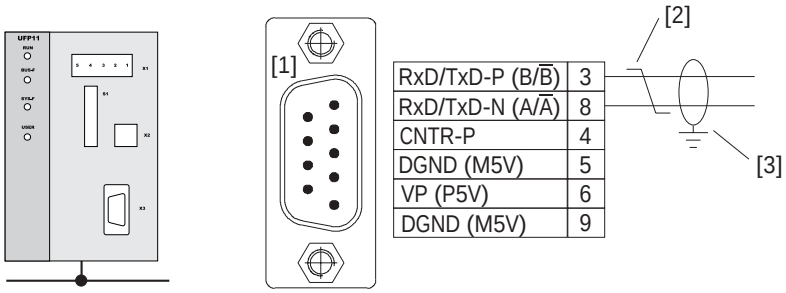

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*Figure 3: Assignment of 9-pin sub D connector **X3** according to EN 50170 ([1] = 9-pin sub D connector; [2] = twisted signal lines; [3] = conductive connection between connector housing and shielding)*

Fieldbus connector

The fieldbus interface is generally connected to the PROFIBUS system using a shielded twisted-pair cable. The shielding of the PROFIBUS cable must be attached to both sides, for example on the connector housing. Observe the maximum supported transmission rate when selecting the bus connector.

The twisted-pair cable is connected to the PROFIBUS connector via pin 8 (A/Ā) and pin 3 (B/B̄). Communication takes place via these two contacts. The RS-485 signals A/Ā and B/B̄ must be contacted in the same way for all PROFIBUS stations. Otherwise, no communication is possible via the bus medium.

The PROFIBUS interface sends a TTL control signal for a repeater or fiber optic adapter (reference = pin 9) via pin 4 (CNTR-P).

System bus connection

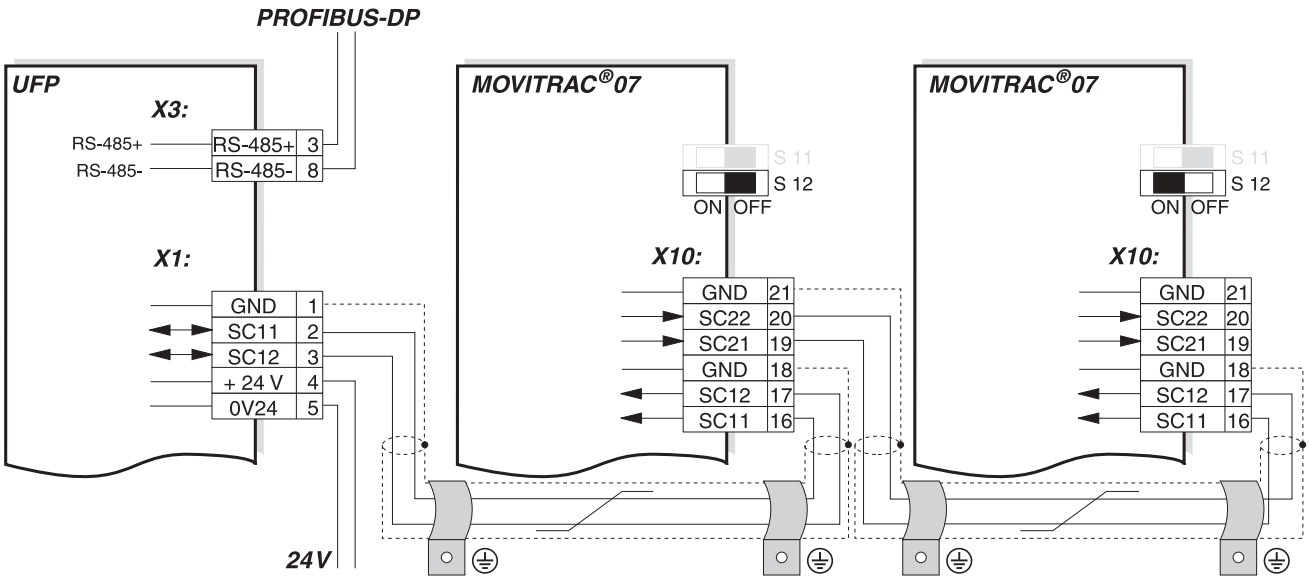

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Figure 4: System bus connection

UFP
GND = System bus reference
SC11 = System bus high
SC12 = System bus low

MOVITRAC® 07
GND = System bus reference
SC22 = System bus low, outgoing
SC21 = System bus high, outgoing
SC12 = System bus low, incoming
SC11 = System bus high, incoming
S12 = System bus terminating resistor

Please note:

- Use a 2-core twisted and shielded copper cable (data transmission cable with braided copper shield). Connect the shield with a wide-area contact at the electronics terminal of MOVITRAC® 07 or UFP11A and also connect the shield ends to GND. The cable must meet the following specifications (CAN bus or DeviceNet cables are suitable, for example):
  - Core cross section 0.75 mm^2 (AWG18)
  - Cable resistance 120 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m (12 pF/ft) at 1 kHz
- The approved total cable length depends on the specified SBus baud rate:
  - 250 kbaud: 160 m (528 ft)
  - 500 kbaud: 80 m (264 ft)
  - 1000 kbaud: 40 m (132 ft)

- Connect the system bus terminating resistor (S12 = ON) at the end of the system bus connection. Disconnect the terminating resistor at the other devices (S12 = OFF). The UFP11A gateway must always be connected either at the beginning or the end of the system bus connection and feature a permanently installed terminating resistor.
- There must not be any difference of potential between the units connected with the SBus. Take suitable measures to avoid a difference of potential, such as connecting the unit ground connectors using a separate line.
- Point-to-point wiring is not permitted.

24 V connection

An external 24 V voltage supply must be connected to terminals X1:4 and X1:5.

Shielding and routing of bus cables

The PROFIBUS interface supports the RS-485 communications protocol and requires cable type A specified for PROFIBUS in accordance with EN 50170 as shielded twisted-pair cable for the physical connection.

Correct shielding of the bus cable attenuates electrical interference that may occur in industrial environments. The following measures ensure the best possible shielding:

- Tighten the mounting screws on the connectors, modules and equipotential bonding conductors by hand.
- Use only connectors with metal housing or plated housing.
- Connect the shielding in the connector with the greatest possible surface area.
- Attach the shielding of the bus line on both sides.
- Do not route signal and bus cables parallel to power cables (motor leads). They must be routed in separate cable ducts.
- Use metallic, grounded cable racks in industrial environments.
- Route the signal cable and the corresponding equipotential bonding in close proximity using the shortest way possible.
- Avoid using plug connectors to extend bus cables.
- Route the bus cables closely along existing grounding surfaces.

In case of fluctuations in the earth potential, a compensating current may flow via the bilaterally connected shield that is also connected to the protective earth (PE). Make sure you supply adequate equipotential bonding according to relevant VDE regulations in such a case.

Bus termination A bus termination is not provided on the UFP electronics. If the UFP module is used as the first or last device of the PROFIBUS line, the bus termination has to be external. We recommend PROFIBUS connectors with integrated bus termination that open the continuing bus in case the bus termination is connected.

3.2 Setting the inverter parameters

The settings can be entered via the inverter keypad. Refer to the operating instructions of the inverter for details.

- Connect the voltage supply for the UFx and all connected inverters.
- Set an individual SBus address (P813) at the inverters. Recommendation: Address setting beginning with address 1 in ascending order based on the arrangement of inverters in the control cabinet. Address 0 should not be assigned because it is used by the UFx.
- Verify the SBus baud rate (P816, factory setting = 500 kbaud).
- Set the setpoint source (P100) to SBus (value 10).
- Set the control source (P101) to SBus (value 3).
- Set the terminal assignment of the binary inputs. For MOVITRAC® 07, the value 0 is recommended for P60-. This corresponds to the following assignment:
  - DI01 CW/Stop (wired to 24 V, both directions of rotation enabled)
  - DI02 CCW/Stop (no function)
  - DI03 F.Setp. toggle(not wired)
  - DI04 n11/n21 (not wired)
  - DI05 n12/n22 (not wired)
  - If you use a MOVIDRIVE® unit as inverter, you must program the terminals that are not used to "No function."
- Important: For MOVITRAC® 07, P815 SBus timeout interval can only be adjusted via PC, if necessary. The default value is 0, which means timeout monitoring is deactivated. Set P815 to the value 1 s.

3.3 Autosetup

The Autosetup function allows startup of the UFx to be performed without a PC. Activate the function via the Autosetup DIP switch. Switching on the Autosetup DIP switch causes the function to be performed once. *The Autosetup DIP switch must then remain in ON position.*The function can be reactivated by turning the DIP switch off and back on again. First, the UFx searches the lower-level SBUS for drive inverters. This process is indicated by the SYS-FAULT LED flashing briefly. For this purpose, different SBus addresses must be set for the drive inverters (P813). We recommend assigning the addresses beginning with address 1 in ascending order based on the arrangement of inverters in the control cabinet. The process image on the fieldbus side is expanded by three words for each detected drive inverter. If no inverter is detected, the SYS-FAULT LED remains lit. A total of up to eight drive inverters is taken into account. The figure shows the process image for three drive inverters with three words each of process output data and process input data. After the search is complete, the UFx cyclically exchanges three process data words with each connected drive inverter. The process output data are fetched from the fieldbus, divided into blocks of three and transmitted. The drive inverters read the process input data, put them together and send them to the fieldbus master.

Important: If you change the process data assignment of the drive inverters connected to the UFP, you have to activate Autosetup again because the UFP saves these values only once during Autosetup. At the same time, the process data assignments of the connected drive inverters may not be changed dynamically after Autosetup.

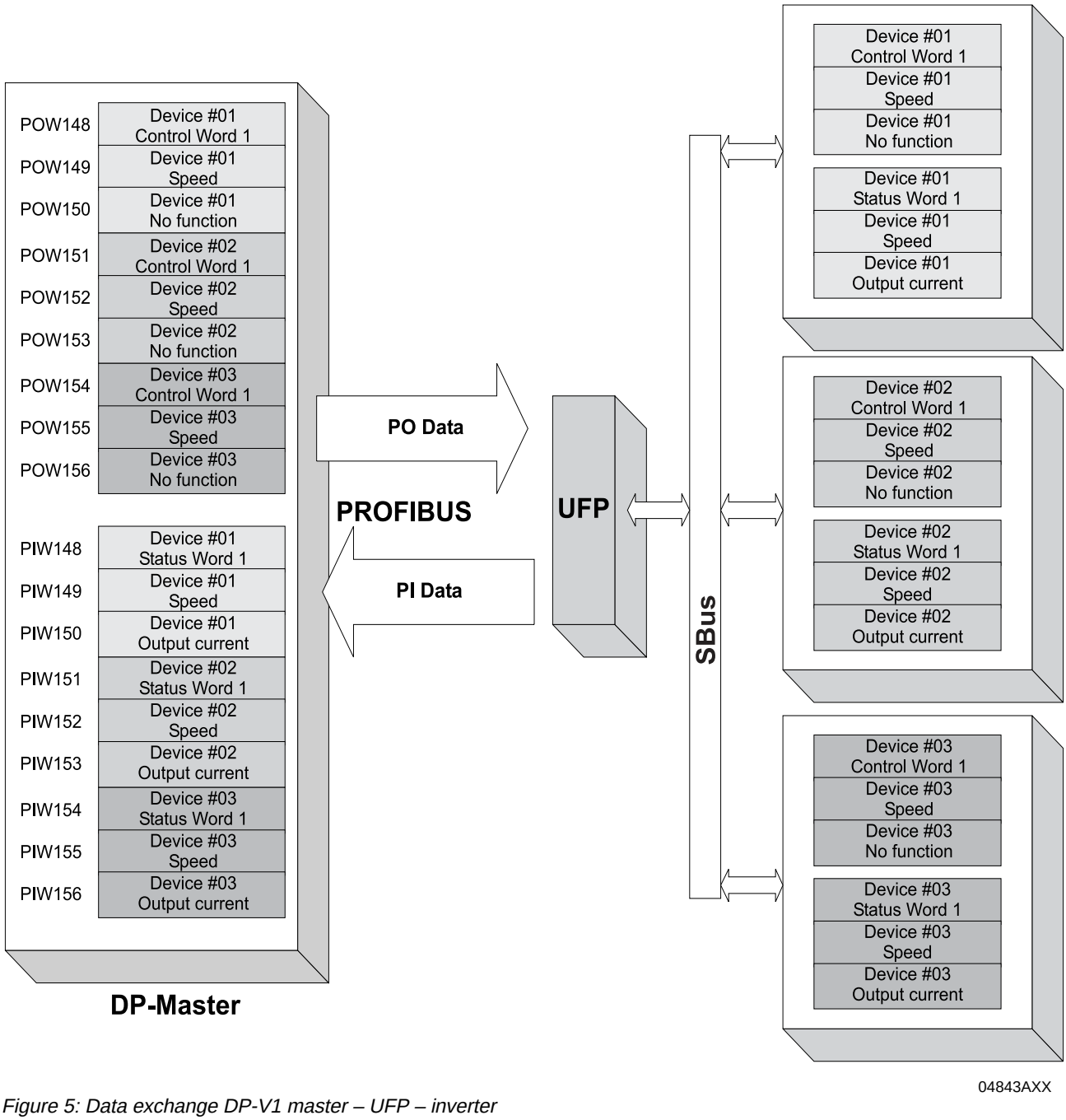

Figure 5: Data exchange DP-V1 master – UFP – inverter

3.4 Project planning of the fieldbus master

- Set an individual PROFIBUS address using the DIP switches of the UFP for project planning. The PROFIBUS address is set in binary form. A change of the PROFIBUS address only becomes effective after switching the UFP off and on again.

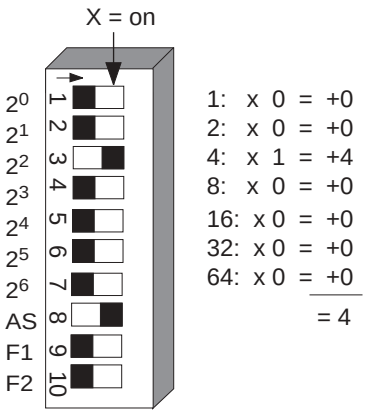

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Figure 6: Setting the PROFIBUS station address

- The fieldbus master is configured using the GSD file (see appendix). The UFP is addressed under the specified PROFIBUS address. The number of process data words the fieldbus master uses to address the UFP depends on the number of connected inverters. The process data width for an inverter is three words. If more than one inverter is present, three words should be planned for each inverter. For example, you have to configure nine words for three MOVITRAC® 07 inverters.
- Example for STEP 7:
  - Install the GDS file in the STEP 7 software.
  - In HW config of the hardware catalog, insert the UFP at the PROFIBUS.
  - Select the setting suitable for your application from the presented process data configurations, for example "9PD", meaning nine process data words for three inverters.
  - Save the configuration.
  - Expand your application program by the data exchange with the UFP. For this purpose, use the system functions of S7 for consistent data exchange (SFC14 and SFC15).
  - The BUS-FAULT LED of the UFP should be extinguished after saving the project, loading it in the DP-V1 master and starting the DP-V1 master. If this is not the case, check the connections and terminating resistors of the PROFIBUS and the project planning, especially the PROFIBUS address in STEP 7.

3.5 Starting the inverters

You can operate up to eight inverters on the PROFIBUS using one UFP. The DP master and the UFP exchange the setpoints and actual values of all inverters connected to the UFP in coherent data packages. It is important for you to know which inverter is located at which position of the data package (process image). Figure 5 shows the relationship.

The inverters are enabled by writing the value 0006h to the corresponding control word 1. The speed setpoint can be specified with the following word. It is scaled with 0.2 1/min per digit.

For more information on the unit profile of MOVITRAC® 07, refer to the "MOVITRAC® 07 Communication" manual.

4 Installation and Operation with PC

4.1 Installation notes

Installation

The unit can be installed directly onto the wall of a control cabinet by using the pre-installed DIN rail mounting or the four drilled holes on the back of the housing. Basically, there are no restrictions regarding the spatial arrangement of the units to be connected (e.g. MOVITRAC® 07). The maximum line length and the fact that the gateway must be installed at the end or the beginning of the system bus (SBus) must be taken into consideration. For this reason, we recommend you take the spatial aspects into account.

The UFP must have additional HF-compliant grounding if the DIN rail mounting option is used with SBus cables of more than 1 m in length.

Pin assignment

The UFP11A fieldbus interface is connected to the PROFIBUS network by means of a 9-pin sub D connector in accordance with EN 50170. The T-bus connection must be implemented with an appropriately designed plug.

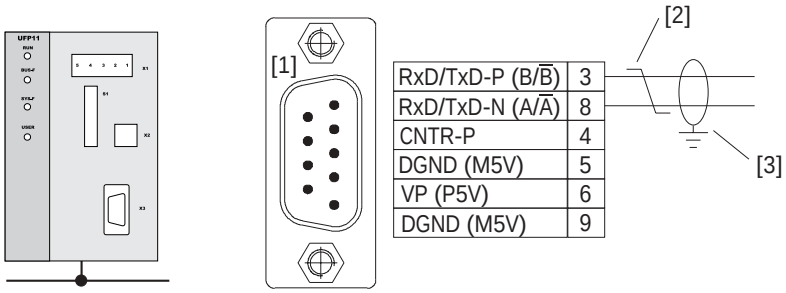

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*Figure 7: Assignment of 9-pin sub D connector **X3** according to EN 50170 ([1] = 9-pin sub D connector; [2] = twisted signal lines; [3] = conductive connection between connector housing and shielding)*

Fieldbus connector

The fieldbus interface is generally connected to the PROFIBUS system using a shielded twisted-pair cable. The shielding of the PROFIBUS cable must be attached to both sides, for example on the connector housing. Observe the maximum supported transmission rate when selecting the bus connector.

The twisted-pair cable is connected to the PROFIBUS connector via pin 8 (A/Ā) and pin 3 (B/B̄). Communication takes place via these two contacts. The RS-485 signals A/Ā and B/B̄ must be contacted in the same way for all PROFIBUS stations. Otherwise, no communication is possible via the bus medium.

The PROFIBUS interface sends a TTL control signal for a repeater or fiber optic adapter (reference = pin 9) via pin 4 (CNTR-P).

System bus connection

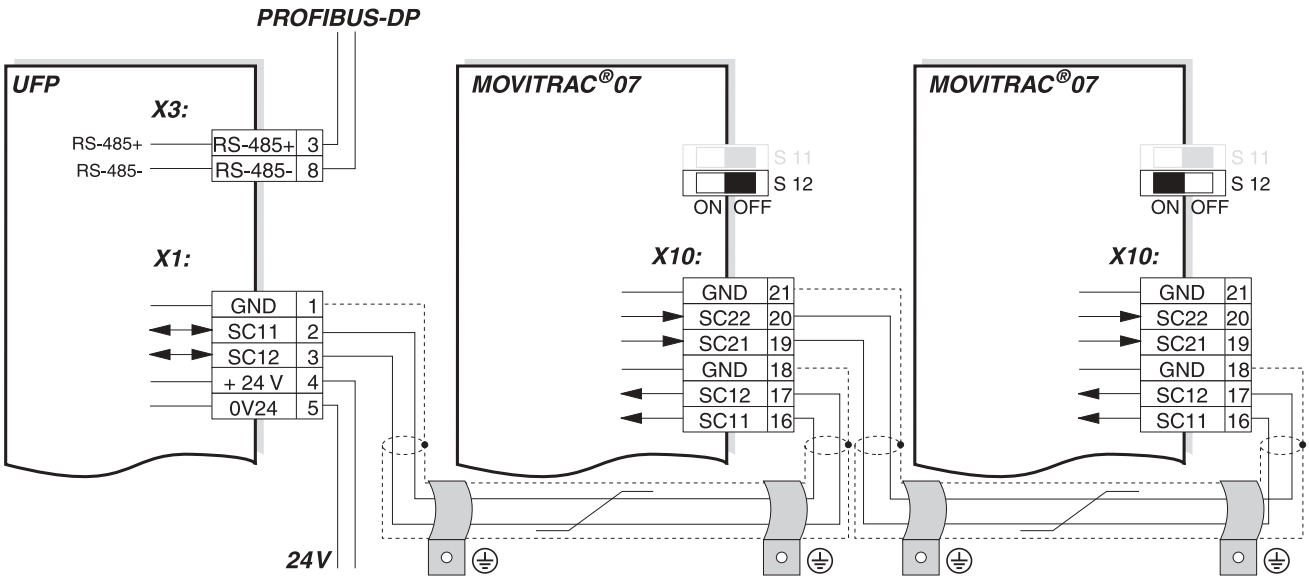

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Figure 8: System bus connection

UFP
GND = System bus reference
SC11 = System bus high
SC12 = System bus low

MOVITRAC® 07
GND = System bus reference
SC22 = System bus low, outgoing
SC21 = System bus high, outgoing
SC12 = System bus low, incoming
SC11 = System bus high, incoming
S12 = System bus terminating resistor

Please note:

- Use a 2-core twisted and shielded copper cable (data transmission cable with braided copper shield). Connect the shield with a wide-area contact at the electronics terminal of MOVITRAC® 07 or UFP11A and also connect the shield ends to GND. The cable must meet the following specifications (CAN bus or DeviceNet cables are suitable, for example):
  - Core cross section 0.75 mm^2 (AWG18)
  - Cable resistance 120 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m (12 pF/ft) at 1 kHz
- The approved total cable length depends on the specified SBus baud rate:
  - 250 kbaud: 160 m (528 ft)
  - 500 kbaud: 80 m (264 ft)
  - 1000 kbaud: 40 m (132 ft)

- Connect the system bus terminating resistor (S12 = ON) at the end of the system bus connection. Disconnect the terminating resistor at the other devices (S12 = OFF). The UFP11A gateway must always be connected either at the beginning or the end of the system bus connection and feature a permanently installed terminating resistor.
- There must not be any difference of potential between the units connected with the SBus. Take suitable measures to avoid a difference of potential, such as connecting the unit ground connectors using a separate line.
- Point-to-point wiring is not permitted.

24 V connection

An external 24 V voltage supply must be connected to terminals X1:4 and X1:5.

Shielding and routing of bus cables

The PROFIBUS interface supports the RS-485 communications protocol and requires cable type A specified for PROFIBUS in accordance with EN 50170 as shielded twisted-pair cable for the physical connection.

Correct shielding of the bus cable attenuates electrical interference that may occur in industrial environments. The following measures ensure the best possible shielding:

- Tighten the mounting screws on the connectors, modules and equipotential bonding conductors by hand.
- Use only connectors with metal housing or plated housing.
- Connect the shielding in the connector with the greatest possible surface area.
- Attach the shielding of the bus line on both sides.
- Do not route signal and bus cables parallel to power cables (motor leads). They must be routed in separate cable ducts.
- Use metallic, grounded cable racks in industrial environments.
- Route the signal cable and the corresponding equipotential bonding in close proximity using the shortest way possible.
- Avoid using plug connectors to extend bus cables.
- Route the bus cables closely along existing grounding surfaces.

In case of fluctuations in the earth potential, a compensating current may flow via the bilaterally connected shield that is also connected to the protective earth (PE). Make sure you supply adequate equipotential bonding according to relevant VDE regulations in such a case.

Bus termination A bus termination is not provided on the UFP electronics. If the UFP module is used as the first or last device of the PROFIBUS line, the bus termination has to be external. We recommend PROFIBUS connectors with integrated bus termination that open the continuing bus in case the bus termination is connected.

4.2 Setting the inverter parameters

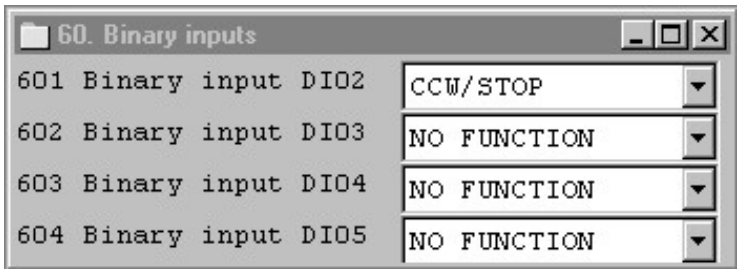
The settings can be entered via the inverter keypad. Refer to the operating instructions of the inverter for details.

- Connect the voltage supply for the UFx and all connected inverters.
- Set an individual SBus address (P813) at the inverters. Recommendation: Address setting beginning with address 1 in ascending order based on the arrangement of inverters in the control cabinet. Address 0 should not be assigned because it is used by the UFx.

4.3 Startup software

- Install the MOVITOOLS software package version 2.70 or higher on your PC.
- Start the software. Select the COM to which the UFP is connected and press the "Update" button. The UFP should appear at address 0 and the connected inverters at the following addresses. If the window does not show an entry, check the COM interface and the connection via UWS21. If the UFP is the only entry in the window, check the SBus cabling and the terminating resistors.
- Select UFx and call up the startup software for the fieldbus gateway (UFx configurator).
- Select the "Reconfigure fieldbus node" menu item.
- Select your project path and project name. Press the "Next" button.
- Press the "Update" button. All inverters connected to the UFP should be displayed now. The configuration can be customized using the "Insert," "Change" and "Delete" buttons. Press the "Next" button.
- Press the "Autoconfiguration" button. The process image for the UFP will now appear in your controller. The process data width is shown at the bottom. This value is important for the project planning of the fieldbus master. Press the "Next" button.
- Save the project data and press the "Download" button. The Autosetup DIP switch must be in OFF position for this purpose.

- The data exchanged between fieldbus master and the UFP can be viewed with the process data monitor.
- Enabling on the terminal side is required to control the inverters via fieldbus. You have already wired the terminals. To check the terminal assignment, select the first inverter with address 1 in the "Connected inverters" window and start Shell. For MOVITRAC® 07, the terminal assignment should be set as follows:



- Repeat the previous step for all inverters displayed in the "Connected inverters" window.

4.4 Starting the inverters

You can operate up to eight inverters on the PROFIBUS using one UFP. The DP master and the UFP exchange the setpoints and actual values of all inverters connected to the UFP in coherent data packages. It is important for you to know which inverter is located at which position of the data package (process image). The process data monitor indicates the relationship in the project planning of the fieldbus gateway (UFx configurator).

The inverters are enabled by writing the value 0006h to the corresponding control word 1. The speed setpoint can be specified with the following word. It is scaled with 0.2 1/min per digit.

For more information on the unit profile of MOVITRAC® 07, refer to the "MOVITRAC® 07 Communication" manual.

5 PROFIBUS interface

5.1 Startup up PROFIBUS DP master

Supporting files for UFP are available in the Internet at http://www.sew-eurodrive.de.

- Observe the notes in the README.TXT file on the GSD disk.
- Install the GSD file according to the requirements of the project planning software for the DP master. After successful installation, the "UFP" device appears in the list of slave stations.
- Insert the interface module into the PROFIBUS structure under the name "UFP" and assign the PROFIBUS address.
- Select the process data configuration required for your application (see next section).
- Enter the I/O or peripheral addresses for the configured data widths.
- Save the configuration.
- Expand your application program by the data exchange with the fieldbus interface. In case of S7, use the system functions for consistent data exchange for this purpose (SFC14 and SFC15).
- The BUS-FAULT LED of the fieldbus interface should extinguish after you have saved the project, loaded it in the DP-V1 master and started the DP-V1 master. If this is not the case, check the connections and terminating resistors of the PROFIBUS and the project planning, especially the PROFIBUS address.

5.2 Configuration of the PROFIBUS DP interface

General information

The inverter must be given a specific DP configuration by the DP master to define type and number of input and output data used for the transmission. You have the opportunity to control the drives via process data and to read or write all parameters of the fieldbus interface via parameter channel.

The figure shows a schematic view of the data exchange between automation device 8DP-V1 master), fieldbus interface (DP-V1 slave) and an inverter with process data channel and parameter channel.

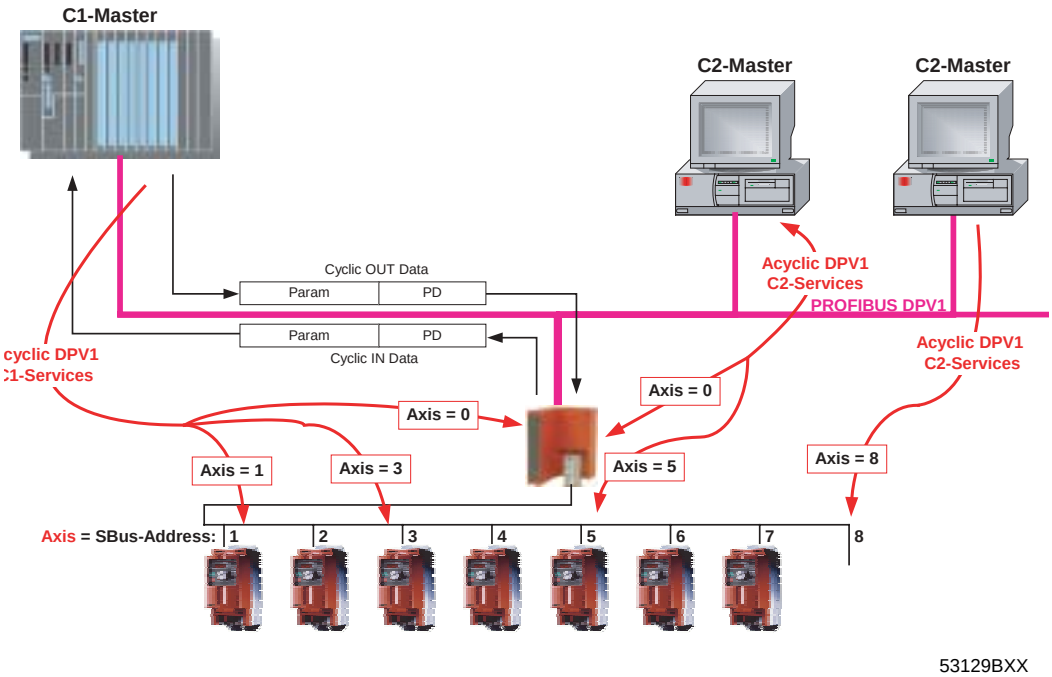


Figure 9: Data exchange with parameter data (Param) and process data (PD)

Process data configuration

The fieldbus interface allows for different DP configurations for the data exchange between DP master and fieldbus interface. The following table provides additional details on all standard DP configurations of the fieldbus interfaces. The "Process data configuration" column shows the name of the configuration. These texts also appear as a selection list in your project planning software for the DP master. The DP configurations column shows the type of configuration data sent to the fieldbus interface while the link to PROFIBUS DP is being established. The configurations are determined by the default process data width for SEW inverters of three process data words. In the simplest case, the controller transmits three process data words to each inverter connected to the fieldbus interface. The fieldbus interface then distributes these process data words to the individual devices. The parameter channel is used for setting the parameters of the UFP and is not passed on to the connected participants. The fieldbus interface accepts 1 ... 24 process data words with and without parameter channel.

The standard entries of the GSD file are based on the UFP Autosetup operating mode and allow process data widths of 3PD ... 24PD according to 1 ... 8 inverters connected to the fieldbus interface.

A maximum of 3PDs can be assigned to any SBus participant!

ONE module for all drives

The process data are transmitted in **one** consistent data block for all inverters connected to the fieldbus interface. Thus, only system functions SFC14 and SFC15 need to be activated in Step 7.

UFP parameter + ONE module

The configurations under "**UFP parameter + ONE module**" correspond to those listed above. The parameter module that allows for a parameter setting of the UFP with eight consistently transmitted bytes will be processed first. Refer to the "MOVITRAC® 07 Communication" manual for information on the parameter channel.

One module per drive

One consistent data block exists for each connected inverter. From the controller side, this corresponds to the existing setup of several inverters with their own fieldbus interface. System functions SFC14 and SFC15 need to be executed for each inverter in Step 7.

UFP parameter + One module per drive

The configurations under "**UFP parameter + One module**" correspond to those listed above. The parameter module which allows for a parameter setting of the fieldbus interface using eight consistently transmitted bytes will be processed first. Refer to the "MOVITRAC® 07 Communication" manual for information on the parameter channel.

Drive parameters of connected MOVITRAC® 07 inverters can only be accessed using the DP-V1 parameter services.

Process data configuration	Meaning / notes	Cfg0	Cfg1	Cfg2	Cfg3	Cfg4	Cfg5	Cfg6	Cfg7	Cfg8
ONE module for all drives										
AS 1 drive (3 PD)	Control via 3 process data words	0	242							
AS 2 drives (6 PD)	Control via 6 process data words	0	245							
AS 3 Drives (9 PD)	Control via 9 process data words	0	248							
AS 4 Drives (12 PD)	Control via 12 process data words	0	251							
AS 5 Drives (15 PD)	Control via 15 process data words	0	254							
AS 6 Drives (18 PD)	Control via 18 process data words	0	192	209	209					
AS 7 Drives (21 PD)	Control via 21 process data words	0	192	212	212					
AS 8 Drives (24 PD)	Control via 24 process data words	0	192	215	215					

Process data configuration	Meaning / notes	Cfg0	Cfg1	Cfg2	Cfg3	Cfg4	Cfg5	Cfg6	Cfg7	Cfg8
UFP parameter + ONE module										
AS 1 Drive (Param + 3PD)	Control via 3 process data words / parameter setting via 8-byte parameter channel	243	242							
AS 2 Drives (Param + 6PD)	Control via 6 process data words / parameter setting via 8-byte parameter channel	243	245							
AS 3 Drives (Param + 9PD)	Control via 9 process data words / parameter setting via 8-byte parameter channel	243	248							
AS 4 Drives (Param + 12PD)	Control via 12 process data words / parameter setting via 8-byte parameter channel	243	251							
AS 5 Drives (Param + 15PD)	Control via 15 process data words / parameter setting via 8-byte parameter channel	243	254							
AS 6 Drives (Param + 18PD)	Control via 18 process data words / parameter setting via 8-byte parameter channel	243	192	209	209					
AS 7 Drives (Param + 21PD)	Control via 21 process data words / parameter setting via 8-byte parameter channel	243	192	212	212					
AS 7 Drives (Param + 24PD)	Control via 24 process data words / parameter setting via 8-byte parameter channel	243	192	215	215					
One module per drive										
AS 1 Drive (1 x 3PD)	Control via 1x3 process data words	0	242							
AS 2 Drives (2 x 3PD)	Control via 2x3 process data words	0	242	242						
AS 3 Drives (3 x 3PD)	Control via 3x3 process data words	0	242	242	242					
AS 4 Drives (4 x 3PD)	Control via 4x3 process data words	0	242	242	242	242				
AS 5 Drives (5 x 3PD)	Control via 5x3 process data words	0	242	242	242	242	242			
AS 6 Drives (6 x 3PD)	Control via 6x3 process data words	0	242	242	242	242	242	242		
AS 7 Drives (7 x 3PD)	Control via 7x3 process data words	0	242	242	242	242	242	242	242	
AS 8 Drives (8 x 3PD)	Control via 8x3 process data words	0	242	242	242	242	242	242	242	242

Process data configuration	Meaning / notes	Cfg0	Cfg1	Cfg2	Cfg3	Cfg4	Cfg5	Cfg6	Cfg7	Cfg8
UFP parameter + one module per drive										
AS 1 Drive (Param + 1 x 3PD)	Control via 1x3 process data words / parameter setting via 8-byte parameter channel	243	242							
AS 2 Drives (Param + 2 x 3PD)	Control via 2x3 process data words / parameter setting via 8-byte parameter channel	243	242	242						
AS 3 Drives (Param +3 x 3PD)	Control via 3x3 process data words / parameter setting via 8-byte parameter channel	243	242	242	242					
AS 4 Drives (Param + 4 x 3PD)	Control via 4x3 process data words / parameter setting via 8-byte parameter channel	243	242	242	242	242				
AS 5 Drives (Param + 5 x 3PD)	Control via 5x3 process data words / parameter setting via 8-byte parameter channel	243	242	242	242	242	242			
AS 6 Drives (Param + 6 x 3PD)	Control via 6x3 process data words / parameter setting via 8-byte parameter channel	243	242	242	242	242	242	242		
AS 7 Drives (Param + 7 x 3PD)	Control via 7x3 process data words / parameter setting via 8-byte parameter channel	243	242	242	242	242	242	242	242	
AS 8 Drives (Param + 8 x 3PD)	Control via 8x3 process data words / parameter setting via 8-byte parameter channel	243	242	242	242	242	242	242	242	242

"Universal module" DP configuration

The "Universal Module" configuration (e.g. in STEP7) allows you to set the parameters of the fieldbus interface deviating from the preset standard values of the GSD file. This is useful in case you want to operate several inverters with different process data words at the fieldbus interface.

You must observe the following conditions:

- Module 0 defines the parameter channel of the inverter. Entering 0 will switch off the parameter channel; entering 243 will switch on the parameter channel with 8 bytes length.
- The following modules determine the process data width of the fieldbus interface at the PROFIBUS. The added process data width of all following modules must be between 1 and 24 words. For safety reasons, the modules must be listed with data integrity. Make sure that an inverter connected to the fieldbus interface is represented by such a consistent module entry.
- The special identifier format is permitted.

The following figure shows the structure of the configuration data defined in EN 50170 (V2). These configuration data are transmitted to the inverter during the initial start of the DP master.

Table 1: Format of the Cfg_Data identifier byte according to EN 50170 (V2)

7 / MSB	6	5	4	3	2	1	0 / LSB
				Data length 0000 = 1 byte/word 1111 = 16 bytes/words			
		Input/output 00 = special identifier formats 01 = input 02 = output 11 = input/output					
	Format 0 = byte structure 1 = word structure						
Integrity over 0 = byte or word 1 = entire length							

Note:

Use only the setting "Integrity over entire length" for data transmission!

Data integrity

Integral data are those data that must always be transmitted consistently between automation device and inverter and may never be transmitted separately.

Data integrity is especially important for the transmission of positioning values or complete positioning tasks. Inconsistent transmission may contain data from different program cycles of the automation device and transfer undefined values to the inverter.

For PROFIBUS DP, the data communication always between automation device and drive engineering is generally carried out with the setting "Data integrity over entire length."

External diagnostics

The fieldbus interface does not support external diagnostics. Error messages of the individual inverters are indicated by the corresponding status words. Error states of the fieldbus interface are also displayed on status word 1, for example, timeout of the SBus connection to a participant.

Upon request, the fieldbus interface provides the standard diagnostics in accordance with EN 50170 V2.

Note on Simatic S7 Master Systems

Diagnostic alarms may also be triggered by the PROFIBUS DP system in the DP master even if external diagnostic generation is deactivated. As a result, the corresponding operating blocks (e.g. OB84 for S7-400 or OB82 for S7-300) should always be created in the controller.

5.3 Ident number

Each DP master and DP slave must have an individual ident number assigned by the PROFIBUS user group for unique identification of the connected unit. When the PROFIBUS DP master is started up, it compares the ident numbers of the connected DP slaves with the ident numbers configured by the user. The user data transfer will only be activated after the DP master has ensured that the connected station addresses and device types (ident numbers) correspond to the project planning data. This procedure achieves a high degree of safety with respect to project planning errors.

The ident number for the UFP11A fieldbus interface is 6004_{hex}.

The ident number is defined as an unsigned 16-bit number (Unsigned16). The PROFIBUS user group specified ident number 6004 hex (24580 dec) for the UFP11A fieldbus interface.

5.4 Inverter control

The inverter is controlled via the process data channel which is one, two or three I/O words in length. These process data words may mapped in the I/O or peripheral area of the controller in case a programmable controller is used as DP master and can be addressed as usual.

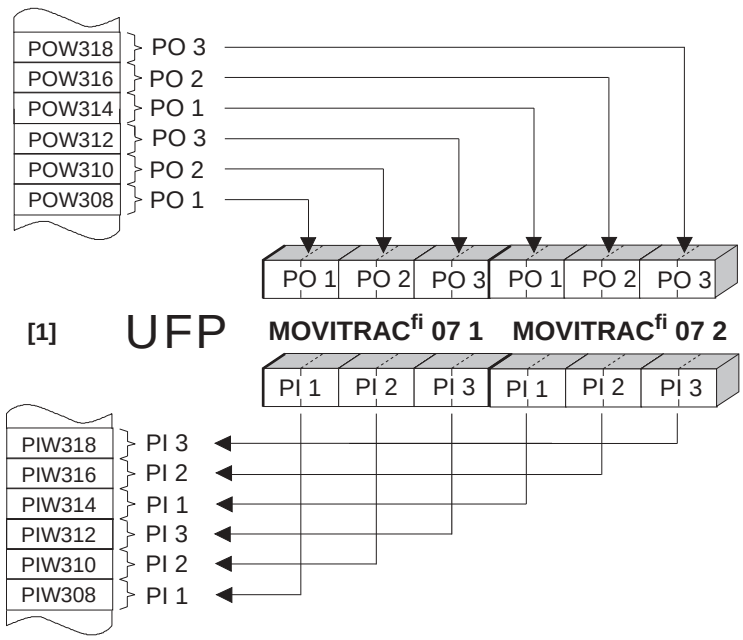


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Figure 10: Mapping of PROFIBUS data in the PLC address range ([1] = parameter channel / [2] = PLC address range / U/f = inverter)

PO = process output data / PI = process input data

Additional information on programming and project planning can be found in the README_GSD6004.PDF file included in the GSD file.

Control example for Simatic S7

The drive inverter is controlled via Simatic S7 in dependence of the selected process data configuration, either directly via load and transfer commands or via the special system functions *SFC 14 DPRD_DAT* and *SFC15 DPWR_DAT*.

In principle, data lengths of 3 bytes or more than 4 bytes must be transmitted using system functions SFC14 and SFC15.

Process data configuration	STEP7 access via
1 PD	Load/transfer commands
2 PD	Load/transfer commands
3 PD ... 24 PD	System functions SFC14/15 (length 6 .. 48 bytes)
Param +1 PD	Parameter channel: System functions SFC14/15 (length 8 .. 48 bytes) Process data: Load/transfer commands
Param +2 PD	Parameter channel: System functions SFC14/15 (length 6 .. 48 bytes) Process data: Load/transfer commands
Param + 3 PD ... 24 PD	Parameter channel: System functions SFC14/15 (length 6 .. 48 bytes) Process data: System functions SFC14/15 (length 6 bytes)

STEP7 programming example

The "README_GSD6004.PDF" file contains project planning and programming examples for Simatic S7.

6 DP-V1 Functions

6.1 *Introduction to PROFIBUS DP-V1*

This chapter describes the functions and terms used for operating SEW drive inverters on PROFIBUS DP-V1. Refer to the PROFIBUS user organization or visit www.profibus.com for extensive technical information on PROFIBUS DP-V1.

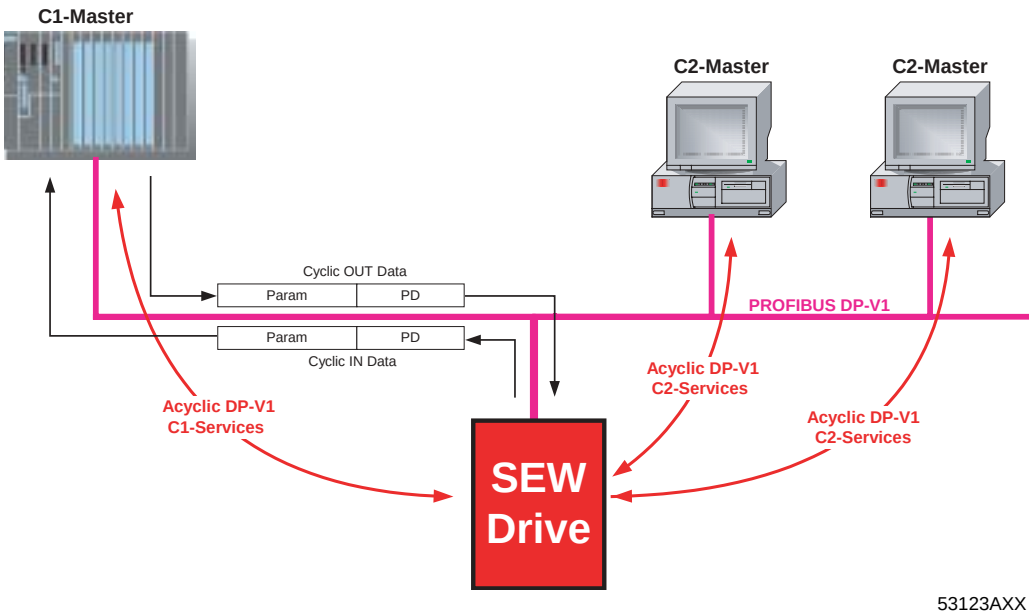
The PROFIBUS DP-V1 specification introduced new acyclical *read/write* services within the context of the PROFIBUS DP-V1 expansions. These acyclical services are inserted into special telegrams during ongoing cyclical bus operation and thus ensure compatibility between PROFIBUS DP (version 0) and PROFIBUS DP-**V1** (**V**ersion **1**).

The acyclical *read/write* services can be used to exchange larger data quantities between master and slave (drive inverter) than it would be possible to transfer in the cyclical input or output data using the 8-byte parameter channel. The advantage of the acyclical data exchange via DP-V1 lies in the minimum load on the cyclical bus operation since DP-V1 telegrams are only added to the bus cycle if required.

The DP-V1 parameter channel provides two options for the user:

- The higher-level controller can access the entire inverter information of the SEW DP-V1 slaves. This means not only cyclical process data but also unit settings can be read, stored in the controller and modified in the slave.
- It is also possible to route the service and startup tool MOVITOOLS across the DP-V1 parameter channel instead of using a proprietary RS-485 connection for this purpose. After installing the MOVITOOLS software, detailed information will be available in the ...\SEW\MOVITOOLS\Fieldbus folder.

The main features of PROFIBUS DP-V1 are explained below.



Class 1 master (C1 master)

Different master classes are distinguished in a PROFIBUS DP-V1 network. The C1 master mainly performs the cyclical data exchange with the slaves. A typical C1 master is a control system, such as a PLC, that exchanges cyclical process data with the slave. If the DPV1 function has been activated via the GSD file, the acyclical connection between C1 master and slave is established automatically when the cyclical connection of the PROFIBUS-DP is being established. Only one C1 master can be operated in a PROFIBUS DP-V1 network.

Class 2 master (C2 master)

The C2 master itself does not perform cyclical data exchange with the slaves. Examples for a typical C2 master are visualization systems or temporary installed programming devices (Notebook / PC). The C2 master uses exclusively acyclical connections for the communication with the slaves. The acyclical connections between C2 master and slave are established by the *Initiate* service. The connection is established after successfully completed *Initiate* service. An established connection allows for cyclical data exchange with the slaves by means of *Read* or *Write* services. Several C2 masters can be active in a DP-V1 network. The number of C2 connections, which are established to a slave simultaneously, are determined by the slave. SEW drive inverters support two parallel C2 connections.

Data sets (DS)

The user data transported via DP-V1 service are collected in a data set. Each data set is uniquely represented through its length, a slot number and an index. The DP-V1 communication with the SEW drive inverter uses the structure of data set 47, which is defined as DP-V1 parameter channel for drives starting with V3.1 in the PROFIdrive profile drive engineering of the PROFIBUS user organization. Different access procedures to the parameter data of the drive inverter are provided via this parameter channel.

DP-V1 services

The DP-V1 expansions offer new services, which can be used for acyclical data exchange between master and slave. The following services are provided:

C1 master	Connection type: MSAC1 (master/slave acyclical C1)
Read	Read data set
Write	Write data set

C2 master	Connection type: MSAC2 (master/slave acyclical C2)
INITIATE	Establish C2 connection
ABORT	Disconnect C2 connection
Read	Read data set
Write	Write data set

DP-V1 alarm handling

The DP-V1 specification not only defines acyclical services, but also includes expanded alarm handling. Alarm handling distinguishes between different alarm types. As a result, the unit-specific diagnostics via the DP-V1 service "DDLM_SlaveDiag" is not possible anymore in DP-V1 operation. No DP-V1 alarm handling was defined for drive engineering as the drive inverter generally transmits status informaton via cyclical process data communication.

6.2 Features of SEW drive inverters

The SEW fieldbus interfaces according to PROFIBUS DP-V1 have the same communication features for the DP-V1 interface. Basically, the drives are controlled via a C1 master according to the DP-V1 standard with cyclical process data. In the case of cyclical data exchange, the C1 master (usually a PLC) can additionally use an 8-byte parameter channel to perform parameter services with the UFP. The UFP cannot access connected MOVITRAC® 07 drives via this parameter channel. The read and write services give the C1 master access to connected participants via the DP-V1 C1 channel.

Two C2 channels can be established in addition to these two parameter channels. The first C2 master can use the C2 channel, for example, to read parameter data as visualization. A second C2 master in the form of a notebook configures the drive using MOVITOOLS.

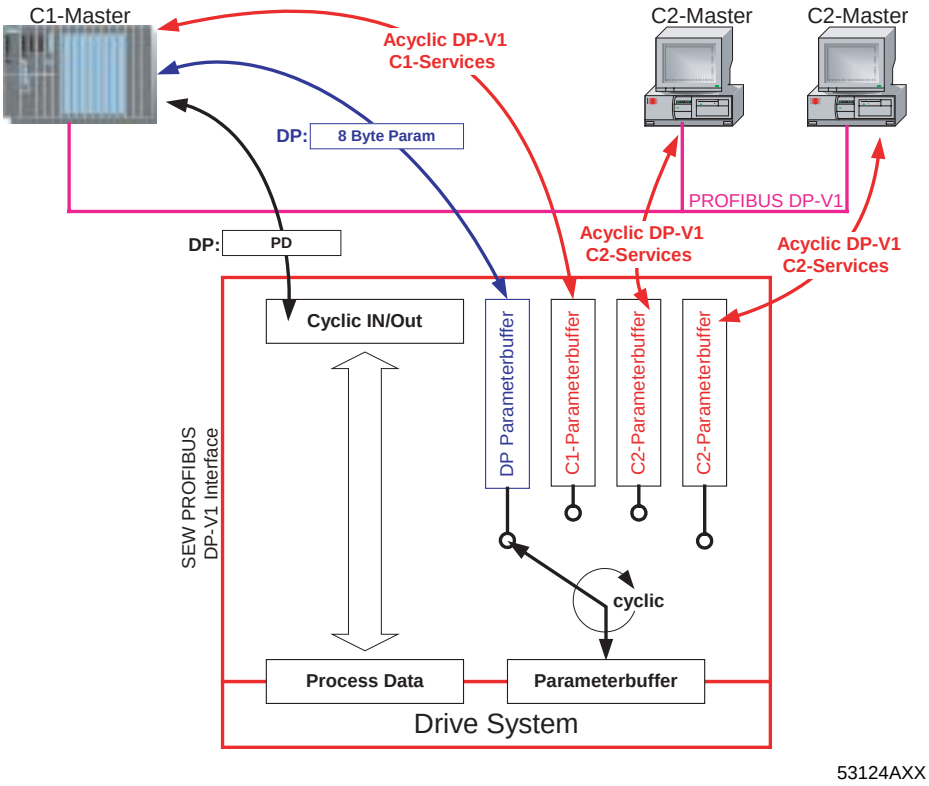
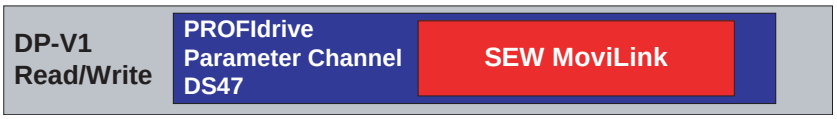


Figure 11: DP-V1 parameter channels

6.3 Structure of the DP-V1 parameter channel

On principle, the parameter setting of the drives to the PROFIdrive DPV1 parameter channel of profile version 3.0 is implemented via data set index 47. The *Request ID* entry is used to distinguish between parameter access based on PROFIdrive profile or via SEW MoviLink services. The following table shows the possible codings of the individual elements. The data set structure is the same for PROFIdrive and MoviLink access.



The following MoviLink services are supported:

- 8-byte MoviLink parameter channel with all the services supported by the drive inverter such as
  - Read parameter
  - Write parameter
  - Write parameter volatile
  - etc.

The following PROFIdrive services are supported:

- Reading (request parameter) individual parameters of the type *double word*
- Writing (change parameter) individual parameters of the type *double word*

Table 2: Elements of data set DS47

Field	Data type	Values
Request Reference	Unsigned8	0x00 Reserved 0x01 ... 0xFF
Request ID	Unsigned8	0x01 Request parameter (PROFIdrive) 0x02 Change parameter (PROFIdrive) 0x40 SEW MoviLink service
Response ID	Unsigned8	Response (+): 0x00 Reserved 0x01 Request parameter (+) (PROFIdrive) 0x02 Change parameter (+) (PROFIdrive) **0x40 SEW MoviLink service (+)** Response (–): 0x81 Request parameter (–) (PROFIdrive) 0x82 Change parameter (–) (PROFIdrive) **0xC0 SEW MoviLink service (–)**
Axis	Unsigned8	0x00 ... 0xFF Number of axis 0 ... 255
No. of parameters	Unsigned8	0x01 ... 0x13 1 ... 19 DWORDs (240 DP-V1 data bytes)
Attributes	Unsigned8	0x10 Value **For SEW MoviLink (Request ID = 0x40):** **0x00 No service** **0x10 Read Parameter** **0x20 Write Parameter** **0x30 Write Parameter volatile** **0x40 ... 0xF0 Reserved**
No. of Elements	Unsigned8	0x00 for non-indexed parameters 0x01 ... 0x75 Quantity 1 ... 117
Parameter Number	Unsigned16	0x0000 ... 0xFFFF MoviLink parameter index
Subindex	Unsigned16	0x0000 SEW: always 0
Format	Unsigned8	0x43 Double word 0x44 Error
No. of Values	Unsigned8	0x00 ... 0xEA Quantity 0 ... 234
Error Value	Unsigned16	0x0000 ... 0x0064 PROFIdrive error codes 0x0080 + MoviLink-AdditionalCode Low **For SEW MoviLink 16 bit error value**

Procedure for setting parameters via data set 47

Parameter access takes place with the combination of the DP-V1 services *Write* and *Read*. The parameter setting service is transferred to the slave with *Write.req*, followed by slave-internal processing.

The master now sends a *Read.req* to pick up the parameter setting response. The master repeats the *Read.req* if the *Read.res* from the slave is negative. The slave responds with a positive response *Read.res* as soon as parameter processing in the drive inverter is finished. The user data now contain the parameter setting response of the parameter setting order that was previously sent with *Write.req* (see figure). This mechanism applies to a C1 as well as a C2 master.

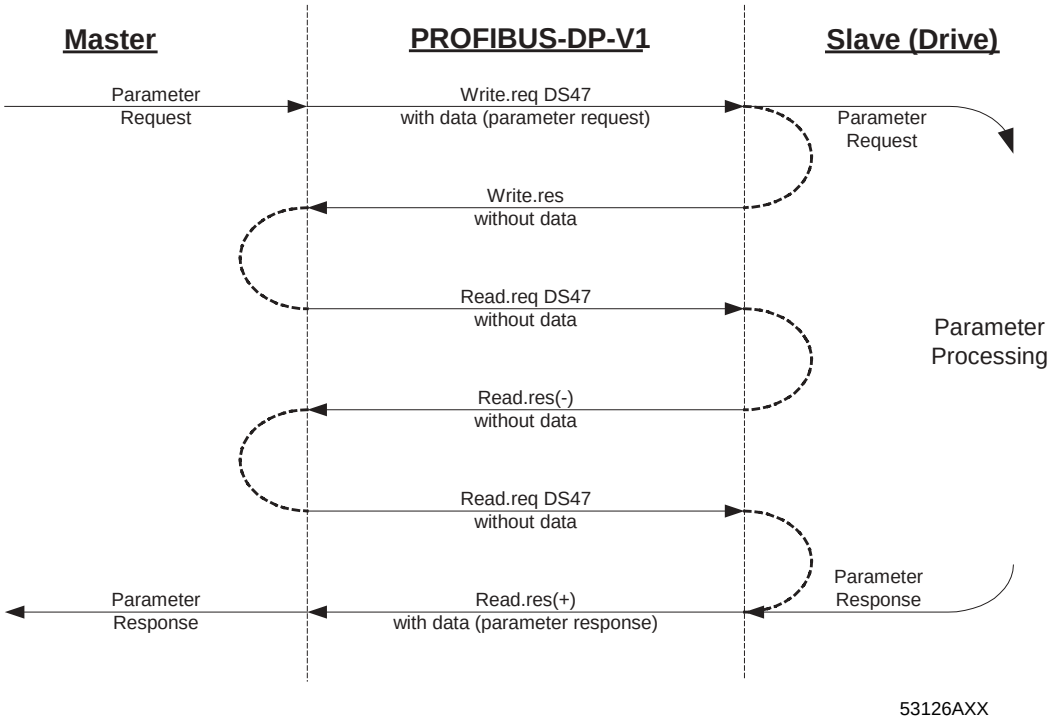
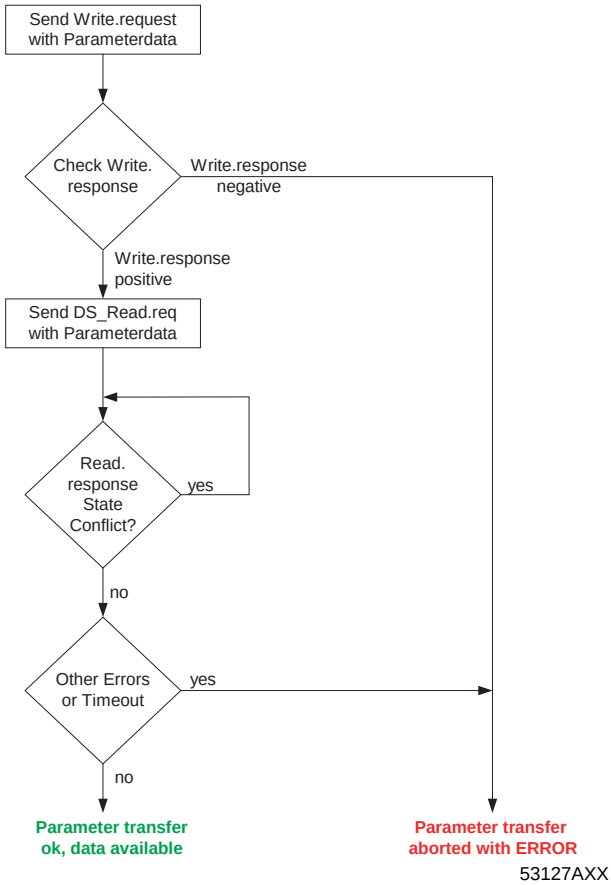


Figure 12: Telegram sequence for parameter access via DP-V1

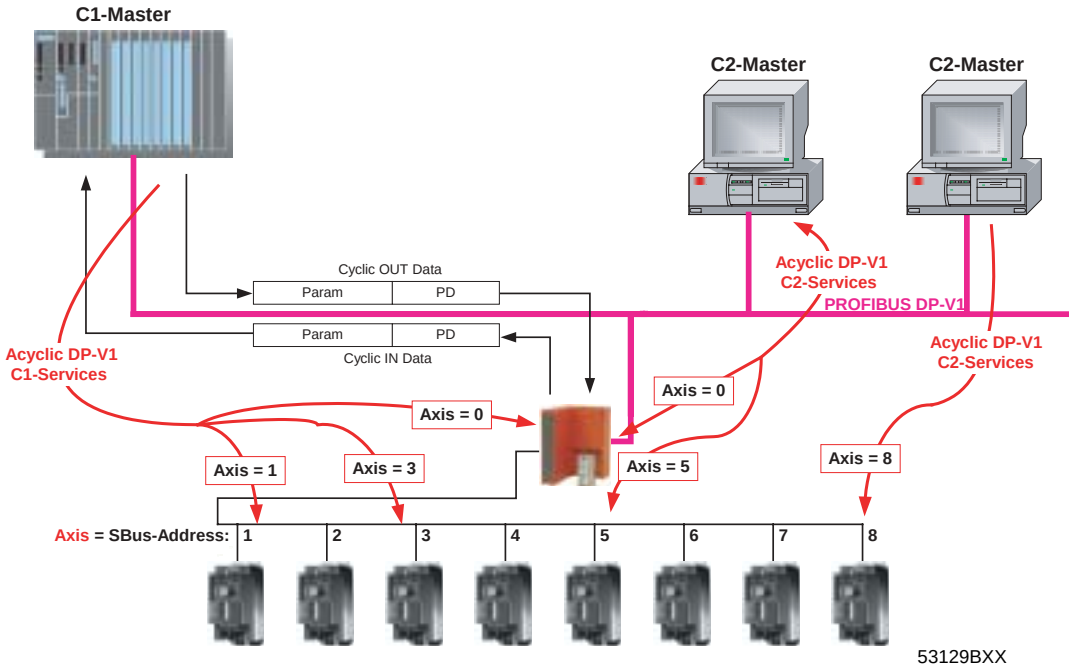
Procedure for the DP-V1 master

If the bus cycle time is short, the parameter response is queried earlier than the inverter has completed the parameter access in the unit. As a result, the response data from the inverter are not yet ready at this time. In this state, the inverter sends a negative response on DP-V1 level with **Error_Code _1 = 0xB5 (status fault)**. The DP-V1 master must then send another request with above Read.req header until the drive inverter sends a positive response.



Addressing a UFP with connected MOVITRAC® 07 units

The structure of the DS47 data set defines an axis element. With the setting *Axis = 0*, the UFP is accessed directly. The SBus address of the corresponding inverter must be entered in the axis element for addressing a connected MOVITRAC® 07.



MoviLink parameter orders

The MoviLink parameter channel of the SEW drive inverters is directly mapped in the structure of data set 47. The Request ID 0x40 (SEW MoviLink service) is used for the exchange of MoviLink parameter setting orders. Parameter access with MoviLink services usually takes place according to the structure described below. The typical message sequence for data set 47 is used for this purpose.

Request ID: 0x40 SEW MoviLink Service

The actual service is defined by the data set element *Attribute* on the MoviLink parameter channel. The high nibble of this element corresponds to the service nibble in the management byte of the DPV0 parameter channel.

Example for reading a parameter via MoviLink

The following tables show an example of the structure of the Write.request and Read.res user data for reading an individual parameter via the MoviLink parameter channel.

Sending parameter order

The following tables show the coding of the user data for the *Write.req* service including the DP-V1 header. The *Write.req* service is used to transfer the parameter setting order to the drive inverter. The firmware version is read.

Table 3: Excerpt from the parameter list ("MOVITRAC® 07 Communication" manual)

Par. no.	Parameter	Index		Unit/index		Access	Default	Meaning / value range
		Dec	Hex	Abbr.	Cv.			
0.. Display values								
07. Unit data								
070	Unit type	8301	206D		0	RO	0	
071	Rated output current	8361	20A9	A	–3	RO	0	
076	Firmware basic unit	8300	206C		0	RO	0	Example: 822609711 = 822 609 7.11 1822609011 = 822 609 X.11

Table 4: Write.request header for transferring the parameter order

Service:	Write.request	
Slot_Number	0	Random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	10	10 byte user data for parameter order

Table 5: Write.req USER DATA for MoviLink "read parameter"

Byte	Field	Value	Description
0	Request Reference	0x01	Individual reference number for the parameter setting order that is reflected in the parameter response
1	Request ID	0x40	SEW MoviLink Service
2	Axis	0x01	Drive number; 1 = SBus address
3	No. of parameters	0x01	1 parameter
4	Attributes	0x10	MoviLink service “Read parameter”
5	No. of Elements	0x00	0 = access to direct value, no subelement
6..7	Parameter Number	0x206C	MoviLink index 8300 = “firmware version”
8..9	Subindex	0x0000	Subindex 0

Requesting the parameter response

The following table shows the coding of the Read.req user data including the DP-V1 header.

Table 6: Read.req for requesting the parameter response

Service:	Write.request	
Slot_Number	0	Random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	10	10 byte user data for parameter order

Positive MoviLink parameter response

The table shows the Read.res USER DATA with the positive response data of the parameter setting order. The parameter value for index 8300 (firmware version) is returned as an example.

Table 7: DP-V1 header of the positive Read.response with parameter response

Service:	Read.request	
Slot_Number	0	Random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	10	10 byte user data in response buffer

Table 8: Positive response for MoviLink service

Byte	Field	Value	Description
0	Response reference	0x01	Mirrored reference number from the parameter setting order
1	Response ID	0x40	Positive MoviLink response
2	Axis	0x01	Mirrored drive number; 1 = SBus address
3	No. of parameters	0x01	1 parameter
4	Format	0x43	Parameter format: Double word
5	No. of values	0x01	1 value
6..7	Value Hi	0x311C	Higher-order part of the parameter
8..9	Value Lo	0x7289	Lower-order part of the parameter
			Decoding: 0x 311C 7289 = 823947913 dec >> firmware version 823 947 9.13

Example for writing a parameter via MoviLink

The following tables show an example of the structure of the *Write* and *Read* services. Speed 123 rpm (≙ value 123 000) is to be written volatile to P160 internal value n11. The MoviLink service *Write Parameter volatile* is used for this purpose.

Table 9: Excerpt from the parameter list ("MOVITRAC® 07 Communication" manual)

Par. no.	Parameter	Index		Unit/index		Access	Default	Meaning / value range
		Dec	Hex	Abbr.	Cv.			
16. Fixed setpoints 1								
160	Internal setpoint n11	8489	2129	rps	66	N/RW	150000	–5000000 ... –0, Step 200 0 ... 5000000, Step 200
161	Internal setpoint n12	8490	212A	rps	66	N/RW	750000	–5000000 ... –0, Step 200 0 ... 5000000, Step 200

Send „Write parameter volatile“ order

Table 10: DP-V1 header of the Write.request with parameter order

Service:	Write.request	
Slot_Number	0	Random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	16	16 byte user data for order buffer

Table 11: Write.req user data for MoviLink service "Write parameter volatile"

Byte	Field	Value	Description
0	Request Reference	0x01	Individual reference number for the parameter setting order that is reflected in the parameter response
1	Request ID	0x40	SEW MoviLink Service
2	Axis	0x01	Drive number; 1 = SBus address
3	No. of parameters	0x01	1 parameter
4	Attributes	0x30	MoviLink service “Write parameter volatile”
5	No. of Elements	0x00	0 = access to direct value, no subelement
6..7	Parameter Number	0x2129	Parameter index 8489 = P160 n11
8..9	Subindex	0x0000	Subindex 0
10	Format	0x43	Double word
11	No. of values	0x01	Change 1 parameter value
12..13	Value HiWord	0x0001	Higher-order part of the parameter value
14..15	Value LoWord	0xE078	Lower-order part of the parameter value

After sending this Write.request, the Write.response is received. If there was no status conflict in processing the parameter channel, a \positive Write.response occurs. Otherwise, the status error is located in Error_code_1.

Requesting the parameter response

The following table shows the coding of the Write.req USER DATA including the DP-V1 header.

Table 12: Read.req for requesting the parameter response

Field	Value	Description
Function_Num		Read.req
Slot_Number	X	Slot_Number not used
Index	47	Index of data set
Length	240	Maximum length of response buffer in DP-V1 master

Positive response to “Write Parameter volatile”

Table 13: DP-V1 header of the positive Read.response with parameter response

Service:	Read.response	
Slot_Number	0	Random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	4	12 byte user data in response buffer

Table 14: Positive response for MoviLink service „Write Parameter'

Byte	Field	Value	Description
0	Response reference	0x01	Mirrored reference number from the parameter setting order
1	Response ID	0x40	Positive MoviLink response
2	Axis	0x01	Mirrored drive number; 1 = SBus address
3	No. of parameters	0x01	1 parameter

Negative parameter response

The following table shows the coding of a negative response of a MoviLink service. Bit 7 is set in the Response ID if the response is negative.

Table 15: Negative response for MoviLink service

Service:	Read.response	
Slot_Number	0	Random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	8	8 byte user data in response buffer

Byte	Field	Value	Description
0	Response reference	0x01	Mirrored reference number from the parameter setting order
1	Response ID	0xC0	Negative MoviLink response
2	Axis	0x01	Mirrored drive number; 1 = SBus address
3	No. of parameters	0x01	1 parameter
4	Format	0x44	Error
5	No. of values	0x01	1 error code
6..7	Error value	0x0811	MoviLink return code z. B. ErrorClass 0x08, Add. Code 0x11 (see the table MoviLink return codes for DP-V1)

MoviLink return codes for parameter setting for DP-V1

The following table shows the return codes that are returned by the SEW DP-V1 interface in case of an error in the DP-V1 parameter access.

MoviLink Return code (hex)	Description
0x0810	Illegal index, parameter index does not exist in the unit
0x0811	Function/parameter not implemented
0x0812	Read access only
0x0813	Parameter lock is active
0x0814	Factory setting is active
0x0815	Value too large for parameter
0x0816	Value too small for parameter
0x0817	Required option card not installed
0x0818	Error in system software
0x0819	Parameter access via RS-485 process interface only
0x081A	Parameter access via RS-485 diagnostic interface only
0x081B	Parameter has access protection
0x081C	Controller inhibit is required
0x081D	Illegal value for parameter
0x081E	Factory setting was activated
0x081F	Parameter was not saved in EEPROM
0x0820	Parameter cannot be changed with output stage enabled / reserved
0x0821	Reserved
0x0822	Reserved
0x0823	Parameter may be changed at IPOS program stop only
0x0824	Parameter may only be changed with deactivated Autosetup
0x0505	Incorrect coding of management and reserved byte
0x0602	Communication error between inverter system and fieldbus option card
0x0502	Timeout of secondary connection (e.g. during reset or with Sys-Fault)

PROFIdrive parameter orders

The PROFIdrive parameter channel of SEW drive inverters is directly mapped in the structure of data set 47. Parameter access with PROFIdrive services usually takes place according to the structure described below. The typical message sequence for data set 47 is used for this purpose. PROFIdrive only defines the two request IDs

Request ID:0x01Request Parameter (PROFIdrive)

Request ID:0x02Change Parameter (PROFIdrive)

That is why data access is limited compared to the MoviLink services.

The request ID = 0x02 = Change Parameter (PROFIdrive) results in a remanent write access to the selected parameter. Consequently, the internal flash/EEPROM of the inverter is written with each write access. Use the MoviLink service "Write Parameter volatile" if parameters must be written cyclically at short intervals. With this service, you alter the parameter values only in the RAM of the inverter.

Example for reading a parameter via PROFIdrive

The following tables show an example of the structure of the Write.request and Read.res user data for reading an individual parameter via the MoviLink parameter channel.

Sending parameter order

The following tables show the coding of the user data for the Write.req service including the DP-V1 header. The Write.req service is used to transfer the parameter setting order to the drive inverter.

Table 16: Write.request header for transferring the parameter order

Service:	Write.request	
Slot_Number	0	Random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	10	10 byte user data for parameter order

Table 17: Write.req USER DATA for MoviLink "read parameter"

Byte	Field	Value	Description
0	Request Reference	0x01	Individual reference number for the parameter setting order that is reflected in the parameter response
1	Request ID	0x01	Request parameter (PROFIdrive)
2	Axis	0x01	Drive number; 1 = SBus address
3	No. of parameters	0x01	1 parameter
4	Attributes	0x10	Access to parameter value
5	No. of Elements	0x00	0 = access to direct value, no subelement
6..7	Parameter Number	0x206C	MoviLink index 8300 = “firmware version”
8..9	Subindex	0x0000	Subindex 0

Requesting the parameter response

The following table shows the coding of the Read.req user data including the DP-V1 header.

Table 18: Read.req for requesting the parameter response

Service:	Read.request	
Slot_Number	0	Random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	240	Maximum length of response buffer in the DP-V1 master

Positive PROFIdrive parameter response

The table shows the Read.res user data with the positive response data of the parameter setting order. The parameter value for index 8300 (firmware version) is returned as an example.

Table 19: DP-V1 header of the positive Read.response with parameter response

Service:	Read.request	
Slot_Number	0	Random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	10	10 byte user data in response buffer

Table 20: Positive response for MoviLink service

Byte	Field	Value	Description
0	Response reference	0x01	Mirrored reference number from the parameter setting order
1	Response ID	0x01	Positive response for „Request Parameter“
2	Axis	0x01	Mirrored drive number; 1 = SBus address
3	No. of parameters	0x01	1 parameter
4	Format	0x43	Parameter format: Double word
5	No. of values	0x01	1 value
6..7	Value Hi	0x311C	Higher-order part of the parameter
8..9	Value Lo	0x7289	Lower-order part of the parameter
			Decoding: 0x 311C 7289 = 823947913 dec >> firmware version 823 947 9.13

Example for writing a parameter via PROFIdrive

The following tables show an example of the structure of the *Write* and *Read* services for the **remanent** writing of the internal setpoint n11 (see "Example for writing a parameter via MoviLink"). The PROFIdrive service *Change Parameter* is used for this purpose.

Send „Write parameter volatile“ order

Table 21: DP-V1 header of the Write.request with parameter order

Service:	Write.request	
Slot_Number	0	Random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	16	16 byte user data for order buffer

Table 22: Write.req user data for MoviLink service "Write parameter volatile"

Byte	Field	Value	Description
0	Request Reference	0x01	Individual reference number for the parameter setting order that is reflected in the parameter response
1	Request ID	0x02	Change parameter (PROFIdrive)
2	Axis	0x01	Drive number; 1 = SBus address
3	No. of parameters	0x01	1 parameter
4	Attributes	0x10	Access to parameter value
5	No. of Elements	0x00	0 = access to direct value, no subelement
6..7	Parameter Number	0x7129	Parameter index 8489 = P160 n11
8..9	Subindex	0x0000	Subindex 0
10	Format	0x43	Double word
11	No. of values	0x01	Change 1 parameter value
12..13	Value HiWord	0x0001	Higher-order part of the parameter value
14..15	Value LoWord	0xE078	Lower-order part of the parameter value

After sending this Write.request, the Write.response is received. If there was no status conflict in processing the parameter channel, a \positive Write.response occurs. Otherwise, the status error is located in Error_code_1.

Requesting the parameter response

The table shows the coding of the Write.req user data including the DP-V1 header.

Table 23: Read.req for requesting the parameter response

Field	Value	Description
Function_Num		Read.req
Slot_Number	X	Slot_Number not used
Index	47	Index of data set
Length	240	Maximum length of response buffer in DP-V1 master

Positive response to “Write Parameter volatile”

Table 24: DP-V1 header of the positive Read.response with parameter response

Service:	Read.response	
Slot_Number	0	Random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	4	12 byte user data in response buffer

Table 25: Positive response for MoviLink service „Write Parameter'

Byte	Field	Value	Description
0	Response reference	0x01	Mirrored reference number from the parameter setting order
1	Response ID	0x02	Positive MoviLink response
2	Axis	0x01	Mirrored drive number; 1 = SBus address
3	No. of parameters	0x01	1 parameter

Negative parameter response

The following table shows the coding of a negative response of a PROFIdrive service. Bit 7 is set in the Response ID if the response is negative.

Table 26: Negative response for PROFdrive service

Service:	Read.response	
Slot_Number	0	Random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	8	8 byte user data in response buffer

Byte	Field	Value	Description
0	Response reference	0x01	Mirrored reference number from the parameter setting order
1	Response ID	0x810x82	Negative response for “Request Parameter” Negative response for “Change Parameter”
2	Axis	0x00	Mirrored drive number; 1 = SBus address
3	No. of parameters	0x01	1 parameter
4	Format	0x44	Error
5	No. of values	0x01	1 error code
6..7	Error value	0x0811	MoviLink return code z. B. ErrorClass 0x08, Add. Code 0x11 (see the table MoviLink return codes for DP-V1)

PROFIdrive return codes for DP-V1

The following table shows the coding of the error number in the PROFIdrive DP-V1 parameter response according to PROFIdrive profile V3.1. This table applies if you use the PROFIdrive services "Request Parameter“ or "Change Parameter.“

Error no.	Meaning	Used at	Supplem. info
0x00	Impermissible parameter number	Access to unavailable parameter	0
0x01	Parameter value cannot be changed	Change access to a parameter value that cannot be changed	Subindex
0x02	Low or high limit exceeded	Change access with value outside the value limits	Subindex
0x03	Faulty subindex	Access to unavailable subindex	Subindex
0x04	No array	Access with subindex to non-indexed parameter	0
0x05	Incorrect data type	Change access with value that does not match the data type of the parameter	0
0x06	Setting not permitted (can only be reset)	Change access with value unequal to 0 where this is not permitted	Subindex
0x07	Description element cannot be changed	Change access to a description element that cannot be changed	Subindex
0x08	Reserved	(PROFIdrive Profile V2: PPO-Write requested in IR not available)	-
0x09	No description data available	Access to unavailable description (parameter value is available)	0
0x0A	Reserved	(PROFIdrive Profile V2: Access group wrong)	-
0x0B	No operation priority	Change access without rights to change parameters	0
0x0C	Reserved	(PROFIdrive Profile V2: incorrect password)	-
0x0D	Reserved	(PROFIdrive Profile V2: Text cannot be read in cyclic data transfer)	-
0x0E	Reserved	(PROFIdrive Profile V2: Name cannot be read in cyclic data transfer)	-
0x0F	No text array available	Access to text array that is not available (parameter value is available)	0
0x10	Reserved	(PROFIdrive Profile V2: No PPO-Write) -	
0x11	Request cannot be executed because of operating state	Access is temporarily not possible for reasons that are not specified in detail	0
0x12	Reserved	(PROFIdrive Profile V2: other error)	
0x13	Reserved	(PROFIdrive Profile V2: Data cannot be read in cyclic interchange)	
0x14	Value impermissible	Change access with a value that is within the value limits but is not permissible for other long-term reasons (parameter with defined single values)	Subindex
0x15	Response too long	The length of the current response exceeds the maximum transmittable length	0
0x16	Parameter address impermissible	Illegal value or value which is not supported for the attribute, number of elements, parameter number or subindex or a combination	0
0x17	Illegal format	Write request: Illegal format or format of the parameter data which is not supported	0

Error no.	Meaning	Used at	Supplem. info
0x18	Number of values are not consistent	Write request: Number of the values of the parameter data do not match the number of elements in the parameter address	0
0x19	Axis nonexistent	Access to an axis which does not exist	-
up to 0x64	Reserved	-	-
0x65..0xFF	Manufacturer-specific	-	-

6.4 Project planning for a C1 master

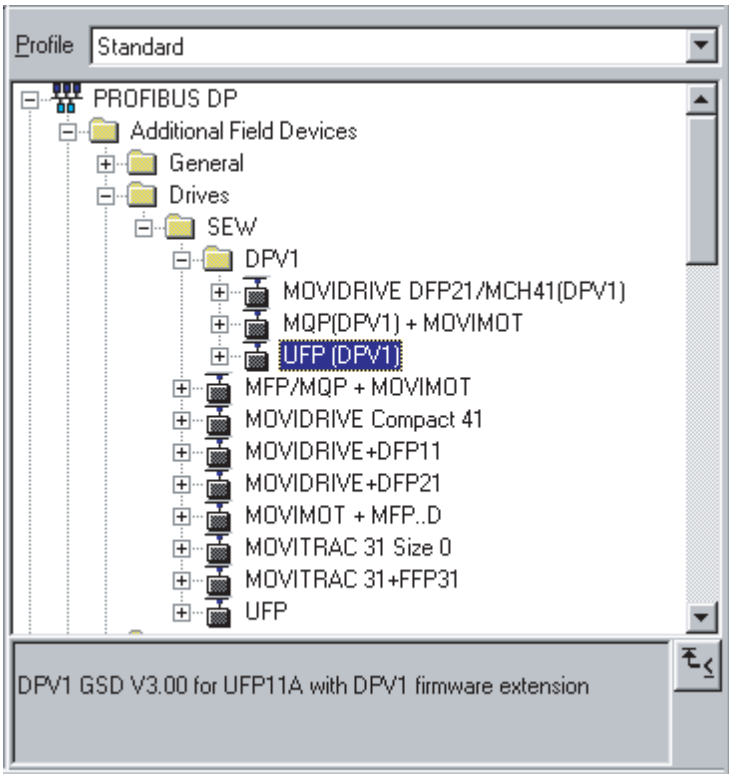
A special GSD file is required for the project planning of a DP-V1 C1 master. This file activates the DP-V1 functions of the UFP. For this purpose, the GSD file and the firmware of the UFP must correspond in terms of functions. After introduction of the DP-V1 functions, SEW-EURODRIVE supplies two GSD files. Selecting the GSD file: see the table "Validity of GSD files for UFP."

Validity of GSD files for UFP

PROFIBUS module UFP 076 firmware basic unit:	SEW_6004.GSD for DP	SEWA6004.GSD for DP-V1
823 908 8.10 - .12	ok	not possible
823 908 8.13 and higher	ok	ok

GSD files for DP-V1

The GSD files for PROFIBUS DP-V1 are displayed in a special subdirectory in the project planning software for the DP-V1 master. The figure shows the representation in the hardware configuration of STEP7.



53131AXX

Operating mode (DP-V1 mode)

As a rule, the operating mode DP-V1 can be activated during project planning for a C1 master. All DP slaves, which have the DP-V1 functions enabled in their GSD files and which support DP-V1, will then be operated in the DP-V1 mode. Standard DP slaves remain to be operated via PROFIBUS DP, which ensures the combined operation of DP-V1 and DP-capable modules. A DP-V1 capable participant, which was configured with the DP-V1 GSD file, can also be operated in the „DP' mode depending on the master functionality.

6.5 Appendix

Sample program for SIMATIC S7

The following STEP7 code shows how parameters are accessed via the STEP7 system function blocks SFB 52/53. You can copy this code and import/compile it as STEP7 source.

Sample function block FB5 „DPV1_Movilink_FB“

```
FUNCTION_BLOCK FB 5
TITLE =DPV1_Movilink_FB
//NOTE!
//This sample program only shows the basic principles of the procedure.
//Neither legal responsibility nor any kind of liability can be inferred from faulty program functions
//and the consequences thereof!
//
//System requirements:
// DP master connection of the S7-300 or S7-400 series,
// which supports the DPV1 master functions.
// - DPV1 Profibus interfaces from SEW (Identification "SEWA600x.GSD")
//
//This function block performs the parameter exchange between inverter
//and PLC via the DPV1 channel. As the data exchange via the
//DPV1 parameter channel is an acyclical service, the
//function block must be called up until the data exchange is complete
// (duration from triggering the parameter order fActivate and up to
//fDone response).
AUTHOR : SEW
FAMILY : Movilink
VERSION : 0.1

VAR_INPUT
  Drive_IO_Address : INT ;  //Peripheral address of the inverter
  bService : BYTE ; //Movilink service byte 0x01 = read, 0x02 = write, etc.
  bAxis : BYTE ;    //0 for single axis, subaddress of the axis when using UFP11A
  wParameterIndex : WORD ;  //Movilink ParameterIndex
  wSubIndex : WORD ;    //Movilink subindex
  dwWriteData : DWORD ; //Write data
  InstanzDB_SFB52 : BLOCK_DB ;  //InstanzDB of the system function SFB52. Is required for DPV1_READ
  InstanzDB_SFB53 : BLOCK_DB ;  //InstanzDB of the system function SFB53. Is required for DPV1_WRITE
END_VAR

VAR_OUTPUT
  bError : BYTE ;   //No error = 0, S7 error = 1, TimeOut = 2, Movilink error = 3;
  dwData : DWORD ;  //Contains data if fError=0; S7-ErrorCode if fError=1; else not defined
END_VAR

VAR_IN_OUT
  fActivate : BOOL ;    //Triggering the function
  fBusy : BOOL ;    //Busy bit. TRUE until the function is finished or timeout monitoring responds
  fDone : BOOL ;    //Indicates that the function is finished (with or without error)
END_VAR

VAR
  fStaticBusy : BOOL ;  //Storage bit for busy flag
  fStaticWriteReq : BOOL ;  //When MVLK WriteReq = TRUE or MVLK ReadReq = FALSE
  fDPV1WriteDone : BOOL ;   //Indicates whether DPV1 write was performed
  fAuxflag : BOOL ;
  dwStaticDriveAddr : DWORD ;   //I/O address of the inverter
  iStaticReqLength : INT ; //Length of the telegrams to be transmitted
  MVLK_Req : STRUCT     //Movilink structure WriteRequest
   RequestReference : BYTE  := B#16#1;  //REQ: Request Reference
   RequestId : BYTE  := B#16#40;    //REQ: Request ID
   Axis : BYTE ;    //REQ: Axis
   No_of_Parameter : BYTE  := B#16#1;  //REQ: No. of parameters
   Attribute : BYTE ;    //REQ: Attributes
   No_of_Elements : BYTE ;    //REQ: No of elements
   ParameterNumber : WORD ; //REQ: Parameter number
   Subindex : WORD ; //REQ: Subindex
   Format: BYTE  := B#16#43;
   Values : BYTE  := B#16#1;
   WriteData : DWORD ;  //REQ: WriteData
  END_STRUCT ;
  TimeoutCounter : WORD ;   //Timeout counter
END_VAR
```

```
VAR_TEMP
  MVLK_Resp : STRUCT    //Movilink structure Response
   ResponseReference : BYTE ;   //RESP: Response reference
   ResponseId : BYTE ;   //RESP: Response ID
   Axis : BYTE ;   //RESP: Axis
   No_of_Parameter : BYTE ;   //RESP: No. of parameters
   Attachment : ARRAY  [0 .. 7 ] OF //REQ: Data
   BYTE ;
  END_STRUCT ;
  fTempError : BOOL ;
  fTempBusy : BOOL ;
  fTempDone : BOOL ;
  fTempValid : BOOL ;
  dwTempStatus : DWORD ;
END_VAR

BEGIN
NETWORK
TITLE =Insert transfer parameter in Movilink structure

 U     #fActivate;
       FP    #fAuxflag; //If neither a parameter service is triggered
       O     #fBusy; //...nor processed,
       SPBN  END; //...then the function is ended
       U     #fStaticBusy; //If static busy is set, write service has already been performed,
       SPBN  NEWR; //then go to new request
       U     #fDPV1WriteDone; //If write service was finished without error, go to READ
       SPB   READ;
       SPA   WRIT; //Else go to WRITE
NEWR:  NOP   0; //Initialization:
       UN    #fStaticBusy; //Output bits and values are reset
       S #fStaticBusy; //Busy output and flag bit are set
       S     #fBusy;
       R     #fDone; //DoneBit is reset
       L     0;
       T     #bError; //Error and data output values are set to ZERO
       T     #dwData;
       L     #Drive_IO_Address; //Convert drive address from Int to DWord
       T     #dwStaticDriveAddr;

//Store data in Movilink structure (only the variable values of the structure are provided with the input parame-
ters)
       L     #bAxis;
       T     #MVLK_Req.Axis;
       L     #bService; //Service byte is multiplied by 10 hex
       SLW   4;
       T     #MVLK_Req.Attribute;
       L     #bService;
       SPL ERUI; //Go to error MVLK service
       SPA   ERUI; // 0x00 No service
       SPA   ZEHN; // 0x01 Read parameter
       SPA   SEXZ; // 0x02 Write parameter
       SPA   SEXZ; // 0x03 Write Parameter volatile
       SPA   ZEHN; // 0x04 Read min
       SPA   ZEHN; // 0x05 Read max
       SPA   ZEHN; // 0x06 Read default
       SPA   ZEHN; // 0x07 Read scale
       SPA   ZEHN; // 0x08 Read attribute
       SPA   ZEHN; // 0x09 Read EEPROM

ERUI:  NOP   0; // Error illegal MVLK service
       L     3; //Movilink error
       T     #bError;
       L     DW#16#501; //MLER_ILLEGAL_SERVICE
       SET   ;
       S     #fDone; //Busy and done bits are reset
       R #fBusy;
       R     #fStaticBusy;
       R     #fDPV1WriteDone;
       BEA   ; //End function

SEXZ:  NOP   0;
       SET   ;
       S     #fStaticWriteReq; //Indication for data evaluation that request was a MVLK write request
       L     16;
       SPA   LEN; //Go to defined length

ZEHN:  NOP   0;
       SET   ;
       R     #fStaticWriteReq; //Indication for data evaluation that request was a MVLK read request
       L     10;

LEN:   NOP   0;
       T     #iStaticReqLength;
       L     #wParameterIndex;
       T     #MVLK_Req.ParameterNumber;
       L     #wSubIndex;
       T #MVLK_Req.Subindex;
       L     #dwWriteData; //Data are written to the structure disregarding if write or read access
       T     #MVLK_Req.WriteData;
```

```
NETWORK
TITLE =Write service
//To transfer a parameter request to the inverter, SFB53
//(DPV1 write service) must be called.
WRIT: NOP   0;
      CALL SFB   53 , #InstanzDB_SFB53 (
           REQ                    := TRUE,
           ID                     := #dwStaticDriveAddr,
           INDEX                  := 47,//Data set 47
           LEN                    := #iStaticReqLength,
           DONE                   := #fTempDone,
           BUSY                   := #fTempBusy,
           ERROR                  := #fTempError,
           STATUS                 := #dwTempStatus,
           RECORD                 := #MVLK_Req);

//Evaluation of return values
      U     #fTempBusy; //If the function is not finished, the function block is quit and the busy bit is set
      SPB   ENDB;
      U     #fTempError; //If no error has occurred, go to read service preparation.
      SPBN  RD_V;
      SET   ; //An error has occurred ! Set error bit and reset busy bits
      R     #fBusy;
      R     #fStaticBusy;
      R     #fDPV1WriteDone;
      S     #fDone;
      L     1; //Issue error code 1 (S7 error)
      T     #bError;
      L     #dwTempStatus; //Return the S7 error code
      T     #dwData;
      BEA   ;
RD_V: NOP   0; //Preparing the DPV1 read service
      SET   ;
      S     #fDPV1WriteDone;

NETWORK
TITLE =Read service
//To fetch the parameter response from the inverter, SFB52
//(DPV1 read service) must be performed.
READ: NOP   0;
      CALL SFB   52 , #InstanzDB_SFB52 (
           REQ                    := TRUE,
           ID                     := #dwStaticDriveAddr,
           INDEX                  := 47,//Data set 47
           MLEN                   := 12,
           VALID                  := #fTempValid,
           BUSY                   := #fTempBusy,
           ERROR                  := #fTempError,
           STATUS                 := #dwTempStatus,
           LEN                    := #iStaticReqLength,
           RECORD                 := #MVLK_Resp);

//Evaluation of return values
      U     #fTempBusy; //If the function is not finished, the function block is quit and the busy bit is set.
      SPB   ENDB;
      U     #fTempError; //If no error has occurred, go to data evaluation
      SPBN  DATA;
      L     #TimeoutCounter; //Timeout counter is increased
      L     1;
      +I    ;
      T     #TimeoutCounter;
      L     #TimeoutCounter; //If the timeout counter has reached 300, a timeout error is triggered
      L     300;
      >=I   ;
      SPB   TOUT;
//If error xx80B5xx hex (state conflict) is reported, then another parameter order already exists and the read
operation must be repeated

 L     #dwTempStatus;
      UD    DW#16#FFFF00;
      L     DW#16#80B500;
      ==D   ;
      SPBN  ERR;
      NOP   0;
      SPA   ENDB;

ERR:  SET   ; //An error has occurred ! Set error bit and reset busy bits
      R     #fBusy;
      R     #fStaticBusy;
      R     #fDPV1WriteDone;
      S     #fDone;
      L     1; //Issue error code 1 (S7 error)
      T #bError;
      L     #dwTempStatus; //Return the S7 error code
      T     #dwData;
      L     0;
      T     #TimeoutCounter; //Reset timeout counter
      BEA   ;
```

```
DATA: NOP   0; //Data evaluation (first selection; positive or negative response)
      L     #MVLK_Resp.ResponseId;
      L     B#16#40; //positive Movilink response ?
      ==I   ;
      SPB   POSR; //go to positive response
      L     #MVLK_Resp.ResponseId;
      L     B#16#C0; //negative Movilink response ?
      ==I   ;
      SPB   NEGR; //go to negative response
      SET   ; //illegal Movilink response
      S     #fDone;
      R     #fBusy;
      R     #fStaticBusy;
      R #fDPV1WriteDone;
      L 3; //Movilink error
      T     #bError;
      L     DW#16#502; //MLER_NO_RESPONSE
      T     #dwData;
      L     0;
      T     #TimeoutCounter; //Reset timeout counter
      BEA   ; //End function

TOUT: NOP   0; //Timeout
      L     2; //Movilink error
      T     #bError;
      L     0;
      T     #dwData;
      T     #TimeoutCounter; //Reset timeout counter
      SET   ; //The function is finished:
      S     #fDone; //=> set done,..reset busy
      R     #fActivate;
      R     #fBusy;
      R     #fStaticBusy;
      R     #fDPV1WriteDone;
      BEA   ;
NETWORK
TITLE =Evaluation of the parameter data

POSR: NOP   0;
      U     #fStaticWriteReq;
      SPB   WRR; //go to WriteRequestResponse
// //Read request was performed
      L     #MVLK_Resp.Attachment[2]; //Received data are written to output parameters
      SLD   24;
      L     #MVLK_Resp.Attachment[3];
      SLD   16;
      +D    ;
      L     #MVLK_Resp.Attachment[4];
      SLD   8;
      +D    ;
      L     #MVLK_Resp.Attachment[5];
      +D    ;
      T     #dwData;
      L     0; //no error
      T     #bError;
      SET   ; //The function is finished:
      S     #fDone; //=> set Done, fActivate,... reset
      R     #fActivate;
      R     #fBusy;
      R     #fStaticBusy;
      R #fDPV1WriteDone;
      L 0;
      T     #TimeoutCounter; //Reset timeout counter
      BEA   ;

WRR:  NOP   0;
// //Write request was performed
      L     0; //Output parameter is filled with ZEROES
      T     #dwData;
      L     0; //no error
      T     #bError;
      SET   ; //Clear error bits
      S     #fDone;
      R     #fActivate;
      R #fBusy;
      R     #fStaticBusy;
      R     #fDPV1WriteDone;
      L     0;
      T     #TimeoutCounter; //Reset timeout counter
      BEA   ;
```

```
NEGR: NOP   0;
      L     3; //Movilink error
      T     #bError;
      L     #MVLK_Resp.Attachment[2]; //Write error code to output parameter
      SLW 8;
      L     #MVLK_Resp.Attachment[3];
      +I    ;
      T     #dwData;
      SET   ; //The function is finished:
      S     #fDone; //=> set done,..reset busy
      R     #fActivate;
      R     #fBusy;
      R     #fStaticBusy;
      R     #fDPV1WriteDone;
      L     0;
      T     #TimeoutCounter; //Reset timeout counter
      BEA   ;

ENDB: SET   ; //Busy end
      S     #fBusy;
END:  NOP   0;
END_FUNCTION_BLOCK
```

Example of calling up FB5 „DPV1_Movilink_FB“

Insert these lines into your cyclical S7 program for calling up the function block.

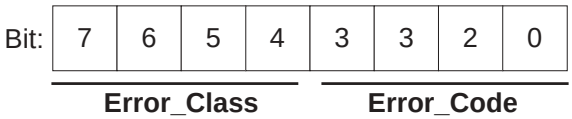
```
FUNCTION FC 1 : VOID
TITLE =Operating the DPV1 parameter channel
//This sample program only shows the basic principles of the procedure.
//Neither legal responsibility nor any kind of liability can be inferred from faulty program functions
//and the consequences thereof!
VERSION : 0.1

BEGIN
NETWORK
TITLE =Writing a MC07 parameter
//In this example, the value 123 rpm is written volatile to
//the internal setpoint n11 (P160).  The parameter service can be triggered by a positive edge at
//M100.0 (Variable table "MC07").
//
//The parameter service addresses the MC07 with SBUS address 2.
//
//PROFIBUS address 9
//Per. addr. 512
// I
//        UFP11A MC07_1          MC07_2
// I_____________I_____________I
// SBUS addr.0     SBUS addr.1     SBUS addr. 2
//
//
//Note on the hardware configuration:
//The periphery addresses ("PIW address" and "POW address") of the UFP11A must have the same
//numerical value to allow that the input "Drive_IO_Address" can be defined
//unambiguously.
//
//

 L     L#123000; //convert the parameter value from DINT..
       T     MD 110; //... to DWORD
//Conversion factor/value range of the parameter value: see parameter list in the "MC07 Communication" manual

 CALL FB     5 , DB     5 (
           Drive_IO_Address         := 512,
           bService                 := B#16#3,//0x01 = read, 0x02 = write, 0x03 = write volatile
           bAxis                    := B#16#2,//MC07 with SBUS addr. 2
           wParameterIndex := W#16#2129,//MOVILINK parameter index 8489d = P160, internal setpoint n11
           wSubIndex                := W#16#0,//MOVILINK subindex = 0
           dwWriteData              := MD   110,//Parameter value that is written
           InstanzDB_SFB52          := DB   201,//InstanzDB for SFB52, is required for DPV1_READ
           InstanzDB_SFB53          := DB   202,//InstanzDB for SFB53, is required for DPV1_WRITE
           bError                   := MB   118,//no error = 0; S7 error = 1, Timeout = 2, MOVILINK error = 3
           dwData                   := MD   114,//bError = 0 => parameter value that was read; bError = 1 => S7
error code
           fActivate                := M    100.0,//Activation bit: Triggering a parameter order
           fBusy                   := M    100.1,//The parameter order is being processed or a timeout has occurred
           fDone                    := M    100.2);//The parameter order is complete

END_FUNCTION
```

Technical data DP-V1 for UFP11

GSD file for DP-V1:	SEWA6004.GSD
Module name for project planning:	UFP (DP-V1)
Number of parallel C2 connections:	2
Supported data set:	Index 47
Supported slot number:	Recommendation: 0
Manufacturer code:	10A hex (SEW-EURODRIVE)
Profile ID:	0
C2-Response Timeout	1 s
Max. length C1 channel:	240 bytes
Max. length C2 channel:	240 bytes

Error codes of the DP-V1 services

This table shows possible error codes of DP-V1 services that may occur in the event of an error in the communication on DP-V1 telegram level. This table is relevant if you want to write your own parameter assignment block because the error codes are directly reported back on the telegram level.



Error_Class (from DP-V1 specification)	Error_Code (from DP-V1 specification)	DP-V1 parameter channel
0x0 ... 0x9 hex = reserved		
0xA = application	0x0 = read error 0x1 = write error 0x2 = module failure 0x3 to 0x7 = reserved 0x8 = version conflict 0x9 = feature not supported 0xA to 0xF = user specific	
0xB = access	0x0 = invalid index	0xB0 = No data block Index 47 (DB47); parameter requests are not supported
	0x1 = write length error 0x2 = invalid slot 0x3 = type conflict 0x4 = invalid area	
	0x5 = state conflict	0xB5 = Access to DB 47 temporarily not possible due to intenal processing status
	0x6 = access denied	
	0x7 = invalid range	0xB7 = Write DB 47 with error in the DB 47 header
	0x8 = invalid parameter 0x9 = invalid type 0xA to 0xF = user specific	
0xC = resource	0x0 = read constraint conflict 0x1 = write constraint conflict 0x2 = resource busy 0x3 = resource unavailable 0x4..0x7 = reserved 0x8..0xF = user specific	
0xD...0xF = user specific		

7 Error Responses

7.1 Fieldbus timeout

Switching off the fieldbus master or an open circuit of the fieldbus cabling leads to a fieldbus timeout at the UFx. The connected drive inverters are switched to a safe state by sending zeros to the process output data which corresponds, for example, to a rapid stop on control word 1. The fieldbus timeout error resets itself, which means the drive inverters receive the current process output data from the controller once the fieldbus communication has been reestablished. This error response can be deactivated via P831 of the UFx.

7.2 SBUS timeout

If one or several drive inverters at the SBus can no longer be addressed by the UFx, the UFx displays error code 91 "System error" on status word 1 of the respective drive inverter. The SYS-FAULT LED lights up and the error is also indicated via diagnostic interface. It is necessary to set the SBus timeout interval P815 of the MOVITRAC® 07 system error to a value other than 0 for the drive inverter to stop. The error resets itself at the UFx, which means the current process data are exchanged immediately after restarting the communication.

7.3 Device errors

UFx gateways detect a series of hardware defects and lock out subsequently. The exact error responses and remedies can be found in the list of errors. A hardware defect causes error 91 to be displayed on the fieldbus process input data for status words 1 of all drive inverters. The SYS-FAULT LED at the UFx then flashes at regular intervals. The exact error code is displayed via MOVITOOLS in the UFx status at the diagnostic interface.

8 LEDs

The UFP PROFIBUS interface has four diagnostic LEDs.

- "RUN" LED (green) for displaying the normal operating status
- "BUS-FAULT" LED (red) for displaying errors at the PROFIBUS DP-V1
- "SYS-FAULT" LED (red) for displaying UFP system errors and operating states.
- "USER" LED (green) for application-specific diagnostics in expert mode.

8.1 RUN

ON	Standard operation, 24 V supply o.k.
OFF	24 V supply is missing, UFP not ready for operation. Check the 24 V voltage supply and switch the UFP on again. Replace the module if problem occurs again.
FLASHING	PROFIBUS address is set to more than 125. Check the DIP switch setting.

8.2 BUS-FAULT

OFF	Standard operating state. UFP is currently exchanging data with the DP master (data exchange). Requirement: "RUN“ LED is lit.
FLASHING	The Profibus baud rate is detected by the UFP. But the UFP is not or incorrectly addressed by the DP master. Check configuration of the DP master. The configured PROFIBUS address must be identical to the PROFIBUS address set on the DIP switch. PROFIBUS addresses must not be assigned twice. If possible, use standard settings for project planning (do not use a universal configuration).
ON	Connection to the DP master has failed The bus is interrupted or the DP master is switched off. Check the PROFIBUS connection to the UFP. Check the complete PROFIBUS cabling and the terminating resistors as well as the DP master. Requirement: "RUN“ LED is ON.

8.3 SYS-FAULT

OFF	Standard operating state. The UFP is exchanging data with the connected inverters. Requirement: "RUN“ LED is on.
FLASHING briefly once, followed by a long pause	Autosetup is selected via DIP switches and UFP is currently configuring itself. If this state lasts longer than 1 minute, switch Autosetup off and on again. Replace the module if Autosetup does not exit itself again.
FLASHING regularly	The UFP is in an error state. If the UFP was started with the Autosetup DIP switch, switch the UFP off and on again. If the LED is now on, restart Autosetup by switching the DIP switch off and on again. If the UFP was started using MOVITOOLS, the status window displays an error message. Please check under the corresponding error description.
ON	The UFP does not exchange data with the connected inverters. It was not configured or the connected inverters do not respond. Repeat the configuration of the UFP. If the UFP was started with Autosetup, switch the Autosetup DIP switch off and on again. If the LED is still lit after Autosetup, check the cabling and the terminating resistors of the SBus as well as the voltage supply of the inverter. If the UFP was started using MOVITOOLS, select the "Update" button in the manager. All inverters should be displayed in the "Connected Inverters" window. If this is not the case, check the cabling and the terminating resistors of the SBus as well as the voltage supply of the inverter. If necessary, repeat the configuration of the UFP with MOVITOOLS.

8.4 USER

OFF	Standard operating state. The "USER' LED is reserved for expert mode.

9 DIP Switches

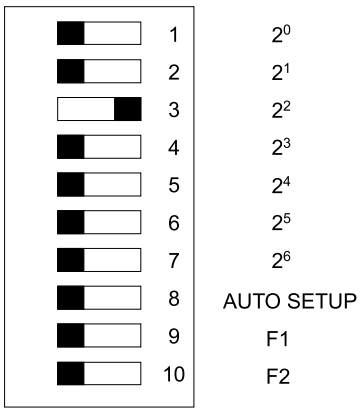


Figure 13: DIP switches (factory setting)

The factory setting is PROFIBUS address 4 and deactivated Autosetup.

F1: Function 1 – reserved, set to "Off"

F2: Function 2 – reserved, set to "Off"

AUTO SETUP: See Sec. "Installation and Operation with Autosetup"

9.1 Setting the station address

The PROFIBUS station address is set using DIP switches. PROFIBUS supports the address range from 0 through 125.

It is not possible to change the PROFIBUS station address via DIP switches during operation of the UFP11A. The modified station address will only become effective after switching the UFP11A on again.

You can control the current PROFIBUS station address with parameter *P092 Fieldbus address*.

10 Operating the Interface

How do I go "online?"

After an "Update," the MOVITOOLS manager displays all participants recognized on the system bus, i.e. inverters and gateway. You can access the status bar, Shell, Assembler and Compiler on all connected inverters via the gateway.

The UFx configurator supports the project planning and startup of a UFP fieldbus node.

A bus configuration can either be configured offline or read from the UFP and processed online.

It is advisable to verify that the hardware Autosetup is switched off (DIP switch 8 in OFF position) before starting the UFx configurator.

Before startup, make sure that neither personnel nor system components are at risk if a bus error should occur on the PROFIBUS and/or system bus end.

Project planning / startup

Two modes are available for project planning/startup.

The Autoconfiguration mode sequentially assigns each participant three process output and input data analogous to the hardware AutoSetup, beginning with the lowest system bus address.

Example

Autoconfiguration: 3 participants with addresses 10, 11 and 12 => 9 PDs

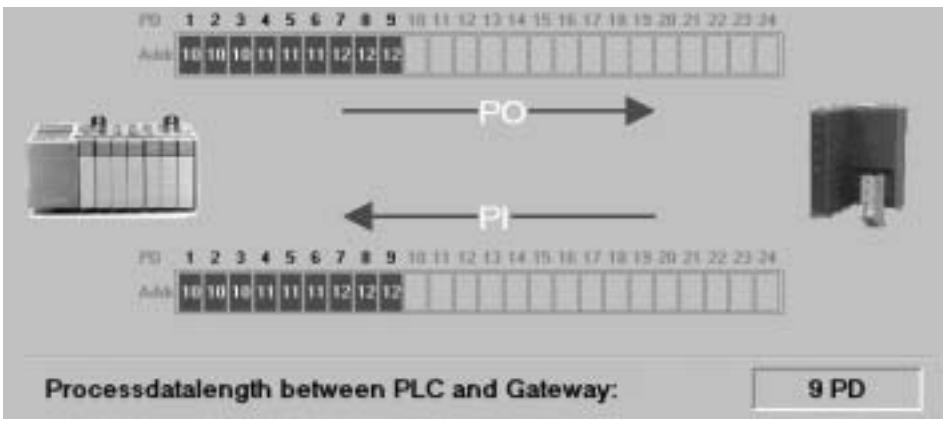


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Figure 14: Autoconfiguration example

The process data assignment can be configured at random in expert mode. The assignment can take place graphically (drag and drop).

Example

Participant 10, PO1 is configured

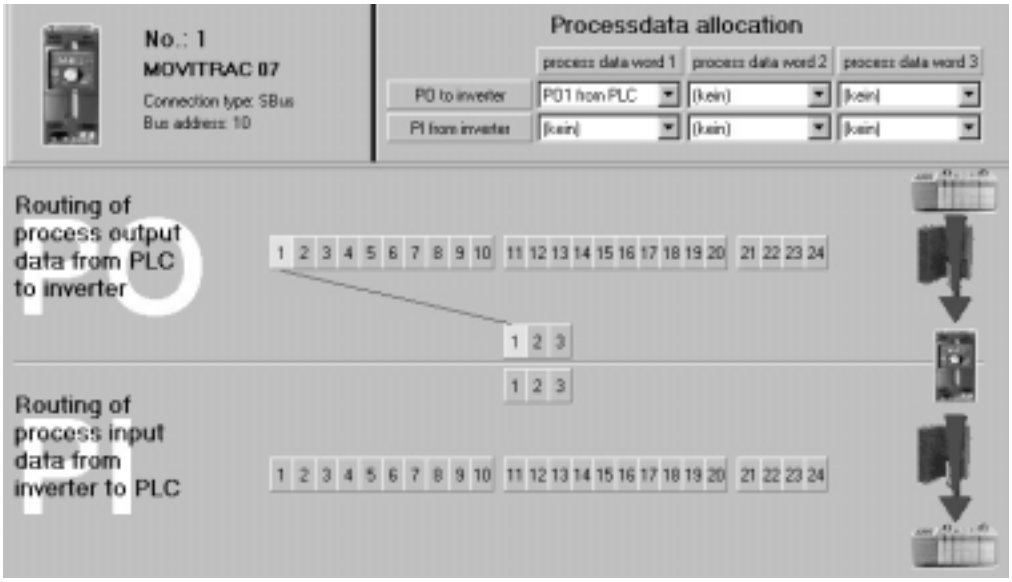

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Figure 15: Participant 10, PO1 is configured

Packaging or bundling the process output data may look as follows: PO1 ... PO3 are received by all 3 participants (e.g. control word 1, speed setpoint, ramp).

The PROFIBUS master receives 1 PD (e.g. status word 2) from each inverter as process input data. Six process output and process input data words are saved in the peripheral area in the master compared to AutoSetup.

A multiple assignment of process input data should be avoided/does not make sense.

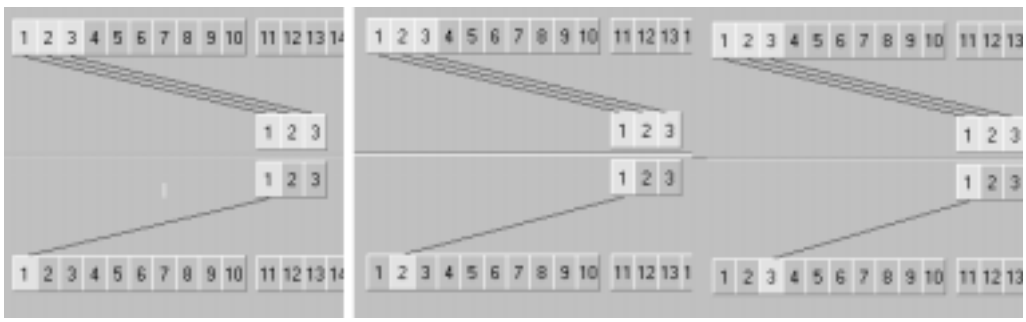

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Figure 16: Multiple assignment

The GSD file supports the configuration of a corresponding process data width in the PROFIBUS master. If a process data width is not listed, select the next higher one (e.g.

5 PDs are configured in expert mode => select 6 PDs):

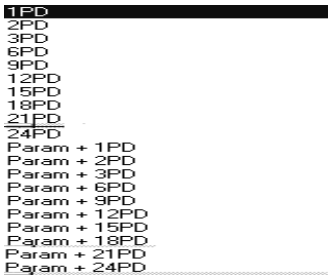

Figure 17: Process data width

The parameter channel refers exclusively to the gateway.

11 Appendix

11.1 List of errors

Error code	Designation	Response	Cause	Action
10	IPOS ILLOP	IPOS program stopped	Error in the IPOS program	Use the UFX configurator to reconfigure the interface
17	Stack overflow	SBus communication stopped	Malfunction of inverter electronics, possibly due to EMC influence	Check ground connections and shieldings and correct, if necessary. Contact SEW service if this error occurs again.
18	Stack underflow	SBus communication stopped	"	"
19	NMI	SBus communication stopped	"	"
20	Undefined opcode	SBus communication stopped	"	"
21	Protection fault	SBus communication stopped	"	"
22	Illegal word operand access	SBus communication stopped	"	"
23	Illegal instruction access	SBus communication stopped	"	"
24	Illegal external bus access	SBus communication stopped	"	"
25	Eeprom	SBus communication stopped	Error while accessing EEPROM	Activate factory settings, perform reset and set parameters for UFx again. Contact SEW service if the error occurs again
28	Fieldbus timeout	Default: PO data = 0 Error response adjustable via P831	No communication took place between master and slave within the projected response monitoring.	• Check communications routine of the master • Extend the fieldbus timeout interval (response monitoring) in the master configuration or deactivate monitoring
32	IPOS index overflow	IPOS program stopped	Programming principles violated leading to system internal stack overflow.	Check and correct IPOS application program
37	Watchdog error	SBus communication stopped	Error during execution of system software	Check ground connections and shieldings and correct, if necessary. Contact SEW service if this error occurs again.
45	Initialization error	SBus communication stopped	Error after self-test during reset	Check DIP switches F1 and F2; they must be set to 'Off.' Perform a reset. Contact SEW service if the error occurs again.
77	Invalid IPOS control value	IPOS program stopped	An attempt was made to set an invalid automatic mode (via external controller).	Check write values of external controller

Error code	Designation	Response	Cause	Action
91	System error	None	Please observe the red SYS-FAULT LED of the UFx. If this LED is on, one or several participants on the SBus could not be addressed within the timeout interval. If the red SYS-FAULT LED flashes, the UFx itself is in an error state. In this case, error 91 was reported to the controller only via fieldbus.	Check voltage supply and SBus cabling, check SBus terminating resistors. Check the project planning if the UFx was configured with the PC. Switch UFx off and on again. If the error is still present, query the error via diagnostic interface and perform the action described in this table.

11.2 Technical data

	Part number:	823 896 0
	Tools for startup:	MOVITOOLS V 2.70 or later
	Voltage supply:	DC 18 ... 30 V, external supply
	Current consumption at DC 24 V:	max. 200 mA
	Parameter setting and diagnostic interface:	RS-485
	Parameter setting:	Autoconfiguration or via MOVITOOLS V 2.70 or later
	Diagnostics:	LEDs on front of unit MOVITOOLS
	Installation:	Screw-type or DIN rail installation
	Ambient temperature:	– 10 °C ... + 50 °C
PROFIBUS DP-V1	PROFIBUS protocol variants:	PROFIBUS DP-V1 to IEC 61158
	Automatic baud rate detection:	9.6 kbaud ... 12 Mbaud
	Connection technology:	9-pole sub D connector Pin assignment to DIN 19245 T1
	Bus termination:	Externally via connector
	Station address:	0 ... 125, adjustable via DIP switches
	Name of GSD file:	SEW_6004.GSD (PROFIBUS DP) SEWA6004.GSD (PROFIBUS DP-V1)
	DP ident number:	6004hex = 24580dec
SBus	Maximum transmission speed:	1 Mbaud
	Transmission protocol:	MOVILINK
	Number of units on the SBus:	Max. 8
	Process data words per unit:	Max. 3 PDs
	Connection technology:	Separable screw-type terminals

11.3 Dimension sheet

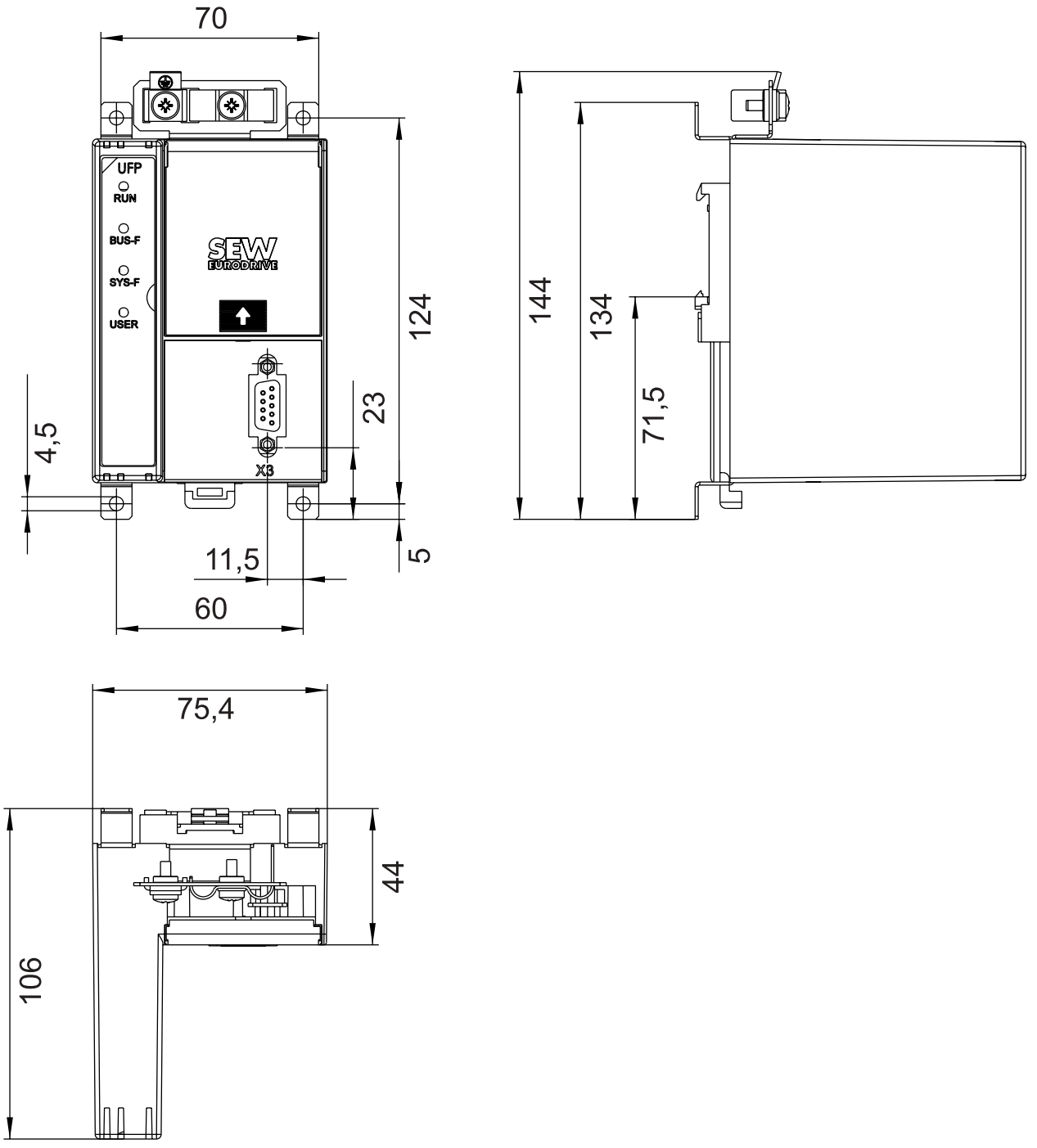

Figure 18: Dimension sheet

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