

Equipment for Machine Tools

WS 400-30/WS 400-50 Operator Panels

Description

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1 Area of Application

Convenient operation of automation systems and machines is by means of operator panels comprising a keyboard and a monitor.

The functions of the operator panels include:

- operator-process communication
- display of operating data and status conditions
- fault reporting
- support for fault correction
- guidance for data input

The WS 400-30 and WS 400-50 operator panels cope with these requirements. They are designed for machine-level application in an industrial environment.

On this basis, a range of standard operator panels has been put together for the user. The operator panels have all the keys needed for convenient operation of the various graphic and control systems.

Depending on the operator panel version, the key codes are recorded on a keyboard encoder that is built in to the operator panel. The long-travel keys are ergonomically designed for comfortable use. The laser-printed key labels are unerasable.

The basic units of the operator panels are equipped with a 14-inch colour monitor and can also be fitted with various keypads depending on which one of the many graphics systems and controls they are connected to. The basic operator panel units can also be equipped with one or two keypad expansion units that are either fitted with keypads or used as machine control panels as needed in the application. The customer assembles the machine control panels.

The analog video signal makes it possible to span long transmission paths between the operator panel and the PLC. Several monitors can be series-connected.

2 Design

The WS 400-30 and WS 400-50 operator panels consist of different basic units and keypads. The planning of the individual versions has ensured that the operator panels will be able to carry out all the specific functions necessary for controlling the graphics and control systems.

One version each of the WS 400-30 or one WS 400-50 operator panel are available depending on whether the unit is connected to a GRACIS or WF 470 system. Keypad expansion units provide a useful complement to the basic units. The specific keypads for GRACIS or WF 470 are built into the individual versions. The keypads and the softkey panel are connected to the units by a keyboard encoder. The keyboard encoder is built in to the WS 400-30 and WS 400-50 basic units. In addition, a WS 400-30 operator panel is available for universal use.

The following versions are available:

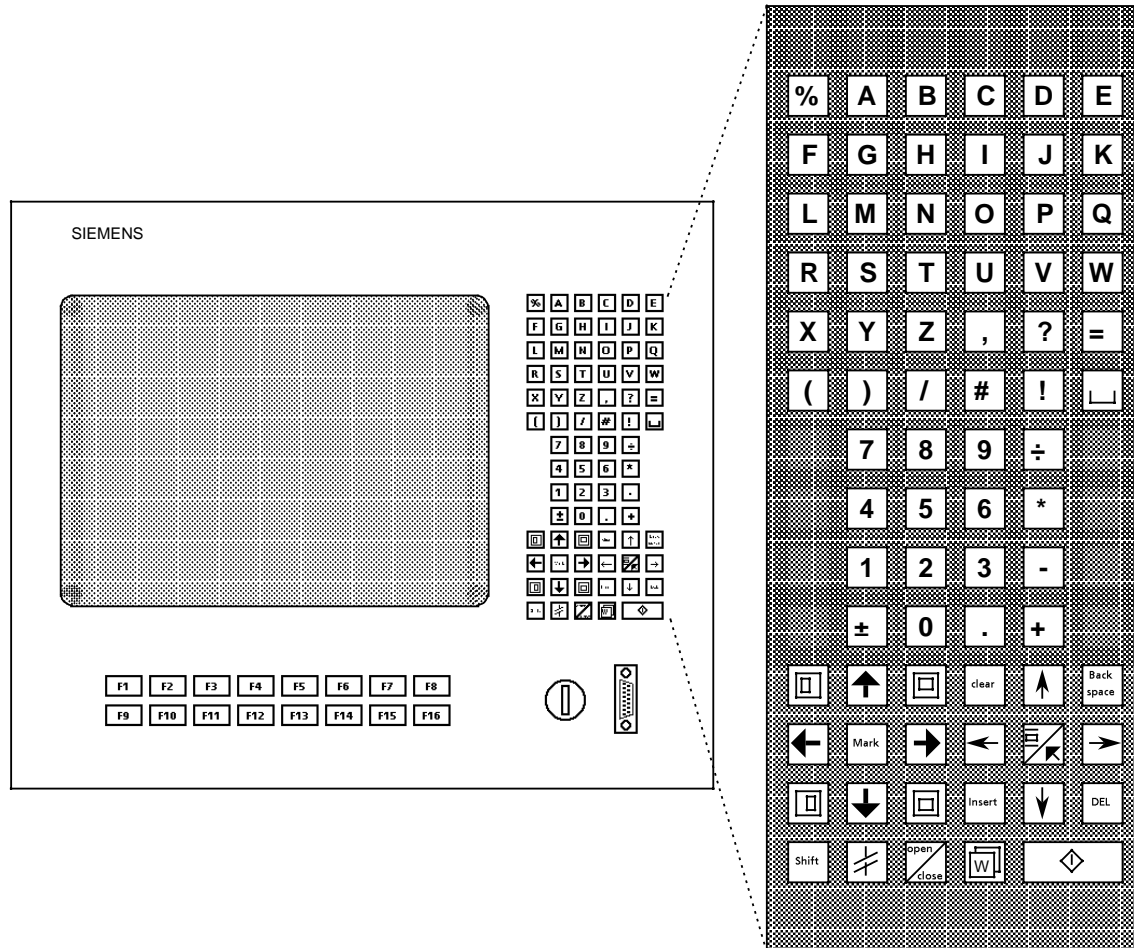
- WS 400-30 for WF 470
- WS 400-30 keypad expansion unit for WF 470
- WS 400-30 for GRACIS
- WS 400-30 keypad expansion unit for GRACIS
- WS 400-30 for universal use
- WS 400-50 for WF 470
- WS 400-50 versions A and B for GRACIS
- WS 400-50 keypad expansion unit for GRACIS/WF 470
- WS 400-30/50 machine control panel

The operator panels for use with GRACIS can be connected to PG 750/PG 770 programming units and GRACIS-S5s.

2.1 WS 400-50 for GRACIS

To cope with the different needs of GRACIS users, two WS 400-50 versions have been implemented. Version B is intended for process operation and version A is for planning and process operation. The two versions have different keypads and softkey panels.

Version A

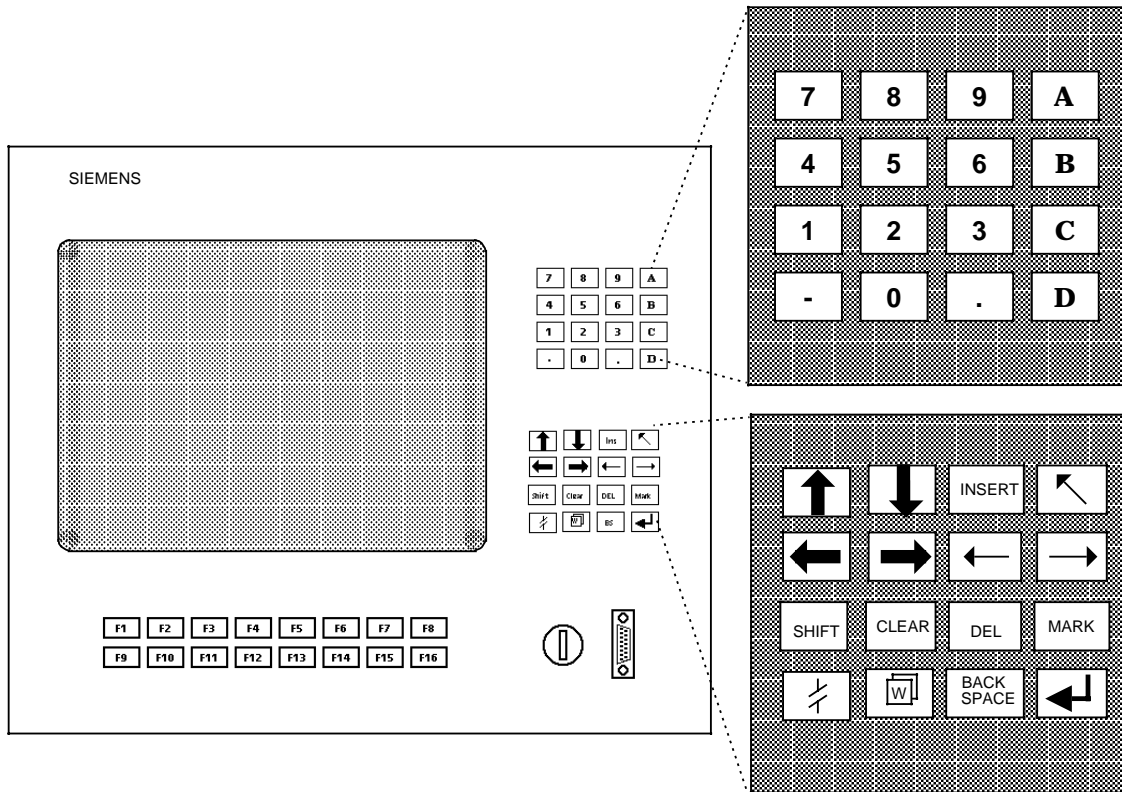


WS 400-50 version A for GRACIS is equipped with:

- a special GRACIS keypad with alphabetical, numeric and special keys
- a 15-pin sub-D socket for external connections, e.g. to a programmer
- a softkey panel with 16 function keys
- a programming unit keyboard interface
- a key-operated switch

The softkey panel and the GRACIS keypad contain all the keys needed for convenient operation at the planning stage and during GRACIS process operation.

Version B

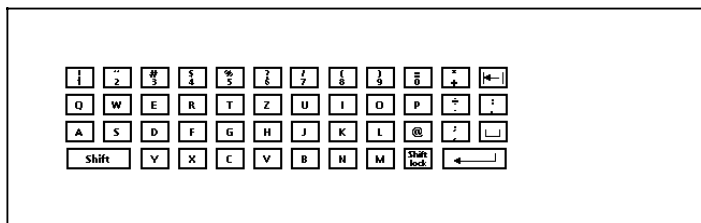


WS 400-50 version B for GRACIS is equipped with:

- a numeric keypad with a decimal point, minus sign and four special keys
- a keypad for GRACIS process operation
- 15-pin sub-D socket for external connections, e.g. to a programmer
- a softkey panel with 16 function keys
- a programming unit keyboard interface
- a key-operated switch

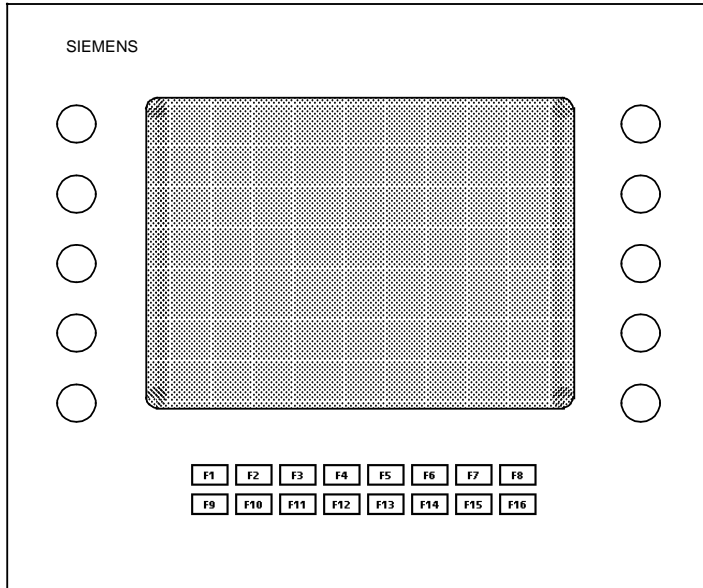
The softkey panel and the GRACIS keypad contain all the keys needed for convenient operation at the planning stage and during GRACIS process operation.

Keypad Expansion Unit (Typewriter Layout)



An alphanumeric keypad with digits, punctuation marks and special characters is built in to the keypadexpansion unit.

2.2 WS 400-30 for GRACIS

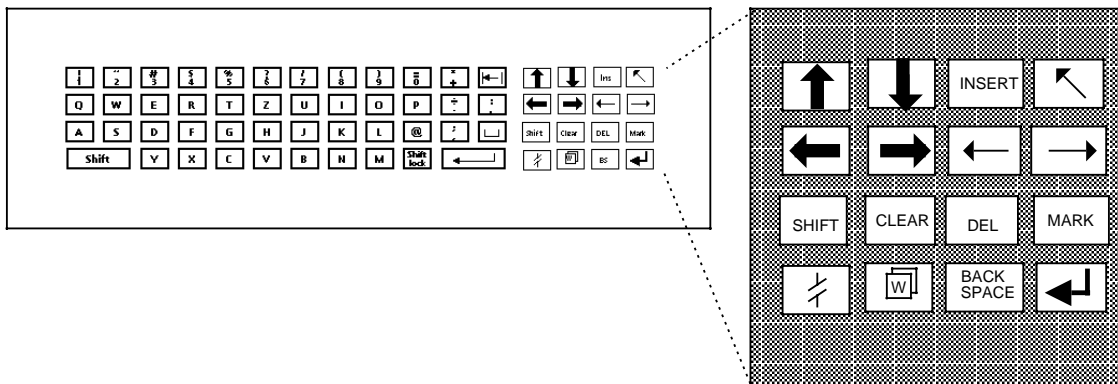


The WS 400-30 operator panel is equipped with:

- a softkey panel with 16 function keys
- five 22.5-mm diameter drilled holes on each side of the screen for 3SB... probes
- a programming unit keyboard interface

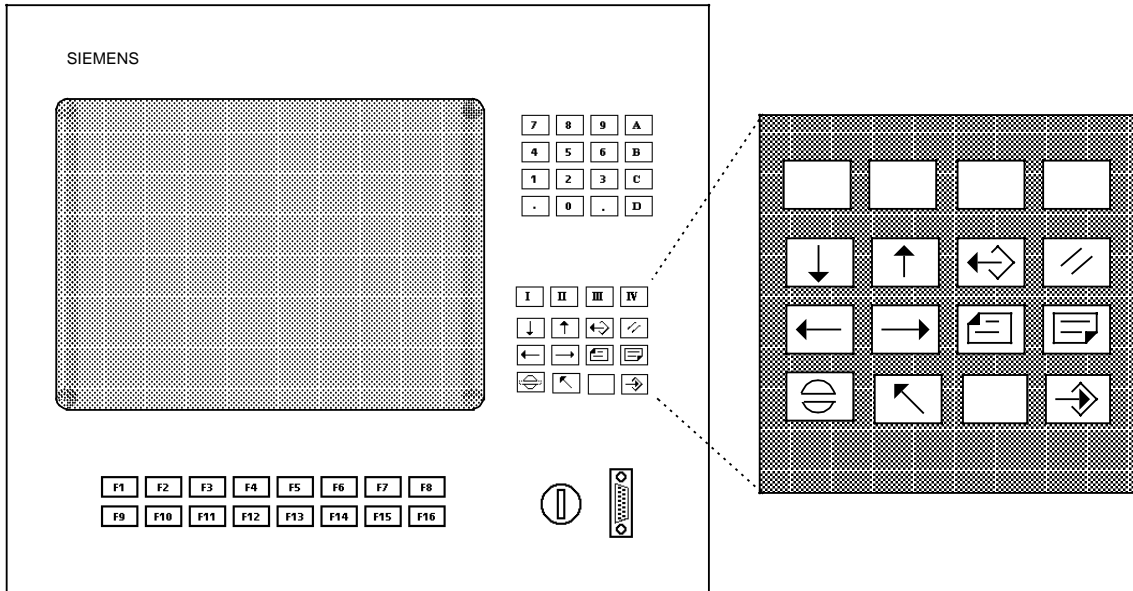
The drilled holes on both sides of the screen go through to the back of the operator panel and can be used for mounting switching or pushbutton units. The machine tool builder is responsible for installing this equipment and connecting it directly to the PLC. On delivery, the holes are sealed by caps.

Keypad Expansion Unit



An alphanumeric keypad with digits, punctuation marks, special characters and the GRACIS process operation keypad is built in to the keypad expansion unit.

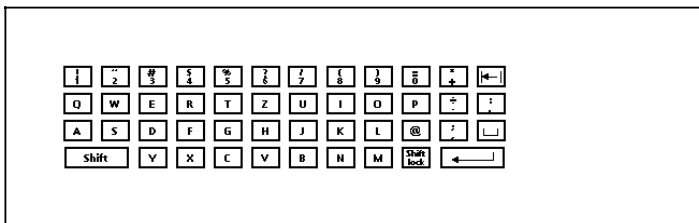
2.3 WS 400-50 for WF 470



For controlling the diagnostics and display system, the WS 400-50 operator panel was equipped with:

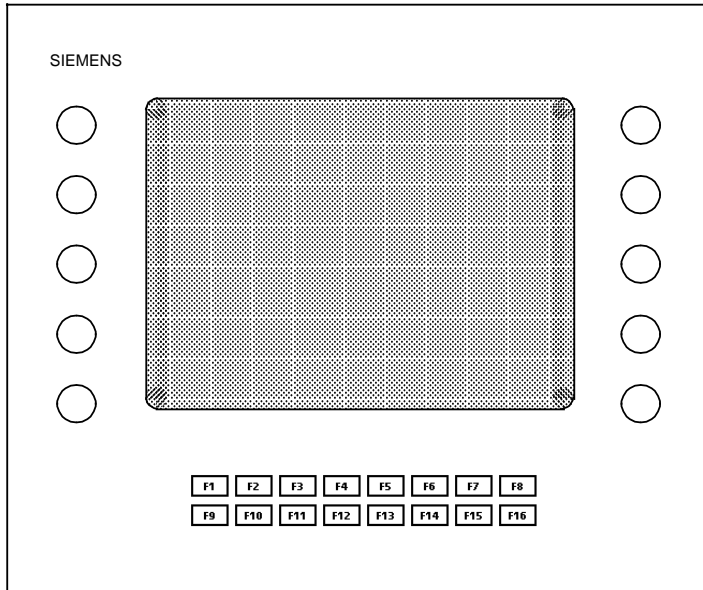
- a numeric keypad with a decimal point, minus sign and special characters
- a WF 470 keypad
- a programming unit connector strip and key-operated switch
- a softkey panel with 16 function keys
- a 15-pin sub-D socket
- a key-operated switch

Keypad Expansion Unit



An alphanumeric keypad with digits, punctuation marks and special characters is built in to the keypad expansion unit.

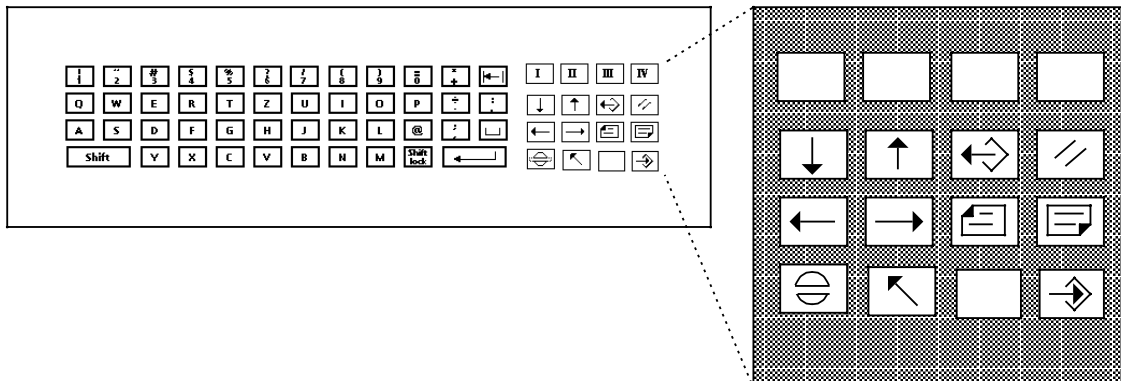
2.4 WS 400-30 for WF 470



The WS 400-30 operator panel connection to the WF 470 diagnostics and display system is fitted with a softkey panel of 16 function keys and has five drilled holes on both sides of the screen.

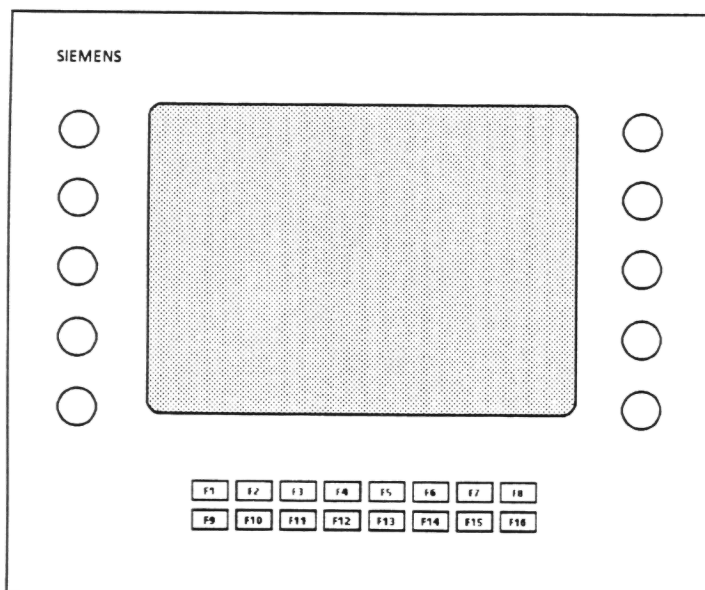
The drilled holes on both sides of the screen go through to the back of the operator panel and can be used for mounting switching or pushbutton units. The machine tool builder is responsible for installing this equipment and connecting it directly to the PLC. On delivery, the holes are sealed by caps.

Keypad Expansion Unit



An alphanumeric keypad with digits, punctuation marks, special characters and an input pad for the WF 470 is built in to the keypad expansion unit.

2.5 WS 400-30 Universal



The WS 400-30 operator panel for universal applications is fitted with:

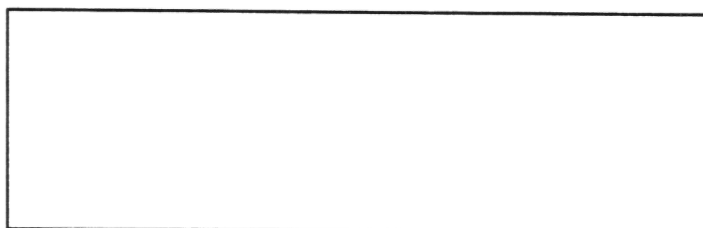
- a softkey panel of 16 function keys
- five 22.5-mm diameter drilled holes on both sides of the screen for SB... probes

The five drilled holes on both sides of the screen can be used for mounting switch or pushbutton units.

All the WS 400-30 keys for universal applications are connected directly to the PLC. The universal operator panel does not have a keyboard encoder.

The monitor can be connected to a GRACIS system, a WF 470 or a GRACIS-PG.

2.6 Machine Control Panel



The machine control panel complements the WS 400-30 and WS 400-50 basic units.

Depending on the functions required, the machine tool builder can equip the machine control panel with mode selector switches, key-operated switches or other pushbutton, switch or display segments.

3 Description of Keypads

The chapter below provides information about the individual keypads:

- Installation options in the operator panel
- Key codes depending on the interface of the connected graphics or control system
- Meanings of the different key symbols

The key codes are shown in hexadecimal notation.

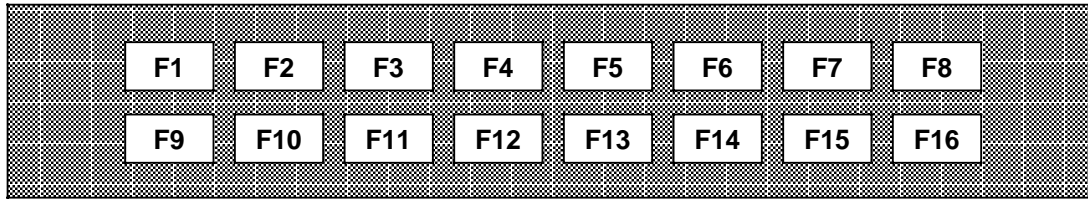
The key codes listed in the tables are divided into three columns, nl, Sh and SL where

nl means normal

Sh means Shift (key code of the special keys with the Shift key pressed)

SL means Shift Lock (key code of the special keys with Shift Lock on)

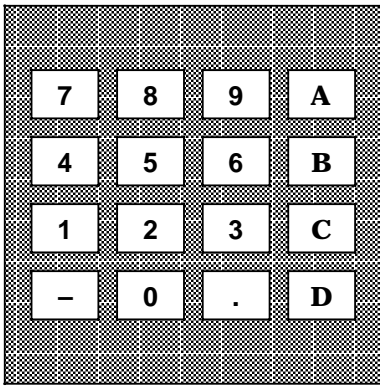
3.1. Softkey Panel with 16 Function Keys



The softkey panel is built-in below the operator panel monitor.

Key Symbols	Key Codes						
	Parallel Interface	Serial Interface				Corresponds to GRACIS-PG Keys	
		WF 470	GRACIS				
			nl/SL	Sh	nl	Sh	
F1	00	C0	01 10	01 14	F1	Shift F1	
F2	01	C1	02 10	02 14	F2	Shift F2	
F3	02	C2	03 10	03 14	F3	Shift F3	
F4	03	C3	04 10	04 14	F4	Shift F4	
F5	04	C4	05 10	05 14	F5	Shift F5	
F6	05	C5	06 10	06 14	F6	Shift F6	
F7	06	C6	07 10	07 14	F7	Shift F7	
F8	07	C7	08 10	08 14	F8	Shift F8	
F9	08	C8	01 12	01 16	ALT F1	ALT Shift F1	
F10	09	C9	02 12	02 16	ALT F2	ALT Shift F2	
F11	0A	CA	03 12	03 16	ALT F3	ALT Shift F3	
F12	0B	CB	04 12	04 16	ALT F4	ALT Shift F4	
F13	0C	CC	05 12	05 16	ALT F5	ALT Shift F5	
F14	0D	CD	06 12	06 16	ALT F6	ALT Shift F6	
F15	0E	CE	07 12	07 16	ALT F7	ALT Shift F7	
F16	0F	CF	08 12	08 16	ALT F8	ALT Shift F8	

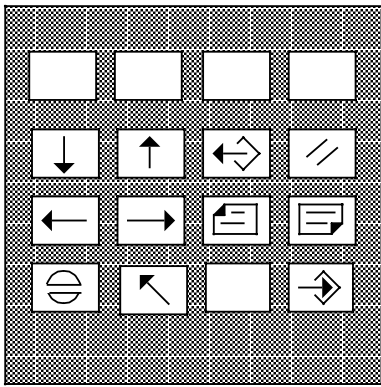
3.2. Numeric Keypad



The numeric keypad is built in to the WS 400-50 operator panel. It contains numeric keys, the decimal point, the minus sign and keys lettered A to D.

Key Symbols	Key Codes							
	Parallel Interface		Serial Interface					
			WF 470		GRACIS		Corresponds to GRACIS-PG Keys	
	nl	SL/Sh	nl	SL/Sh	nl	SL/Sh	nl	SL/Sh
0	10	10	30	30	30 00	30 00	0	0
1	11	11	31	31	31 00	31 00	1	1
2	12	12	32	32	32 00	32 00	2	2
3	13	13	33	33	33 00	33 00	3	3
4	14	14	34	34	34 00	34 00	4	4
5	15	15	35	35	35 00	35 00	5	5
6	16	16	36	36	36 00	36 00	6	6
7	17	17	37	37	37 00	37 00	7	7
8	18	18	38	38	38 00	38 00	8	8
9	19	19	39	39	39 00	39 00	9	9
-	1A	1A	2D	2D	2D 00	2D 00	-	-
.	1B	1B	2E	2E	2E 00	2E 00	.	.
A	4C	4B	41	61	61 00	41 00	a	A
B	6B	6A	42	62	62 00	42 00	b	B
C	67	66	43	63	63 00	43 00	c	C
D	50	4F	44	64	64 00	44 00	d	D

3.3 Keypad for WF 470

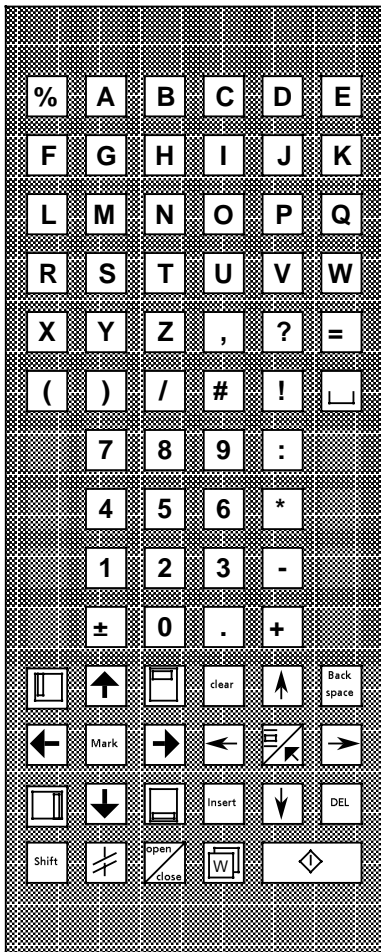


The WS 400-50's keypad for the WF 470 is built in to the operator panel. In the case of the WS 400-30, the keypad for the WF 470 is in the keypad expansion unit.

Key Symbols	WF 470 Key Codes	
	Parallel Interface	Serial Interface
	1C	86
II	1D	85
	1E	84
	1F	04
↓	21	90
↑	20	8F
↔	29	14
//	24	11
←	23	92
→	22	91
☑	25	8C
☑	26	8D
⊖	1F	04
↗	1C	86
→	28	0A

The unlabelled key doesn't generate a code.

3.4 GRACIS Keypad Version A

























The GRACIS keypad version A is particularly suitable for applications in which the operator panel is used to make changes to GRACIS planning data such as the diagrams in addition to being used for process operation.

The keypad contains:

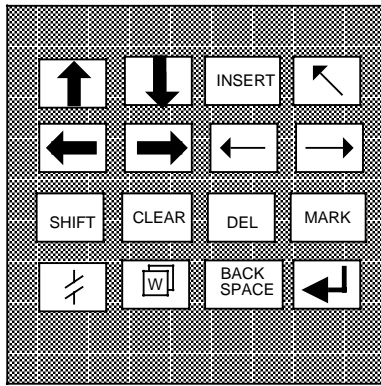
- Alphabetical keys (A-Z)
- Punctuation marks
- Special keys

If a hashmark (#) is printed before one of the numbers in the table below, this means that the operator must press the corresponding number key on the programming unit's keypad.

Key Symbol	GRACIS Key Codes						Corresponds to GRACIS-PG Keys	
	Parallel		Serial					
	nl	Sh/SL	nl	Sh	SL	nl	Sh	
%	2E	2E	25 00	25 00	25 00	%	%	
A	4B	4C	61 00	41 00	41 00	a	A	
B	6A	6B	62 00	42 00	42 00	b	B	
C	66	67	63 00	43 00	43 00	c	C	
D	4F	50	64 00	44 00	44 00	d	D	
E	3A	3B	65 00	45 00	45 00	e	E	
F	51	52	66 00	46 00	46 00	f	F	
G	53	54	67 00	47 00	47 00	g	G	
H	55	56	68 00	48 00	48 00	h	H	
I	44	45	69 00	49 00	49 00	i	I	
J	57	58	6A 00	4A 00	4A 00	j	J	
K	59	5A	6B 00	4B 00	4B 00	k	K	
L	5B	5C	6C 00	4C 00	4C 00	l	L	
M	6E	6F	6D 00	4D 00	4D 00	m	M	
N	6C	6D	6E 00	4E 00	4E 00	n	N	
O	46	47	6F 00	4F 00	4F 00	o	O	
P	48	49	70 00	50 00	50 00	p	P	
Q	36	37	71 00	51 00	51 00	q	Q	
R	3C	3D	72 00	52 00	52 00	r	R	
S	4D	4E	73 00	53 00	53 00	s	S	
T	3E	3F	74 00	54 00	54 00	t	T	
U	42	43	75 00	55 00	55 00	u	U	
V	68	69	76 00	56 00	56 00	v	V	
W	38	39	77 00	57 00	57 00	w	W	
X	64	65	78 00	58 00	58 00	x	X	
Y	62	63	79 00	59 00	59 00	y	Y	
Z	40	41	7A 00	5A 00	5A 00	z	Z	
,	5F	5F	2C 00	2C 02	2C 00	,	ALT ,	
?	2F	2F	3F 00	3F 02	3F 00	?	ALT ?	
=	33	33	3D 00	3D 02	3D 00	=	ALT =	
(31	31	28 00	28 02	28 00	(ALT (
)	32	32	29 00	29 02	29 00)	ALT)	
/	30	30	2F 00	2F 02	2F 00	/	ALT /	
#	2D	2D	23 00	23 02	23 00	#	ALT #	
!	2B	2B	21 00	21 02	21 00	!	ALT !	
␣	61	61	20 00	20 02	20 00	␣	ALT ␣	
7	17	17	37 00	37 02	37 00	7	ALT 7	

Key Symbol	GRACIS Key Codes							
	Parallel			Serial			Corresponds to GRACIS-PG Keys	
	nl	Sh	SL	nl	Sh	SL	nl	Sh
8	18	18	18	38 00	38 02	38 00	8	ALT 8
9	19	19	19	39 00	39 02	39 00	9	ALT 9
:	4A	4A	4A	3A 00	3A 02	3A 00	:	ALT :
4	14	14	14	34 00	34 02	34 00	4	ALT 4
5	15	15	15	35 00	35 02	35 00	5	ALT 5
6	16	16	16	36 00	36 02	36 00	6	ALT 6
*	35	35	35	2A 00	2A 02	2A 00	*	ALT *
1	11	11	11	31 00	31 02	31 00	1	ALT 1
2	12	12	12	32 00	32 02	32 00	2	ALT 2
3	13	13	13	33 00	33 02	33 00	3	ALT 3
-	1A	1A	1A	2D 00	2D 02	2D 00	-	ALT -
±	82	83	82	35 20	35 21	35 20	#5	Ctrl #5
0	10	10	10	30 00	30 02	30 00	0	ALT 0
.	1B	1B	1B	2E 00	2E 02	2E 00	.	ALT .
+	34	34	34	2B 00	2B 02	2B 00	+	ALT +
	77	77	77	18 20	01 00	18 20	Home	Ctrl A
	7A	84	7A	05 00	45 02	05 00	Ctrl E	ALT E
	72	72	72	14 20	12 00	14 20	PgUp	Ctrl R
clear	85	86	85	59 02	19 00	59 02	ALT Y	Ctrl Y
	70	87	70	10 20	38 20	10 20		#8
BACKSPACE	88	89	88	08 00	49 02	08 00		ALT I
	7F	8A	7F	13 00	53 02	13 00	Ctrl S	ALT S
MARK	8B	8C	8B	0E 00	46 02	0E 00	Ctrl N	ALT F
	7E	8D	7E	04 00	44 02	04 00	Ctrl D	ALT D
	75	8E	75	12 20	34 20	12 20		#4
	8F	80	8F	02 00	09 10	02 00	Ctrl B	F9
	74	91	74	13 20	36 20	13 20		#6
	76	76	76	08 20	06 00	08 20	End	Ctrl F
	7B	92	7B	18 00	58 02	18 00	Ctrl X	ALT X
	73	73	73	15 20	03 00	15 20	PgDn	Ctrl C
INSERT	93	94	93	09 20	4A 02	09 20	Ins.	ALT J
	71	95	71	11 20	32 20	11 20		#2
Del	79	96	79	7F 00	4B 02	7F 00	Del	ALT K
	78	97	78	1B 00	1B 02	1B 00	Esc	ALT Esc
open/close	7D	98	7D	0F 00	4C 02	0F 00	Ctrl O	ALT L
	7C	99	7C	17 00	02 20	17 00	Ctrl W	Ctrl+
	28	81	28	0D 00	0A 10	0D 00		F10

3.5 GRACIS Version B Keypad



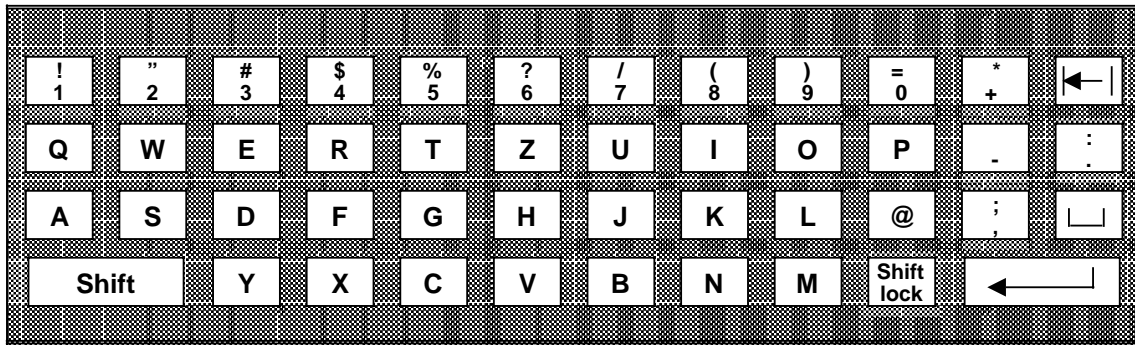
The GRACIS version B keypad is built in the WS 400-50 operator panel or in the keypad expansion unit. It is particularly suitable for convenient GRACIS process operation.

The key symbol meanings are identical to the corresponding key symbols of GRACIS keypad version A.

If a hashmark (#) is printed before a number in the table below, it means that the corresponding digit on the programming unit's numeric keypad must be used.

Key Symbol	GRACIS Key Codes					
	Parallel		Serial		Corresponds to GRACIS-PG Keys	
	n/SL	Sh	n/SL	Sh	nl	Sh
↑	7A	84	05 00	45 02	Ctrl E	ALT E
↓	7B	92	18 00	58 02	Ctrl X	ALT X
INSERT	93	94	09 20	4A 02	Ins.	ALT J
↶	8F	80	02 00	09 10	Ctrl B	F9
↵	7F	8A	13 00	53 02	Ctrl S	ALT S
⇒	7E	8D	04 00	44 02	Ctrl D	ALT D
	75	8E	12 20	34 20		#4
	74	91	13 20	36 20		#6
CLEAR	85	86	59 02	19 00	ALT Y	Ctrl Y
DEL	79	96	7F 00	4B 02	DEL	ALT K
MARK	8B	8C	0E 00	46 02	Ctrl N	ALT F
↯	78	97	1B 00	1B 02	Esc	ALT Esc
Ⓜ	7C	99	17 00	02 20	Ctrl W	Ctrl+
BACKSPACE	88	89	08 00	49 02	←	ALT I
↵	28	81	0D 00	0A 10	↵	F10

3.6 Alphanumeric Keys


























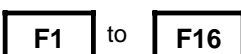



Key Symbols	Key Codes												
	Parallel			Serial									
	nl	Sh	SL	WF 470			GRACIS			GRACIS-PG Keys			
				nl	Sh	SL	nl	Sh	SL	nl	Sh		
1	11	2B	11	31	21	31	31 00	21 00	31 00	1	!		
2	12	2C	12	32	22	32	32 00	22 00	32 00	2	"		
3	13	2D	13	33	23	33	33 00	23 00	33 00	3	#		
4	14	-	14	34	24	34	34 00	24 00	34 00	4	\$		
5	15	2E	15	35	25	35	35 00	25 00	35 00	5	%		
6	16	2F	16	36	3F	36	36 00	3F 00	36 00	6	?		
7	17	30	17	37	2F	37	37 00	2F 00	37 00	7	/		
8	18	31	18	38	28	38	38 00	28 00	38 00	8	(
9	19	32	19	39	29	39	39 00	29 00	39 00	9)		
0	10	33	10	30	3D	30	30 00	3D 00	30 00	0	=		
+	34	35	34	2B	2A	2B	2B 00	2A 00	2B 00	+	*		
	88	89	88	-	-	-	08 00	49 02	08 00		ALT I		
Q	36	37	37	71	51	51	71 00	51 00	51 00	Q	Q		
W	38	39	39	77	57	57	77 00	57 00	57 00	w	W		
E	3A	3B	3B	65	45	45	65 00	45 00	45 00	e	E		
R	3C	3D	3D	72	52	52	72 00	52 00	52 00	r	R		
T	3E	3F	3F	74	54	54	74 00	54 00	54 00	t	T		
Z	40	41	41	7A	5A	5A	7A 00	5A 00	5A 00	z	Z		
U	42	43	43	75	55	55	75 00	55 00	55 00	u	U		
I	44	45	45	69	49	49	69 00	49 00	49 00	i	I		
O	46	47	47	6F	4F	4F	6F 00	4F 00	4F 00	o	O		
P	48	49	49	70	50	50	70 00	50 00	50 00	p	P		
-	1A	1A	1A	2D	2D	2D	2D 00	2D 02	2D 00	-	ALT -		
.	1B	4A	1B	2E	3A	2E	2E 00	3A 00	2E 00	.	.		
A	4B	4C	4C	61	41	41	61 00	41 00	41 00	a	A		

Key Symbols	Key Codes										
	Parallel			Serial							
	nl	Sh	Sh	WF 470			GRACIS			GRACIS-PG Keys	
				nl	Sh	SL	nl	Sh	SL	nl	Sh
S	4D	4E	4E	73	53	53	73 00	53 00	53 00	s	S
D	4F	50	50	64	44	44	64 00	44 00	44 00	d	D
F	51	52	52	66	46	46	66 00	46 00	46 00	f	F
G	53	54	54	67	47	47	67 00	47 00	47 00	g	G
H	55	56	56	68	48	48	68 00	48 00	48 00	h	H
J	57	58	58	6A	4A	4A	6A 00	4A 00	4A 00	j	J
K	59	5A	5A	6B	4B	4B	6B 00	4B 00	4B 00	k	K
L	5B	5C	5C	6C	4C	4C	6C 00	4C 00	4C 00	l	L
@	5D	5E	5D	40	40	40	40 00	0E 00	40 00	@	CTRL N
,	5F	60	5F	2C	3B	2C	2C 00	3B 00	2C 00	,	;
␣	61	61	61	20	20	20	20 00	20 02	20 00	␣	ALT ␣
Y	62	63	63	79	59	59	79 00	59 00	59 00	y	Y
X	64	65	65	78	58	58	78 00	58 00	58 00	x	X
C	66	67	67	63	43	43	63 00	43 00	43 00	c	C
V	68	69	69	76	56	56	76 00	56 00	56 00	v	V
B	6A	6B	6B	62	42	42	62 00	42 00	42 00	b	B
N	6C	6D	6D	6E	4E	4E	6E 00	4E 00	4E 00	n	N
M	6E	6F	6F	6D	4D	4D	6D 00	4D 00	4D 00	m	M
←	28	28	28	0A	0A	0A	0D 00	0D 02	0D 00	←	ALT ←

3.7 Meanings of the Key Symbols
















Special Keys

Meaning with GRACIS

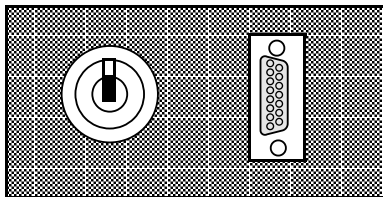
	Move image to the right/page
	Position from element to element
	Move image down/page
	Delete complete input field
	Move cursor upwards
	Delete next character backwards in an input line
	Position from element to element
	Mark element
	Position from element to element
	Move cursor to left
	Position to first operable element
	Move cursor to right
	Move image to left/page
	Position from element to element
	Move image up/page
	Insert/overwrite toggle
	Move cursor downwards
	Delete character under the cursor
	Abort
	Open/close window
	Move between windows
	Accept
	
	Function keys
	Leave a level
	Continue a function key help dialogue call
	Switch operating modes

Key Symbols

Meaning with WF 470

				Cursor movement
				Select function mask
				Software reset
				Scroll image
				Terminate data input
				Acknowledge error message line
				Switch between text and input/output fields
				Move cursor to next input/output field
				Move cursor to previous input/output field

3.8 Programming unit Connector Strip and Key-Operated Switch



The programming unit connector socket with its key-operated switch are built in the front of the WS 400-50 operator panel. On delivery, the connector socket is protected by a plastic cap.

The key can only be removed when the contact is open.

The programming unit connector socket and the key-operated switch are looped through 1:1 to the back of the operator panel to allow the connection of a PLC, for example.

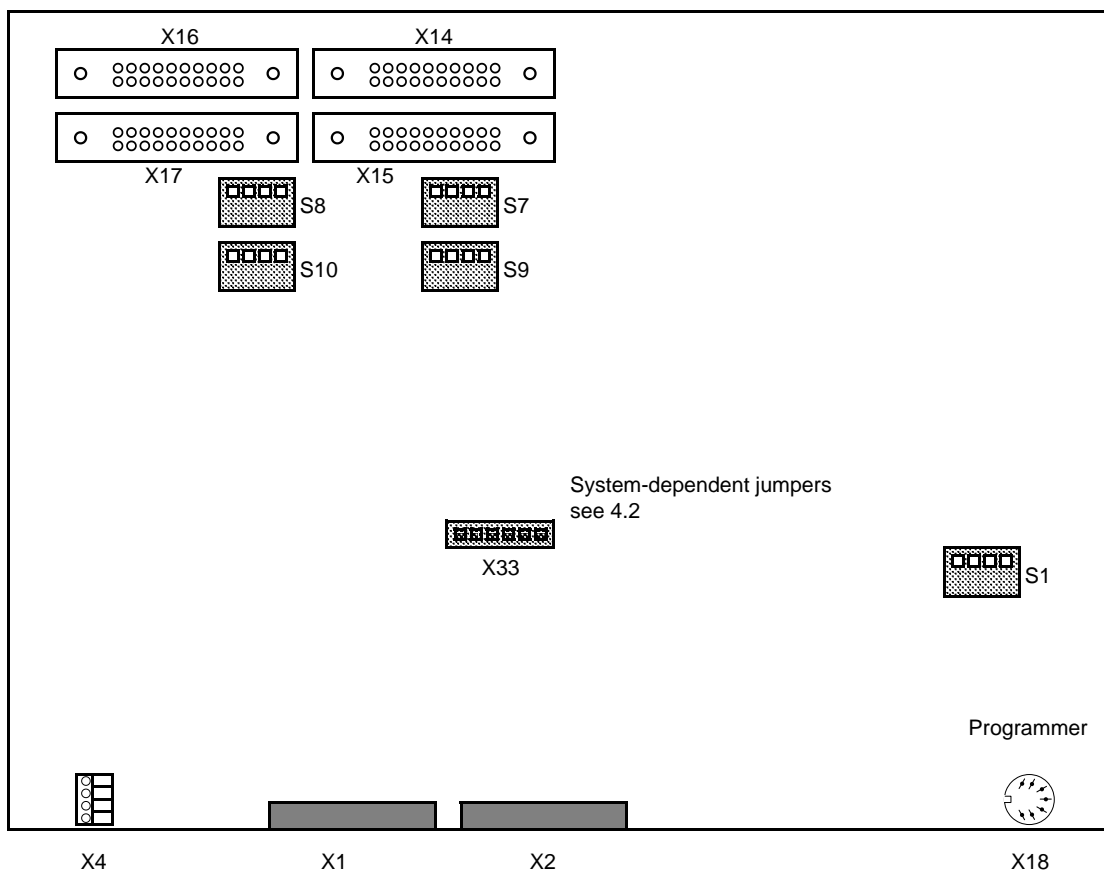
4 Connecting the Operator Panels

4.1. Switch Settings

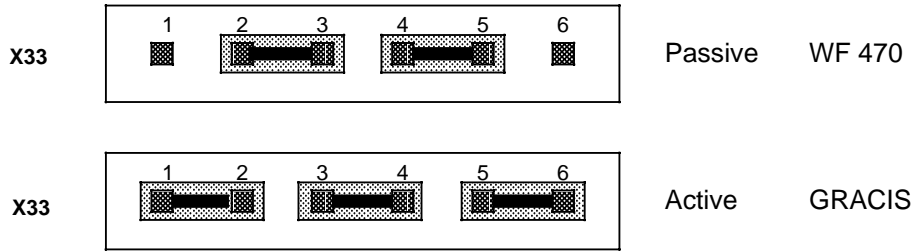
4.1.1 Module Configuration

The WS 400-30 and WS 400-50 operator panels can be connected to different graphics and/or control systems. Adjustment of the operator panel setting to the connected graphics and/or control system is by means of DIL switch S1 that is built in to the keyboard encoder. Viewed from the back, the encoder is to the left of the monitor behind a cover plate.

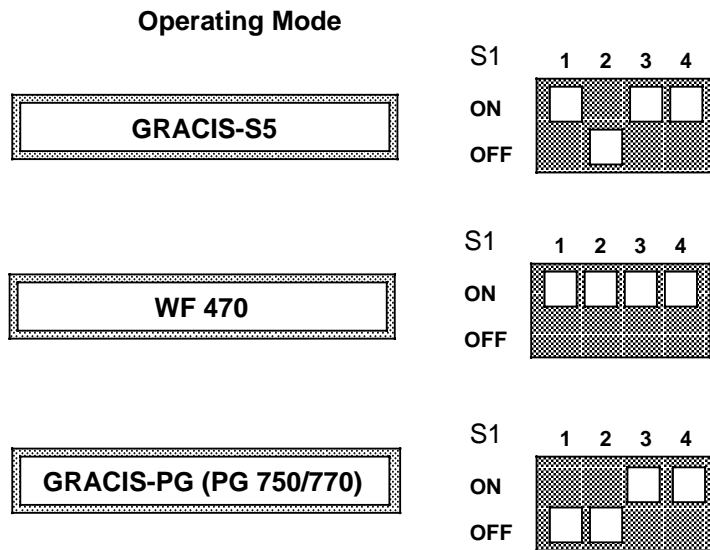
Switches on the keyboard encoder board for setting the module configuration and the keypad identification:



The power supply (24V, approximately 100mA) for the keyboard encoder (X4) can be removed from the monitor. Fitting jumpers in position X33 on the keyboard encoder PCB makes it possible to select an active or a passive 20mA interface (X1).



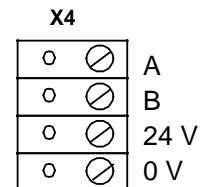
S1 switch settings for connection to:



The white blocks in the banks of switches show the current settings.

In GRACIS-PG mode, the voltage at inputs A and B (X4) determines the keyboards that are enabled (refer also to the table below). Inputs A and B are continuously monitored. This means that it is possible to implement a keyboard lock by appropriate assignments of A and B.

A	B	Meaning
0V	0V	No keyboard enabled
24V	0V	Operator panel keyboard enabled
0V	24V	Programming unit keyboard enabled
24V	24V	Operator panel and programming unit keyboards enabled



If a programming unit keyboard is connected to X18, it can only be used in GRACIS-PG mode (switch S1).

4.1.2 Keypad Identification

The operator panel keyboards comprise individual keypads. Each keypad is directly connected to the keyboard encoder by a ribbon cable which is supplied with the expansion unit.

To ensure correct key signal processing, a code switch is assigned to every connector. Code switches S7 to S10 are used for setting. There are certain restrictions on some keypad connections.

Assignment of code switches to connectors:

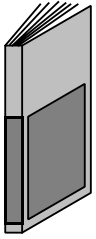
DIL switch	S7	S8	S9	S10
Connector	X14	X16	X15	X17

DIL switch settings on switches S7 to S10. The white blocks in the banks of switches show the current settings:

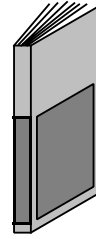
Keypad	Switch Setting				Allowed Connectors				
	Switch No.	1	2	3	4	X14	X15	X16	X17
Softkey panel with 16 function keys (X 101)	ON	White	White	White	White	X	X	X	X
	OFF	Shaded	Shaded	Shaded	Shaded				
Numeric keypad (X 401)	ON	Shaded	Shaded	White	White	X	X	X	X
	OFF	White	White	Shaded	Shaded				
Keypad for WF 470 (X 501)	ON	White	White	White	Shaded	X	X	X	X
	OFF	Shaded	Shaded	Shaded	White				
GRACIS keypad version A (X 901)	ON	Shaded	Shaded	Shaded	White				X
	OFF	White	White	White	Shaded				
GRACIS keypad version B (X 701)	ON	White	Shaded	Shaded	White	X	X	X	X
	OFF	Shaded	White	White	Shaded				
Alphanumeric keys (X 1001)	ON	White	White	White	Shaded		X	X	X
	OFF	Shaded	Shaded	Shaded	White				

4.2 Connection to SIMATIC S5 via the Parallel Interface

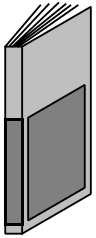
4.2.1 GRACIS Connection



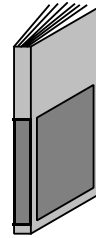
For more detailed information, consult Part 2 of the GRACIS Commissioning Guide SIMATIC S5 Interface under ZFS-TAST.



4.2.2 WF 470 Connection

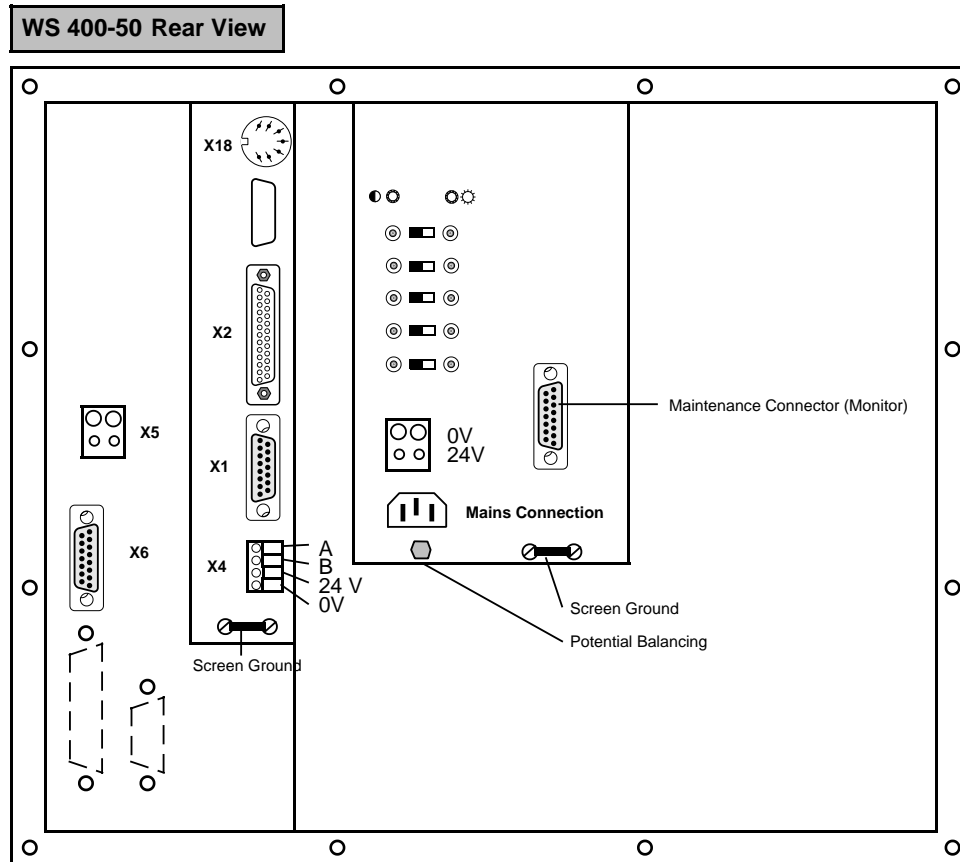


For more detailed information, consult the WF 470 Description.



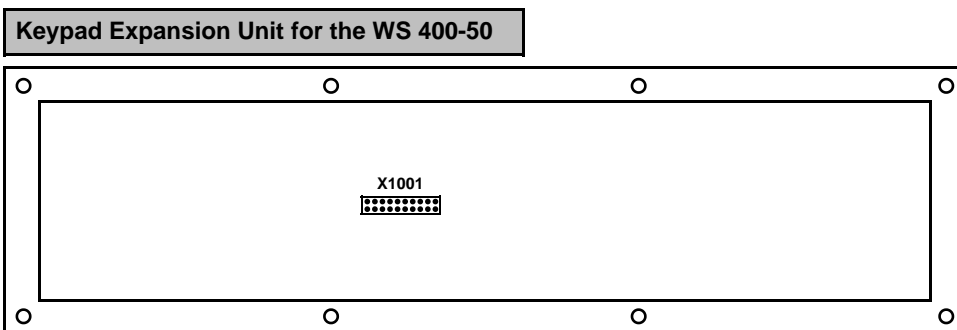
4.3 Interfaces

The WS 400-30/WS 400-50 flexible operator panels have one parallel and two serial interfaces (20mA and RS 232). The serial and the parallel interfaces can be assigned at the same time. Seven bits and the strobe signal are used to transmit the key codes. In the case of GRACIS, eight bits and one strobe signal are used. The parallel interface shares a connector with the 20mA interface.

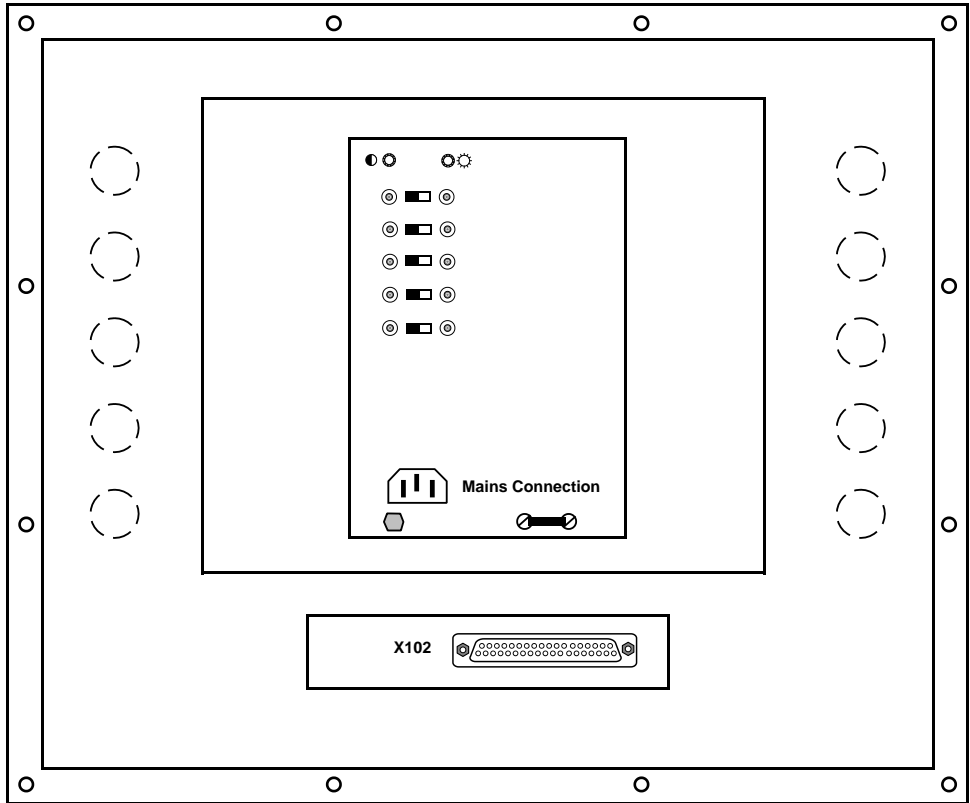


- X1 Parallel and TTY interface
- X2 V.24 interface
- X4 24-volt supply voltage and keyboard selection
- X5 Key-operated switch
- X6 Connected through 1:1 to the sub-D socket on the front (e.g. for a programmer)
- X18 Programming unit keyboard (with GRACIS only)

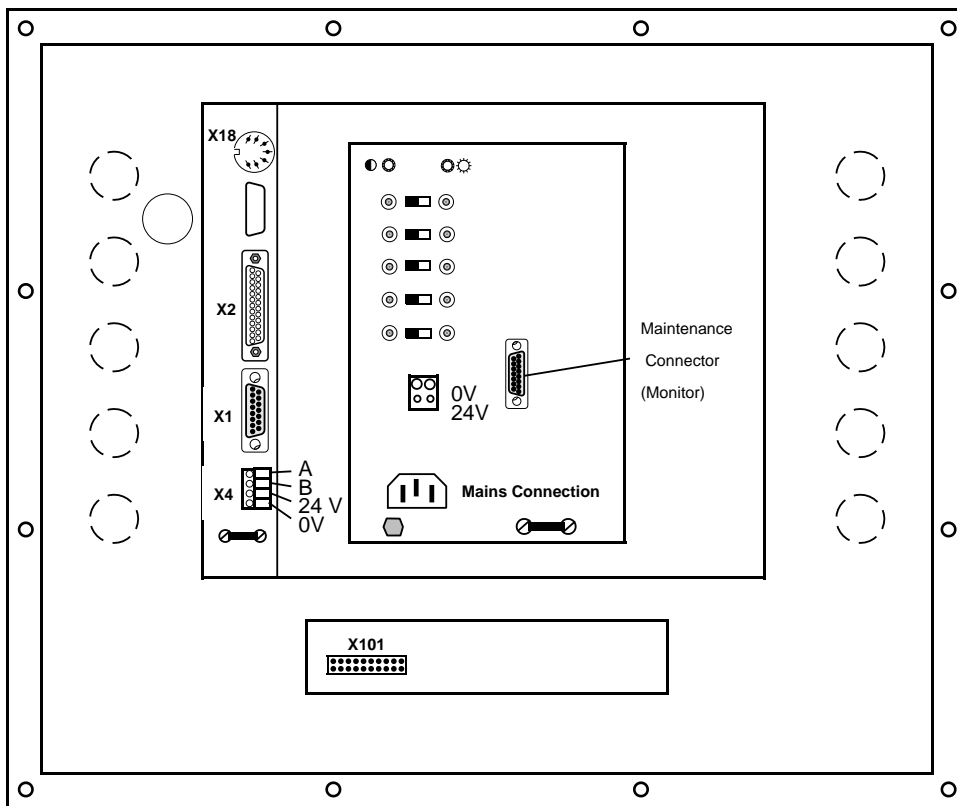
Because of the short connecting cable, the keypad expansion unit must be set up directly below the monitor.



**WS 400-30 (Universal)
Rear View**



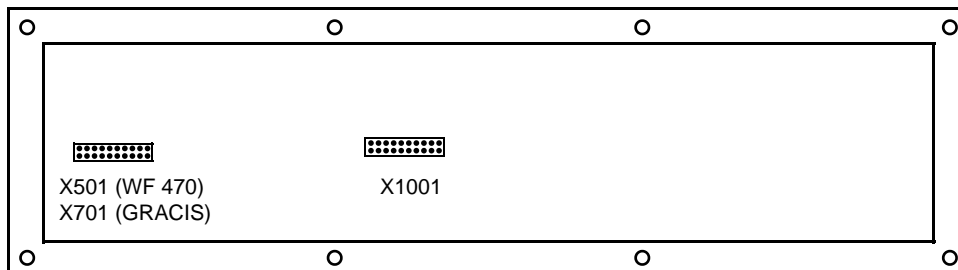
**WS 400-30 (GRACIS and WF 470)
Rear View**



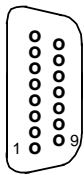
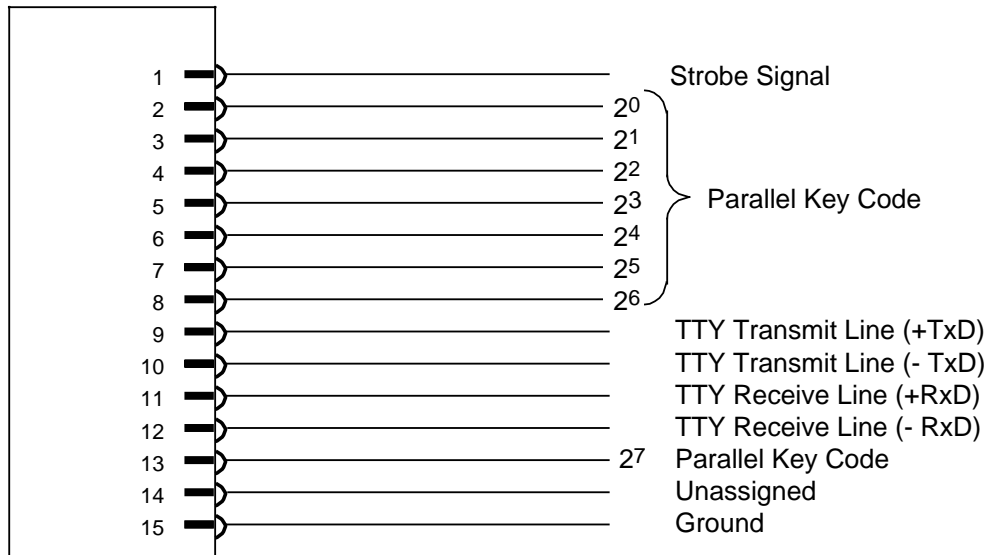
- X1 Parallel and TTY interface
- X2 V.24 interface
- X4 24-volt supply voltage
- X14 Softkey connection to basic unit (X101)
- X18 Programming unit keyboard (with GRACIS only)

Because of the short connecting cable, the keypad expansion unit must be set up directly below the monitor.

Keypad Expansion Unit for WS 400-30



4.3.1 Parallel Interface and 20mA Interface on Connector X1

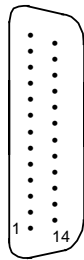
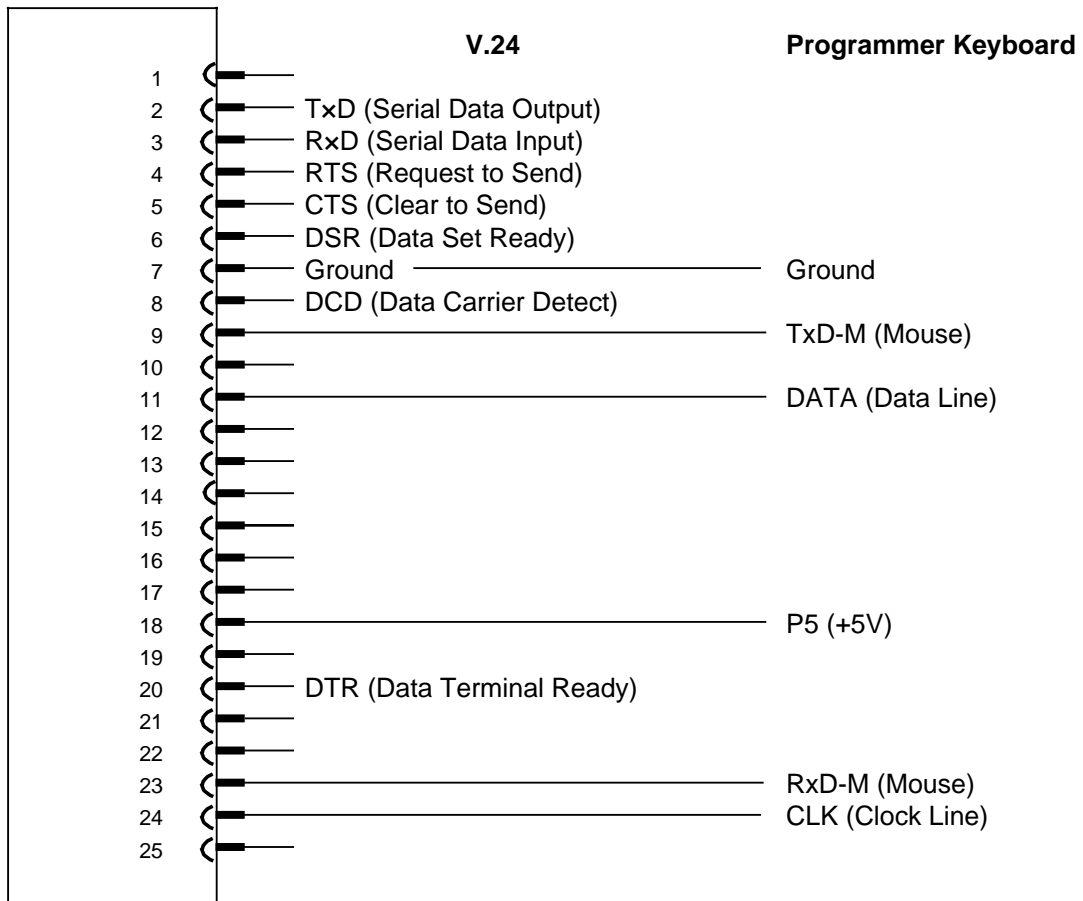


Connector
 6FM1790-8CA00
 15-pin, female
Solder Side
 Screw interlock



Active or passive setting of the 20mA interface is carried out on switch X33 (see Chapter 4.2).

4.3.2 V.24 Interface on Connector X2



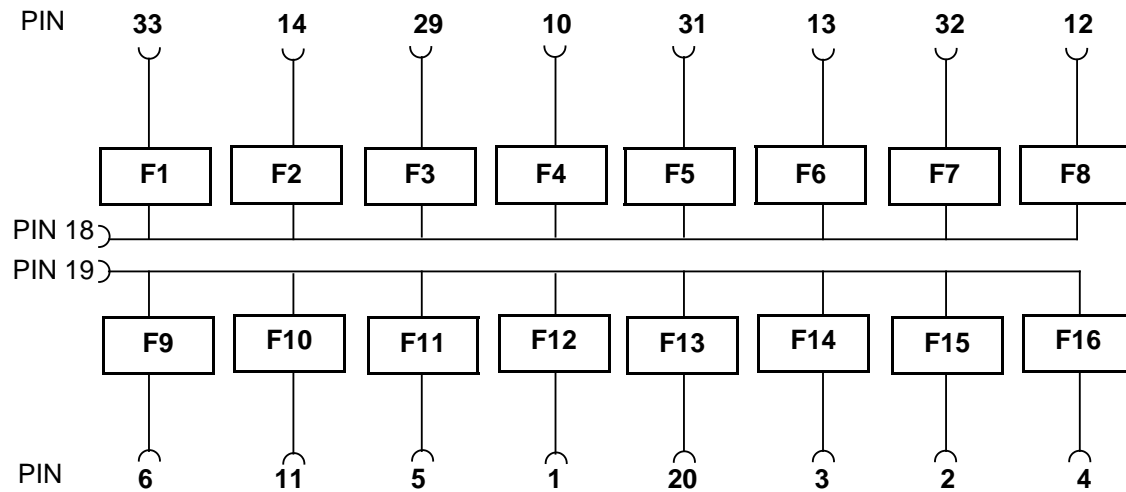
Connector
 25-pin, male
 6FM1 790-8GA00
Solder Side
 Screw interlock

4.3.3 WS 400-30 Keyboard Interface, Universal

In this case, the interface connector (X102) is a 37-pin sub-D male connector.

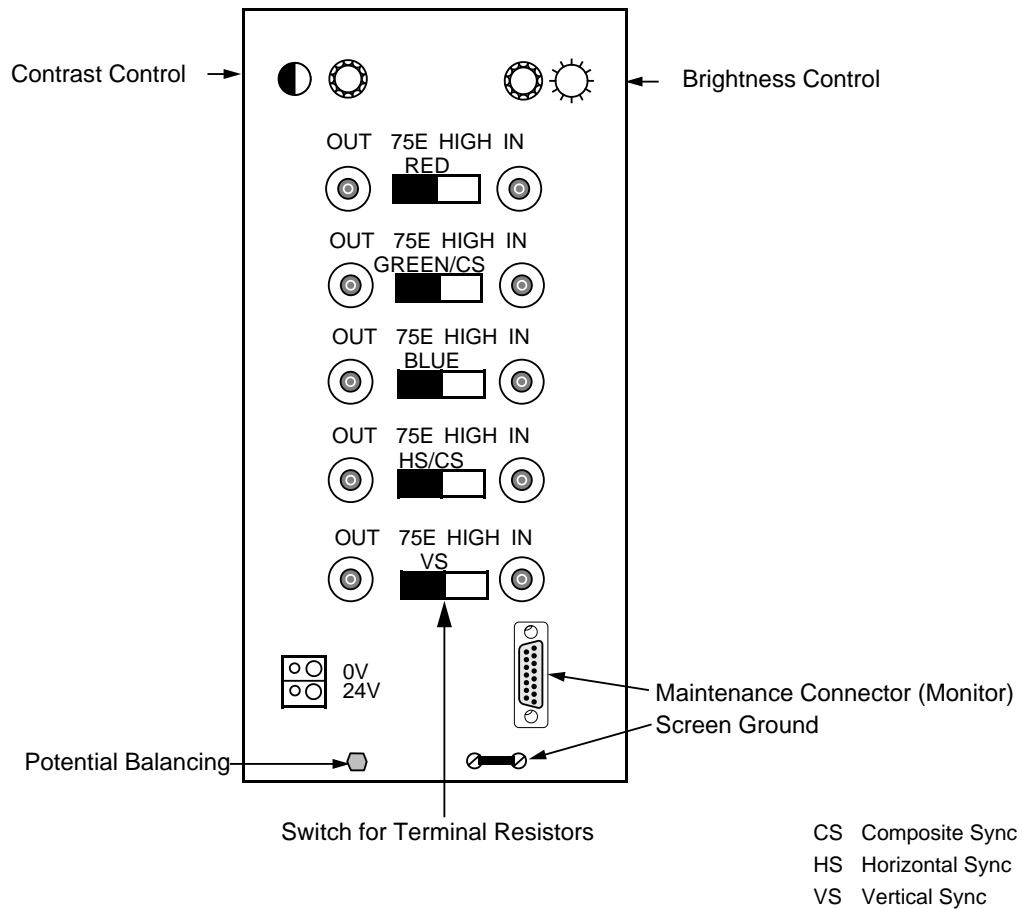
- The contacts are normally closed switches.
- Maximum contact loading: 30V, 5mA
- Connection to a SIMATIC DE module, for example

Assignment of X102



*This interface is universally available with the WS 400-30 operator panel only.
Connection to a keyboard encoder is not possible.*

4.3.4 Monitor Interface



Use the controls on the monitor to set the appropriate brightness and contrast.

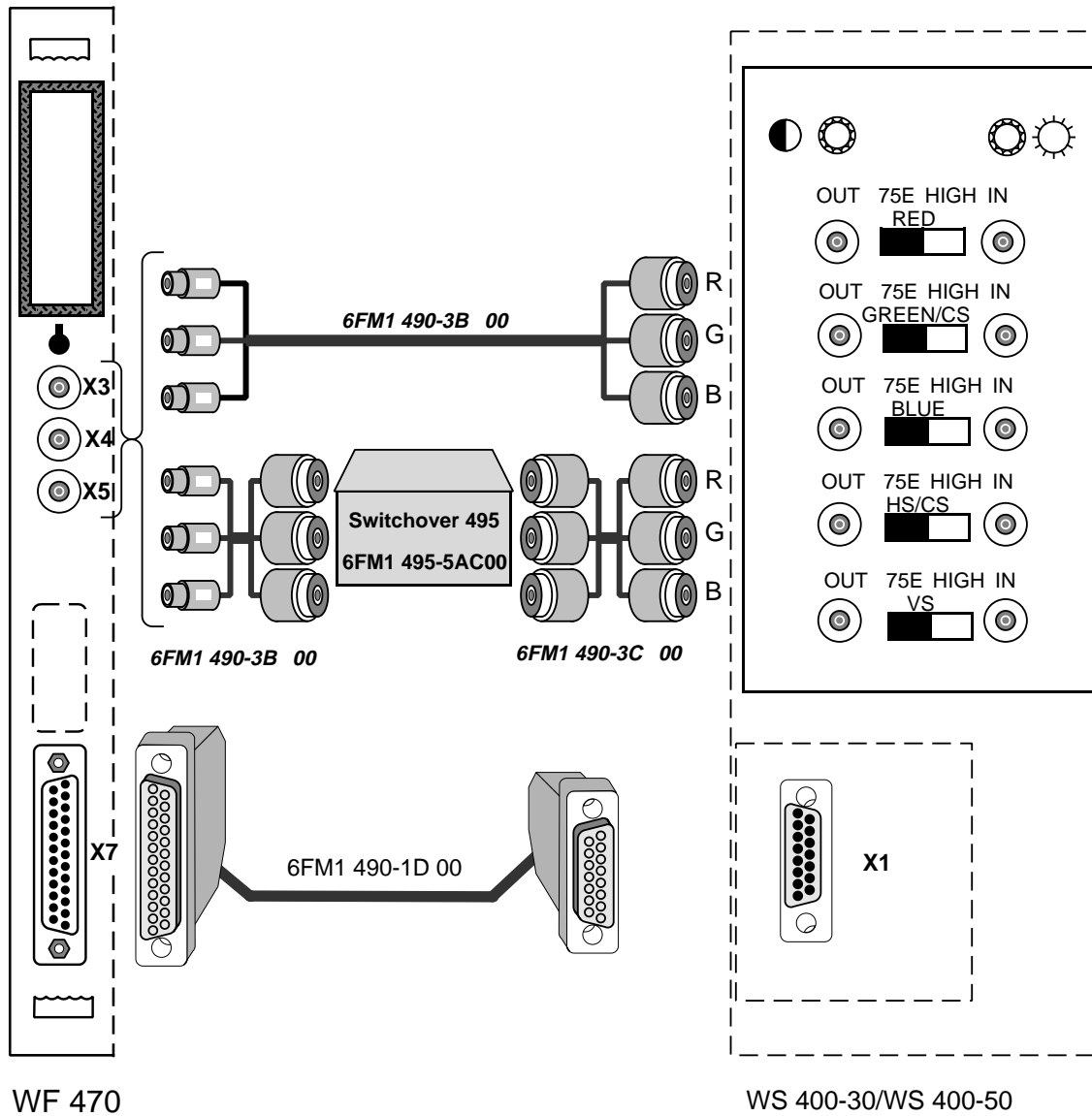
The switch for the terminal resistor may only be switched to "High" if another operator panel or another monitor is connected via the "OUT" BAS socket. For operation without continued looping of the monitor signal, set the switch to "75E".

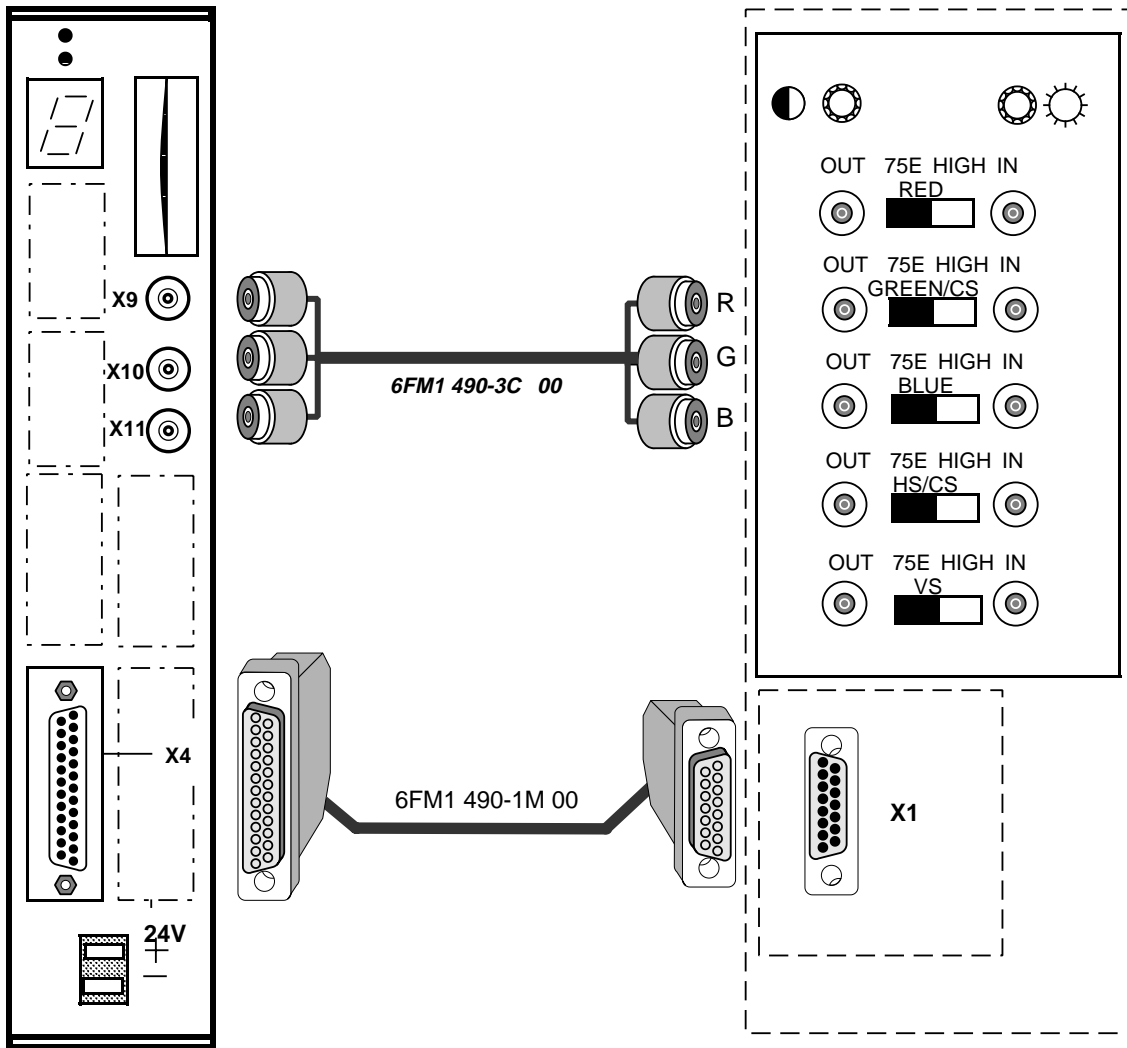
The 24V output is for voltage supply of the keyboard encoder only.



Running the monitor at full contrast reduces the CRT's useful life.

4.4 Overview of Cables

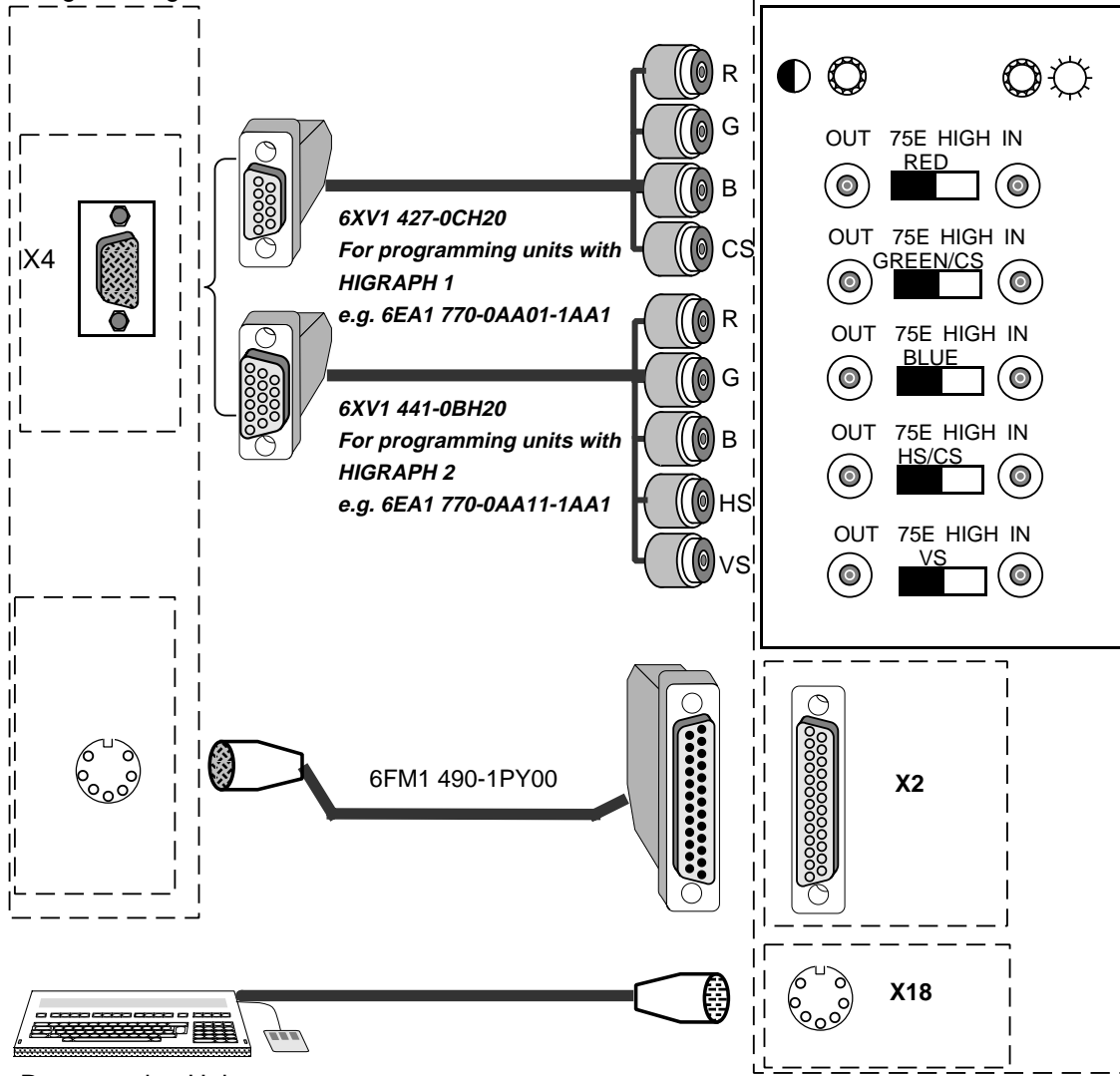




GRACIS

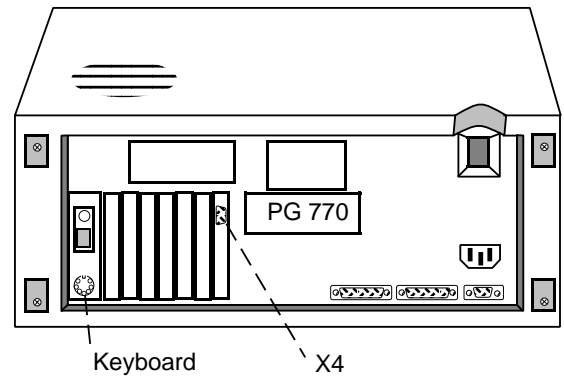
WS 400-30/WS 400-50

Programming Unit



Programming Unit
Keyboard

WS 400-30/WS 400-50

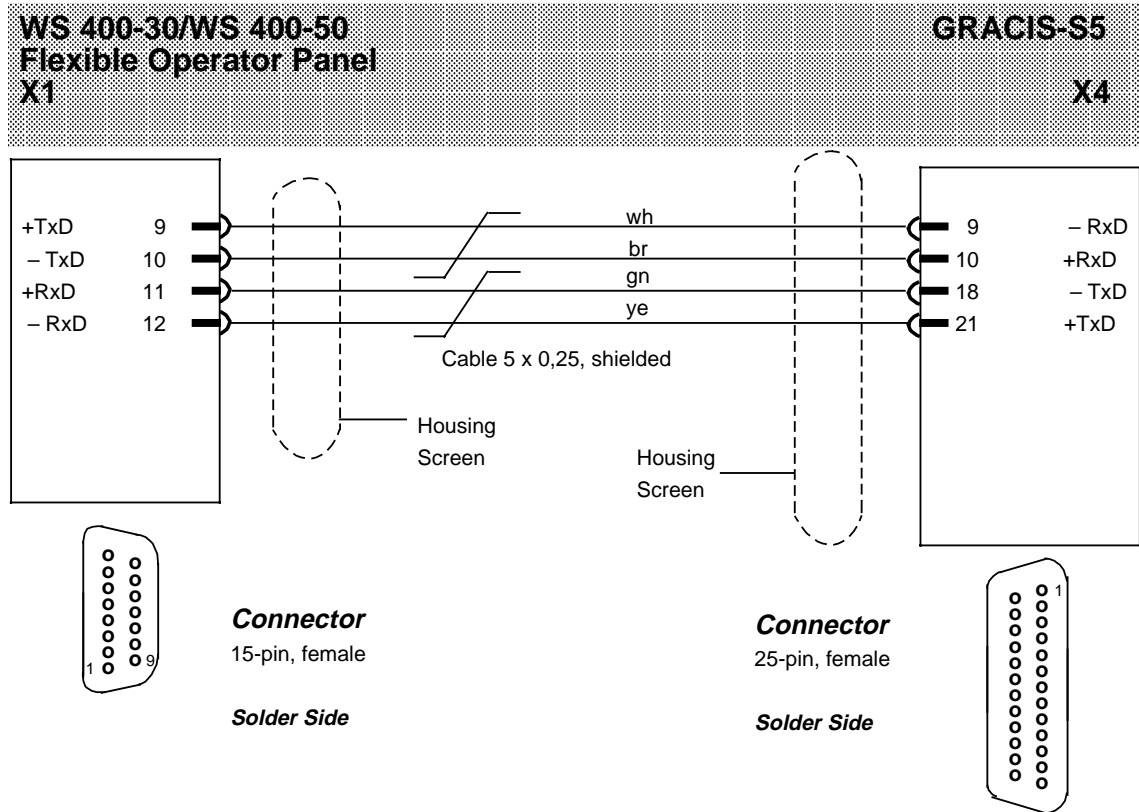


4.5 Cable Plans

4.5.1 Keyboard Cable

Connection to GRACIS

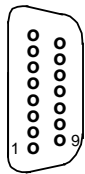
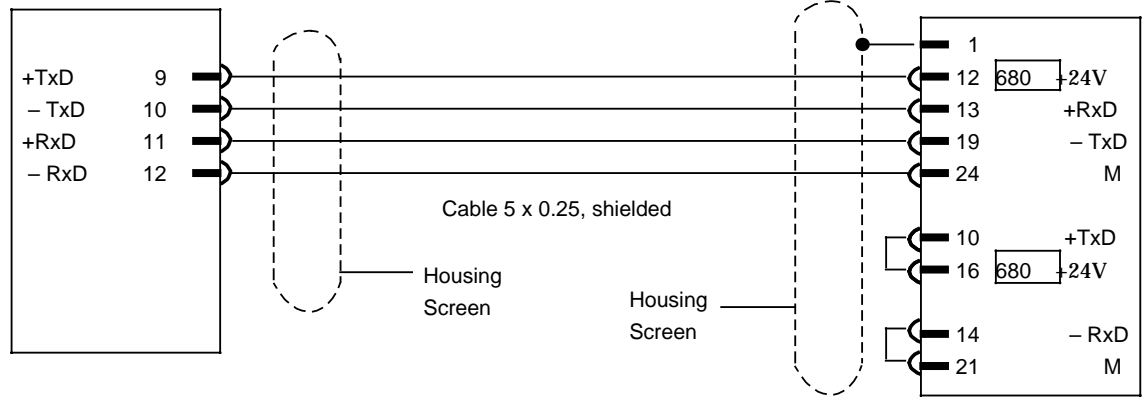
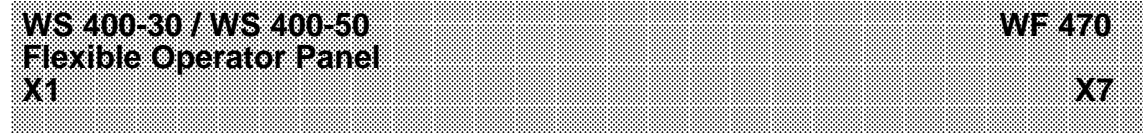
Cable name: Operator panel keyboard cable
Order No.: 6FM1 490-1M 00



Connection to the WF 470 monitor display system

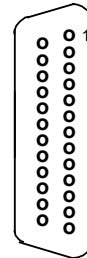
Cable name.: Cable from flexible operator panels to WF 470

Order No.: **6FM1 490-1D 00**

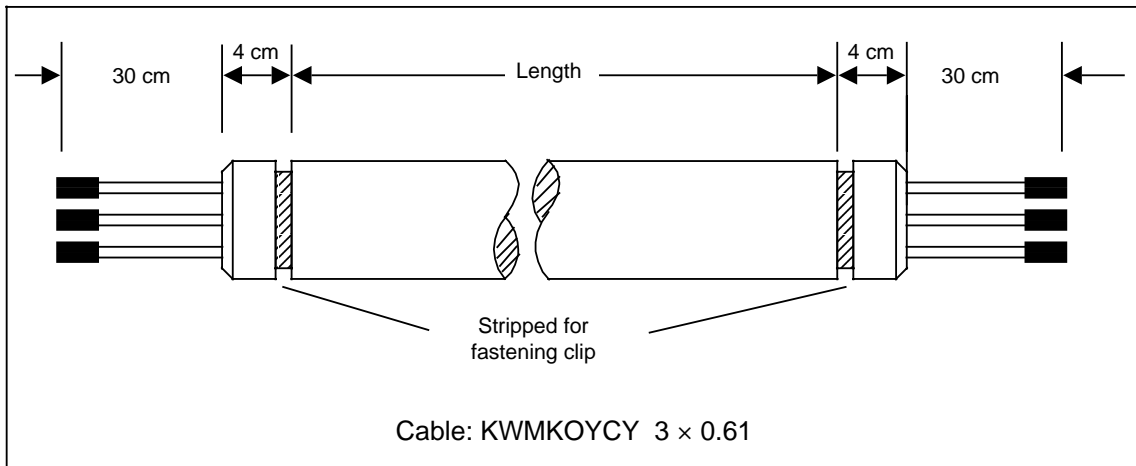


Connector
15-pin, female
Solder Side

Connector
25-pin, female
Solder Side



4.5.2 Connecting Cable for Colour Monitor



Cable Characteristics:

Three individual coaxial cables, PVC sheath, polyurethane sheath, additional complete shield	
Connector	choice of coaxial or BNC
Temperature Range:	-40° C to 90° C
Durability:	oil-, coolant-proof in accordance with VDE guidelines 472/804
Minimum bending radius:	150mm
Impedance:	75
Attenuation:	20 MHz 6.1 dB/100m 100 MHz 10.8 dB/100m

WF 470

Colour Monitor/Switchover Unit

Order No.: 6FM1 490-3B 00

3 coaxial sockets

3 BNC connectors

GRACIS/Switchover Unit

Colour Monitor

Order No.: 6FM1 490-3C 00

3 BNC bayonet connectors

3 BNC connectors

**With cables that are longer than 60 m, always
carry out interference correction.**

5 Technical Data

	WS 400-30	WS 400-50	Expansion
Keyboard	Module-specific stroke keys, customer-specific keys	Module-specific stroke keys	Module-specific stroke keys
Interfaces for			
– Keyboard	8- (9-) bit parallel 24V/DC serial 20mA (TTY)/V.24 Programmer keyboard in PG mode	8- (9-) bit parallel 24V/DC serial 20mA (TTY)/V.24 Programmer keyboard in PG mode	
– Monitor	RGB I/O sockets	RGB I/O sockets	
Operating Temperature	0° to 50° C	0° to 50° C	0° to 50° C
Storage Temperature	-25° to 75° C	-25° to 75° C	-25° to 75° C
Degree of Protection	IP 65 on front	IP 65 on front	IP 65 on front
Power Supply for			
– Monitor	90 to 270V 50/60 Hz, 70–90 W	90 to 270V 50/60 Hz, 70–90 W	
– Keyboard	24V/DC, 100 mA*	24V/DC, 100 mA*	
Dimensions			
HxW in mm	400x483 (19")	400x483 (19")	134x483 (19")
Depth	440 mm	440 mm	75 mm
Weight	16 kg	17 kg	1 kg

* Can be removed from the monitor

The units are connected to the mains by means of a socket for non-heating apparatus on the monitor. A two-metre long mains cable is supplied.

Monitor

CRT – Screen diagonal – System – Dot pitch	14" colour monitor Dual inline, high-resolution 0.31 mm
Image Format	250x175 mm
Input Signals – Video: RGB inputs – Synchronizing inputs Internal synchronization External synchronization	0.7V analog "Sync on green", 0.3V Automatic switchover when an external (TTL) synchronizing signal is connected to "Composite Sync" or H-SYNC/V-SYNC

	Connectable to Operator Panel Monitor			Key-board Encoder	Soft-keys	Key Blocks	Keyboard Outputs			Keypad Expansion Unit
	WF 470	GRACIS-S5	GRACIS-PG				Parallel	Serial	PG	
WS400-30 for WF 470	Yes	No	No	Yes	16		Yes	No	No	WF 470 MA
WS 400-30 for GRACIS	Yes	Yes	Yes	Yes	16		Yes	Yes	Yes*	GRACIS MA
WS 400-30, universal	Yes	Yes	Yes	No**	16		No	No	No	MA
WS 400-50 for WF 470	Yes	No	No	Yes	16	a)+b)	Yes	No	No	ALPHA MA
WS 400-50 for GRACIS version A	Yes	Yes	Yes	Yes	16	d)	Yes	Yes	Yes*	ALPHA MA
WS 400-50 for GRACIS version B	Yes	Yes	Yes	Yes	16	a)+c)	Yes	Yes	Yes*	ALPHA MA

* In GRACIS-PG mode, the programmer keyboard can be connected to the operator panel.

** The 16 softkeys can be directly connected to the PLC's digital inputs.

Key Blocks

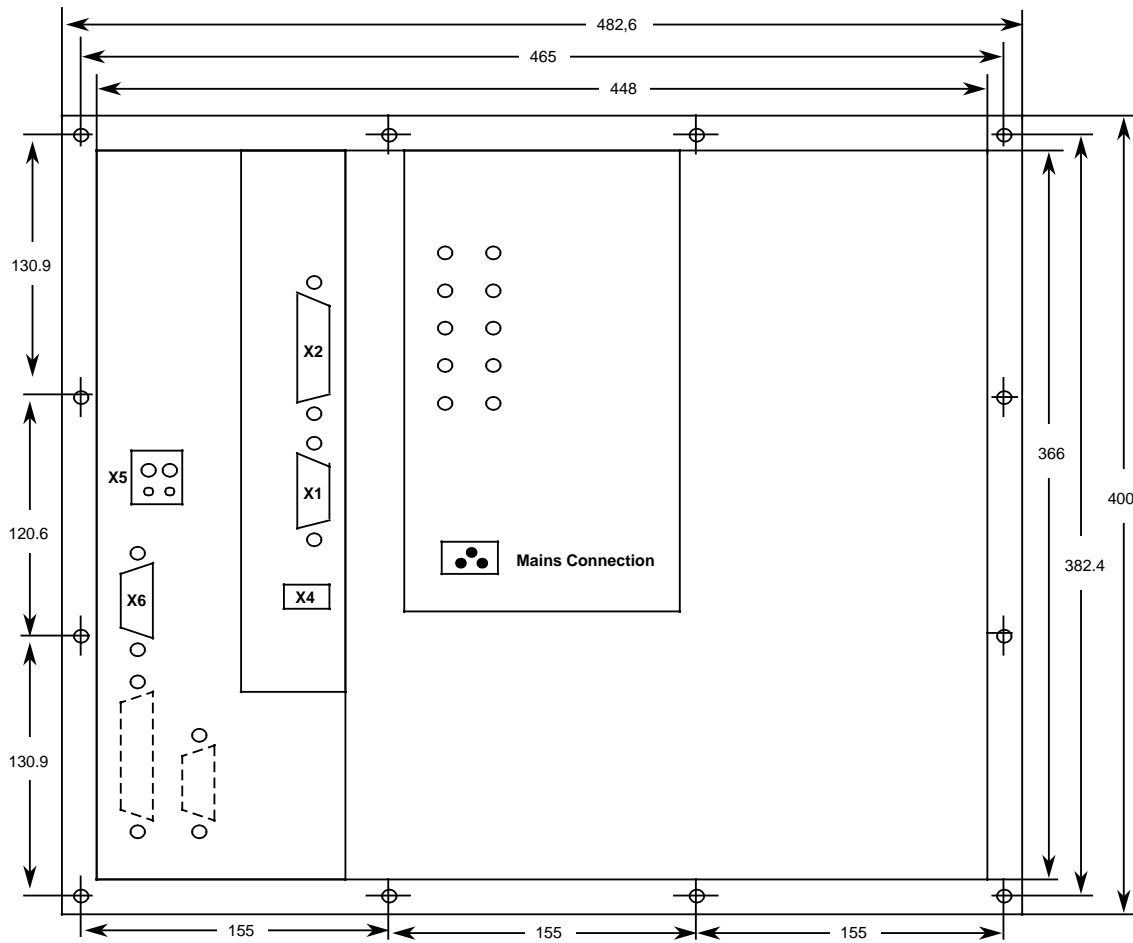
- a) Numeric keypad
- b) Keypad for WF 470
- c) 16-key GRACIS version B keypad
- d) 75-key GRACIS version A keypad

Keypad Expansion Units

- GRACIS** Typewriter keyboard+GRACIS version B
- WF 470** Typewriter keyboard+keypad for WF 470
- ALPHA** Typewriter keyboard layout
- MA** Machine control panel

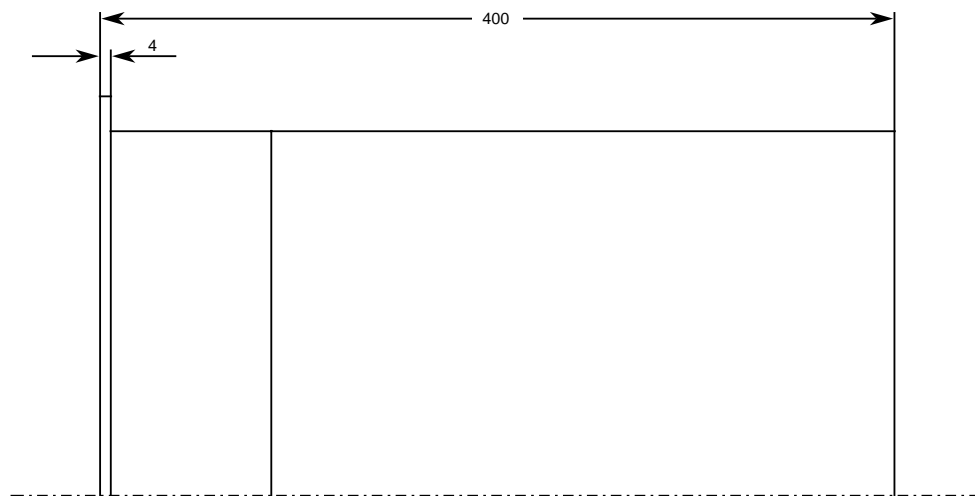
WS 400-50

Rear View



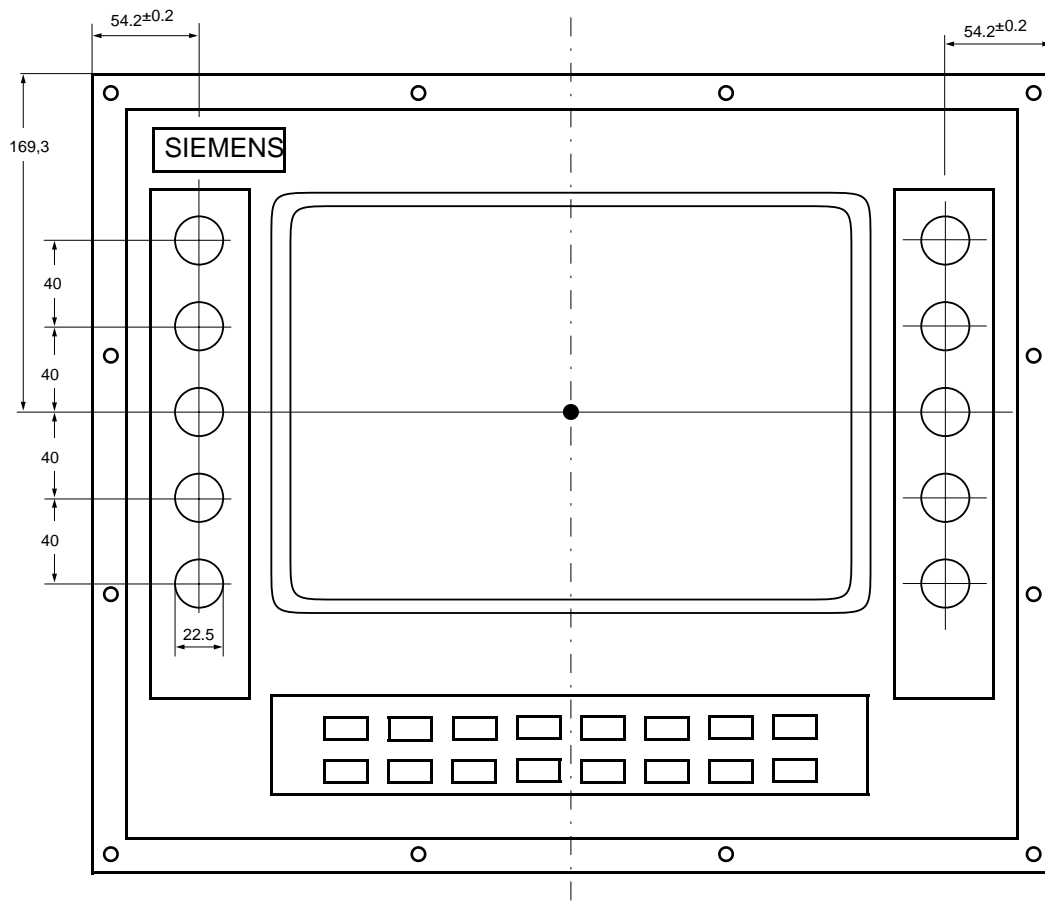
5.5-mm diameter drilled holes

Side View

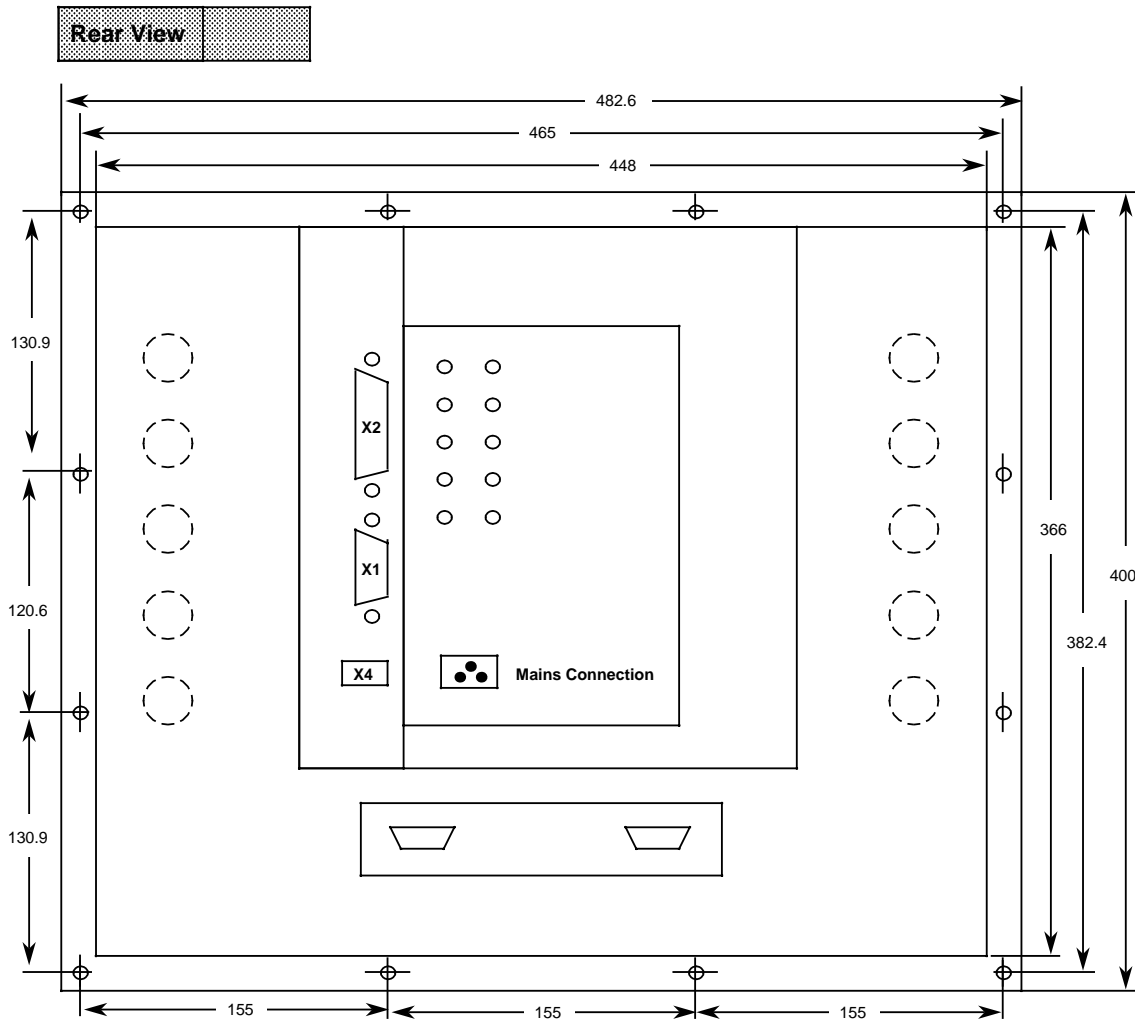


WS 400-30

Front View

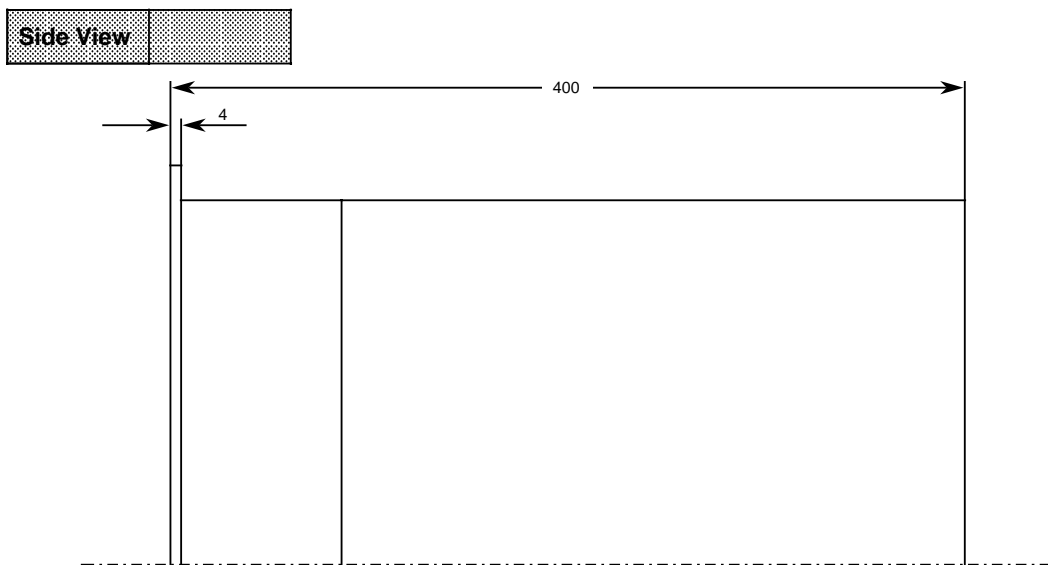


WS 400-30 GRACIS/WF 470 and universal



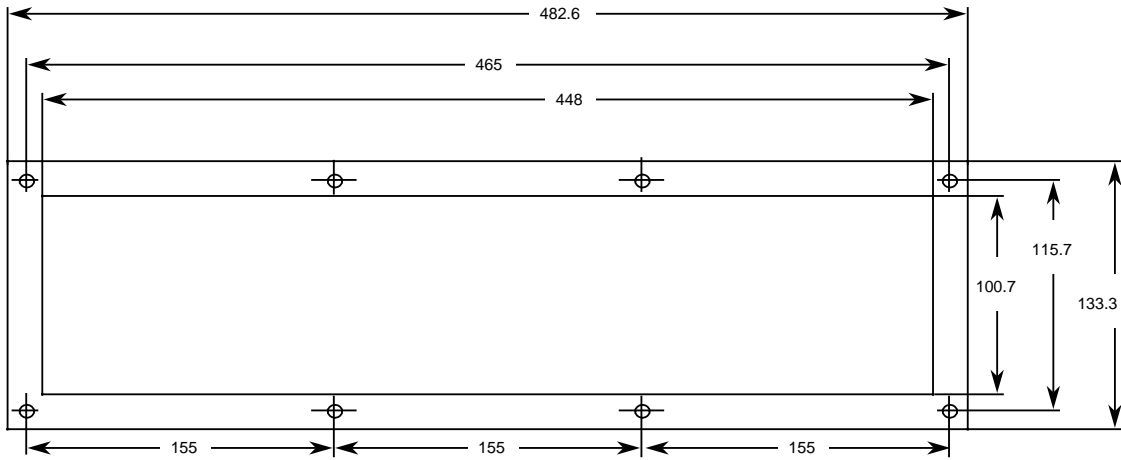
5.5-mm diameter drilled holes

22.5-mm diameter drilled holes
(sealed with caps)



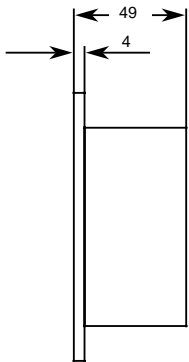
Keypad Expansion Unit for WS 400-30/50 and Machine Control Panel

Rear View



5.5-mm diameter drilled holes

Side View



6 Appendix

6.1 Order Numbers

Operator Panel Version	Order Number
WS 400-30 for WF 470	6FM1 430-1BB10
WS 400-30 Keypad Expansion Unit for WF 470	6FM1 430-2BB10
WS 400-50 for WF 470	6FM1 450-1BB10
WS 400-50 Keypad Expansion Unit (Alphanumeric)	6FM1 450-2BB00
WS 400-30 for GRACIS	6FM1 430-1BF10
WS 400-30 Keypad Expansion Unit for GRACIS	6FM1 430-2BF10
WS 400-50 GRACIS Version A	6FM1 450-1BC20
WS 400-50 GRACIS Version B	6FM1 450-1BF10
WS 400-50 Keypad Expansion Unit (Alphanumeric)	6FM1 450-2BB00
WS 400-30 Universal	6FM1 430-1BE00
Machine Control Panel	6FM1 430-2CA00

Table of Cables

From	To	Max. Length (Metres)	Order Number
WS 400 (Keyboard)	GRACIS-S5	1000	6FM1 490-1M 00
WS 400 (Monitor)	GRACIS-S5/Switchover Unit	60 (150)	6FM1 490-3C 00
WF 470	Switchover Unit		6FM1 490-3B 00
WS 400	WF 470 (Keyboard)		6FM1 490-1D 00
WS 400	Programming Unit (HIGRAPH 1)	2	6XV1 427-0CH20
WS 400	Programming Unit (HIGRAPH 2)	2	6XV1 441-0BH20
WS 400	Programming Unit (Keyboard Connection)	1.5	6FM1 490-1PY00

Length Code for 6FM1 ...-... ..

Length (Metres)	
2.00	A
5.00	B
10.00	C
18.00	D
25.00	E
35.00	F
50.00	G
60.00	H
Special Length	Z

6.2 Bibliography

	Title	Order Number
/1/	WS 400-30/WS 400-50 Operator Panels * Product Brief	6ZB5 440-0BX01-0BA2
/2/	GRACIS Product Brief	6ZB5 440-0BK02-0BA2
/3/	GRACIS Description	6ZB5 440-0BJ02-0BA1
/4/	GRACIS Register Manual *	6ZB5 440-0AJ01-0AA0
/5/	GRACIS Technical Description	6ZB5 440-0BL02-0AA2
/6/	GRACIS Installation, Part 1 *	6ZB5 440-0BM01-0AA1
/7/	GRACIS Installation Instructions, Part 2 SIMATIC S5 Interface	6ZB5 440-0BN02-0AA1
/8/	GRACIS Installation Instructions, Part 3 * SIMATIC S5 Process Operation	6ZB5 440-0BP01-0AA2
/9/	GRACIS Operating Environment, Part 1 *	6ZB5 440-0BQ01-0AA3
/10/	GRACIS Configuring Instructions, Part 2 *	6ZB5 440-0BR01-0AA0
/11/	GRACIS Appendix *	6ZB5 440-0AU01-0AA0
/12/	GRACIS Cross-Linking *	6ZB5 440-0SM01-0AA0

* Available in German only

	Title	Order Number
/13/	WF 470 Display Module Product Brief	6ZB5 440-0FV02-0BA0
/14/	WF 470 Display Module Description	6ZB5 440-0JF02-0BA5
/15/	WF 470 Display Module Configuring Instructions Picture Generation	6ZB5 440-0FH02-0AA0
/16/	List of Documentation *	6ZB5 440-0KE01-0AA8
/17/	AR 10 WS/WF Series Systems and Components (Replaces: Ordering Aids Overview of WS/WF Technology)	E86060-K6310-A101-A2-7600 6ZB5 440-0JL02-0BA0

* Available in German only

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Postfach 48 48, W-8500 Nuernberg 1
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