Machine control panel: MCP 483

24

24.1 Description

The machine control panel MCP 483 permits user-friendly and clear operation of the machine functions. It is suitable for machine-level operation of milling and turning machines, and particularly grinding machines.

Forty-six keys and both control device slots are equipped with user-inscribed slide-in strips for adapting to specific machines. A DIN A4 film for labeling the slide-in strips is included in the delivery kit.

A connecting cable is included in the scope of supply for connecting the direct keys of the SINUMERIK operator panel fronts OP 012 / OP 012T / OP 015A and TP 015A.

The machine control panel is mounted from the rear using special clamps supplied with the panel.

Validity

The description applies to the MCP 483 machine control panel
order number 6FC5203–0AF22–1AA2.

Features

Control elements:

- Operating mode and function keys:
  - 50 keys with LEDs
  - Direction keys for milling machines with rapid traverse override
  - Default key assignment includes 17 freely assignable customer keys
- Spindle control with override spindle (rotary switch with 16 positions)
- Feed control with override feed/rapid traverse (rotary switch with 23 positions)
- Keyswitch (4 positions and 3 different keys)
- 2 emergency stop pushbuttons (1 NO + 1 NC)

Interfaces:

PROFIBUS DP interface

- for 6 control devices (6 inputs/6 outputs) for connection over PROFIBUS DP (additional cable set required for control devices, see section: "Accessories".)
- For 16 direct control keys for OP 012 / OP 012T / OP 015A /TP 015A when connected via PROFIBUS DP (connecting cable: 850 mm, included in scope of supply)
- For 2 handwheels when connected via PROFIBUS DP (max. cable length: 5 m)

Expansion slots:

- 2 slots for control devices (d = 16 mm)

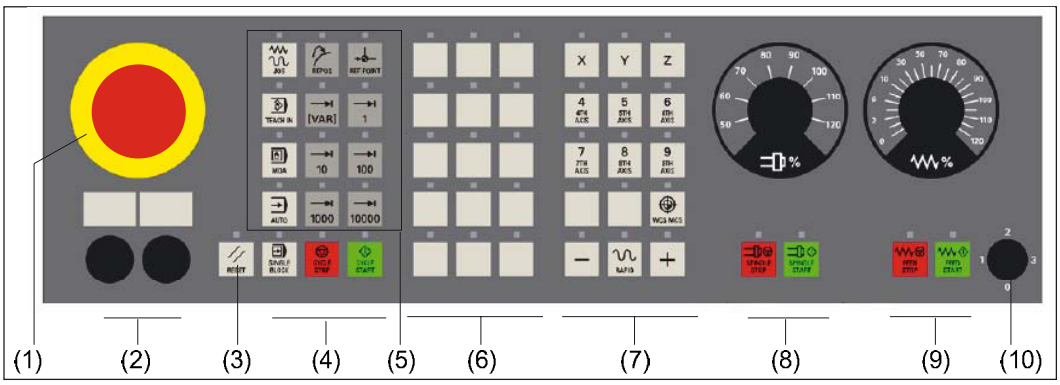
Key type:

- Membrane keys

24.2 Operating and display elements

24.2.1 Front side

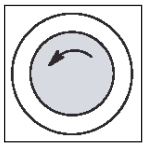
Overview



(1) EMERGENCY STOP key
(2) Installation locations for control devices (d = 16 mm)
(3) Reset button
(4) Program control
(5) Operating modes, machine functions
(6) User keys T1 to T15
(7) Direction keys with rapid traverse override (R1 to R15)
(8) Spindle control with override switch
(9) Feed control with override switch
(10) Keyswitch (four positions)

Figure 24-1 Position of control elements on MCP 483 (milling version)

EMERGENCY STOP key



Emergency stop button
Press the red button in emergencies when

- people are at risk,
- there is the danger of machines or the workpiece being damaged.

As a rule, when operating the EMERGENCY STOP button, all drives are brought to a standstill with max. braking torque.

Turn the EMERGENCY STOP button counterclockwise to unlatch it.

Machine manufacturer
For other reactions to the EMERGENCY STOP:
refer to the machine tool manufacturer's instructions

Circuit for EMERGENCY STOP button

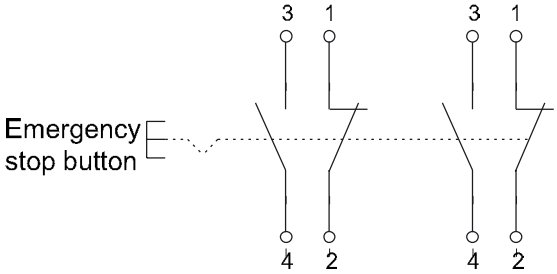


Figure 24-2 EMERGENCY STOP key screw-type terminal diagram

Mounting slots for control devices

⚠WARNING

The openings for mounting control devices **(2)** in Fig.: "Position of control elements of machine control panel MCP 483" must not be chipped out (risk of damage), but drilled to the required width.

24.2.2 Rear side

COM board

The control and display elements on the rear of the MCP 483 are located on the COM board (shown with a gray background in the illustration):

The detailed cutout under or above the interface name shows the position of pin 1 on the connectors.

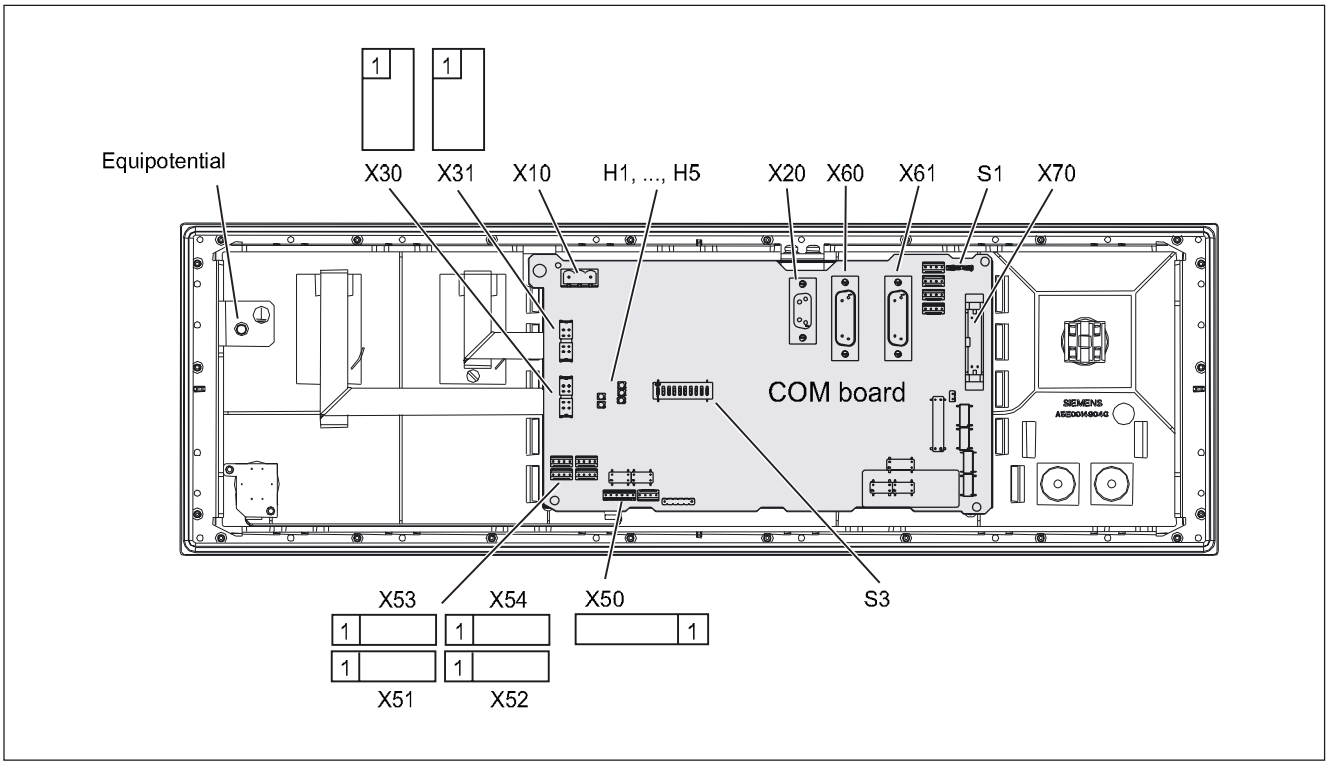


Figure 24-3 Rear of the MCP 483 showing the control and display elements and the interfaces

Jumper S1

Setting the handwheel signal type

– S1 open: TTL

– S1 closed: differential interface

S3 DIP switch

Sets e.g. baud rate, addresses and protocol (see section: "Settings via DIP switch S3")

Diagnostic LEDs 1 ... 5

No.	Monitoring of	Effect: LED ...	Diagnostics
H1	Hardware	lights up red	Initialization error
H2	(reserved)	–	–
H3	Voltage	lights up green	Logic voltages on board OK
H4	(reserved)	-	-
H5	PROFIBUS	flashes green	Ready for communication
		lights up green	Communication in progress
		lights up red	Channel interference or not yet ready (default after Power On)

24.3 Interfaces

MCP 483 communication is handled by the COM board where the interfaces are located (see section: "Control and display elements" --> "Rear side").

Overview

- **X10:** Power supply interface
  3-pin Phoenix terminal block
- **X20:** Operator panel interface (PROFIBUS DP)
  9-pin Sub-D socket connector
- **X30:** Interface for connecting rotary feed override switch (23 graduations)
  2 x 5-pin plug connector with lock
- **X31:** Interface for connecting rotary spindle override switch (16 graduations)
  2 x 5-pin plug connector with lock
- **X50:** Interface to 4-way keyswitch
  1 x 6-pin plug connector
- **X51-X54:** Interface for additional control devices (buttons incl. 24V lamps)
  each 1 x 4-pin plug connector
- **X60/X61:** Connection for 2 handwheels (TTL/DTTL)
  15-pin sub-D socket each
- **X70:** Connection of direct keys (16 digital inputs; opto-decoupled))
  2 x 10-pin plug connector
- **Equipotential bonding**
  The equipotential bonding conductor is attached by means of an M5 screw.

Interfaces for additional control devices

Connector designation:	**X51, ..., X54**
Type:	4-pin plug connector

X51 / X52

Only switches (passive inputs) may be connected to the inputs X51 / X52.

Table 24- 1 Pin assignment for connectors X51/X52

Pin	Name	Meaning	Type
1	KT-IN 1/4 *)	Customer key 1/4	I
2	KT-IN 2/5 *)	Customer key 2/5	
3	KT-IN 3/6 *)	Customer key 3/6	
4	M	Chassis ground	V
*) KT-IN 1/2/3: X51; KT-IN 4/5/6: X52			

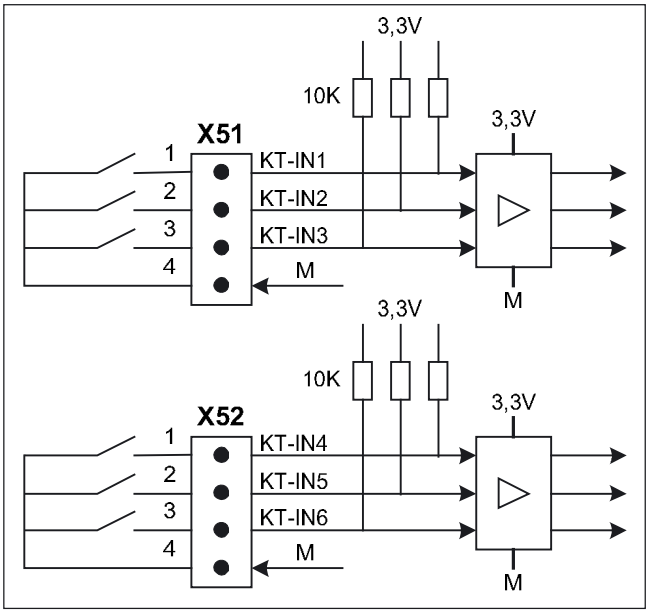


Figure 24-4 Circuit for inputs X51 / X52

Outputs X53 / X54

The outputs X53 / X54 are intended to activate lamps in the buttons.
We would recommend using 1.2 W lamps with max. 0.3 A per output.
High-side switches which limit the current during short circuits are used as output drivers.

CAUTION
Do not connect any relays, valves or other inductive loads.

Table 24- 2 Pin assignment for connectors X53/X54

Pin	Name	Meaning	Type
1	KT-OUT 1/4 *)	Customer key 1/4 lamp	O
2	KT–OUT 2/5 *)	Customer key 2/5 lamp	
3	KT–OUT 3/6 *)	Customer key 3/6 lamp	
4	M24	Ground 24V	V
*) KT–OUT 1/2/3: X53; KT–OUT 4/5/6: X54			

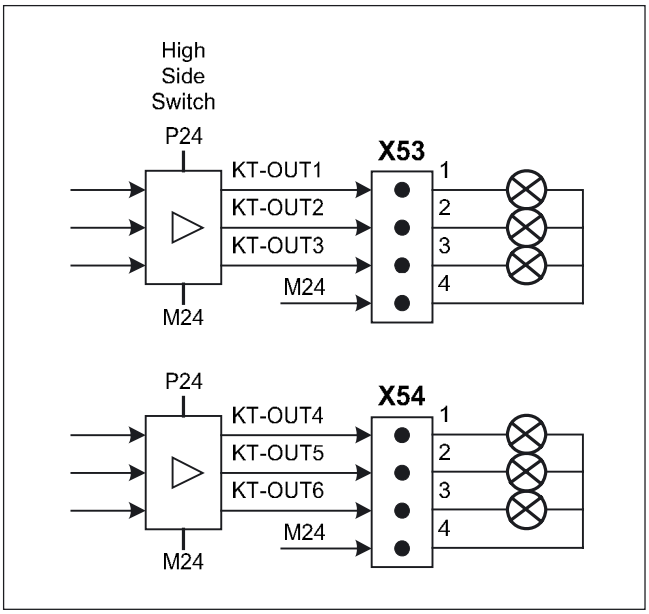


Figure 24-5 Circuit for outputs X53 / X54

Interfaces for override rotary switch

Connector designation:	**X30 / X31**
Type:	2 x 5-pin plug connector, acc. to IEC603-13 with coding

Table 24- 3 Assignment of connector X30

Pin	Name	Type	Meaning	Assignment in terms of process input image
1	N.C.	-	not used	
2	N.C.	-	Unassigned	
3	M	V	Chassis ground	
4	M	V	Ground	
5	P5	V	5 V supply	
6	OV_VS16	I	Rotary override switch, position/value 16	Feed override E
7	OV_VS8		Rotary override switch, position/value 8	Feed override D
8	OV_VS4		Rotary override switch, position/value 4	Feed override C
9	OV_VS2		Rotary override switch, position/value 2	Feed override B
10	OV_VS1		Rotary override switch, position/value 1	Feed override A

Table 24- 4 Assignment of connector X31

Pin	Name	Type	Meaning	Assignment in terms of process input image
1	N.C.	-	Unassigned	
2	N.C.	-	Unassigned	
3	M	V	Ground	
4	M	V	Ground	
5	P5	V	5 V supply	
6	N.C.	-	Unassigned	
7	OV_SP8	I	Rotary override switch, position/value 8	Spindle override D
8	OV_SP4		Rotary override switch, position/value 4	Spindle override C
9	OV_SP2		Rotary override switch, position/value 2	Spindle override B
10	OV_SP1		Rotary override switch, position/value 1	Spindle override A

Note

The +5 V output (X30/X31 pin 3) is only used for electronic rotary switches.

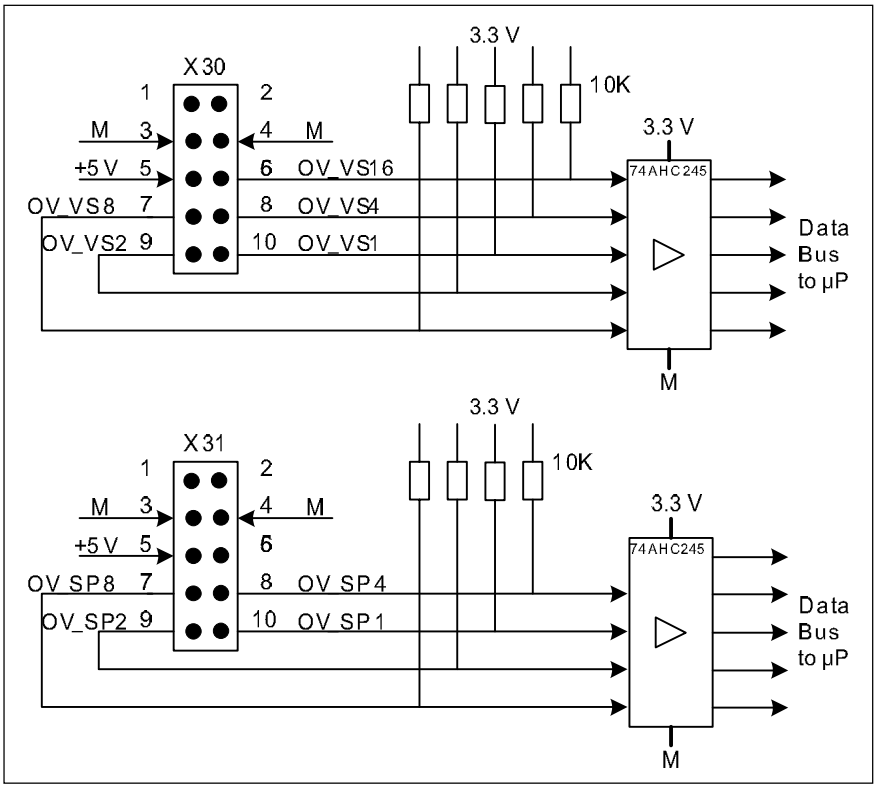


Figure 24-6 Schematic circuit diagram of input circuit for X30 and X31

Interfaces for 2 handwheels

Connector designation: **X60, X61**
Type: 15-pin D-sub female connector

Table 24- 5 Pin assignment for connectors X60/X61 *)

Pin	Name	Meaning	Type
1	PV5	Supply voltage 5V	V
2	M	Chassis ground	
3	HWi_A *)	Handwheel pulses track A	I
4	Hwi_XA	Handwheel pulses track A (negated)	
5	N.C.	Unassigned	-
6	HWi_B	Handwheel pulses track B	I
7	HWi_XB	Handwheel pulses track B (negated)	
8	N.C.	Unassigned	-
9	PV5	Supply voltage 5V	V
10	N.C.	Unassigned	-
11	M	Chassis ground	V
12 - 15	N.C.	Unassigned	-

*) I = 1: X60; i = 2: X61

Interface for direct control keys

Connector designation: **X70**
Type: 2 x 10-pin male connector, 2.54 mm grid

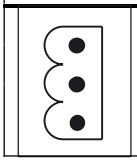
Table 24- 6 Pin assignment for connector X70

Pin	Name	Meaning	Type
i = 1, ..., 16	DT_i	Direct control key i	I
17, 18	P5V_TACO	P5 keyboard controller	V
19, 20	M_TACO	M keyboard controller	

Power supply interface

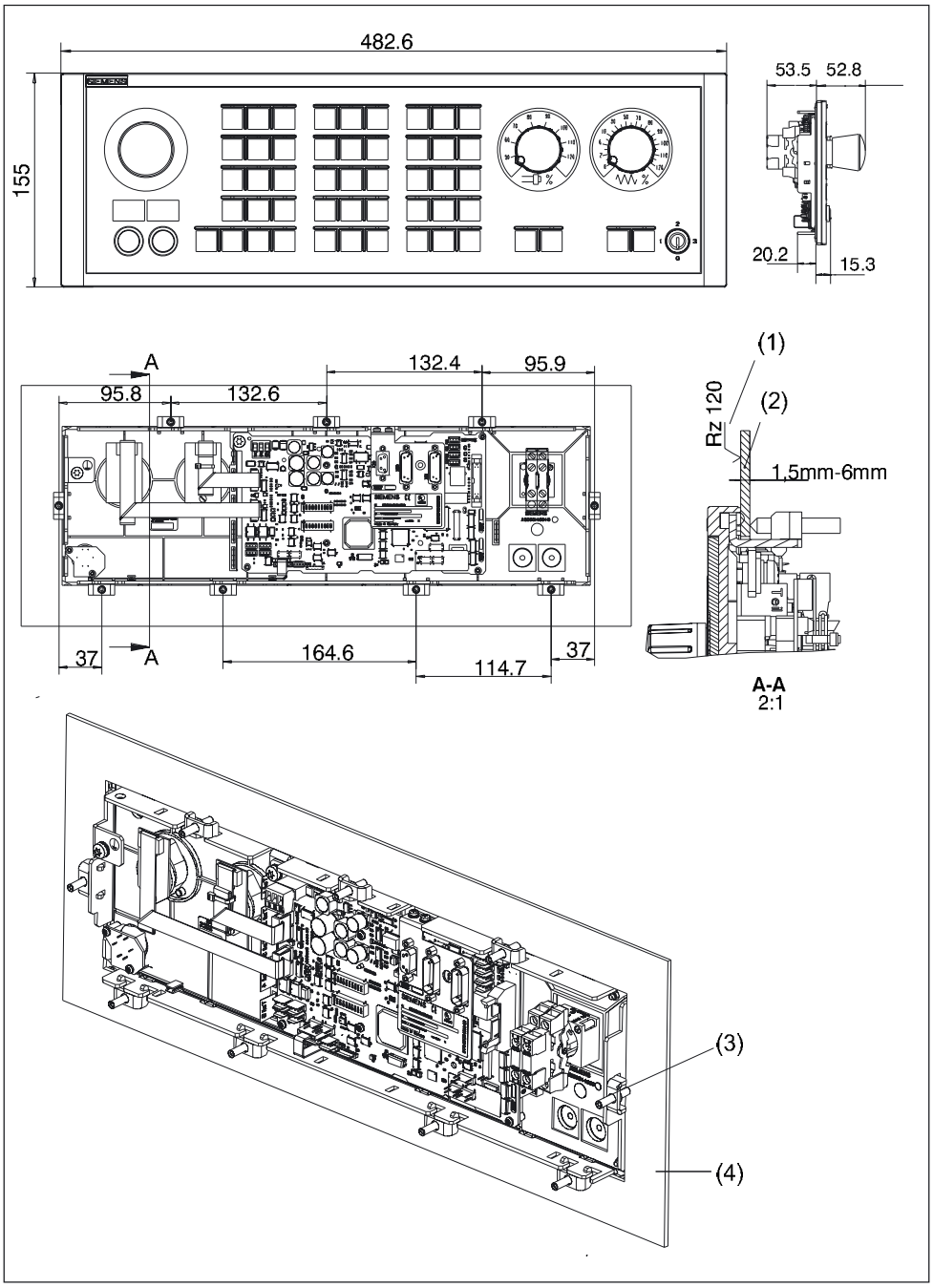
Connector designation: **X10**
Type: 3-pin Phoenix terminal block, straight

Table 24- 7 X10 pin assignments

	Pin	Name	Meaning	Type
	1	P24	24V potential	V power supply
	2	M24	Ground 24V	
	3	SHIELD	Shield connection	

24.4 Mounting

Dimension drawing for machine control panel MCP 483



(1) In the sealing area
(2) Mounting frame
(3) Tension jack (9 parts) tightening torque 0.8 Nm
(4) Mounting frame

Tension jacks

The machine control panel is attached by means of 9 tension jacks (tightening torque 0.8 Nm; see dimension drawing).

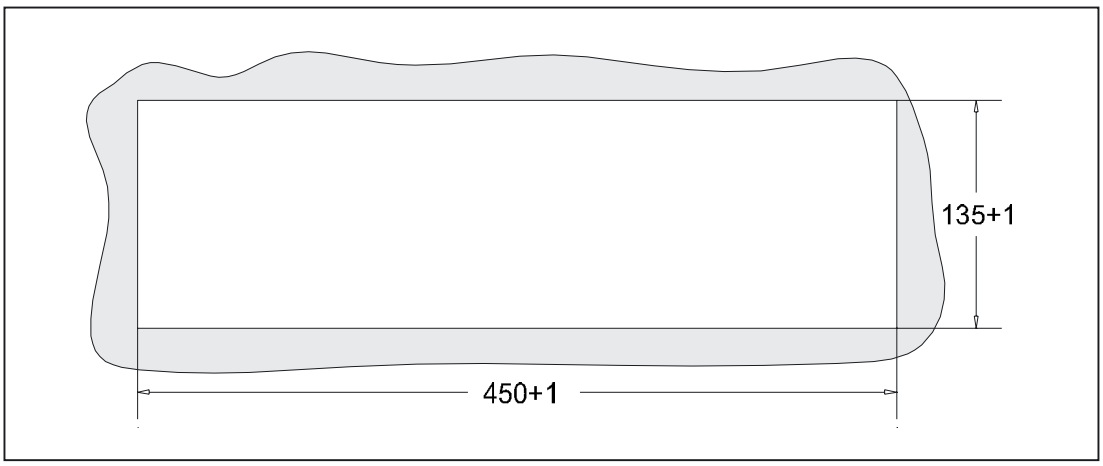


Figure 24-7 Panel cutout for machine control panel MCP 483

Mounting position

Max. 60° to the vertical. For mounting positions greater than 60°, a fan must also be installed to keep the ambient temperature of the machine control panel constantly below 55 °C.

24.5 Settings via DIP switch S3

Delivery condition

Table 24- 8 Delivery condition setting

1	2	3	4	5	6	7	8	9	10	Meaning / value
on	off	**on**	off	**on**	**on**	off	off	off	off	Series

Note

The delivery condition setting MUST be changed in accordance with the "Assignment of the DIP switch S3" table (below).

Connection type: PROFIBUS DP

For PROFIBUS DP, the PROFIBUS address is set using switches 1 to 10:

Table 24- 9 Assignment of DIP switch S3

1	2	3	4	5	6	7	8	9	10	Meaning / value
										PROFIBUS
off	off	off	off	off	off	off	–	**on**	**on**	0
on	off	off	off	off	off	off	–	**on**	**on**	1
off	**on**	off	off	off	off	off	–	**on**	**on**	2
on	**on**	off	off	off	off	off	–	**on**	**on**	3
:	:	:	:	:	:	:	–	–	–	: (etc.)
on	off	**on**	**on**	**on**	**on**	**on**	–	**on**	**on**	125
off	**on**	**on**	**on**	**on**	**on**	**on**	–	**on**	**on**	126

24.6 Connection via PROFIBUS DP

24.6.1 Overview

This section describes:

- Requirements for adding a DP slave MCP to the hardware configuration for a SIMATIC S7 project.
- Configuring a DP slave MCP with STEP7 "HW config."
- Details of how to link the DP slave MCP to the basic PLC program and user program (optional)

Note

The instructions given in this chapter are essentially limited to the special requirements for configuring the DP slave MCP. For more details about working with SIMATIC STEP 7 please refer to the relevant SIMATIC documentation or online help.

Note

Both units can be linked up using the supplied 20-pin ribbon cable in order to transfer the direct control key signals of the operator panel front to the COM board of the machine control panel. The direct control key module therefore no longer needs to be connected.

24.6.2 Prerequisites

The following components are needed as prerequisites for adding a DP slave MCP to the hardware configuration:

- SIMATIC STEP 7
- GSD file of DP slave MCP
- Graphics files of DP slave MCP

SIMATIC STEP 7

SIMATIC STEP 7 is required in the following version or later:

- SIMATIC STEP 7 version 5.2 or later, Service Pack 1

GSD file

The GSD file of the DP slave MCP is required in the following version or later:

- SI008109.GSD version 1.0 or later

A GSD file contains all the properties of a DP slave in ASCII format. For each DP slave SIMATIC STEP 7 requires a module-specific GSD file so that the DP slave can be found in the hardware catalog.

The DP slave MCP is shown in SIMATIC STEP 7 in the hardware catalog of “HW Config” under the following path:

- Profile: **Standard**
  PROFIBUS–DP > Other field devices > NC/RC > Motion Control > SINUMERIK MCP

If the module is not displayed, the GSD file must be installed. To do this, in "HW config" use menu command **Tools > Install new GSD file**. Before installing the GSD file, please read the following instructions concerning the graphics files.

Graphics files

The graphics files belonging to the GSD file:

- SI8109_N.BMP
- SI8109_S.BMP

are used to display the DP slave MCP in the "HW config" station window. They are automatically installed by STEP 7 when the GSD file is installed. They must be located in the same directory as the GSD file.

24.6.3 Functions of the machine control panel

The machine control panel offers the following functions:

- Standard
- Handwheel
- Additional I/Os

Standard

The function transfers input/output data from the function keys and user-specific keys and outputs:

- Input data: 8 bytes
- Output data: 8 bytes

The input/output data is compatible with the input/output data from the previous machine control panel:

The input/output data for machine control panel MCP 483 is compatible with the input/output data from the previous machine control panel:

- Machine control panel (MCP), MPI
- 19'' machine control panel

Handwheel

The function transfers the absolute values for the two handwheels that can be connected to the machine control panel:

Absolute value	1. Handwheel	Absolute value	2. Handwheel
Low byte			High byte

For each handwheel the current handwheel value is transferred as a 16-bit absolute value relative to the starting value. The starting value for the sensor counter in the handwheel is 0.

The absolute values are transferred in big endian format.

The data for both handwheels is always transferred. The absolute value for a handwheel that is not connected is always 0.

Additional I/Os

The function transfers the data for all non-standard inputs/outputs:

- Direct control keys
- Customer keys: 6 signals (bit 0 to bit 6)
- Rotary switch

with the following distribution:

- Input data: 5 bytes

Direct control keys	(OP 012)	User keys	1. Rotary switch	2. Rotary switch
Low byte				High byte

- Output data: 2 bytes

Reserved always 0	Customer LEDs
Low byte	High byte

24.6.4 Configuring the DP slave MCP

This section describes how to configure a DP slave MCP with reference to the hardware configuration for a SIMATIC S7 project shown in the figure by way of example.

The hardware configuration has the following modules:

- SIMATIC station 300 with SINUMERIK 810D/840D and PLC 317-2DP
- SINUMERIK MCP with module: standard, handwheel, extended

Procedure

Configuring the DP slave MCP as an S7 project involves the following steps:

1. Add the DP slave MCP to the configuration **(1)**
2. Set the PROFIBUS address
3. Add the appropriate module to the DP slave MCP according to the functions required. **(2)**
4. Set the I/O addresses for the individual slots.

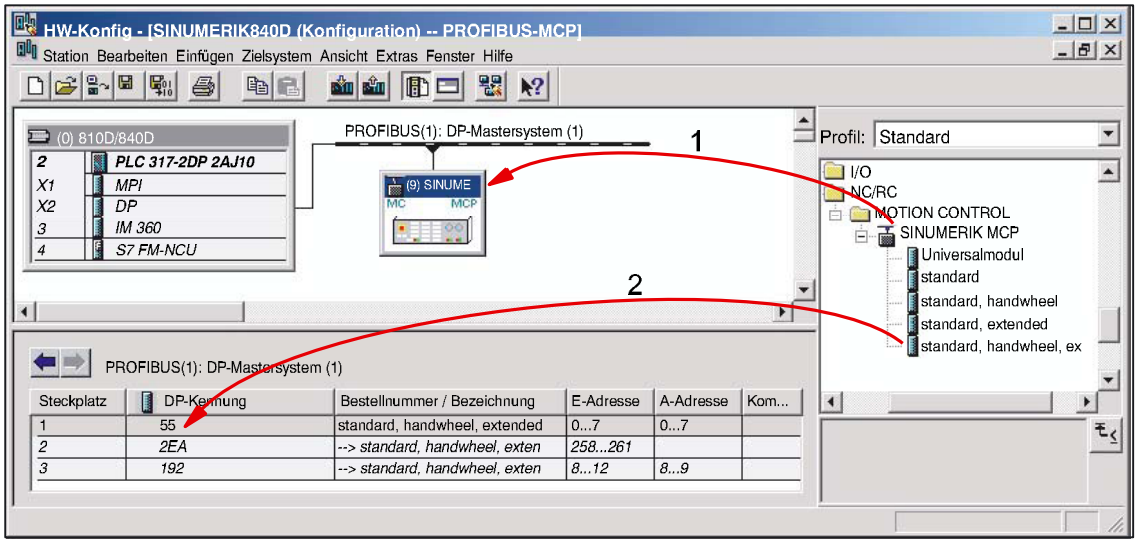


Figure 24-8 Configuration with DP slave MCP

Requirements: S7 project

The following status is required for the S7 project to which the DP slave MCP is to be added:

- You have created the S7 project
- You have set up a SIMATIC 300 station with PROFIBUS master-capable SINUMERIK controller