

SIEMENS

SINUMERIK

SINUMERIK ONE ONE MCP Part 2: MCP 1900.2

Equipment Manual




Fundamental safety instructions	1
Overview	2
Dimension drawings	3
Operator control and display elements	4
Technical data	5

Valid for:
Control system
SINUMERIK ONE
SINUMERIK 840D sl/840DE sl

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

 WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens Aktiengesellschaft. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Table of contents

- 1 Fundamental safety instructions 5**
 - 1.1 General safety instructions 5
 - 1.2 Equipment damage due to electric fields or electrostatic discharge 9
 - 1.3 Warranty and liability for application examples 9
 - 1.4 Cybersecurity information 9
 - 1.5 Residual risks of power drive systems 11
- 2 Overview 13**
- 3 Dimension drawings 15**
- 4 Operator control and display elements 17**
 - 4.1 Front side 17
 - 4.2 Rear side 18
 - 4.3 Configuration 18
- 5 Technical data 21**
- Index 25**

Fundamental safety instructions

1.1 General safety instructions



⚠ WARNING

Electric shock and danger to life due to other energy sources

Touching live components can result in death or severe injury.

- Only work on electrical devices when you are qualified for this job.
- Always observe the country-specific safety rules.

Generally, the following steps apply when establishing safety:

1. Prepare for disconnection. Notify all those who will be affected by the procedure.
2. Isolate the drive system from the power supply and take measures to prevent it being switched back on again.
3. Wait until the discharge time specified on the warning labels has elapsed.
4. Check that there is no voltage between any of the power connections, and between any of the power connections and the protective conductor connection.
5. Check whether the existing auxiliary supply circuits are de-energized.
6. Ensure that the motors cannot move.
7. Identify all other dangerous energy sources, e.g. compressed air, hydraulic systems, or water. Switch the energy sources to a safe state.
8. Check that the correct drive system is completely locked.

After you have completed the work, restore the operational readiness in the inverse sequence.



⚠ WARNING

Electric shock due to connection to an unsuitable power supply

When equipment is connected to an unsuitable power supply, exposed components may carry a hazardous voltage. Contact with hazardous voltage can result in severe injury or death.

- Only use power supplies that provide SELV (Safety Extra Low Voltage) or PELV- (Protective Extra Low Voltage) output voltages for all connections and terminals of the electronics modules.



⚠ WARNING
Electric shock due to equipment damage
Improper handling may cause damage to equipment. For damaged devices, hazardous voltages can be present at the enclosure or at exposed components; if touched, this can result in death or severe injury.
<ul style="list-style-type: none">• Ensure compliance with the limit values specified in the technical data during transport, storage and operation.• Do not use any damaged devices.



⚠ WARNING
Electric shock due to unconnected cable shields
Hazardous touch voltages can occur through capacitive cross-coupling due to unconnected cable shields.
<ul style="list-style-type: none">• As a minimum, connect cable shields and the cores of cables that are not used at one end at the grounded housing potential.



⚠ WARNING
Electric shock if there is no ground connection
For missing or incorrectly implemented protective conductor connection for devices with protection class I, high voltages can be present at open, exposed parts, which when touched, can result in death or severe injury.
<ul style="list-style-type: none">• Ground the device in compliance with the applicable regulations.

NOTICE
Damage to equipment due to unsuitable tightening tools.
Unsuitable tightening tools or fastening methods can damage the screws of the equipment.
<ul style="list-style-type: none">• Only use screw inserts that exactly match the screw head.• Tighten the screws with the torque specified in the technical documentation.• Use a torque wrench or a mechanical precision nut runner with a dynamic torque sensor and speed limitation system.• Adjust the tools used regularly.

 **WARNING****Spread of fire from built-in devices**

Built-in devices can cause a fire and a pressure wave in the event of a fault. Fire and smoke can escape from the control cabinet and cause serious personal injury and property damage.

- Install built-in appliances in a robust metal control cabinet that is suitable for protecting people from fire and smoke.
- Only operate built-in devices with the control cabinet doors closed.
- Ensure that smoke can only escape via controlled and monitored paths.

 **CAUTION****Symptomatic respiratory and skin reaction to chemicals**

A newly purchased product might contain traces of substances that are identified as sensitizers. Sensitizers are substances which can cause sensitization in the lungs and skin after exposure to them.


Once sensitized, individuals can have severe reactions to further exposure, even in small amounts. In the most extreme cases, individuals might develop asthma or dermatitis respectively.

- If the product has a strong smell, keep it in a well-ventilated area for 14 days.

 **WARNING****Unexpected machine movement caused by radio devices or mobile phones**

Using radio devices, cellphones, or mobile WLAN devices in the immediate vicinity of the components can result in equipment malfunction. Malfunctions may impair the functional safety of machines and can therefore put people in danger or lead to property damage.

- Therefore, if you move closer than 20 cm to the components, be sure to switch off radio devices, cellphones or WLAN devices.
- Use the "SIEMENS Industry Online Support App" or a QR code scanner only on equipment that has already been switched off.

 **WARNING****Fire due to inadequate ventilation clearances**

Inadequate ventilation clearances can cause overheating of components with subsequent fire and smoke. This can cause severe injury or even death. This can also result in increased downtime and reduced service lives for devices/systems.

- Ensure compliance with the specified minimum clearance as ventilation clearance for the respective component.

NOTICE

Overheating due to inadmissible mounting position

The device may overheat and therefore be damaged if mounted in an inadmissible position.

- Only operate the device in admissible mounting positions.



WARNING

Unexpected movement of machines caused by inactive safety functions

Inactive or non-adapted safety functions can trigger unexpected machine movements that may result in serious injury or death.

- Observe the information in the appropriate product documentation before commissioning.
- Carry out a safety inspection for functions relevant to safety on the entire system, including all safety-related components.
- Ensure that the safety functions used in your drives and automation tasks are adjusted and activated through appropriate parameterizing.
- Perform a function test.
- Only put your plant into live operation once you have guaranteed that the functions relevant to safety are running correctly.

Note

Important Safety instructions for Safety Integrated

If you want to use Safety Integrated functions, you must observe the Safety instructions in the Safety Integrated documentation.

1.2 Equipment damage due to electric fields or electrostatic discharge

Electrostatic sensitive devices (ESD) are individual components, integrated circuits, modules or devices that may be damaged by either electric fields or electrostatic discharge.



NOTICE

Equipment damage due to electric fields or electrostatic discharge

Electric fields or electrostatic discharge can cause malfunctions through damaged individual components, integrated circuits, modules or devices.

- Only pack, store, transport and send electronic components, modules or devices in their original packaging or in other suitable materials, e.g. conductive foam rubber or aluminum foil.
- Only touch components, modules and devices when you are grounded by one of the following methods:
 - Wearing an ESD wrist strap
 - Wearing ESD shoes or ESD grounding straps in ESD areas with conductive flooring
- Only place electronic components, modules or devices on conductive surfaces (table with ESD surface, conductive ESD foam, ESD packaging, ESD transport container).

1.3 Warranty and liability for application examples

Application examples are not binding and do not claim to be complete regarding configuration, equipment or any eventuality which may arise. Application examples do not represent specific customer solutions, but are only intended to provide support for typical tasks.

As the user you yourself are responsible for ensuring that the products described are operated correctly. Application examples do not relieve you of your responsibility for safe handling when using, installing, operating and maintaining the equipment.

1.4 Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

1.4 Cybersecurity information

For additional information on industrial cybersecurity measures that may be implemented, please visit <https://www.siemens.com/cybersecurity-industry>.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed under <https://new.siemens.com/cert>.

Further information is provided on the Internet:

Industrial Security Configuration Manual (<https://support.industry.siemens.com/cs/ww/en/view/108862708>)



WARNING

Unsafe operating states resulting from software manipulation

Software manipulations, e.g. viruses, Trojans, or worms, can cause unsafe operating states in your system that may lead to death, serious injury, and property damage.

- Keep the software up to date.
- Incorporate the automation and drive components into a state-of-the-art, integrated industrial cybersecurity concept for the installation or machine.
- Make sure that you include all installed products in the integrated industrial cybersecurity concept.
- Protect files stored on exchangeable storage media from malicious software by with suitable protection measures, e.g. virus scanners.
- Carefully check all cybersecurity-related settings once commissioning has been completed.

1.5 Residual risks of power drive systems

When assessing the machine or system-related risk in accordance with the respective local regulations (e.g. EC Machinery Directive), the machine manufacturer or system integrator must take into account the following residual risks emanating from the control and drive components of a drive system:

1. Unintentional movements of driven machine or system components during commissioning, operation, maintenance, and repairs caused by, for example,
 - Hardware faults and/or software errors in the sensors, control system, actuators, and connections
 - Response times of the control system and of the drive
 - Operation and/or environmental conditions outside the specification
 - Condensation/conductive contamination
 - Parameterization, programming, cabling, and installation errors
 - Use of wireless devices/mobile phones in the immediate vicinity of electronic components
 - External influences/damage
 - X-ray, ionizing radiation and cosmic radiation
2. Unusually high temperatures inside and outside the components, including open flames, as well as emissions of light, noise, particles, gases, etc. due to fault conditions, e.g.:
 - Component failure
 - Software errors
 - Operation and/or environmental conditions outside the specification
 - External influences/damage
 - Short circuits or ground faults in the intermediate DC circuit of the converter
3. Hazardous shock voltages caused by, for example:
 - Component failure
 - Influence during electrostatic charging
 - Induction of voltages in moving motors
 - Operation and/or environmental conditions outside the specification
 - Condensation/conductive contamination
 - External influences/damage
4. Electrical, magnetic and electromagnetic fields generated in operation that can pose a risk to people with a pacemaker, implants or metal replacement joints, etc., if they are too close
5. Release of environmental pollutants or emissions as a result of improper operation of the system and/or failure to dispose of components safely and correctly

1.5 Residual risks of power drive systems

6. Influence of network-connected and wireless communications systems, e.g. ripple-control transmitters or data communication via the network or mobile radio, WLAN or Bluetooth.
7. Motors for use in potentially explosive areas:
When moving components such as bearings become worn, this can cause enclosure components to exhibit unexpectedly high temperatures during operation, creating a hazard in areas with a potentially explosive atmosphere.

For more information about the residual risks of the drive system components, see the relevant sections in the technical user documentation.

Overview

This manual describes the specific properties of the SINUMERIK ONE MCP 1900.2 machine control panel. The documentation is always structured in 2 parts. Part 1 contains general information that applies to all machine control panels. Part 2 covers specifics of individual machine control panels. Both parts of the documentation must always be observed.

More information

You can find more information about SINUMERIK ONE MCPs in:

- SINUMERIK ONE MCP - Part 1: MCP xxxx

Validity

The following description applies to the following component:

Designation	Article number
SINUMERIK ONE MCP 1900.2	6FC5303-0AP02-0BA0

View

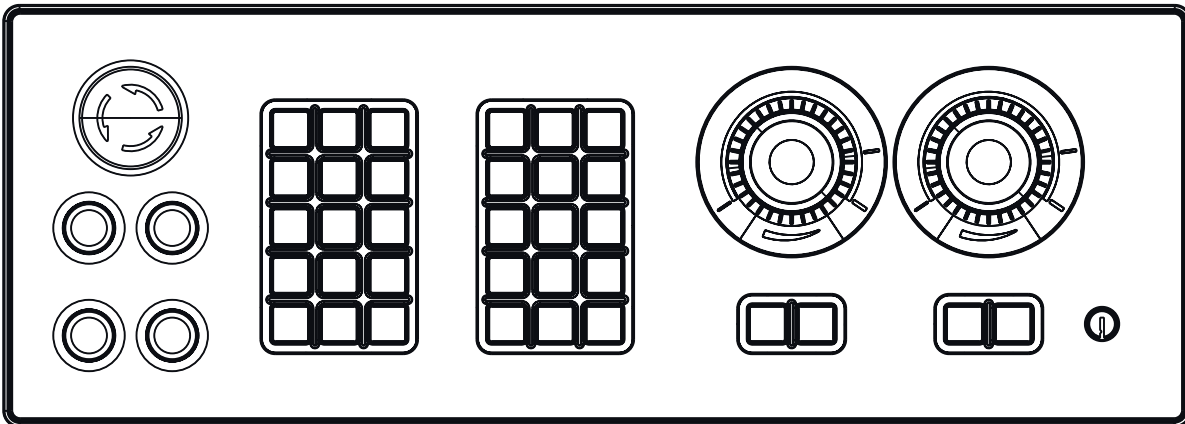
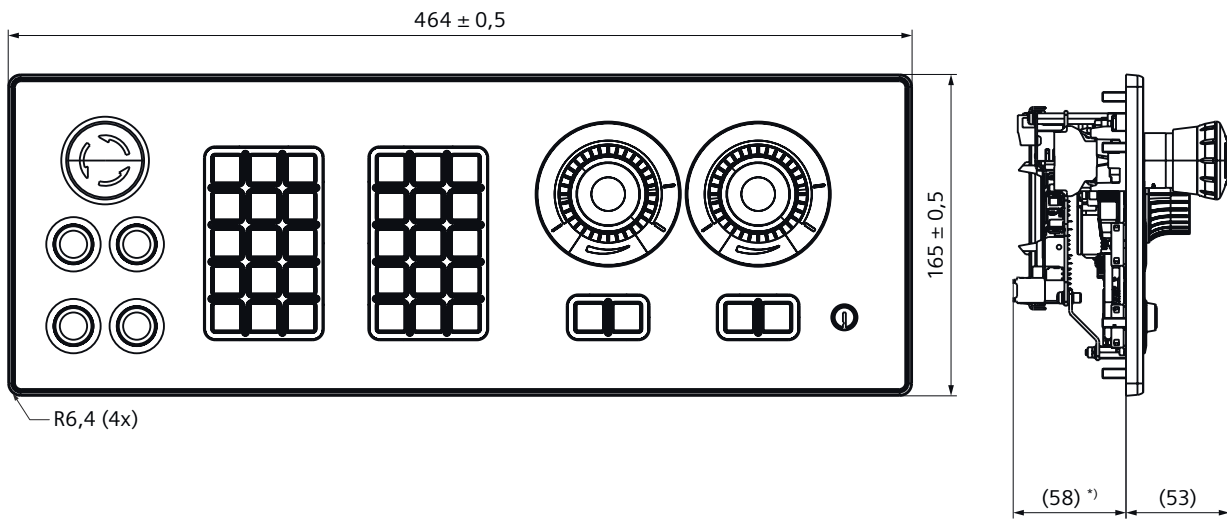


Figure 2-1 MCP 1900.2

Dimension drawings



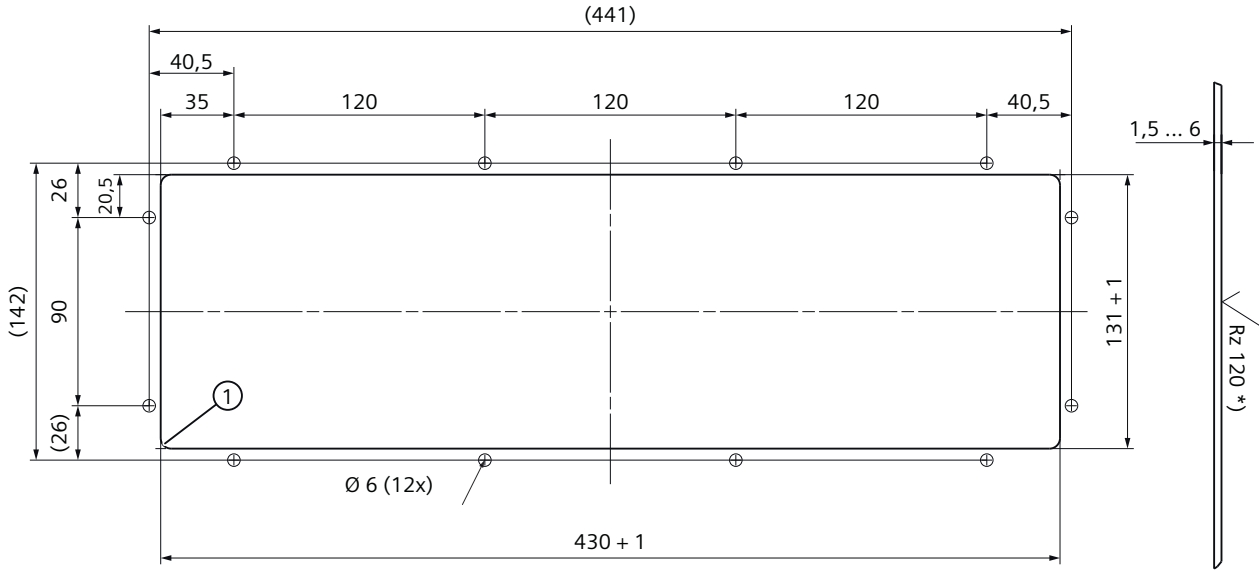
*) Plus wiring portion

Figure 3-1 Front, rear, and side view of MCP 1900.2 (all specifications in mm)

The installation clearance for the MCPs is 70 mm including the wiring portion.

Panel cutout

The MCP 1900.2 is secured using 12 M5 nuts. The tightening torque is 1.5 Nm. In addition to the M5 nuts, use the spring elements provided. Customers are responsible for the geometry of the panel cutout, as well as mounting the MCP in the housing. To mechanically protect the outer edge of the front panel, the device must be installed so that it is recessed by at least 0.5 mm with respect to the surrounding housing.



① All corner radii ≤ R5 or chamfer ≤ 5x45°

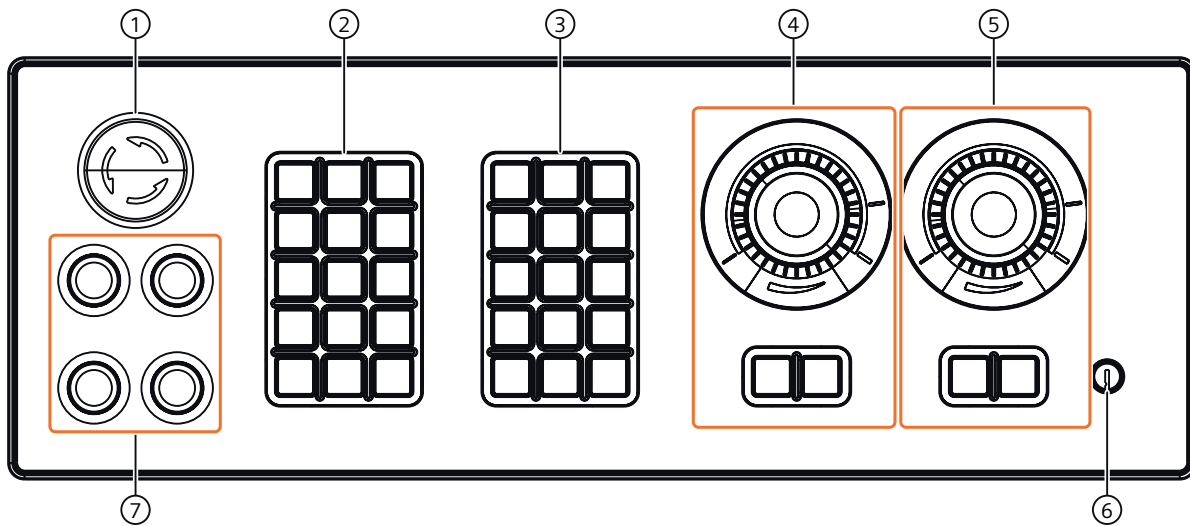
*) In the seal area

Figure 3-2 Panel cutout

Operator control and display elements

4.1 Front side

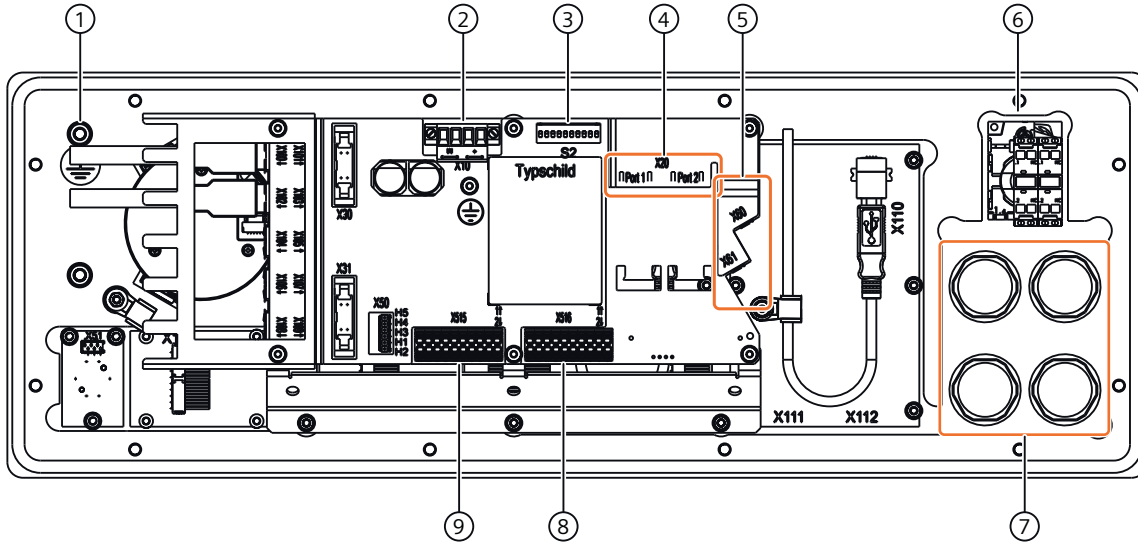
Overview



- ① Emergency stop
- ② Keypad 1 (operating mode block)
- ③ Keypad 2 (axis block)
- ④ Powerride 1 (spindle) + keypad 2.2
- ⑤ Powerride 2 (feed) + keypad 2.1
- ⑥ Key-operated authorization switch
- ⑦ 4x mounting space for 22.5 mm element

Figure 4-1 Position of operator controls on the MCP 1900.2

4.2 Rear side



- ① PE/ground connection
- ② Power supply interface X10
- ③ Switch S2
- ④ Ethernet interfaces X20 port 1/ port 2
- ⑤ Handwheel connections X60/ X61
- ⑥ Emergency stop
- ⑦ 4x mounting space for 22.5 mm element
- ⑧ Interface of the customer-specific inputs/outputs X516
- ⑨ Interface of the customer-specific inputs/outputs X515

Figure 4-2 Rear view of the MCP 1900.2

Handwheel connecting cable

The handwheel connecting cable is not included in the scope of delivery. The article numbers are in Chapter "Spare parts/accessories" in the Equipment Manual "ONE MCP Part 1: MCP xxxx".

4.3 Configuration

Input image

Slot 1	Base
Slot 2	Keypad 1 (operating mode block)
Slot 3	Keypad 2 (axis block)
Slot 4	Powerride 1 (feed)
Slot 5	Powerride 2 (rapid)

Slot 6	Handwheel 1
Slot 7	Handwheel 2

Output image

Slot 1	Base
Slot 2	Keypad 1 (operating mode block)
Slot 3	Keypad 2 (axis block)
Slot 4	Powerride 1 (feed)
Slot 5	Powerride 2 (spindle)

4.3 Configuration

Technical data

		MCP 1900.2	
Safety			
Safety class according to EN 50178	III; PELV		
Degree of protection according to EN 60529 ¹⁾	Front: IP54	Rear: IP00 ²⁾	
Approvals	CE / EAC / UL / UKCA		
Flame resistance	UL 94 V-1 ³⁾		
UL identifier	MCPS2206-464165E-342051AA0		
Electrical data			
Overvoltage category	Secondary circuit supplied from primary circuits up to Cat. III (OVC III), 300 V AC ⁴⁾		
Power supply ⁵⁾	24 V DC (20.4 V ... 28.8 V)		
Power consumption, max., at 28.8 V	+ 10 USB ports	10x 2.6 W	
	+ 2 handwheels	2x 1 W	
	+24 V load on X515/X516	16x 0.15 A	
	Total	115 W	
Current consumption, max., at 20.4 V	4.7 A		
Mechanical data			
Dimensions W x H x D (mm)	464 x 165 x 70		
Weight (kg)	2.2		
Perm. vertical mounting positions	0° - 90°		
Tightening torques, max.	M3: 0.5 Nm standard		
	M4: 1 Nm		
	M5: 1.5 Nm standard		
	Grounding: 3 Nm, hold bottom nut in place		
Mechan. stability	According to UL 61010 ³⁾		
Climatic environmental conditions			
Classification of the climatic environment	3K3 according to EN 60721-3-3		
Heat dissipation	By natural convection		
Condensation and ice formation	Not permitted		
Supply air	Without corrosive gases, dusts and oils		
Use and operation			
Max. installation altitude	Up to 1000 m without derating From 1000 m to 4000 m with linear ambient temperature derating, -0.5 K per 100 m		
Temperature limit values (storage)	-40 ... 70 °C (cyclic)		
Temperature limit values (operation)	0 ... 45 °C (front)		
	0 ... 55 °C (rear)		
Temperature change	Max. 30 K/h		

MCP 1900.2	
Relative humidity	5 ... 90% (without condensation)
Permissible change in the relative humidity	Max. 6%/h
Pollution degree	2 (only use indoors)
Mechanical environmental conditions	
Classification of the mechanical environment	Class 3M2 according to EN 60721-3-3
Vibration load during operation	Frequency range: 10 – 200 Hz Deflection at 9 – 18 Hz: 1.5 mm Acceleration at 18 – 200 Hz: 2 g
Shock load during operation with shock-sensitive components	Acceleration: 5 g Shock duration: 30 ms
	Acceleration: 15 g Shock duration: 11 ms
	Load: 3 x in each direction
EMC conducted / radiation	Class C2 according to EN 61800-3

- 1) The system installer ensures the system is sealed properly according to IP65, IP classification has not been checked by UL, UL TYPE 1.
- 2) Open-type equipment according to UL 61010.
- 3) The customer must ensure that the product, with the rear cover to be attached by the customer, meets the requirements for flame resistance of the material according to UL 94 V-1 and the mechanical stability / fire protection requirements / touch protection according to UL 61010.
- 4) If power supply units with primary-side supplies up to 600 V AC (line-to-neutral voltage) have to be deployed, the transient voltages on the primary side of the power supply unit must be limited to 4000 V.
- 5) Connect the device only to a 24 V DC power supply that is compliant with protective extra-low voltage (PELV) requirements according to UL 61010.

Note

The 24 V DC current source must be adapted to the input data of the device (see "Electrical data").

Note

In a residential environment, this product can cause high-frequency interference, which may make interference suppression measures necessary.

- Have the installation and commissioning with appropriate radio interference suppression measures performed by qualified personnel.

Note

Damage to components by coolants and lubricants

The SINUMERIK operator components have been designed for industrial use, particularly on machine tools and production machines. This also takes into account the use of commercially available coolants and lubricants. The use of aggressive compounds and additives can damage components and result in their failure.

Avoid contact between the operator components with coolants and lubricants, as resistance to all coolants and lubricants cannot be guaranteed.

Emergency stop button

Rated voltage	24 V DC
Current rating, max.	3 A
Current rating, min.	1 mA
Switching capacity	DC 13 according to EN 60947-5-1
Conditional rated short-circuit current	10 A gL/gG according to EN 60947-5-1
B _{10d}	500000

Note

The quantitative assessment of the emergency stop safety function must be based on the B_{10d} values corresponding to the used standards (e.g. ISO 13849-1) under consideration of the respective application (frequency of the actuation, service life, diagnostics by the evaluation unit, etc.). The B_{10d} values only apply when the technical properties of the emergency stop button are taken into account.

Index

M

MCP 1900.2

Emergency stop button, 23

T

Technical data, 21

Current consumption, 21

Power consumption, 21

