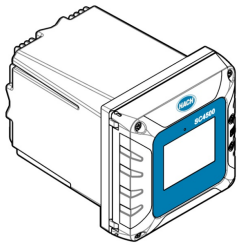
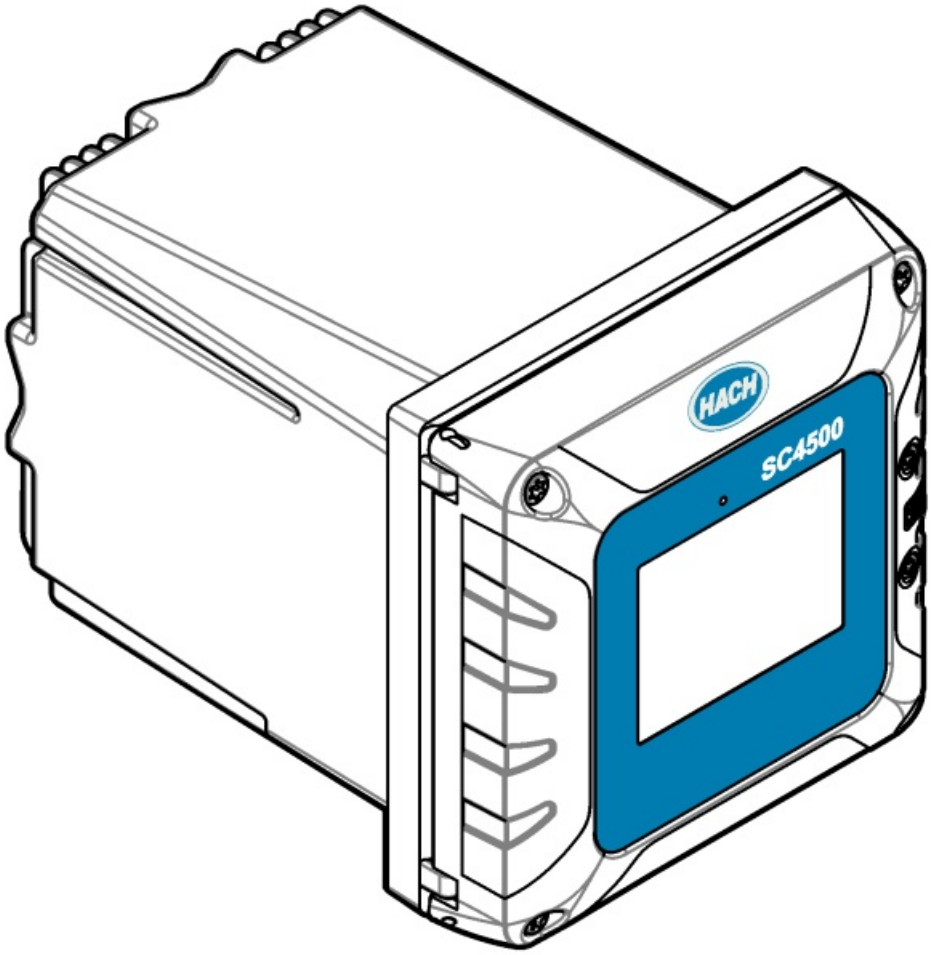


HACH SC4500 Controller Prognosys Ethernet User Manual

HACH SC4500 Controller Prognosys Ethernet



Contents

IN COMPLETE

Section 1 Specifications

Specifications are subject to change without notice.

Specification	Details
Dimensions (W x H x D)	½ DIN-144 x 144 x 192 mm (5.7 x 5.7 x 7.6 in.)
Enclosure	UL50E type 4X, IEC/EN 60529–IP 66, NEMA 250 type 4X Metal enclosure with a corrosion-resistant finish
Weight	1.7 kg (3.7 lb) (Controller weight without optional expansion modules)
Pollution degree	Environment: 4; instrument: 2
Overvoltage category	II
Protection class	I, connected to protective earth
Environmental conditions	Indoor and outdoor use
Power requirements	**AC controller:** 100–240 VAC ±10%, 50/60 Hz; 1 A (50 VA with 8W sensor load, 100VA with 28W sensor load) **DC controller:** 18–28 VDC; 2.5 A (12W with 9W sensor load, 36W with 20 W sensor load)
Operating temperature	• 20 to 60 °C (–4 to 140 °F) (8 W (AC)/9 W (DC) sensor load) • 20 to 45 °C (–4 to 113 °F) (28 W (AC)/20 W (DC) sensor load) Linear derating between 45 and 60 °C (–1.33 W/°C)
Storage temperature	–20 to 70 °C (–4 to 158 °F)
Relative humidity	0 to 95%, non-condensing
Altitude	3000 m (9842 ft) maximum
Display	3.5-inch TFT color display with capacitive touchpad
Measurement	Two device, digital SC connectors

Relays (high voltage)	Two relays (SPDT); Wire gauge: 0.75 to 1.5 mm2 (18 to 16 AWG) **AC controller** Maximum switching voltage: 100–240 VAC Maximum switching current: 5 A Resistive/1 A Pilot Duty Maximum switching power: 1200 VA Resistive/360 VA Pilot Duty **DC controller** Maximum switching voltage: 30 VAC or 42 VDC Maximum switching current: 4 A Resistive/1 A Pilot Duty Maximum switching power: 125 W Resistive/28 W Pilot D uty
Analog inputs (optional)3	One 0-20 mA (or 4-20 mA) analog input on each analog input module One analo g sensor input on each sensor module Maximum of two analog inputs
Analog outputs (optional)3	Five 0–20 mA (or 4-20 mA) analog outputs on each analog output module1
Digital communication (opti onal)3	Profibus DPV1 module, Modbus TCP, PROFINET module, EtherNet/IP™2 modul e
Software module (optional)	Contact sales or technical support for information. Note: Only one software module can be installed on a controller at the same time .
Network connection3	LAN version (optional): Two Ethernet connectors (10/100 Mbps), M12 female D-coding connector; Cellular version and WiFi version (optional)4
USB port	Used for data download and software upload. The controller records approximate ly 20,000 data points for each connected sensor.
Compliance information	CE. ETL certified to UL and CSA safety standards (with all sensor types), FCC, I SED, KC, RCM, EAC, UKCA, SABS, CMIM, Morocco
Warranty	1 year (EU: 2 years)

Section 2 Online user manual

This Basic User Manual contains less information than the User Manual, which is available on the manufacturer's website.

Section 3 General information

In no event will the manufacturer be liable for damages resulting from any improper use of product or failure to comply with the instructions in the manual. The manufacturer reserves the right to make changes in this manual and the products it describes at any time, without notice or obligation. Revised editions are found on the manufacturer's website.

Safety information

The manufacturer is not responsible for any damages due to misapplication or misuse of this product including, without limitation, direct, incidental and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is solely responsible to identify critical application risks and install appropriate mechanisms to protect processes during a possible equipment malfunction.

Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.

Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than that specified in this manual.

Use of hazard information

⚠ DANGER

Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

1. Refer to the module documentation for additional information.
   Note: Install only one module in one of the available slots.
2. EtherNet/IP is a trademark of OVDA Inc.
3. Dependent on controller configuration.
4. An external USB box WiFi is necessary for network connection on WiFi versions. An external USB box cellular is necessary for network connection on cellular versions.

⚠ CAUTION

Indicates a potentially hazardous situation that may result in minor or moderate injury.

NOTICE

Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

Precautionary labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol on the instrument is referenced in the manual with a precautionary statement.

	This is the safety alert symbol. Obey all safety messages that follow this symbol to avoid potential injury. If on the instrument, refer to the instruction manual for operation or safety information.
	This symbol indicates that a risk of electrical shock and/or electrocution exists.
	This symbol indicates the presence of devices sensitive to Electro-static Discharge (ESD) and indicates that care must be taken to prevent damage with the equipment.
	Electrical equipment marked with this symbol may not be disposed of in European domestic or public disposal systems. Return old or end-of-life equipment to the manufacturer for disposal at no charge to the user.

Compliance and certification

⚠CAUTION

This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

Canadian Radio Interference-Causing Equipment Regulation, ICES-003, Class A:

Supporting test records reside with the manufacturer.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

FCC Part 15, Class “A” Limits

Supporting test records reside with the manufacturer. The device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions

1. The equipment may not cause harmful interference.
2. The equipment must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their expense. The following techniques can be used to reduce interference problems:

1. Disconnect the equipment from its power source to verify that it is or is not the source of the interference.
2. If the equipment is connected to the same outlet as the device experiencing interference, connect vthe equipment to a different outlet.
3. Move the equipment away from the device receiving the interference.
4. Reposition the receiving antenna for the device receiving the interference.
5. Try combinations of the above.

Intended use

The SC4500 controller is intended for use by water treatment professionals who measure multiple water quality parameters in industrial water, municipal water or waste water plants. The SC4500 controller does not treat or alter water.

Product overview

DANGER


Chemical or biological hazards. If this instrument is used to monitor a treatment process and/or chemical feed system for which there are regulatory limits and monitoring requirements related to public health, public safety, food or beverage manufacture or processing, it is the responsibility of the user of this instrument to know and abide by any applicable regulation and to have sufficient and appropriate mechanisms in place for compliance with applicable regulations in the event of malfunction of the instrument.

NOTICE

Network and access point security is the responsibility of the customer that uses the wireless instrument. The manufacturer will not be liable for any damages, inclusive however not limited to indirect, special, consequential or incidental damages, that have been caused by a gap in, or breach of network security.

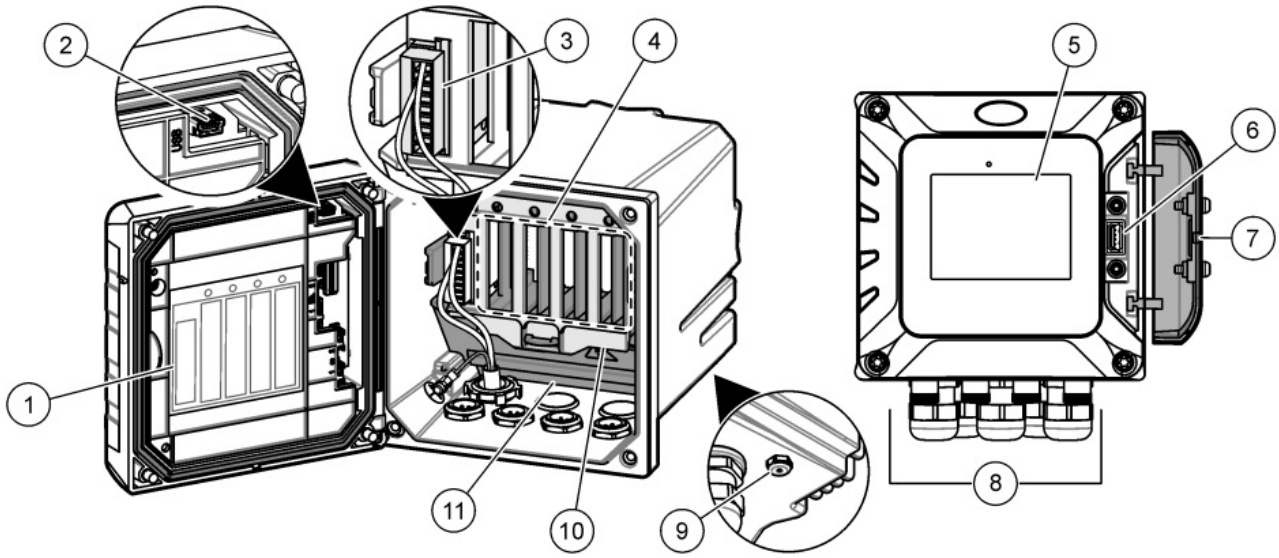
NOTICE

Perchlorate Material—Special handling may apply. Refer to **www.dtsc.ca.gov/hazardouswaste/perchlorate**. This
perchlorate warning applies only to primary batteries (provided singly or installed on this equipment) when sold or distributed in California, USA.

NOTICE

The controller is supplied with a protection foil installed on the display. Make sure to remove the protection foil before the controller is used.

The SC4500 Controller is a 2-channel controller for digital analytical devices (e.g., sensors and analyzers) and analog sensors that are connected to a digital gateway or expansion module. Refer to **Figure 1**.



1. Label for module installation and wiring information
2. USB connection for external USB box (WiFi or cellular connection)
3. Expansion module (Slot 0)5
4. Additional expansion module slots (Slots 1, 2, 3 and 4)
5. Touchpad display
6. USB connection for data download and firmware update
7. USB cove
8. Electrical connections and fittings
9. Protective vent
10. Cover for module installation
11. High-voltage barrier

The controller shows sensor measurements and other data on the display, can transmit analog and digital signals, and can interact with and control other devices through outputs and relays. Outputs, relays, sensors and expansion modules are configured and calibrated through the user interface on the front of the controller or remotely for network connected controllers. The controller connects to Claros with a cellular network5 WiFi network5 or through LAN connection. The Prognosys diagnostic system5 shows the status of maintenance tasks and gives the status of the instrument condition.

The instrument display is a touchscreen. The instrument enclosure has a protective vent in the bottom. Do not cover or remove the protective vent. Replace the protective vent if damage is seen.

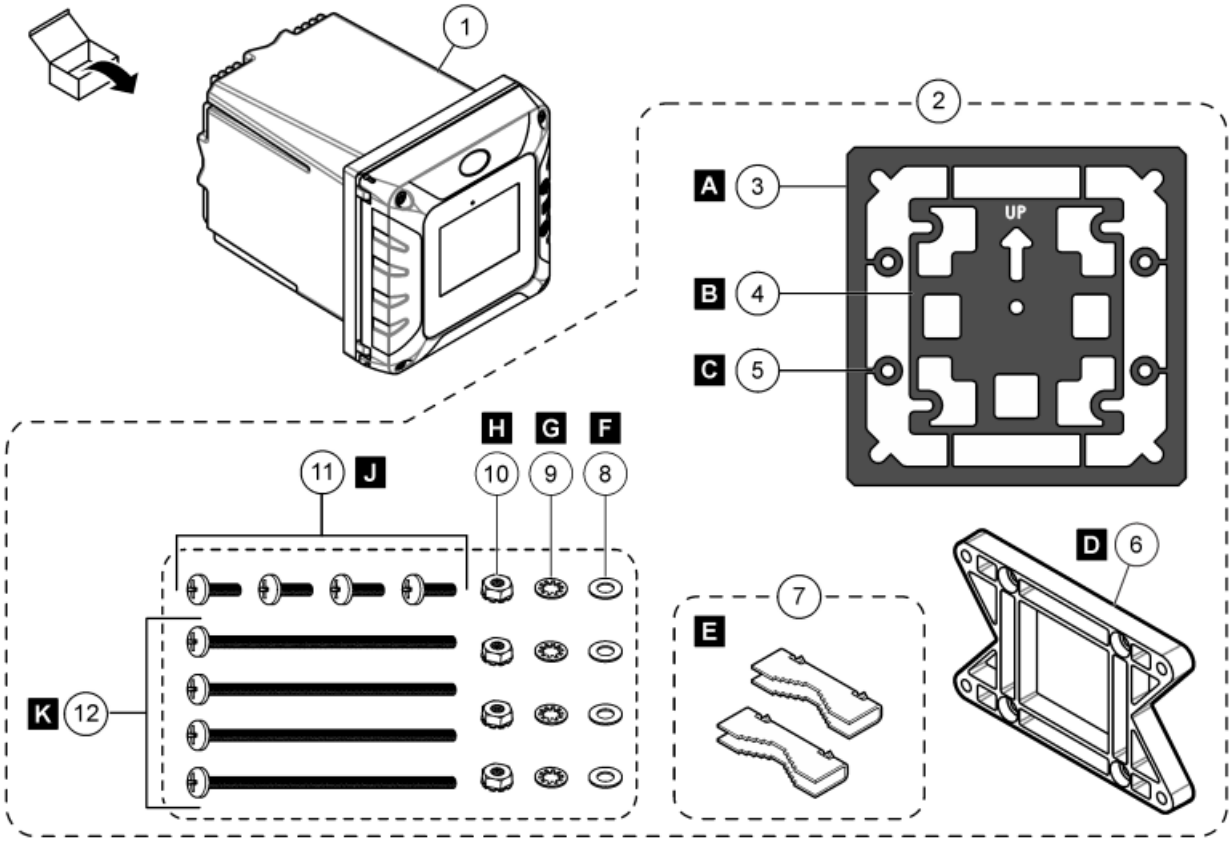
The controller is available with optional expansion modules. Refer to the expanded user manual on the manufacturer’s website for additional information.

Product components

Make sure that all components have been received. Refer to **Figure 2**. If any items are missing or damaged, contact the manufacturer or a sales representative immediately.

1. SC4500 controller
2. Mounting hardware
3. Sealing gasket for panel mount, Neoprene

4. Vibration isolation gasket for pipe mount
5. Vibration isolation washer for pipe mount (4x)
6. Bracket for wall and pipe mounting 6
7. Mounting foot (mounting bracket inserts) (2x)
8. Flat washer, ¼-inch ID (4x)
9. Lock washer, ¼-inch ID (4x)
10. Keps hexnut, M5 x 0.8 (4x)
11. Pan head screws, M5 x 0.8 x 15 mm (4x)
12. Pan head screws, M5 x 0.8 x 100 mm (4x)



Section 4 Installation

DANGER

Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

Installation guidelines

DANGER

Electrical shock hazard. Externally connected equipment must have an applicable country safety standard assessment.

WARNING

Explosion hazard. This manual is only for installation of the unit in a non-hazardous location. For installation of the unit in hazardous locations, use only the instructions and approved control drawing provided in the hazardous location installation manual.

NOTICE

Do not install the controller in an environment with a caustic atmosphere without a protective enclosure. A caustic atmosphere will cause damage to electronic circuitry and components.

NOTICE

Do not install the controller outdoors in an environment that receives direct sunlight or UV radiation or damage to the controller can occur. Install the optional UV protection screen with sunroof to prevent damage from UV exposure when installed outdoors in direct sunlight.

Note: (Network and Claros version only) Make sure that your IT department has approval for the installation and commissioning of the device. Administrator rights are not necessary. The email address “No-reply@hach.com” sends the setup email and “**donotreply@hach.com**” sends the system notifications that are necessary for the installation. Add the two email addresses to the safe senders list to make sure to receive mails from these senders.
Hach does not send a request to confirm that the sender is not a robot.

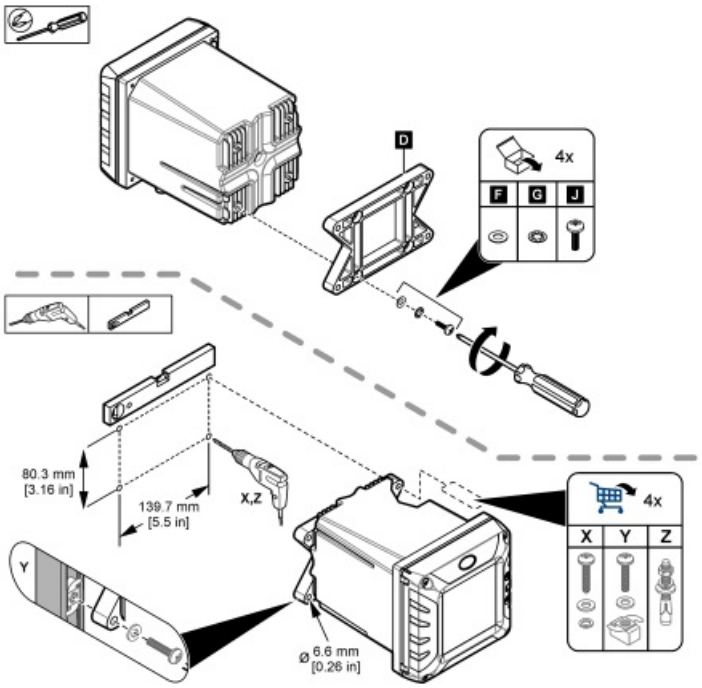
- Install the controller in a location where the power disconnect device for the controller is easily operated.
- Attach the controller upright and level on a flat, vertical surface.
- As an alternative, attach the instrument to a panel, vertical pole or horizontal pole.
- Make sure that the device is in a location where there is sufficient clearance around it to make connections and to do maintenance tasks.
- Make sure that there is a minimum of 16 cm (6.30 in.) of clearance for the controller door to open.
- Install the instrument in a location with minimum vibration.
- The optional holder for mobile phones is recommended for all installations.
- The optional sunroof or the optional UV protection screen with sunroof is recommended for all outdoor installations.
- Give protection to computers or other connected equipment that may not have equivalent environmental ratings based on the enclosure rating of the equipment.
- Obey specified ambient ratings on the internal side of panels for panel mount installations.
- Make sure that the maximum power rating is correct for the ambient temperature.

Mechanical installation

Attach the instrument to a wall

Attach the controller upright and level on a flat, vertical surface. Make sure that the wall mounting is able to hold 4 times the weight of the equipment. Refer to the illustrated steps in **Figure 3 and Product components** on page 8 for the necessary mounting hardware.

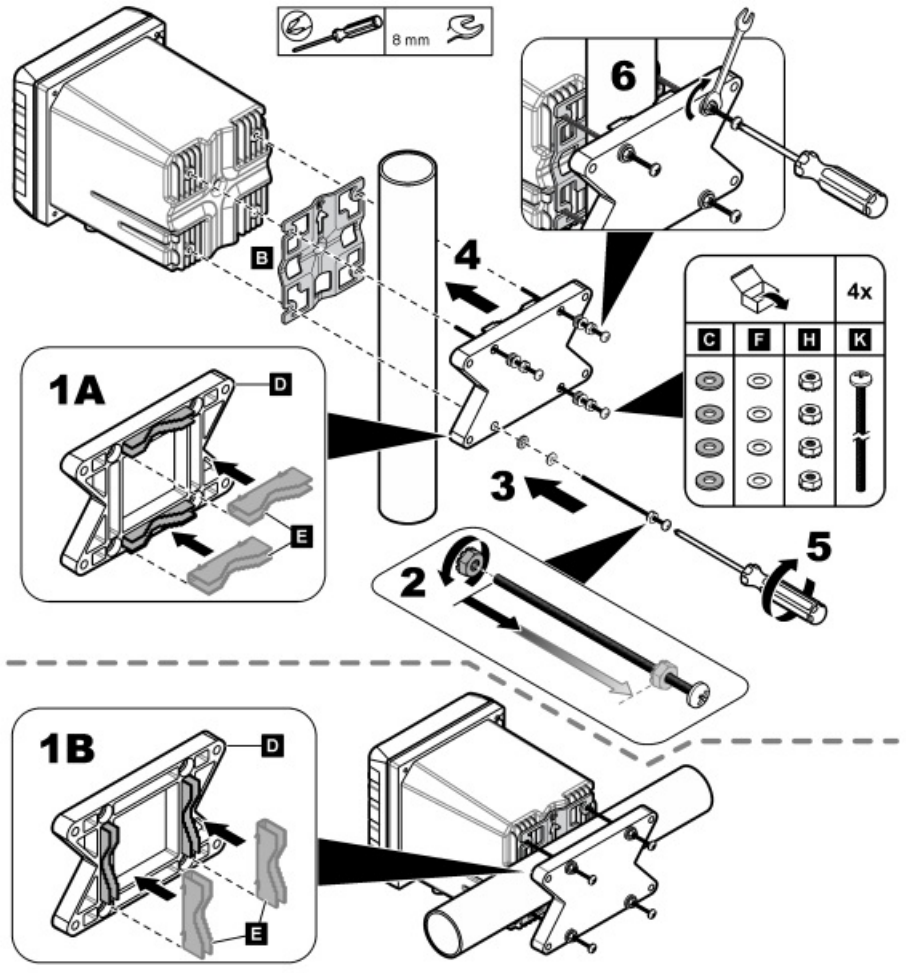
Figure 3 Wall mounting



Attach the instrument to a pole

Attach the controller upright to a pole or pipe (horizontal or vertical). Make sure that the pipe diameter is 19 to 65 mm (0.75 to 2.5 in.) Refer to the illustrated steps in **Figure 4** and **Product components** on page 8 for the necessary mounting hardware.

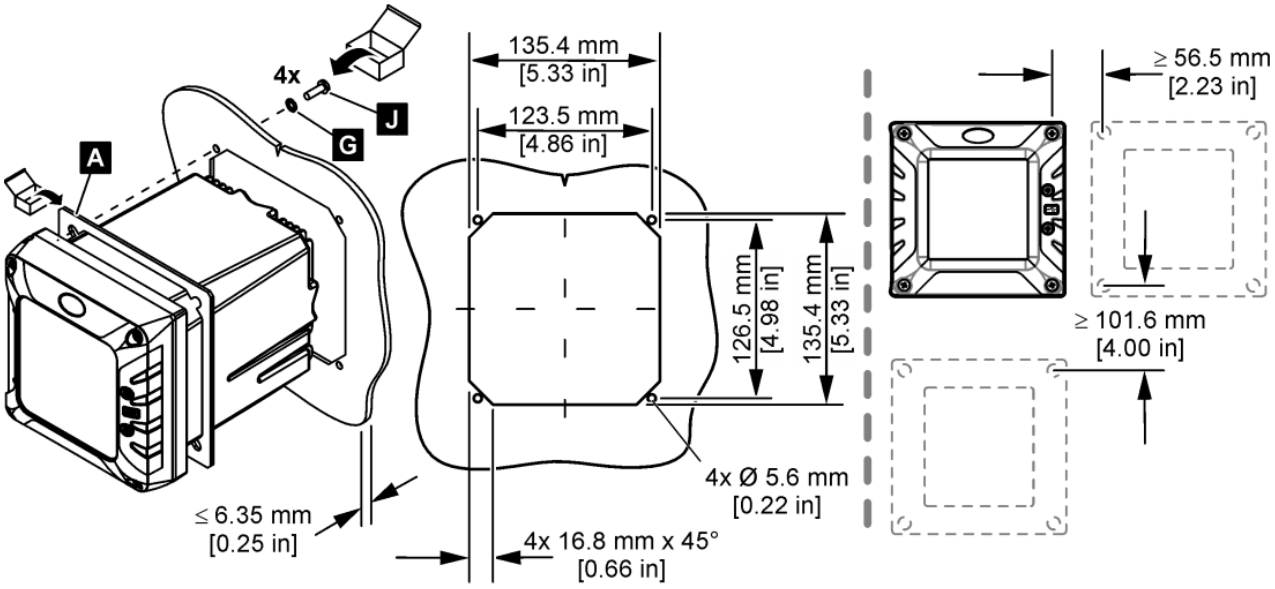
Figure 4 Pole mounting



Install the instrument in a panel

A rectangular hole is necessary for panel installation. Use the supplied sealing gasket for panel mount as a template to cut the hole in the panel. Make sure to use the template in the up position to install the controller vertical. Refer to **Figure 5**.

Figure 5 Panel mounting dimensions



Note: If using the bracket (optional) for panel mounting, push the controller through the hole in the panel and then slide the bracket over the controller on the back side of the panel. Use the four 15 mm pan head screws (supplied) to attach the bracket to the controller and secure the controller to the panel.

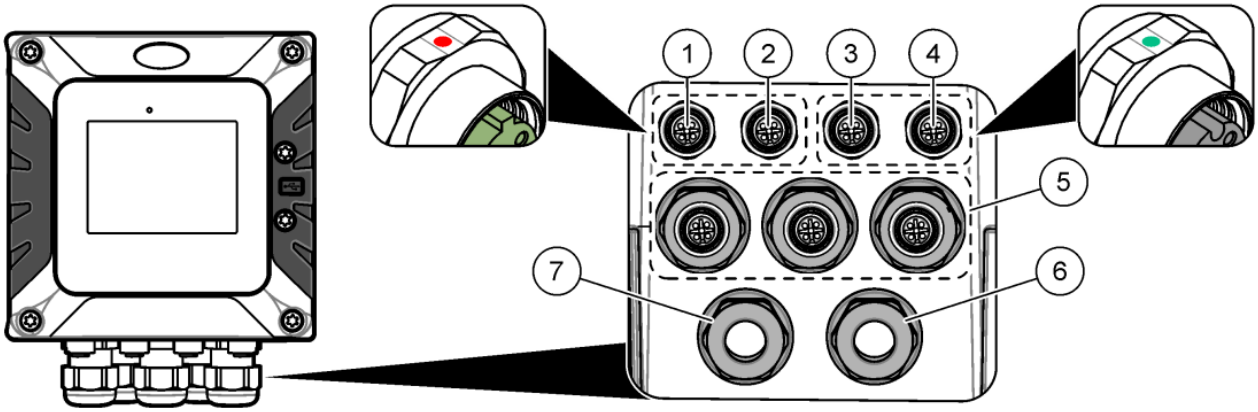
Electrical installation

Electrical connectors and fittings

Figure 6 shows the electrical connectors and fittings on the instrument. To keep the environmental rating of the enclosure, make sure that there is a plug in the strain relief fittings that are not used and a connector cap on the unused connectors.

Figure 6 Electrical connectors and fittings

1. Ethernet connector (optional) for LAN port 1 or EtherNet/IP or PROFINET connector
2. Ethernet connector (optional) for LAN port 2 or EtherNet/IP or PROFINET connector
3. Digital SC connector: Channel 1. Optional: Analog sensor connection to sensor module or analog input connection to 4-20 mA input module
4. Digital SC connector: Channel 2. Optional: Analog sensor connection to sensor module or analog input connection to 4-20 mA input module
5. Strain relief fitting for USB box and expansion modules: Analog inputs/outputs, Profibus DP
6. Power cord (or conduit hub)9
7. Strain relief fitting for high voltage relay



Based on the controller configuration, the controller has

Table 1 Options for each connector and fitting

Device	110	2	Option11	3	4	5	6	7
sc digital sensor, sc digital gateway or analyzer				X	X			
Analog sensor				X	X			
Sensor analog module				X	X			
4-20 mA output						X		
Profibus DP module						X		
USB Box						X		
LAN + LAN	Green	Green	Split / Chaining					
LAN + Modbus TCP	Green	Green	Split / Chaining					
EtherNet/IP	Yellow	Yellow	IEP only					
LAN + EtherNet/IP	Green	Yellow	Mix IEP					
PROFINET	Yellow	Yellow	IEP only					
LAN + PROFINET	Green	Yellow	Mix IEP					
High voltage relay								X
Power supply							X	

Electrostatic discharge (ESD) considerations

NOTICE

 Potential Instrument Damage. Delicate internal electronic components can be damaged by static electricity, resulting in degraded performance or eventual failure.

Refer to the steps in this procedure to prevent ESD damage to the instrument:

- Touch an earth-grounded metal surface such as the chassis of an instrument, a metal conduit or pipe to discharge static electricity from the body.
- Avoid excessive movement. Transport static-sensitive components in anti-static containers or packages.
- Wear a wrist strap connected by a wire to earth ground.

- Work in a static-safe area with anti-static floor pads and work bench pads.

Power connections

DANGER

Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

DANGER

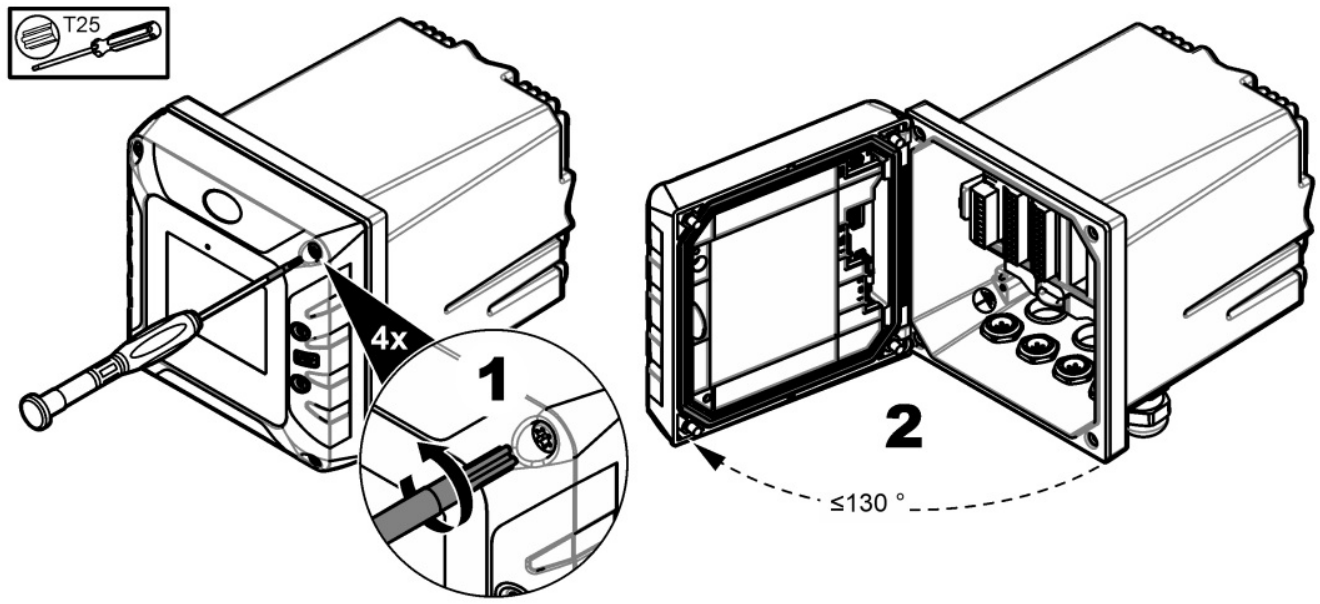
Electrocution hazard. Always remove power to the instrument before making electrical connections.

If the controller does not have an installed power cord, connect power with conduit or a power cord. Refer to the sections that follow to connect power with conduit or a power cord.

Open the controller cover

Open the controller cover to get access to the wiring connections. Refer to **Figure 7**.

Figure 7 Open the controller

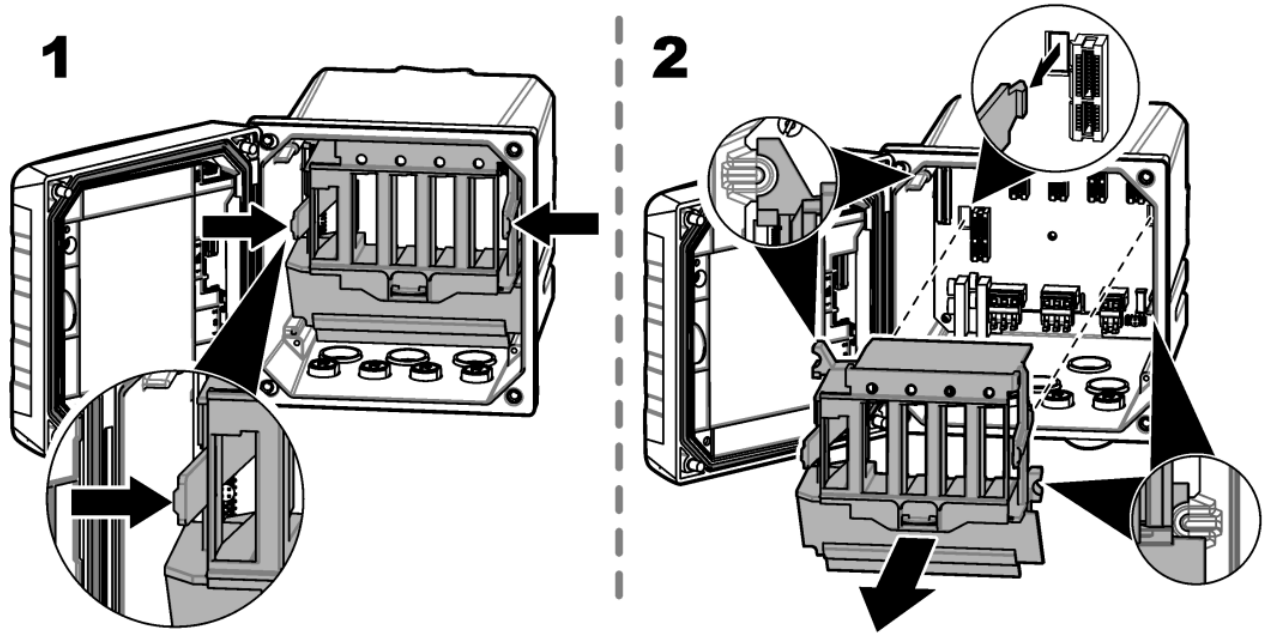


Remove the high-voltage barrier

High-voltage wiring for the controller is located behind a high-voltage barrier in the controller enclosure. Do not remove the barrier while power is supplied to the controller. Make sure that the barrier is installed before power is supplied to the controller.

Remove the high-voltage barrier to get access to the high-voltage wiring. Refer to **Figure 8**.

Figure 8 High-voltage barrier



Wiring for power

⚠DANGER

Electrocution hazard. Protective Earth Ground (PE) connection is required

⚠DANGER

Electrical shock and fire hazards. Make sure to identify the local disconnect clearly for the conduit installation.

⚠WARNING

Potential Electrocution Hazard. If this equipment is used outdoors or in potentially wet locations, a Ground Fault Interrupt device must be used for connecting the equipment to its mains power source.

⚠WARNING

Electrocution hazard. The local disconnection means must disconnect all the electrical currentcarrying conductors. Mains connection must keep supply polarity. The separable plug is the disconnect means for cord connected equipment.

⚠WARNING

 Electrical shock and fire hazards. Make sure that the user-supplied power cord and non-locking plug meet the applicable country code requirements.

⚠WARNING

 Explosion hazard. This manual is only for installation of the unit in a non-hazardous location. For installation of the unit in hazardous locations, use only the instructions and approved control drawing provided in the hazardous location installation manual.

NOTICE

Install the device in a location and position that gives easy access to the disconnect device and its operation.

The controller can be purchased as either a 100-240 VAC powered model or a 18-28 VDC powered model. Follow the appropriate wiring instructions for the purchased model.
Supply power to the instrument with conduit or a power cable. Make sure that a circuit breaker with sufficient current capacity is installed in the power line. The circuit breaker size is based on the wire gauge used for installation.

For installation with conduit:

- Install a local disconnect for the instrument within 3 m (10 ft) of the instrument. Put a label on the disconnect that identifies it as the main disconnect device for the instrument.
- Rated for at least 90 °C (194 °F) and applicable to the installation environment
- For permanent connections use only solid wires. Use cable dimensions between 0.75 to 1.5 mm2 (18 to 16 AWG). Flexible wires must have a crimped ferrule or pin type terminal on the end.
- Connect equipment in accordance with local, state or national electrical codes.
- Connect the conduit through a conduit hub that holds the conduit securely and seals the enclosure when tightened.
- If metal conduit is used, make sure that the conduit hub is tightened so that the conduit hub connects the metal conduit to safety ground.
- The DC power source that supplies power to the DC controller must maintain voltage regulation within the specified 18-28 VDC voltage limits. The DC power source must also provide adequate protection against surges and line transients.

  For installation with a power cable, make sure that the power cable is:
- Less than 3 m (10 ft) in length
- Rated sufficient for the supply voltage and current.
- Rated for at least 90 °C (194 °F) and applicable to the installation environment
- Not less than 0.75 mm2 (18 AWG) with applicable insulation colors for local code requirements. Flexible wires must have a crimped ferrule or pin type terminal on the end.
- A power cable with a three-prong plug (with ground connection) that is applicable to the supply connection
- Connected through a cable gland (strain relief) that holds the power cable securely and seals the enclosure when tightened
- Does not have a locking type device on the plug

Connect conduit or a power cord

Documents / Resources

	HACH SC4500 Controller Prognosys Ethernet [pdf] User Manual SC4500 Controller Prognosys Ethernet, SC4500, Controller Prognosys Ethernet, Prognosys Ethernet, Ethernet

References

- Geräte und Reagenzien für die Wasserqualitätsanalyse | Hach
- dtsc.ca.gov/hazardouswaste/perchlorate
- dtsc.ca.gov/hazardouswaste/perchlorate
- dtsc.ca.gov/hazardouswaste/perchlorate( )
- Hach | Hach