HACH®

SC4500, SC4200c, SC1500, RTC network, HCNB

User Instructions

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Section 1   General information

In no event will the manufacturer be liable for direct, indirect, special, incidental or consequential damages resulting from any defect or omission in this 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.

1.1   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 soley 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.

1.1.1   Use of hazard information

⚠ **D A N G E R**
Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ **W A R N I N G**
Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

⚠ **C A U T I O N**
Indicates a potentially hazardous situation that may result in minor or moderate injury.

N O T I C E
Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

1.1.2   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.

1.2 Intended use

These instructions are intended for use by persons who will integrate Claros enabled controllers, possibly with a customer network, which is compatible with industrial Ethernet-based infrastructures and topologies for real-time data sharing.

1.3 Product overview

Use the Hach Controller Network Bus (HCNB) to make a network that is compatible with industrial Ethernet-based infrastructures and topologies for real-time data sharing. HCNB is a bi-directional communications protocol used to connect Claros controllers and RTC modules. There is no master hierarchy in HCNB. All of the controllers and devices on the network have the same function level.

HCNB is compatible with IP protocol sharing. One controller can share the network connection with other controllers connected to the same network.

HCNB applies to SC1500, SC4200c, Claros Connector and SC4500 controllers.

Section 2 Installation

Note: Refer to the documentation supplied with the controller for complete installation instructions.

LAN or WiFi connectivity is necessary to connect the controller to a HCNB. A LAN or WiFi interface is used to connect all of the devices to the same local network.

When configured, the user has access to other controllers or devices in the network and can share the controller measurements of connected sensors. The output of the controller is configured with local and remote sensors and is attached to the PLC (Programmable Logic Controller). For example, the user can set a sensor measurement to an analog output from a sensor connected to a different controller at the facility. If the user moves the sensor to a different controller, the HCNB automatically finds the sensor and updates the network topology.
Note: With some of the HCNB settings, it is necessary to do a controller restart.

2.1 SC4500 controller

2.1.1 Electrical connectors and fittings

Make sure that the controller connects to the network through LAN or WiFi. The controller has two Ethernet ports for a Ethernet LAN[1] connection. Remove the connector cap to access the connector. Refer to Figure 1. As an alternative, use the optional USB box for a WiFi wireless connection.
Note: Ethernet and wireless connection can be mixed in the same network topology.

Make all of the necessary wiring connections. Refer to the documentation supplied with the controller.

1. Connect a maximum of ten controllers with a LAN cable or the optional USB box WiFi to the network.
2. If necessary, make all of the PLC wiring connections.

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[1] Dependent on controller configuration. A color code identifies the connectors. The LAN connectors are green. The EtherNet/IP or PROFINET connectors are yellow. The Digital SC sensor connectors are black.

Figure 1 Controller Ethernet ports options
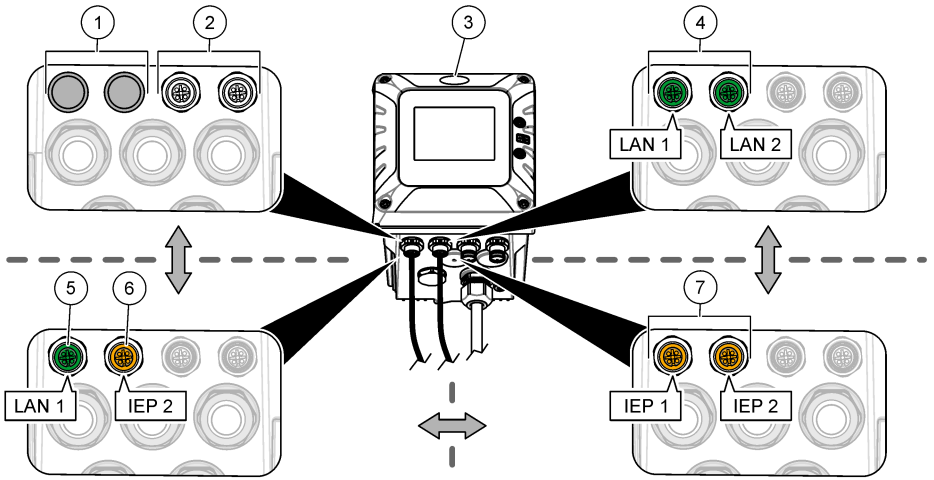
1	No Ethernet ports (LAN configuration: none)	**5**	LAN Ethernet connector (LAN configuration: mix IEP)
2	Digital SC connectors	**6**	Industrial Ethernet protocol connector (LAN configuration: mix IEP)
3	Controller	**7**	Industrial Ethernet protocol connectors (LAN configuration: IEP only)
4	LAN Ethernet connectors (LAN configuration: split or chaining)		

Note: LAN = LAN Ethernet connector. IEP = Industrial Ethernet protocol connector.

2.1.2 LAN connection

The controller is supplied with two Ethernet connectors based on the controller configuration. Regardless of the supplied controller, the user must configure the Ethernet ports to the applicable option.
Note: An Ethernet port upgrade may be necessary based on the controller configuration. Refer to the documentation supplied with the upgrade kit.

1. Use a user-supplied Ethernet cable (M12 to RJ45) to connect the controller to a device with internet connection. Refer to Installation on page 4.
2. Push the main menu icon, then select Controller > Connectivity > LAN > Ethernet ports.
3. Enter the settings.

Option	Description
None	The controller does not have Ethernet ports or the Ethernet ports are not configured. The controller is supplied with the option None by default. *Note: When the controller configuration is set back to the factory settings, all of the LAN connection settings are lost and the Ethernet ports are set back to None.*
Chaining	The two Ethernet ports are configured for LAN connectivity. When selected, the LAN port configuration setting shows on the LAN menu. The two Ethernet ports have the same port configuration. Select this option to share the internet connection with other controllers (daisy chain topology) or to connect the controller to Claros and HCNB through the Ethernet cable.

Option	Description
Split	One Ethernet port is configured for LAN connectivity and the other Ethernet port is configured for a separate LAN or Modbus TCP. When selected, the Lan port 1 configuration and Lan port 2 configuration settings show on the LAN menu. The two Ethernet ports have different port configurations. Select the Split option to have different controller connections to Claros and fieldbus (Modbus TCP or HCNB).
Mix IEP	One Ethernet port is configured for LAN connectivity and the other Ethernet port is configured for IEP[2]. When selected, the LAN port configuration setting shows on the LAN menu. Select this option to use port 1 for LAN connectivity and port 2 for IEP (compatible with EtherNet/IP or PROFINET star topology).
IEP only	The two Ethernet ports are configured for IEP. The two ports are used for EtherNet/IP or PROFINET with chain, ring or star topology.

4. Push SAVE.
5. When applicable, select LAN port configuration. Enter the settings as follows:

    a. If the customer network supports Dynamic Host Configuration Protocol (DHCP), set the option to on (default) to get an IP address automatically. The display shows the MAC address of the selected port.
    b. If the customer network does not support DHCP, set the option to off and complete the settings with IP addresses supplied by the network administrator. Enter the correct settings based on the network topology: IP address, Netmask, Default gateway and DNS address.
    c. When Chaining is selected, the LAN server option shows on the LAN port configuration menu. Set the LAN server to on to share the internet connection with other controllers through LAN connectivity.

6. Select APPLY.

2.1.3 WiFi network connection

An external USB box WiFi with a WiFi adapter is necessary to connect the controller to a WiFi network. Refer to the documentation supplied with the USB box WiFi for more information about the WiFi installation. Follow all WiFi module manufacturer recommendations and guidance.

If the controller connects to the internet with a WiFi network, do the steps that follow:

1. Push the main menu icon, then select Controller > Connectivity > Wi-Fi.
2. Set the Wi-Fi connectivity button to on. A list of available access points shows.
3. Select Network to set the applicable WiFi access point. If necessary, enter the correct credentials. The WiFi connectivity currently accepts the authentication methods that follows: User name and Wi-Fi password.

    a. WEP: Not recommended. The WEP authentication method has low security.
    b. WPA2 Personal / PSK: Standard authentication. Enter the Wi-Fi passwordto access the network.
    c. WPA2 Enterprise: Authentication for enterprise networks. Enter the enterprise credentials, User name andWi-Fi password, to access the network.

4. Select APPLY.

2.1.4 Cellular network connection

Note: Only for Claros connection.

The external USB box cellular is necessary to connect the controller to a mobile network. Refer to the documentation supplied with the USB box cellular for installation instructions.

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2 Based on the controller configuration. Make sure that a PROFINET or EtherNet/IP module is installed in the controller.

2.1.4.1 Configuration with Hach Cellular (Telenor) SIM

If the controller connects to the internet with the factory installed SIM card and the default Hach data plan (Telenor), do the steps that follow:

1. Push the main menu icon, then select Controller > Connectivity > Cellular.
2. Set the Cellular connectivity button to on.
3. Select APPLY.

   Note: Make sure that the SIM card is not locked. If necessary, use the SIM PIN setting to enter the SIM card PIN.

4. After a maximum of 5 minutes, examine the signal strength that shows on the display. The cloud icon shows a correct connection.

2.1.4.2 Configuration with customer supplied SIM

To change the SIM card and connect the controller to the internet with a cellular network through a customer supplied data plan, do the steps that follow:

1. Install a user-supplied Micro SIM card. Refer to the documentation supplied with the USB box cellular for more information about the cellular network installation.

   Note: Follow all the cellular manufacturer recommendations and guidance.

2. Push the main menu icon, then select Controller > Connectivity > Cellular.
3. Make sure that the Cellular connectivity button is set to on.
4. Enter the settings.

Option	Description
Provider	Sets the Provider name (Access Point Name). Select Telenor (NA/Verizon network) for the default settings or Other to set a provider.
APN	Shows the provider name. When Other is selected on the Provider setting, enters the name of the provider.
SIM PIN	SIM card PIN
User name	User name
Password	User password
Internet sharing	Set to on to share the internet connection with other controllers

5. Select APPLY and wait until a confirmation message shows on the display.
6. After a maximum of 5 minutes, examine the signal strength that shows on the display. The cloud icon shows a correct connection.

2.2 SC4200c controller

The data in this section applies to SC4200c controller and Claros Connector.

2.2.1 Electrical connectors and fittings

Figure 2 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.

Note: The controller is supplied without strain relief fittings installed. The user must order the necessary strain reliefs.

Figure 2 Electrical connectors and fittings
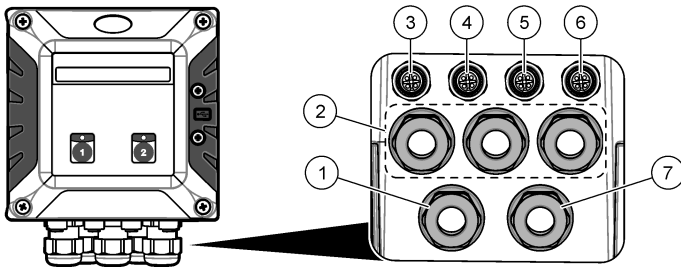
1	Strain relief fitting for relay	5	Digital SC connector: Sensor 1 (Channel 1)
2	Strain relief fitting for modules	6	Digital SC connector: Sensor 2 (Channel 2)
3	Ethernet connector for TCP/IP based fieldbus communication[3]	7	Power cord (or conduit hub) [5]
4	Ethernet connector for LAN connection[4]		

2.2.2 LAN connection

The instrument is factory configured with two subnetworks. This configuration uses the two ethernet ports separately, one for internet access and the other one for TCP/IP based fieldbus communication with PLC/SCADA. To change the Ethernet port configuration and use the port for network sharing, refer to Share the LAN on page 9.

1. Use a user-supplied ethernet cable (M12 to RJ45) to connect the controller to a device with internet connection. Refer to Installation on page 4.

   Note: Connect the ethernet cable to the right ethernet connector.

2. Connect the controller to a PC or laptop. Open the Web server application. Refer to Web server application on page 11.

3. Go to the Ethernet configuration page and configure the LAN connection.

   Note: An internet connection is not necessary to complete this configuration.

4. Open the web browser on the PC. Enter the IP address that follows to connect to the SC4200c controller: "http://192.168.165.30"

5. Select the Ethernet menu.

   a. If the customer network supports Dynamic Host Configuration Protocol (DHCP), use the setting **Obtain an IP address automatically**.

   b. If the customer network does not support DHCP, use the setting **Use the following IP address** and complete the settings with IP addresses supplied by the network administrator.

The controller is factory configured with two different subnets on the Ethernet ports:

- Port 1 (fec0): Ethernet interface for LAN connection with dynamic IP address (default)
- Port 2 (fec1): Ethernet interface for Ethernet-based fieldbus with static IP address 192.168.165.20 (default)

  Note: Make sure that the network connection sharing setting is disabled to use the ethernet port for Modbus TCP/IP communication. Configure the ethernet port parameters to adapt them to the Modbus TCP/IP master (PLC) configuration.

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[3] Change the connector configuration for network sharing and share internet connection between controllers.

[4] Connector used to give internet access to the controller through a customer network with internet function.

[5] The power cord is factory-installed based on the controller configuration.

6. Select the correct IP setting (dynamic or static). If necessary, enter the correct settings based on the network topology: IP address, subnet mask and default gateway.

7. Select Network connection sharing to share the internet connection of the instrument with other controllers.

   Note: When this setting is selected the two ports are switched together and only one port configuration is necessary. With this configuration the Ethernet port is used for network sharing.

8. Select Apply to save the settings.

2.2.2.1 Share the LAN

The instrument can be configured as an ethernet switch. When the network sharing configuration is enabled, a controller with internet access can share the connection with other controllers. Refer to Figure 3. The two ethernet ports share the configuration. The ethernet configuration page only configures one ethernet port. Refer to LAN connection on page 5.

Note: When the network sharing configuration is enabled between multiple controllers, if one controller in the chain goes offline, subsequent controllers will also go offline.

Figure 3 Network sharing
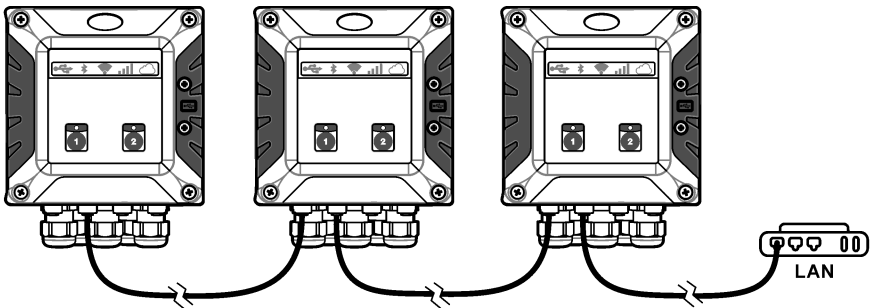
2.2.3 Mobile network connection

If the controller connects to the internet with the factory installed SIM card and the default Hach data plan, no more steps are necessary. To change the SIM card and connect the controller to the internet with a cellular network through a customer supplied data plan, do the steps that follow:

1. Remove the factory installed Micro SIM card.

2. Install a user-supplied Micro SIM card. Refer to Figure 4.

Figure 4 SIM card installation
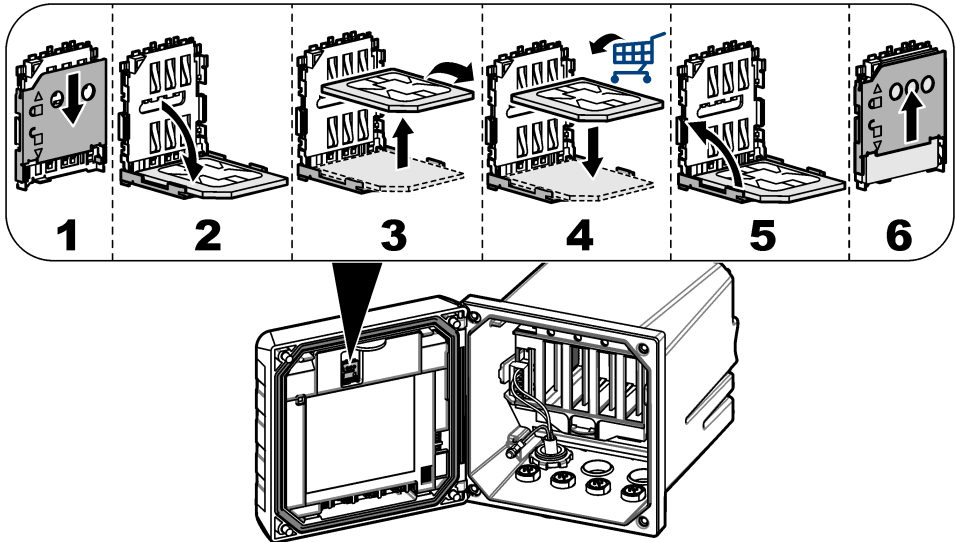
3. Connect the controller to a PC or laptop. Open the Web server application. Refer to Web server application on page 11.
4. Configure the modem.
   Note: An internet connection is not necessary to complete this configuration.
5. Open the web browser on the PC. Enter the IP address that follows to connect to the SC4200c controller: "http://192.168.165.30"
6. Select the Modem menu.
7. Select the SIM provider from the Provider list. If the provider is not in the list, select Other and enter the settings that follow.

Option	Description
APN	Provider name (Access Point Name)
User name	User name
Password	User password
SIM-PIN	SIM card PIN

8. Select Apply and wait until the message "Modem is currently configured" shows on the PC.
   Note: An internet connection is not necessary to complete this configuration.
9. Remove the Ethernet cable and the USB Ethernet adapter from the PC and the controller.
10. After a maximum of 5 minutes, examine the signal strength that shows on the front of the controller. The cloud icon stays blue to show a correct connection.
11. Change the settings to the initial values when the configuration is completed.

2.2.4 WiFi network connection

If the controller connects to the internet with a WiFi network, do the steps that follow:

Note: A USB box and WiFi USB adapter (dongle) are necessary to connect the controller to a WiFi network. Refer to the documentation supplied with the USB box for more information about the WiFi installation.

1. Connect the controller to a PC or laptop. Open the Web server application. Refer to Web server application on page 11.

2. Select the WiFi menu.

3. Set the WiFi connectivity button to on. A list of available access points and the signal strength for each access point shows.

4. Select the applicable WiFi access point. If necessary, enter the correct credentials: user name and password.

   Note: The WiFi connectivity currently accepts the authentication methods that follows:

   - **WEP**: *Not recommended. The WEP authentication method has low security.*
   - **WPA2 Personal / PSK**: *Standard authentication. Use the password to access the network.*
   - **WPA2 Enterprise**: *Authentication for enterprise networks. Use the enterprise credentials (username and password) to access the network.*

5. Select Apply to save the settings.

2.2.5 Web server application

The controller has a web server application that gives access to configuration and diagnostic features. Connect the controller to a PC or laptop to operate with the web server application.
Note: If the supplied SIM card is used with purchased data plans, access to the web server application is not necessary.

2.2.5.1 Connect the controller to a PC or laptop

Connect the controller to a PC or laptop with a Microsoft Windows operating system.
*Note: Make sure that the PC or laptop is **not** connected to a LAN.*

Items to collect:

- PC or laptop
- USB Ethernet adapter
- RJ45 Ethernet cable

1. Connect the Ethernet cable to the PC. Refer to Figure 5.

2. Connect the other end of the Ethernet cable to the USB Ethernet adapter.

3. Connect the USB Ethernet adapter to the USB port on the controller.

Figure 5 Connect the USB Ethernet adapter
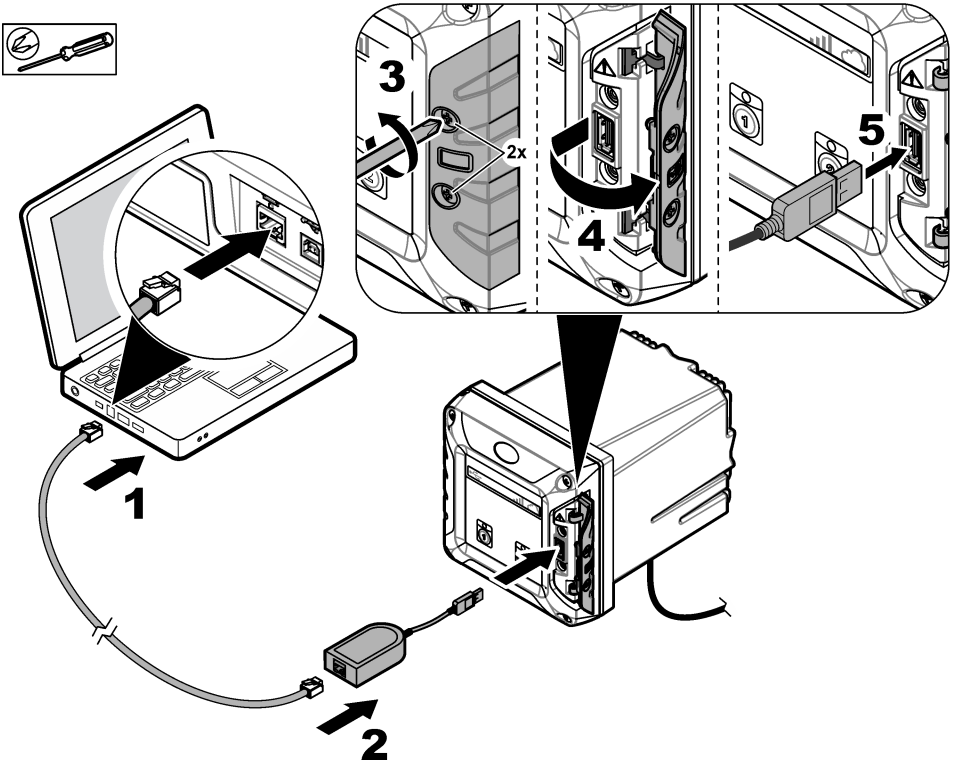
2.2.5.2 Configure the IP address of the PC

Do the steps that follow to change the IP address in Microsoft Windows on your PC or laptop.
Note: The user must have Windows administrator rights on the computer to change the Windows settings.

1. Go to Control Panel > Network and Internet > Network and Sharing center, then select Change adapter settings.
2. Right-click Local Area Connection, then select Properties.
3. Highlight Internet Protocol Version 4 (TCP/IPv4), then select Properties.
4. Select Use the following IP address. Enter the settings that follow.

Option	Description
IP address	192 . 168 . 165 . 1
Subnet mask	255 . 255 . 255 . 0
Default gateway	blank

Note: Record the initial values to change the values back after the configuration.

5. Select OK to confirm the settings.

   Note: Change the settings to the initial values when the configuration is completed.

6. Open the web browser on the PC. Enter the IP address that follows to connect to the SC4200c Controller.
   "http://192.168.165.30"

2.2.5.3 Operate the web server application

1. Select Modem menu to configure the modem.
2. Select Ethernet menu to configure the Ethernet interface to get access to the internet and to the MSM.
3. Select Maintenance and select an option.

Option	Description

Network status	Shows the settings of the controller network interfaces, used to access the MSM. Shows a connectivity report and possible solutions to connectivity issues.
	
	• Internet connection—Shows the internet and Tenant connection status.
	• LAN connection—Shows the cable connection status. Shows the MAC and IP address data. Shows the switch status (ethernet port for network sharing).
	• Wireless
	
	   • WiFi connection—Shows the dongle connection status and the signal strength. Shows the network name and IP address and subnet mask data.
	   • Mobile connection—Shows the modem and SIM connection status and the signal strength. Shows the provider name. Shows the Roaming and APN (modem settings) status. Shows the internet connectivity status (data transmission and data limit).

SC device list	Shows the MSM connectivity status for the expansion modules, sensors and controller. • Controller—Shows the controller name, controller ID and data for Cloud connectivity condition. • Modules—Shows module name, module ID and data for Cloud connectivity condition. • Sensors—Shows sensor name, sensor ID and data for Cloud connectivity condition.
Versions	Shows the software version of the controller.
Logs and History	Shows the historical data (i.e., configuration and log events) of the controller.
Restart	Sets the controller to off and on again.
Factory reset	Sets the controller history, modem and Ethernet configurations back to factory settings.

2.3 SC1500 controller

2.3.1 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
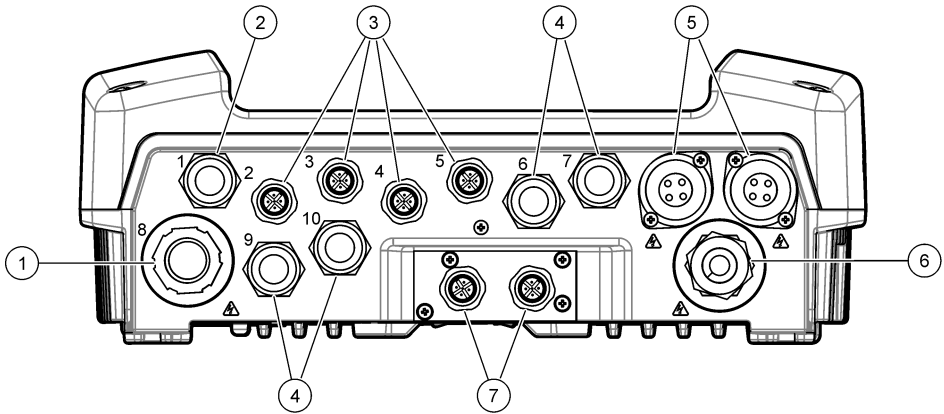
1	Large strain relief fitting for relay—2.19 mm conduit or 9 to 13.5 mm diameter cable	**5**	AC power outlets[7]
2	USB box cable	**6**	Power cord (or conduit hub)
3	Device connectors	**7**	Ethernet connectors[8]
4	Strain relief fittings for the analog output card or for the Profibus card—5 to 6 mm diameter cable		

2.3.2 Connect to a cellular network

Connect the instrument to a cellular network with the USB connector in the USB box. Refer to the illustrated steps that follow.

After the cover is installed, make sure that the screws are tight to keep the environmental rating.

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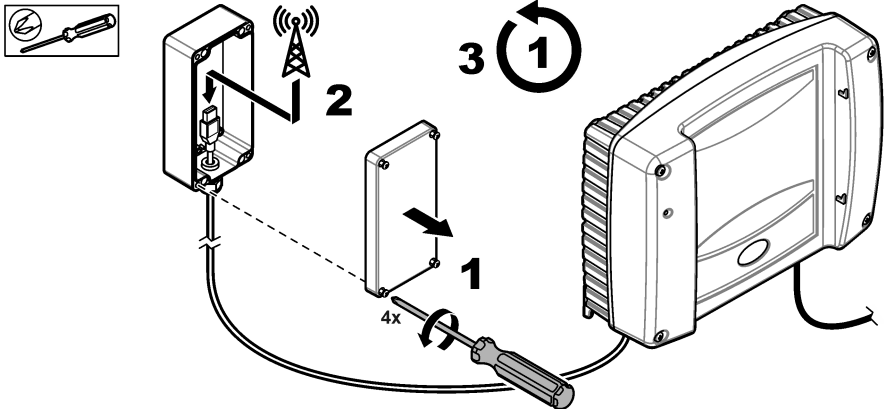
[6] The quantity of device connectors and strain relief fittings varies with model.
[7] The AC power outlets only supply power when the instrument has the optional 100 to 240 VAC power supply.
[8] Right M12 connector used for MODBUS TCP/IP. Left M12 connector used to daisy chain controllers. Refer to Modbus TCP/IP expansion on page 15.

2.3.3 Modbus TCP/IP expansion

Modbus TCP/IP is a standard for industrial communications. The Modbus TCP/IP protocol connects computers to measurement and control systems that use the TCP/IP protocol for data transmission. This type of data transmission is known as machine to machine (M2M) communication.

The Modbus TCP/IP software module enables the controller to be integrated directly in programmable logic controller (PLC) systems. PLC systems record and process the controller measured data. The data analysis and the procedures caused by the results are programmed in the PLC system.

Note: To use the Modbus TCP/IP software module, make sure that there is no Modbus card installed on the controller.

Connect the controller to the external USB box. Refer to the documentation supplied with the USB box. It is possible to daisy chain controllers. Refer to Figure 7. When a modem or WiFi stick is connected at the USB box, this channel connects the controller to the internet. Thus, it is not possible to connect the controller with the modem to the internet and to operate Modbus TCP with WiFi at the same time; the USB box has only one USB slot. In such situation, Modbus TCP/IP can only operate with the ethernet LAN connector (ethernet M12 connector). Table 1 shows the Internet and Modbus TCP/IP possible connections combinations.

When only one controller is used, only the right M12 connector is used to connect to the PLC/internet (left connector is not used). When daisy chain is used, always connect the right M12 connector with the left M12 connector of the next controller. The daisy chained controller connected to PLC/internet uses the right M12 connector for PLC/internet connection.

Figure 7 Connection diagram

1 USB Box	**3** PLC system
2 Controller	
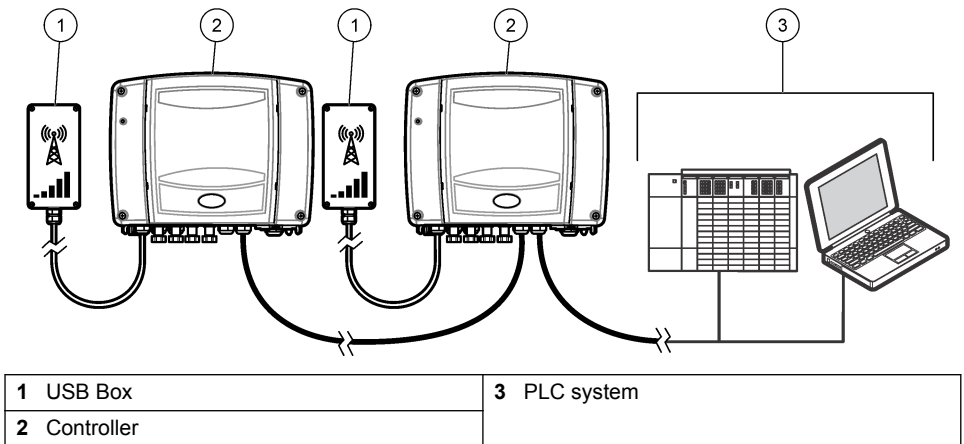
Table 1 Internet and Modbus TCP/IP connections combinations

	LAN (M12 socket)	USB Box	
		WiFi	**Modem**
Internet	X	X	X
Modbus TCP/IP	X	X	—

Section 3 Hach Controller Network Bus configuration

The HCNB applies to Claros and non-Claros controllers, but all of the controllers must connect to HCNB.

Make sure that the controller connects to the network through a LAN or WiFi. Refer to the documentation supplied with the controller. To configure the controller to use the HCNB, do the steps that follow:

1. Access the HCNB menu:

   - SC4500—Push the main menu icon, then select **Controller** > **Connectivity** > **HCNB**.
   - SC4200c and SC1500—Go to the Claros interface and select the device. Then, select **HCNB configuration**

2. Set the **HCNB** button to on. The controller automatically sets the default parameters for **Port**, **Interface** and **Auto detection.**

   Note: When the HCNB option is enabled, the controllers in the same network are automatically found.

   - Set the **HCNB** button to off to disable **HCNB** functionality.
   - Set the **HCNB** button to on to enable **HCNB** functionality.

3. Push **APPLY**.

When **HCNB** is set to on or off, the controller must be restarted.
Note: A system error (ERR-SYS-004) may appear on SC4500 controllers. Wait some seconds and the controller will automatically restart.

3.1 HCNB automatic configuration

HCNB uses the standard mDNS protocol to automatically find all of the controllers connected to the network segment. The mDNS standard supplies network traffic on UDP port 5353. The **Auto detection** setting must be disabled to use a different port.

The manufacturer recommends the Auto detection configuration and TCP port 5445 for HCNB.

1. Access the HCNB menu:

   - SC4500—Push the main menu icon, then select **Controller** > **Connectivity** > **HCNB**.
     Note: As an alternative, use the Claros interface to select the HCNB menu.
   - SC4200c and SC1500—Go to the Claros interface and select the device. Then, select **HCNB configuration**

2. Select one of the options that follow:

   Note: The settings that follow can only be changed if HCNB is set to off.

Option	Description
Port	Sets the Ethernet port number for HCNB communication. The port number must be the same on each controller of the HCNB network. Range from **1024** to **65535** (Default: **5445**). Make sure that the network port is not blocked in the Ethernet network. Contact the network administrator.

Option	Description
Interface	Sets the Ethernet interface for HCNB communication. Options: • **ALL** (default)—The controller uses WiFi and LAN interfaces for the HCNB. • **LAN**—The controller uses only a LAN Ethernet interface for the HCNB. • **WIFI**—The controller uses only a WiFi interface for the HCNB.
Auto detection	Sets the button to on to automatically find all of the devices on the network. **ON** (default)—The controller uses the mDNS protocol to automatically find all devices in the same network segment. mDNS uses UDP port 5353. Make sure that port 5353 is not blocked in the Ethernet network. Contact the network administrator. **OFF**—Auto detection is disabled. No other controllers or devices can be found and the controller cannot be found by other controllers. The configuration of HCNB topology must be done manually.

3. Push **APPLY**.

3.2 HCNB view topology list

The **Topology list** menu shows all of the controller in the network.

Controller type, controller serial number, SC devices and serial number of the connected controller show for each device. SC device description and SC device serial number show for the SC device. SC devices are sensors, analyzers and IO modules.

1. Access the HCNB menu:

   • SC4500—Push the main menu icon, then select **Controller** > **Connectivity** > **HCNB**.
   Note: As an alternative, use the Claros interface to select the HCNB menu.
   • SC4200c and SC1500—Go to the Claros interface and select the device. Then, select **HCNB configuration**

2. Select **Topology list**.

Option	Description
Topology List	Shows a list with all of the controllers with which the controller communicates successfully. Shows the sensors connected to each controller. • Static controllers (future option, currently not available)—Shows the controllers and sensors manually added with the Topology configuration option. • Auto detected controllers—Shows the controllers and sensors automatically found on the HCNB.

3. Push **APPLY**.

3.3 HCNB—View statistics

The **Statistic** menu shows information about the data flow in the network.

1. Access the HCNB menu:

   • SC4500—Push the main menu icon, then select **Controller** > **Connectivity** > **HCNB**.
   Note: As an alternative, use the Claros interface to select the HCNB menu.

- SC4200c and SC1500—Go to the Claros interface and select the device. Then, select **HCNB configuration**

2. Select **Statistic**.

Option	Description
Received	Shows the number of packages received in the HCNB.
Transmitted	Shows the number of packages transmitted in the HCNB.

3. Push **APPLY**.

Section 4 Claros configuration

Claros is a web-based suite of solutions that mixes instrument, data and process management. Mobile Sensor Management (MSM) is part of Claros. MSM lets the user see the measurements and instrument condition anytime, anywhere on a web-enabled device. MSM shows upcoming maintenance tasks and gives simple maintenance instructions. Based on the controller configuration, the controller can connect to Claros to use MSM. Make sure that the controller is connected to the internet with LAN, Wi-Fi or cellular network.

When the controller connects to the internet with a cellular network, the controller can share the internet connection with other controllers in the HCNB.

Configure Claros on the controller as follows:

1. Configure internet connection. Refer to the controller documentation.
2. Push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set the **Claros** button to on.
3. Add the controller to the user Claros account. On a web-enabled device open Claros and follow the instructions on the screen.

Section 5 Network topologies

5.1 SC4500 controller

The topologies that follow are applicable to the SC4500 controller.

5.1.1 HCNB through a customer network (LAN only)

Claros is optional. Refer to Claros configuration on page 18 to enable Claros.

Note: Make sure to accurately follow the hardware connection and the configuration of the topology.

Note: If some preliminary settings in the Connectivity menu were changed, it is recommended to go back to the factory settings. Refer to the controller user manual.

- All of the controllers connect to the same network segment.
- All of the controllers connect to the HCNB.
- Controller 1 and 2 connects to the HCNB through LAN and optionally connects to Claros.
- Controller 3 connects to the HCNB through LAN and connects to a PLC through Industrial Ethernet protocols, Profibus DP or a mA output.

1	Controller 1, SC4500	4	PLC (refer to the documentation supplied with the controller, Profinet module and EtherNet/IP module to configure the PLC)
2	Controller 2, SC4500	5	IEP connection, Profibus DP, or 4-20 mA connection
3	Controller 3, SC4500	6	Ethernet switch[9]

1. Set the Controller 1 configuration as follows:

   Note: Make sure to connect the Ethernet LAN cable to LAN port 1.

   a. To connect to Claros (optional), push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set to on.
   b. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Chaining**.
   c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

---

9 If Internet is available on the Ethernet switch, Claros can be set to on and off.

d. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

   e. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

   f. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

   Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

2. Set the Controller 2 configuration the same as Controller 1.

3. Set The Controller 3 configuration as follows:

   Note: Make sure to connect the Ethernet LAN cable to LAN port 1 and industrial Ethernet cable to IEP port 1.

   a. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > Ethernet ports. Select **Split** or **Mix IEP**.

   b. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

   c. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

   d. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

   e. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

   Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.
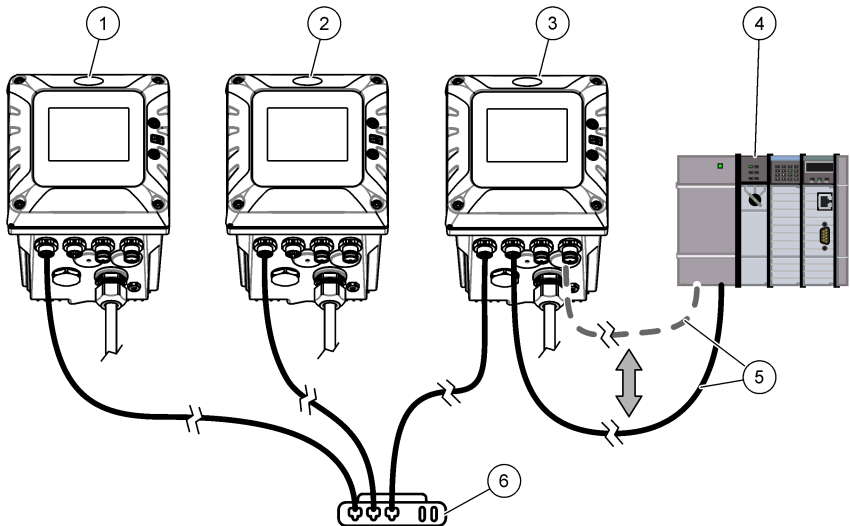
5.1.2 HCNB through a customer network (wired chaining)

Claros is optional. Refer to Claros configuration on page 18 to enable Claros.

Note: Make sure to accurately follow the hardware connection and the configuration of the topology.

Note: If some preliminary settings in the Connectivity menu were changed, it is recommended to go back to the factory settings. Refer to the controller user manual.

- All of the controllers connect to the same network segment.
- All of the controllers connect to the HCNB.
- Controller 1 and 2 connect to the HCNB through LAN and to Claros (optional).
- Controller 3 connects to the HCNB through LAN and connects to a PLC through Industrial Ethernet protocols, Profibus DP or a mA output.

1 Controller 1, SC4500	4 PLC (refer to the documentation supplied with the controller, PROFINET module and EtherNet/IP module to configure the PLC)
2 Controller 2, SC4500	5 IEP connection, Profibus DP, or 4-20 mA connection
3 Controller 3, SC4500	6 Ethernet switch[10]

1. Set the Controller 1 configuration as follows:

    a. To connect to Claros (optional), push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set to on.
    b. Push the main menu icon, then select **Controller** > **Connectivty** > **LAN** > **Ethernet ports**. Select **Chaining**.
    c. Select **Controller** > **Connectivity** > **LAN** > **Ethernet ports** > **LAN port configuration** > **LAN server**. Make sure that **LAN server** is set to **Off**.
    d. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.
    e. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.
    f. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.
    g. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

       Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

---

[10] If Internet is available on the Ethernet switch, Claros can be set to on and off.

2. Set the Controller 2 configuration as follows:

    a. To connect to Claros (optional), push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set to on.

    b. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Chaining**.

    c. Select **Controller** > **Connectivity** > **LAN** > **Ethernet ports** > **LAN port configuration** > **LAN server**. Make sure that **LAN server** is set to **Off**.

    d. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

    e. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

    f. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

    g. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

    Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.
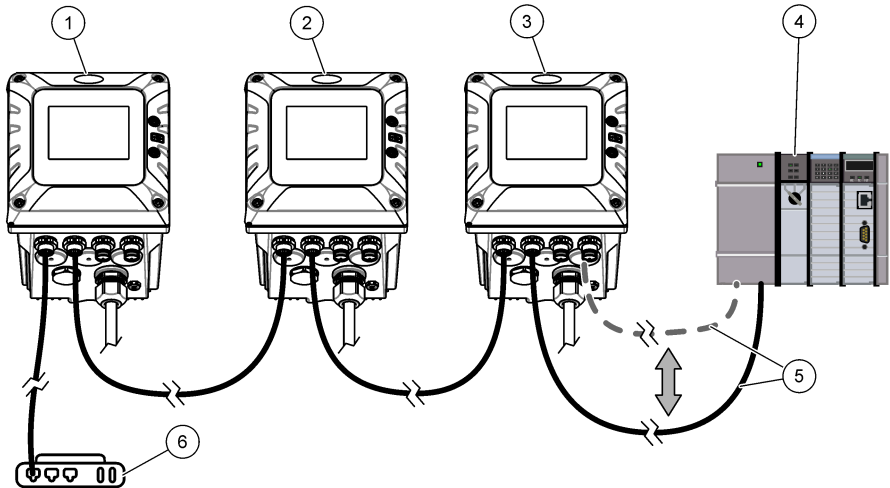
3. Set the Controller 3 configuration as follows:

    Note: Make sure to connect the Ethernet LAN cable to LAN port 1 and industrial Ethernet cable to IEP port 1.

    a. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > Ethernet ports. Select **Split** or **Mix IEP**.

    b. Select **Controller** > **Connectivity** > **LAN** > **Ethernet ports** > **LAN port configuration** > **LAN server**. Make sure that **LAN server** is set to **Off**.

    c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

    d. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

    e. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

    f. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

    Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

5.1.3 HCNB through a customer network (LAN + WiFi)

Claros is optional. Refer to Claros configuration on page 18 to enable Claros.

Note: Make sure to accurately follow the hardware connection and the configuration of the topology.

Note: If some preliminary settings in the Connectivity menu were changed, it is recommended to go back to the factory settings. Refer to the controller user manual.

- All of the controllers connect to the same network segment. The Ethernet switch and the WiFi access point share the same network.
- All of the controllers connect to the HCNB.
- Controller 1 and 2 connect to the network through WiFi. and to Claros (optional).
- Controller 3 connects to the HCNB through LAN and connects to a PLC through Industrial Ethernet protocols, Profibus DP or a mA output.

1 Wi-Fi USB box	**5** PLC (refer to the documentation supplied with the controller, Profinet module and EtherNet/IP module to configure the PLC)
2 Controller 1, SC4500	**6** IEP connection, Profibus DP, or 4-20 mA connection
3 Controller 2, SC4500	**7** Ethernet switch[11]
4 Controller 3, SC4500	

1. Set the Controller 1 configuration as follows:

    a. To connect to Claros (optional), push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set to on.

    b. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **None**.

    c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

---

[11] If Internet is available on the Ethernet switch, Claros can be set to on and off.

d. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **Wi-Fi**.

   e. Select **Controller** > **Connectivity** > **Wi-Fi** > **Wi-Fi connectiviy**. Select **On**. Refer to to configure the Wi-Fi connection.

   f. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

   Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

2. Set The Controller 2 configuration the same as Controller 1.

3. Set the Controller 3 configuration as follows:

   Note: Make sure to connect the Ethernet LAN cable to LAN port 1 and industrial Ethernet cable to IEP port 1.

   a. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Split** or **Mix IEP**.

   b. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

   c. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

   d. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

   e. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

   Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.
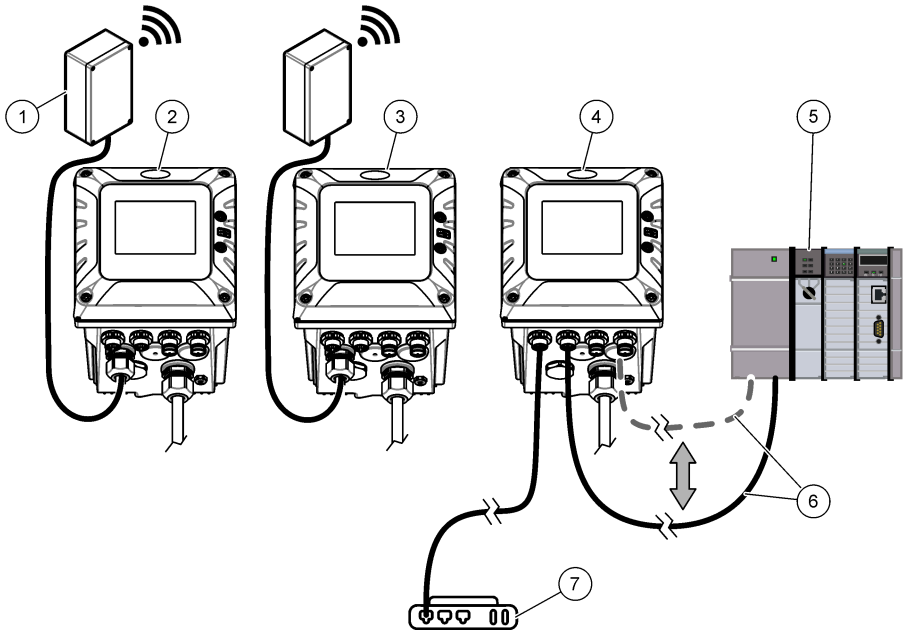
5.1.4 HCNB through embedded LAN server (not Claros compatible)

Note: Make sure to accurately follow the hardware connection and the configuration of the topology.

Note: If some preliminary settings in the Connectivity menu were changed, it is recommended to go back to the factory settings. Refer to the controller user manual.

- All of the controllers connect to the same network segment.
- All of the controllers connect to the HCNB.
- Controller 1 is the LAN server and connects to the HCNB through this LAN.
- Controller 2 connects to the HCNB through a LAN.
- Controller 3 connects to the HCNB through LAN and connects to a PLC through Industrial Ethernet protocols, Profibus DP or a mA output.

1	Controller 1, SC4500	**4**	PLC (refer to the documentation supplied with the controller, PROFINET module and EtherNet/IP module to configure the PLC)
2	Controller 2, SC4500	**5**	IEP connection, Profibus DP, or 4-20 mA connection
3	Controller 3, SC4500		

1. Set the Controller 1 configuration as follows:

   a. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Chaining**.
   b. Select **Controller** > **Connectivity** > **LAN** > **LAN port configuration** > **LAN Server**. Select **On**.
   c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.
   d. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.
   e. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.
   f. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.
      Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

2. Set the Controller 2 configuration as follows:

   a. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Chaining**.
   b. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.
   c. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

d. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

   e. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.
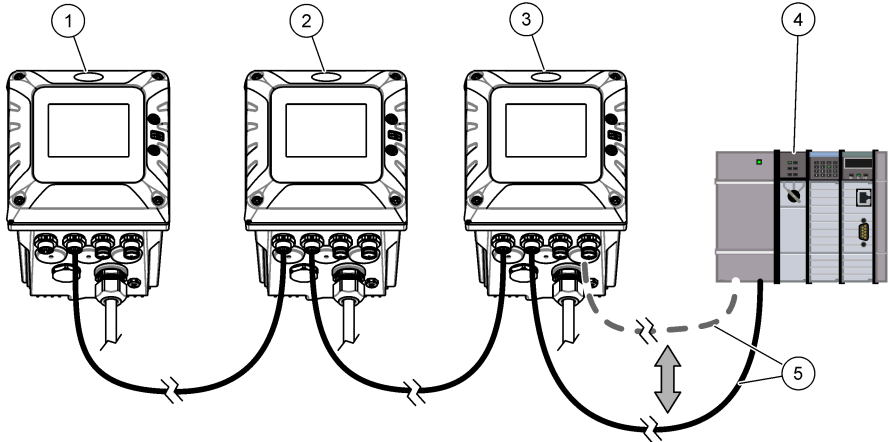
   Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

3. Set the Controller 3 configuration as follows:

   Note: Make sure to connect the Ethernet LAN cable to LAN port 1 and industrial Ethernet cable to IEP port 1.

   a. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > Ethernet ports. Select **Split**.

   b. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

   c. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

   d. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

   e. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.
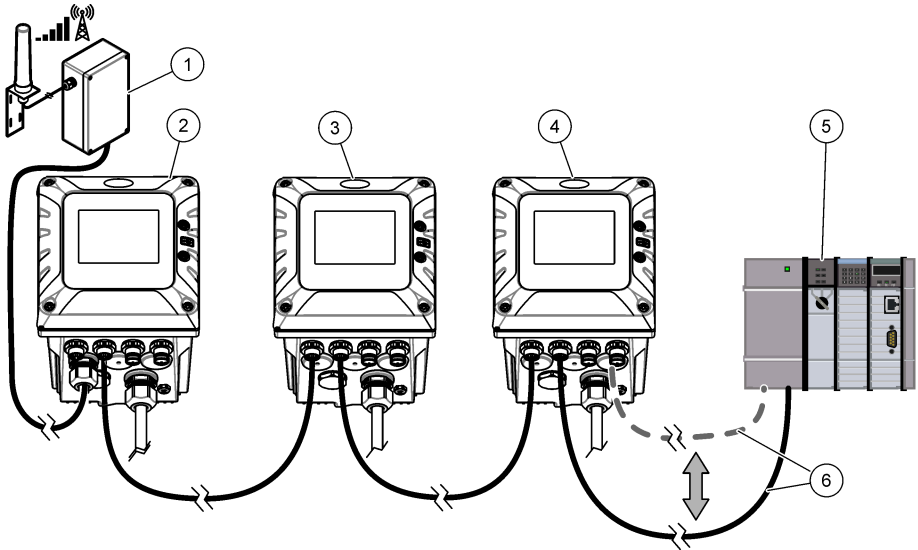
   Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

5.1.5 Claros and HCNB through cellular connection with internet sharing

Note: Make sure to accurately follow the hardware connection and the configuration of the topology.

Note: If some preliminary settings in the Connectivity menu were changed, it is recommended to go back to the factory settings. Refer to the controller user manual.

- All of the controllers connect to the same network segment.
- All of the controllers connect to the HCNB.
- Controller 1 connects to Claros using cellular and shares the connection through LAN. Controller 1 also connects to the HCNB through this LAN.
- Controller 2 connects to Claros and HCNB through LAN.
- Controller 3 connects to Claros and HCNB though a LAN and connects to a PLC through Industrial Ethernet protocols, Profibus DP or a mA output.

1	Cellular USB box	**4**	Controller 3, SC4500
2	Controller 1, SC4500	**5**	PLC (refer to the documentation supplied with the controller, PROFINET module and EtherNet/IP module to configure the PLC)
3	Controller 2, SC4500	**6**	IEP connection, Profibus DP, or 4-20 mA connection

1. Set the Controller 1 configuration as follows:

   a. Push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set to on.
   b. Select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Chaining**.
   c. Select **Controller** > **Connectivity** > **Cellular**. To configure the cellular network refer to .
   d. Select **Controller** > **Connectivity** > **Cellular** > **Internet sharing**. Set to On (default: Off)
   e. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.
   f. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.
   g. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.
   h. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

   Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

2. Set the Controller 2 configuration as follows:

    a. Push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set to on.

    b. Select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Chaining**.

    c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

    d. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

    e. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

    f. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

    Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

3. Set the Controller 3 configuration as follows:

    Note: Make sure to connect the Ethernet LAN cable to LAN port 1 and industrial Ethernet cable to IEP port 1.

    a. Push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set to on.

    b. Select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Split** or **Mix IEP**.

    c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

    d. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

    e. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

    f. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

    Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

5.2 Other topologies

The topologies that follow are applicable to SC4500, SC4200c and SC4200 controllers.

5.2.1 HCNB through a customer network (LAN only)

Refer to Claros configuration on page 18 to enable Claros.

Note: Make sure to accurately follow the hardware connection and the configuration of the topology.

Note: If some preliminary settings in the Connectivity menu were changed, it is recommended to go back to the factory settings. Refer to the controller user manual.

- All of the controllers connect to the same network segment.
- All of the controllers connect to the HCNB.
- RTC controller connects to the HCNB through LAN.
- Controller 1 and 2 connects to the HCNB through LAN and to Claros.
- Controller 3 connects to the HCNB through LAN and to Claros (optional).
- Controller 4 connects to the HCNB through LAN and connects to a PLC through Industrial Ethernet protocols, Profibus DP or a mA output.

1	RTC controller	5	Controller 4, SC4500
2	Controller 1, SC1500	6	PLC (refer to the documentation supplied with the controller, Profinet module and EtherNet/IP module to configure the PLC)
3	Controller 2, SC4200c	7	IEP connection, Profibus DP, or 4-20 mA connection
4	Controller 3, SC4500	8	Ethernet switch[12]

1. Set the Controller 1 configuration as follows:

Note: Make sure to connect the Ethernet LAN cable to right M12 connector.

    a. Connect the controller to Claros.

    b. Go to the Claros interface and select MSM. Then, select the device.

---

[12] Make sure that Internet is available on the Ethernet switch to connect controllers to Claros.

    c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

    d. Select **HCNB menu** > **Port**. Enter 5445.

    e. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

    f. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

    g. Select **HCNB menu** > **HCNB**. Select **On**. Push **Ok** to resart the controller.

2. Set the Controller 2 configuration the same as Controller 1.

   Note: Make sure to connect the Ethernet LAN cable to right M12 connector.

3. Set the Controller 3 configuration as follows:

   Note: Make sure to connect the Ethernet LAN cable to LAN port 1.

    a. To connect to Claros (optional), push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set to on.

    b. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Chaining**.

    c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

    d. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

    e. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

    f. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

    Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

4. Set The Controller 4 configuration as follows:

   Note: Make sure to connect the Ethernet LAN cable to LAN port 1 and industrial Ethernet cable to IEP port 1.

    a. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > Ethernet ports. Select **Split** or **Mix IEP**.

    b. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

    c. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

    d. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

    e. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

    Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.
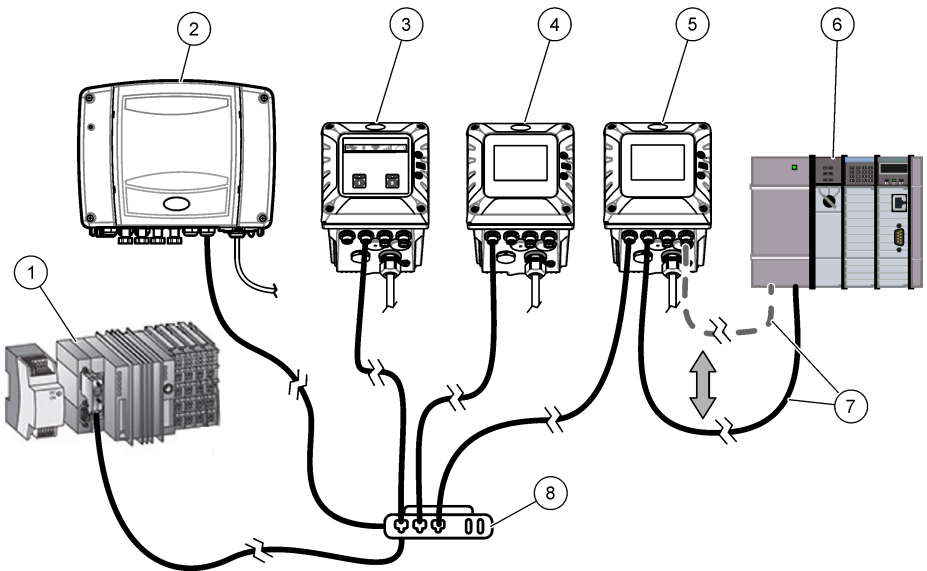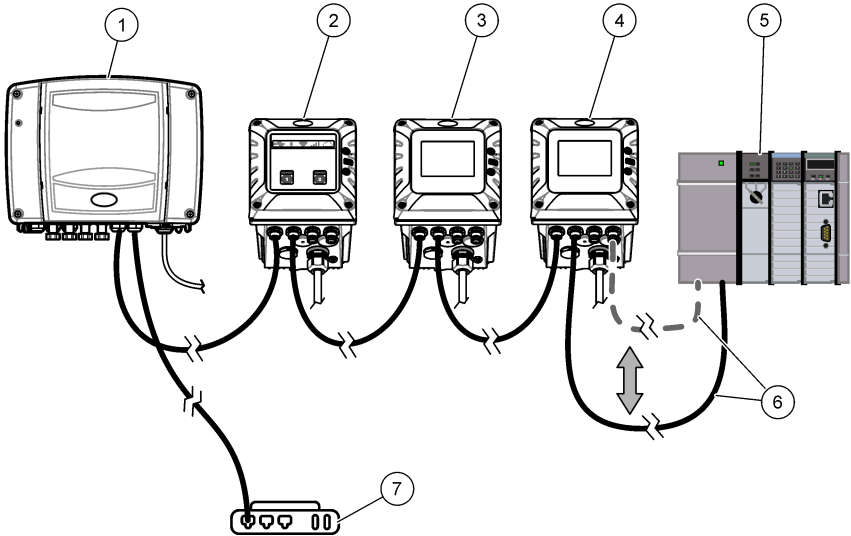
5.2.2 HCNB through a customer network (wired chaining)

Refer to Claros configuration on page 18 to enable Claros.

Note: Make sure to accurately follow the hardware connection and the configuration of the topology.

Note: If some preliminary settings in the Connectivity menu were changed, it is recommended to go back to the factory settings. Refer to the controller user manual.

- All of the controllers connect to the same network segment.
- All of the controllers connect to the HCNB.
- Controller 1 and 2 connect to the HCNB through LAN and to Claros.
- Controller 3 connects to the HCNB through LAN and to Claros (optional).
- Controller 4 connects to the HCNB through LAN and connects to a PLC through Industrial Ethernet protocols, Profibus DP or a mA output.

1	Controller 1, SC1500	**5**	PLC (refer to the documentation supplied with the controller, PROFINET module and EtherNet/IP module to configure the PLC)
2	Controller 2, SC4200c	**6**	IEP connection, Profibus DP, or 4-20 mA connection
3	Controller 3, SC4500	**7**	Ethernet switch[13]
4	Controller 4, SC4500		

1. Set the Controller 1 configuration as follows:

   Note: Make sure to connect the Ethernet LAN cable to right M12 connector and LAN cable for daisy chain to left M12 connector.

   a. Connect the controller to Claros.
   b. Go to the Claros interface and select MSM. Then, select the device.
   c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.
   d. Select **HCNB menu** > **Port**. Enter 5445.
   e. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.
   f. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

---

[13] Make sure that Internet is available on the Ethernet switch to connect controllers to Claros.

    g. Select **HCNB menu** > **HCNB**. Select **On**. Push **Ok** to resart the controller.

2. Set the Controller 2 configuration as follows:

    a. Enable the network sharing configuration. Refer to

    b. Connect the controller to Claros.

    c. Go to the Claros interface and select MSM. Then, select the device.

    d. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

    e. Select **HCNB menu** > **Port**. Enter 5445.

    f. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

    g. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

    h. Select **HCNB menu** > **HCNB**. Select **On**. Push **Ok** to resart the controller.

3. Set the Controller 3 configuration as follows:

    a. To connect to Claros (optional), push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set to on.

    b. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Chaining**.

    c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

    d. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

    e. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

    f. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

    Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

4. Set the Controller 4 configuration as follows:

    Note: Make sure to connect the Ethernet LAN cable to LAN port 1 and industrial Ethernet cable to IEP port 1.

    a. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > Ethernet ports. Select **Split** or **Mix IEP**.

    b. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

    c. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

    d. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

    e. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

    Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

5.2.2.1 HCNB through a customer network, one network (wired chaining + RTC)

Refer to Claros configuration on page 18 to enable Claros.

Note: Make sure to accurately follow the hardware connection and the configuration of the topology.

Note: If some preliminary settings in the Connectivity menu were changed, it is recommended to go back to the factory settings. Refer to the controller user manual.

- All of the controllers connect to the same network segment.
- All of the controllers connect to the HCNB.
- RTC controller connects to the HCNB through LAN.
- Controller 1 and 2 connect to the HCNB through LAN and to Claros.
- Controller 3 connects to the HCNB through LAN and to Claros (optional).

1	Controller 1, SC1500	**5**	PLC
2	Controller 2, SC4200c	**6**	IEP connection, Profibus DP, or 4-20 mA connection
3	Controller 3, SC4500	**7**	Ethernet switch[14]
4	RTC controller		

Note: Refer to HCNB through a customer network (wired chaining) on page 31 for the controllers configuration.

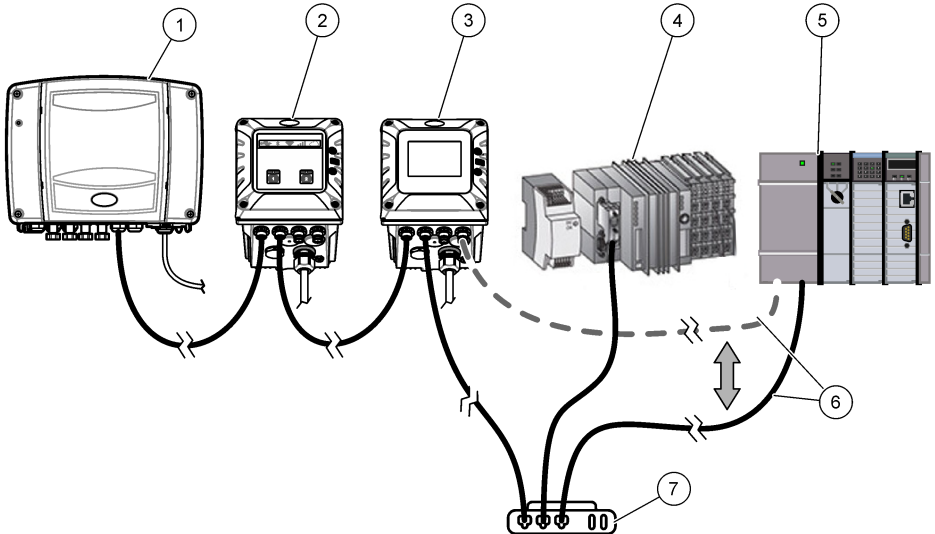[14] Make sure that Internet is available on the Ethernet switch to connect controllers to Claros.

5.2.2.2 HCNB through a customer network, separate network (wired chaining + RTC)

Refer to Claros configuration on page 18 to enable Claros.

Note: Make sure to accurately follow the hardware connection and the configuration of the topology.

Note: If some preliminary settings in the Connectivity menu were changed, it is recommended to go back to the factory settings. Refer to the controller user manual.

- All of the controllers connect to the same network segment.
- All of the controllers connect to the HCNB.
- RTC controller connects to the HCNB through LAN.
- Controller 1 and 2 connect to the HCNB through LAN and to Claros.
- Controller 3 connects to the HCNB through LAN and to Claros (optional).

1	Controller 1, SC1500	**5**	PLC
2	Controller 2, SC4200c	**6**	IEP connection, Profibus DP, or 4-20 mA connection
3	Controller 3, SC4500	**7**	Ethernet switch[15]
4	RTC controller		

Note: Refer to HCNB through a customer network (wired chaining) *on page 31 for the controllers configuration.*

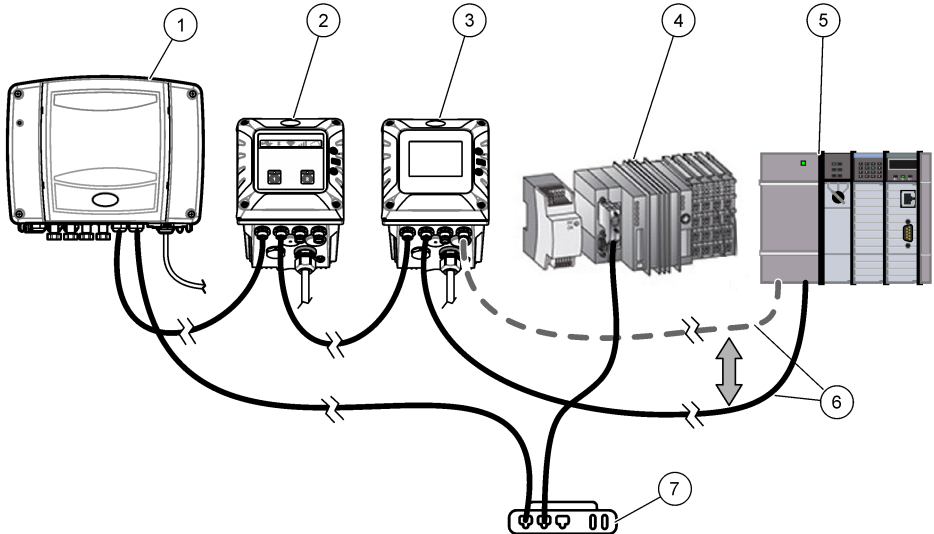[15] Make sure that Internet is available on the Ethernet switch to connect controllers to Claros.

5.2.3 HCNB through a customer network (LAN + WiFi)

Refer to Claros configuration on page 18 to enable Claros.

Note: Make sure to accurately follow the hardware connection and the configuration of the topology.

Note: If some preliminary settings in the Connectivity menu were changed, it is recommended to go back to the factory settings. Refer to the controller user manual.

- All of the controllers connect to the same network segment. The Ethernet switch and the WiFi access point share the same network.
- All of the controllers connect to the HCNB.
- Controller 1 and 2 connect to the network through WiFi and to Claros.
- Controller 3 connects to the network through WiFi and to Claros (optional).
- Controller 4 connects to the HCNB through LAN and connects to a PLC through Industrial Ethernet protocols, Profibus DP or a mA output.
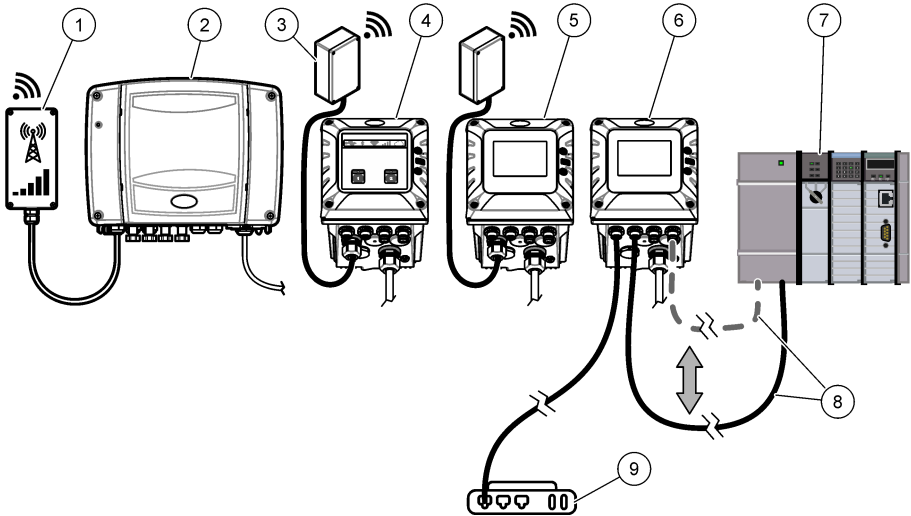
1	USB box with Wi-Fi or Cellular	**6**	Controller 4, SC4500
2	Controller 1, SC1500	**7**	PLC (refer to the documentation supplied with the controller, Profinet module and EtherNet/IP module to configure the PLC)
3	Wi-Fi USB box	**8**	IEP connection, Profibus DP, or 4-20 mA connection
4	Controller 2, SC4200c	**9**	Ethernet switch[16]
5	Controller 3, SC4500		

1. Set the Controller 1 configuration as follows:

   a. Configure the Wi-Fi or Cellular connection of the controller. Refer to the controller documentation.
   b. Connect the controller to Claros.
   c. Go to the Claros interface and select MSM. Then, select the device.
   d. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.
   e. Select **HCNB menu** > **Port**. Enter 5445.
   f. Select **HCNB menu** > **Interface**. Select **WIFI**.

---

[16] Make sure that Internet is available on the Ethernet switch to connect controllers to Claros.

     g. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

     h. Select **HCNB menu** > **HCNB**. Select **On**. Push **Ok** to resart the controller.

2. Set the Controller 2 configuration the same as Controller 1.

3. Set the Controller 3 configuration as follows:

     a. To connect to Claros (optional), push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set to on.

     b. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **None**.

     c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

     d. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **Wi-Fi**.

     e. Select **Controller** > **Connectivity** > **Wi-Fi** > **Wi-Fi connectiviy**. Select **On**. Refer to WiFi network connection on page 6 to configure the Wi-Fi connection.

     f. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

     Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

4. Set the Controller 4 configuration as follows:

   Note: Make sure to connect the Ethernet LAN cable to LAN port 1 and industrial Ethernet cable to IEP port 1.

     a. Push the main menu icon, then select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Split** or **Mix IEP**.

     b. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

     c. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

     d. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

     e. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.
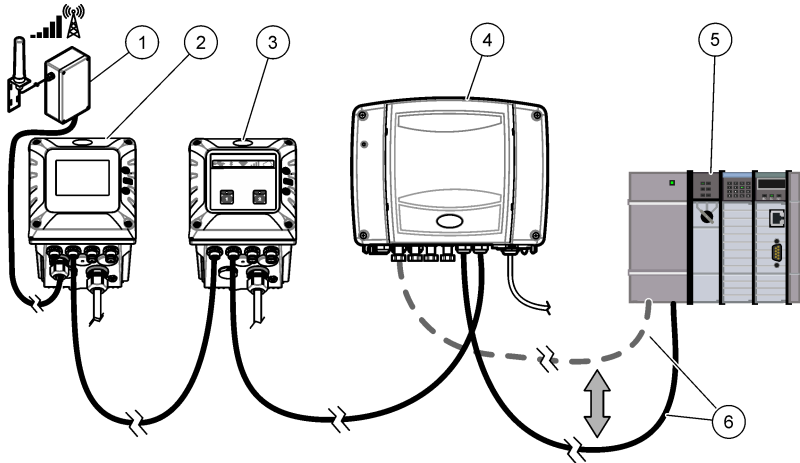
     Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

5.2.4 Claros and HCNB through cellular connection with internet sharing

Note: Make sure to accurately follow the hardware connection and the configuration of the topology.

Note: If some preliminary settings in the Connectivity menu were changed, it is recommended to go back to the factory settings. Refer to the controller user manual.

- All of the controllers connect to the same network segment.
- All of the controllers connect to the HCNB.
- Controller 1 connects to Claros using cellular and shares the connection through LAN. Controller 1 also connects to the HCNB through this LAN.
- Controller 2 connects to Claros and HCNB through LAN.
- Controller 3 connects to Claros and HCNB though a LAN and connects to a PLC through Industrial Ethernet protocols, Profibus DP or a mA output.

1	Cellular USB box	**4**	Controller 3, SC1500
2	Controller 1, SC4500	**5**	PLC (refer to the documentation supplied with the controller)
3	Controller 2, SC4200c	**6**	IEP connection, Profibus DP, or 4-20 mA connection

1. Set the Controller 1 configuration as follows:

   a. Push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set to on.
   b. Select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Chaining**.
   c. Select **Controller** > **Connectivity** > **Cellular**. To configure the cellular network refer to Cellular network connection on page 6.
   d. Select **Controller** > **Connectivity** > **Cellular** > **Internet sharing**. Set to On (default: Off)
   e. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.
   f. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.
   g. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.
   h. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.
      Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

2. Set the Controller 2 configuration as follows:

   a. Enable the network sharing configuration. Refer to Share the LAN on page 9.
   b. Connect the controller to Claros.

    c. Go to the Claros interface and select MSM. Then, select the device.

    d. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

    e. Select **HCNB menu** > **Port**. Enter 5445.

    f. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

    g. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

    h. Select **HCNB menu** > **HCNB**. Select **On**. Push **Ok** to resart the controller.

3. Set the Controller 3 configuration as follows:

Note: Make sure to connect the Ethernet LAN cable to right M12 connector and LAN cable for daisy chain to left M12 connector.

    a. Connect the controller to Claros.

    b. Go to the Claros interface and select MSM. Then, select the device.

    c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

    d. Select **HCNB menu** > **Port**. Enter 5445.

    e. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

    f. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

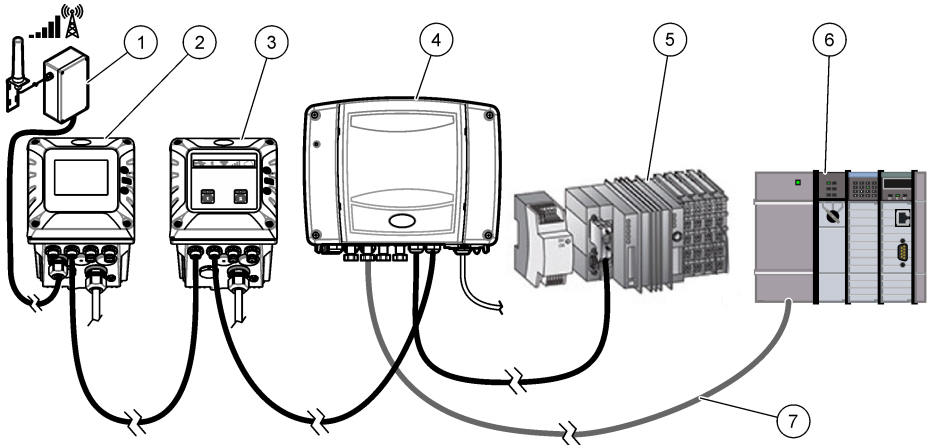   **g.** Select **HCNB menu** > **HCNB**. Select **On**. Push **Ok** to resart the controller.

5.2.5 Claros and HCNB through cellular connection with internet sharing (+RTC)

Note: Make sure to accurately follow the hardware connection and the configuration of the topology.

Note: If some preliminary settings in the Connectivity menu were changed, it is recommended to go back to the factory settings. Refer to the controller user manual.

- All of the controllers connect to the same network segment.
- All of the controllers connect to the HCNB.
- Controller 1 connects to Claros using cellular and shares the connection through LAN. Controller 1 also connects to the HCNB through this LAN.
- Controller 2 connects to Claros and HCNB through LAN.
- Controller 3 connects to Claros and HCNB though a LAN and connects to a PLC through Industrial Ethernet protocols, Profibus DP or a mA output.

1	Cellular USB box	5	RTC
2	Controller 1, SC4500	6	PLC (refer to the documentation supplied with the controller, PROFINET module and EtherNet/IP module to configure the PLC)
3	Controller 2, SC4200c	7	IProfibus DP or 4-20 mA connection
4	Controller 3, SC1500		

1. Set the Controller 1 configuration as follows:

   a. Push the main menu icon, then select **Controller** > **Connectivity** > **Claros**. Set to on.
   b. Select **Controller** > **Connectivity** > **LAN** > **Ethernet ports**. Select **Chaining**.
   c. Select **Controller** > **Connectivity** > **Cellular**. To configure the cellular network refer to Cellular network connection on page 6.
   d. Select **Controller** > **Connectivity** > **Cellular** > **Internet sharing**. Set to On (default: Off)
   e. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.
   f. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.
   g. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.
   h. Select **Controller** > **Connectivity** > **HCNB** > **HCNB**. Select **On**. Push **OK** to restart the controller.

      Note: Wait until the controller restarts. Do not touch the display or go to other menus or an error message will show.

2. Set the Controller 2 configuration as follows:

   a. Enable the network sharing configuration. Refer to Share the LAN on page 9.

b. Connect the controller to Claros.

   c. Go to the Claros interface and select MSM. Then, select the device.

   d. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

   e. Select **HCNB menu** > **Port**. Enter 5445.

   f. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

   g. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

   h. Select **HCNB menu** > **HCNB**. Select **On**. Push **Ok** to resart the controller.

3. Set the Controller 3 configuration as follows:

   Note: Make sure to connect the Ethernet LAN cable to right M12 connector and LAN cable for daisy chain to left M12 connector.

   a. Connect the controller to Claros.

   b. Go to the Claros interface and select MSM. Then, select the device.

   c. Go to **Controller** > **Connectivity** > **HCNB** > **HCNB**. Make sure that HCNB is set to **Off**.

   d. Select **HCNB menu** > **Port**. Enter 5445.

   e. Select **Controller** > **Connectivity** > **HCNB** > **Interface**. Select **ALL**.

   f. Select **Controller** > **Connectivity** > **HCNB** > **Auto detection**. Select **On**.

   g. Select **HCNB menu** > **HCNB**. Select **On**. Push **Ok** to resart the controller.

Section 6 Manufacturer-approved connection devices

Table 2 shows the connection devices that can connect to the controllers. Only use the manufacturer-approved connection devices from Table 2.

Table 2 Manufacturer-approved connection devices

Devices	Sofware version	Description
Amtax sc	V2.30 (2018) or higher	Ammonium analyzer
A-ISE sc	V1.02 or higher	Ammonium ion-selective sensor
AN-ISE sc	V1.08 (2013) or higher	Ammonium and nitrate ion-selective sensor
N-ISE sc	V1.02 or higher	Nitrate ion-selective sensor
Nitratax clear sc Nitratax eco sc Nitratax plus sc	V3.13 (2013) or higher	Nitrate optical sensor
Phosphax sc	V2.30 (2018) or higher	Phosphate analyzer
Phosphax sc LR/MR/HR	V1.01 (2018)or higher	
TSS sc	V41.73 (2013) or higher	Turbidity and suspended solids sensor
Solitax sc	V2.20 (2013) or higher	
TU5300sc TU5400sc	V1.34 (2017)or higher	Turbidimeter
SS7 sc (in Bypass)	V1.06 (2006) or higher	
Ultraturb sc	V3.06 (2017) or higher	
1720E	V2.10 (2006) or higher	
Sonatax sc	V1.15 (2016) or higher	Sludge level sensor
CL17sc	V2.7 (2019) or higher	Colorimetric chlorine analyzer

Table 2 Manufacturer-approved connection devices (continued)

Devices	Sofware version	Description
CL10sc	V1.14 (2013) or higher	Amperometric chlorine analyzer
9184sc	V2.03 (2013) or higher	
9185sc	V2.03 (2013) or higher	Amperometric ozone sensor
9187sc[17]	V2.03 (2013) or higher	Chlorine dioxide amperometric sensor
Uvas plus sc	V3.01 (2017) or higher	Organic load sensor
LDO 2 sc	V1.22 (2013) or higher	Luminescent dissolved oxygen sensor
3798sc[17]	V2.03 (2013) or higher	Conductivity sensor
3700sc + Inductive Conductive Digital Gateway 6120800	V3.00 (2017) or higher	
3422sc, Analog 3400 + Contacting Cond. Digital Gateway 6120700	V3.00 or higher	
pHD sc[17] pHD-S sc	V3.10 (2016) or higher	pH sensor
1200-S sc[17]	V2.04 (2013) or higher	
pHD analog + Digital Gateway 6120500	V3.00 (2017) or higher	pH sensor + Digital Gateway
RC and PC analog sensor + Digital Gateway for conventional analog pH and ORP sensors 6120600	V3.00 (2017) or higher	Combination Digital Gateway
8362sc[17]	V3.00 (2017) or higher	pH and ORP high purity sensor

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[17] Hardware version 1 of instrument is not supported.

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