






INSTALLATION MANUAL

R203 Series

PRELIMINARY WARNINGS

The word **WARNING** preceded by the symbol  indicates conditions or actions that put the user's safety at risk. The word **ATTENTION** preceded by the symbol  indicates conditions or actions that might damage the instrument or the connected equipment.

The warranty shall become null and void in the event of improper use or tampering with the module or devices supplied by the manufacturer as necessary for its correct operation, and if the instructions contained in this manual are not followed.

| | |
|--|--|
|  | WARNING: The full content of this manual must be read before any operation. The module must only be used by qualified electricians. Specific documentation is available using the QR-CODE shown on page 1. |
|  | The module must be repaired and damaged parts replaced by the Manufacturer. The product is sensitive to electrostatic discharges. Take appropriate measures during any operation. |
|  | Electrical and electronic waste disposal (applicable in the European Union and other countries with recycling). The symbol on the product or its packaging shows the product must be surrendered to a collection centre authorized to recycle electrical and electronic waste. |



R203
DOCUMENTATION



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CONTACT INFORMATION

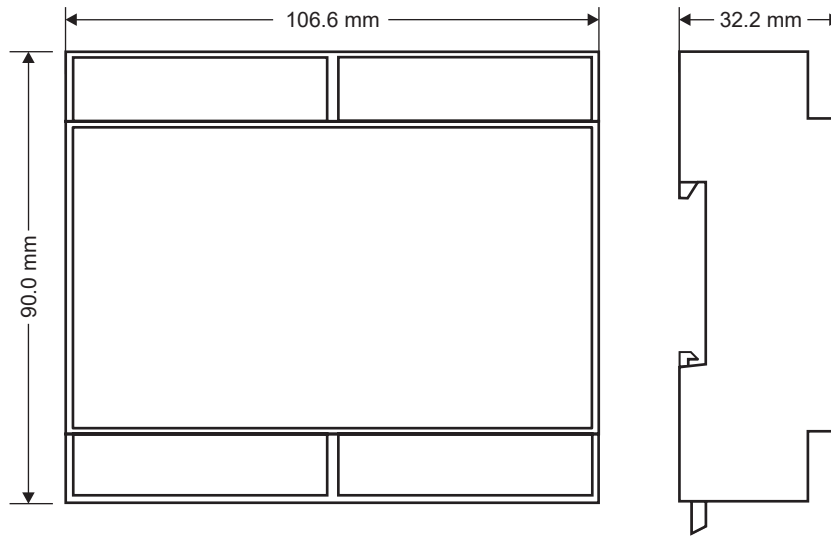
| | | | |
|-------------------|--------------------|---------------------|-----------------------|
| Technical support | supporto@seneca.it | Product information | commerciale@seneca.it |
|-------------------|--------------------|---------------------|-----------------------|

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The content of this document corresponds to the described products and technologies.

Stated data may be modified or supplemented for technical and/or sales purposes.

MODULE LAYOUT




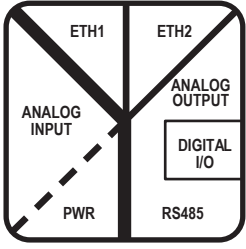
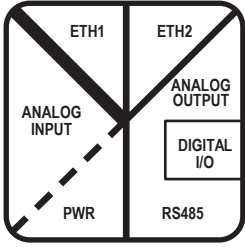


Weight: 170 g; **Enclosure:** UL94-V0 self-extinguishing PC/ABS material, black.

SIGNALS VIA LED ON FRONT PANEL

| LED | STATUS | LED meaning |
|-------------------------|----------|---|
| DO1 | On | Output 01 activated |
| | Off | Output 01 deactivated |
| DO2 | On | Output 02 activated |
| | Off | Output 02 deactivated |
| DI1 | On | Input 01 activated |
| | Off | Input 01 deactivated |
| DI2 | On | Input 02 activated |
| | Off | Input 02 deactivated |
| DATA LOGGER | ON | Data Logger function enabled |
| | Flashing | LOG sending error |
| | Off | Data Logger function disabled |
| STS (Only R-203-2) | On | Set IP address (powered module) |
| | Flashing | Waiting for the IP address from the DHCP (powered module) |
| STS (Only R-203-2-P) | Off | No IP address set |
| | On | IP address set |
| | Flashing | Active Profinet communication |
| STS (Only R-203-2-E) | On | Set IP address (powered module) |
| | Flashing | Ethernet/IP communication active |
| WIRING ERROR | Flashing | Wiring error |
| | Off | Correct wiring |
| RX | On | RS485 connection anomaly |
| | Flashing | Reception of data packet completed on RS485 |
| TX | Flashing | Transmission of data packet completed on RS485 |
| ETH TRF (Yellow) | Flashing | Packet transit on Ethernet port |
| ETH LNK (Green) | Flashing | Ethernet port connected |

TECHNICAL SPECIFICATIONS

| | | |
|--|---|--|
| CERTIFICATIONS |    | |
| INSULATION |  <p style="text-align: center;">R203-2-H</p> |  <p style="text-align: center;">R203-2-L</p> <div style="margin-top: 10px;"> <p>KEY:</p> <p>— 50 V</p> <p>— 1500 Vac</p> <p>- - 3000 Vac*</p> <p>— 3500 Vac*</p> <p>*: Rated withstand voltage</p> </div> |
| ENVIRONMENTAL CONDITIONS | <p>Temperature: -25°C ÷ +65°C</p> <p>Humidity: 30% ÷ 90% non condensing.</p> <p>Storage temperature: -30°C ÷ + 85°C</p> <p>Degree of protection: IP20</p> | |
| ASSEMBLY | DIN rail 35mm IEC EN60715, wall or panel with screws. | |
| CONNECTIONS | Screw terminals 5 mm, 7.5 mm and 3.5 mm pitch (RS485), cable with section <2.5 mm ² | |
| POWER SUPPLY | <p>Voltage: 90 ÷ 264Vac @ 50 ÷ 60Hz, max absorption: 2.5W / 4VA (only R203-2-H)</p> <p>Voltage: 10 ÷ 30Vdc, max absorption: 2.5W / 4VA (only R203-2-L)</p> | |
| COMMUNICATION PORTS | <p>RS485: Baud rate: 1200 ÷ 115200 baud (for further information see the user manual).</p> <p>Ethernet ports 2 (model R203-2); 1 (model R203-1)</p> | |
| VOLTAGE INPUT | Voltage | Up to 600 Vac, frequency 45 ÷ 65Hz Minimum voltage 5 V (F.S. 150 Vac); 20 V (F.S. 600 Vac) |
| ANALOGUE INPUT TA / TA (mV) | Current input | Current input for TA: 1 ÷ 5A full scale. Voltage input (mV) for TA with voltage or Rogowski output: up to 250 mV. |
| | Base prec. (*) | Network frequency: 50 ÷ 60 Hz. Voltmeter: 0.2% Ammeter: 0.2%, wattmeter: 0.5% |
| (*) See the user manual for the error limits. | | |
| ROGOWSKI ANALOGUE INPUT (100 mV/kA) | Class / base prec. (*) | Network frequency: 50 ÷ 60 Hz. Voltmeter: 0.5% Ammeter: 0.5%, wattmeter: 1% |
| | Rogowski supplied by Seneca | <ul style="list-style-type: none"> • 100 mV correspond to 1000 A @ 50 Hz (sinusoidal) • 120 mV correspond to 1000 A @ 60 Hz (sinusoidal) <p>Maximum measurable current: 2500A @50Hz, 2000A @60Hz Precision after calibration: ± 1 % (see chapter "Rogowski sensor") Linearity: ± 0.2 %</p> |
| (*) Accuracy is guaranteed in the ranges: CosΦ > 0.5; Vrms: 40 ÷ 600 Vac; Irms: 5 - 100% Rogowski current (error due to external Rogowski sensors excluded). See the user manual for the error limits. | | |
| ANALOGUE OUTPUT | <p>Voltage: 0 ÷ 10Vdc, minimum load resistance: 2kΩ</p> <p>Current: 0 ÷ 20 mA, max. load resistance: 500Ω</p> <p>Transmission error: 0.1% of maximum field</p> <p>Response time: 1 s (10% ÷ 90%)</p> <p>Temperature drift: 100 ppm/K</p> | |
| DIGITAL INPUT | For the technical specifications, see the electrical connection diagrams on page 5 | |
| DIGITAL OUTPUT | For the technical specifications, see the electrical connection diagrams on page 5 | |
| COUNTERS | Number of counters: 2 at 32 bit, maximum speed: 5 KHz | |
| INSTALLATION CATEGORY | <p>Category III (up to 600 V) in a direct connection (only R203-2-H)</p> <p>Category III (up to 300 V) in a direct connection (only R203-2-L)</p> | |

⚠ CAUTION

This is a Class A product. In a residential environment this equipment may cause radio interference. In this case, the user may have to take adequate countermeasures.

ROGOWSKI SENSOR

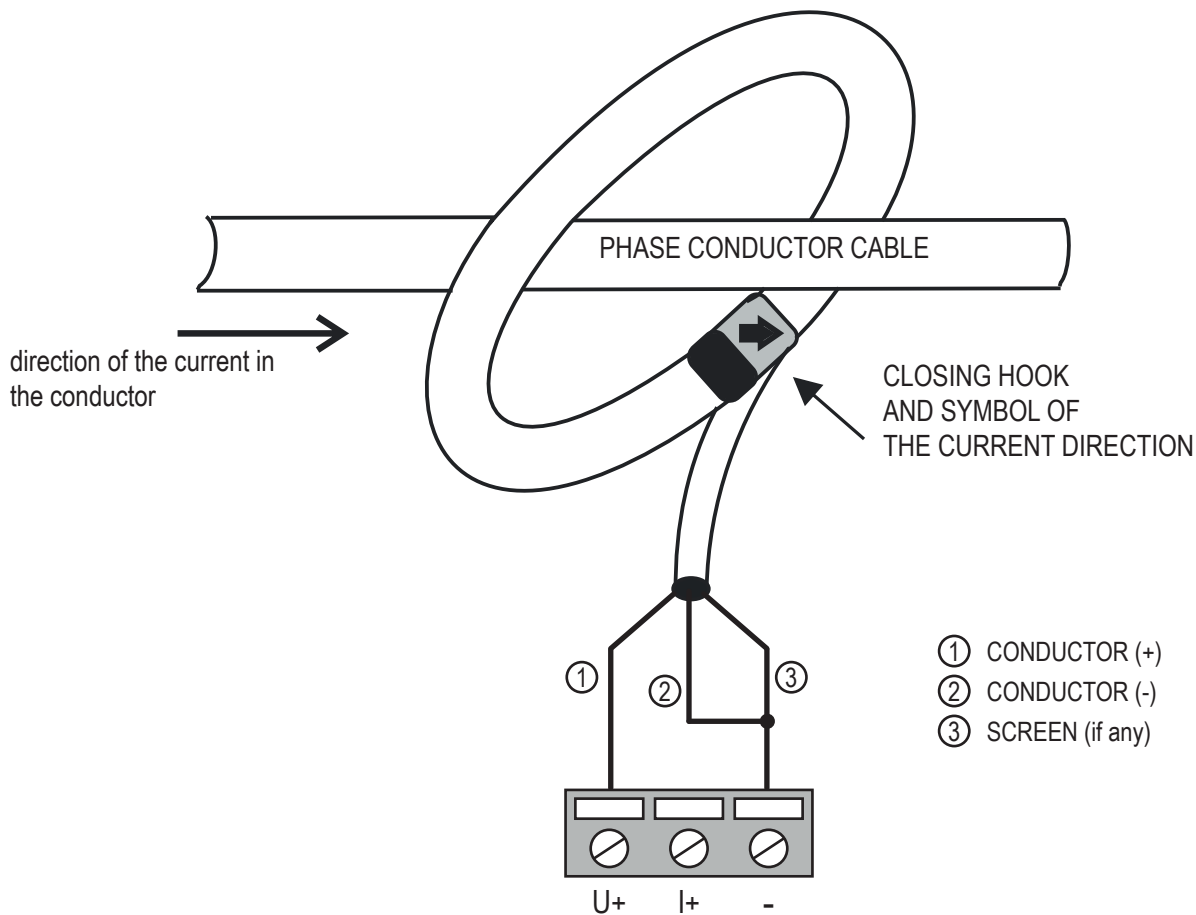
The Rogowski sensor is a ring-shaped device designed for measuring AC, impulsive or complex waveforms.

For its correct use:

- wrap the ring on the conductor so that the arrow symbol on the ring points in the same direction as the current in the conductor
- make sure the connections are made correctly
- for a more precise measurement, the conductor wire must be placed in a central position with respect to the ring
- for a correct measurement, calibrate the Rogowski sensor by writing the calibration coefficient in the corresponding Modbus register (see the user manual).

Example: if the sensor is supplied with a characteristic of 90 mV / 1000 A, on the calibration register corresponding to the phase in which the Rogowski sensor is applied, the value to be set is: $1000 / (90 \cdot 10) = 1.11$

NOTE ON ACCURACY: The product has a nominal accuracy of 0.5%. The total accuracy is the sum between the accuracy of the device and the accuracy of the Rogowski sensor connected to it.



DIP - SWITCH SETTINGS

⚠ WARNING

The DIP-switch settings are read only at boot time. At each change, perform a restart.

For use and settings via DIP-SWITCH, see the user manual available on the website on the web page dedicated to the product.

ELECTRICAL CONNECTIONS

SUPPLY R203-2-H



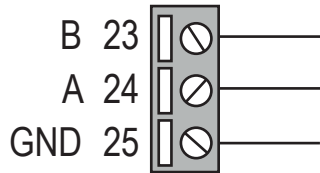
The power supply is connected to terminals 40 and 41.
The supply voltage must be:
90 ÷ 264 Vac, 50 ÷ 60 Hz
It is advisable to insert a 1 A slow-blow fuse

SUPPLY R203-2- L



The power supply is connected to terminals 40 and 41.
The supply voltage must be: 10 ÷ 30Vdc.
It is advisable to insert a 1 A slow-blow fuse

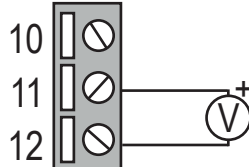
RS485



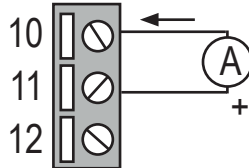
There is no isolation between RS485 and analogue output

ANALOGUE OUTPUT

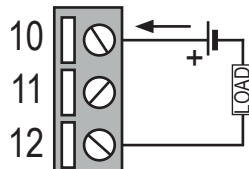
Voltage



Applied current

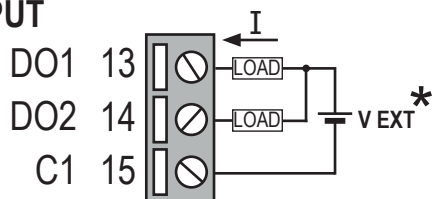


Supply current external



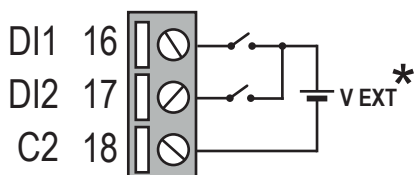
The device provides a voltage output (0 ÷ 10 Vdc) or programmable active or passive current (0 ÷ 20 mA). For the electrical connections, screened cables are recommended.
There is no isolation between RS485 and retransmitted output.
It is necessary to program the outputs to use them correctly.

DIGITAL OUTPUT



The device has two digital outputs.
Capacity: $I_{max} = 50 \text{ mA}$ $V_{max} = 28\text{V}$. See the user manual for the functions.
*: Reversible polarity.

DIGITAL INPUT



The device is equipped with two digital inputs that can be activated with voltage from 12 to 24 V. See the user manual for the functions.
*: Reversible polarity.

ELECTRICAL CONNECTIONS

⚠ CAUTION

The installation of this appliance must only be carried out by qualified personnel.

Check that the device plate data (measurement voltage, auxiliary power supply voltage, measurement current, frequency) match the actual data of the network to which the instrument is connected. In the wiring, strictly observe the insertion diagram; inaccuracy in the connections inevitably causes false measurements or damage to the instrument.

Once the instrument is connected, complete the installation with the device configuration.

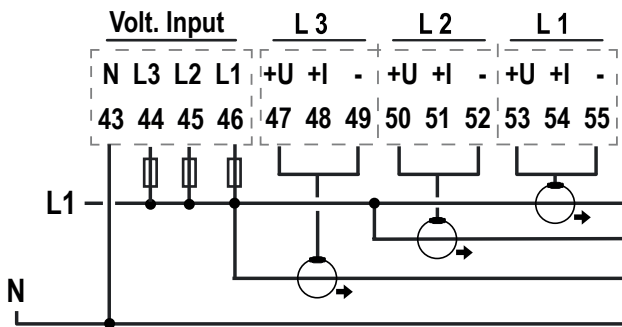
The earth connection of the secondary of CTs with current, voltage or rogowski output is possible on the negative terminal. In the case of rogowski sensors, the screen must always be connected to the negative terminal.

Current measurement is only possible using current transformers.

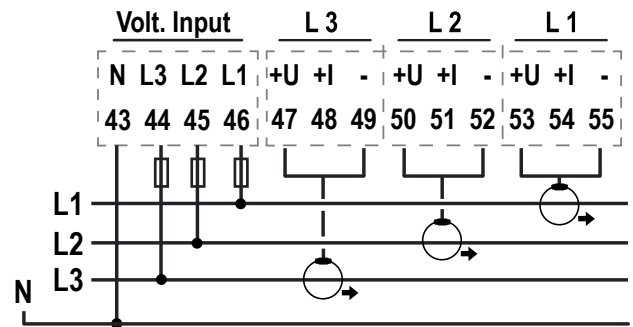
It is advisable to insert a slow-blow 1 A fuse as indicated in the diagrams below.

CONNECTIONS FOR ROGOWSKI SENSORS

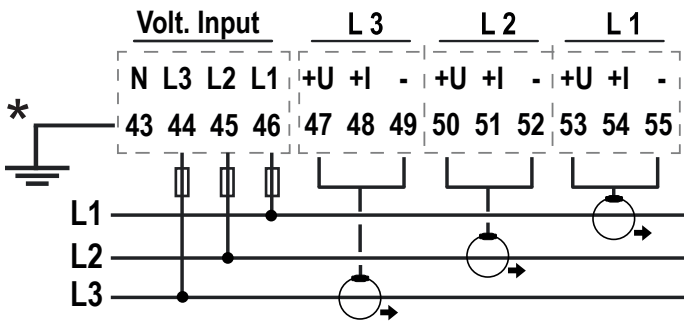
SINGLE-PHASE (with load sharing)



THREE-PHASE: 4 wires



THREE-PHASE: 3 wires



⚠ CAUTION

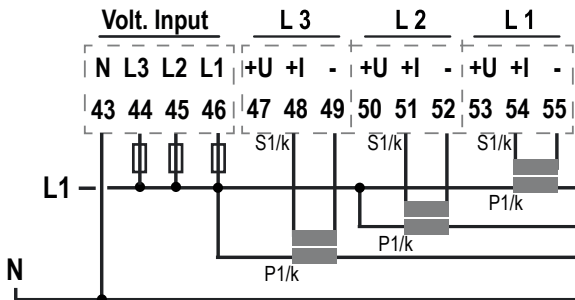
The inputs for the Rogowski sensors are of the **non-inverting type**.

For the electrical connections, refer to the Rogowski sensor manual.

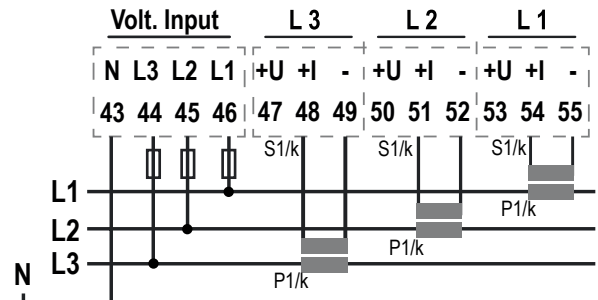
* Optional

CONNECTIONS FOR CURRENT OUTPUT TA

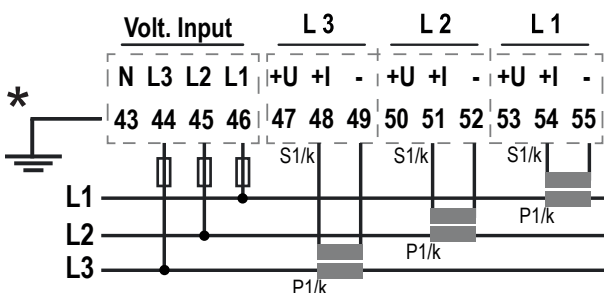
SINGLE-PHASE (with load sharing)



THREE-PHASE: 4 wires



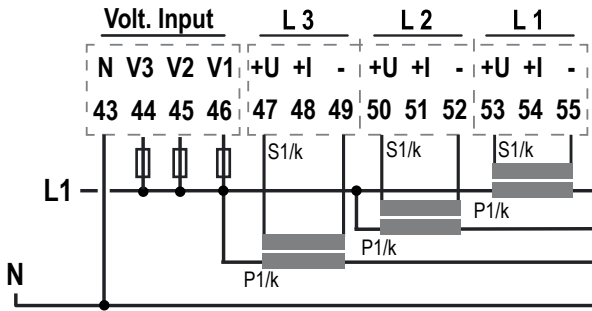
THREE-PHASE: 3 wires



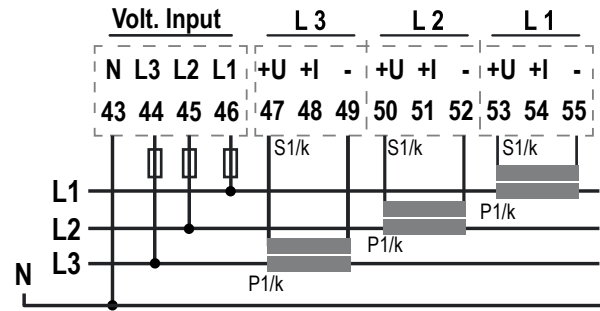
* Optional

CONNECTIONS FOR VOLTAGE OUTPUT TA (mV)

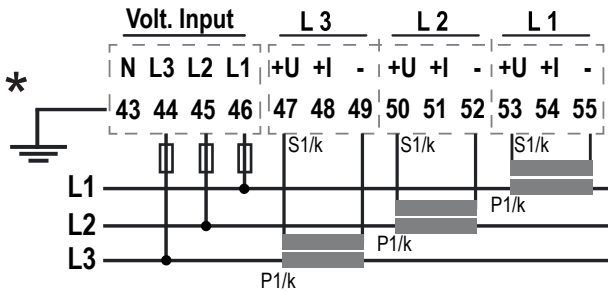
SINGLE-PHASE (with load sharing)



THREE-PHASE: 4 wires

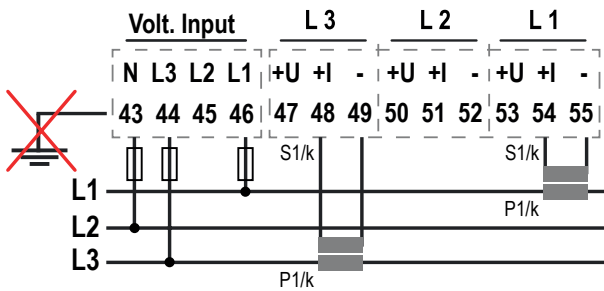


THREE-PHASE: 3 wires



* Optional

CONNECTIONS FOR ARON INSERTION



The same circuit diagram can be applied for connections of Rogowski sensors and CTs with mV outputs.

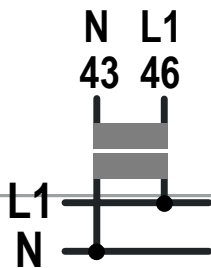
The Aron insertion link is usable from Firmware revision 1030 for model R203 and Firmware revision 1024 for model R203-P.

⚠ ATTENTION

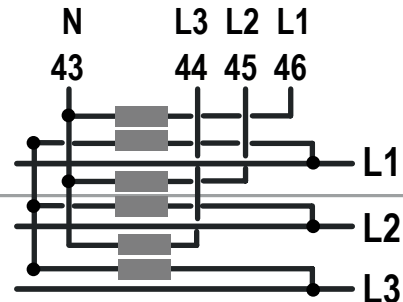
Grounding via terminal 43 is forbidden, otherwise the system to which the instrument is connected will be damaged.

TV CONNECTIONS

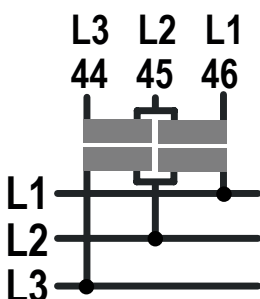
SINGLE-PHASE



THREE-PHASE: 4 wires



THREE-PHASE: 3 wires



FACTORY IP ADDRESS

The default module IP address is static: 192. 168. 90. 101

In the R-203-X-P version, the module is supplied without an IP address (0.0.0).

WEB SERVER

To access the Web Server with the factory IP address above, use the following credentials:

Username: admin; **Password:** admin

⚠ CAUTION

DO NOT USE DEVICES WITH THE SAME IP ADDRESS IN THE SAME ETHERNET NETWORK.

ETHERNET CONNECTION RULES

For the Ethernet cabling between the devices, the use of the shielded CAT5 or CAT5e cable is required.

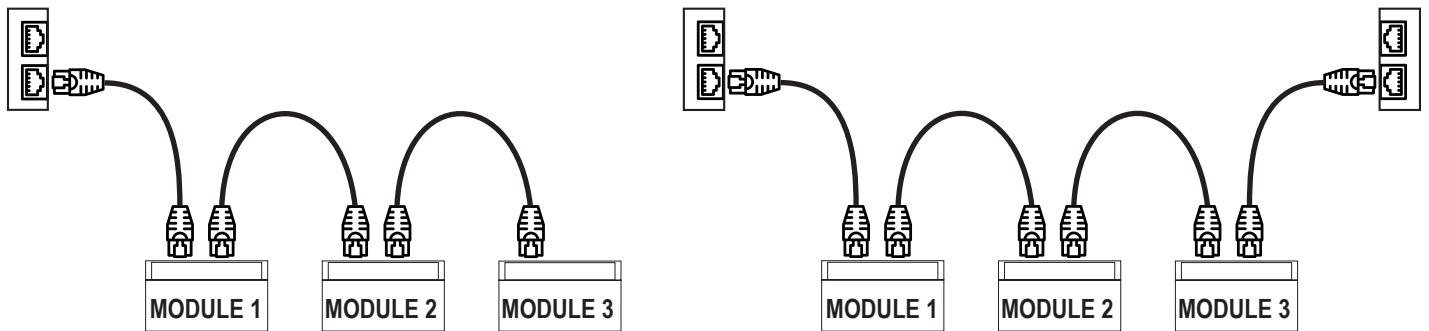
DAISY-CHAIN ETHERNET CONNECTION

⚠ CAUTION

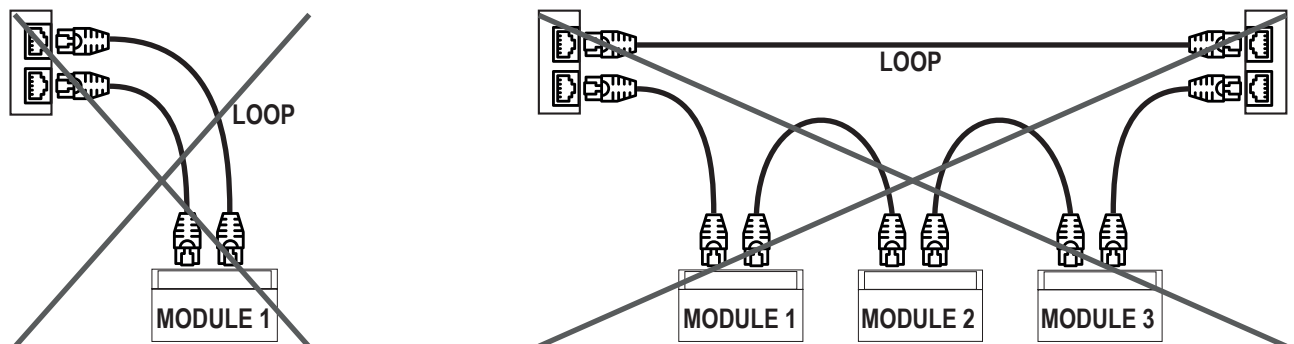
IT IS NOT ALLOWED TO CREATE LOOPS WITH ETHERNET CABLES

Using the daisy-chain connection it is not necessary to use switches to connect the devices.

The following examples show the correct connections.



There must be no loops in the Ethernet cabling, otherwise the communication will not work. The modules and switches must be connected eliminating any loops. The following examples show the incorrect connections.



The LAN fault-bypass function allows you to keep the connection between the two Ethernet ports of the device ON, in the event of a power failure. If a device turns off, the chain is not interrupted and the devices downstream of the switched-off one will still be accessible. This function has a limited duration: the connection remains active for a few days, typically 4. The fault-bypass function requires that the sum of the lengths of the two cables connected to the switched off module is less than 100m.