Installation Instructions - Mounting
IQ422, IQ4NC/00, IQ4NC/12 Controllers

Important: Retain these instructions

These instructions shall be used by trained service personnel only. If the equipment is used in a manner not specified by these instructions, the protection provided by the equipment may be impaired.

GB DE DK ES FI FR
IT NL NO PL RU SE

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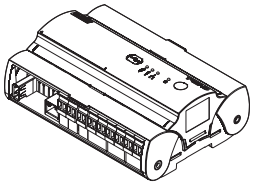
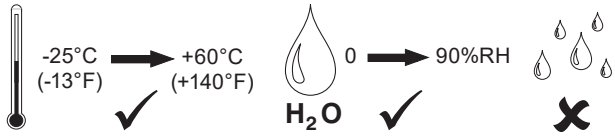
CONTENTS

1 BOX CONTENTS



IQ422,IQ4NC/00,IQ4NC/12 Installation Instructions - Mounting (TG201264)

2 STORING



Note: For temperatures below 0°C (32°F) special care must be taken that there is no condensation on or within the unit.

3 INSTALLATION

Labels used on IQ422, IQ4NC/00, IQ4NC/12

	Caution, consult documentation
	Caution, possibility of electric shock
1 2 3 N L 230VAC	230 Vac input power connector *(../230 only)*
1 2 3 0V 24V	24 Vac input power connector *(../24VAC only)*
	RS-232 local supervisor port *Note: This port provides power to connected RD or SDU product that is within the limits described by EN60950-1 (table 2B).*
80 81 WMB	Wallbus connector *(not IQ4NC/00/.. or IQ422/00/XNC/..)*
70 71 AUX / AUX C 72 73	Auxiliary supply output connectors *(not IQ4NC/00/.. or IQ422/00/XNC/..)*
n 1 n C	Universal input connector *(not IQ4NC/00/.. or IQ422/00/XNC/..)*
	USB (for future use)
	Terminator for MS/TP *(used on IQ4NC only)* or RS-485 *(used on IQ422/../XNC/.. only)*
MS/TP + − 82 83	MS/TP connector *(IQ4NC only)*
RS-485 + − 82 83	RS-485 connector *(used on IQ422/../XNC/.. & /INT only)*
OK RX	Ethernet connector/indicators

It is recommended that the installation should comply with the local electrical safety installation practices (e.g. HSE Memorandum of Guidance on Electricity at Work Regulations 1989, USA National Electric Code).

Any connected devices must be insulated from mains by reinforced insulation.

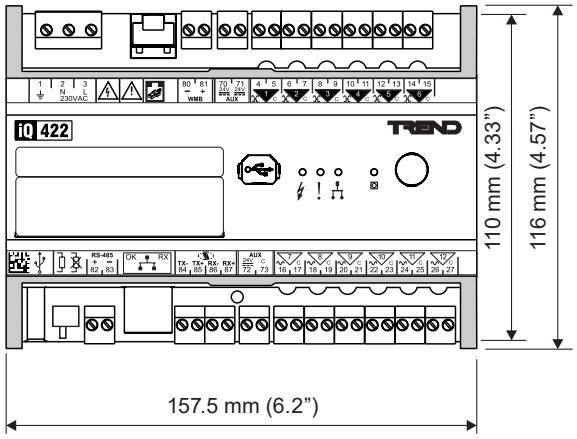
WARNING Removal of cover exposes dangerous voltages.

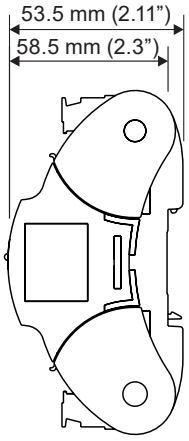
WARNING: To reduce the risk of electrical shock or fire do not interconnect the output of different Class 2 circuits.

TX+ TX− RX+ RX− 84 85 86 87	Trend current loop connector *(IQ4NC and ../LAN variants only)*
0V n n	Analogue output connector *(not IQ4NC/00/.. or IQ422/00/XNC/..)*
	USB local engineering port
	Power on indicator
!	Watchdog indicator
	LAN OK indicator
	Service button and indicator

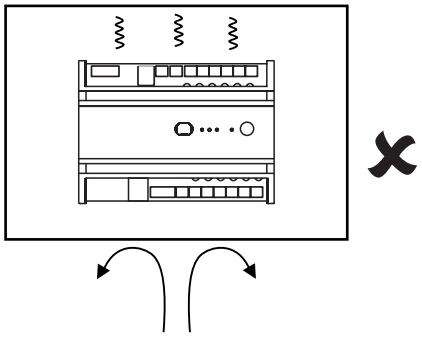
3 INSTALLATION (continued)

1 Dimensions

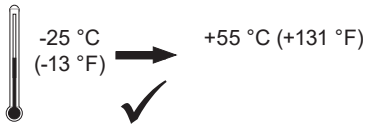




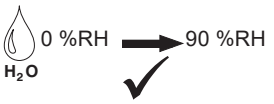
2 Mounting Requirements



Protection	IP20, NEMA1
Altitude	<4000 m (13124')
Pollution degree	2 (Only non-conducting pollution occurs)



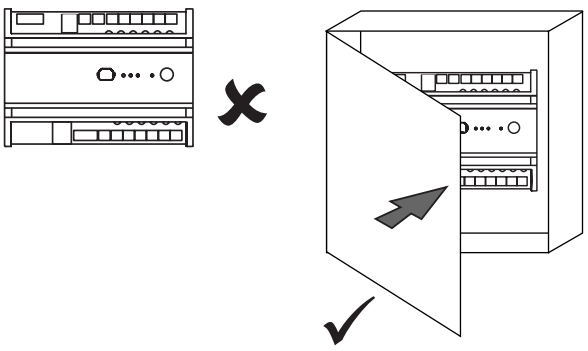
Note: For temperatures below 0°C (32°F) special care must be taken that there is no condensation on or within the unit.

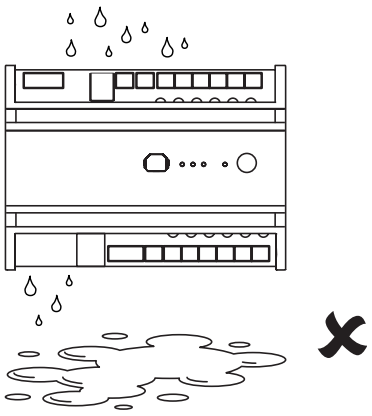


/24VAC: Should be installed in an enclosure or outside normal reach (e.g. in a plenum).

The unit is UL rated as 'UL916 listed open energy management equipment'.

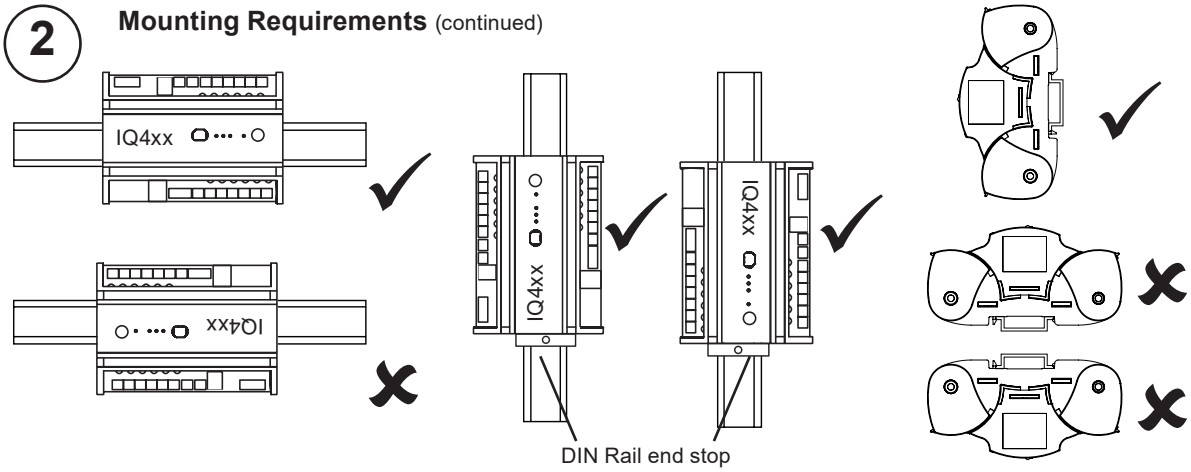
/230: **Must** be installed in an enclosure rated to at least IP20 or equivalent





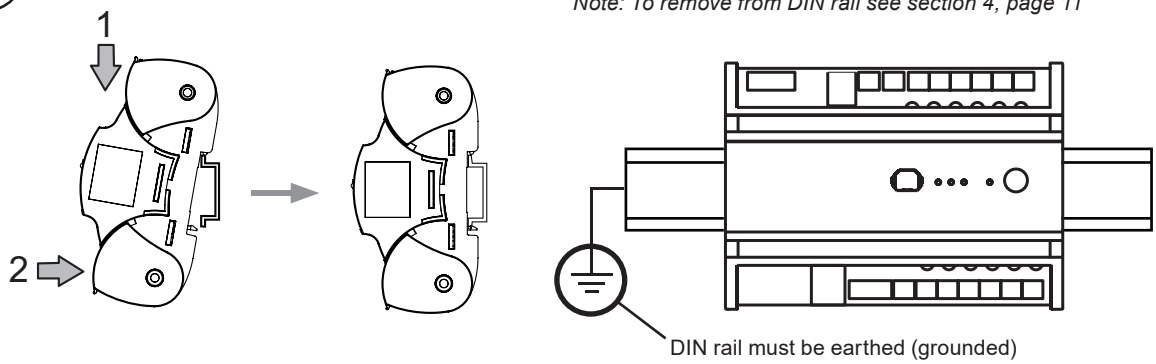
3 INSTALLATION (continued)

2 Mounting Requirements (continued)

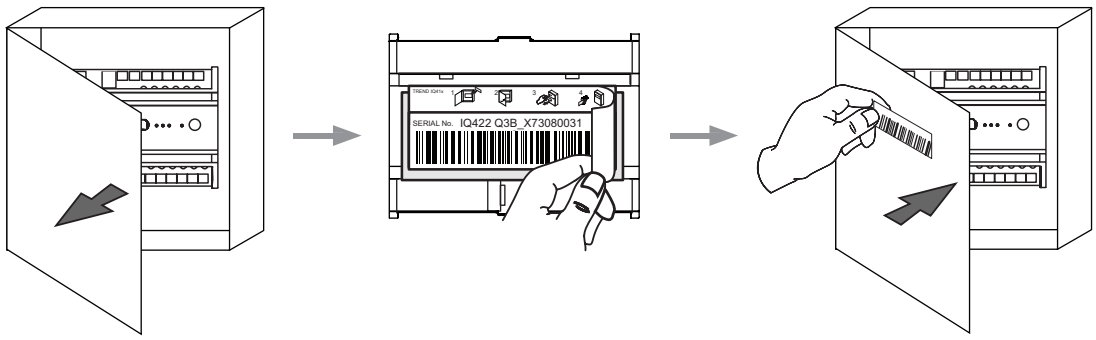


3 Mount Unit on DIN Rail

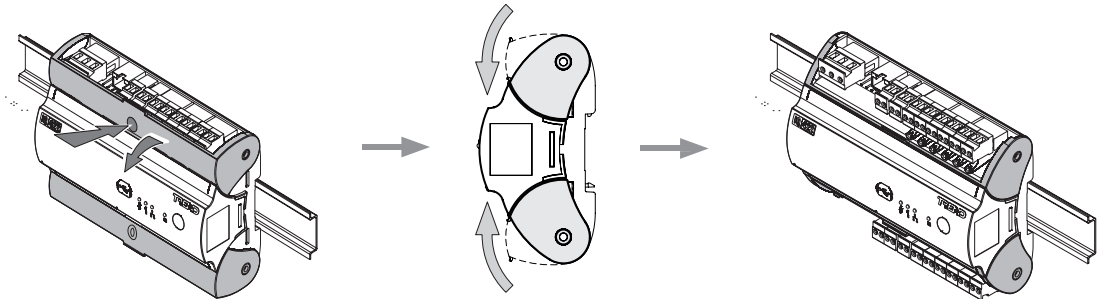
Note: To remove from DIN rail see section 4, page 11



4 Attach Large Barcode Label to Panel

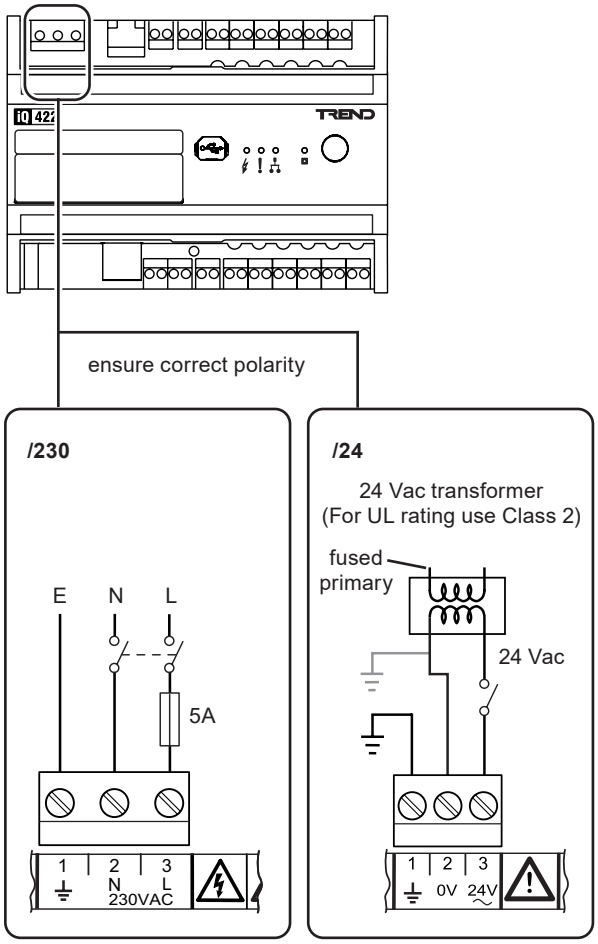


5 Open Rotating Covers



3 INSTALLATION (continued)

6 Connect Power



Terminal size: 0.14 to 2.5 mm² (22 to 12 AWG)
Terminal screw torque: 0.45 to 0.62 Nm (4 to 5.5 lb.in).

Power supply cable must have maximum operating temperature of at least 80°C (176°F). For UL rating the input power connections must be made using 18 AWG or larger wire rated at least 90ºC (194ºF).

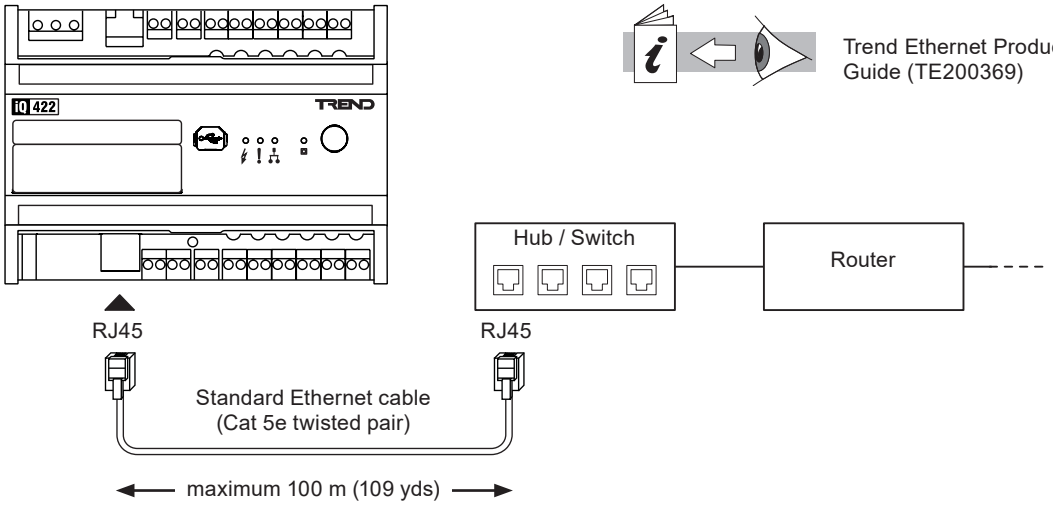
This equipment must be earthed (grounded).

/230 230 Vac ±10% 50/60 Hz at up to 44 VA
The 230 V supply must include a dedicated 5 A fuse complying with IEC60269 (BS1362) and a suitably rated switch in close proximity and be clearly marked as the disconnecting device for the unit. A 5 A circuit breaker with high breaking capacity may be used as an alternative.

/24VAC 24 Vac ±10% 50/60 Hz at up to 28 VA
The 24 V supply must include a suitably rated switch in close proximity and be clearly marked as the disconnecting device for the unit. If one side of the supply transformer's secondary is earthed (grounded), it **MUST** be connected to the controller's 0V terminal (terminal 2).

Do not position the equipment so that the disconnecting device is difficult to operate.

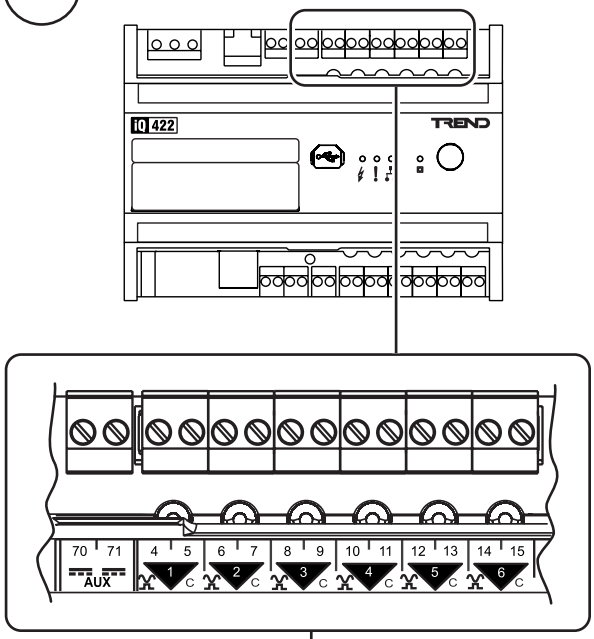
7 Connect Ethernet (if required)



Trend Ethernet Products Engineering Guide (TE200369)

3 INSTALLATION (continued)

8 Connect Universal Inputs IN1 to IN6 (if required - not applicable to IQ4NC/00/..)



Terminal size: 0.14 to 2.5 mm² (22 to 12 AWG)
Terminal screw torque: 0.45 to 0.62 Nm (4 to 5.5 lb.in).

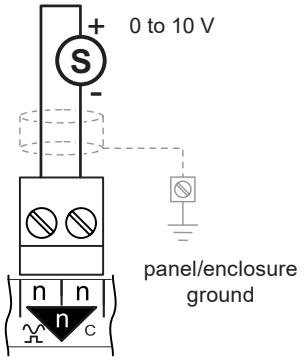
For UL rating use 22 to 14 AWG - Cu only cable. TP/1/1/22/HF/200 (Belden 8761) cable recommended for all inputs.

Screened cable is not generally required unless the cable passes through electrically noisy environments. Where it is used the screen must be connected to the local panel/enclosure ground and left unterminated at the far end.

Note: The input type (i.e. voltage, thermistor, digital or current) is defined in the controller's strategy.

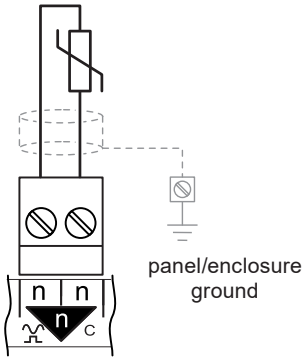
Voltage

ensure correct polarity

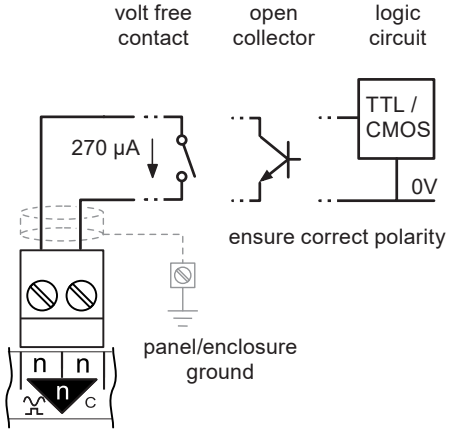


Thermistor

Thermistor 10 kohm
Potentiometer 1 to 11 kohm

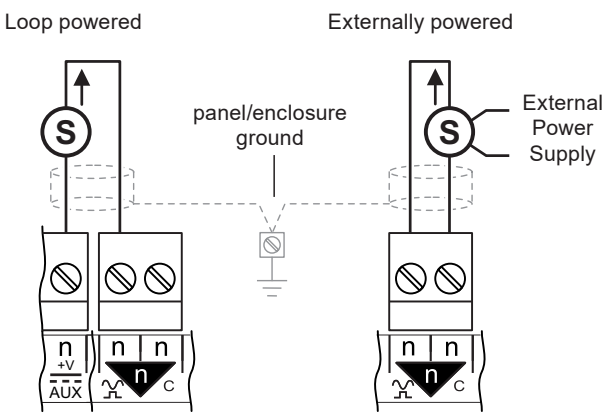


Digital



Current input

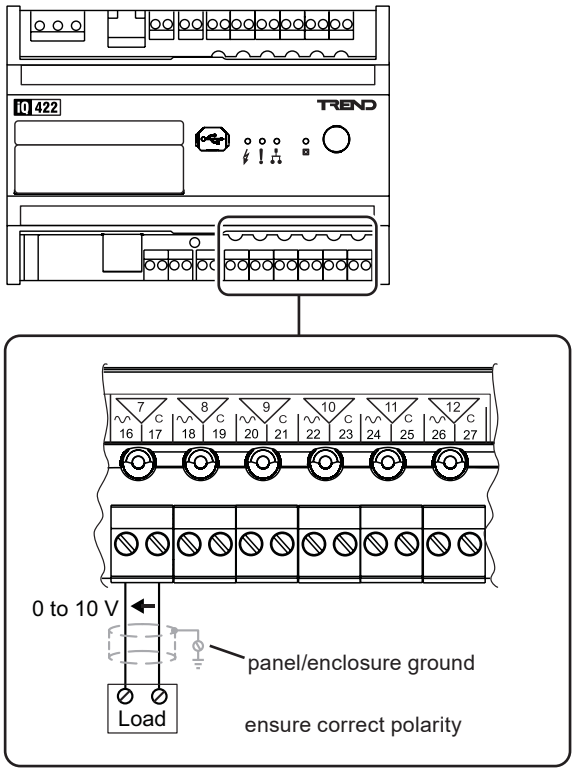
ensure correct polarity



Auxiliary output supply (AUX) - see step 10.

3 INSTALLATION (continued)

9 Connect Analogue Outputs OUT7 to OUT12 (if required - not applicable to IQ4NC/00/..)



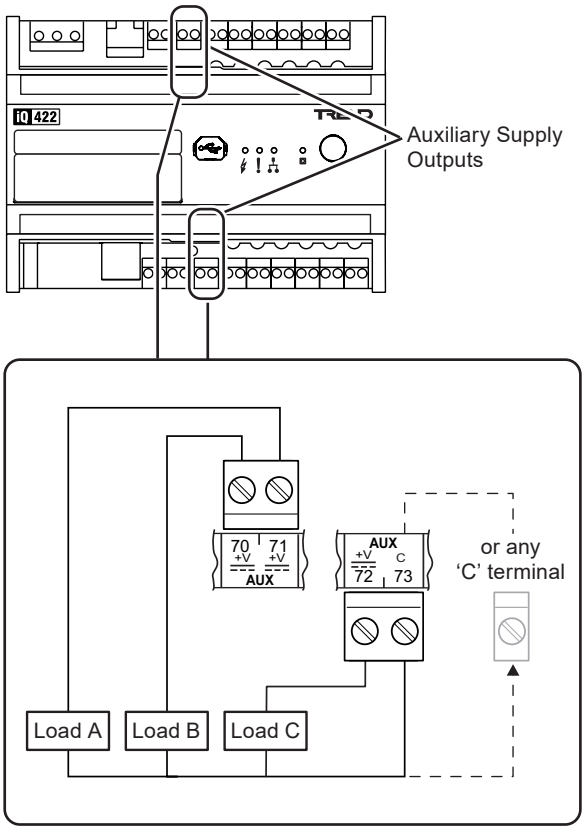
0 to 10 Vdc at up to 20 mA, reduce to 18 mA maximum above +40°C (+104°F). *Note: for /24VAC version see combined supply limitation in step 10.*

Terminal size: 0.14 to 2.5 mm² (22 to 12 AWG)
Terminal screw torque: 0.45 to 0.62 Nm (4 to 5.5 lb.in).

For UL rating use 22 to 14 AWG - Cu only cable. TP/1/1/22/HF/200 (Belden 8761) cable recommended for analogue outputs.

Screened cable is not generally required unless the cable passes through electrically noisy environments. Where it is used the screen must be connected to the local panel/enclosure ground and left unterminated at the far end.

10 Connect Auxiliary Supply Output (if required - not applicable to IQ4NC/00/..)



20 Vdc ±10%. Return through terminal 73 and other 'C' terminals.

/230: 120 mA maximum shared between terminals 70, 71, plus 120 mA maximum from terminal 72

/24VAC: 240 mA maximum shared between all three terminals, 70, 71, 72. Reduce maximum current to 200 mA above 40 °C. The combined current from the auxiliary supply outputs, Wallbus, RS232, and analogue outputs is 240 mA. Exceeding this current may cause the auxiliary supply output voltage to fall out of specification.

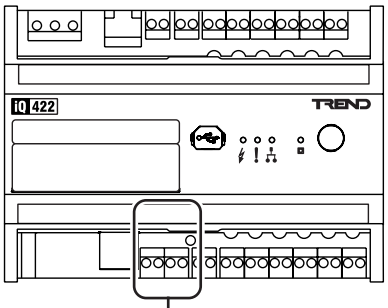
Use to power sensors.
e.g. loop powered sensors - see step 8.

Terminal size: 0.14 to 2.5 mm² (22 to 12 AWG)
Terminal screw torque: 0.45 to 0.62 Nm (4 to 5.5 lb.in).

For UL rating use 22 to 14 AWG - Cu only cable. TP/1/1/22/HF/200 (Belden 8761) cable recommended for auxiliary supply output.

3 INSTALLATION (continued)

11 Connect Trend Current Loop Network (if required - applicable to IQ4NC or IQ422/LAN only)



Terminal size: 0.14 to 2.5 mm² (22 to 12 AWG).
Terminal screw torque: 0.45 to 0.62 Nm (4 to 5.5 lb.in).

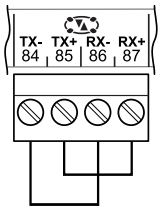
Maximum cable length depends on cable type, see table below:

Cable	Type	Baud Rate				
		1k2	4k8	9k6	19k2	38k4
Trend TP/2/2/22/HF/200 Belden 8723	Shielded twisted pair 2 pairs (4 conductors)	1000 m (1090 yds)			700m (765 yds)	350m (380 yds)
Trend TP/1/1/22/HF/200 Belden 8761	Shielded twisted pair 1 pair (2 conductors)					
Belden 9182 Belden 9207	Twinaxial (2 conductors)					

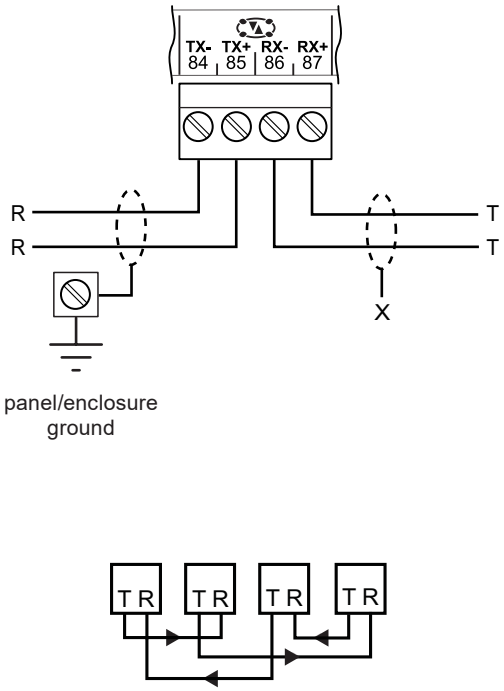
Note: Adjacent devices may specify different maximum cable lengths and baud rates. The shortest cable length (for the chosen baud rate) applies when connecting to the IQ422, IQ4NC/00, IQ4NC/12 current loop.

Not connected

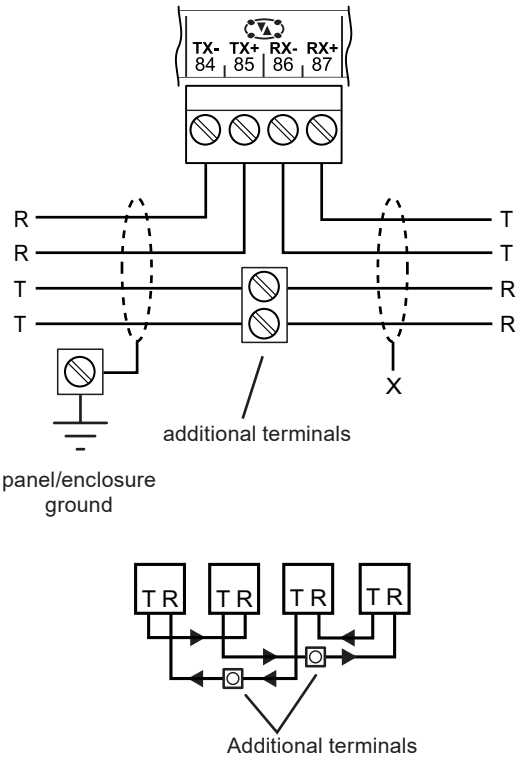
If the current loop Lan is enabled (default), the Lan communications will not operate without an intact network. If a network is not fitted a loop back must be fitted as shown.



2 wire system

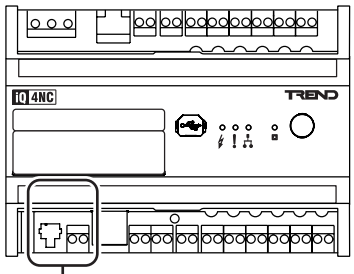


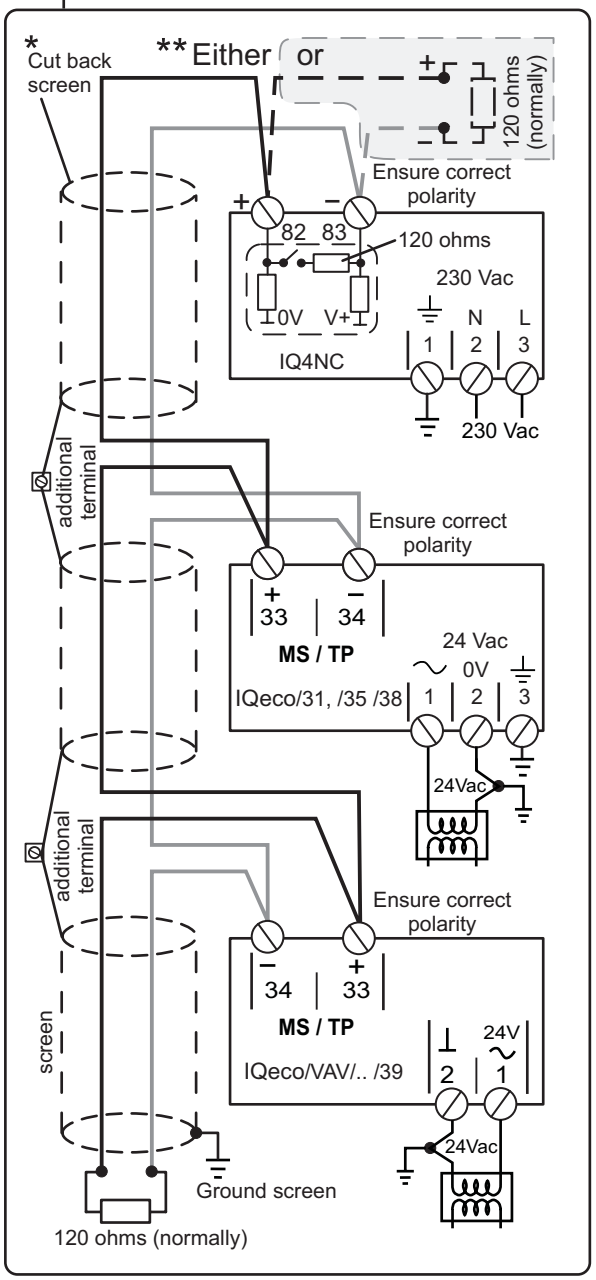
4 wire system



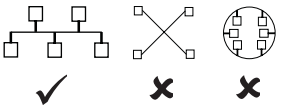
3 INSTALLATION (continued)

12 Connect MS/TP Trunk (if required - applicable to IQ4NC only)





Lay cable as bus topology (not loop or star).

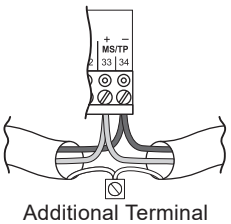


Ensure correct polarity. Ensure maximum number of devices described below is not exceeded.

Earthing: Connect all ground terminals and 24 Vac power supply neutrals to the panel/enclosure ground. Ensure normal safety earthing (grounding) practice.

Cable specification/Maximum length: Use tinned copper, screened, twisted-pair cable with characteristic impedance between 100 and 130 ohms. Distributed capacitance between conductors shall be less than 100 pF per meter (30 pF per foot). Distributed capacitance between conductors and screen shall be less that 200 pF per meter (60 pF per foot). Foil or braided screens are acceptable. The maximum recommended length of an MS/TP segment is 1200 meters (4000 feet) with AWG 18 (0.82 mm^2) conductor area) cable. There may be up to 3 repeaters between devices. The use of greater distances and/or different wire gauges shall comply with the electrical specifications of EIA-485. Details of recommended cable are given in the Trend TP Cable Data Sheet (TA200541).

***Screen** Each MS/TP segment must have a single point screen ground. Screen should be continuous. Do not ground the MS/TP screen using a controller terminal. Ground screen at one end and cut back at the other end. At connecting points, tie the screen through a terminal.



Additional Terminal

****Terminators:** The bus must be terminated at each end with a resistor matched to the cable characteristic impedance (i.e. ±1%, ¼ Watt, range 100 to 130 ohms). If the IQ4NC is at one end of a 120 ohm cable, switch in its built-in terminator, otherwise switch it out and fit a resistor at that end of the cable; the other end must be terminated with a matching resistor.

Maximum number of devices: There may be IQ4NC with up to 64 IQeco's or other manufacturers' devices on the MS/TP trunk. A separate limitation is that the MS/TP segment supports up to 32 'unit' loads. IQeco, IQ4NC and IQ3/BINC present a ¼ BACnet 'unit' load; other manufacturers' devices may have different 'unit' loads.

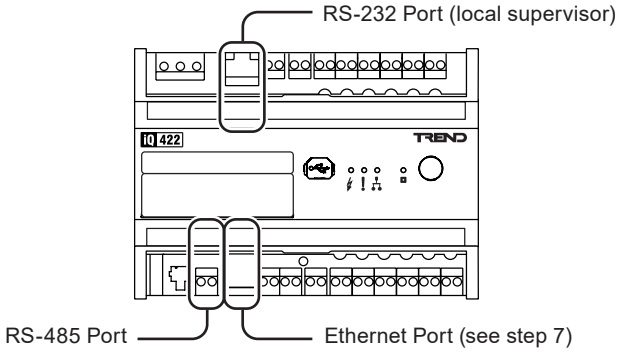
Biassing The IQ4NC provides network biassing (470 ohms); a maximum of two devices on the network can provide network biassing.

Failure to comply with these practices will result in significant impairment of the communication performance.

3 INSTALLATION (continued)

13 **Connect to XNC Interface** (../XNC variants only, if required)

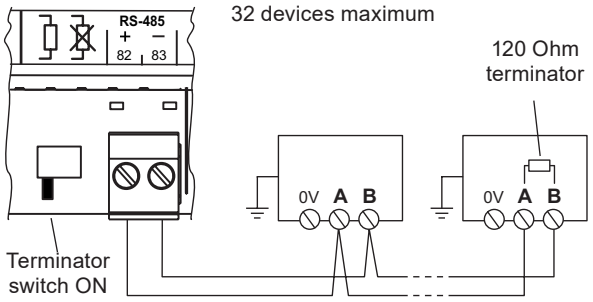
Connect using either the RS-485 Port, RS-232 Port (local supervisor) or Ethernet Port.

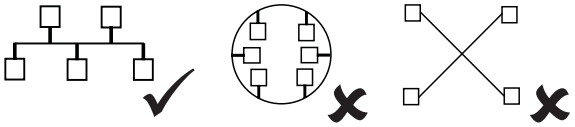


RS-485 2-wire system

Terminal size: 0.14 to 2.5 mm² (22 to 12 AWG).
Terminal screw torque: 0.45 to 0.62 Nm (4 to 5.5 lb.in).

32 devices maximum

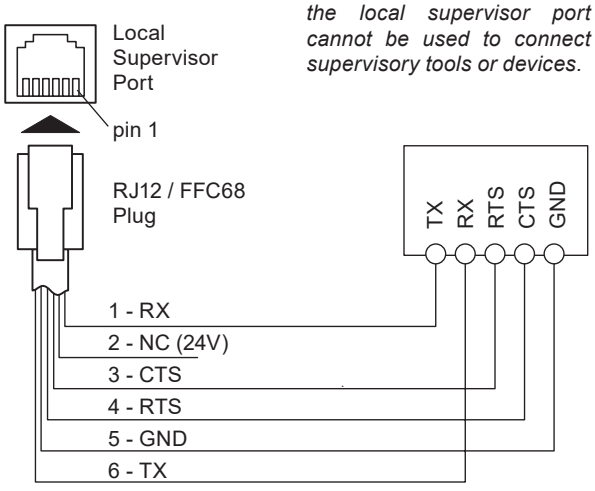




Note: For connection to an RS-485 4-wire system a suitable 2- to 4-wire converter will be required.

RS-232 system

Note: When in use for XNC the local supervisor port cannot be used to connect supervisory tools or devices.



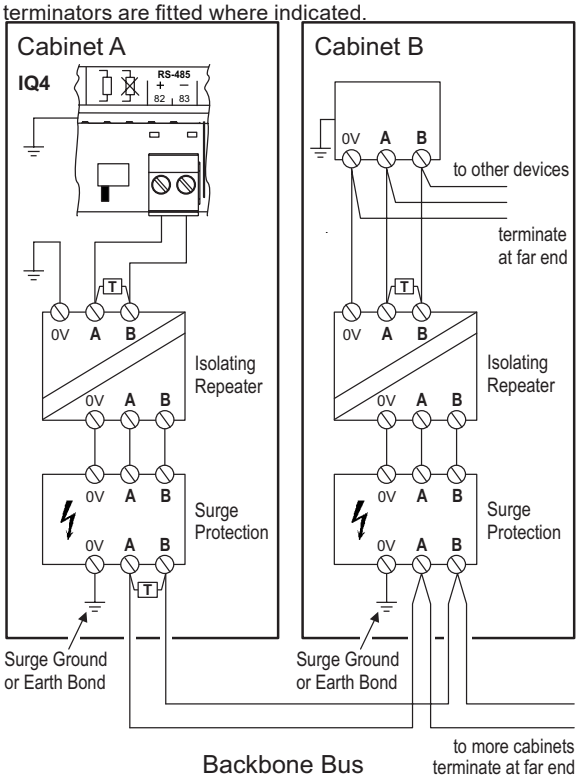
Note: CTS and RTS connections may be connected differently or not used - check the device data/installation sheet.

Earthing (Grounding) & Isolation Requirements

If the IQ422, IQ4NC/00, IQ4NC/12 and other units on the bus are in the same cabinet using the same power supply, each device must have a good physical earth (ground) connection.

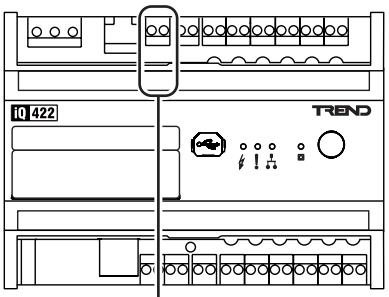
If the IQ422, IQ4NC/00, IQ4NC/12 and other units on the bus are in different cabinets or use different power supplies (e.g. different UPS units), the cabinets must be isolated from each other.

If the bus is likely to suffer from surge and grounding problems, surge protection should be added. The isolator should be connected to the earth (ground) of the nearest device, the 0V of the isolator and the surge protector should be connected together, and earth (ground) of the surge protector's exposed side (e.g. backbone bus) should be connected as directly as possible to the surge ground or earth bond. Ensure that terminators are fitted where indicated.



3 INSTALLATION (continued)

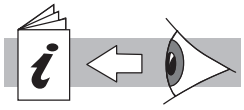
14 Connect Wallbus (if required - not applicable to IQ4NC/00/..)



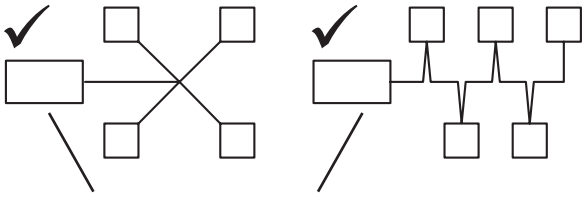
Terminal size: 0.14 to 2.5 mm² (22 to 12 AWG).
Terminal screw torque: 0.45 to 0.62 Nm (4 to 5.5 lb.in).

Cable type: Unscreened twisted pair.
Maximum cable length: 60 m (200 ft) in total, used to connect all wallbus devices.

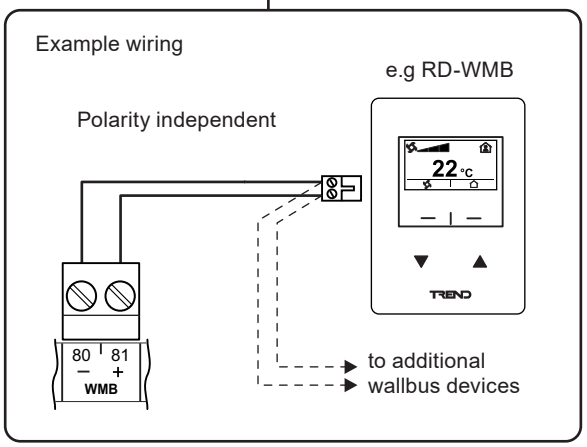
Number of Devices: up to 14 (subject to power loading - refer to device documentation)



IQ4 Configuration Manual (TE201263)

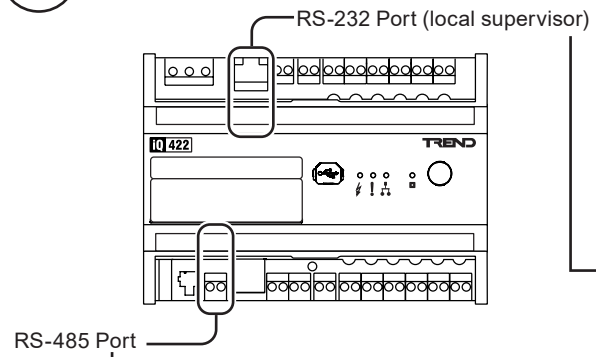


IQ422, IQ4NC/00, IQ4NC/12

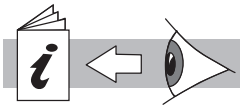


15 Connect Serial MODBUS (/INT only if required)

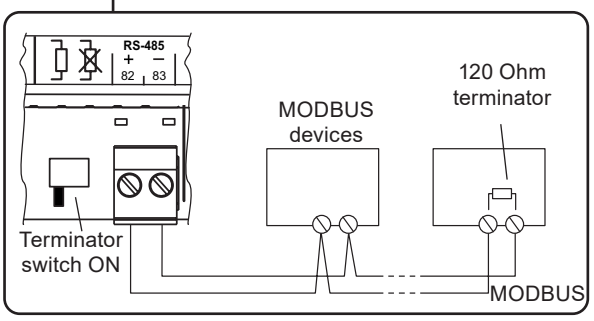
Connect to RS485 Port or RS232 Port as required

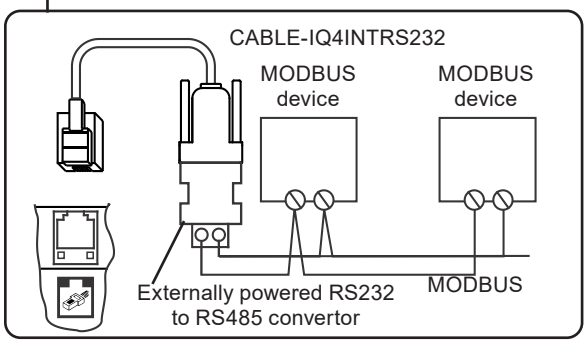


Address range: up to 254
Number of devices: Dependant on 'unit' load. A MODBUS segment supports up to 32 'unit' loads. Each MODBUS device has a different unit load (1, 0.5, or 0.25) - refer to device documentation for the electrical load. IQ4 = 1 electrical load. If more than 32 'unit' loads are required a MODBUS repeater can be used.



IQ4 Configuration Manual (TE201263)





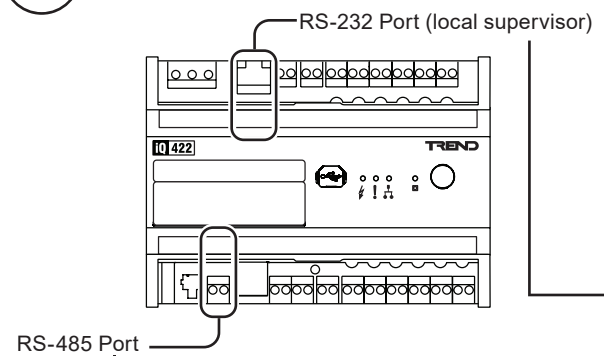
RS485 Port
Terminal size: 0.14 to 2.5 mm² (22 to 12 AWG).
Terminal screw torque: 0.45 to 0.62 Nm (4 to 5.5 lb.in).
Cable type: Unscreened twisted pair.
Maximum cable length: 60 m (200 ft).

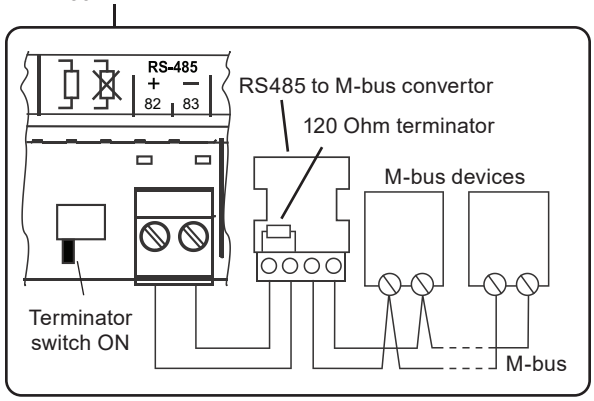
RS232 Port
PIN outs See step 13 RS-232 system.
Terminal size: RJ11 (FCC68)
Cables: RJ11 to 9way male D type (CABLE-IQ4INTRS232) externally powered RS232 to RS485 convertor
Unscreened twisted pair for main MODBUS
Maximum cable length: 60 m (200 ft).

3 INSTALLATION (continued)

16 Connect M-bus (/INT only if required)

Connect to RS485 Port or RS232 Port as required

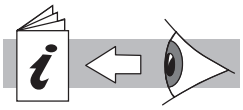




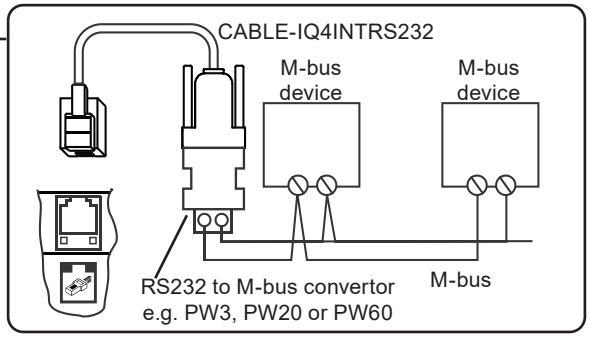
RS485 Port

Terminal size: 0.14 to 2.5 mm² (22 to 12 AWG).
Terminal screw torque: 0.45 to 0.62 Nm (4 to 5.5 lb.in).
Cable type: Unscreened twisted pair to. RS485 to M-bus convertor Unscreened twisted pair for M-bus.
Maximum cable length: 1000m (3280.84 ft).

Maximum cable length: Dependant on M-Bus converter used.
Number of devices: Max 250 (including IQ4) dependant on convertor used.



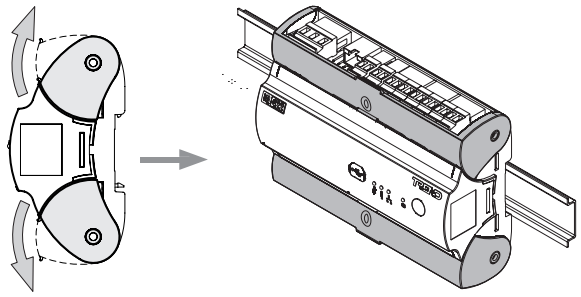
IQ4 Configuration Manual (TE201263)



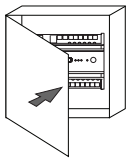
RS232 Port

PIN outs: See step 13 RS-232 system.
Terminal size: RJ11 (FCC68)
Cables: RJ11 to 9 way male D type (CABLE-IQ4INTRS232) to RS232 to M-bus convertor Unscreened twisted pair for M-bus
Maximum cable length: 1000m (3280.84 ft).

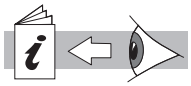
17 Close Rotating Covers



18 Close Panel / Enclosure



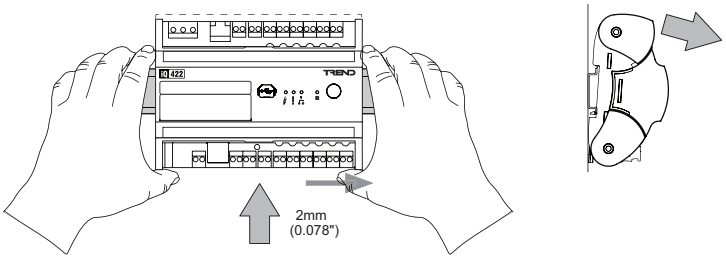
19 Configure IQ4



IQ422,IQ4NC/00,IQ4NC/12 Installation Instructions - Configuration (TG201265)

4 REMOVING FROM DIN RAIL

1 Remove from DIN rail



5 FIELD MAINTENANCE

The IQ422, IQ4NC/00, IQ4NC/12 requires no routine maintenance.

WARNING: Contains no serviceable parts. Do not attempt to open the unit. Failure to comply may cause damage to the unit.

6 DISPOSAL

WEEE Directive:
At the end of their useful life the packaging and product should be disposed of by a suitable recycling centre.
Do not dispose of with normal household waste.
Do not burn.

7 END USER LICENCE AGREEMENT

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TR CU Certification

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