Installation Instructions - Mounting
IQ4E, IQ4NC/16, IQ4NC/32 Controller

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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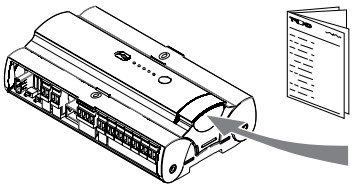
CONTENTS

1 Box Contents 1
2 Storing 1
3 Installation 1
4 Removing From DIN Rail 12
7 End User Licence Agreement 12
5 Field Maintenance 12
6 Disposal 12

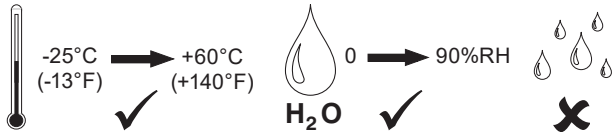
1 BOX CONTENTS



IQ4E/.., IQ4NC/16/.., IQ4NC/32/.. Installation Instructions - Mounting (TG201338)

IQ4/IC/TERM
I/O Bus Terminator

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 IQ4E/.., IQ4NC/16/.., IQ4NC/32/..

	Caution, consult documentation		Caution, possibility of electric shock
1 2 3 ⏚ N L 230VAC	230 Vac input power connector	1 2 3 ⏚ 24V 48V	24 Vac input power connector
	RS232 Local Supervisor Port	80 81 − + WMB	Wallbus connector
70 71 24V 24V AUX	Auxiliary supply output connector	n n Ω C	Universal input connector
	USB (for future use)		Terminator switch
	Bias switch	RS-485 + − 82 83	RS-485
OK RX	Ethernet indicators and connector	TX+ TX- RX+ RX- 84 85 86 87	Trend current loop connector
AUX 24V C 72 73	Auxiliary supply output connector	Ω C n n	Analogue output connector

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.

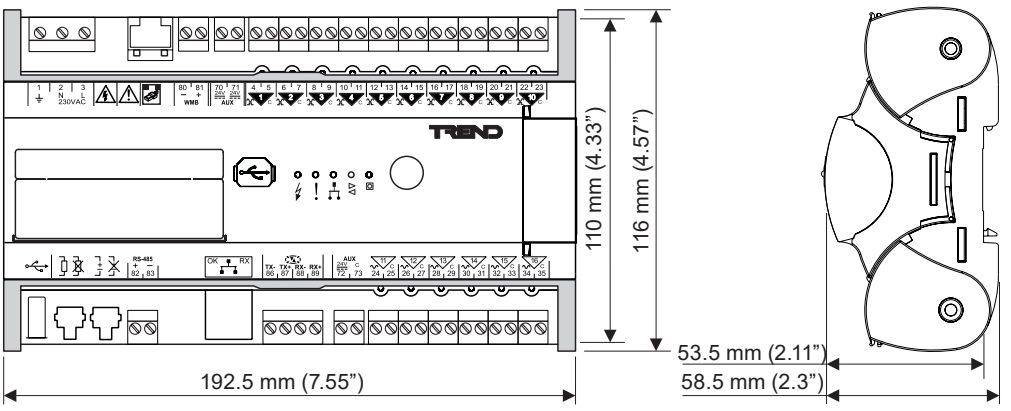
WARNING Removal of cover exposes dangerous voltages.

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

	USB Local Engineering Port		Service button/ indicator
	Power indicator	!	Watchdog indicator
	LAN OK indicator		I/O Bus indicator

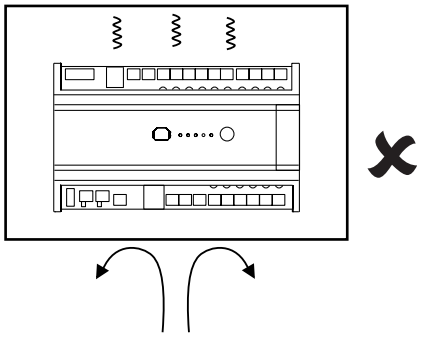
1

Dimensions

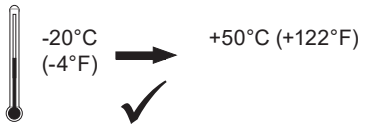


3 INSTALLATION (continued)

2 Mounting Requirements



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

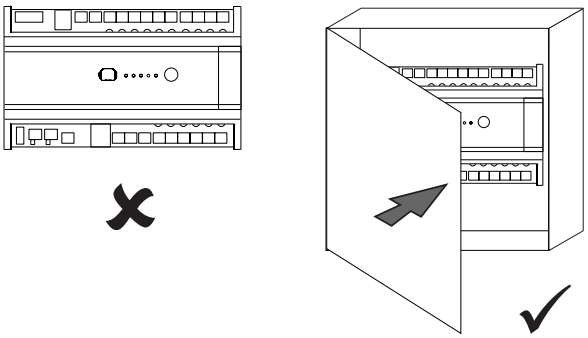


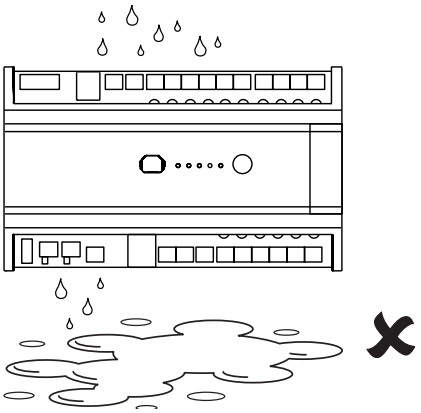
Note: For temperatures below 0°C (32°F) special care must be taken that there is no condensation on or within the unit.

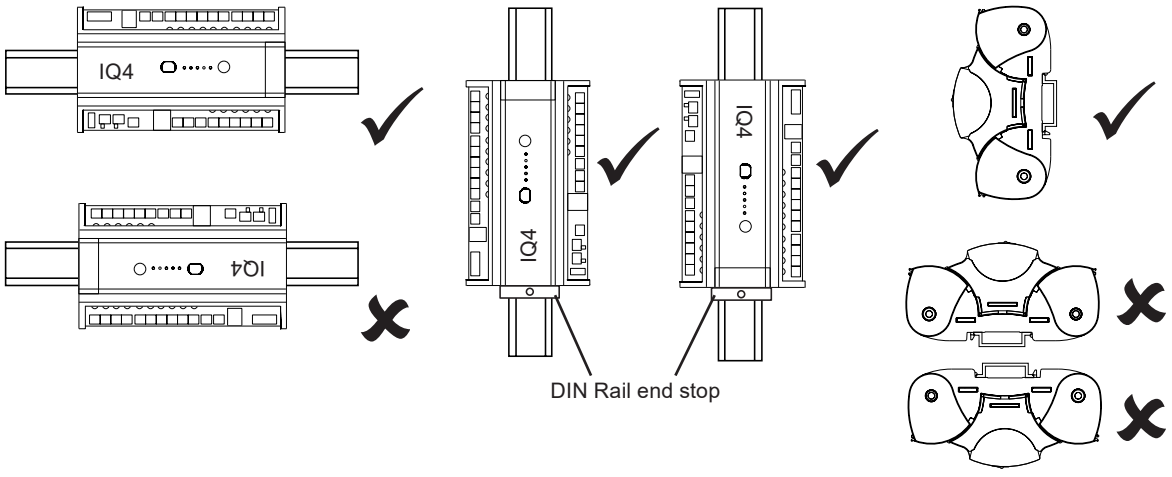
/230: **Must** be installed in an enclosure rated to at least IP20 or equivalent

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

The unit is UL rated as UL60730-1 Automatic electrical controls for household and similar use.

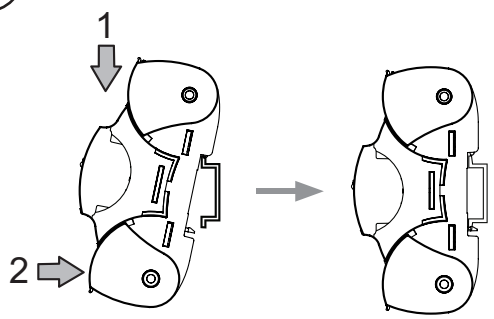




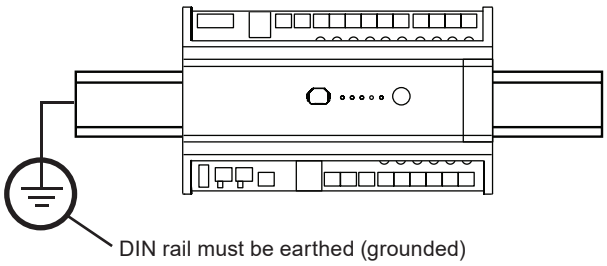


3 INSTALLATION (continued)

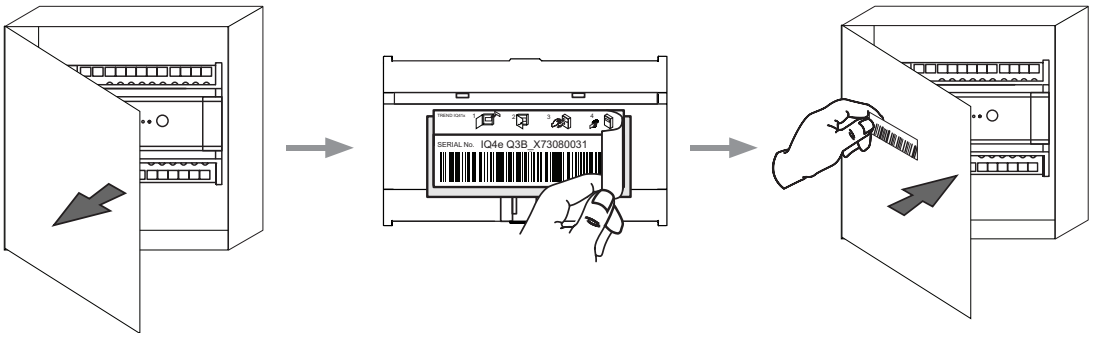
3 Mount Unit on DIN Rail



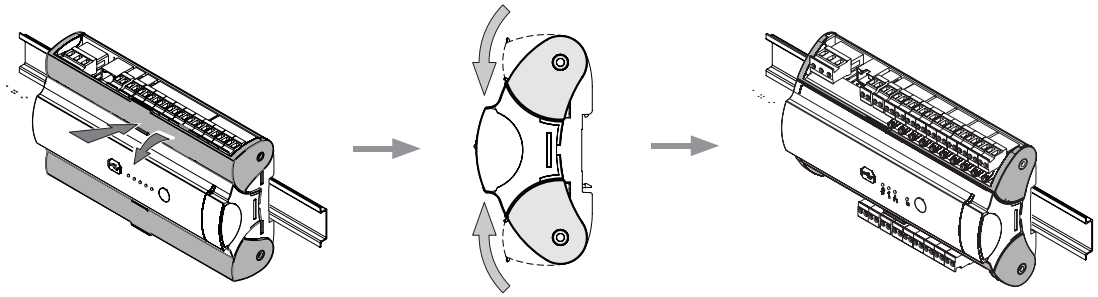
Note: To remove from DIN rail see Section 4, page 13.



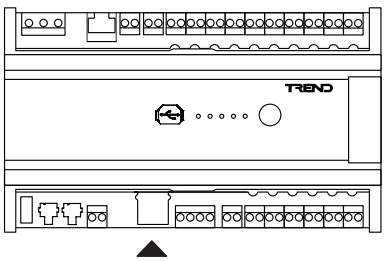
4 Attach Large Barcode Label to Panel

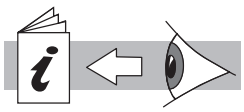


5 Open Rotating Covers

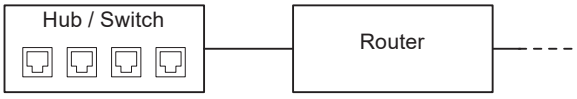


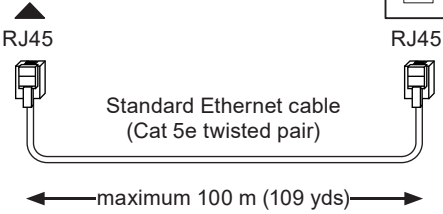
6 Connect Ethernet (if required)





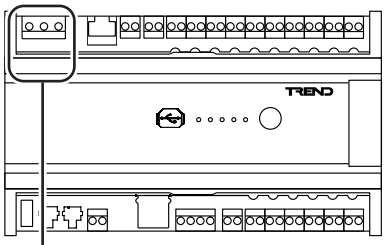
Trend Ethernet Products Engineering Guide (TE200369)





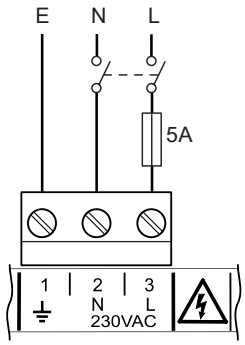
3 INSTALLATION (continued)

7 Connect Power

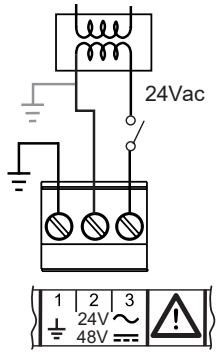


ensure correct polarity

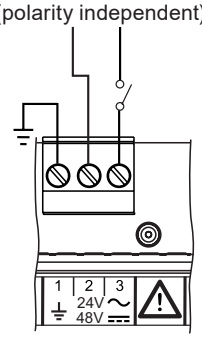
/230



/24 (24Vac supply)
24 Vac transformer
(For UL rating use Class 2)



/24 (48Vdc supply)
48 Vdc supply
(polarity independent)



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 80°C or greater.

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 70 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.

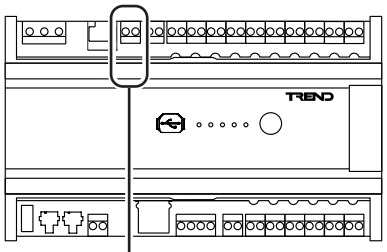
/24VAC 24 Vac ±10% 50/60 Hz at up to 44 VA or 48 Vdc ±15% 0.67A, 32 W.

The supply must include a suitably rated switch in close proximity and be clearly marked as the disconnecting device for the unit.

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

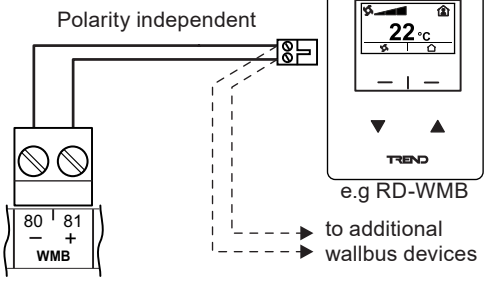
DO NOT SWITCH ON POWER

8 Connect Wallbus (if required)



Example wiring

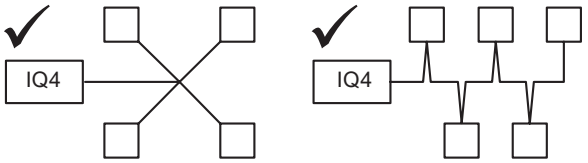
Polarity independent



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).

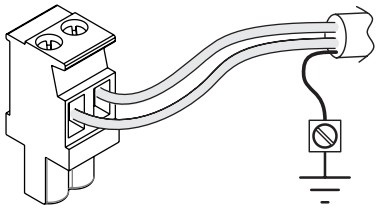


IQ4 Configuration Manual (TE201263)

3 INSTALLATION (continued)

9 Connect Inputs/Outputs - Overview

Plug-in connectors with screw terminals

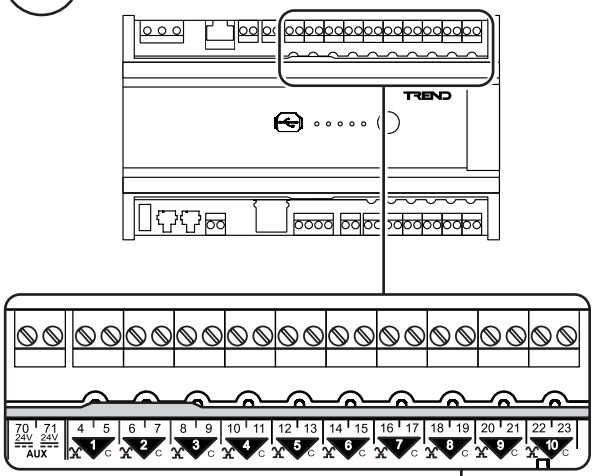


Terminal size: 0.5 to 2.5 mm² (20 to 14 AWG).
Terminal screw torque: 0.45 to 0.62 Nm (4 to 5.5 lb.in).

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

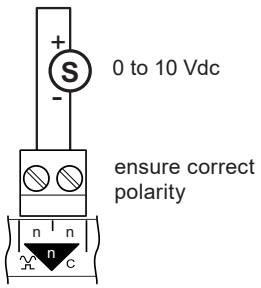
Screened cable is not generally required unless the cable passes through electrically noisy environments. Where it is used the screen must be connected to the local panel/enclosure ground and left unterminated at the far end.

10 Connect Universal Inputs IN1 to IN10 (if required)

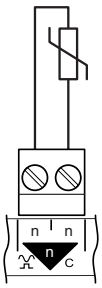


Note: The input type (i.e. voltage, thermistor, digital or current) is defined in the controller's strategy.

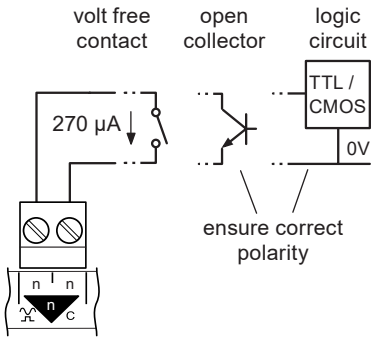
Voltage input



Thermistor input

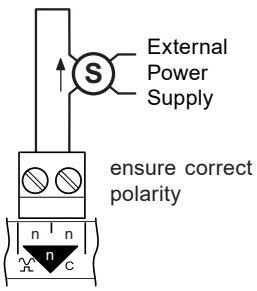


Digital input

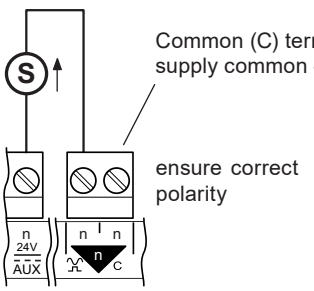


Current input

Externally powered

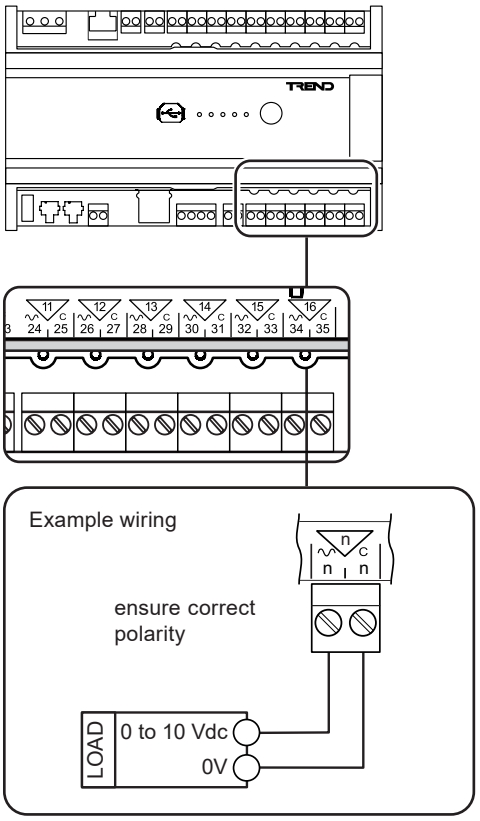


Loop powered (using AUX output supply - see step 12)



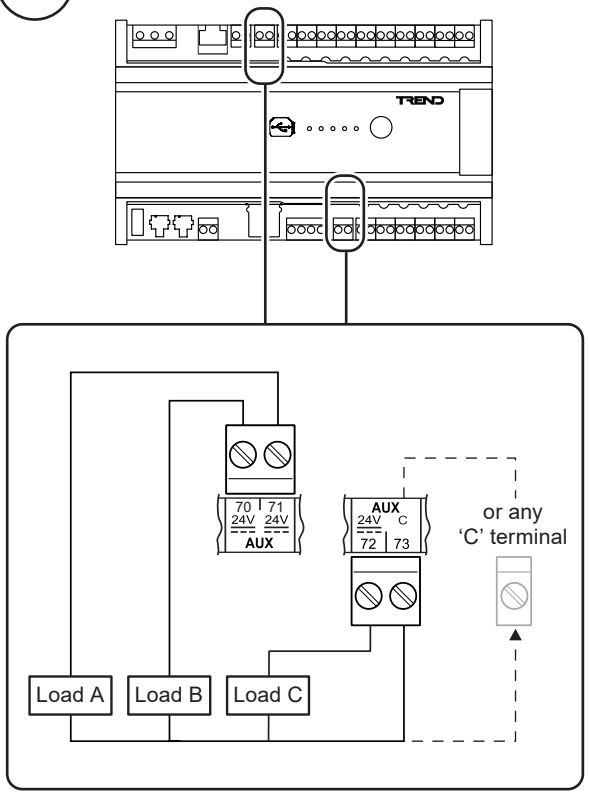
3 INSTALLATION (continued)

11 Connect Analogue Outputs OUT11 to OUT16 (if required)



Output voltage: 0 to 10 Vdc
Maximum current: 20 mA (source); 3mA (sink)
Note: See combined supply limitation in step 12.

12 Connect Auxiliary Supply Output(s) (if required)

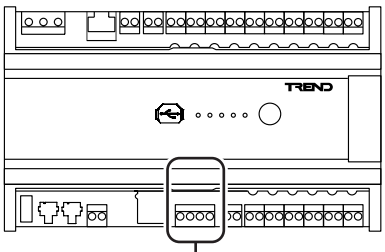


Output voltage: 24 Vdc ±5%.
Maximum current: 240 mA maximum shared between all three terminals, 70, 71, 72. Terminals 70 & 71 (Load A+B) = 120 mA
Terminal 72 (Load C) = 120 mA

The combined current from the auxiliary supply outputs, Wallbus, RS232, I/O modules and analogue outputs cannot exceed 800 mA. Exceeding this current may cause the auxiliary supply output voltage to fall out of specification.

3 INSTALLATION (continued)

13 **Connect Trend Current Loop Network** (/LAN variants and IQ4NC, if required)



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).

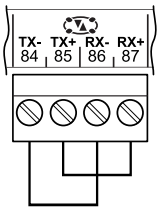
Maximum cable length depends on cable type and baud rate:

Cable	Type	Baud Rate					
		1k2	4k8	9k6	19k2	38k4	76k8
Trend TP/2/2/22/ HF/200 Belden 8723	Shielded twisted pair 2 pairs (4 conductors)	1000 m (1090 yds)			700 m (765 yds)	350 m (380 yds)	175 m (191 yds)
Trend TP/1/1/22/ HF/200 Belden 8761	Shielded twisted pair 1 pair (2 conductors)						
Belden 9182 Belden 9207	Twinaxial (2 conductors)						

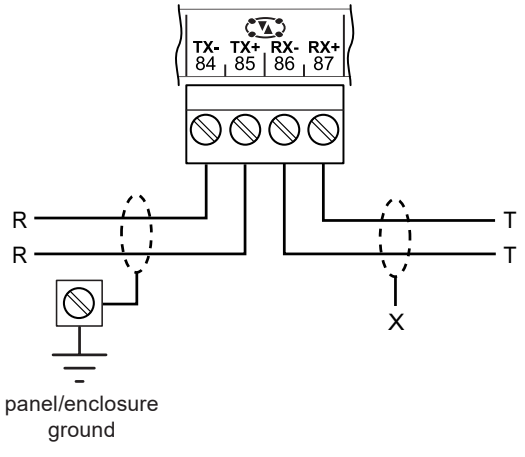
Note: Adjacent devices may specify different maximum cable lengths and baud rates. The shortest cable length (for the chosen baud rate) applies when connecting to the IQ4's current loop.

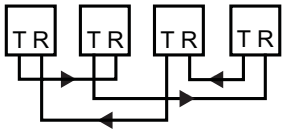
Not connected

If the current loop 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.

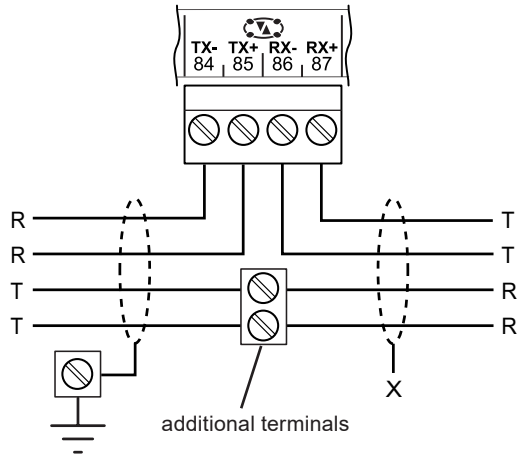


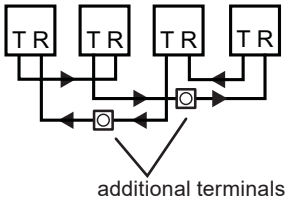
2 wire system





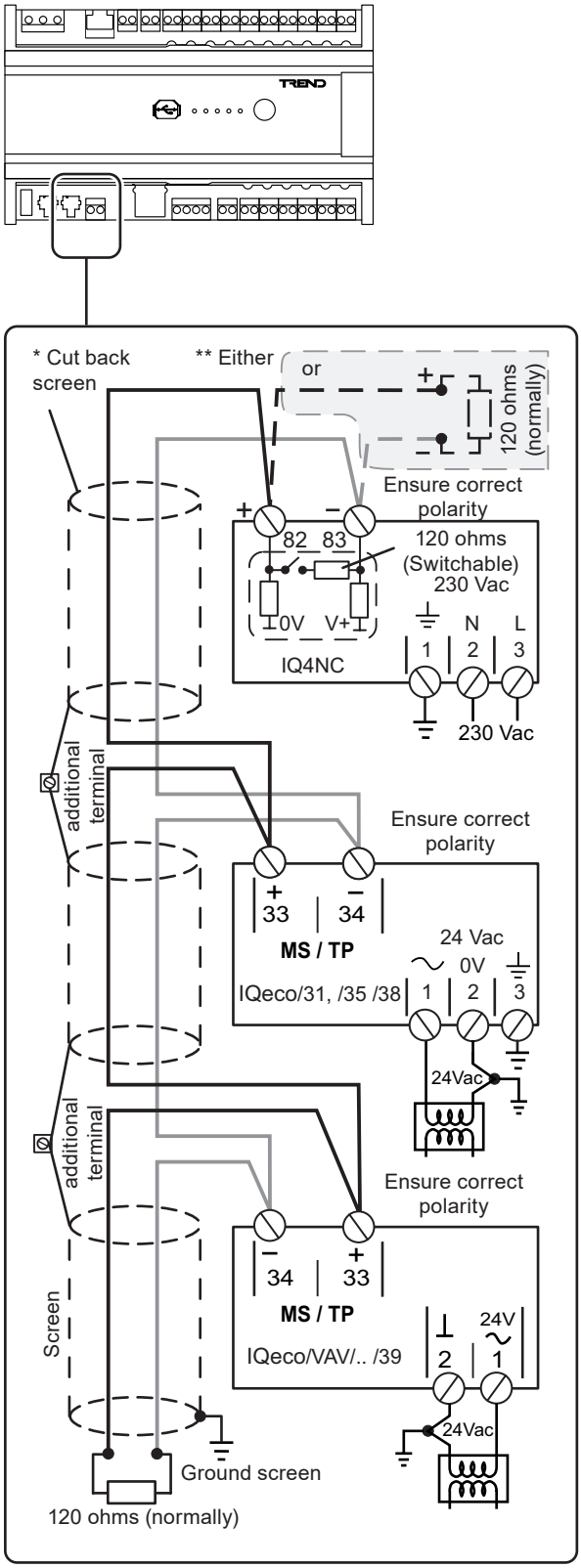
4 wire system





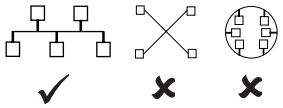
3 INSTALLATION (continued)

14 Connect MS/TP Trunk (IQ4NC/16/..., IQ4NC/32/... only, if required)



Note: If the IQ4NC/16/..., IQ4NC/32/.. is required to interface to a 3rd party system via the RS-485 port - see step (15) the port cannot be used to connect to the MS/TP trunk.

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

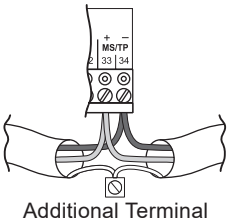


Ensure correct polarity. Ensure maximum number of devices described below is not exceeded.

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.

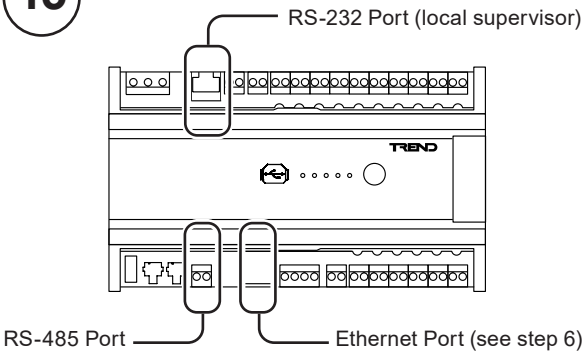
Maximum number of devices: There may be IQ4NC with up to 64 IQeco's or other manufacturers' devices on the MS/TP trunk. A separate limitation is that the MS/TP segment supports up to 32 'unit' loads. IQeco, IQ4NC and IQ3/BINC present a ¼ BACnet 'unit' load; other manufacturers' devices may have different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

Biassing The IQ4NC/16, or IQ4NC/32/ and /XNC variants can provide network biassing (470 ohms). The bias can be switched ON or OFF using the Bias switch. 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)

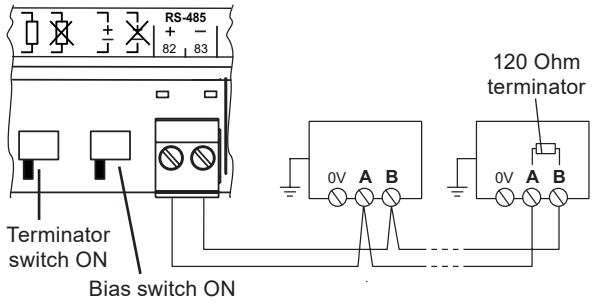
15 Connect to XNC Interface (../XNC variants only, if required)



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

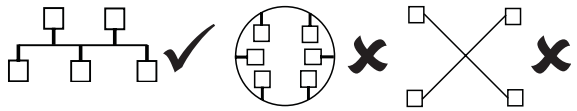
Note: If the IQ4NC/16/..., or IQ4NC/32/... is connecting to the MS/TP trunk - see step (14), the RS-485 port cannot be used to interface to a 3rd party system.

RS-485 2-wire system



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

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).
Number of Devices: up to 32



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 IQ4 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.

Bias: It is recommend that bias is applied at one location. IQ4E, IQ4NC/16/..., or IQ4NC/32/... can be used to apply bias using its bias switch.

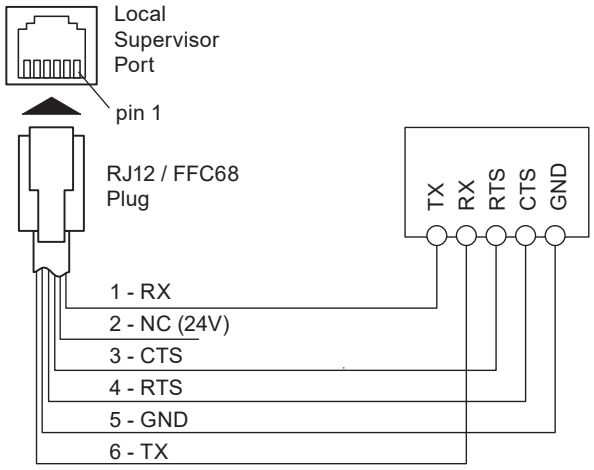
Earthing (Grounding) & Isolation Requirements

If the IQ4 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 IQ4 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.

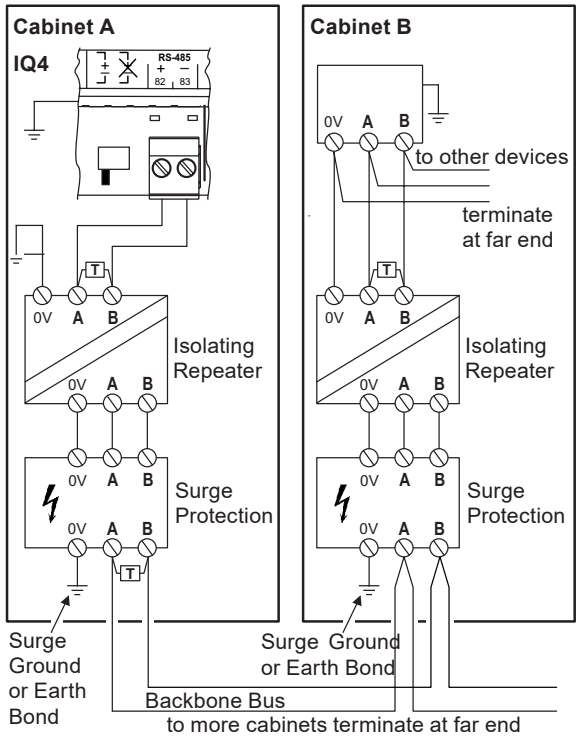
If the bus is likely to suffer from surge and grounding problems, surge protection should be added. The isolator should be connected to the earth (ground) of the nearest device, the 0V of the isolator and the surge protector should be connected together, and earth (ground) of the surge protector's exposed 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.

RS-232 system



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

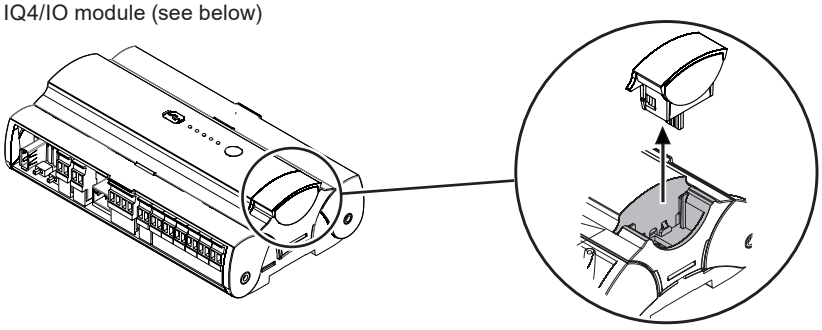
Note: When in use for XNC the local supervisor port cannot be used to connect supervisory tools or devices.



3 INSTALLATION (continued)

16 **Install and Connect I/O Modules** (if required)

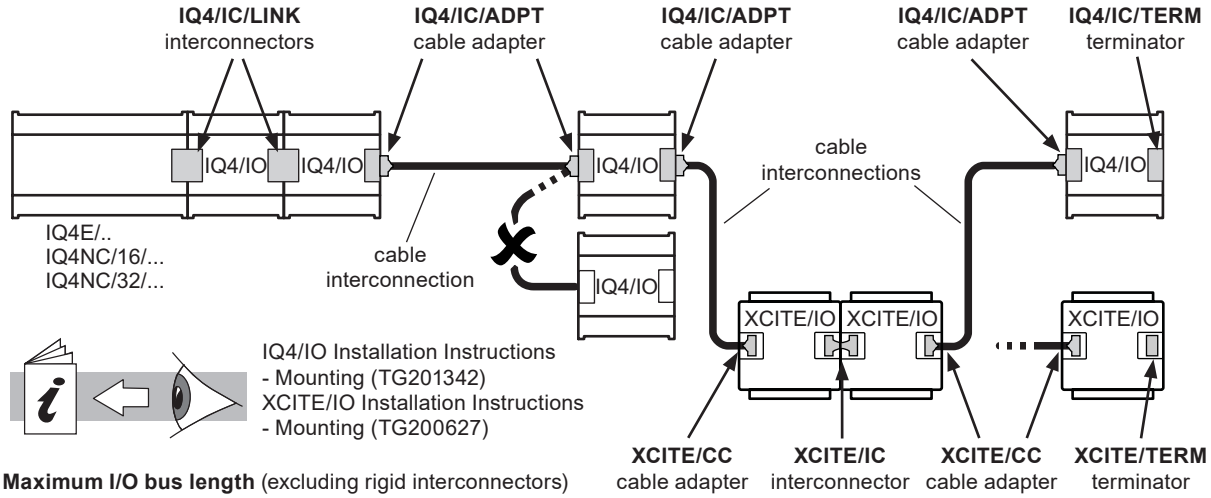
Remove I/O bus terminator from IQ4E/.., IQ4NC/16/.., IQ4NC/32/.. and retain for use on the last IQ4/IO module (see below)



Connecting I/O modules to the I/O bus

The IQ4E, IQ4NC/16/..., and IQ4NC/32/... are compatible with I/O modules from the IQ4/IO and XCITE/IO ranges. Depending on the controller variant, up to 192 I/O channels are supported.

IQ4E Data Sheet (TA201340)



IQ4/IO Installation Instructions - Mounting (TG201342)
XCITE/IO Installation Instructions - Mounting (TG200627)

Maximum I/O bus length (excluding rigid interconnectors)

Product Configuration	Cable Type	
	Belden 3084A	Belden 7895A
IQ4E, IQ4NC/16/..., or IQ4NC/32/... with IQ4/IO modules only	total bus length up to 100 m (109 yards) or total bus length up to 300 m (328 yards) if IQ4/IO modules are within 100m (109 yards) of a power supply	total bus length up to 300 m (328 yards)
Any other combination using XCITE/IO modules or IQ3XCITE controller	total bus length up to 30 m (33 yards)*	

**Maximum 10 m (11 yards) for certain system configurations - for details check the XCITE/IO Modules Data Sheet (TA201352) and XCITE/IO Installation Instructions - Mounting (TG200627).*

For all installations, if the bus voltage at the I/O module drops below 19.2 V at full load, install another power supply at that module.

Maximum number of I/O modules on I/O bus

Up to 30 modules can be connected to the I/O bus, depending on the configuration of controller and modules used:

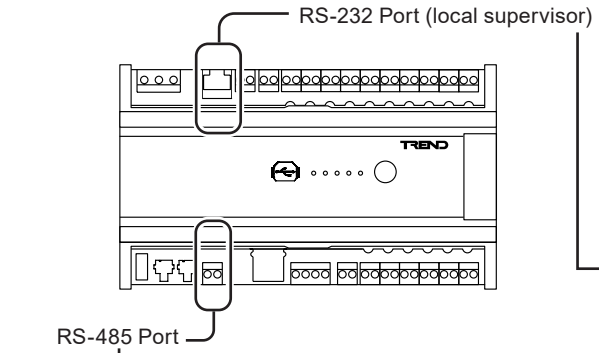
Product Configuration	Maximum No. of Modules
IQ4E, IQ4NC/16/..., or IQ4NC/32/... IQ4/IO modules only	30
Any combination using XCITE/IO modules or IQ3XCITE controller	15

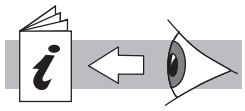
Note: Check that the controller supports the required number of I/O channels.

3 INSTALLATION (continued)

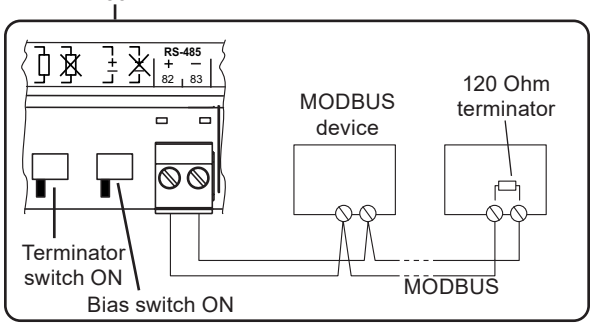
17 **Connect Serial MODBUS** (/INT only if required)
Connect to RS485 Port or RS232 Port as required

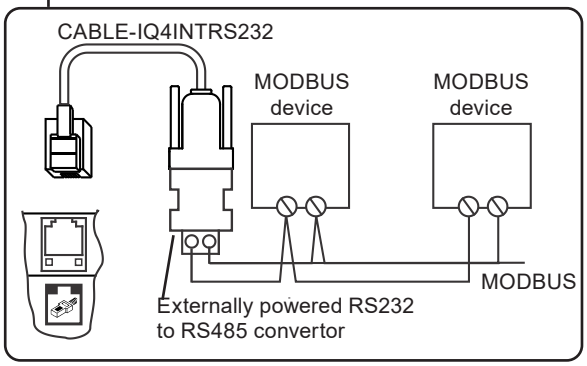
Address range: up to 254
Number of devices: Dependant on 'unit' load. A MODBUS segment supports up to 32 'unit' loads. Each MODBUS device has a different unit load (1, 0.5, or 0.25) - refer to device documentation for the electrical load. IQ4 = 1 electrical load. If more than 32 'unit' loads are required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

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 IQ4 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.

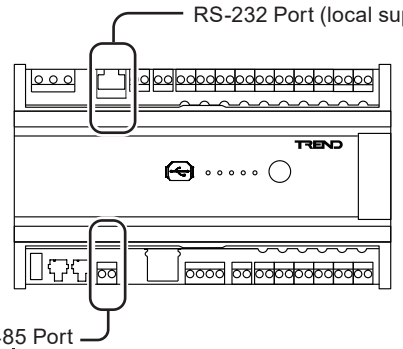
Bias: It is recommend that bias is applied at one location. IQ4E, IQ4NC/16/..., or IQ4NC/32/... can be used to apply bias using its bias switch.

RS232 Port
PIN outs See step 15 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) maximum.

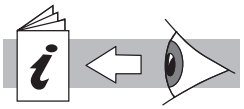
3 INSTALLATION (continued)

18 Connect Serial M-bus (/INT only if required)

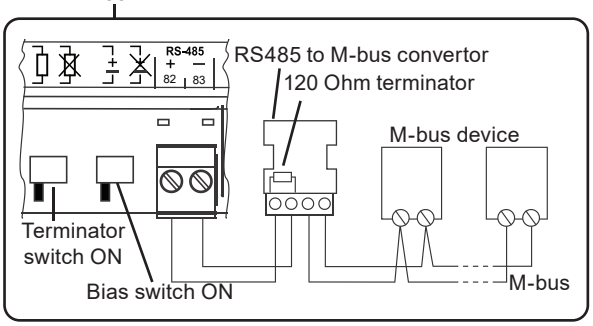
Connect to RS485 Port or RS232 Port as required

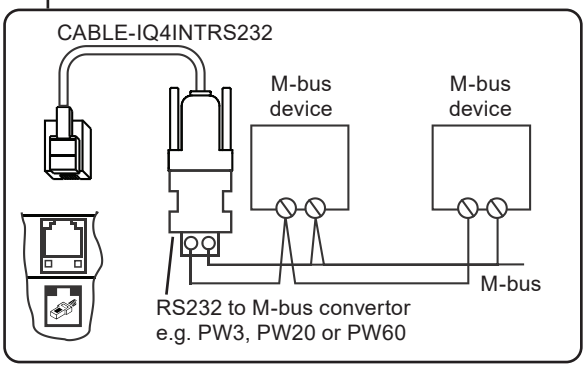


Maximum cable length: Dependant on M-Bus converter used.
Number of devices: Max 250 (including IQ4) dependant on convertor used.



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 to.
RS485 to M-bus convertor
Unscreened twisted pair for M-bus
Maximum cable length: 1000m (3280.84 ft)

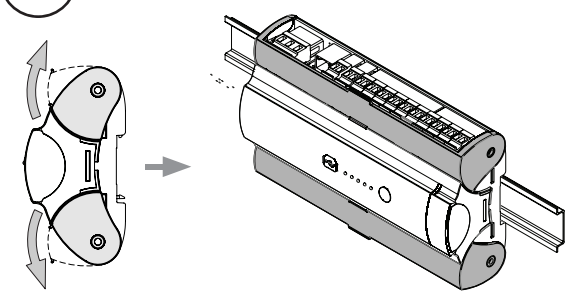
Terminators: The bus must be terminated at each end with a resistor matched to the cable characteristic impedance (i.e. ±1%, ¼ Watt, range 100 to 130 ohms). If the IQ4 is at one end of a 120 ohm cable, switch in its built-in terminator, otherwise switch it out and fit a resistor at that end of the cable; the other end must be terminated with a matching resistor.

Bias: It is recommend that bias is applied at one location. IQ4 can be used to apply bias using its bias switch.

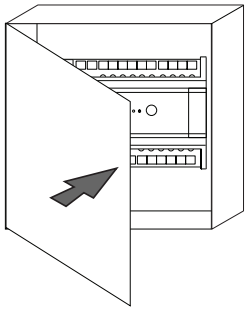
RS232 Port

PIN outs See step 15 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).

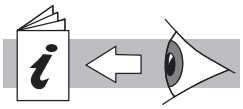
19 Close Rotating Covers



20 Close Panel / Enclosure

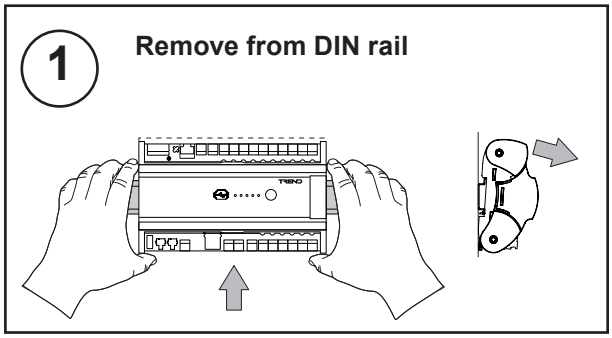


21 Configure IQ4E/.., IQ4NC/16/.., IQ4NC/32/.., and I/O Modules



IQ4E, IQ4NC/16, IQ4NC/32 Installation Instructions - Configuring (TG201339)
IQ4/IO/.. Installation Instructions - Configuring (TG201343)
XCITE/IO/.. Installation Instructions - Configuring (TG201161)

4 REMOVING FROM DIN RAIL



5 FIELD MAINTENANCE

The IQ4E/.., IQ4NC/16/.., IQ4NC/32/.. require 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

Trend Control Systems Limited

St. Mark’s Court, North Street, Horsham, West Sussex, RH12 1BW, UK. Tel: +44 (0)1403 211888, www.trendcontrols.com