London Electronics Limited

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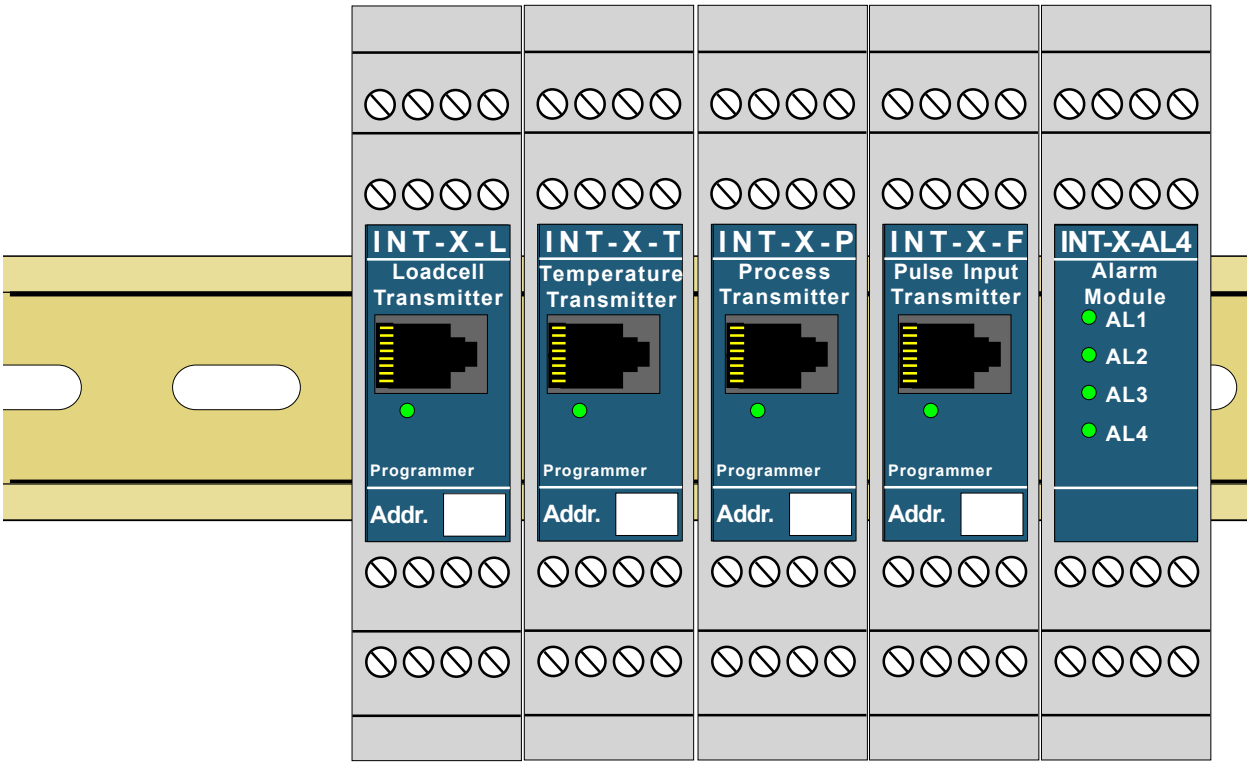
Signal Conditioners, Trip Amplifiers and Transmitters

INT-X Series

Connection details and general information

Digital Scaling and calibration with or without a PC
User friendly, time-saving design
Fast installation and commissioning



Alphabetic Index

Introduction

Please contact us if you need help, if you have a complaint, or if you have suggestions to help us improve our products or services for you.

If you contact us about a product you already have, please tell us the full model number, serial number, and firmware release (software) version, so that we can give you accurate and fast help. You can check the **firmware release version** either with the handheld programmer, or when you connect to the PC programming software.Click on the Device tab and connect. You will see the device's firmware version in the white text box.

This product has a 2 year warranty. We will put right or replace any item which is faulty because of bad workmanship or materials. This warranty does not cover damage caused by misuse or accident.

IMPORTANT

If this equipment is important to your process, you may want to buy a spare to cover possible failure or accidental damage in the future.

This is because at some times, for example during our factory shutdown periods, you may have to to wait several weeks for an equivalent replacement. Or, we may have no stock at the time you urgently need it.

You may also need to pay extra carriage charges if you want a fast, guaranteed courier service. Warranty repairs or replacements are normally returned with a standard courier service.

We do not offer any compensation for losses caused by failure of this instrument.

If you do not agree with these conditions, please return this item now, in unused, clean condition, in its original packaging and we will refund the purchase price, excluding any carriage paid.

We thought you'd prefer to know about possible delays and extra charges now, rather than during a panic.

We always try to improve our products and services, so these may change over time. You should keep this manual safely, because future manuals, for new designs, may not describe this product accurately.

We believe these instructions are accurate, and that we have competently designed and manufactured the product, but please let us know if you find any errors.

Warnings

Please carefully read all warnings and ONLY install the item when you are sure that you've covered all aspects.

* Connect the equipment according to current IEE regulations and separate all wiring according to IEC1010.

* Power supplies to this equipment must have anti-surge (T) fuses rated at 250mA for AC supply or 1A for DC supplies in the range 11-30VDC.

* Check that the model number and supply voltage suit your application before you install the equipment.

* Don't touch any circuitry after you have connected the equipment, because there may be lethal voltages on the circuit board or connector terminals.

* We designed this equipment for Pollution-Degree 2 environments only. This means you must install it in a clean, dry environment.

* Only adjust on-board switches or connections with the power turned off.

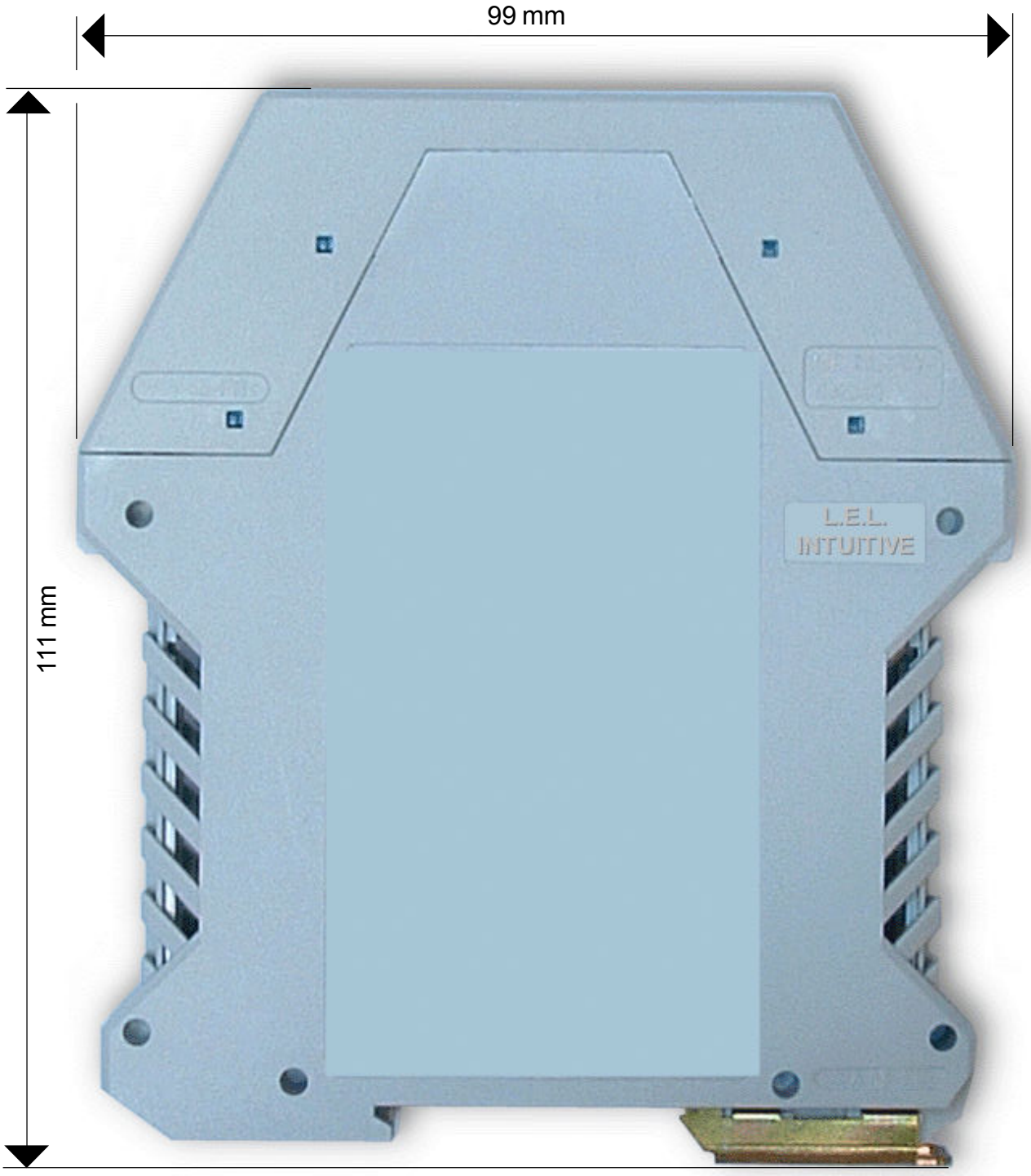
* Make sure all screw terminals are tight before you switch the equipment on.

* Only clean the equipment with a soft dry lint-free cloth. Do not use any solvents.

Safety First .....Don't assume anything..... Always double check.
If in doubt, ask someone who is QUALIFIED to help you in the subject.

Dimensions and weights

Case (stacking) width	: 22.5	mm
Case forward projection	: 111.0	mm
Case height	: 99.0	mm
Typical transmitter weight	: 200	grams
Typical alarm module weight	: 250	grams
Operating conditions	: 0 to 50 degrees C , 10 to 90%rh non-condensing	
Storage conditions	: -20 to +70 degrees C, 10 to 90%rh non condensing	
Case sealing	: IP40	
Case Material	: Polyamide PA 6.6	
Cable dimensions	: Accepts multistrand wires total area from 1mm^2 to 4mm^2	
Connectors	: 4 pin detachable	
Flammability Class	: V0 (UL94)	

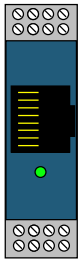


DIN rail mounting & removal

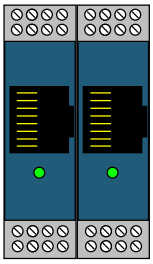
The INT-X series mounts simply and quickly onto DIN rail in accordance with EN 60 715. Simply clip the housing onto the rail.

To prevent side to side movement, you may also wish to add end-stops, which we can supply as a pair. Ask for accessory XSTOP for plastic end-stops or XEARTH for metal stops with earthing terminal.

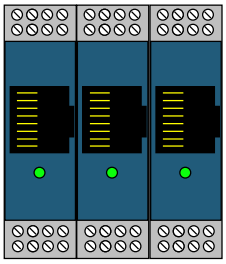
Cooling:
Single transmitters are rated for use in still air at 0 to 50 degreesC.
However , as you stack units together, they will gain heat, which you must remove with forced air ventilation.



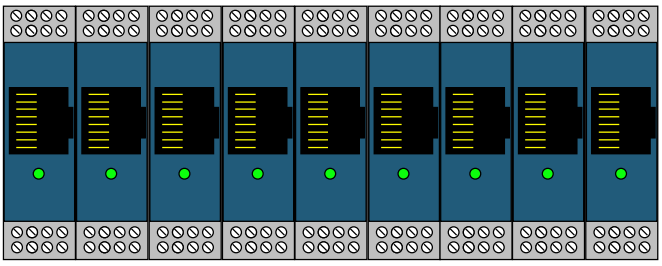
1 unit, natural ventilation
0-50C



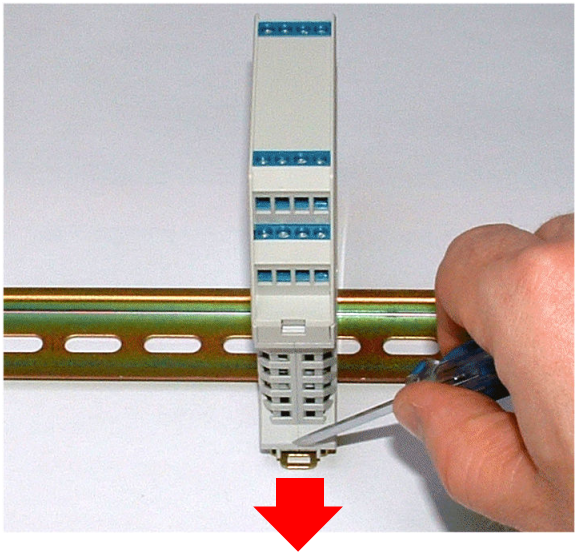
2 units, natural ventilation
0-40C



3 or more units, natural ventilation
0-35C

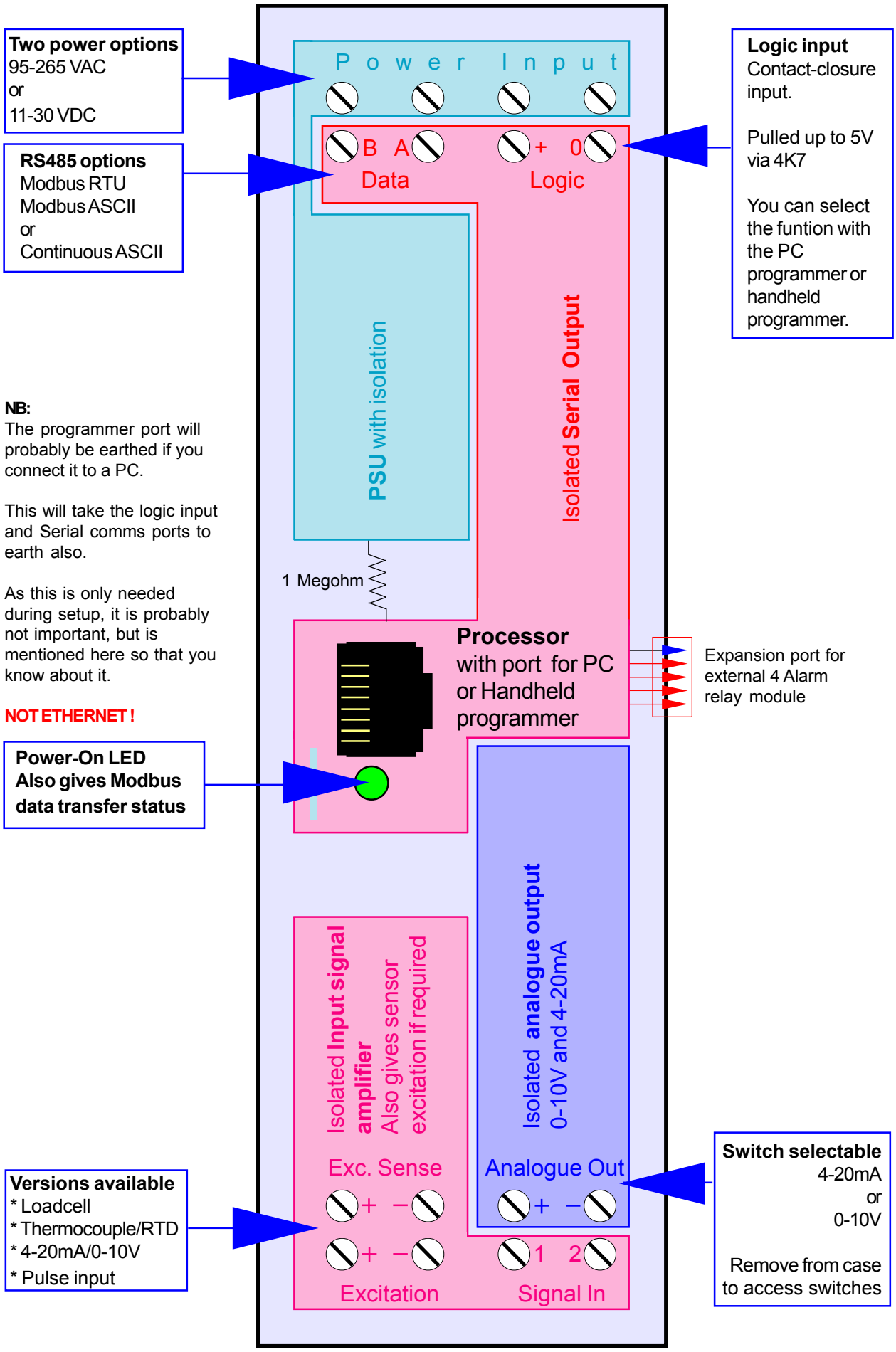


Any number of units, ventilated with air from underneath at >0.5ms^{-1}
0-50 C Use a crossflow or tangential blower, available from us as an accessory.

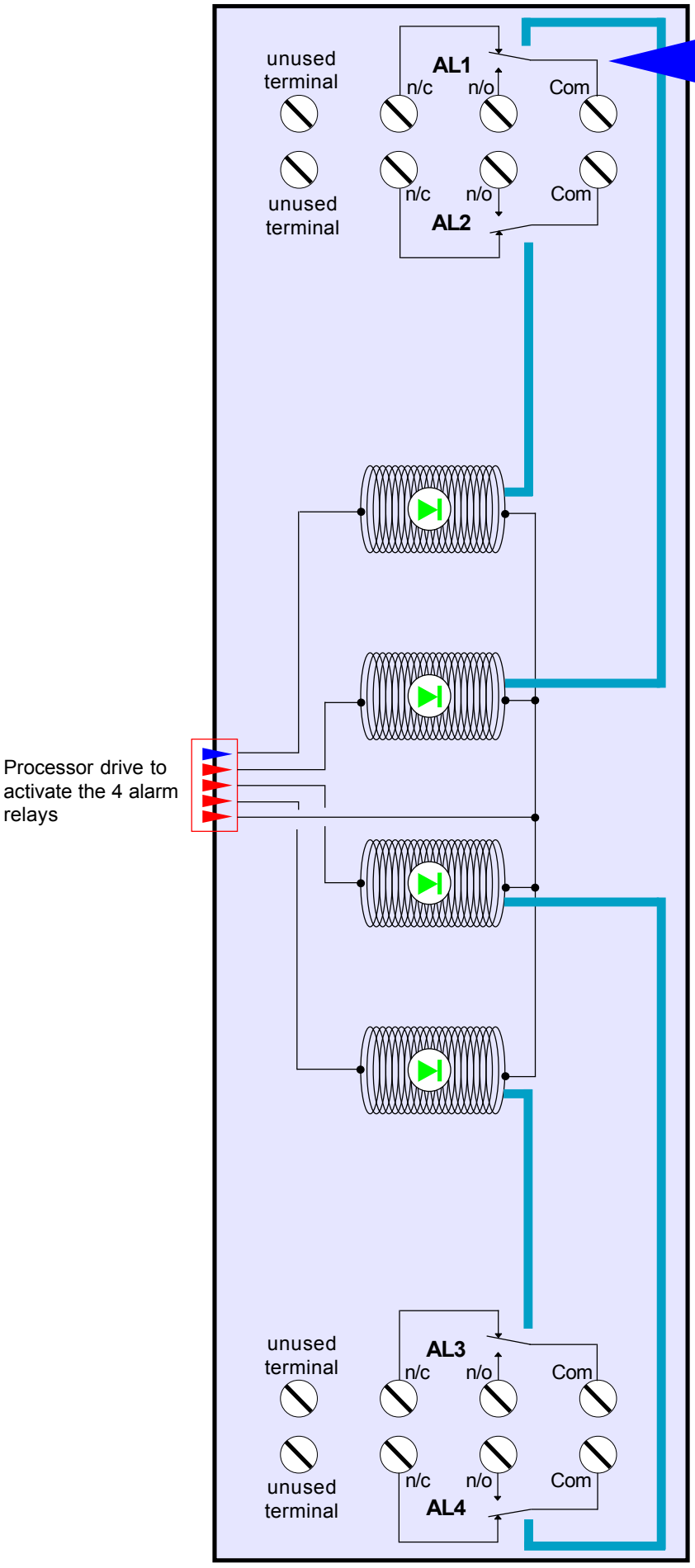


To remove a module, place the tip of a 3mm terminal screwdriver in the slotted metal clip at the base. Pull the clip downwards, and lift the module off the rail.

Block diagram - main module



4 relay module- XR4



Contact ratings
For all 4 relays up to 2.5 Amperes Up to 250VAC Resistive loads

Contact positions
Shown in this diagram with relay coils energised.

Normally, relays will be configured to de-energise on alarm, to give failsafe protection.

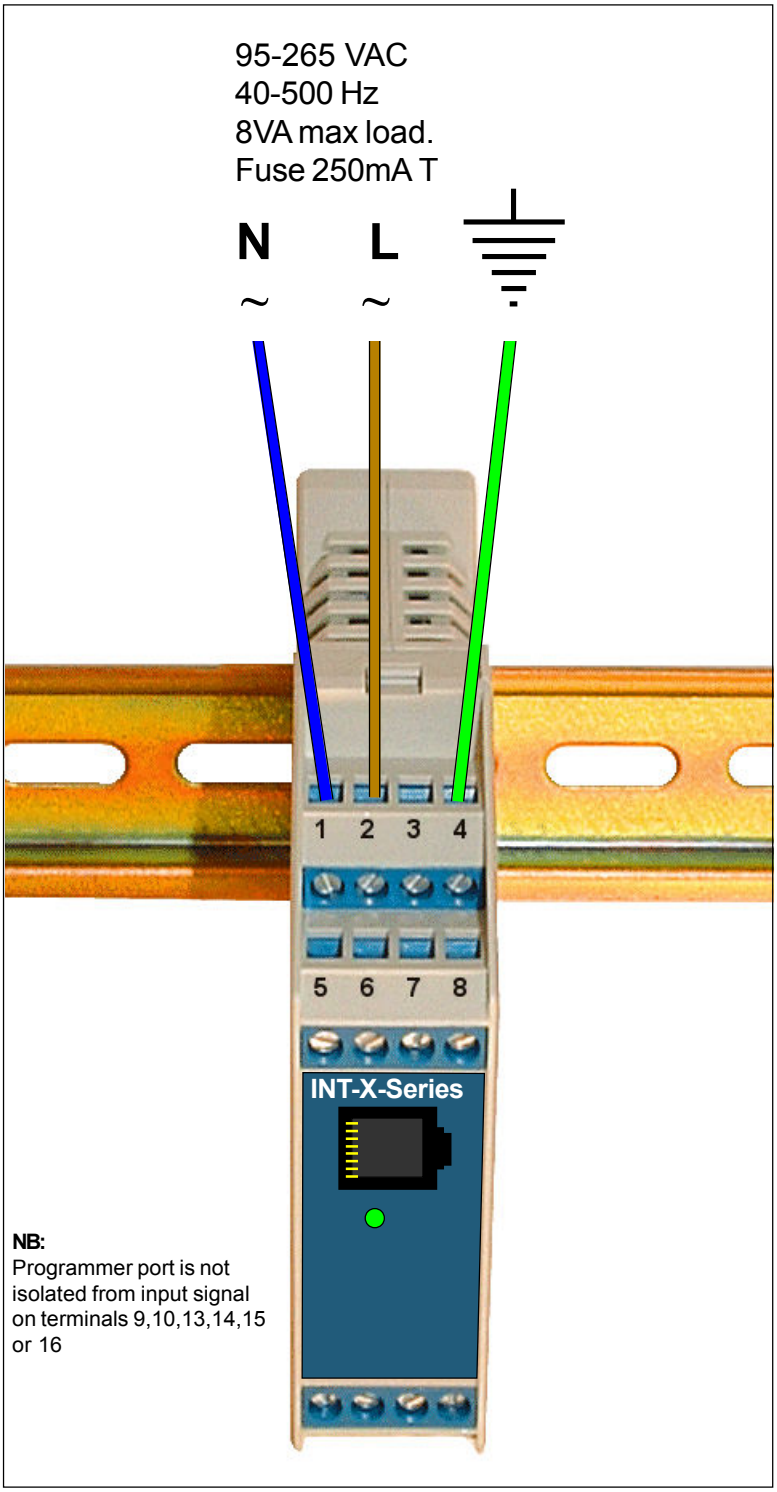
An LED across each coil will light to show when the coil is energised.

AC Power

Where to connect power to your transmitter

First check the voltage rating on the silver label on the side of the transmitter.
It MUST say 95-265 VAC if you want to power your transmitter from an AC supply.

DO NOT connect AC Power to the transmitter if the Voltage rating is 11-30 VDC



Notes:

Terminal 1 = Neutral (AC Lo)
Terminal 2 = Line (AC Hi)
Terminal 3 = no connection
Terminal 4 = Earth / Ground

There is no fuse in the transmitter. You must fuse your power circuit.

DC Power

Where to connect power to your transmitter

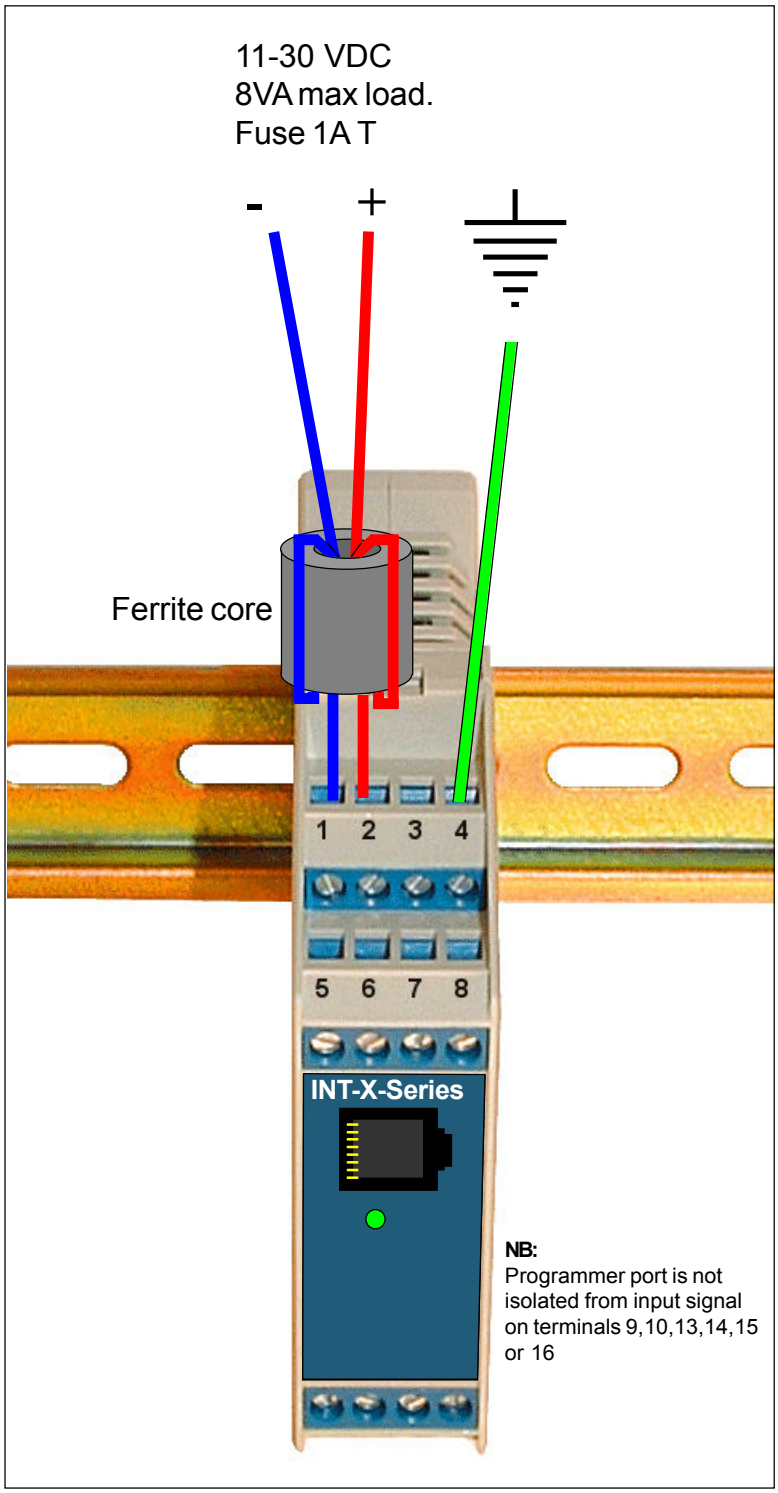
First check the voltage rating on the silver label on the side of the transmitter.
It must say 11-30 VDC if you want to power your transmitter from a DC supply

Notes:

Terminal 1 = Negative
Terminal 2 = Positive
Terminal 3 = no connection
Terminal 4 = Earth / Ground

There is no fuse in the transmitter. You must fuse your power circuit.

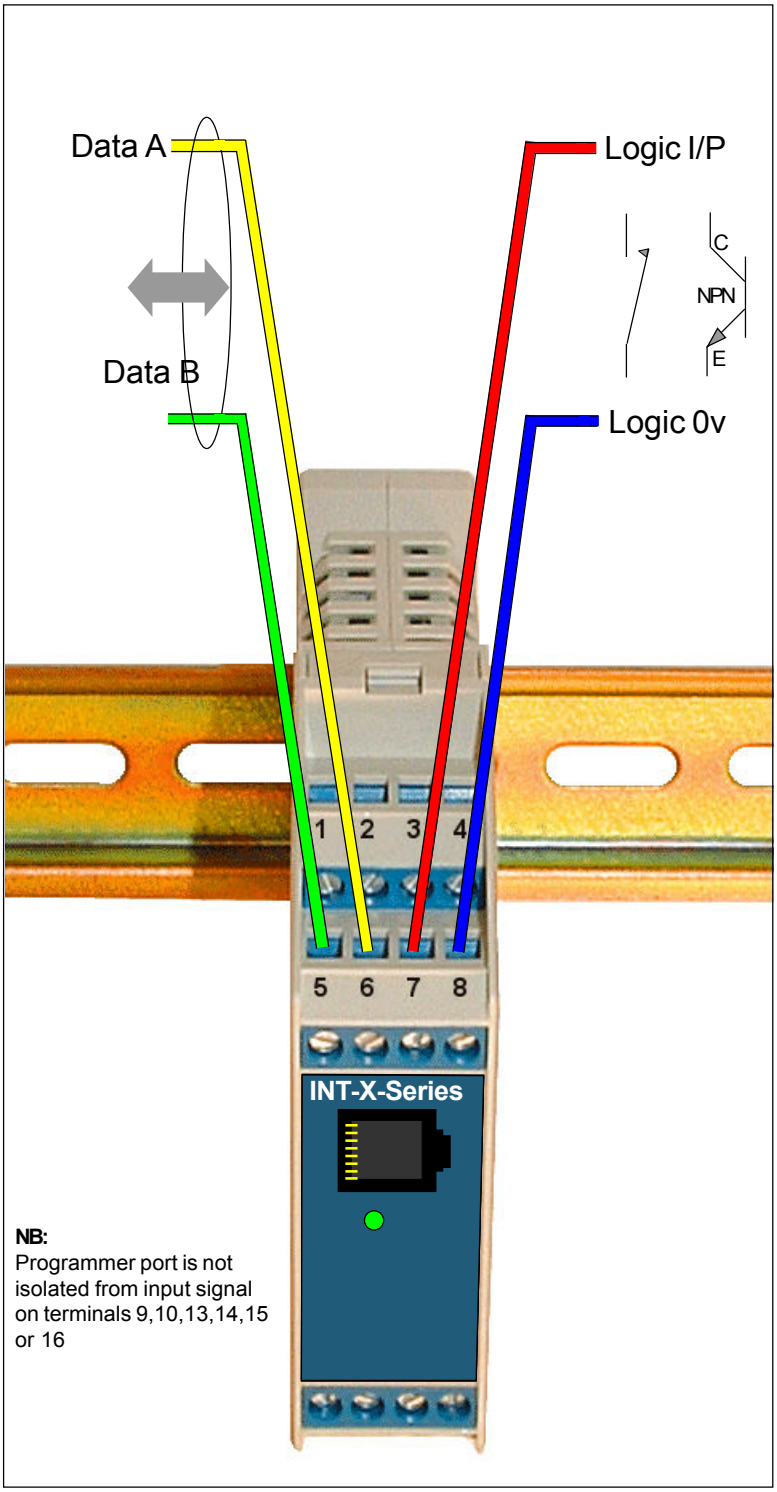
Loop the power cables through the supplied ferrite core, as near to the transmitter as possible. The cables must pass twice through the core, as shown.



Serial Data & Logic Input

Where to connect serial data and logic input

Use screened twisted pair data cable. Keep data cable away from power cabling and noise to reduce interference to the data.



Notes:

You can select either Modbus RTU or ASCII data format. You can also select baudrate and address. You will need to use the PC setup software to do this. You can find details of how to do this in the setup handbook.

You can daisychain a group of up to 64 transmitters together.

The logic input is pulled up to 5V via an internal 4K7 resistor.

4-20mA Input - Active source

Where to connect 4-20mA input if the input does not need excitation

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-P** if you want to connect a 4-20mA input signal.

Notes:

Terminal 9 = not used on INT-X-P

Terminal 10 = not used on INT-X-P

Terminal 11 = Analogue O/P +

Terminal 12 = Analogue O/P -

Terminal 13 = Excitation +

Terminal 14 = Signal common & Exc. -

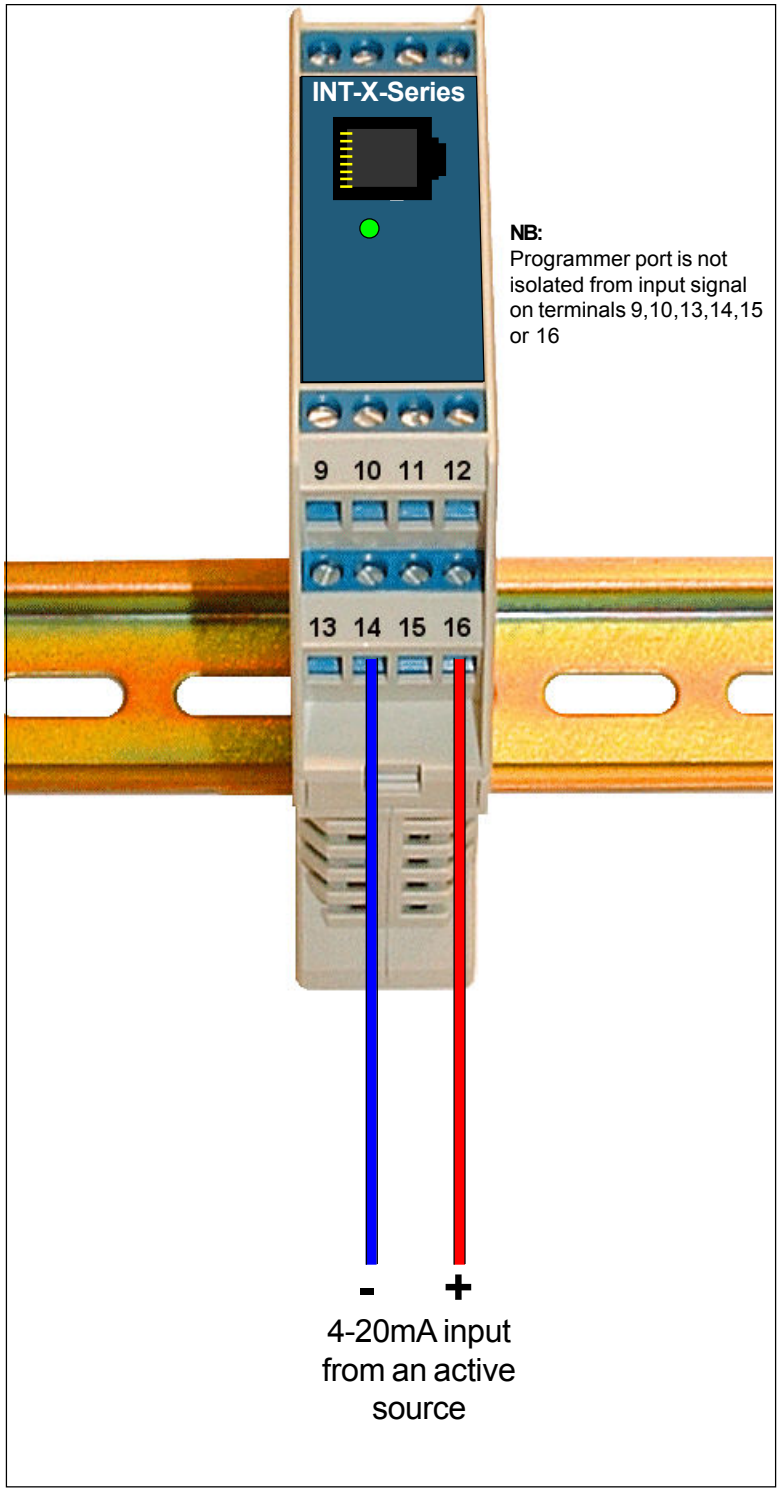
Terminal 15 = 0-10V input

Terminal 16 = 4-20mA input

Excitation voltage is 24V DC +/-10%

Maximum current 30mA

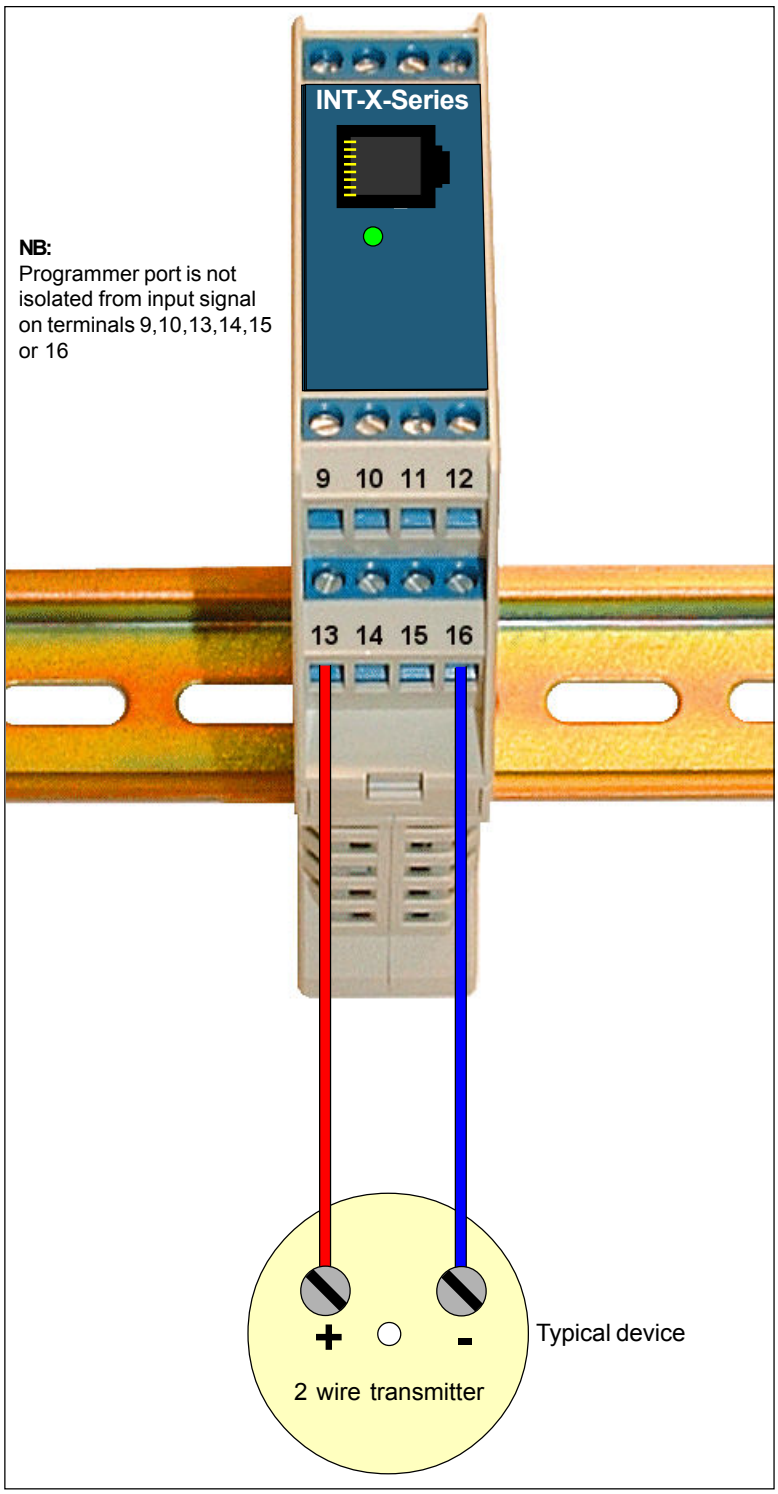
Input resistance 33 Ohms



4-20mA Input - 2 wire Passive source

Where to connect 4-20mA input if the input does need an excitation voltage

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-P** if you want to connect a 4-20mA input signal.



Notes:

Terminal 9 = not used on INT-X-P

Terminal 10 = not used on INT-X-P

Terminal 11 = Analogue O/P +

Terminal 12 = Analogue O/P -

Terminal 13 = Excitation +

Terminal 14 = Signal common & Exc. -

Terminal 15 = 0-10V input

Terminal 16 = 4-20mA input

Excitation voltage is 24V DC +/-10%

Maximum current 30mA

Input resistance 33 Ohms

4-20mA Input - 3 wire Passive source

Where to connect 4-20mA input if the input does need an excitation voltage

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-P** if you want to connect a 4-20mA input signal.

Notes:

Terminal 9 = not used on INT-X-P

Terminal 10 = not used on INT-X-P

Terminal 11 = Analogue O/P +

Terminal 12 = Analogue O/P -

Terminal 13 = Excitation +

Terminal 14 = Signal common & Exc. -

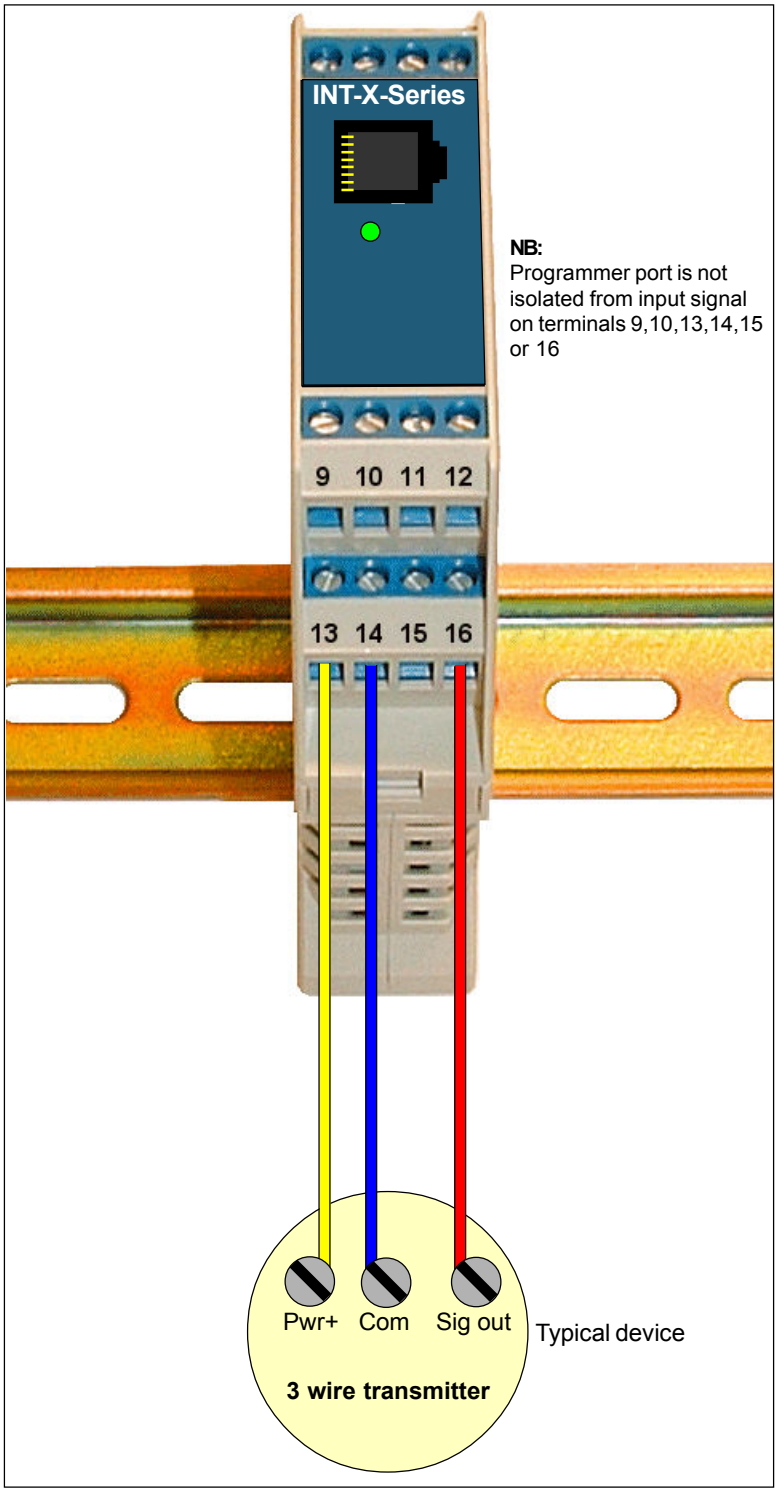
Terminal 15 = 0-10V input

Terminal 16 = 4-20mA input

Excitation voltage is 24V DC +/-10%

Maximum current 30mA

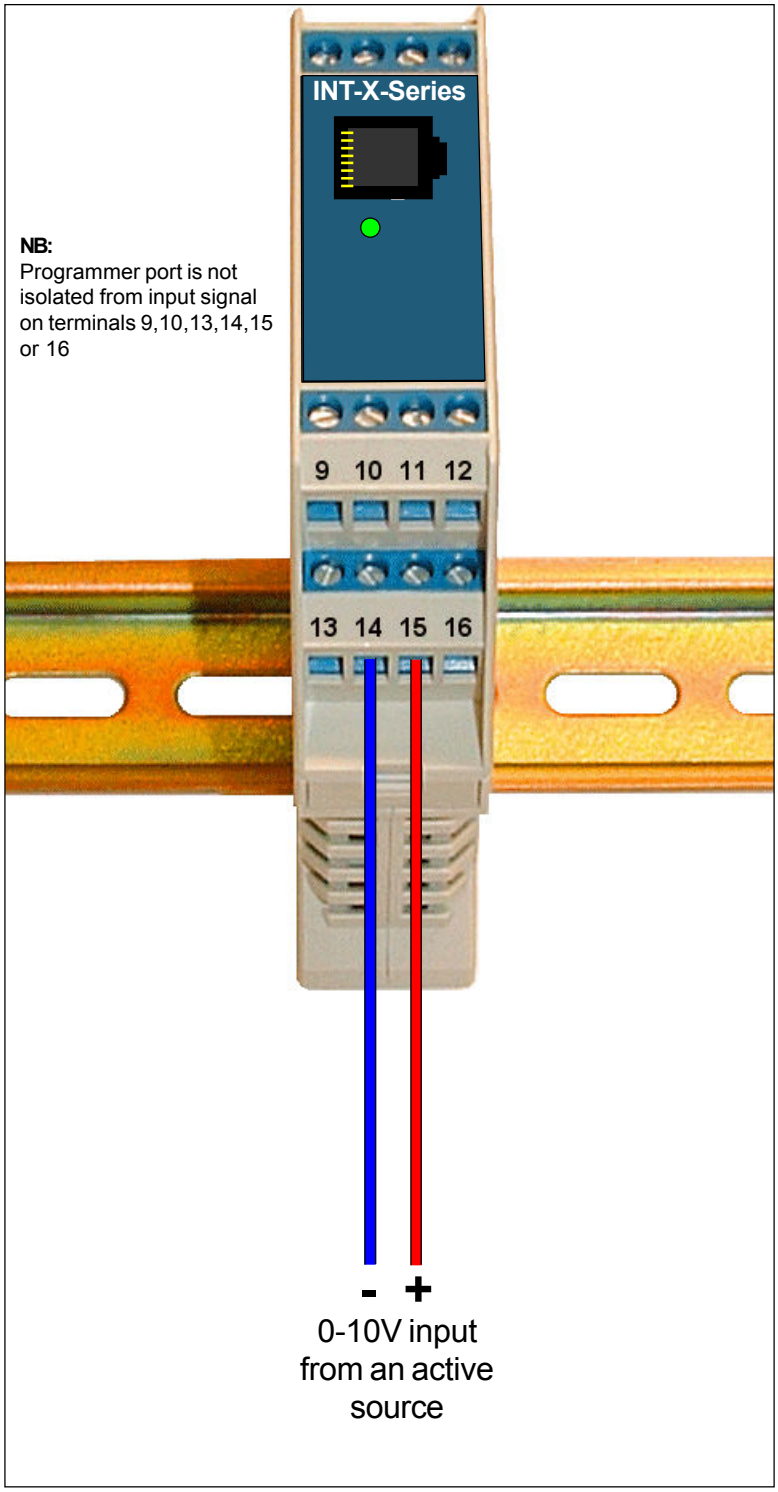
Input resistance 33 Ohms



0-10V Input - Active source

Where to connect 0-10V input if the input does not need excitation

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-P** if you want to connect a 0-10V input signal.



NB:
Programmer port is not isolated from input signal on terminals 9,10,13,14,15 or 16

Notes:

Terminal 9 = not used on INT-X-P

Terminal 10 = not used on INT-X-P

Terminal 11 = Analogue O/P +

Terminal 12 = Analogue O/P -

Terminal 13 = Excitation +

Terminal 14 = Signal common & Exc. -

Terminal 15 = 0-10V input

Terminal 16 = 4-20mA input

Excitation voltage is 24V DC +/-10%

Maximum current 30mA

Input resistance 1 Megohm

0-10V Input - Passive source

Where to connect 0-10V input if the input does need an excitation voltage

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-P** if you want to connect a 0-10V input signal.

Notes:

Terminal 9 = not used on INT-X-P

Terminal 10 = not used on INT-X-P

Terminal 11 = Analogue O/P +

Terminal 12 = Analogue O/P -

Terminal 13 = Excitation +

Terminal 14 = Signal common & Exc. -

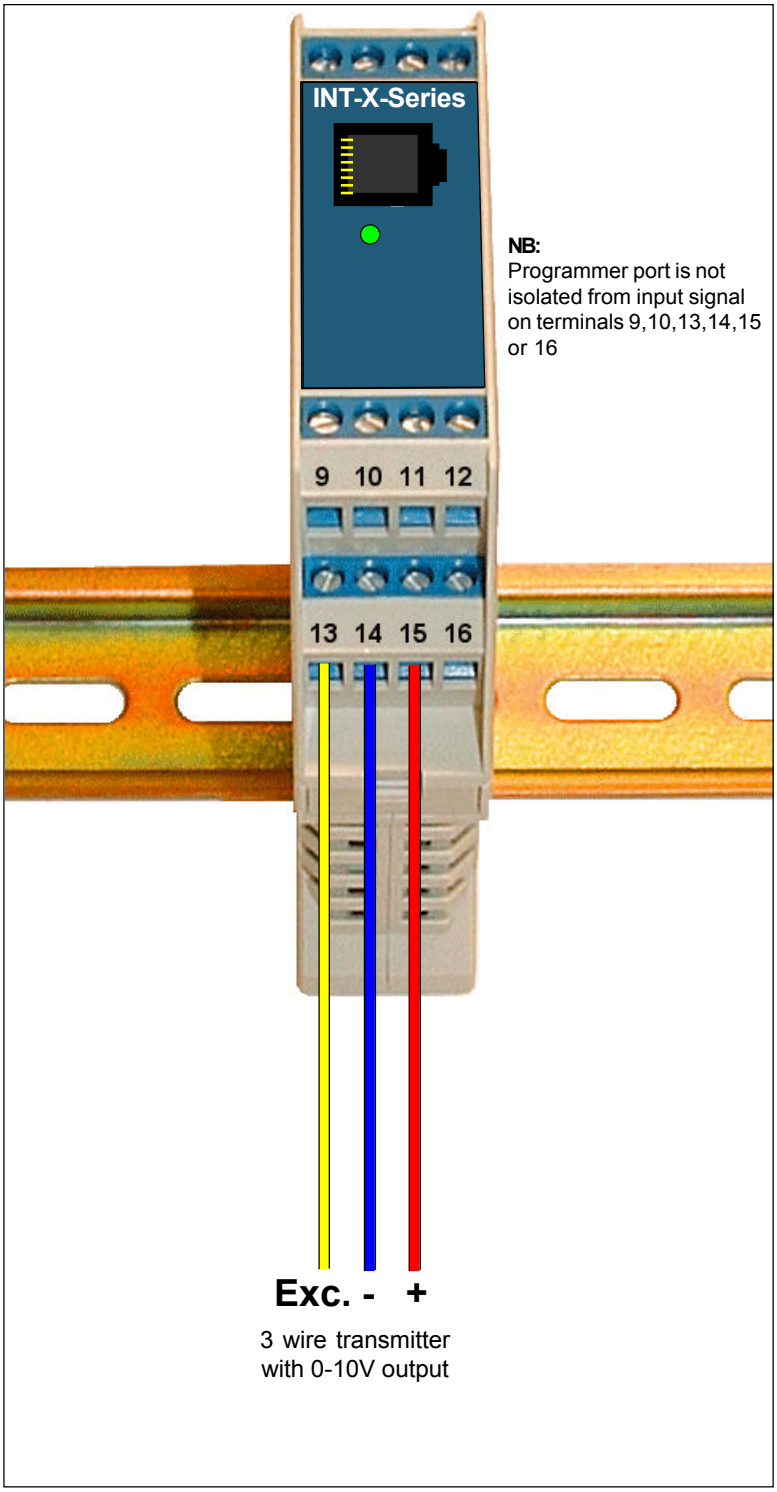
Terminal 15 = 0-10V input

Terminal 16 = 4-20mA input

Excitation voltage is 24V DC +/-10%

Maximum current 30mA

Input resistance 1 Megohm



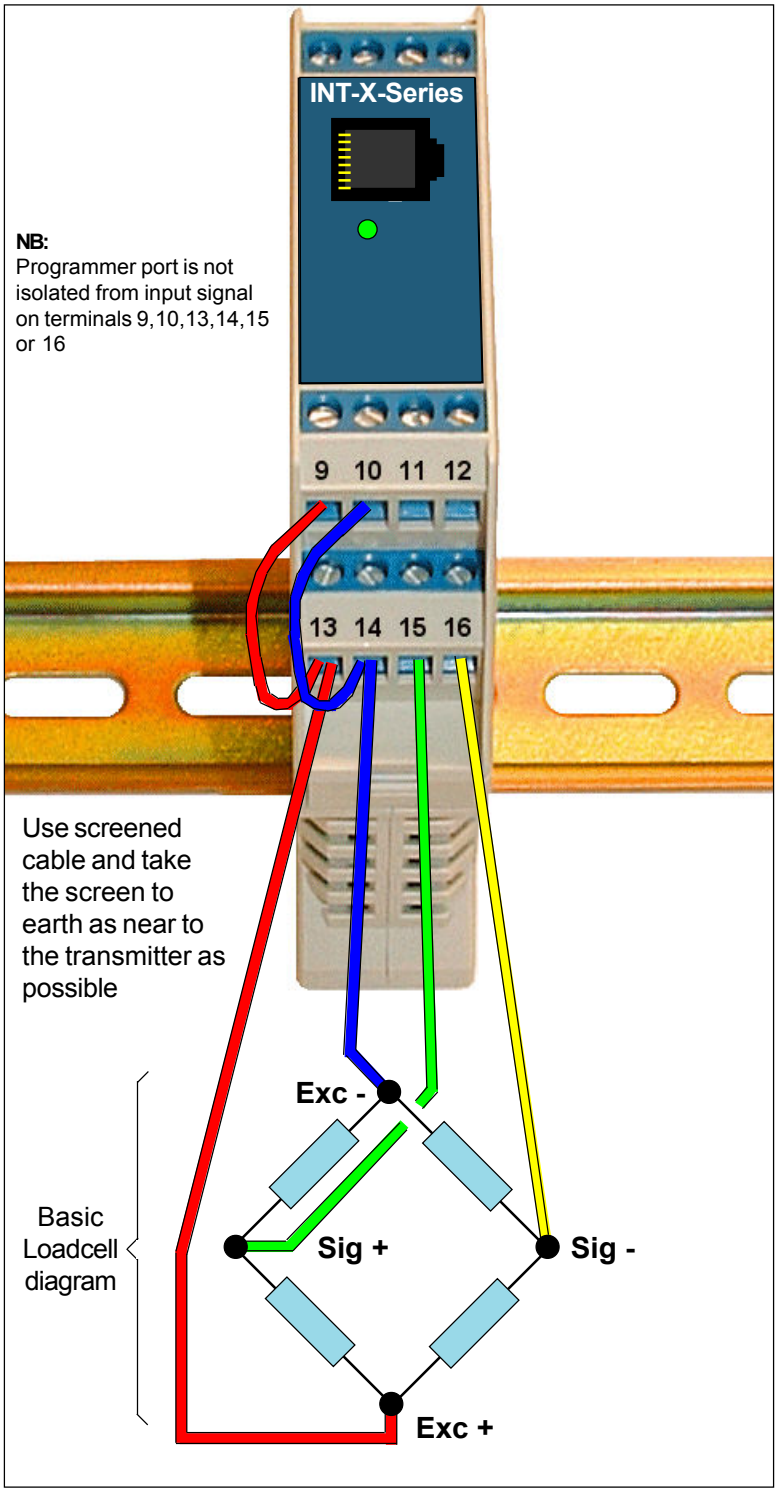
NB:
Programmer port is not isolated from input signal on terminals 9,10,13,14,15 or 16

3 wire transmitter with 0-10V output

Loadcell Input - 4 wire

Where to connect a 4 wire loadcell

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-L** if you want to connect a loadcell input.



Notes:

Terminal 9 = Sense +

Terminal 10 = Sense -

Terminal 11 = Analogue O/P +

Terminal 12 = Analogue O/P -

Terminal 13 = Excitation +

Terminal 14 = Excitation -

Terminal 15 = Signal +

Terminal 16 = Signal -

Excitation voltage 10VDC 120mA max.

Can power up to 4x 350 Ohm Cells.

Input signal range 0 to 30mV nominal

Suits loadcells with sensitivities of 0.5mV/V up to 3mV/V

6 wire - Loadcell Input

Where to connect a 6 wire loadcell

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-L** if you want to connect a loadcell input.

Notes:

Terminal 9 = Sense +

Terminal 10 = Sense -

Terminal 11 = Analogue O/P +

Terminal 12 = Analogue O/P -

Terminal 13 = Excitation +

Terminal 14 = Excitation -

Terminal 15 = Signal +

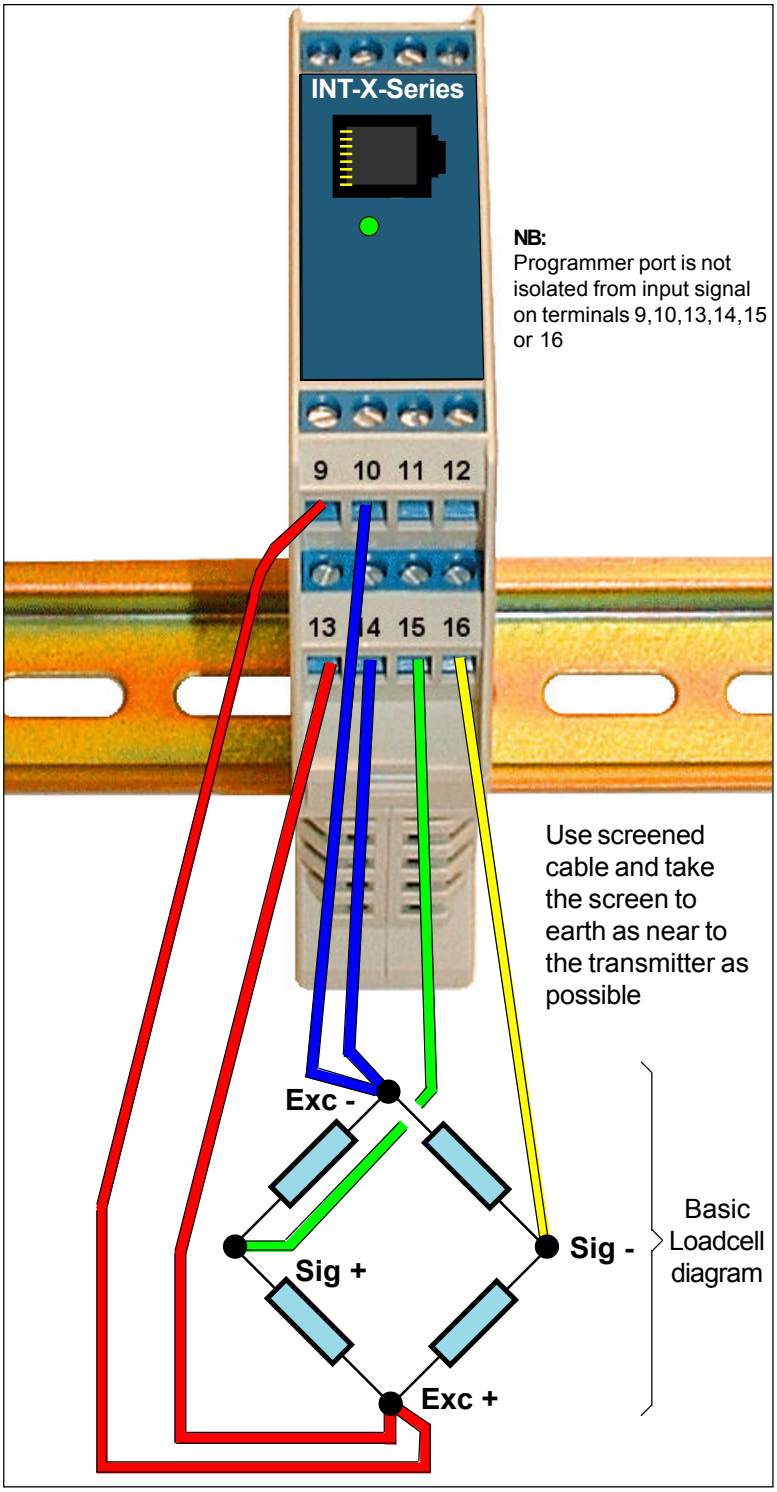
Terminal 16 = Signal -

Excitation voltage 10VDC 120mA max.

Can power up to 4x 350 Ohm Cells.

Input signal range 0 to 30mV nominal
Suits loadcells with sensitivities of
0.5mV/V up to 3mV/V

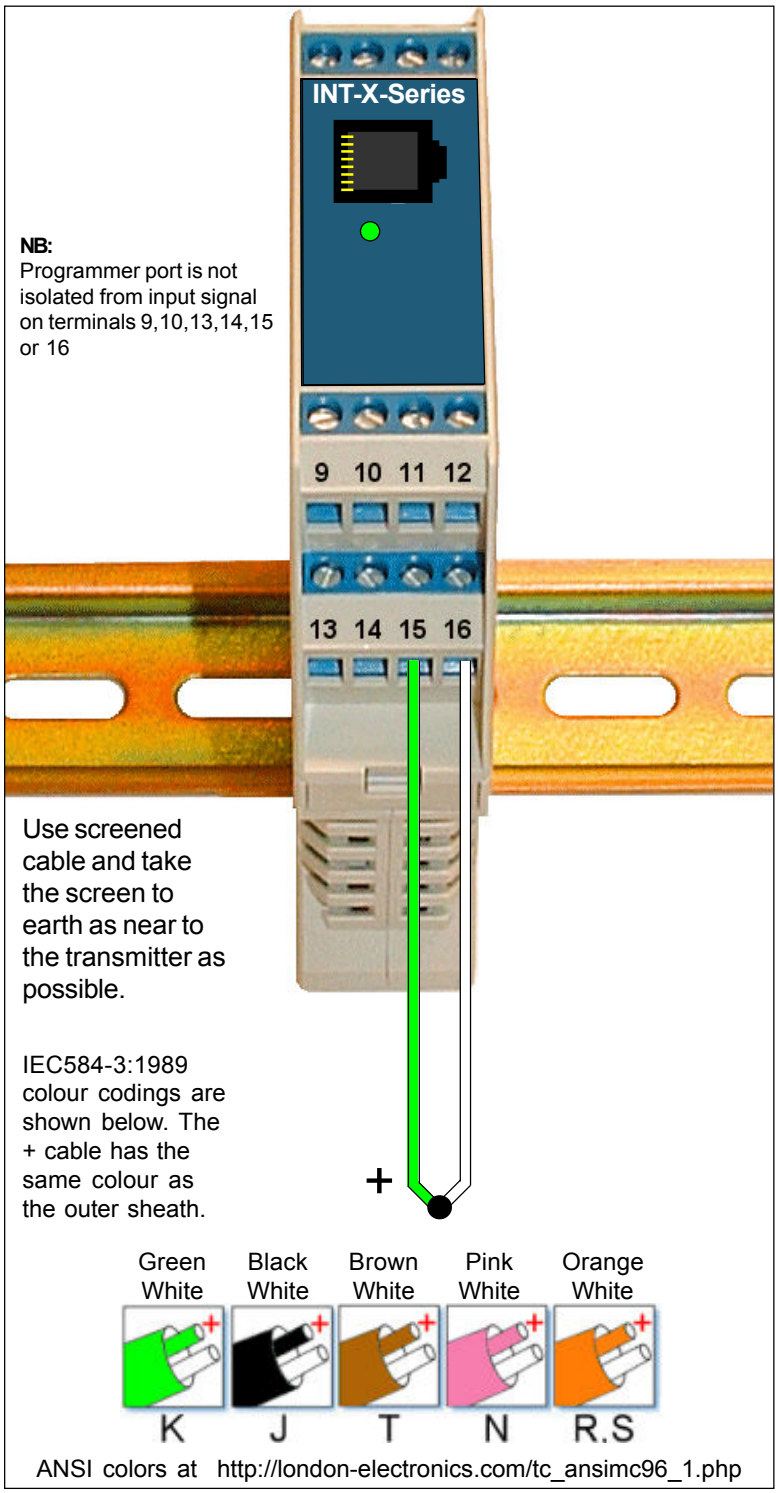
Ratiometric excitation reference allows you to use Zener barriers, provided the cell voltage is no less than 5V.



Thermocouple sensor input

Where to connect a 2 wire thermocouple

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-T** if you want to connect a thermocouple input.



NB:
Programmer port is not isolated from input signal on terminals 9,10,13,14,15 or 16

Use screened cable and take the screen to earth as near to the transmitter as possible.

IEC584-3:1989 colour codings are shown below. The + cable has the same colour as the outer sheath.

ANSI colors at http://london-electronics.com/tc_ansimc96_1.php

Notes:

Terminal 15 = Signal +
Terminal 16 = Signal -

The transmitter will give an output linear to temperature.

Open circuit drive is upscale
You can use the following sensors ...

Type K	:Accuracy +/-0.6 Deg.C
Type J	:Accuracy +/-0.5 Deg.C
Type T	:Accuracy +/-0.3 Deg.C
Type R	:Accuracy +/-1.0 Deg.C
Type S	:Accuracy +/-1.0 Deg.C
Type N	:Accuracy +/-1.0 Deg.C

Cold junction compensation tracking 0.1 Degree / Degree ambient change.

Temperature sensor input PT100

Where to connect a 3 wire PT100 RTD sensor

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-T** if you want to connect a PT100 input.

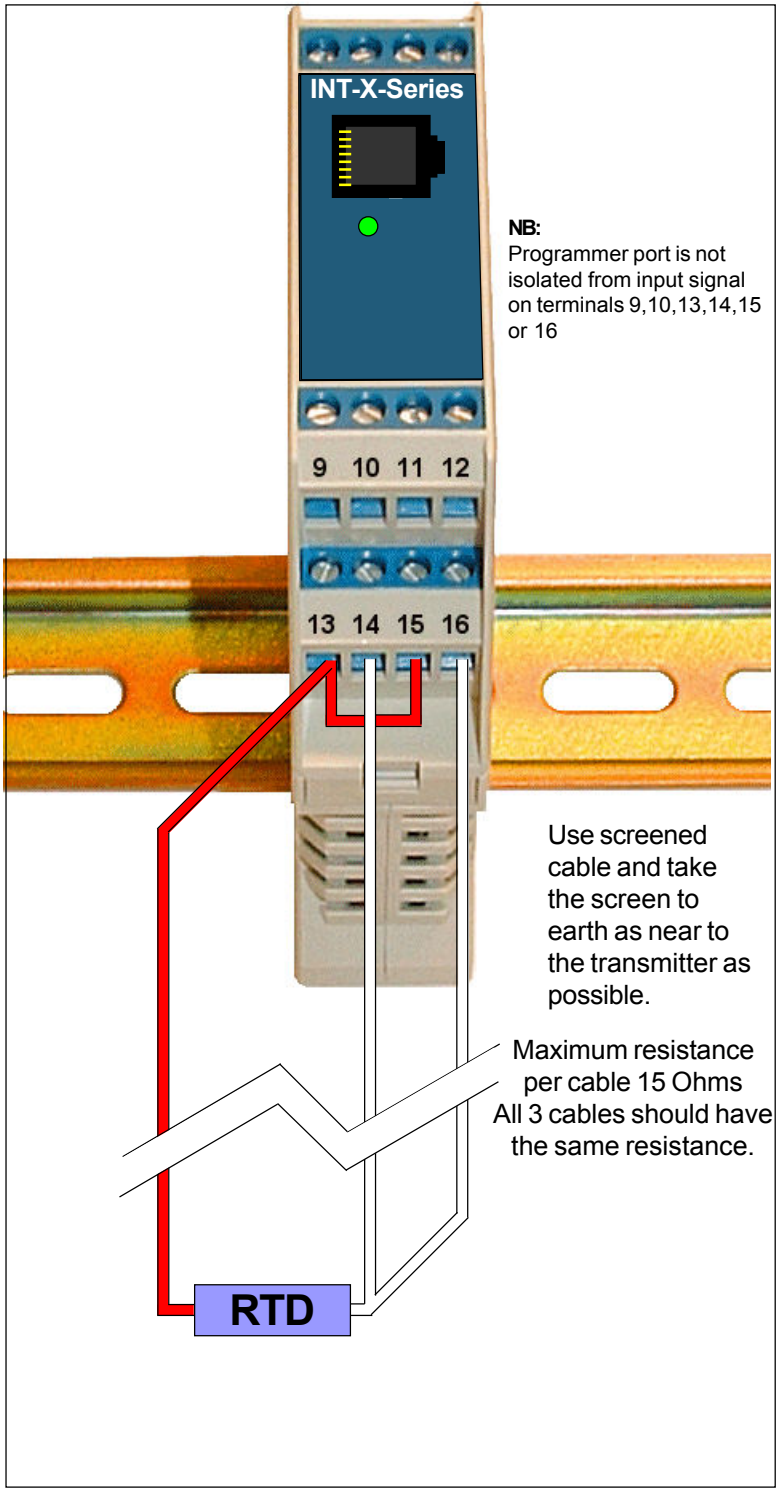
Notes:

Terminal 13= Excitation +
Terminal 14 = Lead Compensation
Terminal 15 = Signal +
Terminal 16 = Signal -

Sensor types you can connect:-
3 wire PT100 DIN
3 wire PT100 ANSI
Choose type either with handheld programmer or PC programme.
Default= PT100 DIN

Accuracy +/- 0.2 Deg C

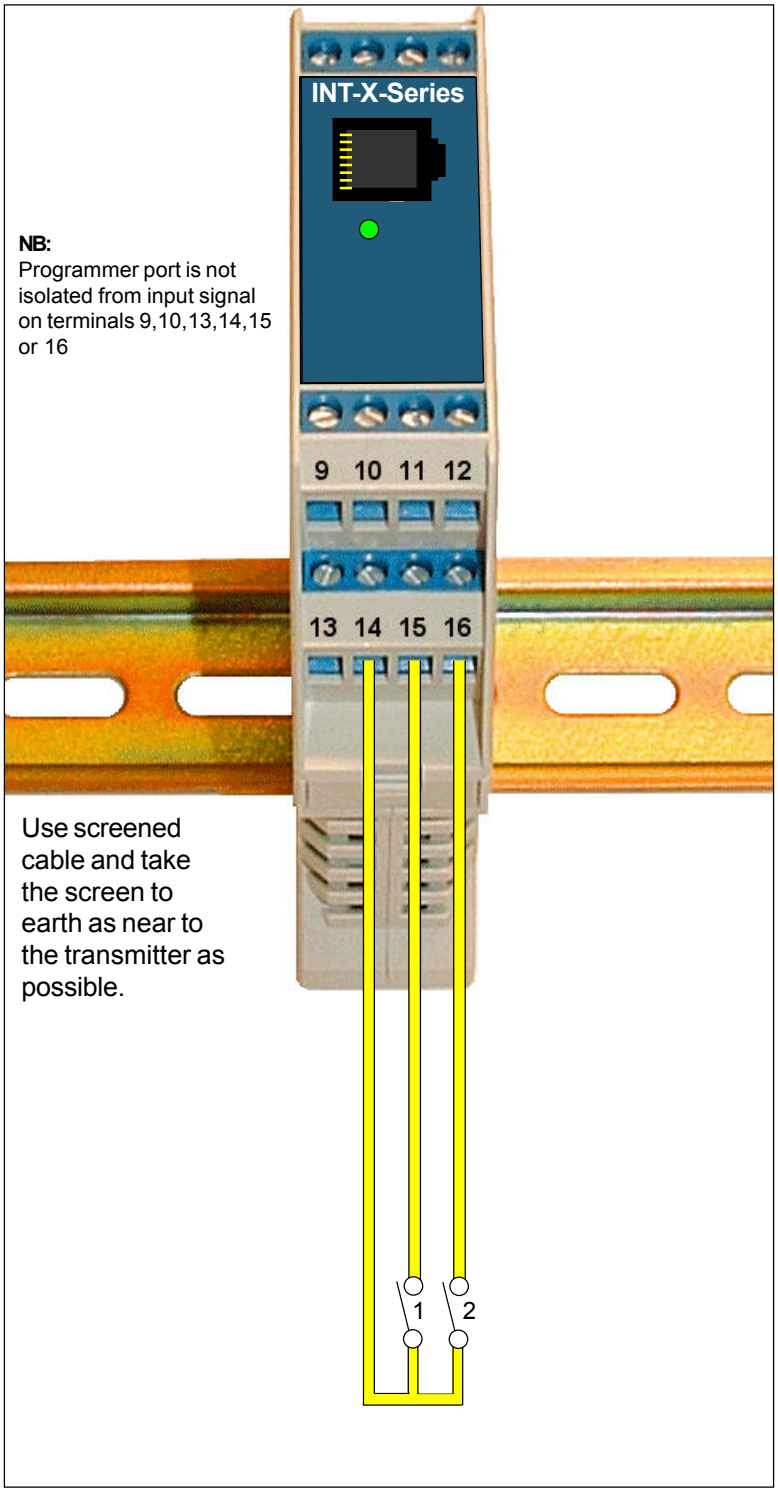
Cable compensation tracking
0.1 Ohm per 10 Ohms cable



Contact closure pulse inputs

Where to connect 1 or 2 contact closures for counting, speed or position measurement.

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-F** if you want to connect contact closure inputs.



NB:
Programmer port is not isolated from input signal on terminals 9,10,13,14,15 or 16

Use screened cable and take the screen to earth as near to the transmitter as possible.

Notes:

Terminal 14 = Input common
Terminal 15 = Signal input 1 (main)
Terminal 16 = Signal input 2 (secondary)

Set the input for 'Pullup' and 'contact debounce'. You can do this either with the handheld remote programmer or with PC software.

The contacts will switch 5V DC at 1mA

The maximum pulse rate on either input, with debounce, is 25 pulses per second.

Contact closures can come from pushbuttons, relay contacts etc.

For simple totalising or rate measurement, use input 1.

For adding two counts together, subtracting one from the other, gated UP/DOWN counting or for quadrature position sensing, use both inputs.

Proximity sensor NPN/PNP inputs

Where to connect 1 or 2 NPN or PNP proximity sensors for counting speed or position measurement.

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-F** if you want to connect NPN or PNP sensor inputs.

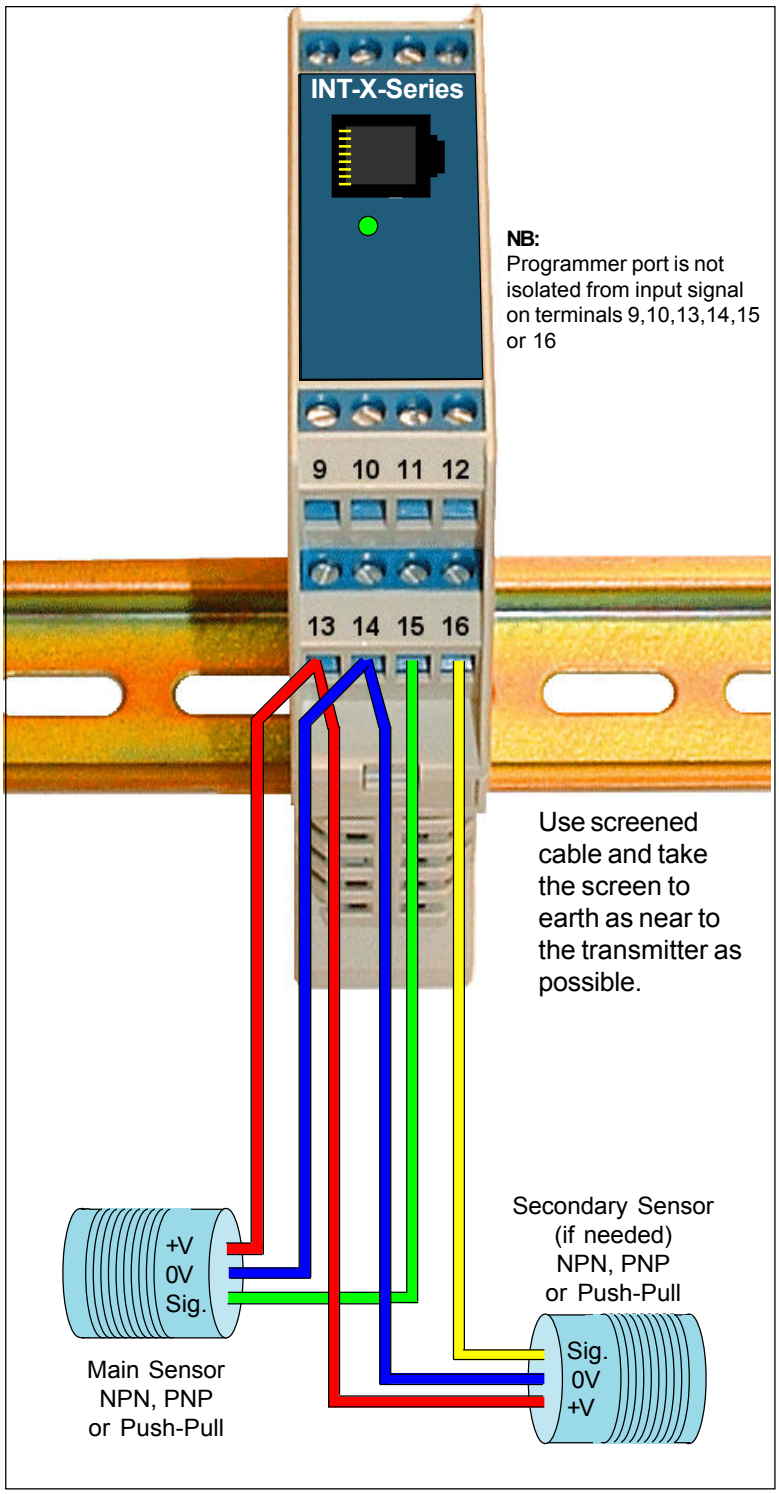
Notes:

Terminal 13= Excitation +
Terminal 14 = Signal Common
Terminal 15 = Signal input 1 (main)
Terminal 16 = Signal input 2 (secondary)

Set the input for 'Pullup' if you have NPN or 'Pulldown' if you have PNP sensor. Set 'Debounce' OFF if the signals are clean and bounce-free.

Excitation is 24V DC at up to 30mA

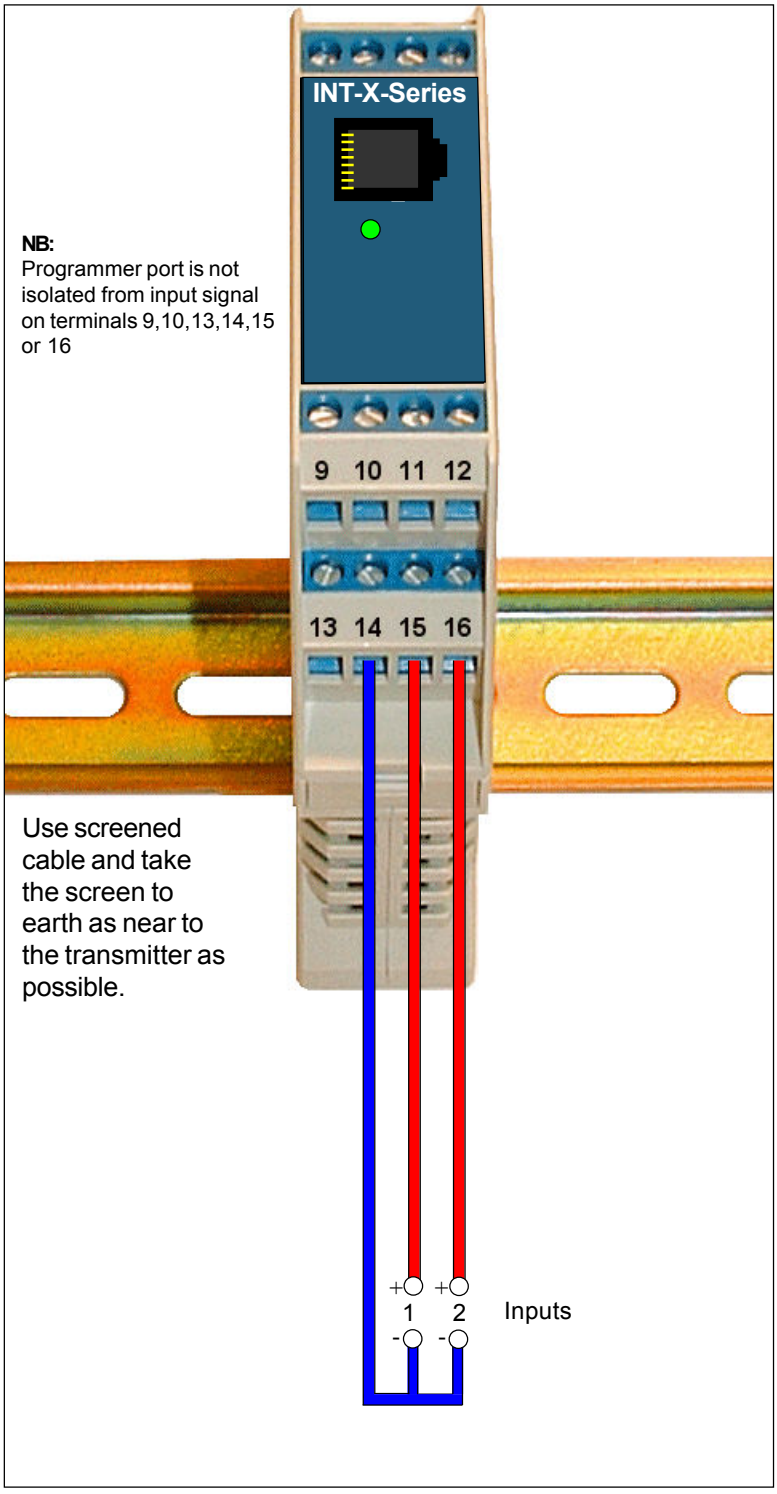
The maximum pulse rate is 50000 pulses per second with debounce off or 25 pulses per second with debounce on.



24V pulse inputs

Where to connect 1 or 2 24V DC pulses for counting, speed or position measurement.

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-F** if you want to connect contact closure inputs.



NB:
Programmer port is not isolated from input signal on terminals 9,10,13,14,15 or 16

Use screened cable and take the screen to earth as near to the transmitter as possible.

Notes:

Terminal 14 = Input common
Terminal 15 = Signal input 1 (main)
Terminal 16 = Signal input 2 (secondary)

Set the input for 'Pulldown'. You can do this either with the handheld remote programmer or with PC software.

The maximum pulse rate on either input, without debounce, is 50000 pulses per second.

For simple totalising or rate measurement, use input 1.

For adding two counts together, subtracting one from the other, gated UP/DOWN counting or for quadrature position sensing, use both inputs.

Passive inductive pickup inputs

Where to connect a passive inductive pickup for counting speed or position measurement.

First check the model number on the silver label on the side of the transmitter.
It must say **INT-X-F** if you want to connect NPN or PNP sensor inputs.

Notes:

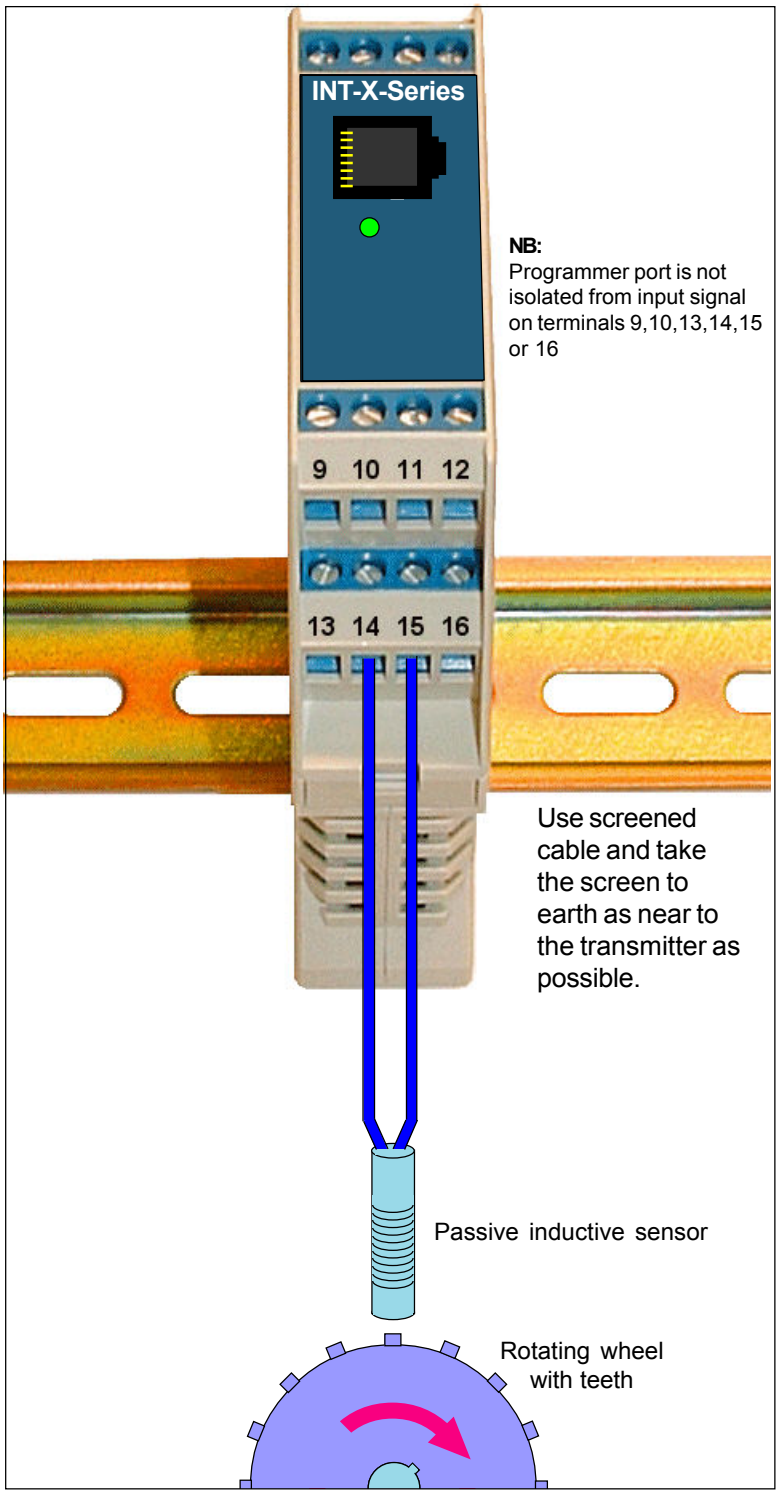
Terminal 14 = Signal Common
Terminal 15 = Signal input

Set the input for 'Pulldown'.
Set 'Debounce' ON.
Set Sensitivity HIGH (see below)

The maximum pulse rate is 50000 pulses per second with debounce off or 25 pulses per second with debounce on.

To set high sensitivity, please remove all cables from the transmitter and open the enclosure to expose both printed circuit boards.

The sensitivity jumper position is shown below ...



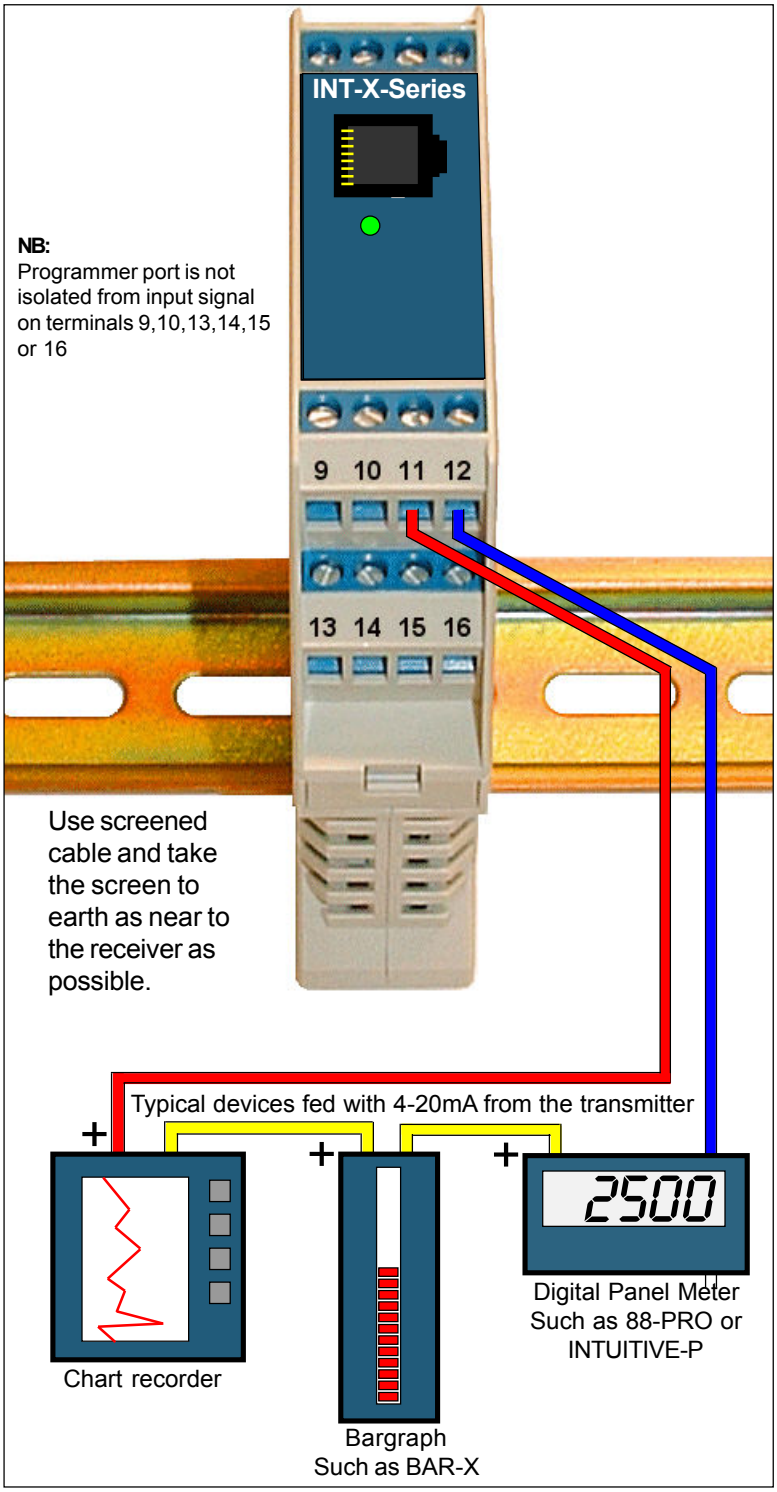
0-20mA or 4-20mA Output

Where to connect for 4-20mA isolated, scaled output

Please Note: If you ordered the transmitter with scaled 4-20mA output it will be supplied already scaled for you.

If you want to change the scaling, you will need to reprogram the transmitter. To do this you will need a handheld programmer or PC setup software and communications cable.

To change to 4-20mA output, from 0-10V, you will need to move the output switch, which is hidden behind the front panel, to its lower position. You will need to reprogram the transmitter.



Notes:

Terminal 11 = Positive +

Terminal 12 = Negative -

Set the output selection switches to the 4-20mA position. See end of manual for details.

Fully isolated and scalable with the Handheld programmer or with a PC.

Can drive into 600 Ohms.max. loop resistance.

0.025% resolution max

Output 0-10V

Where to connect for 0-10V isolated and scaled output

Please Note: If you ordered the transmitter with scaled 0-10V output it will be supplied already scaled for you.

If you want to change the scaling, you will need to reprogram the transmitter. To do this you will need a handheld programmer or PC setup software and communications cable.

To change to 0-10V output, from 4-20mA, you will need to move the output switch, which is hidden behind the front panel, to its upper position. You will need to reprogram the transmitter.

Notes:

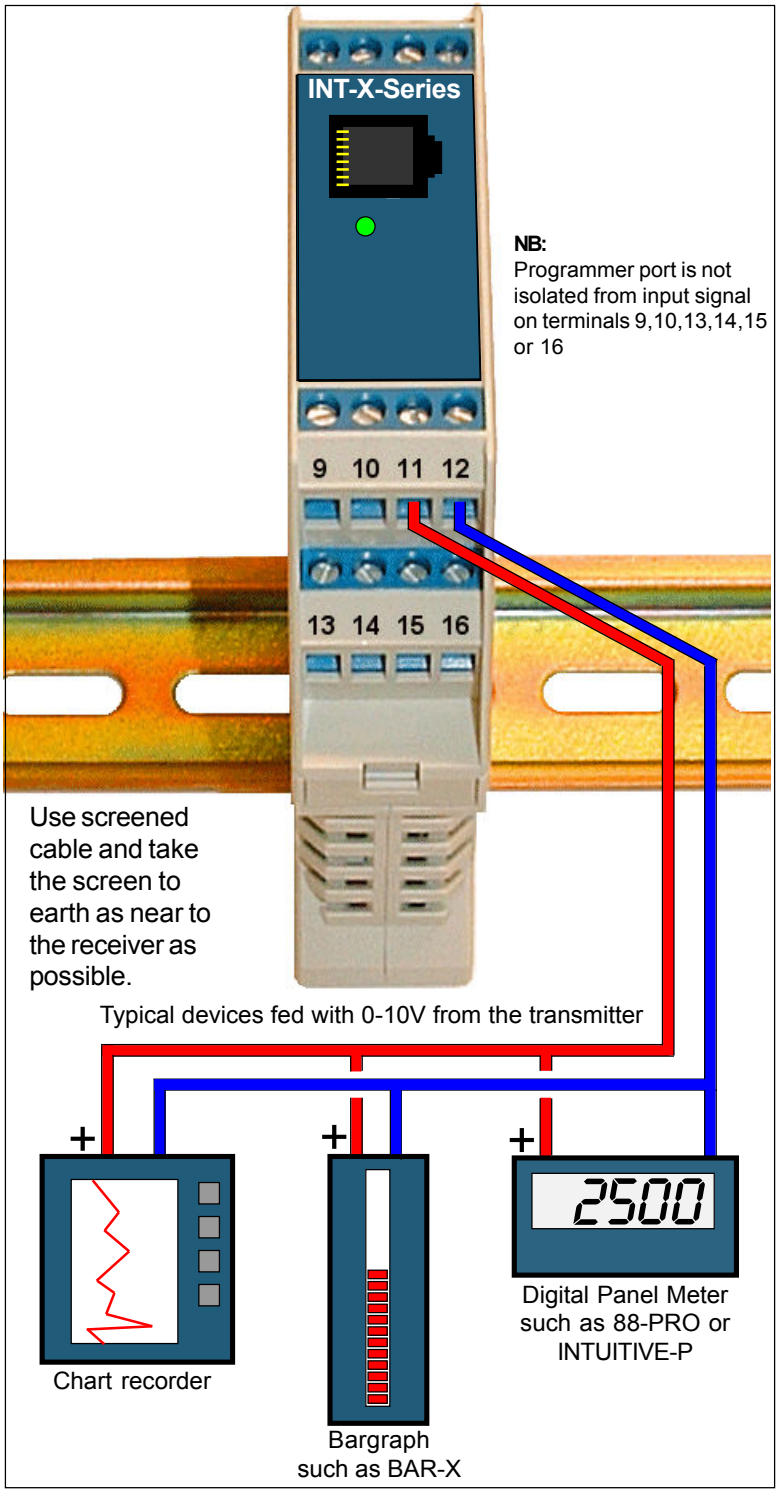
Terminal 11 = Positive +
Terminal 12 = Negative -

Set the output selection switches to the 0-10V position. See end of manual for details.

Fully isolated and scalable with the Handheld programmer or with a PC.

Can drive into 600 Ohms.min. load resistance.

0.025% resolution max

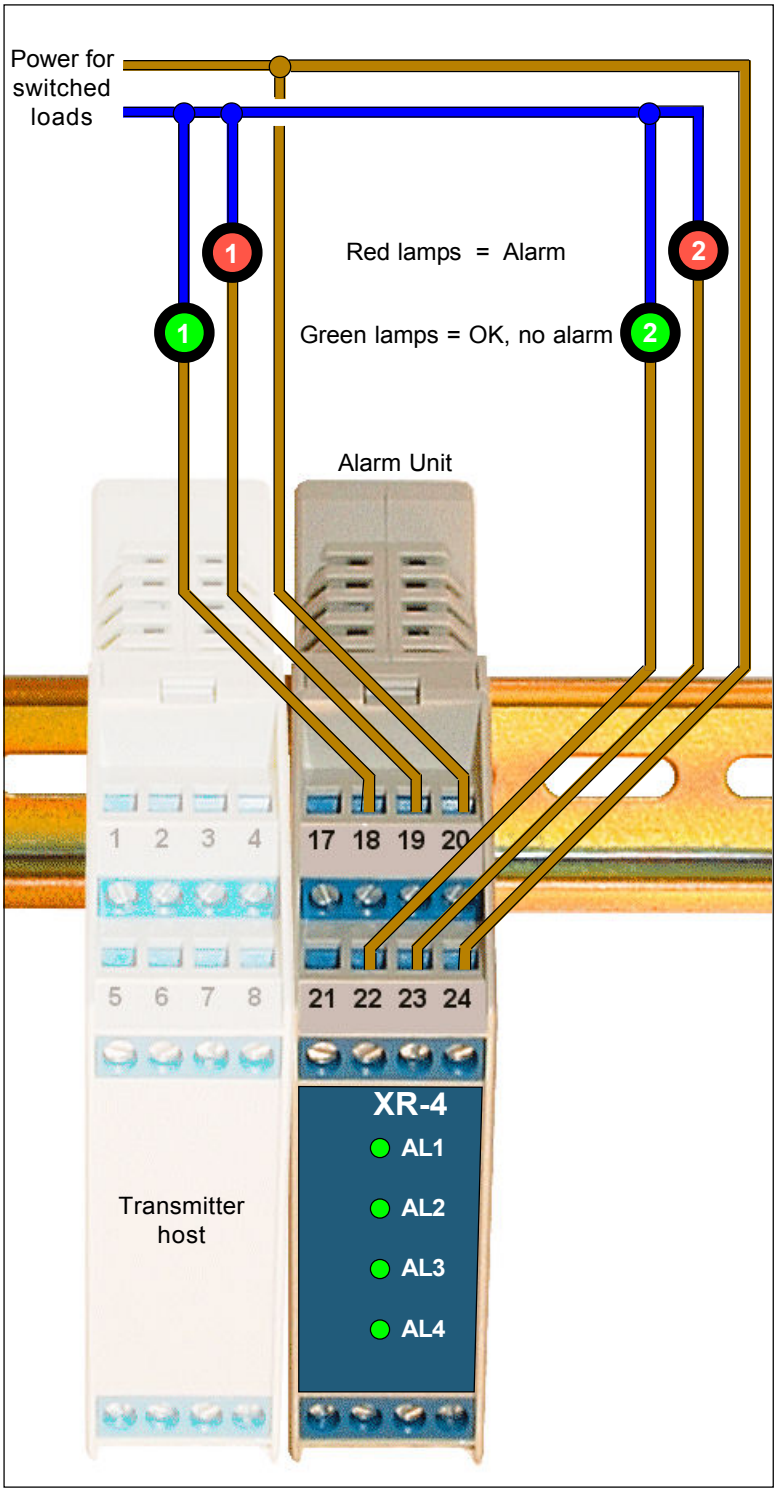


Alarm relay outputs 1 and 2

Where to connect for changeover contacts on Alarm 1 and Alarm 2 on optional module XR4

There are 3 ways you can set the alarm levels and actions of HI or LOW:

1. Tell us the alarm settings you need when you order (settings are stored in the host transmitter)
2. Use the Hand-held remote programmer - see separate operating manual
3. Use your PC with setup software - see separate operating manual



Notes:

This typical example shows how each relay can switch 2 loads.

Here we have a green lamp, which will light when the relay is NOT in alarm.

The red lamp will light when an alarm condition occurs, or when power is lost to the transmitter

Alarm 1 Relay output:

18 = Normally Closed when healthy
19 = Normally Open when healthy
20 = Common

Alarm 2 Relay output:

22 = Normally Closed when healthy
23 = Normally Open when healthy
24 = Common

Healthy means the transmitter has correct power voltage applied, and the signal is not in alarm.

The relays operate in failsafe mode. This means that the relay coils are energised when all is OK. The LEDs on the front of the alarm unit will light when relays are energised (healthy) When an alarm occurs, the relay will de-energise and LED will go out.

Alarm relay outputs 3 & 4

Where to connect for changeover contacts on Alarm 3 and Alarm 4 on optional module XR4

There are 3 ways you can set the alarm levels and actions of HI or LOW:

1. Tell us the alarm settings you need when you order (settings are stored in the host transmitter)
2. Use the Hand-held remote programmer - see separate operating manual
3. Use your PC with setup software - see separate operating manual

Notes:

This typical example shows how each relay can switch 2 loads.

Here we have a green lamp, which will light when the relay is NOT in alarm.

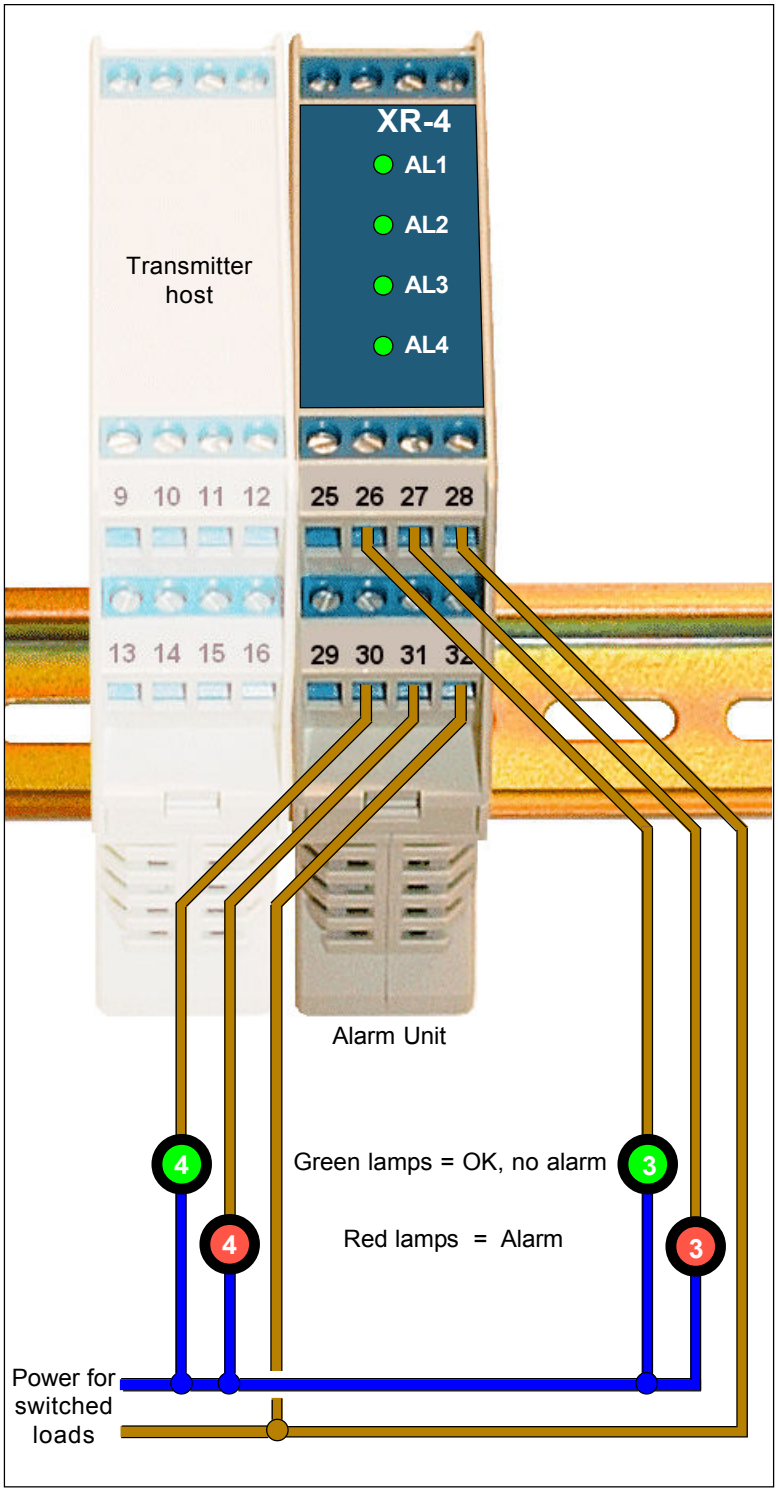
The red lamp will light when an alarm condition occurs, or when power is lost to the transmitter

Alarm 3 Relay output:
26 = Normally Closed when healthy
27 = Normally Open when healthy
28 = Common

Alarm 4 Relay output:
30 = Normally Closed when healthy
31 = Normally Open when healthy
32 = Common

Healthy means the transmitter has correct power voltage applied, and the signal is not in alarm.

The relays operate in failsafe mode. This means that the relay coils are energised when all is OK. The LEDs on the front of the alarm unit will light when relays are energised (healthy) When an alarm occurs, the relay will de-energise and LED will go out.



Programming your transmitters

There are 3 ways you can configure or program your transmitters :-

1. Tell us what settings you need, when you order, and we will set for you before we ship.

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2. Use the optional Handheld plug-in programmer - ideal for on-site or workshop commissioning.

User manual INT-X-RP is supplied with the programmer.
This explains all you need to know about the Handheld programmer and on-site adjustment.
Available from http://london-electronics.com/intxrp_2006.pdf

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3. Use a PC with our optional INT-X programming software - ideal for workshop commissioning.

User manual INT-X-PC and PC connector adapter is supplied with the CD.
This explains all you need to know about the PC programming software and on-site adjustment.
Available from http://london-electronics.com/intxpc_2006.pdf

NOTE: Do NOT connect the programmer cable directly to an Ethernet port. This will damage the transmitter. Connect to a 9 pin D connector RS232 port, using the adapter we provide with the disk and cable

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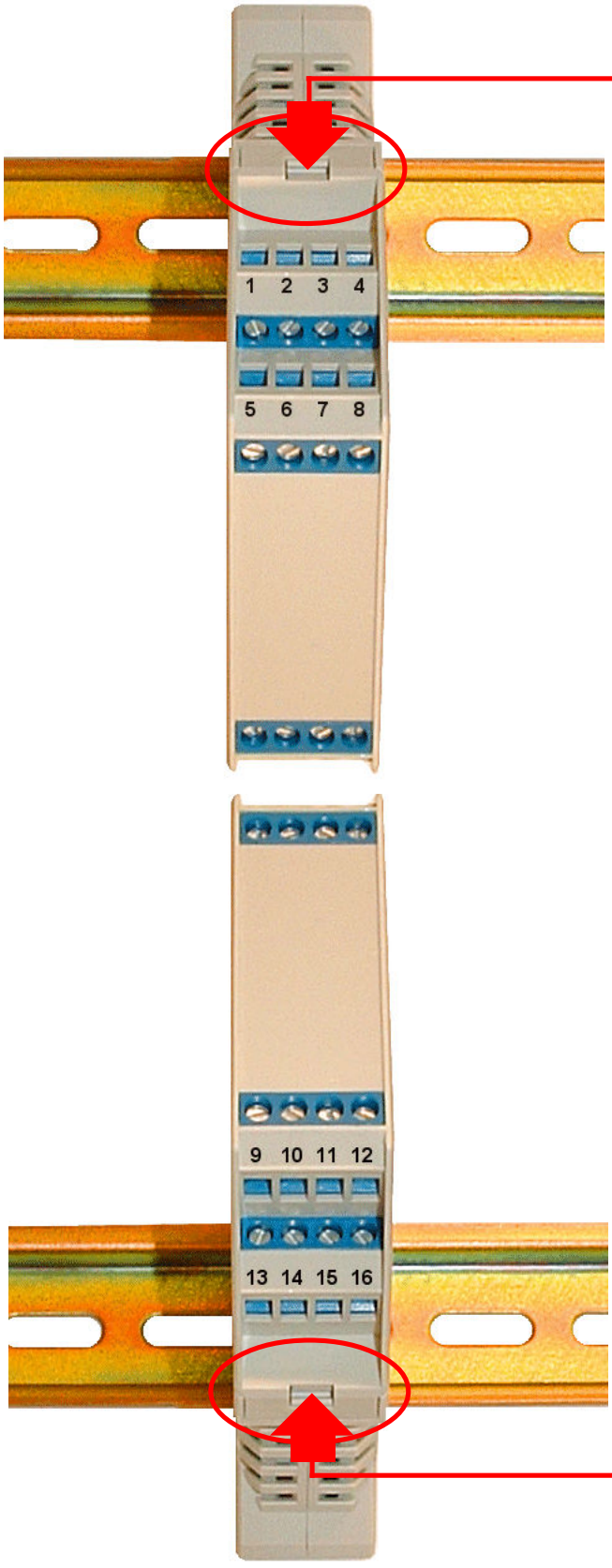
Record of Revisions

7 July 2005	Page 20 - thermocouple input polarity corrected on diagram.
17 Feb 2006	General - New front panel layout, with 8 pole data connector and rear-of-panel analogue output switch.
8 June 2006	New detachable connector version. Added note about maximum temperatures when several units are stacked together, with suggestion on cooling. Added logic input port notes. Added new isolation scheme and included 1 Megohm bleed resistor between power supply and logic input. Added section to explain how to open the case, to access the output selection switches.

Output selection switches - access

You can choose either 0-10V or 4-20mA or 0-20mA analogue output. Select the analogue output with push-on switches and the setup menu.

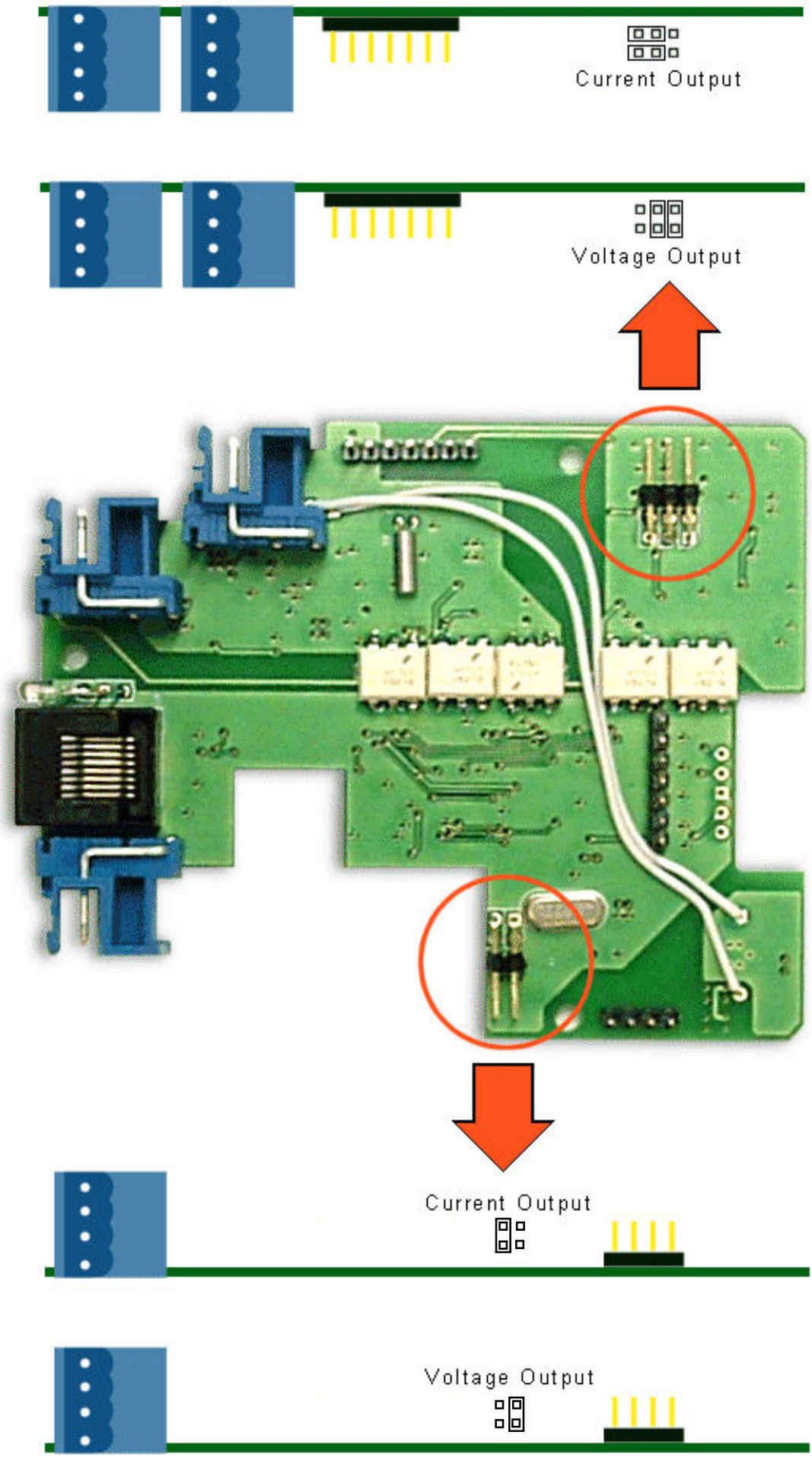
To access the switches, you will need to release the front panel from the case. Remove all connectors and wiring before you open the case.



1. Use a small terminal screwdriver to press the top clip inwards.
2. Pull the case lid forwards a little to release the clip.

3. Use a small terminal screwdriver to press the bottom clip inwards.
4. Pull the unit out of its case

Output selection switches



Notes

Notes

Declaration of Conformity

Declaration Reference	: INTUITIVE-X Transmitter series
Issue Date	: 12 May 2005
Products Covered	: INTUITIVE-X series
Title	: DOC-INTUITIVE-X

This is to confirm that the Product covered by this declaration have been designed and manufactured to meet the limits of the following EMC Standard :

EN61326-1:1997

and has been designed to meet the applicable sections of the following safety standards

EN61010-1:2001

Conditions

The transmitters are permitted a worst case error of 1% of A/D range during electro-magnetic disturbance, and must recover automatically when disturbance ceases without the need for human intervention, such as resetting, power-down etc.

The transmitters covered by this certificate must be installed in adherence to the following conditions :-

No connection shall be made to the programming port if the input signal could exceed 35V above ground potential.

Signal cabling shall be routed separately to power carrying cabling (includes relay output wiring)

All signal cabling shall be screened. The screen shall only be terminated to the power earth terminal.

Declared as true and correct, for and on behalf of London Electronics Ltd.

J.R.Lees Director