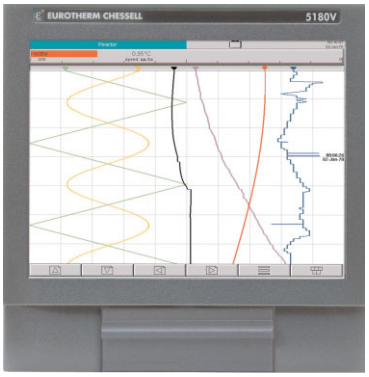
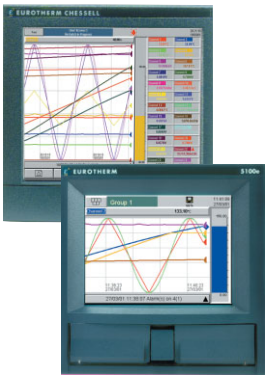
5100e, 5100V 5180V

MODELS

- Colour touchscreen display
- Advanced data security and archiving
- Designed for network and standalone use
- FTP Client and Server
- Ethernet and Modbus TCP comms
- Time sycronisation using SNTP (Server and Client)
- Live, remote data viewing
- Batch functionality
- User editable screens
- Up to 48 universal inputs
- Up to 27 relay outputs
- 125ms parallel sampling
- Review and configuration software as standard
- Alarm notification via email





Networked or Standalone Graphic Data Acquisition Unit

Specification Sheet

The 5000 Series all offer unrivalled input accuracy with a 125ms total sample rate for up to 48 input channels. Input channels are freely configurable to suit your process requirements. Each instrument has an intuitive, touch screen display to enable operators to clearly view process data in varying formats. All have onboard Flash data storage capability, Ethernet communication and either PCCard or Floppy disk. Data is stored in a tamper-proof binary format that can be used for secure, long term records of your process. The 5000 Series is truly designed for todays networked world and can be accessed via a Local Area Network, dial-up connection, Intranet or Internet.

Available Features			
	5100e	**5100V**	**5180V**
Channels	3 or 6	Up to 18 (6 per card)	Up to 48 (6 per card)
Relays	1	Up to 12 (3 per card)	Up to 27 (3 per card)
Events Inputs	✗	12	24
Groups	2	6	6
Auditor Features	✗	✓	✓
Maths channel	12*	78*	48*
Totaliser	12*	36*	48*
Timers	6	12	12
Counters	12*	36*	48*
Alarms	4 per channel Including Maths and totaliser channels		
Batch 5000	✗	✓	✓
Bridge 5000 remote viewing software	✓	✓	✓
Screen builder	✗	Up to 24 user screens	
Security	Unlimited unique user names with configurable access and passwords		
Configuration software	Standard		
Review Lite software	Standard		
Standard views	Vertical trend, horizontal trend, vertical bargraph, horizontal bargraph, numeric value		

* Total number of maths, totalisers and counters must be equal to the number of selected maths channels

Data Logging and Archiving

The 5000 Series recorders have internal Flash memory for secure, short term, data storage. They are also able to accept various removable media types (PC Card or floppy disk). Data stored within the internal memory can be archived to the removable media on demand or at preset intervals. The 5000 will give indication of how long its internal memory and that of the removable media installed will last according to the configuration of the recorder.

All 5000s have Ethernet capability. The 5000 can be configured to archive to the removable media and / or over the Ethernet. Archiving files over the Ethernet effectively gives a secure, infinite archiving capacity.

Approximate duration for continuous recording of one Group of six channels:

Archive Media	Sample Rate					
	0.5s	1s	5s	10s	30s	60s
1.44Mb floppy disk	0.5 days	1 day	5 days	10 days	30 days	61 days
8Mb Flash card	2 days	5 days	28 days	56 days	169 days	339 days
32Mb Flash card	11 days	22 days	113 days	226 days	679 days	1359 days
64Mb Flash card	22 days	45 days	226 days	453 days	1359 days	2718 days
3Mb Internal Flash (5100e)	1 day	2 days	10 days	21 days	63 days	127 days
8.25Mb Internal Flash (5100V)	3 days	5.8 days	29 days	58 days	175 days	350 days
16.25Mb Internal Flash (5180V)	5 days	11 days	57 days	115 days	345 days	690 days
Ethernet	infinite	infinite	infinite	infinite	infinite	infinite

Time Synchronisation (SNTP)

The 5000 Series support Simple Network Time Protocol which, when enabled, updates the instrument time every 15 minutes from the configured SNTP server. The unit can also act as a Unicast SNTP server on the network, allowing client instruments to synchronise with the 5000 to a resolution of one millisecond.

Batch Recording (5100V/5180V only)

Up to six user-defined fields can be used to enter batch specific data.

Field Descriptor	Operator entered batch information
– up to 20 characters	– up to 60 characters

The user can choose to log any number of the given fields on start and / or stop of a batch. The information will appear on the chart as a message and cannot be separated from the process data to which it relates.

Auditor Features (5100V/5180V only)

Designed to meet the requirements of the FDA Regulation 21 CFR Part 11 for Electronic Records and Signatures, this software option provides the 5000 Series with additional security such as password ageing, electronic signatures and time stamped audit trail.

Modbus Master

Allows users to view data from multiple instruments connected either by a local Network connection using Modbus TCP, or a Serial connection using Modbus RTU,

Event Input

The Event Input option offers six isolated event input circuits per board fitted. Triggered externally these discrete inputs can be used to initiate internal actions within the 5000 Series Data Acquisition unit. For example they could be used to remotely start or stop a Batch.

ASCII Printer Output (Reports)

When enabled on the product the ASCII printer option provides the 5000 Series with the ability to generate up to 10 simple reports that can be directed to an ASCII text printer. Reports, triggered by an event/job can be configured to contain parameters such as time and date, batch names, process values and user defined messages.

TECHNICAL SPECIFICATION

Recorder

Environmental performance

Temperature limits	Operation:	0 to +50°C (5 to 40°C if floppy disk version)
	Storage:	–25 to 70°C (–20 to 50°C if floppy disk version)
Humidity limits	Operation:	5% to 80% RH (20% to 80% RH if floppy disk version)
	Storage:	5% to 90% RH (20% to 80% RH if floppy disk version)
Protection	5100e Bezel and display:	IP54
	5100V/5180V Bezel and display:	IP65 without lock (IP20 with lock)
	Sleeve:	IP20
	5100V Portable case option:	IP21
Shock		BS EN61010
Vibration (10 to 150Hz)		2g peak
Altitude		<2000 metres.

Clock (RTC) data

Temperature stability	0 to 40°C	–3 to +2 ppm
	–40 to +85°C	±7.5 ppm
Ageing		±1 ppm per year

Electromagnetic compatibility (EMC)

Emissions and immunity	BS EN61326

Electrical safety

(BS EN61010)	Installation cat. II; Pollution degree 2

INSTALLATION CATEGORY II
The rate impulse voltage for equipment on nominal 230V mains is 2500V.

POLLUTION DEGREE 2
Normally, only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation shall be expected

Physical

Panel mounting		DIN43700
Panel mounting angle		
	Recorders with floppy disk:	±15°
	Other:	±45°
5100V/5100e	Bezel size:	144 x 144mm.
	Panel cutout dimensions:	138 x 138mm (both –0/+1mm)
	Depth behind bezel rear face:	248mm (284 LTC)
	Weight:	3kg (5kg if fitted in portable case)
5180V	Bezel size:	288 x 288mm
	Panel cutout dimensions:	281 x 281mm (both –0/+1mm)
	Depth behind bezel rear face:	305mm
	Weight:	7kg

Operator interface

Type	5100e:	Colour STN LCD with cold cathode backlight, fitted with resistive, analogue, Touch-Panel
	5100V/5180V:	Colour TFT LCD with cold cathode backlight, fitted with resistive, analogue, Touch-Panel
Size and resolution	Model 5100e:	1/4VGA (320 x 240 pixels) 5”
	Model 5100V:	1/4VGA (320 x 240 pixels) 5.5”
	Model 5180V:	SVGA (800 x 600 pixels) 12.1”

Power requirements

Supply voltage	Standard:	85 to 265V ac; 47 to 63Hz or 100 to 370V dc
	Low voltage option:	20 to 42V RMS;45 to 400Hz or 20 to 54V dc
Power (Max)		60VA (Inrush current 36A)
Fuse type		None
Interrupt protection:	Standard:	Holdup >200msec, at 240V ac, with full load
	Low voltage option:	20msec at 20V dc or RMS, with full load

Back-up Battery

Type	Current recorders	Poly-carbonmonofluoride/lithium (BR2330) Part No. PA261095
	Older recorders	Manganese dioxide/lithium (CR2032) Part No. PA250983
Support time (RTC)		1 year min. with recorder unpowered
Replacement period		3 years
Stored data		Time; date; values for totalisers, counters and timers; batch data; Fvalue, Rolling average, Stopwatch etc.

Ethernet communications

Type		10Mbs Ethernet. 10BaseT (IEEE802.3)
Transport protocol		TCP/IP
		Provision for File Transfer Protocol (FTP)
		Modbus/TCP SNTP
Cable	Type:	CAT5
	Maximum length:	100 metres
	Termination:	RJ45

Serial Communications Option (5100V/5180V)

Protocol	ASCII (typical applications: Input of ASCII string inputs from Barcode readers, Credit card readers etc.) ASCII printer support Modbus RTU Master and Slave
Isolation (dc to 65Hz BS EN61010)	Installation category II; Pollution degree 2
Terminals to ground	100V RMS or dc (basic insulation)
Transmission standard	EIA232 or EIA485

Transmitter PSU

Isolated, 5100V recorder only		
Number of output		Three
Output voltage		25V nominal
Maximum current		20mA per output
Isolation (dc to 65Hz BS61010)		Installation category II; Pollution degree 2
	Channel to channel:	100V RMS or DC (double insulation)
	Channel to ground:	100V RMS or dc (basic insulation)
Fuse (20mm Type T)		
	Supply voltage = 110/120V ac:	100mA
	Supply voltage = 220/240V ac:	63mA
Non isolated, 5100e only		
Number of 4-20mA loops		6
Output voltage		24V ±10%
Maximum current	Continuous:	120mA (total for all outputs)
	Peak:	240mA (total for all outputs)
Isolation (dc to 65Hz BS61010)		Installation category II; Pollution degree 2 Non isolated. 0V returns are connected to chassis ground.

Relay Output Board

General

Maximum number of relay boards		
	5100e	1 (max no of relay outputs = 1)
	5100V	4 (max no of relay outputs = 12)
	5180V	9 (max no of relay outputs = 27)
Number of relays per board		
	5100V	3
	5180V	3
Estimated mechanical life		30,000,000 operations
Update rate		See 'Update rates' in 'Recorder Specification' above

AC load ratings

Derating

The figures give below are for restive loads. for reactive or inductive loads, de-rate in accordance with Graph 1, in which

F1 =	Actually measured results on representative samples
F2 =	Typical values according to experience
Contact life =	Resistive contact life x reduction factor

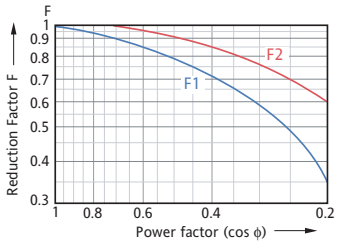
Maximum switching power	500VA
Maximum contact voltage	250V providing this does not cause the maximum switching power (above) to be exceeded
Maximum contact current	2 Amps providing this does not cause the maximum switching power (above) to be exceeded

DC load ratings

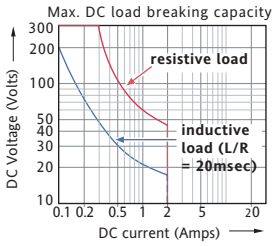
Maximum switching power	See Graph 2 for operating volt/amp envelope
Maximum contact voltage/ Current	See Graph 2 for examples

Safety isolation

Isolation (dc to 65Hz; BS EN61010)		Installation category II; Pollution degree 2
	Relay to Relay:	300V RMS or dc (double insulation)
	Relay to ground:	300V RMS or dc (basic insulation)



Graph 1
Derating curves for ac loads



Graph 2
DC load switching curves

Event Input

Number of inputs		6 discrete inputs
Maximum No. of boards	5100V	2
	5180V	4
Isolation	Event input to ground:	100V RMS or dc (double insulation)
	Event input to Event input:	0V
Recognition levels	Low:	–30V to +0.8V
	High:	2 to 30V
Maximum frequency		8Hz
Minimum pulse width		62.5ms
Contact resistance	Event:	Active if resistance <35KΩ Inactive if resistance >200KΩ Status not defined if 35KΩ < resistance <200KΩ between input terminal and 'C' terminal

Input Board

General

Input types	dc Volts, dc millivolts, dc milliamps (with shunt), Thermocouple, 2/3-wire RTD Contact closure (not Channels 1, 7, 13, 19, 25, 31, 37, 43) >60 ms
Input type mix	Freely configurable.
Maximum number of inputs	6 per board
A/D conversion method	>16 bits, 2nd order delta sigma
Input ranges	See Table1a/1b and Table 3 below.
Termination	Edge connector / terminal block
Noise rejection (48 to 62 Hz)	Common mode: >140dB (channel to channel and channel to ground). Series mode: >60dB.
Maximum common mode voltage	250 Volts continuous
Maximum series mode voltage	45mV at lowest range; 12 Volts peak at highest range.
Isolation	
Channel to channel:	300V RMS or dc (double insulation)
Channel to common electronics:	300V RMS or dc (double insulation)
Channel to ground:	300V RMS or dc (basic insulation)
Dielectric strength (BS EN61010)	(1 minute type tests)
Channel to channel:	2500V ac
Channel to ground:	1500V ac
Insulation resistance	>10MΩ at 500 V dc
Input impedance	38mV, 150 mV, 1 V ranges: >10MΩ; 10V range: 68.8kΩ
Over voltage protection	50 Volts peak (150V with attenuator)
Open circuit detection	± 57nA max.
Recognition time	500msec
Minimum break resistance	10MΩ

Update/archive rates

Input/Relay-output sample rate	8Hz
Display update	1Hz
Archive sample-value	Latest value at archive time
Trend/Display value	Latest value at display update time

DC Input ranges

Shunt	Externally mounted resistor modules
Additional error due to shunt	0.1% of input
Additional error due to attenuator	0.2% of input
Performance	
5100V/5180V	See Table 1a
5100e	See Table 1b

Low Range	High Range	Resolution	Maximum error (Instrument at 20°C)	Worst case temp Performance
–8mV	38mV	1.4µV	0.085% I/P + 0.073% range	80ppm of I/P per °C
–30mV	150mV	5.5µV	0.084% I/P + 0.053% range	80ppm of I/P per °C
–0.2V	1V	37µV	0.084% I/P + 0.037% range	80ppm of I/P per °C
–2V	10V	370µV	0.275% I/P + 0.040% range	272ppm of I/P per °C

Table 1a 5100V/5180V DC performance

Low Range	High Range	Resolution	Maximum error (Instrument at 20°C)	Worst case temp Performance
–38mV	38mV	1.4µV	0.085% I/P + 0.051% range	80ppm of I/P per °C
–150mV	150mV	5.5µV	0.084% I/P + 0.038% range	80ppm of I/P per °C
–1V	1V	37µV	0.084% I/P + 0.029% range	80ppm of I/P per °C
–10V	10V	370µV	0.275% I/P + 0.030% range	272ppm of I/P per °C

Table 1b 5100e DC performance

Thermocouple data

Temperature scale	ITS 90
Bias current	0.05 nA
Cold junction types	Off, internal, external, remote
CJ error	1°C max with inst. at 25°C
CJ rejection ratio	50:1 minimum
Upscale/downscale drive	High, low or none selectable for each thermocouple channel
Additional error:	0.01°C (typ.) if high or low selected
Types and ranges	See Table 2

T/C Type	Overall range (°C)	Standard	Max linearisation error
B	0 to +1820	IEC 584.1	0 to 400°C = 1.7°C 400 to 1820°C = 0.03°C
C	0 to +2300	Hoskins	0.12°C
D	0 to +2495	Hoskins	0.08°C
E	–270 to +1000	IEC 584.1	0.03°C
G2	0 to +2315	Hoskins	0.07°C
J	–210 to +1200	IEC 584.1	0.02°C
K	–270 to +1372	IEC 584.1	0.04°C
L	–200 to +900	DIN43700:1985 (To IPTS68)	0.20°C
N	–270 to +1300	IEC 584.1	0.04°C
R	–50 to +1768	IEC 584.1	0.04°C
S	–50 to +1768	IEC 584.1	0.04°C
T	–270 to +400	IEC 584.1	0.02°C
U	–200 to +600	DIN43700:1985	0.04°C
NiMoNiCo	–50 to +1410	ASTM E1751-95	0.06°C
NiNiMo	0 to +1406	Ipsen	0.14°C
Platinel	0 to +1370	Engelhard	0.02°C
Pt20%Rh/ Pt40%Rh	0 to +1888	ASTM E1751-95	0.07°C

Table 2 Thermocouple types and ranges

Resistance inputs

Ranges (including lead resistance)	0 to 150Ω, 0 to 600Ω, 0 to 6kΩ
Influence of lead resistance	
Error:	Negligible;
Mismatch:	1Ω/Ω
Temperature scale	ITS90
Accuracy and resolution	See Table 3
RTD types and ranges	See Table 4

Low Range	High Range	Resolution	Maximum error (Instrument at 20°C)	Worst case temp Performance
0Ω	150Ω	5mΩ	0.045% I/P + 0.110% range	35ppm of I/P per °C
0Ω	600Ω	22mΩ	0.045% I/P + 0.065% range	35ppm of I/P per °C
0Ω	6kΩ	148mΩ	0.049% I/P + 0.035% range	35ppm of I/P per °C

Table 3 Resistance ranges - accuracy and resolution

RTD Type	Overall range (°C)	Standard	Max linearisation error
Cu10	–20 to +400	General Electric Co.	0.02 °C
Cu53	–70 to ± 200	RC21-4-1966	<0.01°C
JPT100	–220 to +630	JIS C1604:1989	0.01 °C
Ni1000	–60 to +250	DIN43760:1987	0.01 °C
Ni100	–60 to +250	DIN43760:1987	0.01 °C
Ni120	–50 to +170	DIN43760:1987	0.01 °C
Pt100	–200 to +850	IEC 751	0.01 °C
Pt100A	–200 to +600	Eurotherm Recorders SA	0.09 °C
Pt1000	–200 to +850	IEC 751	0.01 °C

Table 4 RTD types and ranges

Portable

Portable option

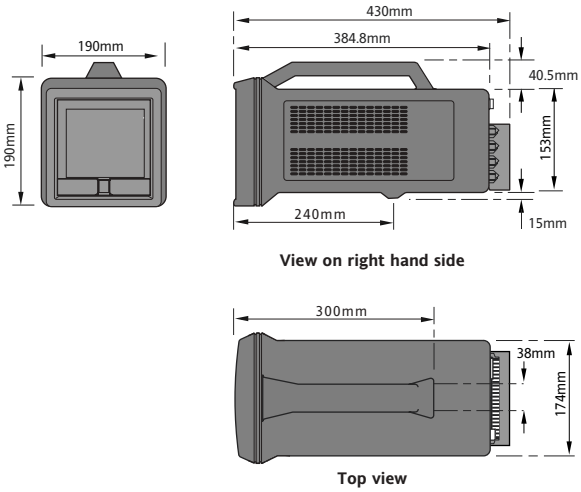
5100V is available as a portable unit with either Thermocouple, General or HTM2010 connections.

5180V is available with optional carry handle and feet for portability

	Max. No of Inputs	Option Slots	C/O Relays	Serial Comms	Transmitter PSU	Events
General	12	4	Yes*	Yes*	Yes*	Yes*
Thermocouple	12	2	Yes*	Yes*		Yes*
HTM2010	6	2	Yes*	Yes*		Yes*

* Requires one option slot

PORTABLE MECHANICAL INSTALLATION

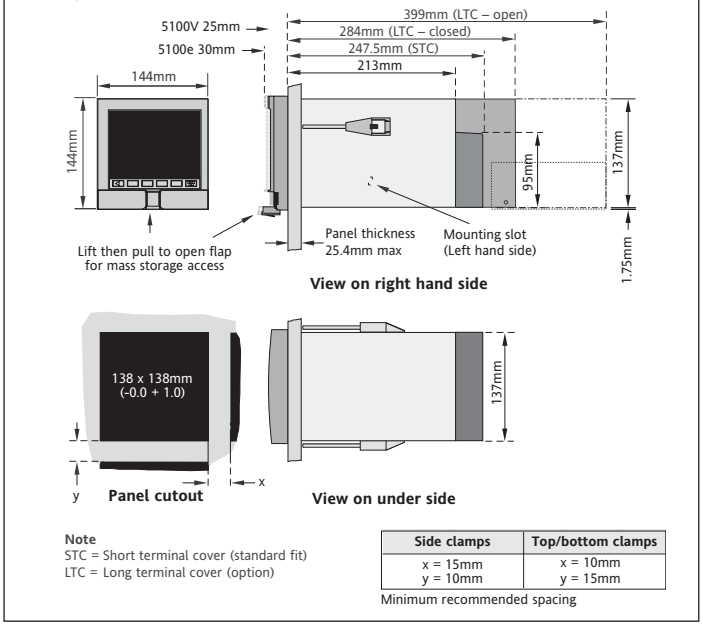


View on right hand side

Top view

MECHANICAL INSTALLATION

5100e, 5100V

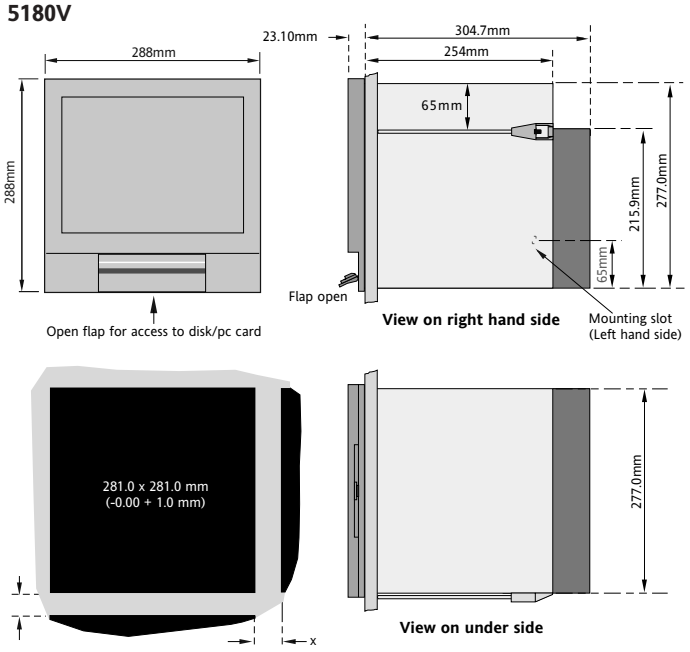


Note
STC = Short terminal cover (standard fit)
LTC = Long terminal cover (option)

Side clamps	Top/bottom clamps
x = 15mm y = 10mm	x = 10mm y = 15mm

Minimum recommended spacing

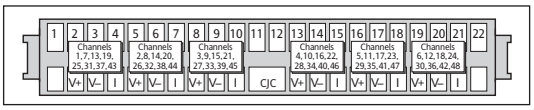
5180V



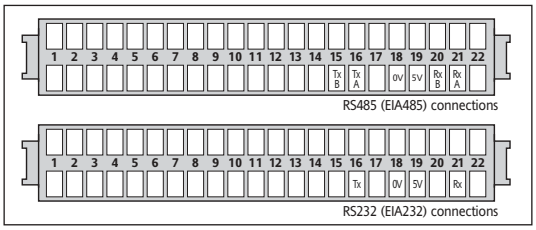
Side clamps	Top/bottom clamps
x = 25mm y = 12.5mm	x = 12.5mm y = 25mm

Minimum recommended spacing

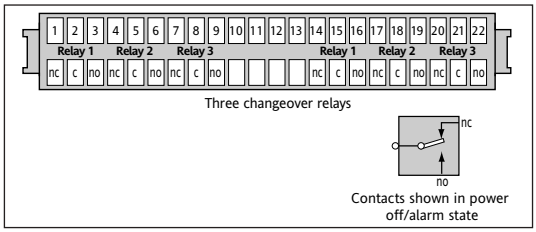
INPUT BOARD WIRING



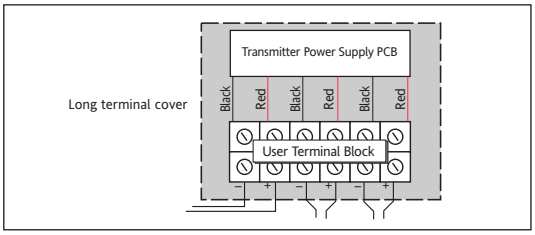
COMMUNICATIONS OPTION WIRING



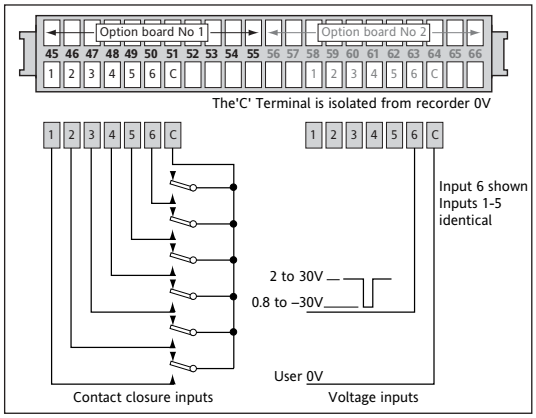
RELAY BOARD WIRING



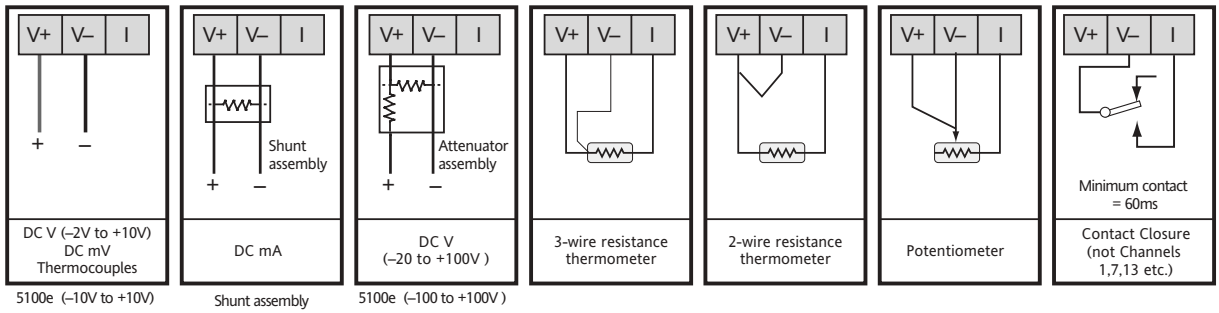
ISOLATED TRANSMITTER POWER SUPPLY WIRING



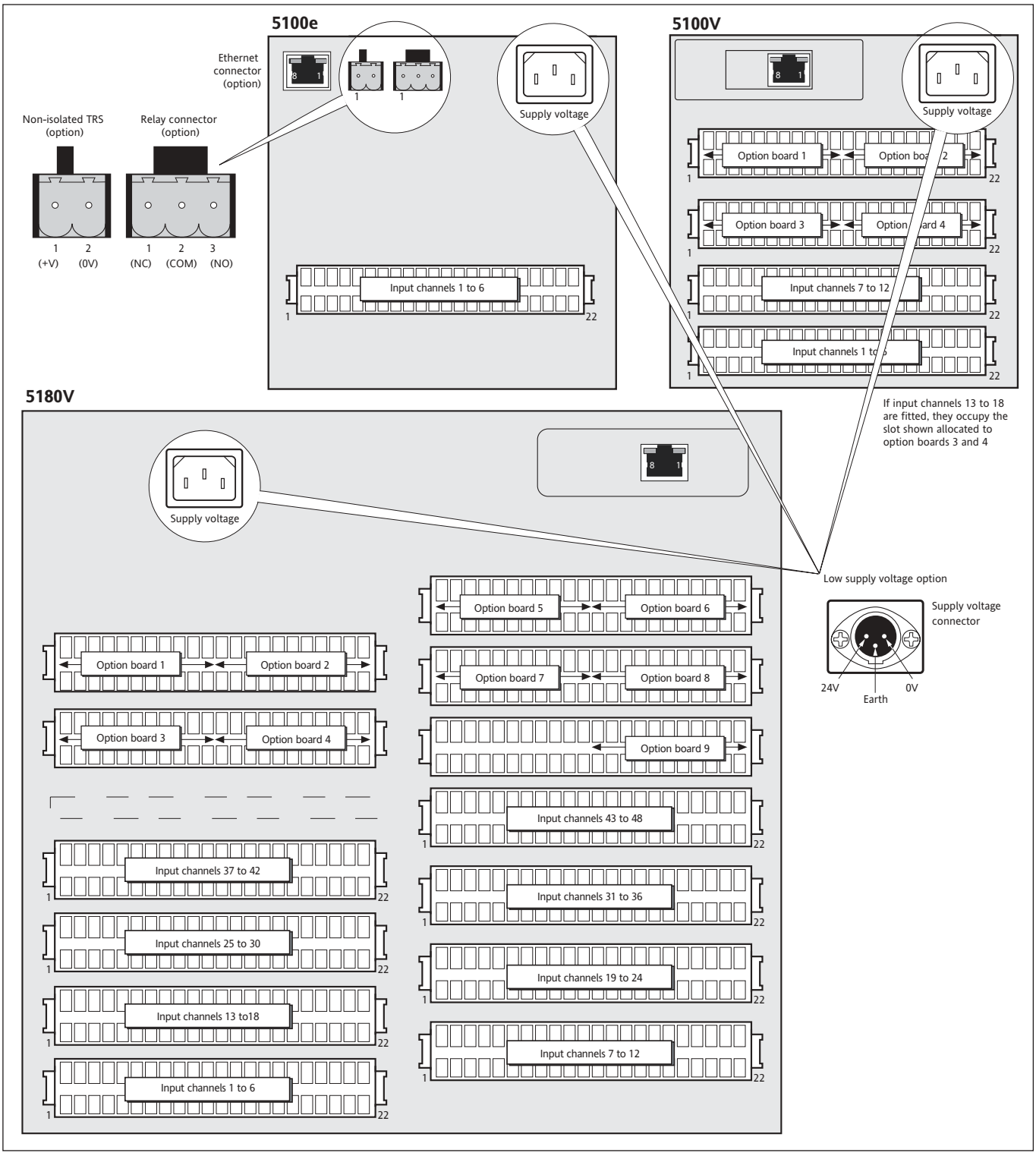
EVENT BOARD WIRING



INPUT BOARD SIGNAL WIRING



SUPPLY VOLTAGE



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