

6100A 6180A

MODELS

Ideal for :

- **21CFR Part II Applications**
- **Furnaces, NADCAP**
- **Water/waste water**
- **Power generation**
- **Sterilizers, autoclaves**

Features :

- **Colour touchscreen display**
- **USB 'plug & play'**
- **Up to 48 Universal Inputs**
- **Up to 96MB non-volatile Flash memory**
- **125ms Parallel sampling**
- **Compact Flash or Secure Digital Card**
- **Modbus master**
- **Ethernet TCP/IP**



Paperless Graphic Recorders Specification Sheet

The 6000 Series 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 choice of Compact Flash or SD Card. Data is stored in a tamper-resistant binary format that can be used for secure, long term records of your process. The 6000 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	6100A	6180A
Display	5.5" 1/4 VGA	12.1" XGA
Channels	18	48
Relays	16	36
Events Inputs	24 (6 per option card)	
Groups	6 standard (12 optional)	
Auditor Features	Lite or Full available	
Virtual channels*	36, 96, 128	
Timers	Fitted as standard	
Alarms	4 per channel	
Batch	Optional	
Bridge- Remote viewing software	Lite as standard (Full optional)	
Screen builder	24 (optional)	
Security	Unlimited unique user names with configurable access permissions and passwords	
Configuration software	Standard	
Review/Quickchart Lite software	Standard	
Standard views	Vertical and horizontal trending, Vertical and Horizontal Bargraphs, Circular Trend and Numeric Values	

* Virtual channels can be configured as Maths, Totalisers, Counters or Comms

Data Logging and Archiving

The 6000 Series recorders have internal Flash memory for secure data storage. They are also able to accept various removable media types (compact flash, SD card or USB memory stick). Data stored within the internal memory can be archived to the removable media on demand or at preset intervals. The 6000 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 6000s have Ethernet capability. The 6000 can be configured to archive to the removable media and / or over Ethernet. Archiving files over Ethernet effectively gives a secure, infinite archiving capacity.

Approximate duration for continuous recording of one Group of six channels, high compression:

Archive Media	Sample Rate						
	0.125s	0.5s	1s	5s	10s	30s	60s
32Mb Internal Flash (approx. 4 million samples)	2.83 days	11.3 days	22.6 days	113 days	226 days	1.86 yrs	3.7 yrs
96Mb Internal Flash (approx. 12 million samples)	8.5 days	33.98 days	67.9 days	339 days	1.86 yrs	5.5 yrs	11 yrs
64Mb CF/SD Card or USB memory stick (approx. 8 million samples)	5.66 days	22.6 days	45.3 days	226 days	1.2 yrs	3.7 yrs	7.4 yrs
256Mb CF/SD Card or USB memory stick (approx. 32 million samples)	22.6 days	90.6 days	181 days	2.4 yrs	4.9 yrs	14.8 yrs	20 yrs
1Gb CF/SD Card or USB memory stick (approx. 125 million samples)	88 Days	354 days	1.9 yrs	9.6 yrs	19 yrs	58 yrs	116 yrs
Ethernet (FTP Server)	Infinite						

Time Synchronisation (SNTP)

The 6000 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 6000 to a resolution of one millisecond.

Batch Recording

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

Designed to meet the requirements of the FDA Regulation 21 CFR Part 11 for Electronic Records and Signatures, this software option provides the 6000 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 6000 Series Paperless Graphic Recorder. For example they could be used to remotely start or stop a Batch.

ASCII Printer Output (Reports)

Fitted as standard the ASCII text printer option provides the 6000 Series with the ability to generate up to 10 simple reports that can be directed to a Serial 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.

Dynamic Host Configuration Protocol (DHCP)

Dynamic Host Configuration Protocol, the successor to BootP, allows a 6000 Series host to obtain Network parameters, such as IP address, Subnet Mask, default gateway and DNS server address dynamically. The implementation of DHCP on the 6000 Series significantly reduces the overhead for maintaining a network of instrumentation.

TECHNICAL SPECIFICATION

Recorder

Environmental performance

Temperature limits	Operation: 0 to +50°C Storage: -20 to 60°C
Humidity limits	Operation: 5% to 80% RH Storage: 5% to 90% RH
Protection	Bezel and display: IP65 Sleeve: IP20 6100A Portable case option: IP21
Shock	BS EN61010
Vibration (10 to 150Hz)	BSEN60873, Section 9,1.8
Altitude	<2000 metres.

Approvals

Electromagnetic compatibility CE, cUL (EMC)

UL file number	e57766
Emissions and immunity	BS EN61326

Electrical safety

(BS EN61010)	Installation cat. II; Pollution degree 2
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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	±45°
6100A	Bezel size: 144 x 144mm. Panel cutout dimensions: 138 x 138mm (both -0/+1mm)
	Depth behind bezel rear face: 246.5mm (284 LTC)
6180A	Weight: 3kg max. (5kg if fitted in portable case) Bezel size: 292 x 292mm Panel cutout dimensions: 281 x 281mm (both -0/+1mm)
	Depth behind bezel rear face: 261mm Weight: 7kg max.

Operator interface

Type	Colour TFT LCD with cold cathode backlight, fitted with resistive, analogue, Touch-Panel
Size and resolution	Model 6100A: 1/4VGA (320 x 240 pixels) 5.5" Model 6180A: XGA (1024 x 768 pixels) 12.1"

Power requirements

Supply voltage	Standard: 85 to 265V ac; 47 to 63Hz or 110 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	Poly-carbonmonofluoride/lithium (BR2330) Part No. PA261095
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	10/100baseT Ethernet. (IEEE802.3)
Protocols	TCP/IP, FTP, DHCP, BOOTP, SNTP, MODBUS, SMTP, ICMP
Cable	Type: CAT5 Maximum length: 100 metres Termination: RJ45

Serial Communications Option

No of Ports	2
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	50V RMS or dc (basic insulation)
Transmission standard	EIA232 or EIA485 (software selectable)

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 Table1 and Table 2 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; 23.74 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; 20V range: 65.3kΩ
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
Trend update	8Hz maximum
Archive sample-value	Latest value at archive time
Display value	Latest value at display update time (8Hz)

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

6100A/6180A See Table 1

Low Range	High Range	Resolution	Typical error (Instrument at 20°C)	Maximum error (Instrument at 20°C)	Worst case temp Performance
-38mV	38mV	1.4µV	0.035% I/P + 0.031% range	0.085% I/P + 0.052% range	80ppm of I/P per °C
-150mV	150mV	5.5µV	0.035% I/P + 0.028% range	0.084% I/P + 0.039% range	80ppm of I/P per °C
-1V	1V	37µV	0.035% I/P + 0.024% range	0.084% I/P + 0.029% range	80ppm of I/P per °C
-20V	20V	720µV	0.097% I/P + 0.027% range	0.448% I/P + 0.033% range	443ppm of I/P per °C

Table 1 Voltage ranges - accuracy and resolution

Low Range	High Range	Resolution	Typical error (Instrument at 20°C)	Maximum error (Instrument at 20°C)	Worst case temp Performance
0Ω	150Ω	5mΩ	0.027% I/P + 0.034% range	0.042% I/P + 0.110% range	35ppm of I/P per °C
0Ω	600Ω	22mΩ	0.027% I/P + 0.035% range	0.042% I/P + 0.065% range	35ppm of I/P per °C
0Ω	6kΩ	148mΩ	0.030% I/P + 0.028% range	0.045% I/P + 0.035% range	35ppm of I/P per °C

Table 2 Resistance ranges - accuracy and resolution

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 3

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	DIN43710:1985 (To IPTS68)	0.02°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	DIN43710:1985	0.08°C
NiMo/NiCo	-50 to +1410	ASTM E1751-95	0.06°C
Ni/NiMo	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 3 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 2
RTD types and ranges	See Table 4

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
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

Analogue Output Board

General

Max. number of output boards
Number of outputs per board

Four
Two

Output ranges
Voltage: 0 to 10V (source 5mA max.)
Current: 0 to 20mA (max. load 1KΩ)
8Hz
Step response
Linearity
Performance

Update rate
250msec (10% to 90%)
0.024% of hardware range
See table

Performance in instrument at 20°C		
Range	Accuracy	Temperature drift
0 to 10V	0.1% of range	±0.12mV +0.022% of reading per °C
0 to 20mA	0.1% of range	±1µA + 0.03% of reading per °C

Safety isolation

Isolation
(dc to 65 Hz; BS EN61010)
Output channel-to OP channel
Output channel to ground

Installation category II;
Pollution degree 2
300V RMS or dc (double insulation)
150V RMS or dc (basic insulation)

Transmitter PSU

Isolated, 6100A recorder only

Number of outputs
Output voltage
Maximum current
Isolation (dc to 65Hz BS61010)
Channel to channel:
Channel to ground:
Fuse (20mm Type T)
Supply voltage = 110/120V ac: 100mA
Supply voltage = 220/240V ac: 63mA

Three
25V nominal
20mA per output
Installation category II;
Pollution degree 2
100V RMS or DC (double insulation)
100V RMS or dc (basic insulation)

Relay Output Board

General

Maximum number of relay boards
6100A 4 (max no of relay outputs = 16)
6180A 9 (max no of relay outputs = 36)

Number of relays per board

3 per C/O
4 per N/C
4 per N/O

Estimated mechanical life
Update rate

30,000,000 operations
See 'Update rates' in 'Recorder Specification' above

AC load ratings

Derating

The figures give below are for resistive 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
Maximum contact voltage

500VA

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

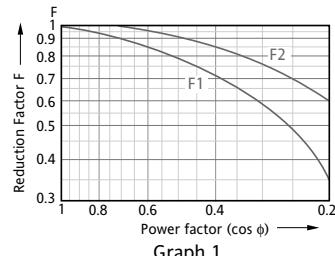
See Graph 2 for operating volt/amp envelope

Maximum contact voltage/
Current

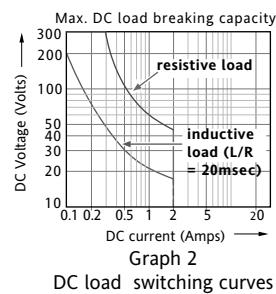
See Graph 2 for examples

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)



Derating curves for ac loads



DC load switching curves

Event Input

Number of inputs 6 discrete inputs

Maximum No. of boards 6100A 4

6180A 4

Isolation Event input to ground: 100V RMS or dc (basic insulation)

Event input to Event input: 0V

Recognition levels 'Active': -30V to +0.8V

'Inactive': +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

Current sink (voltage I/P) 10mA

Safety Isolation

Event input to ground 100V RMS or dc (basic insulation)

Event input to Event input 0V

Portable

Portable option

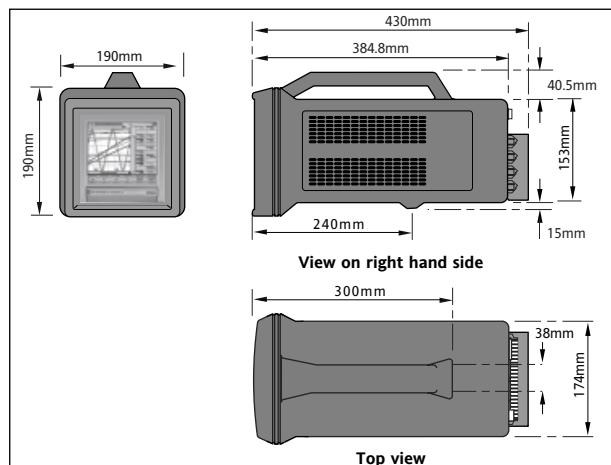
6100A is available as a portable unit with either Thermocouple, General or HTM2010 connections.

6180A is available with optional carry handle and feet for portability

6100A	Max. No of Inputs**	Option Slots**	Relays	Serial Comms	Transm'r PSU	Event I/P	Analogue O/P
General	18	4	Yes*	Yes	Yes*	Yes*	Yes*
Thermocouple	18	0	No	Yes	No	Yes*	No
HTM2010	18	0	No	Yes		No	No

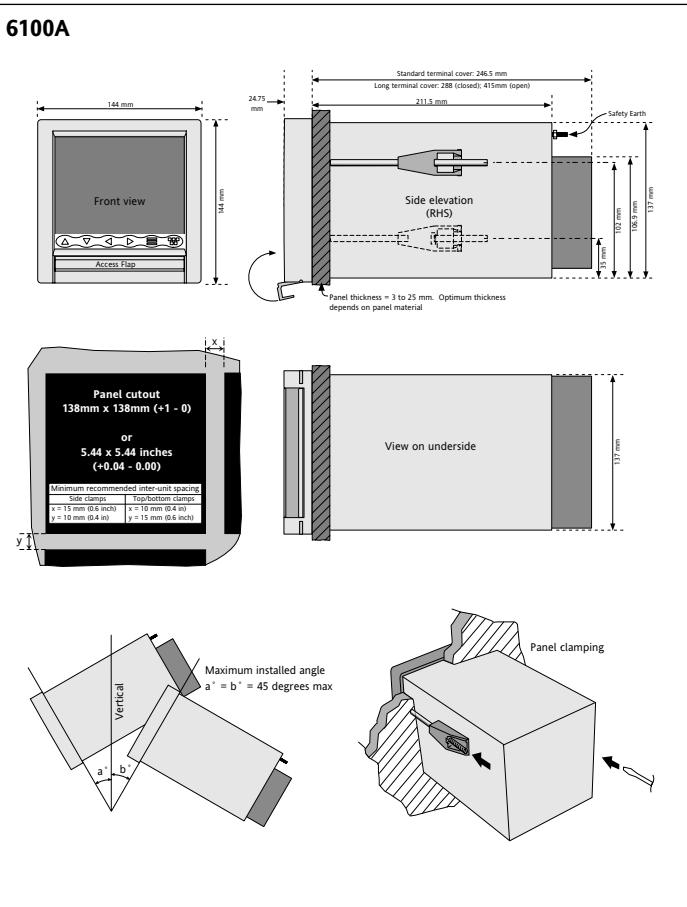
** Mutually exclusive * Requires one option slot

PORTABLE MECHANICAL INSTALLATION

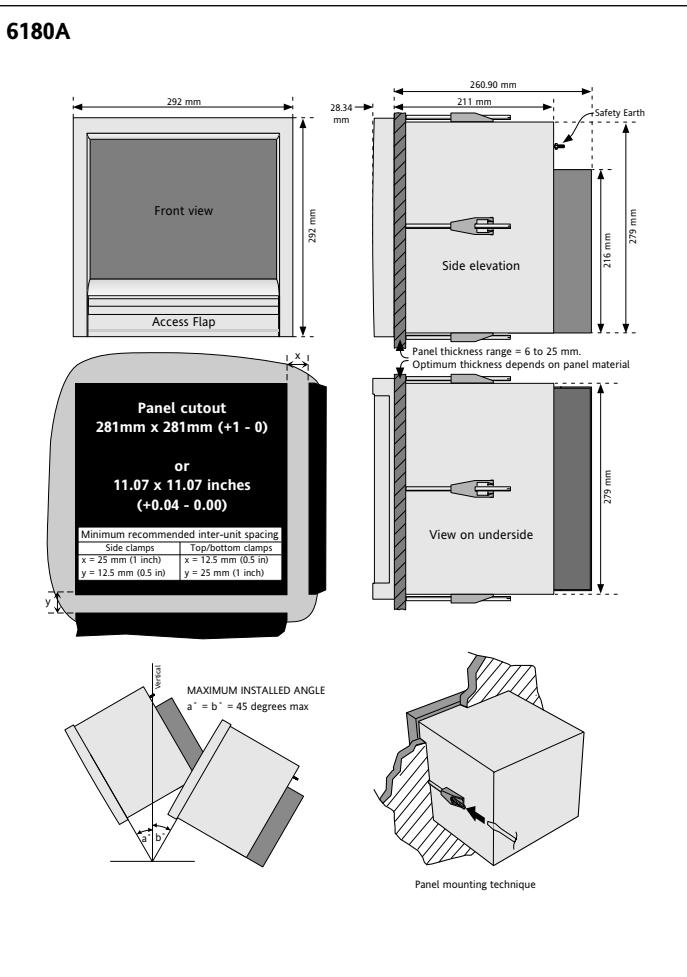


MECHANICAL INSTALLATION

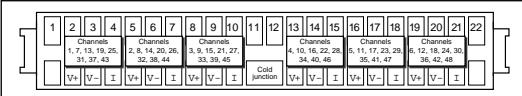
6100A



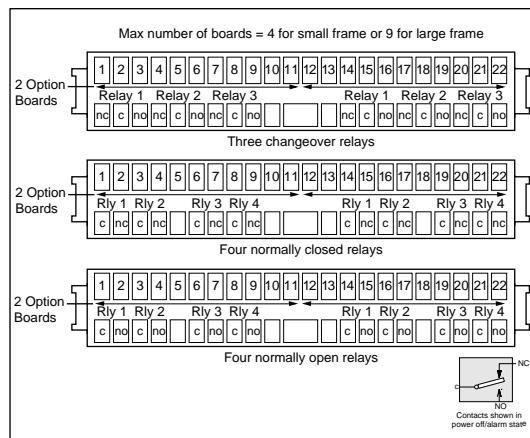
6180A



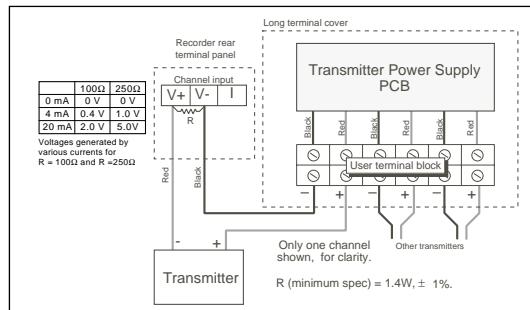
INPUT BOARD WIRING



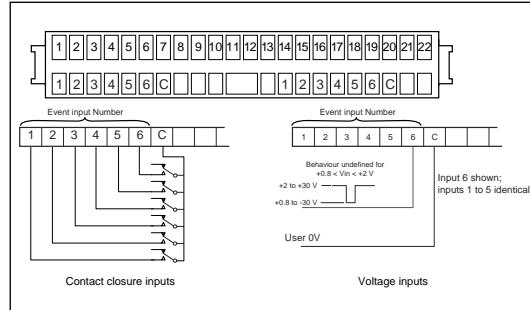
RELAY BOARD WIRING



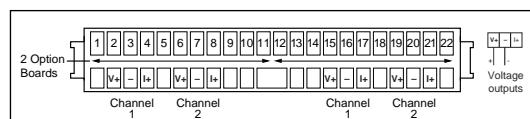
ISOLATED TRANSMITTER POWER SUPPLY WIRING (6100A only)



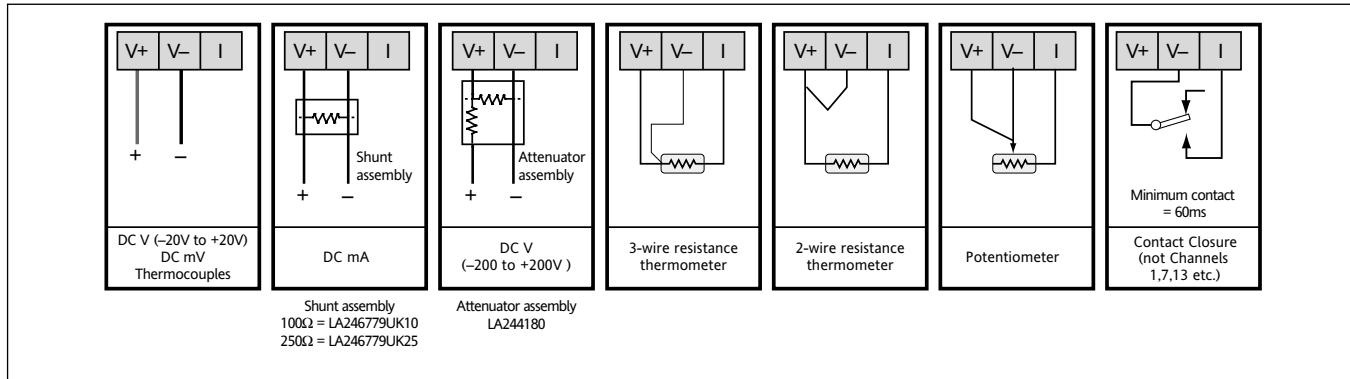
EVENT INPUT BOARD WIRING



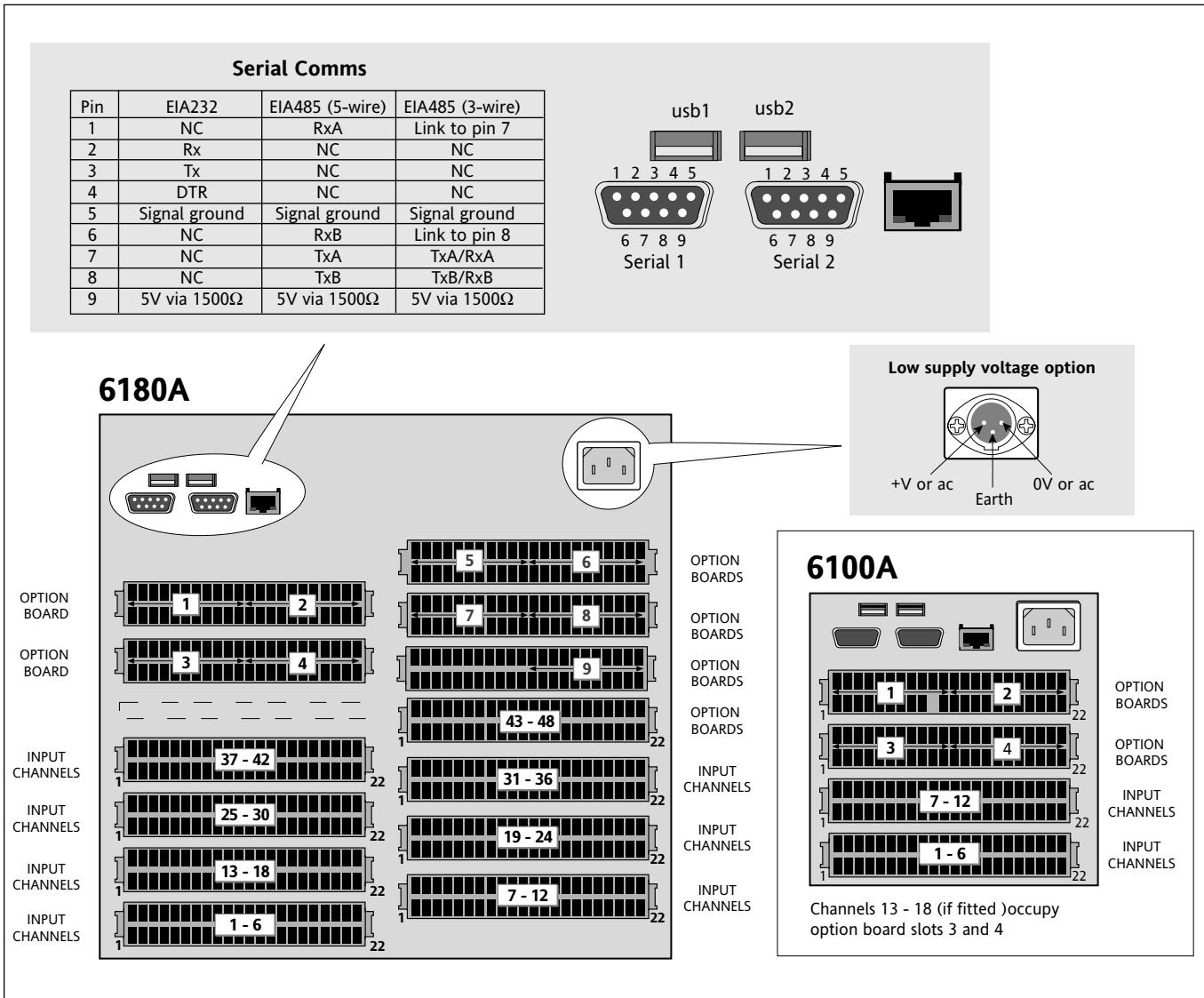
ANALOGUE OUTPUT WIRING



INPUT BOARD SIGNAL WIRING



REAR TERMINAL CONNECTIONS



ORDERING CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
31	32	33	34												

0 Model	
6100A 100mm TFT 1/4VGA Display6100A
6180A 180mm TFT XGA Display6180A
1 Number of channels	
0 Input channelsU00
6 Input ChannelsU06
12 Input ChannelsU12
18 Input ChannelsU18
24 Input Channels (6180A only)U24
30 Input Channels (6180A only)U30
36 Input Channels (6180A only)U36
42 Input Channels (6180A only)U42
48 Input Channels (6180A only)U48
2 Not Used	.XXX
3 Case Options	
Panel mountingPANEL
General Portable (6100A only)PORTGEN
Type T Thermocouple Portable (6100A only)PORTTTC
Type K Thermocouple Portable (6100A only)PORTKTC
Type J Thermocouple Portable (6100A only)PORTJTC
Voltage Input only Portable (6100A only)PORTVTC
HTM2010/2030 Portable Test kit (6100A only)HTM2010
Carry Handle (Bezel Colour Silver, 6180A only)CH
Panel Mounting with Heavy Duty Case clamps (6180A only)PMHD
Panel Mounting with Thin panel mounting kit (6180A only)PMTN
4 Lock	
Media lock not fittedNOLCK
Electronic Lock FittedLOCK
5 Bezel Colour	
Silver including portable optionsSLV
Eurotherm GreenGRN
BlackBLK
6 Power Supply	
90- 264 Vac (110-370Vdc) 45 –65 HzVH
20 – 42 Vac (20 – 54Vdc)VL
240Vac 45 –65 Hz with low inrush current to meet NAMURVH-NMR
24Vdc with low inrush current to meet NAMURVL-NMR
7 24V Isolated Transmitter Power Supply	
Not fittedNONE
110 – 120Vac 3channel TPS (6100A only)115TPS
220 – 240Vac 3 channel TPS (6100A only)230TPS
8 Non Standard	
Non Standard Option	XXXXXX
No logoNLG
9 Internal Memory	
32M Byte for history – approximately 4 million samples032M
96M Byte for history – approximately 12 million samples096M
10 Removable Media	
Compact Flash and Front USB portCF
Secure Digital and Front USB portSD
11 Memory Card Size	
Not fittedNOMC
128M byte Card (CF or SD, dependant on removable media type)128M
256M byte Card (CF or SD, dependant on removable media type)256M
512M byte Card (CF or SD, dependant on removable media type)512M
1Gbyte Card (CF or SD, dependant on removable media type)001G
12 USB Memory Stick Size	
Not fittedNOMS
64M byte USB Memory Stick064MMS
256M byte USB Memory Stick256MMS
512M byte USB Memory Stick512MMS
1G byte USB Memory Stick001GMS
13 Rear USB	
No rear USB ports0RUSB
Two USB ports at rear of product2RUSB
14 Serial Communication Ports	
Not fitted0SRL
Two EIA 232/422/485 Serial Ports2SRL
15 Not Used	.XXXX
16 Calibration Certificates	
Not requiredNOCAL
Calibration certificateCAL
17 Changeover Relays	
Not fitted00
3 changeover relays (1 option board)03
6 changeover relays (2 option boards)06
9 changeover relays (3 option boards)09
12 changeover relays (4 option boards)12
15 changeover relays (5 option boards, 6180A only)15
18 changeover relays (6 option boards, 6180A only)18
21 changeover relays (7 option boards, 6180A only)21
24 changeover relays (8 option boards, 6180A only)24
27 changeover relays (9 option boards, 6180A only)27
18 Normally Closed Relays	
Not fitted00
4 Normally Closed relays (1 option board)04
8 Normally Closed relays (2 option boards)08
12 Normally Closed relays (3 option boards)12
16 Normally Closed relays (4 option boards)16
20 Normally Closed relays (5 option boards, 6180A only)20
24 Normally Closed relays (6 option boards, 6180A only)24
28 Normally Closed relays (7 option boards, 6180A only)28
32 Normally Closed relays (8 option boards, 6180A only)32
36 Normally Closed relays (9 option boards, 6180A only)36
19 Normally Open Relays	
Not fitted00
4 Normally Open relays (1 option board)04
8 Normally Open relays (2 option boards)08
12 Normally Open relays (3 option boards)12
16 Normally Open relays (4 option boards)16
20 Normally Open relays (5 option boards, 6180A only)20
24 Normally Open relays (6 option boards, 6180A only)24
28 Normally Open relays (7 option boards, 6180A only)28
32 Normally Open relays (8 option boards, 6180A only)32
36 Normally Open relays (9 option boards, 6180A only)36
20 Event Inputs	
Not fitted00
06 Event Inputs (1 board)06
12 Event Inputs (2 boards)12
18 Event Inputs (3 boards)18
24 Event Inputs (4 boards)24
21 Analogue Outputs	
None00
2 Analogue Outputs (1 option board)02
4 Analogue Outputs (2 option boards)04
6 Analogue Outputs (3 option boards)06
8 Analogue Outputs (4 option boards)08
22 Quantity of Shunts	
Enter quantity required	—

23	Shunt Value		
	Not requiredNOS	
	100 ohm shunts100	
	250 ohm shunts250	
24	Quantity of Attenuators (100:1)		
	Enter quantity required	—	
25	Warranty		
	Standard warrantyXXXXX	
	Extended warrantyWL005	
26	Bridge		
	Bridge Lite (supplied as standard)BLITE	
	Bridge FullBFULL	
27	Review and Quickchart		
	Review and Quickchart Lite (supplied as standard)RLITE	
	Review and Quickchart FullRFULL	
28	Auditor		
	Not requiredNOADT	
	Audit TrailALITE	
	Auditor FullAFULL	
29	Security Manager		
	Not requiredNOSM	
	Security ManagerSECMAN	
30	Groups		
	6 Groups (supplied as standard)06GROUP	
	12 Groups12GROUP	
31	Maths, Totalisers and Counters		
	Not requiredMTC00	
	36 Virtual ChannelsMTC36	
	96 Virtual ChannelsMTC96	
	128 Virtual ChannelsMTC128	
32	Batch		
	Not requiredNOBTCH	
	BatchBATCH	
33	Screen Builder		
	Not requiredNOSB	
	Advanced Screen BuilderADSB	
34	Master Communications		
	Not requiredNOMSTR	
	Modbus Master CommunicationsMODBUS	

Eurotherm: International sales and service

Understanding and providing local support is a key part of Eurotherm's business. Complementing worldwide Eurotherm offices are a whole range of partners and a comprehensive technical support team... a soothing melody to ensure you get a service you will want to go back to.

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