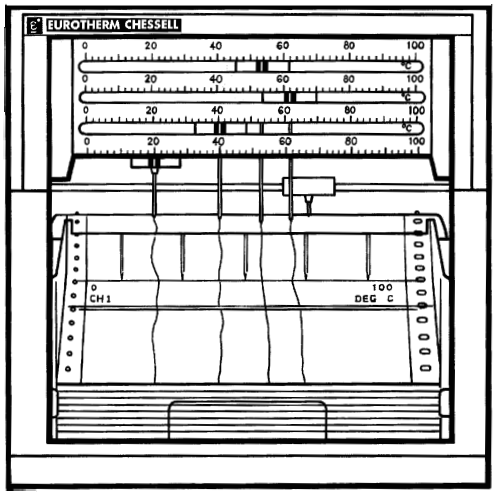
- 4-Pen Continuous trace
- Roll or Z-fold chart
- Analogue display with high trace visibility
- Pre-configured, Universal, Isolated inputs
- PC configuration
- Annotation
- 236 mm overall depth behind panel
- Front access to pen zero/span adjust
- Up to 8 relay outputs
- Ready for immediate use.



The 4101C is a low specification recorder, capable of plotting up to four input signals. Enclosed in a sheet steel case designed to meet the requirements of an industrial environment, the recorder is ideal for production or test purposes.

Display

The 4101C has an analogue scale for each channel, with the current process value being indicated on a 0 to 100% scale, by a fiducial line on the pen body. This, together with the unimpeded view given by the special door design gives high visibility to the traces and their current values.

Input technology

Use of the very latest in Application Specific Integrated Circuit (ASIC) and Surface Mount technologies, gives the 4101 input circuitry high accuracy and stability. Inputs are fully universal accepting inputs from thermocouples, resistance thermometers and potentiometers.

Configuration

The recorder comes pre-configured to the requirements specified at time of order, but the inputs etc. can be fully reconfigured using a DOS-based package, should requirements change.

Annotation

The annotation option provides printing on the chart of scale end-points, units, time and chart speed, thus avoiding the necessity for expensive, specially printed charts.

Chart Illumination

This option provides a fluorescent tube above the chart, making the traces significantly more visible, even in well lighted areas.

Small rear panel depth

The 4101C has a total depth behind panel of 236mm allowing it to fit easily into the standard range of 250mm deep panels.

Front access to adjustments

A pair of push-button switches, accessible when the recorder door is opened, allows the user to change chart speed and alarm thresholds, to park the pens for chart/pen replacement, and to adjust the pens to the chart zero and span gridlines.

Relay Outputs

Two alarm thresholds can be set up for each channel. With the relay output option fitted, these alarms are each assigned a relay which becomes de-energised when the current value lies above the high threshold or below the low threshold.
Three types of relay board are available:
3 x changeover, 4x common/normally closed and 4 x common/normally open.

Model 4101C

Specification sheet

TECHNICAL SPECIFICATION (Input board)

General

Input types	dc Volts, dc millivolts, dc milliamps (with shunt), Thermocouple, 2 / 3-wire RTD **(Channel 1 can be RTD only if no other channels are thermocouple)**
Input type mix	As specified at time of order
Maximum number of inputs	4
Input ranges	- 30 to + 150 mV; - 0.2 to + 1 Volt; - 2 to + 10 Volts
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	180 mV at lowest range; 12 Volts peak at highest range.
Isolation (dc to 65 Hz; EN61010)	Installation cat. II; Pollution deg. 2
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:	2300 Vac
Channel to ground:	1350 Vac
Insulation resistance	>10 MΩ at 500 V dc
Input impedance	150 mV and 1 V ranges: >10 MΩ; 10 V range: 68.8 kΩ
Over voltage protection	50 Volts peak (150V with attenuator)
Open circuit detection	± 57 nA max.
Recognition time	250 msec
Minimum break resistance	10 MΩ

DC Input ranges

Shunt / attenuator	Externally mounted resistor modules
Additional error due to shunt	0.1% of input
Additional error due to attenuator	0.2% of input
Performance	See table 1

Low Range	High Range	Resolution	Maximum error (Instrument at 20˚C)	Worst case temperature performance
-30 mV	150mV	5.5µV	0.084% input + 0.053% range	80ppm of input per deg C
-0.2 Volt	1 Volt	37µV	0.084% input + 0.037% range	80ppm of input per deg C
-2 Volts	10 Volts	370µV	0.275% input + 0.040% range	272ppm of input per deg C

Table 1 DC performance

Input board specification (Cont.)

Thermocouple data

Temperature scale	ITS 90
Linearisation accuracy	0.05% of user-selected span
Bias current	0.05 nA
Cold junction types	Off, internal, external (as defined at time of order)
CJ error	1˚C; instrument at 25˚C
CJ rejection ratio	50:1 minimum
Upscale / downscale drive	High, low or none as specified at time of order.
Types and ranges	See table 2

T/C Type	Overall range (˚C)	Standard
B	0 to + 1820	IEC 584.1
C	0 to + 2300	Hoskins
D	0 to + 2495	Hoskins
E	- 270 to + 1000	IEC 584.1
G2	0 to + 2315	Hoskins
J	- 210 to + 1200	IEC 584.1
K	- 270 to + 1372	IEC 584.1
L	- 200 to + 900	DIN43700:1985 (To IPTS68)
N	- 270 to + 1300	IEC 584.1
R	- 50 to + 1768	IEC 584.1
S	- 50 to + 1768	IEC 584.1
T	- 270 to + 400	IEC 584.1
U	- 200 to + 600	DIN 43710:1985
Ni/NiMo	0 to + 1406	Ipsen
Platinel	0 to + 1370	Engelhard

Table 2 Thermocouple types and ranges

Resistance inputs

Ranges (including lead resistance)	0 to 600 Ω, 0 to 6k Ω
Linearisation accuracy	0.05% of user entered span
Influence of lead resistance Error:	negligible
Mismatch:	1 Ω/Ω
Temperature scale	ITS90
Resolution and performance	See table 3
RTD types and ranges	See table 4

Low Range	High Range	Resolution	Maximum error (Instrument at 20˚C)	Worst case temperature performance
0Ω	600Ω	22mΩ	0.045% input + 0.065% range	35ppm of input per deg C
0Ω	6000Ω	148mΩ	0.049% input + 0.035% range	35ppm of input per deg C

Table 3 Resolution and performance for resistance inputs

RTD Type	Overall range (˚C)	Standard
JPT100	-220 to + 630	JIS C1604:1989
Ni100	- 60 to + 250	DIN43760:1987
Ni120	- 50 to + 170	DIN43760:1987
Pt100	-200 to + 850	IEC 751
Pt100A	-200 to + 600	Eurotherm Recorders SA
Pt1000	-200 to + 850	IEC 751

Table 4 RTD types and ranges

INSTALLATION CATEGORY II

The rated 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.

TECHNICAL SPECIFICATION (Recorder)

Board types

Standard:	Universal input / control board
Options:	3- Change-over relay output board
	4 Normally open relay o/p board
	4 Normally closed relay o/p board
	Transmitter power supply
	Event input board
	Annotator board

Environmental Performance

Temperature limits	Operation: 0 to 50˚C.
	Storage: –20 to + 70˚C
Humidity limits (non-condensing)	Operation: 5% to 80% RH
	Storage: 5% to 90% RH
Protection	Door and Bezel: IP54. Sleeve: IP20
	Transmitter PSU cover: IP10
Shock	BS EN61010 part 1
Vibration	2g peak at 10 Hz to 150Hz
Altitude (max.)	< 2000 metres

Electromagnetic compatibility (EMC)

Emissions	BS EN50081-2
Immunity	BS EN50082-2
Electrical safety	To EN61010: Installation category II;
	Pollution degree 2

Physical

Panel mounting	DIN43700
Bezel size	144 x 144 mm.
Panel cutout dimensions	138 x 138 (both – 0 + 1 mm)
Depth behind bezel rear face	220 mm (No terminal cover);
	236 mm (standard terminal cover)
	275 mm (long terminal cover closed)
	390mm (long terminal cover open)
Weight	< 3.5kg
Panel mounting	Vertical ± 30˚

Printing system

Pen type	Disposable fibre-tipped pens
Pen resolution	0.15 mm
Trace colours	See table 5
Pen life	1.2km (channel);
	7.5 x10^5 dots (annotator)
Update rate	4 Hz
Response time (max)	2 seconds
Characters per line	38

Channel	Colour	Channel	Colour
1 (top)	blue	4 (bottom)	violet
2	red	Annotator	black
3	green		

Table 5 Trace colours

Recorder Specification (Cont.)

Paper transport

Type		Stepper motor driving sprocket tube
Chart speeds		One range from table 6 below
Chart type	Standard:	16- metre z-fold
	Option:	32 - metre roll
Transport accuracy		0.5 cm in 16 metres (approx 0.03%)

Range	Speed (mm/hr) 1	2	3	4	5	
1	Off	5	20	60	120	Annotation (if fitted) inhibited above 300 mm/hr.
2	Off	10	20	60	120	
3	Off	10	30	60	120	
4	Off	20	30	60	120	
5	Off	30	60	120	300	
6	Off	20	120	600	1200	
7	Off	20	300	1200	3600	
8	Off	20	3600	18000	36000	

Table 6 Chart speed ranges

Power requirements

Line voltage	Standard:	90 to 264V at 45 to 65 Hz
	Enhanced interrupt protection:	90 to 132V at 45 to 65 Hz
	Low voltage:	20 to 53V ac/dc
		(ac frequency range: 45 to 400 Hz)
Power (Max)		< 100 VA
Fuse type		None
Interrupt protection	Standard:	40 ms at 75% max. instrument load
	Enhanced:	120ms at 75% max. instrument load

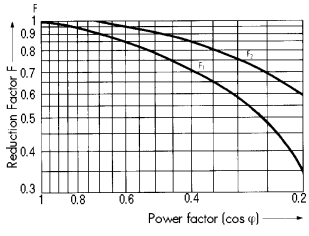
TECHNICAL SPECIFICATION (Options)

All isolation figures are Installation category II and Pollution degree 2

Relay outputs

Maximum switching power*	500VA or 60W
Maximum breaking current*	2 Amps within above power ratings
Maximum contact voltage*	250V within above power ratings
Isolation (dc to 65Hz; BS EN61010)	300V RMS or dc contact-contact (double insulation) and contact to ground (basic insulation)
Estimated life*	30,000,000 operations

* With resistive loads. With inductive loads, derate according to the graph, in which:
contact life = resistive life x F1 or F2
where F1 = measured on representative examples and F2 = typical values according to experience.



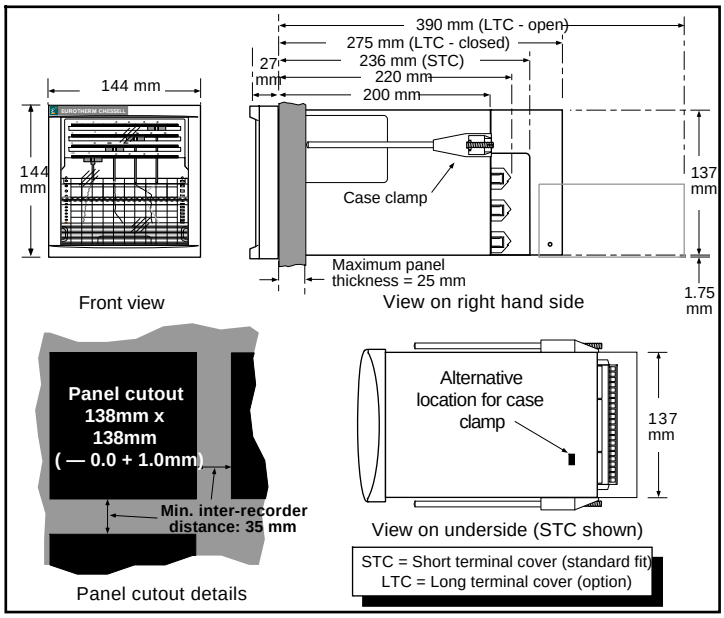
Event inputs

Isolation (dc to 65Hz; BS EN61010)	
Event input to ground:	100V RMS or dc (double insulation)
Event input to Event input:	0V

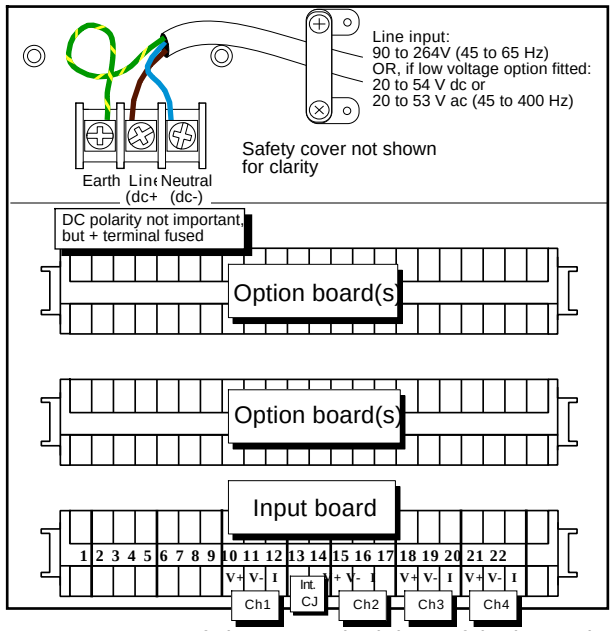
Transmitter Power Supply

Output voltage	3 or 6 x 25V (nom) outputs
Isolation (dc to 65Hz; BS EN61010)	
Channel to channel:	100V RMS or dc (double insulation)
Channel to ground:	100V RMS or dc (basic insulation)
Cover rating	IP10

Mechanical installation

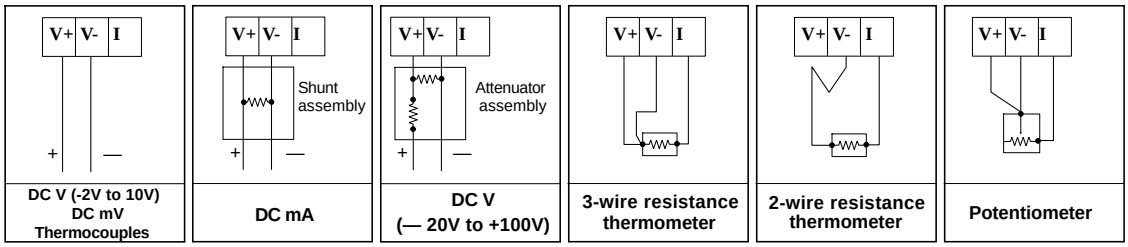


Supply voltage and input board termination



If ch1 = RTD, both legs of the internal CJ sensor are wired to terminal 11

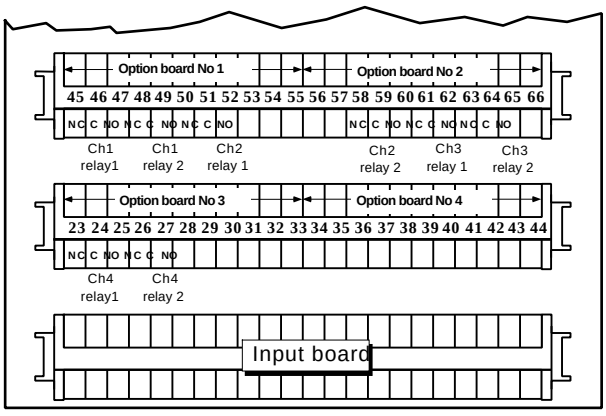
Input board signal wiring



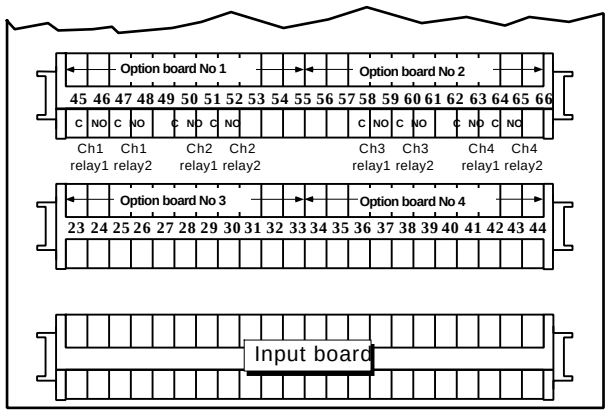
Shunt assembly:
100Ω = LA249885UK10
250Ω = LA249885UK25

Attenuator assembly:
LA244180

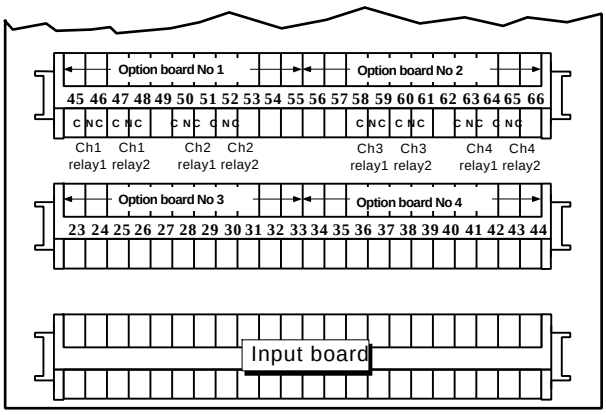
Option wiring



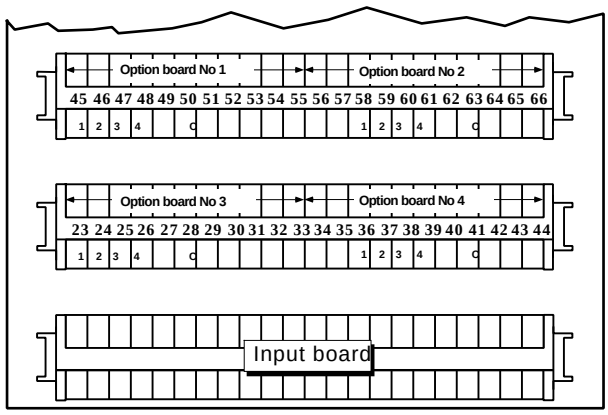
3 Changeover relays option



4 normally open relays option



4 normally closed relays option



Event input board option (alternative locations)

EUROTHERM RECORDERS LIMITED

DOMINION WAY, WORTHING, WEST SUSSEX BN14 8QL TELEPHONE: 01 903 205222 FAX: 01 903 203767

Registered number: 1047639 England. Registered Office: Leonardslee, Lower Beeding, Horsham, West Sussex RH13 6PP

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