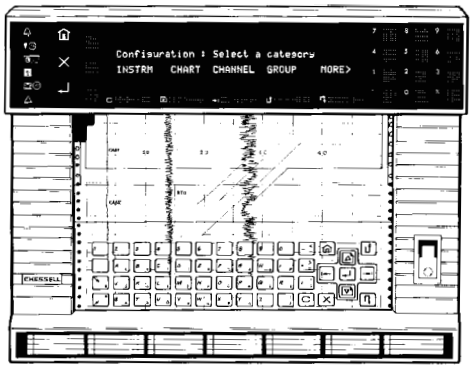
- 250mm Strip Chart Recorder
- Up to 96 inputs
- Unique 'secret-'til-lit' full function keyboard
- Six colour, multi-point printing
- Up to 45 concurrent traces
- 80-character, 3-colour vacuum fluorescent display
- Data storage to PCMCIA memory card
- High speed scanning (all inputs in 1 sec)



The Eurotherm Chessell 4250M, high specification, 250 mm chart recorder combines the latest technology with the proven reliability for which Chessell are renowned. Designed to meet the rigorous requirements of an industrial environment, the recorder is ideal for production or test purposes.

Printing system
Up to 45 traces can be updated and recorded every second, using the sophisticated six-colour 14-pin dot matrix printing system. New printing methods, such as line thickening and adaptive recording provide the clearest, most accurate record available. Concurrent annotation on the chart produces a clear record for later reference.

High Visibility Display
The multi-colour, 80-character vacuum fluorescent display can indicate process values (digital and/or bargraph), alarm status and alarm setpoints.

Secret-'til-lit' keyboard
The instrument can be configured using either the built-in 'Secret-'til-lit', full function, alphanumeric keyboard, or the softkeys. Configuration is password protected and follows clear, plain English, French or German prompts. PC software is available to configure the recorder via a built-in connector, or via the optional communications port. An optional memory card can store several configurations which can be downloaded to the recorder thus allowing rapid re-configuration.

Input Technology
Using the very latest in Application Specific Integrated Circuits (ASIC) and surface mount technology, the 4250M provides input circuitry of high accuracy and stability. All inputs to the 8-channel and 16-channel input boards are scanned and printed in 1 second and are isolated to 250V channel-to-channel and channel-to-ground.

Alarms
A sophisticated alarms package offers up to four alarms per channel. These alarms can be configured as absolute high/low, rate of change rising/falling, deviation in/out or digital change of state. All alarm setpoints are scanned every second.

Options
Memory Card Archiving
Use of the widely accepted PCMCIA standard allows the recorder's configuration to be stored for transfer to another recorder, or to a PC for manipulation using the PC configuration tool. Data can also be stored on the memory card in a format readable by commercial spreadsheet packages or, alternatively, in a format which allows it to be replayed to the chart to provide multiple copies.

Maths, Timers, Counters, Totalisers
These options provide the recorder with integrating and counting facilities, and with the ability to carry out calculations ranging from simple arithmetic functions such as subtracting one channel from another to complex, application specific functions such as Relative Humidity calculations.

Software
Special software options include Continuous Emissions Monitoring (CEM), Quality Monitoring and Rolling Memory. The rolling memory option provides data buffering for chart replay and pre-event tracing that can be initiated by internal or external triggers such as alarms or chart-out.

Serial Communications
The 4250M is an ideal data acquisition hub for a central plant SCADA system. Using the MODBUS protocol, a host computer can read process information from up to 16 recorders on an RS422 multi-drop loop. RS232 is also selectable for single-drop applications.

Model 4250M
Specification sheet

TECHNICAL SPECIFICATION (Recorder)

Board types

Input board types	8-channel universal; 16-channel dc*
Output board type	8-channel relay output, 4/8-channel analogue output (AO)
Max number of I/O boards per type	7 off 8-channel input, 7 off relay output; 6 off 16-channel input, 4 off 8-channel analogue o/p, 7 off 4-channel analogue o/p
Max number of inputs	96 dc inputs*; 56 resistance inputs; 78 contact closure.
Max number of outputs relay o/p:	8 x no of free slots.
Analogue o/p:	32
Maximum number of traced channels	45 total input/derived.

*Volts, mV, mA, thermocouple, contact closure, but not resistance inputs.

SBC memory size

AH243487U200	Type 2:	128kB RAM + 32kB EEPROM
AH243487U300	Type 3:	256kB RAM + 64kB EEPROM

Environmental Performance

General		To BS2011: 1981
Temperature limits	Operation:	0 to + 50 ˚C
	Storage:	-20 to +70 ˚C
Humidity	Operation/storage	5 to 85% RH; non-condensing
Maximum altitude		<2000 metres
Protection		IP54 (door and bezel); IP31 (sleeve).
Shock		BS EN61010 1990 (Safety); IEC873: 1986
Vibration		BS EN61010 1990 (safety); IEC873: 1986. Also recovers from 2g peak at 10 to150 Hz

Electromagnetic compatibility (EMC)

Emissions	BS EN50081-2
Immunity	BS EN50082-2

Electrical Safety

To BS EN61010: 1990 Class 1.

Physical

Bezel size (mm)	288 high x 360 wide x 53 deep.
Panel cutout size	273.5 mm x 348 mm (+ 1.4 - 0 mm.)
Depth behind bezel rear face	450 mm. (inc. rear cover); 410 mm. (no rear cover)
Weight (Eight-channel instrument)	20 kg. max.
Panel mounting angle	Up to ± 30˚ from vertical.

Printing system

Method	14-needle dot-matrix printhead with 6-colour disposable ribbon cartridge (red, orange, green, blue, violet and black)
Ribbon life	> 5 million dots per colour
Print needle diameter	0.35 mm.
Dot spacing (vertical)	0.083 mm. (chart speed <300 mm/hr.); 0.17 mm (600 mm/hr); 0.33 mm. (1200 mm/hr.); 0.42 mm (1500 mm/hr)
Dot spacing (horizontal)	0.4 mm.
Characters per line	104
Noise level	55 dBA max. (door closed).
Maximum trending rate	45 channelss/sec (trending)

Performance

Maximum scan and update rate	All parameters in 1 second
Maximum print rate (trending)	45 channels per second
Maximum chart speed	1500 mm/hr.
Clock accuracy	Better than 50 ppm

Paper transport

Type	Tractor feed with selectable chart speed from 1 to 1500 mm/hr.
Chart length	22 m x 75mm (z - fold); 32 m (roll).
Chart width	274.5 mm overall; 250 mm calibrated.
Chart visible length	155 mm
Resolution (horizontal)	± 0.2 mm.
Pen-to-paper accuracy	0.25% of calibrated chart width.
Transport accuracy	Better than 10 mm. in 32 meters.

Recorder Specification (Cont.)

Power requirements:

Line voltage (45 to 65 Hertz)	90 to 132 Volts or 180 to 264 Volts (User selectable).
Maximum power	120 W
Fuse type	Ceramic 20 mm. 3.15 Amp. Fast blow.
Interrupt protection	100 ms at 60% load.
Memory protection	EEPROM (for configuration) Battery-backed RAM for clock, etc.
RAM / clock-support battery type	Nickel-Cadmium (rechargeable)
Support period (no power to recorder)	3 months min. at 25 ˚C; 1 month min. at 50 ˚C.

8-CHANNEL UNIVERSAL I/P BOARD SPECIFICATION

General specification

Number of inputs		8
Termination		Edge connector / terminal block
Input types		DC Volts, dc millivolts, dc milliamps (with shunt). Thermocouple, RTD (2- or 3-wire), Ohms, Contact closure
Input type mix		User selectable during configuration.
Measurement frequency		All channels in 1 second
Step response to within resolution		2 seconds
Noise rejection	Common mode:	150dB above 45 Hz. (channel-channel and channel-ground.)
	Series mode:	67dB above 45 Hz.
Maximum common mode voltage		250 Volts
Maximum series mode voltage		10 mV at lowest range; 500 mV peak at highest range.
Isolation (dc to 65 Hz; BS EN61010)		Installation cat.2 Pollution degree 2
	channel-to channel	300 V (double isolation)
	channel-to-ground	300 V (basic isolation)
Dielectric strength	channel-to-channel	2350 V ac (1 minute type test)
	channel-to-ground	1350 V ac (1 minute type test)
Insulation resistance		50 MΩ at 500 V dc.
Input impedance		>10 MΩ (68.8kΩ for 10 V ranges)
Over-voltage protection		60 Volts peak; 500 Volts through 50 kΩ resistor
Open cct detection (to 200 mV range)		65 nA current max. 8 seconds recognition time (max.) 40 MΩ minimum break resistance.

DC input ranges

Ranges available	See table 1
Temperature performance (worst case)	
-10 to +40mV	(80ppm reading + 27.9ppm range)/˚C
-50 to +200mV	(80ppm reading + 12.4ppm range)/˚C
-0.5 to +1.0V	(80ppm reading + 2.1ppm range)/˚C
-5 to +10V (100V with attenuator)	(272ppm reading + 4.7ppm range)/˚C
Shunt/Attenuator	Externally mounted resistor modules
Additional error due to above	0.1% (shunt); 0.2% (attenuator)
Typical performance	See table 1

Range	Resolution	Performance (worst case) in instrument at 20 ˚C
–10 mV to + 40 mV	1.4 µV	0.083 % reading + 0.056 % range
– 50 mV to + 200 mV	14 µV	0.072% reading + 0.073% range
– 0.5 V to + 1 V	37 µV	0.070% reading + 0.032% range
– 5 to + 10 V	370 µV.	0.223% reading + 0.034% range

Table 1 DC performance - 8-channel board

Thermocouple data

Linearisation errors	0.15 ˚C or better
Bias current	<2 nA (<10 nA at 70 ˚C)
Cold Junction (CJ) types (selectable)	Off, internal, external, remote.
CJ error	0.5 ˚C or better
CJ rejection ratio	25:1 minimum
Remote CJ	Via any user-selected input channel.
Upscale/downscale drive	Configurable for each channel
Types and ranges	See table 2

Installation category II: The rated impulse voltage for equipment on nominal 230V mains is 2500V.
Pollution degree 2: Normally, only non-conductive pollution occurs. Ocassionally, however, a temporary conductivity caused by condensation shall be expected.

T/C type	Range (˚C)	Standard
B	+ 200 to + 1800	IEC584.1:1977
C	0 to + 2300	Hoskins
E	- 200 to + 1000	IEC584.1:1977
J	- 200 to + 1200	IEC584.1:1977
K	- 200 to + 1370	IEC584.1:1977
L	-200 to + 900	DIN 43710
N	- 200 to + 1300	IEC584.1:1977
R	- 200 to + 1760	IEC584.1:1977
S	- 50 to + 1760	IEC584.1:1977
T	- 250 to + 400	IEC584.1:1977
U	- 100 to + 600	DIN 43710-85
NiNiMo	0 to + 1300	Eurotherm Recorders
Platinel II	-100 to + 1300	Engelhard R83

Table 2 Thermocouple types and ranges

3-wire RTD data

RTD linearisations		Pt100, Pt1000, Cu10, Ni100, Ni120
Linearisation errors		0.012 ˚C or better
Influence of lead resistance	error:	0.15 % of lead resistance
	mismatch:	1 ohm per ohm.
Types and ranges		See table 3
Pt100 performance (worst case)		See table 4

RTD type	Range (˚C)	Standard
Pt 100	- 200 to + 850	IEC751: 1981
Pt1000	- 200 to + 850	Based on IEC751: 1981
Cu 10	-20 to + 250	General Electric
Ni 100	- 50 to + 170	DIN43760
Ni 120	- 50 to + 170	Based on DIN 43760

Table 3 RTD types and ranges

Range ˚C	Resolution	Performance (worst case) in instrument at 20 ˚C
- 200 to + 200	0.02 ˚C	0.033% reading + 0.32 ˚C
- 200 to + 1000	0.14 ˚C	0.033% reading + 1.85 ˚C

Table 4 Typical Pt100 performance

Ohms ranges

Ranges	See table 5
Temperature performance (worst case)	
0 to 180Ω	(35ppm reading + 34.3ppm range)/˚C
0 to 1.8kΩ	(35ppm reading + 14.6ppm range)/˚C
0 to 10kΩ	(35ppm reading + 1.9 ppm range)/˚C

Range	Lead resistance	Resolution	Performance (worst case) in instrument at 20 ˚C
0 to 180 Ω	10 Ω	5 mΩ	0.033% reading +0.070% range
0 to 1.8 kΩ	10 Ω	55 mΩ	0.033 % reading + 0.041 % range
0 to 10 kΩ	10 Ω	148 mΩ	0.037 % reading + 0.020 % range

Table 5 Ohms ranges

Other linearisations

Tables available	√ value; (value)$^{3/2}$; (value)$^{5/2}$; User defined tables (up to 3 off)

Contact closure (switch) inputs

Type	Volt-free contact
Wetting voltage	2.5 Volts nominal
Minimum latched pulse width	125 ms.
De-bounce	Inherent 1 second.

16-CHANNEL DC INPUT BOARD SPECIFICATION

General specification

Number of inputs		16
Termination		Edge connector/terminal block
Input types		DC volts, dc mV, dc mA (with shunt), thermocouple, contact closure (not channels 1, 8 or 16)
Input mix		Software selected on configuration for each channel. (Max. eight different linearisations (inc. linear) per board
Measurement frequency		All channels in 1 second
Step response to within resolution		1.5 seconds
Noise rejection	Common mode:	150dB above 45 Hz. (chan-chan and channel-ground.)
	Series mode:	> 60dB between 10 to 100 Hz.
Maximum series mode voltage		Hardware range +50 mV.
Safety isolation (BS EN61010)		Installation cat.ii; Pollution degree 2
	Channel-to-channel	300V (double isolation)
	Channel-to-ground	300V (basic isolation)
Dielectric strength	Channel-to-channel	2350 V ac continuous
	Channel-to-ground	1350V ac
Input impedance		> 10 MΩ (68.8kΩ for 5V range)
Over-voltage protection		60 Volts peak, 500 V through 50 kΩ resistor.
Open cct detection (85 mV range only)		65 nA current max. 8 seconds recognition time (max.) 40 MΩ minimum break resistance.
Damping		2, 4, 8, 16, 32, 64, 128 or 256 secs. time constant, as configured.

16- channel i/p board specification (Cont.)

DC input ranges

Ranges available	-15mV to +85 mV; -1.0 V to +5 V
Temperature performance (worst case)	
-15mV to +85mV	(80ppm reading +12.9ppm range)/˚C
-1V to +5V	(272ppm reading +7.8ppm range)/˚C
Shunt	Externally mounted resistor modules
Additional error due to shunt	0.1%.
Performance (worst case)	See table 6

Range	Resolution	Performance (worst case) in instrument at 20˚C
–15 mV to + 85 mV	± 5.5 µV	0.072% reading + 0.071% range
– 1.0V to + 5 V	± 280µV	0.223% reading + 0.055 range

Table 6 DC performance (16-channel board)

Thermocouple data (in addition to the above)

Linearisation errors	0.15 ˚C or better
Bias current	< 2 nA (< 10 nA at 70 ˚C)
Cold Junction (CJ) types (selectable)	Off, internal, external, remote.
CJ error	1 ˚C or better
CJ rejection ratio	25:1 minimum
Remote CJ	Via any user-selected input channel.
Upscale drive	Configurable for each channel
Types and ranges	See table 2

Other linearisations

Tables available	√ value; (value)$^{3/2}$; (value)$^{5/2}$; User defined tables (up to 3 off)

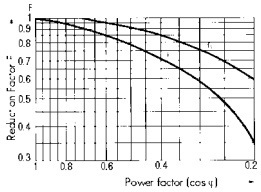
Contact closure inputs (not channels 1, 8 or 16)

Type	Volt-free contact
Wetting voltage	2.5 Volts nominal
Minimum latched pulse width	250 ms.
De-bounce	Inherent 1 second.

RELAY OUTPUT BOARD SPECIFICATION

No of relays per board		Eight
Contact format		Single pole change-over (single set of common, normally open and normally closed contacts)
Estimated life at 60VA load*		1,000,000 operations
Max contact voltage*		250 Volts ac.
Max contact current*	Make:	8 Amp
	Continuous:	3 Amps
	Break:	2 Amps
Maximum switchable power*		60 watts or 500 VA
Isolation (BS EN61010)		Installation cat.. II, Pollution degree 2
	Channel-to-channel	300V ac (double isolation)
	Channel-to-ground	300V ac (basic isolation)
Dielectric strength		1350V ac for 1 min. (contact to contact) 2350V ac for 1 min. (channel to channel) 1350V ac for 1 min. (channel to ground)

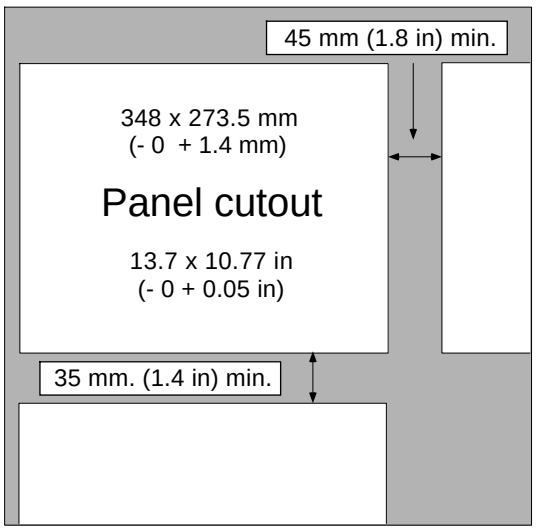
* With resistive loads. Derate with reactive or inductive loads according to the graph in which:
F1 = measured on representitive samples
F2 = typical values (according to experience)
Contact life = resistive life x Reduction factor

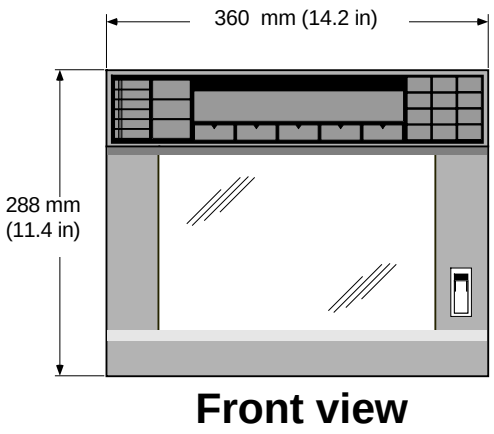


ANALOGUE OUTPUT BOARD SPECIFICATION

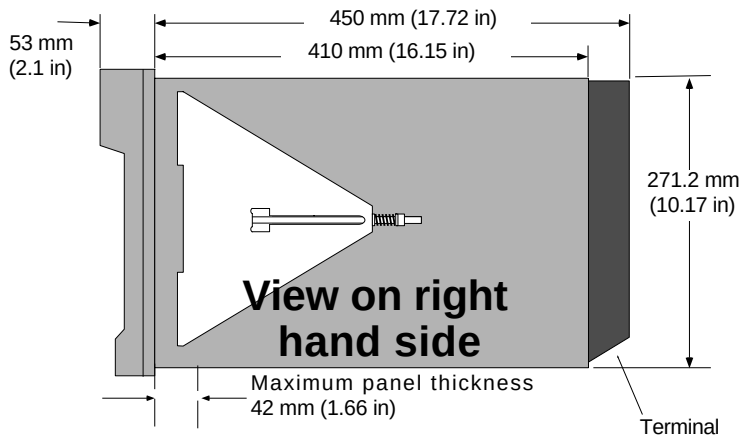
General specification

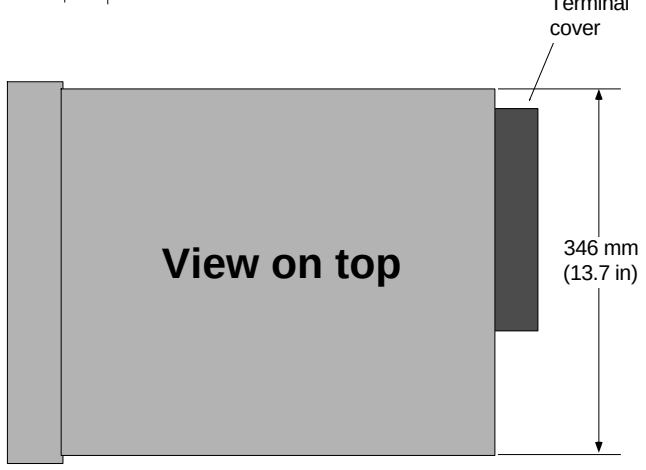
Number of outputs		Four or eight as ordered
Termination		Edge connector / terminal block
Output types		Current or Voltage as configured for each channel
	Current:	0 to 25mA max. at up to 24 V
	Voltage:	-1 to 11V at up to 5 mA
Output frequency		All channels in 1 second
Output damping		250 msec rise time (10% to 90%)
Resolution		0.025% full scale, monotonic.
Isolation (dc to 65 Hz; BS EN61010)		Installation cat. II; Pollution degree 2
	Channel to channel:	300V RMS or dc (double isolation)
	Channel-to-ground:	300V RMS or dc (basic isolation)
Dielectric strength (BS EN61010)		(1 minute type tests)
	Channel to channel:	2350 V ac
	Channel to ground:	1350V ac
Insulation resistance		50 MΩ at 500V dc.



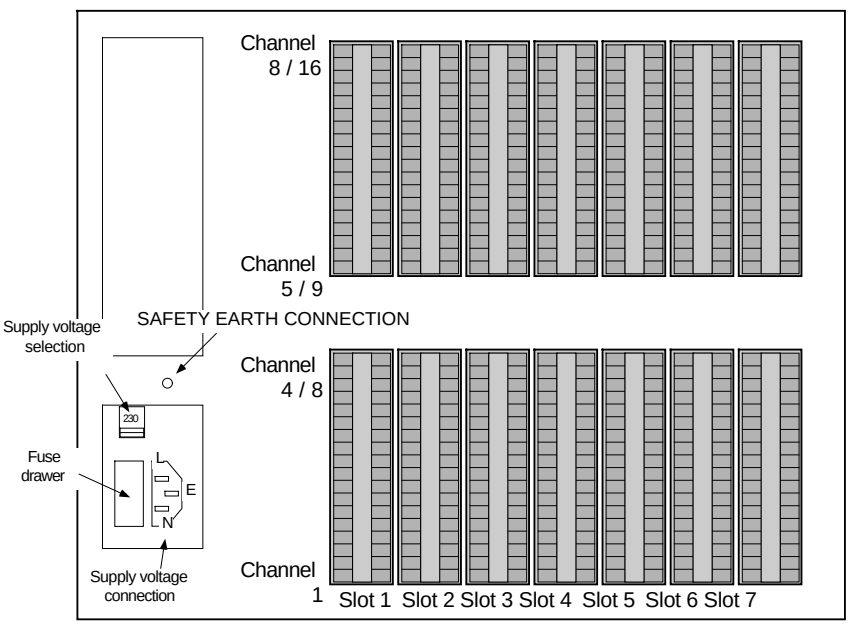


Front view



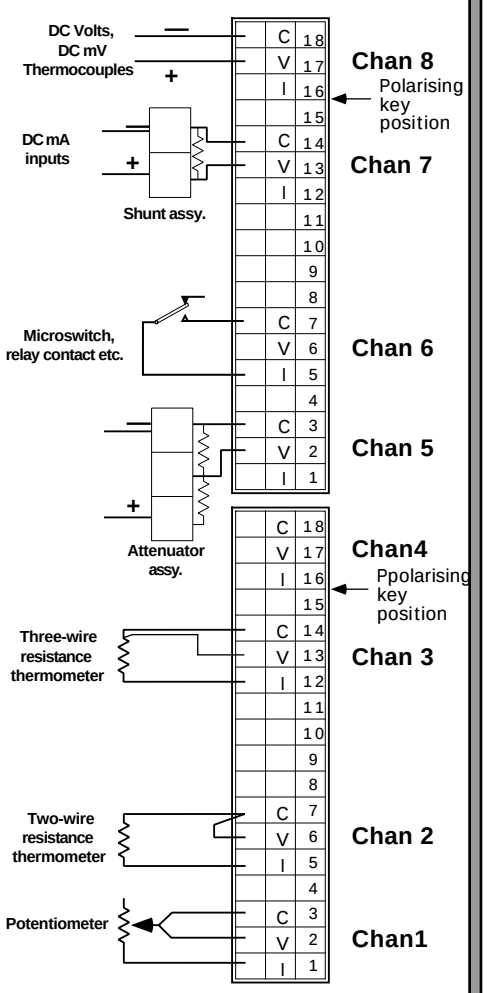


Mechanical Installation



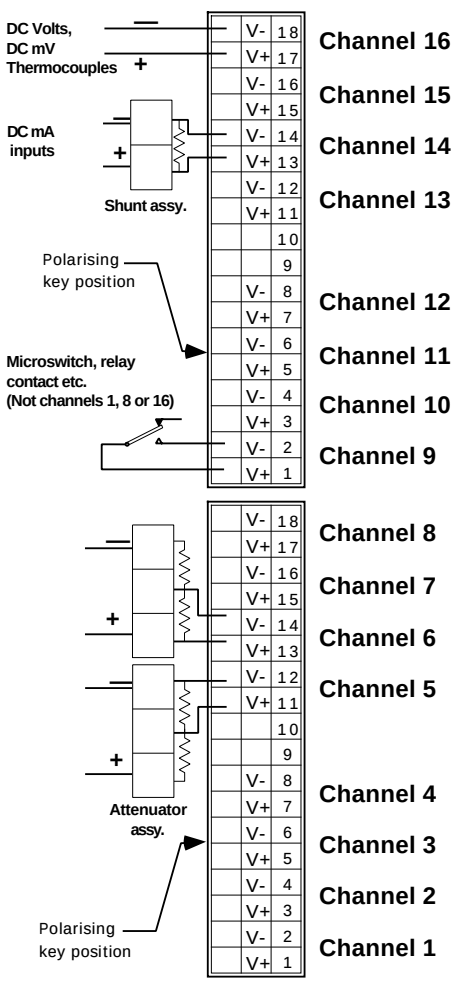
Electrical installation

8 - Channel dc input board (typical input signal wiring)



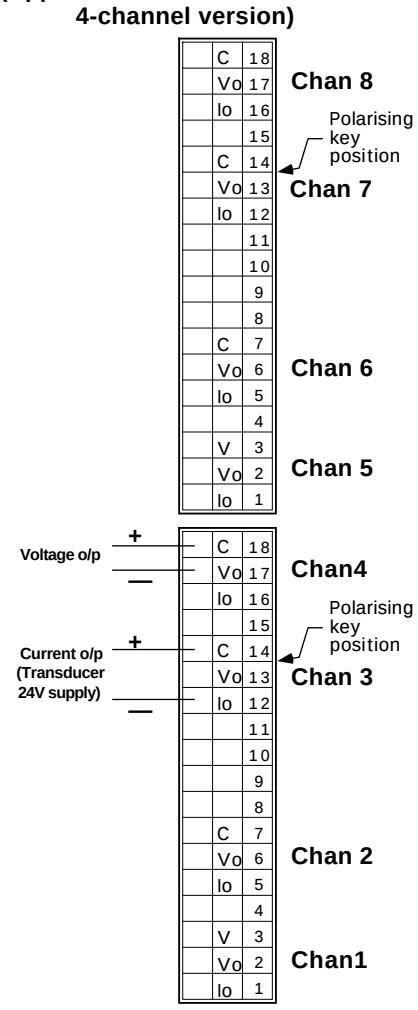
In order to prevent mis-mating, a polarising key can be located between contacts 15 and 16.

16 - Channel dc input board (typical input signal wiring)



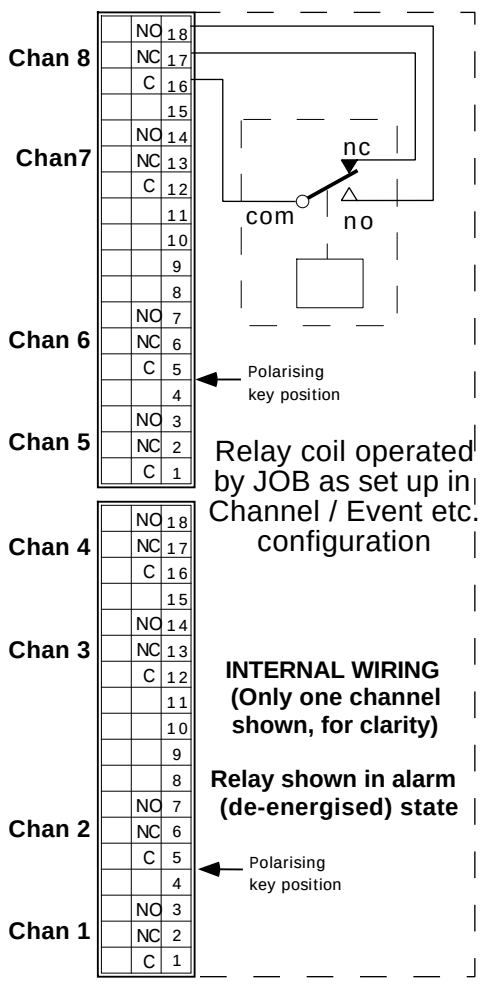
In order to prevent mis-mating, a polarising key can be located between contacts 5 and 6.

4/8 channel analogue output board (Upper connector not wired for 4-channel version)



In order to prevent mis-mating, a polarising key can be located between contacts 13 and 14.

Relay output board



Relay coil operated by JOB as set up in Channel / Event etc. configuration

INTERNAL WIRING (Only one channel shown, for clarity)

Relay shown in alarm (de-energised) state

In order to prevent mis-mating, a polarising key can be located between contacts 4 and 5

Accessory part numbers : 100Ω shunt = LA246779UK10; 250Ω shunt = LA246779UK25; Attenuator = LA244180

Slot 1 is the left-most slot when viewed from the back of the recorder.

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

HP250502/3 Jan 98