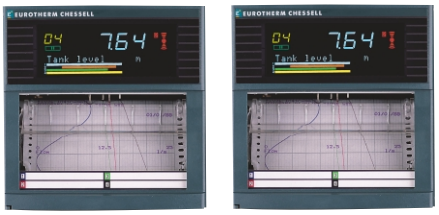
4103C, 4103M

MODELS

- **Continuous Pen Recording**
  1, 2, 3 or 4 Pens
- **Multi-point Recording**
  Providing 6 Colour traces
- **High Visibility Display**

  4103 – Numeric and bargraph indication
- **Isolated Universal Inputs**
  Select from mA, mV, V, Thermocouples and RTD
- **Annotation**
  Clear text printing of time/ date and custom messages
- **Data Archiving Facility**
  Store data on an integral PCMCIA card
- **Powerful Maths Pack**
  Calculate relative humidity, Fo value and more
- **Communications**
  Modbus,RS232 or RS485
  Modem support for remote file transfer

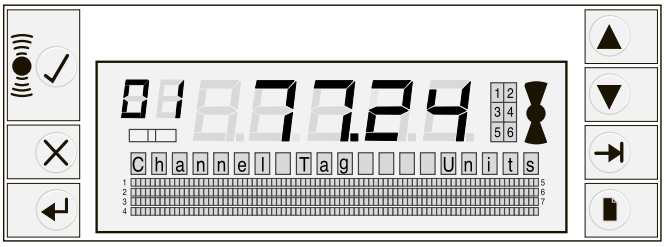


100mm Recorders
Specification Sheet

The 4103 is a high specification, 100mm strip chart recorder, providing continuous recording for up to 6 Process Variables. Information such as Channel descriptor, alarm set point and scale information can be viewed on a high resolution VFD display. Process variables including messages can be archived to an optional removeable media. These units can be programmed on site via the user interface or a configuration file can be transferred using a PCMCIA card.

Display

As well as displaying the process variables as a numeric value the 4103 provides bargraph indication. The display will cycle through PV's configured to appear in the Display group. Additional information including the channel descriptor, scale information and alarm set points can be viewed using the operator key.



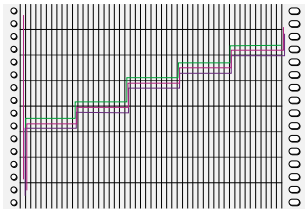
Configuration

In order to prevent unauthorised access the configuration is password protected. Entry of the password provides access to the instrument configuration pages. It is possible to provide the operator access to certain parameters, for example you may require the operator to be able to change the chart speed or archiving interval. These fields can be enabled in the operator access menu.

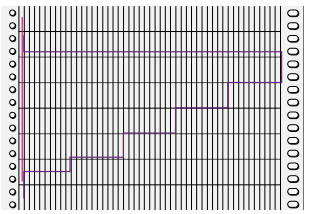
Operation

Adaptive Recording - Multi-point version
At slow chart speeds it is possible that the input circuit, between chart increments will pick up a spike or other brief disturbance in the measured signal, but that this disturbance will not appear on the chart, even though they may trigger an alarm. With adaptive recording enabled, if a sudden change in the input signal is detected, the recorder will place an additional dot on the chart without the chart being moved. This means that even at the lowest chart speed, unexpected signal changes can still be traced.

Pen offset compensation - Continuous Pen version
For continuous trace recorders the traces are separated in the time axis of the chart by 2mm, this results in simultaneous events being separated on the chart by 2mm. When enabled on the 4103C, Pen offset compensation applies a delay to the pens, the time delay being determined by the selected chart speed, such that simultaneous events appear on the same time axis.

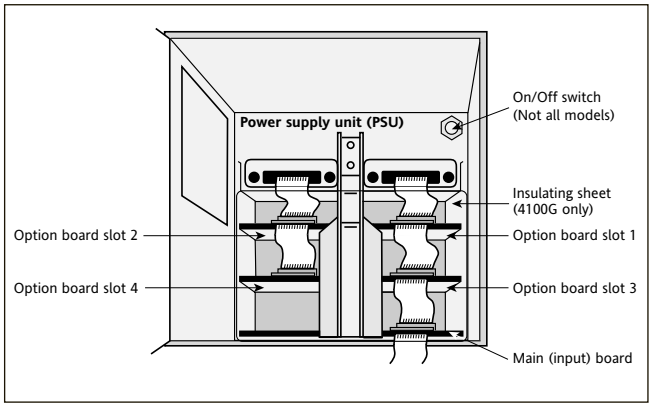


Compensation Off



Compensation On

Modular Design - All
The modular design of the 4100 Series allows for upgrades to be carried out in situ thus reducing downtime.



Exploded view

Data Archiving
Two log groups are available for sending tabular data to the chart or PCMCIA card. Either log groups can be initiated to print on the chart. Log group 2 can also be archived to a PC Card automatically at predetermined intervals. Data can be archived as either ASCII for use in spreadsheet, or Packed for viewing using Eurotherm Review software.

Maths Pack
The addition of the advanced maths pack option provides the 4103 with 16 derived channels and the ability to carry out complex calculations such as relative humidity and mass flow. Derived channels can be added to the log and display groups for trending and archiving as required.

Communications
Supporting either RS232 or RS485 the Serial Communications board provides the means of establishing a link between a recorder and a host computer (using the Gould Modicon MODBUS protocol), terminal emulator or Modem.

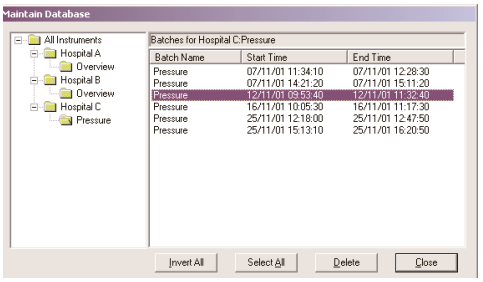
Analogue Output
If required, an input signal or the resulting calculation from a maths channel, can be retransmitted via an anlogue output, to another device. Up to four analogue outputs can be fitted, each capable of generating a voltage or current output.

Events
As standard, there are six internal events, each can be triggered by up to two selected input sources. The number of events rises to 16 when the Event Input board is fitted. Input sources can be logically ANDed or ORed allowing the use of multiple inputs. An example of the event input would be to provide external chart or logging control.

Custom Curve
This option allows the user to enter a Non standard linearisation table. The curve is entered as pairs of points (input (X), display (Y)), up to a maximum of 32 pairs.

Review Package
Offline printing and viewing is made possible by the use of the Review Software package.

This package uses the packed data files from the recorders local storage media and imports them into a PC database. Data from one or more archive files can easily be viewed. This data can then be printed or exported as a CSV file. Review can also be configured to automatically Backup and Transfer the archived files via a modem.



TECHNICAL SPECIFICATION

Input Board

General

Input types		dc Volts, dc millivolts,dc milliamps (with shunt), Thermocouple, 2 / 3-wire RTD Contact closure (not ch 1) >60ms
Input type mix		User configurable
Max no of inputs	4103C	4
	4103M	6
Input ranges		–8 to +38mV; –30 to +150mV; –0.2 to +1 Volt; –2 to +10 Volts –20 to +100 Volts with attenuator
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		45 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		>10MΩ at 500V dc
Input impedance		38mV, 150mV and 1V ranges: >10MΩ; 10V range: 68.8kΩ
Over voltage protection		50 Volts peak (150V with attenuator)
Open circuit detection		±57nA max.
Recognition time		250 msec
Minimum break resistance		10MΩ

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
–8mV	38mV	1.4µV	0.085% input + 0.073% range	80ppm of input per °C
–30mV	150mV	5.5µV	0.084% input + 0.053% range	80ppm of input per °C
–0.2V	1V	37µV	0.084% input + 0.037% range	80ppm of input per °C
–2V	10V	370µV	0.275% input + 0.040% range	272ppm of input per °C

Table 1 DC performance

Thermocouple data

Temperature scale	ITS 90
Bias current	0.05 nA
Cold junction types	Off, internal, external, remote
CJ error	1°C; instrument at 25°C
CJ rejection ratio	50:1 minimum
Remote CJ	Via any user-defined channel
Upscale / downscale drive	High, low or none selectable for each thermocouple channel
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	DIN43700:198	0.08°C
Ni/NiMo	0 to +1406	Ipsen	0.14°C
Platinel	0 to +1370	Englehard	0.02°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: 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	150Ω	5mΩ	0.045% input + 0.110% range	35ppm of input per °C
0Ω	600Ω	22mΩ	0.045% input + 0.065% range	35ppm of input per °C
0Ω	6000Ω	148mΩ	0.049% input + 0.035% range	35ppm of input per °C

Table 3 Resolution and performance for resistance inputs

RTD type	Overall range (°C)	Standard	Max linearisation error
Cu10	–20 to +400	General Electric Co	0 02°C
JPT100	–220 to +630	JIS C 1604:1989	0 01°C
Ni1000	–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

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

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 Analogue output board (2 channel) Event input board Communications board Transmitter power supply

Environmental Performance

Temperature limits	Operation:	0 to 50°C
	4100G	(0 to 40°C with PC/Hard disk)
	Storage:	–20 to + 70°C
Humidity limits	Operation:	5% to 80% RH
(non-condensing)	Storage:	5% to 90% RH
Protection	Door and Bezel:	IP54
	Sleeve:	IP20
	Transmitter PSU cover:	IP10
Shock		BS EN61010
Vibration		2g peak at 10 Hz to 150Hz
Altitude (max.)		2000 metres

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 54V dc or 20 to 35V ac (45 to 400 Hz)
Power (Max)		100 VA
Fuse type		Not user accessible
Interrupt protection	Standard:	40ms at 75% max. instrument load
	Enhanced:	120ms at 75% max. instrument load

Electromagnetic compatibility (EMC)

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

TECHNICAL SPECIFICATION (continued)

Recorder (continued)

Physical

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

Printing System 4103C

Pen type	Disposable fibre-tipped pens
Pen resolution	0.15 mm
Trace colours	See Table 5
Pen life	1.2km (channel); 7.5 x 10^5 dots (annotator)
Update rate	8 Hz
Response time (max)	1 second
Characters per line	42

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

Table 5 4103C Trace colours

Printing System 4103M

Pen type	Six nib cartridge
Pen resolution	0.2 mm
Trace colours	See Table 6
Pen life	1.5 x 10^6 dots per colour
Update rate	2 Hz
Response time (max)	1 pass every 1.5 seconds
Characters per line	42

Channel	1	2	3	4	5	6
Colour	violet	red	black	green	blue	brown

Table 6 4103M Trace colours

Paper transport

Type		Stepper motor driving sprocket tube
Chart speeds		
	4103C	0 to 36,000 mm/hr; 0 to 1417 in/hr
	4103M	0 to 1200 mm/hr;0 to 47 in/hr
Chart type	Standard	16 metre z-fold
	Option	32 metre roll

Options

All isolation figures are Installation category II and Polution degree 2

Modbus (RS232/RS422/RS485) Communications

Isolation	Terminal to ground:	100V RMS/dc (basic insulation)
Protocol		Gould Modicon Modbus® RTU

Profibus Communications

Isolation	Terminal to ground:	50V RMS/dc (basic insulation)

Transmitter Power Supply

Output voltage		3 or 6 x 25V dc (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)

Maths pack

Number of derived channels 16

Level 1 functions

Off	Subtract	Modulus	Constant
Multiply	Add	Divide	

Level2 functions (additional to level 1)

Square root	Rate of change	Third order polynominal	Low select
Channel average	Sample and hold	Relative humidity	Stopwatch
DV group average	Channel min	F value	Time stamp
Rolling average	DV group latching min	Linear mass flow	0_2 correction
e^x	DV group continuous min	Square root mass flow	Time stamp
$\log_n$	Channel max	Zirconia probe	Percentile
10^X	DV group latching max	Switch	
Log_{10}	DV group continuous max	High select	

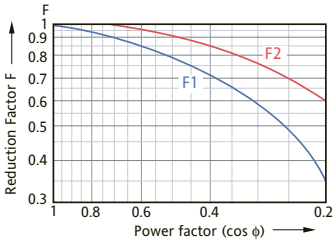
Customer linearisation

Number of tables available	One
Number of point pairs	32

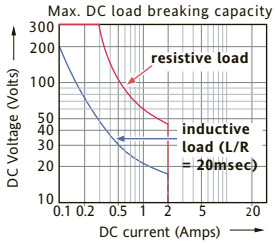
Relay outputs

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

* With resistive loads. With inductive loads, derate according to Graph 1, in which:
Contact life = resistive life x F1 or F2 where
F1 = measured on representative examples and
F2 = typical values according to experience



Graph 1 Derating curves



Graph 2 DC ratings

Analogue (transmission) ouputs

Output ranges (user configurable)

	Voltage:	0 to 10V (source 5mA max)
	Current:	0 to 20mA (max load resistance: 1kΩ)
Update rate		2Hz
Step response (10% to,90%)		250msec
Linearity		0.024% of hardware range
Performance		See Table 7
Isolation	Channel to channel:	300V RMS or dc (double insulation)
	Channel to ground:	300V RMS or dc (basic insulation)

Performance in instrumnet 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	±0.1µA +0.03% of reading per °C

Table 7 Analogue output performance

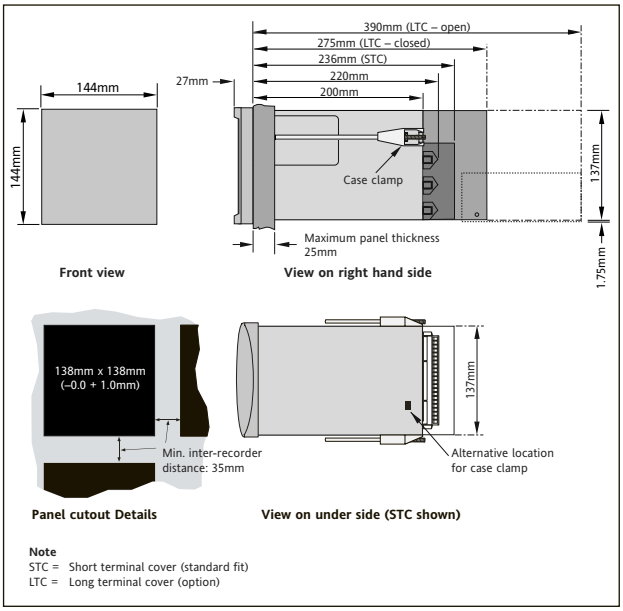
Event inputs

Number of inputs		6 discrete or 16 binary coded inputs + chart synch
Isolation	Event input to ground:	100V RMS or dc (double insulation)
	Chart drive to ground:	100V RMS or dc (double insulation)
	Event input to chart drive:	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	Events:	1Hz
	Pulse counting:	6Hz
Minimum pulse width		6.25ms
Chart synchronization	Chart speed:	Selected speed at 200 pulses/sec
	Maximum pulse rate:	220 pulses per second
	Duty cycle:	20 to 80%

4103C

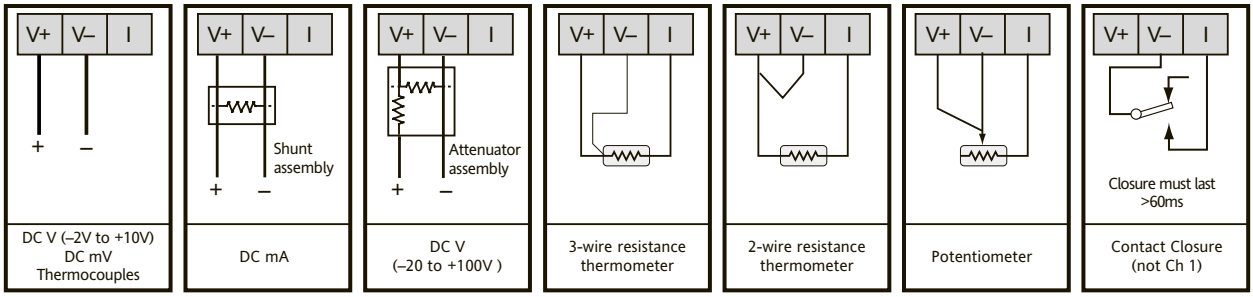
Tested to IEE344 – 1987 'IEEE recommended pratice for Sieimic qualification of class 1E equipment for Nuclear Power Generating Stations'

MECHANICAL INSTALLATION



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

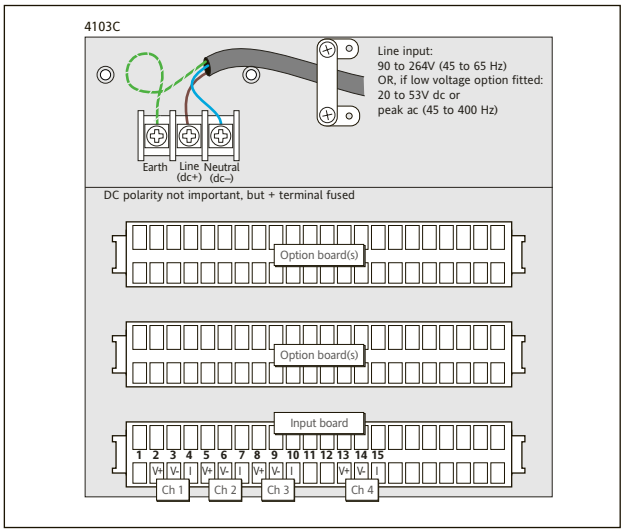
INPUT BOARD SIGNAL WIRING

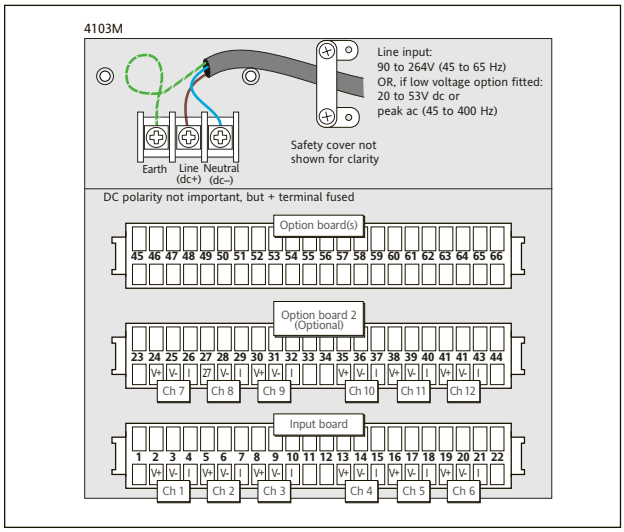


Shunt assembly
100Ω = LA246779UK10
250Ω = LA246779UK25

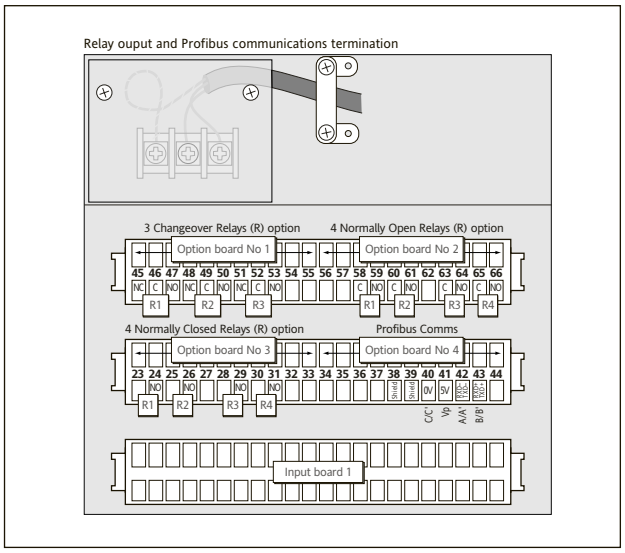
Attenuator assembly
LA244180

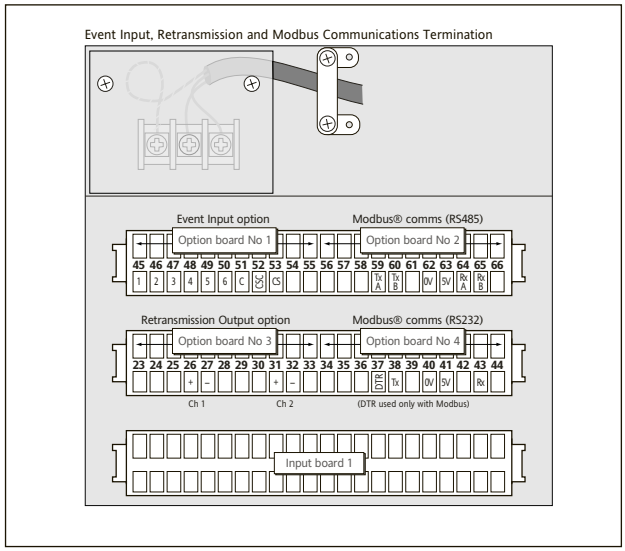
SUPPLY VOLTAGE AND INPUT BOARD TERMINATION





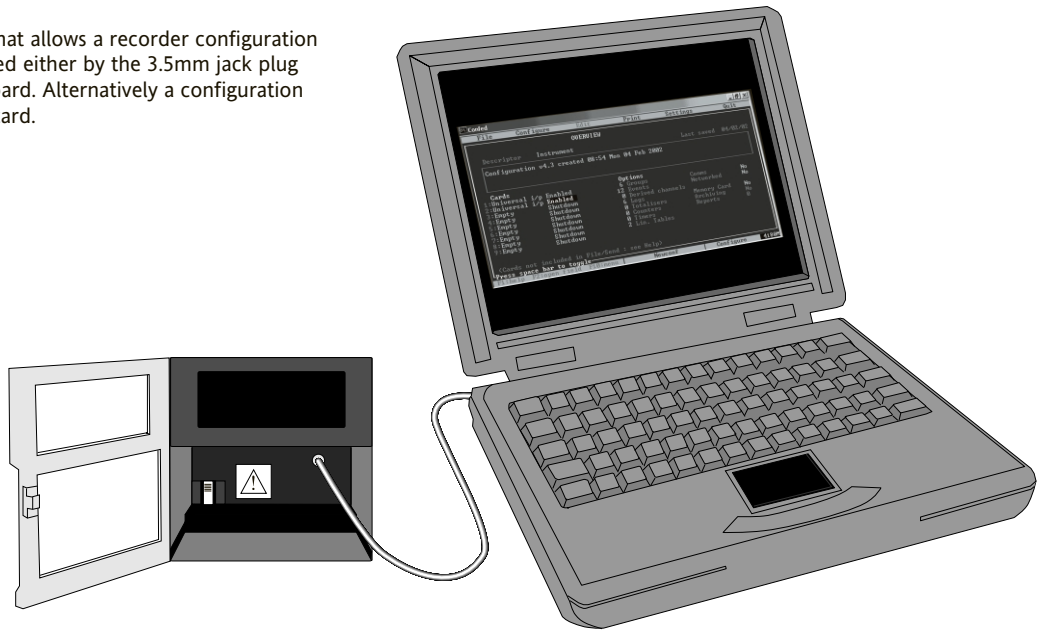
OPTION WIRING





Configuration Editor

An offline configuration package that allows a recorder configuration to be set up on a PC and transferred either by the 3.5mm jack plug or if fitted the Communications board. Alternatively a configuration file can be transferred using a PC card.



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