4101C, 4101M
4102C, 4102M

MODELS

Strip Chart Recorders
Specification Sheet

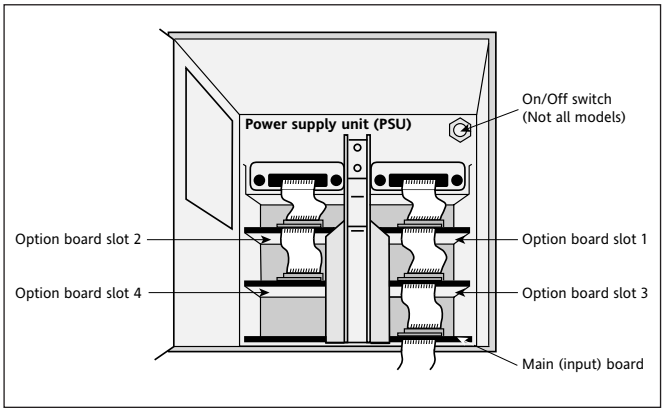
The 4101/2 are low cost, 100mm strip chart recorders, providing recording for up to 4 (continuous pen) or 6 (multi-point) process variables. Designed to fit a DIN cut out (138 x 138 mm) the recorders feature an exceptionally small back panel dimension of 236mm with the cover fitted.

- **Continuous Pen Recording**
  1, 2, 3 or 4 Pens
- **Multi-point Recording**
  Providing 6 Colour traces
- **High Visibility Display**
  
  4101C, 4101M –
  Clear Analogue Scale
  
  4102C, 4102M –
  Large 7 Segment numeric Display
- **Isolated Universal Inputs**
  Select from mA, mV, V, Thermocouples and RTD
- **Annotation**
  Clear text printing of time/date and messages

Display
An analogue scale, specified at the time of order is supplied with all 4101 recorders. The 4102 is supplied with a high visibility seven segment display, providing clear numeric indication of the process variables, and alarm status. The display will cycle through each PV, but can be paused on a particular channel if required.

Configuration
The 4101 is supplied pre-configured and ready for use. The addition of a keypad to the 4102 allows for configuration to be carried out on site. In order to prevent unauthorised access to the 4102, 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

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



Exploded view

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		User configutrable
Max no of inputs	4101C, 4102C	4
	4101M, 4102M	6
Input ranges		–30 to +150mV; –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		>10MΩ at 500V dc
Input impedance		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	4101C, 4102C	250 msec
	4101M, 4102M	500 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
–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
CJ error	1°C; instrument at 25°C
CJ rejection ratio	50:1 minimum
Upscale / downscale drive	High, low or none
Types and ranges	See table 2

T/C Type	Overall range (°C)	Standard	Max linearisation error (4102C, 4102M only)
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	0.08°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 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	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 (4102C, 4102M only)
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
	Transmitter power supply
	Event input board, Annotator board

Environmental Performance

Temperature limits	Operation:	0 to 50°C.
	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

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°C

TECHNICAL SPECIFICATION (continued)

Recorder (continued)

Printing System 4101C, 4102C

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	4 Hz
Response time (max)	2 seconds
Characters per line	38

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

Table 5 4101C, 4102C Trace colours

Printing System 4101M, 4102M

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 5 seconds
Characters per line	42

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

Table 6 4101M, 4102M Trace colours

Paper transport

Type		Stepper motor driving sprocket tube
Chart speeds		
4101C, 4102C with annotation		Off 5, 10, 10, 20, 30, 60, 120, 300 mm/hr
4101C, 4102C annotation inhibited		600, 1200, 3600, 18000, 36000 mm/hr
	4101M, 4102M	Off, 5, 10, 20, 30, 60, 120 mm/hr
Chart type	Standard	16 metre z-fold
	Option	32 metre roll

Vacuum flurescent display (4102C, 4102M)

Process value with minus sign as required	Four, blue 15mm high characters
Channel number	Single, green 8mm high character
Alarm indication	Pair of red arrows for high and low alarms
Channel hold indication	Red 'H' below channel number when channel hold inoperation
Keypad	5-key keypad for operator/ configuration access

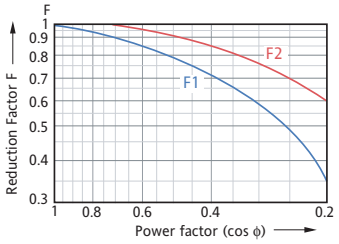
Options

All isolation figures are Installation category II and Polution degree 2

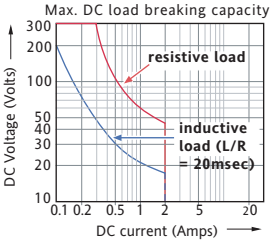
Relay outputs

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

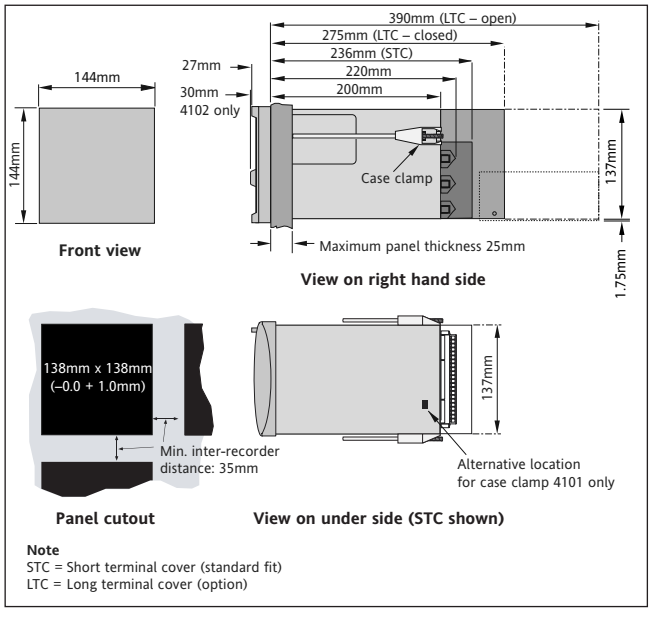
Event inputs

Isolation (dc to 65Hz; BS EN61010)		
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

Transmitter Power Supply

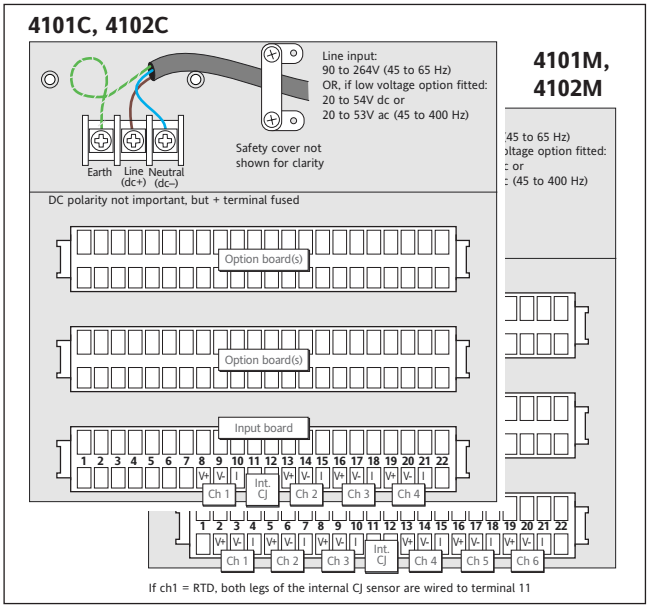
Output voltage	3 or 6 x 25V dc (nom) outputs
Isolation (dc to 65Hz; BS EN61010)	
Channel to channel:	100V RMS or dc (double insulation)
Channel to ground:	100V RMS or dc (basic insulation)
Cover rating	IP10

MECHANICAL INSTALLATION

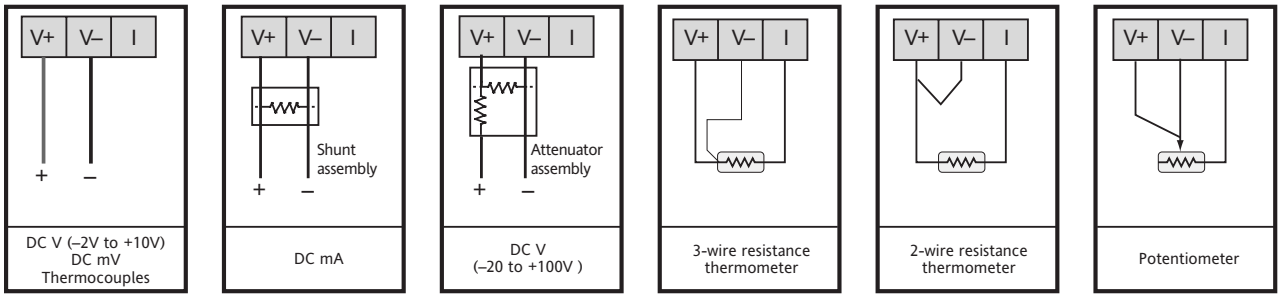


Note
STC = Short terminal cover (standard fit)
LTC = Long terminal cover (option)

SUPPLY VOLTAGE AND INPUT BOARD TERMINATION



INPUT BOARD SIGNAL WIRING



Shunt assembly
100Ω = LA246779UK10
250Ω = LA246779UK25

Attenuator assembly
LA244180

Steriliser Option 4101/2

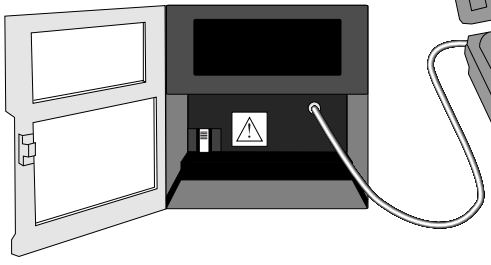
This option offers four inputs to control chart on/off and annotation of events.

Contact 1, when closed the chart runs normally. When open the pens are parked at Zero and the chart winds on 80mm.

Contact 2, applies to annotating recorders only. When closed the current time and date is printed, and as long as the contact remains closed the chart will run at its selected speed, with annotation inhibited. Once the contact goes open the pens are zeroed; the time date, scales and chart speed are printed and the chart is advanced by 80mm and stopped.

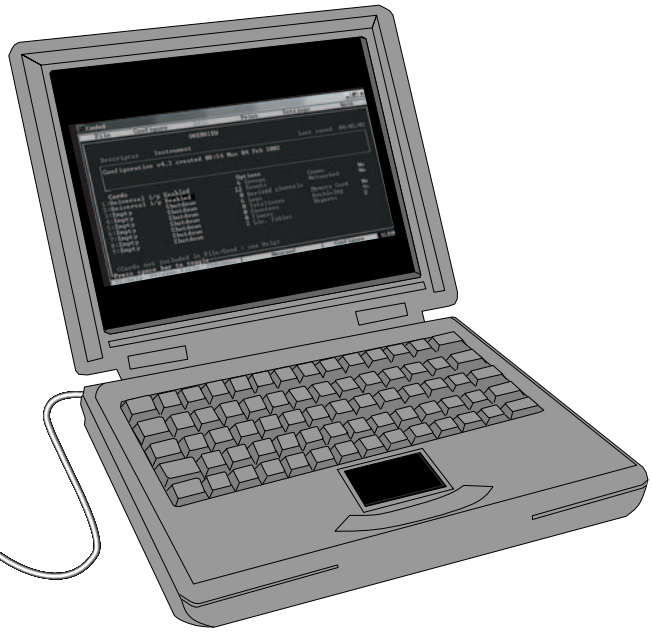
Contact 3, applies to annotating recorders only. On closure the message "EVENT START HH:MM:SS" is printed, where HH:MM:SS show the time of closure in hours, minutes and seconds. On the contact opening, the message "DURATION HH:MM:SS" is printed, where HH:MM:SS shows how long the contact was closed, therefore providing Sterilisation time.

Contact 4, If either contact 1 or 2 is closed then pen 4 (continuous) or pen 6 (multipoint) is used to show the status of Contact 4. Whilst contact 4 is open the trace is at 100%, whilst closed the trace is at 96%.



Configuration Editor

An offline configuration package that allows a recorder configuration to be set up on a PC and transferred by the 3.5mm jack plug.



Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.

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