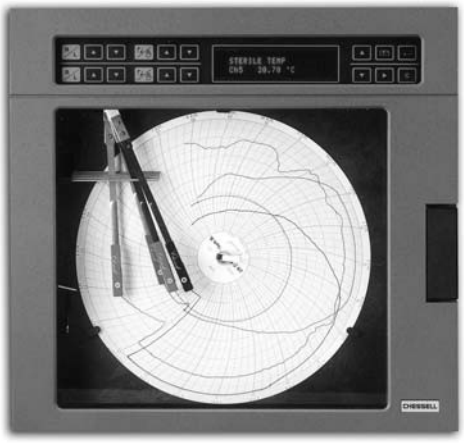
392

MODEL



Circular Chart Recorder

Specification Sheet

- **1 to 4 Universal Input Channels**
- **40 Character Vacuum fluorescent digital display**
- **User Configurable**
- **Maths Functions**
- **Custom Curve**
- **4 Totalisers with 9-digit readout**
- **Up to 2 Single or Dual Output Controllers**
- **Retransmission**

The 392 from Eurotherm® is a user configurable 1, 2, 3 or 4 pens, 100mm calibrated width circular chart instruments, utilising high visibility vacuum fluorescent display. The modular construction and the use of surface mount technology assure a compact design, which is easy to maintain, and upgrade.

Configuration

Use of the integral keypad, and the structured parameter list allows for fast basic set-up and selection of those functions needed for a particular application. Configuration parameters are separated by a user definable password.

Display

The measured value for each channel is displayed along with, the channel number, engineering units, channel Descriptor (16 characters max) and alarm information.

Maths

Addition of the maths function allows for calculations ranging from simple add, subtract through to the more complex, Mass flow and Relative humidity.

Custom Curve

This features allows for a user defined input, such as a Pirani Vacuum Gauge to be entered and selected for tracing on the recorder.

Totalisers

The 392 can be provided with up to 4 integrating/totalising channels, with nine-digit resolution, for flow and power applications. Each totaliser channel is capable of driving a relay output, for example to drive an electromechanical counter.

Alarms

Up to four alarms can be configured per channel. Each alarm can be configured as absolute low/high, deviation, or rate of change.

Relays Outputs

Up to 8 relay outputs can be fitted, driven by any internal recorder event such as channel alarm, totaliser overflow, totaliser output.

Integral Controllers

The model 392 offers two PID controllers with features such as cascade, ratio/bias, feedforward and internal setpoint generation. Dedicated auto/manual and remote/local setpoint keypads allow the user to switch between one control function to the other.

SPECIFICATION

Input Board

General

Number of inputs:	1, 2, 3 or 4
Input Types:	dc Volts, milli-volts, Dc milli-amps (with shunt) Thermocouple, 2/3 wire RTD
T/C Types:	B, C, E, J, K, L, N, R, S, T, Ni/NiMo
RTD Types:	Pt100A, Pt100D, Cu10, Ni100, Ni120
Others:	Linear, Square root, X3/2, X5/2, log User-entered.
Input Type mix:	4
Input ranges:	See Table 1
Termination:	Terminal Block

Hardware Range	Input Accuracy	Minimum Span
4.0 to 20mV	0.02mV	4mV
12 to 60mV	0.06mV	15mV
16 to 80mV	0.08mV	20mV
40 to 200mV	0.20mV	50mV
80 to 400mV	0.40mV	100mV
0.34 to 1.7 V	1.7mV	425mV
0.50 to 2.5 V	2.5mV	625mV
1.00 to 5.0 V	5mV	1.25V

Table 1

Shunt/Attenuator:	Internally mounted resistor modules
Additional error due to shunt:	0.1% of input
Additional error due to attenuator:	0.2% of input

Recorder

Performance

Input resolution:	0.01% of operating gain span
Pen position resolution:	1% of chart range
Display accuracy:	±(0.05% of operating gain span + 0.05% of reading
Pen response:	1 second to full scale
Channel update rate:	250ms
CJC rejection:	±0.5% from 25°C
Noise Rejection (48 to 62Hz):	
Common mode:	>130dB (Channel to Channel and Channel to Ground)
Series Mode:	>60dB
Input Impedance:	>20MΩ

Power Requirements

Line voltage (45- 65Hz):	90 to 132 Volts or 180 to 264 Volts (User selectable)
Low voltage option:	24V dc
Power:	<25VA (115VA with case heater) 25W dc
Fuse:	20mm Slow blow 500mA/240V ac 20mm slow blow 1A/120V ac 20mm slow blow 2A/24V dc Recorder supply voltage (mains) fuse must not exceed 3A

Environmental Performance

Temperature Limits:	
Operation:	0 to 50°C (-20 to 50°C with heater)
Storage:	-20 to +70°C
Humidity Limits (non - condensing:)	10 to 90%
Protection: Standard:	NEMA3 (IP54)
Waterproof:	NEMA4 (IP65)
Shock:	BS EN60873 and BS EN61010
Vibration (EN60873):	1g peak at 60Hz to 150Hz
Altitude (max.):	<2000 metres

Electromagnetic compatibility (EMC)

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

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

Bezel size:	360mm H x 380mm (when viewed from the front, offset 5mm right with respect to cut-out centre line)
Panel cut-out dimensions:	340.5 H x 345mm W (both -0 +1 mm)
Depth behind bezel rear face:	150mm
Weight:	7kg (typical)
Panel Mounting:	+5 to -30 degrees from vertical (+ = top over hang)

Printing System

Pen Type:	Disposable Fibre-tipped pens giving approx. 500 metres of trace each
Chart type:	Circular
Chart speeds:	1 to 4096 hours / revolution.

Memory Protection

Configuration:	saved in EEPROM
Active values (e.g. totalisers):	Super cap back up for 100hrs

Options

Maths Pack

Number of Derived Variables:	2
Functions:	See table 2

Off	High Peak (highest value since reset)	Mass Flow (Linear)
Add (A+B)	Low Peak (Lowest value since reset)	F0 (Sterilization Constant)
Subtract (A-B)	Log (Log to base 10)	Relative Humidity
Multiply (A x B)	Power (Power of 10)	Zirconia Probe
Divide (A / B)	Mass Flow (Square root)	
Linear (A x B + C)	Polynomial (B + C x A + D x A2 + E x A3)	
High Select (A>B -> A)	Average (Single point, cumulative since reset)	
Low Select (A>B -> B)		

Table 2

Customer Linearisation Tables

No. Of tables available:	1
No. Of point pairs:	11

Relay Outputs

Maximum number or relays:	8 (two boards)
Maximum switching power*:	60W
Maximum breaking current*:	2 Amps within above power ratings
Maximum contact voltage*:	250V ac within above power ratings
or	30V dc within above power ratings

* With resistive loads

Analogue (retransmission) Outputs

Max No. of Outputs:		4 (2 boards)
Output Ranges:	Voltage:	0 to 5V dc, or 1 to 5V dc
	Current:	0 to 20mA, or 4 to 20mA (into 1000Ω)

Event Inputs

Max No. of inputs:	16 (2 boards)

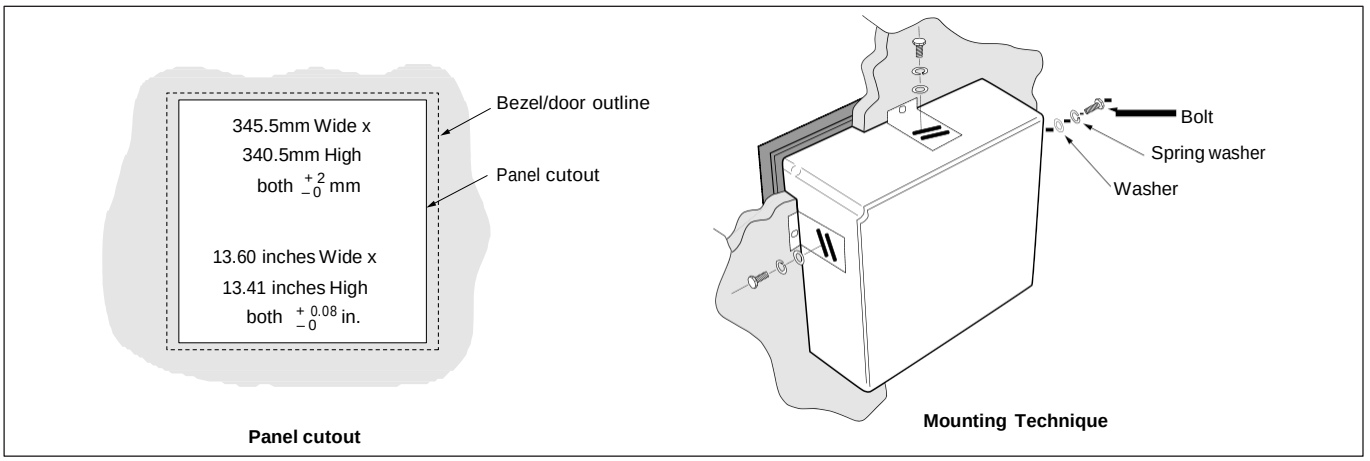
Transmitter Power Supply

Supply:	4 Isolated 28V dc, 24mA supplies 115V ac Supply – 100mA/250V T (slow blow) 240V ac Supply – 63mA/250V T (slow blow

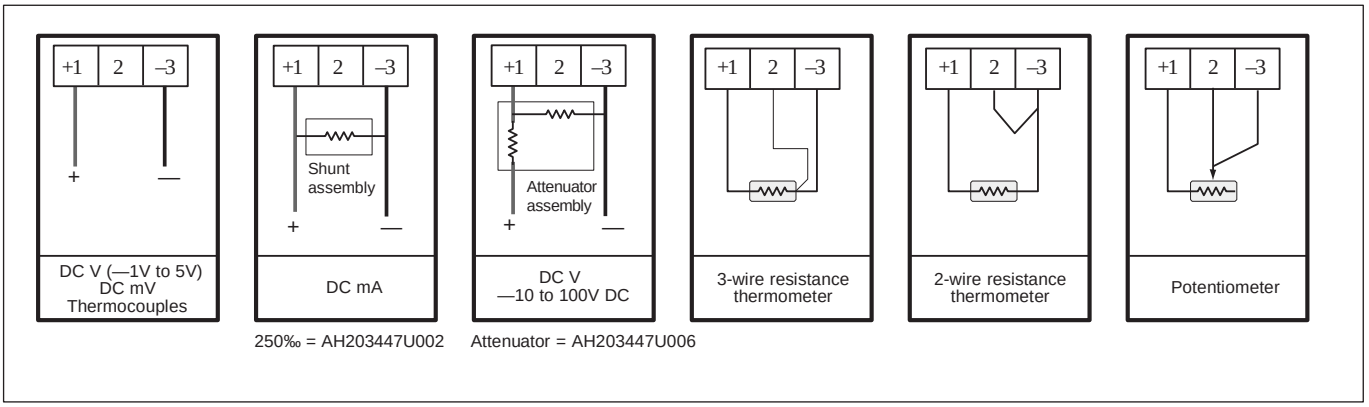
Controllers

Number:	2
Type:	Single or Dual output, 3-node PID controllers, setpoint generators and remote/local setpoint switching

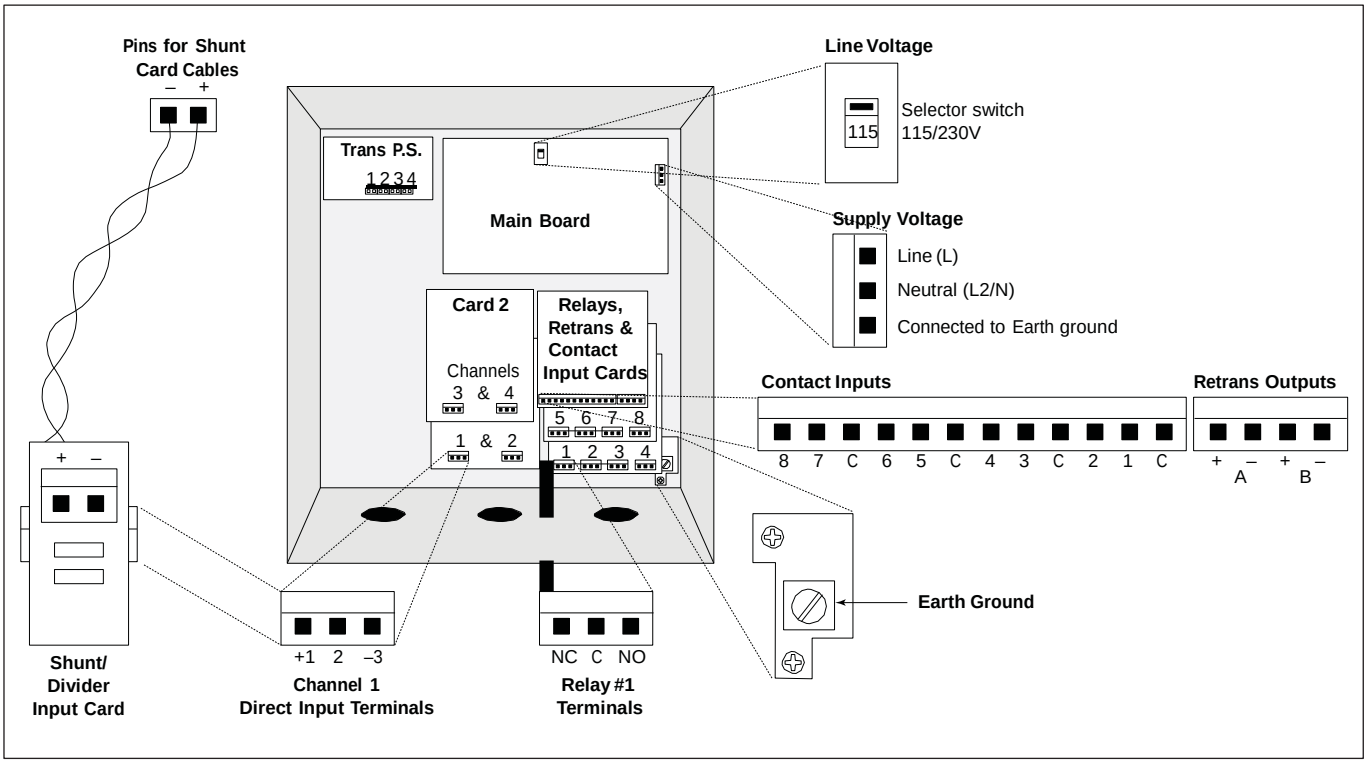
Mechanical installation



Signal wiring



Supply voltage and I/O board wiring



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