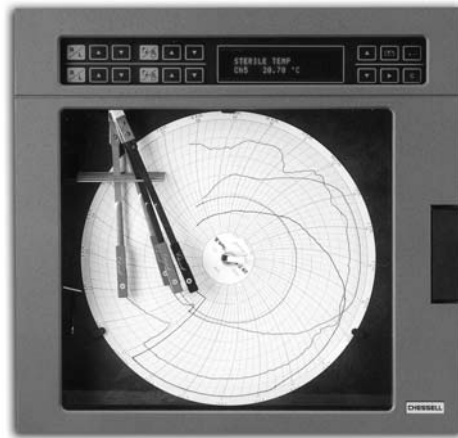


392 MODEL



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: | B5 EN60873 and B5 EN61010 |
| Vibration (EN60873): | 1g peak at 60Hz to 150Hz |
| Altitude (max.): | <2000 metres |

Electromagnetic compatibility (EMC)

| | |
|--------------------|--|
| Emissions: | B5 EN50081-2 |
| Immunity: | B5 EN50082-2 |
| Electrical safety: | B5 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 A ² + E x A ³) | |
| 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 of 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) |
|--------------------|---------------|

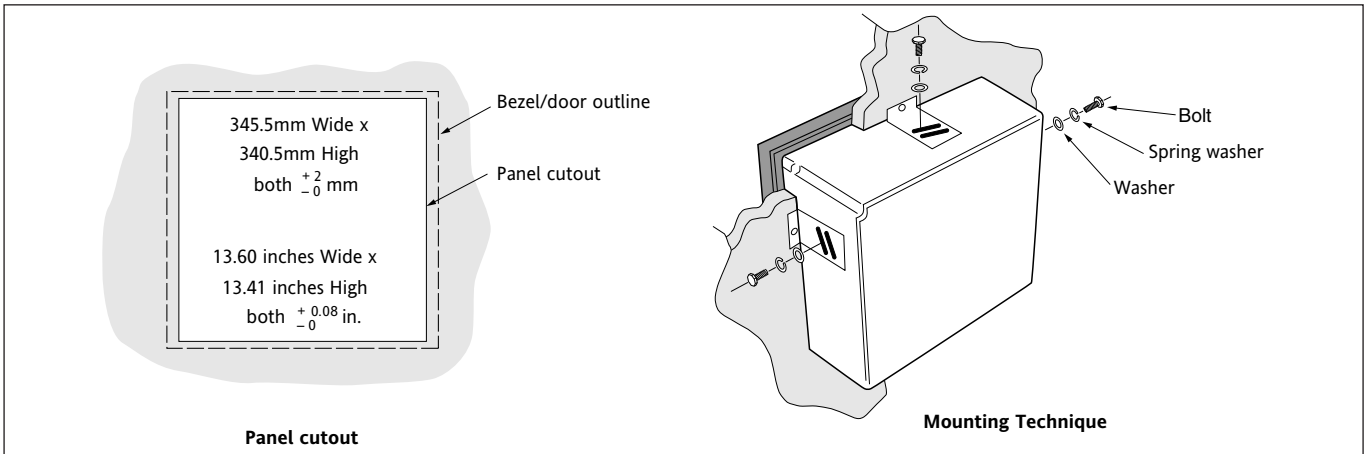
Transmitter Power Supply

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

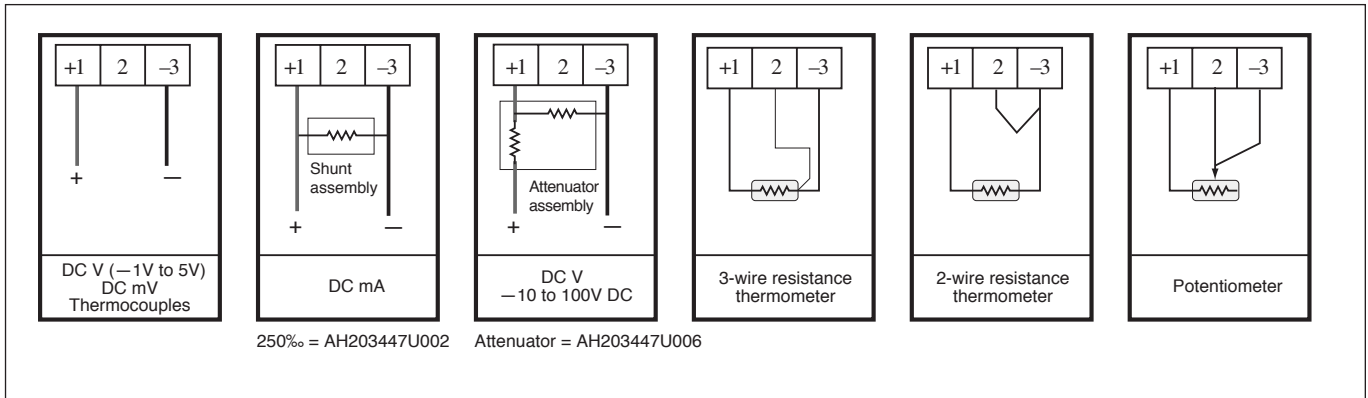
Controllers

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

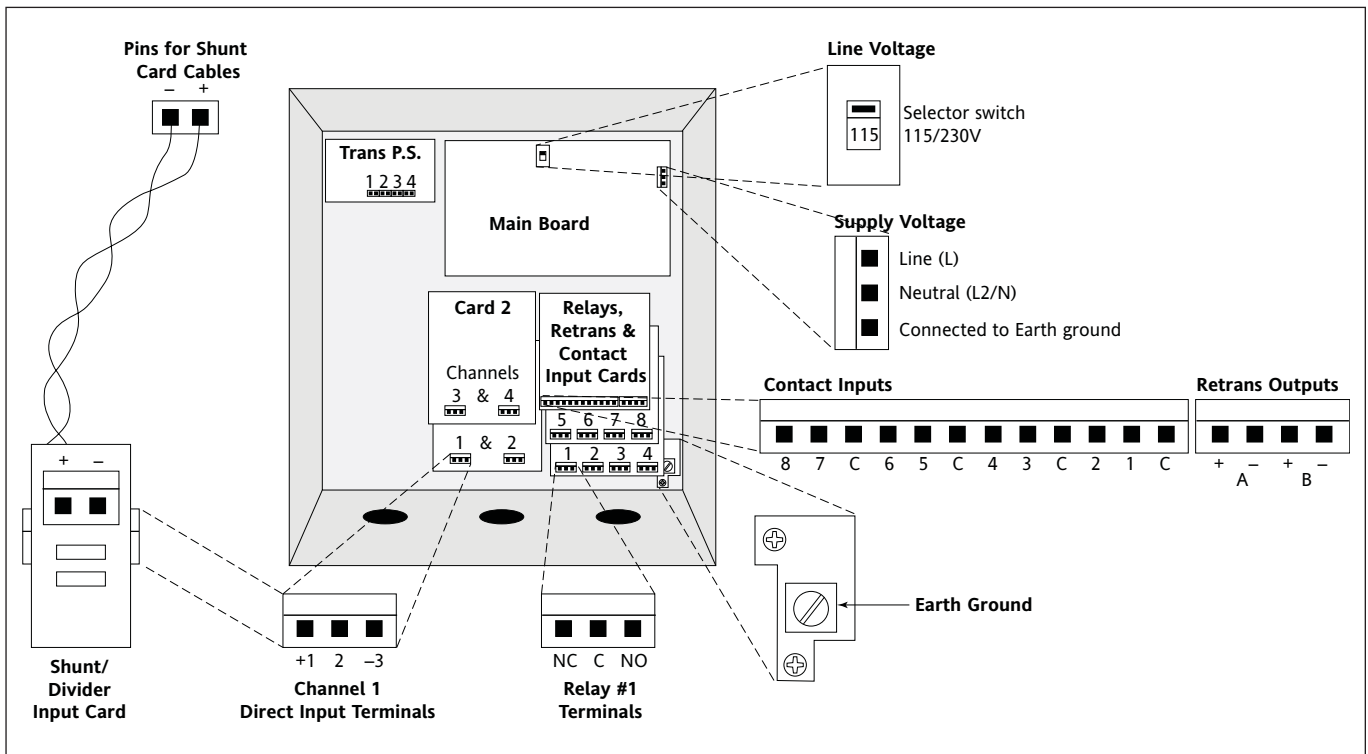
Mechanical installation



Signal wiring



Supply voltage and I/O board wiring



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