

# 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)                                 |
| Fuse:                               | 25W dc                                                         |
|                                     | 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 BS 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                                                                       |

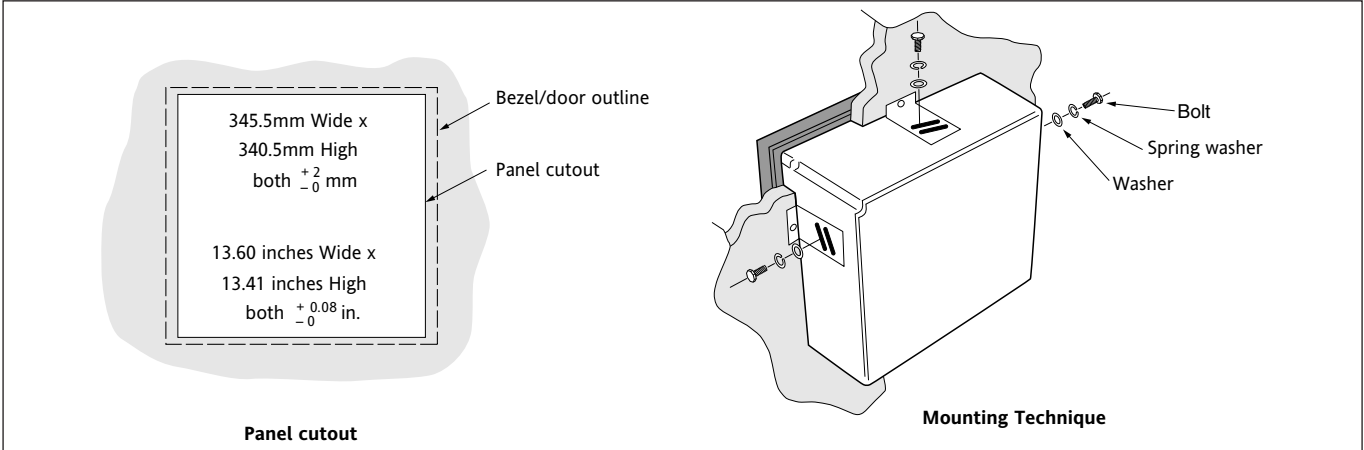
| Options                      |                                                |                             |
|------------------------------|------------------------------------------------|-----------------------------|
| Maths Pack                   |                                                |                             |
| 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 A2 + E x A3)       |                             |
| High Select (A>B -> A)       | Average (Single point, cumulative since reset) |                             |
| Low Select (A>B -> B)        |                                                |                             |

Table 2

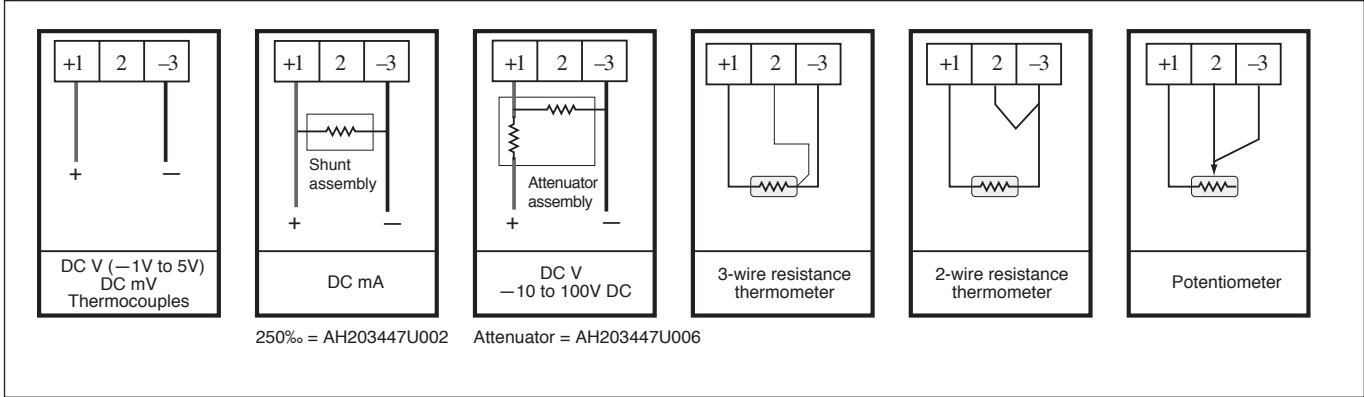
| Customer Linearisation Tables     |                                               |
|-----------------------------------|-----------------------------------------------|
| No. Of tables available:          | 1                                             |
| No. Of point pairs:               | 11                                            |
| Relay Outputs                     |                                               |
| Maximum number 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 |

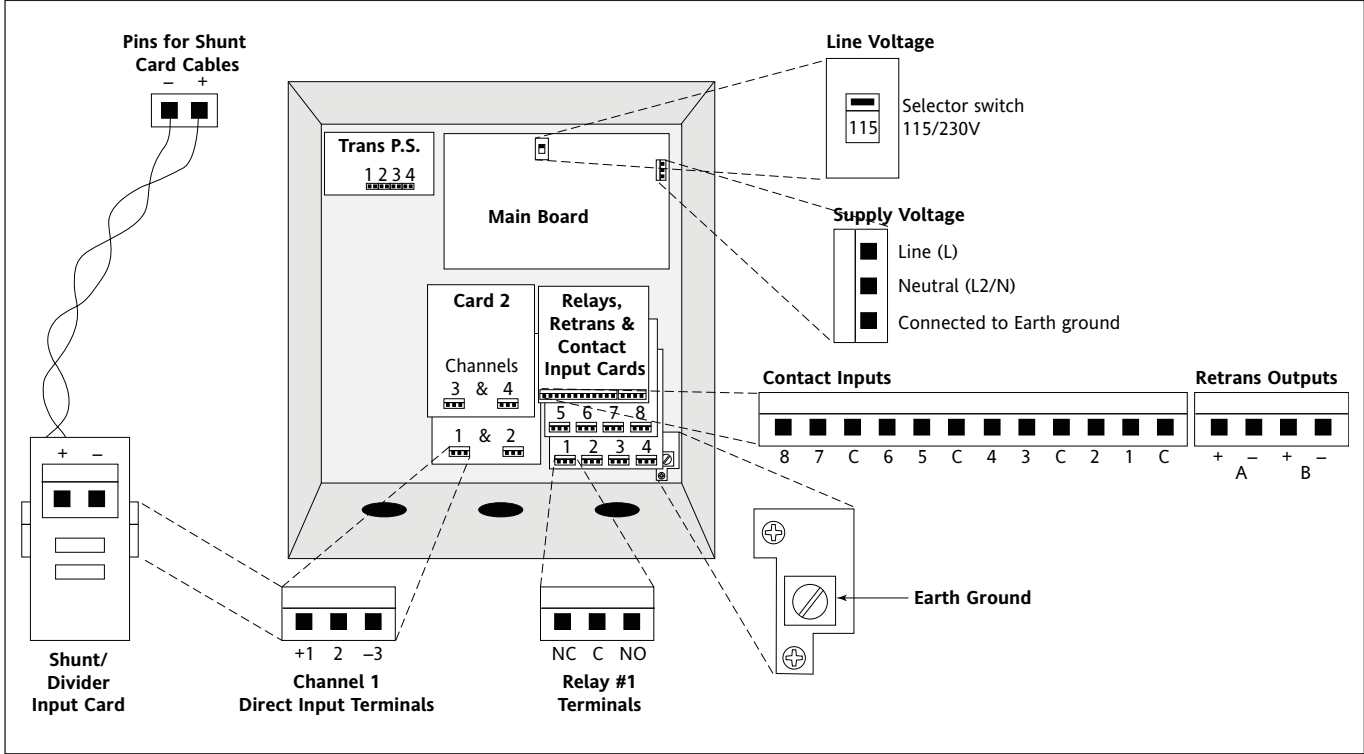
Mechanical installation



Signal wiring



Supply voltage and I/O board wiring



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