

**Panel Meter Model PM6-RT
Temperature Display
Operation and Instruction Manual**

AMALGAMATED INSTRUMENT CO PTY LTD

ACN: 001 589 439

*Unit 5, 28 Leighton Place Hornsby
NSW 2077 Australia*

*Telephone: +61 2 9476 2244
Facsimile: +61 2 9476 2902*

*e-mail: sales@aicpl.com.au
Internet: www.aicpl.com.au*

Table of Contents

1	Introduction	3
2	Mechanical Installation	4
3	Electrical installation	5
4	Function tables - summary of setup functions	7
5	Explanation of functions	8
6	Specifications	15
7	Guarantee and service	16

1 Introduction

1.1 General description

This manual contains installation and operation information for model PM6-RT monitor. Model PM6-RT accepts inputs from either Pt100 or Pt1000 RTD 2 or 3 wire temperature sensors. The temperature can be selected for display in °C, °F or °K.

Unless otherwise specified at the time of order your PM6 has been factory set to a standard configuration. This configuration can be easily changed by the user. All changes to configuration and scaling are made via three push buttons located at the rear of the unit, see chapter 5, page 8.

Functions **Lo di SP** and **Hi, 9H di SP** allow visual warnings of under or over temperature by either flashing the display value on or off or showing the error message **-or-**.

The PM6 series instruments are designed for high reliability in industrial applications. The display can be set to switch brightness between two levels via an external switch for day/night level switching etc. The PM6 range of instruments are monitor only devices and contain no outputs. Other ranges of instruments are available to suit a wide range of instrumentation needs.

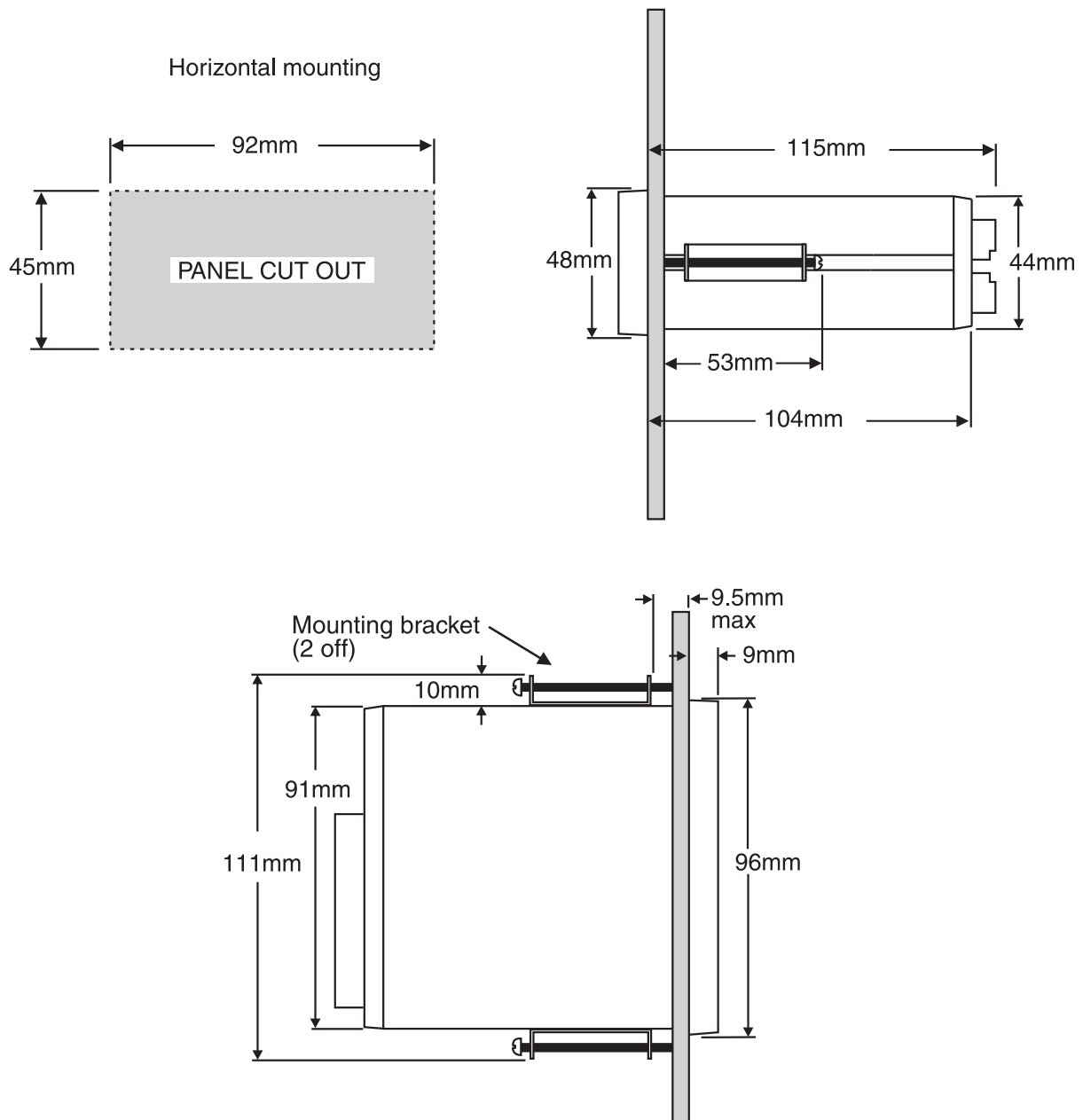
1.2 Basic setup

1. See chapter 5, page 8 for details of accessing and changing functions then follow the procedure for “Entering **CAL** Mode”.
2. Go to the **dCPE** function and select the decimal point position for the required display resolution.
3. Go to the **rtd** function and select the sensor type required.
4. Go to the **DEGTYPE** function and select the temperature display required.
5. Exit the setup functions by pressing and releasing the **F** button until the **FUNC End** message is seen.
6. Connect the sensor to the rear terminals terminals, refer to chapter 3.
7. Check the temperature reading then if necessary calibrate the display using the method described in section 5.8.
8. Check that the display is responding correctly to changes in temperature then consult the setup functions relevant to the operating mode chosen and make any further changes required to these functions.

2 Mechanical Installation

Choose a mounting position as far away as possible from sources of electrical noise such as motors, generators, fluorescent lights, high voltage cables/bus bars etc. An IP65 access cover which may be installed on the panel and surrounds is available as an option to be used when mounting the instrument in damp/dusty positions. A wall mount case is available, as an option, for situations in which panel mounting is either not available or not appropriate. A portable carry case is also available, as an option, for panel mount instruments.

Prepare a panel cut out of 45mm x 92mm +1 mm / - 0 mm (see diagram below). Insert the instrument into the cut out from the front of the panel. From the rear of the instrument fit the two mounting brackets into the recess provided (see diagram below). Whilst holding the bracket in place, tighten the securing screws being careful not to over-tighten, as this may damage the instrument. Hint: use the elastic band provided to hold the mounting bracket in place whilst tightening securing screws.



3 Electrical installation

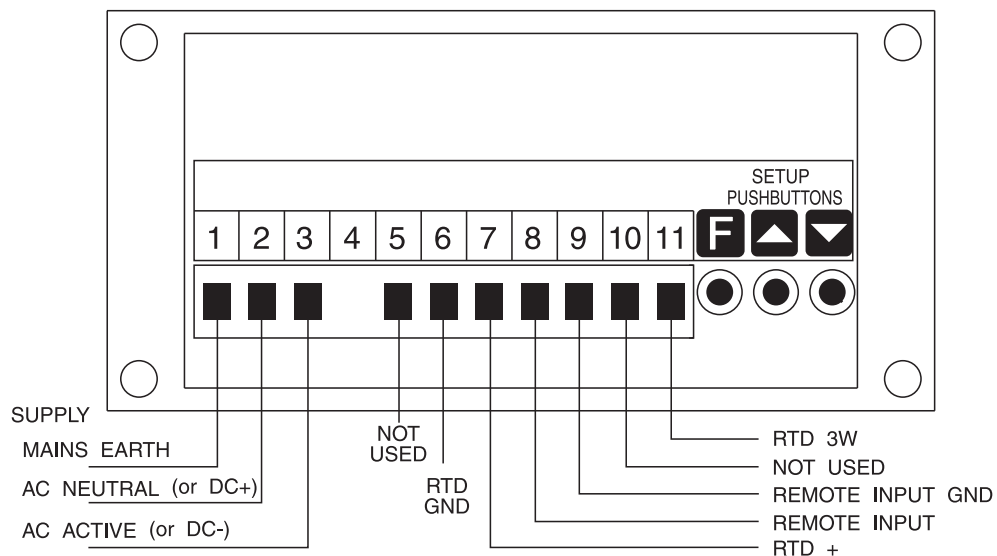
3.1 Electrical installation

The PM6-RT Panel Meter is designed for continuous operation and no power switch is fitted to the unit. It is recommended that an external switch and fuse be provided to allow the unit to be removed for servicing. Power supply type is fixed and factory configured.

The plug in, screw type, terminal blocks allow for wires of up to 2.5mm² to be fitted. Connect the wires to the appropriate terminals as indicated below. Refer to connection details provided in this chapter to confirm proper selection of voltage, polarity and input type before applying power to the instrument.

When power is applied the instrument will cycle through a display sequence indicating the software version and other status information, this indicates that the instrument is functioning. Acknowledgement of correct operation may be obtained by applying an appropriate input to the instrument and observing the reading. The use of screened cable is recommended for signal inputs.

3.2 PM6 rear panel

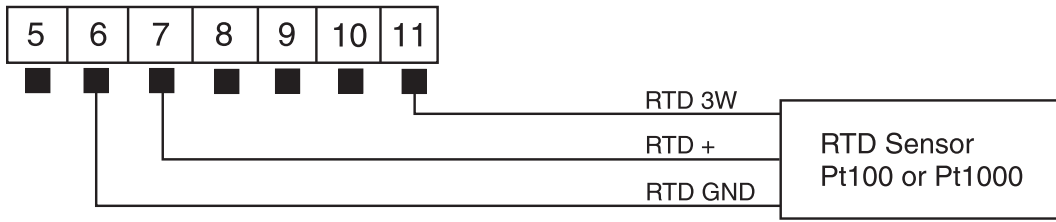


Instrument label example

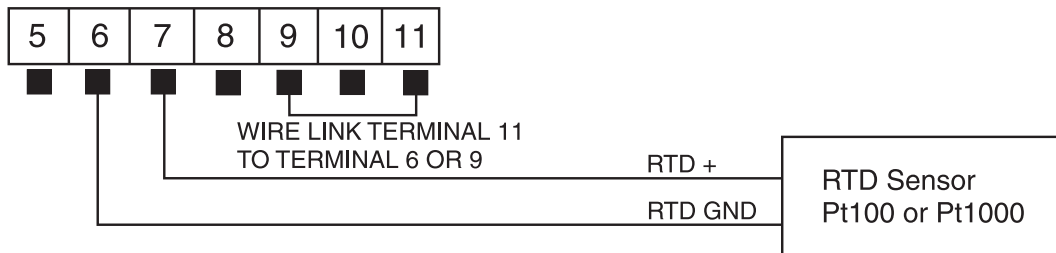
1	MAINS EARTH	
2	240 VAC NEUTRAL	
3	240 VAC ACTIVE	
5	RTD COMMON	
6	RTD INPUT	
7	REMOTE INPUT	
8	GROUND	
9		
10		
11	RTD 3W	
PM6-RT-240-4E		SERIAL No : XXXXX-XXX

3.3 PM6 connection examples

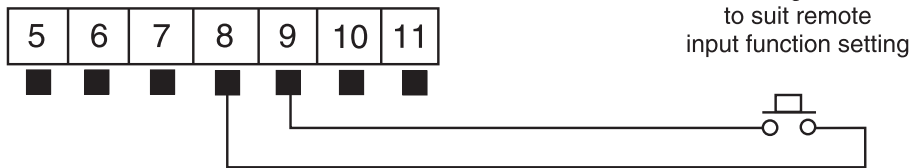
Ex 1. Three wire RTD



Ex 2. Two wire RTD



Ex 3. Remote input wiring



4 Function tables - summary of setup functions

Functions in this first table are available in **FUNC** or **CAL** mode

Display	Function	Range	Default	Your record	Ref/Page
drnd	Display rounding	1 to 5000	1		5.1 / 9
FLtr	Digital filter	0 to 8	2		5.2 / 9
brgt	Display brightness level	1 to 15	15		5.3 / 10
dull	Display remote brightness switching	0 to 15	1		5.4 / 10

Functions in this second table are available in **CAL** mode only

Display	Function	Range	Default	Your record	Ref/Page
dCpt	Decimal point	0, 0.1 etc.	0		5.5 / 10
rtD tYPE	RTD sensor type	100 or 1000	100		5.6 / 11
DEg tYPE	Temperature units	°C, °F or AbS	°C		5.7 / 11
CAL DEg	Temperature calibration	Any temperature within sensor range	n/a		5.8 / 11
r.I NP	Remote input function	NONE, P.HLd, d.HLd, Hi, Lo or dull	NONE		5.9 / 12
Lo di SP	Low overrange visual warning limit value	Any display value or OFF	OFF		5.10 / 12
Hi GH di SP	High overrange visual warning limit value	Any display value or OFF	OFF		5.11 / 13
di SP	Display visual warning flashing mode	FLASH or -or-	FLASH		5.12 / 13
ACCS	Access mode	OFF, NONE or ALL	OFF		5.13 / 13
UCAL	Uncalibrate	n/a	n/a		5.14 / 14

5 Explanation of functions

The PM6 setup and calibration/scaling functions are configured through a push button sequence. The three push buttons located at the rear of the instrument are used to alter settings. Two basic access modes are available:

FUNC mode (simple push button sequence) allows access to common set up functions such as display brightness.

CAL mode (power up sequence plus push button sequence) allows access to all functions including calibration/scaling parameters.

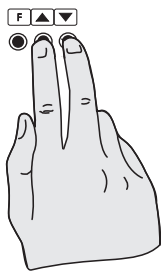
Entering **CAL** Mode



1. Remove power from the instrument. Hold in the **F** button and reapply power. The display will briefly indicate **CAL** as part of the "wake up messages" when the **CAL** message is seen you can release the button. Move to step 2 below.



2. When the "wake up" messages have finished and the display has settled down to its normal reading press, then release the **F** button. Move to step 3 below.



3. Within 2 seconds of releasing the **F** button press, then release the **▲** and **▼** buttons together. The display will now indicate **FUNC** followed by the first function.

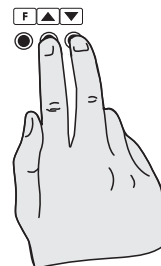
Note: If step 1 above has been completed then the instrument will remain in this **CAL** mode state until power is removed. i.e. there is no need to repeat step 1 when accessing function unless power has been removed.

Entering **FUNC** Mode

No special power up procedure is required to enter **FUNC** mode.



1. When the "wake up" messages have finished and the display has settled down to its normal reading press, then release the **F** button.

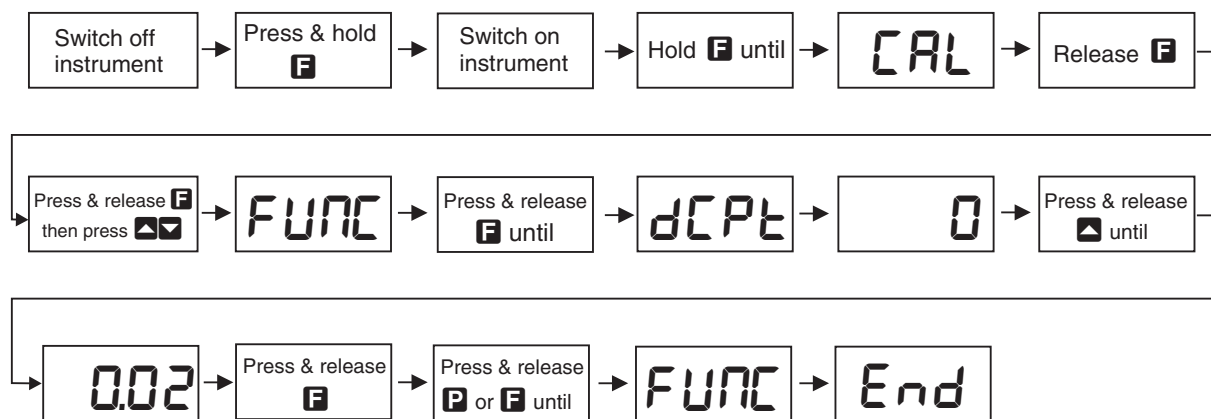


2. Within 2 seconds of releasing the **F** button press, then release the **▲** and **▼** buttons together. The display will now indicate **FUNC** followed by the first function.

Once **CAL** or **FUNC** mode has been entered and the first function is displayed step through the functions by pressing and releasing the **F** push button until the required function is reached. For most setup functions the function name is displayed followed by the function setting and the function name will then flash briefly once every 8 seconds as a reminder of the function being

viewed. Changes to functions are made by pressing the ▲ or ▼ push button (in some cases both simultaneously) when the required function is reached. When the required function has been changed continue pressing and releasing the F button until the FUNC End message is seen and the display returns to normal measurement display. Changes to function settings will not be saved into memory unless either the FUNC End message is reached or if the panel meter has automatically reverted back to normal measurement display. The display will automatically revert back to normal display approximately 5 minutes after CAL or FUNC mode entry. See the flow chart example of changing a function below.

Example: Entering CAL mode to change decimal point function dCpT from 0 to 0.02



Explanation of Functions

5.1 Display rounding

Display: **drnd**
 Range: **1 to 5000**
 Default Value: **1**

Displays and sets the display rounding value. This value may be set to 1 - 5000 displayed units. Display rounding is useful for reducing the instrument resolution without loss of accuracy in applications where it is undesirable to display to a fine tolerance. To set the display rounding value go to the **drnd** function and use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

Example:

If set to **10** the display values will change in multiples of 10 only i.e. display moves from **10** to **20** to **30** etc.

5.2 Digital filter

Display: **FtEr**
 Range: **0 to 8**
 Default Value: **2**

Displays and sets the digital filter value. Digital filtering uses a weighted average method of determining the display value and is used for reducing display value variation due to short term

interference. The digital filter range is selectable from **0** to **8**, where **0** = none and **8** = most filtering. Use **▲** or **▼** at the **FLTR** function to alter the filter level if required. Note that the higher the filter setting the longer the display may take to reach its final value when the input is changed, similarly the relay operation and any output options will be slowed down when the filter setting is increased. To set the digital filter value go to the **FLTR** function and use the **▲** or **▼** push buttons to set the required value then press **F** to accept this selection.

5.3 Display brightness

Display: **br9t**
Range: **1** to **15**
Default Value: **15**

Displays and sets the digital display brightness. The display brightness is selectable from **1** to **15**, where **1** = lowest intensity and **15** = highest intensity. This function is useful for improving the display readability in dark areas or to reduce the power consumption of the instrument. See also the **dULL** function 5.4. To set brightness level go to the **br9t** function and use the **▲** or **▼** push buttons to set the value required then press **F** to accept this value.

5.4 Display remote brightness switching

Display: **dULL**
Range: **0** to **15**
Default Value: **1**

Displays and sets the level for remote input brightness switching, see **r:NP** function. When a remote input is set to **dULL** the remote input can be used to switch between the display brightness level set by the **br9t** function 5.3 and the display brightness set by the **dULL** function. The display dull level is selectable from **0** to **15**, where **0** = lowest intensity and **15** = highest intensity. This function is useful in reducing glare when the display needs to be viewed in both light and dark ambient light levels. To set dull level go to the **dULL** function and use the **▲** or **▼** push buttons to set the value required then press **F** to accept this value.

Example:

With **dULL** set to **4** and **br9t** set to **15** and the **r:NP** function set to **dULL** the display brightness will change from the **15** level to **4** when a switch connected to the remote input terminals is activated.

5.5 Decimal point

Display: **dCPt**
Range: **0**, **0.1** etc.
Default Value: **0**

Displays and sets the decimal point. By pressing the **▲** or **▼** pushbutton at the **dCPt** function the decimal point position may be set. The display will indicate as follows: **0** (no decimal point), **0.1** (1 decimal place), **0.02** (2 decimal places) or **0.003** (3 decimal places). Note if the decimal point is altered the display will need to be recalibrated.

5.6 RTD sensor type

Display: **RTD TYPE**
Range: **100** or **1000**
Default Value: **100**

Displays and sets the RTD type being used, set to **100** if a Pt100 RTD is being used or select **1000** if a Pt1000 RTD is being used.

5.7 Temperature units

Display: **TEMP TYPE**
Range: **°C**, **°F** or **ABS**
Default Value: **°C**

Displays and sets the temperature measurement type being used, set to **°C** for Celsius temperature display or select **°F** for Fahrenheit temperature display **ABS** for Kelvin (Absolute) temperature display.

5.8 Temperature calibration

Display: **CAL TEMP**
Range: Any temperature within sensor range
Default Value: n/a

This function is used to calibrate the temperature display and is only required if an error in the temperature reading is seen. A single point temperature input is required and the temperature probe must be at a known temperature. The calibration procedure is as follows:

1. Place the temperature sensor in a position at which the temperature is known and allow the sensor time to respond.
2. Go to the **CAL TEMP** function and press the **▲** and **▼** simultaneously.
3. The display should show a temperature reading. Watch the reading and wait until it stabilises.
4. When the temperature is stable press the **F** button. The display should show the message **TEMP** followed by a temperature reading.
5. Use the **▲** or **▼** button to make the value displayed the same as the known temperature value.
6. Press the **F** button to store the new calibration, the message **TEMP End** should be seen if the new calibration has been accepted.

5.9 Remote input function

Display: **F.I NP**
Range: **NONE, P.HLd, d.HLd, H, Lo** or **dULL**
Default Value: **NONE**

Remote input function - terminals 8 and 9 at the rear of the instrument are the remote input terminals. When these terminals are short circuited via a switch, relay, keyswitch etc. the instrument will perform the selected remote input function. A message will flash to indicate which function has been selected when the remote input pins are short circuited. The remote input functions are as follows:

- **NONE** - no remote function required i.e. activating the remote input has no effect.
- **P.HLd** - peak hold. The display will show the peak value (highest positive value) only whilst the remote input terminals are short circuited i.e. the display value can rise but not fall whilst the input terminals are short circuited. The message **P.HLd** will appear briefly every 8 seconds whilst the input terminals are short circuited to indicate that the peak hold function is active.
- **d.HLd** - display hold. The display value will be held whilst the remote input terminals are short circuited. The message **d.HLd** will appear briefly every 8 seconds whilst the input terminals are short circuited to indicate that the display hold function is active.
- **H** - peak memory. The peak value stored in memory will be displayed if the remote input terminals are short circuited, if the short circuit is momentary then the display will indicate the peak memory value then return to normal measurement after 30 seconds. To reset the memory hold the remote input closed for 2 to 3 seconds or remove power from the instrument. The message **P H** will appear briefly every 8 seconds whilst the input terminals are short circuited to indicate that the peak memory function is active.
- **Lo** - valley memory. The minimum value stored in memory will be displayed. The message **P Lo** will appear briefly every 8 seconds whilst the input terminals are short circuited to indicate that the peak memory function is active. Otherwise operates in the same manner as the **H** function described above.
- **dULL** - display brightness control. The remote input can be used to change the display brightness. When this mode is selected the display brightness can be switched, via the remote input terminals, between the brightness level set at the **brgt** function and the brightness level set at the **dULL** function.

5.10 Low overrange visual warning limit value

Display: **Lo d! SP**
Range: Any display value or **OFF**
Default Value: **OFF**

Low overrange limit value - the display can be set to show an overrange message if the display value falls below the **Lo d! SP** setting. For example if **Lo d! SP** is set to **50** then once the display reading falls below **50** the message **-or-** will flash on and off or the display value will flash on and off instead of the normal display units (see **d! SP** function 5.12). This message can

be used to alert operators to the presence of an input which is below the low limit. If this function is not required it should be set to **OFF** by pressing the **▲** and **▼** buttons simultaneously at this function.

5.11 High overrange visual warning limit value

Display: **HI 9H d: SP**
Range: Any display value or **OFF**
Default Value: **OFF**

High overrange limit value - the display can be set to show an overrange message if the display value rises above the **HI 9H d: SP** setting. For example if **HI 9H d: SP** is set to **1000** then once the display reading rises above **1000** the message **-or-** will flash on and off or the display value will flash on and off instead of the normal display units (see **d: SP** function 5.12). This message can be used to alert operators to the presence of an input which is above the high limit. If this function is not required it should be set to **OFF** by pressing the **▲** and **▼** buttons simultaneously at this function.

5.12 Display visual warning flashing mode

Display: **d: SP**
Range: **FLSH** or **-or-**
Default Value: **FLSH**

Display overrange warning flashing mode - this function is used in conjunction with the **Lo d: SP** and **HI 9H d: SP** functions. The **d: SP** function can be set to **FLSH** or **-or-**. If the display warning value set at the **Lo d: SP** or **HI 9H d: SP** function is exceeded and the **d: SP** function is set to **FLSH** then the display value will flash on and off every second as a visual warning. If the display warning value set at the **Lo d: SP** or **HI 9H d: SP** function is exceeded and the **d: SP** function is set to **-or-** then the **-or-** message will flash on and off once a second as a visual warning. The warning flashes will cease and the normal display value will be seen when the value displayed is higher than the low limit and lower than the high limit.

5.13 Access mode

Display: **ACCS**
Range: **OFF**, **NONE** or **ALL**
Default Value: **OFF**

Access mode - the access mode function **ACCS** has three possible settings namely **OFF**, **NONE** and **ALL**. If set to **OFF** the function has no effect. If set to **NONE** there will be no access to any functions via **FUNC** mode, entry via **CAL** mode must be made to gain access to functions. If set to **ALL** then access to all functions, including calibration functions, can be gained via **FUNC** mode.

5.14 Uncalibrate

Display: **UCAL**
Range: n/a
Default Value: n/a

Uncalibrate, resets calibration - required only when a calibration problem occurs and it is necessary to clear the calibration memory. At the **UCAL** function press the **▲** and **▼** buttons simultaneously. The message **CAL CLR** should be seen to indicate that the calibration memory has been cleared.

5.15 Error messages

Unstable display - if the display is not stable the usual cause is either that the input signal is unstable or that the calibration scaling was incorrectly attempted. If the calibration scaling was unsuccessful then uncalibrating the display at the **UCAL** function should return the display to stable readings but the previous calibration scaling values will be lost. If the display is still not stable after uncalibrating then check the input for stability and noise.

Display shows “- - - -” - this message indicates that the input signal is higher than normal for the sensor selected. Check sensor resistance Pt1000 measures 1000Ω at 0°C Pt100 measures 100Ω at 0°C

Display shows “999.9 Err” - this message may be seen during calibration and indicates that the input resistance from the sensor is too far away from the calibration value. i.e. there is a large difference between input and the scale value entered. Check the sensor and wiring to the sensor Pt1000 measures 1000Ω at 0°C Pt100 measures 100Ω at 0°C.

Display shows “-or-” - this message indicates either that the temperature value is too big to display e.g. above **9999** or **999.9** etc. or that the **di SP** function has been set to **-or-** and either the **Lo di SP** or **Hi 9H di SP** limits have been exceeded.

Display value flashes on and off - this indicates that **di SP** function has been set to **FLASH** and either the **Lo di SP** or **Hi 9H di SP** limits have been exceeded.

Display shows NO ACC - this indicates that the **ACCS** function has been set to **NONE** blocking entry to **FUNC** mode. Enter functions via **CAL** mode to gain entry to functions and if required change the **ACCS** function setting.

6 Specifications

6.1 Technical specifications

Input type:	2 or 3 wire Pt100 or Pt1000 RTD temperature sensor selectable via pushbutton function setting Input is isolated from power supply.
ADC resolution:	15 bit plus sign
Decimal points:	Programmable 0, 1, 2 or 3 decimal point places
Accuracy:	0.1% of full scale when calibrated $\pm 50\text{ppm}/^\circ\text{C}$, ± 1 display digit
Sample Rate:	2 samples per second
Display update:	2 times per second
Ambient temperature:	-10 to 50° C
Humidity:	5 to 95% non condensing
Display:	4 digit 20mm,
Power supply:	AC 240V, 110V or 24V or DC isolated wide range 12 to 48VDC Note: supply type is factory configured
Power usage:	AC supply 2VA DC supply typically 35mA @ 24VDC or 70mA @ 12VDC

6.2 Physical Characteristics

Bezel Size:	DIN 48mm x 96mm x 9mm
Case Size:	44mm x 91mm x 120mm behind face of panel
Panel Cut Out:	45mm x 92mm +1mm/-0mm
Connections:	Plug in screw terminals (max. 2.5mm ² wire)
Weight:	400 gms (AC supply model) or 300gms (DC supply model)

7 Guarantee and service

The product supplied with this manual is guaranteed against faulty workmanship for a period of 2 years from the date of dispatch.

Our obligation assumed under this guarantee is limited to the replacement of parts which, by our examination, are proved to be defective and have not been misused, carelessly handled, defaced or damaged due to incorrect installation. This guarantee is VOID where the unit has been opened, tampered with or if repairs have been made or attempted by anyone except an authorised representative of the manufacturing company.

Products for attention under guarantee (unless otherwise agreed) must be returned to the manufacturer freight paid and, if accepted for free repair, will be returned to the customers address in Australia free of charge.

When returning the product for service or repair a full description of the fault and the mode of operation used when the product failed must be given. In any event the manufacturer has no other obligation or liability beyond replacement or repair of this product.

Modifications may be made to any existing or future models of the unit as it may deem necessary without incurring any obligation to incorporate such modifications in units previously sold or to which this guarantee may relate.

This document is the property of the instrument and may not be reproduced in whole or part without the written consent of the manufacturer.

This product is designed and manufactured in Australia.