Model PM4-RX3
3 input, 3 wire RTD
Temperature Monitor/Controller
Operation and Instruction Manual

Table of Contents

1 Introduction

This manual contains information on the installation and operation of the PM4-RX3 Monitor. The PM4-RX3 is a purpose built temperature monitor. The instrument accept its input from three, 3 wire 100Ω RTD temperature sensors. Up to three alarm relays are provided. Relay 1 works independently, relays 2 and 3 will trip from the same alarm setpoints. The instrument may be calibrated to display the temperature in ^{o}C or ^{o}F with a resolution of 1°. A standard inbuilt relay provides an alarm/control function, relays 2 and 3 and an isolated DC transmitter supply are optional.

Unless otherwise specified at the time of order, your PM4 has been factory set to a standard configuration. Like all other PM4 series instruments the configuration and calibration is easily changed by the user. Initial changes may require dismantling the instrument to alter PCB links, other changes are made by push button functions.

Full electrical isolation between power supply, input voltage or current and retransmission output is provided by the PM4, thereby eliminating grounding and common voltage problems. This isolation feature makes the PM4 ideal for interfacing to computers, PLC's and other data acquisition devices

The PM4 series of Panel Mount Monitors are designed for high reliability in industrial applications. The high brightness LED display provides good visibility, even in areas with high ambient light levels.

2 Read this First

Your new PM4 monitor has been supplied factory configured (unless otherwise specified), as follows:

Input:	3 x 100Ω RTD (PT100)
Calibration:	-100 to 200°C
Relay 1 Low Setpoint:	Off
Relay 1 High Setpoint:	50
Relay 1 Status:	High Alarm
Relay 1 Hysteresis:	1
Relay 1 Trip Time:	0
Relay 1 Action:	N/O (ie, de-energised when no alarm)
Temperature Units:	oC
Digital Filter:	3 (range 0-8. ie, 0=min & 8=max)
	note: the digital filter for each input channel is individually programable.

2 .1 Options (when fitted)

Relay 2:	(same settings as Relay 1)
Relay 3:	(same settings as Relay 1)
Retransmission Type:	4 to 20mA standard (0-1V or 0-10V by link selection)
Retransmission Low:	0
Retransmission High:	100

2 .2 Input/output Configuration

If you need to the output configuration, proceed as follows:

Remove plug-in input terminal(s).
Unscrew 4 x 2g self tapping screws from back cover.
Remove back cover.
Loosen earth screw.
Slide out the printed circuit board.
Configure PCB links as shown in section "Hardware Configuration".
Slide printed circuit board back into the instrument case.
Make sure the earth screw is tightened.
Refit and secure back cover and plug-in terminals.

3   Mechanical Installation

If a choice of mounting sites is available then choose a site 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 fixes over the front of the instrument 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. Then 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.
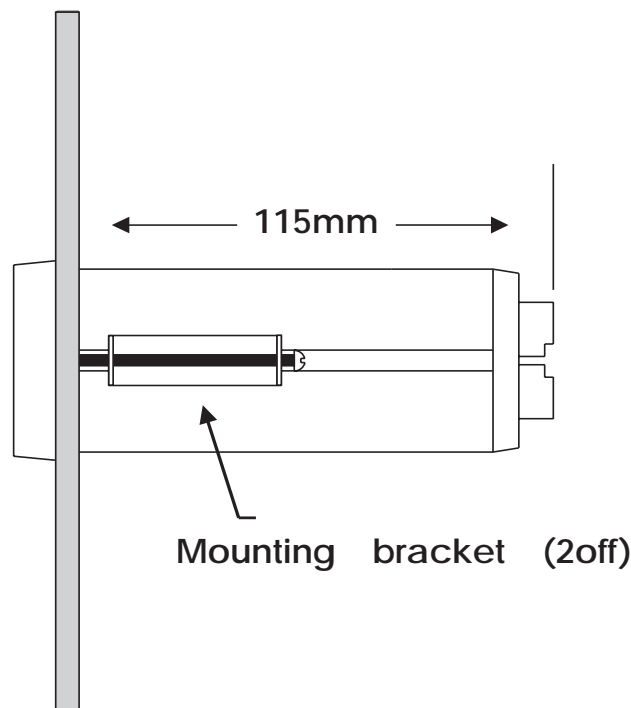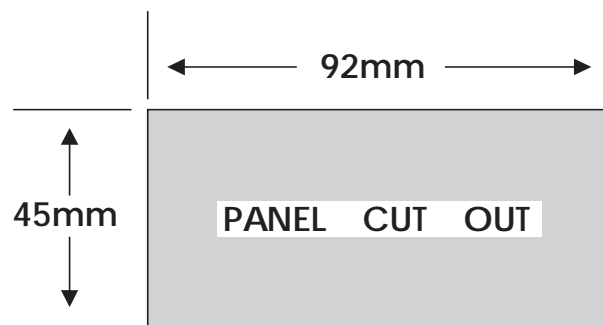
Side   view   of   mounting   panel

4   Electrical Installation

The PM4 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.

The terminal blocks allow for wires of up to 2.5mm^2 to be fitted. Connect the wires to the appropriate terminals as indicated below. Refer to other details provided in this manual 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. Acknowledgment of correct operation may be obtained by applying an appropriate input to the instrument and observing the resultant reading.
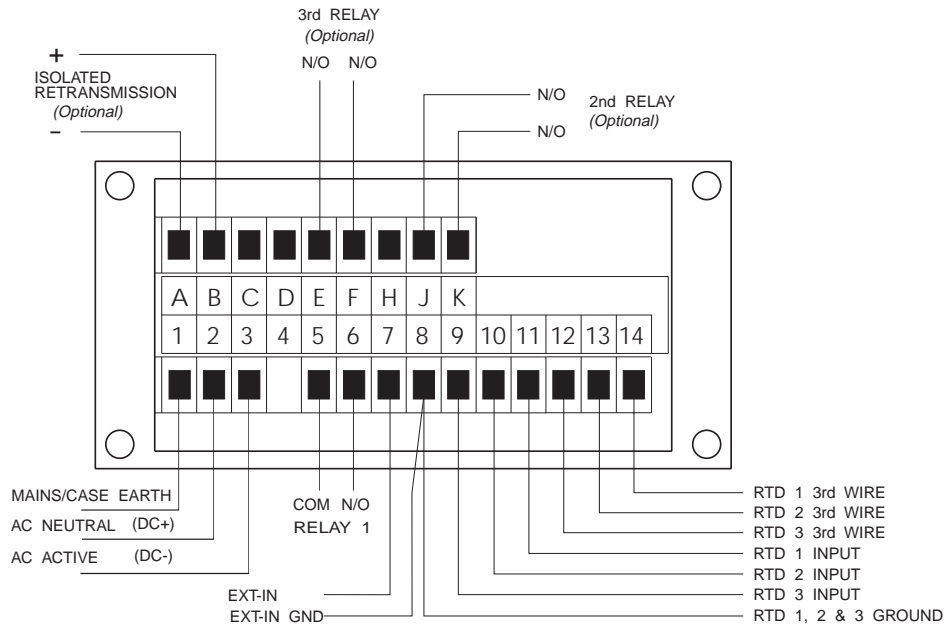
Instrument Rear Panel

1	MAINS EARTH		OPTIONAL OUTPUTS	
2	240VAC NEUTRAL			
3	240VAC ACTIVE		A	OUTPUT V/I	
4			B	OUTPUT V/I	
5	RELAY 1	COM	C		
6	RELAY 1	N/O	D		
7	EXT IN		E	RELAY 3	COM
8	GROUND/RTD COMMON		F	RELAY 3	N/O
9	RTD3 INPUT		H		
10	RTD2 INPUT		J	RELAY 2	COM
11	RTD1 INPUT		K	RELAY 2	N/O
12	RTD3 3RD WIRE		MODEL NO:		
13	RTD2 3RD WIRE		PM4-RX3-240-5E-RR		
14	RTD1 3RD WIRE				
			SERIAL No:		

Instrument Data Label (example)

5   Operation

The PM4-RX3 reads each of the inputs in turn, calculates the temperature from its internal 100Ω RTD tables and displays the highest of the three inputs as follows:

C
channel number

T
temperature
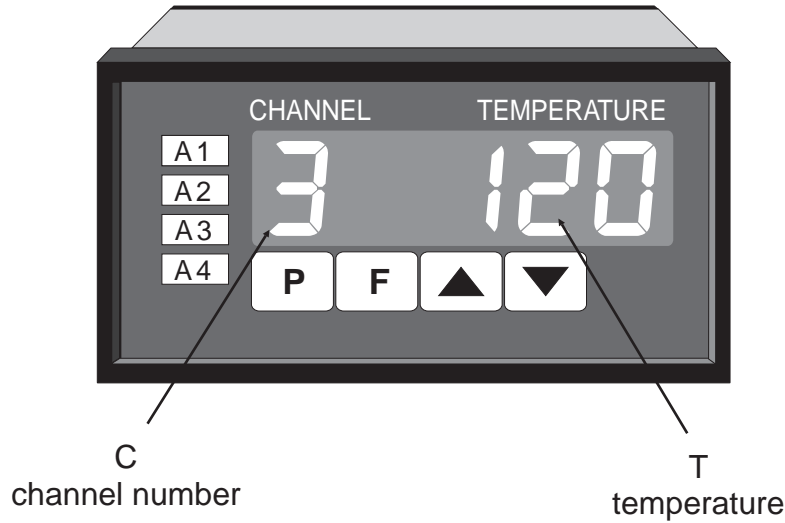
where: C is the channel number (1,2 or 3) and T is the temperature in °C or °F

The alarm relay settings are compared against the three inputs, alarm 1 works independently, alarm 2 and 3 operate from the same setpoint. The values are used to generate relay operation.

If alarm 1 trips relay 1 operates and the "ALM" light on the front panel will flash. The alarm 2 functions (**A2H**, etc.) apply to both relays 2 and 3. If alarm 2/3 trip then both relays 2 and 3 will operate and the "TRP" front panel light will flash. Once the alarm condition is removed the associated relay/relays will reset, the light will stop flashing but remain on (to indicate that an alarm condition was reached). To acknowledge the alarm and extinguish the light either close the external input via a switch contact or press the **F** button for 1 second. Relay 3 normally open/normally closed condition is independent from relay 2 and may be set within the **r3n.o**/**r3n.c** function.

The user may view each channel in turn by pressing the **P** button. After 30 seconds the display will return to the highest temperature reading.

6   Alarm Relays

The PM4 is provided with 1 alarm relay. An optional totally independent 2nd alarm relay may also be provided (up to 7 relays are available on selected models). These are designated **R 1** and **R2**. Each alarm has the following parameters which may be set by the user:

1. Low trip point, adjustable in measurement units.

2. High trip point, adjustable in measurement units.

3. Alarm hysteresis, adjustable in measurement units.

4. Alarm trip time, adjustable in seconds.

5. N/O or N/C relay operation

The alarm operates in the following way:

If the measured value is above the High Trip Point, or below the Low Trip Point, the alarm trip timer starts. This timer is reset if the measured value drops below the High Trip Point or above the Low Trip point. When the alarm trip timer's time exceeds the Trip delay time, the alarm is operated.

When the alarm has tripped, the measured value is compared to the High Set Point less the Hysteresis value and the Low Set Point plus the Hysteresis value. If it is less than the High Set Point less the Hysteresis value and greater than the Low Set Point plus the Hysteresis value, the alarm is reset.

6 .1   Alarm Low Setpoint

The low setpoint may be programmed to operate the alarm relay when the measured value falls below the set value. If the low setpoint is not required, it may be set to **OFF** in the setup mode by pressing, then releasing, ▲ and ▼ simultaneously. The instrument is configurable for each relay to have a low and a high setpoint, so the relay may be triggered if the reading deviates outside of the setpoint limits.

6 .2   Alarm High Setpoint

The high setpoint may be programmed to operate the alarm relay when the measured value exceeds the set value. If the high setpoint is not required, it may be set to **OFF** in the setup mode by pressing, then releasing, ▲ and ▼ simultaneously.

6 .3   Alarm Hysteresis

The hysteresis, or deadband, value is used to prevent too frequent operation of the alarm relay when the measured value stays close to the setpoint. The hysteresis value is common to the high and low relay action for each alarm.

Hysteresis Operation Examples:

If the alarm high setpoint is set to 100 and the alarm hysteresis is set to 10 then the alarm will trip when the display reading is above 100 and will not reset until the display reading falls below 90 (high setpoint minus the hysteresis value). Similarly if the alarm low setpoint is set to 50 and the alarm hysteresis is set to 10 then the alarm will trip when the display reading is below 50 and will not reset until the display value is above 60 (low setpoint plus hysteresis value.

6 .4   Alarm Relay N/O or N/C Operation

Each alarm may be programmed to operate as a normally open (N/O) or normally closed (N/C) device. A N/O relay is de-energised when no alarm condition is present and is energised when an alarm condition is present. A N/C relay is energised when no alarm condition is present and is de-energised when an alarm condition is present. The N/C mode is useful for power failure detection.

6 .5   Alarm Trip Time

The alarm trip time determines how long the measured value has to be above the high set point or below the low set point before the alarm relay is tripped. This can be used to prevent false alarms on noisy inputs. The value is set in seconds, with a range of 0 - 60 seconds. For normal operation a delay of three to five seconds is suitable.

6 .6   Switching Inductive Loads

       If the alarm relay is to be used to switch an inductive load, such as a solenoid, it is advisable to use a suppressor circuit either across the load or across the relay contacts. Switching inductive loads without a suppressor circuit can cause arcing at the relay contacts resulting in electrical interference and wear on the contacts. A typical suppressor circuit consists of a 100Ω resistor in series with a 0.1uF capacitor, this circuit is then placed across the load or relay contacts. Ensure that the resistor and capacitor are of sufficiently high rating to cope with the voltage and current encountered.

7   Output Options

The basic PM4 is provided with a single alarm relay output. Optional outputs may be provided as follows:

7 .1   Additional Alarm Relays

The 2nd alarm relay has the same programmable functions and specifications as the 1st (standard) alarm relay (note up to 6 extra relays are available for some models). The programming messages are automatically updated to include settings for the additional relay(s).

7 .2   Analog Retransmission

The isolated analog retransmission output may be user configured to give an output of 4-20mA, 0-1V or 0-10V without the need to recalibrate the instrument. Other output ranges may be provided (consult sections on hardware configuration). The output limits may be programmed to correspond to any points within the measuring range of the instrument. See rEC and rEC functions in the "Explanation of Functions" chapter for a description of setting up retransmission.

7 .3   DC Voltage Output

An isolated DC voltage output is available to power external transducers etc. The standard output is ±12V (24V), the output may be changed to a ±5V(10V) by a PCB link selector.
 Note: where a 24V DC output is required connect between +12V and -12V (+5V and -5V for 10V outputs).

7 .4   RS232/RS485 Output

An RS232 or RS485 output is available with selectable parameters such as baud rate (300 to 9600), parity (none, even or odd) , number of data bits, alpha character select etc. Setup instructions for RS232/RS485 operation will be given either in a manual appendix or a manual addendum if this option is fitted.

Note: When this option is supplied the analog output is not available.

8　　Explanation of Functions

The PM4 setup and calibration functions are configured through a pushbutton sequence, as explained in "Setting up the instrument" and "Calibration". Two levels of access are provided for setting up and calibrating - level 1 (simple pushbutton sequence) allows access to commonly set up functions, level 2 (power up sequence plus pushbutton sequence) allows access to calibration parameters. Note: certain functions relating to the optional retransmission output limits are only displayed when the retransmission option is fitted. Changes to the setpoints and other functions are made by pressing the ▲ and ▼ pushbuttons. Below is a brief description of each function.

Set up functions (see also chapter titled "Setting up the instrument").

To enter the set up mode, a simple pushbutton sequence is necessary (this prevents accidental alteration of settings). First press the **F** button and then (within 2 seconds) press both the ▲ and ▼ pushbuttons simultaneously. The display will now read $FunC$ thereby indicating that you have entered the Function Setup Mode. Each function may be accessed by pressing the **F** pushbutton to step through the functions as indicated below. Note: The **P** button may be used to exit the function mode at any time and will abort the function currently displayed without accepting any changes to that function. This is useful for quickly exiting the function mode and as a means preventing accidental or unwanted changes to the functions.

Note : The relay functions described in this chapter refer to instruments with up to 2 relay outputs - when 3 relays are supplied the third relay operates from alarm 2 setpoints.

A1Lo (alarm 1 low setpoint).

Displays and sets the alarm 1 low setpoint value. The low alarm setpoint may be disabled by pressing the ▲ and ▼ pushbuttons simultaneously. When the alarm is disabled the display will indicate **OFF**. Alarm 1 will trip when the displayed value is lower than the **A1Lo** setpoint value.

A1Hi (alarm 1 high setpoint).

Displays and sets the alarm 1 high setpoint value. The high alarm setpoint may be disabled by pressing the ▲ and ▼ pushbuttons simultaneously. When the alarm is disabled the display will indicate **OFF**. Alarm 1 will trip when the displayed value is higher than the **A1Hi** setpoint value.

A2Lo (alarm 2 low setpoint).

Displays and sets the alarm 2 (and 3) low setpoint value. The low alarm setpoint may be disabled by pressing the ▲ and ▼ pushbuttons simultaneously. When the alarm is disabled the display will indicate **OFF**. Alarm 2 and 3 will trip when the displayed value is lower than the **A2Lo** setpoint value.

A2Hi (alarm 2 high setpoint).

Displays and sets the alarm 2 (and 3) high setpoint value. The high alarm setpoint may be disabled by pressing the ▲ and ▼ pushbuttons simultaneously. When the alarm is disabled the display will indicate **OFF**. Alarm 2 and 3 will trip when the displayed value is higher than the **A2Hi** setpoint value.

A1HY (alarm 1 hysteresis [deadband]).

Displays and sets the alarm 1 hysteresis limit and is common for both high and low setpoint values. In the high alarm mode once the alarm is tripped the input must fall below the setpoint value minus the hysteresis value to reset the alarm. In the low alarm mode once the alarm is tripped the input must rise above the setpoint value plus the hysteresis value to reset the alarm. The hysteresis units are expressed in displayed engineering units.

A2HY (alarm 2 hysteresis [deadband])

Displays and sets the alarm 2 (and 3) hysteresis limit (other details as per **A1HY**).

A1tt (alarm 1 trip time).

Displays and sets the alarm 1 trip time and is common for both alarm 1 high and low setpoint values. The trip time is the delay before the alarm will trip. The alarm condition must be present continuously for the trip time period before the alarm will trip. This function is useful for preventing an alarm trip due to short non critical deviations from setpoint. The trip time is selectable over 0 to 60 seconds.

A2tt (alarm 2 trip time).

Displays and sets the alarm 2 (and 3) trip time (other details as per **A1tt**).

R1n.o or **R1n.c** (alarm 1 normally open or normally closed)

Displays and sets the alarm relay 1 action to normally open (de-energised) or normally closed (energised), when no alarm condition is present.

r2n.o or **r2n.c** (alarm 2 normally open or normally closed)

Displays and sets the alarm relay 2 action to normally open (de-energised) or normally closed (energised), when no alarm condition is present.

r3n.o or **r3n.c** (alarm 3 normally open or normally closed)

Displays and sets the alarm relay 3 action to normally open (de-energised) or normally closed (energised), when no alarm condition is present.

unit (display units °C or °F)

Displays and sets the display temperature units. Select °C or °F

rEC- (recorder/retransmission output low value)

Displays and sets the analog retransmission (4 to 20mA, 0-1V or 0-10V) output low value (4mA or 0V) in displayed engineering units.

rEC¯ (recorder/retransmission output high value).

Displays and sets the analog retransmission (4 to 20mA, 0-1V or 0-10V) output high value (20mA, 1V or 10V) in displayed engineering units.

Note: the digital filter and temperature calibration are independently programmable for each input channel - press the **P** button to select input 1,2 or 3 prior to entering the function mode to effect changes to each channel.

FLtr (digital filter)

Displays and sets the digital filter value. Digital filtering is used for reducing susceptibility to short term interference. The digital filter range is selectable from 0 to 8, where 0 = none and 8 = most filtering. A typical value for the digital filter would be 3.

Calibration functions (see also chapter titled "Calibration").

To enter this mode a special "power up procedure must be followed" this procedure prevents accidental alteration of calibration and provides a degree of calibration security.

First, turn off the instrument power.

Then press and hold the **F** button whilst applying power to the instrument. The instrument will momentarily show **CAL** in the wake up message to let you know that the calibration level of the function mode is now accessible.
To enter into the calibration mode, you must now enter the function set up mode as described earlier in this chapter "entering the set up mode" and step through the functions until the display indicates **CAL**.

CAL1 (calibration temperature)

Displays the current temperature or simulated temperature for the single point scaling/calibration. See calibration chapter for full details of setting up.

SCL1 (scaling/calibration value)

When the calibration **CAL1** has stabilised a correction factor may be applied by entering a single point scale value **SCL1**

UCAL (uncalibration).

Used to set the instrument back to the factory calibration values. This function should only be used when calibration problems exist, and it is necessary to clear the calibration memory.

Note: Upon completion of calibration return the instrument to normal mode (to prevent tampering of settings) by turning off power to the instrument, waiting a few seconds then restoring power.

9   Setting up the Instrument

Setting up and calibrating the PM4 is extremely easy, since most functions are changed or viewed by pressing the pushbuttons. Note: some initial configuring may require dismantling the instrument to alter selection links (see sections on hardware configuration).

9.1   Step 1, Entering the Function Setup Mode

To enter the setup mode a simple pushbutton sequence is necessary (this prevents accidental alteration of settings). First press the **F** button and then (within 2 seconds) press both the **▲** and **▼** buttons simultaneously. The display will now read *FUNC* indicating that you have entered the Function Setup Mode.

9.2   Step 2, Stepping through the settings

The display of *FUNC* is followed by the first setup message *A1Lo* (Alarm 1 Low setting). As with all other messages the first display lets you know which parameter will be affected when changes are made. Each time the **F** button is pressed another setup parameter is displayed. After the last function the display returns to the normal process display.

9.3   Step 3, Making changes to the settings

Whilst still in the Function Setup Mode, press the **F** button until you reach the parameter you wish to change. Initially the display will indicate the particular function (e.g. *A1Hi*), this will be followed by a display showing the current status of that setting (e.g. *50.0*). The setting may now be changed by pressing the **▲** or **▼** pushbutton until the desired value is displayed. You may then proceed through the functions until you reach the next function that you wish to change or until you exit the function mode.

Note 1: Remember the alarm relays may be configured to have both a high and a low setting. If the relay is required to trip at only one point (e.g. *A1Hi* high alarm only) turn off the unwanted setpoint by selecting the unwanted setting (e.g. *A1Lo*) and press the **▲** and **▼** pushbuttons simultaneously. The display will now indicate *OFF* confirming that Alarm Relay 1 will only trip when the display value is higher than the setpoint value.

Note 2: Instruments with front panel pushbuttons have an additional button (**P** button). Pressing this button in the setup or calibrate mode exits the current function leaving it unchanged. This is useful for aborting a current function or a method of quickly exiting the function mode by stepping to the next function and then pressing the **P** button.

10   Function Table

Function table for fully optioned instrument			
Initial display	Meaning of display	Next display	Record Your Settings
A 1Lo	Alarm 1 Low Setpoint Value	Setpoint Value or OFF	
A 1H,	Alarm 1 High Setpoint Value	Setpoint Value or OFF	
A2Lo	Alarm 2 & 3 Low Setpoint Value	Setpoint Value or OFF	
A2H,	Alarm 2 & 3High Setpoint Value	Setpoint Value or OFF	
A 1HY	Alarm 1Hysteresis	Hysteresis Value in Measured Units	
A2HY	Alarm 2 & 3 Hysteresis	Hysteresis Value in Measured Units	
A 1tt	Alarm 1 Trip Time	No of Seconds before Relay 1 trips	
A2tt	Alarm 2 & 3 Trip Time	No of Seconds before Relay 2 trips	
A 1n.o or A 1n.c	Alarm 1 Action N/O or N/C	A 1n.o or A 1n.c	
r2n.o r2n.c	Relay 2 Action N/O or N/C	r2n.o or r2n.c	
r3n.o r3n.c	Relay 3 Action N/O or N/C	r3n.o or r3n.c	
rEC_	Recorder Output Low Limit	Value in Memory	
rEC⁻	Recorder Output High Limit	Value in Memory	
un,t	ºC or ºF Selection	ºC or ºF	
FLtr Channels 1,2 & 3	Digital Filter Range 0 to 8	0 to 8 (8=most filtering)	
CAL	Calibration	See section on calibration	
UCAL	Uncalibration	See section on calibration	

Note: Functions shown shaded on this table will be displayed, only when those particular options are fitted

11   Calibration

To enter the calibration mode a special "power up procedure" must be followed. This procedure prevents accidental alteration of calibration and provides a degree of calibration security.
Important note: Each input channel is independently calibrated - select the required input channel by pressing the **P** button until the left hand display digit indicates the desired channel number.

11 .1   Preparing to initialise

Turn off instrument Power.

11 .2   Initialising the calibration mode

Press and hold the **F** button whilst applying power to the instrument. The instrument will momentarily show **CAL** (during the wake up messages) to let you know that the calibration level of the function mode is now accessible.

11 .3   Entering the calibration mode

To enter the calibration mode, you must enter the function set up mode as described in chapter "Setting up the Instrument" and then step through the functions until the display indicates **CAL**.
 Note: as you step through the functions take care not to accidentally alter the settings of the various functions.

11 .4   Temperature calibration

Press the ▲ and ▼ buttons simultaneously to enter the single point calibration mode. The display will now indicate **CAL 1** (calibration point) followed by the "live" reading. Apply an input to the instrument from an accurate resistance source or alternatively place the temperature probe into an accurately known temperature environment (this value is not critical and should ideally be close to the normal measuring temperature of the instrument). When the reading has stabilised press the **F** button. The display will indicate **SCL 1** (scale 1) followed by the scale value in memory. Now press the ▲ or ▼ button to obtain the required scale (calibration) value. Press the **F** button the display will now read **CAL End** indicating that the calibration is complete. The display will return to the measure mode (with calibration access).

11 .5   Returning to the normal measure mode

When the calibration procedure has been completed it is advisable to return the instrument to the normal mode (where calibration functions cannot be tampered with). To return to the normal mode, turn off power to the instrument, wait a few seconds and then restore power.

12 Configuring the 3 relay output board

The optional output board is factory supplied with the necessary components for the output options required. No links are required for the selection of the 2nd and 3rd relay outputs. Links are provided for the selection of the analog retransmission output type.

Isolated analog retransmission (4-20mA, 0-1V or 0-10V)

PCB links are fitted to the circuit board to provide data to the microprocessor and to connect the electronic components for the correct output types. It may be necessary to alter the PCB links to change the analog output. (to dismantle the instrument, see section titled "input/output configuration).

Optional output circuit board
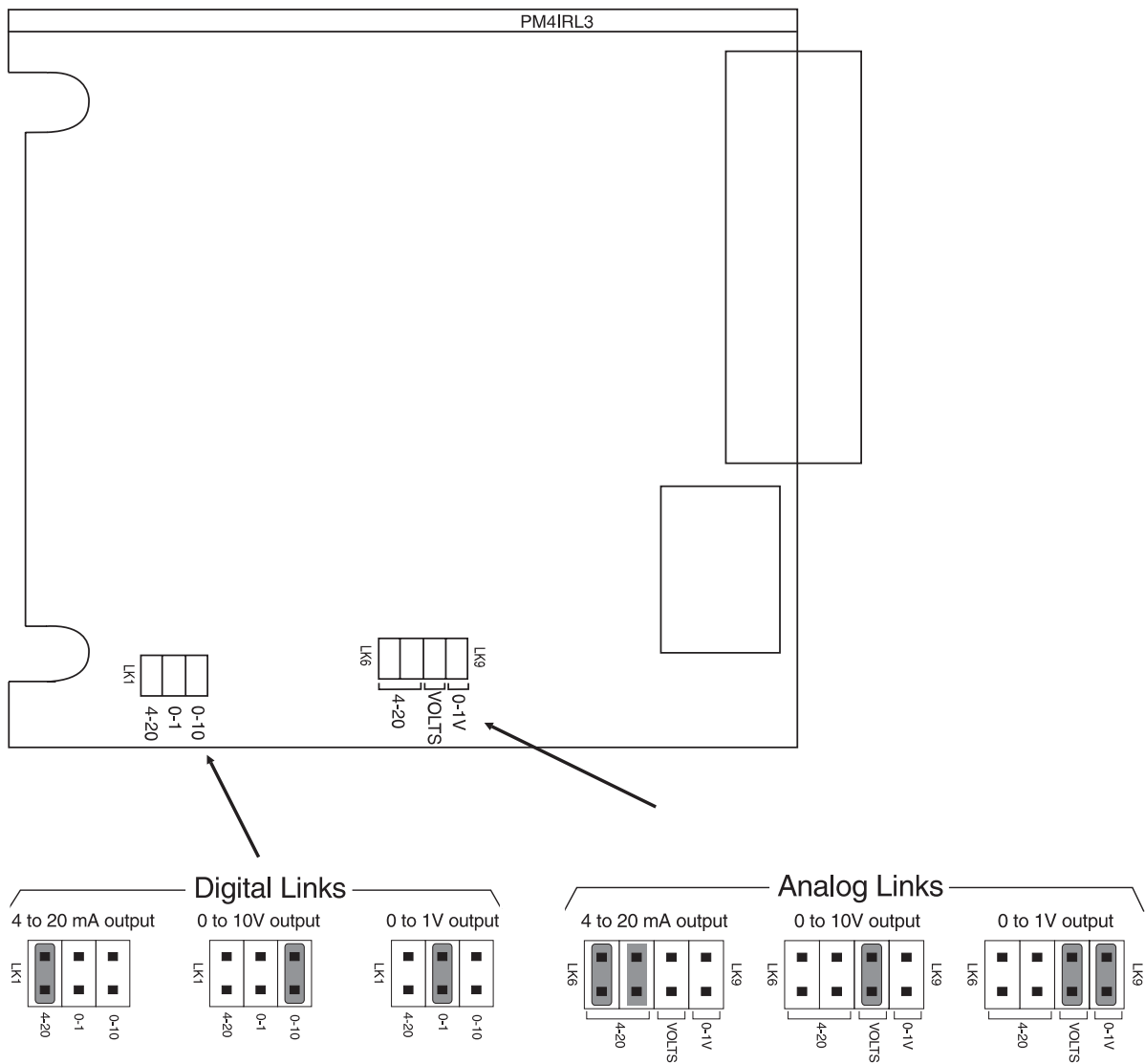
13   Specifications

13 .1   Technical Specifications

Input Sensor Types:	3 x 100Ω RTD
Operation:	Displays highest temperature. Alarm 1 operates independently, alarms 2 & 3 operate from the same setpoints.
Indication:	Left hand digit = channel number Right hand digits = temperature
Temperature Range:	-100 to 200°C
Display Resolution:	1°C
ADC Resolution:	1 in 1000
Accuracy:	0.2% of full scale
Sample Rate:	30 per sec (10 per sec each channel)
Conversion Method:	10 bit successive approximation, capacitive
Microprocessor:	MC68HC05C85 CMOS
Ambient Temperature:	-40 to 60_oC
Humidity:	5 to 95% non condensing
Display:	5 digit 14.2mm + status LEDs + 4 way keypad
Power Supply:	AC 240V,110V or 24V 50/60Hz DC 9 to 55V
Power Consumption:	AC supply 4 VA max, DC supply, (depends on options)
Output (standard):	1 x relay, Form, A rated 5A resistive
Relay Action:	Programmable N.O. or N.C.

13 .2   Output Options

2nd & 3rd Relay:	Same specs as Relay 1
Analog Retransmission:	4 to 20mA standard 0 to 1V and 0 to 10V link selectable
Serial Communications:	(not released)
DC Voltage Output:	Isolated ±12V(24V) or ±5V(10V) link selectable.

13 .3   Physical Characteristics

Bezel Size:	DIN 48mm x 96mm x 10mm
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 1.5mm wire)
Weight:	400 gms Basic model, 450 gms with option card

14   Guarantee and Service

The product supplied with this manual is guaranteed against faulty workmanship for a period of 12 months 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, damaged due to excessive 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 factory 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 must be given, and the mode of operation used when the product failed.

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.

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PM4RX3MAN1.2