Model PM5-TR
Ratemeter/Totaliser
Panel Mount Display/Controller
Operation and Instruction Manual

Table of Contents

1 Introduction

General description

This manual contains information for the installation and operation of the the PM5-TR Monitor. The instrument may be set to operate as a ratemeter or totaliser or allow toggling between rate and total displays. A "grand total" display is also viewable and can be separately reset. The **OPEr** function allows selection of one of these three modes. A brief description of each mode is given below. The "Explanation of functions" chapter details functions available for all modes, consult the separate function table for each mode to view the available functions for these modes.

The 5 digit display version has 4 annunciator LED's on the front panel. These LED's indicate which alarm is activated, not necessarily the relay activated. When in alarm condition the annunciator will flash. If the **F** button is pressed and the alarm is still in alarm condition the annunciator for that alarm will be solidly lit. The annunciator will extinguish only when outside of alarm condition. This applies even if the relay selected by the alarm has itself been acknowledged and reset.

Up to 8 alarms can be set and each alarm can be set to operate from either the rate or total value.

The three modes of operation relevant to this manual selectable at the **OPEr** function are:

1. **totL** - totaliser/counter display. The input pulses are totalised, scaled in engineering units and displayed e.g. Total litres, mm etc. Count up or count down is possible. A total and grand total may be viewed and reset separately. The grand total is a separate total memory which allows storage of all the previous totals. If a front **P** button is fitted this can be programmed to reset the total or set it to a preset. If no **P** button is fitted then remote input 1 or 2 can be programmed to force the display to reset or to go to the preset value.

2. **rAtE** - frequency/rate display. The frequency or rate of the input may be scaled in engineering units and displayed e.g. R.P.M., Bottles/min., Litres/hour etc.. For frequencies below 1kHz there is a choice of displaying rate, averaged rate or rolling average rate each of which are scaleable.

3. **both** - total/rate display (display may be toggled to either total or rate) This mode is primarily used when the display is required to toggle between a rate and total display via an external contact closure or via the front panel **▲** and **▼** buttons (only fitted on certain display options). A total and grand total may be viewed and reset separately.

Up/Down count totalising

The The **tOt dir** function can be used to select up (**UP**) or down (**doūn**) counting or input 2 can be used to control the down direction as described below.

Input 2 can be set to control whether the pulses on input 1 cause the total to increase or decrease. The **tOt dir** function must be set to **UP.dn** for this input to be used. Input 2 is configured by the **iN2** group of functions

Rate scaling methods

Three different methods are provided for scaling the rate display, the selection is made at the **USEr CAL** function. Refer to the individual functions in the "Explanation of Functions" chapter for further description.

1. **iNPt** - with this method values for **iNPt** and **SCL** are entered to provide the correct scaling. e.g. for a scaling in RPM with 100 pulses per revolution the **iNPt** function will be set to 100 and the **SCL** to 60.

2. **USEr** - with this method the user enters two frequencies via the pushbuttons and applies a scale value to each frequency. The **CAL IN 1** and **CAL SCL. 1** functions are used to set the first frequency and the **CAL IN2** and **CAL SCL.2** functions are used to set the second frequency. The display takes these two points as points in a straight line for calculating and displaying inputs above, between and below these two points. For example if it is required that for a zero Hz input the display should show 100 and at a frequency of 500Hz the display should show a frequency of 1000 then **CAL IN 1** would be set to 0, **CAL SCL. 1** would be set to 100 and **CAL IN2** would be set to 500 with **CAL SCL.2** set to 1000.

3. **LIVE** - using this method two live frequency inputs need to be applied and scale values are set for each input. The two frequencies are applied at the **CAL 1** and **CAL2** and a scale value **SCLE** value will be asked for at each input. When using this method a single point offset can also be applied to the scaling at the **OFSt** function.

1.1 Selecting and altering access levels

This subsection details the use "access levels". Access levels can be used to obtain easy access to functions which are regularly required and to limit access to functions which are not required or which restricted access is required. These access level settings can be ignored if no restrictions to access are required and no easy access to selected functions is required.

Each setup function has a default access level allocated to it, for example the relay 1 high alarm function **AL 1hi 9h** is allocated a default level of 2. There is a facility for the user to change the access levels for a limited number of functions to make them either easier to access or harder to access as required, see the **Fn. 1CodE** function.

There are different ways of accessing setup functions, these are explained in the following section. Each mode allows a selection of access levels i.e. allows some choice of which functions are accessible.

The access levels available are:

None - no access to functions
1 - access to functions allocated to level 1
2 - access to functions allocated to level 2
3 - access to functions allocated to level 3
4 - access to functions allocated to level 4
5 - access to functions allocated to level 5
6 - access to functions allocated to level 6
CAL - access to all normal operation functions

1.2 Accessing setup functions

The setup functions allow adjustment of the instruments operation functions. There are five different ways of accessing setup functions. Each mode allows a selection of access levels i.e. allows some choice of which functions are accessible.

As as summary the methods available are:

- **Easy mode** - this is the easiest access mode simply requiring the **F** button to be pressed for 3 seconds. This mode would normally be used to gain access to functions which require frequent adjustment.

- **Remote input mode** - this uses the Easy method of access but also requires the use of a remote input switch.

- **PIN 1 mode** - this method allows a PIN to be set with access via PIN entry.

- **PIN 2 mode** - this method also requires a PIN and would generally be use to allow a higher access level than the first PIN.

- **Super Cal mode** - this method requires a power up procedure and will allow access to all functions.

These modes are explained in more detail below.

- **Easy mode** - Allows access to the level set by the **EASY LEUL** function in the **ACCS** menu. By default the Easy access is set to **NONE** which blocks access to all setup functions. To allow access to functions using this method choose the access level required at the **EASY LEUL** function.
  The Easy mode simply requires that the **F** button is held pressed until the message **FUNC** is seen followed by the first function message, this should take approximately 3 seconds. If the message **FUNC End** or no response is seen at this point it means that the access level has been set to **NONE**. The default access for this level is **NONE** so the access level will need to be changed if access via this method is required.

Easy mode   P F ▲ ▼

Press and hold F for approx. 3 seconds
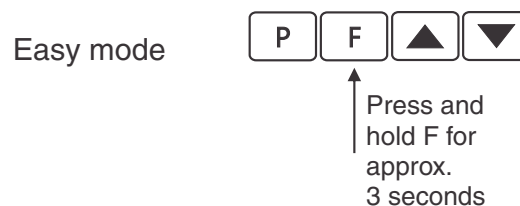
- **Remote input mode** - Allows access to the level set by the **r.I NP LEUL** function in the **ACCS** menu. By default the Remote input access is set to **CAL** level allowing access to all setup functions.
  The remote input mode uses the same access method as the Easy mode but also requires that one of the available remote inputs is set to **ACCS** and that the selected remote input is activated i.e. shorted to GND. The default access for this level is **NONE** so the access level will need to be changed if access via this method is required.

Remote input mode   P F ▲ ▼

Press and hold F for approx. 3 seconds

Also requires that the selected remote input is set to **ACCS** and is activated.
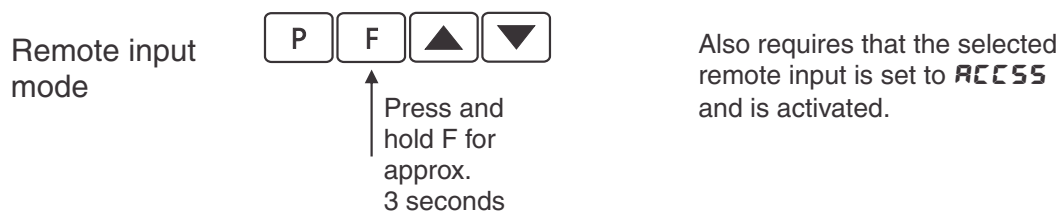
- **PIN 1 mode** - Allows access to the level set by the **USr.I LEUL** function in the **ACCS** menu.
  The PIN 1 mode requires the **F** button is pressed and released then within 2 seconds press the **▲** and **▼** buttons at the same time. The PIN can be set via the **USr.I P.n** function in the **ACCS** menu. A **USr.I LEUL** setting of **0** disables the PIN which means that there is no need to enter the PIN. If the **USr.I LEUL** function has been set to a number other than **NonE** then the first function seen when entering via PIN 1 mode will be the function

CodE. When this function is seen the PIN value set at the **USr.1 P.n** function must be entered via the ▲ or ▼ pushbuttons followed by pressing **F** to accept the PIN before the user can progress to the setup functions.

PIN 1
and
PIN 2
mode

| P | F | ▲ | ▼ |

Press and
release F then:

| P | F | ▲ | ▼ |

Press and
release Up
and Down
simultaneously

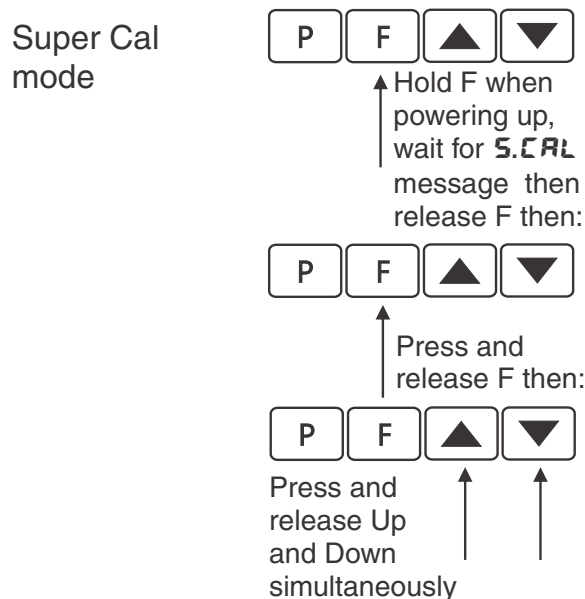If a PIN has been set the message **CodE** will be seen. Use ▲ or ▼ to enter the PIN then press **F** to accept the PIN.
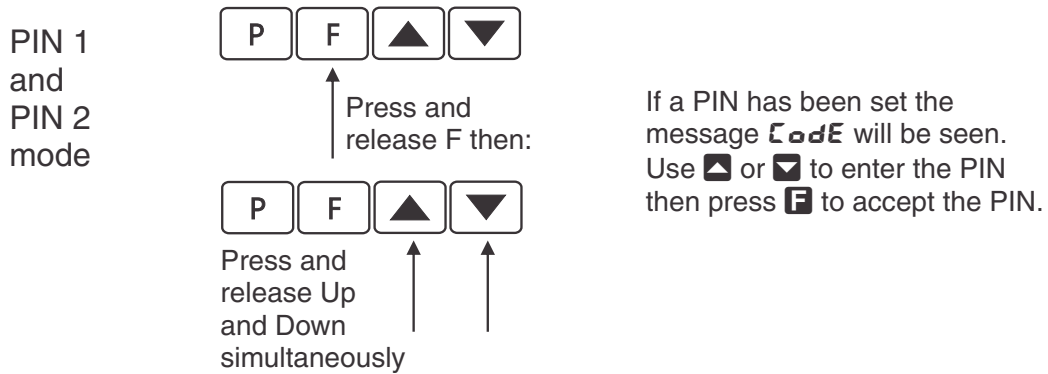
- **PIN 2 mode** - Allows access to the level set by the **USr.2 LEUL** function in the **ACCS** menu.
  This method uses the same access method as PIN 1 mode above. A **USr.2 P.n** setting of **0** disables the PIN. If the **USr.1 LEUL** or a **USr.2 P.n** function has been set to a number other than **0** then the first function seen when entering via PIN 1/PIN2 mode will be the function **CodE**. When this function is seen the PIN value set at the **USr.1 P.n** function can be entered for access to the level set at the **USr.1 LEUL** function or enter the **USr.2 P.n** PIN to gain access to the level set at the **USr.2 LEUL** function. A correct code will allow access to the functions at the selected level. An incorrect code will result in the **FUnC End** message being seen indicating that access to setup functions has been refused and the display will return to normal measurement mode.

- **Super Cal mode** - This method can be used to gain access to all functions. If a PIN has been set and forgotten use this method to access the PIN functions to check the settings. To access via Super Cal mode with the instrument switched off hold in the **F** button whilst the instrument powers up. Keep the button pressed until the **S.CAL** message is seen, you can then release the **F** button. Next press and release **F** then within 2 seconds press and release the ▲ and ▼ pushbuttons simultaneously.

Super Cal
mode

| P | F | ▲ | ▼ |

Hold F when powering up, wait for **S.CAL** message then release F then:

| P | F | ▲ | ▼ |

Press and
release F then:

| P | F | ▲ | ▼ |

Press and
release Up
and Down
simultaneously

The setup functions are organised in blocks or sections e.g. all the settings for channel 1 alarms are in the **AL 1** section. Once access to setup functions has been gained use the ▲ and ▼ buttons to select the section required then press **F** to enter this section and again us the ▲ and ▼ buttons to select the required function for alteration and press **F** to allow alteration of this function.

Typical sections for a basic instrument are illustrated below. In any particular instrument additional sections may appear depending on the part number and any optional outputs fitted.

Use ▲ or ▼ to move to the section required then press **F** to access the functions in that section. Press **P** to escape the section you are in or press **F** at the **End** function in the section.

Relay setup functions e.g. **AL 1**

Relay mode functions e.g. **rLY 1**

Operation functions e.g. **OPEr**

Input setup functions e.g. **rAtE**

Input functions e.g. **I nP 1**

Excitation setup functions e.g. **P.Out**

Remote input/ P button setup functions **r.I nP**

Etc.

The example in the flowchart (for 4 digit display) below shows the method using alarm relay 1 setup function.

Alarm 2 setting section

`AL 2`

Press **F** to go to

To go to back to measurement display press **P** or use **▲** or **▼** to go to `End` then press **F**

To scroll through to other main sections press **▲** or **▼**

Use **▲** or **▼** to move between the alarm 2 settings

Settings for alarm 2

`Hi 9h`

Followed by the setting

Press **F** to go to setting

Use **▲** or **▼** to adjust to any setting or press **▲** and **▼** together to disable and set to `OFF`. Press **F** to accept the change.

`Lo`

Followed by the setting

Press **F** to go to setting

Use **▲** or **▼** to adjust to any setting or press **▲** and **▼** together to disable and set to `OFF`. Press **F** to accept the change.

`HYSt`

Followed by the setting

Press **F** to go to setting

Use **▲** or **▼** to adjust, range 0 to 9999. Press **F** to accept the change.

`tri P`

Followed by the setting

Press **F** to go to setting

Use **▲** or **▼** to adjust, range 0.0 to 999.9. Press **F** to accept the change.

`rSt`

Followed by the setting

Press **F** to go to setting

Use **▲** or **▼** to adjust, range 0.0 to 999.9. Press **F** to accept the change.

`rLYS`

Followed by the setting

Press **F** to go to setting

Use **▲** or **▼** to choose the required relay then use **F** to select `On` or `OFF`. Use **▲** or **▼** to until `End` is seen. Press **F** to accept the change.

`Ch`

Followed by the setting

Press **F** to go to setting

Choose the channel `rAtE` or `totL`. Press **F** to accept the change.

`Ltch`

Followed by the setting

Press **F** to go to setting

Use **▲** or **▼** to choose `LAtch` or `Auto`. Press **F** to accept the change.

`End`

Press **F** or **P** to return to the beginning of the section

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 IP67 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.
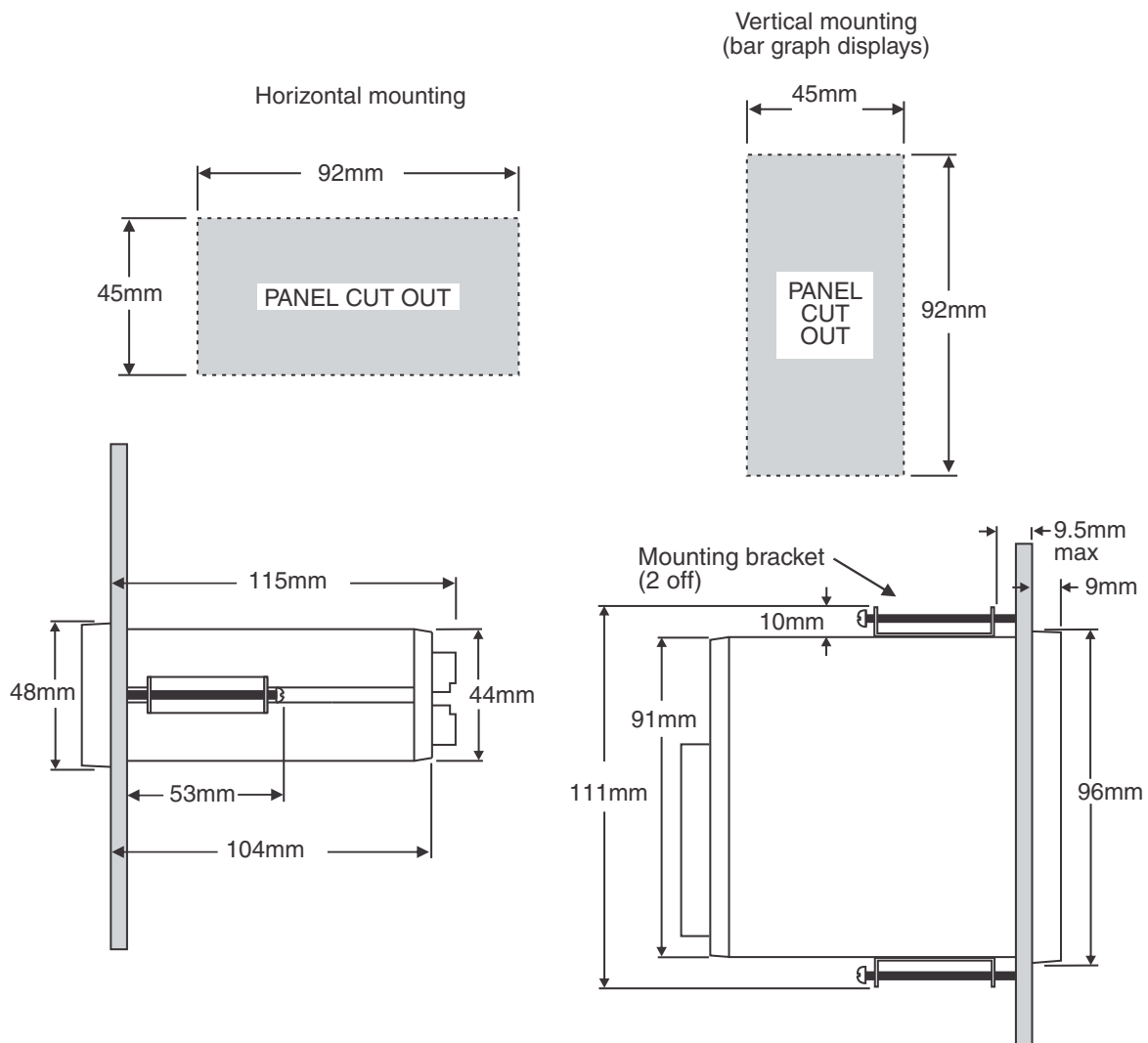
# 3 Electrical installation

3.1 Electrical installation

The PM5 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 plug in, screw type, terminal blocks allow for wires of up to 2.5mm^2 to be fitted for power, relays and options and 1mm^2 for sensor and other wiring. 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.

Instrument rear view for instruments with front pushbuttons
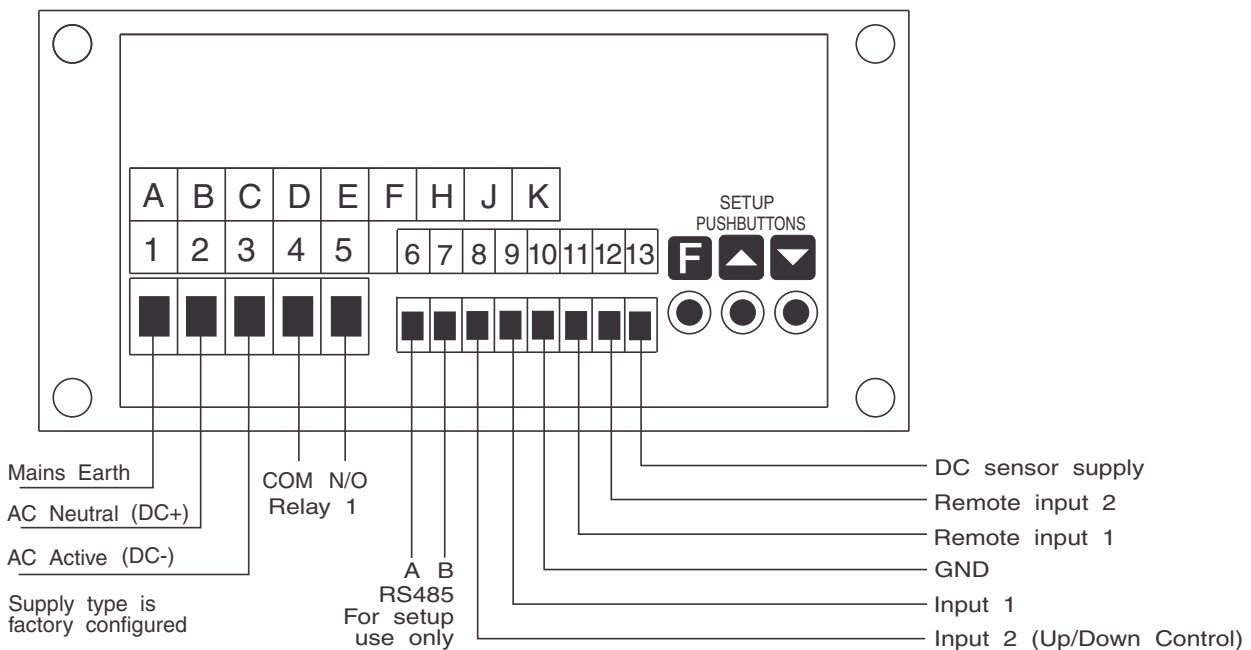
3.2 Input connections

The display will accept many common input sensor types on inputs 1 and 2. Input 1 is used as the rate/total input pulse terminal. Input 2 (terminal 8) can be used to change the totaliser count direction i.e. change from count up (input 2 inactive) or to count down (input 2 active). The totaliser direction function **d,r** must be set to **UP.dn** when this count up/down control is required. The input circuit setups for input 1 (terminals 9 and 10) shown below are software configured via the **In1** or **InP1** functions e.g. **In1 PULL UP** . The input circuit setups for input 2 (terminals 8 and 10) are software configured via the **In2** or **InP2** functions.

Inductive sensor input

INDUCTIVE INPUT   PM5 TERMINALS

9 Input 1

10 GND
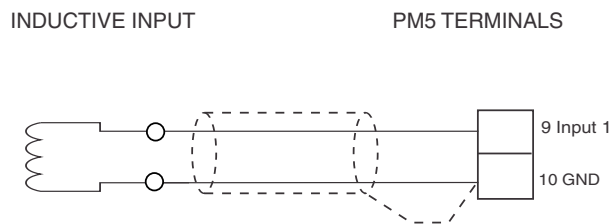
In1 function settings settings for inductive input

- **PULL UP** Set to **Lo**

- **bIAS** Set to **OFF**

- **LoF** Set to **OFF**

- **HYSt** Set to **OFF** for very low amplitude inputs (25mV to 250mV) or **On** for inputs with amplitude 250mV to 48VDC or RMS

- **Attn** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5

- **dC** Set to **On**

- **EdgE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required

- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce

AC input

AC MEASUREMENT   PM5 TERMINALS

9 Input 1

10 GND
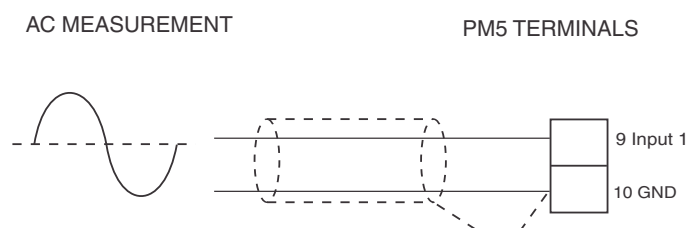
In1 function settings settings for AC input

- **PULL UP** Set to **Lo**

- **bIAS** Set to **OFF**

- **LoF** Set to **OFF**

- **HYSt** Set to **OFF** for very low amplitude inputs (25mV to 250mV) or **On** for inputs with amplitude 250mV to 48VDC or RMS

- **Attn** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5

- **dC** Set to **On** for input frequencies less than 10 Hz, otherwise set to **OFF**

- **EdgE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required

- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce
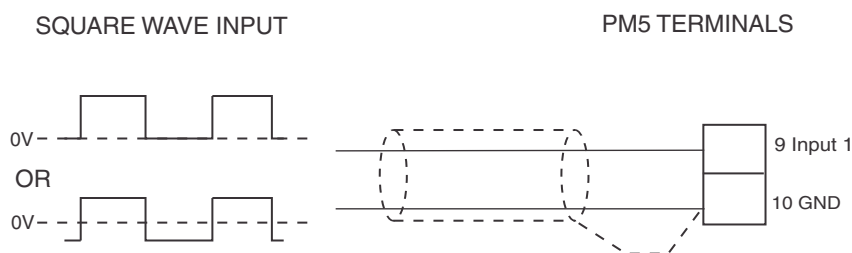

Square wave input

SQUARE WAVE INPUT   PM5 TERMINALS

0V

OR

0V

9 Input 1

10 GND

In1 function settings for square wave input

- **PULL UP** Set to **Lo**

- **bIAS** Set to **On** if signal is never negative polarity, otherwise set to **OFF**

- **LoF** Set to **OFF**

- **HYSt** Set to **OFF** for very low amplitude inputs (25mV to 250mV) or **On** for inputs with amplitude 250mV to 48VDC or RMS

- **Attn** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5

- **dC** Set to **On**

- **EdgE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required

- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce
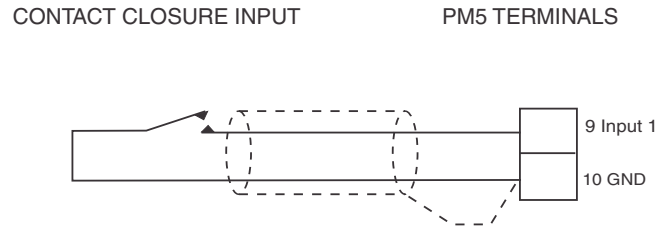

Contact closure input

CONTACT CLOSURE INPUT   PM5 TERMINALS

9 Input 1

10 GND

In1 function settings for contact closure input

- **PULL UP** Set to **High**
- **bIAS** Set to **On**
- **LoF** Set to **On**
- **HYSt** Set to **On**
- **Attn** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5
- **dC** Set to **On**
- **EdgE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required
- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce

---

Namur sensor input

NAMUR INPUT   PM5 TERMINALS   1K5 (5%) RESISTOR

BLUE

9 Input 1

10 GND

BROWN

13 DC supply

In1 function settings for namur sensor input

- **PULL UP** Set to **Lo**
- **bIAS** Set to **On**
- **LoF** Set to **OFF**
- **HYSt** Set to **On**
- **Attn** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5
- **dC** Set to **On**
- **EdgE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required
- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce
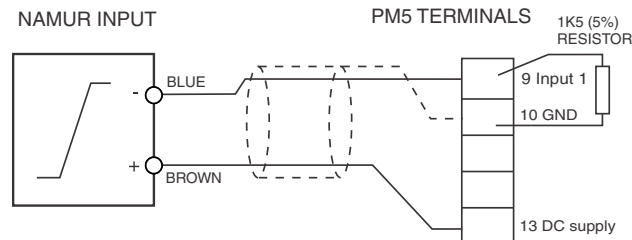
NPN 2 wire sensor input

iΠ1 function settings for NPN 2 wire sensor input

- **PULL UP** Set to **Hi9h**

- **biAS** Set to **On**

- **LoF** Set to **OFF**

- **HYSt** Set to **On**

- **Attn** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5

- **dC** Set to **On**

- **Ed9E** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required

- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce
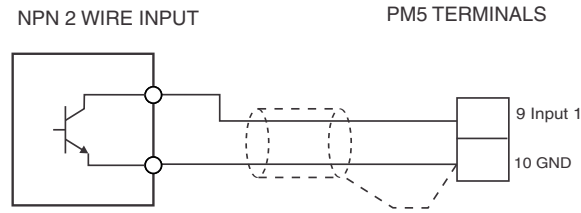
NPN 3 wire sensor input

iΠ1 function settings for NPN 3 wire sensor input

- **PULL UP** Set to **Hi9h**

- **biAS** Set to **On**

- **LoF** Set to **OFF**

- **HYSt** Set to **On**

- **Attn** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5

- **dC** Set to **On**

- **EdGE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required

- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce
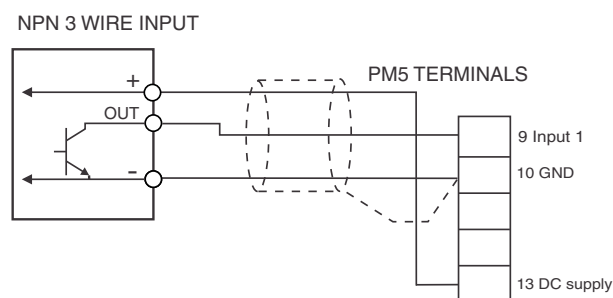

PNP 2 wire sensor input

IN1 function settings for PNP 2 wire sensor input

- **PULL UP** Set to **Lo**

- **bIAS** Set to **On**

- **LoF** Set to **OFF**

- **HYSt** Set to **On**

- **Attn** Set to **OFF** for no attenuation or **ON** to reduce the input amplitude by a factor of 5

- **dC** Set to **On**

- **EdGE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required

- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce
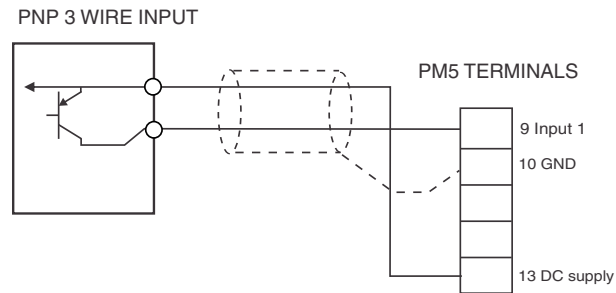

PNP 3 wire sensor input

IN1 function settings for PNP 3 wire sensor input

- **PULL UP** Set to **Lo**

- **bI AS** Set to **On**

- **LoF** Set to **OFF**

- **HYSt** Set to **On**

- **Attn** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5

- **dC** Set to **On**

- **EdGE** Select **Lo** (trigger from low going edge) or **HI** (trigger from rising edge) as required

- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce
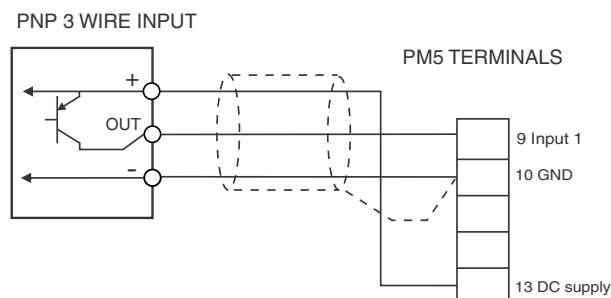

3.3 Relay connections

Relay connections The PM5 is supplied with one alarm relay as standard with connections on terminals 4 and 5, extra relays are optionally available. The relay is a single pole, single throw type and is rated at 5A, 240VAC into a resistive load. The relay contact is voltage free and may be programmed for normally open or normally closed operation.

3.4 Remote input connections

Two programmable remote input connections are available. The function of the remote input can be set for software. To operate the remote input connect a voltage free switch or relay (momentary or latching depending on the operation selected) between the remote input terminal and ground. The relay contacts will open when power is removed.
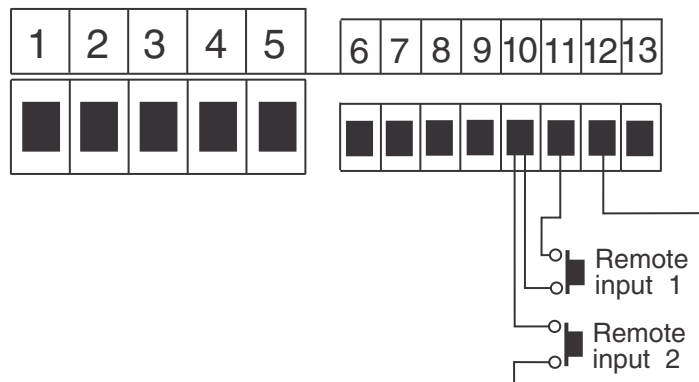
3.5 DC Sensor supply

The DC sensor supply on terminal 13 can be configured for 5V, 12V or 18VDC (25mA max.) via the **P.Out** function.

4 Function tables - summary of setup functions

Note: the order in which the functions appear on the display may not be exactly as shown below. The availability and order of functions is determined by choice of function settings and options fitted.

Display messages shown are those which would appear on a 5 digit display, these display messages may in some cases vary slightly for other display types.

Any functions which rely on options being fitted will be denoted by an asterisk *.

Some of the functions shown in the table below require access via Super Cal **S.CAL** mode.

4.1 Alarm relay function table

Display	Function	Range	Default	Your record	Ref/Page
AL 1 to **AL 8** **Hi.gh**	High setpoint value for designated alarm	Any display value or **OFF**	**OFF**	See 4.16	5.1 / 27
AL 1 to **AL 8** **Lo**	Low setpoint value for designated alarm	Any display value or **OFF**	**OFF**	See 4.16	5.2 / 28
AL 1 to **AL 8** **HYSt**	Hysteresis value for the designated alarm	**0** to **50000**	**10**	See 4.16	5.3 / 29
AL 1 to **AL 8** **tri.P**	Trip time delay for the designated alarm relay x.	**0** to **5000.0** secs	**0.0**	See 4.16	5.4 / 29
AL 1 to **AL 8** **rSt**	Reset time delay for the designated alarm relay x.	**0** to **5000.0** secs	**0.0**	See 4.16	5.5 / 30
OPEr **P.Cnt**	Totaliser relay pass mode value	Any display value or **OFF**	**OFF**	See 4.16	5.6 / 30
OPEr **P.SEC**	Totaliser relay pass mode on time	**0.1** to **5000.0** secs	**0.0**	See 4.16	5.7 / 30
AL 1 to **AL 8** **rLYS**	Relay selection **On** or **OFF**	**On** or **OFF**	**OFF**	See 4.16	5.8 / 31
AL 1 to **AL 8** **OPEr**	Alarm relay operating mode	**Hi.Lo** or **PASS**	**Hi.Lo**	See 4.16	5.9 / 31
AL 1 to **AL 8** **Ch**	Alarm from rate or total	**rAtE** or **totL** or **9.tot**	**rAtE**	See 4.16	5.10 / 31
AL 1 to **AL 8** **Ltch**	Alarm relay latching operation	**Auto**, **Ltch**	**Auto**	See 4.16	5.11 / 31

4.2   Relay function table

Display	Function	Range	Default	Your record	Ref/Page
rL 1 to **rL 7** **rLY**	Alarm relay *x* action to normally open (de-energised) or normally closed (energised)	**n.o**, **n.c**	**n.o**	See 4.16	5.12 / 32
rL 1 to **rL 7** **Ack**	Relay acknowledge	**OFF** or **On**	**OFF**	See 4.16	5.13 / 32
rL 1 to **rL 7** **bool**	Alarm relay Boolean logic operation	**Or**, **And**	**Or**	See 4.16	5.14 / 32

4.3   Operation function table

Display	Function	Range	Default	Your record	Ref/Page
OPEr **CH 1** **OPEr**	Operation	**rAtE**, **totL**, **botH**	**rAtE**		5.15 / 33
OPEr **dFlt** **d.SP**	Default display	**rAtE**, **totL**, **9.tot**	**rAtE**		5.16 / 33

4.4   Rate function table

Display	Function	Range	Default	Your record	Ref/Page
rAtE **d.Pnt**	Decimal point setting for ratemeter	**0**, **0.1**, **0.02**, **0.003**	**0**		5.17 / 33
rAtE **USEr** **CAL**	Rate display scaling method	**inPt**, **USEr**, **LiUE**	**inPt**		5.18 / 34
rAtE **inPt**	Input value for ratemeter	**1** to Maximum display value	**1**		5.19 / 34
rAtE **SCL**	Scale value for ratemeter	**1** to Maximum display value	**1**		5.20 / 34
rAtE **FLtr**	Ratemeter display filter	**0**, **1**, **2**, **3**, **4**, **5**, **6**, **7**, **8**	**0**		5.21 / 35
rAtE **d.rnd**	Display rounding for ratemeter	**1** to **5000**	**1**		5.22 / 35
rAtE **Lo** **d.SP**	Rate low value visual warning	Any display value or **OFF**	**OFF**		5.23 / 35
rAtE **Hi** **d.SP**	Rate high value visual warning	Any display value or **OFF**	**OFF**		5.24 / 36

Display	Function	Range	Default	Your record	Ref/Page
rAtE di SP	Warning message for low and high display	**nonE**, **FLSH**, **- - - -**, **or.ur**, **Hi .Lo**	**nonE**		5.25 / 36
rAtE rngE	Rate/frequency range	**Lo.F**, **Hi .F**, **Au9E**, **r.Au9**	**Hi .F**		5.26 / 36
rAtE t.out	Timeout for low frequency input	**1** to **3200** secs	**10**		5.27 / 37
rAtE A.SEc	Time period for average rate display	**1** to **5000** secs	**1**		5.28 / 37
rAtE A.cnt	Counts for average rate display	**0** to **30**	**1**		5.29 / 38
rAtE CAL i n 1	Rate **USEr** scaling mode frequency 1	Any display value	n/a		5.30 / 38
rAtE CAL SCL. 1	Rate **USEr** scaling mode scale 1	Any display value	n/a		5.31 / 38
rAtE CAL i n 2	Rate **USEr** scaling mode frequency 2	Any display value	n/a		5.32 / 39
rAtE CAL SCL.2	Rate **USEr** scaling mode scale 2	Any display value	n/a		5.33 / 39
rAtE u.CAL	Rate **Li uE** scaling mode uncalibration	n/a	n/a		5.34 / 39
rAtE CAL 1	Rate **Li uE** scaling mode input frequency 1	n/a	n/a		5.35 / 39
rAtE CAL2	Rate **Li uE** scaling mode input input frequency 2	n/a	n/a		5.36 / 40
rAtE oFSt	Rate **Li uE** display offset	n/a	n/a		5.37 / 40

4.5 Totaliser function table

Display	Function	Range	Default	Your record	Ref/Page
tot d.Pnt	Decimal point setting for totaliser	**0**, **0. 1**, **0.02**, **0.003**	**0**		5.38 / 41
tot i nPt	Input value for totaliser	**1** to Maximum display value	**1**		5.39 / 41
tot SCL	Scale value for totaliser	**1** to Maximum display value	**1**		5.40 / 41
tot d.rnd	Display rounding for totaliser	**1** to **5000**	**1**		5.41 / 41
tot trnc	Truncation operation	**trnc**, **rnd**	**trnc**		5.42 / 42

Display	Function	Range	Default	Your record	Ref/Page
tot dir	Totaliser count up/down operation	UP, doun, UP.dn	UP		5.43 / 42
tot 9.tot	Grand total operation mode	NonE, For, rEu, PoS, NE9, AbS	NonE		5.44 / 42
tot Lo diSP	Total low value visual warning	Any display value or OFF	OFF		5.45 / 43
tot Hi diSP	Total high value visual warning	Any display value or OFF	OFF		5.46 / 43
tot diSP	Warning message for low and high display	NONE, FLSH, - - - -, Or.Ur, Hi.Lo	NONE		5.47 / 44
tot P.On r.SEt	Power on total reset	OFF, r.SEt, P.SEt	OFF		5.48 / 44
tot 9t.On r.SEt	Power on grand total reset	OFF, r.SEt	OFF		5.49 / 44
tot P.SEt	Total preset value	Any display value	0		5.50 / 45
tot ürAP OPEr	Wrap around operation	OFF, r.SEt, P.SEt, d.rAP	r.SEt		5.51 / 45
tot r.UAL	Automatic reset wrap around value	Any display value or OFF	OFF		5.52 / 45

4.6   Bargraph function tables - for bargraph display models only

Display	Function	Range	Default	Your record	Ref/Page
bAr9 Ch	Bargraph channel	rAtE, totL, 9.tot	rAtE		5.53 / 46
bAr9 tYPE	Bargraph type	bAr, S.dot, d.dot or C.bAr	bAr		5.54 / 46
bAr9 Lo	Bargraph low value	Any display value	0		5.55 / 46
bAr9 Hi	Bargraph high value	Any display value	1000		5.56 / 47

4.7 Input function tables

Display	Function	Range	Default	Your record	Ref/Page
ıⁿ1 to ıⁿ2 PULL UP	Input pull up	OPEn, Hı9h, Lo	Hı9h		5.57 / 47
ıⁿ1 to ıⁿ2 bıAS	Input bias	OFF, On	On		5.58 / 47
ıⁿ1 to ıⁿ2 LoF	Input low frequency	OFF, On	OFF		5.59 / 48
ıⁿ1 to ıⁿ2 HYSt	Input hysteresis	OFF, On	OFF		5.60 / 48
ıⁿ1 to ıⁿ2 Attn	Input attenuation	OFF, On	OFF		5.61 / 48
ıⁿ1 to ıⁿ2 dC	Input DC coupling	OFF, On	On		5.62 / 49
ıⁿ1 to ıⁿ2 Ed9E	Input edge or level	Lo.E, Hı.E	Lo		5.63 / 49
ıⁿ1 to ıⁿ2 d.bnc	Input de-bounce timer	0 to 15 ms	0		5.64 / 49

4.8 Excitation voltage function tables

Display	Function	Range	Default	Your record	Ref/Page
P.Out P.Out	Output voltage selection	5U, 12U or 18U	5U		5.65 / 50

4.9 Analog output 1 function table

Display	Function	Range	Default	Your record	Ref/Page
rO1 OutP	Output selection for analog output 1. Not seen if output is fixed at 4-20mA (*Optional)	4-20, 0-1.0, 0-10	4-20		5.78 / 54
rO1 ınPt	Input selection for analog output 1 (*Optional)	rAtE, totL, 9.tOt	rAtE		5.79 / 55
rO1 P.Ctl	Analog output 1 PI control on or off (*Optional)	nO or YES	no		5.80 / 55

Display	Function	Range	Default	Your record	Ref/Page
ᴦᴏ¹ Lo	Analog output 1 option low display value (*Optional)	Any display value	0		5.81 / 55
ᴦᴏ¹ H·9h	Analog output option high display value (*Optional)	Any display value	1000		5.82 / 56
ᴦᴏ¹ SEtP	Analog output 1 PI control setpoint (*Optional)	Any display value	0		5.83 / 56
ᴦᴏ¹ SPᴀn	Analog output 1 PI control span (*Optional)	Any display value	1000		5.84 / 56
ᴦᴏ¹ P.9	Analog output 1 PI control proportional gain (*Optional)	Any display value	1.000		5.85 / 57
ᴦᴏ¹ ¹.9	Analog output 1 PI control integral gain (*Optional)	Any display value	0.000		5.86 / 57
ᴦᴏ¹ ¹.H	Analog output 1 PI control integral high limit (*Optional)	0 to 100.0 %	1.000		5.87 / 57
ᴦᴏ¹ ¹.L	Analog output 1 PI control integral low limit (*Optional)	0 to 100.0 %	1.000		5.88 / 58
ᴦᴏ¹ b·ᴀS	Analog output 1 PI control bias (*Optional)	0 to 100.0 %	50.0		5.89 / 58

4.10   Analog output 2 function table

Display	Function	Range	Default	Your record	Ref/Page
ᴦᴏ² OutP	Output selection for analog output 2. Not seen if output is fixed at 4-20mA (*Optional)	4-20, 0-1.0 or 0-10	4-20		5.90 / 58
ᴦᴏ² ¹nPt	Input selection for analog output 2 (*Optional)	ᴦᴀtE, totL, 9.tot	ᴦᴀtE		5.91 / 59
ᴦᴏ² P.Ctl	Analog output 2 PI control on or off (*Optional)	no or YES	no		5.92 / 59
ᴦᴏ² Lo	Analog output 2 option low display value (*Optional)	Any display value	0		5.93 / 59
ᴦᴏ² H·9h	Analog output option high display value (*Optional)	Any display value	1000		5.94 / 60
ᴦᴏ² SEtP	Analog output 2 PI control setpoint (*Optional)	Any display value	0		5.95 / 60
ᴦᴏ² SPᴀn	Analog output 2 PI control span (*Optional)	Any display value	1000		5.96 / 60
ᴦᴏ² P.9	Analog output 2 PI control proportional gain (*Optional)	-32.768 to 32.767	1.000		5.97 / 60
ᴦᴏ² ¹.9	Analog output 2 PI control integral gain (*Optional)	-32.768 to 32.767	0.000		5.98 / 61
ᴦᴏ² ¹.H	Analog output 2 PI control integral high limit (*Optional)	0.0 to 100.0	1.000		5.99 / 61
ᴦᴏ² ¹.L	Analog output 2 PI control integral low limit (*Optional)	0.0 to 100.0	1.000		5.100 / 61

Display	Function	Range	Default	Your record	Ref/Page
rO2 b.AS	Analog output 2 PI control bias (*Optional)	*0.0* to *100.0*	*50.0*		5.101 / 61

4.11 P button and remote inputs function table

Display	Function	Range	Default	Your record	Ref/Page
r.i AP P.but	Front P button operation mode	*NONE*, *P.Hi*, *P.Lo*, *Hi.Lo*, *AL.Ac*, *rSEt*, *9.rSt*, *PSEt*	*NONE*		5.102 / 62
r.i AP r.i A.1 to *r.i A.2*	Remote input 1 operation mode	*NONE*, *P.Hi d*, *d.Hi d*, *P.Hi*, *P.Lo*, *Hi.Lo*, *AL.Ac*, *ACCS*, *P.but*, *F.but*, *U.but*, *d.but*, *dul l*, *rSEt*, *9.rSt*, *StoP*, *PSEt*	*NONE*		5.103 / 62
r.i AP r.i A.2	Remote input 2 operation mode	*NONE*, *P.Hi d*, *d.Hi d*, *P.Hi*, *P.Lo*, *Hi.Lo*, *AL.Ac*, *ACCS*, *P.but*, *F.but*, *U.but*, *d.but*, *dul l*, *rSEt*, *9.rSt*, *StoP*, *PSEt*	*NONE*		5.104 / 63

4.12 Display function table

Display	Function	Range	Default	Your record	Ref/Page
di SP br9t	Display brightness	*1* to *16*	*16*		5.105 / 63
di SP dul l	Dimmed display brighness	*0* to *16*	*2*		5.106 / 64

4.13 Serial communications functions

Display	Function	Range	Default	Your record	Ref/Page
SEri OPEr	Serial operation mode (*Optional)	*NonE.Cont.* *Poll.A.buS.* *di SP.ñ.buS* or *ChAn*	*NonE*		5.107 / 64

Display	Function	Range	Default	Your record	Ref/Page
SErı Ch	Serial operation channel (*Optional)	rAtE, totL, 9.tOt	rAtE		5.108 / 65
SErı bAud	Serial baud rate (*Optional)	1200, 2400, 4800, 9600, 19.2, 38.4, 57.6, 115.2	9600		5.109 / 65
SErı Prty	Serial parity (*Optional)	8n, 8E, 8O, 7E, 7O	8n		5.110 / 65
SErı Unıt Addr	Serial address (*Optional)	1 to 127	1		5.111 / 66
SErı Err dıSP	Serial error display (*Optional)	OFF or On	On		5.112 / 66

4.14   Alarm configuration function table

Display	Function	Range	Default	Your record	Ref/Page
AL.CF AL Cnt	Select number of alarms	0, 1, 2, 3, 4, 5, 6, 7, 8	2		5.113 / 66

4.15   Access control function table

Display	Function	Range	Default	Your record	Ref/Page
ACCES EASY LEUL	Easy access mode	*NONE*, *1*, *2*, *3*, *4*, *5*, *6*, *CAL*	*NONE*		5.114 / 67
ACCES r.i nP LEUL	Remote input access mode	*NONE*, *1*, *2*, *3*, *4*, *5*, *6*, *CAL*	*NONE*		5.115 / 67
ACCES USr.1 P.n	PIN code 1	*0* to *50000*	*0*		5.116 / 67
ACCES USr.1 LEUL	PIN code 1 access level	*NONE*, *1*, *2*, *3*, *4*, *5*, *6*, *CAL*	*NONE*		5.117 / 68
ACCES USr.2 P.n	PIN code 2	*0* to *50000*	*0*		5.118 / 68
ACCES USr.2 LEUL	PIN code 2 access level	*NONE*, *1*, *2*, *3*, *4*, *5*, *6*, *CAL*	*NONE*		5.119 / 68
ACCES Fn.1 CodE	User assignable access function 1	*0000* to *FFFF* hex.	*0000*		5.120 / 69
ACCES Fn.1 LEUL	User assignable access 1 level value	*dFlt*, *1*, *2*, *3*, *4*, *5*, *6*, *CAL*, *S.CAL*	*dFlt*		5.121 / 69
ACCES Fn.2 CodE	User assignable access function 2	*0000* to *FFFF* hex.	*0000*		5.122 / 69
ACCES Fn.2 LEUL	User assignable access 2 level value	*dFlt*, *1*, *2*, *3*, *4*, *5*, *6*, *CAL*, *S.CAL*	*dFlt*		5.123 / 69
ACCES Fn.3 CodE	User assignable access function 3	*0000* to *FFFF* hex.	*0000*		5.124 / 70
ACCES Fn.3 LEUL	User assignable access 3 level value	*dFlt*, *1*, *2*, *3*, *4*, *5*, *6*, *CAL*, *S.CAL*	*dFlt*		5.125 / 70
ACCES Fn.4 CodE	User assignable access function 4	*0000* to *FFFF* hex.	*0000*		5.126 / 70
ACCES Fn.4 LEUL	User assignable access 4 level value	*dFlt*, *1*, *2*, *3*, *4*, *5*, *6*, *CAL*, *S.CAL*	*dFlt*		5.127 / 70

4.16   Relay table

Record your relay settings in the table below

Display	Alarm 1	Alarm 2	Alarm 3	Alarm 4	Alarm 5	Alarm 6	Alarm 7	Alarm 8
H,9h								
Lo								
HYSt								
tr,P								
rSt								
P.SEC								
P.SEC								
rLYS								
OPEr								
Ch								
Ltch								

Record which relays are allocated to which alarms and other relay settings in the table below

Display	Relay 1	Relay 2	Relay 3	Relay 4	Relay 5	Relay 6	Relay 7
Alarm 1							
Alarm 2							
Alarm 3							
Alarm 4							
Alarm 5							
Alarm 6							
Alarm 7							
Alarm 8							
rLY							
Ach							
bool							

5 Explanation of functions

The setup and calibration functions are configured through a push button sequence. The three push buttons located at the front of the instrument are used to alter settings. The access modes available are detailed in section 1.2, starting on page 4.

Display messages shown are those which would appear on a 6 digit display, these display messages may in some cases vary slightly for other display types.

Explanation of Functions

5.1 Alarm relay high setpoint

Section:	**AL 1** to **AL 8**
Display:	**Hi 9h**
Range:	Any display value or **OFF**
Default Value:	**OFF**
Default Access Level	**2**
Function number	**4000** to **4007**

Displays and sets the high setpoint value for the designated alarm. Use this high setpoint function if an alarm operation is required when the display value becomes equal to or greater than the required setpoint value.

To set the high alarm value go to the **Hi 9h** function, press **F** and when you see a digit of the value flash use the **▲** or **▼** push buttons to set the required value then press **F** to accept this selection. The high alarm setpoint may be disabled by pressing the **▲** and **▼** push buttons simultaneously. When the alarm is disabled the display will indicate **OFF**. If the alarm is allocated both a low and high setpoint then the alarm will activate when the value displayed moves outside the band set by the low and high setpoints. The value at which the alarm will reset is controlled by the **HYSt** function. The relay or relays to be used with this alarm can be selected (set to on or off) at the **rLY** function for each alarm.

Overlapping alarms - if the **Hi 9h** value is set lower than the **Lo** value then the alarm will activate in the band between the two values.

If the display has annunciator leds for the alarm then the annunciator will initially flash in alarm condition, if the alarm is acknowledged by pressing the **F** button the annunciator will be solidly lit until the display moves out of alarm condition.

Example:
If **Hi 9h** under **AL 1** is set to **100** then alarm 1 will activate when the display value is **100** or higher. Any relay allocated to this alarm will also activate.
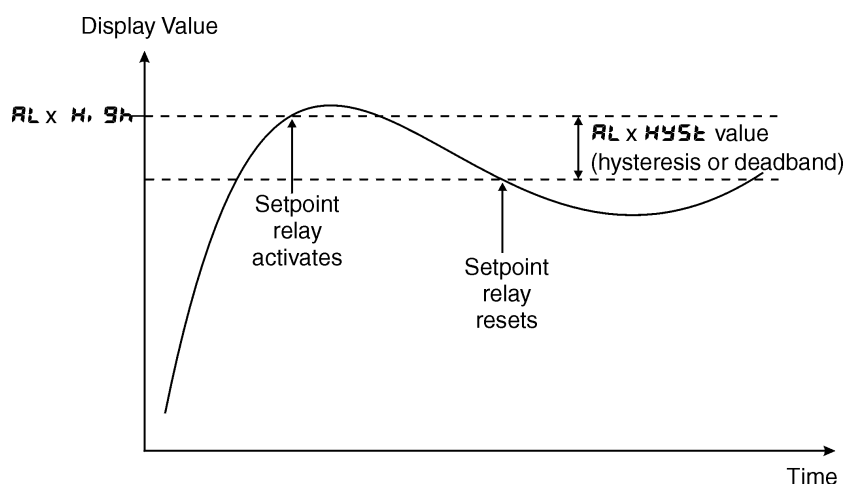
5.2 Alarm relay low setpoint

Section:	**AL 1** to **AL 8**
Display:	**Lo**
Range:	Any display value or **OFF**
Default Value:	**OFF**
Default Access Level	**2**
Function number	**40 10** to **40 17**

Displays and sets the low setpoint value for the designated alarm.

Use this low setpoint function if a relay operation is required when the display value becomes equal to or less than the required setpoint value.

To set the low alarm value press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

The low alarm setpoint may be disabled by pressing the ▲ and ▼ push buttons simultaneously. When the alarm is disabled the display will indicate **OFF**. If the alarm is allocated both a low and high setpoint then the alarm will activate when the value displayed moves outside the band set by the low and high setpoints. The value at which the alarm will reset is controlled by the Hysteresis function. The relay or relays to be used with this alarm can be selected (set to on or off) at the **rLY** function for each alarm.

If the display has annunciator leds for the alarm then the annunciator will initially flash in alarm condition, if the alarm is acknowledged by pressing the **F** button the annunciator will be solidly lit until the display moves out of alarm condition.

Overlapping alarms - if the **Hi 9h** value is set lower than the **Lo** value then the alarm will activate in the band between the two values.

Example:
If **Lo** under **AL 1** is set to **10** then relay 1 will activate when the display value is 10 or less. Any relay allocated to this alarm will also activate
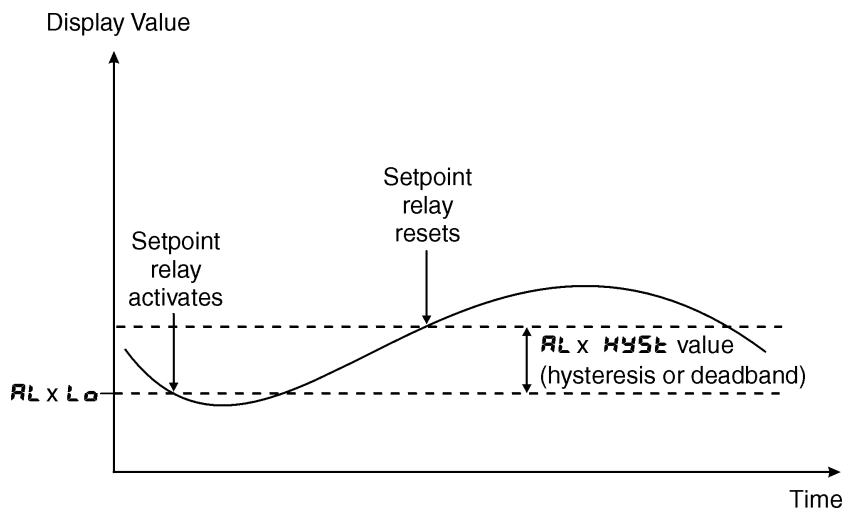
5.3 Alarm hysteresis (deadband)

Section:	**AL 1** to **AL 8**
Display:	**HYSt**
Range:	**0** to **50000**
Default Value:	**10**
Default Access Level	**3**
Function number	**4020** to **4027**

Displays and sets the alarm hysteresis limit for the designated alarm. To set a alarm hysteresis value go to the function and use the ▲ or ▼ push buttons to set the value required then press **F** to accept this value. The hysteresis value is common to both high and low setpoint values. The hysteresis value may be used to prevent too frequent operation of the alarm and associated relays when the measured value is rising and falling around setpoint value. e.g. if **HYSt** under **AL 1** is set to zero the alarm will activate when the display value reaches the alarm setpoint (for high alarm) and will reset when the display value falls below the setpoint, this can result in repeated on/off switching of relays at around the setpoint value.

The hysteresis setting operates as follows: In the high alarm mode, once the alarm is activated the input must fall below the setpoint value minus the hysteresis value to reset the alarm. e.g. if **Hi 9h** under **AL 1** is to **50.0** and **HYSt** is set to **3.0** then the setpoint alarm will activate once the display value goes to **50.0** or above and will reset when the display value goes below **47.0** i.e. at **46.9** or below. In the low alarm mode, once the alarm is activated the input must rise above the setpoint value plus the hysteresis value to reset the alarm. e.g. if **Lo** is to **20.0** and **HYSt** is set to **10.0** then the alarm will activate when the display value falls to **20.0** or below and will reset when the display value goes above **30.0** i.e at **30.1** or above.

To set the hysteresis value go to the **HYSt** function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection. The hysteresis units are expressed in displayed engineering units.

Example: If **Hi 9h** is set to **100** and **HYSt** is set to **10** then alarm 1 will activate when the display value is **100** or higher and will reset at a display value of **89** or lower.

5.4 Alarm relay trip time

Section:	**AL 1** to **AL 8**
Display:	**tri P**
Range:	**0** to **5000.0** secs
Default Value:	**0.0**
Default Access Level	**3**
Function number	**4040** to **4047**

Displays and sets the alarm trip time in seconds. The trip time is common for both alarm high and low setpoint values. The trip time provides a time delay before the alarm relay will activate when an alarm condition is present. The alarm condition must be present continuously for the whole trip time period before the alarm will activate. If the input moves out of alarm condition during this period the timer will reset and the full time delay will be restored. This trip time delay is useful for preventing an alarm trip due to short non critical deviations from setpoint. The trip time is selectable over **0** to **50000** seconds.

To set the trip time value go to the **tri P** function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

Example: If **tri P** is set to **5** seconds then the display must indicate an alarm value for a full 5 seconds before the relay will activate.

5.5   Alarm relay reset time

Section:	**AL 1** to **AL 8**
Display:	**rSt**
Range:	**0** to **5000.0** secs
Default Value:	**0.0**
Default Access Level	**3**
Function number	**4050** to **4057**

Displays and sets the alarm reset delay time in seconds. The reset time is common for both alarm high and low setpoint values. With the alarm condition is removed the alarm relay will stay in its alarm condition for the time selected as the reset time. If the input moves back into alarm condition during this period the timer will reset and the full time delay will be restored. The reset time is selectable over **0** to **50000** seconds.

To set the reset time value go to the **rSt** function, press **F** and when you see a digit of the value flash use the **▲** or **▼** push buttons to set the required value then press **F** to accept this selection.

Example: If **rSt** is set to **10** seconds then the resetting of alarm relay will be delayed by 10 seconds.

5.6   Totaliser relay pass mode value

Section:	**OPEr**
Display:	**P.Cnt**
Range:	Any display value or **OFF**
Default Value:	**OFF**
Default Access Level	**4**
Function number	**4180** to **4187**

When the alarm operation is set to operate from the total display value the "Pass" mode operation option becomes available. In pass mode a value can be set and a relay or relays can be set to activate at multiples of this value. The time duration of the relay activation is set at the **P.SEC** function which follows. For example if the **P.Cnt** function is set to 100 and the **P.SEC** function is set to 2.0 then the associated relays will activate for 2 seconds at total display values of 100, 200, 300 etc.

5.7   Totaliser relay pass mode on time

Section:	**OPEr**
Display:	**P.SEC**
Range:	**0.1** to **5000.0** secs
Default Value:	**0.0**
Default Access Level	**4**
Function number	**4190** to **4197**

This function sets the time in seconds for which the "Pass" mode relays will activate. See the **P.Cnt** function.

5.8   Relay selection

Section:	**AL 1** to **AL 8**
Display:	**rLYS**
Range:	**On** or **OFF**
Default Value:	**OFF**
Default Access Level	**4**
Function number	**4330** to **4337**

Allows a relay to be allocated to an alarm. For example if a high alarm value has been selected at the **AL 1 rLYS** function this alarm could be allocated to relay 3 by selecting **rLY3 On** at this function. Press the **F** button to enter this function then use the **▲** or **▼** pushbuttons to choose the required relay then press the **F** button to toggle to **On** or **OFF** as required.

5.9   Alarm relay operating mode

Section:	**AL 1** to **AL 8**
Display:	**OPEr**
Range:	**Hi.Lo** or **PASS**
Default Value:	**Hi.Lo**
Default Access Level	**4**
Function number	**4160** to **4167**

In **Hi.Lo** the relay operates from the high and/or low values set by the **Hi 9h** and **Lo** functions. In **PASS** mode (can only be used in totaliser operation) the relay operated for a programmed time period at multiples of a pass value. See the **P.Cnt** and **P.SEC** functions.

5.10   Alarm from rate or total

Section:	**AL 1** to **AL 8**
Display:	**Ch**
Range:	**rAtE** or **totL** or **9.tot**
Default Value:	**rAtE**
Default Access Level	**4**
Function number	**4070** to **4077**

If **CH 1 OPEr** function is set to **both** then this function allows selection or alarm operation from the rate value or the total value or (if grand total is enabled) the grand total. If **CH 1 OPEr** function is set to **rAtE** then only rate can be chosen. If **CH 1 OPEr** function is set to **totL** then total or grand total (if grand total is enabled) can be chosen.

5.11   Alarm relay latching operation

Section:	**AL 1** to **AL 8**
Display:	**Ltch**
Range:	**Auto**, **Ltch**
Default Value:	**Auto**
Default Access Level	**4**
Function number	**4170** to **4177**

Allows selection of alarm latching operation. If set to **Auto** the alarm relays will not latch i.e. they will automatically reset when the display moves out of alarm condition. If set to **LAtch** the relay will latch and will not reset until the display value is out of alarm condition and either the **F** button is pressed to clear the latch condition or if power is removed. The relay hysteresis, trip time and reset time settings still apply to latching relays.

In latching mode the alarm annunciator (5 digit display type only) will flash when the display goes into alarm condition. If the display goes out of alarm condition without being acknowledged the flashing period will change to give a longer "off" time. If the alarm is acknowledged by pressing the **F** button then the annunciator will change from flashing to solidly lit. Once the alarm has been acknowledged the relay will be free to reset once the display value moves out of alarm condition.

5.12   Alarm relay normally open/closed

Section:	⌐L ⌐ to ⌐L ⌐
Display:	⌐LY
Range:	n.o, n.c
Default Value:	n.o
Default Access Level	4
Function number	4030 to 4036

Displays and sets the setpoint alarm relay x action to normally open (de-energised) or normally closed (energised), when no alarm condition is present. Since the relay will always open when power is removed a normally closed alarm is often used to provide a power failure alarm indication. To set the alarm relay for normally open or closed go to the ⌐L ⌐ to ⌐L ⌐ ⌐LY function and use the ▲ or ▼ push buttons to set the required operation then press **F** to accept this selection.   **Example:**
If set to A n.o alarm relay 1 will be open circuit when the display is outside alarm condition and will be closed (short circuit across COM and N/O terminals) when the display is in alarm condition.

5.13   Relay acknowledge

Section:	⌐L ⌐ to ⌐L ⌐
Display:	AcK
Range:	OFF or On
Default Value:	OFF
Default Access Level	4
Function number	4320 to 4326

If the **AcK** is set to **On** the operator can acknowledge the alarm whilst still in alarm condition allowing the relay to reset straight away. This is not affected by the alarm being set to either latching or auto reset mode. The acknowledge can be made by pressing the front **F** button, if available. The front **P** button and/or a remote input can also be programmed to be used in acknowledging the alarm.

5.14   Alarm relay Boolean logic operation

Section:	⌐L ⌐ to ⌐L ⌐
Display:	bool
Range:	Or, And
Default Value:	Or
Default Access Level	4
Function number	4310 to 4316

This function allows a Boolean logic AND (**And**) or OR (**Or**) function to be applied to alarms. If two or more alarms use the same relay and that relay is set to operate as an OR operation then this effectively puts the alarms in parallel. If two or more alarms use the same relay that relay is set to operate on an AND operation then this effectively puts the alarms in series.

Examples: 1. If alarms 1, 2 and 3 all use relay 1 and relay 1 is set for **Or** operation then relay 1 will activate if the display value for the selected channels for these alarms causes either alarm 1 or alarm 2 or alarm 3 to go into alarm condition. i.e. relay 1 will activate if any of the alarms is in alarm condition.

2. If alarms 1, 2 and 3 all use relay 1 and relay 1 is set for **Rnd** operation then relay 1 will activate if the display value for the selected channels for these alarms causes alarm 1 and alarm 2 and alarm 3 to go into alarm condition. i.e. all 3 alarms must be in alarm condition for relay 1 to activate.

5.15   Operation mode

Section:	**OPEr**
Display:	**CH 1 OPEr**
Range:	**rRtE**, **tOtL**, **both**
Default Value:	**rRtE**
Default Access Level	**4**
Function number	**4C40**

This function sets the operation mode to either rate only (**rRtE**) or total only **totl** or **both** (both rate and total operation). The front pushbuttons, if fitted can be used to toggle between displays rate and total displays in **both** mode. The **rRtE** for purposes of this software is actually the speed and the **totl** is the distance.

5.16   Default display

Section:	**OPEr**
Display:	**dFlt d.SP**
Range:	**rRtE**, **totL**, **9.tot**
Default Value:	**rRtE**
Default Access Level	**4**
Function number	**4438**

This function sets the default display to either rate (**rRtE**) or total **totl** when **both** (rate and total display) has been is selected. The front pushbuttons, if fitted can be used to toggle between displays but the instrument will always return to its default display after approximately 30 seconds. The display will always show the default display on power up. When toggled to an alternate display e.g. total then a message (e.g. **totl**) will flash approximately once every 8 seconds to indicate that the display currently being viewed is not the default display.

5.17   Decimal point setting for ratementer

Section:	**rRtE**
Display:	**d.Pnt**
Range:	**0**, **0.1**, **0.02**, **0.003**
Default Value:	**0**
Default Access Level	**4**
Function number	**4100**

This function is only seen when **rRtE** or **both** mode is selected. Displays and sets the decimal point position for the rate display. For example selecting **0** will mean no decimal points (e.g. a display such as **25**), **0.1** means 1 decimal point place (e.g. **2.4**), **0.02** gives 2 decimal point places (e.g. **2.35**) etc. The maximum number of decimal point places is one less than the number of digits on the display e.g. a 4 digit display can have 3 decimal points, a 6 digit display can have 5 decimal points etc. Note: If the number of decimal points is altered then the display scaling figure (**SCL**) will also be affected. Always check the scaling figure following a decimal point change and alter as required.

5.18 Rate display scaling method

Section:	**rAtE**
Display:	**USEr CAL**
Range:	**iNPt**, **USEr**, **LiUE**
Default Value:	**iNPt**
Default Access Level	**CAL**
Function number	**4C4A**

Allows selection of frequency scaling method required. Three methods are available:

- **iNPt** - this method uses **iNPt** and **SCL** functions to scale the display.

- **USEr** - this method allows the user to enter two frequencies in Hz (**rAtE CAL iN 1** and **rAtE CAL iN 1** and enter a scaling value for each frequency (**rAtE CAL SCL 1** and **rAtE CAL SCL 2**) to provide the rate display scaling.

- **LiUE** - this method allows the user to apply two known input frequencies (**rAtE CAL 1** and **rAtE CAL2**) and apply a scaling (**rAtE CAL 1 SCLE** and **rAtE CAL2 SCLE**) for each frequency.

See each individual function for further explanation.

5.19 Input value for ratemeter

Section:	**rAtE**
Display:	**iNPt**
Range:	**1** to Maximum display value
Default Value:	**1**
Default Access Level	**4**
Function number	**4C44**

This function is only seen when **rAtE** or **botH** mode is selected. Displays and sets the input pulse rate to be used with the rate scale function to generate the display scaling. See formula below.

5.20 Scale value for ratemeter

Section:	**rAtE**
Display:	**SCL**
Range:	**1** to Maximum display value
Default Value:	**1**
Default Access Level	**4**
Function number	**4C46**

Displays and sets the scale factor to be used with the ratemeter input setting. Scale and input work together to produce a display as follows:

$$New\,Display = \left(\frac{Input\,frequency\,(Hz)\,\times\,Rate\,Scale}{Rate\,Input} \right)$$

5.21 Ratemeter display filter

Section:	┌**ᴀᴛᴇ**
Display:	**FLᴛ┌**
Range:	**0**, **1**, **2**, **3**, **4**, **5**, **6**, **7**, **8**
Default Value:	**0**
Default Access Level	**4**
Function number	**43C0**

This function is only seen when **┌ᴀᴛᴇ** or **boᴛh** mode is selected. 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. 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.

5.22 Display rounding for ratemeter

Section:	┌**ᴀᴛᴇ**
Display:	**d.┌ᴎd**
Range:	**1** to **5000**
Default Value:	**1**
Default Access Level	**4**
Function number	**43b0**

This function is only seen when **┌ᴀᴛᴇ** or **boᴛh** mode is selected. Displays and sets the display rounding value. This value may be set to 1 to 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. 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.

5.23 Rate low value visual warning

Section:	┌**ᴀᴛᴇ**
Display:	**Lo dıSP**
Range:	Any display value or **OFF**
Default Value:	**OFF**
Default Access Level	**4**
Function number	**4550**

This function is only seen when **┌ᴀᴛᴇ** or **boᴛh** mode is selected. Rate display low overrange limit value - the display can be set to show an overrange message if the display value falls below the **Lo dıSP** setting. For example if **Lo dıSP** is set to 50 then once the display reading falls below 50 the display can be programmed to show an overrange message set by the **dıSP** instead of the normal display units. 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.

5.24 Rate high value visual warning

Section:	**rAtE**
Display:	**Hı dıSP**
Range:	Any display value or **OFF**
Default Value:	**OFF**
Default Access Level	**4**
Function number	**4560**

This function is only seen when **rAtE** or **botH** mode is selected. Rate display high overrange limit value - the display can be set to show an overrange message if the display value falls below the **Hı dıSP** setting. For example if **Hı dıSP** is set to 1000 then once the display reading rises above 1000 the display can be programmed to show an overrange message set by the **dıSP** instead of the normal display units. 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.

5.25 Warning message for low and high display

Section:	**rAtE**
Display:	**dıSP**
Range:	**nOnE**, **FLSH**, **- - - -**, **OF.UF**, **Hı .Lo**
Default Value:	**nOnE**
Default Access Level	**4**
Function number	**4570**

This function is only seen when **rAtE** or **botH** mode is selected. Display overrange warning flashing mode - this function is used in conjunction with the **Lo dıSP** and **Hı dıSP** functions. If the display warning value set at the **Lo dıSP** or **Hı dıSP** function is exceeded and the **dıSP** function is set to **FLSH** then the display value will ash on and off every second as a visual warning. If the display warning value set at the **Lo dıSP** or **Hı dıSP** function is exceeded and the **dıSP** function is set to **- - - -** then the display the **- - - -** message will flash once per second. If the display warning value set at the **Lo dıSP** or **Hı dıSP** function is exceeded and the **dıSP** function is set to **OF.UF** then the display the **-OF -** message will flash once per second if the high limit is exceeded or **-UF -** if the low limit is exceeded. If the display warning value set at the **Lo dıSP** or **Hı dıSP** function is exceeded and the **dıSP** function is set to **Hı .Lo** then the display the **-Hı -** message will flash once per second if the high limit is exceeded or **-Lo -** if the low limit is exceeded. A setting of **nOnE** will disable this function. 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.

5.26 Rate/frequency range

Section:	**rAtE**
Display:	**rn9E**
Range:	**Lo.F**, **Hı .F**, **AU9E**, **r.AU9**
Default Value:	**Hı .F**
Default Access Level	**4**
Function number	**4C4E**

Select **Lo.F** if the input frequency is likely to be lower than 4Hz and not greater than 1kHz.

Select **Hı .F** for frequencies with a minimum input frequency of 3Hz or higher (maximum input frequency is 100kHz).

Select **AU9E** for an averaged display. The averaged display allows the input rate to be averaged over

a period of seconds set by the **A.SEc** function. An averaged display is particularly useful when the input is irregular. By averaging the pulses over a period of time the display will give a more stable reading for these irregular pulses.

Select **r.AUg** for a "rolling averaged" display (note the **FLtr** function is not available when this mode is selected). The rolling average allows the frequency/rate reading to be averaged over a period set by the **A.SEc** function but this average is taken over a programmable number of counts set at the **A.cnt** function. For example if the with the **rngE** function set to **r.AUg** (rolling average), the **A.SEc** function set to 300 (300 seconds or 5 minutes) and the **r.AUg** (average count) function set to 12 the display will be averaged and updated every 5 minutes with each new update showing not the average of the last 5 minutes but the average of the last 12 x 5 minute (1 hour) time periods. For this example starting with a zero display a steady input scaled to read 1200 per hour would read 100 after the first 5 minutes, 200 after the second 5 minutes etc. up to 1200 after 1 hour (12 x 5 minutes). Beyond this time the display will update every 5 minutes showing the average over the last 12 x 5 minute time periods. The rate will be zeroed when the display is switched off or if the input stops for a sufficient time to allow the rate to fall to zero.

5.27 Timeout for low frequency input

Section:	**rAtE**
Display:	**t.Out**
Range:	**1** to **3200** secs
Default Value:	**10**
Default Access Level	**4**
Function number	**4C6C**

Only seen if **Lo.F** is selected at the **rngE** function. Displays and sets the time out in seconds when using the low frequency range. The timeout allows very low frequency inputs to be used without the display reverting to zero between samples. If no input pulses are received the display holds the previous display value for the time out period. If a pulse is received during this time the display will update. If no pulses are received or the input period exceeds the time out value set then the display will indicate zero.

5.28 Time period for average rate display

Section:	**rAtE**
Display:	**A.SEc**
Range:	**1** to **5000** secs
Default Value:	**1**
Default Access Level	**4**
Function number	**4C6E**

Only seen if **AUgE** or **r.AUg** is selected under the **rngE** function. Displays and sets the number of seconds over which the rate should be averaged. The rate display will not update until the end of the average seconds time. This function allows the user to select a display update rate most suitable for applications in which the rate input may be irregular.

5.29   Counts for average rate display

Section:	`rAtE`
Display:	`A.cnt`
Range:	`0` to `30`
Default Value:	`1`
Default Access Level	`4`
Function number	`4C70`

Only seen if `r.AVg` is selected at the `rngE` function. Sets the number of time periods counted over which the rolling average display will be calculated. For example if the `A.SEc` is set to 60 and the `1` is set to 10 then the rolling average displayed will be the average of the last ten 60 second averaged periods.

5.30   Rate `USEr` scaling mode frequency 1

Section:	`rAtE`
Display:	`CAL in1`
Range:	Any display value
Default Value:	n/a
Default Access Level	`CAL`
Function number	`46E0`

When the `USEr` method of scaling is chosen at the `USEr CAL` function the user can enter two frequency values in Hz via the pushbuttons and enter a scale value for each frequency. This method or the `LivE` method can used when the display is required to be not directly related to the actual frequency input e.g. when a display of zero is required for an input which is not zero Hz. The method used is as follows:

- at the `CAL in1` function press the **F** button then use the **▲** or **▼** pushbuttons to select the required first frequency.

- Press **F** when the required first frequency is shown (a `CAL End` message should be seen) then press the **▲** pushbutton to move to the first scale function `CAL SCL.1`.

- Press **F** then use the **▲** or **▼** pushbuttons to select the required scale value for the first frequency. e.g. if a display reading of zero is required for a 1000 Hz input frequency then set `CAL in1` to `1000` and set `CAL SCL.1` to `0`.

It is necessary to enter two scaling points so repeat the process using a different frequency and scale selection using `CAL in2` and `CAL SCL.1`.

5.31   Rate `USEr` scaling mode scale 1

Section:	`rAtE`
Display:	`CAL SCL.1`
Range:	Any display value
Default Value:	n/a
Default Access Level	`CAL`
Function number	`4700`

First scale input value for `USEr` scaling mode. See the `CAL in1` function for explanation.

5.32   Rate **USEr** scaling mode frequency 2

Section:	**rAtE**
Display:	**CAL In2**
Range:	Any display value
Default Value:	n/a
Default Access Level	**CAL**
Function number	**46F0**

Second frequency input value for **USEr** scaling mode. See the **CAL In1** function for explanation.

5.33   Rate **USEr** scaling mode scale 2

Section:	**rAtE**
Display:	**CAL SCL.2**
Range:	Any display value
Default Value:	n/a
Default Access Level	**CAL**
Function number	**4710**

Second scale input value for **USEr** scaling mode. See the **CAL In1** function for explanation.

5.34   Rate **LIvE** scaling mode uncalibration (scaling reset)

Section:	**rAtE**
Display:	**U.CAL**
Range:	n/a
Default Value:	n/a
Default Access Level	**CAL**
Function number	**0b20**

This function can be used to reset the display to its default input of 1Hz displays **1** (or **1.0** etc.). To reset the display scaling go to the **U.CAL** function and press ▤ then toggle using the ▲ or ▼ pushbutton from **no** to **YES** and press ▤. The display should show the message **U.CAL End** to indicate that the scaling has been reset to default.

5.35   Rate **LIvE** scaling mode input frequency 1

Section:	**rAtE**
Display:	**CAL 1**
Range:	n/a
Default Value:	n/a
Default Access Level	**CAL**
Function number	**0b00**

This function is only used and seen when the **CAL In1** is set to **LIvE**. This method of scaling allows the user to apply two different known frequencies at the **CAL In1** and **CAL In2** functions and at each of these functions apply a scale value for each input (**CAL1 SCLE** and **CAL2 SCLE**). The method used to scale in the **LIvE** mode is:

- Apply the first known frequency to the input.

- At the **CAL 1** function press ▤ then toggle using the ▲ or ▼ pushbutton from **no** to **YES** and press ▤. A display reading should now be seen. The value displayed is not important but it must be stable before proceeding.

- Press **F**, the message **rAtE CAL1 SCLE** will be seen followed by a value. Use **▲** or **▼** to set the display value required for the first input frequency then press **F**. The message **CAL End** should be seen to indicate that the first scaling point is increased.

It is necessary to enter two scaling points so repeat the process using a different frequency and scale selection at the **CAL2** function.

If an error message is seen e.g. **CAL FAIL** proceed to the second scaling point and perform the second input and scaling anyway. If the error message is seen at both scaling points then check the input signal and input settings.

5.36 Rate **LiUE** scaling mode input frequency 2

Section:	**rAtE**
Display:	**CAL2**
Range:	n/a
Default Value:	n/a
Default Access Level	**CAL**
Function number	**0b10**

Second frequency and scale input value for **LiUE** scaling mode. See the **CAL1** function for explanation.

5.37 Rate **LiUE** display offset

Section:	**rAtE**
Display:	**OFSt**
Range:	n/a
Default Value:	n/a
Default Access Level	**CAL**
Function number	**0b60**

This function can be used to apply an offset value to the display reading, it is only used and seen when the **CAL1 M1** is set to **LiUE**. When applying an offset the offset value will be added or subtracted across the measuring range.

The method used to apply an offset in the **LiUE** mode is:

- Apply a known frequency to the input.

- At the **OFSt** function press **F** then toggle using the **▲** or **▼** pushbutton from **NO** to **YES** and press **F**.

- The current value will be displayed. Press **F** and use the **▲** or **▼** pushbutton to adjust the current value to the required display value for that input.

- When the required display value is set press **F** to accept and store this new value. The message **OFSt End** will be displayed.

5.38   Decimal point setting for totaliser

Section:	**tOt**
Display:	**d.Pnt**
Range:	**0**, **0.1**, **0.02**, **0.003**
Default Value:	**0**
Default Access Level	**4**
Function number	**4102**

This function is only seen when **tOtL** or **both** mode is selected a the. Displays and sets the decimal point position for the total display. For example selecting **0** will mean no decimal points (e.g. a display such as **25**), **0.1** means 1 decimal point place (e.g. **2.4**), **0.02** gives 2 decimal point places (e.g. **2.35**) etc. The maximum number of decimal point places is one less than the number of digits on the display e.g. a 4 digit display can have 3 decimal points, a 6 digit display can have 5 decimal points etc. Note: If the number of decimal points is altered then the display scaling figure (**SCL**) will also be affected. Always check the scaling figure following a decimal point change and alter as required.

5.39   Input value for totaliser

Section:	**tOt**
Display:	**inPt**
Range:	**1** to Maximum display value
Default Value:	**1**
Default Access Level	**4**
Function number	**4C52**

This function is only seen when **tOtL** or **both** mode is selected. Displays and sets the number of input pulses to be used with the total scale function to generate the display scaling. See examples which follow and the formula below.

5.40   Scale value for totaliser

Section:	**tOt**
Display:	**SCL**
Range:	**1** to Maximum display value
Default Value:	**1**
Default Access Level	**4**
Function number	**4C54**

Displays and sets the scale factor to be used with the total input setting. Scale and input work together to produce a display as follows:

$$New\,total \,=\, Old\,total \,+\, \left(\frac{Input\,pulses\,counted \,\times\, Total\,Scale}{Total\,Input} \right)$$

5.41   Display rounding for totaliser

Section:	**tOt**
Display:	**d.rnd**
Range:	**1** to **5000**
Default Value:	**1**
Default Access Level	**4**
Function number	**43b2**

Displays and sets the display rounding value. This value may be set to 1 to 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. 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.

5.42   Truncation operation

Section:	**tOt**
Display:	**trnc**
Range:	**trnc**, **rnd**
Default Value:	**trnc**
Default Access Level	**4**
Function number	**4C56**

This function is only seen when **tOtL** or **both** mode is selected. When set to **rnd** the display will round up to the nearest total value. When set to **trnc** the display will not round up. For example with **inPt** set to 10 and **SCL** set to 1 (i.e. 10 pulses for 1 count) and with the display just reset to zero if truncation is not used then after 6 input pulses the display will round up to show 1. When set for truncation the display will not show 1 until the full 10 input pulses have been received.

5.43   Totaliser count up/down operation

Section:	**tOt**
Display:	**dir**
Range:	**UP**, **doun**, **UP.dn**
Default Value:	**UP**
Default Access Level	**4**
Function number	**4C48**

Allows selection of either count up (**UP**) i.e. total increments when incoming pulses are received or count down (**doun**) i.e. total decrements when incoming pulses are received or allow the up/down count to be controlled by the state of the input on input 2 (**UP.dn** selection).

5.44   Grand total operation mode

Section:	**tOt**
Display:	**9.tot**
Range:	**nonE**, **For**, **rEu**, **PoS**, **nE9**, **AbS**
Default Value:	**nonE**
Default Access Level	**4**
Function number	**4C58**

This function is only seen when **tOtL** or **both** mode is selected. Grand total operating mode - By using the ▲ or ▼ pushbutton the display may be toggled between a total or a grand total display (or between rate, total and grand total in **both** mode). The display will briefly show either **rAtE**, **tot1** or **9tot** to indicate what the following total display is showing. A remote input or the **P** button can be programmed to reset the grand total. Six modes of grand total display are provided namely:

nonE, **For**, **rEu**, **PoS**, **nE9** or **AbS**

The table below explains how each mode operates

Mode	Up Count	Down Count
NonE	No effect	No effect
For	The grand total will increase with each up count input pulse. The grand total can show positive and negative totals.	The grand total will decrease with each down count input pulse. The grand total can show positive and negative totals.
rEU	The grand total will decrease with each up count input pulse. The grand total can show both positive and negative totals.	The grand total will increase with each down count input pulse. The grand total can show both positive and negative totals.
PoS	The grand total will increase with each up count input pulse. The grand total display cannot go negative.	The grand total will not register any down count inputs i.e. the grand total will not change when down count only inputs are present. The grand total display cannot go negative.
NEg	The grand total will not register any up count inputs i.e. the grand total will not change when up count only inputs are present. The grand total display cannot go negative.	The grand total will increase with each down count input pulse. The grand total display cannot go negative.
AbS	The grand total will increase with any input pulse whether up or down count. The grand total display cannot go negative.	The grand total will increase with any input pulse whether up or down count. The grand total display cannot go negative.

5.45   Total low value visual warning

Section:	**tOt**
Display:	**Lo diSP**
Range:	Any display value or **OFF**
Default Value:	**OFF**
Default Access Level	**4**
Function number	**4552**

This function is only seen when **tOtL** or **both** mode is selected. Totaliser low overrange limit value - the display can be set to show an overrange message if the display value falls below the **Lo diSP** setting. For example if **Lo diSP** is set to 50 then once the display reading falls below 50 the display can be programmed to show an overrange message set by the **diSP** instead of the normal display units. This message can be used to alert operators to the presence of a total 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.

5.46   Total high value visual warning

Section:	**tOt**
Display:	**Hi diSP**
Range:	Any display value or **OFF**
Default Value:	**OFF**
Default Access Level	**4**
Function number	**4562**

This function is only seen when **tOtL** or **both** mode is selected. Totaliser high overrange limit value - the display can be set to show an overrange message if the display value goes below the **Hi diSP** setting. For example if **Hi diSP** is set to 1000 then once the display reading rises above 1000 the display can be programmed to show an overrange message set by the **diSP** instead of the normal display units. This

message can be used to alert operators to the presence of a total 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.

5.47   Warning message for low and high display

Section:	**tOt**
Display:	**dISP**
Range:	**NONE**, **FLSH**, **- - - -**, **Or.Ur**, **Hi.Lo**
Default Value:	**NONE**
Default Access Level	**4**
Function number	**4572**

This function is only seen when **tOtL** or **both** mode is selected. Display overrange warning flashing mode - this function is used in conjunction with the **Lo dISP** and **Hi dISP** functions. If the display warning value set at the **Lo dISP** or **Hi dISP** function is exceeded and the **dISP** function is set to **FLSH** then the display value will ash on and off every second as a visual warning. If the display warning value set at the **Lo dISP** or **Hi dISP** function is exceeded and the **dISP** function is set to **- - - -** then the display the **- - - -** message will flash once per second. If the display warning value set at the **Lo dISP** or **Hi dISP** function is exceeded and the **dISP** function is set to **Or.Ur** then the display the **-Or -** message will flash once per second if the high limit is exceeded or **-Ur -** if the low limit is exceeded. If the display warning value set at the **Lo dISP** or **Hi dISP** function is exceeded and the **dISP** function is set to **Hi.Lo** then the display the **-Hi -** message will flash once per second if the high limit is exceeded or **-Lo -** if the low limit is exceeded. A setting of **NONE** will disable this function. 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.

5.48   Power on total reset

Section:	**tOt**
Display:	**P.On r.SEt**
Range:	**OFF**, **r.SEt**, **P.SEt**
Default Value:	**OFF**
Default Access Level	**4**
Function number	**4C86**

This function is only seen when **tOtL** or **both** mode is selected. The power on reset function can be set to cause the total value in memory to be reset to zero each time the display is powered up. If this function is set to **OFF** then the power up will have no effect on the total.

5.49   Power on grand total reset

Section:	**tOt**
Display:	**9t.On r.SEt**
Range:	**OFF**, **r.SEt**
Default Value:	**OFF**
Default Access Level	**4**
Function number	**4C88**

This function is only seen when **tOtL** or **both** mode is selected. The power on grand total reset function can be set to cause the grand total value in memory to be reset of forced reset to zero each time the display

is powered up. If this function is set to **OFF** then the power up will have no effect on the grand total.

5.50   Total preset value

Section:	**tOt**
Display:	**P.SEt**
Range:	Any display value
Default Value:	**0**
Default Access Level	**4**
Function number	**4C60**

This function is only seen when **tOtL** or **both** mode is selected. When a reset operation is undertaken via the reset input or power on reset then the display can be set to reset to zero or to a preset value, the preset value can be set at this function. Presets are commonly used when counting down from a value towards zero.

5.51   Wrap around operation

Section:	**tOt**
Display:	**UrAP OPEr**
Range:	**OFF**, **r.SEt**, **P.SEt**, **d.rAP**
Default Value:	**r.SEt**
Default Access Level	**4**
Function number	**4C8A**

This function is only seen when **tOtL** or **both** mode is selected. When set to **r.SEt** or **P.SEt** this function allow the display to be forced to automatically reset to zero or the preset value when the value set at **r.UAL** function is reached (count up operation only). If set to **r.SEt** the display will reset to zero and if set to **P.SEt** the display will reset to the preset value set by the **P.SEt** function. When set to **d.rAP** the totaliser will automatically wrap around at the maximum display value when counting up or zero when counting down. For example when set to **d.rAP** when counting up on a 5 digit display if the display shows 99999 the next input count of 1 will cause the display to go to 0 and count up from there. Likewise when counting down with the display at zero the next input count of 1 will cause the display to go to 99999 and count down from there.

5.52   Automatic reset wrap around value

Section:	**tOt**
Display:	**r.UAL**
Range:	Any display value or **OFF**
Default Value:	**OFF**
Default Access Level	**4**
Function number	**4C8C**

This function is only seen when **tOtL** or **both** mode is selected. This function allow the display to be forced to automatically reset when the value set at this function is reached. e.g. the display can be set to reset each time a total value of 1000 is reached.

5.53   Bargraph channel

Section:	**bAr9**
Display:	**Ch**
Range:	**rAtE**, **totL**, **9.tOt**
Default Value:	**rAtE**
Default Access Level	**4**
Function number	**43F6**

Seen only in bargraph display instruments. Displays and sets the channel/input type for the bargraph display to operate from. Choices are:

- **rAtE** - bargraph shows the rate value

- **totL** - bargraph shows the totalised value

5.54   Bargraph type

Section:	**bAr9**
Display:	**tYPE**
Range:	**bAr**, **S.dot**, **d.dot** or **C.bAr**
Default Value:	**bAr**
Default Access Level	**4**
Function number	**43F0**

Seen only in bargraph display instruments. Displays and sets the bargraph display type Choices are:

- **bAr** - conventional solid bargraph display i.e. all LEDs illuminated when at full scale.

- **S.dot** - single dot display. A single segment will be lit to indicate the input readings position on the scale.

- **d.dot** - double dot display. Two segments will be lit to indicate the input reading position on the scale. The reading should be taken from the middle of the two segments.

- **c.bAr** - centre bar display. The display will be a solid bargraph but will have its zero point in the middle of the display. If the seven segment display value is positive the bargraph will rise. If the seven segment display value is negative then the bargraph will fall.

5.55   Bargraph low value

Section:	**bAr9**
Display:	**Lo**
Range:	Any display value
Default Value:	**0**
Default Access Level	**4**
Function number	**43F2**

Seen only in bargraph display instruments. Displays and sets the bar graph low value i.e. the value on the 7 segment display at which the bargraph will start to rise. This may be independently set anywhere within the display range of the instrument. Note: The **bAr9 Lo** and **bAr9 Hi** settings are referenced from the 7 segment display readings, not the bargraph scale values. The bargraph scale may scaled differently to the 7 segment display. For example the bargraph scale may be indicating percentage whilst the 7 segment

display is indicating actual process units. To set bargraph low level go to the **bАг9 Lo** function and use the ▲ or ▼ push buttons to set the value required then press **F** to accept this value.

5.56 Bargraph high value

Section:	**bАг9**
Display:	**H,**
Range:	Any display value
Default Value:	**1000**
Default Access Level	**4**
Function number	**43F4**

Seen only in bargraph display instruments. Displays and sets the bar graph high value i.e. the value on the 7 segment display at which the bargraph will reach its maximum indication. This may be independently set anywhere within the display range of the instrument. Note: The **bАг9 Lo** and **bАг9 H,** settings are referenced from the 7 segment display readings, not the bargraph scale values. The bargraph scale may scaled differently to the 7 segment display. For example the bargraph scale may be indicating percentage whilst the 7 segment display is indicating actual process units. To set bargraph low level go to the **bАг9 H,** function and use the ▲ or ▼ push buttons to set the value required then press **F** to accept this value.

5.57 Input pull up

Section:	**iП1** to **iП2**
Display:	**PULL UP**
Range:	**OPEn**, **H, 9h**, **Lo**
Default Value:	**H, 9h**
Default Access Level	**4**
Function number	**4C00** to **4C01**

Allows electrical pull up or pull down setting of the signal input 1 and count up/down input 2. When set to **H, 9h** approximately 5VDC will be placed on the input internally. When set to **Lo** the input will be pulled down to 0V (signal ground). When set to **OPEn** signals up to 48VDC can be applied. See "Electrical Installation" chapter for further information.

5.58 Input bias

Section:	**iП1** to **iП2**
Display:	**bi АS**
Range:	**OFF**, **On**
Default Value:	**On**
Default Access Level	**4**
Function number	**4C02** to **4C03**

Allows electrical input bias setting of the signal input 1 and count up/down input 2. When set to **On** an input bias voltage will be applied to the input circuit. When set to **OFF** no bias voltage will be applied to the input circuit. This function should be set to **On** when the input signal does not go below 0V. See "Electrical Installation" chapter for further information.

5.59 Input low frequency

Section:	ᛁᨏᛁ to ᛁᨏᖆ
Display:	ᒪoᖴ
Range:	ᗝᖴᖴ, ᗝᨆ
Default Value:	ᗝᖴᖴ
Default Access Level	ᥩ
Function number	ᥩᒪᗝᥩ to ᥩᒪᗝᔞ

Allows application of a low pass filter setting for the signal input 1 and count up/down input 2. When set to **ᗝᨆ** an low pass filter will be applied to the input circuit. When set to **ᗝᖴᖴ** no low pass filter will be applied to the input circuit. This function should be set to **ᗝᨆ** for inputs likely to generate contact bounce such as switch and relay inputs but it can also be useful for blocking higher frequency signals when only low frequency inputs are being used. The filter will only allow signals of approx. 1KHz or lower to pass to the input stage when set for square wave input. For other input types the frequency will depend on input settings amplitude and type of waveform. See "Electrical Installation" chapter for further information.

5.60 Input hysteresis

Section:	ᛁᨏᛁ to ᛁᨏᖆ
Display:	ᕼᎽᔕ�
Range:	ᗝᖴᖴ, ᗝᨆ
Default Value:	ᗝᖴᖴ
Default Access Level	ᥩ
Function number	ᥩᒪᗝᔨ to ᥩᒪᗝᛯ

Allows application "hysteresis" setting for the signal input 1 and count up/down input 2. When set to **ᗝᖴᖴ** the input gain will be set for signals of 25mV to 250mV. When set to **ᗝᨆ** the input gain will be set for signals above 250mV. When set to **ᗝᖴᖴ** the input will accept lower amplitude signals but will also be more likely to pick up electrical noise. See "Electrical Installation" chapter for further information.

5.61 Input attenuation

Section:	ᛁᨏᛁ to ᛁᨏᖆ
Display:	ᗋᖆᖆᨆ
Range:	ᗝᖴᖴ, ᗝᨆ
Default Value:	ᗝᖴᖴ
Default Access Level	ᥩ
Function number	ᥩᒪᗝᛒ to ᥩᒪᗝᖴ

Allows application of a 5 times attenuation for the signal input 1 and count up/down input 2. When set to **ᗝᖴᖴ** no attenuation will be applied. When set to **ᗝᨆ** the input signal will be reduced by a factor of 5 before moving on to the first amplification stage. Applying attenuation can be used to reduce the noise level of the input signal when the input signal itself is large enough to be attenuated e.g. a 0 to 20V square wave will become 0 to 4V square wave after attenuation. See "Electrical Installation" chapter for further information.

5.62   Input DC coupling

Section:	ᴵ Ⴖ ᴵ to ᴵ Ⴖ ₂
Display:	dᴄ
Range:	ᴼFF, ᴼₙ
Default Value:	ᴼₙ
Default Access Level	�
Function number	�ᴄᴼᴬ to �ᴄᴼb

Allows application of DC coupling for the signal input 1 and count up/down input 2. When set to **ᴼFF** no DC coupling be applied. When set to **ᴼₙ** DC coupling will be applied. DC coupling should be used (set to **ᴼₙ**) when using switch or relay inputs or when the input frequency is always going to be less than 10Hz. See "Electrical Installation" chapter for further information.

5.63   Input edge or level

Section:	ᴵ Ⴖ ᴵ to ᴵ Ⴖ ₂
Display:	EdᵍE
Range:	Lo.E, Hɪ.E
Default Value:	Lo
Default Access Level	�
Function number	�ᴄ ᴵᴼ to �ᴄ ᴵᴵ

Allows selection of input edge or level for the signal input 1 and count up/down input 2.
Select **Lo.E** for the input to be triggered by a low going edge i.e. falling from a voltage towards zero.
Select **Hɪ.E** for the input to be triggered by a high going edge i.e. rising from a low voltage.
See "Electrical Installation" chapter for further information.

5.64   Input de-bounce timer

Section:	ᴵ Ⴖ ᴵ to ᴵ Ⴖ ₂
Display:	d.bₙᴄ
Range:	ᴼ to ᴵ5 ms
Default Value:	ᴼ
Default Access Level	�
Function number	�ᴄ ᴵ8 to �ᴄ ᴵ9

Allows application of a de-bounce timer for the signal input terminal. A de-bounce time of between 0 and 1000mS can be set. When a de-bounce time is set the signal level before the input trigger signal must have been at that level for the de-bounce time or longer. This is used to help prevent false triggering due to relay or switch contact bounce or signals with high frequency noise. For example if the input is triggered by a high level or high going edge and the de-bounce time is set to 10mS then the input would have to be at a low level for at least 10mS before the input is triggered, if not then the input trigger will not be accepted. At a setting of 10mS (assuming a symetrical waveform with period of 20mS (2 x 10mS)) frequencies above approx. 50Hz (1/20mS) will be rejected and not totalised or shown as rate value. Similarly a setting of 20mS (assuming period of 40mS) would reject frequencies above approx. 25Hz. See "Electrical Installation" chapter for further information.

5.65 Output voltage selection

Section:	**P.Out**
Display:	**P.Out**
Range:	**5U**, **12U** or **18U**
Default Value:	**5U**
Default Access Level	**4**
Function number	**4COF**

Allows selection of the output voltage where available on the input board. 5V 12V or 18VDC (25mA max.) is available as transmitter supply this function allow selection of 5V (**5U**) or 12V (**12U**) or 18V (**18U**). Transmitter supply voltages are approximate.

5.66 Output selection for analog output 1

Section:	**rO1**
Display:	**OutP**
Range:	**4-20**, **0-1.0**, **0-10**
Default Value:	**4-20**
Default Access Level	**4**
Function number	**414O**

Seen only when 16 bit analog retransmission option with choice of outputs is fitted. If the 4-20mA only output is fitted then this function will not be seen. Sets the output type for the 16 bit analog output. Choices are:

- **4-20** for 4 to 20mA output

- **0-1.0** for 0 to 1VDC output

- **0-10** for 0 to 10VDC output

To set the selection go to the **OutP** function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

5.67 Input selection for analog output 1

Section:	**rO1**
Display:	**InPt**
Range:	**CH1**, **CH2**, **rtd1**, **rtd2**
Default Value:	**CH1**
Default Access Level	**4**
Function number	**43EO**

Seen only when analog retransmission option fitted. Sets the input from which the first analog output will operate. Selections available are:
CH1 output operates from value of channel 1
CH2 output operates from value of channel 2 (only available if 2 channels selected)
rtd1 output operates from value of temperature input 1
rtd2 output operates from value of temperature input 2 (only available if 2 temperature sensors selected)

To set the selection go to the **InPt** function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

5.68 Analog output 1 PI control on or off

Section:	rO1
Display:	P.Ctl
Range:	no or YES
Default Value:	no
Default Access Level	4
Function number	4600

Allows selection of retransmission (**no**) or PI control analog output (**YES**). If set to **no** then the analog output will operate as a retransmission output using the limits set at the **Lo** and **HiGH** functions. If set to **YES** then the analog output will operate as a PI control output and the PI control functions will appear.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the selection go to the **P.Ctl** function, press **F** and when you see the decimal points flash use the **▲** or **▼** push buttons to select the required setting then press **F** to accept this selection.

5.69 Analog output 1 PI control setpoint

Section:	rO1
Display:	SEtP
Range:	Any display value
Default Value:	0
Default Access Level	4
Function number	4610

Allows selection of the PI control setpoint.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the selection go to the **SEtP** function, press **F** and when you see a digit of the value flash use the **▲** or **▼** push buttons to set the required value then press **F** to accept this selection.

5.70 Analog output 1 PI control span

Section:	rO1
Display:	SPAn
Range:	Any display value
Default Value:	1000
Default Access Level	4
Function number	4618

Allows selection of the PI control span.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the value go to the **SPAn** function, press **F** and when you see a digit of the value flash use the **▲**

or ▼ push buttons to set the required value then press **F** to accept this selection.

5.71 Analog output 1 PI control proportional gain

Section:	*rO1*
Display:	*P.9*
Range:	Any display value
Default Value:	*1.000*
Default Access Level	*4*
Function number	*4620*

Allows selection of the PI control proportional gain.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the value go to the *P.9* function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

5.72 Analog output 1 PI control integral gain

Section:	*rO1*
Display:	*I.9*
Range:	Any display value
Default Value:	*0.000*
Default Access Level	*4*
Function number	*4628*

Allows selection of the PI control integral gain.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the value go to the *I.9* function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

5.73 Analog output 1 PI control integral high limit

Section:	*rO1*
Display:	*I.H*
Range:	*0* to *100.0* %
Default Value:	*1.000*
Default Access Level	*4*
Function number	*4638*

Allows selection of the PI control integral high limit.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the value go to the ⌐.H function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

5.74 Analog output 1 PI control integral low limit

Section:	⌐0 ⌐
Display:	⌐.L
Range:	0 to 100.0 %
Default Value:	1.000
Default Access Level	4
Function number	4640

Allows selection of the PI control integral low limit.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the value go to the ⌐.L function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

5.75 Analog output 1 PI control bias

Section:	⌐0 ⌐
Display:	b⌐ A5
Range:	0 to 100.0 %
Default Value:	50.0
Default Access Level	4
Function number	4648

Allows selection of the PI control bias.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the value go to the b⌐ A5 function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

5.76 Analog output 1 option low value

Section:	⌐0 ⌐
Display:	Lo
Range:	Any display value
Default Value:	0
Default Access Level	4
Function number	4120

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details.

Displays and sets the analog retransmission output low value (4mA or 0V) in displayed engineering units. To set the selection go to the Lo function, press **F** and when you see a digit of the value flash use the

▲ or ▼ push buttons to set the required value then press F to accept this selection.

Example: If it is required to retransmit 4mA when the display indicates *0* then select *0* in this function using the ▲ or ▼ button.

5.77   Analog output option high value

Section:	*ro 1*
Display:	*Hi gh*
Range:	Any display value
Default Value:	*1000*
Default Access Level	*4*
Function number	*4130*

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details.

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

To set the value go to the *Hi gh* function, press F and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press F to accept this selection.

Example: If it is required to retransmit 20mA when the display indicates *50* then select *50* in this function using the ▲ or ▼ button.

5.78   Output selection for analog output 1

Section:	*ro 1*
Display:	*OutP*
Range:	*4-20 , 0- 1.0 , 0- 10*
Default Value:	*4-20*
Default Access Level	*4*
Function number	*4140*

Seen only when 16 bit analog retransmission option with choice of outputs is fitted. If the 4-20mA only output is fitted then this function will not be seen. Sets the output type for the 16 bit analog output. Choices are:

- *4-20* for 4 to 20mA output

- *0- 1.0* for 0 to 1VDC output

- *0- 10* for 0 to 10VDC output

To set the selection go to the *OutP* function, press F and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press F to accept this selection.

5.79 Input selection for analog output 1

Section:	⌐0 1
Display:	ı ⌐PŁ
Range:	⌐RŁE, ŁoŁL, 9.ŁoŁ
Default Value:	⌐RŁE
Default Access Level	4
Function number	43E0

Seen only when an analog retransmission option fitted. Sets the input from which the first analog output will operate. Note a choice will only exist when the operation is set to **boŁh** mode i.e. both rate and total displays. Selections available are:

⌐RŁE - output operates from rate value

ŁoŁL - output operates from total value

5.80 Analog output 1 PI control on or off

Section:	⌐0 1
Display:	P.CŁı
Range:	⌐0 or 4ES
Default Value:	⌐o
Default Access Level	4
Function number	4600

Allows selection of retransmission (**⌐o**) or PI control analog output (**4ES**). If set to **⌐o** then the analog output will operate as a retransmission output using the limits set at the **Lo** and **H, 9H** functions. If set to **4ES** then the analog output will operate as a PI control output and the PI control functions will appear.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the selection go to the **P.CŁı** function, press 🄵 and when you see the decimal points flash use the 🔼 or 🔽 push buttons to select the required setting then press 🄵 to accept this selection.

5.81 Analog output 1 option low value

Section:	⌐0 1
Display:	Lo
Range:	Any display value
Default Value:	0
Default Access Level	4
Function number	4 120

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details.

Displays and sets the analog retransmission output low value (4mA or 0V) in displayed engineering units. To set the selection go to the **Lo** function, press 🄵 and when you see a digit of the value flash use the 🔼 or 🔽 push buttons to set the required value then press 🄵 to accept this selection.

Example: If it is required to retransmit 4mA when the display indicates **0** then select **0** in this function

using the ▲ or ▼ button.

5.82 Analog output option high value

Section:	⌐o¹
Display:	Hɪ 9h
Range:	Any display value
Default Value:	¹000
Default Access Level	4
Function number	4¹30

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details.

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

To set the value go to the **Hɪ 9h** function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

Example: If it is required to retransmit 20mA when the display indicates **50** then select **50** in this function using the ▲ or ▼ button.

5.83 Analog output 1 PI control setpoint

Section:	⌐o¹
Display:	5EtP
Range:	Any display value
Default Value:	0
Default Access Level	4
Function number	46¹0

Allows selection of the PI control setpoint.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the selection go to the **5EtP** function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

5.84 Analog output 1 PI control span

Section:	⌐o¹
Display:	5PAn
Range:	Any display value
Default Value:	¹000
Default Access Level	4
Function number	46¹8

Allows selection of the PI control span.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog

PI control output" chapter for a full description of the analog PI control functions.

To set the value go to the **SPAn** function, press **F** and when you see a digit of the value flash use the **▲** or **▼** push buttons to set the required value then press **F** to accept this selection.

5.85 Analog output 1 PI control proportional gain

Section:	**rO1**
Display:	**P.g**
Range:	Any display value
Default Value:	**1.000**
Default Access Level	**4**
Function number	**4620**

Allows selection of the PI control proportional gain.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the value go to the **P.g** function, press **F** and when you see a digit of the value flash use the **▲** or **▼** push buttons to set the required value then press **F** to accept this selection.

5.86 Analog output 1 PI control integral gain

Section:	**rO1**
Display:	**I.g**
Range:	Any display value
Default Value:	**0.000**
Default Access Level	**4**
Function number	**4628**

Allows selection of the PI control integral gain.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the value go to the **I.g** function, press **F** and when you see a digit of the value flash use the **▲** or **▼** push buttons to set the required value then press **F** to accept this selection.

5.87 Analog output 1 PI control integral high limit

Section:	**rO1**
Display:	**I.H**
Range:	**0** to **100.0** %
Default Value:	**1.000**
Default Access Level	**4**
Function number	**4638**

Allows selection of the PI control integral high limit.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog

PI control output" chapter for a full description of the analog PI control functions.

To set the value go to the ¦.H function, press ▣ and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press ▣ to accept this selection.

5.88   Analog output 1 PI control integral low limit

Section:	rO¦
Display:	¦.L
Range:	0 to 100.0 %
Default Value:	1.000
Default Access Level	4
Function number	4640

Allows selection of the PI control integral low limit.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the value go to the ¦.L function, press ▣ and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press ▣ to accept this selection.

5.89   Analog output 1 PI control bias

Section:	rO¦
Display:	b¦AS
Range:	0 to 100.0 %
Default Value:	50.0
Default Access Level	4
Function number	4648

Allows selection of the PI control bias.

Seen only when analog retransmission option fitted. Refer to the separate "PM5 Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details. Refer to the addendum "Analog PI control output" chapter for a full description of the analog PI control functions.

To set the value go to the b¦AS function, press ▣ and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press ▣ to accept this selection.

5.90   Output selection for analog output 2

Section:	rO2
Display:	OutP
Range:	4-20, 0-1.0 or 0-10
Default Value:	4-20
Default Access Level	4
Function number	4141

Seen only when dual 16 bit analog retransmission option fitted. Sets the output type for the 16 bit analog output. Choices are:

4-20 for 4 to 20mA output

⌐ ⌐ **⌐ ⌐** for 0 to 1VDC output

⌐ ⌐ ⌐⌐ for 0 to 10VDC output

To set the selection go to the **⌐⌐⌐⌐** function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

5.91 Input selection for analog output 2

Section:	**⌐⌐⌐**
Display:	**⌐⌐⌐⌐**
Range:	**⌐⌐⌐⌐**, **⌐⌐⌐⌐**, **⌐.⌐⌐⌐**
Default Value:	**⌐⌐⌐⌐**
Default Access Level	**4**
Function number	**43⌐⌐**

Seen only when a dual analog retransmission option fitted. Sets the input from which the first analog output will operate. Note a choice will only exist when the operation is set to **⌐⌐⌐⌐** mode i.e. both rate and total displays. Selections available are:
⌐⌐⌐⌐ - output operates from rate value
⌐⌐⌐⌐ - output operates from total value

5.92 Analog output 2 PI control on or off

Section:	**⌐⌐⌐**
Display:	**⌐.⌐⌐⌐**
Range:	**⌐⌐** or **⌐⌐⌐**
Default Value:	**⌐⌐**
Default Access Level	**4**
Function number	**46⌐⌐**

Allows selection of retransmission (**⌐⌐**) or PI control analog output (**⌐⌐⌐**). See function **⌐⌐⌐⌐.⌐⌐⌐** for further details.

5.93 Analog output 2 option low value

Section:	**⌐⌐⌐**
Display:	**⌐⌐**
Range:	Any display value
Default Value:	**⌐**
Default Access Level	**4**
Function number	**4⌐⌐⌐**

Seen only when dual analog retransmission option fitted. See function **⌐⌐⌐⌐⌐** for further details.

5.94   Analog output option 2 high value

Section:	`rO2`
Display:	`Hi 9h`
Range:	Any display value
Default Value:	`1000`
Default Access Level	`4`
Function number	`4131`

Seen only when dual analog retransmission option fitted. See function `rO1 Hi 9h` for further details.

5.95   Analog output 2 PI control setpoint

Section:	`rO2`
Display:	`SEtP`
Range:	Any display value
Default Value:	`0`
Default Access Level	`4`
Function number	`4611`

Allows selection of the PI control setpoint.

Seen only when dual analog retransmission option fitted. See function `rO1 SEtP` for further details.

5.96   Analog output 2 PI control span

Section:	`rO2`
Display:	`SPAn`
Range:	Any display value
Default Value:	`1000`
Default Access Level	`4`
Function number	`4619`

Allows selection of the PI control span for analog output 2. See function `rO1 SPAn` for further details.

5.97   Analog output 2 PI control proportional gain

Section:	`rO2`
Display:	`P.9`
Range:	`-32.768` to `32.767`
Default Value:	`1.000`
Default Access Level	`4`
Function number	`4621`

Allows selection of the PI control proportional gain. See function `rO1 P.9` for further details.

5.98 Analog output 2 PI control integral gain

Section:	*rO2*
Display:	*I.9*
Range:	*-32.768* to *32.767*
Default Value:	*0.000*
Default Access Level	*4*
Function number	*4629*

Allows selection of the PI control integral gain. See function *rO11.9* for further details.

5.99 Analog output 2 PI control integral high limit

Section:	*rO2*
Display:	*I.H*
Range:	*0.0* to *100.0*
Default Value:	*1.000*
Default Access Level	*I.H*
Function number	*4639*

Allows selection of the PI control integral high limit. See function *rO11.H* for further details.

5.100 Analog output 2 PI control integral low limit

Section:	*rO2*
Display:	*I.L*
Range:	*0.0* to *100.0*
Default Value:	*1.000*
Default Access Level	*4*
Function number	*4641*

Allows selection of the PI control integral low limit. See function *rO11.L* for further details.

5.101 Analog output 2 PI control bias

Section:	*rO2*
Display:	*b.AS*
Range:	*0.0* to *100.0*
Default Value:	*50.0*
Default Access Level	*4*
Function number	*4649*

Allows selection of the PI control bias. See function *rO1b.AS* for further details.

5.102   Front P button operation mode

Section:	*r.i np*
Display:	*P.but*
Range:	*nOnE*, *P.Hi*, *P.Lo*, *Hi.Lo*, *AL.Ac*, *rSEt*, *9.rSt*, *PSEt*
Default Value:	*nOnE*
Default Access Level	*4*
Function number	*4720*

Sets the operation mode for front 🅿 button. Functions available are identical to the same functions used in the *r.i n.i* function.

5.103   Remote input 1 operation mode

Section:	*r.i np*
Display:	*r.i n.i* to *r.i n.2*
Range:	*nOnE*, *P.Hi d*, *d.Hi d*, *P.Hi*, *P.Lo*, *Hi.Lo*, *AL.Ac*, *ACCS*, *P.but*, *F.but*, *U.but*, *d.but*, *dui i*, *rSEt*, *9.rSt*, *StoP*, *PSEt*
Default Value:	*nOnE*
Default Access Level	*4*
Function number	*472 i* to *4722*

Sets the operation mode for remote input 1 terminal. Choices are as follows:

- **nOnE** - If this option is selected then remote input 1 will have no function.

- **P.Hol d** - peak hold. The display will show the peak rate 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.Hi d** will appear briefly every 8 seconds whilst the input terminals are short circuited to indicate that the peak hold function is active. All active channels will be peak held when this mode is chosen and activated. Not applicable to total or grand total display.

- **d.Hol d** - display hold. The rate 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. All active channels will be display held when this mode is chosen and activated. Not applicable to total or grand total display.

- **P.Hi** - peak memory. The peak rate 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 return to normal measurement after 20 seconds. If the short circuit is held for 2 to 3 seconds or the power is removed from the instrument then the memory will be reset, a **rSt** message will be seen if the memory is reset by holding a short circuit for 2 to 3 seconds. The peak high mode will operate on all active channels. Not applicable to total or grand total display.

- **P.Lo** - valley memory. The minimum rate value stored in memory will be displayed. Otherwise operates in the same manner as the **P.Hi** function described above. The peak low mode will operate on all active channels. Not applicable to total or grand total display.

- **Hi Lo** - toggle between **Hi** and **Lo** displays. This function allows the remote input to be used to toggle between peak and valley rate memory displays. The first operation of the remote input will cause the peak memory value to be displayed, the next operation will give a valley memory display. **P.Hi** or **P.Lo** will flash before each display to give an indication of display type. The peak high/low mode will operate on all active channels. Not applicable to total or grand total display.

- **Ai .AC** - alarm acknowledge. Allows the remote input to be used to acknowledge an alarm. If the alarm is set for latching operation the acknowledgment will allow the alarm and any relays allocated

to that alarm to reset when the alarm condition is removed. If the alarm is set for automatic reset the acknowledgment will allow the alarm and any relays allocated to that alarm to reset even if the alarm condition still exists this could typically be used to silence a siren controlled by a relay even though the alarm condition is still present. The acknowledge will operate on all alarms programmed to require acknowledgement.

- **ACCS** - remote input access. Allows the remote input to be used for setup function access control purposes. Refer to the " Accessing setup functions" in the Introduction chapter.

- **P.but** - allows the selected remote input to act as the **P** pushbutton.

- **F.but** - allows the selected remote input to act as the **F** pushbutton.

- **U.but** - allows the selected remote input to act as the ▲ pushbutton.

- **d.but** - allows the selected remote input to act as the ▼ pushbutton.

- **dul1** - remote dulling of the display. When activated the display brightness will fall to the level set by the **d1SP dul1** level. This is generally used to reduce current consumption in battery powered applications or for switching between day and night brightness levels.

- **rSEt** - zero the display. This mode allows the remote input to be used as a reset to zero input for the total seen in the **tOtL** and **both** modes.

- **9.rSt** - grand total reset. This mode allows the remote input to be used as a reset input for the grand total seen in the **tOtL** and **both** modes.

- **StoP** - totaliser inhibit - the total display value will be held and any input pulses ignored whilst the remote input is short circuited. Not applicable to rate display.

- **PSEt** - preset the display. This mode allows the remote input to be used as a set display to the preset value input for the total seen in the **tOtL** and **both** modes. The preset value is set at the **tOt P.SEt** function.

5.104   Remote input 2 operation mode

Section:	**r.1 nP**
Display:	**r.1 n.2**
Range:	**nOnE**, **P.HI d**, **d.HI d**, **P.HI**, **P.Lo**, **HI.Lo**, **AL.Ac**, **ACCS**, **P.but**, **F.but**, **U.but**, **d.but**, **dul1**, **rSEt**, **9.rSt**, **StoP**, **PSEt**
Default Value:	**nOnE**
Default Access Level	**4**
Function number	**4722**

Remote input 2 functions. Same choices as **r.1 nP r.1 n.1** apply.

5.105   Display brighness

Section:	**d1SP**
Display:	**br9t**
Range:	**1** to **16**
Default Value:	**16**
Default Access Level	**2**
Function number	**22Fb**

Displays and sets the dulled digital display brightness. The display brightness is selectable from 1 to 16, 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.

To set brightness level go to the **br9t** function press **F** and when you see a digit of the value flash use the **▲** or **▼** push buttons to set the required value then press **F** to accept this selection.

5.106 Dimmed display brighness

Section:	**di.SP**
Display:	**dull**
Range:	**0** to **16**
Default Value:	**2**
Default Access Level	**2**
Function number	**22EC**

Displays and sets the level for remote input brightness switching. 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 and the dimmed display brightness set by the **dull** function. The display dull level is selectable from **0** to **16**, where **0** = lowest intensity and **16** = highest intensity. This function is useful in reducing glare when the display needs to be viewed in both light and dark ambient light levels.

5.107 Serial operation mode

Section:	**SEri**
Display:	**OPEr**
Range:	**NonE**,**Cont**,**Poll**,**A.buS**,**diSP**,**m.buS** or **ChAn**
Default Value:	**NonE**
Default Access Level	**4**
Function number	**4480**

Allows selection of the operating mode to be used for serial RS232 or RS485 communications. See the "PM5 Panel Meter Optional Output Addendum" Choices are:

- **NonE** - no serial comms. required.

- **Cont** - sends ASCII form of display data at a rate typically 90% of the sample rate. The value or values sent depend on the operation mode chosen at the **CH1 OPEr** function.
  In rate (**rAtE**) display mode the value sent will be a start of text character followed by the rate value and ending in a carriage return.
  In total (**totL**) display mode the value sent will be a start of text character followed by the total value and ending in a carriage return.
  In both (**both**) mode (rate and total) the value sent will be a start of text character followed by the rate value followed by a comma then the total value and ending in a carriage return.
  For **totL** and **both** modes if the grand total display is enabled at the **9.tot** function then the grand total will be sent after the total, comma separated.

- **Poll** - controlled by computer or PLC etc. as host. The host sends command via RS232/485 and instrument responds as requested.

- **A.buS** - this is a special communications mode used with Windows compatible optional PC download software. Refer to the user manual supplied with this optional software.

- **diSP** - sends image data from the display without conversion to ASCII. This mode should only be used when the serial output is connected to another display from the same manufacturer.

- **m̄.buS** - Modbus RTU.

- **ChAn** - Operates in a similar manner to **Cont** mode but only outputs the value chosen at the **SEri Ch** function.

5.108   Serial operation channel

Section:	**SEri**
Display:	**Ch**
Range:	**rAtE**, **totL**, **9.tot**
Default Value:	**rAtE**
Default Access Level	**4**
Function number	**4485**

Allows selection of either rate, total or grand total for serial comms. when the **CH 1 OPEr** function is set to **both**. If **CH 1 OPEr** function is set to **rAtE** then only rate can be chosen. If **CH 1 OPEr** function is set to **totL** then total or grand total (if grand total is enabled) can be chosen.

5.109   Serial baud rate

Section:	**SEri**
Display:	**bAud**
Range:	**1200**, **2400**, **4800**, **9600**, **19.2**, **38.4**, **57.6**, **115.2**
Default Value:	**9600**
Default Access Level	**4**
Function number	**4484**

Allows the baud rate to be set for serial communications. Choices are:

1200,**2400**,**4800**,**9600**, **19200**,**38400**,**57600** or **115200**

5.110   Serial parity

Section:	**SEri**
Display:	**PrtY**
Range:	**8n**, **8E**, **8o**, **7E**, **7o**
Default Value:	**8n**
Default Access Level	**4**
Function number	**4482**

Allows selection of the parity check. The parity check selected should match that of the device it is being communicated with.

5.111 Serial address

Section:	SErı
Display:	Unıt Rddr
Range:	1 to 127
Default Value:	1
Default Access Level	4
Function number	0430

Allows selection of the unit address when the operation is set for **POLL** mode. The unit address is offset by 32(DECIMAL) to avoid clashing with ACSII special characters, therefore 42 (DECIMAL) or 2A (HEX) would be unit address 10.

5.112 Serial error display

Section:	SErı
Display:	Err dıSP
Range:	OFF or On
Default Value:	On
Default Access Level	4
Function number	4483

When set to **On** the selected error display will be sent via the serial comms to any connected slave display. When sent to **OFF** the selected speed error display will not be sent. For example if rate visual warning function **dıSP** is set to **Or.Ur** then when this error display is seen on the main display it will also be seen on the slave display if the **Err dıSP** function is set to **On**. If this function is set to **OFF** the value sent to the slave display would be whatever would be on the main display if it were not showing the error message, for example the value transmitted might still be the actual speed. Depending on the **dıSP** selection it may be necessary to use the skip or back count functions in the slave display to align the warning message.

5.113 Select number of alarms

Section:	RL.CF
Display:	RL Cnt
Range:	0, 1, 2, 3, 4, 5, 6, 7, 8
Default Value:	2
Default Access Level	4
Function number	437d

Allows selection of the number of alarms required from 0 (**0**) to 8 (**8**).

5.114 Easy access mode

Section:	ACCES
Display:	EASY LEUL
Range:	NONE, 1, 2, 3, 4, 5, 6, CAL
Default Value:	NONE
Default Access Level	5.CAL
Function number	0C00

Allows choice of the access level available when using the easy access method. For example if this function is set to **3** then functions with levels 1, 2 and 3 can be viewed and changed when access to setup functions is made using this method. To access setup functions using the easy access method press and hold the **F** button until the message **FUNC** is seen followed by the first function message, this should take approximately 3 seconds. If the message **FUNC End** or no response is seen at this point it means that the access level has been set to **NonE** and that access to setup functions has been refused.

5.115 Remote input access mode

Section:	ACCES
Display:	r.iNP LEUL
Range:	NONE, 1, 2, 3, 4, 5, 6, CAL
Default Value:	NONE
Default Access Level	5.CAL
Function number	0C01

This function allows choice of the access level available when using the remote input access method. To access setup functions using the remote input access method one of the remote inputs must be set to **ACCSS** and the chosen remote input must be shorted to ground. Press and hold the **F** button until the message **FUNC** is seen followed by the first function message, this should take approximately 3 seconds. If the message **FUNC End** is seen at this point it means that the access level has been set to **NonE**.

5.116 PIN code 1

Section:	ACCES
Display:	USr.1 Pin
Range:	0 to 50000
Default Value:	0
Default Access Level	5.CAL
Function number	0C09

This function allows choice of the PIN code to be used for PIN code input access method. Associated with the PIN is an access level (see **Pin.1AccS**). If a PIN is not required leave the setting at **0**. If a PIN other than 0 is chosen then this PIN must be entered to gain access to the the selected level.

To access setup functions using the PIN code input access method press then release the **F** button then within 2 seconds press the **▲** and **▼** buttons at the same time. The message **FUNC** is seen followed by the message **CodE**. If the message **FUNC End** is seen at this point it means that the access level has been set to **NonE**. Use the **▲** and **▼** buttons to enter the PIN then press **F** to accept the PIN and proceed to the setup functions.

5.117   PIN code 1 access level

Section:	**ACCES**
Display:	**USr.1 LEVL**
Range:	**NONE**, **1**, **2**, **3**, **4**, **5**, **6**, **CAL**
Default Value:	**NONE**
Default Access Level	**5.CAL**
Function number	**0C02**

This function allows choice of the access level available when using the PIN code 1 input access method. To access setup functions using the PIN code 1 input access method press and hold the **F** button until the message **FUNC** is seen followed by the first function message, this should take approximately 3 seconds. If the message **FUNC End** is seen at this point it means that the access level has been set to **NonE**.

5.118   PIN code 2

Section:	**ACCES**
Display:	**USr.2 P.n**
Range:	**0** to **50000**
Default Value:	**0**
Default Access Level	**5.CAL**
Function number	**0C0A**

This function allows choice of a second PIN code to be used for PIN code input access method. Associated with the PIN is an access level (see **Pin.2AccS**). The second PIN would normally be used to allow a second person to have a higher access to setup functions via a different PIN. If a second PIN is not required leave the setting at **0**. If a PIN other than 0 is chosen then this PIN must be entered to gain access to the the selected level.

To access setup functions using the PIN code input access method press then release the **F** button then within 2 seconds press the ▲ and ▼ buttons at the same time. The message **FUNC** is seen followed by the message **CodE**. If the message **FUNC End** is seen at this point it means that the access level has been set to **NonE**. Use the ▲ and ▼ buttons to enter the PIN then press **F** to accept the PIN and proceed to the setup functions. Ony one **CodE** message will appear even though there can be a second PIN. If the number entered into the **CodE** at this point is the PIN code 1 number then access will be granted to the functions allocated to the first PIN. If the PIN code 2 value is entered then access will be granted to the functions allocated to the second PIN.

5.119   PIN code 2 access level

Section:	**ACCES**
Display:	**USr.2 LEVL**
Range:	**NONE**, **1**, **2**, **3**, **4**, **5**, **6**, **CAL**
Default Value:	**NONE**
Default Access Level	**5.CAL**
Function number	**0C03**

This function allows choice of the access level available when using the PIN code 2 input access method. To access setup functions using the PIN code 2 input access method press and hold the **F** button until the message **FUNC** is seen followed by the first function message, this should take approximately 3 seconds. If the message **FUNC End** is seen at this point it means that the access level has been set to **NonE**.

5.120 User assignable access 1 function number

Section:	**ACCES**
Display:	**Fn.1 CodE**
Range:	**0000** to **FFFF** hex.
Default Value:	**0000**
Default Access Level	**5.CAL**
Function number	**0C10**

In addition to being assigned an access level each setup function is assigned an individual function number. This functions and the ones which follow (**Fn.2 CodE** etc.) can be used to alter the access level for particular functions. For example if the user wishes to change the access level of the channel 1 display units (function number 43A0) from level 5 to level 1 then the value **43A0** would be entered at this function and the value **3** would be entered at the function which follows. This would then enable the channel 1 display unit functions to be accessed at the lowest access level.

5.121 User assignable access 1 level value

Section:	**ACCES**
Display:	**Fn.1 LEUL**
Range:	**dFlt**, **1**, **2**, **3**, **4**, **5**, **6**, **CAL**, **5.CAL**
Default Value:	**dFlt**
Default Access Level	**5.CAL**
Function number	**0C40**

Allows a new access level for the function with the number set in the function to be chosen. If **dFlt** is chosen then the level reverts back to the original default level.

5.122 User assignable access 2 function number

Section:	**ACCES**
Display:	**Fn.2 CodE**
Range:	**0000** to **FFFF** hex.
Default Value:	**0000**
Default Access Level	**5.CAL**
Function number	**0C11**

This function allows as second function access change and operates in the same manner as . Enter the function number required and then enter the new access level at the function which follows.

5.123 User assignable access 2 level value

Section:	**ACCES**
Display:	**Fn.2 LEUL**
Range:	**dFlt**, **1**, **2**, **3**, **4**, **5**, **6**, **CAL**, **5.CAL**
Default Value:	**dFlt**
Default Access Level	**5.CAL**
Function number	**0C41**

Allows a new access level for the function with the number set in the function to be chosen. If **dFlt** is chosen then the level reverts back to the original default level.

5.124 User assignable access 3 function number

Section:	ACCES
Display:	Fn.3 CodE
Range:	0000 to FFFF hex.
Default Value:	0000
Default Access Level	5.CAL
Function number	OC 12

This function allows as third function access change and operates in the same manner as . Enter the function number required and then enter the new access level at the function which follows.

5.125 User assignable access 3 level value

Section:	ACCES
Display:	Fn.3 LEUL
Range:	dFlt, 1, 2, 3, 4, 5, 6, CAL, S.CAL
Default Value:	dFlt
Default Access Level	5.CAL
Function number	OC42

Allows a new access level for the function with the number set in the function to be chosen. If **dFlt** is chosen then the level reverts back to the original default level.

5.126 User assignable access 4 function number

Section:	ACCES
Display:	Fn.4 CodE
Range:	0000 to FFFF hex.
Default Value:	0000
Default Access Level	5.CAL
Function number	OC 13

This function allows as fourth function access change and operates in the same manner as . Enter the function number required and then enter the new access level at the function which follows.

5.127 User assignable access 4 level value

Section:	ACCES
Display:	Fn.4 LEUL
Range:	dFlt, 1, 2, 3, 4, 5, 6, CAL, S.CAL
Default Value:	dFlt
Default Access Level	5.CAL
Function number	OC43

Allows a new access level for the function with the number set in the function to be chosen. If **dFlt** is chosen then the level reverts back to the original default level.

5.128   Error Messages

- **- - - -** or **-or-**, or **-or-** or **-Hi -** or **-LO-** or display value flashes These messages could indicate that a high or low rate or total visual alarm warning has been selected e.g. if the rate **Hi diSP** value is exceeded then the display will show one of the above warning messages as set by the rate **diSP** function.

- **-d.or -** - overrange message - This indicates that the value to be displayed has too many digits to be displayed e.g. you cannot display a number larger than 99999 on a 5 digit display.

- **-d.ur -** - underrange message - This indicates that the value to be displayed is too large a negative number to be displayed.

- **int FF02** - this message indicates that the power has been cycled on and off too quickly i.e. switched off then on again quickly. The display will normally recover from this on its own and proceed to normal operation.

6 Specifications

6.1 Technical specifications

Input :	Selectable for most sensor types. For inductive, AC and square wave inputs the maximum input voltage is 48VDC or RMS with appropriate input setting. Input 2 can be used to control up/down totalising.
Ambient temperature:	LED -10 to 60° C, LCD -10 to 50° C
Humidity:	5 to 95% non condensing
Display:	LED Models: 4 digit 20mm, 5 digit 14.2mm + status LEDs + 4 way keypad. 6 digit 14.2mm + 4 way keypad LCD Models: 4 digit 12.7mm, 6 digit 12.7mm
Power Supply:	AC 240V, 110V or 24V 50/60Hz or DC isolated wide range 12 to 48V. Note: supply type is factory configured.
Power Consumption:	AC supply 4 VA max, DC supply typically 80mA at 12VDC and 40mA at 24VDC for PM5 with no optional outputs, actual current drawn depends on display type and options fitted
Output (standard):	1 x relay, Form A, rated 5A resistive 5V, 12V or 18VDC transmitter supply 25mA max.
Relay Action:	Programmable N.O. or N.C

6.2 Output Options

Extra Relays:	1, 2, or 3 extra relays (form A, 3A @ 240VAC) First extra relay configurable as On/off alarm/control or PI control 6 extra relays (form A, 2A @ 240VAC) 5 extra relays (form A, 2A @ 240VAC) available only with serial retransmission
Analog Retransmission:	Isolated 12 bit 4-20mA output only single or dual channel or 16 bit single or dual channel 4-20mA, 0 to 1V or 0 to 10V analog output options 4 to 20mA output can drive into 800Ω load maximum Analog output 1 can be set for retransmission or PI control Analog output 2 retransmission or PI control
Serial Communications:	RS232 or RS485 or Ethernet

Output options are available in certain combinations e.g. Analog output plus extra relay, contact supplier for details.

6.3 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. $2.5mm^2$ wire)
Weight:	400 gms basic model

7 Guarantee and service

The product supplied with this manual is guaranteed against faulty workmanship for a period of two 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.