

**Model PM5–232 or PM5–485 or
PM5–422 or PM5–CL
Serial Input
Panel Mount Display/Controller
Operation and Instruction Manual**

AMALGAMATED INSTRUMENT CO

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

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

ABN: 80 619 963 692

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

Table of Contents

1	Introduction	3
2	Mechanical Installation	9
3	Electrical installation	10
4	Function tables - summary of setup functions	13
5	Explanation of functions	24
6	Specifications	69
7	Guarantee and service	70

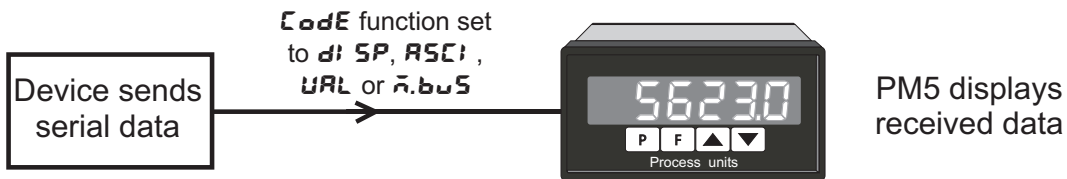
1 Introduction

This manual contains information for the installation and operation of the PM5 serial communications monitor. The PM5 will accept inputs from RS232, RS485, RS422 or serial current loop inputs (factory configured). The digital display will indicate numeric and some alpha characters (when alpha function is selected). The modes of operation of this display are set at the **CONF Code** function. If the mode is changed it is necessary to remove power from the PM5 then reapply power in order to reset the mode.

Summary of input modes available:

1. Direct display of input

The PM5 is sent an ASCII string (or special binary display code in **d: SP** mode) and displays the characters.

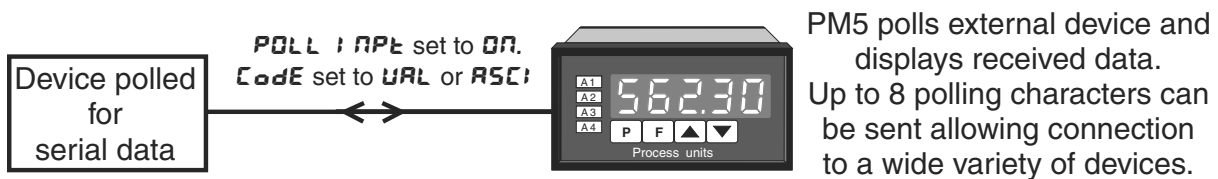


2. Calculation value display

When more than one data string input is being examined the user can select calculation channel results (up to 8 calculation channels are available **CC 1** to **CC 8**). The calculation channel display can be selected to show one of various mathematical results e.g. display the highest of the inputs or the difference between inputs or the average of the inputs etc.

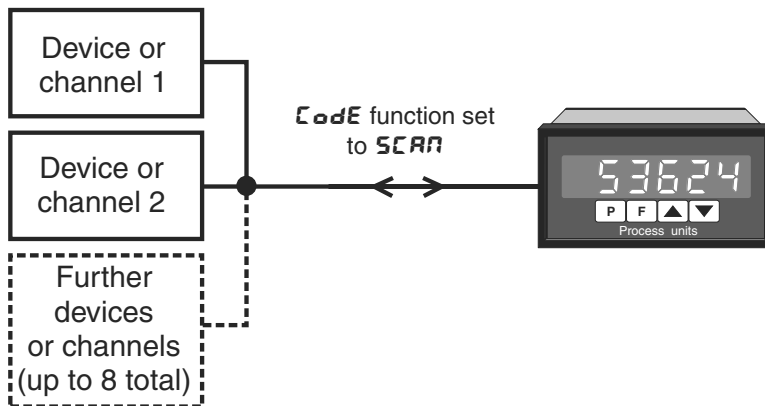
3. Poll mode

PM5 sends a poll command of up to 8 characters to request data. To operate in this mode the **POLL: nPk** function must be set to **ON**.



4. Scanning mode

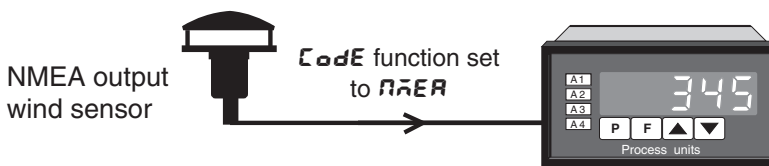
Allows the display to scan up to 8 inputs from other devices and display the value together with an indication of which input is being viewed. The input devices must be of the same manufacture as the PM5 and the serial communications must be via RS485.



PM5 polls external devices
▲ & ▼ can be used to display each input or the display can scroll automatically.
Polled devices must be from the same manufacturer as the PM5. Communications must be RS485 or RS422

5. Wind speed and direction (NMEA)

This mode is used only with instruments using NMEA (National Marine Electronics Association) serial code such as some wind speed and direction sensors.



PM5 receives wind speed & direction information. Use ▲ or ▼ to toggle between speed & direction display.

6. Special mode for Mettler Toledo

The **IND131** mode is a special mode only used when connected to the Mettler Toledo IND131/331 module.

1.1 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 a summary the methods available are:

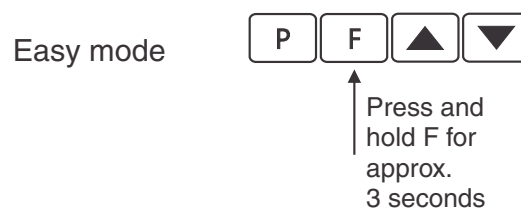
- **Easy mode** - this is the easiest access mode simply requiring the **F** button to be pressed for 3 seconds. This mode would normally be used to gain access to functions which require frequent adjustment.
- **Remote input mode** - this uses the Easy method of access but also requires the use of a 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 used 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 LEVEL** function in the **ACCES** 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 LEVEL** 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.



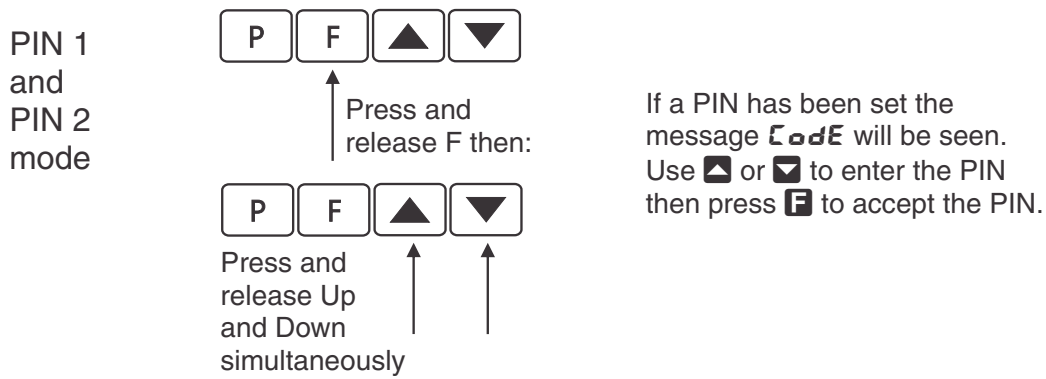
- **Remote input mode** - Allows access to the level set by the **REMOTE LEVEL** function in the **ACCES** menu. By default the Remote input access is set to **CAL** level allowing access to all setup functions.

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 **ACCESS** 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.



- **PIN 1 mode** - Allows access to the level set by the **USF. 1 LEVEL** function in the **ACCES** menu.

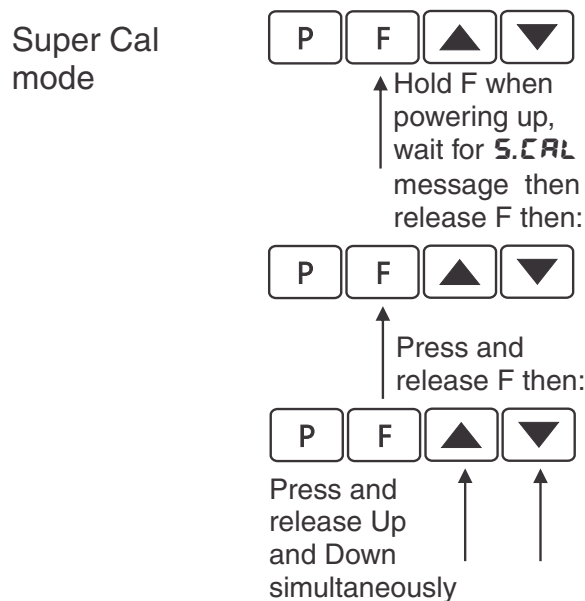
The PIN 1 mode requires the **F** button is pressed and released then within 2 seconds press the **▲** and **▼** buttons at the same time. The PIN can be set via the **USF. 1 P, n** function in the **ACCES** menu. A **USF. 1 LEVEL** setting of **0** disables the PIN which means that there is no need to enter the PIN. If the **USF. 1 LEVEL** 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 **USF. 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 2 mode** - Allows access to the level set by the **USF.2 LEVEL** function in the **ACCESS** menu.

This method uses the same access method as PIN 1 mode above. A **USF.2 Pin** setting of **0** disables the PIN. If the **USF.1 LEVEL** or a **USF.2 Pin** 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 **USF.1 Pin** function can be entered for access to the level set at the **USF.1 LEVEL** function or enter the **USF.2 Pin** PIN to gain access to the level set at the **USF.2 LEVEL** 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.

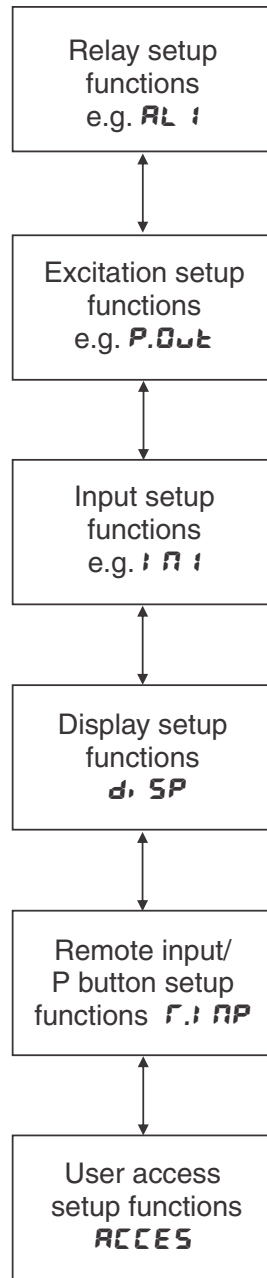
- **Super Cal mode** - This method can be used to gain access to all functions. If a PIN has been set and forgotten use this method to access the PIN functions to check the settings. To access via Super Cal mode with the instrument switched off hold in the **F** button whilst the instrument powers up. 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.



The setup functions are organised in blocks or sections e.g. all the settings for relay 1 are in the **RL 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 use 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.



1.2 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 1h, 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. iCode** 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

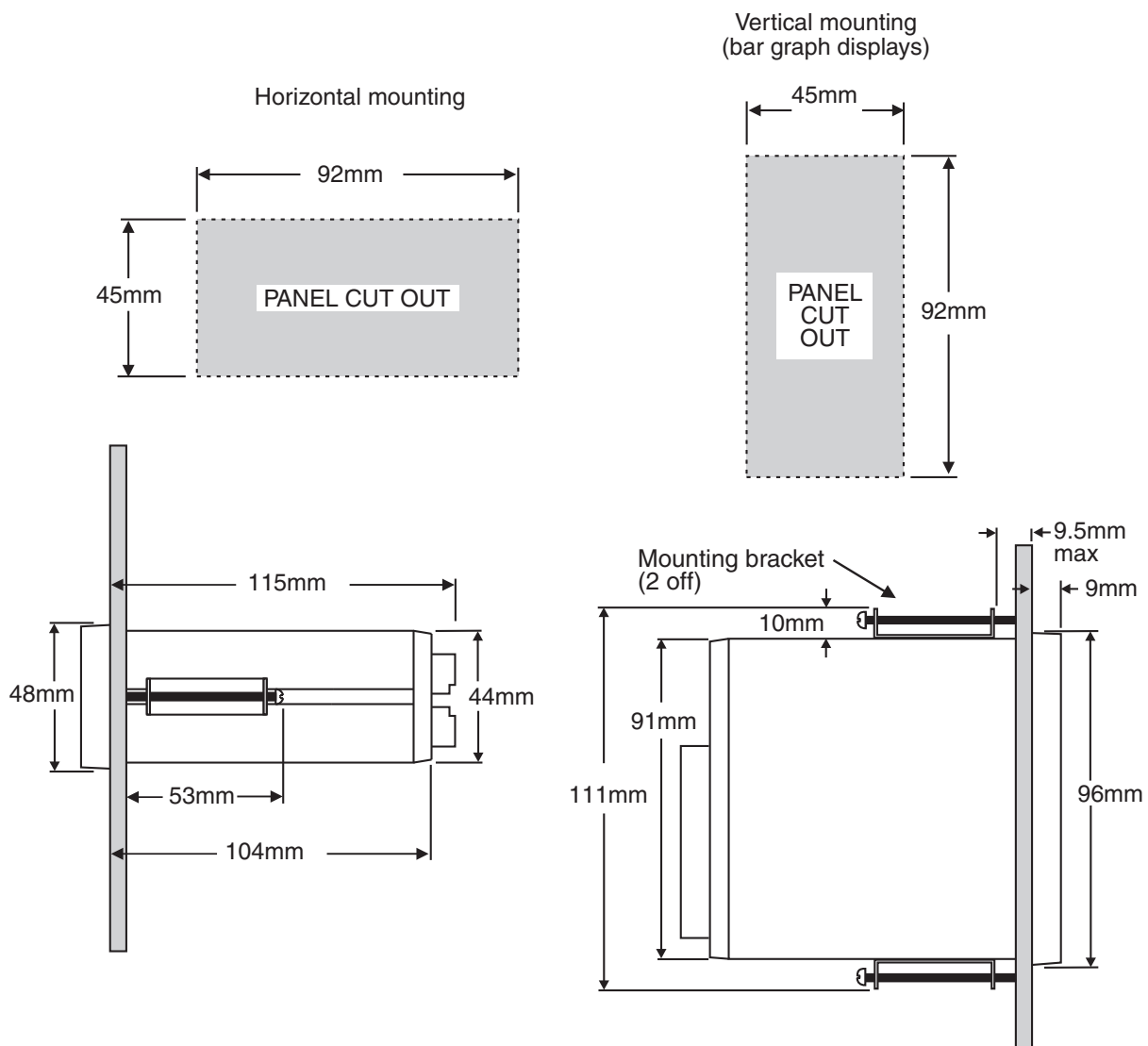
6 - access to functions allocated to level 6

CAL - access to all normal operation functions

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.

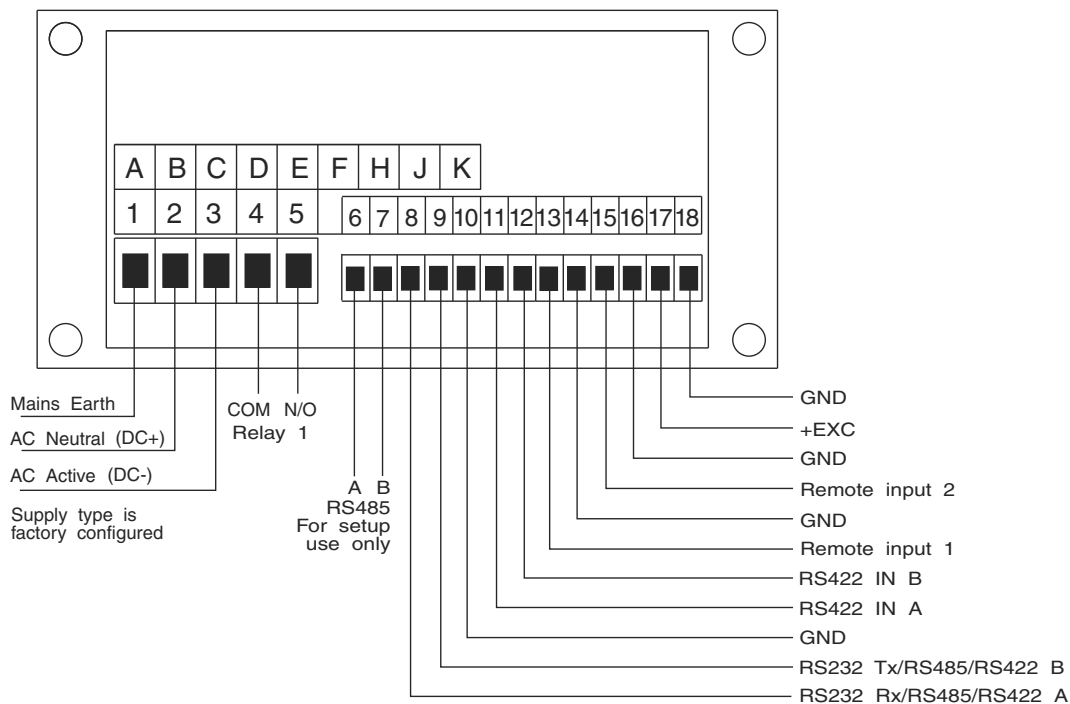
The plug in, screw type, terminal blocks allow for wires of up to 2.5mm² to be fitted for power, relays and options and 1mm² for sensor and other wiring. Connect the wires to the appropriate terminals as indicated below. Refer to connection details provided in this chapter to confirm proper selection 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.

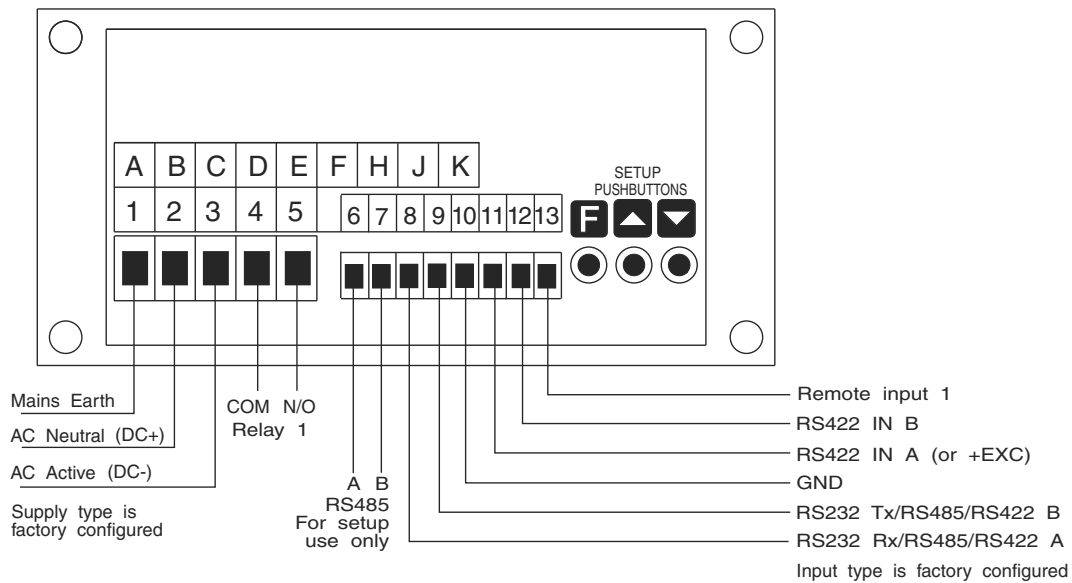
Use twin shielded wire for RS232 connection and twisted pair shielded wire for RS485 and RS422.

Terminal 17 can be set for 5V or 12VDC output via the **P.out** function. If rear pushbuttons are fitted and RS422 is not being used then these voltage can be optionally made available on terminal 11.

Instrument rear view for instruments with front pushbuttons

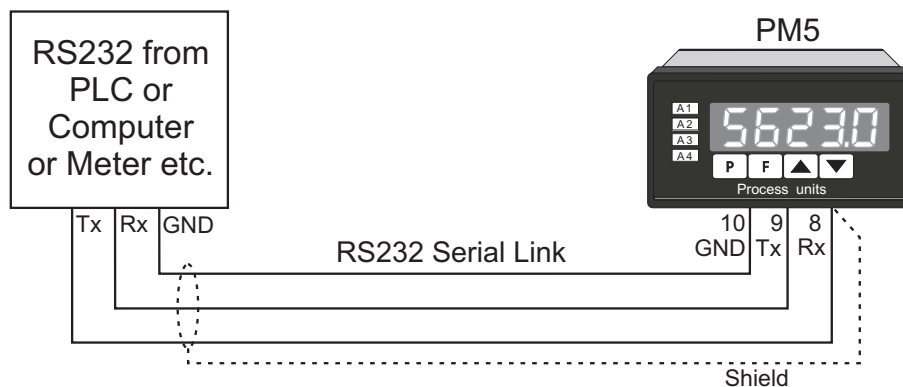


Instrument rear view for instruments without front pushbuttons



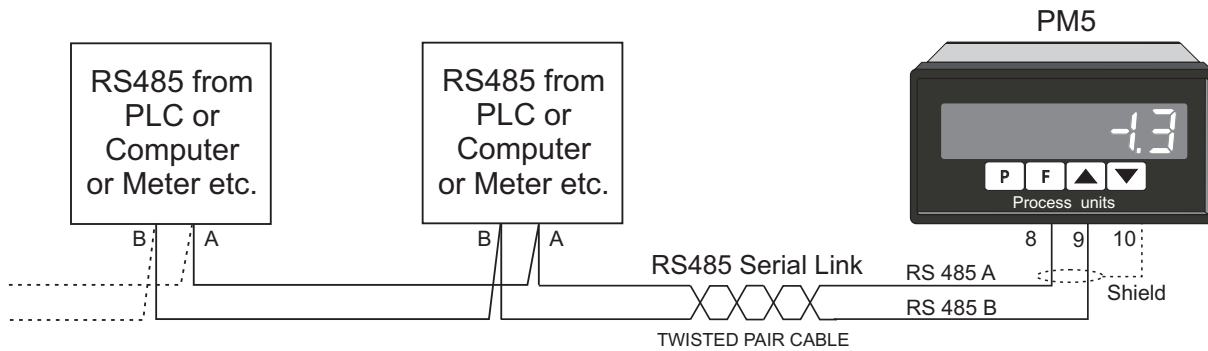
3.2 RS232 connections

Use 3 core shielded cable for RS232 connections. RS232 connections generally have Rx at the PM5 connected to Tx at the PLC/Computer etc. and Tx at the PM5 connected to Rx at the PLC/Computer etc. RS232 connections are usually rated to a maximum cable length of approximately 15 metres and are single ended in operation i.e. only one device can be connected to the PM5.



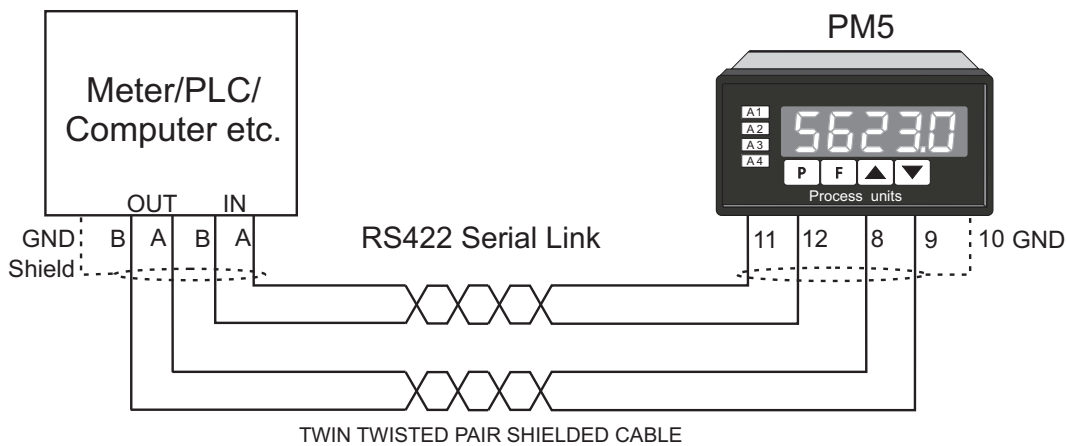
3.3 RS485 connections

RS485 connections use shielded, twisted pair wires. RS485 is rated to a maximum cable length of approximately 1200 metres and will allow connection of up to 32 drivers or receivers on the serial link.



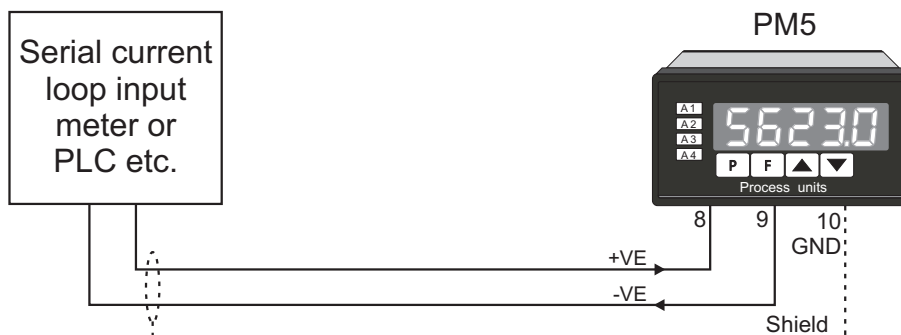
3.4 RS422 connections

RS422 connections use twin twisted pair, overall screened cable. RS422 is rated to a maximum cable length of approximately 1200 metres and will allow connection of 1 driver and up to 10 receivers on the serial link. Internal terminating resistors for RS422 can be fitted via links LK3 and LK4, see RS485 section above for notes on terminating links.



3.5 Serial current loop connections

Serial (i.e. pulsed) 20mA current loop connections are as shown below.



3.6 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.

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.

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

4.1 Alarm relay function table

Display	Function	Range	Default	Your record	Ref/Page
AL 1 to AL B Hi, 9h	High setpoint value for designated alarm	Any display value or OFF	OFF	See 4.15	5.1 / 24
AL 1 to AL B Lo	Low setpoint value for designated alarm	Any display value or OFF	OFF	See 4.15	5.2 / 25
AL 1 to AL B HYSt	Hysteresis value for the designated alarm	0 to 50000	10	See 4.15	5.3 / 26
AL 1 to AL B tRiP	Trip time delay for the designated alarm relay <i>x</i> .	0 to 5000.0 secs	0.0	See 4.15	5.4 / 26
AL 1 to AL B rSt	Reset time delay for the designated alarm relay <i>x</i> .	0 to 5000.0 secs	0.0	See 4.15	5.5 / 27
AL 1 to AL B FLYS	Relay selection On or OFF	On or OFF	OFF	See 4.15	5.6 / 27
AL 1 to AL B tFAIL	Alarm trailing or setpoint mode	SEt.P, tL 1, tL 2, tL 3, tL 4, tL 5, tL 6, tL 7	SEt.P	See 4.15	5.7 / 27
AL x OPER	Alarm relay operating mode	Hi .Lo	Hi .Lo	See 4.15	5.8 / 28
AL x Ch	Alarm relay operation input selection	CH 1 or in AREA mode dir or SPEED	CH 1	See 4.15	5.9 / 28
AL 1 to AL B LAtch	Alarm relay latching operation	Auto, LAtch	Auto	See 4.15	5.10 / 29
AL x tout	Serial input timeout alarm	OFF or On	OFF	See 4.15	5.11 / 29

(*Optional)—this function will only be accessible if the relevant option is fitted

Display	Function	Range	Default	Your record	Ref/Page
FLY 1 to FLY 7FLY	Alarm relay <i>x</i> action to normally open (de-energised) or normally closed (energised)	n.o, n.c	n.o	See 4.15	?? / ??
FLY 1 to FLY 7AcR	Relay acknowledge	OFF or ON	OFF	See 4.15	?? / ??
FLY 1 to FLY 7bool	Alarm relay Boolean logic operation	Or, And	Or	See 4.15	?? / ??

(*Optional)—this function will only be accessible if the relevant option is fitted

4.2 Configuration setup table.

Display	Function	Range	Default	Your record	Ref/Page
CONF Code	Serial input operation mode	d, SP, ASCII, UART, n.buS, SCAN, nAER, , 131	ASCII		5.12 / 29
CONF baud	Baud rate	300, 600, 1200, 2400, 4800, 9600, 19.2, 38.4	9600		5.13 / 31
CONF data	Serial input data bits and parity	8.NONE, 8.odd, 8.EuEn, 7.odd, 7.EuEn, 7.NONE	8.NONE		5.14 / 31
CONF CHAN Count	Select number of channels to scan	1, 2, 3, 4, 5, 6, 7, 8	1		5.15 / 32
CONF CALC Count	Select number of calculation channels	0, 1, 2, 3, 4, 5, 6, 7, 8	0		5.16 / 32
CONF AL Count	Select number of alarms	0, 1, 2, 3, 4, 5, 6, 7, 8	2		5.17 / 32
CONF SCAN DELAY	Select scan delay time	0 to 200 secs	10		5.18 / 32

4.3 Excitation voltage function tables - only seen in displays with no rear pushbuttons

Display	Function	Range	Default	Your record	Ref/Page
E.00t 00tPt	Excitation voltage selection for option boards	50, 120	50		5.19 / 33

4.4 Analog output 1 function table

Display	Function	Range	Default	Your record	Ref/Page
FO 1 00tPt	Output selection for analog output 1. Not seen if output is fixed at 4-20mA (*Optional)	4-20.0-10.0-10	4-20		5.20 / 33
FO 1 1nPt	Input selection for analog output 1 (*Optional)	CH 1, SPEED or d, r	CH 1		5.21 / 33
FO 1 P.Ct1	Analog output 1 PI control on or off (*Optional)	NO or YES	No		5.22 / 34
FO 1 Lo	Analog output 1 option low display value (*Optional)	Any display value	0		5.23 / 34
FO 1 H, 9h	Analog output option high display value (*Optional)	Any display value	1000		5.24 / 34
FO 1 SEtP	Analog output 1 PI control setpoint (*Optional)	Any display value	0		5.25 / 35
FO 1 SPAn	Analog output 1 PI control span (*Optional)	Any display value	1000		5.26 / 35
FO 1 P.9	Analog output 1 PI control proportional gain (*Optional)	Any display value	1.000		5.27 / 35
FO 1 I.9	Analog output 1 PI control integral gain (*Optional)	Any display value	0.000		5.28 / 36
FO 1 I.H	Analog output 1 PI control integral high limit (*Optional)	0 to 100.0 %	1.000		5.29 / 36
FO 1 I.L	Analog output 1 PI control integral low limit (*Optional)	0 to 100.0 %	1.000		5.30 / 36
FO 1 b, AS	Analog output 1 PI control bias (*Optional)	0 to 100.0 %	50.0		5.31 / 37

(*Optional)—this function will only be accessible if the relevant option is fitted

4.5 Analog output 2 function table

Display	Function	Range	Default	Your record	Ref/Page
F02 OutPt	Output selection for analog output 2. Not seen if output is fixed at 4-20mA (*Optional)	4-20, 0-10 or 0-10	4-20		5.32 / 37
F02 InPt	Input selection for analog output 2 (*Optional)	CH1, SPEED or d, r	CH1		5.33 / 37
F02 P.Ct1	Analog output 2 PI control on or off (*Optional)	No or YES	No		5.34 / 38
F02 Lo	Analog output 2 option low display value (*Optional)	Any display value	0		5.35 / 38
F02 Hi, 9h	Analog output option high display value (*Optional)	Any display value	1000		5.36 / 38
F02 SEtP	Analog output 2 PI control setpoint (*Optional)	Any display value	0		5.37 / 38
F02 SPAn	Analog output 2 PI control span (*Optional)	Any display value	1000		5.38 / 39
F02 P.9	Analog output 2 PI control proportional gain (*Optional)	-32.768 to 32.767	1.000		5.39 / 39
F02 I.9	Analog output 2 PI control integral gain (*Optional)	-32.768 to 32.767	0.000		5.40 / 39
F02 I.H	Analog output 2 PI control integral high limit (*Optional)	0.0 to 100.0	1.000		5.41 / 39
F02 I.L	Analog output 2 PI control integral low limit (*Optional)	0.0 to 100.0	1.000		5.42 / 39
F02 b, AS	Analog output 2 PI control bias (*Optional)	0.0 to 100.0	50.0		5.43 / 40

(*Optional)—this function will only be accessible if the relevant option is fitted

4.6 Bargraph display function table

Display	Function	Range	Default	Your record	Ref/Page
bAr-9 Ch	Bargraph channel	CH1, d, r or SPEED	CH1		5.95 / 57
bAr-9 tYPE	Bargraph type	bAr, S.dot, d.dot, c.bAr or r.dot	bAr		5.96 / 57
bAr-9 Lo	Bargraph low value	Any display value	0		5.97 / 58
bAr-9 Hi	Bargraph high value	Any display value	1000		5.98 / 58

(*Optional)—this function will only be accessible if the relevant option is fitted

4.7 Input setup function table

Display	Function	Range	Default	Your record	Ref/Page
1 0 1 SCH 1	Serial input address character 1	-2 to 255	- 1		5.45 / 40
1 0 1 SCH 2	Serial input address character 2	-2 to 255	- 1		5.46 / 41
1 0 1 SCH 3	Serial input address character 3	-2 to 255	- 1		5.47 / 41
1 0 1 SCH 4	Serial input address character 4	-2 to 255	- 1		5.48 / 41
1 0 1 t.chr	Serial input terminating character	- 1 to 255	13		5.49 / 41
1 0 1 dELAY	Number of serial input characters to skip	0 to 255	0		5.50 / 42
1 0 1 bAck	Number of serial input characters to skip back	0 to 120	0		5.51 / 42
1 0 1 n.Chr	Number of serial input characters to skip from SCM	- 120 to 120	0		5.52 / 42
1 0 1 i.dPt	Serial input string decimal point insertion	- 1 to 8	- 1		5.53 / 43
1 0 1 ALPHA	Alpha character display off or on	OFF, 0n, A11	A11		5.54 / 43
1 0 1 d.Pnt	Decimal point	0, 0.1, 0.02, 0.003	0		5.55 / 44
1 0 1 d.rnd	Display rounding	1 to 5000	1		5.56 / 44
1 0 1 FiLteR	Digital filter	0, 1, 2, 3, 4, 5, 6, 7, 8	0		5.57 / 45
1 0 1 Ch.PL	Display polarity	both, Pos, NEG, Abs	both		5.58 / 45
1 0 1 Addr	Modbus address	0 to 255	1		5.59 / 45
1 0 1 dS.to	Display timeout	0 to 1000 secs	10		5.60 / 46
1 0 1 t.out	Data string timeout	0.1 to 10.0 secs	1.0		5.61 / 46
1 0 1 d.SP C.EFF	Input error messages disable	OFF or 0n	0n		5.62 / 46
1 0 1 d1 SP	Input channel display disable	OFF or 0n	0n		5.63 / 46
1 0 1 Un, tS	Wind speed units	mS, hPh, mPh or hnotS	mS		5.64 / 47

(*Optional)—this function will only be accessible if the relevant option is fitted

1 0 1 dF1 t d, SP	NMEA default display	SCAN, d, r or SPEED	SCAN		5.65 / 47
1 0 1 d, SP SECS	Display scan time	0 to 200 secs	10		5.66 / 47

(*Optional)—this function will only be accessible if the relevant option is fitted

4.8 Poll input function table

Display	Function	Range	Default	Your record	Ref/Page
POLL INPUT	Polling function	on or OFF	OFF		5.67 / 48
POLL DELAY	Polling delay time	0.0 to 10.0	1.0		5.68 / 48
POLL P.Ch.1	First polling character	- 1 to 255	- 1		5.69 / 48
POLL P.Ch.2	Second polling character	- 1 to 255	- 1		5.70 / 49
POLL P.Ch.3	Third polling character	- 1 to 255	- 1		5.71 / 49
POLL P.Ch.4	Fourth polling character	- 1 to 255	- 1		5.72 / 49
POLL P.Ch.5	Fifth polling character	- 1 to 255	- 1		5.73 / 49
POLL P.Ch.6	Sixth polling character	- 1 to 255	- 1		5.74 / 49
POLL P.Ch.7	Seventh polling character	- 1 to 255	- 1		5.75 / 50
POLL P.Ch.8	Eighth polling character	- 1 to 255	- 1		5.76 / 50

(*Optional)—this function will only be accessible if the relevant option is fitted

4.9 Scanned channels function table

Display	Function	Range	Default	Your record	Ref/Page
CH 1 to CH8 Poll Addr	Scan channel poll address	1 to 255	1		5.77 / 50

CH 1 to CH8 Cmd	Scan channel command	Pr, SEc, tEr, QuAd, CH0, CH 1, CH 2, CH3, CH4, CH5, CH6, CH 7, CH8, ABUS	Pr,		5.78 / 50
CH 1 to CH8 AbUS Code	ABUS command value	0000 to FFFF			5.79 / 51
CH 1 to CH8 d.Pnt	Channel decimal point	0, 0.1, 0.02, 0.003	0		5.80 / 51
CH 1 to CH8 d.rnd	Channel display rounding	1 to 5000	1		5.81 / 51
CH 1 to CH8 FILtF	Channel display filter	0, 1, 2, 3, 4, 5, 6, 7, 8	0		5.82 / 52
CH 1 to CH8 Ch.PL	Channel display polarity	both, PoS, NEg, AbS	both		5.83 / 52
CH 1 to CH8 di SP	Seen when the CONF Code function is set to SCAN . Channel display on or off	OFF or ON	On		5.84 / 52

4.10 Calculated channel function table

Display	Function	Range	Default	Your record	Ref/Page
CC 1 to CC8 Func	Calculation channel function	H, Lo, di FF, AU9, d.AU9, P.AU9, N.AU9, S.di FF, Add, PC 1, PC2, Sub, Prod, di u, Si nE, CoS, F.AU9, F.AU9	H,		5.85 / 52
CC 1 to CC8 d.Lo9	Calculation channel data log	OFF or ON	OFF		5.86 / 54
CC 1 to CC8 di SP	Calculation channel display	OFF or ON	OFF		5.87 / 54
CC 1 to CC8 d.Pnt	Calculation channel decimal point	0, 0.1, 0.02	0		5.88 / 55

CC 1 to CC8 d.rnd	Calculation channel display rounding	1 to 5000	1		5.89 / 55
CC 1 to CC8 CHAn SEL	Calculation channel selection. Set each channel On or OFF	CH 1, CH2, CH 3, CH4, CH5, CH6, CH7, CH 8, CC 1, CC2, CC3, CC4, CC 5, CC6, CC7, CC8	n/a		5.90 / 55
CC 1 to CC8 A.cnt	Calculation channel fixed average count	1 to 128	4		5.91 / 56
CC 1 to CC8 Ar, th SCALE	Calculation channel multiplication scale	Any display value	n/a		5.92 / 56
CC 1 to CC8 Ar, th OFFSEt	Calculation channel offset value	Any display value	n/a		5.93 / 56
CC 1 to CC8 Ar, th di, u	Calculation channel division	Any display value	n/a		5.94 / 56

4.11 Display function table

Display	Function	Range	Default	Your record	Ref/Page
d, SP br 9t	Display brightness	1 to 16	16		5.99 / 59
d, SP dull	Dimmed display brightness	0 to 16	2		5.100 / 59

(*Optional)—this function will only be accessible if the relevant option is fitted

4.12 P button and remote inputs function table

Display	Function	Range	Default	Your record	Ref/Page
F, NP P.but	Front P button operation mode	NONE, P.H, , P.Lo, H, .Lo, AL.Ac, ZERO	NONE		5.101 / 59

(*Optional)—this function will only be accessible if the relevant option is fitted

F.I NP F.I R.1	Remote input 1 operation mode	NONE, P.Hold, d.Hold, P.H., P.Lo, H.Lo, RL.Rc, ACCESS, dult, ZERO	NONE		5.102 / 59
F.I NP F.I R.2	Remote input 2 operation mode	NONE, P.Hold, d.Hold, P.H., P.Lo, H.Lo, RL.Rc, ACCESS, dult, ZERO	NONE		5.103 / 61

(*Optional)—this function will only be accessible if the relevant option is fitted

4.13 Access control function table

Display	Function	Range	Default	Your record	Ref/Page
ACCES EASY LEVEL	Easy access mode	NONE, 1, 2, 3, 4, 5, 6, CAL	NONE		5.104 / 61
ACCES REMOTE LEVEL	Remote input access mode	NONE, 1, 2, 3, 4, 5, 6, CAL	NONE		5.105 / 61
ACCES USF.1 PIN	PIN code 1	0 to 50000	0		5.106 / 61
ACCES USF.1 LEVEL	PIN code 1 access level	NONE, 1, 2, 3, 4, 5, 6, CAL	NONE		5.107 / 62
ACCES USF.2 PIN	PIN code 2	0 to 50000	0		5.108 / 62
ACCES USF.2 LEVEL	PIN code 2 access level	NONE, 1, 2, 3, 4, 5, 6, CAL	NONE		5.109 / 63
ACCES Fn.1 Code	User assignable access function 1	0000 to FFFF hex.	0000		5.110 / 63
ACCES Fn.1 LEVEL	User assignable access 1 level value	dF1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL	dF1 t		5.111 / 63
ACCES Fn.2 Code	User assignable access function 2	0000 to FFFF hex.	0000		5.112 / 63
ACCES Fn.2 LEVEL	User assignable access 2 level value	dF1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL	dF1 t		5.113 / 64
ACCES Fn.3 Code	User assignable access function 3	0000 to FFFF hex.	0000		5.114 / 64
ACCES Fn.3 LEVEL	User assignable access 3 level value	dF1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL	dF1 t		5.115 / 64
ACCES Fn.4 Code	User assignable access function 4	0000 to FFFF hex.	0000		5.116 / 64
ACCES Fn.4 LEVEL	User assignable access 4 level value	dF1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL	dF1 t		5.117 / 65

(*Optional)—this function will only be accessible if the relevant option is fitted

4.14 Serial output function table

Display	Function	Range	Default	Your record	Ref/Page
SERi OPER	Serial operation mode (*Optional)	<i>None</i> , <i>Cont.</i> , <i>Pol i</i> , <i>R.buS</i> , <i>di SP</i> or <i>ā.buS</i>	None		5.118 / 65
SERi bAud	Serial baud rate (*Optional)	1200, 2400, 4800, 9600, 19.2, 38.4, 57.6, 115.2	9600		5.119 / 65
SERi Prty	Serial parity (*Optional)	8n, 8E, 8O, 7 E, 7O	8n		5.120 / 66
SERi Unit Addr	Serial address (*Optional)	1 to 127	1		5.121 / 66

(*Optional)—this function will only be accessible if the relevant option is fitted

4.15 Relay table

Record your relay settings in the table below

Display	Relay 1	Relay 2	Relay 3	Relay 4	Relay 5	Relay 6	Relay 7
H. 9h							
Lo							
HYSk							
Er, P							
FSt							
FLYS							
Er, FAL							
OPER							
Ch							
LAtch							
tout							

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 1.1, starting on page 4.

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.

Explanation of Functions

5.1 Alarm relay high setpoint

Section:	AL 1 to AL 8
Display:	H, 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.

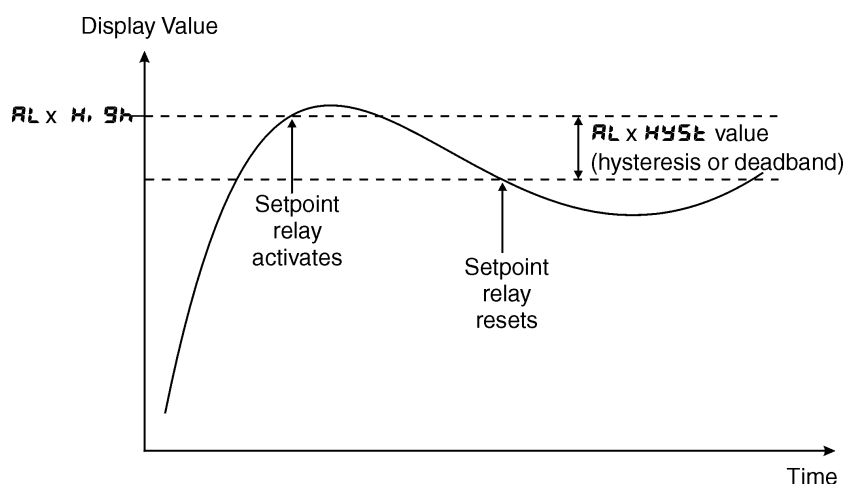
To set the high alarm value go to the **H, 9h** function, press **F** and when you see a digit of the value flash use the **▲** or **▼** push buttons to set the required value then press **F** to accept this selection. The high alarm setpoint may be disabled by pressing the **▲** and **▼** push buttons 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 **HYS E** function. The relay or relays to be used with this alarm can be selected (set to on or off) at the **FLY** function for each alarm.

Overlapping alarms - if the **H, 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 **H, 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.

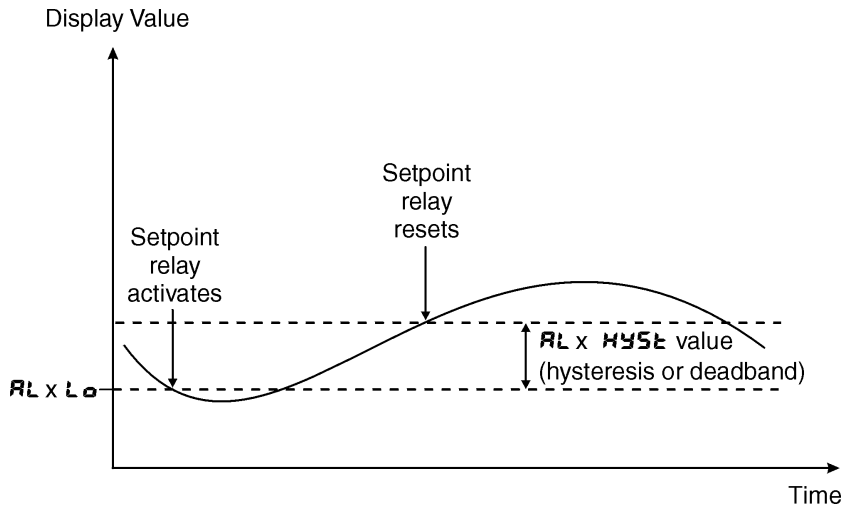
The low alarm setpoint may be disabled by pressing the **▲** and **▼** push buttons simultaneously. When the alarm is disabled the display will indicate **OFF**. If the alarm is allocated both a low and high setpoint then the alarm will activate when the value displayed moves outside the band set by 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 **H_h** 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: HYSL
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 **HYSL** 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 **H, 9h** under **AL 1** is to **50.0** and **HYSL** 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 **L0** is to **20.0** and **HYSL** 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 **HYSL** 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 **H, 9h** is set to **100** and **HYSL** 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: Tr, 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 **Tr, 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 **Tr, 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 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.

5.7 Alarm trailing or setpoint mode

Section:	AL 1 to AL 8
Display:	tFAL
Range:	SEt.P, tL 1, tL 2, tL 3, tL 4, tL 5, tL 6, tL 7
Default Value:	SEt.P
Default Access Level	4
Function number	4060 to 4067

This function will not be seen unless extra optional relays are fitted. Each alarm relay, except relay 1, may be programmed to operate with an independent setpoint value (**SEt.P** selected) or may be linked to operate at a fixed difference to another relay setpoint, known as trailing operation. The operation is as follows:

- Relay 1 (**AL 1**) is always independent.
- Relay 2 (**AL 2**) may be independent or may be linked to relay 1 (**tL 1**).
- Relay 3 (**AL 3**) may be independent or may be linked to relay 1 (**tL 1**) or relay 2 (**tL 2**).
- Relay 4 (**AL 4**) may be independent or may be linked to relay 1 (**tL 1**), relay 2 (**tL 2**) or relay 3 (**tL 3**).

- Relay 5 (**AL5**) may be independent or may be linked to relay 1 (**EL 1**), relay 2 (**EL 2**), relay 3 (**EL 3**) or relay 4 (**EL 4**).
- Relay 6 (**AL6**) may be independent or may be linked to relay 1 (**EL 1**), relay 2 (**EL 2**), relay 3 (**EL 3**), relay 4 (**EL 4**) or relay 5 (**EL 5**).
- Relay 7 (**AL 7**) may be independent or may be linked to relay 1 (**EL 1**), relay 2 (**EL 2**), relay 3 (**EL 3**), relay 4 (**EL 4**), relay 5 (**EL 5**) or relay 6 (**EL 6**).

The operation of each alarm is selectable by selecting, for example, (Relay 4) **AL4 SET.P** = Relay 4 normal setpoint or **AL4 EL 1** = Relay 4 trailing relay 1 or **AL4 EL 2** = Relay 4 trailing relay 2 or **AL4 EL 3** = Relay 4 trailing relay 3. For trailing set points the setpoint value is entered as the difference from the setpoint being trailed.

If the trailing setpoint is to operate ahead of the prime setpoint then the value is entered as a positive number and if operating behind the prime setpoint then the value is entered as a negative number.

Notes: do not use trailing alarms for mixed input types or channels e.g. do not set relay 2 to trail relay 1 if relay 1 is set to operate from the Channel 1 conductivity input and relay 2 is set to operate from a temperature input. Similarly trailing alarms will not operate if the relays chosen are set to operate from different conductivity channels. If a high (**AL x h, 9h**) trailing alarm is set then this will only follow the high alarm setting of the relay it is set to trail. Similarly a low alarm will only trail a low alarm of the relay it is set to trail. It is possible to use trailing alarms with both high and low alarm settings used for each relay.

Example 1 - High alarm: With Relay 2 set to trail relay 1, if **AL 1 h, 9h** is set to **1000** and **AL 2 h, 9h** is set to **50** then relay 1 will activate at **1000** and relay 2 will activate at **1050** (i.e. 1000 + 50). If relay 2 had been set at **-50** then Relay 2 would activate at **950** (i.e. 1000 - 50) or above.

Example 2 - Low alarm: With Relay 2 set to trail relay 1, if **AL 1 Lo** is set to **600** and **AL 2 Lo** is set to **200** then relay 1 will activate at **600** and relay 2 will activate at **800** (i.e. 600 + 200). If relay 2 had been set at **-200** then Relay 2 would activate at **400** (i.e. 600 - 200) or below.

5.8 Alarm relay operating mode

Section: **AL x**
 Display: **OPER**
 Range: **H, Lo**
 Default Value: **H, Lo**
 Default Access Level **4**
 Function number **4 160 to 4 166**

Sets the operating mode for the selected relay, at this point the only choice is for normal on/off switching using high and/or low setpoints. The relay can also be activated by a timeout in the data string.

5.9 Alarm relay operation input selection

Section: **AL x**
 Display: **Ch**
 Range: **CH 1** or in **WDIR** mode **d, r** or **SPEED**
 Default Value: **CH 1**
 Default Access Level **4**
 Function number **4070 to 4076**

Sets the input from which the selected alarm relay will operate. Selections available are:

CH 1 relay operates from value of channel 1 (for this software version only 1 channel is available)

d, r relay operates from wind direction value (only available in **WDIR** mode)

SPEED relay operates from wind speed value (only available in **AREA** mode)

To set the alarm relay input selection go to the **Ch** function, press **F** and when you see the decimal points flash use the **▲** or **▼** push buttons to set the required selection then press **F** to accept this selection.

5.10 Alarm relay latching operation

Section:	AL 1 to AL 8
Display:	LAtch
Range:	Auto, LAtch
Default Value:	Auto
Default Access Level	4
Function number	4 170 to 4 177

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.

5.11 Serial input timeout alarm

Section:	AL x
Display:	tout
Range:	OFF or ON
Default Value:	oFF
Default Access Level	4
Function number	4 1d0 to 4 1d7

Allows the selected relay to be used to give an alarm indication if the serial input string ceases for a time exceeding the display timeout **ds.to** value. Note that this can be used in addition to the high and low setpoints.

5.12 Serial input operation mode

Section:	CONF
Display:	Code
Range:	d, SP, ASCII, UAL, n.bus, SCAN, AREA, , 13 1
Default Value:	ASCII
Default Access Level	CAL
Function number	4d00

Allows selection of the operating mode to be used for serial communications.

d, SP mode

With **d, SP** selected (image mode) the display expects to see an input in raw display data format from another instrument. This mode is generally only used when the display is connected to an instrument from the same manufacturer. This mode is not used with any other source.

The data format expected is: <ESC>Incccc
Where: <ESC> is 27 Dec or 1B Hex
I is the ASCII character "I"
n is the number of image characters to follow
cccc are the image characters in Hex. format

ASCII mode

ASCII selects ASCII type input data, the input data will then be displayed without modification (see also **ALPH** function as this can also affect what is displayed). Displays of characters in **ALPH** mode are left justified. Any leading zeroes received will be visible in this mode e.g. data received such as 00873 will be displayed as 00873.

URL mode

With **URL** selected (numeric or value mode) the incoming characters will not be displayed unless they are numeric characters or a negative sign "-", the characters will be read until a terminating character (see **t.chr**) is found. In circumstances, e.g. when terminating characters are not sent by the transmitting device, the instrument can be programmed to look for a constant transmitted character which occurs before to the required display values rather than at the end of the string. In this instance the **SCH I** character can be used and the display told to display a number of characters after this character (see **n.chr** function). Once the **t.chr** or **SCH I** character is found the numeric value will be updated and displayed. If a non numeric character is found then the conversion will cease at that point. Note that ASCII control characters 00 Decimal (Null) to 31 Decimal (Unit Separator) will be ignored if they are seen as part of the string and will not cause the conversion to cease when encountered, they will however not be ignored if used as a start character (**SCH I, 2** or **3**) or the terminating character set at the **t.chr** function. The numeric value is filtered after conversion the **FLtr** setting determines the level of filtering. Note: In **URL** mode any leading zeroes transmitted will be ignored e.g. data received such as -00345 will be displayed as -345.

̄.bus mode

With **̄.bus** selected the display will accept a Modbus RTU input (RS232 or RS485) or Modbus TCP (port 502) with LE5 models. An address (1 to 255, do not use address 0) must be selected at the function to correspond to the address selected at the host device. The instrument accepts Modbus command 6 "preset single register" and command 16 "preset multiple registers" to send values to the display. The command 6 or 16 information sent can be used to preset four registers, these are:

Register 0 Decimal point position (note **! n ! dPnt** function must be set to **Auto** if this register is to be used to set the decimal point)

Register 1 Input taken as an unsigned 16 bit number (0 to 65535)

Register 2 Input taken as a signed 16 bit number (-32767 to 32767)

Register 3 Signed 32 bit number high order 16 bits

Register 4 Signed 32 bit number low order 16 bits

Registers 3 and 4 are used together to form a 32 bit number. The display will be updated when the low order register is set.

For example to send the number 1234 to a display with address 1 using Modbus RTU function 6 the following could be sent:

01 06 00 01 04 d2 5a 97

Where:

01 is the address set at the **! n ! Addr** function

06 is the function number 6

00 01 is the register number (register 1 unsigned 16 bit number)

04 d2 is 1234 in Hex

5a 97 is the system generated checksum

To poll for the display value via Modbus use address 0x1000 and 0x1001 hex, registers 44097 and 44098, Modbus function 3. Modbus function 1 can be used to poll for relay coil status addresses 0x0000 to 0x0007,

registers 1 to 8, for relays 1 to 8 (4 relays fitted as standard, up to 8 relays are optionally available).

SCAN mode

When **SCAN** is selected the display can scan up to 8 other compatible devices or channels. The address of each device or channel, the display value required etc. must be set, these setting can be found in the **CH 1** to **CH 8** section of software. When this mode is selected the channel number will flash followed by the value for that channel e.g. **CH 2** followed by the value returned for channel 2.

NMEA mode

With **NMEA** selected the instrument must be connected to a sensor with standard NMEA output. In this mode the decimal point **d.Pnt** function operates only on the speed display.

IND 131 mode

This is a special mode use when connected to a Mettler Toledo IND131/331 module. This mode examines special status words sent by the device to determine the placement of decimal points and whether the value is positive or negative. The standard decimal point functions in the PM5 display do not need to be used when connected in this mode. Default settings for this mode are 9600 baud, 7 bit, even parity though this can be altered if the sending unit is not programmed for these settings. When this mode is selected some of the other input setup functions will not be seen. An overrange message on the Mettler Toledo display will be displayed as **-OF-** on the PM5 display.

5.13 Baud rate

Section:	CONF
Display:	bAud
Range:	300, 600, 1200, 2400, 4800, 9600, 19.2, 38.4
Default Value:	9600
Default Access Level	CRL
Function number	4d01

Sets the baud rate for the incoming data string. This must be set to match the baud rate from the sending device. This function will not be seen if Ethernet input is being used.

5.14 Serial input data bits and parity

Section:	CONF
Display:	dATA
Range:	8.NONE, 8.odd, 8.EVEN, 7.odd, 7.EVEN, 7.NONE
Default Value:	8.NONE
Default Access Level	CRL
Function number	4d02

Sets the number of data and parity bits for the incoming serial string. For example for an incoming serial string using 7 bit, even parity select **7.EVEN**. This function will not be seen if Ethernet input is being used.

5.15 Select number of channels to scan

Section: **CONF**
Display: **CHAN Count**
Range: **1, 2, 3, 4, 5, 6, 7, 8**
Default Value: **1**
Default Access Level **CAL**
Function number **4d42**

Sets the number of channels to be scanned when set for scanning operation at the **Code** function.

5.16 Select number of calculation channels

Section: **CONF**
Display: **CALC Count**
Range: **0, 1, 2, 3, 4, 5, 6, 7, 8**
Default Value: **0**
Default Access Level **4**
Function number **438d**

Sets the number of calculation channels required. Calculation channels are not actual inputs but are channels which allow various operations to be conducted on one or more inputs. See the calculation channel **Func** function for a full description.

5.17 Select number of alarms

Section: **CONF**
Display: **AL Count**
Range: **0, 1, 2, 3, 4, 5, 6, 7, 8**
Default Value: **2**
Default Access Level **4**
Function number **437d**

Sets the number of alarms required. Alarms can be set for high, low etc. operation and can be assigned to one or more relays. See the **AL 1** to **AL 8** functions for full description.

5.18 Select scan delay time

Section: **CONF**
Display: **SCAN DELAY**
Range: **0 to 200** secs
Default Value: **10**
Default Access Level **2**
Function number **4d1E**

Sets delay time between scans for each channel in seconds. This function is only required when scanning operation is selected at the **Code** function.

5.19 Output voltage selection for option boards

Section: **E.00t**
Display: **00tPt**
Range: **50, 120**
Default Value: **50**
Default Access Level **4**
Function number **4428**

Allows selection of the output voltage when an option board is supplied with the transmitter supply option or transmitter supply plus analog output option fitted. $\pm 5V$ or $\pm 12V$ (25mA max.) is available as transmitter supply this function allow selection of $\pm 5V$ (**50**) or $\pm 12V$ (**120**). Transmitter supply voltages are approximate.

5.20 Output selection for analog output 1

Section: **F01**
Display: **00tPt**
Range: **4-20.0-10.0-10**
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
- **0-10** for 0 to 1VDC output
- **0-10** for 0 to 10VDC output

To set the selection go to the **00tPt** 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.

5.21 Input selection for analog output 1

Section: **F01**
Display: **inPt**
Range: **CH1, SPEED or dir**
Default Value: **CH1**
Default Access Level **4**
Function number **43E0**

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, in some modes this will be the only channel available

SPEED output operates from wind speed (NMEA mode only)

dir output operates from wind direction (NMEA mode only)

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.

5.22 Analog output 1 PI control on or off

Section: **FO1**
Display: **P.Ct1**
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 **H, SH** 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.Ct1** 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.

5.23 Analog output 1 option low value

Section: **FO1**
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.

5.24 Analog output option high value

Section: **FO1**
Display: **H, SH**
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 **H, SH** 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.

5.25 Analog output 1 PI control setpoint

Section: **FO 1**
Display: **SEtP**
Range: Any display value
Default Value: **0**
Default Access Level **4**
Function number **46 10**

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.

5.26 Analog output 1 PI control span

Section: **FO 1**
Display: **SPAn**
Range: Any display value
Default Value: **1000**
Default Access Level **4**
Function number **46 18**

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.

5.27 Analog output 1 PI control proportional gain

Section: **FO 1**
Display: **P.9**
Range: Any display value
Default Value: **1.000**
Default Access Level **4**
Function number **46 20**

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.

5.28 Analog output 1 PI control integral gain

Section: **FOI**
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.

5.29 Analog output 1 PI control integral high limit

Section: **FOI**
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 **I.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.

5.30 Analog output 1 PI control integral low limit

Section: **FOI**
Display: **I.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 **I.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.

5.31 Analog output 1 PI control bias

Section: **F01**
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 **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.

5.32 Output selection for analog output 2

Section: **F02**
Display: **Output**
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

0-1.0 for 0 to 1VDC output

0-10 for 0 to 10VDC output

To set the selection go to the **Output** 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.

5.33 Input selection for analog output 2

Section: **F02**
Display: **Input**
Range: **CH1**, **SPEED** or **dir**
Default Value: **CH1**
Default Access Level **4**
Function number **43E1**

Seen only when dual analog retransmission option fitted. Sets the input from which the second analog output will operate. See function for further details.

5.34 Analog output 2 PI control on or off

Section: **F02**
Display: **P.Ctl**
Range: **No** or **YES**
Default Value: **No**
Default Access Level **4**
Function number **4601**

Allows selection of retransmission (**No**) or PI control analog output (**YES**). See function **F01P.Ctl** for further details.

5.35 Analog output 2 option low value

Section: **F02**
Display: **Lo**
Range: Any display value
Default Value: **0**
Default Access Level **4**
Function number **4121**

Seen only when dual analog retransmission option fitted. See function **F01Lo** for further details.

5.36 Analog output option 2 high value

Section: **F02**
Display: **H, 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 **F01H, 9h** for further details.

5.37 Analog output 2 PI control setpoint

Section: **F02**
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 **F01SEtP** for further details.

5.38 Analog output 2 PI control span

Section: **F02**
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 **F01SPAn** for further details.

5.39 Analog output 2 PI control proportional gain

Section: **F02**
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 **F01P.9** for further details.

5.40 Analog output 2 PI control integral gain

Section: **F02**
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 **F01I.9** for further details.

5.41 Analog output 2 PI control integral high limit

Section: **F02**
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 **F01I.H** for further details.

5.42 Analog output 2 PI control integral low limit

Section: **F02**
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 **F01I.L** for further details.

5.43 Analog output 2 PI control bias

Section: **F02**
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 **F01b, AS** for further details.

5.44 Checksum error detection

Section: **IN1**
Display: **C.Suñ**
Range: **OFF** or **ON**
Default Value: **On**
Default Access Level **CAL**
Function number **4d08**

Seen only when **IN1C.Suñ** is set to **On**. Allows checksum error detection. If set to **OFF** then no checksum detection is used. If set to **on** then an error message (**C.Suñ Error** or for a 4 digit display **C.Suñ Errr**) will flash when a checksum error is detected.

5.45 Serial input address character 1

Section: **IN1**
Display: **SCH1**
Range: **-2** to **255**
Default Value: **-1**
Default Access Level **CAL**
Function number **4d20**

Used only when **SCH1** function = **URL** or **ASCII**. When a string is sent the instrument will look for four address characters, **SCH1**, **SCH2**, **SCH3** and **SCH4**. If these characters do not appear, one after the other, then the string of data will not be accepted and will not be displayed. Selecting **-2** means “don’t care” i.e. a character will be expected in the SCH character selected but any character will be acceptable as a match. Selecting **-1** disables the function and no matching will be required for that character. Valid characters are -2 to 255 Decimal. **SCH1** is the first start of text character. The use of one or more start of text characters allows addressing of the display in multidrop applications using RS485 or RS422. If data is required to be displayed by only selected displays on a multidrop line then the data can be preceded by an address which matches the **SCH** settings in the instruments required.

For example if the string for a particular display is to be preceded by the letters AB then set **SCH1** to **65** (decimal form or the ASCII character A), **SCH2** to **66** (decimal form of the ASCII character B), **SCH3** to **-1** and **SCH4** to **-1**. Any display set with these SCH characters will accept an input only if it is preceded by the letters AB i.e the letters AB have been used to address displays with these settings. If no address is required then leave the **SCH1** to **SCH4** characters set at **-1**.

The **SCH1** character can also be used in conjunction with the **Addr** function to force the display to show only a certain number of characters following the **SCH1** character. This method cannot be used with either **SCH2**, **SCH3** or **SCH4**. For example if the data string is always preceded by the letter M e.g. M345678 then setting **SCH1** to **77** (decimal form of the ASCII character M) and **Addr** to **3** will mean that the display will show **345** i.e. the three characters following the M character.

5.46 Serial input address character 2

Section: **101**
Display: **SCM2**
Range: **-2 to 255**
Default Value: **-1**
Default Access Level **CRL**
Function number **4d21**

Second address character. Used only when **Code** function = **URL** or **ASCII**. Refer to the **SCM1** function for further details.

5.47 Serial input address character 3

Section: **101**
Display: **SCM3**
Range: **-2 to 255**
Default Value: **-1**
Default Access Level **CRL**
Function number **4d22**

Third address character. Used only when **Code** function = **URL** or **ASCII**. Refer to the **SCM1** function for further details.

5.48 Serial input address character 4

Section: **101**
Display: **SCM4**
Range: **-2 to 255**
Default Value: **-1**
Default Access Level **CRL**
Function number **4d23**

Fourth address character. Used only when **Code** function = **URL** or **ASCII**. Refer to the **SCM1** function for further details.

5.49 Serial input terminating character

Section: **101**
Display: **t.chr**
Range: **-1 to 255**
Default Value: **13**
Default Access Level **CRL**
Function number **4d10**

Used only when function = **URL** or **ASCII**. The display will look for this terminating character to determine when the incoming serial data string has ended. A setting of **-1** means that no terminating character is used so the display will not look for one. If no regular terminating character is available then an alternative method may have to be considered such as using the **SCM1** etc. functions to detect a regular value prior to the required display value.

For example a string of 1234<CR> would use the <CR> (carriage return character) as the terminating character, in this case the **t.chr** function would be set to **13** as 13 is the ASCII value (decimal) for carriage return.

5.50 Number of serial input characters to skip

Section: **IRI**
Display: **dELAY**
Range: **0** to **255**
Default Value: **0**
Default Access Level **CR**
Function number **4d11**

Used only when function = **URL** or **ASCII**. Select the numbers of characters in front of the input string to skip before displaying (may be set from **0** to **255**, default is **0** (off)). This allows the display to skip a certain number of characters in the input string before starting the display. This is useful for skipping unwanted data such as control characters etc., which may be sent by the instruments along with the display information. For example if **dELAY** is set to **5** then **678** will be displayed from the following example string: <STX>12345678<CR> i.e. the first 5 characters of the string will be ignored. Note that in **URL** mode the values displayed will be right justified and in **ASCII** mode the display is left justified e.g. for this example using a 4 digit display <BLANK>**678** will be seen in **URL** mode whereas in **ASCII** mode the value will displayed as **678**<BLANK> for a 4 digit display.

The **ALPHA** function can also affect the character skipping used by the **dELAY** function. See the the **ALPHA** function, section 5.52 for further description and example.

5.51 Number of serial input characters to skip back

Section: **IRI**
Display: **bAct**
Range: **0** to **120**
Default Value: **0**
Default Access Level **CR**
Function number **4d12**

Used only when function = **URL** or **ASCII**. Number of characters back from the terminating character to skip, default is **0** (off). The display will wait for the terminating character and will then skip back over the last X characters in front to the terminating character with the X value being the value set in this function. For example if the terminating character **l.chr** is set to **13** (i.e. carriage return <CR>) and **bAct** is set to **2** then **1234** will be displayed from the example string <STX>123456<CR>. For the same input string the display would show **123456** if the **bAct** function was set to **0** and the display had enough digits to show this value. If the number of display digits is too few the overrange message **-or-** will be seen in **URL** mode or the most significant values which will fit on the display will be displayed in **ASCII** mode. Both **ASCII** an **URL** mode values will be right justified when the **bAct** function is used and the display value is less than the number of digits on the display.

5.52 Number of serial input characters to skip from **SCN** or **l.chr**

Section: **IRI**
Display: **l.chr**
Range: **-120** to **120**
Default Value: **0**
Default Access Level **CR**
Function number **4d13**

Used only when function = **URL** or **ASCII**. This function is used to select the required display value from a string using either the start character or end character as a reference. The **l.chr** function can be used with the **dELAY** or **bAct** function to further aid in selecting the required value, see example below.

The **ALPHA** function setting can also affect what is displayed, if this function is set to **OFF** then alpha

characters (A, B, C etc.) will not be counted i.e. they can be ignored as part of the count forward or back. If this function is set to **ON** then both numeric and alpha characters will be counted. If this function is set to **Al:** then all characters including control characters (e.g. <STX>, <CR> etc.) will be counted.

If the **n.Chr** value is positive then this function sets the number of characters to be extracted from the data string immediately following the **SCM1** (or **SCM2**, **SCM3** or **SCM4** if used) character. If no **SCM** character is selected then the display will count forward from the first character in the string.

If the **n.Chr** value is negative then this function sets the number of characters to be extracted from the data string immediately following the **e.Chr** character.

If this function is not required it should be left at the default setting of **0** which will disable the function.

Example 1:

For string <STX>12345678<CR> the value 1234 will be displayed if the **n.Chr** function is set to 4 and the value 5678 will be displayed if the **n.Chr** function is set to -4.

For the example above the value 3456 if the **n.Chr** function is set to 4 and the **dLAY** function is set to 2. For the example above the value 4567 would be displayed if the **n.Chr** function is set to -4 and the **bAct** function is set to 1.

Example 2: For string <STX>A12345678B<ETX><CR> the value 5678 will be displayed if the **n.Chr** function is set to -4 and the **ALPHA** function is set to **OFF** or the value 678 will be displayed if the **ALPHA** function is set to **ON** i.e. the B character has been counted but the control character <ETX> has not. If the **ALPHA** function is set to **Al:** the the B and <ETX> characters would both be counted and the display value for this string would be 78.

5.53 Serial input string decimal point insertion

Section: **!n!**
 Display: **!.dPt**
 Range: **-1 to 8**
 Default Value: **-1**
 Default Access Level **CAL**
 Function number **4d14**

In some systems the transmitting unit may display a decimal point position but not transmit the decimal point as part of the serial data. The **!.dPt** function can be used to inform the instrument of the required position of the decimal point on the display. The decimal point position of the result shown on the display is set via the **dCPt** function. If the **!.dPt** function is not needed then it should be left at the default setting of **-1** which will disable the function.

Example: Transmitted string is 234 with no decimal point sent. With **dCPt** set to **0.1** and **!.dPt** set to **-1** the displayed value will be **234.0** i.e. the display has been told to show one decimal place but no decimal point has been sent. If we now change the **!.dPt** to **!** the displayed value will be **23.4**

5.54 Alpha character display off or on

Section: **!n!**
 Display: **ALPHA**
 Range: **OFF, ON, Al:**
 Default Value: **Al:**
 Default Access Level **CAL**
 Function number **4d15**

Used only when **Code** function = **URL** or **ASCII** but applicable only to **ASCII**. Set this function to **OFF** to filter alpha characters from the input stream i.e. only numeric characters, spaces, decimal points and

negative signs will be displayed and alpha characters ignored.

When set to **on** the instrument will display both alpha and numeric characters. Note: only a limited number of alpha characters may be displayed due to the nature of 7 segment displays, non displayable characters (e.g. W and X) will be ignored.

When set to **Al:** alpha, numeric and control characters e.g. carriage returns will be included for counting purposes in the string, see paragraph below.

This function can also affect the character skipping used by the **bAct DELAY** and **n.Chr** functions. For example if **ALPHA** is set to **OFF** then only numeric characters, spaces, decimal points and negative signs will be counted and all other characters ignored. If **ALPHA** is set to **on** then all characters except control characters will be counted. If **ALPHA** is set to **Al:** then all characters including control characters will be counted.

See the the **n.Chr** function, section 5.52 for further description and example.

5.55 Decimal point

Section:	! n !
Display:	d.Pnt
Range:	0, 0.1, 0.02, 0.003
Default Value:	0
Default Access Level	CAL
Function number	4100

Displays and sets the decimal point. By pressing the **▲** or **▼** pushbutton at the **dCPt** function the decimal point position may be set. The display will indicate as follows: **0** (no decimal point), **0.1** (1 decimal place), **0.02** (2 decimal places) or **0.003** (3 decimal places). Note if the decimal point is altered the display alarm settings etc. will need to be re-adjusted checked. The **Auto** selection is used when **Code** function is set to **ind 13!** only. In this mode the panel meter expect to receive a separate data word which contains the decimal point position, the panel meter then automatically adjusts the decimal points displayed to match.

5.56 Display rounding

Section:	! n !
Display:	d.rnd
Range:	1 to 5000
Default Value:	1
Default Access Level	CAL
Function number	4360

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

5.57 Digital filter

Section: **IN1**
Display: **FLTR**
Range: **0, 1, 2, 3, 4, 5, 6, 7, 8**
Default Value: **0**
Default Access Level **CAL**
Function number **43C0**

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

5.58 Display polarity

Section: **IN1**
Display: **Ch.PL**
Range: **both, POS, NEG, ABS**
Default Value: **both**
Default Access Level **CAL**
Function number **4dA0**

Applicable in **URL** mode only. If set to **both** then the display will be able to indicate both positive and negative values. If set to **POS** the display will allow only positive values with any values below zero being rounded to zero. If set to **NEG** then the display will allow only negative values with any value above zero being rounded to zero. If set to **ABS** then the absolute value will be displayed i.e. both positive and negative input values will be displayed as positive values.

5.59 Modbus address

Section: **IN1**
Display: **Addr**
Range: **0 to 255**
Default Value: **1**
Default Access Level **CAL**
Function number **4d05**

Seen only when **Code** function is set to **~.bus**. An address (0 to 255) must be selected to correspond to the address selected at the host device when Modbus communications is being used. Note: address 0 is available but should not be used with Modbus communications.

5.60 Display timeout

Section: **1 0 1**
Display: **d5.t0**
Range: **0** to **1000** secs
Default Value: **10**
Default Access Level **4**
Function number **4d 18**

This function allows the user to set a timeout value for a valid display. Valid times are **0** to **1000** seconds, a setting of **0** disables the timeout i.e. the last value received will be displayed until a new number is sent. If a new data stream is not received before the timeout value is reached then the display will be blanked.

5.61 Data string timeout

Section: **1 0 1**
Display: **t.out**
Range: **0.1** to **10.0** secs
Default Value: **1.0**
Default Access Level **CAL**
Function number **4d 19**

This function allows the user to set a timeout value for the data stream. Valid times are **0.1** to **10.0** seconds. The timeout will cause the current data stream to be ignored if the time gap between characters in the stream exceeds the **t.out** value. This function helps to prevent false displays when the data stream is interrupted.

5.62 Input error messages disable

Section: **1 0 1**
Display: **d, SP C.ERR**
Range: **OFF** or **ON**
Default Value: **On**
Default Access Level **CAL**
Function number **4d 1C**

When set to **ON** the display is allowed to display any detected errors in the input string e.g. the **FFAE Err** message. When this function is set to **OFF** these error messages are disabled.

5.63 Input channel display disable

Section: **1 0 1**
Display: **d, SP**
Range: **OFF** or **ON**
Default Value: **On**
Default Access Level **4**
Function number **44F0**

This function can be used to disable the display of the input channel values when calculation channels are used. If set to **OFF** then only the calculation channel values will be seen.

5.64 Wind speed units

Section: **1 0 1**
Display: **U n, t S**
Range: **ā5, hPh, āPh** or **hnoēS**
Default Value: **ā5**
Default Access Level **4**
Function number **4d09**

Allows selection of the wind speed units value when using NMEA mode. Choices are:

ā5 for a display in metres per second

hPh for a display in kilometers per hour

āPh for a display in miles per hour

hnoēS for a display in knots (nautical miles per hour)

5.65 NMEA default display



Section: **1 0 1**
Display: **dFl t d, SP**
Range: **SCAN, d, r** or **SPEED**
Default Value: **SCAN**
Default Access Level **CARL**
Function number **4d0A**

Allows selection of the default display when using NMEA mode. Choices are:

SCAN display will toggle between direction and speed approx every 4 seconds. The display will show **d, r** before the wind direction value and **SPEED** before the wind speed value

d, r for a default display of win direction

SPEED for a default display of win speed

Note that the  and  can be used to toggle between wind speed and wind direction displays. After approx. 4 seconds the display will automatically revert to the default display.

5.66 Display scan time

Section: **1 0 1**
Display: **d, SP SEcS**
Range: **0** to **200** secs
Default Value: **10**
Default Access Level **2**
Function number **4d1E**

When the display is set for **āāEA** wind sensor mode and the **dFl t d, SP** is set to **SCAN** this function sets the number of seconds the display will hold a reading before changing to the alternate reading. e.g. if set for 4 seconds then the display will alternate between the speed and direction displays every 4 seconds. Note the **dS.tō** function must be set to a high enough value to ensure that the display does not time out whilst waiting for the next update, this could be seen as display flashing or display intermittently on then off for periods of time.

5.67 Polling function

Section: **POLL**
Display: **INPUT**
Range: **on** or **OFF**
Default Value: **OFF**
Default Access Level: **CAL**
Function number: **4d16**

Used only when **Code** function = **URL**. The instrument has the ability to transmit up to eight characters for polling purposes. This ability to poll is used when the instrument is to display data from a source which requires a polling command before it will communicate. The characters are set by functions **P.ch.1** to **P.ch.8** and the repeat rate for this polling is set by the **POLL dLAY** function. If **POLL INPUT** is set to **OFF** then no characters will be transmitted and the other polling functions will not be seen. If set to on then the characters selected will be transmitted at the rate selected by the **POLL dLAY** function. This ability to poll is used when the instrument is to display data from a source which requires a polling command before it will communicate.

5.68 Polling delay time

Section: **POLL**
Display: **dLAY**
Range: **0.0** to **10.0**
Default Value: **1.0**
Default Access Level: **CAL**
Function number: **4d17**

Used only when **Code** function = **URL** and **POLL INPUT** function is set to on. When the polling facility is being used the **POLL dLAY** function sets the repeat rate, in seconds, of the poll command. The time may be set from **0.0** seconds (as fast as the baud rate will allow) to **10.0** seconds.

5.69 First polling character

Section: **POLL**
Display: **P.Ch.1**
Range: **-1** to **255**
Default Value: **-1**
Default Access Level: **CAL**
Function number: **4d30**

Used only when **Code** function = **URL** and **POLL INPUT** function is set to on. Each of the eight poll command characters can be set from **-1** to **255** decimal. If set to **-1** then the character is ignored, if set to any other number then the equivalent ASCII character for that number will be sent. Characters 0 to 31 are special control characters such as “carriage return” and “start of text”. Use as many **P.ch** characters as required by your system and set the remaining characters to **-1** so that they are ignored. For example to poll an instrument with the command <STX>P!<CR> (for AIC instruments this means get primary display value from unit with address 1) set **P.ch.1** to 2 (this correspond to <STX>), **P.ch.2** to 80 (this corresponds to P), **P.ch.3** to 33 (this corresponds to address 1), **P.ch.4** to 13 this corresponds to <CR>, **P.ch.5**, **P.ch.6**, **P.ch.7** and **P.ch.8** are all set to -1.

5.70 Second polling character

Section: **POLL**
Display: **P.Ch.2**
Range: **- 1 to 255**
Default Value: **- 1**
Default Access Level **CRL**
Function number **4d31**

Second polling character, refer to function 5.69.

5.71 Third polling character

Section: **POLL**
Display: **P.Ch.3**
Range: **- 1 to 255**
Default Value: **- 1**
Default Access Level **CRL**
Function number **4d32**

Third polling character, refer to function 5.69.

5.72 Fourth polling character

Section: **POLL**
Display: **P.Ch.4**
Range: **- 1 to 255**
Default Value: **- 1**
Default Access Level **CRL**
Function number **4d33**

Fourth polling character, refer to function 5.69.

5.73 Fifth polling character

Section: **POLL**
Display: **P.Ch.5**
Range: **- 1 to 255**
Default Value: **- 1**
Default Access Level **CRL**
Function number **4d34**

Fifth polling character, refer to function 5.69.

5.74 Sixth polling character

Section: **POLL**
Display: **P.Ch.6**
Range: **- 1 to 255**
Default Value: **- 1**
Default Access Level **CRL**
Function number **4d35**

Sixth polling character, refer to function 5.69.

5.75 Seventh polling character

Section: **POLL**
Display: **P.Ch.7**
Range: **- 1 to 255**
Default Value: **- 1**
Default Access Level **CAL**
Function number **4d36**

Seventh polling character, refer to function 5.69.

5.76 Eighth polling character

Section: **POLL**
Display: **P.Ch.8**
Range: **- 1 to 255**
Default Value: **- 1**
Default Access Level **CAL**
Function number **4d37**

Eighth polling character, refer to function 5.69.

5.77 Scan channel poll address

Section: **CH 1 to CH8**
Display: **Poll Addr**
Range: **1 to 255**
Default Value: **1**
Default Access Level **CAL**
Function number **4d90 to 4d97**

Seen when the **CONF Code** function is set to **SCAN**. This function selects the serial address of the instruments to be scanned. For example if 2 instruments are to be scanned one could be given an address (**Addr**) of 1 and the second an address of 2.

5.78 Scan channel command

Section: **CH 1 to CH8**
Display: **Cmd**
Range: **Pr, SEc, tEr, QuAd, CH0, CH 1, CH2, CH3, CH4, CH5, CH6, CH 7, CH8, AbUS**
Default Value: **Pr,**
Default Access Level **CAL**
Function number **4d80 to 4d87**

Seen when the **CONF Code** function is set to **SCAN**. This function sets the value to be returned from the polled instrument. See individual instruction manuals for the instruments being scanned to determine which choice below is suitable e.g. some instruments may only have a primary display value available. Choices are:

- Pr,** - instructs the scanned instrument to return its primary display value.
- SEc** - instructs the scanned instrument to return its secondary display value.
- tEr** - instructs the scanned instrument to return its tertiary display value.
- QuAd** - instructs the scanned instrument to return its quinary display value.

CH0 - instructs the scanned instrument to return its channel zero display value.

CH 1 to CH8) - instructs the scanned instrument to return its channel one or two etc. up to channel eight display value.

ABUS - if communicating with an instrument capable of AIC ABUS communication it is possible to use this option to request a particular value by sending the ABUS value e.g. 800 hex is the ABUS value required to request the primary display value from the instrument being scanned.

5.79 ABUS command value

Section: **CH 1 to CH8**
Display: **AbuS Code**
Range: **0000 to FFFF**
Default Value:
Default Access Level **CAL**
Function number **4dF0 to 4dF7**

Seen when the **CONF Code** function is set to **SCAN**. This function sets the ABUS command used when **Cmd** is set to **ABUS** e.g. **0800** is the command for the primary display value. Thousands of commands are available some of which are not useful in this software. A complete list is not available, contact supplier if a different command is required.

5.80 Channel decimal point

Section: **CH 1 to CH8**
Display: **d.Pnt**
Range: **0, 0.1, 0.02, 0.003**
Default Value: **0**
Default Access Level **CAL**
Function number **4100 to 4107**

Seen when the **CONF Code** function is set to **SCAN**. This function sets the decimal point placement for the selected channel.

5.81 Channel display rounding

Section: **CH 1 to CH8**
Display: **d.rnd**
Range: **1 to 5000**
Default Value: **1**
Default Access Level **CAL**
Function number **4360 to 4367**

Seen when the **CONF Code** function is set to **SCAN**. This function sets the display rounding for the selected channel. e.g. if set to **0.2** the display will only show multiples of 0.2.

5.82 Channel display filter

Section: **CH 1 to CH 8**
Display: **FILTER**
Range: **0, 1, 2, 3, 4, 5, 6, 7, 8**
Default Value: **0**
Default Access Level **CAL**
Function number **43C0 to 43C7**

Seen when the **CONF Code** function is set to **SCAN**. Displays and sets the digital filter value for the selected channel. 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.

5.83 Channel display polarity

Section: **CH 1 to CH 8**
Display: **Ch.PL**
Range: **both, POS, NEG, ABS**
Default Value: **both**
Default Access Level **CAL**
Function number **4dA0 to 4dA7**

Seen when the **CONF Code** function is set to **SCAN**. Displays and sets the polarity selection for the display for the selected for channel. If set to **both** then both positive and negative values can be displayed. If set to **POS** the display will allow only positive values with any values below zero being rounded to zero. If set to **NEG** then the display will allow only negative values with any value above zero being rounded to zero. If set to **ABS** then both positive and negative values received will be displayed as positive values.

5.84 Channel display on or off

Section: **CH 1 to CH 8**
Display: **di SP**
Range: **OFF** or **ON**
Default Value: **On**
Default Access Level **4**
Function number **44F0 to 44F7**

Allows selection of which channels will be seen and which not seen on the display. If set to **OFF** that selected channel will not be seen on the display. If set to **ON** that channel will be seen on the display. For example when adding two channels together using a calculated channel it may be required that channel 1 and channel 2 not be seen on the display so that only the sum (produced by the calculated channel) is seen.

5.85 Calculation channel function

Section: **CC 1 to CC 8**
Display: **Func**
Range: **H_i, Lo, di FF, AU9, d.AU9, P.AU9, N.AU9, S.di FF, Add, PC 1, PC 2, Sub, Prod, di u, S, nE, CoS, f.AU9, F.AU9**
Default Value: **H_i**
Default Access Level **4**
Function number **4E 10 to 4E 17**

Allows selection of the function to be used for each calculated channel. Options are:

OFF - calculated channel not used.

H - calculated channel shows the highest positive value from all of the selected input channels.

Lo - calculated channel shows the lowest value from all of the selected input channels.

d:FF - calculated channel shows the difference in value between the highest and lowest selected input channel readings.

AUS - calculated channel shows the average of all selected input channel readings.

d.AUS - calculated channel shows a value equal to the highest positive or negative value and the average of the selected channels.

P.AUS - calculated channel shows a value equal to the highest positive value and the average of the selected channels.

N.AUS - calculated channel shows a value equal to the average minus the lowest value of the selected channels.

S.d:FF - calculated channel shows the difference (positive or negative) between the first two selected active channels.

Add - calculated channel shows the arithmetic sum of all the selected channels.

PC 1 - calculated channel shows the percentage of the first selected channel to the sum of all selected channels including itself.

PC 2 - calculated channel shows the percentage of the second selected channel to the sum of all selected channels including itself.

Sub - subtraction, channel 2 will be subtracted from channel 1 and if there are more than 2 channels the next channel will be subtracted from the result of channel 1 minus channel 2 etc.

Prod - multiplication, channel 1 and 2 will be multiplied and if there are more than 2 channels the result of channel 1 times channel 2 will be multiplied by the next channel etc.

d:u - division. channel 1 divided by channel 2 and if there are more than 2 channels this result will be divided by the next channel etc.

S:NE - sine, channel 1 is multiplied by the sine of the value on channel 2 and if there are more than 2 channels this result will be multiplied by the sine of the value of the next channel etc.

CoS - cosine, channel 1 is multiplied by the cosine of the value on channel 2 and if there are more than 2 channels this result will be multiplied by the cosine of the value of the next channel etc.

F.AUS - rolling average. The rolling average causes the display to show the rolling average. The rolling average will take the current input and average this with the previously calculated average figure. The rolling and fixed averages both use the count set by the **A.cnt** function to set the number of input values to be averaged but the rolling average updates with every new input value received.

F.AUS - fixed average. The fixed average causes the display to show the average of the number of data strings selected at the **A.cnt** function. The fixed average will only be displayed at the end of the number of data string selected. For example if **A.cnt** is set to **20** then the display will update when 20 data strings have been input and averaged (assuming timeouts have not been exceeded).

Example 1: To program calculated channel 1 to activate relay 1 and 2 to operate on an highest value if the value of any of the 8 inputs exceeds 120 the basic settings are:

- At the **CONF CHAN Count** function ensure that at least one calculation channel is set
- Set **AL 1 H, 9h** to **120**
- Set **AL 1 FLYS** to **FLY 1 On** and **FLY 2 On**
- Set **AL 1 OPER** to **H, .Lo**
- Set **AL 1 Ch** to **CC 1**
- Set **CC 1 Func** to **H,**
- Set **CC 1 Chan SEL** to **Ch 1 On, Ch2 On, Ch3 On, Ch4 On, Ch5 On, Ch6 On, Ch7 On** and **Ch8 On**

Relays 1 and 2 will now activate if any of the 8 inputs exceeds a value of 120 and if annunciators are fitted annunciator 1 will flash. In the example above if **AL 1 Lo** had been set to **120** with the high alarm set to **OFF** then the relays would activate if any of the inputs falls below 120.

Example 2: To program calculated channel 1 to activate relay 1 to operate on a difference value if the difference between inputs 1 and 2 exceeds a value of 20 the basic settings are:

- At the **CONF CHAN Count** function ensure that at least one calculation channel is set
- Set **AL 1 H, 9h** to **20**
- Set **AL 1 FLYS** to **FLY 1 On**
- Set **AL 1 OPER** to **H, Lo**
- Set **AL 1 Ch** and to **CC 1**
- Set **CC 1 Func** to **d, FF**
- Set **CC 1 Chan SEL** to **Ch 1 On** and **Ch2 On**

Relay 1 will now activate if the difference between input channels 1 and 2 exceeds a value of 20 and if annunciators are fitted annunciator 1 will flash. In the example above if **AL 1 Lo** had been set to **20** with the high alarm set to **OFF** then the relay would activate if the difference between the two inputs was less than 20.

Example 3: To program calculated channel 1 to show the fixed average of every 20 data strings:

- Set the **CALC Count** function in the configuration section to **1**
- Set the **Func** in the calculated channel section to **F.AVG**
- Set the **R.cnt** in the calculated channel section to **20**

The average of each 20 data strings will now be shown as the calculated channel 1 (**CC 1**) value.

5.86 Calculation channel data log

Section: **CC 1 to CC 8**
Display: **d.Lo9**
Range: **OFF** or **On**
Default Value: **OFF**
Default Access Level **4**
Function number **4E50 to 4E57**

Applicable only when the internal data logger option is fitted. This function allows the calculated channel values to be added to the values logged by the data logger when set to **On** or stops the values being added to the logged values when set to **OFF**.

5.87 Calculation channel display

Section: **CC 1 to CC 8**
Display: **d1 SP**
Range: **OFF** or **On**
Default Value: **OFF**
Default Access Level **4**
Function number **4E60 to 4E67**

This function allows the user to select whether or not the calculated channel is shown on the display along with the input channels. Each calculated channel can be independently set to **On** or **OFF** i.e. it is possible to select only those channels you wish to see. If set to **OFF** the calculated channel selected will not be

displayed. If set to **ON** the calculated channel selected will be displayed and will show a **c** on the display e.g. a display of **123c4** would indicate the calculated channel 4 value is 123. If it is required to only display the calculation channel result and not the input channel then the input channel display must be set to **OFF** (see **, n i** etc. functions). If the calculation channel is the only channel being viewed the the message **CC i** will flash periodically approx. every 8 seconds if the **CONF SCAN DELAY** function is set to **0** if set to a value other than zero the message **CC i** will not flash periodically.

5.88 Calculation channel decimal point

Section: **CC 1 to CC 8**
 Display: **d.Pnt**
 Range: **0, 0.1, 0.02**
 Default Value: **0**
 Default Access Level **4**
 Function number **4E70 to 4E77**

This function allows the user to select the decimal point for the calculated channel display. In temperature displays the choice will be **0** (no decimal point) or **0.1** (one decimal point). In other displays this may go up to **0.003** (3 decimal points). The decimal points for the calculated channel do not need to match those of the physical input channels but allowances need to be made for the number of display digits available.

5.89 Calculation channel display rounding

Section: **CC 1 to CC 8**
 Display: **d.rnd**
 Range: **1 to 5000**
 Default Value: **1**
 Default Access Level **4**
 Function number **4E80 to 4E87**

This function allows the user to select the display rounding for the calculated channel display. Display rounding allow the resolution of the display to be reduced to an acceptable level whilst minimising any distracting changing of display value at each sample. For example with this function set to **5** the value displayed will be rounded up or down and will change in multiples of 5 only e.g. 0, 5, 10, 15 etc. and values in between will not be shown.

5.90 Calculation channel selection

Section: **CC 1 to CC 8**
 Display: **Chan SEL**
 Range: **CH 1, CH2, CH3, CH4, CH5, CH6, CH7, CH8, CC 1, CC2, CC3, CC4, CC5, CC6, CC7, CC8**
 Default Value: **n/a**
 Default Access Level **4**
 Function number **4E20 to 4E27**

This function allows the user to select which the available channels the calculated channel will use by turning each channel on (**ON**) or off (**OFF**). For example if you wish to display the highest input from physical inputs 2, 4 and 6 on calculated channel 1 then at the **CC 1 Chan SEL** function set **CH2, CH4** and **CH6** to **ON** and set all other channels to **OFF**.

Note this function allows both physical input channels and other calculated channels to be used as inputs for the calculated result. e.g. in the example above it would also be possible to choose to display the

highest value from **CH2**, **CH4**, **CH6** or **CC2** (calculated channel 2).
See the **Func** function for a list of the mathematical calculations available.

5.91 Calculation channel fixed average count

Section: **CC 1 to CC 8**
Display: **A.cnt**
Range: **1 to 128**
Default Value: **4**
Default Access Level **4**
Function number **4EF0 to 4EF7**

This function set the number of channels to average when the calculation channel is set for fixed average operation (**F.AVG**).

5.92 Calculation channel multiplication scale

Section: **CC 1 to CC 8**
Display: **Ar, Ch SCALE**
Range: Any display value
Default Value: n/a
Default Access Level **4**
Function number **4E90 to 4E97**

Arithmetic offset, scale and division functions allow the value sent to the display to be altered prior to display. The offset operation will be performed first followed by the scale and then the division. The **Ar, Ch SCALE** function allows the user to select a scaling value for the display. For example if this function is set to **2** then the value sent to the display will (after any addition required) be doubled.

5.93 Calculation channel offset value

Section: **CC 1 to CC 8**
Display: **Ar, Ch OFFSET**
Range: Any display value
Default Value: n/a
Default Access Level **4**
Function number **4EA0 to 4EA7**

Arithmetic offset, scale and division functions allow the value sent to the display to be altered prior to display. The offset operation will be performed first followed by the scale and then the division. The **Ar, Ch OFFSET** function allows the user to select an offset value to be added to the incoming value prior to display. For example if this function is set to **100** then the value sent to the display will be have the value of 100 added to it.

5.94 Calculation channel division

Section: **CC 1 to CC 8**
Display: **Ar, Ch d, u**
Range: Any display value
Default Value: n/a
Default Access Level **4**
Function number **4EB0 to 4EB7**

Arithmetic offset, scale and division functions allow the value sent to the display to be altered prior to

display. The offset operation will be performed first followed by the scale and then the division. The **Ar, Ch, d, u** function allows the user to select a division value to be used on the incoming value prior to display. For example if this function is set to **5** then the value sent to the display will (after any addition and scale has been applied) be divided by 5.

5.95 Bargraph channel

Section: **bAr9**
 Display: **Ch**
 Range: **CH1, d, r** or **SPEED**
 Default Value: **CH1**
 Default Access Level **4**
 Function number **43FB**

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

- **CH1** - bargraph shows channel 1 value
- **d, r** - bargraph shows wind direction in **AREA** mode
- **SPEED** - bargraph shows wind speed in **AREA** mode

To set bargraph channel go to the **bAr9 Ch** function, press **F** and when you see the decimal points flash use the **▲** or **▼** push buttons to set the required choice then press **F** to accept this selection.

5.96 Bargraph type

Section: **bAr9**
 Display: **TYPE**
 Range: **bAr, S.dot, d.dot, c.bAr** or **r.dot**
 Default Value: **bAr**
 Default Access Level **4**
 Function number **43FD**

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.
- **r.dot** -modulus or wrap around single dot bargraph. This mode of operation allows the bargraph to wrap around the limits set by the **bAr9 Lo** and **bAr9 Hi** functions by dividing the 7 segment display by the modulus (the modulus is the difference between 0 and **bAr9 Hi**) and displaying the remainder. For example if **bAr9 Lo** is set to 0 and **bAr9 Hi** is set to 10 then in other bargraph modes when the 7 segment display reads a value such as 25 the bargraph would be stuck at the high limit of its travel since it cannot go beyond 10. In **r.dot** mode the display will wrap around at 10 then continue up the bar again and will be at the midpoint of the bargraph when the

7 segment display shows 25 (as it would for a 7 segment display of 15, 35, etc.). In this example for a 7 segment display of 25 the value of 25 is divided by the modulus value of 10 in this example and the remainder displayed i.e. 10 goes into 25 twice with the remainder of 5 and so a bargraph position of 5 is displayed.

To set bargraph type go to the **bARr9 tYPE** function, press **F** and when you see the decimal points flash use the **▲** or **▼** push buttons to set the required choice then press **F** to accept this selection.

For wind direction operation using a circular bargraph select **r.dot** mode and set **bARr9 Lo** to the value -180 and **bARr9 Hi** to the value 180.

5.97 Bargraph low value

Section:	bARr9
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 **bARr9 Lo** and **bARr9 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 **bARr9 Lo** function and use the **▲** or **▼** push buttons to set the value required then press **F** to accept this value.

5.98 Bargraph high value

Section:	bARr9
Display:	Hi
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 **bARr9 Lo** and **bARr9 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 **bARr9 Hi** function and use the **▲** or **▼** push buttons to set the value required then press **F** to accept this value.

5.99 Display brightness

Section: **d, 5P**
Display: **br 9t**
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 **dul 1** function.

To set brightness level go to the **br 9t** 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.

5.100 Dimmed display brightness

Section: **d, 5P**
Display: **dul 1**
Range: **0 to 16**
Default Value: **2**
Default Access Level **2**
Function number **22Ee**

Displays and sets the level for remote input brightness switching. When a remote input is set to **dul 1** the remote input can be used to switch between the display brightness level set by the **br 9t** function and the dimmed display brightness set by the **dul 1** 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.

5.101 Front P button operation mode

Section: **F, 1 NP**
Display: **P. but**
Range: **NONE, P.Hi, P.Lo, Hi, .Lo, AL.Ac, 2EFG**
Default Value: **NONE**
Default Access Level **4**
Function number **4720**

Sets the operation mode for front **P** button. Functions available are identical to the same functions used in the **F, 1 N, 1** function.

5.102 Remote input 1 operation mode

Section: **F, 1 NP**
Display: **F, 1 N, 1**
Range: **NONE, P.Hol d, d.Hol d, P.Hi, P.Lo, Hi, .Lo, AL.Ac, ACCESS, dul 1, 2EFG**
Default Value: **NONE**
Default Access Level **4**
Function number **472 1**

Sets the operation mode for remote input 1 terminal at the rear of the instrument. Choices are as follows:

- **NONE** - If this option is selected then remote input 1 will have no function.
- **P.Hold** - peak hold. The display will show the peak value (highest positive value) only whilst the remote input terminals are short circuited i.e. the display value can rise but not fall whilst the input terminals are short circuited. The message **P.HLD** will appear briefly every 8 seconds whilst the input terminals are short circuited to indicate that the peak hold function is active.
- **d.Hold** - display hold. The display value will be held whilst the remote input terminals are short circuited. The message **d.HLD** will appear briefly every 8 seconds whilst the input terminals are short circuited to indicate that the display hold function is active.
- **P.H** - peak memory. The peak value stored in memory will be displayed if the remote input terminals are short circuited, if the short circuit is momentary then the display will 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.
- **P.Lo** - valley memory. The minimum value stored in memory will be displayed. Otherwise operates in the same manner as the **P.H** function described above.
- **H, Lo** - toggle between **H** and **Lo** displays. This function allows the remote input to be used to toggle between peak and valley 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.H** or **P.Lo** will flash before each display to give an indication of display type.
- **Al.Ac** - alarm acknowledge. Allows the remote input to be used to acknowledge a latching alarm. See the **LATCH** function.
- **ACCESS** - remote input access. Allows the remote input to be used for access control purposes. See the **FUNCTION LEVEL** function.
- **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.
- **du:l** - display brightness control. The remote input can be used to change the display brightness. When this mode is selected the display brightness can be switched, via the remote input terminals, between the brightness level set at the **br:gt** function and the brightness level set at the **du:l** function.
- **b:inc** - display brightness increment. Allows the selected remote input to be used to increment the display brightness. If no other remote input is set to **b:dec** then once maximum brightness is reached the brightness will start again from lowest brightness and increment. If auto brightness is turned on then when powered up the display will go to its auto brightness level and can be adjusted from there. . If auto brightness is turned off then the display will remember its last brightness setting on power up.
- **b:dec** - display brightness decrement. Allows the selected remote input to be used to decrement the display brightness. If no other remote input is set to **b:inc** then once minimum brightness is reached the brightness will start again from lowest highest brightness and decrement. If auto brightness is turned on then when powered up the display will go to its auto brightness level and can be adjusted from there. If auto brightness is turned off then the display will remember its last brightness setting on power up.

5.103 Remote input 2 operation mode

Section: **FUNCTION**
Display: **FUNCTION 2**
Range: **NONE, P.Hold, d.Hold, P.H, P.Lo, H.Lo, AL.Ac, ACCESS, dUI, ZFG**
Default Value: **NONE**
Default Access Level **4**
Function number **4722**

Sets the operation mode for remote input 2 terminal (where available) at the rear of the instrument and has the same choices as remote input one. See **FUNCTION 1** function for full description.

5.104 Easy access mode

Section: **ACCESS**
Display: **EASY LEVEL**
Range: **NONE, 1, 2, 3, 4, 5, 6, CAL**
Default Value: **NONE**
Default Access Level **5.CAL**
Function number **0000**

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.

5.105 Remote input access mode

Section: **ACCESS**
Display: **FUNCTION LEVEL**
Range: **NONE, 1, 2, 3, 4, 5, 6, CAL**
Default Value: **NONE**
Default Access Level **5.CAL**
Function number **0001**

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 **ACCESS** 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**.

5.106 PIN code 1

Section: **ACCESS**
Display: **USER PIN**
Range: **0 to 50000**
Default Value: **0**
Default Access Level **5.CAL**
Function number **0009**

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 **P, n. 1Acc5**). 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.

5.107 PIN code 1 access level

Section:	ACCES
Display:	USF.1 LEVEL
Range:	NONE, 1, 2, 3, 4, 5, 6, CAL
Default Value:	NONE
Default Access Level	S.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**.

5.108 PIN code 2

Section:	ACCES
Display:	USF.2 P, n
Range:	0 to 50000
Default Value:	0
Default Access Level	S.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 **P, n.2Acc5**). 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. Only 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.

5.109 PIN code 2 access level

Section: **ACCES**
Display: **USF.2 LEVEL**
Range: **NONE, 1, 2, 3, 4, 5, 6, CAL**
Default Value: **NONE**
Default Access Level **S.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**.

5.110 User assignable access 1 function number

Section: **ACCES**
Display: **Fn. 1 Code**
Range: **0000 to FFFF hex.**
Default Value: **0000**
Default Access Level **S.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.

5.111 User assignable access 1 level value

Section: **ACCES**
Display: **Fn. 1 LEVEL**
Range: **dFlt, 1, 2, 3, 4, 5, 6, CAL, S.CAL**
Default Value: **dFlt**
Default Access Level **S.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.

5.112 User assignable access 2 function number

Section: **ACCES**
Display: **Fn.2 Code**
Range: **0000 to FFFF hex.**
Default Value: **0000**
Default Access Level **S.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.

5.113 User assignable access 2 level value

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

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

5.114 User assignable access 3 function number

Section: **ACCES**
Display: **Fn.3 Code**
Range: **0000 to FFFF hex.**
Default Value: **0000**
Default Access Level **S.CAL**
Function number **0C12**

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.

5.115 User assignable access 3 level value

Section: **ACCES**
Display: **Fn.3 LEVEL**
Range: **dFl t, 1, 2, 3, 4, 5, 6, CAL, S.CAL**
Default Value: **dFl t**
Default Access Level **S.CAL**
Function number **0C42**

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

5.116 User assignable access 4 function number

Section: **ACCES**
Display: **Fn.4 Code**
Range: **0000 to FFFF hex.**
Default Value: **0000**
Default Access Level **S.CAL**
Function number **0C13**

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.

5.117 User assignable access 4 level value

Section: **ACCES**
Display: **Fn.4 LEVEL**
Range: **dfit, 1, 2, 3, 4, 5, 6, CAL, S.CAL**
Default Value: **dfit**
Default Access Level **S.CAL**
Function number **0043**

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

5.118 Serial operation mode

Section: **SER1**
Display: **OPER**
Range: **None, Cont, Pol1, R.buS, di SP or n.buS**
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.
- **Pol1** - controlled by computer or PLC etc. as host. The host sends command via RS232/485 and instrument responds as requested.
- **R.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.
- **di SP** - 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.
- **n.buS** - Modbus RTU.

5.119 Serial baud rate

Section: **SER1**
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**

5.120 Serial parity

Section: **SErI**
Display: **Prty**
Range: **80, 8E, 80, 7E, 70**
Default Value: **80**
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.

5.121 Serial address

Section: **SErI**
Display: **Unit Addr**
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.

5.122 Examples

Example 1

Input string: <STX>Weight: +2000kg gross +1234kg tare<CR>

Required display: **1234** (on a 4 digit display)

One possible group of settings to achieve the required display is:-

SCH1 set to **2** Decimal (this corresponds to <STX>)
SCH2 set to **87** Decimal (this corresponds to W)
SCH3 set to **- 1** (disabled)
Code set to **URL**
DELAY set to **5**
tchr set to **13** (this corresponds to <CR>)

The matching of all three start of text characters is valid since <STX> appears first followed by W (from Weight) and **SCH3** is disabled. The 5 numeric characters following the W (i.e. <SPACE> and 2000) are ignored since **DELAY** is set to **5**. The kg characters are ignored since **Code** is set to **URL**. The + is taken as a numeric value but is not displayable. The terminating character is set to <CR>.

Example 2

Input string: <STX>XYZNNM10.05kg<ETX>

Required display: **10.05** on a 4 digit display

One possible group of settings to achieve the required display is:-

SCH1 set to **- 1** (disabled)
SCH2 set to **- 1** (disabled)
SCH3 set to **- 1** (disabled)
DELAY set to **0**
ALPHA set to **OFF**
Code set to **URL**

dPnt set to **0.02**

t.chr set to **3** (this corresponds to <ETX>)

The **SCH 1**, **SCH 2** and **SCH 3** characters are all disabled. The decimal point is set at two places and therefore appears between the two zeroes on the display.

Example 3

Input string: <STX>X1 ABC 12.34<CR> <LF> <STX>Y2 ABC 56.78<CR> <LF>

Required display: **56.8** with 5 sec. display blanking.

One possible group of settings to achieve the required display is:-

SCH 1 set to **2** Decimal (this corresponds to <STX>)

SCH 2 set to **-2** (don't care)

SCH 3 set to **50** (this corresponds to 2 in ASCII)

dELAY set to **1**

ALPHA set to **OFF**

dPnt set to **0.1**

bAct set to **0**

t.chr set to **13** (this corresponds to <CR>)

dS.to set to **5**

The <STX> character corresponds to **SCH 1**, **SCH 2** is set to don't care and **SCH 3** is set to **2** so the first string is ignored (<STX>Y1 does not match <STX> / don't care / 2). The second string does match, all of the alpha characters which follow Y2 (ABC) are ignored since **ALPH** is set to **OFF** but the spaces are numeric values so setting **dLAY** to **1** will cause one space to be ignored. The decimal point is set at one place and therefore the displayed number is rounded and shown as one decimal place. The display will blank if there is a 5 second gap between strings due to the **dS.to** setting.

5.123 Error Messages

- Blank display - if the display shows messages when it powers up but then blanks out i.e. does not display the value being sent then this is generally due to a mismatch in settings between the input string and the PM5 setup. For example if the input string ends with an end of text character (<ETX>) but the PM5 terminating character function is set the carriage return (<CR>) the display will be blank as it will not see the carriage return it has been programmed to look for. Check all parameters of the input string against the PM5 settings.
- **FRAM Error** - framing error - this message indicates that serial data is being received but cannot be decoded. Typical reasons for this would be incorrect baud rate or parity, check the settings in the PM5 against the serial data being transmitted.
- **-or-** - overrange message - This indicates that the value to be displayed has too many digits to be displayed e.g. you cannot display 199999 on a 5 digit display.
- **t.out Error** - timeout error - This will sometimes be seen when entering the setup functions whilst the display is blank i.e. timed out. Ignore the message as it has no effect on the display and proceed with accessing the setup functions if required.
- **!nt FFD2** - 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.

5.124 ASCII Code Conversion Listing

ASCII for control characters is shown in brackets. e.g. STX may in some cases be entered as ^B.

ASCII char.	Decimal	Hex	ASCII char.	Decimal	Hex	ASCII char.	Decimal	Hex
NUL (^@)	00	00	+	43	2B	V	86	56
SOH (^A)	01	01	,	44	2C	W	87	57
STX (^B)	02	02	-	45	2D	X	88	58
ETX (^C)	03	03	.	46	2E	Y	89	59
EOT (^D)	04	04	/	47	2F	Z	90	5A
ENQ (^E)	05	05	0	48	30	[	91	5B
ACK (^F)	06	06	1	49	31	\	92	5C
BEL (^G)	07	07	2	50	32	]	93	5D
BS (^H)	08	08	3	51	33	^	94	5E
HT (^I)	09	09	4	52	34	_	95	5F
LF (^J)	10	0A	5	53	35	'	96	60
VT (^K)	11	0B	6	54	36	a	97	61
FF (^L)	12	0C	7	55	37	b	98	62
CR (^M)	13	0D	8	56	38	c	99	63
SO (^N)	14	0E	9	57	39	d	100	64
SI (^O)	15	0F	:	58	3A	e	101	65
DLE (^P)	16	10	;	59	3B	f	102	66
DC1 (^Q)	17	11	<	60	3C	g	103	67
DC2 (^R)	18	12	=	61	3D	h	104	68
DC3 (^S)	19	13	>	62	3E	i	105	69
DC4 (^T)	20	14	?	63	3F	j	106	6A
NAK (^U)	21	15	@	64	40	k	107	6B
SYN (^V)	22	16	A	65	41	l	108	6C
ETB (^W)	23	17	B	66	42	m	109	6D
CAN (^X)	24	18	C	67	43	n	110	6E
EM (^Y)	25	19	D	68	44	o	111	6F
SUB (^Z)	26	1A	E	69	45	p	112	70
ESC (^[)	27	1B	F	70	46	q	113	71
FS (^\)	28	1C	G	71	47	r	114	72
GS (^_)	29	1D	H	72	48	s	115	73
RS (^)	30	1E	I	73	49	t	116	74
US (^.)	31	1F	J	74	4A	u	117	75
SP (^)	32	20	K	75	4B	v	118	76
!	33	21	L	76	4C	w	119	77
”	34	22	M	77	4D	x	120	78
#	35	23	N	78	4E	y	121	79
\$	36	24	O	79	4F	z	122	7A
%	37	25	P	80	50	{	123	7B
&	38	26	Q	81	51	|	124	7C
'	39	27	R	82	52	}	125	7D
(	40	28	S	83	53	~	126	7E
)	41	29	T	84	54	DEL	127	7F
*	42	2A	U	85	55			

6 Specifications

6.1 Technical specifications

Input types:	Either RS232, RS485, RS422 or Serial current loop (input type is factory configured)
Baud rate:	1200, 2400, 4800, 9600, 19.2k, 38.4k, 57.6k or 115.2k programmable
Microprocessor:	HC68HC11 CMOS
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 or 12VDC transmitter supply 25mA max on terminal 17 (or terminal 11 if rear pushbuttons fitted and RS422 is not used)
Relay Action:	Programmable N.O. or N.C

6.2 Optional outputs

Extra Relays:	Available as one, three or six extra relays.
Analog Retransmission:	12 bit isolated 4 to 20mA, or 16 bit 4 to 20mA 0 to 1V or 0 to 10V (single or dual analog output versions available). (4-20mA will drive into resistive loads of up to 800Ω)
Serial Communications:	Isolated RS232 or RS485 (ASCII)

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, 450 gms with option card

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.

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

This product is designed and manufactured in Australia.