

**LD5-TMR and LE5-TMR**  
**Large Digit Timer Display**  
**Operation and Instruction Manual**

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# 1 Introduction

## General description

This manual contains information for the installation and operation of the LD5-TMR display. The display has several modes of operation allowing up timing, down timing, stopwatch operation etc.

Electrical inputs for start, stop, reset and preset are provided.

An input from a voltage free switch connected to the Reset input (between connector D1 and GND on the DIGITAL IN connector) or Preset input (between connector D2 and GND on the DIGITAL IN connector) can be used to reset or reset to preset the display depending on the operation mode chosen.

## 1.1 Selecting and altering access levels

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

Each setup function has a default access level allocated to it, for example the ascending alarm 1 function **ALARM 1** 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. 1 Code** function.

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

The access levels available are:

**None** - no access to functions

**1** - access to functions allocated to level 1

**2** - access to functions allocated to level 2

**3** - access to functions allocated to level 3

**4** - access to functions allocated to level 4

**5** - access to functions allocated to level 5

**6** - access to functions allocated to level 6

**CAL** - access to all normal operation functions

## 1.2 Accessing setup functions

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

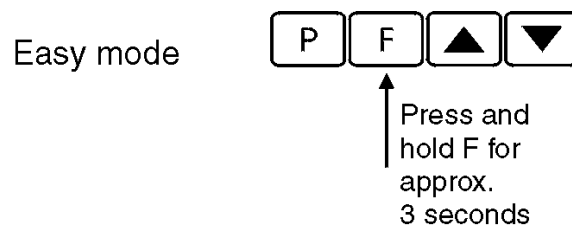
As a summary the methods available are:

- **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.

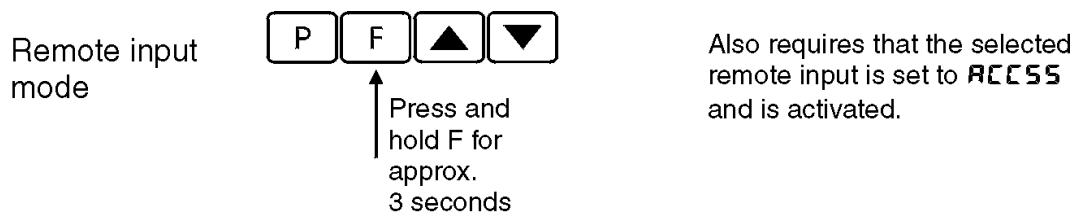
- **PIN 1 mode** - this method allows a PIN to be set with access via PIN entry.
- **PIN 2 mode** - this method also requires a PIN and would generally be use to allow a higher access level than the first PIN.
- **Super Cal mode** - this method requires a power up procedure and will allow access to all functions.

These modes are explained in more detail below.

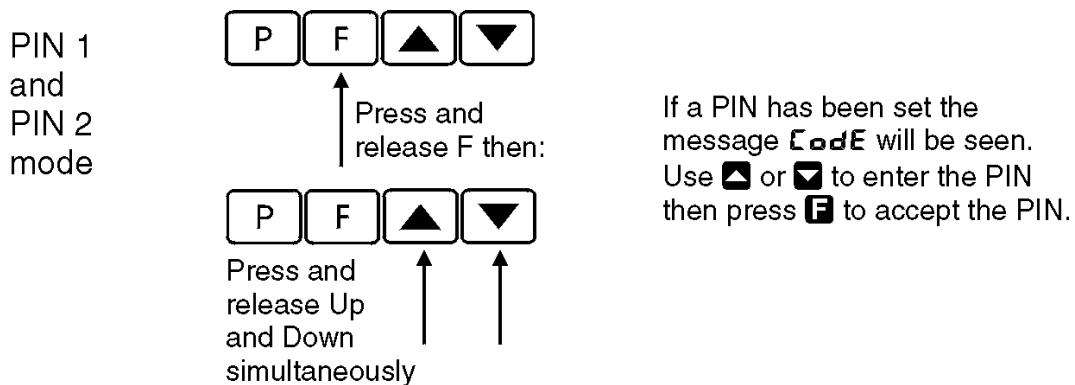
- **Easy mode** - Allows access to the level set by the **EASYLEVL** function in the **ACCESS** menu. By default the Easy access is set to **NONE** level i.e. no access.  
The Easy mode simply requires that the **F** button is held pressed until the message **FUNC** is seen followed by the first function 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.



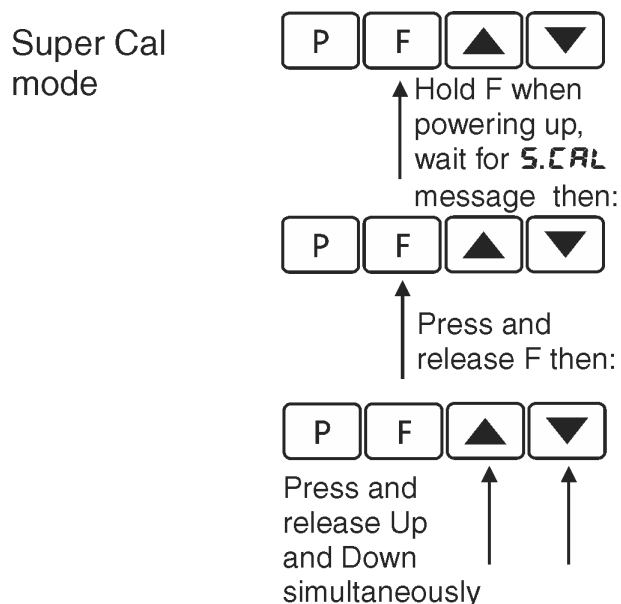
- **Remote input mode** - Allows access to the level set by the **REMOTELEVL** function in the **ACCESS** menu. By default the Remote input access is set to **CAL** level allowing access to all setup functions. The remote input mode uses the same access method as the Easy mode but also requires that 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 **USR1LEVL** function in the **ACCESS** menu. The PIN 1 mode requires the **F** button is pressed and released then within 2 seconds press the **Up** and **Down** buttons at the same time. The PIN can be set via the **PIN1CODE** function in the **ACCESS** menu. A **USR1LEVL** setting of **0** disables the PIN which means that there is no need to enter the PIN. If the **USR1LEVL** 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 **USR1LEVL** function must be entered via the **Up** or **Down** pushbuttons followed by pressing **F** to accept the PIN before the user can progress to the setup functions.

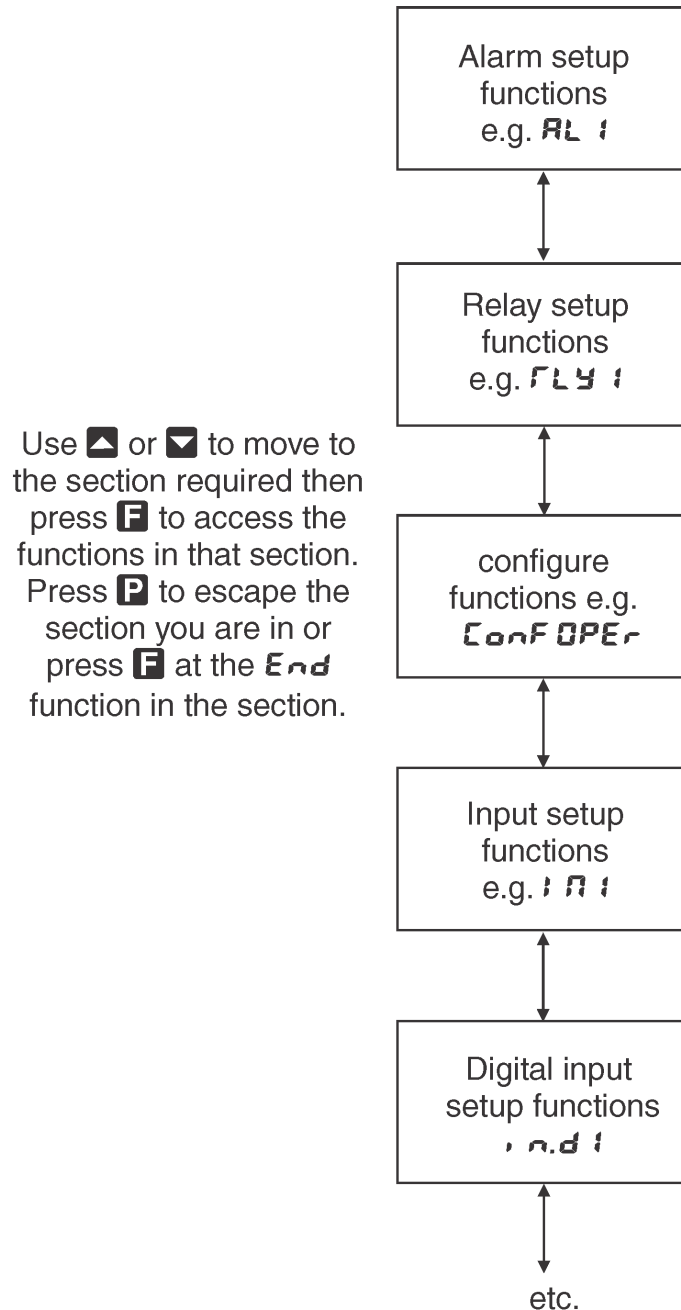


- PIN 2 mode** - Allows access to the level set by the **USR.2LEUL** function in the **ACCS** menu. This method uses the same access method as PIN 1 mode above. A **P. n.2Code** setting of **None** disables the PIN. If the **USR.1LEUL** or a **USR.2LEUL** function has been set to a number other than **None** then the first function seen when entering via PIN 1/PIN2 mode will be the function **Code**. When this function is seen the PIN value set at the **USR.1LEUL** function can be entered for access to the level set at the **P. n.1ACCS** function or enter the **USR.2LEUL** PIN to gain access to the level set at the **P. n.2ACCS** 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.

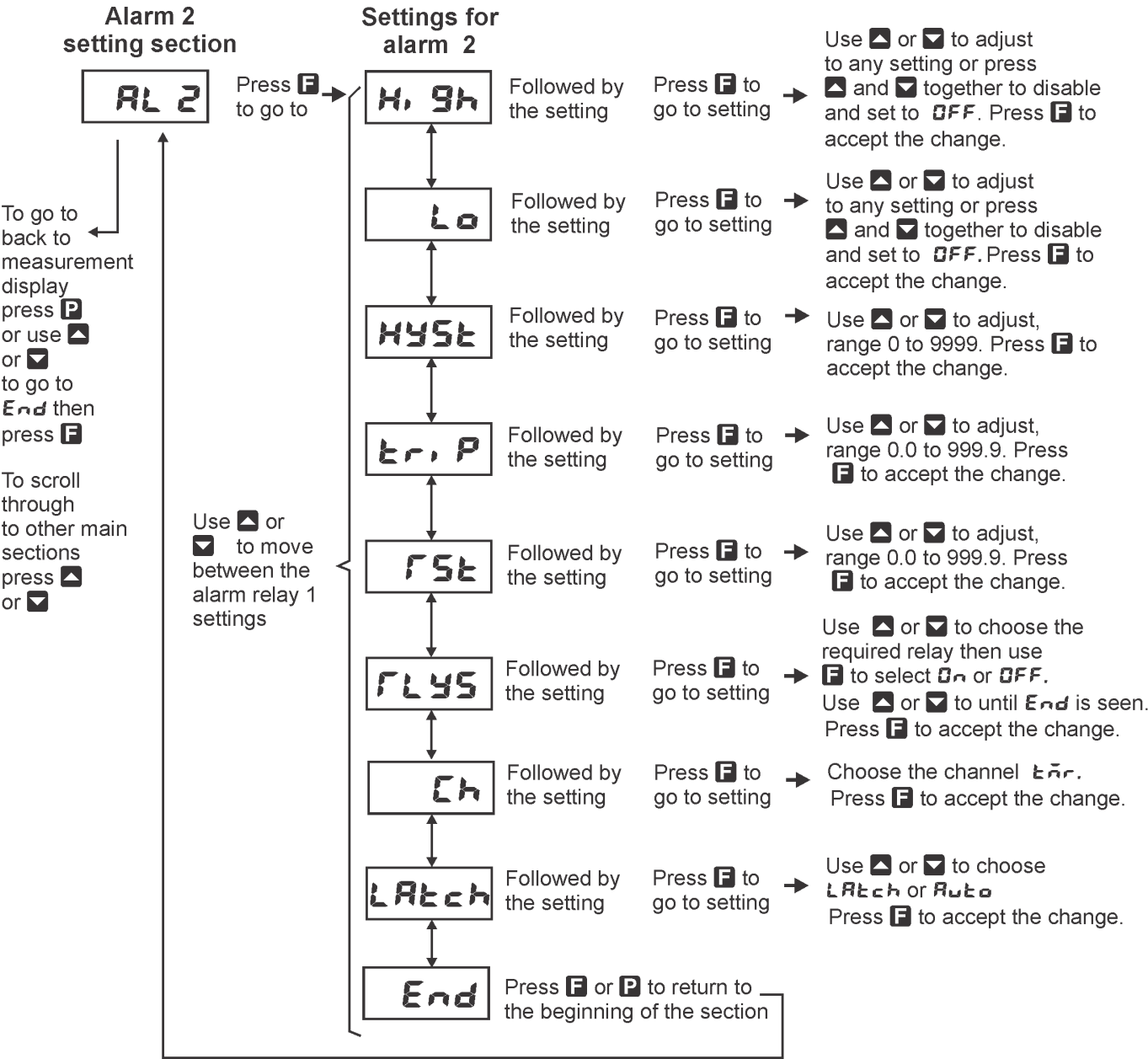


The setup functions are organised in blocks or sections e.g. all the settings for channel 1 alarms are in the **AL 1** section. Once access to setup functions has been gained use the **▲** and **▼** buttons to select the section required then press **F** to enter this section and again use the **▲**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



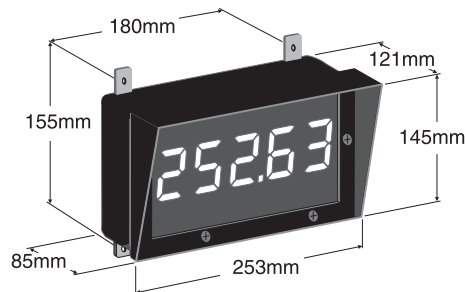
The example in the flowchart (for 4 digit display) below shows the method using alarm relay 1 setup function.



## 2 Mechanical installation

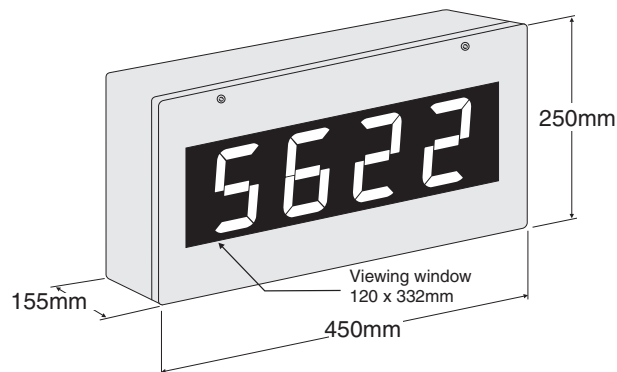
### 2.1 20mm, 38mm, 45mm, 57mm and 58mm LED

An optional panel mount kit is available for these size displays. Panel cut out size is 240 x 130mm (-0.0mm / +0.5mm). Weight: All types 1.6kg approx.



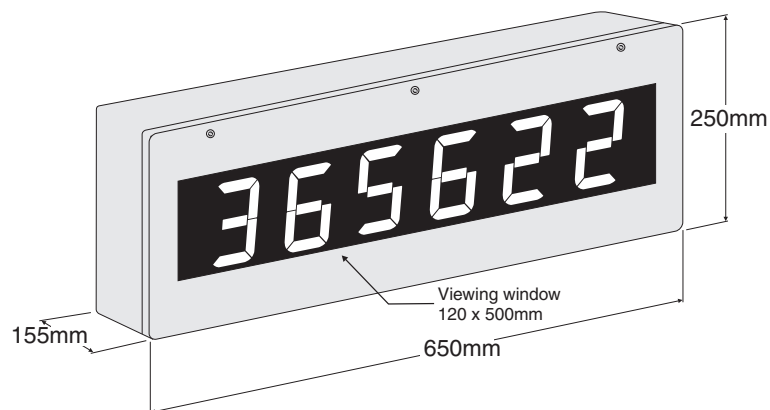
### 2.2 100mm 4 digit LED

Weight 10kg (LED)



### 2.3 100mm 6 digit LED

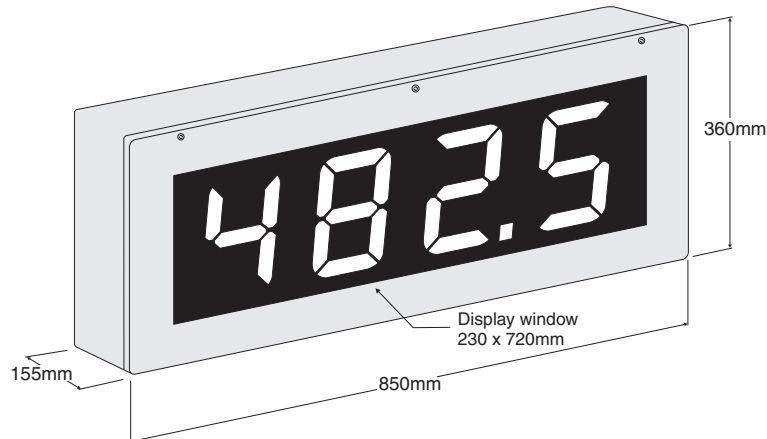
Weight 14kg (LED)





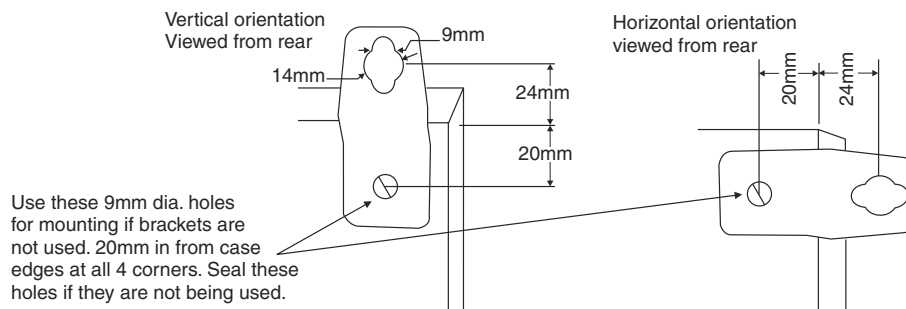
## 2.4 200mm 4 digit LED

Weight 14kg.



## 2.5 Cable entry and Mounting brackets

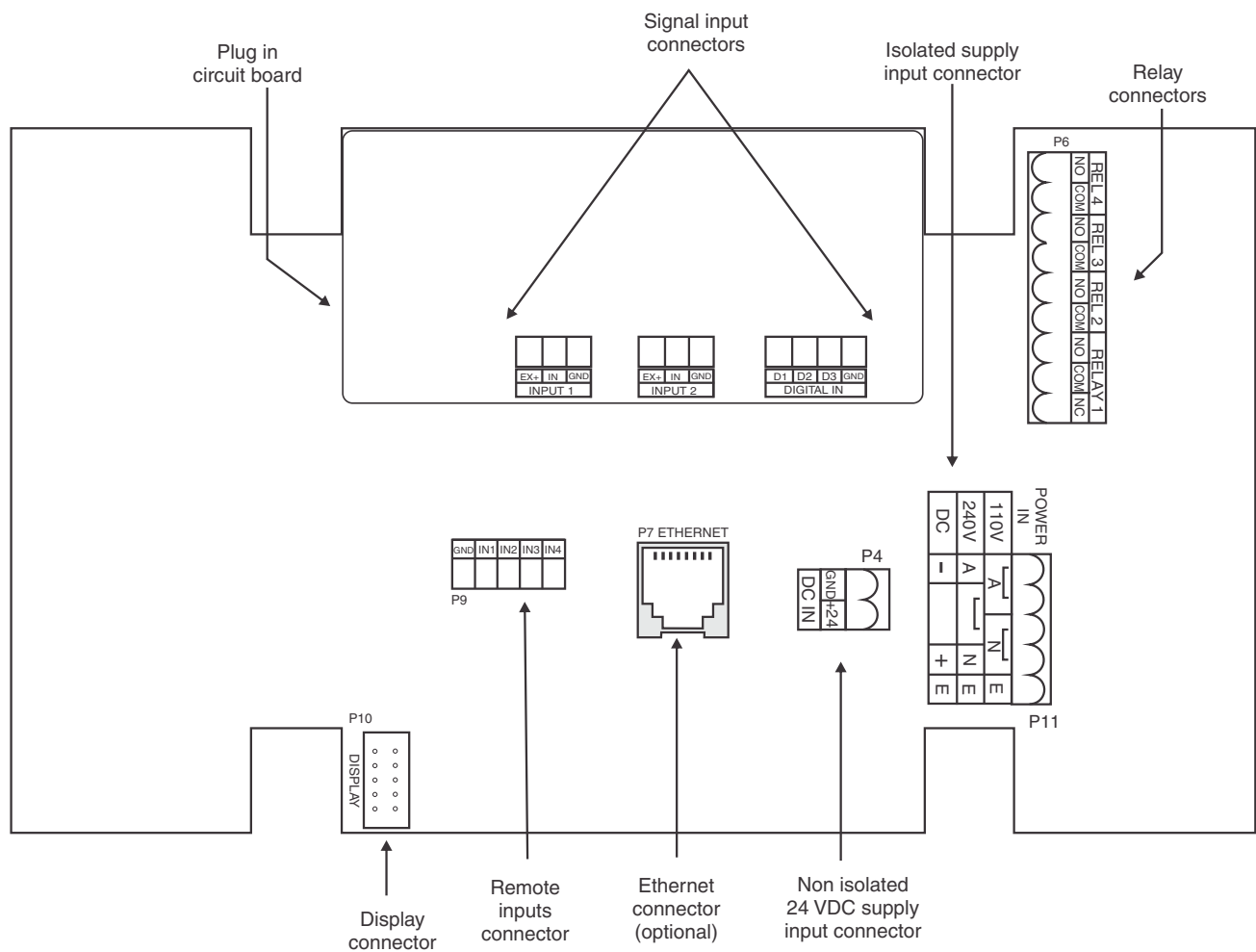
For 20 to 58mm displays no holes are pre drilled. For all 100mm and 200mm displays 3 off 20mm holes are drilled at the bottom of the case, these are fitted with 2 x IP65 grommets and 1 x air vent which allows moisture to exit the case but not enter. Four mounting brackets and four blind grommets are supplied for use with all metal case large digit displays. Diagrams below illustrate vertical and horizontal installation for mounting brackets. If mounting without the brackets is preferred then the 9mm dia. case holes provided for the brackets can be used as alternative mounting holes. Any rear holes not used for mounting should be sealed.



### 3 Electrical Installation

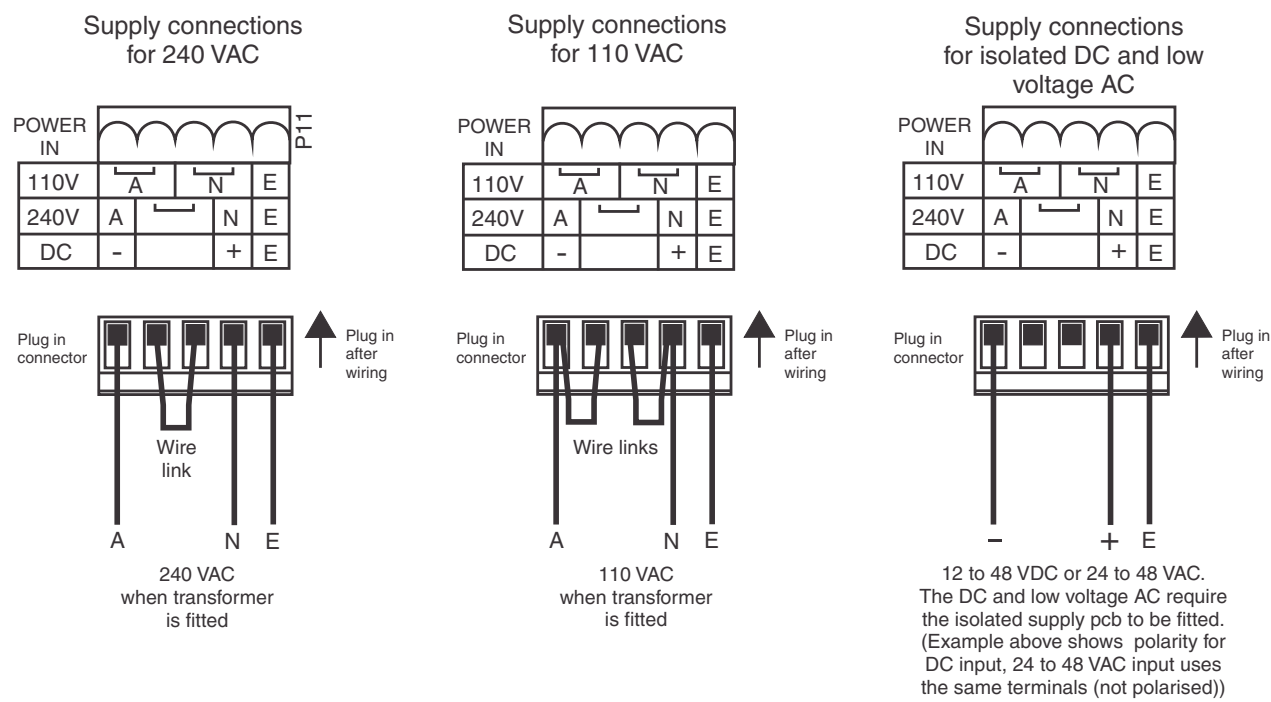
The display is designed for continuous operation and therefore no mains/power switch is fitted to the unit. It is recommended that an external switch and fuse be provided to allow the unit to be removed for servicing. To install cables remove six front panel retaining screws. Remove front panel taking care not to damage the ribbon cable (ribbon cable joins the front display circuit board to the main circuit board). Connect power and input cables to the plug in terminal blocks located within the enclosure. The terminals are clearly labeled and unplug for ease of installation, please take care to connect them correctly. The terminal blocks allow for wires of up to 2.5mm<sup>2</sup> to be fitted (relays and power) and 1.5mm<sup>2</sup> for inputs. 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.

#### Input board layout

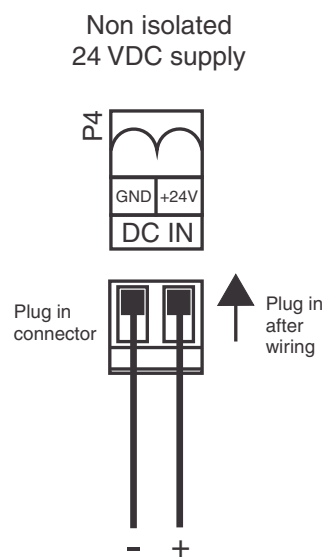


3.1 Power supply connections

3.2 AC supply or isolated DC supply (38, 45, 57 and 58mm displays only)



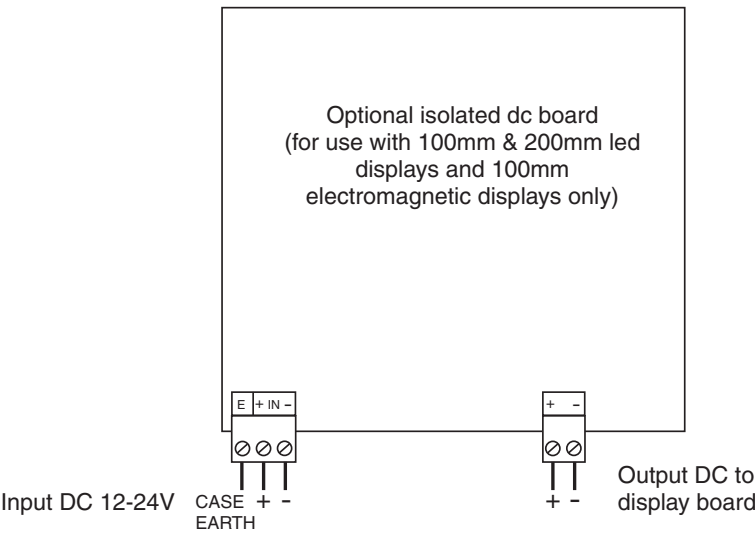
3.3 Non isolated DC supply (38, 45, 57 and 58mm displays only)



### 3.4 100mm, 200mm LED and 100mm electromagnetic display power supplies

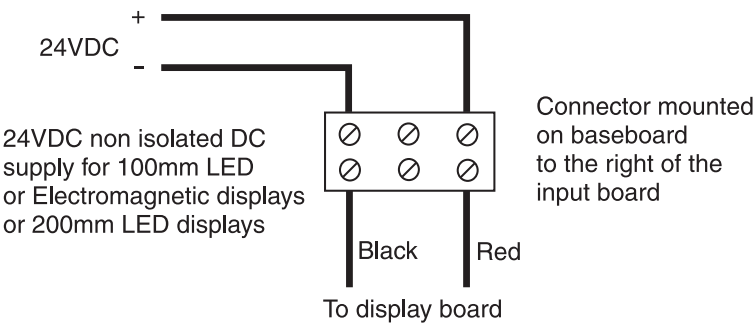
Isolated DC supplies (12 to 24VDC) connect to the isolated supply pcb on the base board. AC supplies connect to the transformer primary on the base board. The base board is located under the input circuit board.

#### Optional isolated DC supply (100 and 200mm displays only)

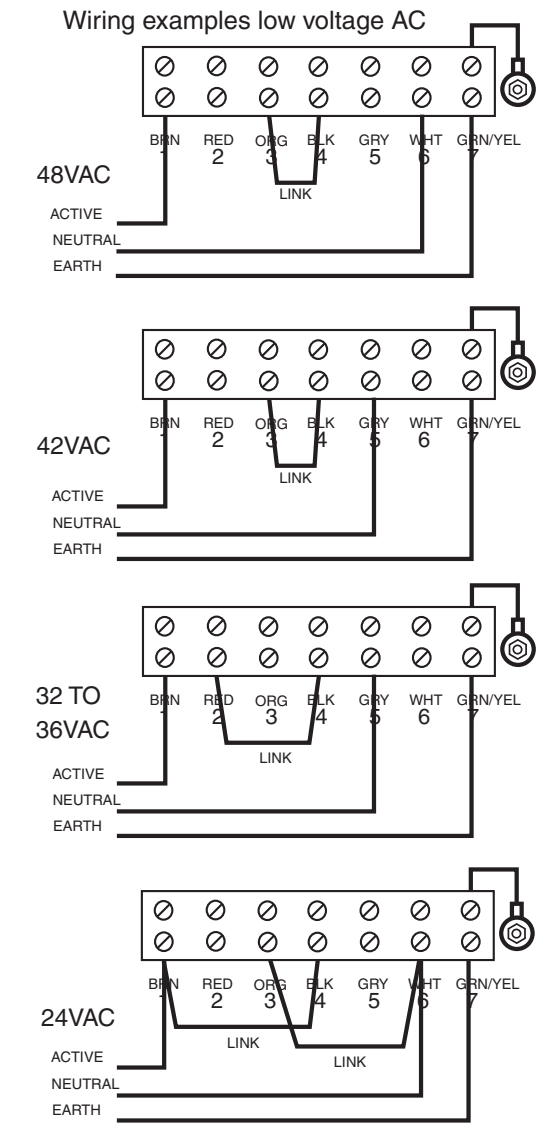
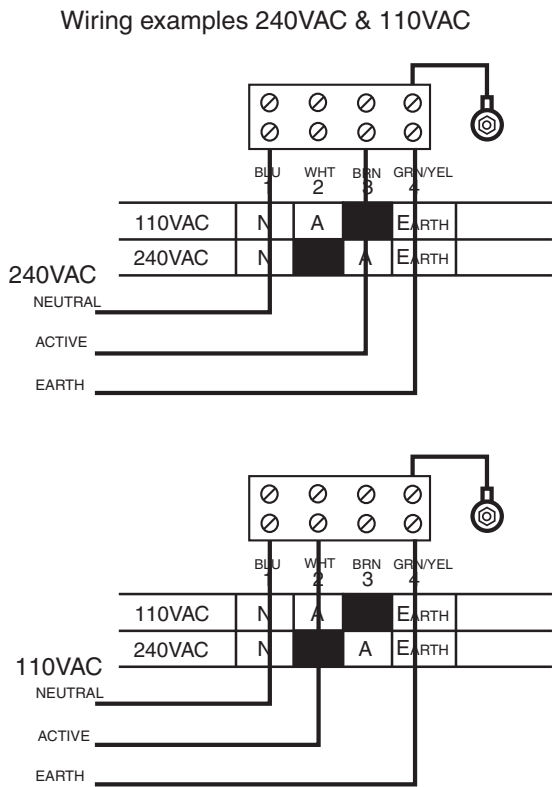
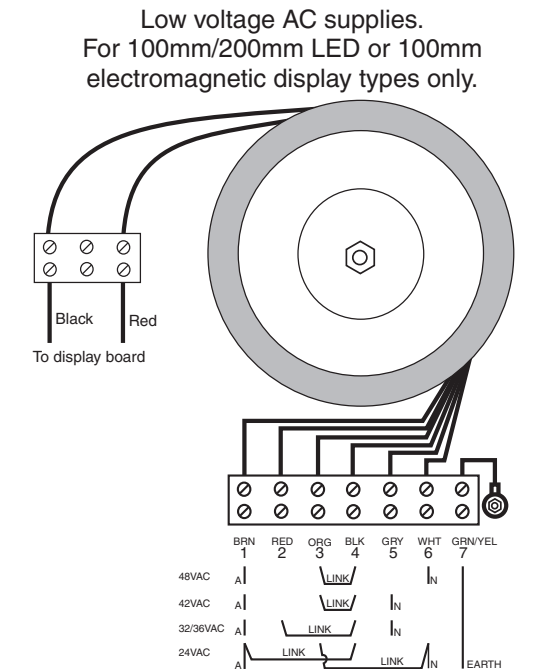
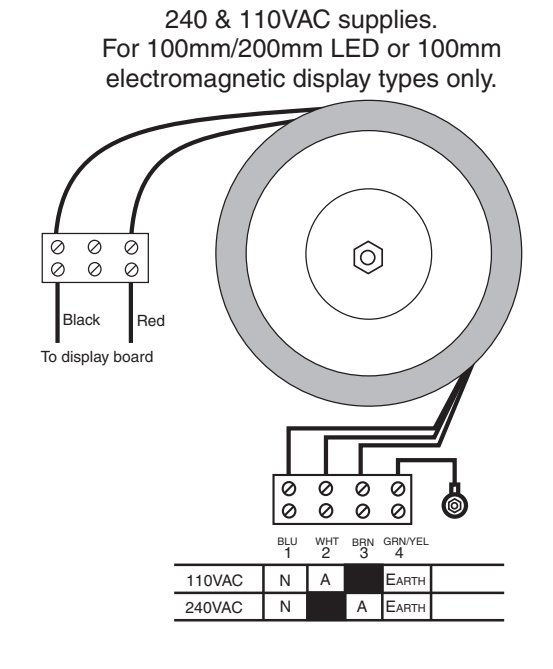


#### Non isolated DC power supplies (100 and 200mm displays only)

Non isolated DC supplies (24VDC) are wired to a connector on the baseboard as shown below.



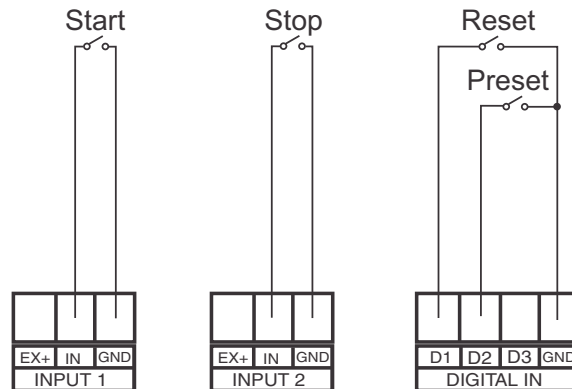
High and low voltage AC supplies (100 and 200mm displays only)



Important note: the 240V & 110V supplies use the same transformer, low voltage instruments use a different transformer. Do not use a low voltage transformer for 240V or 110V or vice versa.

### 3.5 Input connections

The START, STOP, RESET TO ZERO and RESET TO PRESET inputs are on a small pcb on top of the main pcb. The voltage between the EX+ and GND terminals (5, 12 or 18VDC) is determined by the setting of the **P.O.U.T** function and these terminals can alternatively be pulled down to ground by the **PULL UP** function.

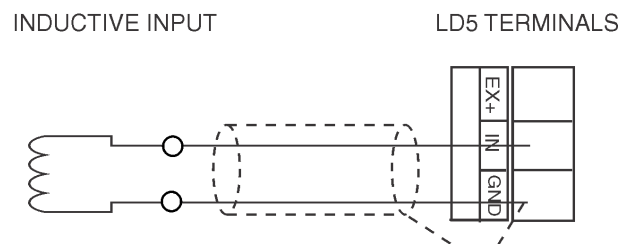


Use momentary or latching switches to suit the mode selected. Some modes do not use the Stop input. The Reset input will reset the display to zero. The Preset input will reset the display to the preset value selected at the Preset function.

### 3.6 Input connections

The display will accept many common input sensor types. The input circuit is configured by the **I.N.I** functions (**I.N.2** functions are not applicable to this instrument). The common input types together with typical **I.N.I** settings for these inputs are given below.

#### Inductive sensor input

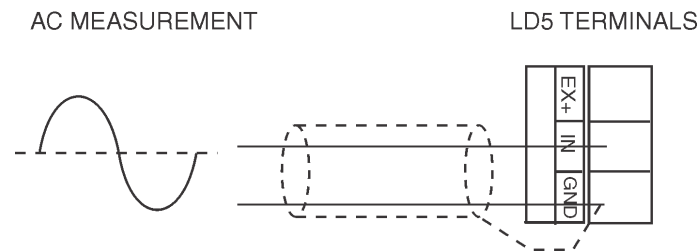


#### **I.N.I** function settings settings for inductive input

- **PULL UP** Set to **Lo**
- **b.I.RS** Set to **OFF**
- **LoF** Set to **OFF**
- **HYSL** Set to **OFF** for very low amplitude inputs (25mV to 250mV) or **On** for inputs with amplitude 250mV to 48VDC or RMS

- **Att<sub>n</sub>** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5
- **dc** Set to **On**
- **EDGE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required
- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce

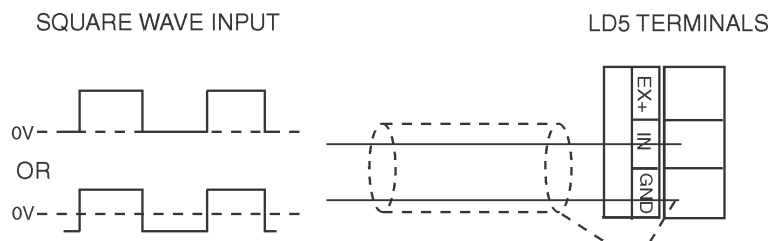
## AC input



### LD5 function settings for AC input

- **PULL UP** Set to **Lo**
- **b1 AS** Set to **OFF**
- **LoF** Set to **OFF**
- **HYS<sub>h</sub>** Set to **OFF** for very low amplitude inputs (25mV to 250mV) or **On** for inputs with amplitude 250mV to 48VDC or RMS
- **Att<sub>n</sub>** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5
- **dc** Set to **On** for input frequencies less than 10 Hz, otherwise set to **OFF**
- **EDGE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required
- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce

## Square wave input

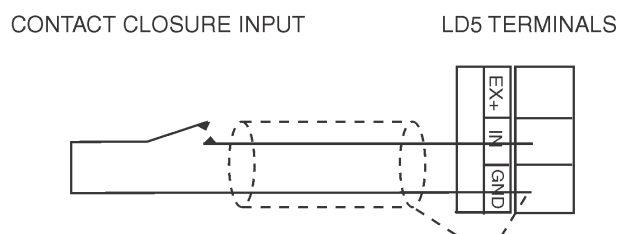


### LD5 function settings for square wave input

- **PULL UP** Set to **Lo**
- **b1 AS** Set to **On** if signal is never negative polarity, otherwise set to **OFF**

- **LoF** Set to **OFF**
- **HYSE** Set to **OFF** for very low amplitude inputs (25mV to 250mV) or **On** for inputs with amplitude 250mV to 48VDC or RMS
- **AttEn** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5
- **dC** Set to **On**
- **EDGE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required
- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce

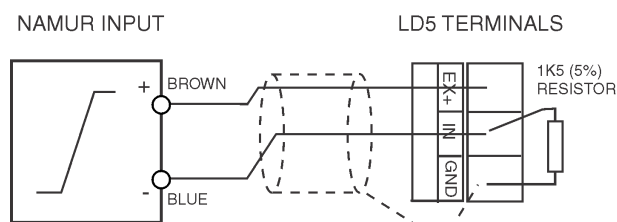
## Contact closure input



## LD5 function settings for contact closure input

- **PULL UP** Set to **Hi, 9h**
- **bI AS** Set to **On**
- **LoF** Set to **On**
- **HYSE** Set to **On**
- **AttEn** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5
- **dC** Set to **On**
- **EDGE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required
- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce

## Namur sensor input



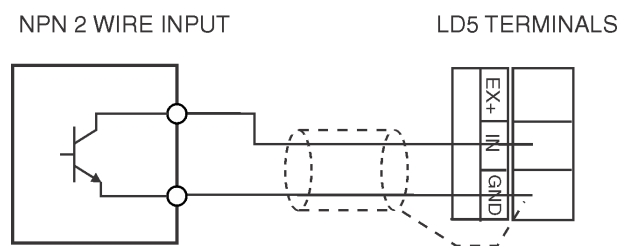
## LD5 function settings for namur sensor input

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



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

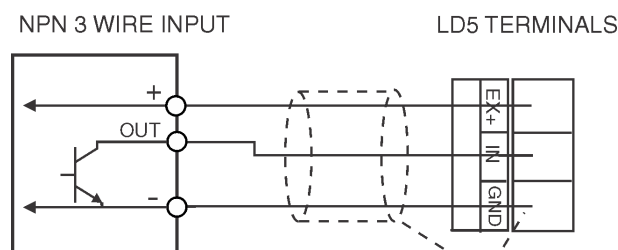
### NPN 2 wire sensor input



### ! n ! function settings for NPN 2 wire sensor input

- **PULL UP** Set to **Hi, 9h**
- **biAS** Set to **On**
- **LoF** Set to **OFF**
- **HYSL** Set to **On**
- **AttL** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5
- **dC** Set to **On**
- **EDGE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required
- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce

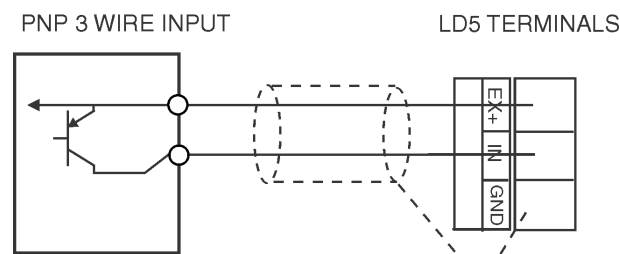
### NPN 3 wire sensor input



### ! n ! function settings for NPN 3 wire sensor input

- **PULL UP** Set to **H**, **9h**
- **bl AS** Set to **0n**
- **LoF** Set to **OFF**
- **HYS** Set to **0n**
- **Att** Set to **OFF** for no attenuation or **0n** to reduce the input amplitude by a factor of 5
- **dc** Set to **0n**
- **EDGE** Select **Lo** (trigger from low going edge) or **H** (trigger from rising edge) as required
- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce

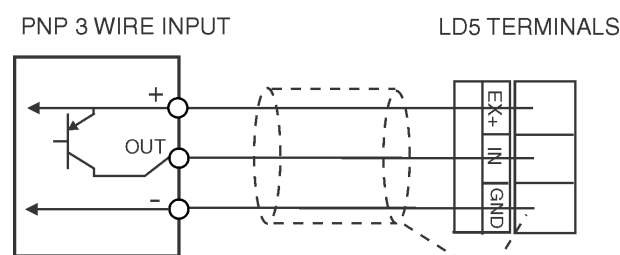
### PNP 2 wire sensor input



### LD5 function settings for PNP 2 wire sensor input

- **PULL UP** Set to **Lo**
- **bl AS** Set to **0n**
- **LoF** Set to **OFF**
- **HYS** Set to **0n**
- **Att** Set to **OFF** for no attenuation or **0n** to reduce the input amplitude by a factor of 5
- **dc** Set to **0n**
- **EDGE** Select **Lo** (trigger from low going edge) or **H** (trigger from rising edge) as required
- **d.bnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce

### PNP 3 wire sensor input

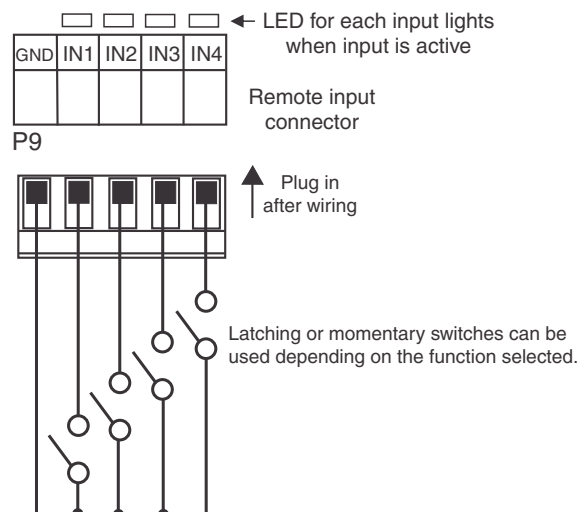


## Input function settings for PNP 3 wire sensor input

- **PULL UP** Set to **Lo**
- **BIAS** Set to **On**
- **LoF** Set to **OFF**
- **HYS** Set to **On**
- **ATTN** Set to **OFF** for no attenuation or **On** to reduce the input amplitude by a factor of 5
- **dc** Set to **On**
- **EDGE** Select **Lo** (trigger from low going edge) or **Hi** (trigger from rising edge) as required
- **dbnc** Normally only required for contact closure e.g. relay or switch input. Select a debounce time which allows operation without false triggering due to contact bounce

### 3.6.1 Remote/Digital inputs

The digital inputs will accept voltage free contact closure inputs or up to 24VDC signal. The electrical configuration for these inputs is configured by digital input functions, see the **digital** section functions. The operation mode of the digital inputs are controlled by separate functions for each input, see the **PNP** section functions. The electrical configuration for these inputs is configured by digital input functions, see the **digital** section functions. Wiring example showing voltage free contacts below.



### 3.6.2 Relays

Relays are rated at 240VAC 5A into a resistive load. Relay 1 is form C type. Relays 2, 3 and 4 are form A type.



## 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.

Actual messages seen on the display may vary slightly depending on the number of display digits.

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

### 4.1 Alarm function table

Display	Function	Range	Default	Your record	Ref/Page
<b>AL 1 to AL B H, 9h</b>	High setpoint value for designated alarm relay	Any display value or <b>OFF</b>	<b>OFF</b>	See 4.5	5.1 / 29
<b>AL 1 to AL B Lo</b>	Low setpoint value for designated alarm relay.	Any display value or <b>OFF</b>	<b>OFF</b>	See 4.5	5.2 / 30
<b>AL 1 to AL B HYSL</b>	Alarm relay hysteresis (deadband)	<b>0 to 6553.5</b>	<b>1.0</b>	See 4.5	5.3 / 30
<b>AL 1 to AL B Tr, P</b>	Trip time delay for the designated alarm relay	<b>0 to 6553.5</b> secs	<b>0.0</b>	See 4.5	5.4 / 31
<b>AL 1 to AL B RSL</b>	Reset time delay for the designated alarm relay	<b>0 to 6553.5</b> secs	<b>0.0</b>	See 4.5	5.5 / 31
<b>AL 1 to AL B FLYS</b>	Relay selection <b>On</b> or <b>OFF</b>	<b>On</b> or <b>OFF</b>	<b>OFF</b>	See 4.5	5.6 / 32
<b>AL 1 to AL B Ch</b>	Alarm input channel selection	<b>1-5</b>	<b>1-5</b>	See 4.5	5.7 / 32
<b>AL 1 to AL B Llch</b>	Alarm relay latching operation	<b>Auto, Llch, A.b, L.b</b>	<b>Auto</b>	See 4.5	5.8 / 32

## 4.2 Relay function table

Display	Function	Range	Default	Your record	Ref/Page
<b>FL 1</b> to <b>FLB</b> <b>FLY</b>	Alarm relay <i>x</i> action to normally open (de-energised) or normally closed (energised)	<b>n.o, n.c</b>	<b>n.o</b>	See 4.5	5.9 / 33
<b>FL 1</b> to <b>FLB</b> <b>ACK</b>	Relay acknowledge	<b>OFF</b> or <b>ON</b>	<b>OFF</b>	See 4.5	5.10 / 33
<b>FL 1</b> to <b>FLB</b> <b>bool</b>	Alarm relay Boolean logic operation	<b>Or, And</b>	<b>Or</b>	See 4.5	5.11 / 33

## 4.3 Analog output function table

Display	Function	Range	Default	Your record	Ref/Page
<b>FO 1</b> to <b>FO2</b> <b>OutP</b>	Analog retransmission outputs (*Optional)	<b>4-20, 0-10, 0-10</b>	<b>4-20</b>		5.12 / 34
<b>FO 1</b> to <b>FO2</b> <b>InPt</b>	Analog retransmission input channel (*Optional)	<b>ENF</b>	<b>ENF</b>		5.13 / 34
<b>FO 1</b> to <b>FO2</b> <b>Lo</b>	Analog retransmission low display value (*Optional)	Any display value	<b>0.0</b>		5.14 / 34
<b>FO 1</b> to <b>FO2</b> <b>Hi, 9h</b>	Analog retransmission high display value (*Optional)	Any display value	<b>100.0</b>		5.15 / 34

## 4.4 Configuration functions

Display	Function	Range	Default	Your record	Ref/Page
<b>CONF</b> <b>OPER</b>	Operating mode	<b>run, dur, PLSE, SngL, PLS.H, Sng.H, UP, dn, d.run</b>	<b>run</b>		5.16 / 35
<b>CONF</b> <b>range</b>	Time display range	<b>SECS, nn.ss, nnn, hh.nn, hrS, dd.hh, days</b>	<b>SECS</b>		5.17 / 37
<b>CONF</b> <b>dP</b>	Decimal point	<b>0, 0.1, 0.02, 0.003</b>	<b>0</b>		5.18 / 37
<b>CONF</b> <b>P.set</b>	Preset	Any display value	<b>0.0</b>		5.19 / 38

<b>CONF RESET</b>	Reset mode	<b>RESET, PRESET</b>	<b>RESET</b>		5.20 / 38
<b>CONF STOP ZERO</b>	Stop at zero	<b>OFF</b> or <b>ON</b>	<b>OFF</b>		5.21 / 39
<b>CONF RUN FLASH</b>	Display running indication	<b>OFF</b> or <b>ON</b>	<b>ON</b>		5.22 / 39
<b>CONF P.ON RESET</b>	Reset at power up	<b>OFF</b> or <b>ON</b>	<b>OFF</b>		5.23 / 39

Display	Function	Range	Default	Your record	Ref/Page
<b>IN1 to IN2 PULL UP</b>	Inputs 1 and 2 pull up	<b>OPEN, Hi, 9h, Lo</b>	<b>Hi, 9h</b>		5.24 / 39
<b>IN1 to IN2 BIAS</b>	Inputs 1 and 2 bias	<b>OFF, ON</b>	<b>ON</b>		5.25 / 40
<b>IN1 to IN2 LOF</b>	Inputs 1 and 2 low frequency	<b>OFF, ON</b>	<b>OFF</b>		5.26 / 40
<b>IN1 to IN2 HYS</b>	Inputs 1 and 2 hysteresis	<b>OFF, ON</b>	<b>OFF</b>		5.27 / 40
<b>IN1 to IN2 ATTEN</b>	Inputs 1 and 2 attenuation	<b>OFF, ON</b>	<b>OFF</b>		5.28 / 40
<b>IN1 to IN2 DC</b>	Inputs 1 and 2 DC coupling	<b>OFF, ON</b>	<b>ON</b>		5.29 / 41
<b>IN1 to IN2 EDGE</b>	Inputs 1 and 2 input edge or level	<b>Lo, Hi</b>	<b>Lo</b>		5.30 / 41
<b>IN1 to IN2 d.bnc</b>	Inputs 1 and 2 de-bounce timer	<b>0 to 1000 ms</b>	<b>5</b>		5.31 / 41

Display	Function	Range	Default	Your record	Ref/Page
<b>IND1 to IND3 EDGE</b>	Digital input edge or level selection	<b>Lo, Hi</b>	<b>Lo</b>		5.32 / 42
<b>IND1 to IND3 d.bnc</b>	Digital inputs 1, 3 and 3 de-bounce timer	<b>0 to 1000 ms</b>	<b>5</b>		5.33 / 42

Display	Function	Range	Default	Your record	Ref/Page
<b>P.Out</b> <b>P.Out</b>	Output voltage selection	<b>5U, 12U, 18U</b>	<b>5U</b>		5.34 / 42

Display	Function	Range	Default	Your record	Ref/Page
<b>F.I NP</b> <b>P.but</b>	Front P button operation mode	<b>NONE, P.Hi, P.Lo, Hi.Lo, AL.Ac</b>	<b>NONE</b>		5.35 / 43
<b>F.I NP</b> <b>F.I N.1</b>	Remote input 1 operation mode	<b>NONE, P.Hi d, d.Hi d, P.Hi, P.Lo, Hi.Lo, AL.Ac, ACCS, dui i</b>	<b>NONE</b>		5.36 / 43
<b>F.I NP</b> <b>F.I N.2</b>	Remote input 2 operation mode	<b>NONE, P.Hi d, d.Hi d, P.Hi, P.Lo, Hi.Lo, AL.Ac, ACCS, dui i</b>	<b>NONE</b>		5.37 / 44
<b>F.I NP</b> <b>F.I N.3</b>	Remote input 3 operation mode	<b>NONE, P.Hi d, d.Hi d, P.Hi, P.Lo, Hi.Lo, AL.Ac, ACCS, dui i</b>	<b>NONE</b>		5.38 / 44
<b>F.I NP</b> <b>F.I N.4</b>	Remote input 4 operation mode	<b>NONE, P.Hi d, d.Hi d, P.Hi, P.Lo, Hi.Lo, AL.Ac, ACCS, dui i</b>	<b>NONE</b>		5.39 / 44

Display	Function	Range	Default	Your record	Ref/Page
<b>d.i n</b> <b>d.i n.1</b> <b>P.UP</b>	Remote input (digital inputs) 1 pull up/down operation	<b>OPEN, Hi, 9h, Lo</b>	<b>Hi, 9h</b>		5.40 / 45
<b>d.i n</b> <b>d.i n.1</b> <b>Lui</b>	Remote input (digital inputs) 1 input level	<b>Hi, 9h, Lo</b>	<b>Lo</b>		5.41 / 45
<b>d.i n</b> <b>d.i n.2</b> <b>P.UP</b>	Remote input (digital inputs) 2 pull up/down operation	<b>OPEN, Hi, 9h, Lo</b>	<b>Hi, 9h</b>		5.42 / 45
<b>d.i n</b> <b>d.i n.2</b> <b>Lui</b>	Remote input (digital inputs) 2 input level	<b>Hi, 9h, Lo</b>	<b>Lo</b>		5.43 / 46
<b>d.i n</b> <b>d.i n.3</b> <b>P.UP</b>	Remote input (digital inputs) 3 pull up/down operation	<b>OPEN, Hi, 9h, Lo</b>	<b>Hi, 9h</b>		5.44 / 46



<b>d.i.n d.i.n.3 Lvl</b>	Remote input (digital inputs) 3 input level	<b>H, 9h, Lo</b>	<b>Lo</b>		<a href="#">5.45 / 46</a>
<b>d.i.n d.i.n.4 P.UP</b>	Remote input (digital inputs) 4 pull up/down operation	<b>OPEN, H, 9h, Lo</b>	<b>H, 9h</b>		<a href="#">5.46 / 46</a>
<b>d.i.n d.i.n.4 Lvl</b>	Remote input (digital inputs) 4 input level	<b>H, 9h, Lo</b>	<b>Lo</b>		<a href="#">5.47 / 47</a>

Display	Function	Range	Default	Your record	Ref/Page
<b>d.i.SP brgt Auto</b>	Automatic display brightness	<b>OFF or ON</b>	<b>ON</b>		<a href="#">5.48 / 47</a>
<b>d.i.SP brgt</b>	Display brightness	<b>1 to 63</b>	<b>63</b>		<a href="#">5.49 / 47</a>
<b>d.i.SP dim</b>	Dimmed display brightness	<b>0 to 63</b>	<b>7</b>		<a href="#">5.50 / 47</a>
<b>d.i.SP Auto H, 9h</b>	Auto display brightness high level	<b>15 to 63</b>	<b>63</b>		<a href="#">5.51 / 48</a>
<b>d.i.SP Auto Lo</b>	Auto display brightness low level	<b>1 to 63</b>	<b>7</b>		<a href="#">5.52 / 48</a>

Display	Function	Range	Default	Your record	Ref/Page
<b>AL.CF AL Cnt</b>	Select number of alarms	<b>0, 1, 2, 3, 4, 5, 6, 7, 8</b>	<b>2</b>		<a href="#">5.53 / 48</a>

Display	Function	Range	Default	Your record	Ref/Page
<b>ACCESS EASY LEVL</b>	Easy access mode	<b>NONE, 1, 2, 3, 4, 5, 6, CAL</b>	<b>NONE</b>		5.54 / 48
<b>ACCESS F.NP LEVL</b>	Remote input access mode	<b>NONE, 1, 2, 3, 4, 5, 6, CAL</b>	<b>NONE</b>		5.55 / 49
<b>ACCESS USF.1 PIN</b>	PIN code 1	<b>0 to 65535</b>	<b>0</b>		5.56 / 49
<b>ACCESS USF.1 LEVL</b>	PIN code 1 access level	<b>NONE, 1, 2, 3, 4, 5, 6, CAL</b>	<b>NONE</b>		5.57 / 49
<b>ACCESS USF.2 PIN</b>	PIN code 2	<b>0 to 65535</b>	<b>0</b>		5.58 / 50
<b>ACCESS USF.2 LEVL</b>	PIN code 2 access level	<b>NONE, 1, 2, 3, 4, 5, 6, CAL</b>	<b>NONE</b>		5.59 / 50
<b>ACCESS Fn.1 Code</b>	User assignable access function 1	<b>0000 to FFFF</b> hex.	<b>0000</b>		5.60 / 50
<b>ACCESS Fn.1 LEVL</b>	User assignable access 1 level value	<b>df1 E, 1, 2, 3, 4, 5, 6, CAL, 5.CAL</b>	<b>df1 E</b>		5.61 / 51
<b>ACCESS Fn.2 Code</b>	User assignable access function 2	<b>0000 to FFFF</b> hex.	<b>0000</b>		5.62 / 51
<b>ACCESS Fn.2 LEVL</b>	User assignable access 2 level value	<b>df1 E, 1, 2, 3, 4, 5, 6, CAL, 5.CAL</b>	<b>df1 E</b>		5.63 / 51
<b>ACCESS Fn.3 Code</b>	User assignable access function 3	<b>0000 to FFFF</b> hex.	<b>0000</b>		5.64 / 51
<b>ACCESS Fn.3 LEVL</b>	User assignable access 3 level value	<b>df1 E, 1, 2, 3, 4, 5, 6, CAL, 5.CAL</b>	<b>df1 E</b>		5.65 / 52
<b>ACCESS Fn.4 Code</b>	User assignable access function 4	<b>0000 to FFFF</b> hex.	<b>0000</b>		5.66 / 52
<b>ACCESS Fn.4 LEVL</b>	User assignable access 4 level value	<b>df1 E, 1, 2, 3, 4, 5, 6, CAL, 5.CAL</b>	<b>df1 E</b>		5.67 / 52
<b>ACCESS Fn.5 Code</b>	User assignable access function 5	<b>0000 to FFFF</b> hex.	<b>0000</b>		5.68 / 52

<b>ACCESS Fn.5 LEUL</b>	User assignable access 5 level value	<b>df1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL</b>	<b>df1 t</b>		<a href="#">5.69 / 53</a>
<b>ACCESS Fn.6 Code</b>	User assignable access function 6	<b>0000 to FFFF</b> hex.	<b>0000</b>		<a href="#">5.70 / 53</a>
<b>ACCESS Fn.6 LEUL</b>	User assignable access 6 level value	<b>df1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL</b>	<b>df1 t</b>		<a href="#">5.71 / 53</a>
<b>ACCESS Fn.7 Code</b>	User assignable access function 7	<b>0000 to FFFF</b> hex.	<b>0000</b>		<a href="#">5.72 / 53</a>
<b>ACCESS Fn.7 LEUL</b>	User assignable access 7 level value	<b>df1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL</b>	<b>df1 t</b>		<a href="#">5.73 / 54</a>
<b>ACCESS Fn.8 Code</b>	User assignable access function 8	<b>0000 to FFFF</b> hex.	<b>0000</b>		<a href="#">5.74 / 54</a>
<b>ACCESS Fn.8 LEUL</b>	User assignable access 8 level value	<b>df1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL</b>	<b>df1 t</b>		<a href="#">5.75 / 54</a>

4.5 Relay tables

Note: 4 relays are provided as standard - 4 extra relays are optionally available

Record your relay settings in the table below

Display	Alarm 1	Alarm 2	Alarm 3	Alarm 4	Alarm 5	Alarm 6	Alarm 7	Alarm 8
H, 9h								
Lo								
HYST								
Err, P								
FSE								
FLYS								
Ch								
Ltch								

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

Display	Relay 1	Relay 2	Relay 3	Relay 4	Relay 5	Relay 6	Relay 7	Relay 8
Alarm 1								
Alarm 2								
Alarm 3								
Alarm 4								
Alarm 5								
Alarm 6								
Alarm 7								
Alarm 8								
FLY								
ACK								
booi								

# 5 Explanation of functions

The setup and calibration functions are configured through a push button sequence. The push buttons located at the front of the instrument or on the main circuit board are used to alter settings.

Display messages shown are those which would appear on a display with 4 digits for the process reading, these display messages may in some cases vary slightly for other display types.

Note: default access levels for each function are shown in this section but the access levels are not applicable to this software version.

## Explanation of Functions

### 5.1 Alarm relay high setpoint

Section:	<b>AL 1 to AL 8</b>
Display:	<b>H, 9h</b>
Range:	Any display value or <b>OFF</b>
Default Value:	<b>OFF</b>
Default Access Level	<b>2</b>
Function number	<b>4000 to 4007</b>

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

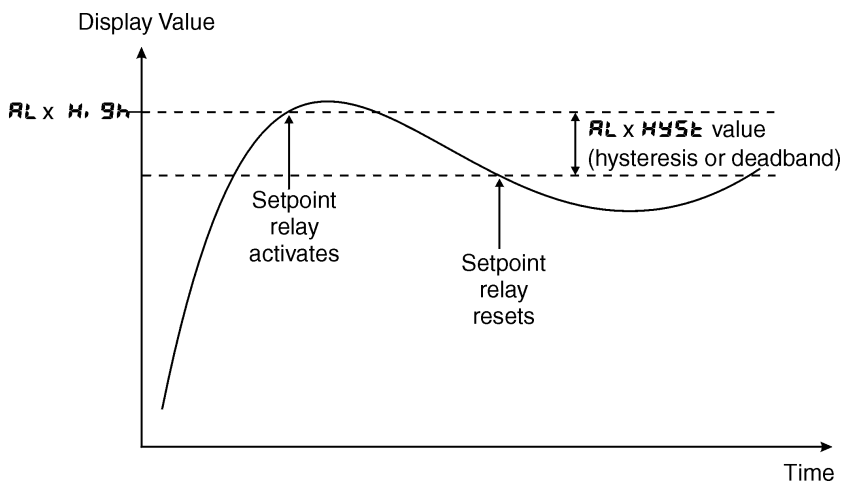
To set the high alarm value go to the **H, 9h** function, press **F** and when you see a digit of the value flash use the **▲** or **▼** push buttons to set the required value then press **F** to accept this selection. The high alarm setpoint may be disabled by pressing the **▲** and **▼** push buttons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

**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 relay then the annunciator will initially flash in alarm condition, if the alarm is acknowledged by pressing the **F** button (where fitted) or has been acknowledged by a **P** button or remote input operation 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 relay 1 will activate when the display value is **100** or higher.



Note if the high alarm value is set lower than the low alarm value the relay will activate between the two i.e. activate in the band between the two values.

## 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	4010 to 4017

Displays and sets the low setpoint value for the designated alarm relay. Use this low setpoint function if a relay operation is required when the display value becomes equal to or less than the low setpoint value.

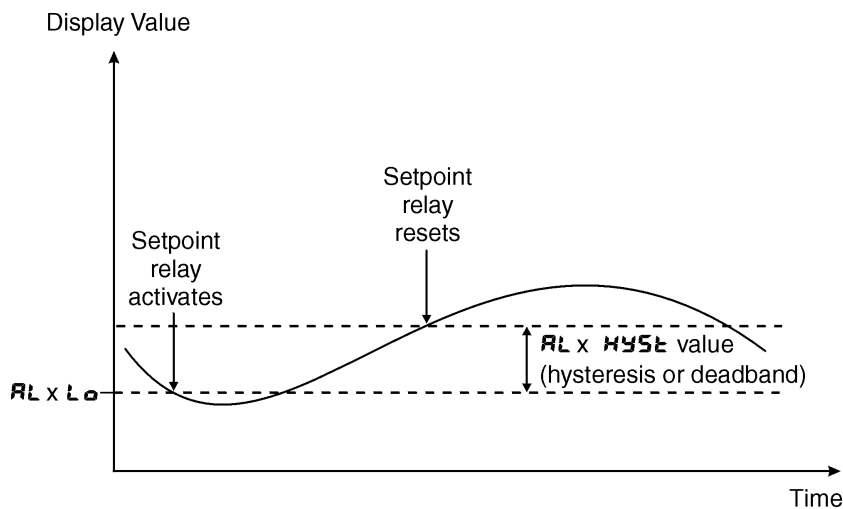
To set the low alarm value press **F** and when you see a digit of the value flash use the **▲** or **▼** push buttons to set the required value then press **F** to accept this selection.

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 relay is allocated both a low and high setpoint then the relay will activate when the value displayed moves outside the band set by the low and high setpoints. The value at which the relay will reset is controlled by the Hysteresis function.

If the display has annunciator leds for the relay then the annunciator will initially flash in alarm condition, if the alarm is acknowledged by pressing the **F** button (where fitted) or has been acknowledged by a **P** button or remote input operation the annunciator will be solidly lit until the display moves out of alarm condition.

### Example:

If **Lo** under **AL 1** is set to **10** then relay 1 will activate when the display value is 10 or less.



## 5.3 Alarm relay hysteresis (deadband)

Section:	AL 1 to AL 8
Display:	HYSL
Range:	0 to 6553.5
Default Value:	1.0
Default Access Level	3
Function number	4020 to 4027

Displays and sets the alarm relay hysteresis limit for the selected channel. To set a relay hysteresis value go to the **HYSL** 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 Fault, Low and High setpoint values. The hysteresis value may be used to prevent too frequent operation of the relay when the measured value is rising and falling around setpoint value.

The hysteresis setting operates as follows: For the ascending alarms, once the alarm is activated the input must fall below the setpoint value minus the hysteresis value to reset the alarm. e.g. if **AL 3 H, 9h** is to **50.0** and **AL 3 HYSL** is set to **3.0** then the channel 4 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.

For the descending alarms, once the alarm is activated the input must rise above the setpoint value plus the hysteresis value to reset the alarm. e.g. if **AL 2 H, 9h** is to **0.0** and **AL 2 HYSL** is set to **10.0** then the channel 5 alarm will activate when the display value falls below **0.0** and will reset when the display value goes above **10.0** i.e at **10.1** or above. The hysteresis units are expressed in displayed engineering units.

## 5.4 Alarm relay trip time

**Section:** **AL 1 to AL 8**  
**Display:** **TR, P**  
**Range:** **0 to 6553.5** 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 **0.0 to 6553.5** 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 **5.0** 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:** **RLS**  
**Range:** **0 to 6553.5** 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 **0.0 to 6553.5** seconds.

To set the reset time value go to the **RLS** 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 **RLS** is set to **10.0** seconds then the resetting of alarm relay will be delayed by 10 seconds.

## 5.6 Relay selection

**Section:** **AL 1 to AL 8**  
**Display:** **FLYS**  
**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 H. 9h** function this alarm could be allocated to relay 3 by selecting **FLY3 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. When relay PI control is used alarm 1 is dedicated to relay 1 and alarm 2 is dedicated to relay 2 so no selection choice will appear when set for PI control.

## 5.7 Alarm input channel selection

**Section:** **AL 1 to AL 8**  
**Display:** **Ch**  
**Range:** **ENF**  
**Default Value:** **ENF**  
**Default Access Level** **4**  
**Function number** **4070 to 4077**

In this instrument the only choice is to allocate the alarm to the timer operation i.e. **ENF**.

## 5.8 Alarm relay latching operation

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



Allows selection of alarm latching operation. If set to **Auto** the alarm relays will not latch i.e. they will automatically reset when the display moves out of alarm condition. If set to **Ltch** 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 (if annunciators are fitted) 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.



## 5.9 Alarm relay normally open/closed

**Section:** FL 1 to FL 8  
**Display:** FL Y  
**Range:** n.o, n.c  
**Default Value:** n.o  
**Default Access Level** 4  
**Function number** 4030 to 4037

Displays and sets the setpoint alarm relay *x* action to normally open (de-energised) or normally closed (energised), when no alarm condition is present. Since the relay will always open when power is removed a normally closed alarm is often used to provide a power failure alarm indication. To set the alarm relay for normally open or closed go to the FL 1 to FL 8 FL Y function and use the  or  push buttons to set the required operation then press **F** to accept this selection. **Example:**

If set to **A n.o** alarm relay 1 will be open circuit when the display is outside alarm condition and will be closed (short circuit across COM and N/O terminals) when the display is in alarm condition.

## 5.10 Relay acknowledge

**Section:** FL 1 to FL 8  
**Display:** Ac K  
**Range:** OFF or ON  
**Default Value:** OFF  
**Default Access Level** 4  
**Function number** 4320 to 4327

If an alarm has been set to latching operation it will not reset until the reading is outside its alarm condition and the operator has acknowledged the alarm by pressing the **F** button (where fitted) or using a **P** button of remote input to acknowledge the alarm. If the **Ac K** is set to **ON** the operator can acknowledge the alarm whilst still in alarm condition allowing the alarm to reset automatically when the reading moves outside the alarm condition.

## 5.11 Alarm relay Boolean logic operation

**Section:** FL 1 to FL 8  
**Display:** bool  
**Range:** Or, And  
**Default Value:** Or  
**Default Access Level** 4  
**Function number** 4310 to 4317

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

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

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

## 5.12 Analog retransmission outputs

**Section:** **r01 to r02**  
**Display:** **0.00P**  
**Range:** **4-20, 0-1.0, 0-10**  
**Default Value:** **4-20**  
**Default Access Level** **4**  
**Function number** **4140 to 4141**

One or two analog outputs are optionally available in either 12 or 16 bit versions. The 12 bit version output is fixed at 4-20mA. With the 16 bit version the user can select 4-20mA, 0-1VDC or 0-10VDC output at this function.

## 5.13 Analog retransmission input channel

**Section:** **r01 to r02**  
**Display:** **INPt**  
**Range:** **ENF**  
**Default Value:** **ENF**  
**Default Access Level** **4**  
**Function number** **43E0 to 43E1**

This function allows selection of which channel the selected analog output is to follow. In this instrument the only choice is timer operation **ENF**

## 5.14 Analog retransmission low display value

**Section:** **r01 to r02**  
**Display:** **Lo**  
**Range:** Any display value  
**Default Value:** **0.0**  
**Default Access Level** **4**  
**Function number** **4120 to 4121**

This function can be used to set the analog retransmission signal output low value in displayed engineering units. For example to set analog output 1 to retransmit 4mA (or 0V if available) for a display value of zero set **r01Lo** to **0**.

## 5.15 Analog retransmission high display value

**Section:** **r01 to r02**  
**Display:** **H. 9h**  
**Range:** Any display value  
**Default Value:** **100.0**  
**Default Access Level** **4**  
**Function number** **4130 to 4131**

This function can be used to set the analog retransmission signal output high value in displayed engineering units. For example to set analog output 1 to retransmit 20mA (or 1V or 10V if available) for a display value of 200 set **r01Lo** to **200**.

# 5.16 Operating mode

Section:	CONF
Display:	OPER
Range:	run, dur, PLSE, SngL, PLS.H, Sng.H, UP, dn, d.run
Default Value:	run
Default Access Level	4
Function number	4C 74

Displays and sets the operation mode to be used in measuring the pulse period. All of the modes are up timers with the exception of the **dn** mode.

Mode	Operation
<b>run</b> (run)	<p>The run option allows accumulated time display. The mode operates in the following manner:</p> <p><b>Input inactive:</b> The timer stops but holds the time display.</p> <p><b>Input active:</b> The timer continues timing from the previous time i.e. the time accumulates.</p>
<b>dur</b> (duration)	<p>The duration option allows display of an input time with a reset at the end of the input. The mode operates in the following manner:</p> <p><b>Input inactive:</b> The timer is automatically reset and the display shows zero or the preset value.</p> <p><b>Input active:</b> The timer starts timing from zero or the preset value.</p>
<b>PLSE</b> (pulse)	<p>The pulse option allows timing of the duration of an input pulse. The mode operates in the following manner:</p> <p><b>Input inactive:</b> The display will hold the time of the last pulse.</p> <p><b>Input active:</b> The display resets to zero (preset does not apply to this mode) then starts timing the new pulse.</p>
<b>SngL</b> (single pulse)	<p>The single pulse option allows timing of the duration of a pulse. The mode operates in the following manner:</p> <p><b>Input inactive:</b> The display will hold the time of the last pulse. The display must be reset before a new pulse can be timed.</p> <p><b>Input active:</b> If the previous time display has been reset then the timing process will start from zero or the preset value. If the previous display has not been reset the value displayed will not change when the input becomes active.</p>
<b>PLS.H</b> (pulse held)	<p>The pulse held option operates in the same manner as the <b>PLSE</b> option with the exception that the display indication only changes at the end of the active input i.e. the previous display is held until the new active input ends.</p>
<b>Sng.H</b> (single pulse held)	<p>The pulse held option operates in the same manner as the <b>SngL</b> option with the exception that the display indication only changes at the end of the input pulse. As with the <b>SngL</b> option the display must be reset before a new pulse can be timed.</p>
<b>UP</b> (up timer)	<p>The up timer option allows the instrument to be used as a timer with a start, stop and reset input. The mode operates in the following manner:</p> <p>Upon receiving an active input the display will show accumulated time. This timing will continue until a STOP input is received even if the input becomes inactive. This STOP input is operated via an edge between the Input 2 IN and GND terminals. A reset input will reset the timer to zero. If the timer is stopped and then restarted without a reset the timing will continue from the previous time.</p>
<b>dn</b> (down timer)	<p>The down timer works in the same manner as the UP timer with the exception that the down timing will automatically start from the time set at the <b>P.SET</b> function.</p>
<b>d.run</b> (down timer run mode)	<p>The mode operates in the following manner:</p> <p><b>Input active:</b> Display starts timing from preset value or the previous time recorded. <b>Input inactive:</b> Display holds time. A preset (or reset to preset) operation must be carried out when the time needs to be reset.</p>

# 5.17 Time display range

Section:	CONF
Display:	FnGE
Range:	SECS, m.m.SS, mmm, h.h.mm, hrS, dd.hh, dAYS
Default Value:	SECS
Default Access Level	4
Function number	4C74

Allows setting of the display time range. Choices are:

- SECS for a display in seconds
- m.m.SS for a display in minutes and seconds.
- h.h.S for a display in hours, minutes and seconds.
- mmm for a display in minutes.
- h.h.mm for a display in hours and minutes.
- hrS for a display in hours.
- dd.hh for a display in days and hours.
- dAYS for a display in days.

Note that the display is also affected by the decimal point setting. Examples below show how a 100 second display is affected by the display range Examples are shown for a 4 digit display type instrument.

# 5.18 Decimal point

Section:	CONF
Display:	dP
Range:	0, 0.1, 0.02, 0.003
Default Value:	0
Default Access Level	4
Function number	4C50

Displays and sets the decimal point for the period display. The decimal point function display shown will depend on the number of digits in the display and the CONF FnGE setting. The table below shows settings for a 4 digit display.

<b>CONF F nSE</b>	<b>CONF dP</b>	Measuring units
<b>SECS</b>	<b>0</b>	Seconds
<b>SECS</b>	<b>0.1</b>	Seconds and tenths of seconds
<b>SECS</b>	<b>0.02</b>	Seconds and hundredths of a second
<b>SECS</b>	<b>0.003</b>	Seconds and thousandths of a second
<b>mm.SS</b>	<b>0</b>	Minutes and seconds
<b>mm.SS</b>	<b>0.1</b>	Minutes and seconds and tenths of a second
<b>mm.SS</b>	<b>0.02</b>	Seconds and hundredths of a second
<b>mm.SS</b>	<b>0.003</b>	Seconds and thousandths of a second
<b>mm</b>	<b>0</b>	Minutes
<b>mm</b>	<b>0.1</b>	Minutes and tenths of a minute
<b>mm</b>	<b>0.02</b>	Minutes and hundredths of a minute
<b>mm</b>	<b>0.003</b>	Minutes and thousandths of a minute
<b>hh.mm</b>	<b>0</b>	Hours and minutes
<b>hh.mm</b>	<b>0.1</b>	Hours, minutes and tenths of a minute e.g. <b>1.33.7</b>
<b>hh.mm</b>	<b>0.02</b>	Minutes and hundredths of a minute
<b>hh.mm</b>	<b>0.003</b>	Minutes and thousandths of a minute
<b>hrs</b>	<b>0</b>	Hours
<b>hrs</b>	<b>0.1</b>	Hours and tenths of an hour
<b>hrs</b>	<b>0.02</b>	Hours and hundredths of an hour
<b>hrs</b>	<b>0.003</b>	Hours and thousandths of an hour
<b>dd.hh</b>	<b>0</b>	Days and hours
<b>dd.hh</b>	<b>0.1</b>	Days, hours and tenths of an hour e.g. <b>3.15.2</b>
<b>dd.hh</b>	<b>0.02</b>	Hours and hundredths of an hour
<b>dd.hh</b>	<b>0.003</b>	Hours and thousandths of an hour
<b>dAYS</b>	<b>0</b>	Days
<b>dAYS</b>	<b>0.1</b>	Days and tenths of a day
<b>dAYS</b>	<b>0.02</b>	Days and hundredths of a day
<b>dAYS</b>	<b>0.003</b>	Days and thousandths of a day

## 5.19 Preset

**Section:** **CONF**  
**Display:** **P.SEt**  
**Range:** Any display value  
**Default Value:** **0.0**  
**Default Access Level** **2**  
**Function number** **4C78**

This function displays and sets the preset value to be used when the reset mode is set to go to the preset value rather than zero. Resetting to a preset value is most commonly used when down timing from a preset value.

## 5.20 Reset mode

**Section:** **CONF**  
**Display:** **r.SEt**  
**Range:** **rSEt, P.SEt**  
**Default Value:** **rSEt**  
**Default Access Level** **4**  
**Function number** **4C96**

The reset terminal can be programmed to cause the display to reset to either zero (**rSEt**) or the preset value set via the **CONF P.SEt** function.

## 5.21 Stop at zero

**Section:** **CONF**  
**Display:** **STOP ZERO**  
**Range:** **OFF** or **ON**  
**Default Value:** **OFF**  
**Default Access Level** **4**  
**Function number** **4C98**

This function is only available when the down timer mode is selected at the **CONF OPER** function. When set to **ON** the down count will stop at zero. When set to **OFF** the timer will continue through zero to show negative value if the timer operation is still active.

## 5.22 Display running indication

**Section:** **CONF**  
**Display:** **FUN FLSH**  
**Range:** **OFF** or **ON**  
**Default Value:** **ON**  
**Default Access Level** **4**  
**Function number** **4C9A**

The colons and/or decimal point depending on display type on the display can be set to flash when the display is running (timing up or down) (**FUN FLSH** set to **ON**) or can be set not to flash at any time (**FUN FLSH** set to **OFF**). The flashing mode is useful to indicate the display is running when the display is set for minutes, hours or days.

## 5.23 Reset at power up

**Section:** **CONF**  
**Display:** **P.ON FSt**  
**Range:** **OFF** or **ON**  
**Default Value:** **OFF**  
**Default Access Level** **4**  
**Function number** **4C9b**

When set to **ON** the display will reset to zero each time it is powered up. When set to **OFF** the display will retain and display its last value when powered up.

## 5.24 Inputs 1 and 2 pull up

**Section:** **IN 1 to IN 2**  
**Display:** **PULL UP**  
**Range:** **OPEN, H, 9h, Lo**  
**Default Value:** **H, 9h**  
**Default Access Level** **4**  
**Function number** **4C00 to 4C01**

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

## 5.25 Inputs 1 and 2 bias

**Section:** **IN1 to IN2**  
**Display:** **BIAS**  
**Range:** **OFF, ON**  
**Default Value:** **ON**  
**Default Access Level** **4**  
**Function number** **4C02 to 4C03**

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

## 5.26 Inputs 1 and 2 low frequency

**Section:** **IN1 to IN2**  
**Display:** **LOF**  
**Range:** **OFF, ON**  
**Default Value:** **OFF**  
**Default Access Level** **4**  
**Function number** **4C04 to 4C05**

Allows application of a low pass filter setting for inputs 1 and 2. When set to **ON** an low pass filter will be applied to the input circuit. When set to **OFF** no low pass filter will be applied to the input circuit. This function should be set to **ON** for inputs likely to generate contact bounce such as switch and relay inputs but it can also be useful for blocking higher frequency signals when only low frequency inputs are being used. The filter will only allow signals of approx. 80Hz or lower to pass to the input stage. See “Electrical Installation” chapter for further information.

## 5.27 Inputs 1 and 2 hysteresis

**Section:** **IN1 to IN2**  
**Display:** **HYST**  
**Range:** **OFF, ON**  
**Default Value:** **OFF**  
**Default Access Level** **4**  
**Function number** **4C06 to 4C07**

Allows application “hysteresis” setting for inputs 1 and 2. When set to **OFF** the input gain will be set for signals of 25mV to 250mV. When set to **ON** the input gain will be set for signals above 250mV. When set to **OFF** the input will accept lower amplitude signals but will also be more likely to pick up electrical noise. See “Electrical Installation” chapter for further information.

## 5.28 Inputs 1 and 2 attenuation

**Section:** **IN1 to IN2**  
**Display:** **ATTN**  
**Range:** **OFF, ON**  
**Default Value:** **OFF**  
**Default Access Level** **4**  
**Function number** **4C08 to 4C09**

Allows application of a 5 times attenuation for inputs 1 and 2. When set to **OFF** no attenuation will be applied. When set to **ON** the input signal will be reduced by a factor of 5 before moving on to the first amplification stage. Applying attenuation can be used to reduce the noise level of the input signal when the input signal itself is large



enough to be attenuated e.g. a 0 to 20V square wave will become 0 to 4V square wave after attenuation. See “Electrical Installation” chapter for further information.

## 5.29 Inputs 1 and 2 DC coupling

**Section:** 1 0 1 to 1 0 2  
**Display:** dC  
**Range:** OFF, 0h  
**Default Value:** 0h  
**Default Access Level** 4  
**Function number** 4C 0A to 4C 0b

Allows application of DC coupling for inputs 1 and 2. When set to **OFF** no DC coupling be applied. When set to **0h** DC coupling will be applied. DC coupling should be used (set to **0h**) when using switch or relay inputs or when the input frequency is always going to be less than 10Hz. See “Electrical Installation” chapter for further information.

## 5.30 Inputs 1 and 2 input edge or level

**Section:** 1 0 1 to 1 0 2  
**Display:** EdgE  
**Range:** L0, H, L0E, H, E  
**Default Value:** L0  
**Default Access Level** 4  
**Function number** 4C 10 to 4C 11

Allows selection of input edge or level for inputs 1 and 2.

Select **L0** for the input to be triggered by a low level signal i.e. input will be triggered whilst the input is held low.

Select **H,** for the input to be triggered by a high level signal i.e. input will be triggered whilst the input is held high.

Select **L0E** for the input to be triggered by a low going edge i.e. falling from a voltage towards zero.

Select **H, E** for the input to be triggered by a high going edge i.e. rising from a low voltage.

See “Electrical Installation” chapter for further information.

## 5.31 Inputs 1 and 2 de-bounce timer

**Section:** 1 0 1 to 1 0 2  
**Display:** d.bnc  
**Range:** 0 to 1000 ms  
**Default Value:** 5  
**Default Access Level** 4  
**Function number** 4C 18 to 4C 19

Allows application of a de-bounce timer for inputs 1 and 2. A de-bounce time of between 0 and 1000mS can be set for inputs 1 and 2. When a de-bounce time is set the signal level before the input trigger signal must have been at that level for the de-bounce time or longer. This is used to help prevent false triggering. For example if the input is triggered by a high level or high going edge and the de-bounce time is set to 100mS then the input would have to be at a low level for at least 100mS before the input is triggered, if not then the input trigger will not be accepted. See “Electrical Installation” chapter for further information.

## 5.32 Digital input edge or level selection

**Section:** **, n.d 1 to , n.d 3**  
**Display:** **Ed9E**  
**Range:** **L0, H,**  
**Default Value:** **L0**  
**Default Access Level** **4**  
**Function number** **4C 12 to 4C 14**

Allows selection of input edge or level for digital inputs 1, 2 and 3 (terminal marked “DIGITAL IN”).

Select **L0** for the input to be triggered by a low level signal i.e. input will be triggered whilst the input is held low.

Select **H,** for the input to be triggered by a high level signal i.e. input will be triggered whilst the input is held high.

Select **L0E** for the input to be triggered by a low going edge i.e. falling from a voltage towards zero.

Select **H, E** for the input to be triggered by a high going edge i.e. rising from a low voltage.

Select **None** to disable this input.

See “Electrical Installation” chapter for further information.

## 5.33 Digital inputs 1, 3 and 3 de-bounce timer

**Section:** **, n.d 1 to , n.d 3**  
**Display:** **d.bnc**  
**Range:** **0 to 1000 ms**  
**Default Value:** **5**  
**Default Access Level** **4**  
**Function number** **4C 1A to 4C 1C**

Allows application of a de-bounce timer for digital inputs 1, 2 and 3 (terminal marked “DIGITAL IN”). A de-bounce time of between 0 and 1000ms can be set for inputs 1, 2 and 3. When a de-bounce time is set the signal level before the input trigger signal must have been at that level for the de-bounce time or longer. This is used to help prevent false triggering. For example if the input is triggered by a high level or high going edge and the de-bounce time is set to 100ms then the input would have to be at a low level for at least 100ms before the input is triggered, if not then the input trigger will not be accepted. See “Electrical Installation” chapter for further information.

## 5.34 Output voltage selection

**Section:** **P.Out**  
**Display:** **P.Out**  
**Range:** **5V, 12V, 18V**  
**Default Value:** **5V**  
**Default Access Level** **4**  
**Function number** **4C 0F**

Allows selection of the excitation voltage where available on the input board at terminal or terminals. 5V, 12V or 18VDC (25mA max.) is available as transmitter supply this function allow selection of 5V (**5V**) or 12V (**12V**) or 18V (**18V**). Transmitter supply voltages are approximate. If a change is made the **P.Out** function must be exited before the supply will change.

## 5.35 Front P button operation mode

Section: **F.I NP**  
Display: **P.buE**  
Range: **NONE, P.H., P.Lo, H., Lo, AL.AC**  
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.I N. 1** to **F.I N.4** functions.

## 5.36 Remote input 1 operation mode

Section: **F.I NP**  
Display: **F.I N. 1**  
Range: **NONE, P.Hold, d.Hold, P.H., P.Lo, H., Lo, AL.AC, ACCESS, dui 1**  
Default Value: **NONE**  
Default Access Level **4**  
Function number **4721**

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

- **NONE** - If this option is selected then remote input 1 will have no function.
- **P.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.Hd** will appear briefly every 8 seconds whilst the input terminals are short circuited to indicate that the peak hold function is active. All active channels will be peak held when this mode is chosen and activated.
- **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. All active channels will be display held when this mode is chosen and activated.
- **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, a **RESET** message will be seen if the memory is reset by holding a short circuit for 2 to 3 seconds. The peak high mode will operate on all active channels.
- **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. The peak low mode will operate on all active channels.
- **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. The peak high/low mode will operate on all active channels.
- **AL.AC** - alarm acknowledge. Allows the remote input to be used to acknowledge an alarm. If the alarm is set for latching operation the acknowledgment will allow the alarm and any relays allocated to that alarm to reset when the alarm condition is removed. If the alarm is set for automatic reset the acknowledgment will allow the alarm and any relays allocated to that alarm to reset even if the alarm condition still exists this could typically be used to silence a siren controlled by a relay even though the alarm condition is still present. The acknowledge will operate on all alarms programmed to require acknowledgement.

- **ACCESS** - remote input access. Allows the remote input to be used for setup function access control purposes. Refer to the “ Accessing setup functions” in the Introduction chapter.
- **dull** - remote dulling of the display. When activated the display brightness will fall to the level set by the **display** level. This is generally used to reduce current consumption in battery powered applications or for switching between day and night brightness levels.
- **ZERO** - zero the display. This mode allows the remote input to be used as a reset to zero input for the total seen in the **total** and **both** modes.
- **GRST** - grand total reset. This mode allows the remote input to be used as a reset input for the grand total seen in the **total** and **both** modes.
- **STOP** - totaliser inhibit - the total display value will be held and any input pulses ignored whilst the remote input is short circuited. Not applicable to rate display.

### 5.37 Remote input 2 operation mode

**Section:** **F.1 NP**  
**Display:** **F.1 N.2**  
**Range:** **NONE, P.Hi d, d.Hi d, P.Hi, P.Lo, Hi .Lo, AL.Ac, ACCESS, dull**  
**Default Value:** **NONE**  
**Default Access Level** **4**  
**Function number** **4722**

Remote input 2 functions. Same choices as **F.1 NP F.1 N.1** apply.

### 5.38 Remote input 3 operation mode

**Section:** **F.1 NP**  
**Display:** **F.1 N.3**  
**Range:** **NONE, P.Hi d, d.Hi d, P.Hi, P.Lo, Hi .Lo, AL.Ac, ACCESS, dull**  
**Default Value:** **NONE**  
**Default Access Level** **4**  
**Function number** **4723**

Remote input 3 functions. Same choices as **F.1 NP F.1 N.1** apply.

### 5.39 Remote input 4 operation mode

**Section:** **F.1 NP**  
**Display:** **F.1 N.4**  
**Range:** **NONE, P.Hi d, d.Hi d, P.Hi, P.Lo, Hi .Lo, AL.Ac, ACCESS, dull**  
**Default Value:** **NONE**  
**Default Access Level** **4**  
**Function number** **4724**

Remote input 4 functions. Same choices as **F.1 NP F.1 N.1** apply.

## 5.40 Remote input (digital inputs) 1 pull up/down operation

**Section:** d.i. n  
**Display:** d.i. n. 1 P.UP  
**Range:** OPEN, H, 9h, Lo  
**Default Value:** H, 9h  
**Default Access Level** 4  
**Function number** 4A50

This function sets the voltage level present on the digital input terminal. If set to **H, 9h** a 5VDC voltage will be placed on the input terminal via a pull up resistor and a short circuit to ground or voltage below 2V will be required to activate the remote input. If set to **Lo** then the input terminal will be connected to ground via a pull down resistor and a voltage between 5 and 24VDC will be required at the input to activate the remote input. If set to **OPEN** then both the pull up and pull down resistors will be taken out of circuit and the terminal voltage will be “floating”, this choice can be used when input devices are used which may supply their own voltage to the digital input terminal, maximum acceptable voltage is 24VDC.

## 5.41 Remote input (digital inputs) 1 input level

**Section:** d.i. n  
**Display:** d.i. n. 1 Lvl  
**Range:** H, 9h, Lo  
**Default Value:** Lo  
**Default Access Level** 4  
**Function number** 4A58

This function sets the input level required to activate the remote input. A setting of **Lo** means that a low voltage usually 0V or a short circuit to ground will activate the remote input. A setting of **H, 9h** means that a voltage of 5 to 24V is required to activate the remote input.

## 5.42 Remote input (digital inputs) 2 pull up/down operation

**Section:** d.i. n  
**Display:** d.i. n.2 P.UP  
**Range:** OPEN, H, 9h, Lo  
**Default Value:** H, 9h  
**Default Access Level** 4  
**Function number** 4A51

This function sets the voltage level present on the digital input terminal. If set to **H, 9h** a 5VDC voltage will be placed on the input terminal via a pull up resistor and a short circuit to ground or voltage below 2V will be required to activate the remote input. If set to **Lo** then the input terminal will be connected to ground via a pull down resistor and a voltage between 5 and 24VDC will be required at the input to activate the remote input. If set to **OPEN** then both the pull up and pull down resistors will be taken out of circuit and the terminal voltage will be “floating”, this choice can be used when input devices are used which may supply their own voltage to the digital input terminal, maximum acceptable voltage is 24VDC.

## 5.43 Remote input (digital inputs) 2 input level

**Section:** d.1 n  
**Display:** d.1 n.2 Lvl  
**Range:** H, 9h, Lo  
**Default Value:** Lo  
**Default Access Level** 4  
**Function number** 4A59

This function sets the input level required to activate the remote input. A setting of **Lo** means that a low voltage usually 0V or a short circuit to ground will activate the remote input. A setting of **H, 9h** means that a voltage of 5 to 24V is required to activate the remote input.

## 5.44 Remote input (digital inputs) 3 pull up/down operation

**Section:** d.1 n  
**Display:** d.1 n.3 P.UP  
**Range:** OPEN, H, 9h, Lo  
**Default Value:** H, 9h  
**Default Access Level** 4  
**Function number** 4A52

This function sets the voltage level present on the digital input terminal. If set to **H, 9h** a 5VDC voltage will be placed on the input terminal via a pull up resistor and a short circuit to ground or voltage below 2V will be required to activate the remote input. If set to **Lo** then the input terminal will be connected to ground via a pull down resistor and a voltage between 5 and 24VDC will be required at the input to activate the remote input. If set to **OPEN** then both the pull up and pull down resistors will be taken out of circuit and the terminal voltage will be “floating”, this choice can be used when input devices are used which may supply their own voltage to the digital input terminal, maximum acceptable voltage is 24VDC.

## 5.45 Remote input (digital inputs) 3 input level

**Section:** d.1 n  
**Display:** d.1 n.3 Lvl  
**Range:** H, 9h, Lo  
**Default Value:** Lo  
**Default Access Level** 4  
**Function number** 4A5A

This function sets the input level required to activate the remote input. A setting of **Lo** means that a low voltage usually 0V or a short circuit to ground will activate the remote input. A setting of **H, 9h** means that a voltage of 5 to 24V is required to activate the remote input.

## 5.46 Remote input (digital inputs) 4 pull up/down operation

**Section:** d.1 n  
**Display:** d.1 n.4 P.UP  
**Range:** OPEN, H, 9h, Lo  
**Default Value:** H, 9h  
**Default Access Level** 4  
**Function number** 4A53

This function sets the voltage level present on the digital input terminal. If set to **H, 9h** a 5VDC voltage will be placed on the input terminal via a pull up resistor and a short circuit to ground or voltage below 2V will be required

to activate the remote input. If set to **L0** then the input terminal will be connected to ground via a pull down resistor and a voltage between 5 and 24VDC will be required at the input to activate the remote input. If set to **OPEN** then both the pull up and pull down resistors will be taken out of circuit and the terminal voltage will be “floating”, this choice can be used when input devices are used which may supply their own voltage to the digital input terminal, maximum acceptable voltage is 24VDC.

## 5.47 Remote input (digital inputs) 4 input level

Section: **di 04**  
 Display: **di 04 Lvl**  
 Range: **H, 9h, L0**  
 Default Value: **L0**  
 Default Access Level: **4**  
 Function number: **4A5b**

This function sets the input level required to activate the remote input. A setting of **L0** means that a low voltage usually 0V or a short circuit to ground will activate the remote input. A setting of **H, 9h** means that a voltage of 5 to 24V is required to activate the remote input.

## 5.48 Automatic display brightness

Section: **di 5P**  
 Display: **br 9t Auto**  
 Range: **OFF or ON**  
 Default Value: **ON**  
 Default Access Level: **2**  
 Function number: **22Ff**

Automatic display brightness adjustment. Not applicable unless the optional light sensor is fitted. The automatic brightness adjustment uses the optional light sensor to gauge the required brightness level for the environment. The high and low brightness limits are set at the **Auto H, 9h** and **Auto L0** functions described below.

## 5.49 Display brightness

Section: **di 5P**  
 Display: **br 9t**  
 Range: **1 to 63**  
 Default Value: **63**  
 Default Access Level: **2**  
 Function number: **22Fb**

Allows manual adjustment of the display brightness from 1 (lowest brightness) to 63 (highest brightness).

## 5.50 Dimmed display brightness

Section: **di 5P**  
 Display: **di 1**  
 Range: **0 to 63**  
 Default Value: **7**  
 Default Access Level: **2**  
 Function number: **22Ee**

Displays and sets the manually set level for remote input brightness switching. When a remote input is set to

**dul** : the remote input can be used to switch between the display brightness level set by the **brgt** function and the dimmed display brightness set by the **dul** function. The display dull level is selectable from **0** to **63**, where **0** = lowest intensity and **63** = highest intensity. This function is useful in reducing glare when the display needs to be viewed in both light and dark ambient light levels.

## 5.51 Auto display brightness high level

Section: **dl SP**  
 Display: **Auto H, 9h**  
 Range: **15 to 63**  
 Default Value: **63**  
 Default Access Level **2**  
 Function number **22EA**

Automatic brightness high level - seen only when **Auto H, 9h** is set to **ON**. The high brightness level sets the maximum brightness which the automatic brightness control can achieve with 64 being the highest intensity.

## 5.52 Auto display brightness low level

Section: **dl SP**  
 Display: **Auto Lo**  
 Range: **1 to 63**  
 Default Value: **7**  
 Default Access Level **2**  
 Function number **22Eb**

Automatic brightness low level - seen only when **Auto H, 9h** is set to **OFF**. The low brightness level sets the minimum brightness which the automatic brightness control can achieve with **64** being the highest intensity and **0** being the lowest intensity.

## 5.53 Select number of alarms

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

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

## 5.54 Easy access mode

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

Allows choice of the access level available when using the easy access method. For example if this function is set to **3** then functions with levels 1, 2 and 3 can be viewed and changed when access to setup functions is made using this method. To access setup functions using the easy access method press and hold the **F** button until the message



**FUNC** is seen followed by the first function message, this should take approximately 3 seconds. If the message **FUNC End** or no response is seen at this point it means that the access level has been set to **None** and that access to setup functions has been refused.

## 5.55 Remote input access mode

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

This function allows choice of the access level available when using the remote input access method. To access setup functions using the remote input access method one of the remote inputs must be set to **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**.

## 5.56 PIN code 1

Section: **ACCES**  
 Display: **USF. 1 P. n**  
 Range: **0 to 65535**  
 Default Value: **0**  
 Default Access Level **5.CAL**  
 Function number **0C09**

This function allows choice of the PIN code to be used for PIN code input access method. Associated with the PIN is an access level (see **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.

## 5.57 PIN code 1 access level

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

This function allows choice of the access level available when using the PIN code 1 input access method. To access setup functions using the PIN code 1 input access method press and hold the **F** button until the message **FUNC** is seen followed by the first function message, this should take approximately 3 seconds. If the message **FUNC End** is seen at this point it means that the access level has been set to **None**.

## 5.58 PIN code 2

**Section:** *ACCES*  
**Display:** *USF.2 P. n*  
**Range:** *0* to *65535*  
**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.2 Acc5*). 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.

## 5.59 PIN code 2 access level

**Section:** *ACCES*  
**Display:** *USF.2 LEVL*  
**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*.

## 5.60 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.

## 5.61 User assignable access 1 level value

Section: **ACCES**  
Display: **Fn. 1 LEVL**  
Range: **df1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL**  
Default Value: **df1 t**  
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 **df1 t** is chosen then the level reverts back to the original default level.

## 5.62 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.

## 5.63 User assignable access 2 level value

Section: **ACCES**  
Display: **Fn.2 LEVL**  
Range: **df1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL**  
Default Value: **df1 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 **df1 t** is chosen then the level reverts back to the original default level.

## 5.64 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.

## 5.65 User assignable access 3 level value

**Section:** *ACCES*  
**Display:** *Fn.3 LEVL*  
**Range:** *df1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL*  
**Default Value:** *df1 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 *df1 t* is chosen then the level reverts back to the original default level.

## 5.66 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.

## 5.67 User assignable access 4 level value

**Section:** *ACCES*  
**Display:** *Fn.4 LEVL*  
**Range:** *df1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL*  
**Default Value:** *df1 t*  
**Default Access Level** *S.CAL*  
**Function number** *0C43*

Allows a new access level for the function with the number set in the function to be chosen. If *df1 t* is chosen then the level reverts back to the original default level.

## 5.68 User assignable access 5 function number

**Section:** *ACCES*  
**Display:** *Fn.5 Code*  
**Range:** *0000 to FFFF hex.*  
**Default Value:** *0000*  
**Default Access Level** *S.CAL*  
**Function number** *0C14*

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.

## 5.69 User assignable access 5 level value

Section: **ACCES**  
Display: **Fcn.5 LEVL**  
Range: **df1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL**  
Default Value: **df1 t**  
Default Access Level **S.CAL**  
Function number **0C44**

Allows a new access level for the function with the number set in the function to be chosen. If **df1 t** is chosen then the level reverts back to the original default level.

## 5.70 User assignable access 6 function number

Section: **ACCES**  
Display: **Fcn.6 Code**  
Range: **0000 to FFFF hex.**  
Default Value: **0000**  
Default Access Level **S.CAL**  
Function number **0C15**

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.

## 5.71 User assignable access 6 level value

Section: **ACCES**  
Display: **Fcn.6 LEVL**  
Range: **df1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL**  
Default Value: **df1 t**  
Default Access Level **S.CAL**  
Function number **0C45**

Allows a new access level for the function with the number set in the function to be chosen. If **df1 t** is chosen then the level reverts back to the original default level.

## 5.72 User assignable access 7 function number

Section: **ACCES**  
Display: **Fcn.7 Code**  
Range: **0000 to FFFF hex.**  
Default Value: **0000**  
Default Access Level **S.CAL**  
Function number **0C16**

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.

### 5.73 User assignable access 7 level value

Section: **ACCES**  
Display: **Fn.7 LEVL**  
Range: **df1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL**  
Default Value: **df1 t**  
Default Access Level **S.CAL**  
Function number **0C46**

Allows a new access level for the function with the number set in the function to be chosen. If **df1 t** is chosen then the level reverts back to the original default level.

### 5.74 User assignable access 8 function number

Section: **ACCES**  
Display: **Fn.8 Code**  
Range: **0000 to FFFF hex.**  
Default Value: **0000**  
Default Access Level **S.CAL**  
Function number **0C17**

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.

### 5.75 User assignable access 8 level value

Section: **ACCES**  
Display: **Fn.8 LEVL**  
Range: **df1 t, 1, 2, 3, 4, 5, 6, CAL, S.CAL**  
Default Value: **df1 t**  
Default Access Level **S.CAL**  
Function number **0C47**

Allows a new access level for the function with the number set in the function to be chosen. If **df1 t** is chosen then the level reverts back to the original default level.

## 6 Modbus

Modbus TCP is available on the optional Ethernet port and Modbus RTU is available on the standard RS485 port or on the optional RS232 or RS485 port.

### Modbus table for function 03

Registers 40001 and 40002 show the display value shown in the same units the lowest time value in the display (no decimal point shown) e.g. 6.5 seconds would show as 65 i.e. 65 tenths of a second, 1 minute and 3.5 seconds would show as 635. Registers 40003 and 40004 show the number of complete seconds. Registers 40005 and 40006 show the number of complete milli seconds.

Register	Name	Data Type	Units	Func	Address	R/W
40001/2	Display	32 bit Integer		0x03	0x0000, 0x0001	R
40003/4	Seconds	32 bit Integer		0x03	0x0002, 0x0003	R
40005/6	Milliseconds	32 bit Integer		0x03	0x0004, 0x0005	R

### Modbus table for function 01

Func Code	Description	Register Range	Address Range
0x01	Read Coil Status	1 - 9999	0x0000 - 0x270E
0x03	Read Holding Registers	40001 - 49999	0x0000 - 0x270E

## 7 Technical specifications

Display:	6 digit 38mm red LED or 5 digit 45mm red LED or 4 digit 57mm or 58mm red LED or 4 or 6 digit 100mm red LED or 4 digit 200mm red LED type Count/Rate High contrast versions 38mm 6 digit, 58mm 4 digit, 100mm 4 or 6 digit and 200mm 4 digit available in red, green, white or amber led.
Input:	Link selectable to suit most sensor types. For inductive, AC and square wave inputs the maximum input voltage is 48VDC or RMS with appropriate link settings
Timer Functions:	Various selectable modes available including up timing, down timing, stopwatch etc.
Impedance:	1M $\Omega$ in normal mode or 12K $\Omega$ in attenuated input mode
Memory Retention:	Battery backed memory
Display Reset:	Remote reset and preset inputs with configurable pull up or down input
Ambient Temperature:	-10 to 60°C
Humidity:	5 to 95% non condensing
Power supply:	100 and 200mm LED: AC 240 or 110V selectable, 50/60Hz or AC 48/42/32/24 selectable, 50/60Hz or DC isolated wide range 12 to 24V. 20mm, 38mm, 45mm, 57 or 58mm LED: AC 240/110V 50/60Hz or AC 24 to 48V 50/60Hz or DC 12 to 48V isolated or DC 24V non isolated Supply type is factory configured
DC output supply:	5, 12 or 18VDC @ 50mA max.
Output (standard):	4 x relays, 1 x Form C, 3 x Form A rated 5A resistive. Programmable N.O. or N.C. RS485 non isolated serial communications

### Optional outputs - some options below are available in combination

Extra relays:	4 extra relays, form A
Analog retransmission:	Single 4 to 20mA 12 bit or 16 bit versions Single 4-20mA, 0-1VDC or 0-10VDC (user selectable), 16 bit (4-20mA will drive into resistive loads of up to 800 $\Omega$ ) Analog outputs can be configured for retransmission or PI control
Serial communications:	RS485 isolated 8 bit (ASCII or Modbus RTU functions 1 and 3) RS232 serial comms. 8 bit (ASCII or Modbus RTU functions 1 and 3) Ethernet, can be used with Modbus TCP Web page optional with Ethernet option USB port, type B

### Physical characteristics - see chapter 2



## 8 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.