

London Electronics Limited

Thorncote Road, Near Sandy, Bedfordshire SG19 1PU
Tel +44(0)1767 626444 Fax +44(0)1767 626446
www.london-electronics.com help@london-electronics.com

Average of 2 inputs process indicator with 2 alarms

IJ2-P-AVG

Connection details, scaling and general information



Caution: There is a risk of electrical shock if this instrument is not properly installed



Caution: Risk of danger: Read the whole manual before you install this meter



Software version F00.18

Document Ref:pm65\manuals\INT2_P

Revision:17 Dated: 6 September 2010

Contents

| | |
|---|-------|
| Warnings | 4 |
| Introduction | 5 |
| General Description | 6 |
| Panel mounting & Installation - Class II | 7 |
| DIN Rail mounting option | 8 |
| Other Mounting options | 9 |
| Wiring Advice | 10 |
| Connections | 11 |
| Installation hints for best performance | 12-13 |
| Easy/Advanced menu mode | 14 |
| Language Selection | 15 |
| Display Brightness | 16 |
| Display Calibration Modes | 17 |
| Direct Calibration | 18-19 |
| Theoretical Calibration | 20-21 |
| Sensor Drift correction | 22 |
| Logic Input connections & Front Buttons | 23 |
| Factory defaults | 24 |
| Calibration Audit number | 24 |
| Signal Filtering / Averaging | 25 |
| Last Digit rounding | 26 |
| Menu Timeout adjustment | 27 |
| Alarm Installation hints for best performance | 28 |
| Alarm output board configuration | 29 |
| Alarm - High alarm settings | 30-31 |
| Alarm - Low alarm settings | 32-33 |
| Alarm troubleshooting and faultfinding | 34 |
| Bootup Routine choices | 35 |
| Error Codes | 36 |
| WEEE | 37 |
| Equipment Specifications | 38 |
| Record of Revisions | 39 |
| Declaration of Conformity | 40 |

* Need a manual urgently?

You can download manuals from <http://www.london-electronics.com/manuals/>

Warnings

Please carefully read this manual and all warnings. Install the meter ONLY when you are sure that you've covered all aspects.



Where the product is intended for "UL" installations, removal or addition of option boards is not permitted.



Check that the model number and supply voltage suit your application before you install the meter.



Connect the meter according to current IEE regulations, IEC61010 & NFPA:70 National Electric Code in USA.



This meter is for Installation class II service only. This means it has exposed electrical and power terminals. You must install it in a suitable fire enclosure which will also protect users from electric shock



We designed this meter for Pollution-Degree 2 environments only.



Power supplies to this equipment must have anti-surge (T) fuses rated at 400mA for 230V supply, 400mA for 110V supply or 2A for DC supplies in the range 11-30VDC. Only Siba fuses in series 189500, cULus listed according to file #E167295 are accepted for this service under the terms of UL listing. A switch or circuit breaker, clearly marked as a disconnecting device, must be included close to the installation.



Don't touch any circuitry after you have connected the meter, because there may be lethal voltages on the circuit board.



Only adjust on-board switches or connections with the power turned off



Make sure all screw terminals are tight before you switch the meter on.



Only clean the meter's front with a soft damp cloth. Only lightly dampen with water. Do not use any other solvents. The behind-panel case may be cleaned with a dry cloth only, use no liquid or solvent on it.

**Safety FirstDon't assume anything..... Always double check.
If in doubt, ask someone who is QUALIFIED to assist you in the subject.**

Introduction

Please contact us if you need help, if you have a complaint, or if you have suggestions to help us improve our products or services.

If you contact us about a product you already have, please tell us the full model number and serial number, so that we can give you accurate and fast help.

This product has a 2 year warranty. We will put right or replace any meter which is faulty because of bad workmanship or materials. This warranty does not cover damage caused by misuse or accident.

If you return a unit for repair, please include a detailed description of the problem, and the name of a contact who we can refer to for any questions. Please mark for the attention of the QA Department.

IMPORTANT

If this equipment is important to your process, you may want to buy a spare to cover possible failure or accidental damage in the future.

This is because during factory shutdown periods, you may have to wait several weeks for an equivalent replacement, or we may have no stock at the time you urgently need it.

You may also need to pay extra carriage charges if you want a fast, guaranteed courier service. Warranty repairs or replacements are usually returned with a standard courier service.

We do not offer compensation for losses caused by failure of this instrument.

If you do not agree with these conditions, please return this item in unused, condition, in its original packaging and we will refund the purchase price, excluding any carriage paid.

We thought you'd prefer to know about possible delays and extra charges now, rather than during a panic. A spare unit could help to avoid these issues.

We always try to improve our products and services, so these may change over time. You should keep this manual safely, because future manuals, for new designs, may not describe this product accurately.

We believe these instructions are accurate, and that we have competently designed and manufactured the product, but please let us know if you find any errors.

General Description

This series of meters accepts industrial sensors to allow various physical measurements to be made, such as weight, temperature, pressure, humidity etc. Different models are available for different sensor types.

The main function of this series is to give a numeric readout of the variable being monitored. Most models include an excitation power output, to power the sensor directly.

Various optional output modules are also available on the more advanced versions, to give alarm relay outputs, analogue output or digital communications, or any combination of these options.

Meters are programmed using front panel pushbuttons. The buttons may be locked with a rear switch.

Meters have two power supply options : 100-240 VAC or 11-30VDC

These meters are designed to mount into a protective enclosure which will protect users from contact with power and signal wiring.

These units must be installed fully assembled, and must be installed according to local electrical installation rules. When properly installed, they provide ingress protection to IP65 / NEMA4X from the front

Safety



Caution: There is a risk of electrical shock if this instrument is not properly installed



Caution: Risk of danger: Read the whole manual before you install this meter

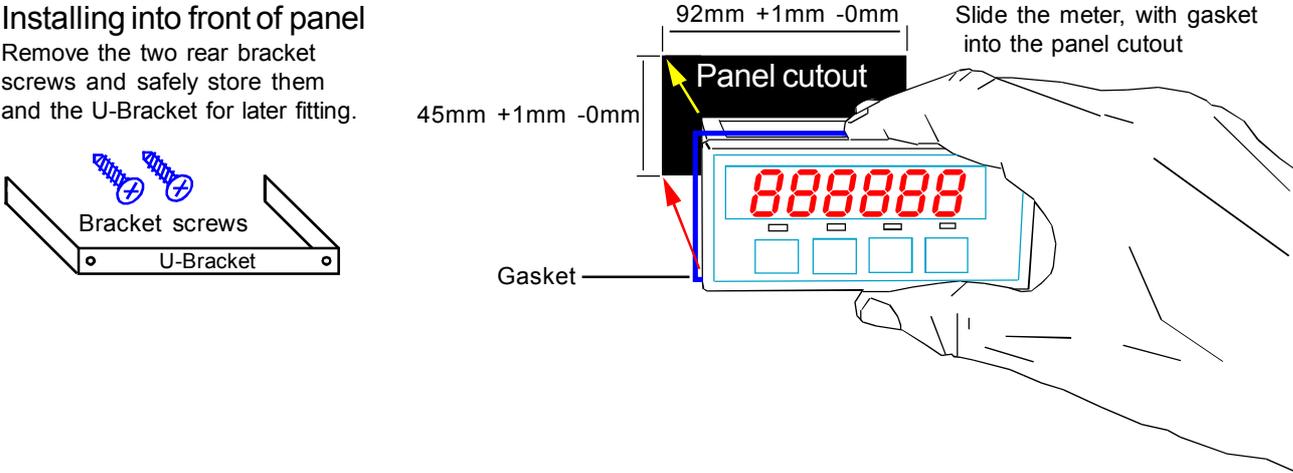
Obey all safety warnings in this manual, and install the meter according to local wiring and installation regulations. Failure to follow these guidelines may cause damage to the meter, connected equipment, or may be harmful to personnel.

Any moving mechanical device controlled by this equipment must have suitable access guards to prevent injury to personnel if the meter should fail.

Panel Mounting and Installation - Class II

Install the meters in a suitable protective electrical control enclosure according to local wiring regulations. See specifications for maximum allowable temperature in enclosure. Allow adequate air circulation.

Installing into front of panel
Remove the two rear bracket screws and safely store them and the U-Bracket for later fitting.

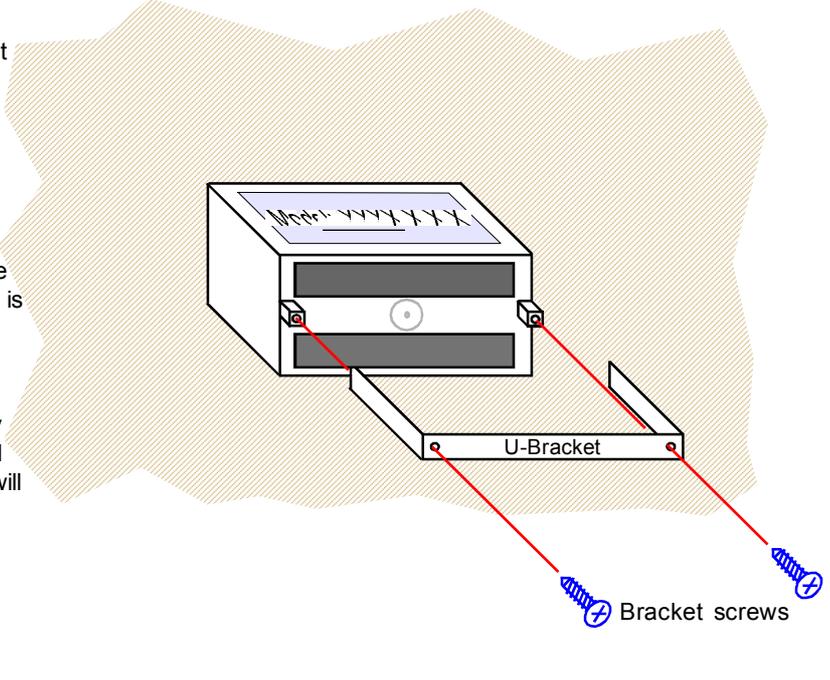


92mm +1mm -0mm
45mm +1mm -0mm
Panel cutout
Gasket
Slide the meter, with gasket into the panel cutout
Bracket screws
U-Bracket

Securing into the panel
Re-fit the U-Bracket and tighten the bracket screws to firmly clamp the meter in place. Check that the gasket is evenly pinched between the meter's front bezel and the enclosure front.

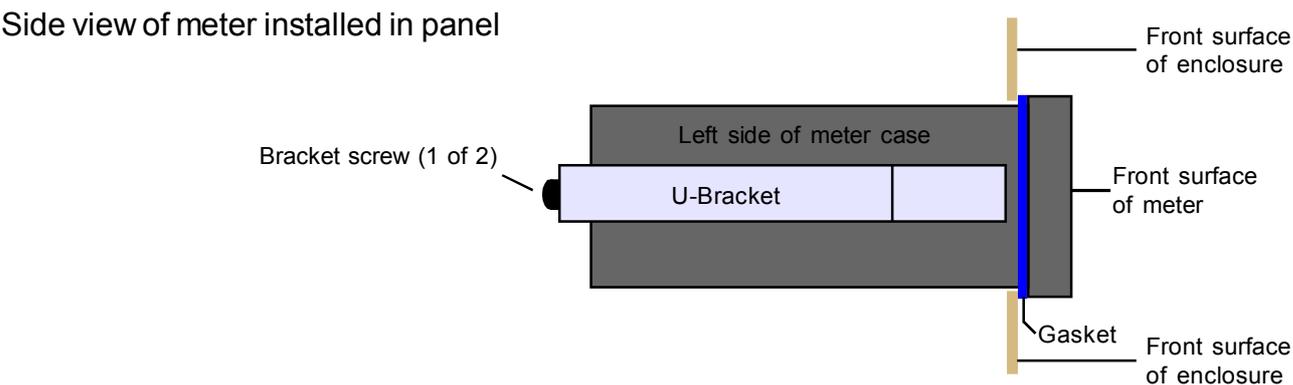
Ventilation
There should be sufficient ventilation in the enclosure to ensure that the meter's case is always kept to less than 60C.

Meter Spacing.
Meters should be spaced apart sufficiently to allow a free flow of ventilation air around the meters, such that no part of the case will exceed 60C



U-Bracket
Bracket screws
Meter

Side view of meter installed in panel



Bracket screw (1 of 2)
Left side of meter case
U-Bracket
Gasket
Front surface of enclosure
Front surface of meter

DIN Rail Mounting option

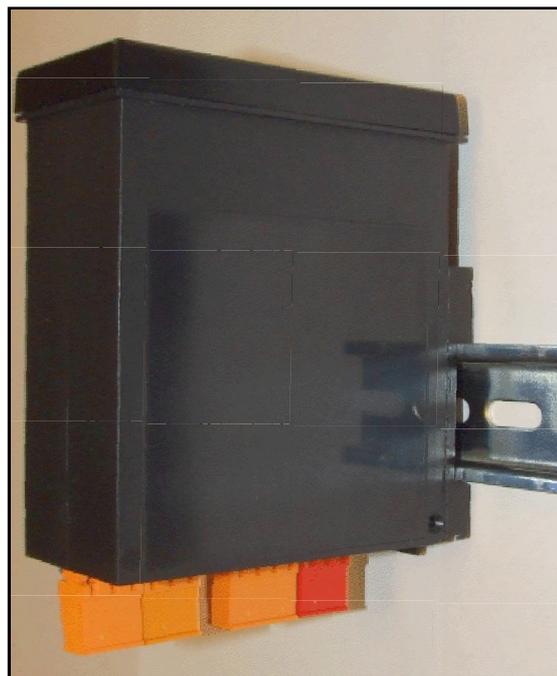
The INT2 Series is ideal if you need high precision signal conditioning. Sometimes, it is not necessary to have front panel indication, so in such cases, we offer a DIN rail mounting option, which allows the INT2 to be installed within a control panel.

Detachable connectors add to the simplicity of installation, and of course the setup method is identical to the panel mounting version, so you don't need to learn a new method.

The INT2's display remains active, so you can see at a glance the status of your signals, and programming is simple, using the 4 buttons.

Output functions include isolated 16 bit 4-20mA, 0-10V, -10 to +10V, RS232, RS485 and up to 4 alarms with a wide choice of alarm functions.

Install the meters in a suitable protective electrical control enclosure according to local wiring regulations. See specifications for maximum allowable temperature in enclosure. Allow adequate air circulation.



Securing into the panel

Use standard top-Hat DIN rail 35 mm x 7.5 mm (EN 50022, BS 5584, DIN 46277-3)

Ventilation

There should be sufficient ventilation in the enclosure to ensure that the meter's case is always kept to less than 60C.

Meter Spacing.

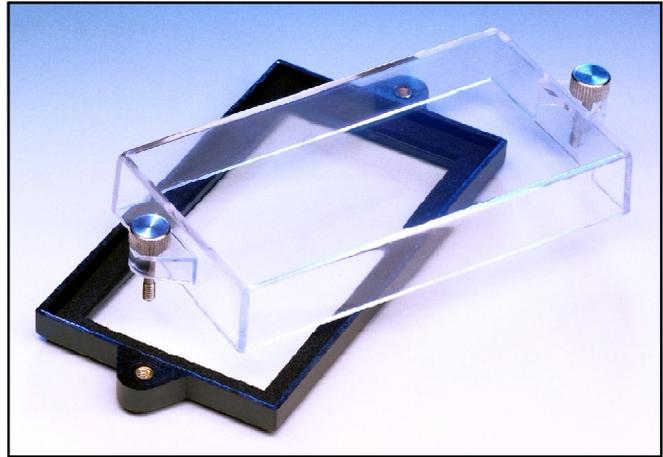
Meters should be spaced apart sufficiently to allow a free flow of ventilation air around the meters, such that no part of the case will exceed 60C

Other mounting options

IP67 SPC4

The SPC4 splashproof cover gives IP67 / NEMA4-X protection for the front of your meter. Ideal for use in harsh wet environments.

Available with optional security tag ports to allow you to fit your own crimped wire tamper-seals, to prevent or indicate unauthorised access (Similar to tags used on electricity meters)



Wall Box

The Wallbox is sealed IP65 all round, and is supplied with the meter installed, for you to wire to, via 3 cable glands. It comes complete with SPC4 splashproof cover.

We also offer a dual version of this enclosure, which can take 2 meters, one above the other.



PCC Series

The PCC series of Portable Carrying cases is ideal for housing your panel meters so that they can be used in the lab. These enclosure come fully wired, with panel meters fitted and with IEC switched power connector plus any input or output connectors, as required.

Versions are available to accept 1, 2, 4, 6, 8, 12 or 16 meters



Wiring Advice

This meter uses detachable screw terminal connectors. Refer to the wiring diagram on the following page for the correct positioning of each wire.

The conductors you use must be suitable for the meter's temperature, current and voltage rating, which is broadly described as follows:-

Cable Temperature Rating

All cables must be rated for operation up to 90C continuous.

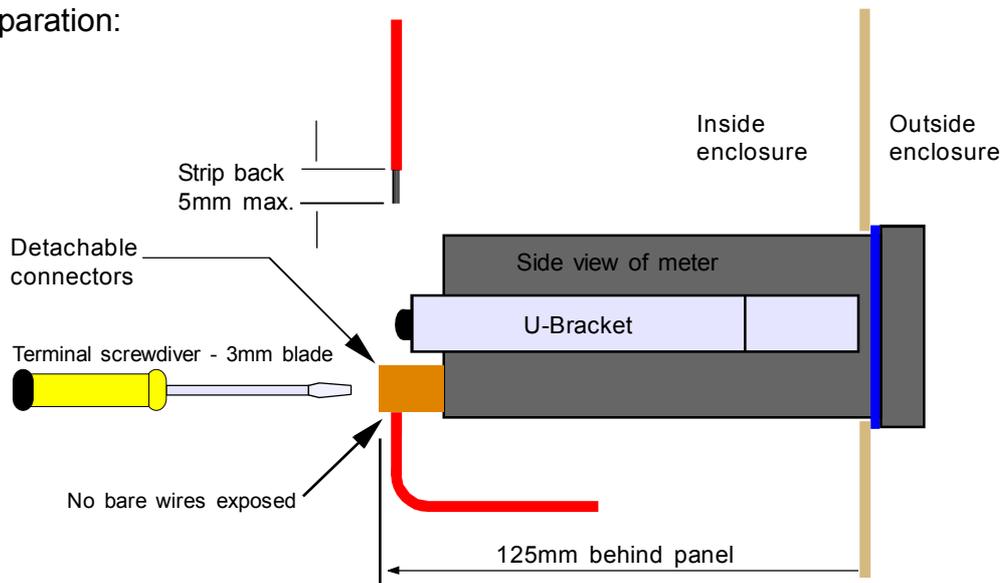
Cable gauge and screw tightness

The connectors on this instrument can accept conductors up to 16 gauge AWG / 1.5mm² c.s.a. The minimum cross sectional area shall be 22 gauge AWG / 0.5mm². Tighten screw terminals to 7.0 lb/in torque / 0.8 Nm torque.

Cable insulation voltage rating

Cables shall have an insulation voltage rating of at least 380V continuous.

Wire preparation:



We recommend multi-strand wire, because it withstands vibration better than single strand cable. Pull the wire firmly after you make the connection to confirm it is tight.

Use screened cable for all signal and control wiring and connect the screen to earth at the destination end only. Route signal cabling away from power cabling and relay switching cabling, to avoid electrical noise interference.

Connections

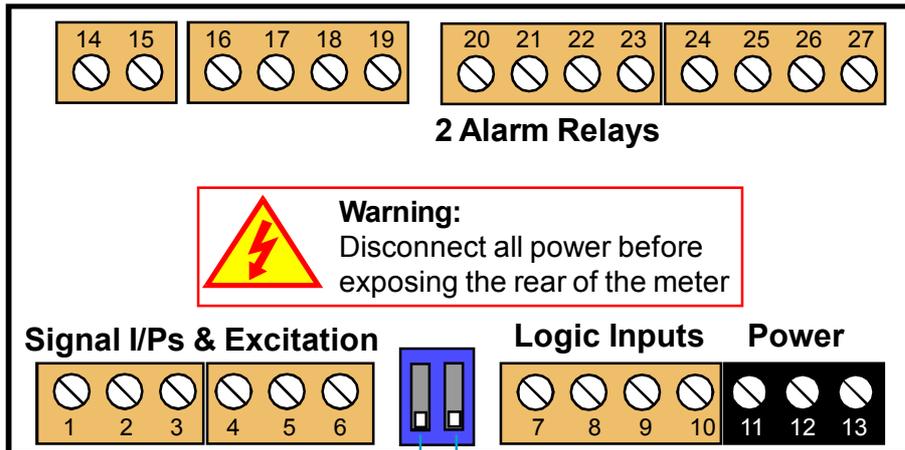


Connectors and options

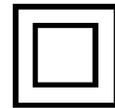
Connectors may be present even if output options are not installed. Refer to rating label to see installed options.

Rated 2A 250VAC Resistive

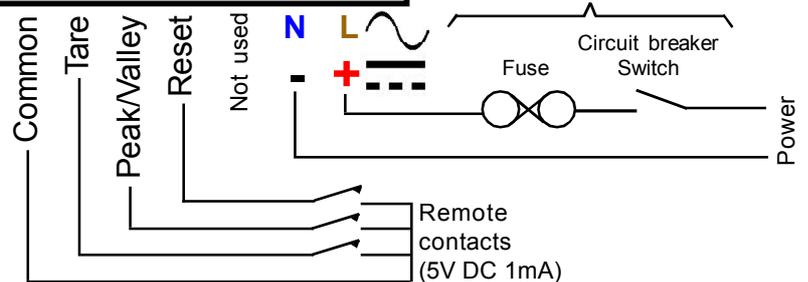
AL1 AL2



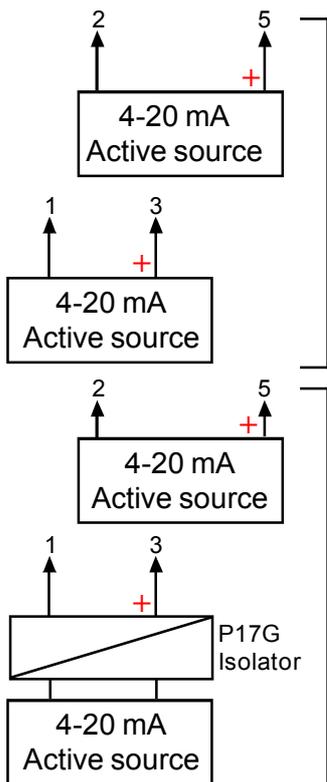
Class II Installation



Customer-supplied disconnection and overload protection devices



EXAMPLES



This format is suitable if the two inputs are electrically isolated from each other and you are happy for them to share a common 0V connection in the meter

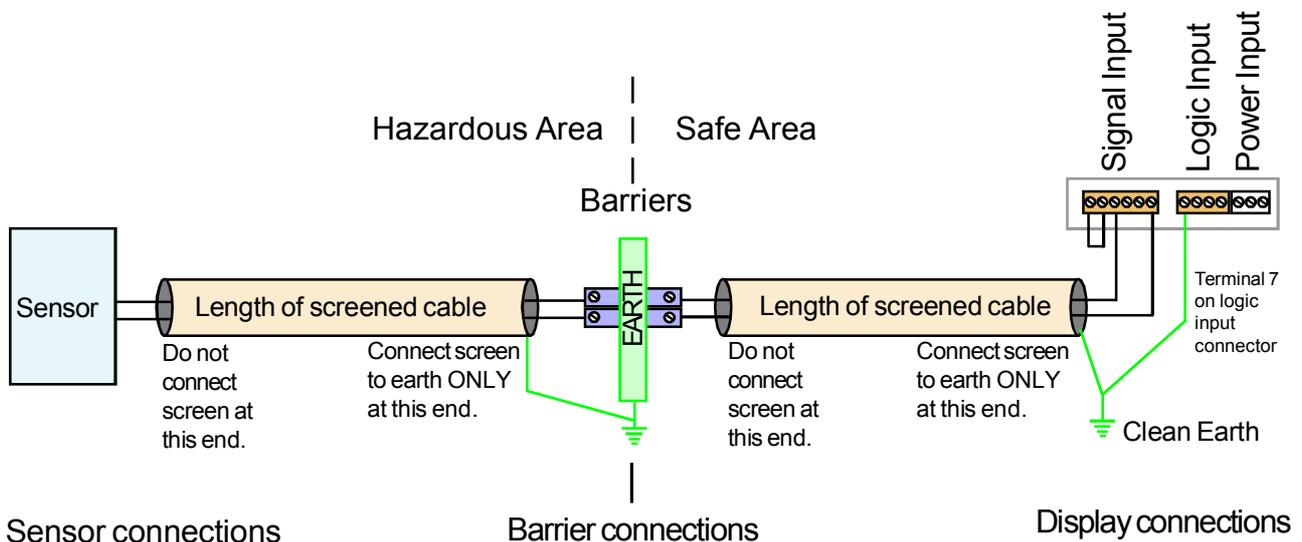
This format is suitable if the two inputs are not electrically isolated from each other and you can not share a common 0V connection in the meter

Installation hints for best performance

This section offers several suggestions which will help you get the best performance from your measurement system.

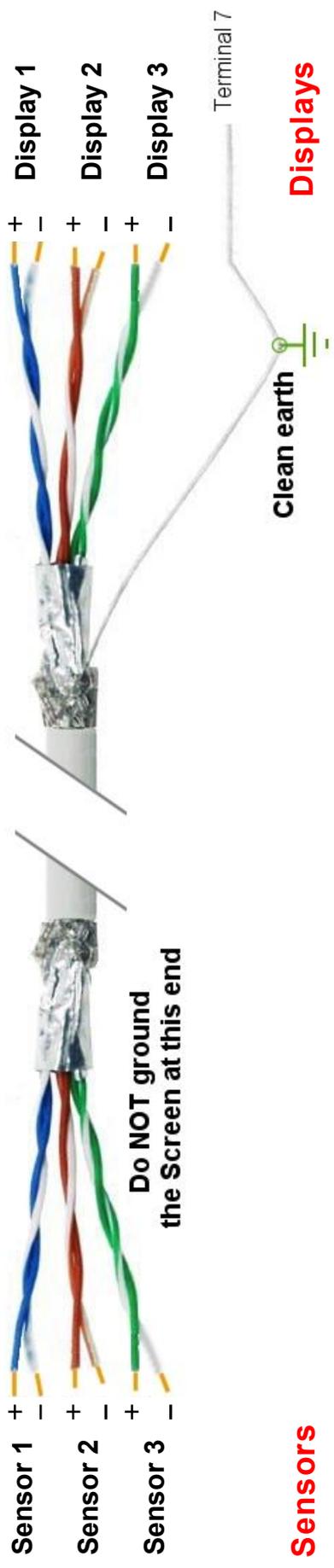
Some sensors generate comparatively small signals which can easily be corrupted by the potentially high level of electrical noise which can be created by electrical machinery such as motors, welding systems, discharge lighting, AC power inverters and solenoids. These steps will ensure you get the best possible performance from your system.

1. Use good quality screened signal cable, with twisted pairs. Belden 8777NH, Belden 9503 and AlphaWire 6010C are good choices, available from many electrical distributors.
2. If you are using multi-pair twisted cable, each pair should be dedicated to a single display as shown opposite, for maximum noise immunity. This will ensure that any electrical noise induced in the cable is properly cancelled. Mixing destinations carelessly amongst the twisted pairs can actually worsen noise performance.
3. The cable should be routed away from noisy wiring and devices such as power feeds from inverters, discharge-lighting cables, welder cabling etc, and should preferably be routed in a dedicated low voltage signalling/instrumentation conduit or cable tray.
4. Screened cable should be earthed at the display end only.
5. All wires and screens coming out of the screened cable should be kept as short as possible to minimise pickup of noise.
6. If you are using barriers, you should earth your screen as shown below, paying particular care that you do not earth both ends of any run of of cable.



When using multi-core screened cable to connect several displays to several sensors, please be sure to use one twisted pair for each display and sensor.

Do NOT use a wire from one pair for signal positive and a wire from another pair for signal negative, as this will prevent the twisted cables from cancelling any induced electrical noise.



Easy or Advanced menu mode

You can choose from two menu modes.

1. Easy Mode - This limits the menu to the most commonly required features, in order to make it less complex and easier to navigate. This is the default level.

2. Advanced Mode - This gives you access to all available menu features.



Each menu feature in this manual has a heading note to tell you whether it is available in Easy or Advanced mode.

How to choose menu mode:-

This feature is available in Easy and Advanced Modes

- Press together briefly

Lockout Switch must be OFF

Circuit board ON
- Press briefly

Press OK a few times, until you see **Adv.** or **EASY**
- Press to toggle

Each press of the DOWN arrow, or UP arrow will alternate between showing **Adv.** or **EASY**
- Press to accept

Press OK to select your choice.

Done!

Language Selection for user interface

You can select English or French menu prompts.

This feature is available in Easy and Advanced Modes

1

Set1 Digit Set2 Max/Min Output Alarms Lockout Switch must be OFF OFF

Press together, briefly

Circuit board ON

2

Set1 Digit Set2 Max/Min Output Alarms OK

Press to toggle

Display shows

UI Eng (Default)
for User Interface English
or
UI Fr-FR
for User Interface French

3

Set1 Digit Set2 Max/Min Output Reset Alarms OK

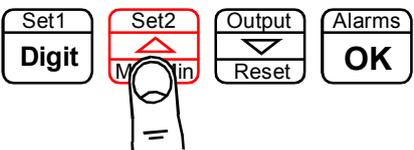
Press to accept

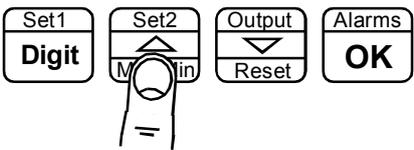
Done!

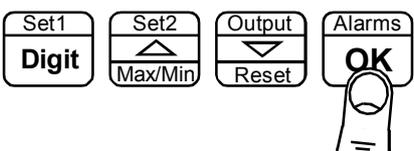
Display Brightness

You can adjust the display brightness at any time, provided the display is locked.

This feature is available in Easy and Advanced Modes

1 —  **Lockout Switch must be ON** 
Press 3 seconds Circuit board ON

2 —  **Display shows *br ight***
Press for 3 seconds Each press of the UP button will select a new brightness level. There are 7 brightness levels to choose from. (Default = Full brightness)

3 —  **Done!**
Press to accept



Did you know, we make this display in two brightness versions? Standard brightness for use inside, and Daylight Viewing for use outside in direct sunlight. The Daylight Viewing version has suffix -DLV in its part number.

Meter Calibration Modes

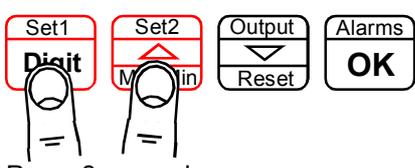
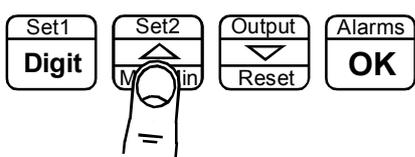
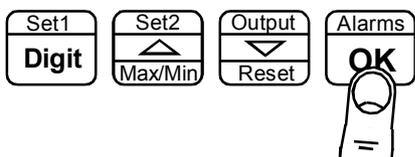
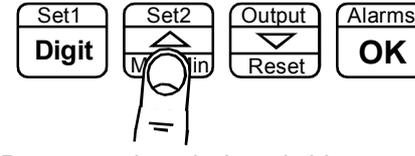
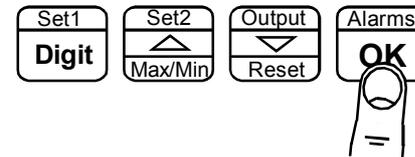
You can choose from two main calibration methods.

1. Direct Calibration - this is when you connect the meter to your system and make the meter read what you want it to, at 2 different points. *This is the preferred calibration method, because it allows you to calibrate the system as a whole.*

2. Theoretical Calibration - this is when you type in the sensor's theoretical signal level at the bottom and top of its range and then type in the value the display should show, for each signal level.

How to choose a calibration method:-

This feature is available in Easy and Advanced Modes

- 1**  **Lockout Switch must be OFF** 
Press 3 seconds Circuit board ON
- 2**  Display shows **CAL Src** then **dirECT** or **thEor** (Default)
- 3**  Press to accept
- 4**  Display shows **inPuT** then **dc A** for current or **dc U** for voltage (Default)
- 5**  Press to accept  **Done!**

If you chose Theoretical, you will now be asked whether your input signal will be DC Current or DC voltage ... the display will show **inPuT** followed by **dc A** or **dc U**

Direct Calibration - Full Scale Setting

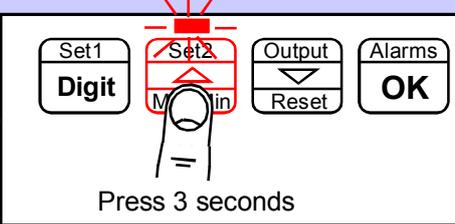
This is when you connect the meter to your system and make the meter read what you want it to, at 2 different points. *This is the preferred calibration method, because it allows you to calibrate the system as a whole.*

How to do direct calibration:-

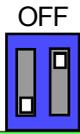
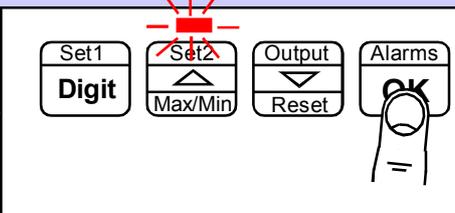
If you have not done so before, please select Direct Calibration mode from the previous page.

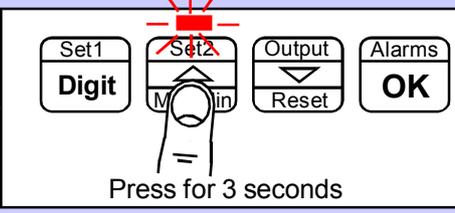
First we recommend you set the **FULL SCALE** calibration ...

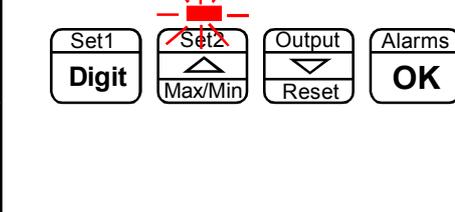
This feature is available in Easy and Advanced Modes

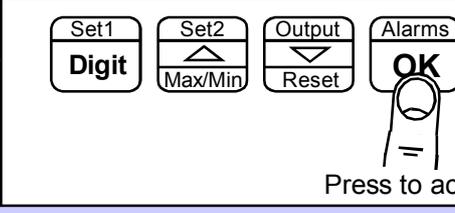
- 

1 — Press 3 seconds

Lockout Switch must be OFF  OFF
Display shows **Direct** followed by **Set H**  Circuit board ON
- 

2 — Press OK. Apply the highest calibration signal you can achieve, ideally 100% of system capacity. You can use less, but you will get better accuracy with higher signals.
- 

3 — Press Set2 for 3 seconds. You can now set your decimal point position using the UP or DOWN buttons. Press OK when done.
- 

4 — You can now set the display value you want to see - use DIGIT to select each digit in turn, and the UP or DOWN arrow to increase or decrease each digit's value, as required.
- 

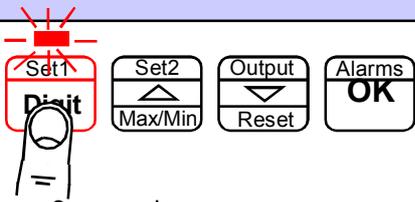
5 — Press to accept  **Done!**

Direct Calibration - Zero Setting

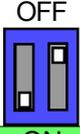
How to calibrate the **ZERO** point.

This feature is available in Easy and Advanced Modes

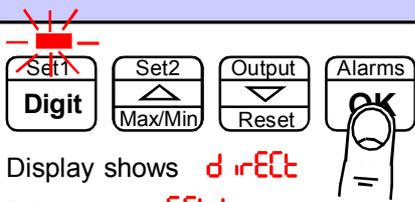
- 1** Press 3 seconds



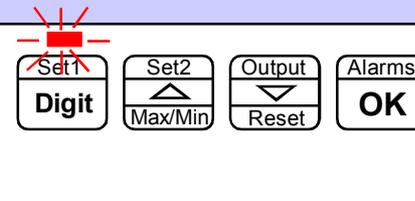
Lockout Switch must be OFF

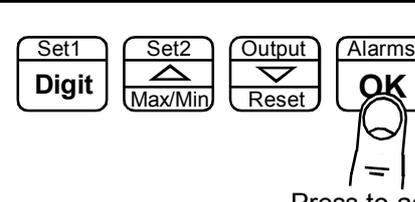


Circuit board ON
- 2** Press OK. Apply the lowest calibration signal you can achieve, ideally 0% of system capacity.



Display shows **d r E C t** followed by **S E t L o**
- 3** You can now set the display value you want to see - use DIGIT to select each digit in turn, and the UP or DOWN arrow to increase or decrease each digit's value, as required.


- 4** Press to accept



Done!



You can set Zero first, if you prefer, but you will not be able to change the decimal point position in the ZERO calibration step.

This will not be an issue if your zero calibration reading is 0, but may become confusing otherwise.

When you have finished your calibration, please remember to put the calibration lockout switch in its ON position, to protect your settings.

Theoretical Cal. - Decimal Point & Full Scale

This is when you type in the sensor's theoretical signal level at the top and bottom of its range and the value to display, for each signal level.



If you have not done so before, please select Theoretical Calibration mode from the **Meter Calibration** page AND choose whether your input is current or voltage.

First we recommend you set the **FULL SCALE** calibration ...

This feature is available in Easy and Advanced Modes

- 1

Lockout Switch must be OFF

Press 3 seconds

Circuit board ON
- 2

Display shows ~~thEor~~ followed by **dC R** or **dC U**, depending on whether you have chosen current or voltage input, then **InH**.
- 3

You can now specify the maximum input signal. Use DIGIT to select each digit in turn, and the UP or DOWN arrow to increase or decrease each digit's value, as required. eg set **20.0000** if your input is 4-20mA

Press to accept
- 4

Display now shows **dH**, briefly. You can now specify the maximum reading and decimal point position. Press Set2 button for 3 seconds to set decimal point position. Use up and down arrows to move the decimal point and press OK when done. Then, use DIGIT to select each digit in turn, and the UP or DOWN arrow to increase or decrease each digit's value, as required. eg set 100.000 if your display range is 0 to 100.000

Defaults are
4-20mA = 0-100.00 for dCA
and
0-10V = 0-100.00 for dC V
- 5

Done!

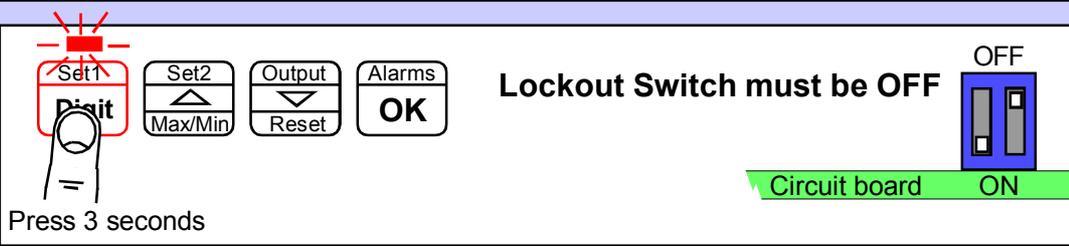
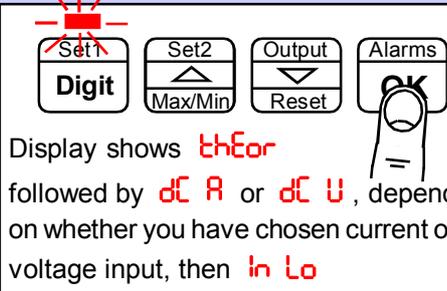
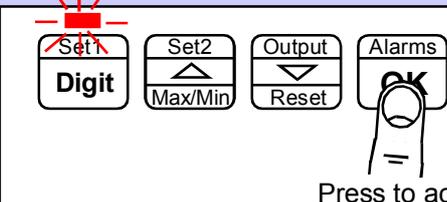
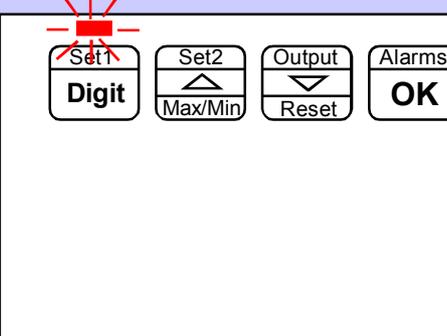
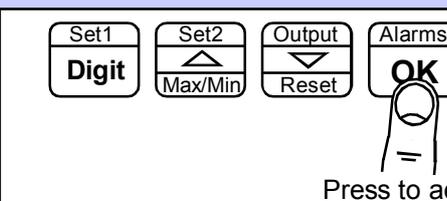
Press to accept

Theoretical Calibration - Low end calibration

This is when you type in the sensor's theoretical signal level at the top and bottom of its range and the value to display, for each signal level.

If you have not done so before, please select Theoretical Calibration mode from the **Meter Calibration** page.

This feature is available in Easy and Advanced Modes

- 1**  **Lockout Switch must be OFF** 
Press 3 seconds
- 2**  Press OK. You can now specify the lowest input signal. Use DIGIT to select each digit in turn, and the UP or DOWN arrow to increase or decrease each digit's value, as required. eg set **04.0000** if your input is 4-20mA
- 3**  Press to accept
- 4**  Display now shows **rd Lo** briefly. You can now specify the low reading.
Use DIGIT to select each digit in turn, and the UP or DOWN arrow to increase or decrease each digit's value, as required. eg set **000.000** if your display range is 0 to 100.000
- 5**  Press to accept  **Done!**

You can set Zero first, if you prefer, but you will not be able to change the decimal point position in the ZERO calibration step. This will not be an issue if your zero calibration reading is 0, but may become confusing otherwise.

Sensor Drift correction

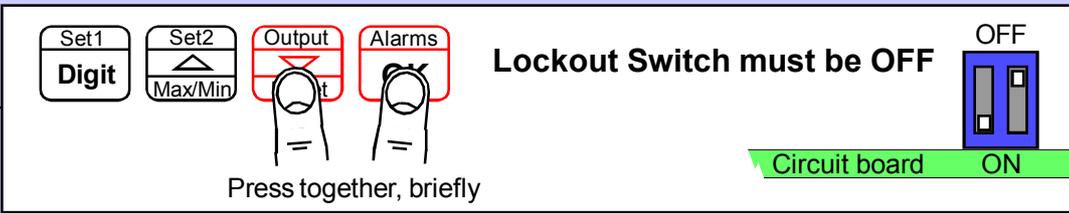
If your system is normally reading 0, for example as is typical with platform scales or a torque meter, you may find a small amount of sensor drift caused by changes in temperature, ageing etc.

We can automatically correct for slow, long term drift, by comparing your signal to 0 every 30 seconds, and re-calibrating to remove any detected movement.

This does not affect the sensitivity of your system, and is only applied for readings less than 8 least-significant counts.

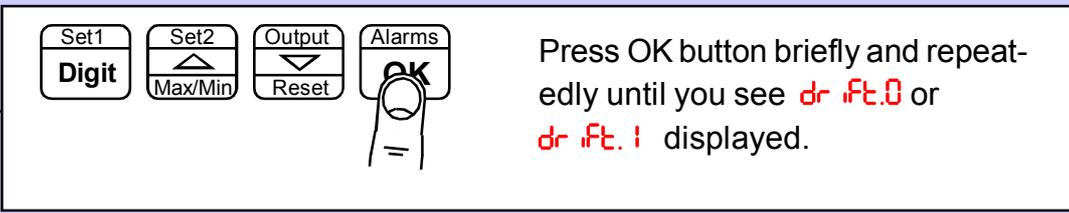
The corrected value is stored in non-volatile memory, so that any drift trend will be re-applied after you have switched off the meter.

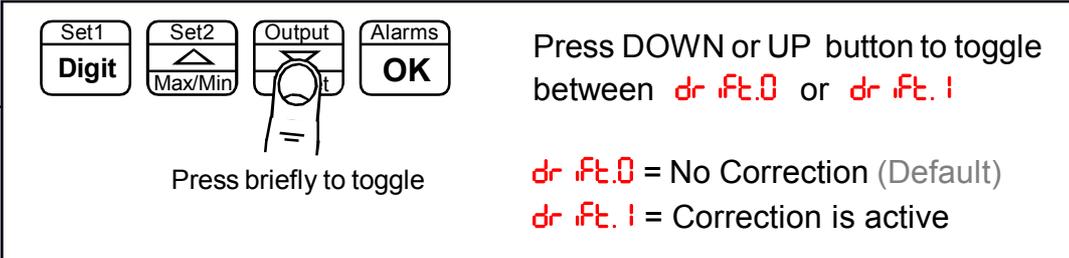
This feature is available in Easy and Advanced Modes

- 

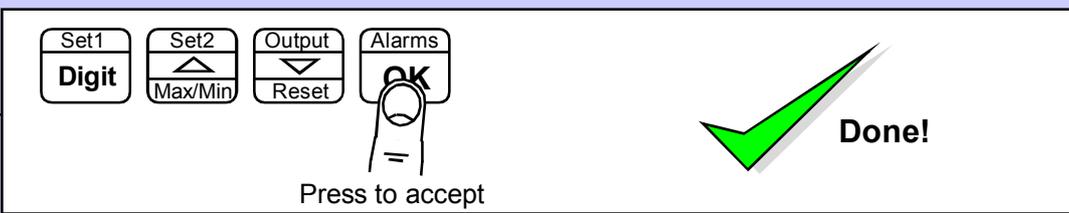
Lockout Switch must be OFF

Press together, briefly

Circuit board ON
- 

Press OK button briefly and repeatedly until you see **drift.0** or **drift.1** displayed.
- 

Press DOWN or UP button to toggle between **drift.0** or **drift.1**

drift.0 = No Correction (Default)
drift.1 = Correction is active
- 

Press to accept

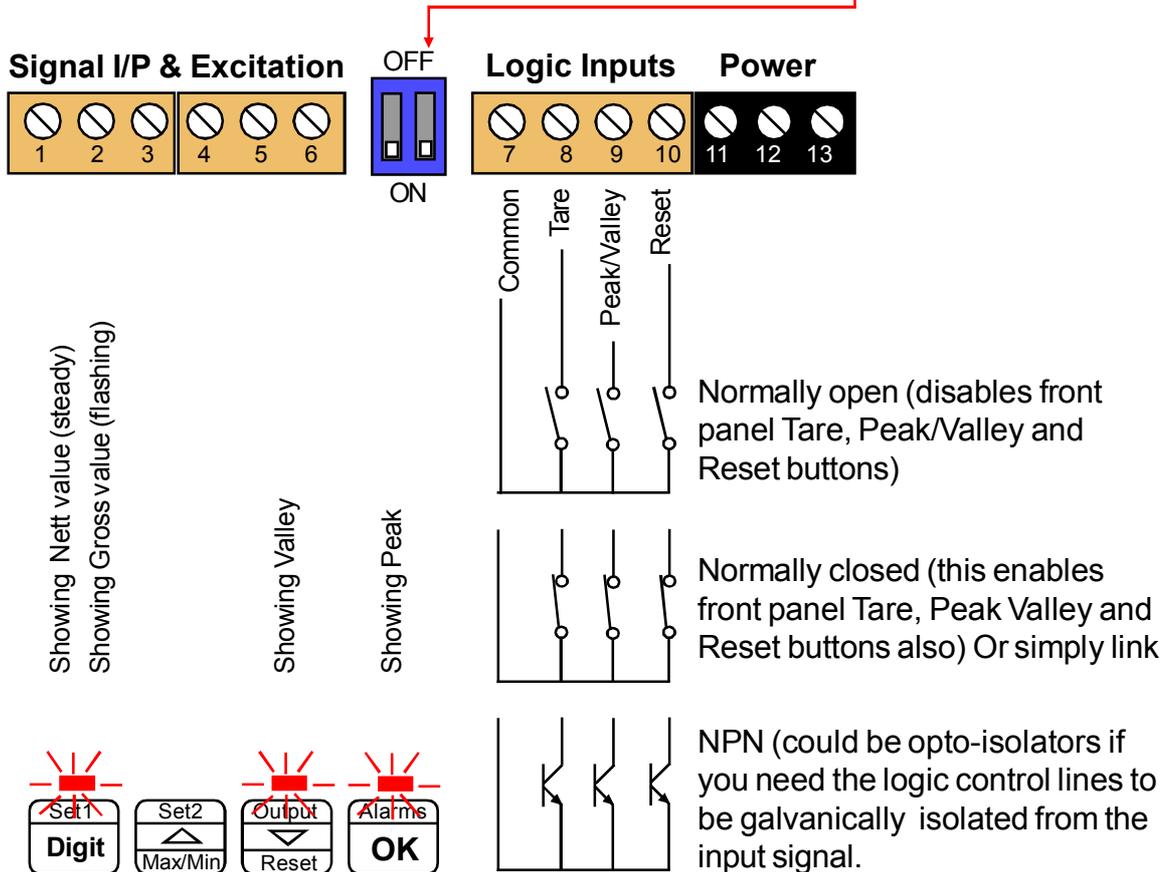
Done!

Logic input connections and front buttons

The logic input provides a 5V DC signal. When you connect this to common, a current of 1mA will flow. Because this is a small signal, we recommend you use switches with gold plated contacts, or self cleaning contacts, for best long term reliability.

The logic inputs are not galvanically isolated from the input signal.

The logic inputs are only activated when the lockout switch is ON



To enable the front panel buttons, you must connect the logic input for that function to common. If you want to have both front panel and remote tare, reset and peak/valley functions, you can use normally closed pushbuttons for the remote switches.

Tare = Tares display to 0. Often used in weighing systems to zero a display prior to making a measurement. Net weight is shown once tared. When a display has been tared the small LED above the Set1 button will be illuminated.

Peak/Valley = Allows you to view the maximum and minimum values which have been displayed since last reset. 0% LED illuminates when showing valley, 100% LED illuminates when showing peak.

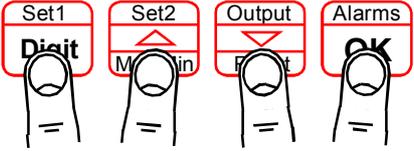
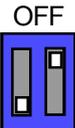
Reset. = This clears any tare, peak, valley, alarm latch

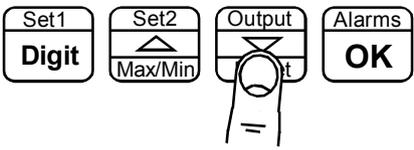
Factory Defaults

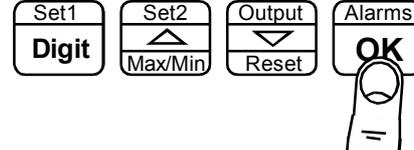
You can return the display to its factory default conditions whenever you wish. If you do so, you will permanently lose all your settings and will need to start from the beginning again.

The calibration Audit Counter will NOT be reset, there is no way provided to reset this value, as it is intended as a secure record to indicate whether changes have been made to the display since it was last calibrated..

This feature is available in Easy and Advanced Modes

1 —  **Lockout Switch must be OFF**  OFF
Circuit board ON
Press together for 3 seconds

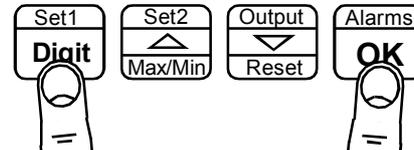
2 —  Display shows :-
dEFS n (Defaults no)
Press the DOWN button to change the display to **dEFS y** (Defaults Yes) if you want to return to default conditions.

3 —   **Done!**
Press to accept

Calibration audit number

Your display includes a non-resettable counter which increments each time you make a change to the display's calibration. This is useful if you want to check whether a display has been altered since it was last calibrated.

The Calibration audit number starts at **CAL 01** up to **CAL FF** allowing up to 255 alterations to be recorded. Whenever you want to check the calibration audit number, press and hold the 2 outer buttons (Set1 + Alarms) for more than 3 seconds.

1 —   **Done!**
Press together for 3 seconds

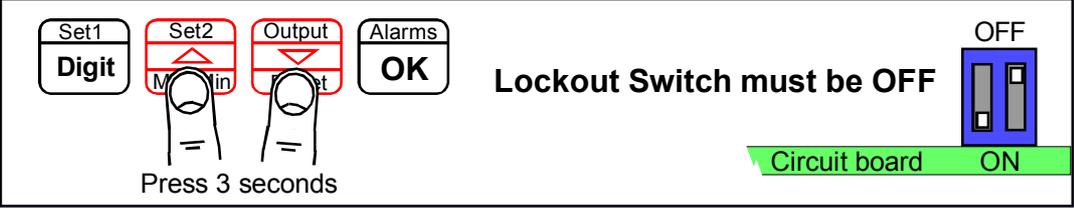
Signal Filtering / Averaging

You can adjust the filtering time constant to reduce the effect of noise or instability on your input signal.

A larger FIL value will give a more stable display, but the response to signal changes will be slower.

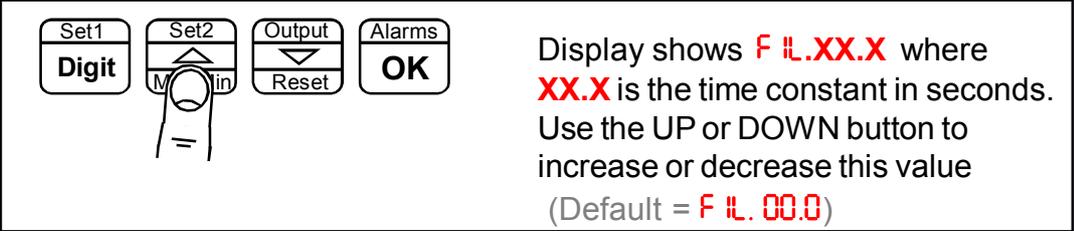
Because your output options, such as analogue output, alarm relays and serial output are all derived from the displayed value, they will respond at the same rate as the filtered display.

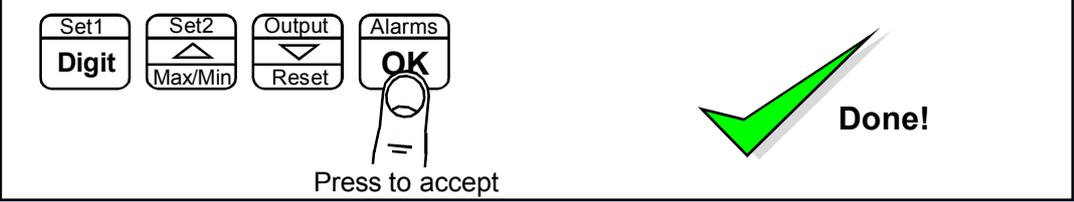
This feature is available in Easy and Advanced Modes

- 

1 — Lockout Switch must be OFF

Press 3 seconds

Circuit board ON
- 

2 — Display shows **F IL.XX.X** where **XX.X** is the time constant in seconds. Use the UP or DOWN button to increase or decrease this value (Default = **F IL.00.0**)
- 

3 — Done!

Press to accept

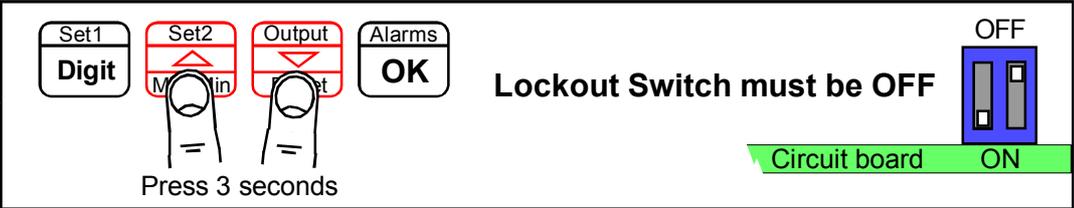
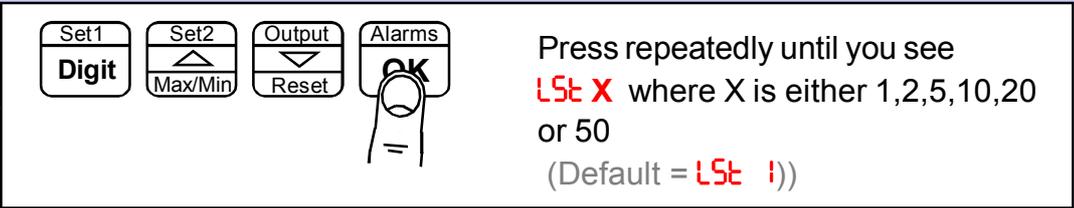
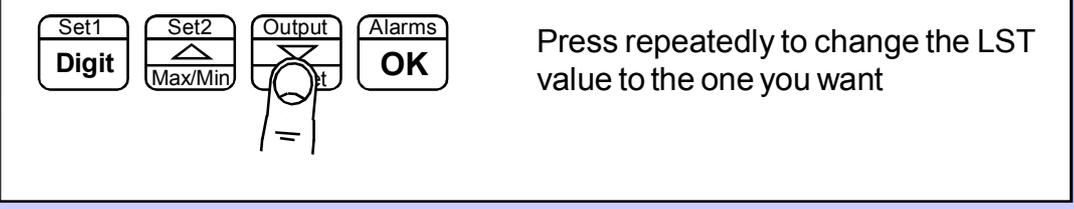
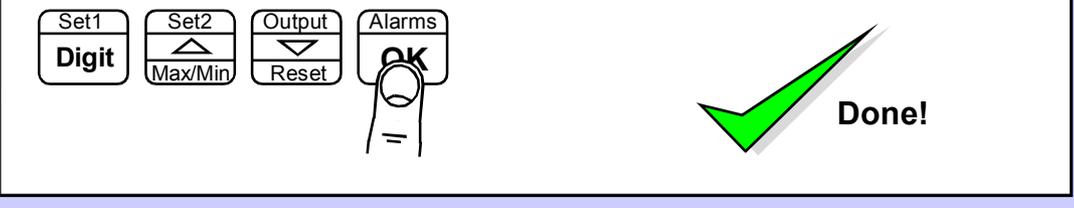
See also Filter Jump setting in the Advanced Menu, if your signal is particularly noisy and you cannot get sufficient smoothing with this filter.

Last Digit rounding up by 1, 2, 5, 10, 20 or 50

You can adjust the way the display rounds up, which is useful if you want to display a very large number, but do not want jitter on the last digit.

The display can be set to round up to the nearest 1 (no rounding) 2, 5, 10, 20 or 50

This feature is available in Easy and Advanced Modes

- 1** — 
- 2** — 
- 3** — 
- 4** — 

Menu timeout adjustment

The display has a default timeout of 60 seconds, to allow you sufficient time to refer to the manual between key operations.

You can make this period shorter, if you wish, once you become more familiar with the setup method.

!! This feature is available in Advanced Mode only !!

1

Set1 Digit Set2 Max/Min Output Alarms

Press together, briefly

Lockout Switch must be OFF

Circuit board ON

2

Set1 Digit Set2 Max/Min Output Reset Alarms OK

Press repeatedly until you see **dLAY. XX** where **XX** is the delay in seconds. Choices are ...

- dLAY. 10
- dLAY. 20
- dLAY. 30
- dLAY. 60 (default)

3

Set1 Digit Set2 Max/Min Output Reset Alarms OK

Press to accept

Done!

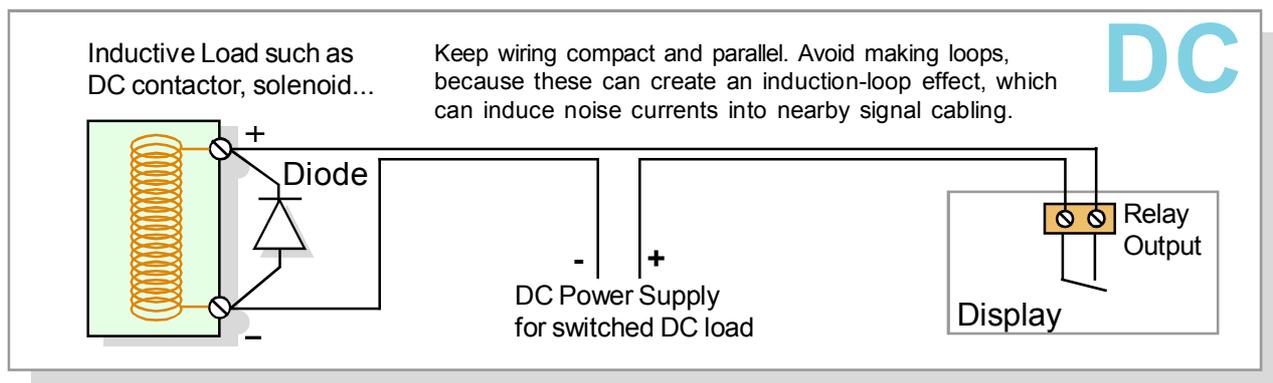
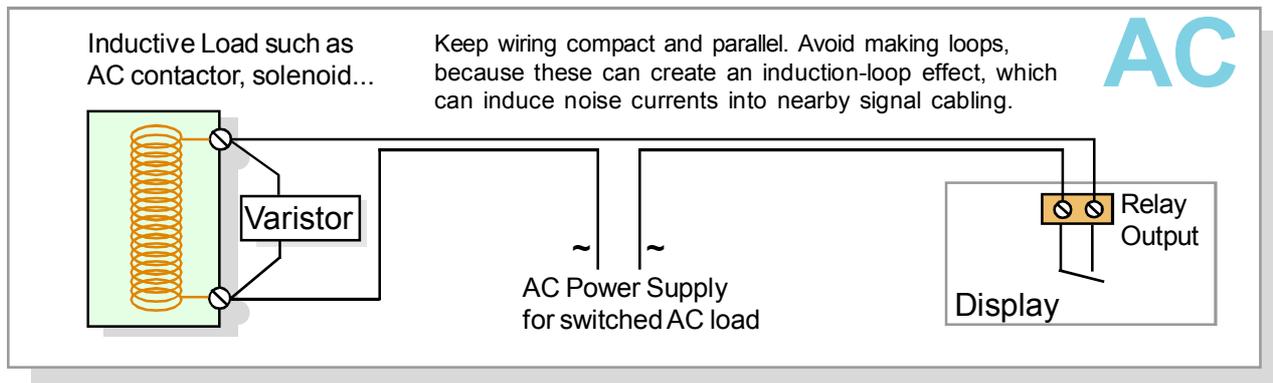
Alarm Installation hints for best performance

This section offers several suggestions which will help you get the best performance from your alarm relay output board.

1. Route your relay cabling away from any signal cabling. This is because when the relay operates and switches your load, large electrical noise spikes can be created, and these can interfere with low-level signals. Ideally the relay cabling will be in a separate cable tray or conduit, along with other power cabling.
2. You can leave the alarm section of the display unlocked, but lock the main setup system of the display, if you wish. Or you can lock everything out, to prevent any adjustments. Simply switch the Alarm lockout switch on or off, and the Calibration lockout switch on or off, in a combination which best suits your requirements.
3. If you are switching an inductive load, such as a contactor or solenoid, you should use a varistor or flywheel diode to limit the electrical noise spike which will occur when your relay contacts open. This noise spike is caused by the rapidly collapsing magnetic field in the contactor or solenoid, and can create thousands of volts of noise.

Contact the manufacturer of the inductive load, who should be able to guide you regarding suitable varistor or flywheel diode. Most contactor manufacturers have standard varistor and diode accessories.

The varistor or flywheel diode should be mounted at the inductive-load end of the cable, not at the display end. See below for guidance.

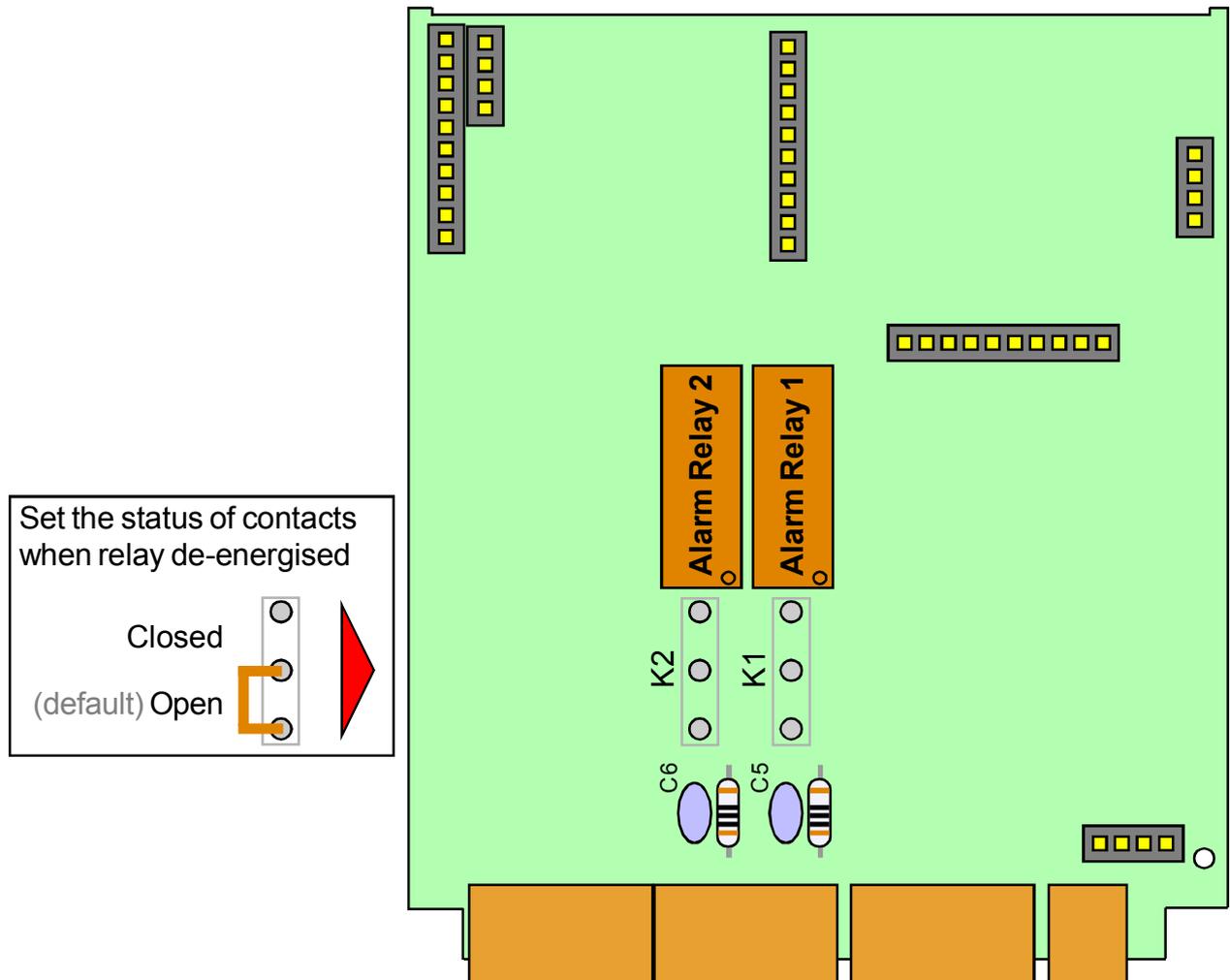


Alarm output board configuring

Your alarm board has 2 mechanical alarm relays.

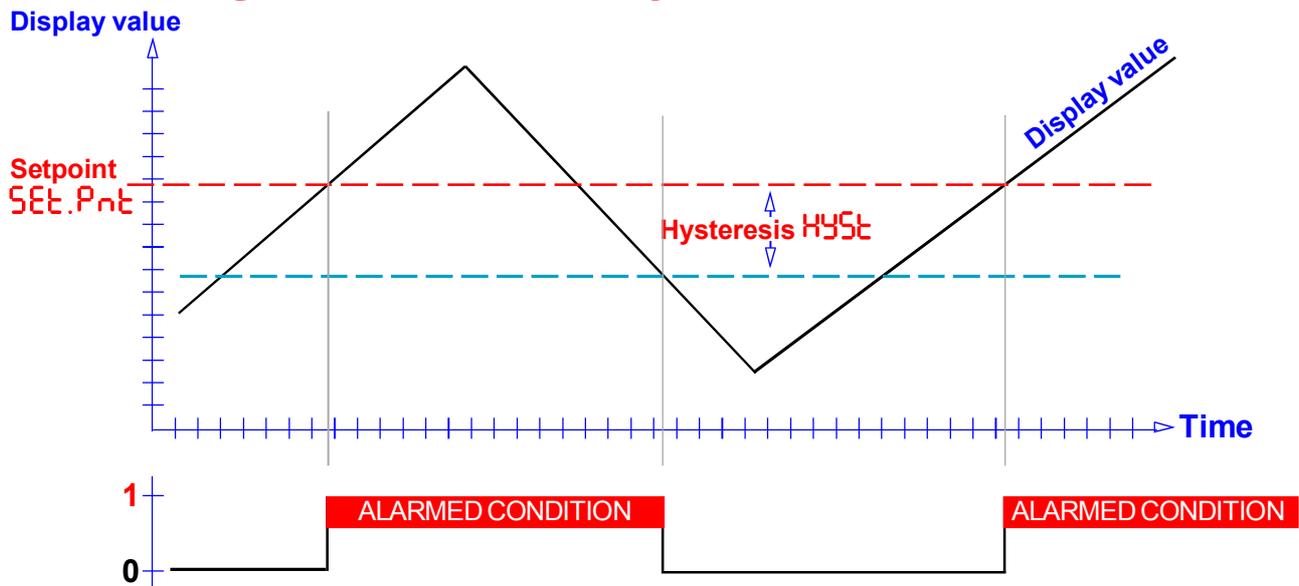
The only function you may need to physically set on this board is the relay contact status. Each relay can be set to provide closed or open contacts when it is de-energised.

Our default is to provide contacts which open when the relay de-energises - this is the failsafe mode.



- OFF** = No alarm mode has yet been set, so this alarm relay will be inactive.
- AL CF9** = Alarm Configuration. Confirms that you can configure the alarms.
- SEt.Pnt** = Setpoint. The main alarm comparison point.
- HYSt** = Hysteresis. In simple HI or LO alarm mode, the difference between alarm trip and reset values.
- rLY dE** = Relay will De-Energise on alarm. (Failsafe)
- rLY En** = Relay will Energise on alarm.
- GrOSS** = Setpoint will be compared to Gross value.
- NEt** = Setpoint will be compared to Net value.
- Lo** = Low Alarm. Relay will trip if display value below setpoint.
- Hi** = High Alarm. Relay will trip if display value above setpoint.

Basic High Alarm with hysteresis

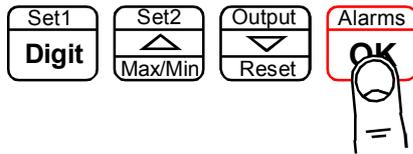


The Setpoint can be placed anywhere you like, in the range **-999999** to **+999999** and will include a decimal point in the appropriate position if you have set your display range to have a decimal point.

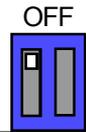
- Setpoint **SEt.Pnt** = The point at which you want the alarm to occur
- Alarm configuration **AL CF9** , then use the UP button to choose **H** = High Alarm mode then press OK to accept
- Net or Gross **NET** = alarm compared to nett value, or **Gross** = alarm compared to gross value. Use UP button to toggle between these options and press OK to accept.
- Hysteresis **HYSL** = the amount by which the reading must drop below the alarm point before the relay will reset. Can be set to 999999 if you want the alarm to latch.
- Relay state **RLY dE** = Relay de-energises on trip (failsafe)
 RLY eN = Relay energises on trip

How to set a basic High Alarm with hysteresis

1



Lockout Switch must be OFF



Circuit board ON

Press briefly to view each existing setpoint, if one has already been set. The LEDs to the right of the display will illuminate to show you which alarm channel you are viewing.



The display will show (in dim numerals) the existing setpoint level for that alarm, or it will show **OFF** if that alarm has not yet been given a mode.

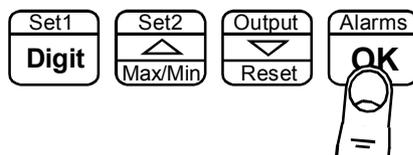
If the setpoint was displayed, and you want to change it, press the Alarm button for a further 3 seconds, and you will see the prompt **SEtPt**. You can now change the setpoint value. Use the DIGIT button to select each digit in turn, and the UP or DOWN button to change the value of each digit. When you have edited the setpoint and want to save it, press OK.

If you want to change the Alarm Configuration, press the Alarm button and wait until the display shows **AL CF9**. Other prompts such as **SEtPt** may appear first, but do not release the alarm button until you see **AL CF9**. This will take between 3 and 6 seconds to appear.

You will see the existing mode, which may say **OFF**, **Lo**, or **H**.

Use the UP or Down Buttons to scroll through the available choices and press OK when you see **H**.

2

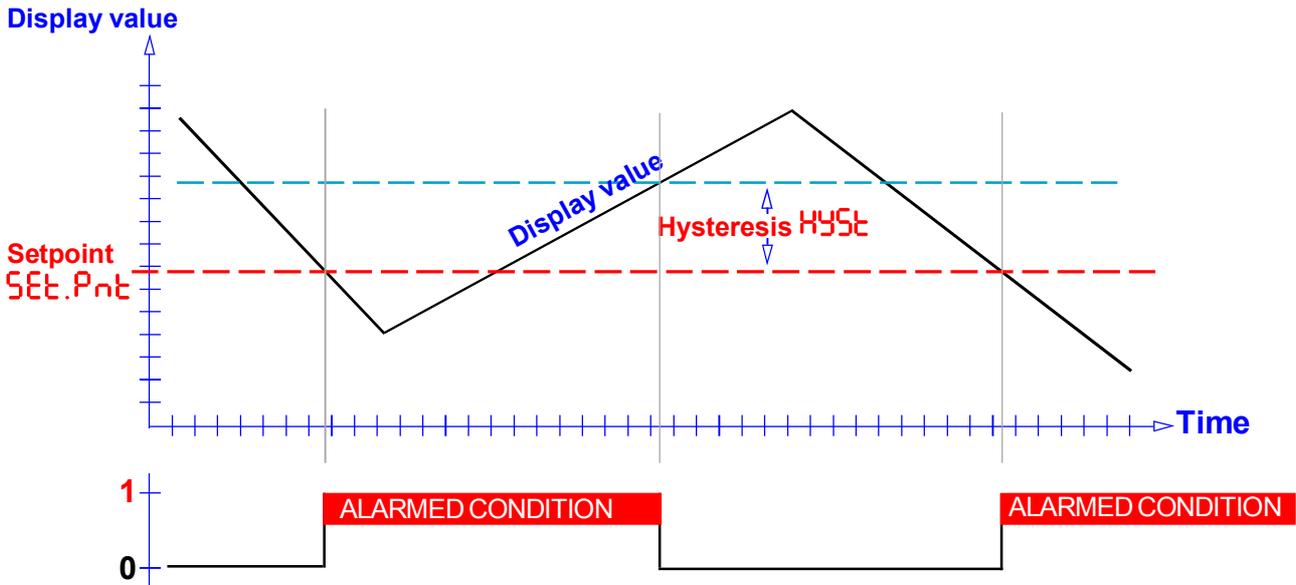


Press to accept



Now simply follow the prompts you will see, according to the list opposite, make your choices and accept with the OK button.

Basic Low Alarm with hysteresis

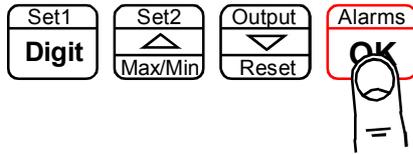


The Setpoint can be placed anywhere you like, in the range **-999999** to **+999999** and will include a decimal point in the appropriate position if you have set your display range to have a decimal point.

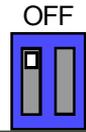
- Setpoint **SEt.Pnt** = The point at which you want the alarm to occur
- Alarm configuration **AL Cfg** , then use the UP button to choose **Lo** = Low Alarm mode then press OK to accept
- Net or Gross **Net** = alarm compared to nett value, or **Gross** = alarm compared to gross value. Use UP button to toggle between these options and press OK to accept.
- Hysteresis **HYSL** = the amount by which the reading must rise above the alarm point before the relay will reset. Can be set to 999999 if you want the alarm to latch.
- Relay state **RLY dE** = Relay de-energises on trip (failsafe)
RLY En = Relay energises on trip

How to set a basic Low Alarm with hysteresis

1



Lockout Switch must be OFF



Circuit board ON

Press briefly to view each existing setpoint, if one has already been set. The LEDs to the right of the display will illuminate to show you which alarm channel you are viewing.



The display will show (in dim numerals) the existing setpoint level for that alarm, or it will show **OFF** if that alarm has not yet been given a mode.

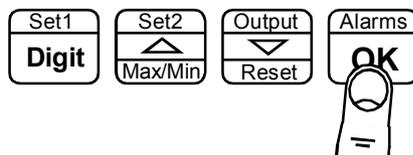
If the setpoint was displayed, and you want to change it, press the Alarm button for a further 3 seconds, and you will see the prompt **SEtPt**. You can now change the setpoint value. Use the DIGIT button to select each digit in turn, and the UP or DOWN button to change the value of each digit. When you have edited the setpoint and want to save it, press OK.

If you want to change the Alarm Configuration, press the Alarm button and wait until the display shows **AL CF9**. Other prompts such as **SEtPt** may appear first, but do not release the alarm button until you see **AL CF9**. This will take between 3 and 6 seconds to appear.

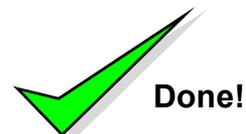
You will see the existing mode, which may say **OFF**, **Lo**, or **Hi**.

Use the UP or Down Buttons to scroll through the available choices and press OK when you see **Lo**.

2



Press to accept

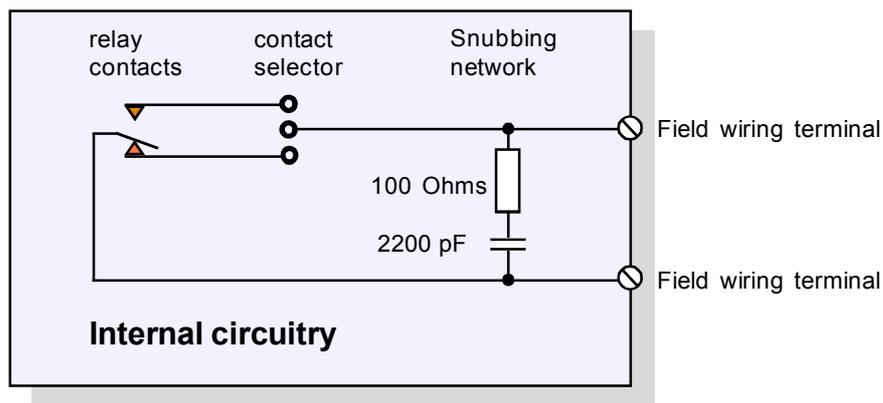


Now simply follow the prompts you will see, according to the list opposite, make your choices and accept with the OK button.

Alarm Troubleshooting and faultfinding

Q. I am switching AC power voltage through your relays, but I notice that when the relay contacts should be open, I am still measuring a high AC voltage. What is wrong?

A. This is probably because you are using a high impedance digital voltmeter, so there is no load current being drawn through the relay. Our relays include a small capacitor and resistor across the contacts to reduce contact arcing, the benefit is greatly increased contact life. If you measure the open contact resistance, using a DC resistance meter, you will measure open circuit, or infinity.



But because you are switching an AC signal, the capacitor is acting as a charge coupler, and your voltmeter is detecting the coupled AC voltage. If you were to use a traditional, lower impedance moving pointer meter, such as an AVO, you would probably not see this effect. The impedance of the capacitor is very high, around 1 500 000 Ohms with 50Hz AC or 1 200 000 Ohms with 60Hz AC.

In rare cases, if you want to remove the capacitor because its effect is influencing your system, you can do so. C5 is associated with Alarm 1, C6 with Alarm 2, C7 with Alarm 3 and C8 with Alarm 4. They are located on the printed circuit board immediately in front of the alarm connectors.

Q. I have set my -AL4 relays to energise on trip, but the contacts open when the alarm LED comes on. I expected the contacts to close. Why is this happening?

A. There is a push on contact-selector switch near each relay, which lets you chose the normally open or normally closed contact of the relay. Move this switch and you will get the function you want.

Our default setting is for the contacts to open on alarm, and for the relay to de-energise on alarm, because this gives failsafe operation.

See the page in this manual which describes configuration of the alarm board

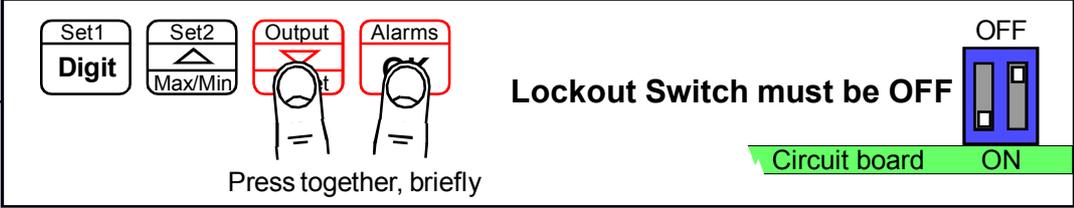
Bootup routine choices

When you switch on your meter, it can be set to power up with 3 possible summary message combinations.

The choices are:-

- boot 0** = Segment test, followed by a full summary of software revision, calibration audit number, model number, installed options.
- boot 1** = Segment test followed by model number (Default)
- boot 2** = No summary, meter displays the measurement value immediately power is applied.

!! This feature is available in Advanced Mode only !!

- 1** 

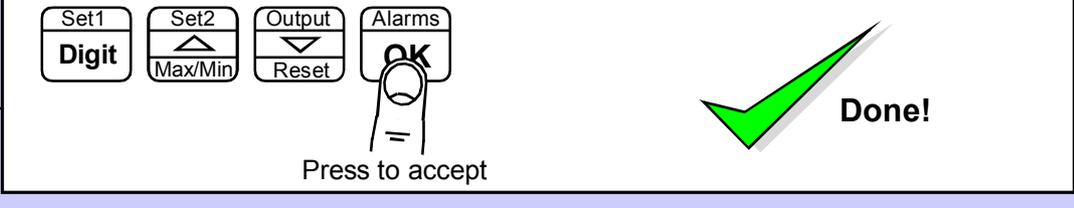
Press together, briefly

Lockout Switch must be OFF

Circuit board ON
- 2** 

Press OK button briefly and repeatedly until you see **boot 0** or **boot 1** or **boot 2** displayed.
- 3** 

Press DOWN or UP button briefly and repeatedly to choose from **boot 0** or , **boot 1** or **boot 2**

Press briefly to toggle
- 4** 

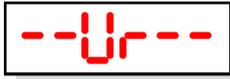
Press to accept

Done!



You can trigger the full summary message whenever you want, without having to power the meter off, by pressing and holding the 2 outer buttons (Set1 + Alarms) for more than 3 seconds.

Display Error codes and fault finding



1. Under Range. The meter is being asked to display a value which is more negative than its limit of -199999



2. Over Range. The meter is being asked to display a value which is higher than its limit of 999999

These fault codes could be displayed because the signal is too negative, too positive, or because there is a wiring error, or because the display's scaling has been adjusted to give excessive sensitivity, or because there is a fault in the display.

a. If you are connecting a 4-20mA signal to the display, please measure the DC millivolt signal between terminals 2(-) and 3(+) Ideally, you will measure 132mV at 4mA and 660mV at 20mA.

If the voltage is much higher, there may be a problem with the 33 Ohm input shunt resistor.

You can verify this as follows...

Remove the input signal and power connectors to the meter, and measure the resistance between terminals 2 and 3. This should be 33 Ohms. If it is more than this, the resistor has probably been overloaded and burned by having a voltage connected across it. Please check your field wiring to ensure that no more than 30mA or 1V can be applied to the current input terminals.

Sometimes excessive current can feed to the current input of the display if your 2 wire 4-20mA transmitter is faulty or is wired incorrectly, because we rely on the transmitter to regulate the loop current between 4 and 20mA. The excitation power supply for the loop may have a much higher capacity than 20mA.

b. If the measurements above were satisfactory, the problem may be caused by the scaling being too sensitive.

If you are happy to do so, it is a simple matter to reset the display's scaling to the factory default conditions. Put the lockout switch off and press all 4 buttons together for around 3 seconds until the display shows "dEFS n". Then press the UP button once so the display shows "dEFS Y". Now press the OK button and the display will be reset to factory defaults.

If still no success, please return the display to us for the attention of our QA Manager, with a report of what you found, for repair.

Waste Electrical Electronic Equipment (WEEE)

In Europe, this equipment must be disposed of in accordance with European Parliamentary Directive 2002/96/EC

This directive encourages recycling and the reduction of waste materials in the environment.

This means it must be sent to an approved recycling plant if you want to dispose of it.

It must not be thrown away with general rubbish.



WEEE Waste Recycling

If you are unable to dispose of this item locally, you may send it to us for recycling.

Conditions:

1. We will only accept items of our manufacture.
2. You must pay for the transport of the goods to us.
3. We will only accept items if they include a signed declaration by an authorised person in your organisation, stating that :-
 - i. The item is safe to handle and has no contaminants which may be harmful to health.
 - ii. You wish us to dispose of or destroy the item(s)

Equipment Specifications

| | |
|--------------------------------|--|
| Bezel size | 48mm high by 96 mm wide (1/8 DIN) |
| Panel Cutout | 45 mm high by 92 mm wide |
| Case Depth | 125 mm including connectors |
| Weight | 300 grammes |
| Case Material | Black polycarbonate |
| Connectors | Detachable Screw Terminal connectors |
| Environmental | Storage Temperature range -20 to +70C, non condensing Operating temperature range 0 to 50C, non condensing Front sealed IP65. Optional cover SPC4 for IP67 |
| Power Burden | 100-240 VAC, 45 to 60Hz or 11-30 VDC optional 10VA maximum |
| Input Signals (bipolar) | 2 x 4-20mA |
| Input Resistance | 16.5 Ohms for current inputs |
| Accuracy | +/-0.05% of range |
| Span tempco | 25 ppm/Degree Celsius |
| Zero Tempco | 30 ppm/Degree Celsius |
| 24V Excitation voltage | 24VDC nominal rated at 60mA |
| 10V Excitation voltage | 10VDC nominal rated at 20mA |
| Filtering / smoothing | Selectable time constants of 0 to 25 seconds. |
| A/D conversion | Sigma-Delta 10 conversions per second, 50/60Hz rejection Resolution 1 in 400 000 max. over full range |
| Display update rate | 10 readings per second. |
| Display Range (max) | -199999 to +199999, depending on available signal level. |
| Mechanical Relays | |
| Formats | 2 alarms SPST |
| Contact Rating | 2 Amperes at 250 VAC, resistive load. All relays must switch power from the same phase. Selectable normally open or normally closed by on-board switches. Selectable energise or de-energise on trip by menu. |
| Annunciation | 2 LEDs to the right of the display. Annunciators are active even if alarm relays have not been installed. LED lights to indicate the relay is in alarm state, while power is available to the display. . LED does not indicate whether the relay is energised or de-energised. |
| Response speed | Relays are compared to displayed value and setpoint. If the display has filtering, the alarm speed will be directly related to display update speed. With no filtering, please allow 105mS for a reponse to input signal change. |
| Security | All settings are stored in non-volatile memory. The Alarm section may be left accessible to operators or may be locked from access. |

Record of Revisions

6 September 2010

Version F0.18 Software released. Manual format revised to improve clarity and segregate easy from advanced menu functions. Optional outputs now described in their own dedicated manuals. DIN Rail mounting option added. Cabling guidance added.

Declaration of CE Conformity

Declaration Reference : INTUITIVE Mk2
Issue Date : 30 April 2007
Products Covered : INTUITIVE Mk2 series
Title : DOC-INTUITIVE2

This is to confirm that the Product covered by this declaration has been designed and manufactured to meet the limits of the following EMC Standard :

EN61326-1:1997

and has been designed to meet the applicable sections of the following safety standards

EN61010-1:2001



Conditions

The meters are permitted a worst case error of 1% of A/D range during electro-magnetic disturbance, and must recover automatically when disturbance ceases without the need for human intervention, such as resetting, power-down etc.

The meters covered by this certificate must be installed in adherence to the following conditions :-

Signal cabling shall be routed separately to power carrying cabling (includes relay output wiring)

All signal cabling shall be screened. The screen shall only be terminated to the power earth terminal at the meter end of the cable.

Declared as true and correct, for and on behalf of London Electronics Ltd.

J.R.Lees Director