INTUITIVE

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

Panel mounting clock / timer

Model INT4-H

Installation & Operating Manual

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 F00-33

Revision:1
Dated: 15 March 2023

Warranty

We warrant this product against defects in materials or workmanship for a period of three (3) years from the date of purchase.

In the event of a defect during the warranty period, the unit should be returned, freight (and all duties and taxes) prepaid by the Buyer to the authorised distributor from where the unit was purchased.

The Distributor, at its option, will repair or replace the defective unit. The unit will be returned to the Buyer with freight charges prepaid by the distributor.

LIMITATION OF WARRANTY
The foregoing warranty shall not apply to defects resulting from:

1. Improper or inadequate maintenance by the buyer.
2. Unauthorised modification or misuse.
3. Operation outside the environmental specification of the product.
4. Mishandling or abuse.

The warranty set forth above is exclusive and no other warranty, whether written or oral is expressed or implied. We specifically disclaim the implied warranties of merchantability and fitness for a particular purpose.

EXCLUSIVE REMEDIES
The remedies provided herein are the buyer's sole and exclusive remedies.

In no event shall we be liable for direct, indirect, incidental or consequential damages (including loss of profits) whether based on contract, tort or any other legal theory.

Contents

Separate manuals for options

* Need a manual urgently?
You can download manuals from our website.

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, c**UL**us 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 First .....Don'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 3 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 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.

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 a 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 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 / NMA4X 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.

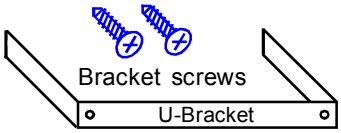
Any moving mechanical device controlled by this equipment must have suitable access guards to prevent injury to personnel if the meter should fail.

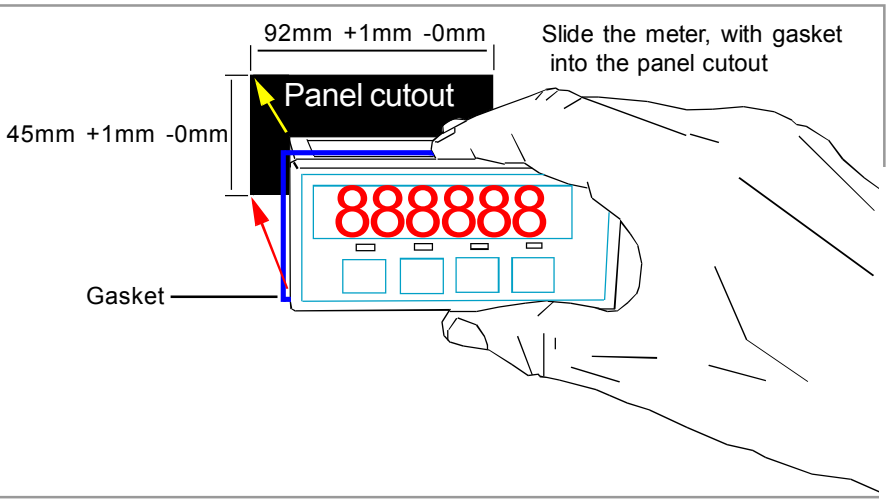
Panel Mounting and Installation - Class II

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.





Securing into the panel

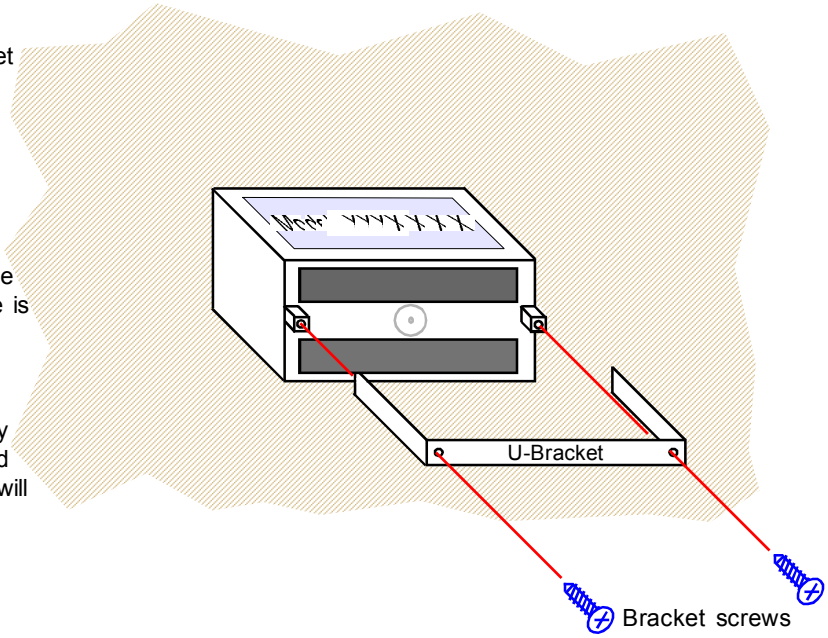
Re-fit the U-Bracket and tighten the bracket screws to firmly clamp the meter in place. Check that the gasket is evenly pinched between the meter's front bezel and the enclosure front

Ventilation

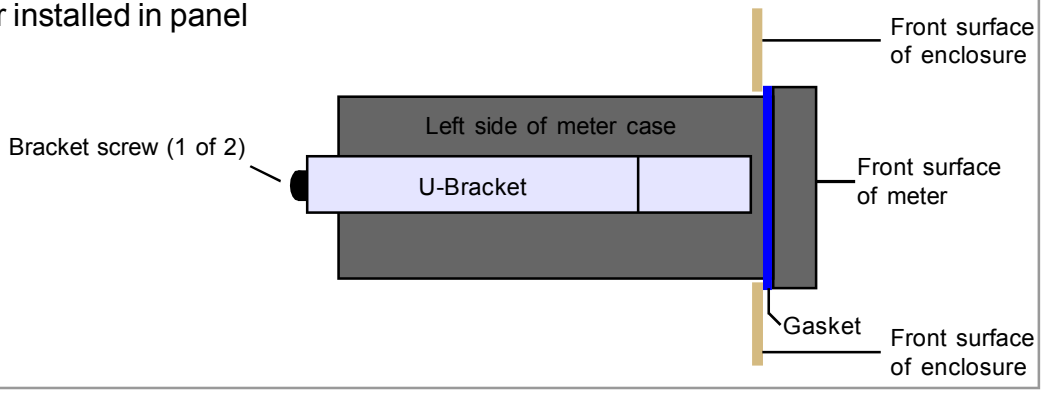
There should be sufficient ventilation in the enclosure to ensure that the meter's case is always kept to less than 60C.

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



Side view of meter installed in panel



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.

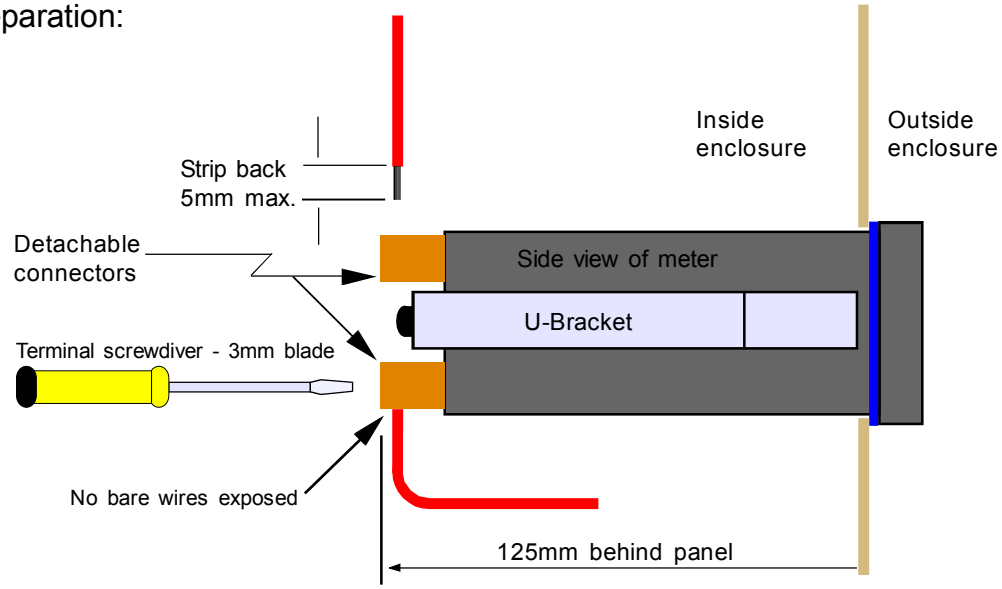
The conductors you use must be suitable for the meter's temperature, current and voltage rating, which is broadly described as follows:-

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 / 1.5mm^2 c.s.a. The minimum cross sectional area shall be 22 gauge AWG / 0.5mm^2. 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.

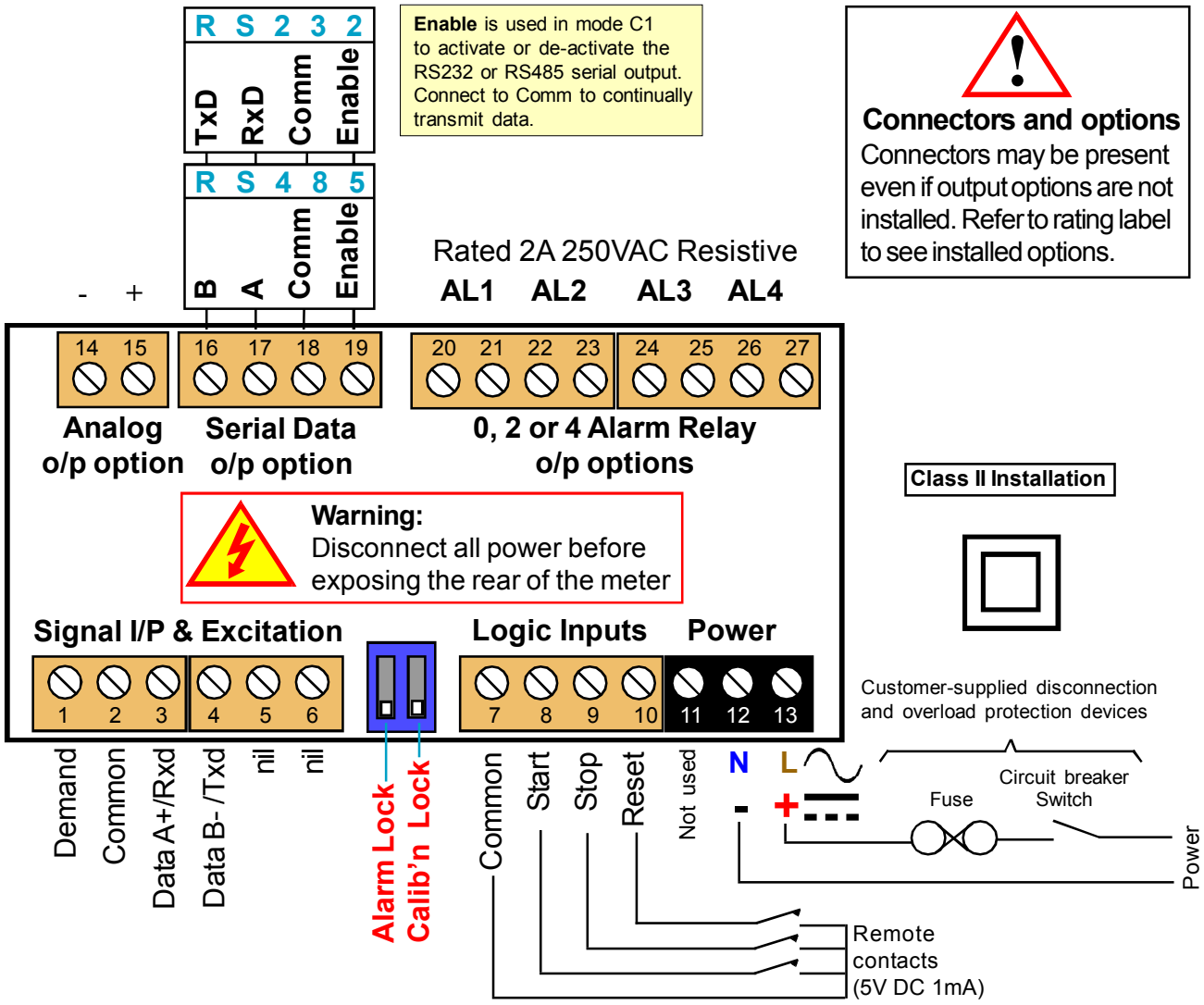
Wire preparation:



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



Enable is used in mode C1 to activate or de-activate the RS232 or RS485 serial output. Connect to Comm to continually transmit data.

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

Class II Installation

Customer-supplied disconnection and overload protection devices

Installation hints for best performance

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

The logic input signals are comparitively small and can easily be corrupted by the comparatively 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.

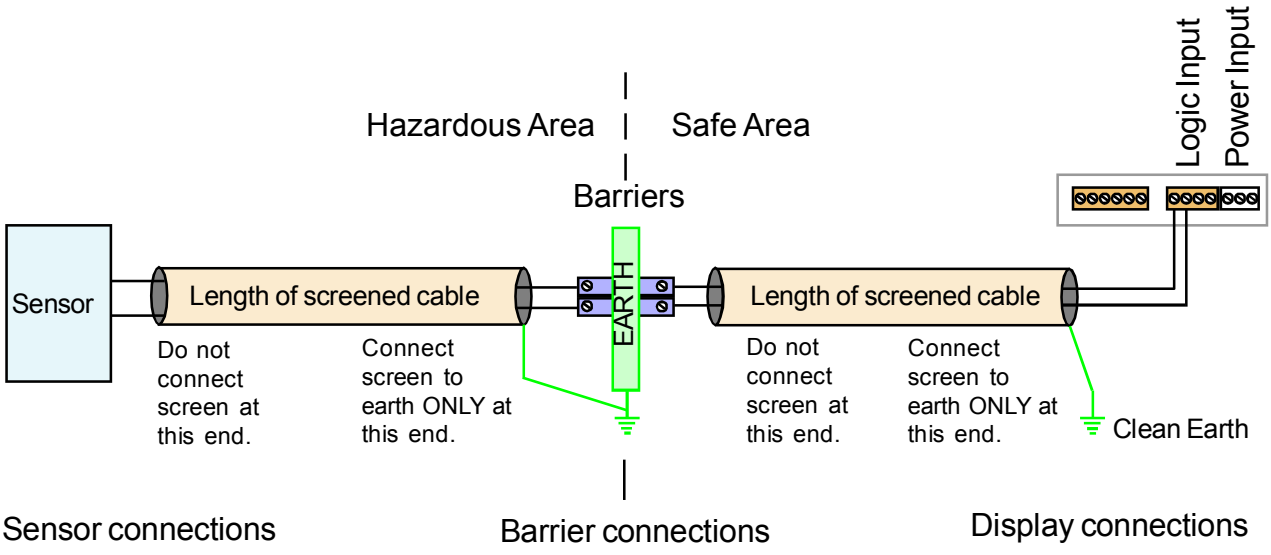
2. If you are using multi-pair twisted cable, each pair should be dedicated to a single display as shown opposite, for maximum noise immunity.This will ensure that any electrical noise induced in the cable is properly cancelled. Mixing destinations carelessly amongst the twisted pairs can actually worsen 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 preferrably 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 <u>do not earth both ends</u> 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 form cancelling any induced electrical noise, and can couple noise from one channel to another.

Easy or Advanced menu mode

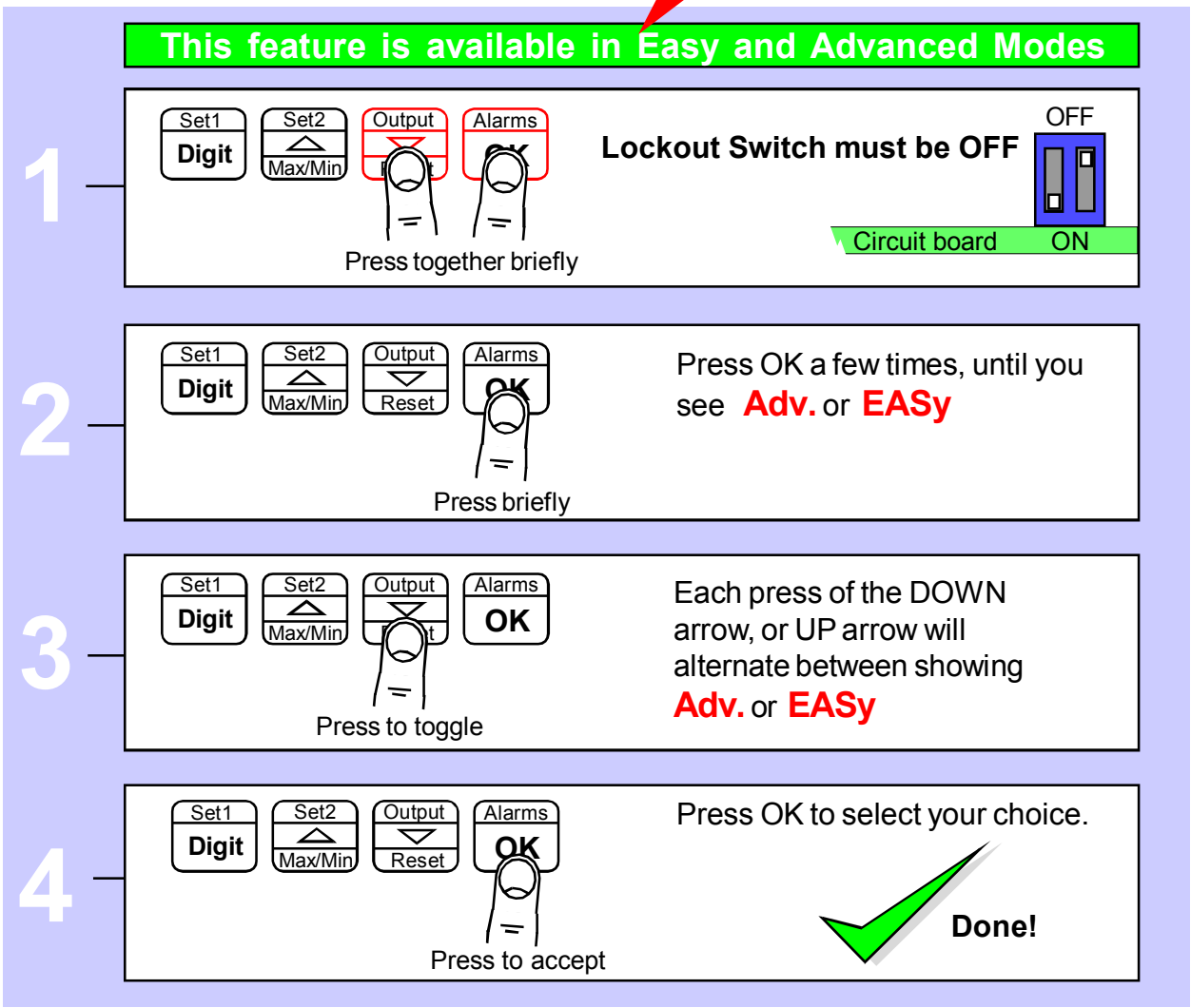
You can choose from two menu modes.

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:-

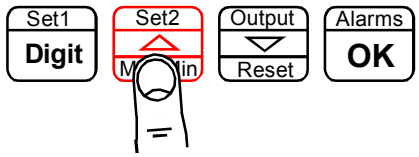


Display Brightness

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

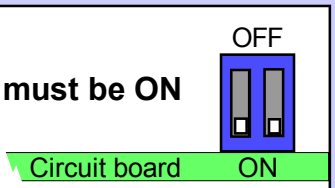
This feature is available in Easy and Advanced Modes

1

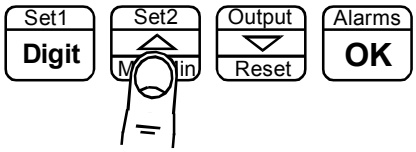


Press 3 seconds

Lockout Switch must be ON



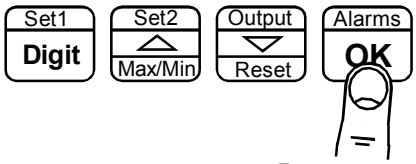
2



Press for 3 seconds

Display shows **briL**
Each press of the UP button will select a new brightness level.There are 7 brightness levels to choose from.
(Default = Full brightness)

3



Press to accept

Done!

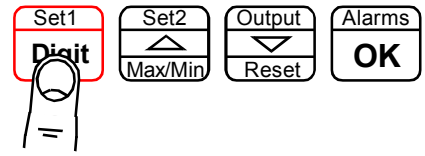
Did you know, we make this display in two brightness versions? Standard brightness for use inside, and Daylight Viewing for use outside in direct sunlight. The Daylight Viewing version has suffix -DLV in its part number.

Mode Setting

The display's calendar and internal clock will need to be set whenever the battery is renewed, and the clock may need to be set from time to time, if it is not synchronised to a master timesource, such as our ASR-GPS

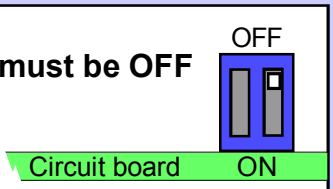
This feature is available in Easy and Advanced Modes

1

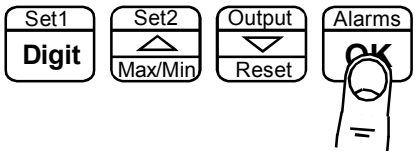


Press together for 3 seconds

Lockout Switch must be OFF



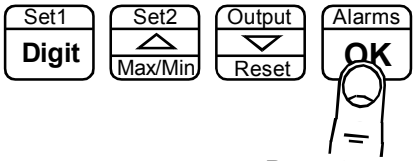
2



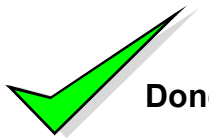
Display shows the available modes

CL.	Clock Mode
dd.MM.YY	Calendar Mode - dd:MM:yy
MM.dd.YY	Calendar Mode - MM:dd:yy
dAy.Cnt	Timer Mode - Days (eg days since last accident)
HH.MM	Timer Mode - HH:MM
MM.SS	Timer Mode - MM:SS
SSSS	Timer Mode - SSSS
SSSSS.t	Timer Mode - SSSSS.t
MMMM	Timer Mode - MMMM
HH.MM.SS	Timer Mode - HH:MM:SS

3



Press to accept



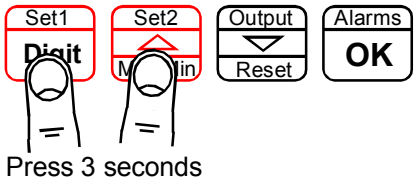
Done!

Basic clock configuration

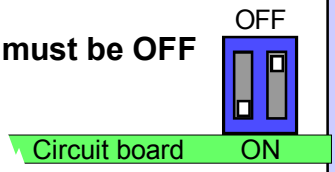
If the display is being used in **Clock Mode**, the following basic configurations will be available ....

This feature is available in Easy and Advanced Modes

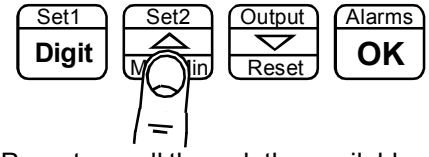
1



Lockout Switch must be OFF



2



Press to scroll through the available mode choices and press OK to select.

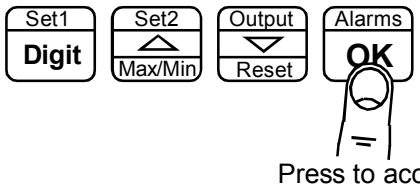
Display shows input channel choices...

Display format...
24Hr(leading zeros 9am shows 09:00)
12Hr(no leading zeros 9am shows 9:00)

Daylight saving time modes...
dst OFF US EU
None USA Europe

Display sequencing dwell times...
C 00.0 Clock visibility time (seconds)
t 00.0 Temperature visibility time (seconds)
H 00.0 Humidity visibility time (seconds)
NB. All three are normally set to 0.00 and are only altered if you connect a remote ASR-GPS master clock to the display, with Temperature and Humidity sensors installed.

3



Done!

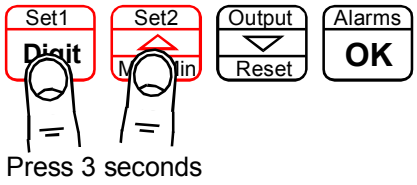
See the following page if you chose Day Counter or Elapsed timer modes...

Timer Mode settings

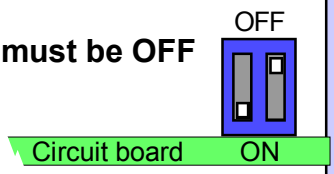
If the display is being used in Timer Mode, the following basic configurations will be available ....

This feature is available in Easy and Advanced Modes

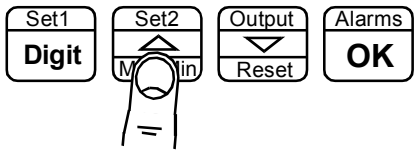
1



Lockout Switch must be OFF



2



Press to scroll through the available mode choices and press OK to select.

Display shows input channel choices...

Counting direction...

UP Up counting, normally from zero

dn Down counting, normally from preset

Down Count, action on reaching 0

Neg.Y Display will go below 0 on down count

neg.n Display will stop at 0 on down count

The display will flash if negative

Offset adjustments

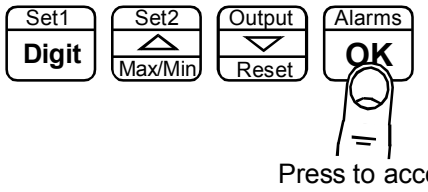
Preset

Display goes to this value whenever it is reset, and the display will normally count down from this value to 0

pr.Load

If a period has already elapsed, when the display is installed (For example you are installing the display to show Days since last Accident and so far there have been 349 days without accident, you would set Pr.Load to 349) you can enter this value here. When the display is reset, the display will go to 0

3



Done!

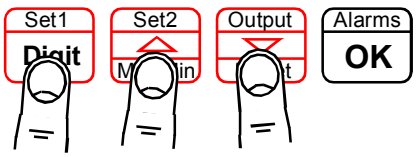
See the previous page if you chose Clock mode...

RTC setup method

The display's calendar and internal clock will need to be set whenever the battery is renewed, and the clock may need to be set from time to time, if it is not synchronised to a master timesource, such as our ASR-GPS

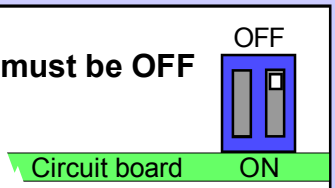
This feature is available in Easy and Advanced Modes

1

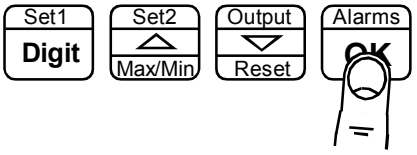


Press together for 3 seconds

Lockout Switch must be OFF



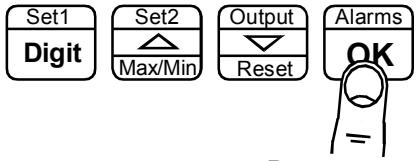
2



Display shows each of the parameters and you can move on to the next one with the OK button.
Edit settings with the DIGIT, UP and DOWN buttons, OK to accept. Let us assume it is March 24, 2011. If the time will soon be 14:59 you will set ...

yr. 11	Set the last 2 digits of the year
n ~03	Set the month. 1=Jan, 12 = Dec
dt.24	Set the date 1=1st , 31=31st
14:59	Set the hour (**must be GMT or UTC**)*
14:59	Set the minutes
14:59	The time will brighten and the 4 leds to the right of the display will flash. At exactly 14:59, press the OK button. No menu timeout.

3



Press to accept

Done!

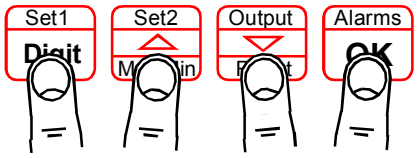
Factory Defaults

You can return the display to its factory default conditions whenever you wish. If you do so, you will permanently loose 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..

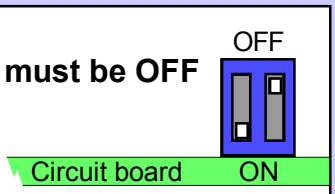
This feature is available in Easy and Advanced Modes

1

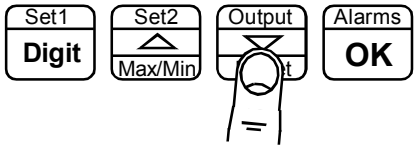


Press together for 3 seconds (1, 2,3 then 4 buttons)

Lockout Switch must be OFF



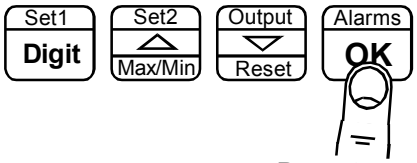
2



Display shows :-
defn (Defaults no)

Press the DOWN button to change the display to **defy** (Defaults Yes) if you want to return to default conditions.

3



Press to accept

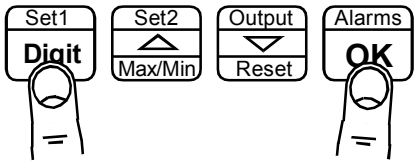
Done!

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 **CL 01** up to **CL 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



Press together for 3 seconds

Done!

Logic input functions

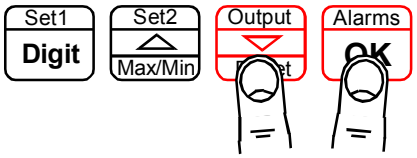
The three contact closure inputs on the rear of the meter have default functions which are:-

Contact closure 1 = Start (starts timing period, clears display to 0 or preset)
Contact closure 2 = Stop
Contact closure 3 = Reset

Note:
You cannot reset or restart the timer if it has not been stopped.
You can tie reset to start to simultaneously reset and start.
You can tie reset to stop to simultaneously reset and stop.

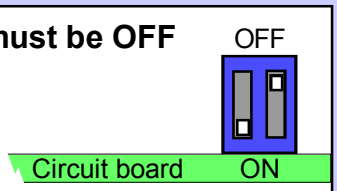
!! This feature is available in Advanced Mode only !!

1

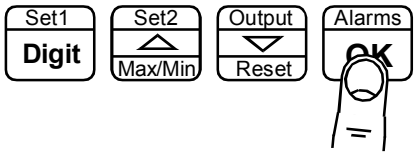


Press 3 seconds

Lockout Switch must be OFF



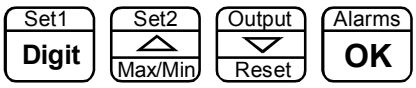
2



Press repeatedly until you see **CC.1** , followed by the existing function for Contact Closure 1.

After you have set **CC.1**, you will get the prompt **CC.2** to allow you to set Contact Closure 2 function and when you have set CC.2 you will get the prompt **CC.3** to allow you to set Contact Closure 3 function

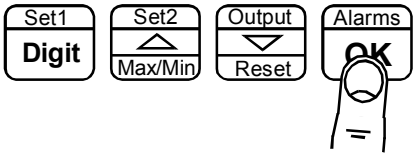
3



Use UP or DOWN buttons to select from these available functions...

Defaults are:-
CC.1 = Start
CC.2 = Stop
CC.3 = rst

4



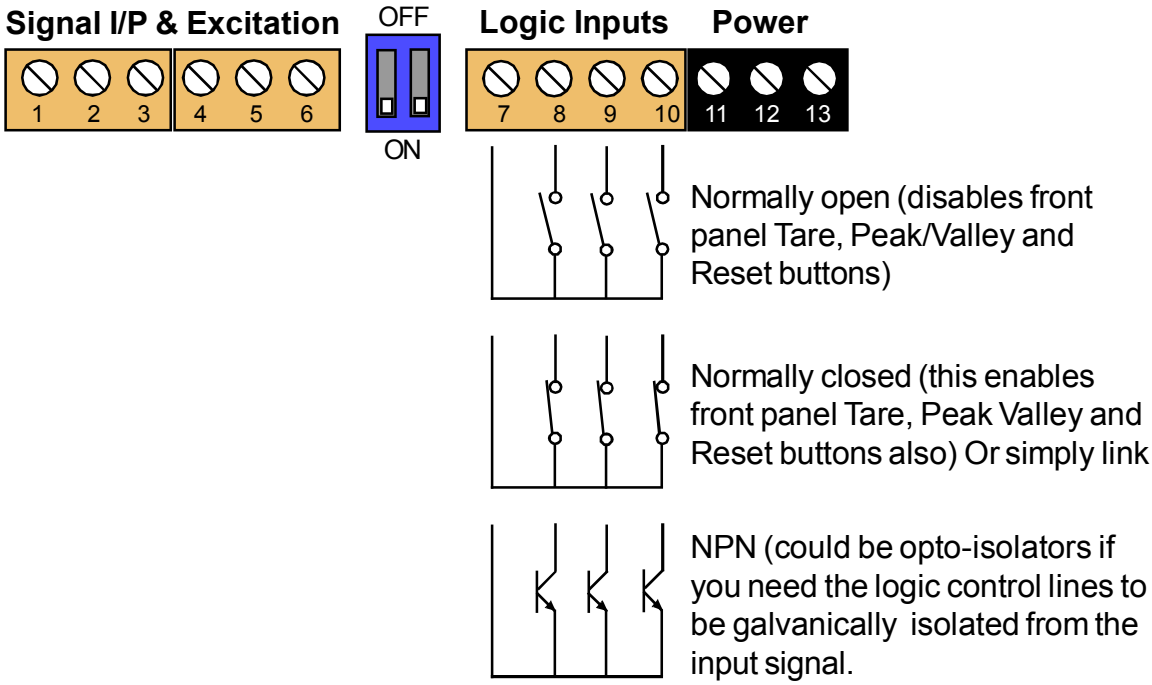
Press to accept

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.



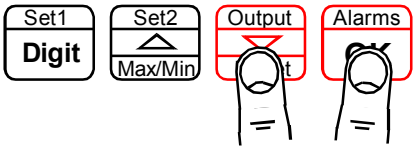
Menu timeout adjustment

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.

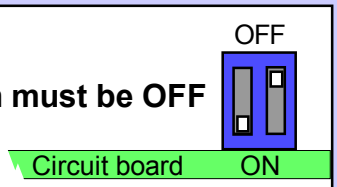
!! This feature is available in Advanced Mode only !!

1

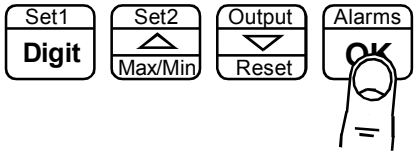


Press together, briefly

Lockout Switch must be OFF



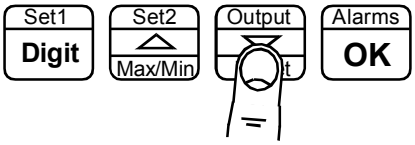
2



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

dLAy.1 0
dLAy. 20
dLAy. 30
dLAy. 60 (default)

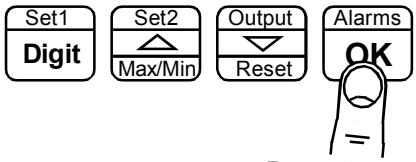
3



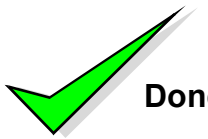
Press briefly to toggle

Press DOWN or UP button briefly and repeatedly to choose from **dlay.10** or **dlay.20** or **dlay.30** or **dlay.60**

4



Press to accept



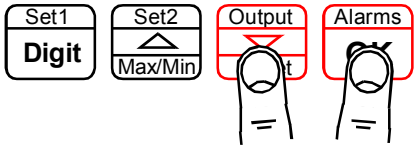
Done!

Reverse Display function (mirror image)

If you need to be able to see a reflection of the display in a mirror or other reflective surface, for example in a simple heads-up system, or for drivers reversing into a bay, using mirrors only, you can set the display to show as a mirror image.

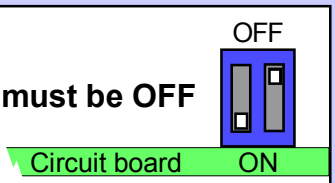
!! This feature is available in Advanced Mode only !!

1

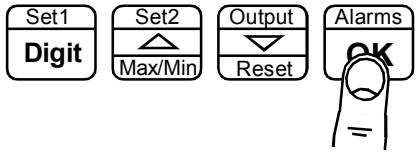


Press together, briefly

Lockout Switch must be OFF



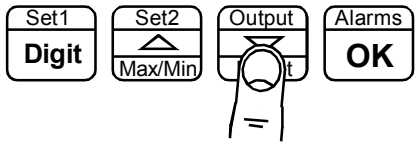
2



Press OK button briefly and repeatedly until you see

rEV.d 0 (Default)
or
rEV.d 1

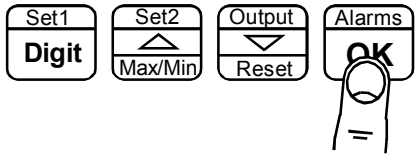
3



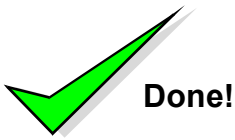
Press briefly to toggle

Press DOWN or UP button briefly and repeatedly to choose from
rEV.d 0 (normal display) or
rEV.d 1 (mirror image display)

4



Press to accept



Done!

rEV.d 0

Example of normal display format displaying the number 876543

rEV.d

Example of Mirror Reverse display format displaying the number 876543

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.

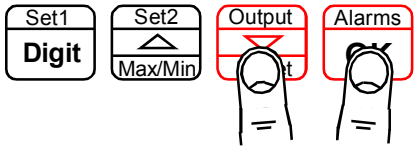
boot 1 = Segment test followed by model number (Default)

boot 2 = No summary, meter displays the measurement value immmediately power is applied.

boot 3 = Segment test which remains active until a button is pressed.

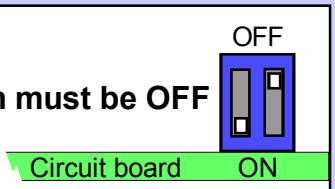
!! This feature is available in Advanced Mode only !!

1

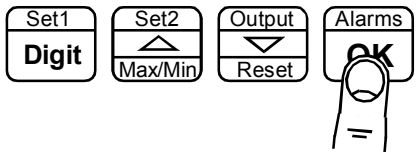


Press together, briefly

Lockout Switch must be OFF

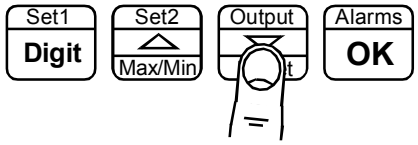


2



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

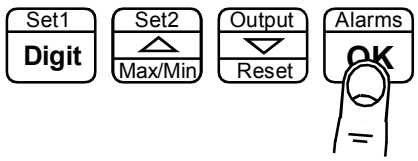
3



Press briefly to toggle

Press DOWN or UP button briefly and repeatedly to choose from **boot 0** or **boot 1** or **boot 2** or **boot 3**

4



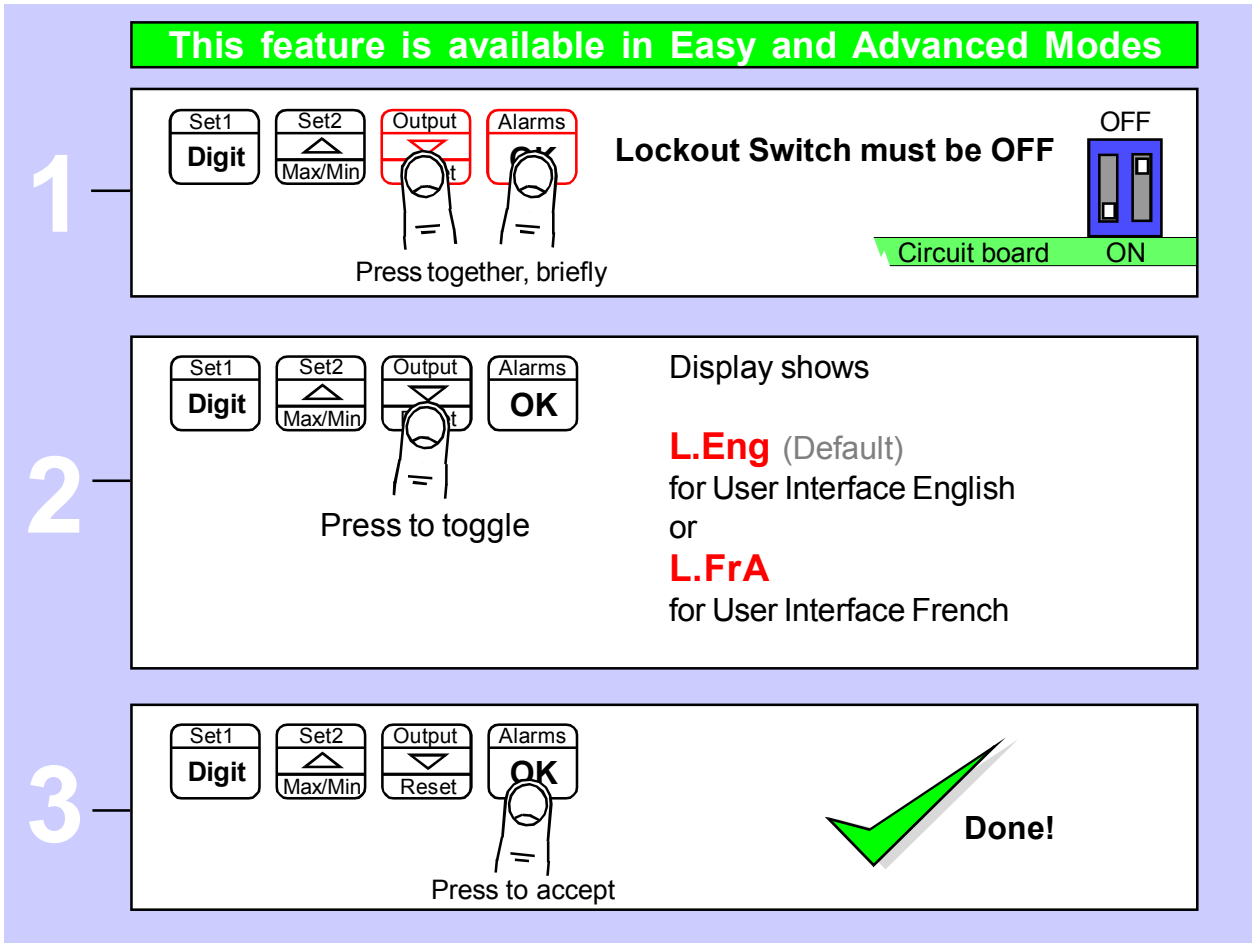
Press to accept

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.

Language Selection for user interface

You can select English or French menu prompts.



Error codes and fault finding

1. Time does not automatically correct at summer/winter time changeover.

   Check that the **dst** has been set to your region.

How to install option boards

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

Warning: Disconnect power before you expose the rear of the meter

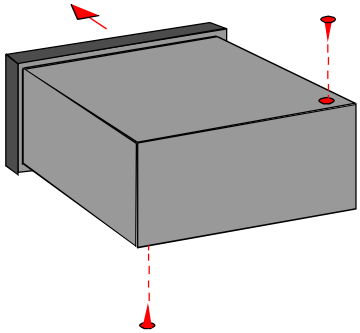
If you want to open your meter to install or modify option boards, follow these steps...

1) Switch off power to the meter and unplug all connectors.

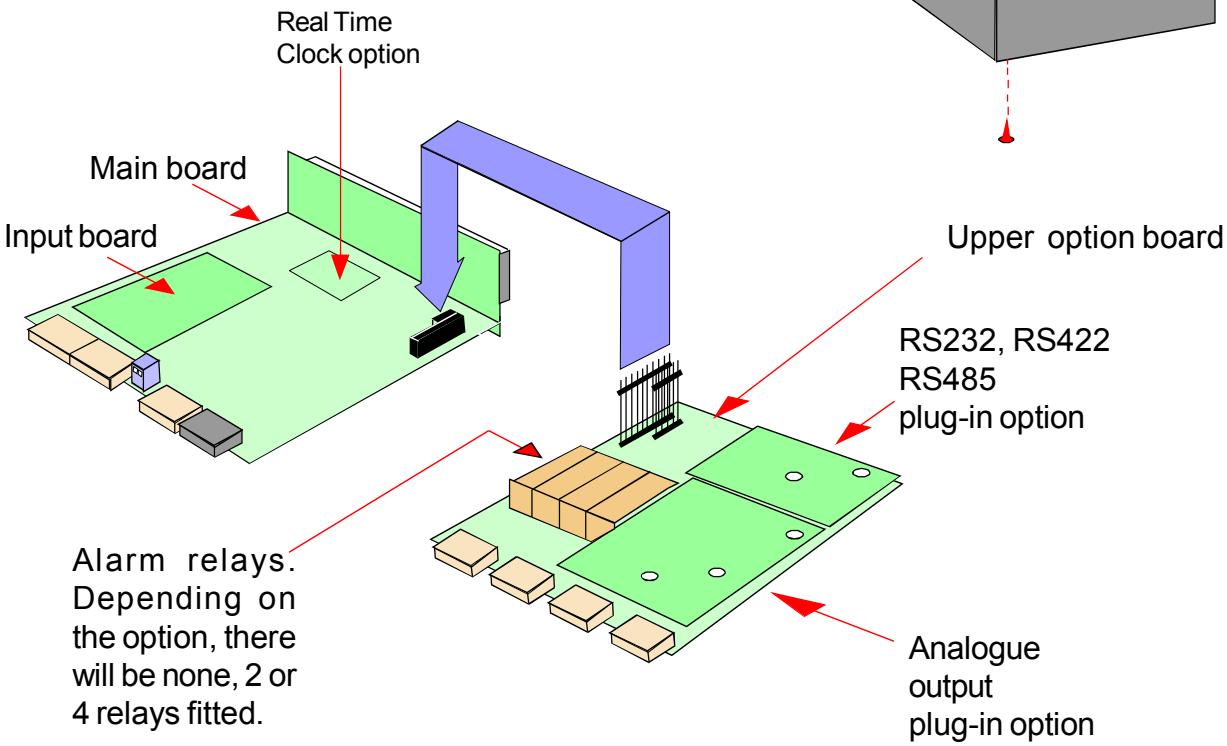
2) Unclip the front bezel. This is easier if you squeeze the top and bottom of the case, near the front.

3) Remove the small screws shown in the diagram. If the meter doesn't yet have an output option board, the top screw may not yet be fitted.

4) Slide the electronic boards out throught the front of the case. You can easily separate the upper option board from the main board. We strongly suggest that you use anti-static precautions to prevent damage to the semiconductors.



The board assemblies will look something like this...



The analogue output and RS232 or RS422 plug-in option boards are fixed to the upper option board with white plastic pillars. You must apply a firm force when fitting or removing these options.

Always be careful to connect the pins to sockets accurately. When reassembling, make sure option boards are firmly fixed to the upper option board. When the boards are replaced in the case, secure them again with the two small black screws.

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 Allow 30 minutes for the display to reach thermal equilibrium.
Power	100-240 VAC, 45 to 60Hz or 11-30 VDC optional
Burden	10VA maximum
Accuracy	Better than +/- 10 seconds per month (DS3231SN) Battery backup during power loss. Battery = CR1620 3V Lithium Allow 30 minutes after switch-on, for thermal stabilisation.
Memory	Totals and settings saved in 10 year non-volatile memory.

Plug-In Output Options

Analogue O/P	See analogue output manual on our website for details.
Alarm Relay O/P	See alarm output manual on our website for details.
ASCII Data O/P	See serial output manual on our website for details.
Calendar/Clock option	See serial output manual on our website for details.

Record of Revisions

15 March 2023	INT4 version released

Declaration of UK & CE Conformity

Declaration Reference	: INTUITIVE Mk4
Issue Date	: 20 September 2022
Products Covered	: INTUITIVE Mk4 series
Title	: DOC-INTUITIVE4

We hereby self-certify that the design and manufacture of this product conforms with the UKCA and CE standards, by complying with the directives and standards below.

Electrical Equipment (Safety) Regulations, 2016 and amendments
Low Voltage Directive 2014/35/EU
BS EN 61010-1 : 2010 + A1 : 2019

Electromagnetic Compatibility Regulations, 2016 and amendments
EMC Directive 2014/30/EU
EN 61326-1 : 2013
Immunity for equipment intended to be used in an industrial electromagnetic environment.

Maximum errors of 1% of dynamic range are permitted.
Instrument must recover automatically from disturbance.

Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations, 2012 and amendments
RoHS2 directive incorporating RoHS3 Amendment 2015/863/EU
EN IEC 63000 : 2018

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