



CE UK  
CA

# FUSION

Large 4 Digit Counter / Rate Display



## Model FUSION-C

Installation & Operating Manual Revision 6

- ✓ Easy setup
- ✓ Up to 4 inputs NPN, PNP, 24V & Contact Closure
- ✓ Fully Scalable
- ✓ Total, Rate & Quadrature Modes
- ✓ Optional Output 4-20mA / 0-10V isolated
- ✓ Optional Alarm output = 2 or 4 relays Optional
- ✓ Comms Output = RS232 or RS485 95-230V AC or
- ✓ 11-30V DC power

**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



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## 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.

## 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.



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.



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



Do not apply power to the display if its case is open.



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.

### Rear case screws - please note

The rear panel is held in place with socket flange button head screws, which only need to be gently tightened, with the supplied 2mm hex key.

**Do not use tools to tighten or loosen the screws, as this could cause damage to the internal threads.**

## 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, you must fill in the RMA form on our website, 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.

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 digit heights are available, to suit the maximum viewing distance required in each installation.

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

Displays are programmed using front panel push buttons. The front panel buttons can be disabled. In addition, you can connect 4 remote wired push buttons to the display, so that you can make adjustments while the display is mounted in an inaccessible location.

Power supply options : 95-265V AC, 48V AC or 11-30VDC

These displays must be installed fully assembled, and must be installed according to local electrical installation rules.

When properly installed, and provided they have been ordered with cable glands exiting the lower surface of the case, they provide ingress protection to IP65 / NEMA4X from all directions.

### Safety



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

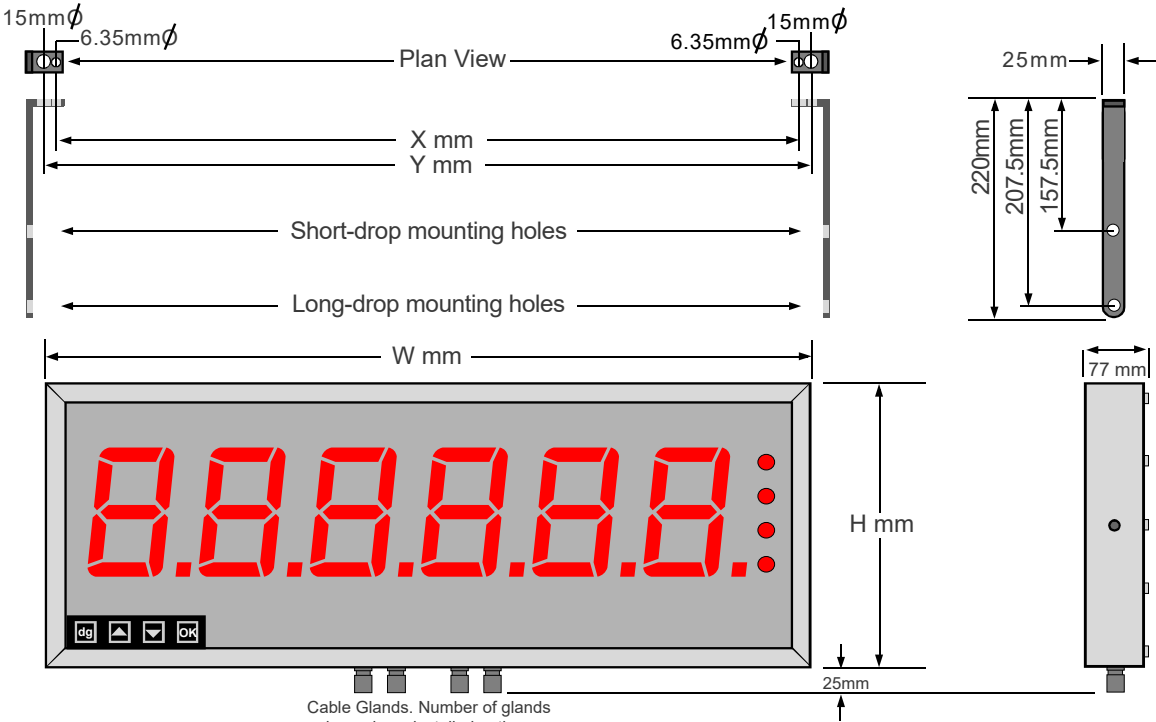


**Caution:** Risk of danger: Read the whole manual before you install this meter

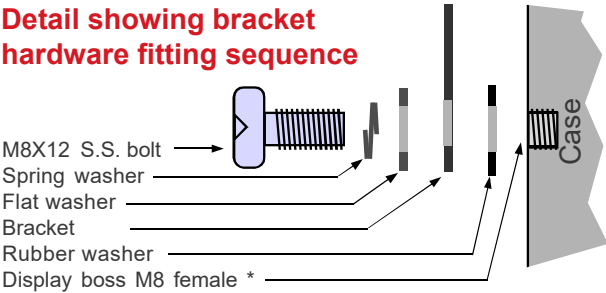
Obey all safety warnings in this manual, and install the meter according to local wiring and installation regulations. Failure to follow these guidelines may cause damage to the meter, connected equipment, or may be harmful to personnel.

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

# Suspension Mounting Dimensions



### Detail showing bracket hardware fitting sequence



You can order these displays with the cable glands in the bottom surface (as shown) the rear, or top.

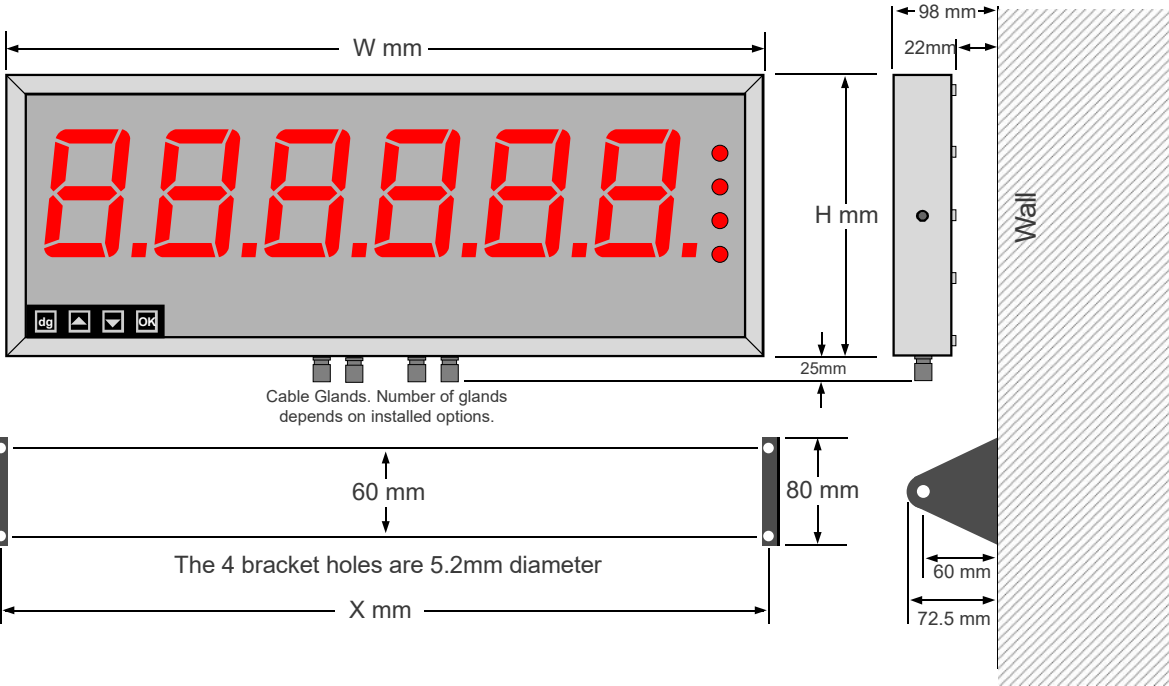
Rear glands allow you to mount the display on top of a cubicle, using the brackets shown.

**\* Do not use longer bolt threads than 12mm , or you will fracture the female boss and the case will no longer be sealed.**

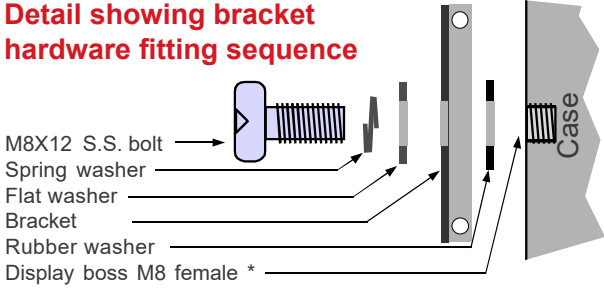
Display Format	X mm	H mm	W mm	Y mm
2" 4 digit numeric	219.5	154.5	279.5	249.5
2" 6 digit numeric	316	154.5	376	346
4" 4 digit numeric	374	195.5	434	404
4" 6 digit numeric	556	195.5	616	586
6" 4 digit	520	246	580	550
6" 6 digit	760	246	820	790
8" 4 digit	690	290	750	720
8" 6 digit	1012	290	1072	1042
12" 4 digit	990	408	1050	1020
12" 6 digit	1480	408	1540	1510
16" 4 digit	1308	515	1368	1338
16" 6 digit	1960	515	2020	1990



# Wall Mounting Dimensions



### Detail showing bracket hardware fitting sequence



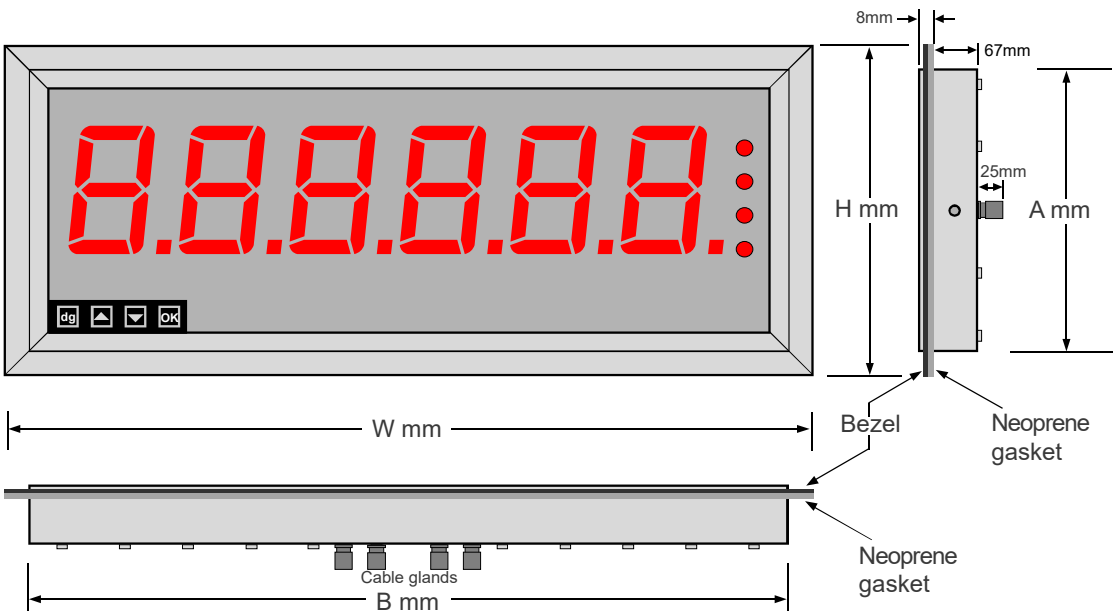
You can order these displays with the cable glands in the bottom surface (as shown) the rear, or top.

Rear glands allow you to mount the display on top of a cubicle, using the brackets shown.

**\* Do not use longer bolt threads than 12mm , or you will fracture the female boss and the case will no longer be sealed.**

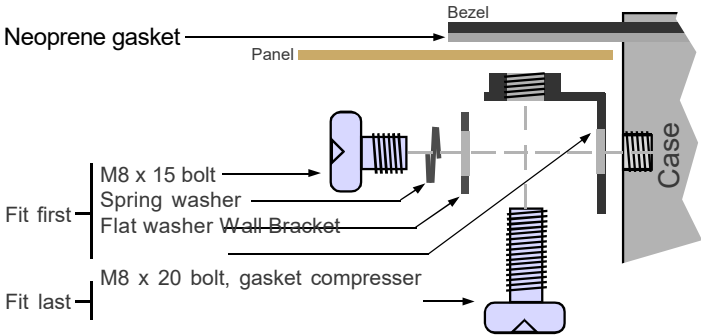
Display Format	X mm	H mm	W mm
2" 4 digit numeric	266.5	154.5	279.5
2" 6 digit numeric	363	154.5	376
4" 4 digit numeric	421	195.5	434
4" 6 digit numeric	603	195.5	616
6" 4 digit	567	246	580
6" 6 digit	807	246	820
8" 4 digit	737	290	750
8" 6 digit	1059	290	1072
12" 4 digit	1037	408	1050
12" 6 digit	1527	408	1540
16" 4 digit	1355	515	1368
16" 6 digit	2007	515	2020

# Panel Mounting Dimensions




### Detail showing bracket hardware fitting sequence

Panel cutout dimensions  
 $A+3\text{mm}(h) \times B+3\text{mm}(w)$



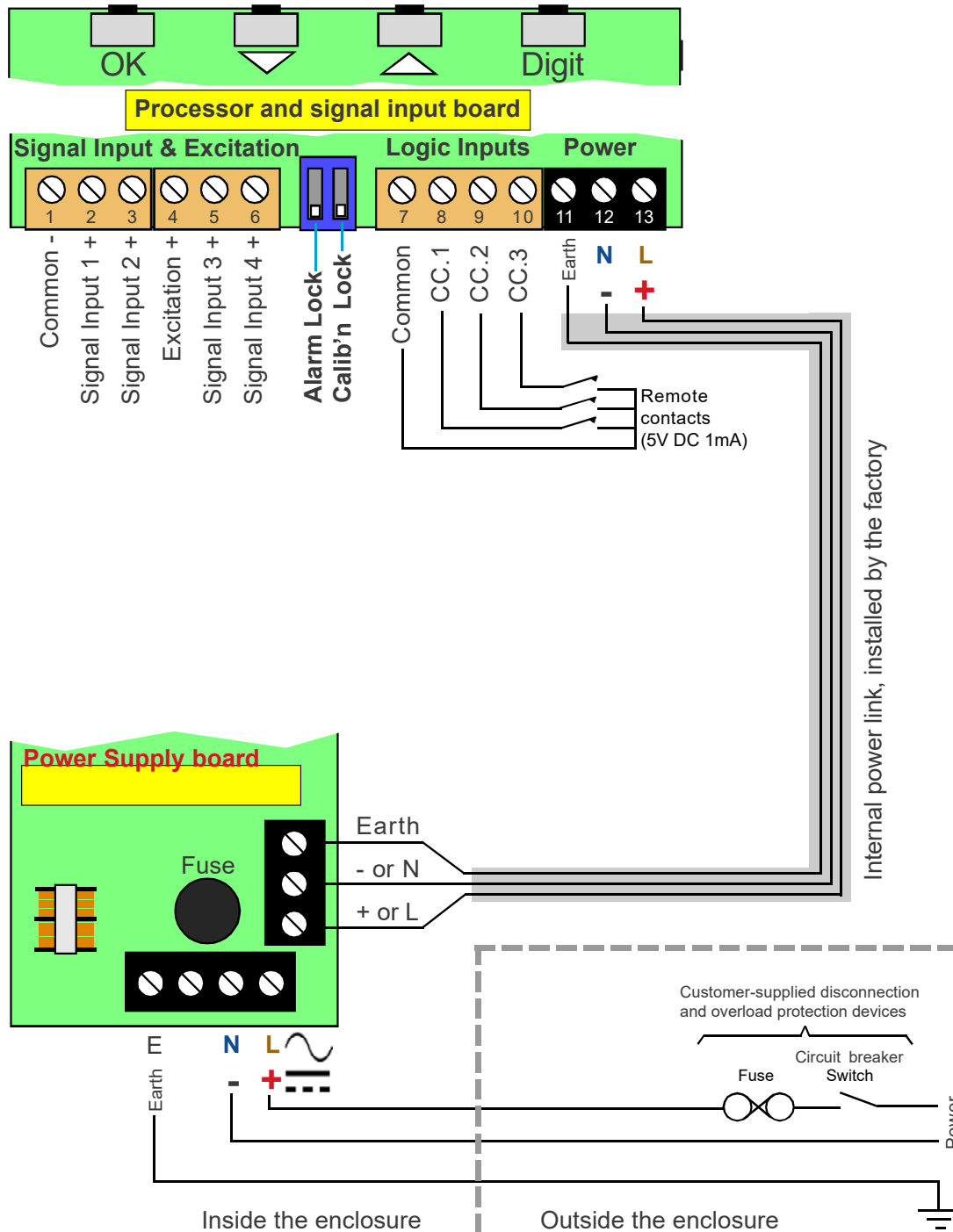
Display Format	H mm	A mm	B mm	Wmm
2" 4 digit numeric	172.5	154.5	279.5	297.5
2" 6 digit numeric	172.5	154.5	376	394
4" 4 digit numeric	213.5	195.5	434	452
4" 6 digit numeric	213.5	195.5	616	634
6" 4 digit	264	246	580	598
6" 6 digit	264	246	820	838
8" 4 digit	308	290	750	768
8" 6 digit	308	290	1072	1090
12" 4 digit	426	408	1050	1068
12" 6 digit	426	408	1540	1558
16" 4 digit	533	515	1368	1386
16" 6 digit	533	515	2020	2038

# Connections



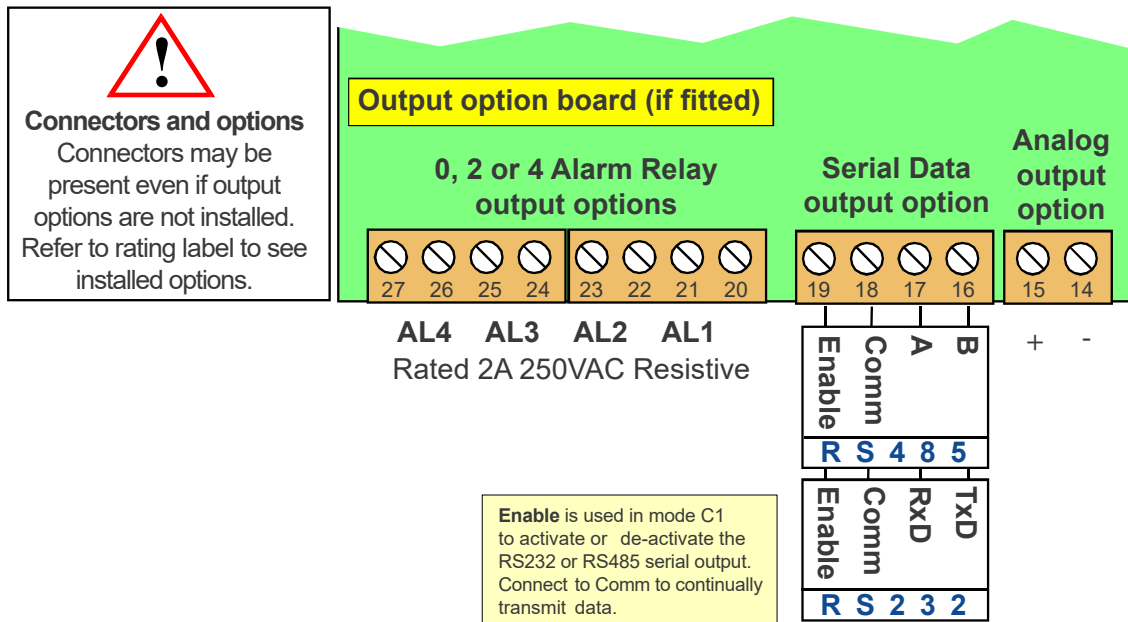
**Warning:**  
Disconnect all power before removing the rear of the display

There is a wide range of possible locations for the input board, output board and power supply board/s. Their locations depend on the height of digits, number of digits, brightness of digits and any installed options. Because the permutation of possible locations is large, we will not describe the location of boards within the display, but simply identify the connectors and their functions on each board, below ...



## Connections

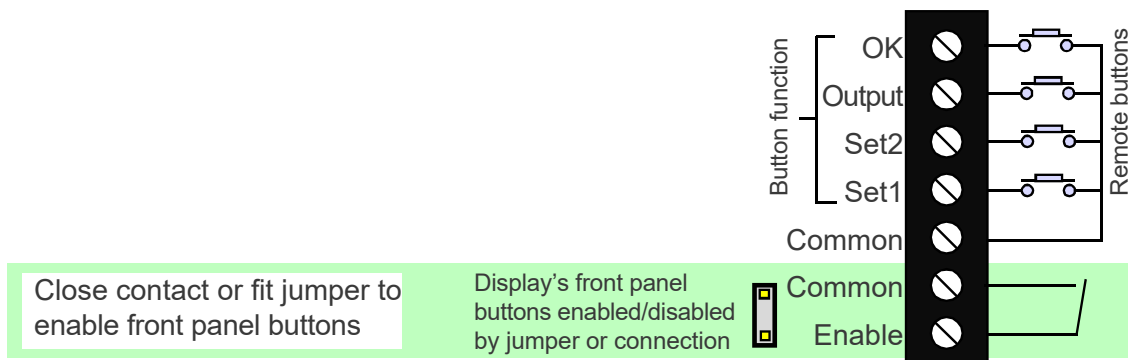
**Warning:**  
Disconnect all power before removing the rear of the display



### Remote programming button connector

On one of the display boards, you will find a 7 way connector, to which you can wire remote programming buttons, to allow adjustment of the display's settings when the display is inaccessible.

You can also enable or disable the display's front panel buttons, either by a remote contact closure, or by an on-board push-on jumper switch, which is located near to the remote button connector. When the contact is closed, or the push-on switch fitted, the front buttons are enabled.



### Rear case screws - please note

The rear panel is held in place with socket flange button head screws, which only need to be gently tightened, with the supplied 2mm hex key.

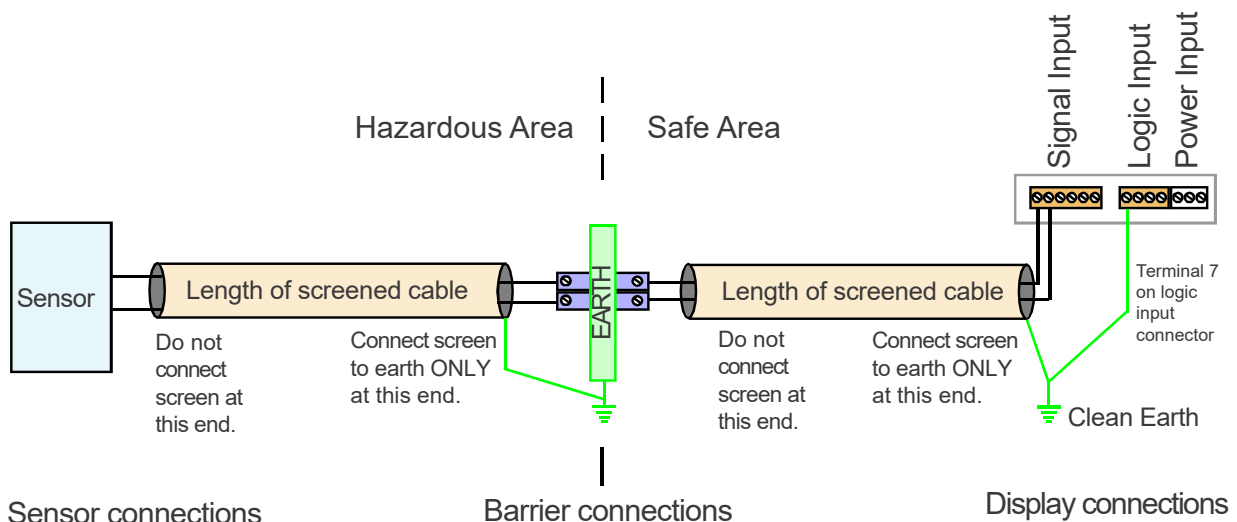
**Do not use tools to tighten or loosen the screws, as this could cause damage to the internal threads.**

## Installation Hints For Best Performance

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

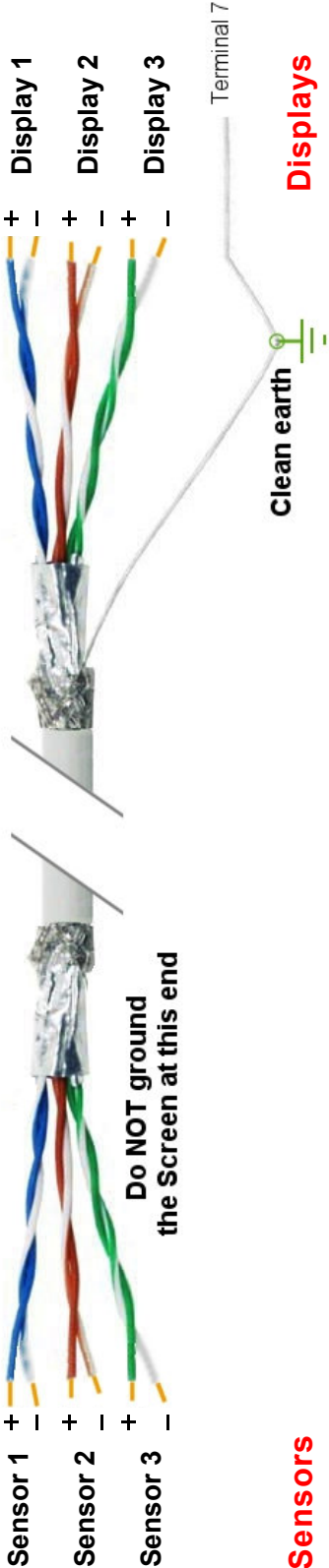
Some sensors generate comparatively small signals which can easily be corrupted by the potentially high level of electrical noise which can be created by electrical machinery such as motors, welding systems, discharge lighting, AC power inverters and solenoids. These steps will ensure you get the best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

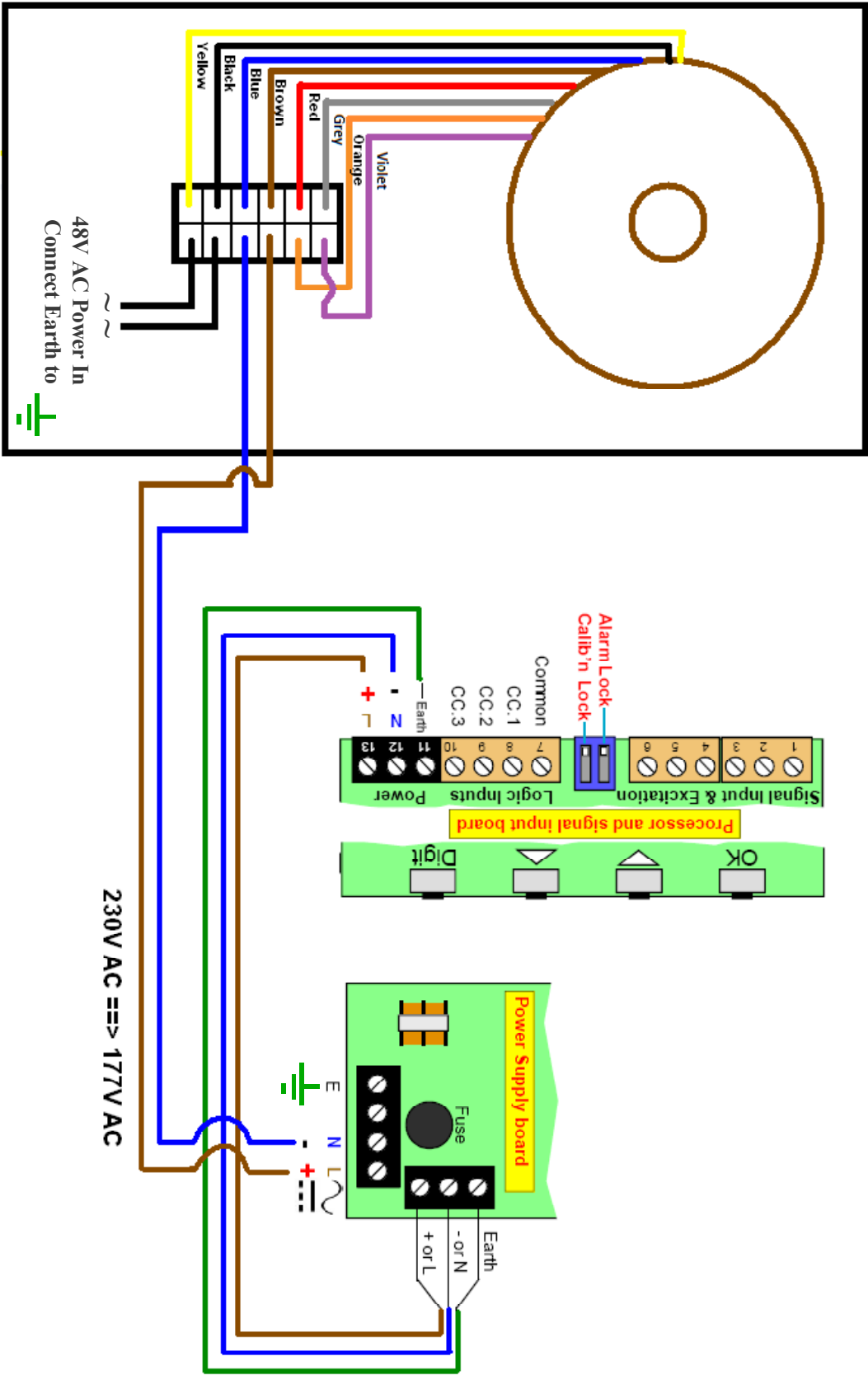


When using multi-core screened cable to connect several displays to several sensors, please be sure to use one twisted pair for each display and sensor.

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, and can couple noise from one channel to another.



# 48V AC Power Wiring Option



## Display Brightness

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

1

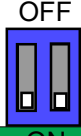
Set1  
**Digit**

Set2  
Max/Min

Output  
Reset

Alarms  
**OK**

**Lockout Switch must be ON**



Circuit board ON

Press 3 seconds

2

Set1  
**Digit**

Set2  
Max/Min

Output  
Reset

Alarms  
**OK**

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)

Press for 3 seconds

3

Set1  
**Digit**

Set2  
Max/Min

Output  
Reset

Alarms  
**OK**

**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.



# Input Signal Configuration

Each of the display's 4 inputs can be configured to accept different types of input signals, using the procedure below....

1

Press 3 seconds

**Lockout Switch must be OFF**

Circuit board ON

2

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

Display shows input channel choices...

<b>INP 1</b>	Input 1
<b>INP 2</b>	Input 2
<b>INP 3</b>	Input 3
<b>INP 4</b>	Input 4

3

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

Display shows input signal type choices...

<b>DC . IN</b>	DC pulses from 5 to 60V
<b>INDU</b>	Passive inductive sensors
<b>AC . IN</b>	AC signals up to 60V

4

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

Display shows input signal loading choices...

<b>NPN</b>	Pull up resistor activated
<b>PNP</b>	Pull down resistor activated

5

Press to select an Edge choice then press OK to accept.

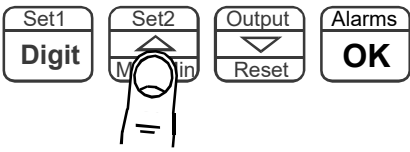
Display shows input de-bounce choices...

<b>DB . 1</b>	Contact debounce active
<b>DB . 0</b>	Contact debounce inactive

Continued ...

# Input Signal Configuration - Continued


6



Press to select an Edge choice  
then press OK to accept.

Display shows edge count choices in  
the following modes:-  
**1in.u.d, 2in.u.d, 2in.u.u.,4 uudd, 4  
uuuu, 4 dddd, quad.**

**EDG. 1**     Count rising edge  
**EDG. 0**     Count falling edge

 **Done!**

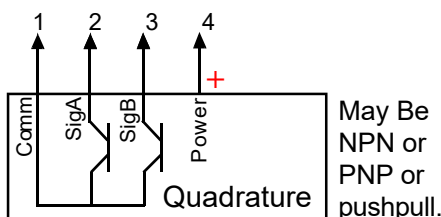
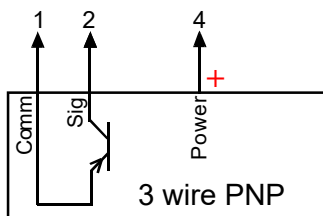
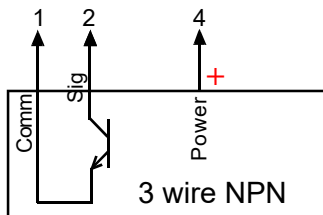
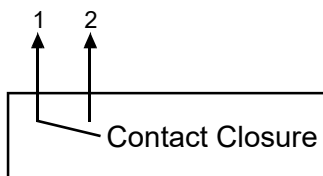
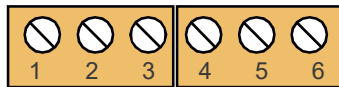
## Input Signal Configuration Guide

This table tells you which settings to choose for each input signal type. The sensor should be connected to the display according to the connection diagram page.

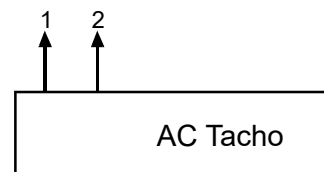
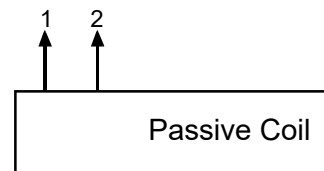
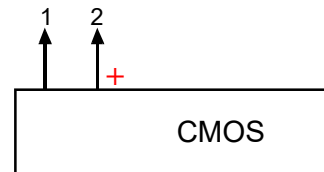
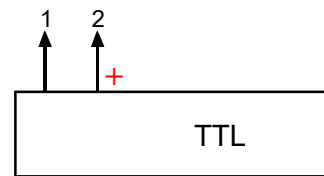
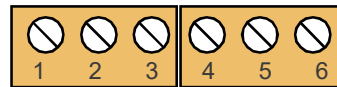
Sensor family	Input Signal Type	Input signal loading	Input de-bounce
Contact closure	<i>PULS.DC</i>	<i>NPN</i>	<i>DBN.ON</i>
NPN	<i>PULS.DC</i>	<i>NPN</i>	<i>DBN.OFF</i>
PNP/ Push-pull	<i>PULS.DC</i>	<i>PNP</i>	<i>DBN.OFF</i>
TTL	<i>PULS.DC</i>	<i>NPN</i>	<i>DBN.OFF</i>
CMOS	<i>PULS.DC</i>	<i>PNP</i>	<i>DBN.OFF</i>
Passive coil	<i>INDUCT</i>	<i>PNP</i>	<i>DBN.OFF</i>
AC Tacho	<i>PULS.DC</i>	<i>PNP</i>	<i>DBN.OFF</i>

Excitation Output: 24VDC nominal rated at 60mA, to power sensors (standard) 10V DC at 120mA Max (optional), 5V DC at 30mA max (optional)

### Signal I/P & Excitation



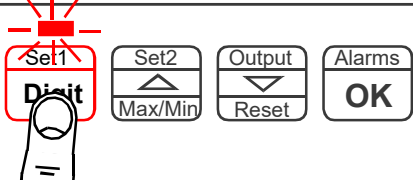
### Signal I/P & Excitation



## Display Modes

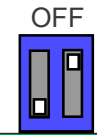
You can choose from eleven basic display modes, some of which have extra sub-modes.

1



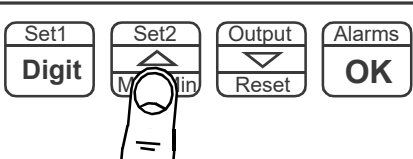
Press 3 seconds

**Lockout Switch must be OFF**



Circuit board ON

2



Press to scroll through the available mode choices.

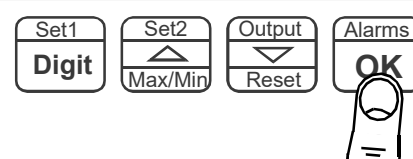
Each mode has a separate section to describe its operation in detail.

When you have chosen a mode, press OK to select.


Display shows...

<b>RATE</b>	Rate, Frequency, RPM
<b>PER</b>	Intervals, bake time
<b>TOT</b>	Counting
<b>GAT.T</b>	Gated counting
<b>11.U.D.</b>	1 input, Up/Down control
<b>21.U.D.</b>	2 in, Up/Down
<b>21.U.U.</b>	2 in Up, Up
<b>UUDD</b>	4 in , Up, Up, . Down, Down
<b>UUUU</b>	4 in, Up, Up, Up, Up
<b>DDDD</b>	4 in Down, Down, Down, Down
<b>QUAD</b>	Quadrature

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 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..

1

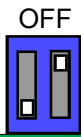
Set1  
Digit

Set2  
Max/Min

Output  
Reset

Alarms  
OK

**Lockout Switch must be OFF**



Circuit board ON

Press together for 3 seconds

2

Set1  
Digit

Set2  
Max/Min

Output  
Reset

Alarms  
OK

Display shows :- **DEF.N** (Defaults no)

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


3

Set1  
Digit

Set2  
Max/Min

Output  
Reset

Alarms  
OK



**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 **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

Set1  
Digit

Set2  
Max/Min

Output  
Reset

Alarms  
OK



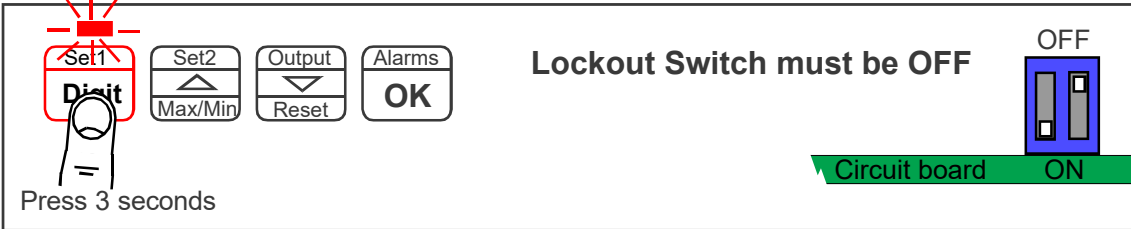
**Done!**

Press together for 3 seconds

## Simple Rate Mode

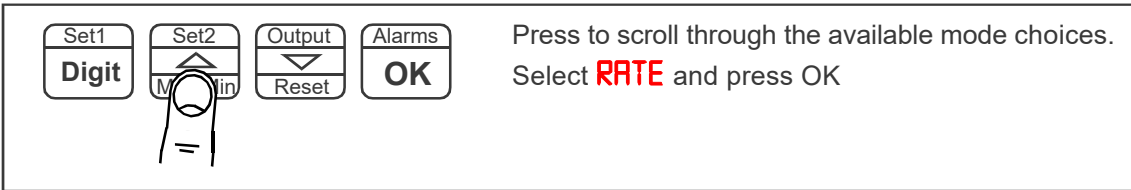
Rate mode is ideal for showing instantaneous speed, RPM, frequency, production rate, flow rate etc. For production rate showing the true number of items produced in the last hour, consider using our 'Production Rate Mode' method, which is ideal for production which is erratic or has periods of widely differing production rate.

- 1**

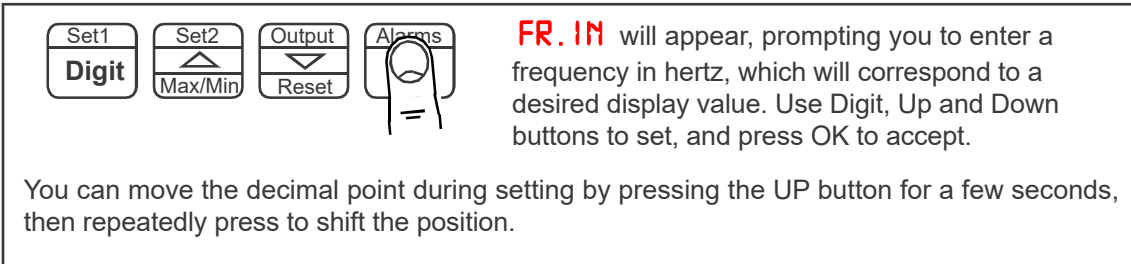


Press 3 seconds

**Lockout Switch must be OFF**
- 2**

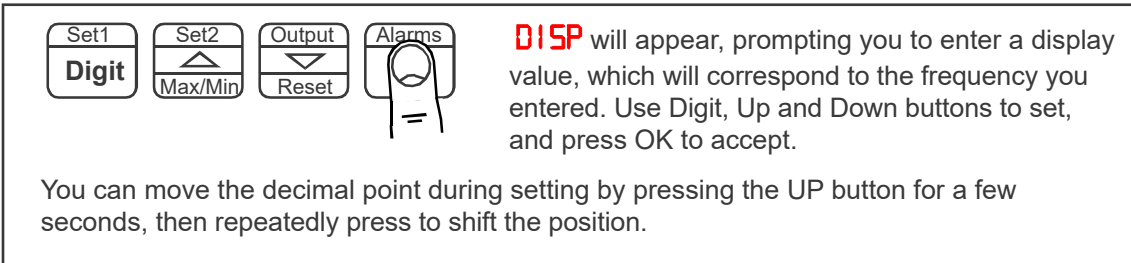


Press to scroll through the available mode choices. Select **RATE** and press OK
- 3**



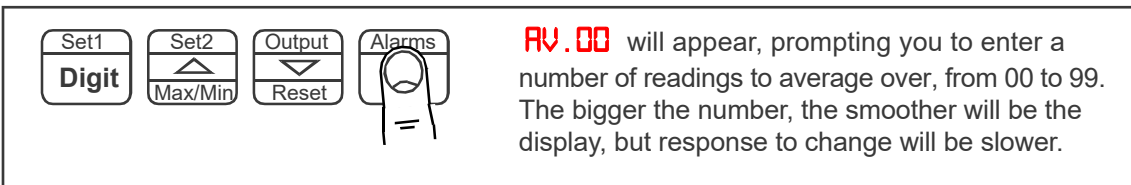
**FR. IN** will appear, prompting you to enter a frequency in hertz, which will correspond to a desired display value. Use Digit, Up and Down buttons to set, and press OK to accept.

You can move the decimal point during setting by pressing the UP button for a few seconds, then repeatedly press to shift the position.
- 4**



**DISP** will appear, prompting you to enter a display value, which will correspond to the frequency you entered. Use Digit, Up and Down buttons to set, and press OK to accept.

You can move the decimal point during setting by pressing the UP button for a few seconds, then repeatedly press to shift the position.
- 5**

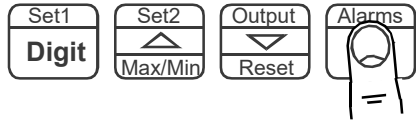


**AV.00** will appear, prompting you to enter a number of readings to average over, from 00 to 99. The bigger the number, the smoother will be the display, but response to change will be slower.

Continued ...

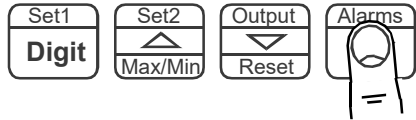
## Simple Rate Mode - Continued

6



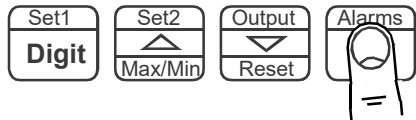
**DL03** will appear, prompting you to enter a delay time in seconds, so that if no pulses are received within this time, the display will revert to showing 0

7



**TGT** will appear, prompting you to enter a target rate. If measured rate falls below this value, display will flash. To disable this feature, set the target to 0

8



Press to accept



## Application Notes - Rate Mode

Bolt(s) to create pulse in sensor  
 Rotating part  
 Proximity sensor

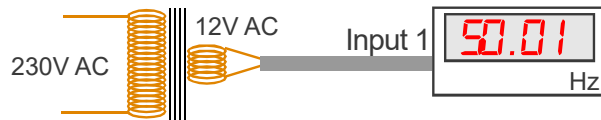
Input 1 **2866**  
 RPM

Set **FR.IN** = 1  
 Set **DISP** = (60/pulses per rotation)  
 Set **AV.04**  
 Set **DLO3**

Ideal for the precision measurement of generator or inverter grid frequency.

A simple step down transformer can be used to drop the line voltage down to a level suitable for the display.

5V to 30V AC is ideal.

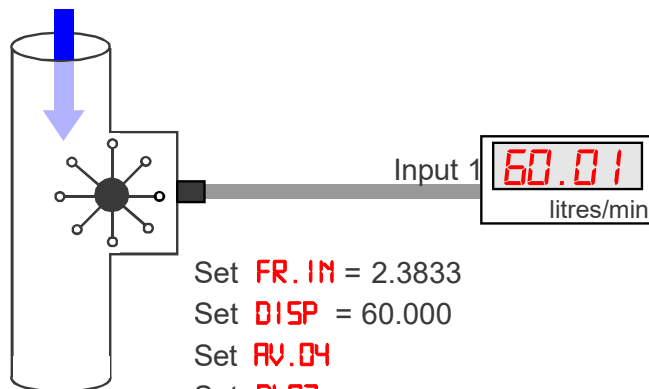


Set **FR.IN** = 1  
 Set **DISP** = 1.000  
 Set **AV.04**  
 Set **DLO3**

Accepts pulses from turbine flowmeters, positive displacement flowmeters.

Has flexible scaling to suit any relationship between pulses per unit volume.

Example 143 pulses per litre, show litres per minute

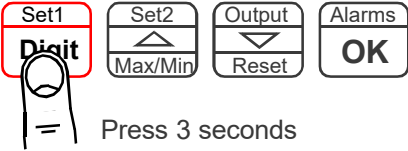




## Period Mode

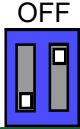
Rate mode is ideal for showing instantaneous speed, RPM, frequency, production rate, flow rate etc. For production rate showing the true number of items produced in the last hour, consider using our 'Binned Rate' method, which is ideal for production which is erratic or has periods of widely differing production rate.

- 1**

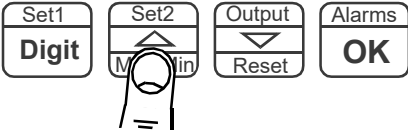


Press 3 seconds

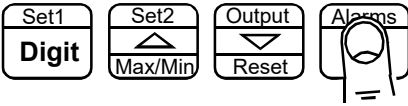
**Lockout Switch must be OFF**



**Circuit board ON**
- 2**

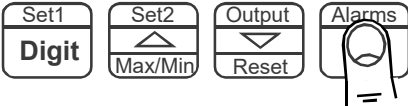


Press to scroll through the available mode choices. Select **PER** and press OK
- 3**



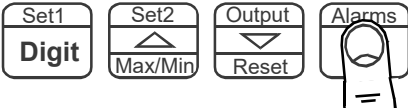
**PER. 1** will appear, prompting you to enter a period in milliseconds, which will correspond to a desired display value. Use Digit, Up and Down buttons to set, and press OK to accept.

You can move the decimal point during setting by pressing the UP button for a few seconds, then repeatedly press to shift the position.
- 4**

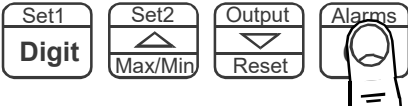


**DISP** will appear, prompting you to enter a display value, which will correspond to the period in milliseconds you entered. Use Digit, Up and Down buttons to set, and press OK to accept.

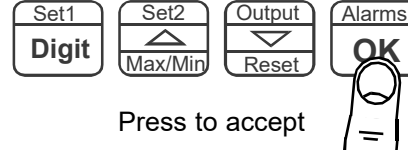
You can move the decimal point during setting by pressing the UP button for a few seconds, then repeatedly press to shift the position.
- 5**




**AV. 00** will appear, prompting you to enter a number of readings to average over, from 00 to 99.
- 6**



**DL03** will appear, prompting you to enter a delay time in seconds, so that if no pulses are received during this time, the display will revert to 0
- 7**

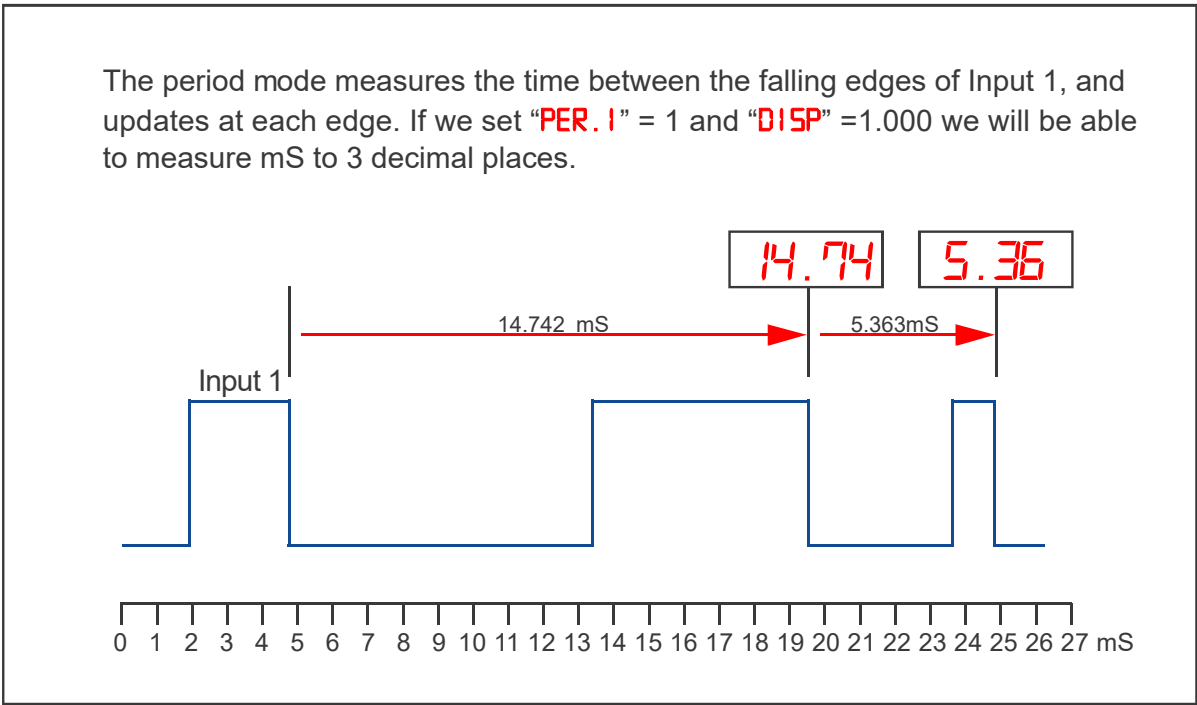
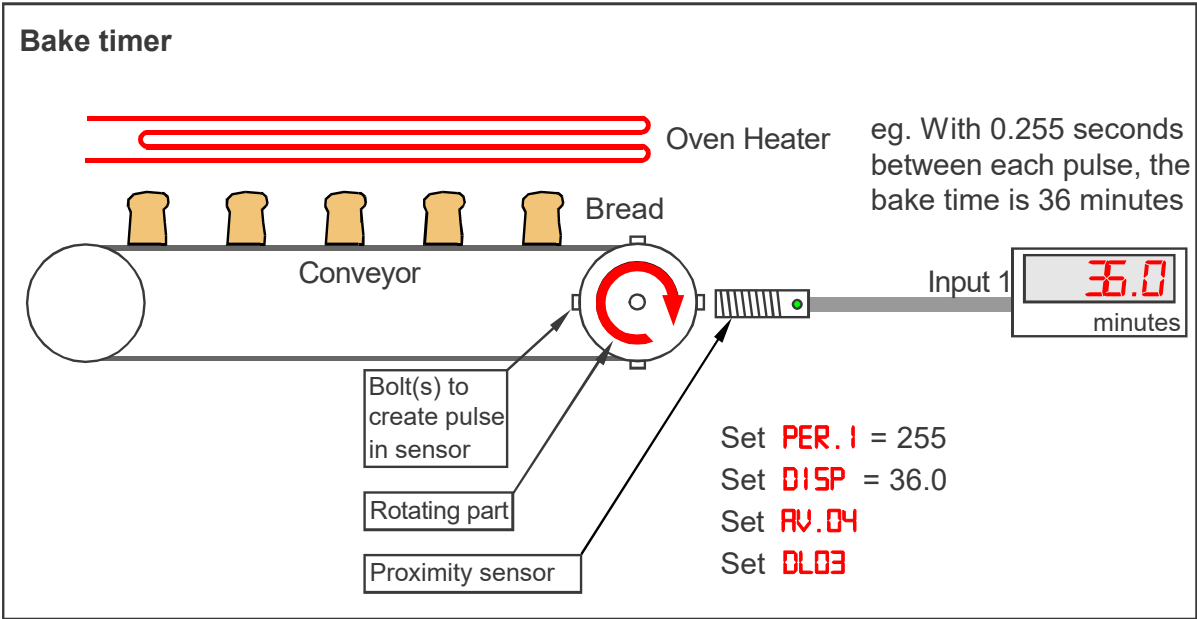


Press to accept



**Done!**

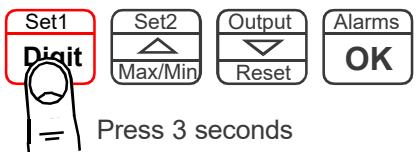
# Application Notes - Period Mode



## Totalising Modes

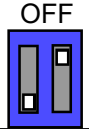
There are several useful totalising modes available, which use 1 or more of the display's logic input ports. The total will be stored on loss of power, and will be restored when power is returned to the display.

- 1**

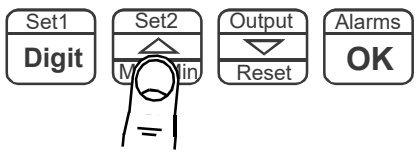


Press 3 seconds

**Lockout Switch must be OFF**

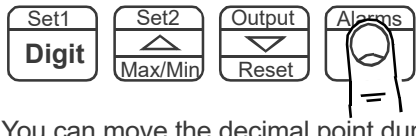


**Circuit board ON**
- 2**



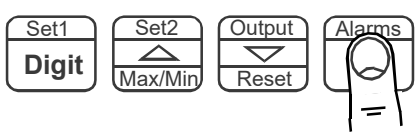
Press to scroll through the available mode choices. Choose from these modes (described opposite)

**TOT, GAT.T, H.U.D, ZI.U.D., ZI.U.U., UJDD, UUUU, DDDD**
- 3**



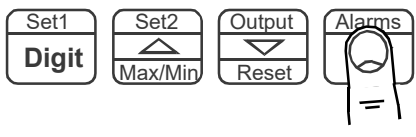
**IMP.P** will appear, prompting you to enter a number of input pulses, which will correspond to a desired display value. Use Digit, Up and Down buttons to set, and press OK to accept.

You can move the decimal point during setting by pressing the UP button for a few seconds, then repeatedly press to shift the position.
- 4**

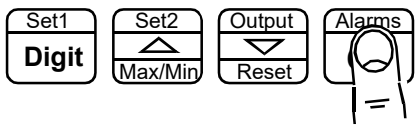


**DISP** will appear, prompting you to enter a display value, which will correspond to the number of input pulses you entered. Use Digit, Up and Down buttons to set, and press OK to accept.

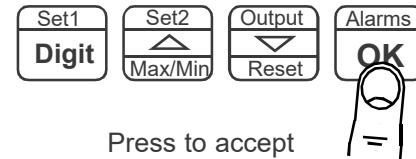
You can move the decimal point during setting by pressing the UP button for a few seconds, then repeatedly press to shift the position. A negative value will give down counting.
- 5**




**PRES** will appear, prompting you to enter a reset value. The display will revert to this value whenever it is reset. Often used to count down from the preset to 0.
- 6**



**PR.LD** will appear, prompting you to enter a value, if required. You can preload a count number here. This value will disappear if you reset the display.
- 7**



Press to accept



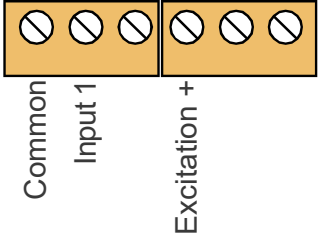
**Done!**

## Totalising Modes - Application Notes

The 8 totalising modes are ideal for counting pulses, where 1 pulse = 1 item, or the total can be scaled, for example to show total flow of liquid, where 1 pulse may represent a certain volume of liquid according to the relationship between “**INP.P**” and “**DISP**”

**TOT**

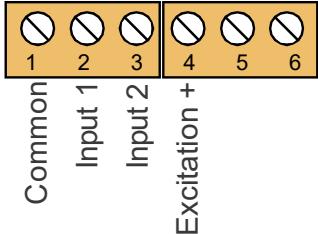
**Totaliser (simple)**  
Pulses on input 1 are counted and scaled.



**GAT.T**

**Gated Totaliser**  
Pulses on input 1 are counted and scaled, provided Input 2 is low. When input 2 is held high, pulses on Input 1 are ignored.

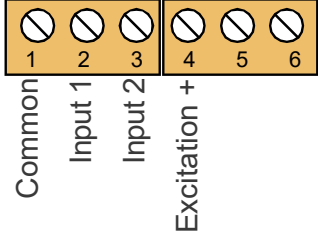
**Signal I/P & Excitation**



**U.U.D**

**1 input, Up/Down totaliser**  
Pulses on input 1 are counted and scaled.  
When input 2 is held high, pulses on Input 1 are added.  
When input 2 is held low, pulses on Input 1 are subtracted.

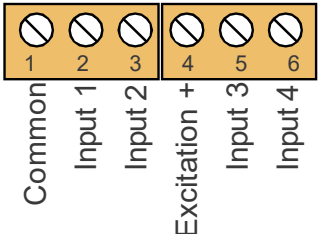
**Signal I/P & Excitation**



**2i. U.D. 2i. U.U. U.U.D.D**  
**UUUU DDDD**

**Multi input, Up/Down totaliser**  
2i u.d. = Count up on input1, count down on input 2  
2i u.u. = Count up on input1, count up on input 2  
4i u.d. = Count up on input1&2, count down on input 3&4  
3&4 uuuu = Count up on input1, 2,3 and 4  
dddd = Count down on input1, 2,3 and 4

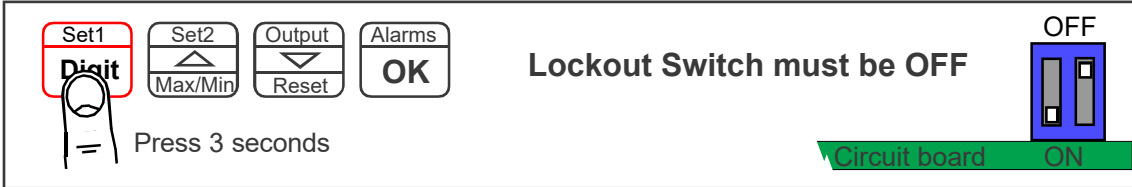
**Signal I/P & Excitation**



## Production Rate Mode

In this mode four inputs are available, two can add to give a combined total, and two can subtract to give combined rejects. This mode of rate measurement is ideal for showing real production rates over longer periods, for example showing items per hour, for the previous hour, updated every 15 seconds, 5 minutes, or whatever best suits your process.

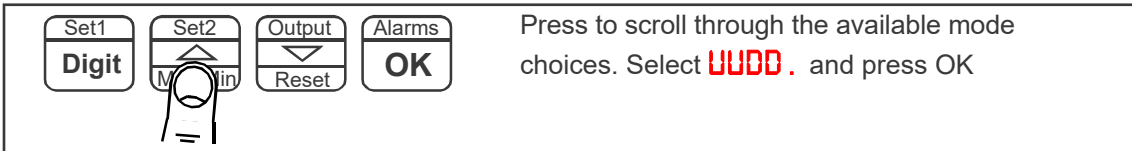
- 1**



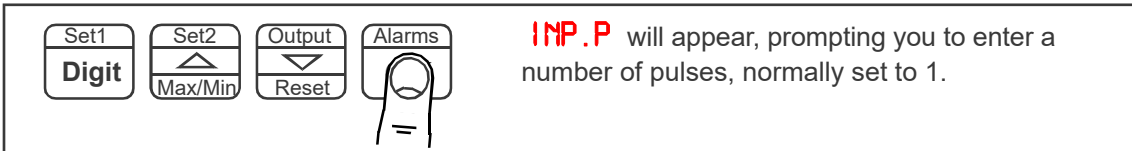
Press 3 seconds

Lockout Switch must be OFF

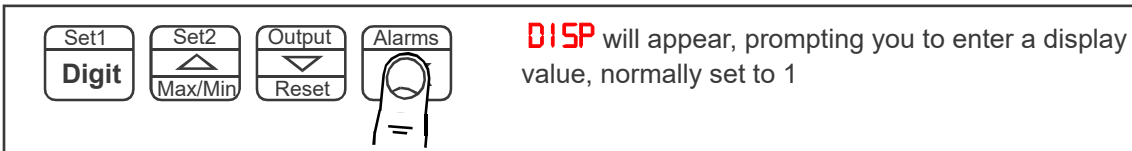
Circuit board ON
- 2**



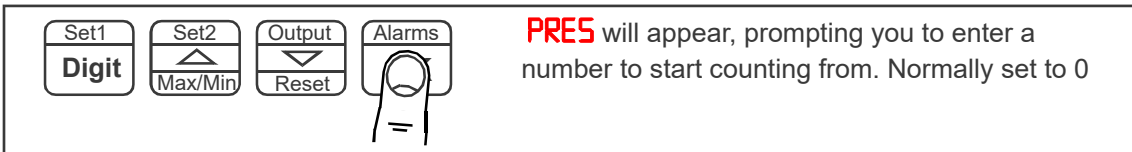
Press to scroll through the available mode choices. Select **UUDD** and press OK
- 3**



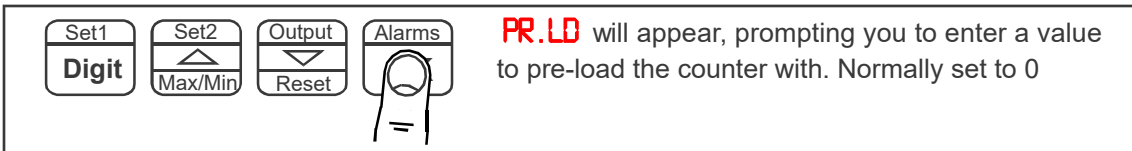
**INP.P** will appear, prompting you to enter a number of pulses, normally set to 1.
- 4**



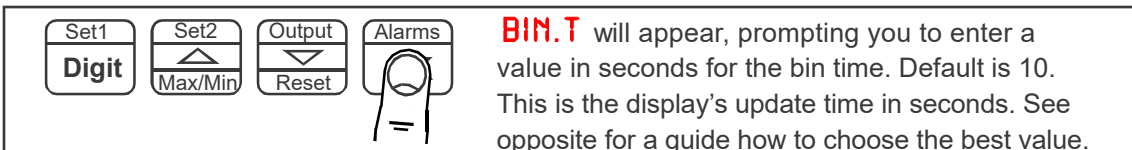
**DISP** will appear, prompting you to enter a display value, normally set to 1
- 5**



**PRES** will appear, prompting you to enter a number to start counting from. Normally set to 0
- 6**



**PR.LD** will appear, prompting you to enter a value to pre-load the counter with. Normally set to 0
- 7**




**BIN.T** will appear, prompting you to enter a value in seconds for the bin time. Default is 10. This is the display's update time in seconds. See opposite for a guide how to choose the best value.


Continued ...

## Production Rate Mode - Continued

8

Set1 Digit	Set2 Max/Min	Output Reset	Alarms	<p><b>BIN.C</b> will appear, prompting you to enter a value for the number of bins to use. Default is 0, maximum is 200. See opposite for a guide how to choose the best value.</p>
				

9

Set1 Digit	Set2 Max/Min	Output Reset	Alarms	<p><b>SCAL</b> will appear, prompting you to enter a scale factor, to allow the readout to be presented in items per minute, per hour, per shift, per day etc. See opposite for a guide how to choose the best value.</p>
				

10

Set1 Digit	Set2 Max/Min	Output Reset	Alarms	 <p><b>Done!</b></p>
				

## Production Rate Mode - Application Notes

1. Choose an averaging time, in seconds, you want to use for computing your production rate.

For example if you want to average over 45 minutes, your averaging time will be 2700 seconds.

We need to calculate an update time for your display, we will have up to 200 samples available in your averaging period.

Update time =  $2700/200 = 13.5$   
Round this up to the nearest whole number.  
This is set in the variable **bin.t = 14**  
Set **bin.c = 200**

This means that your display will update every 14 seconds in this case.

NB If your averaging time is less than 3 minutes, please use the formula  
Update time = averaging time/20 , round up to nearest whole number = **bin.t**  
Set **bin.C= 20**

2. We now need to set a scale factor so that your display reads correctly in items per hour, per minute or per second.

The scale factor settings will be....

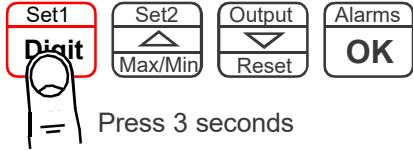
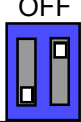
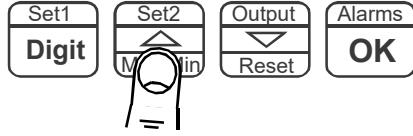
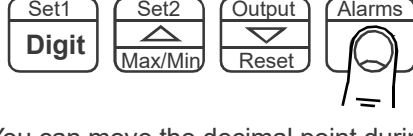
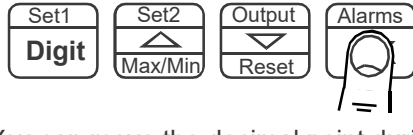
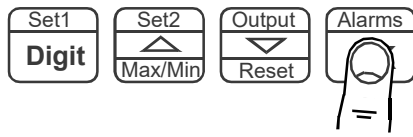
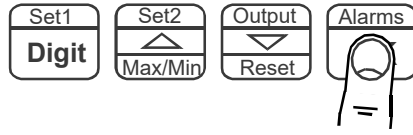
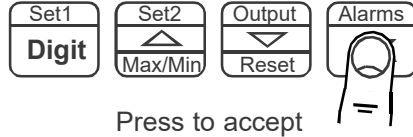

For items per second	= <b>SCAL</b> = $1/\text{bin.t}$
For items per minute	= <b>SCAL</b> = $60/\text{bin.t}$
For items per hour	= <b>SCAL</b> = $3600/\text{bin.t}$
For items per shift	= <b>SCAL</b> = $28800/\text{bin.t}$
For items per day	= <b>SCAL</b> = $86400/\text{bin.t}$

For an online calculator to choose the best settings for you, please see

<https://www.london-electronics.com/int4-c-production-rate-calculator/>

## Quadrature Mode

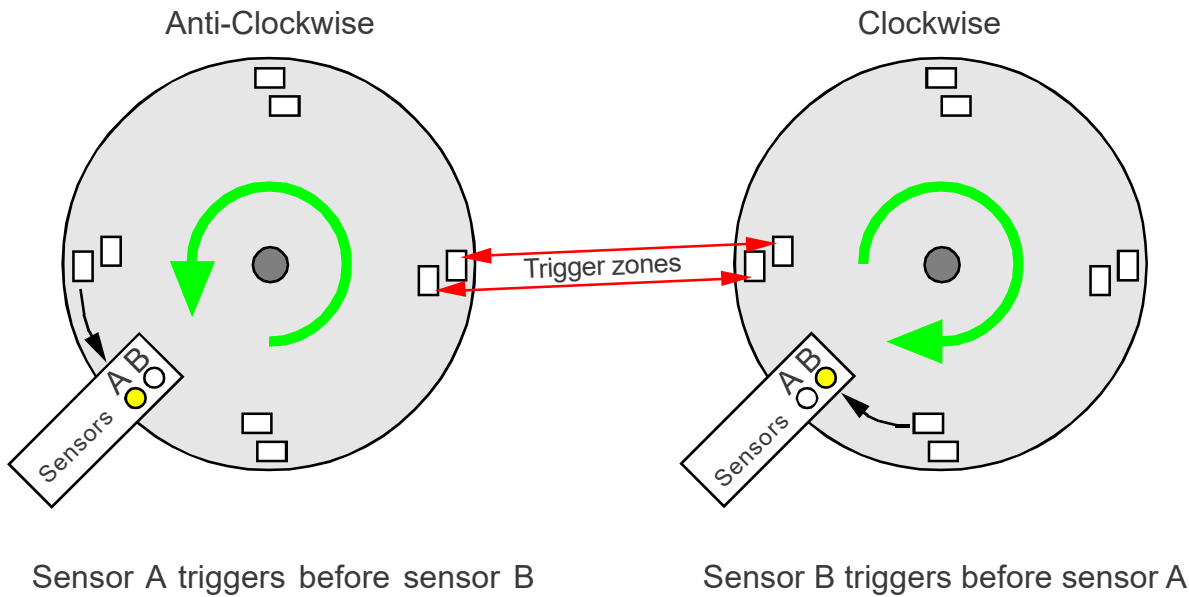
The quadrature mode allows you to scale a count and increase or decrease the value according to the sequencing of two pulses which are 90 degrees out of phase. This mode is ideal for measuring distance in pay-out/feed-in cable systems, or direction in rotary systems.

1	 <p>Press 3 seconds</p>	<p><b>Lockout Switch must be OFF</b></p>  <p><b>Circuit board ON</b></p>
2		<p>Press to scroll through the available mode choices. Select <b>QUAD</b> and press OK</p>
3		<p><b>INP.P</b> will appear, prompting you to enter a number of input pulses, which will correspond to a desired display value. Use Digit, Up and Down buttons to set, and press OK to accept.</p> <p>You can move the decimal point during setting by pressing the UP button for a few seconds, then repeatedly press to shift the position.</p>
4		<p><b>DISP</b> will appear, prompting you to enter a display value, which will correspond to the number of input pulses you entered. Use Digit, Up and Down buttons to set, and press OK to accept.</p> <p>You can move the decimal point during setting by pressing the UP button for a few seconds, then repeatedly press to shift the position. A negative value will give down counting.</p>
5		<p><b>PRES</b> will appear, prompting you to enter a number to start counting from. The display will revert to this value whenever it is reset. Often used to count down from the preset to 0.</p>
6		<p><b>PR.LD</b> will appear, prompting you to enter a value, if required. You can preload a count number here. This value will disappear if you reset the display.</p>
7	 <p>Press to accept</p>	 <p><b>Done!</b></p>



## Quadrature Mode - Application Notes

In a quadrature sensor, the two incoming pulses overlap. Pulses to input 1 will arrive before or after pulses to input 2, depending on the direction of movement. This is achieved by staggering the trigger zones for sensor A and B. They must overlap, so that one will lead the other in one direction, and vice-versa. Trigger zones on large rotating wheels can be bolt heads or holes. In small angular encoders, the trigger zones are normally etched into a thin disc or are photographically produced to make light and dark areas.



In the simplified arrangement shown above, we get 4 pulses per revolution, because we have 4 pairs of triggers. The angular resolution we get with this arrangement is 90 degrees. Some sensors have 1024 pulses per revolution, giving 0.35 degree resolution, but there are many different arrangements available. Our scheme above would be typical in cable laying applications, where it is more important to count revolutions of the drum than to know its absolute angle. The trigger zones can also be arranged in a straight line instead of around a circumference, to create a sensor for linear displacement.

Please be sure to check that the sensor's maximum output frequency is kept to less than 10000 pulses per second.

**QUAD**

**Quadrature counter**  
 Pulses on input 1 are counted and scaled, with directional information decided by detecting whether pulses for Input 2 arrive before or after pulses for Input 1

Signal I/P & Excitation					
1	2	3	4	5	6
Common	Input 1 = A	Input 2 = B	Excitation +		

## Logic Input Functions

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

- Contact closure 1 = Tare
- Contact closure 2 = Peak/Valley display
- Contact closure 3 = Reset

You can re-assign these to include :HOLD, Nett/Gross value display, Memory page address 1,2 or 4 (only if Multi-memory MEM option is installed)

1

Press 3 seconds

Lockout Switch must be OFF

Circuit board ON

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:-

<b>CC. 1</b> = TARE	<b>TARE</b> = Tare display to 0
<b>CC. 2</b> = PV	<b>PV</b> = Peak/Valley toggle
<b>CC. 3</b> = RST	<b>RST</b> = Reset
	<b>HOLD</b> = Freeze display
	<b>NT.GR</b> = Nett / Gross display
	<b>PA. 1</b> = Page Address 1*
	<b>PA. 2</b> = Page Address 2*
	<b>PA. 4</b> = Page Address 4*

4

Press to accept

Done!

\* Only available if the Multi-memory MEM option is installed

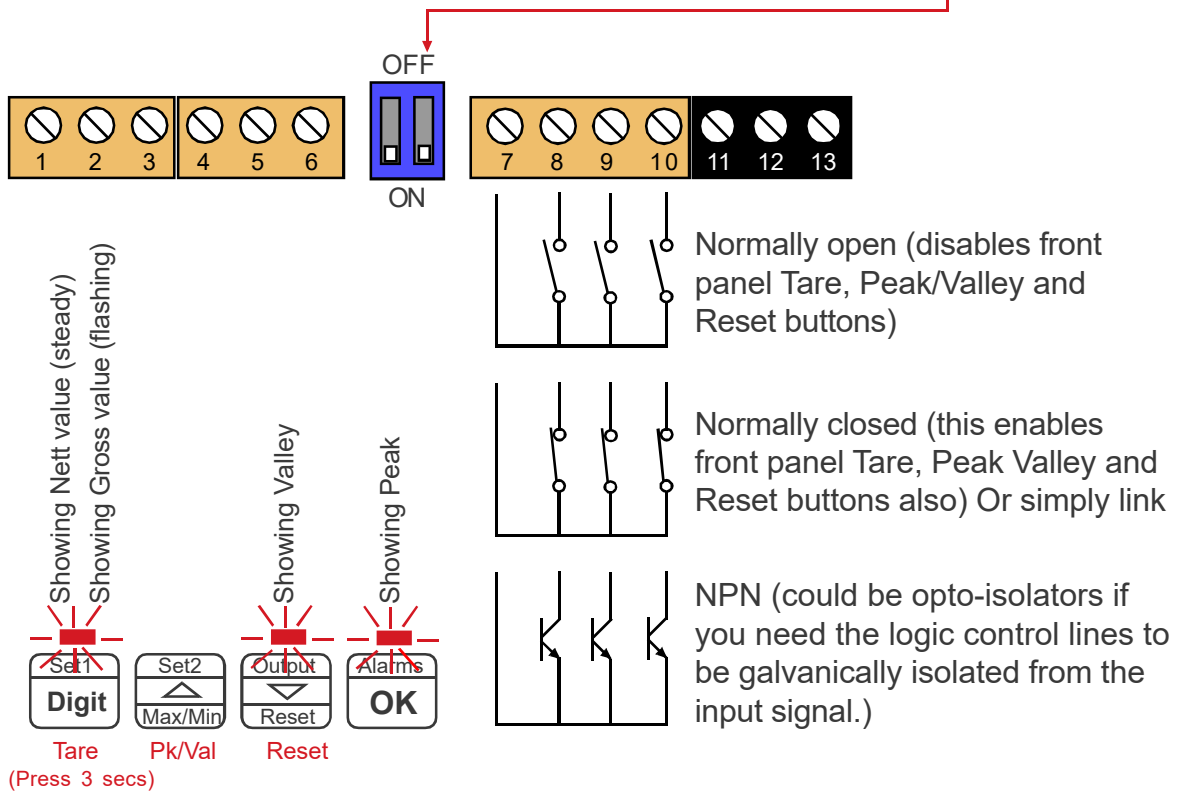
## Logic Input Connections & Front Buttons

The previous page explained how to select the functions of the 3 logic inputs. You can connect remote contact closures or open NPN collectors to activate these logic inputs.

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



- 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.
- PV** = Peak/Valley toggle. 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.
- RST** = Reset. This clears any tare, peak, valley, alarm latch
- HOLD** = Freezes the displayed value for as long as the Hold input is closed
- NT.GR** = Allows you to toggle between Nett and Gross values on the display
- PA. 1 ..4** = Page Addresses, if MEM option is installed.

## 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

- 1

Set1 Digit	Set2 Max/Min	Output Reset	Alarms OK
---------------	-----------------	-----------------	--------------

Press 3 seconds

**Lockout Switch must be OFF**



Circuit board ON
- 2


Set1 Digit	Set2 Max/Min	Output Reset	Alarms OK
---------------	-----------------	-----------------	--------------

Press repeatedly until you see **L.D.X** where **X** is either 1,2,5,10,20 or 50  
(Default = **L.D. 1**)
- 3

Set1 Digit	Set2 Max/Min	Output Reset	Alarms OK
---------------	-----------------	-----------------	--------------

Press repeatedly to change the LST value to the one you want
- 4

Set1 Digit	Set2 Max/Min	Output Reset	Alarms OK
---------------	-----------------	-----------------	--------------



**Done!**

## Scale Factor Adjustment

After you have calibrated your meter, you can use the SCALE feature to make fine adjustments to calibration, without affecting the calibration itself.

### Example

#### 1. Changing weight units of measure from kg to pounds

You could also use the SCALE to convert your readout from kg to pounds, without affecting the calibration. Simply set SCALE = 2.205 and your meter which was calibrated in kg will now read in pounds.

#### 2. Correcting for gravitational variance

Your weighing system was calibrated where gravitational acceleration = 9.812m/s<sup>2</sup> (London) You then move the system to Bangkok where gravitational acceleration is reduced to 9.782m/s<sup>2</sup>

You can correct for this difference by setting Scale = 9.812 / 9.782 = 1.003, so that a given mass in Bangkok will show the same weight as it did in London. Set Offset = 0.0000 See [http://en.wikipedia.org/wiki/Earth%27s\\_gravity](http://en.wikipedia.org/wiki/Earth%27s_gravity)

1


Set1  
Digit

Set2  
▲  
▼  
Max/Min

Output  
▲  
▼  
Reset

Alarms  
OK

**Lockout Switch must be OFF**



OFF

Circuit board ON

Press 3 seconds

2

Set1  
Digit

Set2  
▲  
▼  
Max/Min

Output  
▲  
▼  
Reset

Alarms  
OK

Press repeatedly until you see **SCAL**, followed by the existing scale factor. (Default = **00 1.0**)

3

Set1  
Digit

Set2  
▲  
▼  
Max/Min

Output  
▲  
▼  
Reset

Alarms  
OK

Use DIGIT button to select each digit in turn, UP or DOWN buttons to increase or decrease each digit's value. Press OK when done.

4

Set1  
Digit

Set2  
▲  
▼  
Max/Min

Output  
▲  
▼  
Reset

Alarms  
OK

**Done!**

Press to accept

You may want to adjust an offset value also, see separate OFFSET page for this feature.

## Offset Adjustment

After you have calibrated your meter, you can use the **OF.ST** feature to make fine additions or subtractions to the reading, without affecting the calibration itself.

1

Set1 Digit Set2 Max/Min Output Reset Alarms OK

Press 3 seconds

Lockout Switch must be OFF

Circuit board ON

2

Set1 Digit Set2 Max/Min Output Reset Alarms OK

Press repeatedly until you see **OF.ST**, followed by the existing offset value. (Default is **000.0**)

3

Set1 Digit Set2 Max/Min Output Reset Alarms OK

Use DIGIT button to select each digit in turn, UP or DOWN buttons to increase or decrease each digit's value. If you want to set a negative value, use DIGIT to select the left hand digit, and press the down button to go below 0 to activate the - sign. Press OK when done.

4

Set1 Digit Set2 Max/Min Output Reset Alarms OK

Press to accept

Done!





You may want to adjust a SCALE FACTOR value also, without affecting calibration. See the separate SCALE page for this feature.

## 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.

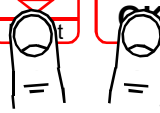
1


**Lockout Switch must be OFF**



**OFF**







Press together, briefly



**ON**

2


Press repeatedly until you see **09. XX** where **XX** is the delay in seconds. Choices are ...

**09. 10**





**09. 20**

**09. 30**

**09. 60** (default)




3





Press DOWN or UP button briefly and repeatedly to choose from


**09. 10** or **09. 20** or **09. 30** or **09. 60**




Press briefly to toggle

4



**Done!**

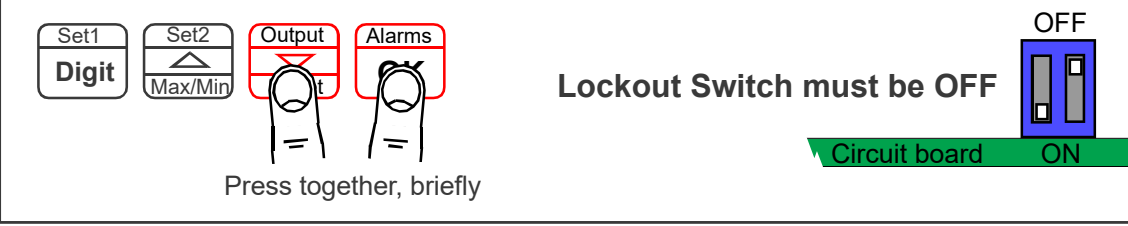


Press to accept

## 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.

**1**

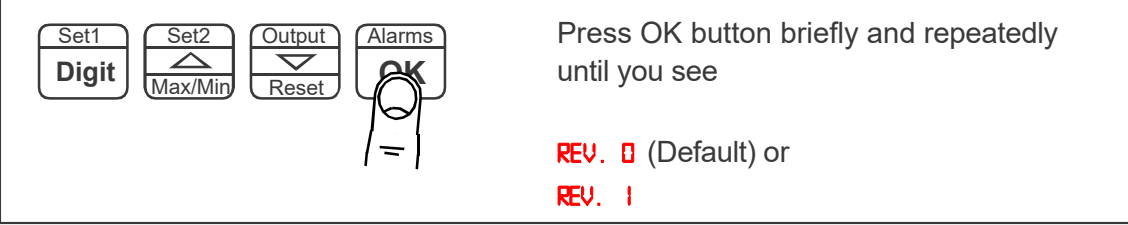


Press together, briefly

Lockout Switch must be OFF

Circuit board ON

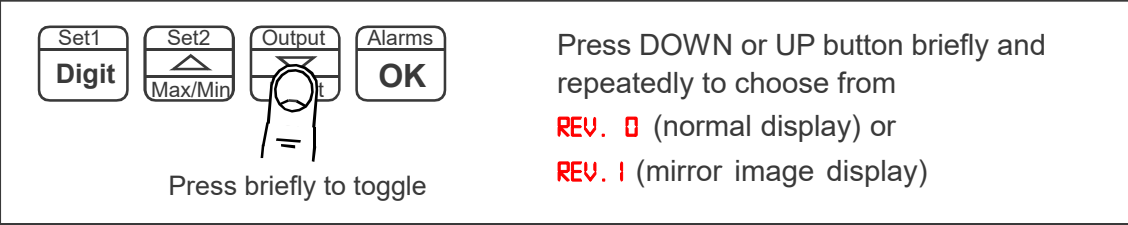
**2**



Press OK button briefly and repeatedly until you see

REV. 0 (Default) or  
REV. 1

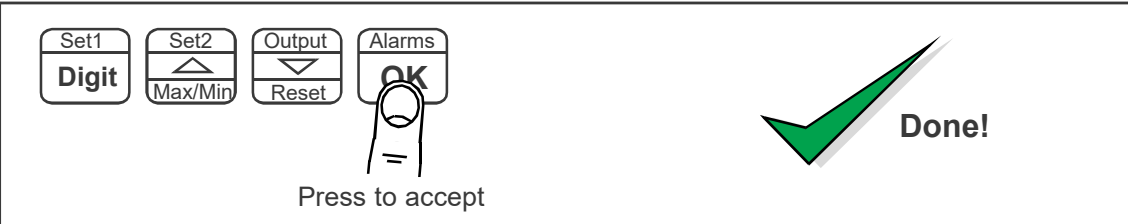
**3**



Press briefly to toggle

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

**4**



Press to accept

Done!

REV. 0



Example of normal display format displaying the number 876543

REV. 1



Example of Mirror Reverse display format displaying the number 876543



## Bootup Routine & Tare Save Choices

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

The choices are:-

- BT 0** = Segment test, followed by a full summary of software revision, calibration audit number, model number, installed options.
- BT 1** = Segment test followed by model number (Default)
- BT 2** = No summary, meter displays the measurement value immediately power is applied.
- BT 3** = All segments illuminate permanently, until a button is pressed.

1


Set1
<b>Digit</b>

Set2
▲
Max/Min

Output
▼
Reset

Alarms
OK

**Lockout Switch must be OFF**



OFF

Circuit board ON

Press together, briefly

2

Set1
<b>Digit</b>

Set2
▲
Max/Min

Output
▼
Reset

Alarms
OK

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

Press OK button briefly and repeatedly

3

Set1
<b>Digit</b>

Set2
▲
Max/Min

Output
▼
Reset

Alarms
OK

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

Press briefly to toggle

4


Set1
<b>Digit</b>

Set2
▲
Max/Min

Output
▼
Reset

Alarms
OK

**Done!**



Press to accept

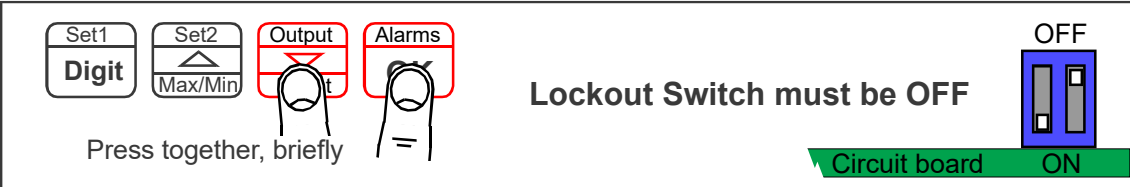


You can trigger the full summary message whenever you want, without having to power the meter off, by pressing and holding the 2 outer buttons (Set1 + Alarms) for more than 3 seconds.

## Language Selection for User Interface

You can select English or French menu prompts.

**1**



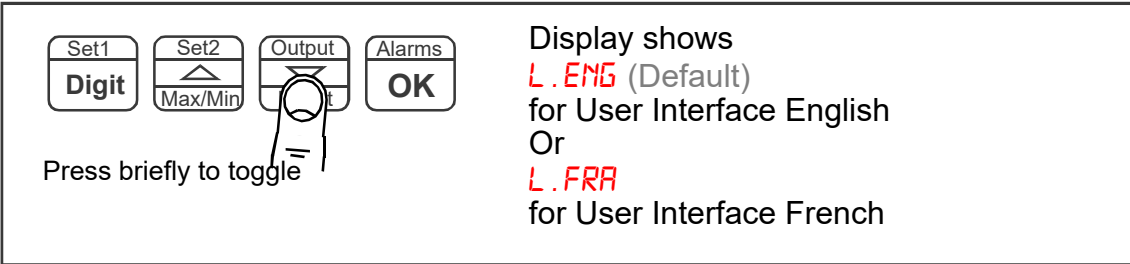
Set1 Digit    Set2 Max/Min    Output    Alarms

Press together, briefly

Lockout Switch must be OFF

Circuit board ON OFF

**2**




Set1 Digit    Set2 Max/Min    Output    Alarms

Press briefly to toggle

Display shows  
*L.ENG* (Default)  
 for User Interface English  
 Or  
*L.FRA*  
 for User Interface French

**3**



Set1 Digit    Set2 Max/Min    Output Reset    Alarms OK

Press to accept

Done!

## Multi-Program Memory Option ‘MEM’

The three contact closure inputs on the rear of the meter may be used to call up between 1 to 7 additional meter setup memories (pages), if the MEM option has been installed. This allows you to save up to 8 complete sets of independent calibrations, alarm settings, analogue output settings and serial comms settings.

First decide how many memory pages you want, as this will determine how many logic inputs you will need to use for the addressing. Logic inputs not required for Page Addressing can be used for other functions such as Tare, Reset, Display Hold, Peak/Valley display.

If you have used all 3 logic inputs for Page Addressing, you can still use the meter’s front panel buttons to perform Tare, Reset and peak/Valley view.

**See “Contact Closure Input Functions” page for CC.1, CC.2, CC.3 & COP settings**

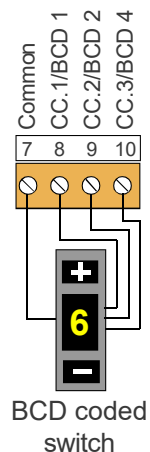
Total number of pages	Logic Inputs required for addressing
1	none, standard single page meter
2	1 Set CC.1 = PA.1
3 or 4	2 Set CC.1 = PA.1, Set CC.2 = PA.2
5 to 8	3 Set CC.1 = PA.1, Set CC.2 = PA.2, Set CC.3 = PA.4

1. Set lockout switches OFF, and set page address to 0 or unplug the logic connector.
2. Set the copy instruction to **COP. 1** in page address 0 ( found after you set CC3) .
3. Press all 4 buttons together, display shows **DEF . N**
4. Press the Up arrow to change display to **DEF . Y** and press OK.
5. If you want all channels to share a common setting, eg. calibration, do that setting now.
6. When you want to do separate settings for each channel, set COP.0

### Programming and recalling individual pages

Plug the logic input connector back in, if you removed it earlier. Select a page address using the switch combinations shown below, wired to the Logic Input connector ...

Page address 0	All logic inputs open
Page address 1	CC.1 closed to Common
Page address 2	CC.2 closed to Common
Page address 3	CC.1 and CC.2 closed to Common
Page address 4	CC.3 closed to Common
Page address 5	CC.1 and CC.3 closed to Common
Page address 6	CC.2 and CC.3 closed to Common
Page address 7	All logic inputs closed to Common



Perform the settings you require, according to the pages in this manual. Do this for all page addresses required. Then put the lockout switch in its ON position. Now, if you select a page address, the meter will briefly confirm the chosen page address on screen, and will then function according to the settings you programmed for that address.

Suitable BCD coded switches are available from many electrical supply stores. For example consider Kraus & Naimer part A540-600 E24 or Apem part number IRBC10N1248 or London Electronics part number SW2P-8W-BCD, which also provides separate 2 pole 8 way signal selection function.

## Error Codes & Fault Findings

**-UR-**

1. Under Range. The meter is being asked to display a value which is more negative than its limit of -1999

**-OR-**

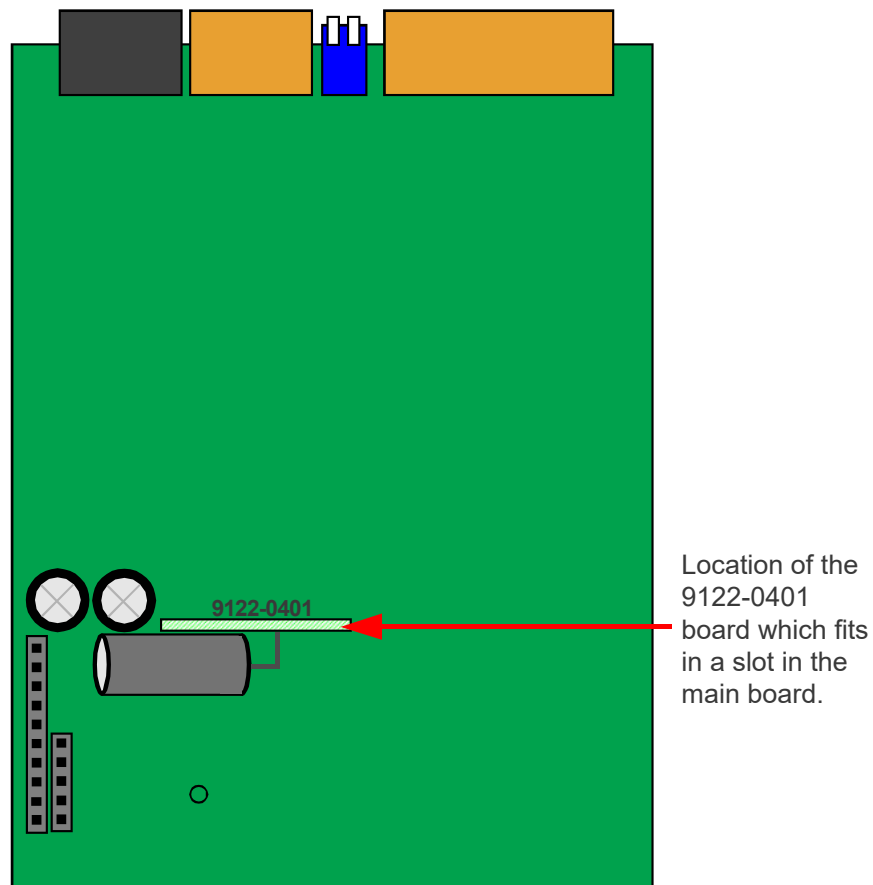
2. Over Range. The meter is being asked to display a value which is higher than its limit of 9999

These fault codes could be displayed because the signal scale factor has been set too large or because the input frequency is too high.

3. Display is reading much higher than you expect and may also be erratic. This could be caused by contact bounce if you are using a contact closure input - be sure that the contact debounce is enabled **DB. 1**

4. Total is not saved on power-down in a DC powered totaliser.

This could be caused by converting a DC powered INT4-P, INT4-L, INT4-S etc to an INT4-C. If you have converted one of these models to INT4-C, simply by changing the input board, you will find that total is not stored at power-down. You will need to fit a power-down control module, part number 9122-0401 to the display control board.



## How To Install Option Boards



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

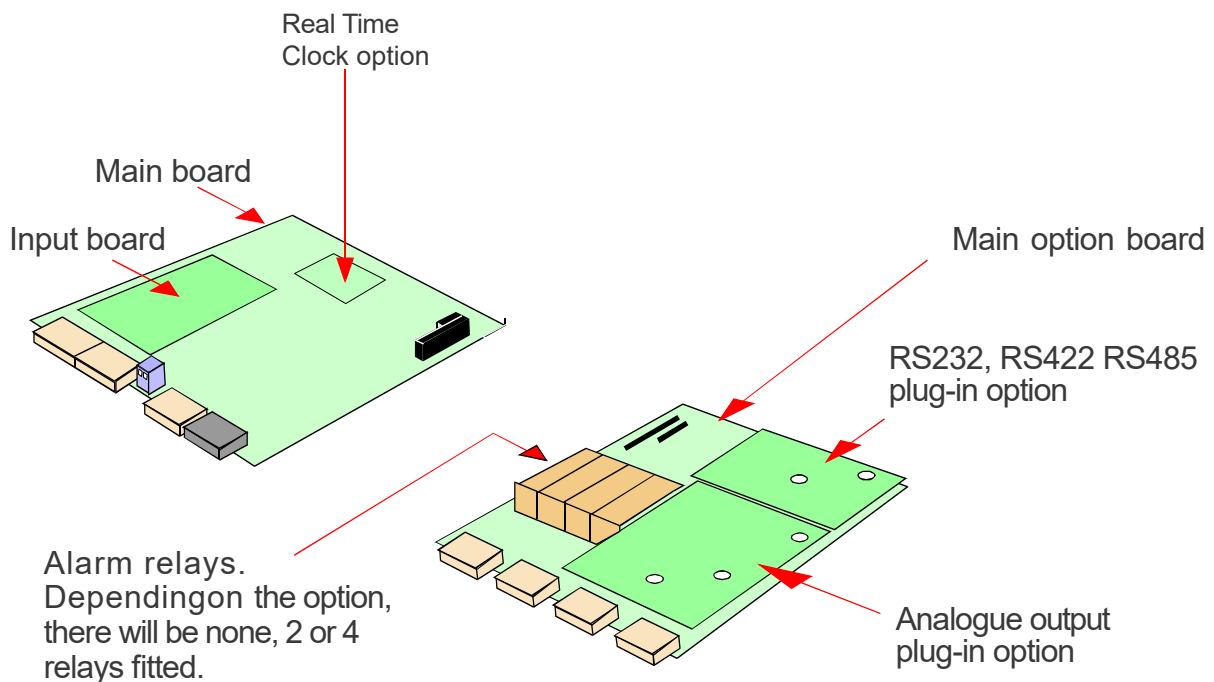


**Warning:** Disconnect power before you expose the internals of the display

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

- 1) Switch off power to the display and unplug all connectors.
- 2) Undo all the thumb screws on the rear case, store them safely and remove the back panel
- 3) Locate the main option board, which will be similar in appearance to the diagram below. If a main option board is absent, which will be the case if the display was ordered without any output options, then a main option board will need to be fitted.

The board assemblies will look like this...



The analogue output and RS232 or RS422 plug-in option boards are fixed to the main 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.

## 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

TECHNICAL DATA									
Digit Height (inches)	2"	4"	6"	8"	12"	16"	24"	32"	48"
Digit Height (mm)	57mm	102mm	150mm	200mm	300mm	400mm	600mm	800mm	1200mm
Viewing Distance (feet)	75ft	150ft	225ft	300ft	450ft	600ft	900ft	1200ft	1800ft
Viewing Distance (metres)	25m	50m	75m	100m	150m	200m	300m	400m	600m
Number of Digits	4 or 6								
Digit Format	8.8.8.8. or 8.8.8.8.8.8.								
Input Signal	NPN, PNP, Contact Closure, 24V logic, AC tachometer, 100mV passive Inductance pick up								
Accuracy	+/- 0.05% of range								
Excitation Voltage	24V @ 30mA								
Digit Colour	Blue, green, red, white or yellow								
Brightness	Indoor or outdoor with 7 levels of adjustment								
Power Supply	95-265V AC (standard), 11-30V DC (optional), 48V AC (optional)								
Power Burden	40VA maximum								
Mounting	Brackets supplied for wall, suspension or panel mounting								
Front Panel Controls	Up to 200mm high digits, above 200mm high digits requires an optional wired or wireless controller								
Logic Inputs	3 x NPN or contact closure for TARE, PEAK/VALLEY and RESET								
Environmental									
Enclosure Material	Heavy duty welded uPVC								
Lens Material	Acrylic								
Sealing	IP65								
Storage Temperature	-20°C to +70°C, non-condensing								
Operating Temperature	0°C to +50°C, non-condensing								
Extended Operating Temperature	-25°C to +50°C, non-condensing (with optional heater fitted inside display)								
Connectors	Internal detachable screw terminal connectors accessed via compression glands								
Analogue Output (optional)									
ANB Option	-10 to +10V into loads >1k Ohms, resolution 0.4mV								
ANI Option	0-20mA or 4-20mA into loads <500 Ohms, resolution 0.4uA								
ANV Option	0-10V into loads >1k Ohms, resolution 0.2mV								
Scaling	Fully adjustable, direct or inverse. Can be derived from GROSS or NETT value								
Response Speed	Derived from displayed value, updated x10 per second, display filtering applies to analogue output								
Linearisation	Derived from displayed value								
Isolation	250V AC optically isolated from input, logic, excitation, power, alarms and data output ports								
Accuracy	+/- 0.1% of range								
Linearity	+/- 0.02% of range								
Stability	+/- 50ppm/°C								
Alarm Outputs (optional)									
AL2 and AL4 Option	2 or 4 x SPST mechanical relays, 2A @ 250V AC, resistive load								
DSS and QSS Option	2 or 4 x solid state relays, specify AC or DC, 100mA max @ 250V AC, 500mA max @ 60V DC								
SPCO Option	2 x SPCO mechanical relays, 2A @ 250V AC, resistive load								
Response Speed	For mechanical relays allow 105mS, for solid state relays allow 100mS								
Data Output (optional)									
232 Option	RS232 ASCII								
485 Option	RS422/RS485 ASCII + Modbus ASCII								
RTU Option	Modbus RTU								
Response Speed	Derived from displayed value, updated x10 per second, display filtering applies to data output								
Isolation	250V AC optically isolated from input, logic, excitation, power, alarms and analogue output ports								

## Record of Revisions

6 September 2010	Version F00.18 Software released. Manual format revised to improve clarity and segregate easy from advanced menu functions. Optional outputs now described in their own dedicated manuals. Cabling guidance added.
1 February 2011	Version F00.20 software released.
3 February 2011	Version F00.21 software released
28 February 2011	Warranty increased to 3 years and terms added.
22 August 2011	Corrected remote programmer connector details
20 March 2017	F4 software released
1 February 2019	Corrected target and filtering text errors.
12 September 2022	Amended helper URL for Production Rate mode
20 September 2022	Amended UKCA certification
20 June 2024	Backing screws changed to 'M3x8 Socket Flange Button Head Screws'





## 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