

London Electronics Limited

Warren Court, Chicksands, Shefford, Bedfordshire SG17 5QB

Tel +44(0)1462-850967 Fax +44(0)1462-850968

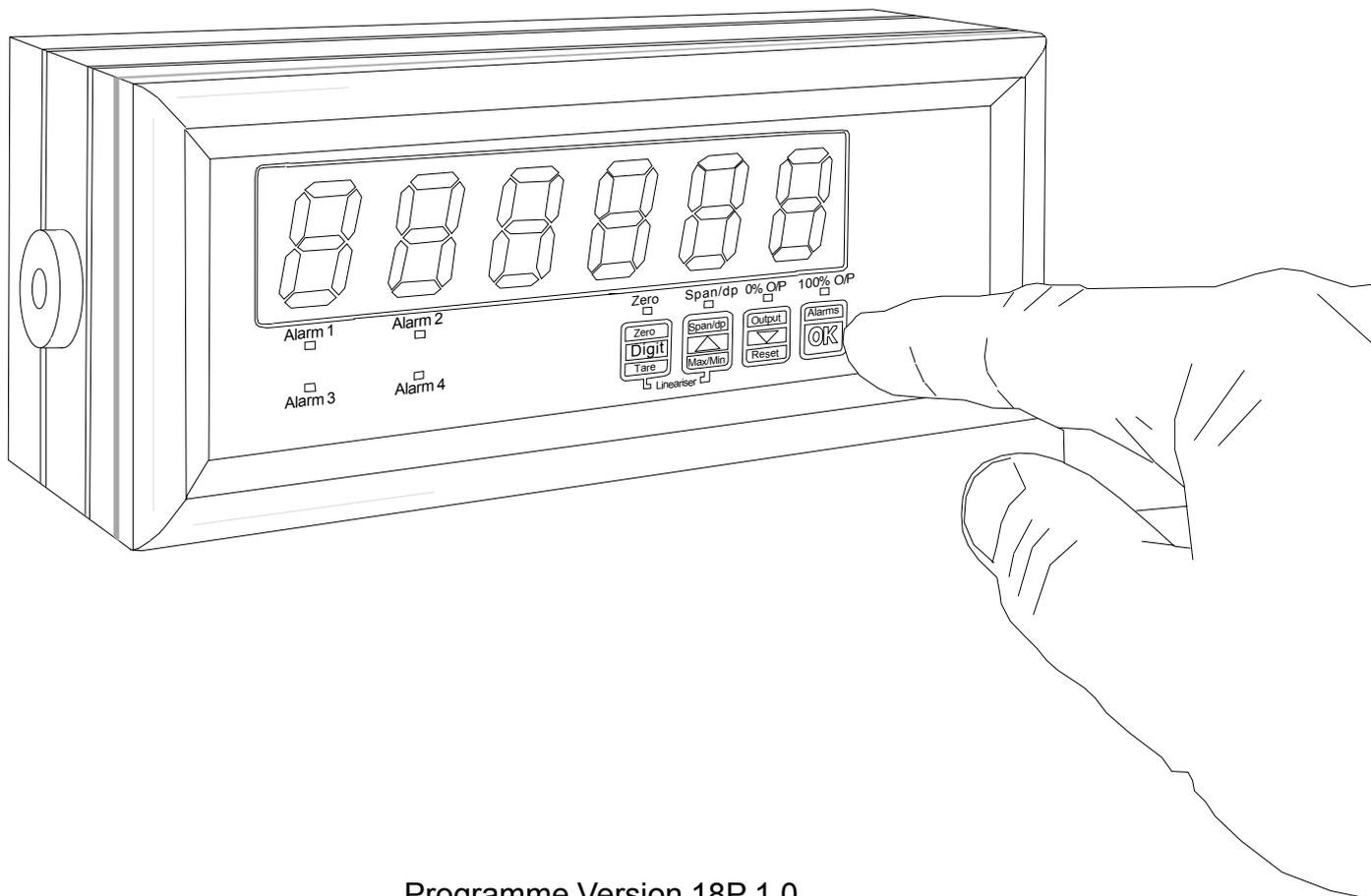
www.london-electronics.com help@london-electronics.com

Model P1861

Display accepting 4-20mA, 0-10V and other process signals

IP65 All-round Sealed Enclosure

Dual alarm relays optional



Programme Version 18P 1.0



Document Ref:Anfield\manuals\english\P1861

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Rev. 0

Notes

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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 for you.

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

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

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 at some times, for example during our factory shutdown periods, you may have to wait several weeks for an equivalent replacement. Or, we may have no stock at the time you urgently need it.

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

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

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

We thought you'd prefer to know about possible delays and extra charges now, rather than during a panic.

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.

Warnings



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

- * Connect the meter according to current IEE regulations and separate all wiring according to IEC1010.
- * Power supplies to this equipment must have anti-surge (T) fuses at 125mA for 230V supply, 250mA for 110V supply or 1A for DC supplies in the range 11-30VDC.
- * Check that the model number and supply voltage suit your application before you install the meter.
- * 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 with a soft damp cloth. Only lightly dampen with water. Do not use any other solvents.

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

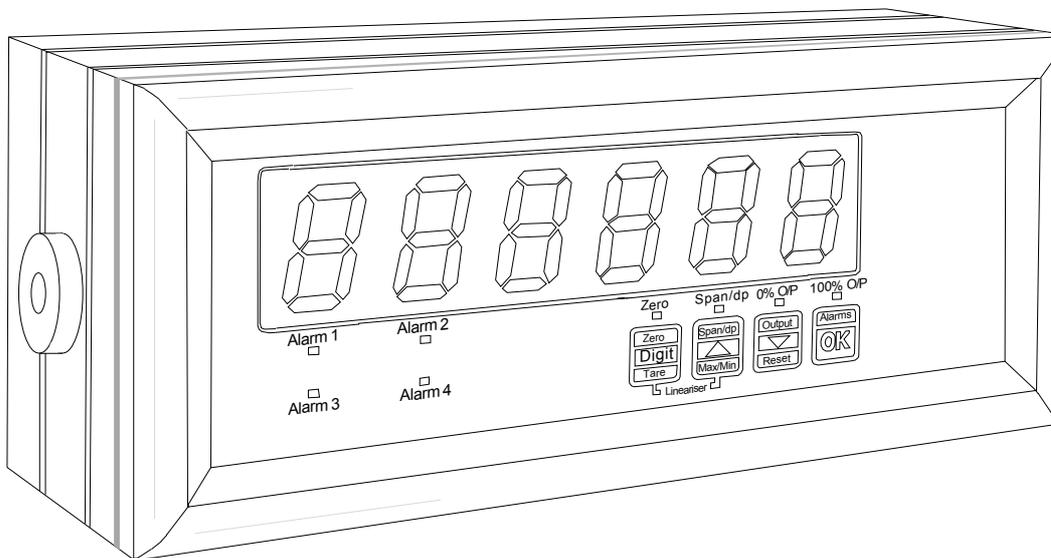
Description

The P1861 accepts process signals such as 4-20mA, 0-10V etc and can be scaled to give a reading in engineering units. Up to 5 digits may be used for the display value.

It can give optional alarm relay outputs, which can be generated by comparing the displayed value to adjustable high or low limits.

The front panel comprises of a 6 digit LED display, including decimal points and minus sign.

The alarms each have a red LED annunciator - at present only 2 alarms are active when the alarm option is installed.



All calibration adjustments are made with front panel pushbuttons.

A lockout connector allows you to disable the front panel programming buttons, to prevent loss of calibration.

Before you start ...

First, please check that the display will suit all the requirements of your application. Page 2 has some important warnings - please check that all warnings are covered.

Next, set the jumpers on the back of the display to suit your application. See page 5.

Remove the rear screws and slide the case apart. Connect the signal and power cables to the appropriate screw terminal connectors. See page 5 to check that you are using the correct terminals.

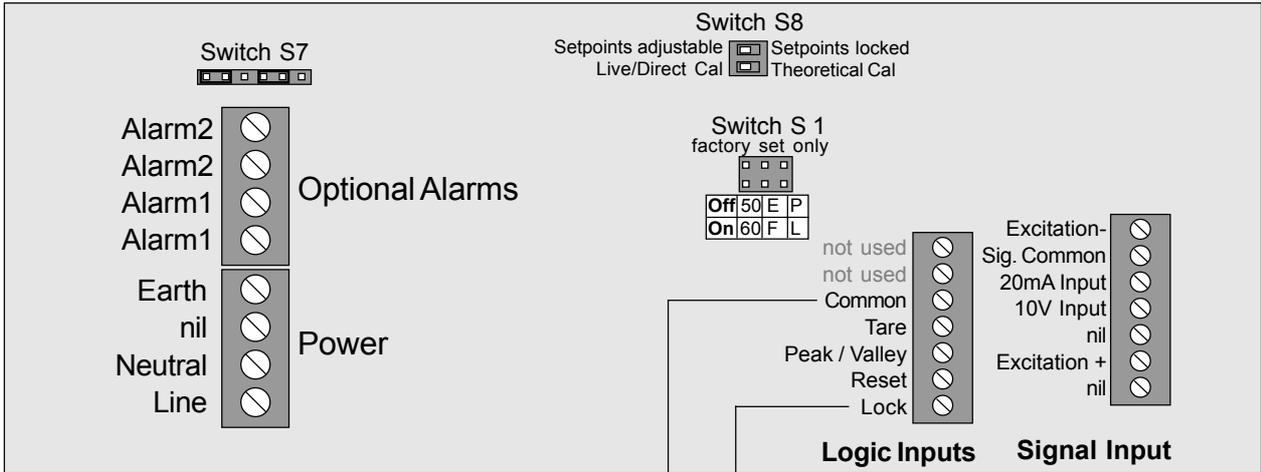
Apply power, and confirm that the meter illuminates all segments for a few seconds and then shows the software version "18P. 1.X" briefly (The X numeral depends on revision level. The revision level is mentioned on the front cover of this manual. Please check that the number on the manual is the same as that you see on the display).

Unlock the display so you can change the meter's settings - see connections page 5.

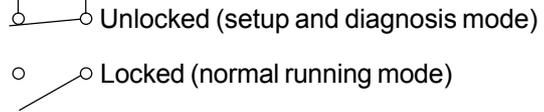
Set scaling, decimal point position, filtering, alarm levels etc. to suit your system. Inject an analogue input signal within range. The meter should respond correctly.

To safeguard your settings you must set the lockout to ON when you have finished testing and commissioning - see connections page 5.

Connections

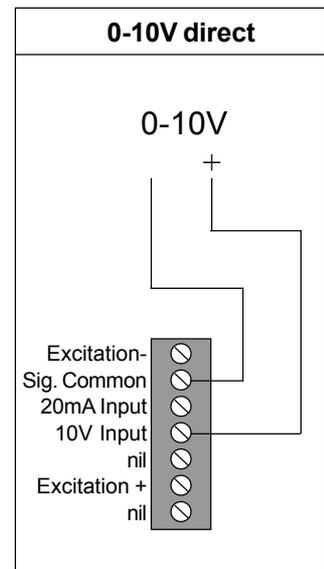
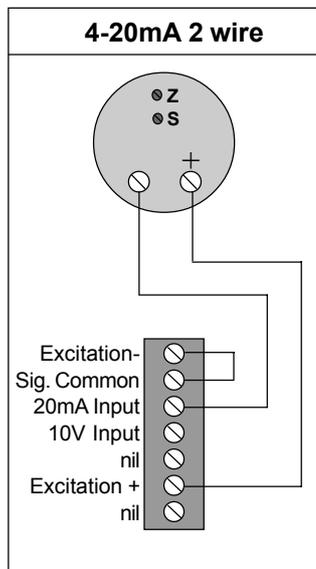
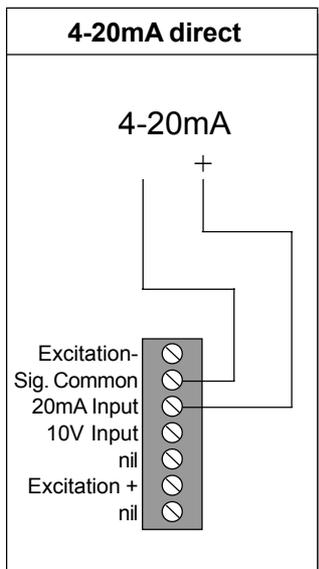


You could use a remote keyswitch to unlock the display for periodic re-calibrations, or simply remove any connection to the Lock terminal for maximum security of your settings.



Use screened cables for input signal and contact closure logic functions. Install these cables well away from noise-carrying cables and devices, to minimise the chances of interference.

Examples of Input Signal connections for different signal types ...



Choosing a Calibration Method

You can choose one of two calibration methods...

1) Calibration without an input signal. This is 'THEORETICAL' Calibration

You can use this method if you know the calibration of your sensor. Assume your sensor gives 4-20mA for 0-250 bar.

You should first select the 'THEORETICAL' calibration position on switch S8 inside the meter.

Then, using the buttons on the meter, you will tell the meter what 0% input signal level will be (4mA) and what 0% reading value will be (0). Next, tell it what 100% input signal level will be (20mA) and what 100% reading value will be (250)

2) Calibration by injecting signals into the meter, either from a calibrator or a sensor installed in a system. This is 'DIRECT' Calibration.

Select the 'DIRECT' calibration position on switch S8 inside the meter.

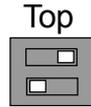
Inject a signal to the meter equal to 0% of signal range. (If the signal is from a sensor, you don't need to know the value of signal, only what the meter should read. Assume your pressure sensor covers 0-250 Bar) Use the buttons on the meter to tell the meter what to read when no pressure is applied to the sensor.

Now apply a signal 100% of range (If the signal comes from a sensor, apply 250 Bar to the sensor, if possible. If you can't apply 100% of range, apply a lesser, known pressure. Calibration accuracy will be better with larger signals) Use the buttons on the meter to set reading to 250, or the lesser pressure you apply.

Separate pages cover each calibration method in detail.

Direct Calibration - (use live input signals)

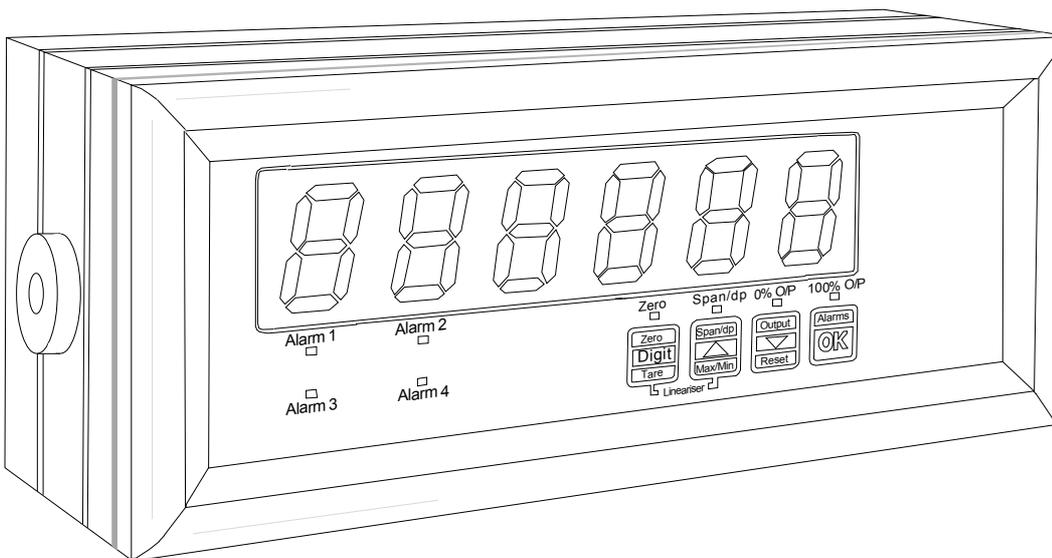
Set switch S8 as you see here if you want to **prevent** adjustment of alarm levels, filtering and count-by settings.



Set switch S8 as you see here if you want to **permit** adjustment of alarm levels, filtering and count-by settings.



Unlock the display. To do this, **connect** 'LOCK' to 'COMMON' on the logic input connector. (see connections page)



Connect the meter to power and a steady input signal before you start.

How to set SPAN and DECIMAL POINT

- 1) Apply 100% Cal. signal. Make sure it is steady before you proceed.
- 2) Press the SPAN Button for 3 seconds
- 3) The SPAN LED should flash
- 4) Set the display to read your desired value for the signal you're injecting. Do this with the DIGIT and UP/DOWN Keys. To change the decimal point position, use the DIGIT button to brighten the left-hand digit. Then, one more push of the DIGIT button will allow you to move the decimal point with the UP/DOWN buttons.
- 5) Press OK when the reading is correct.

How to set ZERO

- 1) Apply the Lowest cal. signal. Make sure it is steady before you proceed.
- 2) Press the ZERO Button for 3 seconds.
- 3) The ZERO LED should flash.
- 4) Set the display to read 0, or the desired reading for this signal. Do this with the DIGIT and UP/DOWN Keys.
- 5) Press OK when done

Lock the display to prevent unwanted changes. To do this, **disconnect** 'LOCK' from 'COMMON' on the logic input connector. See page 5.

Theoretical Calibration - (type-in input and display values)

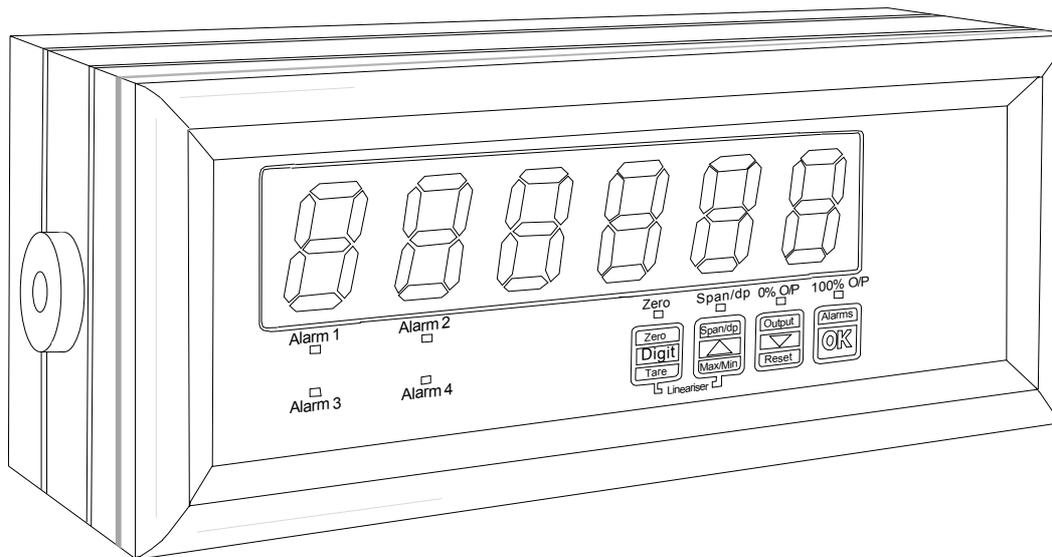
Set switch S8 as you see here if you want to **prevent** adjustment of alarm levels, filtering and count-by settings.



Set switch S8 as you see here if you want to **permit** adjustment of alarm levels, filtering and count-by settings.



Unlock the display. To do this, **connect** 'LOCK' to 'COMMON' on the logic input connector. (see connections page)



1) How to set SPAN and DECIMAL POINT

Press the SPAN button for 3 seconds. You'll see 'dC V' or 'dCA' for DC Voltage or DC Current. Use the up or down arrow to change, if needed, and then press OK.

You'll now see 'In HI'. This is 20.000 for a 4-20mA input signal, or 10.000 for a 0-10V input signal, etc. To change this value, use the 'DIGIT' key to select digits, and the 'UP' or 'DOWN' arrow keys to change them. Press the 'OK' button when done.

Now 'rd HI' appears briefly. This is what will be displayed for the IN HI input. If you want to change this value, use the 'DIGIT' key to select digits, and the 'UP' or 'DOWN' arrow keys to alter. The **Decimal point** position may be set after the most significant digit has been selected. Press the 'OK' button when you have finished.

2) How to set ZERO

Press the ZERO button for 3 seconds. You'll see 'IN LO' briefly, then a value, with one digit brighter than the other. This is 4.000 for a 4-20mA input signal, 0.000 for a 0-10V input signal, etc. If already correct, press the 'OK' button. Or, use the 'DIGIT' key to select digits, and the 'UP' or 'DOWN' arrow keys to change. When correct, press the 'OK' button.

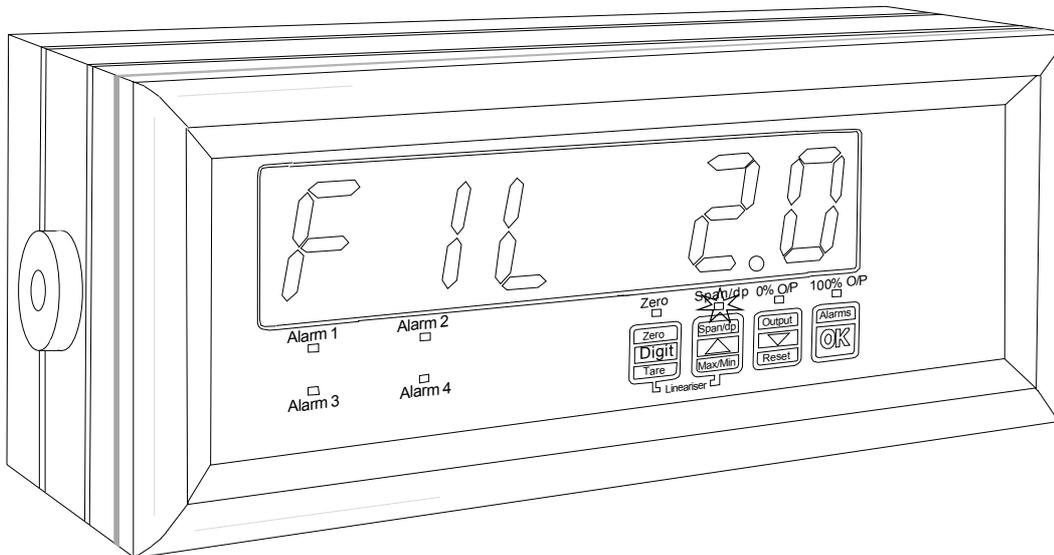
You'll now see 'LO rd' briefly, then a value, with one digit brighter than the other. This is what will be displayed for the IN LO input. If already correct, simply press the 'OK' button. Or, use the 'DIGIT' key to select digits, and the 'UP' or 'DOWN' arrow keys to change. Press the 'OK' button when done.

Lock the display to prevent unwanted changes. To do this, **disconnect** 'LOCK' from 'COMMON' on the logic input connector. See page 5.

Filter and Last Digit Roundup

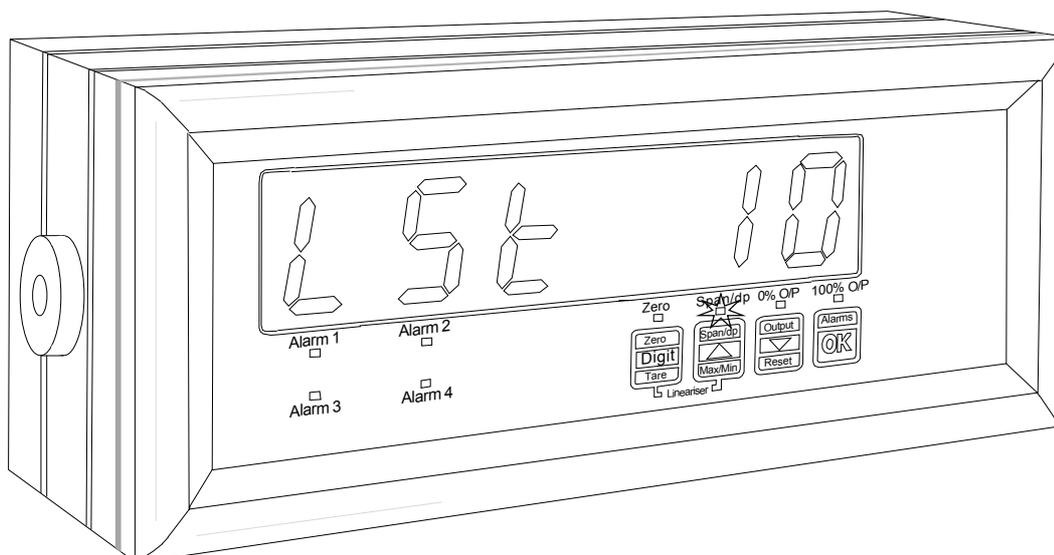
Unlock the alarms with S8 to access. See p5

Press the OK button 3 times to change the filter time constant, shown in seconds. Use the filter to improve display stability with fluctuating input signals. The UP and DOWN buttons select time constants in the range 0 to 5 seconds. Press OK when selected.



The filter time is similar to the time constant of an RC filter where $T=RC$. This is the time it takes for the display to reach 63 % of its change, after a step change on the input. If you have a 1 second filter time, it will take several seconds for the meter to reach its final value. For a fast response to large step changes, we briefly cancel the filter action for stable input step changes of over 64 counts, and then re-apply the filter to maintain stability.

After the filter setting, the display will show LSt and a number. This number sets the increments by which the meter will change its reading. Use the UP/DOWN buttons to select a roundup value. Press OK to accept.

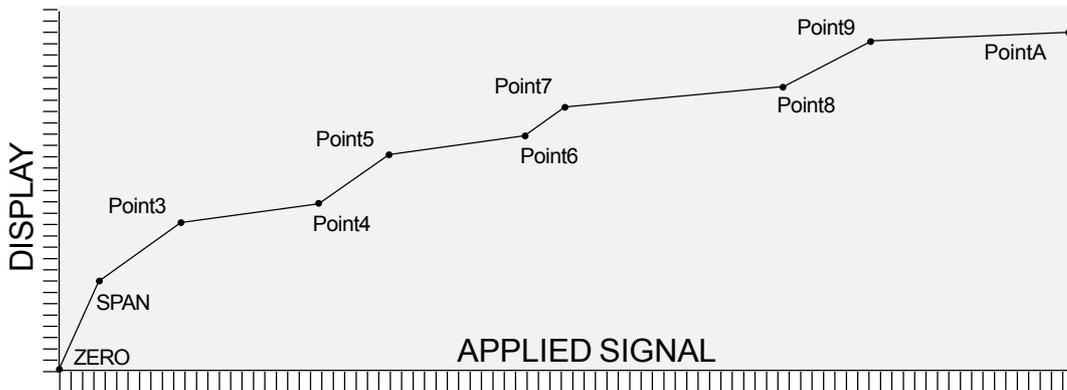


- | | |
|---|----------------------------|
| LSt = 1 Best resolution, but most sensitive to noise. | Sequence 0,1,2,3,4,5,6 ... |
| LSt = 2 | Sequence 0,2,4,6,8,0... |
| LSt= 5 | Sequence 0,5,0,5... |
| LSt=10 | Sequence 0,10,20,30... |
| LSt=20 | Sequence 0,20,40,60... |
| LSt=50 Lowest resolution, least sensitive to noise | Sequence 0,50,100,150... |

Using the Lineariser

You can enter up to 10 calibration points, to generate a curved function between input signal and displayed value. Each point **MUST** be greater in value than the previous one and the meter must be set for DIRECT calibration method.

(Note - linearising is only possible on meters set for DIRECT or LIVE calibration)



- 1) Calibrate the **first two points** using the ZERO pushbutton for the lowest input value and SPAN pushbutton for the 2nd input value. Use the direct calibration routine. **Do not calibrate SPAN with 100% input !**

- 2) Apply the 3rd input level and press both 'LINEARISER' Buttons. Display should show "POINT3".

Adjust the reading to the desired value using the DIGIT SELECT and the UP/DOWN pushbuttons.

Press OK when done.

- 3) Apply the 4th input level and then press both 'LINEARISER' Buttons. Display should show "POINT4".

Adjust the reading to the desired value using the DIGIT SELECT and the UP/DOWN pushbuttons.

Press OK when done.

Repeat this process for as many other calibration I/P's you wish to apply, up to a maximum of 10.

There is no time limit with these settings, so take as much time as you need to adjust each point. Do not remove power from the meter during the procedure, or your settings will be corrupted.

Please set the calibration lockout switch ON when complete, to save your settings.

Logic Input functions

Tare Command

To force the reading to zero, you can either press the front panel tare button for 2 to 3 seconds, or apply a remote contact closure to the Tare input logic connector. Following readings will be the 'net' value, offset by the reading at the time the tare switch was operated. The tare value is stored in non-volatile memory. The ZERO led will light to show that the meter has been tared.

To reset the tare from the front panel, press the Tare button and the Reset button together. The ZERO led will go out when the tare offset has been cleared.

Front Panel key Taring

- 1) Link COMMON terminal to TARE terminal
- 2) The meter must be LOCKED for taring to function (no connection to the LOCK terminal)
- 3) Press ZERO key to tare display

Remote contact closure taring

- 1) Connect a normally-open switch between COMMON terminal TARE terminal
- 2) The meter must be LOCKED for taring to function (no connection to the LOCK terminal)

Peak and Valley Detection (Maximum/Minimum Reading View)

The meter can store the lowest and highest reading values in memory. You can see these values by briefly pressing the MAX/MIN front panel button, or by using remote contact closure switches. The first press shows peak, with the upper left hand indicator bar lit. The second press shows valley, with the lower left hand indicator lit. The display returns to the running value after 2 or 3 seconds. Peak and Valley values are not stored if you switch the meter off.

How to use the MAX/MIN button to view Peak or Valley

- 1) Link COMMON terminal to PEAK/VALLEY terminal
- 2) The meter must be LOCKED for MAX/MIN to function (no connection to the LOCK terminal)
- 3) Press UP arrow key (MAX/MIN) for peak, valley, normal

Remote contact closure viewing of Peak/Valley

- 1) Connect a normally-open switch between COMMON terminal and PEAK/VALLEY terminal
- 2) The meter must be LOCKED for MAX/MIN to function (no connection to the LOCK terminal)

Reset Command

Use the reset command to clear peak or valley data, tared offsets and in-flight compensation data. It may be accessed either from the front panel or by external contact closure command.

To reset the Peak and Valley memories, you must activate the Peak/Valley button or Peak/Valley logic input at the same time as you activate the Reset command.

To reset the Tare offset, you must activate the Tare button or Tare logic input at the same time as you activate the Reset command,

Front Panel key reset command

- 1) Link COMMON terminal to RESET terminal
- 2) The meter must be LOCKED for Reset to function (no connection to the LOCK terminal)
- 3) Press Down Arrow key to reset display

Remote contact closure resetting

- 1) Connect a normally-open switch between COMMON terminal and RESET terminal
- 2) The meter must be LOCKED for Reset to function (no connection to the LOCK terminal)

Features

Automatic Zero-Drift Compensation

This feature is useful in applications where your meter reads zero most of the time. It cancels long-term zero drift caused by ageing, temperature change, etc. If the reading is within 7 counts of zero for around 100 seconds, the reading will go to zero without changing basic calibration.

The correction is **not** stored when the meter is switched off and is cleared if you activate RESET for more than 3 seconds. To activate this feature, set the display value at 0% input to MINUS ZERO (-0)

Calibration Counter / Tamper detector

An internal totaliser counts each change to the meter's calibration.

The 'CAL XX' value appears for a second or two after you switch the meter on. The number starts at 00 and can go up to FF (255 counts).

It does not count changes of setpoints, or changes of filter value or count-by value . It stores the total in non-volatile memory which can not be reset, so is useful if you want to keep track of the meter's calibration history, perhaps as part of an audit trail.

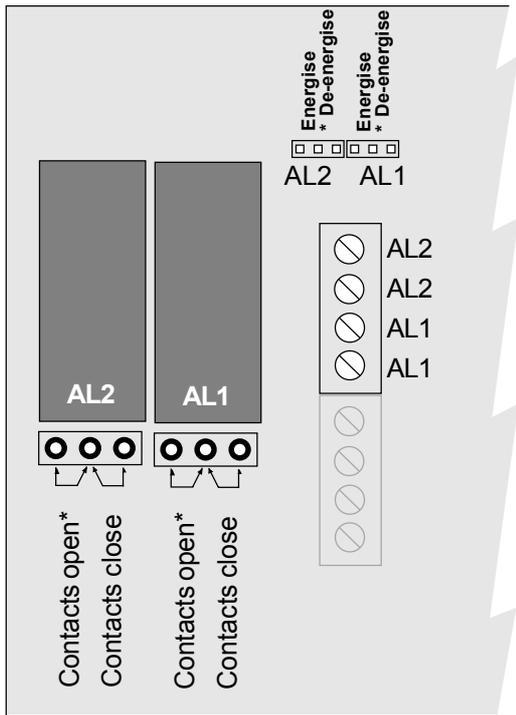
Alarm configuration and adjustment

We configure the alarm relays to be failsafe by default. This means on alarm, the relay de-energises and the contact opens.

You can change this action if you want, by way of push-on jumpers, whose positions and functions are shown below...

Choose the relay action to suit your application, and place the jumpers to suit.

Default = De-energise on alarm, contacts open on alarm (failsafe)



Energise = Relay coils are powered in alarm (non-failsafe)
De-energise = Relays are not powered in alarm (failsafe)

* = Default condition

Setting alarm levels

Each time you momentarily press the alarm button, you can see the alarm level for each channel. The LED "Alarm 1" or "Alarm2" will illuminate to show you which channel's value you are viewing.

You can alter the alarm level and action if you press the alarm button for more than 3 seconds.. Alarm action is set with the left-hand character, which is 'H' for HIGH, 'L' for LOW or 'o' for OFF, which means inactive.

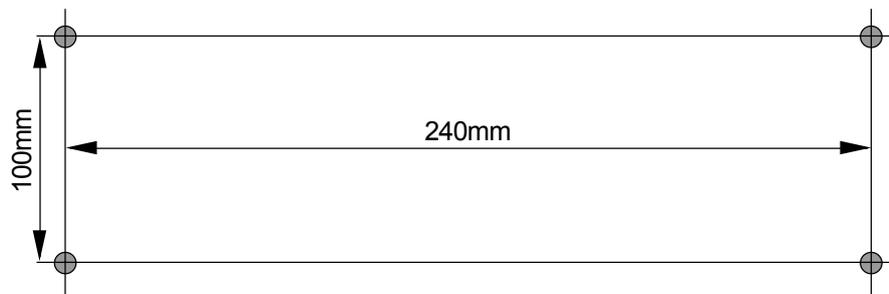
You can change the values, to suit your application, using the DIGIT and UP / DOWN buttons. The DIGIT button selects each digit in turn (you'll see the selected digit is brighter than the others) and the UP or DOWN buttons increase and decrease the digit's values.

The hysteresis value is identified after the alarm level and action has been set, by 'Hy'. The hysteresis value can be set in the same manner, using DIGIT, UP and DOWN buttons.

The hysteresis value is a direct offset from the alarm value. For example, let's assume your alarm level is set to High at 100 and the Hysteresis is set to 20. The alarm will occur when the input rises to 100 and will reset when it drops to 80.

Specifications

Input Signals (bipolar)	4-20mA 0-10mA 0-10VDC 1-5VDC Custom Ranges
Input Resistance	33 Ohms 33 Ohms 1 Meg 1 Meg Ask factory
Accuracy	+/-0.05% of range
Span tempco	50ppm/Degree Celsius
Zero Tempco	20ppm/Degree Celsius
Excitation voltage	24VDC +/- 20% rated at 50mA
Filtering / smoothing	Selectable time constants of 0 to 5 seconds in 0.5 second steps.
A/D conversion	Dual slope 10 conversions per second. Resolution 1 in 63000 max. over the full range
Display update rate	Every 400 milliseconds (2 1/2 readings per second)
Bezel dimensions	95mm high by 240 mm wide
Cutout dimensions	87mm high by 232 mm wide (for panel mounting only)
Case depth	130mm behind the panel , including connectors/glands/cables
Weight	1300 grammes typically
Wall Mounting	4 off 5mm diameter holes, spaced as shown below.



Case material	PVCu black housing, neoprene gaskets, polycarbonate window Stainless steel closure screws
Connectors	Detachable screw terminal types, within the sealed enclosure Access via compression glands on rear of case.
Temperature	Storage -10 to +70, operating 0 to +50 °C
Power	95-265 VAC or 11-30 VDC to special order.
Consumption	8 Watts maximum
ALARM outputs	2 optional alarms, SPST rated 5A, 250 VAC, resistive

Modifications and revisions

Revisions and modifications may be made from time to time, for several reasons

- 1) If users ask for new options to be included in the functions.
- 2) If users ask for functions to be modified in some way
- 3) Whenever errors in the manual are corrected
- 4) Whenever errors in the programme software are corrected
- 5) When the product is otherwise improved or developed

4 September 2004 Product released with 18P 1.0 software

Notes

Declaration of Conformity

Declaration Reference : INTUITIVE
Issue Date : 9 October 1998 revised 31 July 2003
Products Covered : INTUITIVE series
Title : DOC-INTUITIVE

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

EN61326-1:1997

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

EN61010-1:2001

Conditions

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

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

Signal cabling shall be routed separately to power carrying cabling (includes relay output wiring)
All signal cabling shall be screened. The screen shall only be terminated to the power earth terminal.

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

Warren Court, Beds.

J.R.Lees Director