London Electronics Limited
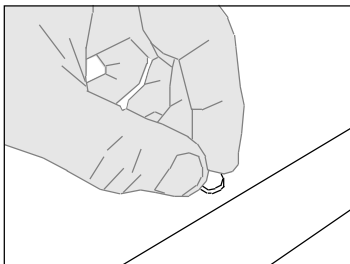
Large display scalable process signal display

EasyReader Model ER4P

Connection details, scaling and general information

Rear case screws - please note

The rear panel is held in place with finger-screws, which only need to be gently tightened.
Do not use tools to tighten or loosen the screws, as this could cause damage to the internal threads.

Alphabetic Index

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 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.

* We designed this meter for Pollution-Degree 2 environments only. This means you must install it in a clean, dry environment.

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

General Description

The EasyReader displays are large versions of the popular "Intuitive" Lite process meter family.

They use a dual slope integration method to give up to 9999 count resolution of +/-20mA or +/-10V analogue input signals. This allows for normal 4-20mA and 0-10V process signals with 9999 count resolution, and 1-5V process signals with at least 9999 count resolution.

You can scale the meter in engineering units to give up to -1999 or +9 999 display range, with selectable decimal point position.

You can either scale the meter theoretically, using stored calibration figures, or directly, using signals generated from the process system itself.

An excitation supply gives you loop power for 4-20mA process transmitters.

These meters have some features of their parent "Intuitive" meters :

-     *   Digital signal filtering
-     *   Last digit rounding (count by 1, 2, 5, 10, 20, 50)
-     *   Minimum (valley) and maximum (peak) reading memory
-     *   Display taring

We offer two power option models 95-265 VAC or 11-30VDC

Getting Started

First, check that the display will suit your application and the available power source (either 95-265 VAC or 11-30 VDC).

If you asked us to configure the display for you, please check that the scaling and settings agree with your requirements.

We fully tested and calibrated your display for you, but a pre-installation test may be useful to check that everything works as needed.

Remove the screws which hold the rear panel in place.

Feed the signal and power cables through the cable glands.

Connect the signal and power cables to the appropriate screw terminal connectors. See our connection drawing to check that you are using the correct terminals.

Check, before switching on, that the power is suitable for the unit.

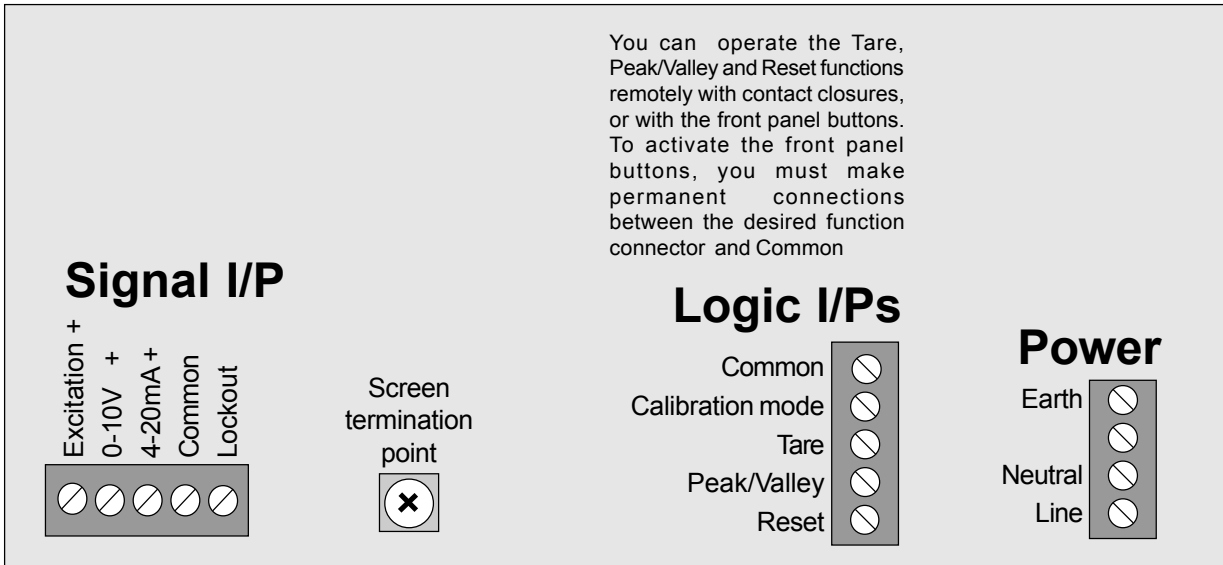Switch on, and the display should show 'EPX.X' for a second or two. (where EPX.X is the software version). Units with custom software will have a different prompt.

Next, 'C. XX' will appear for a second or two. The XX value increases each time a calibration is completed. The display should then show a steady reading relating to zero input signal; for the factory default 4-20mA scaling, this should be between -24.9 and -25.1.

Connections

We supply detachable screw terminal connectors to make installation as easy as possible for you. You should use multistrand insulated wire with ferrules to DIN46228/1. You can use stripped wire with cross sectional area from 0.5 to 2.5mm^2. Strip back insulation 7mm.
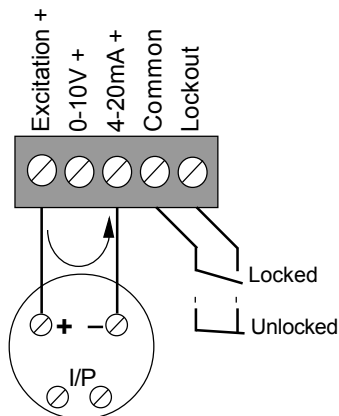
3 cable glands accept the 3 groups of cables up to 6mm diameter.

You can operate the Tare, Peak/Valley and Reset functions remotely with contact closures, or with the front panel buttons. To activate the front panel buttons, you must make permanent connections between the desired function connector and Common

Signal I/P

Excitation +
0-10V +
4-20mA +
Common
Lockout

Screen termination point

Logic I/Ps

Common
Calibration mode
Tare
Peak/Valley
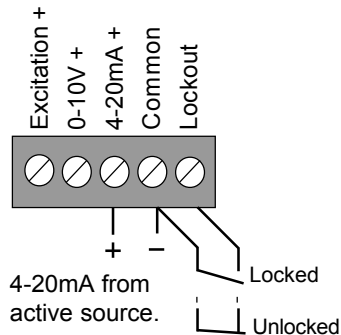Reset

Power

Earth
Neutral
Line

Use screened cable for the input signal and connect the screen to power earth at the meter end of the cable only. For best performance, keep the signal cable well away from the power and alarm cables, which could carry electrical noise likely to interfere with your measurement.

Input Connection Examples:

Loop powered 2 wire
4-20mA transmitter

Excitation +
0-10V +
4-20mA +
Common
Lockout

Locked

Unlocked

I/P

Direct 4-20mA I/P

Excitation +
0-10V +
4-20mA +
Common
Lockout

+   −

4-20mA from active source.

Locked

Unlocked

Direct 0-10V I/P

Excitation +
0-10V +
4-20mA +
Common
Lockout

+   −

0-10V from active source

Locked

Unlocked
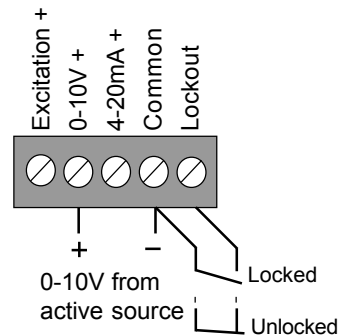
Calibration Methods

There are two ways you can calibrate your meter. You can type-in theoretical calibration values, or you can connect the meter to your system and make the meter's readings agree with known conditions in the system.

1) Calibration without the need for an input signal.
This is known as the 'THEORETICAL' Calibration method
Disconnect the 'calibration mode' terminal from common to enable this method.

If you know the input signal range, and the display values required, you can tell the meter what to read for two known signal levels. Let's assume that you have a sensor giving 4-20mA for a pressure range of 0 to 250 bar. Select the 'THEORETICAL' calibration switch position on rear of the meter.

You need to tell the meter what 0% input signal level will be (4mA) and then what 0% reading value will be (0). Next, you'd tell it what 100% input signal level will be (20mA) and what 100% reading value will be (250).

2) Calibration when you inject signals into the meter, either from a calibrator or a sensor in the system.

This is known as the 'DIRECT' calibration method. Signals must be stable.
Connect the 'calibration mode' terminal to common to enable this method.

This can give the best system precision, because you weill use real signals as your reference, and any errors in the meter or sensor will be allowed for in the calibration process. You need to select the 'DIRECT' calibration switch position on the rear of the meter.

Apply 0% of signal range. (If the signal comes from a sensor, you don't need to know the value of signal itself, only what the meter *should* read at that time. Let's assume you have a pressure sensor covering 0-250 Bar) Using the buttons on the meter, you'd tell the meter what it should read now(ie with no pressure applied to the sensor, should read 0).

Now apply 100% of signal range (If the signal comes from a sensor, apply 250 Bar to the sensor or a lesser known pressure. The accuracy of calibration will be better with higher applied signals).

Using the buttons, you'd adjust for a reading of 250, or the lesser pressure you applied.

A separate, dedicated page covers this calibration method in detail.

'THEORETICAL' Calibration

Connect 'Lockout' terminal to 'Common' terminal.
Disconnect the 'calibration mode' terminal from common.

1) How to set SPAN and DECIMAL POINT
Press the SPAN button for 3 seconds. You'll see 'dC V' or 'dC A' if the meter is set 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' briefly, then a value, with one digit brighter than the other. This is 20.000 for a 4-20mA input signal, or 10.000 for a 0-10V input signal, 5.000 for a 1-5V input signal and so on. If the value is correct, press the 'OK' button, otherwise use the 'DIGIT' key to select digits, and the 'UP' or 'DOWN' arrow keys to alter. When correct, press the 'OK' button.

'rd.HI' appears briefly, then a value, with one digit brighter than the other. This is what will be displayed for the In.HI input. If the value is correct, press the 'OK' button , otherwise 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. When correct, press the 'OK' button.

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, 1.000 for a 1-5V 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. When correct, press the 'OK' button.

Now, remove the link from 'Lockout' to 'Common' to save settings.

3) How to set the Filter Time constant
Press the OK button. You will see 'F   X'with the present time constant, in seconds. You can change this by pressing the 'UP' or 'DOWN' arrow keys. Press 'OK' when done.

4) How to Select Count by Value (after Filter Time constant - above)
After you set the Filter Time Constant, 'Cb. X' will appear, with XX as the count-by number. Use the UP or DOWN buttons to select counting by 1, 2, 5, 10, 20 or 50. Press OK when done.

'DIRECT' Calibration

Connect 'Lockout' terminal to 'common' terminal
Connect 'calibration mode' terminal to 'common'

Connect the display to power and a steady input signal before you start. Leave the display powered for 15 minutes before you start, to allow it to reach normal operating temperature.

1) How to set the Span Calibration and Decimal Point position
1)   Apply 100% Cal. signal, and ensure it is steady before proceeding
2)   Press the SPAN Button for 3 seconds
3)   Set the display to read your desired fullscale for the signal you're
       injecting by pressing 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.
4)   When correctly set, press OK

2) How to calibrate Zero
1)   Apply the Lowest cal. signal and ensure it is steady before proceeding
2)   Press the ZERO Button for 3 seconds
3)   Set the display to read 0 , or the desired reading for this signal, by
       pressing DIGIT SELECT and theUP/DOWN Keys
4)   Press OK when done

That completes the calibration of your display

Now, remove the link from 'Lockout' to 'Common' to save settings.

3) How to set the Filter Time constant
Press the OK button. You will see 'F   X'with the present time constant, in seconds. You can change this by pressing the 'UP' or 'DOWN' arrow keys. Press 'OK' when done.

4) How to Select Count by Value (after Filter Time constant - above)
 After you set the Filter Time Constant, 'Cb. X' will appear, with XX as the count-by number. Use the UP or DOWN buttons to select counting by 1, 2, 5, 10, 20 or 50. Press OK when done.

Features

Automatic Zero-Drift Compensation
This cancels long-term zero drift due to ageing, temperature drift, 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 with a RESET input. To activate this feature, set the display value at 0% input to MINUS ZERO (-0)

Reset Input
Front panel or remote contact RESET command sets the Peak and Valley memories to latest display value, clears Tare, automatic Zero compensation offset and clears digital filtering history memory.

Peak and Valley Detection (Maximum/Minimum Reading View)
The meter stores the lowest and highest reading values in memory. Press the MAX/MIN front panel button or remote contact to view. 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. Clear memory with the RESETinput.

Tare Command
Press the front panel tare switch for more than 2 seconds, or make a momentary contact closure to the TARE terminal and Common if you want to force the display to 0. Following readings will be the 'net' value. The tare value is 'remembered' when the meter is switched off. You can clear this memory with the RESET input.

Digital Filtering
A simple digital filter gives 'R-C' type time constants in the range 0 to 5 seconds. A value of 1 second gives a settling to 1% in around 5 seconds for a small step input. The filtering averages ripple in the input signal. For 'large' steps of signal input the filtering is bypassed, to give a fast initial response. You can reset the filtering by pressing the front panel reset switch for 2 to 3 seconds.

Last Digit Rounding
You can set the meter to count by 1,2,5,10,20 or 50 so that display flicker can be hidden.

Calibration Counter / Tamper detector
A internal totaliser counts each calibration. The 'C. 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 doesn't count changes of filter value or count-by value in the 'theoretical calibration' menu. It stores the total in non-volatile memory which can't be reset, useful for keeping track of the meter's calibration history.

Contact closure inputs

The contact closure inputs allow you to operate the Tare, peak/valley and reset functions remotely, but only when the meter is 'locked' - see page 5.

The switched signal is 5V DC at a current of 1.5mA

Remote contact-closure inputs
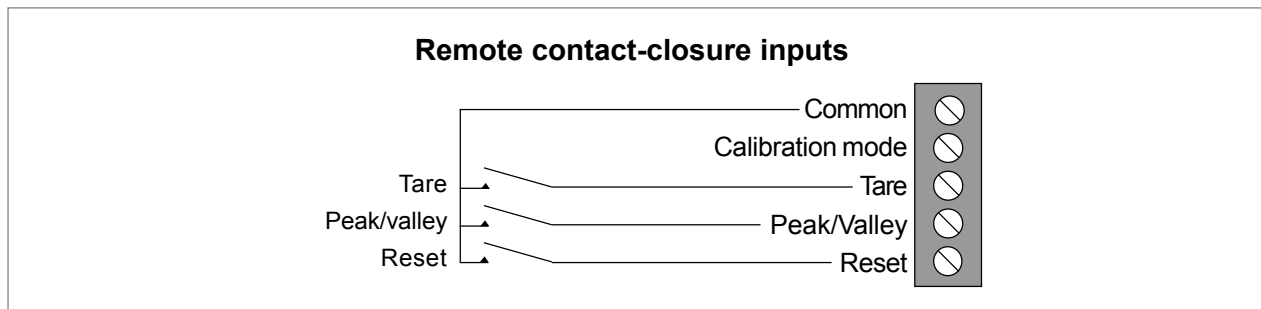
CALIBRATION MODE — A contact closure which selects either direct or theoretical calibration method.

        Contact open   = Theoretical calibration
        Contact closed   = Direct calibration

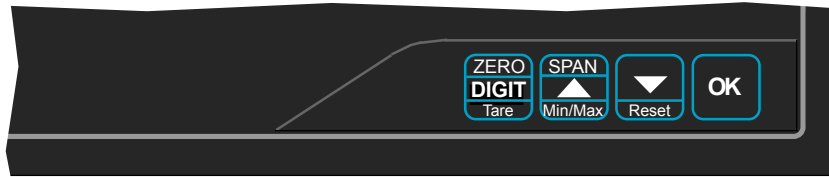TARE — Contact closure resets the displayed value to zero, regardless of input signal level.

PEAK/VALLEY — Contact closure sequentially displays the peak and valley values, since the display was last reset.

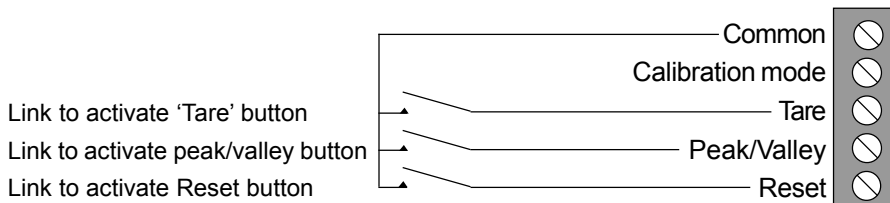The display will time out and return to showing the actual input after 3 seconds.

RESET — Contact closure will reset the stored Tare, peak and valley and averaging history values.

Front panel controls

Control Type   4 pushbutton switches located behind a flexible overlay.

Function   Depends on mode (whether locked or in setup mode)
Also depends on remote input contact status - see below..

Contact-closure inputs are used to activate front-panel buttons

	Common
	Calibration mode
Link to activate 'Tare' button	Tare
Link to activate peak/valley button	Peak/Valley
Link to activate Reset button	Reset

Normal running mode (Locked)

TARE   Press to tare the reading to zero, if the remote Tare terminal is connected to Common.

MAX / MIN   Selects max/min/current readings, in turn if the remote MIN/MAX terminal is connected to Common.

RESET   Press to reset any tared value, max., min. and filter history if the remote Reset terminal is connected to Common.

Setting mode (unlocked)

ZERO   Press for more than 3 seconds. Lets you adjust the meter zero calibration

SPAN/d.p.   Press for more than 3 seconds. Lets you adjust the meter span calibration, decimal point position, filter time constant and count-by last digit roundup.

DIGIT   Chooses a digit to be changed on the display, while adjusting.

UP arrow   Each press increases a chosen digit value, while adjusting.

DOWN arrow   Each press decreases a chosen digit value, while adjusting.

OK   Confirms any changes made or skips to next step.

Specifications

Bezel size	415mm wide x 195mm high
Case Depth	75mm
Weight	900 grammes
Case Material	Black uPVC with Acrylic lens
Connectors	Internal Detachable Screw Terminal connectors

Operating Temp.	0 to 50 degrees C, non condensing humidity
Storage Temp.	-20 to 70 degrees C

Power supply	95-265 VAC or 11-30 VDC optional
Power consumption	8 watts maximum

Input Signal Ranges	+/-20mA	+/-10V
Operating Overload	+/-22mA	+/-12V
Maximum Overload	+/-150mA	+/-100V
Input Resistance	33 Ohms +/-2%	1 Megohm nominal

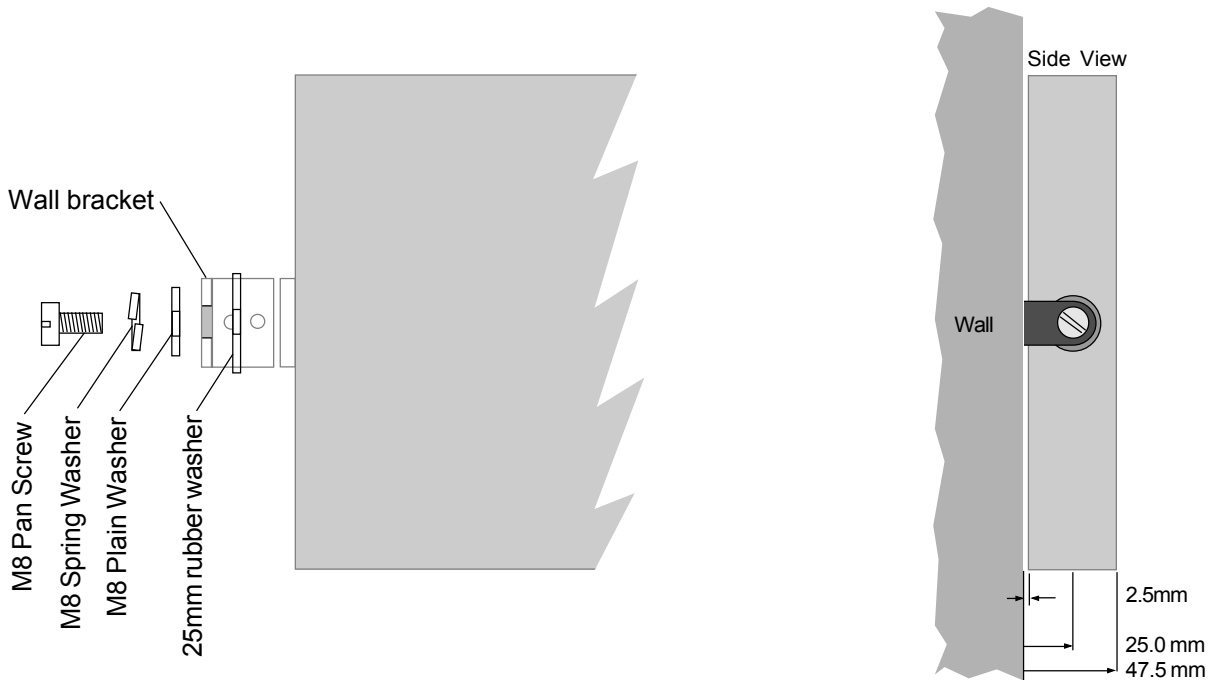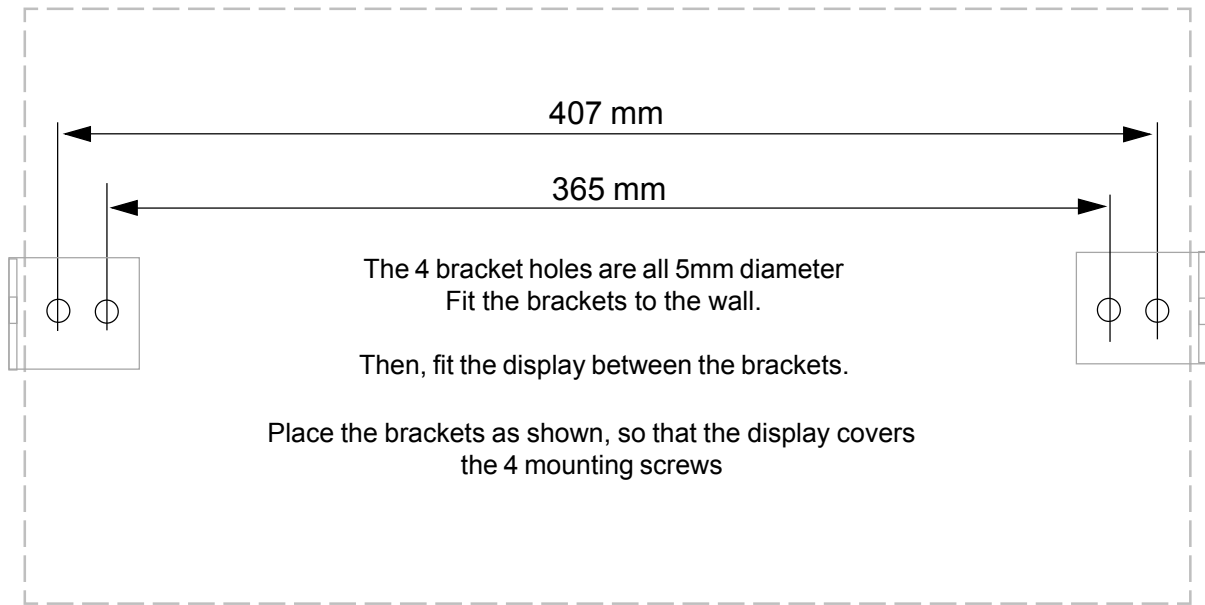|	
Display type	High efficiency LED, red or green
Digit height	102mm (A 57mm high model is also available)
Display Rangability	Fully digitally scalable for ZERO and SPAN readings anywhere in the range -1999 to 9999 with selectable decimal point positon
Viewing distance	50 metres (25 metres with 57mm digit model)
Accuracy	+/-0.1% of range +/-2 counts
Span tempco	100ppm/Degree Celsius max
Zero Tempco	50ppm/Degree Celsius
Excitation voltage	24VDC +/- 20% rated at 30mA. Noise 200mV max (50Hz-100KHz)
Filtering	Selectable time constants up to 5 secs in 0.5sec increments
Count-by (roundup)	1, 2, 5, 10, 20 or 50
A/D conversion	Dual slope -1999 to +9999 count maximum resolution
CMRR	100dB 0-60Hz. 250V max.
NMRR	60 db at 50/60 Hz.
Display update rate	2.5 readings per second
Memory	10 year data retention. No batteries required.

How to Mount your display

1. Wall Mounting

Wall mount your EasyReader display in a clean, dry environment.

Drill 4 holes in your wall, spaced as you see in this diagram...

The mounting screws you use should have a diameter between 3.4 and 4.6 mm and should be suitable for the material of the wall. You may need to use wall plugs or other screw accessories, if the wall material is not suitable to take screws directly.

407 mm

365 mm

The 4 bracket holes are all 5mm diameter
Fit the brackets to the wall.

Then, fit the display between the brackets.

Place the brackets as shown, so that the display covers
the 4 mounting screws

Wall bracket

M8 Pan Screw

M8 Spring Washer

M8 Plain Washer

25mm rubber washer

Side View

Wall

2.5mm

25.0 mm

47.5 mm

Route cables neatly away from the display. If the cables may become damaged in the environment, protect them with suitable conduit or trunking.

How to Mount your display ... continued

1. Suspension Mounting

Suspension mount your EasyReader display in a clean, dry environment.

The mounting screws you use should have a diameter between 3.2 and 3.8 mm and should be suitable for the supporting material. You may need to use screw plugs or other screw accessories, if the material is not suitable to take screws directly.

Mount the brackets first, then fit the display to the brackets.
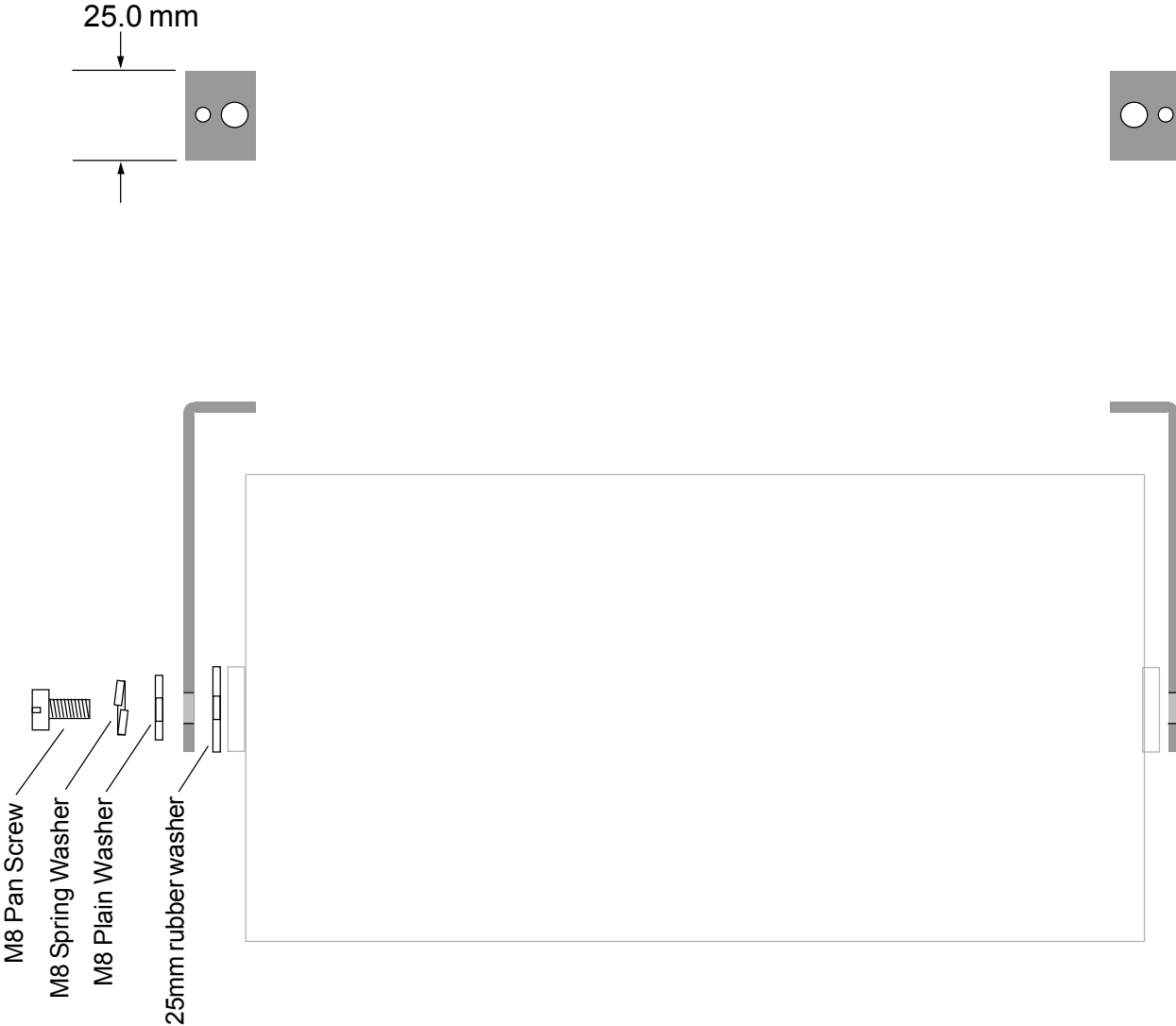
25.0 mm

M8 Pan Screw

M8 Spring Washer

M8 Plain Washer

25mm rubber washer

Route cables neatly away from the display. If the cables may become damaged in the environment, protect them with suitable conduit or trunking.
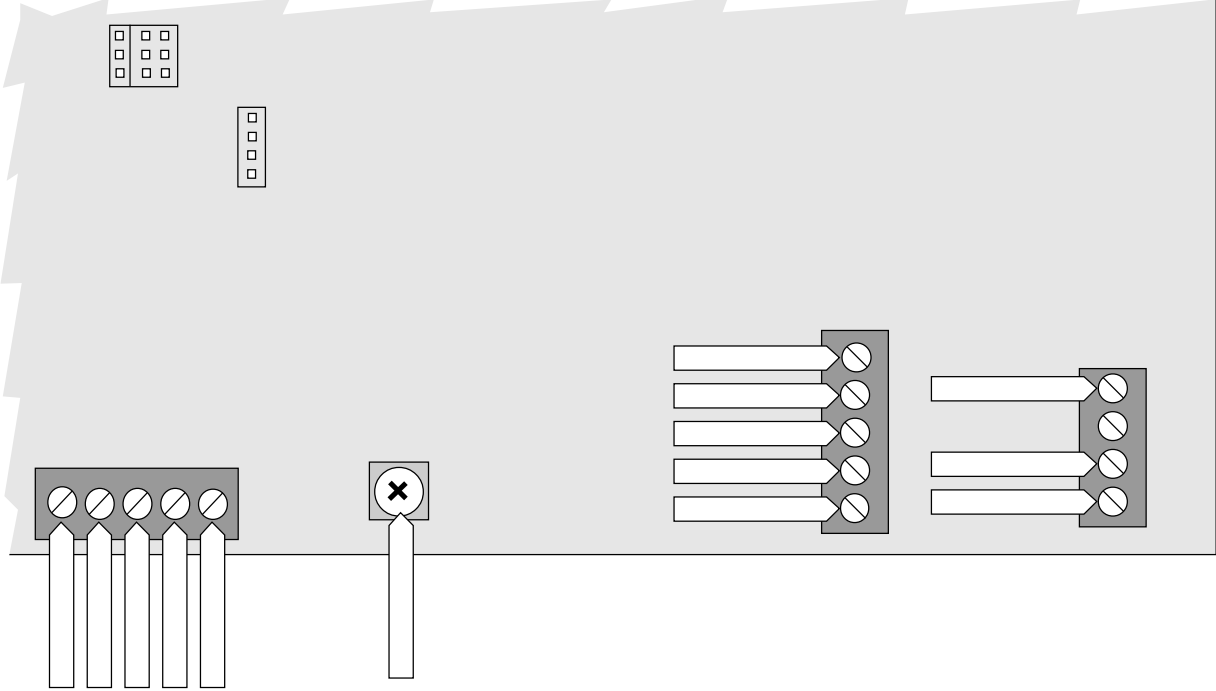
Record of Revisions

16 December 2003	Product released
25 March 2004	Added Wiring and Jumper record sheet to page 16
8 November 2005	Added side view for wall mounting case on page 13

Wiring and jumper record

For future reference, record all the jumper positions and wiring colours you used in your installation.

16

Declaration of Conformity

Declaration Reference   : EasyReader
Issue Date   : 16 December 2003
Products Covered   : EasyReader series
Title   : DOC-EasyReader

This is to confirm that the Product covered by this declaration have 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.

Note: RF interference in the range 20MHz to 75MHz, with an amplitude greater than 8V on the power cables may cause the display to show "Err" . This effect will cease when the interference is removed. This effect may be cured by adding clip-on ferrite cores around the power cable, close to the display.

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.

J.R.Lees   Director