DIGITAL INDICATOR

Type 550-2A

User Guide

Continuous development may necessitate
changes in these details without notice

Document Ref: UD550-2A Rev 0

PROCESS MEASUREMENT, CONTROL & DISPLAY INSTRUMENTATION

STROUD INSTRUMENTS LTD
36-40 Slad Road, Stroud, Gloucestershire GL5 1QW England
Tel: +44 (0)1453 765433 Fax: +44 (0)1453 764256
sales@sil.co.uk http://www.sil.co.uk

WARNING!

It is important that this guide is read and fully understood before attempting installation or commissioning of the instrument. Instructions appearing in this document, and current safety legislation, must be observed to ensure personal safety and to prevent damage to the instrument or equipment connected to it.

The instrument should be installed, commissioned and operated only by suitably qualified and authorised personnel.

Safety and EMC information

Safety: EN61010 -1

Immunity: EN50082-1

Emissions: EN50081-1

CE certified

The specifications for the instrument must not be exceeded. If the instrument is used in a manner not specified, the protection provided by the instrument may be compromised.

The instrument must be installed in an enclosure that provides adequate protection against electric shock.

Ensure that power to the instrument is switched off and signal wiring isolated from hazardous voltages before carrying out installation or maintenance.

The instrument is designed for installation in a clean, dry environment (Pollution degree 1). ***A transparent rubber hood offering front of panel protection up to IP65 is available as an optional extra.***

Stroud Instruments Ltd strongly recommends that repairs and re-calibration work are done on a return to factory basis in order that our quality standards, product specifications and safety precautions are not compromised.

The instrument is double insulated

Note: Clean with a moist cloth - USE NO SOLVENTS.

Continuous development may necessitate changes in these details without notice

Installation

WARNING: Installation should be conducted by appropriately skilled and authorised personnel only.

WARNING: Ensure that power to the instrument is switched off and signal wiring isolated from hazardous voltages before carrying out installation.

WARNING: The instrument must be installed in an enclosure that provides adequate protection against electric shock.

Location

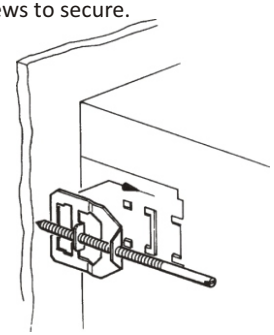
☐ The instrument is designed for installation in a clean, dry environment

☐ Do not install near to switch gear, motor controllers or other sources of strong magnetic fields.

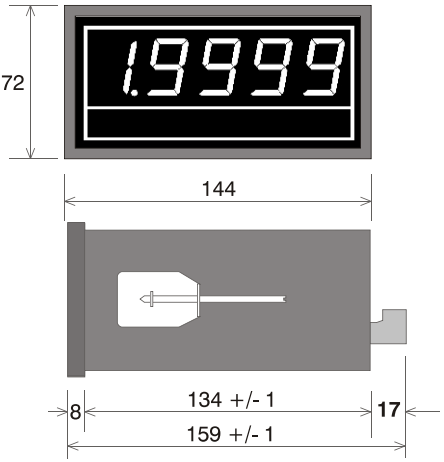
☐ Avoid exposure to direct sunlight and ensure the ambient temperature of the enclosure that the unit in mounted in will not exceed the specification.

Fixing

1. From the front of the control panel insert the instrument into the cut-out.
2. From the rear of the control panel fit the two screw clamps as shown and tighten screws to secure.



Dimensions & Panel cut out



Panel cut-out
68mm (+0.7, -0) x 138mm (+1, -0)

Wiring and connections

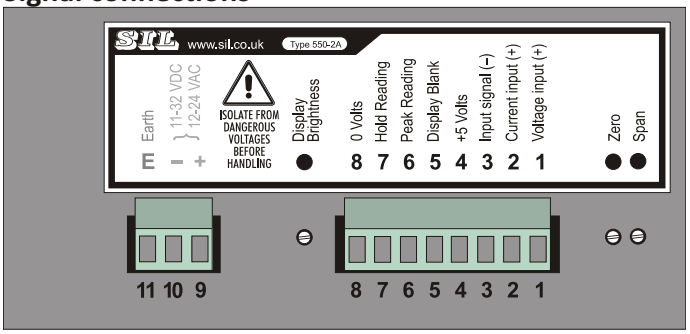
☐ Segregate power supply and signal wiring.

☐ Use screened cable for all signal wiring with the screen earthed at instrument end only.

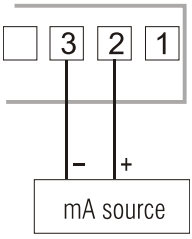
☐ All connections should be made using ferrules.

Unpluggable screw terminal connectors are provided which will accept wires 0.2 - 2.5 sq. mm (24 - 12 AWG).

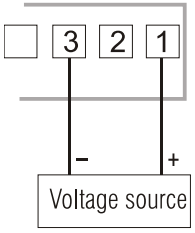
Signal connections



mA input



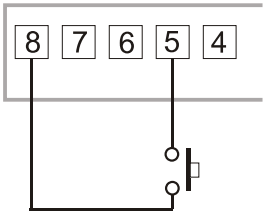
Voltage input



Note: The instrument must be set up for the type of input to be measured - see Configuration.

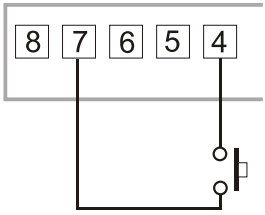
Display blanking

- see 'External controls'

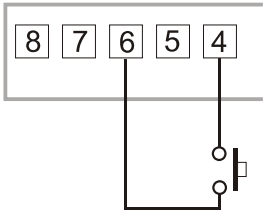


Hold reading input

- see 'External controls'



Peak reading - see 'External controls'



Power supply connections

This instrument is supplied in *one* of two power supply versions.

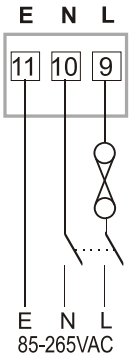
1. AC mains supply in the range 85 - 260 V, 50/60Hz, 3VA.
2. Low voltage option 11-32 VDC, 4W or 12-24VAC

WARNING: Check that the supply voltage on the data label (on top of instrument), and as marked on the connection label (shown on previous page), is suitable for the application.

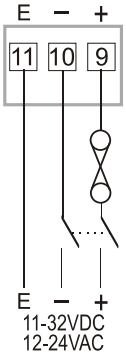
WARNING: Ferrules must be used for AC mains power wiring

Power supply wiring to the instrument should be protected by a suitable fuse and double pole switch - see below. The switch should be clearly marked as the isolating switch for the instrument.
The power wiring terminals are on the three terminal connector.

AC mains



Low voltage



Please note:
The unit cannot be changed by the user from one type of power supply version to another. This conversion can only be done on a return to factory basis.

Configuration

The instrument is configured by means of internal switches, links and trim controls.

WARNING: Switch off all supplies and isolate signal and other wiring from dangerous voltages before proceeding

Access to adjustments

1. Unplug the two connectors from the rear of the instrument
2. Loosen the two screw clamps securing the instrument to the control panel sufficient to enable the instrument bezel to be unclipped (gently pull the top edge, at one of the corners, towards you) and remove the display window.
3. Withdraw the printed circuit assembly from the enclosure.
4. Set the configuration options as per the instructions on the following pages.

Input signal selection

The 550-2A may be set to accept one of five ranges of input signal. Input ranges are selected by switch SW3 (*see page 7 for location*) - see Table 1.

Table 1

Input	**SW3** 1 = 'ON'					
	1	**2**	**3**	**4**	**5**	**6**
0-1V	1	0	0	0	0	0
0-5V	1	0	1	0	0	0
1-5V	0	1	0	0	0	0
0-10mA	1	0	0	0	0	1
0-20mA	1	0	0	1	0	0
4-20mA	0	0	0	0	1	0

Full scale (Span) and Zero

Scaling in engineering units may be set to any portion of the display range i.e. within the range -19999 to +19999; NB span must be a minimum of 2000 counts.

The required readouts at span and zero are set initially by internal switches (coarse setting) and then fine trimming via rear panel controls. For electrical safety, Span and Zero switch settings are carried out with the instrument unplugged and withdrawn from its case. Fine trimming of span/zero is achieved after the instrument is returned to its case and reconnected.

NB Allow a one hour warm up period before adjusting span and zero.

Span and Zero (coarse) selection

Table 2 and switch SW1 are used for setting Span. Table 3 and SW2 are used for setting Zero. The tables give approximate display readouts expected for each switch when set in its 'OFF' position (all others to 'ON').

In each case the sum of the table readouts giving a reading nearest to, but not greater than, the desired display is used to determine the switch settings required.

1. Turn Span fine trimming control fully clockwise.
2. From the appropriate table select the value nearest to, but not greater than, the Desired Readout.
3. Subtract the selected table value from the Desired Readout noting the remainder and the corresponding switch position to be set to 'OFF'.
4. Repeat the process substituting the 'Remainder' from the current calculation for the 'Desired Readout' in Step 1 until remainder is less than -100 (i.e. between 0 and minus 100).
5. Any difference between the Desired Value and the final 'Remainder' may be set with the fine trim controls.

NB See example on page 7.

Table 2 - coarse span display selection

SW1 switch set to 'OFF'	**Approximate Readout**
8	12550
7	6300
6	3200
5	1600
4	800
3	400
2	200
1	100

Table 3 - coarse zero display selection

SW2 switch set to 'OFF'	**Approximate Readout**
8	13900
7	7100
6	3600
5	1800
4	900
3	450
2	230
1	110

Example span setting:

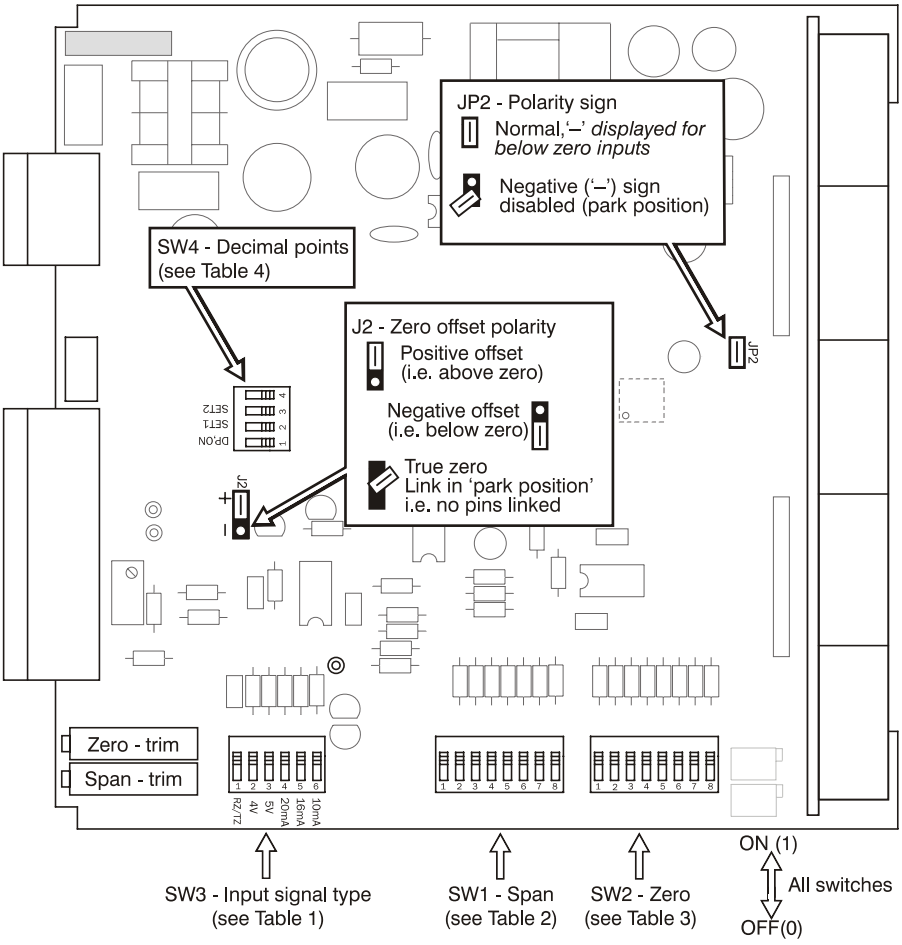
Desired Readout 15000
Table 2 nearest reading is 12550 (SW2-8 to 'OFF')
15000 minus 12550 = 2450
Table 2 nearest reading = 1600 (SW2-5 to 'OFF')
2450 minus 1600 = 850
Table 2 nearest reading = 800 (SW2-4 to 'OFF')
850 minus 800 = 50
Table 2 nearest reading = 100 (SW2-1 to 'OFF')
50 minus 100 = -50

- trim this remainder using the appropriate rear panel trim control.

Note: The tables give approximate readouts only and actual results may vary between instruments due to component tolerances. If the remainder in the above procedure cannot be trimmed out by the rear panel controls, further adjustment of switch positions will be necessary.

NB. See Appendix 1 for more calibration examples.

Fig 1 - Location of Adjustments



Zero offset polarity

The engineering units displayed when the input signal is at zero may be a true zero, a negative or a positive quantity. Link J2 must be set accordingly (*see page 7*).

Span/Zero fine trimming

For the final setting up of Span and Zero the instrument is returned to its case and switched on.

1. With the input signal at its 'zero' value adjust the Zero Trim control to obtain the required readout.
2. With the input signal at its full scale value adjust the Span Trim control to obtain the required readout.

   NB If a zero offset is used, i.e. the display is other than all zeros with input signal at its zero value, some interaction between the full scale and zero settings will occur and the fine trimming of span and zero may have to be repeated until the desired readings are obtained.

Decimal point setting

The decimal point required is set by SW4 (*for location see Page 7*).

SW4 (1 = 'ON')			**Decimal Position**
1	**2**	**3**	
0	0	0	18888
1	0	0	1888.8
1	0	1	188.88
1	1	0	18.888
1	1	1	1.8888

External controls

See page 3 for Signal Connections.

Peak reading

When activated (Term. 6 to Term. 4) only the highest input signal reading is displayed. Initially, the current measurement is displayed. The next sample is then compared to the current result. If the new value is larger than the previous peak value, the new value is displayed. If the new value is less than the previous peak value, the display remains unchanged.

Hold reading

This holds the readout at the value currently sampled by the analogue to digital converter. Hold is activated by connecting Term. 7 to Term. 4.

Display blanking

The display may be blanked (switched off) by a connecting Term. 7 to Term. 8 (0V)

Display brightness

The brightness of the display may be adjusted via the rear panel control.

Display messages

On power up: For a short period the 550-2A performs internal self-checking and calibration procedures during which a sequence of numbers are displayed.
Error messages: The instrument detects over-range and under-range conditions displaying as follows:

Condition	**Display**
Over-range	1----
Under-range	-1----

Appendix 1 - Calibration Examples

Example 1 - To display 0-1500

(I) Set J2, (*see page 7*) to ' 0 ' (Park position -no offset)
(ii) Set SW2, (*Table 3*) to 11111111
(iii) With input signal at zero value, Adjust Zero Trim until display reads zero
(iv) Set SW1, (*Table 2*) to 10001111
(v) With input signal at full scale, adjust Span Trim until display reads 1500

Example 2 - To display 100-1270

(I) Set J2 to ' + ' (positive offset)
(ii) Set SW2 to 01111111
(iii) With input signal at zero value, adjust Zero Trim until display reads 100
(iv) Range required is 1270-100 = 1170. Set SW1 to 00101111
(v) With input signal at full scale, adjust Span Trim until display reads 1270
(vi) Check zero repeating steps (v) and (vi) as required.

Example 3 - To display -500 to 15000

(I) Set J2 to ' - ' (negative offset)
(ii) Set SW2 to 01011111
(iii) With input signal at zero value, adjust Zero Trim until display reads -500
(iv) Range required is 15000-(-500) = 15500
Set SW1 to 01000110
(v) With input signal at full scale, adjust Span Trim until display reads 15000
(vi) Check zero steps (v) and (vi) as required.

Example 4 - To display 0-1000 reverse reading, i.e. 0 at 20mA, 1000 at 4mA

(I) Set J2 to ' - ' (negative offset)
(ii) Set JP2 to "Negative sign disabled (*'park' position*)" see Page 7)
(iii) Set SW2 to 10101111
(iv) Adjust Zero Trim until display reads -1000
(v) Range required: is 0-(-1000) = 1000
Set SW1 to 01101111
(vi) Adjust Span Trim until display reads 0000
(vii) Check zero steps (v) and (vi) as required.

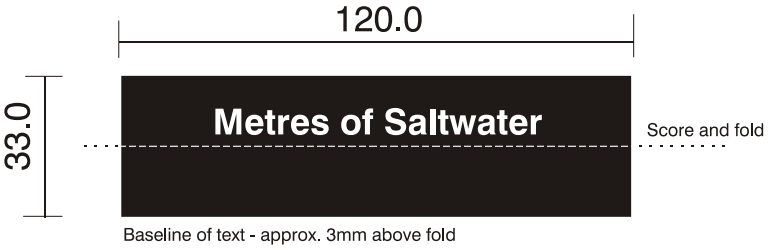
Appendix 2 - Display window legend

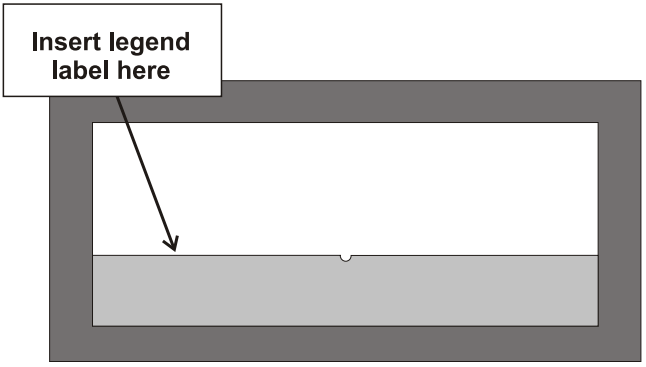
The legend for the display window is easily changed. A pocket at the rear of the window is designed to hold a folded paper legend.

Removing the display window

(I). Loosen the two screw clamps securing the instrument to the control panel sufficient to enable the instrument bezel to be unclipped (gently pull the top edge, at one of the corners, towards you) and then remove the display window.

Legend dimensions





Specification

DISPLAY

Type: 25mm high brightness red LED
Range: 4.5 digit (-19999 to +19999)
Sample rate: 2.5 per second
Overrange display: **1----**
Underrange display: **-1----**
Polarity: automatic with '-' displayed

ACCURACY

± 0.1% FS ±1 digit (when works calibrated)

LINEARITY ERRORS

±1 digit

INPUTS (others available to order)

Current 0-10mA, 4-20mA, 0-20mA
Voltage 0-1V, 0-5V, 1-5V
Input impedance: Current 100 ohms
Voltage 240k ohms
Input protection:
Voltage inputs 250V RMS or DC
Current inputs 100mA

CONFIGURATION

The instrument is configured by means of internal switches and link and external trim controls.

Internal user adjustable settings:

Scaling: any portion of the display range (minimum span 2000 counts)
Input signal type (see Inputs above)
True/raised zero input
Decimal points: switch selectable
Zero offset polarity

External control

Display blanking, Hold reading, Peak reading, Display brightness

TEMPERATURE COEFFICIENT

± 100ppm/ deg C typ.

ENVIRONMENTAL

Temperature range:
-10 to +50 deg C operating
-20 to +70 deg C storage
Humidity: 0-95 RH non-condensing

MECHANICAL

Dimensions (mm):
144 (W) x 72 (H) x 159 (D)
Panel cut-out (mm):
68 (H) x 138 (W)
Weight: 450g

CONNECTORS

Un-pluggable screw terminals (separate supply and signal)
Wire capacity: 0.2 - 2.5 sq. mm;
(24 - 12 AWG)

SAFETY and EMC

Safety:	EN61010-1
Immunity:	EN61000-6-2:1999
Emissions:	EN50081-2:1994
	FCC CFR47: July 2001
	Part 15 Class A

CE certified

POWER

85-260 Vac, 50-60Hz 3VA
Fuse: Internal fusible resistor
Low voltage: 11-32 VDC 4W / 12-24VAC
Protected by a 500mA internal self-resetting fuse.