

BRIDGE AMPLIFIER

Type B12-1B

User Guide

Continuous development may necessitate
changes in these details without notice

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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>

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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).



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.

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 inside the enclosure that the unit is mounted in will not exceed our specification.

Fixing

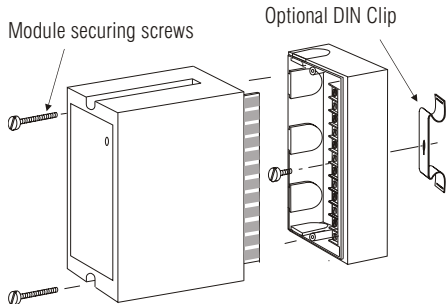
B12 Series Modules are designed to be fitted to a flat dry surface using two 4mm screws. Alternatively, by fitting an optional DIN clip, they may be clipped to a rail conforming to BS5584:1978, EN50 022, DIN46277-3.

Grommets are provided on three sides of the base section and there are two rear entry knock outs in the bottom.

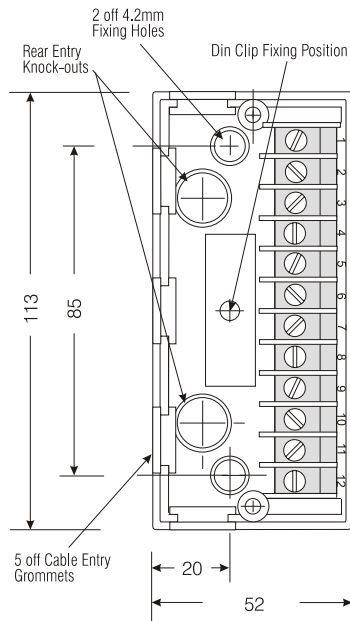
To gain access to fixing points:

- (i) Remove the plug-in module securing screws.
- (ii) Gently pull away the plug-in module from the base section.

- (iii) To refit the module, align the module edge connectors with the socket in the base and carefully press home. NB do not overtighten the module securing screws.



Dimensions and fixing positions



Depth of unit 106mm

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.

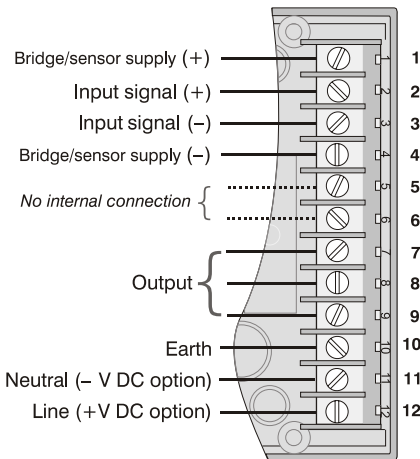
Screw terminals are provided - wire capacity $2 \times 1.5\text{mm}^2$ (approx. 16 AWG).

Access to terminals



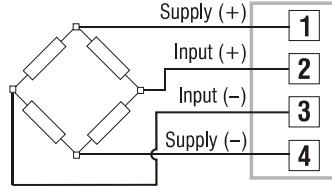
WARNING: Ensure that power to the instrument is switched off and signal wiring isolated from hazardous voltages

Loosen the two module securing screws. Gently pull away the top section of the module from its base to expose the fixing points and wiring terminals. To refit the module, align the module edge connectors with the socket in the base and carefully press home. **NB** do not over tighten the module securing screws.

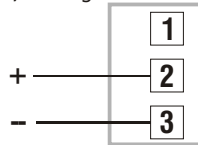


Input connections

Bridge type transducer connections



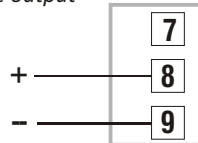
milliVolt / Voltage



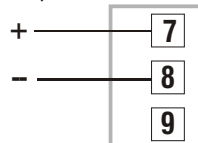
Output connections

Outputs are calibrated to order and are not user configurable - see data label on enclosure for calibration details.

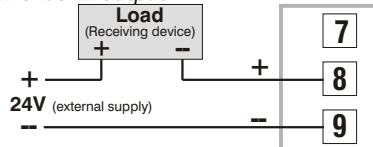
Voltage output



Current output



Current sink output



Power supply connections

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

1. AC mains supply either: 110V, 220V or 230V \pm 50/60Hz, 5VA.
2. Low voltage supply: 11-32VDC 4W / 12-24VAC.



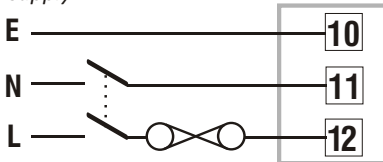
WARNING: Check that the supply voltage on the data label (on side of instrument) is suitable for the application.



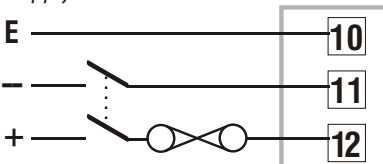
WARNING: Ferrules must be used for AC mains power wiring

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.

AC supply



DC supply



Input range configuration

Suitable measuring equipment is required to set the unit to its specified accuracy or to the requirements of the application e.g. a 4½ digit DVM, 100 ohm laboratory standard

resistor (*for current outputs*) and a signal source to simulate the input transducer.

The fine-trim span (*upper*) and zero (*lower*) controls are accessed through the front panel. The range setting switches are mounted internally and may be accessed as follows:

Access to internal settings



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

- (i) Remove plug-in module as described in Access to Terminals in the Installation section.
- (ii) The plate with the terminal connections label can now be removed by easing apart the longer sides of the module to release the interlocking tongue and groove.
- (iii) Note the location of the printed circuit board which must be replaced in the same position. Slide out the board.

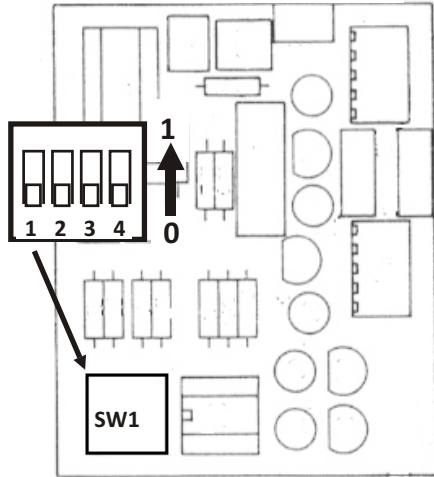
Calibration procedure

- (i) Set the range switches (SW1) as required (*see Fig 1 and Table 1*).
- (ii) Reassemble and plug the module into the base section. (*see 'Replacing the Module cover' on page 6*).
- (iii) **Set output Zero:** with input signal at its zero setting monitor the output signal with a suitable instrument and adjust the zero control (*lower hole*).
- (iv) **Set Span:** with input at full scale, adjust the span control (*upper hole*).
- (v) Repeat steps (iii) and (iv) readjusting if necessary.

Table 1 Range switch settings

SW1 Positions				Nominal Input (mV)	
1	2	3	4	Min	Max
0	0	0	0	7.5	9
1	0	0	0	8	10
0	1	0	0	9	11
1	1	0	0	10	12
0	0	1	0	11	13
1	0	1	0	11	14
0	1	1	0	12	15
1	1	1	0	13	17
0	0	0	1	17	22
1	0	0	1	20	25
0	1	0	1	22	30
1	1	0	1	26	33
0	0	1	1	33	45
1	0	1	1	40	54
0	1	1	1	54	75
1	1	1	1	72	100

Fig 1 Bridge Amp Sub-board



Fuse replacement and power supply adjustments



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

Please note: the operating supply voltage on DC and 24V AC powered versions cannot be changed by the user.

- (i) Remove plug-in module as described in 'Access to Terminals' in the Installation section.
- (ii) Refer to 'Access to internal settings' to open the module.

Fuse replacement

The fuse holder is located at the edge of the main circuit board adjacent to the mains transformer or low voltage power unit.

Fuse size: 20mm x 5mm dia.

Fuse ratings:

AC supply - 100mA Quick Blow

DC supply - 250mA Anti-surge

Changing AC supply voltage

Mains powered units can be adapted for operation on 110V, 220V or 230V supplies.



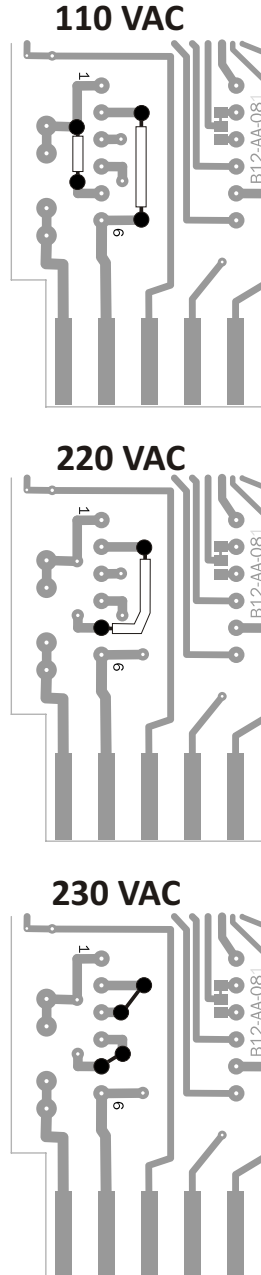
WARNING: Links for 110VAC and 220VAC must be insulated with silicon rubber sleeving.

Fig 2 provides details of the required link settings which are effected by soldered tinned copper wire links.

Replacing module cover

- (i) Replace the printed circuit board ensuring correct location in the module cover slots.
- (ii) Replace the plastic plate by locating the side with the two tongues around the protruding printed circuit board and engaging into the mating grooves.
- (iii) Press the plate home to engage the single tongue.

Fig 2. AC mains supply links



Specifications

Notes:

1. Output ranges are factory calibrated for one type of signal and not user configurable

Inputs

User adjustable within the range 0-10mV up to 0-100mV as standard.

Outputs

0-10mA (2000R), 0-20 mA (1000R),
4-20 mA (1000R)

High impedance output drive options: 0-10mA (5000R), 0-20 mA (2500R), 4-20 mA (2500R)

Maximum output impedances in ohms shown in brackets.

0-5v, 1-5V, 0-10V, 2-10V (500R minimum)

Current sink 4-20mA @ 50 volts max.

Transducer Excitation Supply

Constant Current:

Typically 5mA

Set during manufacture to suit transducer.

Constant Voltage

Output Typically 10V at 6mA max.

Accuracy 0.01%

Load Regulation 0.005% / mA

Temp. Coefficient 0.002% / °C

Response Time

1 sec as standard.

Isolation

The input and output are not isolated from each other, but are isolated from the power supply.

Calibrated Accuracy

± 0.1% FSD at 100% when factory calibrated.

NB Error introduced by User output range changes, typically 1% but may be corrected by span control.

Linearity Error

± 0.1% FSD

Output Ripple

0.2% RMS of FSD

Load Resistance Effect

0.001% of span / 100 ohm change

Stability

Over 24 hours ± 0.1% FSD,

Over 1 year ± 0.25% FSD

Temperature Coefficients

Zero: ± 0.02% span / °C, Span: ± 0.02% span / °C

Environmental

Temperature: operating -10 to +60°C,
storage -20 to +70°C

Humidity: 0 – 95% RH non-condensing

Power Supply

AC Supply: 110, 220 or 230V ±10% 50/60Hz 5VA

Fuse: 100mA quick-blow (internal)

Low voltage: 11-32VDC 4 W / 12-24VAC

Fuse: 250mA anti-surge (internal)

Supply Voltage Rejection

Span change: <0.02% span / % supply change.

Mechanical

Weight: approx. 0.5kg

Enclosure: Fire retardent materials -
PPO base, ABS cover

Screw terminal wire capacity: 2 x 1.5mm²