

TRIP AMPLIFIERS

Single Types B12-ST2, B12-ST2/K

Dual Types B12-DT2, B12-DT2/K

User Guide

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Specification

INPUTS *(other inputs available to order)*

B12-ST2 & B12-DT2 Current Input Types

Universal input accepts any signal within the range 0-20mA.

Input Impedance 50 ohms.

B12-ST2 & B12-DT2 Voltage Input Types

Universal input accepts any signal within the range 0-5V. Input impedance greater than 200 k ohms

B12-ST2/K & B12-DT2/K

(calibrated to specified Input Range)

0-10 mA into 100 ohms

0-20 mA into 50 ohms

4-20 mA into 62.5 ohms

0-5v into greater than 200 k ohms

1-5v into greater than 200 k ohms

TRANSMITTER POWER SUPPLY

24 VDC with current limit of 24mA

OUTPUT

Relay with single pole changeover contact.

Contact rating: 5A @ 250V AC resistive

2.5A @ 24V DC resistive

HYSTERESIS

Approximately $\pm 1\%$ of span.

ISOLATION

The outputs are isolated from the supply and input.

REPEATABILITY

The switching point will repeat within $\pm 0.1\%$ of span.

INTERFERENCE REJECTION

Filtering is incorporated to reject R.F. and other industrial noise.

SERIES MODE AC REJECTION

<0.2% error is caused in the set point for 50/60 Hz series mode signals of peak to peak amplitude equal to $2\frac{1}{2}$ times full scale.

COMMON MODE REJECTION

<0.2% error is caused in the set point for 250V RMS 50/60 Hz, or 400V DC, common mode signals.

INPUT OVERRANGE PROTECTION

Voltage Inputs: 240 volts RMS or DC

Current Inputs: 50mA

TEMPERATURE COEFFICIENTS

Zero: $\pm 0.02\%$ span/ $^{\circ}\text{C}$

Span: $\pm 0.02\%$ span/ $^{\circ}\text{C}$

TEMPERATURE RANGE

Operating: -10°C to $+60^{\circ}\text{C}$

Storage: -20°C to $+70^{\circ}\text{C}$

WEIGHT

Approx. 0.5kg

SAFETY & EMC

Safety: EN61010-1

Immunity: EN50082-1

Emissions: EN50081-1

CE certified

POWER SUPPLY

85 - 260 VAC 50/60Hz; 24 - 200 VDC (3W nominal)

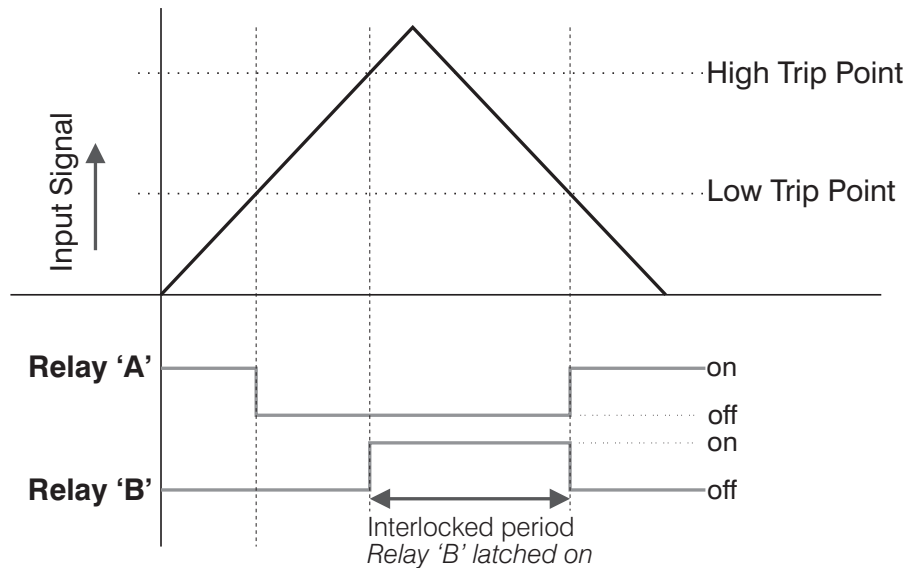
2. Interlocked output triggered by a high level

This mode of operation is the inverse of the previous one. In this mode the input signal reaching the high trip point energises Relay 'B' which will not switch off until the low trip point is reached (see Fig 4).

To set up the unit to operate with an interlock triggered by a High Level set the High - Low programming links as follows:-

1. Set jumper link J2 to Low ('L')
2. Set jumper link J3 to High ('H')
3. Set jumper link J4 to 'Interlock Enabled'

Fig 4 Interlock set by high level



The front panel controls function as follows:-

- For the Low Set Point use the control for Trip Point 'A'
- For the High Set Point use the control for Trip Point 'B'

Relay 'B' is energised during the interlock period.



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 soft dry cloth

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/control panel in which the unit is located, will not exceed our specification.

Fixing

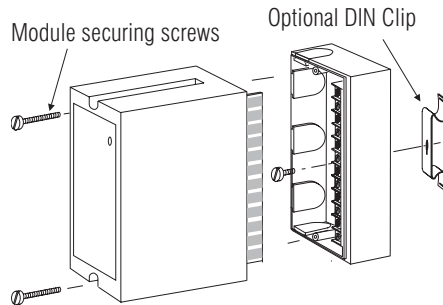
B12 Series Modules are designed to be fitted to a flat dry surface using two 4mm screws. Alternatively, by fitting an optional DIN clip, they may be clipped to a rail conforming to BS5584:1978, EN50 022, DIN46277-3.

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:

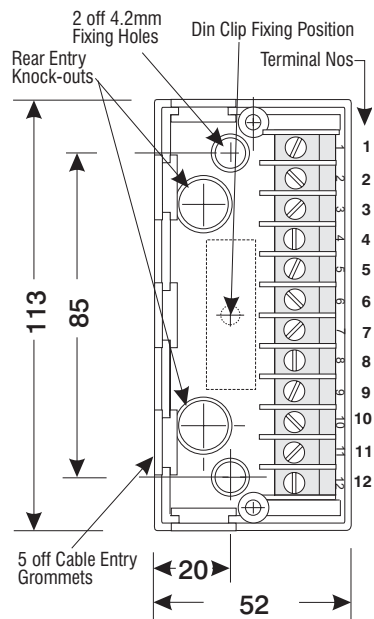
1. Remove the plug-in module securing screws.

2. Gently pull away the plug-in module from the base section.
 3. To refit the module, align the 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



Interlocked operation

1. Interlocked output triggered by a low level

This mode of operation will enable one relay to energise and not switch off until the input signal reaches the high trip point. (see Fig 3). This mode could be used for controlling a pump filling a tank. Relay 'B' would control the pump circuit - an empty tank would require the pump to be switched on and stay on until the high level was reached when it would switch off. The pump would then remain switched off until the low trip point was reached.

To set up the unit to operate with an interlock triggered by a Low Level set the High - Low programming links as follows:-

1. Set jumper link J2 to High ('H')
2. Set jumper link J3 to Low ('L')
3. Set jumper link J4 to 'Interlock Enabled'

The front panel controls function as follows:-

- For the High Set Point use the control for Trip Point 'A'
- For the Low Set Point use the control for Trip Point 'B'

Relay 'B' is energised during the interlock period.

Fig 3 Interlock set by low level

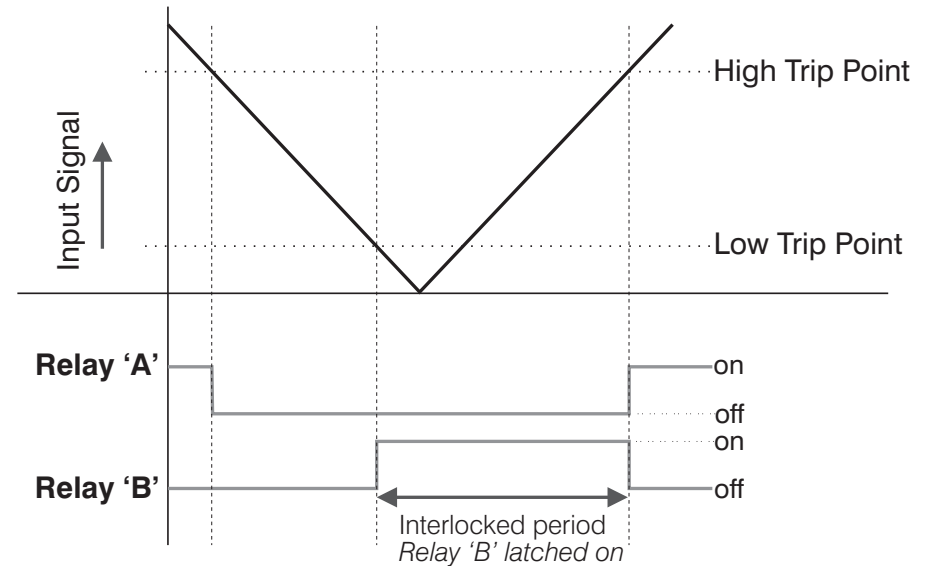
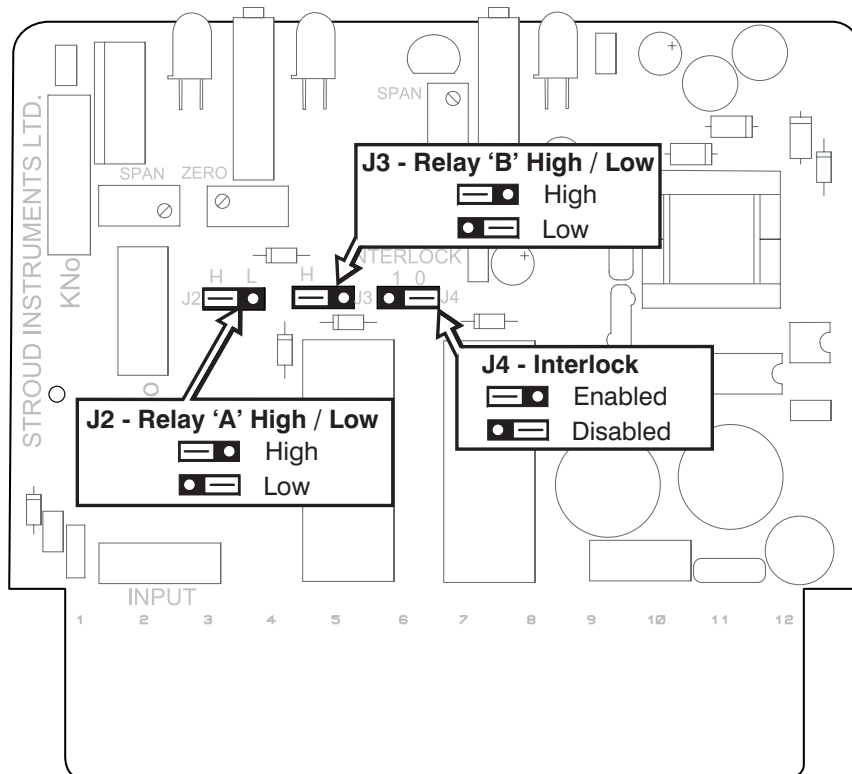


Fig 1 User selectable options



Wiring and connections

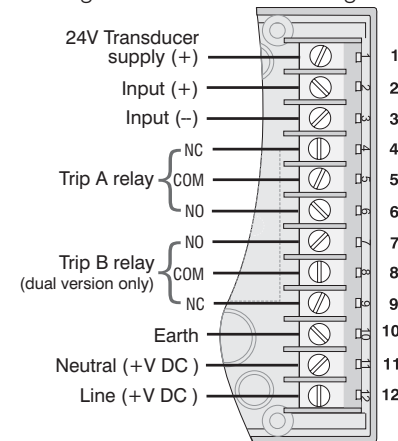
Screw terminals are provided - wire capacity 2 x 1.5 mm² (approx. 16 AWG).

- Segregate power supply and signal wiring.
- Use screened cable for all signal wiring with the screen earthed at *one* end only.
- All connections should be made using ferrules.

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.



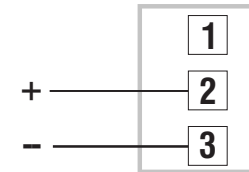
NOTE: Units with mA inputs are supplied with a component connected between terminals 2 and 3. This maintains the signal loop when the instrument is unplugged from its base section.

Input connections

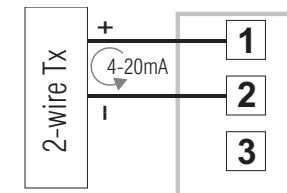
Inputs are configured during manufacture to suit the application specified - see *data label on enclosure*.

Note: the 24V transducer supply is provided for trip-amps configured for 4-20mA input only.

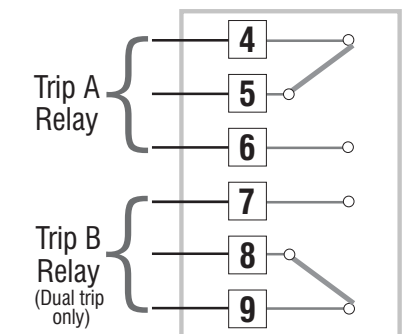
Voltage and mA



4-20mA two-wire transmitter

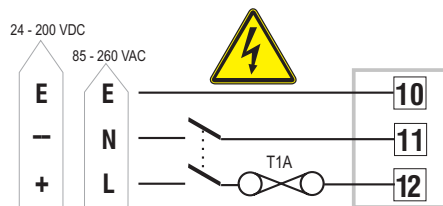


Output connections



Power supply connections

- This instrument is equipped with a universal power supply and may be operated from either of the following supply ranges:
DC supplies: 24 - 200 VDC
AC supplies: 85 - 260 VAC
- Power supply wiring to the instrument should be protected by a 1A time-delay fuse fuse and double pole switch - see *below*. The switch should be clearly marked as the isolating switch for the instrument.



Operation

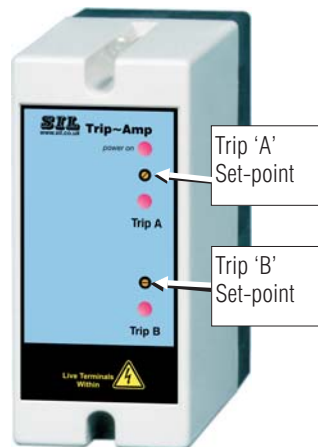
The B12 Series of trip amplifiers have one input and, depending on the type of unit supplied, either one or two set-points. Output relay(s) change state when the input signal passes the level set by the set-point control. A LED indicator is provided for each output relay. The indicator illuminates when the is relay energised.

Input

Units with current inputs have a zener diode installed between terminals 2 and 3 which provides a 'No-Break Signal' facility. This enables the module to be unplugged without breaking the current loop.

Universal input types (B12-ST2 and B12-DT2) will accept any input signal in the range up to 20 mA span (current input type) or up to 5 volts span (voltage input type). Inputs may be raised or true zero.

Ten-turn Dial Types (B12-ST2/K and B12-DT2/K) are calibrated to suit the required input.



Set-points

B12-ST2 (Single Set-Point) and B12-DT2 (Dual Set-Point)

With these Trip Amplifiers, the trip-point is set up by multi-turn trim pot(s) accessed through holes in the front panel. Trimming of these controls should be carried out using a proprietary insulated trimming tool.

B12-ST2/K (Single Set-Point) and B12-DT2/K (Dual Set-Point)

These Trip Amplifiers are provided with front panel mounted ten-turn dials scaled 0-100% of the full scale input signal.

Hysteresis

B12 Series Trip Amplifiers have a factory-set hysteresis of approximately $\pm 1\%$ of input signal span.

Trip amplifier configuration

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.
NB on B12-DT2/K and B12-ST2/K types the printed circuit board will remain attached to the front panel controls via a 5-pin plug and care

must be taken not to apply any strain to the interconnecting wiring.

Re-assembly

- (i) Recheck your link selections.
- (ii) Replace the printed circuit board into the case ensuring that the main board is located in the slots under the LED indicator windows.
- (iii) Replace the bottom plate by first engaging the side with the two tongues into the slots in the case and then press the plate home to engage the side with the single tongue.
- (iv) Plug the reassembled module into the base section and secure with the two captive screws provided - *do not overtighten*.

High - Low selection

The High - Low settings determine whether the output relay energises when the input signal falls below the trip point (LOW setting) or when it rises above the trip point (HIGH setting) - see Fig 1.

Interlocked output

This mode, available only in dual trip versions, is enabled by jumper link J4 (see Fig 1). Two modes of interlock operation are possible and are selected by Jumper Links J2 and J3. See the *Interlocked Operation* section for a detailed explanation of this function.