

DUAL TRIP AMPLIFIER

Type 112-2A-2

User Guide

Continuous development may necessitate
changes in these details without notice

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PROCESS MEASUREMENT, CONTROL & DISPLAY INSTRUMENTATION

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Installation

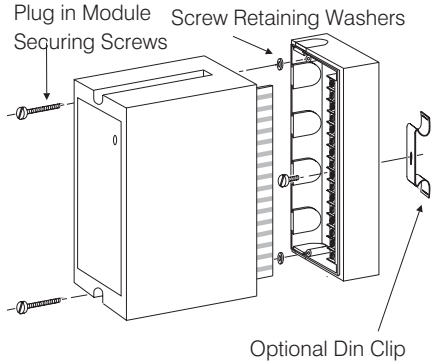
112 Series Modules are designed to be fitted to any flat dry surface using two 4mm screws. Alternatively, by fitting an optional DIN clip, they may be clipped to a rail conforming to BS5584:1978, EN50 022, DIN46277-3.

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

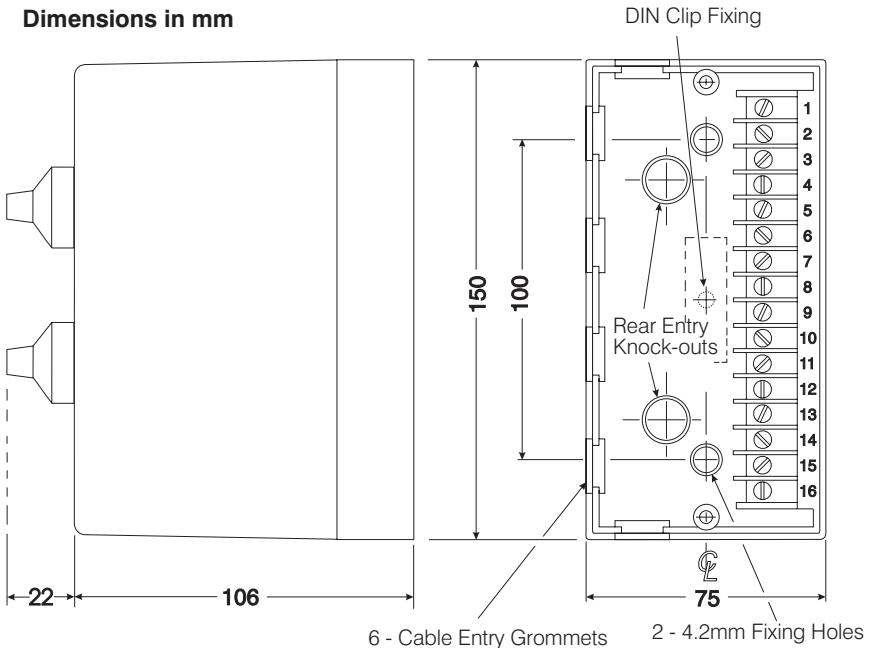
Wiring

Good instrumentation practice must be observed when wiring to the unit to ensure segregation of supply and signal wiring, and the use of suitably screened signal cabling.

WARNING! This unit can be mains powered. All inputs must be isolated from dangerous voltages before the plug in module is removed from the base section for maintenance or adjustment. Live terminals will be exposed.



Dimensions in mm



Terminal Connections

Input

- 1 Transducer supply (+)
or optional Second Input (+)
- 2 Input Signal (+)
- 3 Input Signal Common (-)

Channel A

- 4 SPCO Normally Closed
- 5 SPCO Common
- 6 SPCO Normally Open
- 7 SP Common
- 8 SP Normally Open

Channel B

- 9 SP Normally Open
- 10 SP Common
- 11 SPCO Normally Open
- 12 SPCO Common
- 13 SPCO Normally Closed

Supply

- 14 Earth
- 15 Neutral
- 16 Line

DC versions only
Earth
Negative (-)
Positive (+)

Operation

The output relays of the dual trip amplifier change state when the input signal passes the points set on the front panel mounted 'Trip Point' controls.

Single Input

The unit is normally connected internally to be driven from one input signal. Current input types are calibrated with a signal input conditioning resistor which is installed between terminals 2 and 3 (Input 'A' position) in the base section of the module.

Please note

On early releases of this unit, the transducer supply is not available. These units are identified by "112-2A-080" on the PCB adjacent to hysteresis pots.

Two Input Option

Where two separate inputs are specified, the transducer supply is not available but is replaced by a connection for a second input signal. Each 'channel' is calibrated to its respective input signal. Channel A input signal connects to Terminal 1.

Current Inputs

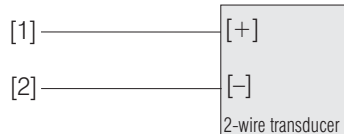
For current inputs, when the plug-in module is removed, signal loops are maintained via a shunt resistor mounted in the base section of the module. The unit and its shunt resistor(s) are calibrated as a matched pair. An error of $\leq \pm 0.1\%$ can be expected if the instrument is used with an unmatched input resistor (e.g. by swapping plug-in modules.).

Front Panel Controls

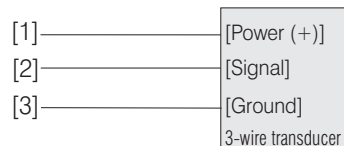
The front panel controls are scaled 0-100% of the full scale input signal. The LED indicators illuminate when the respective relays are energised.

Transducer Supply

(i) Two wire transmitter connections



(ii) Three wire transmitter connections



Access to settings

Facilities for all configuration settings are to be found on the printed circuit board. Change in AC mains supply, hysteresis settings, high or low operation and interlock mode may be set using links and controls provided.

Opening the module

- (i) Isolate all supplies to the unit.
- (ii) Unscrew two module retaining screws and separate the plug-in module from the base section.
- (iii) With the fingers, ease apart the longer sides of the cover releasing the interlocking tongue and groove fastenings to remove the plastic plate with the connections label.
- (iv) Slide out the printed circuit board (pcb) noting the location and orientation of the pcb.

NB the pcb will remain attached to the front panel controls but may be disconnected from the cover by unplugging the connector.

Re-assembly

- (i) Slide the printed circuit board into the correct slot in the cover (i.e. ensuring the LED indicators align with their windows in the front panel).
- (iii) Replace the plastic plate by first engaging the side with the two tongues into their slots in the case then press the plate home to engage the single tongue.
- (iv) Insert the plug-in module into the base section and secure with the retaining screws. NB do not over tighten.

Internal Controls and Links

Interlocked Output

This mode is enabled by LK5 (see Fig 1). Two modes of interlock operation are possible which are selected by the Switch A / Switch B High - Low settings. See the *Interlocked Operation* section for a detailed explanation of this function.

Changing supply voltage

Please Note: The operating voltage of DC powered versions cannot be changed.

Details of the linking arrangements for AC supplies are shown in Fig 1. The required tappings are made by soldering tinned copper wire links.

IMPORTANT - Links for 110V operation must be insulated with silicon rubber sleeving.

Fuse replacement

See Fig 1 for location of fuse and fuse ratings. **Fuse size:** 20mm x 5mm dia.

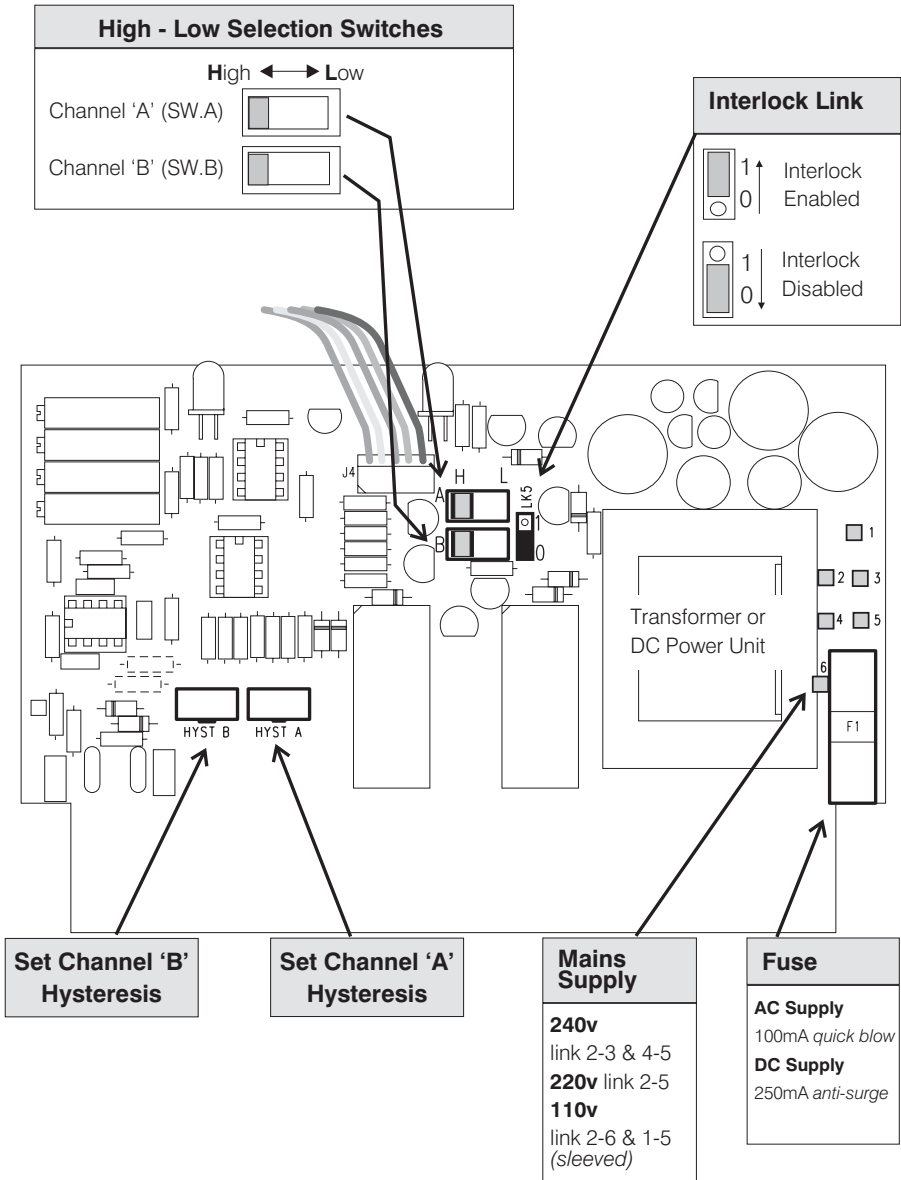
Hysteresis

Hysteresis is set during calibration at $\pm 1\%$ of span as standard. The amount of adjustment on the hysteresis controls give a maximum hysteresis of $\pm 5\%$. See Fig 1 for location of the hysteresis controls. NB The controls may be clockwise or anti-clockwise types for increasing hysteresis. Spectrol types are clockwise, Bourns are anti-clockwise.

High - Low Selection

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

Fig 1 Location of adjustments



Interlocked Operation

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 2). This mode would 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.

Setting up

To set up the unit to operate with an interlock triggered by a Low Level:

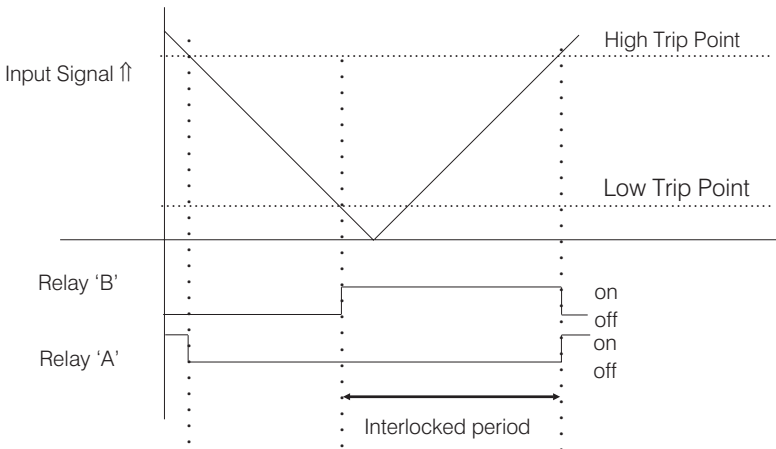
1. Ensure Link 5 is set correctly (see page 4)
2. Set SW.A to High ('H')
3. Set SW.B to Low ('L')

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 2 Interlock set by Low Level



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 3).

Setting up

To set up the unit to operate with an interlock triggered by a High Level:

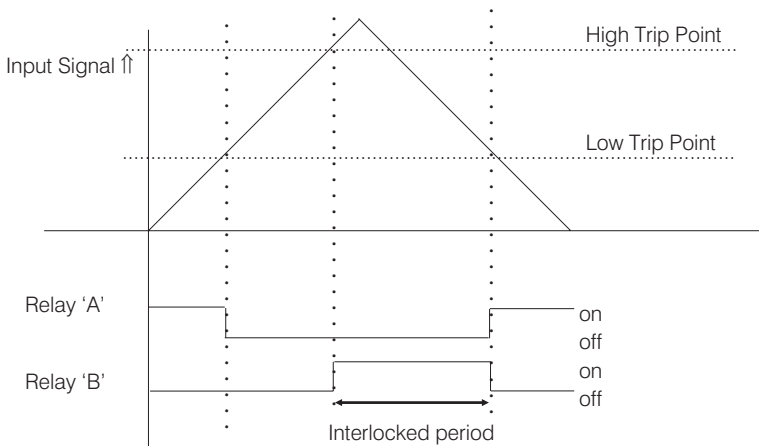
1. Ensure Link 5 is set correctly (see page 4)
2. Set SW.A to Low ('L')
3. Set SW.B to High ('H')

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.

Fig 3 Interlock set by High Level



Specification Summary

Inputs

others available to order

0 - 10 mA	into	100Ω
0 - 20 mA	into	50 Ω
4 - 20 mA	into	62.5Ω
0 - 5 volts	into	>200kΩ
1 - 5 volts	into	>200kΩ

Outputs

Two relays with single pole change-over contacts and a single pole normally open contact rated at:-

- 5A @ 250 volts AC resistive or
- 2.5A @ 24 volts DC resistive

Hysteresis

Set during calibration at $\pm 1\%$ of span as standard. The amount of adjustment on the internal controls give a maximum hysteresis of $\pm 5\%$.

High - Low Selection

Internal switches select whether relays energise when the input signal is higher or lower than the set point.

Interference Rejection

Filtering is incorporated to reject RF and other industrial noise.

Supply Voltage Rejection

Span change $< 0.01\%$ span /% supply change

Series Mode AC Rejection

A hysteresis setting of $\pm 1\%$ will reject 50/60Hz series mode signals with peak to peak amplitude equal to 5 x full scale.

Common Mode AC Rejection

$< 0.2\%$ error is caused in the set point for 250v RMS 50/60 Hz or 400v DC common mode inputs.

Repeatability

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

Input Over-range Protection

240 volts RMS or DC (*voltage inputs only*).

Isolation

The output contacts are isolated from the supply and the inputs. Input 'A' is not isolated from Input 'B'.

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 $+70^{\circ}\text{C}$

Power Supply

AC 110/220/240V $\pm 10\%$ 50/60Hz 5VA
DC 12/24v -10% $+20\%$ 3.5W