

# **COMPARATOR**

Type 112-22A

User Guide

Continuous development may necessitate changes in these details without notice

# Installation

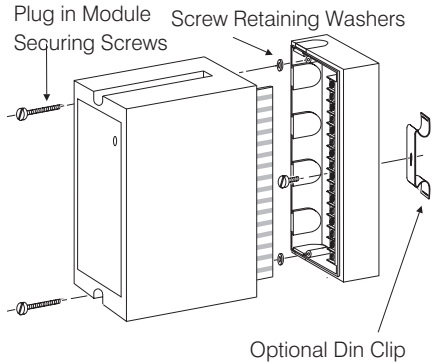
112 Series Modules are designed to be fitted to any flat dry surface using two 4mm screws. Alternatively, by fitting an optional DIN clip, they may be clipped to a rail conforming to BS5584:1978, EN50 022, DIN46277-3.

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

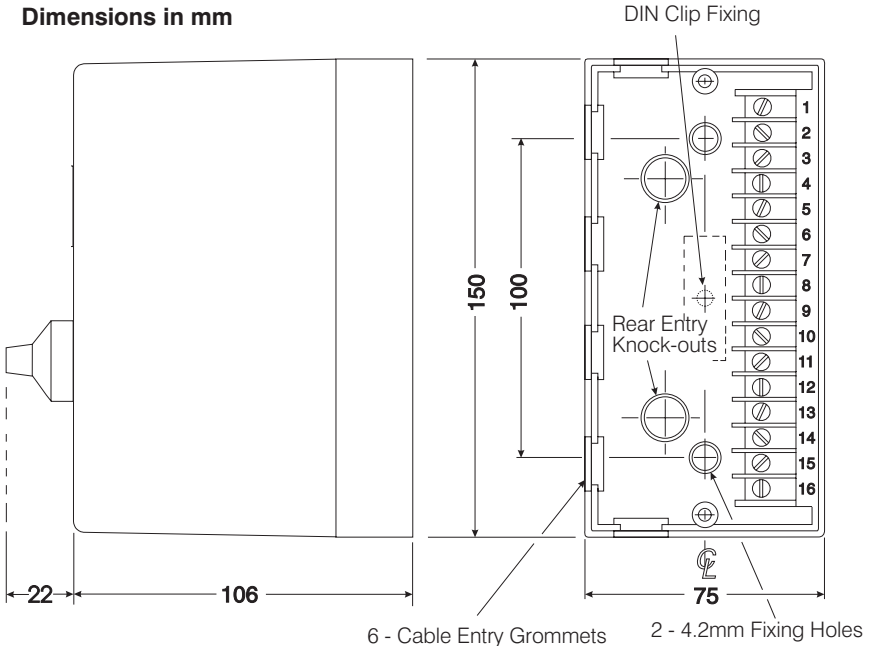
## Wiring

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 Input Signal Common (-)
- 2 Input Signal 'A' (+)
- 3 Input Signal 'B' (+)

### Relay A

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

### Relay B

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

### Supply

- |            |                  |
|------------|------------------|
| 14 Earth   | DC versions only |
| 15 Neutral | Earth            |
| 16 Line    | Negative (-)     |
|            | Positive (+)     |

## Operation

The two input signals are subtracted and compared with a reference value which is set by the front panel mounted control. When the magnitude of the difference between the input signals exceeds the reference value the switched states of the output relays\* are affected as follows:-

Relay 'A' changes state when Input 'A' is greater than Input 'B'

Relay 'B' changes state when Input 'B' is greater than Input 'A'.

\*The energised state of the relay in each case is set by internal switches (see Relay Mode section).

### Inputs

Both input signals must be of the same type (eg both 4 - 20mA or 0 - 5volts etc). Current input types are calibrated with each input signal matched to its conditioning resistor mounted between the terminals in the base section of the unit.

### Front Panel Control

The front panel control is scaled 0-100% and represents the difference between the input signals at which the output relays change state. To prevent relay 'chatter' at the trip point a small amount of hysteresis is added (see *Hysteresis*). The value of hysteresis set will be added to the front panel control set point.

The LED indicators provide the on/off status of the relays. The top LED indicator illuminates when Relay 'A' is energised and the lower LED when Relay 'B' is energised.

## 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

### 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.

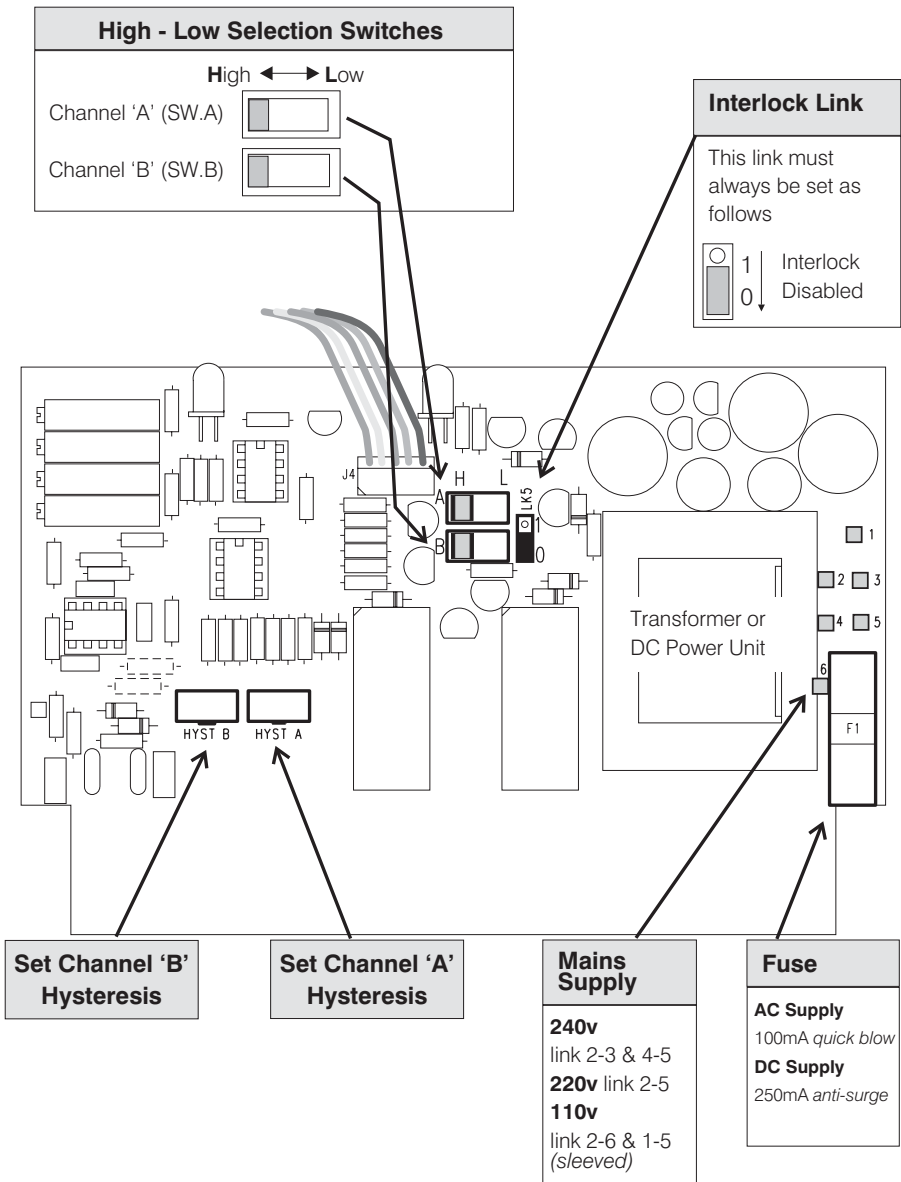
NB The controls may be clockwise or anti-clockwise types for increasing hysteresis. Spectrol types are clockwise, Bourns are anti-clockwise.

### Relay Mode

The High - Low switches SW.A and SW.B on the printed circuit board determine the energised state of the output relays.

Table 1 shows the effect of the switch settings. The standard settings are shown shaded.

**Fig 1 Location of adjustments**



**Table 1 Relay Mode settings**

Input Conditions	Relay 'A'		Relay 'B'	
	SW.A = H	SW.A = L	SW.B = H	SW.B = L
A > B	ON	OFF	OFF	ON
B > A	OFF	ON	ON	OFF



# Specification Summary

## Inputs

*others available to order*

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

## 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  $\pm 5\%$ .

## Relay Mode

Selectable by internal switches.

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

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

## Power Supply

AC 110/220/240V  $\pm 10\%$  50/60Hz 5VA

DC 12/24v  $-10\%$   $+20\%$  3.5W