

ANALOGUE SUMMATOR

Type 112-6A

User Guide

Continuous development may necessitate
changes in these details without notice

Document Ref: UD112-6A Rev 0



PROCESS MEASUREMENT, CONTROL & DISPLAY INSTRUMENTATION

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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

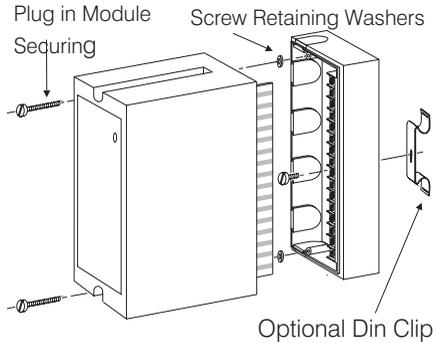
112 Series Modules are designed to be fitted to a flat dry surface using two 4mm screws. Alternatively, by fitting an optional DIN clip, they may be clipped to a rail conforming to BS5584:1978, EN50 022, DIN46277-3.

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:

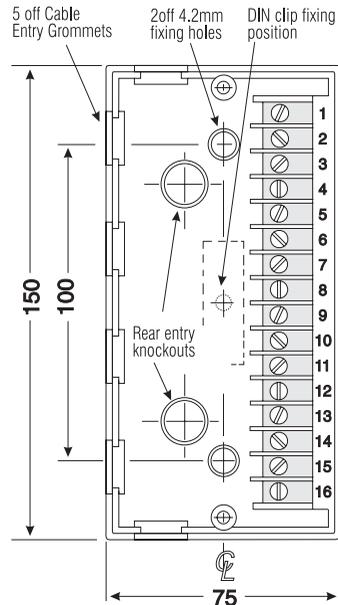
1. Remove the plug-in module securing screws.
2. Gently pull away the plug-in module from the base section.

3. To refit the module, align the 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

Height of unit 106mm



Wiring and connections

- 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.

Screw terminal connectors are provided. Maximum wire capacity is 2 x 1.5 sq. mm (approx. 16 AWG).

Terminal connections

Inputs

- 1 Input A (+)
- 2 Input B (+)
- 3 Input Common (-)
- 4 Input C (+)
- 5 Input D (+)
- 6 Input Common (-)
- 7 Input E (+)
- 8 Input F (+)
- 9 Input Common (-)

Please note: terminals 3, 6 & 9 ('Input common') are internally connected.

Outputs

Current output option

- 10 Output signal (+)
- 11 Output signal (-)

Current sink output option

- 11 Output signal (+)
- 12 Output signal (-)

Voltage output option

- 11 Output signal (+)
- 12 Output signal (-)

Supply

- | | | |
|------------|--------------|--------------------|
| 14 Earth | Earth | } DC Supply Option |
| 15 Neutral | Negative (-) | |
| 16 Line | Positive (+) | |

Access to Terminals



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

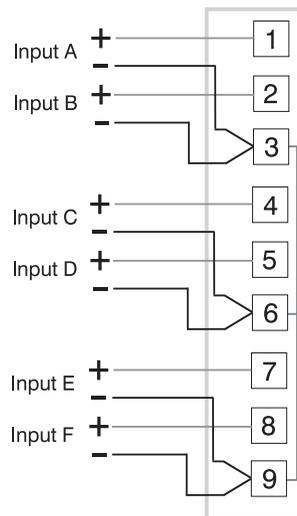
Loosen the two module securing screws. Gently pull away the top section of the module from its base to expose the fixing points and wiring terminals. To refit the module, align the module edge connectors with the socket in the base and carefully press home. **NB** do not over tighten the module securing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

Input connections

Input signals

Inputs are configured during manufacture to suit the application specified. A change in the number of inputs, or type of input from voltage to current or vice versa, will require a return to factory for reconfiguration.

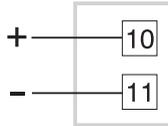
NB only those inputs configured during manufacture are available - see data label on the side of instrument or connection label on underside of plug-in top section.



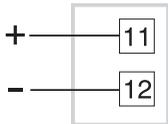
Output connections

Outputs are configured during manufacture to suit the application specified. A change in the type of output will require a return to factory for reconfiguration.

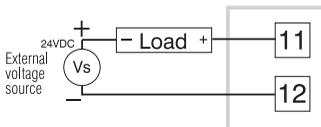
Current outputs



Voltage outputs



Current Sink outputs



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 the side of the instrument) is suitable for the application.

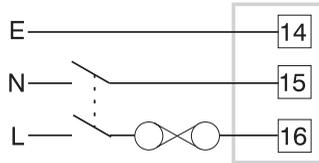


WARNING: Ferrules must be used for AC mains power wiring

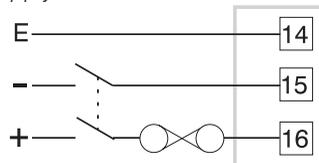
Power supply wiring to the instrument should be protected by a suitable fuse

and double pole switch - see below. The switch should be clearly marked as the isolating switch for the instrument.

AC mains



DC supply



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.

Fuse replacement and supply voltage adjustments

Gaining access to power supply

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

Remove plug-in module as described on page 3 - "Access to Terminals"

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. Note the location of the printed circuit board which must be replaced in the same position. Slide out the board.

Supply Voltage

Mains powered units can be adapted for operation on 110V, 220V or 240V supplies. Fig 1 provides details of the required link settings which are effected by soldered tinned copper wire links.



WARNING: Links for 110V operation must be insulated with silicon rubber sleeving.

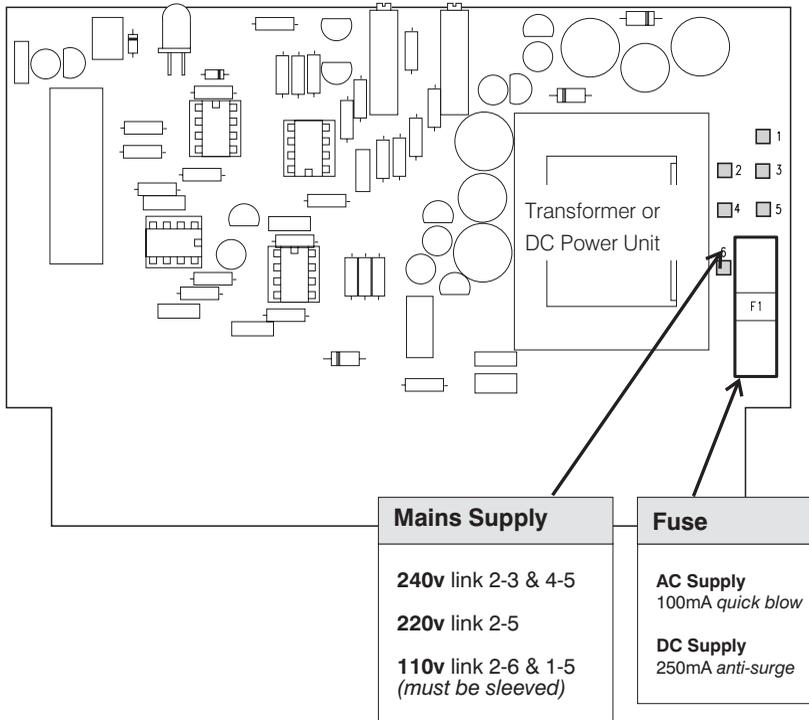
NB: DC powered units are an option specified at the time of ordering and have no facilities for changing the operating supply voltage.

Re-assembly

Recheck your link selections.

Replace the printed circuit board into the case ensuring that it is located in the slot under the LED indicator window. 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. Plug the reassembled module into the base section and secure with the two captive screws provided.

Fig. 1 Location of fuse and AC mains supply links



SPECIFICATION

INPUTS

See data label on side of unit for type fitted.

All inputs must be able to share a common connection. If they cannot be connected together, a Signal Isolator e.g. type B12-SI must be used to isolate the inputs.

0-10 mA into 100 ohms

0-20 mA into 50 ohms

4-20 mA into 62.5 ohms

0-5v into greater than 1 M ohms

1-5v into greater than 1 M ohms

FUNCTION

$kA \pm kB \pm kC \pm kD \pm kE \pm kF = \text{Output}$.

(The output is always positive. The subtractor result must always be positive).

OUTPUTS

See data label on side of unit for type fitted.

0-10 mA into 2000 ohms max.

0-20 mA into 1000 ohms max.

4-20 mA into 1000 ohms max.

0-5v into 500 ohms min.

1-5v into 500 ohms min.

Current Sink 4- 20 mA @ 50 Volts max.

CALIBRATED ACCURACY

Set at 100% to be within $\pm 0.1\%$ FSD

LINEARITY ERROR

$\leq \pm 0.1\%$ FSD.

SUPPRESSION/ELEVATION ERROR

$\leq \pm 0.1\%$ FSD.

SUBTRACTOR

Note: the error in the output signal is relative to the largest input span, in engineering terms.

STABILITY

Over 24 hours $\pm 0.1\%$ FSD.

Over 1 year $\pm 0.25\%$ FSD.

CURRENT INPUT SHUNT ERROR

For current inputs, the isolator and a shunt resistor (mounted in the base section of the module) 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.

OUTPUT RIPPLE

$\leq 0.1\%$ RMS of FSD.

LOAD RESISTANCE EFFECT

$\leq 0.001\%$ of span/100 ohms change.

ISOLATION

The inputs are commoned together but are isolated from the output and the power supply.

Maximum voltage 250V RMS or 400V DC

Resistance between input, output or power supply $\geq 50 \times 10^6$ ohms measured at 1000 V DC.

INPUT OVER-RANGE CAPABILITY

Voltage inputs 250 volts RMS or DC max.

Current inputs: 0.5W max.

TEMPERATURE COEFFICIENTS

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

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

ENVIRONMENTAL

Temperature range: operating -10 to $+50$ deg C; storage -20 to $+70$ deg

Humidity: 0-95% RH non-condensing

SUPPLY VOLTAGE REJECTION

Output change $< 0.01\%$ span/% supply change.

POWER SUPPLY

A LED indicates when the power supply is connected. **Standard AC:** 110, 220 or 240V $\pm 10\%$ 50/60Hz; 5VA; Fuse (internal) 100mA quick-blow (20 x 5mm)

Optional DC: 12, 24 or 48V $-10\% + 20\%$; 3.5W; Fuse (internal) 250mA anti-surge (20 x 5mm)