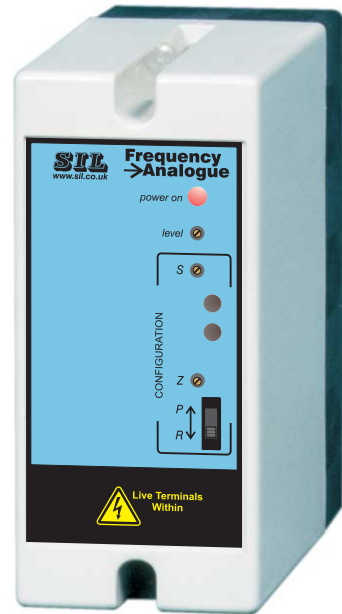


Frequency to Analogue Converter

Type B12-10C
Installation Guide



Document Ref: UDB12-10C.vp Rev 2



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.

- 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 only with a dry soft cloth.

Safety and EMC information

Safety: EN61010 -1, Immunity: EN50082-1
Emissions: EN50081-1, CE certified

Installation

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.

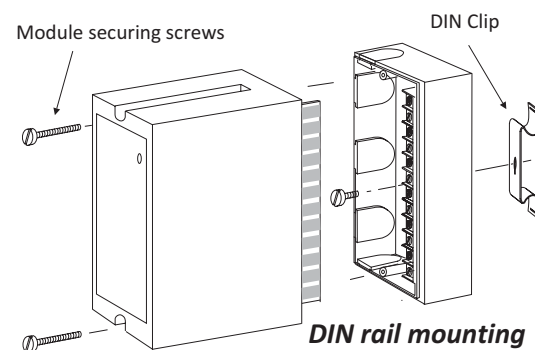
Fixing

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.

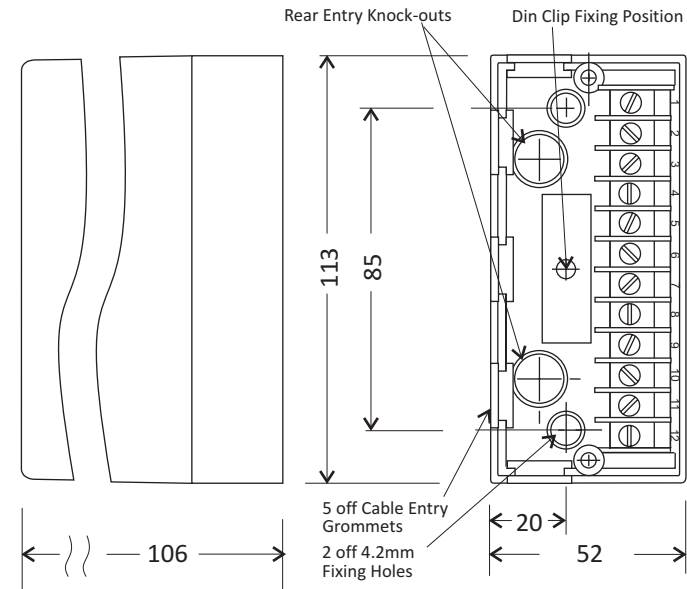
To gain access to fixing points:

- (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.



Wall / surface mounting



Wiring and connections

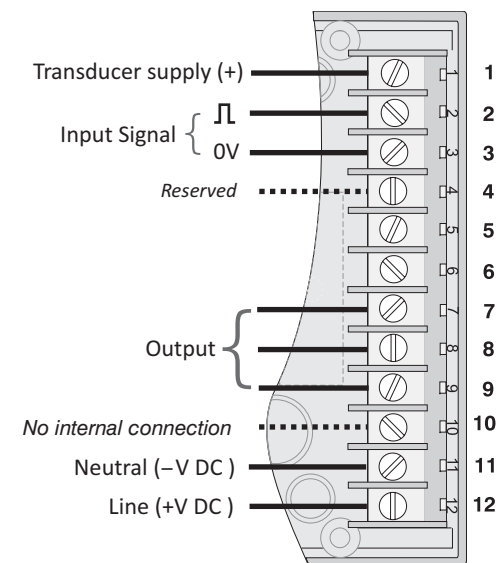
- Segregate power supply and signal wiring.
- Use screened cable for all signal wiring with the screen earthed at one end only.
- All connections should be made using ferrules to avoid short-circuits between adjacent terminals.
- This instrument is equipped with a universal power supply and may be operated from either of the following supply ranges:
DC supplies: 24 VDC to 200 VDC or AC supplies: 85 VAC to 260VAC
- 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.

Access to terminals

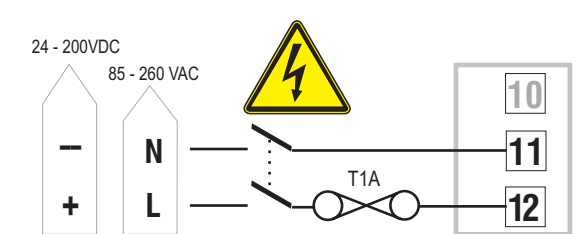


WARNING: Ensure that power to the instrument is switched off and signal wiring isolated from hazardous voltages

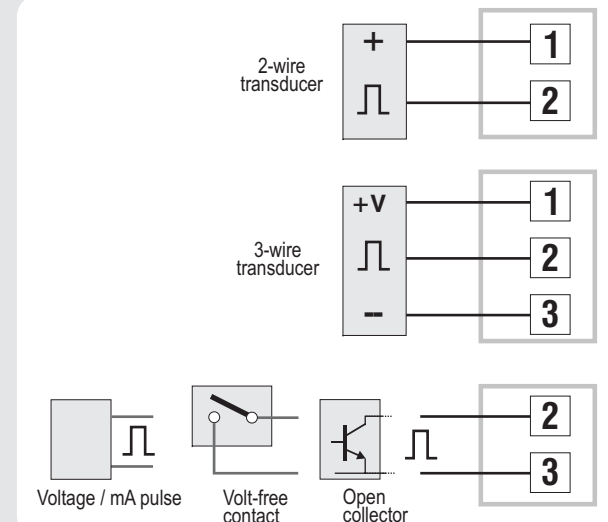
Loosen the two module securing screws. Gently pull away the top section of the module from its base to expose the fixing points and wiring terminals. To refit the module, align the module edge connectors with the socket in the base and carefully press home. NB do not over tighten the module securing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



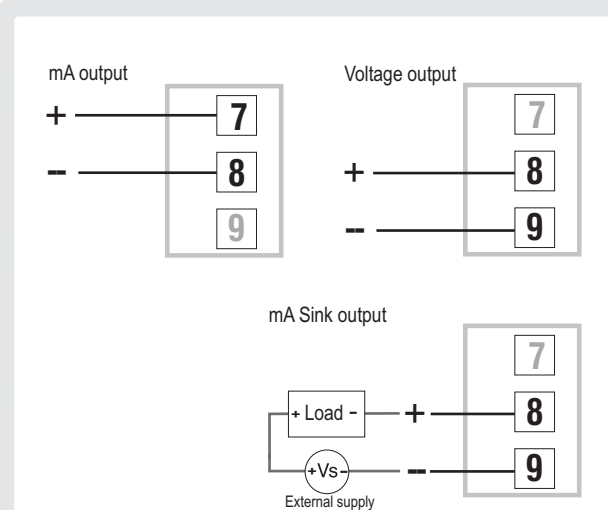
Supply



Input



Output



Notes:

1. Input and output types are set internally - see 'Configuration'

2. Transducer power supply - (terminal 1) is either 12V (supplied as default), or otherwise as specified when ordered. See connection label on side of unit.

Operation

The Frequency to Analogue Converter provides an output current or voltage which is proportional to the frequency of an alternating voltage or pulse input signal. Digital and analogue filtering are provided to optimise performance to site conditions.

Optional computer software and infra red link enable ranging to be adjusted, e.g. to suit a turbine meter replacement, and other parameters tuned to filter the effects of input signal noise.

Input signal level

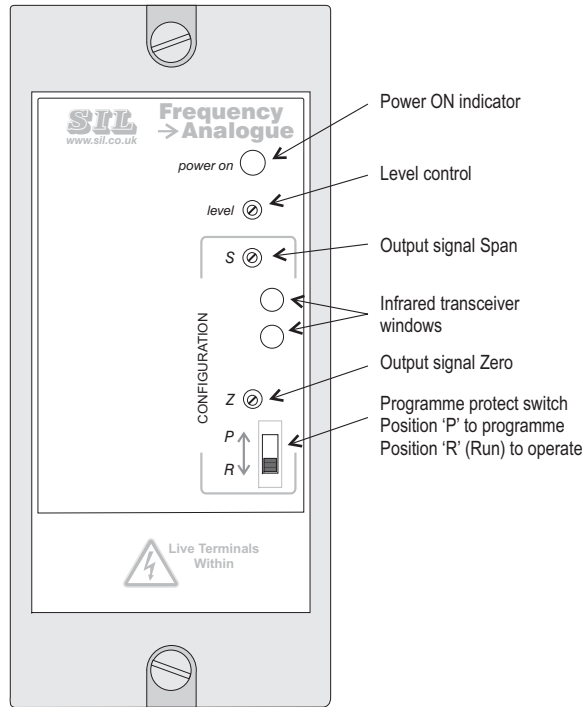
The 'Level' control accessed through the front panel, sets the sensitivity or trigger threshold for the instrument. Turning the level control anticlockwise will decrease the trigger point making the instrument more sensitive to lower amplitude signals.

To reduce sensitivity to noise, the level control should be turned clockwise (decreases sensitivity) until the output signal falls and then back off the control until reliable triggering is achieved. NB see 'Level control sensitivity adjustment' in the 'Configuration' section.

Programme protect switch

To improve noise immunity in areas near to variable speed drives, switch gear or other sources of strong magnetic fields, the B12-10C is equipped with a Programme Protect Switch: position 'R' (Run) is for normal operational mode and position 'P' for programming the unit (optional programming kit required).

Note: With the switch in position 'P' the output is held at the zero value.



Configuration adjustments

Please note: If calibration / configuration data is specified at the time of ordering i.e. a Type B12-10C /9 is ordered, ranges will have been factory set and tested. In this case the relevant details will be given on the data label fixed to the side of the unit. If not specified, i.e. a Type B12-10C is ordered, the unit will be supplied set to the following:

Transducer supply = 12V, Output type = 4-20mA, Frequency 0-100Hz, Filter settings to 'default' see 'Programmable options in Specifications' and the Level control sensitivity adjustment set for input voltage levels of greater than 6 volts.



WARNING: The Frequency to Analogue Converter must be isolated from power supply and any potentially hazardous signals before commencing this procedure.

The following procedures require the PCB to be removed from the case.

1. Turn off all power to the unit and isolate all potentially hazardous signals.
2. Refer to 'Access to terminals' in the installation section to separate the plug-in module section from the base.
3. 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.
4. Note the location of the printed circuit board which must be replaced in the same position and slide out the PCB.

Input signal

1. Refer to the Input Type jumper links as shown in the 'Configuration links' diagram.
2. If no other changes are required, refer to the Module re-assembly section below.

Level control sensitivity adjustment

The B12-10C is designed to accept voltage levels from 10 mV p.t.p. up to 250 V R.M.S. To cater for this wide range, the Level Control Sensitivity jumper link is provided to set the trigger level sensitivity for:

- (i) input signals \leq 6 Volts
- (ii) input signals $>$ 6 Volts (default setting).

1. Refer to Level Control Sensitivity in the 'Configuration links' diagram and set as required.
2. If no other changes are required, refer to the Module re-assembly section below.

Output signal

1. Refer to the Output Range and Output Type jumper links in the 'Configuration links' diagram and set as required.
2. Reinstall the unit as detailed in the Module reassembly section below. Without trimming the Output Span (S) and Output Zero (Z) controls changes to the output signal Range and Type may introduce an error of typically 1%. To make adjustments to the calibration, refer to the Output Calibration section.

Module re-assembly

1. Recheck your link selections.
2. Replace the printed circuit board into the case ensuring that the PCB is located in the slots under the LED indicator windows.
3. 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.
4. Plug the reassembled module into the base section and secure with the two captive screws provided - *do not overtighten*.

Calibration adjustment

To maintain specified accuracy, a timer-counter, digital voltmeter (and standard resistor for current outputs) of sufficient accuracy are required for this procedure.



Do not attempt to adjust 'Span' and 'Zero' controls with the unit out of its case.

1. Allow a warm-up time of 30 minutes
2. Set the input frequency to Zero value and adjust the 'Zero' trim to achieve the required output zero.
3. Set the input frequency to Fullscale value and adjust the 'Span' trim to the required output full scale.
4. Repeat steps 2 and 3 as required.

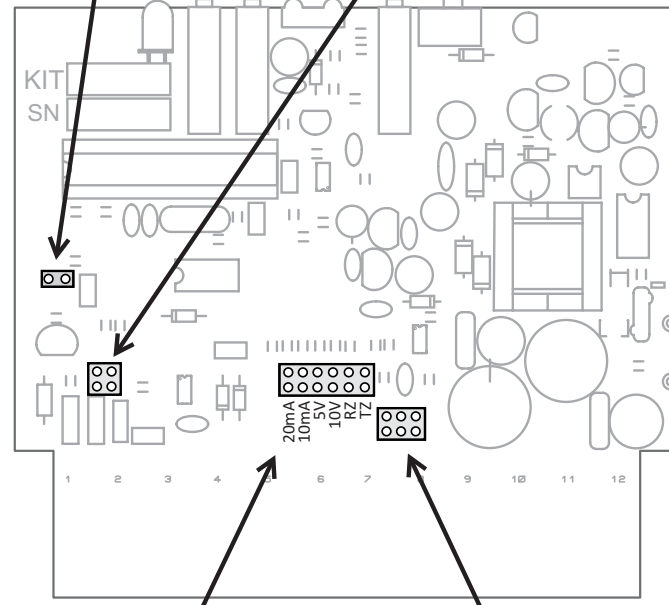
Configuration links

Level Control Sensitivity

- Input range $>$ 6 Volts (set by default)
- Input range \leq 6 Volts

Input Type

- Open collector & Volt-free contact
- Current e.g. 1-3mA pulse
- Voltage input



Output Range

- 0 - 20mA
- 4 - 20mA
- 0 - 10mA
- 0 - 5V
- 1 - 5V
- 0 - 10V

Output Type

- Current
- Voltage
- Current sink

Configuration of frequency range and digital filtering

These parameters are user configurable using the optional Programming Kit. Full details are provided in the programming guide on the software CD.

Specifications

Notes:

1. Input and output types, other than those shown are possible - our sales team will be pleased to advise.

Input Types - user selectable

Voltage: \pm 10mV p.t.p. to \pm 100V p.t.p. sine, square or triangular waveforms
Open collector: (npn), **Current input:** 1—3 mA (NAMUR) e.g from proximity switch, **Volt-free contact**.

Input Range: See programmable options

Transducer Power Supply

12VDC @ 10mA max (default setting) or customer specified voltage in the range 2.5V to 20V.

Outputs - user selectable

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

Response Time

Varies between 1 sec. and 1 period of input signal.

Isolation

The input and output are isolated from each other and from the power supply. Maximum voltage 250V RMS or 400V DC. Resistance \geq 50 x 10⁵ ohms measured at 1000V DC.

Programmable Options

Parameter	Min.	Max.	Default
Zero scale frequency (Hz)	0	5000	0
Full scale frequency (Hz)	0.1	5000	100
Minimum threshold - (low level cut-off (% of FS)	0.1	100	1
Change threshold (% of FS)	0	100	10
Static state timeout (s)	2	4000	2
Averaging count	1	20	5

Calibrated Accuracy

Error \leq \pm 0.2% FSD at 100% when factory calibrated.
 NB Error introduced by User output range changes, typically 1% but may be corrected by span and zero controls.

Linearity Error

\leq \pm 0.1% FSD (from 1 to 100% FSD)

Output Ripple

\leq 0.1% (peak to peak) of FSD

Load Resistance Effect

\leq 0.001% of span / 100 ohm change

Stability

Over 24 hours \pm 0.1% FSD, Over 1 year \pm 0.25% FSD

Temperature Coefficients

Zero: \pm 0.02% span / °C, Span: \pm 0.02% span / °C

Environmental

Temperature: operating -10 to +60°C, storage -20 to +70°C
 Humidity: 0 – 95% RH non-condensing

Power Supply

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

Safety & EMC

Safety: EN61010-1, Immunity: EN50082-1, Emissions: EN50081-1, CE certified

Mechanical

Weight: approx. 0.5kg, Dimensions (mm): 106D x 52W x 113H
 Enclosure: Fire retardent materials - PPO base, ABS cover
 Screw terminal wire capacity: 2 x 1.5mm²