

## Minimum threshold or *Low-level cut-off* (% of FSD)

The percentage of full scale below which the output signal is cut-off to zero. This is applicable only to successful measurements within the period defined by the Static State Timeout.

Minimum: 0.1, Maximum: 100, Default: 1

**Tip...** This parameter is more suitable for measurements that are typically well above 1Hz. As the sampling period is a minimum of one second, it will take at least this time for the output to clip to zero if such a measurement suddenly stops.

**NOTE: For correct functioning of the configuration software, one place of decimal only may be entered.**

## Averaging count

Spurious input signals are attenuated by averaging the number of input measurements specified by the Averaging Count. The Averaging Count is the number of measurements used for calculating the running average.

Minimum: 1 (no digital filtering), Maximum: 20, Default 5

## Change threshold (%)

To enable a rapid response to a change in the input signal, the most recent input measurement is continuously compared with the running average. If the change in input is greater than that specified by the Change Threshold parameter, the current averaging cycle is abandoned and a new one started.

Minimum: 0 (no averaging), Maximum: 100, Default: 10

## Input and output readings

With an input signal connected, the input measurement (Hz) and output value (% of FSD) are displayed by the software.

### NOTES:

(i) Storing or reading parameters will cause the current measurement of the input signal to be abandoned. The software will generate a warning if a new measurement has not taken place since the last computer reading taken.

(ii) Parameter settings are restricted by the software to valid limits. Notification is given by the software in the event of range errors.

(iii) Fractional precision outside valid limits will be truncated on downloading to the instrument.

(iv) A warning will be given by the software if the minimum threshold setting corresponds to a time greater than the combined static state timeout for high and low states.

(v) Measurements outside of defined input range are clipped to

limits with the exception of a 2.3% over-range which allows measurements and outputs of up to 102.3% of full scale.

## Troubleshooting

If no response is received from the F to A Converter, check the following:

- The USB driver and programming software has been correctly installed
- The Programme Protect Switch is set to the 'P' position.
- The correct COM port has been chosen.
- IR Link connections are secure.
- The F to A Converter is powered up.
- The IR Link Transceiver is positioned correctly.
- There are no other infrared sources which may temporarily disrupt communications.



## FREQUENCY TO ANALOGUE CONVERTER Programming Guide

For the following types B12-10C, C16-10 and superceded types 107-10b and B12-10b

Document Ref: PGC16-10.vp Rev 2

# Frequency to analogue converter configuration software

## Minimum requirements

PROG-10U Programming Kit

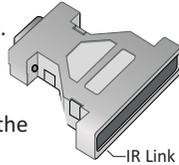
PC with vacant USB port

The software is Windows™ 98/NT/ME/2000/XP, etc. compatible.

## Install the USB Link IR virtual Com Port Driver

**NB** The driver should be installed before connecting the IR Link to the PC.

1. Open the 'Freq\_to\_Analogue' folder on the CD.
2. Open the 'USB-LINK-IR' folder.
3. Double-click 'USB-LINK-IR.exe' to install.
4. Follow the on-screen instructions to complete the installation.
5. Note: when installing on Windows 7 an update to the 'CP2102 USB to UART Bridge Controller' will be required. Win 7 normally searches for and installs this update automatically. Should it fail to do so the driver update is provided on the CD in the USB to UART Bridge Controller Update folder. The 'Read\_Me\_First' file on the CD also provides a link to the update download page.



## Install the configuration software

1. Open the 'Freq\_to\_Analogue' folder on the CD.
2. Double-click the 'F-to-A-Config' folder.
3. Double-click 'setup.exe' to install

**NOTE:** Software may be downloaded from [www.sil.co.uk/software.htm](http://www.sil.co.uk/software.htm)

## Programme protect switch

To improve noise immunity in areas near to variable speed drives, switch gear or other sources of strong magnetic fields, the F to A Converter is supplied with a Programme Protect Switch: position 'R' (Run) is for normal operational mode and position 'P' for programming the unit. The switch is located on the front of the instrument. **Please note:** the Programme Protect Switch must be returned to the 'R' position after programming. With the switch in position 'P' the output is held at the zero value.

## Positioning the IR transceiver

Infrared communications are effective at distances up to one metre. The IR USB Link Transceiver must be pointed at the two infrared transceiver windows, located on the front panel above the Programme Protect Switch. The IR Link Transceiver has a beam angle

of approximately 15° so alignment is not critical however the line of sight must be unobstructed.

**NOTE:** If there are other C16-10, B12-10 or 107-10B units in the vicinity, ensure they are 'programme protected' i.e. by link - on 107-10b & B12-10b units, by switch on the B12-10C or C16-10 units, or otherwise shielded from the infrared beam.

## Setting up the IR link

Before communication with the F to A Converter can be initiated, the software must be configured for the appropriate serial (COM) port. Open the F to A Converter programmer application and select the appropriate COM port from the 'Communications Port' drop down list (*bottom left hand of the application window*).

Confirm communication with the F to A Converter has been established by clicking the "Read current settings from unit" button. Refer to 'Troubleshooting' if no reply is received from the unit.

## Programming

Settings are stored in non-volatile memory. To obtain the settings currently programmed into the F to A Converter, click the 'Read current settings from unit' button.

## How digital filtering works

Digital filtering enables effective attenuation of noise yet permits a rapid response to a change in the input signal.

Spurious input signals are attenuated by averaging a series of input measurements. The number of measurements used in the averaging process is specified by the 'Averaging Count' parameter.

When this is set to a count of '1', no digital filtering is performed. Increasing the Averaging Count will increase the amount of input signal filtering but will incur a proportionate increase in response time.

To enable a rapid response to a change in the input signal, the most recent input measurement is continuously compared with the current average. If the change is greater than that specified by the 'Change Threshold' parameter (this is specified as a percentage of FSD), the current averaging cycle is abandoned and a new one started.

The characteristics of the digital filter can therefore be modified by the Change Threshold and Averaging Count parameters. Changes in input due to noise or spurious signals that do not exceed the Change Threshold will be filtered therefore increasing the Change Threshold increases the maximum change in input that can be filtered. Increasing the Averaging Count will increase the attenuation of these spurious signals.

The response time for the output of the F to A Converter to settle will depend on the number of readings specified by the Averaging Count. Consequently a large value of Change Threshold will result in slow response times for all but large changes in input.

**Tip...** The Change Threshold should be set to the lowest setting that gives adequate noise rejection whilst providing satisfactory response times for the application.

With the Change Threshold set low, the value of the Averaging Count will not affect the response time for a step input change but if the input is changing very slowly, a large value of Averaging Count will cause the output signal to lag behind the input.

**Tip...** The Averaging Count should be set to the lowest value that gives sufficient filtering.

## Programmable parameters

### Output scaling

The output signal may be scaled to any portion of the input signal frequency range with the following parameters.

**NOTE:** For correct functioning of the configuration software, two places of decimal only may be entered for the following frequency settings.

#### 1- Zero Scale Frequency (Hz)

The input signal frequency giving zero output signal.

Minimum: 0, Maximum: 5000, Default: 0

#### 2- Full Scale Frequency (Hz)

The input signal frequency giving full scale output signal.

Minimum: 0.1, Maximum: 5000, Default: 1000

### Static state timeout (seconds)

If the period in which the input signal remains unchanged exceeds this value, the current measurement is abandoned and the output signal cut to zero. In the event of a transducer or signal line failure, this facility ensures the output is not erroneously held at the last reading. The maximum allows for valid measurements to be taken with a single pulse every 4000 seconds i.e.  $f=0.00025\text{Hz}$ .

**NOTE:** This parameter overrides 'Minimum Threshold'.

Minimum: 2, Maximum: 4000, Default: 2