

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. NB This does not include any measurements over 10kHz.

Troubleshooting

If no response is received from the C16-10, 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 C16-10 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

Type C16-10

Programming Guide

Document Ref: PGC16-10.vp Rev 0

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Frequency to analogue converter configuration software

Minimum requirements

PROG-10U Programming Kit

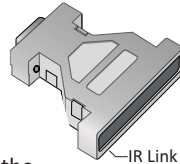
PC with vacant USB port

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

Install the USB Link IR driver

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

1. Open the 'Freq_to_Analog' folder on the CD.
2. Double-click the 'USB-LINK-IR.zip' file to open it.
3. Double-click 'setup.exe' to begin installation.
4. Follow the on-screen instructions to complete the installation.



Install the configuration software

1. Open the 'Freq_to_Analog' folder on the CD.
2. Double-click the 'F-to-A-Config.zip' file to open it and extract to a folder of your choice. A temporary folder on the 'desktop' is recommended.
3. Double-click 'setup.exe' to begin the installation. .exe'-

NOTE: Software may be downloaded from
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 C16-10 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:** to maximise noise immunity, the Programme Protect Switch must be returned to the 'R' position after programming.

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 to the left of the 'Power' LED, on the front panel of the C16-10 Frequency to Analogue unit. 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 -

107-10b & B12-10b, by switch on the C16-10, or otherwise shielded from the infrared beam.

Setting up the IR link

Before communication with the C16-10 can be initiated, the software must be configured for the appropriate serial (COM) port. Open the C16-10 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 C16-10 has been established by clicking the "Read current settings from unit" button. Refer to 'Troubleshooting' if no reply is received from the C16-10.

Programming

Settings are stored in non-volatile memory. To obtain the settings currently programmed into the C16-10, 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 C16-10 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, three 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: 10000, Default: 0

2- Full Scale Frequency (Hz)

The input signal frequency giving full scale output signal.

Minimum: 0.1, Maximum: 10000, 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