



# FREQUENCY TO ANALOGUE CONVERTER

Type C16-10

- Frequency ranges from 0 - 0.1Hz up to 0 - 5kHz
- Programmable filtering and ranging via USB infrared link
- Transducer power supplies
- Pre-configured inputs available at terminal connections: open-collector, volt-free contact, 1-3mA pulse (NAMUR), and voltage
- User configurable output ranges: V, mA sink or source
- Universal AC/DC powered (85 - 260 VAC, 24 - 200 VDC)
- Removable terminals
- Five year warranty



The C16-10 frequency to analogue converter provides a current or voltage output which is proportional to the frequency of alternating voltage or pulsed input signal. The C16-10 has many uses in applications including water and energy metering and rotational measurements. Optional PC configuration software provides range changing, e.g. to suit a turbine meter replacement, and optimisation of digital filtering to suit site conditions. The frequency to analogue converter is supplied either pre-calibrated to customers' specification (*i.e. no further configuration required*) or as a readily available item supplied with default settings for configuration by the user.

## Analogue filtering

The level of input signal at which the frequency to analogue converter triggers is set by the front panel control.

## Digital filtering

Digital filtering enables effective attenuation of noise yet permits a rapid response to a change in the input frequency. Factory-set default settings are suitable for many situations, however, the Programming software enables the characteristics of the digital filter to be modified by the following parameters:

**Averaging Count:** (digital filtering) Spurious input signals are attenuated by averaging the number of input measurements specified by the Averaging Count.

**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.

See the C16-10 Frequency to Analogue User Guide for more comprehensive information on digital filtering.

## Calibration

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

**Zero Scale Frequency** The input signal frequency required for 'zero' output signal.

**Full Scale Frequency** The input signal frequency giving full scale output signal.

Other parameters which effect the output are:

**Static State Timeout:** 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. NB This parameter overrides 'Minimum Threshold.'

**Minimum Threshold** The percentage of full scale below which the output signal is cut-off to zero.

## Optional Programming Kit

A Programming Kit, comprising Windows™ 95/98/NT/ME/2000/XP compatible software and infrared USB link, provides adjustments to all the above parameters. It also enables input measurements (Hz) and output (% FS) to be displayed on screen.

## 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:** 10 mV p.t.p. to 250 V R.M.S - 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 Supplies

(1) 12VDC @ 10mA max (default setting) or customer specified voltage in the range 5V to 15V.

(2) 24VDC @ 20mA max.

### 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

Typically 1 sec without digital filtering (averaging count =1).

### Isolation

The input and output are isolated from each other and from the power supply. Maximum voltage 250V RMS or 400V DC. Resistance  $\geq 50 \times 10^6$  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)

### Supply Voltage Rejection

Span change:  $<0.02\%$  span / % supply change.

### Safety & EMC

Safety: EN61010-1, Immunity: EN50082-1,

Emissions: EN50081-1, CE certified

### Mechanical

Weight: approx. 0.5kg, Dimensions (mm): 116D\* x 22.5W x 99.5H \*Depth is 117.9 when mounted on DIN rail TS3/TS35D

### Information required when ordering

#### Standard units

Standard units are supplied with the default settings as listed under 'Programmable Options', Transducer supply (1) = 12V and the Output type = 4-20mA.

Order code: **C16-10**

Programming kit order code: **Prog-10U**

#### Pre-configured units

- Specify type **C16-10 /9** followed by:-
  - Input signal and /or transducer type
  - Output signal (*see specification*)
  - Zero scale frequency
  - Full scale frequency
  - If programming kit required add: **Prog-10U**
- For the following, if default settings are required (see 'Programmable Options'), specify 'default' against the appropriate parameter.*
- Averaging count
  - Change threshold (% of full scale)
  - Static state timeout (seconds)
  - Minimum threshold (% of full scale)



**THIS UNIT CAN BE MAINS POWERED, AND ALL INPUTS TO IT MUST BE ISOLATED FROM DANGEROUS VOLTAGES BEFORE THE FRONT COVER IS REMOVED. LIVE TERMINALS WILL BE EXPOSED.**

Continuous development may necessitate changes in these details without notice

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