

## Measuring the frequency of the signals **MCH8**

MCH8 is a mezzanine module for measuring the frequency of an arbitrary waveform over 8 channels. The main use as a speed meter (tachometer) for various applications.

Each channel can receive a periodic signal either from a digital input (isolated from other channels) or from an analog input with an adjustable threshold relative to the common analog circuit (not isolated from other channels).

When using a digital input, the mezzanine can measure the frequency of a periodic signal in the form of a sequence of pulses, in which the duration of the front and cutoff is no more than 0.1 % of the period duration.

When using an analog input, the mezzanine can measure the frequency of periodic signals in the form of a sequence of pulses with an arbitrary edge duration, and also measure the duration of the positive or negative part of the periodic signal pulses in the form of a sequence of pulses, in which the duration of the front and cutoff is not more than 0.1% of the period duration.

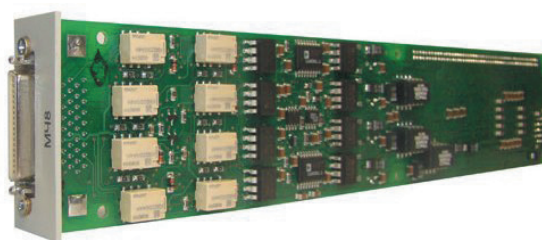
When combining analog inputs in pairs, the mezzanine can operate in two-threshold mode

The mezzanine performs measurements in the following modes:

- "One-time" - a single measurement is performed on all channels;
- "Block" - measurements are performed until a pre-set number of samples (results) is received on all channels;
- "Continuous" - measurements are performed on all channels in a continuous loop until the stop command is received.

### Key Features

- the channels are galvanically isolated from the control circuits, power lines and common (GND) VXI trunks, as well as from the mezzanine case and the mezzanine carrier module;



- two types of inputs are available:
  - Opto-isolated differential input with control current up to 10 mA (8 channels). The main application is the measurement of the frequency of normalized signals after inductive sensors;
  - Uninsulated entrance with common ground and adjustable threshold comparator (8 channels). The main application is measuring the frequency of a signal directly from inductive sensors;
- from 8 channels, you can create any combination of channels having at the same time 2 threshold channels and single threshold and optoisolated.
- The choice of the type of channels is carried out programmatically. This function makes it easy to integrate this module into existing speed measurement systems with or without standardization;
- the ability to measure the average duration of the positive and negative part of the pulses;
- the ability to measure the frequency or duration of pulses in single or continuous mode;
- programmable channel polling period of the module (sampling period);
- increasing the sampling period increases the accuracy of the frequency measurement;
- filtering impulse noise and comparator operation noise

## Технические характеристики:

Number of channels-8	Range of measured frequency of periodic signals when using any input from 0.1 Hz to 500 kHz
The input impedance of the analog input is 100 kOhm	
The period for receiving measurement results (sampling period) is set programmatically in the range from 32 μs to 21 seconds. Step for changing the sampling period 32 μs	Limits of the permissible basic relative error of frequency measurements when using a digital input and the duration of the front and cutoff of the periodic signal is not more than 0.1 % of the period duration at an ambient temperature of $+(20 \pm 2)^\circ\text{C}$ , % $\Delta = \pm(0,1 \times T_{\text{min}}/T_s + \Delta_0)$
The input signal range when using an analog input is from -25 to 25 V	$T_{\text{min}}$ - minimum allowed sampling period, equal to $32 \times 10^{-6}$ s; $T_s$ - the period of sampling, s $\Delta_0 = 0.00018\%$
The range of software setting of voltage thresholds of comparators on analog inputs from -4 to 4 V. The step of setting the threshold voltage is at least 20 mV.	
The limits of permissible additional relative error of frequency measurement when using a digital input and the duration of the rising and falling of the periodic signal is not more than 0.1 % of the duration, frequency when using analog input, the duration of the positive or negative portion of the rectangular pulses using the analog inputs and the duration of the rising and falling of the periodic signal is not more than 0.1 % of the duration of the period., % $\pm 0,0001 T$ ,	
where T - dimensionless quantity, is numerically equal to the deviation of ambient temperature from the value of 18 °C (for temperature range from 5 to 18 °C) or from value of 22 °C (for temperature range from 22 to 40 °C).	
The measuring circuits of the mezzanine are galvanically isolated from the housing. Galvanic isolation voltage-not less than 200 V. Galvanic isolation resistance-not less than 20 MOhm	In the off state, all input lines of the mezzanine are galvanically isolated from each other. The galvanic isolation voltage is not less than 150 V. the galvanic isolation resistance is not less than 20 MOhm
Overall dimensions 270 x 50.8 x 22 mm	Weight 120 g