MODEL AFCM - ANALOG TO FREQUENCY CONVERTER MODULE

DESCRIPTION
The configurable analog to frequency converter is used to convert analog standard signals to frequency signals or pulse width modulated (PWM) signals. Input signal ranges are 0 - 20 mA, 4 - 20 mA, 0 - 10 mA, 2 - 10 mA, 0 - 10 V, 2 - 10 V, 0 - 5 V, or 1 - 5 V.

The DIP switches are accessible on the side of the housing and allow the following parameters to be configured:
- Input signal
- Output values
- Output type (frequency or PWM)
- Filter type (for smoothing interferences on the input signal)
- Input over/under range fault detection

SAFETY SUMMARY
The device may only be installed and put into operation by qualified personnel. The corresponding national regulations must be observed.

SPECIFICATIONS

INPUT
1. INPUT SIGNAL RANGE (Configurable): 0 - 20 mA, 4 - 20 mA, 0 - 10 mA, 2 - 10 mA, 0 - 10 V, 2 - 10 V, 0 - 5 V, 1 - 5 V
2. MAX. INPUT SIGNAL:
   - Current inputs: 100 mA
   - Voltage inputs: 30 VDC
3. INPUT RESISTANCE:
   - Current inputs: 50 Ω, approx.
   - Voltage inputs: 110 KΩ, approx.

OUTPUT
1. OUTPUT SIGNAL RANGE (Configurable):
   - Frequencies: 0 - 10 kHz, 0 - 5 kHz, 0 - 2.5 kHz, 0 - 1 kHz, 0 - 500 Hz, 0 - 250 Hz, 0 - 100 Hz, 0 - 50 Hz
   - PWM: 7.8 kHz, 3.9 kHz, 1.9 kHz, 977 Hz, 488 Hz, 244 Hz, 122 Hz, 61 Hz
2. MIN. LOAD:
  Frequency: 6 KΩ
   PWM: 2 KΩ
3. MAX. LOAD CURRENT: 20 mA
4. OUTPUT: NPN open collector transistor
5. MAX. SWITCHING VOLTAGE: 30 V
6. OVER-RANGE/UNDER-RANGE FAULT DETECTION: Configurable
7. OUTPUT PROTECTION: Short circuit and polarity protection

GENERAL DATA
1. SUPPLY VOLTAGE: 19.2 - 30 VDC
2. NOMINAL VOLTAGE: 24 VDC
3. CURRENT CONSUMPTION: < 10 mA
4. POWER CONSUMPTION: < 200 mW
5. TRANSMISSION ERROR: < 0.1%
6. TEMPERATURE COEFFICIENT (MAX.): < 0.02%/K
7. STEP RESPONSE:
   - 0% to 99%: < 15 msec + (1/T)
   - With Largest Filter: < 1 sec + (1/T)
8. TEST VOLTAGE (INPUT / OUTPUT / SUPPLY): 1.5 kV, 50 Hz, 1 min
9. AMBIENT TEMPERATURE RANGE:
   - Operation: -20 t +65°C (-4 to 148°F)
   - Storage: -40 to +85°C (-4 to 183°F)
10. FAULT DETECTION: Red LED under clear cover top

ORDERING INFORMATION

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11. CERTIFICATIONS AND COMPLIANCES:

Immunity to Interference According to EN 61000-6-2
Discharge of static electricity (ESD) EN 61000-4-2 Criterion B1
Electromagnetic HF field EN 61000-4-3 Criterion A2
Fast transients (Burst) EN 61000-4-4 Criterion B1
Surge voltage capacities (Surge) EN 61000-4-5 Criterion B1
Conducted disturbance EN 61000-4-6 Criterion A2
Noise Emission According to EN 61000-6-4
Noise emission of housing EN 55011 Class A3

1 Criterion B: Temporary impairment to operational behavior that is corrected by the device itself.
2 Criterion A: Normal operating behavior within the defined limits.
3 Class A: Area of application industry.

12. CONNECTIONS: Wire Gauge: 24-12 AWG, Stripping length: 0.47" (12 mm)
13. CONSTRUCTION: Polybutyleneterephthalate PBT, black
14. MOUNTING: Standard DIN top hat (T) profile rail according to EN50022 - 35 x 7.5
15. WEIGHT: 2 oz. (54 g)

WIRING CONNECTIONS
Primary power is connected to terminals 7 or 3 (19.2 – 30 VDC) and 8 or 4 (GND 3). For best results, the Power should be relatively “clean” and within the specified variation limits. Drawing power from heavily loaded circuits or from circuits that also power loads that cycle on and off, should be avoided.

The input signal is connected to terminal 1 (In UI) and 2 (GND 1). Connections for the output signal is on terminals 5 (Out f) and 6 (GND 2).

The moving average filter can group values (1, 2, 4, 6) using moving window averaging to form a new measured value. In moving window averaging, the average of a fixed number of measured values is taken, whereby the oldest value is always dropped and the most recent added.

DIP Switch S2
Using DIP switch S2, you can set the output values, the output type and fault detection.

Output Signals
Frequency Output:
Variable frequency/period duration T

PWM Output
(Pulse Wide Modulation):
Variable pulse to pause ratio/fixed period duration T

Fault Detection
Freeze at 100% measuring range end value
105% measuring range end value
110% measuring range end value
Fault detection OFF (continues past end value)

INSTALLATION
The unit is equipped with a universal mounting foot for attachment to standard DIN style top hat (T) profile rail according to EN50022 - 35 x 7.5 and 35 x 15. The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

T Rail Installation
To install the AFCM on a “T” style rail, angle the module so that the top groove of the “foot” is located over the lip of the top rail. Push the module toward the rail until it snaps into place. To remove a module from the rail, insert a screwdriver into the slot on the bottom of the “foot”, and pry upwards on the module until it releases from the rail.