FM-1D/K  Frequency Converter  Frequency-to-current converter and flowrate indicator

Description

The FM-1D/K is a µP-controlled frequency converter. It converts input pulses to an analog current signal proportional to the instantaneous flowrate. It is equipped with a numerical display on the front. The registered pulses are converted into:
- counter reading (pulse totalling)
- flow rate indication
- output pulses with different pulse value
- normalised output current

Application

On-site display of:
- flow rate and current counter reading
Remote transfer for:
- apportioning, process automation, display of flow rate and current counter reading

Main characteristics

Simple set up using 3 keys on the front
Wall mounted or clipped onto a top hat rail acc. to EN 50022
Accommodates a wide range of pulser inputs
Pulse output through relay
Current output 0 or 4 ... 20 mA
Reverse flow identification
Set up of input and output pulse values
Test mode
Local indication on the front of:
- instantaneous flowrate
- counter reading
- programming data
Data retention in case of power failure by non-volatile memory
Performance Data

Power supply
230 V AC (209...253 V), 115 V AC (105...126 V),
24 V DC (20...27 V) and 24 V AC (17...27 V)

Power consumption
3.5 VA (3 W)

Dimensions
100 x 73 x 114 mm (W x H x D)

Weight
approx. 650 g

Protection class
IP 40

Temperature range
operation: 0 to +70 °C
storage: -10 to +80 °C

Input
Dry contact sensors or proximity detectors
(opto-electronic) acc. to EN 60947-5-6 (Namur)
2-wire, 8.2 V, approx. 1 kOhm

Auxillary voltage for feeding 3-wire sensor
12 V, 10 mA

Input frequency range
0...0.1 to 0 ...1000 Hz (for 0/4 ... 20 mA)

Maximum cable length
approx. 6 km (depending on cable type used)

Automatic contact bounce suppressing
(depends on the input frequency)

Output
Current output
0 ... 20 mA or 4 ... 20 mA (selectable)

Load
max. 1000 Ohm (at nominal supply voltage)
(max. 700 Ohm with connected 3-wire pulser)

Damping factor
14 step selectable
(no damping = 1, max. damping = 14)

Max. transmission distance
approx. 14 km at 500 Ohm-load
with a cable cross section of 1mm²

Pulse output
Relay closure, max. 48 V AC/DC, 1 A, voltage free,
closing time 500 ms, max. 1 Hz

Maximum transmission distance
approx. 500 m and 12 km with an additional
transistor relay

Display
- 4-digit, 7-segment LED, 10 mm digit height
- instantaneous flowrate
- counter reading

programming data:
- flowrate range
- input pulse values
- output pulse values
- standardised output current range
- damping factor

Programming
By 3 keys on the front with indication on the display and the LEDS.

Protection of the parameters by code.

Lightning Protection
To protect the FM-1D/K from voltage surges caused by lightning, installation
of adequate lightning protection devices is recommended.

Intrinsic Safety
If the water meter/pulser is installed in a hazardous area, the FM-1D/K must
be installed in a safe area with the pulse sensor connected to the frequency
converter via a suitable transistor relay.
Display

Program Mode
Select key (select)
Selects the indicated parameter.
Change key (+) or (-)
Change to program mode (flashing status LED, flashing digit).
Change key (+) or (-)
Modifies the selected (flashing) digit.
Select key (select)
Changes the selected digit.
Select key (select)
After modification of the tight-most digit, the value is stored in a non-volatile memory and will not be lost in the case of power failure.

Protection of parameters against modification
Press simultaneously on the change keys (+) and (-) and select key
Move to protect menu
Change key (+) or (-)
Toggle between protected (Loc8) and open for changes (Loc6)
Select key (select)
Confirms the selected mode (protected or not)
- “Loc8” indicates settings are protected against being overwritten:
  In program mode the display will indicate “Loc6” and it is not possible to enter changes.

Standard Mode
Select key (select)
Selection of the measuring value to be displayed.

The numerical display of the FM-1D/K performs a dual function:
- In program mode the settings are entered with the aid of the interactive display and the keys on the front.
- In standard mode the current values are displayed: instantaneous flow rate and counter reading.

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*) Decimal point depends on output pulse value

- Flowrate range.
Enter the maximum value directly in m³/h from 0.001...9999 m³/h.
- Instantaneous flowrate.
The instantaneous flowrate is indicated in m³/h. At reverse flow [-0.00] is indicated.
- Counter reading.
Presetting the start value; digits 1...4 and 5...8 are set separately. *)
- Counter reading.
Indicating the current reading; digits 1...4 and 5...8 are indicated in two steps. *)
- Input pulse value.
Enter in litres per pulse.
- Input pulse value.
Checking the settings.
- Output pulse value.
Enter from 0.001...9999 m³ per pulse.
- Output pulse value.
Checking the settings.
- Current output range.
Selectable 0...20 mA or 4...20 mA.
- Current output range.
Checking the settings.
- Damping factor of current output.
Setting from 1 (no damping) to 14 (max. damping).
- Damping factor of current output.
Checking the settings.
- Test mode.
Checking the cabling and operation of the frequency converter.
- Test mode.
Shows in standard mode the internal software version of the FM-1D/K.
Mounting

Snap action on 35 mm top hat rail to EN 50022

Wall mounting with two screws

Connection

- Max. cable cross section is 2.5 mm².
- Check power supply before using.
- When using a 24 V DC power supply, polarity is irrelevant.