

# FM-1D/K

Frequency Converter  
Frequency-to-current converter  
and flowrate indicator



## 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

## Description

The FM-1D/K is a  $\mu$ P-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

# Performance Data

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## 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 1mm<sup>2</sup>

### 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.

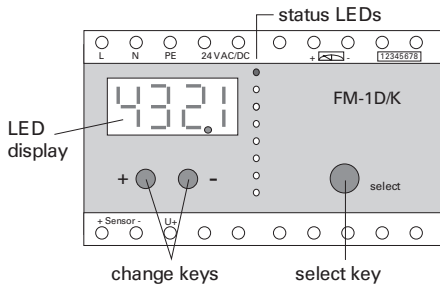
## Lightning Protection

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



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.

## 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.

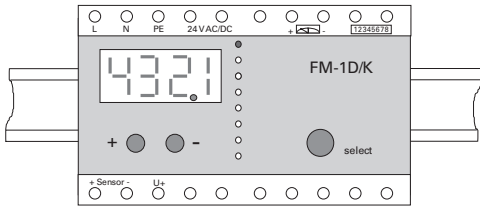
## Standard Mode

Select key (select)

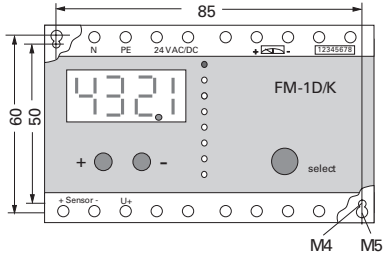
Selection of the measuring value to be displayed.

Numerical display	LED state	Program mode	Standard mode
	●  m <sup>3</sup> /h	Flowrate range. Enter the maximum value directly in m <sup>3</sup> /h from 0.001 ... 9999 m <sup>3</sup> /h.	Instantaneous flowrate. The instantaneous flowrate is indicated in m <sup>3</sup> /h. At reverse flow [-0.00] is indicated
*) Decimal point depends on output pulse value	●  1234 5678	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. *)
	● Sensor I/	Input pulse value. Entry in litres per pulse.	Input pulse value. Checking the settings.
	●  123.4 m <sup>3</sup> /	Output pulse value. Entry from 0.001...9999m <sup>3</sup> per pulse.	Output pulse value. Checking the settings.
	● 0/4 ... 20mA	Current output range. Selectable 0...20 mA or 4...20 mA.	Current output range. Checking the settings.
	●  1 ...  14	Damping factor of current output. Setting from 1 (no damping) to 14 (max. damping).	Damping factor of current output. Checking the settings.
	● Test	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

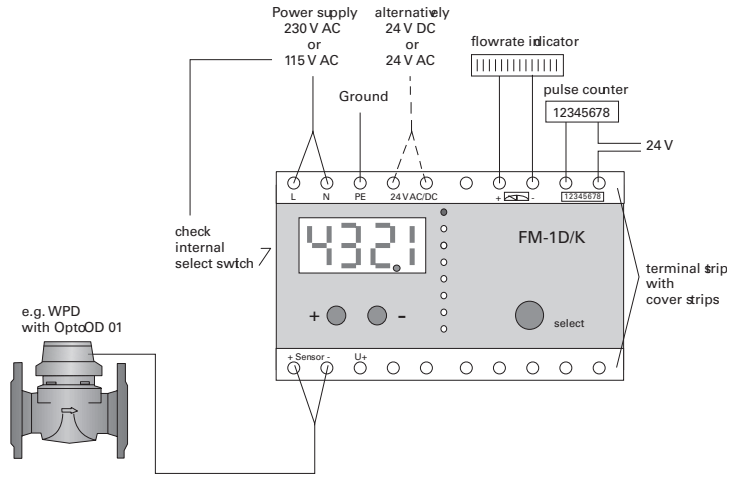


Snap action on 35 mm top hat rail to EN 50022



Wall mounting with two screws

## Connection



- Max. cable cross section is 2.5 mm<sup>2</sup>.
- Check power supply before using.
- When using a 24 V DC power supply, polarity is irrelevant.



Certified according to ISO 9001  
Quality Management System OQS Reg.no. 3496/0

### UK & Ireland Enquiries

Sensus Metering Systems 11 The Quadrangle, Abbey Park, Romsey, Hampshire SO51 9DL UK  
T: +44 (0) 1794 526100 F: +44 (0) 1794 526101 Email: info.gb@sensus.com [www.sensus.com](http://www.sensus.com)

### International Enquiries

Sensus GmbH Ludwigshafen Industriestrasse 16, 67063 Ludwigshafen Germany  
T: +49 (0) 621-6904-0 F: +49 (0) 621-6904-1409 Email: info.int@sensus.com [www.sensus.com](http://www.sensus.com)

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