Badger Meter

F001 - Basic Flow rate Indicator / Totalizer

with analog and pulse signal outputs

DESCRIPTION

The F001 flow transmitter is complete with pulse and analog output signals. The display shows flow rate, total and accumulated total. On-screen engineering units are easily configured from a comprehensive selection. It uses a simple configuration structure. Each setting is clearly indicated with an alphanumeric description, which avoids confusing abbreviations.

DISPLAY

The main process information is displayed with 7 digits (0.47", 12 mm) to show flow rate, total or accumulated total. The 7 alpha-numeric digits (0.28", 7 mm) are used for the flow rate measurement units and the clear setup menu messages. For good readings in full sunlight and darkness, the F001 provided with a bright backlight.

OUTPUTS

Analog output	The flow rate is transmitted with the 4-20 mA output signal. The F001 can even be powered via the loop-current.
Pulse output	A scaled pulse output is available according the accumulated total. The pulse length can be set to 5 msec or 100 msec. The output is a passive NPN signal.

POWER REQUIREMENTS

Several power inputs are available to supply the F001 and sensor. The F001 can be powered with a signal 3.6 V lithium AA battery or loop powered via the analog output.

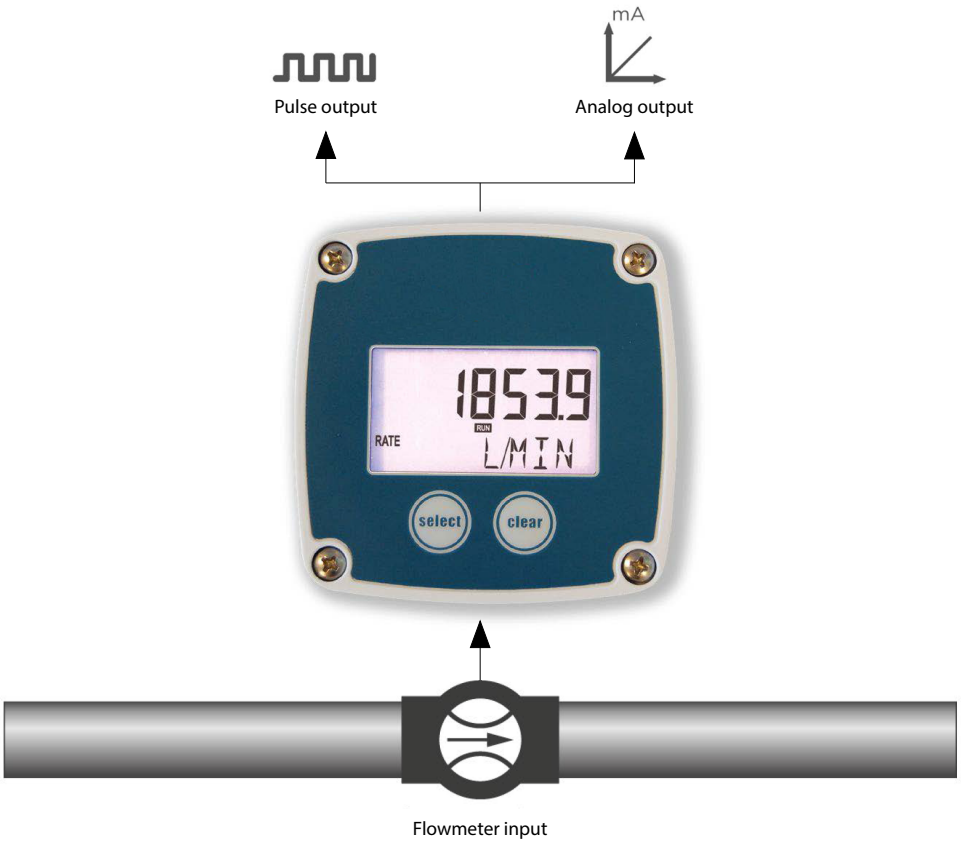
The basic 10-30 V DC power supply can supply the F001 including the backlight and offers an 8.2 V DC sensor supply.

FEATURES

- Displays instantaneous flow rate, total and accumulated total.
- Clear 0.5" (12 mm) numeric and 0.3" (7 mm) alphanumeric digits.
- All info at a glance with clear alphanumeric display.
- Bright LED backlight.
- The F001 accepts the basic sensor input signals: Reed-switch, Namur, NPN, PNP, Sine wave (coil).
- Loop powered 4-20 mA output according to flow rate.
- Scaled pulse output according to accumulated total.
- Power requirements:
  External power supply 10-30 V DC
  or Battery supply,
  outputs are loop powered.
- Sensor supply: 8.2 V DC.
- Auto backup of settings and running totals.
- One 20 mm and two 16 mm knock-out hole cable entries.

OVERVIEW APPLICATION F001

Basic flow measurement where re-transmission of the flow rate and/or totalizer functions is required. The F001 offers an economical solution for common industrial applications.



SIGNAL INPUT

The F001 accepts the basic flow meter input signals: Namur Reed-switch, NPN, PNP and Sine wave (coil). The input signal type can easily be selected in the configuration menu.

Type of signal	Resistance	Low Pass filter (LP)	Max. frequency	Max, frequency Low Pass filter (LP)	Min. amplitude P-P	Remark
NPN	100KΩ pull-up		6 kHz Threshold 1.2 V			Open collector
REED		1MΩ pull-up		120 Hz		
PNP			6 kHz Threshold 1.2 V			
NAMUR	47KΩ pull-up		4 kHz			External power required
COIL	820Ω pull-up				90 mV_{PP}	Default sensitivity

TECHNICAL DATA

Display	
Type	High intensity transflective numeric and alphanumeric LCD, with white LED backlight
Dimensions	2.13" x 1.14" (54 x 29 mm)
Digits	Seven 0.47" (12 mm) and seven 0.28" (7 mm) digits Various symbols and measuring units
Refresh rate	During operation 8 times/sec, it will automatically switch to 1 time/sec after 30 sec without operation

Operating temperature	
Ambient	-4 °F to +140 °F (-20 °C to +60 °C)

Power requirements		
Basic supply	10 - 30 V DC. Standard consumption:	P_{max}. 60 mW
	With backlight:	P_{max}. 435 mW
	With backlight + sensor supply:	P_{max}. 735 mW
Note	The basic power supply will also supply the backlight or the 8.2 V DC sensor supply	
Battery	1 x 3.6 V AA Lithium battery - life-time depends upon settings and configuration - up to approx. 2 years	
Loop powered	Loop powered, analog output. 12 - 30 V DC. 3.3 - 21.7 mA according Namur NE45. I_{max} = 22 mA. Consumption max. 660 mW @ 0 Ohm (22 mA @ 30 V DC)	

Sensor excitation	
Terminal 3	3 V DC for pulse signals and 1.2 V DC for coil pick-up, I_{out} max. 100 µA
Note	This is not a real sensor supply. Only suitable for sensors with a very low power consumption like coil
Terminal 4	8.2 V DC, I_{out}t mac. 10 mA, requires 10 - 30 V DC supply

Data protection	
Type	Non-volatile backup of all settings. Backup of running totals every minute. Data retention at least 10 years
Password	Configuration settings can be password protected

Directives & Standards	
EMC	Directive 2014/30/EU, FCC 47 CFR part 15
Low voltage	Directive 2014/35/EU
RoHS	Directive 2011/65/EU
IP & NEMA	EN 60529 & NEMA 250

Enclosure	
Material	GRP, IP65 (Type4), UV-resistant and flame retardant
Window	Polycarbonate window
Sealing	EPDM gasket
Control keys	Two industrial micro-switch keys
Dimensions	3.62" x 3.62" x 2.36" (92 x 92 x 60 mm) - W x H x D
Weight	0.44 lbs / 200 g

Terminal connections	
Type	Removable plug-in terminal strip. Wire max. 1.5 mm^2

Signal inputs - Flowmeter	
Pulse Inputs	Coil / sine wave (sensitivity: 80 mVpp), NPN, PNP, reed-switch, Namur
Frequency	Minimum OHz - maximum 6 kHz for total and flow rate. Maximum frequency depends on signal type and internal low-pass filter. E.g. reed-switch with low pass filter: max. frequency 120 Hz
K-Factor	0.000010 - 9,999,999 with variable decimal position

Signal outputs - Digital output	
Function	Pulse output - transmitting accumulated total
Frequency	User definable: 100 Hz (5 msec) or 5 Hz (100 msce)
Output type	One passive transistor output (NPN) - not isolated. 300 mA, max. 30 V

Signal outputs - Analog output	
Function	Transmitting flow rate
Output type	Loop powered, analog output. 12 - 30 V DC. 3 - 22 mA according Namur NE45
Accuracy	10 bit. Error 0.5% of full scale and temperature range. Analog output signal can be scaled to any desired range
Liftoff voltage	12 V. Typical 500 Ohm @ 24 V. max. 800 Ohm

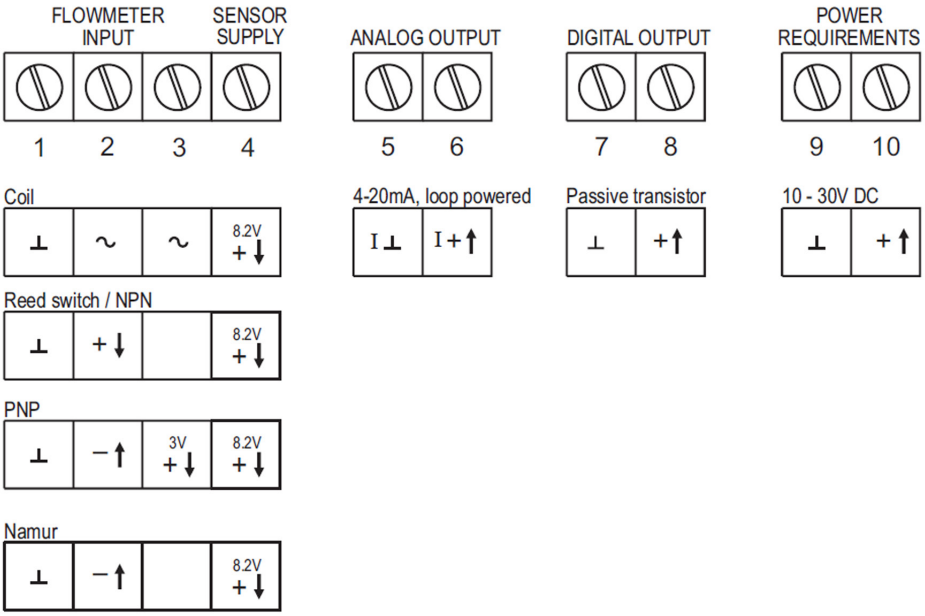
Operator functions	
Displayed info	• Flow rate • Total • Accumulated total • Reset total by pressing the CLEAR-key twice

Total	
Digits	7 digits
Units	L, m^3, US gal, igal, Oil bbl, kg, lb or none
Decimals	0 - 1 - 2 or 3
Note	Total can be reset to zero

Accumulated total	
Digits	7 digits
Units / decimals	According to selection for total
Note	Can not be reset to zero

Flow rate	
Digits	7 digits
Units	mL, L, m^3, g, kg, ton, US ton, US gal, igal, Oil bbl, lb, cf or none
Decimals	0 - 1 - 2 or 3
Time units	/sec - /min - /hr - /day

TERMINAL CONNECTIONS



ENCLOSURES

The smart design of the rugged IP65 (Type4) GRP enclosure ensures optimal advantages for various mounting possibilities. The F001 can be field or wall mounted or directly on the flowmeter.

Dimensions enclosure

GRP field mount enclosure