Flow-meter for liquids

Developed with Vortex technology in technopolymers



Flow-meter is a direct type of flow-measuring device with operating fundamentals based on the Von Karman principle. A piezo-elettric sensor detects the vortices, which are converted into an electrical frequency signal.

- Dimensions DN20 e DN25
- Low pressure drop
- Flow rate 5...150 l/min
- Medium temperature -20...+90 °C
- Output flow: 0...10 V, 4...20 mA or Modbus
- Multicolor LED status indicator
- Constant accuracy for temperature and flow measurements

Application

The flow-meter is used where flow measurement is needed, in hot or cold water. The measurement results are indipendent regardless of fluid density. The wide measuring range of flow rates allows use in various areas of application.

Function

The device is installed in a circuit paying attention to the flow direction indicated by an arrow on the body.

It can be used on heating and cooling water circuits of HVAC systems, in particular on heat pumps where it is useful or necessary to know with a good time response the amount of circulating flow. An electronic temperature sensor is available to monitor the temperature of the fluid.

The electronic solution used allows a choice of various output signals or Modbus.

The absence of moving parts ensures stable operation over time and eliminates maintenance work.

Installation

The product is available in multiple sizes, which are easily installed with standard 1" and 1" 1/4 gas threads.

The visible LED on the electronic board has three colors to simplify installation and monitor the transducer reading/ operation status.

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Technical data

Nominal diameter	DN20	DN25
Connection	G1 according to ISO 228 male	G1 1/4 according to ISO 228 male
Weight [g]	70	90
Flow rate [l/min]	5…80	10…150
Accuracy [Flow]	±1 % of range	±2 % of range
Repeatability [Flow]	±1 %	±1.5 %
Flow output	Modbus	
	0…10 Vdc (RL ≥ 10 kΩ)	
	0 V -> 0 l/min	0 V -> 0 l/min
	10 V -> 80 l/min	10 V-> 150 l/min
	4…20 mA (RL ≤ 250 Ω)	
	4 mA -> 0 l/min	4 mA -> 0 l/min
	20 mA -> 80 l/min	20 mA -> 150 l/min
Frequency NPN Open collector	0 Hz -> 0 l/min	0 Hz -> 0 l/min
	1000 Hz -> 80 l/min	1000 Hz -> 150 l/min
Temperature output	Modbus RTU RS485	
	0…10 Vdc (RL ≥ 10 kΩ)	
Power supply	12...24 Vdc ±10%	
Consumption	< 1 VA	
Medium temperature range	-20...+90 °C	
Accuracy [Temp]	±0,8 K	
Pressure rating	PN10	
Medium	Water and aqueous solution (with usual additives)	
Medium temperature	-20...+90 °C	
Working room temperature	-20...+70 °C	
Stock temperature	-20...+70 °C	
Protection	IP65	
Approval	CE, UKCA	
CE compliance standard	EN IEC 61326-2-3:2021	

Packaging	40 pcs	30 pcs

Additional information

- The accuracy data of the device have been verified with water at 20°C.
- The use of fluids with densities and viscosities different from pure water may compromise the product's accuracy.

Materials

Body	PA6 30% glass fibre reinforced
Material Cover	ETFE
O-ring	EPDM

Code selection table

		MF	XX	X	X	X	00	X
Nominal diameter	DN20		20					
	DN25		25					
Type of connection	Threaded male type G			G				
Internal temperature sensor	Present				T*			V/M
	Absent				0			
Gaskets	EPDM					1		
Analog / digital outputs	0...10 Vdc							V
	4...20 mA				0			C
	Modbus							M

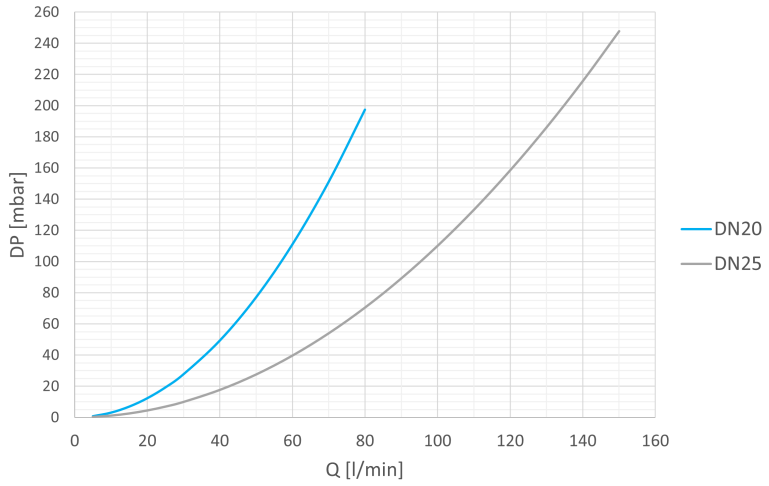
Note *: The temperature 4…20 mA output is not selectable.

Example: MF25GT100V: flow-meter DN25, threaded connection 1” 1/4 G, with temperature sensor, EPDM gaskets, output 0...10 Vdc

Accessories

Article	Description
MFC5L2	Cable PVC UL2464, 5 pin, lenght 2 m, with M12x1 90° connector

Pressure drop



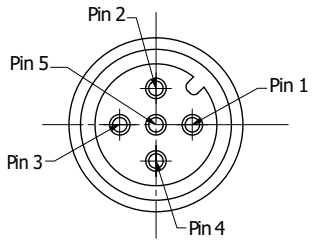
Mounting instructions

Mounting this category of flow meters in inadequate systems can significantly compromise measurement performance. The main assembly choices that must be respected to guarantee the total functionality of the device are reported in the following points:

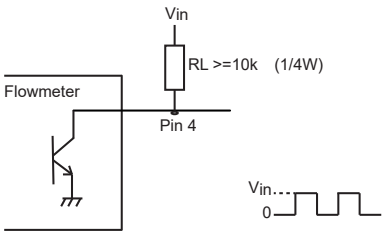
- Avoid obstacles such as misalignments, protruding flat gaskets, diameter variations, etc. near the inlet and outlet of the flow meter. These can cause strong disturbances in the signal, resulting in false pulses.
- The flow meter can be mounted in all positions, except for those in which system filling problems may arise.
- The connecting pipes must have the same internal diameter as the flow meter for a specific length at the inlet and outlet of the body.
- The length of the inlet section must be a minimum of 10 times the DN, while the length of the outlet section must be a minimum of 5 times the DN.
- The installation position must prevent vibrations from being transmitted to the flow meter.
- It is necessary to avoid as much as possible installing the device in points of the system that can apply mechanical stress.
- The flow meter is only suitable for use in completely filled pipes.
- The connection cable must not be longer than 3 m.

For further information, please refer to the instructions provided with the device.

Electrical connections



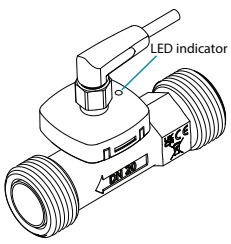
N pin	Versions			Cables colours MFC5L2 (optional)
	0…10 V	4…20 mA	Modbus	
Pin 1	Vin	Vin	Vin	Brown
Pin 2	Out Flow(0…10 V)	Out Flow(4…20 mA)	Gnd	White
Pin 3	Gnd	Gnd	M+	Blue
Pin 4	Out Flow (Freq)	Out Flow (Freq)	M-	Black
Pin 5	Out Temp	-	Reset Par.	Grey



Note: the frequency output is a square wave with 50% duty oscillating between Vin (positive power supply) and ground. The frequency is available on Pin 4, an external resistor must be mounted between Pins 4 and 1 (RL ≥ 10 kΩ 1/4 W).

Only for Modbus versions: to reset the communication parameters, power on the flow-meter and connect Pin 5 with Pin 1 for 1 second. The communication parameters are reset to the default values (address = 50, baud rate = 19200, parity = even, 1 stop bit).

LED color	Meaning (intermittent, on for 1 second every 5 seconds)
red	flow range below detactable limits
yellow	flow rate out of range
green	flow rate in the range



Modbus variables

Address	Description	Unit	Default	Min	Max	R/W
3999	ADR_MOD_VAR -> baud rate Modbus communication 0 = 9600 1 = 19200 2 = 38400		1	0	2	R/W
4000	ADR_MOD_VAR_PARITY -> parity Modbus communication 0 = no parity 1 = odd 2 = even		2	0	2	R/W
4001	ADR_MOD_VAR_STOP_BIT -> stop bit Modbus communication 0 = 1 stop bit 1 = 2 stop bit		0	0	1	R/W
4002	ADR_MOD_VAR_ADDRESS -> address of unit in Modbus network		50	1	247	R/W
4003	ADR_MOD_VAR_FLOW -> flow value based on the unit set The flow value read in l/min or US gpm (gallon/min) is multiplied x10 Example: 534 corresponds to 53.4 per l/min or US gpm The flow value read in l/h remains unchanged Example: 534 corresponds to 534 per l/h			**DN20** / **DN25**	**DN20** / **DN25**	R
		l/min (x 10)		50 / 100	800 / 1500	
		l/h		300 / 600	4008 / 9000	
		US gpm (x10)		13 / 26	211 / 369	
4004	ADR_MOD_VAR_FLOW_STATUS -> state of flow measurement 0 = flow not measurable 1 = flow in the range of measure (5...80 l/min for DN20, 10...150 l/ min for DN25 2 = flow out of range			0	2	R
4005	ADR_MOD_VAR_FLOW_UNIT -> unit of flow measurement 0 = l/min 1 = l/h 2 = US gpm (gallon/min)		0	0	2	R/W
4006	ADR_MOD_VAR_FLOW_SPEED -> speed of the flow in the pipe m/s x 10	m/sec (x 10)		**DN20** / **DN25**	**DN20** / **DN25**	R
				3 / 4	47 / 55	
4007	ADR_MOD_VAR_TEMP_SENS -> value of temperature (x 10) with °C or (x 1) with °F In case of error the value of temperature is visualized as 99.9°C (or 212 °F) In case the value temperature used is not selectable is visualized as 88.8°C (or 192°F)	°C (x 10)		-200	900	R
		°F		-4	194	
4008	ADR_MOD_VAR_TEMP_STATUS -> status of temperature sensor 0 = error | 1 = no error | 2 = no sensor			0	2	R
4009	ADR_MOD_VAR_TEMP_UNIT 0 = °C (temp x 10) | 1 = °F		0	0	1	R/W
4010	ADR_VAR_FIRMWARE_VERSION -> firmware version Example: version 5 corresponds to firmware 5			0	59999	R
4011	ADR_MOD_VAR_DN -> describes the product model 20 = DN20 | 25 = DN25		20/25			R

Modbus function codes

03 (0x03) - Read single Holding Register

06 (0x06) - Write Single Holding Register

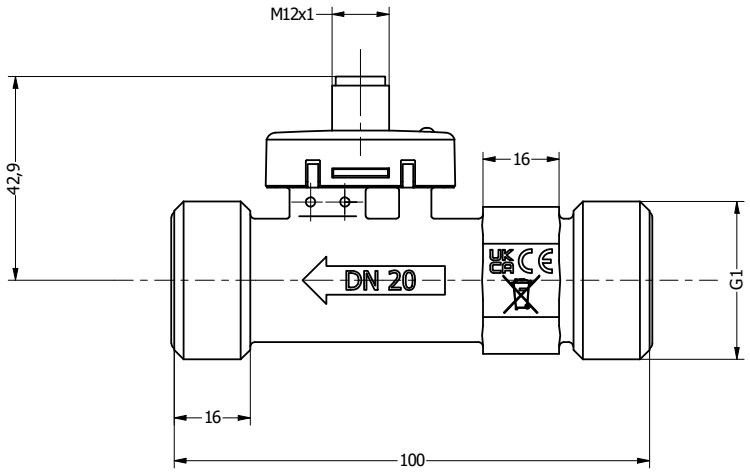
16 (0x10) - Write Multiple Holding Registers

Modbus data types

All parameters are 16-bit unsigned, except “Medium temperature” 16-bit signed (address 4007)

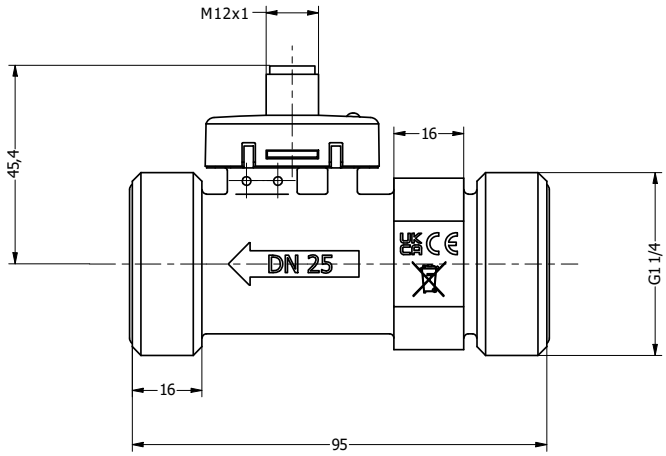
Dimensions

Model DN20



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Model DN25



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Documentation

All documentation can be downloaded from www.industrietechnik.it.