

# 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 variants and particle presence

## Application

The flow-meter is used where flow measurement is needed, in hot or cold water. The measurement results regardless of fluid density and the presence of small particulates. 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 technical water circuits, hot or cold, 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 %   | ±2 %                             |
| 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  |                                  |
|                              | 0...10 Vdc (RL ≥ 10 kΩ)                           |                                  |
| Power supply                 | 12...24 V DC ±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...+60 °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                           |

## Materials

|                |                                |
|----------------|--------------------------------|
| Body           | PA6 50% glass fibre reinforced |
| Material Cover | ETFE                           |
| O-ring         | EPDM                           |

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## Code selection table

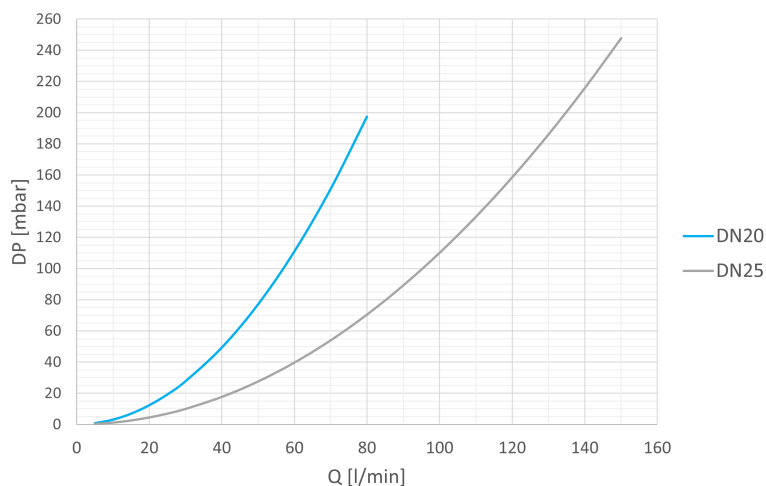
|                                |                          | MF | XX | X | X | X | 00 | X   |
|--------------------------------|--------------------------|----|----|---|---|---|----|-----|
| Diámetro nominal               | DN20                     |    | 20 |   |   |   |    |     |
|                                | DN25                     |    | 25 |   |   |   |    |     |
| Tipo di attacco                | Filettato maschio tipo G |    |    | G |   |   |    |     |
| Sensore interno di temperatura | Presente                 |    |    |   | T |   |    | V/M |
|                                | Assente                  |    |    |   | 0 |   |    |     |
| Guarnizioni                    | EPDM                     |    |    |   |   | 1 |    |     |
| Uscita analogica / digitale    | 0...10 Vdc               |    |    |   |   |   |    | V   |
|                                | 4...20 mA                |    |    |   | 0 |   |    | C   |
|                                | Modbus                   |    |    |   |   |   |    | M   |

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 drops



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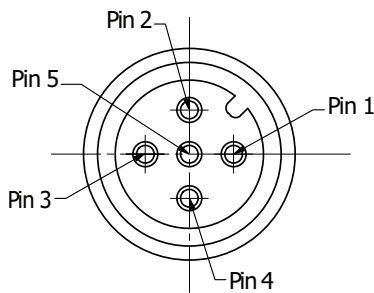
## Mounting instructions

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 object are reported in points:

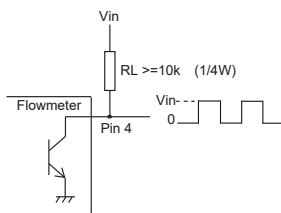
- Avoid obstacles such as misalignments, protruding flat gaskets, diameter variations, etc. near the inlet and outlet of the flow meter. These can cause strong disturbances in the signal, resulting in false pulses.
- The flow meter can be mounted in all positions, except for those in which system filling 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 object in points of the system that can apply mechanical stress to the flow meter.
- 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



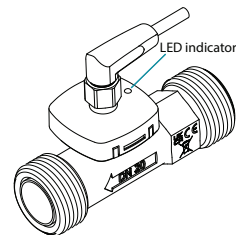
| N pin | Versions           |                      |            | Cable colours<br>MFC5L2<br>(optional) |
|-------|--------------------|----------------------|------------|---------------------------------------|
|       | 0...10 V           | 4...20 mA            | Modbus     |                                       |
| Pin 1 | Vin                | Vin                  | Vin        | Brown                                 |
| Pin 2 | Out Flow (0...10V) | 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 ( $RL \geq 10 \text{ k}\Omega$  1/4 W).

Only for Modbus version: to reset the communication parameters, power the flow-meter and connect Pin 5 with Pin 2 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       | missing flow  |
| yellow    | flow rate out of range                                  |
| green     | flow rate in the range                                  |



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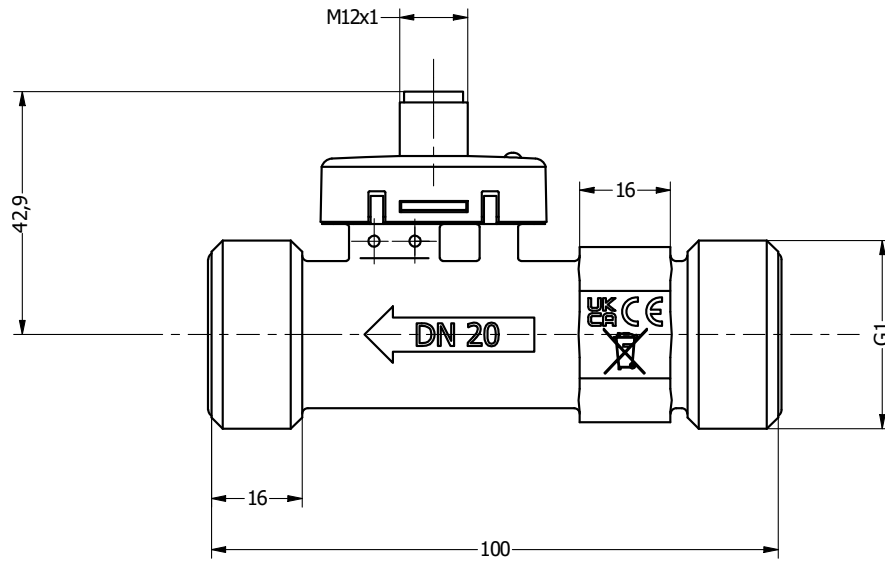


## Modbus variables

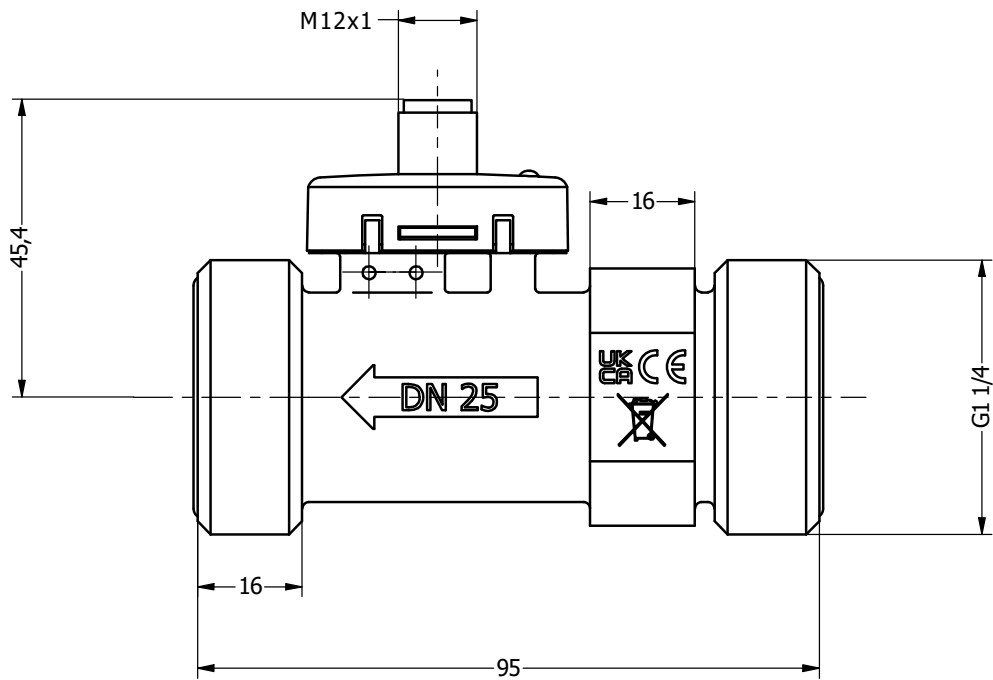
| Address | Descrizione  | Unit         | Default | Min  |      | Max   |      | R/W |
|---------|--|--------------|---------|------|------|-------|------|-----|
| 3999    | ADR_MOD_VAR -> baud rate Modbus communication<br>0 = 9600<br>1 = 19200<br>2 = 38400  |              | 1       | 0    |      | 2     |      | R/W |
| 4000    | ADR_MOD_VAR_PARITY -> parity Modbus communication<br>0 = no parity<br>1 = odd<br>2 = even  |              | 2       | 0    |      | 2     |      | R/W |
| 4001    | ADR_MOD_VAR_STOP_BIT -> stop bit Modbus communication<br>0 = 1 stop bit<br>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<br>The flow value read in l/min or gpm is multiplied x10<br>Example: 534 corresponds to 53.4 per l/min or gpm (gallon/min)<br>The flow value read in l/h remains unchanged<br>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 |     |
|         | gpm  |              | 13      | 26   | 211  | 369   |      |     |
| 4004    | ADR_MOD_VAR_FLOW_STATUS -> state of flow measurement<br>0 = flow not measurable<br>1 = flow in the range of measure (5...80 l/min for DN20, 10...150 l/min for DN25)<br>2 = flow out of range  |              |         | 0    |      | 2     |      | R   |
| 4005    | ADR_MOD_VAR_FLOW_UNIT -> unit of flow measurement<br>0 = l/min<br>1 = l/h<br>2 = gpm (gallon/min)  |              | 0       | 0    |      | 2     |      | R/W |
| 4006    | ADR_MOD_VAR_FLOW_SPEED -> speed of the flow in the pipe<br>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<br>(x 10) with °C or (x 1) with °F<br>In case of error the value of temperature is visualized as 99.9°C (or 212 °F)<br>In case of absent sensor of temperature is visualized as 88.8°C (or 192°F)                            | °C (x 10)    |         | -200 |      | -200  | 900  | R   |
|         |  | °F           |         | -4   |      | -4    | 194  |     |
| 4008    | ADR_MOD_VAR_TEMP_STATUS -> status of temperature sensor<br>0 = error   1 = no error   2 = no sensor  |              |         | 0    |      | 2     |      | R   |
| 4009    | ADR_MOD_VAR_TEMP_UNIT<br>0 = °C (temp x 10)   1 = °F   |              | 0       | 0    |      | 1     |      | R/W |
| 4010    | ADR_VAR_FIRMWARE_VERSION -> firmware version   |              |         | 0    |      | 59999 |      | R   |
| 4011    | ADR_MOD_VAR_DN -> describes the product type<br>20 = DN20   25 = DN25  |              | 20/25   |      |      |       |      | R   |

## Dimensions

### Modello DN20



### Modello DN25



## Documentation

All documentation can be downloaded from [www.industrietechnik.it](http://www.industrietechnik.it).

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