bürkert
FLUID CONTROL SYSTEMS

# Flowmeter
# for water continuous measurement

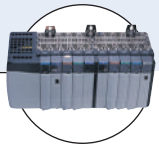
- Ultrasonic flowmeter using transit time method
- Dynamic range ≥ 1:250
- Low pressure drop
- No flow-settling section necessary in the inlet and/or outlet

Type 8081 can be combined with...

**Type 2712 (8630)**
Process control valve

**Type 8611**
PI Flow-Controller

**Type 8032**
Remote flow transmitter



**PLC**

The Type 8081 ultrasonic flowmeter is intended for the measurement of water flows which may be slightly charged with contaminants. It consists of an electronic module and a brass fitting with a built-in measuring tube. It enables a control loop to be established. The electrical connection is made via an 5-pin M12 fixed connector.

The flowmeter features, depending on the version:
- a pulse output or
- a pulse output and a 4... 20 mA current output.

Each version is available for 5 flow ranges:
- model QN 0.6 DN15: 0.06 to 20 l/min (nominal flow rate 0.6 $m^3$/h namely 10 l/min)
- model QN 1.5 DN15: 0.1 to 50 l/min (nominal flow rate 1.5 $m^3$/h namely 25 l/min)
- model QN 2.5 DN20: 0.16 to 82 l/min (nominal flow rate 2.5 $m^3$/h namely 41 l/min)
- model QN 3.5 DN25: 0.6 to 116 l/min (nominal flow rate 3.5 $m^3$/h namely 58 l/min)
- model QN 6.0 DN25: 1 to 200 l/min (nominal flow rate 6.0 $m^3$/h namely 100 l/min)

| **General data** | |
|---|---|
| **Process connection** | G or NPT External thread; 3/4", 1" or 1"1/4 |
| **Materials** | |
| Housing, cover | PPS |
| Fixed connector M12 | PA |
| Seal | Silicone |
| Materials wetted parts | |
| Fitting | Brass |
| Measuring tube | PES |
| Seal | EPDM |
| **Electrical connection** | 5-pin M12 male fixed connector for female 5-pin M12 cable plug (not provided) |
| **Connection cable** | 1.5 $mm^2$ max. cross-section |

| **Complete device data (fitting + electronic module)** | |
|---|---|
| **Pipe diameter** | DN15 to DN25 |
| **Measuring range** | 0.06 to 200 l/min |
| **Measuring element** | 2 ultrasound emitter-receiver cells |
| **Medium temperature** | 5 to 90°C *(41 to 194°F)* |
| **Fluid pressure max.** | PN16 *(232.16 PSI)* |
| **Accuracy** (Flowrate) | ≤ (0.01% of F.S.* + 2% of measuring value)[1)] |
| **Repeatability** | ≤ 1% |

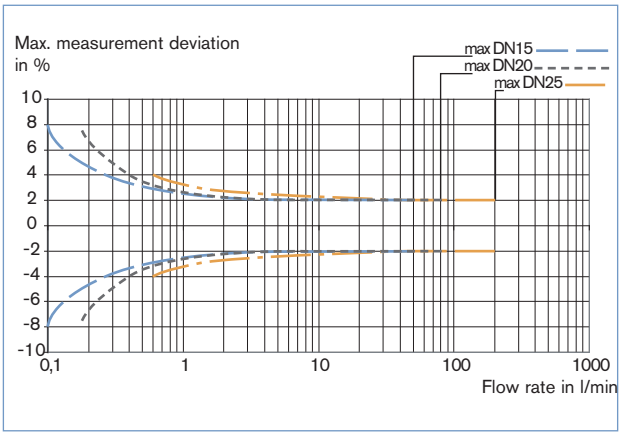
* F.S. = Full scale (see flow range on accuracy diagram)
1) Under reference conditions i.e. measuring fluid = water, ambient and water temperature = 20°C *(68°F)*.

| Electrical data | |
|---|---|
| **Power supply (V+)** | 12 - 36 V DC |
| **Current consumption** | Own consumption: < 4 mA<br>Consumption with load: < 1 A |
| **Reversed polarity of DC** | Protected |
| **Voltage peak** | Protected |
| **Short circuit** | Protected for transistor output |
| **Output**<br>Pulse (transistor)<br>version without current output<br><br>version with current output<br><br>Current | <br><br>NPN (as default setting) or PNP (on request), open collector, 700 mA max., 5 mA min., NPN output: 0.2 - 36 V DC<br>PNP (as default setting ) or NPN (on request), open collector, 700 mA max., 5 mA min., PNP output: supply voltage (V+)<br>4... 20 mA (sourcing mode and PNP transistor as default setting, sinking mode and NPN transistor on request)<br>loop resistance max. : 1100 Ω at 36 V DC<br>610 Ω at 24 V DC; 100 Ω at 12 V DC |
| **Scaling** Pulse (Transistor)<br><br>Current | K-factor: 500 Pulse/Litre (version QN 0.6 and 1.5)<br>200 Pulse/Litre (version QN 2.5 - 3.5)<br>100 Pulse/Litre (version QN 6.0)<br>4 mA correspond to 0 l/min (by default) or to $T_{min}$ of temperature range (on request)<br>20 mA correspond to $Q_{max.}$ of flow range (by default) or to $T_{max.}$ of temperature range (on request) |
| **Environment** | |
| **Ambient temperature** | 5 to +55°C *(41 to 131°F)* (operating and storage) |
| **Relative humidity** | ≤ 80%, without condensation |
| **Standards, directives and approvals** | |
| **Protection class** | IP65 with M12 cable plug plugged-in and tightened |
| **Standards, directives**<br>EMC<br>Pressure<br>Vibration<br>Shock | <br>EN 61000-6-3, EN 61000-6-2<br>Complying with article 3 of §3 from 97/23/CE directive.*<br>EN 60068-2-6<br>EN 60068-2-27 |
| **Approval / Certificate on request** | 2.2 Certificate;<br>Calibration Certificate |

* For the 97/23/CE pressure directive, the device can only be used under following conditions (depend on max. pressure, pipe diameter and fluid).

| Type of fluid | Conditions |
|---|---|
| Fluid group 1, §1.3.a | Forbidden |
| Fluid group 2, §1.3.a | Allowed (PN*DN ≤1000) |
| Fluid group 1, §1.3.b | Forbidden |
| Fluid group 2, §1.3.b | Allowed |

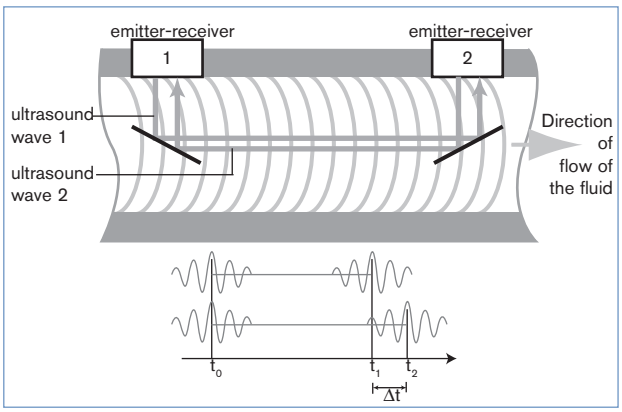
## Accuracy diagram




## Design and principle of operation

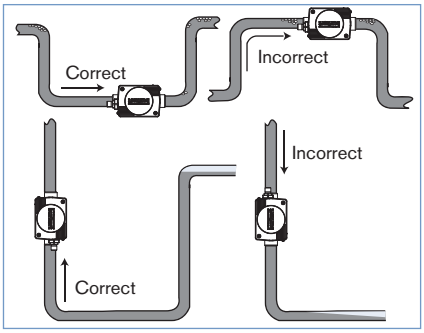
The 8081 Ultrasonic flowmeter is based on the transit time method. The sound transit time from emitter 1 to receiver 2 will be measured and compared with the transit time from emitter 2 to receiver 1. The difference in transit time is direct proportional to flow speed of the fluid.

The electronic module delivers a pulse signal proportional to the volume or an industry-standard 4... 20 mA signal, proportional to the flow rate or to the temperature.

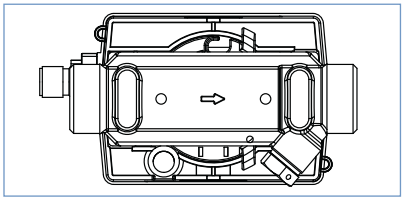


## Installation

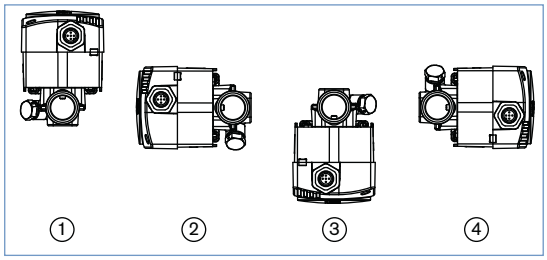
The 8081 ultrasound flowmeter can be fitted onto a horizontal or vertical pipe.
When horizontally mounted, the max. fluid temperature is 90°C. But the max. fluid temperature must be reduced to 80°C when the electronic (black enclosure) is turn upwards. When vertically mounted the max. fluid temperature is also 80°C.



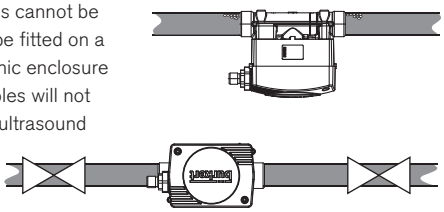

The correct direction of fluid flow in the pipe is indicated with an arrow, engraved on the underside of the fitting.



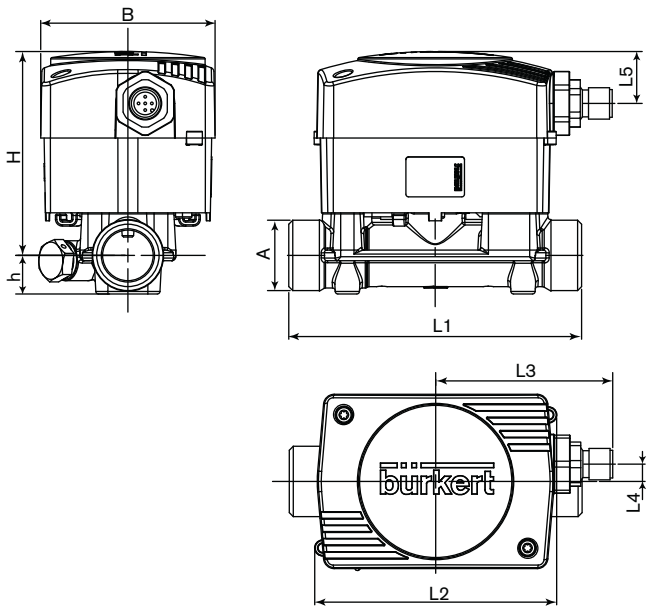
Minimum upstream and downstream distances are not necessary.
The 8081 works correctly when the pipe is full and free of any air bubbles near the flowmeter. In presence of bubbles in the pipe, the left installation no.1 should be avoid.




If the absence of any air bubbles cannot be guaranteed, the device should be fitted on a horizontal pipe, with the electronic enclosure facing down. This way, the bubbles will not interfere with the circulation of ultrasound waves.
It is equally advisable to place stop valves before and after the flowmeter, in order to facilitate the assembly and disassembly of the latter.



## Dimensions [mm]




| DN | A | B | H | h | L1 | L2 | L3 | L4 | L5 |
|---|---|---|---|---|---|---|---|---|---|
| 15 | G or NPT 3/4” | 65.5 | 76.5 | 14.5 | 110 | 90 | 67 | 6.5 | 19.5 |
| 20 | G or NPT 1” | 65.5 | 79.0 | 18 | 130 | 90 | 67 | 6.5 | 19.5 |
| 25 | G or NPT 1”1/4 | 65.5 | 83.5 | 23 | 260 | 90 | 67 | 6.5 | 19.5 |

## Ordering chart for flowmeter Type 8081

| Model | DN | Flow range | Process connection | Outputs | Item no. |
|---|---|---|---|---|---|
| QN 0.6 | 15 | 0.06 to 20 l/min | External thread G 3/4" | Pulse, NPN | 560 131 |
| | | | | Pulse, PNP + 4... 20 mA as source | 560 113 |
| | | | External thread NPT 3/4" | Pulse, NPN | 560 612 |
| | | | | Pulse, PNP + 4... 20 mA as source | 560 617 |
| QN 1.5 | 15 | 0.1 to 50 l/min | External thread G 3/4" | Pulse, NPN | 559 865 |
| | | | | Pulse, PNP + 4... 20 mA as source | 559 868 |
| | | | External thread NPT 3/4" | Pulse, NPN | 560 613 |
| | | | | Pulse, PNP + 4... 20 mA as source | 560 618 |
| QN 2.5 | 20 | 0.16 to 82 l/min | External thread G 1" | Pulse, NPN | 559 866 |
| | | | | Pulse, PNP + 4... 20 mA as source | 559 869 |
| | | | External thread NPT 1" | Pulse, NPN | 560 614 |
| | | | | Pulse, PNP + 4... 20 mA as source | 560 619 |
| QN 3.5 | 25 | 0.6 to 116 l/min | External thread G 1"1/4 | Pulse, NPN | 559 867 |
| | | | | Pulse, PNP + 4... 20 mA as source | 559 870 |
| | | | External thread NPT 1"1/4 | Pulse, NPN | 560 615 |
| | | | | Pulse, PNP + 4... 20 mA as source | 560 620 |
| QN 6.0 | 25 | 1 to 200 l/min | External thread G 1"1/4 | Pulse, NPN | 560 132 |
| | | | | Pulse, PNP + 4... 20 mA as source | 560 114 |
| | | | External thread NPT 1"1/4 | Pulse, NPN | 560 616 |
| | | | | Pulse, PNP + 4... 20 mA as source | 560 621 |

## Ordering chart for accessories for flowmeter Type 8081 (to be ordered separately)

| Description | Item no. |
|---|---|
| 5-pin M12 female cable plug moulded on cable (2 m, shielded) | 438 680 |
| 5-pin M12 female cable plug with plastic threaded locking ring | 917 116 |