Zertifiziertes QM-System
DIN EN ISO 9001
Zertifikat-Nr. 01017

# Turbine Wheel Flowmeter

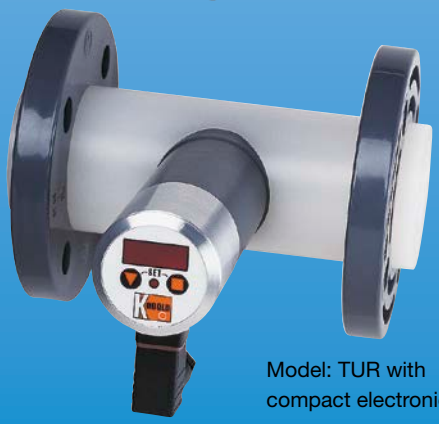
plastic version for liquids

measuring • monitoring • analysing

## TUR

Model: TUR
with transmitter

Model: TUR with
ADI electronics



Model: TUR with
compact electronics

- Measuring ranges:
  0.2 - 5.0 ... 2.5 - 100,0 $m^3/h$ water
- Measuring accuracy:
  ± 1% of full scale
- $p_{max}$: 10 bar; $t_{max}$: 70 °C
- Viscosity range: low viscosity
- Connection:
  flange DN 25 ... DN 100
- Material: PVC, PVDF
- Output: pulses,
  0 - 20 mA, 4 - 20 mA or 0 - 10 V,
  LED display, switching output

S4

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### Service

The flowmeters with turbine wheel serve to measure, control and regulate flowing liquids. The use of chemically highly resistant materials allows the devices to be used with acids, bases and aggressive media that are to be found in the chemical industry.

### Design

A flow measurement system comprises:

**1 Fitting**

Material: PVC or PVDF
Connection: flange NW 25, 50, 80 or 100

**2a Pulse generator**

PNP (24 $V_{DC}$, $I_{max}$ 400 mA)
NPN (24 $V_{DC}$, $I_{max}$ 400 mA)

**2b Transmitter (option)**

Output: 0 - 20 mA, 4 - 20 mA or 0 - 10 V
Supply: 24 $V_{DC}$, 24 $V_{AC}$ or 230 $V_{AC}$

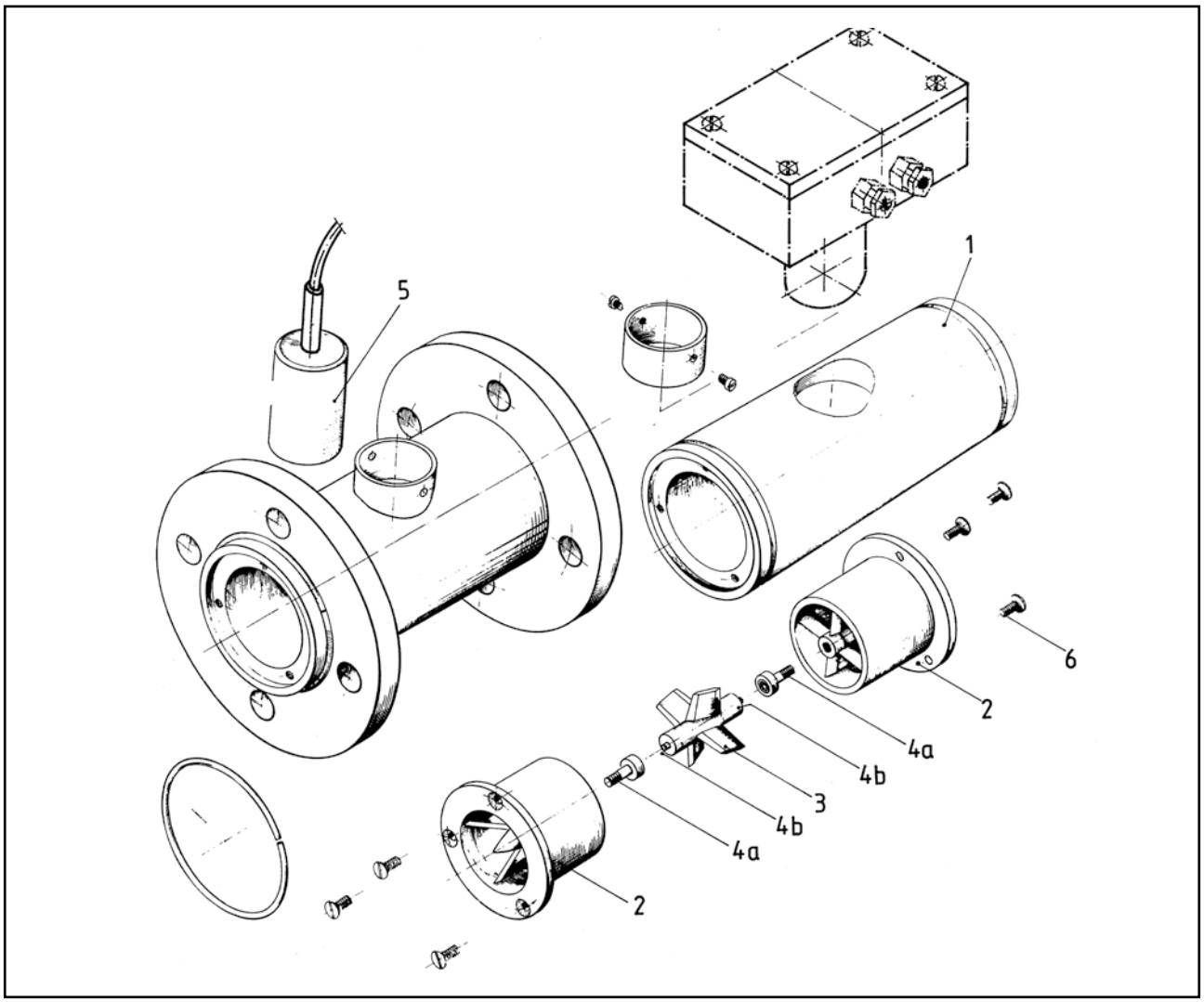
### Method of Operation

The unit comprises a thick-walled plastic pipe (1); rotatable PVC flanges are secured at each end.

Bearing cross bars (2), which ensure steady flow, are fitted in inlet and outlet. A turbine wheel (3) with cast-in mild steel pieces at each end rotates smoothly depending on the flow rate. The metal parts do not come into contact with the medium and are therefore protected against corrosion. The sapphire bearing bushes (4a) are fitted in the bearing cross bars and are adjustable.

The bearing axle made of chemically highly resistant tungsten-carbide is cast into the turbine wheel. The rotation is picked off by a top-mounted pulse generator (5) without seals and mechanically non-interacting, and transferred to the evaluating electronics as impulses.

The evaluating electronics converts the pulse signal into a display, limit contacts, analogue output, or counts the quantity of liquid flow.



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## Technical Details

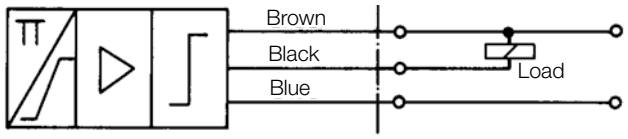
| | |
|---|---|
| Measuring accuracy: | ±1% of full scale |
| Viscosity range: | for low-viscosity media |
| Max. operating temperature: | 60 °C (PVC version)<br>70 °C (PVDF version) |
| Max. operating pressure: | PN 10 |
| Protection type: | IP 65 |

### Materials

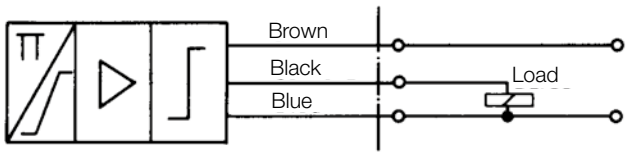
| | PVC version | PVDF version |
|---|---|---|
| (1) Fitting | PVC | PVDF |
| (2) Bearing cross bars | PVC | PVDF |
| (3) Turbine wheel | PVC | PVDF |
| (4a) Bearing bush | sapphire | sapphire |
| (4b) Bearing axle | sapphire | sapphire |
| (6) Bolts | polyamide | PVDF |
| (7) Flange | PVC | PVC |

## Electrical Connection Diagram

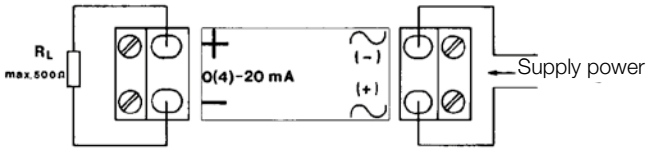
### Connection diagram NPN TUR-1...N



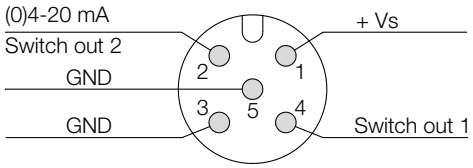

### Connection diagram PNP TUR-1...P




### Connection diagram transmitter TUR-2...M...




### TUR-2...C...




## Electronics

### Frequency output

| | |
|---|---|
| Power supply: | 24 $V_{DC}$ ±20% |
| Idle current: | typ. 15 mA |
| Pulse output: | PNP or NPN, max. 400 mA |
| Electrical connection: | 2 m PVC cable |

### Transmittter

| | |
|---|---|
| Power supply: | 230 $V_{AC}$, 24 $V_{AC}$, 24 $V_{DC}$ |
| Output: | 0-20 mA, 4-20 mA or 0-10 $V_{DC}$<br>4-wire |
| Max. load: | 500 Ω |
| Electrical connection: | adapter box with<br>cable connection |

### Compact electronics

| | |
|---|---|
| Display: | 3-segment LED |
| Analogue output: | (0)4... 20 mA adjustable,<br>max. 500 W |
| Switching outputs: | 1 (2) semiconductor PNP or NPN<br>factory set |
| Contact operation: | N/C / N/O contact programmable |
| Setting: | with 2 buttons |
| Power supply: | 24 $V_{DC}$ ±20%, 3-wire technology,<br>approx. 100 mA |
| Electrical connection: | plug connector M12x1 |

### ADI electronics

| | |
|---|---|
| Display: | bar graph and 5-digit digital display |
| Analogue output: | (0)4...20 mA, 0-10 $V_{DC}$ |
| 2 switching outputs: | relay /changeover contact,<br>max. 250 $V_{AC}$/5 A<br>resistive load, max. 30 $V_{DC}$ / 5 A |
| Setting: | via 4 buttons |
| Power supply: | 100 ... 240 $V_{AC}$ ± 10 % or<br>18 ... 30 $V_{AC}$ /10 ... 40 $V_{DC}$ |
| Electrical connection: | pluggable terminal block via cable gland |

*For more technical details on ADI electronic indicator see data sheet ADI-1.*

**TUR-1...**
**with frequency output**

**TUR-2...**
**with integrated converter**

**Measuring sensor with frequency output – Order Details** (example: **TUR-1025 N**)

| Connection PVC flange Nominal dia. | Measuring range water [m³/h] | Frequency range [Hz[ | Frequency [Pulses/Liter] | Model designation wetted parts | | Pulse detector |
|---|---|---|---|---|---|---|
| | | | | PVC | PVDF | |
| 25 | 0.2 - 5.0 | 5.5 - 157 | 113 | **TUR-1025...** | **TUR-1125...** | **..N** pulse detector NPN, 24 $V_{DC}$, 3-wire |
| 50 | 1.2 - 20.0 | 4.8 - 79.4 | 14.30 | **TUR-1050...** | **TUR-1150...** | |
| 80 | 2.0 - 80.0 | 2.7 - 106.4 | 4.79 | **TUR-1080...** | **TUR-1180...** | **..P** pulse detector PNP, 24 $V_{DC}$, 3-wire |
| 100 | 2.5 - 100.0 | 2.1 - 82.2 | 2.96 | **TUR-1010...** | **TUR-1110...** | |





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**Measuring sensor with ADI electronics – Order Details** (example: **TUR-2025 M000**)

| Connection PVC flange Nominal dia. | Measuring range water [m³/h] | Model designation wetted parts | |
|---|---|---|---|
| | | PVC | PVDF |
| 25 | 0.2 - 5.0 | **TUR-2025...** | **TUR-2125...** |
| 50 | 1.2 - 20.0 | **TUR-2050...** | **TUR-2150...** |
| 80 | 2.0 - 80.0 | **TUR-2080...** | **TUR-2180...** |
| 100 | 2.5 - 100.0 | **TUR-2010...** | **TUR-2110...** |

**Evaluating electronics Transmitter**

| Supply | Output |
|---|---|
| **..M0..** = 230 $V_{AC}$<br>**..M2..** = 24 $V_{AC}$<br>**..M3..** = 24 $V_{DC}$ | **..40** = 4-20 mA<br>**..00** = 0-20 mA<br>**..10** = 0-10 $V_{DC}$ |

**Compact electronics***

**..C30R** = LED display, 2x open collector, PNP, plug con. M12x1

**..C30M** = LED display, 2x open collector, NPN, plug con. M12x1

**..C34P** = LED display, 4-20 mA, 1x open collector, PNP, plug connector M12x1

**..C34N** = LED display, 4-20 mA, 1x open collector NPN, plug connector M12x1

**Counter electronics**

**..E34R** = 24 $V_{DC}$, 0(4)-20 mA

**..E31R** = 24 $V_{DC}$, 0-10 V

**..E04R** = 90-250 $V_{AC}$, 0(4)-20 mA

**..E01R** = 90-250 $V_{AC}$, 0-10 V

**Dosing electronics**

**..G34R** = 24 $V_{DC}$, 0(4)-20 mA

**..G31R** = 24 $V_{DC}$, 0-10 V

**..G04R** = 90-250 $V_{AC}$, 0(4)-20 mA

**..G01R** = 90-250 $V_{AC}$, 0-10 V

**ADI electronics***

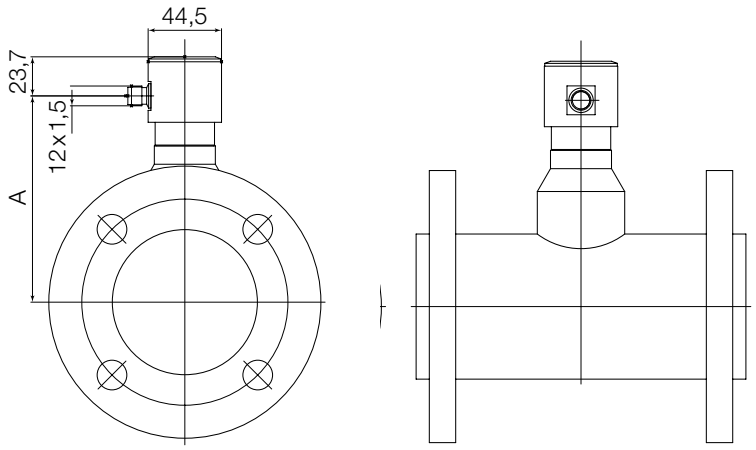
| Display | Supply | Output | Contacts |
|---|---|---|---|
| **..K..** = Bar graph/ Digital display | **0** = 100-240 $V_{AC/DC}$<br>**3** = 18-30 $V_{AC}$, 10-40 $V_{DC}$ | **0** = without<br>**4** = 0(4)-20 mA, 0-10 V | **2** = 2 change-over contacts |

* Please specify flow direction in writing

## **Dimensions** [mm]

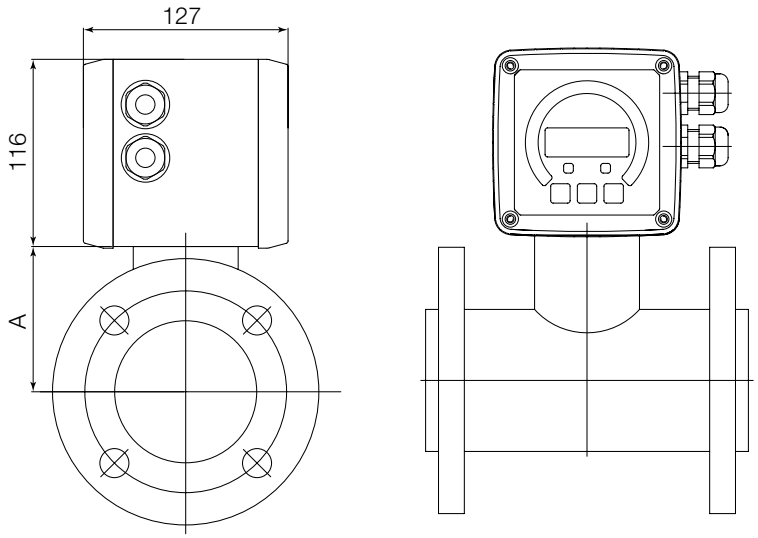
### TUR with compact

| Model | Dimension A |
|---|---|
| **TUR-..25** | 112 |
| **TUR-..50** | 125 |
| **TUR-..80** | 140 |
| **TUR-..10** | 150 |



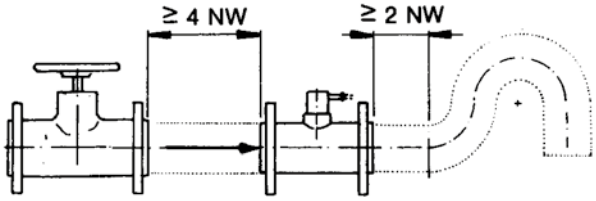

### TUR with ADI-, Gxxx- and Exxx electronics

| Model | Dimension A |
|---|---|
| **TUR-..25** | 77 |
| **TUR-..50** | 90 |
| **TUR-..80** | 105 |
| **TUR-..10** | 115 |

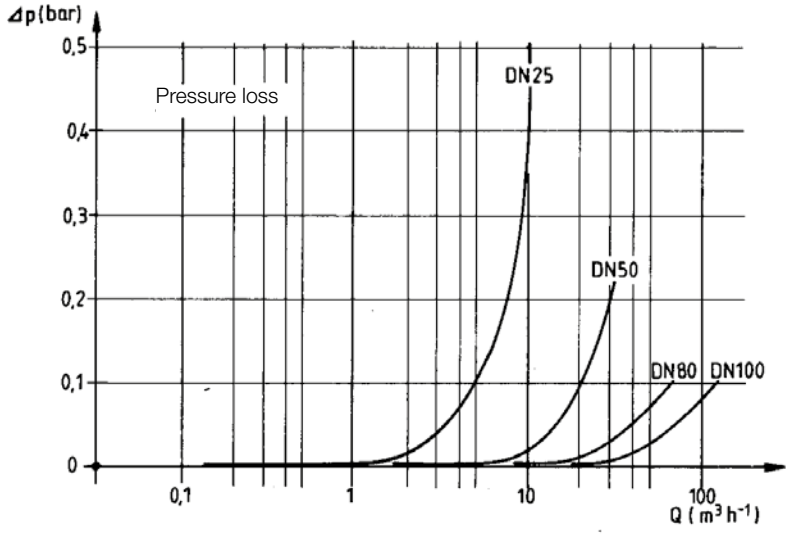


### Installation Instructions

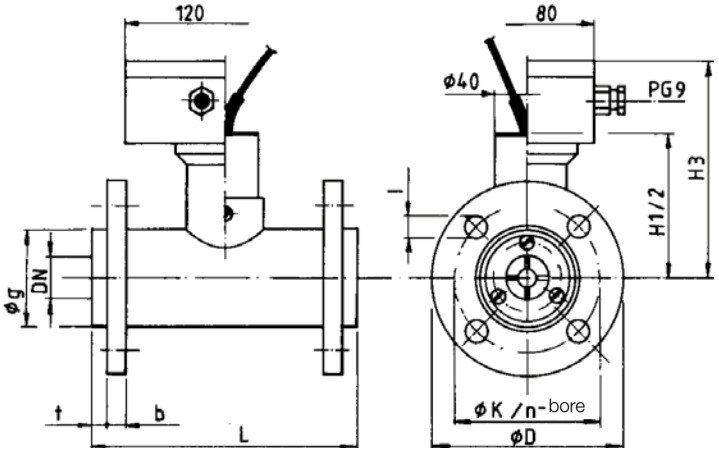
- Choice of installation position
- Flow rate in direction of arrow
- The unit must always be flooded with liquid (see Installation Example)
- The installation must be free of stress and with compressible seal
- Gaskets are not supplied




### Pressure Loss Diagram




### Dimensions [mm]




| DN | b | D | g | H2* | H3 | K | L | n | l | t |
|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 15 | 115 | 58 | 87 | 127 | 85 | 160 | 4x | 14 | 9 |
| 50 | 20 | 165 | 88 | 100 | 140 | 125 | 200 | 4x | 18 | 11 |
| 80 | 22 | 200 | 123 | 115 | 155 | 160 | 225 | 8x | 18 | 11 |
| 100 | 22 | 220 | 145 | 125 | 165 | 180 | 250 | 8x | 18 | 11 |

* with NPN- or PNP sensor