Turbine Wheel Flow Meter

Plastic Version for Liquids

Model: TUR
with transmitter

Model: TUR
with pointer
indication

- Measuring ranges:
  0.2 - 5.0 to 2.5 - 100.0 m³/h water
- Measuring accuracy: ± 1 % f. s.
- p_{max}: 10 bar, t_{max}: 70 °C
- Viscosity range: low viscosity
- Connection:
  flange DN 25 to DN 100
- Material: PVC, PVDF
- Output: pulses,
  0 - 20 mA, 4 - 20 mA or 0 - 10 V,
  LED display, pointer indication,
  switching output

Model: TUR with
ADI electronics

Model: TUR with
compact electronics

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Model:
TUR...

Service

The KOBOLD flow meters 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, lyes and aggressive media that are to be found in the chemical industry.

Design

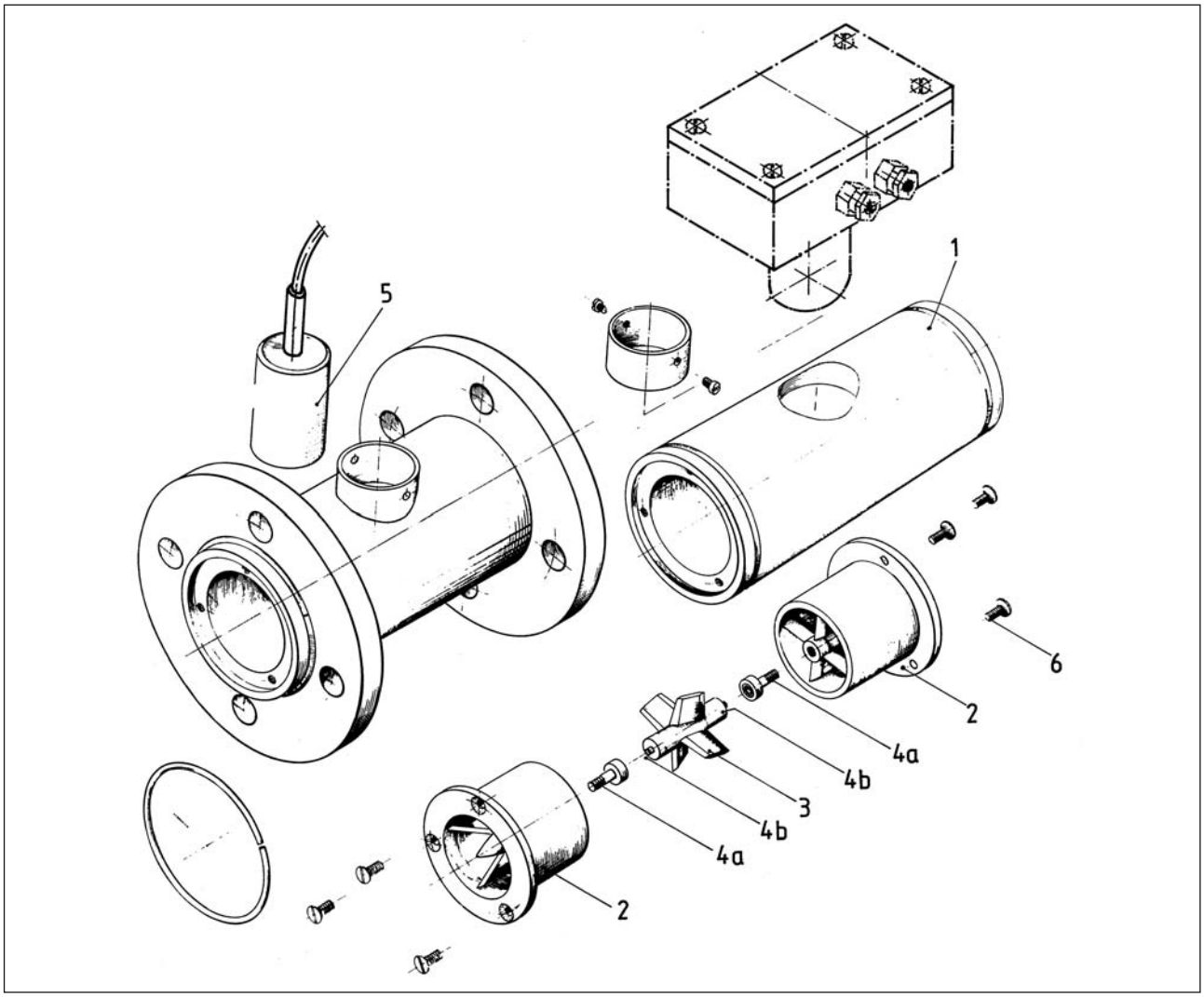
A flow measurement system comprises:

1. **Fitting**
   Material: PVC or PVDF
   Connection: flange NW 25, 50, 80 or 100
2. **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), that 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.



Technical Data

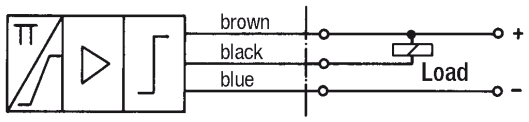
Measuring accuracy:	±1% of f. s.
Viscosity range:	for low-viscosity media
Max. operating temperature:	60°C (PVC version) 70°C (PVDF version)
Max. operating pressure:	PN 10
Protection type:	IP 65

Materials

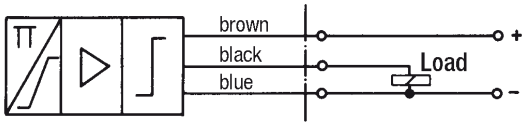
	PVC version	PVDF version
(1) Fitting	PVC	PVDF
(2) Bearing cross bars	PVC	PVDF
(3) Turbine wheel	PVC	PVDF
(4a) Bearing bush	sapphire	sapphire
(4b) Bearing axle	sapphire	sapphire
(6) Bolts	polyamide	PVDF
(7) Flange	PVC	PVC

Electrical Connection Diagram

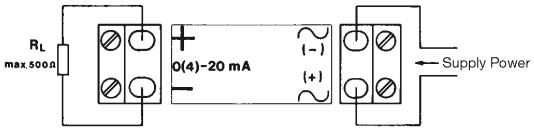
Connection diagram NPN TUR-1...N



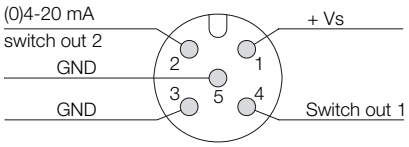
Connection diagram PNP TUR-1...P



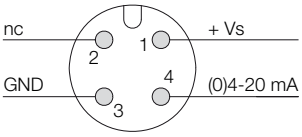
Connection diagram Transmitter TUR-2...M...



TUR-2...C...



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} 4-wire
Max. load:	500 Ω
Electrical connection:	adapter box with cable connection

- **Compact electronics**

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

- **Pointer indicator with analogue output**

Housing:	aluminium
Display:	moving-coil instrument, 240° display
Power supply:	24 V_{DC} ±20%
Output:	0-20 mA or 4-20 mA, 3-wire
Max. load:	250 Ω
Electrical connection:	plug connector M12x1

- **ADI electronics**

Display:	bar graph, 3.5-segment digital or combination display, batch system
Analogue output:	4-20 mA
Two switching outputs:	relay/changeover contacts max. 115/230 V_{AC}, 5 A resistive load max. 30 V_{DC}/5 A or 2 open collector 5-50 V_{DC}, I_{total} = 50 mA
Setting:	via 3 buttons
Power supply:	230/115/48/24 V_{AC}, 24 V_{DC}
Electrical connection:	pluggable terminal block PG-cable glandes

See brochure Z2 for more technical details on ADI evaluating electronics.

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

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

Connection PVC flange Nominal dia.	Measuring range [m³/h water]	Model designation wetted parts PVC	PVDF	Evaluating electronics Transmitter Supply	Output
25	0.2 - 5.0	**TUR-2025...**	**TUR-2125...**	**..M0..** = 230 V_{AC} **..M2..** = 24 V_{AC} **..M3..** = 24 V_{DC}	**..40** = 4 - 20 mA **..00** = 0 - 20 mA **..10** = 0 - 10 V_{DC}
50	1.2 - 20.0	**TUR-2050...**	**TUR-2150...**	**Compact electronics***	
80	2.0 - 80.0	**TUR-2080...**	**TUR-2180...**	**..C30R** = LED display, 2 x open collector, PNP, plug con. M12x1 **..C30M** = LED display, 2 x open collector, NPN, plug con. M12x1 **..C34P** = LED display, 4-20 mA, 1x open coll., PNP, plug con. M12x1 **..C34N** = LED display, 4-20 mA, 1x open coll., NPN, plug con. M12x1	
100	2.5 - 100.0	**TUR-2010...**	**TUR-2110...**	**Pointer indication***	
				..Z300 = 240° pointer indication, 0-20 mA, plug connector M12x1 **..Z340** = 240° pointer indication, 4-20 mA, plug connector M12x1	

ADI electronics*

Display	Supply	Output	Contacts
..B.. = Bar graph **..D..** = Digital **..K..** = Bar graph/ digital display **..A..** = batch system	**..0..** = 230 V_{AC} **..4..** = 115 V_{AC} **..1..** = 48 V_{AC} **..2..** = 24 V_{AC} **..3..** = 24 V_{DC}	**..0..** = without **..F..** = scalable frequency** **..1..** = 0-10 V **..2..** = 0-20 mA **..4..** = 4-20 mA	**..0** = without **..2** = 2 change-over contacts **..6** = 2 open collector

*Please specify flow direction in writing
**ADI-K electronics only

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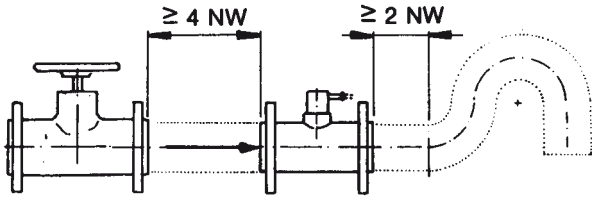
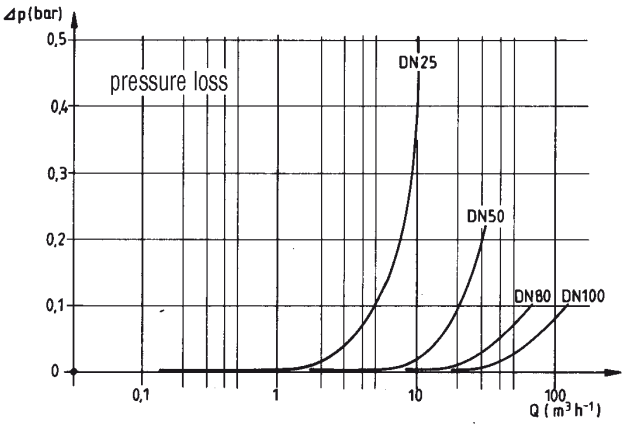
Installation Instructions

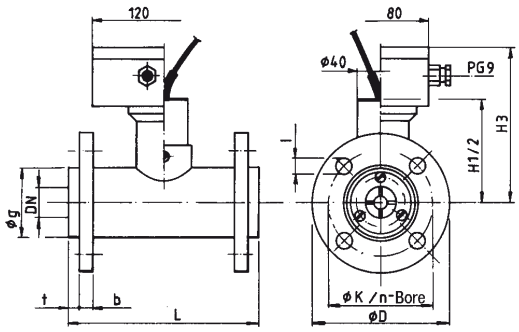
- Choice of installation position.
- Flow rate in direction of arrow.
- The unit must always be flooded with liquid (see Installation Example).
- The installation must be free of stress and with compressible seal.
- Gaskets are not supplied.



Pressure loss Diagram



Dimensions



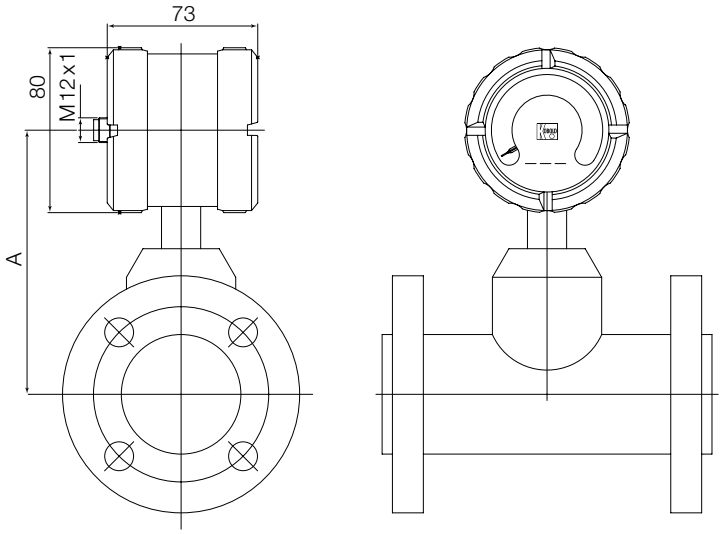
DN	b	D	g	H2*	H3	K	L	n	l	t
25	15	115	58	87	127	85	160	4x	14	9
50	20	165	88	100	140	125	200	4x	18	11
80	22	200	123	115	155	160	225	8x	18	11
100	22	220	145	125	165	180	250	8x	18	11

*with NPN- or PNP sensor

Dimensions

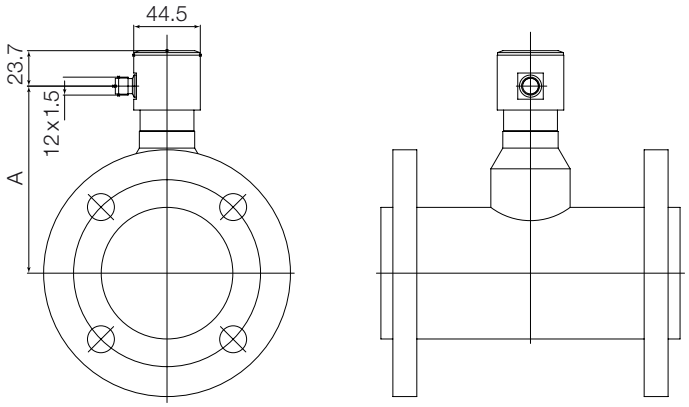
TUR with pointer

Description	Dimension A
TUR-..25	128
TUR-..50	141
TUR-..80	156
TUR-..10	166



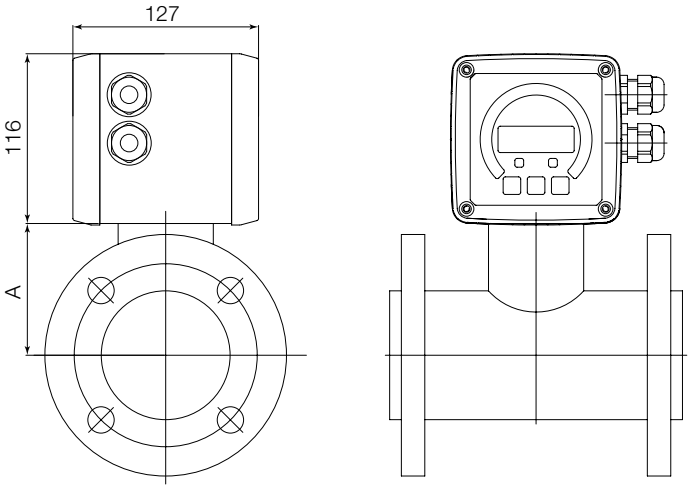
TUR with compact

Description	Dimension A
TUR-..25	112
TUR-..50	125
TUR-..80	140
TUR-..10	150



TUR with ADI

Description	Dimension A
TUR-..25	77
TUR-..50	90
TUR-..80	105
TUR-..10	115



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