Operating Instruction

for

Turbine-wheel Flow Meter

Model: DRB-...

1. Contents

Manufactured and sold by:

Kobold Messring GmbH
Nordring 22-24
D-65719 Hofheim
Tel.: +49(0)6192-2990
Fax: +49(0)6192-23398
E-Mail: info.de@kobold.com
Internet: www.kobold.com

2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.
The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and with the prevailing regulation applying to safety and the prevention of accidents.

When used in machines, the measuring unit should be used only then when the machines fulfil the EC-machine guide lines.

PED 2014/68/EU
In acc. with Article 4 Paragraph (3), "Sound Engineering Practice", of the PED 2014/68/EU no CE mark.
Table 8, Pipe, Group 2 dangerous fluids

3. Instrument Inspection

These devices are checked before shipping and sent out in perfect condition. Should damage to a device be visible, we recommend a thorough inspection of the delivery packing. In case of damage, please inform your parcel service/ forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:
- Turbine-wheel Flow Meter, Model: DRB
- Operating Instructions

4. Regulation Use

The “turbine-wheel flow meter, model DRB“, is to be installed only in specified applications. Any usage which exceeds the specifications is considered to be no-specified, and would also invalidate the warranty. Any damages resulting therefrom are not the responsibility of the manufacturer. The user assumes all risk for such usage. The application specifications include the installation, start-up and service requirements specified by the manufacturer.

5. Operating Principle

The KOBOLD flow meter model DRB is used for measuring and monitoring liquids. The device works according the well-known paddle wheel principle.
The four vane paddle wheel is retained radially in a high quality sapphire bearing. The sensor is supplied ready-to-install with pipe fittings or with weld-on sleeves. The paddle wheel is set in motion by the flowing medium. Magnets are embedded hermetically sealed in the ends of the blades. The magnets generate electrical pulses in a Hall-effect sensor mounted outside the flow area. Various electronics units can be used to display and monitor the volumetric flow.

6. Mechanical Connection

6.1. Examine operating conditions:

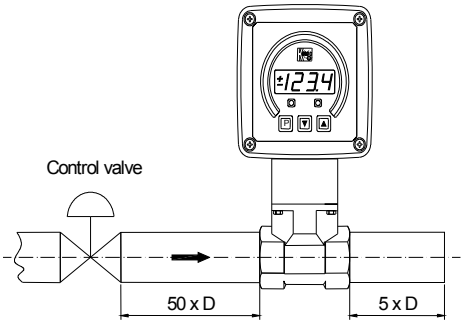
- Flow volume
- Max. operating pressure
- Max. operating temperature
  Ensure that they are all within the limits of the device

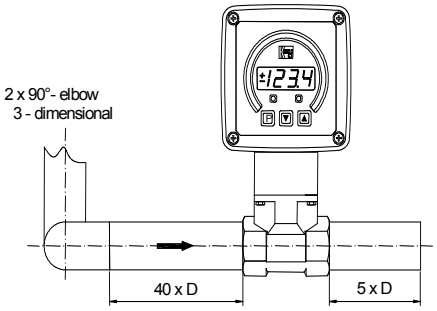
Attention! Over-ranging may cause bearing damage and considerable measurement errors.

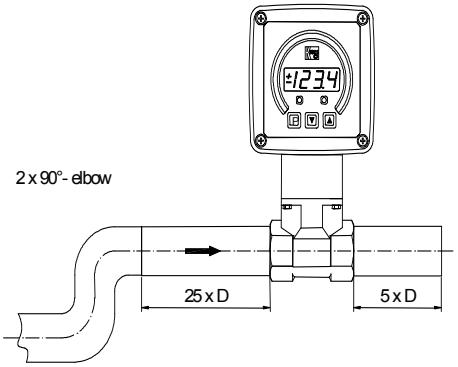
6.2. Installation

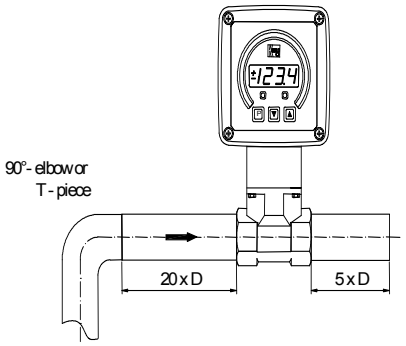
- Flow in the direction of the pointing arrow (position independent)
- Pressure and tensile loading should be avoided
- The inlet and outlet should be secured at a distance of 50 mm mechanically from the connection.
- Check the sealing of connections/joints

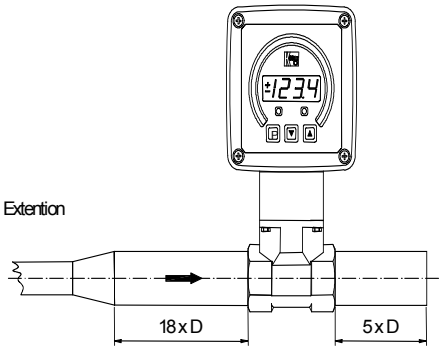
6.3. Inlet and outlet path straight piping requirements

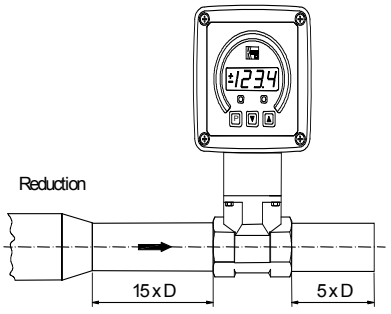




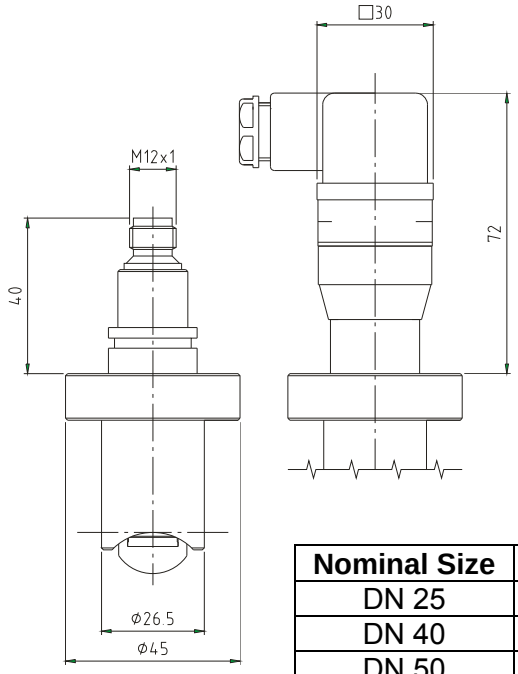


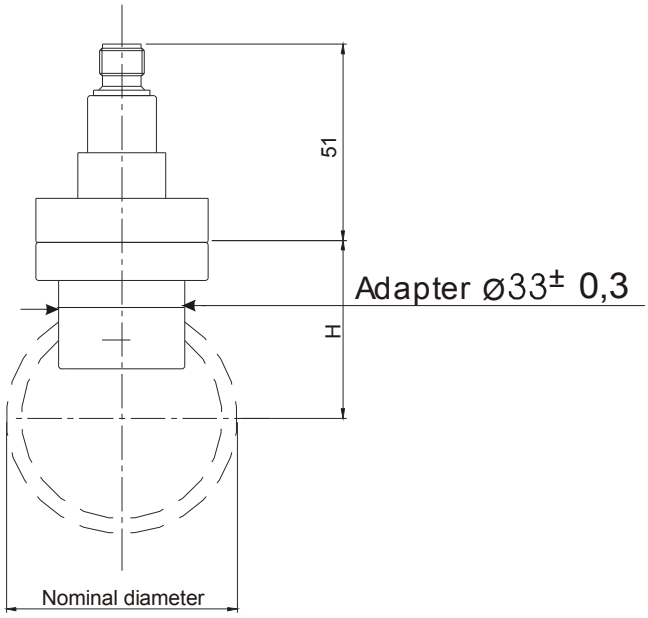






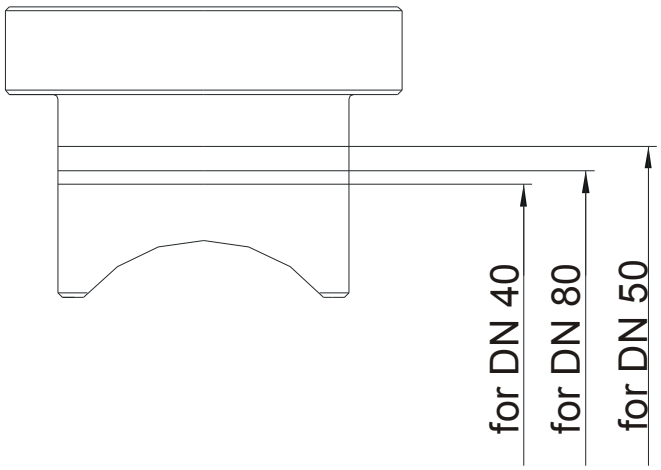
Version with weld-on mounting adapter
Weld the mounting adapter in the piping according to the sketch given below.





Nominal Size	H
DN 25	30
DN 40	44
DN 50	46
DN 80	63

Position and weld-in the mounting adapter according to the nominal diameter suitable marking. The marking on the adapter must be in line with the outer diameter of the pipe. Also pay attention to the later position of the rotating vane (shaft of the vane shifted by 90° to the direction of flow).



7. Electrical connection

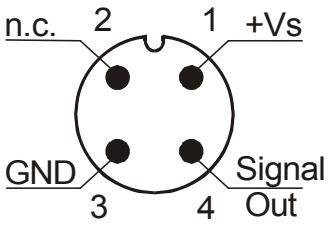
7.1. General

Attention! Make sure that the power supply voltage corresponds with the voltage requirement of the flow meter.

- Ensure that power supply is de-energized
- Connect the power supply and the output signal to the plug-pins, as shown below.
- We recommend a cross-section of 0.25 mm² for the power supply cable.

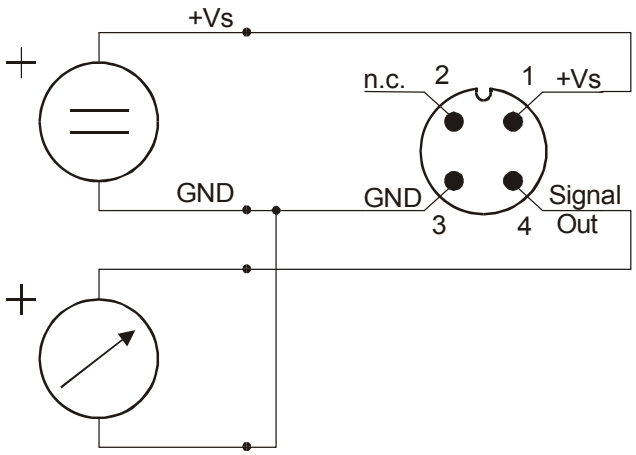
Attention! Incorrect wiring may cause permanent damage to the sensor.

7.2. Output Electronics:
Frequency output (..F300; ..F320, ..F340)

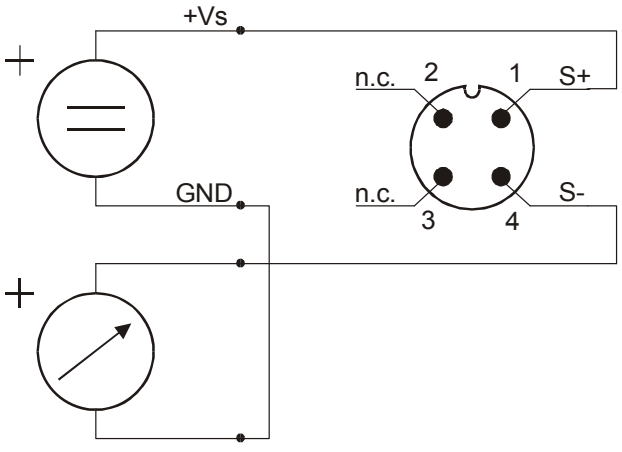


7.3. Output Electronics:
Analogue output (..L303, ..L342, ..L343, ..L442)

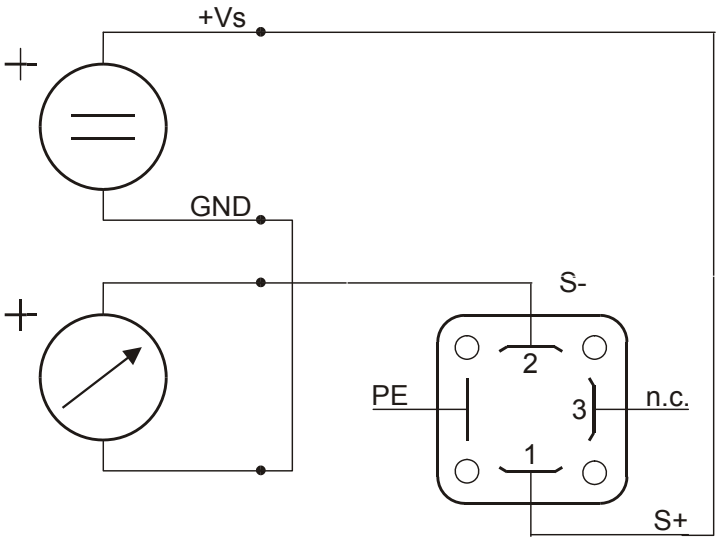
3-wire (..L303, ..L343)



2-wire (..L342)



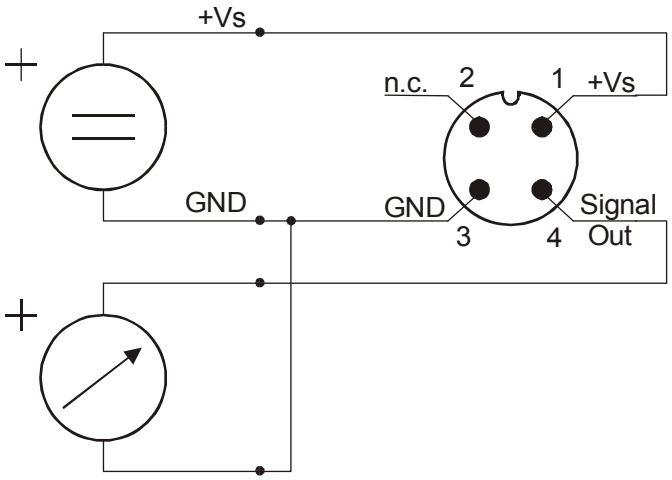
2-wire, DIN-plug (..L442)



7.4. Compact Electronics: (..C30R, ..C30M, ..C34P, ..C34N)

see
Instruction Manual-Supplement
for Compact Electronics

7.5. Evaluation electronics: Pointer indication (..Z300, ..Z340)



Caution! If the current output is not needed, PIN 4 (signal out) shall be permanently connected to ground (GND) (short circuit).

7.6. ADI electronics

see
Instruction Manual-Supplement
for ADI-electronics

8. Commissioning – Evaluation Electronics

8.1. General

The Measuring units factory are pre-set and are ready for use after electrical connections are made.

8.2. Adjustment – Compact electronics

see
Instruction Manual-Supplement
for Compact electronics with Frequency output

8.3. Adjustment – ADI display/controller

see
Instruction Manual-Supplement
for ADI-series display/controller

9. Maintenance

The measuring unit is maintenance-free if the medium to be measured does not cause deposition of impurities. In order to avoid problems, we recommend installation of a filter, such as magnet filter, model MFR.
Should cleaning of the sensor becomes inevitable, after opening the sensor the inner parts may be accessed. Note the direction that the turbine points during removal and re-install in the same direction. Please be careful to avoid any damage to the sensor and in particular, to the turbine blades. Repair work regarding electronics may only be carried out by the supplier. Any access or work on the electronics voids the warranty.

10. Technical Data

10.1. Sensor data

Measuring range:	50-30...50-750 L/min Water
Measuring accuracy:	±3% of. f.s.
Process temperature:	max. 80 °C
Ambient temperature:	max. 80 °C
Max. operating pressure:	PN 16 / 20 °C
Max. pressure loss:	DRB-...05: 0.05 bar
	DRB-...10. DRB-..15: 0.03 bar
	DRB-...20: 0.04 bar
	DRB-...25: 0.02 bar
	DRB-...30: 0.01 bar
Protection:	IP65
Materials	
Housing:	brass casting
	st. steel 1.4581
	st. steel 1.3955 (DRB...W)
Sealings:	brass casting version: NBR
	st. steel version: FPM
Turbine-wheel:	PVDF
Axle:	hard metal (DRB-11... and DRB-12...)
	ceramic (DRB-1300...)
Bearing:	ceramic (DRB-11... and DRB-12...)
	ceramic/PEEK (DRB-1300...)

10.2. Evaluation electronics

Frequency output (F...300)

Power supply:	12 – 28 V_{DC}
Power consumption:	10 mA
Pulse output:	PNP, open collector, max. 25 mA
Electrical connection:	plug connector M12x1

Frequency output with frequency divider

Power supply:	24 V_{DC} ±20 %
Power consumption:	15 mA
Pulse output:	PNP, open collector, max. 25 mA
Electrical connection:	Plug M12x1
Division ratio:	1...1/128, factory set

Analogue output (plug-on display option)

Power supply:	24 V_{DC} ±20%
Output:	0-20 mA or 4-20 mA, 2-wire or 3-wire
Max. load:	500 Ω
Electrical connection:	plug connector M12x1 or DIN 43 650
Option:	plug-on display (with plug connection DIN 43 650, 2-wire)

Compact electronics

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

Pointer indication with analogue output

Housing:	Aluminium
Display:	moving-coil instrument, 240° display
Power supply:	24 V_{DC} ±20 %
Output:	4-20 mA or 0-20 mA/0-10 V, 3-wire
Max. load:	250 Ω
Electrical connection:	plug connector M12x1

ADI electronics

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

DRB-...Exxx (Counter elektronic)

Display:	LCD, 2 x 8 digit, illuminated total, part and flow quantities units selectable
Analogue output:	0(4)...20 mA adjustable
Load:	max. 500 Ω
Switching output:	2 relays, max. 250 V / 5 A /1000 VA
Settings:	via 4 buttons
Functions:	reset, MIN/MAX memory, flow monitor, monitoring for part and total quantity, language
Power supply:	24 VDC ± 20 %, 3-wire
Power consumption:	approx. 170 mA
Electrical connection:	pluggable terminal block via cable gland

DRB-...Gxxx (Dosing electronic)

Display:	LCD, 2 x 8 digit, illuminated total, part and flow quantities units selectable
Analogue output:	0(4)...20 mA adjustable
Load:	max. 500 Ω
Switching output:	2 relays, max. 250 V / 5 A / 1000 VA
Settings:	via 4 buttons
Functions:	dosing (relay S2), start, stop, reset, fine dosing, correction amount, flow switch, total quantity, language
Power supply:	24 VDC ± 20 %, 3-wire
Power consumption:	approx. 170 mA
Electrical connection:	pluggable terminal block via cable gland

11. Order Details

example: **DRB-1105 G4 F300**

With pipe fitting

Measuring range max. 3 m/s (L/min water)	app. frequency (Hz) f. s.	Flow rate max. 10 m/s (L/min water)	Model: Mat. brass casting	Model: Material st. steel	Connection: Standard fem. Thread	Connection: Special fem. thread
5-30	40	100	**DRB-1105..**	**DRB-1205..**	..**G4**..= G 1/2	..**N4**..= 1/2 NPT
10-50	40	180	**DRB-1110..**	**DRB-1210..**	..**G5**..= G 3/4	..**N5**..= 3/4 NPT
20-80	65	230	**DRB-1115..**	**DRB-1215..**	..**G6**..= G 1	..**N6**..= 1 NPT
25-250	85	600	**DRB-1120..**	**DRB-1220..**	..**G8**..= G 1 1/2	..**N8**..= 1 1/2 NPT
30-350	80	1000	**DRB-1125..**	**DRB-1225..**	..**G9**..= G 2	..**N9**..= 2 NPT
50-750	70	1600	**DRB-1130..**	**DRB-1230..**	..**GB**..= G 3	..**NB**..= 3 NPT

With installation adapter
not available with compact or ADI electronics

Meas. range (m/s)	approx. frequency (Hz) at max. value	Max. flow rate (m/s)	Model: Material 1.3955 axle hard metal	Model: Material 1.3955 axle ceramic	Connection for nominal pipe size
0.7-3 0.3-3 0.3-3 0.2-3	**50** (at DN 25) **85** (at DN 40) **80** (at DN 50) **70** (at DN 80)	10	**DRB-1200..**	**DRB-1300..**	..**W6**.. = DN 25 ..**W8**.. = DN 40 / DN 50 ..**WB**.. = DN 80

*Please specify flow direction in writing

Evaluating electronics

Frequency output
..F300= Frequency output, plug connector M12x1
..F320= Frequency divider 1:2 plug connection M12x1
..F340= Frequency divider 1:4, plug connector M12x1
..F390= Frequency divider 1…1/128 plug connector M12x1

Analogue output
..L303= 0-20 mA output, 3-wire, M12x1 plug connector
..L342= 4-20 mA output, 2-wire M12x1 plug connector
..L343= 4-20 mA output, 3-wire, M12x1 plug connector
..L442= 4-20 mA output, 2-wire, plug connection DIN EN 175301

Compact electronics*
..C30R= LED display, 2xOpen Collector, PNP, plug connector M12x1
..C30M= LED display, 2xOpen Collector, NPN, plug connection M12x1
..C34P= LED display, 4-20 mA, 1x Open Collector PNP, plug connector M12x1
..C34N= LED display, 4-20 mA, 1xOpen collector NPN, plug connector M12x1

Pointer indication, 240°*
..Z300= 240° pointer indication, 0-20 mA, plug connector M12x1
..Z340= 240° pointer indication, 4-20 mA, plug connector M12x1

Counter electronics
..E34R = LCD, 0(4)-20 mA, 2 x relays

Dosing electronics
..G34R = LCD, 0(4)-20 mA, 2 x relays

ADI electronics*

Display	Power supply	Output	Contacts
K..= Bargraph/ Digital display	**0=**100-240 $V_{AC/DC}$ **3=** 18-30 V_{AC}, 10-40 V_{DC}	**0=** without **4=** 0(4)-20 mA, 0-10 V	**2=** 2 change-over contacts

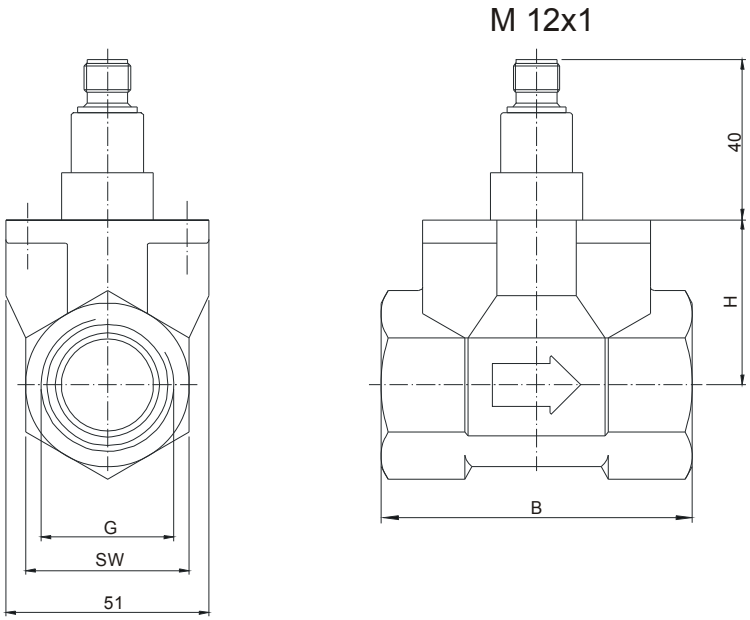
Plug-on display

For model DRB...L442 (with 2-wire, 4-20mA output and DIN plug connector)

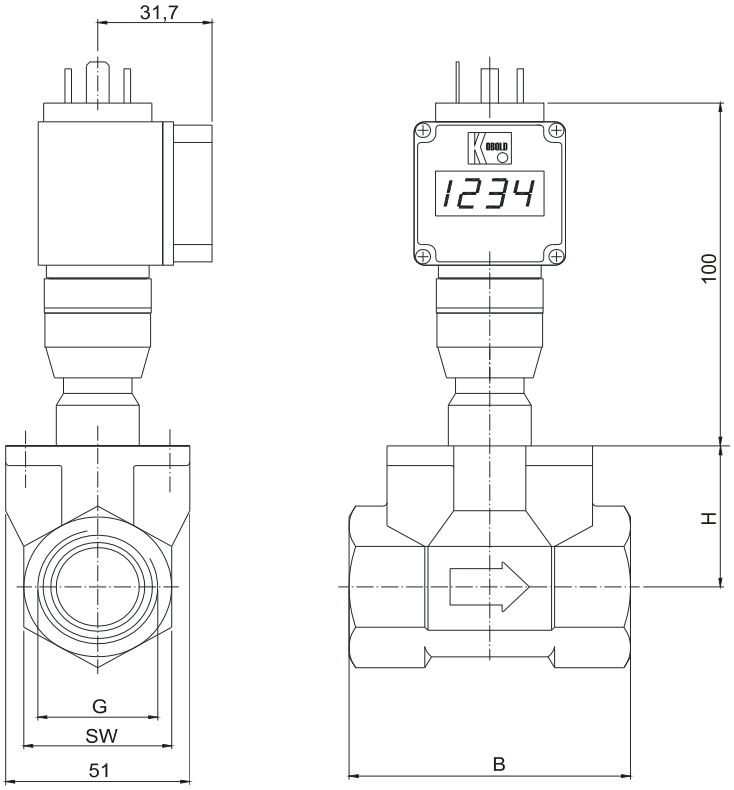
Description	Order number
4-digit LED, connector DIN 43650, 2-wire, supply through analogue output	**AUF-1000**
as above however with additional open collector output	**AUF-1001**

12. Dimensions (mm)

Model: DRB-...L3.. / DRB- F..
(with analogue output)

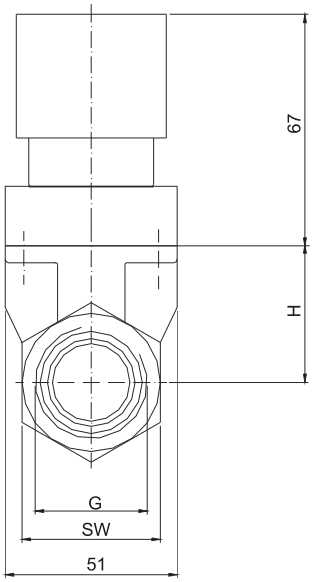


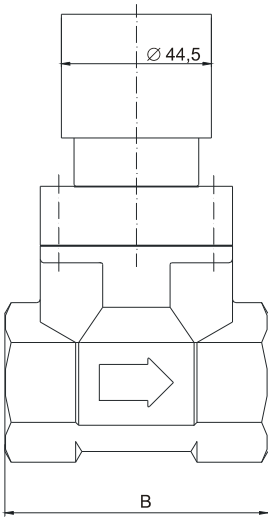
Model: DRB-..L4..
(with analogue output and optional plug-on display)



G	SW	B	H
G 1/2, 1/2 NPT	27	78	40
G 3/4, 3/4 NPT	41	78	42
G 1, 1 NPT	41	78	42
G 1 1/2, 1 1/2 NPT	55	78	57
G 2, 2 NPT	70	81	58
G 3, 3 NPT	100	106	75

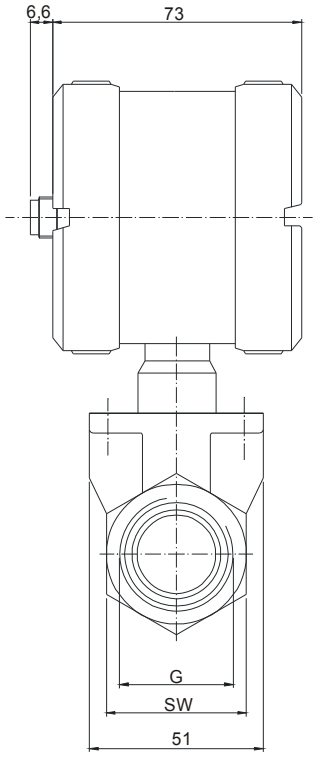
Model: DRB-..C.. (with Compact electronics)

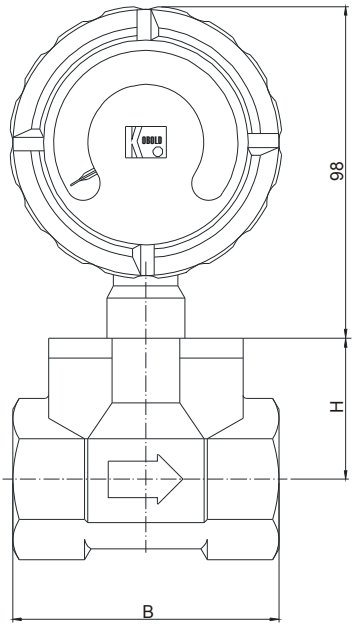




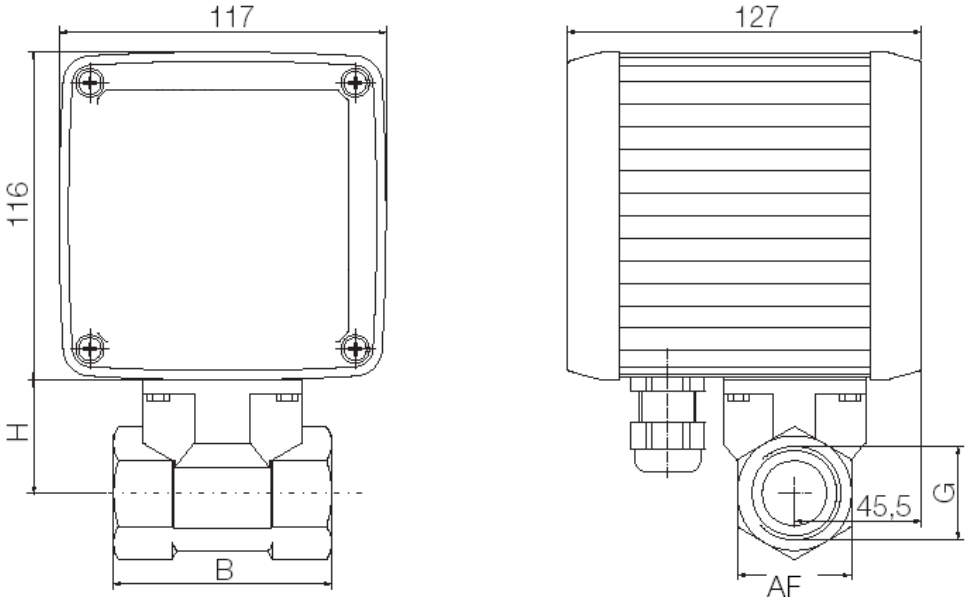
G	SW	B	H
G 1/2, 1/2 NPT	27	78	40
G 3/4, 3/4 NPT	41	78	42
G 1, 1 NPT	41	78	42
G 1 1/2, 1 1/2 NPT	55	78	57
G 2, 2 NPT	70	81	58
G 3, 3 NPT	100	106	75

Model: DRB-..Z.. (with pointer indication)





Model: DRB-..K,..G.., ..E..
(with ADI evaluating electronic, counter or dosing electronic)



G	SW	B	H
G 1/2, 1/2 NPT	27	78	40
G 3/4, 3/4 NPT	41	78	42
G 1, 1 NPT	41	78	42
G 1 1/2, 1 1/2 NPT	55	78	57
G 2, 2 NPT	70	81	58
G 3, 3 NPT	100	106	75

13. EU Declaration of Conformance

We, KOBOLD-Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Turbine-wheel flow meter Model: DRB -...

to which this declaration relates is in conformity with the standards noted below:

EN 61000-6-4:2011
Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

EN 61000-6-2:2005
Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

EN 61010-1:2010
Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements

EN 60529:2014
Degrees of protection provided by enclosures (IP Code)

EN 50581:2012
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Also the following EC guidelines are fulfilled:

2014/30/EU **EMC Directive**
2011/65/EU **RoHS**

Hofheim, 08 March 2018

H. Peters
General Manager

M. Wenzel
Proxy Holder