

# Operating Instructions for Turbine-Wheel Flow Meter

**Model: DPE-...**



Order from: **C A Briggs Company**

622 Mary Street; Suite 101; Warminster, PA 18974

Phone: 267-673-8117 - Fax: 267-673-8118

[Sales@cabriggs.com](mailto:Sales@cabriggs.com) - [www.cabriggs.com](http://www.cabriggs.com)

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### **Manufactured and sold by:**

Kobold Messring GmbH  
Nordring 22-24  
D-65719 Hofheim/Germany  
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 in accordance with local regulations applying to Health & Safety and prevention of accidents.

By usage in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

### As per the “Pressure Equipment Directive 2014/68/EU”

No CE marking, see Article 4, Section 3 "Sound Engineering Practice", Directive 2014/68/EU

	Piping	
	Diagram 8 Group 1 Dangerous Fluids	Diagram 9 Group 2 Non-dangerous Fluids
DPE-xx05...DPE-xx25	Article 4, Section 3	Article 4, Section 3
DPE-1130	Not available	Article 4, Section 3
DPE-1230	Category II	Article 4, Section 3

## 3. Instrument Inspection

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

### Scope of delivery:

The standard delivery includes:

- Turbine-wheel Flow Meter model: DPE-...
- Operating instructions

## 4. Regulation Use

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Any use of the Turbine-Wheel Flow Meter, model: DPE-..., which exceeds the manufacturer's specification, may invalidate its warranty. Therefore any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

## 5. Operating Principles

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The Kobold flow meter model DPE is used for measuring and monitoring liquids. The device works according the well-known blade wheel principle. The six vane blade wheel is retained axially in a high-quality sapphire bearing. The sensor is supplied ready-to-install with pipe fittings or with weld-on sleeves. The blade wheel is set in motion by the flowing medium. Hermetically sealed magnets are embedded in the ends of the blade wheels. The magnets generate electrical pulses in a Hall-effect sensor mounted outside the flow area.

## 6. Mechanical Connection

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### 6.1. Check the installation conditions:

- Flow volume
- Max. operating pressures
- Max. operating temperature

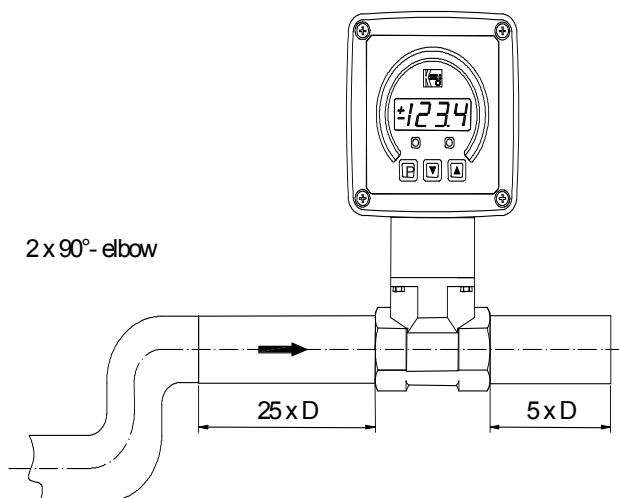
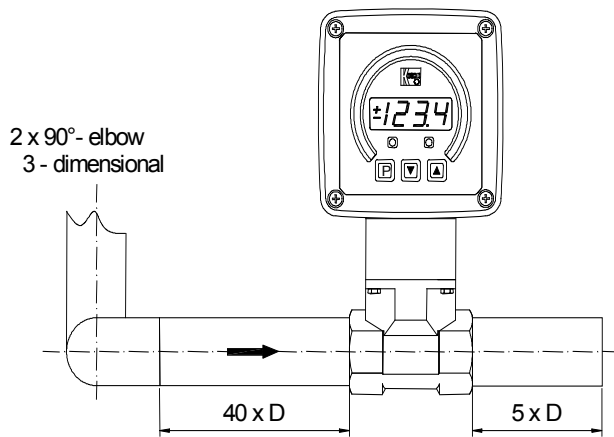
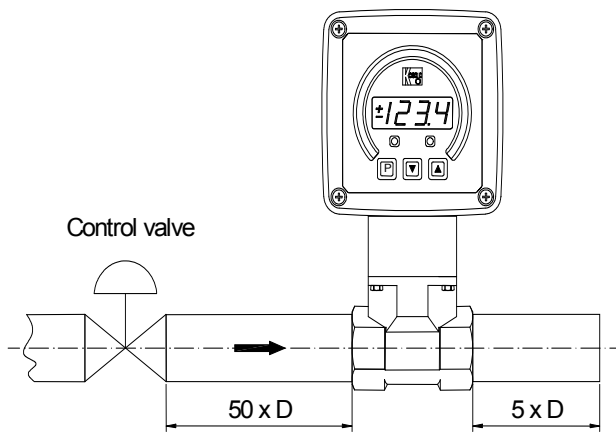


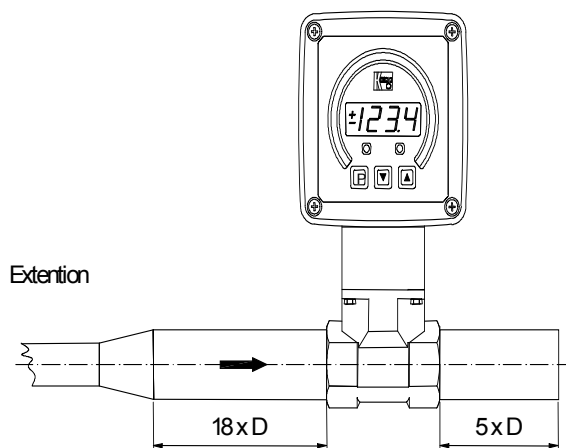
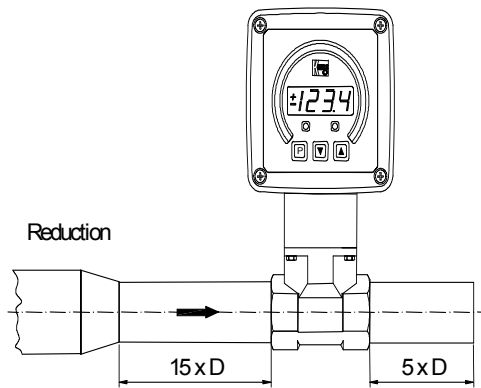
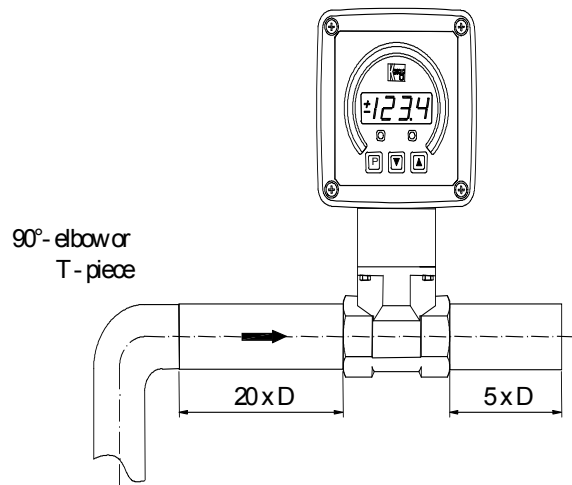
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**Caution! Exceeding the measuring range will damage the bearings in the device and lead to significant errors in measurement.**

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## 6.2. Inlet and outlet path straight piping requirements





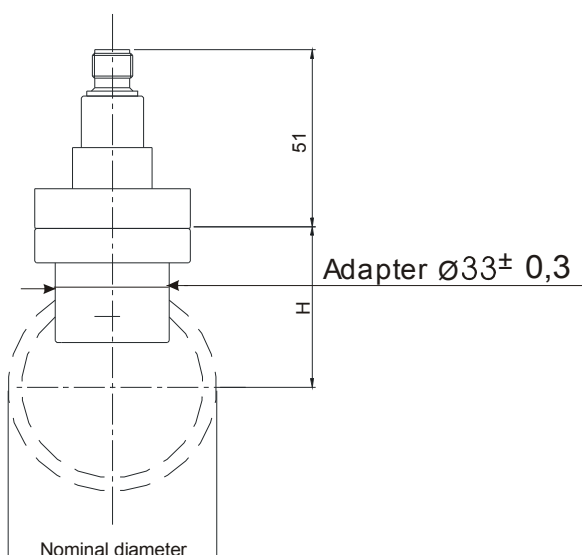
### 6.3. Installation

#### Standard installation

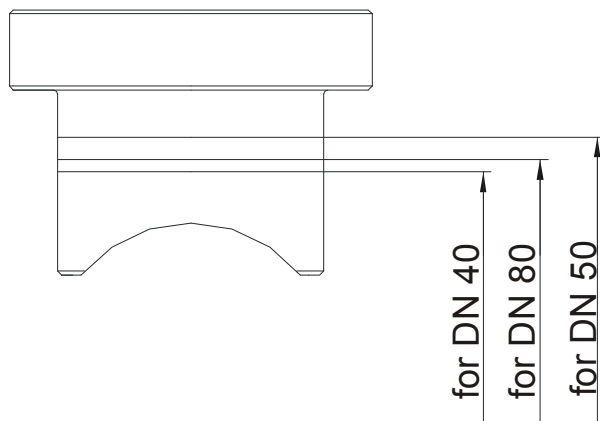
- Ensure that the flow is in the direction of the arrow (universal positioning).
- Avoid pressure and tension loads on the device.  
Mechanically secure the inlet and outlet lines at a distance of 50 mm from the connections.
- Check the connections for leaks.

#### Installation with mounting adapter: (DPE-1200W...)

Weld the adapter to the piping (to the proper depth, using **H** reference) as shown in the drawing (flow is in direction of arrow).



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

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### 7.1. General information



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**Attention! Make sure that the voltage values of your system correspond with the voltage values of the measuring unit.**

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- Make sure that the supply wires are de-energized.
- Connect and plug in the system according to the connecting plans.
- We recommend to use wires with cross sectional area of min. 0,25 mm<sup>2</sup>



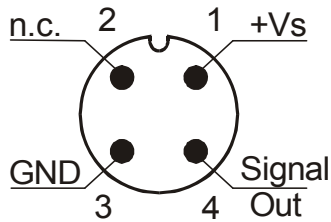
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**Attention! Wrong wiring will lead into damage of the unit's electronic.**

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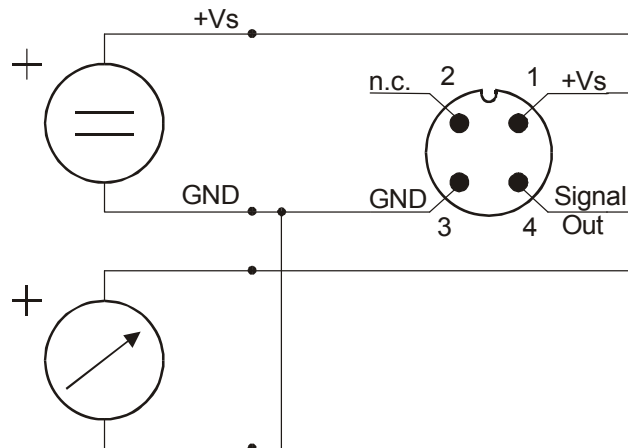


**7.2. Electronic analyzer:  
Frequency output (..F300; ..F320, ..F340)**

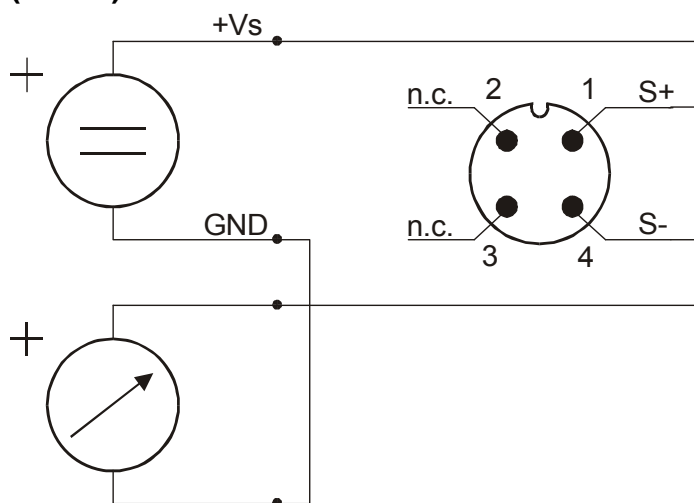


**7.3. Electronic analyzer:  
Analog output (..L303, ..L342, ..L343, ..L442)**

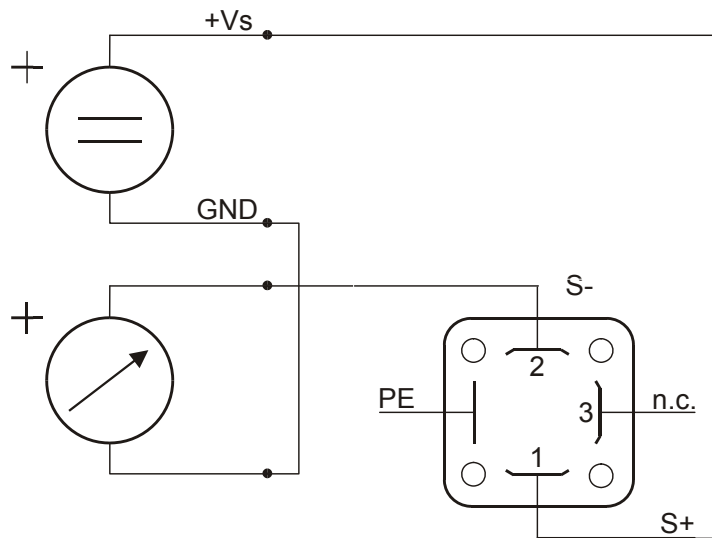
3-wire (..L303, ..L343)



2-wire (..L342)



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

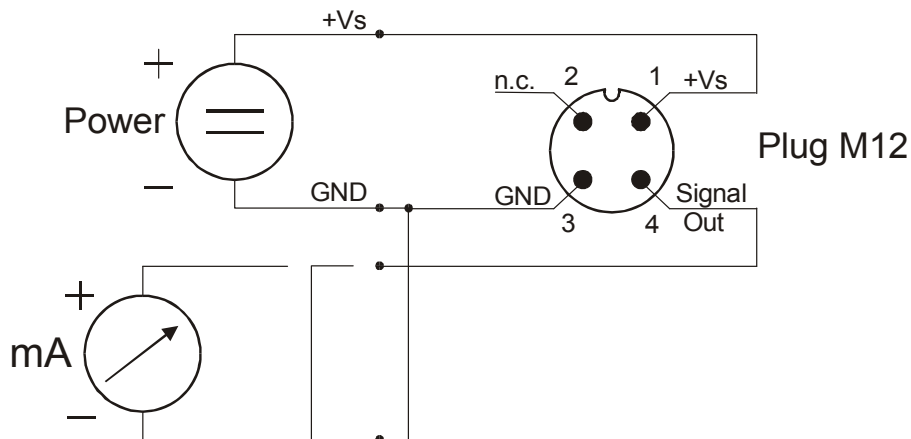


### 7.4. Compact electronics: (..C30R, ..C30M, ..C34P, ..C34N)

See

Operating instructions supplement for compact electronics with frequency output

## 7.5. Electronic analyzer: pointer indicator (..Z300, ..Z340)



**Caution! In case current output is not needed, PIN 4 (Signal Out) is to be permanently connected with Ground (GND) (short circuit jumper).**

## 7.6. ADI electronic analyzer

See

Operating instructions supplement for ADI electronic analyzer

# 8. Commissioning - Electronic Analyzer

## 8.1. General

These measuring devices are preset at the factory and ready for operation after the electric connection is completed.

## 8.2. Settings - Compact electronics

See

Operating instructions supplement for compact electronics with frequency output

## 8.3. Settings - ADI electronic analyzer

See

Operating instructions supplement for ADI electronic analyzer

## 9. Maintenance

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This measuring device is maintenance-free when used in fluids that do not leave deposits. To prevent contamination problems, we recommend installation of a filter, such as a model MFR magnetic filter.

If the sensor has to be cleaned, it can be opened to access the internal parts. Make sure that the sensor and especially the turbine blades are not damaged. During reassembly, make sure that the turbine is positioned and oriented correctly. All work on the sensor electronics must be performed by the supplier; otherwise the guarantee will be voided.

## 10. Technical Information

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### 10.1. Sensor data

Measuring ranges:	5 - 30...50 - 750 L/min. water
Measuring accuracy:	± 2.5% f. s.
Process temperature:	max. 80 °C
Ambient temperature:	max. 80 °C
Max. operating pressure:	PN40 / 20 °C PN 16 (DPE-1200W)
Max. pressure loss:	DPE- 05: 0.05 bar DPE- 10, DPE- 15: 0.03 bar DPE- 20: 0.04 bar DPE- 25: 0.02 bar DPE- 30: 0.01 bar
Protection type:	IP65
<b>Materials:</b>	
Housing:	Brass casting Stainless steel 1.4581
Seals:	Brass casting version: NBR Stainless steel version: FPM
Turbine wheel:	PVDF
Axle:	Hard metal
Bearing:	sapphire

### 10.2. Evaluation electronics

<b>Frequency output</b>	
Power supply:	12 – 28 V <sub>DC</sub>
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 <sub>DC</sub> ± 20%
Power consumption:	15 mA
Pulse output:	PNP, open collector, max. 25 mA
Electrical connection:	plug connector M12x1
Division ratio:	1...1/128, factory setting

**Analogue output (plug-on display option)**

Power supply:	24 V <sub>DC</sub> ± 20%
Output:	0 - 20 mA or 4-20 mA, 2-wire or 3-wire
Max. load impedance:	500 Ω
Electrical connection:	plug connector M12x1 or DIN 43 650
Option:	plug-on display (with plug connector DIN 43 650 and 4 – 20 mA output only)

**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, frequency programmable
Setting:	with 2 buttons
Supply:	24 V <sub>DC</sub> ± 20%, 3-wire, about 100 mA
Electrical connection:	plug connector M12x1

**Pointer indicator with analogue output**

Housing:	aluminium
Display:	moving-coil instrument, 240° display
Power supply:	24 V <sub>DC</sub> ± 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 and 5-digit digital display
Analogue output:	(0)4 –20 mA, 0-10 V <sub>DC</sub>
Two switching outputs:	relay/ changeover contacts max. 250 V <sub>AC</sub> /5 A resistive load, max. 30 V <sub>DC</sub> / 5 A
Setting:	via 4 buttons
Power supply:	100...240 V <sub>AC</sub> ±10 % or 18...30 V <sub>AC</sub> /10...40 V <sub>DC</sub>
Electrical connection:	pluggable terminal block via cable gland

## **DPE-...Exxx (Counter electronic)**

Display:	LCD, 2x8 digit, illuminated total, part and flow quantities, units selectable
Analogue output:	(0)4 –20 mA adjustable
Load:	max. 500 $\Omega$
Switching outputs:	2 relays, max. 250 V/5 A/1000 VA
Setting:	via 4 buttons
Functions:	Reset, Min./Max., memory, flow monitor, monitoring for part and total quantity, language
Supply:	24 V <sub>DC</sub> $\pm$ 20 %, 3-wire
Power consumption:	approx. 170 mA
Electrical connection:	pluggable screw terminals via cable gland

## **DPE-...Gxxx (Dosing electronic)**

Display:	LCD, 2x8 digit, illuminated total, part and flow quantities, units selectable
Analogue output:	(0)4 –20 mA adjustable
Load:	max. 500 $\Omega$
Switching outputs:	2 relays, max. 250 V/5 A/1000 VA
Setting:	via 4 buttons
Functions:	dosing (relay S2), start, stop, reset, fine dosing, correction amount, flow switch, total quantity, language
Supply:	24 V <sub>DC</sub> $\pm$ 20 %, 3-wire
Power consumption:	approx. 170 mA
Electrical connection:	pluggable screw terminals via cable gland

## 11. Order Codes

(Example: DPE-1105 G4 F300)

With pipe fitting					Evaluating electronics			
Measuring range max. 3 m/s (L/min water)		Flow rate max. 10 m/s (L/min water)	Model		Connection			Frequency output
app. frequency (Hz) f. s.			Mat. Brass casting	Material st. steel	Standard fem. Thread	Special fem. thread		
5-30	80	100	DPE-1105..	DPE-1205..	..G4.. = G 1/2	..N4.. = 1/2 NPT	..F300= Frequency output, plug connector M12x1	
10-50	80	180	DPE-1110..	DPE-1210..	..G5.. = G 3/4	..N5.. = 3/4 NPT	..F320= Frequency divider 1:2 plug connection M12x1	
20-80	65	230	DPE-1115..	DPE-1215..	..G6.. = G 1	..N6.. = 1 NPT	..F340= Frequency divider 1:4, plug connector M12x1	
25-250	140	600	DPE-1120..	DPE-1220..	..G8.. = G 1 1/2	..N8.. = 1 1/2 NPT	..F390= Frequency divider 1... <sup>1</sup> /128 plug connector M12x1	
30-350	135	1000	DPE-1125..	DPE-1225..	..G9.. = G 2	..N9.. = 2 NPT	<b>Analogue output</b>	
50-750	110	1600	DPE-1130..	DPE-1230..	..GB.. = G 3	..NB.. = 3 NPT	..L303= 0-20 mA output, 3-wire, M12x1 plug connector	
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		Connection for nominal pipe size			
			Mat. Brass casting	Material st. steel	..W6.. = DN 25			
0-3	65 (at DN 25) 140 (at DN 40) 135 (at DN 50) 110 (at DN 80)	10	---	DPE-1200..	..W8.. = DN 40 / DN 50			
					..WB.. = DN 80			

ADI electronics*			
Display	Power supply	Output	Contacts
K = Bar graph/ digital display	0= 100-240 V <sub>AC</sub> 3= 18-30 V <sub>AC</sub> 10-40 V <sub>DC</sub>	..0= without ..4= (0)4-20 mA, 0-10 V	..2= 2 change-over contacts

\*Please specify flow direction in writing.

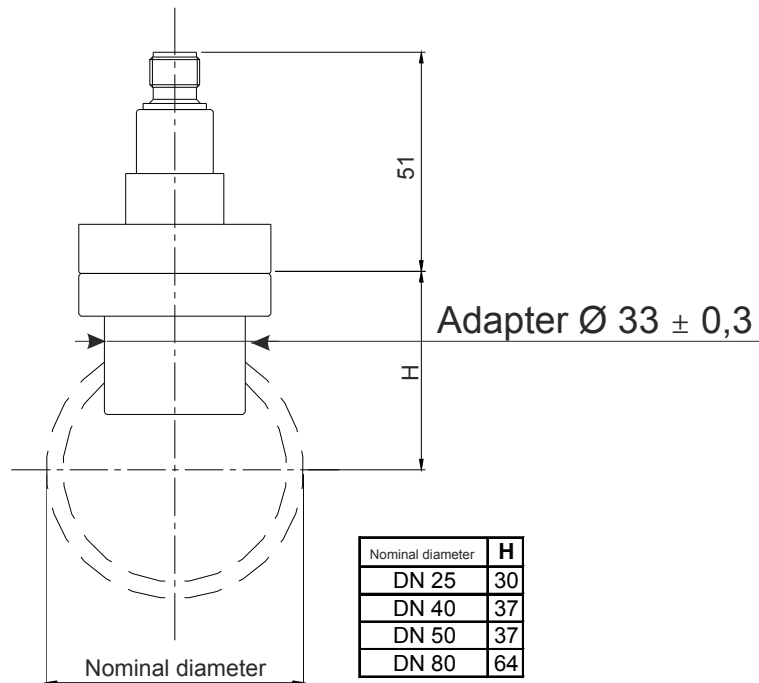
### Plug-on display

for model DPE-...L442 (with 4 – 20 mA output and DIN connector)

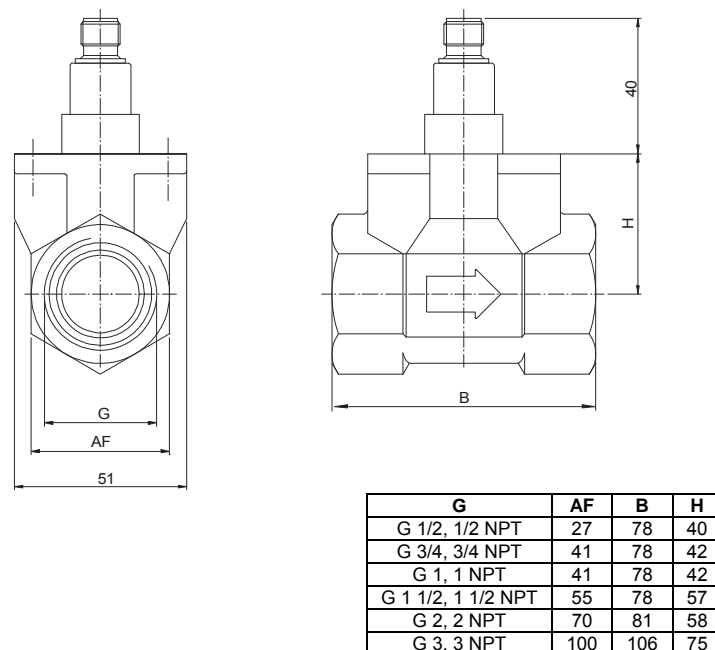
Description	Order number
4-digit LED, connector DIN 43650, 2-wire, supply through analogue output	AUF-1000
as above however with additional open collector output	AUF-1001

## 12. Dimensions

Model: DPE-..W.. (with weld-on sleeve)



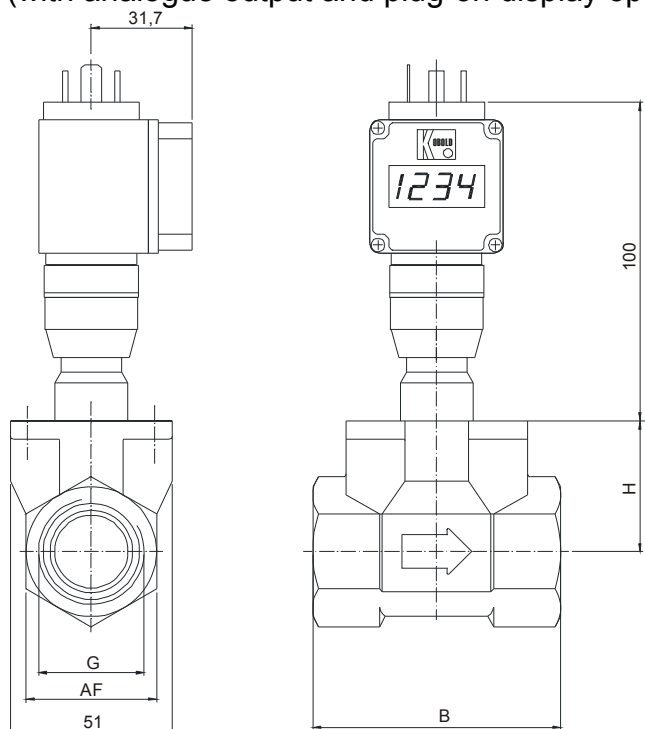
Model: DPE-..L3.. / DPE-..F.. (with analogue output)





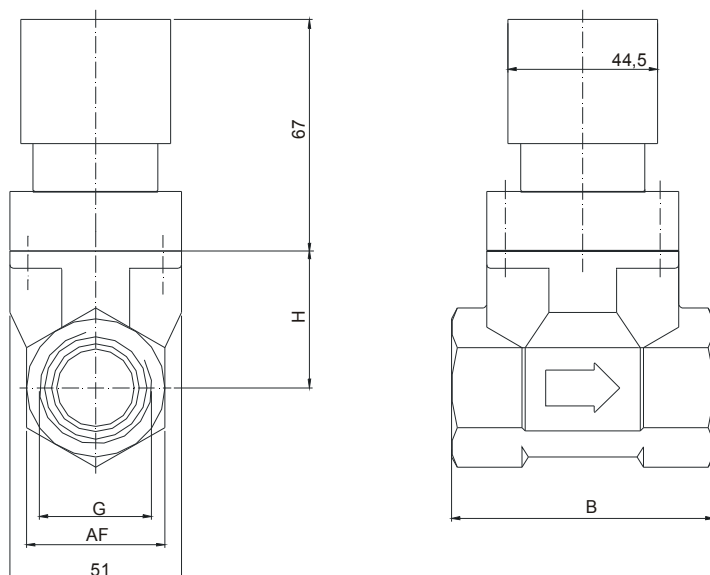
## Model: DPE-..L4..

(with analogue output and plug-on display option)



G	AF	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

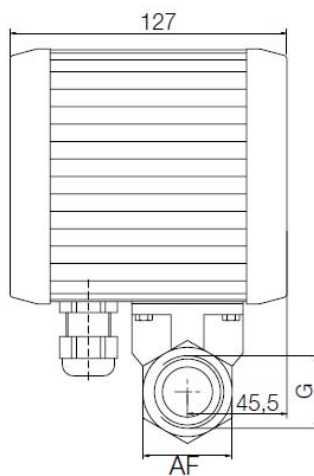
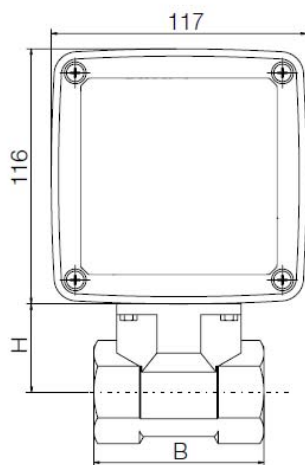
## Model: DPE-..C.. (with compact electronic)



G	AF	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

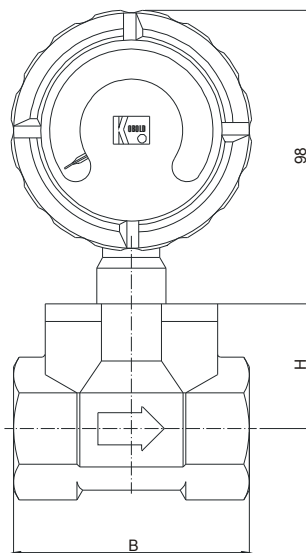
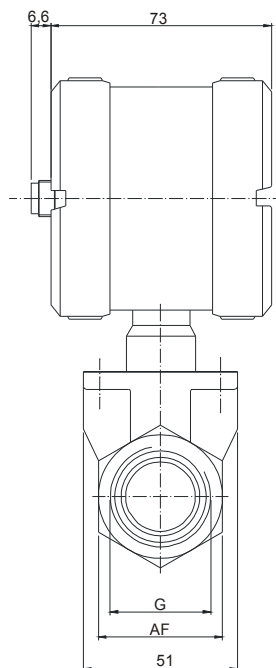
# DPE

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



G	AF	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: DPE-..Z..** (with pointer indication)



G	AF	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**

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

**Turbine-Wheel Flow Meter            Model: DPE -...**

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:

<b>2014/35/EU</b>	<b>Low Voltage Directive</b>
<b>2014/30/EU</b>	<b>EMC Directive</b>
<b>2011/65/EU</b>	<b>RoHS (category 9)</b>

For DPE-1230...

2014/68/EU

PED

- Category III (IV) Diagram 1, vessel, group 1 dangerous fluids
- Module D, marking CE0575
- Notified body: DNV GL
- Certificate No. PEDD000000R

Hofheim, 02. Aug. 2018



H. Peters  
General Manager



M. Wenzel  
Proxy Holder