

Operating Instructions
for
Turbine-Wheel Flow Meter
Model: DPE-...



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2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The instruction manuals on our website www.kobold.com are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email (info.de@kobold.com) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

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-...

4. Regulation Use

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

The Kobold flow meter model DPE is used for measuring and monitoring liquids. The device works according to 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

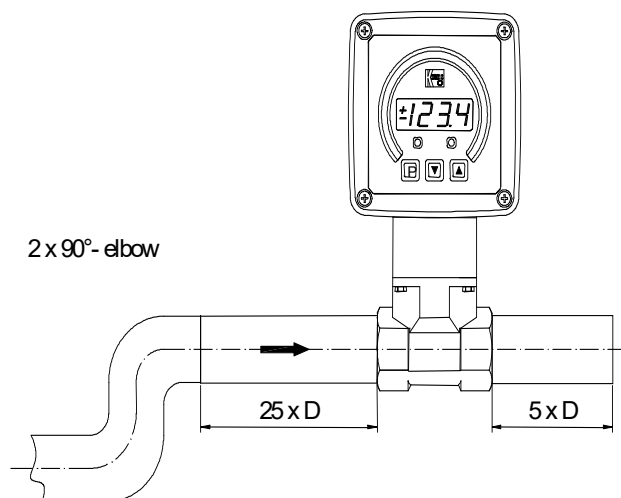
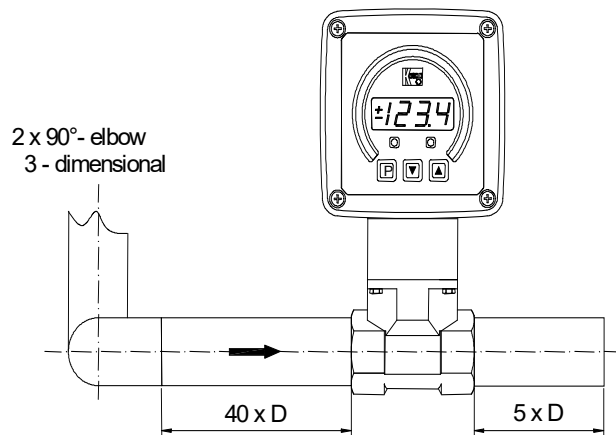
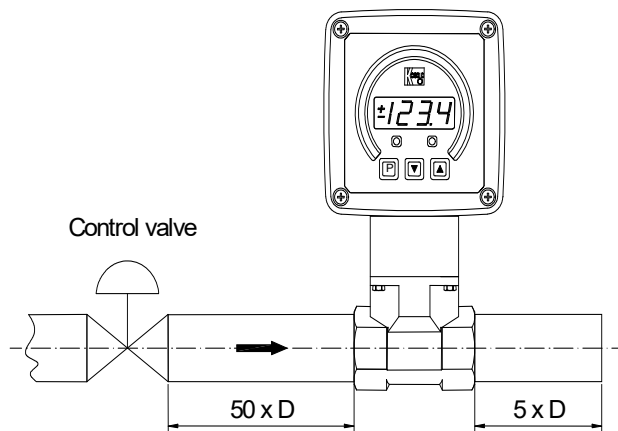
6.1. Check the installation conditions:

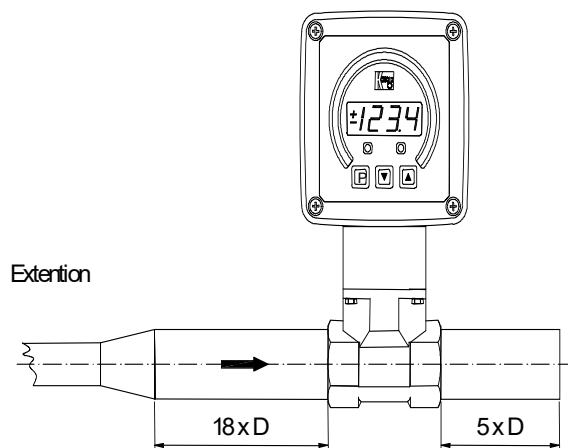
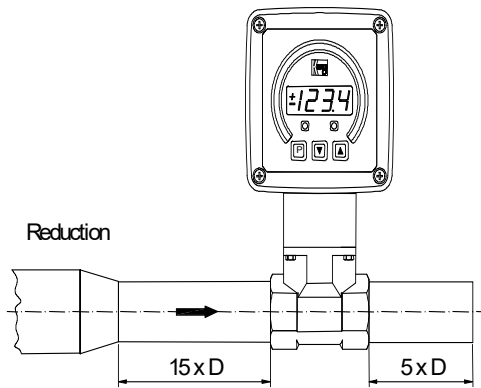
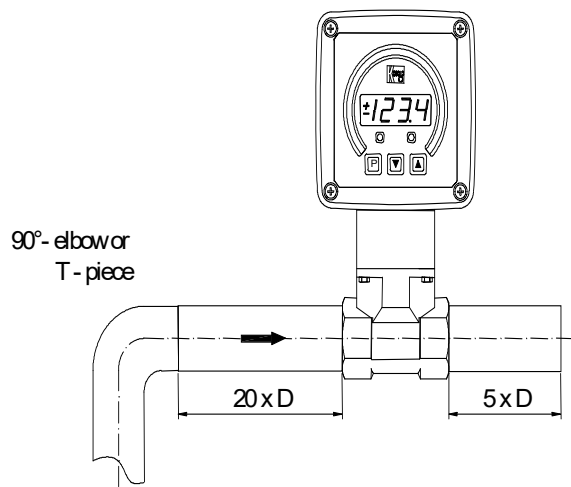
- Flow volume
- Max. operating pressures
- Max. operating temperature



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

6.2. Inlet and outlet path straight piping requirements





6.3. Installation

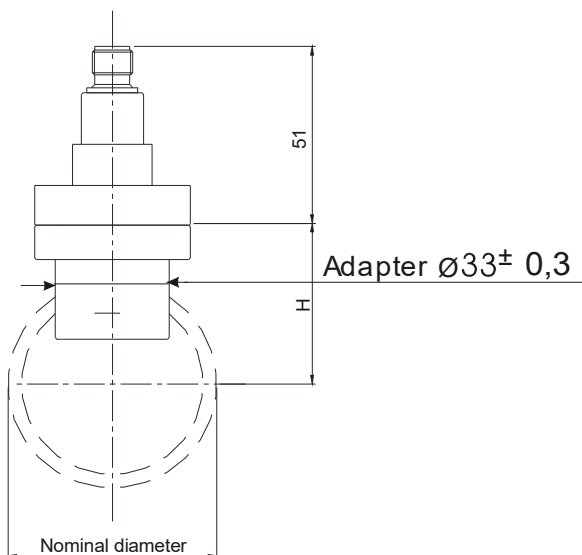
Standard installation

- 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:

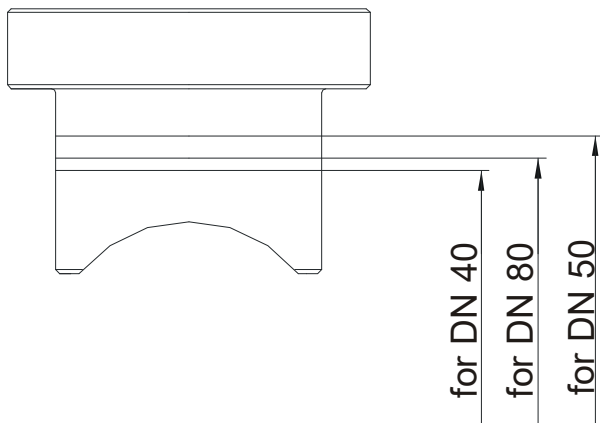
(DPE-1200W...)

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



| 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 information



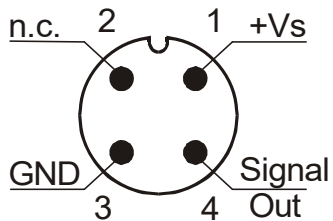
Attention! Make sure that the voltage values of your system correspond with the voltage values of the measuring unit.

- 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 mm²



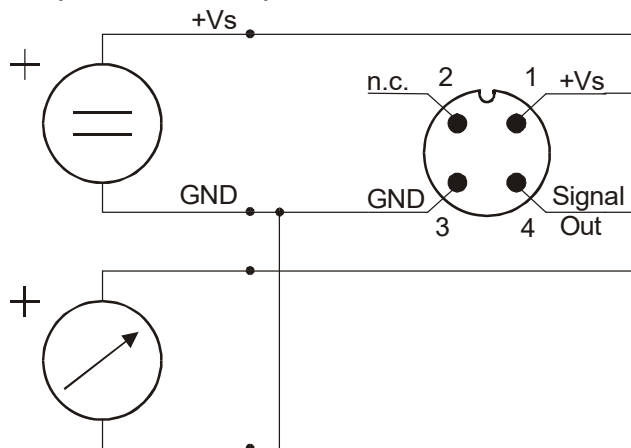
Attention! Wrong wiring will lead into damage of the unit's electronic.

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

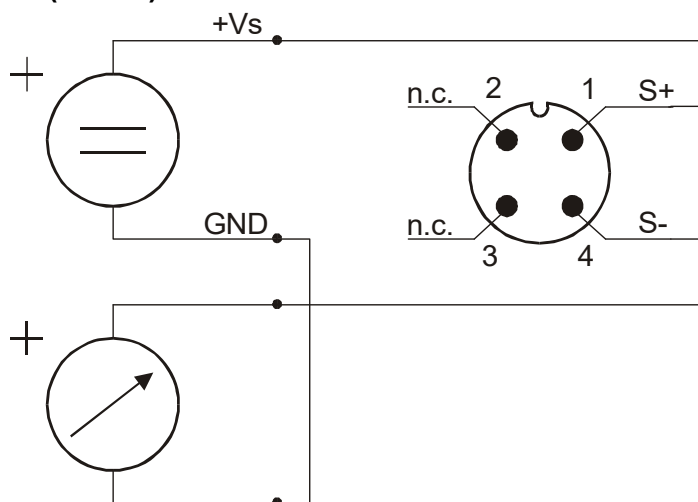


**7.3. Electronic analyzer:
Analog output (..L303, ..L342, ..L343, ..L442)**

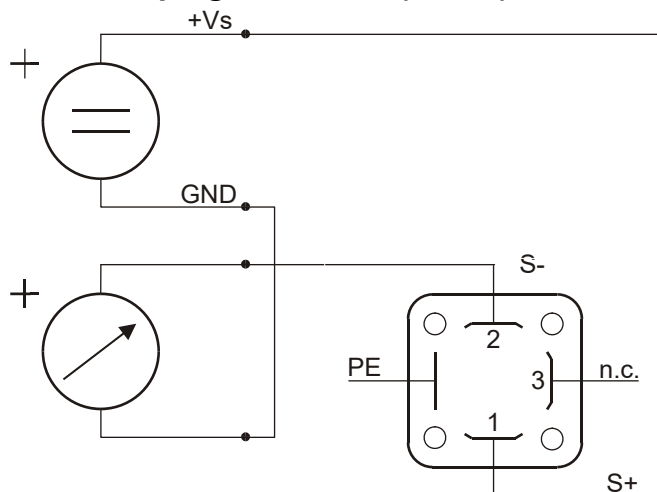
3-wire (..L303, ..L343)



2-wire (..L342)

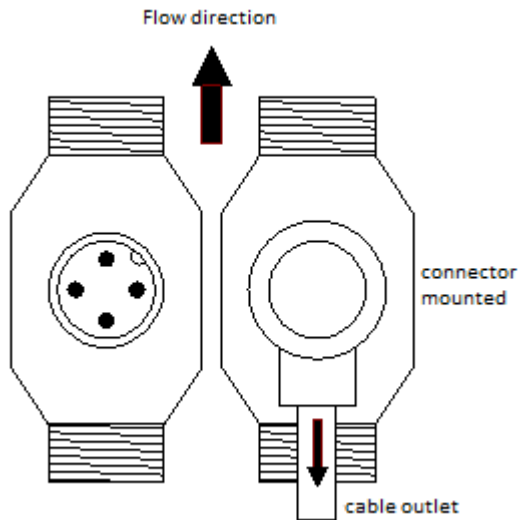


2-wire, DIN plug connector (..L442)



7.4. Cable outlet with M12x1 angle plug electronic options F3x and L3x

When using a pre-assembled M12x1 connection cable with angled plug, the cable outlet is always aligned opposite to the flow direction.



7.5. Compact electronics: (..C30R, ..C30M, ..C34P, ..C34N)

See
Operating instructions supplement for compact electronics with frequency output

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

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

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 |
| Materials: | |
| 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

Frequency output

| | |
|------------------------|---------------------------------|
| 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 connector M12x1 |
| Division ratio: | 1...1/128, factory setting |

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 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 _{DC} \pm 20%, 3-wire, about 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} |
| Two switching outputs: | relay/ changeover contacts max. 250 V _{AC} /5 A resistive load, max. 30 V _{DC} / 5 A |
| Setting: | via 4 buttons |
| Power supply: | 100...240 V _{AC} \pm 10 % or 18...30 V _{AC} /10...40 V _{DC} |
| 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 Ω |
| 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 _{DC} \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 Ω |
| 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 _{DC} \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 | | | | | |
| | 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 | | | | |
| 10-50 | 80 | 180 | DPE-1110.. | DPE-1210.. | ..G5.= G 3/4 | ..N5.= 3/4 NPT | | | | |
| 20-80 | 65 | 230 | DPE-1115.. | DPE-1215.. | ..G6.= G 1 | ..N6.= 1 NPT | | | | |
| 25-250 | 140 | 600 | DPE-1120.. | DPE-1220.. | ..G8.= G 1 1/2 | ..N8.= 1 1/2 NPT | | | | |
| 30-350 | 135 | 1000 | DPE-1125.. | DPE-1225.. | ..G9.= G 2 | ..N9.= 2 NPT | | | | |
| 50-750 | 110 | 1600 | DPE-1130.. | DPE-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 | | Connection for nominal pipe size | | Display | Power supply | Output | Contacts |
| 0-3 | 65 (at DN 25) 140 (at DN 40) 135 (at DN 50) 110 (at DN 80) | 10 | --- | DPE-1200.. | ..W6.. = DN 25 ..W8.. = DN 40 / DN 50 ..WB.. = DN 80 | K = Bar graph/ digital display | 0= 100-240 V _{AC} 3= 18-30 V _{AC} 10-40 V _{DC} | ..0= without ..4= (0)4-20 mA, 0-10 V | ..2= 2 change-over contacts | |

*Please specify flow direction in writing.

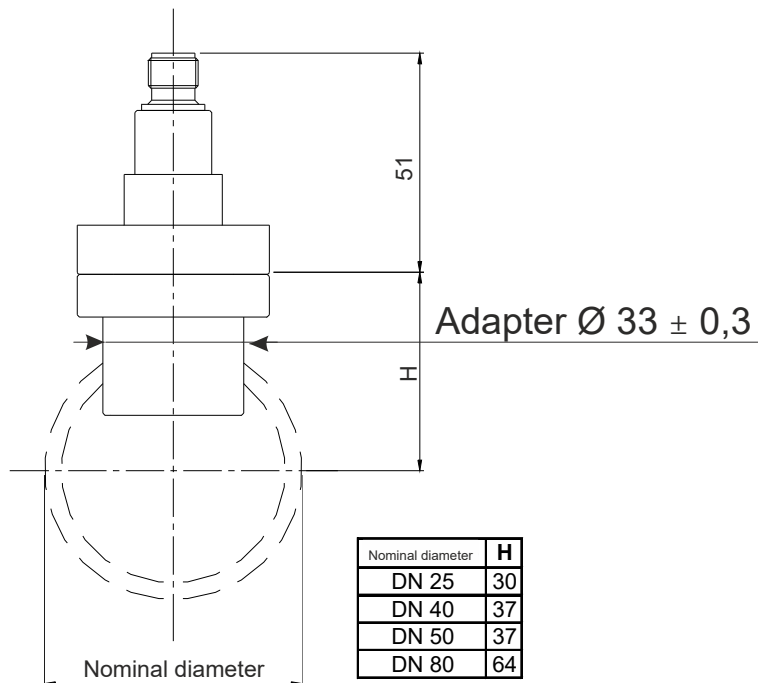
Plug-on display

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

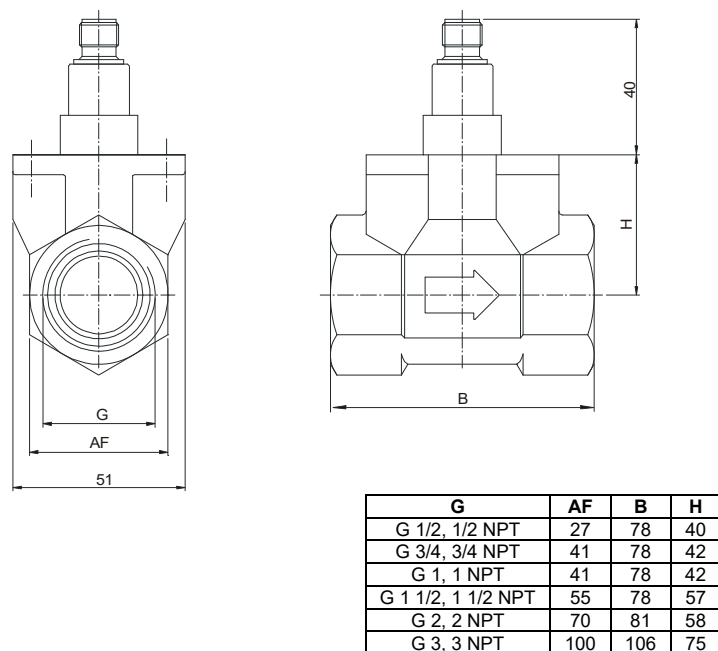
| Description | Order number |
|--|--------------|
| 4-digit LED, connector DIN 43650, 2-wire, supply through analogue output | AUF-1000 |
| as above however with additional open collector output | AUF-1001 |

12. Dimensions

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

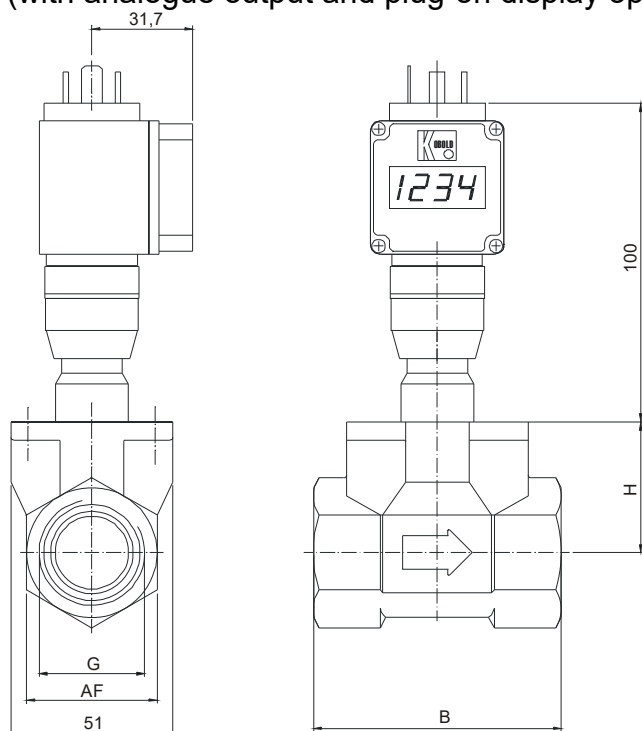


Model: DPE-..L3.. / DPE-..F.. (with analogue output)



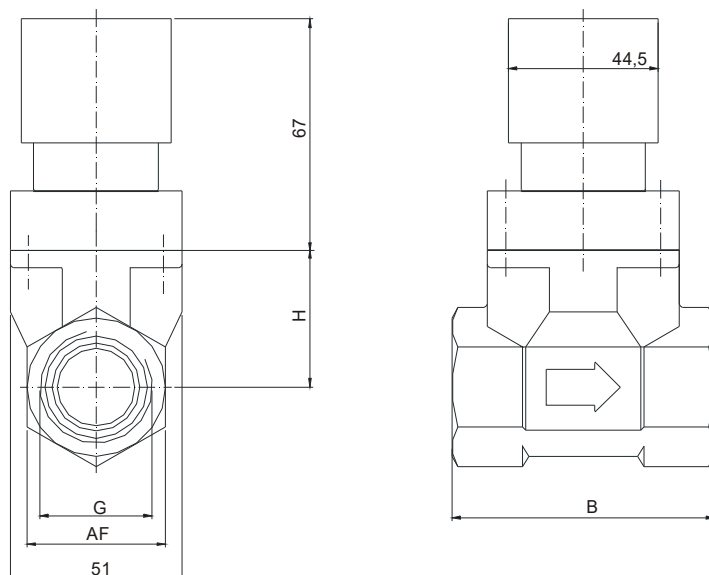
Model: DPE-..L4..

(with analogue output and plug-on display option)



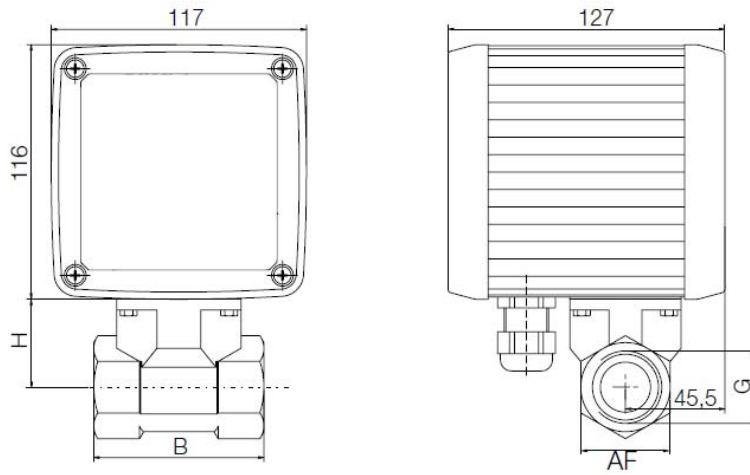
| G | AF | B | H |
|--------------------|-----|-----|----|
| G 1/2, 1/2 NPT | 27 | 78 | 40 |
| G 3/4, 3/4 NPT | 41 | 78 | 42 |
| G 1, 1 NPT | 41 | 78 | 42 |
| G 1 1/2, 1 1/2 NPT | 55 | 78 | 57 |
| G 2, 2 NPT | 70 | 81 | 58 |
| G 3, 3 NPT | 100 | 106 | 75 |

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 |

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 |

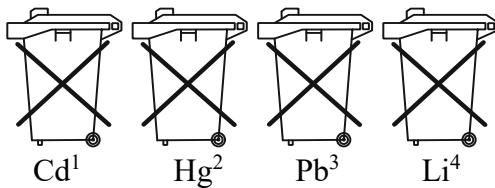
13. Disposal

Note!

- Avoid environmental damage caused by media-contaminated parts
- Dispose of the device and packaging in an environmentally friendly manner
- Comply with applicable national and international disposal regulations and environmental regulations.

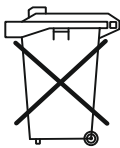
Batteries

Batteries containing pollutants are marked with a sign consisting of a crossed-out garbage can and the chemical symbol (Cd, Hg, Li or Pb) of the heavy metal that is decisive for the classification as containing pollutants:



1. „Cd" stands for cadmium
2. „Hg" stands for mercury
3. „Pb" stands for lead
4. „Li" stands for lithium

Electrical and electronic equipment



14. EU Declaration of Conformance

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 IEC 63000:2018 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:

| | |
|--------------------|---------------------------------------|
| 2014/35/EU | Low Voltage Directive |
| 2014/30/EU | EMC Directive |
| 2011/65/EU | RoHS (category 9) |
| 2015/863/EU | Delegated Directive (RoHS III) |

Additionally, for DPE-1230...

2014/68/EU

PED

- Category II, Diagram 8, piping, group 1 dangerous fluids
- Module D, marking CE0575
- Notified body: DNV GL
- Certificate No. PEDD000000R

Hofheim, 15 April 2021

H. Volz
General Manager

M. Wenzel
Proxy Holder

15. UK Declaration of Conformity

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:

BS EN 61000-6-4:2007+A1:2011

Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments

BS EN 61000-6-2:2005

Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments

BS EN 61010-1:2010

Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements

BS EN 60529:1992+A2:2013

Degrees of protection provided by enclosures (IP-Code)

BS EN IEC 63000:2018

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Also, the following UK guidelines are fulfilled:

- | | |
|-----------------------|--|
| S.I. 2016/1101 | Electrical Equipment (Safety) Regulations 2016 |
| S.I. 2016/1091 | Electromagnetic Compatibility Regulations 2016 |
| S.I. 2012/3032 | The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 |

Additionally, for DPE-1230...

S.I. 2016/1105 The Pressure Equipment (Safety) Regulations 2016

- Category II, Diagram 8, piping, group 1 dangerous fluids
- Module D, marking CE0575
- Notified body: DNV GL
- Certificate No. PEDD000000R

Hofheim, 15 April 2021



H. Volz
General Manager



M. Wenzel
Proxy Holder