

# Operating Instructions for Piston Flow Meters

**Model: DRZ**



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## **2. Note**

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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.

When used in machines, the measuring unit should be used only when the machines fulfil the EWG-machine guidelines.

### **as per PED 97/23/EG**

In acc. with Article 3 Paragraph (3), "Sound Engineering Practice", of the PED 97/23/EC no CE mark.

Diagram 8, Pipe, Group 1 dangerous fluids

## **3. Instrument Inspection**

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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:

- Piston Flow Meters            model: DRZ
- Operating Instructions

## **4. Regulation Use**

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Any use of the Piston Flow Meters, model: DRZ, which exceeds the manufacturers specification may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

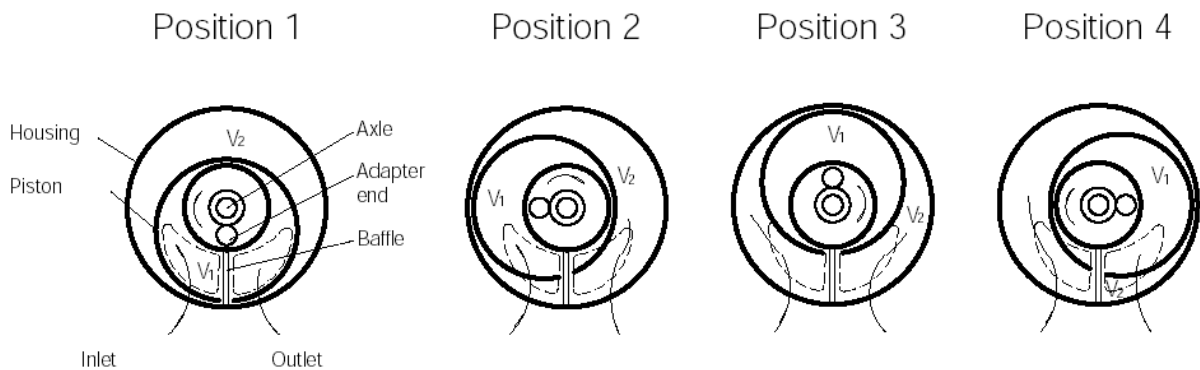
## 5. Operating Principle

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KOBOLD Piston Flow Meters are direct volume counters, also called displacement counter (positive displacement meter).

Its function is based on continuous limitation of a definite part-volume of the flow in a measuring cell through continuous filling and emptying of this measuring cell. The measuring cell consists of the measuring chamber and the moving part, the piston.

The piston is driven by the pressure difference between inlet and outlet of the measured media. The counter is a pure mechanical instrument. The revolution is carried forward via a magnet and a magnet field sensor. In cross section the u-formed piston is guided with its piston and guiding-adapter in a ring chamber at the bottom and top of the measuring-body and with its slot at the baffle. The inlet and outlet openings are located on both sides of the chamber's wall. They are constantly sealed by the piston and the baffle. The incoming measured media fills up the sickle shaped spaces, it wants to increase these spaces and therefore turns the piston. Until one after the other the volumes  $V_1$  and  $V_2$  are reached. While moving ahead, these filled spaces are connected with the outlet and are emptied. Since both sickle shaped spaces - the inner and the outer - are displaced to one another, the piston movement will not have a dead centre. The piston moves continuously depending to the measured flow.



One complete turn of the piston adapter end is equal to the flow of the measuring chamber content ( $V_1+V_2$ ). With the help of a located magnet and a Hall-type sensor, it is possible to create a digital signal, which can be evaluated.

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## 6. Mechanical Connection

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### Before installation:

- Remove all packing materials, transport retainers and ensure that no such materials remain in the device.
- Make sure that the maximum operating pressure and temperature of the device are not exceeded.
- Please ascertain, that the pipe system is free of any welding bead, ferrite particles or other pollution.
- Make sure that the application flow amount corresponds with the flow range of the instruments.

### Installation

- The mounting position of the piston is free of choice. The flow direction must be in the direction as indicated by the arrow.
- In- and outlet flow sections are not necessary.
- The sealing of the connection threads is done with sealing tape or something similar.
- During installation, please pay attention that the DRZ-instrument is not exposed to mechanical stress or tension. We recommend to mechanically fasten the connection pipes approximately 50 mm away from the connection thread.
- If possible, after completing the mechanical installation, check the thread connection between the device and the piping for leakage immediately.

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## 7. Electrical Connection

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### 7.1 General

- Make sure that the supply wires are de-energised.
- Connect the power supply and the evaluation of the output signal to the pins of the plug described as follows.



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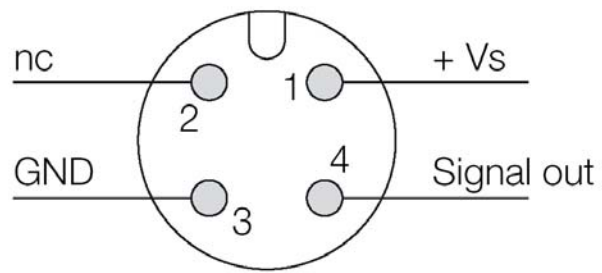
**Warning! Incorrect wiring of the connections in the coupling plug can lead to the electronics being destroyed. Make sure that the voltage values of your installation correspond with the voltage values of the measuring instrument.**

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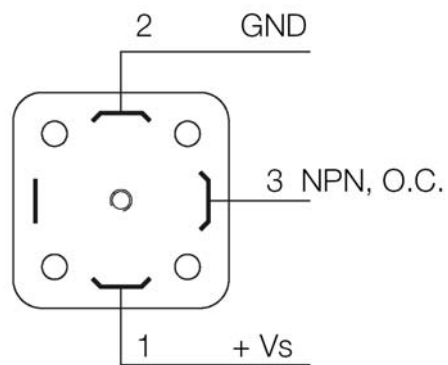
# DRZ

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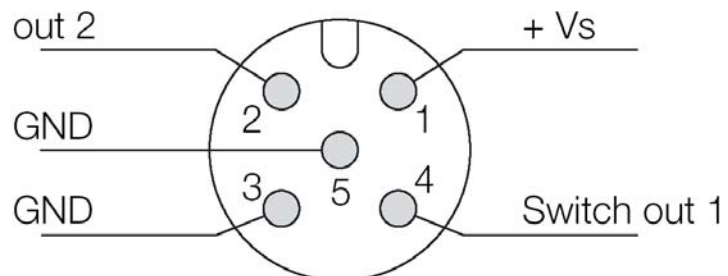
DRZ-..F3..; DRZ-..L3..



DRZ-..0000



DRZ-..C3..



## 8. Technical Information

Measuring range:	6-420 L/h
Max. flow rate:	600 L/h
Measuring accuracy:	± 1.0% of reading ± 2.5% of reading
Repeatability:	± 0.2%
Standard viscosity range:	5-100 mm <sup>2</sup> /s
Process temperature:	max. 80 °C
Ambient temperature:	-10 to +60 °C
Max. pressure:	40 bar
Max. pressure loss:	1.5 bar
Connection:	Female thread G 1/8; G 1/4; 1/8 NPT; 1/4 NPT
Mounting position:	independent
Recom. filter fineness:	100 µm
Protection type:	IP 65
Weight:	approx. 0.7 kg (DRZ-..F.., DRZ-..L..) approx. 1.0 kg (DRZ-..C..)

### Materials:

Housing:	Brass
Piston:	Aluminium
Magnet holder:	POM
Magnet:	Permanent magnet
O-ring/Seal:	FPM

### Electronics

#### OEM frequency output (...0000) (without CE)

Power supply:	5-24 VDC
Supply current:	10 mA
Pulse output:	NPN, open collector, max. 15 mA
Impulse rate:	405 pulses/litre
Electr. connection:	Plug connector DIN 43650
Option:	Plug-on display AUF-4000 with 4 -20 mA output

#### Frequency output (...F300)

Power supply:	12-28 V <sub>DC</sub>
Supply current:	10 mA
Pulse output:	PNP, open collector, max. 25 mA
Impulse rate:	432 pulses/litre
Electr. connection:	Plug connector M12x1

## Frequency output with frequency divider (...F3X0)

Power supply: 24 VDC  $\pm$  20%  
 Supply current: 15 mA  
 Pulse output: PNP, open collector,  
 max. 25 mA  
 Electr. connection: Plug connector M12x1  
 Division factor: 1:2, 1:4 or customer request

## Analogue output (...L303; ...L343)

Power supply: 24 V<sub>DC</sub>  $\pm$ 20%  
 Output: 4-20 mA, 0-20 mA, 3-wire  
 Max. load: 500  $\Omega$   
 Electr. connection: Plug connector M12x1

## Compact electronics (..C3..)

Display: 3-segment LED  
 Analogue output: (0)4...20 mA adjustable, max. 500  $\Omega$   
 Switching output: 1 (2) semiconductor PNP  
 or NPN, factory setting  
 Contact function: N/C or N/O programmable  
 Setting: via 2 buttons  
 Power supply: 24 V<sub>DC</sub>  $\pm$ 20%,  
 3-wire technology  
 Electr. connection: Plug connector M12x1

## 9. Order Codes

**Example: DRZ-1110 G1 F300**

Version	Model	Connection	Evaluating electronics
Brass housing 6 - 420 L/h oil	<b>DRZ-1110</b>	<b>G1</b> = G 1/8 IG <b>G2</b> = G 1/4 IG <b>N1</b> = 1/8 NPT <b>N2</b> = 1/4 NPT	<b>OEM frequency output, no CE</b> <b>0000</b> = DIN plug connector 43650, NPN  <b>Frequency output</b> <b>F300</b> = plug connector M12x1, PNP <b>F320</b> = plug connector M12x1, PNP, divider 1:2 <b>F340</b> = plug connector M12x1, PNP, divider 1:4 <b>F390</b> = plug connector M12x1, PNP, divider adjustable  <b>Analogue output</b> <b>L303</b> = plug connector M12x1, 0 - 20 mA, 3-wire <b>L343</b> = plug connector M12x1, 4 - 20 mA, 3-wire  <b>Compact electronics</b> <sup>1)</sup> <b>C30M</b> = LED display, 2x NPN switch. output, plug con. M12x1 <b>C30R</b> = LED display, 2x PNP switch. output, plug con. M12x1 <b>C34N</b> = LED display, 4 - 20 mA, 1x NPN switching output, plug connector M12x1 <b>C34P</b> = LED display, 4 - 20 mA, 1x PNP switching output, plug connector M12x1



<sup>1)</sup> Please specify flow direction in wiring.

## Plug-on display

for model DRZ...0000 (OEM version, NPN- and DIN connector)

Description	Order No.
4-digit LED, Plug connector DIN 43 650 Input: pulses of DRZ Output: 4 - 20 mA, 3-wire Load: max. 250 Ω	<b>AUF-4000</b>

## Accessories

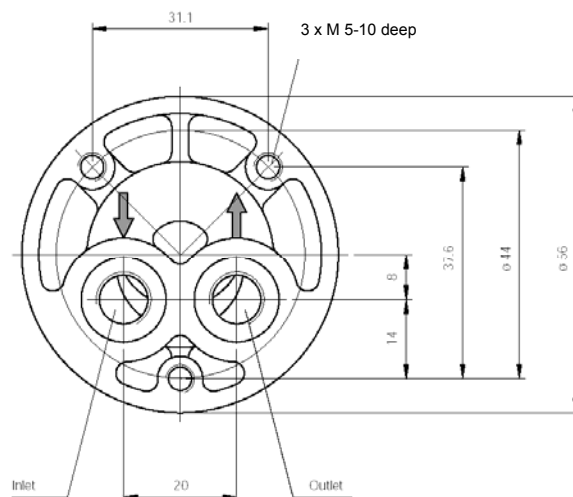
Round plug

Model	Description
ZUB-KAB-12D500	Round plug M12 x 1 socket with screw clamps, 5 pins
ZUB-KAB-12K002	Round plug M12 x 1 socket with 2 m cable, 4 pins
ZUB-KAB-12K005	Round plug M12 x 1 socket with 5 m cable, 4 pins
ZUB-KAB-12Q000	Round plug M12 x 1 socket with Quick-on, 4 pins

## 10. Dimensions

### Dimensions

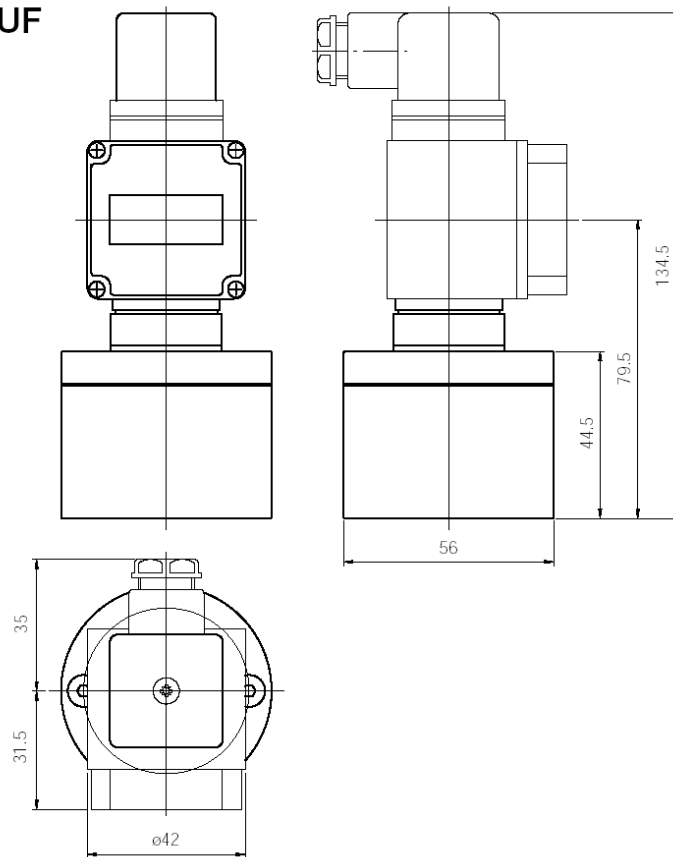
Mechanical connection



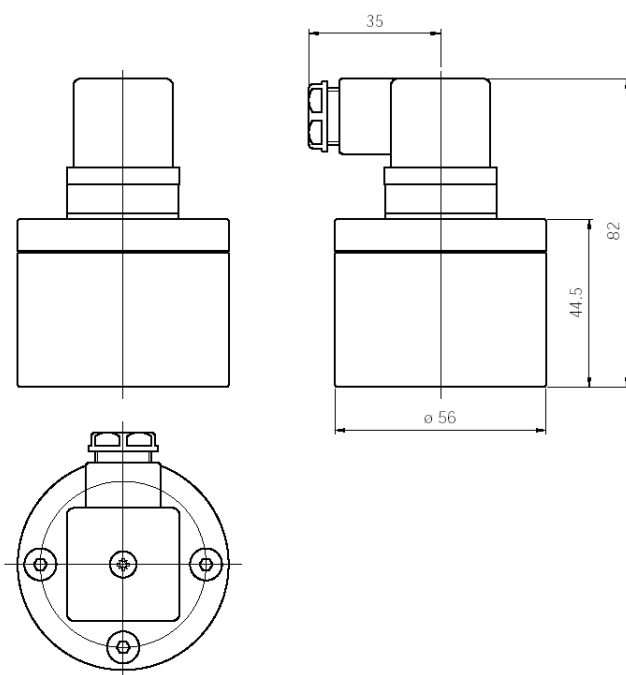
### Process connection

G 1/8  
G 1/4  
1/8 NPT  
1/4 NPT

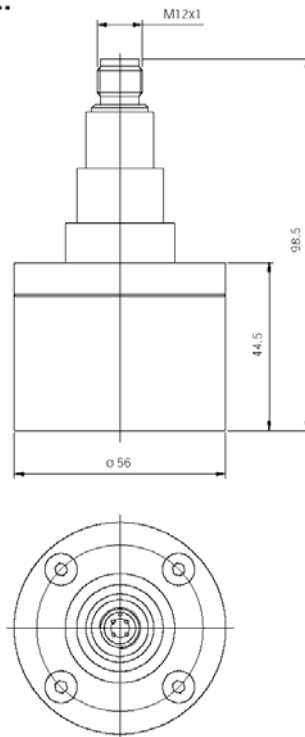
DRZ-...0000 with AUF



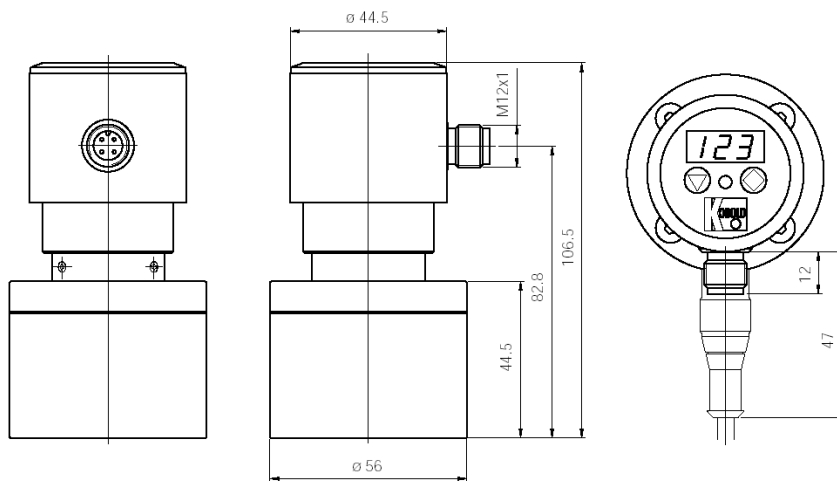
DRZ-...0000



DRZ-..F3..; DRZ-..L3..

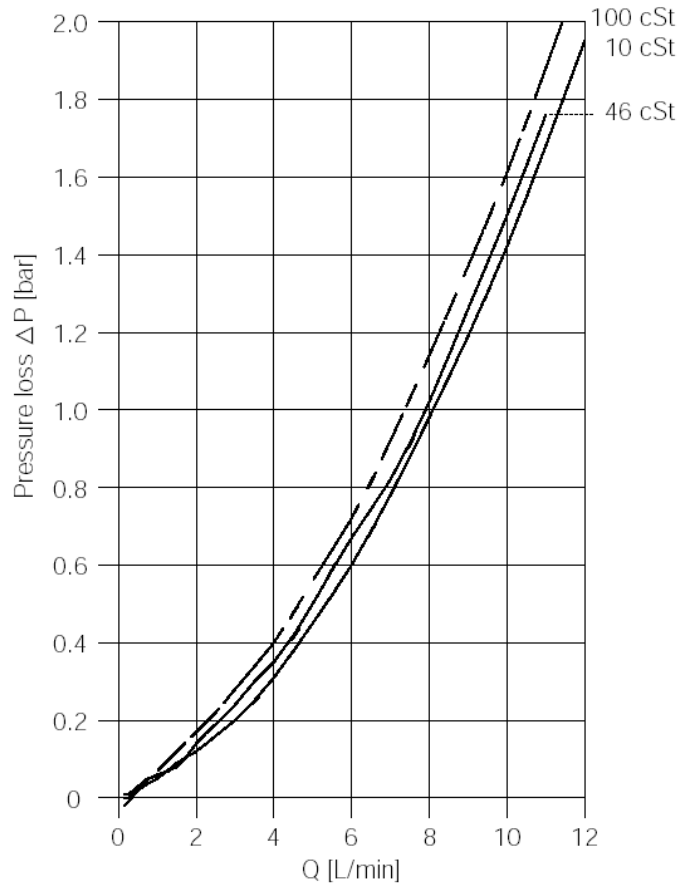


DRZ-...C3



## 11. Pressure Loss Diagram

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## **12. Declaration of Conformance**

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

**Piston Flow Meters                      Model: DRZ**

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

**DIN EN 50081-2            1994-03**  
**DIN EN 50082-2            1996-02**  
**DIN EN 61010-1            1994-03**  
**EN 60529, DIN VDE 0470-1    1992-11**

Also the following EWG guidelines are fulfilled:

**2004/108/EC                      EMC Directive**  
**2006/95/EC                      Low Voltage Directive**

**97/23/EG**

Category II, Table 8, pipe, Group 1 dangerous fluids  
D 1 dangerous fluids  
Module, mark CE0098  
notified body: Germanischer Lloyd

Hofheim, 16. Jan. 2007



H. Peters  
General Manager



M. Wenzel  
Proxy Holder