

Operating Instructions
for
Oscillation Flowmeter
for dry and wet gases
Model: DOG-...

Sensor and Electronic Options A/B...O/P



DOG-4



DOG-6



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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.

as per machine-guidelines 2006/42/EC

When used in machines, the DOG-4 should be used only when the machines fulfil the EC-machine guidelines.

as per PED 2014/68/EU piping

Model DOG	DN	P _{max} [bar]	Diagram 6 Group 1 Dangerous fluids	Diagram 7 Group 2 Not dangerous fluids
DOG-	25	25	I	Art. 4, § 3
DOG-	40	25	II	II
DOG-	50	25	II	II
DOG-	80	25	II	II
DOG-	100	25	II	II
DOG-	150	16	II	II
DOG-	200	16	II	II

Funded by the Federal Ministry of Economics and Technology based on a decision of the German Bundestag.

3. Information on operating the device in potentially explosive environments (Ex, A0/D0/F0/H0/K0/N0/P0 option)

The devices can be used in the following way:

1. Sensor DOG-...: In zones 0, 1 and 2 (gas Ex, category 1G, 2G, 3G) in explosion groups IIA, IIB and IIC

2. Transmitter DOG-...: Outside the EX-area

Here the following ambient temperatures must be adhered to

$-20\text{ °C} \leq T_a \leq 60\text{ °C}$

The DOG-... is suitable for use with gases of the explosion group IIC and temperature class $\geq T4$.

Further important details can be found in the EC Type Examination Certificate.

3.1 General requirements

In the event of failure to comply with this information or unauthorized tampering with the device, the manufacturer's liability will no longer apply. Moreover, the guarantee for the device and accessory parts will become void.

- Comply with the information in these operating instructions and adhere to the conditions of use and permissible data printed on each device / type plates.
- Follow the generally accepted rules of technology when selecting and operating a device.
- Take appropriate measures to prevent unintentional activation or inadmissible impairments.
- The devices may be used only in the correct way and for the intended purpose in a normal industrial environment. Use for unsuitable purposes, will render all guarantees and liability of the manufacturer void!
- Ensure that only devices with ignition protection suitable for the operating zones are installed.
- All electronic operating resources connected must be suitable for the respective use.
- The operator is obligated to provide lightning protection according to local regulations.

3.2 Startup, installation

The devices are intended for installation in a higher-level system. The intervals for cleaning the operating resources (dust deposits) are specified depending on the degree of IP protection. It is extremely important to ensure that only devices with suitable ignition protection for the zones/categories are installed! It is essential that the installation regulations applicable at the national level, e.g. EN 60079-14, are adhered to during installation. Other important factors:

- In the event of adverse environmental conditions, it is necessary to ensure that the devices are accordingly protected.
- Follow the operating instructions for the respective device and adhere to any special conditions described there.
- The device may only be used for the purpose for which it was intended.
- It is essential to avoid electrostatic charges.
- Any possible metal parts in the device/lines (e.g. shielding) must be incorporated in the potential equalization PA in compliance with the user's country regulations.
- Parts that have jammed (e.g. as the result of frost or corrosion) may not be loosened by force in hazardous atmospheres.
- Operate the device only in the completely assembled state and enclosed in undamaged housing. Operating with a damaged housing is prohibited.
- At ambient temperatures of less than -5°C the connecting lines must be securely laid.
- Do not allow the outside of the device to come into contact with strongly corrosive media.
- Do not subject the system to excessive vibrations, bending or torsion.
- The devices may not – or only with the manufacturer's permission, and then only using special measures – be used in systems with electric corrosion protection. Parasitic currents must not be fed in via the shielding.
- Installations in Ex areas may be carried out only in compliance with the local installation regulations.
- Installation and maintenance only in ex-free atmospheres in compliance with the user's national regulations.

Additional precautionary measures must be taken if there is a possibility that hydrogen sulfide, ethylene oxide and/or carbon monoxide could be present. These compounds have very low ignition power!

Only non-arcing tools may be used for these compounds as well as all compounds included in explosion group IIC – if explosive atmospheres are still to be expected!

3.3 Application

The devices may be used only in the correct way and for the intended purpose in a normal industrial environment. Use for unsuitable purposes, will render all guarantees and liability of the manufacturer void!

See Chapter 4, 5, 7 and 9.

3.4 Repair, maintenance (for applications in Ex areas)

Definition of terms as defined in IEC 60079-17:

Repair and maintenance: A combination of all activities carried out to maintain an item or restore the object to a state in which it is able to meet the requirements of the relevant specification and ensure the execution of its required functions.

Inspection: An activity comprising the careful examination of an item carried out either without demounting or, if necessary, with partial demounting through such steps as measurement in order to reliably determines the condition of the item.

Visual inspection: An inspection in which visible faults, e.g. missing bolts, are detected without the use of equipment or tools.

Close inspection An inspection which comprises the aspects of a visual inspection in addition to identifying defects, e.g. loose bolts, apparent only by access with the use of equipment, e.g. steps (when necessary) and tools. Close inspections do not normally require an open enclosure or the de-energizing of the equipment.

Detailed inspection An inspection which encompasses those aspects covered by a close inspection and, in addition, identifies those defects, e.g. loose connections which are only be apparent by opening the enclosure and/or using tools and test equipment where necessary.

- Maintenance work may be performed only by qualified personnel with the equivalent of or qualification according to TRBS 1203 (German Technical Rules for Industrial Safety).
- Only accessory parts which fulfill all European regulations and national laws may be used in hazardous areas.
- The replacement of components may only take place using original spare parts approved for use in Ex areas as well.
- The devices in Ex areas must be cleaned regularly. The intervals must be specified by the operator according to the environmental load.
- After maintenance and/or repair, replace all barriers and notices removed in the process in their original positions.
- Uninstall the device if any faults are detected. The customer may not repair internal parts. Send the device to the manufacturer for inspection.

Task	Visual inspection monthly	Check every 6 months	Detailed inspection every 12 months
Visual inspection of the device for integrity, remove dust residues	•		•
Inspection of the entire system	Responsibility of the operator		

3.1 Disposal

Disposal of the packaging and the used parts must be carried out according to the regulations of the country in which the device is installed.

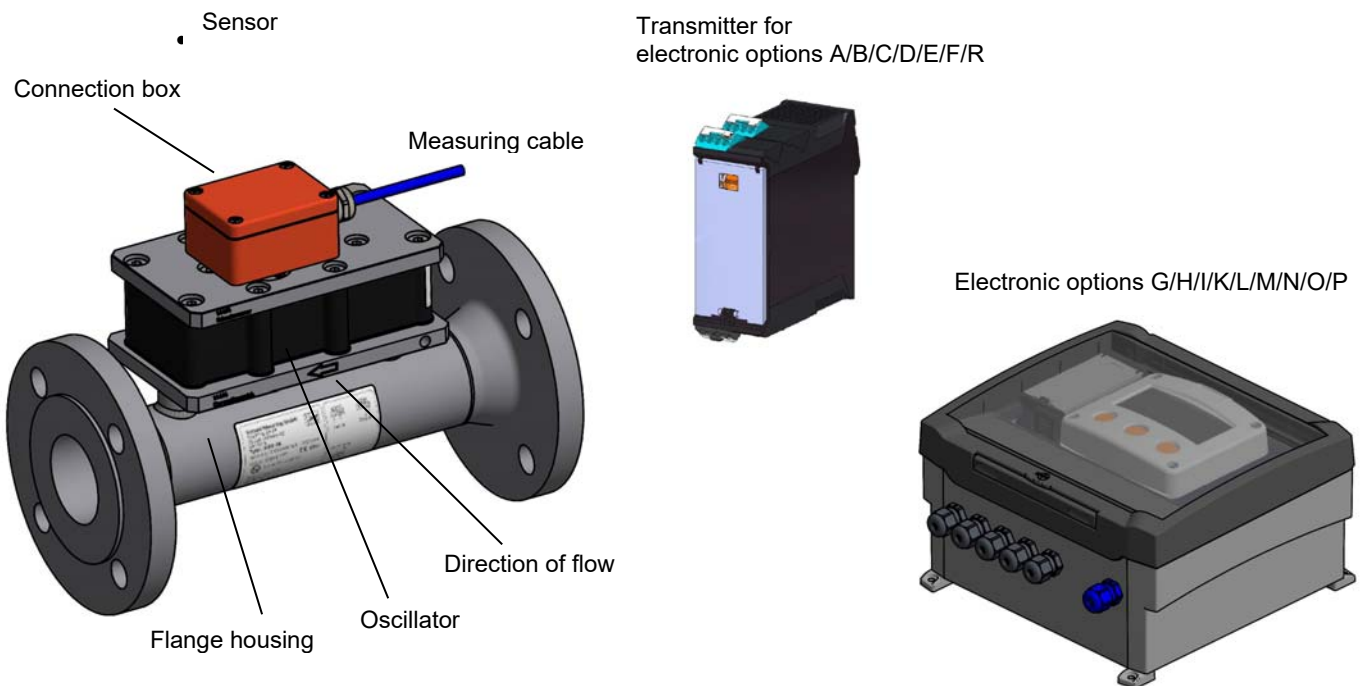
4. Instrument Inspection

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:

- Sensor DOG-... including flange housing, measuring head, thermal wire sensor and connection box.
- Measuring cable from the sensor to the measuring converter (optional).
- Transmitter DOG-... possibly with electronic options G/H/I/K/L/M/N/O/P

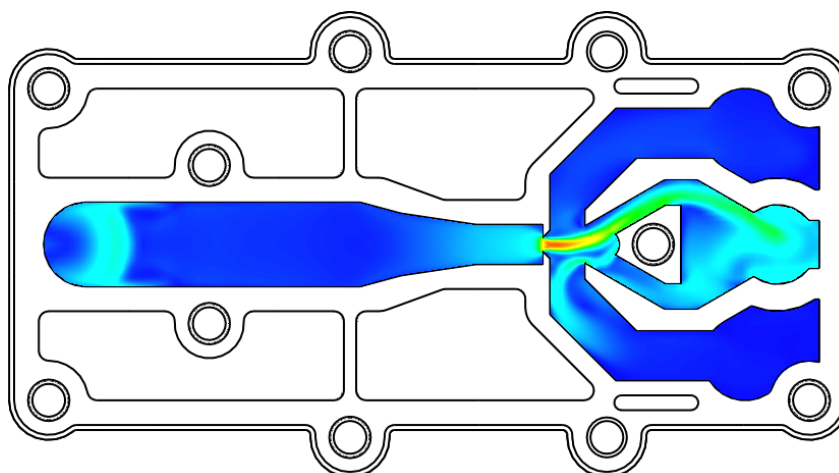


5. Regulation Use

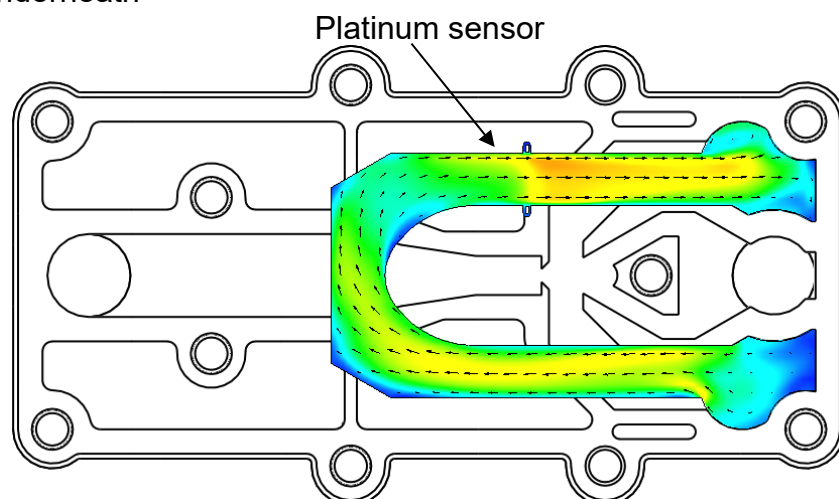
DOG-4/-6 type devices are used for measuring and monitoring the rate of flow. Only clean media may be measured, against which the materials used are resistant. Dirt particles and other impurities can impair the measurement results, in spite of the fact that the continuous change in direction of the flow ensures a self-cleaning effect. The sensor may be used only with the corresponding transducer.

6. Operating Principle

This device is an oscillating beam device and works without any movable parts. An orifice plate in the base creates flow resistance, which forces a partial flow to be directed into the oscillator. The gas in the oscillator begins to oscillate. The frequency of oscillation is proportional to the flow of volume. As the ratio between the flow through the oscillator and the flow through the measuring housing is constant, the frequency of oscillation is directly proportional to the entire flow of volume through the device. A platinum sensor determines the oscillation in the measuring head. The transmitter normalises the measured oscillation to 0 Hz (without flow) and to 150 Hz for the end of the measuring range.



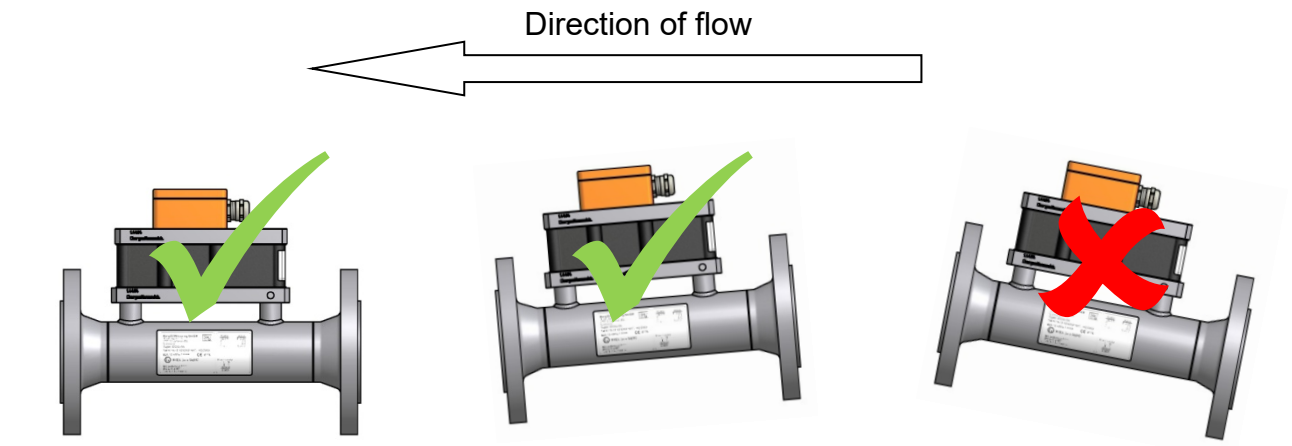
View from underneath



View from above

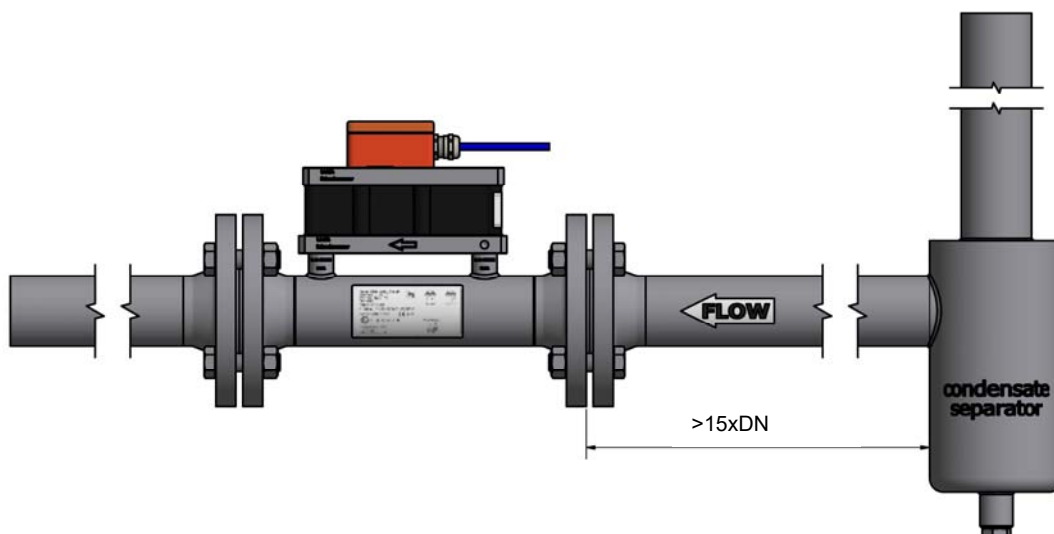
7. Mechanical Connection

The measuring sensor should be installed in a horizontal position with the oscillator facing upwards. A slight inclination in the direction of flow is permitted. The arrow on the flange housing must point in the direction of flow. The recommended minimum inlet path is 10 times the diameter of the pipe and the maximum outflow zone 5 times the diameter of the pipe. To prevent any possible rotational flow, it is recommended that a flow straightener be fitted upstream of the sensor. For damp media, slightly inclined installation in the direction of flow is recommended in order to ensure the removal of condensate from the oscillator.



It is also recommended to install a condensate separator, preferably in a vertical pipe in front of the flow meter (see figure below). The condensate can thus be removed before entering the flow meter.

Should the temperature difference between ambient and medium be $+20\text{ }^{\circ}\text{C}$ or greater, the pipeline and the flow meter should be thermally insulated to prevent condensation.



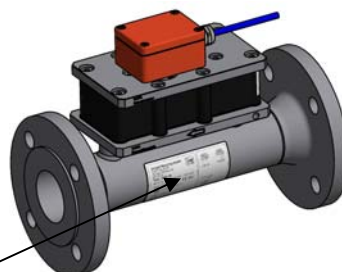
8. Identification (Ex version)

Type plate sensor DOG-...
(flange housing, measurement tube)

Kobold Messring GmbH
Nordring 22-24
65719 Hofheim / Ts.
Germany



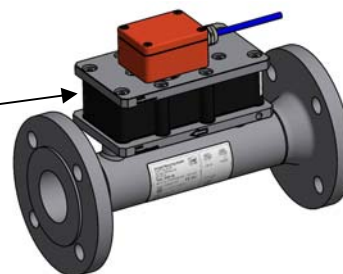
Type: Sensor **DOG-XXXXXX**
Serial no.: XXXXXX YofC.: XX/20XX
BVS 13 ATEX E020 X IECEx BVS 13 0035X
Ex II 1G Ex ia IIC T4 Ga
CE 0575 0158 Medium T = -20...+60 °C
-20°C ≤ Ta ≤ +60°C Pmax = xx bar
Nur zur Anschaltung an Transmitter DOG-
Only for connection to transmitter DOG-



There is a warning label on the plastic housing “WARNING – DANGER OF ELECTROSTATIC DISCHARGE – SEE OPERATING INSTRUCTIONS”




WARNUNG – GEFAHR DURCH ELEKTROSTATISCHE
ENTLADUNGEN – SIEHE BETRIEBSANLEITUNG
WARNING – POTENTIAL ELECTROSTATIC
CHARGING HAZARD – SEE INSTRUCTIONS
DANGER – POSSIBILITÉ DE CHARGE
ÉLECTROSTATIQUE – VOIR LES INSTRUCTIONS



Type plate transmitter DOG-...
(see left)

Kobold Messring GmbH
Nordring 22-24
65719 Hofheim / Ts.
Germany



Type: Transmitter **DOG-XXXXXX**
Serial no.: XXXXXX YofC.: XX/20XX
BVS13 ATEX E020 X IECEx BVS130035X
Ex II (1) G [Ex ia Ga] IIC
CE 0158
-20°C ≤ Ta ≤ +60°C
Un = 230 VAC

(blue)
Sensor
1 2 3 4
+ -

(orange)
Output
1 2 3 4
E C

(black)
230VAC
1 2 3 4
L N



9. Electrical connections

9.1 General

- Install the measuring sensor near the transducer (max. 100 m cable length, depending on the electrical interference zone).
- The measuring cable must be laid well away from strong sources of electrical interference and not parallel to power cables.
- The measuring cable of several DOG-... must not be laid over long distances next to one another or bundled together.
- The electronics of the DOG-... must be installed outside of the Ex-zone.
- Lay the electrical cabling according to the following wiring diagram.
- Each transducer is matched specifically to the respective measuring sensor and must not be swapped over.
- The pipelines and the flange housing must be grounded.

9.2 Measuring cable in Ex areas

An Ölflex EP (without shield) or Ölflex EBCY (with shield) may be used as measuring cable between the sensor and transmitter. Alternatively, a cable with comparable properties may be used.

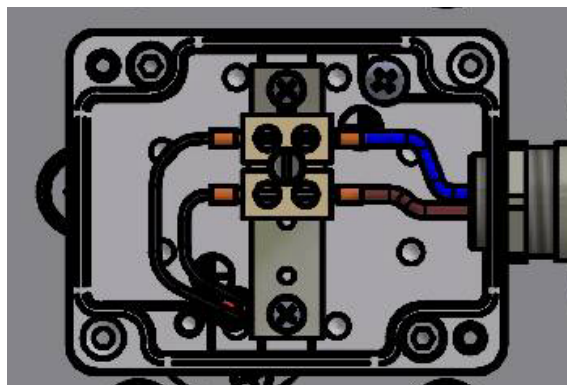
Ölflex EB $Li=0.65 \text{ mH/km}$ $Cisy=110 \text{ nF/km}$

Ölflex EBCY $Li=0.65 \text{ mH/km}$ $Cisy=135 \text{ nF/km}$ $Ciasy=185 \text{ NF/km}$

The length of the cable may not exceed 100 m. The maximum permitted cable inductance is $L_{imax}=65 \mu\text{H}$ and the maximum capacitance $C_{imax}=32 \text{ nF}$.

9.3 Connection to the measuring sensor

To connect the measuring cable, first unscrew the lid of the connection box and remove the lid. Feed the cable through the cable gland and connect it to the connecting terminal (independent of polarity). When using a shielded cable, the shield must be connected to the grounding screw.



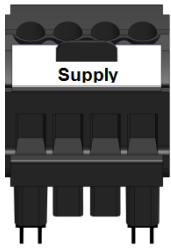
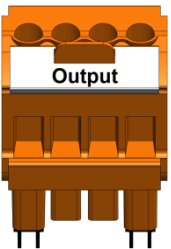
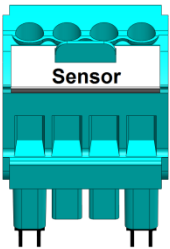
9.4 Terminal assignment of the DOG-... A/B/C/D/E/R... reader/transducer



230 V_{AC}
110 V_{AC}
24 V_{AC}
24 V_{DC}

Output

Sensor

 <p>Supply</p>				 <p>Output</p>				 <p>Sensor</p>			
Supply				Output				Sensor			
black				orange				blue			
1	2	3	4	1	2	3	4	1	2	3	4
	L		N			E	C	+		-	
	+		-								

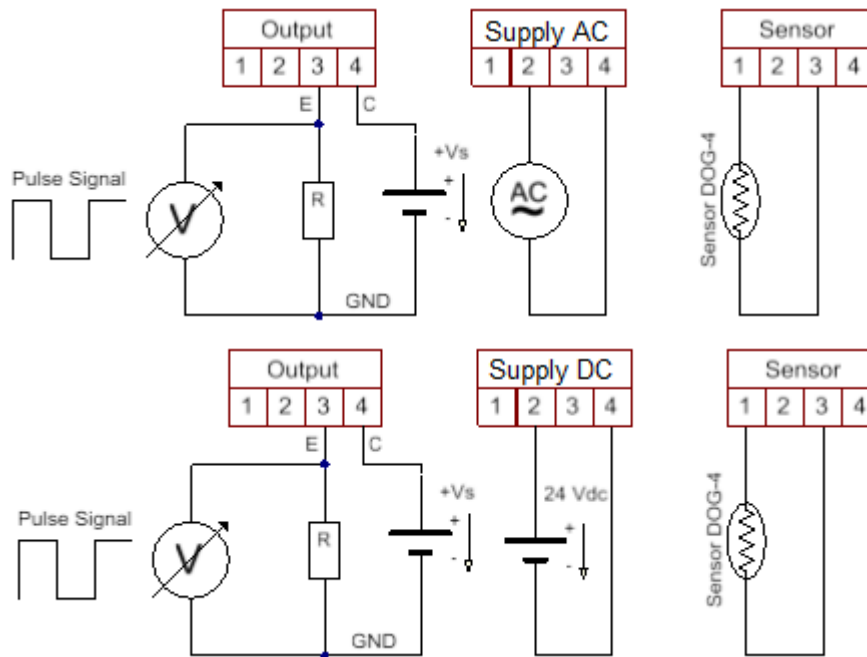
for AC
for DC

L = 230 V/110 V/24 V outer conductor
N = 230 V/110 V/24 V neutral conductor

+ = supply DC+
- = supply DC-

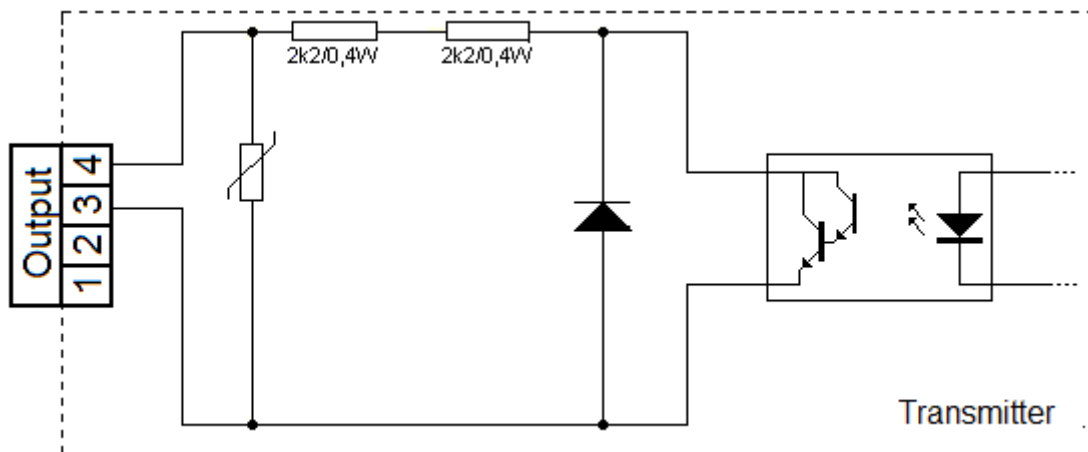
E = emitter optical coupler
C = collector optical coupler

I- = sensor conductor
I+ = sensor conductor



$$U_{HIGH} = \frac{R}{R+4.4\text{ k}\Omega} ; U_{LOW} < 0.5\text{ V}$$

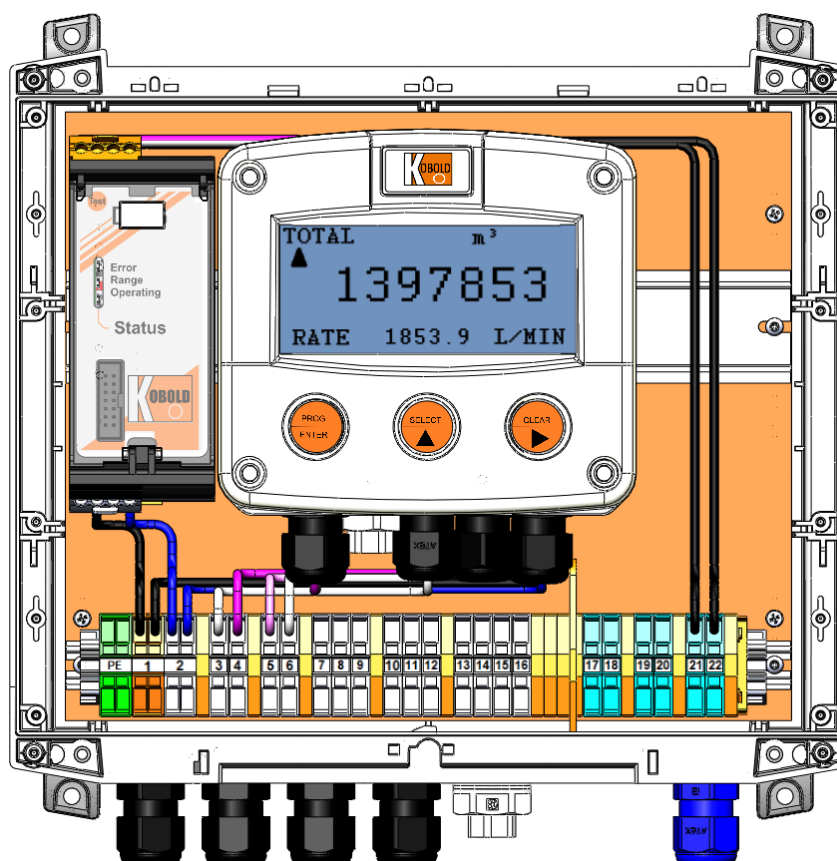
Example: $V_s = 24\text{ V}_{DC}$: $U_{HIGH}=17\text{ V}_{DC}@R=10\text{ k}\Omega$, $U_{HIGH}=23\text{ V}_{DC}@R=80\text{ k}\Omega$,



Optical coupler output, external supply max. 30 V_{DC}, I_{max} = 50 mA

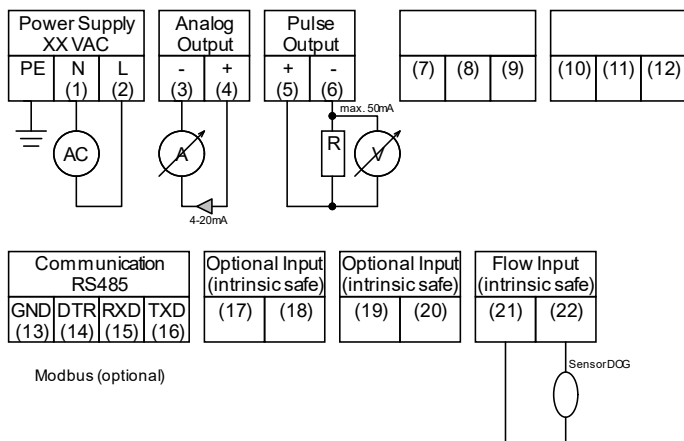
9.5 Terminal assignment of the electronic option G0/H0/I0/K0/L0/M0/N0/O0/P0

With the electronic option G0/H0/L0/M0/N0, the transmitter is located together with the flow controller/flow computer prewired in the plastic wall housing. The connection terminal strip is located underneath the terminal cover. This must be removed for the electrical connection.

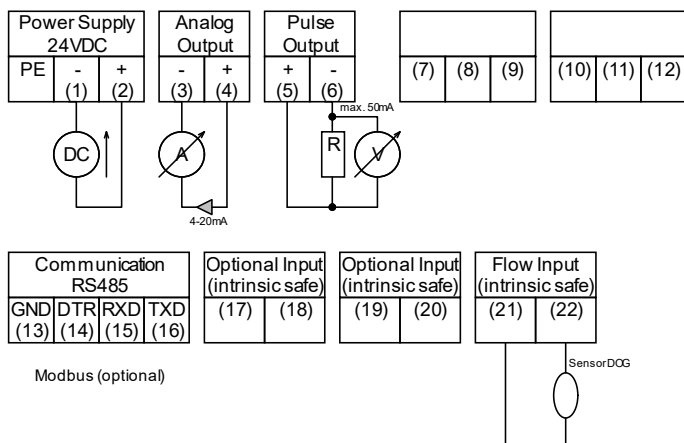
**Note:**

Additional pressure and temperature sensors are required for the electronic options M0/N0/O0/P0 (flow computer). These sensors are not included in the scope of delivery.

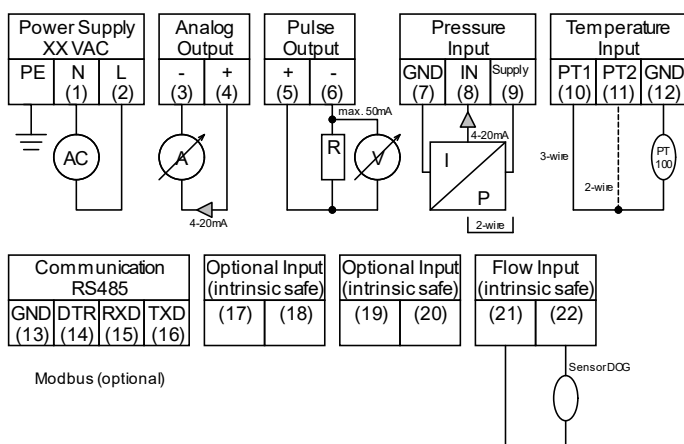
Wiring diagram electronic option G0/H0/I0/K0



Wiring diagram electronic option L0



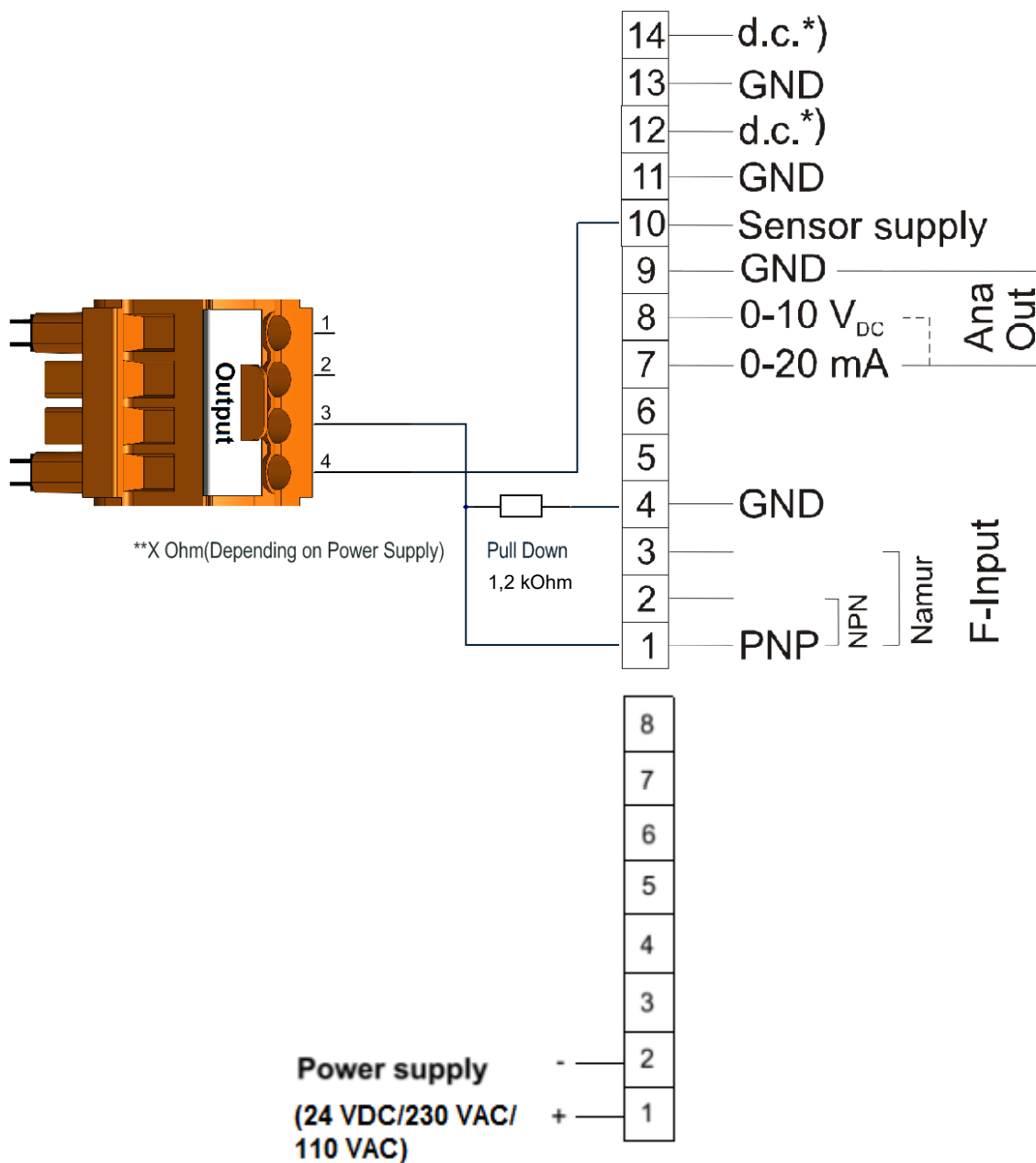
Wiring diagram electronic option M0/N0/00/P0



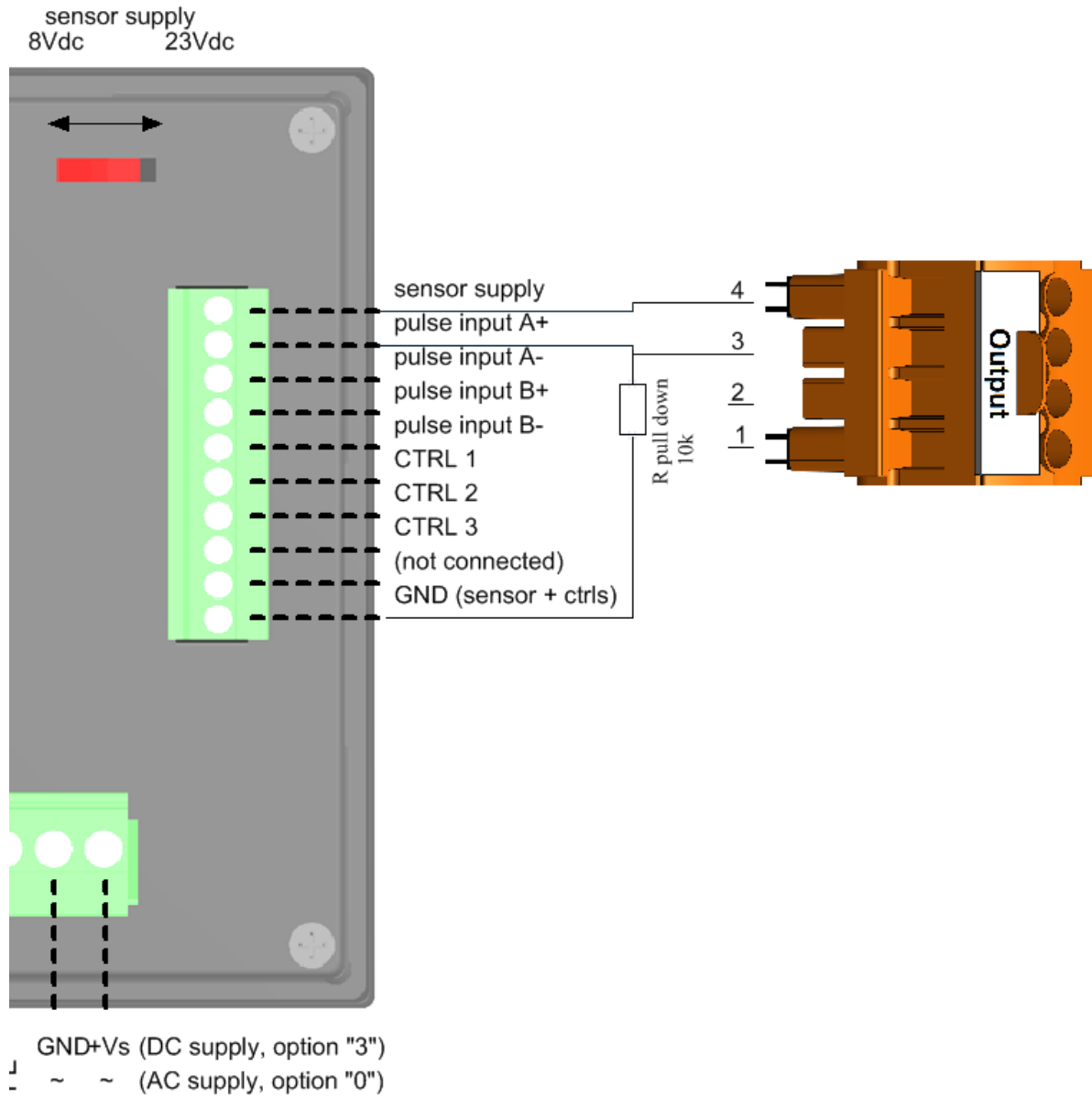
Note:

There is installation space for 2 additional Zener barriers in the housing if the pressure/temperature sensors do not have the required certification. Establishing contact in Ex areas can take place via terminals 17 to 20. The required cabling is the responsibility of the installer.

9.6 Connections of DOG-... Transmitter with KOBOLD Evaluation Electronics ZED-X and ZOK-Zx



DOG-... connection with ZED-Zx

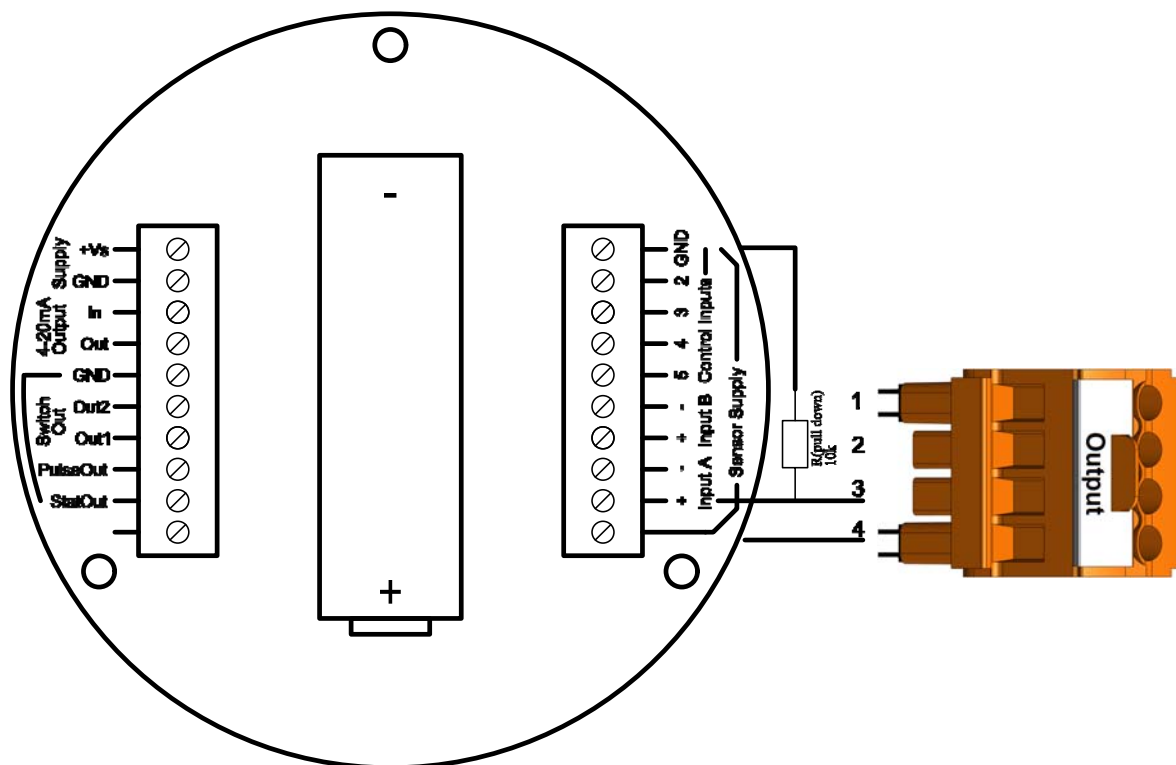


DOG... connection with ZOK-ZxP

Notes:

* The sensor supply from ZOK-ZxP must be set to 8 VDC.

From the software menu of ZOK-Zx, the 'Sensor type' must be set to 'PNP'
(For details, please see the operating manual of ZOK-Zx electronics).



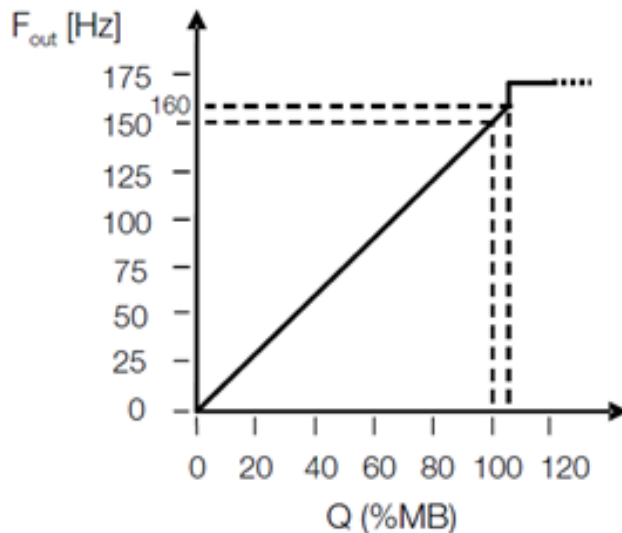
Connection example for DOG-... with ZOK-ZxK

The sensor type must be set to "PNP" in the ZOK-ZX software menu (see operating manual ZOK-Zx electronics).

10. Startup

During startup, ensure that the shut-off valves upstream and downstream of the device are opened slowly. Avoid increasing the flow velocity to prevent the discharge rate from damaging the sensor.

The output frequency of the DOG-... with the electronic options A/B/C/D/E/F/R is proportional to the measuring range.



In the event of a hot wire sensor fault (breakdown or short circuit) the transistor output is permanently connected. During self-diagnosis, the transistor output is switched to the high-resistance state.

11. Setup and operation of the flow controller/flow computer (option G0/H0/I0/K0/M0/N0/L0/O0/P0)

The integrated flow controller/flow computer are preset and calibrated at the factory. See the separate operating instructions for the DOG-4/-6 Electronic option G0/H0/I0/K0/L0 and DOG-4/-6 Electronic option M0/N0/O0/P0 for details.

12. Transmitter error message

12.1 Status display not illuminated

- Check terminal “230 V_{AC}” of the terminal assignment.
- Check supply voltage

12.2 OPERATING illuminated green but no output signal

- Check terminal “Output” of the terminal assignment

12.3 RANGE illuminated yellow

- Measuring range overflows or underflows, decrease or increase flow

12.4 ERROR illuminated red

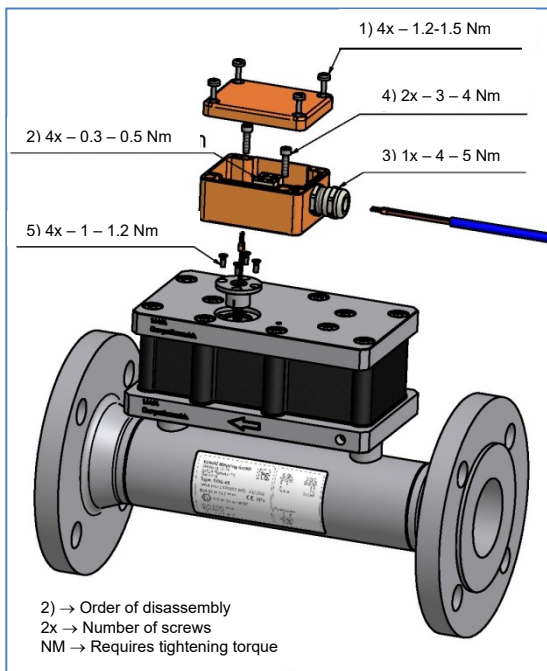
- Short circuit or interruption of the sensor circuit from the sensor to the transmitter.
- Check terminal “Sensor” of the terminal assignment
- Defective hot wire sensor (target value: 40-60 Ohm)



13. Maintenance

13.1 Replacing the sensor

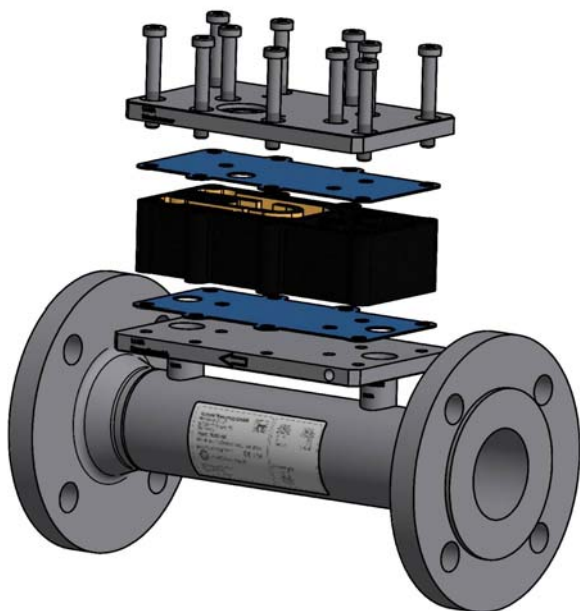
To replace the hot wire sensor, turn off the flow of medium and discharge the pressure in the lines. For versions with ball valves, it is sufficient to simply shut these. Demounting (see diagram) is carried out in the following order:



- 1) Open the connection box (4 x screws)
- 2) Unclamp the hot wire sensor from the strip terminal (2 screws)
- 3) If necessary (due to lack of space or tight cable arrangement), also unclamp from the strip terminal, loosen the cable gland and pull out the cable
- 4) Loosen the connection box from the plate (2 x screws)
- 5) **Slowly** release the hot wire sensor screws and **carefully** pull out the hot wire sensor. Take care that no hot wire sensor parts remain in the device and also that no foreign parts fall into the device (2 screws).

Reassembly is in the reverse order. Replac the O-rings with the new ones supplied with the hot wire sensor. Uniformly tighten the screws crosswise.

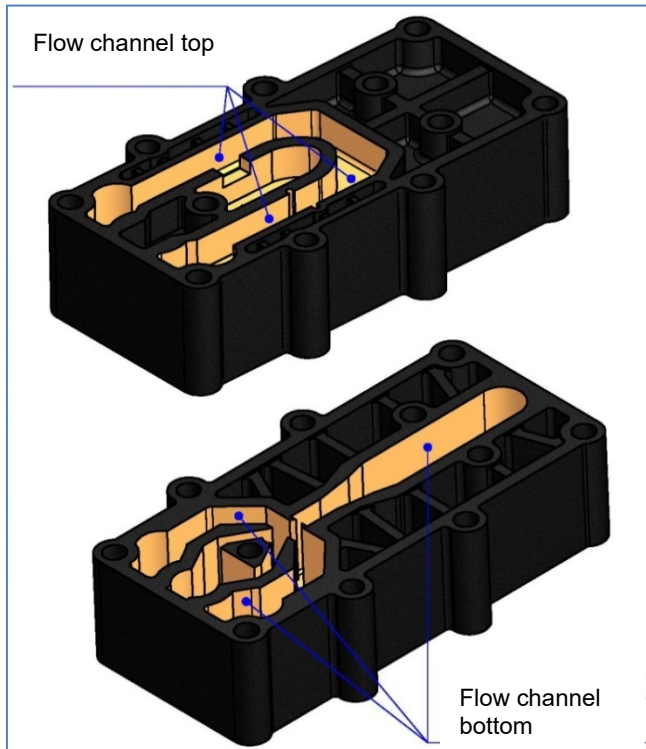
13.2 Disassembly and cleaning the sensor



In the event that the internal section of the oscillator is dirtied by the medium or foreign particles fall into this during replacement of the sensor, the device must be demounted and cleaned (see figure at left).

Before the device can be demounted, the connection box and the hot wire sensor must be unscrewed. For this, see point 13.1.

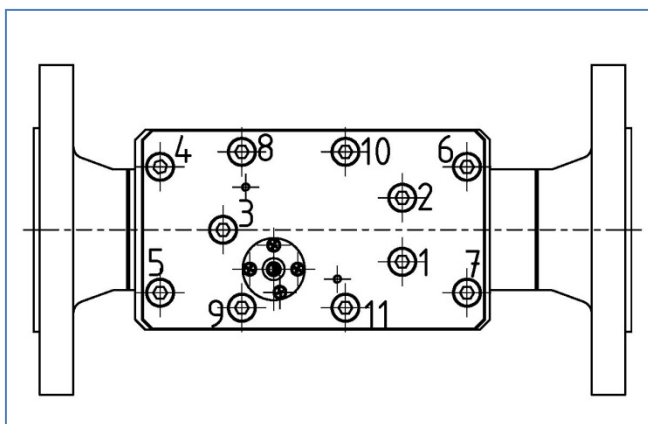
Then unscrew the screws in the upper plate, separate the parts and clean the flow channel of the oscillator on both sides.



Do not use any sharp objects or aggressive cleaning agents. These could damage the oscillator, causing measurement inaccuracies or breakdown of the device. Check the inflow and discharge channel and clean if necessary.

Reassembly takes place in the reverse order. The two gaskets must be replaced and are included in the repair set.

The screws are tightened evenly in two steps: Step 1 -> tighten the screws with a torque of 25 Nm, Step 2 -> after 5 minutes tighten the screws with 30 Nm. The figure at the lower left shows the required order when tightening. Otherwise, the device may leak or be damaged.



14. Technical Data

Measuring accuracy:	$\pm 1,5\%$ of reading (at $Q_t \leq MW \leq 100\%$ *) $\pm 5\%$ of reading (at $1\% \leq MW \leq -Q_t^*$) *The lower limit Q_t depends on the density. $Q_t = 8\%$ at density 1 kg/m^3 $Q_t = 4\%$ at density 2 kg/m^3 $Q_t = 2\%$ at density 4 kg/m^3 $Q_t = 1\%$ at density $\geq 8 \text{ kg/m}^3$
Repeatability:	0.1% of reading
Media temperature:	-20 ...+120 °C (non ATEX version) -20 ...+60 °C (ATEX version)
Ambient temperature:	-25 ...+80 °C (non ATEX version) -20...+60 °C (ATEX version)
Operating pressure p_{\max} :	25 bar nominal size 25, 40, 50, 80 and 100 16 bar nominal size 150 and 200
Span:	DOG-4: 1:100, DOG-6: max. 1:75
Hot wire sensor:	platinum sensor
Protection:	IP 65



Materials (Transmitter)

Housing:	stainless steel 1.4404/316L
Orifice:	stainless steel 1.4404/316L
Oscillator:	PPS
Hot wire sensor:	platinum/PEEK/ceramic
Gaskets:	Klingersil® C-4265, NBR
Ball valves:	stainless steel, rust proof

14.1 Electronic options

Electronics DOG-...A0/B0

(Sensor with/without ATEX/IECEX certification)

Power supply A/B:	230 V _{AC} ± 10 %, 50...60 Hz
Power supply C/D:	110 V _{AC} ± 10 %, 50...60 Hz
Power supply E/F:	24 V _{AC} ± 10 %, 50...60 Hz
Power supply R:	24 V _{DC} ± 20 %
Input:	Hot wire sensor (allowed distance: max. 50 m between sensor and transmitter)
Output:	Opto coupler, frequency linear to flow V _{CE} : 12-24 V (recommended), max. 30 V I _c : max. 50 mA P _{tot} : 100 mW at 25 °C Derating: 0.91 mW/°C
Ambient temperature:	-20...+60 °C
Protection:	IP20
Ex-version(A/D/F):	
ATEX	
Transducer:	 II (1)G [Ex ia Ga] IIC
Sensor:	 II 1 G Ex ia IIC T4 Ga
IECEX	
Transducer:	[Ex ia Ga] IIC
Sensor:	Ex ia IIC T4 Ga
Mounting:	DIN Rail
Dimensions:	
Width:	45 mm
Height:	105.6 mm
Depth:	113.6 mm
Weight:	approx. 200 g

Electronics DOG-...G/H/I/K/L

(Sensor without/with ATEX/IECEX certification and Flow rate/Unit counter, with current/pulse output)

Display:	alphanumeric LCD, UV-resistant, with displayed functions: Compensated flow rate (7 digits, 17 mm high) Compensated total (7 digits, 17 mm high) resettable Accumulated total (11 digits, 8 mm high) not resettable
Units:	Flow: m ³ , cf, scf, Nm ³ Time units: /sec, /min, /hr, /day Total: m ³ Accumulated total: m ³
Decimal places:	Flow: 0, 1, 2 or 3 Total: 0, 1, 2 or 3 Accumulated total: according to selection for total
Backlighting:	yes
Signal input:	Flow: sensor
Power supply:	
G/H:	230 V _{AC} ± 10 %, 50...60 Hz
I/K:	110 V _{AC} ± 10 %, 50...60 Hz
L:	24 V _{DC} ± 20 %
Electrical connection:	4 x M16 x 1.5 cable gland
Housing material:	ABS with PC cover
Weight:	approx. 1800 g
Analogue output:	4...20 mA (active) 10-Bit resolution, 3-wire
Pulse output:	PNP, 24 V _{DC} active max. 50 mA, scaled according to linearised accumulated total (e.g. pulse every 12 liters) Pulse duration: user defined 0.008 s...2 s max. frequency: 64 HZ
Protection:	IP65
Mounting:	Wall mounting
Data protection:	EEPROM backup, backup of running totals every minute, Data retention at least 10 years
Communication:	Modbus RTU RS485 2-wire (optional, other Modbus versions on request)

Electronic Options DOG-...M/N/O/P

(Sensor without/with ATEX/IECEX certification and Flow computer)

Display:	Alphanumeric LCD, UV-resistant with Displayed functions: Compensated Flow rate (7 digits, 17 mm high) Compensated total: (7 digits, 17 mm high) resettable Accumulated total (11 digits, 8 mm high) not resettable Actual line temperature (6 digits) Actual line pressure (6 digits)
Units:	Flow: m ³ , cf, scf, Nm ³ Time units: /sec, /min, /hr, /day Total: m ³ Accumulated total: m ³ Temperature: °C, °F, or K Pressure: mbar, bar PSI
Decimals:	Flow: 0, 1, 2 or 3 Total: 0, 1, 2 or 3 Accumulated total: according to selection for total Temperature/Pressure: 1
Backlighting:	yes
Signal input:	Flow: sensor Temperature: PT100, 2- or 3-wire Pressure: 0(4)...20 mA (passive), 14-Bit resolution, 2- or 3-wire
Power supply:	
M/N:	230 V _{AC} ± 10 %, 50...60 Hz
O/P:	110 V _{AC} ± 10 %, 50...60 Hz
Electrical Connection:	5 x M16 x 1.5 cable gland
Housing material:	ABS with PC cover
Weight:	approx. 1800 g
Analogue output:	4...20 mA (active), 10-Bit resolution, 3-wire
Pulse output:	PNP, 24 VDC active max. 50 mA, scaled according to linearised accumulated total (e.g. pulse every 12 liters) Pulse duration: user defined 0.001 s...10 s max. frequency 500 Hz
Protection:	IP65
Mounting:	Wall mounting
Data protection:	EEPROM backup, backup of running totals every minute, Data retention at least 10 years
Communication:	Modbus RTU RS485 2-wire (optional, other Modbus versions on request)

Display



Note: Temperature and pressure sensors are not included in scope of delivery.

15. Order Details

Order Details for DOG-4 for dry gases (Example: DOG-42S0S50 0 A0 0)

Measuring range	Model Material stainless steel	Pressure rating flanges* [PN]	Connection flange [size/type]	Ball valve	Electronics	Options
0.12...12 m³/h Air	DOG-42S0S25..	PN40	DN25			
0.2...20 m³/h Air	DOG-4200S25..					
0.35...35 m³/h Air	DOG-4250S25..					
0.7...70 m³/h Air	DOG-42A0S25..					
0.07...7 CFM	DOG-42S1S25..					
0.12...12 CFM	DOG-4201S25..					
0.21...21 CFM	DOG-4251S25..					
0.41...41 CFM	DOG-42A1S25..					
0.12...12 m³/h Air	DOG-42S0A25..	Class 150	ANSI 1"			
0.2...20 m³/h Air	DOG-4200A25..					
0.35...35 m³/h Air	DOG-4250A25..					
0.7...70 m³/h Air	DOG-42A0A25..					
0.07...7 CFM	DOG-42S1A25..					
0.12...12 CFM	DOG-4201A25..					
0.21...21 CFM	DOG-4251A25..					
0.41...41 CFM	DOG-42A1A25..					
0.12...12 m³/h Air	DOG-42S0B25..	Class 300				
0.2...20 m³/h Air	DOG-4200B25..					
0.35...35 m³/h Air	DOG-4250B25..					
0.7...70 m³/h Air	DOG-42A0B25..					
0.07...7 CFM	DOG-42S1B25..					
0.12...12 CFM	DOG-4201B25..					
0.21...21 CFM	DOG-4251B25..					
0.41...41 CFM	DOG-42A1B25..					
0.12...12 m³/h Air	DOG-42S0S40..	PN40	DN40	0 = without ball valve 1 = with ball valve		
0.2...20 m³/h Air	DOG-4200S40..					
0.9...90 m³/h Air	DOG-42A5S40..					
2...200 m³/h Air	DOG-42C0S40..					
0.07...7 CFM	DOG-42S1S40..					
0.12...12 CFM	DOG-4201S40..					
0.53...53 CFM	DOG-42A6S40..					
1.2...120 CFM	DOG-42C1S40..					
0.12...12 m³/h Air	DOG-42S0A40..	Class 150	ANSI 1½"			
0.2...20 m³/h Air	DOG-4200A40..					
0.9...90 m³/h Air	DOG-42A5A40..					
2...200 m³/h Air	DOG-42C0A40..					
0.07...7 CFM	DOG-42S1A40..					
0.12...12 CFM	DOG-4201A40..					
0.53...53 CFM	DOG-42A6A40..					
1.2...120 CFM	DOG-42C1A40..					
0.12...12 m³/h Air	DOG-42S0B40..	Class 300				
0.2...20 m³/h Air	DOG-4200B40..					
0.9...90 m³/h Air	DOG-42A5B40..					
2...200 m³/h Air	DOG-42C0B40..					
0.07...7 CFM	DOG-42S1B40..					
0.12...12 CFM	DOG-4201B40..					
0.53...53 CFM	DOG-42A6B40..					
1.2...120 CFM	DOG-42C1B40..					
0.12...12 m³/h Air	DOG-42S0S50..	PN40	DN50			
0.2...20 m³/h Air	DOG-4200S50..					
1.1...110 m³/h Air	DOG-42B0S50..					
2.5...250 m³/h Air	DOG-42C5S50..					
0.07...7 CFM	DOG-42S1S50..					
0.12...12 CFM	DOG-4201S50..					
0.65...65 CFM	DOG-42B1S50..					
1.5...150 CFM	DOG-42C6S50..					

*Max. pressure rating limited to 25 bar.

B0 = frequency output, 230 V_{AC}
A0 = as 'B0', with ATEX/IECEX
C0 = frequency output, 110 V_{AC}
D0 = as 'C0', with ATEX/IECEX
E0 = frequency output, 24 V_{AC}
F0 = as 'E0', with ATEX/IECEX
R0 = frequency output, 24 V_{DC}
G0 = unit counter, pulse output, analogue output, 230 V_{AC}
H0 = as 'G0', with ATEX/IECEX
I0 = unit counter, pulse output, analogue output, 110 V_{AC}
K0 = as 'I0', with ATEX/IECEX
L0 = unit counter, pulse output, analogue output, 24 V_{DC}
M0 = flow computer, pulse output, analogue output, 230 V_{AC}
N0 = as 'M0', with ATEX/IECEX
O0 = flow computer, pulse output, analogue output, 110 V_{AC}
P0 = as 'O0', with ATEX/IECEX
Y0 = special (specify in clear text)

0 = without
Y = special option
(specify in clear text)

Order Details for DOG-4 for dry gases (Example: DOG-42S0S50 0 A0 0) (continued)

Measuring range	Model Material stainless steel	Pressure rating flanges* [PN]	Connection flange [size/type]	Ball valve	Electronics	Options
0.12 ... 12 m³/h Air	DOG-42S0A50..	Class 150	ANSI 2"	0 = without ball valve 1 = with ball valve	B0 = frequency output, 230 V _{AC} A0 = as 'B0', with ATEX/IECEX C0 = frequency output, 110 V _{AC} D0 = as 'C0', with ATEX/IECEX E0 = frequency output, 24 V _{AC} F0 = as 'E0', with ATEX/IECEX R0 = frequency output, 24 V _{DC} G0 = unit counter, pulse output, analogue output, 230 V _{AC} H0 = as 'G0', with ATEX/IECEX I0 = unit counter, pulse output, analogue output, 110 V _{AC} K0 = as 'I0', with ATEX/IECEX L0 = unit counter, pulse output, analogue output, 24 V _{DC} M0 = flow computer, pulse output, analogue output, 230 V _{AC} N0 = as 'M0', with ATEX/IECEX O0 = flow computer, pulse output, analogue output, 110 V _{AC} P0 = as 'O0', with ATEX/IECEX Y0 = special (specify in clear text)	0 = without Y = special option (specify in clear text)
0.2 ... 20 m³/h Air	DOG-4200A50..					
1.1 ... 110 m³/h Air	DOG-42B0A50..					
2.5 ... 250 m³/h Air	DOG-42C5A50..					
0.07 ... 7 CFM	DOG-42S1A50..					
0.12 ... 12 CFM	DOG-4201A50..					
0.65 ... 65 CFM	DOG-42B1A50..					
1.5 ... 150 CFM	DOG-42C6A50..					
0.12 ... 12 m³/h Air	DOG-42S0B50..	Class 300	ANSI 2"			
0.2 ... 20 m³/h Air	DOG-4200B50..					
1.1 ... 110 m³/h Air	DOG-42B0B50..					
2.5 ... 250 m³/h Air	DOG-42C5B50..					
0.07 ... 7 CFM	DOG-42S1B50..					
0.12 ... 12 CFM	DOG-4201B50..					
0.65 ... 65 CFM	DOG-42B1B50..					
1.5 ... 150 CFM	DOG-42C6B50..					
1.4 ... 140 m³/h Air	DOG-42B5F80..	PN 16	DN 80			
4.5 ... 450 m³/h Air	DOG-42D5F80..					
8.0 ... 800 m³/h Air	DOG-42F0F80..					
0.82 ... 82 CFM	DOG-42B6F80..	PN 40	DN 80			
2.7 ... 270 CFM	DOG-42D6F80..					
4.7 ... 470 CFM	DOG-42F1F80..					
1.4 ... 140 m³/h Air	DOG-42B5S80..	PN 40	DN 80			
4.5 ... 450 m³/h Air	DOG-42D5S80..					
8.0 ... 800 m³/h Air	DOG-42F0S80..					
0.82 ... 82 CFM	DOG-42B6S80..	PN 40	DN 80			
2.7 ... 270 CFM	DOG-42D6S80..					
4.7 ... 470 CFM	DOG-42F1S80..					
1.4 ... 140 m³/h Air	DOG-42B5A80..	Class 150	ANSI 3"			
4.5 ... 450 m³/h Air	DOG-42D5A80..					
8.0 ... 800 m³/h Air	DOG-42F0A80..					
0.82 ... 82 CFM	DOG-42B6A80..	Class 300	ANSI 3"			
2.7 ... 270 CFM	DOG-42D6A80..					
4.7 ... 470 CFM	DOG-42F1A80..					
1.4 ... 140 m³/h Air	DOG-42B5B80..	Class 300	ANSI 3"			
4.5 ... 450 m³/h Air	DOG-42D5B80..					
8.0 ... 800 m³/h Air	DOG-42F0B80..					
0.82 ... 82 CFM	DOG-42B6B80..	Class 300	ANSI 3"			
2.7 ... 270 CFM	DOG-42D6B80..					
4.7 ... 470 CFM	DOG-42F1B80..					
2.7 ... 270 m³/h Air	DOG-42D0F1H..	PN 16	DN 100			
6.5 ... 650 m³/h Air	DOG-42E5F1H..					
10 ... 1000 m³/h Air	DOG-42F5F1H..					
1.6 ... 160 CFM	DOG-42D1F1H..	PN 16	DN 100			
3.8 ... 380 CFM	DOG-42E6F1H..					
5.9 ... 590 CFM	DOG-42F6F1H..					
2.7 ... 270 m³/h Air	DOG-42D0S1H..	PN 40	DN 100			
6.5 ... 650 m³/h Air	DOG-42E5S1H..					
10 ... 1000 m³/h Air	DOG-42F5S1H..					
1.6 ... 160 CFM	DOG-42D1S1H..	PN 40	DN 100			
3.8 ... 380 CFM	DOG-42E6S1H..					
5.9 ... 590 CFM	DOG-42F6S1H..					

*Max. pressure rating limited to 25 bar

Order Details for DOG-4 for dry gases (Example: DOG-42F0F80 0 A0 0) (continued)

Measuring range	Model Material stainless steel	Pressure rating flanges ²⁾ [PN]	Connection flange [size/type]	Ball valve	Electronics	Options
2.7...270 m³/h Air	DOG-42D0A1H..	Class 150	ANSI 4"	0 = without ball valve 1 = with ball valve	B0 = frequency output, 230 V _{AC} A0 = as 'B0', with ATEX/IECEX C0 = frequency output, 110 V _{AC} D0 = as 'C0', with ATEX/IECEX E0 = frequency output, 24 V _{AC} F0 = as 'E0', with ATEX/IECEX R0 = frequency output, 24 V _{DC} G0 = unit counter, pulse output, analogue output, 230 V _{AC} H0 = as 'G0', with ATEX/IECEX I0 = unit counter, pulse output, analogue output, 110 V _{AC} K0 = as 'I0', with ATEX/IECEX L0 = unit counter, pulse output, analogue output, 24 V _{DC} M0 = flow computer, pulse output, analogue output, 230 V _{AC} N0 = as 'M0', with ATEX/IECEX O0 = flow computer, pulse output, analogue output, 110 V _{AC} P0 = as 'O0', with ATEX/IECEX Y0 = special (specify in clear text)	0 = without Y = special option (specify in clear text)
6.5...650 m³/h Air	DOG-42E5A1H..					
10...1000 m³/h Air	DOG-42F5A1H..					
1.6...160 CFM	DOG-42D1A1H..					
3.8...380 CFM	DOG-42E6A1H..					
5.9...590 CFM	DOG-42F6A1H..					
2.7...270 m³/h Air	DOG-42D0B1H..	Class 300	ANSI 4"			
6.5...650 m³/h Air	DOG-42E5B1H..					
10...1000 m³/h Air	DOG-42F5B1H..					
1.6...160 CFM	DOG-42D1B1H..					
3.8...380 CFM	DOG-42E6B1H..					
5.9...590 CFM	DOG-42F6B1H..					
6.0...600 m³/h Air	DOG-42E0F1F..	PN 16	DN 150			
12...1200 m³/h Air	DOG-42G0F1F..					
30...3000 m³/h Air	DOG-42H0F1F..					
3.5...350 CFM	DOG-42E1F1F..					
7.1...710 CFM	DOG-42G1F1F..					
18...1800 CFM	DOG-42H1F1F..					
6.0...600 m³/h Air	DOG-42E0A1F..	Class 150	ANSI 6"			
12...1200 m³/h Air	DOG-42G0A1F..					
30...3000 m³/h Air	DOG-42H0A1F..					
3.5...350 CFM	DOG-42E1A1F..					
7.1...710 CFM	DOG-42G1A1F..					
18...1800 CFM	DOG-42H1A1F..					
12...1200 m³/h Air	DOG-42G0E2H..	PN 10	DN200			
25...2500 m³/h Air	DOG-42G5E2H..					
60...6000 m³/h Air ¹⁾	DOG-42H5E2H..					
7.1...710 CFM	DOG-42G1E2H..					
15...1500 CFM	DOG-42G6E2H..					
35...3500 CFM ¹⁾	DOG-42H6E2H..					
12...1200 m³/h Air	DOG-42G0F2H..	PN 16		DN200		
25...2500 m³/h Air	DOG-42G5F2H..					
60...6000 m³/h Air ¹⁾	DOG-42H5F2H..					
7.1...710 CFM	DOG-42G1F2H..					
15...1500 CFM	DOG-42G6F2H..					
35...3500 CFM ¹⁾	DOG-42H6F2H..					
12...1200 m³/h Air	DOG-42G0A2H..	Class 150	ANSI 8"			
25...2500 m³/h Air	DOG-42G5A2H..					
60...6000 m³/h Air ¹⁾	DOG-42H5A2H..					
7.1...710 CFM	DOG-42G1A2H..					
15...1500 CFM	DOG-42G6A2H..					
35...3500 CFM ¹⁾	DOG-42H6A2H..					
Special	DOG-42YYYYY..	Special	Special			

¹⁾ Calibrated up to 4000 m³/h. Higher flow rate calibration on request.

²⁾ Max. pressure rating limited to 25 bar. For DN150/DN200 (ANSI 6"/8") max. pressure rating limited to 16 bar.

Order Details for DOG-6 for wet gases (Example: DOG-62S0S50 0 B0 0)

Measuring range	Model Material stainless steel	Pressure rating flanges * [PN]	Connection flange [size/type]	Ball valve	Electronics	Options
0.12...9 m³/h Air	DOG-62S0S25..	PN40	DN25	0 = without ball valve 1 = with ball valve	B0 = frequency output, 230 V _{AC} A0 = as 'B0', with ATEX/IECEX C0 = frequency output, 110 V _{AC} D0 = as 'C0', with ATEX/IECEX E0 = frequency output, 24 V _{AC} F0 = as 'E0', with ATEX/IECEX R0 = frequency output, 24 V _{DC} G0 = unit counter, pulse output, analogue output, 230 V _{AC} H0 = as 'G0', with ATEX/IECEX I0 = unit counter, pulse output, analogue output, 110 V _{AC} K0 = as 'I0', with ATEX/IECEX L0 = unit counter, pulse output, analogue output, 24 V _{DC} M0 = flow computer, pulse output, analogue output, 230 V _{AC} N0 = as 'M0', with ATEX/IECEX O0 = flow computer, pulse output, analogue output, 110 V _{AC} P0 = as 'O0', with ATEX/IECEX Y0 = special (specify in clear text)	0 = without Y = special option (specify in clear text)
0.2...15 m³/h Air	DOG-6200S25..					
0.35...27 m³/h Air	DOG-6250S25..					
0.7...55 m³/h Air	DOG-62A0S25..					
0.07...5 CFM	DOG-62S1S25..					
0.12...9 CFM	DOG-6201S25..					
0.21...16 CFM	DOG-6251S25..					
0.41...32 CFM	DOG-62A1S25..					
0.12...9 m³/h Air	DOG-62S0A25..	Class 150	ANSI 1"			
0.2...15 m³/h Air	DOG-6200A25..					
0.35...27 m³/h Air	DOG-6250A25..					
0.7...55 m³/h Air	DOG-62A0A25..					
0.07...5 CFM	DOG-62S1A25..					
0.12...9 CFM	DOG-6201A25..					
0.21...16 CFM	DOG-6251A25..					
0.41...32 CFM	DOG-62A1A25..					
0.12...9 m³/h Air	DOG-62S0B25..	Class 300				
0.2...15 m³/h Air	DOG-6200B25..					
0.35...27 m³/h Air	DOG-6250B25..					
0.7...55 m³/h Air	DOG-62A0B25..					
0.12...9 m³/h Air	DOG-62S0S40..	PN40	DN40			
0.2...15 m³/h Air	DOG-6200S40..					
0.9...70 m³/h Air	DOG-62A5S40..					
2...150 m³/h Air	DOG-62C0S40..					
0.07...5 CFM	DOG-62S1S40..					
0.12...9 CFM	DOG-6201S40..					
0.53...41 CFM	DOG-62A6S40..					
1.2...88 CFM	DOG-62C1S40..					
0.12...9 m³/h Air	DOG-62S0A40..	Class 150	ANSI 1½"			
0.2...15 m³/h Air	DOG-6200A40..					
0.9...70 m³/h Air	DOG-62A5A40..					
2...150 m³/h Air	DOG-62C0A40..					
0.07...5 CFM	DOG-62S1A40..					
0.12...9 CFM	DOG-6201A40..					
0.53...41 CFM	DOG-62A6A40..					
1.2...88 CFM	DOG-62C1A40..					
0.12...9 m³/h Air	DOG-62S0B40..	Class 300				
0.2...15 m³/h Air	DOG-6200B40..					
0.9...70 m³/h Air	DOG-62A5B40..					
2...150 m³/h Air	DOG-62C0B40..					
0.12...9 m³/h Air	DOG-62S0S50..	PN40	DN50			
0.2...15 m³/h Air	DOG-6200S50..					
1.1...85 m³/h Air	DOG-62B0S50..					
2.5...190 m³/h Air	DOG-62C5S50..					
0.07...5 CFM	DOG-62S1S50..					
0.12...9 CFM	DOG-6201S50..					
0.65...50 CFM	DOG-62B1S50..					
1.5...110 CFM	DOG-62C6S50..					
0.12...9 m³/h Air	DOG-62S0A50..	Class 150	ANSI 2"			
0.2...15 m³/h Air	DOG-6200A50..					
1.1...85 m³/h Air	DOG-62B0A50..					
2.5...190 m³/h Air	DOG-62C5A50..					
0.12...9 CFM	DOG-62S1A50..					
0.2...15 CFM	DOG-6201A50..					
0.65...50 CFM	DOG-62B1A50..					
1.5...110 CFM	DOG-62C6A50..					
0.12...9 m³/h Air	DOG-62S0B50..	Class 300				
0.2...15 m³/h Air	DOG-6200B50..					
1.1...85 m³/h Air	DOG-62B0B50..					
2.5...190 m³/h Air	DOG-62C5B50..					

*Max. pressure rating limited to 25 bar

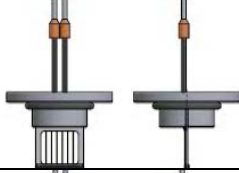
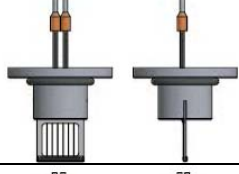
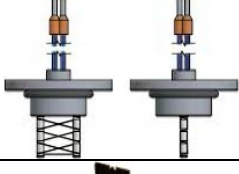

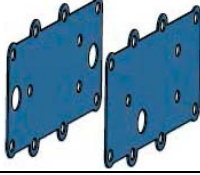
Order Details for DOG-6 for wet gases (Example: DOG-62S0S50 0 B0 0) (continued)

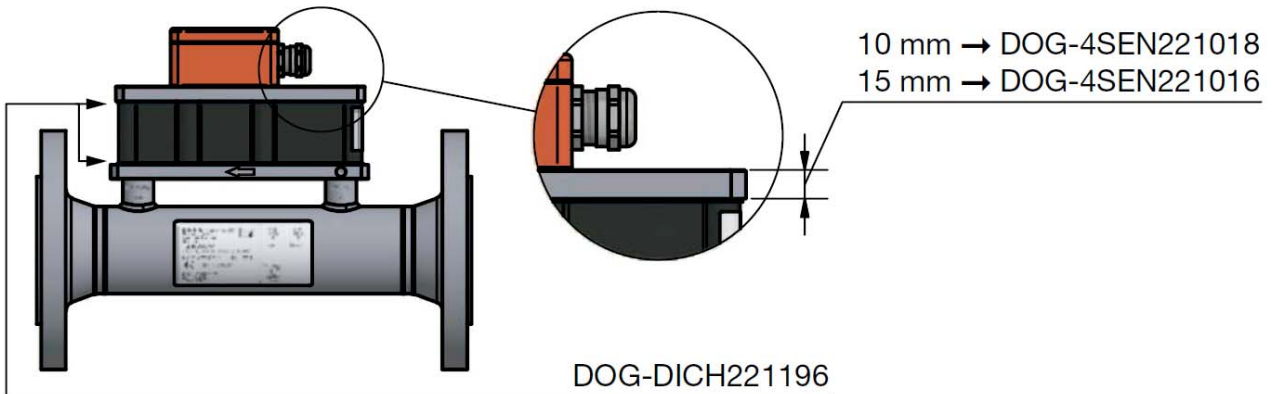
Measuring range	Model Material stainless steel	Pressure rating flanges ¹⁾ [PN]	Connection flange [size/type]	Ball valve	Electronics	Options
1.4...105 m³/h Air	DOG-62B5F80..	PN 16	DN 80	0 = without ball valve 1 = with ball valve	B0 = frequency output, 230 V _{AC} A0 = as 'B0', with ATEX/IECEX C0 = frequency output, 110 V _{AC} D0 = as 'C0', with ATEX/IECEX E0 = frequency output, 24 V _{AC} F0 = as 'E0', with ATEX/IECEX R0 = frequency output, 24 V _{DC} G0 = unit counter, pulse output, analogue output, 230 V _{AC} H0 = as 'G0', with ATEX/IECEX I0 = unit counter, pulse output, analogue output, 110 V _{AC} K0 = as 'I0', with ATEX/IECEX L0 = unit counter, pulse output, analogue output, 24 V _{DC} M0 = flow computer, pulse output, analogue output, 230 V _{AC} N0 = as 'M0', with ATEX/IECEX O0 = flow computer, pulse output, analogue output, 110 V _{AC} P0 = as 'O0', with ATEX/IECEX Y0 = special (specify in clear text)	0 = without Y = special option (specify in clear text)
4.5...340 m³/h Air	DOG-62D5F80..					
8.0...600 m³/h Air	DOG-62F0F80..					
0.82...62 CFM	DOG-62B6F80..					
2.7...200 CFM	DOG-62D6F80..					
4.7...350 CFM	DOG-62F1F80..					
1.4...105 m³/h Air	DOG-62B5A80..	Class 150	ANSI 3"			
4.5...340 m³/h Air	DOG-62D5A80..					
8.0...600 m³/h Air	DOG-62F0A80..					
0.82...62 CFM	DOG-62B6A80..					
2.7...200 CFM	DOG-62D6A80..					
4.7...350 CFM	DOG-62F1A80..					
1.4...105 m³/h Air	DOG-62S0B80..	Class 300				
4.5...340 m³/h Air	DOG-62D5B80..					
8.0...600 m³/h Air	DOG-62F0B80..					
2.7...205 m³/h Air	DOG-62D0F1H..	PN 16	DN 100			
6.5...490 m³/h Air	DOG-62E5F1H..					
10...750 m³/h Air	DOG-62F5F1H..					
1.6...120 CFM	DOG-62D1F1H..					
3.8...290 CFM	DOG-62E6F1H..					
5.9...440 CFM	DOG-62F6F1H..					
2.7...205 m³/h Air	DOG-62D0A1H..	Class 150	ANSI 4"			
6.5...490 m³/h Air	DOG-62E5A1H..					
10...750 m³/h Air	DOG-62F5A1H..					
1.6...120 CFM	DOG-62D1A1H..					
3.8...290 CFM	DOG-62E6A1H..					
5.9...440 CFM	DOG-62F6A1H..					
2.7...205 m³/h Air	DOG-62S0B1H..	Class 300				
6.5...490 m³/h Air	DOG-6200B1H..					
10...750 m³/h Air	DOG-6250B1H..					
6.0...450 m³/h Air	DOG-62E0F1F..	PN 16	DN 150			
12...900 m³/h Air	DOG-62G0F1F..					
30...2250 m³/h Air	DOG-62H0F1F..					
3.5...270 CFM	DOG-62E1F1F..					
7.1...530 CFM	DOG-62G1F1F..					
18...1300 CFM	DOG-62H1F1F..					
6.0...450 m³/h Air	DOG-62E0A1F..	Class 150	ANSI 6"			
12...900 m³/h Air	DOG-62G0A1F..					
30...2250 m³/h Air	DOG-62H0A1F..					
3.5...270 CFM	DOG-62E1A1F..					
7.1...530 CFM	DOG-62G1A1F..					
18...1300 CFM	DOG-62H1A1F..					
12...900 m³/h Air	DOG-62G0E2H..	PN 10	DN 200			
25...1900 m³/h Air	DOG-62G5E2H..					
60...4000 m³/h Air	DOG-62H5E2H..					
12...900 m³/h Air	DOG-62G0F2H..	PN 16				
25...1900 m³/h Air	DOG-62G5F2H..					
60...4000 m³/h Air	DOG-62H5F2H..					
7.1...530 CFM	DOG-62G1F2H..					
15...1100 CFM	DOG-62G6F2H..					
35...2400 CFM	DOG-62H6F2H..					
12...900 m³/h Air	DOG-62G0A2H..	Class 150	ANSI 8"			
25...1900 m³/h Air	DOG-62G5A2H..					
60...4000 m³/h Air	DOG-62H5A2H..					
7.1...530 CFM	DOG-62G1A2H..					
15...1100 CFM	DOG-62G6A2H..					
35...2400 CFM	DOG-62H6A2H..					
Special	DOG-62YYYYY..	Special	Special			

¹⁾ Max. pressure rating limited to 25 bar. For DN150/DN200 (ANSI 6"/8") max. pressure rating limited to 16 bar.

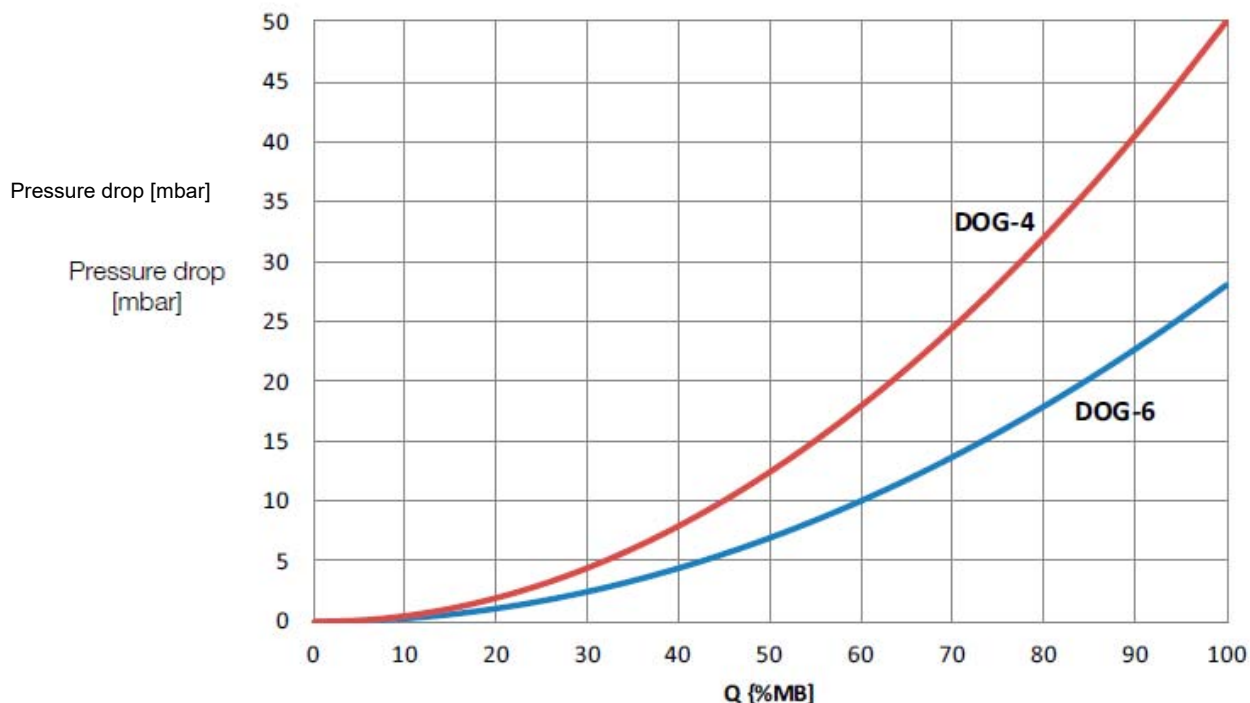
DOG

Order Details/Spare parts for DOG-4/-6

Order code	Description	Image
DOG-4SEN221018	DOG-4 spare sensor with transport sleeve, 10 mm plate	
DOG-4SEN221016	DOG-4 spare sensor with transport sleeve, 15 mm plate	
DOG-6SEN221195	DOG-6 spare sensor with transport sleeve	
DOG-4KAL01	DOG-4/-6 calibration software with PC interface with USB connection	
DOG-DICH221196	DOG-4/-6 sealing set for oscillator	



16. Pressure Loss/Flow



The diagram applies for gases with a density of air at NPT (0 °C and 1013.25 mbar). The pressure loss is always proportional to the density of the gas. For example, at 100% higher density there is double pressure loss.

Calculating the Actual Density

The actual density can be calculated with the following formula:

$$D = \frac{D_0 \cdot P \cdot T_0}{T}$$

D0 = density at 1 bar abs. and 0 °C (= 273 K) T = temperature in K

(= °C + 273 for example 20 °C = 273 + 20 = 293 K) T0 = 273 K

P = operating pressure in bar (absolute pressure)

Calculating the Norm Flow

$$Q_N = Q \cdot \frac{P \cdot 273}{1.013 \cdot T}$$

QN = norm flow at 1.013 bar abs. and 0 °C

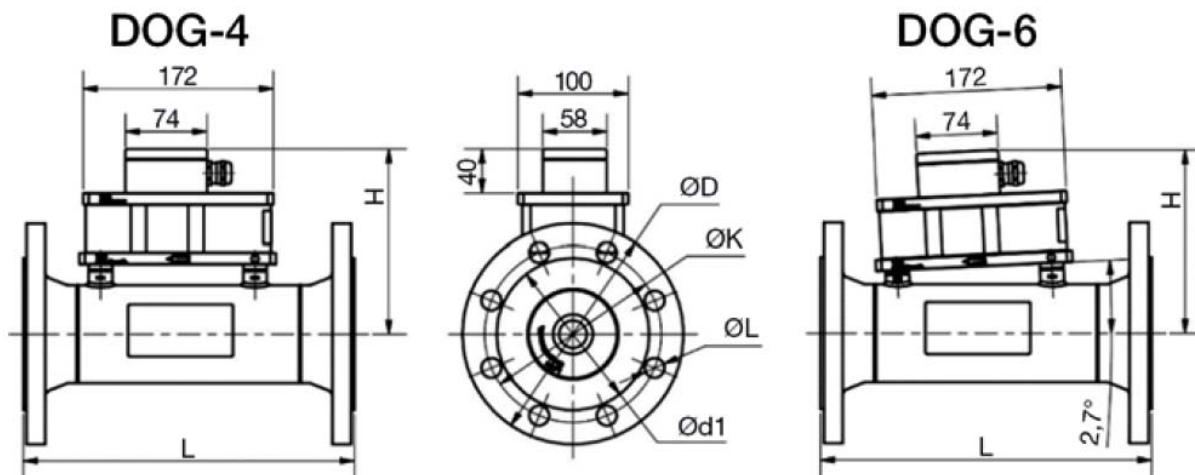
Q = operating flow

P = operating pressure in bar (absolute pressure)

T = operating temperature in K

17. Dimensions

Dimensions and Weights DOG-4/-6 (without ball valve)

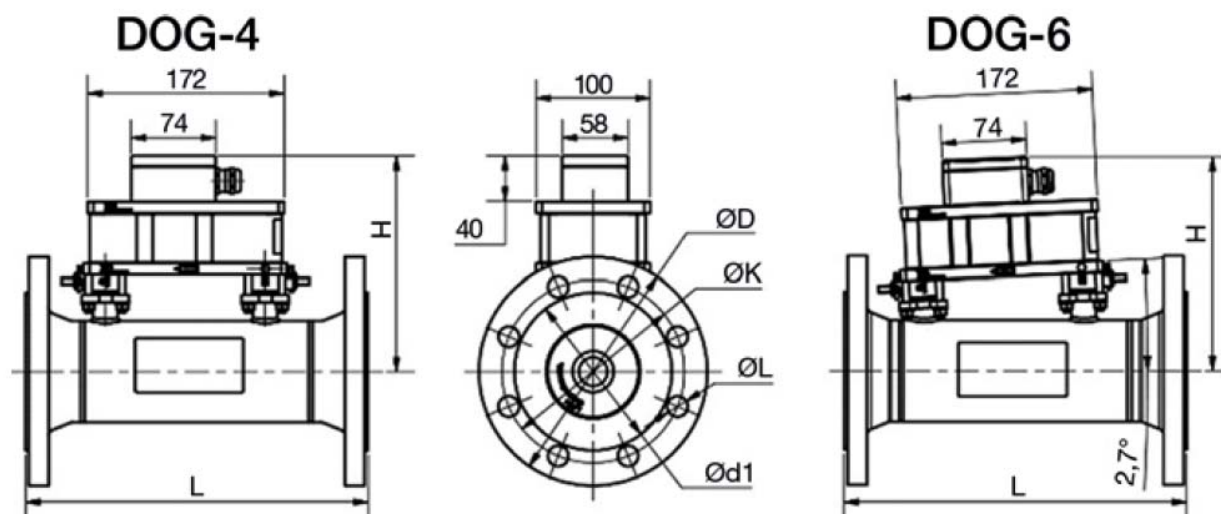


Dimensional details without ball valve, EN-flanges									
DN... PN... [mm... bar...]	L (length) [mm]	H (height) [mm]	ØD (outer Ø) [mm]	ØK (pitch circle) [mm]	ØL (hole Ø) [mm]	Ød1 (sealing surface Ø) [mm]	No. of screws	Screw size	Weight [kg]
DN25 PN40	300	145	115	85	14	68	4	M12	6.9
DN40 PN40	300	153	150	110	18	88	4	M16	8.8
DN50 PN40	300	159	165	125	18	102	4	M16	10.4
DN80 PN16	300	173	200	160	18	138	8	M16	13.2
DN80 PN40	300	173	200	160	18	138	8	M16	14.8
DN100 PN16	320	186	220	180	18	158	8	M16	15.5
DN100 PN40	320	186	235	190	22	162	8	M20	18.9
DN150 PN16	320	213	285	240	22	212	8	M20	24
DN200 PN10	320	239	340	295	22	268	8	M20	35
DN200 PN16	320	239	340	295	22	268	12	M20	34.8

Dimensional details without ball valve, ASME-flanges Class 150									
NPS	L (length) [mm]	H (height) [mm]	ØD (outer Ø) [mm]	ØK (pitch circle) [mm]	ØL (hole Ø) [mm]	Ød1 (sealing surface Ø) [mm]	No. of screws	Screw size	Weight [kg]
1	317.5 ≈ 12.5"	140	110	79.4	15.9	50.8	4	M14	6.3
1½	317.5 ≈ 12.5"	148	125	98.4	15.9	73	4	M14	8.1
2	317.5 ≈ 12.5"	154	150	120.7	19.1	92	4	M16	10.2
3	355.7 ≈ 14"	168	190	152.4	19.1	127	4	M16	15.4
4	355.7 ≈ 14"	181	230	190.5	19.1	157.2	8	M16	20.1
6	381 ≈ 15"	208	280	241.3	22.2	216	8	M20	29.7
8	381 ≈ 15"	233	345	298.5	22.2	270	8	M20	47.3

Dimensional details without ball valve, ASME-flanges Class 300									
NPS	L (length) [mm]	H (height) [mm]	ØD (outer Ø) [mm]	ØK (pitch circle) [mm]	ØL (hole Ø) [mm]	Ød1 (sealing surface Ø) [mm]	No. of screws	Screw size	Weight [kg]
1	317.5 ≈ 12.5"	140	124	88.9	19.1	50.8	4	M16	7.3
1½	317.5 ≈ 12.5"	148	155	114.3	22.2	73	4	M20	10.2
2	317.5 ≈ 12.5"	154	165	127	19.1	92	8	M16	11.5
3	355.7 ≈ 14"	168	210	168.3	22.2	127	8	M20	18.9
4	355.7 ≈ 14"	181	255	200	22.2	157.2	8	M20	28.5

Dimensions and Weights DOG-4/-6 (with ball valve)

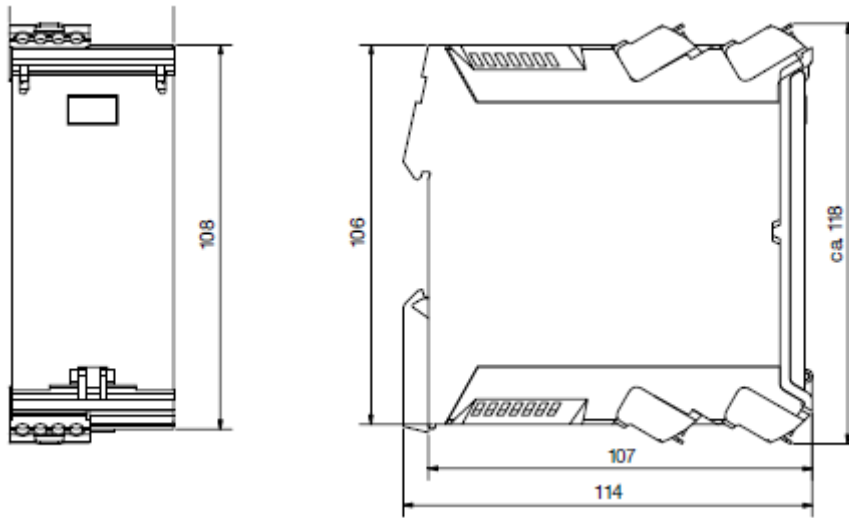


Dimensional details with ball valve, EN-flanges									
DN... PN... [mm... bar...]	L (length) [mm]	H (height) [mm]	ØD (outer Ø) [mm]	ØK (pitch circle) [mm]	ØL (hole Ø) [mm]	Ød1 (sealing surface Ø) [mm]	No. of screws	Screw size	Weight [kg]
DN25 PN40	300	166	115	85	14	68	4	M12	7.2
DN40 PN40	300	174	150	110	18	88	4	M16	9.3
DN50 PN40	300	180	165	125	18	102	4	M16	10.8
DN80 PN16	300	194	200	160	18	138	8	M16	13.6
DN80 PN40	300	194	200	160	18	138	8	M16	15.1
DN100 PN16	320	207	220	180	18	158	8	M16	15.7
DN100 PN40	320	207	235	190	22	162	8	M20	19.2
DN150 PN16	320	234	285	240	22	212	8	M20	24.3
DN200 PN10	320	260	340	295	22	268	8	M20	35.6
DN200 PN16	320	260	340	295	22	268	12	M20	35.2

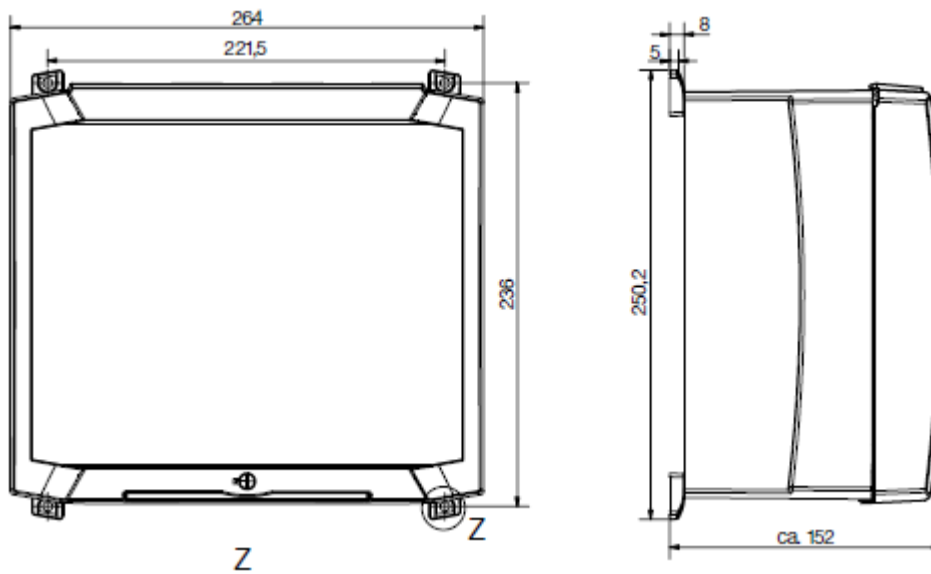
Dimensional details with ball valve, ASME-flanges Class 150									
NPS	L (length) [mm]	H (height) [mm]	ØD (outer Ø) [mm]	ØK (pitch circle) [mm]	ØL (hole Ø) [mm]	Ød1 (sealing surface Ø) [mm]	No. of screws	Screw size	Weight [kg]
1	317.5 ≈ 12.5"	166	110	79.4	15.9	50.8	4	M14	6.7
1½	317.5 ≈ 12.5"	174	125	98.4	15.9	73	4	M14	8.5
2	317.5 ≈ 12.5"	180	150	120.7	19.1	92	4	M16	10.5
3	355.7 ≈ 14"	194	190	152.4	19.1	127	4	M16	15.7
4	355.7 ≈ 14"	207	230	190.5	19.1	157.2	8	M16	20.5
6	381 ≈ 15"	234	280	241.3	22.2	216	8	M20	30
8	381 ≈ 15"	260	345	298.5	22.2	270	8	M20	48

Dimensional details with ball valve, ASME-flanges Class 300									
NPS	L (length) [mm]	H (height) [mm]	ØD (outer Ø) [mm]	ØK (pitch circle) [mm]	ØL (hole Ø) [mm]	Ød1 (sealing surface Ø) [mm]	No. of screws	Screw size	Weight [kg]
1	317.5 ≈ 12.5"	166	124	88.9	19.1	50.8	4	M16	7.7
1½	317.5 ≈ 12.5"	174	155	114.3	22.2	73	4	M20	10.6
2	317.5 ≈ 12.5"	180	165	127	19.1	92	8	M16	11.9
3	355.7 ≈ 14"	194	210	168.3	22.2	127	8	M20	19.3
4	355.7 ≈ 14"	207	255	200	22.2	157.2	8	M20	28.8

Dimensions Electronics DOG-...A/B/C/D/E/F/R



Dimensions Electronics DOG-...G/H/I/K/L/M/N/O



18. EU Declaration of Conformance

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

Oscillation Flowmeter Model: DOG-4/-6

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

EN 61326:2013-07 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

EN 13480-1:2013-11 Metallic industrial piping - Part 1: General

EN IEC 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Additional for **DOG-4/-6...A/H/N/D/F/P/K**:

EN 60079-0:2018 Explosive atmospheres - Part 0: Equipment – General requirements

EN 60079-11:2012 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

Also, the following EU guidelines are fulfilled:

2014/30/EU	EMC Directive
2014/35/EU	Low Voltage Directive
2011/65/EU	RoHS (category 9)
2015/863/EU	Delegated Directive (RoHS III)
2014/68/EU	PED

Model DOG	DN [mm]	P _{max} [bar]	Diagram 6 Group 1 Dangerous fluids	Diagram 7 Group 2 Not dangerous fluids
DOG-	25	25	I	Art. 4, § 3
DOG-	40	25	II	II
DOG-	50	25	II	II
DOG-	80	25	II	II
DOG-	100	25	II	II
DOG-	150	16	II	II
DOG-	200	16	II	II

- Module D, marking CE0575
- Notified body: DNV GL
- Certificate No. PEDD000000R

additional for **DOG-4/-6...A/H/N/D/F/P/K:**

2014/34/EU Equipment and Protective systems intended for
use in a potentially Explosive Atmospheres


Quality Management Production

Certificate number: BVS 21 ATEX ZQS/E110

Notified body: DEKRA Testing and Certification GmbH

Identification number: 0158

Hofheim, 14 April 2022



H. Volz
General Manager



M. Wenzel
Proxy Holder

19. ATEX-Certificate



Translation

1 EU-Type Examination Certificate Supplement 2

2 **Equipment intended for use in potentially explosive atmospheres
Directive 2014/34/EU**

3 EU-Type Examination Certificate Number: **BVS 13 ATEX E 020 X**

4 Product: **Flow measuring system type DOG-42***** and DOG-62*******

5 Manufacturer: **KOBOLD Messring GmbH**

6 Address: **Nordring 22-24, 65719 Hofheim/Ts., Germany**

7 This supplementary certificate extends EU-Type Examination Certificate No. BVS 13 ATEX E 020 X to apply to products designed and constructed in accordance with the specification set out in the appendix of the said certificate but having any acceptable variations specified in the appendix to this certificate and the documents referred to therein.

8 DEKRA Testing and Certification GmbH, Notified Body number 0158, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential Report No. BVS PP 13.2048 EU.

9 The Essential Health and Safety Requirements are assured in consideration of

EN IEC 60079-0:2018 General requirements
EN 60079-11:2012 Intrinsic Safety "i"

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

11 This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

 **II (1)G [Ex ia Ga] IIC for transmitter type DOG-42***** and DOG-62*******
II 1G Ex ia IIC T4 Ga for sensor type DOG-42*** and DOG-62*******

DEKRA Testing and Certification GmbH
Bochum, 2021-08-11

Signed: Jörg-Timm Kilisch

Managing Director



Page 1 of 3 of BVS 13 ATEX E 020 X / N2 – Jobnumber 342232300
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DEKRA Testing and Certification GmbH, Handwerkstr. 15, 70565 Stuttgart, Germany
Certification body: Dinnendahlstr. 9, 44809 Bochum, Germany
Phone +49.234.3696-400, Fax +49.234.3696-401, e-mail DTC-Certification-body@dekra.com



13 **Appendix**

14 **EU-Type Examination Certificate**

**BVS 13 ATEX E 020 X
Supplement 2**

15 **Product description**

15.1 **Subject and type**

Flow measuring device type DOG-42*****,
consisting of one type transmitter DOG-42***** with one type sensor DOG-42*****,
and
Flow measuring device type DOG-62*****
consisting of one type of transmitter DOG-62***** with one type of sensor DOG-62*****.

15.2 **Description**

The flow measuring system is intended for flow measuring of gaseous media,
The flow measuring system consists of a type transmitter DOG-42***** with a type sensor DOG-42***** or of a type transmitter DOG-62***** with a type sensor DOG-62*****.
The transmitter have to be mounted outside the hazardous area, both apparatus can be connected via an up to 100 m long cable.

Type Code

DOG	-	a	2	*	*	*	*	*	b	*	*
-----	---	---	---	---	---	---	---	---	---	---	---

All characters "*" are not relevant for explosion protection.

- a State of aggregation of the medium
4 = for gases
6 = for damp gases
- b Electronics
A = Frequency output, 230 VAC
D = Frequency output, 110 VAC
F = Frequency output, 24VAC
R = Frequency output, 24VDC
H = Totaliser, pulse output, analogue output, 230 VAC
I = Totaliser, pulse output, analogue output, 110 VAC
L = Totaliser, pulse output, analogue output, 24 VDC
N = Flow computer, pulse output, analogue output, 230 VAC
P = Flow computer, pulse output, analogue output, 110 VAC

Reason for the supplement:

- Additional variant type DOG-62***** is due to a special sensor especially for use with humid gases.
- The type code is extended.
- Update of documentation.
- Testing is no longer carried out according to the IEC 60079-26 standard.



Page 2 of 3 of BVS 13 ATEX E 020 X / N2 – Jobnumber 342232300
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Certification body: Dinnendahlstr. 9, 44809 Bochum, Germany
Phone +49.234.3696-400, Fax +49.234.3696-401, e-mail DTC-Certification-body@dekra.com



15.3 Parameters

15.3.1 Type transmitter DOG-42***** and DOG-62*****

15.3.1.1 Mains circuit (terminals X100:2 and X100:4)

Nominal voltage		AC	230	V
	or	AC	110	V
	or	AC	24	V
Max. voltage	U _m	AC	253	V

15.3.1.2 Power supply (sensor) circuit (terminals X201:1 and X201:3), level of protection Ex ia IIC

Voltage	U _o	DC	8.6	V
Current	I _o		925	mA
Power	P _o		1.17	W

Trapezoid output characteristic

15.3.1.3 Floating opto coupler output circuit (terminals X200:3 and X200:4), level of protection Ex ia IIC

Voltage	U _i	DC	30	V
---------	----------------	----	----	---

Effective internal capacitance C_i negligible

Effective internal inductance L_i negligible

15.3.1.4 Ambient temperature range T_a -20 °C up to +60 °C

15.3.2 Type sensor DOG-42***** and DOG-62*****

Ambient temperature range T_a -20 °C up to +60 °C

16 Report Number

BVS PP 13.2048 EU, as of 2021-08-11

17 Special Conditions for Use

The sensor has to be mounted in areas where ignition hazard due to impact or friction will be excluded.

The sensor has to be mounted in areas where electrostatic charging / discharging hazard will be excluded.

The connecting cable has to be in a fixed installation if the ambient temperature is below -5 °C.

18 Essential Health and Safety Requirements

The Essential Health and Safety Requirements are covered by the standards listed under item 9.

19 Drawings and Documents

Drawings and documents are listed in the confidential report.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA Testing and Certification GmbH
Bochum, 2021-08-11
BVS-Alh/Mu A20210176


Managing Director



Page 3 of 3 of BVS 13 ATEX E 020 X / N2 – Jobnumber 342232300
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Certification body: Dinnendahlstr. 9, 44809 Bochum, Germany
Phone +49.234.3696-400, Fax +49.234.3696-401, e-mail DTC-Certification-body@dekra.com



Translation

EU-Type Examination Certificate Supplement 1

Change to Directive 2014/34/EU

- 2 **Equipment intended for use in potentially explosive atmospheres**
Directive 2014/34/EU
- 3 EU-Type Examination Certificate Number: **BVS 13 ATEX E 020 X**
- 4 Product: **Flow measuring system type DOG-4**
- 5 Manufacturer: **KOBOLD Messring GmbH**
- 6 Address: **Nordring 22-24, 65719 Hofheim/Ts., Germany**

7 This supplementary certificate extends EC-Type Examination Certificate No. BVS 13 ATEX E 020 X to apply to products designed and constructed in accordance with the specification set out in the appendix of the said certificate but having any acceptable variations specified in the appendix to this certificate and the documents referred to therein.

8 DEKRA EXAM GmbH, Notified Body number 0158, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in the confidential Report No. BVS PP 13.2048 EU.

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 60079-0:2012 + A11:2013 General requirements
EN 60079-11:2012 Intrinsic Safety "i"
EN 60079-26:2015 Equipment with equipment protection level (EPL) Ga

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

11 This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

 **II (1) G [Ex ia Ga] IIC** for type transmitter DOG-4
II 1 G Ex ia IIC T4 Ga for type sensor DOG-4

DEKRA EXAM GmbH
Bochum, 2016-10-31

Signed: Jörg Koch

Certifier

Signed: Dr. Michael Wittler

Approver



Page 1 of 3 of BVS 13 ATEX E 020 X / N1
This certificate may only be reproduced in its entirety and without any change.

DEKRA EXAM GmbH, Dinnendahlstrasse 9, 44809 Bochum, Germany,
telephone +49.234.3696-105, Fax +49.234.3696-110, zs-exam@dekra.com



13 **Appendix**

14 **EU-Type Examination Certificate**

**BVS 13 ATEX E 020 X
Supplement 1**

15 **Product description**

15.1 **Subject and type**

Flow measuring system type DOG-4,
consisting of a type transmitter DOG-4 and a type sensor DOG-4

15.2 **Description**

The flow measuring system is intended for flow measuring of gaseous media.

The flow system consists of a transmitter which has to be mounted outside the hazardous area and a flow sensor; both apparatus can be connected via an up to 100 m long cable.

With this supplement the certificate is changed to Directive 2014/34/EU.

(Annotation: In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplementary Certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.)

Reason for the supplement:

Change to Directive 2014/34/EU

Two new variants with mains voltages 110 V and 24 V are possible

15.3 **Parameters**

15.3.1 **Type transmitter DOG-4**

15.3.1.1 **Mains circuit (terminals X100:2 and X100:4)**

Nominal voltage		AC	230	V
	or	AC	110	V
	or	AC	24	V
max. voltage	U_m	AC	253	V

15.3.1.2 **Power supply (sensor) circuit (terminals X201:1 and X201:3), level of protection Ex ia IIC**

Voltage	U_o	DC	8.6	V
Current	I_o		925	mA
Power	P_o		1.17	W

trapezoid output characteristic

15.3.1.3 **Floating opto coupler output circuit (terminals X200:3 and X200:4), level of protection Ex ia IIC**

Voltage	U_i	DC	30	V
Effective internal capacitance	C_i		negligible	
Effective internal inductance	L_i		negligible	

15.3.1.4 **Ambient temperature range**

T_a -20 °C up to +60 °C

15.3.2 **Type sensor DOG-4**

Ambient temperature range T_a -20 °C up to +60 °C





16 **Report Number**

BVS PP 13.2048 EU, as of 2016-10-31

17 **Special Conditions for Use**

The sensor has to be mounted in areas where ignition hazard due to impact or friction will be excluded.

The sensor has to be mounted in areas where electrostatic charging/discharging hazard will be excluded.

The connecting cable has to be in a fixed installation if the ambient temperature is below -5 °C.

18 **Essential Health and Safety Requirements**

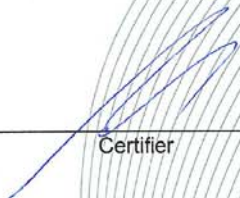
The Essential Health and Safety Requirements are covered by the standards listed under item 9.

19 **Drawings and Documents**


Drawings and documents are listed in the confidential report.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA EXAM GmbH
Bochum, dated 2016-10-31
BVS-Schu/Nu A 20160043



Certifier



Approver

Page 3 of 3 of BVS 13 ATEX E 020 X / N1
This certificate may only be reproduced in its entirety and without any change.




DEKRA EXAM GmbH, Dinnendahlstrasse 9, 44809 Bochum, Germany,
telephone +49.234.3696-105, Fax +49.234.3696-110, zs-exam@dekra.com



Translation

EC-Type Examination Certificate

- (1) Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC
- (2) No. of EC-Type Examination Certificate: **BVS 13 ATEX E 020 X**
- (3) Equipment: **Flow measuring system type DOG-4**
- (4) Manufacturer: **KOBOLD Messring GmbH**
- (5) Address: **Nordring 22-24, 65719 Hofheim/Ts., Germany**
- (6) The design and construction of this equipment and any acceptable variation thereto are specified in the appendix to this type examination certificate.
- (7) The certification body of DEKRA EXAM GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive. The examination and test results are recorded in the test and assessment report BVS PP 13.2048 EG.
- (8) The Essential Health and Safety Requirements are assured by compliance with:
 - EN 60079-0:2012 General requirements**
 - EN 60079-11:2012 Intrinsic safety 'i'**
 - EN 60079-26:2007 Equipment with equipment protection level (EPL) Ga**
- (9) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the appendix to this certificate.
- (10) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.
- (11) The marking of the equipment shall include the following:

 **II (1) G [Ex ia Ga] IIC** for reader type DOG-4A
II 1 G Ex ia IIC T4 Ga for sensor type DOG-4S

DEKRA EXAM GmbH
 Bochum, dated 22nd February 2013

Signed: Simanski

Signed: Dr. Eickhoff

 Certification body

 Special services unit



(13) Appendix to

(14) **EC-Type Examination Certificate
BVS 13 ATEX E 020 X**

(15) 15.1 Subject and type

Flow measuring system type DOG-4,
consisting of a reader type DOG-4A and a sensor type DOG-4S

15.2 Description

The flow measuring system is intended for flow measuring of gaseous media.
The flow system consists of a reader which has to be mounted outside the hazardous area and a flow sensor; both apparatus can be connected via an up to 100 m long cable.

15.3 Parameters

15.3.1 Reader type DOG-4A

15.3.1.1 Mains circuit (terminals X100:2 and X100:4)

Nominal voltage		AC	230	V
max. voltage	Um	AC	253	V

15.3.1.2 Power supply (sensor) circuit (terminals X201:1 and X201:3), level of protection Ex ia IIC

Voltage	Uo	DC	8.6	V
Current	Io		925	mA
Power	Po		1.17	W

trapezoid output characteristic

15.3.1.3 Floating opto coupler output circuit (terminals X200:3 and X200:4),
level of protection Ex ia IIC

Voltage	Ui	DC	30	V
effective internal capacitance	Ci		negligible	
effective internal inductance	Li		negligible	

15.3.1.4 Ambient temperature range

Ta	-20 °C up to +60 °C
----	---------------------

15.3.2 Sensor type DOG-4S

Ambient temperature range	Ta	-20 °C up to +60 °C
---------------------------	----	---------------------

(16) Test and assessment report

BVS PP 13.2048 EG as of 22nd February 2013

(17) Special conditions for safe use

- 17.1 The sensor has to be mounted in areas where ignition hazard due to impact or friction will be excluded.
- 17.2 The sensor has to be mounted in areas where electrostatic charging/discharging hazard will be excluded.
- 17.3 The connecting cable has to be in a fixed installation if the ambient temperature is below -5 °C.



We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.


DEKRA EXAM GmbH
44809 Bochum, 22nd February 2013
BVS-Schu/Ma A 20120869

Certification body

Special services unit

20. IECEx-Certificate

		<h2 style="margin: 0;">IECEX Certificate of Conformity</h2>	
<p>INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres <small>for rules and details of the IECEx Scheme visit www.iecex.com</small></p>			
Certificate No.:	IECEX BVS 13.0035X	Page 1 of 4	<u>Certificate history:</u>
Status:	Current	Issue No: 2	Issue 1 (2016-11-04) Issue 0 (2013-03-01)
Date of Issue:	2021-08-17		
Applicant:	KOBOLD Messring GmbH Nordring 22-24 65719 Hofheim/Ts. Germany		
Equipment:	Flow measuring system type DOG-42***** and DOG-62*****		
Optional accessory:			
Type of Protection:	Intrinsic Safety "I"		
Marking:	[Ex Ia Ga] IIC for type transmitter DOG-42***** and DOG-62***** Ex Ia IIC T4 Ga for type sensor DOG-42***** and DOG-62*****		
Approved for issue on behalf of the IECEx Certification Body:		Ralf Leiendecker Deputy Head of Certification Body	
Position:			
Signature: (for printed version)		_____ 17.08.2021	
Date:			
1. This certificate and schedule may only be reproduced in full. 2. This certificate is not transferable and remains the property of the issuing body. 3. The Status and authenticity of this certificate may be verified by visiting www.iecex.com or use of this QR Code.			
Certificate issued by:			
DEKRA Testing and Certification GmbH Certification Body Dinnendahlstrasse 9 44809 Bochum Germany		On the safe side.	

	IECEX Certificate of Conformity	
Certificate No.:	IECEX BVS 13.0035X	Page 2 of 4
Date of issue:	2021-08-17	Issue No: 2
Manufacturer:	KOBOLD Messring GmbH Nordring 22-24 65719 Hofheim/Ts. Germany	
Additional manufacturing locations:		
<p>This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEX Quality system requirements. This certificate is granted subject to the conditions as set out in IECEX Scheme Rules, IECEX 02 and Operational Documents as amended</p>		
STANDARDS : The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards		
IEC 60079-0:2017 Edition:7.0	Explosive atmospheres - Part 0: Equipment - General requirements	
IEC 60079-11:2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "I"	
This Certificate does not indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.		
TEST & ASSESSMENT REPORTS: A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:		
Test Report:	DE/BVS/EXTR13.0034/02	
Quality Assessment Report:	DE/BVS/QAR09.0001/11	



IECEX Certificate of Conformity

Certificate No.: **IECEX BVS 13.0035X**

Page 3 of 4

Date of issue: 2021-08-17

Issue No: 2

EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

General product information:

The flow measuring system is intended for flow measuring of gaseous media.
 The flow measuring system consists of a type transmitter DOG-42***** with a type sensor DOG-42***** or of a type transmitter DOG-62***** with a type sensor DOG-62*****.
 The transmitter have to be mounted outside the hazardous area; both apparatus can be connected via an up to 100 m long cable.

Type Code

DOG	-	a	2	**	*	**	*	b	*	*
-----	---	---	---	----	---	----	---	---	---	---

All characters "*" are not relevant for explosion protection.

- a State of aggregation of the medium
 - 4 = for gases
 - 6 = for damp gases


- b Electronics
 - A = Frequency output, 230 VAC
 - D = Frequency output, 110 VAC
 - F = Frequency output, 24 VAC
 - R = Frequency output, 24 VDC
 - H = Totaliser, pulse output, analogue output, 230 VAC
 - I = Totaliser, pulse output, analogue output, 110 VAC
 - L = Totaliser, pulse output, analogue output, 24 VDC
 - N = Flow computer, pulse output, analogue output, 230 VAC
 - P = Flow computer, pulse output, analogue output, 110 VAC

Parameters

See Annex

SPECIFIC CONDITIONS OF USE: YES as shown below:

- The sensor has to be mounted in areas where ignition hazard due to impact or friction will be excluded.
- The sensor has to be mounted in areas where electrostatic charging / discharging hazard will be excluded.
- The connecting cable has to be in a fixed installation if the ambient temperature is below -5 °C.

	<h2>IECEX Certificate of Conformity</h2>
Certificate No.: IECEX BVS 13.0035X	Page 4 of 4
Date of issue: 2021-08-17	Issue No: 2
DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)	
<ul style="list-style-type: none">- Additional variant type DOG-62***** is due to a special sensor especially for use with humid gases. The transmitter remains unchanged to type DOG-42***** in housing and electronics design.- The type code is extended- Update of documentation.- Testing is no longer carried out according to the IEC 60079-26 standard.	
Annex:	
BVS_13_0035X_Kobold_Annex_Issue_2.pdf	



IECEX Certificate
of Conformity



Certificate No.: **IECEX BVS 13.0035X issue No: 2**
Annex
 Page 1 of 1


Parameters

1	Type transmitter DOG-42***** and DOG-62*****				
1.1	Mains circuit (terminals X100:2 and X100:4)				
	Nominal voltage		AC	230	V
			or AC	110	V
			or AC	24	V
	max. voltage	U _m	AC	253	V
1.2	Power supply (sensor) circuit (terminals X201:1 and X201:3), level of protection Ex ia IIC				
	Voltage	U _o	DC	8.6	V
	Current	I _o		925	mA
	Power	P _o		1.17	W
	Trapezoid output characteristic				
1.3	Floating opto coupler output circuit (terminals X200:3 and X200:4), level of protection Ex ia IIC				
	Voltage	U _i	DC	30	V
	Effective internal capacitance	C _i		negligible	
	Effective internal	L _i		negligible	
1.4	Ambient temperature range	T _a		-20 °C up to +60 °C	
2	Type sensor DOG-42***** and DOG-62*****				
	Ambient temperature range	T _a		-20 °C up to +60 °C	



IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
 for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx BVS 13.0035X	issue No.:1	Certificate history: Issue No. 1 (2016-11-4) Issue No. 0 (2013-3-1)
Status:	Current		
Date of Issue:	2016-11-04	Page 1 of 4	
Applicant:	KOBOLD Messring GmbH Nordring 22-24 65719 Hofheim/Ts. Germany		
Equipment: Optional accessory:	Flow measuring system type DOG-4		
Type of Protection:	Equipment protection by intrinsic safety "I", Equipment with Equipment Protection Level (EPL) Ga		
Marking:	[Ex ia Ga] IIC for type transmitter DOG-4 Ex ia IIC T4 Ga for type sensor DOG-4		
Approved for issue on behalf of the IECEx Certification Body:	J. Koch		
Position:	Head of Certification Body		
Signature: (for printed version)	 _____		
Date:	 _____		


1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the [Official IECEx Website](http://www.iecex.com).

Certificate issued by:

DEKRA EXAM GmbH
 Dinnendahlstrasse 9
 44809 Bochum
 Germany



DEKRA
 On the safe side.

		<h2 style="margin: 0;">IECEX Certificate of Conformity</h2>	
Certificate No.:	IECEX BVS 13.0035X	Issue No.:	1
Date of Issue:	2016-11-04	Page 2 of 4	
Manufacturer:	KOBOLD Messring GmbH Nordring 22-24 65719 Hofheim/Ts. Germany		
Additional Manufacturing location(s):			
This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.			
STANDARDS: The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:			
IEC 60079-0 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements		
IEC 60079-11 : 2011 Edition: 6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"		
IEC 60079-26 : 2014-10 Edition: 3.0	Explosive atmospheres – Part 26: Equipment with Equipment Protection Level (EPL) Ga		
<i>This Certificate does not indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.</i>			
TEST & ASSESSMENT REPORTS: A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in			
<u>Test Report:</u> DE/BVS/ExTR13.0034/01			
<u>Quality Assessment Report:</u> DE/BVS/QAR09.0001/07			



IECEx Certificate of Conformity

Certificate No.: IECEx BVS 13.0035X
 Date of Issue: 2016-11-04
 Issue No.: 1
 Page 3 of 4

Schedule


EQUIPMENT:
 Equipment and systems covered by this certificate are as follows:

General product information:
 The flow measuring system is intended for flow measuring of gaseous media.
 The flow system consists of a transmitter which has to be mounted outside the hazardous area and a flow sensor; both apparatus can be connected via an up to 100 m long cable.

Parameters
 See Annex

SPECIFIC CONDITIONS OF USE: YES as shown below:

The sensor has to be mounted in areas where ignition hazard due to impact or friction will be excluded.
 The sensor has to be mounted in areas where electrostatic charging/discharging hazard will be excluded.
 The connecting cable has to be in a fixed installation if the ambient temperature is below -5 °C.

	IECEX Certificate of Conformity	
Certificate No.:	IECEX BVS 13.0035X	
Date of Issue:	2016-11-04	Issue No.: 1
		Page 4 of 4
DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):		
<p>Two variants have been added: variants with nominal mains voltage of AC 110 V and with nominal mains voltage of AC 24 V (marking of mains voltage on the label).</p>		

Annex: [BVS_13_0035X_Kobold_Annex_issue_1.pdf](#)