



Oscillation Flow Meter for dry and wet gases



measuring
•
monitoring
•
analysing

DOG-4/-6



DOG-4



DOG-6



- Measuring ranges:
0.12 - 12 ... 60 - 6000 m³/h air
- p_{max}: 25 bar; t_{max}: 120 °C
- Connection:
flange DN 25 ... DN 200,
ANSI 1" ... 8"
- Material: stainless steel
- Accuracy:
±1.5 % of reading
- No moving parts
- Long-term stability
- Options: flow computer,
analogue and pulse outputs



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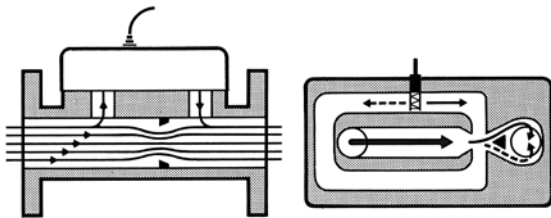
Description

The KOBOLD flow meters DOG-4/-6 are used for flow measurement of gases.

Primary use of DOG-4 is for dry gases.

The DOG-6 comes with a special sensor construction and an inclined measuring head. This inclination optimises the condensate drain specifically for applications involving wet gases, e.g. biogas.

The medium flows through an orifice in a tube. Bypass bores are located at the sides. The dynamic pressure at the orifice causes part of the gas volumetric flow to flow into the bypass. The pressure ratio remains constant over the whole measuring range.



The bypass channel contains the Oscillator – the Measuring cell itself. When the gas flows through the measuring cell, a gas column oscillates in a U-shaped channel mounted to the left and right. This oscillation frequency is proportional to the flow velocity and thus to the total volume flow. The oscillation frequency is sensed with a platinum sensor. An electrical alternating signal is generated that is displayed in the series connected electronics.

Application

The inner, connected flow channels are generously dimensioned. The constant changes of direction of the flow in the channels have a self-cleaning effect. The devices are therefore extremely dirt resistant and have no consumables. The mounting position can be chosen at will. When condensate forms in the gas, the horizontal mounting position with the sensing element pointing upwards is recommended. The gas flow velocity anywhere in the pipework upstream of the flow meter should not exceed the sound velocity. Pressure drops above critical and pulsating streams must be avoided.

The recommended inlet pipe section is 10xDN and the outlet pipe section 5xDN.

The version available with the bypass ball valves installed between the measuring head and the housing enables easy sensor replacement and/ or measuring head cleaning without flow interruption in main line/ flow meter. The bypass valves also serve for sensor protection against mechanical damage during start-up.

Areas of Application

- Compressed air
- Natural gas, biogas, fermentation gas
- Propane
- Hydrogen gas
- Nitrogen
- Argon

Technical Details

Measuring accuracy:	±1.5% of reading (at $Q_t \leq MV \leq 100\%^*$) ±5 % of reading (at $1\% \leq MV < Q_t^*$) <i>*The lower limit Q_t depends on the density</i> $Q_t = 8\%$ 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 ≥ 8 kg/m ³
Repeatability:	0.1% of reading
Media temperature:	-20 ... +120 °C (non ATEX version) -20 ... +60 °C (ATEX version)
Ambient temperature:	-20 ... +80 °C (non ATEX version) -20 ... +60 °C (ATEX version)
Operating pressure:	max. 25 bar
Span:	DOG-4: 1:100, DOG-6: max. 1:75
Hot wire sensor:	platinum sensor
Protection:	IP 65

Materials (Sensor)

Housing:	stainless steel 1.4404/316L
Orifice:	stainless steel 1.4404/316L
Measuring head:	polyphenylene sulfide (PPS)
Hot wire sensor:	platinum/PEEK/ceramic
Gaskets:	Klinger SIL® C-4265, NBR
Ball valves:	stainless steel

Note:

Sponsored by the Federal Ministry of Economics and Technology on the basis of a resolution of the German Bundestag.

Electronic Options


Electronics DOG-...A/B/C/D/E/F/R
(Sensor with/without ATEX/IECEX certification)

Power supply:

A:	230 V _{AC} ±10 %, 50 ... 60 Hz (with ATEX/IECEX)
B:	230 V _{AC} ±10 %, 50 ... 60 Hz (without ATEX/IECEX)
C:	110 V _{AC} ±10 %, 50 ... 60 Hz (without ATEX/IECEX)
D:	110 V _{AC} ±10 %, 50 ... 60 Hz (with ATEX/IECEX)
E:	24 V _{AC} ±10 %, 50 ... 60 Hz (without ATEX/IECEX)
F:	24 V _{AC} ±10 %, 50 ... 60 Hz (with ATEX/IECEX)
R:	24 V _{DC} ±20 %, (without ATEX/IECEX)

Input: platinum sensor (Allowed distance:
max. 50 m to sensor)

Output: opto coupler, frequency linear to
flow (see graph below)
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: -25 ... +60 °C

Protection: IP 20

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
Transducer	
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:

Flow rate

(7 digits, 17 mm high)

Total

(7 digits, 17 mm high)

resettable**Accumulated total**

(11 digits, 8 mm high)

not resettable

Flow: m³, cf, scf, Nm³

time units: /sec, /min, /hr, /day

Total: m³

Accumulated total: m³

Units:

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:	230 V _{AC} ± 10 %, 50 ... 60 Hz (without ATEX/IECEX)
H:	230 V _{AC} ± 10 %, 50 ... 60 Hz (with ATEX/IECEX)
I:	110 V _{AC} ± 10 %, 50 ... 60 Hz (without ATEX/IECEX)
K:	110 V _{AC} ± 10 %, 50 ... 60 Hz (with ATEX/IECEX)
L:	24 V _{DC} ± 20 %, (without ATEX/IECEX)

Electrical connection: 4 x M16x1.5 cable gland

Housing material: ABS with PC cover

Weight: approx. 1800 g

Analogue output: 4 ... 20 mA (active),
10-Bit resolution, 3-wire

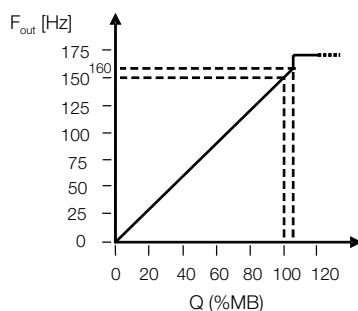
Pulse output: PNP, 24 V_{DC} active max. 50 mA,
scaled according to linearised
accumulated total (e. g. pulse
every 12 litres)
pulse duration: user defined
0.008 s ... 2 s
max. frequency 64 Hz

Protection: IP 65

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

Frequency/Flow Linearity



Elektronic Options (continuation)

(optional, other Modbus versions on request)

Ex version (K):

ATEX

Transducer:

Ex II (1)G [Ex ia Ga] IIC

Sensor:

Ex II 1 G Ex ia IIC T4 Ga

IECEX

Transducer:

[Ex ia Ga] IIC

Sensor:

Ex ia IIC T4 Ga

Electronics 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: m³, cf, scf, Nm³

time units: /sec, /min, /hr, /day

Total: m³

Accumulated total: m³

Temperature: °C, °F or K

Pressure: mbar, bar, PSI

Decimal places:

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:

230 V_{AC} ± 10 %, 50 ... 60 Hz
(without ATEX/IECEX)

N:

230 V_{AC} ± 10 %, 50 ... 60 Hz
(with ATEX/IECEX)

O:

110 V_{AC} ± 10 %, 50 ... 60 Hz
(without ATEX/IECEX)

P:

110 V_{AC} ± 10 %, 50 ... 60 Hz
(with ATEX/IECEX)

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 V_{DC} active max. 50 mA,
scaled according to linearised
accumulated total (e. g. pulse
every 12 litres)
pulse duration: user defined
0.001 s ... 10 s
max. frequency 500 Hz

Protection:

IP 65

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)

Ex version (P):

ATEX

Transducer:

Ex II (1)G [Ex ia Ga] IIC

Sensor:

Ex II 1 G Ex ia IIC T4 Ga

IECEX

Transducer:

[Ex ia Ga] IIC

Sensor:

Ex ia IIC T4 Ga

Display



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

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 = 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-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			
0.2...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.



Oscillation Flow Meter Model DOG-4/-6

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					
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..						
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..						
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..						
2.7 ... 270 CFM	DOG-42D6A80..						
4.7 ... 470 CFM	DOG-42F1A80..						
1.4 ... 140 m³/h Air	DOG-42B5B80..	Class 300					
4.5 ... 450 m³/h Air	DOG-42D5B80..						
8.0 ... 800 m³/h Air	DOG-42F0B80..						
0.82 ... 82 CFM	DOG-42B6B80..						
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..						
3.8 ... 380 CFM	DOG-42E6F1H..						
5.9 ... 590 CFM	DOG-42F6F1H..						
2.7 ... 270 m³/h Air	DOG-42D0S1H..	PN 40					
6.5 ... 650 m³/h Air	DOG-42E5S1H..						
10 ... 1000 m³/h Air	DOG-42F5S1H..						
1.6 ... 160 CFM	DOG-42D1S1H..						
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 6"	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-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								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)												
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"							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)									
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	DN 200														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)						
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					DN 200													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)			
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"																				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)
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.



Oscillation Flow Meter Model DOG-4/-6

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..	Class 150	ANSI 1"			
0.12...9 m³/h Air	DOG-62S0A25..					
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..	Class 300	ANSI 1"			
0.41...32 CFM	DOG-62A1A25..					
0.12...9 m³/h Air	DOG-62S0B25..					
0.2...15 m³/h Air	DOG-6200B25..	Class 300	ANSI 1"			
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	DN 40			
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..	Class 150	ANSI 1 ½"			
0.12...9 m³/h Air	DOG-62S0A40..					
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..	Class 300	ANSI 1 ½"			
1.2...88 CFM	DOG-62C1A40..					
0.12...9 m³/h Air	DOG-62S0B40..					
0.2...15 m³/h Air	DOG-6200B40..	Class 300	ANSI 1 ½"			
0.9...70 m³/h Air	DOG-62A5B40..					
2...150 m³/h Air	DOG-62C0B40..					
0.12...9 m³/h Air	DOG-62S0S50..	PN40	DN 50			
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..	Class 150	ANSI 2"			
0.12...9 m³/h Air	DOG-62S0A50..					
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..	Class 300	ANSI 2"			
1.5...110 CFM	DOG-62C6A50..					
0.12...9 m³/h Air	DOG-62S0B50..					
0.2...15 m³/h Air	DOG-6200B50..	Class 300	ANSI 2"			
1.1...85 m³/h Air	DOG-62B0B50..					
2.5...190 m³/h Air	DOG-62C5B50..					

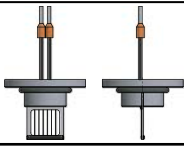
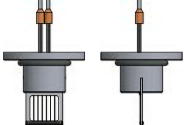
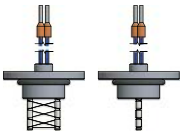
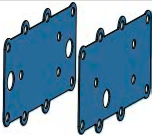
*Max. pressure rating limited to 25 bar

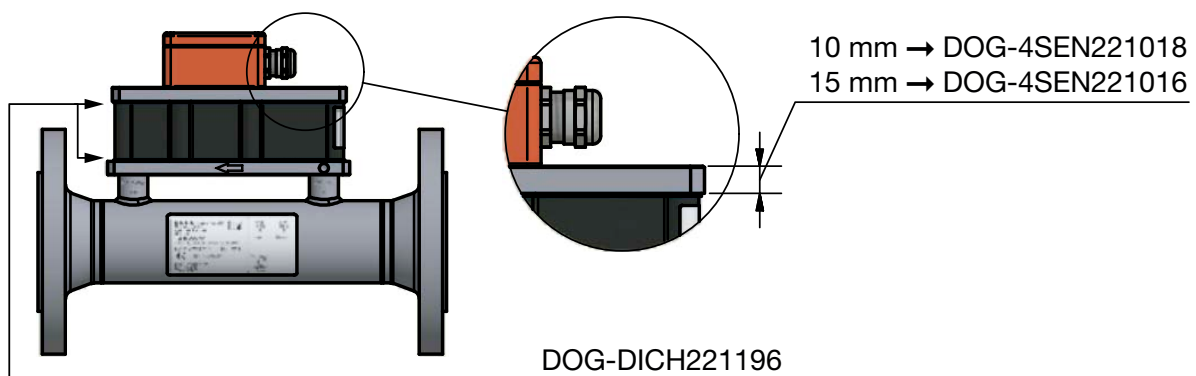
Order Details for DOG-6 for wet gases (Example: DOG-62S0S50 0 B0 0) (continued)

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-62D0B1H..						
10...750 m³/h Air	DOG-62S0B1H..						
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				

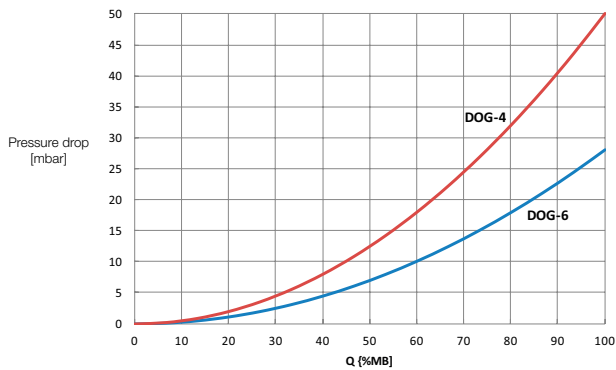
¹⁾ Max. pressure rating limited to 25 bar. For DN150/DN200 (ANSI 6"/8") max. pressure rating limited to 16 bar.

Order Details Accessories/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	



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, the pressure loss doubles at 100% higher operating pressure.

Calculating the Actual Density

The actual density can be calculated with the following formula:

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

D_0 = density at 1 bar abs. and 0°C (= 273 K)

T = temperature in K

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

T_0 = 273 K

P = operating pressure in bar (absolute pressure)

Calculating the Norm Flow

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

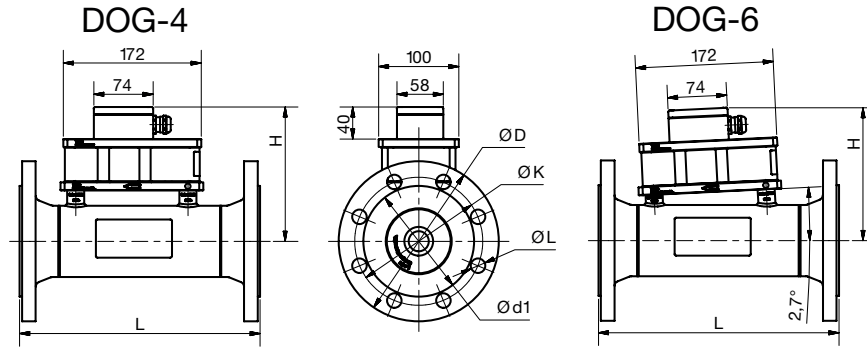
Q_N = norm flow at 1.013 bar abs. and 0°C

Q = operating flow

P = operating pressure in bar (absolute pressure)

T = operating temperature in K

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

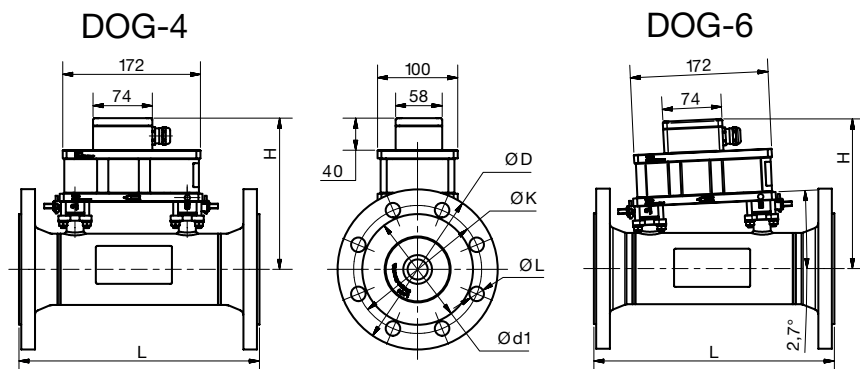


Dimensional details without ball valve, EN-flanges									
DN... PN... [mm... bar...]	L (length) [mm]	H (height) [mm]	ØD (outer Ø) [mm]	ØK (pitch circle) [mm]	ØL (hole Ø) [mm]	Ød1 (sealing surface Ø) [mm]	No. of screws	Screw size	Weight [kg]
DN25 PN40	300	145	115	85	14	68	4	M12	6.9
DN40 PN40	300	153	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

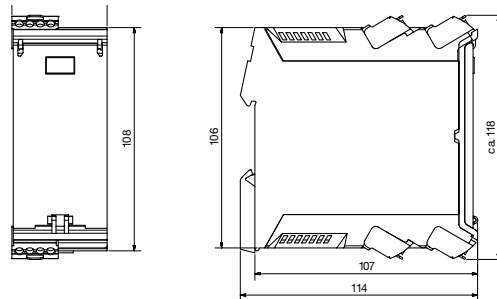
Dimensional details with ball valve, ASME-flanges Class 150

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

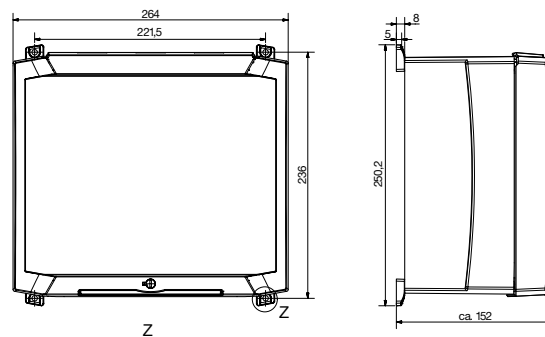
Dimensional details with ball valve, ASME-flanges Class 300

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/E/R



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



Accessories (optional)

- Replacement sensor
- Sealing for oscillator
- Recalibration tool for transmitter