

# FLOW 33

# FLOW 33 Ex

## Industrial induction flow meter in compact design without the display unit.

The flow meter can be in full stainless design where the evaluation unit is located right on the flow meter sensor. The advantage: the possibility of using the meter in various technologies where the customer needs pulse or current signals from the meter for process management. Its applications can be found in all sorts of industries.

It can be selected from two types of meter, according to environmental classification. Application in standard environment and in potentially explosive atmospheres (EX design).

The flow meter is equipped with two information LEDs, indicating the state of the meter. Electrical connection is ensured through standard M12 connector, whereas in Ex design, by means of Amphenol C006 connector.



## MAIN MERITS

- Optional compact design with full stainless construction
- Very rigid construction
- Extensive variability of mechanical connection
- Wide choice of materials for liners and electrodes
- Status signalling with LEDs
- Maintenance-free operation
- Meter constructed into Ex environment with
  - I M1 Ex ia I Ma
  - II 1G Ex ia IIC T6 Ga
  - II 1D Ex ia IIIC T85°C Da



# COMAC CAL

# TECHNICAL DATA

Power	24V DC±15 % power with polarity reversal protection
Input power	4.2 VA
Electrical connection	through M12 (8-pin) connector
Design	compact
Maximum fluid temperature	90 °C (according to lining), for higher temperatures upon agreement with the manufacturer
Diameter Nominal	DN 10÷400 (other DN upon agreement with the manufacturer)
Lining material (lining maximum temperature)	rubber (hard, soft, with potable water test certificate): DN 20÷DN 400 (T <sub>max</sub> 80 °C) PTFE: DN 15÷DN 250 (T <sub>max</sub> 150 °C) PFA: DN 300÷DN 400 (T <sub>max</sub> 130 °C) Ceramics, PEAK, PVDF (upon agreement with the manufacturer)
Electrode material	CrNi steel DIN 1.4571, Hastelloy C4, Titan, Tantalum, Platinum*
Frame	all-welded
Sensor material	flanged – stainless steel and structural steel with polyurethane coating sandwich, threaded, food grade – stainless steel
Process connection	sandwich flanged DIN (EN1092) threaded (EN1092) food grade (DIN 11851 fitting, clamp)
Pressure	PN10, PN16, PN25, PN40
Measured fluid min. conductivity	20 µS (at a lower conductivity, upon agreement with the manufacturer)
Flow meter measuring range (Q <sub>min</sub> /Q <sub>max</sub> )	unidirectional/bidirectional for 0.2÷12 m/s (1/60)
Flow meter accuracy	up to 0.5 %, repeatability up to 0.2 %
Pressure loss	negligible
Additional electrodes	grounding and detection electrodes for empty piping (DN 15÷DN 400)
Empty piping detection	DN 15÷DN 400
Display 2x LED	2× LED (meter's state is distinguished with 4 colours)
Setting	is done via Bluetooth
Outputs (passive)	pulse/flow switch (max. 1,6 kHz), 4÷20 mA
Max. ambient temperature	55 °C
Flow sensor degree of protection	IP65, IP67, IP68
Electrode degree of protection	IP67

\* With PVDF lining only

SANDWICH SENSOR



FOOD GRADE SENSOR



THREADED SENSOR

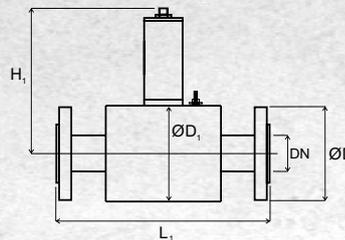


# FLOW RANGES

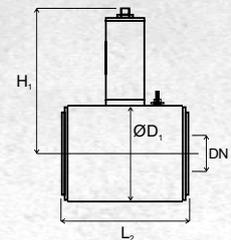
Instantaneous flow rate corresponding to flow velocity

Diameter nominal [mm]	Q <sub>min</sub> [m <sup>3</sup> /h] us Q <sub>min</sub> /Q <sub>max</sub>	Q <sub>max</sub> [m <sup>3</sup> /h]
	1/60 (0.2 m/s)	– (12 m/s)
DN 6	0.02	1.2
DN 8	0.04	2.2
DN 10	0.06	3.4
DN 15	0.13	7.6
DN 20	0.24	14.2
DN 25	0.35	21
DN 32	0.6	34
DN 40	0.9	54
DN 50	1.4	84
DN 65	2.4	144
DN 80	3.6	220
DN 100	5.6	340
DN 125	8.9	534
DN 150	13	760
DN 200	23	1350
DN 250	35	2115
DN 300	51	3050
DN 350	70	4150
DN 400	90	5426

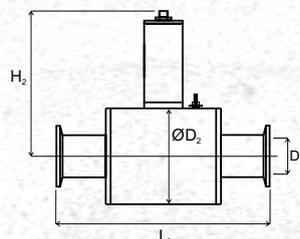
FLANGE  
(EN 1092)



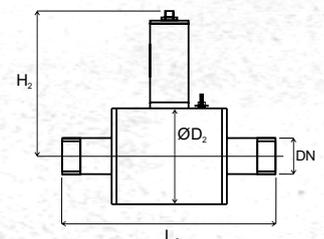
SANDWICH



CLAMP/FOOD THREAD  
(DIN32676/DIN11851)

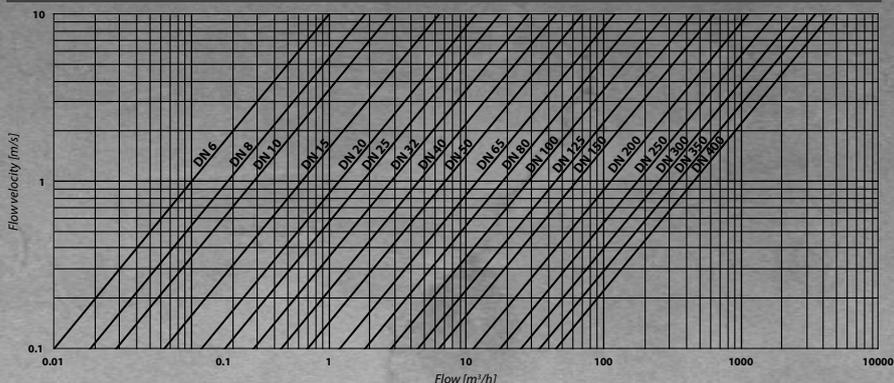


THREAD  
(EN 1092)



Constructional lengths can be modified upon agreement with the manufacturer.

## VOLUMETRIC FLOW VERSUS INSTANTANEOUS FLOW RATE DIAGRAM



## METER STATES DISPLAYED

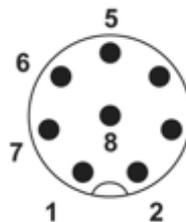
The state of the meter is continuously indicated by two LED indicators located in the cover plate of the evaluation unit (next to M12 connector).

The status of the meter indicated by LED indicators may be as follows:

LED 1	LED 2	Description	Current output
●	–	The meter is in order and the flow is zero or negative (for single-direction measurement)	4 mA
●	● flickering blue	The meter is in order and the flow is positive whereas the blue LED indicates the transmission of volumetric pulses	4÷20 mA
●	●	Empty measuring tube	<4 mA
●	–	Meter is out of order, servicing needed	<4 mA
●	●	Meter is temporarily out of parameters	<4 mA
–	–	Supply voltage error	–

## M12 CONNECTOR PINOUT

**Standard M12 male connector on meter's body pinout:**  
8-pin M12 connector for 24 V DC±15 % power, pulse output and current loop



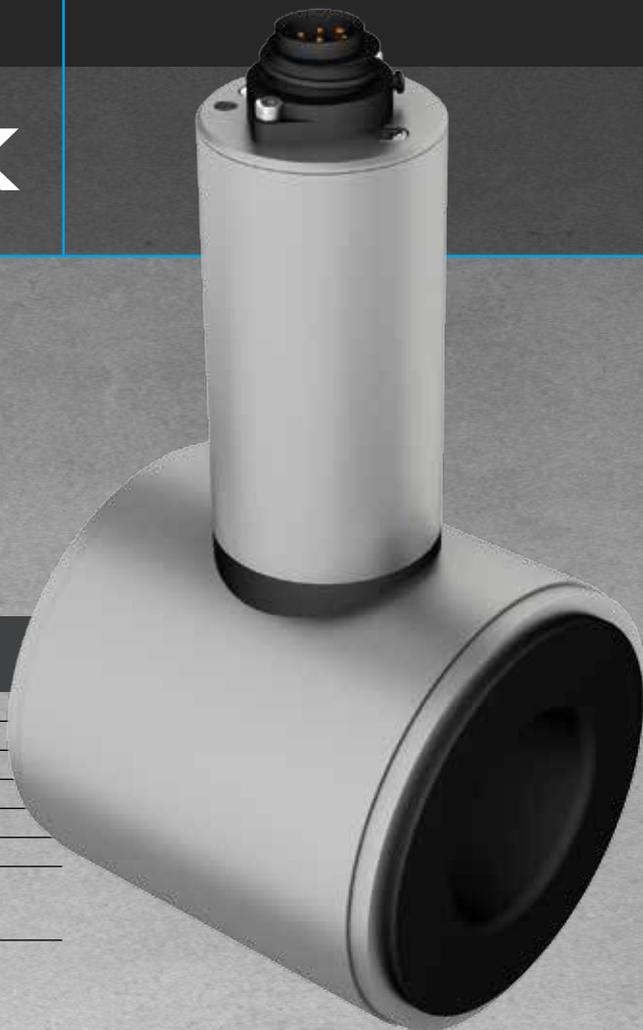
- PIN 1 Tx/D service USART
- PIN 2 Pulse output (collector – positive potential)
- PIN 3 Pulse output (emitter – negative potential)
- PIN 4 Rx/D service USART
- PIN 5 4÷20mA -
- PIN 6 4÷20mA +
- PIN 7 GND
- PIN 8 +Vdd



## DIMENSIONAL TABLE

Connection [mm]	Constructional length [mm]					Outside diameter [mm]			Total height of Compact design [mm]	
						Flange	Sensor body			
	Flanged	Sandwich	Threaded	Food Thread	Clamp	Flanged	Flanged	Threaded	Flanged	Threaded
DN	L1	L2	L3		D	D1	D2	H1	H2	
6	–	90	–	–	–	–	61	–	146	–
8	–	90	–	–	–	–	61	–	146	–
10	–	90	–	–	–	–	61	–	146	–
15	200	90	133	133	161	95	61	70	146	150
20	200	90	141	139	161	105	61	80	146	155
25	200	90	147	149	169	115	71	90	151	160
32	200	90	155	155	169	135	82	100	156	165
40	200	110	175	177	189	145	92	116	161	173
50	200	110	–	181	193	160	107	136	169	183
65	200	130	–	211	229	180	127	151	179	191
80	200	130	–	221	229	195	142	177	186	204
100	250	200	–	–	–	215	168	–	199	–
125	250	200	–	–	–	245	194	–	212	–
150	300	200	–	–	–	280	224	–	227	–
200	350	200	–	–	–	335	284	–	257	–
250	450	–	–	–	–	405	–	–	300/–	–
300	500	–	–	–	–	440	–	–	325/–	–
350	550	–	–	–	–	500	–	–	355/–	–
400	600	–	–	–	–	565	–	–	385/–	–

# FLOW 33 Ex



## Additional construction for Ex version

Power	24 V DC ± 15 % (Pi 1,904 W)
Electrical connection	through Amphenol C006 (8 Pin) connector
Diameter nominal	DN 15÷200
Lining material	rubber (hard, soft, with potable water test certificate) PTFE
Outputs	pulse or frequency 5÷15 Hz, current loop 4÷20 mA or 0,2÷1 mA
Classification	I M1 Ex ia I Ma II 1G Ex ia IIC T6 Ga II 1D Ex ia IIIC T85°C Da

The other parameters are consistent with technical data for FLOW 33.

It is an induction flow meter with optional full stainless steel construction designed for technological processes in mining industry where there are demanding requirements related to explosion hazard.

Due to its unique stainless steel construction, it is ideal for use where long service life is required also in extreme conditions. The meter is in compact design.

The meter is equipped with the pulse output with a variable impulse number or 5–15 Hz output and 4÷20 mA or 0.2–1 mA current loops.

### PRODUCT ORDERING CODE

FLOW 33

FL33/DNXXX/A1/BX/CX/DX/EX/FX/GX/H1/I1/JX

#### DN (diameter nominal)

DN... 6÷400

#### A (design)

A1... compact

#### B (connection)

B1... flanged B3... threaded  
B2... sandwich B4... diary fitting  
B5... clamp

#### C (pressure)

C1... PN10 C3... PN25  
C2... PN16 C4... PN40

#### D (lining)

D1... hard rubber D4... PTFE  
D2... soft rubber D5... PFA  
D3... rubber with potable D6... ceramics\*  
water test certificate D7... PEEK\*\*  
D8... PVDF\*\*

\* DN 15–80

\*\* Always for DN 6–10, standard EPDM sealing

#### J (oposit connector M12, 8 pin)

J1... yes  
J2... no

#### I (measuring range $Q_{min}/Q_{max}$ )

I1... 1/60

#### H (power)

H1... 24V DC ± 15 %

#### G (output)

G1... impulse  
G2... imp. + 4÷20 mA

#### F (degree of protection)

F1... IP65  
F2... IP67  
F3... IP68

#### E (electrodes)

E1... stainless steel 316 Ti  
E2... hastelloy C4  
E3... titanium  
E4... tantalum  
E5... platinum

FLOW 33 EX

FL33EX/DNXXX/A1/BX/CX/DX/EX/FX/GX/H1/I1/JX/KX

#### DN (diameter nominal)

DN... 15÷200

#### D (lining)

D1... hard rubber  
D2... soft rubber  
D3... rubber with potable water test certificate  
D4... PTFE

#### K (Atex)

K1... I M2 Ex mb I  
K2... I M1 Ex ia I Ma  
K3... II 1G Ex ia IIC T6 Ga  
K4... II 1D Ex ia IIIC T85°C Da

#### J (oposit connector Amphenol C006)

J1... yes  
J2... no

#### H (power)

H1... 24V DC ± 15 % (Pi 1,904W)

#### G (output)

G1... pulses G4... 5÷15 Hz  
G2... puls + 4÷20 mA G5... 5÷15 Hz + 4÷20 mA  
G3... puls + 0,2÷1 mA G6... 5÷15 Hz + 0,2÷1 mA

The other points of order code are consistent with order code of FLOW 33. Standard set include installation manual and calibration certificate. For other requirements, please contact the manufacturer directly.



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