

Description

Microcontroller operated Flow Meter for gases such as air, compressed air, oxygen, nitrogen, argon, carbon dioxide, methane/natural gas and hydrogen. The FC100-CA is particularly suited to consumption measurement and leakage detection in compressed air systems. It is suitable for use with calorimetric monitoring heads.

Please note for use with carbon dioxide and argon that measurement is only possible with adapters TP-01 through TP-04.

The RS232 interface allows configuration, operation and data logging by means of a PC software.



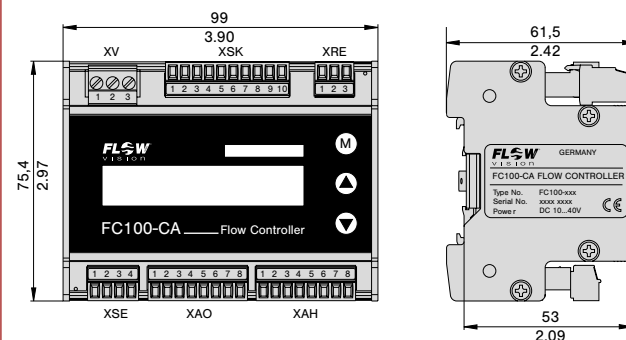
FC100-CA
rail-mounted version surface mounted version

Features

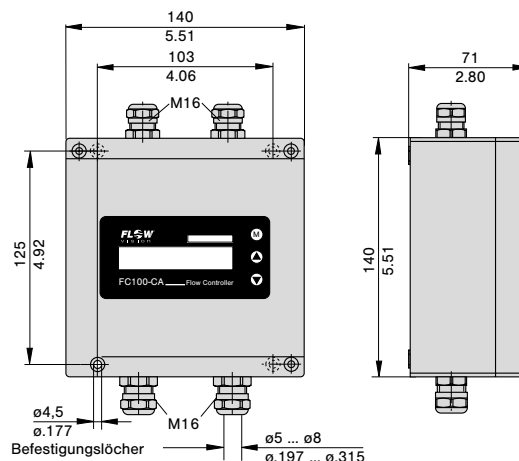
- Menu driven (keypads)
- LC display (2 x 16 digits) can show:
 - actual operating flow velocity/standard flow velocity, operating volume flow/standard volume flow, mass flow, medium temperature;
 - directions for parameter assignment, configuration, diagnostics and error correction;
 - peak value indication
 - display illumination
- Two scalable analogue outputs
- Minimum/maximum memory of flow velocity and temperature
- Two freely selectable limit contacts
- Volume- or mass flow dependent pulse output
- Totalizer (with external reset), power fail-safe
- RS232 interface allows configuration, operation and data logging by means of a PC software

Dimensions

FC100-CA (rail-mounted version)



FC100-FH-CA (surface mounted version)



This is a metric design and millimeter dimensions take precedence (mm / inch)

Ordering information

Type

FC100-CA	Flow Meter with software for mass measurement of gases, rail mounted
FC100-FH-CA	Flow Meter with software for mass measurement of gases, surface mounted

Input voltage

U1 DC 10 ... 40 V

Signal outputs

R2 2 relay outputs (2 limit values)

T4 4 transistor outputs (2 limit values + 2 status or 2 limit values + 1 status + 1 pulse output)

Analogue outputs

V1 0/1-5 Volt

V2 0/2-10 Volt

C1 0/4-20 mA (self-powered, galvanically isolated)

Serial interface

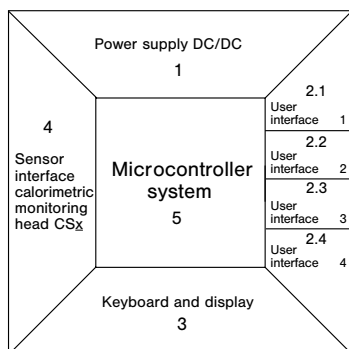
K1 RS232 (with PC-Software)

FC100-CA - U1 R2 V1 K1 ordering example

TECHNICAL DATA

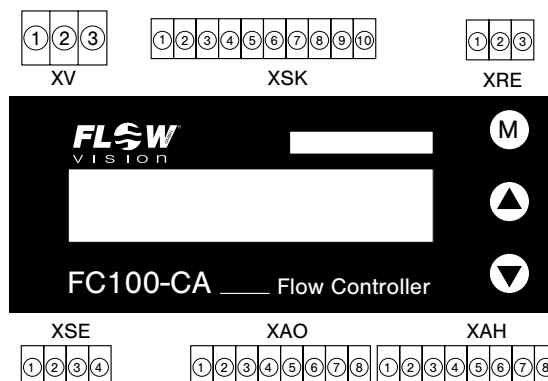
Flow Meter FC100-CA		with CSP monitoring head and sensor adapter TP/ball valve BV	with CST/CSF monitoring head ⁽²⁾	
General data				
Monitoring head applicable in		air, compressed air, oxygen, argon, carbon dioxide, methane/natural gas, nitrogen, hydrogen, other gases on request		
Measuring functions		operating/standard flow velocity, operating/standard volume flow rate, mass flow, medium temperature, totalized flow rate		
Display		2 x 16 digit LC display		
Parameter assignment, configuration by		keypads or PC software		
Serial interface		RS232, PC-Software runs on Windows® XP/Windows Vista®/Windows® 7		
Temperature range (electronic control unit) in circulating air		+5 °C ... +50 °C/+41 °F ... +122 °F		
Standard flow velocity (unit = Nm/s) and standard volume flow rate (unit = Nm³/h) are related to 1013 mbar/14.7 psi and 0 °C/+32 °F Operating flow velocity and operating volume flow rate are related to set pressure and measured temperature				
Electrical data				
Input voltage		DC 10 V ... 40 V		
Power consumption		DC 10 V: 650 mA; DC 24 V: 240 mA; DC 40 V: 150 mA		
Analogue outputs (flow and temperature)		0/4-20 mA or 0/2-10 V or 0/1-5 V		
Signal outputs	2 relay outputs (2 limit values)	2 SPDT contacts AC/DC 50 V / 1 A / 50 W		
	4 transistor outputs (2 limit values + 2 status, or 2 limit values + 1 status + 1 pulse output)	open collector outputs DC 36 V / 150 mA / 1,5 W		
MTTF (SN 29500)		54 ... 79 years, depends on device type, for details see MTTF-certificate		
Flow measurement				
Measuring range 0 ... 68 Nm/s (medium air) (display range 0 ... 100 Nm/s) valid up to 12 bar abs., > 12 bar abs. upon request Zero adjustment possible for smallest volume flow quantities Low flow suppression (adjustable, 0 ... 10 % of measuring range final value)		in TP-01	0 - 50 (70) Nm³/h ⁽¹⁾	see table flow measurement range (next page) ⁽²⁾
		in TP-02	0 - 77 (109) Nm³/h ⁽¹⁾	
		in TP-03	0 - 120 (170) Nm³/h ⁽¹⁾	
		in TP-04	0 - 197 (280) Nm³/h ⁽¹⁾	
		in TP-05	0 - 308 (439) Nm³/h ⁽²⁾	
		in TP-06	0 - 480 (685) Nm³/h ⁽²⁾	
Accuracy ⁽⁴⁾ 3 % ... 50 % of measuring range	△ 2 ... 34 Nm/s	±3 % of measured value ±0,1 % of MRFV	±5 % of measured value ±0,5 % of MRFV	
50 % ... 100 % of measuring range	△ 34 ... 68 Nm/s	±4 % of measured value ±1 % of MRFV	±7 % of measured value ±1 % of MRFV	
Repeatability (5 % MRFV ... 100 % MRFV) ⁽³⁾		±1 % of measured value ±0,5 % of measuring range final value		
Temperature drift (of electronic control unit)		0,05 %/°K/measuring range final value		
Pressure error		±0,5 %/bar / ±0,5 %/14.5 psi of measured value		
Response time (step function)		< 1 s		
Temperature measurement				
Measuring range		-40 °C ... +130 °C/-40 °F ... +266 °F		
Accuracy		±1 % of measuring range		
Mechanical data (electronic control unit)				
Degree of protection	rail-mounted:	IP20		
	surface mounted:	IP66		
Materials	rail-mounted:	acrylic vinyl/ styrene/ polycarbonate; heat sink aluminium		
	surface mounted:	aluminium Acryl		
Housing dimension (LxWxH)		see dimension diagram (previous page)		
Mass	rail-mounted:	365 g/0.805 lb		
	surface mounted:	1200 g/2.65 lb		
Cables	voltage supply	3x0,75 mm² (AWG 18)		
	to monitoring head	LifYCY 4x2x0,2 mm² (AWG 24)		
	analogue outputs	2 x LifYCY 2x0,25 mm² (AWG 24)		
	limit value output	2 x LifYCY 3x0,38 mm² (AWG 22)		
Max. cable length to monitoring head		200 m/656 ft		
⁽¹⁾ measuring ranges for:		methane/natural gas:	argon and carbon dioxide:	
TP-01(1/2 in)		36 Nm³/h (54 Nm³/h)	3,0 - 50 Nm³/h (70 Nm³/h)	
TP-02 (3/4 in)		56 Nm³/h (84 Nm³/h)	4,0 - 70 Nm³/h (110 Nm³/h)	
TP-03/BV-03 (1 in)		88 Nm³/h (132 Nm³/h)	5,0 - 120 Nm³/h (176 Nm³/h)	
TP-04/BV-04 (1.1/4 in)		144 Nm³/h (217 Nm³/h)	5,0 - 195 Nm³/h (289 Nm³/h)	
TP-05/BV-05 (1.1/2 in)		226 Nm³/h (339 Nm³/h)		
TP-06/BV-06 (2 in)		353 Nm³/h (530 Nm³/h)	TP-01 ... TP-04 only	
CST and CSF monitoring heads up to		50 Nm/s (75 Nm/s)	hydrogen:	
			29,0 Nm³/h (62,3 Nm³/h)	
			45,2 Nm³/h (97,3 Nm³/h)	
			70,7 Nm³/h (152 Nm³/h)	
			116 Nm³/h (249 Nm³/h)	
			181 Nm³/h (389 Nm³/h)	
			283 Nm³/h (608 Nm³/h)	
			40 Nm/s (86 Nm/s)	
⁽²⁾ not released for carbon dioxide (CO ₂) and argon (Ar)				
⁽³⁾ of the set value, at constant temperature and flow conditions and stable thermal conductivity				
⁽⁴⁾ the accuracy values were determined under ideal conditions:				
- symmetrical complete flow profile				
- correct mounting in the pipe				
- inlets and outlets according to EN ISO 5167-1				
Accuracy values not verified for inside pipe diameters > 500 mm				
MRFV = measuring range final value				
Windows and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.				

Block diagram



- 1 Input voltage: DC 10 ... 40 V
- 2.1 User interface 1: relay outputs: 2 limit values
transistor outputs: 2 limit values + 1 error indication + 1 busy signal or pulse output (software selected)
- 2.2 User interface 2: analogue outputs: temperature and flow current or voltage
- 2.3 User interface 3: RS232 interface
- 2.4 User interface 4: totalizer reset: edge controlled potential free, normally open contact or voltage pulse DC10 ... 40 V
- 3 Keyboard/Display: keypads
LC display
2 x 16 digits
backlight (can be switched off)
- 4 Sensor interface: calorimetric monitoring head type CSx
- 5 Controller system: signal processing
I/O - controlling
monitoring
parameter memory
communication

Connection diagram



- XV - power supply
- XSK - calorimetric monitoring head
- XRE - totalizer reset
- XSE - RS232 communication interface
- XAO - analogue outputs
- XAH - signal outputs

Flow measurement range (referring to the medium air)

The flow measurement range is determined by the inner pipe diameter (see table). It can be calculated with the following equation:

$$Q = V_N \times A_R$$

Q (Nm³/h) - flow quantity

V_N (m/h) - average standard velocity

A_R (m²) - inner pipe cross section

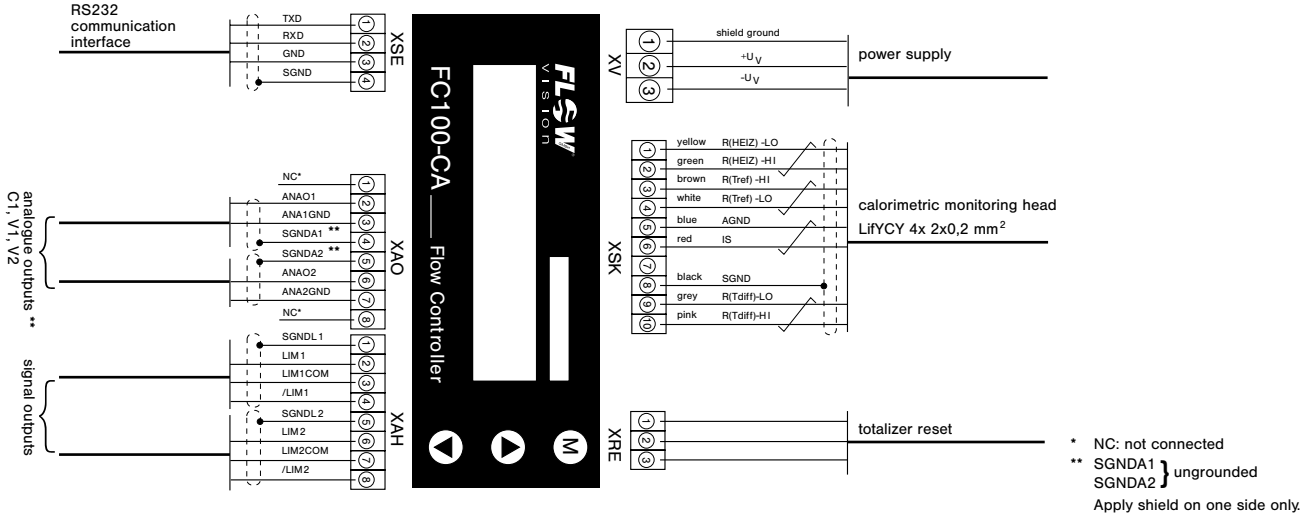
Setting range for inner pipe diameter: 10.0 mm ... 9999.9 mm / .394 in. ... 39.4 in.

Velocity range: 0 ... 68 Nm/s (100 Nm/s)

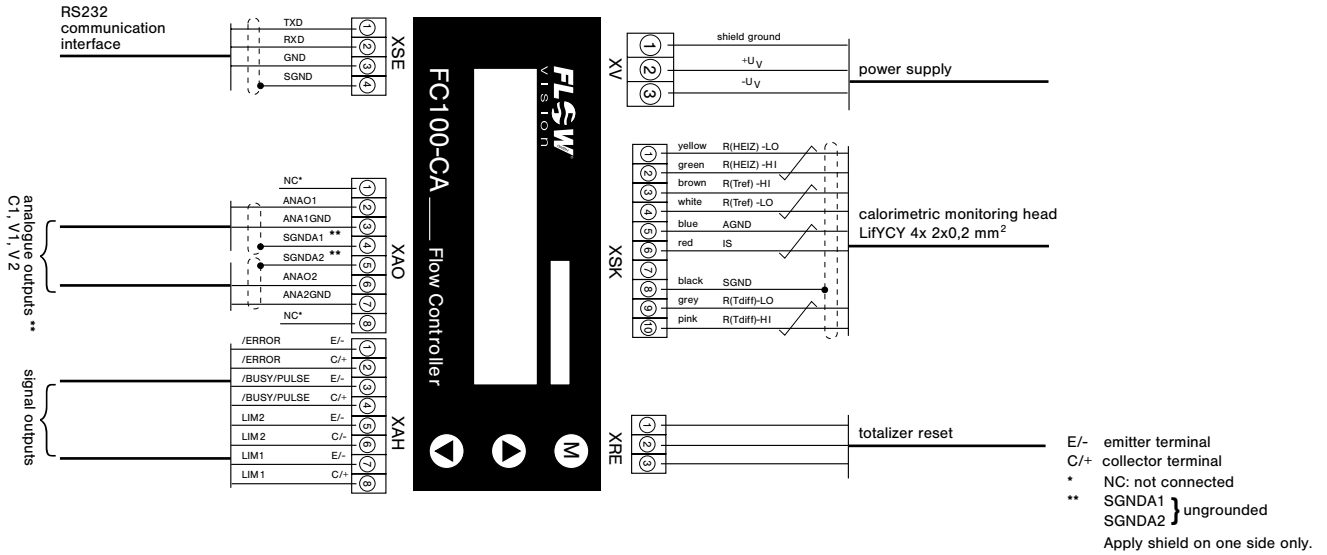
inner pipe diameter D in mm	measuring range in Nm ³ /h	display range in Nm ³ /h	inner pipe diameter D in mm	measuring range in Nm ³ /h	display range in Nm ³ /h
20	76	113	200	7690	11309
30	173	254	250	12016	17671
40	307	452	300	17303	25446
50	480	706	400	30762	4523
60	692	1017	500	48066	70685
70	942	1385	600	69215	101787
80	1230	1809	700	94210	138544
90	1557	2290	800	123049	180955
100	1922	2827	900	155734	229021
150	4325	6361	1000	192265	282743

Connection diagrams

FC100-CA with relay outputs

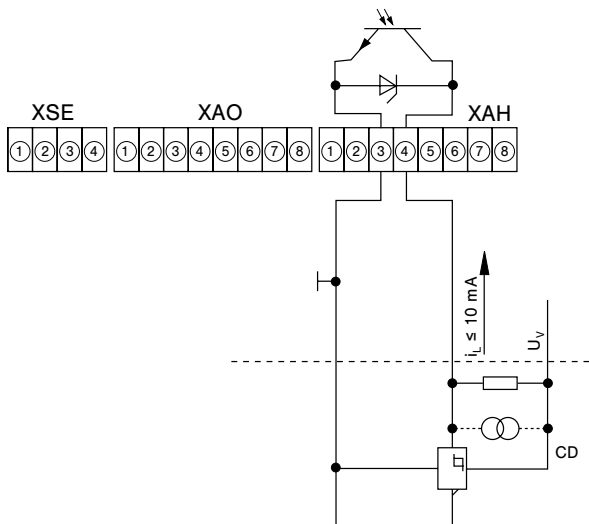


FC100-CA with transistor outputs

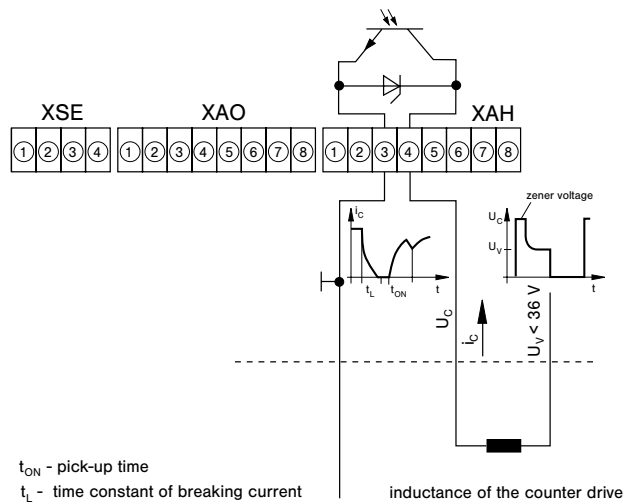


FC100-CA - Recommended connection of pulse output

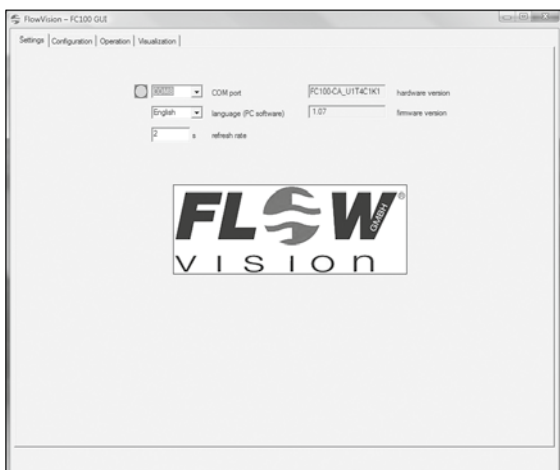
Electronic signal processing



Electromagnetic pulse counter

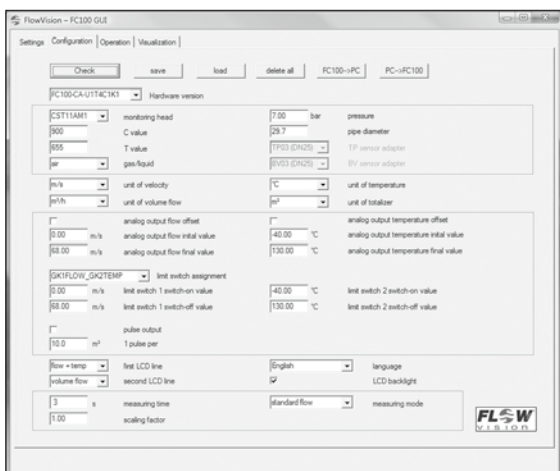


PC-Software



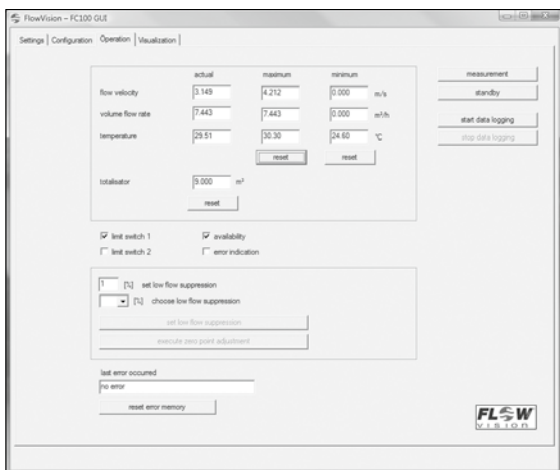
General Settings:

- Selection of the language of the PC software
- Definition how often measuring values are read from the FC100-CA
- Indication of hardware and firmware version



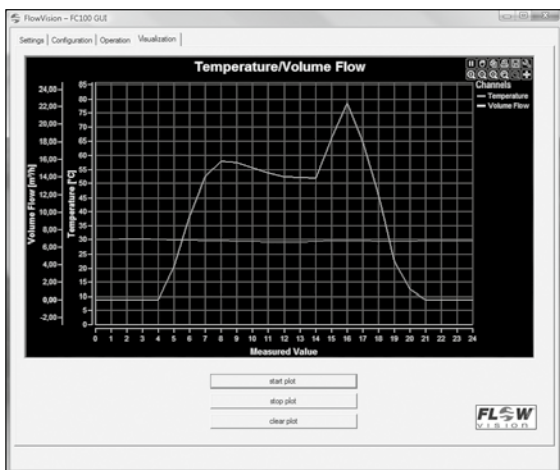
Configuration of the FC100-CA:

- Basic settings (e.g. type of measuring head, pipe size)
- Selection of the units of all measured values
- Configuration of the analogue and signal outputs and the pulse output
- Settings of the display and further configuration possibilities



Operation of the FC100-CA:

- Indication of the actual measured values and saved minimum and maximum values
- Indication of the actual condition of the signal outputs
- Setting of the low flow suppression
- Logging of all measured values - export to Microsoft® Excel®



Visualization of the measured values:

- Plot of the measured values (volume flow and temperature)
- Flexible indication of the measured values (e.g. scale, zoom, scroll)

Microsoft and Excel are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

A

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

B

Description

Sensor adapters TP and BV facilitate correct positioning and exchange of CSP monitoring heads, FC03 or FS10 in pipes with process connection DN 15 ... DN 50.

Ball valve BV enables pressure-free installation and removal of CSP monitoring heads, Flow Meter FC03 and Flow Monitor FS10 simply by closing the input and output pipe. The measuring points are suited to temporary measurements; after completion of the measuring cycle they can be closed by means of blanking plugs.

Sensor adapter TP-... / Ball valve BV-...



TP-...

BV-...

Features

- Correct positioning of the sensor
- Ease of sensor replacement
- Measuring point can be closed if not used
- Sensor adapter available as screw-in or welding type
- Ball valve also serves as a shutoff valve (both input and output)
- Carbon dioxide (CO₂) and argon (Ar): only approved for TP-01 ... 04

Ordering information

Type	
BV	ball valve with internal thread
Process connection/Nominal size	
03	DN 25 G1 internal thread length: 88 mm/3.46 in.
04	DN 32 G1 1/4 internal thread length: 100 mm/3.94 in.
05	DN 40 G1 1/2 internal thread length: 110 mm/4.33 in.
06	DN 50 G2 internal thread length: 131 mm/5.16 in.
Material of the area exposed to medium	
M3	nickel plated brass, Delrin seal
BV - 03	M3 ordering example

Ordering information

Type	
TP	Sensor adapter with internal thread
Process connection/Nominal size	
01	DN 15 G1/2 internal thread length: 50 mm/1.97 in.
02	DN 20 G3/4 internal thread length: 64 mm/2.52 in.
03	DN 25 G1 internal thread length: 78 mm/3.07 in.
04	DN 32 G1 1/4 internal thread length: 94 mm/3.70 in.
05	DN 40 G1 1/2 internal thread length: 110 mm/4.33 in.
06	DN 50 G2 internal thread length: 138 mm/5.43 in.
Material of the area exposed to medium	
M1	stainless steel 1.4571/AISI 316Ti PN 315 bar/4570 psi
M3	brass (not TP-03..) PN 25 bar/363 psi
M5	red brass (only TP-03..) PN 16 bar/232 psi
TP - 01	M3 ordering example

Accessories

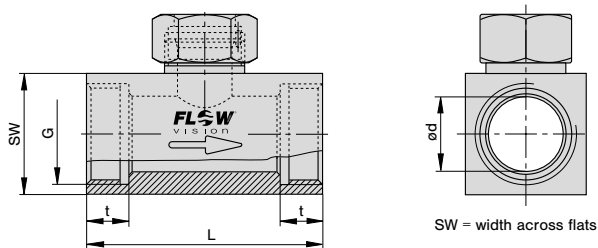
Description	Ref. No.
Blanking plug, brass, with O ring	0Z121Z000186
Union nut, brass	Y 306 901 01
Blanking plug, stainless steel 1.4571/AISI 316 Ti, with viton O ring	0Z121Z000187
Union nut, stainless steel	Y 306 901 03

Ordering information

Type	
TP	Sensor adapter with welding nipples
Process connection/Nominal size	
01	DN 15 dia.d: 16 mm/.630 in. length: 80 mm/3.15 in.
02	DN 20 dia.d: 20 mm/.787 in. length: 70 mm/2.76 in.
03	DN 25 dia.d: 25 mm/.984 in. length: 80 mm/3.15 in.
04	DN 32 dia.d: 32 mm/1.26 in. length: 100 mm/3.94 in.
05	DN 40 dia.d: 40 mm/1.57 in. length: 110 mm/4.33 in.
06	DN 50 dia.d: 50 mm/1.97 in. length: 140 mm/5.51 in.
Material of the area exposed to medium	
M1	stainless steel 1.4571/AISI 316Ti
Process connection	
SA	welded connection
TP - 01	M1 - SA ordering example

Dimensions

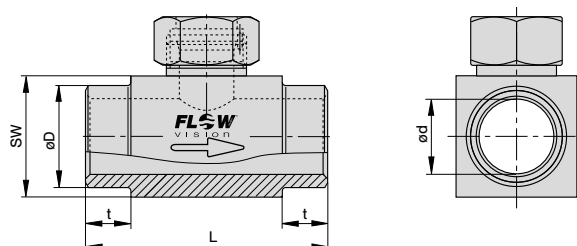
TP... Sensor adapter with internal thread



Material stainless steel (-M1): PN 315 bar / 4570 psi
 Material brass (-M3): PN 25 bar / 363 psi
 Material red brass (-M5): PN 16 bar / 232 psi

Type	DN		dia. d		G	t		L		SW	
	mm	in.	mm	in.	in.	mm	in.	mm	in.	mm	in.
TP-01 ...	15	.591	16	.630	1/2"	11	.433	50	1.97	27	1.06
TP-02 ...	20	.787	20	.787	3/4"	12	.472	64	2.52	32	1.26
TP-03 ...	25	.984	25	.984	1"	14	.551	78	3.07	40	1.57
TP-04 ...	32	1.26	32	1.26	1 1/4"	15	.591	94	3.70	50	1.97
TP-05 ...	40	1.57	40	1.57	1 1/2"	15	.591	110	4.33	55	2.16
TP-06 ...	50	1.97	50	1.97	2"	19	.748	138	5.43	70	2.76

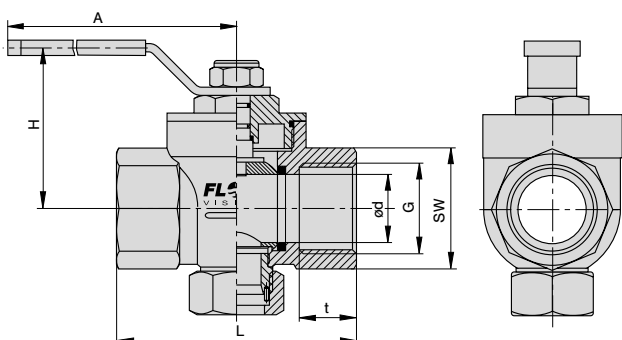
TP...M1-SA Sensor adapter with welding nipples



PN 315 bar / 4570 psi

Type	DN		dia. d		dia. D		t		L		SW	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
TP-01M1-S A	15	.591	16	.630	21.3	.839	15	.591	80	3.15	27	1.06
TP-02M1-S A	20	.787	20	.787	26.9	1.06	15	.591	70	2.76	32	1.26
TP-03M1-S A	25	.984	25	.984	33.7	1.33	15	.591	80	3.15	40	1.57
TP-04M1-S A	32	1.26	32	1.26	42.4	1.67	15	.591	100	3.94	50	1.97
TP-05M1-S A	40	1.57	40	1.57	48.3	1.90	15	.591	110	4.33	55	2.16
TP-06M1-S A	50	1.97	50	1.97	60.3	2.37	15	.591	140	5.51	70	2.76

BV...M3 Ball valve with internal thread



PN 25 bar / 363 psi

Type	DN		dia. d		G	t		L		SW		H		A	
	mm	in.	mm	in.	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
BV-03M3	25	.984	25	.984	1"	21	.827	88	3.46	41	1.61	59	2.32	115	4.53
BV-04M3	32	1.26	32	1.26	1 1/4"	24	.945	100	3.94	50	1.97	65	2.56	115	4.53
BV-05M3	40	1.57	40	1.57	1 1/2"	24	.945	110	4.33	54	2.13	77	3.03	150	5.91
BV-06M3	50	1.97	50	1.97	2"	28	1.10	131	5.16	70	2.76	85	3.35	150	5.91

This is a metric design and millimeter dimensions take precedence (mm / inch)

- A
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- B

Description

Calorimetric plug-in type monitoring head for sensor adapter TP/BV and flow meter FC100-CA, suitable for compressed-air applications and for measurement of gases.

Features

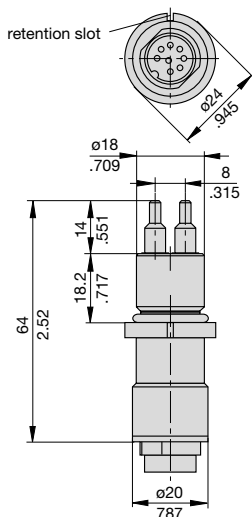
- Ease of installation
- Small physical size
- Medium temperature range: -40 °C ... +130 °C/-40 °F ... +266 °F
- Material: stainless steel 1.4571/AISI 316 Ti
- Sealing: Viton O ring

Ordering information

Type No.	CSP	plug-in type monitoring head with calorimetric sensors
Process connection	11	plug-in type
Medium	A	air (standard)
Material of areas exposed to medium	M1	stainless steel 1.4571/AISI 316 Ti (standard)
Length of shank/thread	L05	18.2 mm (standard)
Electrical connection	E10	round connector with tinned contacts (plug and cable to order separately)
Certification	T0	without certificate (standard)*
Specification of medium	xxx	
Ordering example	CSP - 11 A M1 L05 E10 T0 - ...	

*) for detailed information please see section 0.

Dimensions



This is a metric design and millimeter dimensions take precedence ($\frac{mm}{inch}$)

Monitoring head CSP



CSP-11

Technical data

Type of head	plug-in type
Shank diameter	18 mm/.709 in.
Length of shank	18.2 mm/.717 in.
Length of sensor	14 mm/.551 in.
Suitable for	air, compressed air, nitrogen, oxygen, argon, carbon dioxide, methane, hydrogen and other gases (please enquire)
Temperature range *)	-40 °C ... +130 °C/-40 °F ... +266 °F (of gas)
Temperature drift of monitoring head	±0.05 %/°K/measuring range (in the range between +20°C ... +80°C/+68 °F ... +176 °F)
Measuring ranges (air)	in TP01 0 - 50 Nm³/h in TP02 0 - 77 Nm³/h in TP03 0 - 120 Nm³/h in TP04 0 - 197 Nm³/h in TP05 0 - 308 Nm³/h in TP06 0 - 480 Nm³/h
Pressure resistance ⁽¹⁾	100 bar/1450 psi
Degree of protection	connector ⁽²⁾ : IP67
Material	housing: stainless steel 1.4571/AISI 316 Ti laser welded O ring: Viton
Cable to electronic control unit	LifYCY 4x2x0.2 mm² (AWG 24)

⁽¹⁾ Admissible operating pressure DIN 2401, measured at max. temperature (= max. medium temperature)

⁽²⁾ with mating connector

^{*)} max. +85 °C/+185 °F in the connector area

Cable types 15/18 with connectors



Do + Ka type 15
Do + Ka type 18

Technical data

Cable type 15

Features: highly flexible, paired, fully shielded, electrical and thermal properties at +20 °C/+68 °F

Conductor resistance:	92 Ω/km
Insulation resistance:	20 MΩ x km
Operating voltage:	250 V
Withstand voltage:	500 V
Max. load:	2 A
Temperature range:	-10 °C ... +80 °C/+14 °F ... +176 °F (processing and operation) -30 °C ... +80 °C/-22 °F ... +176 °F (transport and storage)

Cable type 18

Features: non-halogenous, highly flexible, cold- and heat resistant, paired, fully shielded, electrical and thermal properties at +20 °C/+68 °F

Conductor resistance:	80 Ω/km
Insulation resistance:	1200 MΩ x km
Operating voltage:	300 V
Withstand voltage:	1500 V
Max. load:	3 A
Temperature range:	-50 °C ... +180 °C/-58 °F ... +356 °F

Ordering information

Type between calorimetric monitoring heads **CSP** and **FC100-CA, FC100-FH-CA**

Do + Ka type 15	PVC insulated cable, type LiFYCY 4x2x0.2 mm ² (AWG 24) 8-pole round connector + 10-pole clamping connector
Do + Ka type 18	silicone insulated cable, type 4x2x0.2 mm ² (AWG 24) 8-pole round connector + 10-pole clamping connector

Available cable lengths

...m	2 m, 3 m, 5 m, 8 m, 10 m, 15 m, 20 m, 25 m, 30 m, 40 m, 50 m, 60 m, 70 m, 80 m, 90 m, 100 m, 110 m, 120 m, 130 m, 140 m, 150 m, 160 m, 170 m, 180 m, 190 m, 200 m (up to max. 656 ft)
-------------	---

Do + Ka type 15 - 2 m ordering example

Description

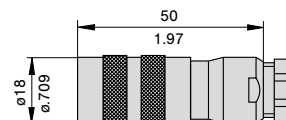
Cable between Flow Meter FC100-xxx and calorimetric monitoring head type CSP.

- Connection to monitoring head by means of 8-pole round connector
- Connection to FC100-xxx by means of 10-pole clamping connector (XSK)

Accessories

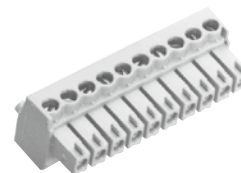
8-pole round connector

(without cable, for individual wiring by customer)
OZ112Z003124



10-pole clamping connector for cable types 15 and 18

(without cable, for individual wiring by customer)
OZ112Z000167



This is a metric design and millimeter dimensions take precedence ($\frac{\text{mm}}{\text{inch}}$)

Standard warranty cover will be invalidated if the correct FlowVision monitoring head/control unit connecting cable is not used.

Description

A Thread-mounted calorimetric monitoring head for flow Meter FC100-CA, suitable for compressed air applications.

Features

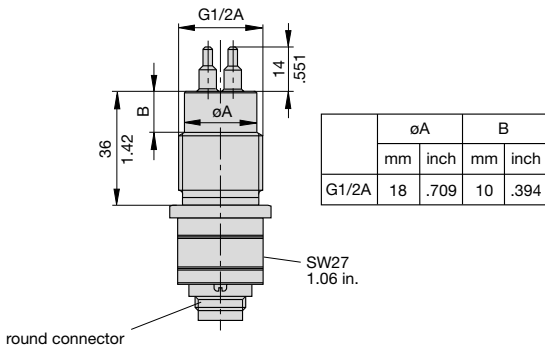
- Suitable for installation in welding sleeves
- Medium temperature: -40 °C ... +130 °C/-40 °F ... +266 °F
- Material: stainless steel 1.4571/AISI 316 Ti, or Hastelloy alloy C4/2.4610
- Not suitable for carbon dioxide and argon!

Ordering information

Type No.	CST	Thread-mounted monitoring head with calorimetric sensors
Process connection	11	thread size G1/2A
Medium	A	air
Material of areas exposed to medium	M1	stainless steel 1.4571/AISI 316 Ti (standard)
	M2	nickel-based alloy Hastelloy alloy C4/2.4610
Length of shank/thread	L10	36 mm (standard)
Electrical connection	E10	round connector with tinned contacts (plug and cable to order separately)
Certification	T0	without certificate (standard) *
Specification of medium	xxx	
CST - 11 A M1 L10 E10 T0 - ... ordering example		

*) for detailed information please see section 0.

Dimensions of round connector



This is a metric design and millimeter dimensions take precedence (mm / inch)

Thread-mounted calorimetric monitoring head



CST-11

Technical data

Type of head	thread-mounted
Thread	G1/2A
Length of shank	36 mm/1.42 in.
Length of sensor	14 mm/.551 in.
Suitable for	air, compressed air, nitrogen, oxygen, methane, hydrogen and other gases (please enquire)
Temperature range *) (of gas)	-40 °C ... +130 °C/-40 °F ... +266 °F
Temperature drift of monitoring head	± < 0.05 %/°K/measuring range (in the range between +20 °C ... +80 °C/ +68 °F ... +176 °F)
Measuring ranges:	Average standard flow velocity x pipe cross section
Flow velocity range:	0 - 68 (100) Nm/s
Pressure resistance ⁽¹⁾	100 bar / 1450 psi
Degree of protection	connector ⁽²⁾ : IP67
Material	stainless steel 1.4571/AISI 316 Ti Hastelloy C4
Cable to electronic control unit	LiFCY 4x2x0.2 mm ² (AWG 24)

⁽¹⁾ Admissible operating pressure DIN 2401, measured at max. temperature (= max. medium temperature)

⁽²⁾ with mating connector

^{*)} max. +85 °C/+185 °F in the connector area

Cable types 15/18 with connectors



Do + Ka type 15
Do + Ka type 18

Technical data

Cable type 15

Features: highly flexible, paired, fully shielded, electrical and thermal properties at +20 °C/+68 °F

Conductor resistance:	92 Ω/km
Insulation resistance:	20 MΩ x km
Operating voltage:	250 V
Withstand voltage:	500 V
Max. load:	2 A
Temperature range:	-10 °C ... +80 °C/+14 °F ... +176 °F (processing and operation) -30 °C ... +80 °C/-22 °F ... +176 °F (transport and storage)

Cable type 18

Features: non-halogenous, highly flexible, cold- and heat resistant, paired, fully shielded, electrical and thermal properties at +20 °C/+68 °F

Conductor resistance:	80 Ω/km
Insulation resistance:	1200 MΩ x km
Operating voltage:	300 V
Withstand voltage:	1500 V
Max. load:	3 A
Temperature range:	-50 °C ... +180 °C/-58 °F ... +356 °F

Ordering information

Type between calorimetric monitoring heads **CST** and **FC100-CA, FC100-FH-CA**

Do + Ka type 15	PVC insulated cable, type LiFYCY 4x2x0.2 mm ² (AWG 24) 8-pole round connector + 10-pole clamping connector
Do + Ka type 18	silicone insulated cable, type 4x2x0.2 mm ² (AWG 24) 8-pole round connector + 10-pole clamping connector

Available cable lengths

...m	2 m, 3 m, 5 m, 8 m, 10 m, 15 m, 20 m, 25 m, 30 m, 40 m, 50 m, 60 m, 70 m, 80 m, 90 m, 100 m, 110 m, 120 m, 130 m, 140 m, 150 m, 160 m, 170 m, 180 m, 190 m, 200 m (up to max. 656 ft)
------	---

Do + Ka type 15 - 2 m ordering example

Description

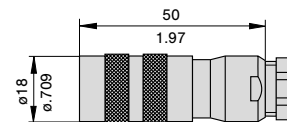
Cable between Flow Meter FC100-xxx and calorimetric monitoring head type CST.

- Connection to monitoring head by means of 8-pole round connector
- Connection to FC100-xxx by means of 10-pole clamping connector (XSK)

Accessories

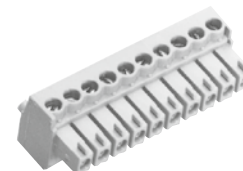
8-pole round connector

(without cable, for individual wiring by customer)
0Z112Z003124



10-pole clamping connector for cable types 15 and 18

(without cable, for individual wiring by customer)
0Z112Z000167

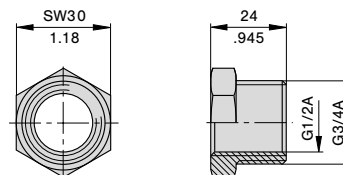


Reducing piece

from G3/4 to G1/2

Material: stainless steel 1.4571/AISI Ti 316

0Z032Z000149



This is a metric design and millimeter dimensions take precedence ($\frac{\text{mm}}{\text{inch}}$)

Standard warranty cover will be invalidated if the correct FlowVision monitoring head/control unit connecting cable is not used.

Description

Extended calorimetric monitoring head with variable immersion depth for Flow Meter FC100-CA, suitable for use in pipelines with process connections DN 50 plus.

Caution: Fix with locking set 01 (see accessories).

Features

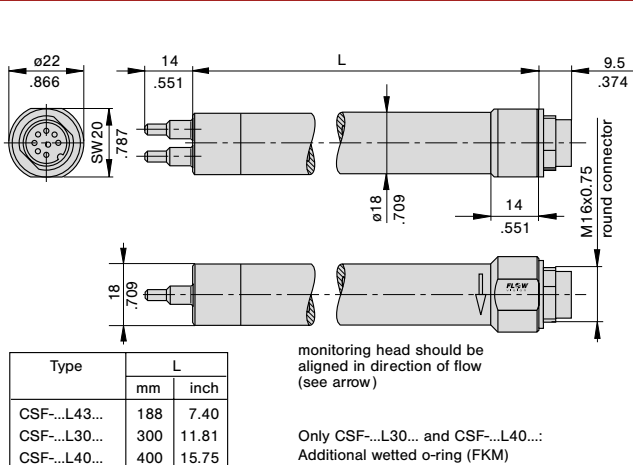
- Medium temperature range
Stainless steel version: -40 °C ... +130 °C/-40 °F ... +266 °F
- Material: stainless steel 1.4571/AISI 316 Ti
- Not suitable for carbon dioxide and argon!

Ordering information

Type	CSF	Extended monitoring head with calorimetric sensors
	Monitoring head design	
	11	Monitoring head with variable immersion depth
	Medium	
	A	air
	Material of areas exposed to medium	
	M1	stainless steel 1.4571/AISI 316 Ti
	M2	nickel-base alloy Hastelloy alloy C4 2.4610
	Process connection	
	00	without flange; see accessories for connections
	Length of shank/thread	
	L43	188 mm (standard) other lengths upon request
	Electrical connection	
	E10	round connector with tinned contacts (plug and cable to order separately)
	Certification	
	T0	without certificate (standard) *)
	Specification of medium	
	xxx	
CSF - 11 A M1 00 L43 E10 T0 - ...		ordering example

*) for detailed information please see section 0

Dimensions



This is a metric design and millimeter dimensions take precedence (mm / inch)

Monitoring head CSF



CSF-11
variable immersion depth

Technical data

Type of head	push-in
Shank diameter	18 mm/.709 in. without thread
Length of shank	188 mm/7.40 in.
Length of sensor	14 mm/.551 in.
Suitable for	air, compressed air, nitrogen, oxygen, methane, hydrogen and other gases (please enquire)
Temperature range*) (of gas)	-40 °C ... +130 °C/-40 °F ... +266 °F (stainless steel)
Temperature drift of sensor	± < 0.05 %/°K/measuring range (in the range between +20 °C ... +80 °C/ +68 °F ... +176 °F)
Measuring ranges:	depending on immersion depth;
Flow velocity range:	0 - 68 (100) Nm/s
Pressure resistance ⁽¹⁾ (sensor)	100 bar/1450 psi (stainless steel)
Pressure resistance ⁽¹⁾ (installation)	depending on connection (see accessories)
Degree of protection	connector ⁽²⁾ : IP67
Material	stainless steel 1.4571/AISI 316 Ti
Cable to electronic unit	LifYCY 4x2x0.2 mm ² (AWG 24)

⁽¹⁾ Admissible operating pressure DIN 2401, measured at max. temperature (= max. medium temperature)

⁽²⁾ with mating connector

^{*)} max. +85 °C/+185 °F in the connector area

Cable types 15/18 with connectors



Do + Ka type 15
Do + Ka type 18

Technical data

Cable type 15

Features: highly flexible, paired, fully shielded, electrical and thermal properties at +20 °C/+68 °F

Conductor resistance:	92 Ω/km
Insulation resistance:	20 MΩ x km
Operating voltage:	250 V
Withstand voltage:	500 V
Max. load:	2 A
Temperature range:	-10 °C ... +80 °C/+14 ° F ... +176 °F (processing and operation) -30 °C ... +80 °C/-22 ° F ... +176 °F (transport and storage)

Cable type 18

Features: non-halogenous, highly flexible, cold- and heat resistant, paired, fully shielded, electrical and thermal properties at +20 °C/+68 °F

Conductor resistance:	80 Ω/km
Insulation resistance:	1200 MΩ x km
Operating voltage:	300 V
Withstand voltage:	1500 V
Max. load:	3 A
Temperature range:	-50 °C ... +180 °C/-58 °F ... +356 °F

Description

Cable between Flow Meter FC100-xxx and calorimetric monitoring head type CSF.

- Connection to monitoring head by means of 8-pole round connector
- Connection to FC100-xxx by means of 10-pole clamping connector (XSK)

Ordering information

Type between calorimetric monitoring heads CSF and FC100-CA, FC100-FH-CA

Do + Ka type 15	PVC insulated cable, type LiFYCY 4x2x0.2 mm ² (AWG 24) 8-pole round connector + 10-pole clamping connector
Do + Ka type 18	silicone insulated cable, type 4x2x0.2 mm ² (AWG 24) 8-pole round connector + 10-pole clamping connector

Available cable lengths

...m	2 m, 3 m, 5 m, 8 m, 10 m, 15 m, 20 m, 25 m, 30 m, 40 m, 50 m, 60 m, 70 m, 80 m, 90 m, 100 m, 110 m, 120 m, 130 m, 140 m, 150 m, 160 m, 170 m, 180 m, 190 m, 200 m (up to max. 656 ft)
------	---

Do + Ka type 15 - 2 m ordering example

A

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

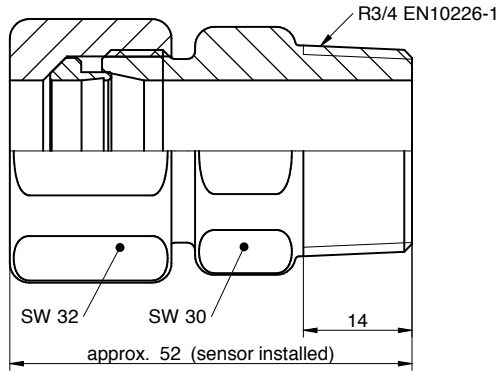
17

18

19

B

Compression fitting



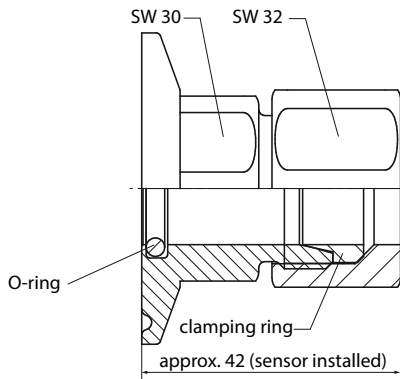
Description and ordering information

Compression fitting for push-in sensors with R3/4 thread

Compression fitting for push-in sensors

EEF	Compression fitting		
	Process connection		
	04	Thread R3/4	
		Material double nipple and cap nut	
		M1	Stainless steel 1.4571
		M2	Hastelloy C4 2.4610
		Material clamping ring	
		CR1	Stainless steel 1.4571 PN 25 bar abs.
		CR2	PTFE PN 5 bar abs.
		CR3	Hastelloy C4 2.4610 PN 25 bar abs.
EEF -	04 -	M1 -	CR1 ordering example

Hygiene flange



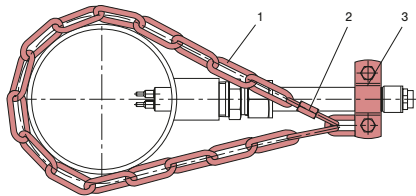
Description and ordering information

Hygiene flange for push-in sensors with front-flush o-ring with FDA approval

Hygiene flange for push-in sensors

HEF	Hygiene flange		
	Process connection		
	TF1	Triclamp DIN 32676	
		Material flange and cap nut	
		M1	Stainless steel 1.4571
		M2	Hastelloy C4 2.4610
		O-ring	
		R1	VMQ (Silicone) blue FDA (standard)
		R2	VMQ (Silicone) white FDA
		Material clamping ring	
		CR1	Stainless steel 1.4571 PN 25 bar abs.
		CR2	PTFE PN 5 bar abs.
		CR3	Hastelloy C4 2.4610 PN 25 bar abs.
HEF -	TF1 -	M1 -	R1 - CR1 ordering example

Locking set



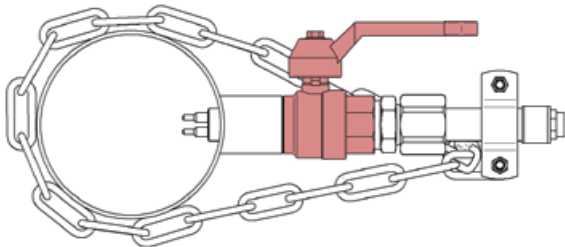
Description and ordering information

Locking set for push-in sensors.

- 1 Chain 4 x 32 DIN 5685 (approx. 1 m)
- 2 Catch for chain NG 5
- 3 Clip with screw and nuts DN15 to DIN 11850

Ordering no.: 0Z122Z000204

Ball valve for installation under pressure

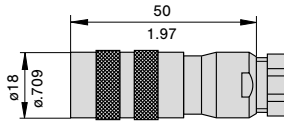


Description and ordering information

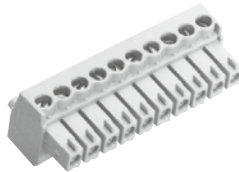
Material (body, ball): Brass nickel plated	Material (body, ball): Stainless steel 1.4408, 1.4401
Material (ball seal): PTFE	Material (ball seal): PTFE
Length: 65 mm	Length: 78 mm
Outside thread: G3/4", L = 13 mm	Outside thread: R3/4", L = 17 mm
Inside thread: G3/4", L = 15 mm	Inside thread: Rp3/4", L = 13 mm
Fluid temperature: -20...120 °C	Fluid temperature: -30...180 °C
Ambient temperature: 0...80 °C	Ambient temperature: 0...80 °C
Pressure: PN 25 bar (up to 80 °C)	Pressure: PN 64 bar (up to 80 °C)
Ordering number: BV-02M3-PI	Ordering number: BV-02M15-PI

Further accessories

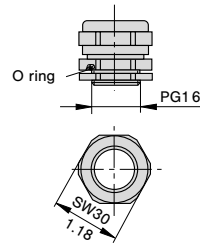
8-pole round connector
(without cable, for individual wiring by customer)
OZ112Z003124



10-pole clamping connector for cable types 15 and 18
(without cable, for individual wiring by customer)
Z00020



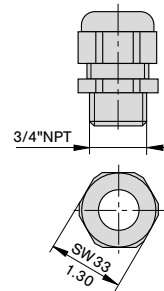
PG16 nickel-plated brass
(standard)
OZ122Z000128



pressure resistant up to 2 bar/29.0 psi

This is a metric design and millimeter dimensions take precedence ($\frac{\text{mm}}{\text{inch}}$)

NPT3/4" moulded, black
OZ122Z000131



pressure resistant up to 2 bar/29.0 psi

Caution: Standard warranty cover will be invalidated if the correct FlowVision monitoring head/control unit connecting cable is not used.

A

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

B