Description

Microcontroller operated Flow Meter for gases such as air, compressed air, oxygen, nitrogen, argon, carbon dioxide, methane/natural gas and hydrogen. The FC01-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.

rail-mounted version

FC01-CA

front panel mounted version | surface mounted version

Features

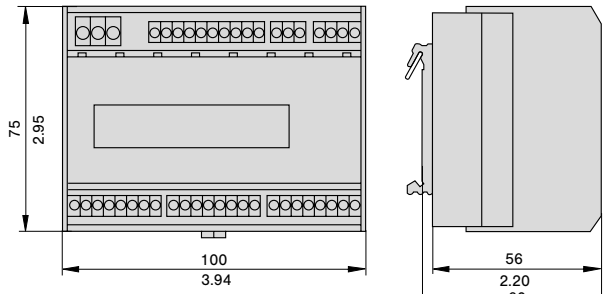
- Menu driven (keypads)
- LC display (2 x 16 digits) can show:
  - actual operating flow velocity/standard flow velocity, operating volume flow/standard volume flow, mass flow, medium temperature;
  - bargraph status indication of limit contacts, actual flow rate/ quantity or medium temperature;
  - directions for parameter assignment, configuration, diagnostics and error correction;
  - base value indication
- Two scalable analogue outputs
- Minimum/maximum memory of flow velocity and temperature
- Two freely selectable limit contacts
- Volume- or mass flow dependent pulse output

Ordering information

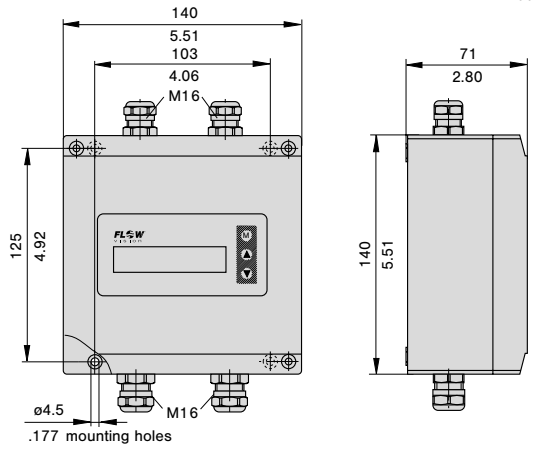
Type					
FC01-CA	Flow Meter with software for mass measurement of gases, rail mounted				
FC01-FH-CA	Flow Meter with software for mass measurement of gases, surface mounted				
FC01-ST-CA	Flow Meter with software for mass measurement of gases, front panel mounted				
	Input voltage				
	U1	DC 19...32 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		
			C1	0/4-20 mA (self-powered, galvanically isolated)	
FC01-CA	- **U1**	**R2**	**C1**	ordering example	

Dimensions

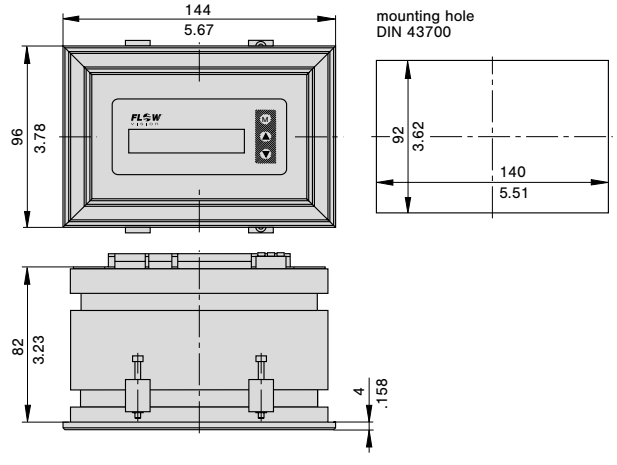
FC01-CA (rail-mounted housing)



FC01-FH-CA (surface mounted housing)



FC01-ST-CA (front panel mounted housing)



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

TECHNICAL DATA			
Flow Meter FC01-CA		**with CSP monitoring head and sensor adapter TP/ball valve BV**	**with CST/CSF monitoring head** (2)
General data			
Monitoring heads 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, calibration by:		keypads	
Temperature range (electronic control unit) in circulating air		+10 °C ... +50 °C/+50 °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 24 V (19 ... 32 V)	
Power consumption		DC 200 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	
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) 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)	see table flow measurement range (next page) (2)
Accuracy(5) 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 (4) (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	
	front panel mounted:	IP65	
Materials	rail-mounted:	acrylic vinyl/ styrene/ polycarbonate; heat sink aluminium	
	surface mounted:	aluminium Acryl	
	front panel mounted:	aluminium, black coated; display polyester foil	
Housing dimension (LxWxH)		see dimension diagram (previous page)	
Mass	rail-mounted:	485 g/1.07 lb	
	surface mounted:	1250 g/2.76 lb	
	front panel mounted:	900 g/1.98 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	

*) with output C1 the max. admissible ambient temperature for the rail-mounted version is limited to +40 °C/+104 °F

**) with output C1, power consumption may be up to 300 mA ± 10 %

(1) measuring ranges for:

	methan/natural gas:	argon and carbon dioxide:	hydrogen:
TP-01(1/2 in)	36 Nm³/h (54 Nm³/h)	3,0 - 50 Nm³/h (70 Nm³/h)	29,0 Nm³/h (62,3 Nm³/h)
TP-02 (3/4 in)	56 Nm³/h (84 Nm³/h)	4,0 - 70 Nm³/h (110 Nm³/h)	45,2 Nm³/h (97,3 Nm³/h)
TP-03/BV-03 (1 in)	88 Nm³/h (132 Nm³/h)	5,0 - 120 Nm³/h (176 Nm³/h)	70,7 Nm³/h (152 Nm³/h)
TP-04/BV-04 (1.1/4 in)	144 Nm³/h (217 Nm³/h)	5,0 - 195 Nm³/h (289 Nm³/h)	116 Nm³/h (249 Nm³/h)
TP-05/BV-05 (1.1/2 in)	226 Nm³/h (339 Nm³/h)		181 Nm³/h (389 Nm³/h)
TP-06/BV-06 (2 in)	353 Nm³/h (530 Nm³/h)	TP-01 ... TP-04 only	283 Nm³/h (608 Nm³/h)
CSF and CST monitoring heads up to	50 Nm/s (75 Nm/s)		40 Nm/s (86 Nm/s)

(2) not released for carbon dioxide (CO_2) and argon (Ar)

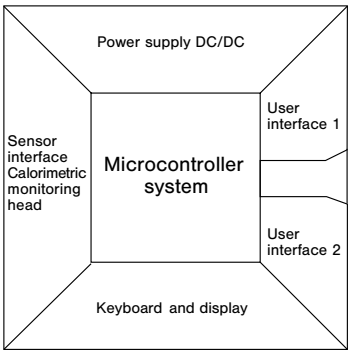
(3) of the set value, at constant temperature and flow conditions and stable thermal conductivity

(4) warm-up time to full accuracy: 15 minutes

(5) 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

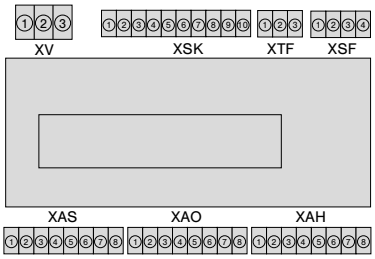
MRFV = measuring range final value

Block diagram



Input voltage:	DC 19 ... 32 V	
Keyboard/display:	keypads LC display 2 x 16 digits	
User interface 1:	relay outputs: transistor outputs:	2 limit values 2 limit values + 1 error indication + 1 busy or quantity dependent pulse output (software selected)
User interface 2:	analogue outputs current or voltage	
Controller system:	signal processing I/O - controlling monitoring parameter memory	
Sensor interfaces:	calorimetric monitoring head	

Connection diagram



Wire size:	0.14 mm² to 1.5 mm² single or finely stranded conductor
Stripping length:	6.5 mm
Clamping screw:	M2 (nickel-plated brass)
Contact material:	pre-tinned tin bronze

XV: current supply
XSK: calorimetric monitoring head
XTF: keyboard release
XSF: not released for user
XAS: not released for user
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 (Nm^3/h) - flow quantity
V_N (m/h) - average standard velocity
A_R (m^2) - inner pipe cross section

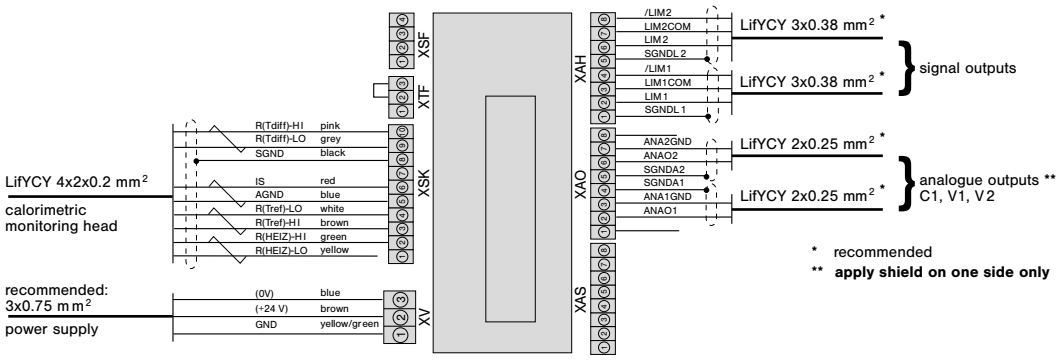
Setting range for inner pipe diameter: 10.0 mm ... 999.9 mm/ .394 in. ... 39.4 in.

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

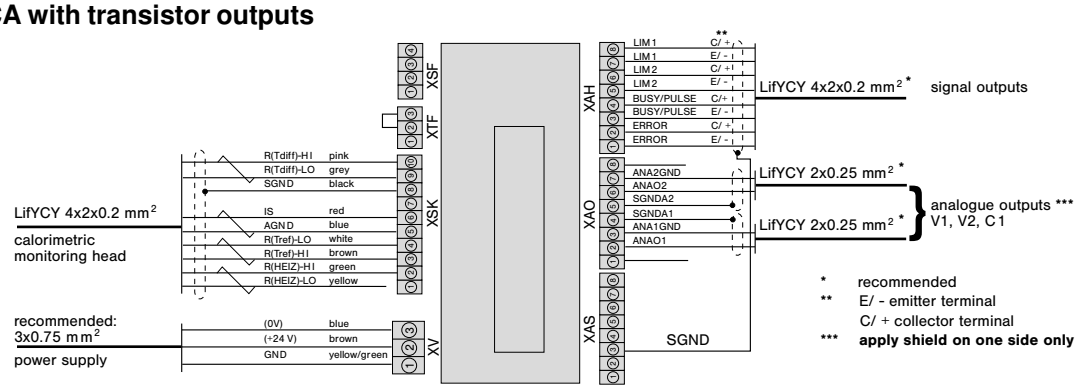
inner pipe diameter D in mm	measuring range in Nm^3/h	display range in Nm^3/h	inner pipe diameter D in mm	measuring range in Nm^3/h	display range in Nm^3/h
20	76	113	200	7690	11309
30	173	254	250	12016	17671
40	307	452	300	17303	25446
50	480	706	400	30762	45239
60	692	1017	500	48066	70685
70	942	1385	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

FC01-CA with relay outputs

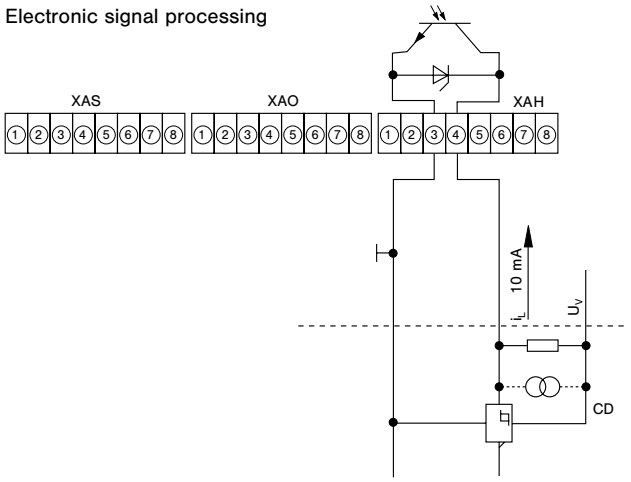


FC01-CA with transistor outputs

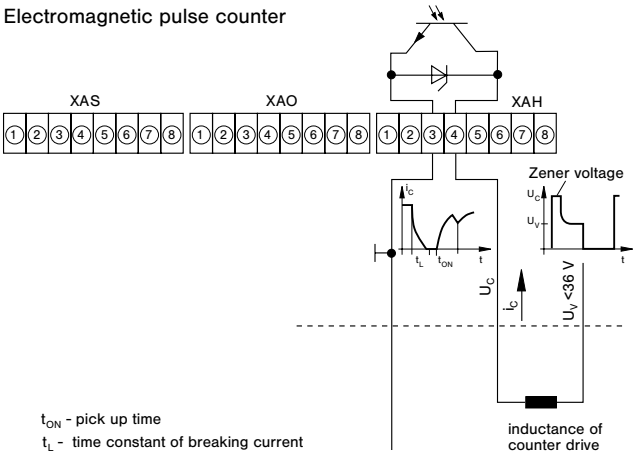


FC01-CA - Recommended connection of pulse output

Electronic signal processing



Electromagnetic pulse counter



t_{ON} - pick up time
t_L - time constant of breaking current

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

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 (CO_2) 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	G 1/2	internal thread	length: 50 mm/1.97 in.
	02	DN 20	G 3/4	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

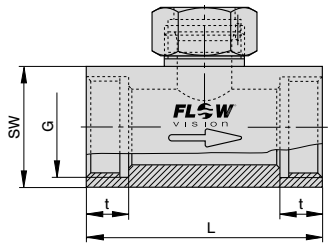
Description	Ref. No.
Blanking plug, brass, with O ring	0Z121Z000186
Union nut, brass	Y 306 901 01
Blanking plug, stainless steel 1.4571/AISI 316 Ti, with viton O ring	0Z121Z000187
Union nut, stainless steel	Y 306 901 03

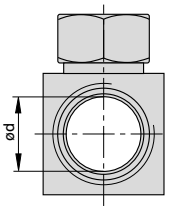
Ordering information

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



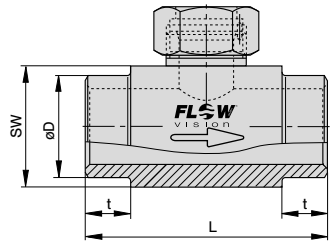


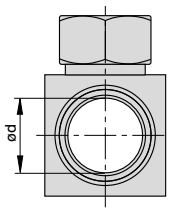
SW = width across flats

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

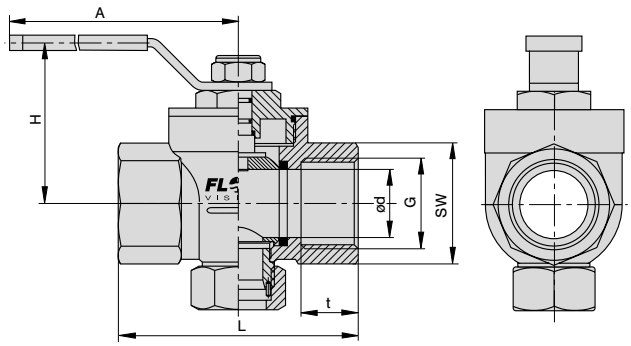




PN 315 bar / 4570 psi

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-03M 3	25	.984	25	.984	1"	21	.827	88	3.46	41	1.61	59	2.32	115	4.53
BV-04M 3	32	1.26	32	1.26	11/4"	24	.945	100	3.94	50	1.97	65	2.56	115	4.53
BV-05M 3	40	1.57	40	1.57	11/2"	24	.945	110	4.33	54	2.13	77	3.03	150	5.91
BV-06M 3	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 ($\frac{mm}{inch}$)

Description

Calorimetric plug-in type monitoring head for sensor adapter TP/BV and flow meter FC01-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

Monitoring head CSP

CSP-11

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	
CSP	**11**	**A**	**M1**	**L05**	**E10**	**T0**	**...**	ordering example

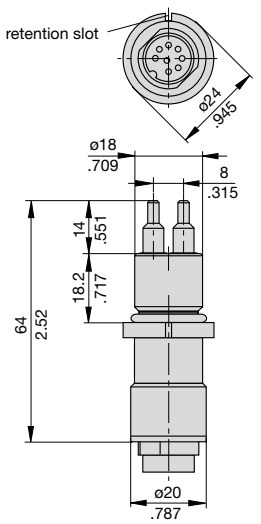
*) for detailed information please see section 0.

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 *) (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 (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

Dimensions



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

Cable types 15/18 with connectors

Do + Ka type 15
Do + Ka type 18

Do + Ka type 15-ST
Do + Ka type 18-ST

Description

Cable between Flow Meter FC01-xxx and calorimetric monitoring head type CSP.

- Connection to monitoring head by means of 8-pole round connector
- Connection to FC01-xxx by means of 10-pole clamping connector (XSK)

Technical data

Cable type 15 and 15-ST
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 and 18-ST
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

Typ between calorimetric monitoring heads **CSP** and **FC01-CA, FC01-FH-CA**

Do + Ka type 15 **PVC** insulated cable, type LifYCY 4x2x0.2 mm² (AWG 24)
8-pole round connector + 10-pole clamping connector

Do + Ka type 18 **silicone** insulated cable, type 4x2x0.2 mm² (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

Type between calorimetric monitoring heads **CSP** and **FC01-ST-CA**

Do + Ka type 15-ST **PVC** insulated cable, type LifYCY 4x2x0.2 mm² (AWG 24)
8-pole round connector + 10-pole clamping connector

Do + Ka type 18-ST **silicone** insulated cable, type 4x2x0.2 mm² (AWG 24)
8-pole round connector + 10-pole clamping connector

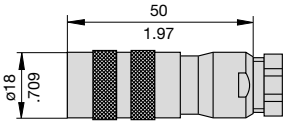
Available cable lengths

...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)

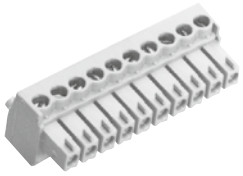
Do + Ka type 15-ST -2 m ordering example

Accessories

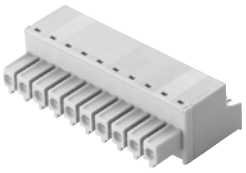
8-pole round connector
(without cable, for individual wiring by customer)
0Z112Z003124



10-pole clamping connector for cable types 15 and 18
(without cable, for individual wiring by customer)
0Z112Z000167



10-pole clamping connector for cable types 15-ST and 18-ST
(without cable, for individual wiring by customer)
0Z112Z000205



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

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

Description

Thread-mounted calorimetric monitoring head for flow Meter FC01-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!

Thread-mounted calorimetric monitoring head

CST-11

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

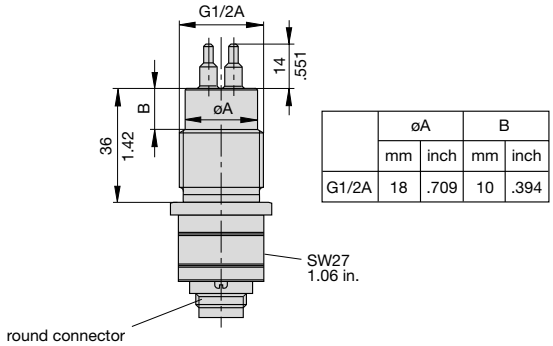
*) for detailed information please see section 0.

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	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

Dimensions of round connector



	øA		B	
	mm	inch	mm	inch
G1/2A	18	.709	10	.394

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

Cable types 15/18 with connectors

Do + Ka type 15 **Do + Ka type 15-ST**
Do + Ka type 18 **Do + Ka type 18-ST**

Description

Cable between Flow Meter FC01-xxx and calorimetric monitoring head type CST.

- Connection to monitoring head by means of 8-pole round connector
- Connection to FC01-xxx by means of 10-pole clamping connector (XSK)

Technical data

Cable type 15 and 15-ST
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 and 18-ST
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

Typ between calorimetric monitoring heads **CST** and **FC01-CA, FC01-FH-CA**

Do + Ka type 15 **PVC** insulated cable, type LifYCY 4x2x0.2 mm² (AWG 24)
8-pole round connector + 10-pole clamping connector

Do + Ka type 18 **silicone** insulated cable, type 4x2x0.2 mm² (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

Type between calorimetric monitoring heads **CST** and **FC01-ST-CA**

Do + Ka type 15-ST **PVC** insulated cable, type LifYCY 4x2x0.2 mm² (AWG 24)
8-pole round connector + 10-pole clamping connector

Do + Ka type 18-ST **silicone** insulated cable, type 4x2x0.2 mm² (AWG 24)
8-pole round connector + 10-pole clamping connector

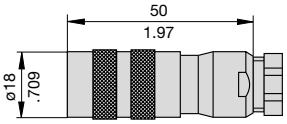
Available cable lengths

...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)

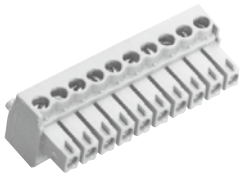
Do + Ka type 15-ST -2 m ordering example

Accessories

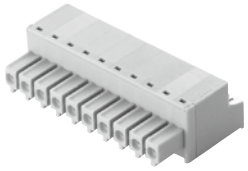
8-pole round connector
(without cable, for individual wiring by customer)
0Z112Z003124



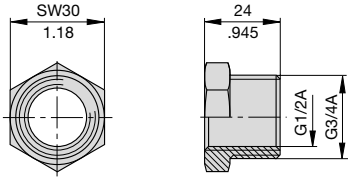
10-pole clamping connector for cable types 15 and 18
(without cable, for individual wiring by customer)
0Z112Z000167



10-pole clamping connector for cable types 15-ST and 18-ST
(without cable, for individual wiring by customer)
0Z112Z000205



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 (mm / 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 FC01-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!

Monitoring head CSF

CSF-11
variable immersion depth

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

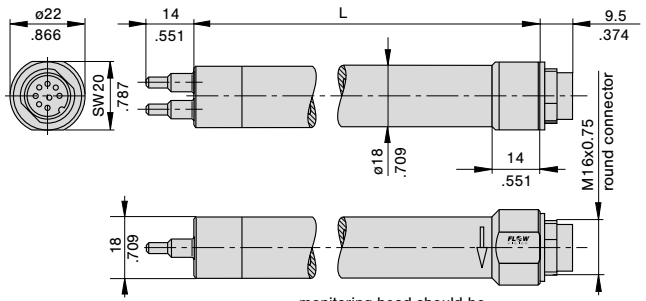
*) for detailed information please see section 0

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: Flow velocity range:	depending on immersion depth; 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 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

Dimensions



Type	L	
	mm	inch
CSF-...L43...	188	7.40
CSF-...L30...	300	11.81
CSF-...L40...	400	15.75

monitoring head should be aligned in direction of flow (see arrow)

Only CSF-...L30... and CSF-...L40...:
Additional wetted o-ring (FKM)

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

Cable types 15/18 with connectors

Do + Ka type 15
Do + Ka type 18

Do + Ka type 15-ST
Do + Ka type 18-ST

Description

Cable between Flow Meter FC01-xxx and calorimetric monitoring head type CSF.

- Connection to monitoring head by means of 8-pole round connector
- Connection to FC01-xxx by means of 10-pole clamping connector (XSK)

Technical data

Cable type 15 and 15-ST
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 and 18-ST
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

Typ between calorimetric monitoring heads **CSF** and **FC01-CA, FC01-FH-CA**

Do + Ka type 15 **PVC** insulated cable, type LifYCY 4x2x0.2 mm² (AWG 24)
8-pole round connector + 10-pole clamping connector

Do + Ka type 18 **silicone** insulated cable, type 4x2x0.2 mm² (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

Type between calorimetric monitoring heads **CSF** and **FC01-ST-CA**

Do + Ka type 15-ST **PVC** insulated cable, type LifYCY 4x2x0.2 mm² (AWG 24)
8-pole round connector + 10-pole clamping connector

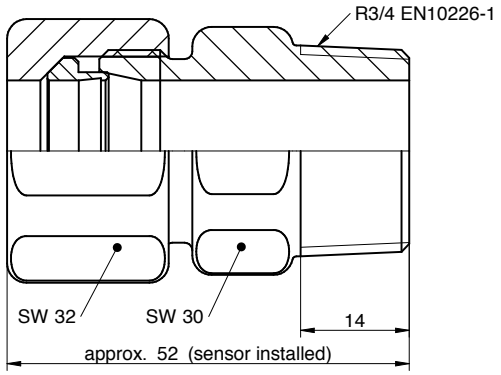
Do + Ka type 18-ST **silicone** insulated cable, type 4x2x0.2 mm² (AWG 24)
8-pole round connector + 10-pole clamping connector

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-ST -2 m ordering example

Compression fitting

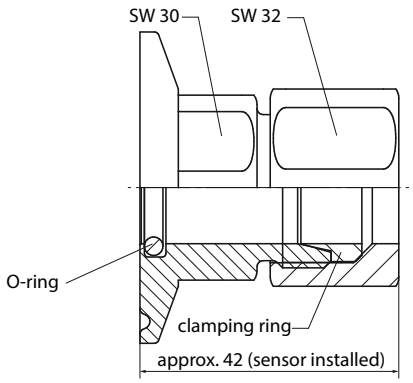


Description and ordering information

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

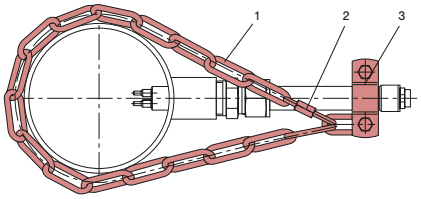


Description and ordering information

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



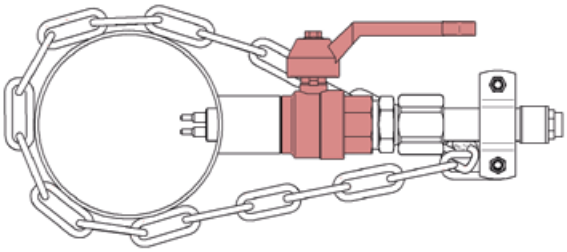
Description and ordering information

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



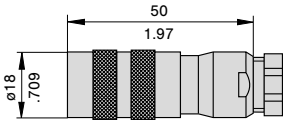
Description and ordering information

Material (body, ball):
Brass nickel plated
Material (ball seal): PTFE
Length: 65 mm
Outside thread: G3/4“, L = 13 mm
Inside thread: G3/4“, L = 15 mm
Fluid temperature: -20...120 °C
Ambient temperature: 0...80 °C
Pressure: PN 25 bar (up to 80 °C)
Ordering number: BV-02M3-PI

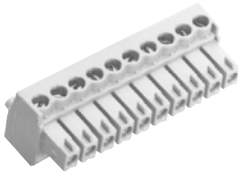
Material (body, ball):
Stainless steel 1.4408, 1.4401
Material (ball seal): PTFE
Length: 78 mm
Outside thread: R3/4“, L = 17 mm
Inside thread: Rp3/4“, L = 13 mm
Fluid temperature: -30...180 °C
Ambient temperature: 0...80 °C
Pressure: PN 64 bar (up to 80 °C)
Ordering number: BV-02M15-PI

Further accessories

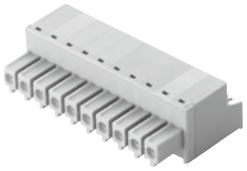
8-pole round connector
(without cable, for individual wiring by customer)
0Z112Z003124



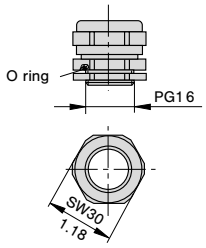
10-pole clamping connector for cable types 15 and 18
(without cable, for individual wiring by customer)
0Z112Z000167



10-pole clamping connector for cable types 15-ST and 18-ST
(without cable, for individual wiring by customer)
0Z112Z000205

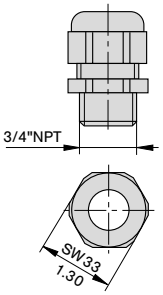


PG16 nickel-plated brass
(standard)
0Z122Z000128



pressure resistant up to 2 bar/29.0 psi

NPT3/4" moulded, black
0Z122Z000131



pressure resistant up to 2 bar/29.0 psi

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

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