

FlexBar 3431 Pressure Transmitter

Profibus® PA communication

Configurable address, span, unit and damping

Zero point adjustment

2-point calibration and linearisation table

-1(0)...400 bar

Relative or absolute pressure

400% overpressure safety limit

Hygienic process connections

Configurable with FlexProgrammer and Simatic® PDM® software

**Optional display
with push button address setting**

Demko EEx ia IIC T4/T5, ATEX II 1G



Description

FlexBar 3431 is a configurable pressure transmitter with Profibus® PA communication. FlexBar 3431 measures the pressure by means of a polysilicon strain gauge sensor. The electronics are separated from the media by a thin diaphragm and an oil-filling. Three different oil fillings are available including a mineral oil complying with demands from FDA for use in the food and pharmaceutical industries.

The electronics are located in a separate sealed housing giving FlexBar 3431 superb resistance to moisture. Cable connection is via gland or plug.

FlexBar 3431 is used in food, chemical and petrochemical industries to measure absolute or relative pressure. The wide range of process connections together with the configurable facilities make FlexBar 3431 the ideal choice for all pressure measuring applications.

Hygienic process connections for a wide range of standards are available for FlexBar 3431 with a flush diaphragm and G1/2A male nipple. Please refer to the data sheet for FlexBar Accessories.

FlexBar 3431 is designed according to the Profibus® PA profile ver. 3.0 and is fully configurable via Simatic® PDM® software.

The Profibus® PA communication features on-line process monitoring, transmitter configuration and multiple process control in 2-wire networks especially suited for Ex applications.

The integrated display is optional.



Technical Data

Input

Measuring limits	See "Ordering Details"
Overpressure	400% of full range, max. 600 bar (continuously)
Resolution	14 bit
Accuracy	<0.2% f.r.

Output

Current consumption	15 mA ± 1 mA
Signal	IEC 1158-2
Characteristic	Linear or customised (30 points)
Supply range	9...32 V _{ac}
Isolation voltage	500 V _{ac} (From housing to output connection)

Display (optional)

Type	4 digits, 7 segment LCD, and a DOT matrix area 7 x 20 pixels
Display	-9999...+9999
Digit height	11.5 mm
Engineering units	bar, mbar, PSI, mmHg, kPa, MPa, atm, inH ₂ O, inHg, mH ₂ O, %
Rotation	Max. one turn of display cable

Adjustment limits

Span	-10...10% of read-out LSL < span < USL
Zero point	-10...10% of full range

Auto zero

Auto zero	-10...10% of full range Min. value > -1 bar rel. LSL < auto zero < USL
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Communication

Profibus® profile	Profibus PA, ver. 3.0, DPV1
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Configuration

PDM® version 5.02	Diagnostics and parameterisation
FlexProgrammer	Dedicated PC-program
Push button	Address setting (display version only)

Operational conditions

Amb. temperature, std.	-30...85°C (With cover)
Amb. temperature, display	-20...70°C
Display optimal readability	-10...70°C
Storage temperature	-40...85°C
Process temperature	Standard: -30...121°C Cleaning ≤ 150°C for < 60 min. Cooling neck: -30...200°C (Filling fluid DC550)
Relative humidity	< 98%, condensing
Protection class	Plug M12 + Gland: IP 66/67
Vibrations	Lloyds Register, test 2
Shock test	100g for 10 msec.

Operational condition effects

Ambient temperature influence, measured at -10...70°C and max. span:

Zero point	< 0.05% per 10K
Span	< 0.05% per 10K
Process temperature	< 0.2% per 10K

Cooling neck only. Media temperature (t_m) influence in the temperature interval 100...200°C:

G1/2A	20 mbar + (t _m - 100) x 2.0 mbar
DS 722	20 mbar + (t _m - 100) x 0.5 mbar
ISO 2852	20 mbar + (t _m - 100) x 0.5 mbar
3A/DN38	20 mbar + (t _m - 100) x 1.0 mbar
3A/DN76	20 mbar + (t _m - 100) x 0.5 mbar
GEA Varivent	20 mbar + (t _m - 100) x 0.5 mbar

Transitional behaviour

Switch-on time	< 2 sec.
Sample time	0.25 sec.
Step response time	< 0.5 sec.
Damping, t₉₉	0...60 sec. (2 sec. steps)
Long-term drift	Typ. 0.1% per year

EMC data

Immunity	EN 61326 {7}
Emission	EN 61326 {7}

Approval (Demko) EEx ia IIC T4/T5, ATEX II 1G

Internal inductivity	L _i ≤ 10 µH
Internal capacity	C _i ≤ 5 nF
Coupler/link	FISCO Standard; U: 17.5 V _{ac} ; I: All; P: All
Zener barrier	U ≤ 20 V _{dc} ; I ≤ 0.1 A; P ≤ 0.75 W
Temperature class	T1...T4: -30 < T _{amb} < 85°C {6} T5: -30 < T _{amb} < 60°C {6}

Materials

Housing	Stainless steel (AISI 304/W1.4301)
Pressure sensor	Polysilicon strain gauge
Fill fluid	Ondina, Halocarbon or DC550
Wetted parts	Acid-proof stainless steel (AISI 316L/W1.4404) or Hastelloy C
Options	PTFE-teflon coating (Accofal 2G54) Other coatings on request

Electrical connection

Cable entry	Gland M16 Plug M12
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Disposal of product and packing

According to national laws or by returning to Bourdon-Haenni

Additional Description

The mounting method for the pressure sensor ensures fast response time, excellent temperature compensation and high measuring accuracy.
All diaphragm weldings are checked with a helium leak-tester.

Configuration

Unless specified the FlexBar 3431 will be configured with device address 126.

FlexBar 3431 can be configured either online via the Profibus® PA network or offline with the dedicated Bourdon-Haenni FlexProgrammer unit connected to a standard PC.

The following parameters can be configured using the FlexProgrammer:
Proces Value Scale corresponding to 0...100% output at the display.
Enable/Disable the push button at the display.
Set the transmitter device address.
Set/change the display engineering unit.

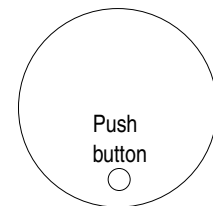
In a Profibus® PA network all standard parameters for a PA pressure device, such as measuring limits, linearisation, damping, one- or two points calibration, alarm limits, etc. can be configured.

Setting the device address

The push button at the display is for control and setting of the transmitter device address.

Monitor the address: Push the button once.
Change the address: Push the button in 5 secs., the display flashes.
Increase address by 1: Push the button again.
Increase address by >1: Push and hold the button.
No activity for 5 secs.: The display shows the process value and the new address has been activated.

The push button can be enabled/disabled using the FlexProgrammer

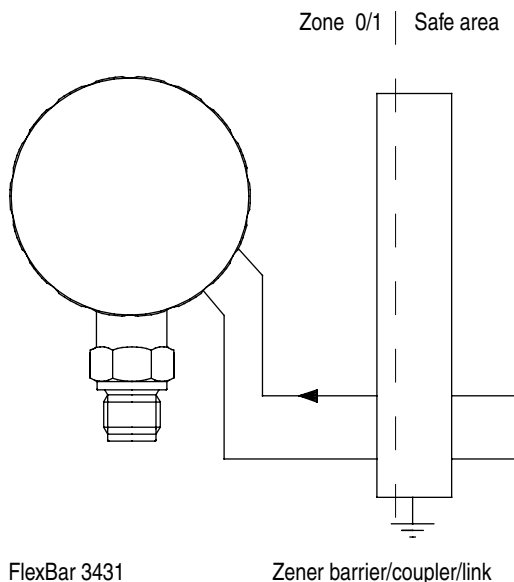


Rear view of the display.
(optional)

Measuring Units Conversion

bar	PSI	mH ₂ O	Pascal	kPa	MPa
1	14.5	10.197	10 ⁵	100	0.1

Ex-application



FlexBar 3431 is approved by Demko for EEx ia IIC T4/T5 and ATEX II 1G according to the European standards EN 50014 and EN 50020.

FlexBar 3431 must be installed in accordance with prevailing guidelines for zone 0 or 1, and a certified, intrinsically safe zener barrier with the maximum values $U_{max} = 20 V_{dc}$; $I_{max} = 0.1 A$; $P_{max} = 0.75 W$ must be used.

Alternatively FlexBar 3431 can be connected to a Profibus DP/PA converter, such as coupler or link. The maximum specifications must follow FISCO standards and not exceed:

U_{max} : 17.5 V_{dc}; I: All; P: All

Ordering Details - FlexBar 3431

		343x	xxxx	xxxx
Type		4' digit		
With integrated, digital display {4}		1		
Without display		2		
Safety - Note{8}		5' digit		
Standard version		1		
Demko EEx ia IIC T4/T5, ATEX II 1G		2		
Electrical connection		6' digit		
Gland M16		1		
Plug M12		2		
Process connection position		7' digit		
At the base		1		
At the rear		2		
At the base with cooling neck		3		
At the rear with cooling neck		4		
Diaphragm surface		8' digit		
Standard, AISI 316L		1		
Covered with Teflon {1}		2		
Oil filling		9' digit		
Ondina (Recommended for food industry applications, max. 121°C)		1		
Halocarbon (For Oxygen measuring, max. 120°C)		2		
DC550 (Silicone oil for high temperature applications, max. 200°C)		3		
Process connection standard		10' digit		
Flush diaphragm, male nipple	G1/2A	PN400	AISI 316L	1
Flush diaphragm, male nipple	G1/2A	PN400	Hastelloy C-276	2
DS 722 rotating female nut	DN40	PN16	AISI 316L	3
ISO 2852 clamp, 3A approved	DN38	PN40	AISI 316L	4
ISO 2852 clamp, 3A approved	DN51	PN40	AISI 316L	5
3A hygienic connection, 3A approved	DN38	PN40	AISI 316L	6
3A hygienic connection, 3A approved	DN76	PN40	AISI 316L	7
GEA Tuchenhausen Varivent		PN40	AISI 316L	8
SMS 1145 male nipple	DN38	PN25	AISI 316L	9
Homogeniser, type A {2}		PN400	AISI 316L	A
Homogeniser, type B {2}		PN400	AISI 316L	B
Homogeniser, type C {2}		PN400	AISI 316L	C
Homogeniser, type D {2}		PN400	AISI 316L	D
M44 x 1.25 male nipple, pulp and paper version		PN16	AISI 316L	E
M44 x 1.25 male nipple, hygienic, 3A approved		PN16	AISI 316L	F
ø43 mm hygienic connection		PN16	AISI 316L	G
DIN 11851 rotating female nut DN40	PN25	AISI 316L		H
DIN 11851 rotating female nut DN50	PN25	AISI 316L		J
SMS 1145 rotating female nut DN38	PN25	AISI 316L		K
SMS 1145 rotating female nut DN51	PN25	AISI 316L		L
1/2"-14 NPT male nipple, ANSI/ASME B1.20.1		PN400	AISI 316L	N
Gauge connection for external seal {3}	G1/2A	PN16	DIN 16288	S
Pressure type		11' digit		
Relative pressure (bar)				1
Absolute pressure (bar)				2
Pressure range		12' digit		
-0.1...0.4	0...0.4			1
-0.4...1	0...1			2
-1.0...2.5	0...2.5			3
-1.0...6	0...6			4
-1.0...16	0...16			5
-1.0...40	0...40			6
-1.0...100	0...100			7
-1.0...400	0...400			8

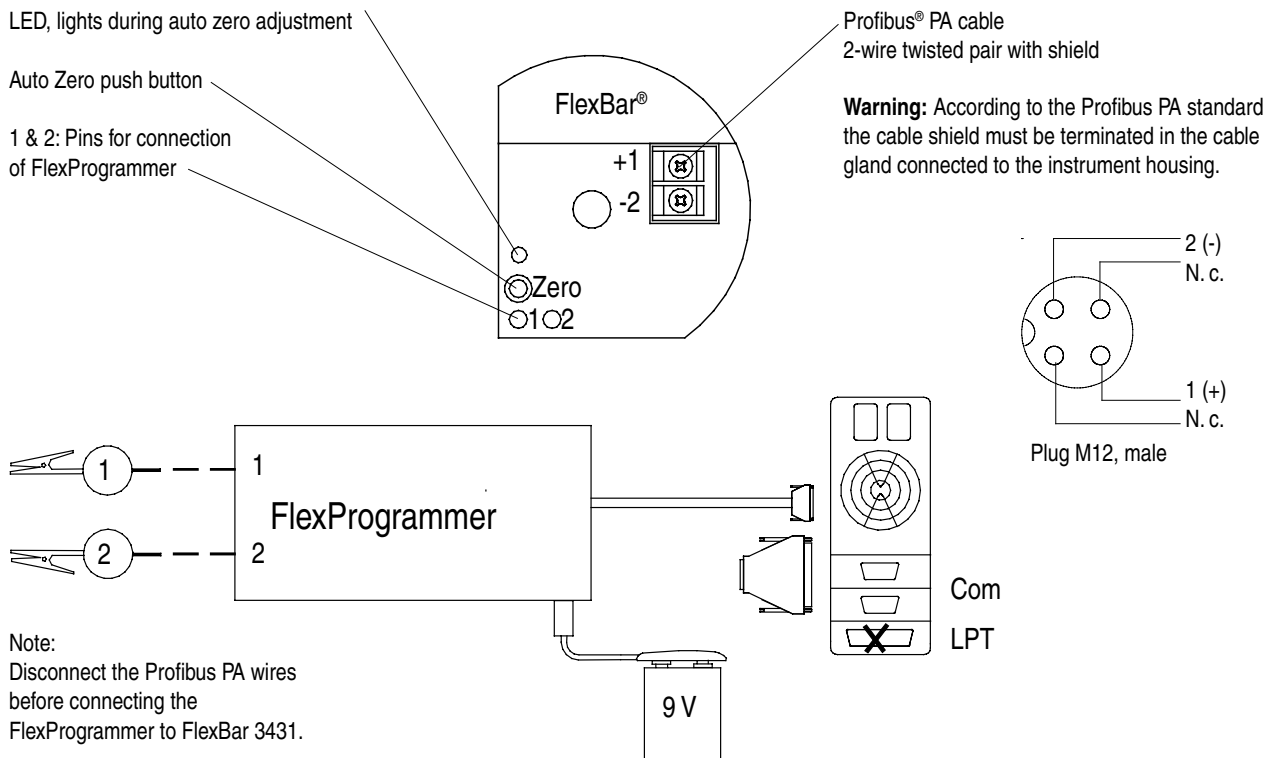
Accessories

GSD & EDD file on diskette	9000-0015
Digital display	9000-0013 {4}

Ordering Details - Notes

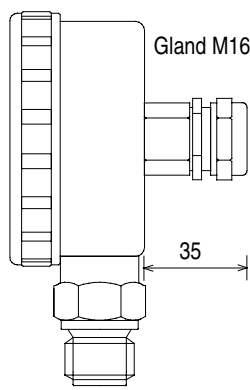
- {1} $P \leq 16$ bar. FDA approved. **NOT** 3A approved.
- {2} Only 0...400 bar relative pressure. No cooling neck available.
- {3} $P \leq 16$ bar. This connection has no diaphragm and no oil filling. An external flange with seal and non-aggressive/non-conductive filling fluid must be mounted.
- {4} **The digital display can be mounted only at the BHDK factory.**
- {5} **Accessories** for FlexBar 3431 are usually supplied separately. If you prefer the accessories to be assembled from the factory prior to delivery, please order type number 81 26-950.
- {6} With display the lowest temperature is -10°C
- {7} Measured with 2-wire, shielded, twisted pair cable.
- {8} As standard the vented filter is with an EPDM gasket. A silicone gasket (VMQ) is optional (please specify).

Electrical Connection

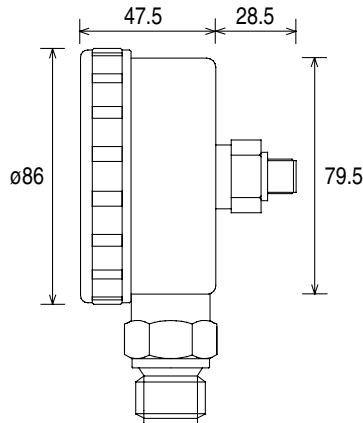


Dimensional Drawings

[mm]

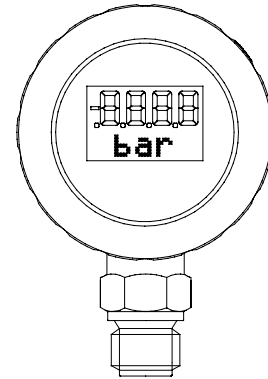


G1/2A, with gland.
Process connection at the base
Side view

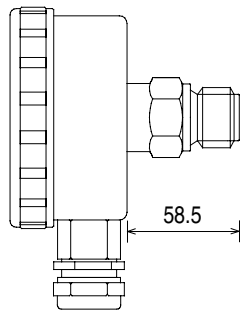


G1/2A, with M12 plug.
Process connection at the base
Side view

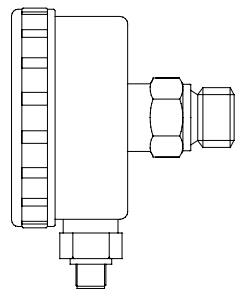
The digital display is optional



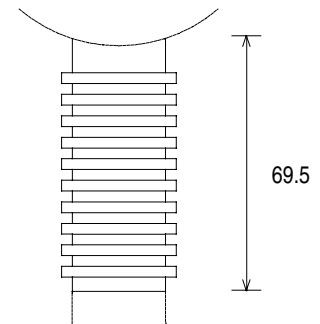
G1/2A
Process connection at the base.
With digital display. Frontview



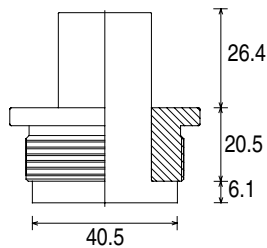
G1/2A, with gland.
Process connection at the rear
Side view



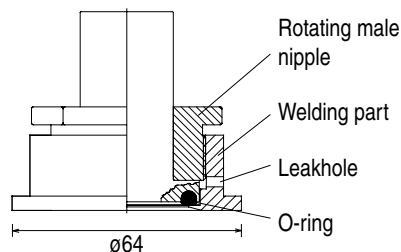
G1/2A, with M12 plug.
Process connection at the rear
Side view



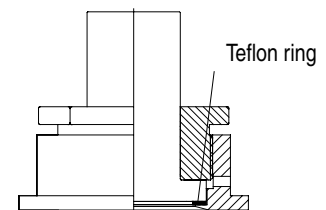
Cooling neck (integrated). Specify
mounting at the base or at the rear.
Add the measure to the total height



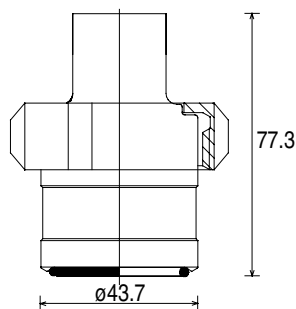
M44 x 1.25 connection with
cut through rotating male nipple



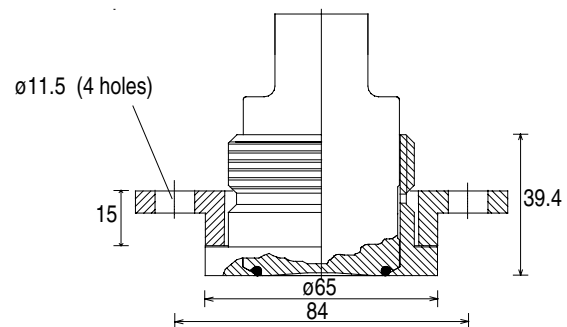
M44 x 1.25 hygienic connection
mounted in welding part
O-ring, EPDM included



M44 x 1.25 pulp/paper version
mounted in welding part



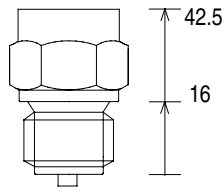
ø43 mm connection with O-ring sealing
and DN25 rotating female nut (DIN 11851)



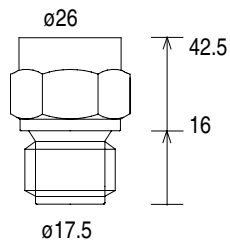
ø43 mm connection with O-ring sealing mounted in
welding part and with flange (shown without nut)

Dimensional Drawings

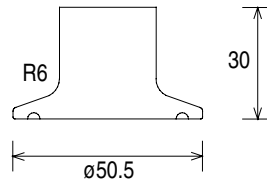
[mm]



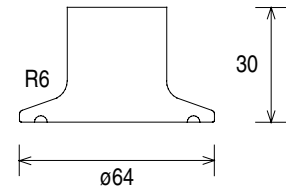
Gauge connection for external seal {4}



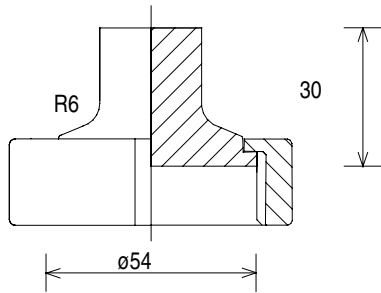
Male nipple G1/2A
Flush diaphragm



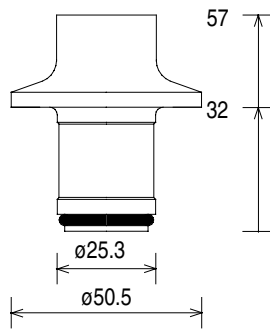
ISO 2852 clamp, DN38
EPDM gasket included



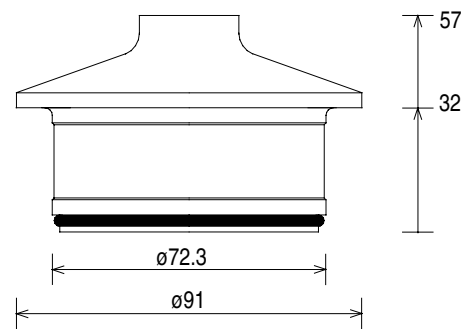
ISO 2852 clamp, DN51
EPDM gasket included



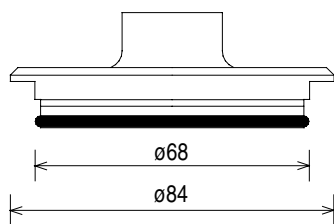
DS 722 rotating female nut, DN40



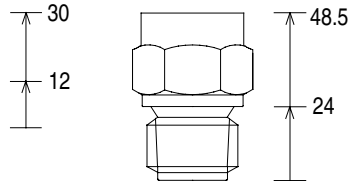
3A hygienic, DN38
O-ring, EPDM included



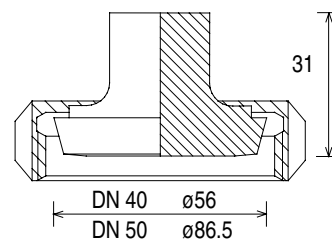
3A hygienic, DN76
O-ring, EPDM included



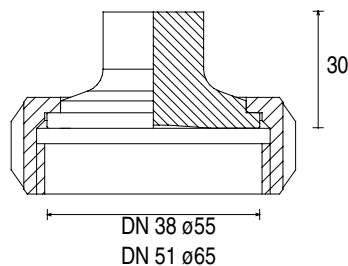
GEA Tuchenhagen Varivent



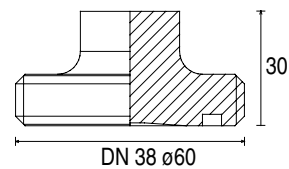
Male nipple 1/2-14 NPT



DIN 11851 rotating female nut



SMS 1145 Rotating female nut



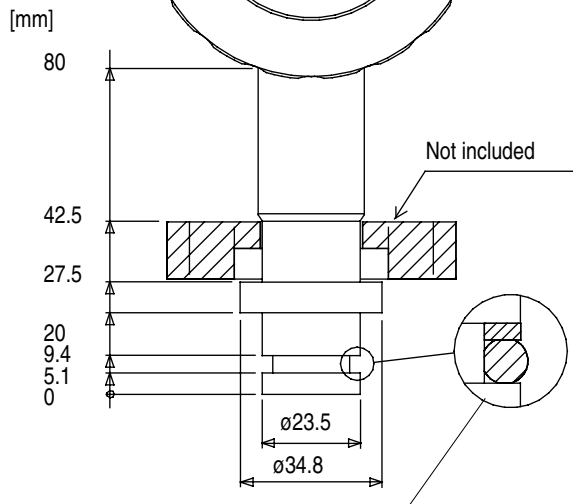
SMS 1145 Male nipple

Notes

FlexBar 3431 total measure:
Housing + (cooling neck) + connection

Dimensional Drawings

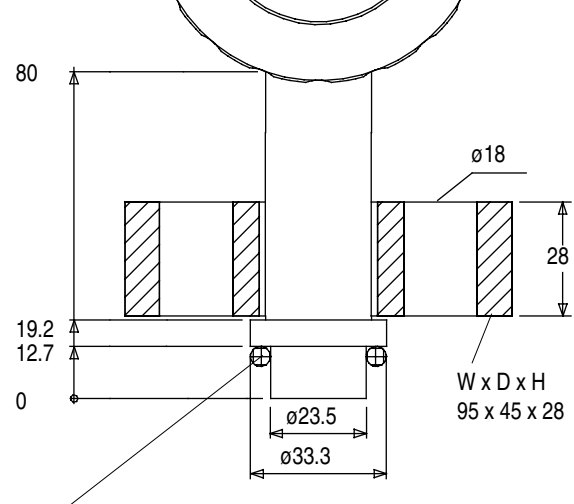
Version A Type number 816x 1x11 1A18



Type number 81 26-951 for version A

- 5 pcs. backing ring, PTFE
- 5 pcs. O-ring, FPM

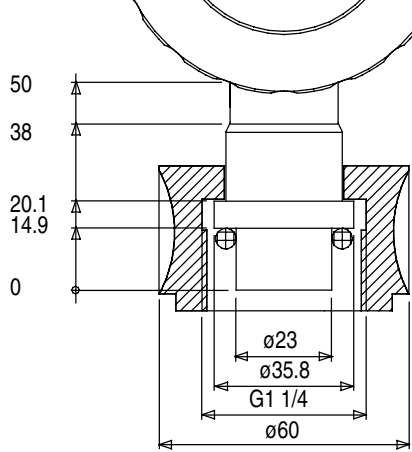
Version B Type number 816x 1x11 1B18



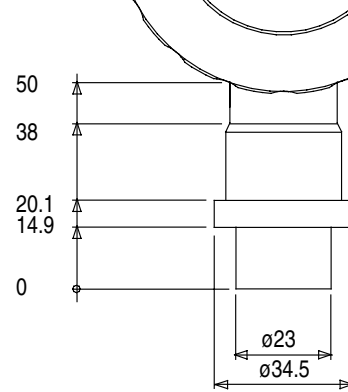
Type number 81 26-952 for the versions B, C and D

- 5 pcs. O-ring, FPM

Version C Type number 816x 1x11 1C18



Version D Type number 816x 1x11 1D18



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