MA-98HP

Magnetic Level Gauge for High Process Pressures

- **Pressure- and gas-proof separation of chamber and display**
- **Level measuring and indicating of aggresive, combustible, toxic, hot, contaminated and agitated liquids**
- **For operating pressures up to 400 bar and operating temperatures from -160°C to 400°C**
- **Up to 6 meter measuring length**
- **Flange, thread and welded connections**
- **Fully stainless steel measuring tube or optionally made from Hastelloy or titanium**
- **Switching contacts and optional measuring transmitter**
- **Customized designs**

Description: A stainless steel measuring tube has two connecting sleeves on the side which are joined with the vessel to be monitored. Since in this reference vessel the same fluid level is found as that in the tank, a cylindrical stainless steel or titanium float is located always at the level with the vessel level. The float is counterbalanced exactly to the density of the medium and it carries a specially designed disc-shaped magnetic system that acts through the stainless steel wall of the measuring tube on an indicator bar which is sensitive to magnetic forces. Due to the magnetic force of the float, its pre-magnetized rollers are flipped by 180° in such a way that all rollers below the float train their red side and the remaining rollers above the float their white side to the front. Thus, the observer obtains a precise visual statement on the level in the container. Optionally, the reference tube can be equipped with bistable, magnetic sensitive limit contacts which emit a binary signal when the float has passed the level where the sliding contacts are mounted. Another alternative to the remote transmission of value is adding a reed contact chain externally on the measuring tube that would convert the float movement into a stepped resistance or current signal. Instead of the reed contact chain, also a magnetostrictive sensor can be used which breaks up the level at a higher accuracy and provides a 4 to 20 mA power signal in 2-wire circuit.

Range of application: The MA-98HP series of magnetic level gauges has been long in use in large numbers in the entire industry. Wherever a level needs to be durably transmitted in visualized or electrical form under harsh conditions or at high pressure or extreme temperatures, the principle of magnetic float transmission in bypass, that has a proven record of over 30 years, the use is worthwhile.
Meanwhile, the technology of remote transmission, for example, by using magnetostrictive sensor has been perfected to such extent that it is no way inferior to other methods of level measurement and monitoring. Moreover, the advantage here is that the level can be identified at one glance directly at the measuring point. The electrical signals in the control room can be verified visually without much assembling work.
Besides pressure levels up to PN400, also all conceivable variants of draining and ventilation such as valves, ball-cocks or compression and cutting ring fittings are available in our program. Just contact us for more details.

N 2014 / 02

www.profimess.com
Schleusenstraße 3 · 27568 Bremerhaven · ☎ +49 471 98 24 -151 · 🖷 +49 471 98 24 -152 · E-Mail: info@profimess.de

Versions:

Measuring range (M): The distance between the upper and the lower lateral connection is specified in millimeters. The maximum length of a measuring tube is 6000 mm; for greater lengths, however, several reference tubes must be used. For a length of 2000 mm and above, we recommend equipping the magnetic level gauge with a welded bracket for additional securing (Option /7). If the free space (dugout) between the lower connecting piece and the base or the space (projection) between the upper connecting piece and the ceiling are in one way or the other restricted, the relevant maximum parameter must be specified in detailed text at the time of placing an order.

Ordering codes:

Order.-No.: MA-98HP. [][][][]. 1. DN[]-PN[]. 0000. 0. 0. 0

Magnetic Level Gauge for High Process Pressures

Center distance of lateral connections in mm:
[ ][ ][ ][ ] mm (6000 mm max.)

Process connection:
1 = flange in stainless steel EN 1092-1
2 = ANSI flange in stainless steel
3 = thread connecting piece
4 = thread bushing
5 = welded connecting piece
99 = customized special version

Nominal diameter and pressure level flange:
[ ][ ][ ][ ] e.g. DN50 PN250 o. 2" Class 1500
(0000 for flange or welded end)

Connecting thread for thread connecting piece or bushing:
[ ][ ][ ][ ] e.g. G3/4" o. M18x1.5
(0000 for flange or welded end)

Drain:
0 = plug 1/2-NPT
0a = plug G 1/2"
1 = valve in stainless steel
99 = customized special version, please specify in detailed text

Ventilation:
0 = cap
1 = cap with ventilation screw 1/2"-NPT
1a = cap with ventilation screw G 1/2"
99 = customized special version, please specify in detailed text

Options (multiple names like /1/7/8 possible):
0 = none
1 = limit contacts (quantity and function, see electrical specifications)
2 = remote transmitter REED contact chain with resistance output
3 = remote transmitter REED contact chain with power output 4 to 20 mA
4 = remote transmitter magnetostrictive with linear power output 4 to 20 mA
7 = mounting bracket for lengths from 2000 mm
8 = low temperature version below -10°C
9 = electrical trace heating
10 = chamber insulation

Please specify in detailed text: media density, operating temperature and operating pressure.

In an empty vessel, the float for the MA-98HP is located in the so-called float-sack below the connection and in a full tank in the projection above the connection. This means that these dimensions must correspond with at least the float length. However, since the float's mounting length also depends on the media density, special materials must be used in case of space constraints, if necessary, in order to reduce the float length.

Process connection: Flanges as per EN or ANSI, female and male threads or welded ends are the most commonly used features for connecting the MA-98HP on the side of the chamber. Customized solutions like aligning the connecting piece on top/ below or on top/laterally or at the bottom/laterally are available on request.

Nominal diameter and pressure level for flange: The precise name of the connecting flange on the vessel must be specified in a detailed text. Some examples are EN DN25 PN160 DL-C or ANSI 1" 300 lbs RF. Standard flanges are EN DN15 PN160 with sealing bar Form-C.

Male thread for screw neck or bushing: If a screw neck or a bushing is selected as a variant for the connection, the thread size must be specified in detailed text. Here the standard is G3/4". All common threads in inch or metric are available on request.

Drain: For changing the float the MA-98HP is always provided with a flange connection on the lower side of the tube which is closed with a blind flange. As a standard, the blind flange is provided with a thread hole and a 1/2"-NPT plug so that the vessel can be emptied through this hole during operation. Optionally, a valve can be mounted into the flange, which normally points to the bottom and can be aligned also laterally in case of space constraints. Customized versions like drain ball-cocks, compression and cutting ring fittings for connecting a tube directly are available on request.

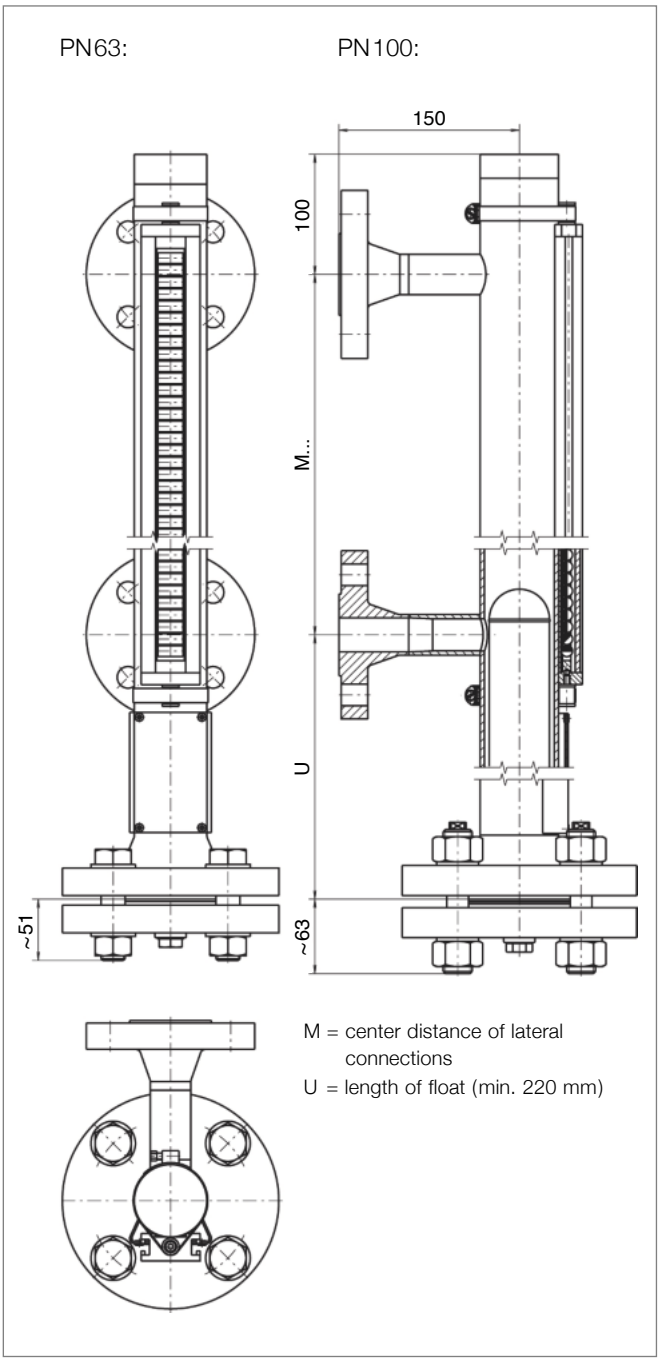
Ventilation: Normally, the MA-98HP has a completely closed cap as the top closure for the reference vessel. In this solution, in applications at high pressure there is a risk of formation of a locked-in pressure pocket above the float which may affect the measuring accuracy. To circumvent this, the cap can be provided with a threaded hole. As a standard, we supply a 1/2"-NPT connection with sealing plugs. Other thread variants or also hose nipples can be provided on request.

Options: With regard to options, specify in detail if the MA-98HP should be provided with electrical limit contacts and as to how many (Option /1). Optionally, for remote transmission of level value a reed contact measuring transmitter (Option /2 and /3) or a magnetostrictive sensor (Option /4) can be mounted externally on the MA-98HP which provides a 4 to 20 mA signal at the output (see also FM-01N and FM-02 for details). Mounting brackets stabilize the magnetic level gauge for lengths above 2 meters (Option /7), and a low temperature version (Option /8) has a special type level gauge bar which will not become "blind" due to condensate. Optionally, the MA98HP can be fitted with an electrical trace heating (Option /9) or a chamber insulation (Option /10).

Technical specifications PN63 / PN100:

Chamber:	PN63 Ø 60.3 x 2 mm or PN63 Ø 60.3 x 2.6 mm; PN100 Ø 65 x 3.5 mm
Chamber end top:	welding cap, flat top or flanged Options: - vent plug - vent valve - vent flange
Chamber end bottom:	flanged with drain plug Options: - drain valve - drain flange
Process connection:	flange EN 1092-1, DN10-DN100, PN63-PN100; flange ANSI B 16.5, 1/2"-4", Class 600; thread socket G / NPT, 1/2"-1"; welding socket 1/2"-1"
Center distance of lateral connections M... :	min. 150 mm to max. 6000 mm, (other dimensions on request)
Nominal pressure:	PN63, max. 63 bar PN100, max. 100 bar
Temperature range:	-30°C. to +300°C (according to design)
Density:	from 0.5 g/cm^3
Materials:	
Chamber, connecting piece, flange, brackets:	stainless steel (standard), Hastelloy C, Titanium etc.
Float:	Titanium 3.7035 (float design according to process parameters density, pressure and temperature)
Display:	magnetic roller display, type A or type B (according to design)
Display type A:	
Ambient temperature:	max. +200°C
Housing:	aluminium anodised
Rollers:	Crastin PBT, red and white
Cover:	Makrolon PC
Display type B:	
Ambient temperature:	max. +450°C
Housing:	aluminium anodised
Rollers:	ceramics, red and white
Cover:	glass
Advanced options:	On request: - electrical trace heating - chamber insulation - Explosion protection: Ex II 1/2G c T1-T6 KEMA 02 ATEX 2106 X

Dimensions (mm):



www.profimess.com
Schleusenstraße 3 · 27568 Bremerhaven · ☎ +49 471 98 24 -151 · 🖷 +49 471 98 24 -152 · E-Mail: info@profimess.de

Technical specifications PN160 / PN250:

Chamber: PN160 Ø 73.03 x 5.16 mm
PN250 Ø 71 x 7.5 mm

Chamber end top: flat top or flanged
ANSI 2 1/2“ Class 1500
Options:
- vent plug
- vent valve
- vent flange

Chamber end bottom: flanged ANSI 2 1/2“ Class 1500 with drain plug
Options:
- drain valve
- drain flange

Process connection: flange EN 1092-1, DN10-DN50, PN160-PN250;
flange ANSI B 16.5, 1/2“-2“, Class 1500;
thread socket G / NPT, 1/2“-1“;
welding socket 1/2“-1“

Center distance of lateral connections M... : min. 150 mm to max. 6000 mm, (other dimensions on request)

Nominal pressure: PN160, max. 160 bar
PN250, max. 250 bar

Temperature range: PN160, -30°C to +285°C
PN250, -30°C to +200°C
(according to design)

Density: from 0.64 g/cm^3

Materials:

Chamber, connecting piece, flange, brackets: stainless steel (standard), Hastelloy C, Titanium etc.

Float: Titanium 3.7035
(float design according to process parameters density, pressure and temperature)

Display: magnetic roller display, type A or type B (according to design)

Display type A:

Ambient temperature: max. +200°C
Housing: aluminium anodised
Rollers: Crastin PBT, red and white
Cover: Makrolon PC

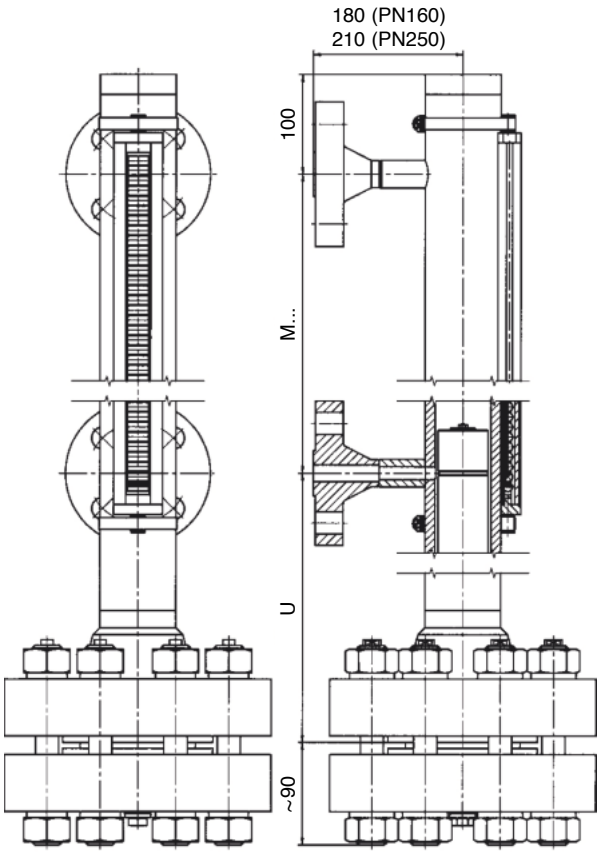
Display type B:

Ambient temperature: max. +450°C
Housing: aluminium anodised
Rollers: ceramics, red and white
Cover: glass

Advanced options: On request:
- electrical trace heating
- chamber insulation
- Explosion protection:
  Ex II 1/2G c T1-T6
  KEMA 02 ATEX 2106 X

Dimensions (mm):

PN160/250:



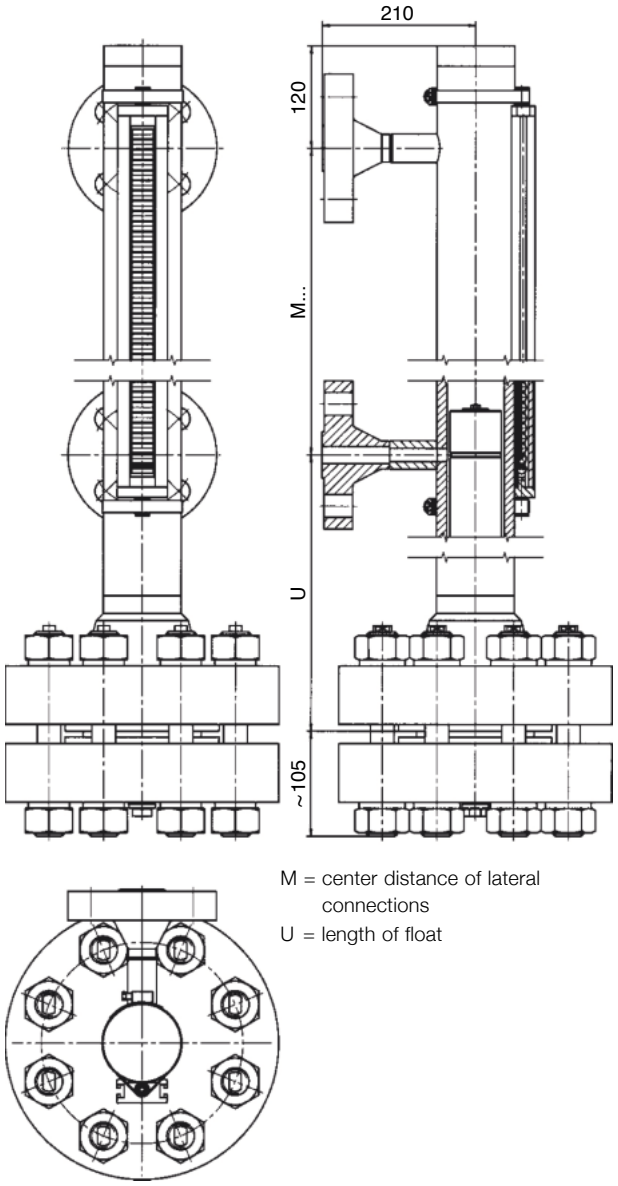
M = center distance of lateral connections
U = length of float (min. 220 mm)

Technical specifications PN400:

Chamber:	Ø 76 (Ø 76.1) x 10 mm
Chamber end top:	flat top or flanged ANSI 2 1/2“ Class 2500 Options: - vent plug - vent valve - vent flange
Chamber end bottom:	flanged ANSI 2 1/2“ Class 2500 with drain plug Options: - drain valve - drain flange
Process connection:	flange EN 1092-1, DN10-DN50, PN400; flange ANSI B 16.5, 1/2“-2“, Class 2500; thread socket G / NPT, 1/2“-1“; welding socket 1/2“-1“
Center distance of lateral connections M... :	min. 150 mm to max. 6000 mm, (other dimensions on request)
Nominal pressure:	max. 400 bar
Temperature range:	-30°C to +70°C (according to design)
Materials:	
Chamber, connecting piece, flange, brackets:	stainless steel (standard), Hastelloy C, Titanium etc.
Float:	Titanium 3.7035 (float design according to process parameters density, pressure and temperature)
Display:	magnetic roller display, type A
Display type A:	
Ambient temperature:	max. +200°C
Housing:	aluminium anodised
Rollers:	Crastin PBT, red and white
Cover:	Makrolon PC
Advanced options:	On request: - Explosion protection: Ex II 1/2G c T1-T6 KEMA 02 ATEX 2106 X

Dimensions (mm):

PN 400:



www.profimess.com
Schleusenstraße 3 · 27568 Bremerhaven · ☎ +49 471 98 24 -151 · 🖷 +49 471 98 24 -152 · E-Mail: info@profimess.de

Electrical specifications:

Magnetic switch:

Connection housing: aluminium anodised or stainless steel

Assembling position: cable pointing downwards

Fixture: sliding block (for aluminium housing) or clamping tape (for stainless steel housing)

Limit contact: reed, bistable

Contact function: 1x change-over

Version cable:

Connecting cable: 3 x 0.75 mm²

Type MS-1-PVC: 1 m PVC grey (standard)

Type MS-1-SIL: 1 m Silicone

Type MS-1E-PVC: 1 m PVC blue

max. Ambient temp.:

Type MS-1-PVC: +90°C

Type MS-1-SIL: +150°C

Type MS-1E-PVC: T6 up to +85°C

Switch rating:

Type MS-1-PVC: 230 V AC, 60 VA, 1 A; 230 V DC, 30 W, 0.5 A

Type MS-1-SIL: 230 V AC, 60 VA, 1 A; 230 V DC, 30 W, 0.5 A

Type MS-1E-PVC: for use in intrinsically safe circuit only with max. 100 mA and max. 30 V

Type code adder /N: for use in control circuits acc. to DIN EN 60947-5-6

Protection class: IP65

Explosion protection: (type MSA-1E-PVC only) II 1 G Ex ia IIC T6 - T3 LCIE 01 ATEX 6047 X

Version cable Ex d:

Connecting cable: 3 x 0.75 mm²

Type MSEx-1-PVC: 1 m PVC grey (standard)

Type MSEx-1-PUR: 1 m PUR yellow

Type MSEx-1-PURA: 1 m PUR yellow armoured

Type MSEx-1-SIL: 1 m Silicone

max. Ambient temp.:

Type MSEx-1-PVC, Type MSEx-1-PUR, Type MSEx-1-PURA: T6 up to +85°C

Type MSEx-1-SIL: T6 up to +85°C, T5 up to +100°C T4 up to +135°C, T3 up to +150°C

Switch rating:

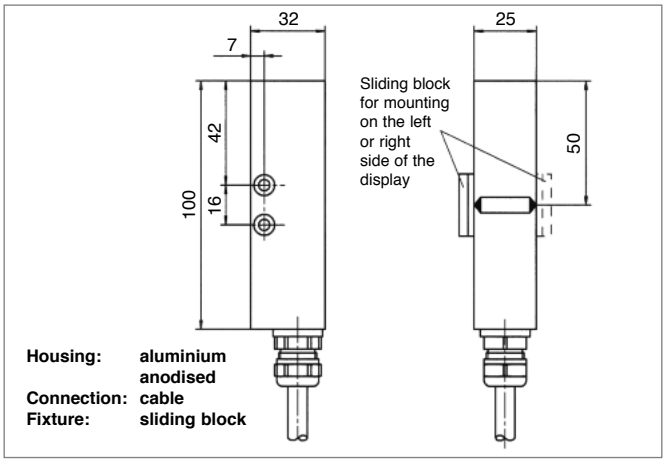
Type MSEx-1-PVC, Type MSEx-1-PUR, Type MSEx-1-PURA, Type MSEx-1-SIL: 230 V AC, 60 VA, 1 A; 230 V DC, 30 W, 0.5 A

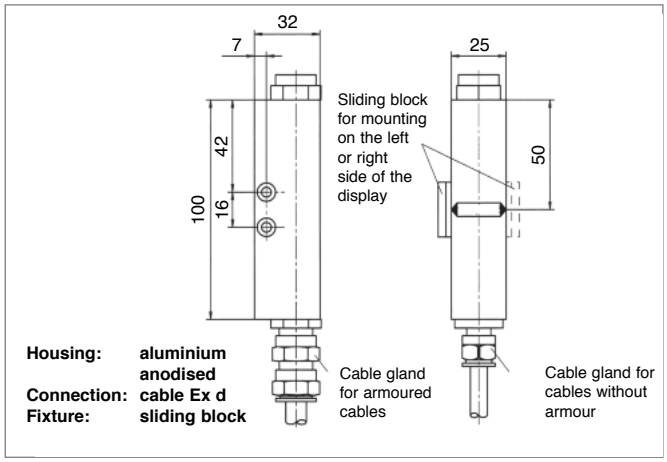
Type code adder /N: for use in control circuits acc. to DIN EN 60947-5-6

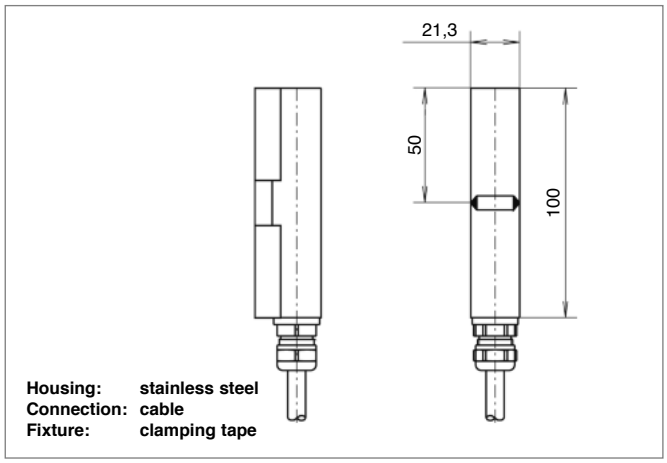
Protection class: IP68

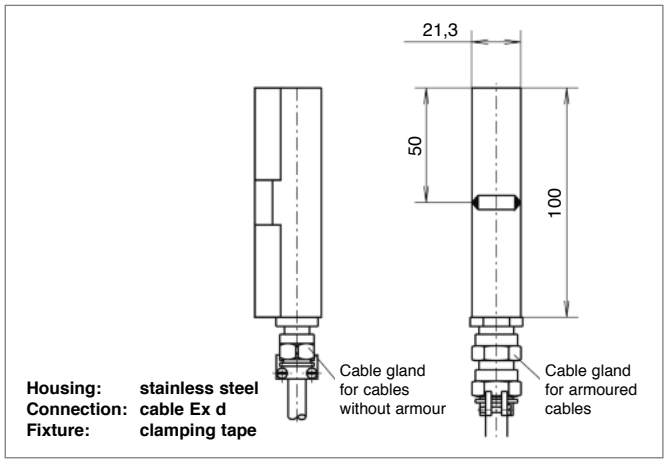
Explosion protection: II 2 G Ex d IIC T6 - T3 LCIE 01 ATEX 6047 X

Dimensions (mm):

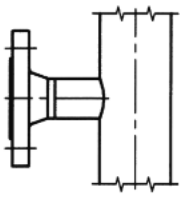




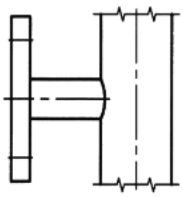




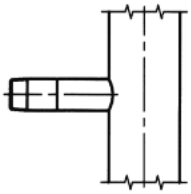
Lateral connections:



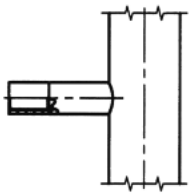
welding neck flanges
up to DN25 (1“)



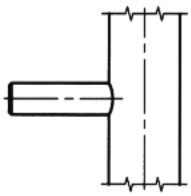
blind flange
above DN32 (1¼“)



thread socket
(male)



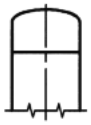
thread socket
(female)



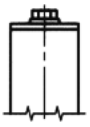
weld-on socket

Chamber end top:

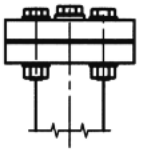
(with dampening spring on request)



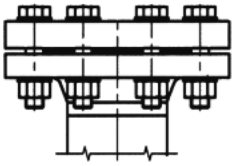
welding cap



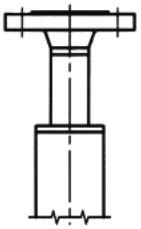
flat top with
vent plug



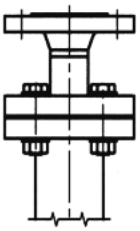
flanged with
vent plug



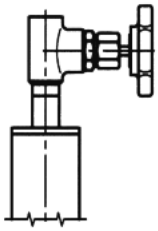
flanged e. g. flange
facings with groove and tongue



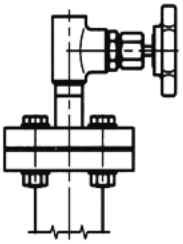
flat top with
vent flange



flanged with
vent flange



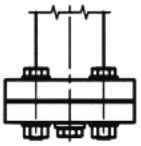
flat top with
vent valve



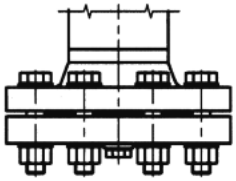
flat top with
vent valve

Chamber end bottom:

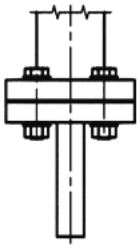
(with dampening spring on request)



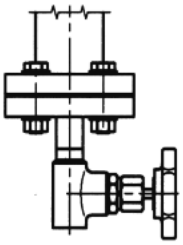
flanged with
drain plug



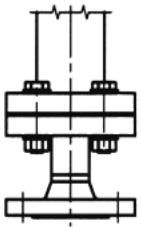
flanged with drain plug
e. g. flange facings
with groove and tongue



flanged with
drain nozzle



flanged with
drain valve



flanged with
drain flannge

www.profimess.com
Schleusenstraße 3 · 27568 Bremerhaven · ☎ +49 471 98 24 -151 · 🖷 +49 471 98 24 -152 · E-Mail: info@profimess.de