

PRATT

Henry Pratt Company

Ballcentric® Plug Valve



**Engineering Creative Solutions
for Fluid Systems Since 1901**

A Tradition of Excellence

With the development of the first rubber seated butterfly valve more than 70 years ago, the Henry Pratt Company became a trusted name in the flow control industry, setting the standard for product quality and customer service. Today Pratt provides the following range of superior products to the water, wastewater and power generation industries.

Butterfly Valves: from 3" to 162"

Rectangular Valves: 1' x 1' to 14' x 16'

Ball Valves –

Rubber Seated: from 4" to 60"

Metal Seated: from 6" to 48"

Plug Valves: from 1/2" to 72", 100% port available up to 48", 3 ways

Air Valves for Water and Wastewater: from 1/2" to 20"

Hydraulic Control Systems

Valve Controls

**Energy Dissipating Valves
and Fixed Energy Dissipaters**

Cone Valves

Check Valves

Plunger Valves

A Commitment to Meeting The Customers' Needs

Henry Pratt valves represent a long-term commitment to both the customer and to a tradition of product excellence. This commitment is evident in the number of innovations we have brought to the industries we serve. In fact, the Henry Pratt Company was the first to introduce many of the flow control products in use today, including the first rubber seated butterfly valve, one of the first nuclear N-Stamp valves, and the bonded seat butterfly valve.

Innovative Products For Unique Applications

Though many of the standard valves we produce are used in water filtration and distribution applications, Pratt has built a reputation on the ability to develop specialized products that help customers to meet their individual operational challenges.

Creative Engineering for Fluid Systems

Pratt's ability to provide practical solutions to complex issues is demonstrated by the following case histories.

Earthquake Proof Valves

Pratt designed and manufactured hydraulically actuated valves for a water storage application so that the valves would automatically operate in the event of earthquakes. This led to the development of a valve that will withstand acceleration forces of up to 6gs.

Custom Actuation/Isolation Valves

Pratt has designed and manufactured nuclear quality quarter-turn valves and parts since the first nuclear-powered generating plants were built. Our custom valves are able to close in a millisecond, using specially designed Pratt electro-pneumatic actuators.

Valves Designed for Harsh Environments

Pratt designed and manufactured a 144" diameter butterfly valve for the emergency cooling system at a jet engine test facility. The valve was designed to supply water to help dissipate the tremendous heat generated by the engines during testing.



Through experience, commitment and creative engineering, Pratt is uniquely suited to provide superior products for our customers' special needs. For more information, contact our corporate headquarters in Aurora, Illinois.

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Ballcentric® Plug Valve

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Scope of Line

The Henry Pratt criteria of quality, reliability, safety and value are embodied in the Ballcentric® plug valve, setting higher standards for dependable performance with excellent features achieved by the utilization of the very latest design and manufacturing techniques.

- Computer Aided Design
- High Integrity Casting
- CNC manufacturing delivers consistent sizes on all components

All complemented by rigorous Quality Control System

Body

Conforming to AWWA C504 wall thickness, the Ballcentric® plug valve body casting is in ASTM A126 CL B cast iron using high pressure molding techniques. Alternative flanged, grooved or mechanical joint ends are available.

Flange diameter, thickness and drilling conform to ANSI B16.1 Class 125 or 250.

Grooved ends meet AWWA C-606 for ductile or steel pipe. Mechanical joints to AWWA C111 (ANSI A21.11).

Seat

The Ballcentric® plug valve incorporates as standard, on 3" and larger, a 1/8" thick welded 99% nickel seat for corrosion and erosion resistance specifically profiled for low torque and extended seat life.

Stem Seal

High integrity sealing by combining the advantages of a resilient and abrasion resistant U-Cup seal. From vacuum to high pressure, the self-adjusting sealing system (per AWWA C504) gives positive, trouble-free service and is retained independently of the plug stem or external torque device, thereby eliminating periodic maintenance.

Bearings

The plug rotates in permanently lubricated 316 grade stainless steel bearings, located in the body and bonnet, along with upper and lower PTFE thrust washers, which ensure consistently low operating torque.

Plug

Supported on integral trunnions, the plug is totally encapsulated with an elastomer that is molded on 2 1/2" – 48" and vulcanized on 54" and larger to the casting providing tight shut off even under vacuum conditions. High integrity corrosion-free sealing is achieved by a variety of abrasion resistant elastomers which protect the plug right up to the trunnions. When assembled, the light compression of the elastomers onto PTFE thrust washers, prevents entry of abrasive materials into the bearings.

Bonnet Seal

Superior "O" ring sealing with metal/metal contact means lower bolting stresses compared with compression gaskets.

Flow

The port design (round on 2 1/2" – 12" and rectangular on 14" and larger) with streamlined internal contours gives the highest industry capacity straight through flow in the full open position, reducing turbulence and pressure drop and the effect of erosive media. Handling of sludges and slurries is therefore enhanced.

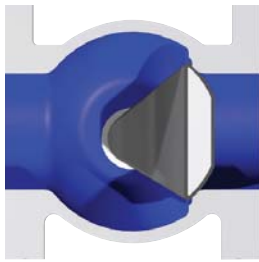
Interchangeable

Because of the common face to face dimension with wedge gate valves (3" – 12"), fitting the tight shut-off rotary Ballcentric® plug valve into existing systems is accomplished without pipeline modifications.

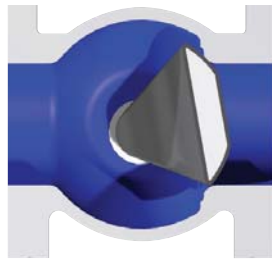
Travel Stops

Adjustable open and closed travel stops are fitted as standard on both wrench and gear operated Ballcentric® plug valves.

Features and Benefits



- Valve in closed position for bubble tight shut-off
- Normal flow direction gives pressure assisted sealing
- Torques are low even in reverse flow



- Plug rotates away from the seat for instant opening
- Seat wear and operating torque reduced
- No further seat contact until valve is closed again



- Design of Ballcentric® plug valve allows modulating control over the full 90° travel
- Ideally suited for balancing service
- Standard rotary valve provides control and tight shut off in one valve



- Plug is out of flow path when fully open
- Straight through, uninterrupted smooth flow
- Round port reduces turbulence and erosion, lowers pumping costs and can be "pigged" to clean the pipeline

Installation

The Ballcentric® plug valve is suitable for flow and shut-off in either direction. Seat end downstream is the preferred orientation and any reverse flow requirement should be stated at the time of order. For use on fluids with suspended solids, it is recommended that the valve should be installed with the seat upstream and the valve stem horizontal with plug rotation to the top of the valve ensuring smooth operation.

In-Line Maintenance

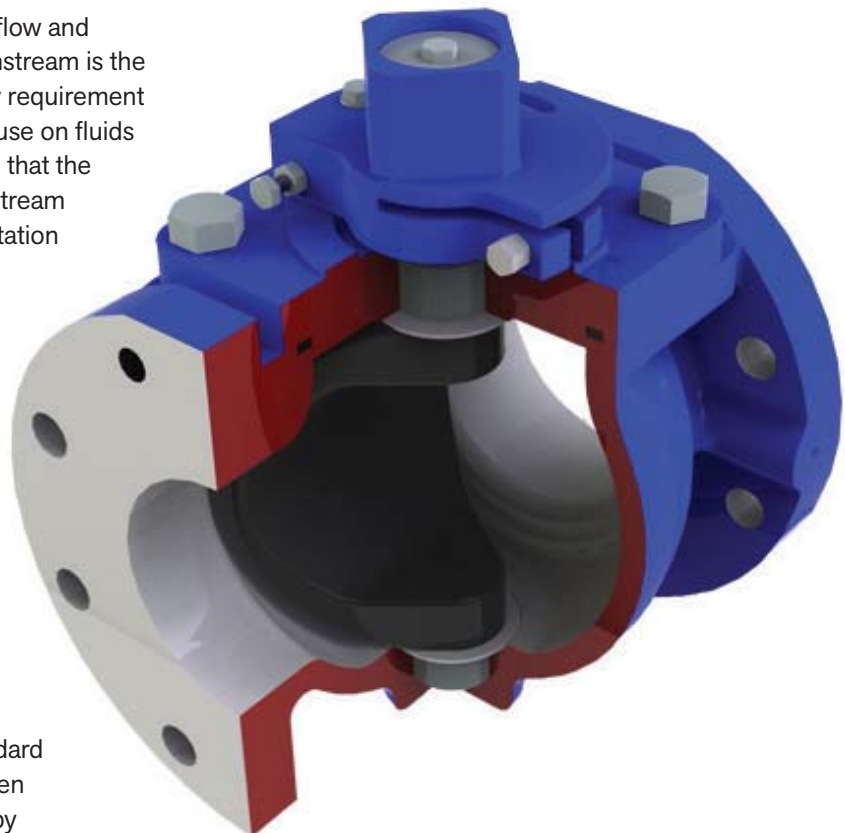
In the unlikely event of stem leakage, the stem seals can be easily replaced without removing the bonnet. Access to the body for cleaning or inspection does not require removal from the line.

Modular Construction

Design of the bonnet and stem allows for on-site adaption of gear operators, power actuators, or extension devices on to standard valves. Conversion can be easily undertaken without removing the valve bonnet, thereby minimizing downtime.

Power Operation

Pneumatic, electric or hydraulic operation is available, complete with accessories such as limit switches, solenoid valves and positioners when required.



Dimensional Data

ORDERING INFORMATION

Valve Types

	Designation
Mechanical Joint Cast Iron	600
Mechanical Joint Ductile Iron	610
ANSI 125 Flanged Cast Iron	601
ANSI 125 Flanged Ductile Iron	611
ANSI 150 Flanged Ductile Iron	621
ANSI 250 Flanged Ductile Iron	602
ANSI 125 Grooved for Steel Pipe	606S
ANSI 125 Grooved for Ductile Pipe	606D
ANSI 150 Flanged 316SS	601S
SEAT	
Nickel (3" & Larger)	N
Epoxy (2½" ONLY)	E
316SS (on stainless steel valve only)	S
Rubberlined	RL
Glasslined	GL
ELASTOMER TRIM	
EPDM	0
Buna-Nitrile	1
Viton	2
Neoprene	3
Natural	4

MANUAL OPERATORS

Above Ground Gear and Handwheel	AGHW
Above Ground Gear with 2" Nut	AGNUT
Buried Gear with 2" Nut	BG
Memory Stop Gear with Handwheel	MGHW
Lever / Wrench (8" & smaller)	L
Direct Nut (8" & smaller)	TC

Example: 4" 601N3AGHW = 4" ANSI 125 Flanged, Nickel Seat, Neoprene plug with Above Ground Gear and Handwheel

Valves are only tested for bi-directional shut-off if specified at time of order. Contact Henry Pratt for bi-directional ratings.

NOTE: We recommend mechanical joint or buried flanged valves to have gear operators

NOTE: We recommend valves for bi-directional service to have gear operators

PRESSURE RATING

12" and smaller	ANSI 125	175 psi
14" and larger	ANSI 125	150 psi
20" and smaller	ANSI 150	285 psi
12" and smaller	ANSI 250	400 psi
14" and larger	ANSI 250	300 psi
Body Hydrotest = 150% of rated pressure / Seat Test = 100% of rated pressure Testing per AWWA C517		

ELASTOMERS AVAILABLE FOR BALLCENTRIC® PLUG VALVE

Natural rubber is also available.

Nitrile

A general purpose material sometimes referred to as BUNA-N or HYCAR with a -20°F to 212°F temperature range. Used on sewage, water, hydrocarbon and mineral oils.

EPDM

An excellent polymer for use on chilled water through to LP steam applications having a temperature range of -35°F to 250°F.

Resistance to many acids, alkalies, detergents, phosphate esters, alcohols and glycols is an added benefit.

Neoprene

This versatile material shows outstanding resistance to abrasion and ozone. Chemical resistance to a wide range of petroleum base products and dilute acids and alkalies. Temperature range -20°F to 225°F.

Viton

Retention of mechanical properties at high temperature is an important feature of this elastomer: temperature range is -10°F to 300°F. It also has excellent resistance to oils, fuels, lubricants and most mineral acids and aromatic hydrocarbons.

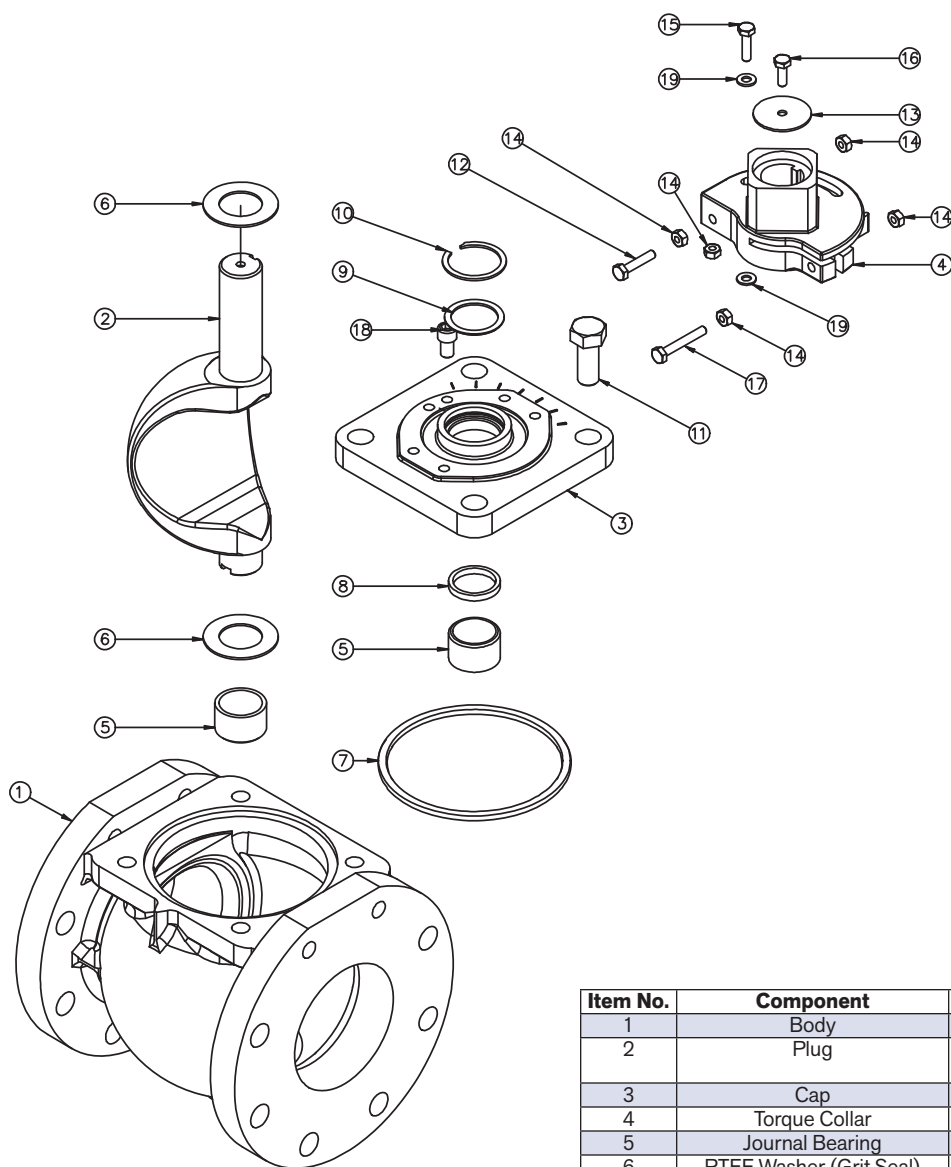
Note: Not for water or steam applications.

Elastomer Selection Chart

Service	Elastomer	Average Useful Temp. Range	Service	Elastomer	Average Useful Temp. Range	Service	Elastomer	Average Useful Temp. Range
Acetone	EPDM	-35°F to 250°F	Caustic Soda	EPDM	-35°F to 250°F	Oil, Animal	Nitrile	-20°F to 212°F
Air	EPDM	-35°F to 250°F	Cement Slurry	EPDM	-35°F to 250°F	Oil, Mobil Therm Light	Viton	10°F to 250°F
Air w/Oil	Nitrile	0°F to 212°F	Copper Sulphate	EPDM	-35°F to 250°F	Oil, Mobil Therm 600	Viton	10°F to 250°F
Alcohol AMYL	EPDM	0°F to 212°F	Creosote (Coal)	Nitrile	-20°F to 212°F	Oil, Mobil Therm 603	Nitrile	-20°F to 212°F
Alcohol Aromatic	Viton	10°F to 250°F	Coal Slurry	Nitrile	-20°F to 212°F	Oil, Lubricating	Nitrile	-20°F to 212°F
Alcohol Butyl	Neoprene	-20°F to 225°F	Diesel Fuel No. 3	Nitrile	-20°F to 212°F	Oil, Vegetable	Nitrile	-20°F to 212°F
Alcohol Denatured	Nitrile	-20°F to 212°F	Diethylene Glycol	EPDM	-35°F to 250°F	Paint, Latex	Nitrile	-20°F to 212°F
Alcohol Ethyl	EPDM	-20°F to 250°F	Ethylene Glycol	EPDM	-35°F to 250°F	Phosphate Ester	EPDM	-35°F to 250°F
Alcohol Grain	Nitrile	-20°F to 212°F	Fatty Acid	Nitrile	-20°F to 212°F	Propane	Nitrile	-20°F to 212°F
Alcohol Isopropyl	Neoprene	-20°F to 225°F	Fuel Oil No. 2	Nitrile	-20°F to 212°F	Rape Seed Oil	EPDM	-35°F to 250°F
Alcohol Methyl	EPDM	-20°F to 250°F	Fertilizer Liquid H4N2O2	EPDM	-35°F to 250°F	Sewage with Oils	Nitrile	-20°F to 212°F
Ammonia Anhydrous	Neoprene	-20°F to 225°F	Gasoline Keg	Nitrile	-20°F to 212°F	Sodium Hydroxide 20%	EPDM	-35°F to 250°F
Ammonium Nitrate	EPDM	-20°F to 250°F	Gas Natural	Nitrile	-20°F to 212°F	Starch	EPDM	-35°F to 250°F
Ammonia, water	EPDM	-20°F to 250°F	Glue, Animal	Nitrile	-20°F to 212°F	Steam to 250°F	EPDM	-35°F to 250°F
Animal Fats	Nitrile	-20°F to 212°F	Green Liquor	EPDM	-20°F to 212°F	Stoddard, Solvent	Nitrile	-20°F to 80°F
Black Liquor	EPDM	-20°F to 250°F	Hydraulic Oil (Petro)	Nitrile	-20°F to 212°F	Sulphuric Acid 10% 50%	Neoprene	-20°F to 158°F
Blast Furnace Gas	Neoprene	-20°F to 225°F	Hydrogen	Nitrile	-20°F to 212°F	Sulphuric Acid 100%	Viton	10°F to 300°F
Butane	Nitrile	-20°F to 212°F	JF4, JP5	Viton	-20°F to 212°F	Trichloroethylene Dry	Viton	10°F to 300°F
Bunker Oil "C"	Nitrile	-20°F to 212°F	Kerosene	Nitrile	0°F to 212°F	Triethanol Amine	EPDM	-35°F to 250°F
Calcium Chloride	EPDM	-20°F to 250°F	Ketone	EPDM	-35°F to 250°F	Varnish	Viton	10°F to 300°F
Carbon Dioxide	EPDM	-20°F to 250°F	Lime Slurry	EPDM	-35°F to 250°F	Water, Fresh	EPDM	-35°F to 250°F
Carbon Monoxide (Cold)	Neoprene	-20°F to 150°F	Methane	Nitrile	-20°F to 212°F	Water, Salt	EPDM	-35°F to 250°F
Carbon Monoxide (Hot)	Viton	10°F to 300°F	Methyl Ethyl Ketone	EPDM	-35°F to 250°F	Xylene	Viton	10°F to 300°F
Carbon Tetrachloride	Viton	10°F to 300°F	Naptha (Berzin)	Nitrile	-20°F to 212°F			

NOTE: Above elastomer/temperature chart are guidelines only. See Henry Pratt Compatibility Chart for specific applications.

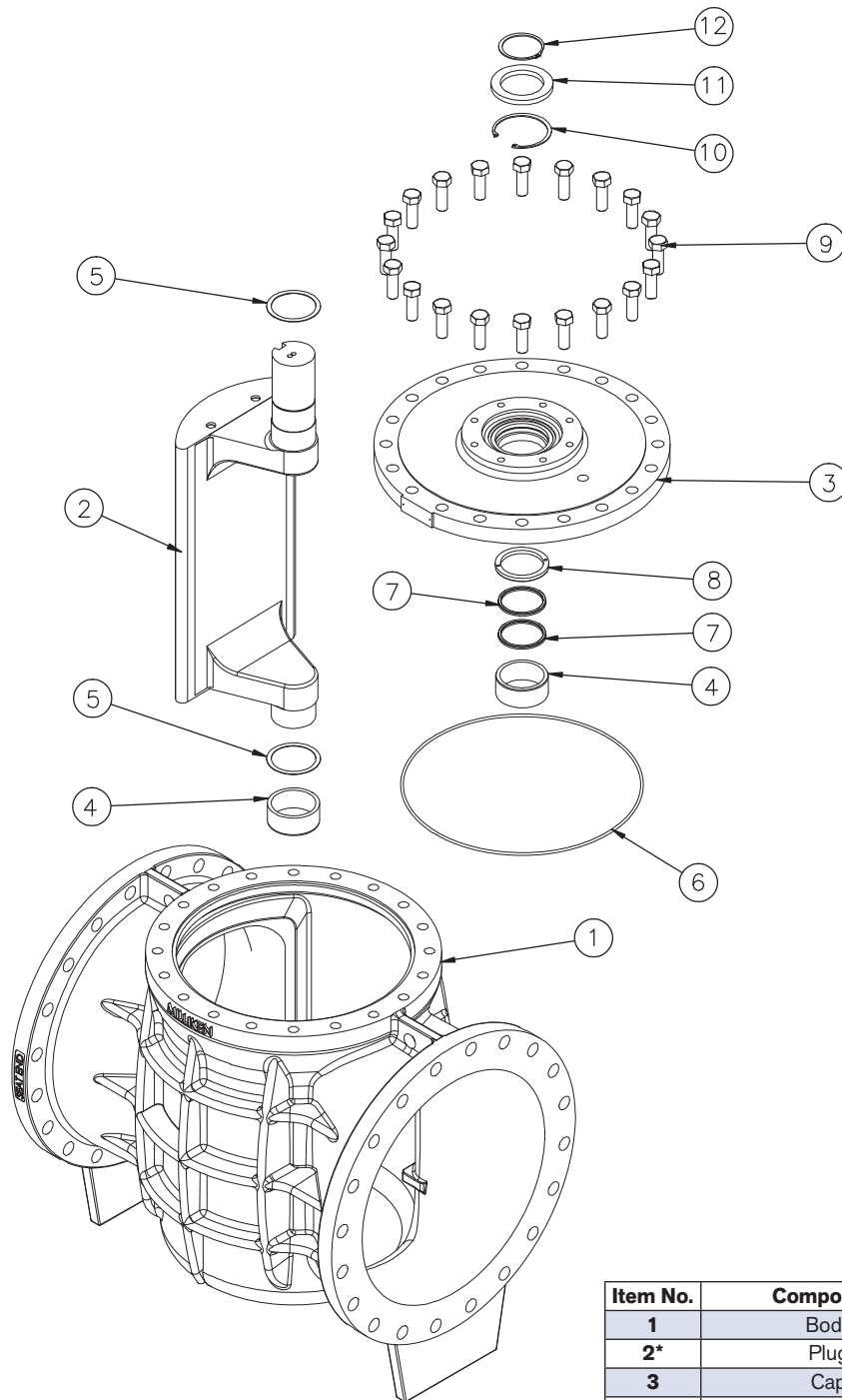
Standard Materials of Construction, Fig. 601/600, 12" & Smaller



Item No.	Component	Material
1	Body	Cast Iron A126 Class B
2	Plug	Rubber Coated Ductile Iron ASTM A536
3	Cap	Cast Iron A126 Class B
4	Torque Collar	Ductile Iron ASTM A536
5	Journal Bearing	St. Steel – ANSI 316
6	PTFE Washer (Grit Seal)	PTFE
7	O Ring	Elas. as Spec.
8	U Cup Seal	Elas. as Spec.
9	Washer	Brass – ASTM B-138-675
10	Internal Snap Ring	Spring Steel
11	Setscrew	Steel (Zinc Plated)
12*	Closed Stop	Steel (Zinc Plated)
13*	Locking Washer	Steel
14*	Nut	Steel (Zinc Plated)
15*	Open Stop	Steel (Zinc Plated)
16*	Setscrew	Steel (Zinc Plated)
17*	Torque Bolt	Steel (Zinc Plated)
18*	Travel Stop	Steel
19*	Washer	Steel

***NOTE:** Torque Collar Assembly on 8" and Smaller

Standard Materials of Construction, Fig. 601/600, 14" & Larger



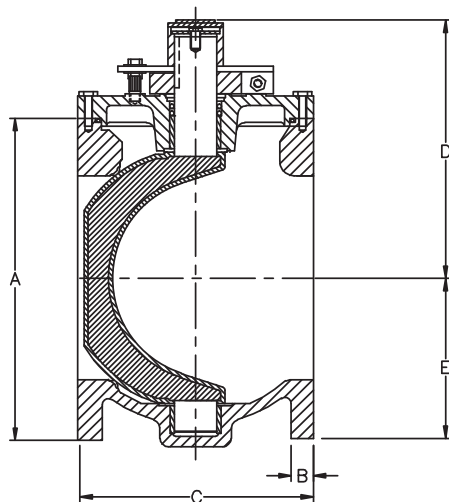
Item No.	Component	Material	Qty.
1	Body	Cast Iron A126 Class B	1
2*	Plug	Rubber Coated See Note 1	1
3	Cap	Cast Iron A126 Class B	1
4	Sleeve Bearing	Stainless Steel/Bronze	2
5	PTFE Washer (Grit Seal)	PTFE	2
6	Cap "O" Ring	Elas. as Spec.	1
7	U Cup Seal	Elas. as Spec.	2
8*	Seal Retaining Ring	See Note 2	1
9	Cap Screw	Steel (Zinc Plated)	A/R
10	Internal Snap Ring	Spring Steel	1
11	Support Collar	Steel	1
12	External Snap Ring	Spring Steel	1

*NOTE 1: Plugs: Ductile Iron — ASTM A536 on 14" – 20"
Cast Iron — A126 Class B on 24" and larger

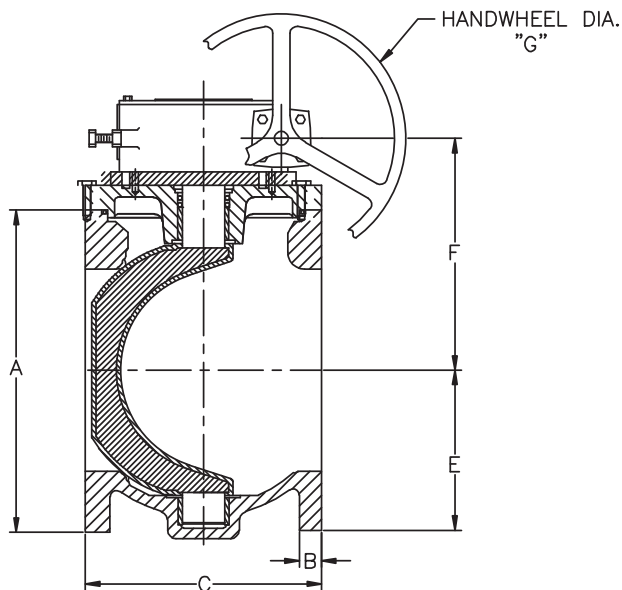
*NOTE 2: Seal Retaining Ring: Brass — ASTM B-138-675 on 14" – 20"
Steel on 24" and larger

Fig. 601 Cast Iron / 611 Ductile Iron – Flanged End 2 1/2" – 12", 175 PSI

2 1/2" – 8" VALVES ONLY



2 1/2" – 12" VALVES



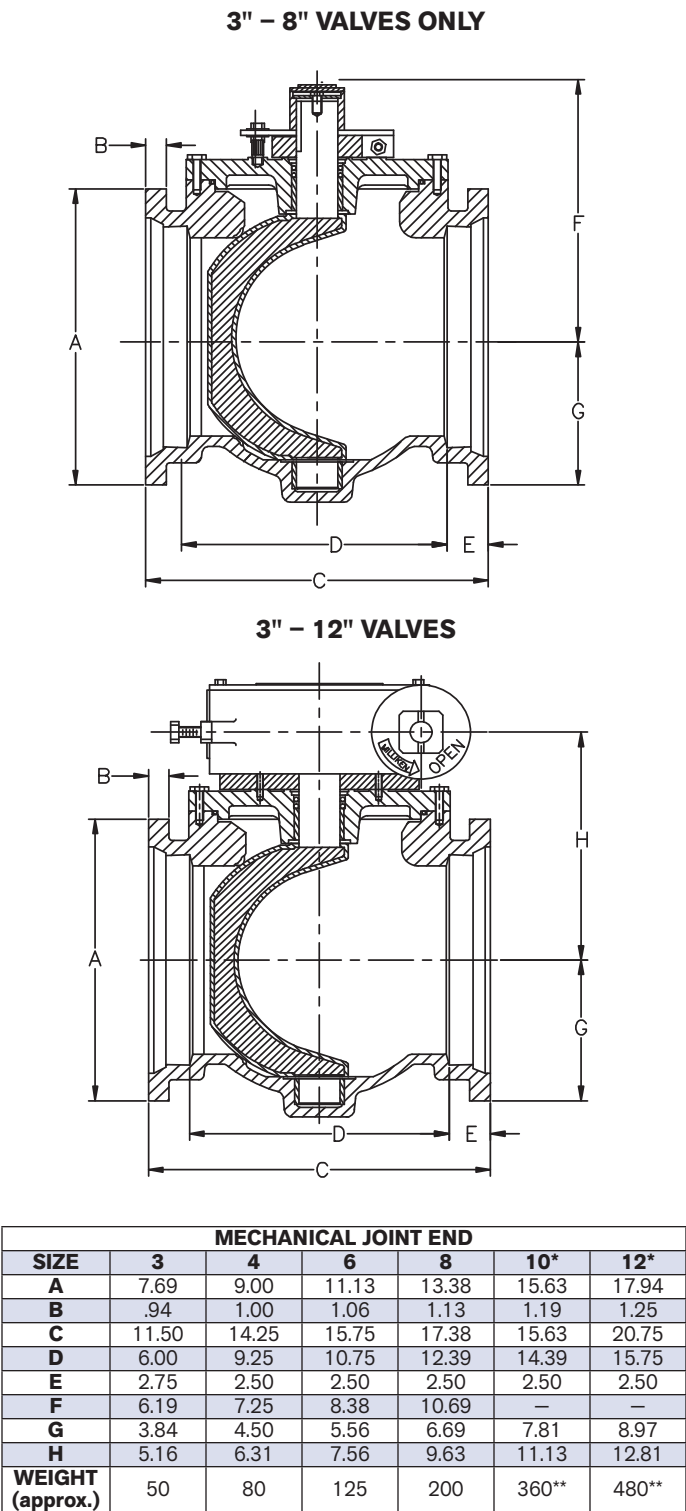
FLANGED END – ANSI 125								
SIZE	2.50	3	4	5	6	8	10*	12*
A	7.00	7.50	9.00	10.00	11.00	13.50	16.00	19.00
B	.69	.75	.94	.94	1.00	1.13	1.19	1.25
C	7.50	8.00	9.00	10.00	10.50	11.50	13.00	14.00
D	6.19	6.19	7.25	8.38	8.38	10.69	—	—
E	3.50	3.75	4.50	5.75	5.75	7.63	8.88	10.00
F	5.16	5.16	6.31	7.56	7.56	9.63	11.13	12.81
G	6.00	6.00	6.00	6.00	6.00	12.00	12.00	12.00
WEIGHT (approx.)	30	40	70	105	115	190	345**	440**

*10" & above have gear operators as standard

**Weight includes gear operator

NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

Fig. 600 Cast Iron / 610 Ductile Iron – Mechanical Joint
3" – 12", 175 PSI



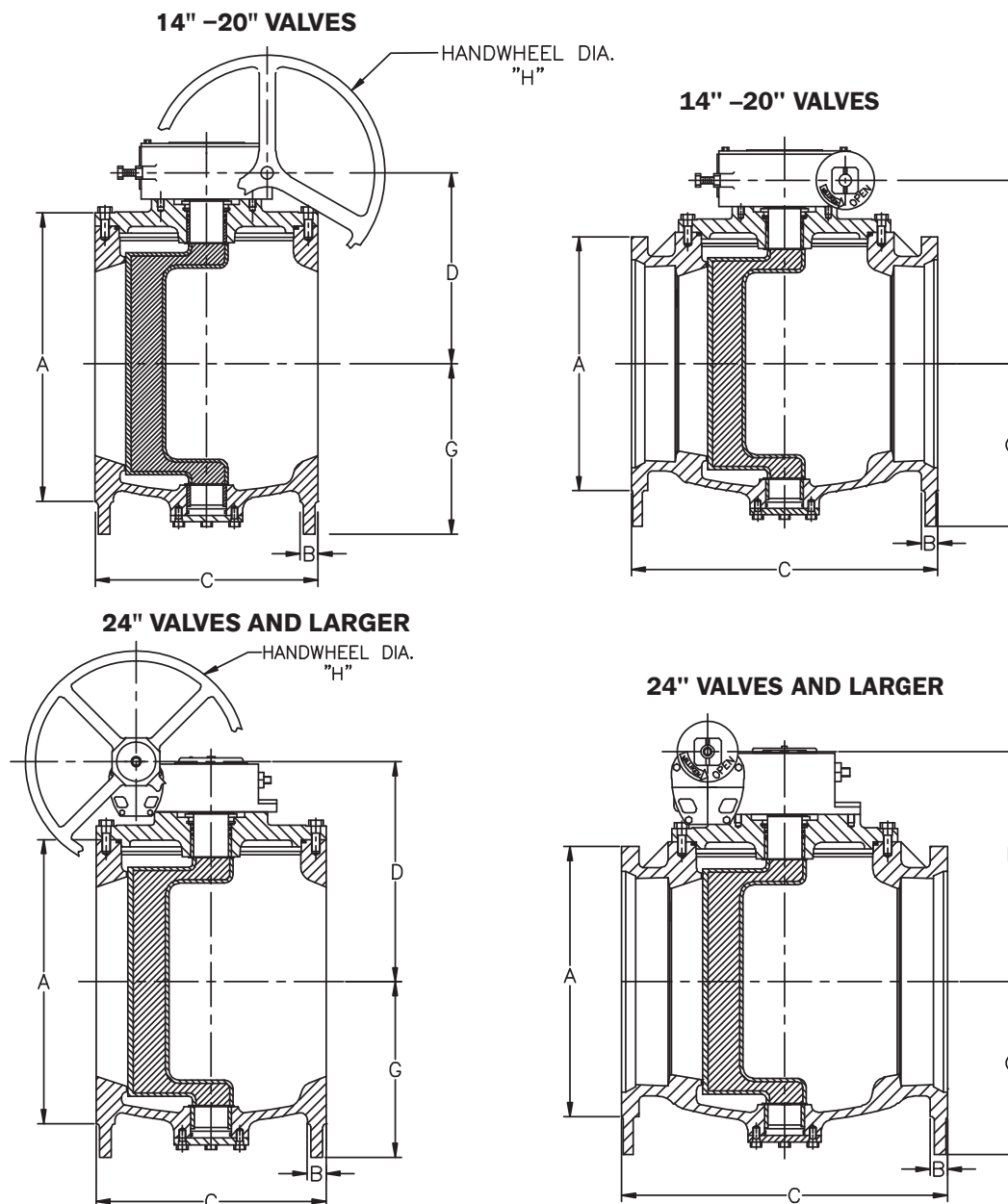
*10" & above have gear operators as standard

**Weight includes gear operator

We recommend gears on all Mechanical Joint Valves

NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

Fig. 601 Cast Iron / 611 Ductile Iron Flanged End
Fig. 600/610 Ductile Iron Mechanical Joint End
14" & Larger, 150 PSI



FLANGED END – ANSI 125										
SIZE	14	16	18	20	24	30	36	42	48	54
A	21.00	23.50	25.00	27.50	32.00	38.75	46.00	53.00	59.00	66.25
B	1.38	1.44	1.56	1.69	1.88	2.13	2.38	2.63	2.75	3.00
C	17.00	17.75	21.50	23.50	42.00	51.00	60.00	72.00	84.00	96.00
D	14.56	15.81	16.36	17.63	25.13	29.00	33.51	33.88	39.57	50.86
G	13.00	14.00	15.00	16.00	21.62	24.43	29.00	29.00	36.00	36.00
H	18.00	18.00	18.00	18.00	24.00	24.00	24.00	30.33	30.00	30.00
WEIGHT (approx.)	905	1030	1355	1880	3800	5200	6950	10160	13350	15100

Flanged Valves Meet ANSI B16.1

Weight includes gear operator

NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams.

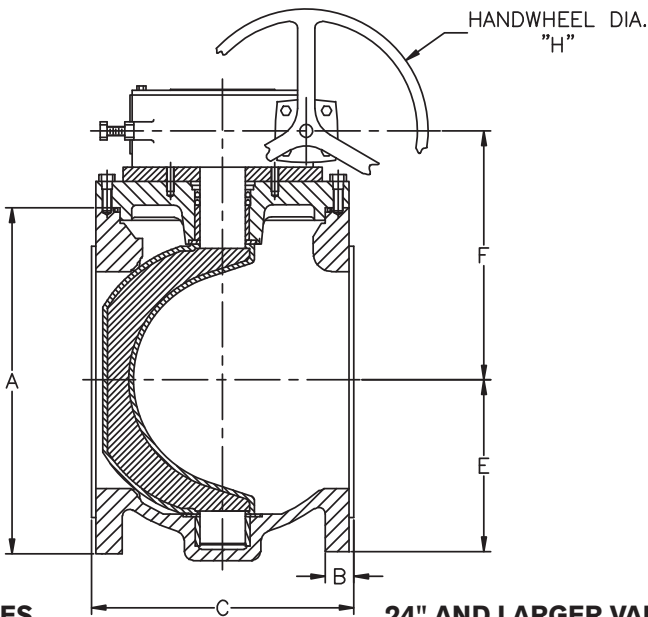
NOTE: Dimensions on 60" and larger available upon request.

MECHANICAL JOINT END									
SIZE	14	16	18	20	24	30	36	42	48
A	20.13	22.56	24.84	27.06	31.50	39.13	46.00	53.13	60.00
B	1.31	1.38	1.43	1.50	1.62	1.68	2.00	2.00	2.00
C	24.50	27.25	29.25	31.00	42.00	51.00	60.00	72.00	84.00
F	14.56	15.81	16.36	17.63	25.13	29.00	33.51	33.88	39.57
G	13.00	14.00	15.00	16.00	21.62	24.75	29.00	29.00	36.00
WEIGHT (approx.)	905	1030	1355	1880	3800	5200	6950	10160	13350

Mechanical Joint Valves Meet ANSI 21.11 & AWWA C-111

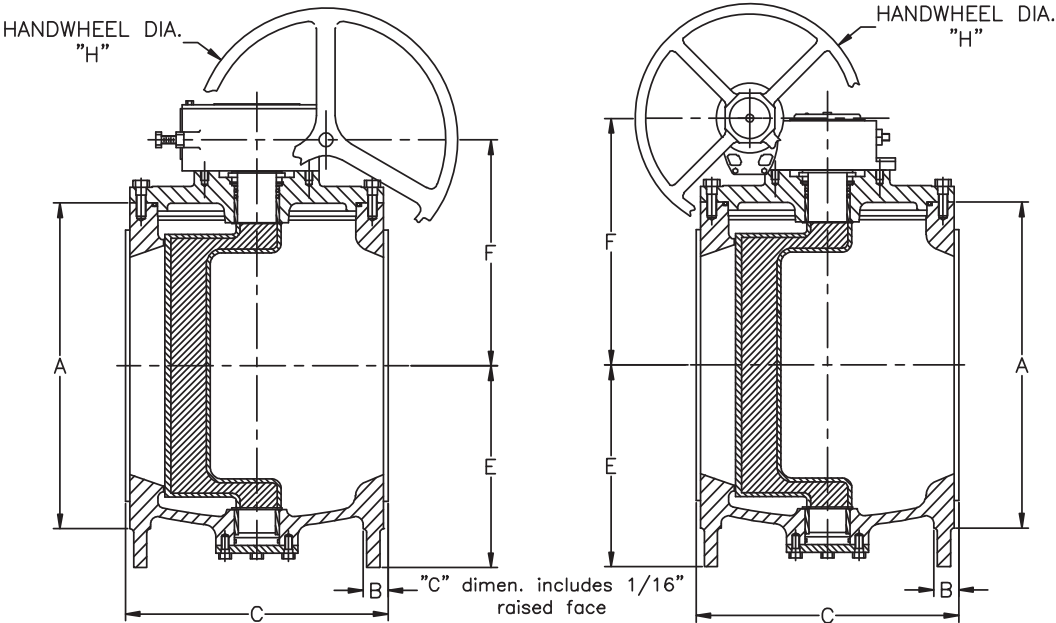
Fig. 602 Class 250 Flanged End **2 1/2" – 12", 400 PSI, 14" – 36", 300 PSI**

2 1/2" – 12" VALVES



14" – 20" VALVES

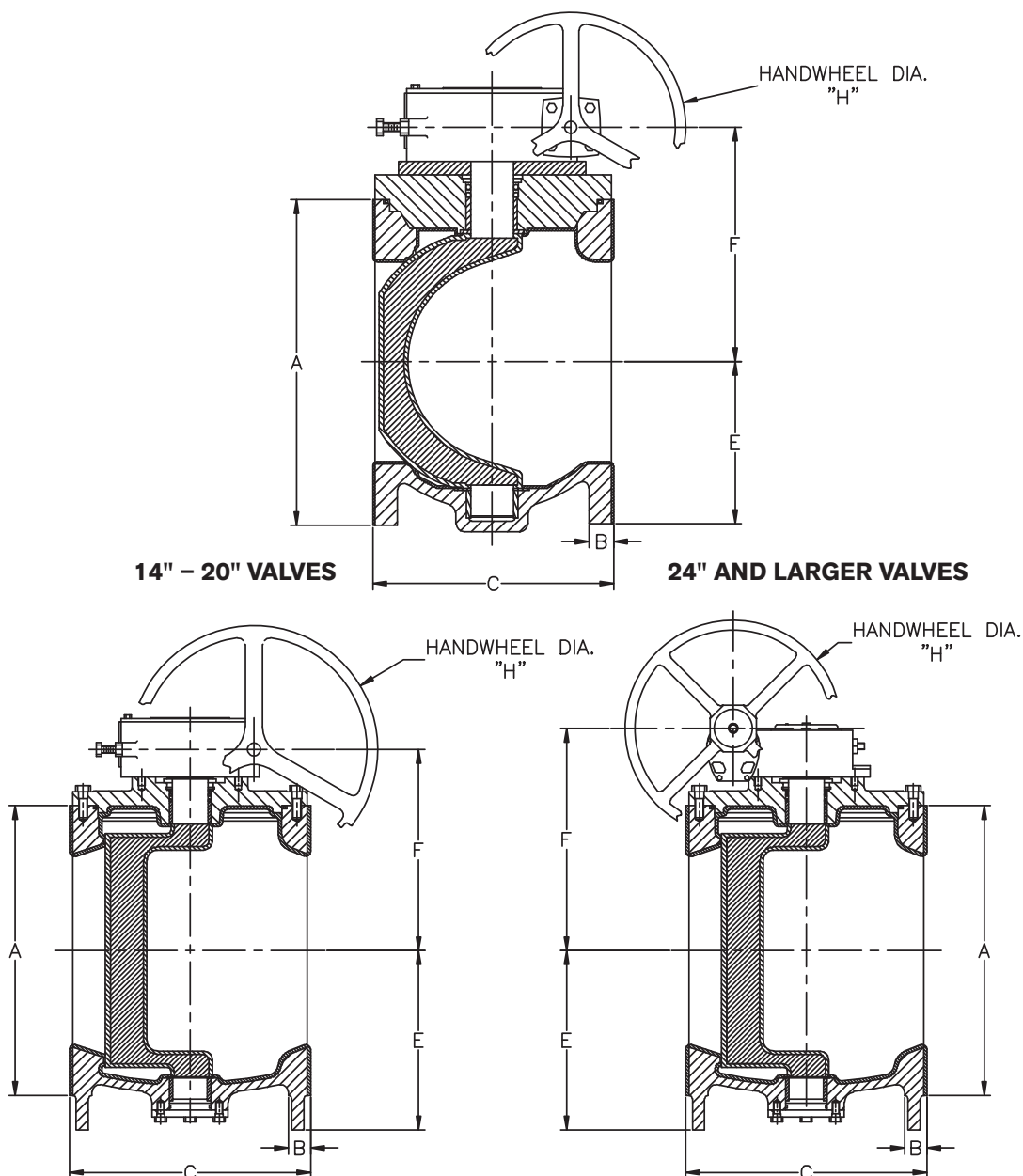
24" AND LARGER VALVES



FLANGED END – ANSI 250															
SIZE	2.50	3	4	5	6	8	10	12	14	16	18	20	24	30	36
A	7.50	8.25	10.00	11.00	12.50	15.00	17.50	20.50	23.00	25.50	28.00	30.50	36.00	43.00	50.00
B	1.06	1.13	1.25	1.38	1.44	1.63	1.88	2.00	2.12	2.25	2.38	2.50	2.75	3.00	3.38
C	9.50	11.13	12.00	15.00	15.88	16.50	18.00	19.75	18.50	19.38	23.13	25.00	42.88	51.88	61.00
E	3.50	3.75	4.50	5.75	5.75	17.63	8.88	10.00	13.00	14.00	15.00	16.00	21.62	24.75	29.00
F	5.16	5.16	6.31	7.56	7.56	9.63	11.13	12.81	14.56	15.81	16.36	17.63	22.81	27.59	33.00
H	6.00	6.00	6.00	6.00	6.00	12.00	12.00	12.00	18.00	18.00	18.00	18.00	24.00	24.00	24.00
WEIGHT (approx.)	70	80	120	162	170	275	398	590	980	1125	1830	2060	4160	5700	7670

All above have gear operators as standard
 Weight includes gear operator
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams
NOTE: Dimensions on 42" and larger available upon request

Fig. 601RL Rubberlined – Flanged End
3" – 12", 175 PSI, 14" & Larger, 150 PSI
3" – 12" VALVES



FLANGED END – ANSI 125 RUBBER LINED															
SIZE	3	4	5	6	8	10	12	14	16	18	20	24	30	36	42
A	7.50	9.00	10.00	11.00	13.50	16.00	19.00	21.00	23.25	25.00	27.50	32	38.75	46.00	53.00
B	.88	1.07	1.07	1.13	1.26	1.32	1.38	1.26	2.25	2.38	2.50	2.75	3.00	3.38	3.38
C	8.25	9.25	10.25	10.75	11.75	13.25	14.25	17.25	18.00	21.75	23.75	42.25	51.25	60.25	72.25
E	3.75	4.50	7.75	7.75	7.63	8.88	10.00	13.00	14.00	15.00	16.00	21.63	24.75	29.00	29.00
F	5.16	6.31	7.56	7.56	9.63	11.13	12.81	14.56	15.81	16.36	17.63	25.13	29.00	33.51	33.88
H	6.00	6.00	6.00	6.00	12.00	12.00	12.00	18.00	18.00	18.00	18.00	24.00	24.00	24.00	24.00
WEIGHT (approx.)	70	100	135	145	240	345	440	905	1030	1355	1880	3800	5200	6940	10160

All above have gear operators as standard

Weight includes gear operator

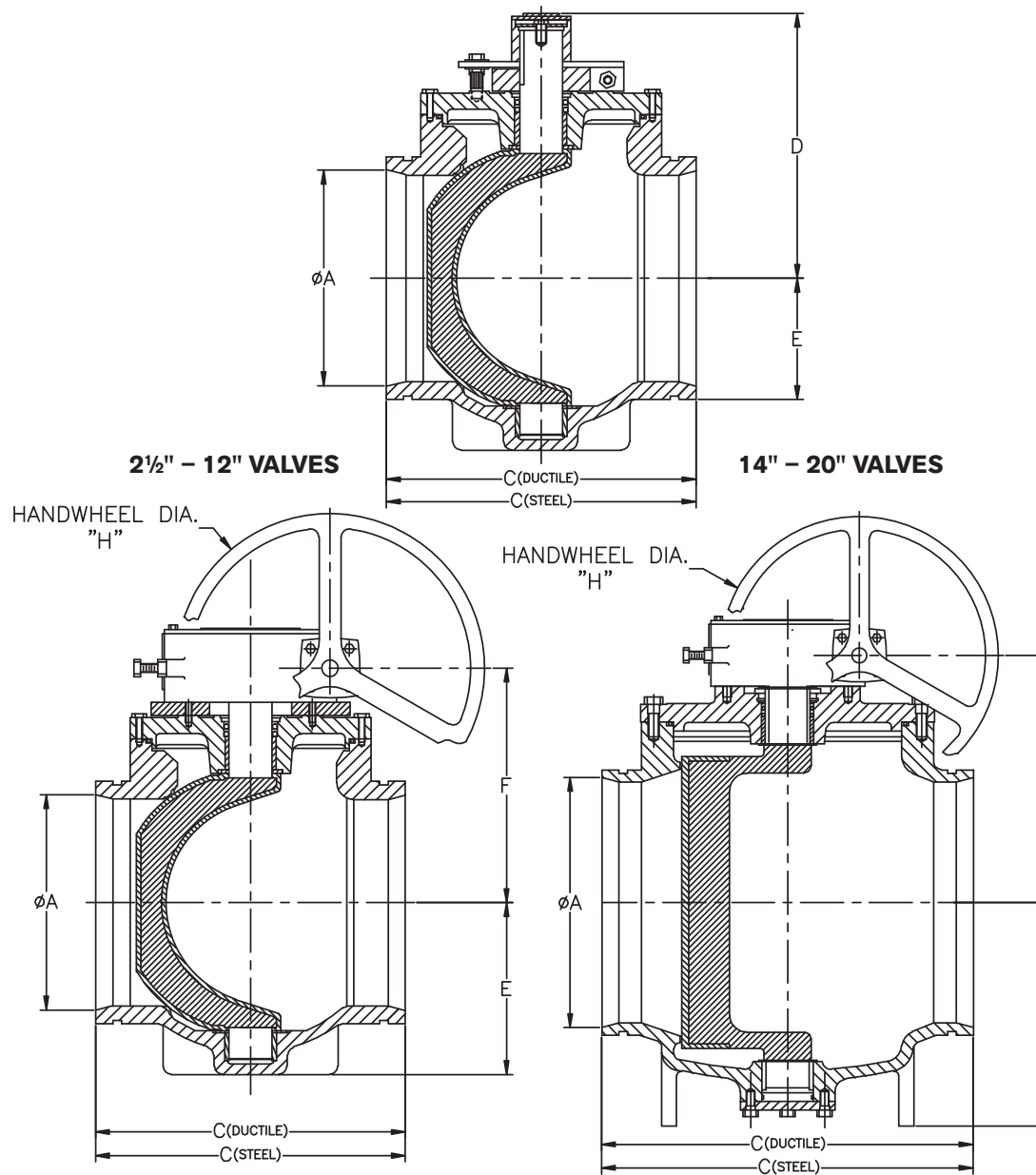
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

NOTE: Dimensions on 48" and larger available upon request

Fig. 606 Grooved End

2 1/2" – 12", 175 PSI, 14" – 20", 150 PSI

2 1/2" – 8" VALVES



GROOVED END – AWWA 606												
SIZE	2.50	3	4	5	6	8	10*	12*	14*	16*	18*	20*
A	2.50	3.00	4.00	5.00	6.00	8.00	10.00	12.00	14.00	15.25	16.19	18.06
C (Duct.)	N/A	9.06	10.25	N/A	12.50	14.00	16.56	18.00	21.63	N/A	27.50	30.00
C (Steel)	7.13	8.50	10.13	12.38	12.38	13.88	16.44	17.88	21.63	22.50	27.50	30.00
D	6.19	6.19	7.25	8.38	8.38	10.69	—	—	—	—	—	—
E	3.50	3.75	4.50	5.75	5.75	7.63	8.88	10.00	10.00	14.00	15.00	16.00
F	5.16	5.16	6.31	7.56	7.56	9.63	11.13	12.86	13.56	15.81	16.35	17.63
H	6.00	6.00	6.00	6.00	6.00	12.00	12.00	12.00	12.00	18.00	18.00	18.00
WEIGHT (approx.)	20	30	50	70	80	145	325**	420**	RTF	RTF	RTF	RTF

*10" & above have gear operators as standard

**Weight includes gear operator

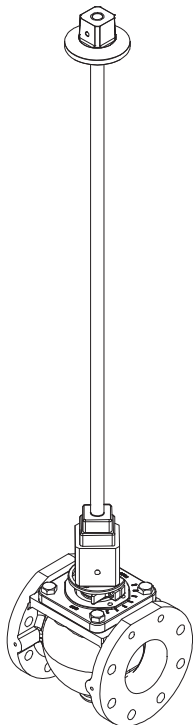
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

NOTE: Larger sizes are available. Contact Henry Pratt Valve for data.

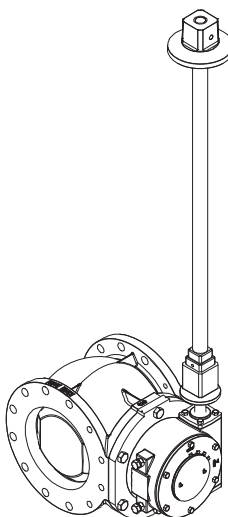
Adaption

A range of extended stems & floor mounted stands for remote operation, particularly in buried service, are available.
Chainwheels & locking devices are readily incorporated onto the Ballcentric® Plug Valve.

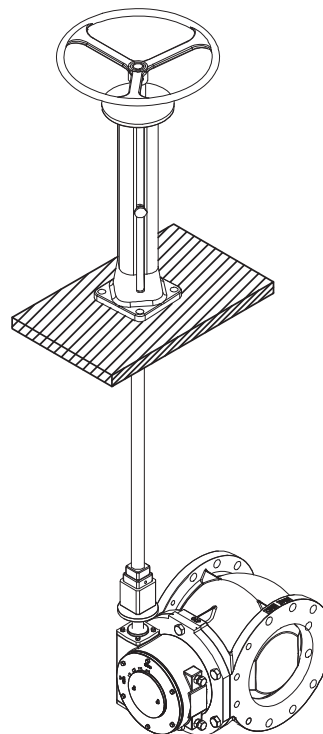
**Valve with extended stem & 2" nut
(Only for 8" and smaller valves)**



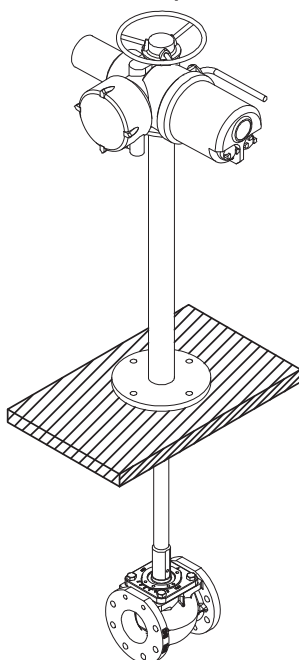
**Valve with extended stem,
buried gear and 2" nut**



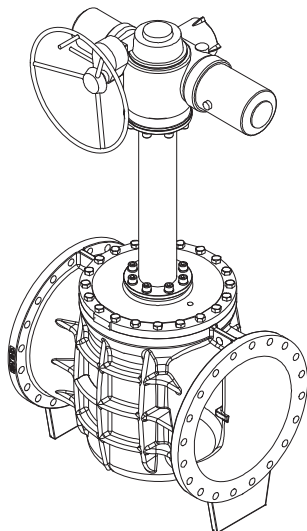
Valve with indicating floorstand



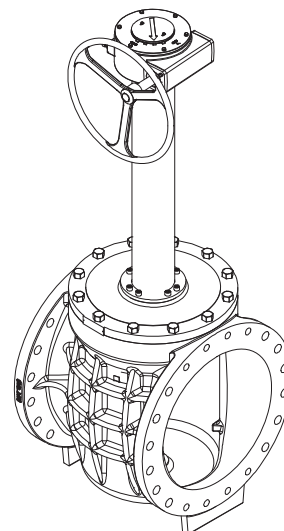
**Valve with non-indicating floorstand
& motor operator**



**Valve with extended bonnet
& motor operator**



Valve with extended bonnet with gear



Technical Specification Ballcentric® Series 601/600 Plug Valves

AWWA C517-09 Standards

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with **ANSI B16.1 Class 125/150** including facing, drilling and flange thickness. Mechanical joint ends shall be in compliance with **AWWA/ANSI C-111-92**. Grooved ends shall be manufactured to the dimensions of **ANSI/AWWA C606** for ductile or steel pipe as required. Ports shall be round on sizes 2½"-12" and rectangular port design on valves 14" and larger. All valves shall be capable of being "pigged" with a soft pig when required.

Valve bodies shall be of **ASTM A-126 Class B** cast iron in accordance with **AWWA C-517-09 Section 4.3.3.1**. Valves 3" and larger shall be furnished with a welded-in overlay seat of 1/8" thick of not less than 99% nickel in accordance with **AWWA C-517-09, Section 4.3.3.4**. Sprayed, plated or screwed-in seats are not acceptable.

Plugs shall be of **ASTM A-536-Grade 65-45-12** for sizes 20" and smaller, and **ASTM A126 Class B Cast Iron** for sizes 24" and larger in compliance with **AWWA C-517-09 Sections 4.3.3.1 and 4.3.3.2**. The plugs shall be of one piece solid construction with PTFE thrust bearings on the upper and lower bearing journals to reduce torque and prevent dirt and grit from entering the bearing and seal area.

Valves shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-517-09, Section 4.3.3.6**. Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743 Grade CF-8M**. Valve shaft seals shall be of the "U" cup type in accordance with **AWWA C-517-09 Section 4.4.7**. Seals shall be self adjusting and repackable without removing the bonnet from the valve.

Wrench operated valves 2½"-8" shall be capable of being converted to worm gear or automated operation without removing the bonnet or plug from the valve. All wrench operated valves shall be equipped with a 2" square nut for use with removeable levers or extended "T" handles.

Worm gear operators, where required, shall be of the heavy duty construction with the ductile iron quadrant supported on the top and bottom by oil impregnated bronze bearings. The worm gear and shaft shall be manufactured of hardened steel and run on high efficiency roller bearings.

Valves shall be designed and manufactured to shut off bubble tight at 175 psi for valves 2½"-12" and 150 psi for valves 14" and larger. Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-517-09 Section 5.2.2** when requested.

Plug valves shall be Ballcentric® Plug Valve Series 601/600 as manufactured by Henry Pratt Company of Aurora, Illinois.

Technical Specification Ballcentric® Series 602 ANSI Class 250 Plug Valves

AWWA C517-09 Standards

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with **ANSI B16.1 Class 250** including facing, drilling and flange thickness. Ports shall be round on sizes 2½" through 12" to facilitate "pigging" when required. Valves 14" and larger shall be of a rectangular port design.

Valve bodies shall be of **ASTM A-536 Grade 65-45-12** ductile iron in accordance with **AWWA C-517-09 Section 4.3.3.2**. Valves 3" and larger shall be furnished with a welded-in overlay seat of ⅛" thick of not less than 99% nickel in accordance with **AWWA C-517-09 Section 4.3.3.4**. Sprayed, plated or screwed-in seats are not acceptable.

Plugs shall be of **ASTM A-536-Grade 65-45-12** in compliance with **AWWA C-517-09 Section 4.3.3.2**. The plugs shall be of one piece solid construction with PTFE thrust bearings on the upper and lower bearing journals to reduce torque and prevent dirt and grit from entering the bearing and seal area.

Valves shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-517-09 Section 4.3.3.6**. Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743 Grade CF-8M**. Valve shaft seals shall be of the "U" cup type in accordance with **AWWA C-517-09 Section 4.4.7**. Seals shall be self adjusting and repackable without removing the bonnet from the valve.

Worm gear operators shall be of the heavy duty construction with the ductile iron quadrant supported on the top and bottom by oil impregnated bronze bearings. The worm gear and shaft shall be manufactured of hardened steel and run on high efficiency roller bearings. All worm gear operators shall be sized for bi-directional shutoff at the valves design pressure rating.

Valves shall be designed and manufactured to shut off bubble tight at 400 psi for valves 2½"-12" and 300 psi for valves 14"-48" with pressure behind the plug.

Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-517-09 Section 5.2.2** when requested.

Plug valves shall be Ballcentric® Plug Valve **Series 602** as manufactured by Henry Pratt Company of Aurora, Illinois.

Technical Specification Ballcentric® Series 601RL Rubberlined Plug Valves

AWWA C517-09 Standards

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with **ANSI B16.1 Class 125/150** including facing, drilling and flange thickness. Mechanical joint ends shall be in compliance with **AWWA/ANSI C-111- 92**. Grooved ends shall be manufactured to the dimensions of **ANSI/AWWA C606** for ductile or steel pipe as required. Ports shall be round on sizes 2½"-12" and rectangular port design on valves 14" and larger. All valves shall be capable of being "pigged" with a soft pig when required.

Valve bodies shall be of **ASTM A-126 Class B** cast iron in accordance with **AWWA C- 517-09 Section 4.3.3.1**. The interior of the valve bodies shall be covered with a suitable elastomer with a minimum thickness of 1/8". The elastomer shall extend through the valve flow way and onto the flanges to ensure a positive seal.

Plugs shall be of **ASTM A-536-Grade 65-45-12** for sizes 20" and smaller, and **ASTM A126 Class B Cast Iron** for sizes 24" and larger in compliance with **AWWA C-517-09 Sections 4.3.3.1 and 4.3.3.2**. The plugs shall be of one piece solid construction with PTFE thrust bearings on the upper and lower bearing journals to reduce torque and prevent dirt and grit from entering the bearing and seal area.

Valves shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-517-09, Section 4.3.3.6**. Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743 Grade CF-8M**. Valve shaft seals shall be of the "U" cup type in accordance with **AWWA C-517-09 Section 4.4.7**. Seals shall be self adjusting and repackable without removing the bonnet from the valve.

Worm gear operators shall be of the heavy duty construction with the ductile iron quadrant supported on the top and bottom by oil impregnated bronze bearings. The worm gear and shaft shall be manufactured of hardened steel and run on high efficiency roller bearings. All worm gear operators shall be sized for bi-directional shutoff at the valves design pressure rating.

Valves shall be designed and manufactured to shut off bubble tight at 175 psi for valves 2½"-12" and 150 psi for valves 14" and larger. Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-517-09 Section 5.2.2** when requested.

Plug valves shall be Ballcentric® Plug Valve **Series 601RL** as manufactured by **Henry Pratt Company of Aurora, Illinois**.

Technical Specification Ballcentric® Series 601S – Stainless Steel Plug Valves

AWWA C517-09 Standards

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with **ANSI B16.1 Class 125** including facing, drilling and flange thickness. Ports shall be round on sizes 2½"-12" and rectangular port design on valves 14" and larger. All valves shall be capable of being "pigged" with a soft pig when required.

Valve bodies shall be of **CF8M (316 stainless steel)**.

Valves shall be furnished with 316 stainless steel seat in accordance with **AWWA C-517-09 Section 4.3.3.4**.

Plugs shall be of **CF8M (316 stainless steel)**. The plugs shall be of one piece solid construction with PTFE thrust bearings on the upper and lower bearing journals to reduce torque and prevent dirt and grit from entering the bearing and seal area.

Valves shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-517-09 Section 4.3.3.6**.

Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743 Grade CF-8M**. Valve shaft seals shall be of the "U" cup type in accordance with **AWWA C-517-09 Section 4.4.7**. Seals shall be self adjusting and repackable without removing the bonnet from the valve.

Wrench operated valves 2½"-8" shall be capable of being converted to worm gear or automated operation without removing the bonnet or plug from the valve. All wrench operated valves shall be equipped with a 2" square nut for use with removable levers or extended "T" handles.

Worm gear operators, where required, shall be of the heavy duty construction with the ductile iron quadrant supported on the top and bottom by oil impregnated bronze bearings. The worm gear and shaft shall be manufactured of hardened steel and run on high efficiency roller bearings. All worm gear operators shall be sized for bi-directional shutoff at the valves design pressure rating.

Valves shall be designed and manufactured to shut off bubble tight at 175 psi for valves 2½"-12" and 150 psi for valves 14" and larger. Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-517-09 Section 5.2.2** when requested.

Plug valves shall be Ballcentric® Plug Valve **Series 601S** as manufactured by Henry Pratt Company of Aurora, Illinois.

Technical Specification Ballcentric® Series 611/610

Ductile Iron Plug Valves

AWWA C517-09 Standards

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with **ANSI B16.1 Class 125/150** including facing, drilling and flange thickness. Mechanical joint ends shall be in compliance with **AWWA/ANSI C-111-92**. Grooved ends shall be manufactured to the dimensions of **ANSI/AWWA C606** for ductile or steel pipe as required. Ports shall be round on sizes 2½"-12" and rectangular port design on valves 14" and larger. All valves shall be capable of being "pigged" with a soft pig when required.

Valve bodies shall be of **ASTM A-536 Grade 65-45-12** in accordance with **AWWA C-517-09 Section 4.3.3.2**. Valves 3" and larger shall be furnished with a welded-in overlay seat of ⅛" thick of not less than 99% nickel in accordance with **AWWA C-517-09, Section 4.3.3.4**. Sprayed, plated or screwed-in seats are not acceptable.

Plugs shall be of **ASTM A-536-Grade 65-45-12** for all sizes in accordance with **AWWA C-517-09 Section 4.3.3.2**. The plugs shall be of one piece solid construction with PTFE thrust bearings on the upper and lower bearing journals to reduce torque and prevent dirt and grit from entering the bearing and seal area.

Valves shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-517-09, Section 4.3.3.6**. Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743 Grade CF-8M**. Valve shaft seals shall be of the "U" cup type in accordance with **AWWA C-517-09 Section 4.4.7**. Seals shall be self adjusting and repackable without removing the bonnet from the valve.

Wrench operated valves 2½"-8" shall be capable of being converted to worm gear or automated operation without removing the bonnet or plug from the valve. All wrench operated valves shall be equipped with a 2" square nut for use with removeable levers or extended "T" handles.

Worm gear operators, where required, shall be of the heavy duty construction with the ductile iron quadrant supported on the top and bottom by oil impregnated bronze bearings. The worm gear and shaft shall be manufactured of hardened steel and run on high efficiency roller bearings. All worm gear operators shall be sized for bi-directional shutoff at the valves design pressure rating.

Valves shall be designed and manufactured to shut off bubble tight at 175 psi for valves 2½"-12" and 150 psi for valves 14" and larger. Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-517-09 Section 5.2.2** when requested.

Plug valves shall be Ballcentric® Plug Valve **Series 611/610** as manufactured by Henry Pratt Company of Aurora, Illinois.

Technical Specification Ballcentric® Series 601GL Glass Lined Plug Valves

AWWA C517-09 Standards

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with **ANSI B16.1 Class 125/150** including facing, drilling and flange thickness. Mechanical joint ends shall be in compliance with **AWWA/ANSI C-111-92**. Grooved ends shall be manufactured to the dimensions of **ANSI/AWWA C606** for ductile or steel pipe as required. Ports shall be round on sizes 3"-12" and rectangular port design on valves 14" and larger. All valves shall be capable of being "pigged" with a soft pig when required.

Valve bodies shall be of **ASTM A-126 Class B** cast iron in accordance with **AWWA C-517-09 Section 4.3.3.1**. Interior of valves shall be glass lined at .008-.012 mils thickness, covering the entire interior of valve bodies and stopping at the flange faces.

Plugs shall be of **ASTM A-536-Grade 65-45-12** for sizes 20" and smaller, and **ASTM A126 Class B Cast Iron** for sizes 24" and larger in compliance with **AWWA C-517-09 Sections 4.3.3.1 and 4.3.3.2**. The plugs shall be of one piece solid construction with PTFE thrust bearings on the upper and lower bearing journals to reduce torque and prevent dirt and grit from entering the bearing and seal area.

Valves shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-517-09, Section 4.3.3.6**. Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743 Grade CF-8M**. Valve shaft seals shall be of the "U" cup type in accordance with **AWWA C-517-09 Section 4.4.7**. Seals shall be self adjusting and repackable without removing the bonnet from the valve.

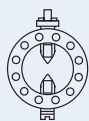
Wrench operated valves 2½"-8" shall be capable of being converted to worm gear or automated operation without removing the bonnet or plug from the valve. All wrench operated valves shall be equipped with a 2" square nut for use with removeable levers or extended "T" handles.

Worm gear operators, where required, shall be of the heavy duty construction with the ductile iron quadrant supported on the top and bottom by oil impregnated bronze bearings. The worm gear and shaft shall be manufactured of hardened steel and run on high efficiency roller bearings. All worm gear operators shall be sized for bi-directional shutoff at the valves design pressure rating.

Valves shall be designed and manufactured to shut off bubble tight at 175 psi for valves 2½"-12" and 150 psi for valves 14" and larger. Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-517-09 Section 5.2.2** when requested.

Plug valves shall be Ballcentric® Plug Valve Series **601GL/600GL** as manufactured by Henry Pratt Company of Aurora, Illinois.

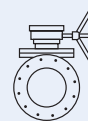
PRATT PRODUCT GUIDE



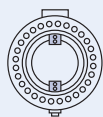
**Model
2FI**



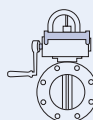
**Monoflange
MKII**



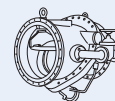
**Plug
Valve**



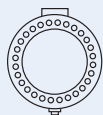
**Triton®
XR70**



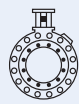
**Indicating Butterfly Valve
UL & FM approved**



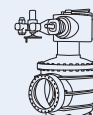
**Tilting Disc
Check Valve**



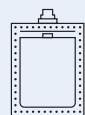
**Triton®
XL**



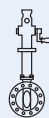
**N-Stamp Nuclear
Butterfly Valve**



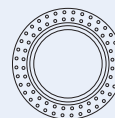
**Cone
Valve**



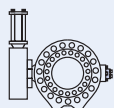
Rectangular



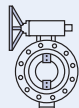
**PIVA Post Indicating Valve Assembly
UL & FM approved**



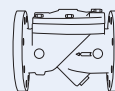
**Sleeve
Valve**



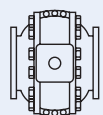
**Rubber Seated
Ball Valve**



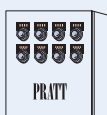
**Triton®
HP250**



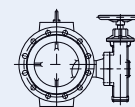
**Check
Valve**



**Metal Seated
Ball Valve**

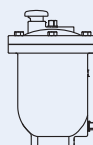


**Control
Systems**



Plunger Valve

PRATT



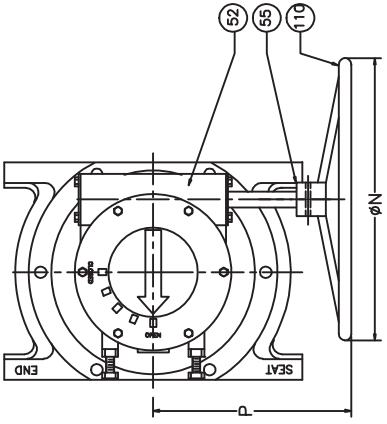
Air Valve

Henry Pratt Company

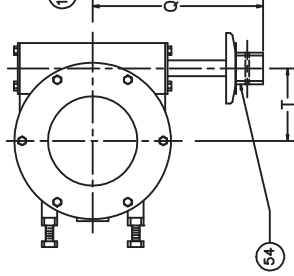
401 South Highland Avenue
Aurora, Illinois 60506-5563 - US
P: 630-844-4000 F: 630-844-4160
www.henrypratt.com
ISO 9001: 2000 Certified

VALVE SIZE	GEAR SIZE & RATIO	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	S	T
2.5	M2 (20:1)	7.5	3.41	3.50	2.5	5.50	7.00	0.75	4	--	--	0.69	2.5	6	4.75	4.75	1.75	2.00
3	M2 (20:1)	8	3.41	3.75	3	6.00	7.50	0.75	4	--	--	0.75	2.5	6	4.75	4.75	1.75	2.00
4	M3 (30:1)	9	4.38	4.50	4	7.50	9	0.75	6	0.63	2	0.94	3	6	9.50	8	2.00	2.56
5	M3 (30:1)	10	5.63	5.75	5	8.50	10	0.88	6	0.75	2	0.94	3	6	9.50	8	2.00	2.56
6	M3 (30:1)	10.50	5.63	5.75	6	9.50	11	0.88	6	0.75	2	1	3	6	9.50	8	2.00	2.56
8	M5 (50:1)	11.50	7.56	7.63	8	11.75	13.50	0.88	6	0.75	2	1.13	6	12	11.25	8	2.25	3.16
10	M8 (80:1)	13	9.25	8.88	10	14.25	16	1	8	0.88	4	1.19	6	12	11.63	10	2.00	4.63
12	M8 (80:1)	14	10.88	10	12	17.00	19	1	8	0.88	4	1.25	6	12	11.63	10	2.00	4.63

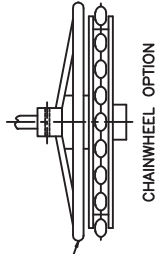
ABOVE GROUND GEAR
W/ HANDWHEEL
OPTION



BURIED GEAR
W/ 2" NUT
OPTION



CHAINWHEEL OPTION



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Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0011_ACP

by: LJ

chkd: GP

appvd: CB



ACTIFLO RECIRCULATION LINE

INSTRUMENTS

OIM manual section: 4.3.11.5

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CS-400-120 : Identification sheet

VWTC PROJECT NUMBER:	5000218009	REV:	1
PROJECT NAME:	AGNICO EAGLE MINES		
ENGINEER:	SUBMITTED TO (RESPONSIBLE):		
PROJECT MANAGER:	SUBMITTED TO (RESPONSIBLE):		
PHONE NUMBER:	PROJECT NUM REFERENCE.:		
	LOT NUMBER:		

SUPPLIER	EQPT CODE	EQPT TAG NO	DIA	DESCRIPTION	INFO 1	INFO 2	INFO 3	APPLIC.	NOTE	REV
HACH	IEPOTB200853	AE2-012	Imme rsion senso r: 60 x 200 mm (2.4 x 7 9	TURBIDIMETER PROBE - ACP	SOLITAX IMMERSION SENSOR FOR TURBIDITY AND INLINE SC sc PVC WITH WIPER 0.001- 4000 NTU, 0.001 mg/L - 50 g/L/MANUFACTURER: HACH/ MODEL: LXV423.99.10100	N/A	N/A	ACTIFLO RECIRCUL ATION LINE MODIFICA TION		rev1
HACH	IEPOTB200853	AE2-022	Imme rsion senso r: 60 x 200 mm (2.4 x 7 9	TURBIDIMETER PROBE - ACP	SOLITAX IMMERSION SENSOR FOR TURBIDITY AND INLINE SC sc PVC WITH WIPER 0.001- 4000 NTU, 0.001 mg/L - 50 g/L/MANUFACTURER: HACH/ MODEL: LXV423.99.10100	N/A	N/A	ACTIFLO RECIRCUL ATION LINE MODIFICA TION		rev1

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SOLITAX[®]sc TURBIDITY & SUSPENDED SOLIDS SENSORS

Applications

- Drinking Water
- Wastewater
- Beverage
- Industrial Water
- Power



Accurate, color-independent suspended solids and turbidity measurements.

Greater Accuracy, Less Maintenance

Hach SOLITAX sc sensors provide accurate, color-independent measurement of turbidity and suspended solids in drinking water, wastewater and industrial process applications. A self-cleaning device prevents biological growth and interference of gas bubbles. This system's reliable performance and full data communication capability help improve process control and reduce treatment costs associated with polymer use, digester volume, and sludge handling.

Excellent Correlation to Laboratory Analysis

SOLITAX sc sensors show an exceptional correlation to laboratory analysis. On-line measurement not only saves time on manual analysis, but also provides critical real-time measurements that can be used to operate the plant more efficiently.

Fully Serviceable Sensors

Conventional turbidity and suspended solids sensors are potted and are discarded when they no longer function. SOLITAX sc sensors are fully serviceable, which often doubles the useful life of the sensor.

Easy One-point Calibration

Factory calibrated in conformity with DIN EN ISO 7027 for long-term calibration stability. Calibration is easy with a simple correction factor procedure.

Multi-channel, Multi-parameter System

Any two SOLITAX sc sensors can be installed on one Hach sc200 Controller. The same controller can also accommodate any combination of parameters. All of Hach's model sc sensors are "plug and play" with no complicated wiring or set-up procedure necessary.

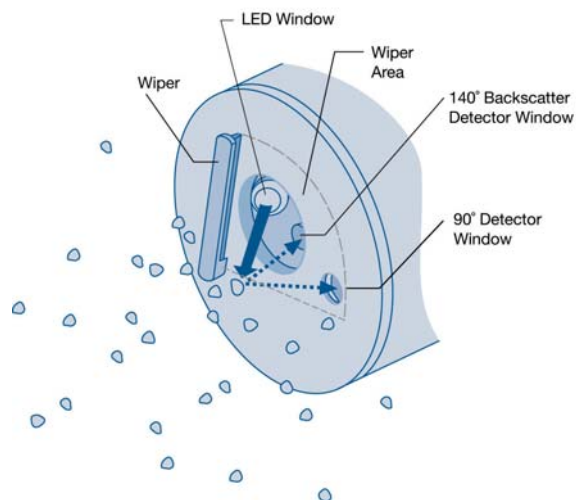
Specifications*

	For insertion in pipes		For immersion in open tanks		
Model	INSERTION inline sc	INSERTION highline sc	IMMERSION t-line sc	IMMERSION ts-line sc	IMMERSION hs-line sc
Parameter	Suspended Solids, Turbidity	Hight Range Suspended Solids, Turbidity	Turbidity	Suspended Solids, Turbidity	Hight Range Suspended Solids, Turbidity
Measuring Range Turbidity	0.001 to 4000 NTU	0.001 to 4000 NTU	0.001 to 4000 NTU	0.001 to 4000 NTU	0.001 to 4000 NTU
Measuring Range TSS-Content	0.001 mg/L to 50 g/L	0.001 mg/L to 500 g/L		0.001 mg/L to 50 g/L	0.001 mg/L to 500 g/L
Unit	Turbidity: User selectable—NTU, FNU, or TE/F Suspended Solids: User selectable—g/L, mg/L, ppm, or % solids				
Accuracy	Turbidity up to 1000 NTU; without calibration < 5% of the measured value ±0.01 NTU; with calibration < 1% of the measured value ±0.01 NTU				
Repeatability	Suspended solids content: < 3 %				
	Turbidity: < 1 %				
Response Time	1 s < T90 < 300 s (adjustable)				
Calibration Method	Turbidity: Formazin or STABLCAL Standard (at 800 NTU). Suspended Solids: Sample specific, based on gravimetric TSS analysis with a correction factor procedure.				
Certifications	CE certified to EN 61326-1, EN 61326/A1, EN 61326/A2, EN 61010-1				
Flow	Max. 3 m/s (the presence of air bubbles affects the measurement)				
Operating Temperature Range	0 to 40 °C (32 to 104°F)				
Pressure Limit	Stainless steel: 6 bar or 60 m (87 psi) PVC: 1 bar or 10 m (14.5 psi) Stainless steel: 6 bar or 60 m (87 psi) PVC: 1 bar or 10 m (14.5 psi)				
Material	Optics Carrier and Sleeve: stainless steel 1.4571 or black PVC Wiper Arm: stainless steel 1.4581; Wiper Blade: silicone (standard) Optional: Viton (LZX578); Wiper Shaft: stainless steel 1.4571 Threaded cable fitting: stainless steel 1.4305 or white PVC		Optics Carrier and Sleeve: stainless steel 1.4571 or black PVC Wiper Arm: stainless steel 1.4581; Wiper Blade: silicone (standard) Optional: Viton (LZX578); Wiper Shaft: stainless steel 1.4571 Threaded cable fitting: stainless steel 1.4305 or white PVC		
Weight Sensor	Insertion stainless steel: 2.4 kg (5.29 lb.)		Immersion stainless steel: 1.38 kg (3.0 lb.) Immersion PVC: 0.52 kg (1.2 lb.)		
Cable Length	10 m (optional extension cables available)				
	*Subject to change without notice				

Principle of Operation

SOLITAX sc ts-line sensor with dual-beam optics and added backscatter detector

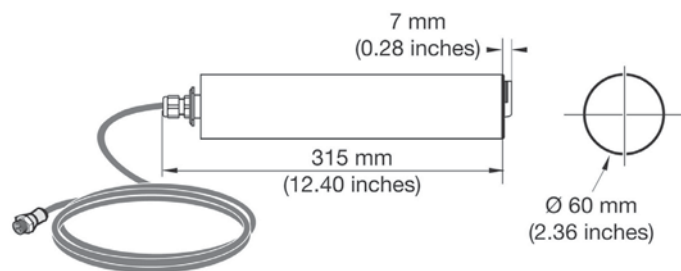
- Dual infrared light beams. LED light source transmits light at 45° to sensor face.
- Nephelometric photoreceptors detect light at 90° to the transmitted light beam.
- Backscatter photoreceptor (included on all models except the SOLITAX sc t-line) detects light at 140° to the transmitted light beam to measure suspended solids in heavily loaded sample streams.
- Self-cleaning wiper, optional.
- T-line probes measure turbidity only. TS, HS, inline, and highline sensors measure either turbidity or suspended solids.



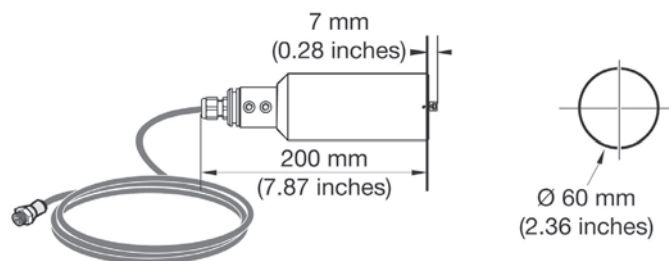
Dimensions

Hach SOLITAX sc sensors can be fixed to the rim of the tank for immersion applications or inserted directly through the sidewall of a pipeline for insertion applications. A variety of installation kits are available.

SOLITAX sc Insertion Probe

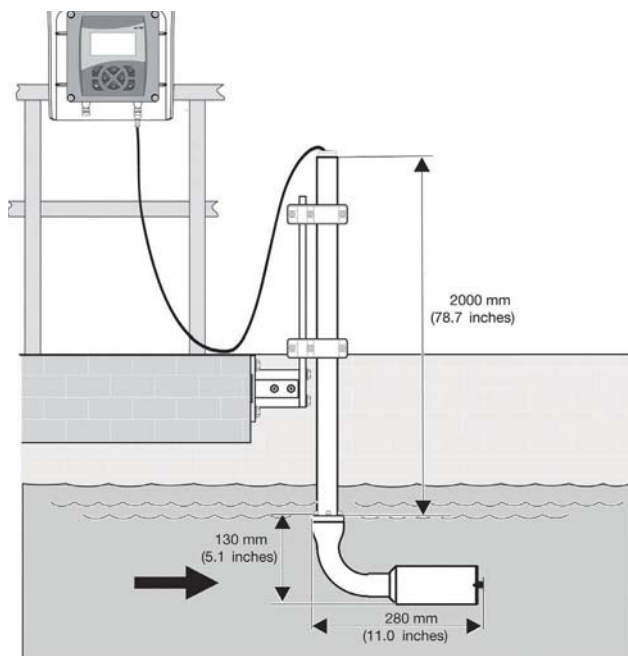


SOLITAX sc Immersion Probe

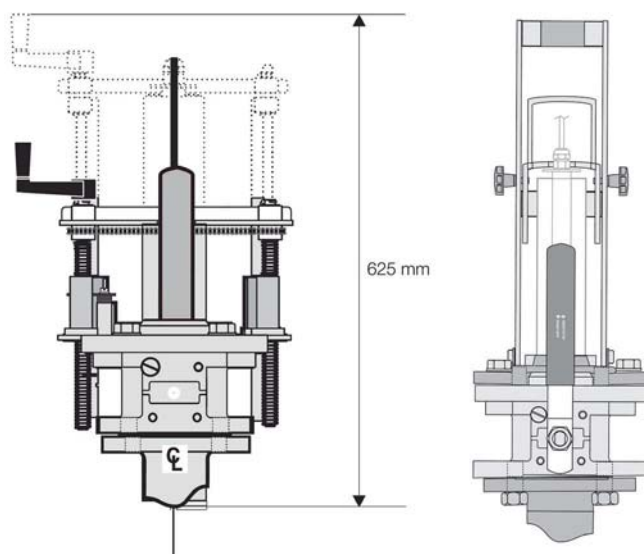


Installation / Mounting

*Installation for mounting SOLITAX sc for immersion in open tanks.
(Stainless steel pole mount kit, Prod. No. LZY714.99.53120)*



*Fixture with ball valve for mounting SOLITAX sc models
inline and highline sensors in pipes., minimum pipe size 100 mm (4-in.)
(Prod. No. LZX337, max pressure 6 bar;
Prod. No. 936, max. pressure 1 bar.*



Ordering Information

Common Configurations: SOLITAX sc Turbidity and Suspended Solids Analyzers with sc200 controller and sensors shown

Immersion in Open Tanks Applications

2983400	Turbidity Analyzer, t-line sc, stainless steel with wiper (0.001 to 4000 NTU)
2983500	Turbidity and Suspended Solids Analyzer, ts-line sc, stainless steel with wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)
2983600	Turbidity and High Range Suspended Solids Analyzer, hs-line sc, stainless steel with wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)

Insertion in Pipes Applications (includes insertion mounting kit)

2983700	Turbidity and Suspended Solids Analyzer, inline sc, stainless steel with wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)
2983900	Turbidity and High Range Suspended Solids Analyzer, highline sc, stainless steel with wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)

NOTE:

1. Power Cords must be ordered separately.
2. Fixed point installation kit or handrail mount kit must be ordered separately for all immersion analyzers.

Individual SOLITAX sc Sensors

Immersion Sensors

LXV423.99.10000	Turbidity, t-line sc, PVC with wiper (0.001 to 4000 NTU)
LXV423.99.12000	Turbidity, t-line sc, PVC without wiper (0.001 to 4000 NTU)
LXV423.99.10100	Turbidity and Suspended Solids, ts-line sc, PVC with wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)
LXV423.99.12100	Turbidity and Suspended Solids, ts-line sc, PVC without wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)
LXV423.99.00100	Turbidity and Suspended Solids, ts-line sc, stainless steel with wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)
LXV423.99.02100	Turbidity and Suspended Solids, ts-line sc, stainless steel without wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)
LXV423.99.10200	Turbidity and Suspended Solids, hs-line sc, PVC with wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)

LXV423.99.12200 Turbidity and Suspended Solids, hs-line sc, PVC without wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)

LXV423.99.00200 Turbidity and Suspended Solids, hs-line sc, stainless steel with wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)

LXV423.99.02200 Turbidity and Suspended Solids, hs-line sc, stainless steel without wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)

Insertion Sensors

LXV424.99.00100 Turbidity and Suspended Solids, inline sc, stainless steel with wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)

LXV424.99.02100 Turbidity and Suspended Solids, inline sc, stainless steel without wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)

LXV424.99.00200 Turbidity and Suspended Solids, highline sc, stainless steel with wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)

LXV424.99.02200 Turbidity and Suspended Solids, highline sc, stainless steel without wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)

Installation Accessories

LZY714.99.53120 Stainless Steel pole mount kit for SOLITAX t-line, ts-line, and hs-line immersion sensors, including 10 cm base and 2 m pole with sensor adapter

5738400 Insertion Mounting Kit for inline and highline insertion sensors (ball valve safety armature and extraction system). Kit includes a 4 inch pre-coped Carbon Steel Flange. Non-coped flanges are available

AHA033NPT Sensor Adapter, straight 1-1/2 FNPT

AHA034NPT Sensor Adapter, elbow 1-1/2 FNPT 90°

MH236B00Z Handrail Mounting Kit (for sensor to be used with either adapter above) includes 1.5-inch diameter by 7.5-ft long CPVC pipe and swivel/pivot/ pipe clamp assembly

LZX337 Stainless steel ball valve safety armature/ extraction fitting for in-line and hi-line probes w/o welding flange, maximum operating pressure 6 bar/87 psi

LZX936 Stainless steel ball valve armature, maximum operation pressure 1 bar/14.5 psi

LZX660 Non-coped stainless steel welding flange for insertion kit

LZX661 Non-coped carbon steel welding flange for insertion kit

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hach.com			

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In the interest of improving and updating its equipment,

Hach Company reserves the right to alter specifications to equipment at any time.



Be Right™



CS-403-550 : Identification sheet

VWTC PROJECT NUMBER:	5000218009	REV:	1
PROJECT NAME:	AEM AMARUQ	SUBMITTED TO (COMPANY):	AGNICO EAGLE MINES
ENGINEER:	Gabriel Hébert	SUBMITTED TO (RESPONSIBLE):	
PROJECT MANAGER:	Clément B	PROJECT NUM REFERENCE.:	
PHONE NUMBER:		LOT NUMBER:	

SUPPLIER	EQPT CODE	EQPT TAG NO	DIA	DESCRIPTION	INFO 1	INFO 2	INFO 3	APPLIC.	NOTE	REV
HACH	IECNGU340502	AIT2-012	144	TSS TRANSMITTER	MULTIPURPOSE TRANSMITTER	N/A	N/A	ACTIFLO		rev1
			mm x		/MANUF: HACH/MODEL: SC200			RECIRCUL		
			144		/LXV404.99.00552/120V/ 2			ATION		
			mm x		DIGITAL CHANNEL/ HART			LINE		
			181		PROTOCOL MODULE 9328100			MODIFICA		
			mm					TION		
HACH	IECNGU340502	AIT2-022	144	TSS TRANSMITTER	MULTIPURPOSE TRANSMITTER	N/A	N/A	ACTIFLO		rev1
			mm x		/MANUF: HACH/MODEL: SC200			RECIRCUL		
			144		/LXV404.99.00552/120V/ 2			ATION		
			mm x		DIGITAL CHANNEL/ HART			LINE		
			181		PROTOCOL MODULE 9328100			MODIFICA		
			mm					TION		

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sc200™ UNIVERSAL CONTROLLER

Applications

- Drinking Water
- Wastewater
- Industrial Water
- Power



One Controller for the Broadest Range of Sensors.

Choose from 30 digital and analog sensor families for up to 17 different parameters.

Maximum Versatility

The sc200 controller allows the use of digital and analog sensors, either alone or in combination, to provide compatibility with Hach's broad range of sensors, eliminating the need for dedicated, parameter-specific controllers.

Ease of Use and Confidence in Results

Large, high-resolution, transreflective display provides optimal viewing resolution in any lighting condition. Guided calibration procedures in 19 languages minimize complexity and reduce operator error. Password-protected SD card reader offers a simple solution for data download and transfer. Visual warning system provides critical alerts.

Wide Variety of Communication Options

Utilize two to five analog outputs to transmit primary and secondary values for each sensor, or integrate Hach sensors and analyzers into MODBUS RS232/RS485, Profibus® DP, and HART networks.



Password protected SD card reader offers a simple solution for data download and transfer, and sc200 and digital sensor configuration file duplication and backup.

Controller Comparison



Features	Previous Models		sc200™ Controller	Benefits
	sc100™ Controller	GLI53 Controller		
Display	64 x 128 pixels 33 x 66 mm (1.3 x 2.6 in.)	64 x 128 pixels 33 x 66 mm (1.3 x 2.6 in.)	160 x 240 pixels 48 x 68 mm (1.89 x 2.67 in.) Transreflective	- Improved user interface—50% bigger - Easier to read in daylight and sunlight
Data Management	irDA Port/PDA Service Cable	N/A	SD Card Service Cable	- Simplifies data transfer - Standardized accessories/ max compatibility
Sensor Inputs	2 Max Direct Digital Analog via External Gateway	2 Max Analog Depending on Parameter	2 Max Digital and/or Analog with Sensor Card	- Simplifies analog sensor connections - Works with analog and digital sensors
Analog Inputs	N/A	N/A	1 Analog Input Signal Analog 4-20mA Card	- Enables non-sc analyzer monitoring - Accepts mA signals from other analyzers for local display - Consolidates analog mA signals to a digital output
4-20 mA Outputs	2 Standard	2 Standard	2 Standard Optional 3 Additional	Total of five (5) 4-20 mA outputs allows multiple mA outputs per sensor input
Digital Communication	MODBUS RS232/RS485 Profibus DP V1.0	HART	MODBUS RS232/RS485 Profibus DP V1.0 HART 7.2	Unprecedented combination of sensor breadth and digital communication options

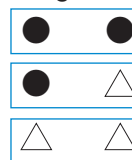
Choose from Hach's Broad Range of Digital and Analog Sensors

Parameter	Sensor	Digital or Analog
Ammonia	AMTAX™ sc, NH4D sc, AISE sc, AN-ISE sc	●
Chlorine	CLF10 sc, CLT10 sc, 9184 sc	●
Chlorine Dioxide	9185 sc	●
Conductivity	GLI 3400 Contacting, GLI 3700 Inductive	△
Dissolved Oxygen	LDO® Model 2, 5740 sc	●
Dissolved Oxygen	5500	△
Flow	U53, F53 Sensors	△
Nitrate	NITRATAX™ sc, NO3D sc, NISE sc, AN-ISE sc	●
Oil in Water	FP360 sc	●
Organics	UVAS sc	●
Ozone	9187 sc	●
pH/ORP	pHD	●
pH/ORP	pHD, pH Combination, LCP	△
Phosphate	PHOSPHAX™ sc	●
Sludge Level	SONATAX™ sc	●
Suspended Solids	SOLITAX™ sc, TSS sc	●
Turbidity	1720E, FT660 sc, SS7 sc, ULTRATURB sc, SOLITAX sc, TSS sc	●
Ultra Pure Conductivity	8310, 8311, 8312, 8315, 8316, 8317 Contacting	△
Ultra Pure pH/ORP	8362	△

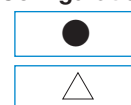
● = Digital △ = Analog

Connect up to two of any of the sensors listed above, in any combination, to meet your application needs. The diagrams below demonstrate the potential configurations. Operation of analog sensors requires the controller to be equipped with the appropriate sensor module. Contact Hach Technical Support for help with selecting the appropriate module.

2 Channel Configurations



1 Channel Configurations



Specifications*

Dimensions (H x W x D)	5.7 in x 5.7 in x 7.1 in (144 mm x 144 mm x 181 mm)
Display	Graphic dot matrix LCD with LED backlighting, transreflective
Display Size	1.9 x 2.7 in. (48 mm x 68 mm)
Display Resolution	240 x 160 pixels
Weight	3.75 lbs. (1.70 kg)
Power Requirements (Voltage)	100 - 240 V AC, 24 V DC
Power Requirements (Hz)	50/60 Hz
Operating Temperature Range	-20 to 60 °C , 0 to 95% RH non-condensing
Analog Outputs	Two (Five with optional expansion module) to isolated current outputs, max 550 Ω , Accuracy: $\pm 0.1\%$ of FS (20mA) at 25 °C, $\pm 0.5\%$ of FS over -20 °C to 60 °C range
Analog Output Functional Mode	Operational Mode: measurement or calculated value Linear, Logarithmic, Bi-linear, PID
Security Levels	2 password-protected levels
Mounting Configurations	Wall, pole, and panel mounting
Enclosure Rating	NEMA 4X/IP66
Conduit Openings	1/2 in NPT Conduit
Relay: Operational Mode	Primary or secondary measurement, calculated value (dual channel only) or timer

Relay Functions

Scheduler (Timer), Alarm, Feeder Control, Event Control, Pulse Width Modulation, Frequency Control, and Warning

Relays

Four electromechanical SPDT (Form C) contacts, 1200 W, 5 A

Communication

MODBUS RS232/RS485, PROFIBUS DPV1, or HART 7.2 optional

Memory Backup

Flash memory

Electrical

Certifications

EMC

CE compliant for conducted and radiated emissions:

- CISPR 11 (Class A limits)

- EMC Immunity EN 61326-1 (Industrial limits)

Safety

cETLus safety mark for:

- General Locations per ANSI/UL 61010-1 & CAN/CSA C22.2. No. 61010-1

- Hazardous Location Class I, Division 2, Groups A,B,C & D (Zone 2, Group IIC) per FM 3600 / FM 3611 & CSA C22.2 No. 213 M1987 with approved options and appropriately rated Class I, Division 2 or Zone 2 sensors

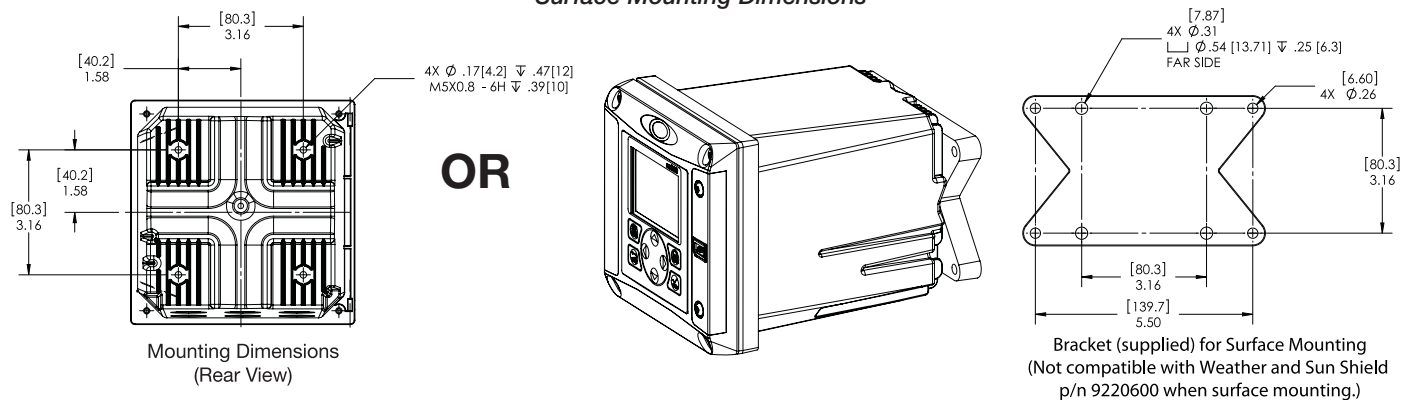
cULus safety mark

- General Locations per UL 61010-1 & CAN/CSA C22.2. No. 61010-1

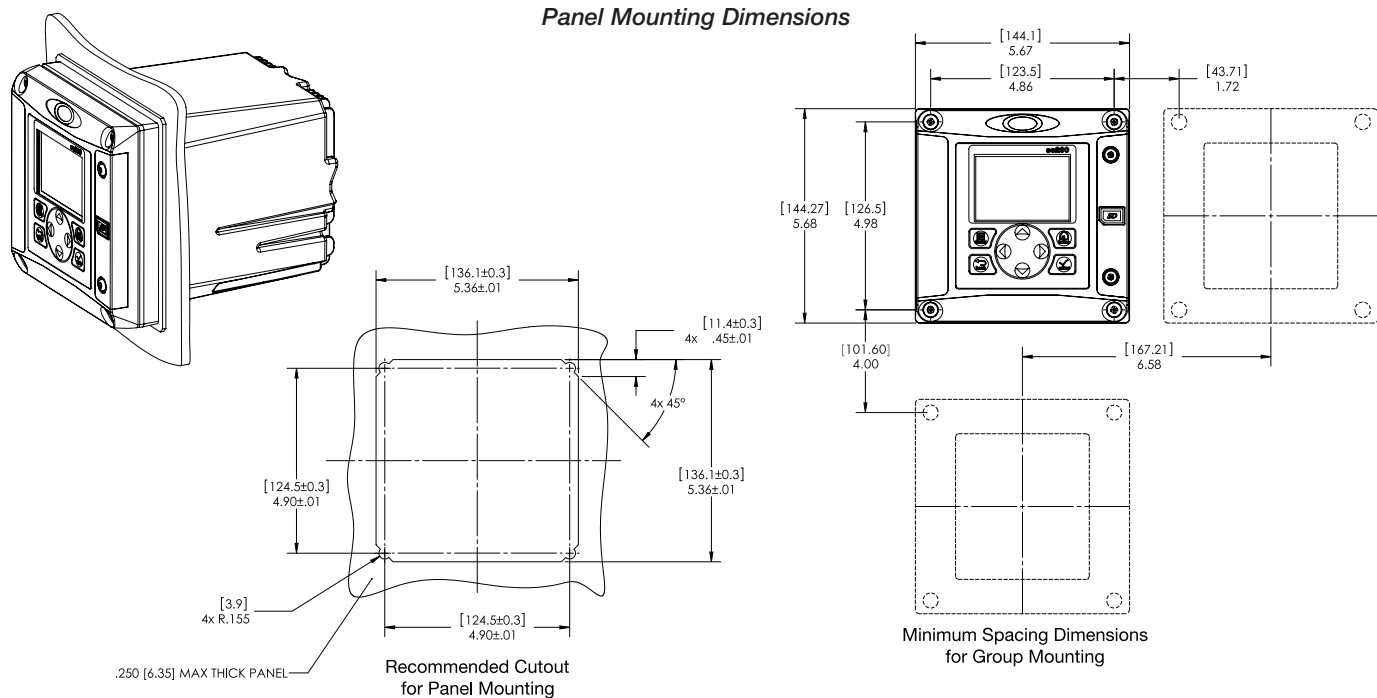
**Subject to change without notice.*

Dimensions

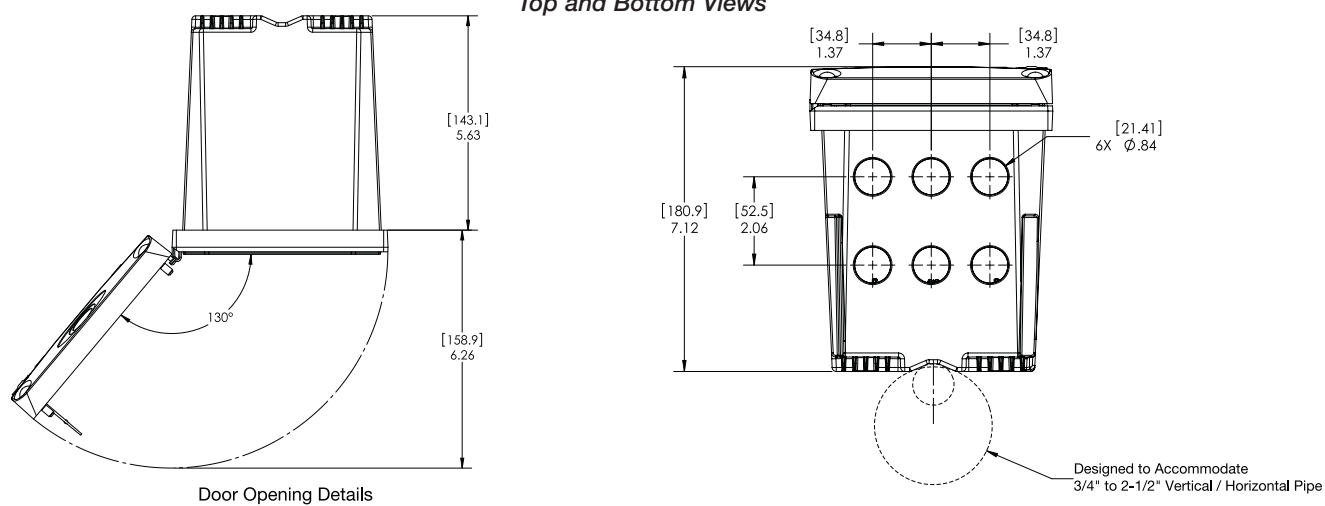
Surface Mounting Dimensions



Panel Mounting Dimensions



Top and Bottom Views



Ordering Information

sc200 for Hach Digital and Analog Sensors

LXV404.99.00552	sc200 controller, 2 channels, digital
LXV404.99.00502	sc200 controller, 1 channel, digital
LXV404.99.00102	sc200 controller, 1 channel, pH/DO
LXV404.99.00202	sc200 controller, 1 channel, Conductivity
LXV404.99.01552	sc200 controller, 2 channels, digital, Modbus RS232/RS485
LXV404.99.00112	sc200 controller, 2 channel, pH/DO

Note: Other Sensor combinations are available. Please contact Hach Technical Support or your Hach representative.

Note: Communication options (MODBUS, Profibus DPV1, and HART) are available. Please contact Hach Technical Support or your Hach representative.

sc200 for Ultrapure Sensors

9500.99.00602	sc200 controller, 1 channel, ultrapure conductivity
9500.99.00702	sc200 controller, 1 channel, ultrapure pH
9500.99.00662	sc200 controller, 2 channel, ultrapure conductivity
9500.99.00772	sc200 controller, 2 channel, ultrapure pH

Sensor and Communication Modules

9012900	Analog pH/ORP and DO module for GLI Sensors
9013000	Analog Conductivity module for GLI Sensors
9012700	Flow module
9012800	4-20 mA Input Module
9525700	Analog pH/ORP Module for Polymetron Sensors
9525800	Analog Conductivity Module for Polymetron Sensors
9013200	Modbus 232/485 Module
9173900	Profibus DP Module
9328100	HART Module
9334600	4-20 mA Output Module (Provides 3 additional mA Outputs)

Accessories

9220600	sc200 Weather and Sun Shield with UV Protection Screen
8809200	sc200 UV Protection Screen
9218200	SD card reader (USB) for connection to PC
9218100	4 GB SD card



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Hach Company reserves the right to alter specifications to equipment at any time.



Be Right™



CS-403-603 : Identification sheet

VWTC PROJECT NUMBER:	5000218009	REV:	1
PROJECT NAME:	AEM AMARUQ	SUBMITTED TO (COMPANY):	AGNICO EAGLE MINES
ENGINEER:	Gabriel Hébert	SUBMITTED TO (RESPONSIBLE):	
PROJECT MANAGER:	Clément B	PROJECT NUM REFERENCE.:	
PHONE NUMBER:		LOT NUMBER:	

SUPPLIER	EQPT CODE	EQPT TAG NO	DIA	DESCRIPTION	INFO 1	INFO 2	INFO 3	APPLIC.	NOTE	REV
HACH	ST-403-303	AE2-011	N/A	PH METER PROBE - ACP	pH SENSOR/MANUFACTURER: HACH/MODEL: DPD1R1	N/A	N/A	ACTIFLO RECIRCUL ATION LINE MODIFICA TION		rev1
HACH	ST-403-303	AE2-021	N/A	PH METER PROBE - ACP	pH SENSOR/MANUFACTURER: HACH/MODEL: DPD1R1	N/A	N/A	ACTIFLO RECIRCUL ATION LINE MODIFICA TION		rev1

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DIFFERENTIAL pH AND ORP SENSORS

Applications

- Drinking Water
- Wastewater
- Industrial Water
- Power



Wide range pH glass
(HF resistant glass also available)



The smart choice for accurate, reliable, and dependable pH/ORP measurement.

Hach Digital pHD sc sensors are available in convertible (PEEK® or Ryton®), insertion, and sanitary body styles. Three electrodes are used in these sensors to increase measurement accuracy and eliminate sensor ground loops.

Differential Electrode Measurement Technique

This field-proven technique uses three electrodes instead of the two normally used in conventional pH sensors. Process and reference electrodes measure the pH differentially with respect to a third ground electrode. The end result is unsurpassed measurement accuracy, reduced reference junction potential, and elimination of sensor ground loops. These sensors provide greater reliability, resulting in less downtime and maintenance.

Patented Technology

The former GLI, now a Hach Company brand, invented the Differential Electrode Technique for pH measurement in 1970. The pHDT™ sensor series (U.S. Patent Number 6395158B1, May 28, 2002) takes this field-proven technology to a new level.

Replaceable Salt Bridge/Protector

The unique, replaceable salt bridge holds an extraordinary volume of buffer to extend the working life of the sensor by protecting the reference electrode from harsh process conditions.

Built-in Encapsulated Preamp

Encapsulated construction protects the sensor's built-in preamp from moisture and humidity, ensuring reliable sensor operation. The preamp in the pHD analog sensor produces a strong signal, enabling the sensor to be located up to 1000 m (3280 ft.) from the analyzer.

Durable Body Materials

Both the digital and analog pH and ORP differential sensors feature a durable PEEK® body for chemical compatibility with most process solutions. For less aggressive solutions, Hach offers a Ryton® sensor in a convertible style for pH and ORP measurement. A sensor with a stainless steel body is available for immersion applications.

Versatile Mounting Styles

Sensors are available in four mounting styles—convertible, insertion, immersion, and sanitary.

Differential Sensor Warranty

Hach Company offers an outstanding warranty on its differential sensors. We will replace any differential sensor that fails due to defects in materials or workmanship within one year from the date of shipment, and up to 30 months on a prorated basis for any failure.



Specifications*

pH Sensors

Some industrial applications require accurate measurement and control below 2 or above 12 pH. In these special cases, please contact Hach Technical Support for further details.

Measuring Range	-2 to 14 pH
Sensitivity	±0.01 pH
Stability	0.03 pH per 24 hours, non-cumulative
Operating Temperature	Digital Sensor: -5 to 70°C (23 to 158°F) Analog Sensor with Digital Gateway: 5 to 105°C (23 to 221°F) Immersion Sensor: 0 to 50°C (32 to 122°F)
Flow Rate	3 m (10 ft.) per second, maximum
Sensor Pressure/ Temperature Limits	Digital: 6.9 bar at 70°C (100 psi at 158°F) Analog: 6.9 bar at 105°C (100 psi at 221°F)
Built-in Temperature Element	NTC 300 ohm thermistor for automatic temperature compensation and analyzer temperature readout
Transmission Distance	100 m (328 ft.), maximum 1000 m (3280 ft.), maximum when used with a termination box
Sensor Cable (integral)	4 conductor cable with one shield and polyurethane jacket; rated to 105°C (221°F); 10 m (33 ft.) standard length
Wetted Materials	PEEK® or Ryton® (PVDF), salt bridge of matching material with Kynar® junction, glass process electrode, titanium ground electrode, and Viton® O-ring seals (Please contact Hach Technical Support for available wetted O-ring materials.)

ORP (Redox) Sensors

For best ORP measuring results in solutions containing zinc, cyanide, cadmium or nickel, Hach recommends using the pHD sc ORP sensor equipped with an optional gold electrode.

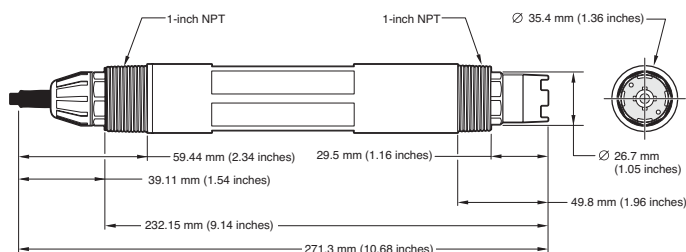
Measuring Range	-1500 to +1500 mV
Sensitivity	±0.5 mV
Stability	2 mV per 24 hours, non-cumulative
Operating Temperature	Digital Sensor: -5 to 70°C (23 to 158°F) Analog Sensor with Digital Gateway: -5 to 105°C (23 to 221°F) Immersion Sensor: 0 to 50°C (32 to 122°F)
Flow Rate	3 m (10 ft.) per second, maximum
Sensor Pressure/ Temperature Limits	Digital: 6.9 bar at 70°C (100 psi at 158°F) Analog: 6.9 bar at 105°C (100 psi at 221°F)
Built-in Temperature Element	NTC 300 ohm thermistor for analyzer temperature readout only—no automatic temperature compensation necessary for ORP measurement
Transmission Distance	100 m (328 ft.), maximum 1000 m (3280 ft.), maximum when used with a termination box
Sensor Cable (integral)	4 conductor cable with one shield and polyurethane jacket; rated to 105°C (221°F); 10 m (33 ft.) standard length
Wetted Materials	PEEK® or Ryton® (PVDF), salt bridge of matching material with Kynar® junction, glass and platinum (or plastic and gold) process electrode, titanium ground electrode, and Viton® O-ring seals

**Subject to change without notice.*

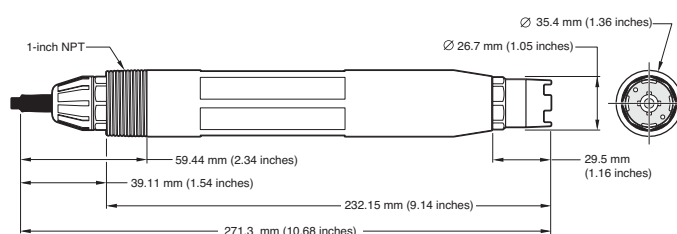
PEEK® is a registered trademark of ICI Americas, Inc.; Ryton® is a registered trademark of Phillips 66 Co.; Kynar® is a registered trademark of Pennwalt Corp.; Viton® is a registered trademark of E.I. DuPont de Nemours + Co.

Dimensions

Convertible Style



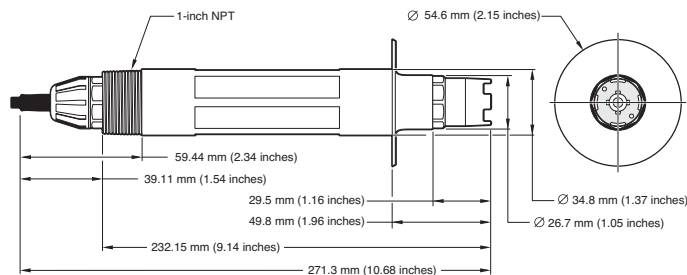
Insertion Style



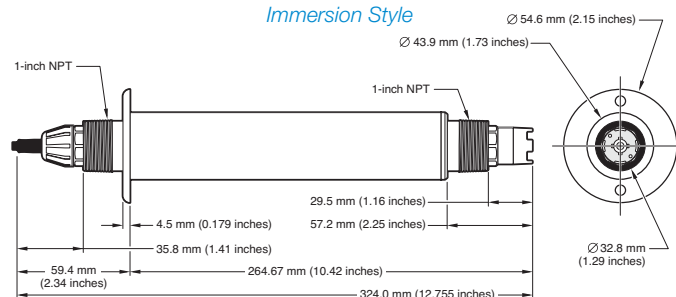
Continued on next page.

Dimensions *continued*

Sanitary Style



Immersion Style



Ordering Information

pHD sc Digital Differential pH/ORP Sensors

All digital sensors include built-in digital electronics and integral 10 m (33 ft.) cable terminated with connector for the Hach sc Digital Controllers.

pH Sensors

Prod. No.	Body Material	Body Style*	Electrode Material	Max Temp
DPD1P1	PEEK ¹	Convertible	Glass, General Purpose	70°C (158°F)
DPD1P3	PEEK ¹	Convertible	Glass, HF-resistant	70°C (158°F)
DPD2P1	PEEK ¹	Insertion	Glass, General Purpose	70°C (158°F)
DPD3P1	PEEK ¹	Sanitary	Glass, General Purpose	70°C (158°F)
DPD1R1	Ryton ²	Convertible	Glass, General Purpose	70°C (158°F)
DPD1R3	Ryton ²	Convertible	Glass, HF-resistant	70°C (158°F)
DPS1	Stainless Steel	Immersion	Glass, General Purpose	50°C (122°F)

¹Polyetheretherketone ²Polyphenylene Sulfide

ORP Sensors

Prod. No.	Body Material	Body Style*	Electrode Material	Max Temp
DRD1P5	PEEK ¹	Convertible	Platinum	70°C (158°F)
DRD1P6	PEEK ¹	Convertible	Gold	70°C (158°F)
DRD2P5	PEEK ¹	Insertion	Platinum	70°C (158°F)
DRD1R5	Ryton ²	Convertible	Platinum	70°C (158°F)
DRD1R6	Ryton ²	Convertible	Gold	70°C (158°F)
DRS5	Stainless Steel	Immersion	Platinum	50°C (122°F)

¹Polyetheretherketone ²Polyphenylene Sulfide

Digitl Gateway

6120500 Digital Gateway, convert pHD analog sensors to digital output for connecting to sc1000 digital controller

pHD Analog Sensors

All analog sensors include built-in preamplifier and integral 4.5 m (15 ft.) cable terminated with stripped and tinned wires.

pH Sensors

Prod. No.	Body Material	Body Style*	Electrode Material	Max Temp
PD1P1	PEEK ¹	Convertible	Glass, General Purpose	95°C (203°F)
PD1P3	PEEK ¹	Convertible	Glass, HF-resistant	95°C (203°F)
PD2P1	PEEK ¹	Insertion	Glass, General Purpose	95°C (203°F)
PD3P1	PEEK ¹	Sanitary	Glass, General Purpose	95°C (203°F)
PD1R1	Ryton ²	Convertible	Glass, General Purpose	95°C (203°F)
PD1R3	Ryton ²	Convertible	Glass, HF-resistant	95°C (203°F)

¹Polyetheretherketone ²Polyphenylene Sulfide

ORP Sensors

Prod. No.	Body Material	Body Style*	Electrode Material	Max Temp
RD1P5	PEEK ¹	Convertible	Platinum	95°C (203°F)
RD1P6	PEEK ¹	Convertible	Gold	95°C (203°F)
RD2P5	PEEK ¹	Insertion	Platinum	95°C (203°F)
RD1R5	Ryton ²	Convertible	Platinum	95°C (203°F)
RD1R6	Ryton ²	Convertible	Gold	95°C (203°F)

¹Polyetheretherketone ²Polyphenylene Sulfide

*Definitions of body styles:

- Convertible – 1-inch NPT threads at both ends, designed for tee-mounting or other flow through mountings, and pipe mounting for immersion
- Insertion – no threads on the electrode end, designed for use with insertion valve assembly
- Sanitary – 2-inch flange for a tri-clover style fitting
- Immersion – used with chain mounting or pipe mounting

Continued on next page.

Ordering Information *continued*

pHD sc Digital and pHD Analog Sensor Accessories

Cables

Extension cables are used only with digital sensors or digital gateways when connecting to an sc Digital Controller.

6122400	Digital Extension Cable, 1 m (3.2 ft.)
5796000	Digital Extension Cable, 7.7 m (25 ft.)
5796100	Digital Extension Cable, 15 m (50 ft.)
5796200	Digital Extension Cable, 31 m (100 ft.)

Interconnect cables are used only with analog sensors, junction box, and controller.

1W1100	Analog Interconnect Cable, order per foot
---------------	---

Digital Termination Box

Required when the cable between the sensor/gateway and sc Digital Controller is 100 m (328 ft.) to 1000 m (3280 ft.)

5867000	Digital Termination Box
----------------	-------------------------

Analog Junction Box

Required when the cable between the analog sensor and controller is greater than standard sensor cable. Includes terminal strip and gasket.

60A2053	Junction Box, Surface-mount, aluminum (includes mounting hardware)
60A9944	Junction Box, Pipe-mount, PVC (for 1/2-inch diameter pipe, includes mounting hardware)
60G2052	Junction Box, Pipe-mount, PVC (for 1-inch diameter pipe, includes mounting hardware)
76A4010-001	Junction Box, NEMA 4X (no mounting hardware included)

Salt Bridges

The double junction salt bridge on the standard cell of all Hach pHD sensors is field-replaceable.

SB-P1SV	PEEK Sensor and Salt Bridge Body, Kynar (PVDF) Outer Junction
SB-P2SV	PEEK Sensor and Salt Bridge Body, Ceramic Outer Junction
SB-P1SP¹	PEEK Sensor and Salt Bridge Body, Kynar (PVDF) Outer Junction
SB-R1SV	Ryton Sensor and Salt Bridge Body, Kynar (PVDF) Outer Junction

¹Special perfluoroelastomer O-ring in place of the Viton® O-ring

pHD Sensor Reagents and Standards

25M1A1025-115	Standard Cell Solution, 500 mL
25M8A1002-101	Gel Powder, for high temperature applications, 2 g

pH Buffers

2283549	pH 7, 500 mL (1 pint)
2283449	pH 4, 500 mL (1 pint)
2283649	pH 10, 500 mL (1 pint)

ORP Reference Solutions (in resealable plastic bottles)

25M2A1001-115	200 mV 500 mL (1 pint)
25M2A1002-115	600 mV 500 mL (1 pint)

Mounting Hardware for pHD sc Differential Sensors

Sanitary Mount

MH018S8SZ	316 SS
------------------	--------

Includes 2-inch sanitary tee and heavy-duty clamp. Cap and EPDM compound gasket supplied with sensor; can be ordered separately.

Union Mount

6131300	CPVC
6131400	316 SS

Includes standard 1-1/2 inch tee, union pipe with adapter, sealing hub, and lock ring and Viton® O-ring.

Flow-through Mount

MH334N4NZ	CPVC
MH314N4MZ	316 SS

Includes a standard 1-inch tee in respective material.

Insertion Mount

Digital		Analog	
5646300	CPVC	5646400	CPVC
5646350	316 SS	5646450	316 SS

Includes a 1-1/2 inch ball valve, 1-1/2 inch NPT close nipple, sensor adapter with two Viton® O-rings and wiper, extension pipe, pipe adapter, back tube, and lock ring.

Immersion Mount

Standard Hardware

Digital		Analog	
6136400	CPVC	MH434A00B	CPVC
6136500	316 SS	MH414A00B	316 SS

Includes 1-inch by 4 ft. pipe and 1-inch x 1-inch NPT coupling. (Pipe-mount junction box with terminal strip included in analog hardware.)

Handrail Hardware

MH236B00Z	CPVC
------------------	------

Includes 1-1/2 inch by 7.5 ft. CPVC pipe, and swivel/pivot/ pipe clamp assembly.

Chain Mount Hardware

2881900	316 ss
----------------	--------

Includes stainless steel bail, nuts, and washers. Does not include chain. To be used with stainless steel immersion sensor only.

Ball Float Hardware

6131000	CPVC
----------------	------

Includes 1-1/2 inch by 7.5 ft. CPVC pipe, ball float assembly, and swivel/pivot/ pipe clamp assembly.

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Outside United States:	970-669-3050 tel	970-461-3939 fax	int@hach.com
hach.com			

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In the interest of improving and updating its equipment,

Hach Company reserves the right to alter specifications to equipment at any time.



Be Right™



CS-413-310 : Identification sheet

VWTC PROJECT NUMBER:	5000218009	REV:	1
PROJECT NAME:	AEM AMARUQ	SUBMITTED TO (COMPANY):	
ENGINEER:	Gabriel Hébert	SUBMITTED TO (RESPONSIBLE):	
PROJECT MANAGER:	Clément B	PROJECT NUM REFERENCE.:	
PHONE NUMBER:		LOT NUMBER:	

SUPPLIER	EQPT CODE	EQPT TAG NO	DIA	DESCRIPTION	INFO 1	INFO 2	INFO 3	APPLIC.	NOTE	REV
TECKNO VALVE	ST-413-359	PI2-011	4.5"	DIAPHRAGM PRESSURE GAUGE	PRESSURE GAUGE C/W ISOLATOR // MANUFACTURER : ASHCROFT // MODEL 45-1009SL-04L-60#-XAJ C/W SEAL 50-101SS-04T-XCG	N/A	N/A	ACTIFLO RECIRCULATION LINE MODIFICATION		rev1
TECKNO VALVE	ST-413-359	PI2-012	4.5"	DIAPHRAGM PRESSURE GAUGE	PRESSURE GAUGE C/W ISOLATOR // MANUFACTURER : ASHCROFT // MODEL 45-1009SL-04L-60#-XAJ C/W SEAL 50-101SS-04T-XCG	N/A	N/A	ACTIFLO RECIRCULATION LINE MODIFICATION		rev1
TECKNO VALVE	ST-413-359	PI2-021	4.5"	DIAPHRAGM PRESSURE GAUGE	PRESSURE GAUGE C/W ISOLATOR // MANUFACTURER : ASHCROFT // MODEL 45-1009SL-04L-60#-XAJ C/W SEAL 50-101SS-04T-XCG	N/A	N/A	ACTIFLO RECIRCULATION LINE MODIFICATION		rev1
TECKNO VALVE	ST-413-359	PI2-022	4.5"	DIAPHRAGM PRESSURE GAUGE	PRESSURE GAUGE C/W ISOLATOR // MANUFACTURER : ASHCROFT // MODEL 45-1009SL-04L-60#-XAJ C/W SEAL 50-101SS-04T-XCG	N/A	N/A	ACTIFLO RECIRCULATION LINE MODIFICATION		rev1

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Type 1009 4½" & 6" Stainless Steel Gauge



- 4½" and 6" SS gauges
- Dry and liquid-filled versions
- Micrometer adjustable pointer
- Variety of Bourdon tube materials
- ASME Grade 1A, ±1% of span accuracy
- New PLUS!™ Performance Option:
 - Liquid-filled performance in a dry gauge
 - Fights vibration and pulsations with out liquid-fill headaches
 - Order as option XLL

The 4½" and 6" Ashcroft® Type 1009 gauges are suitable where ambient corrosion is a major concern. Its attractive stainless steel case and ring provides excellent resistance to chemical, weather and corrosion attack. This 1009 has many optional features that allow a user to develop a basic or special product specification. The 1009 is part of the extensive line of Ashcroft stainless steel pressure gauges.

The gauge is available dry, liquid-filled weatherproof or hermetically sealed and now with **PLUS!™** Performance option.

TEMPERATURE LIMITS

	Ambient	Process	Storage
Dry	-20°F/200°F ⁽¹⁾ (-29°C/93°C)	-20°F/250°F ⁽¹⁾ (-29°C/121°C)	-40°F/250°F (-40°C/121°C)
PLUS!™	-40°F/150°F (-40°C/66°C)	-40°F/200°F (-40°C/93°C)	-40°F/150°F (-40°C/66°C)
LF (glycerin)	20°F/150°F (7°C/66°C)	20°F/150°F (7°C/93°C)	0°F/150°F (-18°C/66°C)
(silicone)	-40°F/150°F (-40°C/66°C)	-40°F/200°F (-40°C/93°C)	-40°F/150°F (-40°C/66°C)
(Halocarbon®)	-40°F/150°F (-40°C/66°C)	-40°F/200°F (-40°C/93°C)	-40°F/150°F (-40°C/66°C)

Note: Other than discoloration of the dial and hardening of the gasketing that may occur as ambient or process temperatures exceeds 150°F, non-liquid-filled gauges with standard glass windows, can withstand continuous operating temperatures up to 250°F (121°C). Liquid-filled gauges can withstand 200°F (93°C) but glycerin fill and acrylic window will tend to yellow. Accuracy at temperatures above or below the reference ambient temperature of 68°F will be affected by approximately .4% per 25°F. Gauges with welded joints will withstand 750°F (450°F (232°C) with silver brazed joints) for short times without rupture, although other parts of the gauge will be destroyed and calibration will be lost. For continuous use and for process or ambient temperatures above 250°F (121°C), a diaphragm seal or capillary or siphon is recommended.

PRODUCT SPECIFICATIONS

Model Number:	1009
Accuracy:	1% full scale (Grade A, ASME B40.100)
Ranges:	Vacuum – 30,000 psi
Dial Size:	4½" and 6" diameter
Case:	Open front
Case Material:	304 SS
Weather Protection:	Dry Case: IP54 Liquid filled or hermetically sealed case: IP 65
Ring Type:	304 SS, bayonet
Window:	Glass
Dial:	Aluminum, white background, black figures and graduations.
Pointer:	Micrometer adjustable
Movement:	400 SS (conventional)
Bourdon Tube and Socket:	Bronze/Brass (A) ⁽¹⁾ 316L SS/316L SS (S) ⁽²⁾ Monel®/Monel® (P) ⁽²⁾
Connection Size:	¼, ½ NPT

Connection Location: Lower and back

PRODUCT OPTIONS

PLUS! Performance:	XLL
Fill:	L-Glycerin-Standard XGV-Silicone-Optional XGX-Halocarbon®-Optional

Weatherproof	
Hermetic Seal:	XLJ
Panel Mount	
Front Flange:	XFF
Panel Mount	
U-Clamp:	XUC
Surface Mount:	XBF
Oxygen Clean:	X6B
Window	
Acrylic:	XPD
Shatterproof	
Glass:	XSG

⁽¹⁾ Joints silver brazed
⁽²⁾ Joints welded

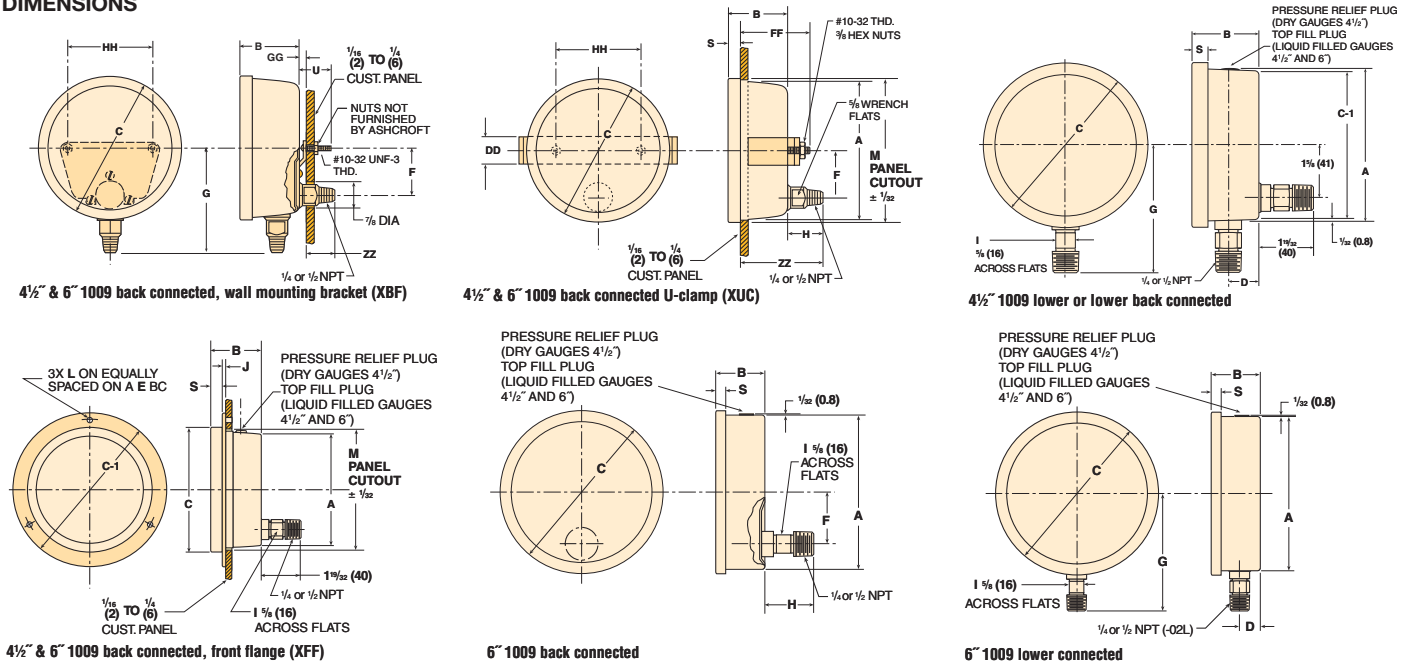
45/60 1009 GAUGE PRODUCT CODING

Typical Code:

45	1009	S	L	04	L	XSG	100#		
SIZE	TYPE NUMBER	SYSTEM (Tube & Socket)		CASE DESIGN	PROCESS CONN. SIZE	CONNECTION LOCATION	VARIATIONS	RANGE	ENGINEERING UNITS ⁽¹⁾
(45) 4½" (60) 6"	1009	Code Bourdon Tube (A) Phos Brz ⁽¹⁾ (S) AISI 316SS ⁽²⁾ (P) K Monel ⁽²⁾ (1) To 1000 psi (2) To 30,000 psi	Socket Brass AISI 316SS Monel 400	Code Description (L) Liquid Filled (glycerin std.)	Code NPT (02) ¼ Male ⁽¹⁾ (04) ½ Male ⁽¹⁾ (09) ¾-18 UNF-2B Aminco (standard for high pressure >20,000 psi (1) Max Pressure 20,000 psi	Code Description (L) Lower (B) Back (D) Side Conn. 3 o'clock (E) Side Conn. 9 o'clock (T) Top	(GV) Silicone Case Fill (GX) Halocarbon Case Fill (NH) SS Wired Tag (TS) Throttle Screw ⁽¹⁾ (GB) Oxygen Service (PD) Acrylic Window ⁽¹⁾ (SG) Safety Glass (LJ) Hermetically Sealed Liquid Fillable (IP65) (EP) Maximum Pointer, Adjustable (SH) Red Set Hand, Stationary (LL) PLUS!™ Performance (FF) Flush Mounting Ring (C4) Individual Calibration Chart (1) Standard with hermetically sealed or liquid filled gauge.	15 30 60 100 160 200 300 400 600 1000 1500 2000 3000 5000 6000 10,000 20,000 30,000	(#) PSI (BR) Bar (KG) Kilograms/ CMF (KP) Kilopascal (IMV) Inches of Mercury Vacuum <

Type 1009 4½" & 6" Stainless Steel Gauge

DIMENSIONS



Gauge Size	A	B	C	C-1	D	DD	E	F	FF	G	GG	H	HH	I	J	L	M	S	U	ZZ	Weight	
																					Dry	LF
4½ (100)	4 ²³ / ₃₂ (120)	2 ¹ / ₁₆ (52)	5 ³ / ₃₂ (129)	6 ¹ / ₄ (159)	1 ⁵ / ₁₆ (24)	1 (25)	5 ¹¹ / ₁₆ (144)	1 ⁵ / ₈ (41)	2 ⁵ / ₁₆ (59)	3 ¹⁵ / ₁₆ (100)	3 ¹ / ₁₆ (5)	1 ⁵ / ₈ (41)	3 (76)	5 ⁵ / ₈ (16)	5 ⁵ / ₃₂ (4)	7 ⁷ / ₃₂ (6)	4 ¹³ / ₁₆ (122)	1 ⁵ / ₃₂ (12)	1 ⁷ / ₁₆ (37)	3 ⁹ / ₃₂ (83)	1.75#	2.40#
6 (160)	6 ⁵ / ₁₆ (160)	2 (51)	6 ²¹ / ₃₂ (169)	7 ⁴¹ / ₆₄ (194)	2 ⁷ / ₃₂ (22)	1 (25)	7 ¹ / ₃₂ (179)	1 ⁵ / ₈ (41)	2 ⁵ / ₈ (67)	4 ¹³ / ₁₆ (122)	3 ¹ / ₁₆ (5)	1 ⁵ / ₈ (41)	4 ¹ / ₂ (114)	5 ⁵ / ₈ (16)	1 ¹ / ₁₆ (2)	1 ¹ / ₄ (7)	6 ⁷ / ₁₆ (163)	1 ¹³ / ₃₂ (10)	1 ⁷ / ₁₆ (37)	3 ³ / ₁₆ (81)	2.25#	4.12#
																					1kg	1.85k

Note: Dimensions in brackets () are millimeters.

Standard Ranges (Metric equivalents available)

Pressure – psi				
Range	Figure Interval		Minor Graduation	
0/15	1		0.2	
0/30	5		0.5	
0/60	5		0.5	
0/100	10		1	
0/160	20		2	
0/200	20		2	
0/300	50		5	
0/400	50		5	
0/600	50		10	
0/800	100		10	
0/1000	100		10	
0/1500	200		20	
0/2000	200		20	
0/3000	500		20	
0/5000	500		50	
0/6000	500		50	
0/10,000	1000		100	
0/20,000	2000		250	
0/30,000	5000		200	
Compound				
Range	Figure Interval		Minor Grads	
	in Hg	psi	in Hg	psi
30" Hg/15 psi	5	3	0.5	0.2
30" Hg/30 psi	10	5	1	0.5
30" Hg/60 psi	10	10	1	1
30" Hg/100 psi	10	10	2	1
30" Hg/150 psi	10	20	5	2
30" Hg/200 psi	30	20	5	2
30" Hg/300 psi	30	50	5	2
Vacuum				
Range	Figure Interval		Minor Grads	
30/0 in. Hg	5 in		0.2 in	
34/0 ft H ₂ O	5 ft		0.5 ft	

Type 100 Series Threaded Capsule Diaphragm Seal



TYPE 100 SHOWN

When isolation of the process from an instrument is required, Ashcroft® offers a comprehensive line of diaphragm seals. Seal types include threaded, flanged, in-line threaded, in-line flanged, in-line socket weld, in-line butt weld, saddle and sanitary seals. Also available is a complete offering of isolation or iso-rings and isolation or iso-spools.

APPLICATIONS

- Elevated process temperatures
- Corrosive service
- Isolation of the process for safety
- Suspended solids in the process
- Sanitary connections
- Minimize process dead leg
- Ease of cleaning between batches

FEATURES

- The top housing and diaphragm capsule are interchangeable with all Ashcroft bottom housings.
- A fill/bleed connection is standard, which permits filling the seal and instrument simultaneously after evacuation and allows the fill to flow into the completed unit.
- A Viton O-ring, compatible with all standard fill fluids, and a Teflon back-up ring provide a seal between the diaphragm capsule and the top housing.
- A thin Teflon PTFE gasket between the diaphragm and bottom housing ensures a leak-tight corrosion resistant seal even at high pressure.
- Top housing and pressure instrument are removable.
- Continuous-duty design will prevent loss of process fluid if pressure instrument is removed or fails.

SPECIFICATIONS

Model Number: Type 100, 101, 102, 103, 104, 105, 106, 107, 108

Process Connection Size: See Table A (Pg. 2)

Instrument Connection Size: 1/4, 1/2 NPT

Diaphragm Material: See Table B (Pg. 2)

Bottom Housing Materials: See Table C (Pg. 2)

Filling Fluid: Glycerin, Halocarbon, Silicone, Stylytherm

OPTIONS

316 stainless steel top housing

Stainless steel clamp rings and flanged ring – includes 300 stainless steel clamping bolts (1500 psi max)

300 series stainless steel clamping bolts (max pres is 1500 psi)

Pipe plugs for flushing connections – pipe plugs are available in the same materials as bottom housings per Table C (Pg. 2)

5000 psi pressure rating Threaded inlet and metal diaphragm only

Welded instrument to diaphragm seal

Dual flushing connections (1/2 NPT) (Limited to 2" thru 3" flanged seals)

Ring joint (Flanged seal only)

Flat face (Flanged seal only)

Clean for gaseous oxygen or strong oxidizing agent applications

Code

YT

SE

SB

PU

HP

DU

DB

RJ

FF

6B

Type 100 Series Threaded Capsule Diaphragm Seal

TYPE 100 SERIES THREADED CAPSULE SEAL TYPES

Type 100 –Threaded ¼, ½, ¾, 1 NPT



Type 101 –Threaded with flushing connection ¼, ½, ¾, 1 NPT



Type 102 – Raised Face Flanged ½, ¾, 1, 1½, 2, 3"



Type 103 – Raised Face Flanged ½, ¾, 1, 1½, 2, 3 with flushing connection



Type 104 – In-line Threaded ¼, ½, ¾, 1 NPT



Type 105 – Saddle 3, 4" pipe only



Type 106 – In-line Flanged ½, ¾, 1, 1½, 2, 3, 4, 6, 8"



Type 107 – In-line Socket Weld ½, ¾, 1, 1½, 2"



Type 108 – In-line Butt Weld ¼, ½, ¾, 1, 1½, 2"



Table A – Process Connection/Type Number

Process Connection	Process Connection Size/Code—Inches											Type Number
	Size	¼	½	¾	1	1½	2	3	4	6	8	
Threaded—female NPT	Code	25	50	75	10	15	20	30	40	60	80	
Threaded—female NPT		•	•	•	•	•						100
Threaded—female NPT (with flushing conn.)		•	•	•	•	•						101
Flanged ⁽¹⁾			•	•	•	•	•	•				102
Flanged (with flushing conn.)			•	•	•	•	•	•				103
In-line—threaded NPT		•	•	•	•							104
Saddle								•	AND LARGER			105
In-line—butt weld		•	•	•	•	•	•					108
In-line—flanged ⁽²⁾			•	•	•	•	•	•	•	•	•	106
In-line—socket weld		•	•	•	•	•	•	•				107

Pressure Ratings—All 2500 psi except flanged seals are per ASME B 16.5, temperature limit determined by diaphragm, bottom housing and/or filling fluid.

Table B – Diaphragm Material

Material	Code
316L stainless steel	S
304L stainless steel	C
Monel 400	P
Nickel	N
Carpenter 20	D
Tantalum	U
Hastelloy B	G
Hastelloy C 22 ⁽³⁾	J
Hastelloy C 276 ⁽³⁾	H
Halar Coated Monel	R
Gold Plated 304 SS	W

Table C – Housing Materials

Bottom	Code
Steel	B
304L SS	C
316L SS	S
Hastelloy B	G
Hastelloy C 22 ⁽³⁾	J
Hastelloy C 276 ⁽³⁾	H
Carpenter 20	D
Monel "400"	M
Inconel "600"	W
Nickel	N
PVC ⁽⁴⁾⁽⁹⁾	V
Tantalum clad SS ⁽⁵⁾	SU
Halar coated SS ⁽⁶⁾	BH
Teflon flanged steel ⁽⁷⁾	T
Kynar ⁽⁸⁾⁽⁹⁾	KY
Titanium	TI

Table D – Instrument Connection

Size – NPT	Code
¼	02T
½	04T

Table E – Filling Fluid

Filling	Service	Connection to Instrument	Temperature Range °F	Code
Glycerin	Pressure	Direct Only	0/400	CG
Silicone	Pressure/Vacuum	Direct or Flexible Line	–40/500	CK, DJ
Halocarbon	Pressure/Vacuum in presence of strong oxidizing agent	Direct or Flexible Line	–70/300	CF
Syltherm	Pressure/Vacuum	Direct or Flexible Line	–40/750	HA

Notes:

- (1) 150, 300, 600, 900, 1500 & 2500 class flanges.
- (2) 1" 150 thru 8" 300 class flanges only.
- (3) Use on applications where NACE standard MR-01-75/ISO 1516 w/Sept. 2005 corrigendums.
- (4) Maximum Press./Temp.
Threaded: 200 psi/74°F, 125 psi/125°F, 80 psi/150°F.
Flanged: 75 psi/100°F.
- (5) Type 102 only.

- (6) Type 102 only – Temp. Limits: –40/300°F.
- (7) Only available in 1", 1½", & 2" 150 class, Types 102.
Max. Press./Temp. – 270 psi and 150°F. Consult factory for conditions beyond these limits.
- (8) Maximum Pressure/Temp.: 200 psi and 180°F.
- (9) Type 100: ¼ or ½ NPT only. Larger sizes offered with solvent weld joint. N/A in 101 or 103 design.

Monel is a registered trademark of Huntington Alloys, Inc.
Hastelloy is a registered trademark of Cabot Corp.
Halocarbon is a registered trademark of Halocarbon Products
GYLON 3510 is a registered trademark of Garlock Inc.

HOW TO ORDER:

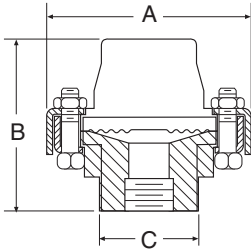
- From Table A...select TYPE NUMBER based on process connection, process connection size and diaphragm type/construction. (e.g., Threaded/1"/capsule-code-10-100)
 - From Table B...select DIAPHRAGM MATERIAL. (e.g., 316L stainless steel-code S)
 - From Table C...select BOTTOM HOUSING MATERIAL. (e.g., 316 stainless steel-code S)
 - From Table D...select INSTRUMENT CONNECTION size. (e.g., ¼ NPT-code 02T)
 - From Table E...select FILLING FLUID, if diaphragm seal will be attached to instrument. (e.g., Glycerin-code CG)
- Typical code: 10-100SS-02T-CG

Type 100 Series Threaded Capsule Diaphragm Seal

DIMENSIONS

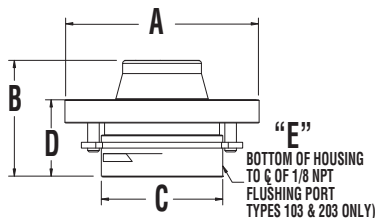
Type 100 – Threaded

¼, ½, ¾, 1 NPT



A		B		C	
in	mm	in	mm	in	mm
¾	(95)	2 7/8	(73)	1 13/16	(46)

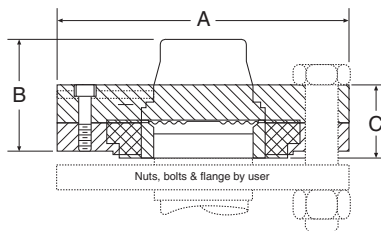
Type 102 – Flanged 1" (raised face only)
 one piece bottom housing, with and without
 flushing connection



Flange Size	Rating #	in.	A mm	in.	B mm	in.	C mm
1	150 300 or 600	4-1/4 5	(100) (127)	2-9/16	(65)	1-23/32	(69)

Flange		D		103 & 203 only E	
Size	Rating #	in.	mm	in.	mm
1	150 300 or 600	1-5/8	(41)	3/8	(9)

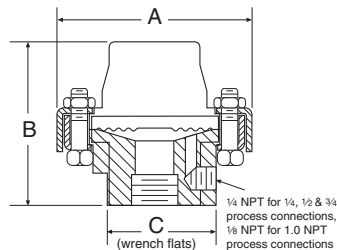
Type 102 – Flanged 1" (raised face only)
 two piece bottom housing, 1½, 2, - PVC, Teflon
 and Kynar



Flange Size	Rating #	in	A mm	in	B mm	in	C mm
1½"	150	5	(127)	2 5/8	(59)	1 13/32	(39)
2"	150	6	(152)	2 5/8	(54)	1 9/16	(40)

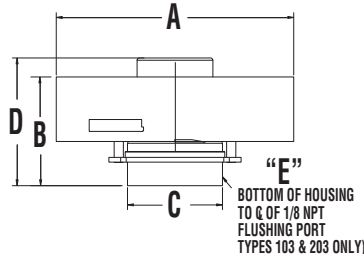
Type 101 – Threaded

¼, ½, ¾, 1 NPT (with flushing connection)



A		B		C	
in	mm	in	mm	in	mm
¾	(95)	2 7/8	(73)	1 13/16	(46)

Type 102 – Flanged 1" (raised face only)
 one piece bottom housing, with and without
 flushing connection

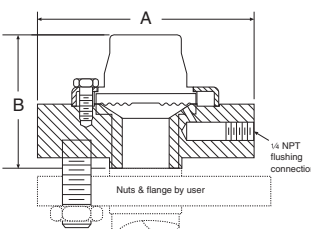


Flange Size	Rating #	in.	A mm	in.	B mm	in.	C mm
1	900 or 1500 2500	5-7/8 6-1/4	(149) (159)	2-7/8	(73)	2-1/4	(57)

Flange		103 & 203 only			
Size	Rating #	D		E	
		in.	mm	in.	mm
1	900 or 1500 2500	3-3/8	(86)	3/8	(9)

Type 103 – Flanged

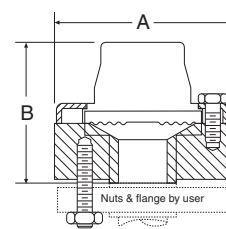
½, ¾" (with flushing connection)



Flange Size	Rating #	in	A mm	in	B mm
150		3 1/2	(89)	2 15/16	(75)
½"	300 or 600	3 3/4	(95)	3	(76)
900 or 1500		4 3/4	(121)	3 3/8	(81)
150		3 7/8	(98)	2 13/16	(71)
¾"	300 or 600	4 1/2	(117)	3	(76)

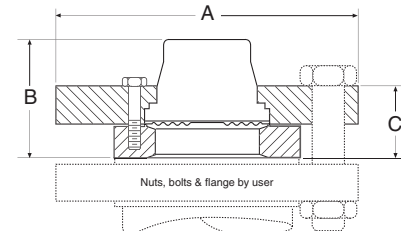
Type 102 – Flanged

½, ¾"



Flange Size	Rating #	in	A mm	in	B mm
150		3 1/2	(89)	2 15/16	(75)
½"	300 or 600	3 3/4	(95)	3	(76)
900 or 1500		4 3/4	(121)	3 3/8	(81)
150		3 7/8	(98)	2 13/16	(71)
¾"	300 or 600	4 1/2	(117)	3	(76)
900 or 1500		5 1/2	(130)	3 3/8	(81)

Type 102 – Flanged (raised face only)
 1½, 2, 3" one piece bottom housing -
 all materials except PVC, Teflon and Kynar

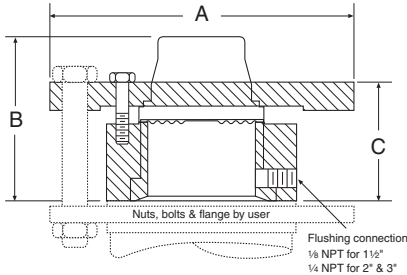


Flange Size	Rating #	in	A mm	in	B mm	in	C mm
150		5	(127)			1 1/2	(38)
1½"	300 or 600	6 1/4	(159)	2 3/8	(61)	1 1/2	(38)
900 or 1500		7	(178)			1 1/2	(38)
150		6	(152)			1 3/8	(35)
2"	300 or 600	6 1/2	(165)	1 15/16	(49)	1 1/2	(38)
900 or 1500		8 1/2	(216)			2 1/8	(54)
150		7 1/2	(191)	2	(51)	1 5/8	(41)
3"	300 or 600	8 1/4	(206)	2 1/8	(52)	1 7/8	(47)
900 or 1500		10 1/2	(267)	2 11/16	(68)	3 1/4	(82)

Type 100 Series Threaded Capsule Diaphragm Seal

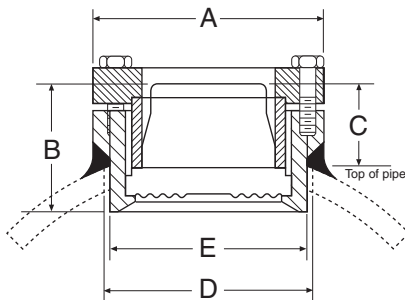
DIMENSIONS

Type 103 – Flanged 1½", 2", 3" (raised face only)
 one piece bottom housing with flushing connection



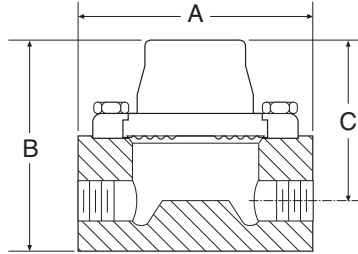
Flange Size	Rating #	A in mm	B in mm	C in mm
150		5 (127)		
1½"	300 or 600	6¼ (159)	3 (76)	2½ (64)
	900 or 1500	7 (178)		
2"	300 or 600	6 (152)	3½ (89)	2¾ (71)
	900 or 1500	8½ (215)		
3"	150	7½ (191)	3¾ (95)	2⅞ (73)
	300 or 600	8¼ (210)	3⅞ (98)	2⅞ (73)
	900	9½ (241)		
	1500	10½ (267)	3⅞ (98)	2¾ (70)

Type 105 – Saddle
 4" Pipe only



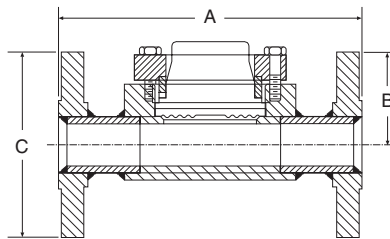
A in mm	B in mm	C in mm	D in mm	E in mm
3½ (89)	1½ (38)	1¾ (41)	3 (76)	2¾ (71)

Type 104 – In-Line Threaded
 ¼, ½, ¾, 1 NPT



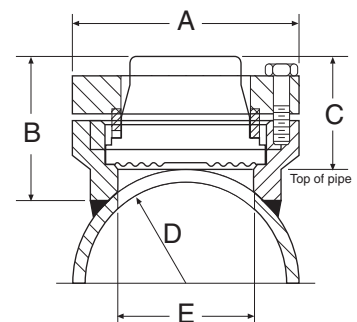
Process Connection	A in mm	B in mm	C in mm
¼ NPT		2½ (64)	2½ (64)
½ NPT	4 (102)	3¾ (95)	2¾ (71)
¾ NPT		3¾ (95)	3 (76)
1 NPT		3¾ (95)	3 (76)

Type 106 – In-Line Flanged
 ½", 1", 1½", 2", 3"



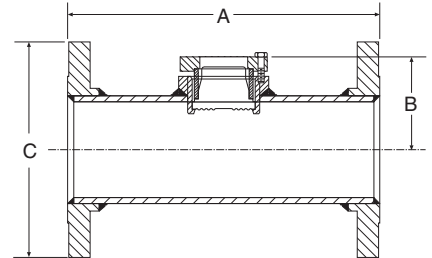
Flange Size	Rating #	A in mm	B in mm	C in mm
150	7 (178)		2⅞ (73)	3½ (89)
300	7 (178)		3¾ (95)	3¾ (95)
1"	150	7 (178)	2⅞ (73)	4¼ (108)
	300	8 (203)	4¾ (120)	4¾ (120)
1½"	150	8 (203)	2⅞ (73)	5 (127)
	300	9 (229)	2⅞ (73)	6 (152)
2"	150	9 (229)	2⅞ (73)	6 (152)
	300	10 (254)	3¾ (95)	6½ (165)
3"	150	11 (279)	3¾ (95)	7½ (191)
	300	12 (305)	3¾ (95)	8¼ (210)

Type 105 – Saddle
 3" Pipe only



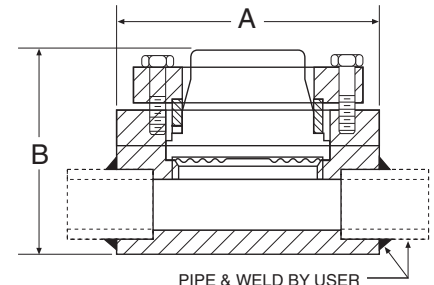
A in mm	B in mm	C in mm	D in mm	E in mm
3½ (89)	2¼ (57)	1¾ (41)	1¾ (41)	2½ (64)

Type 106 – In-Line Flanged
 4", 6", 8"



Flange Size	Rating #	A in mm	B in mm	C in mm
150	13 (330)		3¾ (95)	9 (229)
300	14 (356)		4 (102)	10 (254)
150	16 (406)		4⅞ (124)	11 (279)
300	17 (432)		5 (127)	12½ (318)
8"	150	16 (406)	5⅞ (148)	13½ (343)

Type 107 – In-Line Welded
 ¼", ½", ¾", 1", 1½", 2"



Pipe Size	A in mm	B in mm
¼"		2⅞ (73)
½"		2⅞ (73)
¾"		2⅞ (73)
1"	4 (102)	2⅞ (73)
1½"		2⅞ (73)
2"		2⅞ (73)



OPERATION AND MAINTENANCE MANUAL
AMARUQ WTP – NUNAVUT
VEOLIA PROJECT: 5000 218 009

4 – DETAILED TECHNICAL DOCUMENTATION

4.3 – SHOP DRAWINGS

4.3.12 – RAW WATER

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Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0012_RW

by: BB

chkd: GP

appvd: CB



SUBMITTAL PACKAGE

RAW WATER

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Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0012_RW

by: BB

chkd: GP

appvd: CB



RAW WATER INSTRUMENTS

OIM manual section: 4.3.12.1

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CS-404-500 : Identification sheet



VWTC PROJECT NUMBER:	5000218009	REV: 1
PROJECT NAME:	AEM AMARUQ	
ENGINEER:	Gabriel Hébert	
PROJECT MANAGER:	Clément B	
PHONE NUMBER:		
SUBMITTED TO (COMPANY):	AGNICO EAGLE MINES	
SUBMITTED TO (RESPONSIBLE):		
PROJECT NUM REFERENCE.:		
LOT NUMBER:		

SUPPLIER	EQPT CODE	EQPT TAG NO	DIA	DESCRIPTION	INFO 1	INFO 2	INFO 3	APPLIC.	NOTE	REV
E&H	ST-404-566	FIT1-011	24"	FLOWMETER	Electromagnetic flowmeter// Manuf: E&H // Model : 50W6H- ULGA1RC2BAAW+1// DN600 (24")// Liner: Polyurethane Process Connection: Cl.150, A105, flange ANSI B16.5 Electrodes: 1.4435/316L, bullet nose Calibration: 0.5% Additional Test, certificate: w/o	Housing: Wall Alu, IP67 NEMA4X Cable, Remote Version: 10m/30ft coil + signal cable Cable Entry: Thread NPT 1/2 Power Supply; Display: A 85-260VAC, WEA, 2- line + pushbuttons,	Adjustment; Software Feature: A Factory setup; basic version Output, Input: W 4-20mA SIL HART Marking: 1 Tagging (TAG), see additional spec.	RAW WATER		rev1

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Level



Pressure



Flow



Temperature

Liquid
Analysis

Registration

Systems
Components

Services



Solutions

Technical Information

Proline Promag 50W, 53W

Electromagnetic Flow Measuring System

Flow measurement of liquids in water or wastewater applications



Application

Electromagnetic flowmeter for bidirectional measurement of liquids with a minimum conductivity of $\geq 5 \mu\text{S}/\text{cm}$:

- Drinking water
- Wastewater
- Sewage sludge
- Flow measurement up to 110000 m³/h (484315 gal/min)
- Fluid temperature up to +80 °C (+176 °F)
- Process pressures up to 40 bar (580 psi)
- Lengths in accordance with DVGW/ISO

Application-specific lining of the measuring pipe from polyurethane or hard rubber with the following drinking water permissions:

- KTW
- WRAS
- NSF
- ACS

Approvals for hazardous area:

- ATEX
- IECEx
- FM

- CSA
- NEPSI

Connection to process control system:

- HART
- PROFIBUS DP/PA
- FOUNDATION Fieldbus
- MODBUS RS485

Your benefits

Promag measuring devices offer you cost-effective flow measurement with a high degree of accuracy for a wide range of process conditions.

The uniform Proline transmitter concept comprises:

- Modular device and operating concept resulting in a higher degree of efficiency
- Software options for batching, electrode cleaning and for measuring pulsating flow
- High degree of reliability and measuring stability
- Uniform operating concept

The tried-and-tested Promag sensors offer:

- No pressure loss
- Not sensitive to vibrations
- Simple installation and commissioning

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Function and system design

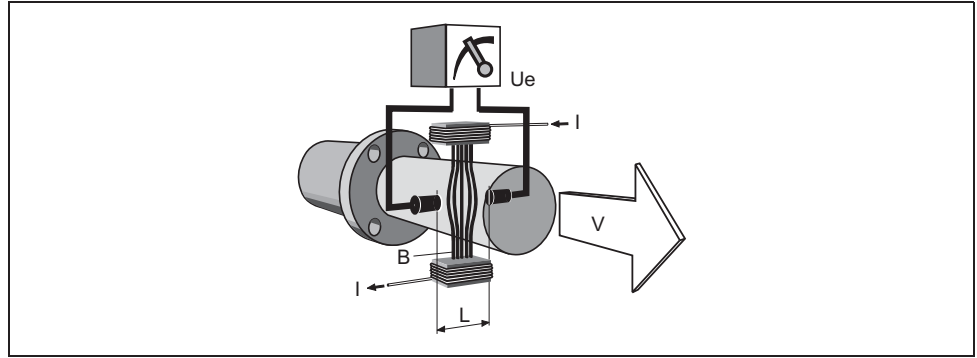
Measuring principle

Following Faraday's law of magnetic induction, a voltage is induced in a conductor moving through a magnetic field.

In the electromagnetic measuring principle, the flowing medium is the moving conductor.

The voltage induced is proportional to the flow velocity and is supplied to the amplifier by means of two measuring electrodes. The flow volume is calculated by means of the pipe cross-sectional area.

The DC magnetic field is created through a switched direct current of alternating polarity.



$$U_e = B \cdot L \cdot v$$

$$Q = A \cdot v$$

U_e	Induced voltage
B	Magnetic induction (magnetic field)
L	Electrode spacing
v	Flow velocity
Q	Volume flow
A	Pipe cross-section
I	Current strength

Measuring system

The measuring system consists of a transmitter and a sensor.

Two versions are available:

- Compact version: Transmitter and sensor form a mechanical unit.
- Remote version: Sensor is mounted separate from the transmitter.

Transmitter:

- Promag 50 (user interface with push buttons for operation, two-line display, illuminated)
- Promag 53 ("Touch Control" without opening the housing, four-line display, unilluminated)

Sensor:

- Promag W (DN 25 to 2000 / 1 to 78")

Input

Measured variable	Flow velocity (proportional to induced voltage)
Measuring ranges	Measuring ranges for liquids Typically $v = 0.01$ to 10 m/s (0.03 to 33 ft/s) with the specified accuracy
Operable flow range	Over $1000 : 1$
Input signal	Status input (auxiliary input) ■ $U = 3$ to 30 V DC, $R_i = 5$ kΩ, galvanically isolated ■ Configurable for: totalizer(s) reset, measured value suppression, error-message reset Status input (auxiliary input) with PROFIBUS DP and MODBUS RS485 ■ $U = 3$ to 30 V DC, $R_i = 3$ kΩ, galvanically isolated ■ Switching level: 3 to 30 V DC, independent of polarity ■ Configurable for: totalizer(s) reset, measured value suppression, error-message reset, batching start/stop (optional), batch totalizer reset (optional) Current input (only Promag 53) ■ active/passive selectable, galvanically isolated, full scale value selectable, resolution: 3 μA, temperature coefficient: typ. 0.005% o.r./$^{\circ}$C (o.r. = of reading) ■ active: 4 to 20 mA, $R_i \leq 150$ Ω, max. 24 V DC, short-circuit-proof ■ passive: $0/4$ to 20 mA, $R_i < 150$ Ω, max. 30 V DC

Output

Output signal	Promag 50 Current output active/passive selectable, galvanically isolated, time constant selectable (0.01 to 100 s), full scale value selectable, temperature coefficient: typ. 0.005% o.r./$^{\circ}$C (o.r. = of reading), resolution: 0.5 μA ■ active: $0/4$ to 20 mA, $R_L < 700$ Ω (HART: $R_L \geq 250$ Ω) ■ passive: 4 to 20 mA, operating voltage V_S: 18 to 30 V DC, $R_i \geq 150$ Ω Pulse/frequency output passive, open collector, 30 V DC, 250 mA, galvanically isolated ■ Frequency output: full scale frequency 2 to 1000 Hz ($f_{\max} = 1250$ Hz), on/off ratio $1:1$, pulse width max. 10 s ■ Pulse output: pulse value and pulse polarity selectable, max. pulse width configurable (0.5 to 2000 ms) PROFIBUS DP interface ■ Transmission technology (Physical Layer): RS485 in accordance with ANSI/TIA/EIA-485-A: 1998, galvanically isolated ■ Profi version 3.0 ■ Data transmission rate: $9,6$ kBaud to 12 MBaud ■ Automatic data transmission rate recognition ■ Function blocks: $1 \times$ analog Input, $1 \times$ totalizer ■ Output data: volume flow, totalizer ■ Input data: positive zero return (ON/OFF), totalizer control, value for local display ■ Cyclic data transmission compatible with previous model Promag 33 ■ Bus address adjustable via miniature switches or local display (optional) at the measuring device PROFIBUS PA interface ■ Transmission technology (Physical Layer): IEC 61158-2 (MBP), galvanically isolated ■ Profi version 3.0 ■ Current consumption: 11 mA ■ Permissible supply voltage: 9 to 32 V ■ Bus connection with integrated reverse polarity protection ■ Error current FDE (Fault Disconnection Electronic): 0 mA ■ Function blocks: $1 \times$ analog input, $2 \times$ totalizer ■ Output data: volume flow, totalizer ■ Input data: positive zero return (ON/OFF), control totalizer, value for local display ■ Cyclic data transmission compatible with previous model Promag 33 ■ Bus address adjustable via miniature switches or local display (optional) at the measuring device
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Promag 53

Current output

active/passive selectable, galvanically isolated, time constant selectable (0.01 to 100 s), full scale value selectable, temperature coefficient: typ. 0.005% o.r./°C (o.r. = of reading), resolution: 0.5 μ A

- active: 0/4 to 20 mA, $R_L < 700 \Omega$ (HART: $R_L \geq 250 \Omega$)
- passive: 4 to 20 mA, operating voltage V_S : 18 to 30 V DC, $R_i \geq 150 \Omega$

Pulse/frequency output

active/passive selectable, galvanically isolated (Ex i version: only passive)

- active: 24 V DC, 25 mA (max. 250 mA during 20 ms), $R_L > 100 \Omega$
- passive: open collector, 30 V DC, 250 mA
- Frequency output: full scale frequency 2 to 10000 Hz ($f_{max} = 12500$ Hz), EEx-ia: 2 to 5000 Hz; on/off ratio 1:1, pulse width max. 10 s
- Pulse output: pulse value and pulse polarity selectable, max. pulse width configurable (0.05 to 2000 ms)

PROFIBUS DP interface

- Transmission technology (Physical Layer): RS485 in accordance with ANSI/TIA/EIA-485-A: 1998, galvanically isolated
- Profi version 3.0
- Data transmission rate: 9,6 kBaud to 12 MBaud
- Automatic data transmission rate recognition
- Function blocks: 2 $\times$ analog Input, 3 $\times$ totalizer
- Output data: volume flow, calculated mass flow, totalizer 1 to 3
- Input data: positive zero return (ON/OFF), totalizer control, value for local display
- Cyclic data transmission compatible with previous model Promag 33
- Bus address adjustable via miniature switches or local display (optional) at the measuring device
- Available output combination $\rightarrow$ 8

PROFIBUS PA interface

- Transmission technology (Physical Layer): IEC 61158-2 (MBP), galvanically isolated
- Profi version 3.0
- Current consumption: 11 mA
- Permissible supply voltage: 9 to 32 V
- Bus connection with integrated reverse polarity protection
- Error current FDE (Fault Disconnection Electronic): 0 mA
- Function blocks: 2 $\times$ analog input, 3 $\times$ totalizer
- Output data: volume flow, calculated mass flow, totalizer 1 to 3
- Input data: positive zero return (ON/OFF), totalizer control, value for local display
- Cyclic data transmission compatible with previous model Promag 33
- Bus address adjustable via miniature switches or local display (optional) at the measuring device

MODBUS RS485 interface

- Transmission technology (Physical Layer): RS485 in accordance with ANSI/TIA/EIA-485-A: 1998, galvanically isolated
- MODBUS device type: Slave
- Address range: 1 to 247
- Bus address adjustable via miniature switches or local display (optional) at the measuring device
- Supported MODBUS function codes: 03, 04, 06, 08, 16, 23
- Broadcast: supported with the function codes 06, 16, 23
- Übertragungsmodus: RTU oder ASCII
- Supported baudrate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Baud
- Response time:
 - Direct data access = typically 25 to 50 ms
 - Auto-scan buffer (data range) = typically 3 to 5 ms
- Available output combination $\rightarrow$ 8

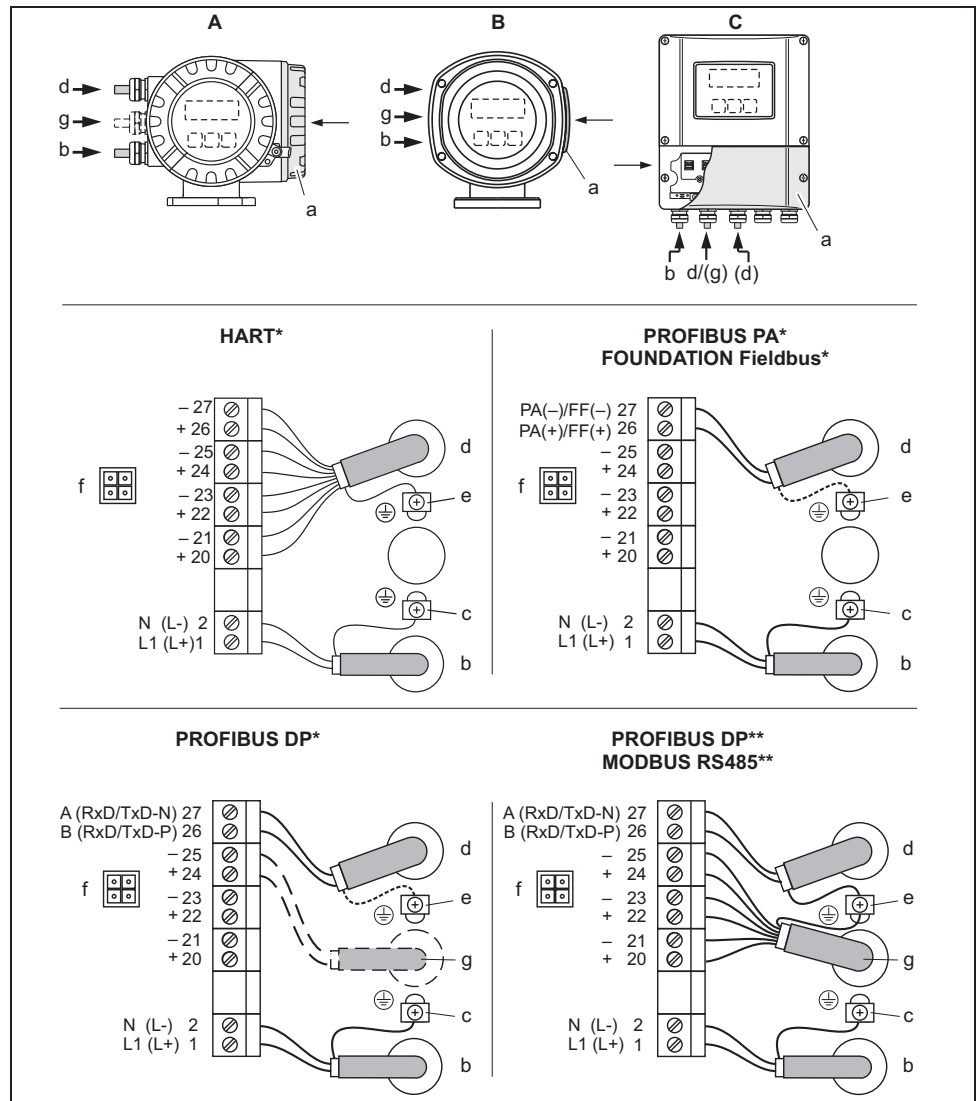
FOUNDATION Fieldbus interface

- FOUNDATION Fieldbus H1
- Transmission technology (Physical Layer): IEC 61158-2 (MBP), galvanically isolated
- ITK version 5.01
- Current consumption: 12 mA
- Error current FDE (Fault Disconnection Electronic): 0 mA
- Bus connection with integrated reverse polarity protection
- Function blocks:
 - 5 × Analog Input (execution time: 18 ms each)
 - 1 × PID (25 ms)
 - 1 × Digital Output (18 ms)
 - 1 × Signal Characterizer (20 ms)
 - 1 × Input Selector (20 ms)
 - 1 × Arithmetic (20 ms)
 - 1 × Integrator (18 ms)
- Output data: volume flow, calculated mass flow, temperature, totalizer 1 to 3
- Input data: positive zero return (ON/OFF), reset totalizer
- Link Master (LM) functionality is supported

Signal on alarm	■ Current output → failure response selectable (e.g. in accordance with NAMUR recommendation NE 43) ■ Pulse/frequency output → failure response selectable ■ Status output (Promag 50) → non-conductive by fault or power supply failure ■ Relay output (Promag 53) → de-energized by fault or power supply failure
Load	see "Output signal"
Low flow cutoff	Switch points for low flow cutoff are selectable.
Galvanic isolation	All circuits for inputs, outputs and power supply are galvanically isolated from each other.
Switching output	Status output (Promag 50, Promag 53) Open collector, max. 30 V DC / 250 mA, galvanically isolated. Configurable for: error messages, Empty Pipe Detection (EPD), flow direction, limit values. Relay outputs (Promag 53) Normally closed (NC or break) or normally open (NO or make) contacts available (default: relay 1 = NO, relay 2 = NC), max. 30 V / 0,5 A AC ; 60 V / 0,1 A DC, galvanically isolated. Configurable for: error messages, Empty Pipe Detection (EPD), flow direction, limit values, batching contacts.

Power supply

Electrical connection,
measuring unit



Connecting the transmitter, cable cross-section max. 2.5 mm² (14 AWG)

- A View A (field housing)
- B View B (stainless steel field housing)
- C View C (wall-mount housing)

*) fixed communication boards

**) flexible communication boards

a Connection compartment cover

b Cable for power supply: 85 to 260 V AC / 20 to 55 V AC / 16 to 62 V DC

- Terminal No. 1: L1 for AC, L+ for DC

- Terminal No. 2: N for AC, L- for DC

c Ground terminal for protective conductor

d Signal cable: see "Electrical connection, terminal assignment" → 8

Fieldbus cable:

- Terminal No. 26: DP (B) / PA + / FF + / MODBUS RS485 (B) / (PA, FF: with polarity protection)

- Terminal No. 27: DP (A) / PA - / FF - / MODBUS RS485 (A) / (PA, FF: with polarity protection)

e Ground terminal for signal cable shield / Fieldbus cable / RS485 line

f Service adapter for connecting service interface FXA193 (Fieldcheck, FieldCare)

g Signal cable: see "Electrical connection, terminal assignment" → 8

Cable for external termination (only for PROFIBUS DP with fixed assignment communication board):

- Terminal No. 24: +5 V

- Terminal No. 25: DGND

**Electrical connection,
terminal assignment****Terminal assignment, Promag 50**

Order variant	Terminal No. (inputs/outputs)			
	20 (+) / 21 (-)	22 (+) / 23 (-)	24 (+) / 25 (-)	26 (+) / 27 (-)
50***_*****W	—	—	—	Current output HART
50***_*****A	—	—	Frequency output	Current output HART
50***_*****D	Status input	Status output	Frequency output	Current output HART
50***_*****H	—	—	—	PROFIBUS PA
50***_*****J	—	—	+5 V (external termination)	PROFIBUS DP
50***_*****S	—	—	Frequency output, Ex i, passive	Current output, Ex i, passive, HART
50***_*****T	—	—	Frequency output, Ex i, passive	Current output, Ex i, passive, HART

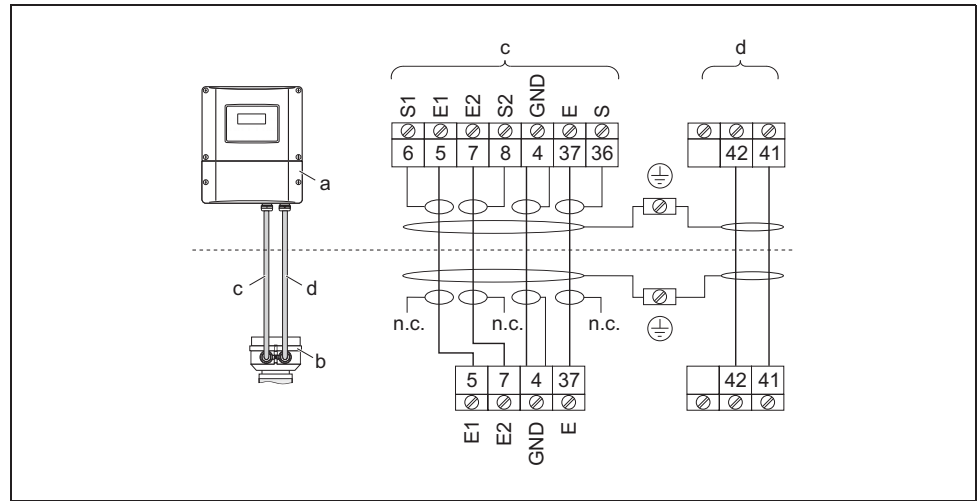
Ground terminal → 7

Terminal assignment, Promag 53

The inputs and outputs on the communication board can be either permanently assigned or variable, depending on the version ordered (see table). Replacements for modules which are defective or which have to be replaced can be ordered as accessories.

Order variant	Terminal No. (inputs/outputs)			
	20 (+) / 21 (-)	22 (+) / 23 (-)	24 (+) / 25 (-)	26 (+) / 27 (-)
Fixed communication boards (fixed assignment)				
53***_*****A	—	—	Frequency output	Current output HART
53***_*****B	Relay output 2	Relay output 1	Frequency output	Current output HART
53***_*****F	—	—	—	PROFIBUS PA, Ex i
53***_*****G	—	—	—	FOUNDATION Fieldbus, Ex i
53***_*****H	—	—	—	PROFIBUS PA
53***_*****J	—	—	—	PROFIBUS DP
53***_*****K	—	—	—	FOUNDATION Fieldbus
53***_*****Q	—	—	Status input	MODBUS RS485
53***_*****S	—	—	Frequency output, Ex i	Current output, Ex i, passive, HART
53***_*****T	—	—	Frequency output, Ex i	Current output, Ex i, passive, HART
Flexible communication boards				
53***_*****C	Relay output 2	Relay output 1	Frequency output	Current output HART
53***_*****D	Status input	Relay output	Frequency output	Current output HART
53***_*****L	Status input	Relay output 2	Relay output 1	Current output HART
53***_*****M	Status input	Frequency output	Frequency output	Current output HART
53***_*****N	Current output	Frequency output	Status input	MODBUS RS485
53***_*****P	Current output	Frequency output	Status input	PROFIBUS DP
53***_*****V	Relay output 2	Relay output 1	Status input	PROFIBUS DP
53***_*****2	Relay output	Current output	Frequency output	Current output HART
53***_*****4	Current input	Relay output	Frequency output	Current output HART
53***_*****7	Relay output 2	Relay output 1	Status input	MODBUS RS485

Ground terminal → 7

**Electrical connection,
remote version**

A00117ZZ

Connecting the remote version

- a Wall-mount housing connection compartment
- b Sensor connection housing cover
- c Signal cable
- d Coil current cable

n.c. Not connected, insulated cable shields

Terminal no. and cable colors: 6/5 = brown; 7/8 = white; 4 = green; 36/37 = yellow

Supply voltage (power supply)

- 85 to 260 V AC, 45 to 65 Hz
- 20 to 55 V AC, 45 to 65 Hz
- 16 to 62 V DC

PROFIBUS PA and FOUNDATION Fieldbus

- Non-Ex: 9 to 32 V DC
- Ex i: 9 to 24 V DC
- Ex d: 9 to 32 V DC

Cable entry**Power supply and signal cables (inputs/ outputs):**

- Cable entry M20 × 1.5 (8 to 12 mm / 0.31 to 0.47")
- Sensor cable entry for armoured cables M20 × 1.5 (9.5 to 16 mm / 0.37 to 0.63")
- Thread for cable entries, ½" NPT, G ½"

Connecting cable for remote version:

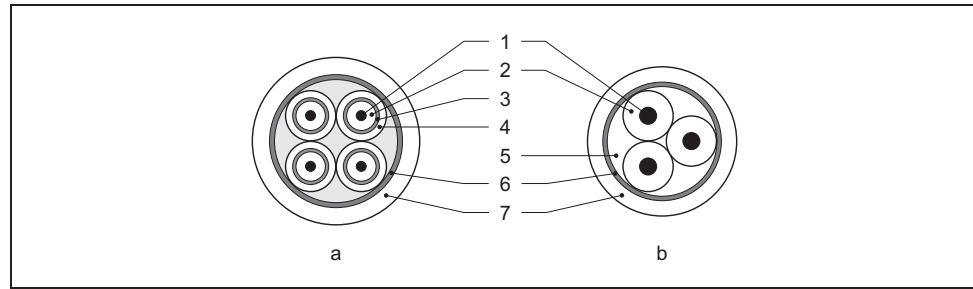
- Cable entry M20 × 1.5 (8 to 12 mm / 0.31 to 0.47")
- Sensor cable entry for armoured cables M20 × 1.5 (9.5 to 16 mm / 0.37 to 0.63")
- Thread for cable entries, ½" NPT, G ½"

**Remote version cable
specifications****Coil cable**

- 2 × 0.75 mm² (18 AWG) PVC cable with common, braided copper shield (Ø ~ 7 mm / 0.28")
- Conductor resistance: ≤ 37 Ω/km (≤ 0.011 Ω/ft)
- Capacitance core/core, shield grounded: ≤ 120 pF/m (≤ 37 pF/ft)
- Operating temperature: -20 to +80 °C (-68 to +176 °F)
- Cable cross-section: max. 2.5 mm² (14 AWG)
- Test voltage for cable insulation: ≤ 1433 AC r.m.s. 50/60 Hz or ≥ 2026 V DC

Signal cable

- 3 × 0.38 mm² (20 AWG) PVC cable with common, braided copper shield (Ø ~ 7 mm / 0.28") and individual shielded cores
- With empty pipe detection (EPD): 4 × 0.38 mm² (20 AWG) PVC cable with common, braided copper shield (Ø ~ 7 mm / 0.28") and individual shielded cores
- Conductor resistance: ≤ 50 Ω/km (≤ 0.015 Ω/ft)
- Capacitance core/shield: ≤ 420 pF/m (≤ 128 pF/ft)
- Operating temperature: -20 to +80 °C (-68 to +176 °F)
- Cable cross-section: max. 2.5 mm² (14 AWG)



A0003194

- a Signal cable
 b Coil current cable
- 1 Core
 2 Core insulation
 3 Core shield
 4 Core jacket
 5 Core reinforcement
 6 Cable shield
 7 Outer jacket

Operation in zones of severe electrical interference

The measuring device complies with the general safety requirements in accordance with EN 61010 and the EMC requirements of IEC/EN 61326 and NAMUR recommendation NE 21.



Caution!

Grounding is by means of the ground terminals provided for the purpose inside the connection housing. Ensure that the stripped and twisted lengths of cable shield to the ground terminal are as short as possible.

Power consumption

- AC: < 15 VA (incl. sensor)
- DC: < 15 W (incl. sensor)

Switch-on current:

- Max. 3 A (< 5 ms) for 260 V AC
- Max. 13.5 A (< 50 ms) for 24 V DC

Power supply failure

Lasting min. ½ cycle frequency: EEPROM saves measuring system data

- EEPROM or T-DAT (Promag 53 only) retain the measuring system data in the event of a power supply failure
- S-DAT: exchangeable data storage chip which stores the data of the sensor (nominal diameter, serial number, calibration factor, zero point etc.)

Potential equalization



Warning!

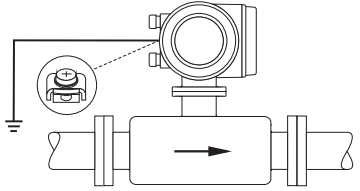
The measuring system must be included in the potential equalization.

Perfect measurement is only ensured when the fluid and the sensor have the same electrical potential. This is ensured by the reference electrode integrated in the sensor as standard.

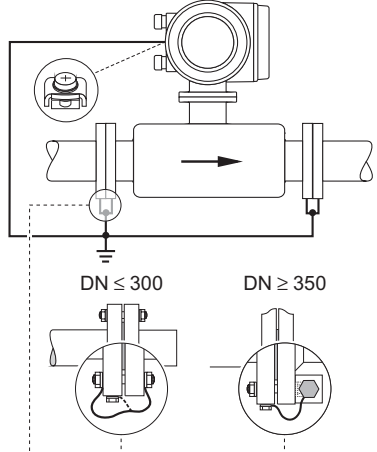
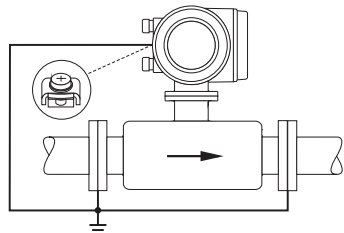
The following should also be taken into consideration for potential equalization:

- Internal grounding concepts in the company
- Operating conditions, such as the material/ grounding of the pipes (see table)

Standard situation

Operating conditions	Potential equalization
When using the measuring device in a: ■ Metal, grounded pipe Potential equalization takes place via the ground terminal of the transmitter.  Note! When installing in metal pipes, we recommend you connect the ground terminal of the transmitter housing with the piping.	 A0011892 Via the ground terminal of the transmitter

Special situations

Operating conditions	Potential equalization
When using the measuring device in a: ■ Metal pipe that is not grounded This connection method also applies in situations where: ■ Customary potential equalization cannot be ensured. ■ Excessively high equalizing currents can be expected. Both sensor flanges are connected to the pipe flange by means of a ground cable (copper wire, at least 6 mm² / 0.0093 in²) and grounded. Connect the transmitter or sensor connection housing, as applicable, to ground potential by means of the ground terminal provided for the purpose. ■ DN ≤ 300 (12"): the ground cable is mounted directly on the conductive flange coating with the flange screws. ■ DN ≥ 350 (14"): the ground cable is mounted directly on the transportation metal support.  Note! The ground cable for flange-to-flange connections can be ordered separately as an accessory from Endress+Hauser.	 A0011893 Via the ground terminal of the transmitter and the flanges of the pipe
When using the measuring device in a: ■ Plastic pipe ■ Pipe with insulating lining This connection method also applies in situations where: ■ Customary potential equalization cannot be ensured. ■ Excessively high equalizing currents can be expected. Potential equalization takes place using additional ground disks, which are connected to the ground terminal via a ground cable (copper wire, at least 6 mm² / 0.0093 in²). When installing the ground disks, please comply with the enclosed Installation Instructions.	 A0011895 Via the ground terminal of the transmitter and the optionally available ground disks

Operating conditions	Potential equalization
When using the measuring device in a: ■ Pipe with a cathodic protection unit The device is installed potential-free in the pipe. Only the two flanges of the pipe are connected with a ground cable (copper wire, at least 6 mm² / 0.0093 in²). Here, the ground cable is mounted directly on the conductive flange coating with flange screws. Note the following when installing: ■ The applicable regulations regarding potential-free installation must be observed. ■ There should be no electrically conductive connection between the pipe and the device. ■ The mounting material must withstand the applicable torques.	A0011896 Potential equalization and cathodic protection 1 Power supply isolation transformer 2 Electrically isolated

Performance characteristics

Reference operating conditions

As per DIN EN 29104 and VDI/VDE 2641:

- Fluid temperature: $+28\text{ °C} \pm 2\text{ K}$ ($+82\text{ °F} \pm 2\text{ K}$)
- Ambient temperature: $+22\text{ °C} \pm 2\text{ K}$ ($+72\text{ °F} \pm 2\text{ K}$)
- Warm-up period: 30 minutes

Installation conditions:

- Inlet run $> 10 \times \text{DN}$
- Outlet run $> 5 \times \text{DN}$
- Sensor and transmitter grounded.
- The sensor is centered in the pipe.

Maximum measured error

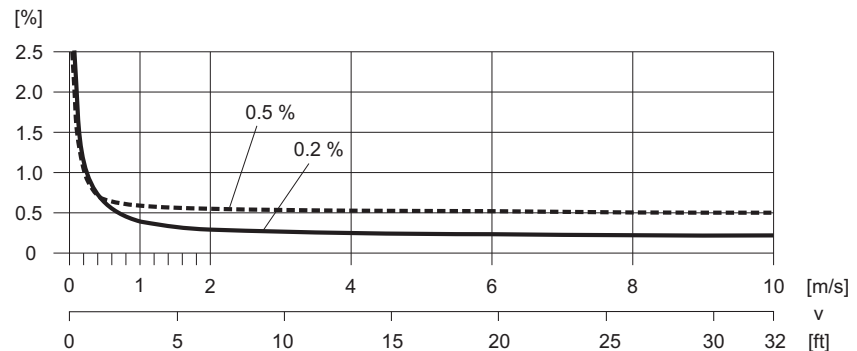
Promag 50:

- Current output: also typically $\pm 5\text{ }\mu\text{A}$
- Pulse output: $\pm 0.5\%$ o.r. $\pm 1\text{ mm/s}$ ($\pm 0.5\%$ o.r. $\pm 0.04\text{ in/s}$)
optional: $\pm 0.2\%$ o.r. $\pm 2\text{ mm/s}$ ($\pm 0.2\%$ o.r. $\pm 0.08\text{ in/s}$) (o.r. = of reading)

Promag 53:

- Current output: also typically $\pm 5\text{ }\mu\text{A}$
- Pulse output: $\pm 0.2\%$ o.r. $\pm 2\text{ mm/s}$ ($\pm 0.2\%$ o.r. $\pm 0.08\text{ in/s}$) (o.r. = of reading)

Fluctuations in the supply voltage do not have any effect within the specified range.



A0005531

Max. measured error in % of reading

Repeatability

Max. $\pm 0.1\%$ o.r. $\pm 0.5\text{ mm/s}$ ($\pm 0.1\%$ o.r. $\pm 0.02\text{ in/s}$) (o.r. = of reading)

Operating conditions: Installations

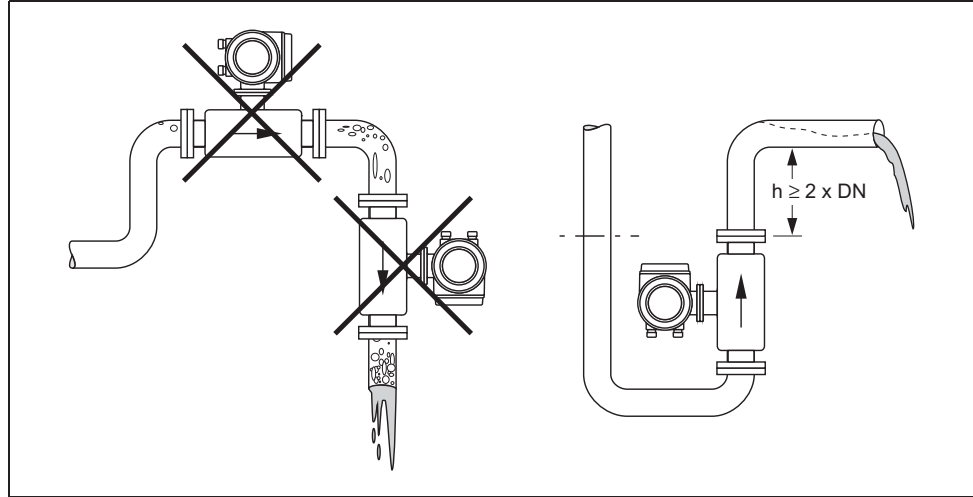
Installation instructions

Mounting location

Entrained air or gas bubble formation in the measuring tube can result in an increase in measuring errors.

Avoid the following installation locations in the pipe:

- Highest point of a pipeline. Risk of air accumulating!
- Directly upstream from a free pipe outlet in a vertical pipeline.



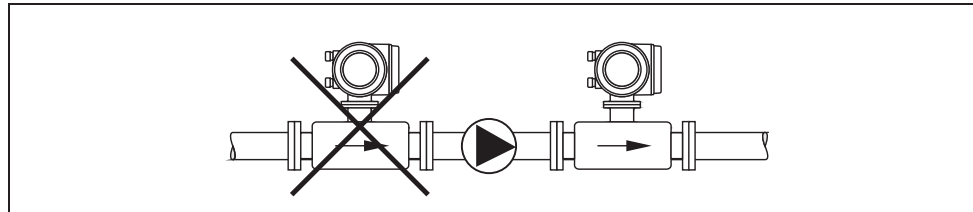
A0011899

Mounting location

Installation of pumps

Sensors may not be installed on the pump suction side. This precaution is to avoid low pressure and the consequent risk of damage to the lining of the measuring tube. Information on the pressure tightness of the measuring tube lining → 21, Section "Pressure tightness".

Pulsation dampers may be needed when using piston pumps, piston diaphragm pumps or hose pumps. Information on the shock and vibration resistance of the measuring system → 20, Section "Shock and vibration resistance".



A0011900

Installation of pumps

Partially filled pipes

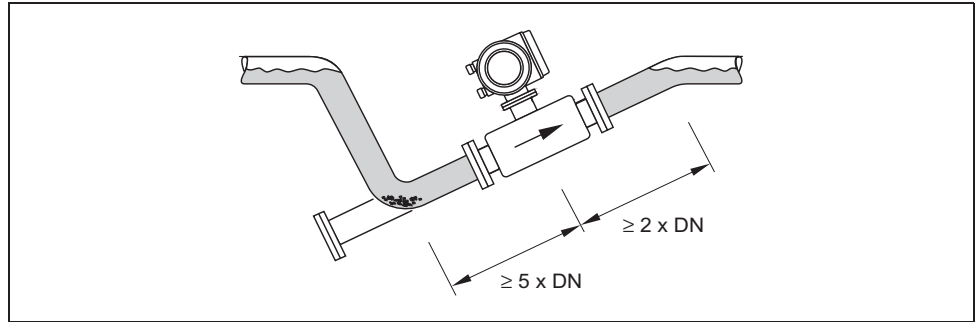
Partially filled pipes with gradients necessitate a drain-type configuration.

The empty pipe detection function (EPD) provides additional security in detecting empty or partially filled pipes.



Caution!

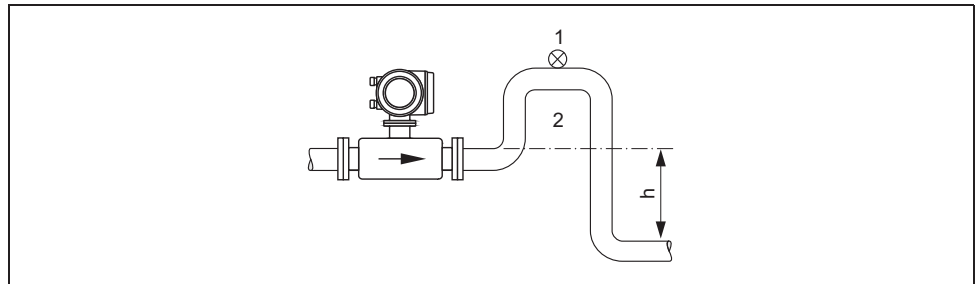
Risk of solids accumulating. Do not install the sensor at the lowest point in the drain. It is advisable to install a cleaning valve.



Installation with partially filled pipes

Down pipes

Install a siphon or a vent valve downstream of the sensor in down pipes $h \geq 5$ m (16.4 ft). This precaution is to avoid low pressure and the consequent risk of damage to the lining of the measuring tube. This measure also prevents the liquid current stopping in the pipe which could cause air locks. Information on the pressure tightness of the measuring tube lining → 21, Section "Pressure tightness".



Installation measures for vertical pipes

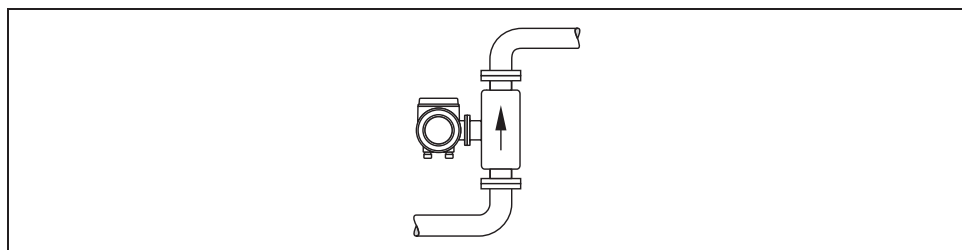
- 1 Vent valve
- 2 Pipe siphon
- h Length of the down pipe

Orientation

An optimum orientation helps avoid gas and air accumulations and deposits in the measuring tube. However, the measuring device also offers the additional function of empty pipe detection (EPD) for detecting partially filled measuring tubes or if outgassing fluids or fluctuating operating pressures are present.

Vertical orientation

This is the ideal orientation for self-emptying piping systems and for use in conjunction with empty pipe detection.



Vertical orientation

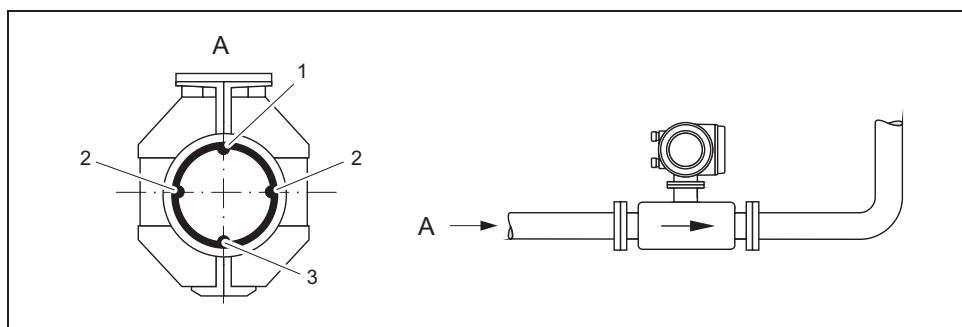
Horizontal orientation

The measuring electrode axis should be horizontal. This prevents brief insulation of the two measuring electrodes by entrained air bubbles.



Caution!

Empty pipe detection only works correctly with horizontal orientation if the transmitter housing is facing upwards. Otherwise there is no guarantee that empty pipe detection will respond if the measuring tube is only partially filled or empty.



Horizontal orientation

- 1 EPD electrode for empty pipe detection
- 2 Measuring electrodes for signal detection
- 3 Reference electrode for potential equalization

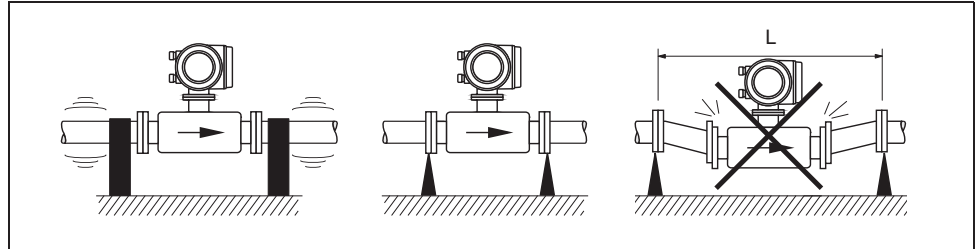
Vibrations

Secure the piping and the sensor if vibration is severe.



Caution!

If vibrations are too severe, we recommend the sensor and transmitter be mounted separately. Information on the permitted shock and vibration resistance → 20, Section "Shock and vibration resistance".



A0011906

Measures to prevent vibration of the measuring device

$L > 10 \text{ m (33 ft)}$

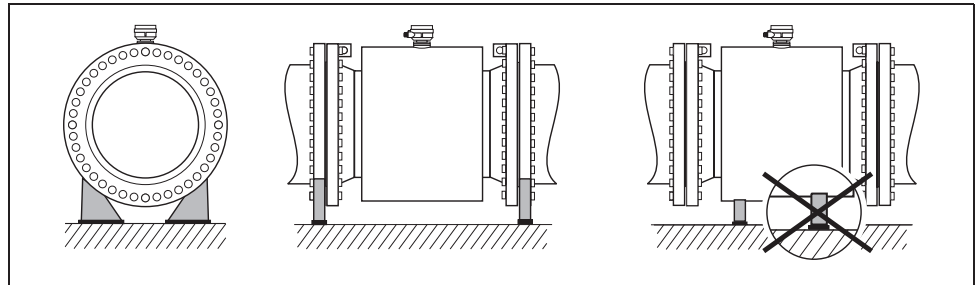
Foundations, supports

If the nominal diameter is $\text{DN} \geq 350$, mount the transmitter on a foundation of adequate load-bearing strength.



Caution!

Do not allow the casing to take the weight of the sensor. This would buckle the casing and damage the internal magnetic coils.



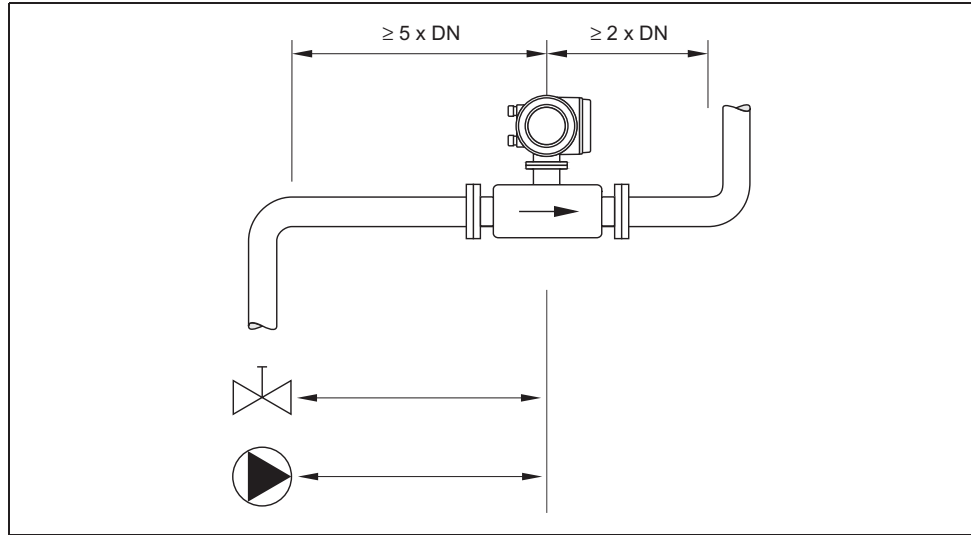
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Inlet and outlet run

If possible, install the sensor well clear of assemblies such as valves, T-pieces, elbows etc.

Note the following inlet and outlet runs to comply with measuring accuracy specifications:

- Inlet run: $\geq 5 \times \text{DN}$
- Outlet run: $\geq 2 \times \text{DN}$



A0011905

Inlet and outlet run

Adapters

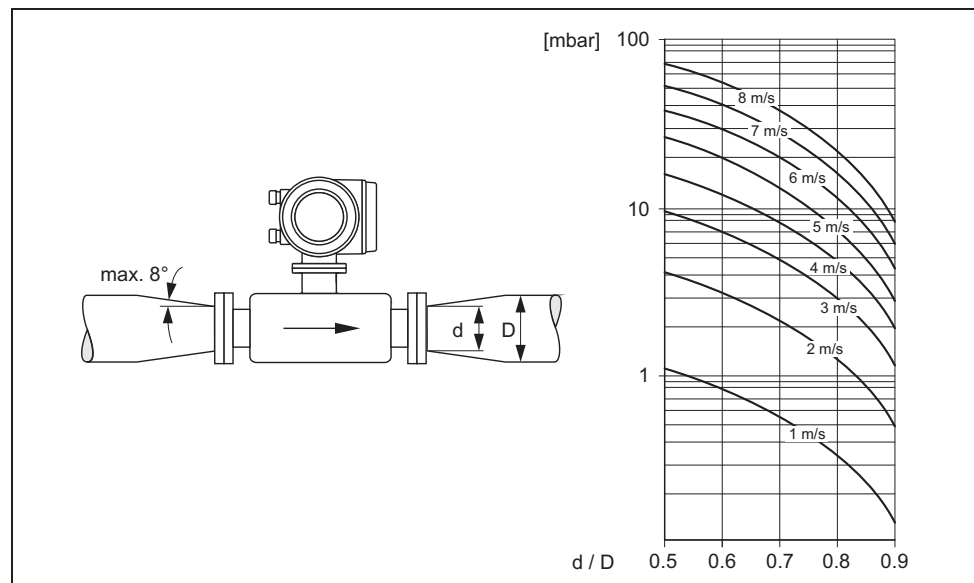
Suitable adapters to DIN EN 545 (double-flange reducers) can be used to install the sensor in larger-diameter pipes. The resultant increase in the rate of flow improves measuring accuracy with very slow-moving fluids. The nomogram shown here can be used to calculate the pressure loss caused by reducers and expanders.



Note!

The nomogram only applies to liquids of viscosity similar to water.

1. Calculate the ratio of the diameters d/D .
2. From the nomogram read off the pressure loss as a function of flow velocity (downstream from the reduction) and the d/D ratio.



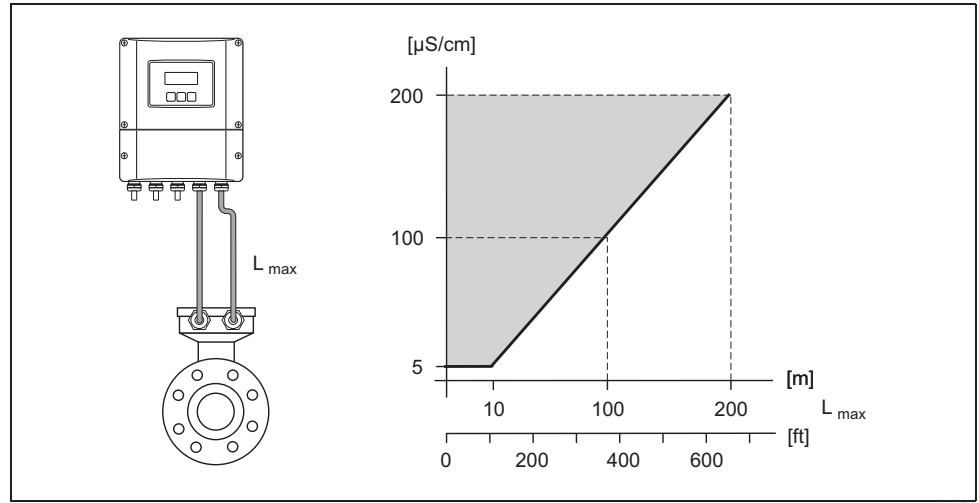
A0011907

Pressure loss due to adapters

Length of connecting cable

When mounting the remote version, please note the following to achieve correct measuring results:

- Fix cable run or lay in armored conduit. Cable movements can falsify the measuring signal especially in the case of low fluid conductivities.
- Route the cable well clear of electrical machines and switching elements.
- If necessary, ensure potential equalization between sensor and transmitter.
- The permitted cable length $L_{\max}$ is determined by the fluid conductivity. A minimum conductivity of $20 \mu\text{S/cm}$ is required for measuring demineralized water.
- When the empty pipe detection function is switched on (EPD), the maximum connecting cable length is 10 m (33 ft).



Permitted length of connecting cable for remote version

Area marked in gray = permitted range; $L_{\max}$ = length of connecting cable in [m] ([ft]); fluid conductivity in $\mu\text{S/cm}$

Operating conditions: Environment

Ambient temperature range



Transmitter

- Standard: -20 to +60 °C (-4 to +140 °F)
- Optional: -40 to +60 °C (-40 to +140 °F)

Note!

At ambient temperatures below -20 °C (-4 °F) the readability of the display may be impaired.

Sensor

- Flange material carbon steel: -10 to +60 °C (14 to +140 °F)
- Flange material stainless steel: -40 to +60 °C (-40 to +140 °F)



Caution!

The permitted temperature range of the measuring tube lining may not be undershot or overshoot
→ 21, Section "Medium temperature range".

Please note the following points:

- Install the device in a shady location. Avoid direct sunlight, particularly in warm climatic regions.
- The transmitter must be mounted separate from the sensor if both the ambient and fluid temperatures are high.

Storage temperature



The storage temperature corresponds to the operating temperature range of the measuring transmitter and the appropriate measuring sensors.

Caution!

- The measuring device must be protected against direct sunlight during storage in order to avoid unacceptably high surface temperatures.
- A storage location must be selected where moisture does not collect in the measuring device. This will help prevent fungus and bacteria infestation which can damage the liner.
- Do not remove the protective plates or caps on the process connections until the device is ready to install.

Degree of protection

- Standard: IP 67 (NEMA 4X) for transmitter and sensor.
- Optional: IP 68 (NEMA 6P) for sensor for remote version.
- For information regarding applications where the device is buried directly in the soil or is installed in a flooded wastewater basin please contact your local Endress+Hauser Sales Center.

Shock and vibration resistance Acceleration up to 2 g following IEC 600 68-2-6

Electromagnetic compatibility (EMC)

- As per IEC/EN 61326 and NAMUR recommendation NE 21.

Operating conditions: Process

Medium temperature range

The permitted temperature depends on the lining of the measuring tube:

- Polyurethane: -20 to +50 °C (-4 to +122 °F) (DN 25 to 1200 / 1 to 48")
- Hard rubber: ±0 to +80 °C (+32 to +176 °F) (DN 50 to 2000 / 2 to 78")

Conductivity

The minimum conductivity is:

- $\geq 5 \mu\text{S/cm}$ for fluids generally
- $\geq 20 \mu\text{S/cm}$ for demineralized water



Note!

In the remote version, the necessary minimum conductivity also depends on the cable length (→ 19, Section "Length of connecting cable").

Medium pressure range (nominal pressure)

- EN 1092-1 (DIN 2501)
 - PN 6 (DN 350 to 2000 / 14 to 78")
 - PN 10 (DN 200 to 2000 / 8 to 78")
 - PN 16 (DN 65 to 2000 / 3 to 78")
 - PN 25 (DN 200 to 1000 / 8 to 40")
 - PN 40 (DN 25 to 150 / 1 to 6")
- ANSI B 16.5
 - Class 150 (DN 1 to 24")
 - Class 300 (DN 1 to 6")
- AWWA
 - Class D (DN 28 to 78")
- JIS B2220
 - 10 K (DN 50 to 300 / 2 to 12")
 - 20 K (DN 25 to 300 / 1 to 12")
- AS 2129
 - Table E (DN 80, 100, 150 to 400, 500, 600 / 3", 4", 6 to 16", 20", 24")
- AS 4087
 - PN 16 (DN 80, 100, 150 to 400, 500, 600 / 3", 4", 6 to 16", 20", 24")

Pressure tightness

Measuring tube lining: Polyurethane

Nominal diameter		Limit values for abs. pressure [mbar] ([psi]) at fluid temperatures:			
		25 °C (77 °F)		50 °C (122 °F)	
[mm]	[inch]	[mbar]	[psi]	[mbar]	[psi]
25 to 1200	1 to 48"	0	0	0	0

Measuring tube lining: Hard rubber

Nominal diameter		Limit values for abs. pressure [mbar] ([psi]) at fluid temperatures:					
		25 °C (77 °F)		50 °C (122 °F)		80 °C (176 °F)	
[mm]	[inch]	[mbar]	[psi]	[mbar]	[psi]	[mbar]	[psi]
50 to 2000	2 to 78"	0	0	0	0	0	0

Limiting flow

The diameter of the pipe and the flow rate determine the nominal diameter of the sensor.

The optimum flow velocity is between 2 to 3 m/s (6.5 to 9.8 ft/s). The velocity of flow (v), moreover, has to be matched to the physical properties of the fluid:

- $v < 2$ m/s (6.5 ft/s): for abrasive fluids such as potter's clay, lime milk, ore slurry etc.
- $v > 2$ m/s (6.5 ft/s): for fluids causing build-up such as wastewater sludges etc.

Flow characteristic values (SI units)					
Diameter		Recommended flow Min./max. full scale value ($v \sim 0.3$ or 10 m/s)	Factory settings		
[mm]	[inch]		Full scale value Current output ($v \sim 2.5$ m/s)	Pulse value (~ 2 pulses/s)	Low flow ($v \sim 0.04$ m/s)
25	1"	9 to 300 dm ³ /min	75 dm ³ /min	0.50 dm ³	1 dm ³ /min
32	–	15 to 500 dm ³ /min	125 dm ³ /min	1.00 dm ³	2 dm ³ /min
40	1½"	25 to 700 dm ³ /min	200 dm ³ /min	1.50 dm ³	3 dm ³ /min
50	2"	35 to 1100 dm ³ /min	300 dm ³ /min	2.50 dm ³	5 dm ³ /min
65	–	60 to 2000 dm ³ /min	500 dm ³ /min	5.00 dm ³	8 dm ³ /min
80	3"	90 to 3000 dm ³ /min	750 dm ³ /min	5.00 dm ³	12 dm ³ /min
100	4"	145 to 4700 dm ³ /min	1200 dm ³ /min	10.00 dm ³	20 dm ³ /min
125	–	220 to 7500 dm ³ /min	1850 dm ³ /min	15.00 dm ³	30 dm ³ /min
150	6"	20 to 600 m ³ /h	150 m ³ /h	0.025 m ³	2.5 m ³ /h
200	8"	35 to 1100 m ³ /h	300 m ³ /h	0.05 m ³	5.0 m ³ /h
250	10"	55 to 1700 m ³ /h	500 m ³ /h	0.05 m ³	7.5 m ³ /h
300	12"	80 to 2400 m ³ /h	750 m ³ /h	0.10 m ³	10 m ³ /h
350	14"	110 to 3300 m ³ /h	1000 m ³ /h	0.10 m ³	15 m ³ /h
375	15"	140 to 4200 m ³ /h	1200 m ³ /h	0.15 m ³	20 m ³ /h
400	16"	140 to 4200 m ³ /h	1200 m ³ /h	0.15 m ³	20 m ³ /h
450	18"	180 to 5400 m ³ /h	1500 m ³ /h	0.25 m ³	25 m ³ /h
500	20"	220 to 6600 m ³ /h	2000 m ³ /h	0.25 m ³	30 m ³ /h
600	24"	310 to 9600 m ³ /h	2500 m ³ /h	0.30 m ³	40 m ³ /h
700	28"	420 to 13500 m ³ /h	3500 m ³ /h	0.50 m ³	50 m ³ /h
–	30"	480 to 15000 m ³ /h	4000 m ³ /h	0.50 m ³	60 m ³ /h
800	32"	550 to 18000 m ³ /h	4500 m ³ /h	0.75 m ³	75 m ³ /h
900	36"	690 to 22500 m ³ /h	6000 m ³ /h	0.75 m ³	100 m ³ /h
1000	40"	850 to 28000 m ³ /h	7000 m ³ /h	1.00 m ³	125 m ³ /h
–	42"	950 to 30000 m ³ /h	8000 m ³ /h	1.00 m ³	125 m ³ /h
1200	48"	1250 to 40000 m ³ /h	10000 m ³ /h	1.50 m ³	150 m ³ /h
–	54"	1550 to 50000 m ³ /h	13000 m ³ /h	1.50 m ³	200 m ³ /h
1400	–	1700 to 55000 m ³ /h	14000 m ³ /h	2.00 m ³	225 m ³ /h
–	60"	1950 to 60000 m ³ /h	16000 m ³ /h	2.00 m ³	250 m ³ /h
1600	–	2200 to 70000 m ³ /h	18000 m ³ /h	2.50 m ³	300 m ³ /h
–	66"	2500 to 80000 m ³ /h	20500 m ³ /h	2.50 m ³	325 m ³ /h
1800	72"	2800 to 90000 m ³ /h	23000 m ³ /h	3.00 m ³	350 m ³ /h
–	78"	3300 to 100000 m ³ /h	28500 m ³ /h	3.50 m ³	450 m ³ /h
2000	–	3400 to 110000 m ³ /h	28500 m ³ /h	3.50 m ³	450 m ³ /h

Flow characteristic values (US units)					
Diameter		Recommended flow rate Min./max. full scale value (v ~ 0.3 or 10 m/s)	Factory settings		
[inch]	[mm]		Full scale value Current output (v ~ 2.5 m/s)	Pulse value (~ 2 pulses/s)	Low flow (v ~ 0.04 m/s)
1"	25	2.5 to 80 gal/min	18 gal/min	0.20 gal	0.25 gal/min
–	32	4 to 130 gal/min	30 gal/min	0.20 gal	0.50 gal/min
1½"	40	7 to 190 gal/min	50 gal/min	0.50 gal	0.75 gal/min
2"	50	10 to 300 gal/min	75 gal/min	0.50 gal	1.25 gal/min
–	65	16 to 500 gal/min	130 gal/min	1 gal	2.0 gal/min
3"	80	24 to 800 gal/min	200 gal/min	2 gal	2.5 gal/min
4"	100	40 to 1250 gal/min	300 gal/min	2 gal	4.0 gal/min
–	125	60 to 1950 gal/min	450 gal/min	5 gal	7.0 gal/min
6"	150	90 to 2650 gal/min	600 gal/min	5 gal	12 gal/min
8"	200	155 to 4850 gal/min	1200 gal/min	10 gal	15 gal/min
10"	250	250 to 7500 gal/min	1500 gal/min	15 gal	30 gal/min
12"	300	350 to 10600 gal/min	2400 gal/min	25 gal	45 gal/min
14"	350	500 to 15000 gal/min	3600 gal/min	30 gal	60 gal/min
15"	375	600 to 19000 gal/min	4800 gal/min	50 gal	60 gal/min
16"	400	600 to 19000 gal/min	4800 gal/min	50 gal	60 gal/min
18"	450	800 to 24000 gal/min	6000 gal/min	50 gal	90 gal/min
20"	500	1000 to 30000 gal/min	7500 gal/min	75 gal	120 gal/min
24"	600	1400 to 44000 gal/min	10500 gal/min	100 gal	180 gal/min
28"	700	1900 to 60000 gal/min	13500 gal/min	125 gal	210 gal/min
30"	–	2150 to 67000 gal/min	16500 gal/min	150 gal	270 gal/min
32"	800	2450 to 80000 gal/min	19500 gal/min	200 gal	300 gal/min
36"	900	3100 to 100000 gal/min	24000 gal/min	225 gal	360 gal/min
40"	1000	3800 to 125000 gal/min	30000 gal/min	250 gal	480 gal/min
42"	–	4200 to 135000 gal/min	33000 gal/min	250 gal	600 gal/min
48"	1200	5500 to 175000 gal/min	42000 gal/min	400 gal	600 gal/min
54"	–	9 to 300 Mgal/min	75 Mgal/min	0.0005 Mgal	1.3 Mgal/min
–	1400	10 to 340 Mgal/min	85 Mgal/min	0.0005 Mgal	1.3 Mgal/min
60"	–	12 to 380 Mgal/min	95 Mgal/min	0.0005 Mgal	1.3 Mgal/min
–	1600	13 to 450 Mgal/min	110 Mgal/min	0.0008 Mgal	1.7 Mgal/min
66"	–	14 to 500 Mgal/min	120 Mgal/min	0.0008 Mgal	2.2 Mgal/min
72"	1800	16 to 570 Mgal/min	140 Mgal/min	0.0008 Mgal	2.6 Mgal/min
78"	–	18 to 650 Mgal/min	175 Mgal/min	0.001 Mgal	3.0 Mgal/min
–	2000	20 to 700 Mgal/min	175 Mgal/min	0.001 Mgal	3.0 Mgal/min

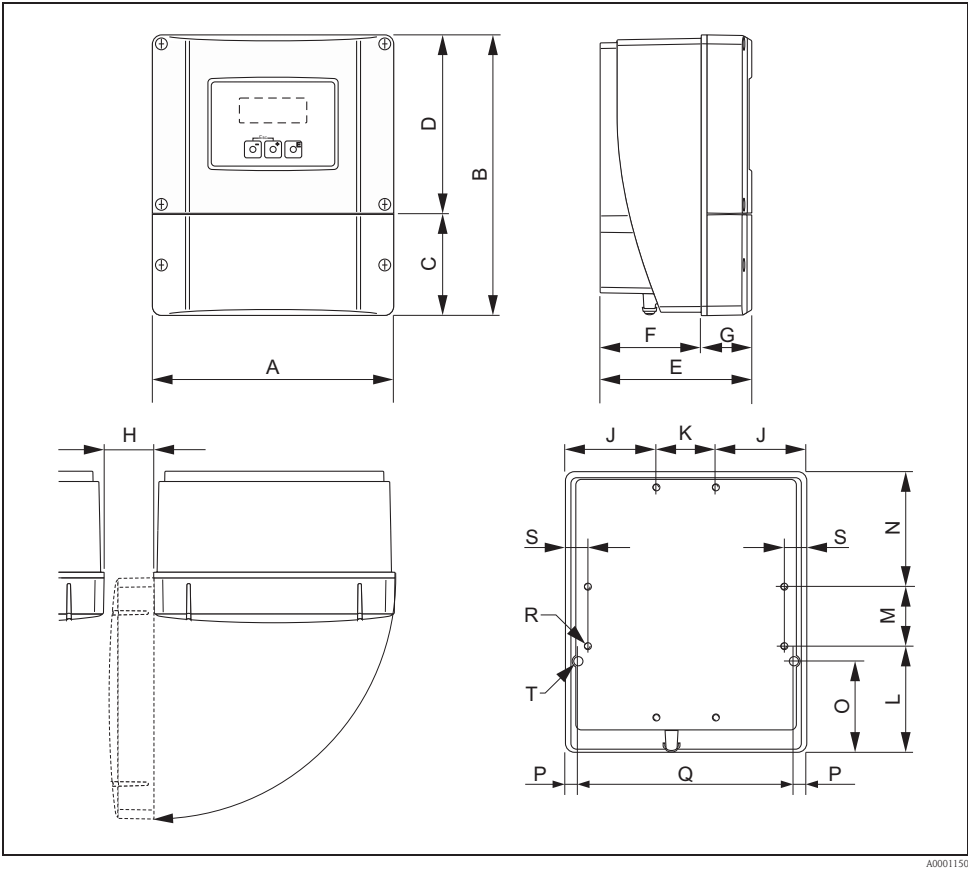
Pressure loss

- No pressure loss if the sensor is installed in a pipe with the same nominal diameter.
- Pressure losses for configurations incorporating adapters according to DIN EN 545 (→ 18, Section "Adapters").

Mechanical construction

Design, dimensions

Transmitter remote version, wall-mount housing (non Ex-zone and II3G/Zone 2)



A0001150

Dimensions (SI units)

A	B	C	D	E	F	G	H	J
215	250	90.5	159.5	135	90	45	> 50	81
K	L	M	N	O	P	Q	R	S
53	95	53	102	81.5	11.5	192	8 × M5	20

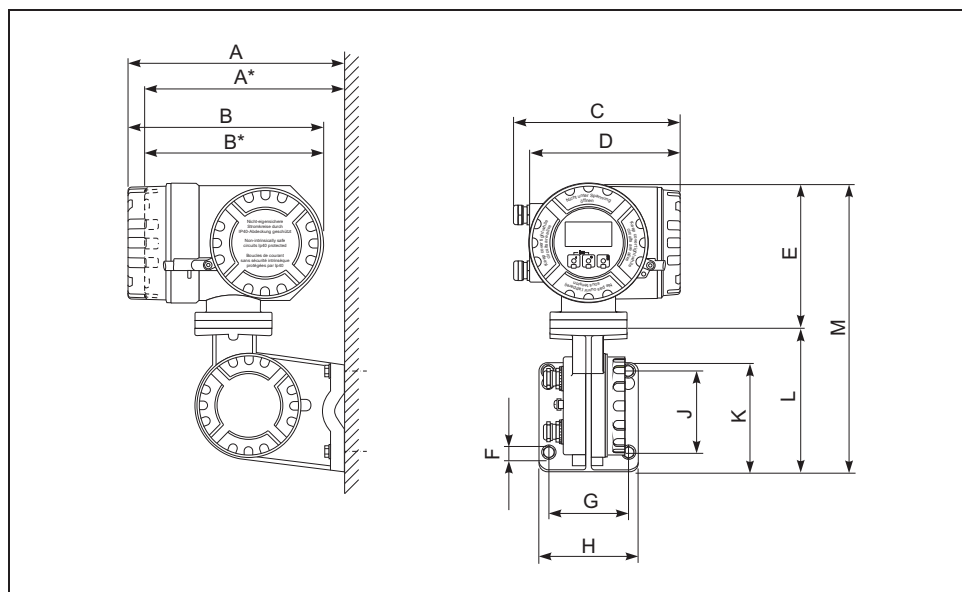
All dimensions in [mm]

Dimensions (US units)

A	B	C	D	E	F	G	H	J
8.46	9.84	3.56	6.27	5.31	3.54	1.77	> 1.97	3.18
K	L	M	N	O	P	Q	R	S
2.08	3.74	2.08	4.01	3.20	0.45	7.55	8 × M5	0.79

All dimensions in [inch]

Transmitter remote version, connection housing (II2GD/Zone 1)



A0002128

Dimensions (SI units)

A	A*	B	B*	C	D	E	Ø F	G	H	J	K	L	M
265	242	240	217	206	186	178	8.6 (M8)	100	130	100	144	170	355

All dimensions in [mm]

Dimensions (US units)

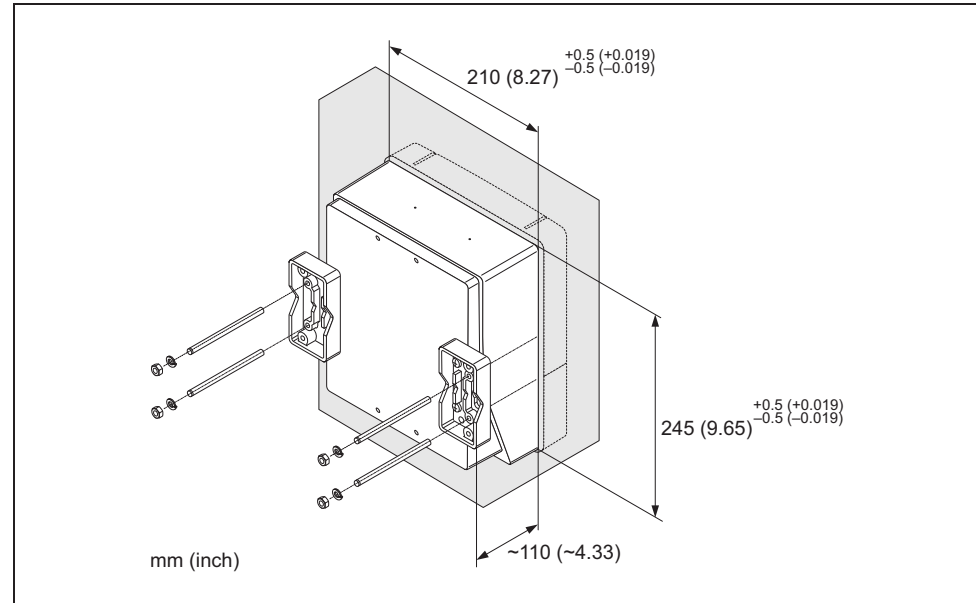
A	A*	B	B*	C	D	E	Ø F	G	H	J	K	L	M
10.4	9.53	9.45	8.54	8.11	7.32	7.01	0.34 (M8)	3.94	5.12	3.94	5.67	6.69	14.0

All dimensions in [inch]

There is a separate mounting kit for the wall-mounted housing. It can be ordered from Endress+Hauser as an accessory. The following installation variants are possible:

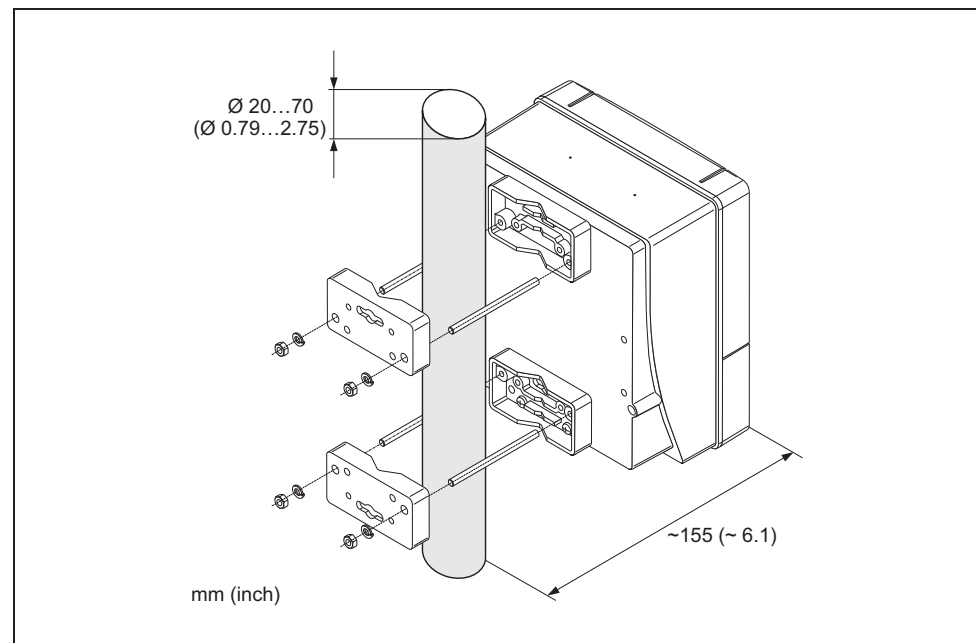
- Panel-mounted installation
- Pipe mounting

Installation in control panel

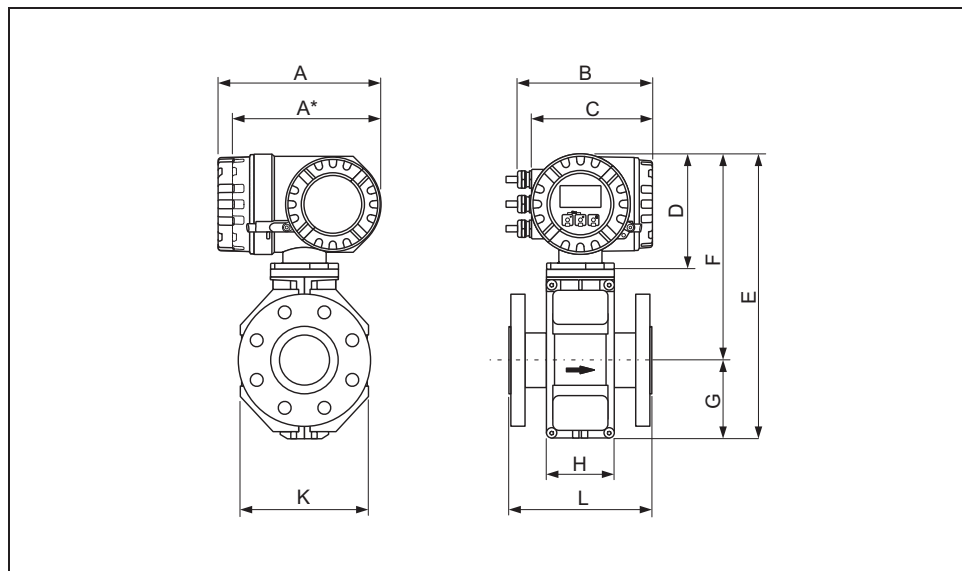


A0001131

Pipe mounting



A0001132

Compact version DN ≤ 300 (12")

A0005423

Dimensions (SI units)

DN EN (DIN) / JIS / AS ²⁾	L ¹⁾	A	A*	B	C	D	E	F	G	H	K
25	200	227	207	187	168	160	341	257	84	94	120
32	200						341	257	84	94	120
40	200						341	257	84	94	120
50	200						341	257	84	94	120
65	200						391	282	109	94	180
80	200						391	282	109	94	180
100	250						391	282	109	94	180
125	250						472	322	150	140	260
150	300						472	322	150	140	260
200	350						527	347	180	156	324
250	450						577	372	205	166	400
300	500						627	397	230	166	460

¹⁾ The length is regardless of the pressure rating selected. Fitting length to DVGW.

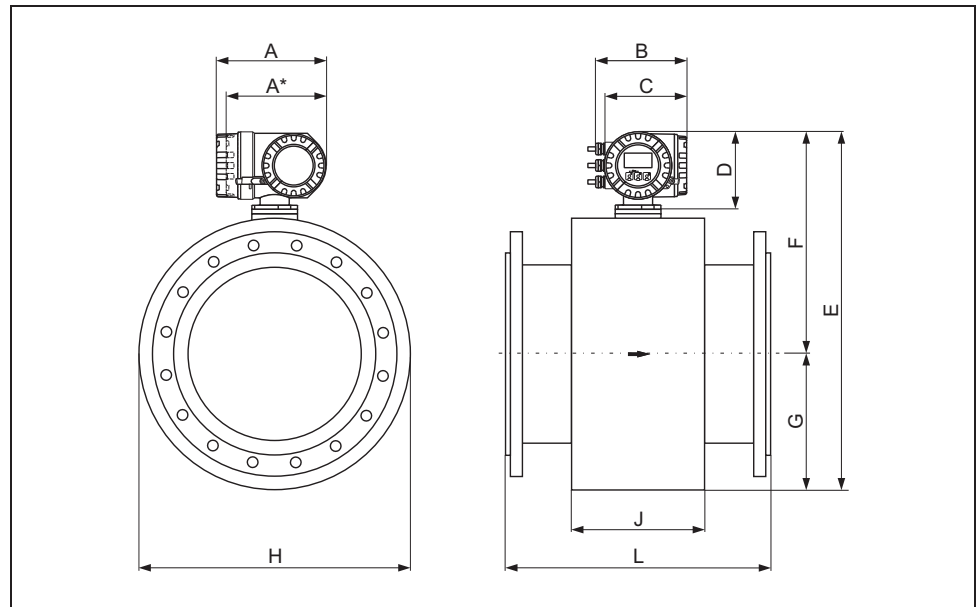
²⁾ For flanges to AS, only the nominal diameters DN 80, 100 and 150 to 300 are available.

All dimensions in [mm]

Dimensions (US units)

DN ANSI	L ¹⁾	A	A*	B	C	D	E	F	G	H	K
1"	7.87	8.94	8.15	7.36	6.61	6.30	13.4	10.1	3.31	3.70	4.72
1½"	7.87						13.4	10.1	3.31	3.70	4.72
2"	7.87						13.4	10.1	3.31	3.70	4.72
3"	7.87						15.4	11.1	4.29	3.70	7.09
4"	9.84						15.4	11.1	4.29	3.70	7.09
6"	11.8						18.6	12.7	5.91	5.51	10.2
8"	13.8						20.8	13.7	7.09	6.14	12.8
10"	17.7						22.7	14.7	8.07	6.14	15.8
12"	19.7						24.7	15.6	9.06	6.54	18.1

¹⁾ The length is regardless of the pressure rating selected. Fitting length to DVGW.
All dimensions in [inch]

Compact version DN ≥ 350 (14")

A0005424

Dimensions (SI units)

DN EN (DIN) / AS ²⁾	L ¹⁾	A	A*	B	C	D	E	F	G	H	J
350	550	227	207	187	168	160	738.5	456.5	282.0	276	564
375	600						790.5	482.5	308.0	276	616
400	600						790.5	482.5	308.0	276	616
450	650						840.5	507.5	333.0	292	666
500	650						891.5	533.0	358.5	292	717
600	780						995.5	585.0	410.5	402	821
700	910						1198.5	686.5	512.0	589	1024
750	975						1198.5	686.5	512.0	626	1024
800	1040						1241.5	708.5	533.5	647	1067
900	1170						1394.5	784.5	610.0	785	1220
1000	1300						1546.5	860.5	686.0	862	1372
1050	1365						1598.5	886.5	712.0	912	1424
1200	1560						1796.5	985.5	811.0	992	1622
1350	1755						1998.5	1086.5	912.0	1252	1824
1400	1820						2148.5	1161.5	987.0	1252	1974
1500	1950						2196.5	1185.5	1011.0	1392	2022
1600	2080	227	207	187	168	160	2286.5	1230.5	1056.0	1482	2112
1650	2145						2360.5	1267.5	1093.0	1482	2186
1800	2340						2550.5	1362.5	1188.0	1632	2376
2000	2600						2650.5	1412.5	1238.0	1732	2476

¹⁾ The length is regardless of the pressure rating selected. Fitting length to DVGW.²⁾ For flanges to AS, only DN 350, 400, 500 and 600 are available.

All dimensions in [mm]

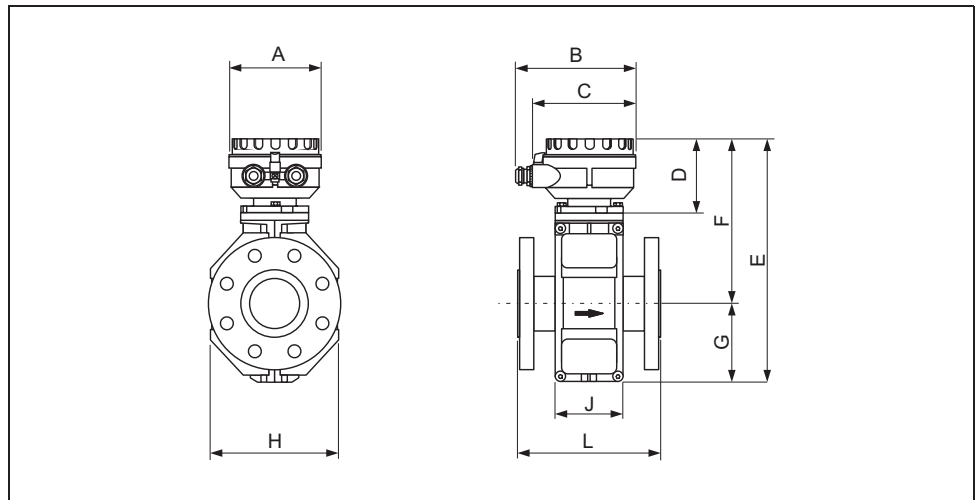
Dimensions (US units)

DN ANSI / AWWA ²⁾	L ¹⁾	A	A*	B	C	D	E	F	G	H	J
14"	21.6	8.94	8.15	7.36	6.61	6.30	29.1	17.9	11.1	10.9	22.2
15"	23.6						31.1	18.9	12.1	10.9	24.2
16"	23.6						31.1	18.9	12.1	10.9	24.2
18"	25.6						33.1	19.9	13.1	11.5	26.2
20"	25.6						35.1	20.9	14.1	11.5	28.2
24"	30.7						39.2	23.0	16.2	15.8	32.3
28"	35.8						47.2	27.0	20.1	23.2	40.3
30"	38.4						47.2	27.0	20.1	24.6	40.3
32"	40.9						48.9	27.9	21.0	25.5	42.0
36"	46.0						54.9	30.9	24.0	30.9	48.0
40"	51.2						60.9	33.9	27.0	33.9	54.0
42"	53.7						62.9	34.9	28.0	35.9	56.0
48"	61.4						71.7	38.8	31.9	39.0	63.8
54"	69.1						78.7	42.8	35.9	42.3	71.8
56"	71.7						84.6	45.7	38.9	49.3	77.7
60"	76.8						86.5	46.7	39.8	54.8	79.6
64"	81.9						90.0	48.4	41.6	58.4	83.2
66"	84.4						92.9	49.9	43.0	58.4	86.0
72"	92.1						100.4	53.6	46.8	64.2	93.5
78"	102.3						104.3	55.6	48.7	68.2	97.5

¹⁾ The length is regardless of the pressure rating selected. Fitting length to DVGW.

²⁾ Flanges ≤ 24" only to ANSI available, ≥ 28" only to AWWA available.

All dimensions in [inch]

Sensor, remote version DN ≤ 300 (12")

A0012462

Dimensions (SI units)

DN EN (DIN) / JIS / AS ²⁾	L ¹⁾	A	B	C	D	E	F	G	H	J
25	200	129	163	143	102	286	202	84	120	94
32	200	129	163	143	102	286	202	84	120	94
40	200	129	163	143	102	286	202	84	120	94
50	200	129	163	143	102	286	202	84	120	94
65	200	129	163	143	102	336	227	109	180	94
80	200	129	163	143	102	336	227	109	180	94
100	250	129	163	143	102	336	227	109	180	94
125	250	129	163	143	102	417	267	150	260	140
150	300	129	163	143	102	417	267	150	260	140
200	350	129	163	143	102	472	292	180	324	156
250	450	129	163	143	102	522	317	205	400	166
300	500	129	163	143	102	572	342	230	460	166

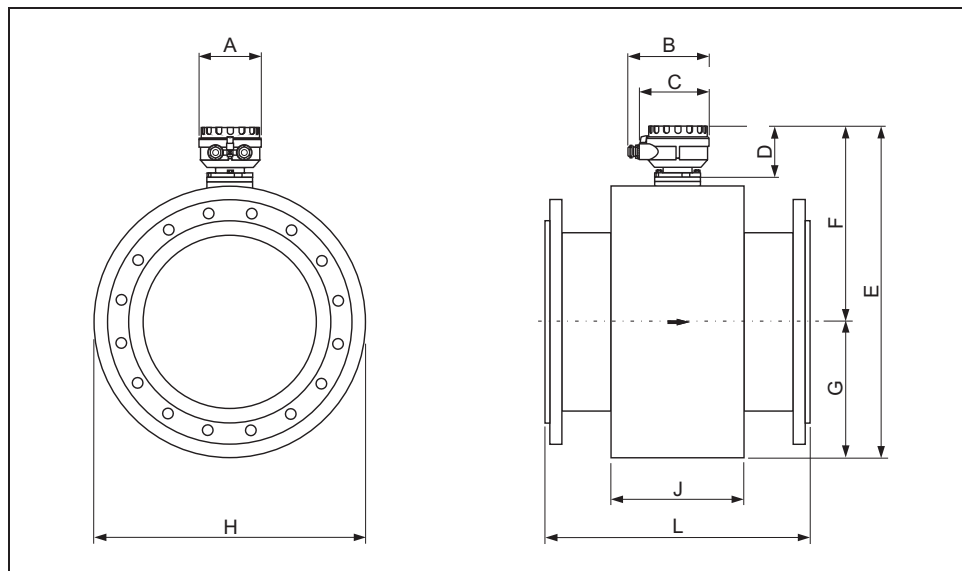
¹⁾ The length is regardless of the pressure rating selected. Fitting length to DVGW.

²⁾ For flanges to AS, only the nominal diameters DN 80, 100 and 150 to 300 are available.
All dimensions in [mm]

Dimensions (US units)

DN ANSI	L ¹⁾	A	B	C	D	E	F	G	H	J
1"	7.87	5.08	6.42	5.63	4.02	11.3	7.95	3.32	4.72	3.70
1½"	7.87	5.08	6.42	5.63	4.02	11.3	7.95	3.32	4.72	3.70
2"	7.87	5.08	6.42	5.63	4.02	11.3	7.95	3.32	4.72	3.70
3"	7.87	5.08	6.42	5.63	4.02	13.2	8.94	4.30	7.10	3.70
4"	9.84	5.08	6.42	5.63	4.02	13.2	8.94	4.30	7.10	3.70
6"	11.8	5.08	6.42	5.63	4.02	16.4	10.5	5.91	10.2	5.51
8"	13.8	5.08	6.42	5.63	4.02	18.6	11.5	7.10	12.8	6.14
10"	17.7	5.08	6.42	5.63	4.02	20.6	12.5	8.08	15.8	6.14
12"	19.7	5.08	6.42	5.63	4.02	22.5	13.5	9.06	18.1	6.54

¹⁾ The length is regardless of the pressure rating selected. Fitting length to DVGW.
All dimensions in [inch]

Sensor, remote version DN ≥ 350 (14")

A0003220

Dimensions (SI units)

DN EN (DIN) / AS ²⁾	L ¹⁾	A	B	C	D	E	F	G	H	J
350	550	129	163	143	102	683.5	401.5	282.0	564	276
375	600					735.5	427.5	308.0	616	276
400	600					735.5	427.5	308.0	616	276
450	650					785.5	452.5	333.0	666	292
500	650					836.5	478.0	358.5	717	292
600	780					940.5	530.0	410.5	821	402
700	910					1143.5	631.5	512.0	1024	589
750	975					1143.5	631.5	512.0	1024	626
800	1040					1186.5	653.0	533.5	1067	647
900	1170					1339.5	729.5	610.0	1220	785
1000	1300					1491.5	805.5	686.0	1372	862
1050	1365					1543.5	831.5	712.0	1424	912
1200	1560					1741.5	930.5	811.0	1622	992
1350	1755					1943.5	1031.5	912.0	1824	1252
1400	1820					2093.5	1106.5	987.0	1974	1252
1500	1950					2141.5	1130.5	1011.0	2022	1392
1600	2080					2231.5	1175.5	1056.0	2112	1482
1650	2145					2305.5	1212.5	1093.0	2186	1482
1800	2340					2495.5	1307.5	1188.0	2376	1632
2000	2600					2595.5	1357.5	1238.0	2476	1732

¹⁾ The length is regardless of the pressure rating selected. Fitting length to DVGW.²⁾ For flanges to AS, only DN 350, 400, 500 and 600 are available.

All dimensions in [mm]

Dimensions (US units)

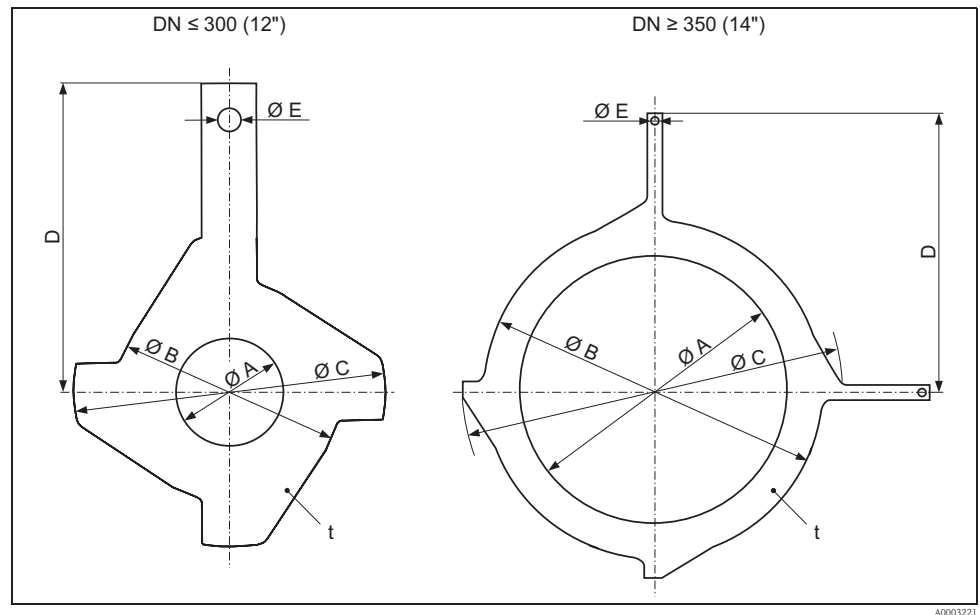
DN ANSI / AWWA ²⁾	L ¹⁾	A	B	C	D	E	F	G	H	J
14"	21.6	5.08	6.42	5.63	4.02	29.1	15.8	11.1	22.2	10.9
15"	23.6					31.1	16.8	12.1	24.2	10.9
16"	23.6					31.1	16.8	12.1	24.2	10.9
18"	25.6					33.1	17.8	13.1	26.2	11.5
20"	25.6					35.1	18.8	14.1	28.2	11.5
24"	30.7					39.2	20.9	16.2	32.3	15.8
28"	35.8					45.0	24.9	20.1	40.3	23.2
30"	38.4					45.0	24.9	20.1	40.3	24.6
32"	40.9					46.7	25.7	21.0	42.0	25.5
36"	46.0					52.7	28.7	24.0	48.0	30.9
40"	51.2					58.7	31.7	27.0	54.0	33.9
42"	53.7					60.7	32.7	28.0	56.0	35.9
48"	61.4					68.5	36.6	31.9	63.8	39.0
54"	69.1					76.5	40.6	35.9	71.8	42.3
56"	71.7					82.4	43.6	38.9	77.7	49.3
60"	76.8					84.3	44.5	39.8	79.6	54.8
64"	81.9					87.9	46.3	41.6	83.2	58.4
66"	84.4					90.8	47.7	43.0	86.0	58.4
72"	92.1					98.2	51.5	46.8	93.5	64.2
78"	102.3					102.2	53.4	48.7	97.5	68.2

¹⁾ The length is regardless of the pressure rating selected. Fitting length to DVGW.

²⁾ Flanges ≤ 24" only to ANSI available, ≥ 28" only to AWWA available.

All dimensions in [inch]

Ground disk for flange connections



A0003221

Dimensions (SI units)

DN ¹⁾ EN (DIN) / JIS / AS ²⁾	A	B	C	D	E	t
25	26	62	77.5	87.5	6.5	2
32	35	80	87.5	94.5		
40	41	82	101	103		
50	52	101	115.5	108		
65	68	121	131.5	118		
80	80	131	154.5	135		
100	104	156	186.5	153		
125	130	187	206.5	160		
150	158	217	256	184		
200	206	267	288	205		
250	260	328	359	240		
300 ³⁾	312	375	413	273		
300 ⁴⁾	310	375	404	268		
350 ³⁾	343	433	479	365	9.0	2
375 ³⁾	393	480	542	395		
400 ³⁾	393	480	542	395		
450 ³⁾	439	538	583	417		
500 ³⁾	493	592	650	460		
600 ³⁾	593	693	766	522		

¹⁾ Ground disks can be used for all flange standards/pressure ratings that can be delivered, except for DN ≥ 300.

²⁾ Only DN 32, 40, 65 and 125 are available for flanges according to AS.

³⁾ PN 10/16

⁴⁾ PN 25, JIS 10K/20K

All dimensions in [mm]

Dimensions (US units)

DN ¹⁾ ANSI	A	B	C	D	E	t
1"	1.02	2.44	3.05	3.44	0.26	0.08
1½"	1.61	3.23	3.98	4.06		
2"	2.05	3.98	4.55	4.25		
3"	3.15	5.16	6.08	5.31		
4"	4.09	6.14	7.34	6.02		
6"	6.22	8.54	10.08	7.24		
8"	8.11	10.5	11.3	8.07		
10"	10.2	12.9	14.1	9.45		
12"	12.3	14.8	16.3	10.8		
14"	13.5	17.1	18.9	14.4		
15"	15.45	18.9	21.3	15.6	0.35	
16"	15.45	18.9	21.3	15.6		
18"	17.3	21.2	23.0	16.4		
20"	19.4	23.3	25.6	18.1		
24"	23.4	27.3	30.1	20.6		

¹⁾ Ground disks can be used for all flange standards/pressure ratings.
All dimensions in [inch]

Weight**Weight in SI units**

Weight data in kg									
Nominal diameter		Compact version			Remote version (without cable)				Transmitter
[mm]	[inch]	EN (DIN) / AS ¹⁾	JIS	ANSI / AWWA	EN (DIN) / AS ¹⁾	JIS	ANSI / AWWA	Wall-mount housing	
25	1"	PN 40	7.3	7.3	7.3	5.3	5.3	5.3	6.0
32	–		8.0	7.3	–	6.0	5.3	–	
40	1½"		9.4	8.3	9.4	7.4	6.3	7.4	
50	2"		10.6	9.3	10.6	8.6	7.3	8.6	
65	–	PN 16	12	11.1	–	10.0	9.1	–	
80	3"		14	112.5	14.0	12.0	10.5	12.0	
100	4"		16	14.7	16.0	14.0	12.7	14.0	
125	–		21.5	21.0	–	19.5	19.0	–	
150	6"	PN 10	25.5	24.5	25.5	23.5	22.5	23.5	
200	8"		45	41.9	45	39.9	43	43	
250	10"		65	69.4	75	67.4	73	73	
300	12"		70	72.3	110	68	70.3	108	
350	14"	PN 6	105	Class D	175	103	173	173	
375	15"		120		–	118	–	–	
400	16"		120		205	118	203	203	
450	18"		161		255	159	253	253	
500	20"		156		285	154	283	283	
600	24"		208		405	206	403	403	
700	28"		304		400	302	398	398	
–	30"		–		460	–	458	458	
800	32"		357		550	355	548	548	
900	36"		485		800	483	798	798	
1000	40"		589		900	587	898	898	
–	42"		–		1100	–	1098	1098	
1200	48"		850		1400	848	1398	1398	
–	54"		–		2200	–	2198	2198	
1400	–		1300		–	1298	–	–	
–	60"		–		2700	–	2698	2698	
1600	–	PN 6	1700		–	1698	–	–	
–	66"		–		3700	–	3698	3698	
1800	72"		2200		4100	2198	4098	4098	
–	78"		–		4600	–	4598	4598	
2000	–		2800		–	2798	–	–	

¹⁾ For flanges to AS, only DN 80, 100, 150 to 400, 500 and 600 are available.

- Transmitter (compact version): 3.4 kg
- Weight data valid for standard pressure ratings and without packaging material.

Weight in US units (only ANSI / AWWA)

Weight data in lbs					
Nominal diameter		Compact version		Remote version (without cable)	
[mm]	[inch]	ANSI / AWWA		Sensor ANSI / AWWA	Transmitter Wall-mount housing
25	1"	Class 150	16.1	Class 150	11.7
40	1½"		20.7		16.3
50	2"		23.4		19.0
80	3"		30.9		26.5
100	4"		35.3		30.9
150	6"		56.2		51.8
200	8"		99.2		94.8
250	10"		165.4		161.0
300	12"		242.6		238.1
350	14"		385.9		381.5
400	16"		452.0		447.6
450	18"		562.3		557.9
500	20"		628.4		624.0
600	24"		893.0		888.6
700	28"	Class D	882.0	Class D	877.6
–	30"		1014.3		1009.9
800	32"		1212.8		1208.3
900	36"		1764.0		1759.6
1000	40"		1984.5		1980.1
–	42"		2425.5		2421.1
1200	48"		3087.0		3082.6
–	54"		4851.0		4846.6
–	60"		5953.5		5949.1
–	66"		8158.5		8154.1
1800	72"		9040.5		9036.1
–	78"		10143.0		10138.6

13.2

- Transmitter (compact version): 7.5 lbs
- Weight data valid for standard pressure ratings and without packaging material.

Measuring tube specifications

Diameter		Pressure rating						Internal diameter			
		EN (DIN)	AS 2129	AS 4087	ANSI	AWWA	JIS	Hard rubber		Polyurethane	
[mm]	[inch]	[bar]			[lbs]			[mm]	[inch]	[mm]	[inch]
25	1"	PN 40	–	–	Cl. 150	–	20 K	–	–	24	0.94
32	–	PN 40	–	–	–	–	20 K	–	–	32	1.26
40	1 ½"	PN 40	–	–	Cl. 150	–	20 K	–	–	38	1.50
50	2"	PN 40	Table E	PN 16	Cl. 150	–	10 K	50	1.97	50	1.97
65	–	PN 16	–	–	–	–	10 K	66	2.60	66	2.60
80	3"	PN 16	Table E	PN 16	Cl. 150	–	10 K	79	3.11	79	3.11
100	4"	PN 16	Table E	PN 16	Cl. 150	–	10 K	102	4.02	102	4.02
125	–	PN 16	–	–	–	–	10 K	127	5.00	127	5.00
150	6"	PN 16	Table E	PN 16	Cl. 150	–	10 K	156	6.14	156	6.14
200	8"	PN 10	Table E	PN 16	Cl. 150	–	10 K	204	8.03	204	8.03
250	10"	PN 10	Table E	PN 16	Cl. 150	–	10 K	258	10.2	258	10.2
300	12"	PN 10	Table E	PN 16	Cl. 150	–	10 K	309	12.2	309	12.2
350	14"	PN 6	Table E	PN 16	Cl. 150	–	–	342	13.5	342	13.5
375	15"	–	–	PN 16	–	–	–	392	15.4	–	–
400	16"	PN 6	Table E	PN 16	Cl. 150	–	–	392	15.4	392	15.4
450	18"	PN 6	–	–	Cl. 150	–	–	437	17.2	437	17.2
500	20"	PN 6	Table E	PN 16	Cl. 150	–	–	492	19.4	492	19.4
600	24"	PN 6	Table E	PN 16	Cl. 150	–	–	594	23.4	594	23.4
700	28"	PN 6	–	–	–	Class D	–	692	27.2	692	27.2
–	30"	–	–	–	–	Class D	–	742	29.2	742	29.2
800	32"	PN 6	–	–	–	Class D	–	794	31.3	794	31.3
900	36"	PN 6	–	–	–	Class D	–	891	35.1	891	35.1
1000	40"	PN 6	–	–	–	Class D	–	994	39.1	994	39.1
–	42"	–	–	–	–	Class D	–	1043	41.1	1043	41.1
1200	48"	PN 6	–	–	–	Class D	–	1197	47.1	1197	47.1
–	54"	–	–	–	–	Class D	–	1339	52.7	–	–
1400	–	PN 6	–	–	–	–	–	1402	55.2	–	–
–	60"	–	–	–	–	Class D	–	1492	58.7	–	–
1600	–	PN 6	–	–	–	–	–	1600	63.0	–	–
–	66"	–	–	–	–	Class D	–	1638	64.5	–	–
1800	72"	PN 6	–	–	–	Class D	–	1786	70.3	–	–
2000	78"	PN 6	–	–	–	Class D	–	1989	78.3	–	–

Material

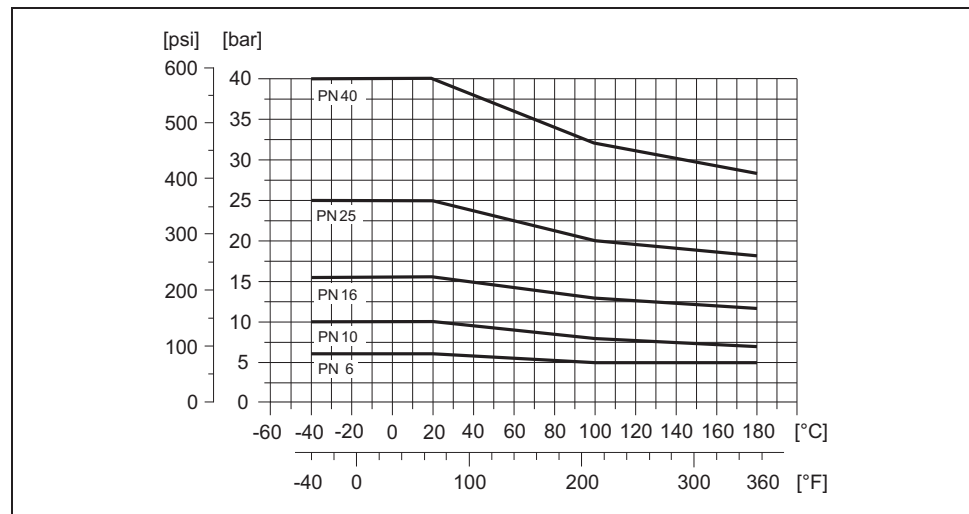
- Transmitter housing
 - Compact housing: powder-coated die-cast aluminum
 - Wall-mount housing: powder-coated die-cast aluminum
- Sensor housing
 - DN 25 to 300 (1 to 12"): powder-coated die-cast aluminum
 - DN 350 to 2000 (14 to 78"): with protective lacquering
- Measuring tube
 - DN ≤ 300 (12"): stainless steel 1.4301 or 1.4306/304L;
(for flanges made of carbon steel with Al/Zn protective coating)
 - DN ≥ 350 (14"): stainless steel 1.4301 or 1.4306/304L;
(for flanges made of carbon steel with Al/Zn protective coating)
- Electrodes: 1.4435, Alloy C-22, Tantalum
- Flanges
 - EN 1092-1 (DIN 2501): 1.4571/316L; RSt37-2 (S235JRG2); C22; FE 410W B
(DN ≤ 300 (12"): with Al/Zn protective coating; DN ≥ 350 (14") with protective lacquering)
 - ANSI: A105; F316L
(DN ≤ 300 (12"): with Al/Zn protective coating; DN ≥ 350 (14") with protective lacquering)
 - AWWA: 1.0425
 - JIS: RSt37-2 (S235JRG2); HII; 1.0425/316L
(DN ≤ 300 (12"): with Al/Zn protective coating; DN ≥ 350 (14") with protective lacquering)
 - AS 2129
 - DN 150 to 300, 600 (6 to 12", 24"): A105 or RSt37-2 (S235JRG2)
 - DN 50, 80, 100, 350, 400, 500 (2", 3", 4", 14", 16", 20"): A105 or St44-2 (S275JR)
 - AS 4087: A105 or St44-2 (S275JR)
- Seals: to DIN EN 1514-1
- Ground disks: 1.4435/316L, Alloy C-22, Tantalum

Material load diagram**Caution!**

The following diagrams contain material load diagrams (reference curves) for flange materials with regard to the medium temperature. However, the maximum medium temperatures permitted always depend on the lining material of the sensor and/or the sealing material (→ 21).

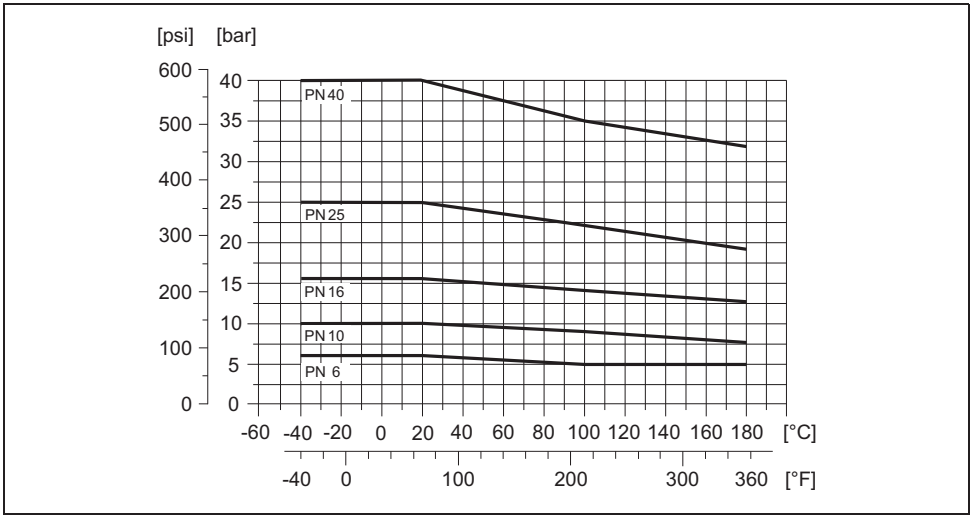
Flange connection to EN 1092-1 (DIN 2501)

Material: RSt37-2 (S235JRG2) / C22 / Fe 410W B



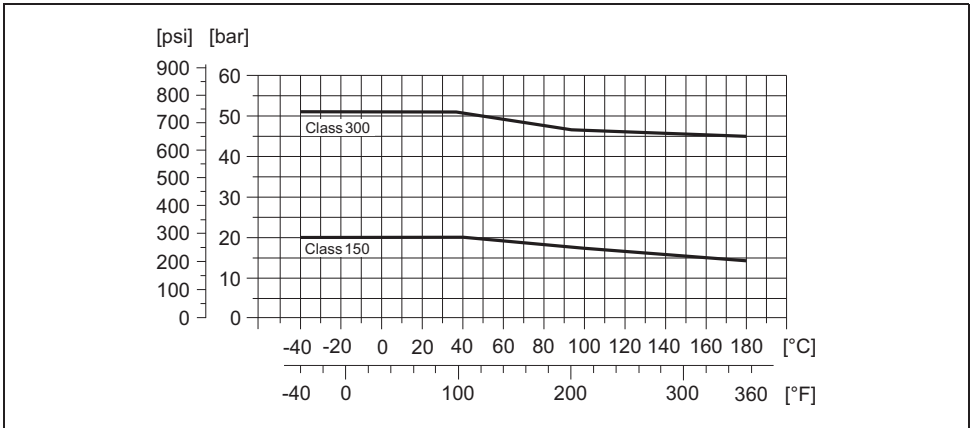
A0005594

Flange connection to EN 1092-1 (DIN 2501)
Material: 316L / 1.4571



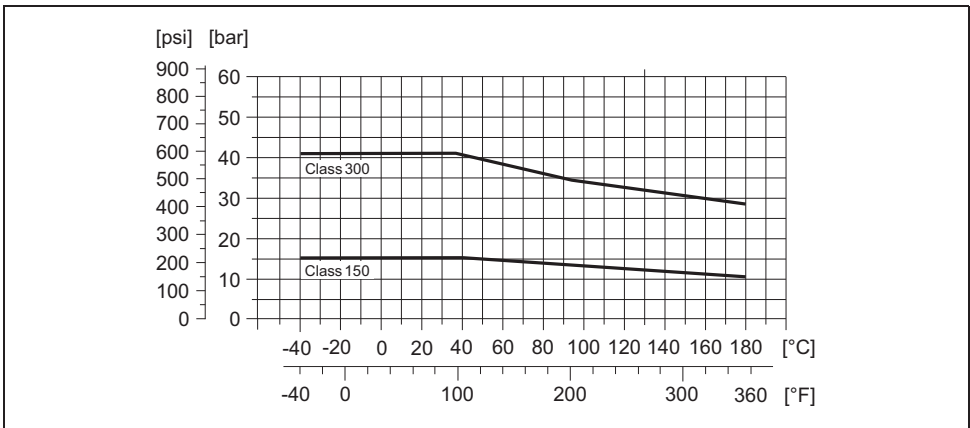
A0005304

Flange connection to ANSI B16.5
Material: A 105



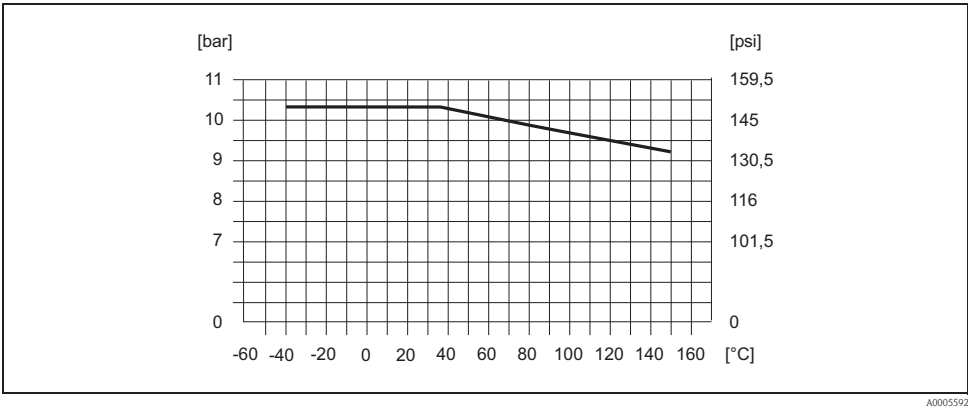
A0003226

Flange connection to ANSI B16.5
Material: F316L

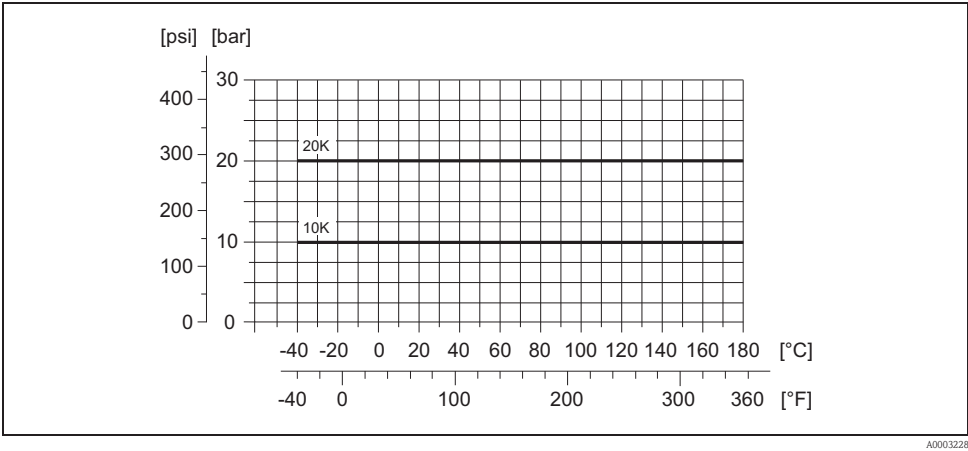


A0005307

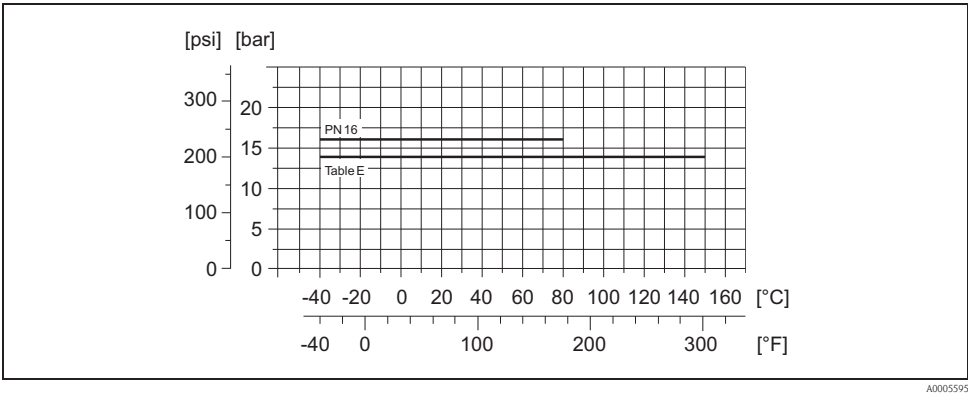
Flange connection to AWWA C 207, Class D
Material: 1.0425



Flange connection to JIS B2220
Material: RSt37-2 (S235JRG2) / HII / 1.0425 / 316L



Flange connection to AS 2129 Table E or AS 4087 PN 16
Material: A105 / RSt37-2 (S235JRG2) / St44-2 (S275JR)



Fitted electrodes	Measuring electrodes, reference electrodes and empty pipe detection electrodes: ■ Standard available with 1.4435, Alloy C-22, tantalum ■ Optional: exchangeable measuring electrodes made of 1.4435 (DN 350 to 2000 / 14 to 78")
Process connections	Flange connection: ■ EN 1092-1 (DIN 2501), DN ≤ 300 (12") form A, DN ≥ 350 (14") form B (Dimensions to DIN 2501, DN 65 PN 16 and DN 600 (24") PN 16 exclusively to EN 1092-1) ■ ANSI B16.5 ■ AWWA C 207, Class D ■ JIS B2220 ■ AS 2129 Table E ■ AS 4087 PN 16
Surface roughness	■ Electrodes – 1.4435, Alloy C-22, tantal: ≤ 0.3 to 0.5 µm (≤ 11.8 to 19.7 µin) (all data refer to parts in contact with medium)

Human interface

Display elements	■ Liquid crystal display: backlit, two lines (Promag 50) or four lines (Promag 53) with 16 characters per line ■ Custom configurations for presenting different measured-value and status variables ■ Totalizer – Promag 50: 2 totalizers – Promag 53: 3 totalizers
Operating elements	Unified operation concept for both types of transmitter: Promag 50: ■ Local operation via three keys (◀, +, E) ■ Quick Setup menus for straightforward commissioning Promag 53: ■ Local operation via three keys (◀, +, E) ■ Application-specific Quick Setup menus for straightforward commissioning
Language groups	Language groups available for operation in different countries: Promag 50, Promag 53: ■ Western Europe and America (WEA): English, German, Spanish, Italian, French, Dutch, Portuguese ■ Eastern Europe and Scandinavia (EES): English, Russian, Polish, Norwegian, Finnish, Swedish, Czech ■ South and east Asia (SEA): English, Japanese, Indonesian Promag 53: ■ China (CN): English, Chinese You can change the language group via the operating program "FieldCare".
Remote operation	■ Promag 50: Remote control via HART, PROFIBUS DP/PA ■ Promag 53: Remote control via HART, PROFIBUS DP/PA, MODBUS RS485, FOUNDATION Fieldbus

Certificates and approvals

CE mark	The measuring system is in conformity with the statutory requirements of the EC Directives. Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.
C-tick mark	The measuring system meets the EMC requirements of the "Australian Communications and Media Authority (ACMA)".
Pressure measuring device approval	Measuring devices with a nominal diameter smaller than or equal to DN 25 correspond to Article 3(3) of the EC Directive 97/23/EC (Pressure Equipment Directive) and have been designed and manufactured according to good engineering practice. Where necessary (depending on the medium and process pressure), there are additional optional approvals to Category II/III for larger nominal diameters.
Ex approval	Information about currently available Ex versions (ATEX, IECEx, FM, CSA, NEPSI) can be supplied by your Endress+Hauser Sales Center on request. All explosion protection data are given in a separate documentation which is available upon request.
Other standards and guidelines	■ EN 60529 Degrees of protection by housing (IP code) ■ EN 61010 Protection Measures for Electrical Equipment for Measurement, Control, Regulation and Laboratory Procedures. ■ IEC/EN 61326 "Emission in accordance with requirements for Class A". Electromagnetic compatibility (EMC requirements) ■ NAMUR NE 21: Electromagnetic compatibility (EMC) of industrial process and laboratory control equipment. ■ NAMUR NE 43: Standardization of the signal level for the breakdown information of digital transmitters with analog output signal. ■ NAMUR NE 53: Software of field devices and signal-processing devices with digital electronics. ■ ANSI/ISA-S82.01 Safety Standard for Electrical and Electronic Test, Measuring, Controlling and related Equipment - General Requirements Pollution degree 2, Installation Category II. ■ CAN/CSA-C22.2 No. 1010.1-92 Safety requirements for Electrical Equipment for Measurement and Control and Laboratory Use. Pollution degree 2, Installation Category II
FOUNDATION Fieldbus certification	The flow device has successfully passed all the test procedures carried out and is certified and registered by the Fieldbus Foundation. The device thus meets all the requirements of the following specifications: ■ Certified to FOUNDATION Fieldbus Specification ■ The device meets all the specifications of the FOUNDATION Fieldbus H1. ■ Interoperability Test Kit (ITK), revision status 5.01 (device certification number: on request) ■ The device can also be operated with certified devices of other manufacturers ■ Physical Layer Conformance Test of the Fieldbus Foundation
MODBUS RS485 certification	The measuring device meets all the requirements of the MODBUS/TCP conformity test and has the "MODBUS/TCP Conformance Test Policy, Version 2.0". The measuring device has successfully passed all the test procedures carried out and is certified by the "MODBUS/TCP Conformance Test Laboratory" of the University of Michigan.
PROFIBUS DP/PA certification	The flow device has successfully passed all the test procedures carried out and is certified and registered by the PNO (PROFIBUS User Organisation). The device thus meets all the requirements of the following specifications: ■ Certified to PROFIBUS PA, profile version 3.0 (device certification number: on request) ■ The device can also be operated with certified devices of other manufacturers (interoperability)

Accessories

Various accessories, which can be ordered separately from Endress+Hauser, are available for the transmitter and the sensor. Your Endress+Hauser service organization can provide detailed information on the order codes in question.

Documentation

- Flow Measurement (FA005D/06)
- Operating Instructions Promag Promag 50 (BA046D/06 and BA049D/06)
- Operating Instructions Promag Promag 50 PROFIBUS PA (BA055D/06 and BA056D/06)
- Operating Instructions Promag Promag 53 (BA047D/06 and BA048D/06)
- Operating Instructions Promag Promag 53 FOUNDATION Fieldbus (BA051D/06 and BA052D/06)
- Operating Instructions Promag Promag 53 MODBUS RS485 (BA117D/06 and BA118D/06)
- Operating Instructions Promag Promag 53 PROFIBUS DP/PA (BA053D/06 and BA054D/06)
- Supplementary documentation on Ex-ratings: ATEX, IECEx, FM, CSA, NEPSI

Registered trademarks

HART®

Registered trademark of the HART Communication Foundation, Austin, USA

PROFIBUS®

Registered trademark of the PROFIBUS Nutzerorganisation e.V., Karlsruhe, D

FOUNDATION™ Fieldbus

Registered trademark of the Fieldbus Foundation, Austin, USA

MODBUS®

Registered trademark of the MODBUS Organisation

HistoROM™, S-DAT®, T-DAT™, F-CHIP®, FieldCare®, Fieldcheck®, FieldXpert™, Applicator®

Registered or registration-pending trademarks of Endress+Hauser Flowtec AG, Reinach, CH

Order Codes

NOTE: Endress+Hauser reserves the right to change or modify product, specifications, and ordering information at any time without notice.
Please consult Endress+Hauser or your local representative for the most recent information.

Please note that the Promag 50W/53W is also available with:

Hard rubber and Polyurethane liners; ACS, KTW/W270 and WRAS B59620 approvals
PED Cat. II / III material certificates
ATEX and NEPSI hazardous area approvals
DIN2501 and JIS B2220 process connections

Consult factory for information.

Promag 50W, 1" to 24"

Promag 50W -

Nominal Diameter

- 25 1"
- 40 1-1/2"
- 50 2"
- 80 3"
- 1H 4"
- 1F 6"
- 2H 8"
- 2F 10"
- 3H 12"
- 3F 14"
- 4H 16"
- 4F 18"
- 5H 20"
- 6H 24"
- 010 Liner
 - D Hard rubber, NSF61 drinking water approval (not available for 1", 1-1/2" or 2" sensors)
 - H Hard rubber (not available for 1", 1-1/2" or 2" sensors)
 - P Polyurethane, NSF61 drinking water approval
 - S Hard rubber HR (not available for 1", 1-1/2" or 2" sensors)
 - U Polyurethane
 - 9 Special version, to be specified
- 020 Process connection
 - L Class 150 ANSI B16.5 CS steel A105 flanges
 - M Class 300 ANSI B16.5 CS steel A105 flanges (not for 8" and larger)
 - R Class 150 ANSI B16.5 316L SS flanges
 - S Class 300 ANSI B16.5 316L SS flanges (not for 8" and larger)
 - 9 Special version, to be specified
- 030 Electrodes / material
 - 0 Measuring, reference and EPD electrodes / 316L SS
 - 1 Measuring, reference and EPD electrodes / Alloy C22
 - 2 Measuring, reference and EPD electrodes / tantalum
 - 7 Measuring electrode, exchangeable / 316L SS (for hard rubber liner only, 14" and larger sensors, no EPD or reference electrodes, for safe areas only)
 - G Measuring, reference and EPD electrodes, bullet nose / 316L SS
 - H Measuring, reference and EPD electrodes, bullet nose / Alloy C-22
 - 9 Special version, to be specified
- 040 Calibration
 - A 3-point calibration, 0.5%
 - B 3-point calibration, 0.2%
 - D SCS/A2LA 3-point 0.5% calibration (ISO/IEC 17025) with certificate traceable according to ISO 9000 (specify range)
 - E SCS/A2LA 3-point 0.2% calibration (ISO/IEC 17025) with certificate traceable according to ISO 9000 (specify range)
 - 9 Special version, to be specified
- 050 Certificates
 - 1 Standard, no certificate
 - 2 3.1B material certificate for pipe and flanges
 - 3 2.3 pressure test certificate (1.5 x PN, 3 minutes) for sensors up to 12" only
 - 4 3.1B material and 2.3 pressure test certificate for sensors up to 12" only
 - 5 CRN approval
 - 8 CRN approval + material certificate + pressure test
 - 9 Special version, to be specified
- 060 Approvals
 - A For use in non-hazardous areas
 - N FM explosion proof Class I, Div. 1 / CSA Class I, Div. 1 (only for aluminum field housing, compact version, not for 14" and larger sensors)
 - R FM non-incendive Class I, Div. 2 / CSA Class I, Div. 2

070 Housing

- A NEMA 4X (IP 67) compact aluminum housing
- C NEMA 4X (IP 67) remote wall-mounted (only for approvals A or R)
- G NEMA 4X (IP 67) remote aluminum field housing for non-hazardous areas
- K NEMA 6P sensor, wall-mounted housing (only for approvals A or R)
- N NEMA 6P sensor, aluminum field housing, non-hazardous
- P NEMA 4X (IP 67) compact aluminum housing, HE (harsh environment), compact and remote sensor sizes up to 12" only *
- S NEMA 4X (IP 67) remote wall-mounted housing, HE (harsh environment), remote sensor sizes 14" to 78" (only for approvals A and R) *
- 1 -40°F (-40°C) ambient temperature, NEMA 4X (IP 67), compact, aluminum field housing (only for approvals A and R)
- 3 -40°F (-40°C) ambient temperature, NEMA 4X (IP 67), compact (only for approvals A and R)
- 5 -40°F (-40°C) ambient temperature, NEMA 4X (IP 67) wall mount housing, for NEMA 6P sensor (only for approvals A and R)
- 9 Special version, to be specified

080 Cable for remote

- 0 Without cable
- 1 15 foot coil and signal cable
- 2 30 foot coil and signal cable
- 5 Coil and signal cable, specify length (maximum 650 ft depending on conductivity of process material)
- 7 Coil and signal cable, flexible conduit, specify length (maximum 650 ft depending on conductivity of process material)
- 9 Special version, to be specified

090 Cable entries

- B 1/2" NPT
- L 1/2" NPT fieldbus connector (only for approval A and R)
- 9 Special version, to be specified

100 Power supply / display

- 7 85 to 260 VAC, without display, remote configuration only (not for wall mount or SS housing)
- 8 20 to 55 VAC / 16 to 62 VDC, without display, remote configuration only (not for wall mount or SS housing)
- A 85 to 260 VAC, with display, push button operation (language: EN, ES, FR, IT, NL, PT, DE)
- B 20 to 55 VAC / 16 to 62 VDC, with display, push button operation (language: EN, ES, FR, IT, NL, PT, DE)
- X Sensor only (without transmitter, only available up to 8")
- 9 Special version, to be specified

110 Software

- A Standard software
- X Sensor only (up to 8" only)
- 9 Special version, to be specified

120 Outputs / Inputs

- A Current HART, SIL, frequency
- D Current HART, SIL, frequency, status output, status input
- H PROFIBUS-PA (approvals A and R only)
- J PROFIBUS-DP (approvals A and R only)
- S Current HART, SIL, frequency; active I.S. (not for approvals A and R)
- T Current HART, SIL, frequency; passive I.S. (not for approvals A and R)
- W Current HART, SIL
- X Sensor only
- 9 Special version, to be specified

* Harsh environment (HE) option is available for process conditions where cool process temperatures in tropical (high humidity) environments or process fluids which undergo large cyclical temperature variations which can cause high amounts of moisture that could condense onto the measurement tube.

Promag 50W, 28" to 78"

Promag 50W -

Nominal Diameter

7H 28"
7F 30", AWWA
8H 32"
9H 36"
TO 40"
VO 42", AWWA
T2 48"
V3 54", AWWA
V5 60", AWWA
V6 66", AWWA
T8 72"
V9 78", AWWA

010 Liner

D Hard rubber, NSF61 drinking water approval
H Hard rubber
P Polyurethane, NSF61 drinking water approval (not available for 42" up to 78")
S Hard rubber HR
U Polyurethane (not available for 42" up to 78")
9 Special version, to be specified

020 Process connection

P Class D AWWA carbon steel A105 flanges
9 Special version, to be specified

030 Electrodes / material

0 Measuring, reference and EPD electrodes / 316L SS
1 Measuring, reference and EPD electrodes / Alloy C22
2 Measuring, reference and EPD electrodes / tantalum
7 Measuring electrode, exchangeable / 316L SS (for hard rubber liner only, 14" and larger sensors, no EPD or reference electrodes, for safe areas only)
G Measuring, reference and EPD electrodes, bullet nose / 316L SS
H Measuring, reference and EPD electrodes, bullet nose / Alloy C-22
9 Special version, to be specified

040 Calibration

A 3-point calibration, 0.5%
B 3-point calibration, 0.2%
D SCS/A2LA 3-point 0.5% calibration (ISO/IEC 17025) with certificate traceable according to ISO 9000 (specify range)
E SCS/A2LA 3-point 0.2% calibration (ISO/IEC 17025) with certificate traceable according to ISO 9000 (specify range)
9 Special version, to be specified

050 Certificates

1 Standard, no certificate
2 3.1B material certificate for pipe and flanges
9 Special version, to be specified

060 Approvals

A For use in non-hazardous areas
R FM non-incendive Class I, Div. 2 / CSA Class I, Div. 2

070 Housing

A NEMA 4X (IP 67) compact aluminum housing
C NEMA 4X (IP 67) remote wall-mounted (only for approvals A or R)
G NEMA 4X (IP 67) remote aluminum field housing for non-hazardous areas
K NEMA 6P sensor, wall-mounted housing (only for approvals A or R)
S NEMA 4X (IP 67) remote wall-mounted housing, HE (harsh environment), remote sensor sizes 14" to 78" (only for approvals A and R) *
1 -40°F (-40°C) ambient temperature, NEMA 4X (IP 67), compact, aluminum field housing (only for approvals A and R)
3 -40°F (-40°C) ambient temperature, NEMA 4X (IP 67), compact (only for approvals A and R)
5 -40°F (-40°C) ambient temperature, NEMA 4X (IP 67) wall mount housing, for NEMA 6P sensor (only for approvals A and R)
9 Special version, to be specified

080 Cable for remote

0 Without cable
1 15 foot coil and signal cable
2 30 foot coil and signal cable
5 Coil and signal cable, specify length (maximum 650 ft depending on conductivity of process material)
7 Coil and signal cable, flexible conduit, specify length (maximum 650 ft depending on conductivity of process material)
9 Special version, to be specified

090 Cable entries

B 1/2" NPT
L 1/2" NPT fieldbus connector (only for approval A and R)
9 Special version, to be specified

100 Power supply / display

7 85 to 260 VAC, without display, remote configuration only (not for wall mount or SS housing)
8 20 to 55 VAC / 16 to 62 VDC, without display, remote configuration only (not for wall mount or SS housing)
A 85 to 260 VAC, with display, push button operation (language: EN, ES, FR, IT, NL, PT, DE)
B 20 to 55 VAC / 16 to 62 VDC, with display, push button operation (language: EN, ES, FR, IT, NL, PT, DE)
X Sensor only (without transmitter, only available up to 8")
9 Special version, to be specified

110 Software

A Standard software
9 Special version, to be specified

120 Outputs / Inputs

A Current HART, SIL, frequency
D Current HART, SIL, frequency, status output, status input
H PROFIBUS-PA (approvals A and R only)
J PROFIBUS-DP (approvals A and R only)
S Current HART, SIL, frequency; active I.S. (not for approvals A and R)
T Current HART, SIL, frequency; passive I.S. (not for approvals A and R)
W Current HART, SIL
X Sensor only
9 Special version, to be specified

* Harsh environment (HE) option is available for process conditions where cool process temperatures in tropical (high humidity) environments or process fluids which undergo large cyclical temperature variations which can cause high amounts of moisture that could condense onto the measurement tube.

Promag 53W, 1" to 24"

Promag 53W -

Nominal Diameter

25 1"
40 1-1/2"
50 2"
80 3"
1H 4"
1F 6"
2H 8"
2F 10"
3H 12"
3F 14"
4H 16"
4F 18"
5H 20"
6H 24"

010 Liner

D Hard rubber, NFS61 drinking water approval (not available for 1", 1-1/2" or 2" sensors)
H Hard rubber (not available for 1", 1-1/2" or 2" sensors)
P Polyurethane, NSF61 drinking water approval
S Hard rubber HR (not available for 1", 1-1/2" or 2" sensors)
U Polyurethane
9 Special version, to be specified

020 Process connection

L Class 150 ANSI B16.5 CS steel A105 flanges
M Class 300 ANSI B16.5 CS steel A105 flanges (not for 8" and larger)
R Class 150 ANSI B16.5 316L SS flanges
S Class 300 ANSI B16.5 316L SS flanges (not for 8" and larger)
9 Special version, to be specified

030 Electrodes / material

0 Measuring, reference and EPD electrodes / 316L SS
1 Measuring, reference and EPD electrodes / Alloy C22
2 Measuring, reference and EPD electrodes / tantalum
7 Measuring electrode, exchangeable / 316L SS (for hard rubber liner only, 14" and larger sensors, no EPD or reference electrodes, for safe areas only)
G Measuring, reference and EPD electrodes, bullet nose / 316L SS
H Measuring, reference and EPD electrodes, bullet nose / Alloy C-22
9 Special version, to be specified

040 Calibration

B 3-point calibration, 0.2%
E SCS/A2LA 3-point, 0.2% calibration (ISO/IEC 17025) with certificate traceable according to ISO 9000 (specify range)
9 Special version, to be specified

050 Certificates

1 Standard, no certificate
2 3.1B material certificate for pipe and flanges
3 2.3 pressure test certificate (1.5 x PN, 3 minutes) for sensors up to 12" only
4 3.1B material and 2.3 pressure test certificate for sensors up to 12" only
5 CRN approval
8 CRN approval + material certificate + pressure test
9 Special version, to be specified

060 Approvals

A For use in non-hazardous areas
N FM explosion proof Class I, Div. 1 / CSA Class I, Div. 1 (only for aluminum field housing, compact version, not for 14" and larger sensors)
R FM non-incendive Class I, Div. 2 / CSA Class I, Div. 2

070 Housing

A NEMA 4X (IP 67) compact aluminum housing
C NEMA 4X (IP 67) remote wall-mounted (only for approvals A or R)
G NEMA 4X (IP 67) remote aluminum field housing for non-hazardous areas
K NEMA 6P sensor, wall-mounted housing (only for approvals A or R)
N NEMA 6P sensor, aluminum field housing, non-hazardous
P NEMA 4X (IP 67) compact aluminum housing, HE (harsh environment), compact and remote sensor sizes up to 12" only *
S NEMA 4X (IP 67) remote wall-mounted housing, HE (harsh environment), remote sensor sizes 14" to 78" (only for approvals A and R) *
1 -40°F (-40°C) ambient temperature, NEMA 4X (IP 67), compact, aluminum field housing (only for approvals A and R)
3 -40°F (-40°C) ambient temperature, NEMA 4X (IP 67), compact (only for approvals A and R)
5 -40°F (-40°C) ambient temperature, NEMA 4X (IP 67) wall mount housing, for NEMA 6P sensor (only for approvals A and R)
9 Special version, to be specified

080 Cable for remote

0 Without cable
1 15 foot coil and signal cable
2 30 foot coil and signal cable
5 Coil and signal cable, specify length (maximum 650 ft depending on conductivity of process material)
7 Coil and signal cable, flexible conduit, specify length (maximum 650 ft depending on conductivity of process material)
9 Special version, to be specified

090 Cable entries

B 1/2" NPT
L 1/2" NPT Fieldbus connector (only for approval A and R)
9 Special version, to be specified

100 Power supply / display

7 85 to 260 VAC, without display, remote configuration only (not for wall mount or SS housing)
8 20 to 55 VAC / 16 to 62 VDC, without display, remote configuration only (not for wall mount or SS housing)
A 85 to 260 VAC, with display, push button operation (language: EN, ES, FR, IT, NL, PT, DE)
B 20 to 55 VAC / 16 to 62 VDC, with display, push button operation (language: EN, ES, FR, IT, NL, PT, DE)
X Sensor only (without transmitter, only available up to 8")
9 Special version, to be specified

110 Software

A Standard software
C ECC electrode cleaning circuit (only for approvals A and R)
9 Special version, to be specified

120 Outputs / Inputs

Fixed communication boards
A Current HART, SIL, frequency
B Current HART, SIL, frequency, 2 relays
F PROFIBUS-PA, IS
G Foundation Fieldbus, IS
H PROFIBUS-PA
J PROFIBUS-DP
K Foundation Fieldbus
Q Modbus RS485, status input
S Current HART, SIL, frequency; active I.S
T Current HART, SIL, frequency; passive I.S
Flexible communication boards
C Current HART, SIL, frequency, 2 relays, flexible module
D Current HART, SIL, frequency, relay, and status input, flexible module
L Current HART, SIL, 2 relays and status input/output
M Current HART, SIL, 2 frequency output, status input
N Modbus RS 485, current and frequency output, status input
P PROFIBUS-DP, current and frequency output, status input
V PROFIBUS-DP, two relay outputs, status input
2 Current HART, SIL, relay, current, frequency outputs
4 Current HART, SIL, relay, frequency outputs, current input
7 Modbus RS485, two relay outputs, status input
X Sensor only
9 Special version, to be specified

* Harsh environment (HE) option is available for process conditions where cool process temperatures in tropical (high humidity) environments or process fluids which undergo large cyclical temperature variations which can cause high amounts of moisture that could condense onto the measurement tube.

Promag 53W, 28" to 78"

Promag 53W -

Nominal Diameter

- | | | | | | | | | | | | | | | |
|----|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 7H | 28" | | | | | | | | | | | | | |
| 7F | 30", AWWA | | | | | | | | | | | | | |
| 8H | 32" | | | | | | | | | | | | | |
| 9H | 36" | | | | | | | | | | | | | |
| TO | 40" | | | | | | | | | | | | | |
| VO | 42", AWWA | | | | | | | | | | | | | |
| T2 | 48" | | | | | | | | | | | | | |
| V3 | 54", AWWA | | | | | | | | | | | | | |
| V5 | 60", AWWA | | | | | | | | | | | | | |
| V6 | 66", AWWA | | | | | | | | | | | | | |
| T8 | 72" | | | | | | | | | | | | | |
| V9 | 78", AWWA | | | | | | | | | | | | | |
- 010 Liner
D Hard rubber, NSF61 drinking water approval
H Hard rubber
P Polyurethane, NSF61 drinking water approval (not available for 42" to 78" sensors)
S Hard rubber HR
U Polyurethane (not available for 42" to 78" sensors)
9 Special version, to be specified
- 020 Process connection
P Class D AWWA carbon steel A105 flanges
9 Special version, to be specified
- 030 Electrodes / material
0 Measuring, reference and EPD electrodes / 316L SS
1 Measuring, reference and EPD electrodes / Alloy C22
2 Measuring, reference and EPD electrodes / tantalum
7 Measuring electrode, exchangeable / 316L SS (for hard rubber liner only, 14" and larger sensors, no EPD or reference electrodes, for safe areas only)
G Measuring, reference and EPD electrodes, bullet nose / 316L SS
H Measuring, reference and EPD electrodes, bullet nose / Alloy C-22
9 Special version, to be specified
- 040 Calibration
B 3-point calibration, 0.2%
E SCS/A2LA 3-point 0.2% calibration (ISO/IEC 17025) with certificate traceable according to ISO 9000 (specify range)
9 Special version, to be specified
- 050 Certificates
1 Standard, no certificate
2 3.1B material certificate for pipe and flanges
9 Special version, to be specified
- 060 Approvals
A For use in non-hazardous areas
R FM non-incendive Class I, Div. 2 / CSA Class I, Div. 2
- 070 Housing
A NEMA 4X (IP 67) compact aluminum housing
C NEMA 4X (IP 67) remote wall-mounted (only for approvals A or R)
G NEMA 4X (IP 67) remote aluminum field housing for non-hazardous areas
K NEMA 6P sensor, wall-mounted housing (only for approvals A or R)
S NEMA 4X (IP 67) remote wall-mounted housing, HE (harsh environment), remote sensor sizes 14" to 78" (only for approvals A and R) *
1 -40°F (-40°C) ambient temperature, NEMA 4X (IP 67), compact, aluminum field housing (only for approvals A and R)
3 -40°F (-40°C) ambient temperature, NEMA 4X (IP 67), compact (only for approvals A and R)
5 -40°F (-40°C) ambient temperature, NEMA 4X (IP 67) wall mounting housing, for NEMA 6P sensor (only for approvals A and R)
9 Special version, to be specified
- 080 Cable for remote
0 Without cable
1 15 foot coil and signal cable
2 30 foot coil and signal cable
5 Coil and signal cable, specify length (maximum 650 ft depending on conductivity of process material)
7 Coil and signal cable, flexible conduit, specify length (maximum 650 ft depending on conductivity of process material)
9 Special version, to be specified
- 090 Cable entries
B 1/2" NPT
L 1/2" NPT Fieldbus connector (only for approval A and R)
9 Special version, to be specified
- 100 Power supply / display
7 85 to 260 VAC, without display, remote configuration only (not for wall mount or SS housing)
8 20 to 55 VAC / 16 to 62 VDC, without display, remote configuration only (not for wall mount or SS housing)
A 85 to 260 VAC, with display, push button operation (language: EN, ES, FR, IT, NL, PT, DE)
B 20 to 55 VAC / 16 to 62 VDC, with display, push button operation (language: EN, ES, FR, IT, NL, PT, DE)
9 Special version, to be specified
- 110 Software
A Standard software
C ECC electrode cleaning circuit (only for approvals A and R)
9 Special version, to be specified
- 120 Outputs / Inputs
Fixed communication boards
A Current HART, SIL, frequency
B Current HART, SIL, frequency, 2 relays
F PROFIBUS-PA, IS
G Foundation Fieldbus, IS
H PROFIBUS-PA
J PROFIBUS-DP
K Foundation Fieldbus
Q Modbus RS485, status input
S Current HART, SIL, frequency; active I.S
T Current HART, SIL, frequency; passive I.S
Flexible communication boards
C Current HART, SIL, frequency, 2 relays, flexible module
D Current HART, SIL, frequency, relay, and status input, flexible module
L Current HART, SIL, 2 relays and status input/output
M Current HART, SIL, 2 frequency output, status input
N Modbus RS 485, current and frequency output, status input
P PROFIBUS-DP, current and frequency output, status input
V PROFIBUS-DP, two relay outputs, status input
2 Current HART, SIL, relay, current, frequency outputs
4 Current HART, SIL, relay, frequency outputs, current input
7 Modbus RS485, two relay outputs, status input
X Sensor only
9 Special version, to be specified

* Harsh environment (HE) option is available for process conditions where cool process temperatures in tropical (high humidity) environments or process fluids which undergo large cyclical temperature variations which can cause high amounts of moisture that could condense onto the measurement tube.

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OPERATION AND MAINTENANCE MANUAL

AMARUQ WTP – NUNAVUT

VEOLIA PROJECT: 5000 218 009

4 – DETAILED TECHNICAL DOCUMENTATION

4.3 – SHOP DRAWINGS

4.3.13 – SLUDGE TANKS

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Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0013_SLG

by: BB

chkd: GP

appvd: CB



SUBMITTAL PACKAGE

SLUDGE TANKS

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Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0013_SLG

by: BB

chkd: GP

appvd: CB



SLUDGE TANKS

VALVES

OIM manual section: 4.3.13.1

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CS-301-1110 : Identification sheet



VWTC PROJECT NUMBER:	5000218009	REV:	1
PROJECT NAME:	AEM AMARUQ	SUBMITTED TO (COMPANY):	AGNICO EAGLE MINES
ENGINEER:	Gabriel Hébert	SUBMITTED TO (RESPONSIBLE):	
PROJECT MANAGER:	Clément B	PROJECT NUM REFERENCE.:	
PHONE NUMBER:		LOT NUMBER:	

SUPPLIER	EQPT CODE	EQPT TAG NO	DIA	DESCRIPTION	INFO 1	INFO 2	INFO 3	APPLIC.	NOTE	REV
CFF	VABLSS200267	PI4-011-V001	DIA: 13 mm (1/2")	ISOLATION VALVE	TYPE: TWO PIECE BALL VALVE 1000 psi W.O.G./MANUFACTURER : CFF//MODEL : SS-2 (1/2")//CONNECTION TYPE : THREADED 13 mm (1/2")//BODY : 316 SS// SEAL SEAT : PTFE TEFLON// STEM : 316 SS C/W MANUAL LEVER			SLUDGE TANK		
CFF	VABLSS200267	PI4-011-V002	DIA: 13 mm (1/2")	ISOLATION VALVE	TYPE: TWO PIECE BALL VALVE 1000 psi W.O.G./MANUFACTURER : CFF//MODEL : SS-2 (1/2")//CONNECTION TYPE : THREADED 13 mm (1/2")//BODY : 316 SS// SEAL SEAT : PTFE TEFLON// STEM : 316 SS C/W MANUAL LEVER			SLUDGE TANK		

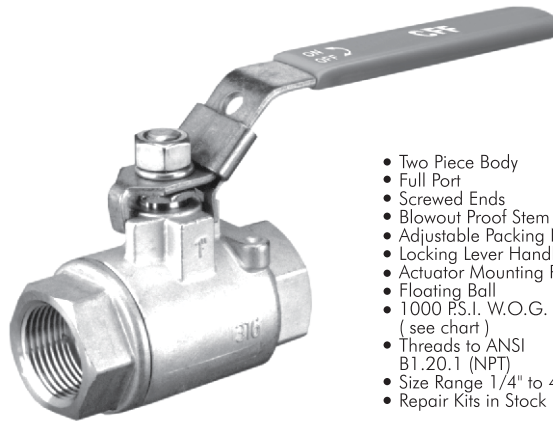
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C.F.F. SS · SERIES 316 STAINLESS STEEL VALVES

BALL VALVES

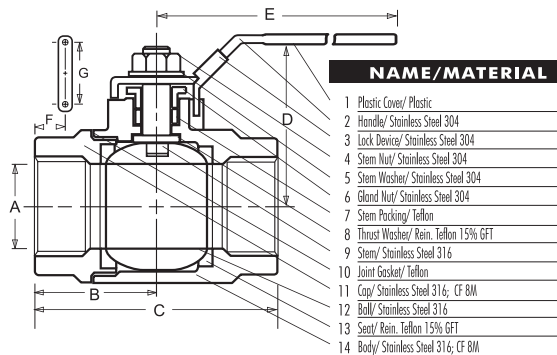


BALL



- Two Piece Body
- Full Port
- Screwed Ends
- Blowout Proof Stem
- Adjustable Packing Nut
- Locking Lever Handle
- Actuator Mounting Pad
- Floating Ball
- 1000 P.S.I. W.O.G.
(see chart)
- Threads to ANSI
B1.20.1 (NPT)
- Size Range 1/4" to 4"
- Repair Kits in Stock

**Manufactured in accordance with
ISO 9002 quality standards.**



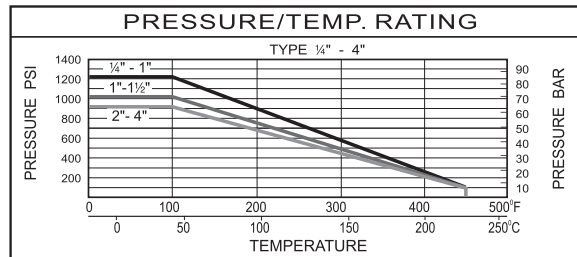
Visit us on-line at:
www.cffstainless.com

SS · 2 BALL VALVE

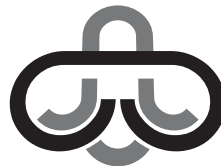
BALL VALVES

DIMENSIONS								
	Nominal Size	(mm/in) A	(mm/in) B	(mm/in) C	(mm/in) D	(mm/in) E	(mm/in) F	(mm/in) G
8	¼	11.6	30	60	45	110	12.7	28.45
		0.457	1.181	2.362	1.772	433.1	0.50	1.120
10	⅜	12.7	30	60	45	110	12.7	28.45
		0.50	1.181	2.362	1.772	433.1	0.50	1.120
15	½	15	32	64	45	130	12.7	28.45
		0.591	1.260	2.520	1.772	5.118	0.50	1.120
20	¾	20	38.5	77	50	130	22.10	34.80
		0.787	1.516	3.032	1.969	5.118	0.87	1.37
25	1	25.4	45	90	65	155	22.10	38.10
		1.00	1.772	3.543	2.559	6.102	0.87	1.37
32	1¼	32	50	100	70	155	23.62	38.10
		1.260	1.967	3.937	2.756	6.102	0.93	1.50
40	1½	38.1	59	118	75	185	23.62	38.10
		1.50	2.323	4.646	2.953	7.283	0.93	1.50
50	2	50.8	68.5	137	85	185	23.62	38.10
		2.00	2.697	5.398	3.346	7.283	0.93	1.50
65	2½	65	82.5	165	136	250	—	70
		2.561	3.248	6.496	5.364	9.843	—	2.756
80	3	80	97.5	195	149	250	—	70
		3.152	3.839	7.677	5.866	9.843	—	2.756

Design and materials are subject to change without notice.



FLOW COEFFICIENT CV										
Size (in.)	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Cv	6	7	10	25	35	46	80	110	310	360
Operating Torques (lbs.)	36	36	43	65	101	158	187	230	430	1380



Visit us on-line at:
www.cffstainless.com



CS-313-200 : Identification sheet

VWTC PROJECT NUMBER:	5000218009	REV:	1
PROJECT NAME:	AEM AMARUQ	SUBMITTED TO (COMPANY):	
ENGINEER:	Gabriel Hébert	SUBMITTED TO (RESPONSIBLE):	
PROJECT MANAGER:	Clément B	PROJECT NUM REFERENCE.:	
PHONE NUMBER:		LOT NUMBER:	

SUPPLIER	EQPT CODE	EQPT TAG NO	DIA	DESCRIPTION	INFO 1	INFO 2	INFO 3	APPLIC.	NOTE	REV
DM VALVE	ST-313-501	FCV4-011	75 mm (3")	PINCH VALVE	TYPE: PINCH VALVE 150 PSI//MANUFACTURER : FLOWROX//MODEL : PVE3AK150-601L- SBRT//CONNECTION TYPE : FLANGED 75 mm (3")//BODY : CAST IRON// SEAL SEAT :N/A// SLEAVE : SBRT	ACTUATOR TYPE : MANUAL// MANUFACTURER : N/A// MODEL # :N/A//	w/ el. Pneum. Positioner	SLUDGE TANK		

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Valve Solutions



Heavy Duty Pinch Valves
General Line Pinch Valves
Slurry Knife Gate Valves
Smart Features
Spares & Services

Valve solutions

For demanding shut-off and control applications

We deliver flow control solutions for the most demanding process conditions. Our story has started over 40 years ago making us the industry benchmark and experts on valve technology. Our robust full bore design enables effortless process flow. We provide services ranging from sizing, materials selection, installation, spare parts and maintenance to optimize the up- and downstream flow.

1977:

Company Larox is established

LAROX

1993:

Company Larox Flowsys Oy is established

**LAROX
FLOWSYS**

2000:

Product portfolio expanded to plastic body PVEG valves



2009:

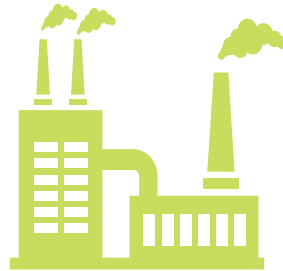
Product portfolio expanded to Slurry Knife Gate Valves



2011 -
Name
changed

**LAROX
FLOWSYS**

FLOWROX



4 DECADES: KNOW-HOW & INDUSTRY EXPERTISE

- Mining, metallurgy & minerals
- Construction
- Energy
- Environment
- Water & wastewater
- Chemical process industry
- Oil & offshore
- Pulp & paper
- Food & pharma

2014:

Flowrox biggest DN1200 knife gate valves delivered for mining application

2016:

Launch of Smart Solutions™



**OVER
100 000
products
delivered
Globally**



WE PROVIDE THE OPTIMAL SOLUTION:

Ball valve



Flowrox valve solution



The shown comparison of cost over a period of 5 years on a DN100 pinch valve feeding abrasive slurry. The valve operates 4-6 times/hour. The conventional valve is a stainless ball valve with PTFE seats.

YOUR BENEFITS

Low Total Cost of Ownership

Low operating costs

Improved process performance

Long service intervals

Minimized downtime

Heavy duty design

Flowrox Valve Product Portfolio

> Pinch Valves



Heavy duty pinch valves

- Pressure rating up to 100 bar
- Size DN25 - 800
- High cycling applications
- For isolation & control purposes



General line pinch valves

- Pressure rating 10 bar
- Size DN50 - 250
- Low cycling applications
- For isolation duty

> Slurry Knife Gate Valves



SKW

- Without flange
- Pressure rating 10 bar
- Size DN50 - 600
- Isolation duties only



SKF

- With flange
- Pressure rating 10 bar
- Size DN80 - 1200
- Isolation duties only



SKH

- Without flange
- Pressure rating 20 bar
- Size DN80 - 600
- Isolation duties only

> Smart Solutions™



Enhance your performance with Smart Solutions™

- Smart valve series provide online information about the process, valve operations and condition of the valve.
- Enables advanced reporting and data analytics, making your process more reliable and transparent
- Fast analysis of faults and planning of maintenance

> Services



Comprehensive Valve Installation, Maintenance and Spare Services

- Site survey services
- Spare parts and component services
- Installation and maintenance services, repairing services
- Analysis services / commissioning / training

Expansion project: Saving time during start-up with 330 Flowrox valves

Customer:

Trafigura Mining Group, MATSA mine, Spain

Products:

330 PVE enclosed body & PVG shut-off valves

Application: Ore & water treatment & process water supply in copper, zinc and lead mining

Benefits: Increased safety, easy installation & maintenance, process reliability, light-weight products.



Long-term benefits in ownership

The Tranfigura Mining Group ordered 330 Flowrox PVE enclosed body pinch valves and PVG shut-off pinch valves for various demanding flow control and shut-off duties, from ore treatment to water treatment plant and process water supply.

“When the project was engineered, we constantly had in mind that the choice of appropriate instrumentation for each application is fundamental to the process performance. We decided that all control valves and also some of the shut-off valves would be pinch valves, which finally ended up saving us a lot of time in the start-up of the plant,” says Ms. **Luisa Montes**, a Project Team Member from MATSA mine.

All installed Flowrox Pinch Valves delivered were an enclosed body type and include an SBRT valve sleeve to meet the requirements of various mediums in different process areas and to achieve the longest sleeve life time.

As the valves are self-cleaning, even if any solids are accumulated in the sleeve wall, it breaks away when the valve is operated. This is due to the flexibility of the sleeve, making the valve lifetime longer than many other competing products on the market.

The Flowrox Pinch Valves were chosen to gain long-term benefits based on low total cost of ownership. The PVE control valves at the plant are actuated by pneumatic double acting actuators with positioners. Also, all of the on/off PVG valves include limit switches for position indication.

“In the future, we are definitely expecting cost savings,” Ms. Montes states.



OUR CUSTOMER: TRAFIGURA MINING GROUP

Trafigura Mining is a market leader in copper, lead and zinc concentrates trading. The flagship mine, Aguas Teñidas (MATSA), is located in Andalucía, Spain. In the year 2015 the production of concentrates nearly doubled to 4.4 Mt per year.



Flowrox Valve References

- > **Customer:** HUSAB Uranium Mine, Namibia
- Products:** Pinch valves
- Application:** Tailings Transfer
- Benefits:**
- Increased process reliability
 - Cost efficiency with remote valve control
 - Low total cost of ownership



- > **Customer:** Wastewater treatment plant, Warsaw, Poland
- Products:** DN500 control pinch valves
- Application:** Flow control of biological sludge
- Benefits:**
- Gentle handling due to living bacteria in sludge
 - Wide and accurate flow control range
 - Extended maintenance interval



- > **Customer:** LKAB, Sweden
- Products:** PV and PVE pinch valves
- Application:** Thickener underflow
- Benefits:**
- Reliability with abrasive slurry
 - Wide and accurate flow control range
 - Extended maintenance interval



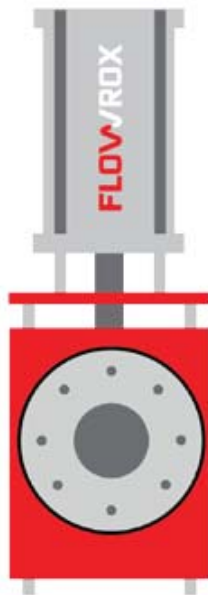
Heavy Duty Pinch Valves

Flowrox heavy duty pinch valves are “The pinch valves”. They are made to last and are ideal where shut-off and control applications involve abrasive or corrosive slurries, powders or coarse substances.

Made to Last

The operating principle of Flowrox pinch valves is simple. In the open position, the valve is at full bore with no flow restrictions. During closing, two pinch bars squeeze the valve sleeve shut on the centerline. The sleeve is naturally wear resistant and when particles hit the sleeve's rubber surface, the collision energy is absorbed and released when the rubber bounces back.

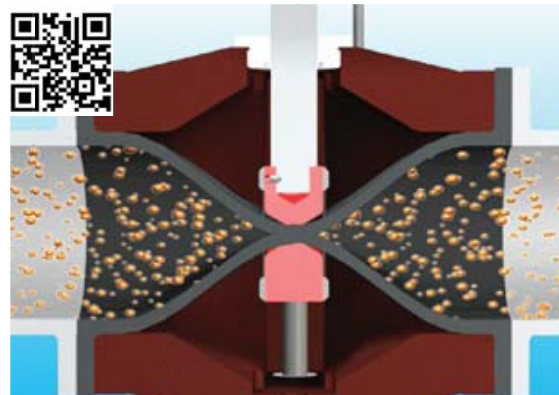
Heavy duty pinch valves provide bubble tight shut-off even if solids have built up on the sleeve wall. When compressed, any crystallized particles flake off the sleeve surface. The full bore structure ensures free flow of the medium. The construction and materials of the three main components (sleeve, body and actuator) can be tailored to suit your process conditions.



Benefits: This Is How We Flow!

- Long service intervals
- Only one wearing part
- Excellent also for dry powders
- Low maintenance cost

Image: During closing, two pinch bars squeeze the valve sleeve shut on the centerline. See the Pinch Valve in action by scanning the QR code.



Valve Model Selection Guide

Type	Size (DN)	Actuator	Pressure class	Flange drilling	Body material	Shape of flange	Opening tags	Auxiliaries	Sleeve material
PV = open	25	M = manual	1 = 1 bar	1 = -	0 = GRS/Fe	type 1	L= opening tags	R = readiness for ind. limit switches	SBRT = Styrene butadiene
PVE = enclosed	-1000	MG = manual with gear	6 = 6 bar	2 = DIN PN10	2 = AISI 316	type 3		R1 = AC/DC	EPDM = Ethylene propylene
PVE/S = enclosed / sealed		A = pneumatic	10 = 10 bar	3 = DIN PN16	3 = aluminium	type 4		R2 = DC, PNP	NR = Natural rubber
PVS = sealed		AB = w/ manual override	16 = 16 bar	4 = DIN PN25	4 = other	Determined by Flowrox		R3 = DC, NPN	NBR = Nitrile
		AK = w/ el.pneum. positioner	25 = 25 bar	5 = DIN PN40	5 = polyurethane/ polyamide			S = magnetic limit switches	CSM = Hypalon
		AKU = w/ el.pneum. positioner & pneum. spring	40 = 40 bar	6 = ANSI150				T = mechan. limit switches	EPDMB = Green liquor sleeve
		AKV = w/ el.pneum. positioner & mech. spring	64 = 64 bar	7 = ANSI300				Q = quick exhaust valve	CR = Chloroprene
		AKF = w/ integrated Festo positioner	100 = 100 bar	8 = BS TABLE D				Z1 = solenoid valve, 24VDC	IIR = Butyl
		AN = w/ pneum. positioner		9A = AS TABLE D				Z2 = solenoid valve, 230V, 50/60 Hz	NRF = Foodstuff natural rubber
		AU = w/ pneum. spring		9B = AS TABLE E				Z3 = solenoid valve, 110V, 50/60 Hz	NBRF = Foodstuff nitrile
		AV = with mech. spring		9C = JIS 10				F = Filter regulator + Gauge	HNBR = Hydrogenated nitrile
		E = electric		9D = JIS 16				J1 = Junction box small	FPM = Fluorine rubber
		EO = with electrical positioner		9 = OTHER				J2 = Junction box large	/M = SensoMate sleeve
		H = hydraulic						X = must be specified	/PU = PU-coating inside the sleeve
		HP =hydraulic w/ positioner							/VAC = Sleeve for suction

Example: PVE 150A10-203LR1Z2, SBRT

Control Valves

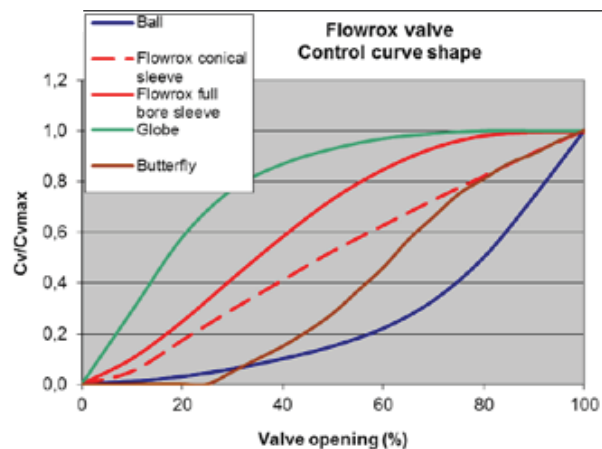
The Flowrox control valves are designed for demanding control applications in which conventional valves encounter problems with wear due to increased turbulence.

When the controlled flow is abrasive, it is a big advantage to have only one, wear resistant, valve part in contact with the medium. The need for maintenance and spare parts is reduced.

Controllability can be further improved with conical sleeves or smart positioners.

Flowrox control valve sizing is based on international IEC60534 standard (harmonized with ANSI/ISA S75).

Flowrox Control Valve Sizing Program is available to ease your work.

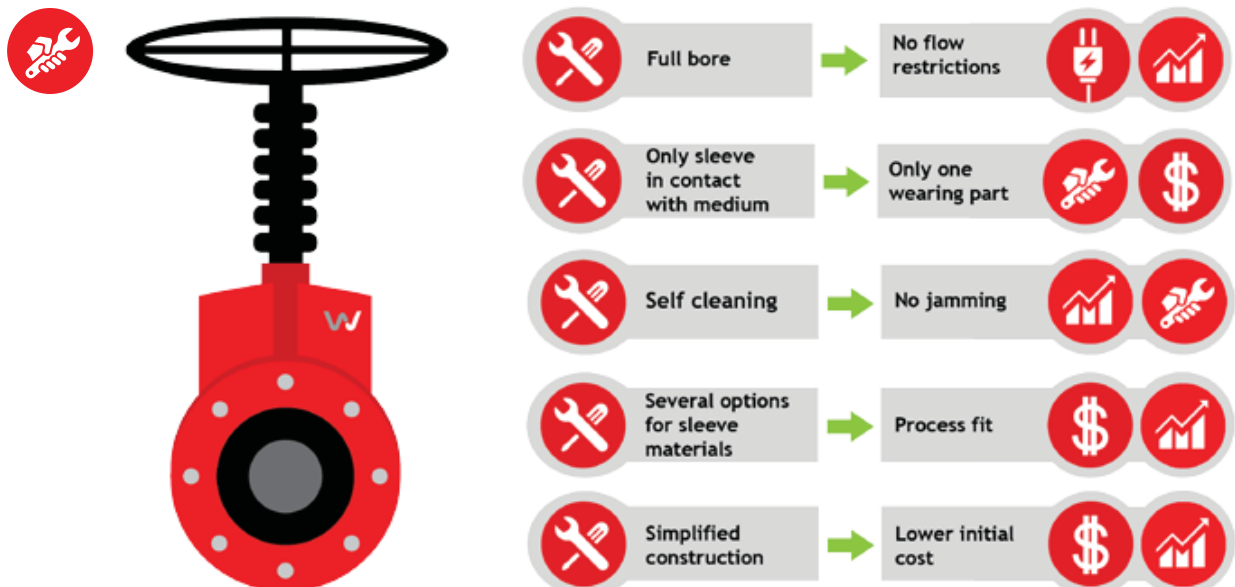


General Line Pinch Valves

PVG and PVEG valves

Flowrox general line pinch valves are robust and cost-effective valves with simple, single-sided closing mechanism. PVG valves have a strong valve body and opening tags in the sleeve as standard. PVEG valves have a corrosion resistant and light-weight plastic body.

They both are ideal for low cycle applications involving abrasion, corrosion and aggressive slurries. Through the reliability and structure, they offer substantial savings based on improved performance, long service lifetime and low total cost of ownership.



Benefits: This Is How We Flow!

- Long service intervals
- Only one wearing part
- Excellent also for dry powders
- Simple sleeve replacement

Image: The closing element squeezes the sleeve shut against the lower body half, providing a 100 % tight shut-off. See the PVG in action by scanning the QR code.



PVG Valve Model Selection Guide

Type	Size (DN)	Actuator	Pressure class	Flange drilling	Body material	Sleeve material	Auxiliaries
PVG = Flowrox Pinch valve	50 - 250	M = manual A = pneumatic E = electric	4 = 4 bar 6 = 6 bar 10 = 10 bar	2 = DIN PN 10 6 = ANSI 150 9 = other	0 = cast iron	SBRT = Styrene butadiene rubber EPDM = Ethylene propylene diene monomer	Z1 = solenoid valve, 24V DC Z2 = solenoid valve, 230V 50/60 Hz Z3 = solenoid valve, 110V DC S = Magnetic limit switches

Example: PVG 50M10, SBRT

PVEG Valve Model Selection Guide

Type	Size (DN)	Actuator	Pressure class	Flange drilling	Body material	Sleeve material	Auxiliaries
PVEG = Flowrox Pinch valve	50 - 150	M = manual A = pneumatic	6 = 6 bar 10 = 10 bar	2 = DIN PN 10 6 = ANSI 150 9 = other	5 = Polyamide	SBRT = Styrene butadiene rubber	Z1 = Solenoid valve, 24V DC Z2 = Solenoid valve, 230V 50/60 Hz
PVEG/C = Flowrox Pinch valve	50 - 150	M = manual A = pneumatic	6 = 6 bar 10 = 10 bar	2 = DIN PN 10 6 = ANSI 150	5 = Polyamide	EPDM = Ethylene propylene diene monomer	Z3 = Solenoid valve, 110V DC S = Magnetic limit switches

Example: PVEG 150M10-25



Image: PVEG50M manual polyamide body pinch valves in a hydrocyclone at Kara Mine, TMM, Tasmania, Australia.

Knife Gate Valves

Heavy Duty Slurry Knife Gate Valves isolate flow, even in the most demanding process conditions. The complete valve is built around an ease-of-maintenance concept.

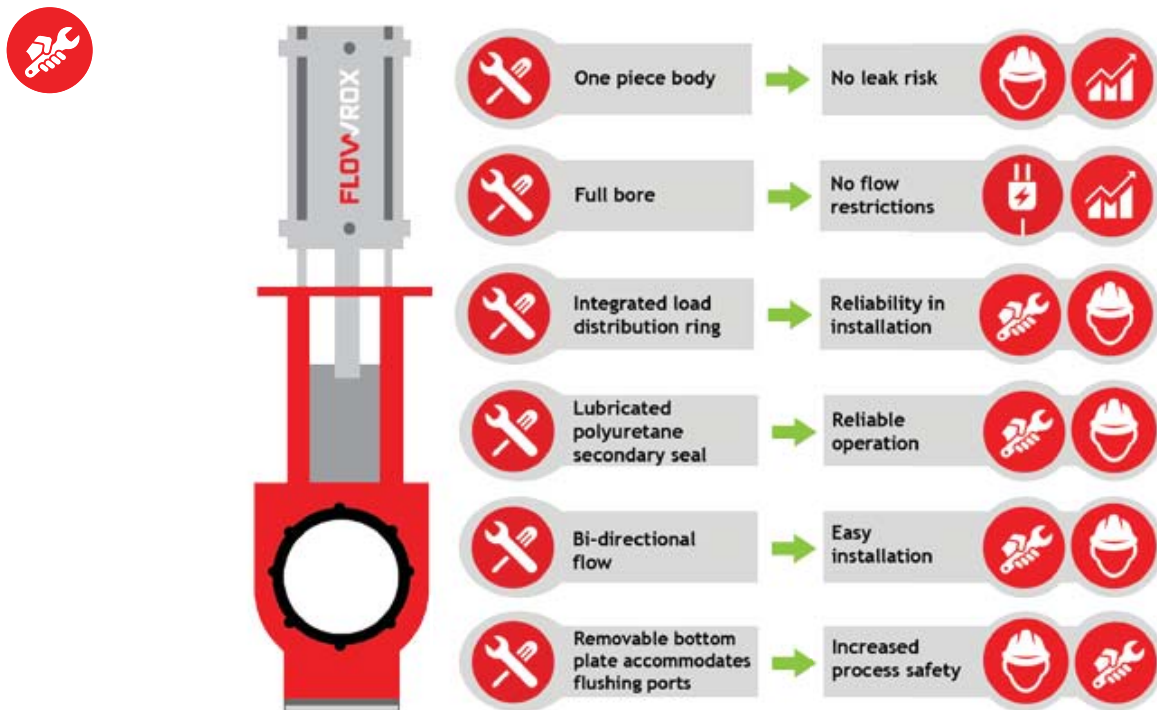
Slurry Knife Gate Valves

The designs of Flowrox Slurry Knife Gate Valves are based on the years of experience Flowrox has gained, providing reliable solutions for abrasive and corrosive process applications.

They feature a load distribution ring that prevents over compression and ensures tight sealing between the ring sleeve and the valve gate. To add to the ease of maintenance, the load distribution ring has been integrated into the ring sleeves of the valve.

The universal tower design of the valve accommodates most actuator types, allowing for actuator interchangeability. The tower also ensures that the top plate, body and actuator are always aligned and that the gate is in the right position.

The valve body itself is a one-piece casting, eliminating the need for sealing between the body halves.



Benefits: This Is How We Flow!

- Small face-to-face dimension
- Easy installation
- Available in large size scale
- Low maintenance cost

Image: Elastomer ring sleeves on both sides of the gate provide a tight shut off. See the Flowrox knife gate valve in action by scanning the QR code.



SKW / SKF Valve Model Selection Guide

Type	Size (DN)	Actuator	Pressure class (PN)	Flange drilling	Body material	Gate material	Ring sleeve material	Auxiliaries
SKW SKF	50 - 600	M = manual MG = manual with gearbox A = pneumatic AU = pneumatic with pneumatic spring H = hydraulic E = electric	10 = 10 bar standard	2 = DIN PN10 3 = DIN PN16 4 = DIN PN25 5 = DIN PN40 6 = ANSI150 7 = ANSI300 9 = other	0 = Cast iron/ Welded steel 2 = AISI 316 4 = other	S = stainless steel Other on request COATING: 0 = nothing	NR = natural rubber +75°C max NBR = nitrile +100°C max EPDM = ethylene propylene +120°C max	R = readiness for inductive limits R1 = AC/DC R2 = DC, PNP R3 = DC, NPN Z1 = solenoid valve, 24V DC Z2 = solenoid valve, 230V, 50/60 Hz Z3 = solenoid valve, 110V, 50/60 Hz G = guard

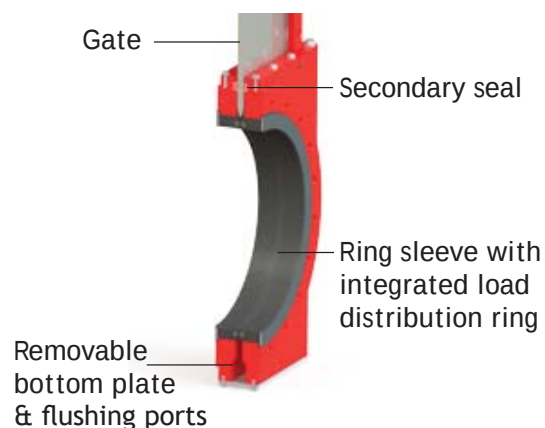
Example:SKW 100M10-20S0-NR-G

SKH Valve Model Selection Guide

Type	Size (DN)	Actuator	Pressure class (PN)	Flange drilling	Body material	Gate material	Ring sleeve material	Auxiliaries
SKH = High pressure slurry knife gate valve	80 - 600	MG = manual with gearbox A = pneumatic AU = pneumatic with pneumatic spring H = hydraulic E = electric	20 = 20 bar standard	2 = DIN PN10 3 = DIN PN16 4 = DIN PN25 5 = DIN PN40 6 = ANSI150 7 = ANSI300 9 = other	0 = Cast iron/ Welded steel 2 = AISI 316 4 = other	S = Stainless steel Other on request COATING: 0 = nothing	NR = natural rubber +75°C max NBR = nitrile +100°C max EPDM = ethylene propylene +120°C max	R = readiness for inductive limits R1 = AC/DC R2 = DC, PNP R3 = DC, NPN Z1 = solenoid valve, 24V DC Z2 = solenoid valve, 230V, 50/60 Hz Z3 = solenoid valve, 110V, 50/60 Hz G = guard

Example:SKH 200E20-30S0-NR

Slurry Knife Gate Design



Flowrox Knife Gate Valves are suitable for large-scale project deliveries with a selection of Flowrox pumps and valves.

Smart Features

Enhance your performance with Smart Solutions™. Flowrox Smart features can be included into any old or new delivery. The Smart valves are next generation solutions delivering data and information in order to provide reliable and cost-efficient production. Real time information from site results in optimised production with maximised output and minimised unplanned shutdowns.

Smart Solutions™

Flowrox Smart valves provide you with online information about their condition, process and operations.

Flowrox Smart PVE is based on the reliable PVE valve and is equipped with a new smart positioner for detailed information about valve operations. The SPVE includes a leak sensor and various embedded instruments for additional information.

Optional SensoMate Smart sleeve detects the wearing before actual sleeve failure.

The Flowrox Smart Valve combined with the Malibu™ IIoT user interface enables advanced reporting and data analytics, making your process more reliable and transparent. Malibu™ is accessible on any device with an Internet browser.



Technical Features

- Pre-fail indications
- Real time data in Malibu™
- Pressure measurement at the valve inlet/outlet
- Medium temperature measurement
- Leak sensor
- Connectivity with 3G/4G, WIFI or LAN

From Features to Benefits

- **Online valve performance monitoring**
 - ➔ Detect issues before they become a problem
- **Automatic pre-fail indications**
 - ➔ Savings in maintenance & unexpected shutdown costs
- **Analytics tools**
 - ➔ Help you make the correct decisions fast
- **Advanced reporting tools**
 - ➔ Access to detailed asset performance information
- **Easy accessibility via Internet**
 - ➔ Access where ever you are



The Flowrox smart instrumentation can be retrofitted to automatic pinch valves.



Flowrox Smart Valves:

The SPVE series provides online information about the process performance and condition of the valve.

The Flowrox Smart Valve combined with Malibu™ enables advanced reporting and data analytics, making your process more reliable and transparent.

Spares & Services

Sleeves: The core of our valves

Our technologically advanced Flowrox sleeves guarantee high resistance to wear and corrosion, trouble-free operation and extended lifetime.

Robust Heart of the Pinch Valve

The handmade sleeve has a reinforced construction, making it the pressure-containing part of the valve.

Standard Flowrox PV, PVE and PVG sleeves are equipped with opening tags to ensure full valve opening in all process conditions.

Ring Sleeves for Knife Gate Valves

The ring sleeve is a moulded part with a reinforcement steel ring integrated near the sealing area. The flange of the ring sleeve is reinforced with a load distribution ring to ensure even compression.



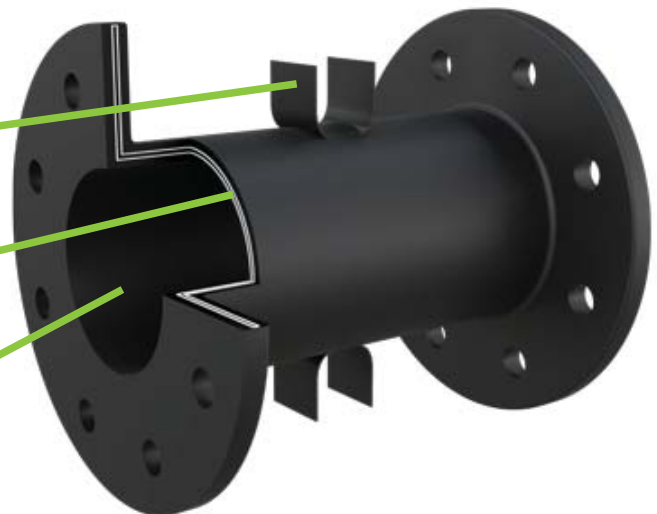
Special Sleeve Features

- Conical sleeve for control valves
- Suction sleeve for negative pressure applications
- SensoMate sleeve detecting and signalling critical wear
- Polyurethane lined sleeve with improved protection against wear in abrasive control applications
- Foodgrade rubber for FDA requirements

Opening tags

Reinforcing cords

Wear-resistant inner lining



To cover a wide range of applications, several rubber compounds are available.



Flowrox valves are available in various sizes and models for various applications. Flowrox Services supports you throughout the entire life cycle.



Services

We offer prompt support, spare parts and services in order to maximise your performance.

We manufacture and deliver original spare parts and components for all Flowrox products (valves, hose pumps, PC pumps).

- On-time trouble-free delivery of spares and services
- Cost savings through optimised service cycles and reduced downtime of equipment
- Longer life cycles for equipment





This is how we flow!

Check out the **Flowrox Pinch Valves** in action by scanning this QR code.



Open your gates!

Check out the **Flowrox Knife Gate Valves** in action by scanning this QR code.



Get Smarter!

Check out the **Flowrox Smart Solutions™** by scanning this QR code.



We are recognised as a reliable industrial solutions provider for demanding process conditions. Our 40 years of experience in flow control and elastomer technology are obvious benefits we can offer. Formerly known as Larox Flowsys, our heritage forms the foundation of what we are today; the benchmark for heavy duty valves, pumps and systems. We know that all processes are different, all customers unique and process conditions vary, but we are happy to adapt.

We operate on 6 continents and support our customers through a network of over 200 representatives.



Contact your local Flowrox representative



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04/18 EN

Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0013_SLG

by: BB

chkd: GP

appvd: CB



SLUDGE TANKS

INSTRUMENTS

OIM manual section: 4.3.13.2

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CS-400-140z : Identification sheet



WVTC PROJECT NUMBER:	5000218009	REV:	1
PROJECT NAME:	AEM AMARUQ	SUBMITTED TO (COMPANY):	
ENGINEER:	Gabriel Hébert	AGNICO EAGLE MINES	
PROJECT MANAGER:	Clément B	SUBMITTED TO (RESPONSIBLE):	
PHONE NUMBER:		PROJECT NUM REFERENCE.:	
		LOT NUMBER:	

SUPPLIER	EQPT CODE	EQPT TAG NO	DIA	DESCRIPTION	INFO 1	INFO 2	INFO 3	APPLIC.	NOTE	REV
HACH	ST-400-140zz1	AE4-011	144 mm x 144 mm x 181 mm (controller) 	TURBIDIMETER PROBE	SOLITAX INSERTION SENSOR FOR TURBIDITY AND SS t-line sc STAINLESS STEEL WITH WIPER 0.001-4000 NTU, 0.001 mg/L - 50 g/L/MANUFACTURER: HACH/ MODEL: LXV424.99.00100/LZX661/5738 400 C/W CONTROLLER SC200 2 CHANNELS DIGITAL LXV404.99.00552/ 9328100 HART MODULE	N/A	N/A	SLUDGE TANK		rev1

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SOLITAX® sc Turbidity and Suspended Solids Sensors

Turbidity and Suspended Solids

Features and Benefits

Accurate, Color-independent Measurement

Hach's SOLITAX sc Turbidity and Suspended Solids Sensors are immune to shifts in color of activated sludge caused by variations in through-flow volume, climatic fluctuations, or other unexpected events. Unlike conventional systems, that need to be continually calibrated to compensate for color variation, the proven measurement technique used in the SOLITAX sc sensor is the only technology that provides measurement completely independent of color.

Self-cleaning Wiper Prevents Erroneous Values

The SOLITAX sc sensor's self-cleaning wiper prevents erroneous values and maintenance problems by preventing biological growth. Gas bubbles in the sample do not interfere with the measurement.

Excellent Correlation to Laboratory Analysis

Comparisons between laboratory analysis and continuous suspended solids measurement using SOLITAX sc sensors show an exceptional correlation to mixed liquor, settled and thickened sludge. Online measurement not only saves time on manual analysis but also provides critical real time TSS measurements that can be used to operate the plant more efficiently. (See Correlation Chart on page 2.)

Fully Serviceable Sensors

Conventional Turbidity and Suspended Solids sensors are potted and are discarded when they no longer function. SOLITAX sc sensors are serviceable so that the useful life of the sensor, in many cases, is doubled.

Easy One-point Calibration

Calibration of SOLITAX sc sensors is easy with a simple correction factor procedure to measure turbidity or suspended solids. Multipoint calibration is available for nonlinear samples.

Versatile Mounting Styles

SOLITAX sc sensors can easily be configured for many applications. Models designed for immersion into a tank are available in PVC plastic or stainless steel. An insertion style sensor for pipes is available in stainless steel. Installation kits for either style sensor are also available.



Hach SOLITAX sc sensors provide accurate, color-independent measurement of turbidity and suspended solids in drinking water, wastewater, and industrial process applications. A self-cleaning wiper prevents measurement error due to fouling. These sensors demonstrate excellent correlation with laboratory analysis so it's an exceptional tool for process control.

Multi-channel, Multi-parameter System

Any combination of two SOLITAX sc sensors can be installed using one Hach sc200 Controller. The same controller can also accommodate any combination of parameters, including suspended solids, turbidity, pH/ORP, dissolved oxygen, conductivity, and nitrate. All of Hach's model sc sensors are "plug and play" with no complicated wiring or set-up procedure necessary.

Communications—Multiple alarm/control schemes are available using four relays and two PID control outputs. Communications use analog 4-20 mA and digital MODBUS®/RS485, MODBUS®/RS232 protocols. (Other digital protocols are available. Contact your Hach representative for details.)

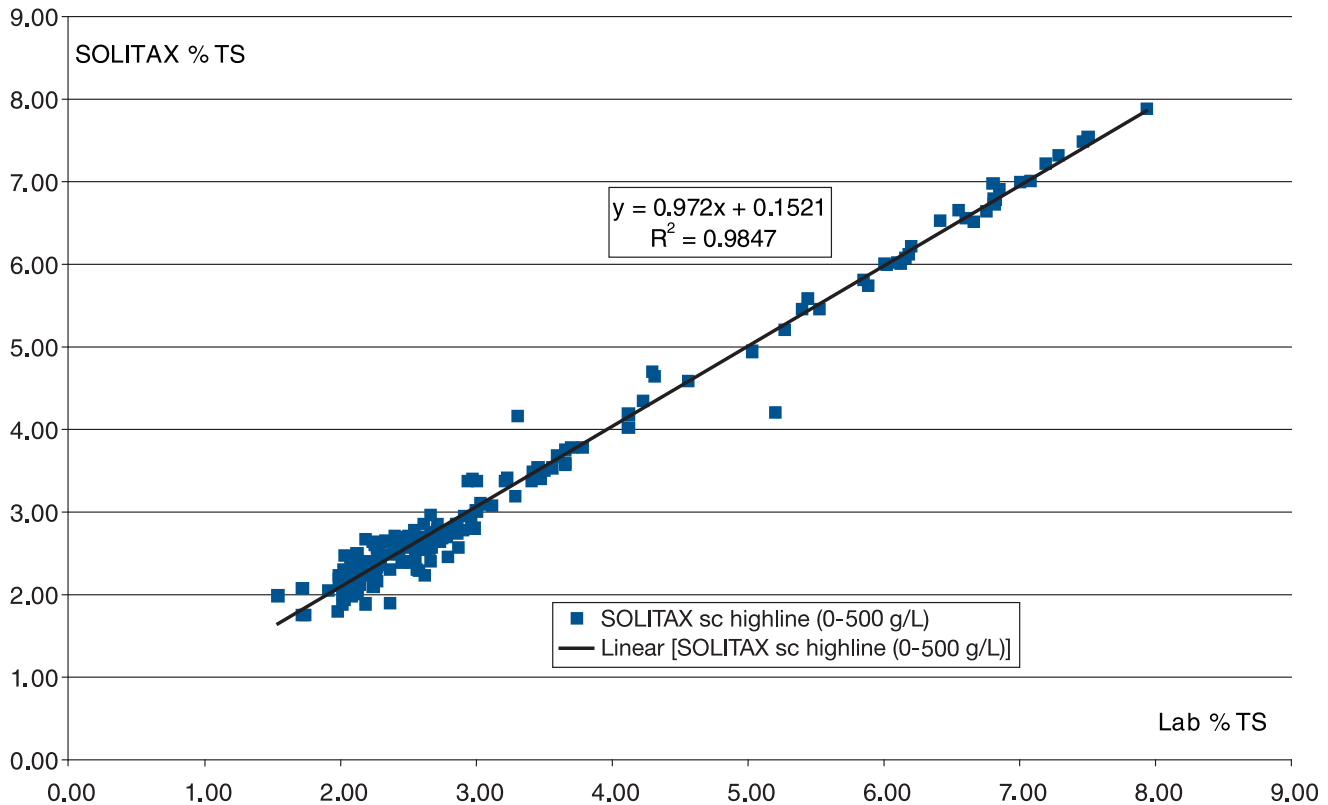
Data logger—A built-in data logger collects measurement data, calibration, verification points, and alarm history for up to 6 months. The embedded SD card reader ensures simple download of the logged data.

DW = drinking water WW = wastewater municipal PW = pure water / power
IW = industrial water E = environmental C = collections FB = food and beverage



Be Right™

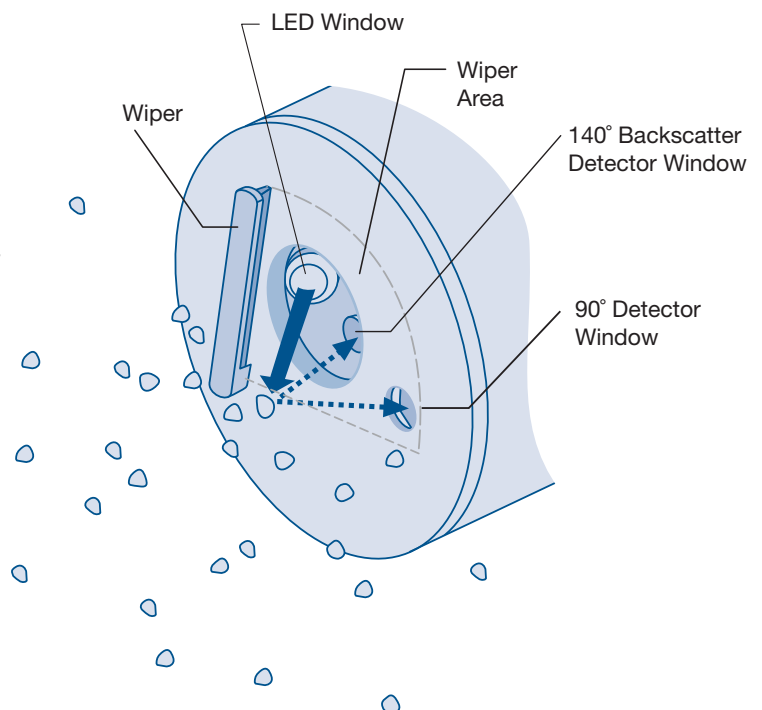
Correlation of SOLITAX sc *highline* sensor with lab analysis of sludge



Principal of Operation:

SOLITAX sc ts-line sensor with dual-beam optics and added back-scatter detector

- Dual infrared light beams. LED light source transmits light at 45° to sensor face.
- Nephelometric photoreceptors detect light at 90° to the transmitted light beam.
- Backscatter photoreceptor (included on all models except the SOLITAX sc t-line) detects light at 140° to the transmitted light beam to measure suspended solids in heavily loaded sample streams.
- Self-cleaning wiper, optional.
- T-line probes measure turbidity only.
- TS, HS, inline, and highline sensors measure either turbidity or suspended solids. The parameter to be measured is user selectable and can be changed at any time.



Specifications*

	For insertion in pipes		For immersion in open tanks		
	Model inline sc	Model highline sc	Model t-line sc	Model ts-line sc	Model hs-line sc
Parameter					
	Turbidity Suspended Solids	Turbidity Suspended Solids	Turbidity	Turbidity Suspended Solids	Turbidity Suspended Solids
Measuring Range					
<i>Turbidity Suspended Solids</i>	0.001 to 4000 NTU 0.001 mg/L to 50 g/L	0.001 to 4000 NTU 0.001 mg/L to 500 g/L	0.001 to 4000 NTU n/a	0.001 to 4000 NTU 0.001 mg/L to 50 g/L	0.001 to 4000 NTU 0.001 mg/L to 500 g/L
Units of Measure					
<i>Turbidity Suspended Solids</i>	User selectable—NTU, FNU, or TE/F User selectable—g/L, mg/L, ppm, or % solids				
Accuracy	<i>Turbidity up to 1000 FNU/NTU</i>				
<i>Without Calibration With Calibration</i>	<5% of the measured value ± 0.01 FNU/NTU <1% of the measured value ± 0.01 FNU/NTU				
Repeatability	<i>Defined according to ISO/WD 13530.</i>				
<i>Turbidity Suspended Solids</i>	Less than 1% of reading Less than 3% of reading (depends on the homogeneity of municipal activated sludge)				
Response Time	1 s < T90 < 300 s (adjustable)				
Calibration					
<i>Turbidity Suspended Solids</i>	Formazin or StablCal® Standard Based on gravimetric TSS analysis with a correction factor procedure				
Certifications	CE certified to EN 61326-1, EN 61326/A1, EN 61326/A2, EN 61010-1				
Mounting					
	Through sidewall of a pipeline using a ball valve; minimum pipe size 100 mm (4 in.) in carbon or stainless steel		Fixed to the rim of the tank		
Flow Velocity	3 m/s (9.8 ft./s) maximum				
Operating Temperature	>0 to 40°C (>32 to 104°F)				
Sample Temperature	>0 to 40°C (>32 to 104°F)				
Sample Pressure					
	Stainless steel: 6 bar or 60 m (87 psi) PVC: 1 bar or 10 m (14.5 psi)				
Sensor Construction					
<i>Wiper Sensor body</i>	Silicon Stainless steel		Silicon Stainless steel or PVC		
Dimensions	<i>(diameter x length)</i>				
	Insertion sensor: 60 x 315 mm (2.4 x 12.4 in.); Ball valve from flange: 185 x 625 mm (7.3 x 24.6 in.)		Immersion sensor: 60 x 200 mm (2.4 x 7.9 in.)		
Weight					
	Insertion stainless steel: 2.4 kg (5.3 lb.)		Immersion, stainless steel: 1.38 kg (3.0 lb.) Immersion, PVC: 0.52 kg (1.2 lb.)		
Cable Length					
	10 m (33 ft.) standard. Optional extension cables available in 7.6 m (25 ft.), 15.2 m (50 ft.), 30.5 m (100 ft.). Maximum total length: 100 m (328 ft.).				

*Specifications subject to change without notice.

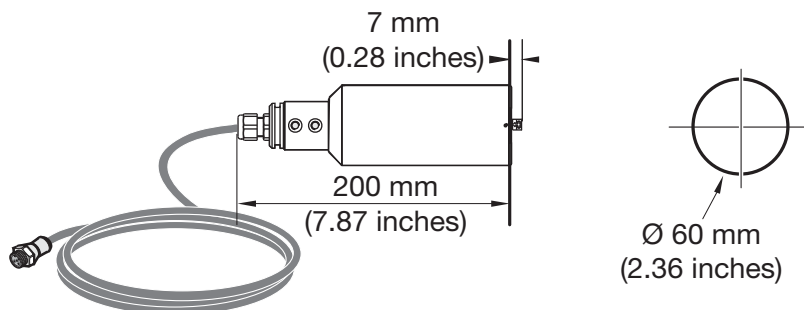
Engineering Specifications

1. The suspended solids and/or turbidity sensor shall consist of a digital sensor designed to connect to a universal controller.
2. The suspended solids and/or turbidity sensor shall use dual infrared light beam technique design utilizing an LED light source in the sensor to transmit an infrared/scattered dual beam into the sample stream at an angle of 45 degrees to the sensor face.
3. A photoreceptor located in the sensor face shall detect scattered light (turbidity) at 90 degrees to the transmitted beam.
4. A backscatter photoreceptor (included on all models except the SOLITAX sc t-line), positioned at 140 degrees to the transmitted beam, shall detect light scattered for suspended solids readings.
5. The sensor shall analyze the dual-beam data and provides a color independent measurement.
6. The sensor shall have a self-cleaning wiper to prevent erroneous values and maintenance problems caused by biological activity, scum build-up, and gas bubbles.
7. The self-cleaning wiper shall ensure that measurements are accurate, continuous, and completely color independent.
8. The sensor shall have an operating range of 0.001 mg/L to 50 g/L or 0.001 mg/L to 500 g/L and/or 0.001 to 4000 NTU suspended solids and turbidity depending on the model.
9. The sensor shall be capable of immersion in a tank or insertion into a pipe.
10. The materials of construction shall be PVC or polished stainless steel, depending on the sensor selection.
11. The sensor shall have an operating temperature of >0 to 40°C (32 to 104°F).
12. The initial response time shall be 1 second and user-adjustable up to 300 seconds.
13. The accuracy shall be less than 1% of reading or 0.01 NTU, whichever is greater for turbidity and less than 5% of reading for suspended solids.
14. The suspended solids and turbidity sensor shall be Hach Company Model t-line sc for turbidity measurement or ts-line sc, hs-line sc, inline sc, or highline sc for suspended solids and turbidity measurement.

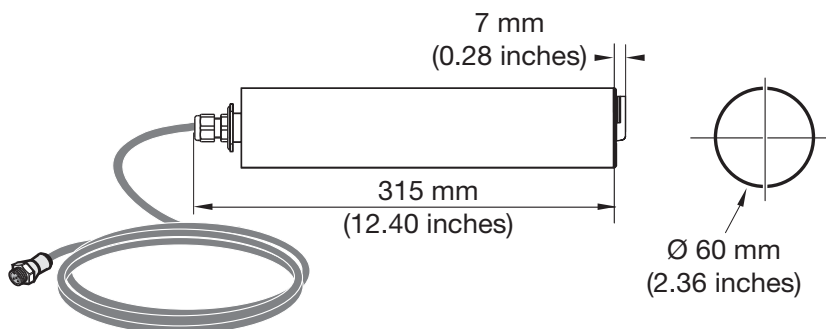
Dimensions

Hach SOLITAX sc sensors can be fixed to the rim of the tank for immersion applications or inserted directly through the sidewall of a pipeline for insertion applications. The optical unit of the sensor should be installed facing downstream in the direction of the flow to minimize the impact of debris against the measurement system. A variety of installation kits are available.

SOLITAX sc models t-line, ts-line, and hs-line sensors for immersion in open tanks

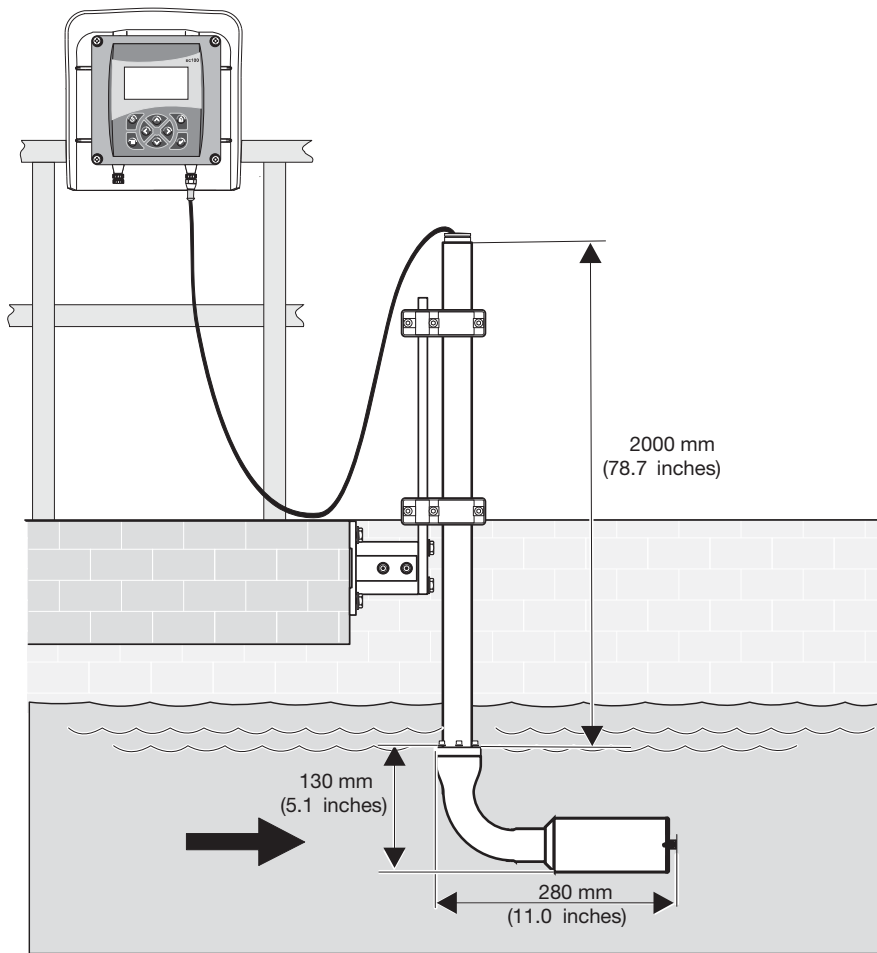


SOLITAX sc models inline and highline sensors for insertion in pipes

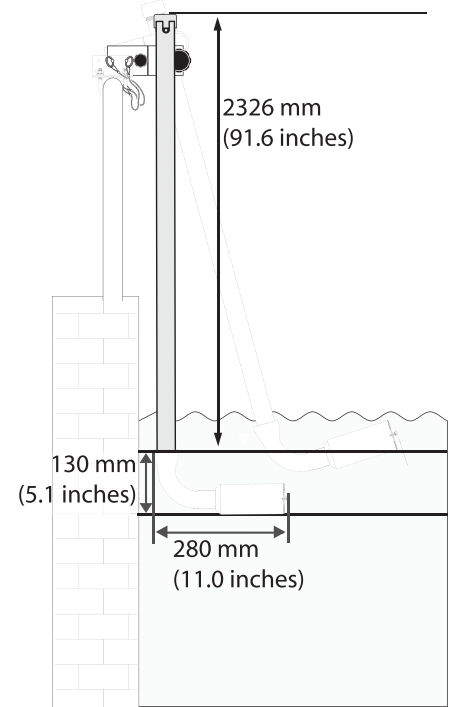


Dimensions continued

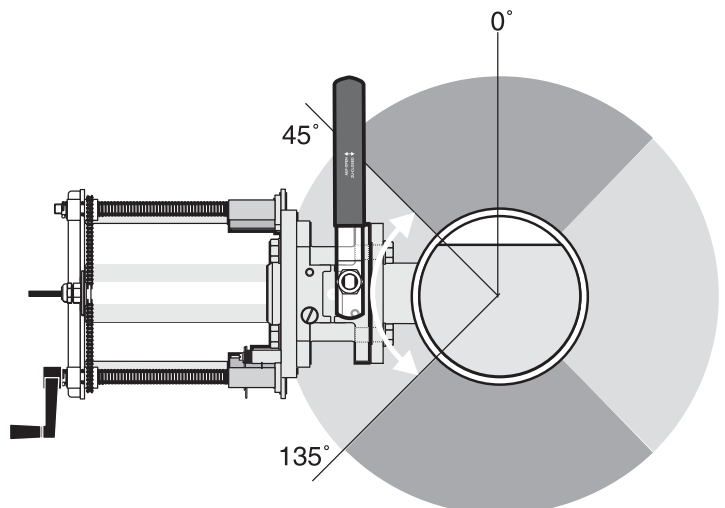
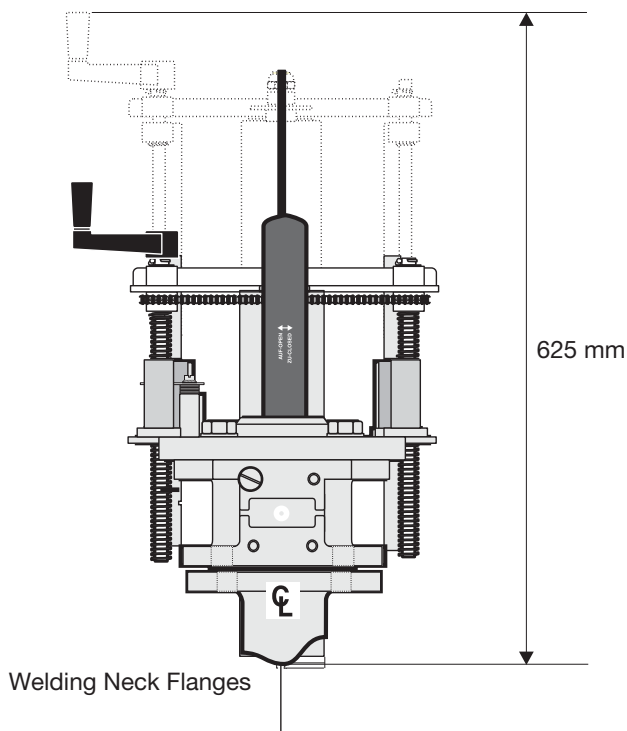
Installation for mounting SOLITAX sc models t-line, ts-line, and hs-line sensors for immersion in open tanks. (Fixed point Installation Kit, P/N 5734400)



Handrail Mounting Kit includes 1.5-inch diameter by 7.5-ft long CPVC pipe and swivel/pivot/ pipe clamp assembly (P/N MH236B00Z)



Fixture with ball valve for mounting SOLITAX sc models inline and highline sensors in pipes



Ordering Information

Sensor Selection

		For insertion in pipes		For immersion in open tanks		
	Range	inline	highline	t-line	ts-line	hs-line
Wastewater						
Final effluent	0 to 0.1 g/L or 0 to 1000 NTU	●		●	●	
Influent suspended solids	0 to 1.5 g/L	●			●	●
Filtrate/centrate	0 to 2 g/L	●			●	●
Mixed liquor suspended solids	0 to 5 g/L	●			●	
Return activated sludge	0 to 25 g/L	●			●	
Waste activated sludge	0 to 2% or 0 to 20 g/L	●			●	
Primary sludge (settled sludge)	0.5 to 10% or 5 to 100 g/L		●			●
Anaerobic digested sludge	1.5 to 7% or 15 to 70 g/L		●			●
Gravity thickened sludge	2 to 10% or 20 to 100 g/L		●			●
Mechanically thickened sludge	3 to 8% or 30 to 80 g/L		●			●
Drinking Water						
Source water monitoring	0 to 500 NTU	●		●	●	
Influent pressurized raw water	0 to 500 NTU	●			●	●
Clarifier efficiency	0 to 20 NTU	●		●	●	
Filter backwash	0 to 20 NTU	●		●	●	
De-watering	0.5 to 10% or 5 to 100 g/L	●	●			●
Industrial Water						
Make-up water—Power, Pulp & Paper, Petrochemical, Food & Beverage		●		●	●	
Boiler and cooling water—Petrochemical, Pulp & Paper				●	●	
Lime addition—Petrochemical, Mining, Pulp & Paper			●			●
Wastewater (activated sludge process)—Power, Pulp & Paper, Petrochemical, Food & Beverage		●	●	●	●	●
White liquid applications—Pulp & Paper			●			●
Stormwater—Pulp & Paper, Petrochemical		●		●	●	

Ordering Information *continued*

SOLITAX sc Turbidity and Suspended Solids Analyzers

(common controller and sensor configurations)

Immersion in Open Tanks Applications

2983400	Turbidity Analyzer includes sc200 controller and PVC t-line sc sensor (0.001 to 4000 NTU) with wiper
2983500	Turbidity and Suspended Solids Analyzer includes sc200 controller and stainless steel ts-line sc sensor (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L) with wiper
2983600	Turbidity and High Range Suspended Solids Analyzer includes sc200 controller and stainless steel hs-line sc sensor (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L) with wiper

Insertion in Pipes Applications

2983700	Turbidity and Suspended Solids Analyzer includes sc200 controller, stainless steel inline sc sensor (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L) with wiper, and insertion mounting kit
2983900	Turbidity and High Range Suspended Solids Analyzer includes sc200 controller, stainless steel highline sc sensor (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L) with wiper, and insertion mounting kit
<i>Both 2983700 and 2983900 include the insertion mounting kit which includes a 4 inch pre-coped Carbon Steel Flange. Non-coped flanges are available. See below.</i>	

NOTE

1. Power cords must be ordered separately.
2. Fixed point installation kit or handrail mount kit must be ordered separately for all immersion analyzers.

Individual SOLITAX sc Sensors

Immersion Sensors

LXV423.99.10000	Turbidity, t-line sc, PVC with wiper (0.001 to 4000 NTU)
LXV423.99.12000	Turbidity, t-line sc, PVC without wiper (0.001 to 4000 NTU)
LXV423.99.10100	Turbidity and Suspended Solids, ts-line sc, PVC with wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)
LXV423.99.12100	Turbidity and Suspended Solids, ts-line sc, PVC without wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)
LXV423.99.00100	Turbidity and Suspended Solids, ts-line sc, stainless steel with wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)
LXV423.99.02100	Turbidity and Suspended Solids, ts-line sc, stainless steel without wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)
LXV423.99.10200	Turbidity and Suspended Solids, hs-line sc, PVC with wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)
LXV423.99.12200	Turbidity and Suspended Solids, hs-line sc, PVC without wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)
LXV423.99.00200	Turbidity and Suspended Solids, hs-line sc, stainless steel with wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)
LXV423.99.02200	Turbidity and Suspended Solids, hs-line sc, stainless steel without wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)

Insertion Sensors

LXV424.99.00100	Turbidity and Suspended Solids, inline sc, stainless steel with wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)
LXV424.99.02100	Turbidity and Suspended Solids, inline sc, stainless steel without wiper (0.001 to 4000 NTU, 0.001 mg/L to 50 g/L)
LXV424.99.00200	Turbidity and Suspended Solids, highline sc, stainless steel with wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)
LXV424.99.02200	Turbidity and Suspended Solids, highline sc, stainless steel without wiper (0.001 to 4000 NTU, 0.001 mg/L to 500 g/L)

Accessories

5733000	Calibration Kit, includes calibration cylinder, two 500-mL 800 NTU StablCal®, and a sensor bracket
2660549	800 NTU StablCal®, 500-mL (two required per calibration)
LZX050	Wiper Blades, replacement only, pkg. of 5
9220600	Sun Shield for sc200 controller

Cable Accessories

5796000	7.6 m (25 ft.) Extension Cable
5796100	15.2 m (50 ft.) Extension Cable
5796200	30.5 m (100 ft.) Extension Cable

Maximum total length 100 m (328 ft.)

Installation Accessories

5734400	Fixed Point Installation Kit for t-line, ts-line, and hs-line immersion sensors, includes stand and sun shield for controller and pipe for sensor cable
5738400	Insertion Mounting Kit for inline and highline insertion sensors (ball valve and extraction system). Kit includes a 4 inch pre-coped Carbon Steel Flange. Non-coped flanges are available. See below.
AHA033NPT	Sensor Adapter, straight 1-1/2 FNPT
AHA034NPT	Sensor Adapter, elbow 1-1/2 FNPT, 90°
MH236B00Z	Handrail Mounting Kit (for sensor to be used with either adapter above) includes 1.5-inch diameter by 7.5-ft long CPVC pipe and swivel/pivot/ pipe clamp assembly
LZX337	Stainless steel ball valve/extraction fitting for in-line and hi-line probes w/o welding flange
LZX660	Non-coped stainless steel welding flange for insertion kit
LZX661	Non-coped carbon steel welding flange for insertion kit

To complete your turbidity and suspended solids measurement system, choose from these Hach controllers...

Model sc200 Controller

(see Lit. #2665)

The sc200 Universal Controller is the most versatile controller on the market. The new sc200 controller is the only controller that allows the use of digital and analog sensors, either alone or in combination, to provide compatibility with the broadest range of sensors. It replaces the Hach sc100 digital and GLI53 analog controllers with advanced features for easier operator use.



Model sc1000 Controller

(see Lit. #2403)

Get the same great features as the sc200 Controller above—"plug and play", all digital operation and communication—but with the Hach sc1000 Controller, up to eight Hach sensors can be used with one controller in any combination. The sc1000 Controller is also expandable and upgradeable to easily adapt to your needs.



At Hach, it's about learning from our customers and providing the right answers. It's more than ensuring the quality of water—it's about ensuring the quality of life. When it comes to the things that touch our lives...

Keep it pure.

Make it simple.

Be right.

For current price information, technical support, and ordering assistance, contact the Hach office or distributor serving your area.

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In the interest of improving and updating its equipment, Hach Company reserves the right to alter specifications to equipment at any time.



Be Right™

sc200™ UNIVERSAL CONTROLLER

Applications

- Drinking Water
- Wastewater
- Industrial Water
- Power



One Controller for the Broadest Range of Sensors.

Choose from 30 digital and analog sensor families for up to 17 different parameters.

Maximum Versatility

The sc200 controller allows the use of digital and analog sensors, either alone or in combination, to provide compatibility with Hach's broad range of sensors, eliminating the need for dedicated, parameter-specific controllers.

Ease of Use and Confidence in Results

Large, high-resolution, transreflective display provides optimal viewing resolution in any lighting condition. Guided calibration procedures in 19 languages minimize complexity and reduce operator error. Password-protected SD card reader offers a simple solution for data download and transfer. Visual warning system provides critical alerts.

Wide Variety of Communication Options

Utilize two to five analog outputs to transmit primary and secondary values for each sensor, or integrate Hach sensors and analyzers into MODBUS RS232/RS485, Profibus® DP, and HART networks.



Password protected SD card reader offers a simple solution for data download and transfer, and sc200 and digital sensor configuration file duplication and backup.

Controller Comparison



Features	Previous Models		sc200™ Controller	Benefits
	sc100™ Controller	GLI53 Controller		
Display	64 x 128 pixels 33 x 66 mm (1.3 x 2.6 in.)	64 x 128 pixels 33 x 66 mm (1.3 x 2.6 in.)	160 x 240 pixels 48 x 68 mm (1.89 x 2.67 in.) Transreflective	- Improved user interface—50% bigger - Easier to read in daylight and sunlight
Data Management	irDA Port/PDA Service Cable	N/A	SD Card Service Cable	- Simplifies data transfer - Standardized accessories/ max compatibility
Sensor Inputs	2 Max Direct Digital Analog via External Gateway	2 Max Analog Depending on Parameter	2 Max Digital and/or Analog with Sensor Card	- Simplifies analog sensor connections - Works with analog and digital sensors
Analog Inputs	N/A	N/A	1 Analog Input Signal Analog 4-20mA Card	- Enables non-sc analyzer monitoring - Accepts mA signals from other analyzers for local display - Consolidates analog mA signals to a digital output
4-20 mA Outputs	2 Standard	2 Standard	2 Standard Optional 3 Additional	Total of five (5) 4-20 mA outputs allows multiple mA outputs per sensor input
Digital Communication	MODBUS RS232/RS485 Profibus DP V1.0	HART	MODBUS RS232/RS485 Profibus DP V1.0 HART 7.2	Unprecedented combination of sensor breadth and digital communication options

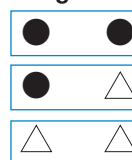
Choose from Hach's Broad Range of Digital and Analog Sensors

Parameter	Sensor	Digital or Analog
Ammonia	AMTAX™ sc, NH4D sc, AISE sc, AN-ISE sc	●
Chlorine	CLF10 sc, CLT10 sc, 9184 sc	●
Chlorine Dioxide	9185 sc	●
Conductivity	GLI 3400 Contacting, GLI 3700 Inductive	△
Dissolved Oxygen	LDO® Model 2, 5740 sc	●
Dissolved Oxygen	5500	△
Flow	U53, F53 Sensors	△
Nitrate	NITRATAX™ sc, NO3D sc, NISE sc, AN-ISE sc	●
Oil in Water	FP360 sc	●
Organics	UVAS sc	●
Ozone	9187 sc	●
pH/ORP	pHD	●
pH/ORP	pHD, pH Combination, LCP	△
Phosphate	PHOSPHAX™ sc	●
Sludge Level	SONATAX™ sc	●
Suspended Solids	SOLITAX™ sc, TSS sc	●
Turbidity	1720E, FT660 sc, SS7 sc, ULTRATURB sc, SOLITAX sc, TSS sc	●
Ultra Pure Conductivity	8310, 8311, 8312, 8315, 8316, 8317 Contacting	△
Ultra Pure pH/ORP	8362	△

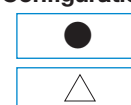
● = Digital △ = Analog

Connect up to two of any of the sensors listed above, in any combination, to meet your application needs. The diagrams below demonstrate the potential configurations. Operation of analog sensors requires the controller to be equipped with the appropriate sensor module. Contact Hach Technical Support for help with selecting the appropriate module.

2 Channel Configurations



1 Channel Configurations



Specifications*

Dimensions (H x W x D)	5.7 in x 5.7 in x 7.1 in (144 mm x 144 mm x 181 mm)
Display	Graphic dot matrix LCD with LED backlighting, transreflective
Display Size	1.9 x 2.7 in. (48 mm x 68 mm)
Display Resolution	240 x 160 pixels
Weight	3.75 lbs. (1.70 kg)
Power Requirements (Voltage)	100 - 240 V AC, 24 V DC
Power Requirements (Hz)	50/60 Hz
Operating Temperature Range	-20 to 60 °C , 0 to 95% RH non-condensing
Analog Outputs	Two (Five with optional expansion module) to isolated current outputs, max 550 Ω , Accuracy: $\pm 0.1\%$ of FS (20mA) at 25 °C, $\pm 0.5\%$ of FS over -20 °C to 60 °C range
Analog Output Functional Mode	Operational Mode: measurement or calculated value Linear, Logarithmic, Bi-linear, PID
Security Levels	2 password-protected levels
Mounting Configurations	Wall, pole, and panel mounting
Enclosure Rating	NEMA 4X/IP66
Conduit Openings	1/2 in NPT Conduit
Relay: Operational Mode	Primary or secondary measurement, calculated value (dual channel only) or timer

Relay Functions

Scheduler (Timer), Alarm, Feeder Control, Event Control, Pulse Width Modulation, Frequency Control, and Warning

Relays

Four electromechanical SPDT (Form C) contacts, 1200 W, 5 A

Communication

MODBUS RS232/RS485, PROFIBUS DPV1, or HART 7.2 optional

Memory Backup

Flash memory

Electrical

EMC

Certifications

CE compliant for conducted and radiated emissions:

- CISPR 11 (Class A limits)

- EMC Immunity EN 61326-1 (Industrial limits)

Safety

cETLus safety mark for:

- General Locations per ANSI/UL 61010-1 & CAN/CSA C22.2. No. 61010-1

- Hazardous Location Class I, Division 2, Groups A,B,C & D (Zone 2, Group IIC) per FM 3600 / FM 3611 & CSA C22.2 No. 213 M1987 with approved options and appropriately rated Class I, Division 2 or Zone 2 sensors

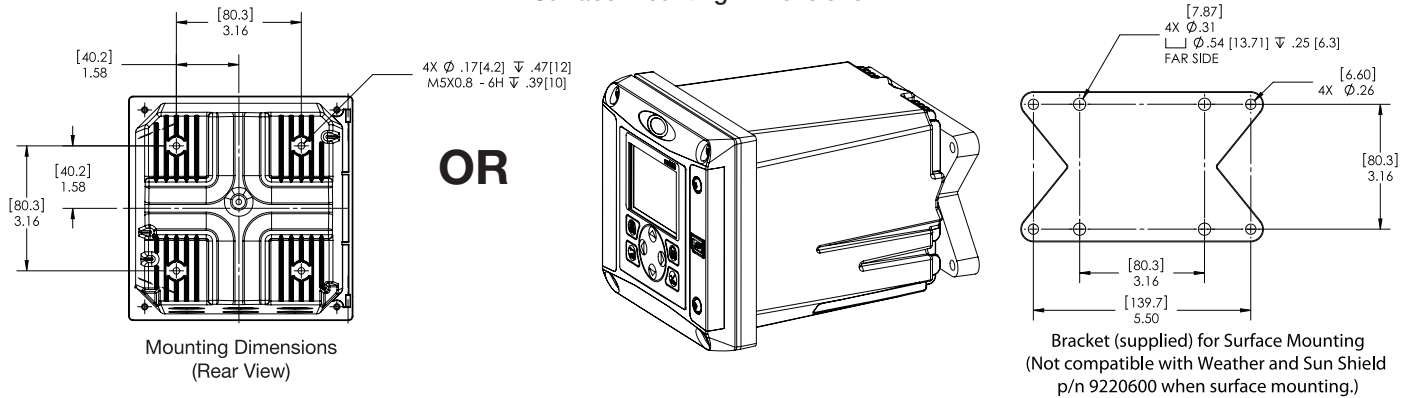
cULus safety mark

- General Locations per UL 61010-1 & CAN/CSA C22.2. No. 61010-1

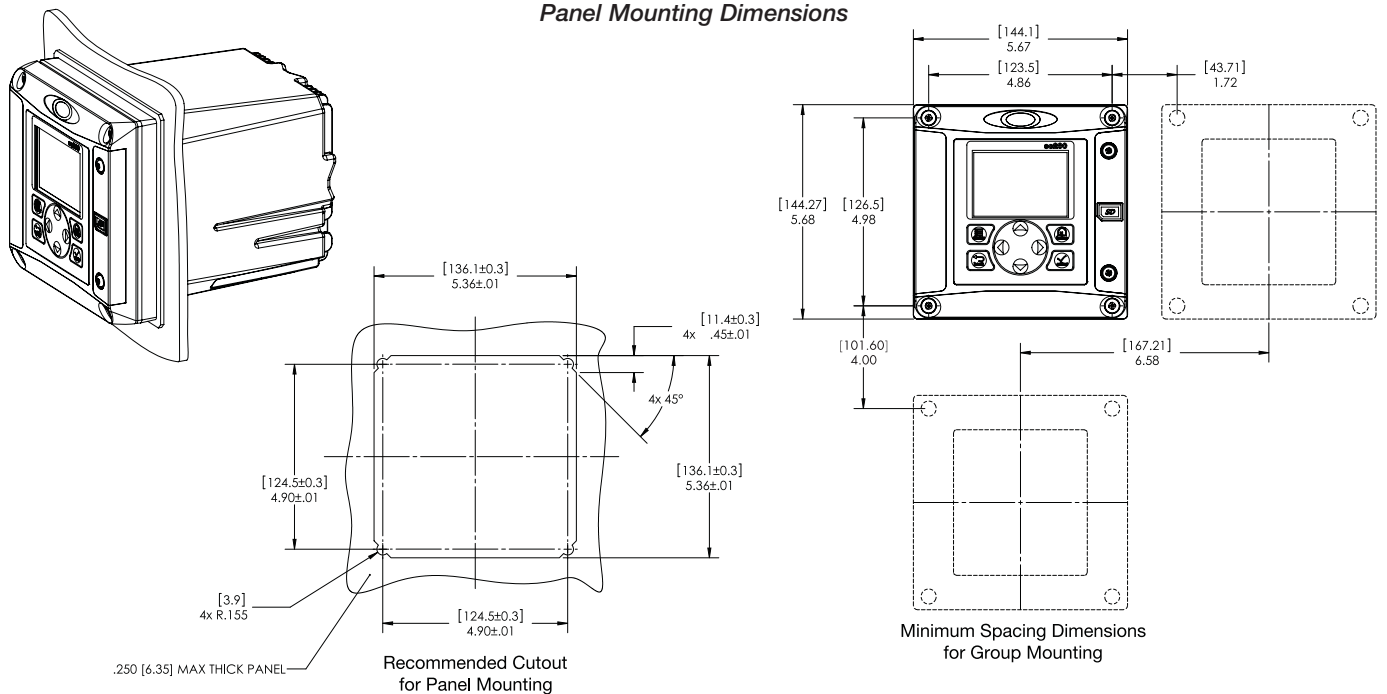
**Subject to change without notice.*

Dimensions

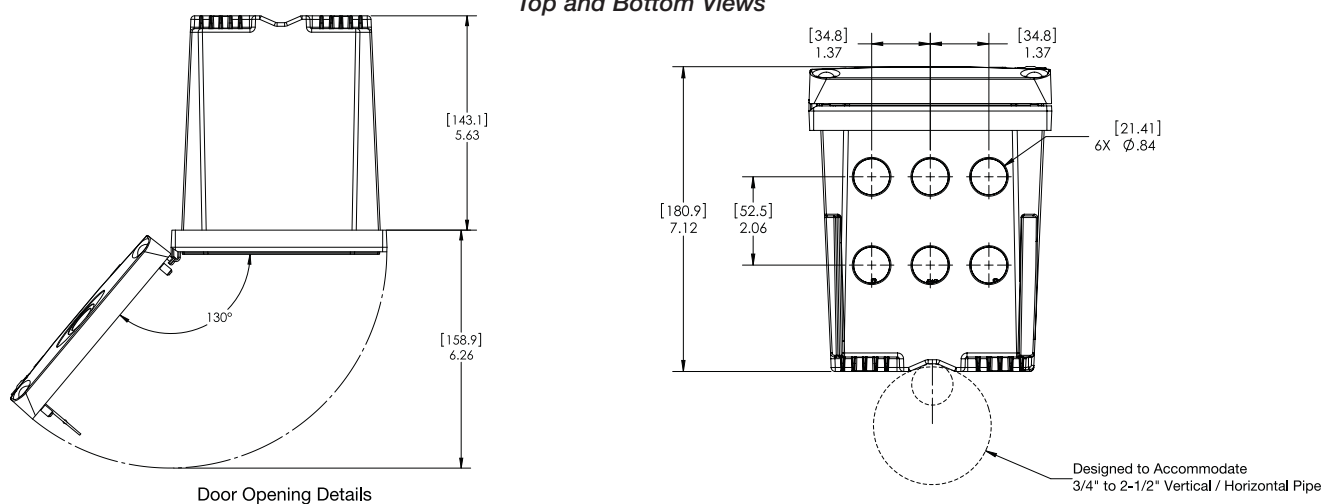
Surface Mounting Dimensions



Panel Mounting Dimensions



Top and Bottom Views



Ordering Information

sc200 for Hach Digital and Analog Sensors

LXV404.99.00552	sc200 controller, 2 channels, digital
LXV404.99.00502	sc200 controller, 1 channel, digital
LXV404.99.00102	sc200 controller, 1 channel, pH/DO
LXV404.99.00202	sc200 controller, 1 channel, Conductivity
LXV404.99.01552	sc200 controller, 2 channels, digital, Modbus RS232/RS485
LXV404.99.00112	sc200 controller, 2 channel, pH/DO

Note: Other Sensor combinations are available. Please contact Hach Technical Support or your Hach representative.

Note: Communication options (MODBUS, Profibus DPV1, and HART) are available. Please contact Hach Technical Support or your Hach representative.

sc200 for Ultrapure Sensors

9500.99.00602	sc200 controller, 1 channel, ultrapure conductivity
9500.99.00702	sc200 controller, 1 channel, ultrapure pH
9500.99.00662	sc200 controller, 2 channel, ultrapure conductivity
9500.99.00772	sc200 controller, 2 channel, ultrapure pH

Sensor and Communication Modules

9012900	Analog pH/ORP and DO module for GLI Sensors
9013000	Analog Conductivity module for GLI Sensors
9012700	Flow module
9012800	4-20 mA Input Module
9525700	Analog pH/ORP Module for Polymetron Sensors
9525800	Analog Conductivity Module for Polymetron Sensors
9013200	Modbus 232/485 Module
9173900	Profibus DP Module
9328100	HART Module
9334600	4-20 mA Output Module (Provides 3 additional mA Outputs)

Accessories

9220600	sc200 Weather and Sun Shield with UV Protection Screen
8809200	sc200 UV Protection Screen
9218200	SD card reader (USB) for connection to PC
9218100	4 GB SD card



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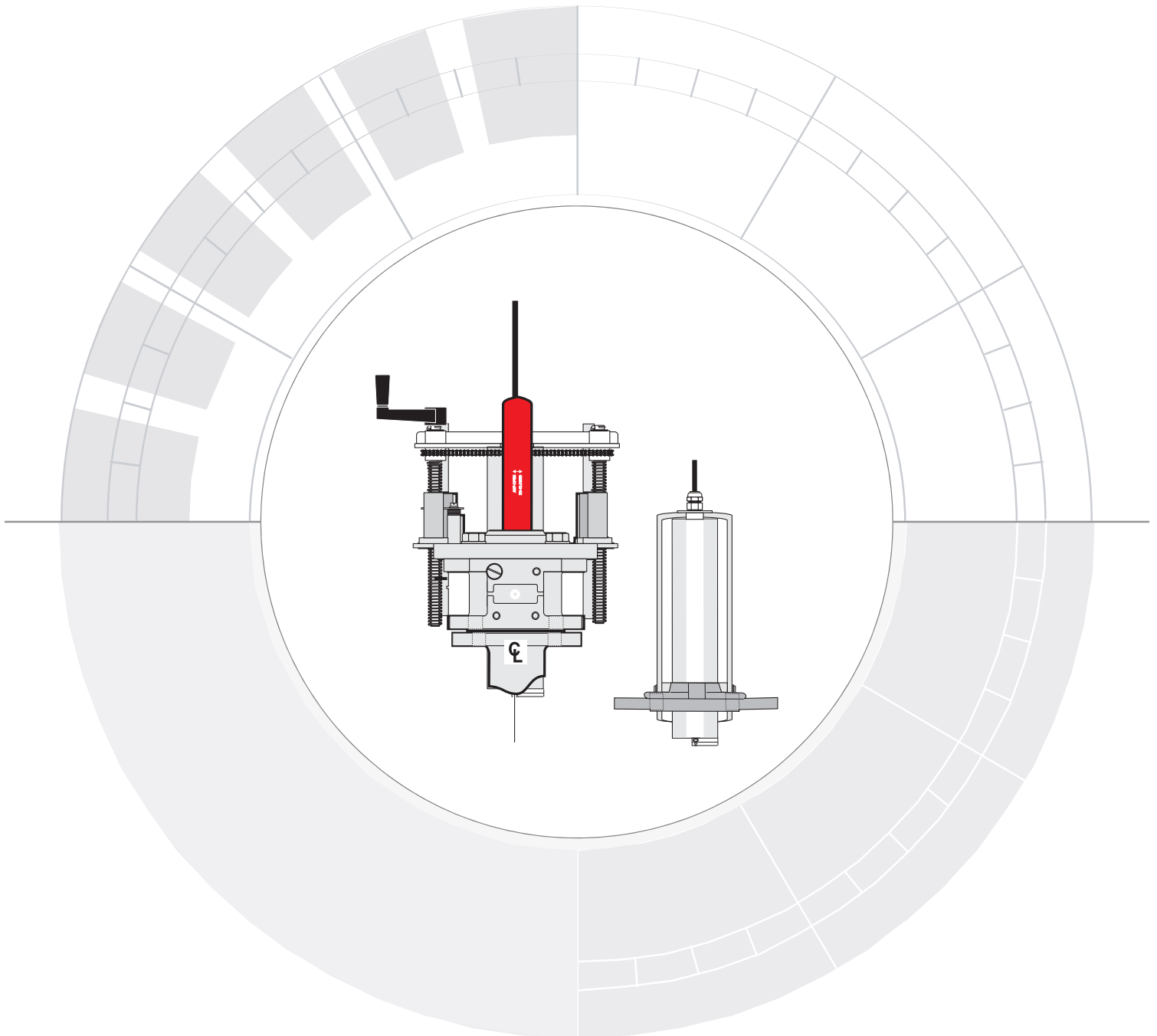
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INSTALLATION

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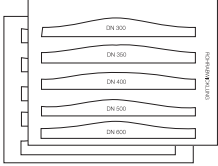
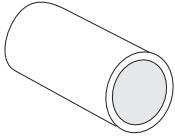
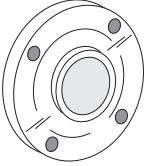
>>Rohrleitungseinbau SOLITAX
>>Piping Installation



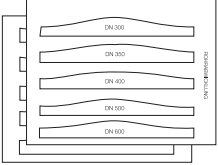
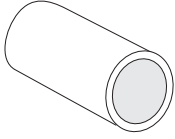
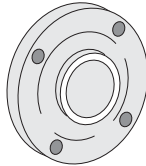
>>INSTALLATION

Rohrleitungseinbau SOLITAX Piping Installation

LZX660

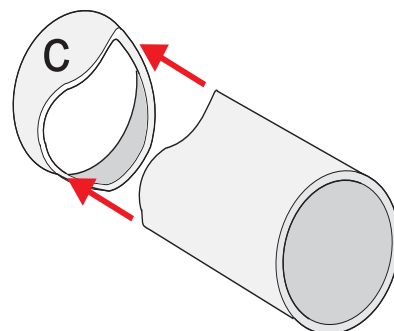
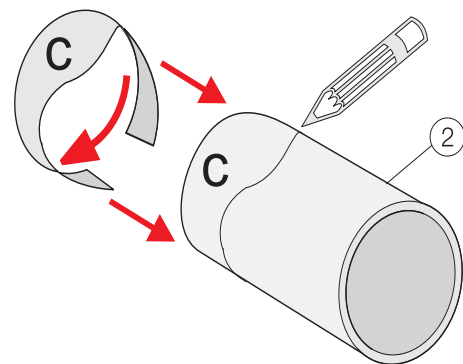
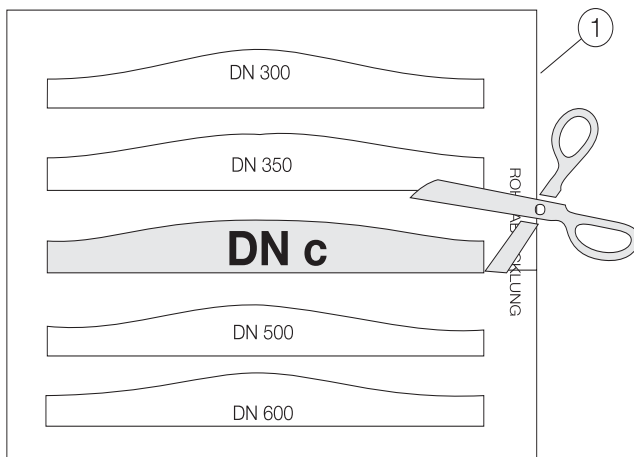
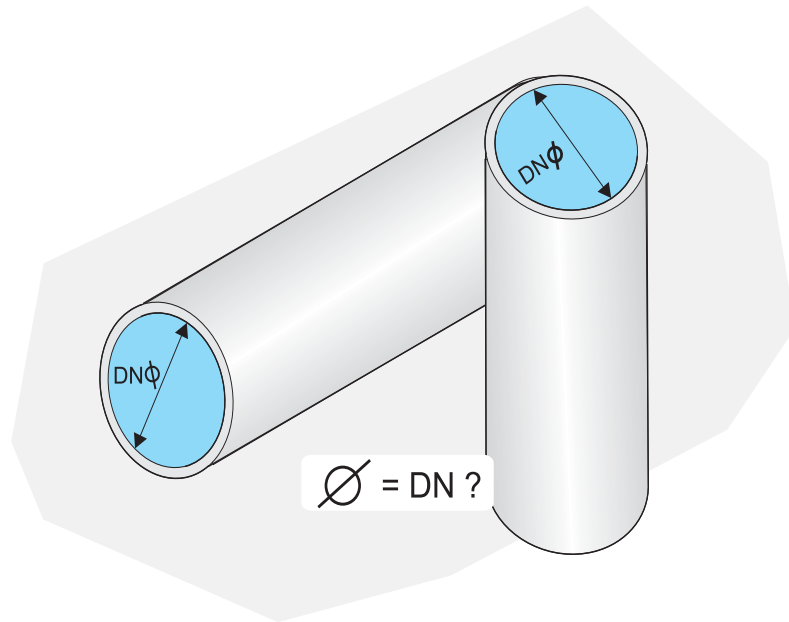
① 	Vorlage Rohrabwicklung Cross sectional profile for pipe
② 	Verlängerungsstück (Edelstahl 1.4571) Extension
③ 	Vorschweißflansch (Edelstahl 1.4571) Welding Neck Flanges (High Grade Steel) DN65/PN16 DIN 2633

LZX661

① 	Vorlage Rohrabwicklung Cross sectional profile for pipe
② 	Verlängerungsstück Extension
③ 	Vorschweißflansch (C-Stahl) Welding Neck Flanges (C-steel) DN65/PN16 DIN 2633

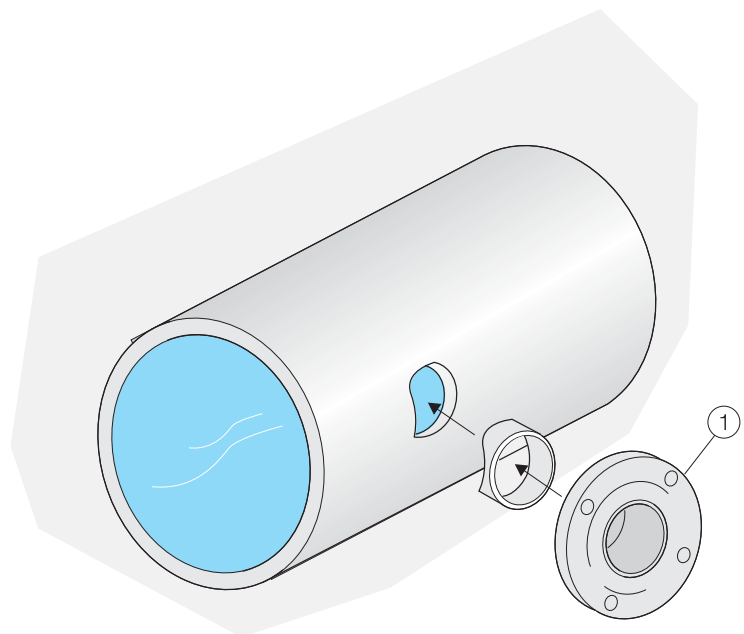
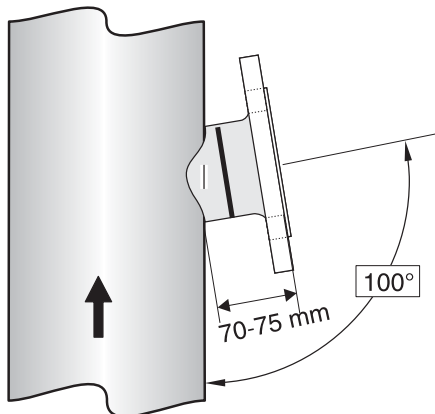
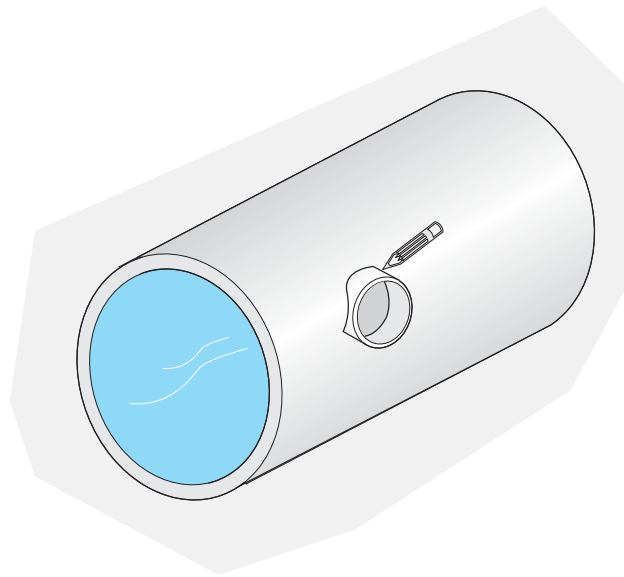
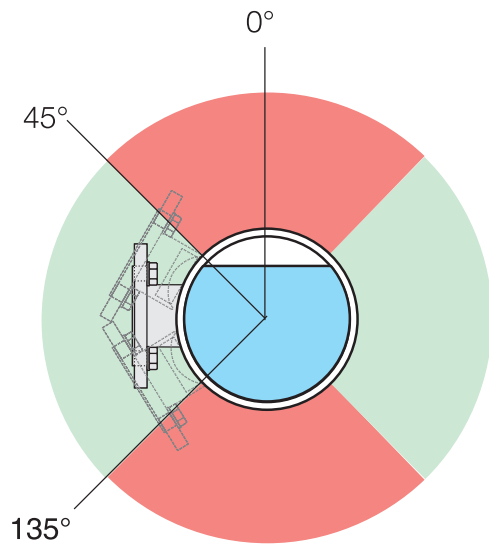
>>INSTALLATION

Rohrleitungseinbau SOLITAX Piping Installation



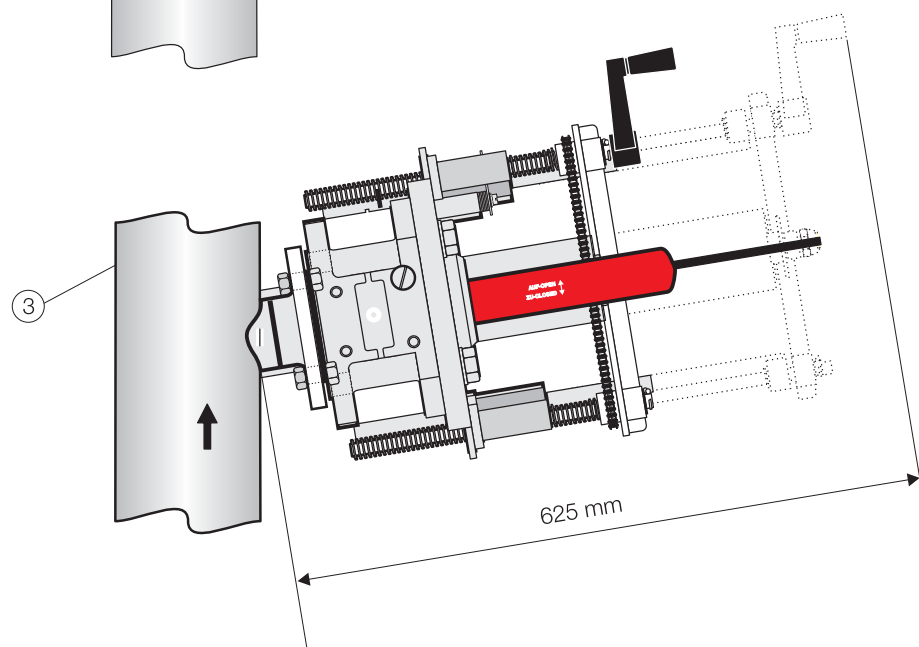
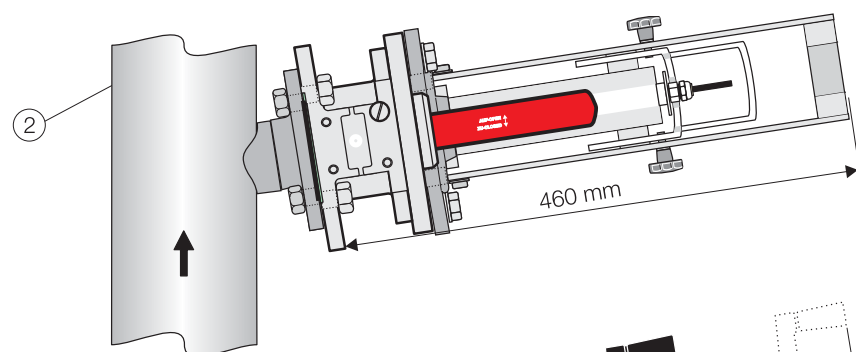
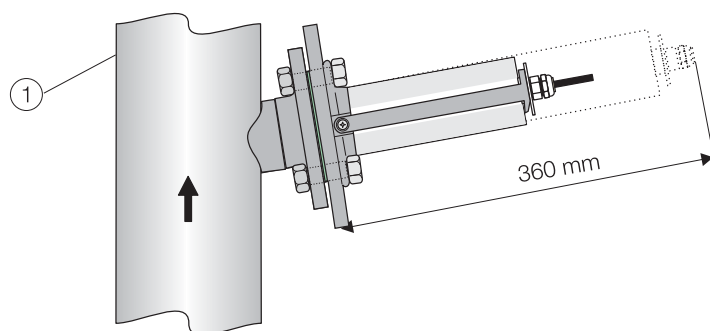
>>INSTALLATION

Rohrleitungseinbau SOLITAX Piping Installation



>>INSTALLATION

Rohrleitungseinbau SOLITAX Piping Installation



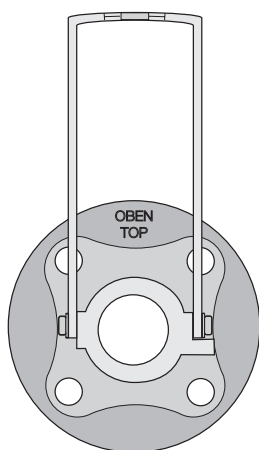
1 LZX461 Einbauarmatur, drucklos, Inline armature, pressure-free

2 LZX936 Einbauarmatur, drucklos mit Kugelhahn, Inline armature, pressure-free with ball valve

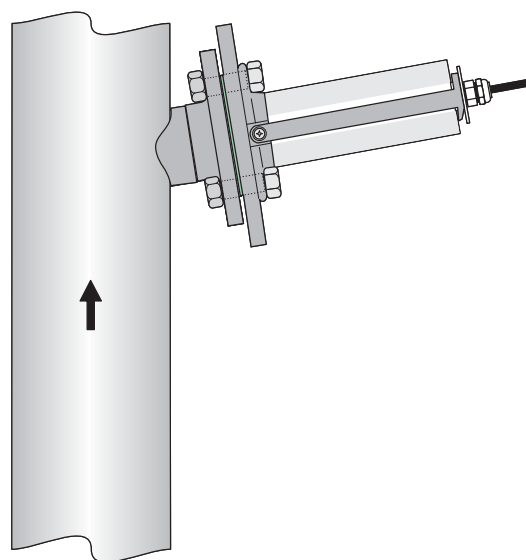
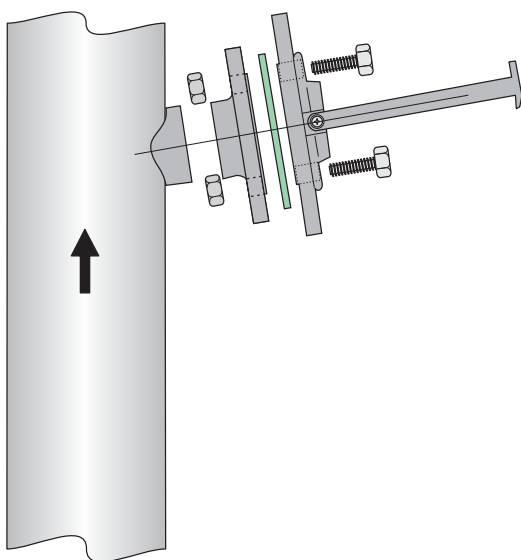
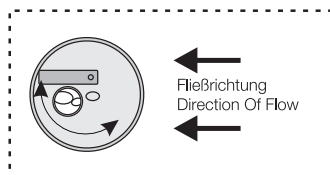
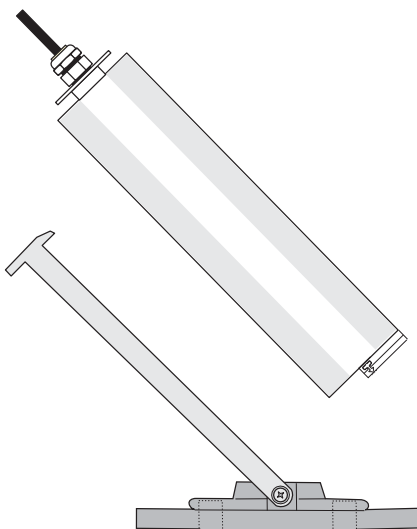
3 LZX337 Sicherheitseinbauarmatur (max. 5 bar) safety inline armature

>>INSTALLATION

Rohrleitungseinbau SOLITAX Piping Installation

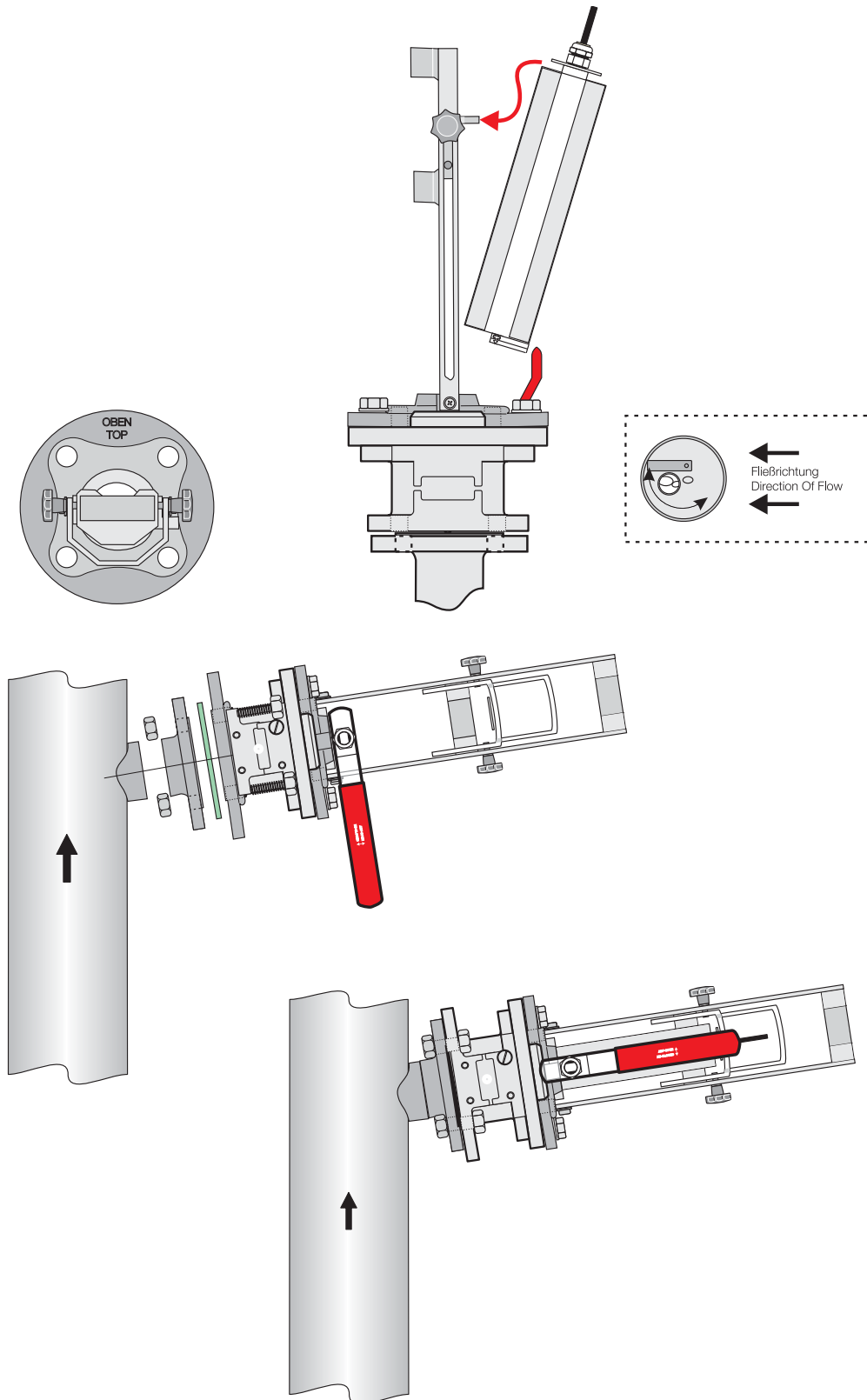


Edelstahl 1.4581
High Grade Steel



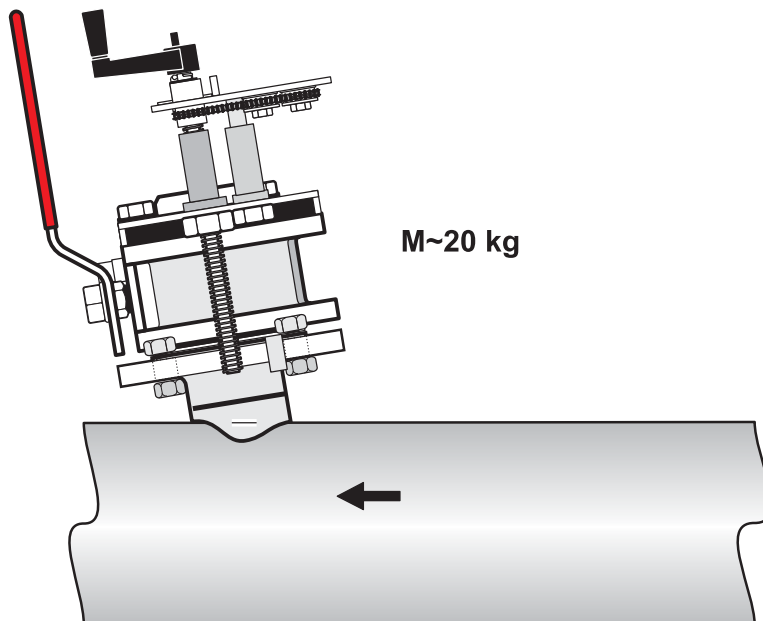
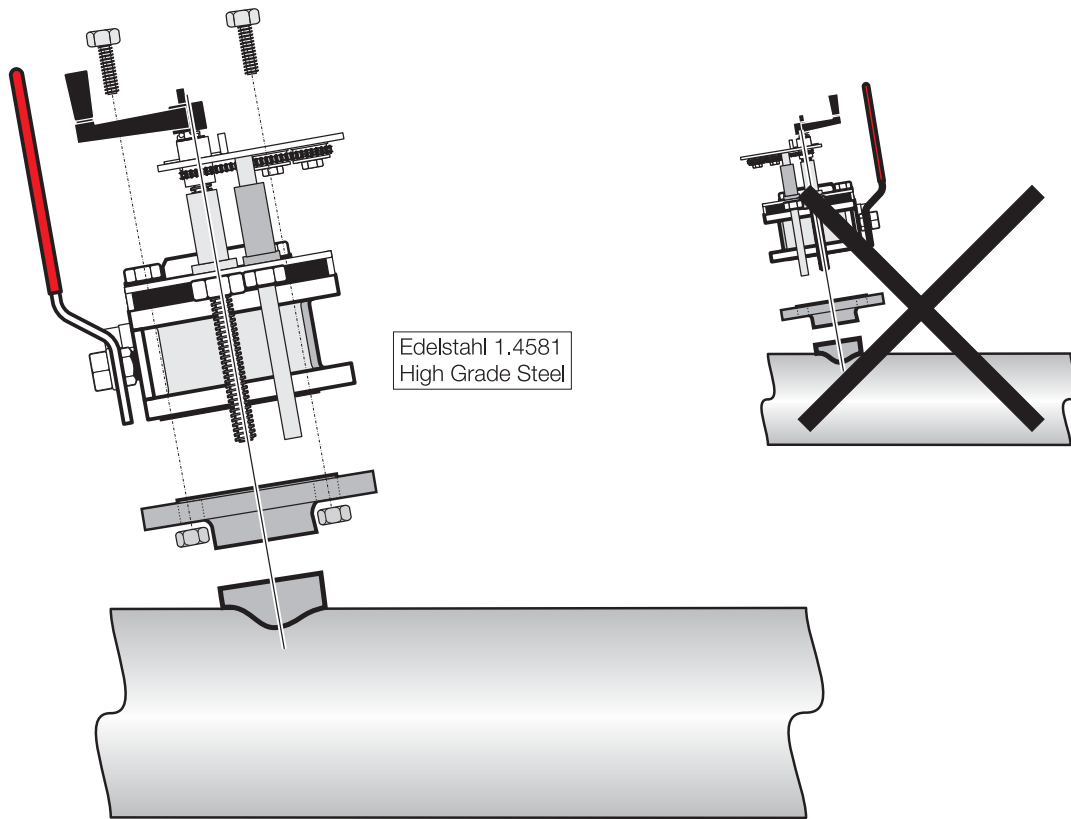
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Rohrleitungseinbau SOLITAX Piping Installation



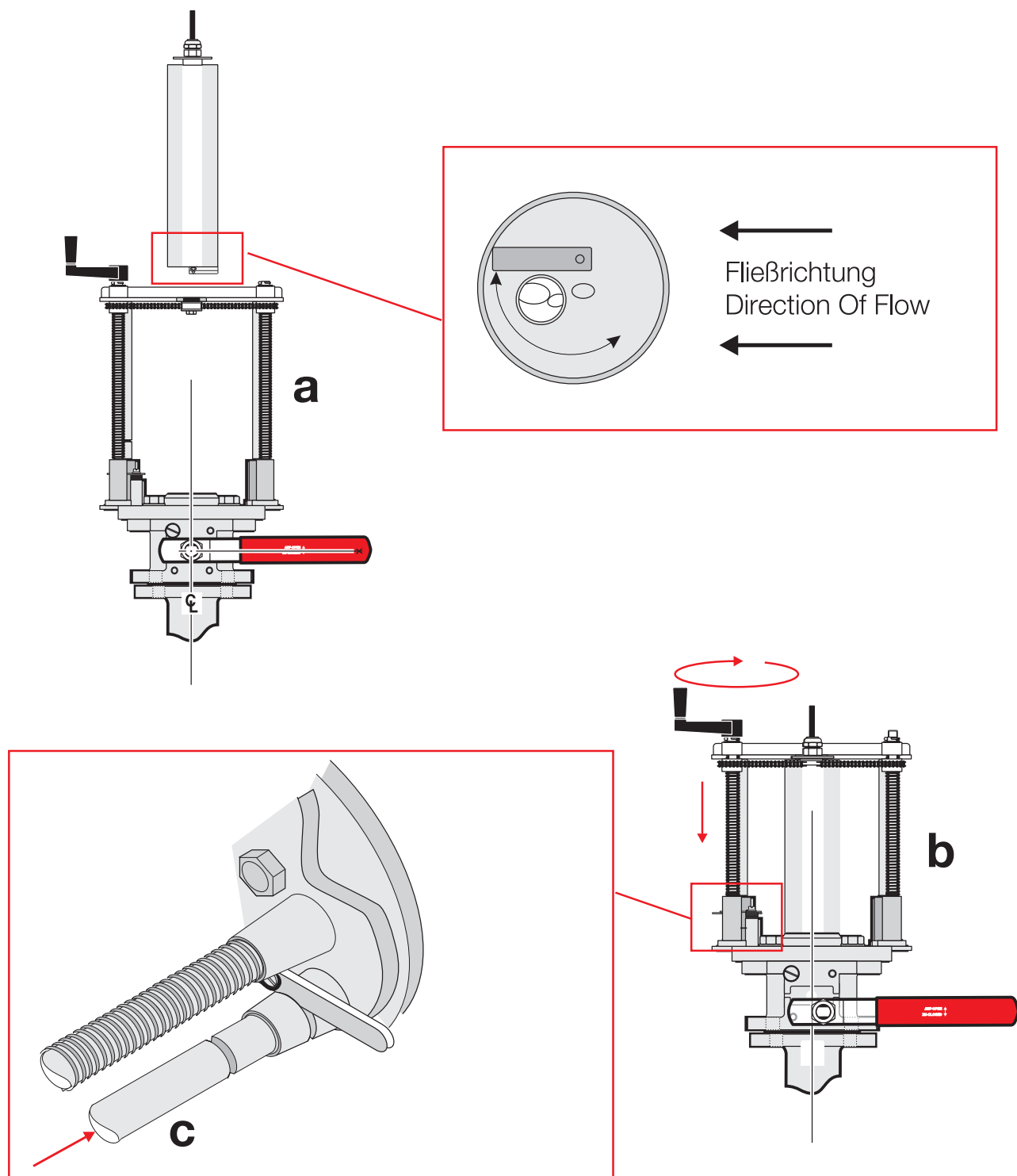
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Rohrleitungseinbau SOLITAX Piping Installation



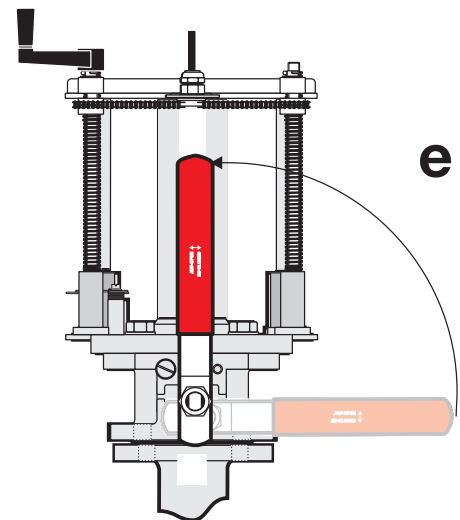
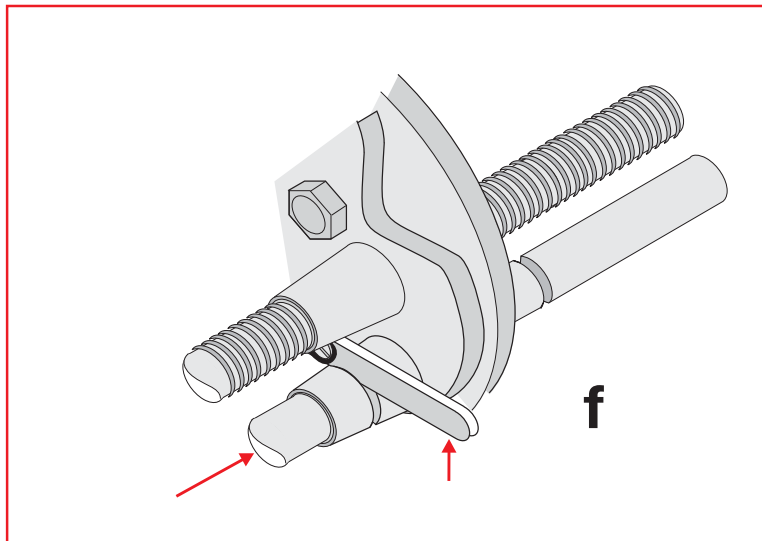
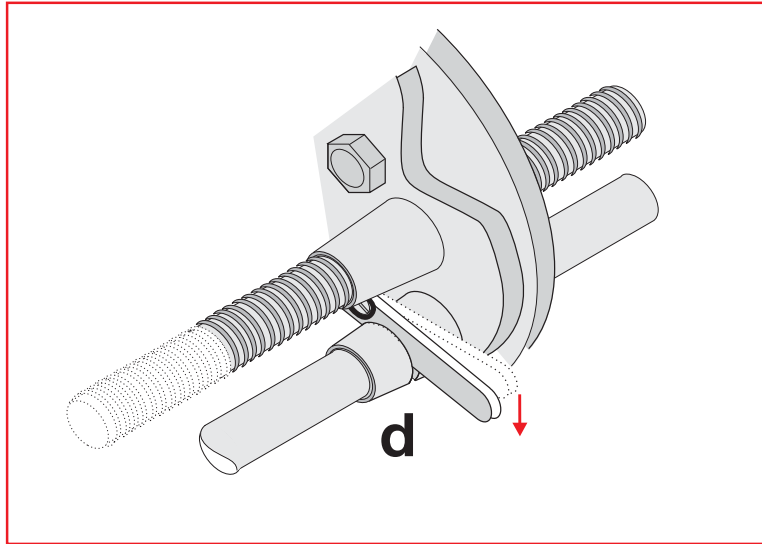
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Rohrleitungseinbau SOLITAX Piping Installation



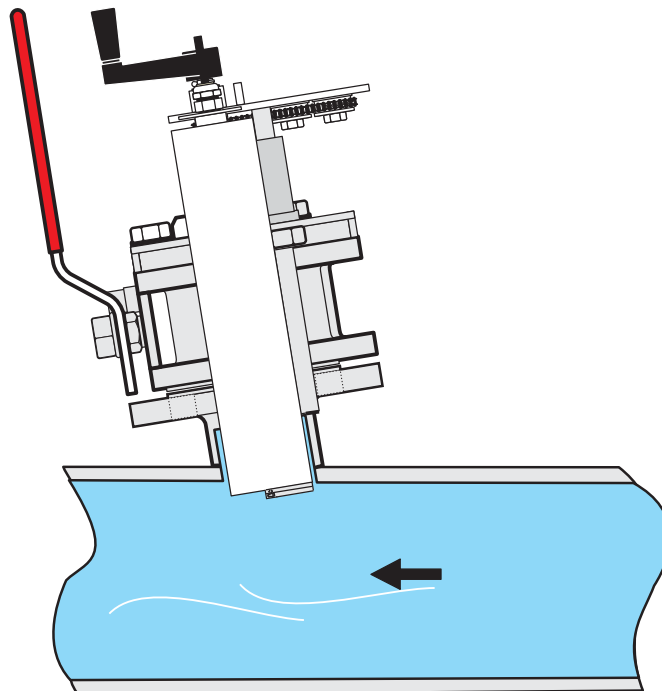
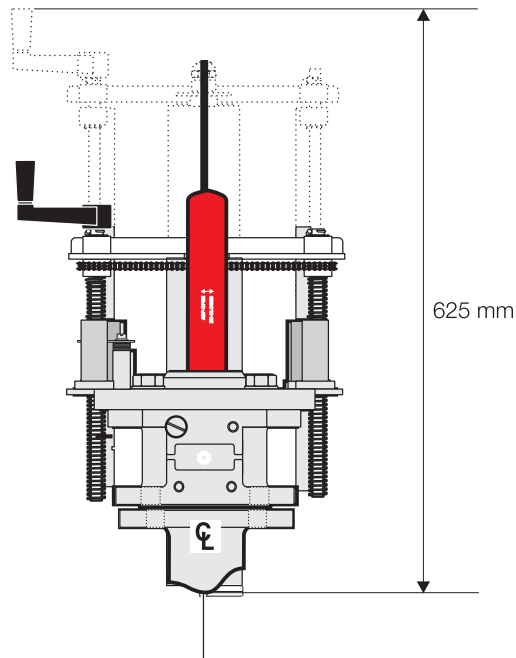
>>INSTALLATION

Rohrleitungseinbau SOLITAX Piping Installation



>>INSTALLATION

Rohrleitungseinbau SOLITAX Piping Installation



>>INSTALLATION

Rohrleitungseinbau SOLITAX Piping Installation

Teile-Liste / Part List

Deutsch	Englisch	Material (DIN / EN - Standard)	Anzahl / Quantity	Bestellnr. / Order Number
Sicherheitseinbauarmatur (Edelstahl), Safety inline armature (highgrade steel)			1	LZX 337
Einbauarmatur vollständig (Edelstahl)	Inline armatur full scale (highgrade steel)	EN Werkstoff 1.4571 (X6CrNiMoTi17-12-2)		
Gehäuse	Housing	Edelstahl, high-grade steel 1.4401		
Kugel	Ball	Edelstahl, high-grade steel 1.4401		
Dichtung	Gasket	PTFE, Teflon		
O-Ringe	O-Ring	Perbunan (Viton)		
Flachdichtung	Flat gasket	PN 16 / 40 65 DIN 3535		
Sechskantschraube	Hex screw	ISO 4017 M 16 x 45 -A4	4	
Einbauarmatur (highgrade steel) drucklos, Inline armature (highgrade steel) pressureless			1	LZX 461
Sondenhalter vollständig (Edelstahl)	Probe holder full scale (highgrade steel)	EN Werkstoff 1.4571 (X6CrNiMoTi17-12-2)	1	
Flachdichtung	Flat gasket	PN 16 / 40 65 DIN 3535	1	
Sechskantschraube	Hex screw	ISO 4017 M 16 x 50 -A4	4	
Sechskantmutter	Hex nut	ISO 4032 M 16 -A4	4	
Einbauarmatur (Edelstahl) drucklos mit Kugelhahn, Inline armature (highgrade steel) pressureless with ball valve			1	LZX 936
Sondenhalter	Sensor holder	RVS304-AISI304 = 2VA		
Gehäuse	Housing	Edelstahl, high-grade steel 1.4401		
Kugel	Ball	Edelstahl, high-grade steel 1.4401		
Dichtung	Gasket	PTFE		
O-Ringe	O-ring	Perbunan (Viton)		
Flachdichtung	Flat gasket	PN 16 / 40 65 DIN 3535	1	
Flachkopfschraube mit Kreuzschlitz	Flathead screw w. cross slot	ISO 7045 - M 5 x 12 - A4 - 70 - Z	2	
Sechskantschraube	Hex screw	ISO 4017 M 16 x 50 -A4	4	
Sechskantmutter	Hex nut	ISO 4032 M 16 -A4	4	

>>INSTALLATION

Rohrleitungseinbau SOLITAX Piping Installation

Vorschweißflansch (Edelstahl), Welding Neck Flanges (highgrade steel)			1	LZX 660
Vorschweißflansch (Edelstahl)	Welding Neck Flanges (highgrade steel)	DIN 2633 DN 65 / 76,1 EN Werkstoff 1.4571 (X6CrNiMoTi17-12-2)		
Anschweißrohr	Welding pipe	NW 65/76.1 PN 16 1.4571 - DIN 2633		
Vorschweißflansch (C-Stahl), Welding Neck Flanges (C-steel)			1	LZX 661
Vorschweißflansch	Welding Neck Flanges (C-steel)	DN 65 / 76,1 C 22.8 (C-Stahl)		
Anschweißrohr	Welding pipe	NW 65/76.1 PN 16 C22.8 103F - DIN 2633		



**DR. BRUNO LANGE
GMBH & CO. KG**

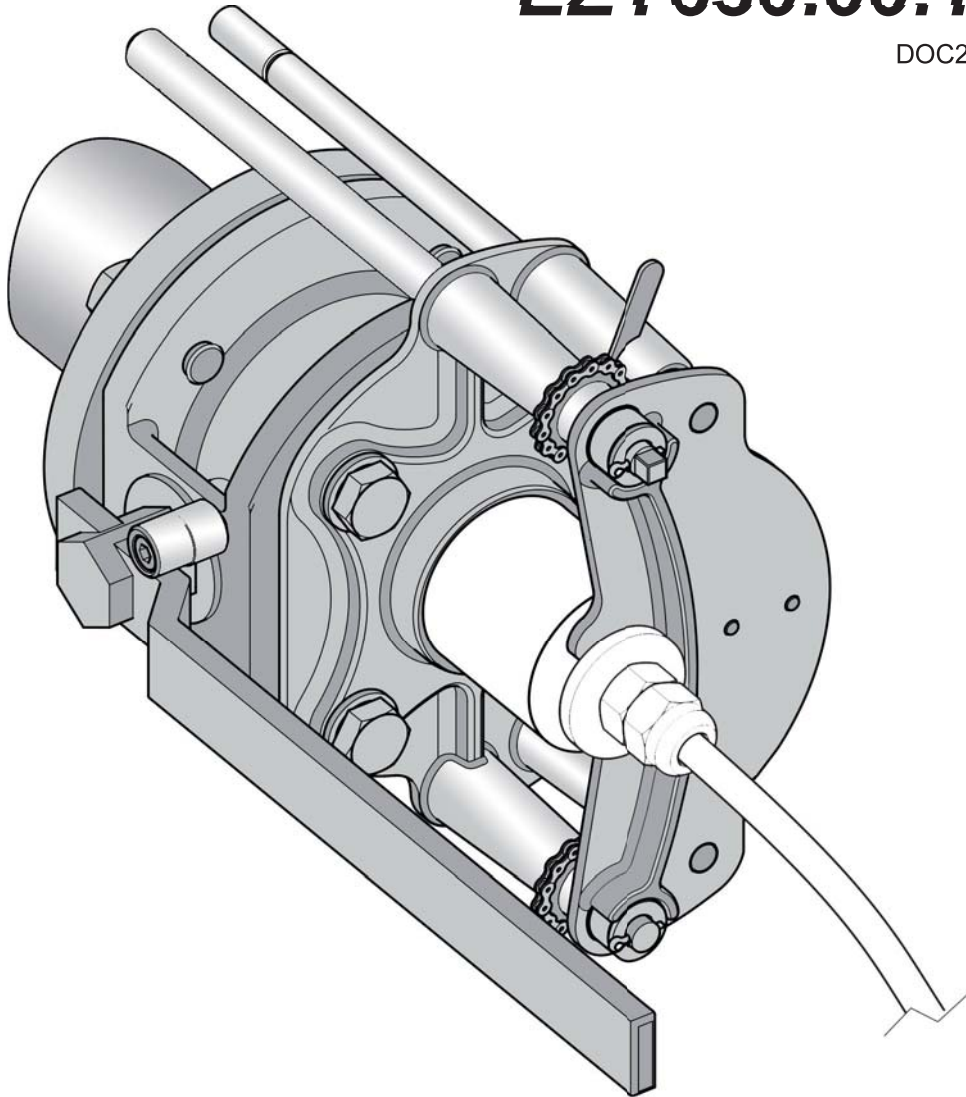
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LZX337
LZX660
LZX661
LZY630.00.10000
LZY630.00.11000
LZY630.00.12000

DOC273.99.90204/6A



BG Преди инсталацията/монтажа на продукта, прочетете внимателно всички инструкции за инсталация и ги спазвайте по време на инсталацията. Инсталацията трябва да се извършва от квалифициран специалист в съответствие с местните разпоредби за безопасност. Погрижете се избраното място на инсталацията да гарантира безопасна инсталация и експлоатация. Продуктът е предназначен единствено за придържане/прикрепване на измервателните сензори/продукти на HACH/HACH LANGE. Всяко друго приложение може да носи риск за потребителя. Работите по поддръжката и ремонта трябва да се извършват изключително от оторизирания отдел за обслужване на клиенти. Могат да се използват само оригинални резервни части и препоръчани от производителя принадлежности. Всякакви изменения по продукта водят до анулиране на всички отговорности от страна на производителя. Непазването на инструкциите за употреба или използването на продукта за цели, различни от тези, за които е предназначен, може да доведе до сериозно нараняване на потребителя и/или повреда на оборудването. Работата по заваряване, трябва да бъде извършвана само от квалифицирани заварчици съгласно DIN/EN 287 или от сертифицирани фирми по EN 3834-2.

CS Při instalaci/montáži produktu si pečlivě přečtěte všechny pokyny k instalaci a v průběhu instalace tyto pokyny dodržujte. Instalaci musí provádět kvalifikovaný odborník v souladu s místními bezpečnostními předpisy. Pečlivě vyberte umístění pro instalaci, které zajistí bezpečnou instalaci a provoz. Produkt je určen pouze k upevnění/přichycení měřičích snímačů/produktů HACH/HACH LANGE. Jakékoli jiné použití může znamenat riziko pro uživatele. Údržbu a opravy smí provádět výhradně autorizované oddělení zákaznických služeb. Je dovoleno používat pouze originální náhradní díly a příslušenství doporučené výrobcem. Jakékoli změny provedené na produktu způsobí neplatnost veškerých záruk. Nedodržení těchto pokynů nebo používání produktu pro jiný účel než pro který je určen může způsobit uživateli vážné zranění anebo poškodit zařízení. Potřebné svařecké práce musí být provedeny kvalifikovaným svařčem výhradně podle DIN/EN 287 nebo dodavatelem v souladu s EN 3834-2.

DA Før du installerer/monterer produktet, skal du læse alle installationsinstruktionerne grundigt og følge dem under installationen. Installationen skal udføres af en kvalificeret ekspert i overensstemmelse med alle lokale sikkerhedsbestemmelser. Vælg sikker og betjeningsvenligt placering til installationen. Produktet er kun beregnet til at holde/fastgøre HACH/HACH LANGE-målesensorer/-produkter. Enhver anden form for brug kan medføre skadesrisiko for brugeren. Vedligeholdelse og reparation bør kun udføres af en autoriseret kundeserviceafdeling. Der må kun anvendes originale reservedele og tilbehør, der er anbefalet af producenten. Alle ændringer af produktet ophever garantien. Hvis du ikke følger disse instruktioner eller bruger produktet til et andet formål, end det er beregnet til, kan der forekomme alvorlige personskader og/eller skader på udstyret. Svejsearbejde må kun udføres af DIN/EN 287 kvalificerede svejsere, eller EN 3834-2 certificerede firmaer.

DE Die Montageanleitung ist vor der Installation/Montage des Produktes sorgfältig und vollständig zu lesen und zu befolgen. Die Installation muss von einer Fachkraft (qualifiziertes Personal) unter Einhaltung aller lokal gültigen Sicherheitsvorschriften erfolgen. Der Montageort ist so zu wählen, dass eine sichere Installation und der sichere Betrieb gewährleistet ist. Die Verwendung des Produktes ist ausschließlich zum Halten/Befestigen von HACH/HACH LANGE Messsonden/Produkten vorgesehen. Jede andere Benutzung ist mit Risiken für den Benutzer verbunden. Wartungs- und Reparaturarbeiten sollten nur vom autorisierten Kundendienst durchgeführt werden. Es dürfen nur vom Hersteller empfohlene Originalersatz- und Zubehörteile verwendet werden. Änderungen am Produkt haben den Verlust jeglicher Haftungsansprüche zur Folge. Nichtbeachtung dieser Anweisungen oder eine andere Verwendung des Produktes kann schwerwiegende Verletzungen der Anwender oder Beschädigung am Gerät zur Folge haben. Die notwendigen Schweißarbeiten dürfen ausschließlich von entsprechend DIN/EN 287 qualifizierten Schweißern durchgeführt werden, oder von Fachfirmen entsprechend EN 3834-2.

EL Πριν από την εγκατάσταση/τοποθέτηση του προϊόντος, διαβάστε προσεκτικά και ακολούθηστε όλες τις οδηγίες εγκατάστασης κατά την εγκατάσταση. Η εγκατάσταση πρέπει να πραγματοποιηθεί από κατάλληλα εκπαιδευμένο τεχνικό και σύμφωνα με όλους τους τοπικούς κανονισμούς ασφαλείας. Επιλέξτε μια θέση τοποθέτησης που θα διασφαλίσει την ασφαλή εγκατάσταση και λειτουργία. Το προϊόν προορίζεται αποκλειστικά για τη στήριξη/σύνδεση των αισθητήρων μέτρησης/προϊόντων HACH/HACH LANGE. Οποιαδήποτε άλλη χρήση ενδέχεται να ενέχει κινδύνους για τον χρήστη. Οι εργασίες συντήρησης και επισκευής θα πρέπει να εκτελούνται αποκλειστικά από το εξουσιοδοτημένο τμήμα εξυπηρέτησης πελατών. Επιτρέπεται η χρήση μόνον των γνήσιων ανταλλακτικών και των αξεσουάρ που συνιστά ο κατασκευαστής. Οποιοσδήποτε αλλαγές στο προϊόν ακυρώνουν την ευθύνη της εταιρείας. Σε περίπτωση που δεν τηρηθούν αυτές τις οδηγίες ή χρησιμοποιηθούν το προϊόν για διαφορετικό σκοπό από αυτόν που προορίζεται, ενδέχεται να προκληθεί σοβαρός τραυματισμός στον χειριστή και/ή βλάβη στον εξοπλισμό. Οι απαιτούμενες εργασίες συγκόλλησης θα πρέπει να διεξάγονται από εξειδικευμένο προσωπικό σύμφωνα με DIN / EN287 ή από κατασκευαστικές εταιρείες σύμφωνα με DIN 3834-2.

EN Before installing/mounting the product, read all the installation instructions carefully and follow the instructions during installation. Installation must be carried out by a qualified expert in accordance with all local safety regulations. Take care to choose an installation location that will ensure safe installation and operation. The product is intended solely for holding/attaching HACH/HACH LANGE measuring sensors/products. Any other use may involve risks for the user. Maintenance and repair work should be carried out exclusively by the authorized customer service department. Only original replacement and accessory parts recommended by the manufacturer may be used. Any changes made to the product will nullify all liability. Failure to follow these instructions or use of the product for a purpose other than that for which it was intended may result in serious injury to the user and/or damage to the equipment. The required welding work must be performed exclusively in accordance with DIN / EN 287 qualified welders, or from contractors in accordance with EN 3834-2.

ES Antes de instalar o fijar el producto, lea con atención todas las instrucciones de instalación y sigalas durante el montaje. La instalación debe llevarla a cabo un experto cualificado, de acuerdo con las normas de seguridad locales. Elija una ubicación para la instalación que garantice que ésta y el funcionamiento del producto sean seguros. El producto sólo está diseñado para sujetar o fijar sensores o productos de medición de HACH/HACH LANGE. Cualquier otro uso puede conllevar riesgos para el usuario. El trabajo de mantenimiento y reparación sólo debe llevarse a cabo por el departamento de atención al cliente autorizado. Sólo deben utilizarse las piezas de repuesto recomendadas por el fabricante. Cualquier cambio que se realice en el producto anulará toda responsabilidad. Si no se siguen estas instrucciones o si se utiliza el producto para un uso distinto del uso para el que fue diseñado, el usuario puede sufrir heridas graves y/o se puede dañar el equipo. Los trabajos de soldadura requeridos deben ser realizados exclusivamente por soldadores cualificados según DIN / EN 287, o por contratistas de acuerdo a EN 3834-2.

FI Ennen kuin asennat/kiinnität tuotteen, lue kaikki asennusohjeet huolellisesti ja noudata niitä. Tuotteen saa asentaa vain valtuutettu henkilö, ja asennuksessa on noudatettava kaikkia paikallisia turvallisuusmääräyksiä. Asenna tuote sellaiseen paikkaan, johon asentaminen on turvallista ja jossa tuote toimii oikein. Tuote on tarkoitettu ainoastaan HACH/HACH LANGE -mittausanturien/-tuotteiden ripustamiseen/kiinnittämiseen. Muulainen käyttö voi aiheuttaa vaaratilanteita käyttäjälle. Huolto- ja korjaustyöt saa tehdä vain valtuutettu asiakaspalveluosasto. Tuotteessa saa käyttää vain valmistajan suosittelemia alkuperäisiä vara-

ja lisäosia. Tuotteeseen tehdyt muutokset mitätöivät kaikki vastuut. Jos näitä ohjeita ei noudateta tai jos tuotetta käytetään johonkin muuhun kuin sen varsinaiseen käyttötarkoitukseen, käyttäjälle voi aiheutua vakavia vammoja ja/tai laite voi vaurioitua. Vain DIN / EN 287 mukaan hyväksytyt hitsaajat tai EN 3834-2 mukaiset urakoitsijat saavat tehdä vaaditut hitsaukset.

FR Avant l'installation/le montage du produit, lisez attentivement toutes les instructions d'installation et suivez-les au cours de l'installation. L'installation doit être réalisée par un expert qualifié conformément à toutes les réglementations de sécurité locales. Veillez à choisir un emplacement permettant d'assurer une installation et un fonctionnement en toute sécurité. Ce produit est uniquement destiné à maintenir/fixer des capteurs/équipements de mesure HACH LANGE. Toute autre utilisation entraînerait un risque pour l'utilisateur. Seul le service clientèle agréé est autorisé à effectuer les travaux de maintenance et de réparation. Seuls les pièces de rechange et les accessoires d'origine recommandés par le fabricant doivent être utilisés. La modification du produit annule toute responsabilité. Le non-respect de ces instructions ou l'utilisation de ce produit à des fins autres que celles auxquelles il est destiné risqueraient de gravement blesser l'utilisateur et/ou d'endommager le matériel. Le travail de soudure requis doit être réalisé exclusivement par des soudeurs qualifiés en conformité avec DIN / EN 287, ou par prestataires conformément à EN 3834-2.

HR Prije instalacije/postavljanja uređaja, pažljivo pročitajte sve upute za montažu i pratite ih tijekom postupka instalacije. Instalaciju mora provesti kvalificirani stručnjak u skladu s lokalnim sigurnosnim propisima. Brižljivo odaberite mjesto instalacije na kojem će se postavljanje uređaja i njegovo korištenje odvijati u sigurnim uvjetima. Uređaj je namijenjen isključivo za držanje/pričvršćivanje HACH/HACH LANGE mjernih senzora/uređaja. Upotreba uređaja u druge svrhe može predstavljati rizik za korisnika. Održavanje i popravke smije provoditi isključivo ovlašteni servisni odjel. Mogu se upotrebljavati samo originalni rezervni i dodatni dijelovi koje je preporučio proizvođač. Bilo kakve izmjene izvršene na uređaju poništiti će njegovu pouzdanost. Nepoštivanje ovih uputa ili upotreba uređaja za svrhe za koje nije namijenjen mogu dovesti do ozbiljnih ozljeda osoba koje se njime koriste i/ili štete na opremi. Potreban posao za zavarivanje mora biti izveden prema DIN / EN 287 od strane kvalificiranih varoica ili izvođača radova prema EN 3834-2.

HU A termék üzembe helyezésére/rögzítésre előtt tekintse át a vonatkozó utasításokat, és tartsa is be azokat. Az üzembe helyezést kizárólag szakember végezheti, a hatályos biztonsági előírásoknak megfelelően. A telepítéshez biztonságos üzemet szavatoló helyet válasszon. A termék kizárólag HACH/HACH LANGE mérőberendezések és készületek rögzítésére szolgál. Az ettől eltérő bármilyen használat kockázattal jár. A karbantartást és egyéb javításokat kizárólag az arra feljogosított ügyfélszolgálati részleg végezheti el. Csak a gyártó által ajánlott cserealkatrészek használhatóak. A terméken végzett bármilyen módosítás a felelősség kizárását vonja maga után. Az utasítások be nem tartása, a termék megadott felhasználási területétől eltérő célra való alkalmazása a kezelő súlyos sérülését és/vagy a berendezés károsodását okozhatja. A szükséges hegesztési munkákat csak DIN/EN 287 bizonyítvánnyal rendelkező hegesztő szakember, vagy EN 3834-2 minősítéssel rendelkező szakőég végezheti.

IT Prima di installare/montare il prodotto, leggere le istruzioni sull'installazione e attenersi scrupolosamente ad esse durante l'installazione. L'installazione deve essere eseguita da personale qualificato in base alle norme di sicurezza locali. Scegliere con cura il punto di installazione per un'installazione corretta e un funzionamento sicuro. Il prodotto è adatto esclusivamente per il sostegno/collegamento di prodotti/sensori di misura HACH/HACH LANGE. Qualsiasi altro utilizzo può provocare lesioni all'utente. La manutenzione e gli interventi di riparazione devono essere eseguiti esclusivamente dal reparto assistenza clienti. Il produttore consiglia di sostituire gli accessori solo con ricambi originali. Qualsiasi modifica apportata al prodotto prevede l'esclusione da qualsiasi responsabilità. La mancata osservanza della procedura di installazione o l'utilizzo inappropriato del prodotto possono provocare serie lesioni all'utente e/o danni all'apparecchiatura. Il lavoro di saldatura richiesto deve essere effettuato esclusivamente in accordo alla direttiva DIN / EN 287 da saldatori qualificati o da costruttori in accordo a EN 3834-2.

JA 製品を取り付ける前にすべての設置手順をよく読み、手順に従って設置してください。設置は地域の安全基準に従い、資格のある担当者が行ってください。設置場所は、安全に取り付けで操作できる場所を選んでください。本製品は、HACH/HACH LANGE 測定センサー/製品の保持および接続専用です。その他の用途には、ユーザーの責任において使用してください。メンテナンスおよび修理は、認定されたカスタマー サービス部門のみが実施できます。交換部品および付属品には、メーカー推奨の純正品ののみを使用してください。製品を改変した場合、保証は無効になります。手順に従わなかった場合、または製品を用途外に使用した場合は、整備を欠たり、装置が破壊することがあります。フルディングはDIN/EN287に基づいて認定された作業業者あるいはEN3834-2に基づくと受託業者が実施する。

KO 본 제품을 설치하거나 장착하기 전에 모든 설치 지침을 충분히 검토하고 설치 시 반드시 해당 지침을 따르십시오. 설치는 숙련된 기술자가 지역의 모든 관련 안전 규정을 준수하여 수행해야 합니다. 설치 및 작동 시 안전한 장소를 신중하게 고려하십시오. 본 제품은 HACH/HACH LANGE 측정 센서 또는 측정 제품을 지지하거나 연결하는 용도로만 사용됩니다. 그 외 다른 용도로 사용 시 작업자가 위험할 수 있습니다. 유지 관리 및 보수 작업은 공인된 고객 서비스 부서에서 전적으로 담당해야 합니다. 제조사가 승인한 교체용 부품 및 주변 장치만 사용 가능합니다. 제품 변경으로 인한 책임은 지지 않습니다. 이러한 지침에 어긋나거나 원래 제품의 용도나, 본 목적으로 사용할 경우 작업자에게 심각한 부상이 일어나거나 장비가 손상될 수 있습니다. 용접 작업이 필요한 경우에는 반드시 DIN/EN 287 자격을 가진 용접공이나 EN3834-2에 상응한 사람에 의해서 반드시 수행되어야 합니다.

NL Lees vóór montage van het product alle montage-instructies grondig door en volg de instructies tijdens de montage op. Montage dient te worden uitgevoerd door een gekwalificeerde persoon en in overeenstemming met alle plaatselijke veiligheidsvoorschriften. Kies een montagelocatie die een veilige montage en werking garandeert. Het product is uitsluitend bedoeld voor opname/bevestiging van meetsensoren/-producten van HACH/HACH LANGE. Elk ander gebruik kan gevaren voor de gebruiker met zich meebrengen. Onderhoud en reparatie mogen uitsluitend worden uitgevoerd door de geautoriseerde afdeling klantenservice. Er mogen alleen originele, door de fabrikant aanbevolen reservedelen en accessoires worden gebruikt. Bij elke aanpassing van het product vervalt de aansprakelijkheid. Als u deze instructies niet opvolgt of als u het product voor een ander doel gebruikt dan waarvoor het is bedoeld, kan dit leiden tot ernstig letsel van de gebruiker en/of beschadiging van de apparatuur. Het benodigde laswerk mag uitsluitend uitgevoerd worden door DIN/EN287 gekwalificeerde lassers, of door EN3834-2 gecertificeerde installateurs.

PL Przed zainstalowaniem/zamontowaniem produktu, uważnie przeczytać wszystkie instrukcje i postępować zgodnie z ich zaleceniami podczas instalacji. Instalacja powinna zostać wykonana przez specjalistę o odpowiednich kwalifikacjach, zgodnie ze wszystkimi obowiązującymi lokalnie przepisami bezpieczeństwa. Wybrać takie miejsce instalacji, które zapewni bezpieczeństwo podczas instalacji i użytkowania. Produkt jest przeznaczony wyłącznie do zamocowania/zawieszenia czujników/mierników firmy HACH/HACH LANGE. Jakiegokolwiek inne zastosowanie niesie ze sobą ryzyko dla użytkownika. Konserwację i naprawy powinny być przeprowadzane wyłącznie przez upoważnioną personel działu serwisowego klienta. Wolno używać tylko oryginalnych części zamiennych i części wyposażenia zalecanych przez producenta. Jakiegokolwiek modyfikacje w budowie i działaniu produktu uznają wygaśnięcie

gwarancji i wykluczają wszelką odpowiedzialność producenta. Nieprzestrzeganie tych instrukcji lub używanie produktu do celów innych niż wynika z opisu jego przeznaczenia, może być przyczyną poważnych wypadków z udziałem użytkownika i/lub uszkodzenia sprzętu. Wymagane prace spawalnicze muszą być wykonane zgodnie z normą DIN / EN 287 przez wykwalifikowany personel lub przez firmy pośredniczące zgodnie z EN3834-2.

PT Antes de instalar/montar o produto, leia atentamente as instruções de instalação e siga-as durante a instalação. A instalação deve ser efectuada por um profissional qualificado em conformidade com todas as regulamentações locais de segurança. Escolha cuidadosamente o local de instalação de modo a assegurar uma operação e instalação com segurança. Este produto foi concebido apenas para segurar/fixar sensores/produtos para medições da HACH/HACH LANGE. Qualquer outro tipo de utilização pode implicar riscos para o utilizador. O trabalho de manutenção e reparação deve ser efectuado única e exclusivamente pelo departamento de assistência ao cliente devidamente autorizado. Apenas podem ser utilizados acessórios e peças de substituição originais recomendados pelo fabricante. Qualquer alteração feita ao produto anula qualquer responsabilidade da nossa parte. O não cumprimento das instruções ou a utilização do produto para outros fins que não aqueles para que o produto foi concebido pode resultar em ferimentos graves e/ou danos ao equipamento. O trabalho de soldadura exigido deverá ser executado exclusivamente por soldadores qualificados de acordo com a norma DIN / EN 287, ou por empreiteiros em conformidade com a norma EN 3834-2.

RO Înainte de instalarea/montarea produsului, citiți cu atenție toate instrucțiunile de instalare și urmați instrucțiunile în timpul instalării. Instalarea trebuie realizată de un expert calificat în conformitate cu toate reglementările locale pentru siguranță. Aveți grijă să alegeți o locație de instalare care să asigure instalarea și funcționarea în siguranță. Produsul este destinat exclusiv pentru menținerea/atașarea senzorilor/produselor de măsurare HACH/HACH LANGE. Utilizarea în alte scopuri poate implica riscuri pentru utilizator. Întreținerea și lucrările de reparație trebuie realizate exclusiv de departamentul de service autorizat pentru clienți. Pot fi utilizate numai piesele de schimb și accesoriile originale recomandate de producător. Orice modificare adusă produsului va duce la anularea oricărei răspunderi. Nerespectarea acestor instrucțiuni sau utilizarea produsului în alte scopuri decât în cele destinate pot duce la accidente grave pentru utilizator și/sau defectarea echipamentului. Lucrările de sudură necesare trebuie să fie efectuate exclusiv de sudori calificați în conformitate cu DIN / EN 287, sau de contractori în conformitate cu EN 3834-2.

RU Перед установкой/монтажом изделия необходимо внимательно прочитать инструкции по установке и строго следовать им во время выполнения работ. Установка должна быть выполнена квалифицированным специалистом с соблюдением действующих правил по технике безопасности. Выбирая место для установки, необходимо учитывать требования по безопасности при монтаже и эксплуатации изделий. Данное изделие предназначено только для крепления измерительных датчиков/приборов компании HACH/HACH LANGE. Любое другое применение может представлять опасность для пользователя. Работы по ремонту и техобслуживанию должны выполняться исключительно специалистами уполномоченной сервисной организации. С изделием могут использоваться только запчасти и принадлежности, рекомендуемые изготовителем. Любые изменения, внесенные в конструкцию изделия, приведут к отмене гарантии поставщика. Несоблюдение требований инструкций или использование изделия не по назначению могут стать причиной серьезных травм для людей и/или повреждения оборудования. Необходимые сварочные работы должны проводиться только сварщиками, квалифицированными в соответствии с DIN / EN 287, или подрядчиками в соответствии с DIN 3834-2.

SK Pred inštaláciou/upevnením produktu si pozorne prečítajte všetky pokyny k inštalácii a počas inštalácie ich dodržujte. Inštaláciu musí vykonať kvalifikovaný expert v súlade so všetkými miestnymi bezpečnostnými nariadeniami. Uistite sa, že si vyberiete miesto inštalácie, ktoré zaručí bezpečnú inštaláciu a prevádzku. Produkt je určený výlučne pre uchytenie/upevnenie meracích snímačov/produktov HACH/HACH LANGE. Akékoľvek iné použitie môže zahŕňať riziká pre používateľa. Údržbu a opravy by malo vykonávať výlučne autorizované oddelenie služieb pre zákazníkov. Môžu sa použiť len originálne náhradné diely a príslušenstvo, ktoré odporúča výrobca. Akékoľvek zmeny vykonané na produkte spôsobia neplatnosť všetkej zodpovednosti. Nedodržanie týchto pokynov alebo používanie produktu na iný než určený účel môže spôsobiť vážne zranenie používateľa alebo poškodenie zariadenia. Požadované zváračské práce musia byť vykonané výhradne v súlade s DIN/EN 287 kvalifikovanými zváračmi, alebo dodávateľmi v súlade s EN 3834-2.

SL Pred namestitvijo/postavitvijo izdelka natančno preberite vsa navodila za namestitev in jih med nameščanjem upoštevajte. Namestitev mora izvesti usposobljen strokovnjak v skladu z vsemi lokalnimi varnostnimi predpisi. Za namestitev izberite mesto, ki zagotavlja varno namestitev in uporabo. Izdelek je namenjen izključno za namestitev/prireditve merilnih senzorjev/izdelkov HACH/HACH LANGE. Vsakršna drugačna uporaba lahko predstavlja nevarnost za uporabnika. Vzdrževanje in popravilo lahko izvaja izključno osebje pooblaščenega servisnega oddelka. Uporabljajte lahko samo originalne nadomestne dele in dodatno opremo, ki jih priporoča proizvajalec. Spremembe izdelka razveljavijo vsakršno odgovornost. Če teh navodil ne upoštevate ali izdelek uporabljate v neprimeren namen, lahko pride do hudih poškodb uporabnika in/ali poškodovanja opreme. Zahtevana dela varenja lahko izvajajo izključno usposobljeni varilci v skladu z DIN/EN 287 ali izvajalci v skladu z EN 3834-2.

SR Pre instalacije/montaže uređaja pažljivo pročitajte sva uputstva za montažu i pratite ih tokom postupka montaže. Instalaciju mora provesti kvalifikovani stručnjak u skladu sa lokalnim propisima o bezbednosti. Brizljivo odaberite mesto instalacije na kom će se montaža uređaja i korišćenje odvijati u bezbednim uslovima. Uređaj je namenjen isključivo za držanje/pričvršćivanje HACH/HACH LANGE mernih senzora/uređaja. Upotreba uređaja u druge svrhe može da predstavlja rizik po korisnika. Održavanje i opravke sme da provodi isključivo ovlašćeni serviser. Kod zamene i opravaka smeju da se koriste samo originalni rezervni i dodatni delovi koje je preporučio proizvođač. Bilo kakve izmene izvršene na uređaju poništice njegovu pouzdanost. Nepridržavanje uputstava ili upotreba uređaja u svrhe za koje nije namenjen mogu dovesti do ozbiljnih povreda ljudi koji ga koriste i/ili štete na opremi. Neophodni radovi zavarivanja treba da budu izvršeni od strane zavarivača u skladu sa DIN / EN 287 ili od ugovorenog izvođača radova u skladu sa EN 3834-2.

SV Läs alla installationsanvisningar noggrant innan du installerar/monterar produkten och följ anvisningarna under installationen. Installationen måste utföras av en kvalificerad expert i enlighet med alla lokala säkerhetsföreskrifter. Se till att välja en installationsplats som garanterar säker installation och drift. Produkten är endast ämnad för att hålla/fästa mätensorer/produkter från HACH/HACH LANGE. Annan användning kan medföra risker för användaren. Underhålls- och reparationsarbeten ska uteslutande utföras av den auktoriserade kundserviceavdelningen. Endast originalreservdelar och -tillbehör som rekommenderas av tillverkaren ska användas. Om någon ändring görs på produkten upphävs tillverkarens ansvar. Det kan det medföra allvariga skador för användaren eller skador på utrustningen om du inte följer anvisningarna eller om du använder produkten i installationer den inte är avsedd för. Svetsarbeten skall uteslutande utföras av svetsare kvalificerade enligt DIN/EN 287, eller av entreprenör enligt EN3834-2.

TR Ürünün montajını yapmadan önce, tüm montaj talimatlarını dikkatlice okuyun ve kurulum sırasında talimatları mutlaka takip edin. Montaj, kalifiye bir uzman tarafından tüm yerel güvenlik düzenlemelerine uygun şekilde yapılmalıdır. Ürünü, montaj ve kullanımin güvenli olacağı bir yere monte edin. Ürün sadece HACH/HACH LANGE ölçüm sensörlerini/ ürünlerini, tutmak/takmak için tasarlanmıştır. Başka amaçlarla kullanılması, kullanıcı için tehlikeler doğurabilir. Bakım ve onarım sadece yetkili müşteri hizmetleri departmanı tarafından gerçekleştirilmelidir. Sadece üretici tarafından önerilen orijinal yedek parça ve aksesuarlar kullanılmalıdır. Ürüne yapılan her türlü değişiklik, tüm sorumluluğu ortadan kaldırır. Bu talimatlara uyulmaması veya ürünün üretim amacından başka bir amaçla kullanılması sonucunda kullanıcı ciddi şekilde yaralanabilir ve/veya ürün zarar görebilir. Gerekli kaynak işi yalnızca kalifiye kaynakçılar tarafından DIN / EN 287'ye göre yapılmalıdır, veya müteahhitler tarafından EN 3834-2'ye göre yapılmalıdır.

ZH 在安装/固定产品之前，请仔细阅读所有安装说明，并在安装过程中遵守这些说明。必须由合格的专家完成安装，并遵守当地的所有安全法规。仔细选择安装地点，确保安全地安装和操作。本产品只能用于固定/连接 HACH/HACH LANGE 测量传感器/产品。用于其它用途可能会给用户带来危险。维护和修理工作应由经授权的客户服务中心完成。只能使用正宗替换件和制造商推荐的附件。对本产品进行任何更改均可能导致所有担保失效。不遵守这些说明，或者将本产品用于其它用途，可能会对用户造成严重伤害和/或设备损坏。所需的焊接工作必须根据 DIN/EN 287，由合格的焊接工人单独执行，或者根据 EN 3834-2 由承包人执行。

