



Aseptic Conference 2006

Product Presentation



Content

- Key Markets Served
 - Why Aseptic Diaphragm Valve and Basic
 - Diaphragm Valve Series
 - Innovative Design, Differentiation
 - Process Fabrications
 - Multiport Valves
 - Tank Valves
 - System Components and Accessories

A 3D CAD model of industrial machinery, likely a pump or valve assembly, is shown in the background. It features various colored components: a large grey cylindrical part, a blue vertical pipe, a green horizontal pipe, a yellow horizontal pipe, and a red horizontal pipe. The model is rendered with a semi-transparent effect, showing internal components.

Key Markets

- Pharmaceutical
- BioProcessing
- Food and Dairy
- Beverage
- Cosmetics
- Aseptic and Hygienic Manufacturing

Why Aseptic Diaphragm Valve

Streamline Fluid Passage

A smooth contoured body, streamlined flow path, and high quality interior surface prevents the accumulation of process fluids or contaminants.

Minimal Contact Surfaces

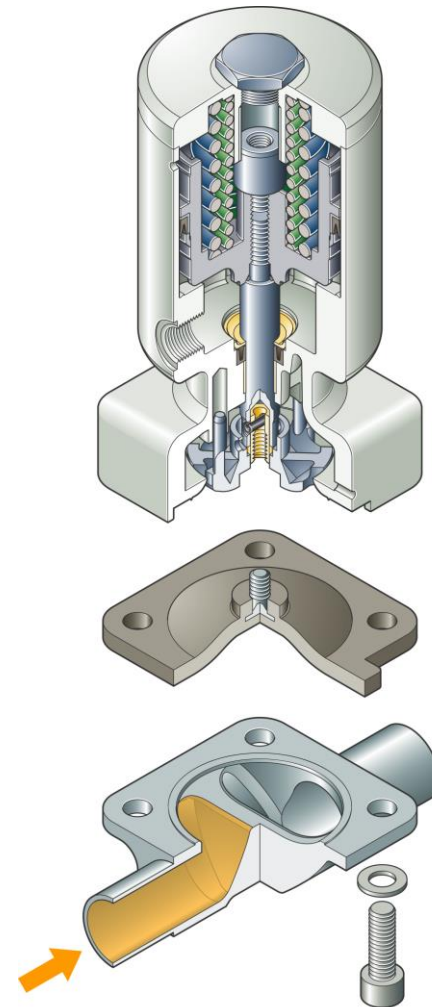
The process contact surfaces (body and diaphragm) are minimal, enhancing the ease of cleaning and sterilization.

In-Line Maintenance

The top entry design allows for in-line maintenance.

Modular Construction System

Modular valve construction system reduces complexity and maintenance expense



Why Aseptic Diaphragm Valve

Positive Closure

The resilient diaphragm bead in contact with the metal weir assures positive closure.

Ideal for CIP and SIP

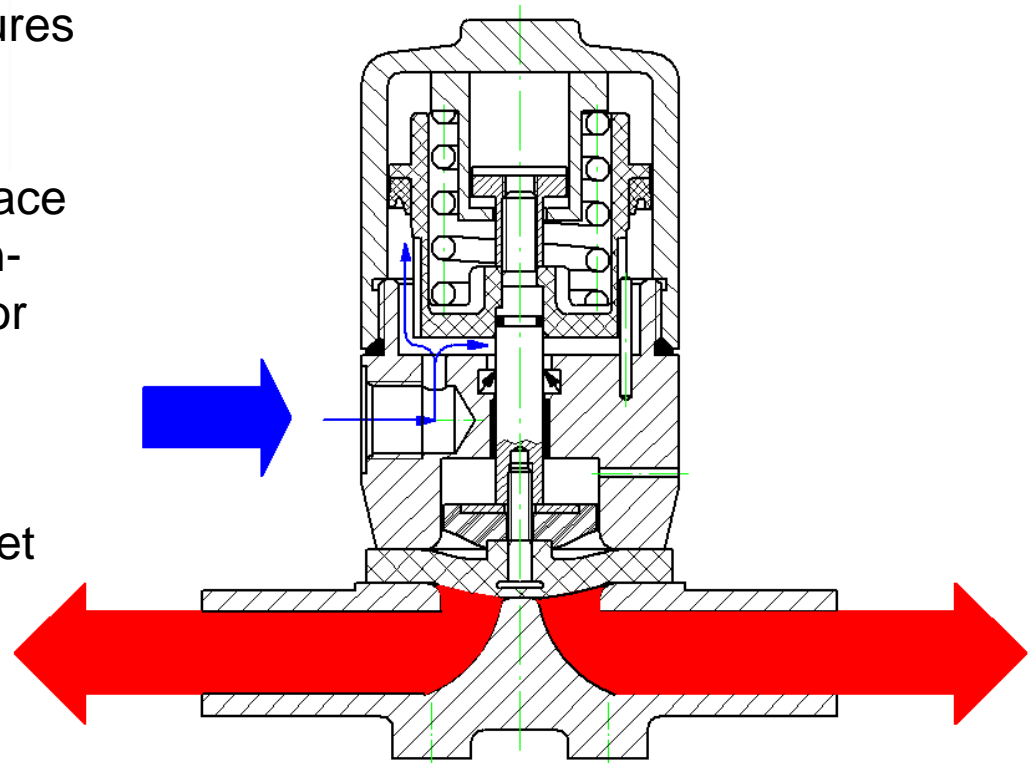
Clean-in-place and Steam-in-place operations may be performed in-line without valve disassembly or operation.

One Centerline for Inlet and Outlet

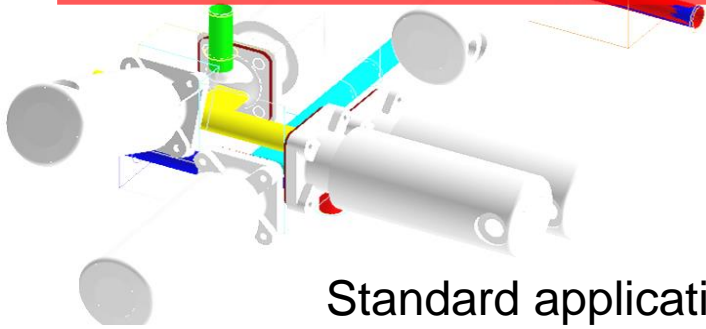
One centerline for inlet and outlet simplifies installation and plant design work.

Bonnet Isolation

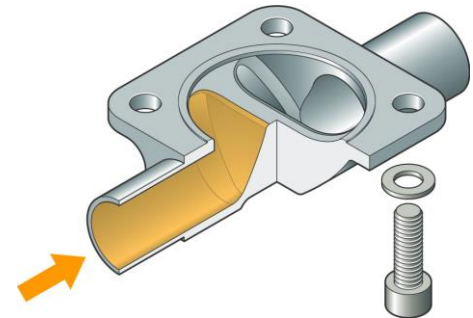
The diaphragm isolates the working parts of the valve from the process media.



Working Pressure



Standard application
unidirectional flow and working
pressure

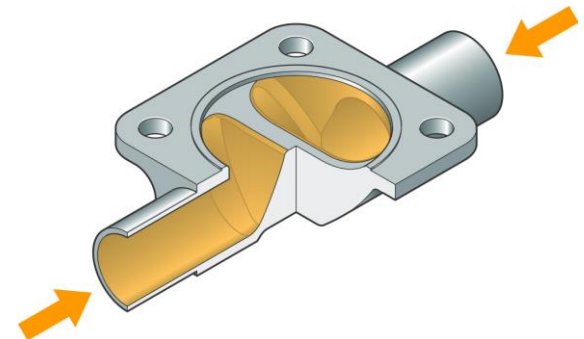


Both sides simultaneously
charged with working pressure

Circulating installation

Higher levels of the piping

Tank Level and Position



Valve Body Materials

Body manufacturing

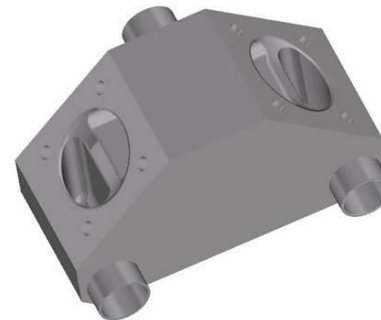
- Forging, solid wrought block, bar stock
- Investment casting (lost wax model)

Size 4-150mm (1/4" to 6")

Size 4-150mm (1/4 to 6")

Materials

- 1.4435/ 316L ASME/BPE Standard
- 1.4539/ ASI 904L
- 2.4602/ Alloy C-22
- 2.4605/ Alloy C-59
- 2.4819/ Alloy C-276



From solid
wrought block



From Forged
body



Delta Ferrit

Delta-Ferrit $\leq 0,5\%$

requires the following ratio of the chemical material composition

$$X = \%Cr + 1,5(\%Si) + \%Mo + 2(\%Ti)$$

[Chrome-Equivalent]

$$Y = \%Ni + 0,5(\%Mn) + 30(\%C) + 30(\%N - 0,02)$$

[Nickel-Equivalent]

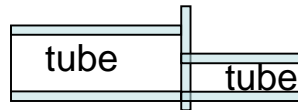
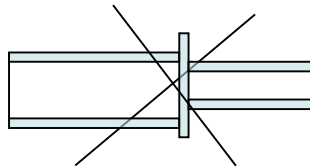
$$X - 0,91Y \leq 7,70$$

Annealing by 1050°C – 20-30 min

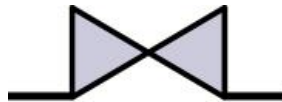
Self Draining Two-Way Valves

Relevant criteria for optimized self draining:

- Inner contour
- Internal surface quality
- End connections



- Slope of the installed valve body

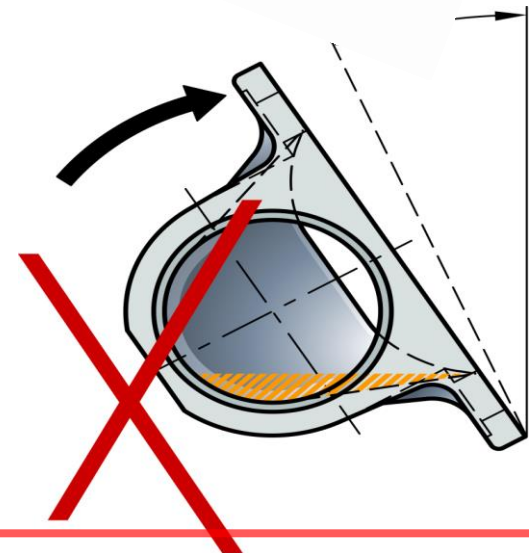
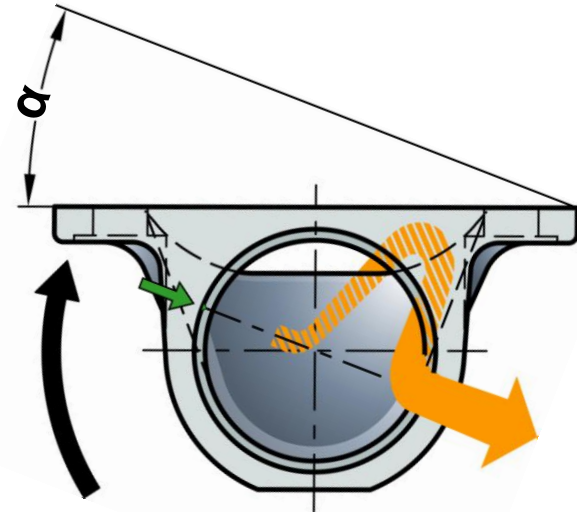


- Consistency of the media
- Self draining installation position

How to adjust:

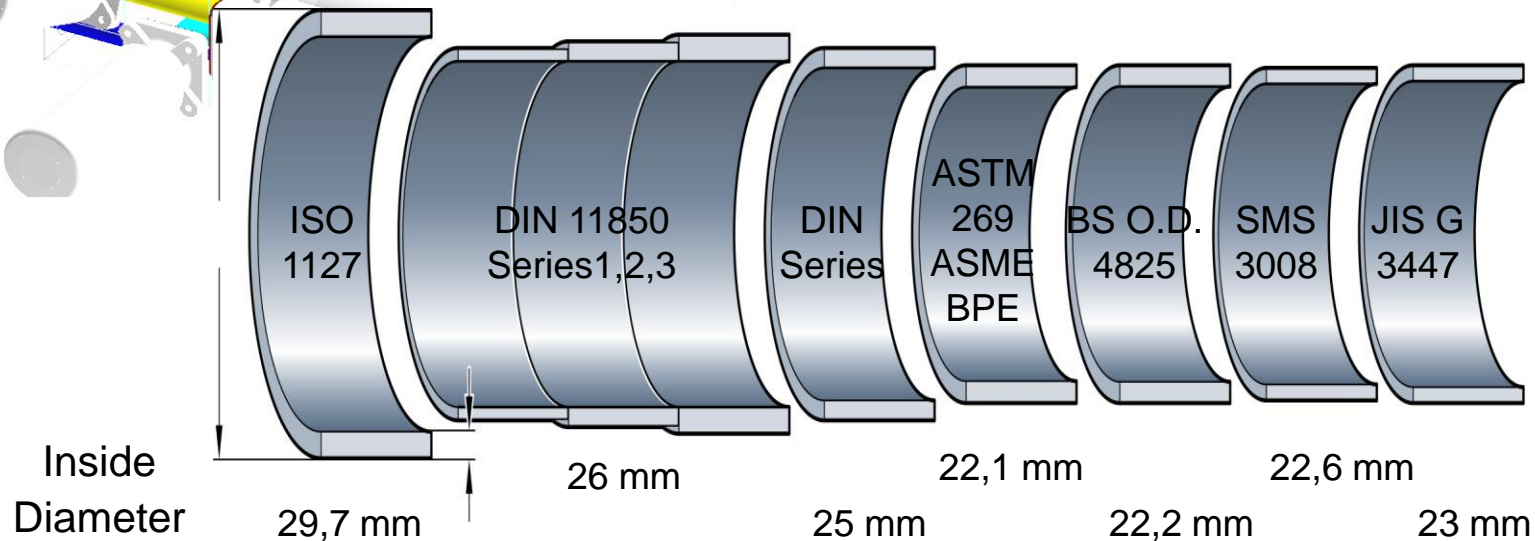
by applying a water level through the centre marked with a green arrow

by applying a simple device, self prepared or provided by SED



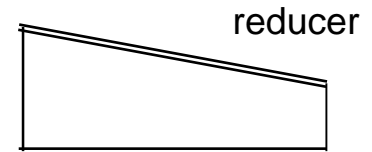
Butt Weld Tube Ends

Example Size 25



Comments

- The first Question you should always ask is the tube standard or sometimes better the tube end dimensions
- Take care of tube standards if you connect the ends
- Take care of the reducer if you have to connect different tube standards
- Take care of standards if aseptic connections to be weld e.g. Clamps, Flanges



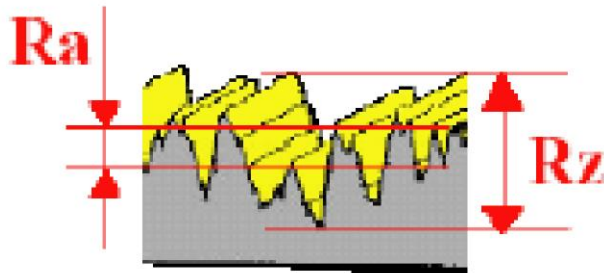
Surface Finish

Ra – Value

Ra is the arithmetic average used as parameter of the surface finish profile according EN ISO 4287.

Lt 5,6 is the traversing length

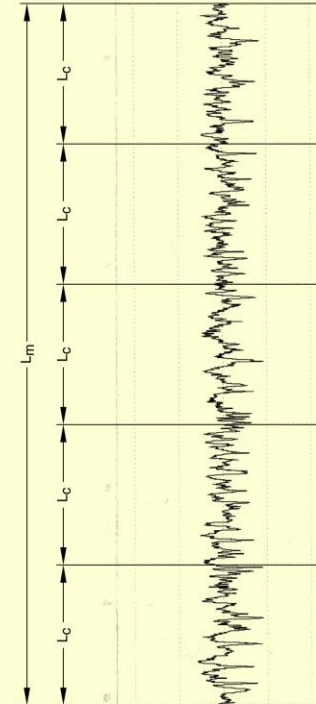
Lc 0,8 single measuring length



Tape Print Out of Surface Finish

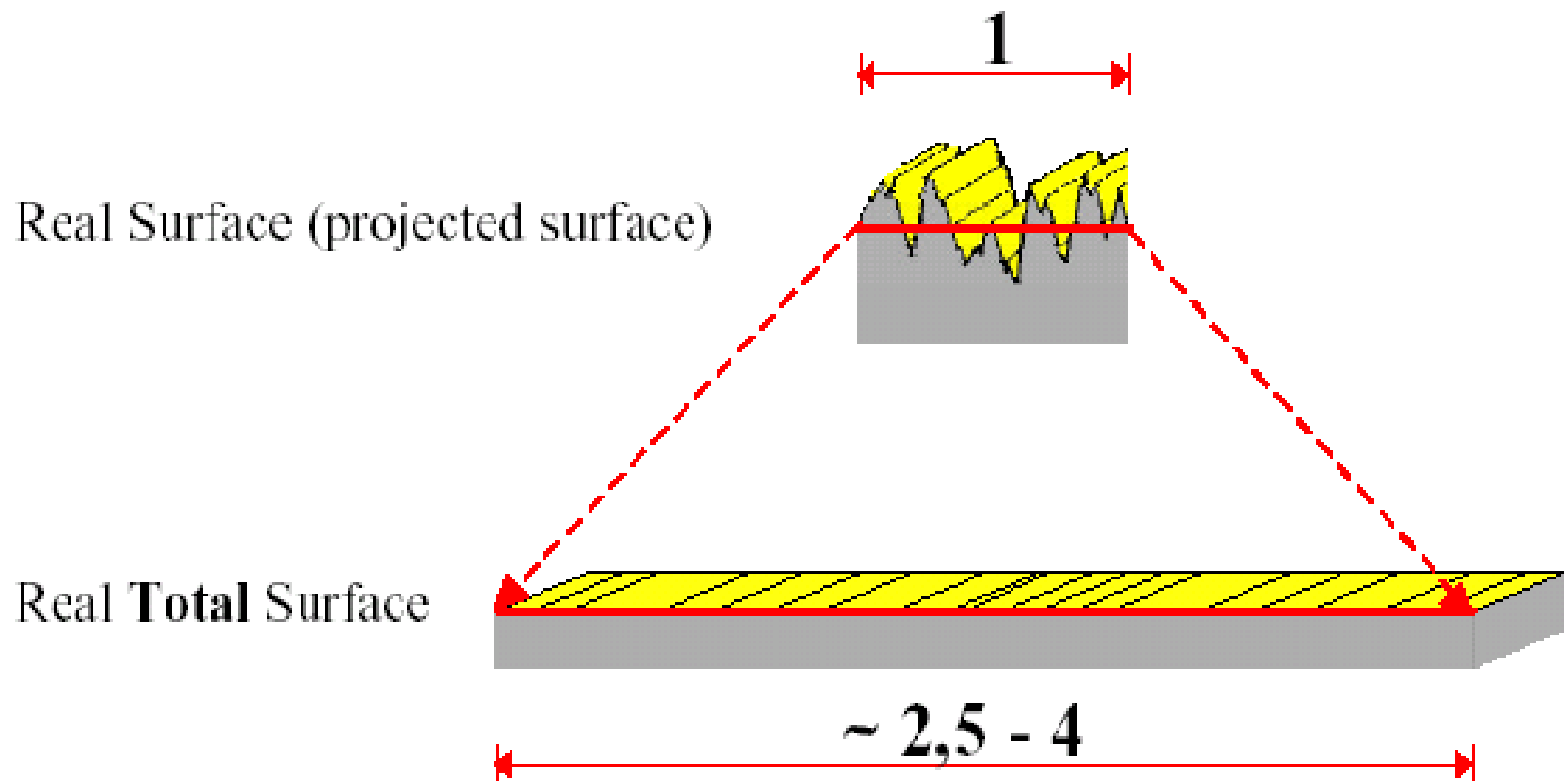
Perthometer M1
Objekt
Name

Lt (AUTO) 5.600 mm
Lc 0.800 mm
Ra 0.484 μm
Rz 3.37 μm
Rmax 3.77 μm
RPa(0.5,-0.5) 108 /c
R Profil
Lc 0.800 mm
VER 2.50 μm



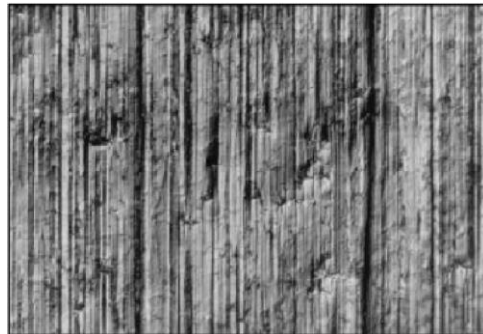
Total Surface Area

Illustration of the *Real (Total) Surface*



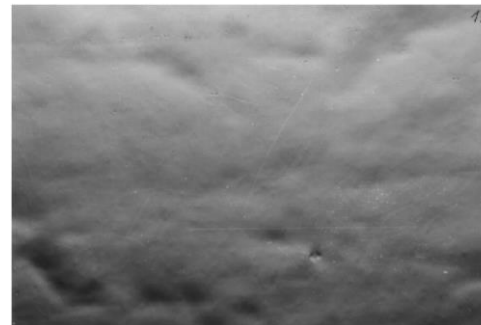
Why Electropolishing

- Brightening of surface: clean, bright, cosmetically attractive
- Burr removal: smoothen surface
- Total passivation: generation of O₂
- Removal of inclusion: CaO, MnS, MnO, Al₂O₃, SiO₂, SiO₄²⁻
- Removal of directional lines
- Reduced surface friction: cleanability
- Reduced surface stress: molecular adsorption
- Increased corrosion resistant: Corrosive medium e.g HCl, HF etc
- Increased Cr:Fe ratio



Surface polished with 400 grit

Ra 0,25µm



Surface polish mechanically

+ elctro polish Ra 0,25µm

Aseptic Connections

Aseptic Connection

Clamps ISO 2852

DIN 32676

ASME BPE

SMS 3017

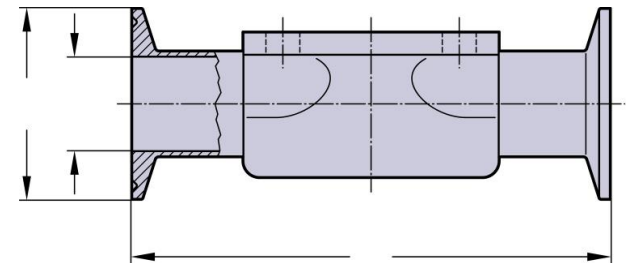
Flanges

DIN 11864-2-A

Screwing

DIN 11864-1-A

DIN 11851(old)



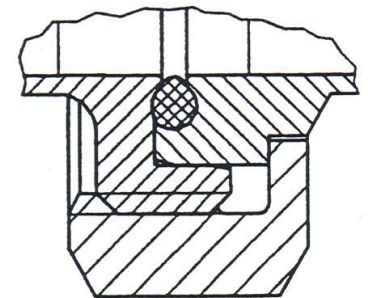
DIN 11864 with metallic stop and interjacent O-ring



round flange



groove flange



SED

**Innovative Design
and
Product Features**

Air Inlet Orientation

Air inlet port 90° to
flow direction

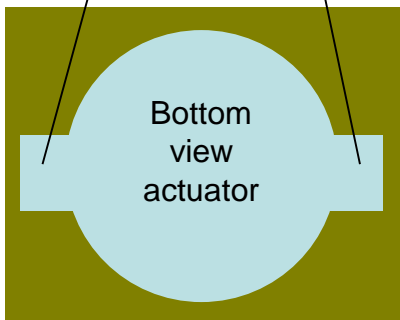
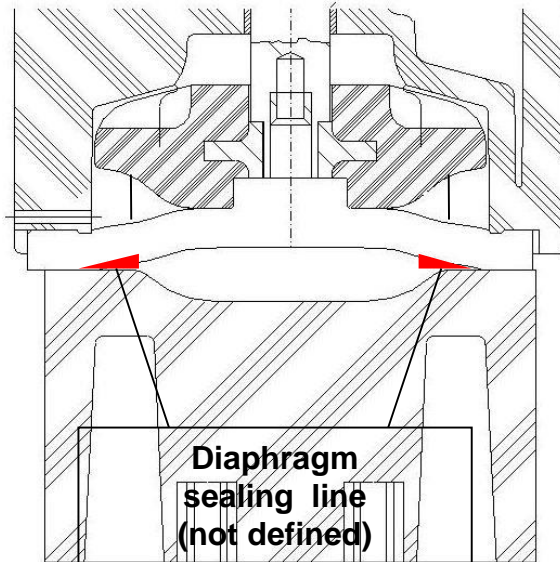


Air inlet port in flow direction

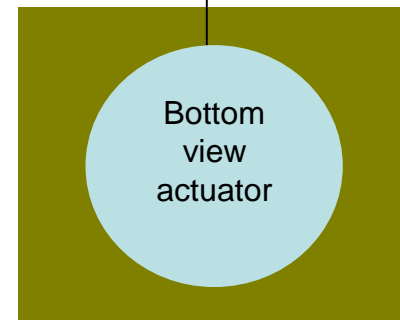
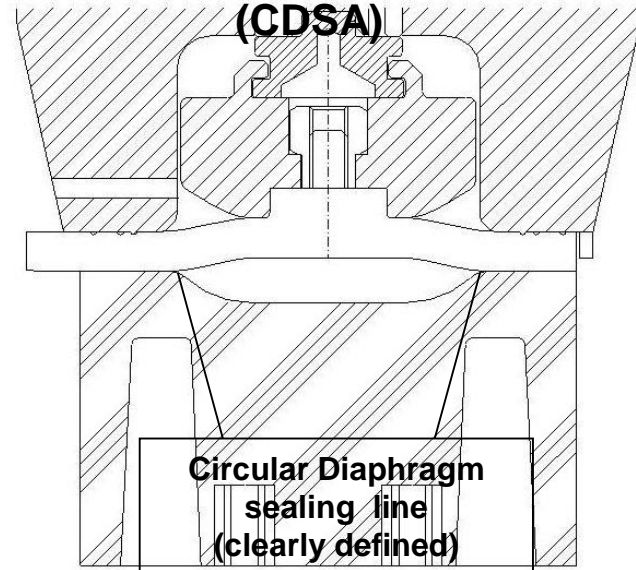


Circumferential Defined Sealing Angle

Conventional design



Circumferential defined sealing angle (CDSA)

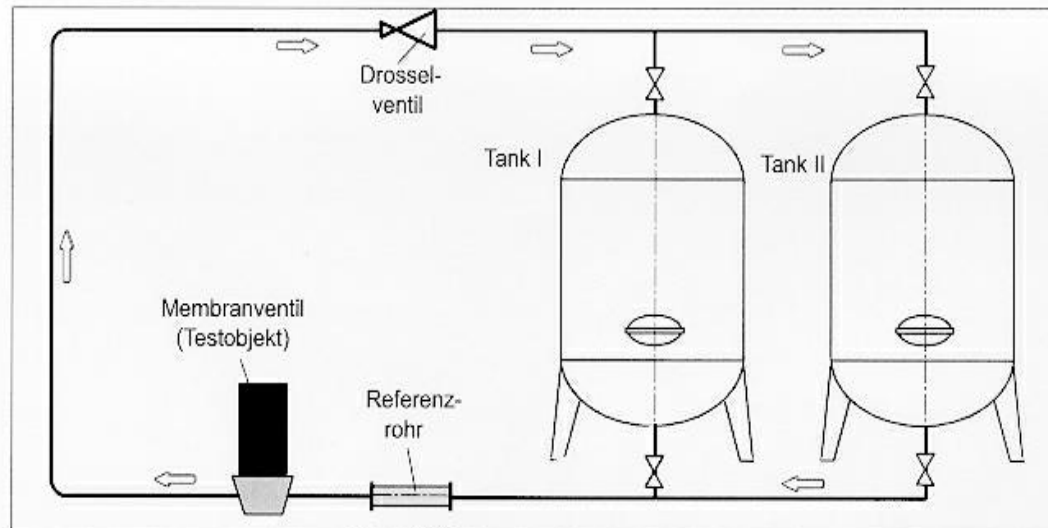


Diaphragm remains the same for both versions

EHEDG Comparative Test

Steps of the test

- Cleaning process with steam
- Pollution of the test sample and reference tube
- Cleaning process with solution 63°C and rinsing with water
- Lining with Agar
- The seed crystal reacts with the Agar and gets yellow
- Comparing the coloured reference tube with test sample
- Evaluation better, equal or worse than the reference tube



EHEDG Test Result

	Conventional Sealing	Circular Sealing
Reference tube Coloured yellow	15%	15%
Valve outlet	Violet	Violet
Weir area	Strong yellow	Violet
Valve inlet	Yellow	Violet
Circumferential Diaphragm sealing	Yellow at circumferential	¼ at the outlet yellow

Note:

Yellow coloured
– micro organism colonies

Violet coloured
- no micro organism colonies

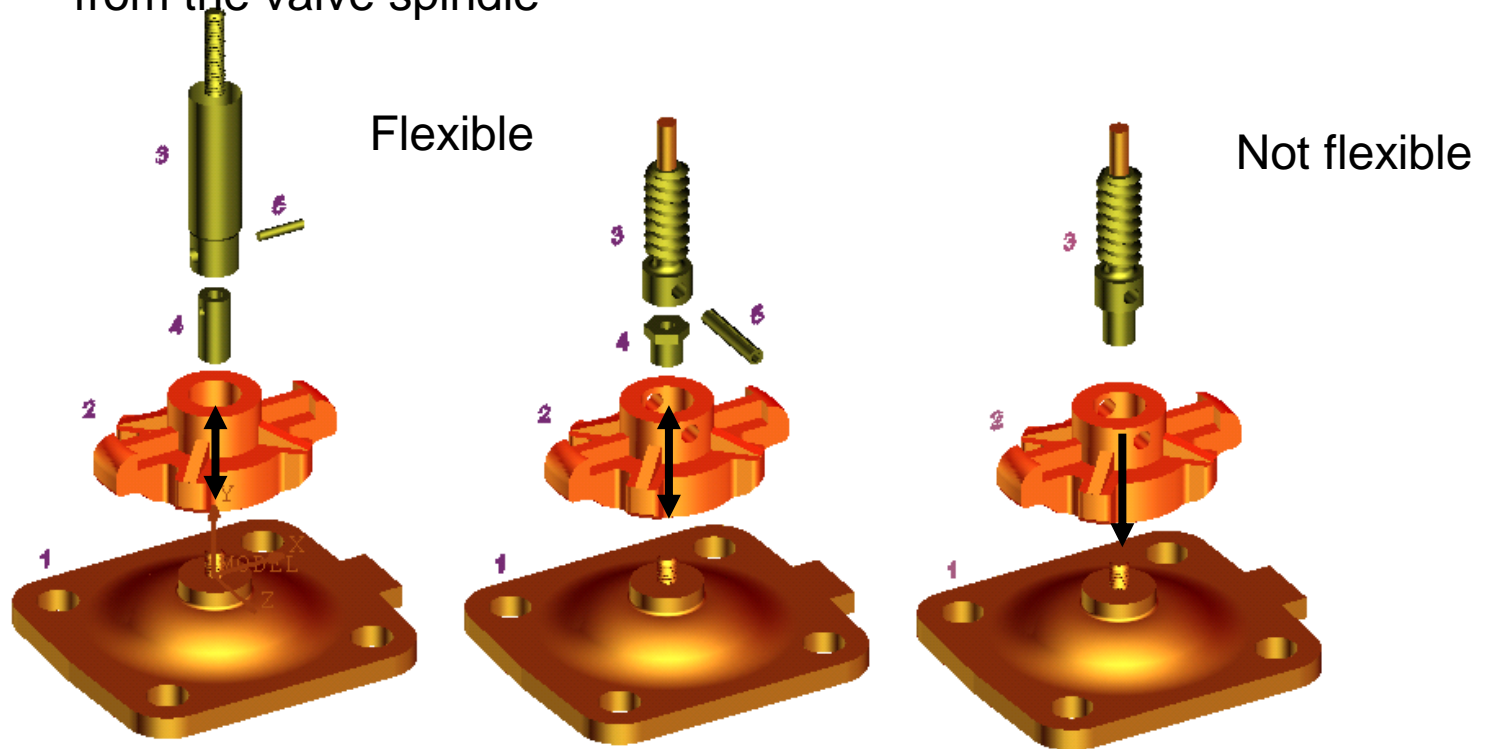


Features of CDSA

- Internal cleaning is more efficient and has been tested and qualified by EHEDG 08.
- Product entrapment reduced or eliminated on the body bonnet flange.
- Reduced cleaning time of SIP systems.
- Reduced use of chemicals and solutions in CIP systems.
- Improves valve drainability.
- Better sealing performance and evenly distributed closing force.
- Diaphragm lifetime is extended.

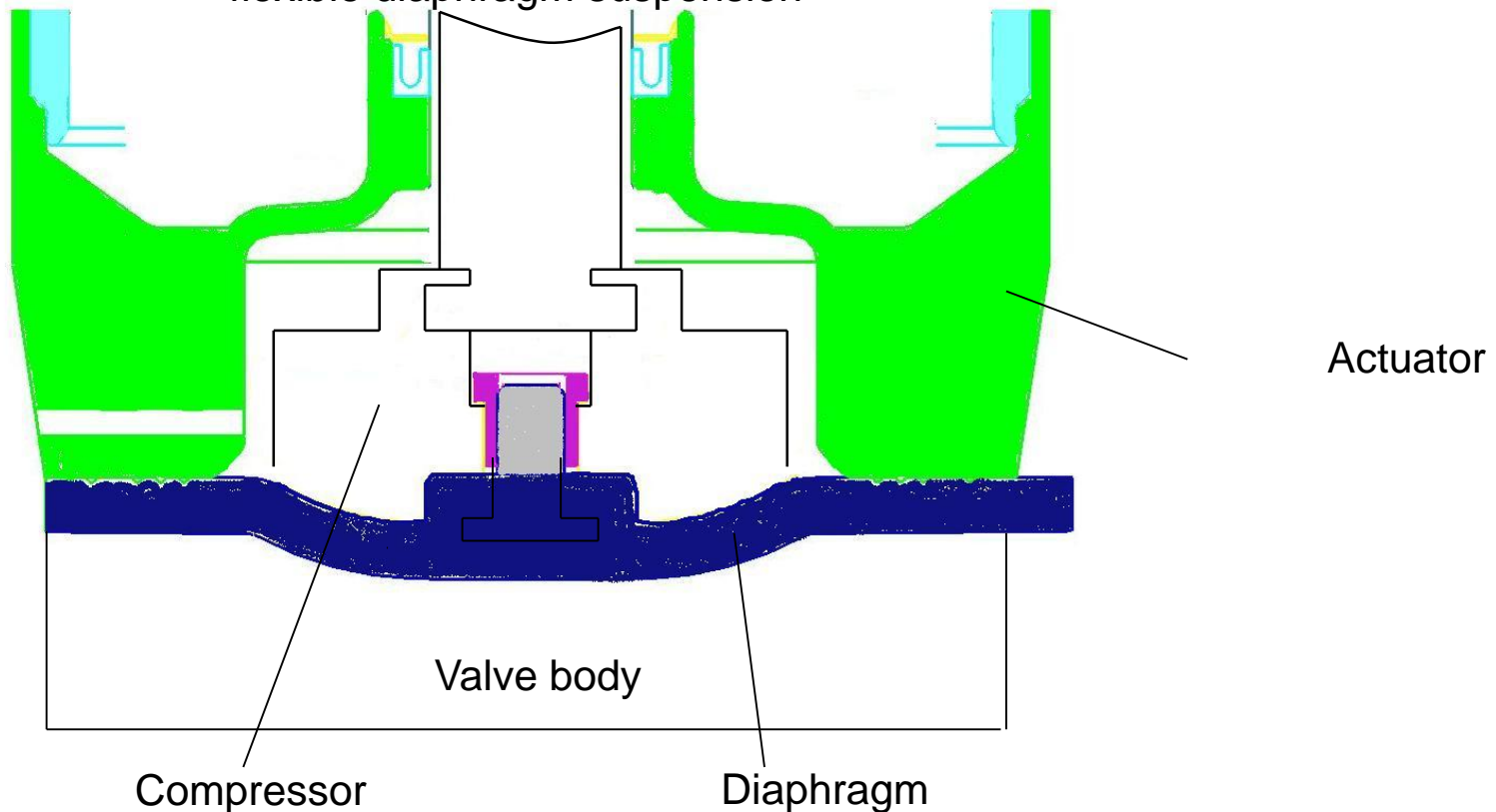
Diaphragm Suspension

Flexible means the diaphragm screwed in the valve actuator can move up and down 2-3 mm independent from the valve spindle



Flexible Diaphragm Suspension

- Avoids point loading in the center
- Most important for two piece PTFE Diaphragms
- All SED valves MA 8, MA 25 and bigger have as standard the flexible diaphragm suspension



Encapsulated Diaphragm

- Prevents the diaphragm from extruding beyond the body flange
- Reduces the risk of a leakage to the exterior through the decrease of diaphragm clamping
- Positive visual appearance

Important feature especially for higher temperature and pressure applications

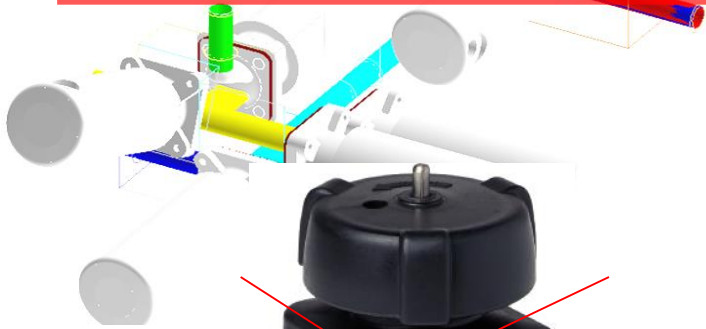


Encapsulated



Not encapsulated
Diaphragm

Suitable for Block Body Assembly



with through bolt
hole assembly



Aseptic Valves DN 4-100 (1/4"-4")

SED Series

Aseptic Valves DN 4-100 (1/4"-4")

Steripur
with stainless
steel piston
actuator

KMA
with stainless
steel adaptation

KMD
with thermoplastic
actuation



Innovative Design

Features	Steripur	KMA	KMD
Compact Design Optional: Orientation of the air inlet port	●		●
Actuation suitable for two-way bodies and welded configurations	●	●	●
Actuation suitable for all valve bodies also multiport and tank valves	●	●	
Optimized internal Cleaning because of circumferential defined sealing angle	●	Type 295 Type 995 MA 25-50	Type 402
Clean and smooth exterior ideal for sterile wash downs	●		●
Flexible diaphragm suspension	●	MA \geq 25	MA \geq 25
Encapsulated working diaphragm	●	●	●
Low weight and reduced heat transfer in sterilisation processes			●

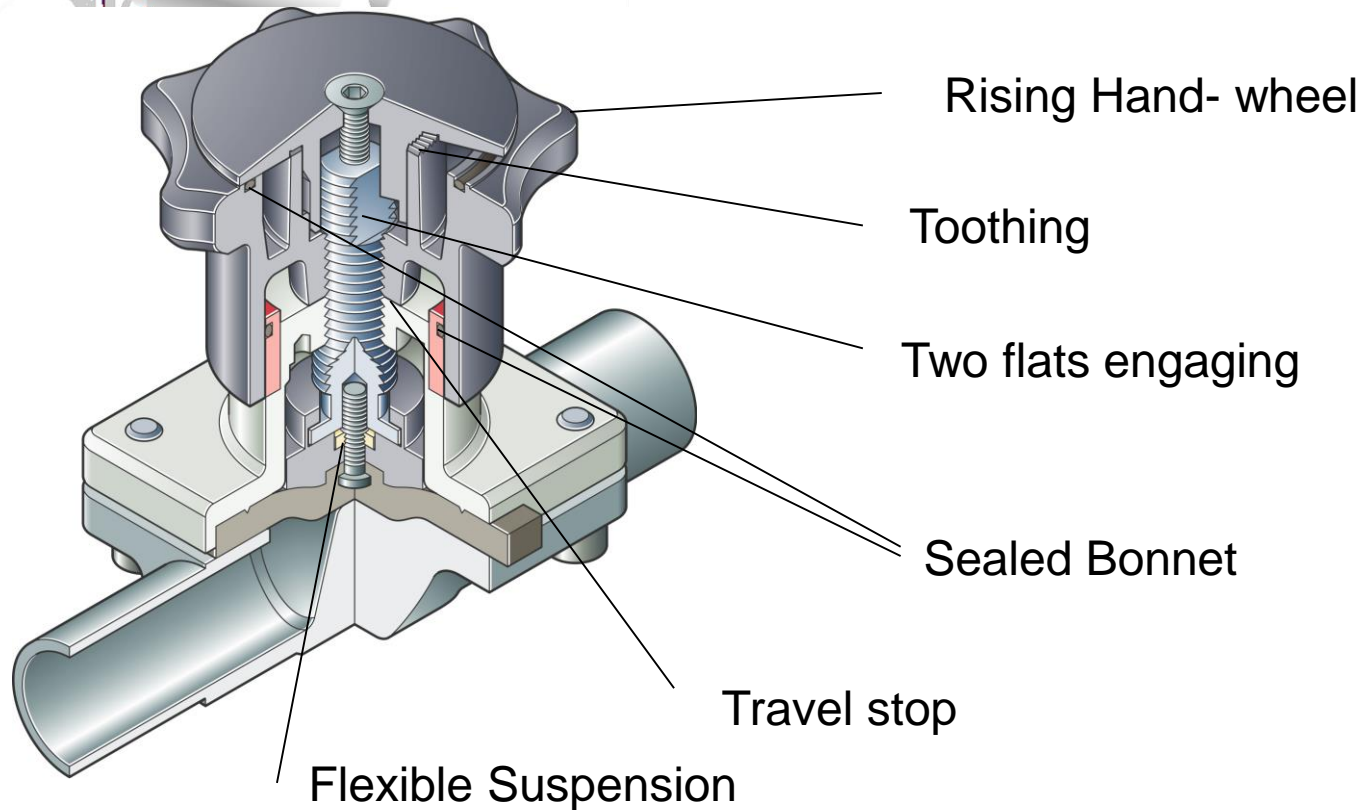
SED

Innovative Products

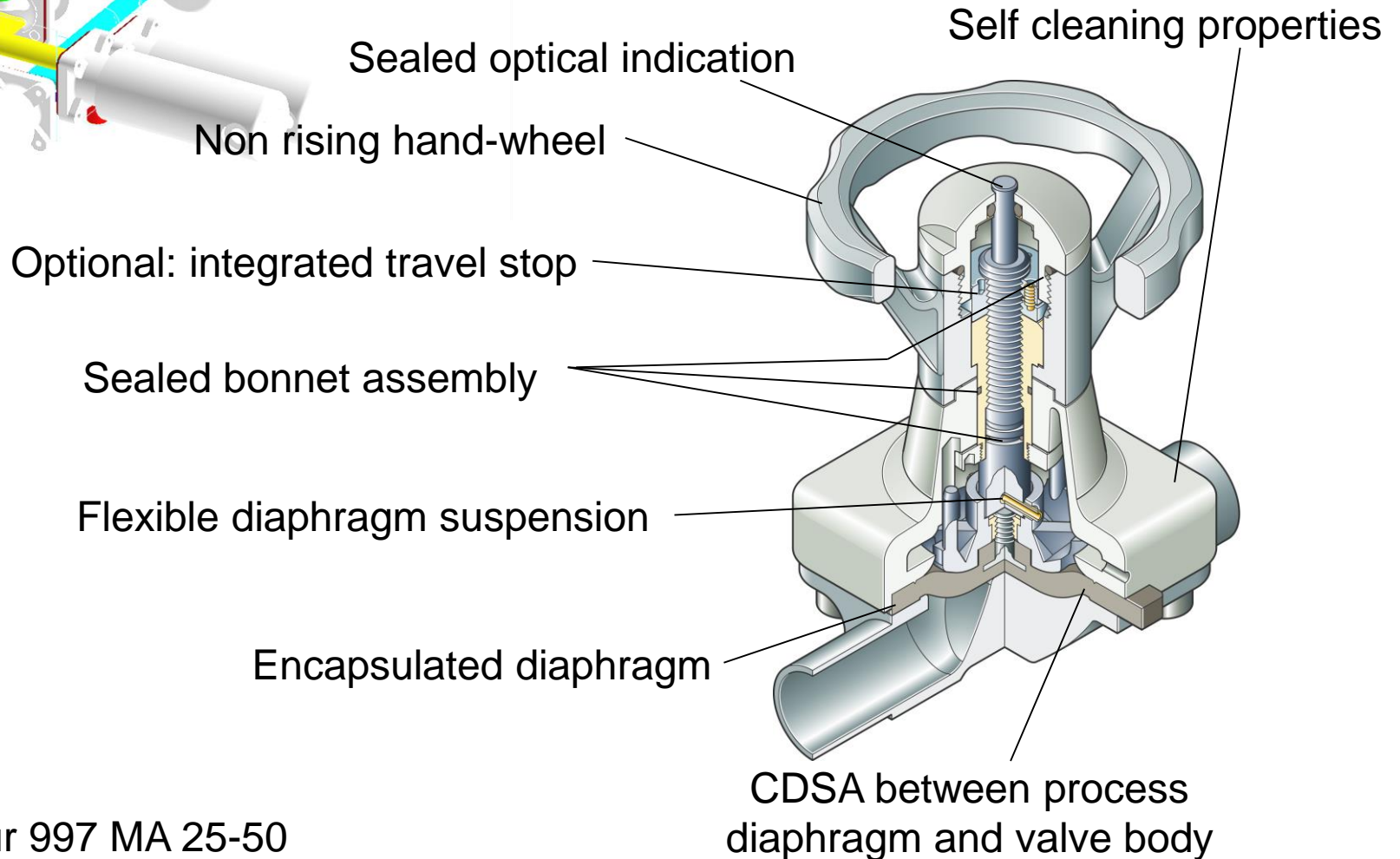
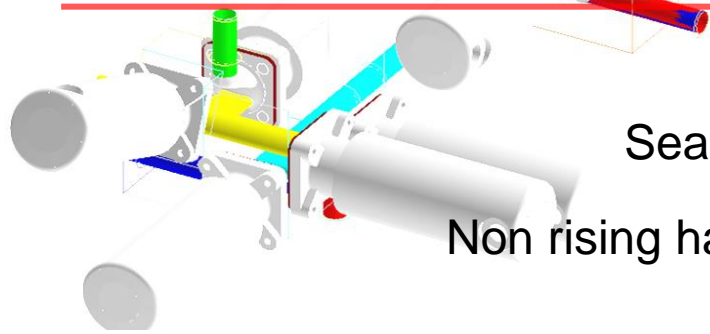
Innovative Products

Integrated Travelstop

Manual MA 8 and MA 10



Innovative Products



Steripur 997 MA 25-50

Innovative Products

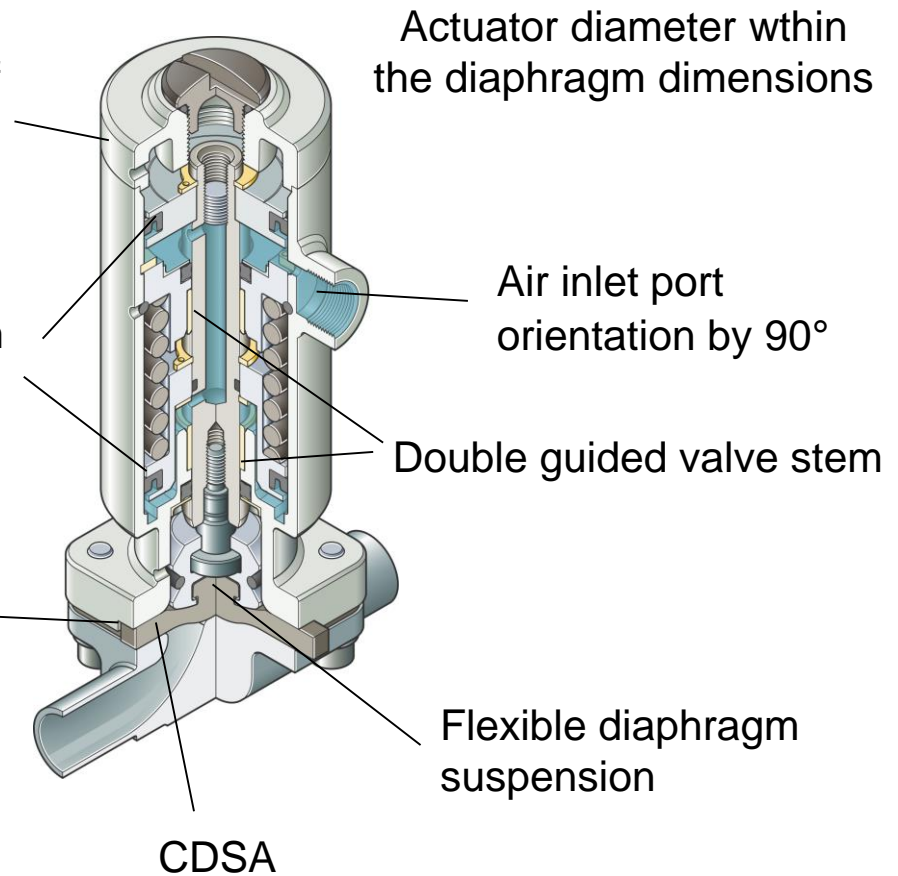
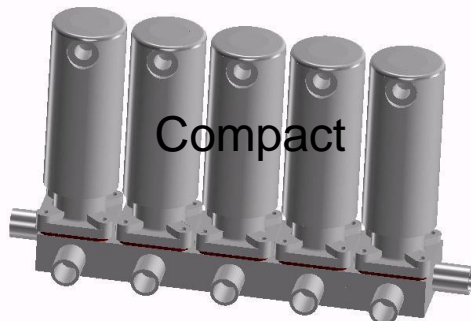
Steripur Type 207

Stainless steel piston actuator. Diameter of the Actuator within the dimensions of the dimensions

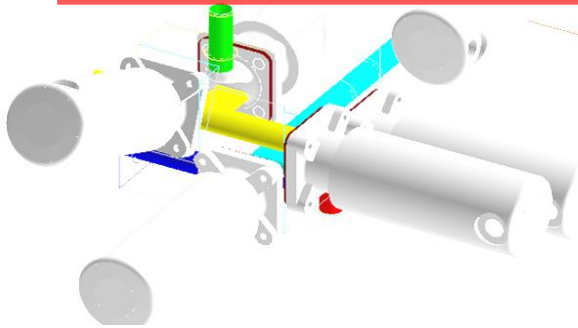
Efficient and high cycle double piston with internal air passage (European patent)

Double guided valve stem

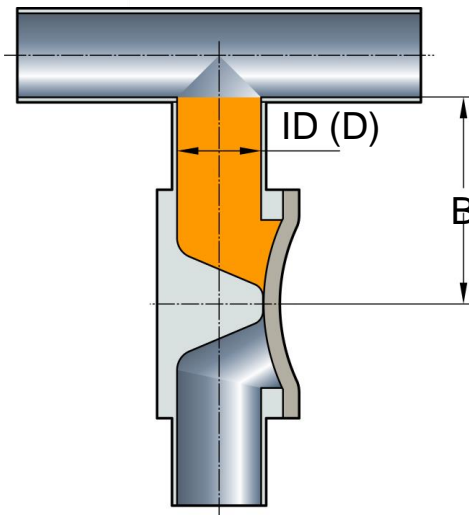
Encapsulated diaphragm



Valve Configurations



D-Rule a criteria to specify
hold up max volume



$$\text{D-Rule} = B/D$$

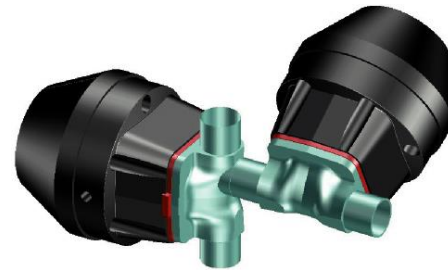
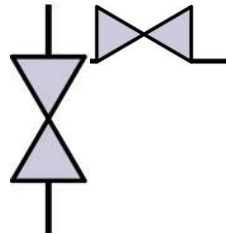
The least hold up volume is achieved
with multiport valve

Welded Valve Configurations

Distinguished in two different principles

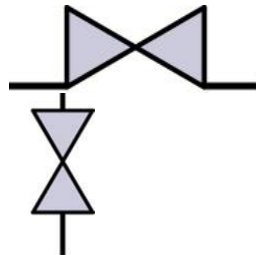
SL or GMP

Utilized in a vertical piping system in point of use applications



SA or SAP

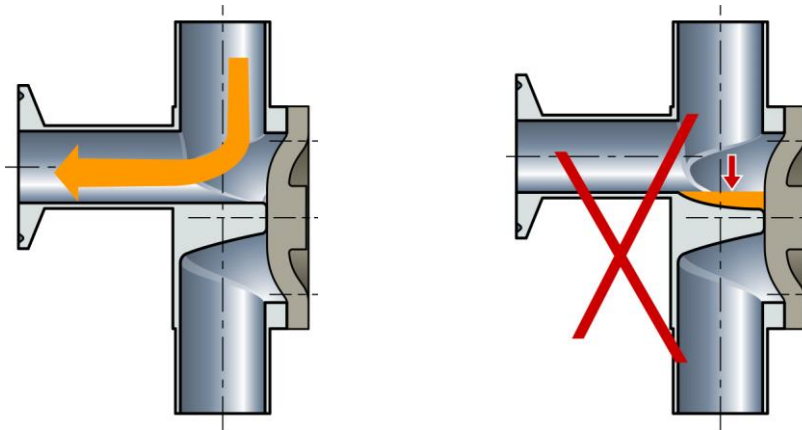
Utilized in a horizontal piping system with access port at the lowest drainable point



Welded Valve Configurations

Advantages of a Welded Valve Configuration:

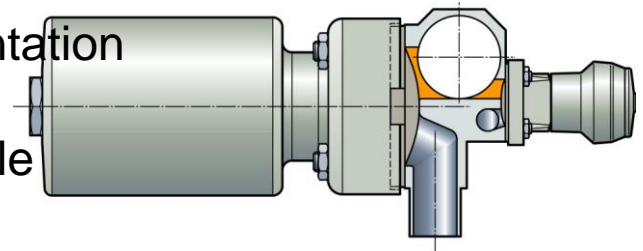
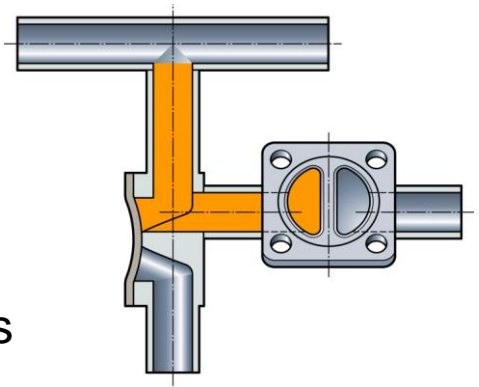
- Totally self draining
- Minimized dead legs
- Reduces surface contact and hold up volume of the medium
- Compact assembly
- Reduces number of welds
- Provides a ready-made assembly for field installation



Multiport Valves

The Advantages at a Glance:

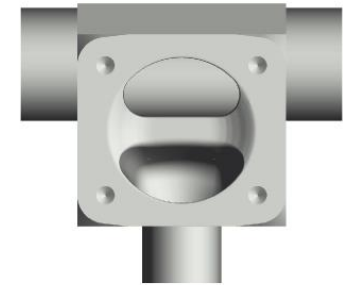
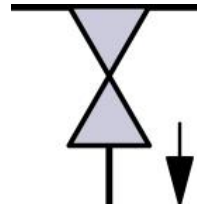
- Customer's specific design
- Compact design and smaller envelope dimension is achievable with the Steripur Series actuators
- Combination of many different nominal diameters
- Optimized drainability
- Minimized dead leg
- Reduces surface contact, hold up volume, and cross contamination of the product
- Reduction of fittings, tubing, and field welds in the system
- Reduces qualification and validation documentation requirements
- All end connections and materials are available according to the customer's specification



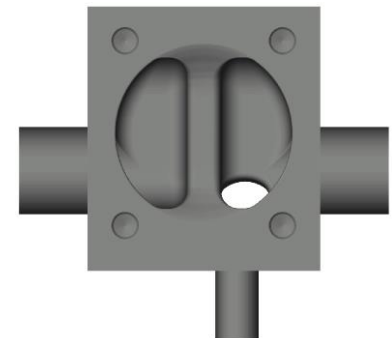
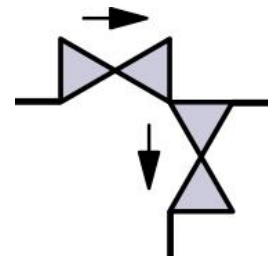
Multiport Valves

For differentiation the following two main criteria are considered

- 1) Multiport blocks with main line open for circulation



- 2) Multiport blocks with all lines and valve ports able to close



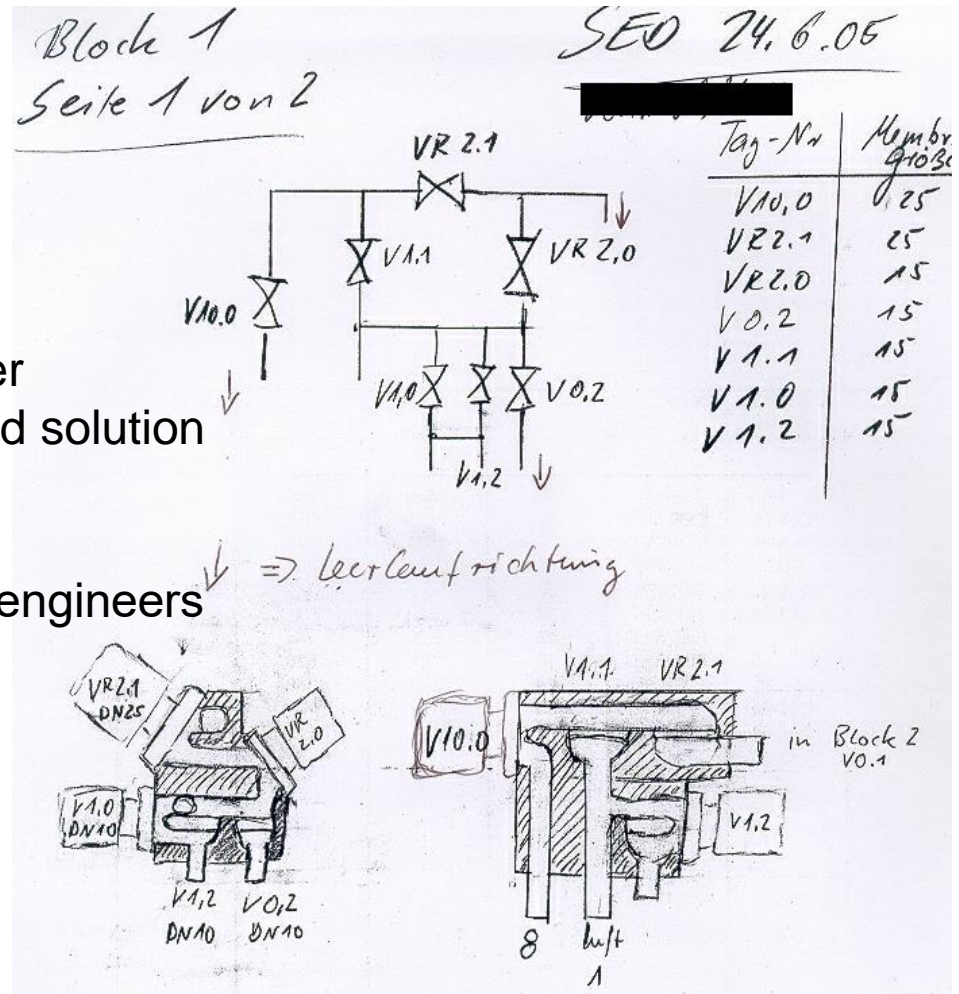
How to achieve self draining

- Horizontal body diaphragm flange in self draining angle
- With the tube ends eccentrically positioned to the lowest point of the valve pocket

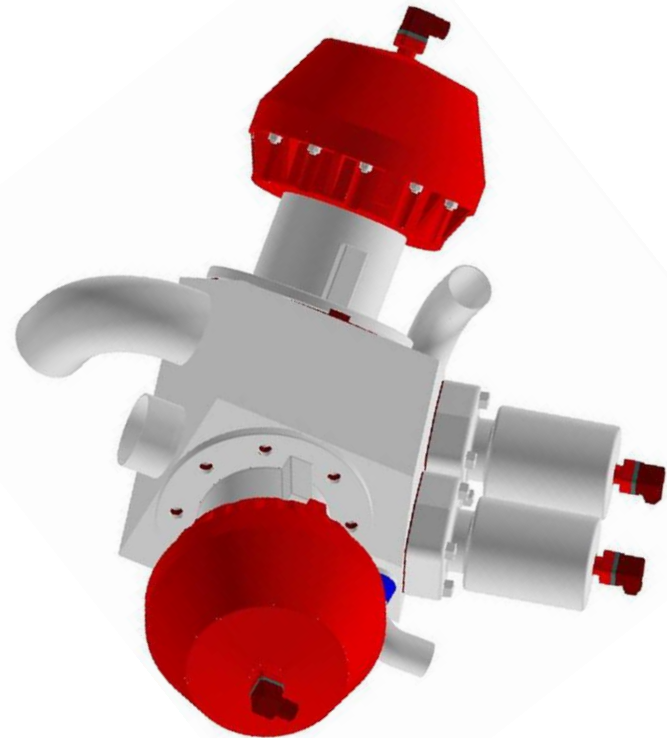
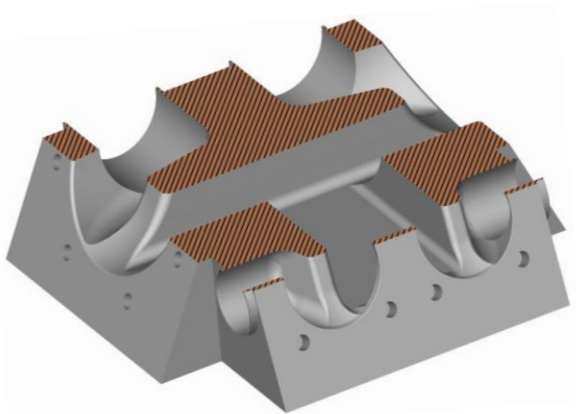
Multiport Valves

Be creative and save money
by considering the TCO and
create image for your customer
by bringing to him an advanced solution

Your friends will be
End-user; OEM's and Project engineers



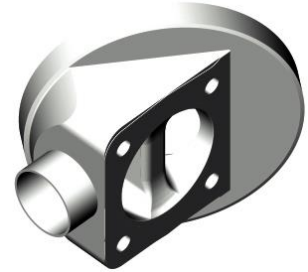
Example of a final Design



Tank Valve

Features:

- Tank body machined from a solid bar stock material
- Material 1.4435/316L ASME/ BPE
- Other alloy options available as specified
- Minimized dead leg and internal sump
- Suitable for mounting with SED Steripur Series and KMA Series Actuation
- Optional manual operation via an extended crankshaft stem



Tank bottom valve



Tank side valve



Diaphragms

The heart of the diaphragm valve



Molded open



Molded open



Molded close



Molded open

Ma 8



Molded open

Ma 10



Molded open

Ma 25,40,80, 100

Diaphragms

SED Code		18	30	44
MA		8 - 100	8 - 50	25 - 100
Material ¹⁾		EPDM	PTFE/ EPDM	PTFE/ EPDM
Design		One-piece Molded open	One-piece Molded open	Two-piece Molded closed
Temperature range ²⁾	(°C)	-40 to 150*	-20 to 150	-20 to 160
	(°F)	-40 to 300*	-20 to 300	-20 to 320
FDA		○	○	○
3A		○	○	○
USP Class VI Test section #87 & #88		○	○	○

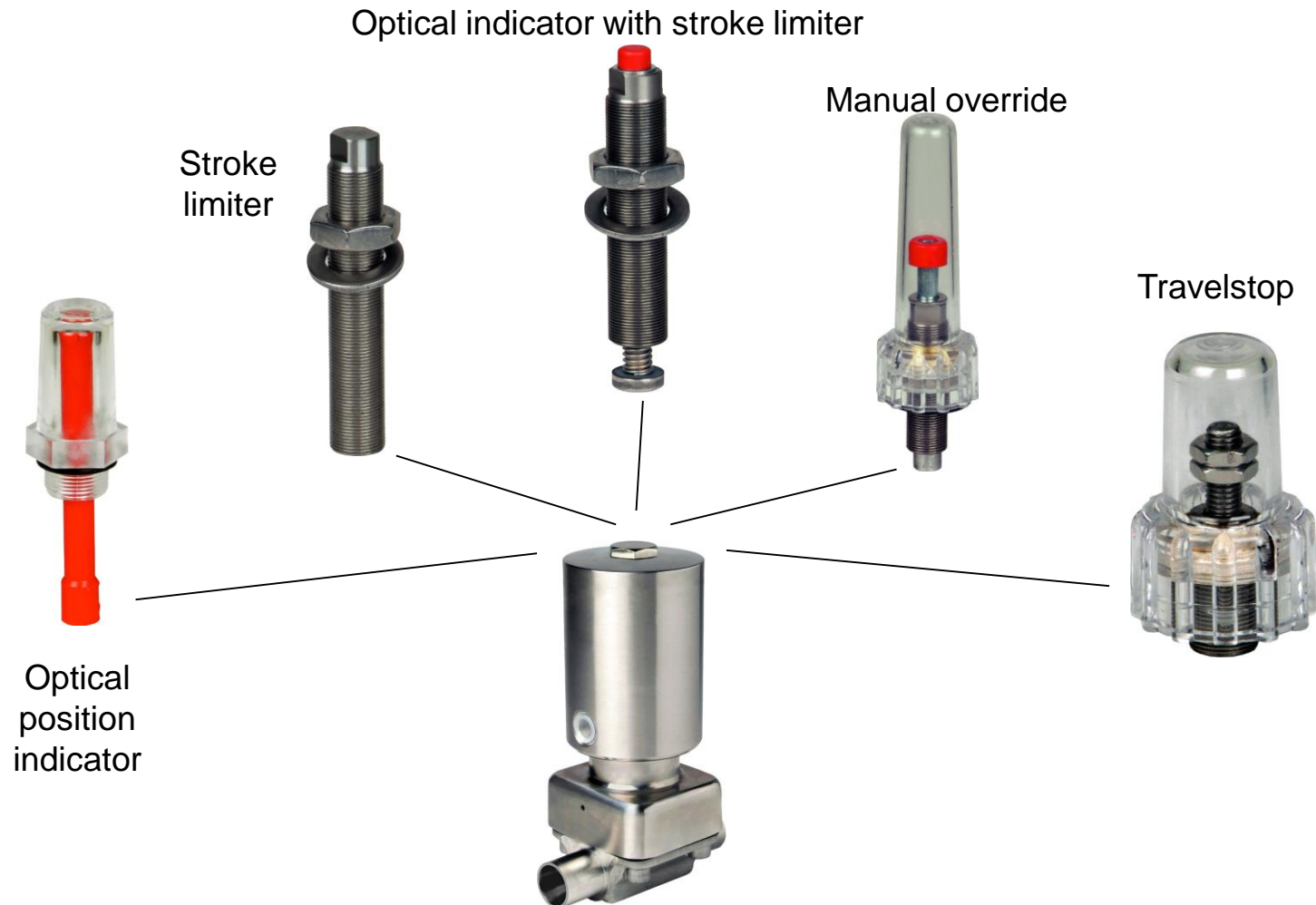
The listed temperatures may apply to clean steam sterilization protocols and may not apply to continuous steam service.

Upon request, other diaphragms are available

¹⁾with other materials

²⁾for higher temperature up to 175°C/ 350°F

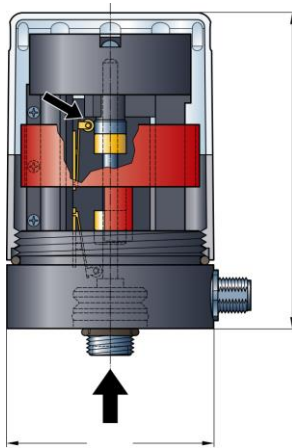
Accessories



Accessories

Control head switch with
catch the eye indication

- Mechanical switches
- Proximity switches
- AS-Interface



Mechanical Switch
open position



Mounting bracket for
proximity switches open
and close



Control head switch
with stroke limiter



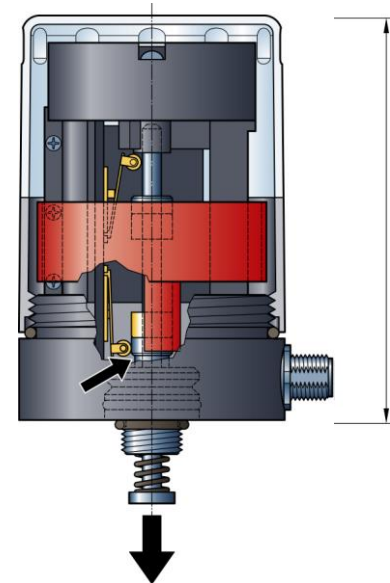
Pilot valve



Control Head Switch

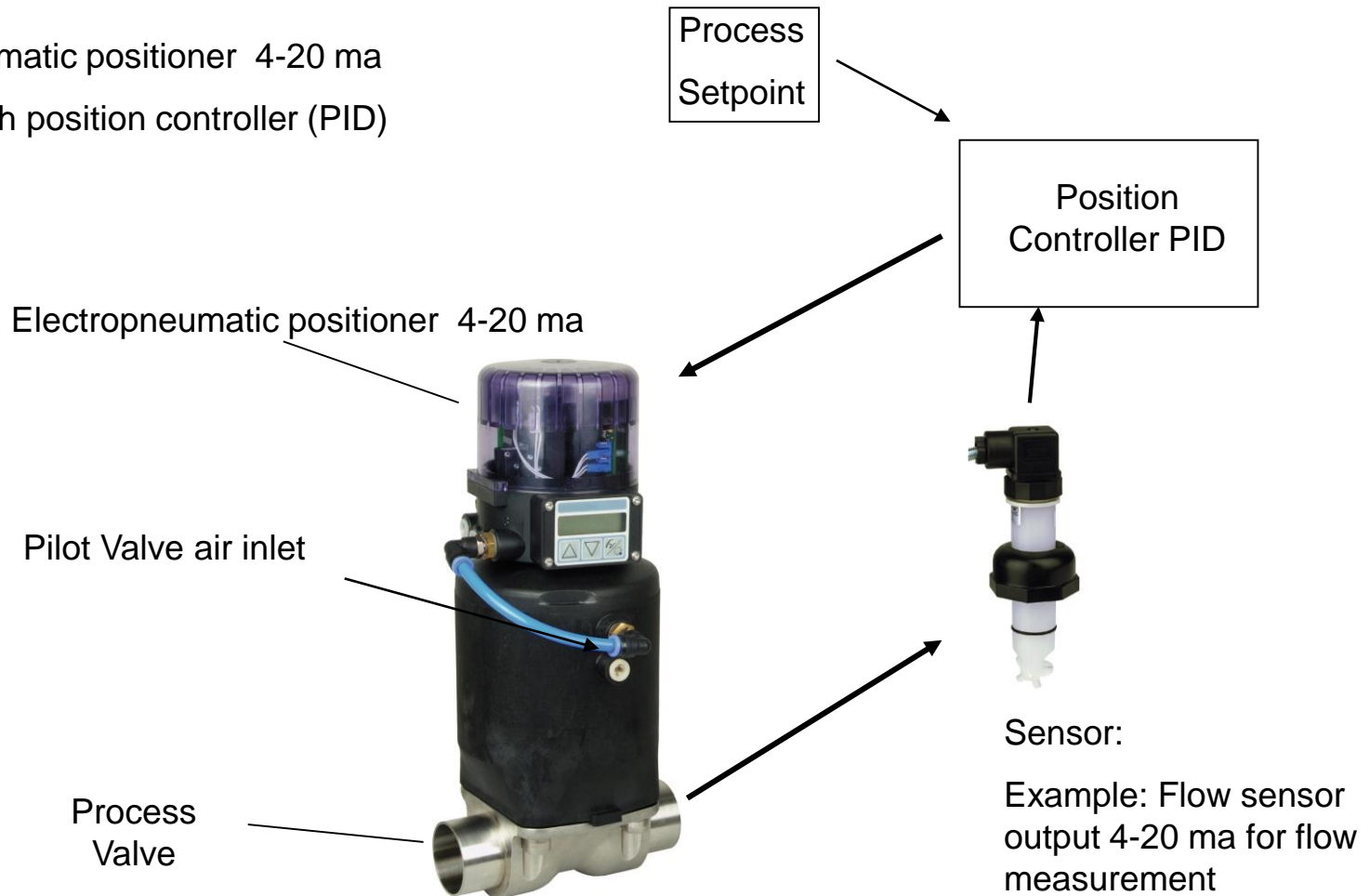
Features:

- Self adjusting
- Catch the eye optical indicator representing the full linear movement
- Ease of assembly and may be assembled with the valve actuator in the field
- Time saving electrical interface via pre-wired pin or a Bus-connection
- Compact design
- Position feedback versions with:
 - Electromechanical switch
 - Inductive initiators Namur or PNP
 - AS-Interface
- Suitable for mounting on linear valves
- Depending on the specification, LED indication is available
- Optional:
 - Integral solenoid valve with direct air line connection to actuator
 - Stroke limiter for the valve stroke adjustment



Process Automation

Electropneumatic positioner 4-20 ma
optionally with position controller (PID)

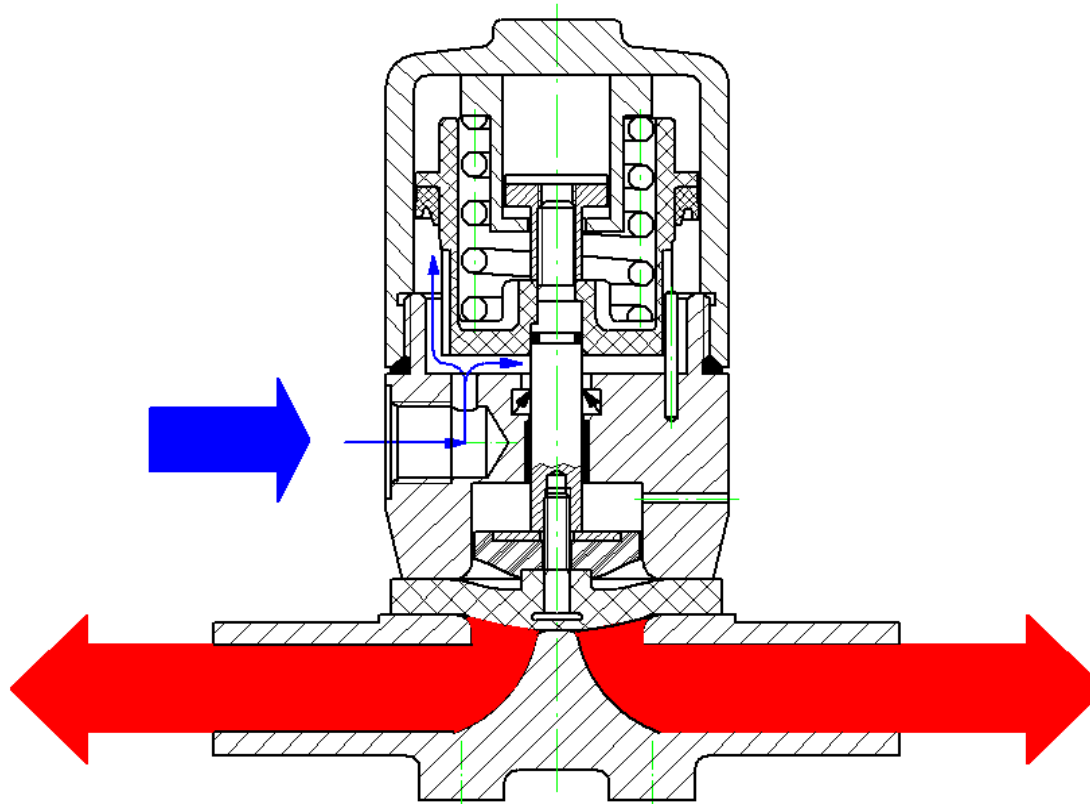


What do you offer the customer

- Never forget the cheapest solution
- Cheapest means not the best or the most efficient it means cheap
- Try to justify the higher efficiency of the more expensive valve solution

SED

The diaphragm valve never stands still



Thanks for your attention