

VACUUM VALVES

- ✓ Pneumatically and electrically operated
- ✓ Great mechanical performances
- ✓ Long service life
- ✓ Easy maintenance



Lifting and moving



Tobacco industry



Aspiration equipment



Vacuum table



Packaging



Plastic injection molding

Vacuum Applications, generated by pumps or blowers

• VACUUM PUMPS

Installation and equipment for food and non food packaging:

With vacuum→ Grinded coffee and grain, salami, fish, diapers, mattresses, pillows, etc.

With vacuum and subsequent injection of inert gas to prolong the conservation→Trays with food portions, meat, fresh and cooked food (Oxygen prematurely oxidizes food, gases such as nitrogen prevent bacterial proliferation).

In case of meat instead, oxygen is used to enhance the red color

Gripping planes:

Wood, glass and skins (cutting), working-machine. In practice where it is necessary to hold the object to work, cut, finish.

Molding plastic and rubber raw materials:

-Vacuum is used to allow the raw material in liquid state to effectively reach any empty space (cavity) of the mold.

-Carbon fiber processing so that this takes the desired shape when drying

Drying and impregnation treatments:

-The moisture contained in the products or systems to be treated (drying, humidity extraction from the car & motorcycle brake systems, air conditioning systems prior to charging or refilling).

Conditions are created for special substances to penetrate inside (for ex. Impregnation of wood by salt, for outdoor use.

Pharmaceutical industry:

-Preparation of medicines

Industry for Home Products and personal hygiene:

-Turbo-mixers where basic products and essences are mixed together (toothpastes, foam bath, shampoo, cosmetics, home detergents).

Distillation:

-To lower the boiling temperature (energy saving) ex. for solvents used in the metal washing machines and paint treatment plants with the reuse of the clean product obtained with this procedure

- **VACUUM PUMPS OR BLOWERS**

Suction control:

Lifting of metal, glass, stone, tiles, sacks, cartons, food packaging (ex. snacks, biscuits, packing of individual packing units, multiple carton packaging, box). Positioners (feeders) to feed the individual machines or at the end of the process for unloading them.

Subassembly lifters for example in the automotive industry, industrial robots

Palletizers:

For orderly arrangement on pallets of packaging to be ready for shipment. Packs, bottles arrangement, etc.

Pneumatic transport under pressure or depression:

Feeding of food and non-food machines (flours, sugar, cacao, plastic granules, in general powdered materials), Sludge suction, Spurge truck (self-cleaning)

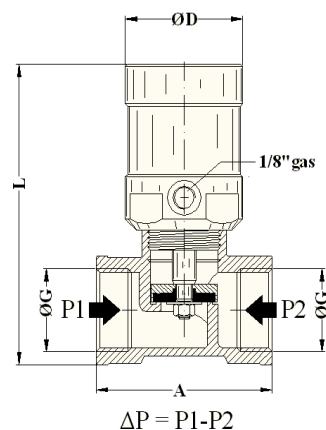
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Fluxa

COMPACT STREAMLINED VALVE TO BE USED ONLY WITH VACUUM PUMPS

Max fluid temperature: +100°C



Sizes	1/2" – 2" (PN16)
Pipe threads	F/F gas ISO228
Normally closed (NC)	Yes cod.51.....
Normally open (NO)	Yes cod.52.....
Double acting (DA)	Yes cod.53.....
Ambient temperature	-20°/+60°C
Pilot pressure	Min 4.5 bar – Max 8.0 bar
Valve body	Brass
Rotable cylinder	Not
Seal holder	Brass
Piston	Aluminium
Cylinder	Anodized aluminium
Piston rod	Stainless steel Aisi 304
Rod wiper	Yes (except 1/2")
Rod guide	Not
Internal o-rings	Fkm
Shutter seal	Ptfe 1/2" – 3/4", Fkm 1" – 2"

On request

Stem for visual indication	Red visual indicator (only NC)
Atex certification	Yes



FLUXA NC. Closing against flow

Code	Gas pipe thread	DN	A	L (max)	D	Ø cylinder	Δp Max [bar]	Kv (2) [m³/h]
51012P	1/2"	15	51	99	45	35	12.3	1.3
51034P	3/4"	20	62	110	45	35	4.2	3.3
51100OI	1"	25	75	122	50	40	7.0	5.9
51114OI	1"1/4	32	84	129	60	50	7.2	15.1
51112OI	1"1/2	40	95	137	70	60	8.4	18.8
51200OI	2"	50	108	149	70	60	5.7	30.6

FLUXA NO. Closing against flow

Code	Gas pipe thread	DN	Pilot pressure [bar]						Kv (2) [m³/h]
			4.0	5.0	5.5	6.0	7.0	8.0	
52012P	1/2"	15	≤16	≤16	≤16	≤16	≤16	≤16	1.3
52034P	3/4"	20	7.1	11.5	13.7	15.9	≤16	≤16	3.1
52100OI	1"	25	6.7	10.5	12.3	14.2	≤16	≤16	5.9
52114OI	1"1/4	32	6.0	8.2	9.3	10.4	12.6	14.8	15.1
52112OI	1"1/2	40	8.3	11.0	12.4	13.7	≤16	≤16	18.8
52200OI	2"	50	5.0	6.7	7.6	8.4	10.2	11.9	32.1

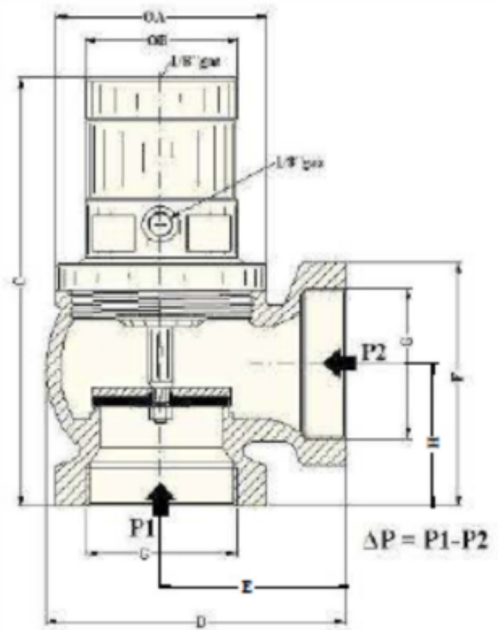
FLUXA DA. Closing against flow

Code	Gas pipe thread	DN	Pilot pressure [bar]						Kv (2) [m³/h]
			4.0	5.0	5.5	6.0	7.0	8.0	
53012P	1/2"	15	≤16	≤16	≤16	≤16	≤16	≤16	1.3
53034P	3/4"	20	15.6	≤16	≤16	≤16	≤16	≤16	3.1
53100OI	1"	25	13.6	≤16	≤16	≤16	≤16	≤16	5.9
53114OI	1"1/4	32	8.2	10.4	11.5	12.6	14.8	≤16	15.1
53112OI	1"1/2	40	10.3	13.0	14.3	15.7	≤16	≤16	18.8
53200OI	2"	50	6.6	8.3	9.2	10.0	11.8	13.5	32.1

INCA

INTERCEPTING VALVE WITH HIGH FLOWRATE TO BE USED WITH VACUUM PUMPS AND BLOWERS.

Max fluid temperature: +100°C



Sizes	1"1/4 – 4" (PN16)
Pipe threads	F/F gas ISO228
Angle	Not
Right-angled	Yes
Normally closed (NC)	Not
Normally open (NO)	Not
Double acting (DA)	Yes cod. 83.....
Ambient temperature	0° / +60°C
Pilot pressure	Min 4 bar – Max 8 bar
Max negative pressure	-995 mBar
Valve body	Bronze
Spacer	Anodized aluminium
Rotable cylinder	Not
Seal holder	Brass 1"1/4-2", Anodized aluminium 3"- 4"
Piston	Aluminium
Cylinder	Anodized aluminium
Piston rod	Inox Aisi 304 / Stainless steel Aisi 304
Rod wiper	Ptfe
Rod guide	Special technopolymer self lubricated
Internal o-ring	Fkm
Shutter seal	Fkm 1"1/4-2", Nbr 3"- 4" (on request Ptfe, Epdm)

On request:

Atex certification	Yes
Switch box	Two reed sensors



INCA DA. Closing against flow

			Pilot pressure [bar]						
			4.0	5.0	5.5	6.0	7.0	8.0	
Code	Gas pipe thread	DN	Δp max [bar]						Kv (2) [m ³ /h]
83114	1"1/4	32	6.9	8.9	9.8	10.8	12.7	14.6	28.2
83200	2"	50	3.9	5.0	5.5	6.1	7.2	8.2	50.2
83300/N	3"	80	2.4	3.1	3.4	3.8	4.4	5.1	152.7
83400	4"	100	1.5	1.9	2.1	2.3	2.7	3.1	256.7

INCA DA. Closing with flow

			Δp [bar]						
			1.0	5.0	10.0	20.0	30.0	40.0	
Code	Gas pipe thread	DN	Min. Pilot pressure [bar]						Kv (2) [m ³ /h]
83114	1"1/4	32	(*)	(*)	(*)	(*)	(*)	(*)	28.2
83200	2"	50	(*)	(*)	(*)	(*)	-	-	50.2
83300/N	3"	80	(*)	(*)	(*)	-	-	-	152.7
83400	4"	100	(*)	(*)	-	-	-	-	256.7

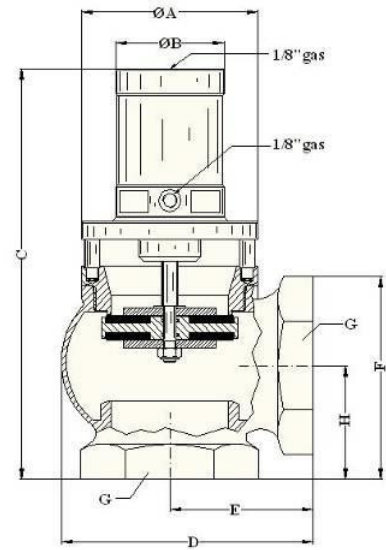
(*) Contact Ma.ro.s. technical office

Code	Gas pipe thread	DN	A	B	C	D	E	F	H
83114	1"1/4	32	90	60	154	88	57	74	44
83200	2"	50	90	60	173	123	75	100	60
83300/N	3"	80	114	70	238	162	93	131	73
83400	4"	100	134	70	265	177	110	152	84

INVA

THREE WAY VACUUM AND VACUUM-BRAKER TO BE USED WITH PUMPS, DIVERTER VALVE FOR USE WITH BLOWERS

Max fluid temperature: +100°C



Sizes	1"1/4 – 4" (PN16)
Pipe threads	F/F gas ISO228
Angle	Not
Right-angled	Yes
Normally closed (NC)	Not
Normally open (NO)	Not
Double acting (DA)	Yes cod. 63.....
Ambient temperature	0° / +60°C
Pilot pressure	Min 4 bar – Max 8 bar
Valve body	Bronze
Spacer	Anodized aluminium
Rotable cylinder	Yes (only when ordering)
Seal holder	Brass 1"1/4 - 2", Anodized aluminium 3" - 4"
Piston	Aluminium
Cylinder	Anodized aluminium
Piston rod	Stainless steel Aisi 304
Rod wiper	Ptfe
Rod guide	Special technopolymer self lubricated
Internal o-ring	Fkm
Shutter seal	Fkm 1"1/4 - 2, Nbr 3" – 4" (on request Ptfe, Epdm)

On request:

Atex certification	Yes
Switch box	Two reed sensors

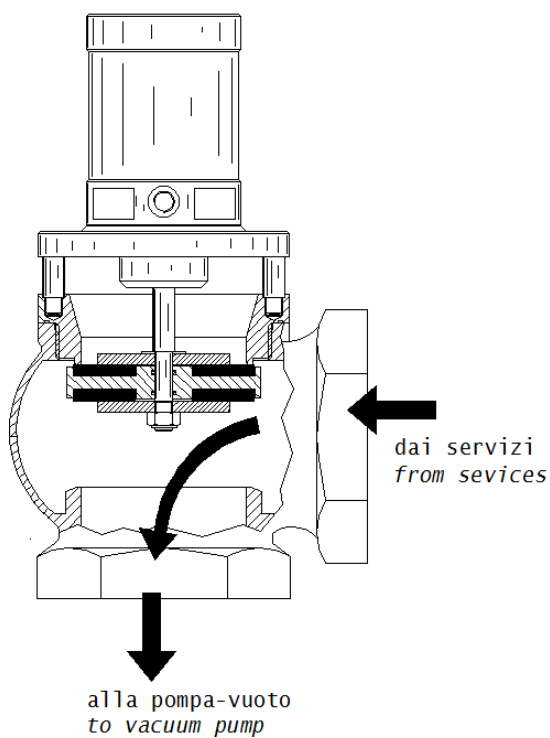


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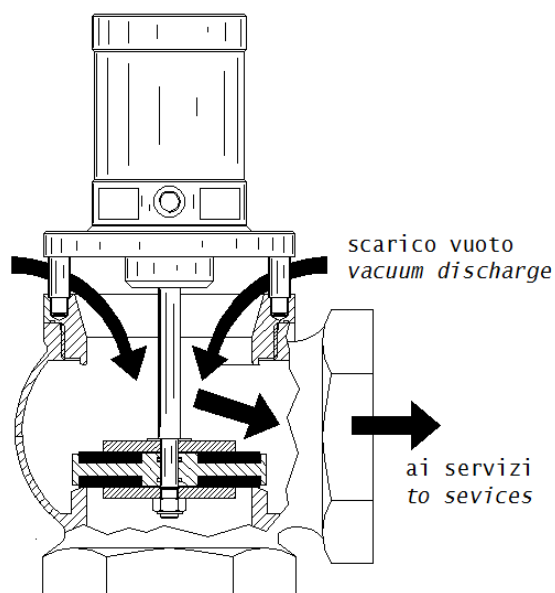
Code	Gas pipe thread	DN	A	B	C	D	E	F	H	Min. absolute pressure [mbar]	Kv (2) [m³/h]
63114	1"1/4	32	90	60	190	88	57	74	44	5	21.4
63200	2"	50	90	60	212	123	75	100	60		50.2
63300/N	3"	80	114	70	265	162	93	131	73		156.9
63400	4"	100	134	70	292	177	110	152	84		256.7

Example of application with vacuum pump

modalità vuoto
vacuum mode



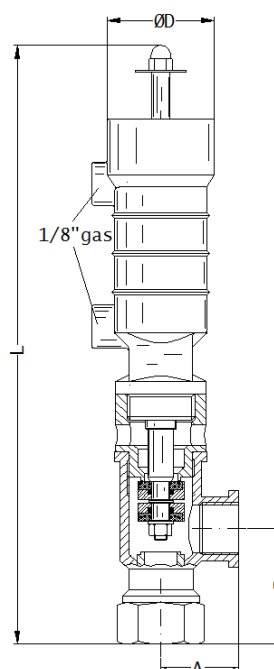
modalità rompi-vuoto
vacuum-breaking mode



INVA NYLON

THREE WAY VACUUM VACUUM-BREAKER TO BE USED WITH PUMPS

Max fluid temperature: +80°C

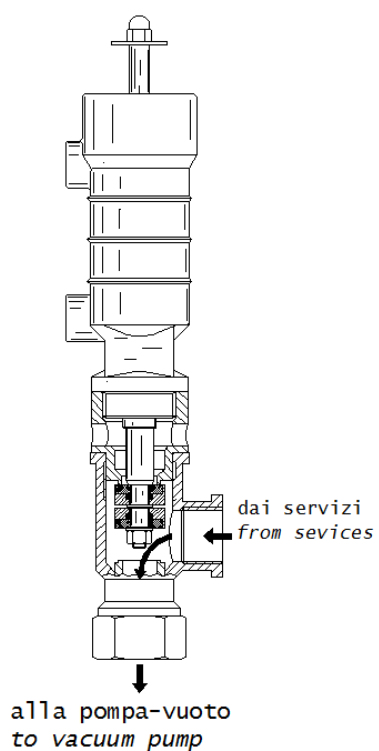


Sizes	1/2" – 2" (PN16)
Pipe threads	F/F gas ISO228
Angle	Not
Right-angled	Yes
Normally closed (NC)	Not
Normally open (NO)	Not
Double acting (DA)	Yes cod. 63.....NY
Ambient temperature	0° / +60°C
Pilot pressure	Min 4 bar – Max 7 bar
Valve body	Brass
Spacer	Brass 1/2"- 3/4". Anodized aluminium 1" - 2"
Rotable cylinder	Not
Seal holder	Brass
Piston	Aluminium
Cylinder	Heat-stabilized nylon 66
Piston rod	Stainless steel Aisi 304
Rod wiper	Not
Rod guide	Not
Internal o-ring	Fkm
Shutter seal	Fkm (on request Ptfе, Epdm)
Stem for visual indication	Stem

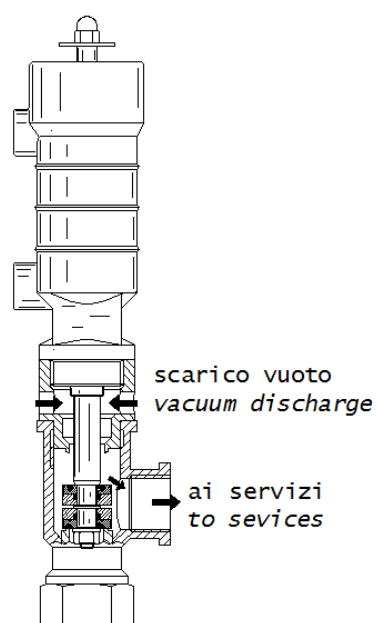
INVA-NY-DA

Code	Gas pipe thread	DN	L	D	A	B	Min. absolute pressure [mbar]
63012	1/2"	15	237	41.5	30	45	5
63034NY	3/4"	20	247	41.5	27	43	
63100NY	1"	25	266	41.5	34	55	
63114NY	1"1/4	32	284	41.5	42	68	
63200NY	2"	50	363	44.5	63.5	102	

modalità vuoto
vacuum mode



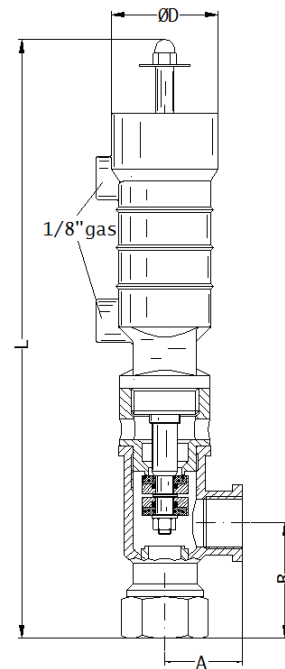
modalità rompi-vuoto
vacuum-breaking mode



INVA R NYLON

THREE WAY VACUUM VACUUM-BREAKER VALVE, WITH RAPID VACUUM-BREAKING FUNCTION, USEFUL IN THE VACUUM TECHNOLOGY (i.e. RELEASE OF SUCTION CUPS). 1/8" BSP AIR INLET CONNECTION FOR A MORE RAPID VACUUM-BREAKING.

Max fluid temperature: +80°C

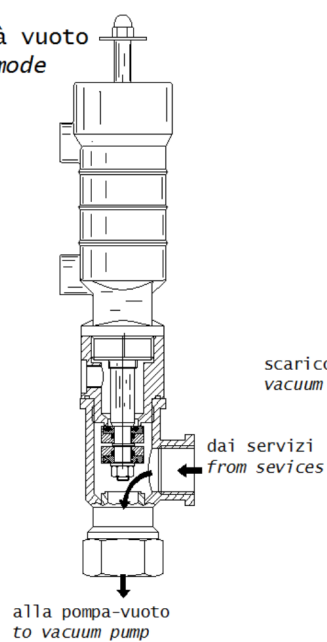


Sizes	1/2" – 2" (PN16)
Pipe threads	F/F gas ISO228
Angle	Not
Right-angled	Yes
Normally closed (NC)	Not
Normally open (NO)	Not
Double acting (DA)	Yes cod. 63.....NYS
Ambient temperature	0° / +60°C
Pilot pressure	Min 4 bar – Max 7 bar
Valve body	Brass
Spacer	Brass 1/2"- 3/4". Anodized aluminium 1" - 2"
Rotable cylinder	Not
Seal holder	Brass 1/2"- 1"1/2. Aluminium 2"
Piston	Aluminium
Cylinder	Heat-stabilized nylon 66
Piston rod	Stainless steel Aisi 304
Rod wiper	Not
Rod guide	Not
Internal o-ring	Fkm
Shutter seal	Fkm (on request Ptfе, Epdm)
Stem for visual indication	Stem

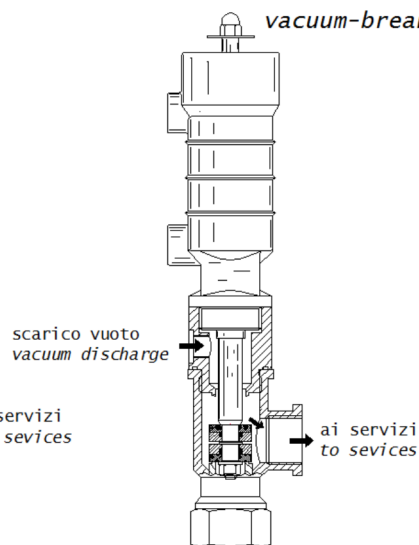
INVA-R-NY-DA

Code	Gas pipe thread	DN	L	D	A	B	Min. absolute pressure [mbar]
63012S	1/2"	15	237	41.5	30	45	5
63034NYS	3/4"	20	247	41.5	27	43	
63100NYS	1"	25	266	41.5	34	55	
63114NYS	1"1/4	32	284	41.5	42	68	
63200NYS	2"	50	363	44.5	63.5	102	

modalità vuoto
vacuum mode



modalità rompi-vuoto
vacuum-breaking mode



INVA 32

REVERSING VALVE 3 WAY – 2 POSITIONS VACUUM-BREAKER FOR PUMPS, DIVERTER VALVE FOR BLOWERS WITH PNEUMATIC OR ELECTRIC DRIVE (Vacuum / Vacuum-breaker only with pneumatic drive)



Pneumatic Actuator

VD323***

Electric Actuator

VD323***24



Cylinder	Anodized aluminium
Pilot pressure	Min. 4 bar – Max 8 bar

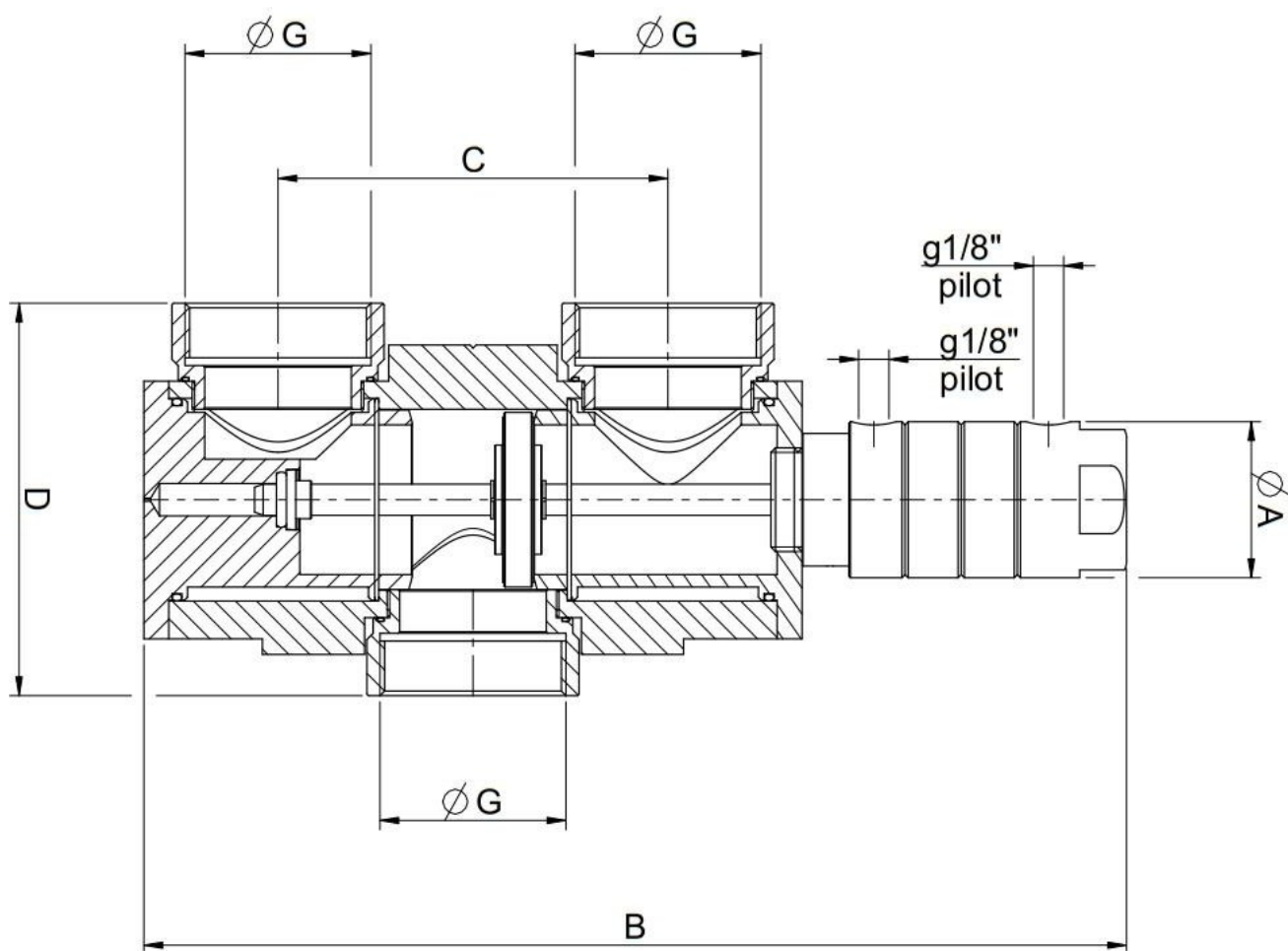
Voltage	24 VDC
Power coil	23 A
Holding coil	0.28 A
Electric connections	FASTON

Sizes	1"1/2 – 2" – 2"1/2
Pipe threads	F/F/F gas ISO228
Double acting (DA)	Yes / only pneumatic actuator
Single acting	Yes / only electric actuator
Max fluid temperature	+140°C Based on Maros Engineering's test
Ambient temperature	0°/ +60°C
Valve body	Anodized aluminium On request Acetal resin
Seal holder	Anodized aluminium
Shutter seal	Fkm (on request Ptfе, Epdm)

On request:

Atex certification	Yes / only anodized aluminium and pneumatic actuator
Switch-box	Two reed sensors





Code	Gas pipe thread	$\varnothing G$ DN	A	B	C	D	Min. absolute pressure [mbar]
VD323112	1"1/2	40	50	315	125	128	5
VD32311224	1"1/2	40	50	333.5	125	128	
VD323200	2"	50	50	315	125	128	5
VD32320024	2"	50	50	333.5	125	128	
VD323212	2"1/2	65	50	315	125	156	5
VD32321224	2"1/2	65	50	333.5	125	156	

INVA 52

REVERSING VALVE 5 WAY – 2 POSITIONS FOR BLOWERS WITH PNEUMATIC OR ELECTRIC DRIVE



Pneumatic Actuator
VD523***

Electric Actuator
VI523***24



Cylinder	Anodized aluminium / Nylon PA66
Pilot pressure	Min. 4 bar – Max 6 bar



Voltage	24 VDC
Power coil	23 A
Holding coil	0.28 A
Electric connections	FASTON

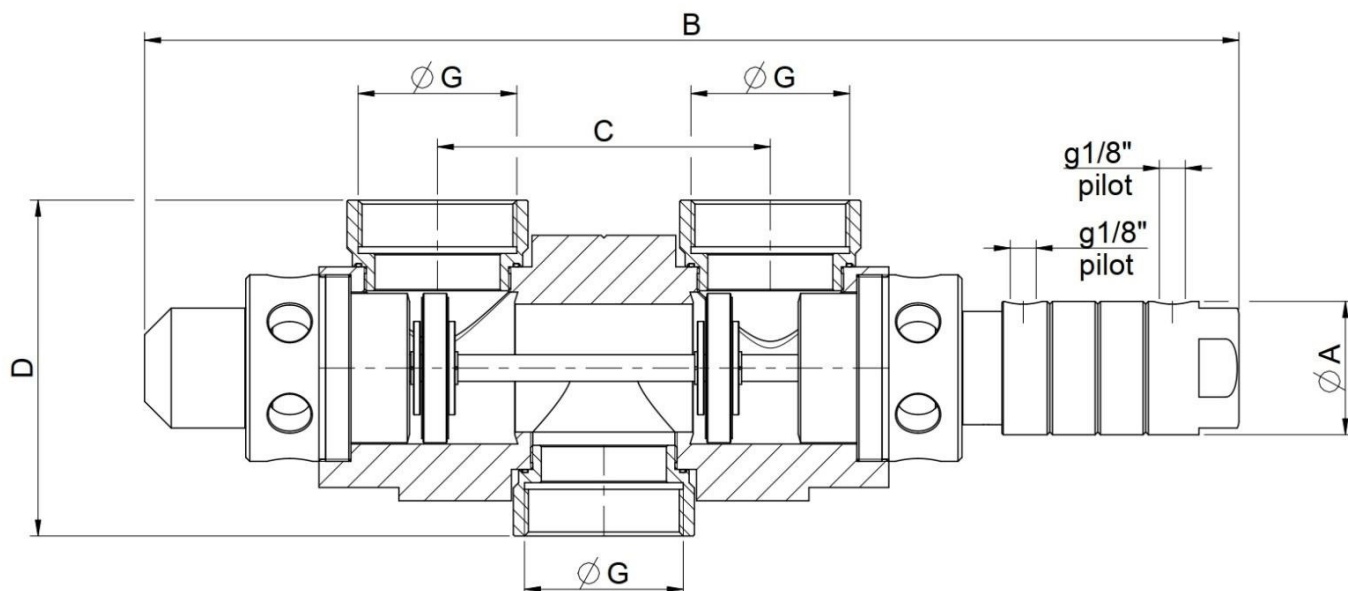


Sizes	1"1/2 – 2" – 2"1/2 – 3" – 4"
Pipe threads	F/F/F gas ISO228
Double acting (DA)	Yes / only pneumatic actuator
Single acting	Yes / only electric actuator
Max fluid temperature	+140°C Based on Maros Engineering's test
Ambient temperature	0° / +60°C
Valve body	1"1/2 – 2" – 2"1/2 Anodized aluminium On request Acetal resin 3" – 4" Acetal resin
Seal holder	Anodized aluminium
Shutter seal	Fkm (on request Ptfе, Nbr)

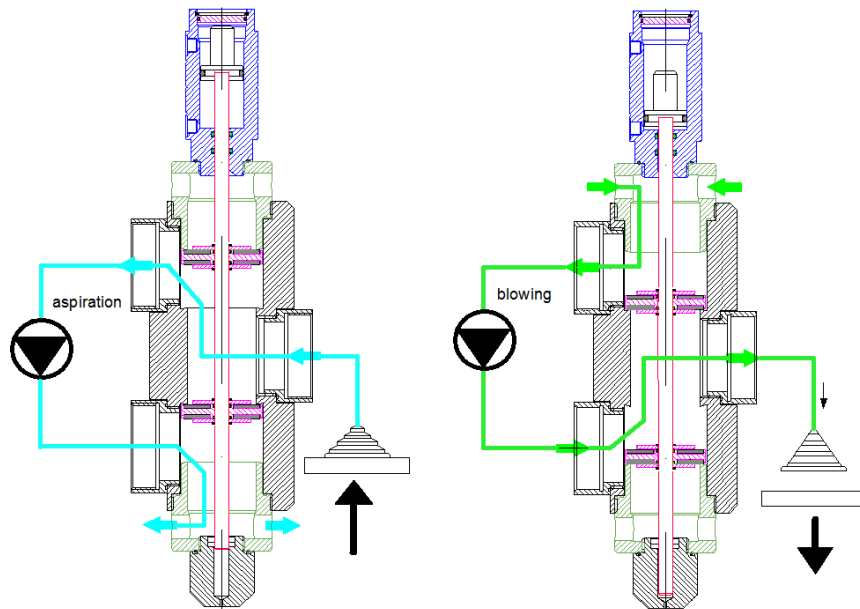
On request:

Atex certification	Yes / only anodized aluminium and pneumatic actuator
Switch box	Two reed sensors





Code	Description	Valve body	Actuator	A	B	C	D	ØG DN
VI523112	INVA 52 DE 1"1/2	Aluminium	Aluminium	50	411	125	126	40
VI523112NY	INVA 52 DE 1"1/2 NY	Acetal resin	Nylon PA66	42	415	125	126	40
VI52311224	INVA 52 DE 1"1/2 24VDC	Aluminium	24 VDC	50	435	125	126	40
VI52311224NY	INVA 52 DE 1"1/2 NY 24VDC	Acetal resin	24 VDC	50	435	125	126	40
VI523200	INVA 52 DE 2"	Aluminium	Aluminium	50	411	125	126	50
VI523200NY	INVA 52 DE 2" NY	Acetal resin	Nylon PA66	42	415	125	126	50
VI52320024	INVA 52 DE 2" 24VDC	Aluminium	24 VDC	50	435	125	126	50
VI52320024NY	INVA 52 DE 2" NY 24VDC	Acetal resin	24 VDC	50	435	125	126	50
VI523212	INVA 52 DE 2"1/2	Aluminium	Aluminium	50	411	125	164	65
VI523212NY	INVA 52 DE 2"1/2 NY	Acetal resin	Nylon PA66	42	415	125	164	65
VI52321224	INVA 52 DE 2"1/2 24VDC	Aluminium	24 VDC	50	435	125	164	65
VI52321224NY	INVA 52 DE 2"1/2 NY 24VDC	Acetal resin	24 VDC	50	435	125	164	65
VI523300	INVA 52 DE 3"	Acetal resin	Aluminium	50	598	204	157	80
VI52330024	INVA 52 DE 3" 24VDC (on request)	Acetal resin	24 VDC	60	620	204	157	80
VI523400	INVA 52 DE 4"	Acetal resin	Aluminium	50	598	204	214	100
VI52340024	INVA 52 DE 4" 24VDC (on request)	Acetal resin	24 VDC	60	620	204	214	100



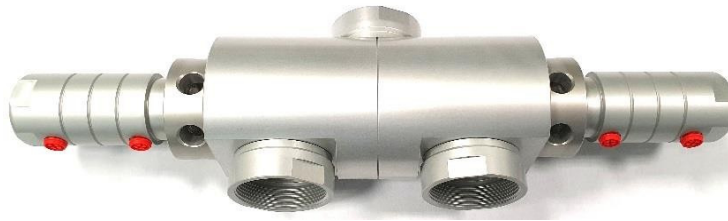
THE VALVE PRATICALLY PERFORMS AS DOUBLE OF VACUUM / VACUUM-BREAKER VALVE HAVING A CENTRAL COMMON PIPE CONNECTION AND IS DRIVEN BY AN ACTUATOR; IT HAS THEREFORE TWO SHUTTERS, TREE PIPE CONNECTIONS AND TWO EXHAUST PORTS. WHEN ONE EXHAUST PORT IS OPEN THE OTHER IS CLOSED AND VICE-VERSA.

TWO POSITIONS OF THE SHUTTERS FITTED ON ONE PISTON ROD DETERMINE THE AIR FOW DIRECTION THROUG THE VALVE

A CLASSIC APPLICATION OF THE INVA 52 IS SHOWN ON FIGURE THAT SUMMARILY DESCRIBES A VACUUM HANDLING SYSTEM, WHERE A BLOWER / ASPIRATOR, DEPENDING ON THE TWO STEADY STAGES OF THE VALVE, IS USED WHETHER TO CREATE VACUUM IN A SUCTION CUP OR TO RESTORE PRESSURE FOR ITS QUICK STAGES.

INVA 53

REVERSING VALVE 5 WAY – 3 POSITIONS FOR BLOWERS WITH PNEUMATIC OR ELECTRIC DRIVE



Electric Actuator
VI533***24

Pneumatic Actuator
VD533***



Cylinder	Anodized aluminium / Nylon PA66
Pilot pressure	Min. 4 bar – Max 6 bar

Voltage	24 VDC
Power coil	23 A
Holding coil	0.28 A
Electric connections	FASTON

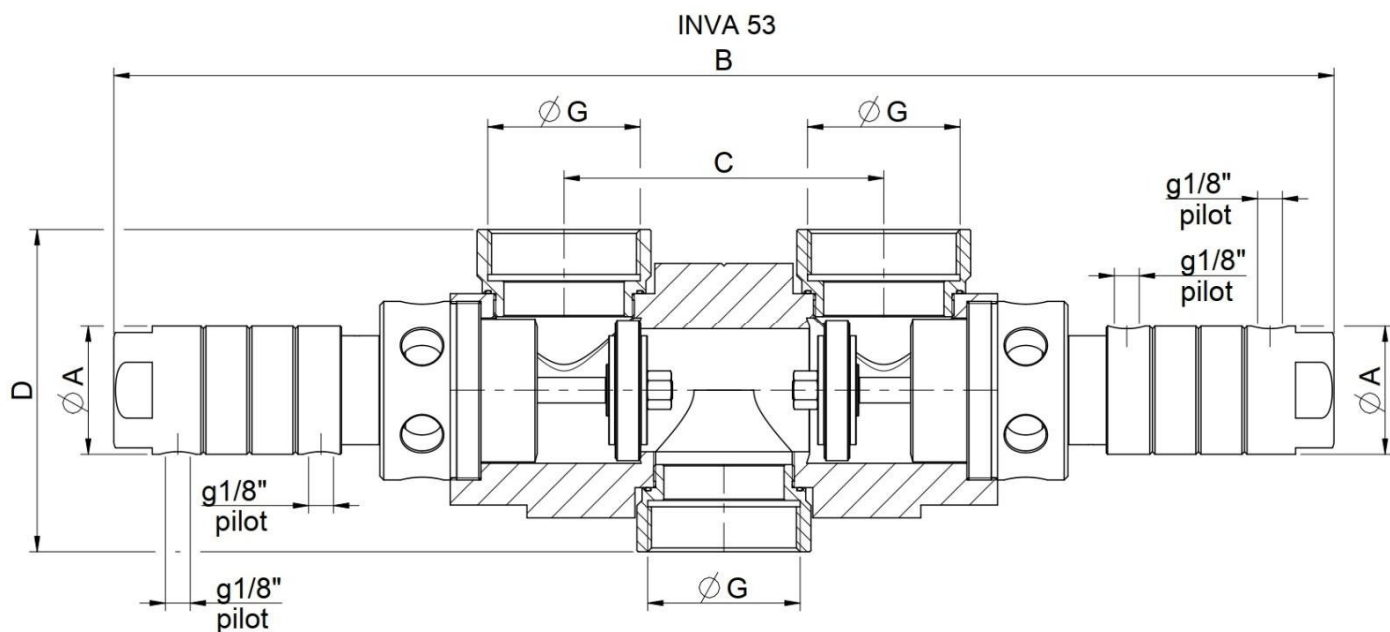


Sizes	1"1/2 – 2" – 2"1/2 – 3" – 4"
Pipe threads	F/F/F gas ISO228
Double acting (DA)	Yes / only pneumatic actuator
Single acting	Yes / only electric actuator
Max fluid temperature	+140°C Based on Maros Engineering's test
Ambient temperature	0°/ +60°C
Valve body	1"1/2 – 2" – 2"1/2 Anodized aluminum On request Acetal resin 3" – 4" Acetal resin
Seal holder	Anodized aluminum
Shutter seal	Fkm (on request Ptfе, Epdm)

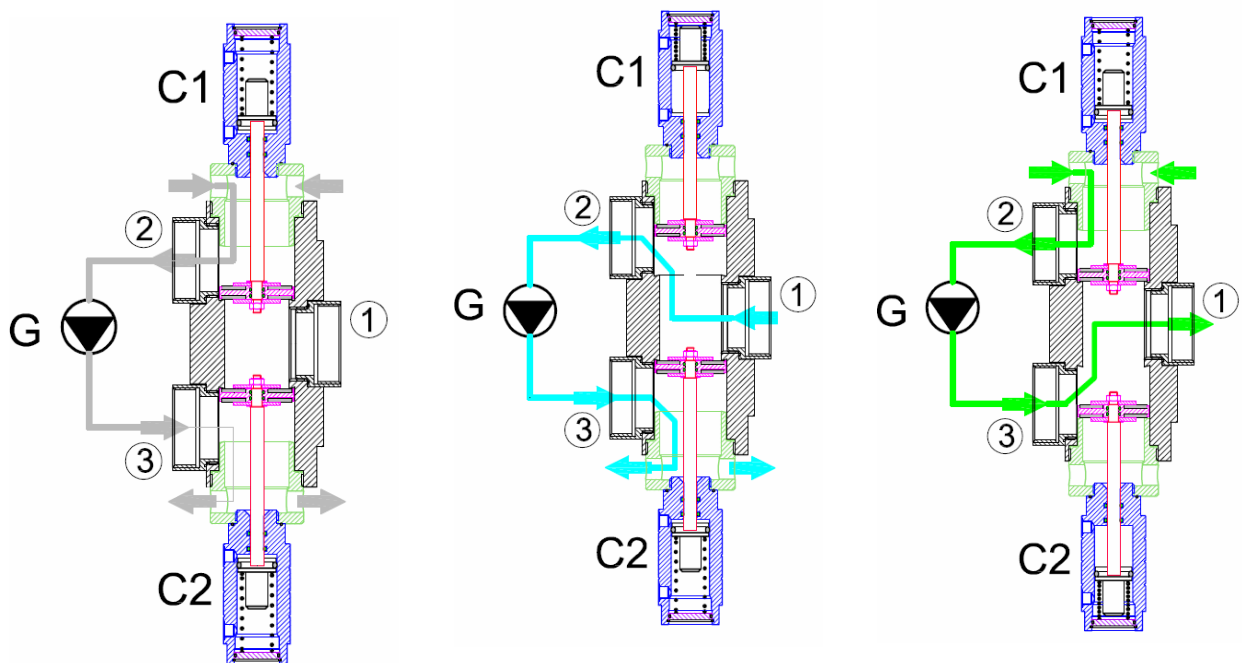
On request:

Atex certification	Yes only 1"1/2-2"-2"1/2 anodized aluminium and pneumatic actuator
Switch box	not





CODE	DESCRIPTION	VALVE BODY	ACTUATOR	A	B	C	D	ØG DN
VI533112	INVA 53 DE 1"1/2	Aluminium	Aluminium	50	478	125	126	40
VI533112NY	INVA 53 DE 1"1/2 NY	Acetal resin	Nylon PA66	42	486	125	126	40
VI53311224	INVA 53 1"1/2 24 VDC	Aluminium	24 VDC	50	526	125	126	40
VI53311224NY	INVA 53 1"1/2 NY 24 VDC	Acetal resin	24 VDC	50	526	125	126	40
VI533200	INVA 53 DE 2"	Aluminium	Aluminium	50	478	125	126	50
VI533200NY	INVA 53 DE 2" NY	Acetal resin	Nylon PA66	42	486	125	126	50
VI53320024	INVA 53 2" 24 VDC	Aluminium	24 VDC	50	526	125	126	50
VI53320024NY	INVA 53 2" NY 24 VDC	Acetal resin	24 VDC	50	526	125	126	50
VI533212	INVA 53 DE 2"1/2	Aluminium	Aluminium	50	478	125	164	65
VI533212NY	INVA 53 DE 2"1/2 NY	Acetal resin	Nylon PA66	42	486	125	164	65
VI53321224	INVA 53 2"1/2 24 VDC	Aluminium	24 VDC	50	526	125	164	65
VI53321224NY	INVA 53 2"1/2 NY 24 VDC	Acetal resin	24 VDC	50	526	125	164	65
VI533300	INVA 53 DE 3"	Acetal resin	Aluminium	50	608	204	157	80
VI53330024	INVA 53 3" 24 VDC (on request)	Acetal resin	24 VDC	60		204	157	80
VI533400	INVA 53 DE 4"	Acetal resin	Aluminium	50	608	204	214	100
VI53340024	INVA 53 4" 24 VDC (on request)	Acetal resin	24 VDC	60		204	214	100



PORT 2 IS CONNECTED TO THE SUCTION OF THE BLOWER G, PORT 3 TO DISCHARGE AND PORT 1 TO FINAL USER (EX. SUCTION CUP, TANK, ETC.)

OPERATING MODE

CYLINDERS C1 AND C2 BOTH IN REST POSITION: PASSIVE CIRCULATION

C1 IN FUNCTION AND C2 IN REST POSITION: SUCTION PHASE

C1 REST POSITION AND C2 IN FUNCTION: BLOWING PHASE

SHUT-OFF VALVES FOR FLUID PNEUMATICALLY OPERATED INSTALLATION, USE AND SERVICE MANUAL

READ CAREFULLY THIS MANUAL BEFORE TO START USING OUR PRODUCTS

INTENDED USE

All valves, produced by Maros Engineering S.r.l., referring to this manual, are projectd to intercept a large variety of liquids and gas, compatibly with raw-materials used for their manufacture.

The datasheets of each valve (avaible on our catalogue or on the website: www.marosengineering.com) are evidencing the use limits, that must be strictly respected. Therefore, before to proceed with the order, customer must verify carefully following points:

- Fluid's compatibility with the raw materials that valve is made. Maros is providing an appropriate table of chemical compatibility in order to help the customer in the best choice.
- Maximum temperature of the intercepted fluid
- Maximum pressure of the fluid, that is maximum pressure gap between in and out of the valve (max ΔP).
- Minimum and maximum pilot pressure to let the actuator working.
- Minimum and maximum ambient temperature.



Valves included in this manual CANNOT absolutely be used in combination with dangerous liquid or gas as:



explosive



extremely or simply flammable (when the maximum temperature of the valve could be exposed is higher than the flash point)



highly toxic



cryogenic liquids

-Use of the valves in potentially explosive atmospheres is allowed only for the suitable models and under specific request from the customer. The non mention of this intended use constitutes an act of serious negligence and it makes fee Maros from any liability either for its products than for the traded ones.

Valves of Maros are not safety valves and therefore must absolutely NOT be employed in this application and cannot be installed equipment where its malfunctioning can cause damage to people and property.



SAFETY

-All products included in this manual are under pressure devices. A wrong or non appropriate use can bring to accidents with serious consequences for people (till death) and properties.

Follow strictly manufactures guidelines here under listed regarding installation, use and maintenance/service.

- All operations on the product must be performed only by qualified and professionally suitable people
- Before installation, use and service check that pressure and temperature of the equipment are not higher than the ones indicated in the valve datasheet.

In case the fluid is high temperature one, it's possible it gets to external surface, therefore be sure the installation is made in a way to avoid accidental contact by personnel. Before any operation, be sure that the part of the duct on which the valve is mounted, is separated from the rest of the system and the pressure is placed to zero. In case of high temperature fluid wait an adequate cooling time to avoid damages to the people, fires, etc.

- In case the valve is passed through by aggressive media it is recommended that the operator for any operation, uses adequate protections (gloves, goggles, specific clothing).

- Check fluid's compatibility with the materials the valve is made.; with particular focus to the gaskets.

If in doubt contact supplier. Use with non compatible fluid can bring to a performance deterioration for the gaskets with consequence of dangerous leakages.

- Be sure the pneumatic actuator is operated with pressure inside technical specifications. Higher pressure than allowed can provide valve structural stresses not bearable and damage it beyond repair.

- In case of piston valves, if the fluid is incompressible (majority of liquids) it is recommended the entrance opposite to the closing movement (against flow) so that to prevent water hammer quite dangerous for the pipeline. Otherwise it is necessary to put on the plant a safety system to prevent this phenomena. For the ball valves, a gradual opening or closing is recommendable.

- In case by accident maximal pressure and temperature of the valve can be exceeded in the portion of equipment where it is fitted, foresee the installation of a safety system to avoid this overloads (ex. Thermostat for the temperature and pressure switch).

- All Maros valves have been projected to operate with homogenous fluids. Presence of solid particles in suspension can bring to premature wear of the gaskets (especially in the ball valves) abrasions and scuffs in the moving parts with possibility of seizures and fluid leakage with extreme consequence of non repairable damage. For piston valves it is absolutely necessary to avoid the case that any external part can fit between the seat and the shutter, because it could bring to the deformation or break of this. In order to avoid this risk it is recommended to install a filter before the equipment or in any case before the valve.

- Foreseeable risks as a consequence of malfunction of the valve cannot be defined by manufacturer because it depends on the equipment characteristics where it is installed.

Risk assessment has to be effected from installer/customer in the general evaluation of the total equipment. When the characteristics of the equipment can generate formation of a potentially explosive atmosphere, it is necessary the use of signaling devices (sensors) or protection barriers.

An other risk factor is connected to the possible flammability of the dust deposited on the valve. In this case we recommend to make an evaluation for the allowed temperature on the contact surface as defined by the UNI-Norm EN ISO 13732-1:2007.

- In the case surface temperature exceed the allowed ones, it is appropriate the use of protection systems for the exposed parts or at least to highlight with appropriate symbol the presence of areas with a suspected dangerous temperature. Furthermore to avoid that the products becomes potential source of ignition due to the electric charges (static or not) must provide for its grounding.

- Maros valves are not suitable to support external loads coming from any part of the equipment where are installed. The duct portion has to support the valve and not vice versa. Installer must take utmost care for an assembly in perfect condition of stability to avoid bending, torsions and anomaly stress which could bring to risk conditions for the complete equipment.

- No modification of our products is allowed from the customer/user.

Maros, when considered possible and appropriate under written request, can make changes to the products in its factory. Any alteration of the valve without prior authorization of the manufacturer will cease warranty and all responsibilities for possible damages that could occur.

INSTALLATION AND USE

- The use of a valve must comply with the original intended use for which it has been projected and built.

Maros datasheets allow to check the suitability for a specific application. The Manufacturer is able to provide, through its Technical Office, the advice for the most appropriate use of its products, based on detailed information received from the customer/user regarding the equipment where these have to be installed.

- Installation in the equipment can be made only by qualified people. They are defined “qualified people” the ones that based on their experience and professionalism are able to perform properly the assigned duties and what is needed to minimize the risk situation for the equipment.

- There are no specific indications for the valve handling. Considering size and weight use adequate transport media (forklift, trans pallets, lifting belts, etc.) in order to avoid falls which could affect the operator and efficiency of the product. Try to lift and manipulate the valves acting on the body avoiding to grab parts more easy to break, as hand wheel, signaling rods, switch-box, etc. Especially for butterfly valves it is recommended to fit them with the disk in closed position to avoid damage.

- Check the compatibility among valve and duct, (thread, flanges, etc.). We recommend connecting the valve to the pipeline with equivalent use characteristic and possibly of the same raw material in order to get best performances. In case connection is made between parts of different materials it is recommended to check the connecting compatibility. Valves and actuators have to be installed in ergonomically favorable and easily accessible position in compliance with the standard UNI547-1:1998.

- Mounting of the valve must be made when the system is stopped taking care that the duct is empty and isolated. The placement should be such as to facilitate as much as possible maintenance operations.

SERVICE

- Before to effect any operation, be sure that the system is not working. Once verified this condition, following operations are applicable to all type of valves

a) completely isolate the part of the equipment where the valve is installed, put to zero the pressure of the fluid (or discharge completely the vacuum in case this is the fluid), furthermore wait till when the temperature has reached an acceptable level.

b) stop and isolate the air compressed circuit; discharge the pressure still present inside the actuator and remove the supply connector(s) from the actuator.

- Ball and butterfly valves The main maintenance essentially involves the gasket-set replacement. For what concerns the valve-body this operation is not-recommended because difficult and non profitable: replacement of the whole piece is recommended. To make service on the actuator it is necessary to remove it from the valve body, unscrewing the bolts. Spare parts replacement should be effected by our service department. If it is not possible, we will take care in supplying – on demand – technical assistance and detailed sequence of the necessary operations, keeping in mind that all these require qualified personnel.

- Piston valves For this category the valve body doesn't need any service, because all replacing parts (gaskets, etc.) are located in the actuator. Pls follow this sequence 1)- Unscrew the actuator from valve body. In NC (Normally Closed) version the shutter is pressed on the sealing seat by preloaded spring, therefore, to perform this operation it is recommended to keep raised the shutter by acting on the cylinder with an external source of compressed air. 2)- Unscrew the nut into end of the piston rod to proceed with the extraction of the seal holder and the replacement of the seal together with the rear o-ring 3)- In order to replace remaining parts of the “revision kit” (various O-ring, rod guide, rod wiper and possibly one or more spring) it is necessary to remove the piston from the cylinder-actuator.

In the NC and NO versions this operation and the following reassembly should be carried out only by qualified personnel equipped with adequate tools, because inside the actuator there are one or more preloaded springs, which without proper precautions can cause serious injury.

- Frequency of the service is non generally predictable because depends on factors normally largely unknown when the valve is sold (nature of fluid, working temperature, ΔP of the valve, cycling frequency, etc.). Service planning should be scheduled by the user together with the service to be performed on the whole equipment. We recommend a careful inspection of the valve efficiency every 50.000 cycles and to reduce this period in the case the valve is working in severe environments (such as: corrosive ambient or saline or with extreme temperature).

- Maros takes no responsibility for any damage caused to persons or equipments as a result of improper maintenance procedure performed by the end user or due to extraordinary intervention not priorly authorized.

- To avoid dust deposit that could become potential source of ignition we recommend to keep clean the exterior surface of the product. In case the ambient where the valve is located has a strong accumulation of dust, increase frequency of this operation.



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