

BIDIRECTIONAL WAFER Type Knife Gate Valve

- Bidirectional knife gate valve with "wafer" design.
- Two-piece cast body, joined by screws, with internal guides for smooth movement of through conduit during operation.
- Provides high flow rates with low pressure drop.
- Various seal and gasket materials available.
- Distance between faces in accordance with Standard UNE-EN 558 Basic Series 20.

General applications:

- This knife gate valve is suitable for working with clean liquids or liquids with a concentration of bland solids:
 - Drying plants.
 - Sewage treatment.
 - Food industry.
 - Oil extraction.
 - Paper Industry.
 - Chemical plants
 - Mining.
 - Sludge.

Sizes: DN50 to DN2000 (other dimensions to order).

- Working (ΔP):**
- DN50 to DN250: 10 Kg/cm²
 - DN300 and DN350: 8 / 10 Kg/cm²
 - DN400 and DN450: 6 / 10 Kg/cm²
 - DN500 and DN600: 5 / 10 Kg/cm²
 - DN700 to DN1400: 2 / 4 / 6 / 10 Kg/cm²
 - DN1600 to DN2000: 2 / 4 / 6 Kg/cm²

Boring: DIN PN10 and ANSI B16.5 (class 150).

Other common flanges:

DIN PN 16.	JIS Standard.
DIN PN6.	Australian Standard
DIN PN25.	British Standard.

Directives:

- Machinery Directive: **DIR 2006/42/EC (MACHINERY).**
- Pressure Equipment Directive: **DIR 97/23/EC (PED) ART.3, P.3.**
- Potentially Explosive Atmospheres Directive (optional): **DIR 94/9/EC (ATEX) CAT.3 ZONE 2 and 22 GD,** for information on categories and zones please contact Tubi Valves Technical-Sales Department.

Quality dossier:

- All valves are tested hydrostatically at CMO and material and test certificates can be provided.
- Body test = working pressure x 1.5.
- Seal test = working pressure x 1.1.

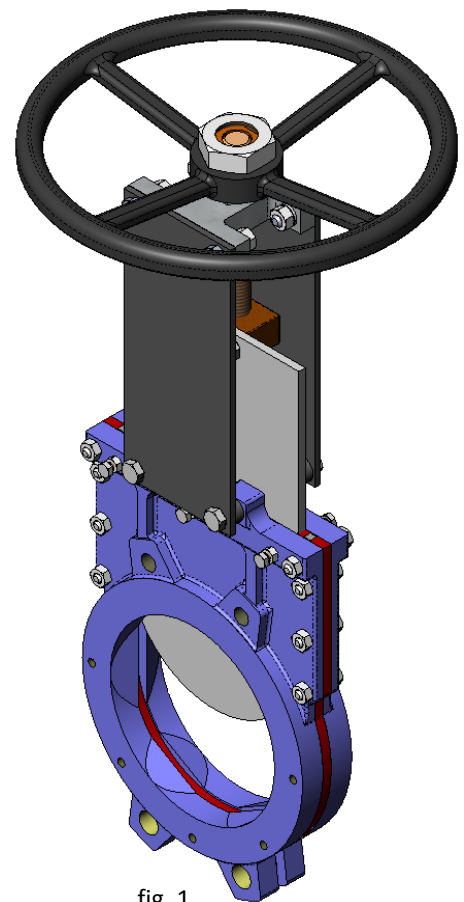


fig. 1

Advantages of CMO "UB Model"

The main characteristic of this valve is the body design. This is a body formed by two screwed parts which have been machined on the inside, providing the valve with capacity to work with fluids in both directions and with the same pressure.

The seal is located between the two parts of the body, and this seal is secured with the screws used to attach the two parts of the body. In valves DN50 to DN600 the seal has a metal core inserted in order to withstand the fluid pressure and allow the valve to shut off correctly. In valves over DN600 the two parts of the body have an outer rim to ensure the seal remains in position.

This seal design provides a completely flat seat with no internal cavities and avoids any build-up of solids in the seat area.

The stem on the CMO valve is made of 18/8 stainless steel. This is another added advantage, as some manufacturers produce it with 13% chrome and it gets rusty very quickly.

The handwheel is made of GJS-500 nodular cast iron. Some manufacturers produce them in normal cast iron which can lead to breakages in the event of very high operating torque or knocks. The yoke has a compact design with the bronze actuator nut protected in a sealed and lubricated box. This makes it possible to move the valve with a key, even without the handwheel (in other manufacturers' products this is not possible).

The pneumatic actuator's upper and lower covers are made of GJS-400 nodular cast iron, making them highly shock resistant. This characteristic is essential in pneumatic actuators.

The pneumatic cylinder sealing joints are commercial products and can be purchased worldwide. This means it is not necessary to contact CMO every time a sealing joint is required.

STANDARD COMPONENTS LIST		
COMPONENT	IRON VERSION	STAINLESS STEEL VERSION
1- Body	GJS-500	CF8M
2-Through conduit	AISI304 / DUPLEX	AISI316 / DUPLEX
3 - Seal Rim	AISI304	AISI316
4-Stuffing box seal	EPDM	EPDM
5- Seal	EPDM + STEEL	EPDM + STEEL
6- Seat	---	RCH 1000
7 - Support	S275JR	S275JR
8- Stem nut	BRONZE	BRONZE
9- Stem	AISI303	AISI303
10- Yoke	GJS-500	GJS-500
11- Stem nut	BRONZE	BRONZE
12- Stopper Nut	STEEL	STEEL
13- Handwheel	GJS-500	GJS-500
14- Nut	5.6 ZINC	5.6 ZINC

table 1

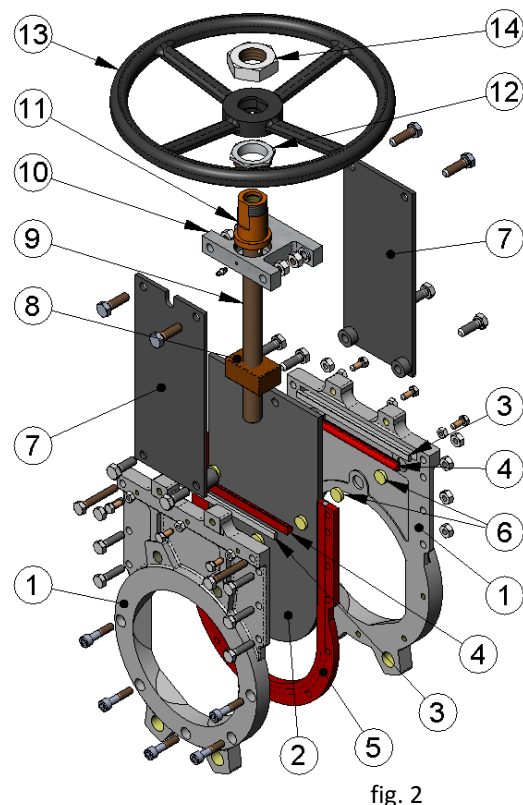


fig. 2

DESIGN CHARACTERISTICS

1- BODY

Wafer design reinforced cast body, comprising two screwed parts. The stainless steel version has RCH1000 interior nylon slides which provide smooth movement of the through conduit; on the other hand, the GJS-500 versions do not require slides.

The internal surface of both parts is fully machined and assembled with screws to form a solid block.

Designed with total passage, with the shape of the inside of the body preventing the build-up of solids in the seal area; this means that there is no cavitation in open position and, in consequence, there is no turbulence in the fluid and the loss of load is minimum, thus providing large flows.

The standard manufacturing materials are CF8M stainless steel and GJS-500 nodular cast iron. Other materials such as A216WCB carbon steel and stainless steel alloys (AISI316Ti, Duplex, 254SMO, Uranus B6, etc.) are available to order. As standard, the carbon steel or nodular cast iron valves are painted with EPOXY anti-corrosive protection (colour RAL 5015). Other types of anti-corrosive protections are available to order.

2- THROUGH CONDUIT

The standard manufacturing materials are AISI304 stainless steel in valves with iron body and AISI316 stainless steel in valves with CF8M body. In both cases, whenever the high pressures to withstand so require, we also make use of DUPLEX material.

Other materials or combinations can be supplied to order.

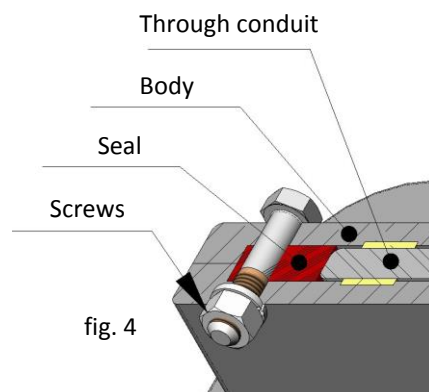
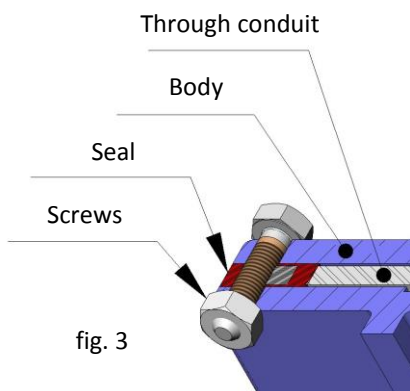
The through conduit is polished on both sides to provide a smooth contact surface with the resilient seal. At the same time, the through conduit is rounded to prevent the sealing joint from being cut. Different degrees of polishing, anti-abrasion treatments and modifications are available to adapt the valves to the customer's requirements.

3- SEAT

This type of valve has an elastic seat which is made up of a rubber seal located between the two parts of the body, secured with the screws used to join the two parts of the body.

In valves DN50 to DN600 the seal has a metal core inserted in order to withstand the fluid pressure and allow the valve to shut off correctly (fig. 3).

In valves over DN600 the two parts of the body have an outer rim to ensure the seal remains in position (fig. 4). This seal design provides a completely flat seat with no internal cavities and avoids any build-up of solids in the seat area.



Seal tight materials
EPDM

This is the standard resilient seal fitted on CMO valves. It can be used in many applications, however, it is generally used for water and products diluted in water at temperatures no higher than 90°C*. It can also be used with abrasive products and provides the valve with 100% sealtightness.

NITRILE

Used in fluids containing fats or oils at temperatures no higher than 90°C*. Provides the valve with 100% sealtightness.

VITON


Suitable for corrosive applications and high temperatures up to 190°C continuously and peaks of 210°C. Provides the valve with 100% sealtightness.

SILICONE

Mainly used in the food industry and for pharmaceutical products with temperatures no higher than 200°C. Provides the valve with sealtightness of 100%.

PTFE

Suitable for corrosive applications and pH between 2 and 12. Does not provide the valve with 100% sealtightness. Estimated leakage: 0.5% of the pipe flow.

 **Note:** In some applications other types of resilient materials are used, such as hypalon, butile or natural rubber. Please contact us if you require one of these materials.

4- GASKET

Valves DN50 to DN600 not have the traditional gasket system, but rather a rubber strip inserted in the top of each body half. This system avoids the need to regularly replace the gasket and also offers the possibility of regulating the body from the outside by way of screws (fig. 5).

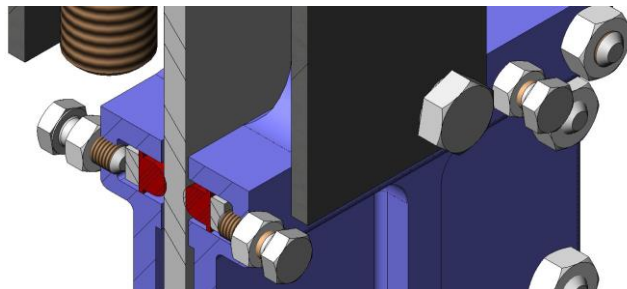


fig. 5

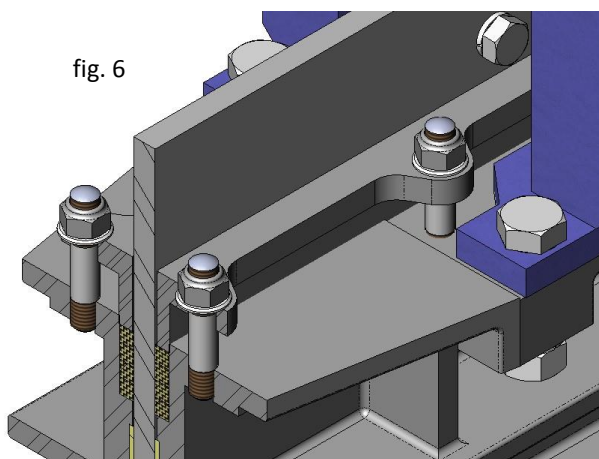


fig. 6

Valves over DN600 do have the traditional system and the standard CMO gasket comprises several lines (from 4 to 6 lines) of seal, providing the required sealtightness between the body and the through conduit and preventing any type of leakage. It is located in an easily accessible place and can be replaced without dismantling the valve from the pipeline (Fig 6).

Below we indicate various types of gasket available according to the use to be given to the valve:

GREASED COTTON (Recommended for hydraulic services)

This gasket is composed of braided cotton fibres soaked in grease both inside and out. It is for general use in hydraulic applications in both pumps and valves.

DRY COTTON

This gasket is composed of cotton fibres. It is for general use in hydraulic applications with solids.

COTTON + PTFE

This gasket is composed of braided cotton fibres soaked in PTFE both inside and out. It is for general use in hydraulic applications in both pumps and valves.

SYNTHETIC + PTFE

This gasket is composed of braided synthetic fibres soaked in PTFE both inside and out. It is for general use in hydraulic applications in both pumps and valves and in all types of fluids, especially corrosive ones, including concentrated and oxidising oils. It is also used in liquids with solid particles in suspension.

LUBRICATED PTFE

It is made with PTFE filaments and designed to work at great speed. It is braided with a diagonal system. Suitable for valves and pumps which work with almost all types of fluids, particularly with the most corrosive, such as oxidant and concentrated oils. It is also used in liquids with solid content.

GRAPHITE

This gasket is composed of high-purity graphite fibres. A diagonal braiding system is used and is impregnated with graphite and lubricant which helps to reduce porosity and improve operation.

It has a wide range of applications as graphite is resistant to steam, water, oils, solvents, alkali and most acids.

CERAMIC FIBRE

This gasket is composed of ceramic material fibres. Its main applications are with air or gas at high temperatures and low pressures.

SEAT/SEALS			GASKET			
Material	Max temp (°C)	Applications	Material	P(bar)	Max temp (°C)	pH
EPDM (E)	90 *	Non-mineral oils, acids and water.	Greased cotton	10	100	6-8
Nitrile (N)	90 *	Hydrocarbons, oils and greases	Dry cotton (AS)	0,5	100	6-8
Viton (V)	200	Hydrocarbons and solvents	Cotton + PTFE	30	120	6-8
Silicone (S)	200	Food Products	Synthetic + PTFE	100	-200+270	0-14
PTFE (T)	250	Resistant to corrosion	Graphite	40	650	0-14
			Ceramic Fibre	0,3	1400	0-14

NOTE: More details and other materials available to order.

*→ EPDM and Nitrile: possible up to Max temp: 120°C to order.

table 2

5- STEM

The stem on the CMO valve is made of 18/8 stainless steel. This characteristic provides high resistance and excellent corrosion-resistant properties.

The standard valve design is with non-rising stem, although rising stem is also available. When a rising stem is required for the valve, a stem hood is supplied to protect the stem from contact with dust and dirt, besides keeping it lubricated.

6- PACKING GLAND

As mentioned above, valves DN50 to DN600 do not have the traditional packing system, but rather a stuffing box seal built into the body. Nevertheless, the common packing system is still used in sizes over DN600; this allows uniform pressure and force to be applied to the gasket, thus ensuring sealtightness. As standard, valves with steel body include a steel packing gland flange, while for valves with stainless steel body this is made of stainless steel.

7- ACTUATORS

All types of actuators can be supplied, with the advantage that, thanks to the CMO design, they are fully interchangeable. This design allows customers to change the actuators themselves and no extra assembly accessories are required. A design characteristic of CMO valves is that all actuators are interchangeable.

Manual:

- Handwheel with non-rising stem
- Handwheel with rising stem
- Chainwheel
- Lever
- Gears
- Others (square stem, etc)

Automatic:

- Electric actuator
- Pneumatic cylinder
- Hydraulic cylinder

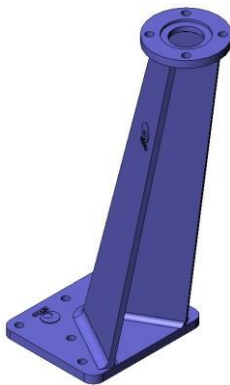


fig. 7

Wide range of accessories available:

- Mechanical stoppers
- Locking devices
- Emergency manual actuators
- Electrovalves
- Positioners
- Limit switches
- Proximity switches
- Leaning floor stand (Fig. 7)
- Straight floor stands (fig. 8)

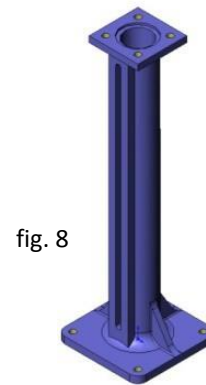
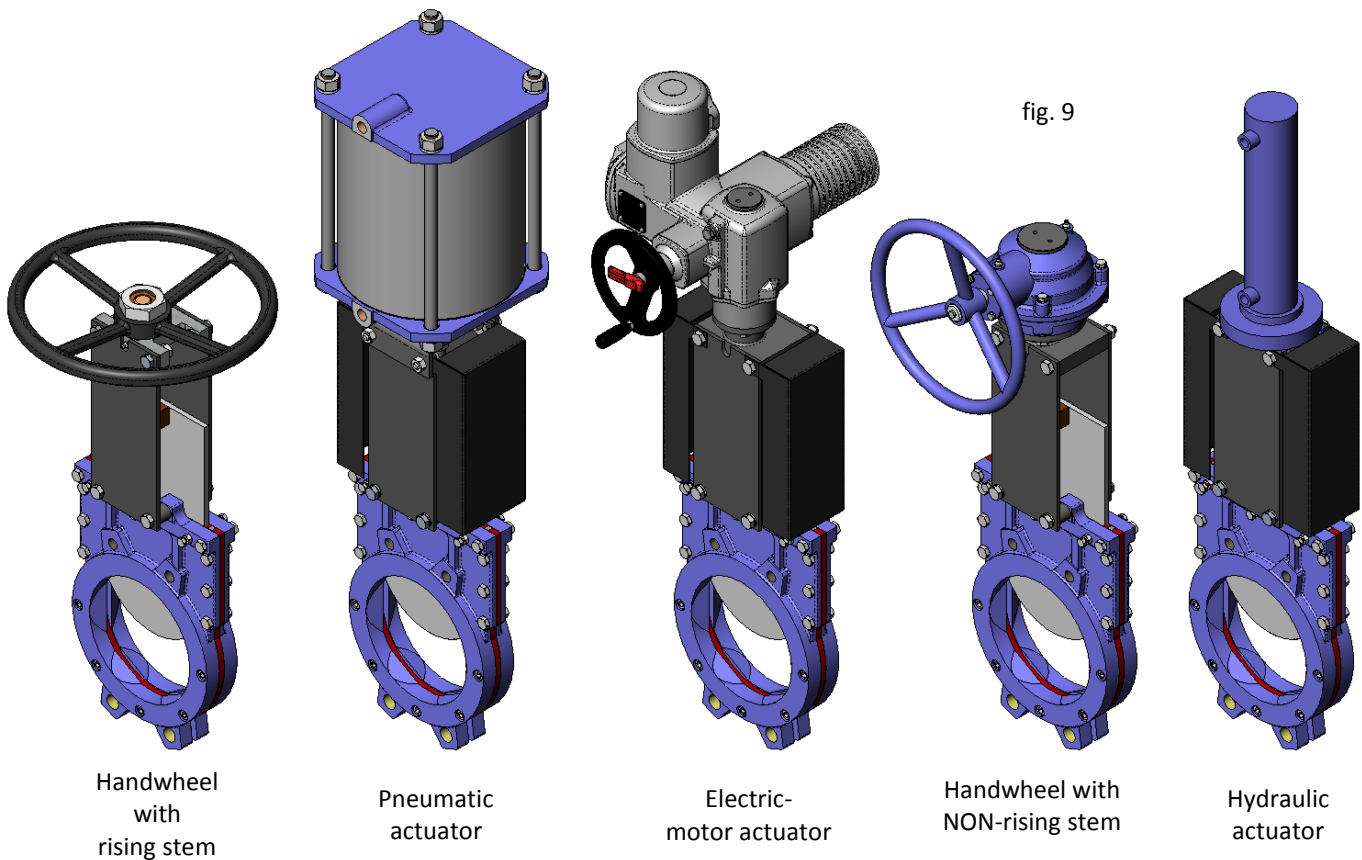


fig. 8

Stem extensions have also been developed, allowing the actuator to be located far away from the valve, to suit all needs. Please consult our technicians beforehand.



ACCESSORIES AND OPTIONS

Different accessories are available to adapt the valve to specific working conditions such as:

Mirror polished through conduit:

The mirror polished through conduit is especially recommended in the food industry and, as standard, in applications in which solids can stick to the through conduit. It is an alternative to ensure the solids slide off and do not stick to the through conduit.

PTFE lined through conduit:

As with the mirror polished through conduit, it improves the valve's resistance to products that can stick to the through conduit.

Stellited through conduit:

Stellite is added to the through conduit's lower perimeter to protect it from abrasion.

Scraper in the gasket:

Its function is to clean the through conduit during the opening movement and prevent possible damage to the gasket.

Air injections in the gasket:

By injecting air in the gasket, an air chamber is created which improves seal tightness.

Cased body:

Recommended in applications in which the fluid can harden and solidify inside the valve's body. An external jacket keeps the body temperature constant, preventing the fluid from solidifying.

Electrovalves (fig. 10):

For air distribution to pneumatic actuators.

Connection boxes, wiring and pneumatic piping:

Units supplied fully assembled with all the necessary accessories.

Mechanical limit switches, inductive sensors and positioners:

Installation of limit switches (fig. 10) or inductive switches to indicate specific valve position, and positioners to indicate continuous position.

Mechanical locking device:

Allows the valve to be mechanically locked in a set position for long periods.

Stroke limiting mechanical stops:

Allow the stroke to be mechanically adjusted, limiting the valve run.

Emergency manual actuator (hand wheel / gear box):

Allows manual operation of the valve in the event of power or air failure (Fig 10).

V-notch and pentagonal diaphragm with indication rule:

Recommended for applications in which it is necessary to regulate the flow, it allows flow control according to the valve's opening percentage.

Interchangeable actuators:

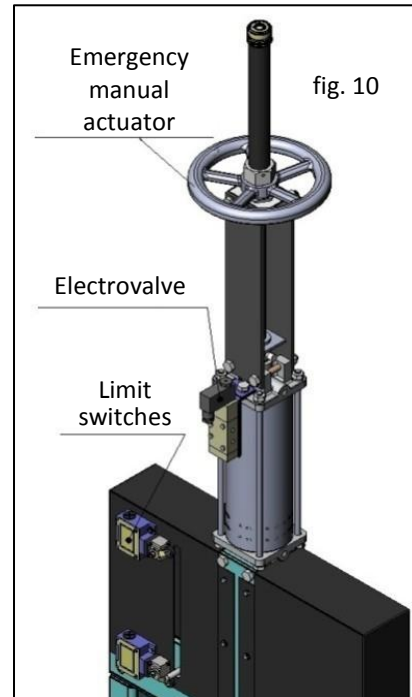
All actuators are easily interchangeable.

Actuator or yoke support:

Made of EPOXY-coated steel (or stainless steel to order), its robust design gives it great rigidity in order to resist the most adverse operation conditions.

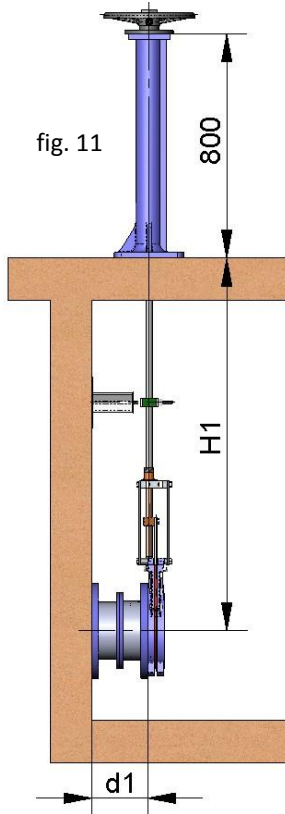
Epoxy coating:

All carbon steel or nodular cast-iron components and bodies of the CMO valves are EPOXY coated, giving the valves great resistance to corrosion and an excellent surface finish. CMO's standard colour is blue RAL-5015.



TYPES OF EXTENSION

When the valve needs to be operated from a distance, the following different types of actuators can be fitted:



1 - Extension: Floor Stand.

This extension is performed by coupling a spindle to the stem. By defining the length of the spindle, the desired extension is achieved. A floor stand is normally installed to support the actuator.

The definition variables are as follows:

H1: Distance from the valve shaft to the base of the stand.

d1: Separation from the wall to the end of the connecting flange.

Characteristics:

- It can be coupled to any type of actuator.
- A stem support-guide is recommended (fig. 12) every 1.5 m.
- The standard floor stand is 800 mm high (fig. 11). Other floor stand measurements available to order.
- A position indicator can be fitted to determine the valve's percentage of opening.
- Possibility of leaning floor stand (fig. 13).

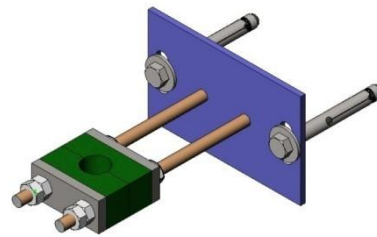


fig. 12

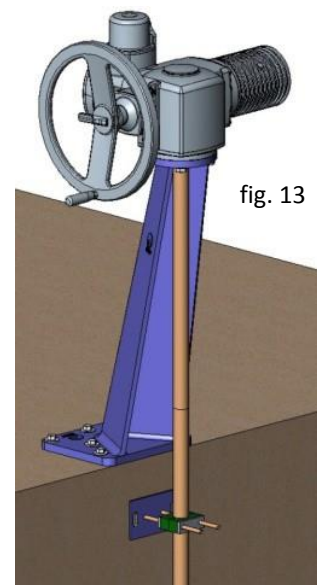
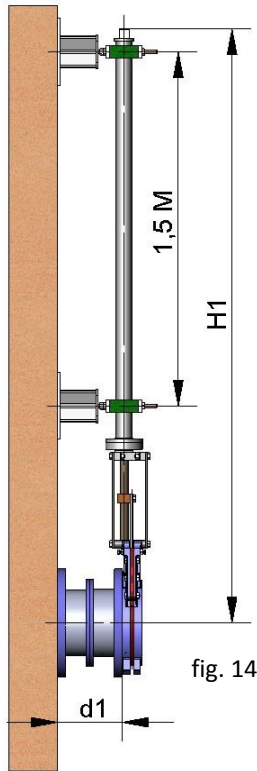


fig. 13

COMPONENTS LIST	
Component	Standard Version
Stem	AISI 303
Spindle	AISI 304
Guide-support	Carbon steel with EPOXI coating
Slide	Nylon
Floor Stand	GJS-500 with EPOXY coating

Table 3



2 - Extension: Pipe (fig. 14)

Consists of raising the actuator. The pipe will rotate with the wheel or key when the valve is operated, although this will always remain at the same height.

The definition variables are as follows:

H1: Distance from the valve shaft to the required height of the actuator.

d1: Separation from the wall to the end of the connecting flange.

Characteristics:

- Standard actuators: Handwheel and "Square Stem".
- A pipe support-guide is recommended every 1.5m.
- The standard materials are: EPOXY coated carbon steel or stainless steel.

fig. 14

3 - Extension: Extended Support Plates (fig. 15)

When a short extension is required, it can be achieved by extending the support plates. An intermediate yoke can be fitted to reinforce the support plates structure.

fig. 15

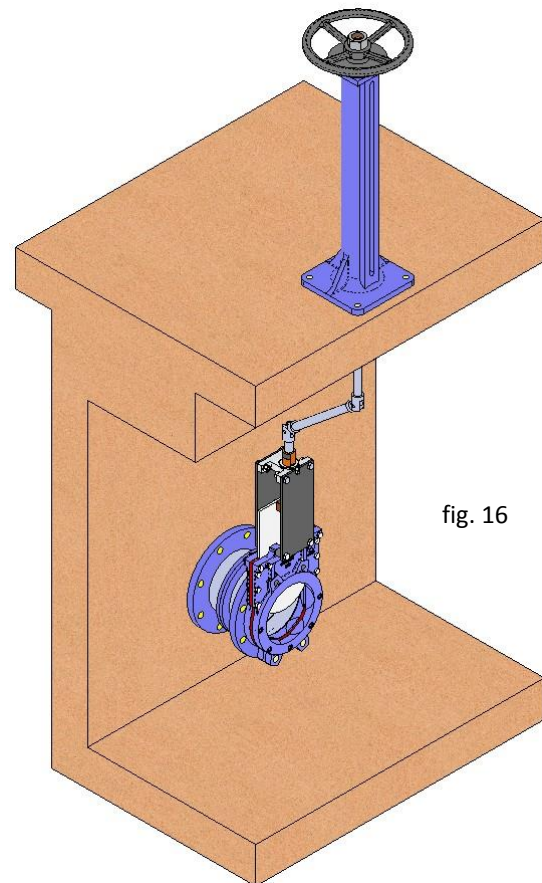
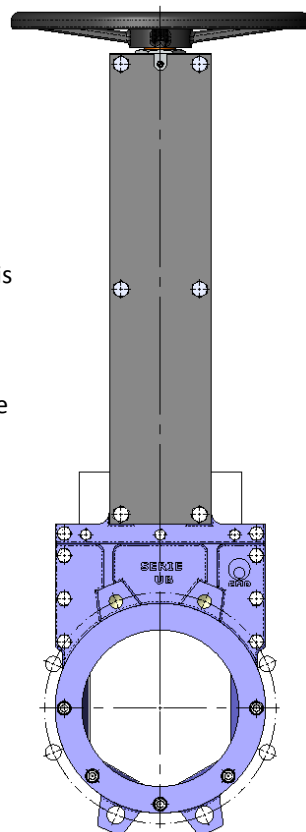


fig. 16

4 - Extension: Cardan joint (Fig.16)

If the valve and the actuator are not in correct alignment, the problem can be resolved by fitting a universal joint.

HANDWHEEL With Non-Rising Stem

- Suitable when no size limitations exist.
- B = max. width** of the valve (without actuator).
- D = max. height** of the valve (without actuator).

- Options:
 - Limiting switches.
 - Extensions: stand, pipe, plates,...
 - Square stem.

- Actuator comprising:
 - Handwheel.
 - Stem.
 - Nut.

- Available: DN50 to DN2000, other DN to order.
- From DN350 the actuator is with geared motor.

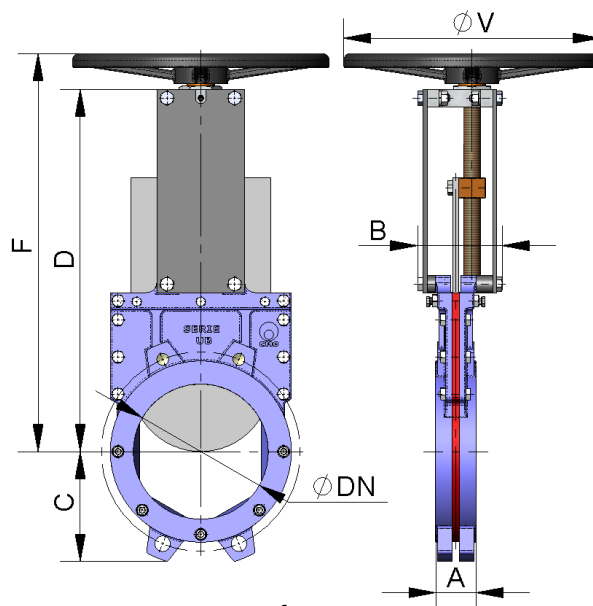


fig. 17

DN	ΔP (Kg/cm ²)	DRAW (Nw)	TORQUE (Nm)	A	B	C	D	F	ϕV
50	10	1,158	2.7	43	101	66	241	281	225
65	10	1,954	4.5	46	101	73	268	306	225
80	10	2,958	7	46	101	96	292	331	225
100	10	4,618	11	52	101	105	324	363	225
125	10	7,215	17	56	111	119	362	401	225
150	10	10,389	24	56	111	137	412	451	225
200	10	18,485	53	60	130	162	525	578	380
250	10	28,901	83	68	130	194	626	687	380
300	8	33,403	115	78	130	219	726	779	450
	10	41,666	143					779	450
350	8	45,578	157	78	320	251	882	--	--
	10	56,825	195					--	--
400	6	44,683	174	102	320	280	982	--	--
	10	74,249	288					--	--
450	6	56,694	220	114	320	306	1,082	--	--
	10	93,876	418					--	--
500	5	58,370	227	127	320	345	1,190	--	--
	10	116,248	636					--	--
600	5	84,360	376	154	320	403	1,385	--	--
	10	167,786	918					--	--

table 4

HANDWHEEL - CHAIN

- Widely used in raised installations with difficult access, the handwheel is fitted in vertical position.
- **B = max. width** of the valve (without actuator).
- **D = max. height** of the valve (without actuator).
- Options:
 - Limiting switches.
 - Extensions: stand, pipe, plates,...
- Actuator comprising:
 - Handwheel.
 - Stem.
 - Nut.
- Available: DN50 to DN600, other DN to order.
- From DN250 the actuator is with gears, see * in table.

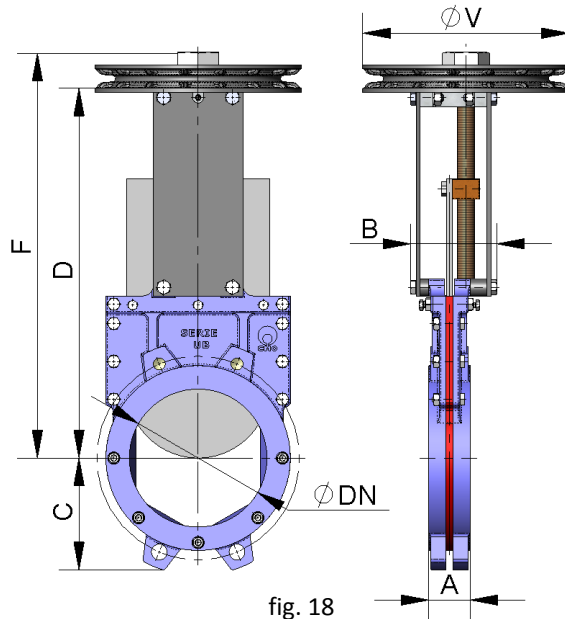


fig. 18

DN	ΔP (Kg/cm ²)	DRAW (Nw)	TORQUE (Nm)	A	B	C	D	F	ϕV
50	10	1,158	2.7	43	101	66	241	281	225
65	10	1,954	4.5	46	101	73	268	306	225
80	10	2,958	7	46	101	96	292	331	225
100	10	4,618	11	52	101	105	324	363	225
125	10	7,215	17	56	111	119	362	401	225
150	10	10,389	24	56	111	137	412	451	225
200	10	18,485	53	60	130	162	525	578	300
250	10	28,901	83	68	130	194	626	687	300
300	8	33,403	115	78	130	219	726	1,000	300*
	10	41,666	143					1,000	300*
350	8	45,578	157	78	320	251	882	1,156	300*
	10	56,825	195					1,207	402*
400	6	44,683	174	102	320	280	982	1,256	300*
	10	74,249	288					1,307	402*
450	6	56,694	220	114	320	306	1,082	1,356	300*
	10	93,876	418					1,407	402*
500	5	58,370	227	127	320	345	1,190	1,515	402*
	10	116,248	636					1,515	402*
600	5	84,360	376	154	320	403	1,385	1,728	402*
	10	167,786	918					1,862	402*

table 5

LEVER

- This is a fast actuator.
- **B = max. width** of the valve (without actuator).
- **B = max. height** of the valve (without actuator).
- The actuator includes:
 - Lever.
 - Spindle.
 - Guide bushing.
 - External limiting switches to maintain position.
- Available: DN50 to DN200, other DN to order.
- * Actuator designed to run at 2 Kg/cm² of differential pressure (DP).

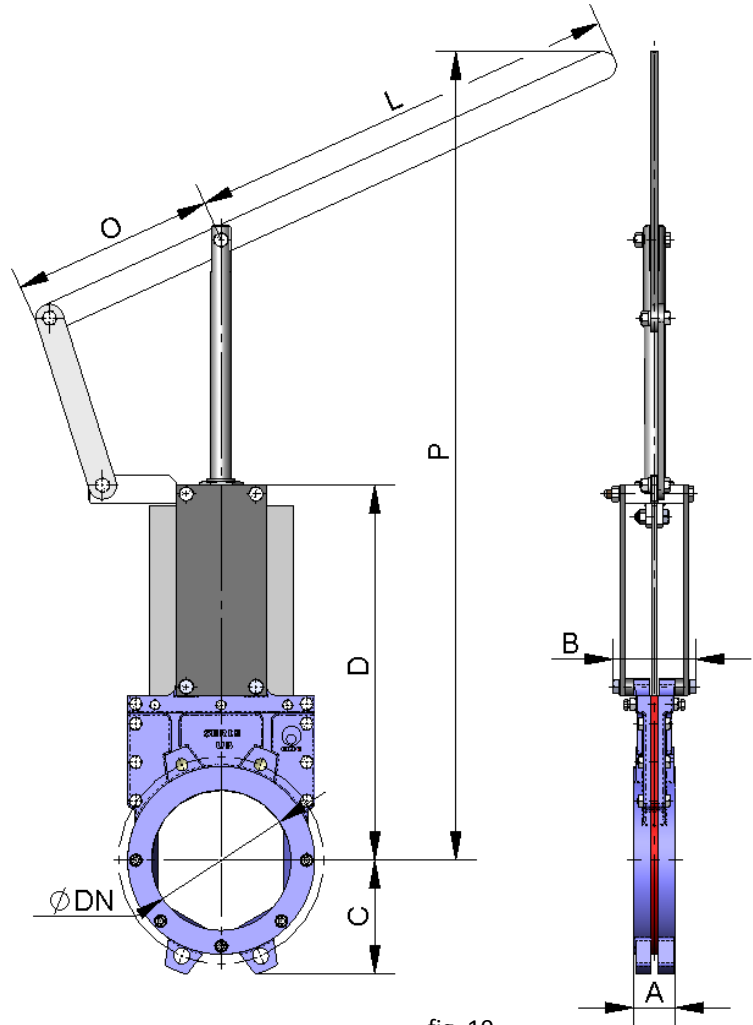


fig. 19

DN	ΔP (Kg/cm ²)	DRAW (Nw)	A	B	C	D	L	O	P
50	10*	241*	43	91	66	241	325	155	504
65	10*	406*	46	91	73	268	325	155	526
80	10*	613*	46	91	96	292	325	155	549
100	10*	954*	52	91	105	324	325	155	605
125	10*	1,494*	56	101	119	362	425	155	902
150	10*	2,151*	56	101	137	412	425	155	956
200	10*	3,832*	60	118	162	525	620	290	1,027

table 6

GEARED MOTOR

- This is recommended from DN 350.
- **B = max. width** of the valve (without actuator).
B = max. height of the valve (without actuator).
- Options:
 - Chainwheel.
 - Limiting switches.
 - Extensions: stand, pipe, plates,...
- Actuator comprising:
 - Stem.
 - Yoke.
 - Cone-shaped gear box.
 - Handwheel.
- Standard reduction ratio = 4 to 1.
- Available: DN 50 to DN 2000, other DN to order.

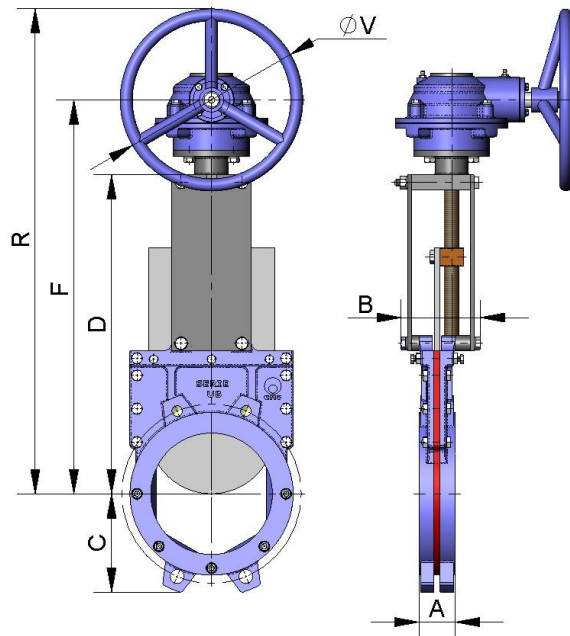


fig. 20

DN	ΔP (Kg/cm ²)	DRAW (Nw)	TORQUE (Nm)	A	B	C	D	F	R	ϕV
50	10	1,158	2.7	43	101	66	241	365	515	300
65	10	1,954	4.5	46	101	73	268	392	542	300
80	10	2,958	7	46	101	96	292	416	566	300
100	10	4,618	11	52	101	105	324	448	598	300
125	10	7,215	17	56	111	119	362	486	636	300
150	10	10,389	24	56	111	137	412	536	686	300
200	10	18,485	53	60	130	162	525	649	799	300
250	10	28,901	83	68	130	194	626	750	900	300
300	8	33,403	115	78	130	219	726	850	1,000	300
	10	41,666	143					850	1,000	300
350	8	45,578	157	78	320	251	882	1,006	1,156	300
	10	56,825	195					1,006	1,156	300
400	6	44,683	174	102	320	280	982	1,106	1,256	300
	10	74,249	288					1,106	1,331	450
450	6	56,694	220	114	320	306	1,082	1,206	1,356	300
	10	93,876	418					1,224	1,549	650
500	5	58,370	227	127	320	345	1,190	1,314	1,464	300
	10	116,248	636					1,466	1,616	300
600	5	84,360	376	154	320	403	1,385	1,527	1,752	450
	10	167,786	918					1,661	1,886	450

table 7

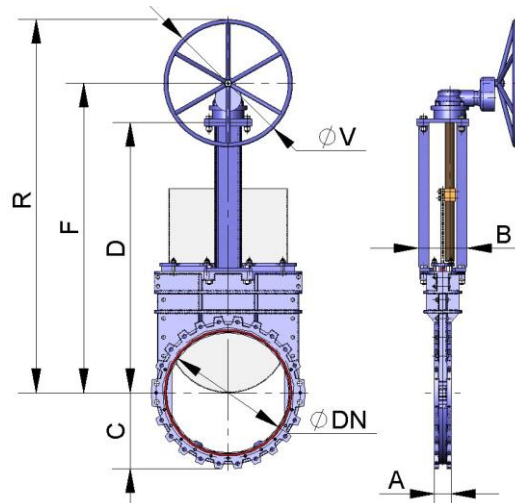


fig. 21

DN	ΔP (Kg/cm ²)	DRAW (Nw)	TORQUE (Nm)	A	B	C	D	F	R	ØV
700	2	46,782	209	165	320	446	1,524	1,648	1,798	300
	4	92,305	411					1,666	1,991	650
	6	137,829	754					1,800	2,025	450
	10	228,876	1,252					1,800	2,025	450
800	2	61,760	275	190	320	506	1,718	1,842	2,067	450
	4	121,216	663					1,994	2,219	450
	6	180,672	988					1,994	2,219	450
	10	299,675	1,639					1,994	2,319	650
900	2	78,134	428	203	320	560	1,950	2,112	2,437	650
	4	153,487	840					2,226	2,451	450
	6	229,618	1,256					2,226	2,451	450
	10	380,238	2,467					2,300	2,725	850
1,000	2	97,383	533	216	320	614	2,176	2,338	2,663	650
	4	190,370	1,235					2,472	2,797	650
	6	283,241	1,838					2,510	2,935	850
	10	469,120	3,044					2,546	2,971	850
1,200	2	140,617	913	254	350	726	2,653	2,949	3,174	450
	4	276,169	2,074					2,987	3,412	850
	6	411,746	3,092					2,987	3,487	1,000
	10	679,339	5,101					3,041	3,541	1,000
1,400	2	194,377	1,460	279	350	835	3,122	3,456	3,781	650
	4	379,113	3,187					3,492	3,917	850
	6	563,628	4,738					3,474	3,974	1,000
	10	930,624	7,823					3,510	4,010	1,000
1,600	2	256,528	2,157	318	390	960	3,780	4,150	4,575	850
	4	497,679	4,184					4,150	4,650	1,000
	6	738,863	6,211					4,168	4,668	1,000
1,800	2	327,616	3,128	356	440	1,060	4,250	4,602	5,027	850
	4	636,611	6,651					4,488	5,163	1,350
	6	941,308	9,834					4,488	5,163	1,350
2,000	2	410,600	3,921	406	480	1,165	4,550	4,902	5,402	1,000
	4	792,563	8,280					4,788	5,463	1,350
	6	1,169,540	12,218					4,788	5,463	1,350

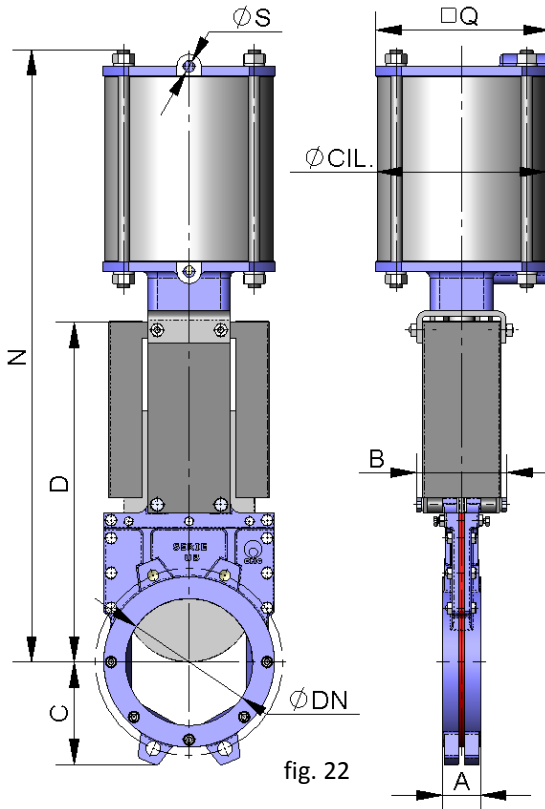
table 8

DOUBLE-ACTING PNEUMATIC CYLINDER

- The air supply pressure to the pneumatic cylinder is a minimum of 6 Kg/cm² and a maximum of 10 Kg/cm², the air must be dry and lubricated.
- 10 Kg/cm² is the maximum admissible air pressure. For air pressures below 6 Kg/cm², please check with CMO.
- For DN50 to DN150 valves, the cylinder's jacket and covers are made of aluminium, the spindle in AISI304, the piston of rubber-coated steel and the O-ring seals are made of nitrile.
- For valves over DN150 the covers are made of nodular cast iron or carbon steel.

To order, we can also supply the actuator made entirely of stainless steel, especially for installation in corrosive atmospheres.

- **B = max. width** of the valve (without actuator).
- **D = max. height** of the valve (without actuator).
- Available: DN50 to DN600, other DN to order.



DN	ΔP (Kg/cm ²)	DRAW (Nw)	A	B	C	D	N	Q	Ø CYL.	Ø SPINDLE.	S (B.S.P.)
50	10	1,158	43	101	66	241	417	90	80	20	1/4"
65	10	1,954	46	101	73	268	456	90	80	20	1/4"
80	10	2,958	46	101	96	292	498	110	100	20	1/4"
100	10	4,618	52	101	105	324	565	135	125	25	1/4"
125	10	7,215	56	111	119	362	634	170	160	30	1/4"
150	10	10,389	56	111	137	412	721	215	200	30	3/8"
200	10	18,485	60	130	162	525	965	270	250	40	3/8"
250	10	28,901	68	130	194	626	1,128	382	300	45	1/2"
300	8	33,403	78	130	219	726	1,296	444	350	45	1/2"
	10	41,666					1,296	444	350	45	1/2"
350	8	45,578	78	320	251	882	1,527	508	400	50	1/2"
	10	56,825					1,527	508	400	50	1/2"
400	6	44,683	102	320	280	982	1,652	444	350	45	1/2"
	10	74,249					1,674	552	450	50	3/4"
450	6	56,694	114	320	306	1,082	1,827	508	400	50	1/2"
	10	93,876					1,860	612	500	50	3/4"
500	5	58,370	127	320	345	1,190	1,985	508	400	50	3/4"
	10	116,248					2,028	715	585	60	1"
600	5	84,360	154	320	403	1,385	2,313	612	500	50	3/4"
	10	167,786					--	--	--	--	--

table 9

ELECTRIC ACTUATOR

- This actuator is automatic and includes the following parts:
 - Electric motor.
 - Stem.
 - Yoke.
- The electric motor includes:
 - Emergency manual handwheel.
 - Limit switches.
 - Torque limiters.
- Choice of different types and brands.
- ISO 5210 / DIN 3338 Flanges.
- Available: DN50 to DN 2000, other DN to order.
- From DN300 the motor is assisted with a gear box.

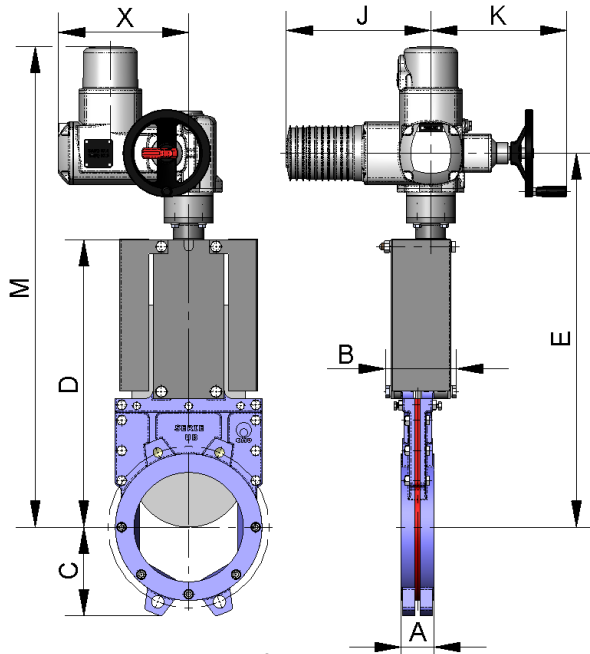


fig. 23

DN	ΔP (Kg/cm ²)	DRAW (Nw)	TORQUE (Nm)	A	B	C	D	E	J	K	M	X
50	10	1,158	2.7	43	101	66	241	399	265	249	609	238
65	10	1,954	4.5	46	101	73	268	426	265	249	636	238
80	10	2,958	7	46	101	96	292	450	265	249	660	238
100	10	4,618	11	52	101	105	324	482	265	249	692	238
125	10	7,215	17	56	111	119	362	520	265	249	730	238
150	10	10,389	24	56	111	137	412	570	265	249	780	238
200	10	18,485	53	60	130	162	525	683	265	249	893	238
250	10	28,901	83	68	130	194	626	796	283	254	1,006	248
300	8	33,403	115	78	130	219	726	810	265	249	912	422
	10	41,666	143					810	265	249	912	422
350	8	45,578	157	78	320	251	882	966	265	249	1,068	422
	10	56,825	195					966	265	249	1,068	422
400	6	44,683	174	102	320	280	982	1,066	265	249	1,168	422
	10	74,249	288					1,056	283	254	1,171	424
450	6	56,694	220	114	320	306	1,082	1,156	283	254	1,271	424
	10	93,876	418					1,174	283	254	1,289	453
500	5	58,370	227	127	320	345	1,190	1,264	283	254	1,379	424
	10	116,248	636					1,446	265	249	1,548	596
600	5	84,360	376	154	320	403	1,385	1,497	283	254	1,612	453
	10	167,786	918					1,631	283	254	1,746	598

table 10

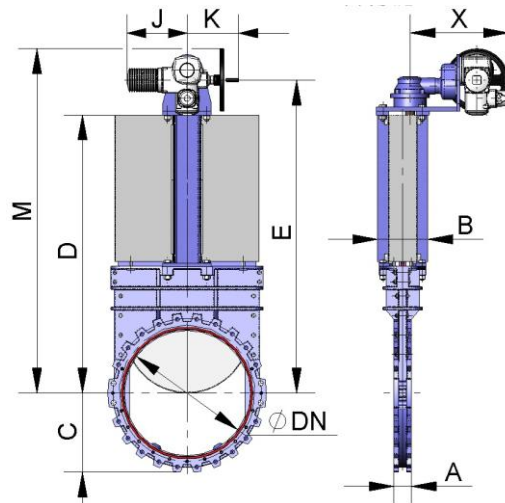


fig. 24

DN	ΔP (Kg/cm ²)	DRAW (Nw)	TORQUE (Nm)	A	B	C	D	E	J	K	M	X
700	2	46,782	209	165	320	446	1,524	1,568	265	249	1,670	422
	4	92,305	411					1,576	283	254	1,691	453
	6	137,829	754					1,720	265	249	1,822	596
	10	228,876	1,252					1,710	283	254	1,825	598
800	2	61,760	275	190	320	506	1,718	1,752	283	254	1,867	424
	4	121,216	663					1,914	265	249	2,016	596
	6	180,672	988					1,904	283	254	2,019	598
	10	299,675	1,639					1,887	389	336	2,045	624
900	2	78,134	428	203	320	560	1,950	1,985	389	336	2,143	479
	4	153,487	840					2,136	283	254	2,251	598
	6	229,618	1,256					2,136	283	254	2,251	598
	10	380,238	2,467					2,193	389	336	2,351	653
1,000	2	97,383	533	216	320	614	2,176	2,211	389	336	2,369	479
	4	190,370	1,235					2,362	283	254	2,477	598
	6	283,241	1,838					2,383	389	336	2,541	653
	10	469,120	3,044					2,419	389	336	2,577	653
1,200	2	140,617	913	254	350	726	2,653	2,839	283	254	2,954	598
	4	276,169	2,074					2,860	389	336	3,018	653
	6	411,746	3,092					2,860	389	336	3,018	653
	10	679,339	5,101					2,878	389	339	3,078	721
1,400	2	194,377	1,460	279	350	835	3,122	3,346	283	254	3,461	627
	4	379,113	3,187					3,365	389	336	3,523	653
	6	563,628	4,738					3,347	389	339	3,547	721
	10	930,624	7,823					3,347	389	339	3,547	721
1,600	2	256,528	2,157	318	390	960	3,780	4,040	283	254	4,155	627
	4	497,679	4,184					4,023	389	336	4,181	653
	6	738,863	6,211					4,005	389	339	4,205	721
1,800	2	327,616	3,128	356	440	1,060	4,250	4,475	389	336	4,633	721
	4	636,611	6,651					4,361	389	336	4,519	853
	6	941,308	9,834					4,361	389	336	4,519	853
2,000	2	410,600	3,921	406	480	1,165	4,550	4,775	389	336	4,933	721
	4	792,563	8,280					4,661	389	339	4,861	853
	6	1,169,540	12,218					4,661	389	339	4,861	853

table 11

HYDRAULIC ACTUATOR (Oil pressure: 135 Kg/cm²)

- **B = max. width** of the valve (without actuator).
- **D = max. height** of the valve (without actuator).
- The hydraulic actuator includes:
 - Hydraulic cylinder.
 - Yoke.
- Available: DN50 to DN 2000, other DN to order.
- Different types and brands available according to customer's requirements.

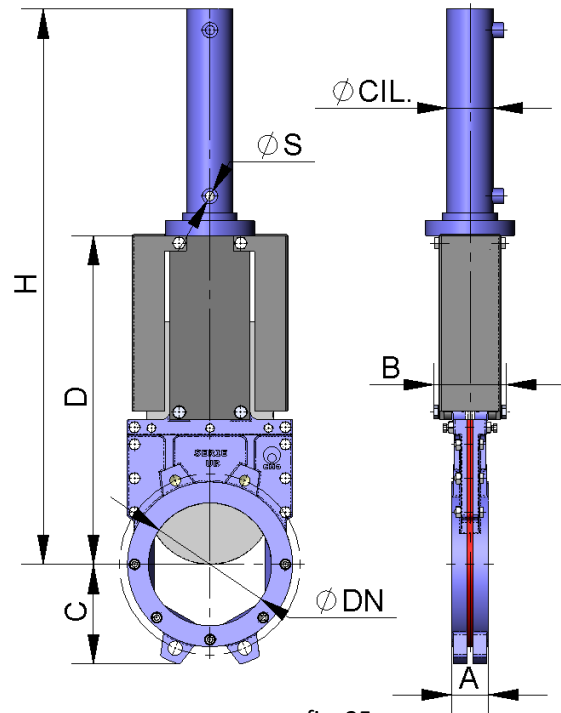
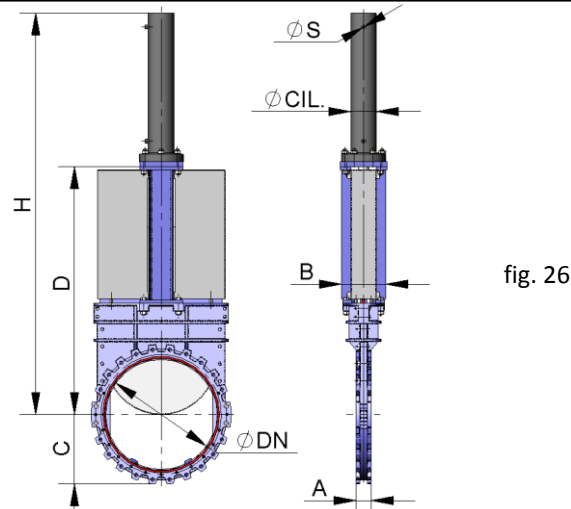


fig. 25

DN	ΔP (Kg/cm ²)	DRAW (Nw)	A	B	C	D	H	Ø CYL.	Ø SPINDLE.	S (B.S.P.)	Oil Cap. (dm ³)
50	10	1,158	43	101	66	241	435	25	18	3/8"	0.03
65	10	1,954	46	101	73	268	477	25	18	3/8"	0.04
80	10	2,958	46	101	96	292	529	32	22	3/8"	0.08
100	10	4,618	52	101	105	324	582	32	22	3/8"	0.09
125	10	7,215	56	111	119	362	653	40	28	3/8"	0.18
150	10	10,389	56	111	137	412	738	50	28	3/8"	0.33
200	10	18,485	60	130	162	525	924	63	36	3/8"	0.69
250	10	28,901	68	130	194	626	1,086	80	36	3/8"	1.36
300	8	33,403	78	130	219	726	1,236	80	36	3/8"	1.61
	10	41,666					1,236	80	36	3/8"	1.61
350	8	45,578	78	320	251	882	1,442	80	36	3/8"	1.86
	10	56,825					1,463	100	45	1/2"	2.91
400	6	44,683	102	320	280	982	1,592	80	36	3/8"	2.11
	10	74,249					1,613	100	45	1/2"	3.30
450	6	56,694	114	320	306	1,082	1,768	100	45	1/2"	3.69
	10	93,876					1,783	125	56	1/2"	5.77
500	5	58,370	127	320	345	1,190	1,937	100	56	1/2"	4.12
	10	116,248					1,946	125	56	1/2"	6.38
600	5	84,360	154	320	403	1,385	2,241	125	56	1/2"	7.61
	10	167,786					2,293	160	70	1/2"	12.47

table 12



DN	ΔP (Kg/cm ²)	DRAW (Nw)	A	B	C	D	H	\varnothing CYL.	\varnothing SPINDLE.	S (B.S.P.)	Oil Cap. (dm ³)
700	2	46,782	165	320	446	1,524	2,432	100	45	1/2"	5.69
	4	92,305					2,447	125	56	1/2"	8.90
	6	137,829					2,476	140	56	1/2"	11.16
	10	228,876					2,541	200	90	1/2"	22.78
800	2	61,760	190	320	506	1,718	2,726	100	45	1/2"	6.48
	4	121,216					2,770	140	56	1/2"	12.70
	6	180,672					2,793	160	70	1/2"	16.59
	10	299,675					2,835	200	90	1/2"	25.92
900	2	78,134	203	320	560	1,950	3,078	125	56	1/2"	11.35
	4	153,487					3,107	140	56	1/2"	14.24
	6	229,618					3,172	200	90	1/2"	29.06
	10	380,238					3,190	220	90	1/2"	35.16
1,000	2	97,383	216	320	614	2,176	3,459	125	56	1/2"	12.64
	4	190,370					3,511	160	70	1/2"	20.71
	6	283,241					3,553	200	90	1/2"	32.36
	10	469,120					3,594	250	90	1/2"	50.56
1,200	2	140,617	254	350	726	2,653	4,188	160	70	1/2"	24.73
	4	276,169					4,230	200	90	1/2"	38.64
	6	411,746					4,271	250	90	1/2"	60.38
	10	679,339					4,305	320	110	1/2"	98.92
1,400	2	194,377	279	350	835	3,122	4,855	160	70	1/2"	28.75
	4	379,113					4,917	220	90	1/2"	54.36
	6	563,628					4,972	320	110	1/2"	115.01
	10	930,624					5,010	350	110	1/2"	137.58
1,600	2	256,528	318	390	960	3,780	5,765	200	90	1/2"	51.21
	4	497,679					5,807	250	90	1/2"	80.01
	6	738,863					5,900	320	110	1/2"	131.09
1,800	2	327,616	356	440	1,060	4,250	6,470	220	90	1/2"	69.56
	4	636,611					6,585	320	110	1/2"	147.18
	6	941,308					6,625	350	110	1/2"	182.8
2,000	2	410,600	406	480	1,165	4,550	6,992	250	90	1/2"	99.89
	4	792,563					7,085	320	110	1/2"	147.18
	6	1,169,540					7,150	350	110	1/2"	202.04

table 13

INFORMATION ON FLANGE DIMENSIONS
EN 1092-2 PN10

DN	ΔP (Kg/cm ²)	Qty.		Metric	P	$\varnothing K$			
		●	○						
50	10	2	2	M 16	9	125			
65	10	2	2	M 16	9	145			
80	10	2	6	M 16	11	160			
100	10	2	6	M 16	12	180			
125	10	2	6	M 16	12	210			
150	10	2	6	M 20	14	240			
200	10	2	6	M 20	14	295			
250	10	4	8	M 20	14	350			
300	8	4	8	M 20	14	400			
350	8	6	10	M 20	20	460			
400	6	6	10	M 24	21	515			
450	6	8	12	M 24	22	565			
500	5	8	12	M 24	22	620			
600	5	8	12	M 27	22	725			
700	2	4	6	10	20	4	M 27	23	840
800	2	4	6	10	20	4	M 30	23	950
900	2	4	6	10	24	4	M 30	23	1,050
1,000	2	4	6	10	24	4	M 33	23	1,160
1,200	2	4	6	10	28	4	M 36	30	1,380
1,400	2	4	6	10	32	4	M 39	30	1,590
1,600	2	4	6	36	4	M 45	35	1,820	
1,800	2	4	6	40	4	M 45	35	2,020	
2,000	2	4	6	44	4	M 45	40	2,230	

table 14

ANSI B16, class 150

ND	ΔP (Kg/cm ²)	Qty.		R UNC	P	$\varnothing K$			
		●	○						
2"	10	2	2	5/8"	9	120.6			
2 1/2"	10	2	2	5/8"	9	139.7			
3"	10	2	2	5/8"	11	152.4			
4"	10	2	6	5/8"	12	190.5			
5"	10	2	6	3/4"	12	215.9			
6"	10	2	6	3/4"	14	241.3			
8"	10	2	6	3/4"	14	298.4			
10"	10	4	8	7/8"	14	361.9			
12"	8	4	8	7/8"	14	431.8			
14"	8	4	8	1"	20	476.2			
16"	6	6	10	1"	21	539.7			
18"	6	6	10	1 1/8"	22	577.8			
20"	5	8	12	1 1/8"	22	635			
24"	5	8	12	1 1/4"	22	749.3			
28"	2	4	6	10	24	4	1 1/4"	23	863.6
32"	2	4	6	10	24	4	1 1/2"	23	977.9
36"	2	4	6	10	28	4	1 1/2"	23	1,085.9
40"	2	4	6	10	32	4	1 1/2"	23	1,200.2
48"	2	4	6	10	40	4	1 1/2"	30	1,422.4
56"	2	4	6	10	44	4	1 3/4"	30	1,651

table 15

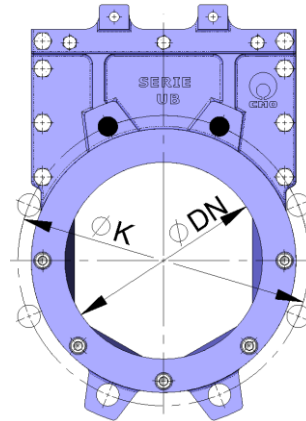

DN50 - 600

fig. 27

● BLIND TAPPED HOLE

○ THROUGH HOLE

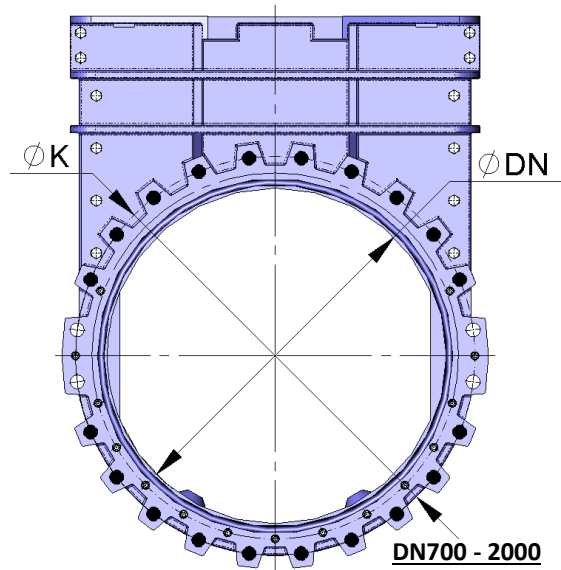

DN700 - 2000

fig. 28

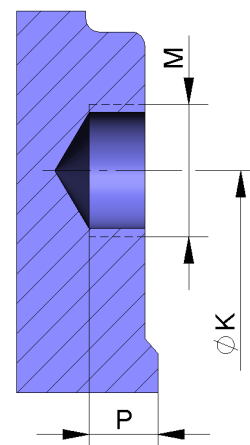


fig. 29