

# FK



## UNIDIRECTIONAL KNIFE GATE VALVE - WAFER DESIGN

### DESCRIPTION

- Unidirectional wafer knife gate valve with wafer design.
- One-piece cast body with guides to support gate and seat wedges.
- Provides high flow rates with low pressure drop.
- Various seat and packing materials available.
- Face-to-face dimension in accordance with **CMO Valves** standard.
- It has an arrow on the body indicating the flow direction

### GENERAL APPLICATIONS

This knife gate valve is suitable for working with dry products like powder and grain. It is generally used for gravity discharge of dry solids.

- Mining
- Silo emptying
- Electrical power stations
- Chemical plants
- Food Industry

### SIZES

DN50 to DN1200

*\* Others larger sizes on request*

### WORKING PRESSURE ( $\Delta P$ )

DN50 - DN250	10 bar
DN300 - DN400	6 bar
DN450	5 bar
DN500 - DN600	4 bar
DN700 - DN1200	3 bar

This valve is usually mounted under a hopper, to prevent any kind of solids accumulating on the seat, the valve has a special body design and it is assembled with the body arrow in the same direction as the fluid.

The design of the **FK valve** seat is the same as for the **A** valve, but the pressures vary to those working the valves.

### STANDARD FLANGES

- EN1092 PN10.
- ASME B16.5 (class 150).

### OTHER COMMON FLANGES

- PN6.
- PN16.
- PN25.
- BS "D" y "E".
- JIS10K.

*\* Others on request.*

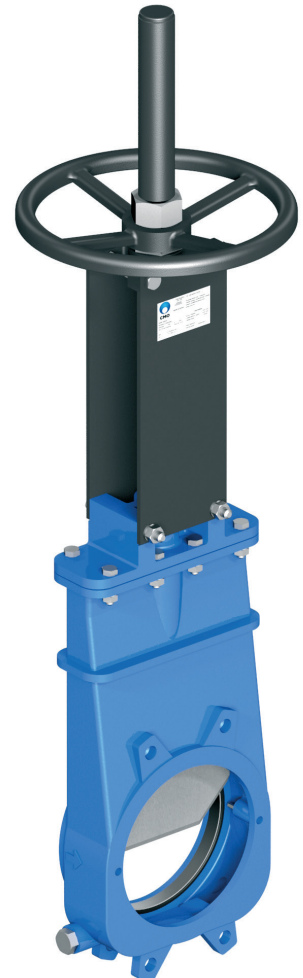


Fig. 1

### APPLICATION OF EUROPEAN DIRECTIVES

See document of European Directives applicable to **CMO Valves**.

*\* For category and zone information, contact technical-commercial department at **CMO Valves**.*

### QUALITY DOSSIER

All valves are tested hydrostatically at **CMO Valves** and material and test certificates can be provided.

- Body test = working pressure x 1.5
- Seat test = working pressure x 1.1

## ADVANTAGES

When a knife gate valve remains open for long periods of time and the body's internal walls are parallel a very large torque is usually required to close it. However, the inside of the body of model **FK** is cone-shaped, which provides greater space and, this way, when the valve is closed the solids stored inside it can be easily removed.

The **FK** valve is unidirectional and an arrow is marked on the body indicating the flow direction.

The stem protection hood is independent from the handwheel securing nut, this means the hood can be disassembled without the need to release the handwheel. This advantage allows regular maintenance operations to be performed, such as lubricating the stem, etc.

The stem on the **CMO Valves** is made of AISI304 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 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 is 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 upper and lower pneumatic actuator covers are manufactured in aluminium, and nodular cast iron for Ø cylinder > 250 mm, meaning shock resistance is high. This characteristic is essential in pneumatic actuators.

The pneumatic cylinder's o-ring seals are commercial products and can be purchased worldwide. This means it is not necessary to contact **CMO Valves** every time a seal is required.

### STANDARD COMPONENTS LIST

COMPONENT	NODULAR IRON	ST. STEEL
1 BODY	GJS500-7	CF8M
2 THROUGH CONDUIT	AISI304	AISI316
3 COVER	GJS500-7	CF8M
4 SEAT SEAL	CARTON	
5 BUSHING	PA6	
6 STOP WASHER	AISI304	AISI316
7 INTERIOR O-RING SEAL	NITRILO	
8 EXTERIOR O-RING SEAL		
9 SEAT	PA6	
10 THROUGH CONDUIT STOPPER	F-111+BRONZE	AISI316+BRONZE
11 SUPPORT	S275JR	
12 SCREW	5.6 ZINC	A-2
13 WASHER	ST ZINC	A-2
14 NUT	5.6 ZINC	A-2
15 SCREW	5.6 ZINC	A-4
16 WASHER	ST ZINC	A-4
17 NUT	5.6 ZINC	A-4
18 THREADED CAP	A-2	A-4
19 SEAL	EPDM	
20 RING	AISI316	

Table 1

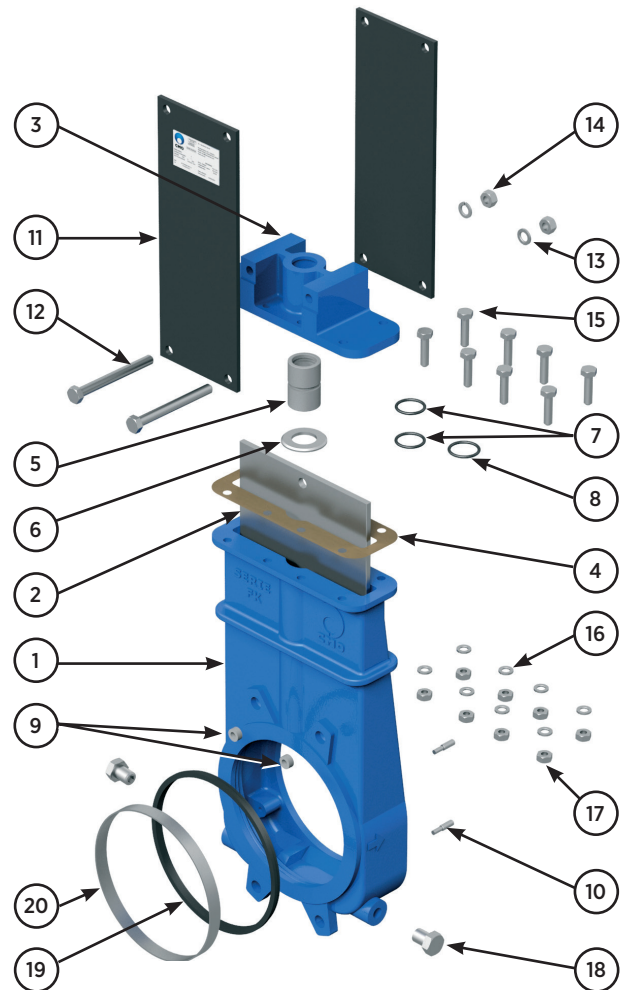


Fig. 2

## DESIGN CHARACTERISTICS

### 1. BODY

- Unidirectional wafer-design knife gate valve. One-piece cast body with guides to support gate and seat wedges.
- For diameters greater than DN1200 the body is machine-welded with the necessary reinforcements to resist the maximum working pressure.
- Full port designed to provide high flow rates with low pressure drop.
- The body's internal design prevents any build up of solids in the seat area.
- The standard manufacturing materials are GJS500-7 castiron and CF8M stainless steel.
- Other materials, such as GJS500-7 nodular cast iron, A216WCB carbon steel and stainless steel alloys (AISI316Ti, Duplex, 254SMO, Uranus B6...) are available on request.
- As standard, iron or carbon steel valves are painted with an anti-corrosive protection of 80 microns of EPOXY (colour RAL 5015). Other types of anti-corrosive protections are available on request.

### 2. GATE

The standard manufacturing materials are AISI304 stainless steel in valves with iron body and AISI316 stainless steel in valves with CF8M body. Other materials or combinations can be supplied on request.

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

### STEM NUT

#### EPDM

This is the standard resilient seat 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 it provides the valve with 100% watertight integrity.

#### NITRILE

It is used in fluids containing fats or oils at temperatures no higher than 90°C\*. It provides the valve with 100% watertight integrity.

#### FKM

Suitable for corrosive applications and continuous high temperatures of up to 190°C and peaks of 210°C. It provides the valve with 100% watertight integrity.

#### SILICONE

Mainly used in the food industry and for pharmaceutical products with temperatures no higher than 200°C. It provides the valve with 100% watertight integrity.

#### PTFE

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

### 3. SEAT

Six types of seats are available according to the working application:

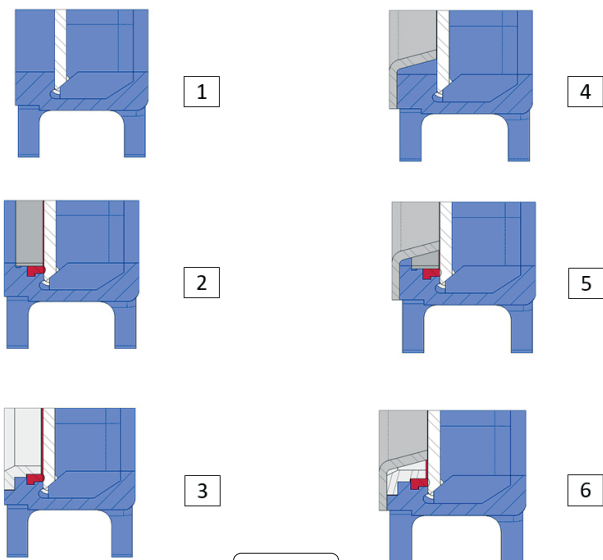


Fig. 3

#### SEAT 1

##### Metal / metal seat.

This type of seat does not include any kind of resilient seat and the estimated leakage (considering water as the test fluid) is 1.5% of the pipe flow.

#### SEAT 2

##### Standard soft-seated valve.

This type of seat includes a resilient seat which is fixed to the inside of the body via an AISI316 stainless steel retaining ring.

#### SEAT 3

##### Soft-seated valve with reinforced socket

Soft-seated valve with reinforced socket. This type of seat includes a resilient seat which is fixed to the inside of the body via a reinforced retaining ring with two functions (to protect the valve from abrasion and clean the gate when working with solids that can stick to it).

#### SEAT 4, 5 and 6

The same as seats 1, 2 and 3 but including a deflector. The deflector is a cone-shaped ring located at the valve's entrance with two functions (to protect the valve from abrasion and guide the flow to the centre of the valve).

**Nota:** Three materials are available for the reinforced socket and the deflector: Steel CA-15, CF8M and Ni-hard.

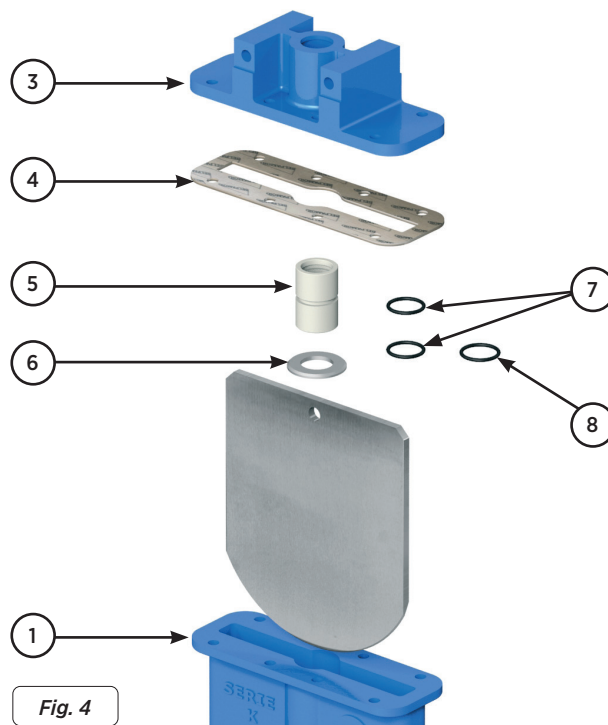
## 4. PACKING

The gasket is the area of the valve where the greatest sealtight integrity must be reached to avoid leakages to the atmosphere, in the **CMO Valves FK models**, this area is between the body bonnet and the rod. There are two types of gasket:

### BUSHING WITH SEALING JOINTS:

This type of seal (Fig.4) achieves sealtightness by way of nylon bushing located between the body and the rod. This bushing (5) is introduced inside the cover (3), until it comes up against the protrusion in the upper section, whilst a washer is located on the lower section; this becomes trapped when fastening the cover (3) and the body (1), preventing the bushing from moving. This bushing has two interior O-rings (7) to guarantee sealtightness between the rod and the bushing (5), and an exterior O-ring (8) to guarantee the absence of leakages between the bushing and the body cover (3). This system is recommended for valves that operate with liquids. See table 2 for the different types of seal materials.

**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.



### 1. GREASED COTTON

#### (Recommended for hydraulic services)

This packing 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.

### 2. DRY COTTON

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

### 3. SYNTHETIC + PTFE

This packing 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.

### 4. GRAPHITE

This packing is composed of high-purity graphite fibres. A diagonal braiding system is used and it 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.

### 5. CERAMIC FIBRE

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

### 6. COTTON + PTFE

This packing 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.

SEATS / SEALS			PACKING			
MATERIAL	T° MÁX (°C)	APLICACIONES	MATERIAL	P(Bar)	T°. MÁX	pH
Steel/Steel	>250°C	High temp./Low watertight integ	Greased cotton	10	100°C	6-8
EPDM (E)	90 *°C	Non-mineral acids and oils	Dry cotton	0,5	100°C	6-8
Nitrile (N)	90 *°C	Hydrocarbons, oils and greases	Cotton + PTFE	30	120°C	6-8
FKM (V)	200°C	Hydrocarbons and solvents	Synthetic + PTFE	100	-200+270°C	0-14
Silicone (S)	200°C	Food Products	Graphite	40	650°C	0-14
PTFE (T)	250°C	Corrosion resistant	Ceramic Fibre	0,3	1400°C	0-14

**Note:** More details and other materials on request \* EPDM and Nitrile: it is possible up to T<sup>a</sup> Max: 120°C on request

Table 2

## 5. STEM

The stem on the **CMO Valves** valve is made of AISI 304 stainless steel. This characteristic provides high resistance and excellent corrosion-resistant properties. The valve design can be rising stem or non-rising stem. When rising stem is required a stem hood is supplied to protect the stem from contact with dust and dirt, as well as keeping it lubricated.

## 6. PACKING GLAND

The packing gland allows uniform force and pressure to be applied to the packing to ensure watertight integrity. As standard, valves with cast iron body include GJS500-7 packing glands, whilst valves with stainless steel body have CF8M packing glands.

## 7. ACTUATORS

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

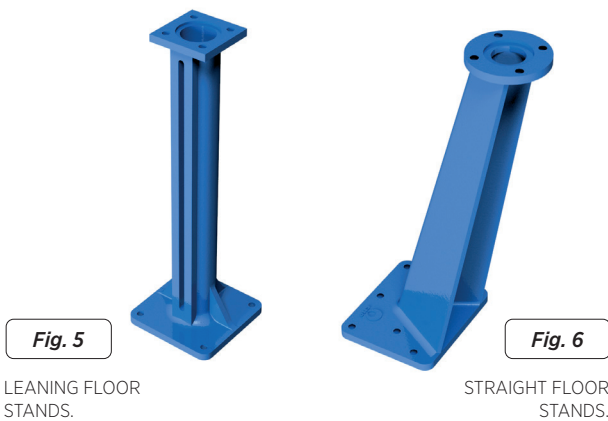
Manual Drives
Handwheel (*)
Chain handwheel (*)
Lever
Geared motor (*)
Others (square stem)

Availability of Accessories
Mechanical stoppers
Locking devices
Emergency manual drives
Electrovalves
Positioners
Limit switches
Proximity detectors
Straight floor stand (fig. 4)
Leaning floor stand (fig. 5)

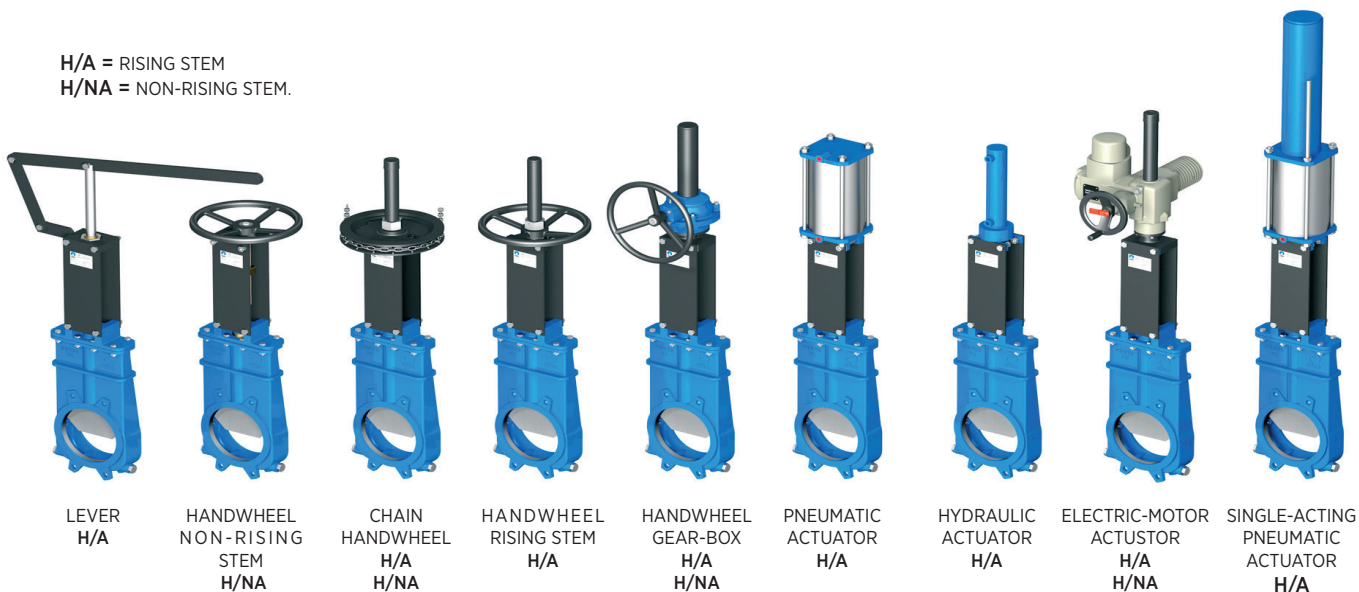
Automatic Drives
Electric actuator (*)
D/E & S/E pneumatic cylinder
Hydraulic cylinder

(\*) Available in rising and non-rising stem versions.



Stem extensions have also been developed, allowing the drive to be located far away from the valve, to suit all needs. Please ask our engineers beforehand.

H/A = RISING STEM  
H/NA = NON-RISING STEM.



**Fig. 7**

## ACCESSORIES AND OPTIONS

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

### MIRROR POLISHED GATE

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

### PTFE LINED GATE

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

### STELLITED GATE

Stellite is added to the gate's lower edge to protect it from abrasion.

### SCRAPER IN THE PACKING

Its function is to clean the gate during the opening movement and prevent possible damage to the packing.

### AIR INJECTION IN THE PACKING GLAND

By injecting air in the packing, an air chamber is created which improves the watertight integrity.

### HEATING JACKET

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.

### DRIVE OR YOKE SUPPORT

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

### MECHANICAL LIMIT SWITCHES, INDUCTIVE SWITCHES AND POSITIONERS

Limit switches or inductive switches are installed to indicate precise valve position, as well as positioners to indicate continuous position.

### SOLENOID VALVES

For air distribution to pneumatic actuators.

### CONNECTION BOXES, WIRING AND PNEUMATIC PIPING

Fully assembled units can be supplied with all the necessary accessories.

### MECHANICAL STROKE LIMITING STOP (MECHANICAL STOPPERS):

These allow the stroke to be mechanically adjusted, limiting the valve run.

### MECHANICAL LOCKING DEVICE:

Allows the valve to be mechanically locked in a fixed position.

### EMERGENCY MANUAL ACTUATOR (HAND WHEEL /GEAR BOX)

Allows manual operation of the valve in the event of power or air failure.

### FLUSHING HOLES IN BODY

Several holes can be drilled in the body to flush air, steam or other fluids out in order to clean the valve seat before sealing.

### TRIANGULAR (V-NOTCH) AND PENTAGONAL DIAPHRAGM WITH INDICATION RULE

Recommended for applications in which flow regulation is required. Allows flow control according to the valve's opening percentage.

### INTERCHANGEABLE ACTUATORS

All actuators are easily interchangeable, except the lever.

### RECUBRIMIENTO DE EPOXI

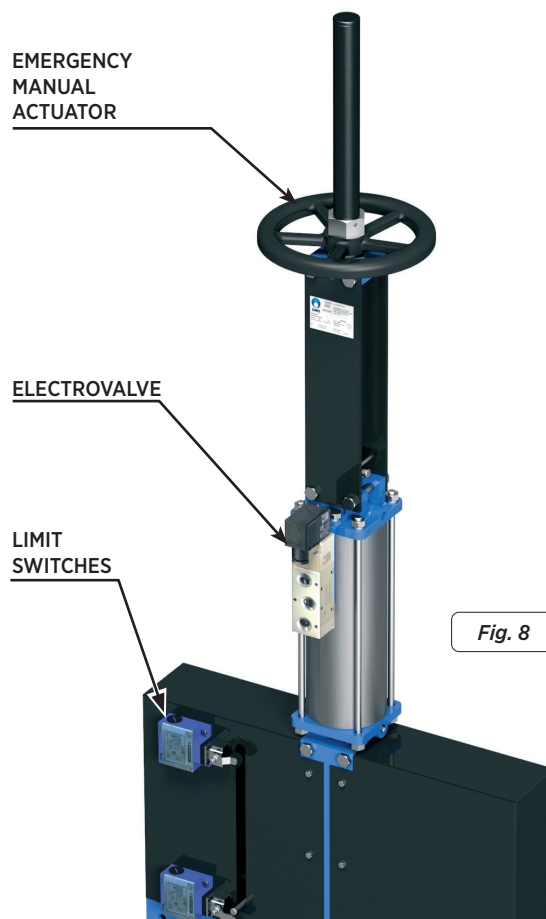
All cast iron and carbon steel bodies and components on **CMO Valves** are EPOXY coated, giving the valves great resistance to corrosion and an excellent finish. **CMO Valves**'s standard colour is blue, RAL-5015.

### GATE SAFETY PROTECTION

In accordance with European Safety Standards ("EC" marking), **CMO Valves** automated valves are equipped with gate guards, to prevent any objects from being accidentally caught in the gate.

### BONNET

Provides total seal-tightness to the outside, reducing the packing maintenance required.



## TYPES OF EXTENSIONS

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

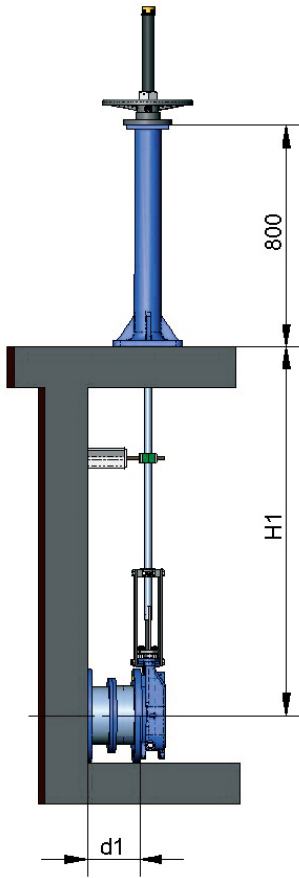


Fig. 9

STANDARD OPERATION STAND.

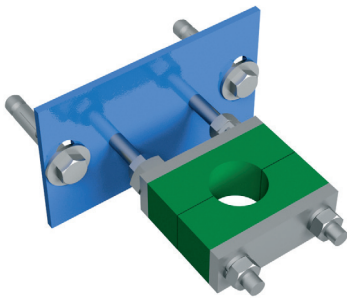


Fig. 10

STEM GUIDE BRACKET

### COMPONENT LIST

COMPONENT	STANDARD VERSION
Stem	AISI 304
Rod	AISI 304
Support-Guide	Carbon steel with EPOXY coating
Guide	PA6
Stand	GJS500-7 with EPOXY coating

Table 3

### 1- FLOOR STAND

This extension is done by coupling a spindle to the stem. The desired extension is achieved by defining the length of the spindle. A floor stand is normally installed to support the drive.

The definition variables are as follows:

**H1** = Distance from valve centre to 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 drive.
- We recommend a stem guide bracket every 1.5 m
- The standard floor stand is 800 mm high.
- Option to use a position indicator to determine the valve's percentage of opening.
- Leaning stand available to order
- Other floor stand measurements available on request.



LEANING STAND.

Fig. 11

## 2.- PIPE

This consists of raising the drive. The pipe will rotate in the same direction as the wheel when the valve is operated. The valve always remains at the same height.

The definition variables are as follows:

**H1** = Distance from valve centre to base of the stand

**d1** = Separation from the wall to the end of the connecting flange

### CHARACTERISTICS:

- Standard drives: handwheel and top square.
- A pipe guide bracket is recommended every 1.5 m.
- The standard materials are: EPOXY-coated carbon steel and stainless steel.

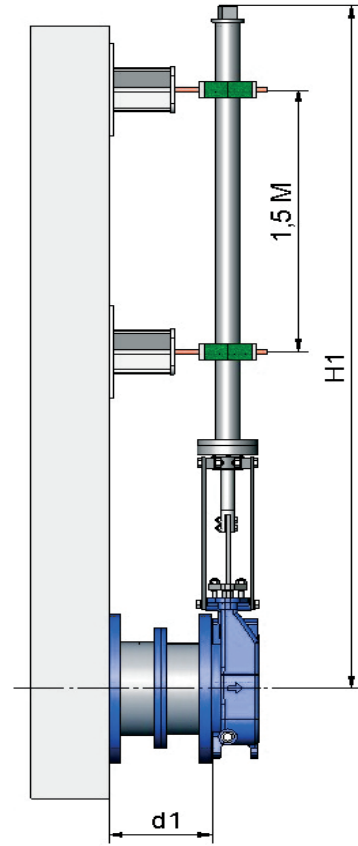


Fig. 12

## 3.- ELONGATED SUPPORT PLATES

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.

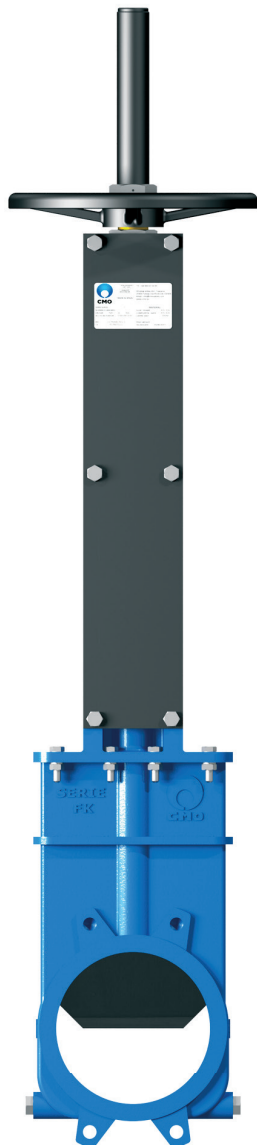


Fig. 13

## 4.- CARDAN JOINT

If the valve and the drive are not in correct alignment, the problem can be resolved by fitting a universal cardan joint. This option is only valid for non-rising stem drives.



Fig. 14



## HANDWHEEL WITH RISING STEM

The definition variables are as follows:

**B = Max. width** of the valve (without drive).

**D = Max. height** of the valve (without drive).

### OPTIONS:

- Locking devices.
- Extensions: stand, pipe, plates.
- DN above those given in the table

### ACTUATOR:

- Handwheel
- Stem
- Nut
- Stem protection hood.

### AVAILABLE:

- Standard NDN50 to DN1200
- From ND600 the actuator is with geared motor.

\* Other ND on request.

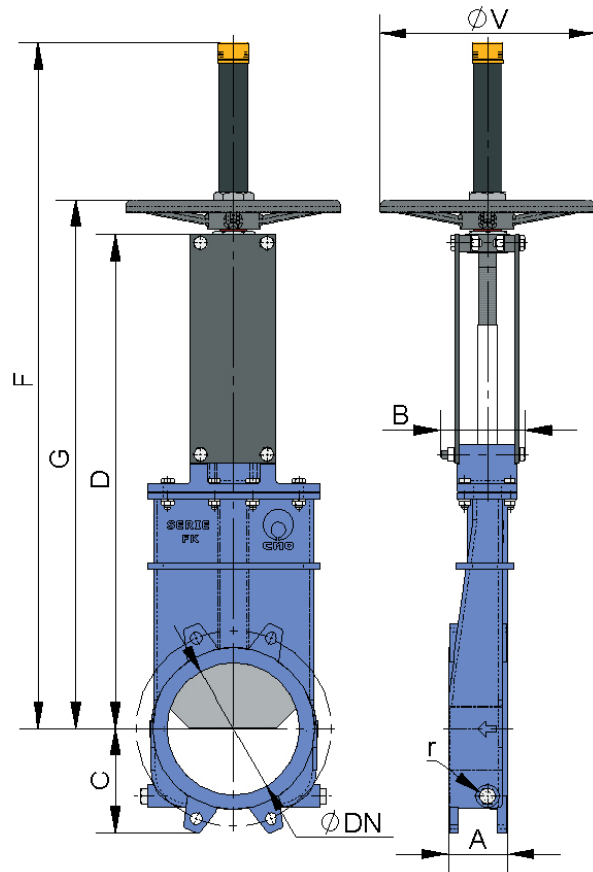


Fig. 15

DN	ΔP (bar)	A	B	C	D	F	G	øV	r (B.S.P.)
50	10	60	91	61	323	492	362	225	1/4"
65	10	60	91	68	362	531	401	225	1/4"
80	10	64	91	91	404	573	443	225	1/4"
100	10	64	91	104	453	622	492	225	1/4"
125	10	70	101	118	511	730	550	225	3/8"
150	10	76	101	130	574	793	613	225	3/8"
200	10	89	118	158	745	1036	798	325	3/8"
250	10	114	118	196	880	1271	933	325	1/2"
300	6	114	118	230	1005	1396	1058	380	1/2"
350	6	127	290	255	1141	1681	1250	450	1/2"
400	6	140	290	290	1266	1806	1375	450	1/2"
450	4	152	290	306	1393	2033	1502	450	1/2"
500	4	152	290	340	1529	2169	1638	450	1/2"
600	4	178	290	398	1782	2522	1891	450	1/2"
700	3	178	320	453	2105	2967	2217	--	1/2"
800	3	178	320	503	2376	3338	2488	--	1/2"
900	3	178	320	583	2655	3717	2767	--	1/2"
1000	3	178	320	613	2935	4097	3047	--	1/2"
1200	3	203	340	728	3440	4802	3552	--	1/2"

Table 4

## HANDWHEEL WITH NON-RISING STEM

Appropriate when the valve is installed at height.

The definition variables are as follows:

**B = Max. width** of the valve (without drive).

**D = Max. height** of the valve (without drive).

### OPTIONS:

- Square nut
- Locking devices
- Extensions: elongated plates...
- ND higher than those give in the table

### ACTUATOR:

- Handwheel
- Stem
- Guide bearings on the yoke.
- Nut

### AVAILABLE:

- ND50 to ND1200.
- From ND600 the actuator is with geared motor.

\* Other ND on request.

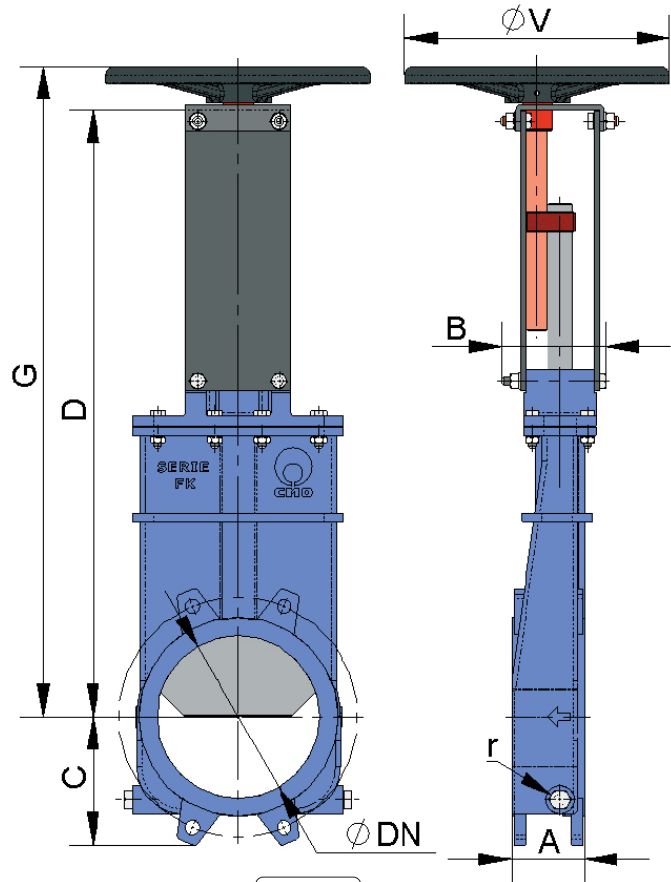


Fig. 16

DN	ΔP (bar)	A	B	C	D	G	øV	r (B.S.P.)
50	10	60	91	61	323	362	225	1/4"
65	10	60	91	68	362	401	225	1/4"
80	10	64	91	91	404	443	225	1/4"
100	10	64	91	104	453	492	225	1/4"
125	10	70	101	118	511	550	225	3/8"
150	10	76	101	130	574	613	225	3/8"
200	10	89	118	158	745	798	325	3/8"
250	10	114	118	196	880	933	325	1/2"
300	6	114	118	230	1005	1058	380	1/2"
350	6	127	290	255	1141	1220	450	1/2"
400	6	140	290	290	1266	1345	450	1/2"
450	4	152	290	306	1393	1472	450	1/2"
500	4	152	290	340	1529	1608	450	1/2"
600	4	178	290	398	1782	1861	450	1/2"
700	3	178	320	453	2105	2170	--	1/2"
800	3	178	320	503	2376	2446	--	1/2"
900	3	178	320	583	2655	2725	--	1/2"
1000	3	178	320	613	2935	3005	--	1/2"
1200	3	203	340	728	3440	3510	--	1/2"

Table 5

## CHAINWHEEL

Widely used in raised installations with difficult access, the handwheel is fitted in vertical position.

The definition variables are as follows:

**B = Max. width** of the valve (without drive).

**D = Max. height** of the valve (without drive).

### OPTIONS:

- Square nut
- Locking devices
- Extensions: elongated plates...
- ND higher than those give in the table

### ACTUATOR:

- Handwheel
- Stem
- Guide bearings on the yoke.
- Nut

### AVAILABLE:

- ND50 to ND1200.
- From ND600 the actuator is with gears

\* Other ND on request.

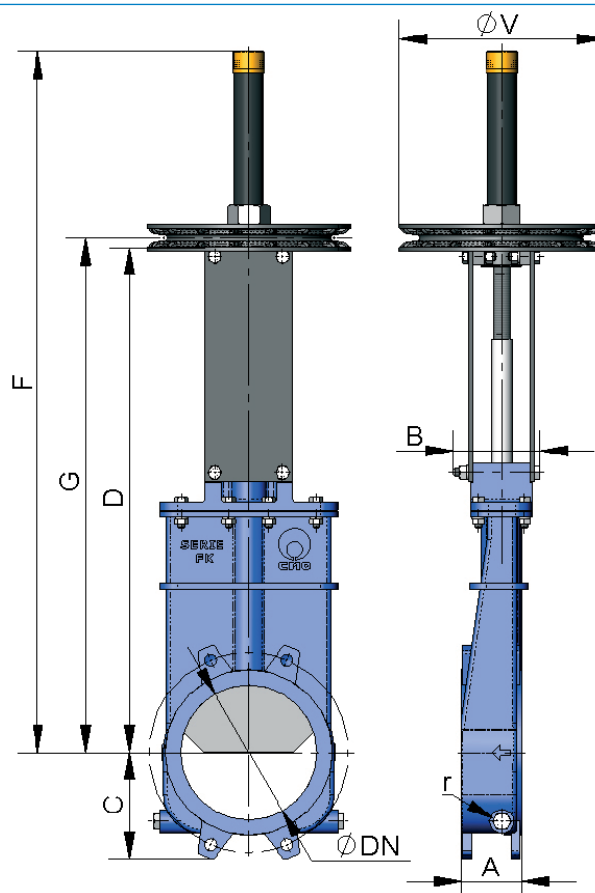


Fig. 17

DN	$\Delta P$ (bar)	A	B	C	D	F	G	$\phi V$	r (B.S.P.)
50	10	60	91	61	323	492	362	225	1/4"
65	10	60	91	68	362	531	401	225	1/4"
80	10	64	91	91	404	573	443	225	1/4"
100	10	64	91	104	453	622	492	225	1/4"
125	10	70	101	118	511	730	550	225	3/8"
150	10	76	101	130	574	793	613	225	3/8"
200	10	89	118	158	745	1036	798	300	3/8"
250	10	114	118	196	880	1271	933	300	1/2"
300	6	114	118	230	1005	1396	1058	300	1/2"
350	6	127	290	255	1141	1681	1250	402	1/2"
400	6	140	290	290	1266	1806	1375	402	1/2"
450	4	152	290	306	1393	2033	1502	402	1/2"
500	4	152	290	340	1529	2169	1638	402	1/2"
600	4	178	290	398	1782	2522	1891	402	1/2"
700	3	178	320	453	2105	3035	2205	402*	1/2"
800	3	178	320	503	2376	3406	2476	402*	1/2"
900	3	178	320	583	2655	3785	2755	402*	1/2"
1000	3	178	320	613	2935	4165	3035	402*	1/2"
1200	3	203	340	728	3440	4870	3540	402*	1/2"

Table 6

## LEVER

It is a fast maneuvering drive.

**B = Max. width** of the valve (without drive).

**D = Max. height** of the valve (without drive).

### ACCIONAMIENTO:

- Palanca
- Vástago
- Casquillo Guía
- Bloqueadores externos para mantener la posición

### DISPONIBLE:

- Estándar DN50 a DN300

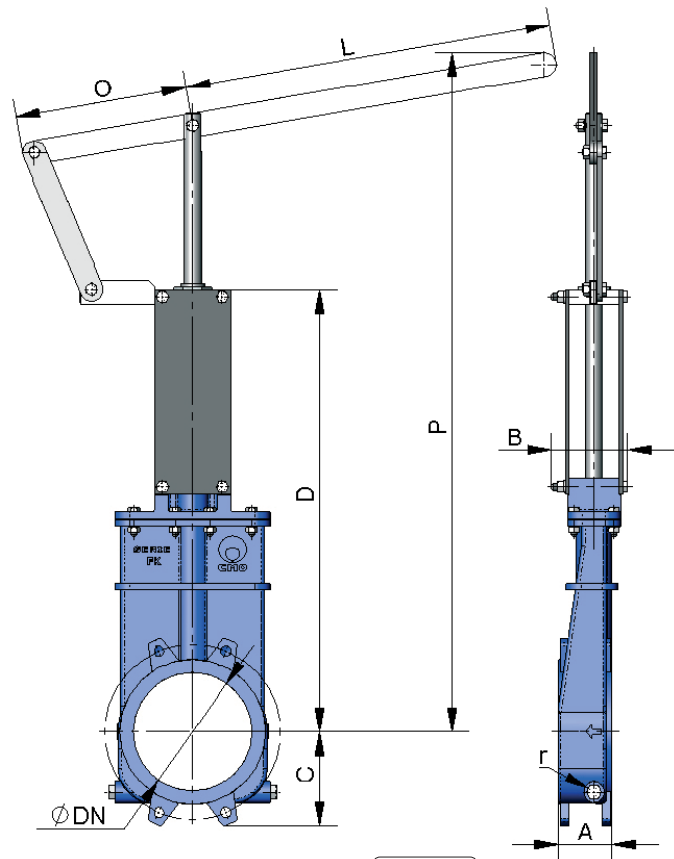


Fig. 18

DN	$\Delta P$ (bar)	A	B	C	D	L	O	P	r (B.S.P.)
50	10	60	91	61	323	325	155	586	1/4"
65	10	60	91	68	362	325	155	620	1/4"
80	10	64	91	91	404	325	155	659	1/4"
100	10	64	91	104	453	325	155	724	1/4"
125	10	70	101	118	511	425	155	1046	3/8"
150	10	76	101	130	574	425	155	1111	3/8"
200	10	89	118	158	745	620	290	1247	3/8"
250	10	114	118	196	880	620	290	1670	1/2"
300	6	114	118	230	1005	620	290	1804	1/2"

Table 7

## GEAR BOX

This is recommendable for DN's greater than 600.

The definition variables are as follows:

**B = Max. width** of the valve (without drive).

**D = Max. height** of the valve (without drive).

### OPTIONS:

- Chain handwheel.
- Locking devices.
- Extensions: stand, pipe, plates, etc.
- Non-rising stem.

### ACTUATOR:

- Stem
- Yoke
- Cone-shaped gear box
- Handwheel
- Standard ratio = 4 to 1.

### AVAILABLE:

- ND50 to DN1200.

\* Other ND on request.

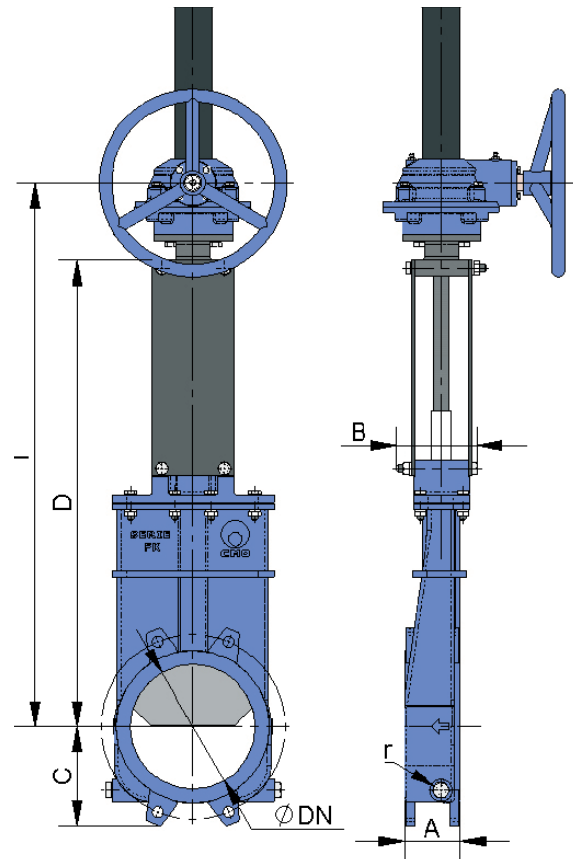


Fig. 19

DN	$\Delta P$ (bar)	A	B	C	D	I	R	r (B.S.P.)
50	10	60	91	61	323	447	620	1/4"
65	10	60	91	68	362	486	659	1/4"
80	10	64	91	91	404	528	701	1/4"
100	10	64	91	104	453	577	750	1/4"
125	10	70	101	118	511	635	808	3/8"
150	10	76	101	130	574	698	871	3/8"
200	10	89	118	158	745	869	1164	3/8"
250	10	114	118	196	880	1004	1299	1/2"
300	6	114	118	230	1005	1129	1424	1/2"
350	6	127	290	255	1141	1265	1680	1/2"
400	6	140	290	290	1266	989	1805	1/2"
450	4	152	290	306	1393	1390	2082	1/2"
500	4	152	290	340	1529	1653	2218	1/2"
600	4	178	290	398	1782	1903	2471	1/2"
700	3	178	320	453	2105	2257	3000	1/2"
800	3	178	320	503	2376	2528	3371	1/2"
900	3	178	320	583	2655	2807	3745	1/2"
1000	3	178	320	613	2935	3088	4149	1/2"
1200	3	203	340	728	3440	3626	4866	1/2"

Table 8

## DOUBLE-ACTING PNEUMATIC CYLINDER

The definition variables are as follows:

**B = Max. width** of the valve (without drive).

**D = Max. height** of the valve (without drive).

The air supply pressure to the pneumatic cylinder is a minimum of 6 bar and a maximum of 10 bar, the air must be dry and lubricated.

10 bar is the maximum admissible air pressure. For air pressures below 6 bar, please check with **CMO Valves**.

For DN50 to DN300 valves, the cylinder's jacket and covers are made of aluminium, the spindle of AISI304, the piston of rubber-coated steel and the O-ring seals are made of nitrile.

For valves larger than DN300 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.

### AVAILABLE:

- ND50 to DN1200.

\* Other ND on request

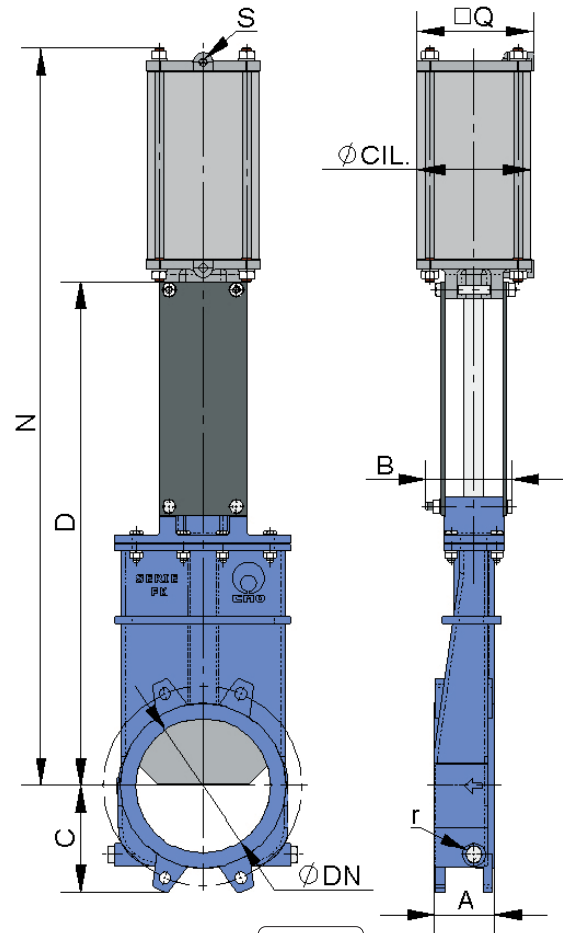


Fig. 20

DN	ΔP (bar)	A	B	C	D	N	Q	ø CIL.	Ø VAST.	S (B.S.P.)	r (B.S.P.)
50	10	60	91	61	323	498	90	80	20	1/4"	1/4"
65	10	60	91	68	362	550	90	80	20	1/4"	1/4"
80	10	64	91	91	404	608	90	80	20	1/4"	1/4"
100	10	64	91	104	453	680	110	100	20	1/4"	1/4"
125	10	70	101	118	511	774	135	125	25	1/4"	3/8"
150	10	76	101	130	574	866	135	125	25	1/4"	3/8"
200	10	89	118	158	745	1090	170	160	30	1/4"	3/8"
250	10	114	118	196	880	1287	215	200	30	3/8"	1/2"
300	6	114	118	230	1005	1462	215	200	30	3/8"	1/2"
350	6	127	290	255	1141	1724	270	250	40	3/8"	1/2"
400	6	140	290	290	1266	1899	270	250	40	3/8"	1/2"
450	4	152	290	306	1393	2081	382	300	45	1/2"	1/2"
500	4	152	290	340	1529	2267	382	300	45	1/2"	1/2"
600	4	178	290	398	1782	2620	382	300	45	1/2"	1/2"
700	3	178	320	453	2105	3085	444	350	45	1/2"	1/2"
800	3	178	320	503	2376	3455	444	350	45	1/2"	1/2"
900	3	178	320	583	2655	3870	508	400	50	1/2"	1/2"
1000	3	178	320	613	2935	4249	508	400	50	1/2"	1/2"
1200	3	203	340	728	3440	4957	508	400	50	1/2"	1/2"

Table 9

## SINGLE-ACTING PNEUMATIC CYLINDER

The definition variables are as follows:

**B = Max. width** of the valve (without drive).

**D = Max. height** of the valve (without drive).

The air supply pressure to the pneumatic cylinder is a minimum of 6 bar and a maximum of 10 bar, the air must be dry and lubricated.

10 bar is the maximum admissible air pressure. For air pressures below 6 bar please consult manufacturer.

Available for opening or closing in case of air supply failure (spring opening or closing).

The jacket is made of aluminium, the covers of nodular cast iron or carbon steel, the rod of AISI304, the piston of rubber-coated steel, the O-ring seals of nitrile and the spring is made of steel.

The **actuator design is spring** activated for valves with diameters up to **DN300**. For larger diameters the actuator contains a double-acting cylinder and an air tank which stores the volume of air necessary to perform the last movement in the event of a air supply failure.

### AVAILABLE:

- Standard from ND50 to DN300.

\* Other ND on request

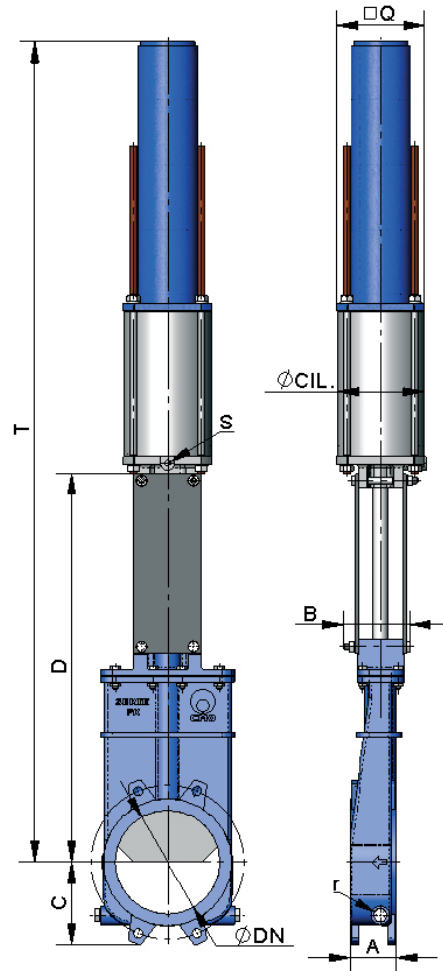


Fig. 21

DN	ΔP (bar)	A	B	C	D	Q	T	Ø CIL.	Ø VAST.	S (B.S.P.)	r (B.S.P.)
50	10	60	91	61	323	135	863	125	25	1/4"	1/4"
65	10	60	91	68	362	135	900	125	25	1/4"	1/4"
80	10	64	91	91	404	135	943	125	25	1/4"	1/4"
100	10	64	91	104	453	135	992	125	25	1/4"	1/4"
125	10	70	101	118	511	170	1054	160	30	1/4"	3/8"
150	10	76	101	130	574	170	1116	160	30	1/4"	3/8"
200	10	89	118	158	745	215	1577	200	30	3/8"	3/8"
250	10	114	118	196	880	270	2109	250	40	3/8"	1/2"
300	6	114	118	230	1005	270	2306	250	40	3/8"	1/2"

Table 10

## ELECTRIC ACTUATOR

The definition variables are as follows:

**B = Max. width** of the valve (without drive).

**D = Max. height** of the valve (without drive).

This actuator is automatic and includes the following parts:

- Electric motor.
- Stem.
- Yoke.

### THE ELECTRIC MOTOR INCLUDE:

- Emergency manual handwheel
- Limit switches
- Torque limiters.
- Different types and brands.
- Non-rising stem.

### AVAILABLE:

- Standard from DN50 to DN1200
- From DN450 the motor is assisted with a gear box.

\* Other ND on request

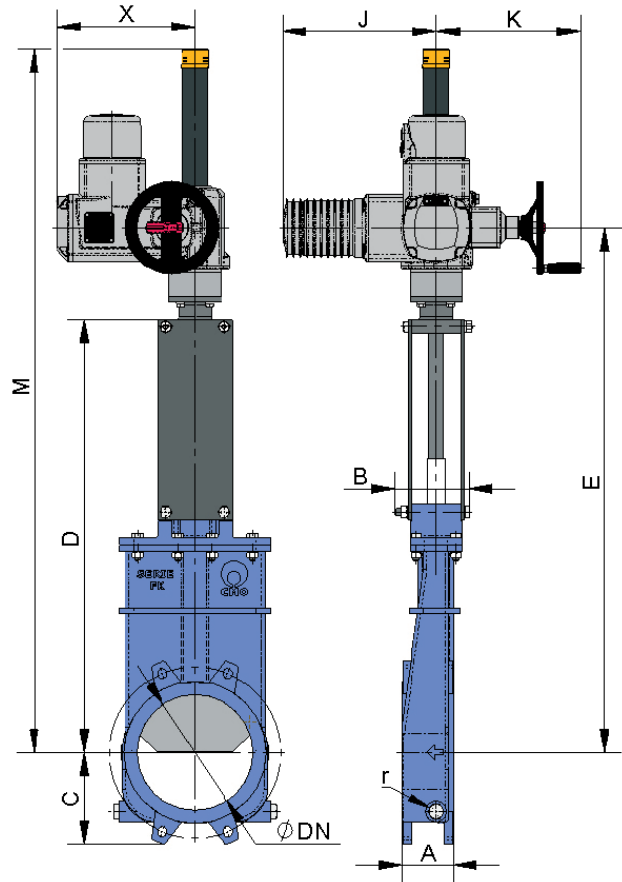


Fig. 22

DN	ΔP (bar)	A	B	C	D	E	J	K	M	X	r (B.S.P.)
50	10	60	91	61	323	479	265	250	674	238	1/4"
65	10	60	91	68	362	518	265	250	713	238	1/4"
80	10	64	91	91	404	560	265	250	755	238	1/4"
100	10	64	91	104	453	609	265	250	804	238	1/4"
125	10	70	101	118	511	667	265	250	862	238	3/8"
150	10	76	101	130	574	730	265	250	925	238	3/8"
200	10	89	118	158	745	903	265	250	1209	238	3/8"
250	10	114	118	196	880	1038	265	250	1344	238	1/2"
300	6	114	118	230	1005	1163	265	250	1469	238	1/2"
350	6	127	290	255	1141	1281	283	254	1648	248	1/2"
400	6	140	290	290	1266	1406	283	254	1823	248	1/2"
450	4	152	290	306	1393	1578	283	254	2160	248	1/2"
500	4	152	290	340	1529	1714	283	254	2296	248	1/2"
600	4	178	290	398	1782	1967	265	250	2549	422	1/2"
700	3	178	320	453	2105	2297	283	254	3000	422	1/2"
800	3	178	320	503	2376	2568	283	254	3371	422	1/2"
900	3	178	320	583	2655	2847	283	254	3745	425	1/2"
1000	3	178	320	613	2935	3127	283	254	4149	425	1/2"
1200	3	203	340	728	3440	3676	389	340	4866	480	1/2"

Table 11



## HYDRAULIC ACTUATOR

The definition variables are as follows:

**B = Max. width** of the valve (without drive).

**D = Max. height** of the valve (without drive).

### THE HYDRAULIC ACTUATOR INCLUDES:

- Hydraulic cylinder
- Yoke

### SUPPLY PRESSURE STANDARD:

- 135 bar.

### OPTIONS:

- Different types and brands available according to customer's requirements.

### AVAILABLE:

- ND50 to DN1200.

\* Other ND on request.

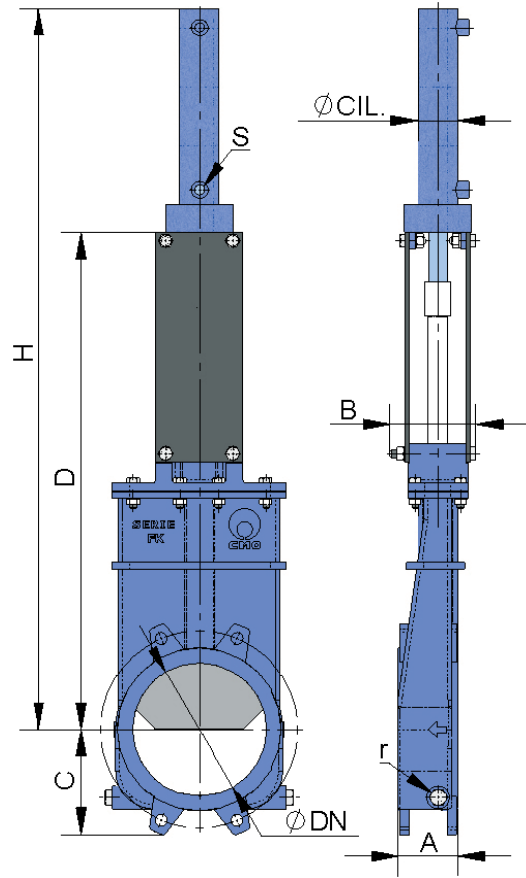


Fig. 23

DN	ΔP (bar)	A	B	C	D	H	Ø CIL.	Ø VAST.	S (B.S.P.)	OIL CAP. (dm <sup>3</sup> )	r (B.S.P.)
50	10	60	91	61	323	539	25	18	3/8"	0.03	1/4"
65	10	60	91	68	362	593	25	18	3/8"	0.03	1/4"
80	10	64	91	91	404	670	25	18	3/8"	0.04	1/4"
100	10	64	91	104	453	739	32	22	3/8"	0.09	1/4"
125	10	70	101	118	511	827	32	22	3/8"	0.11	3/8"
150	10	76	101	130	574	906	40	28	3/8"	0.20	3/8"
200	10	89	118	158	745	1146	50	28	3/8"	0.42	3/8"
250	10	114	118	196	880	1331	50	28	3/8"	0.52	1/2"
300	6	114	118	230	1005	1545	50	28	3/8"	0.62	1/2"
350	6	127	290	255	1141	1720	50	28	3/8"	0.73	1/2"
400	6	140	290	290	1266	1895	63	36	3/8"	1.31	1/2"
450	4	152	290	306	1393	2112	63	36	3/8"	1.47	1/2"
500	4	152	290	340	1529	2297	63	36	3/8"	1.62	1/2"
600	4	178	290	398	1782	2650	80	45	3/8"	3.12	1/2"
700	3	178	320	453	2105	3124	80	45	3/8"	3.62	1/2"
800	3	178	320	503	2376	3495	100	56	1/2"	6.44	1/2"
900	3	178	320	583	2655	3874	100	56	1/2"	7.25	1/2"
1000	3	178	320	613	2935	4294	125	70	1/2"	10.25	1/2"
1200	3	203	340	728	3440	4995	125	70	1/2"	15.1	1/2"

Table 12

## FLANGE DIMENSIONS

### EN 1092-2 PN10

DN	●	○	M (Metric)	P	ØK
50	4	-	M 16	8	125
65	4	-	M 16	8	145
80	4	4	M 16	9	160
100	4	4	M 16	9	180
125	4	4	M 16	9	210
150	4	4	M 20	10	240
200	4	4	M 20	10	295
250	8	4	M 20	12	350
300	8	4	M 20	12	400
350	12	4	M 20	21	460
400	12	4	M 24	21	515
450	16	4	M 24	22	565
500	16	4	M 24	22	620
600	16	4	M 27	22	725
700	20	4	M 27	22	840
800	20	4	M 30	22	950
900	24	4	M 30	20	1050
1000	24	4	M 33	20	1160
1200	28	4	M 36	22	1380

Table 13

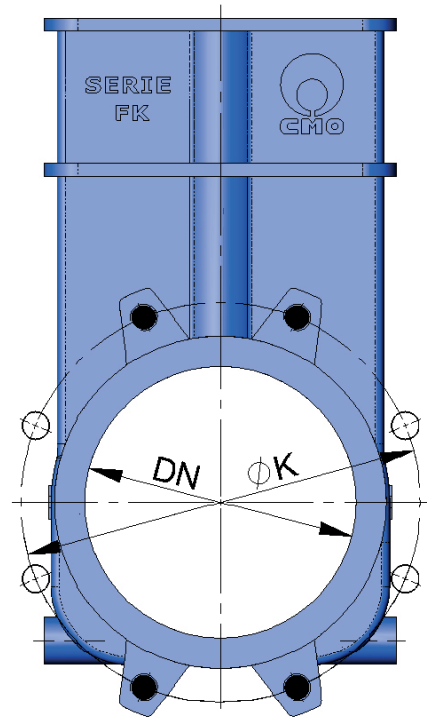


Fig. 24

- TAPPED HOLES
- THROUGH HOLE

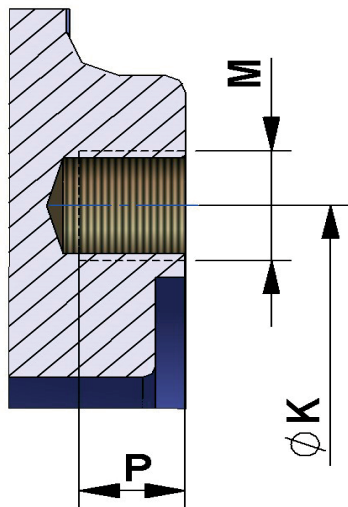


Fig. 25

### ANSI B16, Class 150

DN	●	○	M (UNC)	P	ØK
2"	4	-	5/8"	8	120,6
2 1/2"	4	-	5/8"	8	139,7
3"	4	-	5/8"	9	152,4
4"	4	4	5/8"	9	190,5
5"	4	4	3/4"	9	215,9
6"	4	4	3/4"	10	241,3
8"	4	4	3/4"	10	298,4
10"	8	4	7/8"	12	361,9
12"	8	4	7/8"	12	431,8
14"	8	4	1"	21	476,2
16"	12	4	1"	21	539,7
18"	12	4	1 1/8"	22	577,8
20"	16	4	1 1/8"	22	635
24"	16	4	1 1/4"	22	749,3
28"	24	4	1 1/4"	22	863,6
32"	24	4	1 1/2"	22	977,9
36"	28	4	1 1/2"	20	1085,9
40"	32	4	1 1/2"	20	1200,2

Table 14



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