

## PRODUCT DESCRIPTION

Wafer style, uni-directional knife gate valve.  
One piece integral cast body with guides to support the gate, seating wedges and bolted bonnet.  
High flow rates with low pressure drops.  
Several seat and packing materials available.  
Face to face dimension according CMO standard.  
Arrow on the body pointing the flow direction.

## GENERAL APPLICATIONS

This knife gate valve is appropriate for clean liquids and gases (without solids).  
If a small percentage of dust or powder is present in the fluid its vertical installation is recommended.  
Designed for a wide range of applications such us:

- Water applications.
- Pneumatic transports.
- Liquid bitumen handling.
- Industrial applications.

## TECHNICAL DATA

### Standard manufacturing sizes:

From DN50 up to DN1200 (bigger sizes under request)

### Working pressures:

From DN 50 to DN 125: 10 (kg/cm<sup>2</sup>)  
DN 150: 8 (kg/cm<sup>2</sup>)  
DN 200: 7 (kg/cm<sup>2</sup>)  
From DN 250 to DN 300: 5 (kg/cm<sup>2</sup>)  
From DN 350 to DN 400: 4 (kg/cm<sup>2</sup>)  
From DN 450 to DN 600: 3 (kg/cm<sup>2</sup>)  
From DN 700 to DN 1200: 2 (kg/cm<sup>2</sup>)



**Note:** These pressures are to be applied on the valve following the direction of the arrow stamped on the body side. Due to the valve design with supporting guides it is allowed 30% of these pressures in the opposite direction of the arrow.

### Flange connection drillings:

The standard flange connection is according to DIN PN10.

Other flange connections such as, ANSI 150, DIN PN6 – PN16 – PN25, British Standard, Australian Standard, JIS Standard, are available under request.

### Applied Directives:

Directive 98/37/CE (machinery), **Directive 97/23/CE (PED: Group 2)**, Directive 94/9/CE (ATEX: Group II, Cat. 3 / Zones 2 and 22)

**Quality Dossier:** All valves are hydrostatically tested at CMO with water and CMO material and test certificates can be provided.

Body test pressure = Maximum rated pressure x 1,5

Seat test pressure = Maximum rated pressure x 1,1

## KNIFE GATE VALVES -- MODEL K

DOC. K.04/08

### ADVANTAGES OF CMO "MODEL K" COMPARING WITH SIMILAR PRODUCTS

When a knife gate valve stays open for a long time and its inside body walls are parallel a big torque is needed to close it. The model K has conically shaped inside body walls that provide a bigger space. So, when closing the knife the product stocked in the inside of the body is cleared easily.

This valve is defined as unidirectional, and on unidirectional knife gate valves when there is a back pressure the knife can bend. This is something that can not happen with the CMO valve because it has a guiding supports system that allows to the valve to work with a back pressure of 30% of the maximum rated working pressure without any deformation of the knife.

The stem protection hood is independent from the hand wheel fixing system, so the hood can be removed without removing the hand wheel. This point allows normal maintenance operations like greasing of the spindle, etc.

The spindle (stem) of the CMO valve is made of stainless steel 18/8. This point is very important because there are manufacturers that manufacture it with 13% CR and it gets rusty in a very short time.

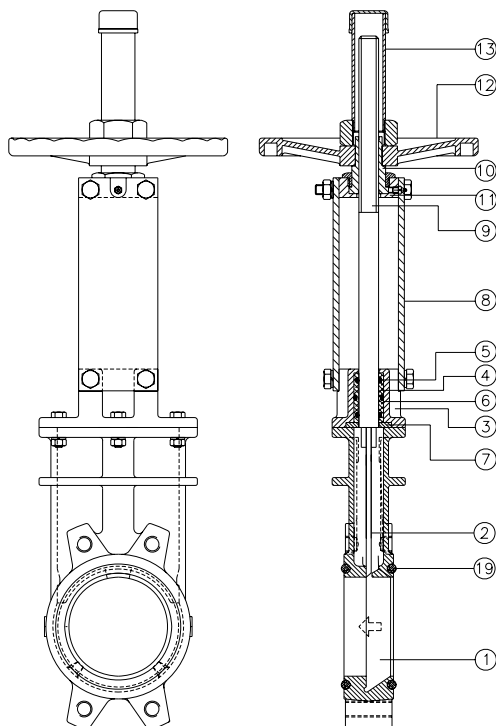
The hand wheel of the manual actuator is made of nodular iron GGG-50. Some manufacturers manufacture it on normal cast iron and they can break easily when receiving any big torque or knock.

The bridge of the CMO manual actuator is manufactured in a compact way, with the bronze nut protected in a greased and closed box. This point gives the possibility to move it with a key even without the hand wheel (in other manufacturer valves this is not possible).

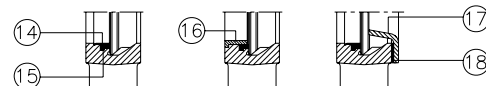
In valves bigger than DN300 the pneumatic actuator upper and lower caps are made of nodular iron GGG-50, therefore their resistance to the knocks is very high. This characteristic is essential in this type of pneumatic cylinder. Special care must be taken with cylinders with covers in aluminium or cast iron.

The sealing o-rings of the pneumatic cylinders are commercial and they can be bought all over the world, it is not needed, therefore, to contact CMO every time that these spares are needed.

### STANDARD MANUFACTURING MATERIALS (OPTIONS 1 AND 2)



POS.	DESCRIPTION	OPTION 1	OPTION 2
1	BODY	GGG50	CF8M
2	KNIFE	AISI304	AISI316
3	COVER	GGG50	CF8M
4	SOCKET	NYLON	NYLON
5	O RING	NITRILE	NITRILE
6	O RING	NITRILE	NITRILE
7	WASHER	INOX.	INOX.
8	SUPPORT	STEEL	STEEL
9	SPINDLE	AISI303	AISI303
10	STEM NUT	BRONZE	BRONZE
11	YOKE	STEEL	STEEL
12	HANDWHEEL	GGG50	GGG50
13	HOOD	STEEL	STEEL
14	SOCKET	AISI316	AISI316
15	JOINT	EPDM	EPDM
16	REINFORCED SOCKET	CF8M	CF8M
17	DEFLECTION CONE	CA15	CA15/CF8M
18	JOINT	BELPA DW	BELPA DW
19	O RING	EPDM	EPDM



## DESIGN FEATURES IN DETAIL

### 1) BODY

Wafer style, one piece mono block cast body with guides to support the gate, seating wedges for tighter shut-off and bolted bonnet. For sizes bigger than DN1200 the construction of the body is fabricated in carbon steel with reinforcement ribs to withstand the maximum rated pressure.

Full port designed to provide high flow rates with low pressure drops.

The internal design of the valve avoids any build up of solids on the sealing area.

The standard manufacturing materials are GG25 cast iron and CF8M stainless steel. Other materials like GGG50 nodular cast iron, A216WCB carbon steel and stainless steel alloys (AISI316Ti, Duplex, 254SMO, Uranus B6 ....) under request. Cast iron or steel valves are painted as standard with 80 microns anticorrosive protection of EPOXY (colour RAL 5015). Other anticorrosive protections available under request.

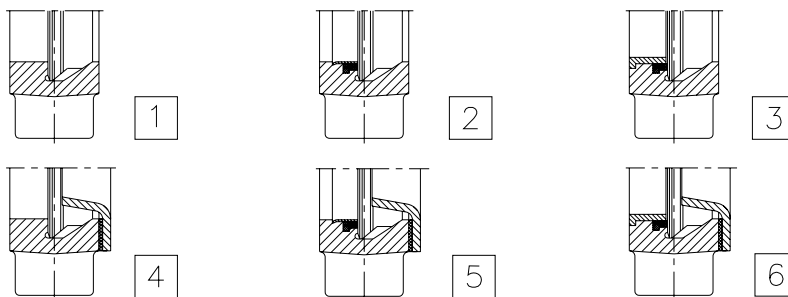
### 2) GATE

The standard manufacturing materials are AISI304 stainless steel for cast iron body valve and AISI316 stainless steel for CF8M stainless steel body valve. Other materials or combinations can be supplied under request.

The gate is polished in both sides to provide a smooth contact surface with the sealing joint. At the same time the gate wedge is rounded to avoid cutting of the sealing. Several polishing grades, anti abrasion treatments and modifications are available to adapt the valve to the customer requirements.

### 3) SEAT

Six different seat constructions are available according to the application in which the knife gate valve will work as follows:



Seat number 1: Metal to metal seat. This seat construction does not include any resilient sealing and the estimated leakage (considering water) is 1.5% of the flow.

Seat number 2: Standard soft seated valve. This seat construction includes a resilient joint that is held on the valve body by an AISI316 stainless steel retaining ring.

Seat number 3: Soft seated valve with reinforced socket. This seat construction includes a resilient joint that is held on the valve body by a reinforced socket with two functions (protect the valve body from abrasion and clean the gate when the valve is working with particles that stick on the gate).

Seats number 4, 5 and 6: Equal to seats 1, 2 and 3 but including a deflector. The deflector is a conical shaped ring located on the valve inlet with two functions (protect the valve body from abrasion guide the flow to the centre of the valve).

**Note:** Three materials are available for reinforced socket and deflector (CA-15 steel, CF8M and Ni-hard).

### Resilient Seat Materials

#### EPDM

This is the standard resilient seat installed on CMO valves. It can be used in many applications, but generally it is used for water and products diluted in water at temperatures not higher than 90°C. The EPDM rubber can also be used for abrasive products. It provides 100% tightness.

#### NITRILE


It is used for greasy fluids or oils at temperatures not higher than 90 °C. It provides 100% tightness.

#### VITON

Appropriate for corrosive products and high temperatures up to 190°C in continuous and picks of 210°C. It provides 100% tightness.

#### SYLICONE

The silicone is used mainly into the food industry and pharmaceutical products with temperatures not higher than 200°C. It provides 100% tightness.

 **Note:** In some applications other different resilient materials are used as, for example, hypalon, butile and natural rubber. Please contact with us in case of such request.

#### PTFE

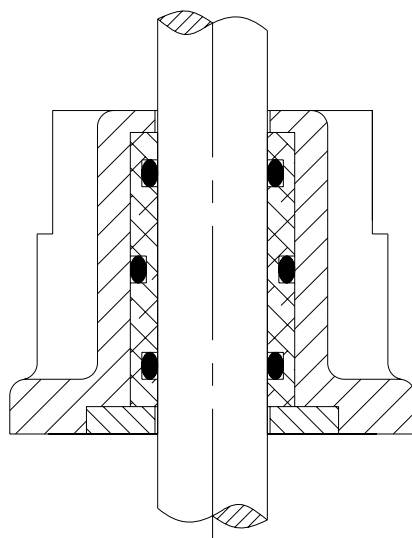
It is used for corrosive products and PH from 2 to 12. This sealing material does not proved 100% tightness. The estimated leakage is 0.5% of the total flow.

### 4) PACKING

The packing is the area where full tightness must be reached in order to avoid any leakage to the atmosphere. On the knife gate valve type K this tightness area is located between the body bonnet and the valve stem. Two different systems are available:

#### a) Socket system with o-rings

This system includes a nylon gasket that is inserted on the valve bonnet and several o-rings are installed internally and externally of this gasket to perform the tightness. Following a drawing is showed with this system construction:





This system is mainly recommended when the valve is working in water applications. But, depending the application other alternatives are available like bronze gasket instead of nylon and viton or silicon o-rings instead of nitrile.

b) Standard packing system with threaded packing

This system is very similar comparing with the packing system of the knife gate valve type A. The packing is composed by several lines of threaded packing that provide the tightness between the body bonnet and the stem of the valve and avoids any kind of leakage to the atmosphere. These packing lines are pressed by a "packing gland".

The packing is located in an easily accessible place and can be changed without dismantling the valve from the pipeline.

Several types of packing can be supplied according to the different applications in which the valve can be located as follows:

**GREASED COTTON (Recommended for hydraulic services)**

This packing is made with cotton threads and has impregnated both the inside and the outside with tallow. It is manufactured by the solid system. It is a packing for general use in hydraulic services for pumps as well as for valves.

$$P(\text{bar}) = 10 / T = 100^{\circ}\text{C} \text{ PH} = 6-8$$

**DRY COTTON**

This packing is made with cotton threads. It is manufactured by the solid system. This is a packing only for solid products.

$$P(\text{bar}) = 0.5 / T = 100^{\circ}\text{C} \quad \text{PH} = 6-8$$

**COTTON + P.T.F.E.**

This packing is made with cotton threads and has the inside and outside impregnated with P.T.F.E. It is manufactured by the solid system. It is a packing for general use in hydraulic services for pumps as well as for valves.

$$P(\text{bar}) = 30 / T = 120^{\circ}\text{C} \text{ PH} = 6-8$$

**P.T.F.E. LUBRICATED**

It is made of PTFE filament threads which are impregnated using vacuum with a dispersion of PTFE and a special lubricant which helps the work at high speed.

It is braided by the diagonal system. Suitable for valves and pumps working with nearly all the fluids, specially the most corrosives, including concentrated oils and oxidants. It is also suitable for fluids with solid contents.

$$P(\text{bar}) = 100 / T = -200+270 \text{ }^{\circ}\text{C} \quad \text{PH} = 0-14$$



### GRAPHITE FILAMENT

It is made of graphite threads of high purity. It is braided by the diagonal system and impregnated with a small quantity of graphite and lubricant which helps to reduce the porosity and makes easier the running.

It is a packing with low friction coefficient and high heat conductivity.

It has a wide range of applications, as the graphite withstands the steam, water, oils, solvents, alkalis and most of the acids.

The chemical products that attack this packing are strong oxidizers as the oleum, the fuming nitric acids, the dichromates and the oxygen.

$$P(\text{bar}) = 40 / T = 650^{\circ}\text{C} \text{ PH} = 0-14$$

### CERAMIC FIBER

It is made with ceramic threads. Its application is only for air or gas at high temperature and low pressure.

$$P(\text{bar}) = 0.3 / T = 1400^{\circ}\text{C} \text{ PH} = 0-14$$

### 5) SPINDLE (STEM)

The spindle (stem) of the CMO valve is made of stainless steel 18/8. This provides a high resistance and long corrosion resistant life.

The valve design can be with rising or non rising stem construction. When rising stem construction is manufactured a stem protection hood is supplied that protects the stem from dust and dirt and, at the same time, keeps the stem lubricated.

### 6) PACKING GLAND

The packing gland gives the possibility to apply a uniform pressing force on the packing to ensure the tightness of the packing. As standard cast iron body valves include aluminium packing gland and stainless steel body valves include CF8M stainless steel packing gland.

### 7) ACTUATORS

All kind of actuators can be supplied with the advantage that CMO design is completely interchangeable.

The design gives the possibility to the customer to change the actuators by their own. Normally there is no need of any extra mounting kit and in the cases that it is necessary CMO provides it.



## ACCESSORIES

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

### **Mirror Polished Gate**

The mirror polished gate is specially recommended for food industry and applications where the solids can stick on the gate. The mirror polished gate is an alternative to solve such kind issues.

### **PTFE Lined Gate**

As the mirror polished gate, it improves the performance of the valve against the adherence.

### **Stellited gate**

Addition of stellite material on the gate wedge to protect it from abrasion.

### **Scraper in the packing**

It cleans the gate during the opening movement to avoid the damage of the packing.

### **Air injection in the packing gland**

Injecting air inside of the packing (stuffing box) an air chamber is created that improves the tightness of it.

### **Heating jacket**

Recommended in applications in which the working fluid can get hard inside of the body casing. The heating jacket keeps the body temperature constant avoiding solidification of the working media.

### **Flushing holes in body**

Several holes can be drilled on the body to flush air, steam or other fluid for cleaning of the valve seat.

### **Mechanical Limit Switches, Inductive Switches and Positioners**

Limit switches for punctual valve position indication and positioners for continuous valve position indication.

### **Solenoid valves**

For air distribution into pneumatic actuators

### **Connection electrical boxes, electrical wiring and pneumatic piping**

Completely assembled units with all accessories can be supplied.

### **Stroke limiting mechanical stops**

### **Mechanical locking device**

Allows the locking of the valve in a fixed position during long periods

### **Emergency manual actuator (hand wheel /gear box)**

For emergency operation of the valve in case of power failure

### **Triangular (V-notch) and pentagonal diaphragm with indication rule**

Recommended for flow regulation purposes

According to the opening percentage of the valve gives the flow passing through the valve.

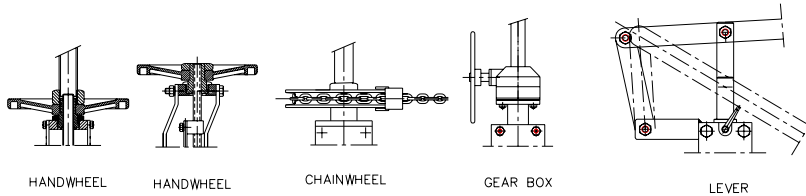
# KNIFE GATE VALVES -- MODEL K

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## ACTUATORS

The following actuators are available:

### MANUAL ACTUATORS



HANDWHEEL

HANDWHEEL  
(NON RISING SPINDLE)

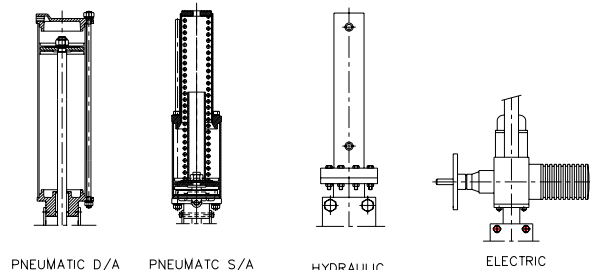
CHAINWHEEL

GEAR BOX

LEVER

(\*NOTE: CHAINWHEEL AND GEAR BOX ALSO AVAILABLE NON RISING STEM DESIGN

### OTHER TYPES OF ACTUATORS



PNEUMATIC D/A

PNEUMATIC S/A

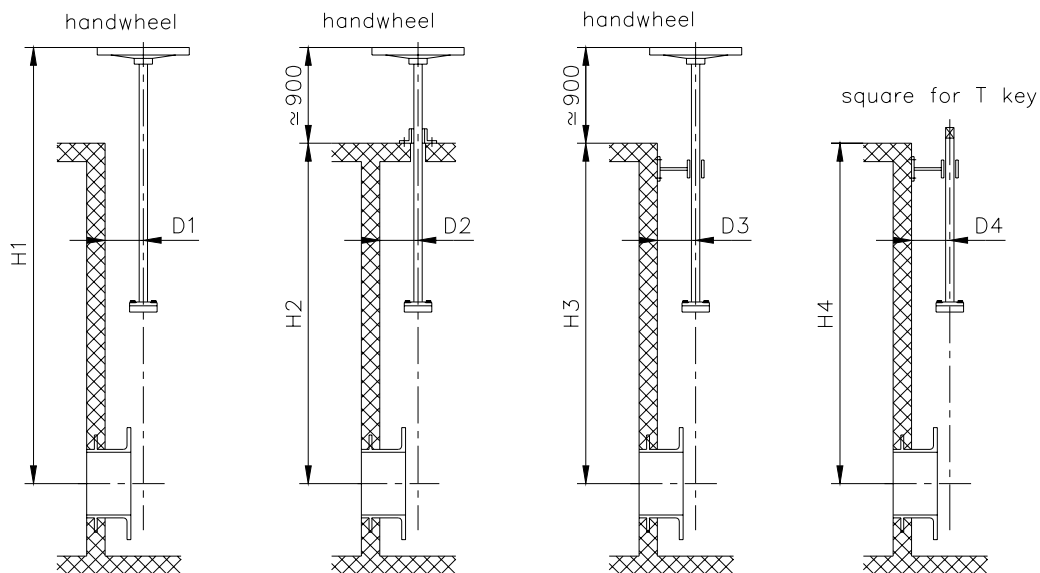
HYDRAULIC

ELECTRIC

(\*NOTE: SINGLE ACTING ACTUATOR AVAILABLE WITH SPRING TO CLOSE OR SPRING TO OPEN DESIGN.

(\*NOTE: ALL AUTOMATED VALVES ARE SUPPLIED WITH SAFETY GUARDS COVERING THE GATE MOVEMENT AREA.

## STEM EXTENSIONS



1) Extension tube with inside rising stem

2) Equal to 1) but with floor support

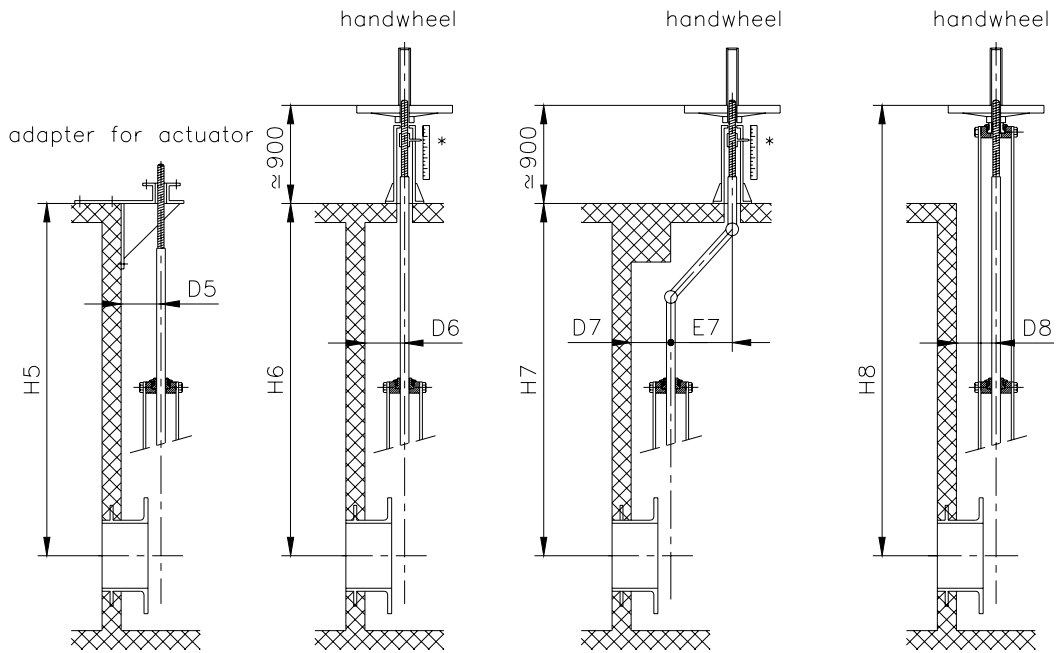
3) Equal to 1) but with wall support

4) Equal to 3) but with T key.

**KNIFE GATE VALVES -- MODEL K**

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\* Optional indication rule on the pedestal



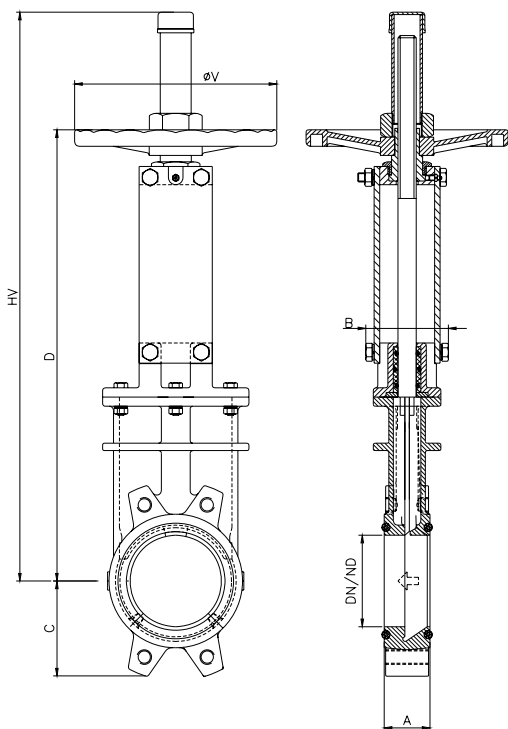
5) Rising stem with wall support and adapter for actuator

6) Rising stem with floor pedestal

7) Non rising stem with pedestal and two universal joints

8) Rising stem with extended support plates

**GENERAL DIMENSIONS: HANDWHEEL – RISING STEM**

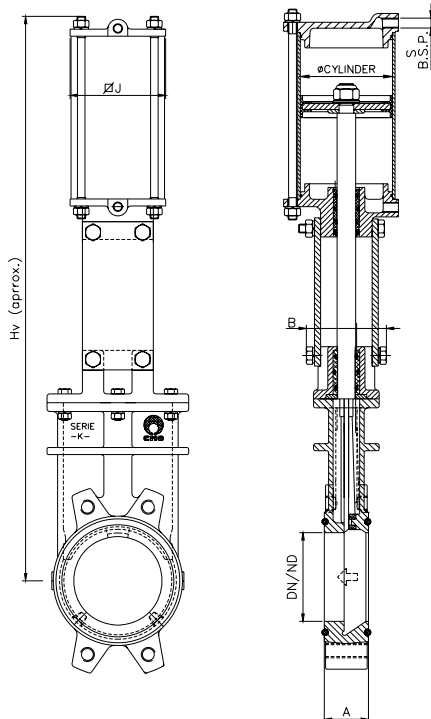


DN	DIMENSIONS					
	A	B	C	D	øV	Hv
50	40	92	63	351	225	480
65	40	92	70	391	225	520
80	50	92	92	429	225	558
100	50	92	105	484	225	613
125	50	102	120	551	225	730
150	60	102	130	614	225	793
200	60	119	160	788	325	1025
250	70	119	198	918	325	1255
300	70	119	234	1043	380	1340
350	96	194	256	1250	460	1680
400	100	194	292	1375	460	1805
450	106	290	308	1499	460	2030
500	110	290	340	1638	460	2170
600	110	290	400	1888	460	2820

**KNIFE GATE VALVES -- MODEL K**

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**GENERAL DIMENSIONS: PNEUMATIC DOUBLE ACTING (air supply pressure: 6 kg/cm<sup>2</sup>)**



DN/ND	DIMENSIONES/DIMENSIONS					
	A	B	ØCILIN.	ØJ	S B.S.P.	Hv
50	40	92	80	96	1/4"	480
65	40	92	80	96	1/4"	530
80	50	92	80	96	1/4"	580
100	50	92	100	115	1/4"	656
125	50	102	125	138	1/4"	774
150	60	102	125	138	1/4"	847
200	60	119	160	175	1/4"	1080
250	70	119	200	218	3/8"	1275
300	70	119	200	218	3/8"	1446
350	96	194	250	270	3/8"	1723
400	100	194	250	270	3/8"	1898
450	106	290	300	382	1/2"	2078
500	110	290	300	382	1/2"	2270
600	110	290	300	382	1/2"	2620

As standard the CMO double acting and single acting actuators are designed to work between 6 and 10 Kg/cm<sup>2</sup> air supply pressure. 10 Kg/cm<sup>2</sup> is the maximum allowed air supply pressure. When the air supply pressure is less than 6 Kg/cm<sup>2</sup> the actuator is oversized.

**Double acting actuator:**

For valves of diameter DN50 up to DN200 the cylinder jacket and the caps are in aluminium, the piston rod in AISI304, the cylinder piston in steel covered by nitrile and the o-rings in nitrile. For valves bigger than DN200 the caps are manufactured in nodular cast iron or carbon steel. The actuator can be manufactured fully in stainless steel under request and specially for very corrosive ambient.

**Single acting actuator:**

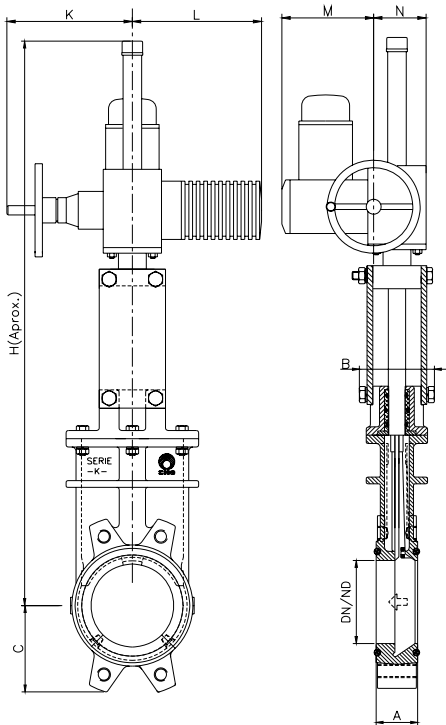
Fail close or fail open single actuators are available (spring to close or spring to open). For all size of valves the cylinder jacket is manufactured in aluminium, the caps are in cast iron or carbon steel, the piston rod in AISI304, the cylinder piston in steel covered by nitrile, the o-rings in nitrile and the spring in steel. The single acting actuator with spring design is manufactured for valves up to DN300. For bigger sizes a double acting actuator is supplied including an air tank. This is tank keeps inside the necessary air volume to make the last stroke of movement in case of fail.

 **Note:** Please read the "CMO pneumatic actuators" catalogue for more information.

**KNIFE GATE VALVES -- MODEL K**

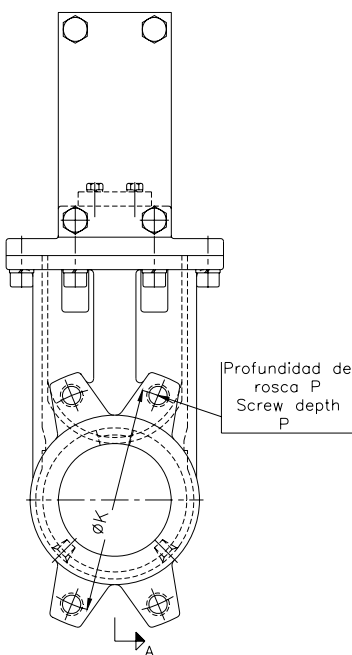
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**GENERAL DIMENSIONS: ELECTRIC ACTUATOR – RISING STEM (non rising stem also available)**



ND	DIMENSIONES/DIMENSIONS							
	A	B	C	K	L	M	N	H
50	40	92	63	234	265	197	102	504
65	40	92	70	234	265	197	102	544
80	50	92	92	234	265	197	102	582
100	50	92	105	234	265	197	102	637
125	50	102	120	234	265	197	102	814
150	60	102	130	234	265	197	102	877
200	60	119	160	234	265	197	102	1164,5
250	70	119	198	234	265	197	102	1294,5
300	70	119	234	234	265	197	102	1419,5
350	96	194	256	256	282	197	115	1645
400	100	194	292	256	282	197	115	1817
450	106	290	308	325	385	222	153	2098
500	110	290	340	325	385	222	153	2207
600	110	290	400	325	385	222	153	2637

**FLANGE CONNECTION DETAILS**



DN	TALADRADO DE BRIDAS/FLANGE DETAIL									
	DIN PN10					ANSI150				
			M Metrica	P	øK			R UNC	P	øK
50	4		M.16	8	125	4		5/8"	8	120'6
65	4		M.16	8	145	4		5/8"	8	139'7
80	4	4	M.16	9	160	4		5/8"	9	152'4
100	4	4	M.16	9	180	4	4	5/8"	9	190'5
125	4	4	M.16	9	210	4	4	3/4"	9	215'9
150	4	4	M.20	10	240	4	4	3/4"	10	241'3
200	4	4	M.20	10	295	4	4	3/4"	10	298'4
250	6	6	M.20	12	350	6	6	7/8"	12	361'9
300	6	6	M.20	12	400	6	6	7/8"	12	431'8
350	10	6	M.20	21	460	8	4	1"	21	476'2
400	10	6	M.24	21	515	10	6	1"	21	539'7
450	14	6	M.24	22	565	10	6	1 1/8"	22	577'8
500	14	6	M.24	22	620	14	6	1 1/8"	22	635
600	14	6	M.27	22	725	14	6	1 1/4"	22	749'3