

## PRODUCT DESCRIPTION

Wafer style, unidirectional knife gate valve.  
Cast body, composed by two bolted parts, with inside sliding guides to provide a smooth operation.  
High flow rates with low pressure drops.  
Several seat and packing materials available.  
Face to face dimension according CMO standard.  
Arrow pointing in the flow direction in the valve body

## GENERAL APPLICATIONS

This knife gate valve is appropriate for liquids with a solids concentration of maximum 6%.  
If it is used for dry solids in gravity feed applications it is recommended to be installed with the arrow in the opposite direction to the flow direction.  
Designed for a wide range of applications such us:

- Pulp and Paper.
- Mining.
- Effluent handling plants.
- Food and beverage.
- Bulk conveying.
- Sewage applications.
- Chemical plants.

## TECHNICAL DATA

### Standard manufacturing sizes:

From DN50 up to DN800 (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 800: 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:

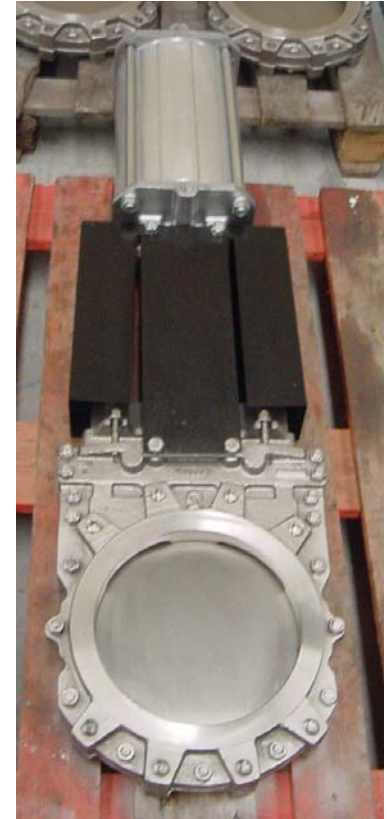
Directive machinery.

(PED) ART.3, CAT.1(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

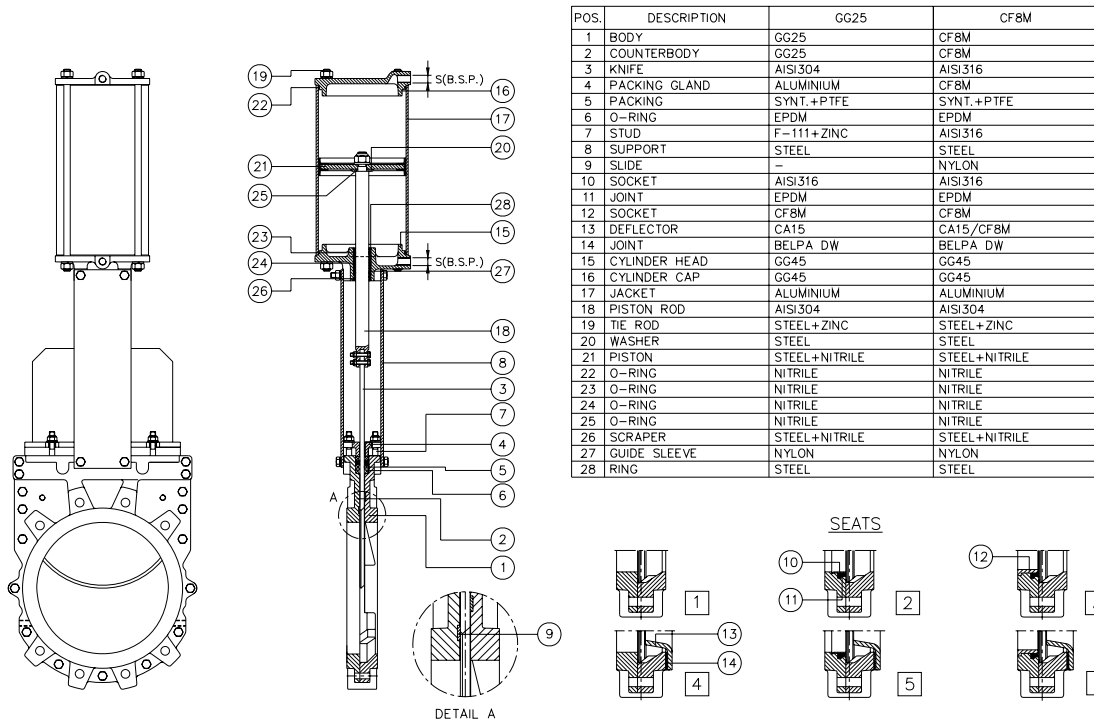
Seat test pressure = Maximum rated pressure x 1,1



# KNIFE GATE VALVES -- MODEL U

DOC. U.07/08

## STANDARD MANUFACTURING MATERIALS (OPTIONS 1 AND 2)



## DESIGN FEATURES IN DETAIL

### 1) BODY

Wafer style cast body composed by two bolted parts, with inside sliding guides to provide a smooth operation and support the gate and seating wedges for tighter shut-off. 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 and the space between the gate and body internals is the minimum avoiding any solid going to the inside cavities.

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

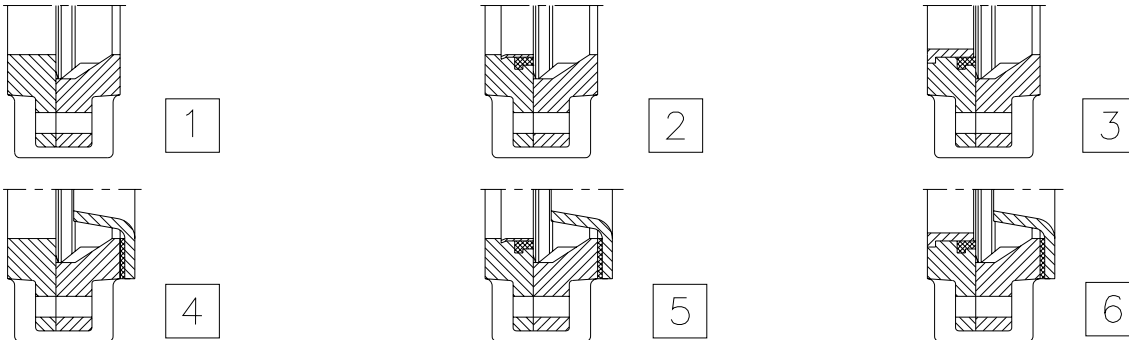
### 2) GATE

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

As standard the packing is composed by three lines with an EPDM o-ring in the middle. It provides the tightness between the body and the gate and avoids any kind of leakage to the atmosphere.

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 more corrosives, including concentrated oils and oxidants. It is also suitable for fluids with solid contents.

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

##### **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.

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



### 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 dirty 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 (Figure 2)

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 (Figure 1)

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 (Figure 2)**

Recommended for flow regulation purposes

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

**ACCESSORIES**

FIGURE 1

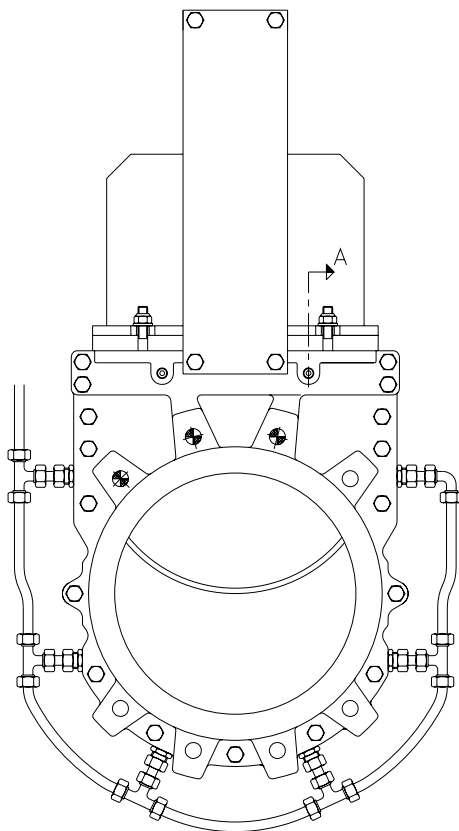
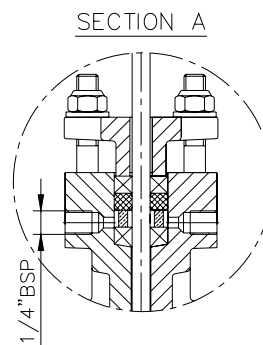


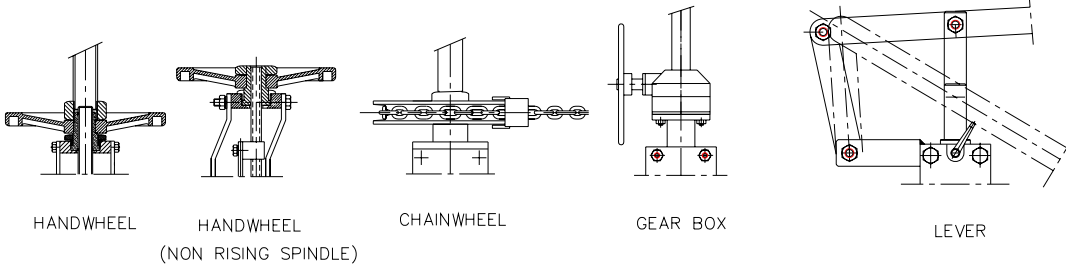
FIGURE 2



## ACTUATORS

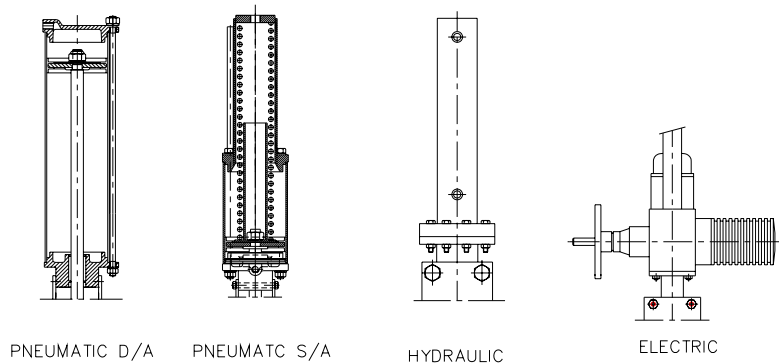
The following actuators are available:

### MANUAL ACTUATORS



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

### OTHER TYPES OF ACTUATORS



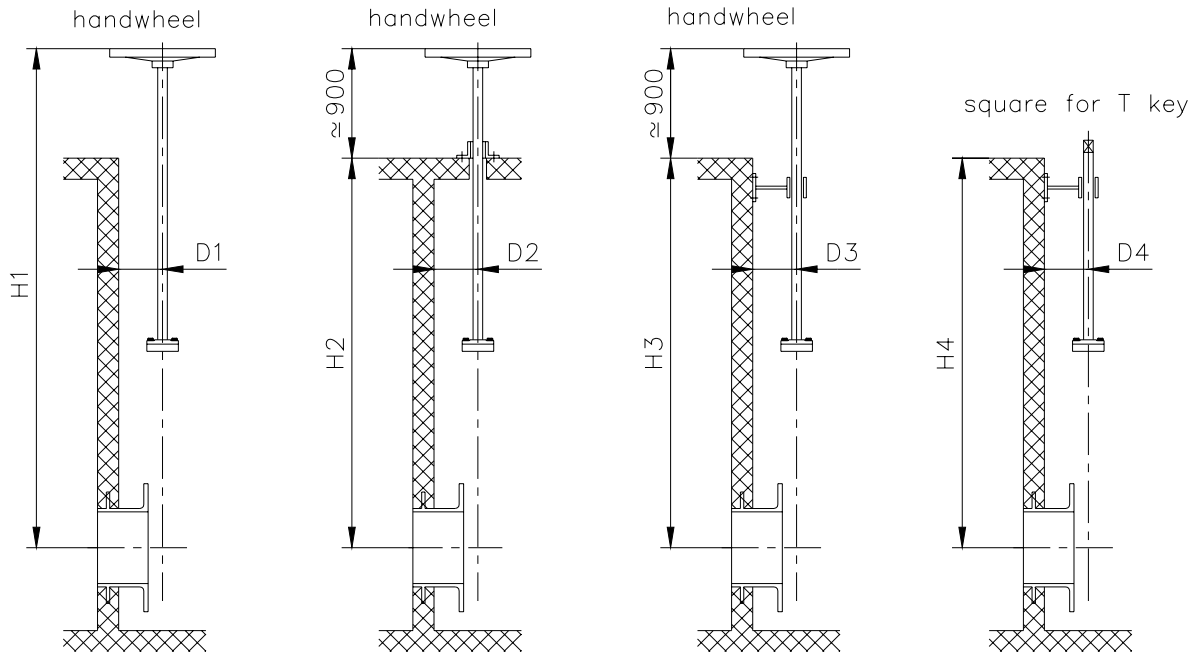
(\*NOTE: SINGLE ACTING ACTUATOR AVAILABLE WITH  
WITH SPRING TO CLOSE OR SPRING TO OPEN  
DESIGN.

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

# KNIFE GATE VALVES -- MODEL U

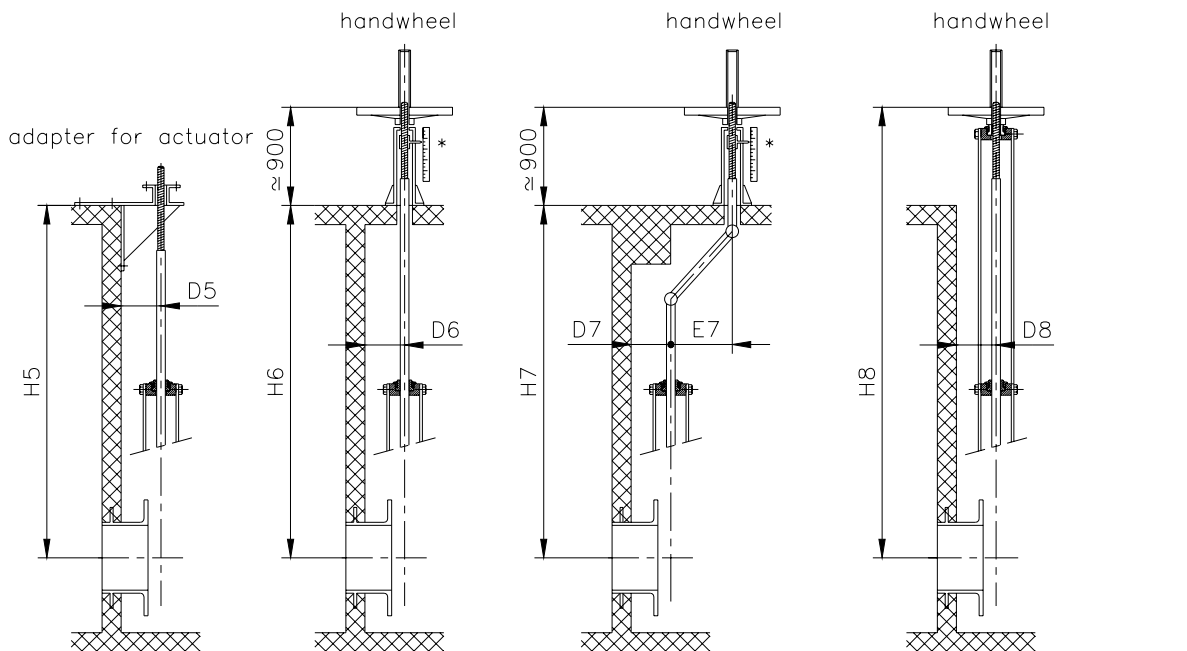
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## STEM EXTENSION TYPES



- 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.

\* Optional indication rule on the pedestal



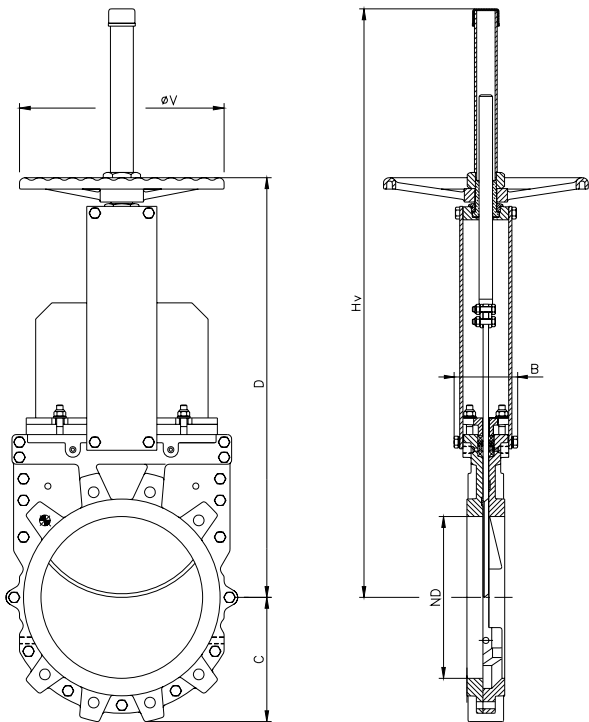
- 5) Rising stem with wall support and adapter for actuator
- 6) Rising stem with floor pedestal
- 7) Non rising stem with pedestal and two universal joints
- 8) Rising stem with extended support plates



# KNIFE GATE VALVES -- MODEL U

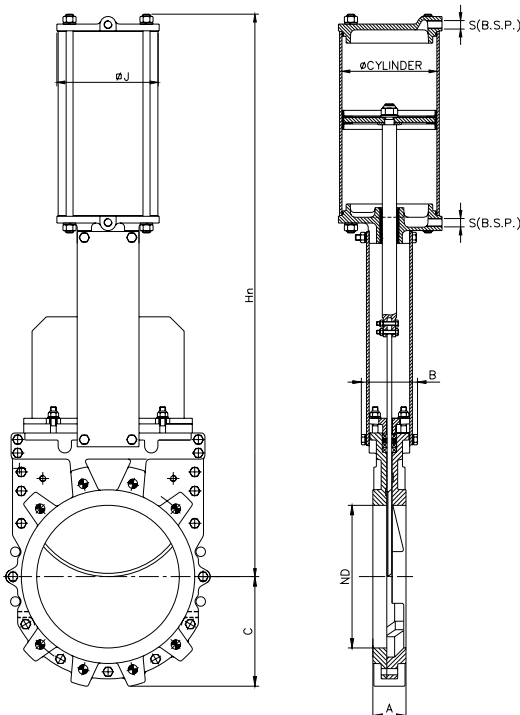
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## GENERAL DIMENSIONS: HANDWHEEL – RISING STEM (non rising stem also available)



DN	DIMENSIONES					
	A	B	C	D	øV	Hv
50	40	92	63	295	225	417
65	40	92	70	320	225	442
80	50	92	92	346	225	469
100	50	92	105	386	225	509
125	50	102	120	420	225	593
150	60	102	130	471	225	644
200	60	119	160	582	325	825
250	70	119	198	683	325	1026
300	70	119	234	790	380	1126
350	96	194	256	907	460	1357
400	100	194	292	1014	460	1463
450	106	290	308	1106	460	1651
500	110	290	340	1211	460	1756
600	110	290	400	1417	460	2062

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



ND	DIMENSIONS						
	A	B	C	ø CYLINDER	S B.S.P.	ø J	Hv
50	40	92	63	80	1/4"	96	412
65	40	92	70	80	1/4"	96	452
80	50	92	92	80	1/4"	96	494
100	50	92	105	100	1/4"	115	557
125	50	102	120	125	1/4"	138	635
150	60	102	130	125	1/4"	138	711
200	60	119	160	160	1/4"	175	871
250	70	119	198	200	3/8"	218	1027
300	70	119	234	200	3/8"	218	1177
350	96	194	256	250	3/8"	270	1380
400	100	194	292	250	3/8"	270	1536
450	106	290	308	300	1/2"	382	1691
500	110	290	340	300	1/2"	382	1846
600	110	290	400	300	1/2"	382	2152

## KNIFE GATE VALVES -- MODEL U

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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.

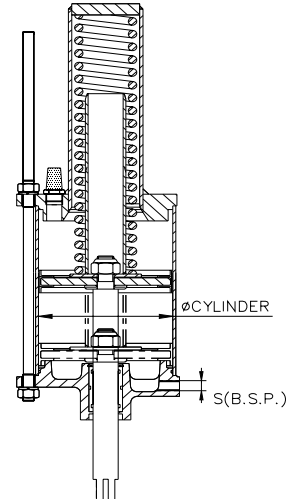
For valves bigger than DN200 the caps are manufactured in nodular cast iron or carbon steel.

The actuator can be manufactured fully in stainless steel under request and specially for very corrosive ambient.

### Single acting actuator:

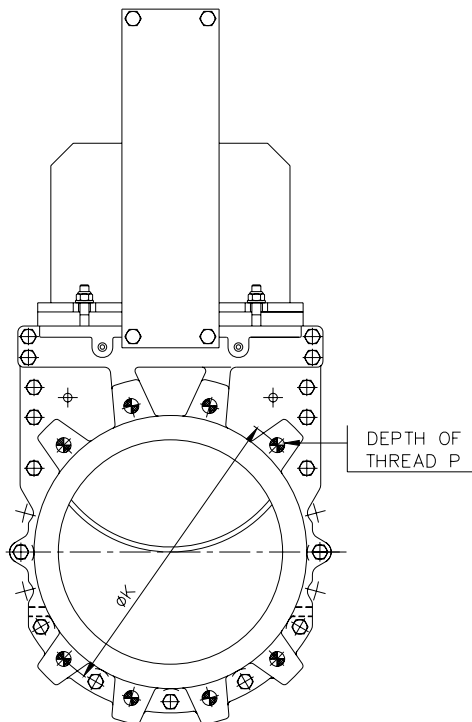
Fail close or fail open single actuators are available (spring to close or spring to open). For all size of valves the cylinder jacket is manufactured in aluminium, the caps are in cast iron or carbon steel, the piston rod in AISI304, the cylinder piston in steel covered by nitrile, the o-rings in nitrile 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.

### FLANGE CONNECTION DETAILS



ND	FLANGE DRILLING									
	DIN PN10					ANSI150				
	⊕	○	M Metric	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	12	160	4		5/8"	12	152'4
100	4	4	M.16	12	180	4	4	5/8"	12	190'5
125	4	4	M.16	12	210	4	4	3/4"	12	215'9
150	4	4	M.20	14	240	4	4	3/4"	14	241'3
200	4	4	M.20	14	295	4	4	3/4"	14	298'4
250	6	6	M.20	15	350	6	6	7/8"	15	361'9
300	6	6	M.20	15	400	6	6	7/8"	15	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