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Product Manual

3-Position Gate Valve

3 Position Gate valve

Contents

3 Position Gate valve

Foreword

Before starting operation, make sure to read and understand this manual completely.

Safety and danger

Information on preventing extensive equipment and environmental damage.

Information on correct handling or use. Disregard can lead to malfunctions or minor equipment damage.

Instruction

Vacuum gate valve usually be used for connecting and block the medium of tube, Suited for large pressure and tubing in big circular.

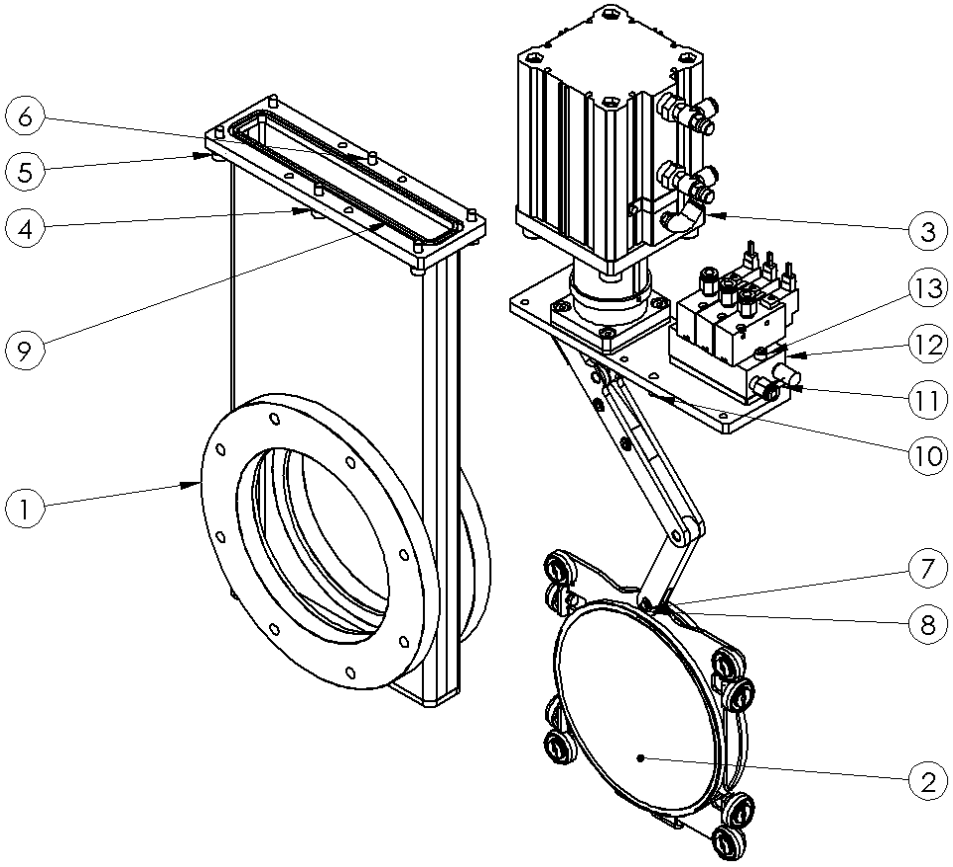
Htc vacuum (HIGHLIGHT TECH CORP.) gate valves are appropriate for both HV and UHV applications and can be operated in pneumatic or in manual modes. Htc gate valves can be used with Cryo-Pumps, Turbo molecular Pumps or in any applications requiring clean, high life cycle, and low maintenance processing.

Except the function of opening and closing tubing, the 3-position gate valve series products increase the control of the gate stopping at the 3rd middle position to provide the user with the ability to adjust the flow of the tubing.

3 Position Gate valve

Product description

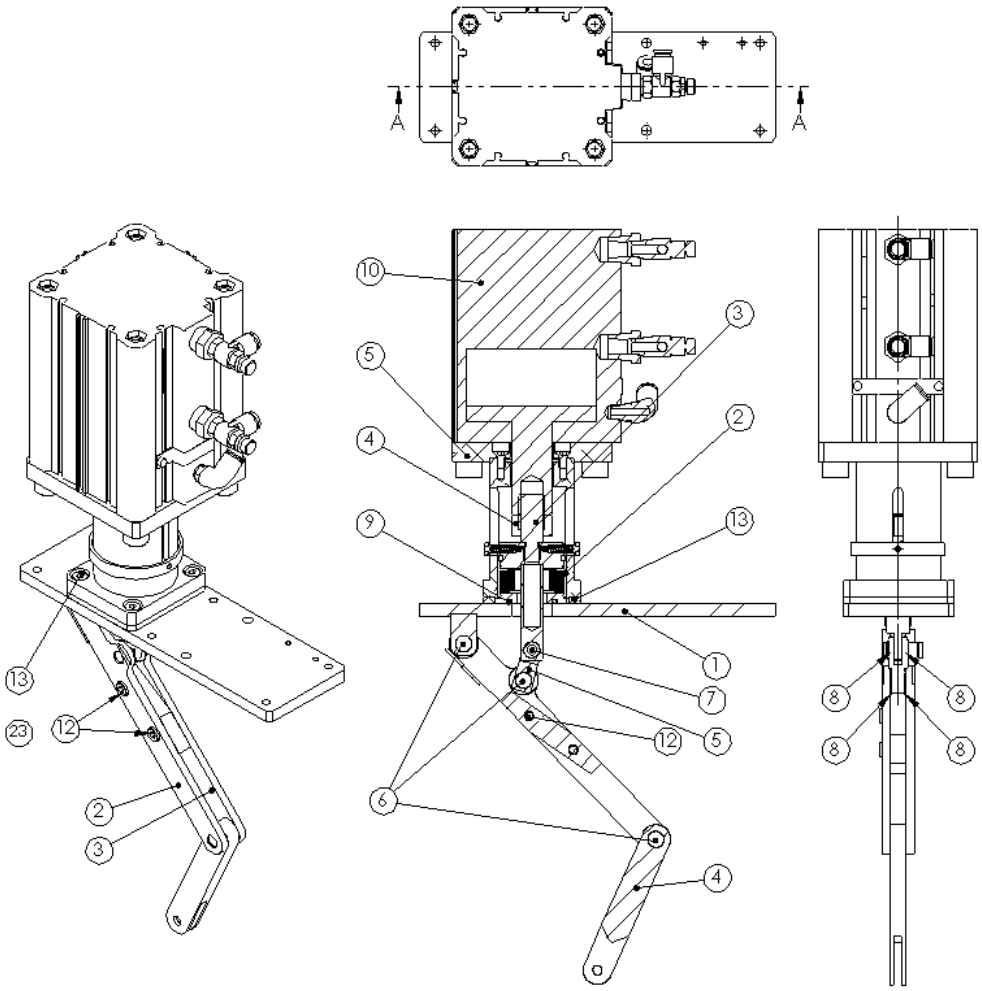
Valve replaces



NO.	Parts Name	Materials	quantity
13	Screws	SUS304	2
12	Solenoid valve base		1
11	Solenoid valve fixing plate	SUS304	1
10	Pin	SUS304	2
9	O-ring	Viton	1
8	E buckle	SUS304	2
7	Drive shaft	SUS304	1
6	Screws	SUS304	6
5	Spring washer	SUS304	6
4	Washer	SUS304	6
3	ISO160 Cylinder		1
2	Gate/Carriage	SUS304	1
1	Body	SUS304	1

Drive link

3 Position Gate valve



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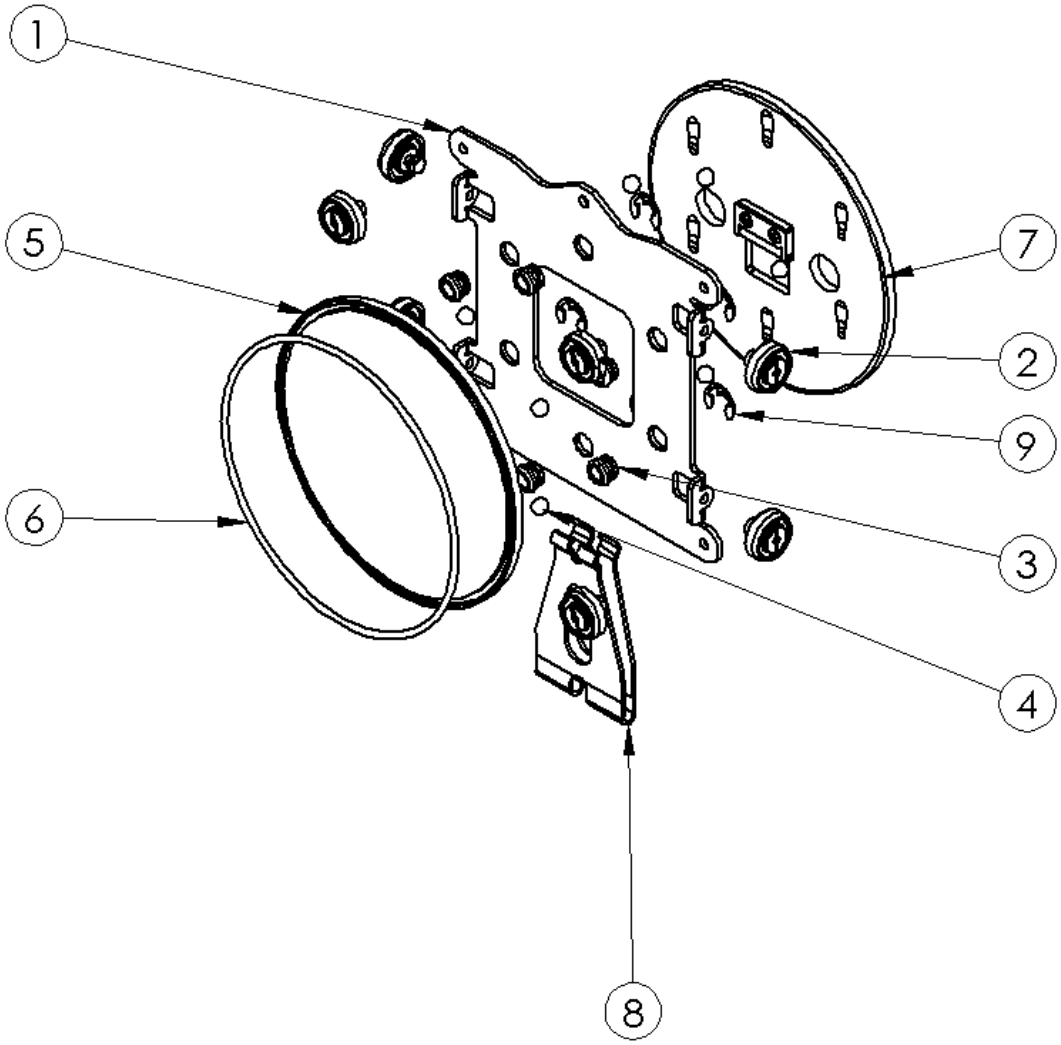
NO.	Parts Name	Materials	quantity
13	Screws	SUS304	4
12	Screws	SUS304	2
11	Spring washer	SUS304	2
10	Pneumatic cylinder		1
9	O-Ring	VITON	1
8	Washer	SUS304	4
7	Link pin-1	SUS304	1
6	Fixed pin	SUS304	3
5	Main shaft	SUS304	1
4	Drive link	SUS304	1
3	Drive link-3	SUS304	1
2	Drive link-1	SUS304	1
1	Top flange		1

Gate carriage

3 Position Gate valve



NO.	Parts Name	Materials	quantity
9	E buckle	SUS304	6
8	Clamp spring	SUS301-CSP	1
7	Plates	SUS304	1
6	O-Ring	VITON	1
5	Gate	SUS304	1
4	Steel ball-OD=8.5	SUS440C	12
3	Steel ball column	SUS304	6
2	Bearing	SUS304	8
1	Drive plate	SUS304	1

3 Position Gate valve

Specification

Material	Body	304 S.S.	
	Carriage	304 S.S.	
	Valve	304 S.S.	
	Bellows	AM350	
Mounting orientation	Any		
Life Cycle		HV type	UHV type
	≦ 4”	300,000 cycle	100,000 cycle
	> 4”	300,000 cycle	50,000 cycle
Helium leak rates at 1 atm differential	$< 2\times10^{-9}$ mbar • l /sec for O-ring $< 5\times10^{-10}$ mbar • l /sec for gasket seal		
Bake Temperature	Open	200℃ Viton bonnet seal	
	Closed	150℃ Viton bonnet seal	
Pressure Range (mbar)	HV: $1x10^{-8}$ ~ 1000 UHV: $1x10^{-10}$ ~1000		
Maximum ΔP (mbar)	≦ 30 before opening		
Standard Seal	Gate	Viton O-ring	
	Bonnet	Viton O-ring or OFHC copper gasket	
Actuator	Pneumatic		
Surface Treatment	Scotch Polished		
Limit switch Solenoid valve	24V DC		

Technical Data

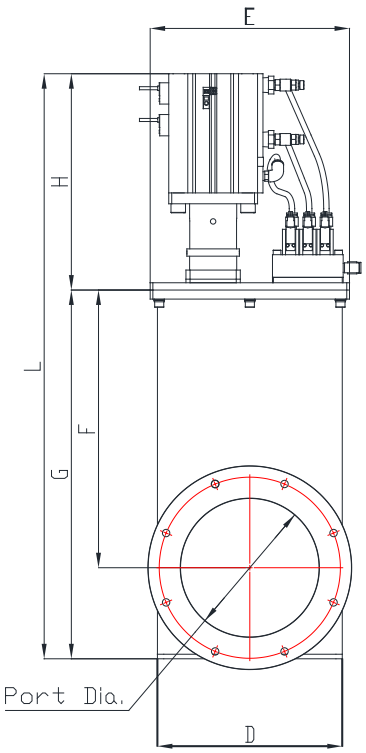
3 Position Gate valve

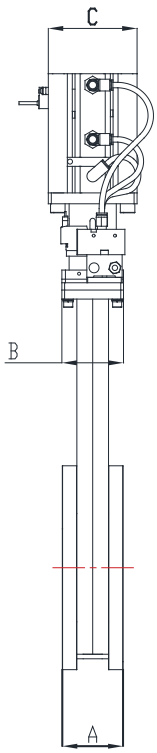
Body Size(Type)	Standard Flange O.D.(Weight)			Air Pressure	Actuated Frequency
	ISO (kg)	CF(kg)	KF(kg)	Kg/cm2	Open & Close
2.5” (B)	130 (7)	113.6 (7)	*	4~6	3 seconds
4” (B)	165 (10)	151.6 (11)	*	4~6	3 seconds
6” (B)	255 (18)	202.5 (17)	*	4~6	5 seconds
8” (B)	285 (27)	253.2 (26)	*	4~6	5 seconds

3 Position Gate valve

Dimension

HV type





Model No.	Part No.	Port Dia.	Bonnet Seal	Flange O.D.	Bolt P.C.D.	Bolt Size	Thread Depth
GVBB3P-SS-ISO63-P	GA4C611CB	63.7	Viton	130	110	M8*4	12
GVBB3P-SS-ISO100-P	GA4E611CB	102	Viton	165	145	M8*8	12
GVBB3P-SS-ISO160-P	GA4F611CB	153	Viton	225	200	M10*8	16
GVBB3P-SS-ISO200-P	GA4G611CB	200	Viton	285	260	M10*12	16

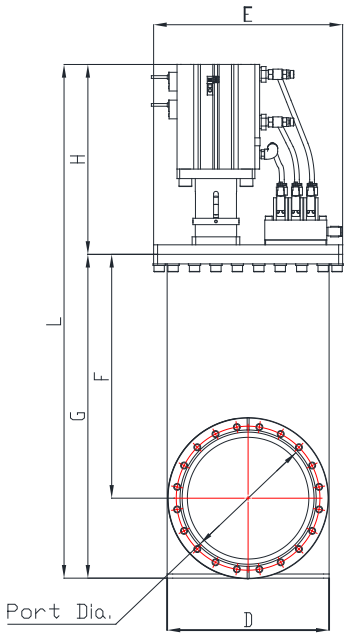
Model No.	A	B	C	D	E	F	G	H	L
GVBB3P-SS-ISO63-P	53	68	77	107	128	158	207	200.5	407.5
GVBB3P-SS-ISO100-P	53.6	68	98	146	170	222	297	215	512
GVBB3P-SS-ISO160-P	67	68	98	204	220	306.5	407	239	646
GVBB3P-SS-ISO200-P	67	70	98	245	267	383	507	239	746

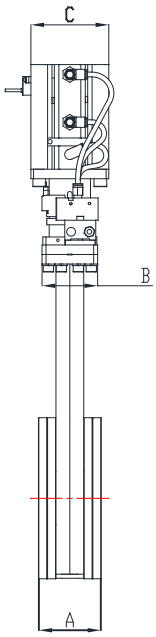
Unit:mm

3 Position Gate valve

Dimension

UHV type





Model No.	Part No.	Port Dia.	Bonnet Seal	Flange O.D.	Bolt P.C.D.	Bolt Size	Thread Depth
GVBB3P-SS-CF63-P	GB3C611CB	63.7	Metal	113.6	92.1	M8*8	18
GVBB3P-SS- CF100-P	GB3E611CB	102	Metal	151.6	130.3	M8*16	20
GVBB3P-SS- CF160-P	GB3F611CB	153	Metal	202.5	181	M8*20	22
GVBB3P-SS- CF200-P	GB3G611CB	200	Metal	253.2	231.8	M8*24	24

Model No.	A	B	C	D	E	F	G	H	L
GVBB3P-SS-CF63-P	65	68	77	107	143	158	207	200.5	407.5
GVBB3P-SS- CF100-P	69.6	68	98	146	182	222	297	215	512
GVBB3P-SS- CF160-P	79	70	98	204	238	306.5	407	239	646
GVBB3P-SS- CF200-P	84.4	70	98	245	282	382	506	239	745

Unit:mm

3 Position Gate valve

Installation

Unpacking

Unpacking the valve from the shipping box and inspect any obvious damage. If damage exists, please contact with Htc immediately.

- Check the gate surface, O-ring surface and O-ring grooves on the valve body, keep them clean and make sure there is no object enters the valve before installation.
- Please wear non-lint gloves when touch the gate and use clean tool to decrease probability of dust pollutes the gate.

Mounting orientation

The seal plate side of the valve should be installed toward the vacuum side of the system. It can be installed in any direction.

CDA and electrical

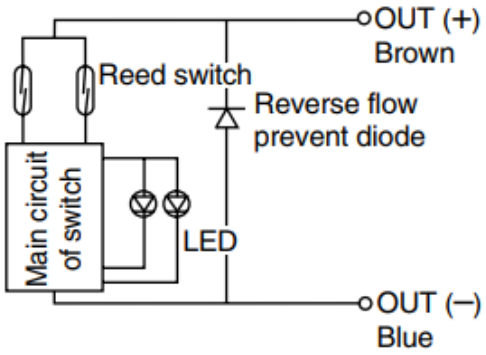
Air pressure: 5 to 6 kg/cm^2
Air tubing: 4x6 mm
Reed sensor：DC24(V)，5-40 mA

3 Position Gate valve

Position indicator

Signals from the switches can be employed to activate a variety of external devices such as indicator lights, alarms and other instruments. A valve can be wired to prevent its accidental opening when entire system is shut down due to power failure. These position indicators are very useful in automatic process control, signals from the opening or closing of a valve can be employed to trigger complex procedures in the high vacuum control system. You can confirm the opening or closing position of valve visually by the outer position indicator.

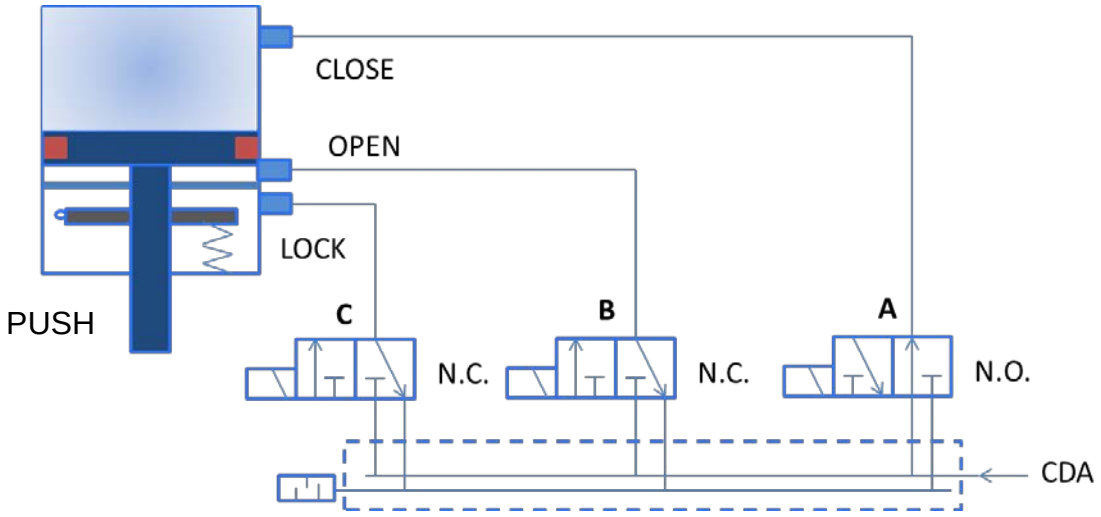
Reed Sensor Fast Connector Wiring



In order to control, needs to install reed sensor 3 pcs on the cylinder of 3-position gate valve, sensors are in charge of detecting open/close and 3-postion. According to the need to determine the location of 3-position sensor (there is a setting mark on the cylinder for reference). Avoid signal interference between sensors; the opening can be set in the range 10%~90%.

3 Position Gate valve

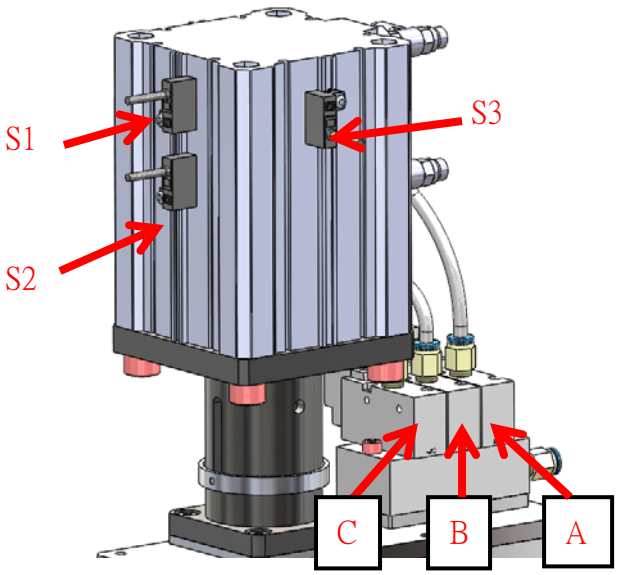
Pneumatic tubing

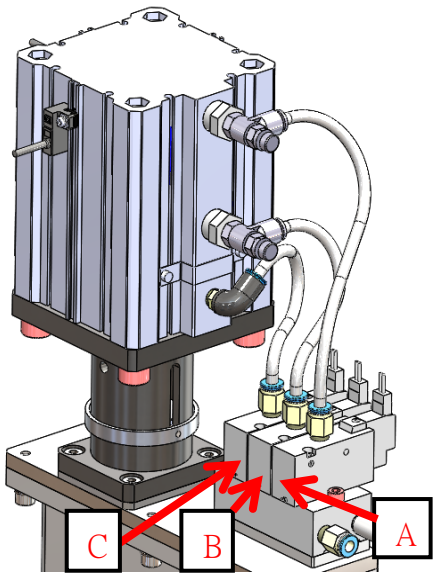


Symbolic explanation

A: Solenoid A
B: Solenoid B
C: Solenoid C

S1: Sensor 1 (Open position)
S2: Sensor 2 (Close position)
S3: Sensor 3 (3-position)





3 Position Gate valve

Operation

- Keep hands out of the gate when air is supplied.
- The valve contains a movable element. Do not connect the pressure connector, except the following conditions:
  - Pressure source is not pressurized.
  - The valve had already installed on vacuum system.
  - Movable element have protective measures.
- Supply incorrect voltage will damage product.

Action; Solenoid valve	A	B	C	S1	S2	S3
Close (original setting)	OFF	OFF	ON/OFF	OFF	ON	OFF
Open	ON	ON	ON	ON	OFF	OFF
3-Position	ON	ON	OFF	OFF	OFF	ON
Notice：When release 3-position status, must carry out close procedure. Do not turn on Solenoid valve C only, otherwise, it will make the cylinder move on suddenly and broken the devices.						

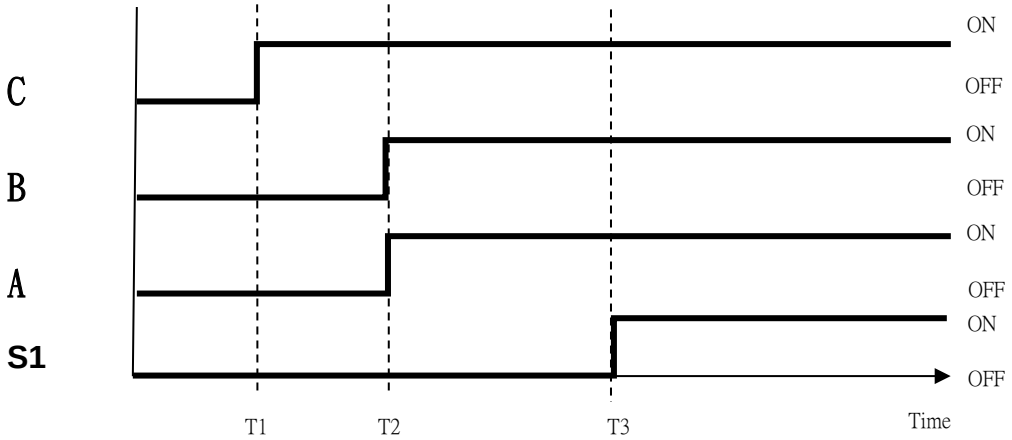
Remark: ON/OFF is the state in which the solenoid valve is actuated. For detailed actuation sequence, please refer to the valve position control timing diagram on the next page.

The 3-position gate valve is driven by the retractable cylinder lock type. When the actuator is pushed out, the locking action is invalid. Above tubing and solenoid is the standard equipment which is selected by Htc. If the user selects solenoid and tubing by himself, he needs to follow the correct operation and control logic to avoid damage on vacuum gate valve.

3 Position Gate valve

Valve position control timing diagram

Valve open timing diagram



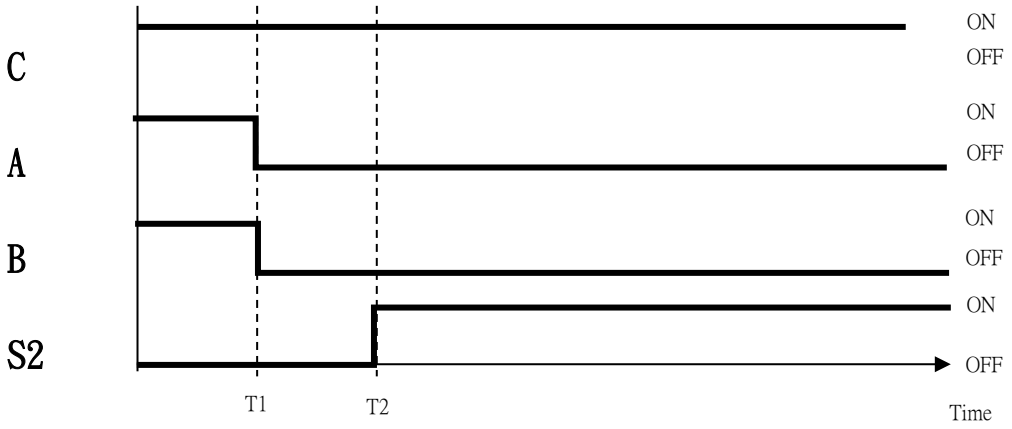
T1: Solenoid C starts to work, cylinder locking mechanism unlocked.

T2: After unlocking for about 0.5 seconds, solenoid A&B starts to work (ON). The open air intake starts to intake.

T3: When the cylinder reaches the set valve open position, sensor and light are on.

* The rest of the sensors are not active (OFF) 。

Valve close timing diagram



T1: Switch starts to work, Solenoid A/B starts to work, Close air intake starts to intake.

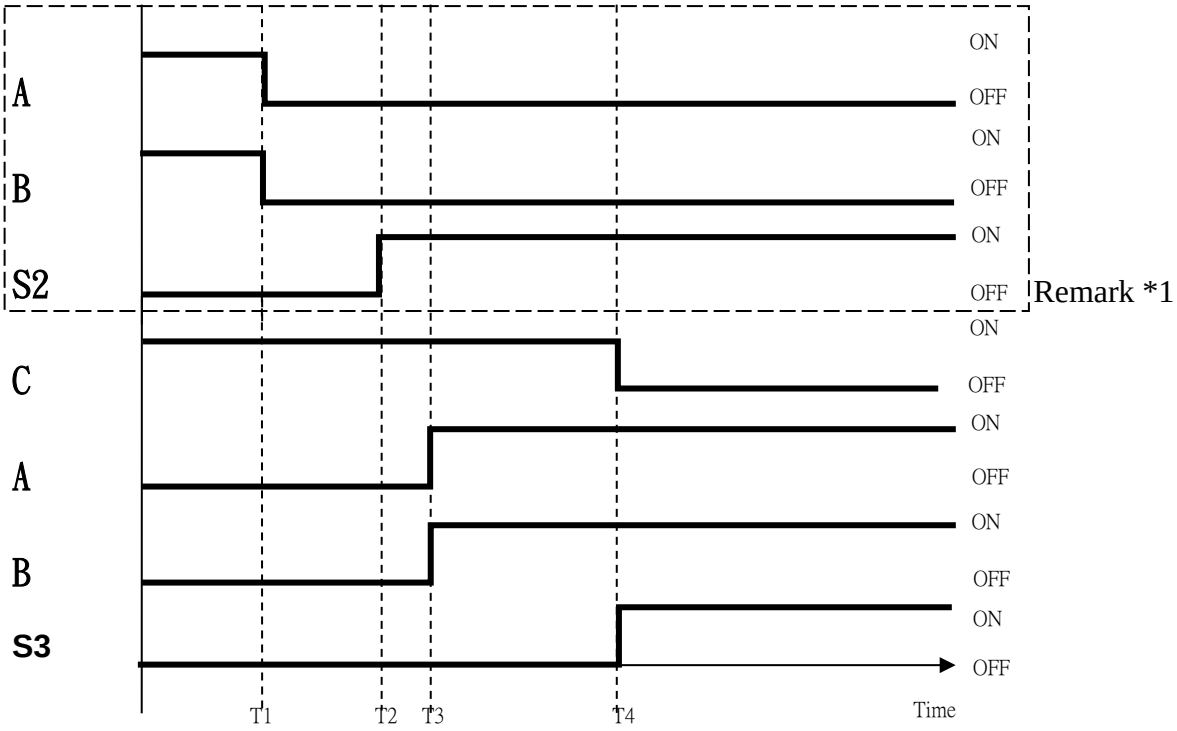
T2: When the cylinder reaches the valve close set position, sensor and light are on. Gate air inlet starts to close.

* The rest of the air intake & sensors are not active (OFF)

** Solenoid C always on

3 Position Gate valve

Reach at the 3-position timing diagram



T1: Solenoid A & B starts to work, close inlet intake and open intake exhaust.

T2: The cylinder moves from the fully open position to the fully closed position. Close position sensor and solenoid C (ON). Cylinder locking mechanism unlocked.

T3: After the cylinder is unlocked, the solenoid A & B (ON). Open inlet intake and close intake exhaust.

T4: When the cylinder moves to 3-position. The 3-position sensor S3 is (ON). Solenoid C is closed and cylinder is locked.

* The rest of the sensors are not active (OFF).

Remark *1: The control frame of the dotted line is the control timing diagram of the valve closing. The valve cannot be moved from the fully open position direct to the third position. If the initial position (fully closed position) is not required, the part of the dotted line process is not required. It can be started by the electromagnetic valve at the time point T2 when the solenoid valve C is actuated to ON.

Leaving the 3-position timing diagram

Valve closing action must be performed when leaving the 3-position.

The solenoid valve C actuation (ON) needs to be 0.5 seconds later than the solenoid valve A/B (OFF).

3 Position Gate valve

Troubleshooting

Valve cannot be closed

Check power

Check Air

Check Solenoid Valve

Valve cannot be opened

Check power

Check Air

Check Solenoid Valve

Gate plate leakage

Clean O-ring, O-ring groove and the seal side

Check CDA pressure, it has to exceed 5 kg / cm^2.

Replace O-ring.

Body leakage

Clean the gate surface, O-ring, flange.

Replace O-ring, washer or valve cover seal.

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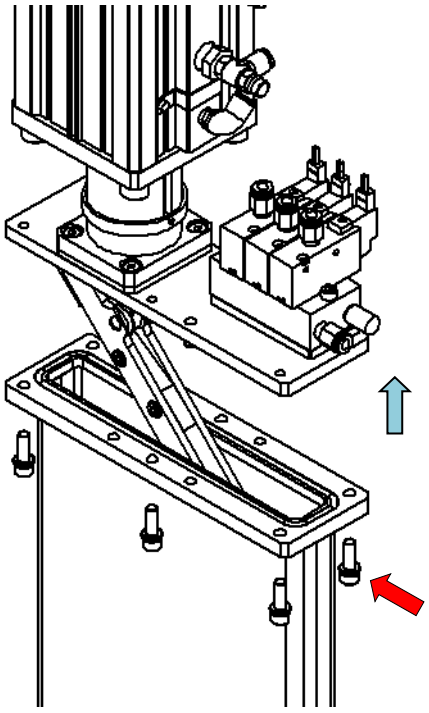
Change the O-ring of sealing plate

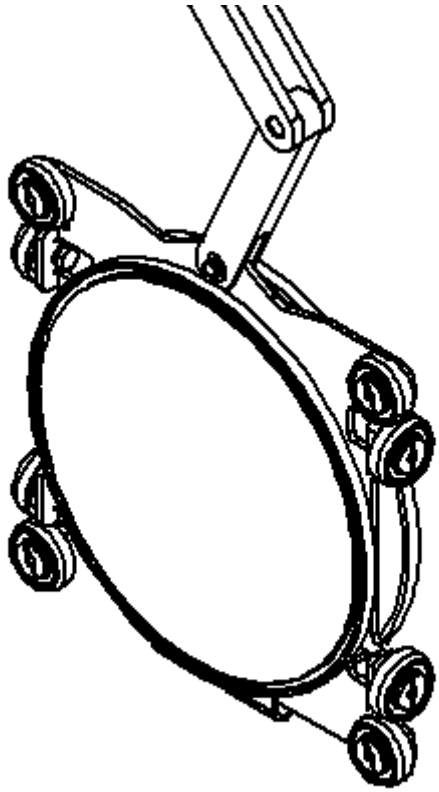
(1) Keep the gate valve on opening status, disassembly pneumatic tubing and sensor wiring.

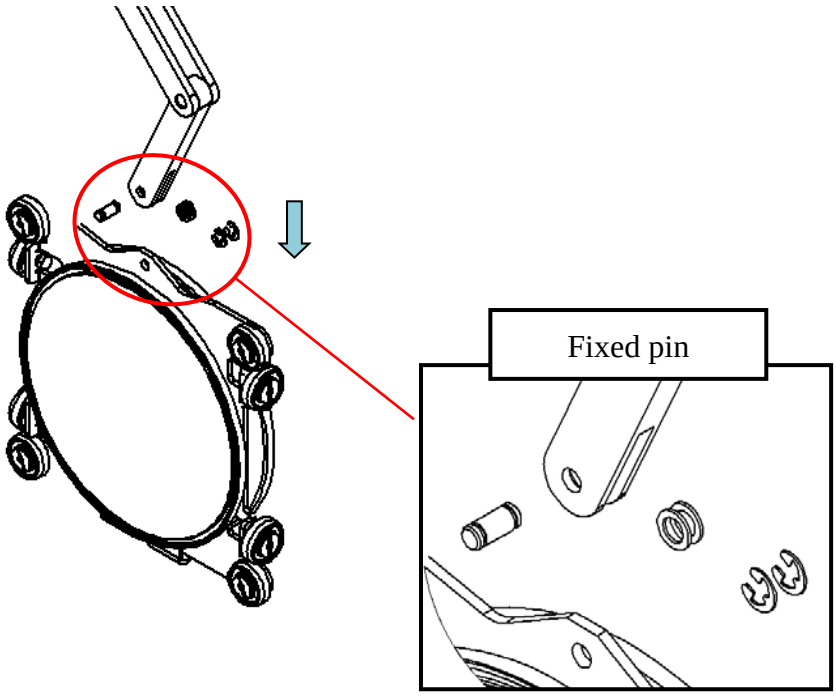
(2) Disassembly the screw from the flange of gate valve body, draw out the linkage and tackle from body.



3 Position Gate valve

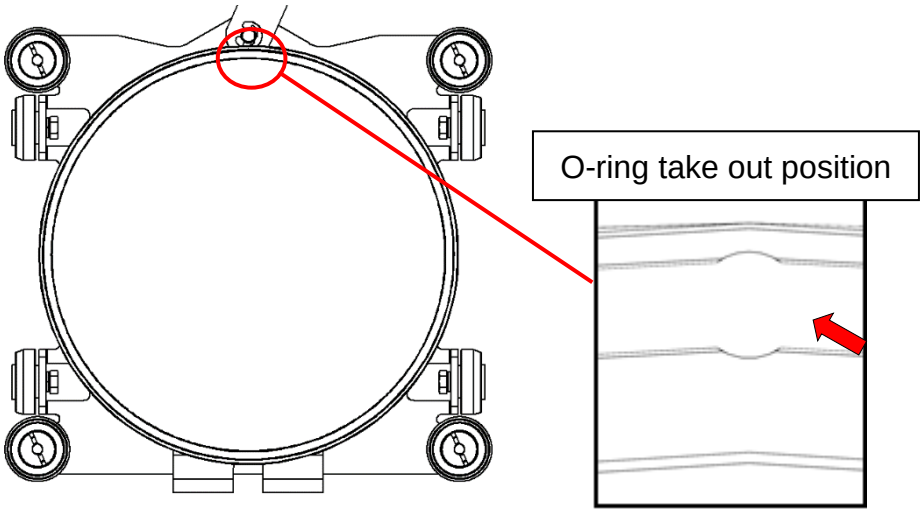
(3) Disassembly the pins of the linkage and tackle.





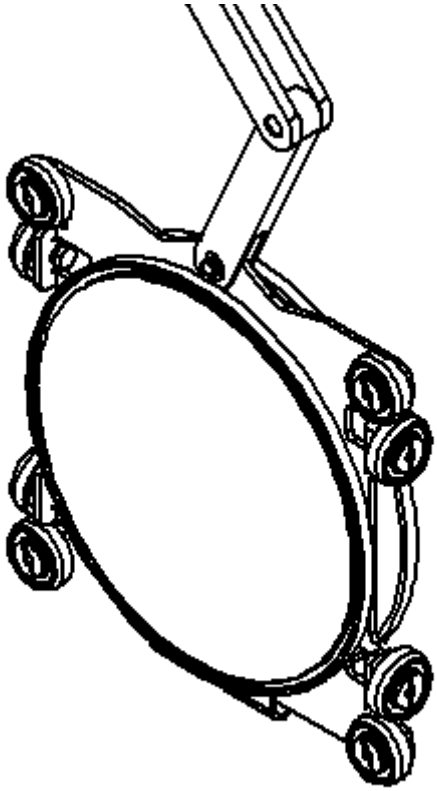
3 Position Gate valve

(4) Disassembly the O-ring of the tackle, took it out from the arrow at the bottom.



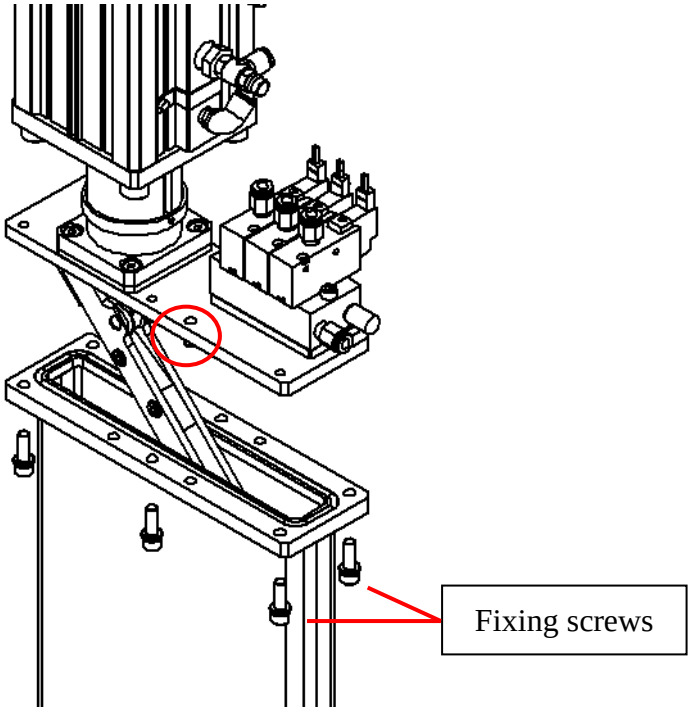
(5) Clean the groove of the tackle and place new O-ring.

(6) Connect the linkage and tackle.



3 Position Gate valve

(7) Combined the gate valve body and pay attention for the position of fool-proof pin. Screw the bolts as the red circle we pointed out. Screws should be fixed uniformly with symmetrical bolts to avoid damage caused by unequal stress.



Note: UHV type needs to be replaced with a new OFHC copper gasket

3 Position Gate valve

Contact

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