CKD

SM－9227－A

INSTRUCTION MANUAL

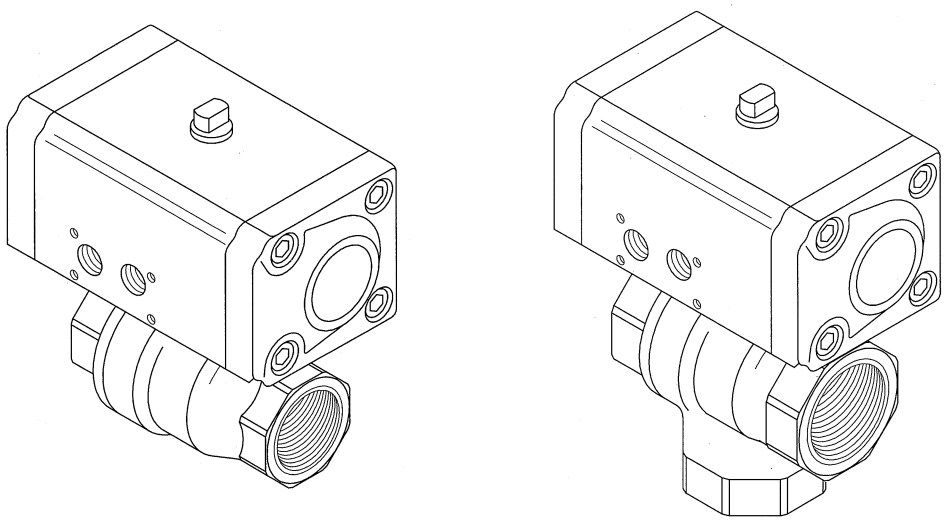
AIR OPERATED

BALL VALVE

CHB Series

CHBF Series

CHG Series



- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

Ver.7

CKD Corporation

Safety precautions

When designing and manufacturing a device using CKD products, the manufacturer is obligated to manufacture a safe product by confirming safety of the system comprising the following items:

■ Device mechanism
■ Pneumatic or water control circuit
■ Electric control that controls the above

It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

⚠ WARNING

1. This product is designed and manufactured as a general industrial machine part. It must be handled by someone having sufficient knowledge and experience.

2. Use this product within its specifications.

Consult with CKD for details when using the product beyond the unique specification range, outdoors, or in the following conditions or environment: Additionally, the product must not be modified or machined.

① Use for special applications requiring safety including nuclear energy, railroad, aviation, ship, vehicle, medical equipment, equipment or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.
② Use for applications where life or assets could be adversely affected, and special safety measures are required.

3. Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.

ISO4414, JIS B 8370 (pneumatic system rules)
JFPS2008(principles for pneumatic cylinder selection and use)
Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, body standards and regulations, etc.

4. Do not handle, pipe, or remove devices before confirming safety.

① Inspect and service the machine and devices after confirming safety of the entire system related to this product.
② Note that there may be hot or charged sections even after operation is stopped.
③ When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Discharge any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.
④ When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

5. Observe warnings and cautions on the pages below to prevent accidents.

■ **The safety cautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.**

DANGER : When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.

WARNING : When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.

CAUTION : When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation. In any case, important information that must be observed is explained.

Precautions with regard to guarantee

● Guarantee period

The guarantee period of our product shall be one (1) year after it is delivered to the place specified by the customer.

● Guarantee coverage

If any failure for which CKD CORPORATION is recognized to be responsible occurs within the above warranty period, a substitute or necessary replacement parts shall be provided free of charge, or the product shall be repaired free of charge at the plant of CKD CORPORATION.

However, the guarantee excludes following cases:

① Defects resulting from operation under conditions beyond those stated in the catalogue or specifications.
② Failure resulting from malfunction of the equipment and/or machine manufactured by other companies.
③ Failure resulting from wrong use of the product.
④ Failure resulting from modification or repairing that CKD CORPORATION is not involved in.
⑤ Failure resulting from causes that could not be foreseen by the technology available at the time of delivery.
⑥ Failure resulting from disaster that CKD is not responsible of.

Guarantee stated here covers only the delivered products. Any other damage resulting from failure of the delivered products is not covered by this guarantee.

● Confirmation of product compatibility

Our customer shall be responsible of confirming compatibility of our product used in our customer's system, machinery or device.

【 Contents 】

1. Unpacking

⚠ CAUTION	Do not remove the packing bag until just before piping work. Otherwise, foreign matter enters from the port and cause malfunction or bad operation.

(1) Check that the model No. shown on the face plate of the product is the same with what you ordered.
(2) Check that the product has no external damages.
(3) When storing the product, attach a sealing plug to prevent the intrusion of foreign matter to the valve. Remove the sealing plug when piping the valve.

2. Installation

⚠ WARNING	Contact CKD if the product is to be used beyond specifications, or in special applications.

2.1 Conditions for installation

⚠ WARNING	a) If there are high levels of dust in the area, provide protection by installing a silencer or an elbow joint facing downward onto the exhaust port so that dust does not enter. b) Do not use this product in an environment in which corrosive gases could encroach the configuration materials. c) Install this product at a place not subject to vibration. d) Avoid humid environments, since condensation may occur with change in temperature.

(1) When using the valve in a cold district, an proper provision is required to prevent freezing of the valve.
(2) To use in a flammable gas environment, install the separate explosion proof solenoid valve on the pilot air circuit.

2.2 Installation method

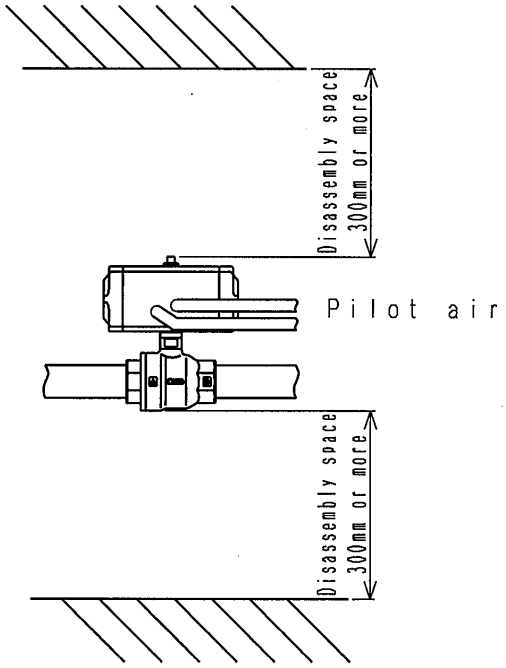
2.2.1 Installation

⚠ CAUTION	a) Always thoroughly read the Instruction Manual before installing this product. b) Always hold the body when handling or installing the product. c) After installing, check for leak from the pipe and make sure that the product is correctly installed.

(1) The installation posture of the valve is not restricted.

2.2.2 Space for maintenance

・ An adequate space shall be provided around the valve to assure the safety during the maintenance / troubleshooting work.



(Figure 2.1)

2.3 Piping method

⚠ CAUTION	a) Fix the product when tightening or reinstalling the piping. When piping to the body side, fix the body, and when piping to the cap side, fix the cap. b) Fix and support the pipes so that the weight and vibration of the pipes are not directly applied on the valves. c) Torque required to tightening pipes are shown in Table 2.2, 2.3 for reference.

(1) Cleaning of piping

・ Before piping, flush the inside of the pipe with 0.3MPa air, and remove any foreign matter, metal powder, rust and sealing tape, etc.

(2) Removal of foreign matter

・ Any dirt or foreign matter in the fluid can prevent the product from functioning correctly. Install an 80 mesh strainer when passing water, and a 5 μ or less filter when passing air.

(3) Piping

・ When piping, pipe the ball valve side and the supply port side of pilot air as shown in Table 2.1.

・ The rubber exhaust cap put on the respiratory hole of the single acting actuator is for preventing mis-piping. The rubber exhaust cap need not be taken off unless water or oil may splash on the valve. In such cases, take off the exhaust cap and take appropriate protective measures to prevent intrusion of liquids inside the valve.

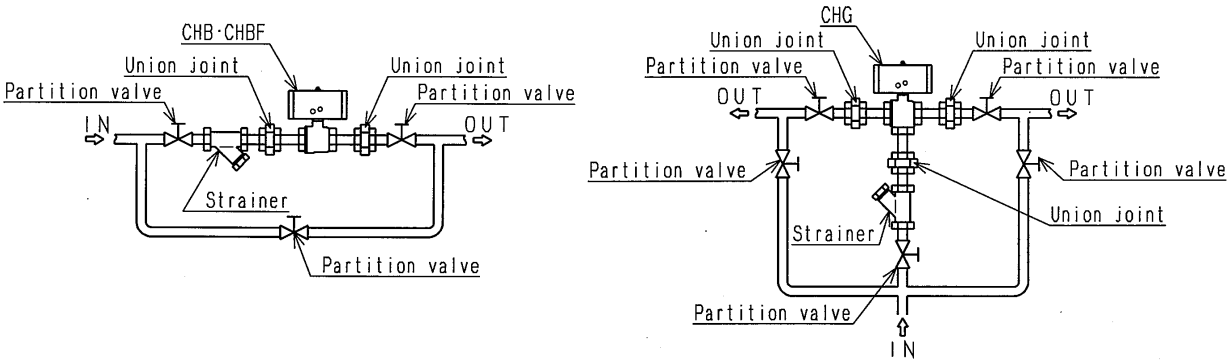
・ Fix the valve by piping support of the ball valve part.

・ When controlling the fluid in a tank, pipe at a level slightly above the bottom of the tank.

Table 2.1 Supply port

Actuation	Ball valve side supply port	Pilot air supply port
2port valve double acting	A or B	OPEN and CLOSED
2port valve single acting	A or B	IN
3port valve double acting	C	A－C and B－C
3port valve single acting	C	IN

The following figure describes recommended piping methods.
Piping recommends the example of the following figure.

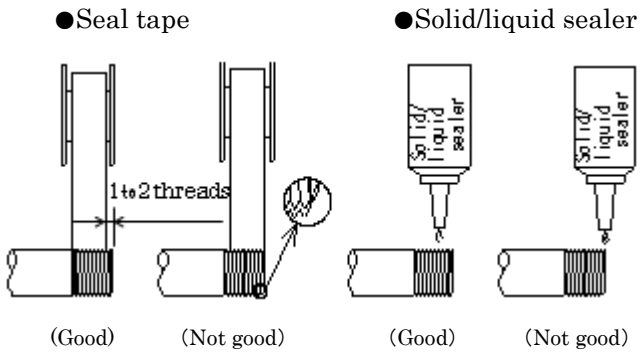


(Figure 2.2)

In order to make maintenance check easy to carry out, a union joint or a flange joint should be used, as well as installation of a bypass.

(4) sealer

・ The sealer shall be used with great care to prevent it from entering the pipes or causing external leakage.
When taping a threaded portion, 1 to 2 threads at the end of the portion shall be exposed. (Figure 2.3) When using liquid sealer, take care not to apply too much sealer. Similarly to the case of taping, threads at the end of the threaded portion shall be exposed.
Do not apply to the female screw of the product.



(Figure 2.3)

(5) torque

·Torque required to tightening pipes are shown in Table 2.2, 2.3 for reference.

Table 2.2. Pilot port recommended torque

Port size	Torque for tightening pipe
R c 1 / 8	7 to 9 [N·m]

Table2.3. Main port recommended torque

Port size	Torque for tightening pipe
Rc3 / 8	31 to 33 [N·m]
Rc1 / 2	41 to 43 [N·m]
Rc3 / 4	62 to 65 [N·m]
Rc1	83 to 86 [N·m]
Rc1 1/4	97 to 100 [N·m]
Rc1 1/2	104 to 108 [N·m]
Rc2	132 to 136 [N·m]

(6) Lubricated or non-lubricated operation

- This series is used with pre-lubricated specifications, so no lubricator is required. Once lubrication is started, however, lubricate continuously to avoid using up lubricator. When lubricating, use the turbine Class 1/ISO VG32 (#90) or the equivalent.

(7) Provision for drain

- The compressed air contains high levels of drain (water, oxidized oil, tar, foreign matter) which can cause the reliability of the pneumatic components to drop remarkably. Improve the quality of the air (create clean air) by removing moisture with an after cooler or dryer, by removing the foreign matter with a filter, and by removing the tar with a tar removal filter, etc.

(8) Solenoid valve for pilot operation

Please use our solenoid valve for pilot operation.

- Recommended solenoid valve for pilot operation

  Double acting : Pilot actuated 5 port valve : pilot operated valve 4G series

  Single acting : Direct actuated 3 port valve : pilot operated valve 3PB2 series

  (Please refer to an exclusive catalog for details.)

(9) Peripheral equipment of a pilot operation part (tube, joint)

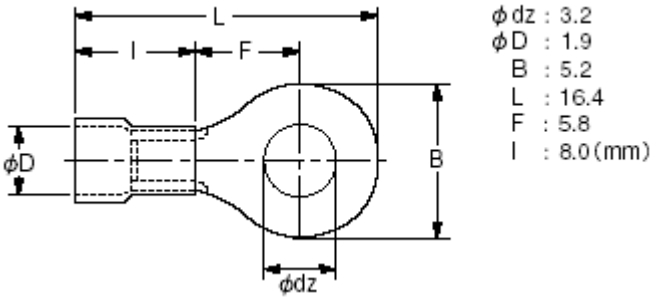
- Please use it according to the specification and the use of the solenoid valve for pilot operation. (Please refer to an exclusive catalog for details.)

2.4 Wiring method (With limit switch)

(1) Wiring

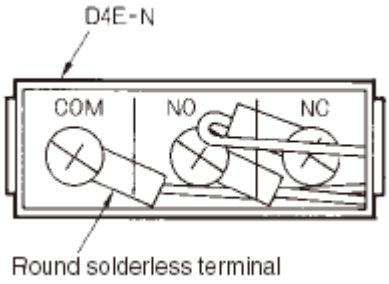
・ When wiring screw terminals, use M3-size round solderless terminals with an insulation tube is recommended.
The conductor size should be 0.75 mm² and cable diameter should be 7 mm.
（Figure 2.4, Figure 2.5）

Round solderless terminals



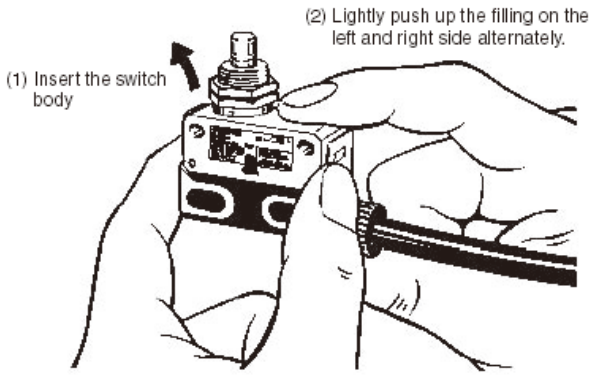
（Figure 2.4）

Wiring Method



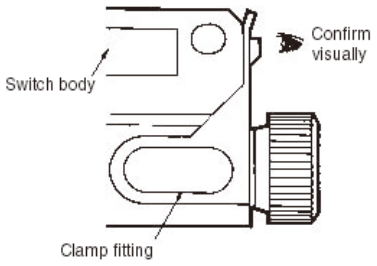
（Figure 2.5）

・ If the one-touch connector is to be mounted onto the switch body, lightly push up the fitting so that the switch body can then be inserted into the clamp. （Figure 2.6）



（Figure 2.6）

・ Be sure that the clamps are inserted to the full depth, because the Switch will not function properly if one of the clamps is improperly inserted. （Figure 2.7）



（Figure 2.7）

・ If the clamps are properly inserted up to the full depth, it will not slide out easily.
Be sure to confirm all the above items.

The limit switch is D4E-1G20N made by OMRON Corporation.
Please refer to the catalogue of D4E-1G20N for the details.

3. Pre-operation (post-installation) check

3.1 Appearance check

⚠WARNING	Shut off the fluid flow.(Close the main shut-off valve) Exhaust the fluid remaining in the valve.

(1) Push the valve with the finger to check that the valve has been properly fixed to the pipe.
(2) Check that the fasteners including hexagon socket head cap screws and bolts are not loose.

3.2 Check for leakage

(1) Apply pressure to the fluid to check for leakage at pipe joints.
It is recommended to check for leakage by supplying compressed air of 0.3 to 0.5MPa and applying soap water to the joints. Air bubbles will appear at the leaking joints.

3.3 Electrical check (With limit switch)

⚠WARNING	Turn off the power supply. Do not touch the wiring connection sections (bare live part) when energized. There is a risk of electric shock.

(1) Please refer to Table 3.1 for the rating.
Table 3.1. Ratings

Rated voltage	Non-inductive load (A)			
	Resistive load		Lamp load	
	NC	NO	NC	NO
250VAC	5		1.5	
30VDC	5		－	

(2) Power supply shall be more than 0.8W. Contact faults may occur if a Switch for general-load is used to switch a micro load circuit.
(3) Values above show normal current.
(4) Light load refers to a load with 10-fold rush current.
(5) The maximum rush current is 10 A.
(6) Consult with CKD when using at extremely small loads.
(7) The limit switch is D4E-1G20N made by OMRON Corporation. Please refer to the catalogue of D4E-1G20N for the details.

4. Instructions for proper use

4.1 Precautions at use

⚠WARNING	a) Do not use this product for an emergency shut off valve. ・The valves listed in this catalog are not designed as valves to ensure safety such as emergency shut off valves. When using in this type of system, always take separate measures that will absolutely ensure safety. b) Take measures to prevent harm to operators or objects if this product fails. c) Liquid-filled state ・ When conveying a liquid in a circuit, operation may fail if liquid-filled state occurs. This is because pressure rises in the liquid filled state when temperature changes. d) Working fluids ・ Do not use this product for fluids other than the working fluids listed in the specifications. ・ Before starting use, confirm the compatibility of the product and applicable fluid with the catalog Applicable Fluid Check List. ・ Internal parts may wear when the valve operates. Caution is required because wear chips could enter the secondary side of the valve.

⚠CAUTION	a) Observe the working pressure range. b) Water hammer prevention When preventing water hammer, restrict the exhaust side with metering valve with silencer and flow control valve, etc. c) Failure to observe the cycle rate could shorten service life. d) Do not touch the stem on the top of the actuator when activated. e) Generally, the valve can be used with a fluid viscosity of up to 500mm²/s. However, the properties may differ according to the fluid type, so consult with CKD. f) Observe the pressurization direction (C-port pressurization limit) for the 3 port valve.

(1) Do not put any object on the valve.

(2) The working pressure range and temperature range of the fluid and ambient temperature range shall be satisfied.

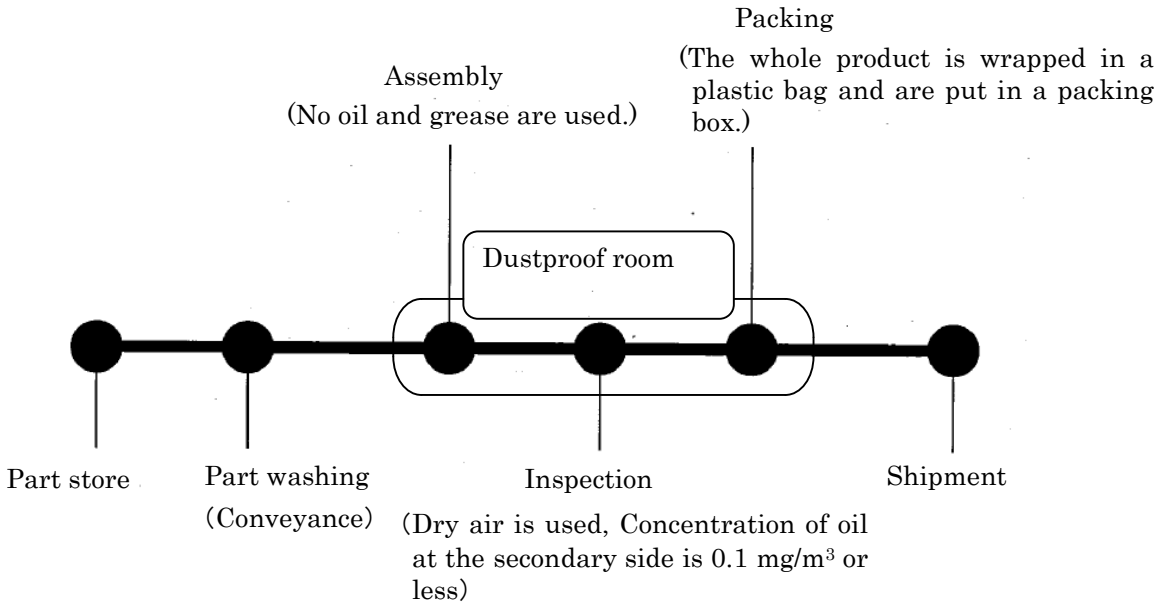
(3) Do not use this product in a explosive gas atmosphere.(applies only for products with limit switch)

(4) Perform trial run if the product has not been used for a long time.

(5) Refer to “6. Troubleshooting” if any abnormality occurs.

4.2 About oil removal

In CKD, high quality oil removal is attained by the following assembling procedures.
Take care when handling the product.



4.3 Disassembly procedure

⚠ CAUTION	a) Close the main supply valve and stop fluid flow. b) Exhaust the fluid remaining in the valve.

(1) Before disassembly, release the pilot and fluid pressure.
Confirm that there is no residual pressure inside the product.

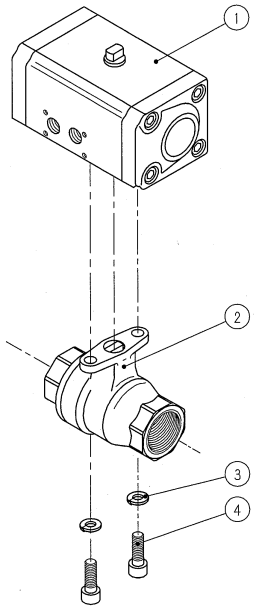
(2) Remove the hexagon socket head cap screw or the hexagon bolt ④.
Then , remove the spring washer ③.

(3) Raise the actuator ① upwards.

№	Part name	Quantity
1	Actuator Assembly	1
2	Ball valve	1
3	Spring washer	2
4	Hexagon socket head cap screw(＊1) Hexagon bolt(＊2)	2

＊1: CHB－10 to 25、CHB－R※－10 to 20、
CHBF－15 to 20、CHBF－R※－15、
CHG－15 to 25、CHG－R※－15 to 20

＊2: CHB－32 to 50、CHB－R※－25 to 50、
CHBF－25 to 40、CHBF－R※－20 to 40
CHG－32 to 50、CHG－R※－25 to 50



(Figure 4.1) The exploded view of the actuator and the ball valve

⚠WARNING	Do not disassemble the actuator. ・ Press-fitted parts are used for the actuator. It is not reusable once it is taken off. A spring is built in the single acting type actuator . There is a risk of injury since the spring may pop out.

⚠CAUTION	a) Do not disassemble the product if the body material is bronze. ・ Adhesives are applied to the connection part of the body and the cap. Once removed, external leak occurs from the connection part. b) When the ball valve is “oil removal type”, the product cannot be disassembled. ・ Since a high non-oil level is maintained, the composition parts of a ball valve are not exchangeable. Exchange the whole ball valve. c) Handling of single acting type actuator section. ・ Do not disassemble the single acting type actuator section. Incorporated reinforced spring will pop out when disassembled.

1) Disassembly of the ball valve (When the body material is stainless steel)

(1) Set the ball valve to the closed position.

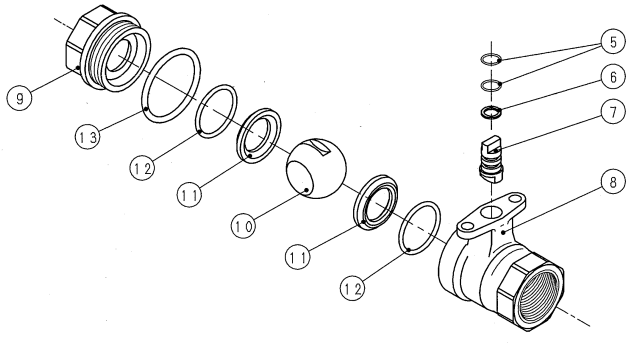
(2) Firmly fix the opposite sides of the octagon shape of the valve body ⑧. Remove the valve cap ⑨ with a tool such as an adjustable spanner. Take out the valve ball ⑩ and the O ring ⑬. Replace the valve ball and the O ring if there are any sign of defects or corrosion.

(3) Take out the respective valve sheets ⑪ and O rings ⑫ from the valve body and the valve cap. Replace the valve seat and O ring if there are any sign of defects, corrosion or permanent distortion. It is recommended to replace the valve seat once it is disassembled, since re-used valve seats may leak internally.

(4) Take out the shaft ⑦ from the body .

Replace the O ring ⑤ if there are any sign of defects corrosion or permanent distortion. Replace the spacer ⑥ if abrasion loss is large.

№	Part name	Quantity
5	Oring	2
6	Spacer	1
7	Shaft	1
8	Valve body	1
9	Valve cap	1
10	Valve ball	1
11	Valve seat	2
12	Oring	2
13	Oring	1



（Figure 4.2）Ball valve exploded view

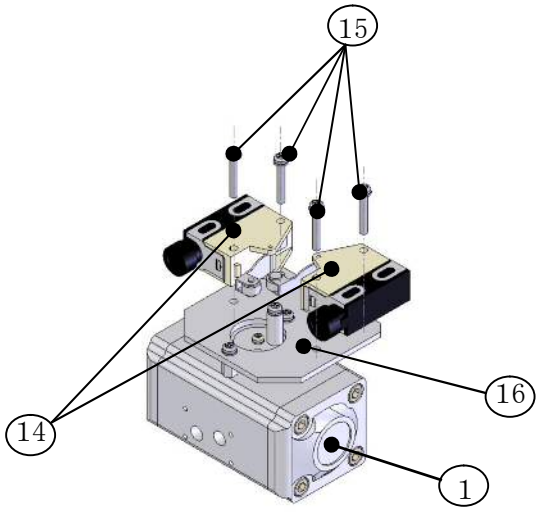
1) Disassembly of the limit switch (option)

(1) Take off the cross recessed head cap screw ⑮.

(2) Remove the limit switch ⑭.

No.	Parts name	Quantity
14	Limit switch（D4E-1G20N）	2（1）
15	Cross recessed head screw with captive washer	4（2）
16	LS plate	1

※Quantity described in ( ) is when there is one limit switch for detection at valve open (H) and detection at valve closed (V).



（Figure 4.3）Limit switch exploded view

4.4 Assembly procedure

1) Assembly of the ball valve (When the body material is stainless steel)

(1) Apply silicone grease to the O ring ⑤⑫⑬.

・ Recommended silicone grease : Shin-Etsu Chemical Co., Ltd. Shin-Etsu silicone G－30H

(2) Set the O ring ⑤ and the spacer ⑥ to the shaft ⑦.

・ Set the O ring certainly to the O ring groove on the shaft.

(3) Apply silicone grease to the part on which the shaft slides, and set the shaft to the valve body.

(4) Set the O ring ⑫ and the valve seat ⑪ to the valve body ⑧ and the valve cap ⑨ one piece each.

(5) Set the valve ball ⑩ to the valve body.

・ Align the direction of the valve ball with the shaft.

(6) Set the O ring ⑬ to the valve body and screw the valve cap into the valve body.

・ Refer to Table 5.1 for the tightening torque of the valve cap.

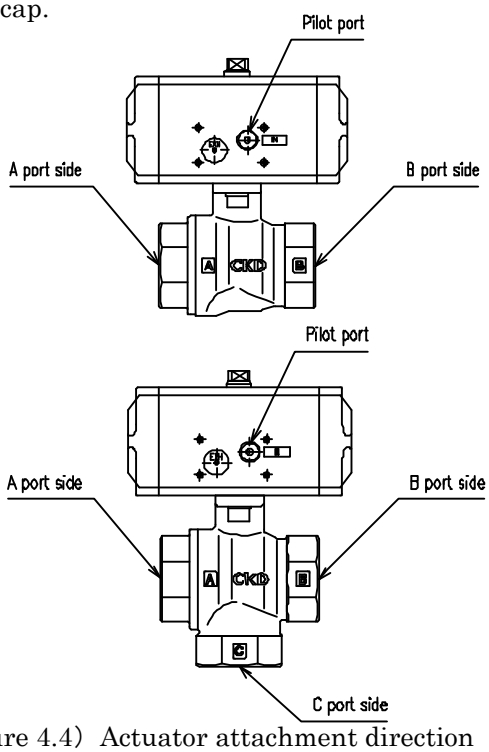
Table 4.1 Recommended tightening torque of the valve cap

Nominal dia.	Tightening torque(N・m)
10･15A	38 to 42
20A	76 to 84
25A	95 to 105
32A	171 to 189
40A	209 to 231
50A	266 to 294

Refer to "8. internal construction drawings" for details.

(7) Attach the actuator as shown in Fig.4.4
Align the direction of the stem of the actuator with the shaft of the ball valve at this time.

(8) Tighten the two hexagon socket head cap screws or the hexagon bolts and spring washers, with torque 4. 5 to 5. 5N･m.



（Figure 4.4）Actuator attachment direction

2) The assembly of the limit switch (option)

(1) Attach the limit switch ⑭ to the LS plate ⑮ with the cross recessed head screw with captive washer ⑯.

Tightening torque of the cross recessed head screw with captive washer : 1.18 to 1.37 N･m.

5.Maintenance

5.1 Maintenance and inspection

(1) Always read the instruction manual thoroughly before starting maintenance to ensure correct operations.

(2) In order to use this product in the best condition, usually perform a scheduled inspection every half a year.

(3) Always carry out trial run before operation if the product was not used for more than a month.

(4) Refer to "3. Pre-operation check " for the contents of inspection.

5.2 Service parts

(1) Ball valve, Valve seat, O ring for ball valves.

Replace when abnormalities such as leak, adherence or delay occurs while in use.

As a reference, the number of operation cycles is 50,000.

(2) Actuator

Replace when abnormalities such as leak or operation malfunction occurs while in use.

As a reference, the number of operation cycles is 200,000 .

(3) Limit switch (option)

Replace when abnormalities, such as reset failure or oxidation of contacts, occurs while in use.

As a reference, the number of operation cycles is 500,000 .

6.Troubleshooting

(1) Perform manual operation at power failure and at emergencies such as malfunction.

⚠ CAUTION	Single acting type cannot be operated manually.

(2) The method of manual operation

- After cutting off pilot air and releasing the pressure in the actuator, slowly turn the stem at the upper part of actuator with an adjustable spanner.
- Since a spring is built-in the actuator of single acting type, manual operation cannot be performed.

(3) If a valve does not operate as intended, please check according to the following table.

The state of failure	Cause	Countermeasure
A valve does not operate.	The operation pressure of the actuator is low.	Set the operation pressure within product specification.
	The operation pressure of the actuator has not switched.	Inspect the solenoid valve used for operation.
	The pressure of fluid to be controlled is too high.	Set the pressure within product specification.
	The viscosity of fluid to be controlled is too high.	Control the fluid viscosity below 500mm²/s.
	Foreign matter such as solid is caught inside.	Inspect inside the ball valve and remove the cause.
	Foreign matter adheres to the valve seat and the valve ball.	
It is not a normal motion although operated.	The operation pressure of the actuator is low.	Set the operation pressure within product specification.
	The pressure of fluid to be controlled is too high.	Set the pressure within product specification.
	Foreign matter such as solid is caught inside.	Inspect inside the ball valve and remove the cause.
	Foreign matter adheres to the valve sheet and the valve ball.	
The valve leaked. (The valve does not close completely.)	Foreign matter such as solid is caught inside.	1. When body material is bronze or it is “oil removal type”: Replace The ball valve. 2. When body material is stainless Steel: Replace or repair the ball valve. The contents of repair. ・Replace the valve ball (when there is a crack). ・Replace the valve sheet. ・Replace the O ring.
	Wear of a valve sheet.	
	The pressurization direction is wrong. (It is pressurized from A port or B port for CHG.)	Pressurize from C port (COM) .

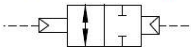
(4) Please contact us or your nearest agent for any unclear points.

7. Product specification and model number display method

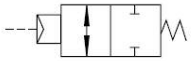
7.1 2 port valve (CHB、CHB-R、CHBF、CHBF-R)

JIS symbol

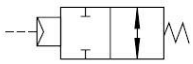
● CHB/CHBF
(Double acting)



● CHB-R1
CHBF-R1
(Single acting - NC)



● CHB-R2
CHBF-R2
(Single acting - NO)



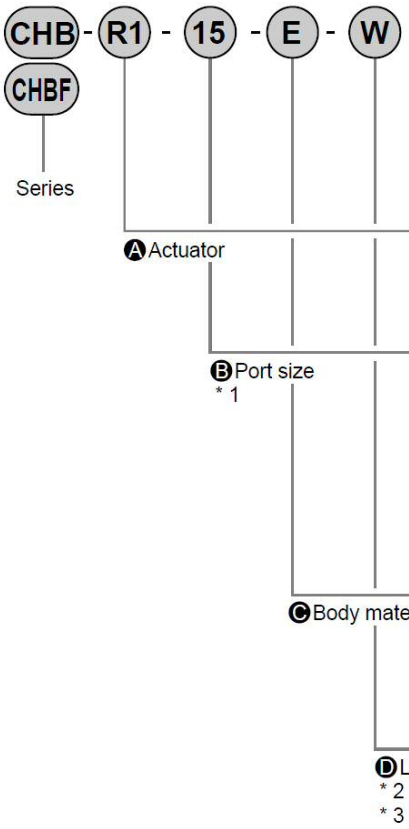
Common specifications

Descriptions		Double acting type CHB (standard bore) CHBF (full bore)	Single acting type CHB-R* (standard bore) CHBF-R* (full bore)
Actuation		Air operated type: double acting	Air operated type: single acting
Working fluid		Water, hot water, air, oil (500mm^2/s or less)	
Working pressure range MPa		0 to 1.0	
Withstanding pressure (water) MPa		2.0	
Fluid temperature ℃		0 to 80 (no freezing)	
Ambient temperature ℃		-10 to 60 (no freezing)	
Working environment		Indoors/outdoors (with the limit switch:Indoors)	
Valve seat leakage cm^3/min		0 (under 1MPa water pressure)	
Installation attitude		Free	
Cycle rate Cycle/min.		1 or less	
Rotary actuator	Pilot fluid	Compressed air	
	Lubrication	Not required (if lubrication is required, use turbine oil Class 1, ISO VG32.)	
	Withstanding pressure (water) MPa	1.5	
	Working pressure range MPa	0.35 to 0.7	0.4 to 0.7
	Fluid temperature ℃	5 to 60	
	Port size	Rc1/8	Rc1/8

Individual specifications

Descriptions / Series		Port size	Orifice (mm)	Cv flow factor	Mass (kg)	
					Double acting	Single acting
Standard bore	**CHB-(R*-)10**	Rc3/8	10	10	1.0	1.1
	CHB-(R*-)15	Rc1/2	10	6	1.0	1.1
	CHB-(R*-)20	Rc3/4	15	16	1.2	1.3
	CHB-(R*-)25	Rc 1	20	29	1.3	2.2
	CHB-(R*-)32	Rc1 1/4	25	50	2.2 (2.3)	2.7 (2.8)
	CHB-(R*-)40	Rc1 1/2	32	98	2.6 (2.7)	4.8 (4.9)
	CHB-(R*-)50	Rc 2	40	125	3.4 (3.5)	5.6 (5.7)
Full bore	**CHBF-(R*-)15**	Rc1/2	15	23	1.2	1.3
	CHBF-(R*-)20	Rc3/4	20	51	1.3	2.2
	CHBF-(R*-)25	Rc 1	25	66	2.2	2.7
	CHBF-(R*-)32	Rc1 1/4	32	114	2.6	4.8
	CHBF-(R*-)40	Rc1 1/2	40	176	3.4	5.6

Note 1: CHB-(R*-) 10 is a full bore. ( ) shows values for stainless steel body
Note 2: When a limit switch is used, weight increases +0.2 kg for 1 switch and +0.3 kg for 2.
Note 3: CHB-R*-40/50 and CHBF-R*-32/40 are not compatible with the limit switch.



Symbol	Descriptions	Series CHB (Standard bore)	Series CHBF (Full bore)
Ⓐ Actuator			
Blank	Double acting type	●	●
R1	Single acting NC (normally closed) type	●	●
R2	Single acting NO (normally open) type	●	●
Ⓑ Port size			
10	Rc 3 / 8	●	
15	Rc 1 / 2	●	●
20	Rc 3 / 4	●	●
25	Rc 1	●	●
32	Rc 1 1/4	●	●
40	Rc 1 1/2	●	●
50	Rc 2	●	
Ⓒ Body material			
Blank	Bronze	●	●
E	Stainless steel	●	●
N	Stainless steel Oil removal	●	●
Ⓓ Limit switch			
Blank	Without switch	●	●
H	Detection at valve open	●	●
V	Detection at valve closed	●	●
W	With 2 switches	●	●

*1: Port size 10 is a full bore, but the model is CHB.
2: CHB-R-40/50 and CHBF-R*-32/40 are not compatible with the limit switch.
*3: OMRON D4E-1G20N

<Example of model number>

CHB-R1-15-E-W

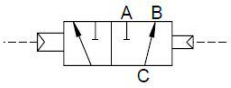
Series: CHB (standard bore)

Ⓐ Actuator : Single acting NC (normally closed) type
Ⓑ Port size : Rc1/2
Ⓒ Body material : Stainless steel (SCS13)
Ⓓ Limit switch : With 2 switches

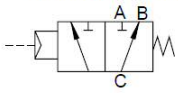
7.2 3 port valve（CHG、CHG-R）

JIS symbol

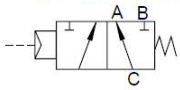
● CHG (Double acting)



● CHG-R1 (Single acting - Constant B - C Flow path)



● CHG-R2 (Single acting - Constant A - C Flow path)



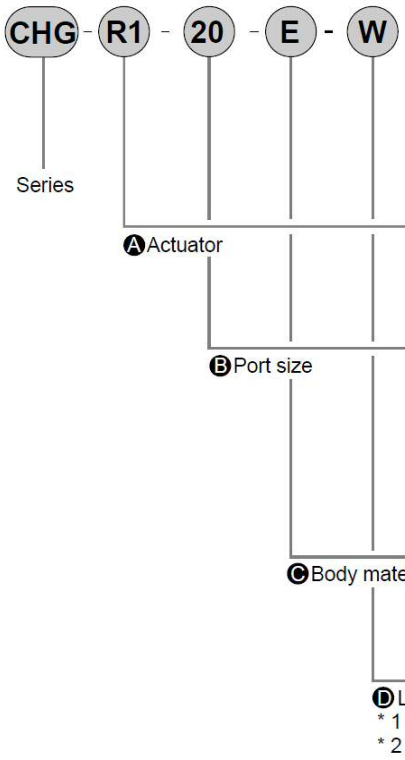
Common specifications

Descriptions		CHG (Double acting)	CHG-R* (Single acting)
Actuation		Air operated type: double acting	Air operated type: single acting
Working fluid		Water, hot water, air, oil (500mm^2/s or less)	
Working pressure range MPa		0 to 1.0	
Withstanding pressure (water) MPa		2.0	
Fluid temperature ℃		0 to 80 (no freezing)	
Ambient temperature ℃		-10 to 60 (no freezing)	
Working environment		Indoors/outdoors (with the limit switch:Indoors)	
Valve seat leakage cm^3/min		0 (under 1MPa water pressure)	
Installation attitude		Free	
Cycle rate Cycle/min.		1 or less	
Pressurization direction		Limited to Port C pressurized	
Flow path shape		Multi-fluid type (90° rotation switching type)	
Rotary actuator	Pilot fluid	Compressed air	
	Lubrication	Not required (if lubrication is required, use turbine oil Class 1, ISO VG32.)	
	Withstanding pressure (water) MPa	1.5	
	Working pressure range MPa	0.35 to 0.7	0.4 to 0.7
	Fluid temperature ℃	5 to 60	
	Port size	Rc1/8	Rc1/8

Individual specifications

Descriptions / Series	Port size	Orifice (mm)	Cv flow factor	Mass (kg)	
				Double acting	Single acting
CHG-(R*-) 15	Rc1/2	10	3	1.1	1.2
CHG-(R*-) 20	Rc3/4	14	6	1.3	1.4
CHG-(R*-) 25	Rc 1	19	11	1.5	2.4
CHG-(R*-) 32	Rc1 1/4	23	16	2.3	2.8
CHG-(R*-) 40	Rc1 1/2	30	28	2.8	5.0
CHG-(R*-) 50	Rc 2	38	47	3.7	5.9

Note 1: When a limit switch is used, weight increases +0.2 kg for 1 switch and +0.3 kg for 2.
Note 2: CHG-R*-40/50 are not compatible with the limit switch.



Symbol	Descriptions
Ⓐ Actuator	
Blank	Double acting type
R1	Single acting　Constant B - C Flow path
R2	Single acting　Constant A - C Flow path
Ⓑ Port size	
15	Rc 1 / 2
20	Rc 3 / 4
25	Rc 1
32	Rc 1 1/4
40	Rc 1 1/2
50	Rc 2
Ⓒ Body material	
Blank	Bronze
E	Stainless steel
N	Stainless steel　Oil removal
Ⓓ Limit switch	
Blank	Without switch
H	A-C flow path detection
V	B-C flow path detection
W	With 2 switches

1: CHG-R-40/50 are not compatible with the limit switch.
*2: OMRON D4E-1G20N

<Example of model number>

CHG-R1-20-E-W

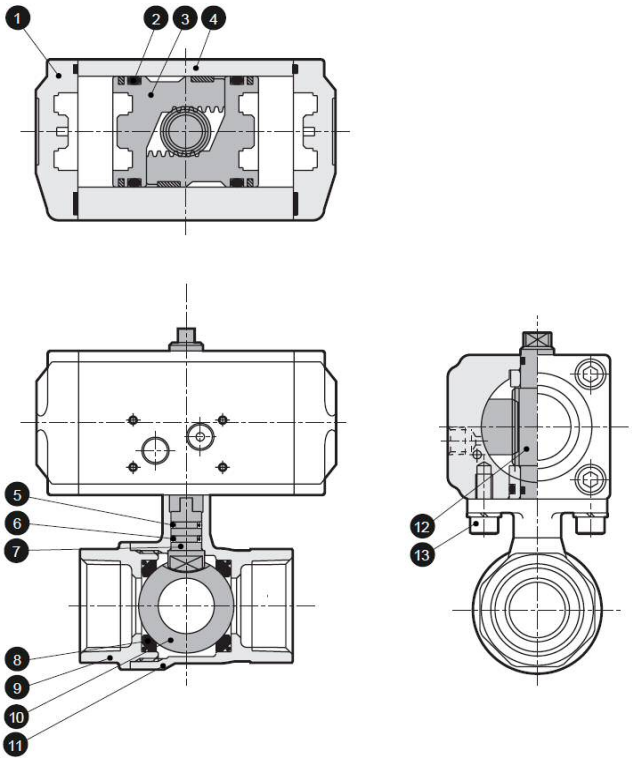
Series: CHG

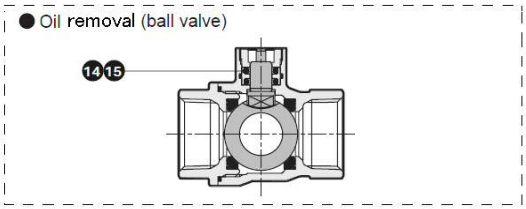
Ⓐ Actuator　: Single acting　Constant B - Flow path C
Ⓑ Port size　: Rc3/4
Ⓒ Body materials　: Stainless steel (SCS13)
Ⓓ Limit switch　: With 2 switches

8. Internal construction drawings

8.1 2 port valve internal construction drawings

8.1.1 CHB、CHBF（Double acting type）

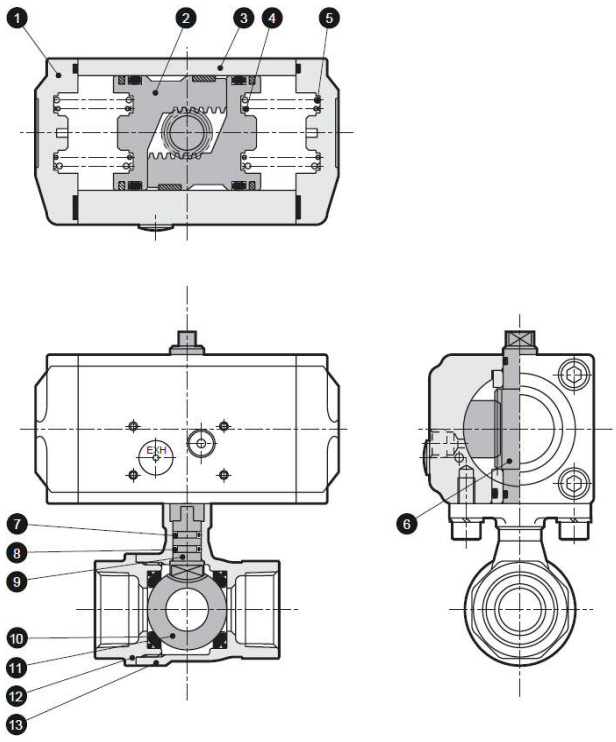


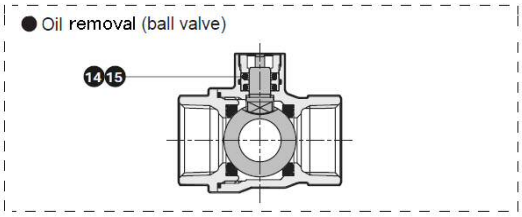


No.	Parts name	Material	
1	Cylinder cap	ADC12	Aluminum alloy die-casting
2	O ring	NBR	Nitrile rubber
3	Piston	ADC12	Aluminum alloy die-casting
4	Cylinder body	A6063	Aluminum
5	O ring	NBR (FKM)	Nitrile rubber (fluoro rubber)
6	O ring	FKM	Fluoro rubber
7	Shaft	SUS303 (SUS304)	Stainless steel (stainless steel)
8	Valve seat	PTFE	Tetrafluoroethylene resin
9	Valve cap	CAC408 (SCS13) CAC407	Bronze casting (stainless steel casting)
10	Valve ball	C3771, Cr plated (SUS304)	Brass, chrome plated (Stainless steel)
11	Valve body	CAC408 (SCS13) CAC407	Bronze casting (stainless steel casting)
12	Stem	SUS303	Stainless steel
13	Hexagon socket head cap screw	SUSXM7	Stainless steel
14	O ring	FKM	Fluoro rubber
15	Sealing ring	UHMW-PE	Ultra high molecular weight polyethylene

( ) shows values for stainless steel body

8.1.2 CHB-R、CHBF-R（Single acting type）



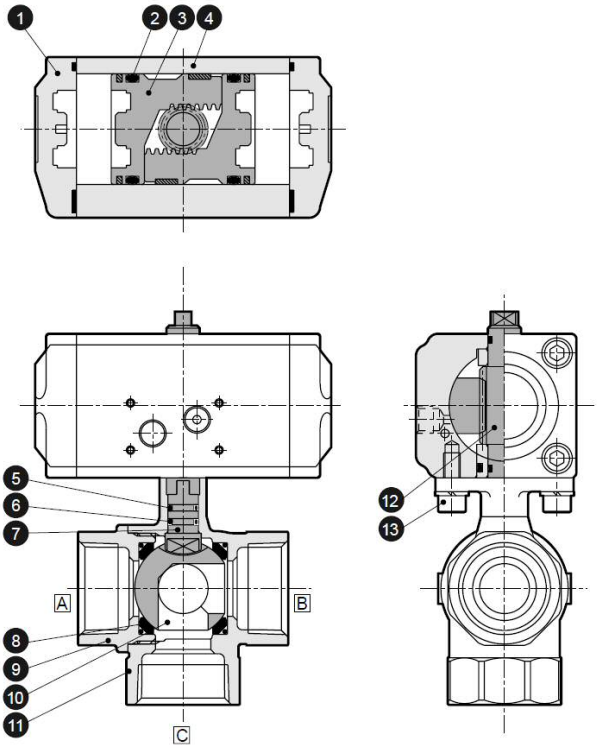


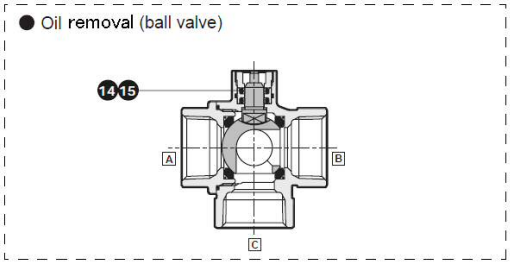
No.	Parts name	Material	
1	Cylinder cap	ADC12	Aluminum alloy die-casting
2	Piston	ADC12	Aluminum alloy die-casting
3	Cylinder body	A6063	Aluminum
4	Spring	SWP	Piano wire
5	Spring	SWP	Piano wire
6	Stem	SUS303	Stainless steel
7	O ring	NBR (FKM)	Nitrile rubber (fluoro rubber)
8	O ring	FKM	Fluoro rubber
9	Shaft	SUS303 (SUS304)	Stainless steel (stainless steel)
10	Valve seat	PTFE	Tetrafluoroethylene resin
11	Valve ball	C3771, Cr plated (SUS304)	Brass, chrome plated (Stainless steel)
12	Valve cap	CAC408 (SCS13) CAC407	Bronze casting (stainless steel casting)
13	Valve body	CAC408 (SCS13) CAC407	Bronze casting (stainless steel casting)
14	O ring	FKM	Fluoro rubber
15	Sealing ring	UHMW-PE	Ultra high molecular weight polyethylene

( ) shows values for stainless steel body

8.2 3 port valve internal construction drawings

8.2.1 CHG (Double acting type)

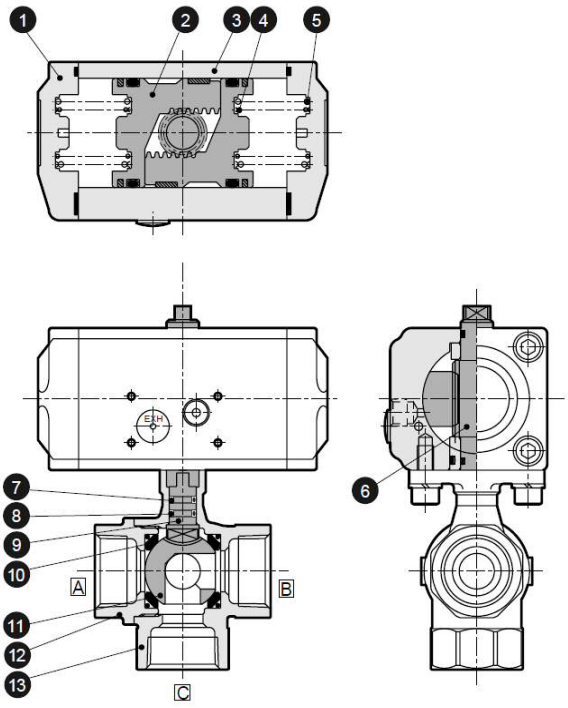


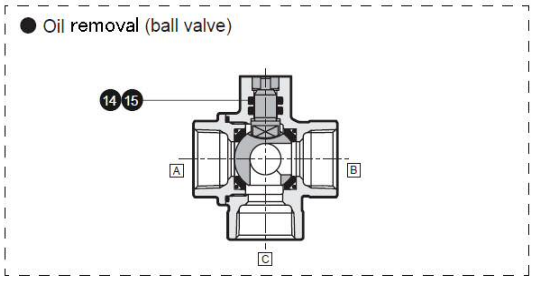


No.	Parts name	Material	
1	Cylinder cap	ADC12	Aluminum alloy die-casting
2	O ring	NBR	Nitrile rubber
3	Piston	ADC12	Aluminum alloy die-casting
4	Cylinder body	A6063	Aluminum
5	O ring	NBR (FKM)	Nitrile rubber (fluoro rubber)
6	O ring	FKM	Fluoro rubber
7	Shaft	SUS303 (SUS304)	Stainless steel (stainless steel)
8	Valve seat	PTFE	Tetrafluoroethylene resin
9	Valve cap	CAC408 (SCS13)	Bronze casting (stainless steel casting)
10	Valve ball	C3771, Cr plated (SUS304)	Brass, chrome plated (Stainless steel)
11	Valve body	CAC408 (SCS13)	Bronze casting (stainless steel casting)
12	Stem	SUS303	Stainless steel
13	Hexagon socket head cap screw	SUSXM7	Stainless steel
14	O ring	FKM	Fluoro rubber
15	Sealing ring	UHMW-PE	Ultra high molecular weight polyethylene

( ) shows values for stainless steel body

8.2.2 CHG-R (Single acting type)





No.	Parts name	Material	
1	Cylinder cap	ADC12	Aluminum alloy die-casting
2	Piston	ADC12	Aluminum alloy die-casting
3	Cylinder body	A6063	Aluminum
4	Spring	SWP	Piano wire
5	Spring	SWP	Piano wire
6	Stem	SUS303	Stainless steel
7	O ring	NBR (FKM)	Nitrile rubber (fluoro rubber)
8	O ring	FKM	Fluoro rubber
9	Shaft	SUS303 (SUS304)	Stainless steel (stainless steel)
10	Valve seat	PTFE	Tetrafluoroethylene resin
11	Valve ball	C3771, Cr plated (SUS304)	Brass, chrome plated (Stainless steel)
12	Valve cap	CAC408 (SCS13)	Bronze casting (stainless steel casting)
13	Valve body	CAC408 (SCS13)	Bronze casting (stainless steel casting)
14	O ring	FKM	Fluoro rubber
15	Sealing ring	UHMW-PE	Ultra high molecular weight polyethylene

( ) shows values for stainless steel body