

Three-Piece ball valve

EA-307 Series  
PED Category I, II



## EA-307 User Manual

### English Version

**[DRAFT VERSION]**

For use for company in Europe who will place the product on the market.

Please amend which necessary.

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PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_

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# 1. General Precautions

a. Material Selection:

The possibility of material deterioration in service and the need for periodic inspections is depended on the contained fluid. Carbide phase conversion to graphite, oxidation of ferrite materials, decrease in ductility of carbon steels at low temperature (even in applications above  $-29^{\circ}\text{C}$ ) are among those items. Even information about corrosion data is provided in this user manual, the user is requested to take attention or consideration to determine the suitability of material in their application.

b. Pressure-Temperature rating:

The Pressure-Temperature rating is considered for static pressure. Please refer to P & T rating section on page 9 for working precaution. The allowable temperature is between  $-29^{\circ}\text{C}$  and  $180^{\circ}\text{C}$ , Do not exceed the temperature range to avoid danger accident happen.

c. Fluid thermal expansion:

Pressure, built-up in the body cavity by heating volatile fluid, can damage the seats or the ball. The hole in the ball beneath the stem slot can equalize pressure between body cavity and the line when valve in the open position. An optional internal pressure equalizing hole drilled in upstream side of ball is suggested for certain applications e.g. ammonia, chlorine, LPG, for pressure equalization when valve in the close position.

d. Static electric effect:

The ball valves are provided with anti-static devices for ball-stem-body. When service conditions require electrical continuity to prevent static discharge, the user is responsible for specifying static grounding.

e. Fire safe condition:

Generally, the application of the valve shall comply with the Pressure-Temperature rating range. If the risk of fire is major effect, user is recommended to select our fire-safe products, which with API-607 4<sup>th</sup> edition approval. Contact to the valve distributor or manufacturer for details.

f. Liquids with high fluid velocity:

When ball valves must be operated frequently on liquids with very high velocity, a check shall be made with the valve distributor or manufacturer for appropriate

advice to minimize the possibility of seat deformation, especially when they are highly pressurized on high-temperature line.

- g. Throttling service: Ball valves are generally not recommended for throttling service, where both the fluid flow and the leading edge of the ball can damage or deform the resilient ball seats causing leakage. High fluid velocity or the presence of solid particles in suspension will further reduce seat life in throttling applications.
- h. Do not open the bonnet or cap when bearing pressure. Valve is not equipped with pressure access device. User should check it by other method through its piping system.
- i. No touch the surface of valve on high temperature.
- j. Not allowed for unstable fluid, otherwise specified with category III in Declaration of conformity or/and in this user manual.
- k. Lock design on the handle to avoid the valve operated by non-related people is optional requested by the user.

## 2. Product Description

### 2.1 Feature

- a. STANDARD type, FULL BORE ball valve.
- b. Blowout proof stem.
- c. Anti-static devices for ball-stem-body.
- d. Pressure balance hole in ball slot.
- e. Pressure self-relief seat to prevent pressure built up.
- f. Lock design on the handle is optional

### 2.2 Product specification

The scope of product specifications are as following

DN	PN63	DN	PN63
DN15	Art .3 para. 3	DN50	Category II
DN20	Art .3 para. 3	DN65	Category II
DN25	Art .3 para. 3	DN80	Category II
DN32	Category II	DN100	Category II
DN40	Category II		

### 2.3 Material of construction and Common dimension

307-1/2"~2"see Fig-1

307-2-1/2"~4" see Fig-2

Fig-1

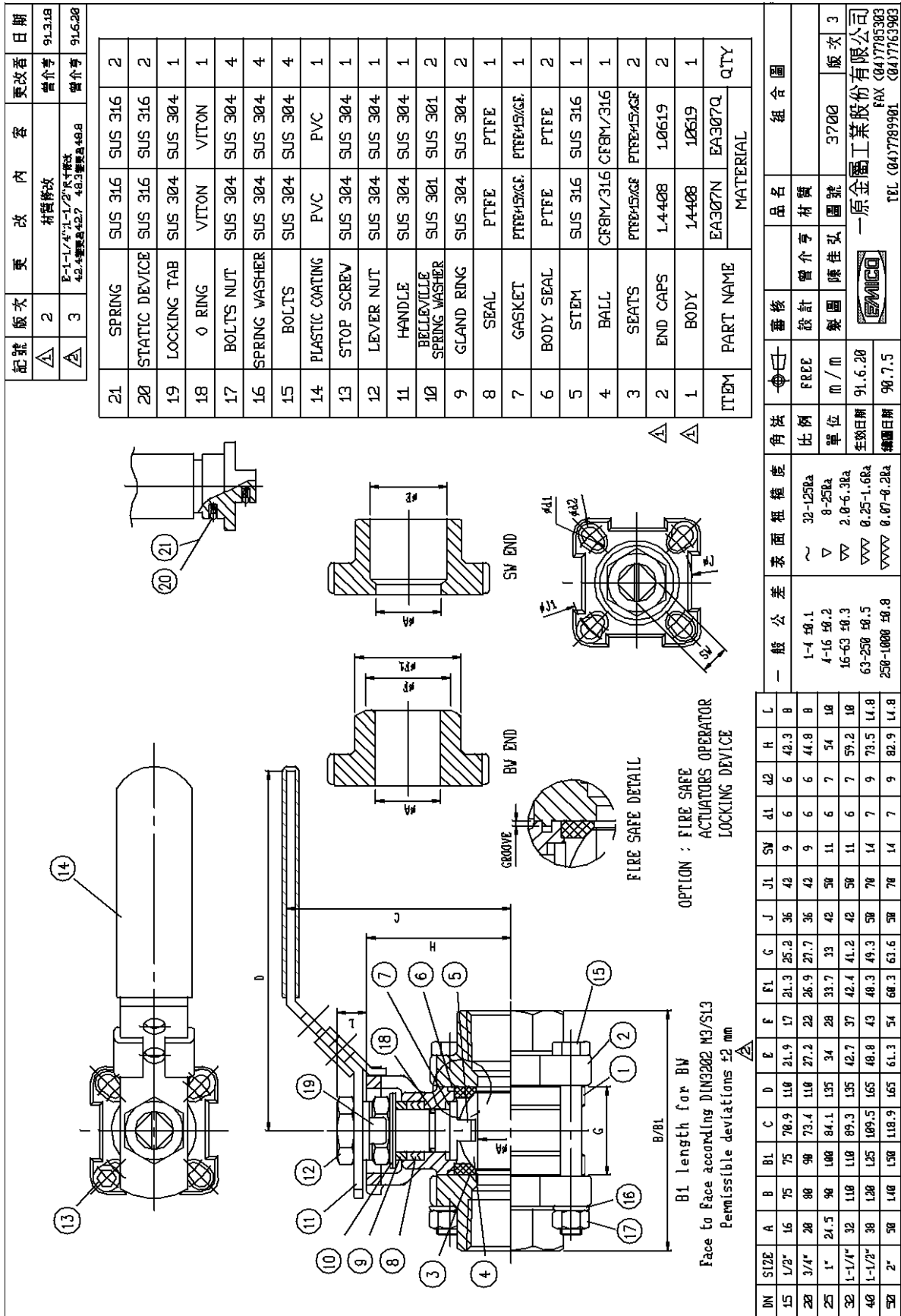
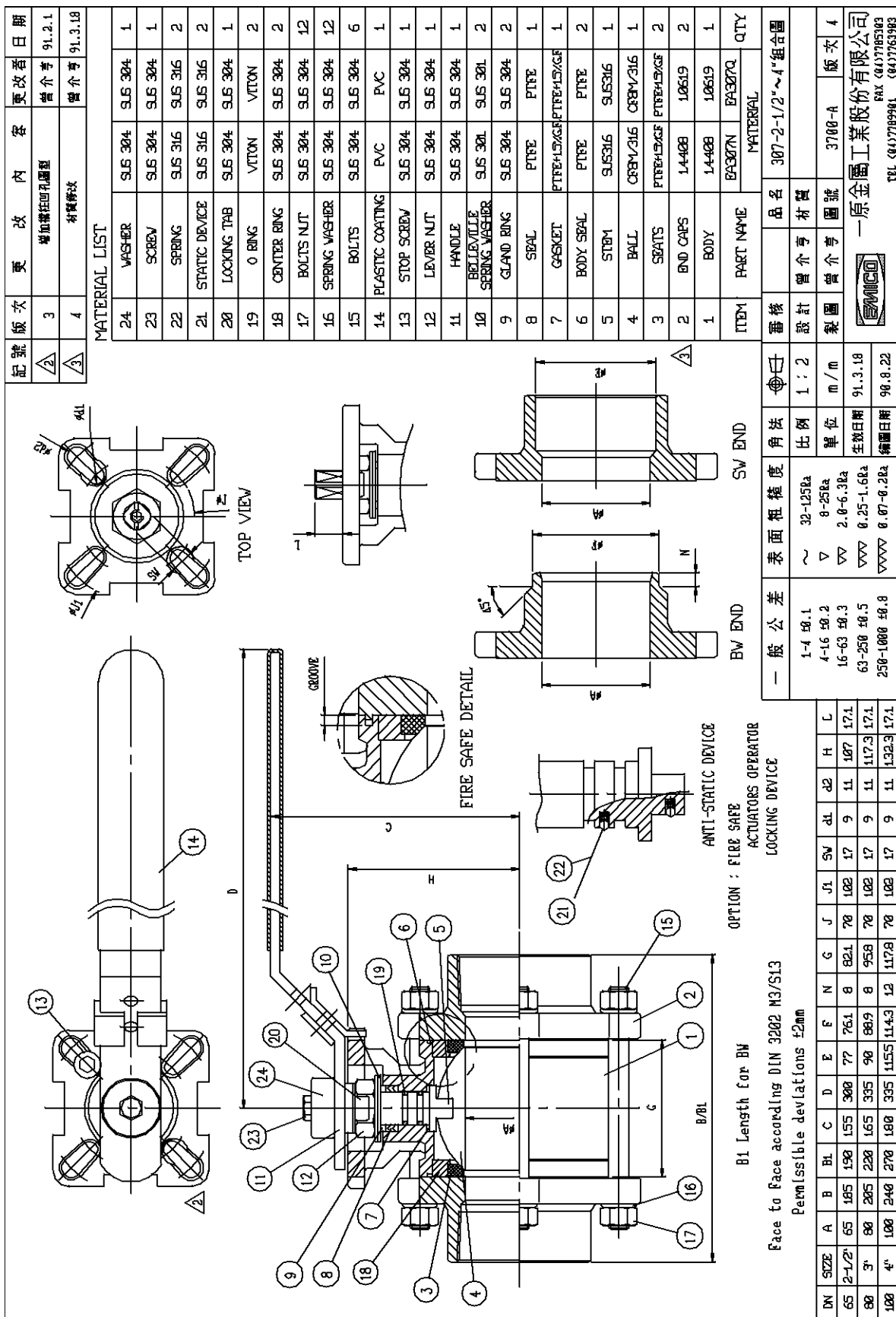


Fig-2



記號	板次	更改	內容	更改者	日期
△2	3		增加帶把孔圖型	曾介考	91.2.1
△3	4		材質修改	曾介考	91.3.18

MATERIAL LIST

24	WASHER	SUS 304	SUS 304	SUS 304	1
23	SCREW	SUS 304	SUS 304	SUS 304	1
22	SPRING	SUS 316	SUS 316	SUS 316	2
21	STATIC DEVICE	SUS 316	SUS 316	SUS 316	2
20	LOCKING TAB	SUS 304	SUS 304	SUS 304	1
19	O RING	VITON	VITON	VITON	2
18	CENTER RING	SUS 304	SUS 304	SUS 304	2
17	BOLTS NUT	SUS 304	SUS 304	SUS 304	12
16	SPRING WASHER	SUS 304	SUS 304	SUS 304	12
15	BOLTS	SUS 304	SUS 304	SUS 304	6
14	PLASTIC COATING	PVC	PVC	PVC	1
13	STOP SCREW	SUS 304	SUS 304	SUS 304	1
12	LEVER NUT	SUS 304	SUS 304	SUS 304	1
11	HANDLE	SUS 304	SUS 304	SUS 304	1
10	BOLLEVILLE SPRING WASHER	SUS 304	SUS 304	SUS 304	2
9	GLAND RING	SUS 304	SUS 304	SUS 304	2
8	SEAL	PTFE	PTFE	PTFE	1
7	GASKET	PTFE+SY/GF	PTFE+SY/GF	PTFE+SY/GF	1
6	BODY SEAL	PTFE	PTFE	PTFE	2
5	STEM	SUS316	SUS316	SUS316	1
4	BALL	CRBM/316	CRBM/316	CRBM/316	1
3	SPRATS	PTFE+SY/GF	PTFE+SY/GF	PTFE+SY/GF	2
2	END CAPS	1.4408	1.4408	1.4408	2
1	BODY	1.4408	1.4408	1.4408	1

審核	品名	307-2-1/2~4"組合圖
設計	曾介考	材質
製圖	曾介考	圖號
		3700-A
		版次
		4



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### 3. Design Specification

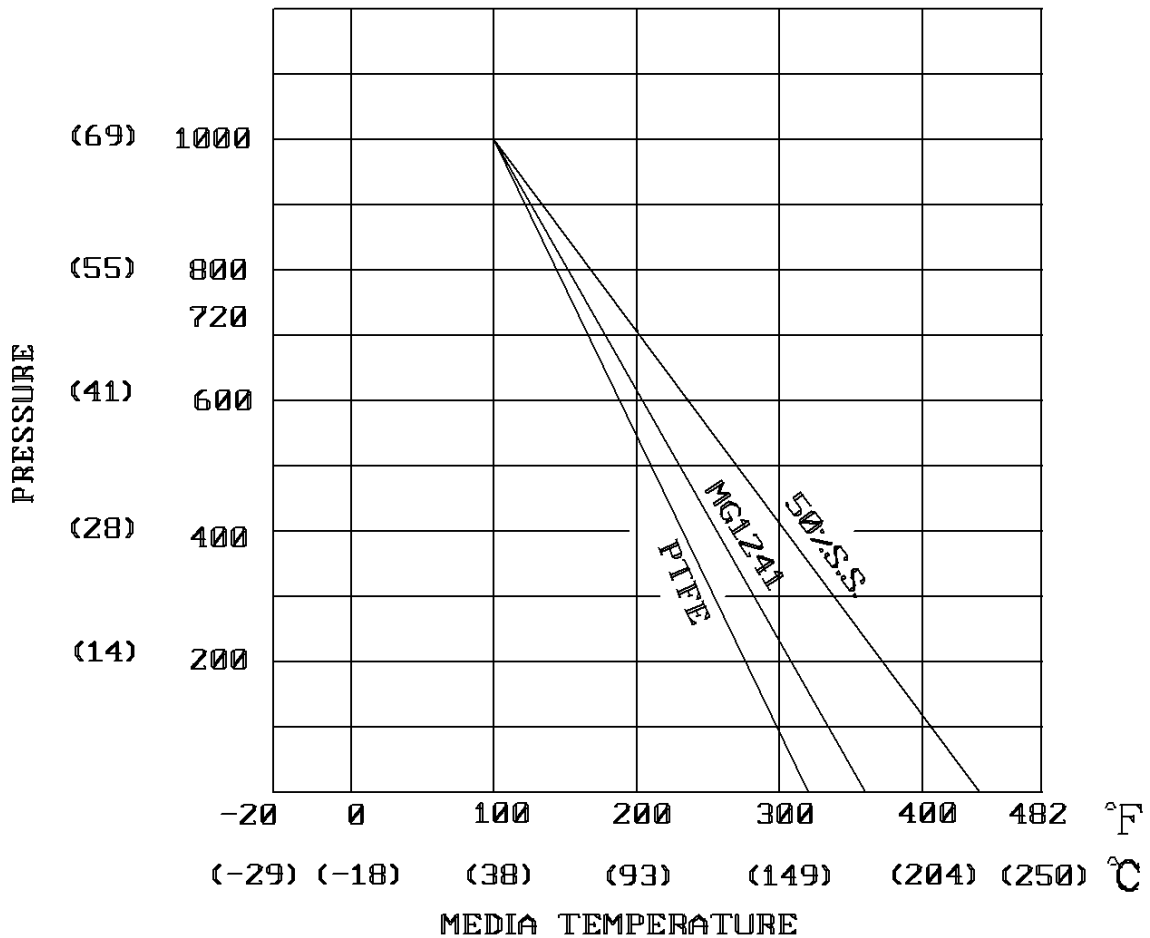
Items	Standards/Codes
Standards of Design (P-T rating)	prEN 12516-1
Testing	prEN 12266-1
Connection	DIN- 2999or259 (screw type) DIN- 3239 (Butt weld type part1) DIN- 3239 (socket weld type part2)
Face to Face	DIN- 3202-M3(screw type & socket weld type) DIN- 3202-S13(Butt weld type)
Mounting Pad	ISO-5211
Stem	DIN-79
Material of Casting (Body, Cap, Ball)	EN 10213-4 1.4408 & 1.4308 EN 10213-2 1.0619
Bolt and Nut	ISO-3506 (A2-70)

### 4. Pressure Temperature Ratings

The pressure-temperature rating of ball valves are determined, not only by valve shell materials, but also by sealing materials used for ball seats, stem packings, and body seal. Sealing materials may be high molecule, elasticity and hardness. However, the choice is limited by the characteristics of the service fluid, temperature, pressure, velocity of fluid, frequency of valves operation and sizes of ball valves etc. Followings are the general rating charts for non-shock fluid service for floating ball valves distinguished by sizes and seating materials, please refer to section 1, General precaution.



## PRESSURE & TEMPERATURE RATING



## 5. Delivery Condition and Storage

Valves stay in the open condition during the transportation. For incoming QC, it must check:

- a. Packing condition: Is there any damaged during the transportation.
- b. The bolts of cap: to make sure the bolt does not loose tightness when it arrived.

Valves must store in an indoor warehouse to avoid dusts and other foreign object, do not exposed in an open space without to put a cover over or take off the packing under an unnecessary situation.

## 6. Installation and Operation

### 6.1 Handling

During the ball valve installation, it must follow the procedure to hold at the both sides of the body. Bigger valves required a hoist to lift must be lifted at both sides of the body. The sling must be strong enough to ensure the safety during the installation.

### 6.2 Cleaning

Even the valves was transported under a clean environment, operator must check is there any foreign body or dusts inside the bore. If yes, clean it before installation. Operator clean the valves by water, compression air, or steam (automation valve shall be cleaned only with water or steam, the compression air is not allowed.) For cleaning, first is to put the valve bore perpendicular to the ground and clean. Ensure all the dusts can be removed from the bore. The second is to check and to clean all the connecting pipe bore and connection area. No flush, rust and foreign bodies are allowed to avoid the blocking and leakage.

### 6.3 Valve Installation (Install to the pipeline system)

#### a. Direction

Most of the valves do not restrict the flow direction.

#### b. Position

The body, cap and gasket are in the connection area of ball valve and pipeline. The bear weight ability and gradient are very important to the pipe installation. Do not make the pressure from the pipeline and stress to concentrate on the connecting area of body and cap. It will cause the deformed and leakage, and the ball, seat, and stem will stick, leaking, and damaged.

#### c. Fittings

##### **1.Screw end---** Fig-3

1.1.Before installation, clean ball valve and pipe fitting up to remove any dusts or foreign object or any tiny metal chips.

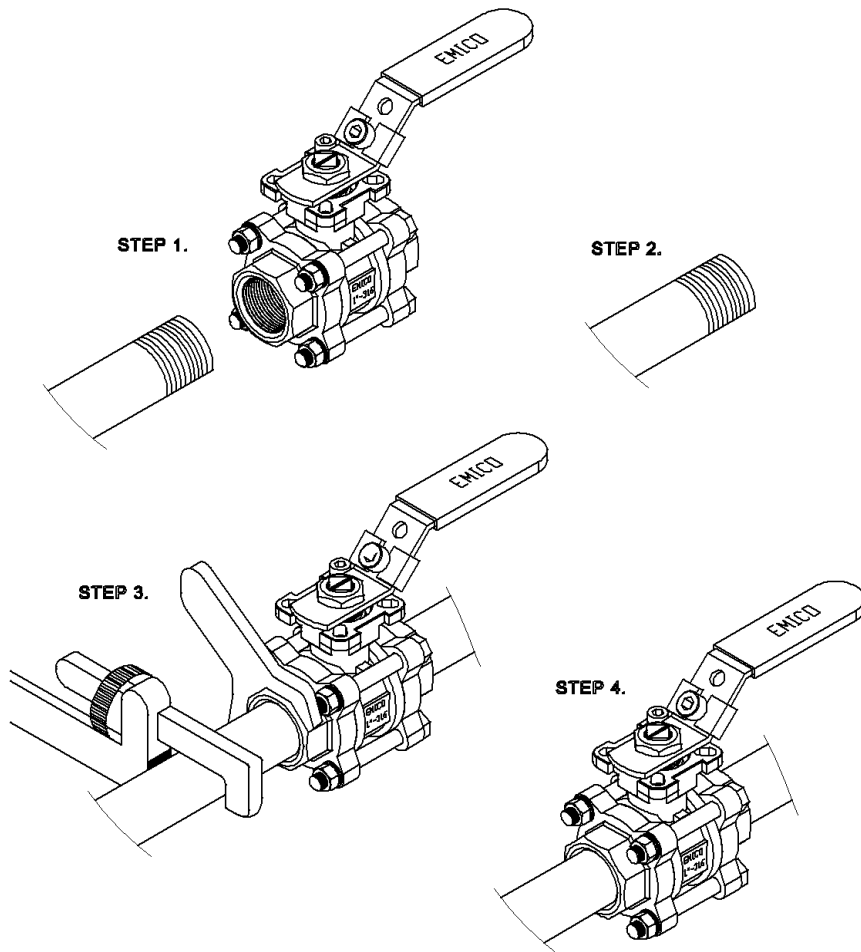
1.2.Check if the threaded type of ball valve is the same as it of pipe.

1.3.Wrap tap seal or other sealing material around threads of pipe 2 – 3 circles.

1.4.Hold end cap of valve with wrench and hold pipe end tightly with pipe wrench. Rotate pipe by clockwise until they joint tightly.

1.5.After installation finished. Apply soap bubbles on the joint points to check if the pipeline is sealed properly.

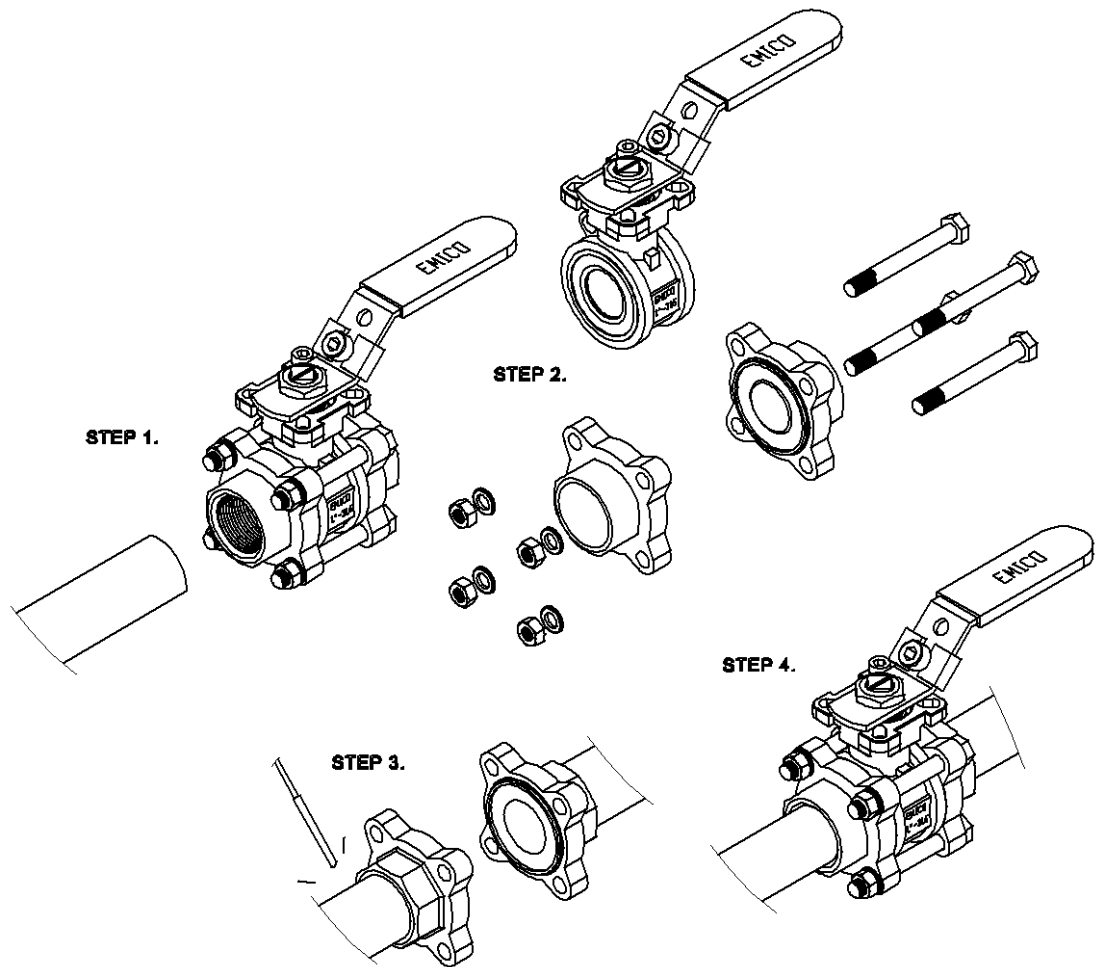
**Fig-3**



**2.Welding end---** Fig-4

- 2.1.Before installation, clean ball valve and pipe fitting up to remove any dusts or foreign object or any tiny metal chips.
- 2.2.Disassemble body and end caps by loosen screws. Take body apart.
- 2.3.Weld end caps at pipeline. (Note the concentricity and parallel between two end caps)
- 2.4.After the temperature at welding section cool down, connect body and end caps. (tighten bolts by symmetrical order)
- 2.5.After installation finished. Apply soap bubble on the joints to check if the pipeline is sealed properly or not.

**Fig-4**



d. Systems hydrostatic test

Before delivery, valves are tested 1.5 times the allowable pressure at ambient temperature in open position. After installation, the piping system may subject to system tests, as condition not to exceed the allowable pressure.

6.4 Actuator installation

The ball valves are provided with ISO 5211 actuator attachment. Following is the flange type against sizes of the ball valves.

SIZ E	Mounting Pad
DN15	F03~F04
DN20	F03~F04
DN25	F04~F05
DN32	F04~F05
DN40	F05~F07
DN50	F05~F07
DN65	F07~F10
DN80	F07~F10

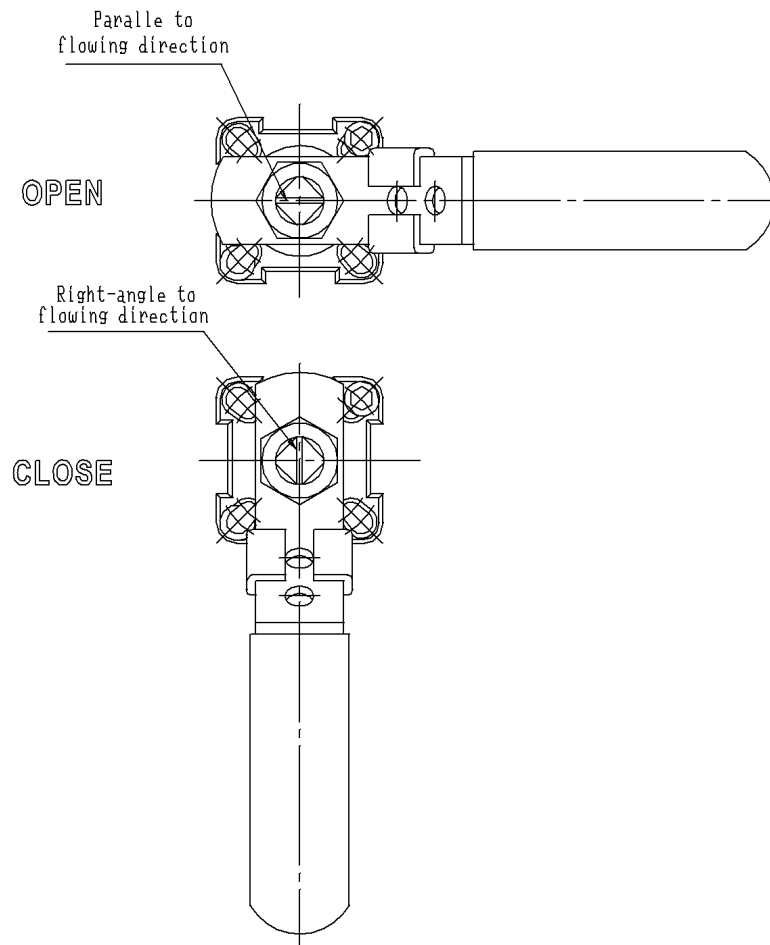
DN100	F07~F10
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The sizes of actuator and setting of the input power or pressure of actuator are depended on the operation torque. The following table lists the maximum torque values of each flange type. User is recommended to refer to the instruction of actuator supplier. Overload torque applied by the actuator may transfer the un-intended load to ball valve itself or to the piping joints. Setting of the input power or pressure of the actuator is better not to exceed 1.5 times of the operation torque data.

## 6.5 Operation

- a. For manual operation, shift the handle in counter clockwise direction for close and clockwise for opening.
- b. If the handle is parallel to the flow direction, the valve is open. If the handle is right-angled to the flow direction, the valve is close.
- c. When installing actuator or the valve is operated with removable handle, the user should ensure the position of the valve whether open or close. There is a sign at the top of stem for square type stem. **Fig-5 below shows** how to access the position of ball valve.

**Fig-5**



## 7. Maintenance

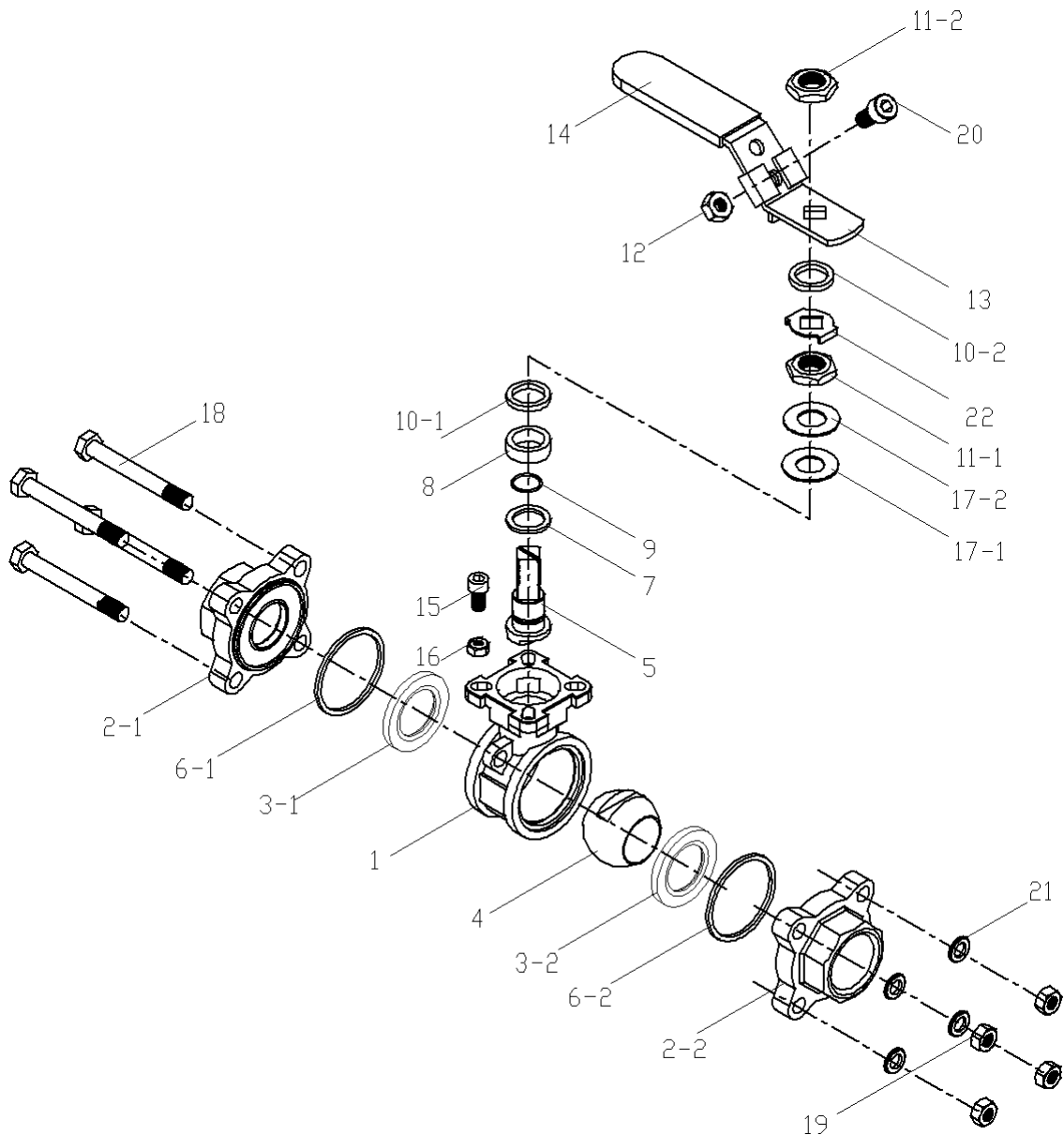
### 7.1 Maintenance frequency

The maintenance frequency is determined upon the application of ball valve. User shall consider the time interval depend on the kinds of fluid, flow velocity, operation frequency, high-pressure effect and high-temperature effect etc.

### 7.2 Disassembly

- a. The user should check if the kits of EA-307 are available in the local market. If not, please do not disassemble the valve, otherwise, please make an order from the original manufacturer for the kits of EA-307.
- b. To dismantle the valve must follow the procedure and drawings below.
- c. Make sure there is no fluid left inside valve before disassembly. The correct position to store the valves is to put the flange end on cardboard or a wooden pallet on a stable platform or ground.

- d. For valve with hand wheel, it is necessary to dismantle the hand wheel from the valve first, then put the valve flange end as above item c.
- e. To dismantle the valve body and end cap, release the bolts symmetrically. It must be careful to dismantle the ball to avoid the seat retainer fall down from end cap.
- f. To take ball out, it is necessary to turn the ball in the close position.
- g. To lift the ball by hoist, it is necessary to make the protection at the corner to avoid the ball damaged by metal contacted.



### 7.3 Parts inspection, maintenance, and replacement:

- a. Check if the surface of ball is scraped? It may use the PT for inspection if necessary. If there is any damaged on the surface, find out the root cause such as

the dirt fluid...etc. It must avoid the damage factors as far as possible.

- b. If the ball surface is damaged, check if it locates at the contacting area of ball and ball seat? If so, the ball must take a fine milling. If it is damaged heavily, and cannot be repaired, then change a new ball.
- c. If the scraped area is not at the location described in the item b above, it is necessary to re-fine milling the damage area again. Otherwise, the ball will damage the soft seat during the open and close operation or it will dig out the ball seat and cause serious leakage.
- d. To inspect the surface of soft seat, if it has any scrape mark, concave, dusts (including weld dregs, iron bit, sands...etc.), abrasion, abnormal press scrape, or a tiny scrape. Usually, the scrape mark and damage by dusts will occur the same time as ball damaged. It is the root cause for leakage. If leakage occurs before repairing, then suggest to change a new soft seat (PTFE or RPTFE). The mark from press or fine scrape is happen in an abnormal operation pressure. It must reconsider to **choose** a right valve.
- e. The gland packing must be replaced by the new parts after dismantle the valve. The **material of it can be** PTFE, Grafoil or PTFE + Glass Fiber. The material of new packing must be the same as the old one. To tight the gland nut, please see Section 9 for torque data.
- f. To do the final inspection for a valve, it must operate 10 times of open and close to ensure all the parts are assemble correctly. To ensure the torque is in the same value during the open/close operation. If the torque is not the same during operation, it may have some parts in an incorrect position or interference. It must be dismantled and re-assembly. Otherwise, it is easy to damage if valve works in a pipeline under higher pressure.

#### 7.4 Assembly

For assembly process, it takes the opposite way of dismantle process. The ball must be at the close position when assembling the body and end cap. **The stopper must locate at the right place.** Otherwise, the open and close operation will be opposite.



## 8. Torque Data

### Stem Nut

SIZE	鎖緊扭力(N-m)	公差
1/2";3/4"	4	+-10%
1";1-1/4"	4.5	
1-1/2";2"	5.5	
2-1/2"	7	
3"	7	
4"	7	

### Bolt&Nut

SIZE	牙式	鎖緊扭力(kgf-cm)	公差
1/2"	M6	190	+-10%
3/4"	M8	220	
1"	M8	250	
1-1/4"	M10	310	
1-1/2"	M10	410	
2"	M10	410	
2-1/2"	M12	1000	
3"	M16	1220	
4"	M16	1430	

## 9. Corrosion Data

The following corrosion data is for information only.

Annex 1.