
KITZ

Operation Manual

For
Floating Type Ball Valves

(Threaded, Gland Construction)

Thank you for having chosen KITZ products.

For safe and trouble-free function and performance of the product, ensure to read and understand all items of this manual before valve mounting and operation.

Keep this manual in a convenient place for your valve operators' easy access.

This manual applies to the KITZ threaded floating type ball valves with gland construction.

This manual is prepared for manual valve operation.

For electric or pneumatic valve operation, refer to the operation manual prepared by the manufacturers of relevant valve actuators.

CAUTION AND WARNING

To ensure safe and trouble-free function and performance of the product, please read all items of this manual before handling, transportation, mounting and operation of valves. Keep this manual in a convenient place for your valve operations' easy access.

The signal words "WARNING" and "CAUTION" are defined as follows:



Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTES TO USERS

This manual covers the normal usage of the product. Technical data and instructions for operation, maintenance and inspection of the product are prepared in consideration of safety. However, they are good only to cover typical applications as a general guideline to users. If technical assistance beyond the scope of this manual is required, contact KITZ Corporation or its distributors.

The illustrations given in this manual do not introduce all details. If more detailed data are needed, refer to our relevant valve assembly drawings.

Any information provided in this operation manual is subject to revision at any time without notice. This edition cancels all previous issues.

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CHAPTER
Construction and Design Features

Construction and Design Features

1. Construction and Design Features

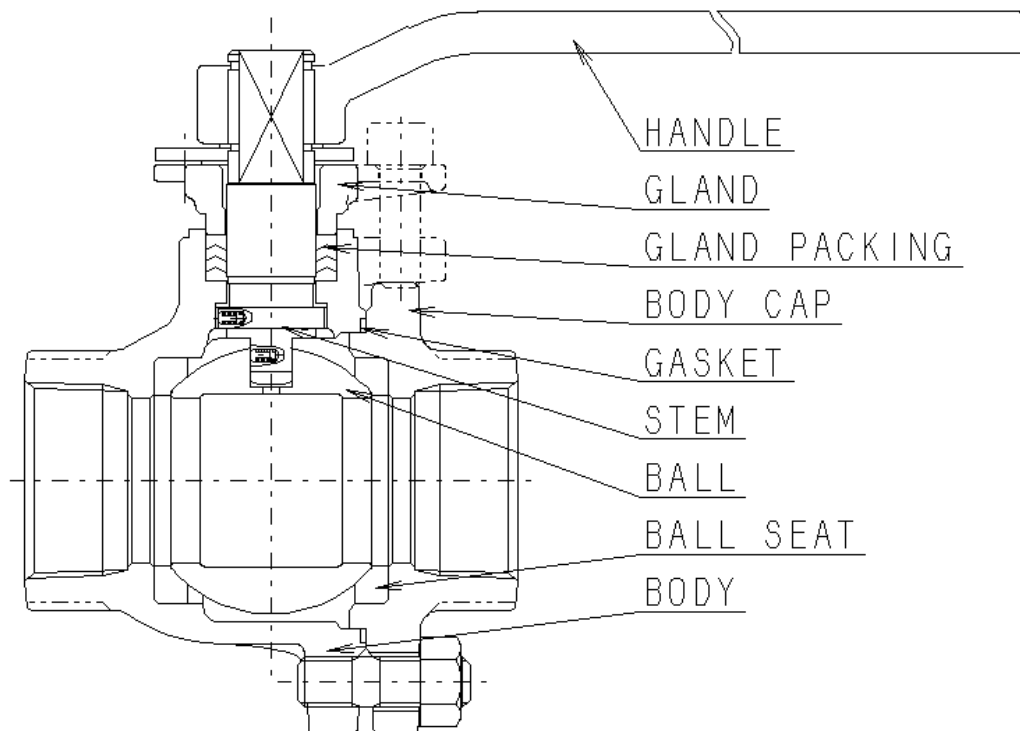
1.1 The typical valve design is as illustrated below.

1.2 Range of operation from full opening to full closing is 90 ° .

1.3 These ball valves are designed for use in the full open or full closed position only.

1.4 The ball is supported by both ball seats. When the valve is pressurized, the ball moves against the downstream seat to complete the seal, shutting off flow of the line fluid.

1.5 This ball valve design may be used on applications where a bi-directional flow is needed.



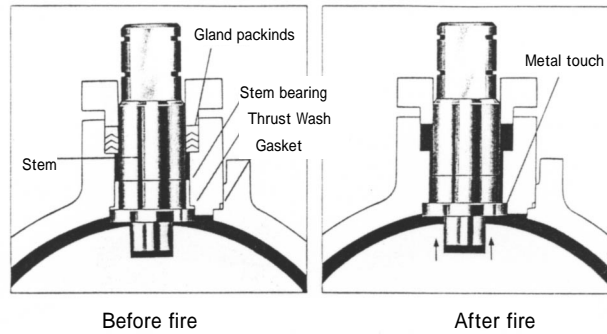
This illustration represents a typical construction.

Construction and Design Features

2. Design Features

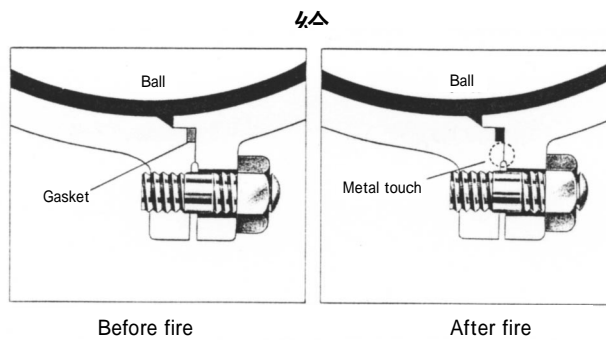
2.1 Blowout-proof stem

The lower end of the stem incorporates a blowout-proof collar or shoulder. This shoulder also functions similarly to a backseat, minimizing external leakage in case of a plant fire.



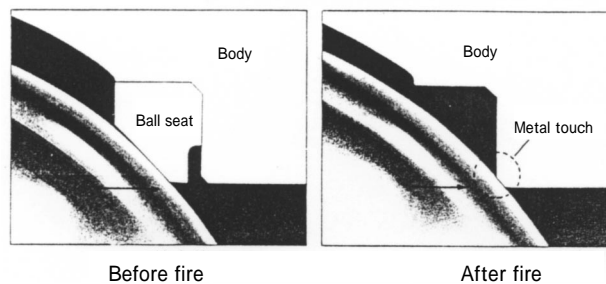
2.2 Body Seal

In addition to body to body-cap flange gaskets, the metal to metal seal construction is provided to minimize external leakage, when resilient gaskets are deteriorated in case of a plant fire.



2.3 Integral Seat

The integral, secondary seats on the body and body cap minimize internal leakage, when resilient ball seats are deteriorated in case a plant fire.



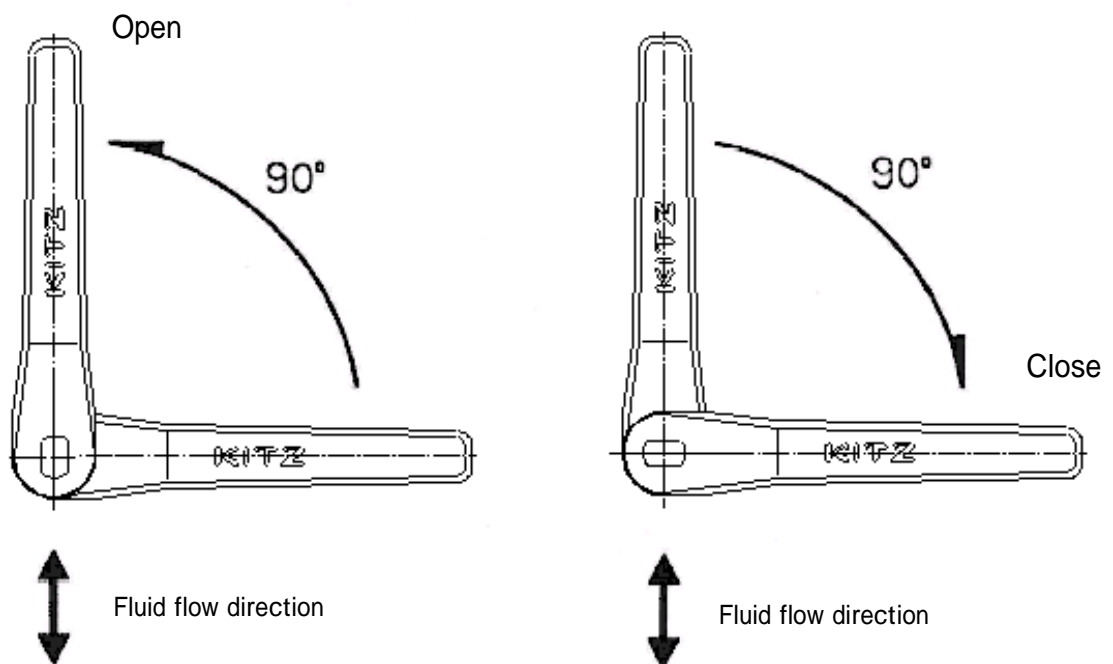
CHAPTER
Valve Operation Device

Valve Operation Device

1. Lever Type Operator

1.1 Levers are mounted directly on the valve stem.

1.2 Rotating the lever clockwise by 90 ° will close the ball, and moving the lever counterclockwise by 90 ° opens it.





CHAPTER

Shipping, Handling and Storage of Valves

Shipping, Handling and Storage of Valves

1. Shipping and Handling Valves

1.1 Care for Shipping and Handling Valves

 CAUTION	
	<p>(1) Take care not to damage coated surface of valves during shipment. This may cause rust or other types of corrosion to form on valves. Any damaged surface should be adequately treated before installation.</p> <p>(2) Take care the handling and storage of carton packed The high humidity may damage the cartons, which may lead to damaging valves.</p>




1.2 Shipping and Handling Valves

1.2.1 Maintain original packing condition during shipment.

1.2.2 Handle valves carefully so that they may not fall or drop on the ground. Any extraordinary mechanical impact should be avoided.

2. Storage

2.1 Care for Valve Storage

 CAUTION	
	<p>(1) DO NOT storage valves in the corrosive environment, which may cause corrosion on threaded portions of valves.</p> <p>(2) DO NOT fall, drop, give mechanical impact or place any other objects on valves, and DO NOT step on them, which may damage valves.</p> <p>(3) DO NOT carelessly pile up products to avoid risk of product damage and personal injury caused by unstable piling.</p>
	<p>(4) Keep the valves in the open position during storage. Storing the valves in halfway position may deform the ball seats, leading to the internal leakage.</p>

2.2 Storage



2.2.1 Indoor storage of valves in a dust-free, low humidity and well ventilated places is recommended.

2.2.2 Storage of valves directly on the ground or concrete floor is not recommended.

CHAPTER
Valve Installation

Valve Installation

1. Care for choice of location for Valve installation

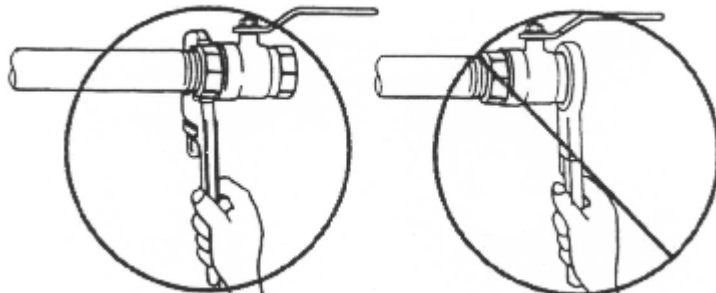
 CAUTION	
	<ul style="list-style-type: none">(1) Keep a secure footing for valve installation and operation.(2) Sufficient lighting should be prepared for valve operation.(3) Piping should be properly supported, if needed.

- 1.1 Allow sufficient room for operation, installation and subsequent maintenance of valves, considering the valve height and the stem direction.
- 1.2 Take appropriate measures for smooth operation, inspection and maintenance of valves if they are forced to be installed in small spaces.
- 1.3 Try not to install valves in the places where valve functions may be hampered by such outer forces as vibrations.
- 1.4 It is recommended to install valves on horizontal piping in a upright position.

Valve Installation

2 Care for Valve inspection

⚠ WARNING	
!	(1) Keep off the valve lifting area to prevent personal injury caused by unsecured valves.

⚠ CAUTION	
⊘	(1) DO NOT disassemble valves during installation.
!	<p>(2) Take care not to damage threaded areas and seat surfaces during installation.</p> <p>(3) Use appropriate sealing materials in threaded areas, considering temperature, types and other conditions of the media.</p> <p>(4) DO NOT use pipe wrenches on valves. Use spanner or other proper tools for valve installation.</p> <p>(5) Apply a spanner to the valve end on the connecting pipe side. DO NOT apply a spanner on the other side.</p> <div style="text-align: center;">  </div> <p>(6) DO NOT overly thread valves into the pipes. Excessive insertion of valves into the pipes may end up damaging the valve seats.</p> <p>(7) Pressure applied to the gland packing may be lowered due to the stress relaxation taking place during transportation or storage, which may cause leakage. Retighten gland packing before operation.</p> <p>(8) Keep valves fully open during valve installation in order to protect the ball surface.</p>

Valve Installation

- 2.1 Check the following items before installation for safe operation of valves.
 - 2.1.1 The service conditions should be within the range of the relevant valve specifications.
 - 2.1.2 Valve threads should correspond with pipe threads.
 - 2.1.3 No damage should be found on valve and pipe threads.
 - 2.1.4 Make sure pipe threads comply with the relevant standards by using thread gauges.
- 2.2 Before installation, the inside and threaded areas of the connecting pipes should be cleaned to remove any foreign object such as sand, dust or welding spatters.
- 2.3 Handle valves carefully so that they may not fall or drop on the ground. Any extraordinary mechanical impact should be avoided.
- 2.4 Remove the protection covers just before installation.
- 2.5 Check all threaded areas after installation and retighten them, if needed.
- 2.6 Flush piping after installation with the valves fully opened, to assure removal of any foreign object. DO NOT operate the valves during flushing.

Valve Installation

3. Valve installation procedure

3.1 Ensure the connecting areas of pipes to valves are threaded.

3.2 Remove all foreign objects such as cuttings and oil from pipes, inside pipes and threaded connections of valves by using detergents and waste cloth.

3.3 Apply sealing agents, including seal tapes, to the threads of pipes.

3.4 Use appropriate tools to thread valves into pipes.

3.5 Do not apply an excessive torque, when threading valves into pipes. Torques should not exceed the value shown below.

Size	1/8	1/4	3/8	1/2	3/4	1
Torque N-m	20 – 29	20 – 29	20 – 29	20 – 29	39 – 49	49 - 59




Size	1-1/4	1-1/2	2	2-1/2	3 and larger
Torque N-m	59 – 69	69 – 78	78 – 88	108 – 118	127 – 137

3.6 Gradually increase the pressure and temperature of pipelines, when conducting test run. Retighten all threaded areas of valves, if needed.

CHAPTER
Valve Operation

Valve Operation

1. Cautions for Safety

 CAUTION	
	<p>(1) DO NOT apply too excessive force to operate the valves by such methods as using a pipe or any other device.</p> <p>(2) Never loosen bolts or nuts used in the gland, cap flanges and end threads of pressurized valves.</p> <p>(3) DO NOT use valves in an intermediate position. Such use may damage ball seats and cause internal through-bore leakage.</p>
	<p>(4) Retighten the gland bolts and nuts before operation of valves. Check a handle torque while retightening the bolts and nuts so that the operation won't become too difficult due to over-tightening. Gland bolts should be alternately tightened with an even force.</p> <p>(5) Valve should be kept fully open during the line test or pressure test. Fully closing valves during the test may deform the ball seats, leading to the occurrence of internal through-bore leakage.</p> <p>(6) In case service temperature fluctuates, retighten gland bolts and nuts after the temperature is stabilized due to the occurrence of stress relaxation of the gland packing.</p> <p>(7) Gradually open valves to prevent damage of pipes, when high temperature fluids such as steam are handled.</p> <p>(8) Take some appropriate measures to prevent freezing, as needed.</p>

2. Operation

2.1 Lever handle

Rotation of the valve stem by 90 ° fully opens or closes the valve. To close the valve, turn the operating handle clockwise according to the letters and the mark indicating the direction . Counterclockwise rotation will open the valve.

Valve Operation




3. Daily Inspection

In order to operate your valves safely and satisfactorily, the daily inspection is very important. Here are the inspection items.

Inspection items	Areas to be inspected	Inspection Method	Remedial Measure
External Leakage	Gland Area	Visual Check with soap solution	Retighten gland bolts. Replace the gland packing as needed
	Flange Areas	Visual Check with soap solution	Retighten flange bolts. Replace gaskets as needed.
	Threaded Portions	Visual Check with soap solution	Retighten each threaded areas. Replace valve components as needed.
	Body	Visual Check with soap solution	Replace the valve.
Abnormal Noises	Valve body	Auditory check	Consult a piping engineer.
	Loosened bolting	Auditory check	Retighten bolting.
	Pipe vibration	Auditory check	Consult a piping engineer
Loosened Bolting	Bolts and Nuts	Visual and Tactile check	Retighten bolts and nuts.
Internal thru-bore leakage			Remove foreign object. Disassemble and inspect the valve components. (Replace the ball seats) Replace the valve.
Valve operation	Valve operating position	Visual Check	Make sure that the valve is in predetermined position.
	Disturbed operation	Visual and Tactile check	Disassemble and inspect the valve components.

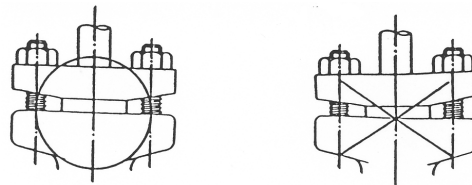
Valve Operation

4. Trouble Shooting and Corrective Measures

 CAUTION	
	<p>(1) Operators should take protective measures at all time to prevent direct exposure to the media including wearing protective goggles, gloves and footwear a minimum.</p> <p>(2) More stringent protective measures may be necessary when handling toxic, inflammable or corrosive media.</p> <p>(3) Ensure to reduce the line pressure to the atmospheric level, before retightening gland or flange bolting, and loosening or replacing packing rings and gaskets.</p> <p>(4) When retightening the bonnet flange bolts, care should taken for a possible gasket blowout. Operation should be carried out at the position where operators do not get a direct exposure of the media, even if such a blowout occurs.</p> <p>(5) Ensure to reduce the line pressure to the atmospheric level, before replacing packing rings and gaskets or losing bolts and nuts. Operation should be carried out at the position where operators do not get a direct exposure of the media.</p>
	<p>(6) DO NOT apply the lubricant to the pipes and valves which handles oxygen.</p>

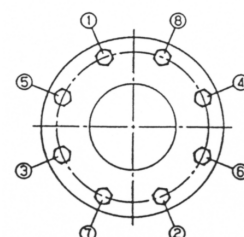
4.1 Leakage from the gland area

Retighten the gland bolts or nuts, if leakage from this area is detected. Evenly tighten the bolts or nuts alternately as shown below. Adequate torque should be applied when retightening the bolts or nuts so that the valve operation won't become difficult. If it does not stop the leakage, the packing rings should be replaced.



4.2 Leakage from the flanged areas.

Evenly tighten the bolting alternately and gradually in a star pattern as shown below.



Valve Operation

5. Trouble Shooting

Defect	Possible causes	Remedial measure
Disturbed valve operation	Foreign objects may have choked up the valve body cavity and stock around the ball seats.	Disassemble and inspect the valve components.
Excessive valve torque	Foreign objects may have stuck to the stem.	Remove the foreign objects and check the valve.
	Foreign objects may have choked up the valve body cavity and stock around the ball seats.	Flush the built-up objects by the media with the ball slightly open and disassemble and inspect the valve.
	The gland bolts may have been overly tightened..	Loosen the gland bolts once and adequately retighten them so that the leakage through the gland does not occur.
Leakage from The gland area	Loose gland bolts.	Retighten the gland bolts.
	Uneven tightening of the gland bolts.	Loose the bolts once and evenly retighten them.
	Damage on the gland packing.,	Replace the gland packing.
Internal through-bore leakage	Damage on the ball seats.	Disassemble and inspect the valve. Replace ball seats.
Abnormal noise or vibration	Loose bolts and nuts..	Retighten the bolts and nuts.

CHAPTER

Periodic Inspection and Maintenance of Valves

Periodic Inspection and Maintenance of Valves

1. Periodic Inspection



- 1.1 A periodic inspection with valves mounted to pipelines is recommended at least once a year.
- 1.2 Ensure the smooth operation and safety of valves before inspection.
- 1.3 Inspection items and methods are same as daily inspection. See Chapter V for the items and methods suggested.
- 1.4 Where valves and adjoining piping are not daily inspected or not operated for a long period of time, a periodic inspection is also recommended. (A periodic inspection should be carried out on all valves.)
- 1.5 It is particularly important to thoroughly check the valves used for the following service :
 - a) Where performance failure of valves could result in a major shutdown of an entire plan unit.
 - b) Where the media contain high viscosity and may get stuck to and built up inside the valves.
 - c) Where corrosion or/and wear by the media is expected.Remove the valves from the pipelines and disassemble them for inspection, if needed.
- 1.6 It is recommended to replace the gland packing every time the periodic inspection is conducted.



Periodic Inspection and Maintenance of Valves

2. Inspection and maintenance

In case pipelines or facilities where valves are installed are shut down for the pipeline inspection, remove the valves from the pipelines and perform the body and seat pressure tests as well as operation tests, if needed. If any defect is found, disassemble the valves for further inspection. The valves must pass required inspections before being sent back to the pipelines or facilities for reinstallation.

2.1 Cautions for removal of the valves from pipelines or installation of the valves on pipelines.

 WARNING	
	<ol style="list-style-type: none"> (1) Discharge the fluid from the pipes and reduce the line pressure to the atmospheric level when disassembling valves. (2) Discharge the fluid and pressure trapped within the valve body with the valve intermediate position before disassembling. (3) In case fluid is toxic, inflammable or corrosive, remove the fluid completely from pipes and internal valves. (4) Take protective measures to prevent direct exposure to the fluid and catching fire. (5) Keep off the working area to prevent personal injury if valves are installed at higher places.

 CAUTION	
	<ol style="list-style-type: none"> (1) Wear the protective items such as goggle, gloves and working boots. (2) Keep a secure footing for valve dismantle and installation. (3) Apply a spanner to the valve end on the connecting pipe side, when the valves are removed from or installed to pipes.

Periodic Inspection and Maintenance of Valves

2.2 Assembly and disassembly

Refer to Chapter VII for assembly and disassembly procedure.

2.3 Test and Inspection



Refer to the following procedure for test and inspection.

2.3.1 Operation Test

- (1) Check smooth operation of valves without galling or sticking of internal valve components.
- (2) Check that the stem is firmly assembled with the ball.
- (3) Ensure that there should be no offset of the ball port and ball seats in the fully open position. The ball should not be protruded into the valve port other than the rounded surface of the ball port edges.

2.3.2 Shell Test and Seat Leakage Test

- (1) Care for shell test and seat leakage test

 CAUTION	
	<ol style="list-style-type: none">(1) Wear the protective items such as goggles, gloves and working boots.(2) Before shell test and seat leakage test begin, take some precautions for operators safety.

- (2) Shell Test and Seat Leakage Test

All valves should be subjected to a hydrostatic or pneumatic shell test and seat leakage test at the required test pressures after reassembly.

Refer to JIS B 2003, JPI-7S-39 or API-598 for test methods and procedures.



CHAPTER



Disassembly and Reassembly of Valves

Disassembly and Reassembly of Valves

1. Disassembly procedure

1.1 Care for disassembly

 WARNING	
	(1) Operator should take an appropriate caution for not being exposed to the fluid or catching fire.

 CAUTION	
	(1) Wear the protective items such as goggle, gloves and working boots. (2) Pay attention not to catch fingers during disassembly.

1.2 Before Disassembly

1.2.1 Place the valve in a dust-free place.

1.2.2 Take care not to damage the flange surfaces, ball and stem.

1.2.3 Give identification marks on edges of the coupled flanges for adequate and easy coupling of the body and body cap on subsequent reassembly.

Disassembly and Reassembly of Valves

1.3 Disassembly procedure

1.3.1 Full close the valve.

1.3.2 Remove the snap ring(48) and stopper(49) from the stem(3).

1.3.3 Remove the cap nuts(33).

1.3.4 Disassemble the body(1) and body cap(2).

1.3.5 Remove the ball(4) from the body(1).

1.3.6 Remove the ball seats(30) and gasket(19) from the body(1) and body cap(2).

1.3.7 Push the stem(3) down into the body cavity to remove it from inside the body(1).




1.3.8 Remove the stem bearing(67) from the body(1) or stem(3).

1.3.9 Remove the gland bolts(36), gland(7) and gland packing(8) from the body(1).

Disassembly and Reassembly of Valves

2. Reassembly procedure

2.1 Care for reassembly

 CAUTION	
	<p>(1) Wear the protective items such as goggles, gloves and working boots.</p> <p>(2) No open flame or smoking should be allowed in the working area.</p> <p>(3) Take care not to catch fingers in flanges during assembly.</p> <p>(4) Replace the gland packing and gasket for new ones to ensure satisfactory sealing performance. Reuse of these components may cause leakage.</p>
	<p>(5) If the piping is for an oxygen service, care should be taken not to apply lubricant at all to valves.</p>

2.2 Before Assembly

- 2.2.1 Check all parts before assembly. If any problem is detected, replace the valve.
- 2.2.2 The consumables such as ball seats, gland packing, gasket and stem bearing should be prepared beforehand.
- 2.2.3 Clean all parts for reuse to thoroughly remove dust and other foreign objects.
- 2.2.4 Assemble the valve in a dust-free area.
- 2.2.5 Take care not to damage the flange surfaces, ball, ball seats and stem.
- 2.2.6 Ensure that the coupling marks provided before disassembly are mated, when the valve is assembled.
- 2.2.7 Keep in mind that all threads should be securely tightened.

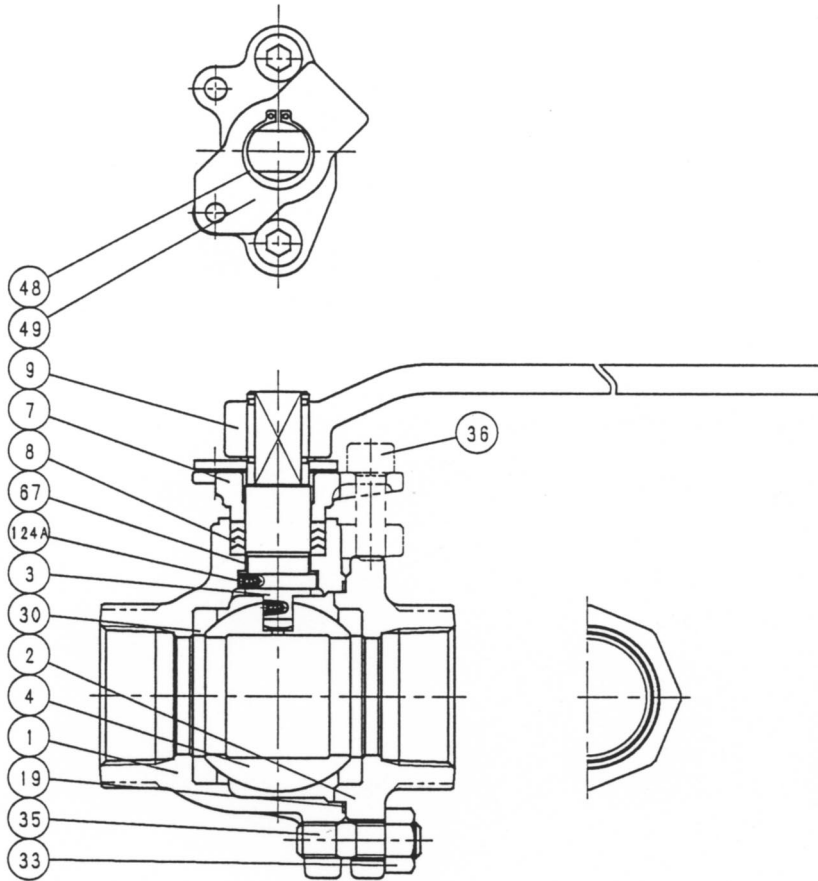
Disassembly and Reassembly of Valves

2.3 Reassembly procedrue

- 2.3.1 Mount the gland packing (8) and gland (7) in the body (1), temporarily tightening the gland bolts (36).
- 2.3.2 Mount the ball seats in the body (1) and body cap (2).
- 2.3.3 Mount the stem bearing (67) in the stem (3).
- 2.3.4 Assemble the stem (3) in the body (1) from the body interior. Ensure that the stem collar securely contacts the valve body and that the valve position is fully closed.
- 2.3.5 Place the ball (4) into the body (1).
- 2.3.6 Mount the gasket (19) on the gasket face of the body.
- 2.3.7 Mount the body cap (2) on the body (1). Ensure that the ball seats (30) are placed in the correct position.
- 2.3.8 Fasten the body (1) and body cap (2) with the cap nuts (33). Evenly tighten the cap nuts(33) alternately and gradually in a star pattern.
- 2.3.9 Mount the stopper (49) in the stem (3) and fix it with the snap ring (48).
- 2.3.10 Tighten the gland bolts (36) adequately for trouble-free valve operation.
- 2.3.11 All threaded parts should be securely tightened. Retighten them, if founded loosened.

Disassembly and Reassembly of Valves

3. Cross-sectional assembly drawing.



No.	Parts Name
1	Body
2	Body Cap
3	Stem
4	Ball
7	Gland
8	Gland Packing
9	Handle
19	Gasket
30	Ball Seat
33	Cap Nut
35	Cap Bolt
36	Gland Bolt
48	Snap Ring
49	Stopper
67	Stem Bearing
124A	Spring & Pin

This drawing introduces a typical construction of the valve.
Refer to the approval drawing before disassembly and assembly.