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 covers the normal use of Class 150/300 SCTA/SCTAM & UTA/UTAM Series, uni-body, end entry design floating ball valves manufactured by KITZ Corporation, as a general guideline to users.

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.

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

- Indicates a potentially hazardous condition which may result in serious injury to personnel, if such warnings shall be ignored.
- Indicates a potentially hazardous condition which may result in minor or moderate injury to personnel or property damage, if such conditions shall be ignored.

Indicate prohibition of an action.

Indicate mandatory implementation of an action.

**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.
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 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.

1.4 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 Uni-body, End entry design
The valve is uni-body and end entry floating ball valves with one-piece body, which completely eliminates concern of fugitive emission through valve body joints.

2.2 Firesafe provision
KITZ ball valves can be optionally provided with graphite packing and body to body-cap flange gaskets for use in the areas of production facilities where external leakage may be caused by plant fires. These graphite components will contain the line media where PTFE or other lesser materials may burn away, feeding fuel increasing the magnitude of the fire. KITZ ball valves provided with graphite sealing components are identified as the SUPER-FIRESAFE version in our product catalogs.

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

2.3 Anti-static provision
Anti-static devices are provided to ensure electrical continuity between ball, stem and body.

2.4 Valve application
This ball valve may be used on application where a bi-directional flow is needed.

2.5 Actuator Mounting Pads
ISO 5211 actuator mounting pad is integrally provided for uniformly simplified mounting of any actuators provided with valve mounting flanges designed to ISO 5211 dimensional requirement.

2.6 Low Fugitive Emission Feature
The surface of stem and stuffing box, and interface clearance of stem-to-gland bush, stem-to-body and gland-to-stuffing box are precision controlled on machining and assembly for low emission service.
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.
1.3 Rotation of the stem by 90° fully opens and fully closes the valve for Bare Stem Type.

An appropriate tool or handle shall be applied to operate the valve and the flow direction shall be checked by the top orientation of the stem.
2. Worm Gear Operator

2.1 The worm gear operator is mounted on the valve.

2.2 According to the arrow or letter on the handwheel, turning the handwheel clockwise closes the valve, and turning the handwheel counterclockwise opens the valve.

2.3 Handwheel operating torque depends on the size and opening position.

2.4 Worm gear operator is to transmit a large torque to valve stems, converting a torque from drive shaft by means of reduction gearing unit using worm gears.
1. Shipping and Handling Valves

1.1 Care for Shipping and Handling Valves

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

(2) 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.

1.2 Shipping and Handling Valves

1.2.1 Maintain original packing condition during shipment. If the protective covers are found missing during transportation, provide appropriate type of protective covers.

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

---

**WARNING**

- Do not remove any protective covers during transportation. This may cause damage to the valves.

**CAUTION**

- Do not expose the valves to direct sunlight or extreme temperatures. This may cause damage to the valves.

- Do not expose the valves to water or moisture. This may cause rust or other types of corrosion to form on the valves.

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2. Storage

2.1 Care for Valve Storage

1. DO NOT storage valves in the corrosive environment, which may cause corrosion on threaded portions of valves.

2. DO NOT remove protective covers until installation. As they will prevent the intrusion of any foreign object, the removal of covers could cause damage to the closure elements such as ball and seats.

3. DO NOT fall, drop, give mechanical impact or place any other objects on valves, and DO NOT step on them, which may damage valves.

4. DO NOT carelessly pile up products to avoid risk of product damage and personal injury caused by unstable piling.

5. 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. And storing the valves in the fully closed position may damage the ball, when the flange protections or covers are torn or removed.

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. Place packed valves on the racks for storage.

2.2.3 Take appropriate measures to prevent valves from direct exposure to dust, rain and sunlight, if valves are temporarily stored outdoors.
Valve Installation

1. Care for Valve Installation

   (1) Check the valve specifications with the identification plate or tag and the relevant catalog, to ensure that the exact valves specified in your piping arrangement plan was provided. The service fluid, pressure and temperature determine the compatibility of sealing materials. Incorrect application of a specific valve could be hazardous.

   (2) DO NOT install for pipe end service, which may cause the external leakage. In such a case, use the blank flange to prevent the leakage.

1.1 Keep a secure footing for valve installation and operation.

1.2 Sufficient lighting should be prepared for valve operation.

1.3 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 in horizontal piping with the stem in upright position.

WARNING

CAUTION
Valve Installation

- Care for Valve inspection

1. Keep off the valve lifting area to prevent personal injury caused by unsecured valves.
2. Take care not to catch fingers in flanges during mounting work.
3. Take care not to damage flanges, ball and ball seats surfaces.
4. Pipes should be properly supported, if needed.
5. 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.
6. Be sure to insert new gaskets for valve mounting.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑️ Care for Valve installation. Prevent personal injury by keeping off the valve lifting area.</td>
</tr>
<tr>
<td>☑️ Take care not to catch fingers in flanges during mounting work.</td>
</tr>
<tr>
<td>☑️ Take care not to damage flanges, ball and ball seats surfaces.</td>
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</tr>
<tr>
<td>☑️ Be sure to insert new gaskets for valve mounting.</td>
</tr>
</tbody>
</table>

KITZ CORPORATION
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 specification.

2.2.2 Valve flanges should correspond with pipe flanges.

2.2.3 Gasket contact surfaces of pipes and valve flanges must be thoroughly inspected. No scratch or other indications of flaw should be found.

2.2.4 The appropriate space should be kept between pipe flanges for the valve face-to-face dimensions including the gasket thickness.

2.2.5 Pipes and valves should be accurately aligned.

2.2.6 Pipe flanges should face parallel to each other. The bolt holes of flanges should be symmetrically lined up against the center line of flanges.

2.2 Before installation, 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 flange covers from valves just before installation.

2.5 Check all threaded areas after installation and retighten them, if needed.

2.6 Piping should be flushed before test operation with the valve fully open, to assure removal of any foreign object that could damage valves. Do not operate the valve during flushing.
3.1 Make sure that pipes should be aligned accurately.
3.2 The appropriate space should be kept between pipe flanges for the valve face-to-face dimensions including the gasket thickness.
3.3 Place the valve between the pipe flanges. Insert bolts through the bottom bolt holes and tighten them lightly.
3.4 Insert gaskets between the valve and pipe flanges. It is recommended to evenly apply a little paste to gasket faces.
3.5 Make sure the correct alignment of gaskets, which are held in place with the bottom bolts.
3.6 Thread bolts through the other holes of flange and lightly tighten them.
3.7 Evenly tighten the bolts alternately in a star pattern as shown below. Once the bolting is properly tightened, both ends of each bolt should evenly protrude beyond the nuts.
3.8 Gradually raise the line temperature and pressure during test duration. Retighten valve bolting, if needed.
Valve Operation

1. Care for valve operation.
   (1) DO NOT apply too excessive force to operate the valves by such methods as using a pipe or any other device.
   (2) Never loosen bolts or nuts used in the gland of pressurized valves.
   (3) DO NOT use valves in an intermediate position. Such use may damage ball seats and cause internal through-bore leakage.
   (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.
   (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.
   (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.
   (7) Gradually open valves to prevent damage of pipes, when high temperature fluids such as steam are handled.
   (8) Take some appropriate measures to prevent freezing, as needed.

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.

2.2 Worm gear operation
   According to the arrow or letter on the handwheel, turning the handwheel clockwise closes the valve, and turning the handwheel counterclockwise opens the valve.
### Valves Operation

#### Daily Inspection

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

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Areas to be inspected</th>
<th>Inspection Method</th>
<th>Remedial Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gland Area</td>
<td>Visual Check</td>
<td>with soap solution</td>
<td>Retighten gland bolts. Replace the gland packing as needed.</td>
</tr>
<tr>
<td>Flange Areas</td>
<td>Visual Check</td>
<td>with soap solution</td>
<td>Retighten flange bolts. Replace gaskets as needed.</td>
</tr>
<tr>
<td>Threaded Portions</td>
<td>Visual Check</td>
<td>with soap solution</td>
<td>Retighten each threaded areas. Replace valve components as needed.</td>
</tr>
<tr>
<td>External Leakage</td>
<td>Body</td>
<td>Visual Check</td>
<td>Replace the valve.</td>
</tr>
<tr>
<td>Body</td>
<td>Auditory check</td>
<td></td>
<td>Consult a piping engineer.</td>
</tr>
<tr>
<td>Loose Bolting</td>
<td>Auditory check</td>
<td></td>
<td>Retighten bolting.</td>
</tr>
<tr>
<td>Abnormal Noises</td>
<td>Pipe vibration</td>
<td>Auditory check</td>
<td>Consult a piping engineer.</td>
</tr>
<tr>
<td>松動部品</td>
<td>Visual and Tactile check</td>
<td></td>
<td>Retighten bolts and nuts.</td>
</tr>
<tr>
<td>Internal thru-bore Leakage</td>
<td></td>
<td></td>
<td>Remove foreign object. Disassemble and inspect the valve components. Replace the ball seats Replace the valve.</td>
</tr>
<tr>
<td>Valve operating position</td>
<td>Visual Check</td>
<td></td>
<td>Make sure that the valve is in predetermined position.</td>
</tr>
<tr>
<td>Valve operation</td>
<td>Disturbed operation</td>
<td>Visual and Tactile check</td>
<td>Disassemble and inspect the valve components.</td>
</tr>
</tbody>
</table>

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4. Corrective measures

(1) Wear the protective items such as goggle, gloves and working boots.

(2) Take safety measures against the toxic, flammable or corrosive fluid.

(3) Reduce the line pressure to the atmospheric level before retightening gland and flange bolts and nuts.

(4) Operators should take protective measures to prevent direct exposure to the fluid, when the fluid spouts out from flange areas.

(5) Reduce the line pressure to the atmospheric level, when the packing and gaskets are replaced or bolts and nuts are loosened. Operators should take protective measures to prevent direct exposure to the fluid, when the fluid spouts out from valves.

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 in a star pattern as shown below.
# Valve Operation

## Trouble Shooting

<table>
<thead>
<tr>
<th>Defect</th>
<th>Possible causes</th>
<th>Remedial measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disturbed valve operation</td>
<td>Foreign objects may have choked up the valve body cavity and stock around the ball seats.</td>
<td>Disassemble and inspect the valve components.</td>
</tr>
<tr>
<td></td>
<td>Foreign objects may have stuck to the stem.</td>
<td>Remove the foreign objects and check the valve.</td>
</tr>
<tr>
<td></td>
<td>Foreign objects may have choked up the valve body cavity and stock around the ball seats.</td>
<td>Flush the built-up objects by the media with the ball slightly open and disassemble and inspect the valve.</td>
</tr>
<tr>
<td>Excessive valve torque</td>
<td>The gland bolts may have been overly tightened.</td>
<td>Loosen the gland bolts once and adequately retighten them so that the leakage through the gland does not occur.</td>
</tr>
<tr>
<td></td>
<td>Loose gland bolts.</td>
<td>Retighten the gland bolts.</td>
</tr>
<tr>
<td></td>
<td>Uneven tightening of the gland bolts.</td>
<td>Loosely the bolts once and evenly retighten them.</td>
</tr>
<tr>
<td>Leakage from the gland area</td>
<td>Damage on the gland packing.</td>
<td>Replace the gland packing.</td>
</tr>
<tr>
<td>Internal through-bore leakage</td>
<td>Damage on the ball seats.</td>
<td>Disassemble and inspect the valve.</td>
</tr>
<tr>
<td></td>
<td>Replace ball seats.</td>
<td></td>
</tr>
<tr>
<td>Abnormal noise or vibration</td>
<td>Loose bolts and nuts.</td>
<td>Retighten the bolts and nuts.</td>
</tr>
</tbody>
</table>
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 plant unit.
   b) Where the media contain high viscosity and therefore may get stuck and build 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.
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 Care for removal of the valves from pipelines or installation of the valves on pipelines.

(1) Discharge the fluid from the pipes and reduce the line pressure to the atmospheric level when disassembling valves. Trapped pressure or fluid is very dangerous and cause accidents resulting in personal injury. In case of installation of pipe end service, the fluid might enclose between the valve and the blank flange. Open the valve and discharge the fluid from the pipe before the blank flange removal.

(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.

(1) Wear the protective items such as goggle, gloves and working boots.

(2) Keep a secure footing for valve dismantle or installation.

(3) Piping and valves should be properly supported, if needed.

(4) Before dismantling valves from the pipeline, mark the valve end flanges and coupled pipe flanges with their original positions. Reinstall the valve on pipes according such marks after reassembly.

(5) Be sure to insert new gaskets for valve mounting.

⚠️ WARNING

-risk of personal injury due to improper care of fluid\n-risk of accident caused by trapped pressure or fluid\n-risk of fire or explosion caused by fluid exposure\n-risk of injury due to incorrect installation position\n-risk of contamination due to improper care of fluid and valve

⚠️ CAUTION

-risk of personal injury due to improper use of protective equipment\n-risk of accident caused by improper footing during valve dismantle or installation\n-risk of incorrect support of piping and valves during installation\n-risk of improper marking of valve end flanges and coupled pipe flanges\n-risk of improper installation of new gaskets
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 protrude 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.
   - Wear the protective items such as goggles, gloves, and working boots.
   - Before shell test and seat leakage test begin, take some precautions for operators' safety.
2. Shell Test
   - All valves should be subjected to a hydrostatic or pneumatic shell test at the required test pressures after reassembly.
   - Refer to BS6755 or API-598 for test methods and procedures.
3. Seat Leakage Test
   - All valves should be subjected to a pneumatic seat test at the required test pressures after reassembly.
   - Pneumatic Seat Test
     - Seat leakage should not be detected.

⚠️ CAUTION

- The safety of operators or other personnel around the test area is very important.
- The test should be performed carefully by experienced personnel.

After inspection:

- Before starting the operation, ensure that there are no loose parts or damages.
- Perform a final check to ensure that all connections are secure.
- Ensure that all protective items are properly stored for future use.

KITZ CORPORATION
CHAPTER

Disassembly and Reassembly of Valves
1. Disassembly procedure

1.1 Care for disassembly

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

(2) Wear the protective items such as goggles, gloves, and working boots.

(3) 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.
Disassembly and Reassembly of Valves

1.3 Disassembly procedure

1.3.1 Full close the valve.

1.3.2 Remove the insert(29).

1.3.3 Disassemble the body(1) and insert(29).

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

1.3.5 Remove the ball seats(30) and gasket(19) from the body(1) and insert(29).

1.3.6 Size 1/2-1 1/2:

" Remove the stem nut(10) handle(9) gland nut(34) lock plate(40A) spring(43) gland(7) and gland packing(8) from the body(1).

Size 2-1 0:

Disassemble the handle(9) snap ring(48) stopper(49) gland bolts(36), gland(7), and gland packing(8) from the body(1).

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 thrust washer(47) or stem bearing(67) from the body(1) or stem(3).
Disassembly and Reassembly of Valves

2. Reassembly procedure

2.1 Care for reassembly

(1) Wear the protective items such as goggle, gloves and working boots.

(2) No open flame or smoking should be allowed in the working area.

(3) Take care not to catch fingers in flanges during reassembly.

(4) Replace the gland packing and gasket for new ones to ensure satisfactory sealing performance. Reuse of these components may cause leakage.

(5) When assembling valves of large size, use appropriate machine to lift up valves.

2.2 Before Assembly

2.2.1 Check all parts before assembly. If any unsatisfactory function is found, replace the valve.

2.2.2 The consumables such as ball, ball seats, seat packing, gland packing, gasket and thrust washer 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 to reassemble the valve in accordance with the marks given during disassembly.

2.2.7 Keep in mind that all threads should be securely tightened.
Disassembly and Reassembly of Valves

2.3 Reassembly procedure

2.3.1 Mount the thrust washer (47) or stem bearing (67) in the stem (3).

2.3.2 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.

2.3.3 Size 1/2-11/2: Mount the gland packing (8) and gland (7) in the body (1). Assemble the spring (43), lock plate (40A), and gland nut (34) and tighten the gland nut (34). Assemble the handle (9) and handle nut (10) and tighten the handle nut (9).

2.3.4 Mount the ball seats (30) in the body (1) and insert (29).

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 (1).

2.3.7 Assemble the insert (29) in the body (1). Ensure that the ball seats (30) are placed in the correct position and tighten the insert.

2.3.8 All threaded parts should be securely tightened. Retighten them if found loosened.
Disassembly and Reassembly of Valves


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