No. KKS980032-4E

# Instruction Manual

Products: Universal Ball Joint

## Metal UT Series

Thank you for purchasing this product.
Prior to use, read this manual carefully and familiarize yourself with the proper operation of the product for best performance.
H. Ikeuchi & Co., Ltd. takes no responsibility for any accidents and/or injuries resulting from improper handling, installation and/or operation.
After reading, keep this manual handy for quick reference.
Please be aware that due to continuing efforts to improve our products, some details in this manual may differ from the actual product.

Contents



H. Ikeuchi & Co., Ltd.

## 1. Safety Precautions

Prior to use, please read these “Safety Precautions” and use the products properly.
Improper use may result in injury and damage to the product.


WARNING

Always operate the product at or below the rated operating pressure shown in the table below.
Do not use the product beyond the maximum allowable pressure, or under conditions involving sudden pressure surges near the maximum allowable pressure or repeated pressure fluctuations.
The actual allowable pressure may also be affected by the material strength and pressure resistance of the connected nozzles and piping.

| Material of UT | Stainless Steel | Brass |
|---|---|---|
| **Rated Operating Pressure** | **15 MPa** | **4 MPa** |

| UT Outlet Thread Size (Ball thread for nozzle connection) | Maximum Allowable Pressure (MPa) | |
|---|---|---|
| | Stainless Steel | Brass |
| 1/8 | 30 | 9 |
| 1/4 | 23 | 6.5 |
| 3/8 | 23 | 6.5 |
| 1/2 | 15 | 4 |
| 3/4 | 15 | 4 |
| 1 | 15 | 4 |
| 1*1/4 | 15 | 4 |
| 1*1/2 | 15 | 4 |
| 2 | 15 | 4 |


WARNING

Do not use products outside of the temperature range of 5–90°C.


WARNING

Do not use products in freezing cold environments.


WARNING

Only connect the product to tapered pipe threads (R or Rc).


WARNING

To prevent a water hammer, avoid a sudden increase in liquid pressure.


WARNING

Do not apply water pressure to the products while the cap (part #3) is loose.


WARNING

In order to avoid any unexpected accidents or injuries, do not stand near or in front of the product and keep your face away.

## 2. Before Use (Instructions & Cautions)


CAUTION

Be sure to flush the pipes before installing the UT to remove any dirt and foreign matter.


CAUTION

Avoid installing the UT immediately after a bend or an elbow in the piping. Turbulence may affect the performance of the nozzle installed on the UT.


CAUTION

Apply sealant or sealing tape to either the pipe threads or the adaptor's pipe-connection thread (part #4) before installation.


CAUTION

When installing the UT, first screw in the adaptor by hand, making sure it is properly engaged. Then tighten it with an appropriate torque wrench.
Refer to the table below for the recommended tightening torque.

| UT Inlet Thread Size (Adaptor thread for pipe connection) | **Adaptor Tightening Torque** (N·m) | |
|---|---|---|
| | Stainless Steel | Brass |
| 1/8 | 8 | |
| 1/4 | 15 | |
| 3/8 | 20 | |
| 1/2 | 40 | |
| 3/4 | 60 | |
| 1 | 100 | |
| 1*1/4 | 120 | |
| 1*1/2 | 150 | |
| 2 | 200 | |


CAUTION

The UT is shipped with the cap (part #3) lightly assembled. (For models with a ball thread size of 1 inch or larger, an anti-seize compound is applied to the adaptor threads on the cap side.)
Before use, adjust the nozzle direction, and always tighten the cap securely before operation. Insufficient tightening may cause the nozzle direction to shift during spraying, while over-tightening may damage the O-ring.
Refer to the table below for the recommended tightening torque.

| UT Outlet Thread Size (Ball thread for nozzle connection) | **Cap Tightening Torque** (N·m) | |
|---|---|---|
| | Stainless Steel | Brass |
| 1/8 | 10 | 6 |
| 1/4 | 30 | 8 |
| 3/8 | 50 | 40 |
| 1/2 | 60 | 55 |
| 3/4 | 60 | 60 |
| 1 | 100 | 60 |
| 1*1/4 | 100 | 60 |
| 1*1/2 | 150 | 100 |
| 2 | 150 | 100 |

CAUTION

When attaching or removing the adaptor (part #4) or cap (#3), use the correct spanner (or wrench) that properly fits the wrench flats on each part.
Never use tools such as a pipe wrench, pipe vice, or pliers. Refer to H1, H2, W1, and W2 in the outer dimensions on Page 5 for the appropriate spanner sizes.

CAUTION

To avoid water hammer, start spraying at a water pressure of 0.05–0.1 MPa, and then gradually increase to operating pressure.

CAUTION

To prevent the nozzles from clogging, install strainers or use a water treatment system, depending on the water quality.

CAUTION

When attaching a nozzle with a strainer, an extension adaptor may be required. If you plan to use such a nozzle, contact us for further assistance.

CAUTION

When spraying liquid other than water, consider the chemicals in the liquid and the resistance of the product and pipe to these chemicals. See Page 4 for product materials.

CAUTION

When a long, heavy, or 90°-angled nozzle is attached to the UT, the nozzle may move due to its own weight or the reaction force during spraying. In such cases, provide a support, or remove the O-ring and use the UT with a metal-to-metal seal. (Note that a slight leakage may occur, as complete sealing cannot always be achieved with the metal seal.)

CAUTION

Do not apply any strong force, shock or vibration to the products.

CAUTION

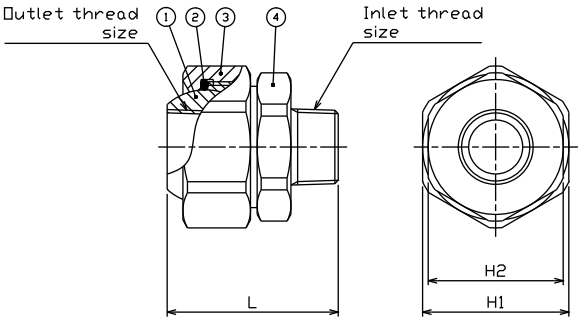
Store the product in a clean, dust-free place.

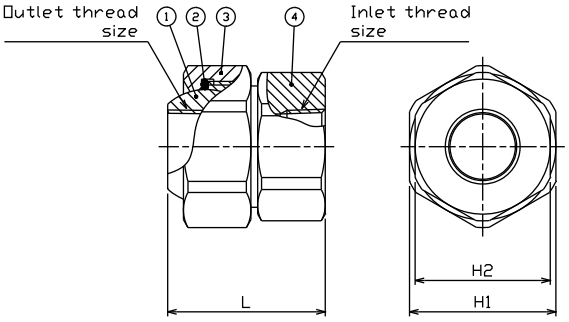
## 3. Structure, Material, and Dimensions

The UT Series has two exterior shapes, determined by the model (see the next page for the classification).

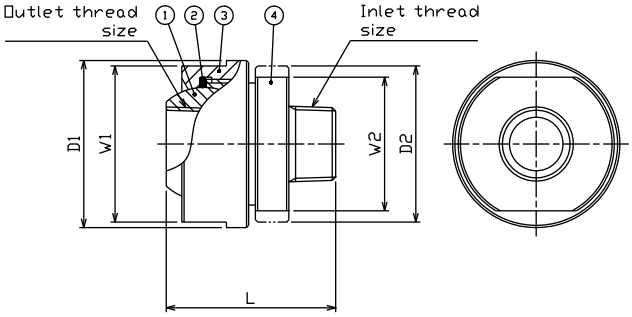
### A. UT (Hexagonal cap & adaptor)

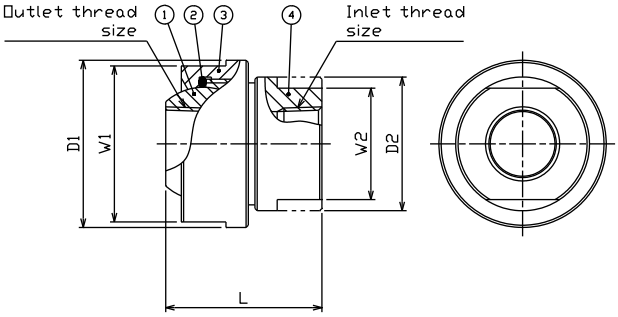
Left: Male thread inlet
Right: Female thread inlet




### B. UT (Round cap & adaptor)




Note: Shape and color differ depending on the product code.

The inlet thread (adaptor thread) is for pipe connection, and the outlet thread (ball thread) is for nozzle connection.

| No. | Parts | Materials |
|---|---|---|
| 1 | Ball | Stainless steel or Brass |
| 2 | O-ring | NBR |
| 3 | Cap | Stainless steel or Brass |
| 4 | Adaptor | Stainless steel or Brass |

## A. UT (Hexagonal cap & adaptor)

| Model | Outer Dimensions (mm) | | | | |
|---|---|---|---|---|---|
| | L | H1 | H2 | Inlet Thread Size | Outlet Thread Size |
| UT 1/8M x 1/8F | 32.5 | 22 | 21 | R1/8 | Rc1/8 |
| UT 1/8F x 1/8F | 28.5 | 22 | 21 | Rc1/8 | Rc1/8 |
| UT 1/4M x 1/8F | 36.0 | 22 | 21 | R1/4 | Rc1/8 |
| UT 1/4F x 1/8F | 28.5 | 22 | 21 | Rc1/4 | Rc1/8 |
| UT 1/4M x 1/4F | 39.5 | 29 | 24 | R1/4 | Rc1/4 |
| UT 1/4F x 1/4F | 33.5 | 29 | 24 | Rc1/4 | Rc1/4 |
| UT 3/8M x 1/4F | 40.0 | 29 | 24 | R3/8 | Rc1/4 |
| UT 3/8F x 1/4F | 33.5 | 29 | 24 | Rc3/8 | Rc1/4 |
| UT 1/2M x 1/4F | 43.0 | 29 | 24 | R1/2 | Rc1/4 |
| UT 1/2F x1/4F | 36.5 | 29 | 27 | Rc1/2 | Rc1/4 |
| UT 3/8M x 3/8F | 47.5 | 35 | 30 | R3/8 | Rc3/8 |
| UT 3/8F x 3/8F | 44.5 | 35 | 30 | Rc3/8 | Rc3/8 |
| UT 1/2M x 3/8F | 50.5 | 35 | 30 | R1/2 | Rc3/8 |
| UT 1/2F x 3/8F | 44.5 | 35 | 30 | Rc1/2 | Rc3/8 |
| UT 1/2M x 1/2F | 54.5 | 41 | 41 | R1/2 | Rc1/2 |
| UT 1/2F x 1/2F | 48.5 | 41 | 41 | Rc1/2 | Rc1/2 |
| UT 3/4M x 3/4F | 61.5 | 50 | 46 | R3/4 | Rc3/4 |
| UT 3/4F x 3/4F | 55.5 | 50 | 46 | Rc3/4 | Rc3/4 |
| UT 1M x 1F* | 76.0 | 65 | 60 | R1 | Rc1 |
| UT 1F x 1F* | 70.0 | 65 | 60 | Rc1 | Rc1 |

## B. UT (Round cap & adaptor)

| Model | Outer Dimensions (mm) | | | | | | |
|---|---|---|---|---|---|---|---|
| | L | D1 | D2 | W1 | W2 | Inlet Thread Size | Outlet Thread Size |
| UT 1M x 1F* | 76.0 | 75 | 70 | 70 | 60 | R1 | Rc1 |
| UT 1F x 1F* | 70.0 | 75 | 60 | 70 | 50 | Rc1 | Rc1 |
| UT 1*1/4M x 1*1/4F | 91.0 | 80 | 75 | 70 | 65 | R1*1/4 | Rc1*1/4 |
| UT 1*1/4F x 1*1/4F | 72.0 | 80 | 75 | 70 | 65 | Rc1*1/4 | Rc1*1/4 |
| UT 1*1/2M x 1*1/2F | 99.5 | 110 | 100 | 100 | 90 | R1*1/2 | Rc1*1/2 |
| UT 1*1/2F x 1*1/2F | 99.5 | 110 | 100 | 100 | 90 | Rc1*1/2 | Rc1*1/2 |
| UT 2M x 2F | 132.5 | 130 | 120 | 120 | 110 | R2 | Rc2 |
| UT 2F x 2F | 121.5 | 130 | 120 | 120 | 110 | Rc2 | Rc2 |

*For UT 1M x 1F and UT 1F x 1F, the shape of the cap and adaptor depends on the material:
・Brass, Stainless Steel 304, and Stainless Steel 316: Hexagonal cap and adaptor
・Stainless Steel 303 and Stainless Steel 316L: Round cap and adaptor

## 4. Operation

### (1) Attaching nozzle to UT Ball Joint

Be sure to flush the pipes before installing the nozzle to remove any dirt and foreign matter. Apply sealant or sealing tape to the thread of the nozzle.

Before attaching a nozzle, tighten the UT cap to secure the ball. (Refer to *Cap Tightening Torque* on Page 2.)
Then screw the nozzle into the ball thread of the UT by hand, and make sure it is properly engaged. Tighten it further using an appropriate tool.
Refer to the table below or to the individual nozzle instruction manual for the recommended nozzle tightening torque. The values in the table are for reference only. If the ball rotates during assembly, further tighten the cap to adjust.

| UT Outlet Thread Size (Ball thread for nozzle connection) | **Nozzle Tightening Torque** (N·m) | |
|---|---|---|
| | Stainless Steel | Brass |
| 1/8 | 8 | 6 |
| 1/4 | 15 | 8 |
| 3/8 | 15 | 15 |
| 1/2 | 15 | 15 |
| 3/4 | 15 | 15 |
| 1 | 20 | 20 |
| 1*1/4 | 20 | 20 |
| 1*1/2 | 20 | 20 |
| 2 | 20 | 20 |

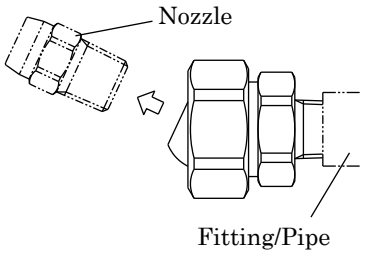
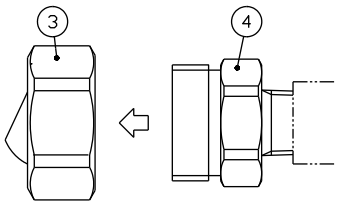
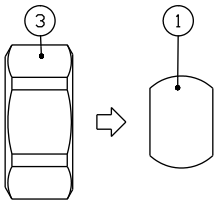
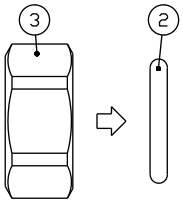
Note: Start spraying at a water pressure of 0.05–0.1 MPa, and then gradually increase to operating pressure.

### (2) Adjusting the spray direction

i. Be sure to stop the pump before positioning the nozzle. Do not apply water pressure to the cap when it is loose.
ii. Slightly loosen the cap.
iii. Adjust the direction of the ball with the nozzle attached.
iv. When the direction is set, tighten the cap firmly. (Refer to *Cap Tightening Torque* on Page 2.)
v. Always make sure that the cap is firmly tightened before starting to spray.

## 5. Disassembly

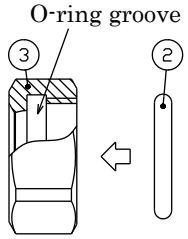
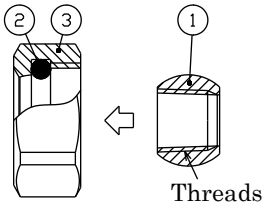
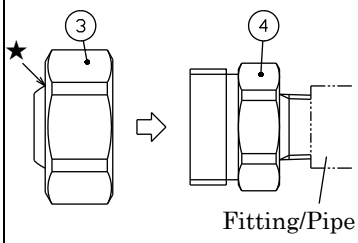
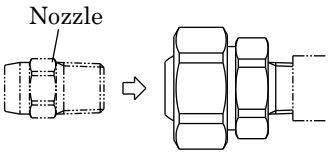
- Disassemble the product in a clean, dust-free environment. Always clean the product surface before disassembly to prevent any dust and dirt from entering the product.
  Be careful not to lose any parts.

| No | Procedures | Diagrams | Notes |
|---|---|---|---|
| 1 | Remove the nozzle from the UT. |  | If the ball (part #1) moves, further tighten the cap to secure it. |
| 2 | Unscrew the cap (#3) from the adaptor (#4). |  | |
| 3 | Push the ball (#1) out from the cap (#3). |  | The ball may be impossible to remove if the nozzle is still attached. |
| 4 | Remove the O-ring (#2) from the cap (#3). |  | If O-ring is stuck, carefully use a soft stick (bamboo skewer, toothpick, or such) to dislodge it. |

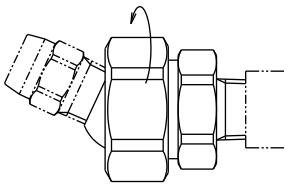
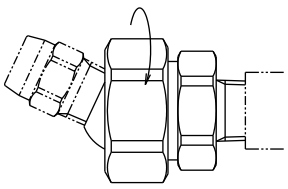
Note: Shapes may differ depending on product codes.

## 6. Reassembly

- Do not use hard objects such as metal pins, nails, or needles, as they may damage the O-ring, leading to water leakage.
- Assemble the product in a clean, dust-free environment. Always clean the product surface before assembly to prevent any dust and dirt from entering the product.
  Be careful not to lose any parts.

| No | Procedures | Diagrams | Notes |
|---|---|---|---|
| 1 | Insert the O-ring (#2) into the cap (#3).<br>Make sure it is properly seated in the O-ring groove and not twisted or out of the groove. |  | Check that the O-ring is undamaged. (Using a new O-ring is recommended.)<br><br>Make sure that the O-ring groove is clean and free from dust or foreign particles. |
| 2 | Firmly push the ball (#1) into the cap (#3) with the O-ring (#2) installed. |  | Pay attention to the orientation of the ball.<br>Confirm that the ball surfaces are clean and undamaged.<br><br>DO NOT attach a nozzle to the ball at this stage, as the ball may not fit into the cap. |
| 3 | Screw the cap (#3) onto the adaptor (#4) until the O-ring (#2) inside the cap makes contact with the end face of the adaptor, then tighten it to the specified torque.<br>(For UT with a ball thread size of 1 inch or larger, apply an anti-seize compound to the adaptor threads on the cap side.) |  | Refer to *Cap Tightening Torque* on Page 2.<br><br>If you see a gap at the part indicated with ★, push the ball back into the cap. (A gap can cause leakage.) |
| 4 | Screw the nozzle into the ball thread of the UT (see Page 6). |  | Refer to Page 6 and the nozzle instruction manual for the recommended tightening torque. |

(Continued on the next page)

| No | Procedures | Diagrams | Notes |
|---|---|---|---|
| 5 | Slightly loosen the cap (#3) and adjust the nozzle direction. |  | Always tighten the cap securely before operation. Applying pressure while the cap is loose is dangerous. |
| 6 | When the direction is set, tighten the cap (#3) firmly. (Refer to *Cap Tightening Torque* on Page 2.) |  | When tightening the cap, hold the adaptor firmly with a spanner/wrench to prevent it from turning. |

Note: Shapes may differ depending on product codes.

## 7. Troubleshooting

If there is a problem, please check the following items first. If the problem persists, please replace the product.

| Problem | Probable cause | Solution |
|---|---|---|
| Leakage from the connection | O-ring is missing, or damaged. | Set or replace the O-ring. |
| | Insufficient tightening | Retighten connections. (See the recommended tightening torque tables on Page 2 and the nozzle instruction manual for the nozzle tightening torque) |
| | Contamination (dust on sealing surfaces) | Clean with ultrasonic cleaner and air blower. |
| Poor ball movement | Damaged or deteriorated O-ring | Replace the O-ring. |
| | Excessive cap tightening | Loosen the cap. |

## 8. Warranty

There is a one year warranty from the date of shipment.
Seller shall be responsible for any damage due to design or production and will replace the item free of charge.
Neither this warrant nor any implied warranty applies to damage or harm caused by any or all of the following: 1. Damage due to misapplication and/or misuse;
2. Improper repair and/or modification; 3. Natural disasters; 4. Normal wear-and-tear of consumable parts.