OCHIAI OF INDUSTRIAL FASTENERS

## Types of Retaining Rings (Characteristics and Instructions for Use)

### TYPE 1 Thrust Direction Mounting Types (Groove required to be machined)

(1) Basic Internal Ring (2) Basic External Ring

**Characteristics**

- This is a basic retaining ring that is mounted from the thrust direction (parallel to the hole or shaft) onto the mating hole (shaft) with a grooved surface.

(3) Inverted Internal Ring (4) Inverted External Ring

**Characteristics**

- Compared to C-type retaining rings, the inner diameter (outer diameter) of the retaining ring after installation in the groove is smaller, allowing it to be used in more space-efficient locations.
- Compared to C-type retaining rings, the contact area with the groove is smaller, resulting in a thrust load of approximately 2/3.

(5) Beveled Internal Ring (6) Beveled External Ring

**Characteristics**

- The Beveled Rings can reduce looseness and unsteadiness resulting from the accuracy of machining to the groove position and variation of their retained parts.
- See page 9, “ (3) Beveled Ring” for details.

### Instructions for Use

(1) Do not reuse these retaining rings.

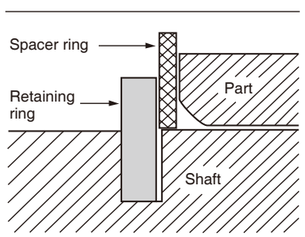
(2) When installing the retaining ring, do not compress (spread) more than 1% of the hole (shaft) diameter. Doing so may prevent it from returning to the mating groove diameter, leading to the risk of play and potential dislodgment from the groove. However, for the Beveled Ring, the amount of compression (spread) is up to the applied hole (shaft) diameter.

(3) Retaining rings are generally compressed (or spreaded) and inserted using specialized pliers (insertion with taper tools reduces permanent deformation).

(4) When fitting the retaining ring on or into retained parts, there is a danger that it may drop out of a jig and spring out causing injury. Take enough care to prevent the ring from falling off the jig.

(5) When using the external retaining ring on a rotating shaft, the ring may drop off since it will spread as the shaft is rotated at a high speed. Be sure to verify the conditions by using the actual machine.

(6) When retained parts have large corner radii or chamfers, the supporting point of load applied to the retaining ring will vary resulting in a danger that the ring may fall off the groove. In this case, fit an angular plain washer-like insert having enough rigidity in between the parts and the ring to prevent deformation.






### TYPE 2 Radial Direction Mounting Type (Groove required to be machined)

(1) E-Ring

**Characteristics**

- This is a basic retaining ring that is mounted from the radial direction (perpendicular to the axis) onto the mating shaft with a grooved surface.

(2) Bowed E-Ring

**Characteristics**

- Can prevent looseness in the thrust direction.

**Notes**

- The retaining ring may be crushed out to prevent removal of looseness if undue load is applied since the portion acting as a spring is short.
- There will be reverse warps (flips) or settling if undue load is applied.
- The bowed ring may be hard to be fit with the fitting load larger from the following reasons:The retained part is scraped during fitting depending on the material (hardness) of the part. And the ring is fit on as the portion acting as a spring is being compressed.

(3) C-Ring

**Characteristics**

- The C Ring has smaller outside diameters and can be applied where space is limited. (This ring is effective where the outside diameter is restricted.)

(4) U-Ring

**Characteristics**

- It has higher thrust loads than the E-rings since it has a large area of contact with the groove.
- This snap ring can be removed using a screwdriver or other tool. However, the snap ring after removed cannot be reused.

### Instructions for Use

(1) Ensure that the Ring is set in the groove. Do not use any retaining ring that has been deformed by incorrect fitting. There is a danger that the ring being not gripped in the groove may fall off.

(2) Do not reuse these retaining rings.

(3) When selecting the retaining ring, check both the shaft diameter and the groove diameter before use.

(4) When using the retaining ring on a rotating shaft, the ring may drop off since it will spread due to centrifugal force. Be sure to verify the conditions by using the actual machine.

(5) When retained parts have large corner radii or chamfers, the supporting point of load applied to the retaining ring will vary resulting in a danger that the ring may fall off the groove. In this case, fit an angular plain washer-like insert having enough rigidity in between the parts and the ring to prevent deformation.