



A mechanical lock is a friction fastener that fastens a shaft and hub without the use of a key. The tolerances and surface roughness of the shaft and hub installation surfaces, and correct tightening of the lock bolts, are very important factors in order to obtain the designated performance. If you have any questions, please contact a dealer or our company.

### For safe use of the product

Thank you for your purchase of an ISEL product. In order to use the product safely and obtain the designated full performance, please be sure to read the following items.

- ◎Read this instruction manual carefully and understand the contents before using the product, and be sure to observe all instructions in the manual and use the product correctly.
  - ◎Be sure that you fully understand the information related to the device and safety before using the product.
  - ◎After reading, be sure to store this manual carefully so that it can be referred to at any time when needed during use.
- This manual classifies important precautions into two categories: **DANGER** and **WARNING**.

 <b>DANGER</b>	 <b>WARNING</b>
Incorrect use or handling will produce dangerous conditions that may result in death or serious injury.	Incorrect use or handling will produce dangerous conditions that may result in injury. There is also the risk of property damage.

### **DANGER**

- ◆When using this product, be sure that the necessary mechanisms (covers, enclosures, etc.) for ensuring the safety of life and health are installed on the equipment.
- ◆Wear clothing and protective gear that is suitable for the work.
- ◆Keep the work area clean and orderly, and work safely in order to prevent secondary accidents.
- ◆In the environment where the product operates, install safety mechanisms onto all parts which may be a danger to the operator.
- ◆When performing maintenance or inspections, turn OFF the motor power (power supply) and check that the machine has fully stopped before beginning work.
- ◆Before using lift equipment, install safety measures on the equipment to prevent falling. There is the risk of death or injury, as well as damage to the equipment, if the lift part falls.
- ◆If the product is used for transporting persons, install the necessary equipment for safety.
- ◆Do not touch the product while it is operating. Doing so may result in injury, damage to the product, or other damage.
- ◆Do not use the product for any purpose other than the designated purpose, and do not modify the product. There is the risk that the designated accuracy and performance will not be possible.
- ◆If abnormal noise or vibration occurs during work, immediately discontinue operation and inspect the equipment and this product. If use is continued without inspecting, there is the risk of injury to operators, damage to equipment, and other damage.

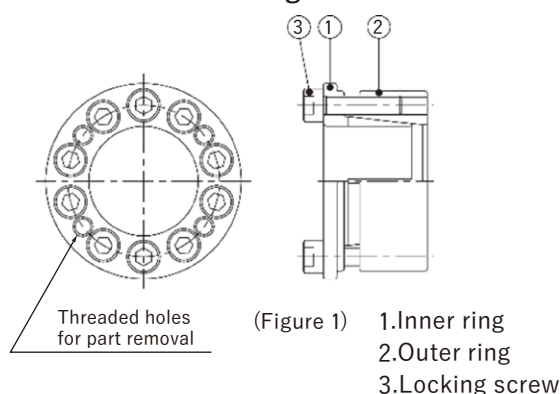
### **WARNING**

- ◇Check that the product is the one you ordered and that there is no damage to it. If the product is not the one you ordered or is damaged, there is the risk of injury to operators, damage to equipment, and other damage.
- ◇Never use molybdenum oil or grease, or oil or grease which contains an extreme-pressure additive. Doing so may cause a large decrease in allowable torque, resulting in slipping.
- ◇If the shaft includes a key groove, it can be used as long as the groove width is as prescribed in the JIS standard. However the maximum allowable torque is reduced by 15% - 20%. Remove any burrs on the key

groove before using.

- ◇If the product is reused, check that there is no deformation, damage, or other problem with the product or any of its components before use. If there is damage, deformation, or other problem, replace with a new product.
- ◇When tightening lock bolts, be sure to use a torque wrench that includes a torque adjustment scale, and tighten at the designated tightening torque. Use of a plate-type torque wrench may cause slipping, deformation, and other trouble because it is difficult to check the designated torque.
- ◇Never use any bolt other than the designated bolt. There is the risk of damage to the bolt, resulting in an accident.
- ◇In order to ensure the designated performance, an opposite shaft with tolerance grade h7, hub tolerance grade H7, and surface roughness of Ra1.6 or less is recommended.
- ◇In the case of a hollow shaft (pipe), depending on the thickness it may not be possible to obtain sufficient surface pressure. Please contact our company.
- ◇If the product has special specifications, it may differ in parts from the contents of this instruction manual. Please contact a dealer or our company.
- ◇With stainless steel specifications (MSA Series), turn the stainless steel bolts slowly when tightening them. If they are turned too quickly, galling or seizure of the bolts may occur.
- ◇If the bolts are tightened when the mechanical lock is not connected to anything, the mechanical lock may become deformed and be rendered unusable. Therefore check that the hub and shaft are fully inserted into the mechanical lock when tightening the bolts.

### ● Structural drawings



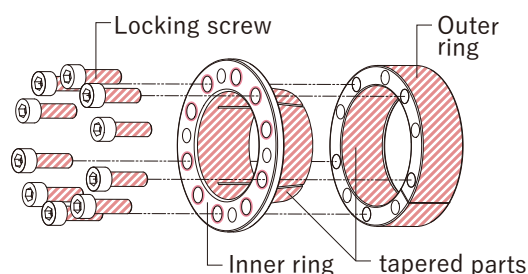
### ● Installation

- (1) Use paint thinner or other means to wipe off any corrosion, dirt, or other substance from the surface of the shaft surface and inner diameter of the hub, then apply a light coat of oil or grease.
  - (2) Refer to Table 1 and apply a light coat of oil or grease to the mechanical lock inner diameter parts, outer diameter parts, contact parts of each taper, and the threads and head seats of the lock bolts. (Figure 2, hatched areas)
- ◇Using the product after unpackaging without applying oil or grease to it may cause a decrease in allowable torque.

	MA	MB	MKA	MSA
Oil application	○	○	○	—
Grease application	—	—	—	○*1

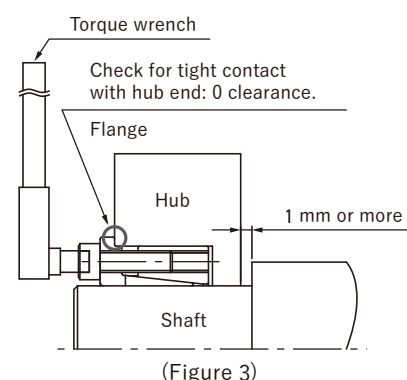
\*1 Do not apply grease to the inner diameter parts of the MSA Series. Doing so may cause slipping.

(Table 1)



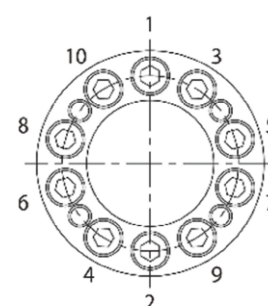
### **WARNING**

- ◇With the MSA Series, depending on the type of grease, grease may improve the tightening efficiency. Because this may result in shaft and hub surface pressure which exceeds the yield point, it is recommended that evaluation testing be performed.
- (3) Install the hub that was machined to the instructed dimensions onto the shaft, and press the mechanical lock onto the shaft. Check that the flange is in tight contact with the end of the hub. (Figure 3) If the outer race cannot be inserted, loosen the bolts and separate the inner and outer race tapered parts to release the tight contact before inserting. If the casing section cannot be inserted, use a plastic mallet or similar tool to gently strike it while inserting. (Strong striking is prohibited!)



### **WARNING**

- ◇If the flange and end are not in tight contact, there is the risk that the mechanical lock flange may become deformed.
- ◇If there is a step on the back of the hub, set clearance of 1 mm or more between the back and step. (If this clearance is not ensured, a large force will be required for removal, and in some cases the inner race flange may become deformed, making reuse impossible.) (Figure 3)
- (4) After positioning, tighten the lock bolts. Use a torque wrench and tighten the lock bolts at diagonally opposite positions in sequence. Tighten gently at first (approximately 1/4 of the designated torque) then gradually increase the tightening force (approximately 1/2 of the designated torque), and then fully tighten the bolts at the designated torque. Finally repeat tightening of each bolt several times, working in the peripheral direction. Check that all lock bolts have been tightened at the designated torque and none were skipped. (Figure 4) (Table 2)



Strength category 12.9 {A2-70}

Bolt	Tightening torque N·m
M3	1.9
M4	3.9 {2.7}
M5	8.8 {5.6}
M6	15.7 {9.6}
M8	37.3
M10	78.5
M12	137.3

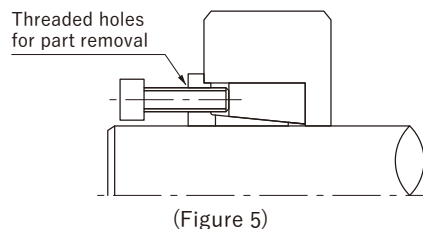
{ } indicates the stainless steel specification MSA Series

(Table 2)

### ● Removal

Check for safety before beginning removal work.

- (1) Turn OFF the motor power (power supply) and check that there is no torque or thrust force applied to the mechanical lock, and that there is no risk of falling or other accident.
- (2) Gradually loosen each of the lock bolts in sequence. Place the loosened lock bolts into all of the threaded holes for part removal, then gradually screw in the bolts working on opposite diagonals in sequence with even force in order to disassemble. (Figure 5)



### ⚠ WARNING

- ◇ Apply oil to the bolts used for part removal.
- ◇ Be sure to use all of the threaded holes for part removal, and to screw the bolts in using several stages. There is the risk that the inner race may become deformed, making reuse impossible.

\*Specifications may be changed without notice.