# LOCKING ASSEMBLY MAV 4081
## Installation and Removal Instructions

### GENERAL RECOMMENDATIONS AND WARNINGS

- Before installing or handling this product, read instructions carefully and completely. Due to possible danger to machinery or persons resulting from improper use of this product, it is very important to follow correct procedures. Proper installation, maintenance and operation procedures must be observed. All instructions included in this manual must be followed carefully. Handling, installation and removal of this product must be done by skilled personnel, familiar with the product, the application and all hazards involved.
- Suitable safety devices should be provided and applicable safety rules should be observed as specified in safety codes. Those are neither the responsibility of MAV S.p.A., nor are provided by MAV S.p.A.
- Contravention of install and safety instructions will void all claims under warranty.
- During storage or handling operations, use only tested and approved handling and/or lifting tools. Make always sure that components of Locking Assembly are secured against slipping, falling or rolling.
- Prior to initiating installation or removal procedures, check to ensure that no loads are acting on Locking Assembly, shaft or any connected component. Motor and drive train must be switched off and secured against accidental activation.

### GENERAL INFORMATION

Locking Assemblies MAV 4081 provide a rigid, zero-backlash, frictional keyless connection between a shaft and hubs such as gears, pulleys, cams, levers, rotors and many others. They are suited for transmitting torque, axial load, bending moment and radial load, separately or in combination. Applied loads are transmitted via pressure and friction across the fitting surfaces between Locking Assembly, shaft and hub bore. In tightened condition, Locking Assemblies exert high radial pressure on shaft and in hub bore.

**Locking Assemblies MAV 4081 are supplied ready for installation and are composed of (fig. 1):**

- One inner ring (slotted)
- One outer ring (slotted)
- One double-cone front thrust ring
- One double-cone rear thrust ring
- One central ring for removal
- One set of socket head cap screws ISO 4762 grade 12.9

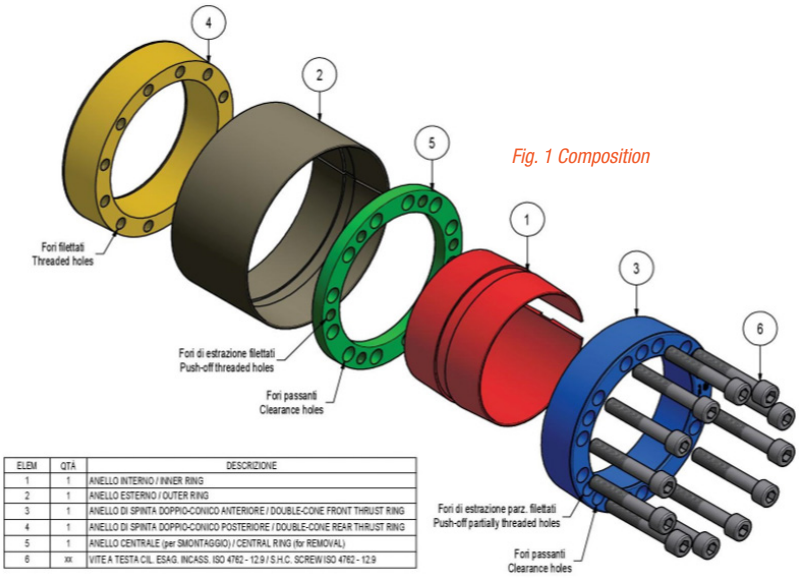



*Fig. 1 Composition*

| ELEM | QTÀ | DESCRIZIONE |
|---|---|---|
| 1 | 1 | ANELLO INTERNO / INNER RING |
| 2 | 1 | ANELLO ESTERNO / OUTER RING |
| 3 | 1 | ANELLO DI SPINTA DOPPIO-CONICO ANTERIORE / DOUBLE-CONE FRONT THRUST RING |
| 4 | 1 | ANELLO DI SPINTA DOPPIO-CONICO POSTERIORE / DOUBLE-CONE REAR THRUST RING |
| 5 | 1 | ANELLO CENTRALE (per SMONTAGGIO) / CENTRAL RING (for REMOVAL) |
| 6 | xx | VITE A TESTA CIL. ESAG. INCASS. ISO 4762 - 12.9 / S.H.C. SCREW ISO 4762 - 12.9 |

### Lubrication

Functional values are rated with screws, locking rings, shaft and hub contact areas coated with a film of mineral or synthetic-base oil with low content of additives (specific corrosion-protection purpose products as well as products used to release oxidized connections are not recommended). DON'T USE low friction lubricants based on molybdenum disulphide, graphite, copper and other similar compounds (e.g., Molykote®, Never-Seeze® or similar products).

Recommended shaft / hub bore tolerances: h8 / H8.

Recommended shaft / hub bore surface finish: 0.8 ≤ Ra ≤ 3.2 µm

### Tightening torque

Functional values in the catalog are based on specified tightening torque (Ma). Tightening torque may be reduced up to 0.6*Ma (max reduction by 40%). A given reduction of tightening torque leads to a proportional reduction of functional values.

After installation is completed, it is usually not necessary to re-check tightening torque after equipment has been in operation. However, loosening of the screws may occur in connections subject to severe operating conditions. In these instances, periodic check of screws tightening torque is recommended.

# LOCKING ASSEMBLY MAV 4081
## Installation and Removal Instructions

## INSTALLATION

### SAFETY NOTICE

**Prior to initiating the installation procedure, check to ensure that no loads are acting on Locking Assembly, shaft or any connected component. Motor and drive train must be switched off and secured against accidental activation.**

Locking Assemblies MAV 4081 are supplied ready for installation. Do not disassemble. During tightening of Locking Assembly, no axial displacement of hub respect to shaft will occur.

1. Make sure that screws, locking rings, shaft and hub contact areas are clean and coated with a film of oil.
2. For ease of installation, thrust rings shall be disengaged (fig. 2). Loosen all screws by two/three turns; then transfer and hand tighten at least two screws into the push-off threaded holes in the front thrust ring and slightly tap the head of remaining screws with an hammer.
3. Insert Locking Assembly into the hub bore and make it slide onto the shaft, making sure that connected components are positioned as required. Push the screws engaged into the rear thrust ring only. Inner respectively outer rings shall be completely supported by shaft respectively hub bore. At this point, relocate the screws used to disengage the front thrust ring. Installation into hubs with shoulder requires a few mm's gap between rear thrust ring and shoulder.
4. Tighten the screws by hand in a crosswise pattern (fig. 3) until fitting clearances with shaft and hub bore are bridged and connected components are slightly locked, while making sure that hub is aligned as required. Alignment of hub respect to shaft may be checked using a dial indicator (fig. 4). Better centering of connected parts from the beginning of installation is essential for better centering when installation is completed.
5. Use a torque wrench set approx. 5% higher than specified tightening torque (Ma), or reduced within admissible value. Progressively tighten the screws in a crosswise pattern (fig. 3), using approx. ¼ turns for several passes until ¼ turns can no longer be achieved. For better centering result, it is recommended to check the alignment of hub respect to shaft with a dial indicator after each tightening pass (fig. 4).
6. Still apply overtorque for a few more passes. This is required to compensate for a system-related relaxation of the screws since tightening of a given screw will always relax adjacent screws. Without overtorquing, a very large number of passes would be needed to reach specified tightening torque.
7. Reset the torque wrench to specified tightening torque (Ma), or reduced within admissible value, and check all screws in either a clockwise or counterclockwise sequence. The installation is completed as long as no screw can be turned further, otherwise repeat step 6.

NOTE: for connections subject to corrosion, slits in inner and outer rings should be sealed with a suitable caulking compound and push-off threads should be plugged. Locking Assembly may also be protected with specific covers.

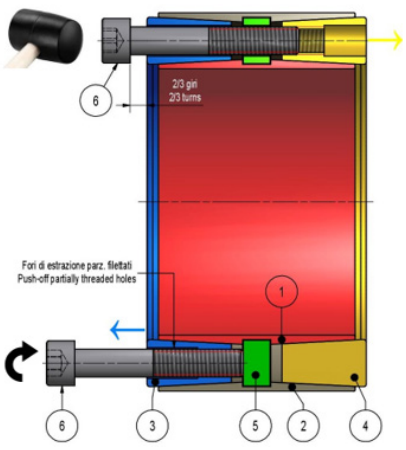



*Fig. 2*
*Disengagement of thrust rings*

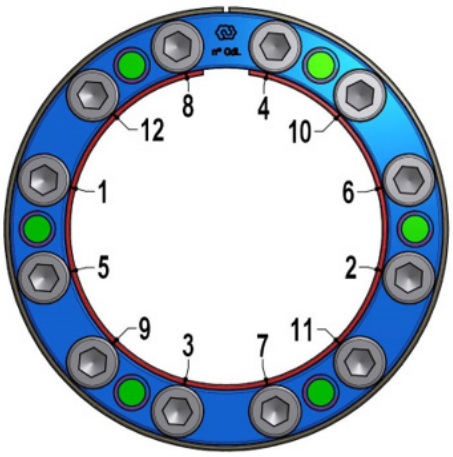



*Fig. 3*
*Example of tightening pattern*

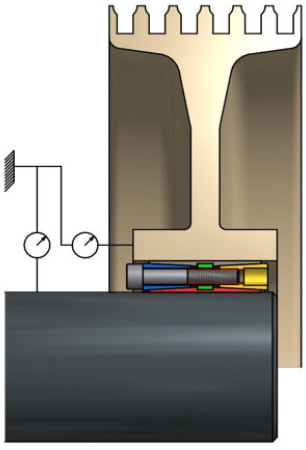


*Fig. 4*
*Check of shaft/hub alignment*

# LOCKING ASSEMBLY MAV 4081
## Installation and Removal Instructions

## REMOVAL

### SAFETY NOTICE

**Prior to initiating the removal procedure, check to ensure that no loads are acting on Locking Assembly, shaft or any connected component. Motor and drive train must be switched off and secured against accidental activation.**

**Some locking screws will be used for removal. The user shall make sure that the end tip of these screws is ground flat and chamfered, in order to prevent damage to the threads and allow their removal from push-off threaded holes. Screws with ground flat and chamfered end tip are not included in the scope of delivery.**

1. Ensure that axial movement of both front and rear thrust rings – necessary for removal – is not restricted. Likewise, ensure that push-off threaded holes are in good conditions.
2. Loosen all screws by two/three turns; then transfer some screws into all push-off partially threaded holes in the front thrust ring. Progressively tighten these screws in a crosswise pattern, using approx. ¼ turns for several passes until front thrust ring is released (fig. 5). Remove the screws still engaged in the rear thrust ring; then remove the front thrust ring.
3. Transfer some screws into all push-off threaded holes in the central ring. Progressively tighten these screws in a crosswise pattern, using approx. ¼ turns for several passes until rear thrust ring is released (fig. 6). Leave these screws in place after rear thrust ring is released.
4. Insert two/three screws into corresponding threaded holes in the rear thrust ring. Hold the head of these screws and pull them out in order to remove inner ring, outer ring, central ring, rear thrust ring all together from hub bore (fig. 7).

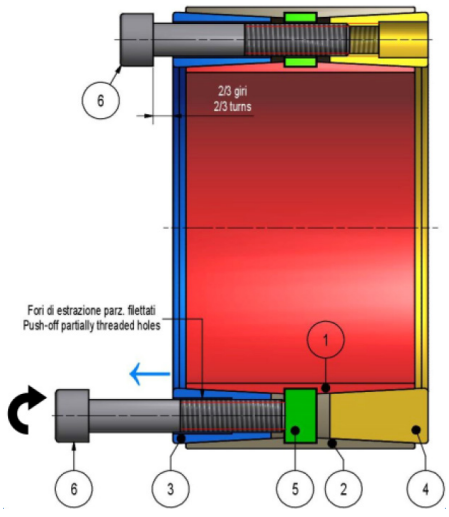



*Fig. 5*
*Release of front thrust ring*

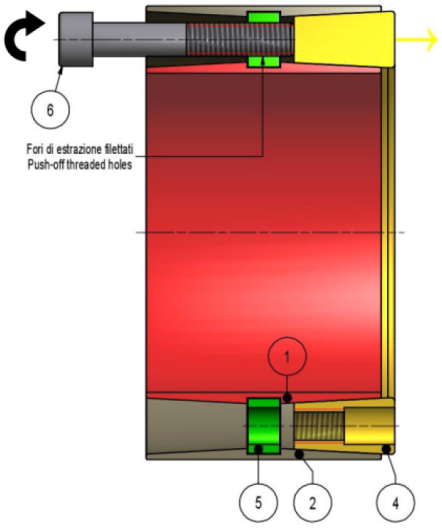



*Fig. 6*
*Release of rear thrust ring*

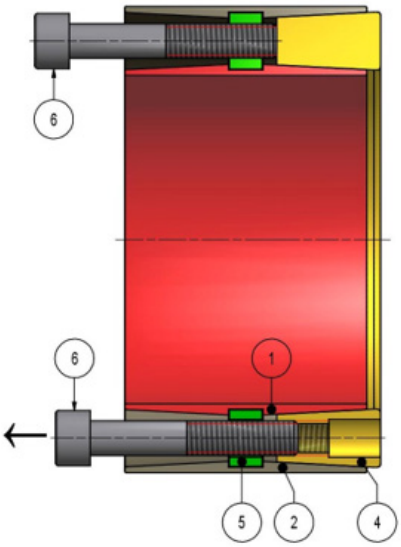



*Fig. 7*
*Removal of Locking Assembly*

Information for proper disposal:

Dispose MAV product as metal

# LOCKING ASSEMBLY MAV 4081 SPECIAL W/ GROUND FLAT & CHAMFERED SCREWS

## Installation and Removal Instructions

## GENERAL RECOMMENDATIONS AND WARNINGS

- Before installing or handling this product, read instructions carefully and completely. Due to possible danger to machinery or persons resulting from improper use of this product, it is very important to follow correct procedures. Proper installation, maintenance and operation procedures must be observed. All instructions included in this manual must be followed carefully. Handling, installation and removal of this product must be done by skilled personnel, familiar with the product, the application and all hazards involved.
- Suitable safety devices should be provided and applicable safety rules should be observed as specified in safety codes. Those are neither the responsibility of MAV S.p.A., nor are provided by MAV S.p.A.
- Contravention of install and safety instructions will void all claims under warranty.
- During storage or handling operations, use only tested and approved handling and/or lifting tools. Make always sure that components of Locking Assembly are secured against slipping, falling or rolling.
- Prior to initiating installation or removal procedures, check to ensure that no loads are acting on Locking Assembly, shaft or any connected component. Motor and drive train must be switched off and secured against accidental activation.

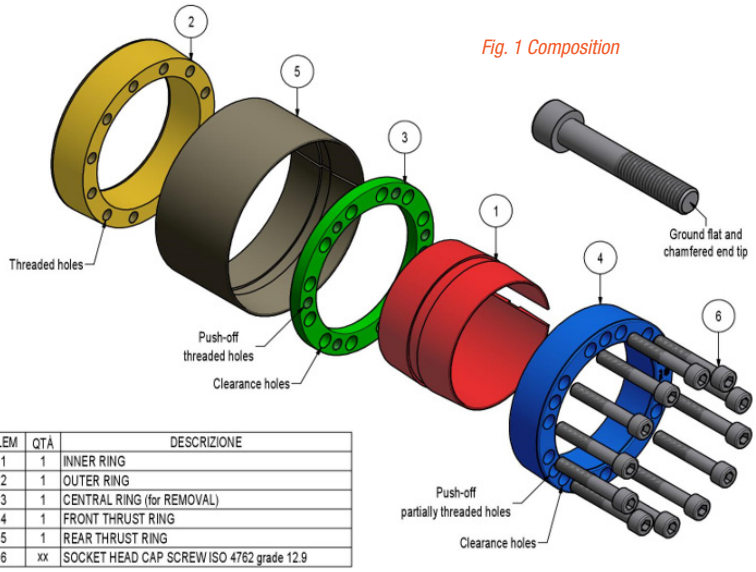
## GENERAL INFORMATION

Locking Assemblies MAV 4081 SPECIAL W/ GROUND FLAT & CHAMFERED SCREWS provide a rigid, zero-backlash, frictional keyless connection between a shaft and hubs such as gears, pulleys, cams, levers, rotors and many others. They are suited for transmitting torque, axial load, bending moment and radial load, separately or in combination. Applied loads are transmitted via friction across the fitting surfaces of shaft and Locking Assembly and Locking Assembly and hub bore. In tightened condition, the Locking Assembly exerts high radial pressure on shaft and in hub bore.

**Locking Assemblies MAV 4081 SPECIAL W/ GROUND FLAT & CHAMFERED SCREWS are supplied ready for installation and are composed of (see fig. 1):**

- One inner ring
- One outer ring
- One front thrust ring
- One rear thrust ring
- One central ring for removal
- One set of socket head cap screws ISO 4762 grade 12.9 with ground flat and chamfered end tip

*Fig. 1 Composition*




| ELEM | QTÀ | DESCRIZIONE |
|---|---|---|
| 1 | 1 | INNER RING |
| 2 | 1 | OUTER RING |
| 3 | 1 | CENTRAL RING (for REMOVAL) |
| 4 | 1 | FRONT THRUST RING |
| 5 | 1 | REAR THRUST RING |
| 6 | xx | SOCKET HEAD CAP SCREW ISO 4762 grade 12.9 |

### Lubrication

Functional values are rated with screws, locking rings, shaft and hub contact areas coated with a film of mineral or synthetic-base oil with low content of additives (specific corrosion-protection purpose products as well as products used to release oxidized connections are not recommended). DON'T USE low friction lubricants based on molybdenum disulphide, graphite, copper and other similar components (e.g., Molykote®, Never-Seeze® or similar products).

Recommended shaft / hub bore tolerances: h8 / H8.

Recommended shaft / hub bore surface finish: 0.8 ≤ Ra ≤ 3.2 µm

After installation is completed, it is usually not necessary to re-check tightening torque after equipment has been in operation. However, loosening of the screws may occur in connections subject to severe operating conditions. In these instances, periodic check of screws tightening torque is recommended.

# LOCKING ASSEMBLY MAV 4081 SPECIAL W/ GROUND FLAT & CHAMFERED SCREWS

## Installation and Removal Instructions

### INSTALLATION

Locking Assemblies MAV 4081 SPECIAL W/ GROUND FLAT & CHAMFERED SCREWS are supplied ready for installation. Do not disassemble. During tightening of Locking Assembly, no axial displacement of hub respect to shaft will occur.

1. Make sure that screws, locking rings, shaft and hub contact areas are clean and coated with a film of oil.
2. For ease of installation, tapers of thrust rings need to be disengaged (see fig. 2). In order to release the tapers of the front thrust ring, loosen all screws by minimum 2 turns; then transfer and hand tighten at least 2 screws into the push-off threads. In order to release the tapers of the rear thrust ring, slightly tap the head of remaining screws with an hammer.
3. Insert Locking Assembly into the hub bore and make it slide onto the shaft. Push the screws engaged into the rear thrust ring only. Inner respectively outer rings shall be completely supported by shaft respectively hub bore. At this point, relocate the screws used to release the tapers of the front thrust ring.
4. Tighten the screws by hand in a crosswise pattern (see fig. 3 as example) until fitting clearances with shaft and hub bore are bridged, while making sure that the hub is aligned as required. Alignment of hub respect to shaft may be checked using a dial indicator (see fig. 4). Better centering of connected parts from the beginning of installation is essential for better centering when installation is completed.
5. Use a torque wrench set approx. 5% higher than specified tightening torque (Ma). Tighten the screws in a crosswise pattern (see fig. 3 as example), using approx. ¼ turns (even if initially some screws require a very low torque to achieve ¼ turns) for several passes until ¼ turns can no longer be achieved. For better centering result, it is recommended to check the alignment of hub respect to shaft with a dial indicator after each tightening pass (see fig. 4).
6. Still apply overtorque for 1 or 2 more passes. This is required to compensate for a system-related relaxation of the screws since tightening of a given screw will always relax adjacent screws. Without overtorquing, an infinite number of passes would be needed to reach the specified tightening torque.
7. Reset the torque wrench to the specified tightening torque (Ma) and check all screws in either a clockwise or counterclockwise sequence. The installation is completed as long as no screw can be turned further, otherwise repeat step 6 for 1 or 2 more passes.

NOTE: for connections subject to extreme corrosion, the slits in inner and outer rings should be sealed with a suitable caulking compound or equivalent. Likewise, push-off threads should also be protected from corrosion.

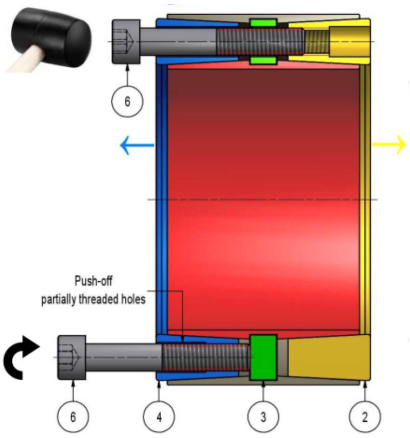



*Fig. 2*
*Release of tapers of thrust rings*

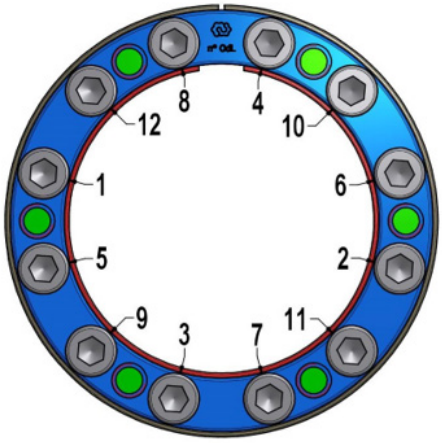



*Fig. 3*
*Example of tightening pattern*

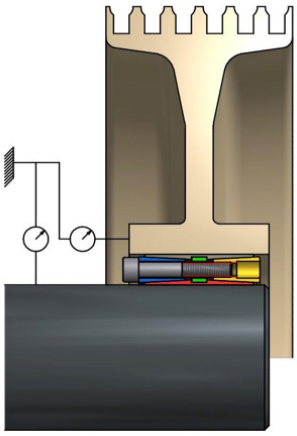


*Fig. 4*
*Check of shaft/hub alignment*

# LOCKING ASSEMBLY MAV 4081 SPECIAL W/ GROUND FLAT & CHAMFERED SCREWS

## Installation and Removal Instructions

## REMOVAL

### SAFETY NOTICE

**Prior to initiating the removal procedure, check to ensure that no loads are acting on Locking Assembly, shaft or any connected component. Motor and drive train must be switched off and secured against accidental activation.**

Some locking screws will be used for removal. In order to prevent damages to the threads of screws used for removal and allow their removal from push-off threads, all locking screws are supplied with ground flat and chamfered end tip.

1. Ensure that axial movement of both front and rear thrust rings – necessary for removal – is not restricted. Likewise, ensure that push-off threads are in good conditions.
2. Remove all locking screws and transfer some into all push-off threads located in front thrust ring.
3. Release the front thrust ring by tightening the screws in all push-off threads against central ring in a crosswise pattern, not exceeding ¼ turns for several passes (see fig. 5). Remove the front thrust ring.
4. Transfer the screws used for releasing of front thrust ring into all push-off threads located in central ring.
5. Release the rear thrust ring by tightening the screws in all push-off threads against rear thrust ring in a crosswise pattern, not exceeding ¼ turns for several passes (see fig. 6). Hub and released Locking Assembly are then normally removed together from the shaft.

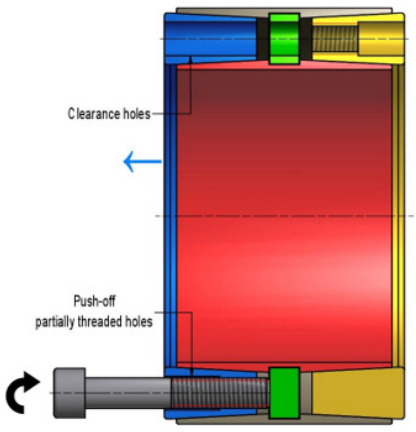



*Fig. 5*
*Release of front thrust ring*

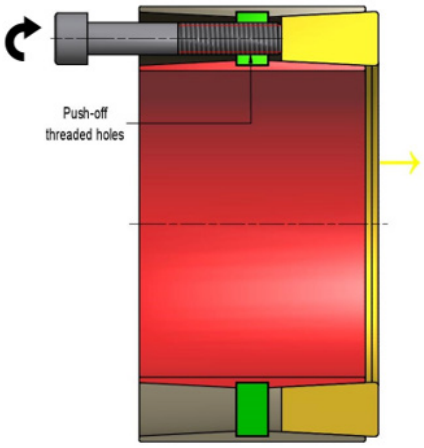



*Fig. 6*
*Release of rear thrust ring*

Information for proper disposal:

Dispose MAV product as metal