Rev. 4/2020

INSTALLATION and REMOVAL INSTRUCTIONS

SHRINK DISCS MAV 3008 – MAV 3009 – MAV 3108 – MAV 3208 – MAV 3209

GENERAL RECOMMENDATIONS and WARNINGS

- **Before installing or handling this product, read instructions carefully and completely. Due to possible danger to persons or machinery 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 the Shrink Disc are secured against slipping, falling or rolling.**

- **Prior to initiating installation or removal procedures, check to ensure that no loads are acting on Shrink Disc, shaft or any connected component. Motor and drive train must be switched off and secured against accidental activation.**

GENERAL INFORMATION

- Shrink Discs MAV 3008 – 3009 – 3108 – 3208 – 3209 are external locking devices, which provide a rigid, zero-backlash, frictional keyless connection between an outer hollow shaft (hub) and an inner shaft. Shrink Discs are installed onto the outer diameter of the hub, which is mounted onto the shaft.
  Shrink Discs are suited for transmitting torque, axial load and bending moment, separately or in combination.
  Applied loads are transmitted via pressure and friction between the fitting surfaces of hub and shaft.
  In tightened condition, Shrink Discs exert high radial pressure on hub and shaft.
- **Shrink Discs are supplied ready for installation**. However, it is necessary to **remove the spacers** that may have been used for shipping purpose prior to initiating the installation. They are composed of (fig. 1):
  - one inner ring (slotted), with integrated push-off threaded holes
  - one outer ring
  - one set of hexagon head cap screws ISO 4014/4017, grade 10.9 (< M6 grade 8.8) for MAV 3008 – 3108 – 3208; grade 12.9 for MAV 3009 – 3209
  - one set of hardened washers DIN 6916 (screw ≥ M16)
- Lubrication.
  - **Screws (under-head and threads): greased at factory** with solid paste **DOW CORNING MOLYKOTE® BR 2 Plus. Don't remove the lubricant.**
  - **Conical surfaces: greased at factory** with solid paste **DOW CORNING MOLYKOTE® G-Rapid Plus**. **Don't remove the lubricant**. Conical surfaces are lubricated with machine **oil** from size **d = 12 to d = 68** included.
  - **Hub ID and shaft OD: lubricant-free and dry**.
  - Hub OD: lubrication with oil or grease is recommended for ease of installation.

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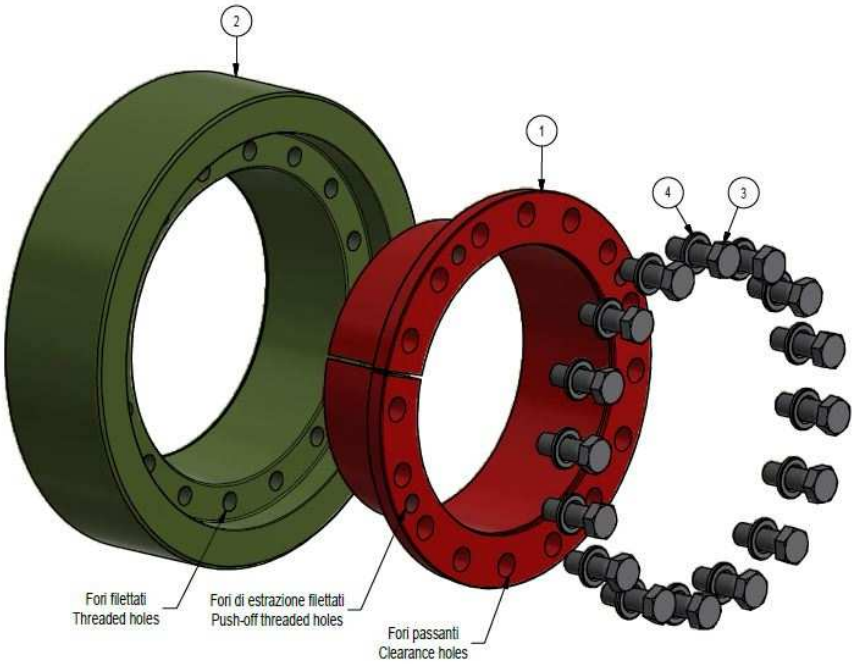
- Recommended tolerances. Functional values in the catalog are based on values specified below. Any deviation requires new rating of functional values.
  - Hub OD: h8 or f7
  - Hub ID and shaft: see table

Shaft dia.		ISO Tolerances	Max diam. clearance
above	up to		mm
6	10	H6/j6	0,011
10	18		0,014
18	30		0,017
30	50	H6/h6	0,032
50	80	H6/g6	0,048
80	120	H7/g6	0,069
120	180		0,079
180	250		0,090
250	315		0,101
315	400		0,111
400	500		0,123

- Recommended hub / shaft surface finish: 0.8 ≤ Ra ≤ 3.2 µm
- Tightening torque. Functional values in the catalog are based on specified tightening torque (Ma). Reduced tightening torque leads to lower functional values.

Functional values depend on tightening torque only. In tightened condition, top faces of inner and outer rings are flush or so (inner ring may protrude from or be recessed in the outer ring), however this is not an evidence of completed installation.

- 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.



ELEM	QTÀ	DESCRIZIONE
1	1	ANELLO INTERNO / INNER RING
2	1	ANELLO ESTERNO / OUTER RING
3	xx	VITE A TESTA ESAG. ISO 4014/4017 - 10.9 o 12.9 (8.8 < M6) / HEX HEAD CAP SCREW ISO 4014/4017 - 10.9 or 12.9 (8.8 < M6)
4	xx	RONDELLA / HV WASHER DIN 6916 (≥ M16)

Fig. 1. Composition.

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INSTALLATION

SAFETY NOTICE

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

Shrink Discs MAV 3008 – 3009 – 3108 – 3208 – 3209 are supplied ready for installation. If any, **remove the spacers** used for shipping prior to initiating the installation: position the shrink disc with screws facing up; move some screws into all threaded holes in the top face of the inner ring; set the washers aside (don't discard); turn these screws until they bottom out; now back out each locking screw two complete turns; lift the inner ring slightly in order to remove the spacers. Once the spacers are removed, lower the inner ring back into position; move the screws used for lifting, together with washers, into their original positions.

Do not remove the grease from screws and conical surfaces (fig. 2).

Never tighten the screws prior to mounting the Shrink Disc onto the shaft, as inner ring and/or hub might remain permanently contracted even at relatively low tightening torques.

Functional values depend on tightening torque only. In tightened condition, top faces of inner and outer rings are flush or so (inner ring may protrude from or be recessed in the outer ring), however this is not an evidence of completed installation.

1. Clean hub OD and Shrink Disc bore. For ease of installation, lightly lubricate hub OD before assembling Shrink Disc onto hub (fig. 2).

2. Carefully **solvent clean and dry shaft and hub bore from any lubricant** (fig. 2) prior to mounting hub onto shaft. This step is critical, as any lubricant on the shaft/hub bore interface will greatly reduce the capacity of the Shrink Disc connection.

3. Move the Shrink Disc onto the hub, then move the hub onto the shaft until the required position is achieved. **The shaft must support completely the toleranced section of hub bore** (fig. 2). **Hand-tighten three or four evenly spaced screws** (fig. 3) and **make sure that inner and outer rings are aligned**; then hand-tighten remaining screws.
At the end of this stage, a light connection is achieved. Hub will not move axially respect to shaft during next tightening steps.

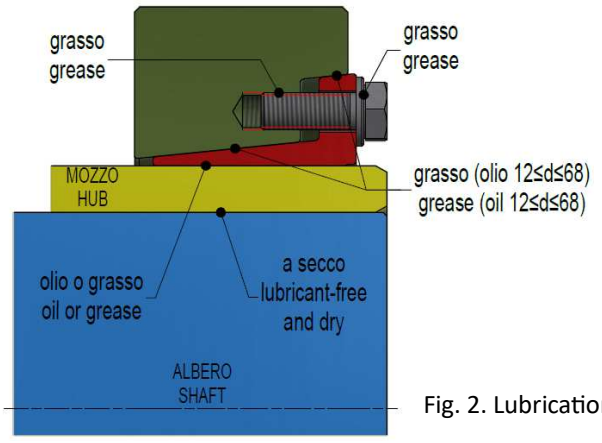

Fig. 2. Lubrication.

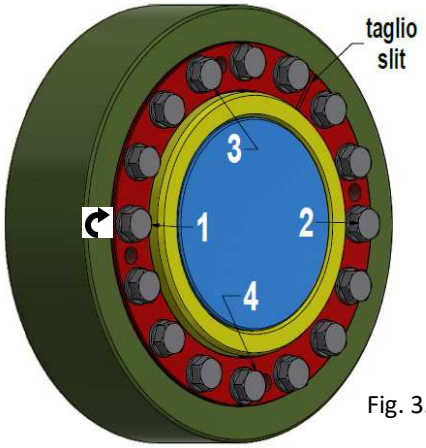

Fig. 3. Pre-tightening.

4. Use a torque wrench set approx. 5% higher than specified tightening torque (Ma). **Progressively tighten the screws in either a clockwise or counterclockwise sequence, using approx. ¼ turns for several passes** until ¼ turns can no longer be achieved (fig. 4).

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5. 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 the specified tightening torque.

6. Reset the torque wrench to 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 5.

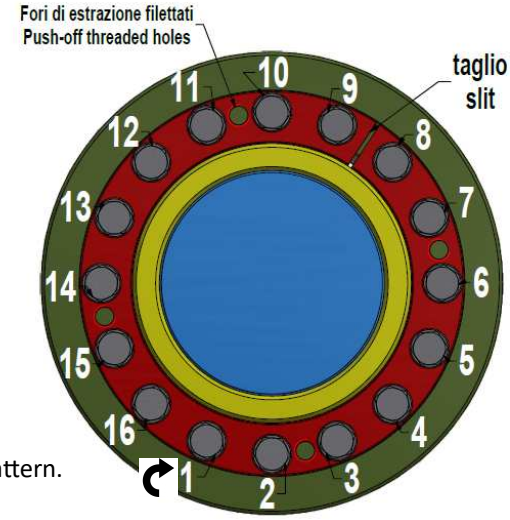

Fig. 4. Example of tightening pattern.

REMOVAL

SAFETY NOTICE

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

SAFETY NOTICE

DO NOT completely remove the screws before outer rings are disengaged. Sudden separation of the rings may occur and involve high separation forces that may result in permanent injury or death. Be certain that the rings are disengaged before completely removing the screws.

Some locking screws might 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. **Progressively loosen all screws in either a clockwise or counterclockwise sequence, using approx. ½ turns for several passes** until the outer ring has released from the inner ring (self-releasing tapers).
   Should releasing not occur, progressively tighten some screws into all threaded holes in the top face of the inner ring, in either a clockwise or counterclockwise sequence, using approx. ½ turns for several passes.

2. Remove the hub from the shaft, then remove the Shrink Disc from the hub.

REUSE of USED SHRINK DISCS

1. **Disassemble, thoroughly clean and inspect all parts** of the Shrink Disc. Permanent deformations, ovalizations, dents, corroded areas, are not admitted. In case of doubts, contact MAV S.p.A. for advice.

2. **Re-lubricate** the Shrink Disc with the following products.
   - **DOW CORNING MOLYKOTE® BR 2 Plus** on **screws** under-head and threads.
   - **DOW CORNING MOLYKOTE® G-Rapid Plus** on **conical surfaces** from size **d = 75 and above**.
   - **Machine oil** on **conical surfaces** from size **d = 12 to d = 68** included.

3. Re-assemble all parts as originally supplied.

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