

**Installation and Operating Instructions for
Complete Low-Speed Backstops FRHN**

E 08.788e



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Date: 23.05.2023	Version: 03	signed.: SOMM	checked.: HEUT	Pages: 14 Page: 2

Important

Please read these instructions carefully before installing and operating the product. Your particular attention is drawn to the notes on safety.

These installation and operating instructions are valid on condition that the product meets the selection criteria for its proper use. Selection and design of the product is not the subject of these installation and operating instructions.

Disregarding or misinterpreting these installation and operating instructions invalidates any product liability or warranty by RINGSPANN; the same applies if the product is taken apart or changed.

These installation and operating instructions should be kept in a safe place and should accompany the product if it is passed on to others – either on its own or as part of a machine – to make it accessible to the user.

Safety Notice

- Installation and operation of this product should only be carried out by skilled personnel.
- Repairs may only be carried out by the manufacturer or accredited RINGSPANN agents.
- If a malfunction is indicated, the product or the machine into which it is installed, should be stopped immediately and either RINGSPANN or an accredited RINGSPANN agent should be informed.
- Switch off the power supply before commencing work on electrical components.
- Rotating machine elements must be protected by the purchaser to prevent accidental contact.
- Supplies abroad are subject to the safety laws prevailing in those countries.

Attention!

In the event of any discrepancies between the original German version and other languages of these mounting and operating instructions, the German version takes precedence!

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1 General information

Complete Freewheels FRHN are machine elements with particular characteristics:

- In one direction of rotation there is no contact between the inner and outer ring; the freewheel is in freewheeling operation.
- In the other direction of rotation there is contact between the inner and outer ring; in this direction, it is possible to transmit high torque.

Complete Freewheels FRHN are used as:

- Backstops

	<p>Caution!</p> <p>Freewheels can be used as safety components, it is therefore essential that these installation and operation instructions are followed carefully.</p>
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1.1 Application as a backstop

Freewheels are used as backstops if reverse rotation is to be prevented. In many machines and installations, for technical safety or functional reasons, it is necessary to ensure that you are working in just one specified direction of rotation. That is why there are legal stipulations requiring a mechanical safety device for the operation of, e.g. conveyor systems.

The normal operating mode of a backstop is freewheeling operation; the locking (torque transmission) is performed at zero speed. The immediate engagement of the clamping elements ensures the required high operating safety.

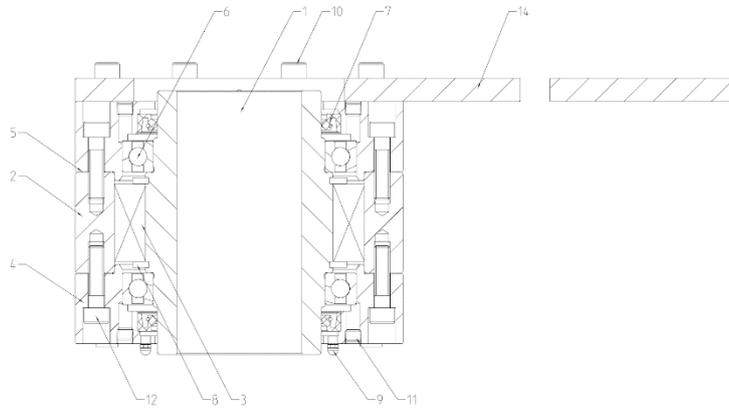
2 Design

Sectional Drawing

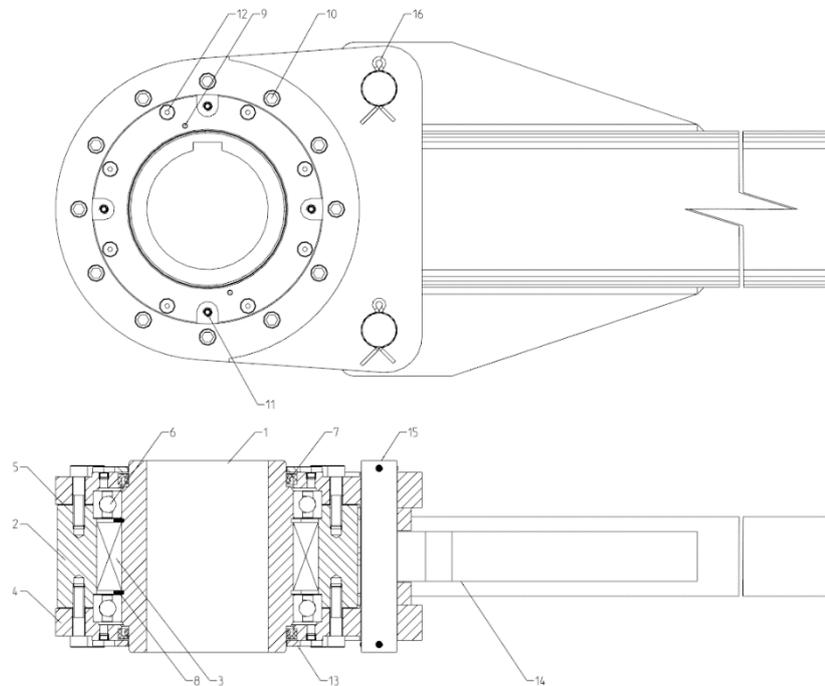
Backstops are designed with the essential functional components:

- 1) Inner Race
- 2) Outer Race
- 3) Sprag Cage
- 4) Cover Plates
- 5) Gaskets
- 6) Bearings
- 7) Seals
- 8) Retaining Clips
- 9) Grease Fittings
- 10) Fasteners
- 11) Oil Plugs
- 12) Fasteners
- 13) Seal Retainer
- 14) Torque Arm
- 15) Torque Arm Pins
- 16) Cotter Pin

FRHN 700 - 900



FRHN 1000 - 1600



Please note!

More information, in particular on the design and function, layout and selection, permissible torques and permissible speeds of these freewheels, can be found in the RINGSPANN Data sheet. Alternatively, contact RINGSPANN Power Transmission (Tianjin) Co., Ltd. directly.

3 General notes

**Caution!**

Exceeding the respective permissible speeds for the various operating states can lead to damage and an impermissible rise in temperature of the freewheel!

**Caution!**

The maximum permissible torque of the freewheel may not be exceeded by application-related peak torques.

The selection torque of the freewheel should be calculated with the help of the RINGSPANN catalogue 84, if necessary please contact RINGSPANN.

Freewheel damages that result from impermissibly high peak torques lead to a loss of function and can lead to an impermissible rise in temperature of the freewheel!

**Caution!**

If the system is exposed to axial and/or radial loads, the roller bearings in the freewheel should be checked with reference to the rules for calculation provided by the bearing manufacturer. It is essential to ensure that bearings will not be damaged.

Bearing damage can result in overheating and the impairment of freewheel function!

**Caution!**

No impermissible torsional oscillations (amplitudes and frequencies that lead to a loading and unloading of the freewheel in quick succession etc.) may occur.

Torsional oscillations can lead to a loss of function and to an impermissible rise in temperature of the freewheel!

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4 Condition at delivery

The Complete Freewheels FRHN are delivered with oil.

Although all backstops are shipped from the factory with oil, lubrication levels must be checked prior to operation.

Store backstop in a protected, clean and dry area. Once every two months the inner ring should be rotated by hand several times to lubricate internal components.

Exposed, unpainted surfaces should be “brush painted” with a rust preventative. Before placing backstop in operation, completely drain and properly fill with oil per “Lubrication” instructions.



Important!

Backstops out of service or in storage for 2 or more years, require new seals before being put into operational service.

5 Technical prerequisite for reliable operation

5.1 Shaft to Bore fit:

- Machine Builders may use non-standard shaft fits to mount RINGSPANN backstops. In this event, direct any questions concerning shaft fit to the machine builder or RINGSPANN Power Transmission (Tianjin) Co., Ltd..

5.2 Backstop Mounting Fit on Shaft

- The bore in the inner ring normally has a tolerance of ISO H7. The tolerance of the shaft must in this case be ISO h6 or j6. The shaft must be straight and not tapered.
- The key must have back play and may have only minimal width oversize, as otherwise the inner ring may be deformed.



WARNING!

DO NOT use Tapered Keys, Keys Must Be Straight.

5.3 Rotation

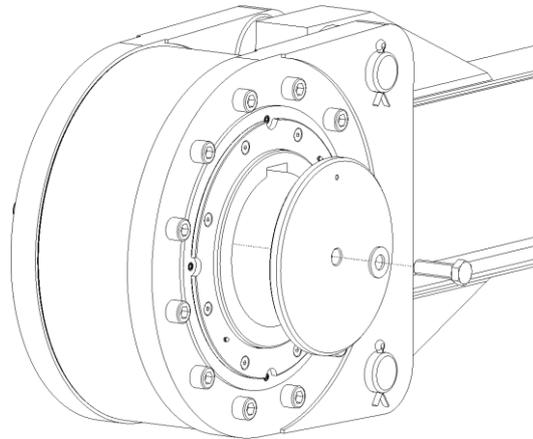
- The backstop is symmetrical, which allows it to be mounted for the desired direction of free shaft rotation.
- Check to *make certain* that the arrow, marked “FREE”, on the backstop inner race face is in the same direction as the desired free shaft rotation.



WARNING!

Rotating equipment is potentially dangerous and should be properly guarded. The user should comply with all applicable safety codes to guard rotating equipment.

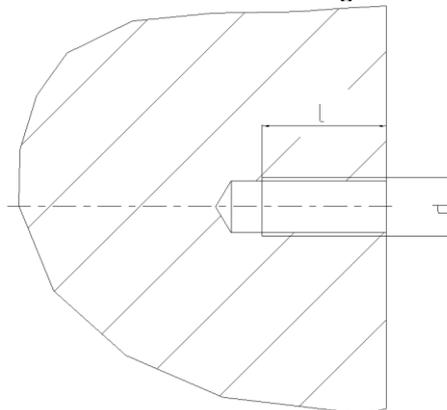
5.4 Axial Retention



- Backstops are manufactured for clearance fit on shafts; therefore, it is important to secure the axial position to prevent the backstop from “walking” on the shaft during operation.
- A shaft cover plate is used to retain the backstop on the shaft.
- The shaft should stick out about 2 to 5 mm from the inner ring.
- The cover plate is mounted to the shaft with the enclosed screw and washer (see image above).
- Sizes 1200 and larger are equipped with a lifting thread (M8) for easier installation.
- Tighten the screw in accordance to the following table.

Size	Tightening torque [Nm]
700, 775	30
800	59
900	100
1000, 1100	250
1200	490
1300, 1400, 1450, 1500	840
1600	1700

- The correct thread dimensions are listed in the following table.



Baugröße	d	l _{min} [mm]
700, 775	M8	20
800	M10	25
900	M12	30
1000, 1100	M16	40
1200	M20	50
1300, 1400, 1450, 1500	M24	60
1600	M30	70

6 Installation



ATTENTION!

Before securing into place, check for proper rotation. As the clutch is symmetrical, in determining the proper direction of free rotation, orientate the clutch to match the directional arrows marked "FREE" on either face of the inner race and then verify by spinning the backstop by hand.



DO NOT FORCE BACKSTOP ONTO SHAFT!

Evidence of damage during assembly caused by disregard of the above instructions is readily traceable and RINGSPANN will not be held responsible for failure of such affected part or parts.

6.1 FRHN 700 – 900

6.1.1 Installation of the torque arm

The torque arm should always be mounted on the side facing the machine to allow for better visibility and accessibility of the oil gauge on the other side.

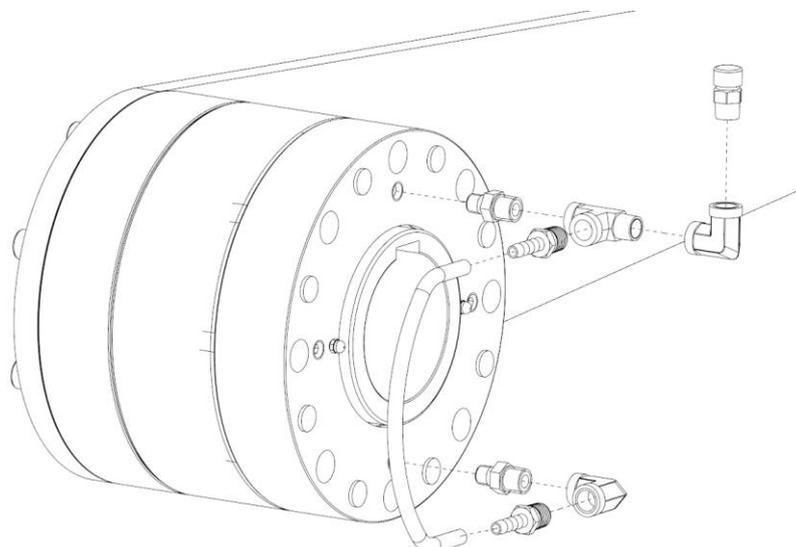
- Fit the torque arm to the freewheel head in an orientation where one of the oil screws is right above the shaft's centerline considering the final orientation. Use the enclosed screws.
- Tighten the screws with a torque according to the following table (in. acc. To VDI 2230-1:2015):

FRHN 700	71 Nm
FRHN 775	123 Nm
FRHN 800	123 Nm
FRHN 900	301 Nm

6.1.2 Installation of the oil level indicator

BEFORE ATTACHING TORQUE ARM

(Oil Fill is Approximated to Shaft Centerline)



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Assembly sequence:

1. Lay the backstop head down with the side, the torque arm is to be mounted to, facing upwards.
2. Remove the oil screws that, in the final mounting position, will be right above and right below the shaft's centerline. Install a straight pipe fitting to either thread using Teflon thread sealer.
3. Install a 90° elbow to the lower straight fitting using Teflon thread sealer. Tighten it and orient it as shown in the image above.
4. Install a hose adapter into the elbow using Teflon thread sealer and tighten it.
5. Install the hose on the adapter and secure it with a clamp.
6. Slide the two O-rings onto free end of tube.
7. Mount the T-fitting to the upper straight fitting using Teflon thread sealer. Tighten it and orient it as shown in the image above.
8. Install the second hose adapter to the 90° elbow side of the T-fitting using Teflon thread sealer and tighten it.
9. Mount the free end of the tube to the adapter and secure it with a clamp.
10. Install the second 90° elbow to the thread of the T-fitting using Teflon thread sealer. Tighten it and orient it as shown in the image above.
11. Rotate the backstop to the later mounting position.
12. The hose should display an oil level at the shaft centerline.
 - If not, then add or remove oil from backstop as necessary to obtain "half-full" oil level. Use a funnel to help fill in the oil through the upper elbow.
13. Once the oil level is adjusted correctly, install the breather to the elbow using Teflon thread sealer.
14. Slide upper O-ring on tube to mark static oil level at the shaft centerline.
15. While backstop is operating at normal speed, slide lower O-ring on tube to mark running oil level.
16. If at any time the oil level is below its respective marker, then add oil as this bulletin instructs.

6.1.3 Mounting the Backstop Head and Key onto the Shaft

- Backstop bores are finished to size for an **easy push fit** on a shaft that is straight and not tapered.
- Shafts should be smooth and free of burrs.
- Coat the shaft with an anti-seizing agent for easy mounting and future removal of the backstop.
- Push the backstop head onto the shaft.
 - Taking care to push only on the face of the inner race.
 - Rotate outer race by hand to verify proper rotation.
 - Secure set screws on both ends. (**Two per side**)
 - Rotate outer race by hand and mount visual oil gauge. (**See next page for instructions**)
- Secure it with the cover plate

6.2 FRHN 1000 - 1600

6.2.1 Mounting the Backstop Head and Key onto the Shaft

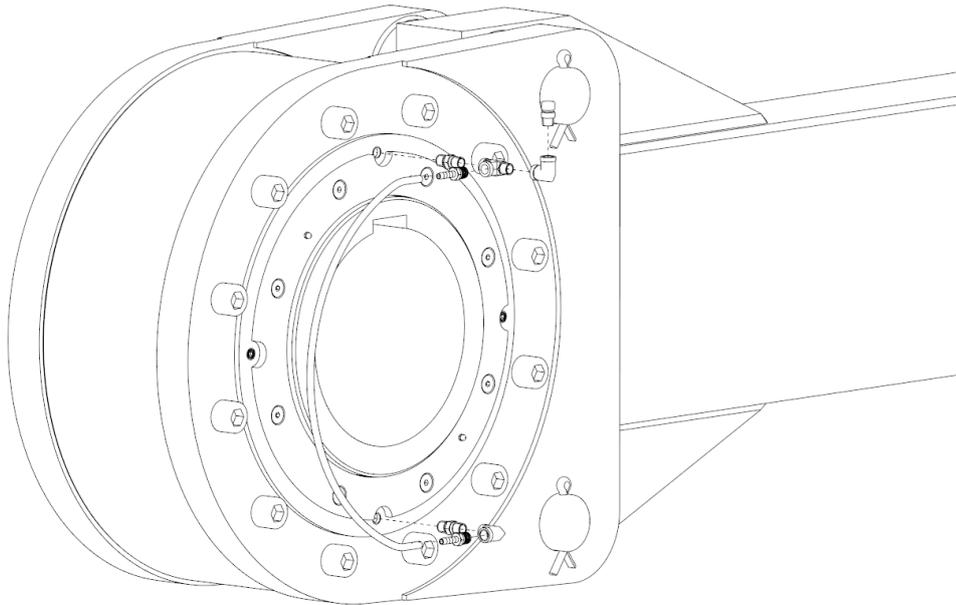
- Backstop bores are finished to size for an **easy push fit** on a shaft that is straight and not tapered.
- Shafts should be smooth and free of burrs.
- Coat the shaft with an anti-seizing agent for easy mounting and future removal of the backstop.
- Push the backstop head onto the shaft.
 - Taking care to push only on the face of the inner race.
 - Rotate outer race by hand to verify proper rotation.
 - Secure set screws on both ends. (**Two per side**)

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- Rotate outer race by hand and mount visual oil gauge. **(See next page for instructions)**
- Secure it with the cover plate

6.2.2 Installation Instruction for Oil Level Indicator

BEFORE ATTACHING TORQUE ARM (Oil Fill is Approximated to Shaft Centerline)



Assembly Sequence:

1. Rotate backstop on shaft until the plug that, in the final position, will be below the centerline is ABOVE the centerline.
2. Remove this plug and install a straight fitting using a Teflon thread sealer.
3. Install a 90° elbow using Teflon thread sealer. Tighten it and orient it as shown in the image above.
4. Install a hose adapter into the elbow using Teflon thread sealer and tighten it.
5. Install the hose on the adapter and secure it with a clamp.
6. Slide the two O-rings onto free end of tube.
7. Rotate the backstop to the latter mounting position. Make sure the free end of the tube is always above the shaft centerline. If necessary, secure it or close it with an appropriate plug.
8. Remove the upper oil plug and install the second straight fitting.
9. Mount the T-fitting to the upper straight fitting using Teflon thread sealer. Tighten it and orient it as shown in the image above.
10. Install the second hose adapter to the 90° elbow side of the T-fitting using Teflon thread sealer and tighten it.
11. Mount the free end of the tube to the adapter and secure it with a clamp.
12. Install the second 90° elbow to the thread of the T-fitting using Teflon thread sealer. Tighten it and orient it as shown in the image above.
13. Attach torque arm to backstop.
14. The hose should display an oil level at the shaft centerline.
 - If not, then add or remove oil from backstop as necessary to obtain "half-full" oil level. Use a funnel to help fill in the oil through the upper elbow.
15. Once the oil level is adjusted correctly, install the breather to the elbow using Teflon thread sealer.
16. Slide upper O-ring on tube to mark static oil level at the shaft centerline.
17. While backstop is operating at normal speed, slide lower O-ring on tube to mark running oil level.
18. If at any time the oil level is below its respective marker, then add oil as this bulletin instructs.

6.2.3 Attach Torque Arm to Backstop

- If installed, remove torque arm pins from backstop cover plates.

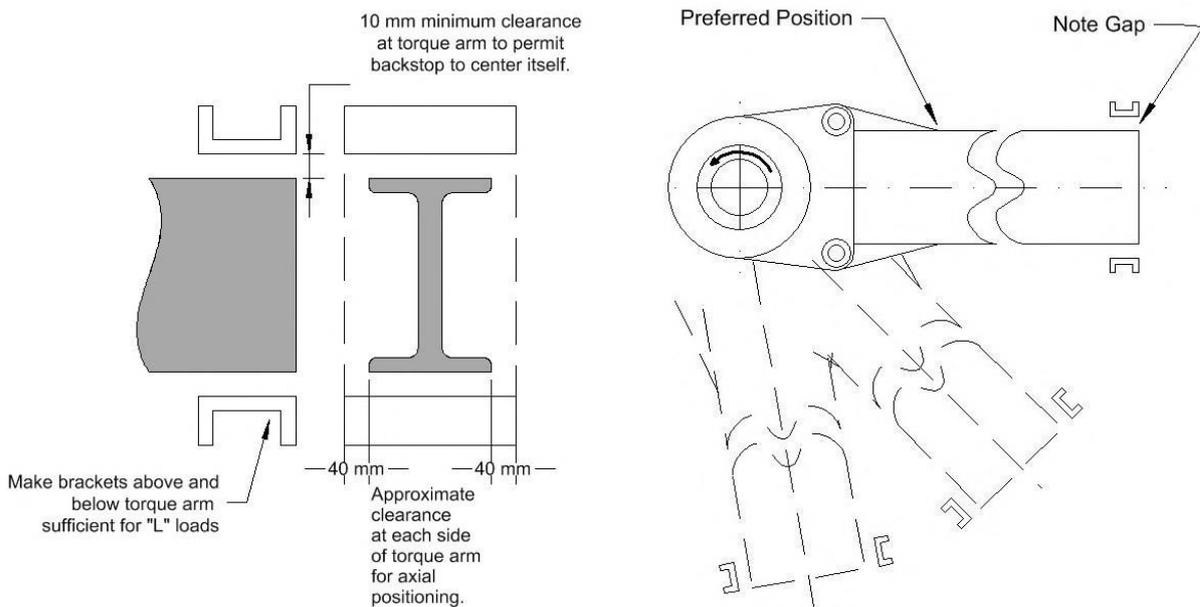
- Use a suitable lifting strap to choke the torque arm.
 - Lift it into position between the cover plates.
- Install torque arm pins and cotter pins.
- Do not fasten torque arm end rigidly to steel framework in angular or axial position.

6.3 Backstop Torque Arm Support and Positioning

The end of the torque arm and the head of the backstop must align with the centerline of the stirrup. When the backstop, the torque arm end, and the centerline of the stirrup are properly aligned, the end of the torque arm should have a minimum of 10mm top clearance, approximately 40mm clearance at each side of the torque arm for axial positioning in its stirrup. The torque arm must be in contact with the support bracket in the direction of loading in order to prevent shock loads and maintain clearances on three remaining sides to prevent undue bearing stresses.



CAUTION!
Misaligned torque arm ends, Twisted crosswise torque arms, and Rigidly held torque arms will impose a pinching action in the bearings causing damage to the bearings and backstop.



Safe backstop mounting is possible at any desired angle of the torque arm. However, mounting the backstop in a straight vertical position is not recommended. A minimum angle, approximately 5 degrees from vertical, should be maintained.

When mounted downward through a floor slot, a suitable boot or hood should be placed around the torque arm at or above the floor level to keep foreign matter from restricting possible torque arm movement.

7 Maintenance

Proper lubrication and lubricant maintenance are the most important single maintenance factor for long, effective, trouble-free operation of backstops.

Lubrication maintenance should not be performed while equipment is in operation.

Change backstop oil every 3 to 6 months as follows:

Note: Always verify oil level in backstop after installation and before start up.

1. Thoroughly, clean around the breather.
2. Remove and clean breather and or replace breather element.
3. Loosen lower hose clamp of visual oil gauge.
4. Drain oil by removing tube from lower fitting or plug at lowest point in outer race.
5. Reattach tube and secure hose clamp.
6. Slowly add clean oil through the breather hole until proper static oil level is achieved.
 - a. The tube should display an oil level at the shaft centerline.
 - i. If not, then add or remove oil from backstop as necessary to obtain "half-full" oil level.
7. Reinstall breather.

The frequency in which the backstop's lubrication should be inspected is an important consideration and can only be determined by individual experience. However, it is considered desirable to inspect the oil level of the backstop once a week for the first month of service. The results of these inspections will dictate the frequency of future inspections, but in any event should not exceed six month intervals. Under severe working conditions, it may be necessary to perform more frequent lubrication maintenance on the backstop.

**WARNING!**

Do not mix oils. When switching from one brand or type to another, drain oil and flush backstop with mineral spirits. Do not use any solvent containing carbon tetrachloride.

**WARNING!**

RINGSPANN is not responsible for any lubrication changes made by others after the backstop leaves the RINGSPANN Power Transmission (Tianjin) Co., Ltd. factory.

**WARNING!**

Do not attempt to convert oil lubricated backstops to grease lubrication or grease lubrication to oil lubrication. Any such conversion may result in malfunction and will void any warranty.

**Important!**

Too much grease can impair the function of the freewheel!
Lubricants with graphite, Molykote or similar friction-reducing additives may not be used.

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8 Lubrication

When re-lubricating or changing the oil we recommend the following oil qualities:

Oil selection table			
Ambient temperature	For ambient temperatures from 0° to 50° C	For ambient temperatures from - 15° to + 15° C	For ambient temperatures from - 40° to 0° C
Kinematic viscosity at 40° C, ISO-VG	46/68 [mm²/s]	32 [mm²/s]	10 [mm²/s]
AGIP	OSO 46/68	OSO 32	OSO 10
ARAL	VITAM GF 46/68	VITAM GF 32	VITAM GF 10
BP	ENERGOL HLP 46/68	ENERGOL HLP 32	AERO HYDRAULIC 1
CASTROL	VARIO HDX	VARIO HDX	ALPHASYNTH 15
CHEVRON	EP HYDRAULIC OIL 46/68	EP HYDRAULIC OIL 32	HYJET IV
DEA	ASTRON HLP 46	ASTRON HLP 32	ASTRON HLP 10
ELF	ELFOLNA 46	ELFOLNA 32	ELF AVIATION HYDRAULIC OIL 20
ESSO	NUTO H 46/68	NUTO H 32	UNIVIS J 13
KLÜBER	LAMORA HLP 46/68	LAMORA HLP 32	Klüberoil 4 UH1-15
MOBIL	D.T.E. 25/26	D.T.E. 24	AERO HF A
SHELL	TELLUS OIL 46/68	TELLUS OIL 32	TELLUS OIL 10
Other manufacturers	Gear or hydraulic oils without solid lubricants ISO-VG 46/68	Gear or hydraulic oils without solid lubricants ISO-VG 32; Automatic transmission fluids [ATF]	Gear or hydraulic oils without solid lubricants ISO-VG 10; note setting point! Aviation hydraulic oils ISO-VG 10

Please contact us in case of temperatures in excess of + 50° C and below - 40° C.

For grease lubrication, we recommend the following lubricants for ambient temperatures from – 15 °C to + 50 °C:

ARAL	ARALUB HL2
BP	ENERGREASE LS2
CASTROL	SPHEEROL AP 2 OPTITEMP LG 2 TRIBOL GR TT 1 PD
ESSO	BEACON 2

KLÜBER	ISOFLEX LDS 18 Spezial A POLYLUB WH 2
MOBIL	MOBILUX 2
SHELL	ALVANIA RL2