




Installation & Maintenance Instruction

Freewheel Cage Assembly - NSC

Doc. No.: N-DD-IM-FA508	<u>Installation & Maintenance Instruction</u> <i>Freewheel Cage Assembly - NSC</i>			
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1.) General Instruction:-

- Please give full attention to Safety Notes before installation.
- These instructions regarding installation will only valid, if the products meets the selection criteria before installation.
- Ignore & misconception of installation & operation instruction invalidate the product liabilities or warranty by the NMTG Mechtrans Private Limited; same applies if the product id taken apart or changed.

2.) Safety Criteria:

- Installation should be carried out by skilled person only.
- Replacement of any part should be carried out by NMTG only.
- If there is any problem detected in clutch or machine into which it is installed, stop machine immediately.
- Make sure turning forces are not applied to Freewheel One-way Clutch or turning shaft of the equipment when conducting inspection or maintenance.
- Pay special attention to the backstopping application to prevent accidents.
- Frequent starting and stopping will apply excessive force on the mounting. Verify mounting strength.
- In accurate installation and mounting, various load conditions, wear and tear of parts, and life expectancy can all affect the performance of a Holdback.
- It is necessary to wear Personal Protective Equipment (such as safety shoes, gloves, goggles, etc.) while handling machine in which Freewheel One way Clutch is installed.
- **Confirm rotational direction prior to installing.**

About NSC:

- NSC cage Freewheel have specific characteristics in connection with Inner & Outer Ring.
- 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.
- Main function of NDC:
 1. Backstop/Holdback
 2. Indexing/Feeding
 3. Overrunning

3.) Functions of NSC:

➤ As a Backstop/Holdback:

Backstop function prevent reverse rotation when input drive is discontinue or power supply failure to input drive. Backstop clutch use to prevent damage caused by power supply failure.

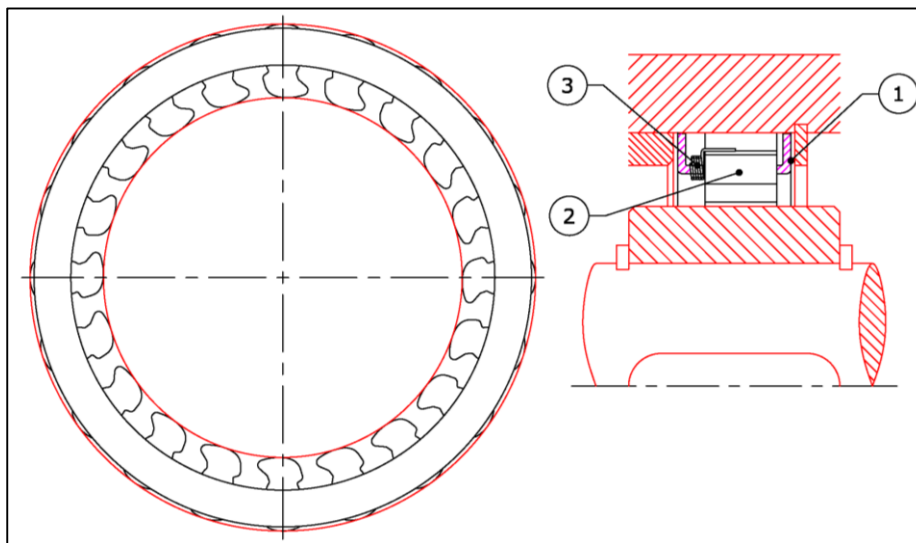
➤ **As a Indexing:**

Indexing function allows the conversion of reciprocating motion applied to the driving race of the clutch into unidirectional intermittent motion of the driven race.

➤ **As a Overrunning:**

When drive member rotates faster than driving member, clutch gets disengage automatically. The highest overrunning speed is possible if outer race overruns. This ensures the best performance, reduce heat generation & wear which lead to increase life.

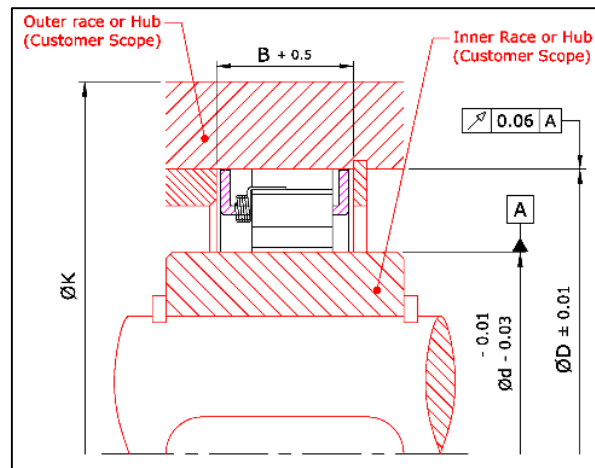
4.) Design:




No.	Nomenclature
1	Cage
2	Sprags
3	Springs

5.) Installation Process:

- Inner race and Outer race is in **Customer scope** then **Case Hardening Steel** material with Hardness **60 ± 3**, Case hardening depth Min. 1.5 mm must be used, Surface roughness in between 1.6 µm to 6.3 µm of Both Races.
- **Maximum permissible Run-out** between Inner race & Outer race must be as per Fig.

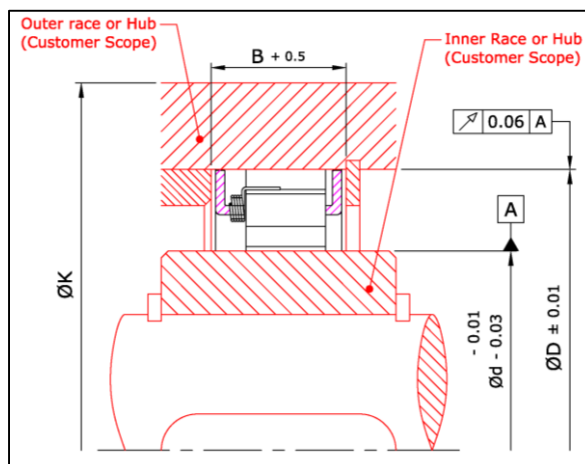


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- Clean the inner race & outer race as well as the lateral guide or support parts for the assembly NSC mounting.
- Before assembly, check NSC for contaminants and possible defects. If assembly is contamination, the assembly must be cleaned with a thin oil.
- Install NSC assembly after clean and dry surfaces where assembly should be fitted.
- Before assembly, check the direction of shaft & inner race rotation is same of NSC assembly, which is shown by an arrow mark on NSC assembly.
- Install the NSC assembly into outer race with specified freewheeling direction of rotation and after the inner race is pushed into NSC assembly in freewheeling direction with slightly rotation. NSC is be fixed with remaining connection parts as example of Fig.
- Rotate Shaft by hand for checking correct Installation of Cage assembly & If reversal of freewheeling direction is required, turn the sprag cage assembly through 180°.
- **External Bearing support must be provided for Axial & Radial load.**
- **Depending on the operating data, oil or grease lubrication must be provided**
- Careful handling of cage assembly is essential during installation to prevent sprags being knock out from cage.
- When pushing the NSC Cage Assembly into the housing, it is important not to hammer the assembly at any time. Hammering by any means will permanently damage the sprags and render them nonfunctional to withstand torque. There is safety by design that even if a single sprag is wrongly oriented, then sprag cage cannot be mounted on shaft.
- Secure position of Outer race & outer cage of the NSC assembly in axial direction with the help of Circlip or retainer ring. (reference Fig. of section – General important note)
- Proper installation required to avoid torsional vibration.
- **Do not use Grease lubricant for indexing application (Use Oil only).**

6.) General important Notes:

- *If a sprag fallout from the cage and is installed wrongly, then sprags will lead to difficulty in fitting the cage assembly, malfunction, and possible destruction of the freewheel assembly.*
- *If Sprag cage assembly is hard to install on Shaft then check the shaft hub tolerance and make sure it is not out of limit. For ease of assembly we recommend that the inner and outer races ends are to be **chamfered at an angle of 15 degrees**. And shaft hub tolerance should be maintained as shown in Figure.*
- *If housing not enclosed, then As Protection against environment condition, there must be sealing-cover arrangement. Please be ensure that no dust, rust, etc. particles come inside freewheel assembly will be damaged.*
- *During Installation, Do not use excessive force; the spring is easily broken.*
- *When clutch is used as backstop, the drive must not be started in the direction opposite the free running direction; otherwise whole assembly may be damaged.*



7.) Change in direction

- Changing of the direction of rotation is achieved by turning the Freewheel Clutch.

8.) Lubrication & Maintenance:

Maintenance:

- Initially change oil after 10 hours of operation. Afterwards change lubricant every 2000 hours and every 1000 hours in a dirty environment. If the cage assembly NSC is submerged in lubrication of Housing or assembly, the lubricant change intervals of external lubricant supply shall apply, these lubricant change interval times should however not significantly exceed the above interval times.
- Before start application, the freewheel assembly NSC unit is to be filled with suitable lubricant.

Oil Lubrication:

- We recommended the following lubrication for when re-lubricating or changing the Lubrication.

Oil			
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	Klübeoil 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	Gearbox- or hydraulic oils without solid lubricants ISO-VG 46/68	Gearbox- or hydraulic oils without solid lubricants ISO-VG 32; Automatic transmission fluids [ATF]	Gearbox- or hydraulic oils without solid lubricants ISO-VG 10; Note setting point! Aviation hydraulic oils ISO-VG 10

- **Note: Don't use oil containing molybdenum sulphide or high-pressure additives or grease of any kind.**
- For working temperature below -40°C and above +50°C, Please contact us.
- When NSC using in Oil lubricant, the inner race should be dipped in oil.

Grease Lubrication:

- Change grease lubrication of Freewheel Clutch within every 3 Months as per Operating Condition. For re-lubricate clean & drain old lubricant as per Maintenance instruction.
- When NSC assembly used in grease lubricant, the free space of freewheel assembly should be filled by 30 to 40% or approx. 1/3 space.
- Excessive amount of grease may lead to malfunction of clutch.
- **For working temperature below -50°C and above 100°C, Please contact us.**
- When working temperature is above 80°C, then check lubrication regularly.

Temp. Range	-50° C to +140° C
Manufacturer	Grease
OKS	OKS 475
KLUBER	ISOFLEX LDS 18 SPECIAL A
MOLYKOTE	MOLYKOTE G-1023
BP	ASV RBL 33

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9.) Preservation & Storage Instruction:

- NMTG Product is supplied with an oil film as Rust & Corrosion Protection as per below instruction for Short Term Storage.
- This protection is renewed at regular intervals which depends on Environmental condition at Storage site. (Temperature, Atmosphere, etc.)
- **Maximum Storage period is 6 Months for Short-term Storage.**

Please follow Instruction for Preservation & Storage of NMTG Products:

- Once NMTG Product is used then clean all its parts with clean cloth.
- Lubricate all parts with rust preventive oil S-VCI 415 or equivalent & assemble as it was & packed in plastic bag.
- After wrapping in plastic bag, Material is packed by S-VCI 131 or equivalent rust preventive paper & store.
- Keep it in dry place and free from dust.
- Do not expose to open or corrosive environment.
- Keep away from direct Sunlight.
- Avoid Mechanical Shock & Vibration.
- Storage Temperature: -10 to +60°C.
- Relative Humidity: Maximum 95%, non-condensing.

For Long term Storage (1 Year):

Please follow Instruction for Preservation & Storage of NMTG Products:

- Once NMTG Product is used then clean all its parts with clean cloth.
- Lubricate all parts with rust preventive oil S-VCI 415 or equivalent & assemble as it was & packed in special Vacuum bag.
- After wrapping in Vacuum bag, Material is packed & store.
- Keep it in dry place and free from dust.
- Do not expose to open or corrosive environment.
- Keep away from direct Sunlight.
- Avoid Mechanical Shock & Vibration.
- Storage Temperature: -10 to +60°C.
- Relative Humidity: Maximum 95%, non-condensing.

