HAN®

Slewing Bearings

Insallation Guide

Project based
special solutions

Real time
delivery guarantee

"Design To
Production"

www.hanmakina.com

Installation, Lubrication and Maintenance

Installation:
There is general and basic information for the correct installation of the rotary table bearings, which are described as the following models.

Before the installation, all equipment required for the mounting should be prepared. If possible, the installation should be carried out in a closed place. If it is not possible, environmental factors should be kept under control to avoid an improper installation.

Attention! During the installation, never hit the bearing with a hard object like a hammer etc.

All safety measures should be in place during the installation. Otherwise material and fatal hazards may occur.

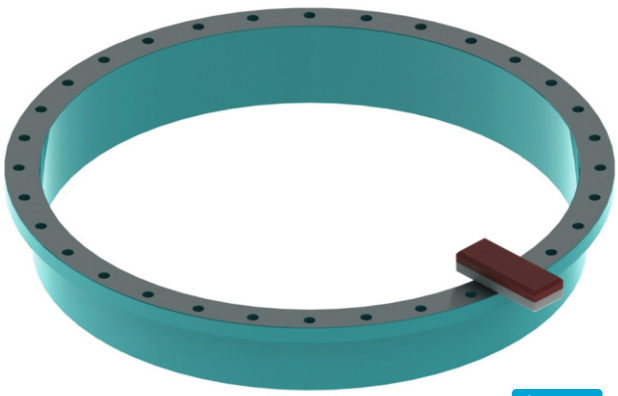

Figure 30

1

Irregularities, rust, and protrusions should be removed with whetstone, sandpaper, or scraper.

2

The support surfaces should be cleaned and dried with a brush or compressed air.

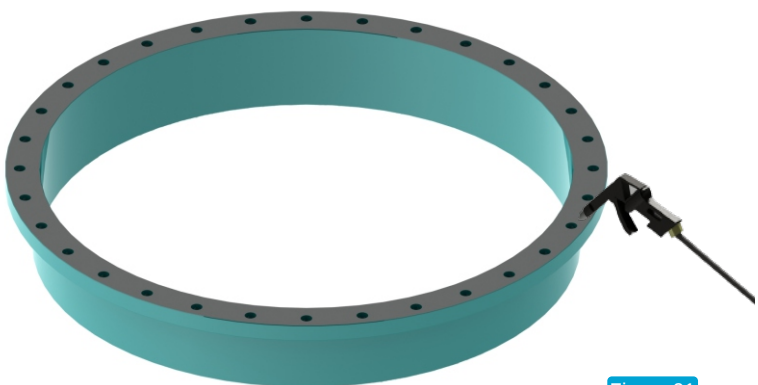

Figure 31

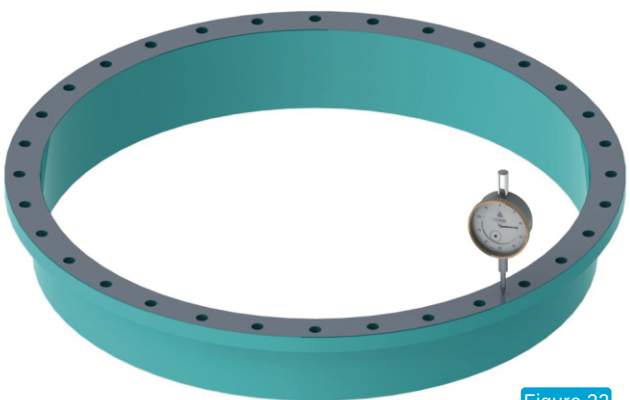

Figure 32

3

The flatness of the support surfaces should be checked. If the surfaces are not flat, their tolerances should be modified according to the information in Table 3 on page 17.

Figure 33

4

The protective anti-corrosion oil on the mounting surfaces of the bearings should be removed. The maximum load point should be positioned at an angle of 90° with the “S” point marked on the rotary table bearing (E.g: Positioning the “S” point with tower crane boom at an angle of 90°).

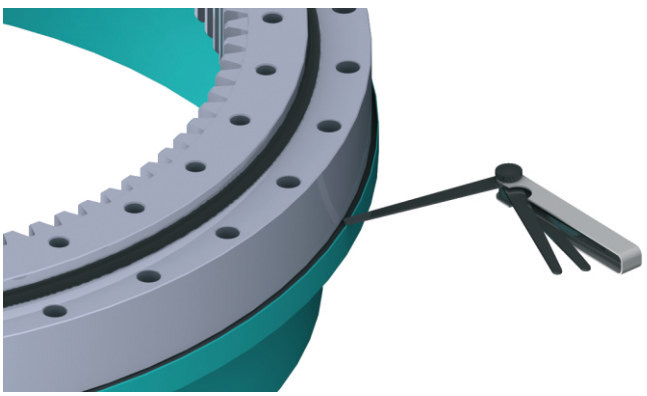

Figure 34

5

The bolt holes on the slewing bearing should be aligned with the holes on the support surface. The contact space between the support surface and bearing surface should be inspected visually or with a feeler gauge to check whether the contact is correct or not.

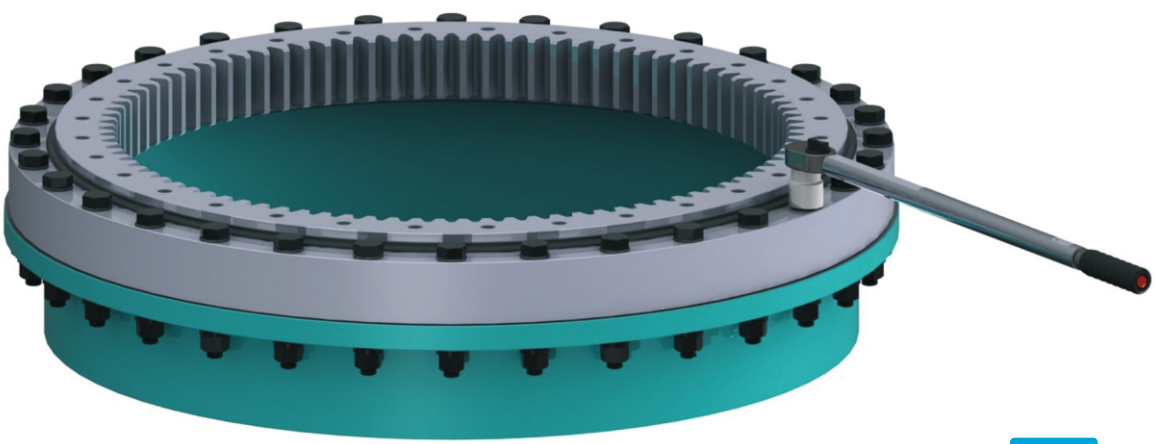

Figure 35

6

The teeth of the bolt and/or stud should be lubricated with thin oil. Attach the bolts, nuts, and washers manually to the holes. The manual installation enables the operator to see the skews on the bolts or the misalignments in the holes. If the bolts are skewed and tightened by force, the rotational torque will increase due to the possible elliptical mounting.

Installation, Lubrication and Maintenance

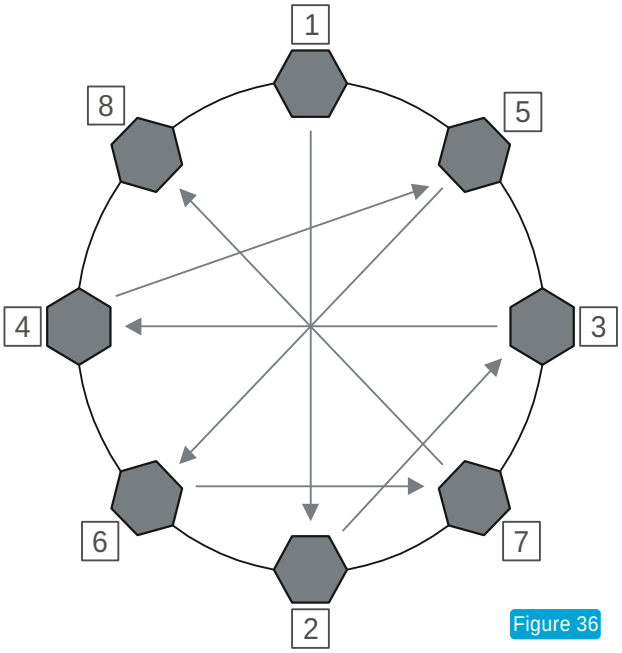

Figure 36

7

During the first tightening process of the bolts and nuts, apply 50% of the tightening value indicated in table 6 on page 19. The complete tightening torque should be applied in the second round. The information in figure 36 should be followed for the tightening sequence of the bolts and nuts. The sequence given in figure 36 enables a tension-free installation.

8

Please rotate the free ring to check the accuracy of the installation. If the bearing correctly installed, the rotational torque should not show any big difference.

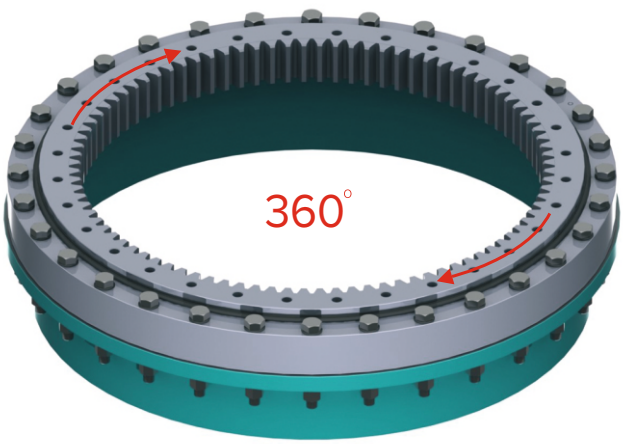

Figure 37

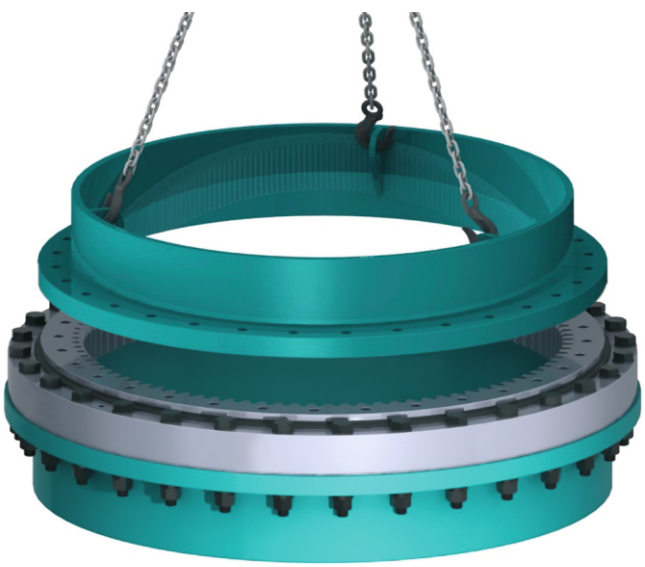

Figure 38

9

After mounting the bearing to the first support structure, we recommend positioning the “S” marked point of the other (free) ring at an angle of 180° with the “S” point of the mounted (not free) ring.

10

Align the holes of the support surface with the holes of the bearing ring.

11

Oil the bolts, nuts, and washers for connecting.

12

As described in figure 6 and 7 figure, carry out a 50% preload during the first round and during the second round tighten the bolts and nuts by applying the full tightening torque values given in the tables (table 6).

13

Check the correctness of the installation by rotating the bearing. There should be no excessive rotational torque and no compressing regions should be observed during rotation.

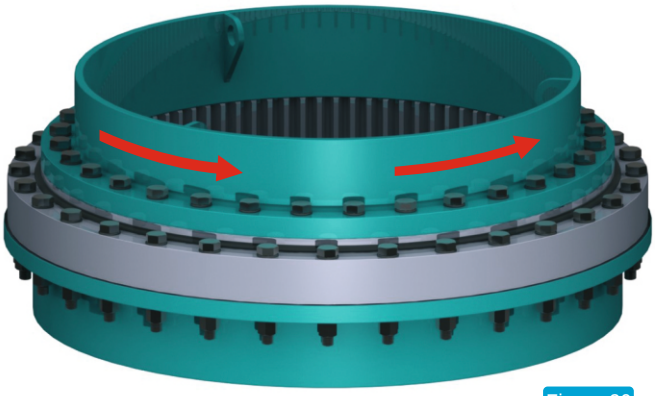

Figure 39

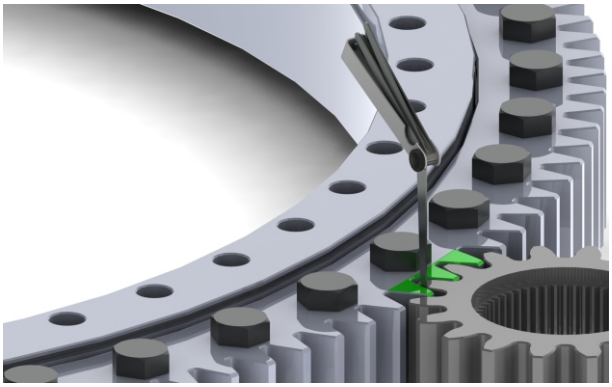

Figure 40

14

During the installation of the pinion gear of the HAN slewing bearings with teeth, a positioning at any tooth of the pinion gear with the help of a feeler gauge is sufficient. An appropriate tooth space should be set to 0.03…. 0.04 x modules as described on page 20.

In the case of induction-hardened bearing gears, the adjustment should be done over the green-colored teeth (figure 40).

15

During the lubrication of the raceways of the slewing bearing, fill the bearing with the recommended grease by rotating the bearing smoothly until the grease starts to leak slightly from the bottom of the seals. If the bearing is produced by our company, the raceways are already filled with grease. If the system has automatic lubrication, you only need to attach the lubrication pipes to the grease holes.

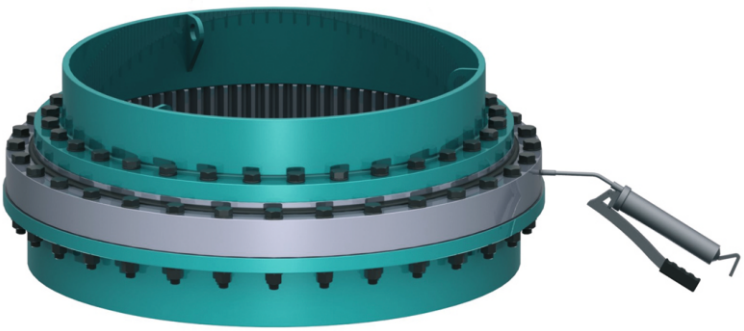

Figure 41

Figure 42

16

Lubricate the gears sufficiently with the recommended lubricant (page 23).

Installation, Lubrication and Maintenance

Bearing Maintenance and Controls

Like all other important machine parts, the slewing bearings should be cleaned and checked at regular intervals. These intervals depend completely on the environmental and operating conditions. If the rotary table bearings are under heavy operating conditions, these maintenance intervals should be planned more frequently. The controls of the clearances in the rotary table bearings are critical regarding the prevention of accidents and injuries.

Checking the Tilting Clearance

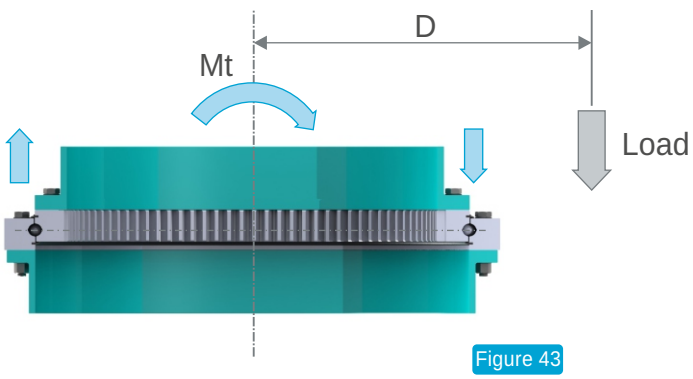

Figure 43

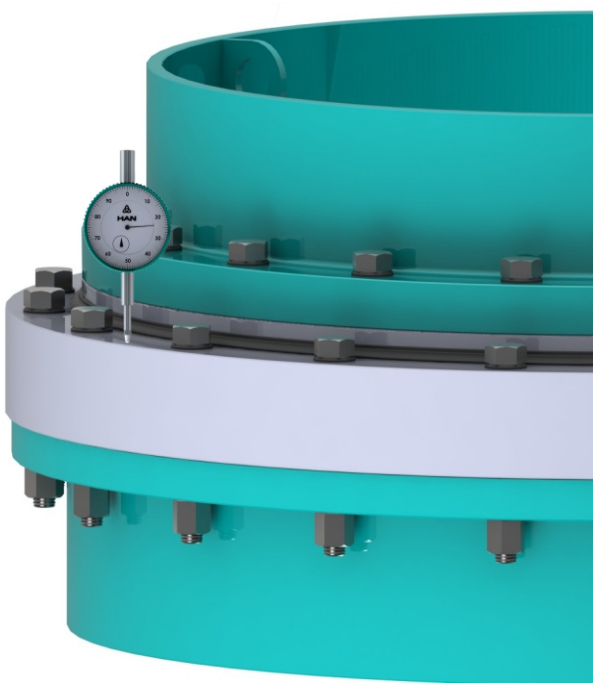

Figure 44

In order to be sure about the clearance tolerance of the slewing bearing, measure the unloaded and loaded clearance under real operation conditions with the help of a dial gauge as described in figure 44. The bearing should be rotated at 0°, 90°, 180° ve 270° and the changes in the dial gauge should be assessed. The result should be nearly close to zero. The amount of change should be recorded. The tilting clearance measured just after the installation is important for the comparison with the clearance checks performed later on.

It is recommended by our company HAN Makina that the clearance in the slewing bearings should be checked and recorded at installation and once a year or every 2000 hours after the start of the operation. The wearing detected during the controls should be compared with the results of the previous controls and should be continuosly monitored. The maximum bearing wearing clearance values given in tables 9, 10 and 11 should be taken into consideration.

4 Point Contact Slewing Bearing (B1100 Series - B2100 Series)

MAXIMUM PERMITTED CLEARANCE VALUES	Raceway Circle Diameter	Rolling Element [mm]									
		20	22	25	30	35	40	45	50	60	70
	1000	1.5	1.5	1.5	1.6	1.8	2.0	2.2	2.6		
	1250	1.5	1.6	1.6	1.7	1.8	2.1	2.3	2.7	2.8	
	1500	1.6	1.7	1.7	1.8	1.8	2.1	2.4	2.7	2.9	3.0
	1750			1.8	1.8	1.9	2.2	2.4	2.8	3.0	3.1
	2000			1.8	1.9	2.0	2.3	2.5	2.9	3.0	3.2
	2250			1.9	2.0	2.1	2.4	2.6	3.0	3.1	3.3
	2500			1.9	2.0	2.1	2.4	2.7	3.0	3.2	3.3
	2750			2.0	2.1	2.2	2.5	2.7	3.1	3.3	3.4
	3000					2.3	2.6	2.7	3.2	3.3	3.5
	3250					2.4	2.7	2.9	3.3	3.4	3.6
	3500						2.8	3.0	3.3	3.5	3.6
	3750						2.9	3.1	3.4	3.6	3.7
	4000						3.0		3.4	3.7	3.8
	4500								3.6	3.9	4.0
	5000								3.8	4.1	4.2
	5500								4.0	4.3	4.4
	6000								4.2	4.6	4.7

Table 09

8 Point Contact Slewing Bearing (B2200 Series)

MAXIMUM PERMITTED CLEARANCE VALUES	Raceway Circle Diameter	Rolling Element [mm]										
		18	20	22	25	30	35	40	45	50	60	70
	1000	1.9	1.9	2.0	2.0	2.1	2.2	2.6	2.9			
	1250	2.0	2.0	2.1	2.1	2.2	2.3	2.7	3.0	3.5	3.7	
	1500		2.0	2.2	2.2	2.3	2.4	2.7	3.0	3.5	3.7	
	1750			2.3	2.3	2.4	2.5	2.9	3.1	3.6	3.8	4.1
	2000				2.4	2.5	2.6	3.0	3.3	3.8	3.9	4.2
	2250					2.6	2.7	3.1	3.4	3.9	4.0	4.3
	2500						2.8	3.2	3.5	4.0	4.2	4.4
	2750						2.9	3.3	3.6	4.1	4.3	4.5
	3000							3.4	3.7	4.2	4.4	4.6
	3250							3.5	3.8	4.3	4.5	4.7
	3500							3.6	3.9	4.4	4.6	4.8
	3750							3.6	3.9	4.5	4.7	4.9
	4000								4.1	4.6	4.8	5.1
	4500									5.0	5.2	5.5
	5500									5.2	5.4	5.6
	6000									5.4	5.6	5.8

Table 10

Cylindrical Roller Slewing Bearing (SM2100 Series - SM3300 Series)

MAXIMUM PERMITTED CLEARANCE VALUES	Raceway Circle Diameter	Rolling Element [mm]										
		16	21	24	26	32	36	40	50	60	70	80
	400	0.20	0.22	0.23	0.24							
	500	0.21	0.23	0.24	0.25	0.28						
	630	0.26	0.28	0.29	0.30	0.34	0.37	0.39				
	800	0.26	0.28	0.29	0.30	0.34	0.37	0.39				
	1000	0.31	0.33	0.34	0.35	0.39	0.42	0.44				
	1250	0.41	0.43	0.44	0.45	0.49	0.52	0.54	0.61			
	1500	0.51	0.53	0.54	0.55	0.59	0.62	0.64	0.71			
	2000	0.60	0.63	0.64	0.65	0.69	0.72	0.74	0.81	0.91		
	2500	0.66	0.70	0.72	0.74	0.79	0.82	0.84	0.91	1.01	1.11	1.21
	3150	0.76	0.80		0.84	0.89	0.92	0.94	1.01	1.11	1.21	1.31
	4000				0.94	0.99	1.02	1.04	1.11	1.21	1.31	1.41
	5000					1.09		1.13	1.21	1.31		
	6000					1.19		1.24	1.31	1.41		

Table 11

Checking the axial clearance

The measurement are performed with the help of a depth gauge (figure 45) or a block with known thickness and feeler gauge (measurements should be done at least at 4 points). The measured value is compared with the first measurement to evaluate the change. If the acceleration of the amount of the clearance continues with an increasing pattern, the subsequent measurements should be performed more frequently.

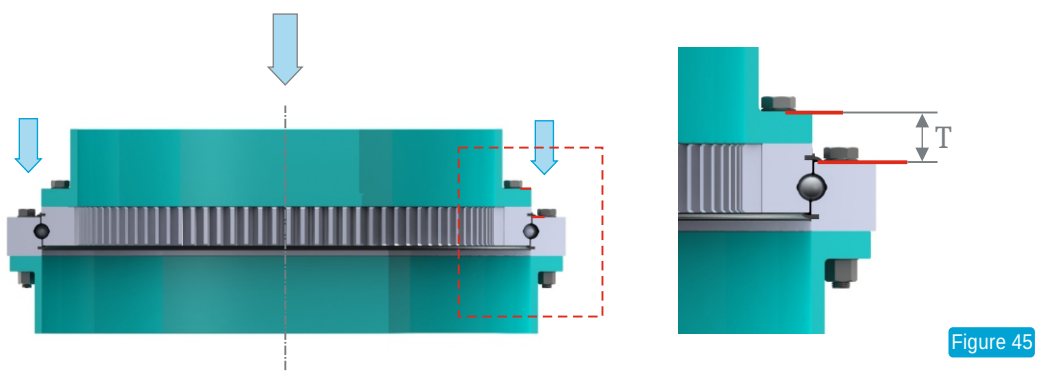

Figure 45

Installation, Lubrication and Maintenance

Checking the Bolt Connections:

Particular attention should be given to the bolt connections in the slewing bearings, as any insufficient connection may lead to death, injuries, and irreversible damage to the system.

In the first and third months following the first start-up of the machine, all bolts and nuts should be checked for tightening. Later on, the bolt tightening torque should be checked once a year or every 2000 hours according to the values given in table 6 on page 19.

If the tension loss is more than 20% in a bolt, it should be replaced together with the neighboring bolts. If 20% of the bolts on a ring have a tension loss of more than 80%, all bolts should be replaced with bolts at least with the same quality of the initially used bolts.

During the replacement, bolts should be replaced according to the sequence used in the first installation without loosening more than one bolt at once.

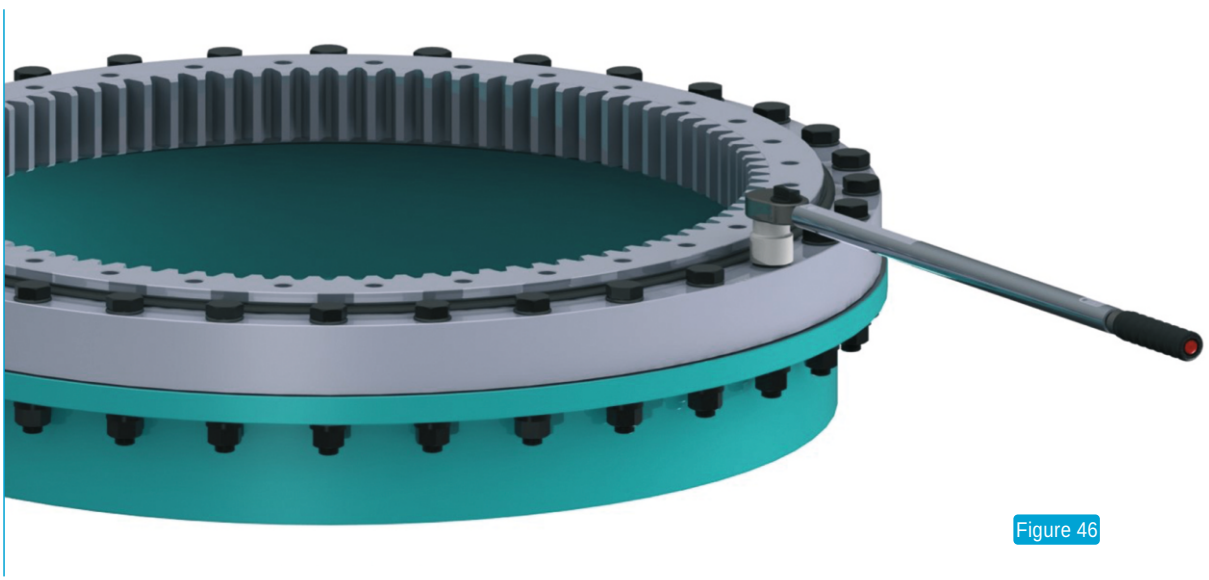

Figure 46

Checking the Seals and Lubrication:

The sealing elements or seals should be checked at least once every six months and should be cleaned if needed. If any wearing or rupture is observed, it should be replaced to avoid the penetration of any wearing material in the bearing. Otherwise, the service life of the bearing may be shortened. Furthermore, the availability of adequate grease around the circumference of the bottom of the felt should be checked. It should not be forgotten that the grease reduces wearing significantly in the slewing bearings.

After grease is applied, excreted grease from the underside of the seals should be cleaned and checked if possible. If there are visible steel particles or foreign materials in grease discharged from the underside of the seal, a maintenance control of the bearing may be necessary. Our company provides also maintenance and repair service along with the production.

Assembly Preload Forces For Bolts (Ref. VDI 2230 Document 1)

Metric ISO	8.8 Quality		10.9 Quality		12.9 Quality	
	Tensioning force [kN]	Maximum tightening torque [Nm]	Tensioning force [kN]	Maximum tightening torque [Nm]	Tensioning force [kN]	Maximum tightening torque [Nm]
M12	42	93	62	137	72	160
M14	58	148	84	218	99	255
M16	79	230	116	338	135	395
M18	99	329	141	469	165	549
M20	127	464	181	661	212	773
M22	158	634	225	904	264	1.057
M24	183	798	260	1.136	305	1.329
M27	240	1.176	342	1.675	400	1.959
M30	292	1.597	416	2.274	487	2.662
M33	363	2.161	517	3.078	605	3.601
M36	427	2.778	608	3.957	711	4.631
M39	512	3.597	729	5.123	853	5.994
M42	587	4.445*	836	6.331*	979	7.409*
M45	686	5.551*	978	7.906*	1.144	9.251*
M48	773	6.715*	1.101	9.565*	1.288	11.193*
M52	926	8.628*	1.319	12.289*	1.543	14.381*
M56	1.068	10.750*	1.522	15.311*	1.781	17.918*
M60	1.247	13.334*	1.776	18.991*	2.078	22.224*
M64	1.411	16.058*	2.010	22.871*	2.352	26.764*

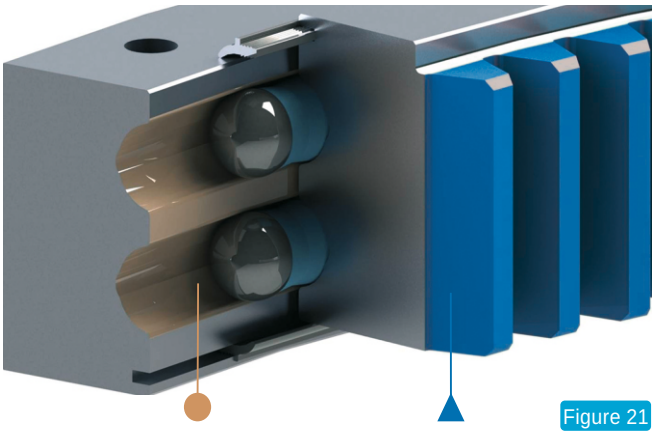

Figure 21

	The Way of Rolling ●	For Gear Surface ▲
Petrol Ofisi	SuperGres EP2 (-12°C to +130°C)	- -
Shell	Gadus S2 V220 2 (-25°C to +130°C)	Gadus S2 OGH NLGI 0/00 (-10°C to +200°C)
Mobil	Mobilux EP2 (-20°C to +120°C)	Mobilgear OGL 461 (-20°C to +120°C)
bp	Energrease LS-EP2 (-25°C to +140°C)	Energrease LC2 (-30°C to +150°C)
Castrol	Spheerol EPL2 (-20°C to +140°C)	Castrol Mollub Alloy OG 9790/2500-0 (-20°C to +90°C)
KLÜBER LUBRICATION	Centoplex EP2 (-20°C to +130°C)	Grafloscon C-SG 0 ultra (-30°C to +200°C)
TOTAL	Multis ep2 (-25°C to +120°C)	Copal OGL 0 (-25°C to +150°C)

Table 8


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