

1.1 Inspection

Determine the available **tilting clearance**.

- The tilting clearance increase raceway wear. To determine the increase in tilting clearance, it is necessary to take basic periodic measurements.
- Permanently designate the measuring point in the main load direction.
- Record all measured values into **Table 1**.

Follow the procedure below:

- All bolts and nuts must be tightened correctly to avoid play.
- Measuring points should be as close as possible to the raceway to introduce less deflections.
- Always apply the same load on all the measurements.
- Determine and mark the measuring spot at the point of load, both on the housing as well as on the worm wheel or on the slewing ring.
- Repeat this procedure so that you can control the entire slew ring as in **Figure 1**.

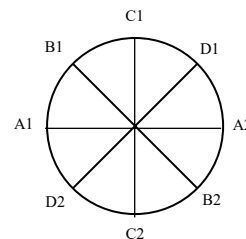


Figure 1: Measuring points

- Fix the dial gauge.
- Apply a minimum of 50% of the maximum operational load in “X1” direction.
- Set the dial gauge on zero.
- Apply a minimum of 50% of the maximum operational load in “X2” direction.
- The measured difference “mx” between “X2” and “X1” corresponds to the tilting clearance and serves as the basis for comparison for later inspections. $mx = X2 - X1$
- The increase clearance “ δ_T ” is the difference between “mx” and “m0”.

$$\delta_T = mx - m0$$

$mx \rightarrow$ “x” corresponds to the inspection number

$X1 \text{ \& } X2 \rightarrow$ “X” corresponds to the measuring points (A, B, C, D)

ALLOWABLE INCREASE PLAY (RACEWAY)

Inspection 0	Load	Direction "1"	Direction "2"	m0	Remark
A					
B					
C					
D					

Inspection X	Load	Direction "1"	Direction "2"	mx	Remark
A					
B					
C					
D					

Table 1: Example of measures record

All the measured values are recorded.

All subsequent measurements are performed at the same measuring point, with the same load, at the same position of the housing relative to the worm wheel or gear ring and in the same sequence.

For purely axial or radial loads, tilting clearance is inspected by applying an additional tilting load.

If it is not possible to measure the **tilting clearance**, use **bearing height reduction**

Determine the **bearing height reduction**:

- To determine bearing height reduction, it is necessary to take basic periodic measurements.
- Permanently designate the measuring point in the main load direction.

Follow the procedure below:

- All bolts and nuts must be tightened correctly to avoid play.
- Measuring points should be as close as possible to the raceway to introduce less deflections.
- Always apply the same load on all the measurements.
- Determine and mark the measuring spot at the point of load, both on the inner ring and

outer ring.

- Repeat this procedure so that you can control the entire slewing ring as in **Figure 2**.

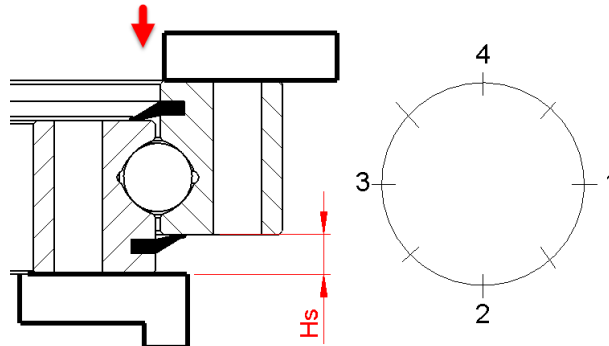


Figure 2: measurement points

- The clearance with height reduction method is equal to the initial measured value minus the value after use.

$$\Delta_{Hw} = H_{s0} - H_{s1}$$

Position	Load	Inspection 0 "Hs0"	Inspection 1 "Hs1"	Remark
1				
2				
3				
4				

Table 2: Example of measures record

All the measured values are recorded.

All subsequent measurements are performed at the same measuring point, with the same load, at the same position of the housing relative to the worm wheel or gear ring and in the same sequence.

1.2 Check the clearance

Raceway wear leads to increase the clearance. It is therefore necessary to check the clearance after 500 operating hours or at the latest after 6 months.

- Check the increase in **tilting clearance** (δ_T) or **height reduction** (Δ_{Hw}) directly on a Slewing drive or slewing ring. The clearance values determined may

not exceed the tolerances shown in the following table. (**Table 2**)

	Ball diameter [mm]						
	<20	<25	<30	<38	<45	<60	≥60
Clearance (mm)	1,4	1,9	2,2	2,4	2,6	2,8	2,9
Critic clearance (mm)	0,7	0,95	1,1	1,2	1,3	1,4	1,45
*Critic clearance: We take into consideration as critical clearance when the integrity of people can take risks							

Table 2: Table of permissible clearance increase

- For both checks:
 - Reduce the inspection interval to 200 operating hours if the measured clearance increases amounts to approx .75% of the maximum permissible clearance increase.
 - Reduce the inspection interval once again after further clearance increase (to 50-100 operating hours).
 - Replace the Slewing drive if the maximum permissible clearance is reached.