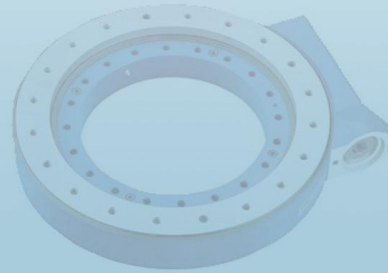




SLEWING DRIVE MANUAL

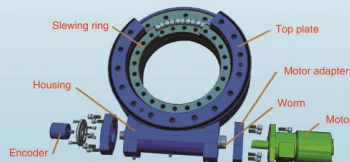


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XUZHO WANDA SLEWING BEARING CO., LTD

1. Slewing drive structure:

Slewing drive consists of worm, slewing ring, housing, top plate and other components. By adopting slewing ring as its core component, slewing drive can bear axial force, radial force and tilting moment simultaneously. Customers can choose different hydraulic motors or electrical motors as power driver according to their requirements, they can also add encoder at the end of the worm or inside the motor.



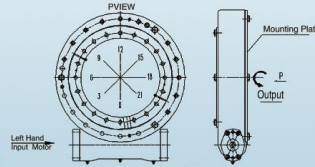
2. Code description:

S (E) XX XX(S) (2)(H)(E) B/12R(L) XXX(E) XXX KK

S – open housing, SE – enclosed housing
XX – slewing drive size, for example 3", 5", 7", 9", 12", 14", 17", 21", 25". These dimensions are similar to slewing ring raceway centering distances.
(2)(H)(E) – 2: dual worm; H: worm hex extrusion; E: shaft opposite to motor, with encoder.
B/12R(L) – B: SAE 6B spline; 12: 12mm keyed shaft; 16: 16mm keyed shaft; 25: 25mm keyed shaft; R(L): hydraulic motor position, right side or left side
XXX(E) – hydraulic motor and electrical motor specification, E: with encoder
XXX – slewing drive final output speed, for example 001, 010, 100 means 100 times of actual output speed of 0.01rpm, 0.1rpm and 1rpm.
KK – customer's special requirement

For example:

"SE17-102S- 12R-24010-REV. A" mean enclosed housing, raceway centering diameter 17", gear ratio 102:1, slewing ring without teeth hardened, 12mm keyed shaft, hydraulic motor position on the right side, 24V direct current electrical motor without encoder, final output speed 0.1rpm, revised A version.



3. Installation

3.1 Preparation

- Check the slewing drive for physical damage
- Clean the slewing drive and mounting structure
- Remove extraneous items from supporting surfaces

3.2 Please clean the corrosion protection coating from the supporting surfaces of slewing drive, following instructions below:

- Clean the exterior of the mounting surfaces with cold solvent (e.g. diesel oil) that will not damage the rubber seals
 - Clean the slewing drive and Mounting hole structure
- Applicable provisions for cleaning media are observed (e.g. Manufacturer provisions, protection of workers, environment protection)

3.3 Permissible Flatness Deviation

Table 1 : Slewing drive permissible flatness includes perpendicularity deviations

Slewing drive size	Permissible perpendicularity deviation in length									
	3"	5"	7"	9"	12"	14"	17"	21"	25"	
Permissible perpendicularity deviation in length	[mm]	0.32	0.4	0.46	0.59	0.78	0.91	1.1	1.32	1.38
	[inch]	0.009	0.031	0.016	0.022	0.032	0.036	0.045	0.057	0.069
Permissible perpendicularity deviation in angle dimension	degree	0.42°	0.42°	0.42°	0.42°	0.42°	0.42°	0.38°	0.35°	0.32°



φ - Angle Deviation X - Distance perpendicular Deviation

The form must resemble a sine curve that gradually rises and falls

3.4 Mounting Bolts

The following mounting fasteners provisions are observed.

- Prescribed size, number and quality grades shall be used
- Grip ratio (grip length to diameter of bolts) shall be observed, from minimum ≥ 2 to maximum ≤ 10 .
- Bolts with a fully threaded shaft should be not permissible Slew drive function, lifespan, and durability of the bolt connection are affected in case of non-compliance.

3.5 Tightening Torque

- Mounting bolts are in normal cases adequately secured by correct preloading
- Use of split rings, split washers, etc. not permissible

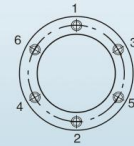
Table 2 (For guidance only): Tightening torques and initial preloads for mounting bolts

Class	Mounting Bolt Dimension					
	M6 (1/4-20UNC)	M8 (5/16-18UNC)	M10 (3/8-16UNC)	M12 (7/16-14UNC)	M14 (5/8-11UNC)	M20 (3/4-10UNC)
Class 8.8	11.5 N.M	28 N.M	55 N.M	97 N.M	240 N.M	470 N.M
Class 10.9	14 N.M	33 N.M	72 N.M	120 N.M	305 N.M	600 N.M
Class 12.9	17 N.M	42 N.M	83 N.M	145 N.M	360 N.M	705 N.M

3.6 Install the Slew Drive

- Clean the mounting structure, e.g. from welding, galvanizing, residues, dirt, etc
- Fix the slew drive with mounting bolts.
- Slew drive should be installed under zero load condition.

3.7 The following procedure shall be followed in order to avoid deviations between bolt tightening forces.



- Apply thread lock liquid to threads
- Preload the bolts including washers, if required, crosswise. See the general pattern in sketch below of how bolts get torqued in crosswise sequence. Start with either inner or outer ring. Do the crosswise torquing of all bolts to 30% of tightening torque. Then repeat crosswise torque to 80% of tightening torque to 100% of the tightening torque.

- First completely torque the inner or outer ring, then do the other ring.
- Once the screw is tightened, please make a permanent mark in the position of the screw head to that of the stationary structure. This will be used later during inspection to be sure the screw has not unwound. Determine the available tilting clearance
- The tilting clearance increases with 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.

4. Re-lubrication Instruction

There are three places which need to be lubricated, they are slew ring raceway, worm thread and taper roller bearings. Slew drives are supplied fully lubricated.

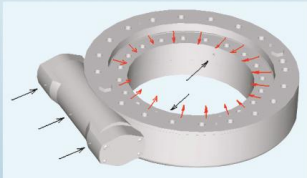
A suitable grease type for normal cases is shown on table 3

Table 3: Grease Specifications

Pars needed to be lubricated	Taper bearing/Ring raceway/Worm gear thread
Lubrication Condition	Pre-lubricated by manufacturer
Recommended grease product name	7014-1 High Temp. By China Petroleum & Chemical Corp
Applicable temp. Range in °C	-40 ~ +200
Color	White
Four-ball test	DIN 51350P2
Viscosity (-40 °C 10 s-1) Pas	653
Dropping point °C	316
Penetration, worked 0.1 mm	67

NOTE: This kind of grease is eco-friendly and harmless to human and environment. Manufacturer provisions about handling the respective lubricant must be observed.

While rotating the slew drive, inject grease into all the cleaned grease nipples consecutively until a continuous collar of fresh grease forms at least on one sealing lip or at the bearing gap.



Relubrication Intervals

- Relubrication intervals depends on the current working and environmental conditions.
- Precise relubrication time intervals can only be obtained by tests of actual working conditions
- Please see table 4 for reference

Table 4

Working conditions	Relubrication Intervals
Dry and clean workshop, industrial positioner (rotator/robot etc.)	Every 500 hours of continuous work/once a year
Wild outside conditions (Such as crane, wind and solar power equipments, and aerial working platform)	Once a year
Harsh environmental condition, marine/desert/polar climate/dirty environment/ consecutive working hours exceeds 70 hours per week	Once every 150 working hours/ Once every 4 months
Extreme condition (tunnel boring machine, steel mill, oil field)	Once every 50 working hours, at least once every two months

The following are normal working conditions:

- Slew drive working temperature -20°C ~ +80°C
- Peripheral velocity < 272 mm/s
- Reducer output speed < 3 rpm

Check mounting bolts:

In order to avoid the possible reinstallation, it is necessary to retighten bolts to prescribed torque. This first time retightening procedure should be performed under the condition that bolt connection without external loads and within less than 100 working hours of the slew drive. Then following mounting bolts check intervals: once a year.

Checking time may be reduced under special workings conditions.

If mounting bolts get loose, please replace all mounting bolts, nuts and washers.

5. Transport, Handling and Storage Provisions

5.1 Transport, carriage and storage

Transport only in horizontal position, impacts should be avoided.

Wear work gloves and take it carefully when handling the slew drive.

Use the holes of the ring in the slew drives to fix bolts for safe hoisting, handling and placement.

Please follow the following storage provisions:

Store only in horizontal position and in closed rooms. Keep it from moisture. The surface corrosion protection holds for approx. 5 months in closed packaging. Longer period storage requires special protective measures.

- This manual contains the necessary information for correct installation and maintenance of slew drives.
- All work steps listed here are to be executed by professionals.
- If further guidance is needed, please contact our after-sale service.
- All of the information in this manual are through serious assessment and examination.

Wanda accepts no liability for:

- Non-compliance with Installation and Maintenance Instructions.
- Failure to pass on content to third party.
- Any omissions in the manual.