SLEWING DRIVE MANUAL

for

CONSTRUCTION MACHINERY

Please read all instructions and manuals carefully before installation

REV：B

2022.04

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General:

- The purchasers are responsible for providing safety precautions and correct installation of all equipment.
- Please read this manual carefully before installation. The working characteristics of the slewing drives can only be ensured when complying with the manual.
- This manual contains the information required for correct installation and maintenance of the slewing drives.
- All of the following steps need to be operated by technical personnels.
- Please don't hesitate to contact service engineers for any further assistance.
- The documents guide purchasers on how to install and maintain the slewing drive correctly. The latest version is published on our homepage and can be downloaded from www.h-fang.com.cn. Please always check that you are working with the latest revision.

After-Sale Service:

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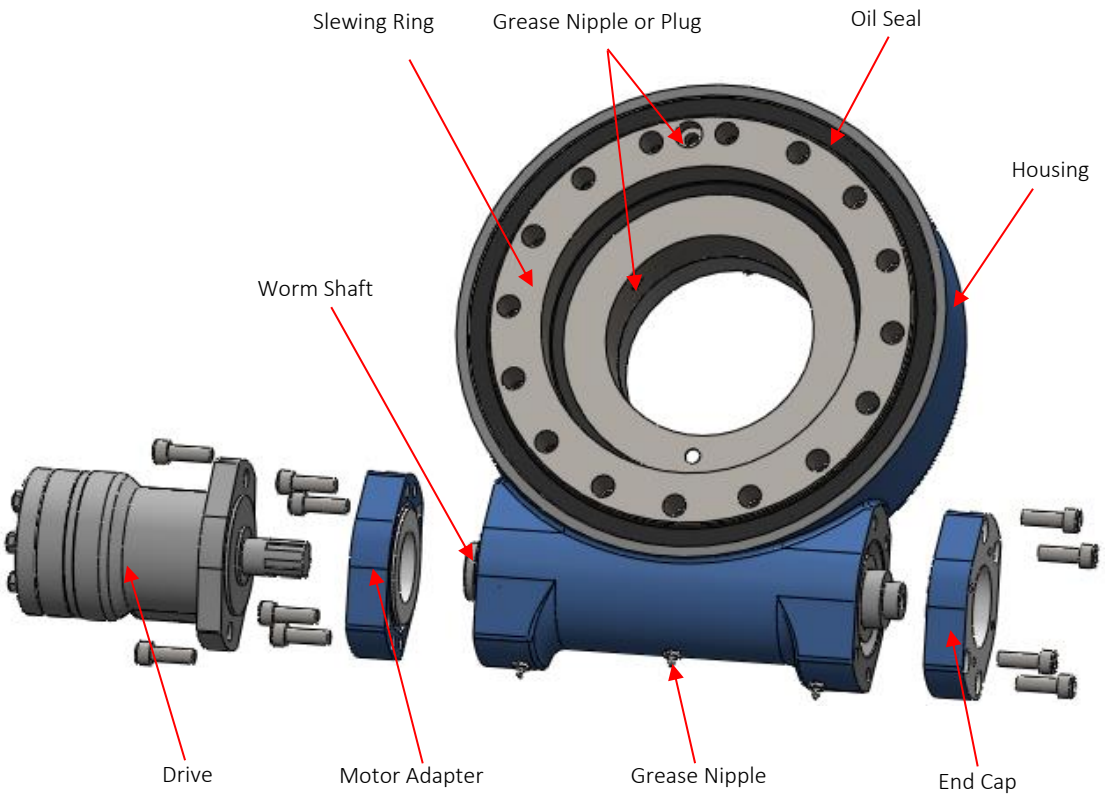
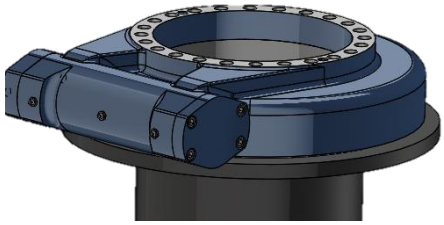
Structure Diagram of Slewing Drive

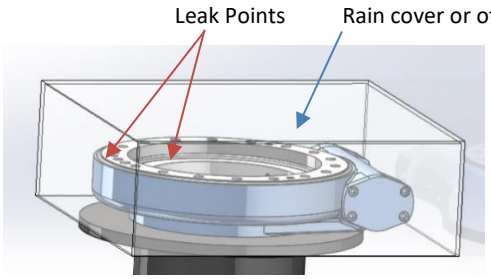


Installation



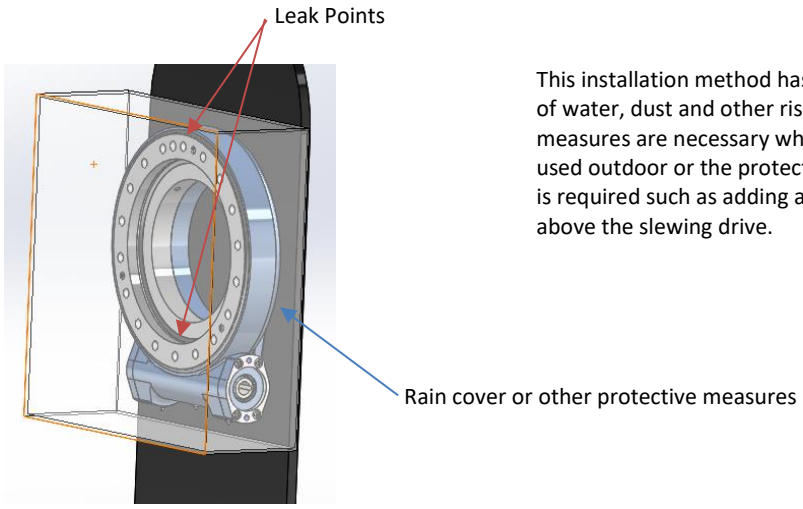
Housing up can be effectively waterproof and dustproof.

Horizontal installation and housing up



This installation method has leakage risks of water, dust and other risks. Protective measures are necessary when the drive is used outdoor or the protective capability is required such as adding a rain cover above the slewing drive.

Horizontal installation and slewing ring up



This installation method has leakage risks of water, dust and other risks. Protective measures are necessary when the drive is used outdoor or the protective capability is required such as adding a rain cover above the slewing drive.

Vertical installation

- **When the slewing drives are used in construction machinery and have special protection requirements, refer to the above requirements for installation.**
- **Choose a suitable installation according to the actual operating conditions and protection requirements.**

Content

1 Transportation, Handling and Storage

1.1 Transportation and Handling

During transportation, please keep the packing boxes placing in the prescribed direction to avoid collision. Please wear working gloves and operate carefully when opening the packing boxes and handling the slewing drivers. The mounting holes of the slewing drives can be used for lifting to ensure safe handing.

1.2 Storage

During storage, please keep the packing boxes placing in the prescribed direction and storing in a closed room to avoid getting wet. In the closed packing, the surface is anticorrosive and rustproof for about 3 months. If longer storage is needed, please take special protective measures.

2 Installation and Maintenance

2.1 Preparation

- Check the slewing drive for physical damage.
- Clean the slewing drive and the mounting structure.
- Remove extraneous materials from mounting surfaces. (Such as iron filings, burrs, paint, welding slag, etc.).
- If there are shipment bolts, remove them before installation. The difference between shipment bolts and positioning bolts is shown in Figure 2.1.1.

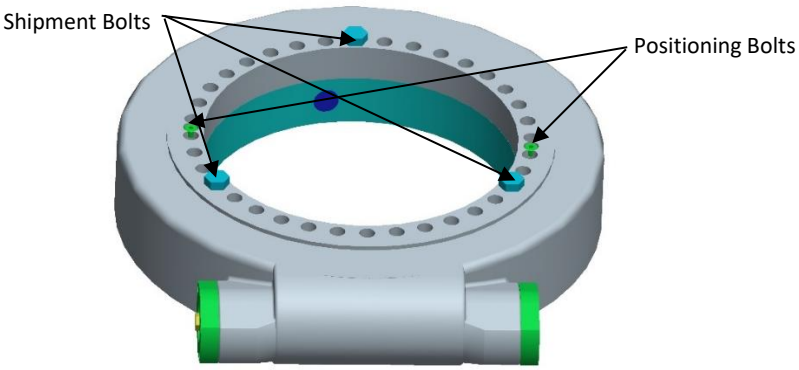


Figure2.1.1

2.2 Permissible Requirement

Permissible horizontal Deviation of the mounting surface when Horizontal installation (see Table 2.21)

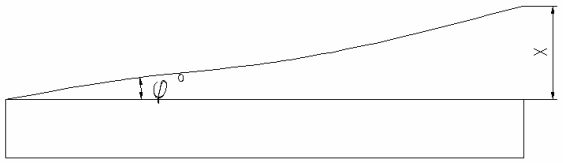
Table 2.21

Model		3 "	5 "	7 "	9 "	12 "	14 "	17 "	19 "	21 "	25 "	28 "
Vertical Deviation	[mm]	0.07	0.09	0.11	0.16	0.23	0.26	0.38	0.32	0.42	0.49	0.95
Angular Deviation	°	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.15

Permissible Flatness Deviation of the mounting surfaces connected with slewing drive（see Table 2.2.2）

Table 2.1.2

Model		3 "	5 "	7 "	9 "	12 "	14 "	17 "	19 "	21 "	25 "	28 "
Flatness Deviation	[mm]	0.04	0.1	0.1	0.12	0.15	0.15	0.15	0.15	0.2	0.2	0.25



φ – Angular Deviation
χ – Vertical Deviation

2.3 Mounting Bolts Selection

- Please select specifications, model and quality grade of bolts correctly. The bolts whose intensity grades are higher than 10.9 are recommended.
- The length of the bolt into the screw hole is generally 2 times the nominal diameter of the bolt.
- Don't allow the bolt to be screwed thread hole outside. Otherwise it will cause interference and damages parts.
- To reduce the contact stress, high strength flat washers are acceptable.

If not, it may affect the performance, service life and tensile strength of the slewing drive bolt connection.

2.3.1 Tightening Torque

- The installation of bolts should be fixed by the proper preload under normal situation.
- Do not use the fracture spring washer, flat mat ,etc.

Tightening torque for mounting bolts ,reference only.

Table2.3.1

Specification	Tightening torque（Nm）		
	8.8 Class	10.9 Class	12.9 Class
M8	26±4	33±3	45±6
M10 / 3/8"-16UNC	52±7	72±6	90±10
M12 / 1/2"-13UNC	90±12	120±10	150±20
M16 / 5/8"-11UNC	225±35	305±25	380±50
M18	310±45	415±35	521±70
M20 / 3/4"-10UNC	410±50	600±50	750±100

2.3.2 Tightening Regulations

- The slewing drive shall be mounted in unloaded condition.
- Apply some thread lock liquid on threads of bolts.
- Tighten the bolts and washers crosswise, tightening order is shown in Figure 2.3.1. Tighten all the bolts diagonally to 30% tightening torque. Then tighten the bolts repeatedly and diagonally to 50% tightening torque. Finally, tighten the bolts to 100% tightening torque.

Figure2.3.1

- All the threaded holes should be fixed with bolts. Check the intensity of bolts if the holes cannot be fixed completely due to structure limit. And seal them to prevent water and dust from entering the slewing driver
- Once the bolts are tightened, make a permanent mark on the bolts head and the stationary structure. This will be used later for bolt looseness inspection.

2.4 Paint Repair

The finish paint will be damaged inevitably during the installation of slewing drive. Paint repair is necessary to improve the rust prevention and anticorrosion performance of slewing drive and bolts after the whole device installation was completed.

2.5 Maintenance, Inspection and Lubrication

2.5.1 Inspection of Mounting Bolts

About 100 hours after the initial assembly, it is necessary to retighten the bolts to the prescribed tightening torque. This inspection should be repeated annually. The inspection frequency may be increased under bad working conditions. Once the bolts are loose, replace all bolts and washers with new bolts and washers.

2.5.2 Lubrication of Slewing Drive

Our products have been injected with enough grease before delivery. We recommend that the re-lubrication should be based on the actual situation.

- Raceway of slewing ring has been injected with grease.
- The meshing place of worm and slewing ring has been injected with grease.

  Note： Open housing slewing drives (S, W series) are not injected this place with grease before delivery. Customers should add grease after receiving the products and ensure that the tooth surfaces are full of grease.
- Tapered roller bearings have been injected with grease.

The grease name is Sinopec 7420-1 at the meshing place of worm and slewing bearing and the cavity of tapered roller bearing. The grease name is Sinopec 7029D-2 at the raceway of slewing ring.

Grease Name	Sinopec 7029D-2	Sinopec 7420-1
Working Temperature（℃）	-40～+180	-20～+100
Appearance	Milky white	Black
Dropping Point（℃）	271	180
Cone penetration，0.1mm	278	315

Note： This grease is harmless to human and circumstance. The grease can be adjusted appropriately for the special grease requirements of the slewing drives.

Later maintenance: add grease to the grease nipples one by one. The recommended injection amount of slewing drives is shown in Table 2.5.1.

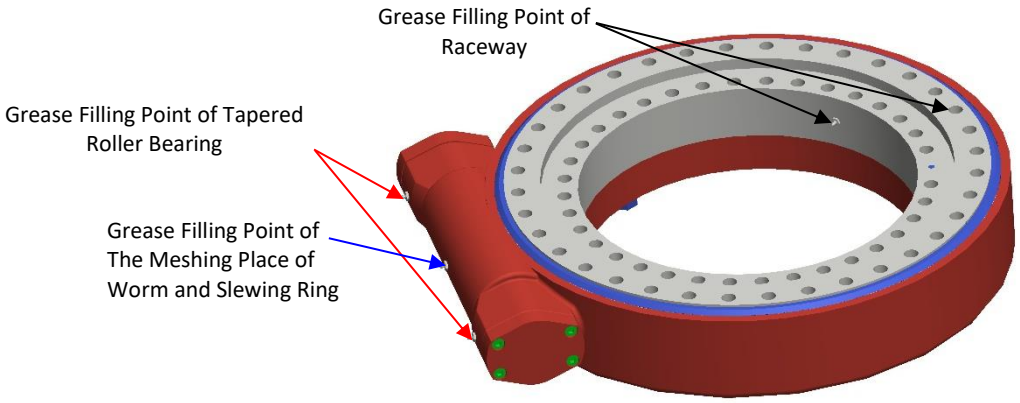
Table2.5.1

Location of Injection	Injection Amount（units：g）										
	3 "	5 "	7 "	9 "	12 "	14 "	17 "	19 "	21 "	25 "	28 "
Raceway of slewing ring	／	／	15-20	30-35	45-50	55-60	70-75	100-110	120-130	140-150	200-220
The meshing place of worm and slewing ring	33-35	50-60	55-65	90-100	100-110	100-110	110-120	120-130	130-140	130-140	150-170
Tapered roller bearing	7±0.5	7±0.5	7±0.5	10±0.5	10±0.5	10±0.5	10±0.5	10±0.5	10±0.5	10±0.5	15±0.5

Inject grease into slewing drives while rotating the slewing drives CW and CCW.
If the customers cannot purchase the same type of grease, the following grease can be used for reference, as shown in Table 2.5.2

Tble2.5.2

Grease Name	Instead Grease				
Sinopec 7420-1	Mobil SHC 1000	G.BESLUX PLEX EH-2/G	BECHEM HIGH-LUB FA 50 Mo	KLUBER BE 41-1501	FUCHS STABYL HD
Sinopec 7029D-2	Mobil XHP460	Mobil SHC220			



Re-lubrication frequency:

- Lubrication frequency depends mainly on the current operating and environmental conditions.
- Exact lubrication frequency can only be determined by test under actual working conditions.
- If abnormal conditions occur during use, please lubricate according to the instructions.
  Note: Abnormal conditions include large noise of rotary transmission, large amount of oil leakage and so on.
- If no reference is available, please refer to Table 2.5.3 below.

Table 2.5.3

Work conditions	Grease-filled slewing drive lubrication intervals
Dry and clean workshop, industrial positioners (turntables/robots, etc.)	Every 500 hours of operation or once every 1 year

Bad conditions in the outside （ crane, wind equipment and mobile elevating work platforms, etc. ）	Every half a year
Aggressive climatic conditions such as sea, desert, Arctic climate, very dirty surrounding, more than 70 continuous operating hours per week	Every 150 hours of operation or once Every 3 months
Extreme conditions (tunneling machines, steel mills, oil field, etc.)	Every 50 operating hours, at least, however every 2 months

The normal working conditions are as below：

- Operating temperature of slewing drive :-30℃ —+60℃.
- Output speed of slewing drive :<1rpm. (Maximum speed depends on torque load applied.）
- Medium and low load. (see Table 2.5.4)

Table 2.5.4

Model	Type / Serie	3”	5”	7”	9”	12”	14”	17”	19”	21”	25”	28”
Rated Torque (kN·m)	S/SE/SEA/SEB	0.16	0.24	0.6	1.85	2	2.4	3	／	4.4	5.5	／
	W/WE/WEA/WEB	／	／	1.2	2.3	2.7	3.2	4	5.7	4.4	11	13.5

The values in the Table 2.5.4 cannot replace the correct load in actual work. Poor lubrication is the most common cause of slewing drives failure.

3 Drive and Control

3.1 Hydraulic Motor

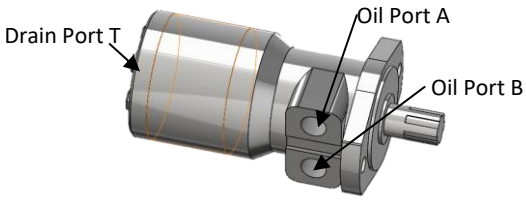
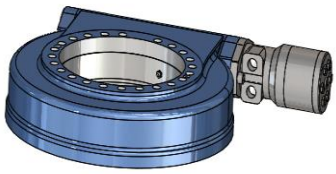


Figure 3.1.1

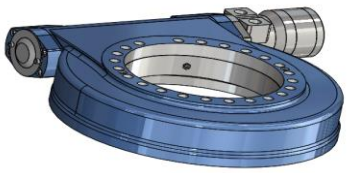
Oil Port A，B	7/8-14UNF(17)	G1/2(15)
Drain Port T	7/16-20UNF(12)	G1/4(12)

The position of hydraulic motor oil ports is shown below

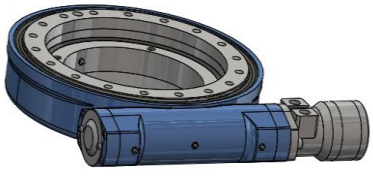
Away



Inside



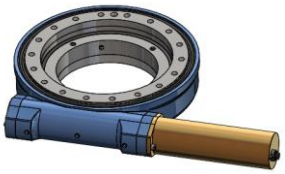
Down



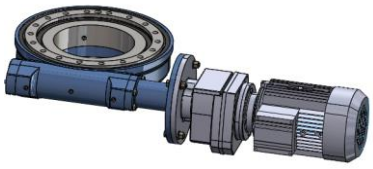
Up

- Check the hydraulic Motor Rotation. As shown in Figure 3.1.1, from the end of the output shaft, port A input, port B output, clockwise rotation. Conversely: port B input, port A output. Counterclockwise rotation.
- Check the tightening torque of assembly bolts according to Table 2.3.1. Connect oil pipe to hydraulic motor.
- Rotate the motor without load to make sure it rotates smoothly. In case of abnormal rotation, please check hydraulic system, joint, rotary reducer, worm, etc.
- After no-load test, load to rated load operation.
- For special hydraulic motor specifications, please read the hydraulic motor manual attached with our products in detail.

3.2 Reducer Motor



DC Motor



AC Motor

Installation of reduction motor:

1. Clean the mounting surfaces.
2. Tighten the connection bolts between the motor and motor adapter. And tighten the torque according to Table 2.3.1.
3. Power on the motor and check the rotation. If the direction of rotation is not as expected, adjust the two power cords interchangeably.
4. Rotate the motor without load to make sure it rotates smoothly. In case of abnormal rotation, please check the electrical system, connection shaft, rotary reducer, worm, etc.
5. After no-load test, load to rated load operation.
6. For unconventional motors such as brushless DC motors, please read the motor manual attached with our products in detail.

Note:

The company is not responsible for the following items:

- Failure to pass the manual to the related third party.
- Failure to install and maintain in accordance with service manual requirements.
- Other matters or terms not mentioned in the manual.