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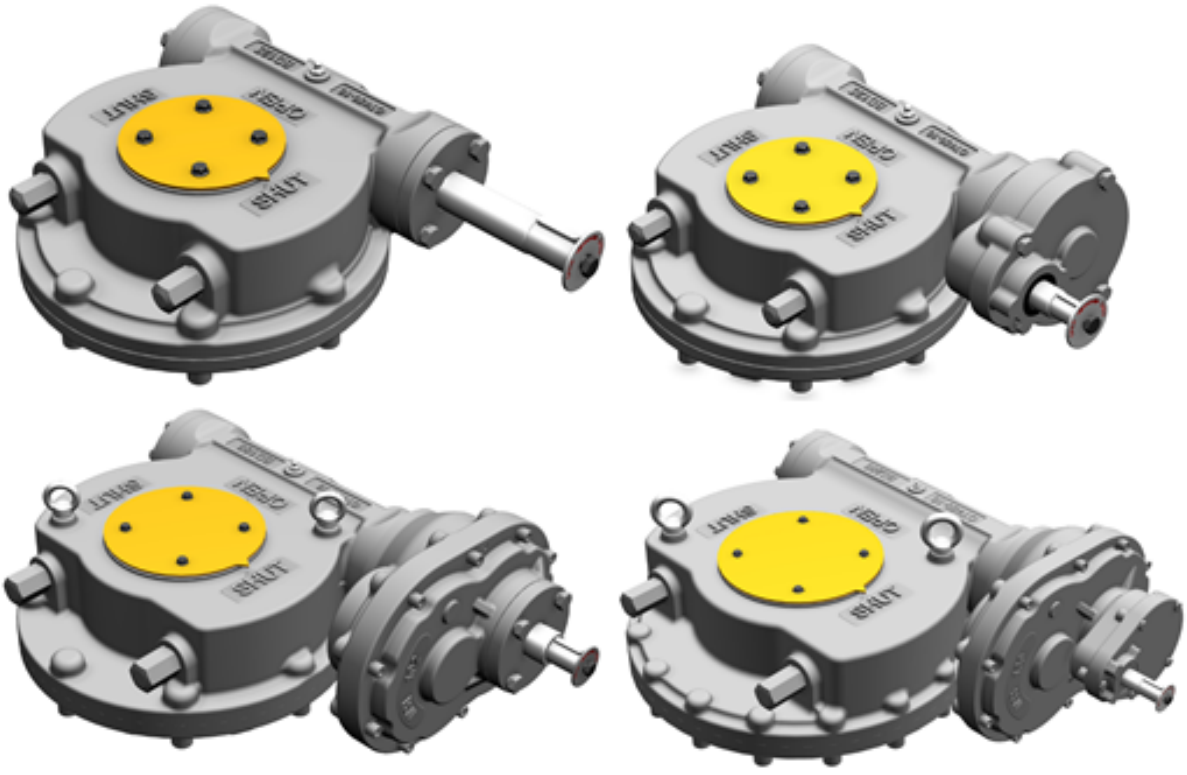
Worm Gear Box Instructions



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User's Manual of worm gear box

Product Overview

1 Overview

When selecting ACTUGEAR worm gear box, customer can consult ACTUGEAR catalogue or ask ACTUGEAR to select the gear models.

ACTUGEAR worm gear box designed according to the valve open and close characteristic, suitable for ball valve, plug valve, butterfly valve and other quarter-turn equipments. Serving the water, oil, gas, chemical, power and general industrial application. The products are widely used in various harsh environment and climate areas and special temperature industrial sites. ACTUGEAR gear boxes have reliable driving stability and long-term maintenance free guarantee.

Remark: For harsh environment, climate and special working conditions, it should be explained when ordering.

2 Protection grade

Standard gear boxes meet IP66 protection grade specified in GB 4208 / IEC 60529 standard.

Additional protection measures shall be used in the worm gear according to different application requirements of the user, such as higher anti-corrosion measures. If required higher IP grade, it shall be stated in the order.

Remark: This instruction manual does not include the subsea worm gear box.

3 Ambient temperature

a) Standard Type (A): -20℃~80℃, Applicable to normal environmental conditions.

b) High temperature type (B): -20℃~180℃, Suitable for high-temperature working conditions, high temperature grease and seals are required.

c) Low temperature type (C): -40℃~80℃, Suitable for low temperature areas, Low temperature body and low temperature grease & seals are required.

d) Ultra low temperature (D): -60℃~80℃, Suitable for ultra-low temperature areas; Low temperature body and grease & seals are required.

Product structure diagram

See Fig. 1 for the typical worm gear box.

Storage and transport

Do not collide when handling or moving the worm gear, and ensure that the connecting surface, input shaft and surface paint are not damaged. If the worm gear is not installed and needs to be stored outdoors for a short time, it shall be protected to prevent collision, sun, rain and corrosion.

If it is not installed, the worm gear is temporarily placed in the workshop. The gear body, indicator and input shaft surface shall be protected. Collision, scratch and oil pollution are strictly prohibited.

If it needs to be stored for a long time, it should be stored in the indoor warehouse. During long-term storage, the outer surface shall be rustproof every 6 months. Keep clean, dry, ventilated and placed neatly without stacking and pressing each other. ACTUGEAR worm gear has been rust proofed and can be stored indoors for 6 months.

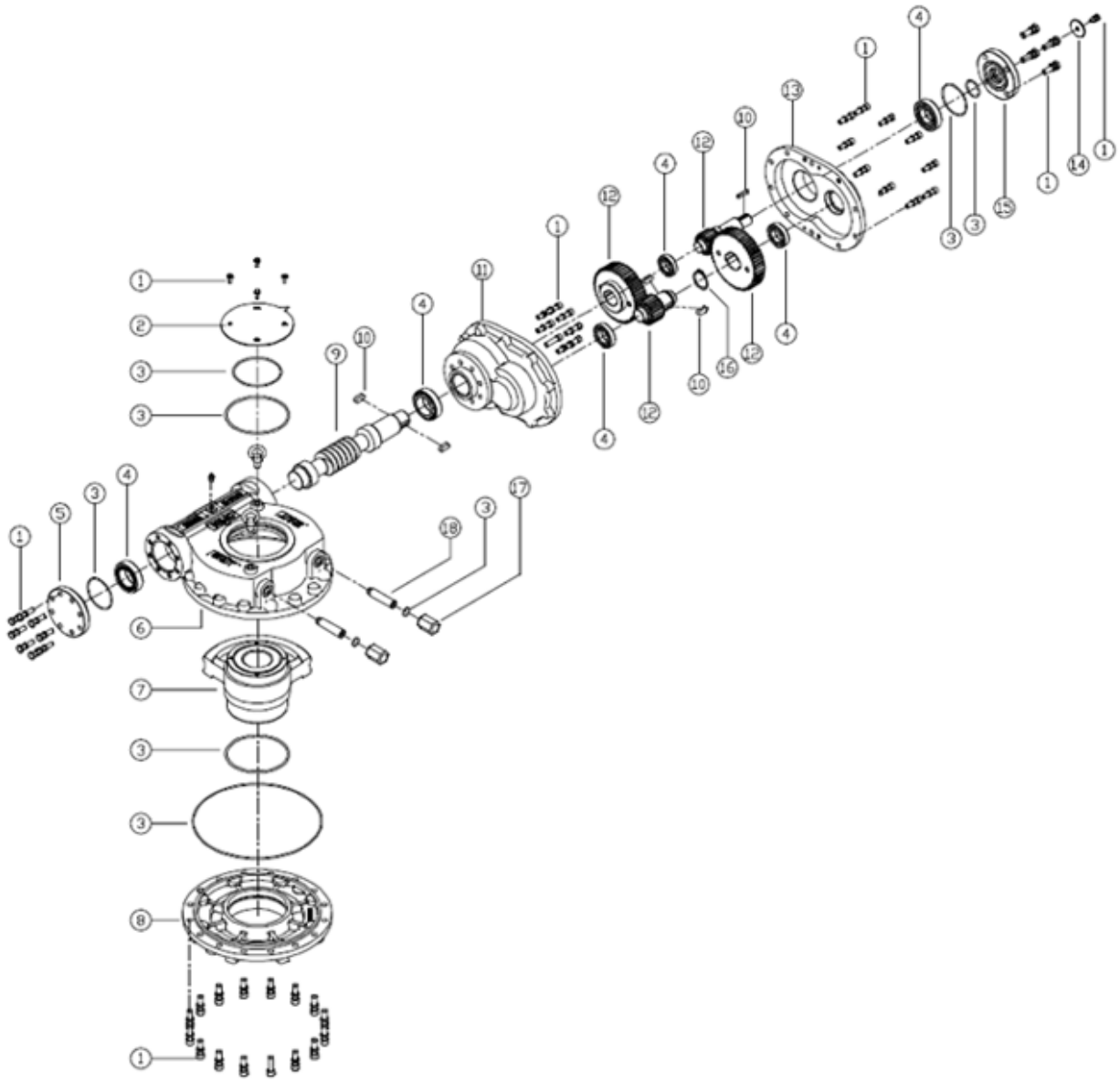


Figure 1: *Typical worm gear box structure*

1—Bolts 2—Indicator 3—O-ring 4—Bearing 5—End cover 6—Housing 7—Worm wheel 8—Cover 9—Worm 10—Key 11—Reduction body 12—Gears 13—Reduction cover 14—Handwheel indicator 15—Grand cover 16—Snap ring 17—Adjusting bolts nut 18—Adjusting bolts

Installation

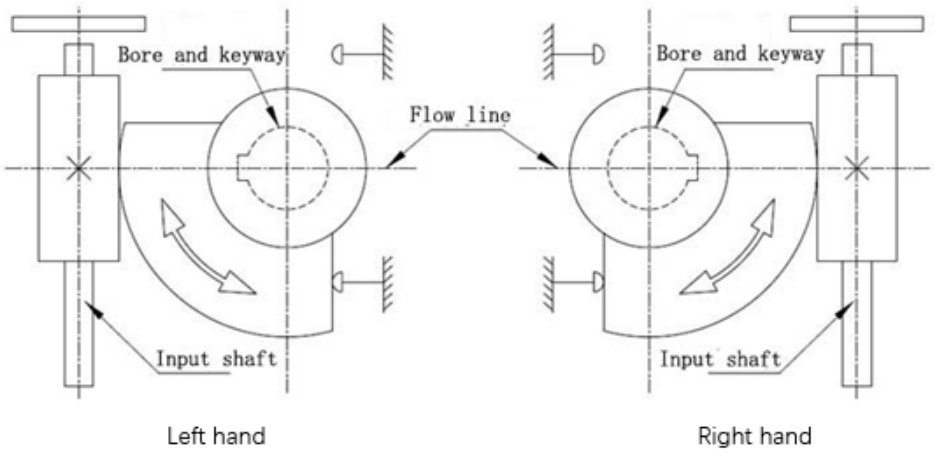
4.1

The input and output mounting flange size of ACTUGEAR worm gear are designed and manufactured in accordance with ISO 5210, JB 2920 and ISO 5211. F20 is the standard given by ACTUGEAR. Please refer to ACTUGEAR specification. The bore and keyway sizes shall be machined according to the buyer's requirements.

Remark: We can machine the connecting sizes according to customers' requirement, such as, one keyway, two keyways, four keyways, square, double D, star type and so on.

4.2

There are two installation methods, see fig. 2.



Left hand Right hand

Fig 2 install methods

4.3

All the worm gears are fully open when leaving ACTUGEAR, and the indicator needle points to the worm, as shown in Figure 1. During installation, the valve shall be in the fully open position, and then the worm gear shall be installed
All the gear boxes with weight greater than 50kg, will be with lifting ring. During installation, lift the worm gear at the fully open position, prevent collision damage, use suitable lifting ropes (such as steel wire rope, chain, etc.). Comply with relevant national safety regulations for lifting operation
Warning: no one is allowed under the lifted object during lifting. Pay attention to ensure safety.

4.4

If the worm gear needs to be used with the electric actuator, it is recommended to install the worm gear on the valve before installing the electric device. The maximum output torque of the selected electric actuator shall not be greater than the maximum acceptable input torque of ACTUGEAR worm gear.

4.5

For the top mounting with pin holes, During installation, the pin should be first inserted on the valve mounting flange before installing the worm gear box.

4.6

During installation, the surface of valve and gear box connection flange should be kept clean and free from scratches and rust to ensure correct installation.

4.7

Regardless of whether the valve stem or connecting shaft with a single key, double key, or four keys for connection, it should comply with the structure shown in Figure 4a. Do not accept the structure shown in Figure 4b to avoid key displacement or removal from the keyway causing connection failure.

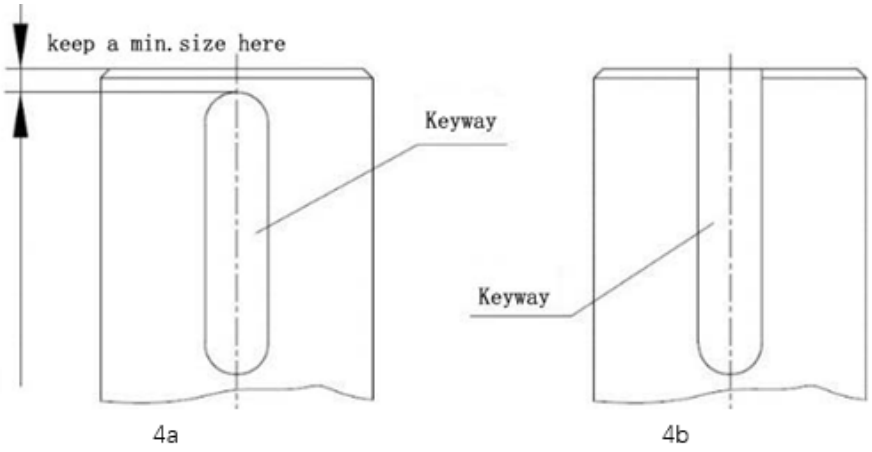


Fig 3

4.8 Install steps

a) Insert the bolt into the worm gear connection flange.

b) Insert the key to the valve stem.

c) Small gear boxes can be directly aligned with the keyway position for installation, If the weight of the gear box is equal to or greater than 50kg, then it can be lifted according to 4.4. The installation method is shown in Figure 2.

Warning: It is strictly prohibited to place hands between the flange of the worm gear and valve during installation to prevent injury.

d) Screw on the nut, and the pre tightening of the bolt should be symmetrical. Each bolt should be evenly tightened.

Warning: It is strictly prohibited to use the lifting ring on the worm gear box to lift the entire valve after installation. Otherwise, the worm gear will be damaged and personnel will be injured.

5. Shakedown test

All the worm gear boxes with 90°±5° degree, so it can be adjusted a little.

a. After the worm gear is installed and fixed, rotate the handwheel to bring the valve to the fully open position. The limit screw precisely limits the position, and the indicator points to “OPEN”. The position is correct without adjustment. If not, adjust according to c.

b. b) Rotate the handwheel to bring the valve to the fully closed position, based on the correct sealing position of the valve. If the limit screw does not exactly limit, adjust according to c.

c. If the full open or full close limit of the valve is not suitable, the set screws should be adjusted, as shown in Figure 4. Loosen the lock nut (2) and limit screw (1), rotate the handwheel and let the valve in the correct “open” position, insert the set screw top to the worm wheel, install the lock nut to make the O-ring (4) close to the housing, lock the nut (2), and deform the rubber ring into the thread to achieve a tight packing seal, preventing rainwater from entering the worm gear box and damaging the product. The elastic function of the rubber can also prevent the nut from loosening, as shown in Figure 5b. The adjustment of the closed position follows the same steps as the open position.

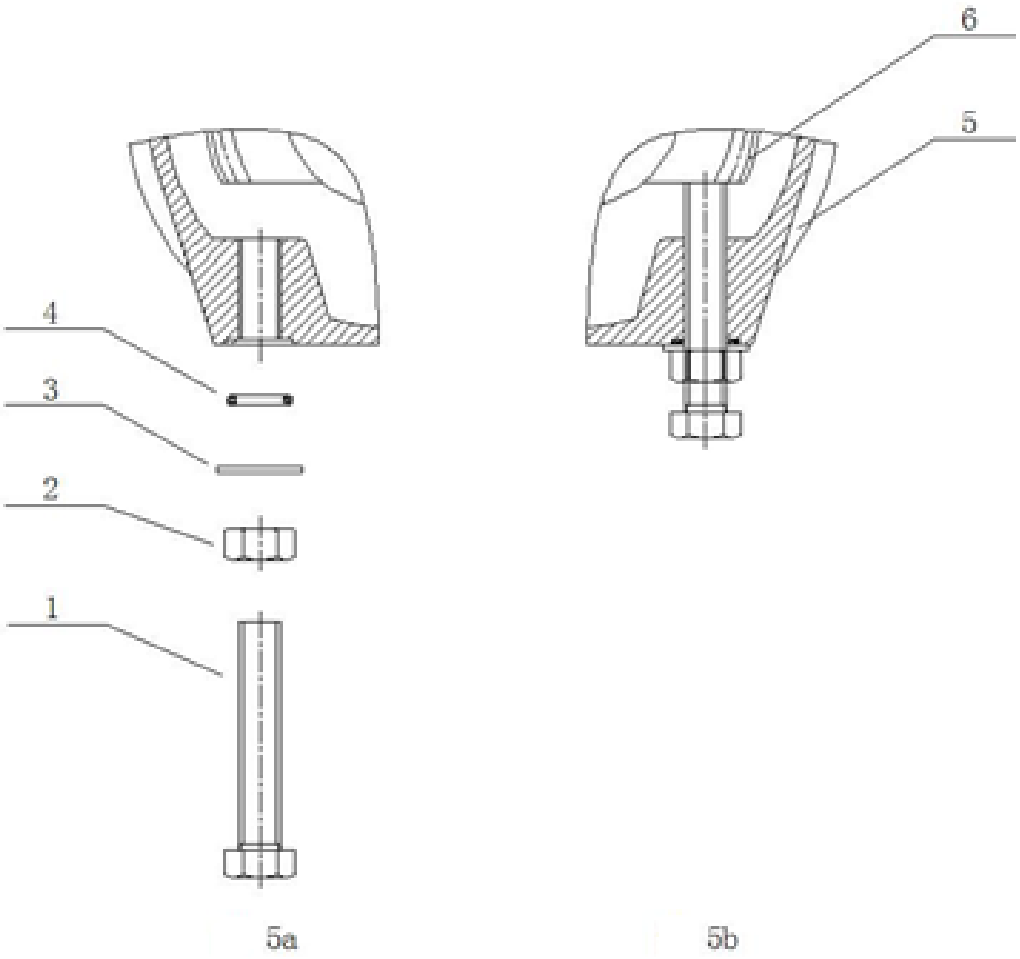


Figure 4

6.Operation

All worm gears of ACTUGEAR follow the opening and closing requirements of the valve, clockwise to close and anticlockwise to open. There is indicator for handwheel as shown in Figure 5.

Figure 5 Handwheel indicator

7.Maintain

The worm gears produced by ACTUGEAR have been greased according to the usage conditions. Normal temperature (standard type), also can be greased for low and high temperature types or according to user requirements, but it should be specified in the order. The maintain as per below instruction:
Check ordinarly the stated below in order to avoid breaking down the unit.

ARTICLE	CONTENTS	PERIOD
gear&bearing	noise	per 12 month
grease	volume of grease	per 12 month
oilseal	oil leak	per 12 month

8.Points for attention

a) Please do not open the worm gear box cover for inspection or repair in harsh weather (rain, snow) outdoors.

b) After maintenance and debugging, all sealing parts should be installed and tightened.

c) Gear box operate by handwheel, shall not be equipped with a sleeve, rod, or rod on the handwheel to increase force arm to open and close.

d) The output torque of the electrical acutator that installed on the gear boxes should not exceed the specified input torque listed on the specification.

e) In situations where valves are rarely used in daily life, it is recommended to regularly open and close the worm gear box if possible

9.Causes analysis and removal

CAUSE	COUNTERPLAN
percolation of impurity	remove or clean
abrasion of gear	replace
abrasion of bearing	replace
loose of tightening up position	tighten up
breakage of oilseal	replace
shortage of grease	fill up of grease

(PRECAUTIONS) When you need to replace the gear, shaft & cover, please contact us.