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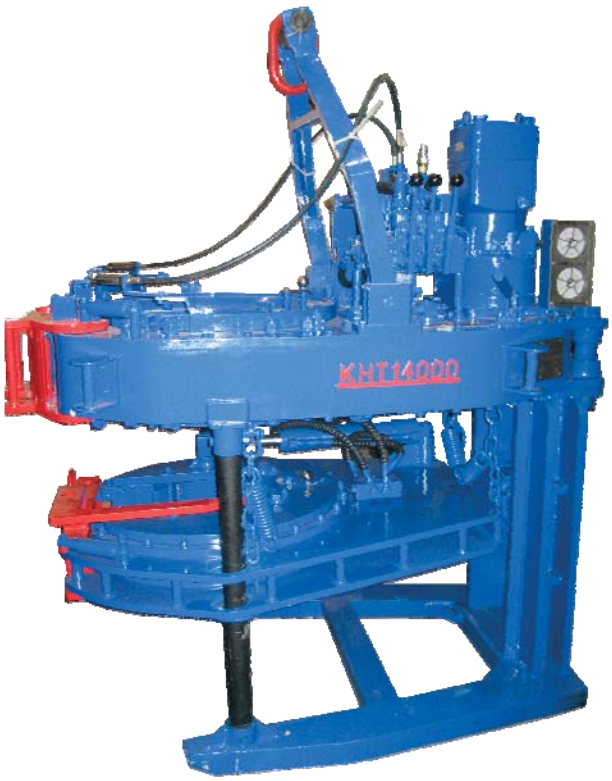
MODEL: KHT14000

Casing Tong

MAINTENANCE AND OPERATION MANUAL



Safety Instruction

●Operators must read and know this manual well.

●Operators must wear work uniform, safety shoes, safety helmet, safety gloves, etc.

●Tie the back guy according to the instruction. Don't tie it in the wrong direction.

●Operation at the side of tong body opening.

●Don't touch the running parts with hands when the tong is running.

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●Keep sundries out of the working area.

●The pump should be off or the hydraulic tong power shut down as maintaining or hanging the jaw plates, die seats or tong dies.

●Over-pressure and over-torque are forbidden.

●Don't add or dismount any parts to the tong.

●Original parts made by TEDA 特达 should be used.

1. Summary

KHT14000 Casing Power Tong is used to make up and break out for casing operation in oil fields. It has greatly reduced the labor of worker, enhanced connection quality of thread and diminished accidents in inappropriate casing operation. The power tong has the following features as well:

Features :

1.1. Large torque range，the maximum torque is up to100kN.m;

1.2. Opening type, convenient and prompt to enter and slide off the working position, with an integral tong head of great strength and rigidity.

1.3. Double swing head jaws, convenient to assemble and disassemble.

1.4. Brake belt assembly, easy to operate and convenient to maintain and replace.

1.5. Four-gear rotation is adopted for large speed regulation range. And the rated torque is large;

1.6. Open gear supporting structure, improving the strength and rigidity.

1.7. Wholly hydraulic mode and mechanical gear shift.

1.8. High strength steel plate used on the shell，increasing the strength. The jaws are cast with precise technology, artistic and strong.

1.9. With hydraulic torque indicator and also installation interface, convenient to realize the computer management.

1.10.Use safety door with soft shaft safety device，which has great safety performance.

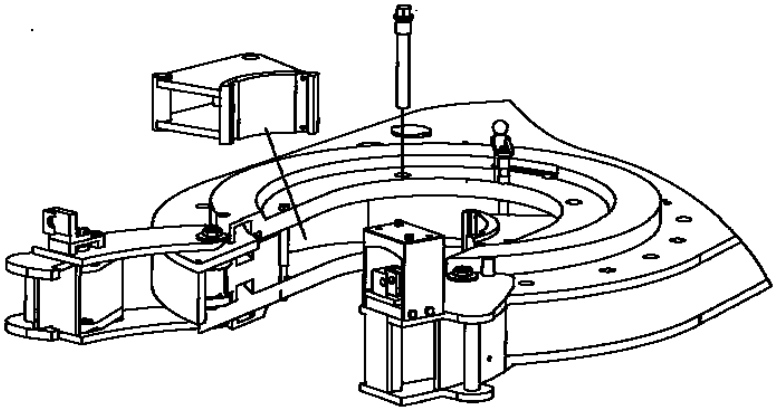
2. Specifications

2.1	Application Range:	master tong	4″--14″
		backup tong	4″--15 $^{1}/_{2}$″
2.2	Tong head rotation speed:	high gear	24rpm
		second high gear	11rpm
		second low gear	7rpm
		low gear	3rpm
2.3	Rated torque:	high gear	10000ft.lbs
		second high gear	20000ft.lbs
		second low gear	35000ft.lbs
		low gear	75000ft.lbs
2.4	Rated pressure:	2200PSI	
2.5	Work flow：	50GPM	
2.6	Torque arm:	master tong	43"
2.7	Overall dimension(L×W×H):	69″×42.5″×80.7″	
2.8	Weight	master tong	1540kg/3400lb(including spring cast)
		combined tong	2565kg/5650lb(including hydraulic cast)
2.9	Specification of jaw plates:	master tong	4″,4 $^{1}/_{2}$″,5″,5 $^{1}/_{2}$″,6 $^{5}/_{8}$″ ,7″,7 $^{5}/_{8}$″,8 $^{5}/_{8}$″,9 $^{5}/_{8}$″,10 $^{3}/_{4}$″,11 $^{3}/_{4}$″, 13 $^{3}/_{8}$″,14″.
		backup tong	4″,4 $^{1}/_{2}$″,5″,5 $^{1}/_{2}$″,6.05,6 $^{5}/_{8}$″ ,7 $^{5}/_{8}$″,8 $^{5}/_{8}$″,9 $^{7}/_{8}$″,10 $^{3}/_{4}$″,11 $^{3}/_{4}$″, 12 $^{3}/_{4}$″,13 $^{3}/_{8}$″,14 $^{3}/_{8}$″,15 $^{1}/_{2}$″.

3. Operation

The instructions for tongs preparing and working as following:

3.1 Jaw installation (see illustration below):



To install the jaws, remove the jaw pivot bolts from the cage plate. Plate one jaw at a time between the upper and lower cage plates with the jaw roller pin facing upward. Align the hole in the jaw with the matching hole in the cage plates, and insert the jaw pivot bolt.

3.2 Tong rig-up

3.2.1 Hang the tongs

(1) Fix the single pulley (with the load of 5 tons) on the bottom girder of the crown.

(2) Put the Slip wire rope (which has a diameter of not less than 5/8″) through the pulley. One end of wire rope fastened on the bottom girder, and other end fastened on the lift bucket(master tong can choose to use spring lift bucket, combined tong can choose to use hydraulic lift bucket).The height of power tongs should be equal to the average height of connectors for tripping string.

3.2.2 Leveling the tong

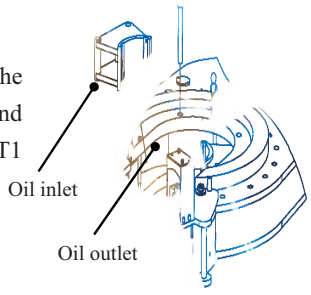
It is necessary to level the tongs after Hang the tongs. Otherwise, it will lead to tong tooth slipping.

Front-rear leveling--it is adjusted through the left and right two horizontal bolts at the connection position between lifting bracket and tong body of the power tongs.

Transverse leveling--it is adjusted through leveling bolts on the upper part of lifting bracket. And it may be adjusted through turning the bolts.

3.2.3 Pipe Connection

When the power unit is not running, or the hydraulic pump is disengaged, the hydraulic hoses may be installed to the tong. Pay attention to the oil inlet and outlet ports before installing, oil inlet port is NPT1″, oil outlet port is NPT1 1/4″.



3.2.4 Tie the back guy

Tail rope diameter should be no less than 5/8″.One end of tail rope is fixed on

tong tail seat. And another end is fixed on drilling platform or the derrick. Note: when tail rope is tightened, it should be in the same level with power tongs and perpendicular to median line of tong body.

3.2.5 Refueling Torque Cylinder

Master tong: when stretched length of piston rod of tension cylinder reaches 1 1/8″ (28 mm), it is necessary to add oil.

Composite tong: when the piston of tension cylinder is retreated to the position which is 1/4″ (6.35 mm) away from cylinder end, it is necessary to add oil.

When it is necessary to add oil, remove quick connector from torque cylinder and insert it into the quick connector which is on the oil filled equipment(Purchase Code:KHT14000-211).After oil filling, connect it. with quick connector which is on the torque meter. Then release plug on torque cylinder until the pressure on torque meter turns to zero.

Note: **Torque testing system of master tong and Torque testing assembly can be selected according to user needs.**

3.2.6 Direction control

The handle control valve controls the tong's rotation direction. For clockwise rotation, push the valve handle forward, and for reverse rotation, pull the valve handle in the opposite direction. (see Fig. below):

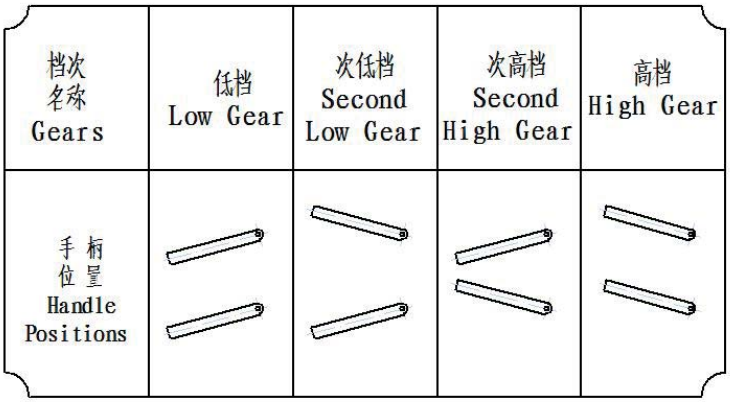
3.3 Operation

3.3.1 Requirements for operators

(1) The operator should know the tong structure and the properties.

(2) Be familiar with the operation of hydraulic reversing handle on power tongs:
When manual reversing valve of control master tong is pushed, large gear on master tong turns in the making-up tong direction; when manual reversing valve of control master tong is pulled, large gear on master tong turns in the braking-out tong direction;
When manual reversing valve of control back tong is pushed, back tong is clamped; when manual reversing valve of control back tong is pulled, back tong is released.

(3) Be familiar with the operation of shifting handle (various gears of shifting handle are shown in Fig. below).



(4) Adjustment of safety door clearance
The clearance between safety door buckle and latch seat on the shell may be regulated through adjusting turning angle of eccentric shaft for minimum clearance for normal opening of safety door.
(5) Learn operation sequence and safety requirements;
(6) Be familiar with the instrument operation.

3.3.2 Operation of power tong

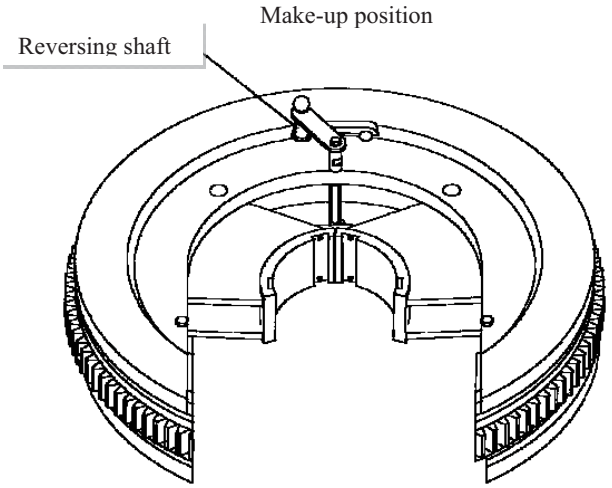
(1) Learn specifications of jaw plates and Die: each specification jaw plate of master tong and backup tong have two jaw plates, and the two are same and may be installed on the left and right. During installing jaw plate, it is necessary to check whether Die is worn or clean. It is necessary to tighten fixation bolts of Die.
(2) Install jaw plate and Die with corresponding size for the string.
(3) Put shifting handle of the upper and lower shifting device on the neutral position;
(4) Start hydraulic power station;
(5) When hydraulic reversing handle is pushed or pulled, rotation noise of hydraulic motor should be heard and open gear of tong head should not rotate;
(6) When shifting handle is put on any gear and hydraulic reversing

Note: **shifting should be carried out when hydraulic motor stops the rotation.**

3.3.3 Working Process

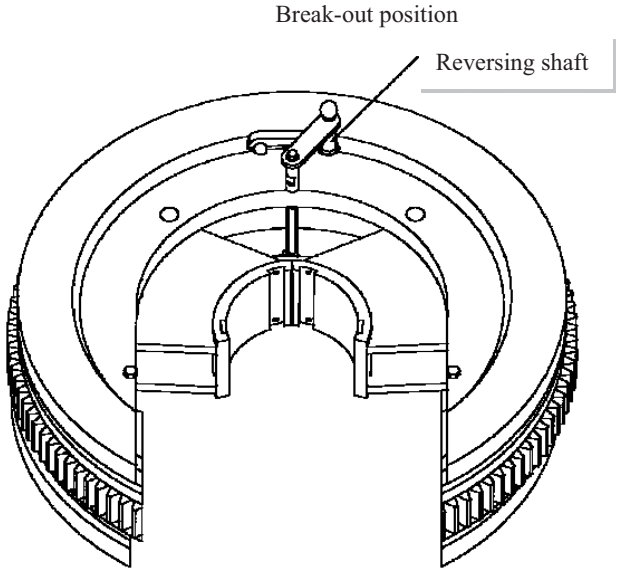
(1) Align the opening of large gear of tong head with the opening of jaw plate bracket.
(2) Insert reversing pin into making-up and breaking-out hole according to the operation requirements and adjust the tight degree of braking staple.
(3) Align the opening of large gear of tong head with the shell opening.
(4) Pull out safety door, push power tongs toward the string to allow the string to be on the central position of tong head and close safety door.
(5) Making-up operation regulation:
   a. Open the safety door, push the tong's opening to the casing pipe;
   b. Close the safety door completely;

c. Put the reversing shaft into the reversing hole(shown in the Fig. below);
Shift transmission into high gear. Push the hand control vale rod to the casing tube thread. When the thread has one or two circles left, release the valve rod.



d. Shift transmission into low gear. Push the hand control vale rod make the casing tube thread frap. Observe the torque indicator, make sure the torque meet the requirement.
e. Reverse hand control vale rod to disengage jaws until the table gear aligns with the door opening.
f. Unlatch the door and remove the tong from pipe.

(6) Breaking-out operation regulation:
a. Open the safety door, push the tong's opening to the casing pipe;
b. Close the safety door completely;
c. Put the reversing shaft into the reversing hole(shown in the Fig. below);



d. Shift the transmission into low gear. Pull the hand control valve rod make the casing tube thread completely loosen.
e. Shift the transmission into high gear. Pull the hand control valve rod make the casing tube thread completely unscrewed to the end.
f. Unlatch the door and remove the tong from pipe.

3.4 Matters needing attention

(1) The power station must be shut down when dismounting the jaws, in case of accident.
(2) Make sure the power tong is properly leveled
(3) Ensure that all tong hydraulic hoses are correctly connected
(4) Pay attention to the specification of the jaws when installing.
(5) Changing gear is not allowed during operation.
(6) Only when the safety door is shut down, the gear notch can start turning, in case of damage to the operators.
(7) Check the clearance between safety door and shell frequently. Adjust the clearance make the door work normally. If the clearance is too much will damage the power tong.
(8) Check the lifting rope and tail rope for safe reliability.
(9) Adjust the Relief valve of the hydraulic power station above 2200PSI(15MPa),the pressure regulating handle will be deadlocked。
(10) When the tong is operating above 51,600ft.lb,ensure that both idler drive gears are engaged with the main gear.

Note: **Be sure the doors are closed and securely latched before power unit is started to insure safety for operation personnel.**

Use start up procedures as recommended by the power unit engine operator's manual. Prior to starting engine, an inspection should be made to assure proper lube oil level in the engine and hydraulic oil level in the hydraulic reservoir. Open the by-pass valve on the hydraulic system. Check all pressure and return line hose connections to make sure they are securely installed.

After the hoses are checked, start the engine and allow it to idle until warm. After the power unit engine has been started and hydraulic oil has circulated for approximately 10 minutes, slowly close the by-pass valve which will allow oil to circulate through the hoses and to the tong. Place the tong gear mechanism in low gear and rotate the tong slowly forward and then reverse with the throttle valve control lever. Once this has been done and the proper size jaws have been installed, the tong is then ready to run pipe.

3.5 General comments

It is recommended that torque not exceed 51,600ft.lbs. Unless both idler gears are in drive position. This will enhance the life expectancy and dependability of the tong. When operating the tong at high gear, it is recommended to frequently check the tightness of the door and make periodic adjustments to assure a secure door fit.

For safety of rig personnel, make sure the door is securely closed and latched at all times.

When make-up integral (shouldered) joints, it is essential to make up the last turn of the threads in low gear. This reduces the tendency of an instant stop or a sudden increase in torque, which induces high stresses to the gear train.

hen pulling a string, do not employ the “snap break” method of breaking out joints. By definition, the “snap break” method is a procedure used by some operations to break-out connections.

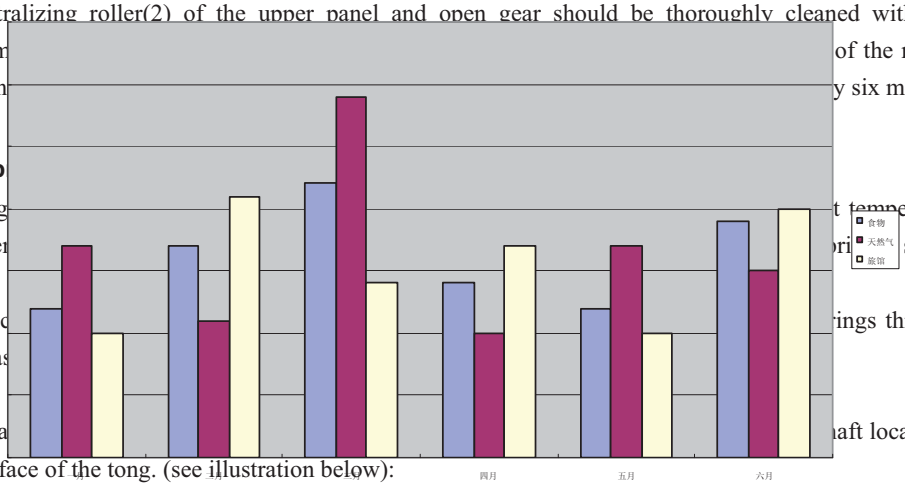
This is accomplished by leaving slack in the “jaw-pipe” engagement, and then quickly pulling the throttle valve control lever allowing the tong to snap into its loaded or high torque conditions. This method, although very effective in breaking out joints,highly stresses the gear train and very frequently causes gear breakage. This method is also dangerous to operating personnel.

4. Care maintenance

It is suggested that a regular maintenance program be established, to assure dependable operation of the TEDA Hydraulic power tong. The following recommendations concerning cleaning, lubrication, and adjustments will enhance the life expectancy of the tong and assure safety to operating personnel.

4.1 Cleaning

The centralizing roller(2) of the upper panel and open gear should be thoroughly cleaned with a good petroleum of the new tong, replace th y six months.



4.2 Lub

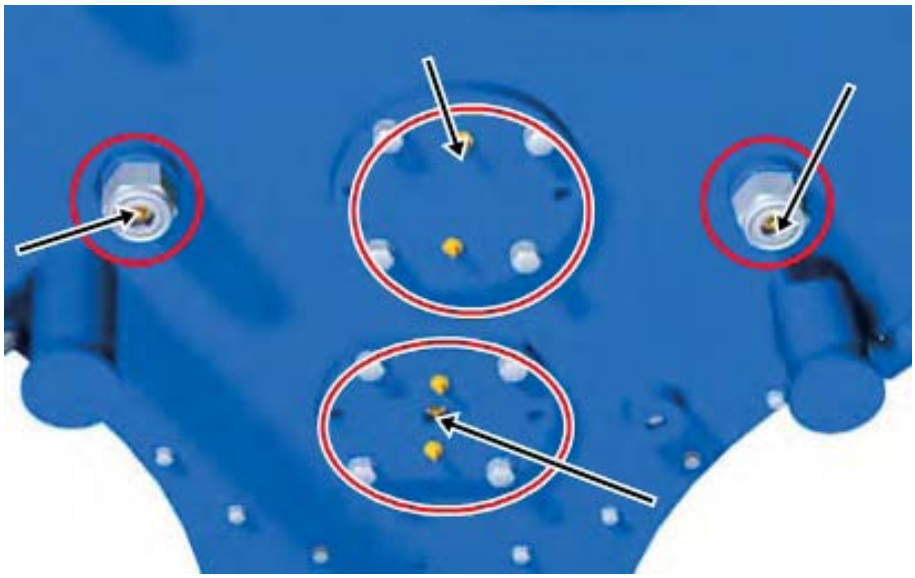
A good-g t temperatures is recommer ori storage

4.2.1

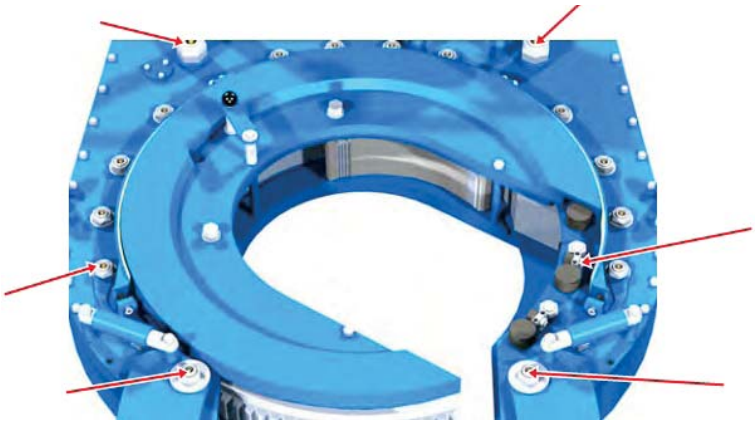
Unsc rings through the greas

4.2.2

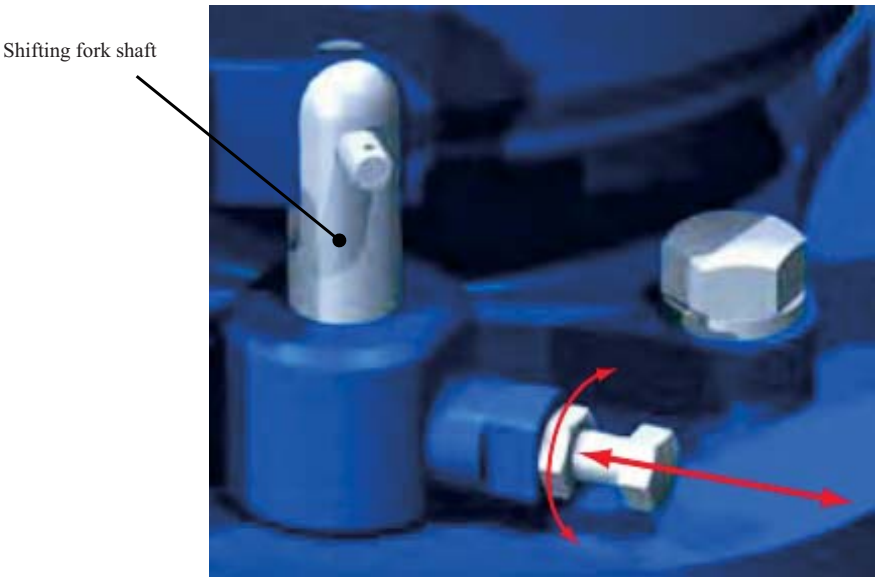
Grea haft located at the top face of the tong. (see illustration below):



4.2.3 Centralizing roller assembly, supporting the general assembly of the right wheel and small idle gear assembly should grease as following Fig.



4.2.4 Apply grease to the reversing shaft through the shaft seat mouth.



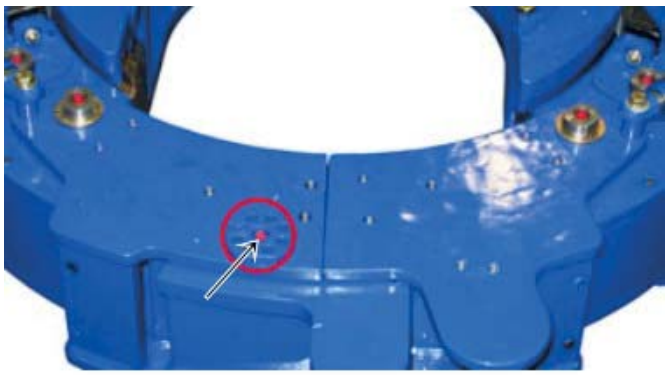
4.3 Adjustments

4.3.1 Gear shifting adjustment

If the groove-skipping phenomenon appears after the tong use a time, users can loosen the hexagon nut according to the figure above, then twist the hexagon bolt inward and wrench the control lever of gear shift, feel strength properly and tighten the nut.

4.3.2 Door latch adjustment

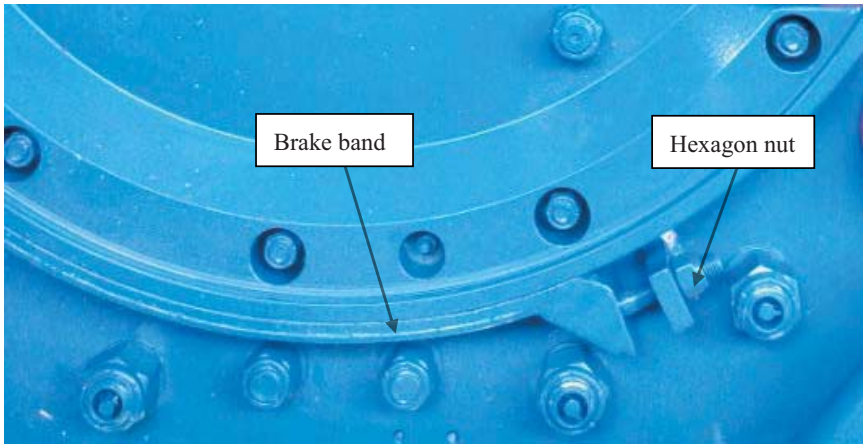
During normal operation of the tong, the left door latch may experience wear which will cause the door to develop a loose fit at the latch. When this occurs, an adjustment can easily be made to assure a secure door fit. This is accomplished as follows (see illustration below):



Located at the top face of the left door is a latch cam plate which has eight positioning holes located on a 360 degree bolt circle. To make any adjustment in door alignment, the 3/8" hex head bolt located at the top and bottom latch shaft sleeve should be removed first, then use a wrench to rotate the latch shaft and shaft sleeve, when desired alignment is achieved, the 3/8" hex head bolt should be tightened.

Note: **It is important to keep a secure fit at the doors as this helps maintain proper gear alignment, reduces the stress distortion caused by the impact of the torque and assure safety to operation personnel.**

4.3.3 Brake band adjustment (see illustration):



As the tong is used, it becomes necessary at times to adjust the brake bands to provide a smoother and more efficient jaw cam action. If the cage plate turns with the rotary gear, the jaws will not cam properly and therefore, will not bite on the tubing or casing. By tightening the brake band against the cage plates, enough frictional resistance occurs to allow jaws to cam properly and grip the casing. To adjust the brake band, simply turn the adjustment bolt clockwise to tighten and counterclockwise to loosen.

4.4 Periodic check list

4.4.1. Shifting shaft

The shifting Yoke is secured to the shifting shaft by one hex jam nut 3/8″×1″and one nut on the bottom of the yoke. These nuts should be checked after each job. This can be accomplished by removing the clutch inspection plate and insuring a snug fit prior to lubrication.

4.4.2. Torque gauge assembly

Periodic calibration of the torque gauge is recommended to assure accurate torque readings. When having the torque gauge serviced and calibrated.

4.5 Overhaul procedures

Should the need arise to overhaul any portion of the tong, certain disassembly procedures must be followed. Access to the gear train is possible by removal of the top plate of the tong.

Note: **All maintenance and overhaul should be accomplished from the top. Therefore, the bottom plate of the tong should never be removed from the gear case housing.**

4.5.1 The first stop in disassembly of the top plate for overhaul is to remove the motor-valve assembly. This is accomplished by removing the four 5/8″×2″socket head cap screws, which secure the motor to the motor mount, and removing the four 1/2″×1 1/4″hex head screws, which secures the valve to the valve mount. The motor-valve assembly may then be lifted off.

4.5.2 Disconnect & remove the linkage between the shifting handle and the shifting shaft.

4.5.3 Back-off the shifting detent bolt (7/16″×2″). This relieves compression on the spring and allows the ball to disengage from the groove in the shifting shaft. Remove the shifting detent bolt and, using pencil magnets, extract the ball and spring before the shifting shaft is removed; this prevents loss of the ball inside the tong.

4.5.4 Remove the doors. This is accomplished as follows:

(1) Remove the two door stop assemblies by removing the hexagon bolt 1/2″×1 1/2″
(2) Remove the top lock nuts from the door roller shaft.
(3) Remove the grease fittings from the end of the door roller shafts and drive the shafts out. The shafts should be very carefully driven out with a soft alloy material (e.g., brass rod, etc.) to eliminate the possibility of damage to the shafts or door. This then allows the doors to be removed.

Note: **When removing the doors make careful note of the bearing shims which align the doors. At reassemble of the doors after overhaul, it will still be necessary to reassemble door bearing shims in the same sequence to assure desired door alignment.**

4.5.5 The next step is to loosen the top and bottom brake band. This is accomplished by backing off the brake band adjustment bolts until the nut is flush with the end of the bolt.

4.5.6 With the bake bands loosened, the next stop is to remove the top and bottom cage plate. This is accomplished by removing the three cage plate support bolts. With these three bolts removed, the top cage plate can be lifted off.

Note: **Care should be taken in removing the cage plate bolts as they are the only means of support for the bottom cage plate, after the brake band is loosened. To prevent damage to the bottom cage plate or personal injury to the mechanic, it is recommended that the bottom cage plate be braced while the mechanic removes the three cage plate bolts.**

4.5.7 Remove the lock nut and washer from the big idler gear assembly, small idler gear assembly, centralizing roller assembly on the face plate. Remove the 3/8"×1-1/2" long hex head bolts from the case body assembly.

4.5.8 With all the above steps taken, the top tong plate can be lifted off providing access to the inside of the gear case.

5.Problem diagnosis

Trouble	Causes	Remedy
The head doesn't turn	l. No pressure from hydraulic station. 2. Damage of the hydraulic reversing valve. 3. Gear changing system fails.	l. Check the station. Add pressure. 2. Replace the valve. 3. Repair
Speed is not enough	l. Low pressure or low flow from the power station. 2. Bad leakage loss from oil motor or hand-reversing valve.	l .Check the station pressure. 2. Replace the motor or hand-reversing valve.
Head slide	l . Disagreement of the sizes of the jaws and casing. 2. Tongs not be leveled. 3. Dies worn out. 4. Die notch filled with oil dirt. 5. Brake band too loose or worn out. 6. Jaw roller failure to turn.	l. Change the jaws. 2. Level the tongs. 3. Change the dies. 4. Get rid of it with a wire brush. 5. Adjust or change the band. 6. Check the roller or oil and repair the pin shaft.
Torque valve less than rated	l. Low pressure from the hydraulic power station or its insufficient oil discharge. 2. Function failure of the hydraulic motor or of the reversing valve. 3.Insufficient oil in the torque cylinder or the sealing ring worn out. 4. Torque gauge failure.	l. Deal with it according to the instruction of hydraulic power station. 2. Repair or change it. 3. Fill in oil or change the ring. 4. Repair or change the torque gauge.
Motor is running but the tong head keeps still or moves slowly, or will stop even loaded light.	l. Gear changing device fails 2.Much leakage loss from the hydraulic motor or the hand- reversing valve. 3. Gear of gearbox damaged or seriously worn out.	1. Repair or change. 2.Repair or change the motor and the valve. 3. Check or repair the gearbox .

6.Storage recommendations

6.1 When storing the tong, an effort should be made to locate the unit in a clean, dry, ventilated area.

6.2 The tong, while in storage, should be well lubricated.

6.3 Spare moving parts (gears, shafts, etc.), if required to remain in storage for a long period of time, tong should be coated with a good corrosion inhibitor, and should be stored in a good dry environment.

6.4 All O' rings, seals, packing, gaskets, etc., should be stored in a good moisture proof, air tight container.

6.5 All bearings (cam followers, roller bearing, etc.) should be well lubricated and stored in a dust free box or container, protected from moisture.

7.Figures and detailed part tables

7.1 General assembly (Fig.1,Table1)

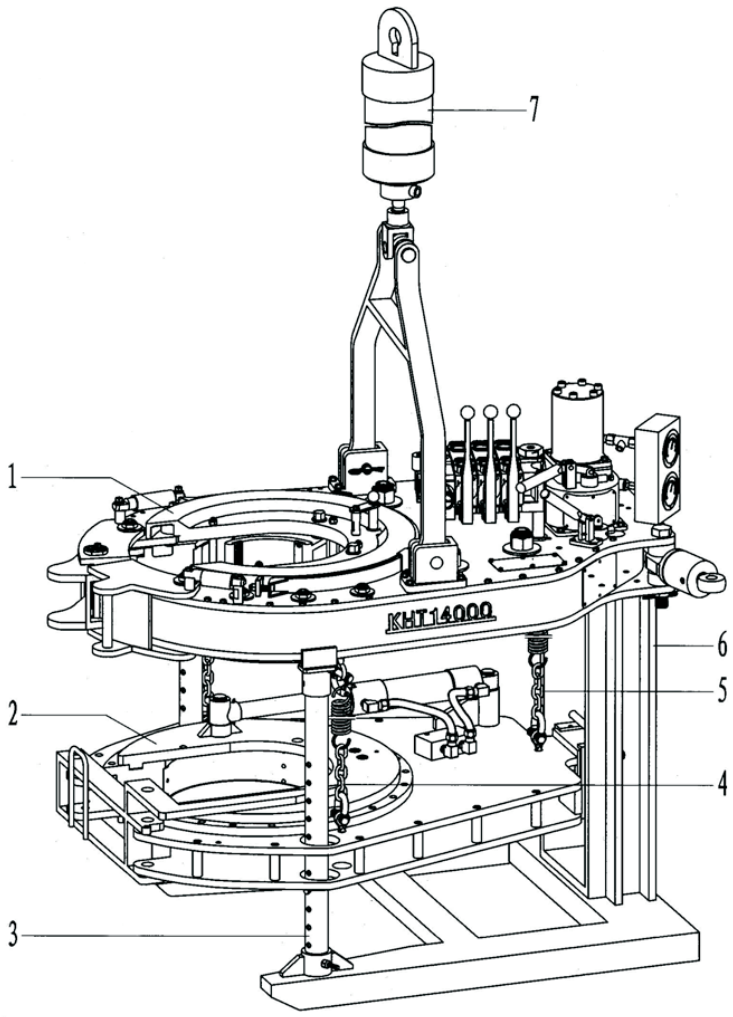


Fig.1

Table 1 KHT14000 assembly detailed part table

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-1	KHT14000.1	Master tong	1
2	KHT14000-2	KHT14000.2	Backup tong	1
3	KHT14000-3	KHT14000.3	Front guide pillar assembly	2
4	KHT14000-4	KHT14000.4	Front spring assembly	2
5	KHT14000-5	KHT14000.5	Rear spring assembly	1
6	KHT14000-6	KHT14000.6	Rear support seat	1
7	KHT14000-7	KHT9625.1.17	Hydraulic spring lifter assembly	1

7.2 Assembly of master tong (Fig 2, Table 2)

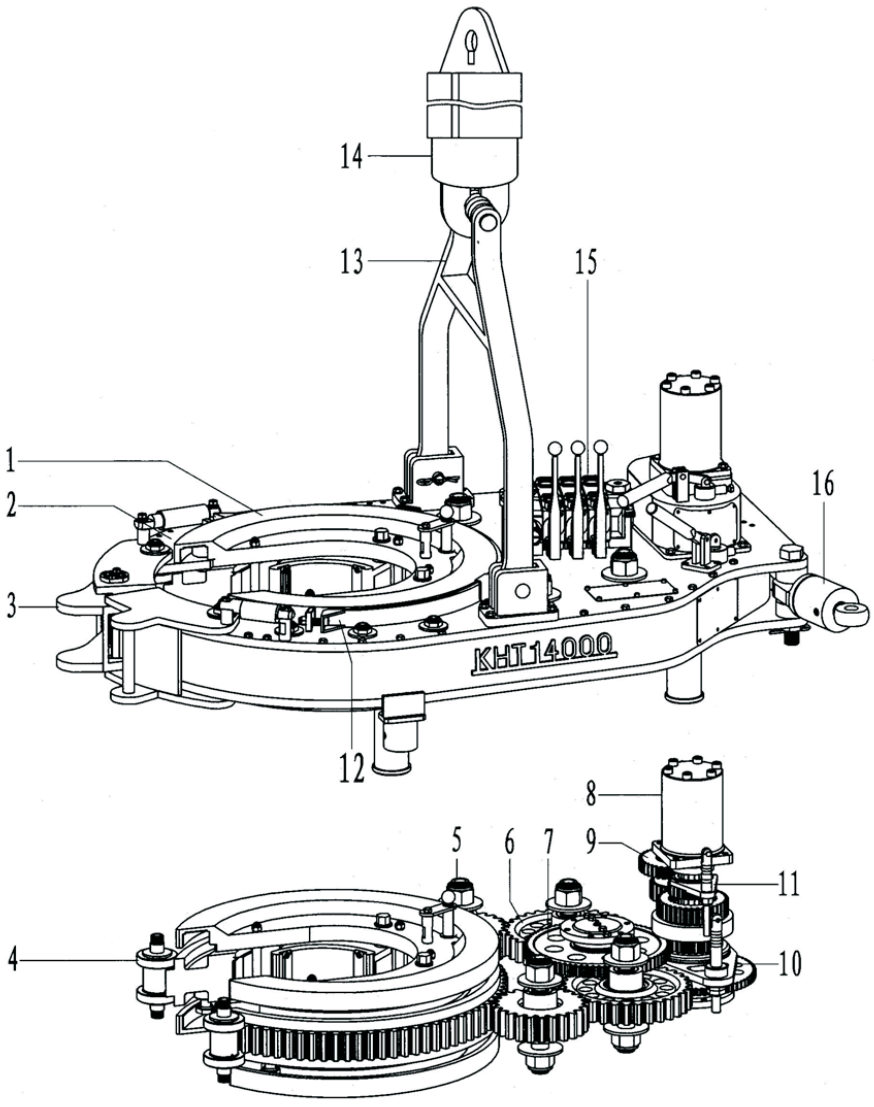


Fig.2

Table 2 List of Master tong

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-10	KHT14000.1.1	Tong head assembly	1
2	KHT14000-11	KHT14000.1.2	Shell	1
3	KHT14000-12	KHT14000.1.10	Safety door assembly	1
4	KHT14000-13	KHT14000.1.16	Righting assembly	1
5	KHT14000-14	KHT14000.1.3	Small idle gear assembly	2
6	KHT14000-15	KHT14000.1.4	Big idle gear assembly	2
7	KHT14000-16	KHT14000.1.5	Triple gear assembly	1
8	KHT14000-17	KHT14000.1.6	Power input shaft assembly	1
9	KHT14000-18	KHT14000.1.8	Duplicate gear assembly	1
10	KHT14000-19	KHT14000.1.11	Gear shifting assembly(below)	1
11	KHT14000-20	KHT14000.1.12	Gear shifting assembly(upper)	1
12	KHT14000-21	KHT14000.1.13	Brake band assembly	2
13	KHT14000-22	KHT14000.1.14	Suspension rod assembly	1
14	KHT14000-23	KT24500.11	Spring lifter	1
15	KHT14000-24	KHT14000.1.9(1)	Hydraulic valve and hydraulic line	1
	KHT14000-25	KHT14000.1.9(2)	Double shaft gated pipeline	1
16	KHT14000-26	KHT14000.1.15	Master tong torque test assembly	1

7.3 Assembly of tong head (Fig 3, Table 3)

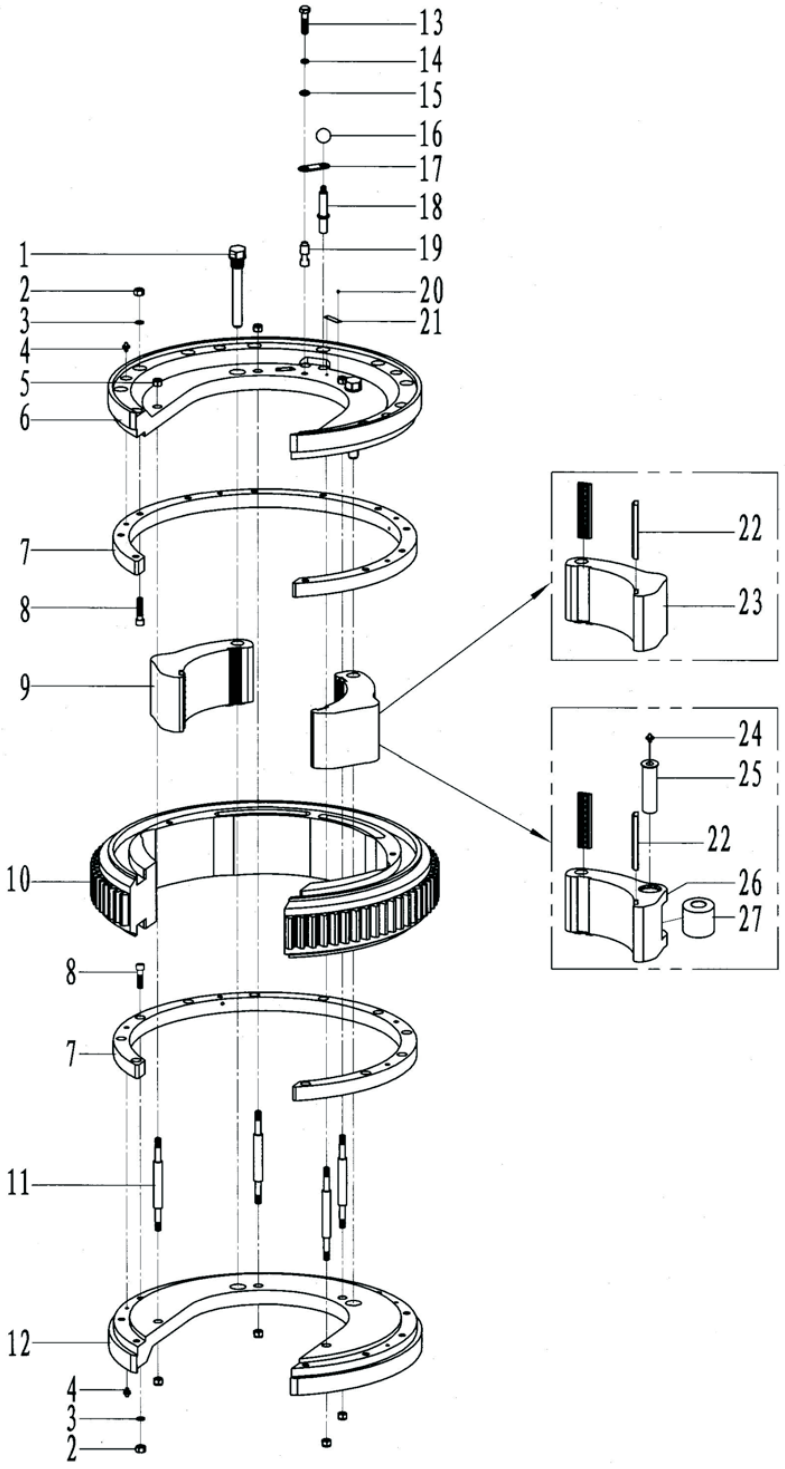


Fig.3

Table3 List of Master tong head

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-30	KHT14000.1.1-5	Jaw plate bolt	2
2	KHT14000-31		Hexagon nut 1/2″	22
3	KHT14000-32		Spring washer 1/2″	22
4	KHT14000-33		Oil cup NPT1/8″	8
5	KHT14000-34		Hexagon locknut 1/2″	8
6	KHT14000-35	KHT14000.1.1-1	Upper jaw plate bracket	1
7	KHT14000-36	KHT14000.1.1-8	Righting ring	2
8	KHT14000-37		Hexagon socket cap head screws 1/2″×2 3/8″	22
9	KHT14000-38	KHT14000.1.1.1(1)	Jaw plate assembly 1 (14)	2
	KHT14000-39	KHT14000.1.1.1(2)	Jaw plate assembly 2 (13 3/8)	2
	KHT14000-40	KHT14000.1.1.1(3)	Jaw plate assembly 3 (11 3/4)	2
	KHT14000-41	KHT14000.1.1.1(4)	Jaw plate assembly 4 (10 3/4)	2
	KHT14000-42	KHT14000.1.1.1(5)	Jaw plate assembly 5 (9 5/8)	2
	KHT14000-43	KHT14000.1.1.1(6)	Jaw plate assembly 6 (8 5/8)	2
	KHT14000-44	KHT14000.1.1.1(7)	Jaw plate assembly 7 (7 5/8)	2
	KHT14000-45	KHT14000.1.1.1(8)	Jaw plate assembly 8 (7)	2
	KHT14000-46	KHT14000.1.1.1(9)	Jaw plate assembly 9 (6 5/8)	2
	KHT14000-47	KHT14000.1.1.1(10)	Jaw plate assembly 10 (5 1/2)	2
	KHT14000-48	KHT14000.1.1.1(11)	Jaw plate assembly 11 (5)	2
	KHT14000-49	KHT14000.1.1.1(12)	Jaw plate assembly 12 (4 1/2)	2
	KHT14000-50	KHT14000.1.1.1(13)	Jaw plate assembly 13(4)	2
10	KHT14000-52	KHT14000.1.1-2	Open gear	1
11	KHT14000-53	KHT14000.1.1-4	Supporting screw	4
12	KHT14000-54	KHT14000.1.1-3	Below jaw plate bracket	1
13	KHT14000-55		Hexagon bolt3/8″×1″	1
14	KHT14000-56		Spring washer3/8″	1
15	KHT14000-57		Plain washer3/8″	1
16	KHT14000-58	TQ508/70Y.1.1-4	Hand shank ball	1
17	KHT14000-59	KHT14000.1.1-7	Connection plate	1
18	KHT14000-60	TQ508/70Y.1.1-2	Reversing shaft	1
19	KHT14000-61	KHT14000.1.1-6	Connection screw	1
20	KHT14000-62	GB/T827	Rivet3×5	4
21	KHT14000-63	01.05-08（2）	Buckle and shackle label	2

22	KHT14000-64	KHT14000.1.1.1-2	Die	
23	KHT14000-38-1	KHT14000.1.1.1-1(1)	Jaw plate1(14)	2
24	KHT14000-66	GB/T1152	Oil cupM6×1	2
25	KHT14000-67	KHT14000.1.1.1-3	Roller shaft	2
26	KHT14000-39-1	KHT14000.1.1.1-1(2)	Jaw plate 2 (13 3/8)	2
	KHT14000-40-1	KHT14000.1.1.1-1(3)	Jaw plate 3 (11 3/4)	2
	KHT14000-41-1	KHT14000.1.1.1-1(4)	Jaw plate 4 (10 3/4)	2
	KHT14000-42-1	KHT14000.1.1.1-1(5)	Jaw plate 5 (9 5/8)	2
	KHT14000-43-1	KHT14000.1.1.1-1(6)	Jaw plate 6 (8 5/8)	2
	KHT14000-44-1	KHT14000.1.1.1-1(7)	Jaw plate 7 (7 5/8)	2
	KHT14000-45-1	KHT14000.1.1.1-1(8)	Jaw plate 8 (7)	2
	KHT14000-46-1	KHT14000.1.1.1-1(9)	Jaw plate 9 (6 5/8)	2
	KHT14000-47-1	KHT14000.1.1.1-1(10)	Jaw plate 10 (5 1/2)	2
	KHT14000-48-1	KHT14000.1.1.1-1(11)	Jaw plate 11 (5)	2
	KHT14000-49-1	KHT14000.1.1.1-1(12)	Jaw plate 12 (4 1/2)	2
	KHT14000-50-1	KHT14000.1.1.1-1(13)	Jaw plate 13(4)	2
27	KHT14000-68	KHT14000.1.1.1-4	Roller	2

7.4 Shell and accessories (Fig 4, Table 4)

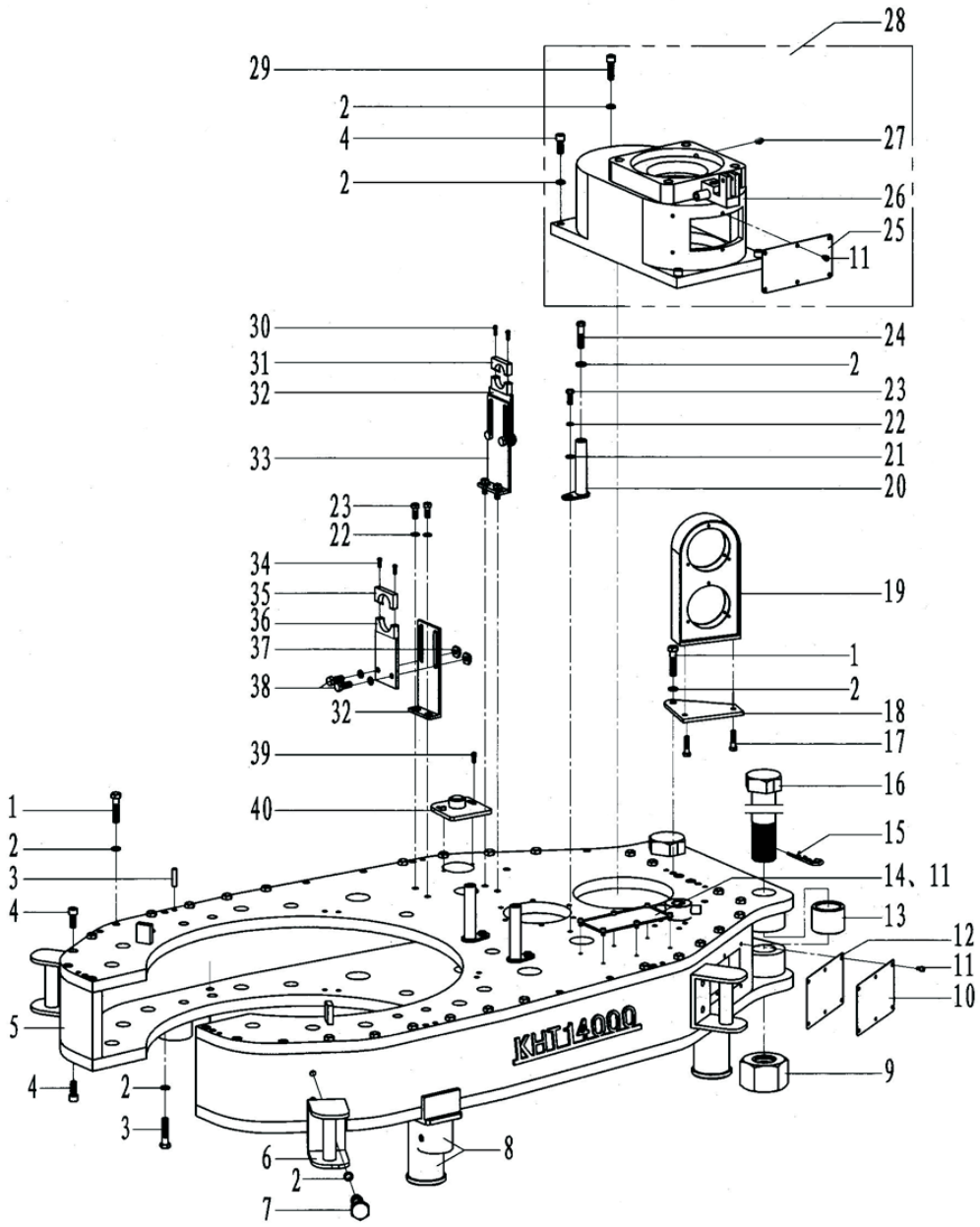


Fig.4

Table 4 List of shell and accessories

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-75		Hexagon bolt1/2"×2 1/4"	54
2	KHT14000-32		Spring washer1/2"	87
3	KHT14000-77	KHT9625.1.2-9	Positioning pin	16
4	KHT14000-78		Hexagon socket head cap screw 1/2"×1 1/2"	21
5	KHT14000-11	KHT14000.1.2	Shell	1
6	KHT14000-80	KHT14.1.2.3	Handler	4
7	KHT14000-81		Hexagon bolt1/2"×1 1/2"	8
8	KHT14000-82	TQ508/70Y.8.1	Supporting leg	4
	KHT14000-83	KHT14.1.2.2	Front guide pole	2
9	KHT14000-84		Hexagon nut2″	2
10	KHT14000-85	KHT9625.1.2-11	Gear grade plate	1
11	KHT14000-86		Hexagon socket head cap screw1/4"×5/16"	16
12	KHT14000-87	KHT9625.1.2-7	Baffle plate	1
13	KHT14000-88	KHT14000.1.2-6	Axle sleeve	2
14	KHT14000-89	KHT14000.1.2-7	Name plate	1
15	KHT14000-90	TQ245-2	Clamp spring	2
16	KHT14000-91	KHT14000.1.2-4	Tail rope bolt	2
17	KHT14000-92		Hexagon socket head cap screw3/8"×1"	2
18	KHT14000-93	KJD9625-4	Gauge seat fixed plate	1
19	KHT14000-94	KJD9625.11(2)	Gauge seat	1
20	KHT14000-95	TQ508/70Y.8.6	Valve support	3
21	KHT14000-96	GB/T95	Plain washer10	3
22	KHT14000-56		Spring washer3/8″	7
23	KHT14000-55		Hexagon bolt3/8″×1″	7
24	KHT14000-99		Hexagon bolt1/2″×4″	3
25	KHT14000-100	KHT14000.1.7-1	Baffle plate	1
26	KHT14000-101	KHT14000.1.7.1	Small cabinet	1
27	KHT14000-102		Oil cup NPT1/8"	1
28	KHT14000-103	KHT14000.1.7	Small cabinet assembly	1
29	KHT14000-104		Hexagon bolt1/2″×2 1/2″	1
30	KHT14000-105		Hexagon socket head cap screwM8×50	2
31	KHT14000-106	KJD9625.18.7-5	Upper jacket(2)	1
32	KHT14000-107	KT24500.2.2	Return line supporting pipe clamp	1
33	KHT14000-108	KHT14000.1.2-11	Adjusting plate	1

34	KHT14000-109		Hexagon socket head cap screwM8×45	2
35	KHT14000-110	KJD9625.18.7-1	Upper jacket(1)	1
36	KHT14000-111	KHT14000.1.2.1	Feeding tube clip	1
37	KHT14000-112		Hexagon locknut3/8″	4
38	KHT14000-113		Hexagon bolt3/8″×1 1/4″	4
39	KHT14000-114		Hexagon socket head cap screw1/4"×3/4"	2
40	KHT14000-115	KJD9625.16	Speed measuring gear seat	1

7.5 Assembly of small idle gear (Fig.5,Table5)

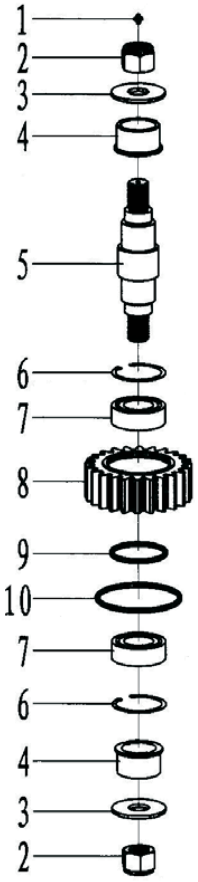


Fig.5

Table 5 List of small idle gear

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-33		Oil cupNPT1/8″	2
2	KHT14000-121	TQ508/70Y.3.1	Hexagon nut	4
3	KHT14000-122	KHT14.1.3-1	Gasket	4
4	KHT14000-123	KHT14000.1.3-2	Lining ring	4
5	KHT14000-124	KHT14000.1.3-1	Small idle gear shaft	2
6	KHT14000-125	GB/T893.1	Circlip for hole130	4
7	KHT14000-126	GB/T283	Single row cylindrical roller bearing NJ215E	4
8	KHT14000-127	KHT14000.1.3-5	Small idle gear	2
9	KHT14000-128	KHT14000.1.3-3	Cone spacer	2
10	KHT14000-129	KHT14000.1.3-4	Outer ring spacer	2

7.6 Assembly of big idle gear (Fig.6,Table6)

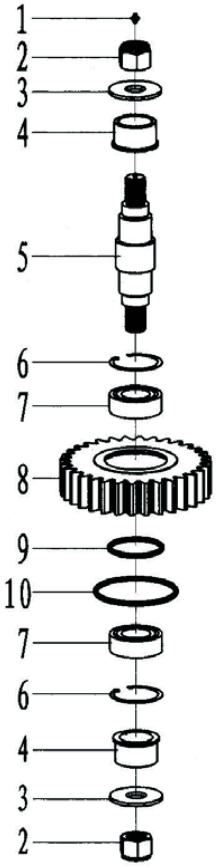


Fig.6

Table 6 List of big idle gear

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-33		Oil cupNPT1/8″	2
2	KHT14000-121	TQ508/70Y.3.1	Hexagon nut	4
3	KHT14000-122	KHT14.1.3-1	Gasket	4
4	KHT14000-123	KHT14000.1.3-2	Lining ring	4
5	KHT14000-124	KHT14000.1.3-1	Small idle gear shaft	2
6	KHT14000-125	GB/T893.1	Circlip for hole130	4
7	KHT14000-126	GB/T283	Single row cylindrical roller bearing NJ215E	4
8	KHT14000-130	KHT14000.1.4-1	Big idle gear	2
9	KHT14000-128	KHT14000.1.3-3	Cone spacer	2
10	KHT14000-129	KHT14000.1.3-4	Outer ring spacer	2

7.7 Assembly of triple gear (Fig.7,Table7)

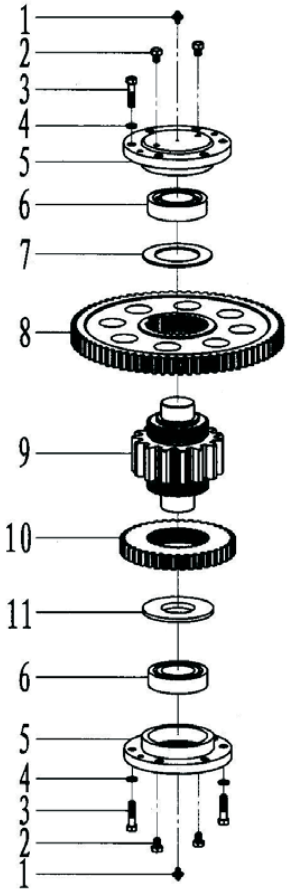


Fig.7

Table 7 List of big idle gear

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-33		Oil cupNPT1/8″	2
2	KHT14000-135		Hexagon bolt3/8″×1/2″	4
3	KHT14000-136		Hexagon bolt3/8″×1 5/8″	12
4	KHT14000-56		Spring washer3/8″	12
5	KHT14000-138	KHT14000.1.5-1	Bearing cover	2
6	KHT14000-139	GB/T283	Cylinder roller bearing NJ214E	2
7	KHT14000-140	KHT14000.1.5-2	Gasket	1
8	KHT14000-141	KHT14000.1.5-3	Large gear	1
9	KHT14000-142	KHT14000.1.5-4	Gear shaft	1
10	KHT14000-143	KHT14000.1.5-5	Small gear	1
11	KHT14000-144	KHT14000.1.5-6	Supporting plate	1

7.8 Assembly of power input (Fig.8,Table8)

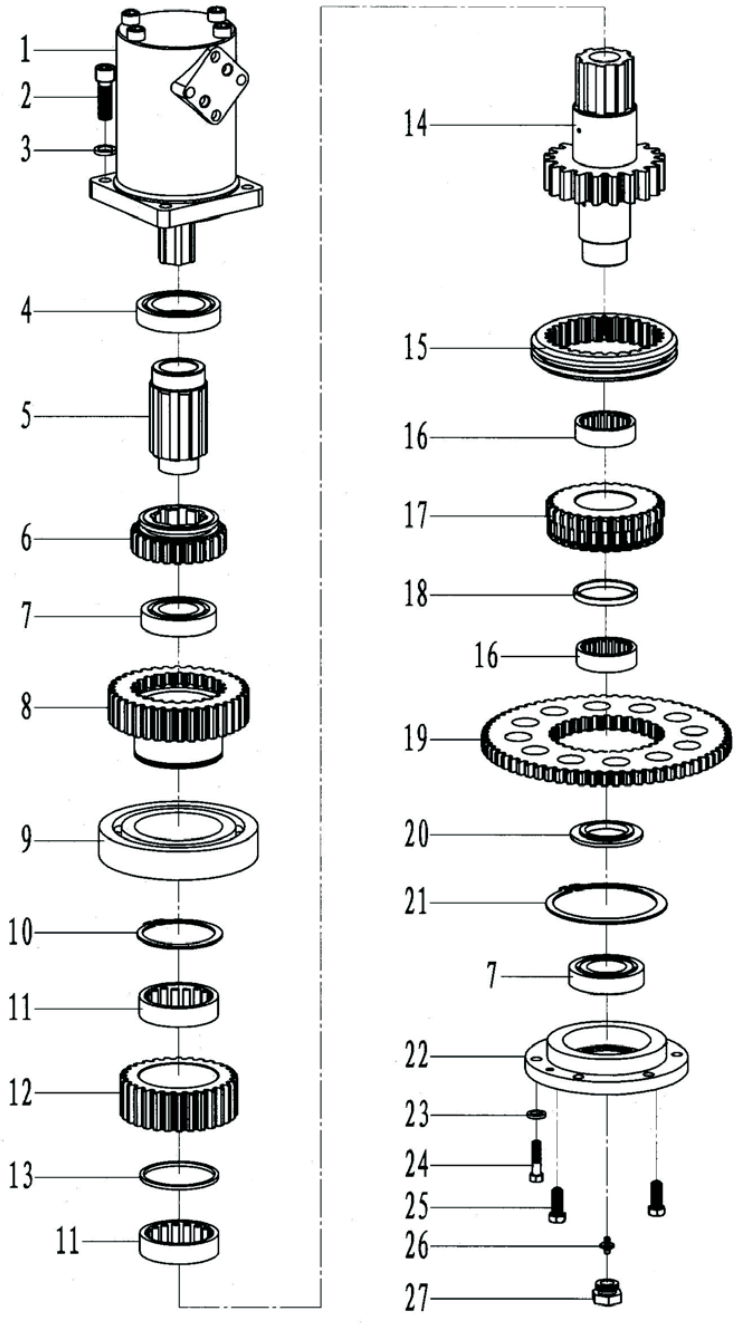


Fig.8

Table 8 List of power input

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-150		10Y-2000 hydraulic motor	1
2	KHT14000-151		Hexagon socket cap head screws 3/4″×3″	4
3	KHT14000-152		Spring washer3/4″	4
4	KHT14000-154	GB/T276	Ball bearing6215	1
5	KHT14000-155	KHT14000.1.6-1	Spline shaft	1
6	KHT14000-156	KHT14000.1.6-2	Shift gear (upper)	1
7	KHT14000-157	GB/T276	Ball bearing6310	2
8	KHT14000-158	KHT14000.1.6-3	Main shaft gear	1
9	KHT14000-159	GB/T276	Ball bearing6320	1
10	KHT14000-160	GB/T893.1	Circlip for shaft 100	1
11	KHT14000-161	GB/T5801	Needle roller bearing without inner ring RNA4913	2
12	KHT14000-162	KHT14000.1.6-4	Clutch gear (upper)	1
13	KHT14000-163	KHT14000.1.6-11	Lining ring 1	1
14	KHT14000-164	KHT14000.1.6-5	Main shaft	1
15	KHT14000-165	KHT14000.1.6-6	Inner gear sleeve	1
16	KHT14000-166	GB/T5801	Needle roller bearing without inner ring RNA4910	2
17	KHT14000-167	KHT14000.1.6-7	Small clutch gear	1
18	KHT14000-168	KHT14000.1.6-12	Lining ring 2	1
19	KHT14000-169	KHT14000.1.6-8	Large clutch gear	1
20	KHT14000-170	KHT14000.1.6-13	Supporting plate	1
21	KHT14000-171	GB/T893.1	Circlip for shaft130	1
22	KHT14000-172	KHT14000.1.6-9	Bearing cover	1
23	KHT14000-56		Spring washer3/8″	6
24	KHT14000-136		Hexagon bolt3/8″×1 5/8″	6
25	KHT14000-135		Hexagon bolt3/8″×1/2″	2
26	KHT14000-33		Oil cupNPT1/8″	1
27	KHT14000-177	TQ508/70Y.6-8	Head screw	1

7.9 Assembly of duplicate gear (Fig.9,Table9)

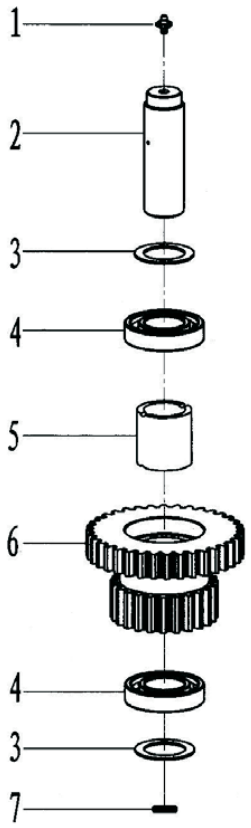


Fig.9

Table 9 List of duplicate gear

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-33		Oil cupNPT1/8″	1
2	KHT14000-180	KHT14000.1.8-1	Mandrel	1
3	KHT14000-181	KHT14000.1.8-2	Gasket	2
4	KHT14000-182	GB/T276	Ball bearing6209	2
5	KHT14000-183	KHT14000.1.8-3	Duplicate gear	1
6	KHT14000-184	KHT14000.1.8-4	Lining ring	1
7	KHT14000-185	XYQ12.Z-45	Positioning plate	1

7.10 Hydraulic pipeline (Fig 10, Table 10)

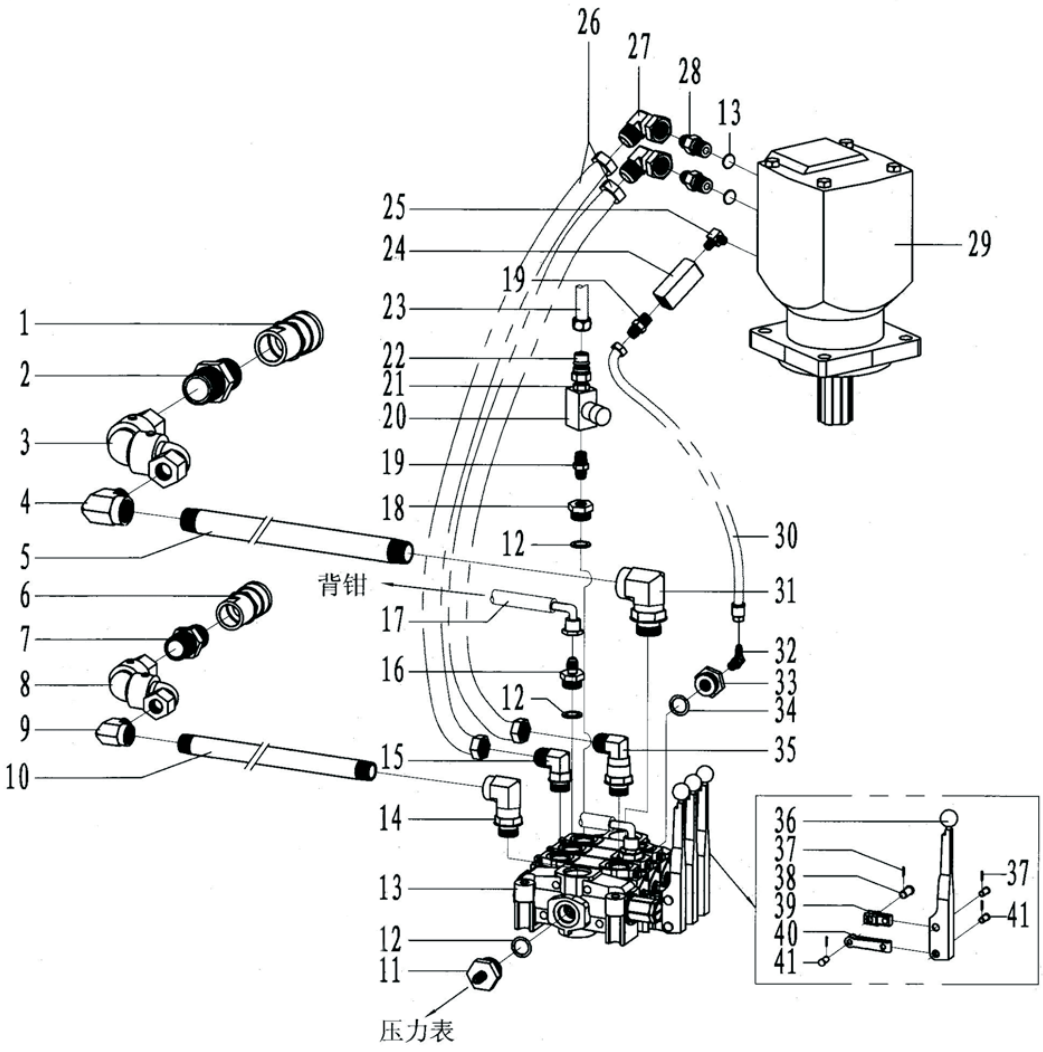


Fig.10

Table 10 List of hydraulic pipeline

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-190	KJD9625.18.3	Quick-change joint (2 1/8-12UN)	1
2	KHT14000-191		Buckle joint(2 1/8-12UN/NPT1 1/4)	1
3	KHT14000-192		Universal joint(NPT1 1/4/2 1/8)	1
4	KHT14000-193	KJD9625.18-7	Bent joint (NPT1 1/4)	1
5	KHT14000-194	KHT14000.1.9(1)-4	Oil tube(NPT1 1/4)	1
6	KHT14000-195	KJD9625.18.4	Quick-change joint （1 7/8-12UN）	1
7	KHT14000-196		Buckle joint（1 7/8-12UN/NPT1）	1
8	KHT14000-197		Universal joint（NPT1/1 7/8-12UN）	1
9	KHT14000-198	KJD9625.18-8	Bent joint(NPT1)	1
10	KHT14000-199	KHT14000.1.9(1)-1	Oil tube NPT1	1
11	KHT14000-200	KHT5500.1.8-5	Buckle joint(1 5/16-12UN-7/16-20UNF)	1
12	KHT14000-202	Parker NO.3-916	O ring29.74×2.95	6
13	KHT14000-203	DL(1).0C	Multitandem valve assembly(five-way)	1
14	KHT14000-204	TQ508/70Y.10.7（2）	Combined joint(NPT1)	1
15	KHT14000-205	TQ508/70Y.10.8.3	Combined joint(1 5/16-12UN)	1
16	KHT14000-206	KHT5500.1.8-6	Buckle joint（1 5/16-12UN-3/4-16UNF）	1
17	KHT14000-207		Hose(3/4-16UNF,L=2050)	2
18	KHT14000-201	TQ508/70Y.10-10	Buckle joint(1 5/16-12UN-3/4-16UNF)	1
19	KHT14000-208	TQ508/70Y.10.1-6	Buckle joint(NPT1/2-3/4UNF)	1
20	KHT14000-209	DV10	Throttle valve	1
21	KHT14000-210	YG-72	One-way connection(NPT1/2)	1
22	KHT14000-211		Quick coupling(NPT1/2)	1
23	KHT14000-212		Hose(3/4-16UNF-M24×1.5,L=2500)	1
24	KHT14000-213	KHT14000.1.9(1).1	One-way valve	1
25	KHT14000-214	YG-94	Angle coupling(NPT1/2-7/16-20UNF)	1
26	KHT14000-215		Hose(1 5/16-12UNC,L=800)	2
27	KHT14000-216	TQ508/70Y.10.8.4	Combined joint(1 5/16-12UN)	2
28	KHT14000-217	TQ508/70Y.10.8-2	One-way connection(1 5/16-12UN)	2
29	KHT14000-150	10Y-2000	Hydraulic motor	1
30	KHT14000-219		Hose(3/4-16UNF,L=280)	1
31	KHT14000-220	KJD9625.18.5（2）	Bent joint(NPT1 1/4-1 5/8-12UN)	1
32	KHT14000-221	TQ508/70Y.10.9（2）	Combined bending joint（3/4-16UNF）	1
33	KHT14000-222	TQ508/70Y.10-4	Buckle joint(1 5/8-12UN/3/4-16UNF)	1
34	KHT14000-223	Parker NO.3-920	O ring37.47×3	1
35	KHT14000-224	TQ508/70Y.10.6	Combined joint(1 5/16-12UN)	1

36	KHT14000-225		Valve stem	3
37	KHT14000-226	GB/T91	Cotter pin 3.2×20	12
38	KHT14000-227	TQ508/70Y.10-16	Pin shaft2	9
39	KHT14000-228	KHT14000.1.9(1)-2	Valve stem connecting seat	3
40	KHT14000-229	KHT14000.1.9(1)-3	Valve stem connecting plate	3
41	KHT14000-230	TQ508/70Y.10-15	Pin shaft1	3

7.10-2 Double shaft gated pipeline (Fig.11,Table11)

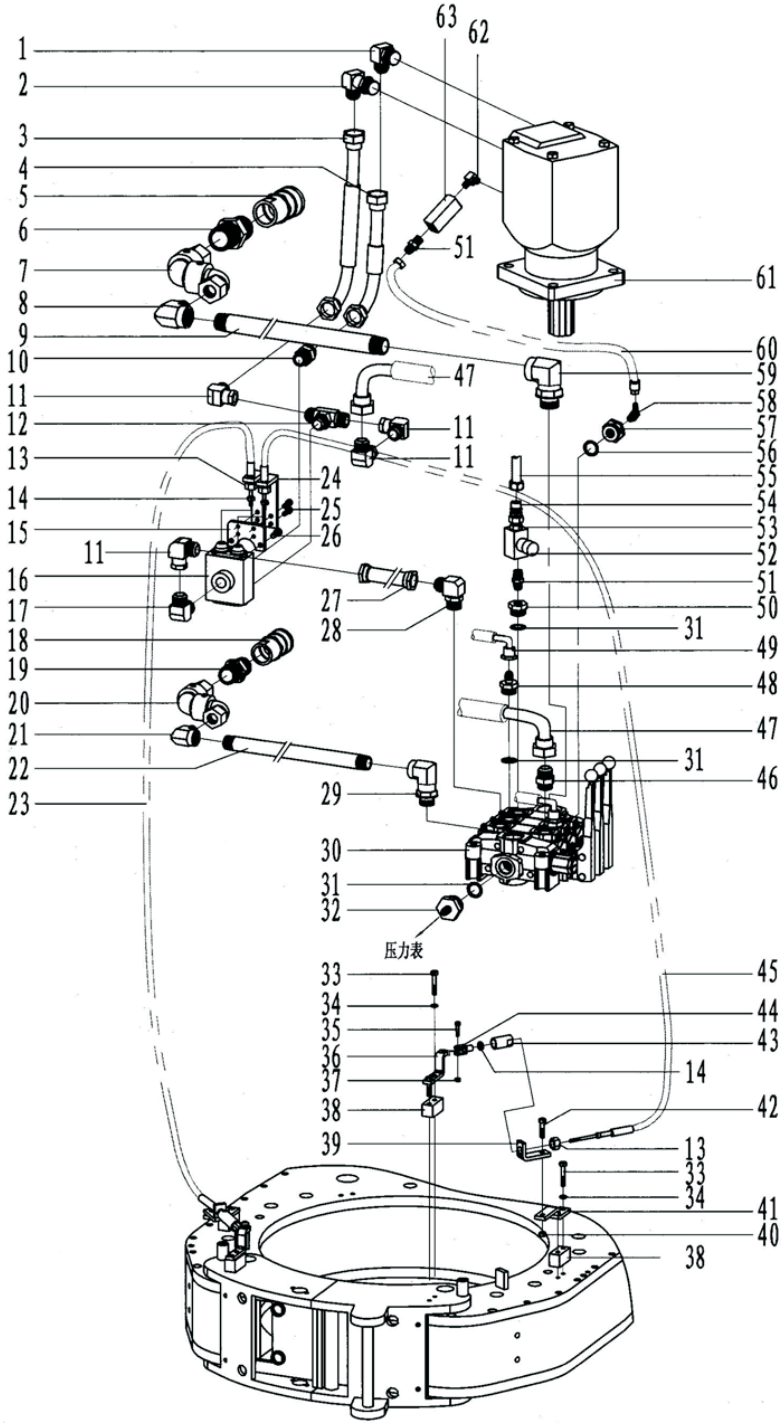


Fig.11

Table 11 List of double shaft gated pipeline

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-240	TQ508/70Y.10.8.3(2)	Combined joint(1 5/16-12UN)	1
2	KHT14000-241	TQ508/70Y.10.8.3(3)	Combined joint(1 5/16-12UN)	1
3	KHT14000-242	KHT14000.1.9(2)-3	Hose(1 5/16-12UN，240×115)	1
4	KHT14000-243	KHT14000.1.9(2)-4	Hose(1 5/16-12UNC,206×215)	1
5	KHT14000-190	KJD9625.18.3	Quick-change joint (2 1/8-12UN)	1
6	KHT14000-191		Buckle joint（2 1/8-12UN-NPT1 1/4）	1
7	KHT14000-192		Universal joint（NPT1 1/4-2 1/8）	1
8	KHT14000-193	KJD9625.18-7	Bent joint(NPT1 1/4)	1
9	KHT14000-194	KHT14000.1.9(1)-4	Oil tube(NPT1 1/4)	1
10	KHT14000-244	KHT5500.1.15C.1-9	Buckle joint(1 5/16-12UN-NPT1)	1
11	KHT14000-216	TQ508/70Y.10.8.4	Combined joint(1 5/16-12UN)	4
12	KHT14000-245	KHT14000.1.9(2)-5	Tee coupling(1 5/16-12UN-NPT1)	1
13	KHT14000-246		Hexagon nut5/8"-18UNF	6
14	KHT14000-247		Hexagon nut1/4"-28UNC	4
15	KHT14000-248	KHT13625.1.8-7	Valve plate1	1
16	KHT14000-249		Double shaft control valve	1
17	KHT14000-250	KJD9625.18.2(3)	Buckle joint(1 5/16-12UN-NPT1)	1
18	KHT14000-195	KJD9625.18.4	Quick-change joint （1 7/8-12UN）	1
19	KHT14000-196		Buckle joint（1 7/8-12UN-NPT1）	1
20	KHT14000-197		Universal joint（1 7/8-12UN-NPT1）	1
21	KHT14000-198	KJD9625.18-8	Bent joint(NPT1)	1
22	KHT14000-199	KHT14000.1.9(1)-1	Oil tubeNPT1	1
23	KHT14000-251	173-LTT-1-58	Flexible shaft(L=58")	1
24	KHT14000-296	KHT13625.1.8-8	Valve plate2	2
25	KHT14000-295		Hexagon bolt5/16"-18UNC×3/4"	4
26	KHT14000-263		Hexagon bolt3/8"-16UNC×3/4"	2
27	KHT14000-252	KHT14000.1.9(2)-1	Flared tube(1 5/16-12UNC，L=185)	1
28	KHT14000-205	TQ508/70Y.10.8.3	Combined joint(1 5/16-12UN)	1
29	KHT14000-204	TQ508/70Y.10.7（2）	Combined joint(NPT1)	1
30	KHT14000-203	DL(1).0C	Multitandem valve assembly(five-way)	1
31	KHT14000-202	Parker NO.3-916	O ring29.74×2.95	4
32	KHT14000-200	KHT5500.1.8-5	Buckle joint(1 5/16-12UN-7/16-20UNF)	1
33	KHT14000-254		Hexagon bolt5/16"-18UNC×2"	8
34	KHT14000-255		Spring washer5/16"	8
35	KHT14000-256		Hexagon bolt1/4"-20UNC×1 1/2"	2

36	KHT14000-257	KHT5500.1.15C.1-2	Connecting plate1	2
37	KHT14000-258		Hexagon nut1/4"-20UNC	2
38	KHT14000-259	KHT14000.1.9(2)-6	Backing plate	4
39	KHT14000-260	KHT14000.1.9(2)-7	Rotating plate	2
40	KHT14000-261		Hexagon nut3/8"-16UNC	2
41	KHT14000-262	KHT5500.1.15C.1-5	Connecting plate2	2
42	KHT14000-55		Hexagon bolt3/8"-16UNC×1"	2
43	KHT14000-264	XQ4.5.Z.6-6	Protective sleeve	2
44	KHT14000-265	KHT5500.1.15C.1-3	Universal joint	2
45	KHT14000-266	173-LTT-1-71	Flexible shaft(L=71")	1
46	KHT14000-217	TQ508/70Y.10.8-2	One-way connection(1 5/16-12UN)	2
47	KHT14000-267	KHT14000.1.9(2)-2	Hose(1 5/16-12UN，288×85×135)	1
48	KHT14000-268	KHT5500.1.8-6	Buckle joint1 5/16-12UN-3/4-16UNF	2
49	KHT14000-207		Hose(3/4-16UNF,L=2050)	2
50	KHT14000-201	TQ508/70Y.10-10	Buckle joint(1 5/16-12UN-3/4-16UNF)	1
51	KHT14000-208	TQ508/70Y.10.1-6	Buckle joint(NPT1/2-3/4UNF)	2
52	KHT14000-209	DV10	Throttle valve	1
53	KHT14000-210	YG-72	One-way connection(NPT1/2)	1
54	KHT14000-211		Quick coupling(NPT1/2)	1
55	KHT14000-212		Hose(3/4-16UNF-M24×1.5,L=2500)	1
56	KHT14000-223	Parker NO.3-920	O ring37.47×3	1
57	KHT14000-222	TQ508/70Y.10-4	Buckle joint1 5/8	1
58	KHT14000-221	TQ508/70Y.10.9（2）	Combined bending joint（3/4-16UNF）	1
59	KHT14000-220	KJD9625.18.5（2）	Bent joint(NPT1 1/4-1 5/8-12UN)	1
60	KHT14000-270		Hose(3/4-16UNF,L=280)	1
61	KHT14000-150	10Y-2000	Hydraulic motor	1
62	KHT14000-214	YG-94	Angle coupling(NPT1/2-7/16-20UNF)	1
63	KHT14000-213		One-way valve	1

7.10-2-1 Double shaft control valve(Fig.12,Table12)

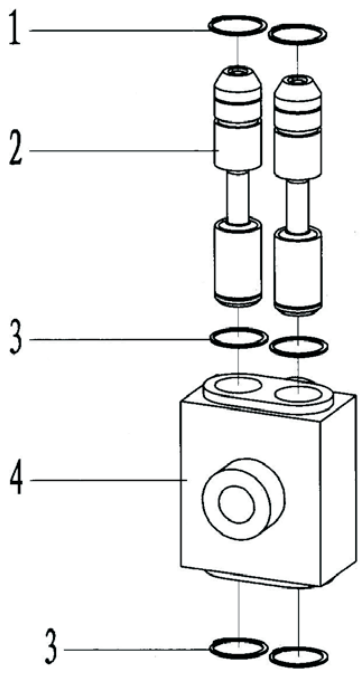


Fig.12

Table 12 List of double shaft control valve

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-290	GB/T89.4.1	Circlip for shaft 30	4
2	KHT14000-291	RHF-2	Valve core	2
3	KHT14000-292	GB/T3452.1	O ring25×2.65	2
4	KHT14000-293	RHF(S)-1	Valve body	1

7.11 Assembly of Safety door (Fig 13, Table 13)

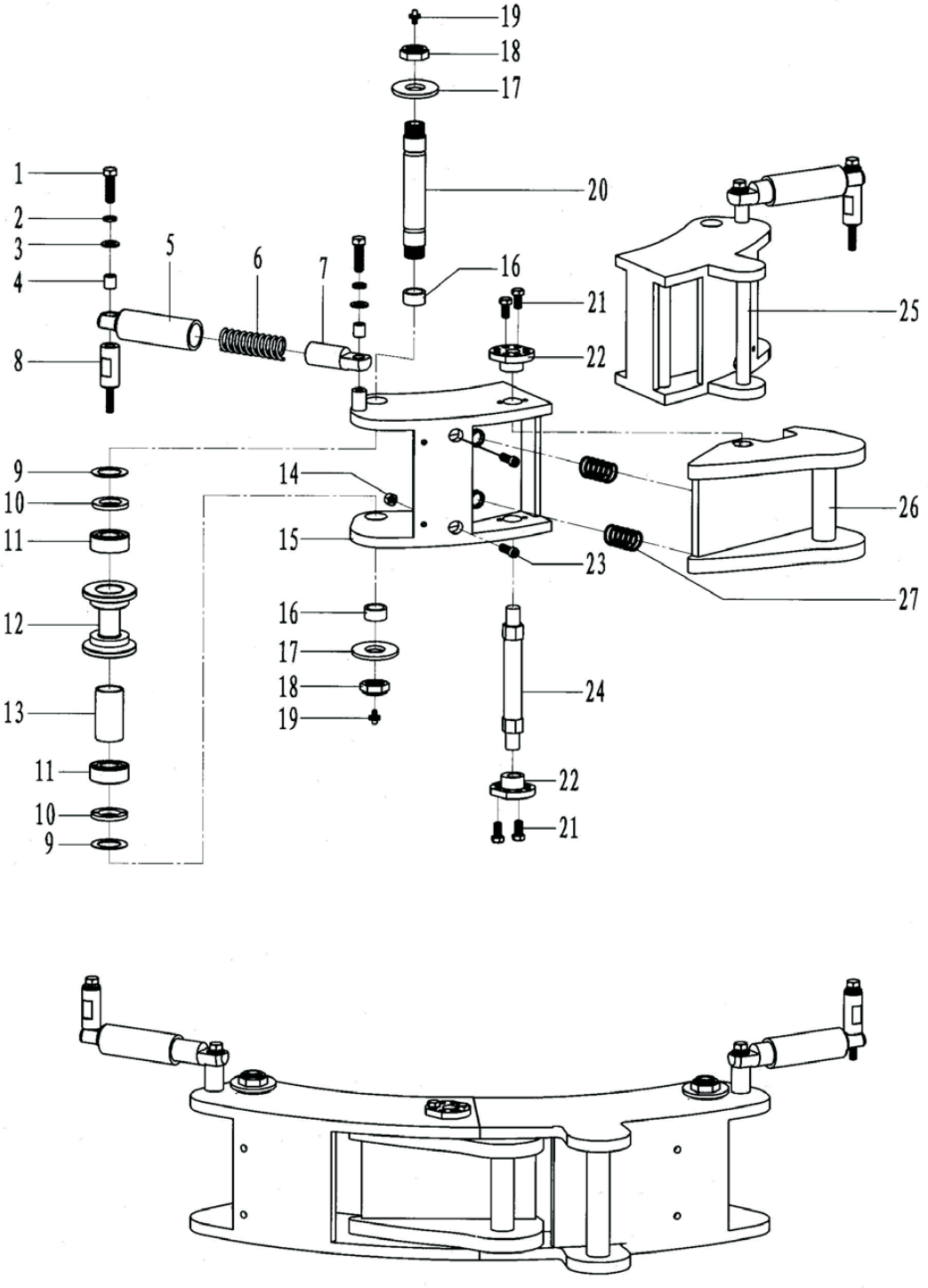


Fig.13

Table13 List of safety door

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-310		Hexagon bolt1/2″×1 1/2″	4
2	KHT14000-32		Spring washer1/2″	4
3	KHT14000-311		Plain washer1/2″	4
4	KHT14000-312	TQ508/70Y.9-2	Lining sleeve	2
5	KHT14000-313	TQ508/70Y.9-3	Sleeve	2
6	KHT14000-314	TQ508/70Y.9-4	Sleeve spring	2
7	KHT14000-315	TQ508/70Y.9-5	Sleeve pole	2
8	KHT14000-316	KHT14000.1.10-1	Sleeve fixed pole	2
9	KHT14000-317	KHT14000.1.10-3	Copper washer	4
10	KHT14000-318	KHT14000.1.16.1-2	Bearing washer	4
11	KHT14000-319	GB/T297	Tapered roller bearing33206	4
12	KHT14000-320	KHT14000.1.16.1-3	Righting wheel	2
13	KHT14000-321	KHT14000.1.16.1-4	Lining ring	2
14	KHT14000-322		Six angle thin nut1/2″	4
15	KHT14000-323	KHT14000.1.10.2.2	Door body(left)	1
16	KHT14000-324	KHT14000.1.10-2	Lining ring	4
17	KHT14000-325	GB/T96	Large washer24	4
18	KHT14000-326		Hexagon nut1″	4
19	KHT14000-66	GB/T1152	Oil cupM6	4
20	KHT14000-328	KHT14000.1.10-4	Door spindle	2
21	KHT14000-55		Hexagon bolt3/8"×1"	4
22	KHT14000-330	KHT14000.1.10.2-1	Eccentric sleeve	2
23	KHT14000-331		Hexagon socket head cap screw 1/2″×1 3/8″	4
24	KHT14000-332	KHT14000.1.10.2-2	Latch shaft	1
25	KHT14000-333	KHT14000.1.10.1	Door body (right)	1
26	KHT14000-334	KHT14000.1.10.2.1	Door knob	1
27	KHT14000-335	TQ508/70Y.9.1-5	Spring	2

7.12 Gear shifting assembly(below) (Fig 14, Table 14)

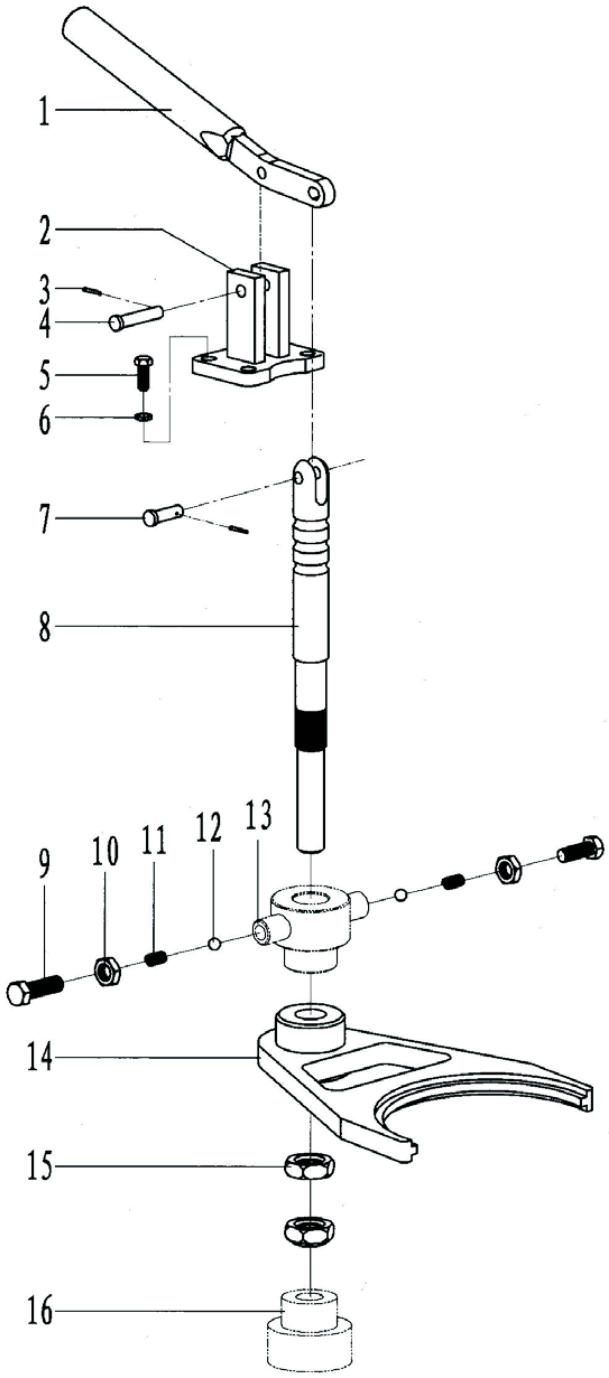


Fig.14

Table14 List of gear shifting assembly(below)

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-340	TQ245.8-1	Control lever	1
2	KHT14000-341	KHT14.1.11.1	Seat	1
3	KHT14000-342	GB/T91	Cotter pin 2.5×12	2
4	KHT14000-343	GB/T882	Pin shaftB8×40	1
5	KHT14000-55		Hexagon bolt3/8"×1"	4
6	KHT14000-56		Spring washer3/8"	4
7	KHT14000-346	GB/T882	Pin shaftB8×32	1
8	KHT14000-347	KHT14000.1.11-1	Lower shift fork shaft	1
9	KHT14000-348		Hexagon bolt7/16"-20UNF×1 1/2"	2
10	KHT14000-349		Hexagon nut7/16"-20UNF	2
11	KHT14000-350	TQ245.8-2	Positioning spring	2
12	KHT14000-351		Steel ball Φ9	2
13	KHT14000-352	KHT14.1.2.1	Positioning seat	1
14	KHT14000-353	KHT14000.1.11.1	Shift fork(below)	1
15	KHT14000-354		Six angle thin nut7/8"-14UNF	2
16	KHT14000-355	KHT14000.1.2-9	Lower shaft sleeve	1

7.13 Gear shifting assembly(upper)(Fig 15, Table 15)

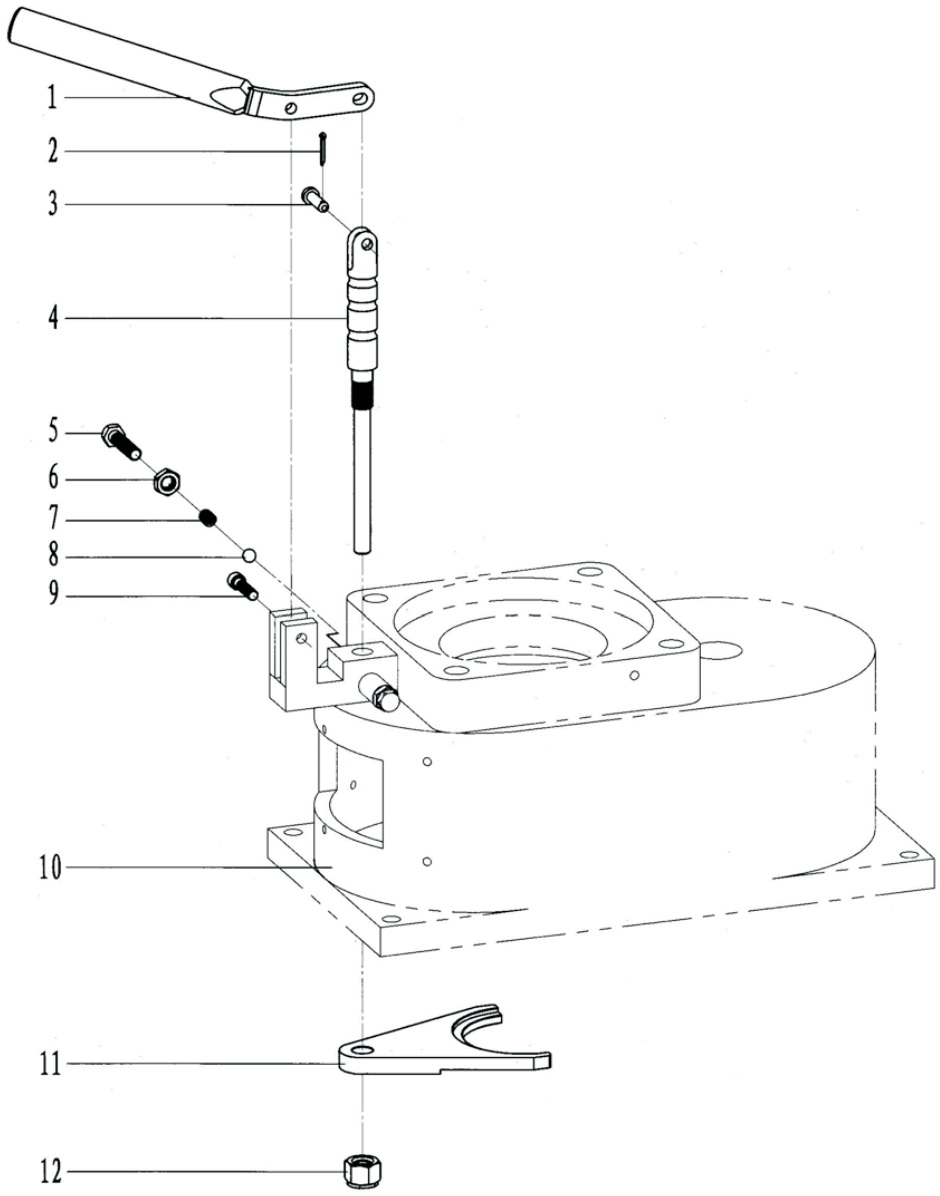


Fig.15

Table15 List of gear shifting assembly(upper)

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-360	KHT14000.1.12-1	Control lever	1
2	KHT14000-342	GB/T91	Cotter pin 2.5×12	1
3	KHT14000-361	GB/T882	Pin shaftB8×28	1
4	KHT14000-362	KHT14000.1.12-2	Upper fork shaft	1
5	KHT14000-349		Hexagon nu7/16"-20UNF	2
6	KHT14000-348		Hexagon bolt7/16"-20UNF×1 1/2"	2
7	KHT14000-350	TQ245.8-2	Positioning spring	2
8	KHT14000-351		Steel ball Φ9	2
9	KHT14000-363		Hexagon socket cap head screws 5/16"×1	1
10	KHT14000-101	KHT14000.1.7.1	Small cabinet	1
11	KHT14000-364	KHT14000.1.12-3	Shift fork(upper)	1
12	KHT14000-365		Hexagon nut5/8"	1

7.14 Assembly of brake band (Fig 16, Table 16)

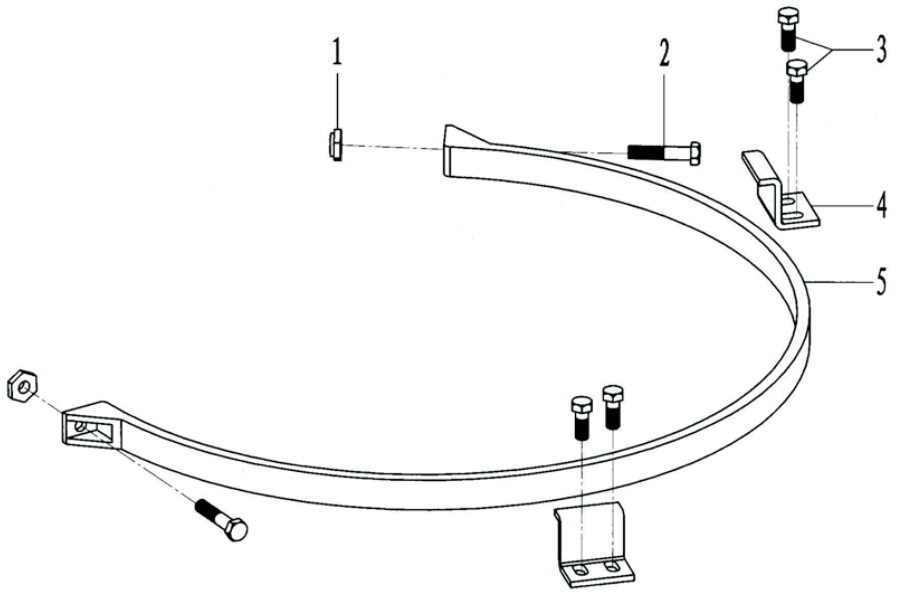


Fig.16

Table16 List of brake band assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-370		Hexagon nut1/2"	2
2	KHT14000-371		Hexagon socket cap head screws 1/2"×2	2
3	KHT14000-372		Hexagon socket cap head screws	4
4	KHT14000-373	TQ340/35Y.1.3-02	Restrict block	2
5	KHT14000-374	KHT14000.1.13.1	Brake band	1

7.15 Assembly of suspension rod (Fig 17, Table 17)

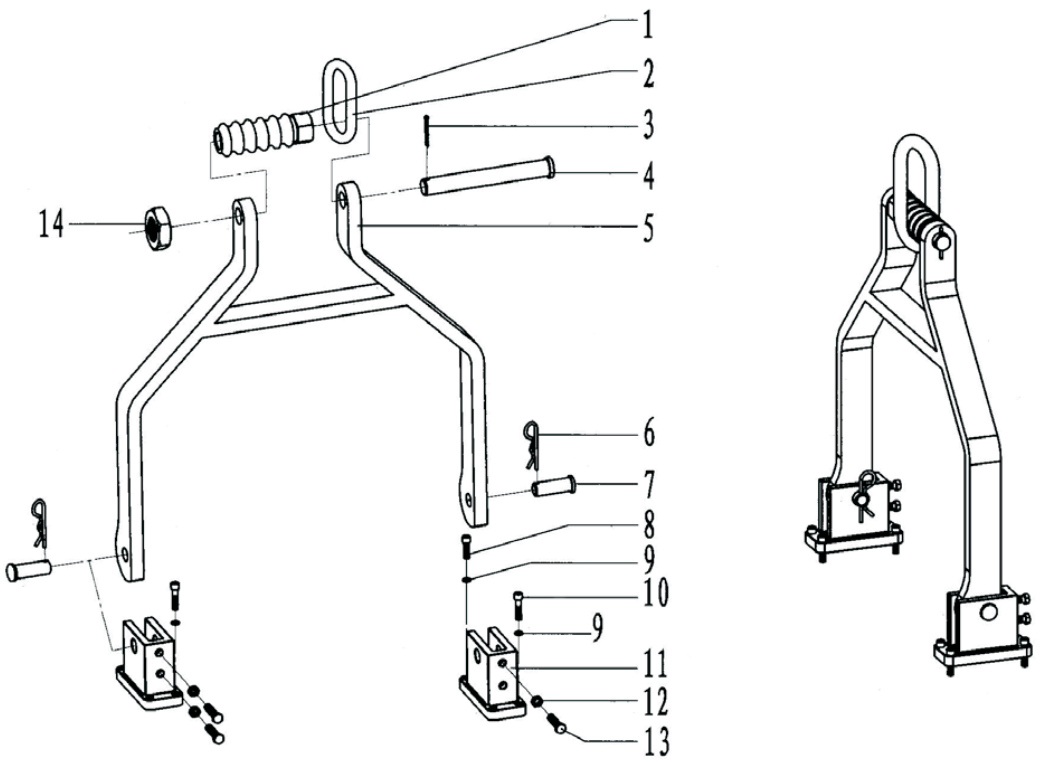


Fig.17

Table17 List of suspension rod assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-380	KHT14000.1.14-1	Helical bar	1
2	KHT14000-381		Long rings(8T)	1
3	KHT14000-382	GB/T91	Cotter pin 6×45	1
4	KHT14000-383	KHT14000.1.14-2	Pin shaft	1
5	KHT14000-384	KHT14000.1.14.1	Suspension rod	1
6	KHT14000-385	TQ245-2	Clamp spring	2
7	KHT14000-386	GB/T882	Pin shaftB25×95	2
8	KHT14000-387		Hexagon socket cap head screws 1/2″×1	4
9	KHT14000-32		Spring washer1/2″	8
10	KHT14000-37		Hexagon socket cap head screws 1/2″×2	4
11	KHT14000-388	KHT14000.1.14-3	Suspending rod seat	2
12	KHT14000-322		Six angle thin nut1/2″	4
13	KHT14000-389		Hexagon bolt1/2″×2″	4
14	KHT14000-390		Hexagon nut1 1/2″	1

7.16-1 Assembly of spring lifter (Fig 18, Table 18)

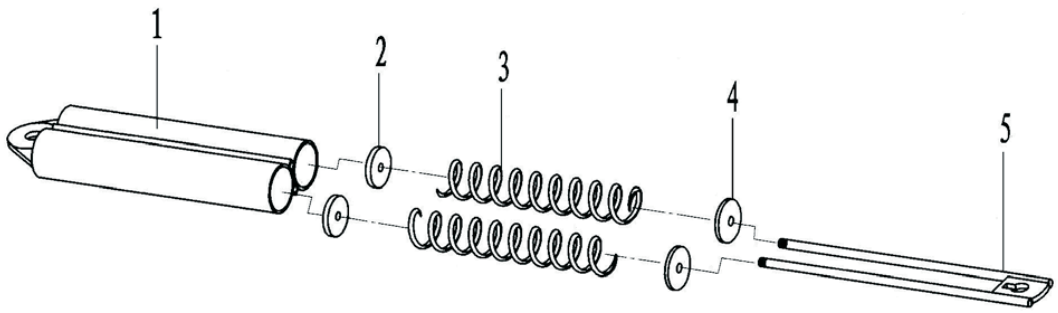


Fig.18

Table18 List of spring lifter assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-395		Cylinder tube assembly	1
2	KHT14000-396	KT24500.11-6	suspender seat	2
3	KHT14000-397	KT24500.11-5	Lifting spring	2
4	KHT14000-398	KT24500.11-3	Bottom plate	2
5	KHT14000-399		Suspender assembly	1

7.16-2 Assembly of hydraulic lifter (Fig 19, Table 19)

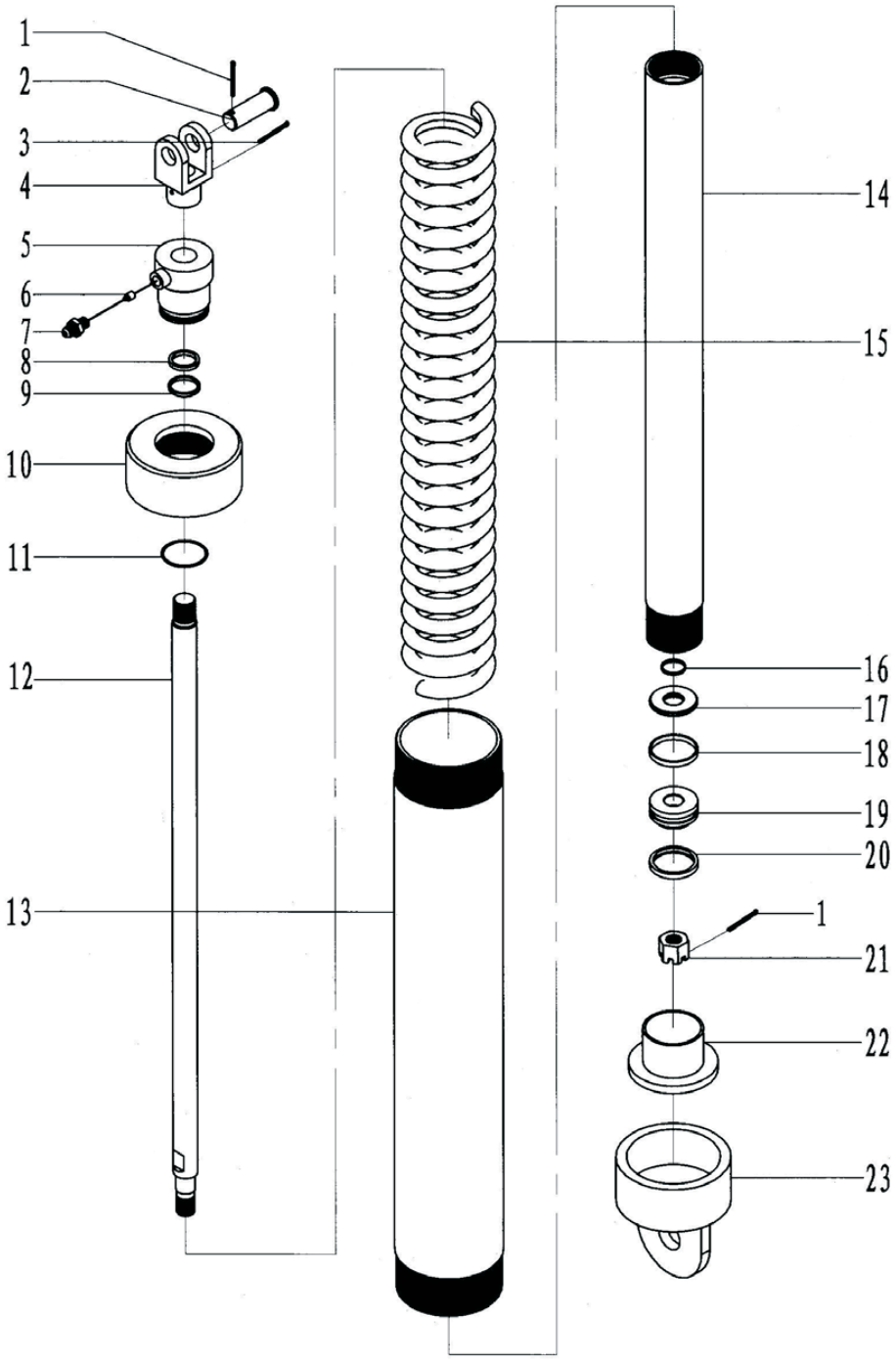


Fig.19

Table19 List of hydraulic lifter assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-405	GB/T91	Cotter pin 6.3×50	2
2	KHT14000-406	GB/T882	Pin shaft 32×90	1
3	KHT14000-407	GB/T91	Cotter pin 6.3×80	1
4	KHT14000-408	TQ340/35YA.1.16-1	Suspender cover	1
5	KHT14000-409	KHT9625.1.17.1	Cylinder end cover 1	1
6	KHT14000-410	XYQ12.YD-01.3	Throttle valve core	1
7	KHT14000-411	YG-54	Adapter connector(M18×1.5-3/4UNF)	1
8	KHT14000-412	GB/T10708.1	Scraper seal FA40×48×5	1
9	KHT14000-413	GB/T10708.1	Y sealing ring Y40×50×6.3	1
10	KHT14000-414	KHT9625.1.17-1	End cover	1
11	KHT14000-415	GB/T3452.1	O-ring 69×5.3	1
12	KHT14000-416	KHT9625.1.17-5	Piston rod	1
13	KHT14000-417	KHT9625.1.17-3	Barrel	1
	KHT14000-418	KHT9625.1.17-3(2)	Barrel	1
14	KHT14000-419	KHT9625.1.17-4	Cylinder	1
15	KHT14000-420	KHT9625.1.17-2	Spring	1
	KHT14000-421	KHT9625.1.17-2(2)	Spring	1
16	KHT14000-422	GB/T3452.1	O-ring 32.5×3.55	1
17	KHT14000-423	KHT9625.1.17-6	Retaining ring	1
18	KHT14000-424	GB/T10708.1	Y sealing ring Y80×65×9.5	1
19	KHT14000-425	KHT9625.1.17-7	Piston rod	1
20	KHT14000-426	GB/T15242.2	SD0800C-ⅡA	1
21	KHT14000-427	GB/T6178	Slotted nutM30	1
22	KHT14000-428	KHT9625.1.17-8	Cylinder end adapter2	1
23	KHT14000-429	KHT9625.1.17.2	Casket end adapter	1

7.17 Master tong torque test assembly(Fig.20,Table20)

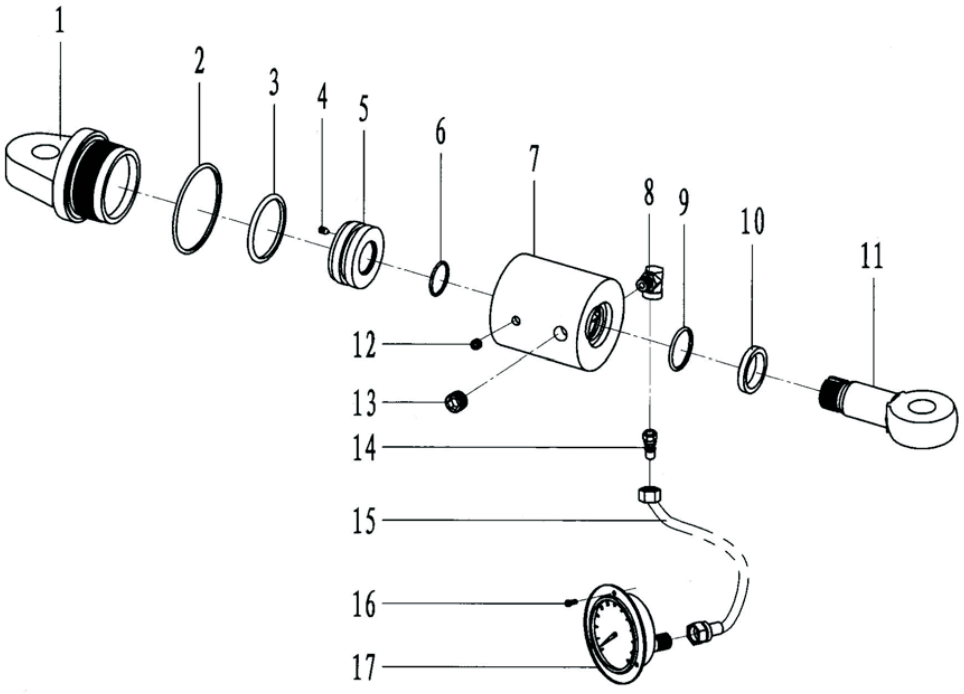


Fig.20

Table20 List of master tong torque test assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-435	KHT14000.1.15.1-1	Cylinder end joint	1
2	KHT14000-436	KHT14000.1.15.1-2	Adjusting ring	1
3	KHT14000-415	GB/T3452	O-Ring 69×5.30	1
4	KHT14000-438		Hex flat end set screw 1/4″×3/8″	1
5	KHT14000-439	KHT14000.1.15.1-4	Piston	1
6	KHT14000-440	GB/T3452	O-Ring 37.5×2.65	1
7	KHT14000-441	KHT14000.1.15.1-3	Cylinder body	1
8	KHT14000-442	TQ508/70Y.14.1-5	Bending joint	1
9	KHT14000-443	GB/T3452	O-Ring 412×3.55	1
10	KHT14000-444	GB/T10708.3	B type scraper seal FB 50 × 40 × 7	1
11	KHT14000-445	KHT14000.1.15.1-5	Piston rod	1
12	KHT14000-446		Hex flat end set screw3/8″-16UNC×1/2	2
13	KHT14000-447	YG-70	Plug screwNPT1/4	1
14	KHT14000-448		Quick-change connectorNPT1/4″	1
15	KHT14000-449		Hose8Ⅱ-700（M20×1.5-NPT 1/4）	1
16	KHT14000-450	GB/T65	Cross recessed countersunk head screwsM5×6	3
17	KHT14000-451	KHT14000.1.15-1	Torque gauge	1

7.18 Righting assembly(Fig.21,Table21)

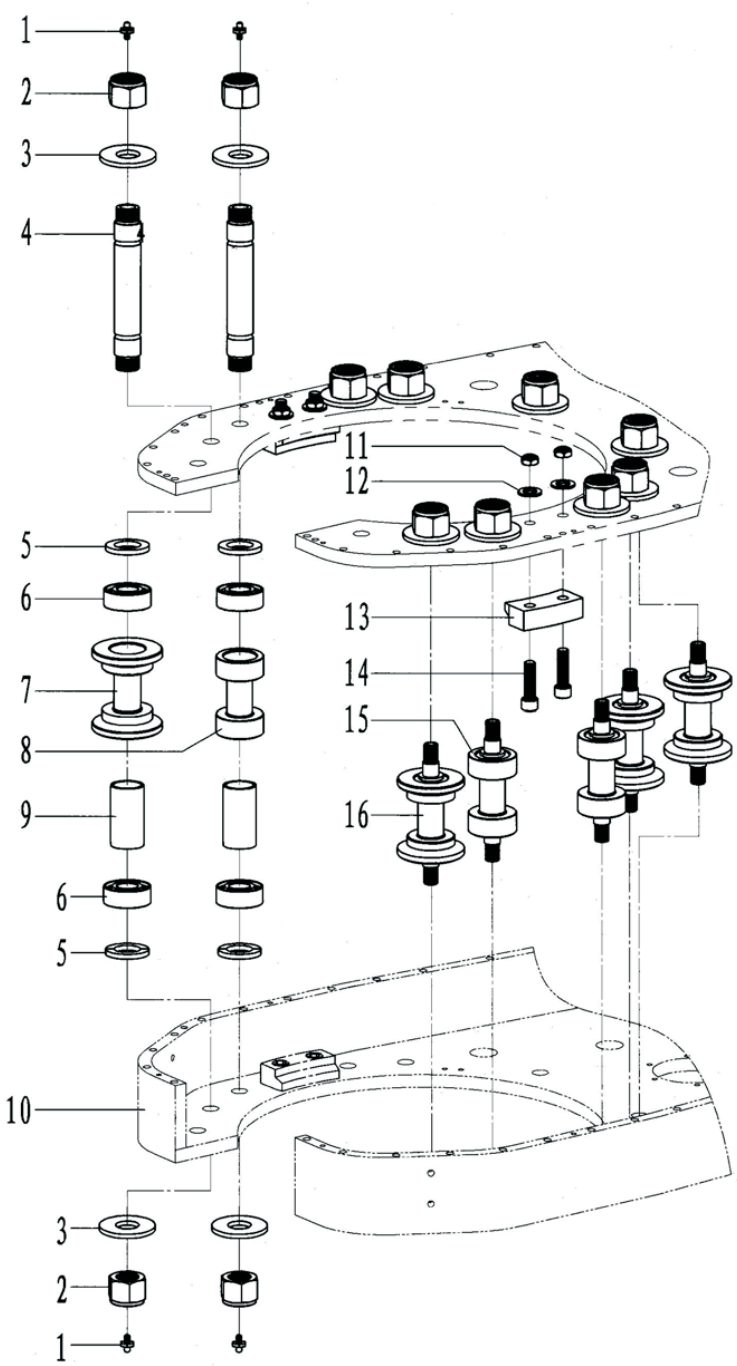


Fig.21

Table21 List of righting assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-66	GB/T1152	Oil cupM6×1	20
2	KHT14000-326		Hexagon nut1″	20
3	KHT14000-325	GB/T96	Large washer24	20
4	KHT14000-460	KHT14000.1.16.1-1	Righting shaft	10
5	KHT14000-318	KHT14000.1.16.1-2	Bearing washer	20
6	KHT14000-319	GB/T297	Tapered roller bearing33206	20
7	KHT14000-320	KHT14000.1.16.1-3	Supporting the right wheel	6
8	KHT14000-461	KHT14000.1.16.2-1	Righting wheel	4
9	KHT14000-321	KHT14000.1.16.1-4	Lining ring	10
10	KHT14000-11	KHT14000.1.16.1.2	Shell	1
11	KHT14000-462		Hexagon nut3/4″	8
12	KHT14000-463	GB/T95	Plain washer20	8
13	KHT14000-464	KHT14000.1.16-1	Righting block	4
14	KHT14000-465		Hexagon socket cap head screws 3/4″×2	8
15	KHT14000-466	KHT14000.1.16.2	Righting wheel assembly	4
16	KHT14000-467	KHT14000.1.16.1	Supporting the right wheel assembly	6

7.19 Backup tong assembly(Fig.22,Table22)

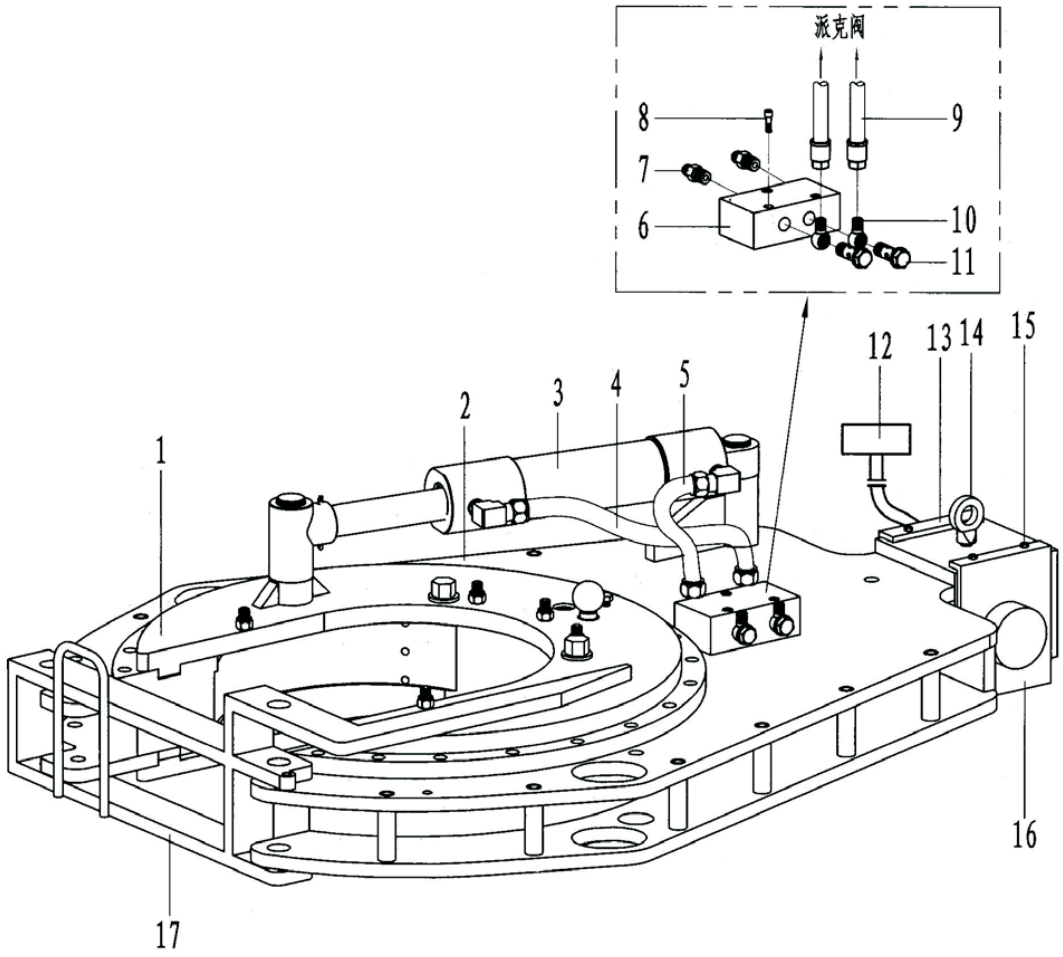


Fig.22

Table22 List of backup tong assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-475	KHT14000.2.1	Backup tong head	1
2	KHT14000-476	KHT14000.2.2	Backup tong main body	1
3	KHT14000-477	KHT14.2.3	Clamp hydraulic cylinder	1
4	KHT14000-478		Hose 10Ⅱ-450(3/4-16UNF flared type)	1
5	KHT14000-479		Hose 10Ⅱ-350(3/4-16UNF flared type)	1
6	KHT14000-480	KHT9625.2.7	Hydraulic control non return valve	1
7	KHT14000-481	YG-53	Buckle connector(NPT1/2-3/4UNF)	2
8	KHT14000-482		Hexagon socket cap head screws 3/8"-16UNC×2"	3
9	KHT14000-207		Hose 10Ⅱ-2050(3/4-16UNF flared type)	2
10	KHT14000-484	YG-46	Spherojoint	2
11	KHT14000-485	XYQ.3C-21	Oil bolt	2
12	KHT14000-486	KHT14000.2.4	Torque test assembly	1
13	KHT14000-487	KHT14000.2.3	Torque cylinder connecting seat	1
14	KHT14000-488	GB/T825	Screw ringM12	1
15	KHT14000-489	KHT5500.2.10	Butterfly bolt	4
16	KHT14000-490	KHT5500.2.9	Limiting seat	1
17	KHT14000-491	KHT14000.2.5	Backup tong safety door assembly	1

7.20 Backup tong head assembly(Fig.23,Table23)

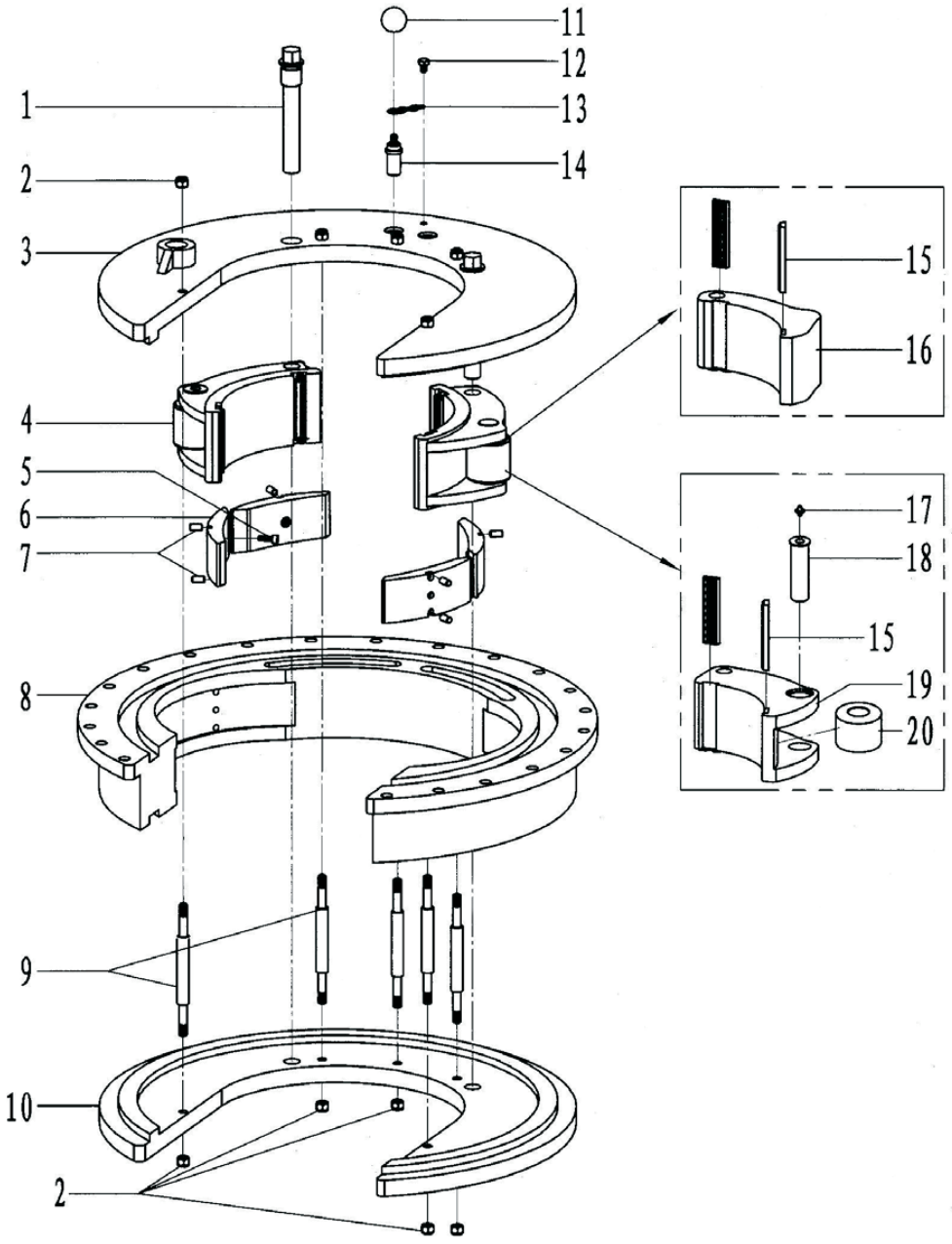


Fig.23

Table23 List of backup tong head assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-510	KHT14000.2.1-5	Jaw set bolt	2
2	KHT14000-511		Hexagon locknut 5/8″	10
3	KHT14000-512	KHT14000.2.1-1	Upper jaw set bracket	1
4	KHT14000-513	KHT14000.2.1(1)	Jaw set assembly 1 (15 1/2)	2
	KHT14000-514	KHT14000.2.1(2)	Jaw set assembly 2 (14 3/8)	2
	KHT14000-515	KHT14000.2.1(3)	Jaw set assembly 3 (13 3/8)	2
	KHT14000-516	KHT14000.2.1(4)	Jaw set assembly 4 (12 3/4)	2
	KHT14000-517	KHT14000.2.1(5)	Jaw set assembly 5 (11 3/4)	2
	KHT14000-518	KHT14000.2.1(6)	Jaw set assembly 6 (10 3/4)	2
	KHT14000-519	KHT14000.2.1(7)	Jaw set assembly 7 (9 5/8)	2
	KHT14000-520	KHT14000.2.1(8)	Jaw set assembly 8 (8 5/8)	2
	KHT14000-521	KHT14000.2.1(9)	Jaw set assembly 9 (7 5/8)	2
	KHT14000-522	KHT14000.2.1(10)	Jaw set assembly 10 (7)	2
	KHT14000-523	KHT14000.2.1(11)	Jaw set assembly 11 (6 5/8)	2
	KHT14000-524	KHT14000.2.1(12)	Jaw set assembly 12 (6.05)	2
	KHT14000-525	KHT14000.2.1(13)	Jaw set assembly 13 (5 1/2)	2
	KHT14000-526	KHT14000.2.1(14)	Jaw set assembly 14 (5)	2
	KHT14000-527	KHT14000.2.1(15)	Jaw set assembly 15 (4 1/2)	2
	KHT14000-528	KHT14000.2.1(16)	Jaw set assembly 16 (4)	2
5	KHT14000-533		Hexagon socket head cap	4
6	KHT14000-534	KHT14000.2.1-7	Ramp	4
7	KHT14000-535	GB/T119	Pin 10×20	8
8	KHT14000-538	KHT14000.2.1-2	Backup tong head body	1
9	KHT14000-540	KHT14000.2.1-3	Supporting screw	5
10	KHT14000-541	KHT14000.2.1-4	Lower jaw set bracket	1
11	KHT14000-58	TQ508/70Y.1.1-4	Hand hank	1
12	KHT14000-543		Hexagon bolt 3/8″×1/2″	1
13	KHT14000-544	KJD9625.2.1-7	Combination chain	1
14	KHT14000-545	KHT14.2.1-6	Reverse shaft	1
15	KHT14000-64	KHT14000.1.1.1-2	Die	
16	KHT14000-513-1	KHT14000.2.1.1-1(1)	Jaw set 1(15 1/2)	2
17	KHT14000-66	GB/T1152	Oil cup M6×1	2
18	KHT14000-67	KHT14000.1.1.1-3	Roller shaft	2

19	KHT14000-514-1	KHT14000.2.1.1-1(2)	Jaw set 2 (14 3/8)	2
	KHT14000-515-1	KHT14000.2.1.1-1(3)	Jaw set 3 (13 3/8)	2
	KHT14000-516-1	KHT14000.2.1.1-1(4)	Jaw set 4 (12 3/4)	2
	KHT14000-517-1	KHT14000.2.1.1-1(5)	Jaw set 5 (11 3/4)	2
	KHT14000-518-1	KHT14000.2.1.1-1(6)	Jaw set 6 (10 3/4)	2
	KHT14000-519-1	KHT14000.2.1.1-1(7)	Jaw set 7 (9 5/8)	2
	KHT14000-520-1	KHT14000.2.1.1-1(8)	Jaw set 8 (8 5/8)	2
	KHT14000-521-1	KHT14000.2.1.1-1(9)	Jaw set 9 (7 5/8)	2
	KHT14000-522-1	KHT14000.2.1.1-1(10)	Jaw set 10 (7)	2
	KHT14000-523-1	KHT14000.2.1.1-1(11)	Jaw set 11 (6 5/8)	2
	KHT14000-524-1	KHT14000.2.1.1-1(12)	Jaw set 12 (6.05)	2
	KHT14000-525-1	KHT14000.2.1.1-1(13)	Jaw set 13 (5 1/2)	2
	KHT14000-526-1	KHT14000.2.1.1-1(14)	Jaw set 14 (5)	2
	KHT14000-527-1	KHT14000.2.1.1-1(15)	Jaw set 15 (4 1/2)	2
	KHT14000-528-1	KHT14000.2.1.1-1(16)	Jaw set 16(4)	2
20	KHT14000-68	KHT14000.1.1.1-4	Roller	2

7.21Clamp hydraulic cylinder(Fig.24,Table24)

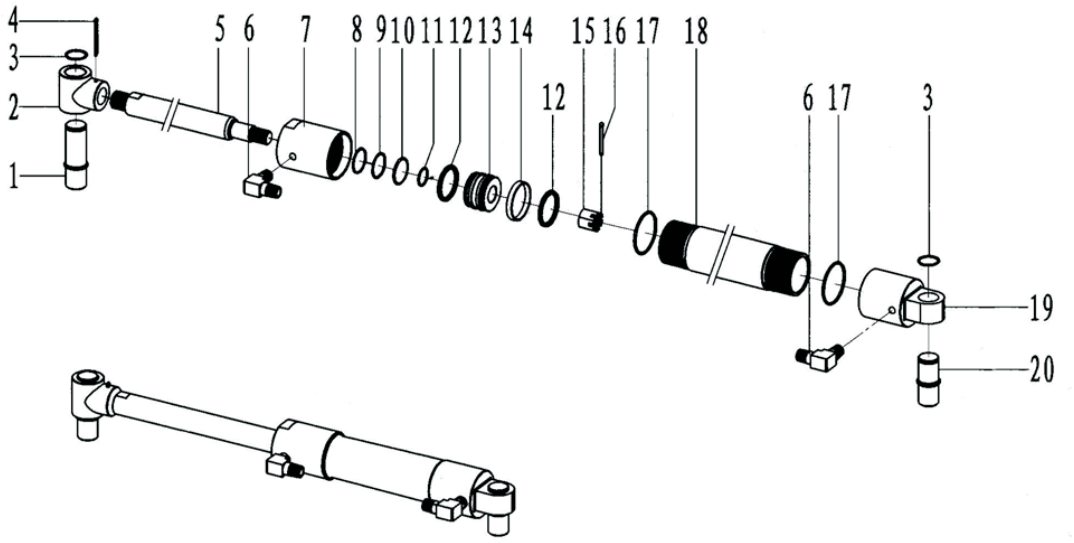


Fig.24

Table24 List of clamp hydraulic cylinder

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-550	KHT9625.2(2).3-1	Pin shaft (1)	1
2	KHT14000-551	KHT9625.2(2).3-2	Knock-off joint	1
3	KHT14000-552	GB/T894.1	Circlip for shaft 35	2
4	KHT14000-553	GB/T91	Pin shaft 5×65	1
5	KHT14000-554	KHT14.2.3-1	Piston rod	1
6	KHT14000-555	KJD9625.18-3	Right-angle connector (NPT1/2)	2
7	KHT14000-556	KHT9625.2(2).3-4	Cylinder end joint(1)	1
8	KHT14000-557	GB/T10708.3	Dust seal ring FA48×40×5	1
9	KHT14000-443	GB/T3452.1	O-ring 41.2×3.55	1
10	KHT14000-559	GB/T3452.1	Retaining ring A40.5×45.5×1.5	1
11	KHT14000-560	GB/T3452.1	O-ring 28×2.65	1
12	KHT14000-561	GB/T10708.1	Y sealing ring Y63×53×6.3	2
13	KHT14000-562	KHT9625.2(2).3-6	Piston rod	1
14	KHT14000-563	GB/T15242.2	Support ring for piston rod： SD 0630C-Ⅱ A	1
15	KHT14000-564	GB/T91	Cotter pin 5×40	1
16	KHT14000-565	GB/T6178	Hexagon M24	1
17	KHT14000-566	GB/T3452.1	O-ring 69×3.55	2
18	KHT14000-567	KHT14.2.3-2	Oil cylinder	1
19	KHT14000-568	KHT9625.2(2).3-7	Cylinder end joint (2)	1
20	KHT14000-569	KHT9625.2(2).3-8	Pin shaft (2)	1

7.22 Torque test assembly(Fig.25,Table25)

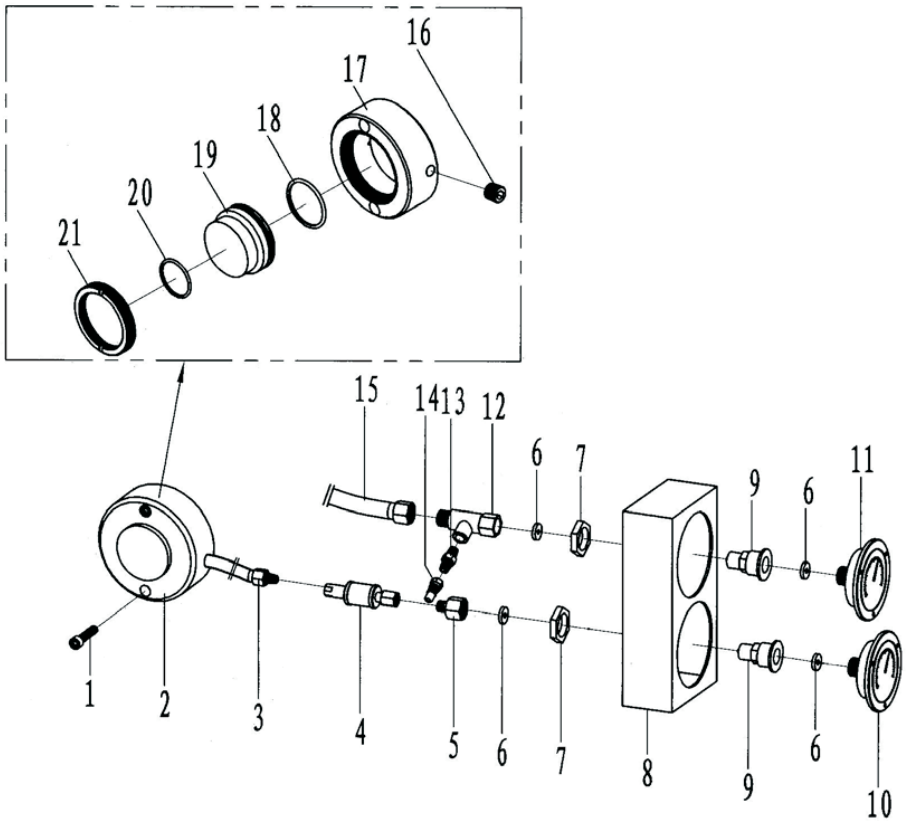


Fig.25

Table25 List of torque test assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-575		Hexagon socket cap head screws 5/16″×3/4″	2
2	KHT14000-576	KHT14000.2.4.1	Sensing oil cylinder（Φ73）	1
3	KHT14000-577		Hose 6Ⅱ-1500（two ends male thread NPT1/4）	1
4	KHT14000-578		Quick combination adapters NPT1/4"	1
5	KHT14000-579	YG-52	Buckle joint	1
6	KHT14000-580		Teflon washer	4
7	KHT14000-581	KJD9625.11(2)-2	Check nut	2
8	KHT14000-94	KJD9625.11(2)	Gauge seat	1
9	KHT14000-582	KJD9625.11(2)-1	Gauge adapter	2
10	KHT14000-451	KHT14000.1.15-1	Torque gauge	1
11	KHT14000-583		Y-100ZT Pressure gauge（0-25MPa，M20×1.5）	1
12	KHT14000-584	KHT5500.1.8.1-1	Oil filled three way connector	1
13	KHT14000-585	YG-68	Adapter	1
14	KHT14000-586		Quick male connector	1
15	KHT14000-587		Hose 6Ⅱ-1200（one end 7/16-20UNF/C、90°，one end M20×1.5）	1
16	KHT14000-588		Hexagon stop screw NPT1/4″	2
17	KHT14000-589	KHT14000.2.4.1-1	Oil cylinder	1
18	KHT14000-590	GB/T3452	O-ring 65×3.55	1
19	KHT14000-591	KHT14000.2.4.1-3	Piston	1
20	KHT14000-592	GB/T3452	O-ring 63×1.8	1
21	KHT14000-593	KHT14000.2.4.1-2	Copper cap	1

7.23 Backup tong safety door assembly(Fig.26,Table26)

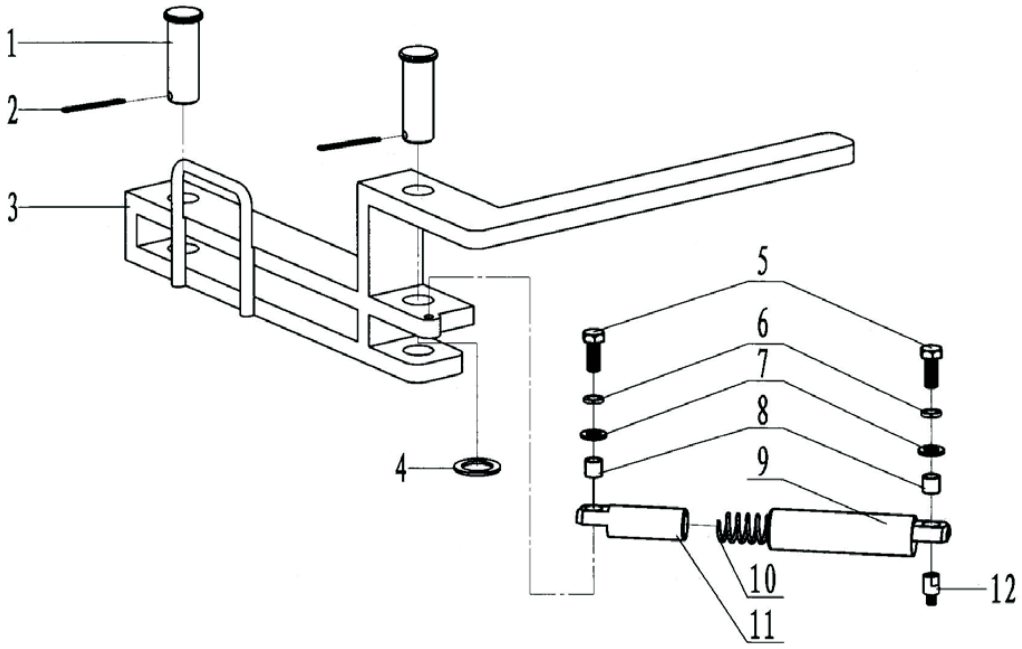


Fig.26

Table26 List of backup tong safety door assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-600	GB/T882	Pin shaft 32×180	2
2	KHT14000-405	GB/T91	Cotter pin 6.3×50	2
3	KHT14000-601	KHT14000.2.5.1	Safety door main body	1
4	KHT14000-602	KHT14000.2.5-1	Copper washer	1
5	KHT14000-603		Hexagon bolt1/2″×1 3/8″	2
6	KHT14000-311		Flat washer 1/2″	2
7	KHT14000-32		spring washer1/2″	2
8	KHT14000-312	TQ508/70Y.9-2	Bushing	2
9	KHT14000-313	TQ508/70Y.9-3	Sleeve	1
10	KHT14000-314	TQ508/70Y.9-4	Sleeve spring	1
11	KHT14000-315	TQ508/70Y.9-5	Sleeve pole	1
12	KHT14000-604	KHT14.2.7-1	Support seat	1

7.24 Front guide pole assembly(Fig.27,Table27)

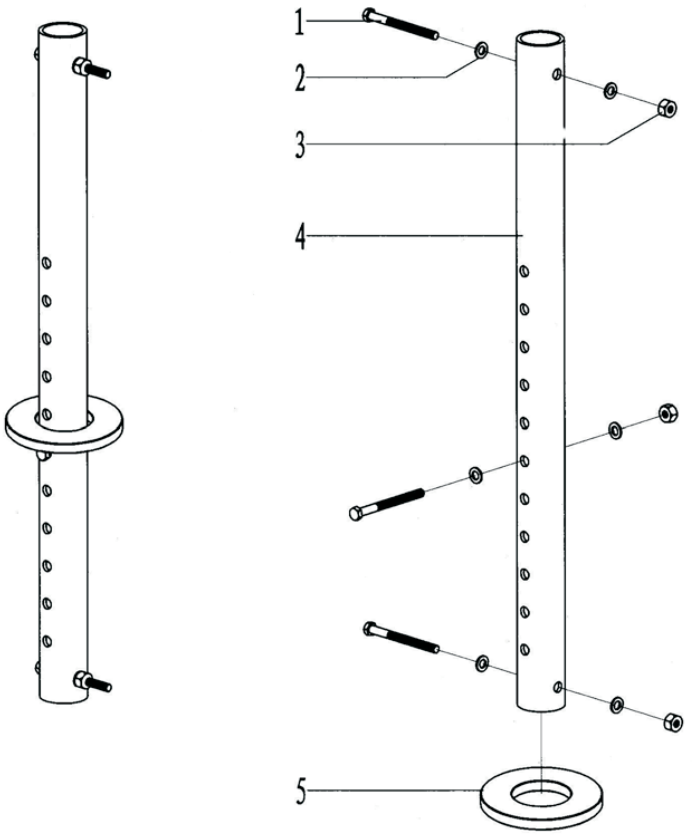


Fig.27

Table27 List of front guide pole assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-610		Hexagon bolt 1/2″-13UNC×4″	3
2	KHT14000-311		Flat washer 1/2″	6
3	KHT14000-612		Hexagon locknut 1/2″	3
4	KHT14000-613	KHT14000.3-1	Front guide pole	1
5	KHT14000-614	KD13375.3-1	Gasket	1

7.25 Front spring assembly(Fig.28,Table28)

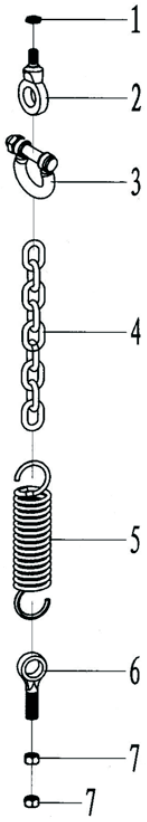


Fig.28

Table28 List of front spring assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-620		Hexagon thin nut 5/8″	2
2	KHT14000-621	KHT9625.2-12	Swing bolt	2
3	KHT14000-622		Arch-breakout（with nut）1/2″	2
4	KHT14000-623	JB/T8108.2	ChainΦ12（L=400）	2
5	KHT14000-624	KHT14000.4-1	Tension spring	2
6	KHT14000-625	KHT5500.2-6	Swing bolt	2
7	KHT14000-626		Hexagon nut 5/8″	4

7.26 Rear spring assembly(Fig.29,Table29)

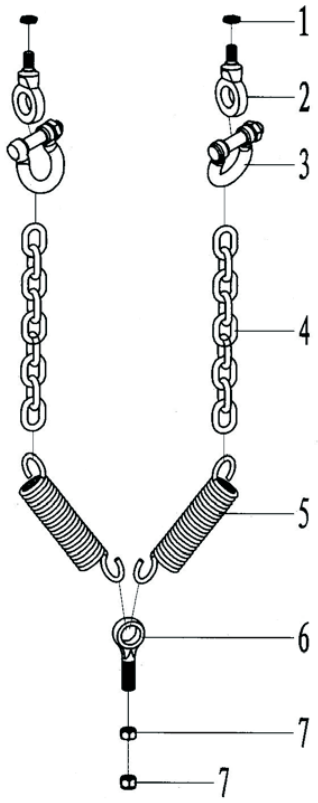


Fig.29

Table29 List of rear spring assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-620		Hexagon thin nut 5/8″	2
2	KHT14000-621	KHT9625.2-12	Swing bolt	2
3	KHT14000-622		Arch-breakout（with nut）1/2″	2
4	KHT14000-623	JB/T8108.2	Chain Φ12（L=400）	2
5	KHT14000-624	KHT14000.4-1	Tension spring	2
6	KHT14000-625	KHT5500.2-6	Swing bolt	1
7	KHT14000-626		Hexagon nut 5/8″	2

7.27 Rear support seat assembly(Fig.30,Table30)

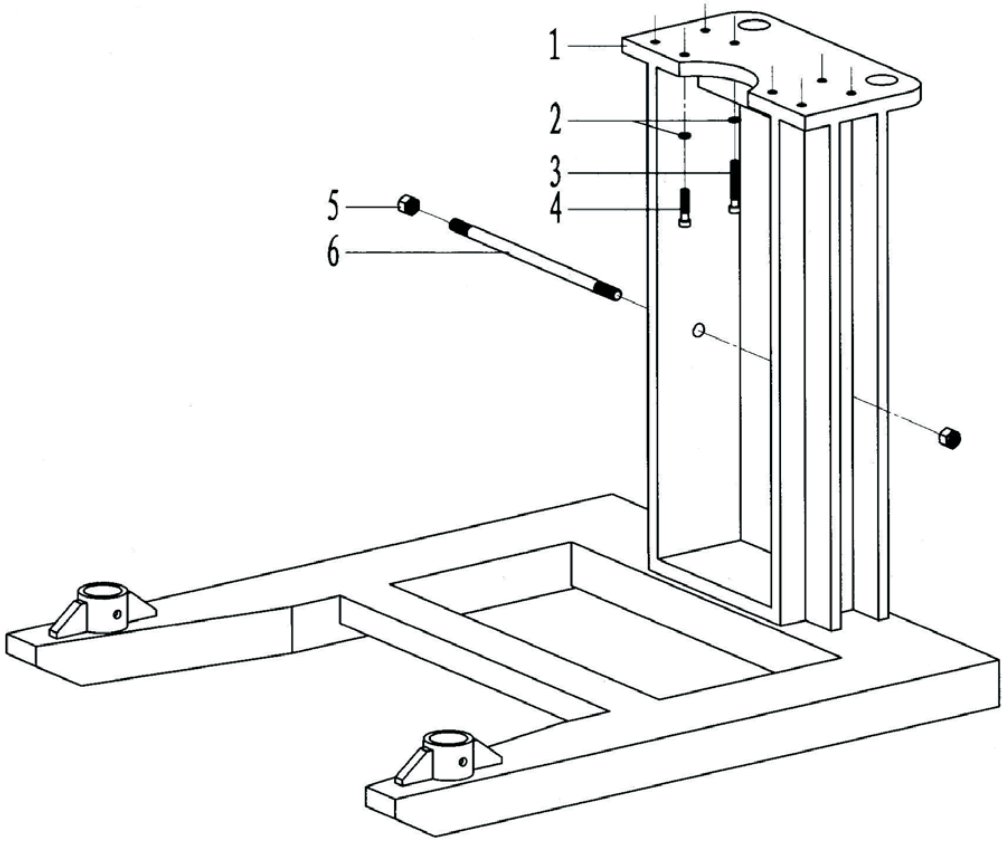


Fig.30

Table30 List of rear support seat assembly

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-630	KHT14000.6.1	Rear support seat	1
2	KHT14000-32		Spring washer1/2″	6
3	KHT14000-631		Hexagon socket cap head screws 1/2″-13UNC×3 1/4″	2
4	KHT14000-632		Hexagon socket cap head screws 1/2″-13UNC×2″	4
5	KHT14000-462		Hexagon locknut3/4″	2
6	KHT14000-633	KHT14000.6-1	Double-headed screw	1

8.Wearing Parts

Recommended spare part quantity for one year:

No.	Purchase Code	Drawing No.	Names and specifications of parts	Qty.
1	KHT14000-21	KHT14000.1.13	Brake band assembly	2
2	KHT14000-30	KHT14000.1.1-5	Jaw plate bolt	4
3	KHT14000-33		Oil cupNPT1/8″	16
4	KHT14000-60	TQ508/70Y.1.1-2	Reversing shaft	2
5	KHT14000-64	KHT14000.1.1.1-2	Die	56
6	KHT14000-66	GB/T1152	Oil cupM6×1	26
7	KHT14000-67	KHT14000.1.1.1-3	Roller shaft	26
8	KHT14000-68	KHT14000.1.1.1-4	Roller	26
9	KHT14000-125	GB/T893.1	Circle for hole130	4
10	KHT14000-160	GB/T893.1	Circle for shaft100	2
11	KHT14000-171	GB/T893.1	Circle for shaft130	2
12	KHT14000-202	Parker NO.3-916	O ring29.74×2.95	12
13	KHT14000-223	Parker NO.3-920	O ring37.47×3	2
14	KHT14000-290	GB/T89.4.1	Circle for shaft30	8
15	KHT14000-292	GB/T3452.1	O ring25×2.65	4
16	KHT14000-413	GB/T10708.1	Y sealing ring Y40×50×6.3	2
17	KHT14000-415	GB/T3452.1	O ring69×5.3	4
18	KHT14000-422	GB/T3452.1	O ring32.5×3.55	2
19	KHT14000-424	GB/T10708.1	Y sealing ring Y80×65×9.5	2
20	KHT14000-443	GB/T3452	O ring41.2×3.55	4
21	KHT14000-444	GB/T10708.3	B type scraper seal FB 40×50×7	2
22	KHT14000-557	GB/T10708.3	Dust seal ring FA48×40×5	2
23	KHT14000-559	GB/T3452.1	Retaining ring A40.5×45.5×1.5	2
24	KHT14000-560	GB/T3452.1	O ring28×2.65	2
25	KHT14000-561	GB/T10708.1	Y sealing ringY63×53×6.3	4
26	KHT14000-590	GB/T3452	O ring65×3.55	2
27	KHT14000-592	GB/T3452	O ring63×1.8	2

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