



YSL135 Hydraulic Swivel

Operation Manual

YSL135-SM

Standard: Q/320623AD30



8C-0121

Goldenman Petroleum Equipment Co., Ltd

Add.:7/F, Wanda International Mansion, 67 Fuqian Street , Dongying China

Tel.: +0086-546-8058779

<http://www.goldenman.com>

E-mail:rachel@goldenman.com

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1. Summary

YSL135 hydraulic swivel is designed to use for workover operations such as drilling, cutting of tubular, drilling out plugs. The equipment can substitute rotary table to supply power for drill pipe and tubing, and be a circulating passage for drilling fluid. The swivel features simple structure, easy installation, and reliable operation.

YSL135 hydraulic swivel is supported with DKYC320/31.5D II hydraulic power control unit, which can realize stepless control on the output of YSL135 swivel to suit for workover jobs.

2. Safety Instructions

2.1 Before using or repairing the hydraulic swivel, the operator should read the operation manual and have a good knowledge about the structure and performance of the swivel and know how to install the swivel on the workover rig.

2.2 Prior to use, ensure installation of the swivel is correct, firm, and reliable. And all parts should be connected well, such as connection between bail with elevator, rotary hose with gooseneck, sub with tubing, and connections of hydraulic hoses, and fixation of anti-torque ropes.

2.3 Be familiar with working principles, working process and handles' function of the swivel. (refer to operation instruction for DKYC320/31.5D II power control unit).

2.4 Operator should be trained and qualified, and be equipped with protective equipment.

3. Technical Specifications

Item	Parameter	
	Metric	British
Max static load	1350 kN	150 US ton
Rated dynamic load (100RPM)	934 kN	103 US ton
Max torque	15500 N.m	11430 ft.lbf
Max speed	160RPM	
Max circulating pressure	35MPa	5,000Psi
Max pressure, hydraulic system	31.5 MPa	4567 psi
Max flow, hydraulic system	320 LPM	84 gal/min
Gooseneck connection	3 LP	
Sub	3 ¹ / ₂ I.F.	
Elevator bail size	88.9mm	3 ¹ / ₂ in
Weight	1200 kg	2645 lbf

4. Main Structure and Working Principle

4.1 Structure

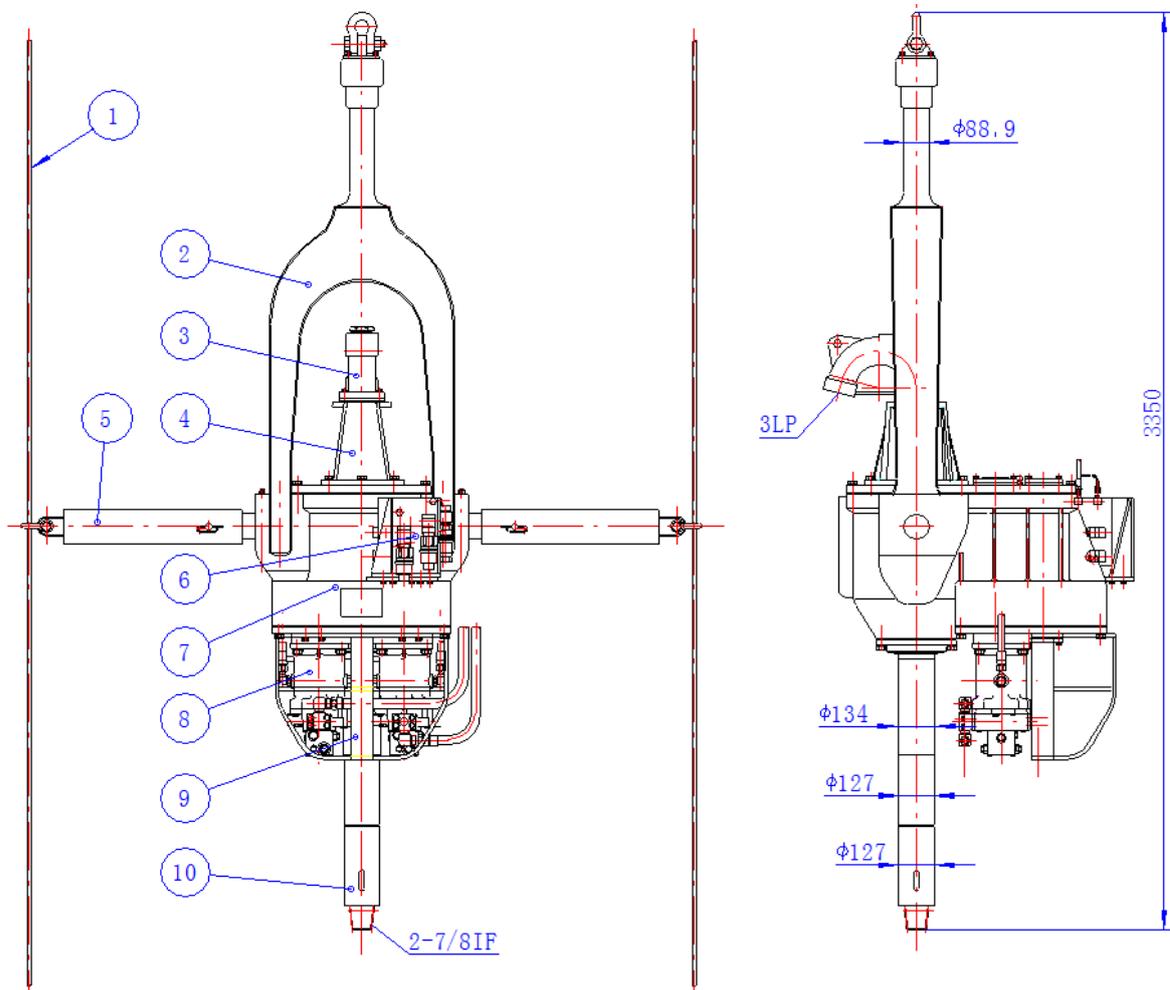


Fig.1: Structure Diagram of YSL135 Hydraulic Swivel

Refer to 1, YSL135 hydraulic swivel consists of anti-torque wire(1), bail (2), gooseneck (3), mud parts (4), torque rein assembly(5), hydraulic valve assembly(6), transmission box assembly (7), hydraulic motor (8), central pipe (9), and sub(10).

Anti-torque rope is to sustain the reaction torque during drilling. One end of the rope is fixed on top of the derrick and the other end is secured on platform. One end of the torque rein assembly is fixed on bail pin of the swivel, and the other end is passed by the wire rope. So the hydraulic swivel may go ups or downs along the rope without any interruption.

Bail (2) connected to swivel case via bail pins is the hanging part for the hydraulic swivel. Elevator lifts swivel bail to bring the swivel and the connected drill tools to move.

Hydraulic motor (8), transmission case assembly (7), central pipe (9) and sub (10) together constitute the power transfer system. Through triple gear reduction, the motion and torque outputted from hydraulic motor will drive central pipe to rotate and bring rotation of sub and drill tools, so to accomplish drilling out of casing, plugs and cements. Hydraulic motor is installed in the lower part of the swivel and is protected by a steel frame

Gooseneck (3), wash pipe assembly (4), and central pipe forms mud circulation system of the swivel. High pressure drilling liquid enters into well hole through mud circulation system. Wash pipe assembly offers transmission of static seal and dynamic seal between gooseneck and central pipe. There is a 2-1/2" NPT plug on the top of case steel gooseneck, which allows tools less than 2-1/4" to be run through the swivel. Seal between gooseneck and central pipe is already hydrostatic tested, with rated circulation pressure 35MPa.

4.2 Working Principle

Refer to the following Fig. 2 for transmission system of the hydraulic system.

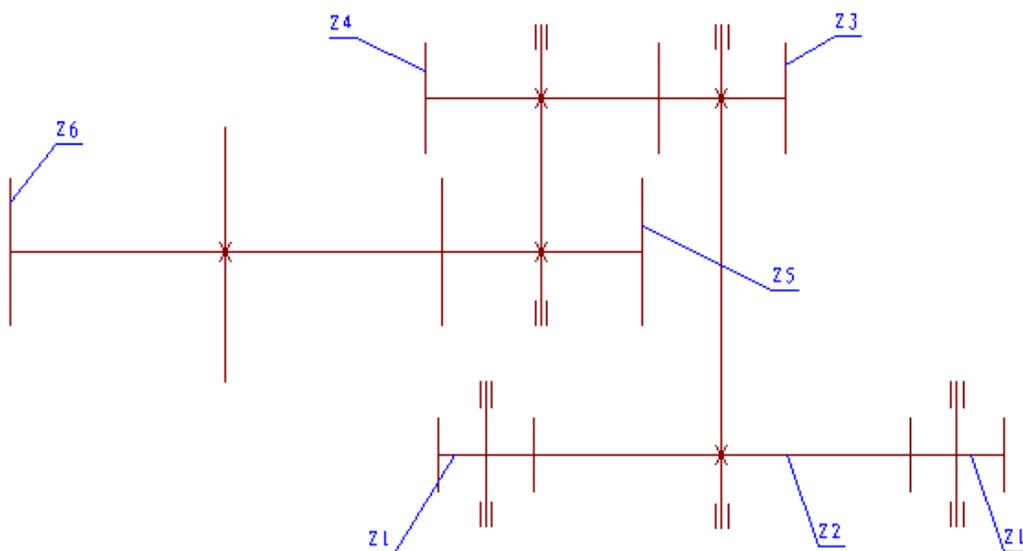


Fig.2: Transmission Principle for YSL135 Hydraulic Swivel

Refer to Fig.2. Z1 is an input gear, installed at output end of hydraulic motor. High speed and low torque inputs from gear Z1, then goes through reduction of triple-gear Z1/Z2, Z3/Z4, Z5/Z6, at last outputs from central pipe via Z6. Gear Z6 and

central pipe are connected into a whole.

The hydraulic swivel is equipped with two hydraulic motors. The two hydraulic motors may parallel output or series output depending on flow distribution of hydraulic system. So the swivel can switch between high and low gears to meet different working needs.

Figure 3 is hydraulic principles for YSL135 hydraulic swivel. Port A and port B are working ports; Port K is for gear-shifting control. When there is no pressure in Port K, two motors are in series and keep the swivel at high gear. When hydraulic fluid enters into Port K, two motors are in parallel and

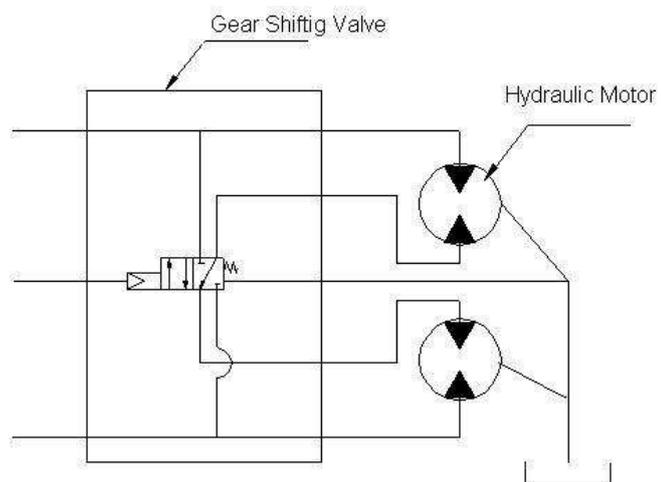


Fig.3 Hydraulic Principles for YSL135

keep the swivel at low gear. By changing status of oil in or out of Port A and B, accordingly the central pipe will rotate in clockwise or anti-clockwise.

Gear shifting button is set on remote control cabinet for DKYC320/31.5D II power control unit. Refer to operation instructions of DKYC320/31.5D II power control unit for details.

Table 2: Relation between central pipe output torque and speed			
Working status of two motors	Maximum output torque, Central pipe		Speed, Central pipe
	kN.m	ft.lbs	rpm
In series (high-gear)	7750	5715	160
In parallel (low-gear)	15500	1130	80

5. Installation

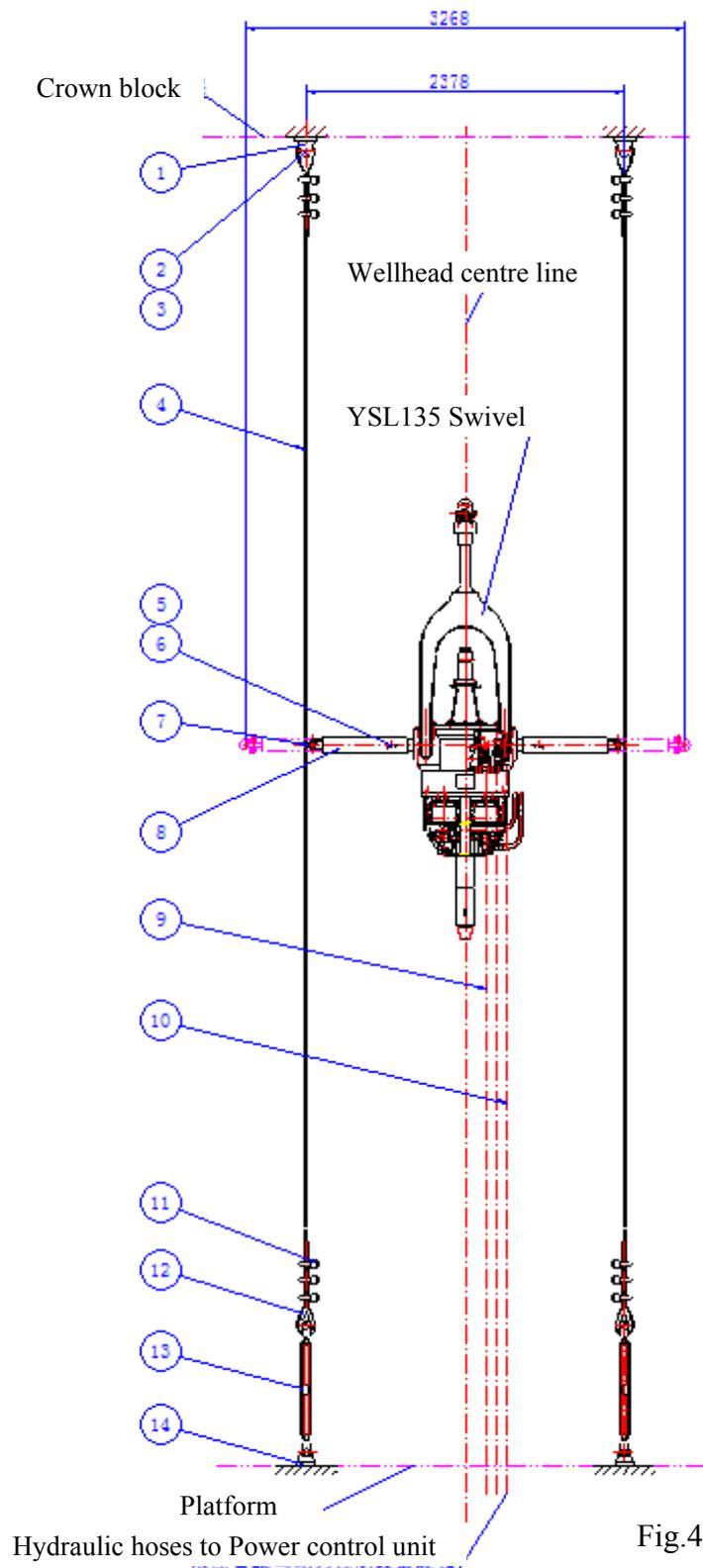


Fig.4: Mounting of YSL135 Swivel

1. Start the power control unit equipped with the swivel, and switch the control button to “multi-way valve” position.
2. Utilize small winch to lift the swivel up slowly from the swivel support frame.

3. During lifting the swivel, alternately operate the two-way control valves on Power control unit to release wire rope from hauling winch and hoses from hydraulic winch.

4. Upon lifting the swivel to wellhead position, remove winch wire rope from swivel bail and spool the rope on hauling winch.

5. Lift the swivel to maximum height of workover rig. Check swivel hoses for free status. Never allow the hoses to be with additional load or impacted against other components.

6. Take out two anti-torque wire ropes and install them on the rig according to the above drawing, and tighten the ropes. The ropes go through the torque rein assembly on both sides of the swivel. Distance of rope mounting center is between 2378mm-3268mm. (See Fig.4) .

7. Move the swivel up and down to make sure the torque rein assembly can slide freely on anti-torque rope.

8. Connect the hydraulic control hoses with quick disconnect on gear-shifting valve block and make sure that all connections are reliable.

Table3: Accessories for mounting YSL135 swivel			
No.	Part No.	Description	Qty.
1	71.191.00A	Support seat	2
2	36.01-01 I	Pin	2
3	GB/T91-2000	Pin 6×40	2
4	GB/T20118-2006	Wire rope φ 16×40m	2
5	RS171.120-01	Fixed pin	2
6	19.500-05	Clip	2
7	JB/T8112-1999	Shackle S-BX5	2
8	RS171.120.00	Torque rein assembly	2
9		Pressure hose 32Ⅳ-30500	2
10		Hose 25Ⅱ-30500	1
11	GB/T5976-2006	Wire rope clamp 16	12

12	GB/T33-1999	Collar WT16	4
13	GB/T3818-1999	Turnbuckle KUUD-M30	2
14	71.192.00A	Support frame	2

6. Usage

YSL135 hydraulic swivel is easy for operation. Only need to operate the handles for Power control unit may control rotation of swivel central pipe. By controlling buttons on console may realize shifting between high gear and low gear.

Working torque and speed is to display on touch screen of Console for Power control unit.

Refer to Operation Instructions for DKYC320/31.5DII power control unit for detail information about the unit console.

7. Maintenance

7.1 Lubrication

Prior to working, check gear lubricant. It is recommended to use L-CKB220 gear lubricant. Oil level for Hydraulic swivel should be in the midst of two oil pointers. Too low or too high will affect normal working of the swivel and weaken its performance and service life.

It is necessary to changing lubricant after working for 100 hours. When changing, remember to clear away scraps on the drain plug.

For every shift, must inject lime grease into grease fitting on wash pipe parts for twice.

Connection thread between central pipe (No.9, Fig.1) and sub (No.10, Fig.1) , sub and drill tool should be applied with thread compound.

7.2 Wear limit

See Fig. 1, connection size of shaft neck on top of bail is $\phi 88.9\text{mm}$. When worn to $\phi 86\text{mm}$, replace right way.

Connection of central pipe and sub is $3\frac{1}{2}$ I.F., and lower end of sub is $2\frac{7}{8}$ I.F. When pitch diameter of thread teeth is worn for 1.5mm, replace the central pipe and

sub.

7.3 Replacement of packing

If packing device shows leaking during operation, replace mud pipe or packing according to the following steps. (See Fig.5).

7.3.1 Remove bolts and washers (No.2 and No.3), and remove gooseneck (No.1), wash pipe (No.5), and seal ring (No.4).

7.3.2 Unscrew packing box (No.16) and release whole packing device from central pipe (No.12).

7.3.3 Remove set screw from packing box, replace with new packing (No.9), O-ring (No.15), and then tighten the set screw.

7.3.4 Screw tight the new packing device in central pipe.

7.3.5 Equip wash pipe (No.5), O-ring (No.4), and gooseneck (No.1) in order on support frame (No.6) with bolts and washers (No.2, and No.3).

7.3.6 Inject grease into packing device.

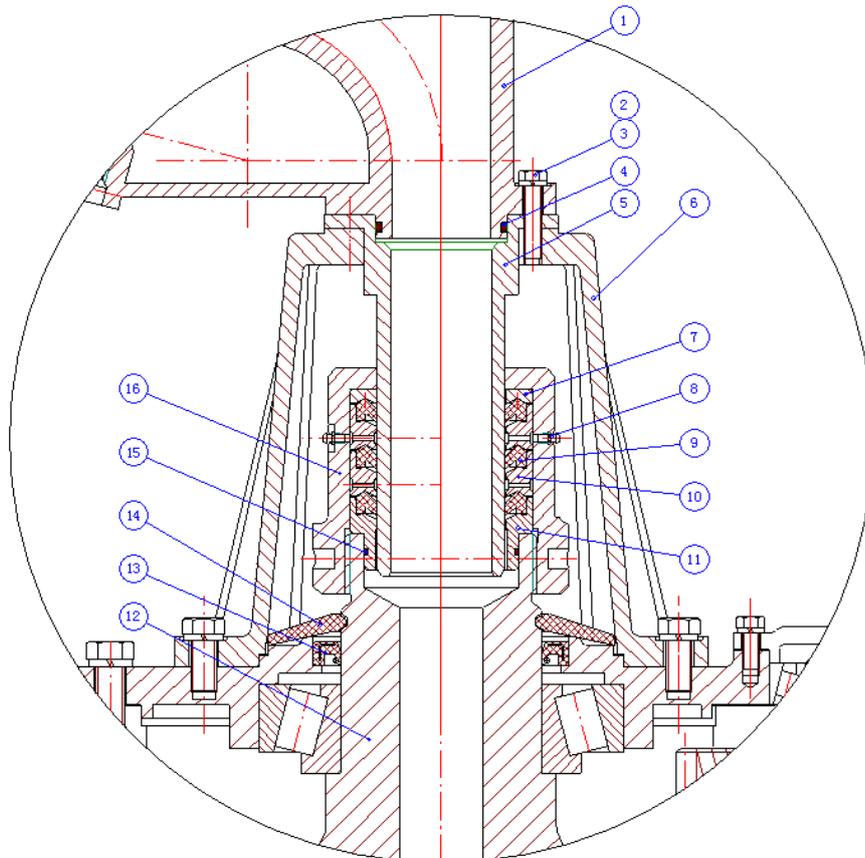


Fig.5: Packing Device of YSL135 Hydraulic Swivel

Table 4: Parts List for YSL135 Hydraulic Swivel Packing Device			
No.	Part No.	Description	Qty.
1	RS171.100-02	Gooseneck	1
2	GB/T32.1-88	Bolt M18×45	6
3	GB/T93-87	Washer 18	6
4		O-ring OR-NBR90 81.92×5.33	1
5	71.100-24B	Wash pipe	1
6	71.100-15B	Support frame	1
7	71.140-02B	Gasket ring	1
8		Grease fitting NPT1/8	2
9	71.140-03A	Packing	3
10	71.140-04A	Spacer ring	2
11	71.140-05A	Lantern ring	1
12	RS171.100-06	Central pipe	1
13		Oil seal 139.7×177.8×16.6	1
14	71.100-20A	Rubber umbrella	1
15		O-ring OR-NBR90 101.19×3.53	1
16	71.140-01A	Packing box	1

7.4 Storage

When the swivel is not in use, keep it on the swivel frame and spool hydraulic hoses and hauling wire rope on corresponding winches. Store the whole power control unit in a dry and clean place.

Protect gooseneck thread, central pipe thread and sub thread against damaging and entering of foreign matters.