Operation and Maintenance

Manual

DZ500-4 BOP Handling System

I. Profile

DZ500-4 BOP Handling System is designed to meet requirement of installing and removing BOP stacks. The system is full-hydraulic control and can be used for heavy and medium duty drilling equipment. The main function of system is to lift and install single BOP or BOP stacks. The system features with explosion-proof, easier operation, better reliability, and safety. It consists of left and right BOP moving device (each hung on one guide rail below drill floor), hydraulic control box, pipelines, and hose hangers. Controlled by hydraulic operating box, the system can achieve the movement of rising, lowering, moving forward and backward synchronously, or moving forward and backward asynchronously, rising and lowering with limited separation distance (less than 1m). It is convenient for installing and removing BOP stacks.

II. Type and Specifications

1. DZ500-4 BOP Handling System mainly consists of left / right handling devices and hydraulic system.
2. DZ500-4 BOP Handling System is powered by hydraulic power station for floor mechanical tools (i.e. power tongs) of drilling rig.
3. DZ500-4 BOP Handling System is easier to assemble and disassemble. All hydraulic hoses adopt snap joints (completed with dust-proof plugs or caps) as connections. It not only makes it easier to assemble and disassemble system but also keep inner hoses clean.
4. Technical Specifications

a.	Max. Lifting Capacity:	2x250=500kN
b.	Max. Lifting Height:	4.0m
c.	Max. Lifting Speed (Two sides):	0.8m/min
d.	Max. Lifting Speed (One side):	1.5m/min
e.	Max. Lowering Speed (Two sides):	1.5m/min
f.	Max. Lowering Speed (One side):	3.2m/min
g.	Max. Horizontal Moving Speed (Dual Direction):	12m/min
h.	Max. W.P. Hydraulic System:	18MPa
i.	Max. Flow Hydraulic System:	120L/min
j.	Wire Line Diameter:	28mm

III. Structure and Features

1. DZ500-4 BOP Handling System is combined by two single lifting devices which each hung on guide rail below the drill floor. One device can lift maximum 250kN load and 500kN for two.

2. The system adopts 3 times stroke scale-up structure which features with shorter cylinder stroke, bigger lifting height. Compared with other same lifting height BOP handling system, it has lighter weight and compact volume.

3. The system is full hydraulic control. Each lifting device consists of following parts:
   - Running mechanism (powered by hydraulic motor)
   - Lifting cylinder
   - Wire rope and pulley block
   - Main frame connecting running mechanism and cylinder
   - Hydraulic control system.

4. Operator can operate and control system by hydraulic control box to achieve the following actions:
   - Rising and lowering synchronously
   - Moving forward and backward synchronously
   - Moving forward and backward asynchronously
   - Rising and lowering synchronously with limited separation distance (less than 1m)

5. By full hydraulic control, it features higher performance on explosion-proof.

6. Easy operating valves on hydraulic control box make it easy to control the speed of rising, lowering, moving forward and backward.

7. DZ500-4 BOP Handling System is easy to install and transport. All hydraulic hoses used to connect or disconnect on installation or dismounting adopt snap joints as connections. It not only makes it easy to install and dismount system but also keep inner hoses clean.

IV. Installation and Test

1. Infix two lifting devices separately from the ends of guide rails below the drilling floor (see Figure 2 for installing direction), and mount stop pins on the end of the guide rails to prevent lifting devices from sliding out of the guide rails.

2. Weld backing plate of pipe hanger matched with wed plates on the middle of guide rails and mount pipe hanger (see Figure 2).

3. According to the matching codes stamped on the snap joints, connect all hydraulic hoses with two lifting devices.

4. According to the matching codes stamped on the snap joints, connect all hydraulic hoses with hydraulic control box and lifting devices, and fix the middle of hoses on the pipe hanger.

Note: The length of hoses between pipe hanger and lifting device should meet the requirement of lifting devices on moving forward and backward.

5. Connect oil inlets and outlets on the hydraulic control box with oil inlets and outlets on the hydraulic station of power tongs on the drilling floor.

6. Ensure all pipe connections in good condition, start hydraulic station to provide DZ500-4 BOP Handling System with 18MPa hydraulic oil.

7. Push handles of control valves according to the direction marked on the nameplates of the control box and check if all actions are right. Only after all actions must be checked with no any mistakes, then the system can be put into operation.

!!! Caution !!!
On the operation of moving forward and backward asynchronously, the distance between two lifting devices must be less than one meter, otherwise it will cause serious accident.

V. Operation, Maintenance and Safety

1. Watch the manometer on the hydraulic control box to check if oil-feeding pressure meets the requirement (18MPa).

2. According to the directions marked on the nameplates of hydraulic control box, operate two lifting devices to rise, lower, move forward and backward.

2.1 Synchronously control valve No. 1 and 2 to make system move synchronously.
2.2 Asynchronously control valve No. 1 and 2 to make system move asynchronously.

!!!Caution!!!
On the operation of moving forward and backward asynchronously, the distance between two lifting devices must be less than one meter, otherwise it will cause serious accident.

2.3 Synchronously control valve No. 3 and 4 to make system lift synchronously.
2.4 Asynchronously control valve No. 3 and 4 to make system lift asynchronously.

3. Maintenance is the needed procedure before installation of two lifting devices. There are 8 lubrication ports on the lifting device each, 6 for pulleys and 2 for driving gears. All lubrication ports should be fed by lithium base grease.

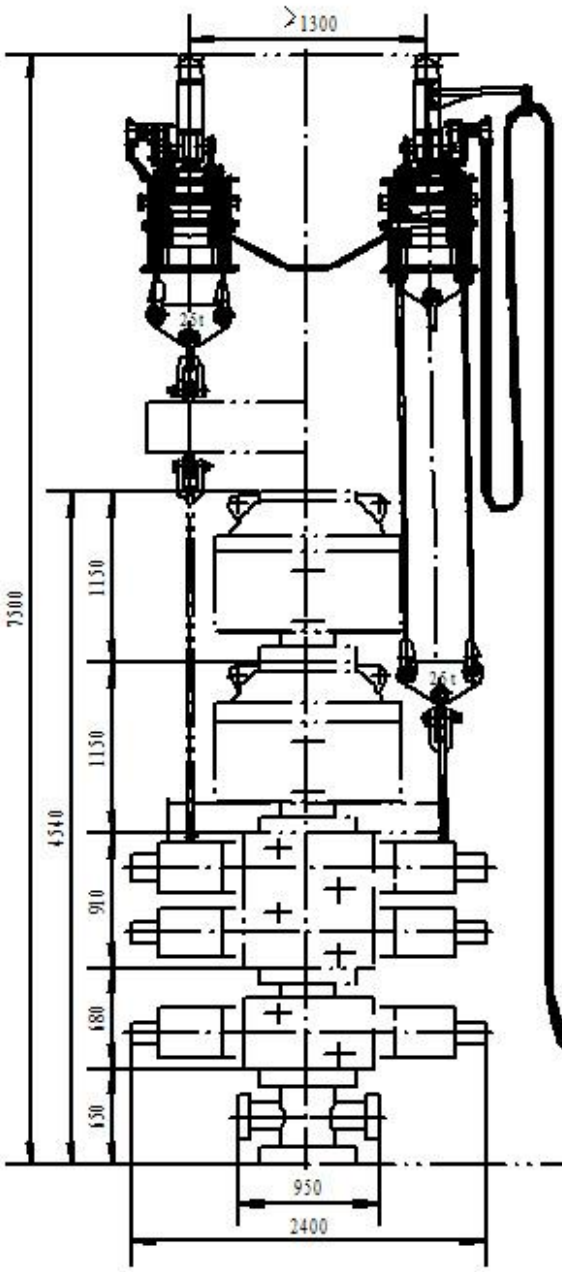
4. Before each lifting operation, operator should check if all cables are in good conditions. All cables should be reliable connection before operation. On lifting operation, workers should be far away from the goods to avoid accidents.

VI. Spare Parts List

Item	Code	Description	Qty.	Components
1	FY50-01.04.02	Cupper Bushing	24	Pulley
2	FY60-07.02	Lift Cable Φ28	2	BOP Handling System
3	GB276-82	Bearing 306	4	Gear Reducer
4	GB278-82	Bearing 60307	4	Gear Reducer
5	GB276-82	Bearing 106	1	Pipe hanger
6	GB301-84	Bearing 8205	1	Pipe hanger
7	GB276-82	Bearing 312	20	Drive / driven Wheel
8	604-1034	J2K-160 Cycloid Motor	4	Hydraulic System
9	DB10-2-	Overflow Valve	2	Hydraulic System
10	RVP10-10	Check Valve	8	Hydraulic System
11	FD12FA	Compensation Valve	2	Hydraulic System
12	GB1235-76	O-ring 12x1.9	36	Hydraulic System
13	GB1235-76	O-ring 16x2.4	4	Hydraulic System
14	GB1235-76	O-ring 20x2.4	13	Hydraulic System
15	GB1235-76	O-ring 24x2.4	2	Hydraulic System
16	GB1235-76	O-ring 30x3.1	2	Hydraulic System
17	JB982-77	Combined Gasket 22	18	Hydraulic System
18	JB982-77	Combined Gasket 18	6	Hydraulic System
19	JB982-77	Combined Gasket 14	18	Hydraulic System

VII. Attached Drawings

1. Fig.1: Lift Diagrammatic Sketch
2. Fig.2: Structure of DZ500-4 BOP Handling System
3. Fig.3: Hydraulic Principle of DZ500-4 BOP Handling System



Technical Specifications

1. Max. Lifting Capacity	2X250=500kN
2. Max. lifting Height	4m
3. Max. Lifting Speed (Two sides) :	2.7m/min
4. Max. Lifting Speed (One side):	5.4m/min
5. Max. Lowering Speed (Two sides):	4.43m/min
6. Max. Lowering Speed (One side):	8.86m/min
7. Max. Horizontal Moving Speed (Dual Direction):	12m/min
8. Max. W.P.Hydraulic System:	16MPa
9. Max. Flow Hydraulic System:	120L/min
10. Wireline Diameter:	Φ28mm

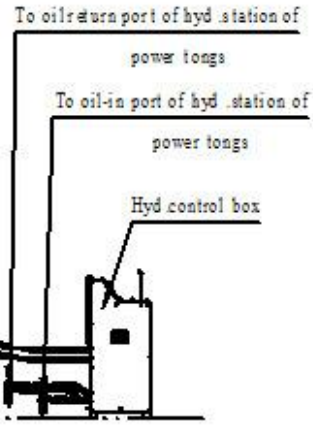


Fig.1: Lift Diagrammatic Sketch

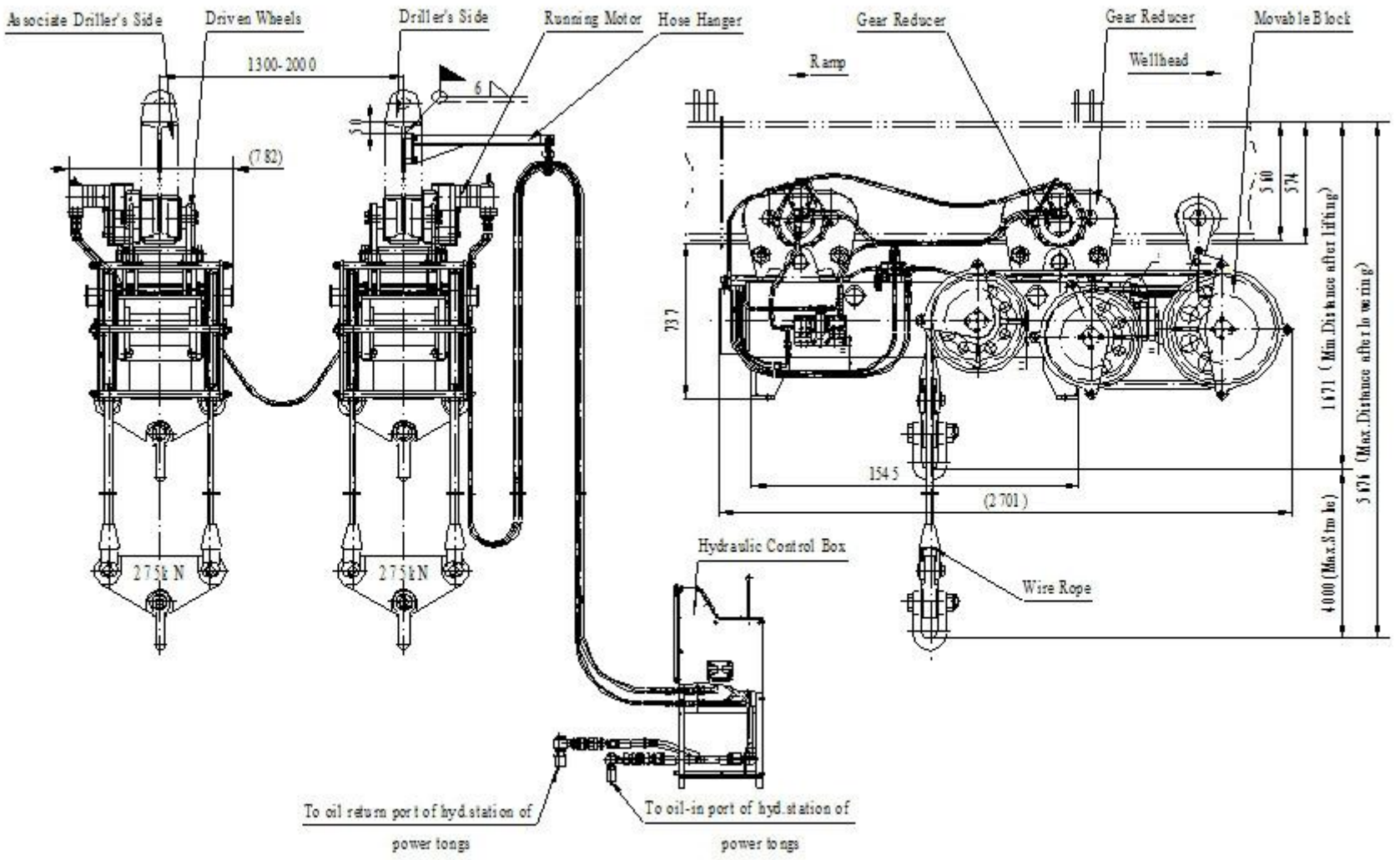


Fig.2: Structure of DZ500-4 BOP Handling System

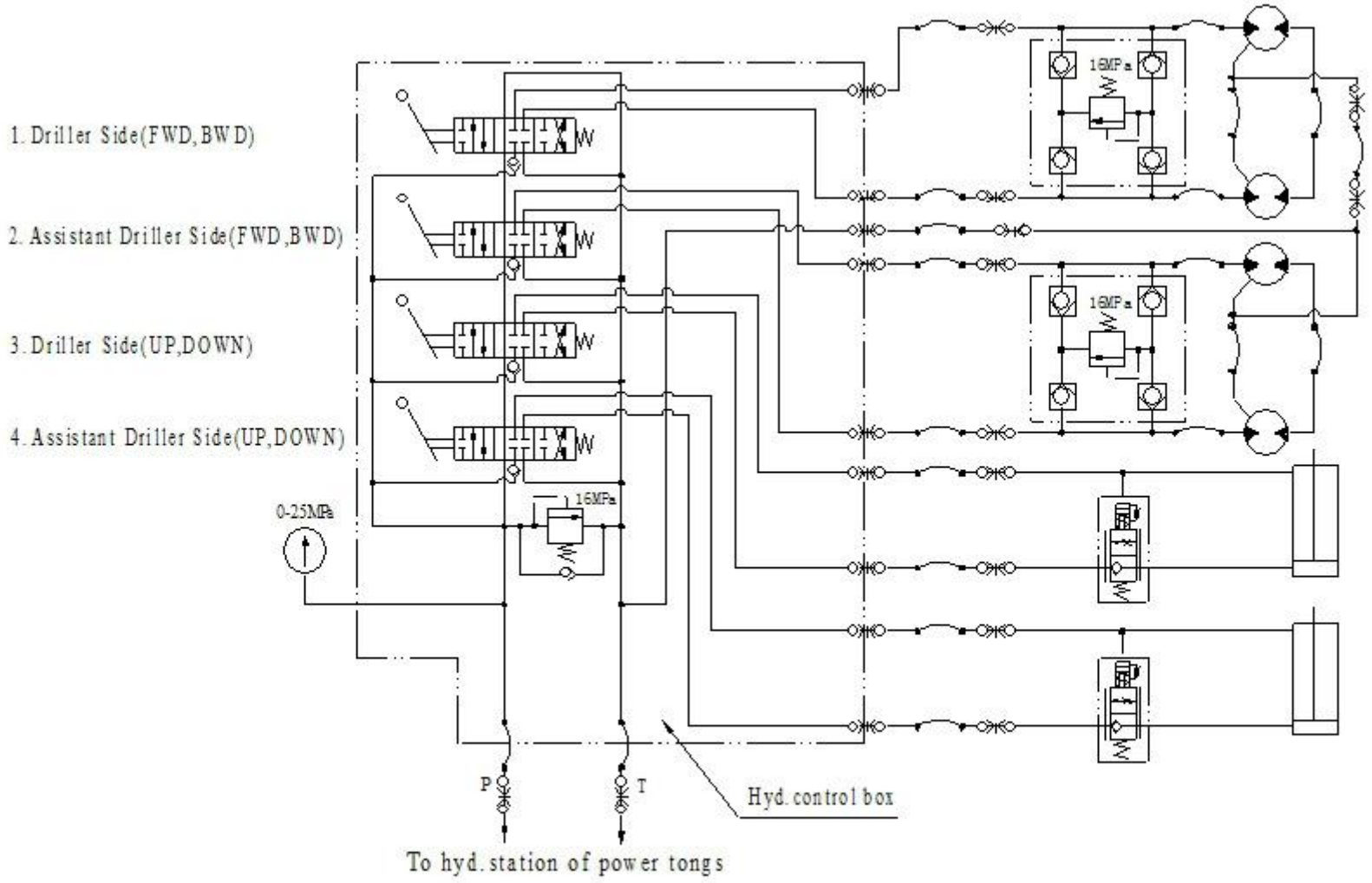


Fig.3: Hydraulic principle of DZ500-4 BOP Handling System