

Technical Specifications for XJ750 Workover Rig

1. Technical standard and reference

- API Spec 4F (2nd edition) Mast base specification for Drilling and Workover rig
- API Spec Q1 (7th edition) Quality outline
- API Spec 8C (4th edition) Drilling and Production Hoisting Equipment
- API Spec 7K (3rd edition) Drilling Equipment specification
- API Spec 7-2001 (40th edition) Rotary Drill Stem Elements specification
- API Spec 9A (25th edition) Wireline specification
- SY/T5202-2004 Specification for Drilling Equipment
- ISO 9001-2000 Quality Systems
- HSE Health, safety, environment control system

2. Main specifications

- Service depth 8500m ($\phi 2\frac{1}{2}$ " tubing)
- Workover depth 7000m ($\phi 2\frac{7}{8}$ " DP)
- Rated hook load: 1176kN
- Max. static load: 1470kN
- Rated Horsepower, engine C11 385HP (2100r/min) x2
- Clear height, mast 34m
- Height, monkey board (to substructure) 55ft
- Traveling system 4x5
- Height, substructure 4.5m
- Drive type, carrier 12x8
- Dia., wireline $\phi 29$ mm
- Traveling dimensions 19.8m x 3.1m x 4.47m
- Max. speed 72km/h
- Min. turning radius 18m
- Traveling weight 56000kg

3. Configuration

1、 Power system	2、 Carrier
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C11 (385hp) Engine HD4700 Transmission Guard cover of engine Inline type dual diesel tanks	Chassis, axles, tires (including spare tire), suspension, steering, braking, cab, removable walkway and handrail, ladder from ground to rig, tool box/tool cabinet etc.
3、 Drive system	4、 Drawworks
Right angle gear box Drive shaft and guard shield Transfer case Input and output chain and guard shield	Main drum & brake system (circulating water cooling) Sand drum & brake system (splash water cooling) WCB224 Air controlled water-cooling disc brake Cooling system of brakes
5、 Mast and traveling system	6、 Rotary system
34m mast assy. (including crown block and monkey board), 3" single standpipe, 4 pcs wind guylines, 2 pcs internal load guyline, 2 pcs cross guylines of monkey board, 2 pcs reinforced guyline, deadline anchor, weight indicator	3t & 5t hydraulic winch, main oil pump, hydraulic oil tank, steering oil pump and hydraulic assist steering system, telescoping cylinder, raising cylinder, leveling cylinder, air compressor, air reservoir, console box, battery and valves. SL160 swivel (w/o spinner)
7、 Accessories	
Preheater Mast inclinometer Overwinding crown saver 4.5m telescoping substructure Sucker rod hanger Driller's console	

4. Specifications of main parts

4.1 Diesel engine

C-11 diesel engine, c/w auto shutdown for oil over pressure, water over temperature, speed governor. Meet the Euro-3 Emission Standard; 12V DC is supplied by engine.

➤ Model

C11

- Rated horsepower 385BHP / (2100rpm)
- Diameter, cylinder 145mm
- Stroke 183mm
- Cylinder no. and arrangement 6 linear arrangement
- Displacement 18.1 L
- Qty. 2

4.2 Hydraulic transmission

HD4700 transmission, c/w PTO for main oil pump. Valve for engaging and gear shifting of hydraulic clutch uses air over hydraulic shifter. The transmission oil is cooled by radiator of diesel engine through heat exchanger.

- Model: ALLISON HD4700
- Gear ratio:

1	2	3	4	5	Reverse
4:1	2.684:1	2.013:1	1.351:1	1:1	5.12:1

- Gear ratio of transfer case: 1:1

4.3 Carrier

Fabricated from reinforced frame welding with H type material. Heavy-duty, wide wheelbase, carrier with 12x4 drive. The first, second and third axles: 10t load, steering slave axle. The fourth and fifth axles: 13t load, driving axle. The sixth axle: 12t load, slave axle. The front three tires are MICHELIN (or other similar imported tire) tubeless tire (type: 445/65R 22.5XZY3), and the rear three tires are MICHELIN (or other similar imported tire) dual application (type: 315/80R 22.5XZY2). The front three axles are of steel plate spring suspension, the fourth and fifth axles are of rigid walking beam suspension, the sixth axle is of air suspension. Hydraulic assist steering. Cab is COE type with single seat. Interlock for wheels and axles between fourth and fifth axles. All controls of carrier are centralized in cab.

- Axle base 1300+1300+4805+1370+1370 mm
- Wheel base 2180 mm
- Drive type 12x4
- Approach angle 27°
- Departure angle 17.3°

- Min. turning radius 18m
- Min. sweeping radius, mast: 22.5m
- Max. climb gradient 32%
- Min. ground clearance 0.34m
- Max. speed: 72km/h
- Tire, front 3 axles single tire
- Tire, rear 3 axles double tires

4.4 Right angle gear box

The right angle gear box mainly consists of input shaft, output shaft, big and small spiral cone gear, output bearing seat, cast steel housing, support, flange, sprocket and various kinds of bearings. The box body is made of integral casting steel and is compact in structure. Helical bevel gear can drive stably with large power. The input and output shafts are made of premium alloy steel. Bearings have two types: dual line tapered bearing and single line centripetal short column roller bearing. Compound sealing, reliable oil bath spraying lubrication.

- Gear ratio: 1:1.57

4.5 Drive system

The engine power is divided into 4 ways after reaching the transfer case via transmission box. Power of the upper transfer case is transferred to main drum through right angle gear box and sand drum. Power of the middle transfer case is transferred to rotary table through the rotary drive. The last way is to rear axle. The specifications of drive chain on the deck are as following:

Right angle gear box→sandline drum	1 ³ / ₄ "Double chain
Sandline drum→main drum	1 ³ / ₄ "Double chain
Rotary drives→rotary table	1 ³ / ₄ "Double chain

4.6 Drawworks

JC650 double drum drawworks. With 29mm LEBUS groove, c/w over-winding crown saver. Drum shaft is fabricated of premium alloy steel; ATD-324H air thrust disk clutch for main drum, inner circulating water cooling system for brakes of main drum, ATD-124H air thrust

disk clutch for sand drum, splash water cooling system for brakes of sand drum. Brake rims are all mono block alloy steel. WCB224 air controlled water-cooling disc brake as auxiliary brake.

— Main drum:

- Groove diameter x length: $\phi 480\text{mm} \times 914.5\text{mm}$
- Groove structure: $\phi 29$ LEBUS groove
- Cooling type of brake rims: inner chamber water circulating type
- Model, clutch: ATD-324H forced thrust disk clutch
- Max. fastline pull: 210KN

— Sandline drum:

- Groove diameter x length: $\phi 324\text{mm} \times 1016\text{mm}$
- Cooling type of brake rims: air pressure water spraying type
- Model, clutch: ATD-124H forced thrust disk clutch
- Max. fastline pull: 115KN

— Auxiliary brake :

- Model: WCB 224 air-controlled water-cooling disc brake
- Max. brake torque: 42000N·m
- Max. air inlet pressure: 1.03MPa
- Max. water temperature: 82

— Cooling system for brakes:

- Capacity, water tank: 4m^3
- External power, in-line pump motor: 460V AC 60Hz

4.7 Mast

Derrick, double-section angle steel mast, hydraulic raising cylinder and telescoping cylinder; slant angle can be adjusted by adjustable screw bar. Integral box type crown block, forged steel sheaves passed dynamic balance test; the profile of groove is designed and made as per API 8C and wireline of rig; line kicker is also equipped on sheaves seat to prevent wireline from jumping over; crown shafts have been heat treated and NDT before installed on rig. Handrail is provided for crown block. Delay type monkey board can be foldable along with mast telescoping, with adjustable finger to fit for different size pipe string.

— Mast:

- Model: JJ155/34 - W

- Clear height: 34m
- Max. static load: 1548kN (8 wirelines)
- Slant angle: 3°, c/w clinometer
- Crown sheaves: Bottom dia. ϕ 655 (for ϕ 29mm wirelines)
- Fastline sheaves: Bottom dia. ϕ 795 (for ϕ 29mm wirelines)
- Traveling system: 4x5
- Capacity, monkey board: 2000m (ϕ 5" DP)
- Max. wind rate: 110km/h (about grade 10)
- Finger beam arrangement, monkey board: horizontal

4.8 4.5m Substructure

The substructure is of telescoping type, and level to the plane of rotary table. Complete with two sets of ladders (one set to the ground and the other to the carrier), one set of V-door, walkway, handrails, stairs, escaping chute, mouse hole and rat hole and two backup tong posts.

- Type: DZ147/4.5-S
- Floor height: 4.5m
- Clear height: 3.5m
- Transportation height: 2.9m
- Max. load, rotary table: 1470KN
- Setback capacity: 6200m (2⁷/₈" EUE tubing)
5200m (2⁷/₈" DP)
3800m (3¹/₂" DP)
2600m (4¹/₂" DP)
- Combined load: 1925 KN
- Floor area: 5.2x8m

4.9 ZP205 rotary table

- Type: ZP205
- Max. static load: 3000kN
- Opening diameter: ϕ 520.7mm (20.5")
- Max. RPM: 300rpm

4.10 Mud boat

4.11 Hydraulic system

It is mainly used for assist steering during rig moving, or for leveling of chassis and mast rising in rig up, and hydraulic application of wellhead tools. The controls of the system are centralized in driller's console. Important manipulating parts are multiple protected. Key parts of system are all imported from USA with reliable and stable performance.

——Max. displacement of oil pump:	165L/min
——Max. pressure, hydraulic system:	14MPa
——Hydraulic oil:	46# wear-resistant oil
——Capacity, oil reservoir:	833L
——3t hydraulic winch:	
➤ Model:	YJ-3
➤ Rated capacity:	30kN
➤ Quantity:	1
——5t hydraulic winch:	
➤ Model:	YJ-5
➤ Rated capacity:	50kN
➤ Quantity:	1

4.12 Air system

The air system is mainly used for controls of rig moving or servicing. Equipped with multiple drying, purifying, antifreezing unit for compressed air. The source of air system is air compressor that is belt driven by engine. Driller's console controls drawworks drum, engine throttle, shutdown, drawworks gearshift, emergency brakes of drum, air spider, air release valve of crown, relief of hydraulic pump etc. Key parts of the system are imported from USA with reliable and stable performance.

➤ Max. displacement, air compressor :	0.67m ³ /1250r/min
➤ Working pressure, system :	0.833 - 0.93MPa
➤ Capacity, air reservoir :	0.155m ³

4.13 Electric system

Traveling lighting system included. 12V DC for traveling is supplied from battery and SCR

generator driven by engine. Startup of engine, lighting for monitoring gauges, sound and lighting in transportation are provided. Red alarm lamp of mast, conduit for electric cables of mast should be provided.

- Power for carrier 12V DC
- External Power 460V AC 60Hz
- Rig lighting 110V AC 60Hz

4.14 Consumable parts come-along with the rig 1 set

4.15 Tools come-along with the rig 1 set

4.16 Documents come-along with the rig 1 set

