

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
1	General description		
1.1	Main technical specification for drilling rig		
1.1.1	Model of drilling rig	1500VFD slingshot drilling rig	
	Rig work temperature range	-18℃ to +50℃	
1.1.2	Parameter		
	Max. hook load	3150kN	
	Line	6x7	
	Diameter of drilling line	Φ35mm	
	Rated input power of drawworks	1200kW (1610HP)	
	Gears of drawworks	1+1R variable frequency stepless speed- regulating	
	Hoisting speed	0~1.3m/s	
	Opening diameter of rotary table	Φ952.5mm (37 1/2")	
	Rated power/No. of drilling pump	1176kW (1600HP) / 2pcs	
	Type of mast	K-type, cantilever	
	Effective height of mast	45.5m	
	Capacity of setback (5" drill pipe)	7000m	
	Type of substructure	Slingshot	
	Height of drill floor	10.5m	
	Area of drill floor (lengthxwidth)	12m×13.7m	
	Clear height under rotary beam	9.15m	
	Volume of air tank	2.5m ³ +4m ³ (Buffering tank)	
	Rated power x No. of main generator set	980kW×3 (60Hz,600V)	
	Total power for drilling rig	3×980kW+320ekW	
	Diameter/rated pressure of drilling fluid manifold	Φ102mm/35MPa	
	Total volume of mud tanks (include buffer tank)	375m ³	
	Type of electric drive	AC—DC—AC	
	Power/No. of drawworks' motors	600kW /2	
	Power/No. of rotary table' motor	600kW /1	
	Power/No. of mud pump' motors	1200kW /2	
	Power/No. of drawworks' auxiliary drive motor	45kW /1	
2	Hoisting system		
2.1	Mast Assembly JJ450/45.5-K		1set
2.1.1	Mast		1set
	Technical specification:		
	Conforming to API Spec 4F 3rd Edition and marked with API monogram.		
	Structural Safety Level (SSL)	E2 and U2	
	Product Specification Level (PSL)	PSL-1	
	Maximum static hook load capacity (6x7 line) (Note: Acceleration, impact, drill string racking and wind load will reduce max. hook load capacity)	4500kN(1000,000lbs)	
	Available height of mast	45.7m	
	Top span (frontxside)	2.2 m×2.2m	
	Bottom span	9m	
	Rated wind load for mast:		
	Expected (No hook load, no setback load)	47.8m/s(107mph)	
	Unexpected (No hook load, full of setback)	36m/s(80.5mph)	

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	Operating	16.5m/s(36.9mph)	
	Erection	16.5m/s(36.9mph)	
	Transportation	16.5m/s(36.9mph)	
	Racking capacity of monkey board (5" drill pipe 28m stand)	5 1/2"DP180pcs ;9" drill collar 4pcs、 8" drill collar 6pcs	
	Available height of monkey board	24.5m、 25.5m、 26.5m	
	Weight	107t	
	<p>Features: K style, cantilever beam leg mast, without guyline Mast consists of main mast ,racking board , casing centralization stage and hoisting device and accessories of mast.</p> <p>Main mast is front opening integrated structure that consist of each 5 sections on right and left, back crossbeam and tie rod. each of them are connected with pin.</p> <p>Mast is assembled horizontally in lower position to be raised up and down by drawworks. Mast raising devices are inclusive of A frames, sheaves, raising wire ropes and hydraulic buffering device.</p> <p>Equipped with complete attachments and safety devices.</p>		
2.1.2	Mast accessories Equipped with following auxiliary components:		1set
	<p>2 mast ladders (one on left to crown block and right side one to racking board) 2 climb assistors 1 standpipe work platform 3 dead line stabilizers 2 manual tong for balance weight 1 hydraulic power tong sheave</p>		
2.1.3	Racking board One racking board with foldable table and fingerboard		1set
	<p>All the fingerboard are equipped withed the safety cable,and foldable are equipped withed safety line Equipped with install seat for 0.5t air winch and sheave Equipped with suspension vertical column prevent falling, and urgency exit for derrick man</p>		
2.1.4	Casing stabbing board Available adjust casing centralization platform,equiped under the left lower end of the mast		
	<p>Raising and lowering of operation board by air winch. Adjust scope for elevating movement of operation board 6M</p>		
2.2	Substructure Assembly DZ450/9-X		1set
2.2.1	Substructure Technical specification:		1set
	<p>Conforming to API Spec 4F 3rd Edition and marked with API monogram.</p>		
	Structural Safety Level (SSL)	E2 and U2	
	Product Specification Level (PSL)	PSL-1	
	Maximum static hook load capacity	4500kN	
	Max. static load capacity for setback	2200kN	
	Load capacity with full setback and max. static hook load	6700kN	

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NO	Description	Model	Qty
	Floor height	9m	
	Floor area	13.25m×12.19m	
	Clear height from rotary beam to ground	7.75	
	Setback capacity (5" DP, 28m stand)	5 1/2" DP180pcs, 9" drill collar 2pcs, 8" drill	
	Weight	162t	
	Features:		
	The substructure is parallelogram construction , inclusive of bottom members, middle members, top members and raising up & down devices. All members are connected by pins.		
	Substructure can be installed at lower position and raised, lowered by drawworks. When mast reaches vertical position, substructure also get in the right position. Drawworks offer the raising power.		
	Low layer includes left base, right base and beam between bases.		
	Middle members are 4 rectangular frames and 4 slant stay posts		
	Top members comprise left upper base, right upper base, setback beam, rotary beam, DW base, floor plates, etc. The floor surface is flush with RT surface. BOP lifting device is under top layer.		
	Drawworks and rotary table are installed on top layer. Dog house and driller's control house is on drill floor.		
	Devices for raising up and down floor include raising frame supports, pulleys, raising lines, balance frames, sheaves and hydraulic buffer unit.		
2.2.2	Substructure attachments		1set
	Equipped with following attachments:		
	2 sets of installation accessories for 5t air winch		
	2 backup tail posts for manual tong		
	1 safety escape slide.		
	1 V-door ramp		
	Equipped with 3 ladders (one is on front floor side to ground, one is on rear floor side to ground, and the other is on right floor side to shaker tank)		
	Mud drip pan to be provided for rotary table		
	Bop handling beam (install under the top)		
	Supports for floor doghouse		
2.2.3	BOP handling device		1set
	Technical specification:		
	Max. hoisting capacity	2×275kN	
	Lifting speed	0~1.6m/min	
	Lifting distance	3.2m	
	horizontal moving speed	0~12m/min	
	Operation	Hydraulic	
	Rated pressure of hydraulic system	17.5MPa	
2.3	Drawworks, JC50DB		1set
2.3.1	Drawworks		1set
	The components of drawworks conform to API Spec 7K- 5th Edition		
	Technical specification:		
	Rated input power	1200kW	
	Max. pull of fastline	350kN	
	Diameter of wireline	Φ35mm	
	Reduction ratio of main gear reducer casing	7.352	
	Gears of drawworks	One gear stepless speed-	
	Drum (diameter×length)	Φ770 mm×1440mm	

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NO	Description	Model	Qty
	Control type of speed and function	AC frequency variable control + dynamic brake	
	Brake	Disc hydraulic disc brake	
	Hoisting speed	0~1.3m/s	
	Automatic bit-feed speed	0~60m/h (auxiliary drive device to be used) 0~200m/h (use main drive)	
	Overall dimension (length×width×height)	7100mm×3000mm×3170mm	
	Weight	43,000kg	
	Features:		
	The drawworks system consisting of two AC motors,two single speed gearbox, a wireline drum, one sets of disc brake and one set of Auxiliary drive unit.		
	The drawworks components are mounted on one skid. The driller uses a joystick and switches to remotely operate the drawworks in the driller cabin.		
	Power is transmitted from the AC motors through single-speed reduction, helical gearbox. The gears are force-lubricated from the oil in the oil tank in the skid, the gearbox has its own oil lubrication circuit.		
	The drawworks equipped with air cooled, parking/E-Stop Hydraulic disc brake.,and the auxiliary brake is AC motor regenerative brake.		
	The Auxiliary drive system can be used for auto-bit-feed and emergency hoisting.		
	Equiped wirh over-riding valve(driller control system is equipped with electronic block position display and crown block collision protection system)		
2.3.2	Hydraulic disc brake		1set
	Technical specification:		
	Model	PS80	
	Brake disc	1pcs	
	Safety caliper	3pcs	
	Service caliper	3pcs	
	Diameter of brake disc	Φ1600mm	
	Rated positive pressure of brake caliper	80kN	
	Rated pressure of hydraulic disc brake operating system	7.5MPa	
	Cooling type of brake disc	Air cooling (natural cooling)	
	Feature:		
	With such functions as operating brake and emergency brake		
	It adopts electro-hydraulic proportion pressure-regulating control with high precision of control.		
	(Hydraulic disk brake is powered by HPU)		
2.3.3	AC frequency variable motor of drawworks		2pc
	Technical specification:		
	Fundamental frequency power	600kW	
	Fundamental frequency voltage	460V	
	Fundamental frequency current	714 A	
	Fundamental frequency power factor	0.86	
	Fundamental frequency rotary speed	661 r/min	
	Fundamental frequency torque	8673Nm	
	Insulation class	200 class	
	Number of poles	6 poles	
	Connection mode for stator winding	Y	

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NO	Description	Model	Qty
	Cooling type	Forced air cooling (equipped with blower)	
	Working type	Continuous	
	Protection grade of junction box	IP54, pressured junction box	
	Weight	2900 kg	
	Feature:		
	The motors can meet the requirements of variable frequency system for the purpose of drive and control, it also can meet the requirement of working environment of drilling		
	The motors are equipped with detector switch, service switch and heater.		
	The motors adopt forced air cooling and are equipped with blower by themselves.		
2.3.4	Drawworks auxiliary drive motor		1pc
	Rated power	45 kW	
	Rated voltage	460V	
	Rated torque	290 Nm	
	Frequency	60 Hz	
	Speed	1720 r/min	
	Max. frequency	100 Hz	
	Coling tape	forced wind cool	
	Motor protection degree	IP55, Exd.	
2.3.5	Auxiliary drive device		1set
	Technical specification:		
	Rated power	45kW	
	Speed range of bit-feed	0-60m/h	
	Feature:		
	The power of auxiliary AC variable frequency motor is input to the main gearbox via helical bevel gear reducer in order to drive the drum shaft.		
	VFD drive with digital control for auto-bit-feed		
	It is featured with high gear ratio and input torque, meeting the requirement of hoisting max. weight of drill string and it also can be used for emergency hoisting in case of failure of main system.		
2.4	Crown block TC315		1set
	Technical specification:		
	Conforming to API Spec 8C 4th Edition/4F 3rd Edition specification		
	Structural Safety Level SSL	E2 and U2	
	Product Specification Level PSL	PSL-1	
	Max. static load	3150kN	
	Quantity of sheaves	6+1	
	OD of fastline sheave	Φ1270mm	
	OD of main sheave	Φ1524mm	
	Diameter of wireline	35mm	
	Overall dimension (Lengthxwidthxheight)	3465x3964x3960mm	
	Weight	8320kg	
	Feature:		
	Adopt bolt connection between crown and mast.		
	The crown block is equipped with main sheave and fastline ward device and the main sheave is equipped with guard.		
	Buffer wood, protective net and safety chain are equipped beneath the crown block frame and handrails are also equipped for crown block.		

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	Water table equipped with suspending stands for protecting fall. Equipped with carry frame for maintain. The crown block is equipped with padeye for suspending the guide rail of top drive and it is also equipped with padeye for spooling wireline of travelling system. All the bearings are lubricated by grease nipples which are located at the end of bearing separately. 5t 2 set DW sheaves for bottom of the DW beam,all the derrick block with safety line																
2.5	<p>Travelling block, YC315</p> <p>Technical specification: Conforming to API Spec 8C 4th Edition and marked with API monogram</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Max. static load</td> <td style="width: 50%;">3150kN</td> </tr> <tr> <td>Quantity of sheave</td> <td>6</td> </tr> <tr> <td>OD of sheave</td> <td>Φ1270mm</td> </tr> <tr> <td>Diameter of wireline</td> <td>Φ35mm</td> </tr> <tr> <td>Overall dimension</td> <td>2,580×1,350×800mm</td> </tr> <tr> <td>Approximate weight</td> <td>5648kg</td> </tr> </table> <p>Feature: The sheaves adopt tapered roller bearing Equipped with bail with high hardness and lug for wireline on the top.</p>	Max. static load	3150kN	Quantity of sheave	6	OD of sheave	Φ1270mm	Diameter of wireline	Φ35mm	Overall dimension	2,580×1,350×800mm	Approximate weight	5648kg		1set		
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2.6	<p>Hook, DG315</p> <p>Technical specification: Conforming to API Spec 8C 4th Edition and marked with API monogram</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Max. static load</td> <td style="width: 50%;">3150kN</td> </tr> <tr> <td>Stroke of spring</td> <td>200mm</td> </tr> <tr> <td>Diameter of main hook opening</td> <td>180mm</td> </tr> <tr> <td>Diameter of auxiliary hook opening</td> <td>120mm</td> </tr> <tr> <td>Opening size of main hook opening</td> <td>220mm</td> </tr> <tr> <td>Overall dimension (length×width×height)</td> <td>2953×890×880mm</td> </tr> <tr> <td>Weight</td> <td>3420kg</td> </tr> </table> <p>Feature: Hook is equipped with rotary locking device Hook opening is equipped with reliable locking device</p>	Max. static load	3150kN	Stroke of spring	200mm	Diameter of main hook opening	180mm	Diameter of auxiliary hook opening	120mm	Opening size of main hook opening	220mm	Overall dimension (length×width×height)	2953×890×880mm	Weight	3420kg		1set
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2.7	<p>Deadline anchor, JZG34A</p> <p>Technical specification: Conforming to API 8C 4th Edition.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Type of installation</td> <td style="width: 50%;">Horizontal</td> </tr> <tr> <td>Sensor</td> <td>Tension type</td> </tr> <tr> <td>Output pressure of sensor</td> <td>6MPa</td> </tr> <tr> <td>Max. pull of deadline</td> <td>340kN</td> </tr> <tr> <td>Diameter of wireline</td> <td>35mm</td> </tr> <tr> <td>Max. displayed load of weight indicator</td> <td>4080kN (6*7)</td> </tr> </table> <p>Feature: The deadline anchor and sensor are designed and manufactured according to API 8C 4th Edition. Install on opposite of driller's cabin and under right of mast</p>	Type of installation	Horizontal	Sensor	Tension type	Output pressure of sensor	6MPa	Max. pull of deadline	340kN	Diameter of wireline	35mm	Max. displayed load of weight indicator	4080kN (6*7)		1set		
Type of installation	Horizontal																
Sensor	Tension type																
Output pressure of sensor	6MPa																
Max. pull of deadline	340kN																
Diameter of wireline	35mm																
Max. displayed load of weight indicator	4080kN (6*7)																
2.8	<p>Drilling wireline</p> <p>Technical specification: Conforming to API 9A 25th Edition</p>		1set														

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NO	Description	Model	Qty
	Type	6×19S+IWRC EIPS (left hand)	
	Diameter	Φ35mm	
	Length	2300m	
2.9	Wireline spooler		1set
	Max. diameter of wireline	2600mm	
	Max. width of wireline reel	1600mm	
	Rated output torque	8000N.m	
	Power of motor:	7.5kW	
	Capacity	2300m (Φ35mm wireline)	
2.10	Elevator link		
	DH350 , L=3300mm		1 pair
	DH500 , L=4500mm		1 pair
3	Rotary system		
3.1	Rotary table and independent drive system		1set
3.1.1	Rotary table,ZP375		1set
	Conforming to API Spec 7K 5th Edition and marked with API monogram.		
	Max. static load	5850kN	
	Opening diameter	Φ952.5mm/ 37½ "	
	Max. rotary speed	300r/min	
	Gear ratio	3.56	
	Overall dimension	2468×1810×718mm	
	Weight (not including that of master bushing)	7548kg	
3.1.2	Rotary table independent drive unit		1set
	Technical specification:		
	Continuous working torque	45000N•m	
	Short-time Max. working torque	67500N•m	
	Speed-regulating range of rotary table	0~220r/min	
	Model of inertia brake	LT500/250T	
	Brake torque (0.8MPa)	26900 N•m	
	Weight (Including weight of rotary table)	12500kg	
	Feature:		
	Rotary is driven through gear wheel case and cardan shaft by AC VF motor.		
	Its drive device is installed on the spreading support of substructure's top layer which is lower than drill floor.		
	It is equipped with inertia brake and adopts ventilating air tube clutch.		
	Gear case is whole sealing construction,grease lubricated.		
	The rotary table drive system can realize such protection functions as over torque, reverse and breakdown.		
3.1.3	Frequency variable motor of rotary table		1pc
	Technical specification:		
	Fundamental frequency power	600kW	
	Fundamental frequency voltage	600V	
	Fundamental frequency current	714 A	
	Fundamental frequency power factor	0.86	
	Fundamental frequency rotary speed	661 r/min	
	Fundamental frequency torque	8673Nm	
	Insulation class	200 class	
	Number of poles	6 poles	
	Connection mode for stator winding	Y	

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NO	Description	Model	Qty
	Cooling type	Forced air cooling (equipped with blower)	
	Working type	Continuous	
	Protection grade of junction box	IP54, pressured junction box	
	Weight	2900 kg	
	The features same as the motor of drawworks		
3.1.4	Bushings for rotary table		1set
	The rotary table is equipped with the following bushings:		
	Master bushing		
	5 1/4" four pins driving roller bushing		
	4 1/4" four pins driving roller bushing		
	2 3/8"-8 5/8"bushing (for drilling)		
	9 5/8"-10 3/4"bushing, (for running 9 5/8" casing)		
	11 3/4"-13 3/8" bushing, (for 13 3/8" casing)		
	20" bushing, (for 20" casing)		
	Lift link for bushing		
3.2	Swivel,SL450(with FMS-20 air motor)		1set
	Technical specification:		
	Conforming toAPI 8C 4th with API monogram		
	Max. static load	4500kN	
	Max. dynamic load (API bearing load)	2800kN	
	Max. rotary speed	300r/min	
	Max. working pressure	35MPa	
	ID of stem	75mm	
	Thread of connection	API / 6 5/8" Reg.LH	
	Connection between gooseneck and rotary hose,, Fig 1002 union		
	Model of air motor	FMS-20	
	Rated rotary speed	2800r/min	
	Rated air pressure	0.6~0.8MPa	
	Rated power	14.7kW	
	Air consumption	17m ³ /min	
	Air inlet pipeline	1 1/2"	
	Rated makeup rotary speed	92r/min	
	Max. makeup spinning torque	3000N·m	
	Overall dimension (lengthxwidthxheight)	3,037x1,090x1,085mm	
	Weight	3461kg	
	Feature:		
	Equipped with bi-directional air spinner		
	The washpipe and packing are cartridge type which can be replaced easily .		
	On the top there is entry for instruments,2" screw plug.		
3.3	Top Drive system		1 set
	The components of top drive Conform to API Spec 8C 4th Edition		
	Specification		
	Model	DQ450DBZ	
	Motor Type	AC VFD	
	Horsepower Rating	778HP(580kw)	
	Transmission	No	

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NO	Description	Model	Qty
	Drilling Parameters		
	Drilling speed range	0 to 220 rpm continuous	
	Max Cont. Torque	37,500 ft lbs	
	Max Intermittent Torque	55,000 ft lbs	
	Static Lock Brake	37,500 ft lbs	
	Hoisting	500 ton	
	Washpipe Packing	5000 psi	
	Pipe Handler		
	Breakout Torque Capacity	55,000 ft lbs	
	Drill Pipe Range	3 1/2" to 5 1/2"	
	IBOP Pressure Rating	15,000 psi	
	Upper IBOP	6-5/8" API Reg. RH, Box and Pin	
	Lower IBOP	6-5/8" API Reg. RH, Box and Pin	
	Swivel Required	No	
	Cooling System	Local Blower	
	Hydraulic Power	Onboard	
	TDS Working Height	18.7 ft	
	Weight	34,800 lbs	
	Feature		
	Without mechanical variable speed drive, the AC VFD electric motor directly drives the main rotary shaft to drill in.		
	The hydraulic power unit, hydraulic valve bank, energy accumulator and cooling blower are installed in the outer shell, convenient for maintenance.		
	Integrated swivel, and motor direct-drive is able to provide bigger drilling torque in short period of time, not affected by the fixed design strength of mechanical transmission, reducing the energy consumption loss of transmission at the same time.		
	The equipment composition is function modularization, with good technology of assembly and installation, modular structure, low fault point and failure rate.		
	Without mechanical variable speed drive, the electric motor directly drives the main rotary shaft to drill in.		
4	High pressure mud system		
4.1	Drilling pump HHF-1600		2pc
	The components of drilling pump to API Spec 7K- 5th Edition		
	Model	Triplex single acting piston type	
	Max. diameter of liner×stroke	Φ180×305mm	
	Rated strokes	120spm	
	Rated power	1176kW(1600HP)	
	Gear ratio	4.206	
	Stroke of piston	305mm (12")	
	Pump valve	API 7#	
	Max. ID of liner	Φ180mm	
	Max. working pressure	34.3MPa	
	Max. displacement (130s/min)	50.42L/s	
	Diameter of discharge pipe	127mm (5")	
	Diameter of suction pipe	304mm (12")	
	Overall dimension (length×width×height)	4426×2413×2688mm	
	Weight	25570kg	
4.2	Drilling pump transmission device		2set
4.2.1	Technical parameters		

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NO	Description	Model	Qty
	Rated power	1200kW	
	Transmission type	Combined narrow V- belt	
	Model of V-belt	25J	
	Transmission ratio	1.98	
	Overall dimension (length×width×height)	8600×3370×2853mm	
	Weight (including drilling pump)	42000kg	
4.2.2	Feature		
	The pump transmission device consists of one AC variable frequency motors,narrow V-belt transmission device, transmission foundation, skid and guard and so on.		
	Equiped with electronic spray pump,charging pump,suction and discharge pipeline.		
	Equiped with spring reset safety relief valve and drilling pump blowdown line.		
4.3	Motor for drilling pump		2 set
4.3.1	Technical specification:		
	Fundamental frequency power	1200kW	
	Fundamental frequency voltage	460V	
	Fundamental frequency current	1077 A	
	Fundamental frequency power factor	0.848	
	Fundamental frequency rotary speed	1000 r/min	
	Fundamental frequency	60 Hz	
	Fundamental frequency torque	11460Nm	
	Max frequency	76Hz	
	Insulation class	200 class	
	Number of Poles	6 poles	
	Connection mode for stator winding	Y	
	Cooling type: forced air cooling (equipped with blower)		
	Working type	Continuous	
	Protection degree of junction box	IP54, pressured junction box	
4.3.2	Feature:		
	The same as drive motor of drawworks		
4.4	Supercharging pump set(centrifugal pump)		2pc
	Technical specification:		
	Model of centrifugal pump	SB6" ×8" J-12 1/2"	
	Inlet diameter of centrifugal pump	8"	
	Outlet diameter of centrifugal pump	6"	
	Displacement of centrifugal pump	209m ³ /h	
	Power of centrifugal pump motor	55 kW	
	Motor voltage/frequence	460v/60hz	
4.5	Drilling fluid manifold		1set
4.5.1	Technical specification:		
	Working pressure	35MPa (5000psi)	
	Nominal diameter	Φ102mm	
	Type:floor double manifold/ double standpipe		
4.5.2	Feature:		
	Positions for drilling parameters instrument, logging instrument, cementing manifold, interface for pump pressure gauge and valves are left in advance.		
	The connection for high pressure manifold adopts hammer union type and the hose should be fixed with safety clamp.		
	All the connection of sensors adopts 2" 1502 union.		

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NO	Description	Model	Qty
	The heights between gooseneck outlet on the top of double standpipe and drill floor are 17.5m and 21.5m respectively. Supporting parts on manifold passed nondestructive examination.		
4.6	Rotary hose Technical specification: Max. working pressure Diameter Length	35MPa 3" 19m、23m	2pc
4.7	Cementing line Technical specification: Working pressure Diameter Start position	70MPa (10000psi) Φ50mm Catwalk to drill floor	1set
5	Low pressure mud system		
5.1	Mud tank The design of mud tanks conforms to API Spec 13C specification		1set
	Total quantity of mud tank (include trip tank)	7pc	
	Total volume of system (include trip tank)	375m ³	
	Overall dimension of mud tank (L×W×H)	12000×2800×2700mm	
	Max. transporting size	12000×3200×3200mm	
5.1.2	Shale shaker tank		1pcs
5.1.3	Trip tank		1pcs
5.1.4	buffer tank		1pcs
5.1.5	Suction tank		1pcs
5.1.6	Mixing tank		1pcs
5.1.7	Reserve tank		2pcs
5.2	Shale Shaker (linear type)		3set
	Model	ZS4/Z-01	
	Treatment capacity	1188GPM	
	Area of screen	3.5X2.3 ft ²	
	Excitation index	7.1 ~ 7.2G	
	Power of excitation motor	2 -1.865KW	
	Excitation motor frequency/voltage	460v/60hz	
5.3	Vacuum degasser		1set
	Model	ZCQ200F-A	
	Process load	1200gpm	
	Vacuum pump power/speed	5.5kW	
	Fluid supply centrifugal pump	SB6"×8"FJ-12 1/2" (55kW)	
5.4	Mud Cleaner		1set
	Model	ZQJ250×3/100×16 (3P)	
	Desand hydrocyclone diameter	10"	
	Desand hydrocyclone Qty.	3	
	Desilt hydrocyclone diameter	4"	
	Desilt hydrocyclone Qty.	16	
	Process load	1145GPM/705GPM	
	Mud Cleaner Fluid Supply Pump		2set
	Model	SB6"×8"FJ-13"	
	Motor power	75kW	
	Motor rated voltage/frequency	460v/60hz	
	Inlet diameter	8"	

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	Outlet diameter	6"	
	Displacement	244m ³ /h	
	Rotary speed	1750rpm	
5.5	Centrifuge system		
5.5.1	Middle Speed Centrifuge		1set
	Model	LW450×1000-N1	
	Process load	45m ³ /h	
	Max. drum speed	1800r/min	
	Main motor power	30kW	
	Motor rated voltage/frequency	460v/60hz	
5.5.2	Feed centrifugal pump		1pc
	Model	SB2" x3" J-9"	
	Motor power	7.5kW	
	Rated voltage/frequency	460v/60hz	
	inlet diameter	3"	
	outlet diameter	2"	
	Displacement	40m ³ /h	
	Head distance	15.2m	
5.6	Mud mixing system		
5.6.1	Mixing pump		2pc
	Model	SB6" x8" J-13"	
	Motor power	75kW	
	Rated voltage/frequency	460v/60hz	
	inlet diameter	8"	
	outlet diameter	6"	
	Displacement	244m ³ /h	
	Head distance	43m	
	Rotary speed	1750rpm	
5.6.1	Mixing funnel		2set
	Model	ZHP150	
	Treatment capacity	180m ³ /h	
5.7	Mud shearing system		
5.7.1	Shear pump		1pc
	Model	WJQ5" x6" -10"	
	Motor power	55 kW	
	Rated voltage/frequency	460v/60hz	
	inlet diameter	6"	
	outlet diameter	5"	
	Displacement	155m ³ /h	
	Head distance	32m	
	Rotary speed	2250r/min	
5.7.2	Mixing funnel		1set
	Qty.	1	
	Model	ZHP150	
	Treatment capacity	180m ³ /h	
5.8	Mud tripping system		1set
	Trip pump		2set
	Model	SB3" x4" J-9 1/2"	
	Motor power	18.5kW	
	Rated voltage/frequency	460v/60hz	

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	inlet diameter	4"	
	outlet diameter	3"	
	Displacement	100m ³ /h	
	Head distance	23m	
	Rotary speed	1750rpm	
	Display of liquid level:Ultra-sonic liquid level gauge (included in drilling parameter instruments)		2set
5.9	Agitator		
5.9.1	Agitator, 11kW		12set
	Model	NJ-11	
	Power of its driving motor	11kW	
5.9.2	Agitator 5.5kW		1set
	Model	NJ5.5	
	Power of its driving motor	5.5kW	
5.10	Mud gun		20set
	Diameter	3"	
	Working pressure	1.0Mpa	
5.11	Pill tank		1set
	Effective volume	2.5m ³	
	Power of its equipped agitator	5.5kW	
5.12	Casing fillup unit		1set
	Diameter of pipeline	3"	
	Working pressure	1.0Mpa	
5.13	Mud-gas separator		1set
	Working media	Mud contained gas	
	Working pressure	0.7MPa	
	ID of separator	φ1200mm	
	Max. capacity to treat mud	424M ³ /h	
	Max. capacity to treat gas	7910M ³ /h	
	Diameter of fluid inlet pipe	102mm	
	Diameter of gas-discharging pipe	325mm	
	Diameter of fluid-discharging pipe	325mm	
	Overall dimension (when transport)	9020x2194x2184	
	The installation position of liquid gas separator and choke line manifold are reserved for make-up pump skid.		
5.14	Mud lab		1set
	Including desk, chair, taintless steel basin ,eye washing unit, lab table.		
5.15	transfer pump		2sets
	Model	SB6" x8" J-13"	
	Motor power	75kW	
	Motor rated voltage/frequency	460V/60Hz	
	Inlet diameter	8"	
	Outlet diameter	6"	
	Displacement	244m ³ /h	
	Delivery head	43m	
	Speed	1750rpm	
5.16	Rainproof shed		1set
	Steel proof , for shale shaker tank,trip tank,buffer tank,Suction tank,Mixing tank and reserve tank.		

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
6	Power system		
6.1	Main generator	CAT3512B	3pcs
	Technical specification		
	Engine rated output power	1101kW	
	rated frequency	60Hz	
	rated voltage	600V	
	rated speed	1200r/min	
	start mode	air motor	
	First maintenance period	≥27000h (under normal operation)	
6.1.2	Engine		
	Model	CAT3512B	
	Nominal power	980kw	
	Nominal rotary speed	1200r/min	
	Direction of rotation (View from the end of flywheel)	Anticlockwise	
	Cooling type	Fixed water tank, fan and closed cooling	
	Nominal working condition		
	Fuel consumption ratio	<205g/kW.h	
	Oil consumption ratio	<1.4g/kW.h	
	Smoke degree	≤1.3Bosch	
6.1.3	Generator		
	Factor	0.7	
	Rated rotary speed	1200r/min	
	Protection class	IP23	
	Cooling type	Air cooling	
	Wiring method	3 phase,4wire	
	Voltage-regulating mode	Automatic voltage- regulating	
	Excitation mode	Brushless permanent magnet excitation	
	Insulation class	F	
6.2	Emergency Generator	CAT C15	1pcs
	Rated output power	320ekW	
	Rated frequency	60Hz	
	Rated voltage	480V	
	Rated speed	1800r/min	
	Start mode	Battery electrical motor start	
6.3	Generator houses		4sets
	Technique specification		
	3 generator houses form an integral block with internal passages. In-house fire extinguishers, emergency lights and safety warning signs are provided.		
	3 sets main generator sets is placed respectively in no1,2,3 gen. house with air supply system inside.No.4 generator house install one auxiliary generator.		
	The design of the generator houses meets the requirements for trailer transportation.		
	All lines are installed under the generator house seat. It adopts rubber pipe connection among houses and equipped with valve according to requirements. Cable and air line over head setsting and fuel pipe inside the skid.		

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	<p>Top of generator house are equipped with cable tray and all cables are layed in the tray. Cable conduits (trough) are installed on the roofs of the generator houses, all cables are sets in corresponding conduits.</p> <p>Fuel, air and water pipeworks are placed in house skid. Hoses and ball valves are used for connection between houses.</p> <p>Cable trays are arranged in upper position below ceiling. All the cables to be placed in cable trays.</p> <p>Each house is equipped with 4 fluorescent lights among which there is one as emergency light.</p>	lighting not including in wellsite lighting	
6.4	<p>VFD room and Control System</p> <p>Design Fundamentals:</p> <p>AC VFD drive system, control system, interlocking protections, etc. is to meet requirement Adopting proper and reliable explosion proof, anti-vibration, dampproof, waterproof measures to satisfy safety requirement.</p> <p>Suitable Condition:</p> <p>Altitude: $\leq 1000\text{m}$</p> <p>For working at the condition of an altitude from $1000\text{m} \sim 3000\text{m}$, it is to be as Attachment B in IEC 61136 Standard upon Semiconductor Converter Application to correct on current capacity to adjust and reduce capacity to apply.</p> <p>Temperature: $-20^{\circ} \sim +50^{\circ}\text{C}$</p> <p>Humidity: less than 90% at temperature of $+20^{\circ}\text{C}$.</p> <p>The system is suitable to be used under oilfield work condition with rigorousness of high humidity, desert, saline-alkali soil, sand blow, etc.</p> <p>Features:</p> <p>The electric AC VFD drive system comprises of VFD house, power and control cables, AC VF motors, other auxiliary electric devices, etc.</p> <p>Main controlled equipments in the system are 2 pcs of DW motors, 1 pc of RT drive motor and 3 pcs of MP motors. Each motor is respectively driven by 1 VF inverter unit.</p> <p>VF inverter unit is digital controlled.</p> <p>Dynamic energy brake, digital-controlled VF auto bit feed, fully digital control console unit, maximum torque output at zero motor rpm are achieved by this kind of drive system.</p> <p>With fully digital-control and profibus technique, fully digital transmission of control signals, fault diagnosing information and relevant parameters can be realized between VFD room and the driller's cabin.</p> <p>To implement real time monitoring, online warning and protection in case of failure. Quick disassembling and fixing, module construction is used for internal elements arrangement and installation so as to reduce maintenance time and system downtime.</p> <p>To achieve real-time monitoring by means of the functions of electrical control system .</p> <p>This system possesses perfect protective functions such as close position control loop to prevent traveling block from collision at top or on floor, power-loss protection, auto-bit feed, drive system emergency shutdown, etc.</p> <p>To have function of computer surveillance and fault diagnosing.</p> <p>Top drive system and rotary table drived by the same VFD cabinet and changed over by contactors.</p>		
6.4.1	<p>VFD house</p> <p>Specification</p>		1set

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	<p>Overall dimension</p> <p>Features:</p> <p>It has sufficient strength, its wall is made of carbon steel material with insulation and heat preservation, fire-proof , and its skid is convenient to lift integrally. It is suitable to use in the severe environments of oil field operation, and has the functions of fireproof, sandproof, shockproof and waterproof , and heat preservation etc..</p> <p>The house has two doors with level safety lock.</p> <p>There are air conditioning system, dehumidifying system, lighting system, emergency lighting system, alarm system, grounding unit, socket for input and output connection unit etc supplied in the VFD room. It can monitor environment's humidity and temperature to ensure the electric system to operate safely and reliably.</p>	13000mmx2800mmx3050mm	
	To achieve manual controlling and paralleling 3 main generators on line.		
6.4.2	<p>Generator control cabinet(cubicle)</p> <p>features</p> <p>The three main generator sets can be manually parallel operated and controlled.It can regulate, run, operate, parallel, measure and protect the appointed generator. The main elements as follows: breaker, speed regulator , voltage regulator, synchronization module, steady voltage power, and instrument indicator etc. Main protection function as follow: reverse power, over voltage, under voltage, over frequency, under frequency, over current and power limitation.</p>		3pcs
6.4.3	<p>Generator synchronizing system</p> <p>Synchronizing system</p> <p>The Generator Synchronization (Sync) Circuit is required to connect additional generators to the Main AC bus, after one (1) or more generators are already connected to the Main AC Bus.</p> <p>The Sync Circuit compares the frequency and voltage of the Main AC Bus with that of the generator being brought on line, so that they can be matched before the new generator's circuit breaker is closed.</p>		1set
	<p>Ground fault detection system for 600V bus bar</p> <p>The Ground Fault System is designed to detect 600V AC bus bar ground faults via a set of grounding detector.</p>		1set
	<p>Power limit circuit</p> <p>The Power Limit System will monitor the kW engine loading and the kVA generator loading of each engine/generator set.</p> <p>If any generator of these parameters reach their limits, the Power Limit Circuit will reduce the power being delivered to the loads so that the load on each generator is held at its limit until the loads on the VFD drives are reduced (by other action) to a level below the generator limit.</p> <p>Amber warning lamps are illuminated on the touch screen of the driller's cabin at a load level just below the power limit.</p>		1set
	<p>HOC circuit</p> <p>The function of HOC circuit :</p> <p>When the first genset is started, it supply for the controlling module. when the end of genset is started and the controlling voltage is lower than 220V, it still supply for the controlling module to be sure that genset closed one by one.</p>		1set

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NO	Description	Model	Qty
	The system consists of transformer,rectifier,capacitance,resistance,steady diode,12VDC storage battery etc.		
6.4.4	Rectifier Unit Features: There are 2 rectifier units, which can be used both independently and separately, with 6 pulse bridge diode construction to supply DC power.	2400kW	2pcs
6.4.5	Mud Pump Speed Regulation Cabinet Technical Specification: Rated power Voltage output Efficiency Features: The inverter unit possesses perfect fault diagnosing and protections inclusive of over-current protection, overvoltage protection overload protection, fuse melting protection, maximum current output limit, fan failure protection and other protections of digitally regulated system.	1400kW 525~690V 0.98	2sets
6.4.6	DW/RT(TD) Speed Regulation Technical specification: Rated power Voltage output Efficiency Features: The inverter unit possesses perfect fault diagnosing and protections inclusive of over-current protection, overvoltage protection, overload protection, fuse melting protection, maximum current output limit, fan failure protection and other protections of digitally regulated system.	900 kW 525~690V 98%	3sets
6.4.7	DW dynamic brake system Technical specification: Suitable relative ambient humidity Cooling mode Features: Composed of brake unit and brake resistor complete with quick fuse and cooling air blower to be connected on the DC busbar.	≤95 %, dew is not allowed. Forced air blower cooling	1set
	brake cabinet	3*NBRA669	2pcs
	brake resistor	6*100kW	1pcs
6.4.8	Switch cabinet Features: Consisting of transformer primary breaker 1000A and transformer secondary breaker 1600A to have parameters display and indications. ABB or Schneider product is to be used as main power breaker product is to be used as main power breaker Standby gen inline 630A breaker will be installed in SW cabinet.		1pc
6.4.9	MCC cabinet Features: To supply power for the blowers and oilers of VF AC motors and rig floor electric Drawer-type units that have same current and power grade can interchange. Motor control unit mainly comprises breaker, contactor, thermal relay, etc. Direct startup mode and local control are used to have indication function. Feed circuit loop is maily composed of breakers		4pcs
6.4.10	Plug board		1set

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NO	Description	Model	Qty
	One (1) 1000 kVA, 600/400 volt, 3 phase, 50 Hz, 60 degrees C ambient copper wound, dry type, Delta/star transformer – outdoor type. Epoxy resin cast type, foil winding coils The transformer will be installed in the Standby Gen house.		
6.4.17	Lighting panel		1pcs
	C/W C65N breakers with electric leakage protection to supply for wellsite lighting.		
6.5	Rotary table/top driver contactor cabinet		1pcs
	C/W rotary table&top driver switch over contactor.		
6.6	Wellsite AC Power Distribution System		1set
6.6.1	Design fundamentals and standards Standards upon which design and manufacture are based. API RP 505 "Recommendation for Area Classification on Electric Equipments in Oilfield Establishment" GB3836.2-2000 Electric Equipment under Explosive Gas Environment (equivalent to IEC60079-0:1998)		
6.6.2	Main technical parameters Rated voltage Rated frequency Suitable condition: Ambient temperature Relative humidity Altitude: Explosion proof grade in explosive area Provided there is wind shed with vent device, it is to be ensured that explosion proof protection grade of around rig floor level, mud tank area, mud pump area is consistent with that when without wind shed.	480/208V/110V (3 Phase,4 line) 60Hz -18°C ~ +50°C +20°C ≤90% ≤1000m	
6.6.3	Technical clarification Conforming to explosion proof requirement in relevant area. Suitable for field open operation and easy to be moved and installed.		
6.6.4	Suitable area All wellsite AC power equipments from MCC cabinet : All the cable wires from MCC cabinet plug board to power distribution boxes (control boxes on rig floor, flameproof junction boxes on mud system, PD boxes in water and fuel tank area) and cable wires leading from PD boxes and startup control units are not included on the plug board of MCC cabinet . Motors with or above 30kW are controlled in MCC cabinet with direct startup and local control. Only start and stop push buttons are provided near motor. Motors below 30 kw are controlled in separate area. Wellsite lighting fixtures and control devices: Cable trays, galvanized tubes, seals, etc.;; junction cable wires from MCC plug board to power and lighting equipments in areas.		
6.6.5	Equipment Descriptions for Each Area of Wellsite Solid control area Supply all cables for power, lightings and control , lamps and fittings, control button, plug-in box and auxiliary parts from MCC cabinet to solid control area (not including socket connector parts at the MCC house end and lighting lamps and pipe in the pump house) There are 5 power cable lines to respectively control agitators on 5 active mud tanks.		

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NO	Description	Model	Qty
	<p>18 lightings installed(3 lightings on each mud tank, 1 lighting each for desander pump and charge pump)</p> <p>Push button box is provided for each agitator motor with or below 15 kW.</p> <p>A control box is allocated on one vertical side face of each mud tank to satisfy local control requirement. Interconnection between control boxes is completed with plugs.</p> <p>There are power and control cables for all 55kW or above 55kW motors to be locally controlled.</p> <p>Power and control cables for trip pumps to trend towards the destination directly from MCC cabinet.</p> <p>2x25A spare lighting receptacles and 2x60A power receptacles are provided in solid control area.</p> <p>Rig floor area</p> <p>Power and lighting cables from MCC cabinet to rig floor area.</p> <p>One flame proof control cubicle which is located in the doghouse is to provide , and receptacles and relevant explosion-proof switches for mast lightings, and inlet line for each power and lighting are provided.3 spare lighting receptacles and 2x60A power receptacles are preserved.</p> <p>19 fluorescent lightings are equipped for both left and right mast. Other 4 lightings for wellhead, 6 lightings for the rig floor.</p> <p>Crown block signal lighting is one explosion-proof filament lamp(red).</p> <p>Fuel and water tank area</p> <p>Power and lighting cable, distribution box and lamps from MCC cabinet to oil and water tanks area; power cables and fittings for liquid level auto-control of oil tank and water tank.</p> <p>Power and control for each motor are provided from each power distribution box.</p> <p>Others</p> <p>Power cables from MCC cabinet to electric air compressors, air purifier unit.</p>		
6.6.6	<p>All lighting fixtures</p> <p>Following lighting fixtures to be provided:</p> <p>All fluorescent lights</p> <p>Crown warning light</p> <p>400W floodlights</p> <p>Note: Quantity of lighting fixtures is subject to</p> <p>General Illumination Level to be maintained:</p> <p>Pump-house shed- 100 Lux Derrick floor- 80 Lux</p> <p>Pipe rack area- 60 Lux Monkey Board- 30 Lux Compressor shed-100 Lux Sub-structure- 150 Lux</p> <p>Engine room- 80 Lux Peripheral/ General area- 10 Lux</p>		<p>1set</p> <p>60sets</p> <p>1pc</p> <p>14sets</p>
6.6.7	<p>Earthing/grounding system</p> <p>According to IEC Regulation and requirements</p> <p>Earthing system consisting of copper grounding rods, clamps, and single conductor cable will connect all generator sets, mud pump skids, mud tanks, utility tanks, substructure, doghouse and the VFD house to earth ground/well head.</p> <p>All grounding cables as per IEC regulations (Non isolated).</p>		1set
6.7	<p>cables</p> <p>Features:</p> <p>Flexible shielded cables with rubber sheathe are used to supply power for VF motors.</p>		

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NO	Description	Model	Qty
	<p>Main motors cables adopt DCEFP/DA series soft rubber casing type.It's tinning copper core with insulator and neoprene casing.Control cables adopt DCEF/DA series soft rubber casing type.With ignition-resistant,endurable oil,antiseptis,endurable cold and soft feature.Adopting tinning copper nose.</p> <p>Tinplated copper cable lugs to be used.</p> <p>rated voltage of Master cables for frequency variable motor is 2000V</p> <p>Wellsite cable is waterproof , oilproof, moistureproof.</p> <p>The colour mark of power cable is L1-yellow ,L2-blue,L3-red,N-black,PE-yellow and</p>		
7	Driller's Cabin and Drilling Instrumentation		1set
7.1	Driller's Cabin		1set
7.1.1	Technical specification:		
	Approximate weight	5500kg	
7.1.2	Features:		
	<p>Designed and constructed as integral to be convenient for operation and observation. It has functions featuring easy operation, comfort and safety. Installed within A frame of mast on left side of floor with shock absorption joints in-between floor.</p>		
7.1.3	Main equipments :		
	The driller cabin body:		1set
	<p>Its surface is made of stainless steel, looks beautiful, this structure is strong and rigid for integral lift. the window is made of bulletproof glass, its door lock is unlocked with lever touch. The house is equipped with two dry powder fire distinguishers; its floor is covered by anti-static rubber sheet.</p>		
	Operation console		1set
	used for installing driller operation and control system; on its left side mainly installed operation touch screen and drawworks speed setting handle; drilling parameter touch screen and disc brake handle are installed on its right hand side.		
	The driller control system		1set
	The driller control system can operate and control the rotary table, drawworks and mud pump. It has closed loop control to travelling block position, to realize the protection to crown block and drill floor. It has the protection functions for power-off of electric system , rotary table torque limitation and the system emergency stop etc.		
	Control cabinet:		1set
	it is used for arranging PLC slave-station, switches, buttons and 24V control power supply etc.		
	Output connection cabinet:		1set
	Output connection cabinet for the connection between outside and inside the driller cabin, it has quick plug-in socket connectors.		
	The pneumatic control system		
	The pneumatic control system is in the cabin: the electromagnetic valve terminal control is used, including connectors, rubber hoses,joint etc.		1set
	Video system:		1set
	There are mainly video system, 15" monitor and control system etc. The four-frame zoom and visible monitoring to racking platform(with pan tilt), shale shaker(with pan tilt), the drawworks's drum and pump house can be realized. The monitor can display the pictures from four channels simultaneously, and switch freely to display the combination of various picture		

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NO	Description	Model	Qty
	<p>Gas detection system:</p> <p>HH will equip with the combustible gas detectors and the H2S detectors with the function of audible and visual alarm on the rig floor, on the mud tank area, at the shale shakers(2) and at the entrance</p> <p>There are audible and visual alarm on the rig floor, on the roof of the VFD house and the rig manager's house</p>		1set
	<p>Lighting system:</p> <p>it meets the lighting requirements of driller cabin, has the emergency function.</p>		1set
	<p>Air conditioner:</p> <p>meets the air conditioning requirements of driller cabin. Explosion-proof requirements</p> <p>Explosion-proof requirements meet the explosion-proof requirements in service area. The location classification for explosion-proof has been carried out API RP 505</p>		1set
7.2	<p>Drilling Parameter Instrumentation</p> <p>Function:</p> <p>Capable of real time parameter collection, storage, processing and output printing. To form parameter tables, curves to be displayed and printed out.</p> <p>Features:</p> <p>Screen menu to be analog dial gauge combined with digital displays so as to be apparent and convenient for reading parameters.</p>		1set
7.2.1	<p>Analog gauge:</p>		
7.2.1.1	<p>Weight indicator</p> <p>Model</p> <p>Dial size</p> <p>Quantity of suitable drilling lines</p> <p>Maximum hook load</p> <p>Installation mode</p>	<p>12"</p> <p>6x7 lines</p> <p>4080kN</p> <p>Panel Mount</p>	1set
7.2.1.2	<p>Standpipe pressure gauge</p> <p>Model</p> <p>Dial size</p> <p>Maximum measurement range</p> <p>Installation mode</p>	<p>6"</p> <p>7,500 PSI, (52.5Mpa)</p> <p>Panel Mount</p>	1set
7.2.1.3	<p>Tongs Torque Gauge</p> <p>mode</p> <p>Dial dimension</p> <p>Max. measuring range</p> <p>installation mode</p>	<p>6"</p> <p>25000 LBs,</p> <p>Panel Mount</p>	1set
7.2.2	<p>Parameters displayed on touch screen:</p> <p>Following drilling parameters to be displayed on driller control screens:</p> <p>Hook load, WOB, standpipe pressure, discharge capacity, pump spm(including total stroke), RT torque, RT speed, hook speed, ROP, cathead makeup and breakout torque, height of traveling block, well depth, drilling hours, etc.</p>		2sets
7.2.3	<p>Drilling parameter recording system</p>		1set

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NO	Description	Model	Qty
	IPC is with interal pentium E5200 2.5G, memory 2G,hard disc SATA 7200RPM,500GB, DVD-RAM R/W, 20' wide screen display, installed in tool pusher office to record drilling parameters ;to print out charts and curve by one inject type printer made Canon. with one fax machine.		
7.2.4	Sensors		
	Hook load sensor		1set
	Pump spm sensor		2sets
	Stand pipe pressure sensor		1set
	Travelling block position sensor		1set
	Flowshow on mud flowback line		1set
	Mud level sensor		9sets
	Sensors can achieve relevant functions and meet Ex requirement in relevant areas		
7.3	Intercom system of drilling rig		1set
	Use megaphone-calling talk-back system , the internal communication between driller control cabin, racking platform, drilling floor, shale shaker, mud pump house, VFD house,toolpusher room can be realized.		
	Each station has a phone, push to talk, and a loudspeaker/ pager as above locations C/W 4 sets of walkie-talkie and its accessories.		
8	Video system:		
	there are mainly vidieo system, 15" monitor and control system etc. The four-frame zoom and visible monitoring to racking platform, shale shaker and pump house can be realized. The monitor can display the pictures from four channels simultaneously, and switch freely to display the combination of various picture		1set
9	Communication system:		
	Communication system is by using megaphone-calling talk-back system , the internal communication between driller control cabin, racking platform, drilling floor, shale shaker, mud pump house, VFD house,toolpusher room can be realized.		1set
10	Gas detection system:		
	the alarm and control system for flammable gas and H ₂ S gas in four channels is used to monitor and alarm flammable gas and H ₂ S gas from drill floor, wellhead, and shale shaker(2).		1set
11	Auxiliary Equipments		
11.1	Air Source System		1set
11.1.1	Technical specification:		
	Screw type air compressor	2pc	
	Compressor model	Quincy QTD45	
	Refrigerant air dryer	1pc	
	Air filter	3set	
	Compressor rated capacity	2×7.5 m ³ /min	
	Rated outlet pressure	1Mpa	
	Rated capacity of cold start compressor	1.4 m ³ /min	
	Volume of air storage vessels	2×2m ³ +2m ³	
	Rated work pressure	1MPa	
	Air pipe line size	2"	
11.1.2	Features:		

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	<p>Air supply system is installed in generator house, mainly consisting of 2 screw type air compressors, 1 refrigerant drier, 2x2m³ storage vessel, 1x2m³ amortizing vessel under rig floor and piping work. Flange connection is used between compressor and vessel.</p> <p>One cold start compressor driven by diesel engine is provided.</p> <p>Air flow chart is designed as compressor-drier-storage vessel-piping to air consuming equipments.</p> <p>Piping control valve is stainless steel ball valve. A bypass is provided for maintenance servicing on drier. Air main piping is 2" line.</p> <p>A 2m³ storage vessel is placed on platform under floor to be convenient for inspection and</p>		
11.2	Rig Floor Doghouse		1set
	Overall dimension	10000x2500x2800mm	
	Doghouse with 3 portions is placed on the left side of floor. The front portion is empty; Equipped with Ex fluorescent lights		
11.3	Floor Tools		
11.3.1	Hydraulic DP power tong	ZQ203-100	1set
	Suitable pipe range	3 1/2" ~8"	
	Max. torque	100kN·m	
	Jaw speed		
	High gear	40r/min	
	Low gear	2.73r/min	
	Rated pressure for hydraulic system	16MPa	
	Rated flow rate for hydraulic system	114L/min	
	Tong head moving span	1.5m	
	Work pressure for air system	0.5~1MPa	
	Overall dimension (LengthxWidthxHeight)	1700mmx1000mmx1400mm	
	Weight	2400kg	
11.3.2	Hydraulic casing power tong	TQ340-35	1set
	Suitable for 5 1/2"、7"、9 5/8"、13 3/8" casing		
	Suitable pipe range	5 1/2" ~13 3/8"	
	Max. torque	40kN.m	
	Jaw speed	High gear: 80r/min Low gear: 3.6r/min	
	Rated pressure for hydraulic system	18MPa	
	Rated flow rate for hydraulic system	160L/min	
	Work pressure for air system	0.5~1MPa	
	Overall dimension (LengthxWidthxHeight)	1580x900x860mm	
	Weight	780kg	
11.3.3	Hydraulic cathead		2pc
	model	YM-16	
	rated pressure	16Mpa	
	Rated flow	120l/min	
	Max pull load	16t	
	Pull storke	1500mm	
11.3.4	Air winch XJFH-5/35		2pc
	Rated lift capacity	50kN	
	Max. wire rope speed	35m/min	
	Rated power	16kW	
	Inlet pressure	0.6~0.9Mpa	

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	Rated air consumption	18.3m ³ /min	
	Capacity to accommodate wire rope	100m	
	Wire rope diameter	19mm	
	Overall dimension	668×343×420mm	
	Weight	500kg	
11.3.5	Air winch JQH-5×48 (on monkey board)		1pc
	Rated lift capacity	5kN	
	Rated power	2.6kW	
	Rated wire rope speed	48m/min	
	Inlet pressure	0.8MPa	
	Capacity to accommodate wire rope	60m	
	Wire rope diameter	13mm	
11.4	Hydraulic Power Unit		1pc
	Technical specification:		
	Effective oil reservoir volume	1000L	
	System flow rate	120L/min	
	Machinery tool pump motor power/rotary speed	37kW/970rpm(60hz)×2	
	Machinery tool pump rated pressure/displacement	16 Mpa /160 ml/r	
	Motor power/revolution of brake pump	3kW/1750rpm(60hz)×2	
	Pressure/displacement of brake pump	8 Mpa /10 ml/r	
	Motor power/revolution of circulating pump	1.5kW/1750rpm×1	
	Pressure/displacement of circulating pump	2.5 Mpa /63 ml/r	
	Capacity of accumulator cylinder	6.3L×4	
	Fuel tank electrical heater power	3kW×2	
	Heat exchanger heating area	2330×1700×2070mm	
	Overall dimension (Length×Width×Height)	2050×1600×1900mm	
	Weight (not inclusive of hydraulic oil)	4004kg	
	Features:		
	<p>HPU is composed of oil tank,main oil pump,disk brake oil pump,oil-filling circulating device,brake valve assembly,master control valve set,remote control device,heat exchanger,pipe fittings and auxiliaries</p> <p>HPU is divided as two independent parts: one part to supply power for hydraulic tools and the other for hydraulic disk brake. Two parts use the same fuel tank, controled separately.</p> <p>Adopt load sensitively multi-circuit change valve block,use electric control and manual control. Circuits of different pressure,different displacement can work synchronically.</p> <p>The system interface numbers satisfy the requirements of hydraulic power supply for drill PLC is used as electric control system for HPU</p> <p>Equipped with hydraulic oil filtering,heating and cooling devices.</p>		
11.6	Industry Water Tank		1set
	Technical specification		
	Volume of tanks	2*80m ³	
	Overall dimension of tank	13300×3000×3110mm	
	Total Water centrifugal pump	2pc	
	Centrifugal pump model	80-50-200B	
	Pump motor power	7.5kW	
11.7	Fuel Tank		1set
	Technical specification		
	Volume of tanks	2*60m ³	
	Overall dimension of tank	12000×2800×3400mm	

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	Total Fuel pump	2pc	
	Pump motor power	5.5KW (EX motor)	
	Filter	2set	
	The shape of tank	horizontal,round	
11.8	Cable and Pipe Tray		1set
	Features:		
	Including grasshopper cable tray to floor and cable tray to mud system.		
	Combined construction is used to be folded for transportation convenience.		
	Grasshopper cable tray is connected at the rear side of DW skid to be raised up and down with DW. Easy to be disconnected.		
	Air and water piping to diversified areas is placed in cable & pipe tray.		
11.9	Catwalk and pipe rack		1set
	Catwalk (2 sections, L*W*H =16*1.5*1.07m)		
	pipe rack		6pcs
11.10	Parts for Rig Assembly		1set
11.11	special Tools		
	Special tools for mud pump		1set
11.12	Safety Devices		
	Equipped with following derrick man safety devices:		
	Differential speed fall arrester	HWS-12	4set
	Climb fall arrester	AH5	2set
	Escape unit on monkey board	RG10D	1set
	Anti slip mat on RT		3set
	Eye wash unit		3set
	1 in doghouse on floor, 2 on mud tanks		
12	BOP and Control Equipment		
12.1	Single Ram BOP		1set
	model	FZ54-14	
	working pressure	2000psi	
	diameter	21-1/4"	
	bottom connection type /working pressure	flange 21-1/4" 2000psi	
	Top connection type/working pressure	studding 21-1/4" 2000psi	
	side outlet	N/A	
	hydraulic control system pressure	1200-1500psi	
	locking type	manual	
	H2S condition	satisfy	
12.2	Annular BOP	FHZ54-14	1 set
	Working Pressure	2000 psi	
	Bore diameter	21-1/4"	
	Pressure of the hydraulic control system	≤10.5MPa	
	Bottom connection type	flange 21-1/4", 2000psi	
	Top connection type	studding 21-1/4", 2000psi	
	H2S condition	satisfy	
12.3	21-1/4" Drilling spool		1 set
	Type	FS54-14	
	Working pressure	2000 psi	
	Master drift diameter	21-1/4"	
	Side drift diameter	4 1/16" -2,000psi	
12.4	Single Ram BOP		1set

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	model	FZ35-70	
	working pressure	10,000psi	
	diameter	13 5/8"	
	bottom connection type /working pressure	flange 13 5/8" 10,000psi	
	Top connection type/working pressure	studding 13 5/8" 10,000psi	
	side outlet	N/A	
	hydraulic control system pressure	1200-1500psi	
	locking type	manual	
	H2S condition	satisfy	
12.5	Double ram BOP		1 set
	model	2FZ35-70	
	working pressure	10,000psi	
	diameter	13 5/8"	
	side outlet QTY	2	
	side outlet/spec/working pressure	4 1/16" -10,000psi	
	locking type	manual	
	bottom connection type/working pressure	flange 13 5/8" 10,000psi	
	top connection type/working pressure	13 5/8" 10,000psi	
	H2S condition	satisfy	
12.6	Annular BOP		1 set
	model	FH35-35/70	
	working pressure	5000 psi	
	diameter	13 5/8"	
	bottom connection type	13 5/8"10,000psi flange	
	top connection type	13 5/8" 5000psi studding	
	H2S condition	satisfy	
12.7	Drilling spool		1 set
	model	FS35-70	
	working pressure	10,000 psi	
	main diameter	13 5/8"	
	side diameter	4 1/16" 10,000psi flange	
	H2S condition	satisfy	
12.8	Pipe ram	For 13 5/8" BOP stack	1 set
	pipe ram QTY/Spec.:1x2 7/8, 1x7", 1x 3 1/2", 1x9 5/8", 2x3 1/2", 2x5", 2x 5 1/2"		
	blind ram QTY		1 set
12.9	BOP control device		1 set
	model	FKQ960-8	
	oil tank QTY	1850L	
	accumulator Qty	17	
	each accumulator QTY	57 L	
	electrical oil pump dischargement /QTY	52L/min /1	
	pneumatic oil pump dischargement /QTY	20L/ min /3	
	control object QTY	8	
	control cabinet of driller on drilling floor	yes	
	control cabinet for rig OIM		
12.1	BOP test device		1 set
	model	QST-140J	
	Max.working pressure	105Mpa	
	low pressure fluid volume	3.36	
	high pressure pump	2.87	

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	recorder	JL-22/ automatic recorder	
12.11	Choke line		1 set
	main diameter	4 1/16"	
	working pressure	10,000 psi	
	manual flat valve diameter /rated pressure	4 1/16" /10,000psi	
	hydraulic flat valve diameter/rated pressure	4 1/16" /10,000psi	
	hose connected to choke manifold diameter/rated pressure	4 1/16" /10,000psi	
12.12	Choke manifold		1 set
	model	JYG-70	
	working pressure	10,000 psi	
	main diameter	4 1/16"	
	side diameter	3 1/16"	
	manual choke diameter/rated power	3 1/16" /10,000psi	
	hydraulic choke diameter/rated power	3 1/16" /10,000psi	
	temperature	-29-121°C	
	lines from BOP to manifold sets	high pressure hose	
	applicable medium: drilling fluid ,petroleum,natural gas(include H2S)		
	H2S resistance	yes	
12.13	Kill line		1 set
	diameter	4 1/16"	
	working pressure	10,000 psi	
	manual flat valve QTY	1	
	hydraulic flat valve QTY	1	
	manual flat valve diameter /rated pressure	4 1/16" /10,000psi	
	hydraulic flat valve diameter/rated pressure	4 1/16" /10,000psi	
13	Drilling String		
13.1	Drill pipe		
	5"DP, 19.5 ppf. S135	NC50, type of upset:IEU.L=9.14m,connection OD 6 5/8" , complete with steel threads protectors. 18° shoulder.Internal coating TC2000,Hardbanding:ARNCO 100	4500m
13.2	Hex Kelly 5-1/4"	L=40ft, top 6 5/8 REG LH, bottom NC50.complete with steel threads protectors. 18° shoulder.Internal coating TC2000,Hardbanding:ARNCO 100	2pc
	Hex Kelly 4-1/4"	L=40ft, top 6 5/8 REG LH, bottom NC38.complete with steel threads protectors. 18° shoulder.Internal coating TC2000,Hardbanding:ARNCO 100	2pc
13.3	Heavy weight drill pipe		
	5" HWDP,25.3 PPF,	NC-50	30pc
13.4	Drill collar		
	9-1/2" Drill Colar	L=30ft.NC50,spiral.3"ID.complete with steel threads protectors. 18° shoulder.Internal coating TC2000,Hardbanding:ARNCO 100	9pc

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	8 " Drill Colar	L=30ft,8"OD X 3"ID, spiral, 136.1 LB/FT, NC50.complete with steel threads protectors.	24pc
	6 1/2" Drill Colar	L=30ft,6-1/2"OD X 2-13/16"ID, spiral, 92.5LB/FT, NC46.complete with steel threads protectors.	30pc
13.5	Roller reamer		
	For hole size: 17 1/2"	7 5/8REG, connection OD 9 1/2"	ea1
	For hole size: 12 1/4"	6 5/8REG, connection OD 8"	ea1
	For hole size: 8 1/2"	NC50, connection OD 6 1/2"	ea1
	For hole size: 6 1/2"	NC38, connection OD 4 3/4"	ea1
13.6	Intergral stabilizer		
	Working OD:17-1/2" (string)	7 5/8REG, connection OD 9 1/2"	2pc
	Working OD:12-1/4" (string)	6 5/8REG, connection OD 8"	3pc
	Working OD:12-1/4"near bit	6 5/8REG B*B, connection OD 8	2pc
	Working OD:8-1/2" (string)	NC50, connection OD 6 1/2"	4pc
	Working OD:8-1/2" near bit	NC50 B-4 1/2REGE B, connection OD 6 1/2"	2pc
13.7	Cross over subs		
	Top NC50 box,bottom NC31pin		2pc
	Top NC38 box,bottom NC31pin		2pc
	Top 7-5/8REG box bottom-7-5/8REG box		2pc
	Top 6-5/8REG box bottom 6-5/8REG box		2pc
	Top 6-5/8REG box- 4-1/2REG box		2pc
	Box, NC46-4-1/2REG		2pc
	box, NC38-3-1/2REG		2pc
	Top 7-5/8REG pin bottom-7-5/8REG box		2pc
	Top 7-5/8REG box bottom-4 1/2REG box		2pc
	Box 6-5/8REG-7-5/8REG		2pc
	Box 6-5/8REG-NC50		2pc
13.8	Lifting subs		
	9-1/2"DC		3pc
	8"DC		8pc
	6-1/2"DC		10pc
13.9	Pup joint		
	5" pup joint, 5ft		10pc
13.10	Pony DC		
	9-1/2" Pony DC, 10ft		3pc
	8 " Pony DC, 10ft		3pc
	6 1/2" Pony DC, 10ft		3pc
13.11	FISHING EQUIPMENT		
	Bowl slip socket for 17-1/2" wellbore	including fishing guide	1lot
	Bowl slip socket for 12-1/4" wellbore	including fishing guide	1lot
	Bowl slip socket for 8-1/2" wellbore	including fishing guide	1lot
	Bowl slip socket for 6-1/8" wellbore	including fishing guide	1lot
	Anticirculating basket for 17-1/2",12-1/4",8-1/2",6" wellbore		ea 1
	Junk sub for 17-1/2" wellbore		2lot
	Junk sub for 12-1/4" wellbore		2lot
	Junk sub for 8-1/2" wellbore		2lot

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	Junk sub for 6" wellbore		1lot
	Strong magnetic die for 17-1/2",12-1/4",8-1/2",6" wellbore		ea 1
	Junk mill for 17-1/2" wellbore		1lot
	Junk mill for 12-1/4" wellbore		3lot
	Junk mill for 8-1/2" wellbore		2lot
	Junk mill for 6" wellbore		1lot
	Die nipple,GZ-NC50		2lot
	Die nipple,GZ-NC38		2lot
	Relief printing,15" OD	connection: OD 9 1/2" ,REG7 5/8" box	1lot
	Relief printing,11-1/2" OD	connection: OD 8" ,REG6 5/8" box	1lot
	Relief printing,8" OD	connection: OD 6 1/2" ,NC50 box	1lot
	Relief printing,5-1/2" OD	connection: OD 4 3/4" ,NC38"	1lot
	Casing caliper	for casing13-5/8", 54ppf	1lot
	Casing caliper	for casing 9-5/8" , 43.5ppf	1lot
	Casing caliper	for casing 7", 23ppf	1lot
	Casing caliper	for casing 5", 15ppf	1lot
13.12	Manual Tongs		
	Q3.1/2"-17"/ 90 Manual tongs	Including lug law for pipe size 3.1/2"-11 1/4"	1pair
	Q13.3/8"-30"/ 35 Manual casing tongs	Including lug law for pipe size 13.3/8"-20"	1pair
	Q3 3/8"-12.3/4"/75 Manual tongs	Including lug law	1pair
13.13	Slips		
	Slips for DP,SDXL5		2pc
	Slips for DC,DCS-L8-1/2-10		2pc
	Slips for DC,DCS-L6 3/4-8 1/4		2pc
	Slips for DC,DCS-R5 1/2-7		2pc
	Slips for 20" casing,CMS 20		2pc
	Slips for 13"3/8 casing,CMS13 3/8		2pc
	Slips for 9"5/8 casing,CMS 9 5/8		2pc
	Slips for 7" casing,CMS 7		2pc
	Slips for 5" casing,CMS 5		2pc
13.14	Elevators		
	Elevator for 5" DP,DDZ5/350t		2pc
	Elevator for DC,DD9 1/2/150t		2pc
	Elevator for DC,DD8/150t		2pc
	Elevator for DC,DD6 1/2/150t		2pc
	Elevator for for 20" casing,SX20"/350		2pc
	Elevator for for 13 3/8" casing,SLX13 3/8"/350		2pc
	Elevator for for 9 5/8" casing,SLX9 5/8"/350		2pc
	Elevator for for 7" casing,SLX7"/350		2pc
	Elevator for for 5" casing,SLX5"/350		2pc
13.15	Safety clamps		
	MP-XL 19 3/8-20 3/8"		1pc
	WA-C 12 1/2"-13.3/8"		1pc
	WA-C 8.1/2"-9.5/8"		1pc
	WA-C 7.1/2"-8.5/8"		1pc

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	WA-C6.1/2"-7.5/8"		1pc
	WA-C 5.1/2"-6.5/8"		1pc
	WA-C 4.1/2"-5.5/8"		1pc
13.16	Kelly cock		
	Upper Kelly cock for 5-1/4"		2pc
	Lower Kelly cock for 5-1/4"		2pc
13.17	Float valves		
	Float valves:7-5/8REG BOX	OD 9 1/2"	2pc
	Float valves:6-5/8REG BOX	OD 8"	2pc
	Float valves:NC50 BOX	OD 6 1/2"	2pc
13.18	Bit breaker		
	Bit breaker 26"		1pc
	Bit breaker 17-1/2"		1pc
	Bit breaker 12-1/4"		1pc
	Bit breaker 8-1/2"		1pc
	Bit breaker 6-1/8"		1pc
13.19	Auxiliary		
	Pipe wiper for 5"DP		3pcs
	Pipe wiper for 3 1/2"DP		3pcs
	lifting cap for 5" DP	NC50 pin	2pcs
	lifting cap for 3 1/2" DP	NC38 pin	2pcs
	lifting cap	NC46 pin	2pcs
	lifting cap	REG 6 5/8" pin	2pcs
	lifting cap	REG 7 5/8" pin	2pcs
14	Rig Skidding System for Cluster Drilling		1set
	Total length 50meters for rig skidding. The distance is 5~8m between well hole.		
14.1	Hydraulic Skidding Device		
	The rig moving unit is made up of three parts, including support moving block which has support base, hoisting cylinder and pulley assembly, step-by-step moving block which has guide rail, horizontal moving cylinder and so on, control block which has hydraulic power unit, hydraulic valves and auxiliary facilities.		
	Theoretical thrust of jacking hydraulic cylinder × quantity:2490kN(21MPa) ×4		
	Diameter of cylinder/rod of jacking up hydraulic cylinder:420/246mm		
	Theoretical pulling /pushing force of translation hydraulic cylinder× quantity:590kN/413kN × 4		
	Diameter of cylinder/rod of translation hydraulic cylinder:200/110mm		
	Diameter of cylinder/rod of jacking up hydraulic cylinder:426/246mm		
	skidding stroke: 600mm		
	Max. jacking up weight: 500T		
14.2	Extension Cable Tray for Skidding		
	Floding type cable tray for the rig skidding with extral extension length 50 meters.		
14.3	Extension High Pressure Manifold for Skidding		
	High pressure pipe sections for total length 50meters for rig skidding. With high pressure pipe rack and union connections		
14.4	Extension Low Pressure Manifold for Skidding		
	Low pressure pipe sections for total length 50meters for rig skidding. Connecting between reserve tank and shale tank. With low pressure pipe rack and flange or union connections.If be necessary,there can be one buffer cabin and sand pumps transporting mud from shaker tank to next tank.		

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty																																
15	Matting board																																		
15.1	underneath substructure, mud pump set, mud system, power unit, fuel tank and water tank																																		
16	Others																																		
16.1	<p>Identification (mark) and Packing</p> <p>all nameplate and warning plate are written with Chinese and English</p> <p>Every packing of equipment have marks of barycenter and lifting locations, convenient to loading and transportation. Every equipment have nameplate at locations easy to see, the content of nameplate include: name, model, size, main technical parameters, ex-factory date, serial number, manufacturer etc.</p> <p>All equipment are anti-corrosion and anti-rust treated, all exposed inlet and outlet are sealed.</p>																																		
16.2	<p>Coating</p> <p>Specification of coating</p> <p>Painting standard</p> <p>In accordance with corporate standards "QHH1204-2010 Oil Rig Painting"</p> <p>Requirement for sandblast</p> <p>After sandblasting component surface, effectiveness of rust removing will be up to Sa21/2</p> <p>Requirement for painting</p> <p>epoxy zinc-rich primer, dry film thickness of 50-70 microns; epoxy micaceous iron oxide paint in the middle, dry film thickness of 50-70 microns; polyurethane finish, dry film thickness of 50-70 microns.</p> <p>The inner wall coating of mud pumps, drawworks, compounding, gear box, drive boxes</p> <p>Color scheme</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Crown block</td> <td>Red</td> </tr> <tr> <td>Mast</td> <td>Red and white</td> </tr> <tr> <td>Substructure</td> <td>Grey</td> </tr> <tr> <td>Drawworks</td> <td>Sea blue</td> </tr> <tr> <td>Mud pump</td> <td>Sea blue</td> </tr> <tr> <td>Doghouse</td> <td>White</td> </tr> <tr> <td>VFD room</td> <td>White</td> </tr> <tr> <td>Driller control cabin</td> <td>Primitive colour of stainless steel</td> </tr> <tr> <td>Generator house</td> <td>White</td> </tr> <tr> <td>Mud tanks</td> <td>Grey</td> </tr> <tr> <td>Cable tray</td> <td>Grey</td> </tr> <tr> <td>Mud manifold</td> <td>Red</td> </tr> <tr> <td>Handrail</td> <td>Yellow</td> </tr> <tr> <td>Guard</td> <td>Yellow</td> </tr> <tr> <td>Oil Tank</td> <td>White</td> </tr> <tr> <td>Water Tank</td> <td>Grey</td> </tr> </table>	Crown block	Red	Mast	Red and white	Substructure	Grey	Drawworks	Sea blue	Mud pump	Sea blue	Doghouse	White	VFD room	White	Driller control cabin	Primitive colour of stainless steel	Generator house	White	Mud tanks	Grey	Cable tray	Grey	Mud manifold	Red	Handrail	Yellow	Guard	Yellow	Oil Tank	White	Water Tank	Grey		
Crown block	Red																																		
Mast	Red and white																																		
Substructure	Grey																																		
Drawworks	Sea blue																																		
Mud pump	Sea blue																																		
Doghouse	White																																		
VFD room	White																																		
Driller control cabin	Primitive colour of stainless steel																																		
Generator house	White																																		
Mud tanks	Grey																																		
Cable tray	Grey																																		
Mud manifold	Red																																		
Handrail	Yellow																																		
Guard	Yellow																																		
Oil Tank	White																																		
Water Tank	Grey																																		
16.3	<p>Technical documents</p> <p>4 sets of hard copy and 2 soft copy</p>	Chinese, English, Spanish	1set																																
16.4	<p>Training</p> <p>Provide 8 persons for 14 days free training in manufacturer's Assembly yard, the foos and local transportation is included, the air ticket, accommodation, food and communication will be on buyer's cost.</p>	8 person 14 days																																	
16.5	Software		1set																																

Technical Specification For 1500HP VFD Rig

NO	Description	Model	Qty
	It shall be intergrated in the control system		
16.6	Assembly and Rig Up	In manufacturer's Workshop	
	Unload equipment required for rig up		
	Set and assemble substructure		
	Install drawworks and rotary table on drill floor		
	Set and assemble mast		
	Install crown block, deadline anchor and mast accessories		
	Testing		
	Run cold starting air compressor and pressure test air system;		
	Run diesel generators and test AC-VFD system, including testing the function of each		
	Run drawworks and rotary table;		
	Attach fast line end to drawworks drum;		
	Raise mast;		
	Raise substructure;		
	Test run mud pumps at required load for 4.5 hours:single mud pump 100% load 2h,mud pump set 80% load 1h.		
	PLC on line demonstration		