ZOOMLION QY25V431 TRUCK CRANE

TECHNICAL SPECIFICATION

CHANGSHA ZOOMLION HEAVY INDUSTRY SCIENCE & TECHNOLOGY DEVELOMENT CO., LTD

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1. Product Characteristics

The QY25V431 truck crane, which is developed independently to adapt to the market demands, is a new-generation and high-performance product integrating our company many years' manufacturing experience with advanced technologies. Its performances such as lifting height, boom length, working speed and lifting capacity have achieved advanced international level.

The truck crane, with spacious cab and compact decoration, adopts full slewing system, 4-section telescopic boom sections, unique manual proportional control system and self-made full-width special purpose chassis with three axles. 6×4 drive provides the crane with good driving performance and flexible steering. The engine complies with the National Stage III emission standard.

The system with latest load feedback hydraulic operated proportional directional control valve and quadruple gear pump, and the safety devices fitted in hydraulic system, such as relief valve, balance valve, hydraulic lock and brake valve etc., prevents the oil line from overloading and the accidents caused by oil pipe breakage and makes full use of the working capacity of each actuating mechanism. Thus the reliability and safety of the crane are increased.

The safety devices such as load moment limiter, and the complete lighting system equipped in the crane ensure your safety during operation and are convenient for night work.

2. Complete vehicle specification

2.1 Product model

Model in auto industry: QY25V431

2.2 Main technical specifications

2.2.1 Chassis model and main specifications of engine

Chassis	Model		ZLJ5325	Code: ZLJ5325V3
	Class		II	
	Engine	Model	WP10.270	
		Rated power kW/r/min	199/2200	
		Max. output torque N.m/r/min	1100/1300～1600	
	Manufacturer		Changsha Zoomlion Heavy Industry Science & Technology Development Co., Ltd.	

2.2.1 Main Technical Specifications

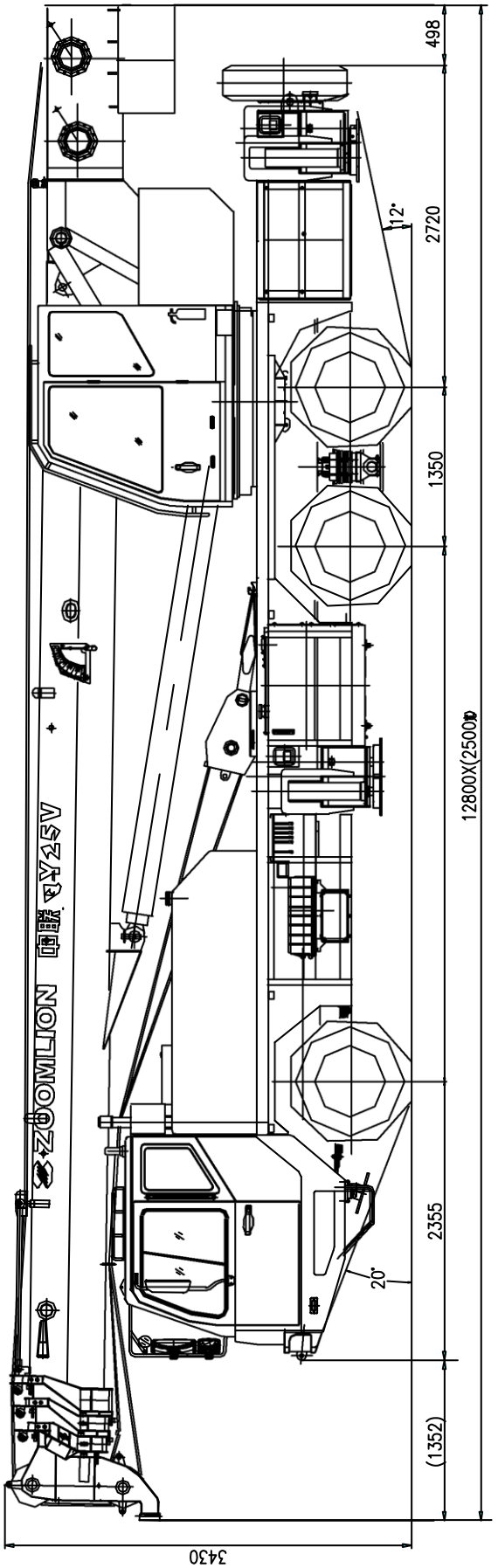
Item		Value	Remarks
Working performance	Max. rated lifting capacity kg	25000	
	Max. load moment of basic boom kN.m	980	
	Max. load moment of max. boom length kN.m	573	
	Max. lifting height of basic boom m	11.5	
	Max. lifting height of boom m	33.8	Deformation of the boom is not taken into consideration.
	Max. lifting height of jib m	41.6	
Working speed	Max. hoist rope speed (main winch) m/min	120	At 4th layer
	Max. hoist rope speed (auxiliary winch) m/min	105	At 2nd layer
	Boom derricking time s	40	
	Boom extending time s	60	
	Slewing speed r/min	0～2.2	
Traveling specifications	Max. traveling speed km/h	78	
	Max. gradeability %	37	
	Min. turning diameter m	≤22	
	Min. ground clearance mm	220	
	Limits for exhaust pollutants and smoke	Meet with related standards	GB3847-2005 GB17691-2005 (National stage III)
	Oil consumption per hundred kilometers L	45	
Weights	Deadweight in traveling condition kg	30000	
	Complete vehicle kerb mass kg	29870	
	Front axle load kg	6800	
	Rear axle load kg	23200	
Dimensions	Overall dimensions (L×W×H) mm	12800×2500×3430	
	Longitudinal distance between outriggers m	5.36	
	Transversal distance between outriggers m	6.1	
	Boom length m	10.5～33.3	
	Boom angle °	-2～80	
	Jib length m	8	
	Offset °	0, 30	

2.2.2 Rated Lifting Capacity Table

额 定 起 重 量 表　　RATED LIFTING CAPACITY TABLE　　单位 UNIT kg

工作 WORKING RADIUS	工 ㄅ (ㄇ) 100M												工ㄅ 仰角 100M ANGLE ( )	工ㄅ + 小ㄅ 100M 主臂加副臂 MAIN JIB 333+80(ㄋ)			
	主臂加长臂 侧 厂方位作业 Outri ei fully extended ide & ieri woilin						主臂十件 侧 厂方位作业 Outri ei half extended ide & ieri woilin							0		30	
	105	149	195	241	287	333	105	149	195	241	287	333		厂 侧方 IIAI & IDI	而方 IIONI	厂 侧方 IIAI & IDI	而方 IIONI
30	25000	17000					25000	17000									
35	25000	17000	16000				22000	17000	16000								
40	24000	17000	16000				20000	17000	16000				80	3000	3000	1500	1500
45	22000	17000	16000	11000			18000	17000	16000	11000			78	3000	3000	1500	1500
50	20000	17000	16000	10800			14000	15000	15000	10800			76	3000	3000	1500	1500
55	17900	17000	15200	10500	8000		11800	12000	12800	10500	8000		74	2900	2900	1500	1500
60	16300	16500	14200	10200	8000		9800	10000	10800	10200	8000		72	2800	2800	1450	1450
65	14900	15200	13200	9800	8000		8300	9000	9100	9200	8000		70	2650	2450	1400	1400
70	13300	13700	12300	9300	8000	7000	7100	7800	8000	8200	8000	7000	68	2500	2050	1350	1350
75	11000	11600	11600	9000	8000	7000	6000	6800	7000	7200	7500	7000	66	2400	1750	1300	1300
80	10500	11000	11000	8500	7400	6500	5200	6000	6200	6300	6500	6300	64	2300	1450	1270	1200
90		9000	9300	7800	6800	6000		4800	5000	5200	5300	5400	62	2150	1250	1240	1050
10		7500	7800	7200	5800	5500		3800	4000	4200	4300	4300	60	2050	1050	1210	850
11		6300	6600	6550	5400	5000		3000	3200	3500	3600	3700	58	1850	900	1180	750
12			5600	5700	5000	4600			2800	2900	3000	3100	56	1650	700	1150	600
13			4800	4950	4450	4200			2200	2500	2600	2600	54	1500	600	1120	500
14			4100	4300	3900	4000			2000	2200	2200	2200	52	1350	450	1100	350
15			3600	3750	3400	3900			1600	1700	1800	1800	50	1200	350	1070	250
16			3100	3300	2700	3500			1200	1500	1600	1600	45	920		840	
18				2600	2100	2800				1200	1100	1200	40	700		660	
20				2000	1700	2200					800	900	35	520		490	
22					1300	1800						600	30	370			
24					1000	1400											
26						1100											
28						850											

2.2.3 Overall view (Unit: mm)



3 Specifications, superstructure

3.1 Boom and telescoping mechanism

The box-type boom consists of 4 hexagon-section boom sections which are made of high-strength low alloy steel, so it has strong bending resistance, great load bearing capacity, light deadweight, large lateral stiffness and small end deflection. Adopting a self-created support structure for sliding block angle, the deadweight of the boom has been greatly decreased and the stress on the boom is distributed more evenly after a series improvements. Thus, boom deformation caused by uneven stress distribution will never occur. Furthermore, the boom has good guidance quality and adjustability.

The boom telescoping mechanism is composed of one telescoping cylinder and two synchronous telescoping mechanisms. This compact design makes the crane operate reliably. Each cylinder is fitted with a balance valve.

3.2 Jib

It is 1-section lattice jib. It is folded on the side of boom and fixed by inserting pins when it is not used. The offset is 0° or 30° and is conveniently changed by operating the shaft and pull bracket.

3.3 Slewing table

Single ribbed plate structured and optimized slewing table made from high-strength steel makes the layout of articulated points of boom and derricking mechanism more reasonable. It also
has a unique structure and beautiful appearance. The engine hood is designed ergonomically.

3.4 Boom head single pulley

The boom head single pulley is mounted on the side of boom head when it is not used. It rotates around the shaft and aligns and then is fixed on the boom head by shaft. This option is set up
for rapid hoists over the boom head to improve the working efficiency when the loads are light.

3.5 Derricking mechanism

Derricking mechanism adopts a front mounted single cylinder which can make the boom angle vary from -2° to 80°. Balance valve fitted on the cylinder can make derricking up/down stably.

3.6 Slewing mechanism

Axial plunger piston hydraulic motor drives the pinion on output shaft via planetary gear reducer to rotate around the slewing ring, providing crane superstructure 360° unlimited rotation. The slewing mechanism is of controllable and free slewing function, which makes the load stop at any position. Slewing cushion valve and normally closed brake provide the crane stable and reliable slewing. 4-point ball type slewing ring makes the slewing table of super-strong bearing capability and long service life.

3.7 Hoisting mechanism

It consists of main and auxiliary winch mechanisms. The hydraulic motor drives the grooved drum via the planetary gear reducer to lift and lower the hook. There is a brake mounted between the motor and reducer. The main winch and auxiliary winch can work independently or simultaneously. Models of main / auxiliary winch reducer are the same. However, the main winch

is driven by variable motor and auxiliary winch is driven by fixed displacement motor. A spring-type rope guard is installed on each winch. The main winch is also equipped with a lowering limit switch. The built-in two-stage planetary gear reducer has such advantages as compact structure, light deadweight and high reliability. The hoist rope is of high-strength and its specifications are as following:

Diameter: ϕ 17.0mm

Strength grade: 1910N/ mm^2、1960 N/ mm^2

Length: main hoisting rope: 160 m

auxiliary hoisting rope: 95m

3.8 Main and auxiliary hook

The lifting capacity of main hook is 25t. The wire rope is reeved on the pulley block for 4

times. The main hook is rotatable and is equipped with a hook safety device and the mounting lugs for fixing the tail end of wire rope. The lifting capacity of auxiliary hook is 3t and the wire rope is reeved on the pulley for 1 time. The auxiliary hook is a rotatable hook and is equipped with a hook safety device.

3.9 Operator's cab

Wide-vision operator's cab with adjustable headrest seat is made of steel. All the instrument panels are installed in front of the seat, and the control levers are beside the left and right armrest. The spacious, comfortable and safe cab, which is equipped with wiper, washer, A/C and heater, is ergonomically designed.

3.10 Outrigger

The crane adopts H-type outrigger. The outrigger box and sliding beam, which are made of low-alloy and high-strength steel, are of box structure. After Pro/E simulation design and actual-use calculation, the section of the outrigger is of good performance and strong bearing capacity.

The horizontal sliding beam can be telescoped in /out via the horizontal cylinder. Large outrigger span ensures the stability of the crane. The outrigger pad is mounted on the head of vertical cylinder and can be pushed and pulled horizontally. When the outriggers are fully extended
or fully retracted, they are fixed by locking pins. The outrigger control levers are installed on both sides of chassis frame and can be operated synchronously or independently. Each vertical cylinder is equipped with a two-way hydraulic lock to ensure stable and reliable operation of the crane.

The 5^{th} outrigger is installed beneath the driver's cab. When the 5^{th} outrigger is set up, the crane can realize all-direction slewing operation.

3.11 Hydraulic system

The unique manual full proportional control incorporates the advantages of traditional lever control and electric-hydraulic pilot control. It not only reserves the merits of safety & reliability of original control structure and low maintenance cost, but also realizes that the working speed of actuating mechanism is only proportional to the opening degree of control valves rather than affected by the load. Furthermore, it has improved the speed-regulation performance.

The outrigger control valve is manual multiple directional control valve which controls the outrigger control mechanism on both sides of chassis frame to control the outriggers telescoping synchronously or independently.

3.12 Electrical system

This is a single wire system with negative earthed. The rated voltage of its power supply is DC 24V.

The superstructure electric includes the superstructure power control light, superstructure start control light, superstructure shutdown control light, overwinding control light, overlowering control light, overpressure control light, hoisting limit switch, lowering limit switch, overload warning device, lighting lamps, fan, wiper, horn and hydraulic oil cooling fan as well as A/C and so on. All
the above devices ensure the safety operation and good working environment of the crane.

Press the red emergency stop button in an emergency, then the power supply of the vehicle will be cut off and the safety of the vehicle can be ensured.

3.13 Safety devices

The crane is equipped with an automatic load moment limiter whose display and warning device is fitted in the operator's cab. If the actual load reaches 90% of the rated one, the warning light lights up and buzzer sends out slow acoustic warning. If the actual load approaches 100% of
the rated one, all dangerous crane movements are switched off. According to the requirements, the digital LCD will display the following data: load moment ratio, boom angle, boom length, working radius, actual lifting capacity, permitted lifting capacity.

In addition, the crane is also equipped with the following safety devices to ensure the safety of the crane:

1) Boom angle indicator;
2) Suspended hoisting limit switch;
3) Hook safety device;
4) Lowering limit switch;
5) The 5^{th} outrigger overpressure protection device;
6) Two-way hydraulic lock;
7) Balance valve;
8) Relief valve.

4. Accessories

4.1 A/C

The driver's cab is equipped with an A/C special for auto. The A/C for operator's cab is optional.

4.2 Fuel heater (optional)

The operator’s cab is equipped with a fuel heater which is used for heating the cab.

5. Specification of special purpose chassis for truck crane

Chassis model	Engine model	Manufacturer
ZLJ5325V3	WP10.270	Weichai Power Co., Ltd

For the detailed information, please refer to the *Technical Specification for Special Purpose Chassis*.

ZOOMLION ZLJ5325 SPECIAL PURPOSE CHASSIS

TECHNICAL SPECIFICATION

ZLJ5325V3/27Y

1. **Product characteristic**

ZLJ5325 special purpose chassis for truck crane, integrating many years' design and manufacturing experience and different kinds of high-tech, is a new generation product with high performances, developed independently by our company in accordance with market trend and consumers' demands. The chassis is designed, manufactured and tested strictly in accordance with the requirements stipulated in national standard and industrial standard. Emission of the crane complies with the regulations of GB17691-2005 National Stage Ⅲ and GB3847-2005, and safety devices conform to the requirements of 3C certification.

This vehicle adopts low-mounted full-width driver's cab and integrated guard plate designed by ourselves and made in special manufacturer, which has original and unique appearance and good characteristic of aerodynamics. The design in driver's cab, including the positions and controls of each switch, control lever and signal lamp, base on the ergonomics theory, so as to provide comfortable environment and convenient operation condition for drivers. The electric control engine can more save energy and protect environment. The control system adopts CAN bus technology and has the function of self-troubleshooting. The 6*4 driving type has excellent driving performance. The hydraulic power steering system makes the steering easy and agile. The dual-circuit pneumatic braking system ensures reliable work. The emergency steering system is optional. It is convenient for emergency steering and tow which makes traveling more safe. Maintenance cost and convenience for customers has been taken into consideration in our original design. Therefore, each instrument in the driver's cab is independent, and connecting elements of pneumatic circuit and oil circuit mostly adopt industrial standardized components.

2. Chassis Specification

2.1 Product Model

Model in auto industry: ZLJ5325

Code:ZLJ5325V3

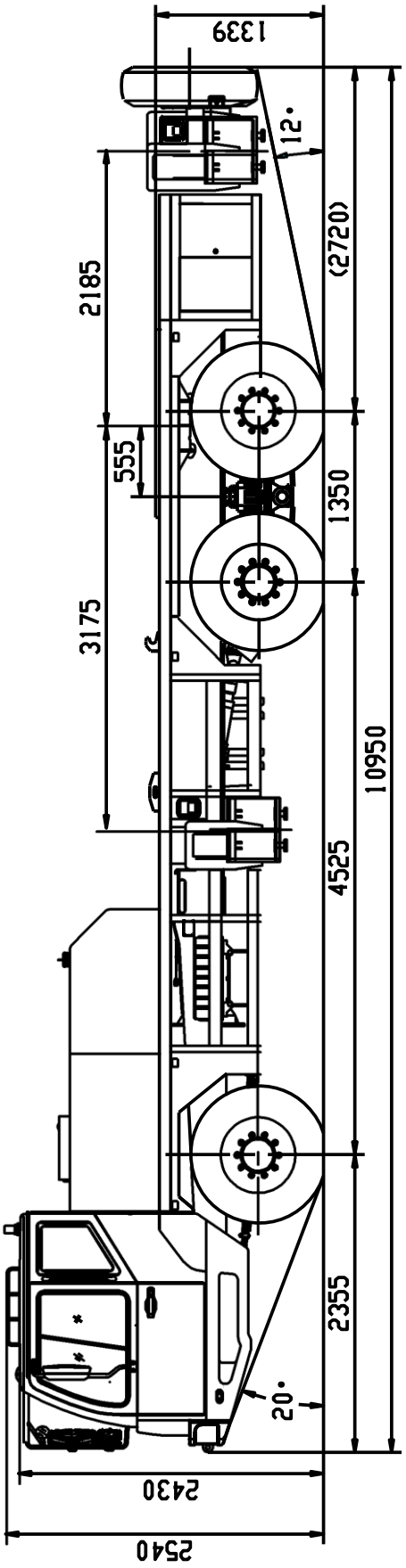
2.2 Main Technical Specifications

Item		Value	Remarks
Mass specifications	Max. design total mass kg	32000	
	Max. design axle load (front /rear) kg	7000/25000 (tandem axles)	
	Complete vehicle kerb mass kg	12200	
	Axle load (front/rear) kg	4450/7750 (tandem axles)	
Traveling specifications	Max. traveling speed km/h	78	
	Max. gradeability %	37	
	Min. turning diameter m	≤22	
	Min. ground clearance mm	220	
	Approach/departure angle °	20/12	
	Braking distance m	≤10	Initial speed: 30km/h
	Limits for exhaust pollutants and smoke	Comply with relative standards	GB3847-2005 GB17691-2005 (stage Ⅲ)
	Oil consumption per hundred kilometers L	45	
	Fuel tank capacity L	250	
Dimension specifications	Overall dimensions (L×W×H) mm	10950×2500×2540	
	Front / rear overhang mm	2355/2720	
	Quantity of axle	3	
	Wheel space mm	4525+1350	

Item			Value	Remarks
	Track	Front mm	2040	
		Rear mm	1830/1830	
Drive axle	Drive type		6×4	
	Speed ratio		5.938	
Quantity of leaf spring (front/rear)			12/10	
Tire	Specification		11.00-20	11.00R20 (optional)
	Number (excluding spare tire)		10	
Engine	Engine model		WP10.270	
	Type		6-cylinder in line , turbocharger, middle-cooling	
	Fuel type		Light diesel oil	
	Displacement ml		9726	
	Rated power / rotational speed kW/r/min		199/2200	
	Max. torque / rotational speed N.m/r/min		1100/1200～1600	
Transmission	Model		8JS118TB-B	
	Type		Mechanical step change	
	Operating method		Mechanical manual operation	
	Quantity of gears		8 forward speeds, 1 reverse speed	
	Speed ratio		Forward speed: 11.40 / 7.94 /5.63 / 4.06 / 2.81 /1.96 / 1.39 /1.0 Reverse speed:11.35	
The number of persons allowed in the driver's cab			2	
Steering system	Steering type		Steering wheel	
	Outer diameter of steering wheel mm		500	

Item			Value	Remarks
	Steering axle		Universal coupling	
	Steering gear	Model	PY-ZJ120C-Z/Y	
		Type	Integral circulating ball hydraulic booster steering gear	
	Power steering tank	Model	QC25/13-WP-PY	Outer circulation
		Type	Gear type	

2.3 Overall View (unit: mm)



3. Specifications for chassis main components

3.1 Engine

This chassis adopts special purpose WP10.270 diesel engine for construction machinery which is developed under special operating conditions for truck crane. The engine has larger output torque, excellence starting performance and quick acceleration while complete vehicle starting. The forced-induction system can usefully ensure engine has larger torque at low-speed running, obviously upgrade its low-speed dynamic property and strengthen gradeability of complete vehicle. Meanwhile, availably prolong service life of complete vehicle under low-speed operating conditions when emission temperature is relatively low. The electrical fuel injection system can save energy and protect environment.

3.2 Clutch and its control

The diameter of friction lining is Φ420mm.

The crane adopts single-dry-plate clutch whose work performance is steady and pedal effort that thorough separation needed is small.

The crane adopts air-assisted hydraulic control mechanism, which makes operation more expediently and reliably. Depressed clutch pedal by driver can get enough hydraulic pressure and make clutch disengage completely even if the air-assisted system is out of control. (Caution: pedal force needed will be increase greatly at this moment).

3.3 Transmission and its control

The crane adopts eight-gear mechanical transmission which has eight forward gears and one reverse gear. The transmission is made up of a main section and a rear mounted auxiliary section which adopt two intermediate shafts of the same structure. The power is inputted from input shaft, and then branches into two intermediate shafts, collects to main shaft to output at last. This structure not only reduces the thickness of gear, shorten the axial dimension of transmission, lighten the mass of complete vehicle, but also make main shaft structure more simple, make it bear toque and not bear bending moment, which improves the force conditions of main shaft and bearing, greatly enhance service reliability and endurance of transmission. The transmission has many gears and its difference of speed ratio between each gear is small, therefore the rotational speed difference between neighbouring gears is small during operation to make shift steady. The output flange has end tooth which comply with ISO8667-T180 requirements.

The fully synchronizer is installed in transmission. High/low gear changeover switch is fixed on

gearshift control lever, which controls shift cylinder. The transmission can operate only when transmission changing from high gear to low gear or from low gear to high gear.

The control system adopts mechanical manual control structure, which is simple in structure, convenient in maintenance and reliable in operation.

3.4 PTO

Rated output torque:686N.m.

Output type: connect the flange, the rotary direction of output flange is the same as that of engine.

The rear mounted PTO is installed on extension intermediate shaft of auxiliary tank on transmission's rear end. Its power is taken out from extension intermediate shaft of transmission by PTO hollow shaft, passes engagement sleeve, input gear, output gear shaft and output flange. At last, the power is output. This type of PTO has larger power.

It adopts two-way electropneumatic control, which can availably avoid accidence caused by the vehicle is in work state by mistake due to vibration and other reasons while the PTO is out of service.

3.5 Propeller shaft

It adopts steyr series propeller shaft assembly, which are all open type. The coupling flange has end tooth.

The rear end of the 1st propeller shaft installs a intermediate support, which is satisfied with the

arrangement need of transmission shaft, at the same time, minishes included angle of universal joint, heightens critical rotational speed and ameliorates resonance characteristic of drive system. The 2nd propeller shaft assembly's structure is similar to that of intermediate/rear axial propeller shaft assembly. There is universal joint at both ends and telescopic spline at intermediate part in order to adjust to axle hopping.

3.6 Axle

The axle consists of a driven axle and two drive axles, all axles are joined to frame by suspension, among which the front axle is steering driven axle, the intermediate axle is through rigid drive axle with longitudinal/transversal differential lock device and the rear axle is normal rigid drive axle with transversal differential lock device. The flange connecting to propeller shaft has end tooth which comply with ISO8667-T180 requirements.

The steering knuckle of front axle is cast solid forked structure, which is connected to Elliot spindle

nose by main pin. The main pinhole of steering knuckle has tin bronze alloy bush inside. The limit screw mounted above knuckle can restrict and adjust internal-external corner and satisfy right steering characteristic.

3.7 Wheel and tire

Rim type：8.00V-20

Tire type: 11.00-20(18 layer)/11.00R20（18 layer）

Tire pressure: 0.91MPa/0.93 MPa（single tire）， 0.84MPa/0.86 MPa（double tire）

The flat base wide rim can effectively enhance the service life of tire and improve trafficability for vehicle and stability for travel.

3.8 Steering system

The steering system consists of integral recirculating ball power steering gear, steering oil pump and steering drive mechanism.

The steering gear adopts inside booster cylinder, recirculating ball cog rack and gear segment steering mechanism and high-sensitivity distributing valve, which has the advantages of larger output torque, good steering performance, safe and reliable operation, simple assembly and convenience maintenance.

The emergency steering system is optional. When the crane is traveling in normal condition, the main steering system works and main steering pump gets power from engine. When the engine can not work and main steering pump can not get power, the main steering system does not work. At this moment, the emergency steering works and it gets power from gearbox (caution: only when the crane is traveling, can the emergency pump get power from gearbox).

3.9 Suspension device

The front suspension adopts leaf spring suspension system in line, which has the advantages of simple structure, high working dependability and convenience maintenance. The rubber buffer block is fitted on leaf spring. When the vehicle is traveling on uneven ground or impacted, the rubber buffer touches limit stop on lower aerofoil of chassis frame to avoid damage of leaf spring.

The rear suspension adopts twin axle balanced suspension of leaf spring, balance beam and propelling rod, among which rear steel spring is fixed on bracket of balance beam by stud platen, balance beam and propelling rod are in series. When the rear axle is distorted, this structure has

large absorbability. Even if the crane is traveling on uneven ground, the skidding phenomenon does not appear. The rubber block and limit stop are installed on rear leaf spring to protect leaf spring.

3.10 Braking system

Main brake：Dual-circuit air pressure brake can act on all wheel hubs;

Parking and emergency brake：Spring brake can act on wheel hubs of intermediate/rear axle;

Auxiliary brake：Exhaust auxiliary brake for engine.

If one of dual-circuit brake pipeline fails, the other could still works normally which greatly enhance work reliability.

When there is a need to apply the emergency brake (under the condition that the foot brake is fails or the pedal is not depressed timely), move the hand brake control lever to exhaust air in the hand brake chamber. The braking spring will be expanded at once to ensure traveling safety.

The brake system adopts brake components such as high integrated solenoid valve, four-circuit protection valve, dryer and so on to make position and repair of pipeline more simple and convenient.

3.11 Electrical system

This chassis uses N200 battery with two tandem connection (voltage of each tandem connection is 12V) to form 24V output voltage and adopts single wire. Its metal (negative pole) is return lead, earth negative pole thru the main power switch .Battery should be conformed to standard GB/T5008.1-2005 “Technical conditions and test methods of lead acid battery for the crane” and lead meets the national requirements of QC/T29106-2004.

Standard generator is a rectification and voltage regulation integration alternating current generator, its output power is 2kW.

It adopts combination lamp, mounts front/rear fog lamp and reversing video camera, which make appearance graceful and increase travel’s safety.

The instruction panel in driver’s cab adopts background lamp with meter, which can offer convenience not only to operate at night and in bad whether, but also to maintain. All connectors of electrical component adopt import parts to reliably link and reduce running cost.

3.12 Driver’s cab

The low-mounted overall width driver’s cab adopts all metallic welded structure and is covered with soft plastic interior decoration of silencing and heat-insulating materials. There is sun visor in driver’s cab. The seats of driver and passenger are adjustable shock- absorbing high-back seat with

safety belt. The steering wheel and electric window on both sides can be adjusted. The vibration-absorptive material stuck near engine can effectively reduce the noise in driver's cab. The door is connected with driver's cab in interior hinged way and the doorframe is equipped with rubber sealing strip to ensure the door has good tightness. The door can be opened with 85° angle

to make person get in or out conveniently.

The front window in driver's cab is installed large parallel electric wiper with window washer and the large combination view mirror is installed on both sides, which has elegant appearance, capacious space and good aerodynamics characteristic.

3.13 A/C system

It is installed adjustable heater system and cooling A/C system, and has the functions of cold air, heater, air circulation, air humidity adjustment, windshield defrosting, which can keep temperature, air humidity, cleanliness and wind velocity comfortable in different weather.