ZOOMLION

ZOOMLION ZRT500V432 ROUGH TERRAIN CRANE

TECHNICAL SPECIFICATIONS

Zoomlion Heavy Industry Science & Technology Co.,Ltd.

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1. PRODUCT CHARACTERISTICS

ZRT500V432 rough terrain crane is adapted to narrow work space through its wide tread, high stability, short wheelbase and small turning radius.

It provides a 360° slewing function, “on-tires” lifts and pick-and-carry operations.

It can be widely used in construction building sites, oil fields, warehouses, freight yards and logistics bases etc., to carry out lifting work, short distance transportation and pick-and-carry operations in narrow working areas.

ZRT500V432 rough terrain crane consists of a superstructure and a special purpose chassis, including a power system, drive system, suspension system, steering system, braking system, hoist mechanism, derricking mechanism, slewing mechanism, boom system, turntable, chassis frame, outrigger, hydraulic system, electric system and cab etc.

Its distinguishing characteristics include:

- Four steering modes:

  2-wheel steering (front wheels), 2-wheel steering (rear wheels), 4-wheel steering and crab steering.

- Max. rated lifting capacity: 50 t at 3 m working radius
- Max. lifting height: 38.2m
- Max. driving speed: 38 km/h
- Overall dimensions: 13110×2980×3800mm
- Deadweight: 32.6 tons
- Capable of picking and carrying loads
- Capable of travelling on rough terrains

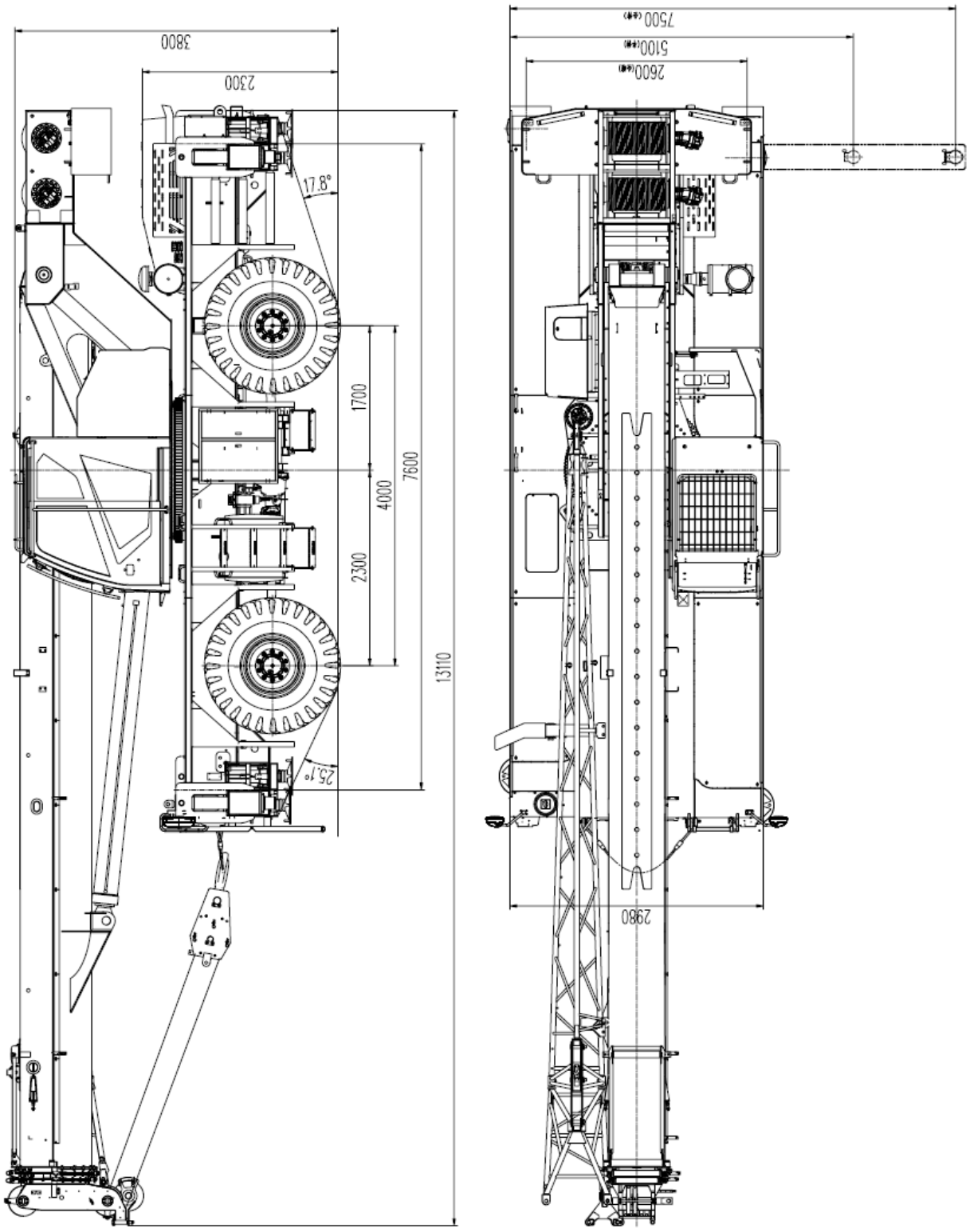


Figure 1 Overall View – ZRT500V432 Rough Terrain Crane

2. TECHNICAL DATA

MAIN TECHNICAL DATA

Type	Ser. No.	Item	Unit	Value
Working performance	1	Max. rated lifting capacity × working radius	kg.m	50000×3
	2	Max. load moment of the boom	kN.m	1715
	3	Max. load moment of the boom (fully extended)	kN.m	826
	4	Max. lifting height of the boom (fully extended)	m	38.2
	5	Max. lifting height of the jib	m	57.8
Dimensions	6	Overall dimensions (L × W × H)	mm	13110×2980×3800
	7	Outrigger spread (Height × Width)	mm	7600×7500
	8	Boom length	mm	10900-36000
	9	Jib length	mm	9000
	10	Boom angle	°	-2-80
	11	Slewing range		360° unlimited slewing (Full range)
Working speeds	12	Max. hoist rope speed (Main winch)	m/min	150
	13	Min. boom telescoping out time	s	60
	14	Min. boom telescoping in time	s	45
	15	Min. boom derricking up time	s	45
	16	Min. boom derricking down time	s	75
	17	Slewing speed	r/min	0-2
Hydraulic system	18	Rated working pressure	MPa	28
	19	Hydraulic oil tank capacity	L	760
Gross vehicle mass	20	Gross weight	kg	32600
Driving	21	Max. driving speed	km/h	38/23
	22	Wheelbase	mm	4000
	23	Treads (Front / Rear)	mm	2380
	24	Max. gradeability	%	79

3. MAIN PARTS TABLE

MAIN PARTS TABLE

Type	Ser. No.	Item		Main configuration
Power system	1	Engine make & model		DF Cummins QSB6.7
	2	Fuel type		Diesel
	3	Intake system		Turbo-charged, air to air, inter-cooling
	4	Cooling system		Water-cooling
	5	Engine rated power	KW/r/min	194KW/2200rpm （Dongfeng Cummins ） 194KW/2400rpm （US Cummins ）
	6	Engine rated torque	N.m/r/min	990N.m/1500rpm
	7	Fuel tank capacity		300 L
Drive system	8	Transmission drive mode		4×2, 4×4,
	9	Model or brand of transmission		DANA
	10	Transmission gear stage		6 forward and 3 reverse speeds
Travel system	11	Suspension		Rigid (front) / Flexible (rear)
	12	Model or brand of axles		Meritor (Xuzhou)
	13	Steering mode		2-wheel steering (front wheels) 2-wheel steering (rear wheels) 4-wheel steering Crab steering
	14	Tire size		23.5-25-32PR
	15	Tire number		4
Hydraulic system	16	Model or brand of main valve		ZOOMLION
	17	Gear pump		Jinan Hydraulics
	18	Balance valve / hydraulic lock		ZOOMLION
	19	Slewing motor		HIGH-TECH
Electrical system	20	Rated capacity indicator		ZOOMLION
	21	Controller		IFM
	22	Electric accelerator pedal		Jieou
	23	Bus cable		Phoenix/Zhaolong
	24	Battery		VARTA

	25	Lights and switches		Hella and Bangchen
Emission	26			Chinese National Stage III for non-road vehicles

4. SPECIFICATIONS, SUPERSTRUCTURE

4.1 Boom and telescoping mechanism

The box-shaped telescopic boom consists of 4 U-shape boom sections made of high-strength steel.

The telescopic boom sections are telescoped in / out via two telescopic cylinders and two sets of boom extension/retraction ropes. Each telescopic cylinder is equipped with a plug-in balance valve.

The boom head is equipped with 5 pulleys, which is convenient for changing wire rope reevings without removing the wedges. A rooster sheave is optional.

Min. boom length (with telescopic sections completely retracted): 10900mm

Max. boom length (with telescopic sections completely extended): 36000mm

Min. telescoping out time: 60 s

4.2 Jib

It consists of two lattice jib sections. The jib section II is secured into the jib section I, and the whole jib is stowed to one side of the boom via moveable pins during driving.

A single pulley is assembled at the jib head.

Jib angle: 0°, 15° and 30°

Jib length: 9m

4.3 Derricking mechanism

A front-mounted single derricking cylinder is installed with a derricking balance valve.

Derricking angle range: -2°- 80°

Derricking speed: -2°- 80°/50s

4.4 Hoist mechanism

4.4.1 Main and auxiliary winches

The main winch realizes lifting and lowering movements through rotations of the drum driven by the planetary reducer which is driven by the axial variable plunger pump.

The auxiliary winch adopts identical components.

4.4.2 Wire rope

High strength wire rope

Max. hoist rope tensile force:	5400kg
Max. hoist rope speed:	150m/min (At the 4th layer)
Rope diameter:	Φ17 mm
Main winch rope length:	160 m
Auxiliary winch rope length:	105 m

4.4.3 Hook block

Rotatable main hook: 50 t, with 5 pulleys and a hook latch, secured at the chassis frame in front of slewing table.

Rotatable auxiliary hook: 4.5 t, with a hook latch, used with the rooster sheave and jib, secured at the auxiliary hook holder on the chassis frame.

4.5 Slewing mechanism

It consists of a hydraulic motor, planetary gear reducer, pinion gear and slewing ring, etc. Via the planetary gear reducer, the hydraulic motor drives the pinion gear to rotate and makes the slewing bearing's outer ring rotate around its inner toothed ring fixed on chassis frame, realizing 360° unlimited superstructure slewing.

A hydraulically controlled usually-closed brake is installed. Controlled slewing function of the slewing mechanism is adopted.

Slewing speed:	0-2 r/min

4.6 Turntable

The turntable adopts a wall plate structure.

4.7 Hydraulic system

4.7.1 Oil pump

Two sets of dual gear pumps are installed on the transmission.

The two front gear pumps supply hydraulic oil together to the boom telescoping system, derricking mechanism and hoisting mechanism.

One rear gear pump supplies hydraulic oil to outriggers, braking system and air conditioner, and supplies pilot oil.

The other rear gear pump supplies hydraulic oil to the slewing and steering mechanisms.

4.7.2 Control valve

Quadruple multi-way directional valves adopt downstream pressure compensation technology.

4.7.3 Pipeline

An air-cooled hydraulic oil cooler driven by an electric motor is located in the return line.
The system pressure can be displayed on the instrument console. There are pressure test ports configured in hydraulic lines.

4.7.4 Hydraulic oil tank

Capacity: 760 L

4.7.5 Filters

A high pressure filter with the filtering accuracy of 10 μ is mounted in oil ways of outriggers, slewing, steering and braking systems.

Two return oil filters with the filtering accuracy of 12 μ are mounted in the hydraulic oil tank.

4.8 Crane controls

The superstructure movements are controlled by two hydraulic joysticks (with a cross shaft) on both sides of operator's seat (complying with ISO standard requirements).

The left joystick controls slewing and auxiliary winch movements

The right joystick controls derricking and main winch movements.

The telescoping control pedal controls boom telescoping movements.

Derricking and telescoping movements can be executed simultaneously.

4.9 Cab

There is only one cab for ZRT500V432 rough terrain crane. It can be used as the operator's cab as well as the driver's cab. The cab is side-mounted and adopts left hand drive.

The crane adopts EATON (Ji'ning) hydraulic steering gear, Yuxin (He'nan) air conditioner and Jingwei (Beijing) cab heater.

Exhaust emission complies with the requirements of European Environment Protection.

There are two control boxes on the both sides of operator's seat. The left / right control box can be pulled up. Controls of the superstructure are arranged according to the requirements of ASME B30.5-2007 standard and comply with ISO (International Organization for Standardization) standard.

Cab dimensions:

Length: 1810±5mm

Width: 1050±5mm

Height: 1710±5mm

4.10 Rated capacity indicator (RCI)

If the actual load approaches the rated one, the buzzer sends out visual and audible warning.

If the actual load reaches the rated one, all dangerous movements are switched off automatically.

The rated capacity indicator can also limit the working range (including working radius, boom angle, lifting height and slewing range etc.).

The following information can be displayed on the screen:

- Boom angle or moment ratio;
- Boom length or default hook weight;
- Actual working radius or slewing angle;
- Actual lifting capacity;
- Max. permissible lifting capacity;
- Jib installation angle or wire rope reeving;
- Boom status indication;
- Outrigger status or “On Tires” indication.

The following information is displayed by bar graph:

- Percentage of actual lifting capacity to the rated one or working pressure of the hydraulic system.

4.11 Outriggers

H-type outriggers, hydraulically controlled, can be operated in the cab simultaneously or independently.

Each vertical jack cylinder is equipped with a two-way hydraulic lock to ensure that outriggers are secured reliably during working or driving.

Outrigger boxes are directly welded onto the chassis frame.

The outriggers can be completely extended, half extended or completely retracted for different operating modes.

Outrigger spread (Height): 7600 mm

Outrigger spread (Width): 7500 mm (fully extended)

5100 mm (half extended)

2600 mm (fully retracted)

5. SPECIFICATIONS, SPECIAL PURPOSE CHASSIS FOR ROUGH TERRAIN CRANE

5.1 Type

Rear-mounted engine, left-hand drive

Drive mode: 4 x 2 and 4 x 4

5.2 Chassis frame

An Integral box-type structure welded by high-strength steel

5.3 Engine

5.3.1 Model

DF CUMMINS QSB6.7

5.3.2 Type

Four-stroke, 6-cylinder, direct injection, water-cooled, turbocharged diesel engine.

5.3.3 Performance

Max. output power:	194KW/2200RPM(194KW/2400)
Max. output torque:	990Nm/1500RPM

5.4 Drive system

Electrically controlled automatic hydraulic transmission, capable of four-wheel drive mode when the transmission drives both the front and rear axles, as well as rear-wheel drive mode when the transmission disengages from the front axle and only drives the rear axle.

6 forwards and 3 reverse speeds, electric-hydraulic power gear shift, with an automatic locking mechanism.

The working hydraulic oil pump and steering oil pump directly take off power from the transmission.

5.5 Axle

5.5.1 Front axle

Steering and driving axle, directly mounted to the chassis frame, with a planetary reducer and brake.

5.5.2 Rear axle

Full-floating steering and driving axle, with a planetary reducer and brake.

5.6 Steering system

Fully hydraulic power steering gear

The cylinder of the steering and driving axles is controlled by steering wheel to realize crane steering.

4 steering modes:

2-wheel steering – front wheel steering

2-wheel steering – rear wheel steering

4-wheel steering – all-wheel steering

4-wheel steering – crab steering

5.7 Suspension system

Front axle: directly mounted to the chassis frame

Rear axle: a swing axle, connecting to the chassis frame via a hydraulic suspension cylinder

5.8 Braking system

5.8.1 Service brake

Hydraulically controlled caliper disc brake acting on 4 wheels

5.8.2 Parking brake

Hydraulically released parking brake, acted on by the spring mounted on the input shaft of the front axle.

5.9 Electrical system

24 Volt DC

2 batteries with 12 V rated voltage and 120 Ah rated current

5.10 Fuel tank

Capacity: 300 L

5.11 Tire

Size: 23.5-25-32PR

6 SAFETY DEVICES

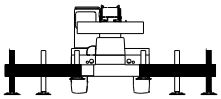
- Rated capacity indicator (RCI)
- Rotating beacon and horn
- Hoisting limiter (anti-two block, ATB)
- Lowering limiter (3rd wrap indicator)
- Balance valve
- Hydraulic lock
- Hydraulic safety valve
- Slewing lock
- Boom angle indicator
- Outrigger beam retaining pin
- Emergency stop button

7 LOAD RATINGS FOR ROUGH TERRAIN CRANE

7.1 Lifts With outrigger beams fully extended

7.1.1 Rated loads with boom

Table 7-1 Rated Load on Outriggers Fully Extended

 Boom	360°slewing (UNIT: KG)	 Outriggers fully extended

Working radius	Cylinder I fully extended, outriggers fully extended, with 3t counterweight						
	10.9	15.1	19.3	23.5	27.7	31.9	36
3	50000	27000					
3.5	45000	27000	24000				
4	**42000**	26800	23500	21600			
4.5	37000	26000	23500	21000	17200		
5	35000	24500	23000	20500	17000	13500	
5.5	30000	24000	22500	20000	16500	13000	
6	26500	**23000**	21700	19500	16000	12600	12000
7	22000	22500	**20000**	18000	14800	12000	11000
8	15200	18000	17800	**16600**	13800	11500	10000
9		14300	14600	14500	12800	10400	9500
10		11600	12000	12100	**11500**	9600	8800
11		9500	10000	10200	10400	9000	8300
12			8600	8800	9000	**8700**	**7800**
14			6300	6600	6900	6800	6500
16				5200	5300	5400	5200
18					4000	4100	4300
20					3200	3400	3500
22					2600	2700	2800
24						2000	2200
26						1700	1850
28							1500
30							1200
I (m)	0	4. 2	8. 4	12. 6	16. 8	21	25. 2
Line part	10	8	8	6	5	4	3
Hook	50t						