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# Modular Low Profile Intelligent Remote Control LHD

Beijing HOT Mining Tech Co.,Ltd



*Process For Environment*

# Modular Low Profile Intelligent Remote Control LHD

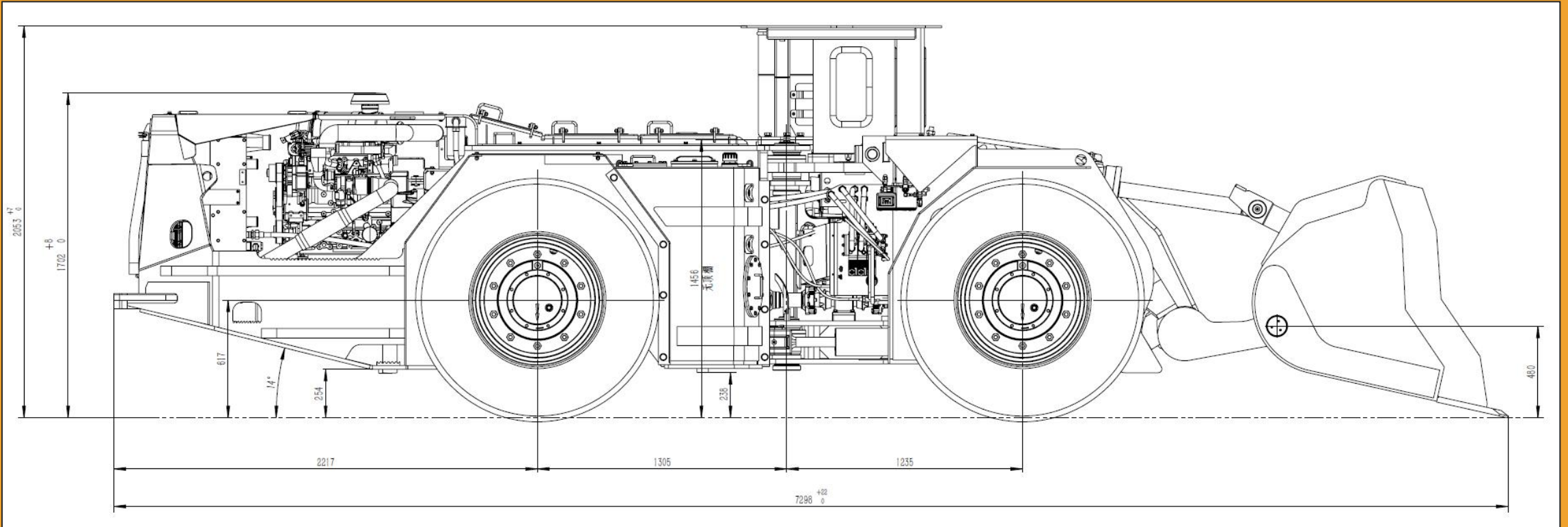


- TH-WJ-2D diesel LHD has a lifting capacity of 4.0 tons, a body length of 7.3m, a width of 1.87m and a height of 2.05m
- TH-WJ-2D diesel LHD is lower than the domestic conventional LHD with a height of 2.3m, which is a low model

# Main Technichal Parameter

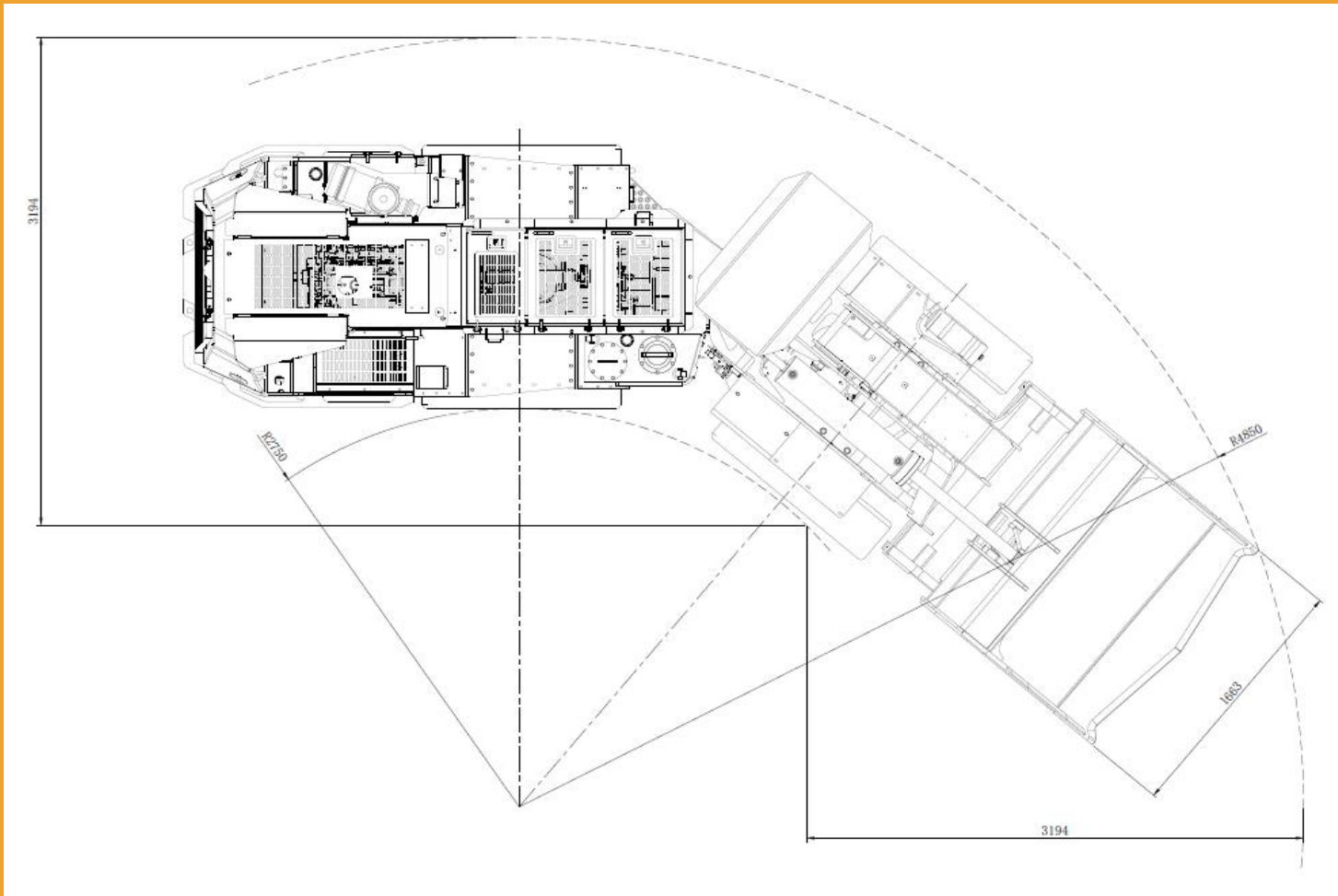
	Models		TH-WJ-2D
Machine Operation Parameters	Maximum working total weight of the machine		12650 kg
	Nominal load		4000 kg
	Straight line static tilting load when lifting arm is horizontal		9807 kg
	Static tilting loads with full steering and lifting arm horizontal		8205 kg
	Breakout force,hydraulic/Breakout force,mechanical		9060 kN / 5936 kN
Transmission System	Engine rating		74.4 kW (2300rpm)
	Travel Speed	Forward (fourth gear)	3.2/6.2/10.2/17.8 km/h
		Astern (fourth gear)	3.2/6.2/10.2/17.8 km/h
Hydraulic System	Hydraulic cycle time		14.9 s (rising : 4.2s / pour : 7.3s / landing : 3.4 s)
Working Parameters	Carriage capacity		2m <sup>3</sup>
	Unloading height at maximum lifting height		1800mm
	Unloading distance at maximum lifting height		900mm
Turning Radius	Maximum steering angle		±40°
	Minimum turning radius (inside/outside)		2620 mm/ 5050 mm
	Rear bridge swing angle		±8°

# Size





# Turning Radius



- Steering Angle :  $\pm 40^\circ$

TH-WJ-2D is flexible enough to give operator great strain space, improve the safety of operation

- The dimensions shown are based on the standard vehicle shape with 25 mm tyre compression
- All dimensions in mm

# Climbing Performance

Standard Configuration, bucket non-load

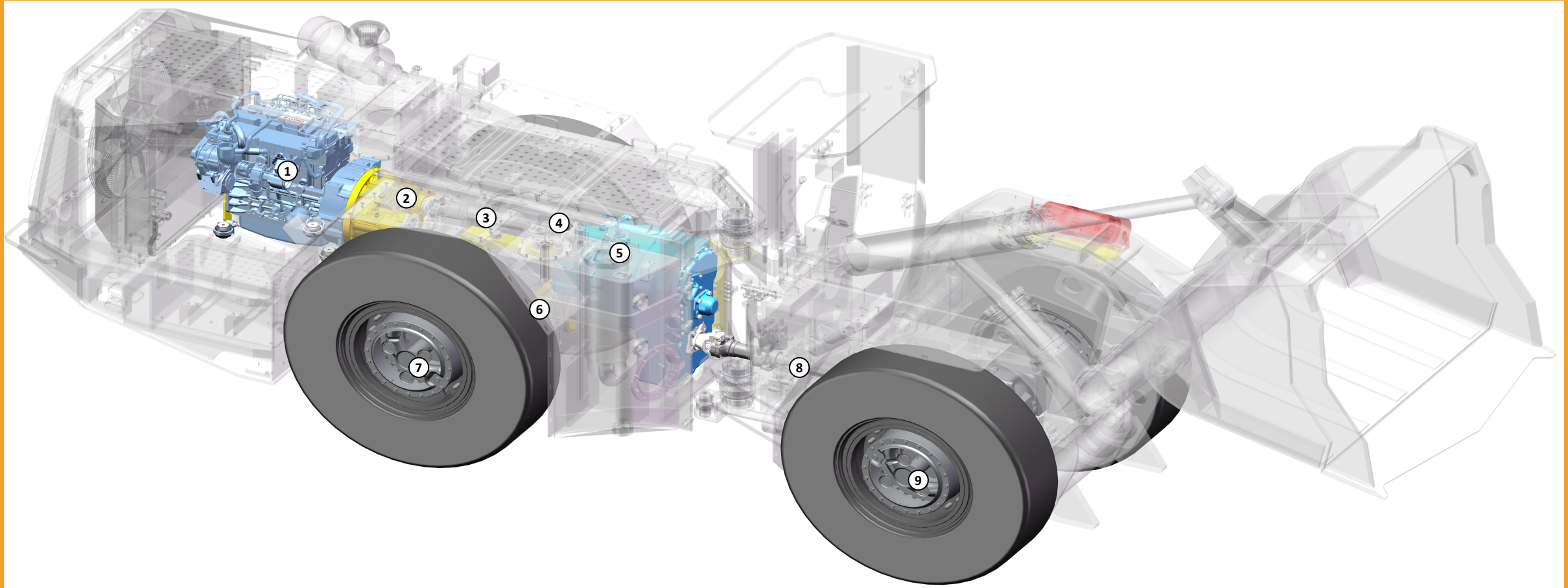
Slope (%)	0.0	2.0	4.0	6.0	8.3	10.0	12.5	14.3	16.0	18.0	20.0	25.0	30.0
Ratio					1:12	1:10	1:8	1:7			1:5	1:4	
1st Gear	3.2	3.1	3.0	2.9	2.9	2.8	2.8	2.7	2.7	2.6	2.6	2.5	2.3
2nd Gear	6.2	6.0	5.8	5.7	5.5	5.3	5.2	5.1	5.0	4.6	4.2	3.8	3.0
3rd Gear	10.2	10.0	9.5	9.8	8.9	7.7	6.5	5.9					
4th Gear	17.8	17.5	14.8										

# Climbing Performance

Standard Confiruration, bucket load

Slope (%)	0.0	2.0	4.0	6.0	8.3	10.0	12.5	14.3	16.0	18.0	20.0	25.0	30.0
Ratio					1:12	1:10	1:8	1:7			1:5	1:4	
1st Gear	3.1	3.0	2.9	2.8	2.8	2.7	2.7	2.6	2.6	2.5	2.5	2.4	2.2
2nd Gear	6.0	5.8	5.6	5.5	5.3	5.1	4.7	4.3	4.0	3.6	3.0	2.4	1.8
3rd Gear	10	9.6	9.1	8.6	6.8	5.7	4.3	3.6	3.1	2.2	1.1		
4th Gear	16.8	15.5	11.9	9.1	5.3	2.2							

# Power Transmission System



①Engine

④Transmission gear box

⑦Rear axle

②Hydraulic torque converter

⑤Hydraulic oil tank

⑧Front transmission assembly

③Upper transmission shaft

⑥Rear transmission shaft

⑨Front axle



# Modular Low Profile Intelligent Remote Control LHD



- All parts of the HOT TH-WJ-2D low model diesel LHD have excellent quality and powerful performance.
- The engineer chooses key accessories when designing: German Deutz engine, American Dana gearbox and torque converter, Denmark Danfoss hydraulic load sensing system, American Meritor front and rear axles and other world brands.

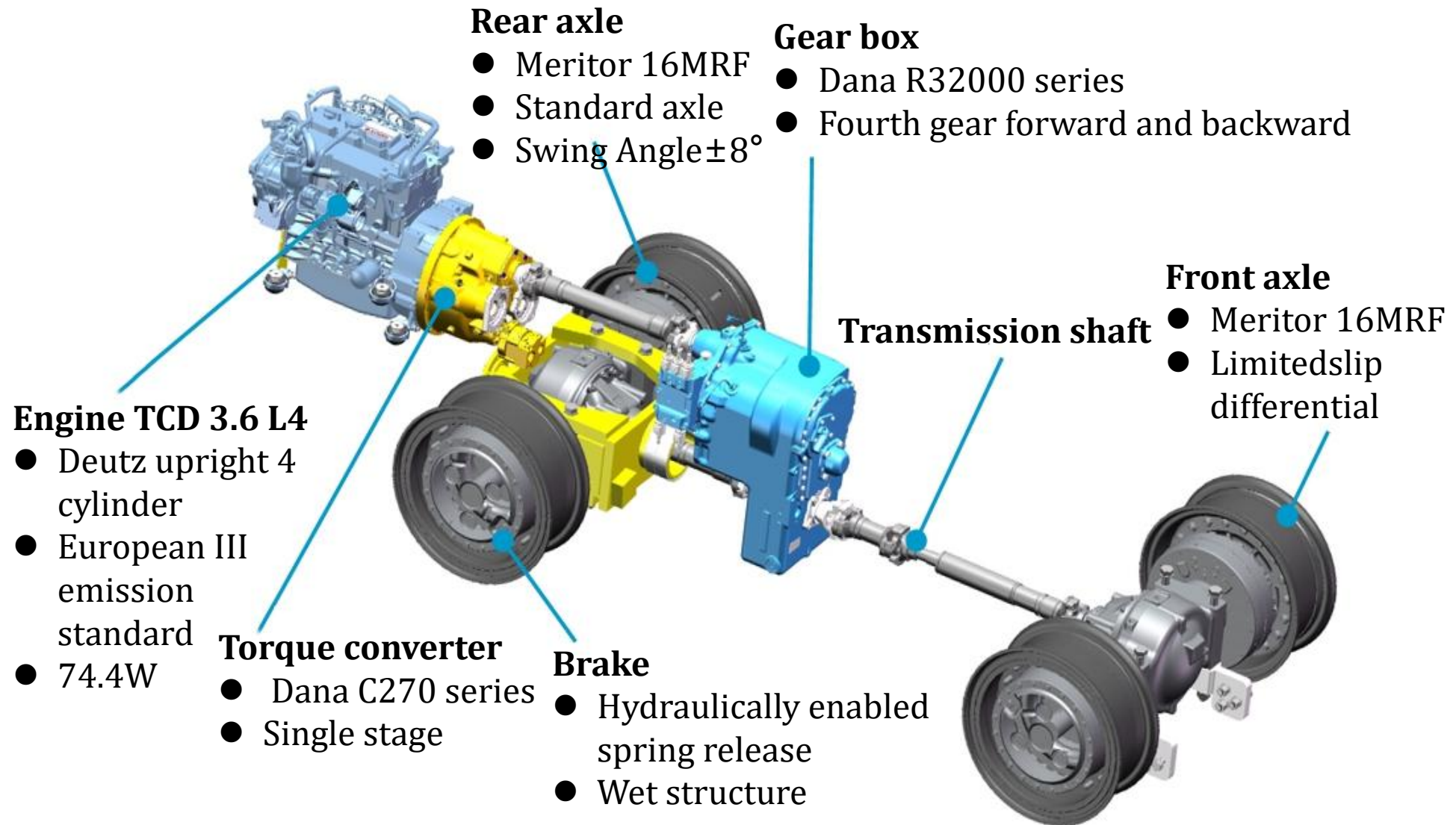


# Modular Low Profile Intelligent Remote Control LHD



- High-end, high-quality imported accessories can ensure the service life and working performance of the LHD as far as possible, improve the efficiency of the LHD at the same time improve the safety of operation, won the trust of customers.

# Power Transmission Diagram





# Engine

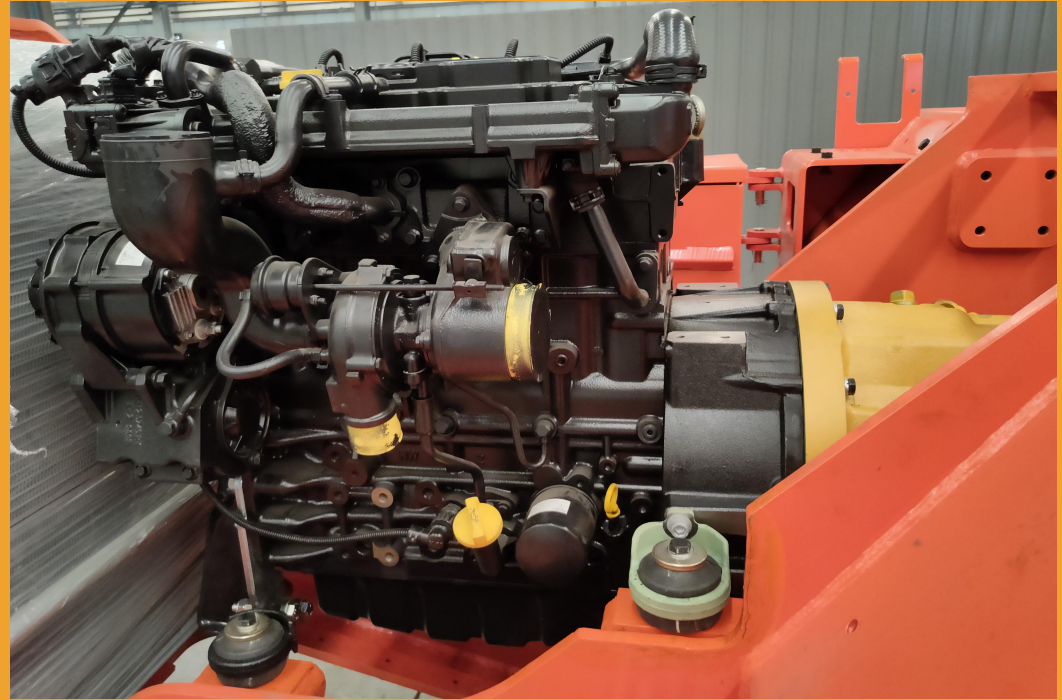
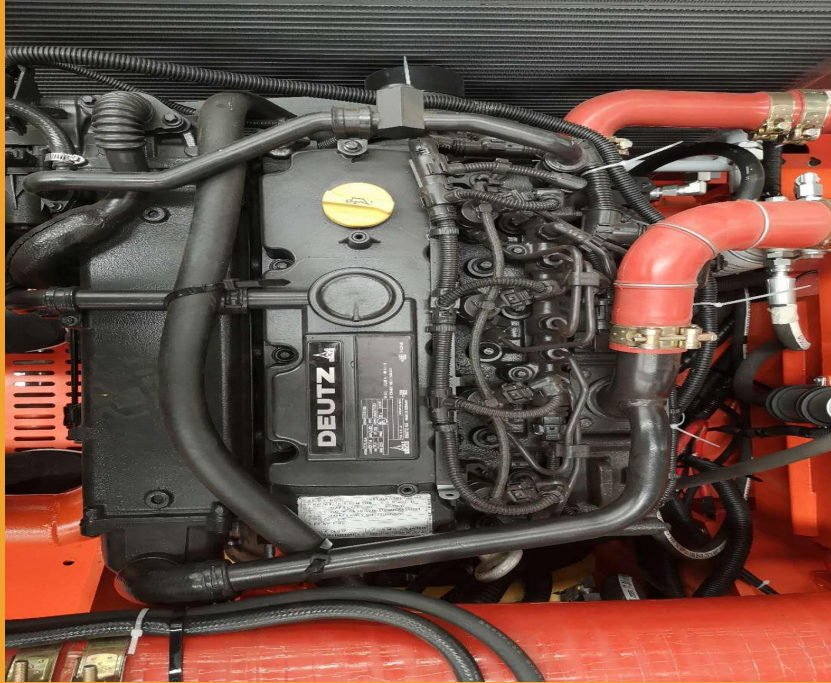


- DEUTZ Diesel Engine *TCD (3.6 L4 Eu stage)*
- Meet the Euro III B emission standard (China Standard Level 3)
- Meet the ventilation requirements of MSHA Part 7 of the U.S. Mine Safety and Health Administration

TLHD-WJ-2D Engine	
Power rating at 2300rpm	74.4kw
Maximum torque at 1600rpm	410Nm
Cylinder	4 cylinder li-line
Displacement	6.6L
Cooling mode	Water cooling
Air volume	127m <sup>3</sup> /min



# Engine



## Characteristics :

- ◆ Self-supporting engine, strong matching, stable and reliable performance
- ◆ Exhaust emissions meet Euro III emission standards, and the engine can be upgraded and improved according to customer needs to meet Euro IV emission standards, which will greatly reduce air pollution and meet exhaust emission requirements under special environments

# Gear Box

- American Dana gearbox (Dana R32000 series)
- Electronic control, Planetary gear power shift gearbox
- Freely adjust the power shift

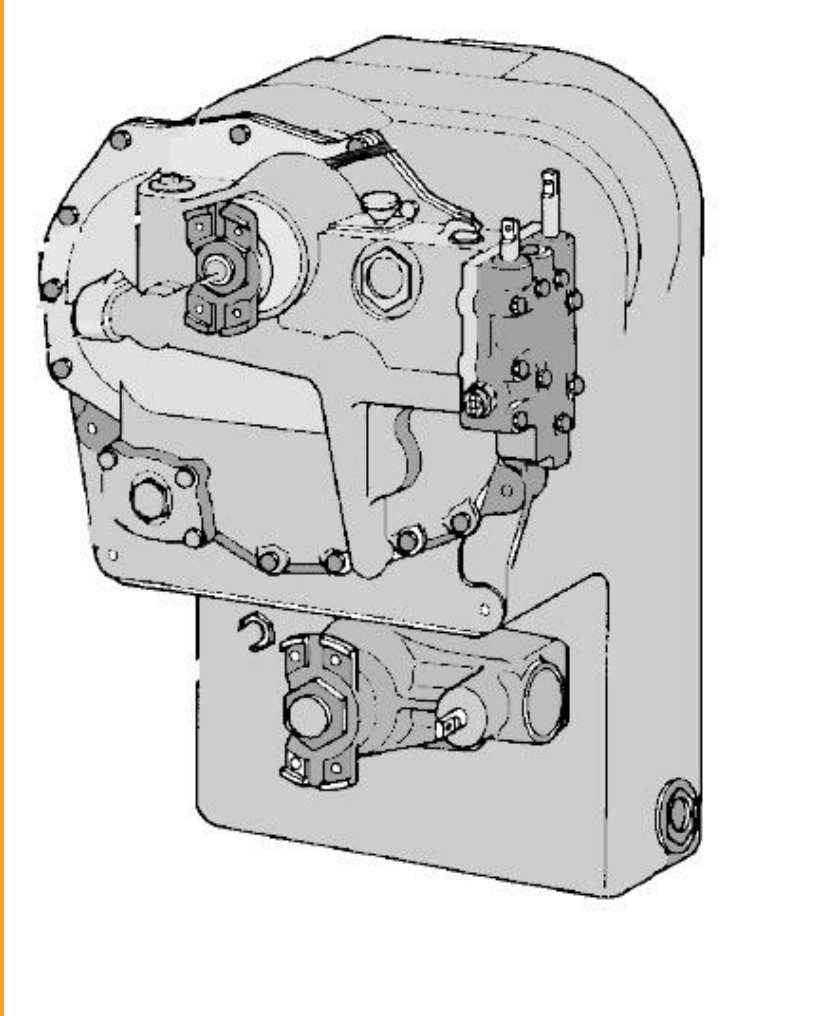
## Characteristics :

- ◆ 4 levels of forward and backward, convenient and diverse, high efficiency
- ◆ With manual and automatic shift mode, meet the requirements of different environments
- ◆ Large diameter clutch set and electronic control shift reduce torque stress of transmission system, shift more smoothly and prolong service life





# Gear Box



## TH-WJ-2D gear box

### Forward speed

1st	3.8 km/hr	6.12 mph
2nd	6.2 km/hr	9.98 mph
3rd	10.2 km/hr	16.41 mph
4th	17.8 km/hr	28.65 mph

### Backward speed

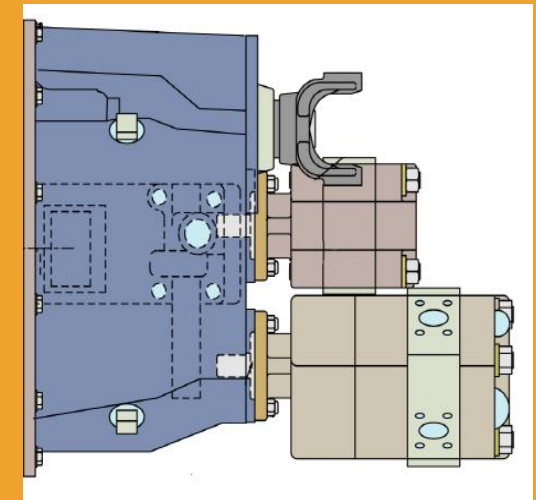
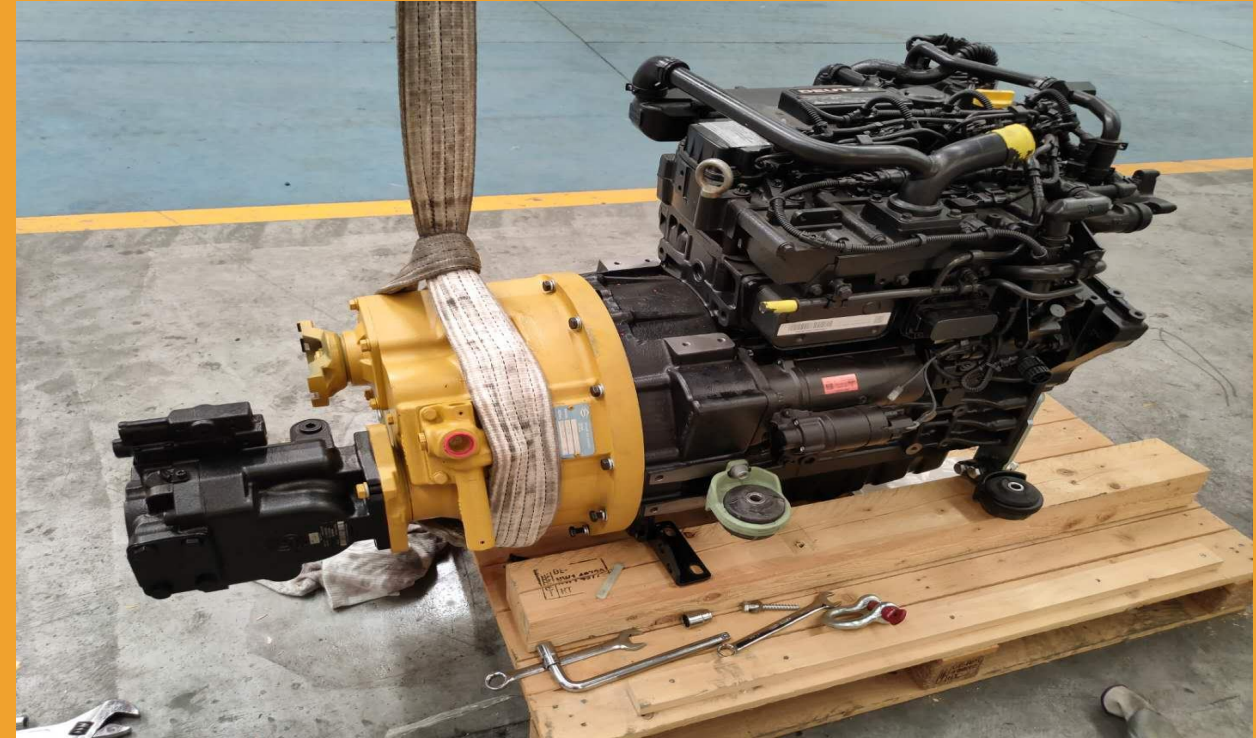
1st	3.8 km/hr	6.12 mph
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# Torque Converter

- Dana torque Converter (Dana C270 series)
- Single stage turbine torque converter

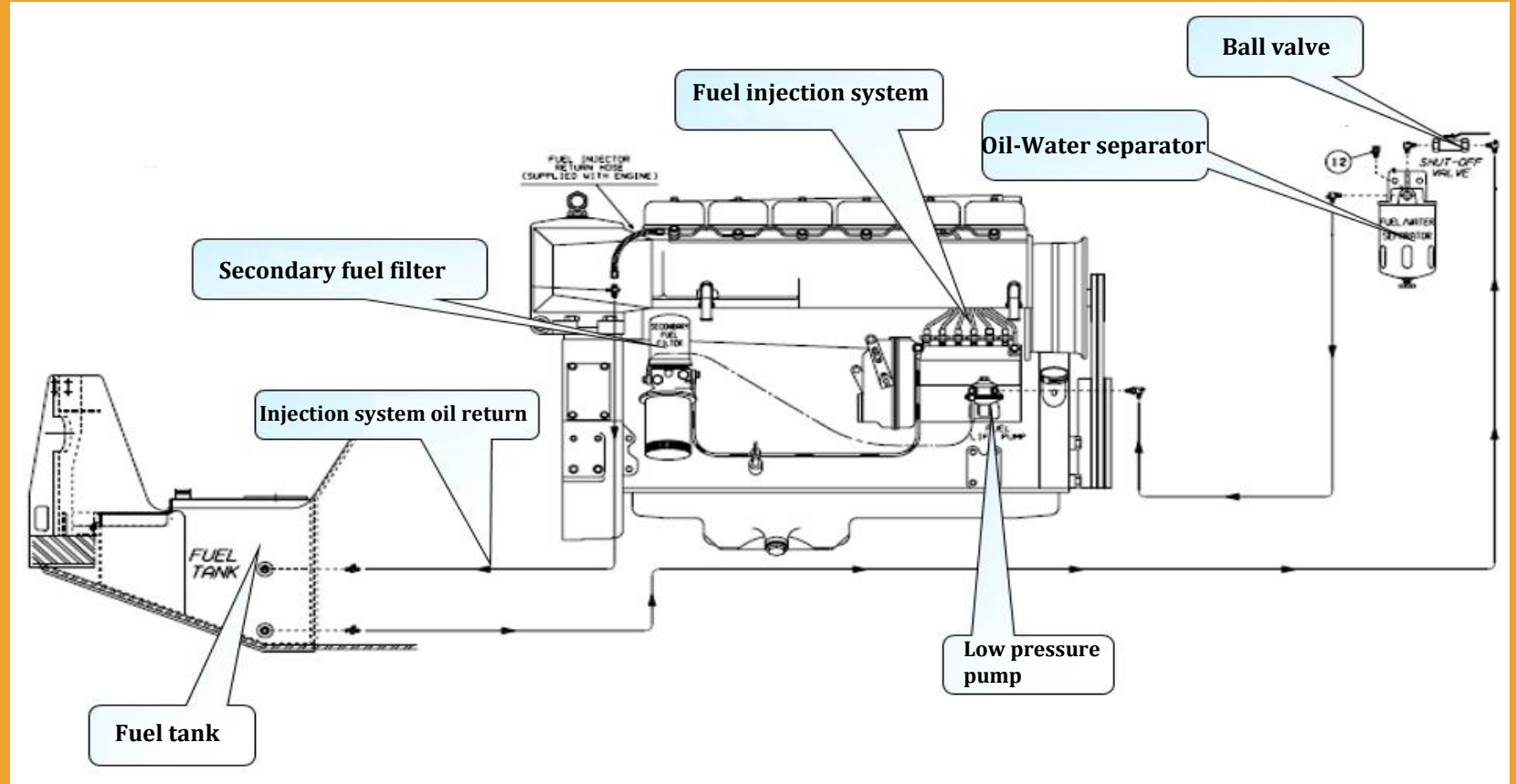
## Characteristics :

- ◆ The torque can be amplified at low speed, so as to buffer the external impact load
- ◆ At high speed, it can be automatically converted into direct transmission with high transmission efficiency





# Hydraulic Load Sensing System



TH-WJ-2D Internal Diagram of Hydraulic System

# Hydraulic Load Sensing System

## TH-WJ-2D Hydraulic Load Sensing System

Heavy duty gear type pump

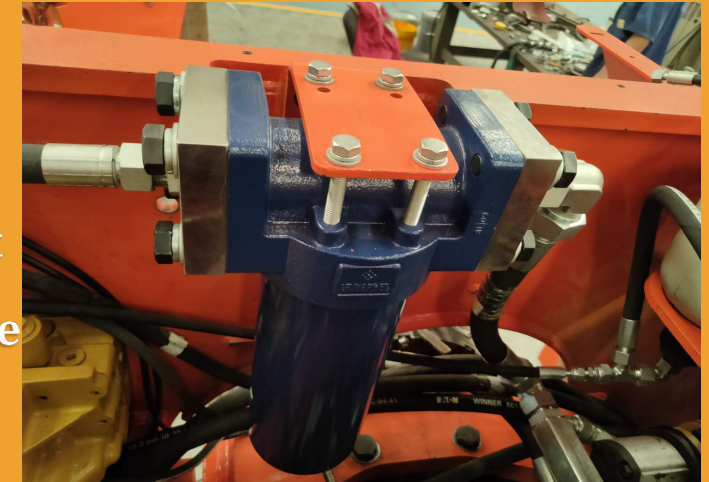
Load sensitive plunger pump

Filtration, oil return	25μm
Pressure of dumping / lifting system	14MPa
Cylinder Diameter	
Steering cylinder	125mm
Lifeing oil cylinder	180mm
Dumping oil cylinder	180mm
Oil Pump	
dumping/lifting	160L / min at 2300rpm
Steering	65L / min at 2300rpm

- Danfoss hydraulic system

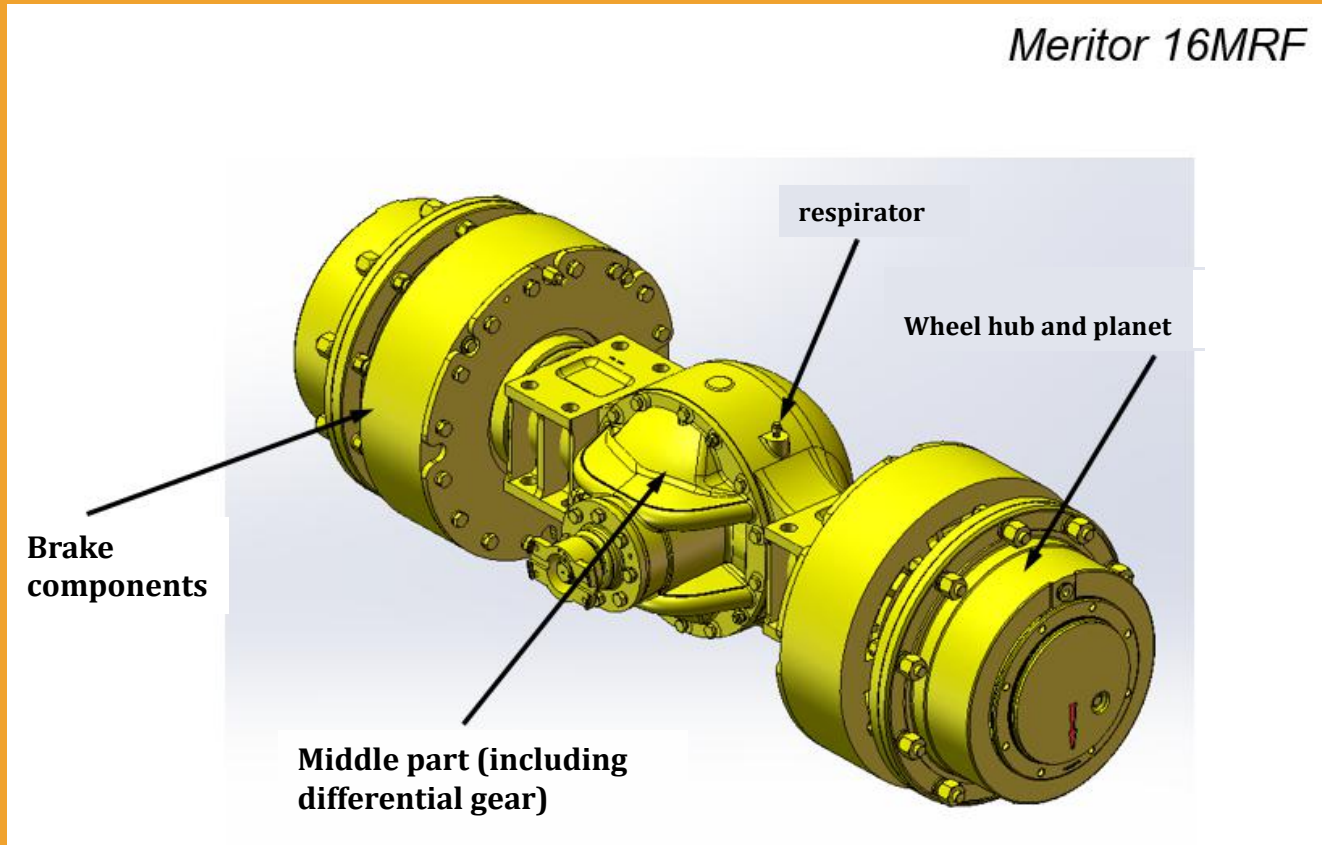
Characteristic :

- ◆ Excellent lifting ability, strong power
- ◆ Large-bore lifting and tipping cylinder with stable power
- ◆ Good sealing and oil cylinder bearings, durable
- ◆ High-efficiency and large-displacement hydraulic pump with sufficient pressure
- ◆ The hose connector can be reused, saving costs





# Axles



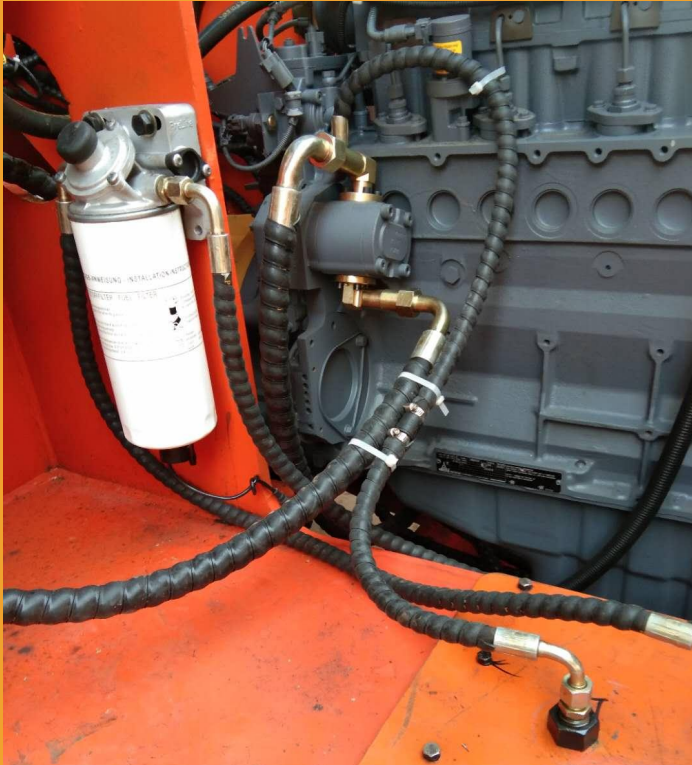
## Characteristic :

- ◆ The full floating axle is bolted for easy disassembly and replacement
- ◆ The planetary deceleration unit can be removed separately for easy maintenance and replacement
- ◆ The front axles adopts no-SPIN anti-slip self-locking setting, which is safe and reliable
- ◆ Planetary wheel side drive, conical spiral bevel gear reduction effect is remarkable



- MERITOR 16MRF
- Swing Angle of front and rear axles is  $16^{\circ} (\pm 8^{\circ})$
- Full floating half shaft
- Conical spiral bevel gear differential wheel

# Brake System

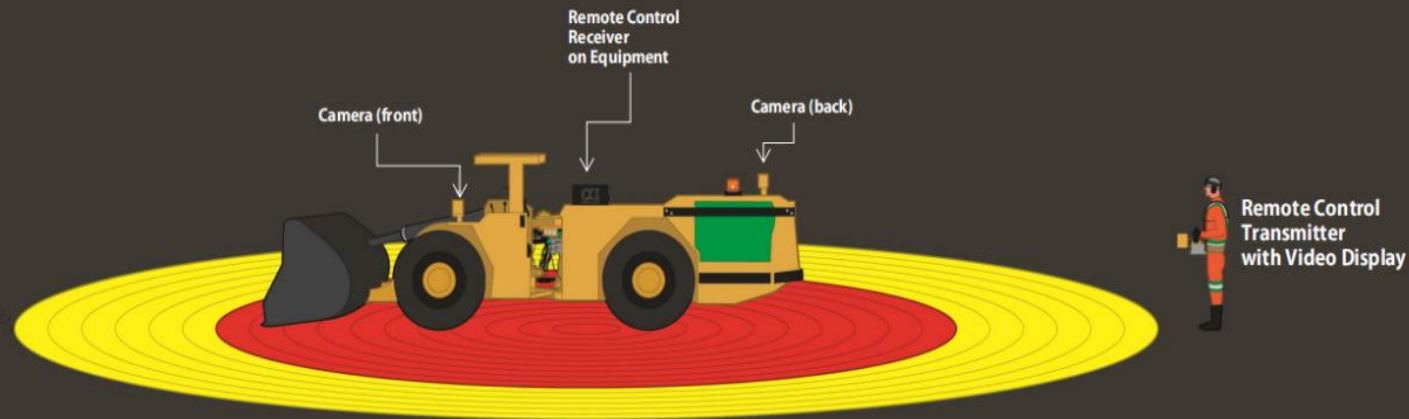


- Hydraulic action, spring release, fully enclosed multi-disc wet structure acting on four wheels
- Parking & Emergency Braking: Hydraulic release, spring action, parking brake will be applied automatically when the hydraulic pressure is too low or out of pressure



# Radio Remote Control System

## Line-of-sight Remote Control of LHD

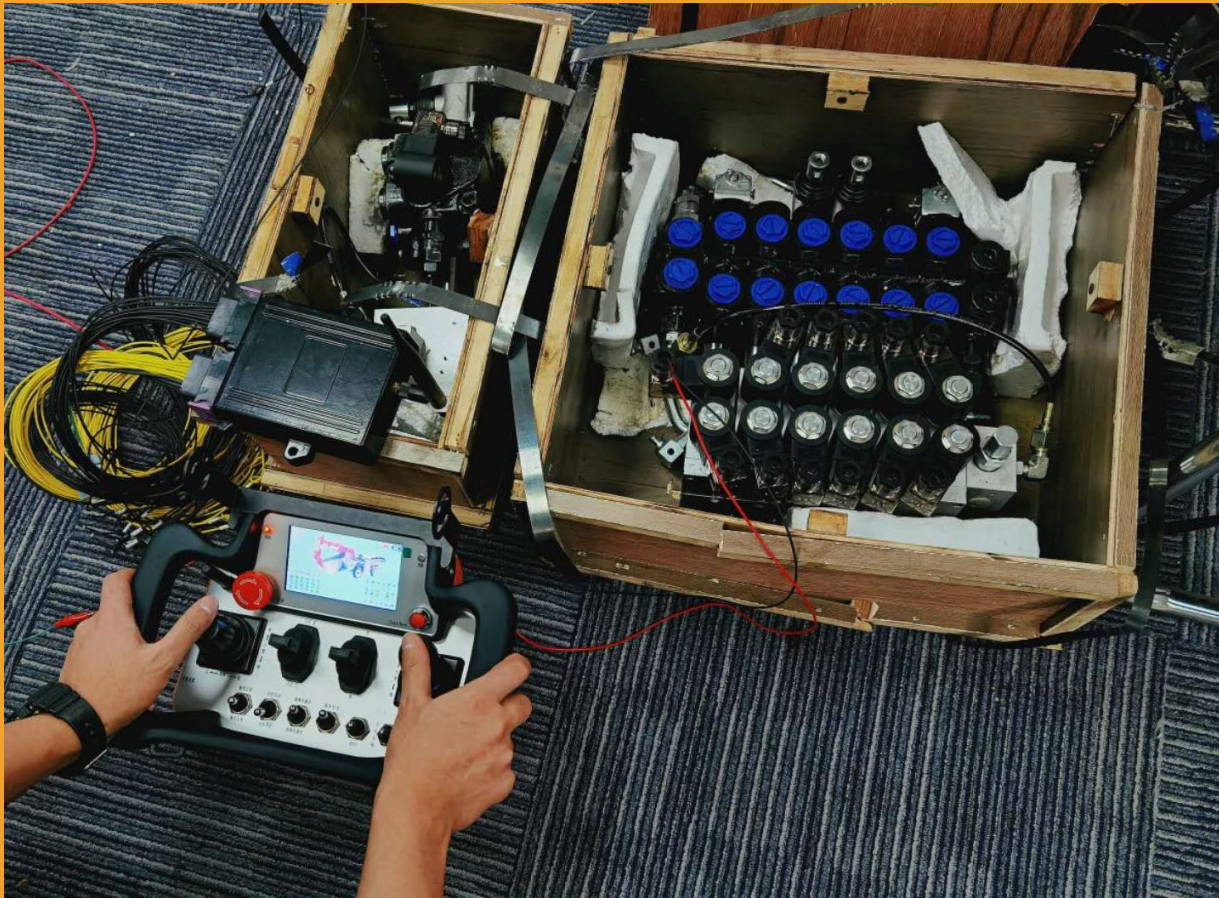


HOT focuses on the wireless remote control field of mineral equipment for many years, and has rich experience. It has a set of wireless remote control system solutions with mature application. According to the actual needs of customers, we can install and support the remote control system for TH-WJ-2D diesel LHD.

HOT can configure remote control for the LHD shipped out of the factory. If the personnel are within 100 meters, the LHD can be operated by the remote control, which is safer and more efficient.



# Radio Remote Control System



HOT customized wireless remote control and hydraulic unit assembly  
for a phosphate mine LHD in Sichuan



# Radio Remote Control System



Receiving Unit



Hydraulic Unit



Electrical Unit



Operating Unit



Video Display Unit

The unit component of the HOT Radio Remote Control System

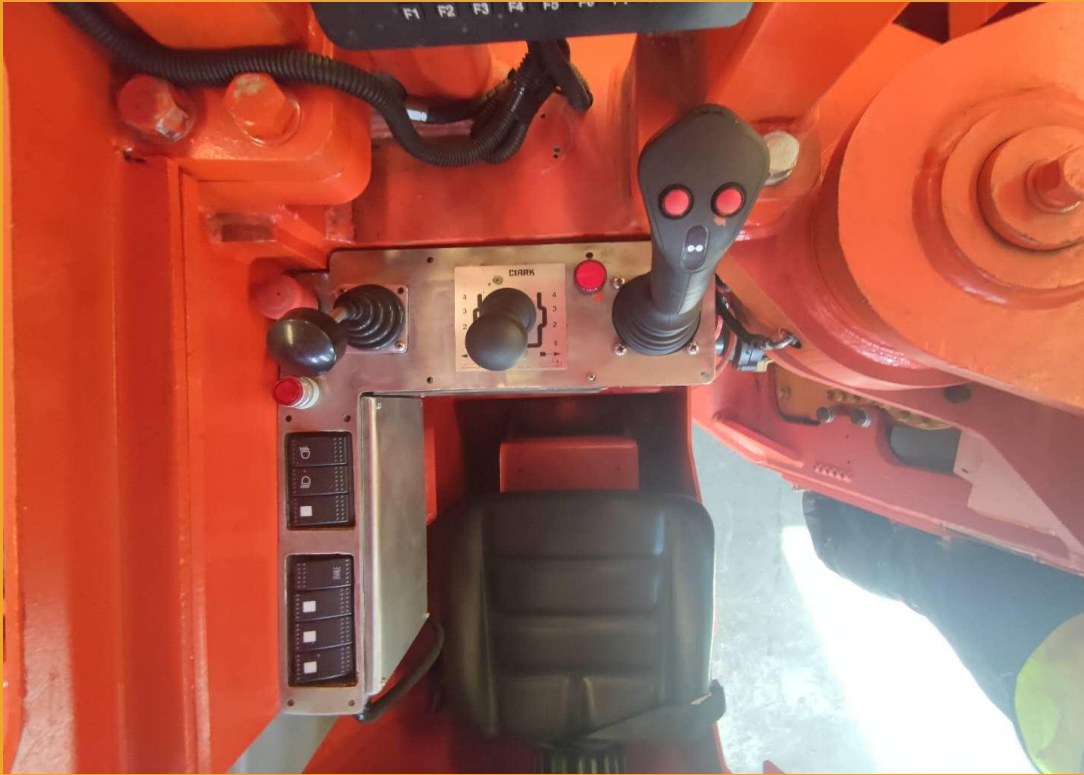


# Line-of-sight Remote Control of LHD



The line-of-sight remote control of our LHD can easily achieve the effect of underground remote control operations.

# Operator Compartment



- ISO ROPS / FOPS certified cab
- Single lever steering control
- Electric control handle dumping / lifting control



## Characteristic :

- ◆ Side setting of operator's seat can realize effective two-way operation and wide vision
- ◆ Ergonomic operator seat with safety belt ensures safe and comfortable operation of each shift
- ◆ Independent steering control lever and action control handle, easy and convenient operation
- ◆ The pedal Angle is precisely designed to alleviate fatigue on the operator's feet



# Frame & Structural parts



- The front frame is designed to resist cyclic loading and extend service life
- The rear frame design has good torsion resistance
- Steel casting is widely used in the structure, which is strong and stable
- Integral hinged design
- All welded joints and box construction
- Wear strip is standard on rear frame



## Characteristic:

- ◆ All conventional and proven components are well protected in the rack
- ◆ Large ground clearance to protect the machine from damage
- ◆ Three point fixed structure and anti-skid arrangement can ensure the safe access of operators and maintenance personnel





# Bucket

## Characteristic :

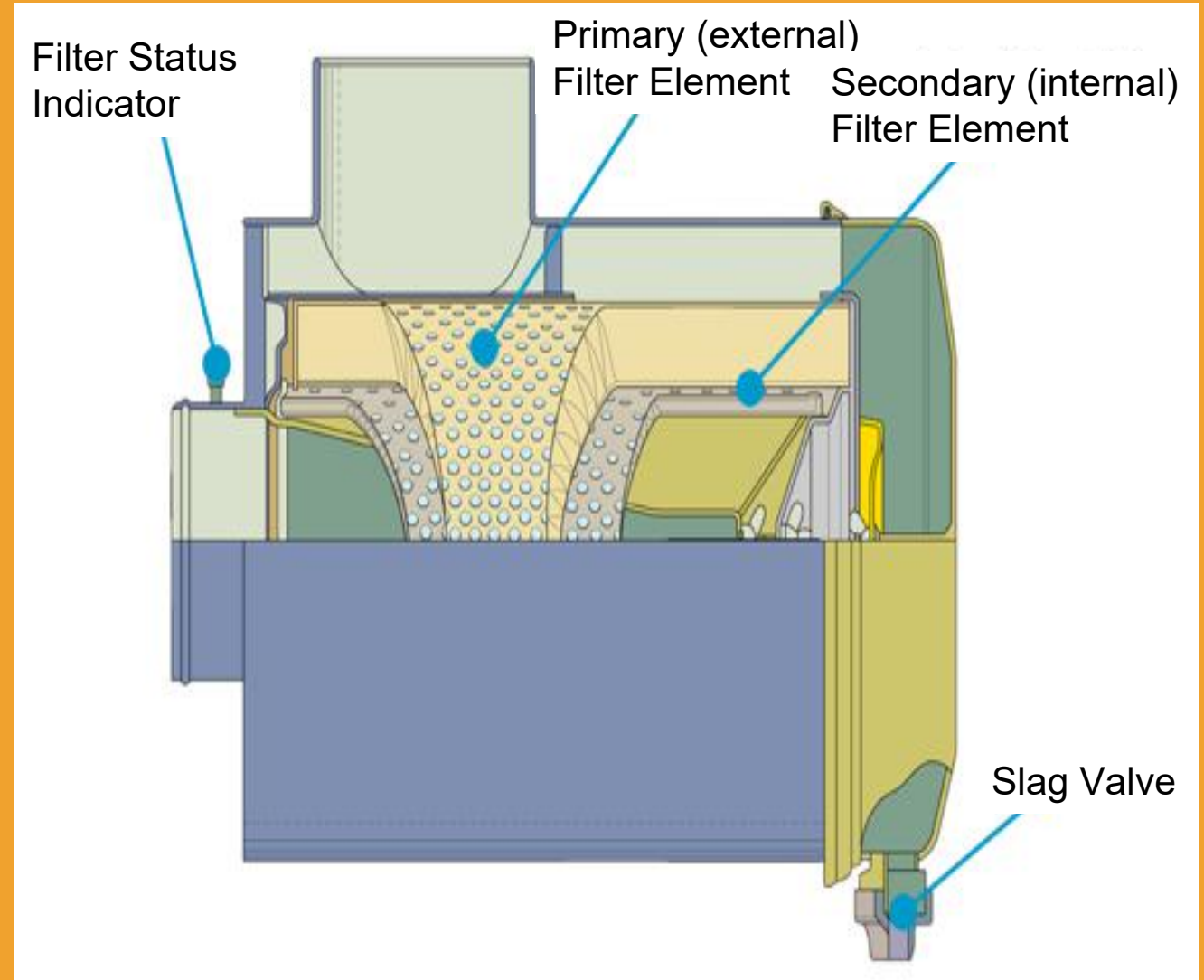
- ◆ Suitable for buckets of different specifications , wheel stop and block bracket , with good optionality
- ◆ The parallel boom structure is equipped with a powerful bucket, so that the machine can achieve efficient ore transportation.



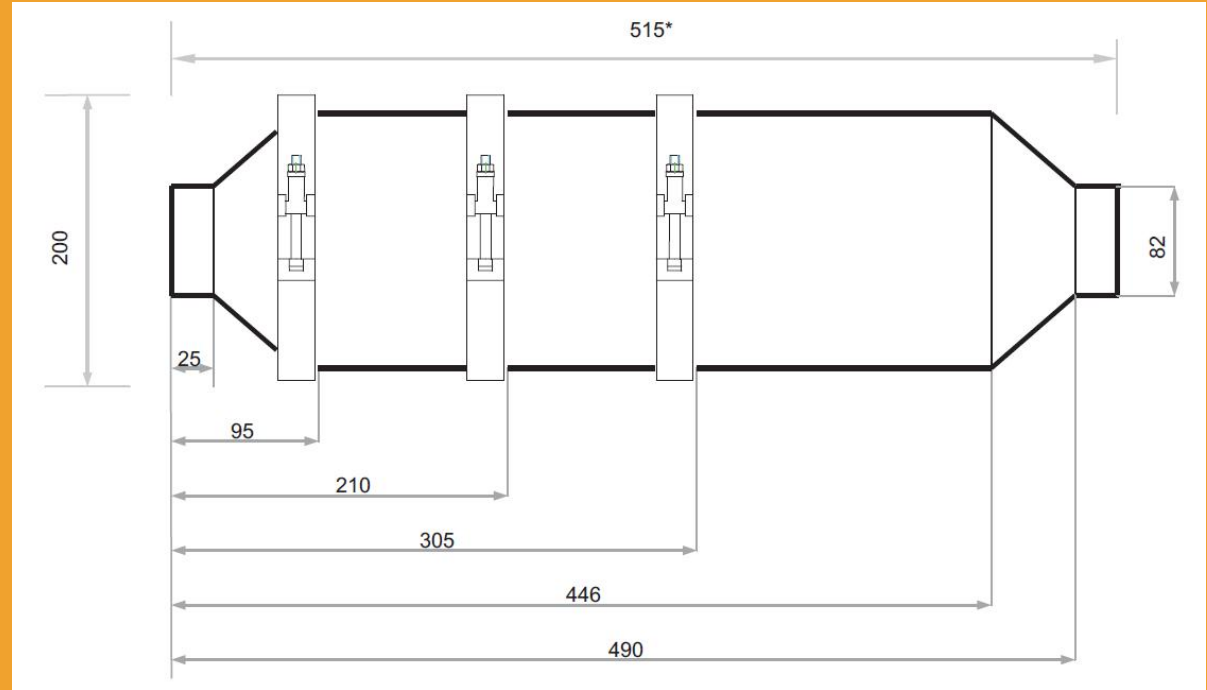
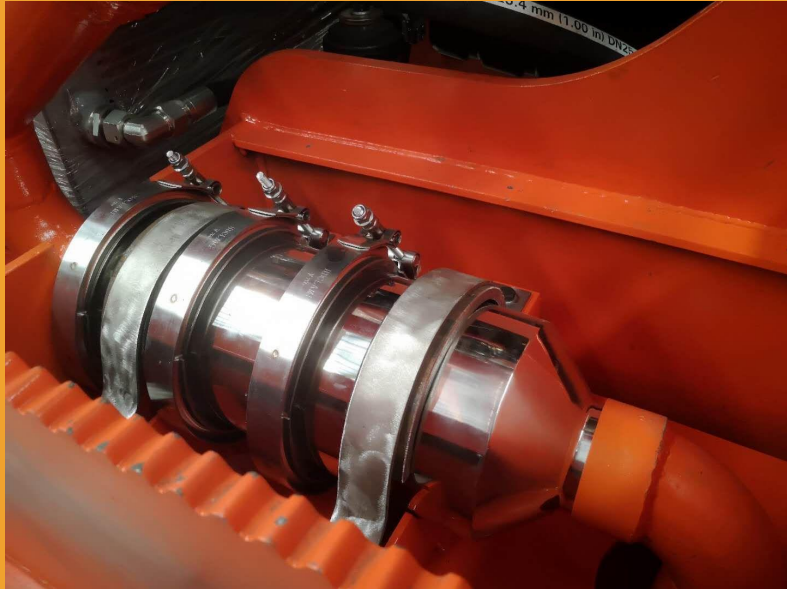
# Air Filter



- Provide clean air to the engine
- Dry cyclone air filter
- Dual filtration of primary (external) and secondary (internal) filter elements
- Filter element status indicator
- The slag discharge valve discharges the dust in the air filter



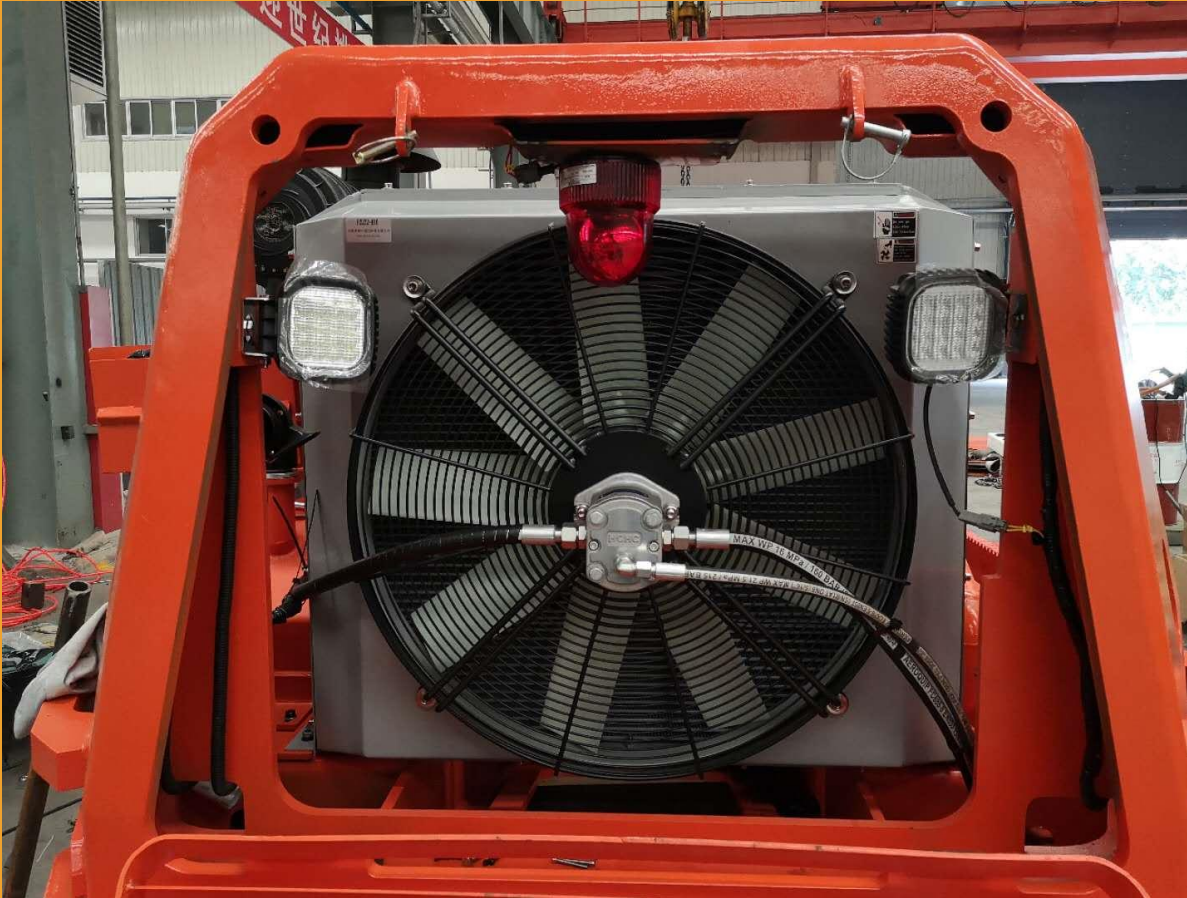
# Exhaust Gas Treatment



- Using Canadian ECS catalytic converter
- The removal rate of CO reaches 80%-95%
- The removal rate of HC reaches 70%-90%
- The removal rate of black smoke particles reaches 35%-70%
- The odor removal effect in diesel exhaust is obvious



# Security



- Long life heavy rolling bearing center hinged connection
- Central manual lubrication
- Centralized lubrication system
- Engine shutdown system
- Boom locking device
- Anti-skid arrangement
- Three point fixed structure
- Frame anti-rotation safety link
- ISROPS/FOPS certified cab
- Fire extinguisher installation

# Maintenance cycle of main parts

	Number of hours (Heavy load factor)	Number of hours (Medium and low load coefficient)
The engine	9000-10,000	10000-11,000
Hydraulic torque converter	9000-10,000	10000-11,000
Gearbox	9000-10,000	10000-11,000
Front axle / Differential	7000-8,000	8000-9,000
Rear axle / Differential	7000-8,000	8000-9,000
Front terminal drive / Brake	7000-8,000	8000-9,000
Rear terminal drive / Brake	7000-8,000	8000-9,000

# Plateau Customized Model



In high altitude areas, the difficulties faced by conventionally configured LHDs :

- ◆ In low oxygen environment, the power of transmission system attenuates, poor start performance
- ◆ The cooling system has poor cooling effect due to low boiling point and low air density
- ◆ The hydraulic system is more easily damaged by the influence of low temperature, low pressure and high ultraviolet rays



# Plateau Customized Model

These objective conditions make the traditional scraper can not meet the needs of plateau work.



At present, the engineer team of HQT has achieved a technical breakthrough at high altitude. We can customize the transformation of TH-WJ-2D low height scraper according to the actual working environment in the plateau region, so as to solve a series of negative effects brought by altitude and meet the needs of users.

This is first-class in the industry.



# TH-WJ-2D Advantage Overview

Items	Description	Advantages
Remote Control System	The remote control and manual mode can be switched freely,if the personnel are within 100 meters, the LHD can be operated by the remote control	The operator can remotely control the operation of the LHD, which is suitable for dangerous areas such as exit windows, low spaces, and restricted personnel access, which is safe and efficient
Plateau Customized Model	The LHD can be transformed according to the actual working environment in the plateau area and has the working capacity in the plateau area	Domestic LHD in plateau operation usually can not reach the rated condition
Engine	German Deutz engine, which meets the Euro III B emission standard, can be upgraded to meet Euro IV B emission standard	Strong power, stable and reliable output, significantly reduce exhaust to air pollution
Brake System	Fully enclosed multi-disc wet hydraulic brake with operating/parking/emergency brake	Strong brake ability, safety, reliability, no attenuation
Hydraulic Load Sensing System	Danfoss hydraulic system, large diameter lift and dump cylinder	High efficiency large displacement hydraulic pump, sufficient pressure
Gearbox & Torque converter	American Dana gearbox, American Dana single stage torque converter	Improve transmission efficiency and reduce oil heating
Front & Rear Axle	The front and rear axle of Meritor, adopts No-Spin anti-skid self-locking	The planetary deceleration unit can be separately removed from the wheel and brake for easy maintenance and replacement

# Thanks !

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