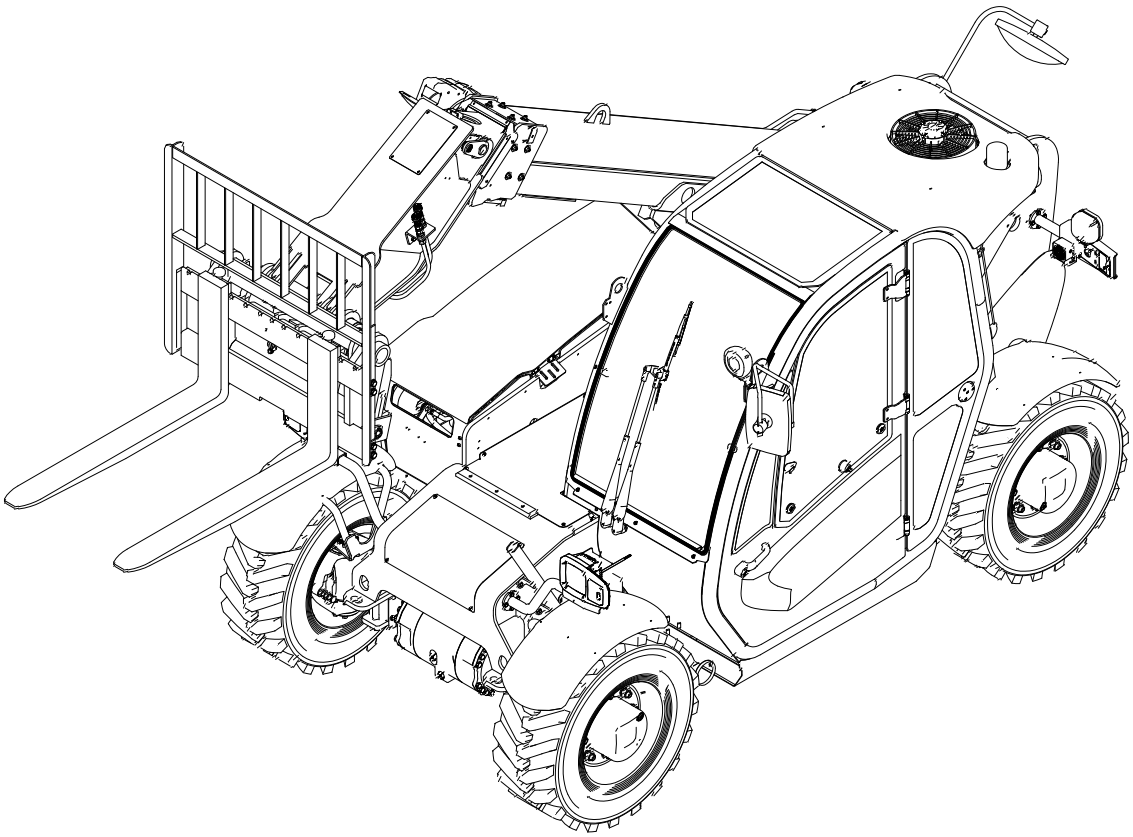
XH Series

Lithium-ion telescopic telehandler

T25-60XHYG
T35-100XHYG

Service Manual



Original Instruction

HANGCHA GROUP CO., LTD.

Mar, 2025

Preface

Thank you very much for purchasing the Hangcha lithium-ion telescopic off-road telehandler.

The new generation of lithium-ion telescopic off-road telehandler is a new generation product developed by our company. This product has the characteristics of beautiful appearance, compact structure, low center of gravity, good stability, and superior performance. The T25-60XHYG model has a full load driving speed of 24.5km/h and a maximum lifting height of 5.8m; The T35-60XHYG model has a full load driving speed of 24.5km/h and a maximum lifting height of 9.8m

This manual is about the structure, working principle, and maintenance of lithium-ion telescopic off-road telehandler. To ensure safety and fully utilize the performance of the telehandler you have purchased, operators, equipment managers, and maintenance personnel should carefully study this manual.

Untrained and qualified personnel are not allowed to repair telehandler.

Our product design will be constantly updated and improved, and the content of this manual may differ from the telehandler in your hand.

If there is anything unclear, please contact Hangcha Group sales company or agent.

Warning

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a. For any inspection, maintenance, or repair, please be sure to cut off the power supply of the high-voltage system, that is, unplug the MSD repair switch on the junction box, and wait for 15-20 minutes. During this period, no operation is allowed, otherwise it may cause personal safety accidents;

b. Please be sure to consult and have Hangcha professional maintenance technicians provide on-site service for the following inspections, maintenance, and repair situations:

--Inspection, maintenance, repair, and replacement of high-voltage components, parts, and circuits;

--Inspect, maintain, and repair non high voltage components and circuits, but are affected by the assembly and disassembly of high voltage components, components, and circuits;

--The malfunction may be caused by high voltage or non high voltage crossing;

--Unable to determine whether the fault is caused by high voltage or not;

--Other items that require or may potentially touch high-voltage components or lines.

c. To inspect and repair the high-voltage parts, special training on high-voltage electrical knowledge should be provided and corresponding certificates should be obtained. The internal inspection and maintenance of lithium batteries must be completed by professional manufacturers.

d. Any inspection, maintenance, and repair should strictly comply with the relevant safety precautions, operating procedures, safety rules, and the use of safety protective equipment and tools for high-voltage electric telehandler in this manual.

Content

Chapter 1 Basic Information

1.1. Machine Diagram (Example T25-60XHTG)

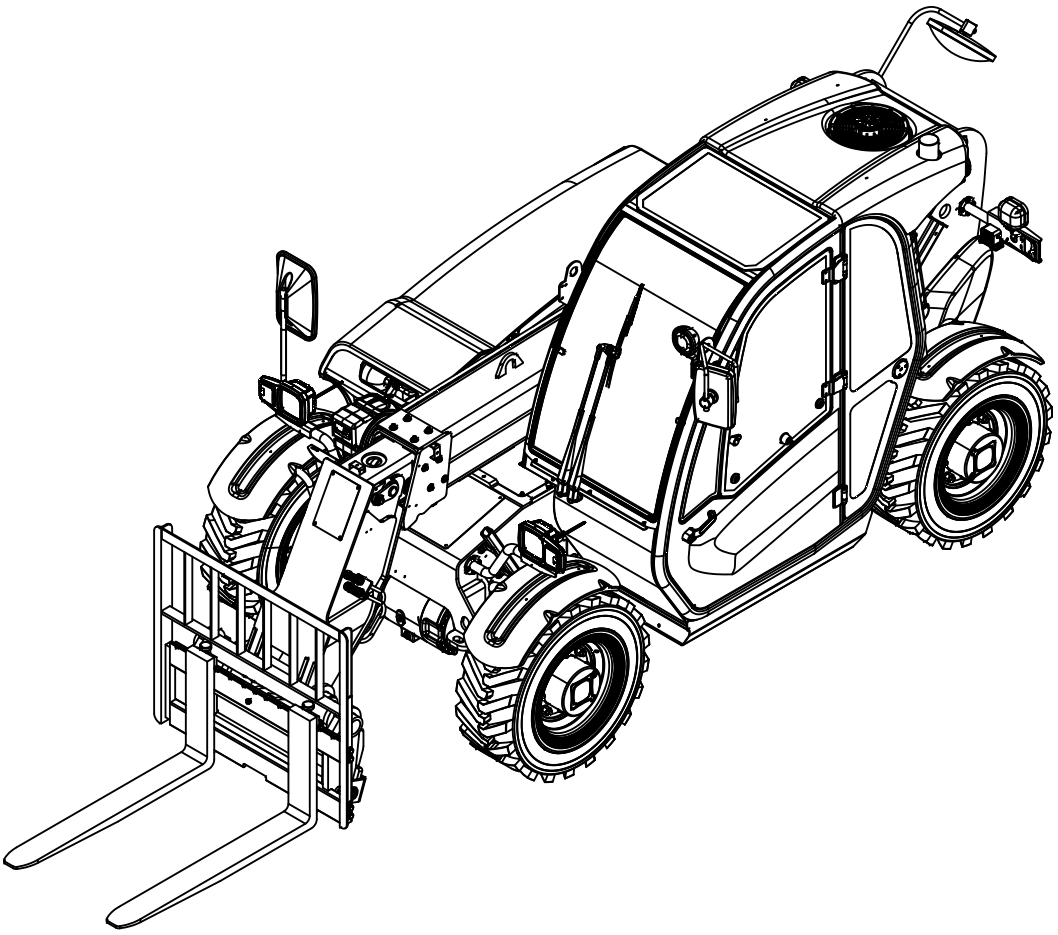


Figure 1.1-1 Machine Diagram

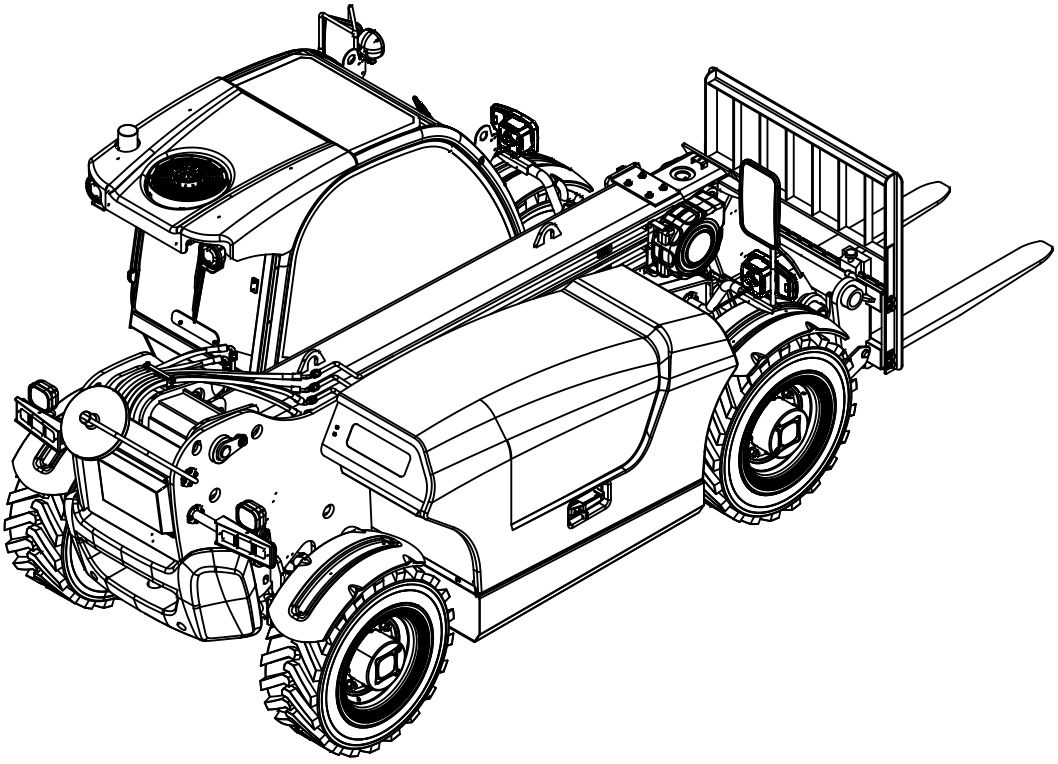
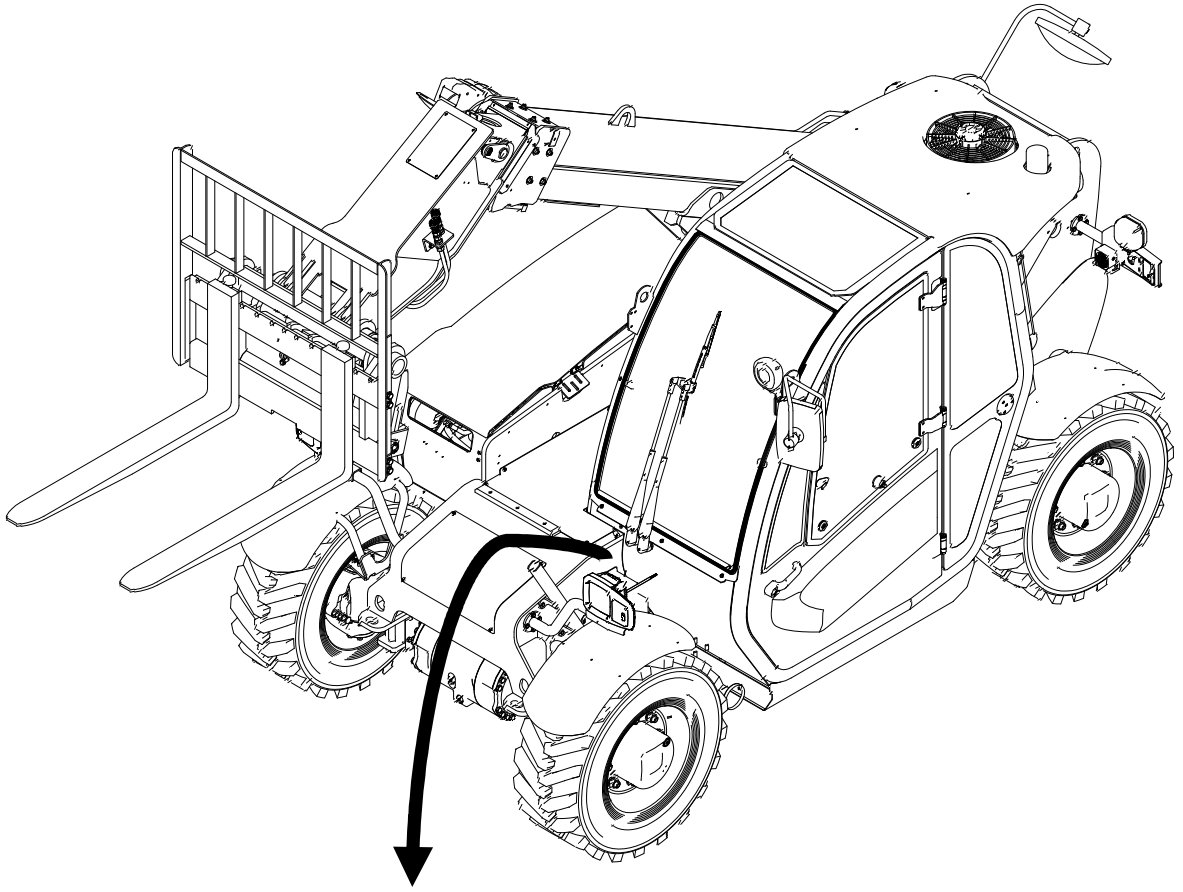


Figure 1.1-2 Machine Diagram

1.1.1. Machine Serial Number Location

Machine nameplate(Example T25-60XHTG)

The machine nameplate is located on the side surface of the chassis in front of the cab.

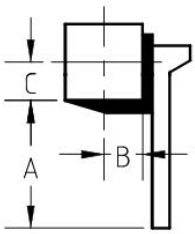


ELECTRIC FORKLIFT TRUCK

MODEL-TYPE	T25-60XHYG		SERIAL NO.	86BD00001			
ATTACHMENT	/				FORK LENGTH	1070	mm
NOMINAL LOAD CENTER	500	mm	MASS WITHOUT BATTERY	5055	kg	RATED CAPACITY 2500	kg
SYSTEM VOLTAGE	310	V	MAX.BATTERY MASS	445	kg	MIN.BATTERY MASS 445	kg
YEAR OF MANUFACTURE	2025		RATED CAPACITY OF TRAVELING MOTOR	30	kW		

Capacity with mast vertical or mast tilted forward and equipped as shown

Load Height Dim A	Maximum Capacity Mast Vertical	Maximum Capacity Mast Fwd Tilted	Load Center Dim B	Load Center Dim C
5800 mm	2000 kg	2000 kg	500 mm	500 mm
4900 mm	2500 kg	2500 kg	500 mm	500 mm
mm	kg	kg	mm	mm
mm	kg	kg	mm	mm



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Add: 666 Xiangfu Road, Hangzhou,Zhejiang,China(311305)

Figure 1.1.2 Machine nameplate(Example T25-60XHTG)

1.1.2. Chassis Serial Number Location

Each machine is uniquely stamped with a chassis serial number (series number), which is marked on the front side of the chassis (①); for specific models, the chassis serial number is located next to the nameplate on the left side of the chassis (②).

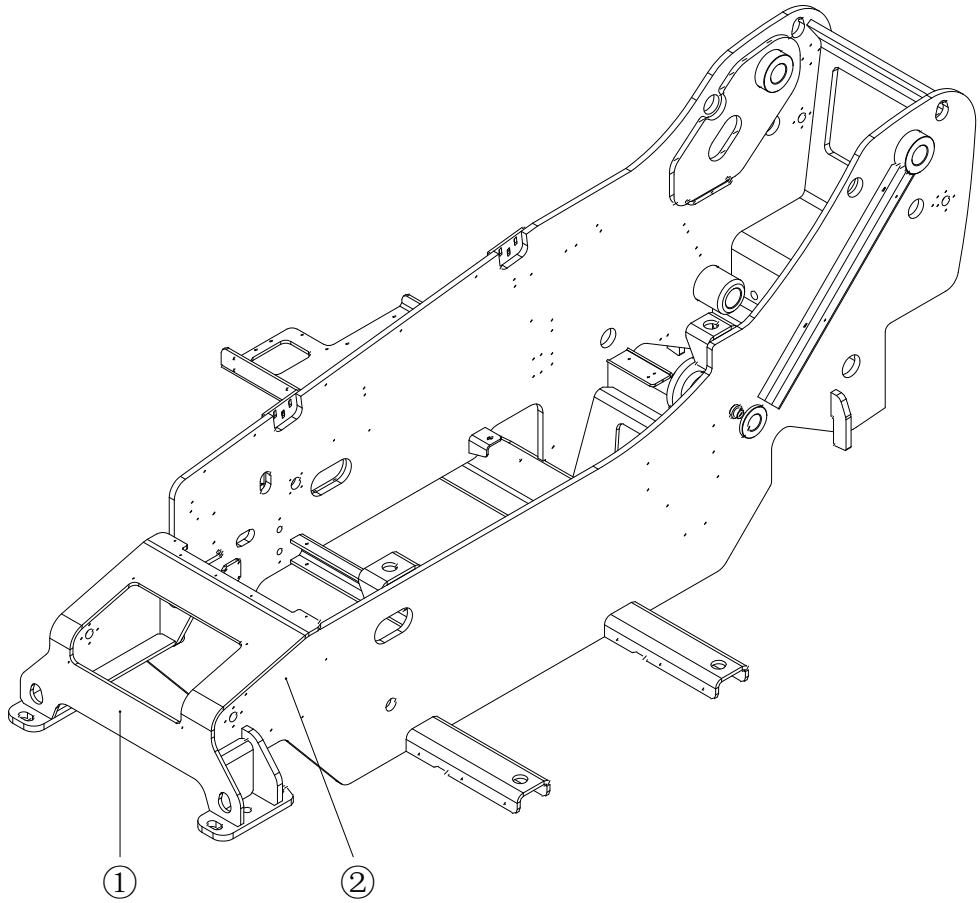


Figure 1.1-2 Chassis Serial Number Location

1.2. Maintenance Guidelines

1.2.1. Safety Operations

1. Only trained and authorized maintenance personnel are permitted to service the telescopic handler.
2. After jacking up the handler, always support it with solid wooden blocks or rigid objects. Never enter beneath the handler when supported solely by wooden blocks.
3. Wire ropes and lifting devices used for hoisting the handler or heavy components must be sufficiently robust to safely support the load.
4. Disconnect the positive battery cable before inspecting or servicing electrical components.
5. In case of vehicle malfunction:
6. Move the vehicle to a non-obstructive area immediately.
7. If caused by brake or steering system failure, transport the vehicle using appropriate carriers.
8. For other malfunctions, tow the vehicle using suitable equipment with safety ropes secured to the vehicle exterior.
9. During maintenance, avoid sharp edges or protruding parts that may injure hands, head, or body.

1.2.2. Proper Procedures

1. Prepare necessary tools and measuring instruments (multimeter, pressure gauge, etc.) before maintenance.
2. Check wire harness colors and connection status before disconnecting cables.
3. Arrange disassembled parts in order or label them during complex component/mechanism disassembly to prevent loss or incorrect reassembly.
4. Use clean tools and work platforms when disassembling/inspecting precision components (e.g., multi-way valves).
5. Follow the disassembly, inspection, and assembly sequences described in this manual.
6. Replace all seals (gaskets, O-rings, etc.) with new ones during reassembly.
7. Diagnose fault locations and causes before replacing or disassembling components.
8. Only use genuine Hangcha replacement parts.

1.2.3. Waste Fluid Management

All fluids drained from the handler must be collected in containers, categorized, and disposed of by professional recycling companies. Unauthorized discharge of fuels, hydraulic oil, coolant, engine oil, gear oil, transmission fluid, battery fluid, or other hazardous substances may harm human health and the environment.

1.2.4. Machine Lifting

Secure the wire ropes through the front left/right lifting holes and rear left/right lifting holes on the chassis, then hoist the machine using lifting equipment.

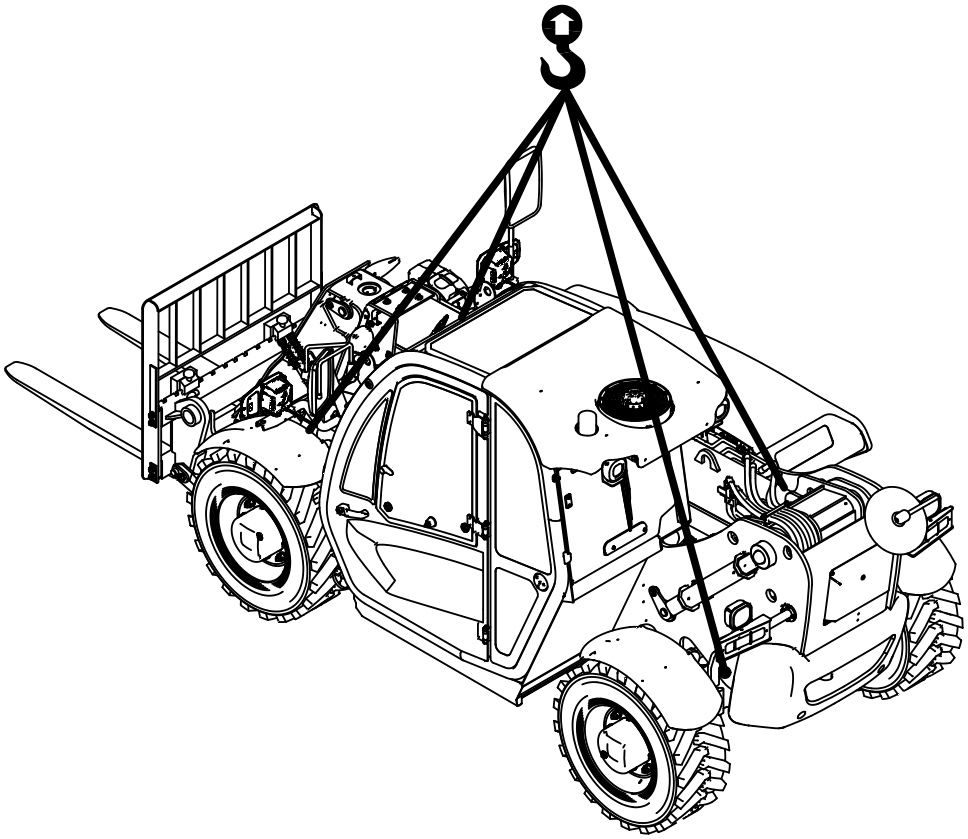


Figure 1.2.4 Machine Lifting

Warning

a. When lifting the handler, ensure that the wire ropes do not entangle with the overhead guard.

b. The wire ropes and lifting devices must be sufficiently robust to safely support the handler, as it is extremely heavy.

c. Never use the cab frame (overhead guard) to lift the handler.

d. Do not enter beneath the handler during lifting.

e. Do not secure wire ropes to undesignated locations.

f. Avoid applying sudden loads to the wire ropes.

1.3.Standard bolt tightening torque

Table 1.3-1 Standard bolt tightening torque

unit:N·m

nominal diameter of bolts(mm)	bolt strength grade			
	6.8	8.8	10.9	12.9
6	7～9	9～12	13～16	16～21
8	17～23	22～30	30～36	38～51
10	33～45	45～59	65～78	75～100
12	58～78	78～104	110～130	131～175
14	93～124	124～165	180～201	209～278
16	145～193	193～257	280～330	326～434
18	199～264	264～354	380～450	448～597
20	282～376	376～502	540～650	635～847
22	384～512	512～683	740～880	864～1152
24	488～650	651～868	940～1120	1098～1464
27	714～952	952～1269	1400～1650	1606～2142
30	969～1293	1293～1723	1700～2000	2181～2908
33	1319～1759	1759～2345	2473～3298	2968～3958
36	1694～2259	2259～3012	2800～3350	3812～5082
39	1559～2079	2923～3898	3812～5082	4933～6577

Attention!

a. All critical connections use Grade 12.9 bolts.

b. The bolt grade can be identified on the bolt head; if unmarked, it defaults to Grade 8.8.

Table 1.3-2 standard joint tightening torque

unit:N·m

threads	flat-face sealed joints	hose joints
G7/16	15-30（30）	-
M12	15-30（30）	10-20（15）
G1/4(M14)	30-50（40）	20-25（20）
M16	40-60（50）	25-30（25）
G3/8(M18)	40-60（60）	30-40（30）
M20	50-70（60）	35-50（40）
G1/2(M22)	60-80（70）	40-60（50）
M24	60-80（70）	40-60（50）
M26	-	60-100
M30	-	80-120
M36	-	100-150
G1 1/4(M42)	-	150-220

1.4. Safety regulations

1.4.1. High voltage components brief introduction

（1）Power battery assembly

The off-road telescopic telehandler is equipped with one lithium battery box as standard for the lithium battery assembly.

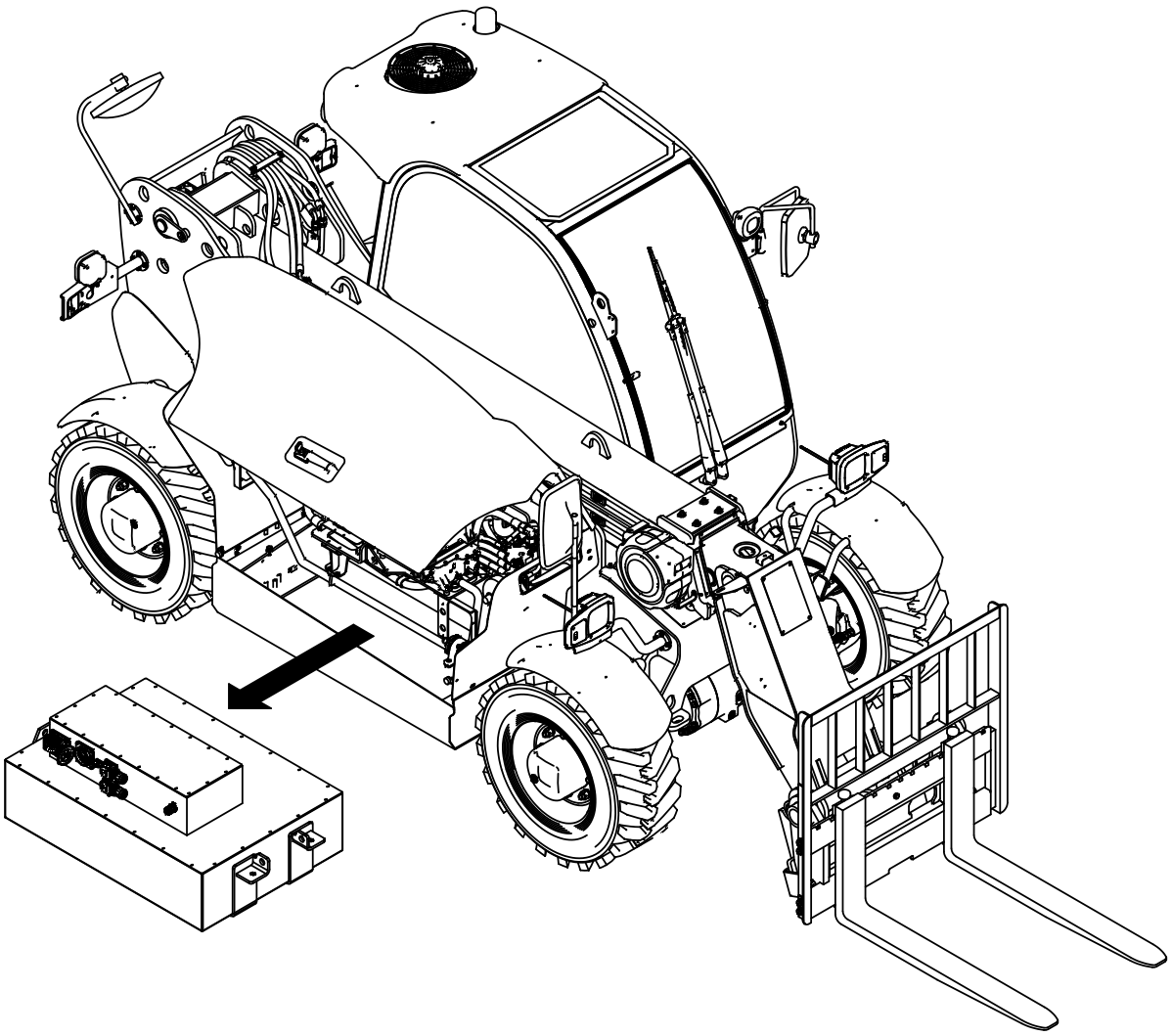


Figure 1-1 Power battery assembly for telehandler

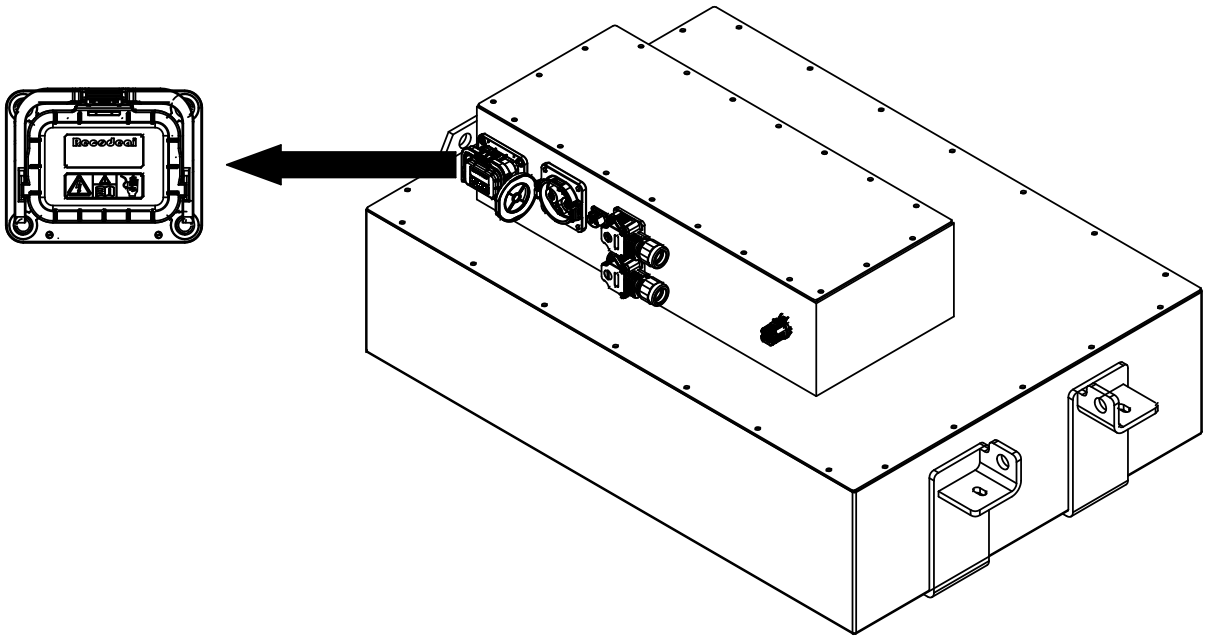


Figure 1-2 MSD maintenance switch on lithium battery

Warning

a. The weight and size of lithium batteries have a significant impact on the stability and load-bearing capacity of vehicle operation.

b. When installing or replacing lithium batteries, it should be paid attention to the fixed position of the lithium battery on the vehicle.

c. Before maintenance, cut off the power supply of the high-voltage system, unplug the MSD maintenance switch on the lithium battery main box, and wait for 15-20 minutes for the high-voltage system to power off.

d. The MSD maintenance switch on the lithium battery main box can also be used for replacing or repairing lithium batteries. Simply unplug the MSD maintenance switch and wait for 15-20 minutes for the lithium battery to power off. The inspection and maintenance of lithium batteries must be carried out by professional personnel designated by Hangcha, and other personnel are strictly prohibited from repairing them.

（2） Power supply two-in-one

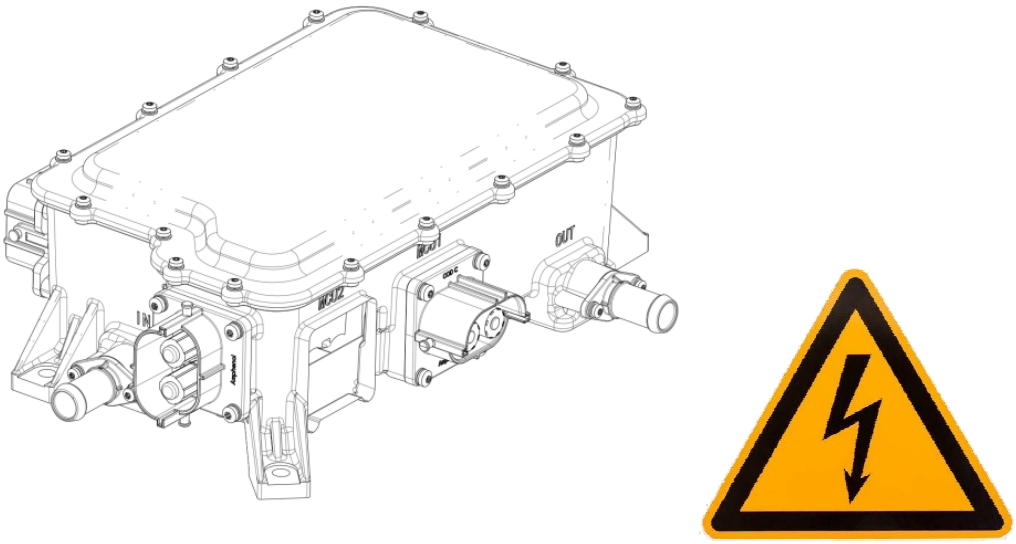


Figure 1-3 Power Supply two-in-one

（3） Motor (drive/travel)

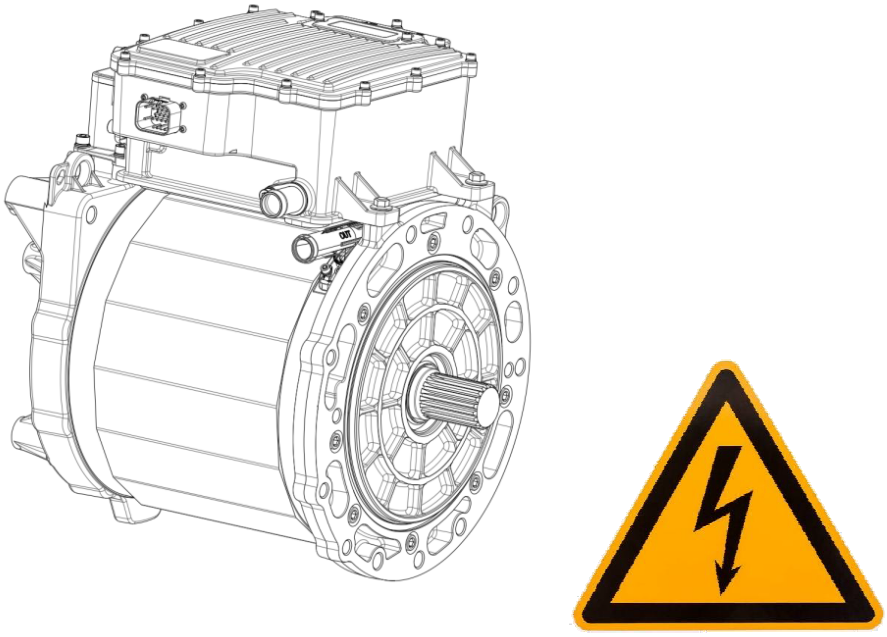


Figure 1-4 Drive motor

(4) Motor (drive/oil pump)

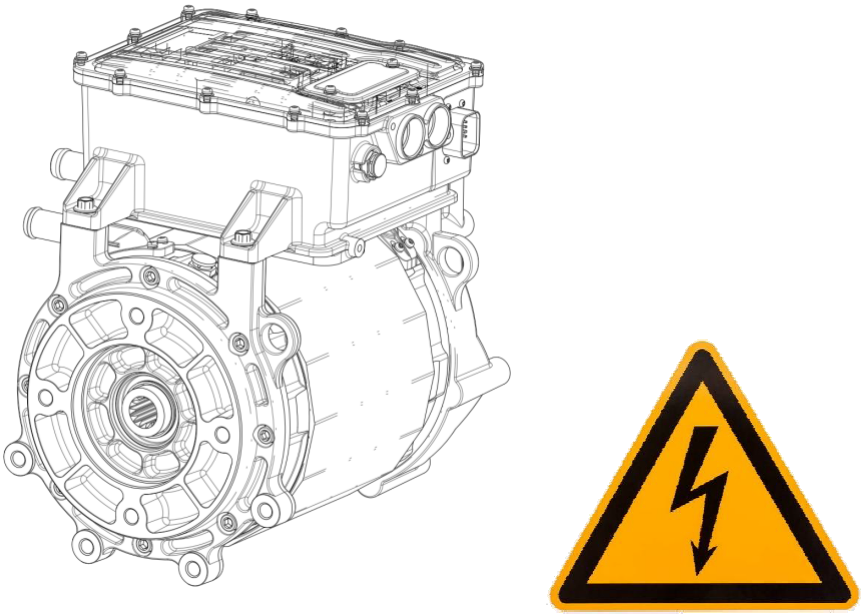


Figure 1-5 Oil pump motor

(5) National standard charging dock

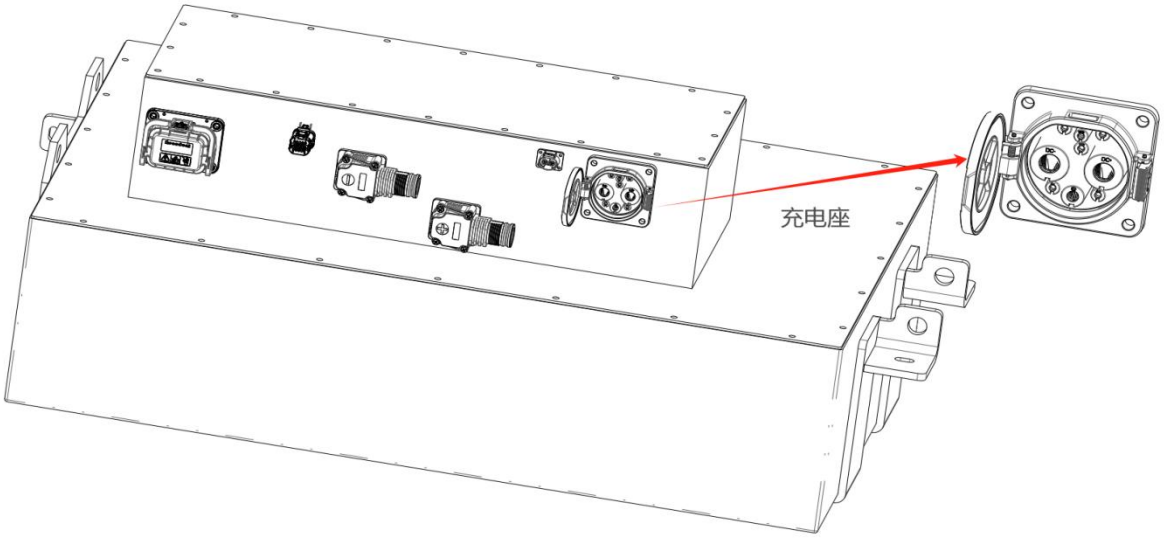


Figure 1-6 National standard charging dock

(6) High voltage connecting cable

Figure 1-7 High voltage connecting cable

Warning

To inspect and repair the high-voltage part, one should receive special training on high-voltage electrical knowledge and obtain the corresponding certificate. The internal inspection and maintenance of lithium batteries must be completed by professional manufacturers.

1.4.2. Safety precautions and operating standards for high-voltage electric telehandler

The following safety precautions for high-voltage electric telehandler must be strictly followed during inspection, maintenance, and repair for your personal safety and that of the personnel in the area. Otherwise, serious injury or even life-threatening situations may occur!

Figure 1-8 Warning signs for high voltage components

1. The connecting wires of the high-voltage electrical part are orange, and there are warning signs on the high-voltage components. When inspecting high voltage areas, the following should be followed:

2. Inspection or maintenance personnel should wear insulated shoes; Wear 1000V insulated gloves and check if the gloves are damaged or aged, otherwise they cannot be used. Without wearing gloves, direct contact with high-voltage electrical parts is prohibited.

3. Dry insulation pads should be laid on the lower part of the vehicle and the standing parts of maintenance personnel.

4. Place a "Danger of Touching During High Voltage Operations" warning triangle.

5. Inspection and maintenance personnel are prohibited from carrying or hanging metal objects;

6. First, check that there is no water (accumulated water, water droplets) on the maintenance floor and inside the vehicle. It is not allowed to work in a damp environment. It is not allowed to perform high-pressure operations when your hands are wet.It is not allowed to work while high-pressure components are wet. When the ground or surrounding humidity is too high, work should be stopped.

7. Dry powder fire extinguishers should be installed in the work area. Do not use other fire extinguishers.

8. Prepare the necessary maintenance tools, which have been insulated.

9. Cut off the power supply of the high-voltage system. First, unplug the MSD maintenance switch on the lithium battery box and wait for 15-20 minutes for the high-voltage system to power off.

Safety operation standards

1. Before carrying out maintenance work, please adopt safety isolation measures (using warning barriers for isolation) and place high-voltage warning signs to alert relevant personnel and avoid safety accidents.

2. Before repairing high-voltage components, please connect the vehicle body to the grounding wire of the electric telehandler dedicated repair station with a grounding wire.

3. High voltage components and battery parts are carried out by Hangcha or authorized institutions and personnel who have received special training (different from regular telehandler training).

4. When repairing high-voltage battery packs with electrolyte leaks, protective goggles should be worn to prevent electrolyte from splashing into the eyes.

5. Before turning on the key switch of the vehicle, pay attention to confirming whether there are still personnel performing high-voltage maintenance operations to avoid accidents.

6. When repairing high-voltage wiring harnesses, any removed high-voltage wiring should be immediately wrapped with insulating tape for insulation.

7. Do not touch the live parts inside the high-voltage wire harness connector with your fingers to avoid electric shock, and also prevent the use of small metal tools or iron.

8. Do not contact the live parts in the connector.

9. In case of abnormal accidents and fires, operators should immediately cut off the high-voltage circuit, and other personnel should immediately use fire extinguishers to put out the fire (dry powder fire extinguishers are used, water-based fire extinguishers are strictly prohibited).

10. When a battery leaks electrolyte, do not touch it with your hands. The electrolyte should be diluted with calcium gluconate ointment and not with water.

11. Pay attention to the colors or markings used for high-voltage components and area prompts during work.

12. Do not touch hands, body, components, or environment with water or moisture, otherwise operation is not allowed.

Maintenance and repair equipment and venue configuration

1. Common tools and equipment

Table 1-1 Basic tools and equipment for high voltage electric telehandler

Tool and equipment name	Specification requirements/technical standards
Electrical test pen	① Non contact type. Sound and light prompts ② Testeable voltage range: 90~1000V AC/DC
Digital clamp meter	Voltage measurement 1000V AC/DC
Megohmmeter (Insulation Resistance Tester)	① Output voltage: 250V/500V/1000V ② Test current: 250V(R=250KΩ)1mA;500V(R=500KΩ)1mA； 1000V(R=1MΩ)1mA ③ Insulation resistance:250V,0.1~20M Ω;500V， 0.1~50MΩ； 1000V， 0.1~100MΩ ④ Test voltage: AC750V
Three-phase AC phase sequencer	① Phase sequence detection voltage range: 200~480V ② Phase sequence detection frequency usage range: 20~400Hz ③ Used for checking the phase sequence of three-phase sinusoidal AC power supply for forward, reverse and phase failure ④ LCD and buzzer indicate positive, negative, and missing phases

2. Safety protective equipment and devices

The safety protection equipment used for maintenance of high-voltage electric telehandler is shown in Table 2-2. Partial protective equipment is shown in the following diagram

Table 1-2 Safety protective equipment and devices for maintenance of high-voltage electric telehandler

Name	Unit	Qty	Specification & requirements
Insulating gloves	Pair	2	Withstand DC voltage above 1000V
Insulating shoes	Pair	2	Withstand DC voltage above 1000V
Insulation pad	Pcs	6	Single 1m2, withstand DC voltage above 1000V
Protective glasses	Pcs	1	Acid and alkali resistance
Acid and alkali resistant gloves	Pair	1	Acid and alkali resistance
Safety warning signs	Pcs	1	Specification: 30cm × 60cm, high-strength ABS plastic; Content: "Danger, do not approach" and high voltage signs
Electrical tape	Roll	2	Size: 18mm × 20mm × 0.18mm Voltage level: 600V; Dielectric strength 1000V/mil (39.37kV/mm) Insulation resistance:>1012 Ω
Dry powder fire extinguisher	Pcs	2	If the vehicle catches fire and the fire is small and slow, please use a dry powder fire extinguisher to extinguish the fire. And immediately make a distress call

Dry powder fire extinguisher

Insulating gloves

Insulated rubber shoes

Insulation pad

Protective glasses

Figure 1-9 Physical Protective Equipment

Maintenance workstation configuration standards

(1) Standard for configuration of safety maintenance sites for high voltage electric telehandler

① Establish dedicated maintenance workstations (equipped with cranes weighing over 5 tons).

② Adopt safety isolation measures and set up high-voltage warning signs. The supplies are shown in the following figure.

Figure 1-10 Warning signs and isolation barriers at maintenance stations

③ Hang the "Safety Operation Specification for High Voltage Electric Telehandler Maintenance" on the wall.

④ The dedicated maintenance station is equipped with a standard three hole socket that complies with GB2099.1, with a rated voltage of 250V and a rated current of 16A, and is single-phase and effectively grounded.

(2) Specification of auxiliary materials for safety maintenance station of high-voltage electric telehandler

⑤ High voltage warning sign (30cmx60cm, high-strength ABS plastic)

⑥ Warning fence (total height 90cm, width 5cm, length 200cm, 300cm, 500cm, color red);

⑦ Insulated ground glue (insulation voltage of 1000V, waterproof level similar to plastic or rubber materials, size 7mx4m), paving effect as shown in the following figure

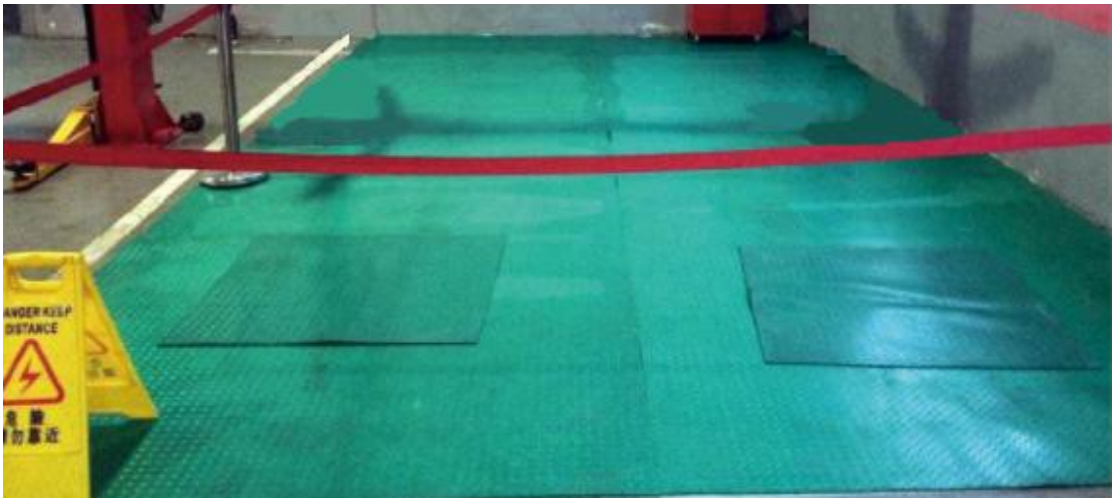


Figure 1-9 Ground Layout of Maintenance Workstation

1.4.3. Emergency treatment for high-voltage accidents

1. Emergency measures for electric shock accidents

When rescuing injured personnel in electrical accidents, do not touch personnel who are still in contact with electricity. If possible, immediately power off the electrical system (turn off the key switch or immediately remove the maintenance switch). Separate the rescued person or conductive body from the discharge body using non-conductive objects (such as wooden strips, bamboo poles, etc.).

When implementing first aid after an electric shock accident, if the rescued person does not respond, the following rescue measures should be taken: first, confirm that the victim has signs of life, such as pulse and breathing; Call the emergency doctor immediately, or have someone else call immediately; Perform artificial respiration and cardiopulmonary compression until the doctor arrives; If breathing stops, use a defibrillator (if available) for rescue.

If the rescued person can respond to the inquiry, the following first aid measures should be taken: cool down the burn area and wrap it with sterilized non-woven cloth; Even if the rescuer refuses, they should be required to receive treatment (to avoid long-term sequelae)

2. Emergency measures for high-voltage battery accidents

When a high-voltage battery catches fire, please perform the following operations according to the actual situation:

① Turn off the key switch and disconnect the 12V battery if conditions permit;

② Disconnect the maintenance switch;

③ Find a fire extinguisher nearby (dry powder fire extinguishers should be used instead of water-based ones);

④ If the vehicle catches fire and the fire is small and slow, please use a dry powder fire extinguisher to extinguish the fire and immediately call for help;

⑤ If the fire is large and developing rapidly, please immediately stay away from vehicles and call the fire alarm number to wait for rescue;

If the high-voltage battery leaks (with obvious liquid flowing out), please operate the vehicle according to the following methods:

① Turn off the key switch and disconnect the 12V battery if conditions permit;

② Disconnect the maintenance switch;

③ When a small amount of leakage occurs, please stay away from the fire source, use a absorbent cloth to absorb and place it in a closed container, or dispose of it by incineration. Before operation, please wear acid and alkali resistant gloves;

④ When a large amount of leakage occurs, please collect it uniformly and handle it according to hazardous chemicals. Calcium gluconate solution can be added to treat the gas produced;

⑤ When the human body accidentally comes into contact with leaked liquid, it should be immediately rinsed with plenty of water for 10-15 minutes. If there is pain, 2.5% calcium gluconate ointment can be applied, or 2% -2.5% calcium gluconate solution can be soaked to relieve pain. If there is no improvement or discomfort symptoms occur, please seek medical attention immediately.

Chapter 2. Transmission system

The transmission system consists of a drive axle, drive shaft, gearbox, tire assembly, etc.

Warning

g. When repairing the transmission system, it is necessary to disconnect the high-voltage cable on the traction motor electronic control two in one, which involves the high-voltage part! Therefore, it is necessary to strictly follow the safety regulations in Chapter 1 for operation!

h. Before carrying out maintenance, it is necessary to unplug the MSD maintenance switch on the lithium battery main box and let it stand for 15-20 minutes to power off the high-voltage system before operation!

2.1. Disassembly and installation of transmission system

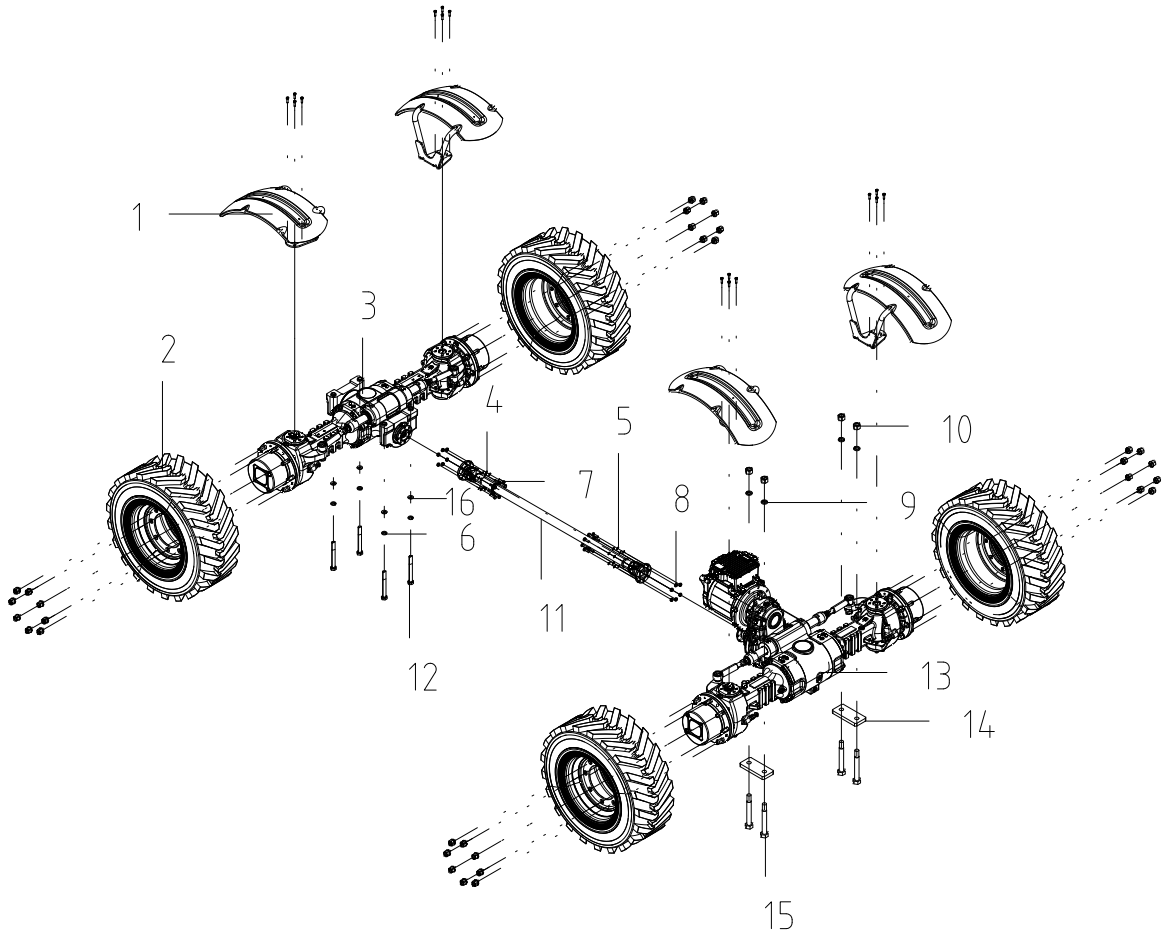


Figure 2.1-1 Transmission System（T25-60XHYG）

1-Fender assembly	2-Front wheel assembly	3-Rear steering drive axle assembly	4-Grommet 10
5-Grommet 10	6-Grommet 20	7-Bolt M10×1.25×35	8-Nut M10×1.25
9-Flat washer Class A 24	10-Nut M24	11-Drive shaft assembly	12-Bolt M20×180
13-Front steering drive axle assembly	14-Front axle mounting plate	15-Bolt M24×210	16-Grommet 20

Table 2-1 Tightening Torque Table for Transmission System

No.	Name	Tightening torque(N·m)	Use position
7	Bolt M10×1.25×35	85	Connection between transmission shaft and drive axle
8	Nut M10×1.25	85	Connection between transmission shaft and drive axle
10	Nut M24	1200	Connection between the vehicle body and the drive axle
12	Bolt M20×180	710	Connection between the vehicle body and the drive axle
15	Bolt M24×210	1220	Connection between the vehicle body and the drive axle

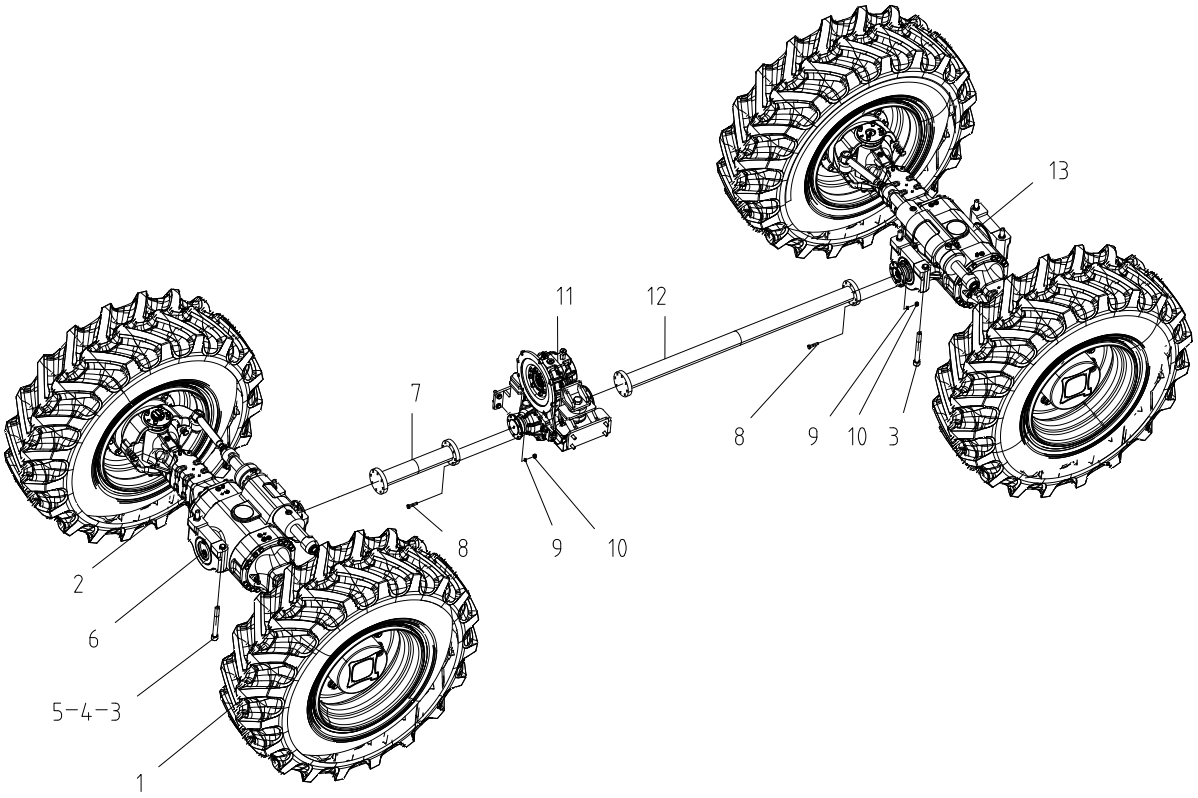


Figure 2.1-2 Transmission System（T35-60XHYG）

1-Tire assembly (left side)	2-Tire assembly (right side)	3-Screw M20×180	4-Grommet 20
5-Grommet 20	6-Front axle assembly	7-Front transmission shaft assembly	8-Bolt M10×1.25×40
9-Grommet 10	10-Nut M10	11-Gear box	12-Rear transmission shaft assembly
13-Rear axle assembly			

Table 2-1 Tightening Torque Table for Transmission System

No.	Name	Tightening torque(N·m)	Use position
3	Screw M20×180	710	Connection between the vehicle body and the drive axle
8	Blot M10×1.25×40	85	Connection between transmission shaft and drive axle

2.1.1. Disassembly of transmission system:

The transmission system of T25-60XHYG is fastened to the frame through bolts (12), front axle mounting plate (14), and bolts (15); The transmission system of T35-100XHYG is fastened to the frame with bolts (3).

1. Pull out the maintenance switch and wait for 15-20 minutes for the vehicle to power off, then remove the relevant cables of the drive motor;
2. Use lifting equipment to lift the telehandler, and then support the frame with wooden blocks or safe fixed seats;
3. Remove the mudguard assembly and tires;
4. Relieve the pressure in the hydraulic pipelines related to the drive axle and remove the brake and steering pipelines;
5. Remove the fixing bolts between the transmission shaft and the front and rear axles, remove the washers, and then remove the transmission shaft;
6. Use a lifting device to lift the drive axle and transmission shaft and place them properly.
7. The installation process is the opposite of disassembly.

Warning

a. Before starting the work, be sure to unplug the maintenance switch and wait for 15-20 minutes for the entire vehicle to be powered off!
b. When removing the tire from the wheel hub, only after deflating can the wheel rim bolts and nuts be removed!

Attention!

a. After removing the brake pipe, insert a rubber plug into the brake pipe opening to prevent brake fluid from flowing out.
b. During installation, pre coat the bolts and nuts with Loctite adhesive to prevent loosening.
c. During installation, be careful not to damage the motor splines.
d. When installing the tire assembly, pay attention to aligning the valve with the notch of the wheel hub.

2.1.2. Remove the drive motor controller two in one:

1. Lay the drive axle flat, with one side of the drive motor slightly 1cm higher;
2. After removing the bolts and washers between the drive motor and the reducer, remove the drive motor and place it on a clean tool rack.
3. The installation process is the opposite of disassembly.

Attention!

a. Before installation, use a brush to apply HR-P high-temperature resistant grease to the connecting splines of the drive motor.
b. The external spline of the drive should be aligned with the internal spline of the gearbox, and the motor should be rotated to engage the tenon.
c. During installation, be careful not to damage the splines of the drive motor.

2.2. Drive motor controller two-in-one

2.2.1. Drive motor

The T25-60XHYG telehandler drive motor adopts a 30kW permanent magnet synchronous AC motor. Other parameters are shown in the table below.

Table 2.2.1-1 Parameters of Drive Motor（T25-60XHYG）

Model	Rated power	Insulation level	Cooling method	Protection grade
TZ220XS30kW309VTQ	30kW	H	Liquid cooling	IP67
	Rated current	Rated voltage	Rated working speed	Working system
	127A(AC)	309V(DC)	11000r/min	S2-60min

The T35-100XHYG telehandler drive motor adopts a 45kW permanent magnet synchronous AC motor. Other parameters are shown in the table below.

Table 2.2.1-2 Parameters of Drive Motor（T35-100XHYG）

Model	Rated power	Insulation level	Cooling method	Protection grade
TZ220XS45kW309VT	45kW	H	Liquid cooling	IP67
	Rated current	Rated voltage	Rated working speed	Working system
	175A(AC)	309V(DC)	9350r/min	S2-60min

Attention！

a. AC motor without commutator and brush, maintenance free. But daily inspections and external dust removal are necessary.

b. Inspection and dust removal on the surface must be strictly carried out in accordance with the safety regulations in Chapter 1!

2.2.2. Traction controller

Table 2.2.2-1 Parameters of Traction Controller（T25-60XHYG）

Model	Continuous working current	Insulation level	Cooling method	Protection grade
MC3906	145A	H	Liquid cooling	IP67
	Peak current	Rated voltage	Control mode	
	440A	309V(DC)	T-CTR	

Table 2.2.2-2 Parameters of Traction Controller（T35-100XHYG）

Model	Continuous working current	Insulation level	Cooling method	Protection grade
MC3906	180A	H	Liquid cooling	IP67
	Short term working current	Rated voltage	Working system	
	320A	309V(DC)	S9	

2.3. Drive axle assembly

2.3.1. Basic structure and working principle of drive axle

2.3.1.1. Basic Structure and Working Principle

The basic structure of the drive axle is shown in Figure 2-2: mainly composed of the axle housing, main reducer, wheel reducer, wet brake, etc.

Its working principle is shown in Figure 2-3: the transmission torque is input to the main reducer, which changes the direction of power and reduces the speed to increase the transmitted torque. Then, the power is transmitted to the wheel edge through the differential and transmission shaft, and further reduced by the wheel edge reduction mechanism to transmit motion and torque to the two driving wheels.

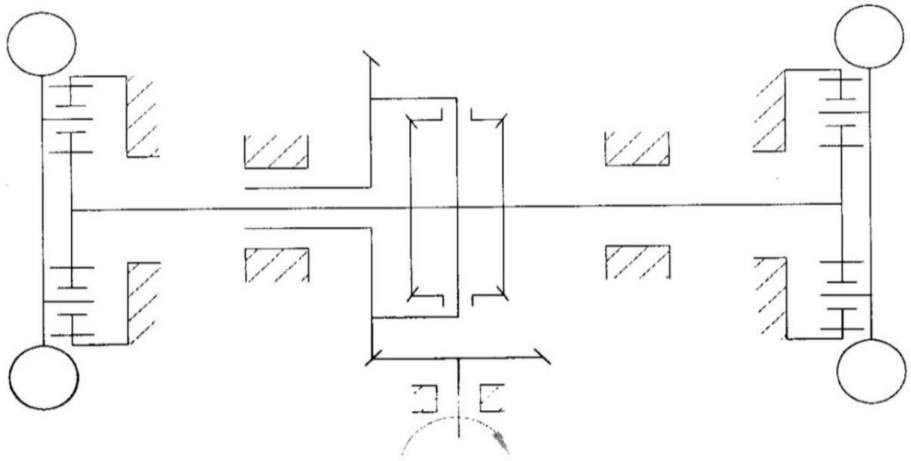


Figure 2.3.1.1 Working principle of drive axle

2.3.1.2. Wheel reducer and axle housing structure

The wheel reducer is a planetary reduction mechanism mainly composed of a planetary gear frame, internal gears, planetary gears, sun gears, etc. The internal gears are fixed to the wheel support shaft through splines, and the planetary gear frame is fixed to the wheel hub as a whole.

2.3.1.3. Main reducer assembly structure

The main transmission structure consists of a pair of helical bevel gears and a differential. The differential is composed of two tapered spur half shaft gears, four tapered spur planetary gears, a left differential housing, and static friction plates.

2.3.1.4.Transfer case structure

The transfer case is a transmission unit composed of a transmission device and a transmission disengagement mechanism. It adopts a T-shaped and return structure layout design, with the transfer case arranged vertically and the motor placed between the transfer case and the bridge, reducing the overall structure and making the telehandler layout more reasonable.

The transmission device inside the transfer case is composed of two-stage external meshing gear pairs. The motor shaft of the driving motor is connected to the internal spline of the first stage driving gear, and the power is input into the transfer case. After being reduced by the two-stage gears, the power is output by the sliding meshing sleeve on the second stage driven gear.

There is also a set of transmission disengagement mechanism arranged inside the transfer case,

consisting of hydraulic device and dynamic and static engagement sleeve, which can realize the switching between four-wheel drive and two wheel drive of the whole vehicle.

2.3.1.5. Wet brake structure

Wet brakes are used for braking, which are mainly composed of friction pads, brake pad assemblies, piston assemblies, etc. Refer to **2.3.7.9. Disassembly of Wet Brake Assembly** for details.

2.3.1.6.Main technical parameters

Table 2-7 Parameters of Drive Axle Assembly（T25-60XHYG）

Drive bridge type	Direct installation of bridge body and frame
Total reduction speed ratio	50.63
Transfer case speed ratio	3.08
Main reducer speed ratio	2.74
Wheel edge speed ratio	6
Wheel side deceleration device	Cylindrical planetary gear type
Brake system	Wet braking
Lubricant	Mobil 424 hydraulic transmission oil (6.6L for front and rear axles respectively)

Table 2-7 Parameters of Drive Axle Assembly（T35-100XHYG）

Drive bridge type	Direct installation of bridge body and frame
Total reduction speed ratio	77.1
Transfer case speed ratio	5
Main reducer speed ratio	2.57
Wheel edge speed ratio	6
Wheel side deceleration device	Cylindrical planetary gear type
Brake system	Wet braking
Lubricant	Mobil 424 hydraulic transmission oil (9.0L for front and rear axles respectively)

2.3.2.Regular technical maintenance

2.3.2.1.First level technical maintenance (approximately 40 hours of operation)

① If the new car is running in, the gear oil needs to be replaced after 100 hours.

Attention！

a. When changing oil, first heat up the car, then drain the oil, and then rinse with kerosene. Then, refuel to the designated position.

b. When draining oil from the wheel reducer, make sure that the oil drain holes of the left and right wheel reducers are at the lowest position, and open the oil drain plug to drain the oil.

② Check the movement of each transmission component and ensure that there are no abnormal sounds.

③ Check if the external fasteners of the wheel reducer, gearbox, and brake are loose and tightened.

④ Check for oil leakage in all parts and promptly repair and eliminate it. All seals, once disassembled, must not be reused.

2.3.2.2.Secondary technical maintenance (approximately 1000 hours of operation)

① Check and adjust the clearance between bearings and bevel teeth.

② Replace gear oil according to seasonal or major maintenance requirements. When changing the oil, first heat up the car, then drain the oil, rinse with kerosene, and then add oil to the designated position.

③ Check and clean oil stains, dirt, and dust, especially keep the ventilation plug on the bridge housing unobstructed.

④ Check and tighten external fasteners. If there is any looseness, apply Loctite 263 anti loosening adhesive and tighten it again.

2.3.2.3.Third level technical maintenance (working time approximately 2000 hours)

① Disassemble and inspect the wheel reducer and main reducer, repair and replace damaged parts. When assembling, clean the parts that were originally coated with sealant with solvent, dry them, and apply SD-314 silicone. All fasteners and bolts should also be cleaned thoroughly, dried, coated with Loctite 262 anti loosening adhesive, and then tightened to the required torque.

② Adjustment of the main reducer and wheel reduction mechanism.

③ The axial clearance of the active spiral bevel gear bearing is 0.06mm to 0.10mm. At this time, the gear should rotate flexibly and there should be no axial movement when pushed by hand. The axial clearance of the bearing should be adjusted with shims.

④ The installation distance of spiral bevel gears must be adjusted to the correct position to ensure correct meshing marks and clearances. This can be achieved by adjusting the nut and washer. The axial clearance of the bearing is 0.05mm to 0.10mm, and the tooth clearance of the main and passive helical bevel gears is 0.18mm to 0.30mm. The meshing marks are checked by coloring method, and the correct marks of the driven helical bevel gear are shown in Figure 5. The contact spot should not be less than 50% along the tooth height and tooth length directions. The adjustment method for incorrect marks can be found **in 2.3.2.4. Incorrect marks and adjustment methods on passive spiral bevel gears.**

⑤ The minimum meshing clearance between the half shaft gear and planetary gear of the differential is 0.1mm. Adjust it with a motion friction pad to ensure that it can be easily rotated by hand without jamming after assembly.

⑥ Maintenance and replacement of wheel side reduction gears, using coloring method to check contact spots, should be greater than 45% along the tooth height and greater than 50% along the tooth length direction. After installing the wheel hub, rotate it by hand to ensure that the bearing is in the correct position. Gradually tighten the round nut until the wheel hub can only rotate reluctantly, and then retract the round nut by 1/10 turn. At this point, the wheel hub can rotate freely without axial play or swing. Finally, fix it with a round nut to control the axial clearance within 0.1mm.

⑦ When replacing the needle rollers in the planetary gear of the wheel edge, all needle rollers must be grouped and selected to ensure that the diameter difference within the same group is not greater than 0.005mm, the needle roller cylinder is 0.003mm, and the radial clearance between the needle rollers, gear

inner holes, and pin shafts is 0.02mm to 0.03mm.

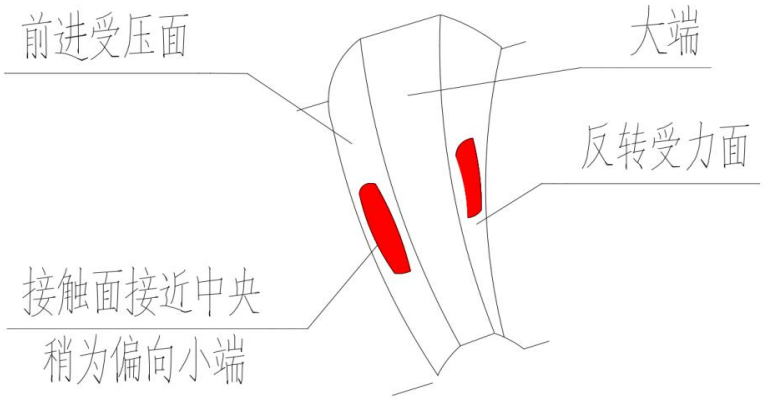
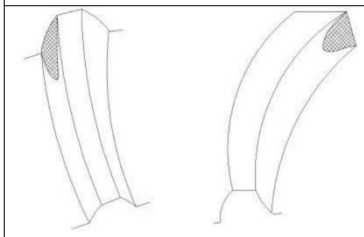
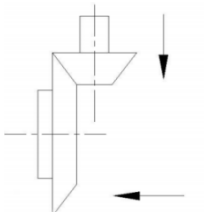
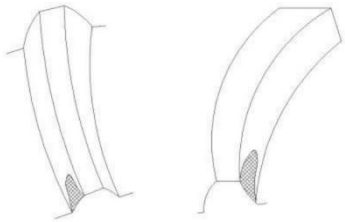
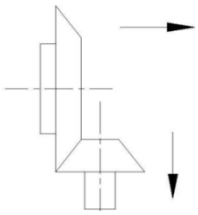
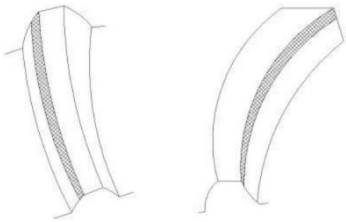
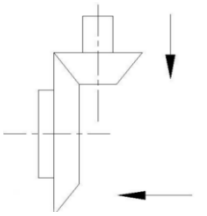
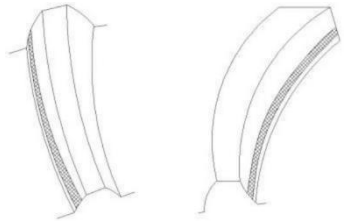
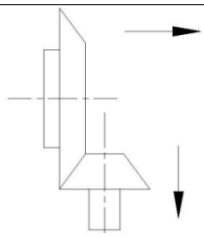


Figure 2.3.2.3 Correct imprint on passive spiral bevel gear

2.3.2.4.Incorrect imprints on passive spiral bevel gears and adjustment methods

Passive gear tooth contact area	Adjustment method	Adjustment direction
	Firstly, reduce the thickness of the bearing sleeve adjustment gasket to bring the active bevel gear closer to the passive bevel gear. If the backlash is too small at this time, move the passive bevel gear outward.	
	Firstly, increase the thickness of the bearing sleeve adjustment gasket to separate the active bevel gear from the passive bevel gear. If the backlash is too large at this time, move the passive bevel gear inward.	
	Firstly, reduce the thickness of the bearing sleeve adjustment gasket to bring the active bevel gear closer to the passive bevel gear. If the backlash is too small at this time, move the passive bevel gear outward.	
	Firstly, increase the bearing sleeve and adjust the thickness of the gasket to separate the active bevel gear from the passive bevel gear. If the backlash is too large at this time, move the passive bevel gear inward.	

2.3.3. Oil filling and draining methods and oil injection amount for the drive axle

When refueling, open the refueling plug on the bridge and add lubricating oil at the refueling observation port 1 of the main reducer until it overflows from the refueling hole, as shown in the figure.

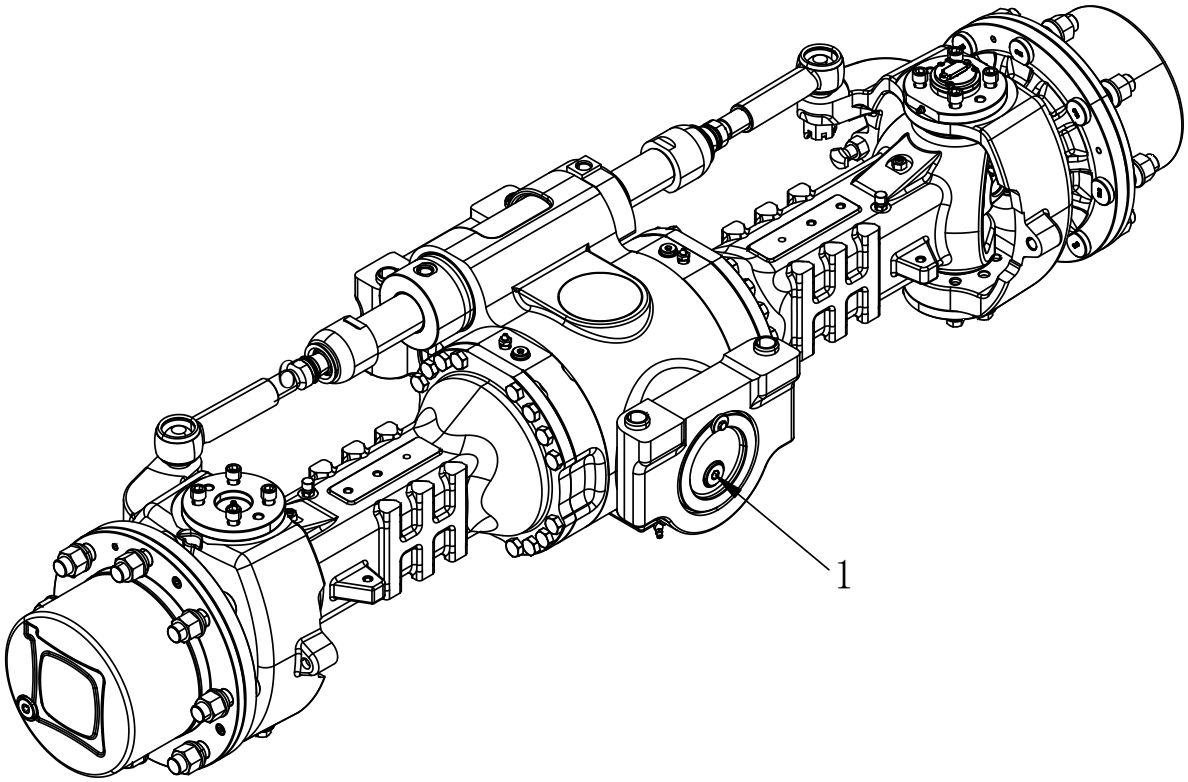


Figure 2.3.3-1 Location of the refueling observation port for the main reducer

Attention!

The prescribed oil injection amount is an approximate value, based on the lubricating oil level being flush with the lower edge of the oil injection hole. A small amount of oil overflow is allowed, and the lower limit of the oil level is 8mm below the busbar of the oil level hole.

Table 2-8 Oil Quantity Table for Drive Axle（T25-60XHYG）

Refueling area	Qty	Oil type	Oil Quantity（L）
Main reducer	2	Mobil 424 hydraulic transmission oil	5
Wheel reducer	4	Mobil 424 hydraulic transmission oil	0.55
Transfer case	1	Mobil 424 hydraulic transmission oil	1

Table 2-8 Oil Quantity Table for Drive Axle（T35-100XHYG）

Refueling area	Qty	Oil type	Oil Quantity（L）
Main reducer	2	Mobil 424 hydraulic transmission oil	6.5
Wheel reducer	4	Mobil 424 hydraulic transmission oil	1
Transfer case	1	Mobil 424 hydraulic transmission oil	1

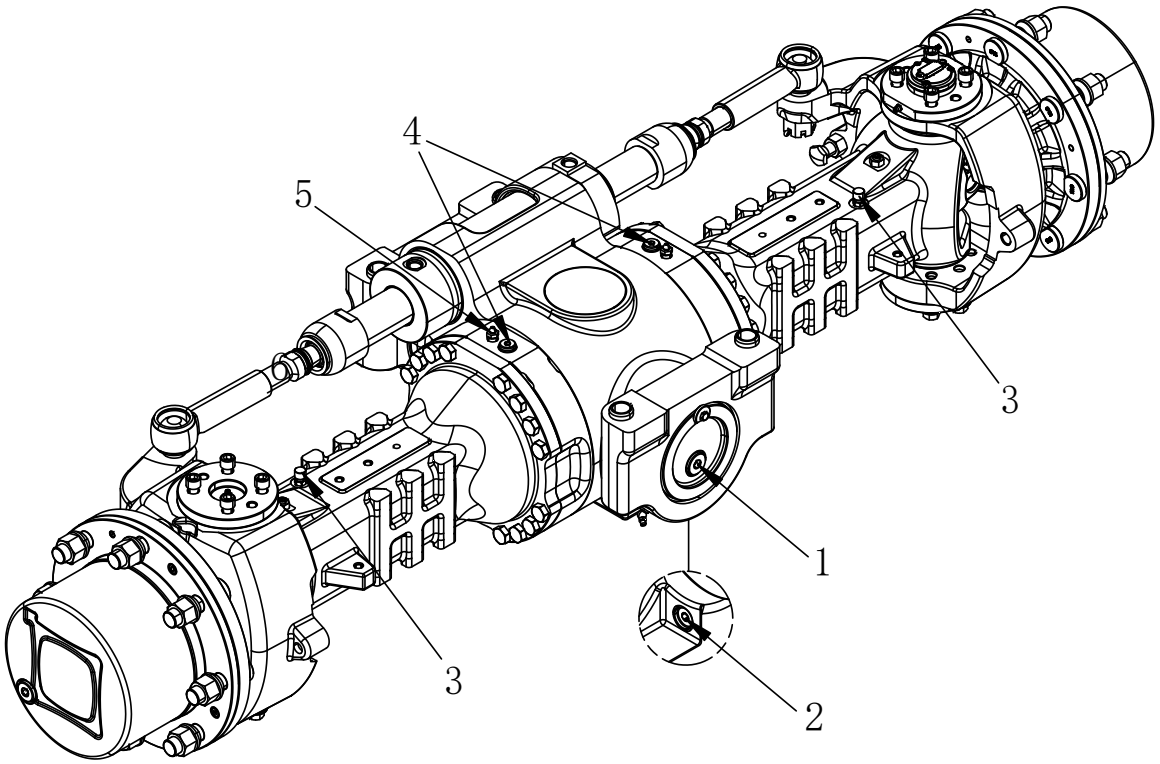


Figure 2.3.3-2 Rear axle fuel port position

1. Oil filler of the main reducer 2. Oil drain port 3. Wheel reducer fuel filler
4. Service brake oil filler 5. Air release port

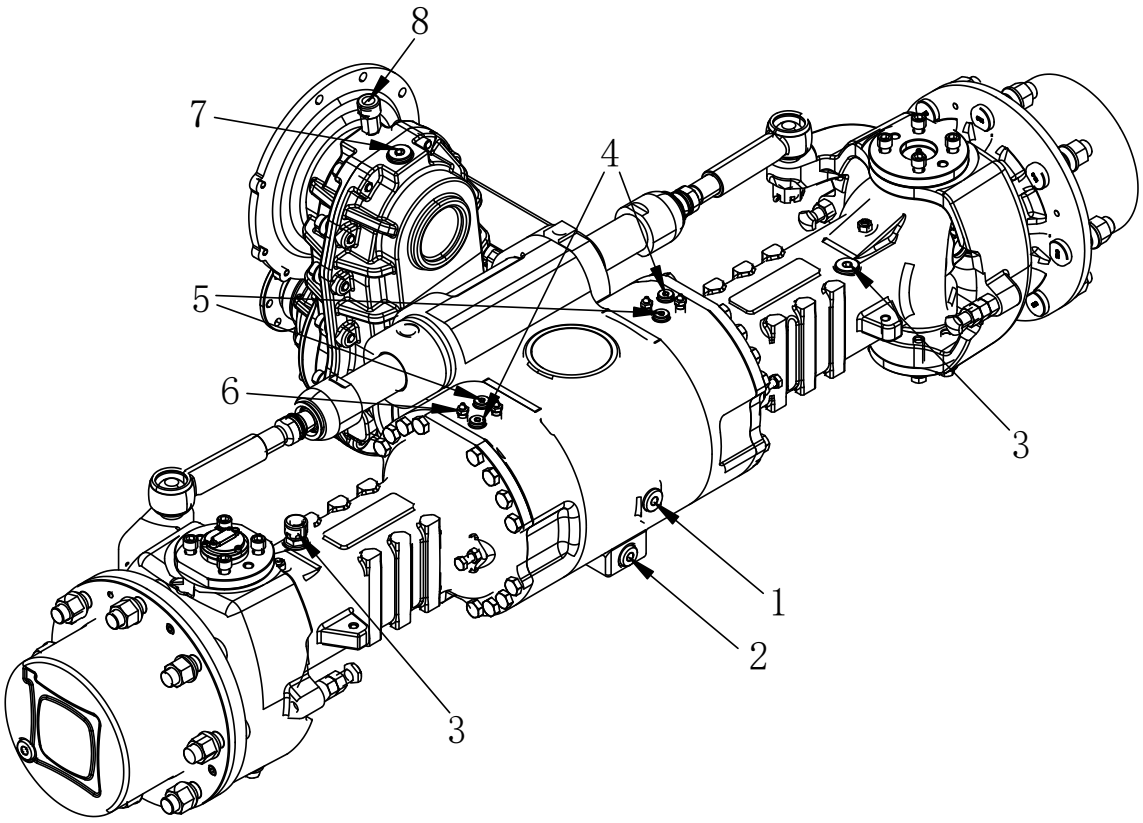


Figure 2.3.3-3 Front axle fuel port position

1.Oil filler of the main reducer 2.Oil drain port 3.Wheel reducer fuel filler
4.Service brake oil filler 5.Refueling port for parking brake 6. Air release port
7.Transfer case fuel port 8. Breathable holes

2.3.4. Lifting of drive axle

When lifting the drive axle, cross the lifting rope at the position shown in Figure 2-5 for lifting. If shoveling, continue to shovel at the position indicated by the arrow in the following figure. No collision or detachment is allowed during lifting or shoveling.

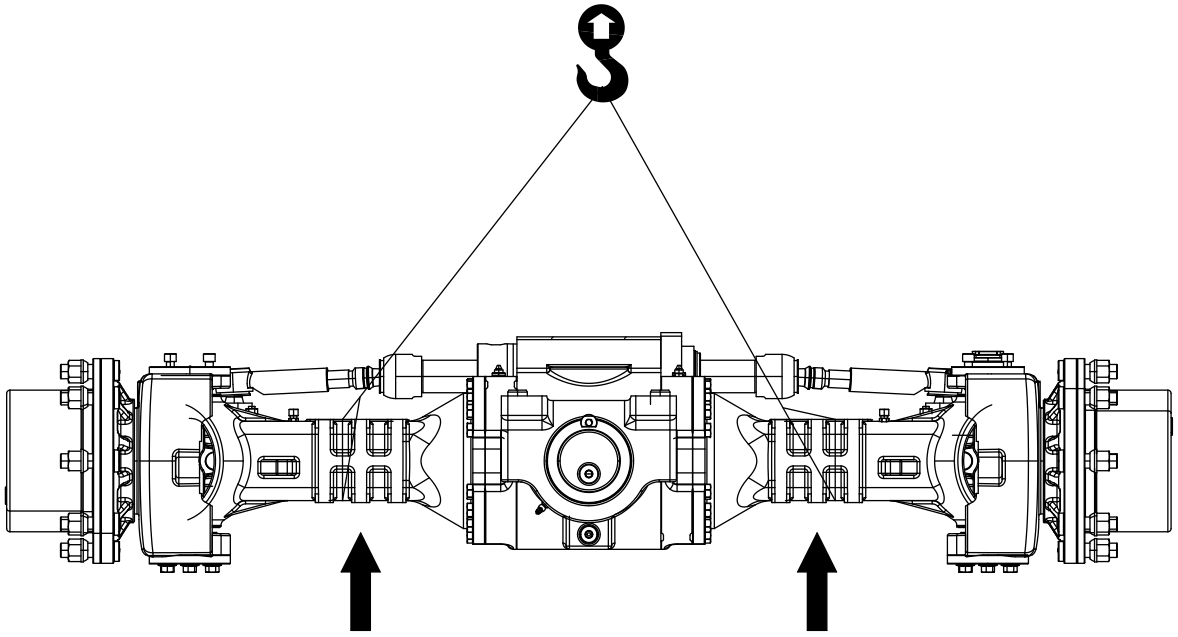


Figure 2.3.4 Lifting and shoveling positions

2.3.5.Fault diagnosis and troubleshooting

Table 2-9 Fault Diagnosis Table for Drive Axle

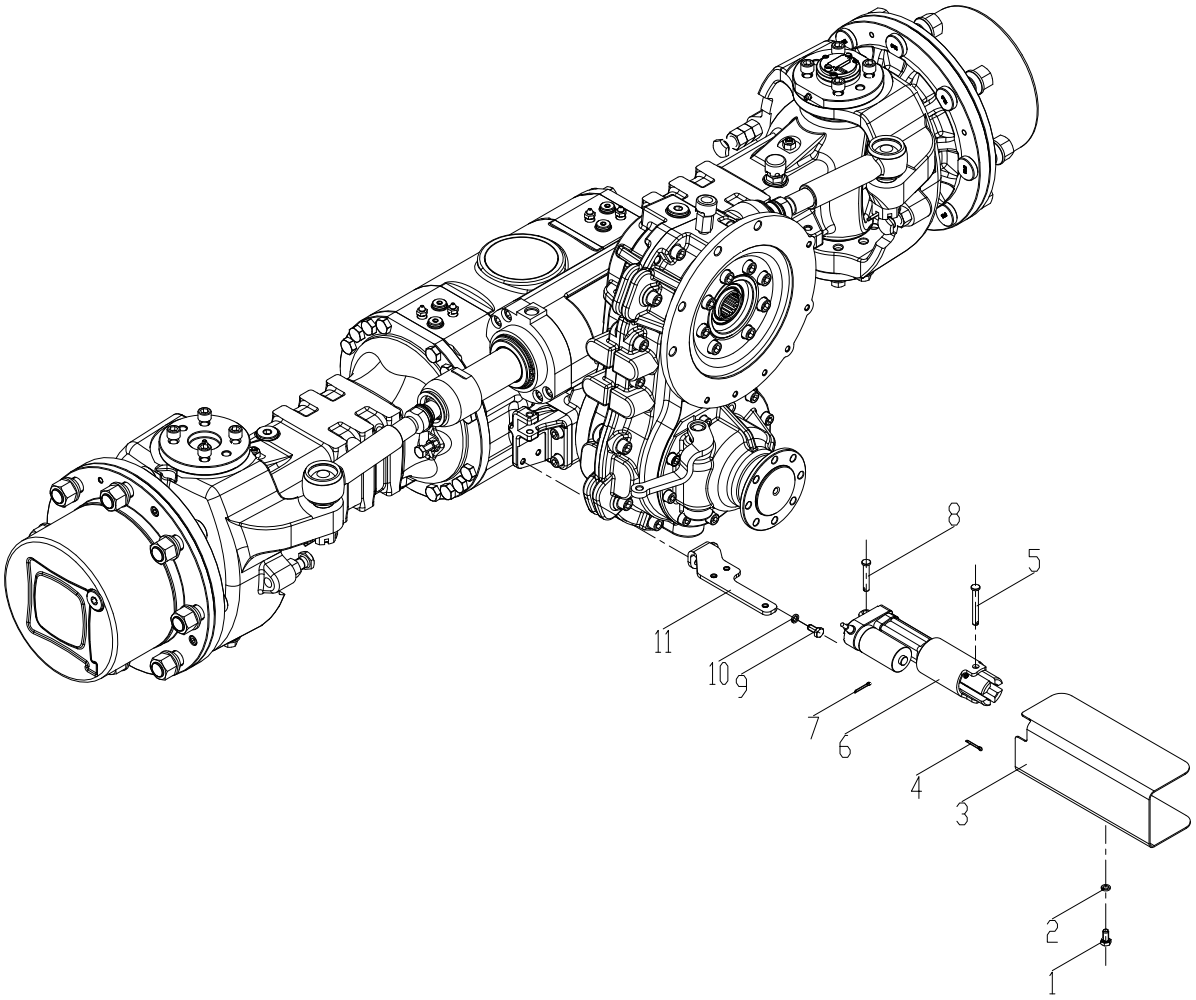
Condition	Possible cause	Exclude
Abnormal noise (Before excluding, please ensure that the noise comes from the drive shaft rather than from the wheel reduction gear or main reducer)	● Loose bolts connecting the drive axle support sleeve to the frame	Fastening
	● Loose wheel nuts	Fastening
	● Other installation parts are loose	Fastening
	● Damaged or worn bearings inside the wheel hub	Replace
	● Poor gear meshing	Reassemble and adjust
	● Improper adjustment of bearings inside the wheel hub	Adjust
	● Half shaft spline wear	Replace
	● Insufficient lubrication	Add lubricating oil
Unstable driving	● Loose wheel nuts	Fastening
	● Wheel deformation	Replace
	● Wear or damage of bearings inside the wheel hub	Replace
	● Loose bolts connecting the drive axle support sleeve to the frame	Fastening
	● Improper adjustment of bearings inside the wheel hub	Adjust
	● Incorrect tire pressure	Adjust
Oil leakage	● Wear or damage to the axle oil seal components	Replace
	● The main transmission device is not installed correctly	Replace the paper pad
	● Loose oil injection and drain plugs	Fastening
	● Poor lubrication	Improve lubrication
	● High oil level	Drain the oil to the designated location

2.3.6.Disassembly of transfer case assembly

1. Disassemble the bolt (1) and washer (2), and remove the protective cover (3);

2. Disassemble the split pin (4), remove the pin (5), disassemble the split pin (7), remove the pin (8), and remove the electric push rod assembly (6);

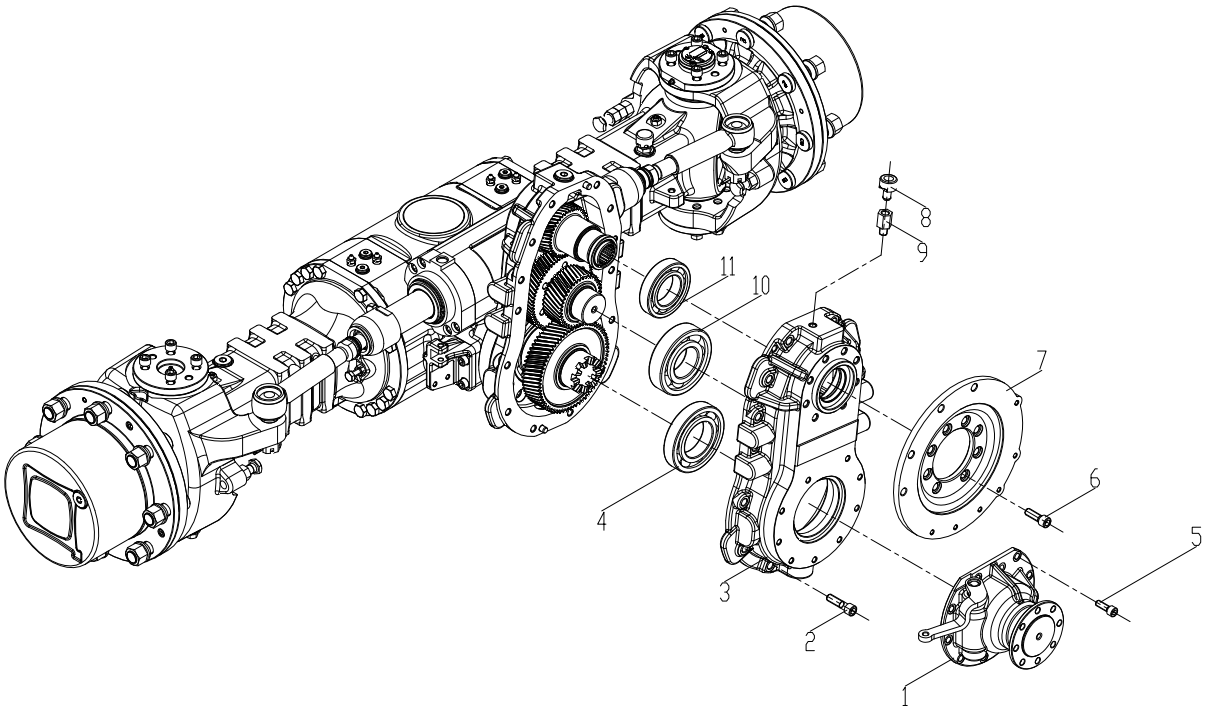
3. Disassemble bolts (9) and washers (10), and remove the protective cover bracket (11);



Attention！

Before disassembly, please place a container under the axle housing and drain the gear oil inside the axle housing.

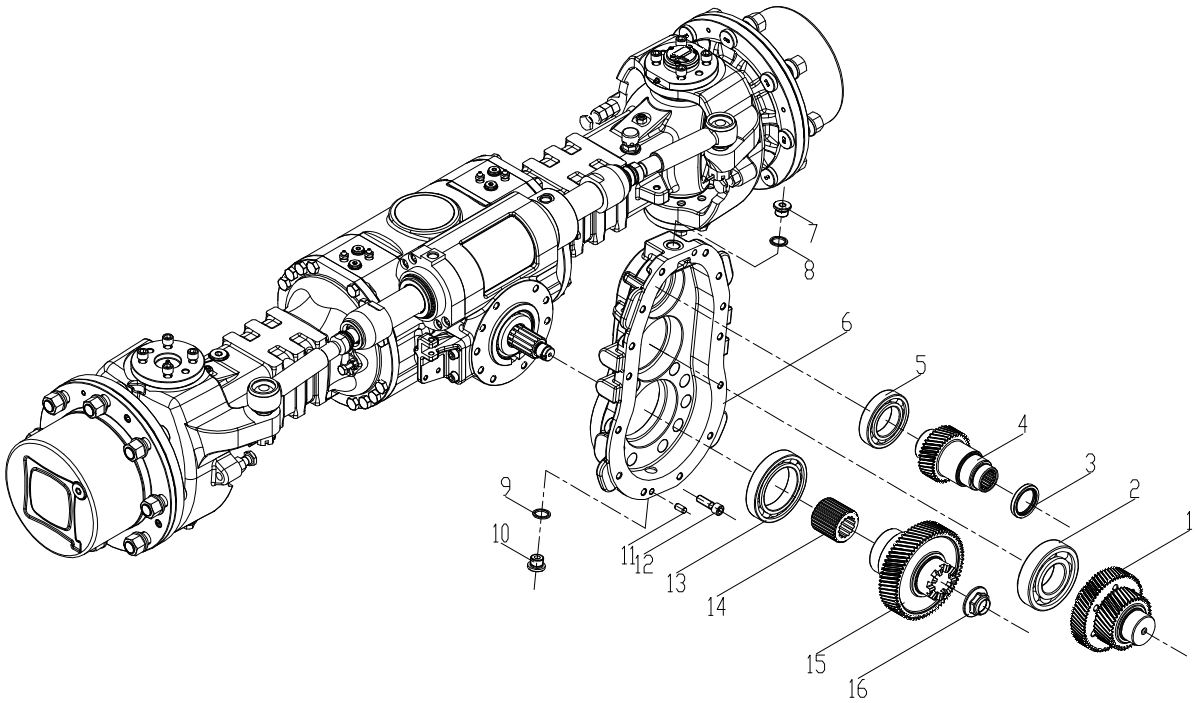
1. Disassemble bolt (5) and remove clutch assembly (1);
2. Disassemble the bolt (6) and remove the input flange (7);
3. Disassemble the bolt (2) and remove the left housing (3);
4. Disassemble the vent plug (8), vent plug seat (9), bearing (4), bearing (10), and bearing (11) in sequence;



Attention !

Apply sealant to the joint surface of the left and right shells during installation.

1. Remove the two axle component (1) and remove the bearing (2);
2. Remove the locking nut (16), take down the gear (15), input flange (14), and bearing (13);
3. Remove the oil seal (3), gear (4), and bearings (5);
4. Disassemble the bolt (12) and pin (11), and remove the right housing (6);
5. Disassemble plug (7), washer (8), plug (10), washer (9);

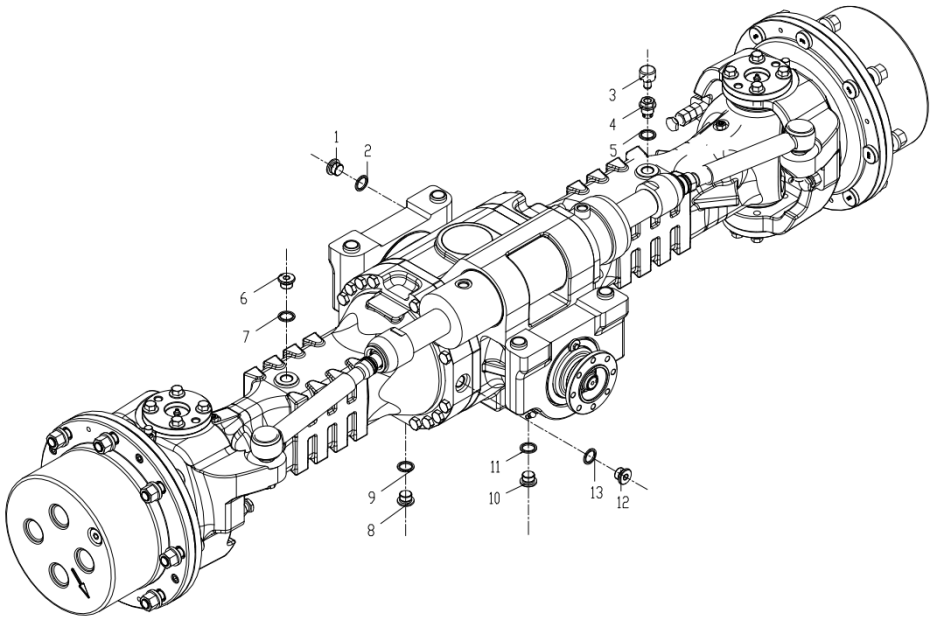


Attention!

The transfer case of the T25-60XHYG model is integrated with the front steering drive axle and connected to the rear steering drive axle through a transmission shaft; The transfer case of the T35-100XHYG model is a split type, connected to the front and rear steering drive axles through a transmission shaft.

2.3.7.Disassembly and installation of steering drive axle

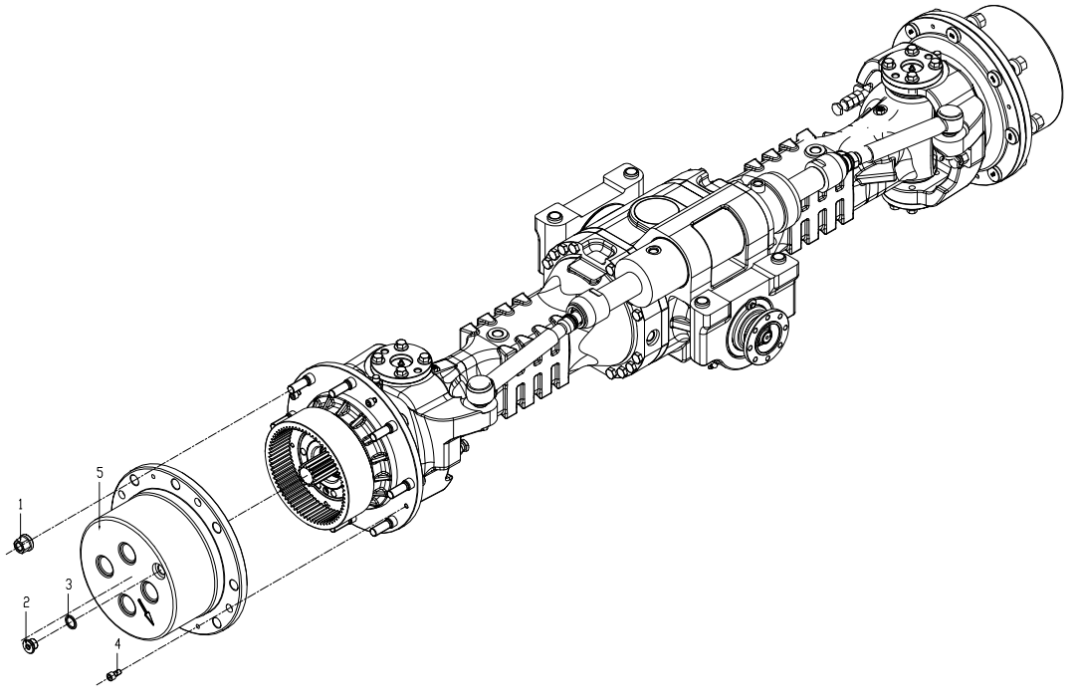
1. Remove the bridge and place it horizontally. Remove the plug and drain the oil.



Attention！

Before disassembly, please place a container under the axle housing and drain the gear oil inside the axle housing.

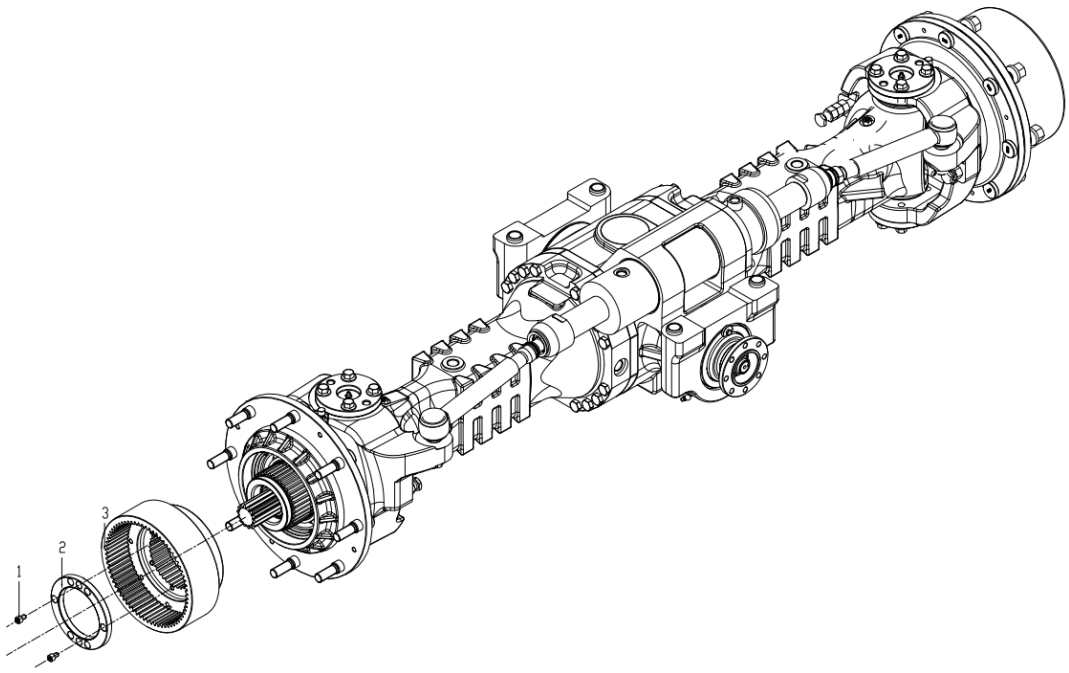
2. Disassemble the wheel hub nut (1), screw plug (2), and sealing gasket (3), remove the screw (4), and take down the wheel housing assembly (5);



Attention！

Pay attention to the position of the threaded hole during installation; The planetary gear meshes with the internal splines of the ring gear and the splines of the transmission shaft.

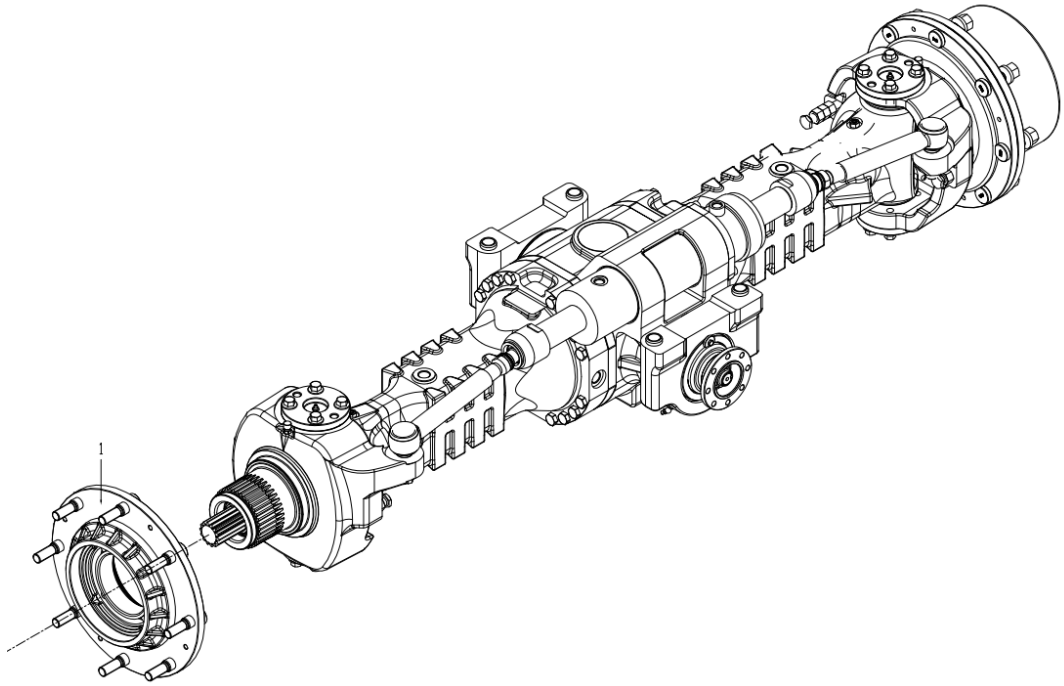
3.Remove the screw (1), remove the locking nut (2), and remove the ring gear support component (3). Tighten the bolt to a torque of 22-30Nm;



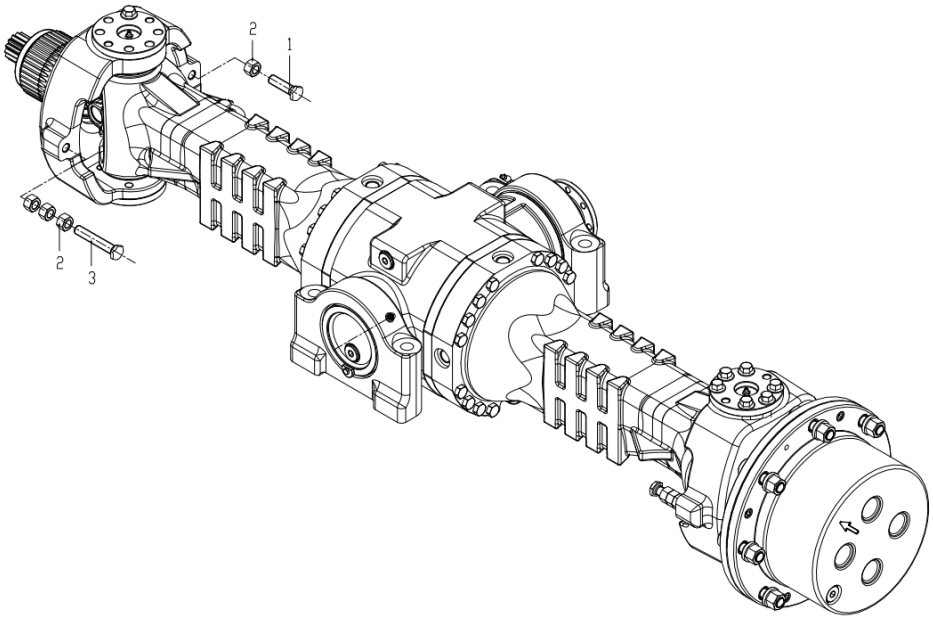
Attention！

When installing, tighten the locking nut until the wheel hub is difficult to rotate, and retract the locking nut by about 60 °.

4.Remove the wheel hub assembly (1).



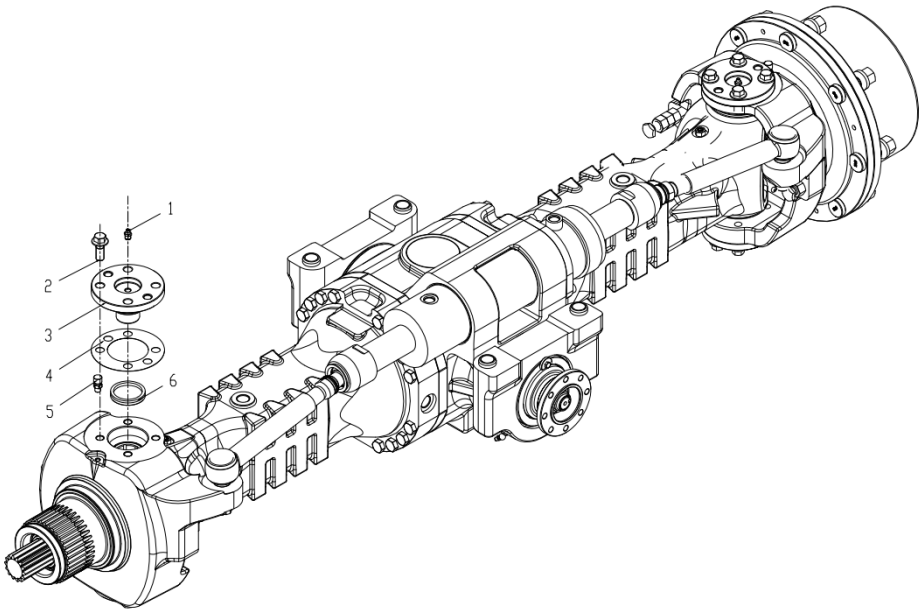
5.Remove the short limit bolt (1), long limit bolt (3), and nut (2);



Attention！

a. Install parts 1 and 2 onto the steering housing and adjust the position of the nut so that the distance from the end of the nut to the surface of the steering housing is 36mm.
b. Install parts 3 and 2 onto the steering housing, and adjust the position of the nut so that the distance from the end of the nut to the surface of the steering housing is 72mm.

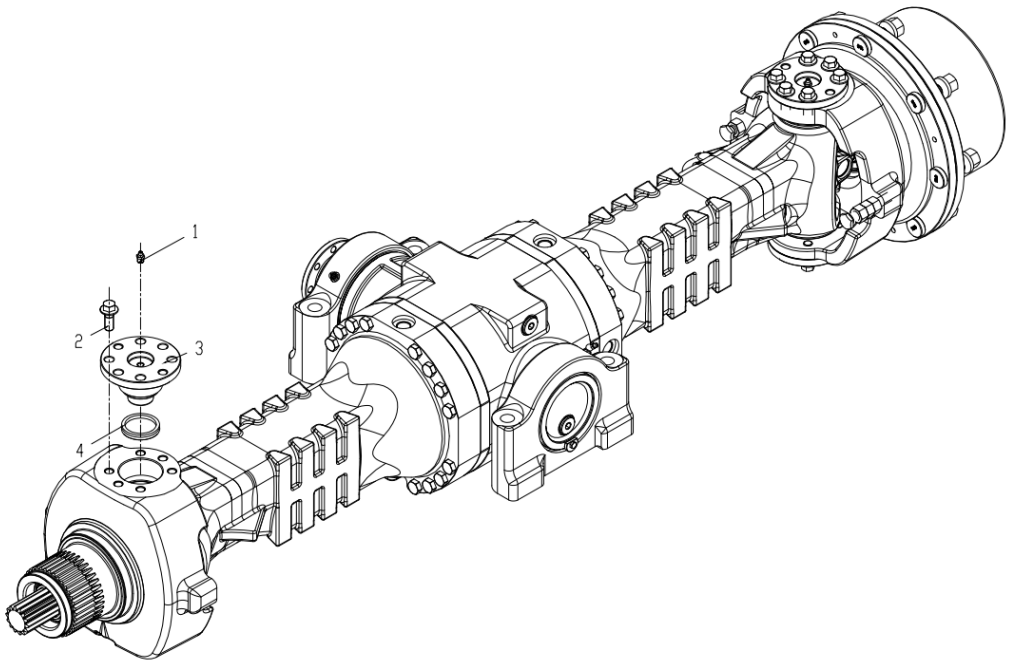
6. Remove the oil cup (1), remove the bolt (2), remove the upper main pin shaft (3), oil seal (6), gasket (4), and remove the vent plug (5);



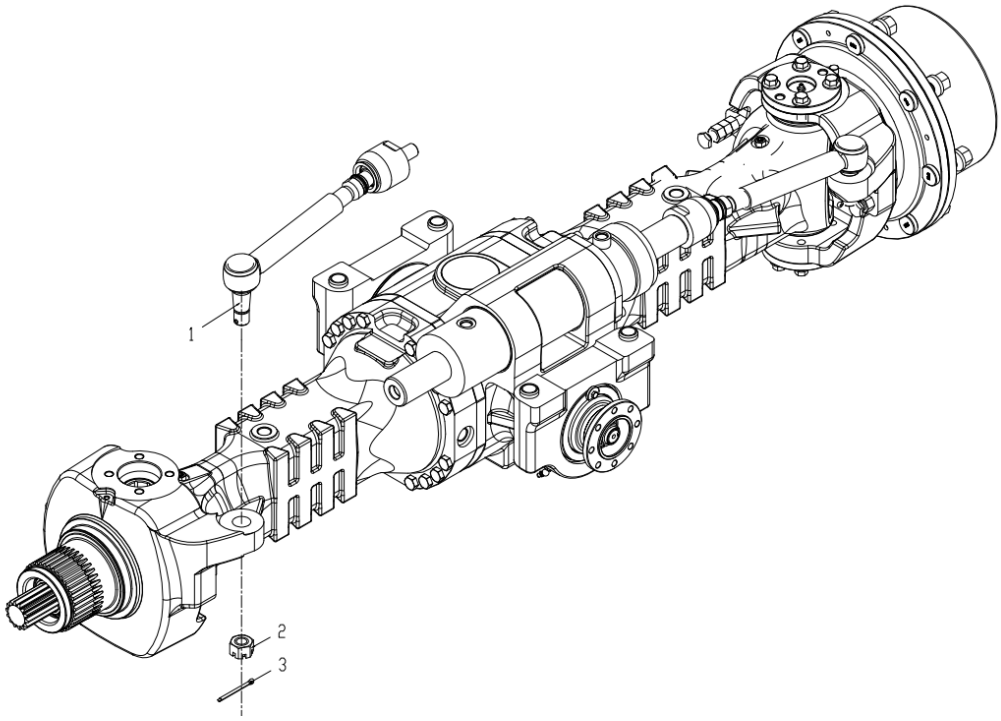
Attention！

During installation, there is visible overflow of lubricating grease from the oil cup after filling; Measure the gap X between the upper main pin shaft and the steering housing with a feeler gauge, and select a suitable gasket thickness between X+0.1mm and X+0.2mm; Apply Loctite 262 thread adhesive to the bolt, with a tightening torque of 200~230 (N · m); The sealing ring should be installed with the large flat surface facing downwards and leveled after installation.

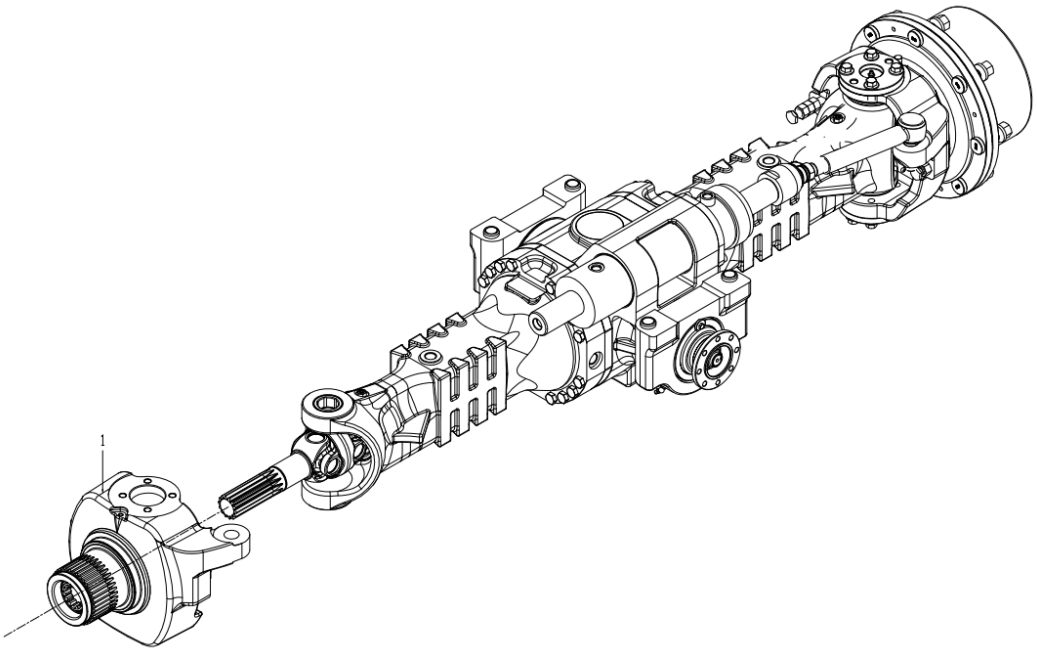
7. Remove the oil cup (1), remove the bolt (2), take down the main pin shaft (3), and oil seal (4);



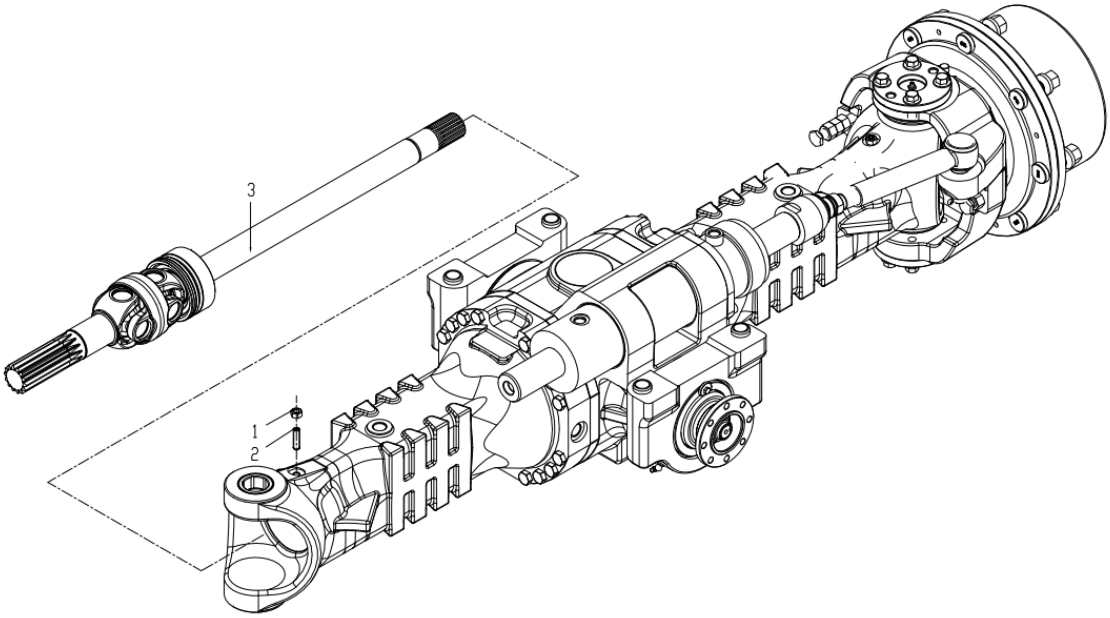
8.Disassemble the split pin (1), nut (2), steering linkage and joint bearing assembly (3);



9.Remove the steering housing assembly (1)



10.Disassemble the nut (1), remove the set screw (2), and remove the transmission shaft assembly (3);

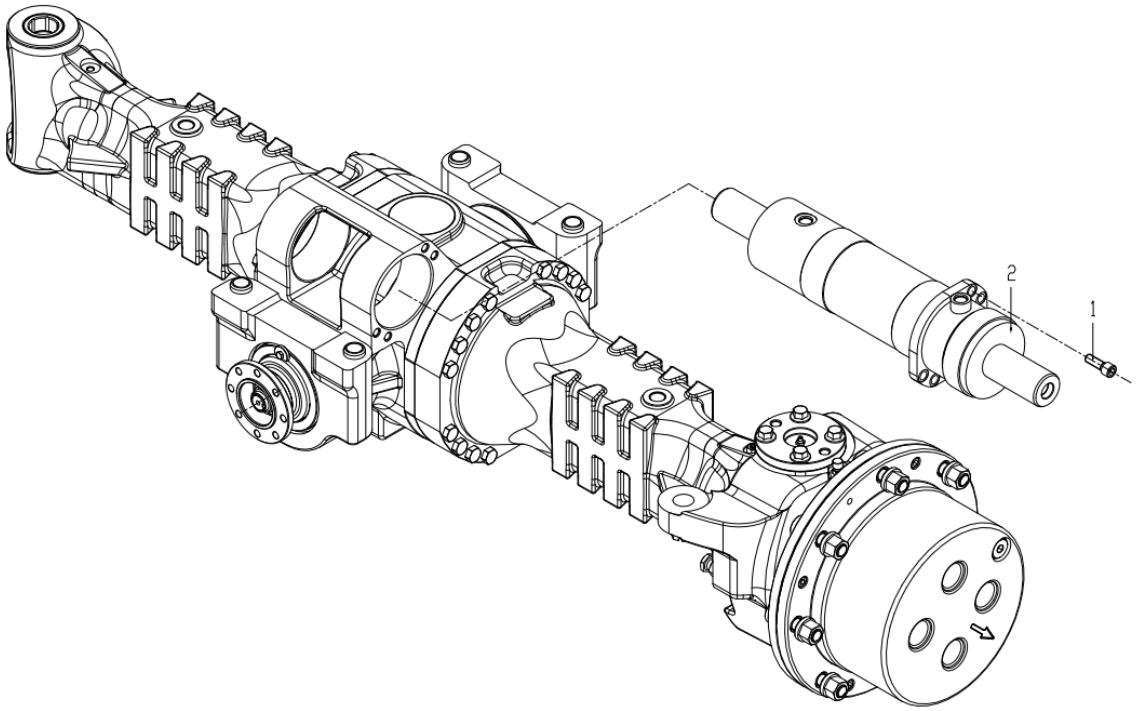


Attention！

Apply Loctite 262 thread sealant to the fastening screws during installation.

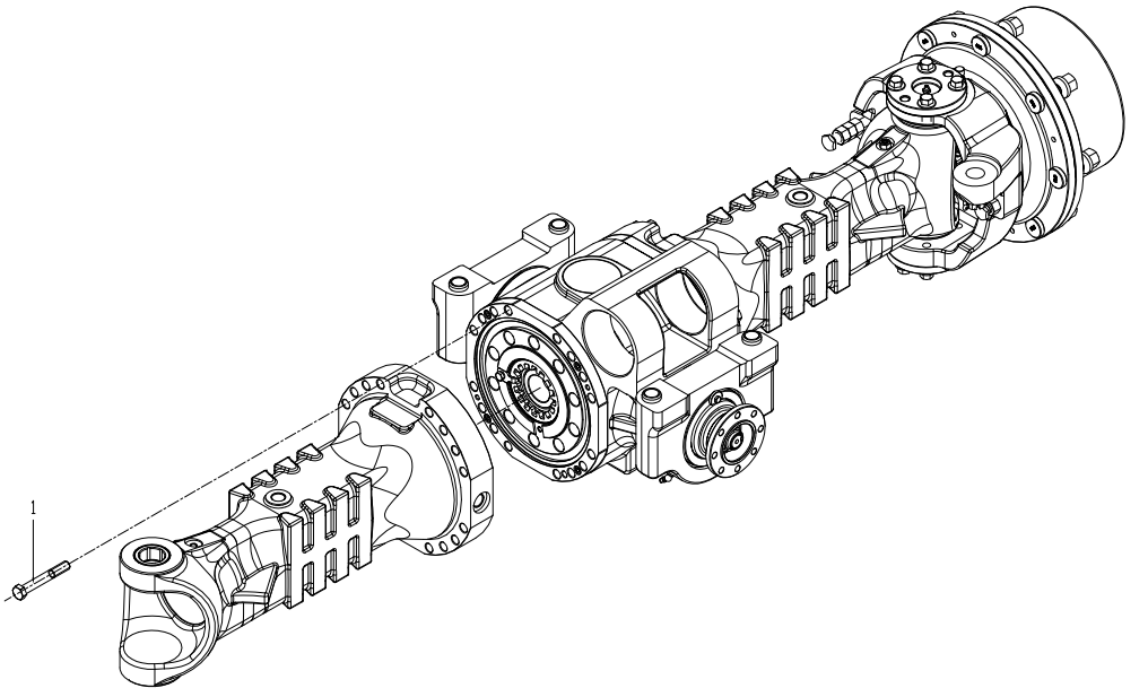
11.Disassemble the bolt (1) and remove the oil cylinder assembly (2);

The tightening torque of the bolt is 115~135 Nm.

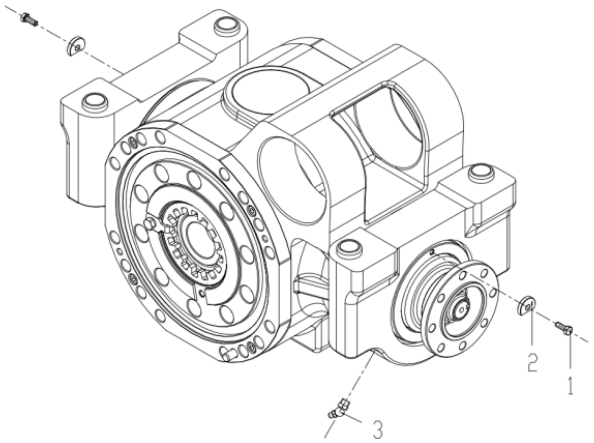


12.Disassemble the bolt (1) and remove the axle housing assembly (2);

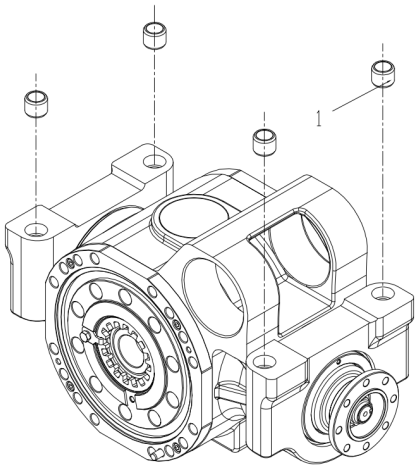
The tightening torque of the bolt is 200~230Nm.



13.Disassemble the bolt (1), retaining ring (2), and oil cup (3);



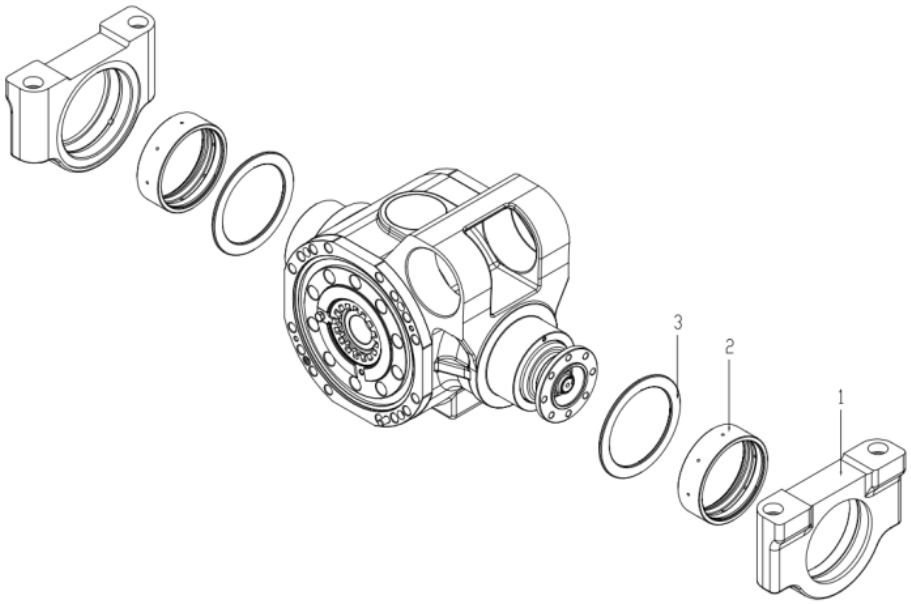
14.Disassemble the positioning sleeve (1);



Attention！

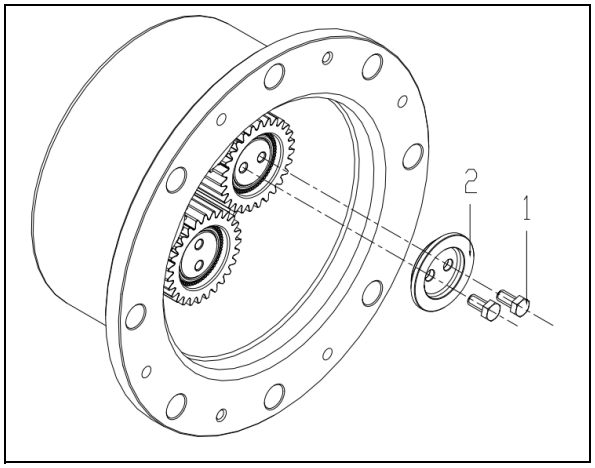
During installation, apply a small amount of lithium based grease evenly to the O-ring seal.

15.Disassemble the swing seat (1), remove the shaft sleeve (2), and take off the washer (3);



16.The installation process is opposite to the disassembly process.

2.3.7.1.Disassembly and installation of wheel housing and planetary carrier components



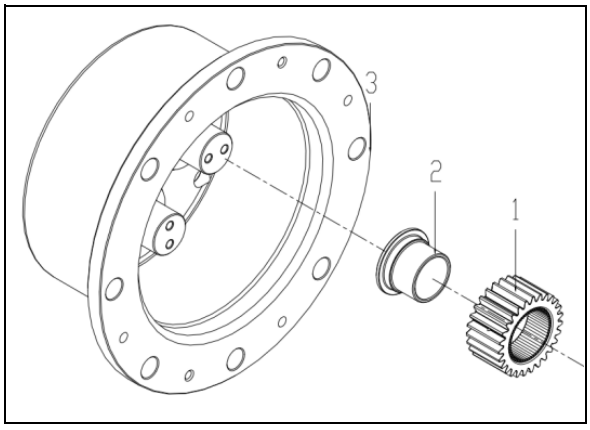
1. Disassemble bolt (1), remove gasket (2), and gear assembly (3).

Attention!

a. Apply Loctite 262 sealant to the bolts;

b. Bolt tightening torque: 41-50 (N · m);

c. After installation, there is no jamming sensation in the rotation of the planetary gear

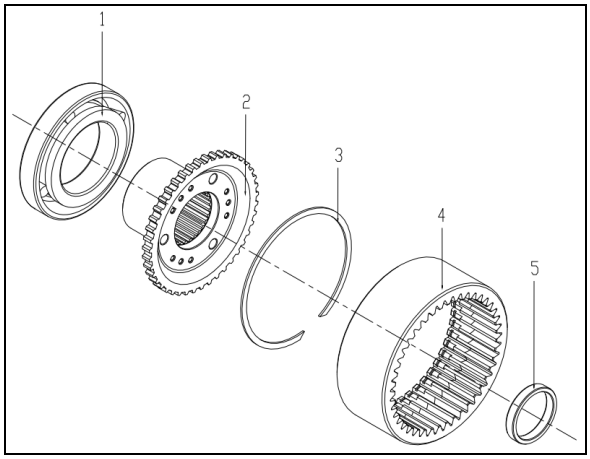


2.Remove the gear assembly (1) and shaft sleeve (2).

Attention!

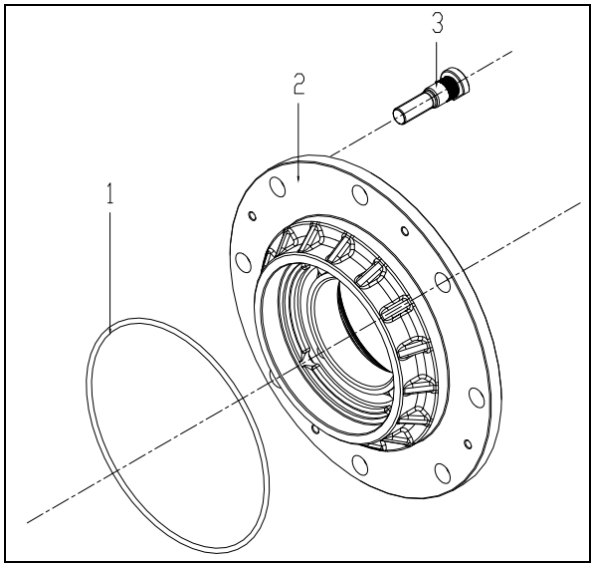
During installation, apply butter lubrication between the rollers of the gear rental to ensure smooth rotation of the gear.

2.3.7.2.Disassembly and installation of ring gear support components



1. Disassemble the bearing inner ring (1), remove the retaining ring (3), and remove the ring gear (2) and ring gear support (4).

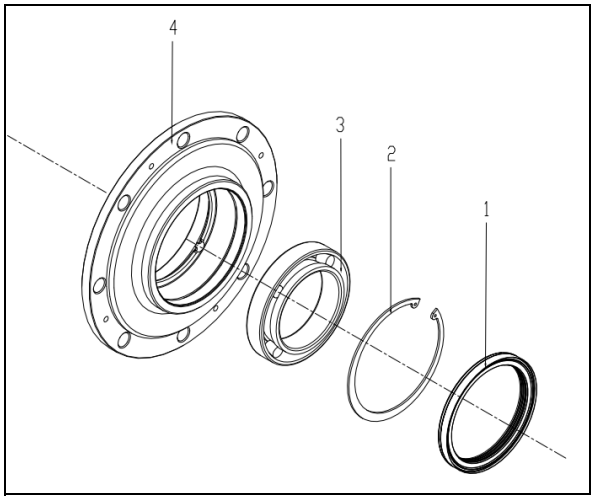
2.3.7.2.Disassembly and installation of wheel hub components



1. Remove the bolt (3) and then remove the O-ring seal (2).

Attention!

During installation, the hub bolts should be tightened and flush with the hub end face without any gaps;

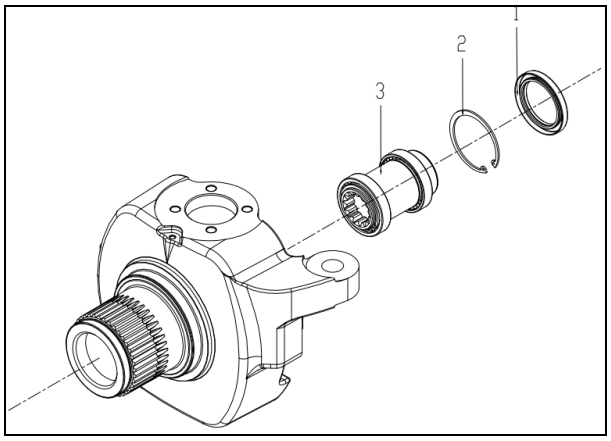


2.Disassemble the oil seal (1), then the retaining ring (2), bearing outer ring (3), and wheel hub (4).

Attention!

Apply a small amount of lithium based grease evenly to the sealing ring.

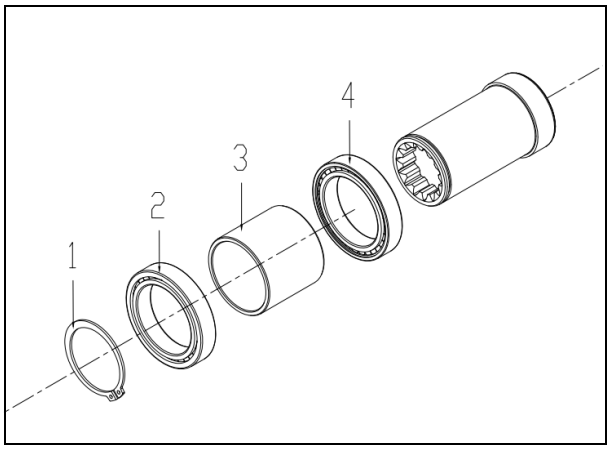
2.3.7.4.Installation and disassembly of steering housing components



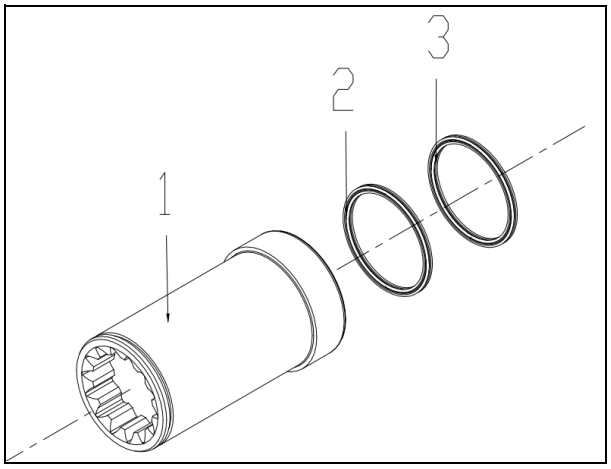
1. Disassemble the oil seal (1), retaining ring (2), and remove the spline sleeve assembly.

Attention!

Apply lubricating grease to the oil seal during installation



2.Disassemble the retaining ring (1), bearing (2), shaft sleeve (3), and bearing (4).

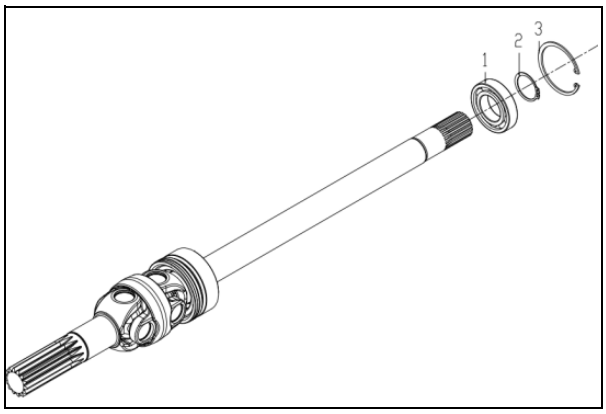


3.Remove the star shaped sealing ring (2) and spline sleeve (1).

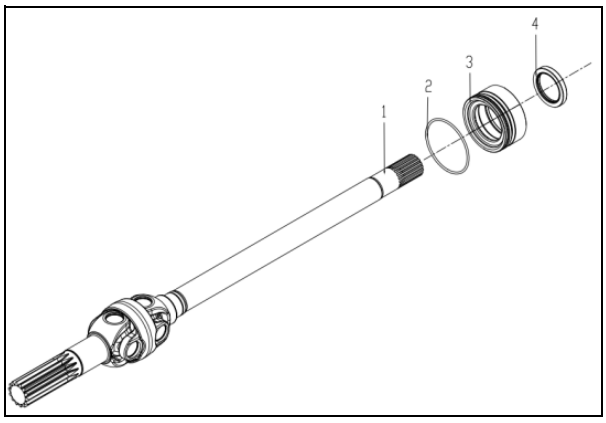
Attention!

Apply lubricating grease to the oil seal during installation

2.3.7.5.Disassembly and installation of transmission shaft assembly



1. Disassemble the retaining ring (3), retaining ring (2), and remove the bearing (1).

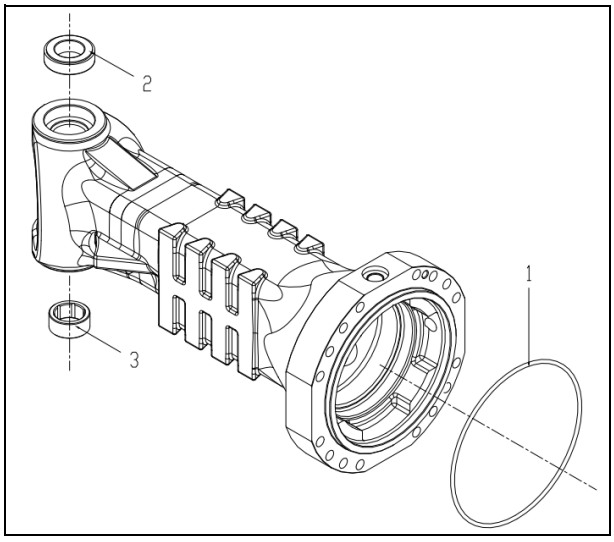


2.Disassemble the bearing mounting seat (3), remove the oil seal (4), O-ring seal (2), and transmission shaft (1).

Attention!

During installation, apply lubricating grease to the oil seal and O-ring

2.3.7.6.Disassembly and installation of bridge housing assembly

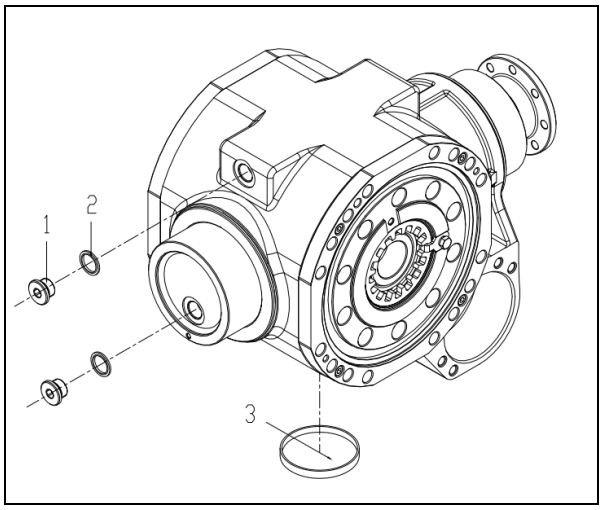


1. Remove the O-ring seal (1), remove the bearing outer ring (2), and steel sleeve (3).

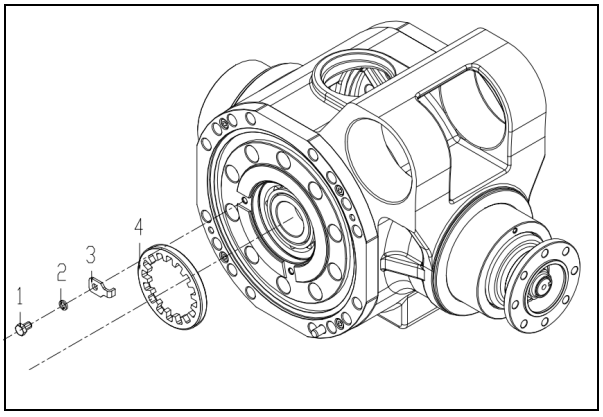
Attention!

During installation, apply lubricating grease to the O-ring seal

2.3.7.7.Disassembly and installation of main reducer assembly



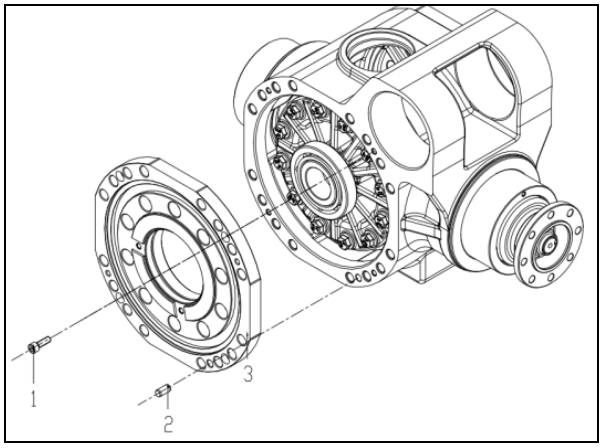
1. Disassemble the screw plug (1), seal gasket (2), and remove the oil seal end cover.



2.Disassemble the bolt (1), washer (2), remove the locking plate (3), and remove the adjusting nut (4).

Attention!

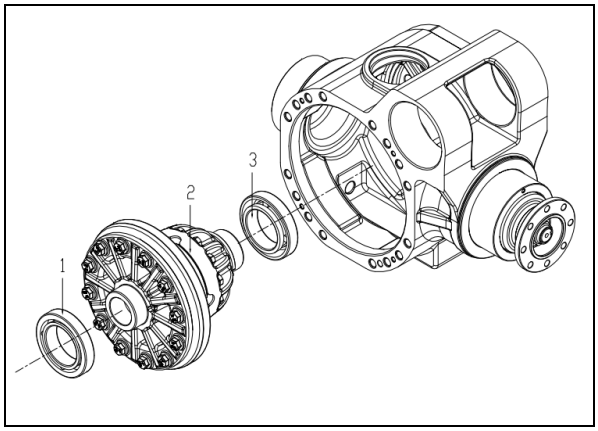
During installation, measure the differential rotation clearance value and adjust the differential adjustment nuts at both ends to achieve a clearance value of 18-25 threads.



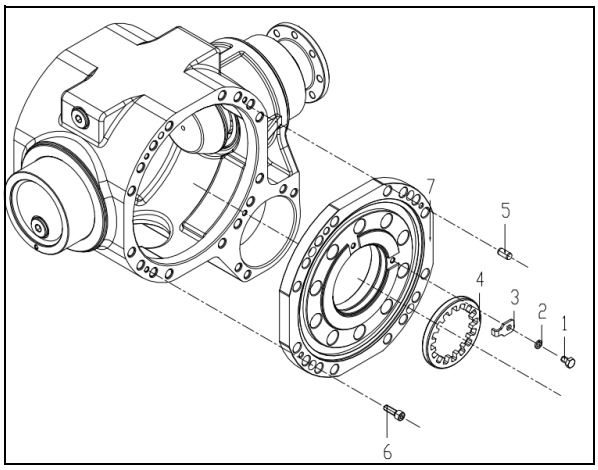
3.Disassemble the bolt (1), remove the bearing seat (2), and disassemble the pin (3).

Attention!

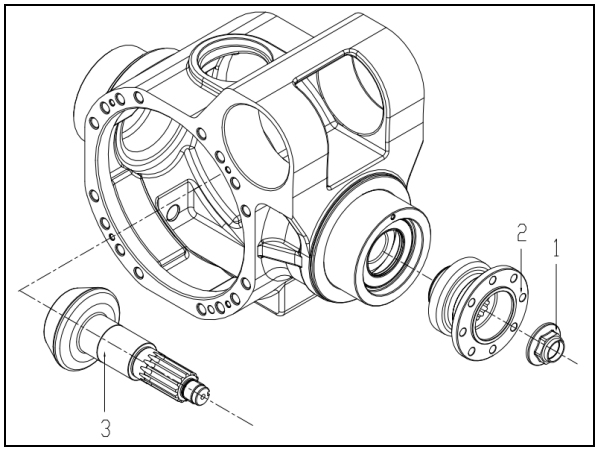
During installation, the joint surface between the bearing seat and the housing should be coated with Loctite 598 sealant, with a diameter of no less than 2mm and no interruptions.



4.Remove the differential assembly (2) and disassemble the bearings (1) and (3).



5.Install the bolt (1), washer (2), locking plate (3), adjusting nut (4), bolt (5), bearing seat (7), and pin (6) on the other side of the main reducer in sequence



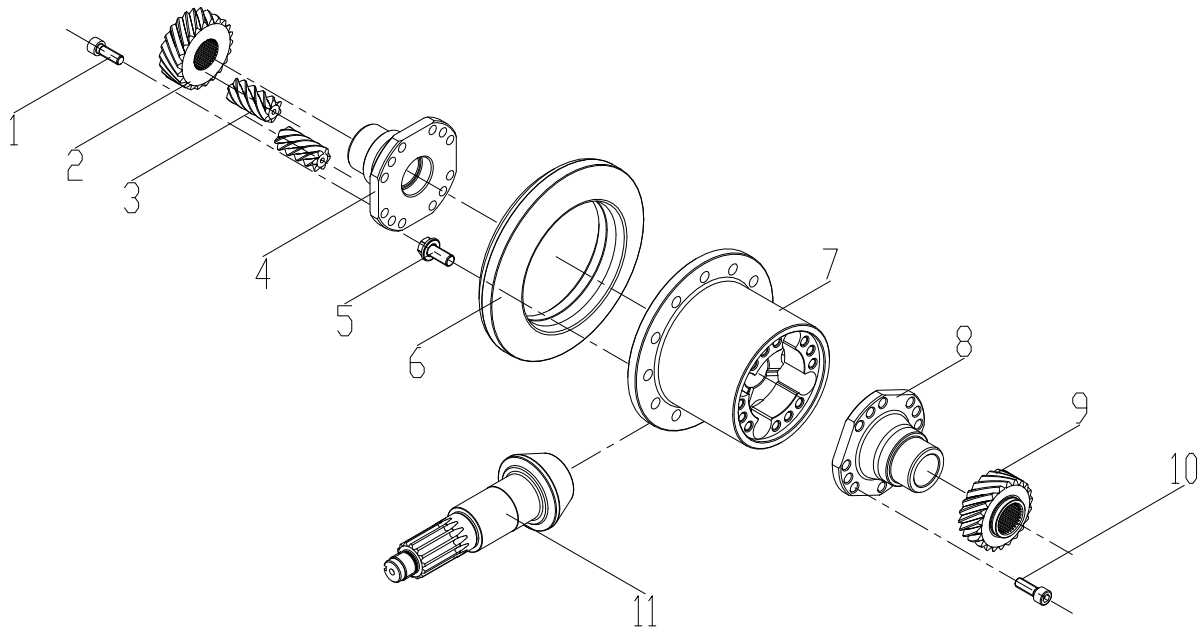
6.Disassemble the flange hex nut (1), remove the driving bevel gear (3), and input flange shaft and dust cover assembly (2).

Attention!

a. During installation, take the hex nut and tighten it to the required torque. Use a tension gauge to measure the starting torque of the driving bevel gear. If it meets the technical requirements, proceed to the next step. If it does not meet the requirements, remove the hex nut, dismantle the driving bevel gear, and replace it with an appropriate thickness of adjusting gasket. Continue the above steps until the starting torque meets the requirements.

b. Apply Loctite 598 sealant to the joint between the hex nut and the component, with a diameter of no less than 2mm and no interruptions. Tightening torque of flange nut: 430-460 (N · m).

2.3.7.8.Disassembly of differential assembly



1. Remove the active bevel gear (11), remove the bolt (5), and remove the passive bevel gear (6).

2. Disassemble bolt (10) and remove differential housing (4) and (8).

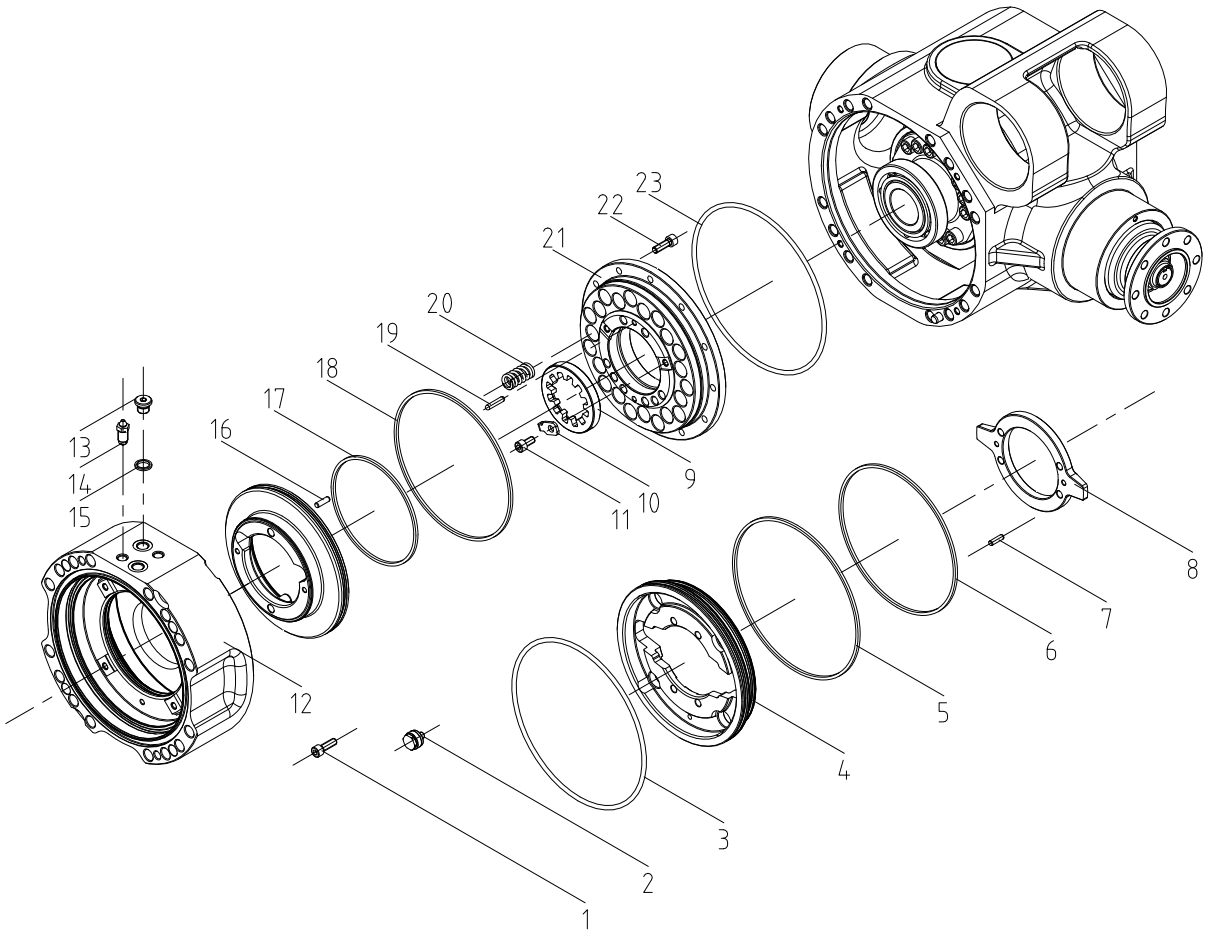
3. Remove the planetary gear gasket (8), planetary gear (9), half shaft gear (11), planetary gear gasket (12), and remove the cross shaft (10).

Attention！

a. The tightening torque for component 5 is 60-75 (N · m), and the tightening torque for component 10 is 60-75 (N · m);

b. The bolts need to be coated with Loctite 262 sealant. The assembled half shaft gear has a mesh clearance of 0.1-0.2 with the planetary gear, and can rotate freely without any jamming phenomenon.

2.3.7.9.Disassembly of wet brake assembly



1. Remove the O-ring seal (3);
2. Disassemble the bolt (1) and the wet brake self-adjusting mechanism assembly (2);
3. Disassemble the piston (4), rectangular sealing ring (5), and rectangular sealing ring (6);
4. Disassemble the pin (7) and baffle (8);
5. Disassemble the screw plug (13), washer (15), and air release nozzle (14), and remove the brake housing (12);
6. Remove the O-ring seal (23), disassemble the bolt (22), and remove the bearing seat (21);
7. Disassemble the bolt (11), lock washer (10), differential adjustment nut (9), and remove the pin (19) and spring (20);
8. Disassemble the pin (16), piston, rectangular sealing ring (17), and rectangular sealing ring (18);

Chapter 3. Steering system

3.1.Structure Introduction

The steering system mainly consists of a steering device and a steering drive axle assembly, as shown in Figure 3.1.

The steering device mainly consists of a steering wheel assembly, a steering pipe device, a locking handle, a steering gear, etc., as shown in Figure 3-2. The steering column and steering wheel can be adjusted back and forth with an adjustable angle of 6 ° to meet the needs of different drivers. In the power-off state, gently rotate the steering wheel with a force of 1kg. After releasing it, the steering wheel should automatically return to its original position by about 10 degrees.

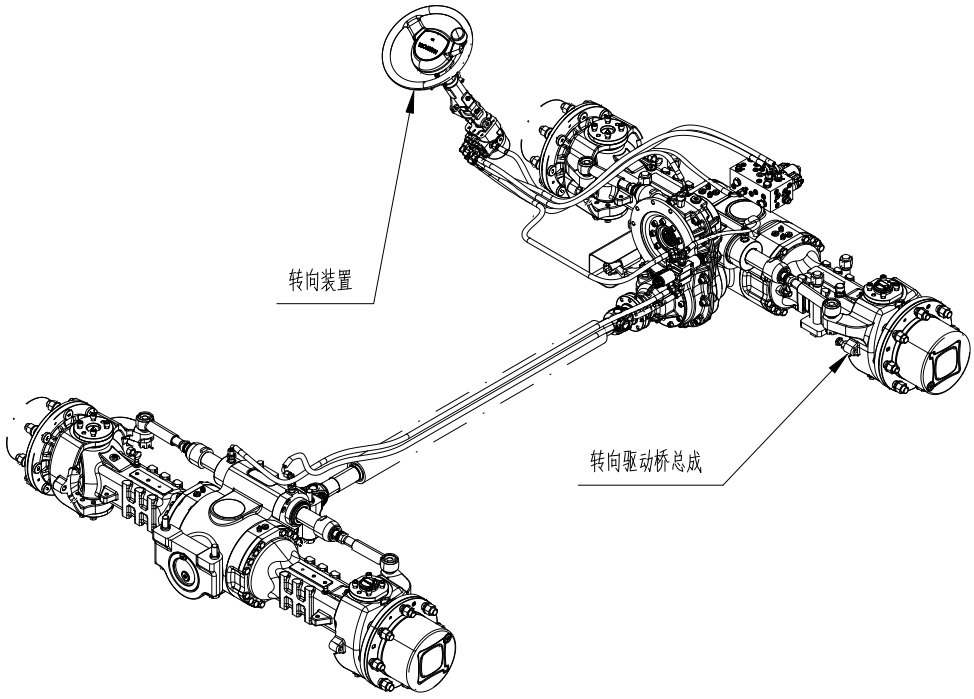


Figure 3.1-1 Schematic diagram of four-wheel drive steering system（T25-60XHYG）

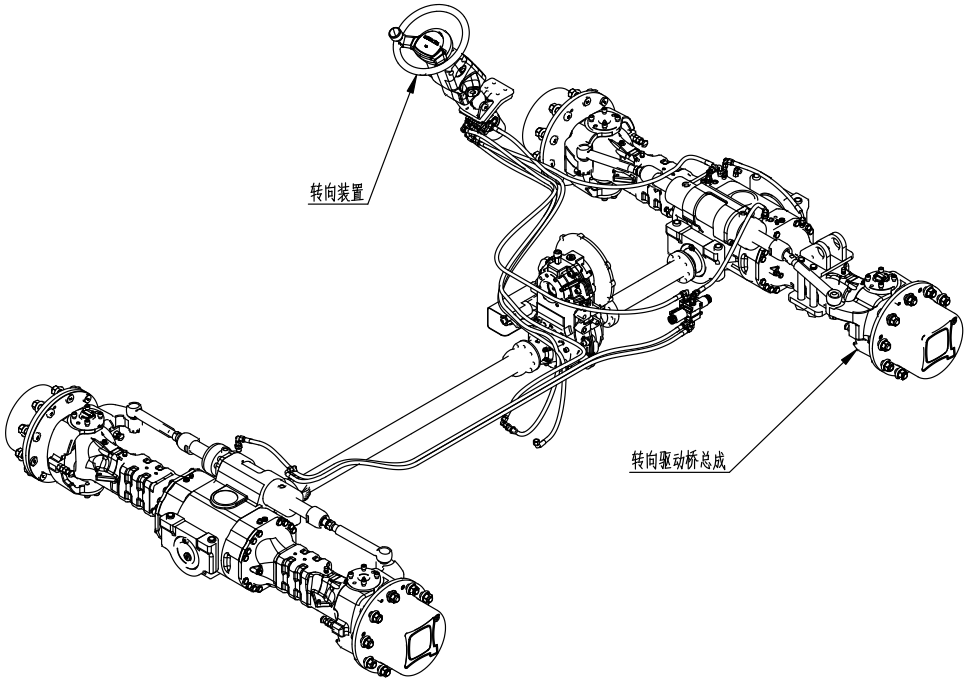


Figure 3.1-2 Schematic diagram of four-wheel drive steering system（T35-100XHYG）

3.2.Steering device structure

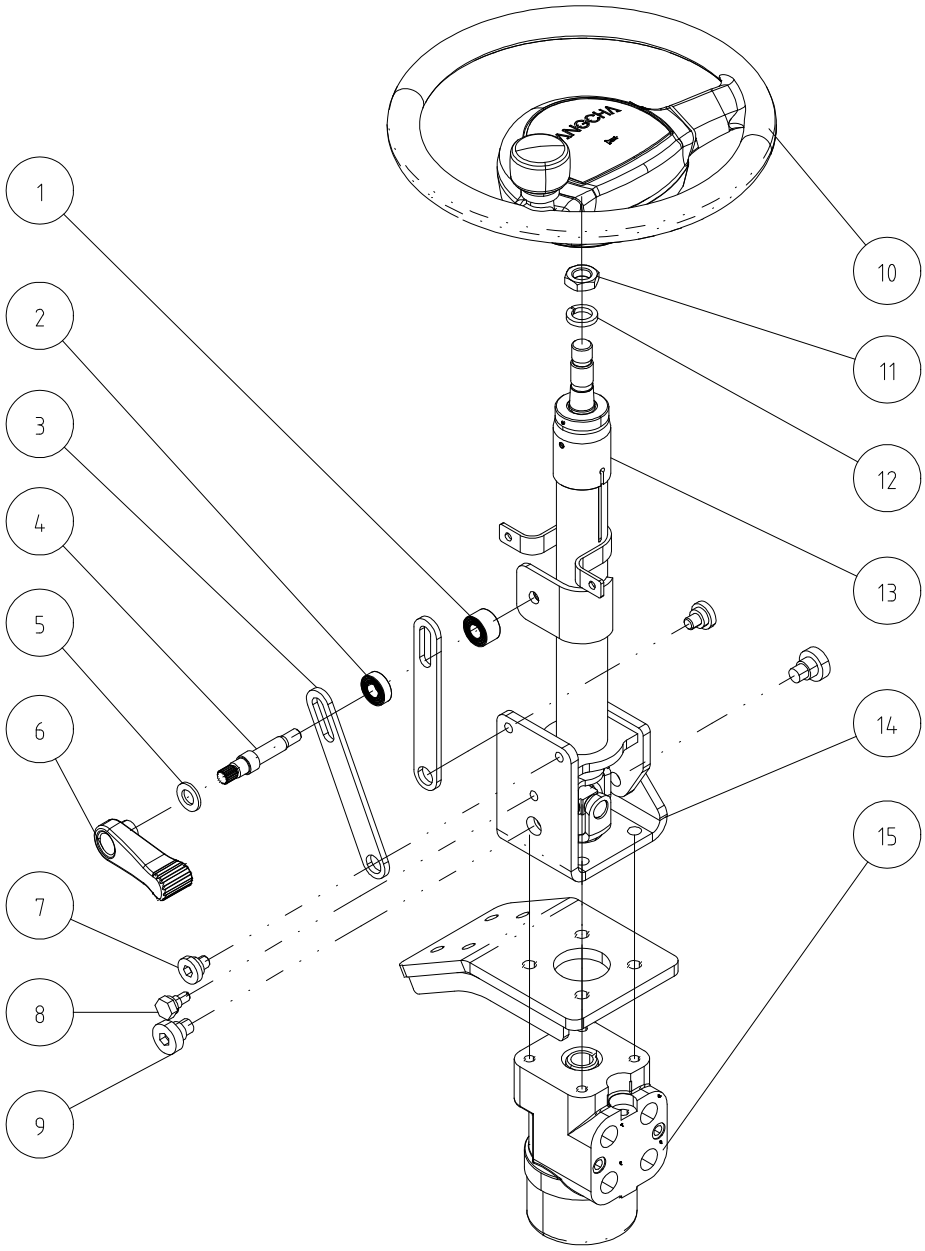


Figure 3-2 Steering device

1-Clamping gasket	2-Clamping gasket	3-Connecting plate	4-Locking shaft
5-Grommet	6-Locking handle	7-Internal hexagon M10 bolt	8-Limit bolt
9-Internal hexagon M12 bolt	10-Steering wheel assembly	11-Steering wheel nut	12-Gasket 16

Table 3-1 Tightening Torque Table for Fasteners Related to Steering Device

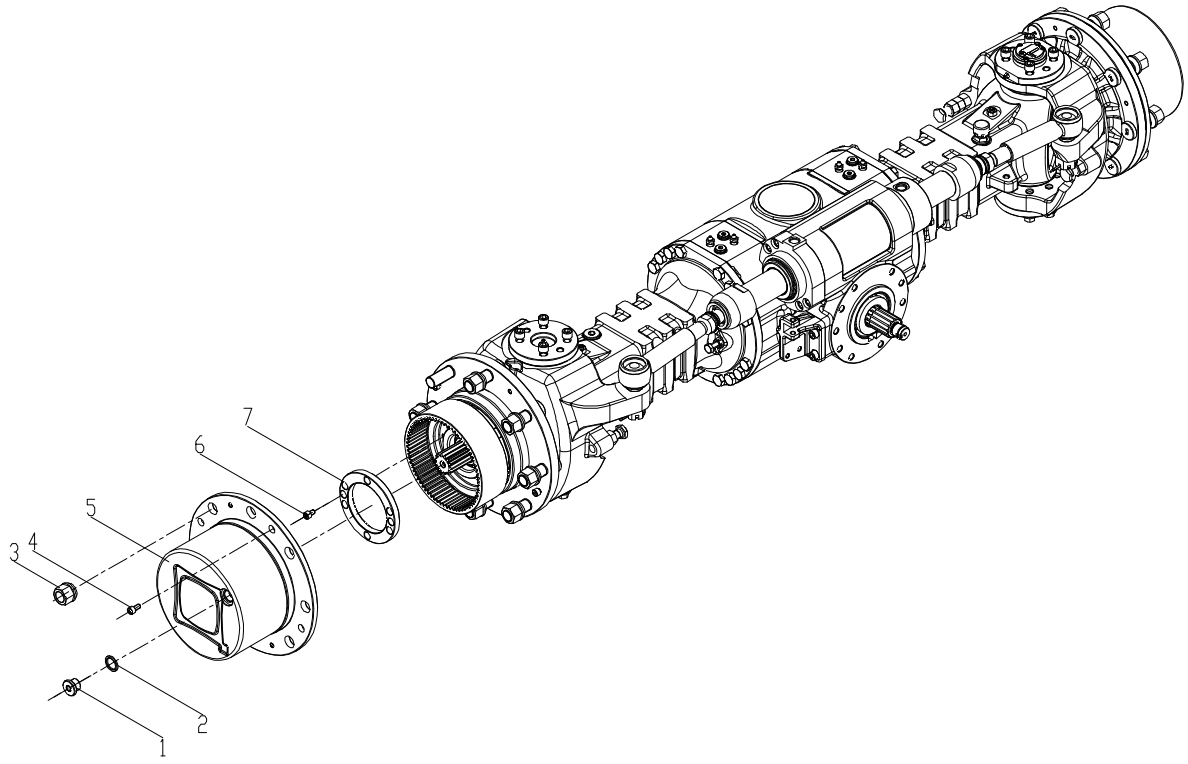
No.	Name	Tightening torque N · m
6	Inner hexagon M10	84
11	Bolt M6	18
12	Inner hexagon M12	145

3.3.Disassembly of steering drive axle

1）Disassemble the wheel hub nut (3) and screw (4), and remove the wheel edge planetary housing assembly (5);

2) Remove the screw plug (1) and gasket (2);

3) Disassemble bolt (6) and locking nut (7);



4）Remove the ring gear support component (19);

5) Remove the wheel hub assembly (18);

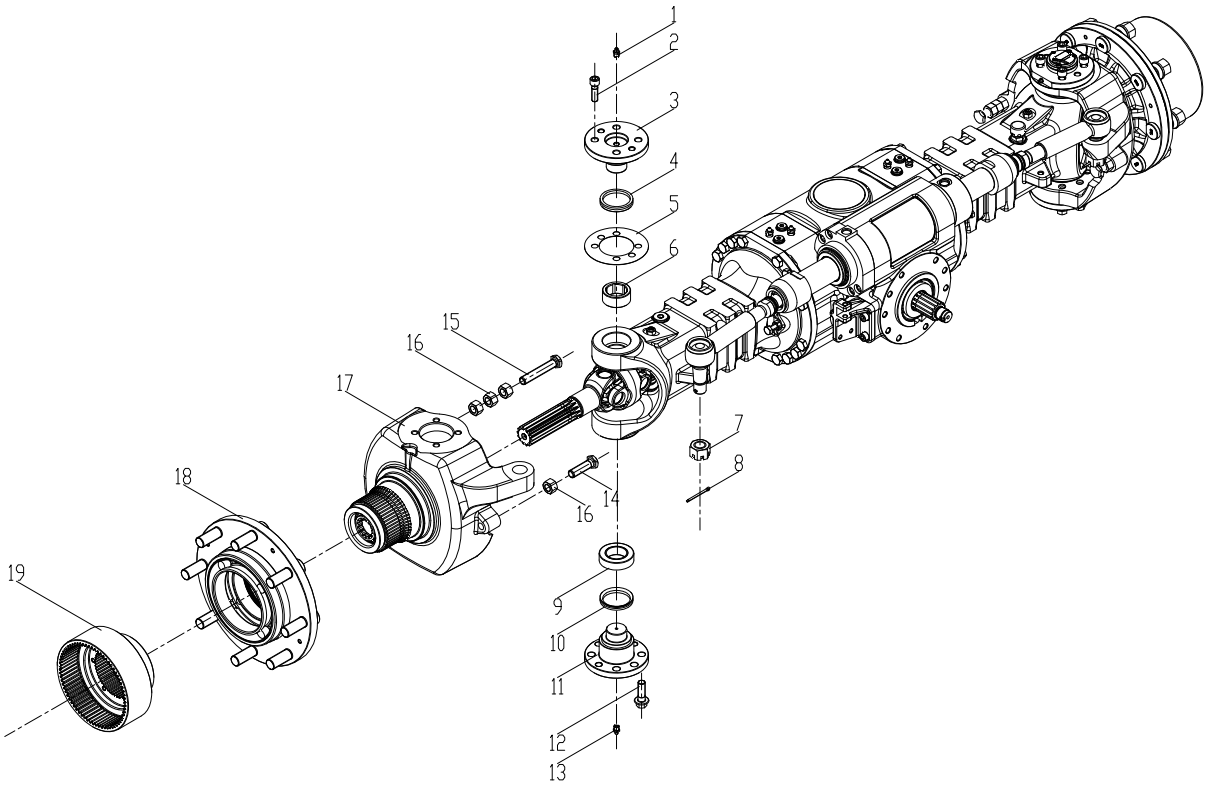
6) Disassemble the air release nozzle (1), bolt (2), upper main pin shaft (3), sealing ring (4), adjusting gasket (5), and steel sleeve (6) in sequence;

7) Disassemble the air release nozzle (13), bolt (12), lower main pin shaft (11), sealing ring (10), and angular contact joint bearing (9) in sequence;

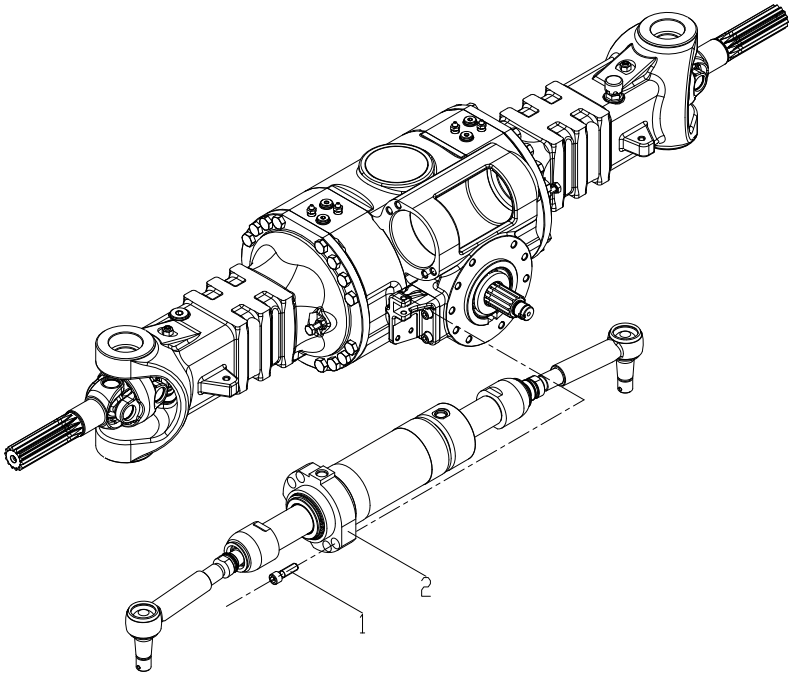
8) Disassemble the split pin (8) and nut (7);

9) Remove the steering knuckle assembly (17);

10) Remove bolt (14), bolt (15), and nut (14) in sequence;



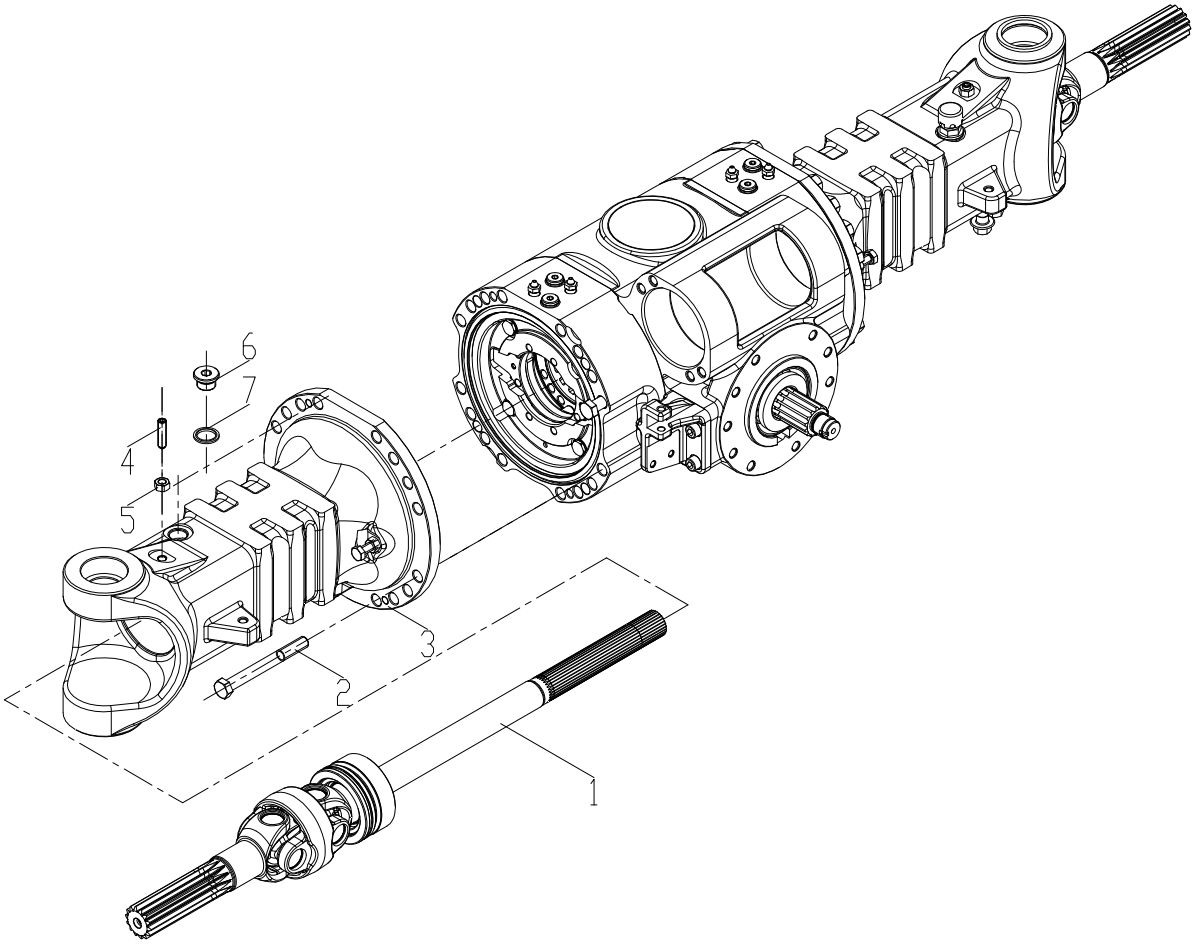
11）Disassemble bolt (1) and remove steering cylinder assembly (2);



12) Disassemble the nut (5), tighten the screw (4), and remove the transmission shaft assembly (1);

13) Disassemble bolt (2) and remove axle housing component (3);

14) Remove the screw plug (6) and gasket (7);



15）Remove the O-ring seal (3);

16) Disassemble bolt (1) and wet brake self-adjusting mechanism assembly (2);

17) Disassemble the piston (4), rectangular sealing ring (5), and rectangular sealing ring (6);

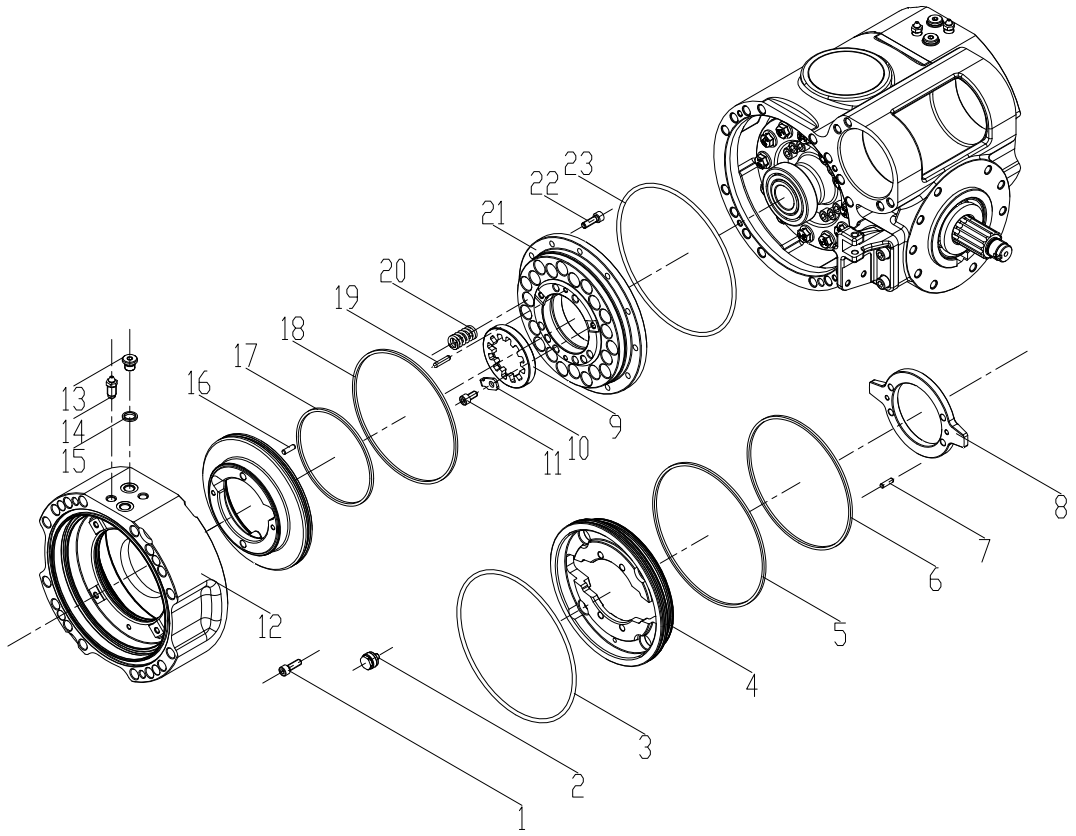
18) Disassemble pin (7) and baffle (8);

19) Disassemble the screw plug (13), washer (15), and air release nozzle (14), and remove the brake housing (12);

20) Remove the O-ring (23), remove the bolt (22), and take down the bearing seat (21);

21) Disassemble the bolt (11), lock washer (10), differential adjustment nut (9), and remove the pin (19) and spring (20);

22) Disassemble the pin (16), piston, rectangular sealing ring (17), and rectangular sealing ring (18);

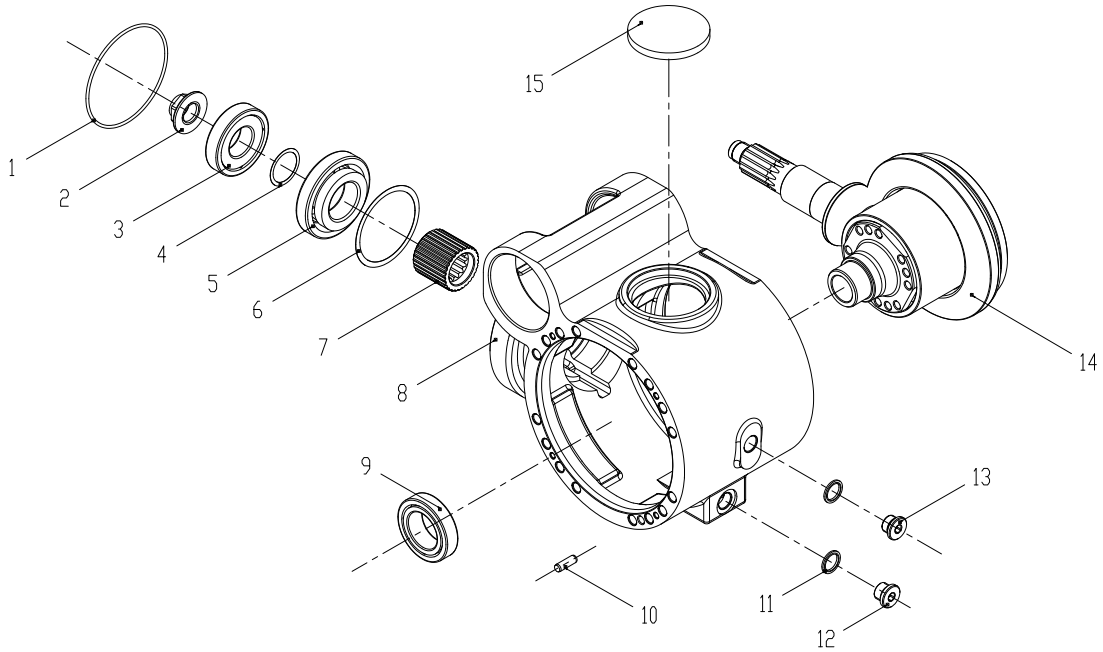


23）Remove the O-ring (1), locking nut (2), and input flange (7) in sequence;

24) Disassemble the bearing (3), washer (4), bearing (5), and washer (6);

25) Remove the differential assembly (14) and disassemble the bearing (9);

26) Remove the pin (1), cover plate (15), screw plug (12), screw plug (13), and washer (11) in sequence;

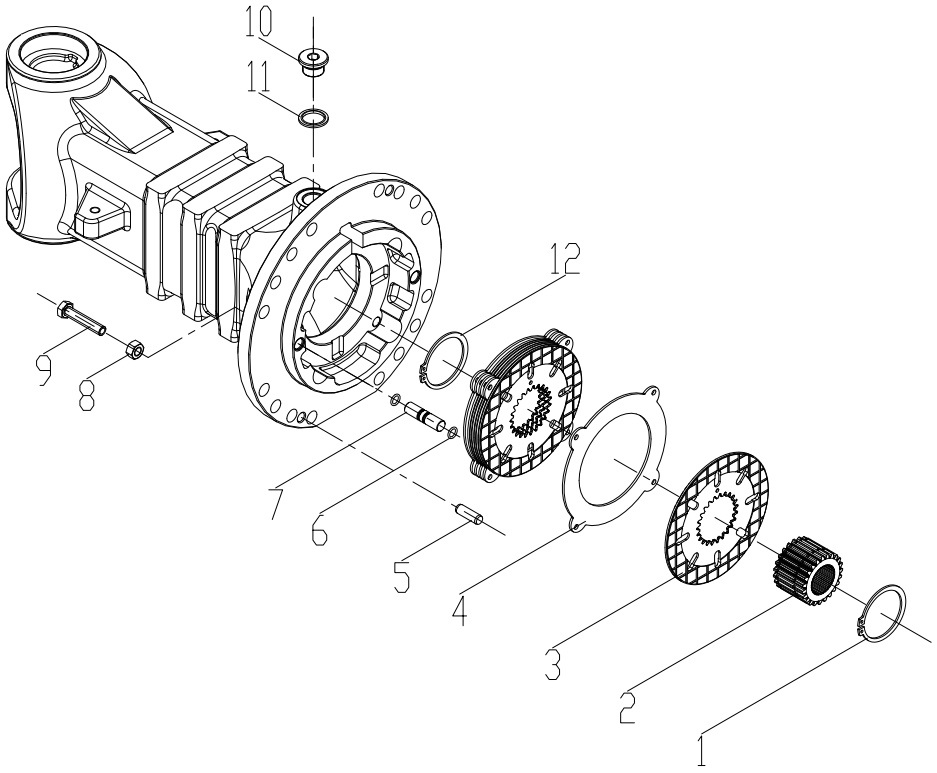


3.3.1.Dismantling of bridge shell components

1) Remove the retaining ring (1), retaining ring (12), spline (2), friction plate assembly (3), and brake pad (4) in sequence;

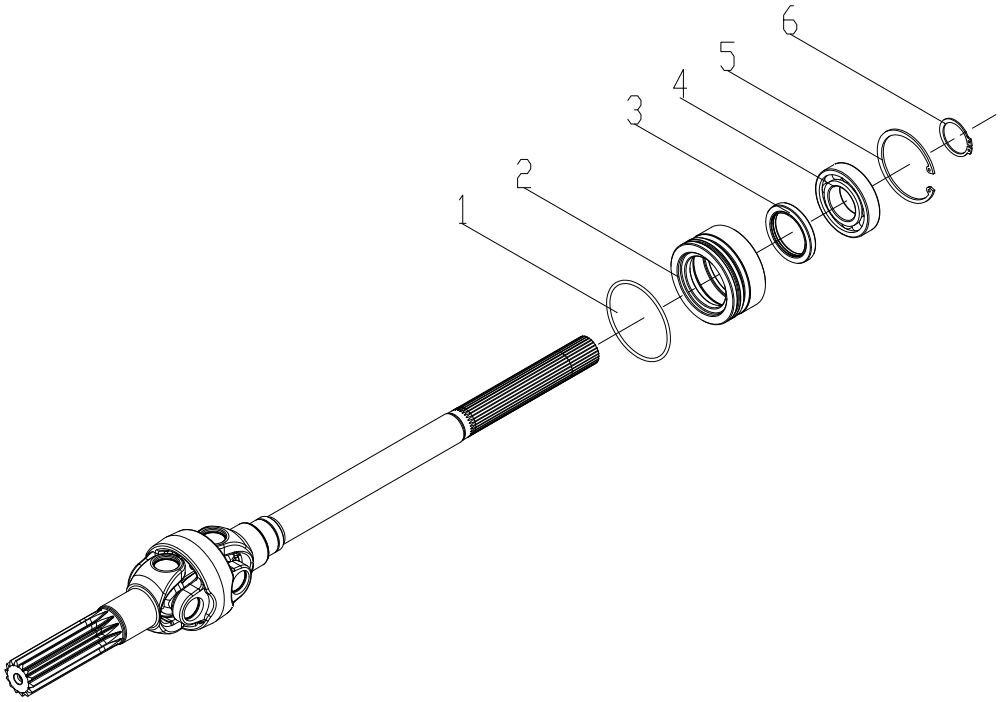
2) Remove the bolt (9) and nut (8), take down the top pillar (7) and O-ring seal (6);

3) Disassemble the pin (5), plug (10), and washer (11);



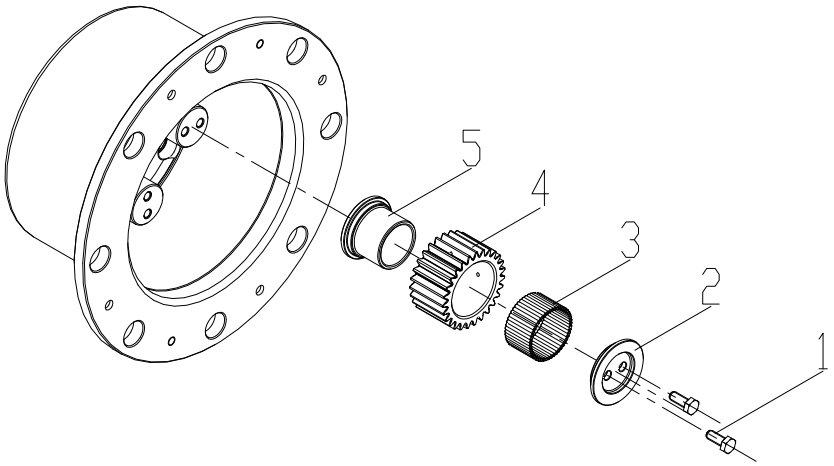
3.3.2.Disassembly of transmission shaft components

1) Remove the retaining ring (6), retaining ring (5), bearing (4), sealing ring (3), bearing seat (2), and O-ring (1) in sequence;



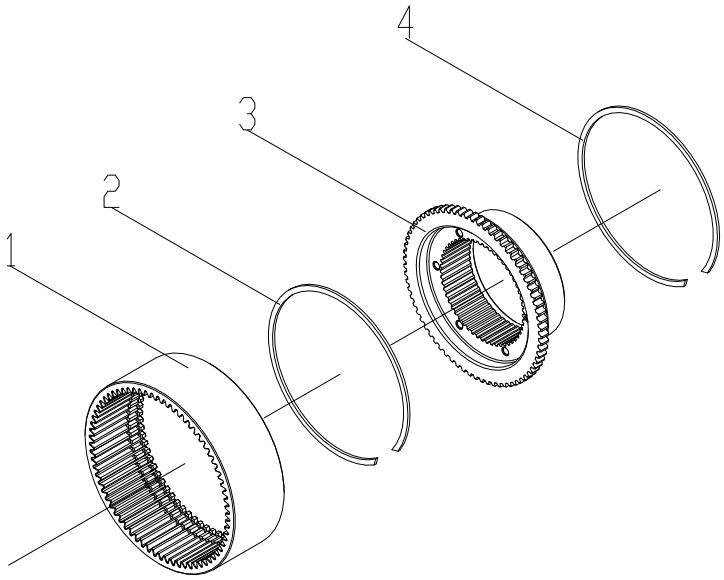
3.3.3.Disassembly of Wheel Side Planetary Carrier Components

1) Remove the bolt (1), planetary gear retaining ring (2), needle roller (3), planetary gear (4), and planetary gear axle sleeve (5) in sequence;



3.3.4.Disassembly of ring gear support components

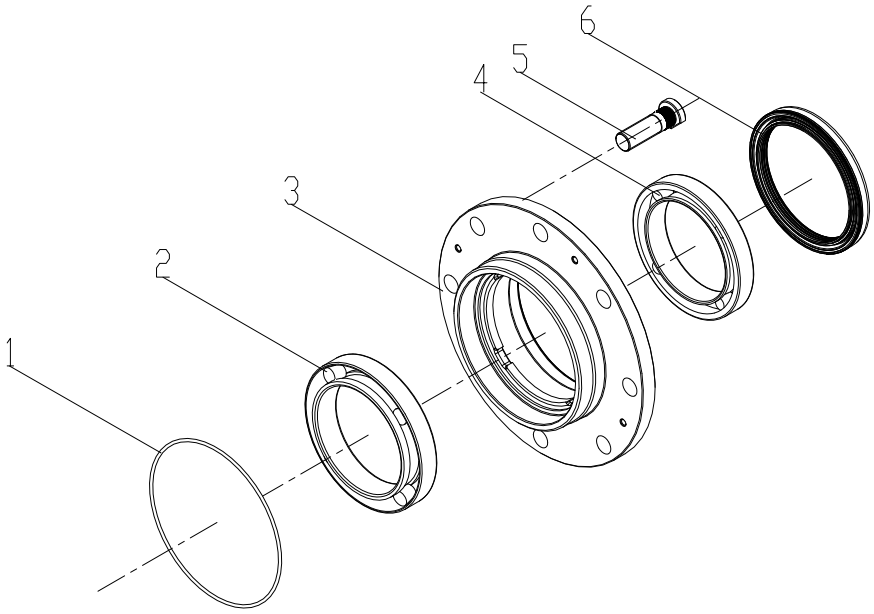
1) Disassemble the retaining ring (2), retaining ring (4), ring gear (1), and ring gear support (3) in sequence;



3.3.5.Disassembly of wheel hub components

1) Remove and dismantle the wheel hub bolt (5), O-ring seal (1), and oil seal (6);

2) Disassemble bearings (2), bearings (4), and hub (3);

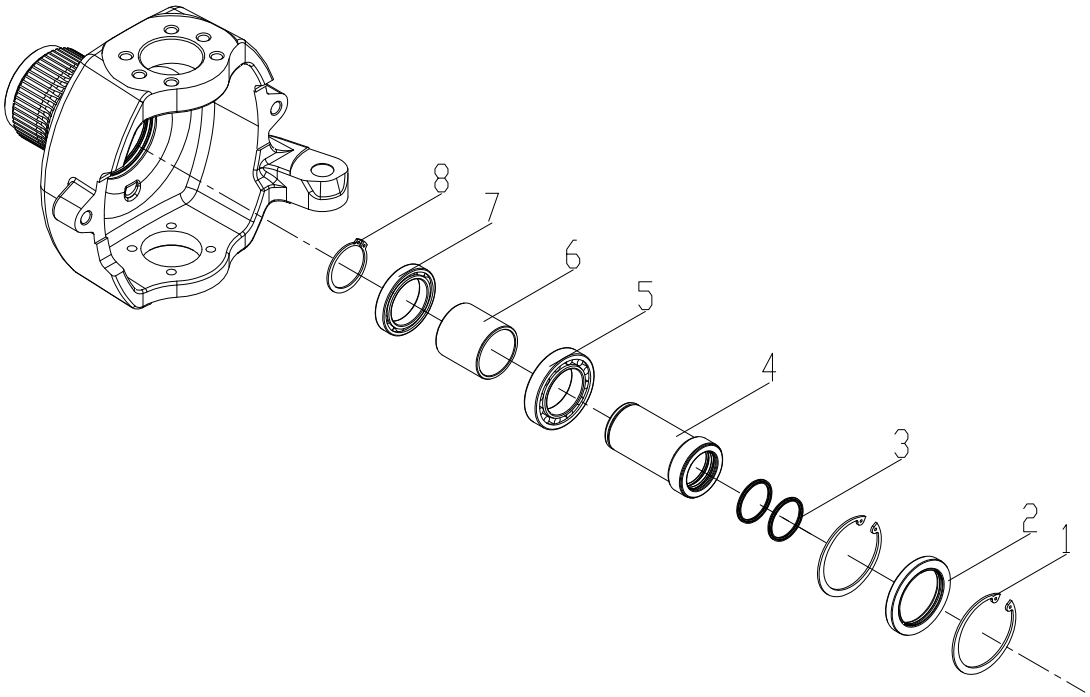


3.3.6.Disassembly of steering knuckle components

1) Disassemble the oil seal (2), retaining ring (1), and remove the spline sleeve assembly;

2) Disassemble the retaining ring (1), bearing (3), shaft sleeve (6), and bearing (5).

3) Remove the star shaped sealing ring (3) and spline sleeve (4).



Chapter 4. Control and braking system

The braking system of this vehicle is divided into two parts: service braking and parking braking.

The braking system of this vehicle adopts the dual circuit braking principle, and the braking system provides vehicle braking through structures such as gear pump, brake charging valve, brake valve, and backup accumulator. The front and rear axles have independent driving brakes, and even if there is a problem with the front axle brakes, the rear axle can still brake the vehicle. Very safe and reliable.

The parking brake of this vehicle defaults to parking when the brake charging valve is not working, and defaults to braking when it is not working to prevent safety accidents caused by operational negligence and improve safety. In addition, if the service brake loses control, the emergency parking brake can be used to ensure personnel safety.

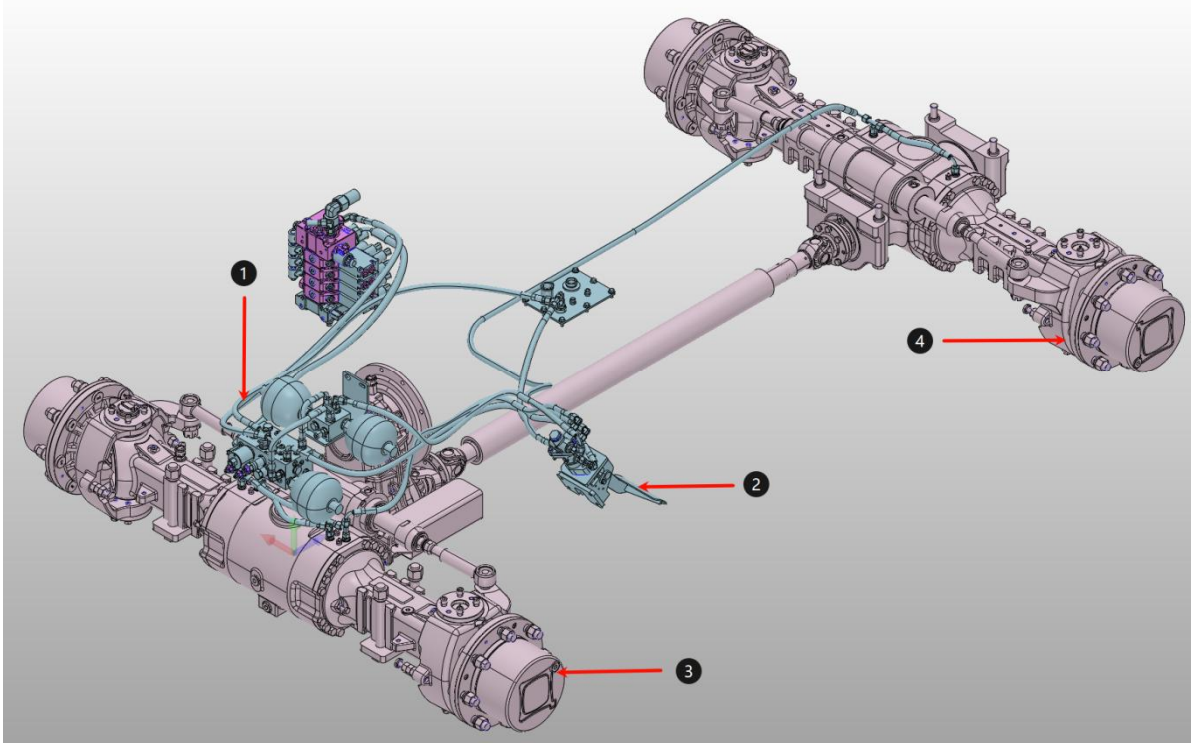


Figure 4-1 Braking System

1-Brake oil circuit 2-Brake pedal assembly 3-Front axle assembly 4-Rear axle assembly

Data:

Brake	Service brake oil pressure (bar)	40
	Driving brake torque (KNm)	3.7
	Service brake fluid volume (mL)	2.7
	Brake clearance self-adjusting mechanism	Available

4.1.Brake pedal assembly

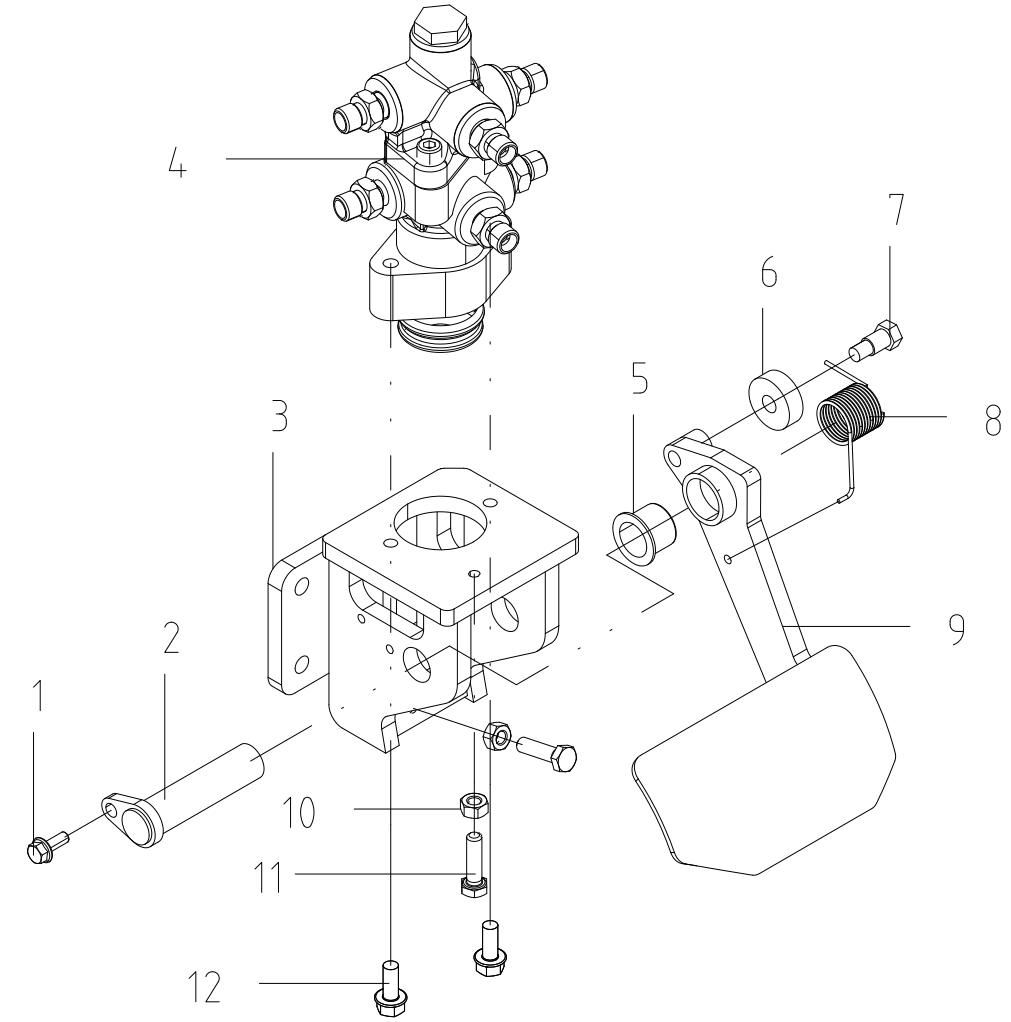


Figure 4-2 Brake Pedal Assembly

1-Bolt M6X20	2-Pin shaft	3-Bracket Assembly	4-Dual circuit brake valve
5-Cover	6-Roller	7-Positional screw	8-Torsional spring
9-Brake pedal	10-Nut M6	11-Bolt M6X30	12-Bolt M8X25

4.1.1.Brake pedal adjustment

1） Adjust the brake pedal limit bolt (10) so that the roller (6) can effectively trigger the dual circuit brake valve (4) when the pedal is pressed, and tighten the bolt nut (11).

2) Adjust the torsion spring (8) so that the torsion spring hook on one side of the pedal is located at 2 hole positions, and the torsion spring hook on one side of the bracket is located at one of the three hole positions at position 1. The three holes at position 1, from top to bottom, will cause the torsion of the torsion spring to increase sequentially. Please choose the position at position 1 that allows the brake pedal to fully rebound when pressed.

3) When the brake pedal is gradually depressed by 10mm to 20mm, the brake light switch should be fully turned on, and when the foot is released to this state, the brake light switch should be disconnected without exception.

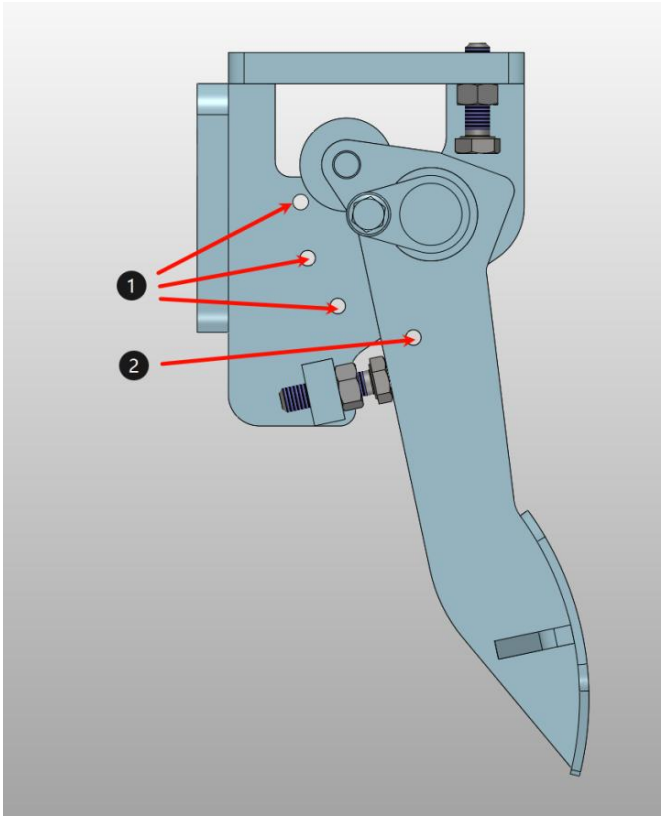


Figure 4-3 Brake pedal adjustment

Adjustment requirements for brake pedal and brake master cylinder:

1) When replacing vulnerable parts, they should be replaced according to the actual vulnerable parts. During the replacement process, if there are damaged fasteners (retaining rings, bolts), they must be replaced and ensured to be installed in place, firmly and reliably, without damaging other components;

2) The relative sliding parts of the brake master cylinder (such as the brake master cylinder push rod) should be maintained with lubricating grease. If the brake is not working or weak, check the vulnerable parts of the brake master cylinder and the brake system;

3) After adjusting the brake pedal, operate it to the full stroke without any abnormal noise or interference;

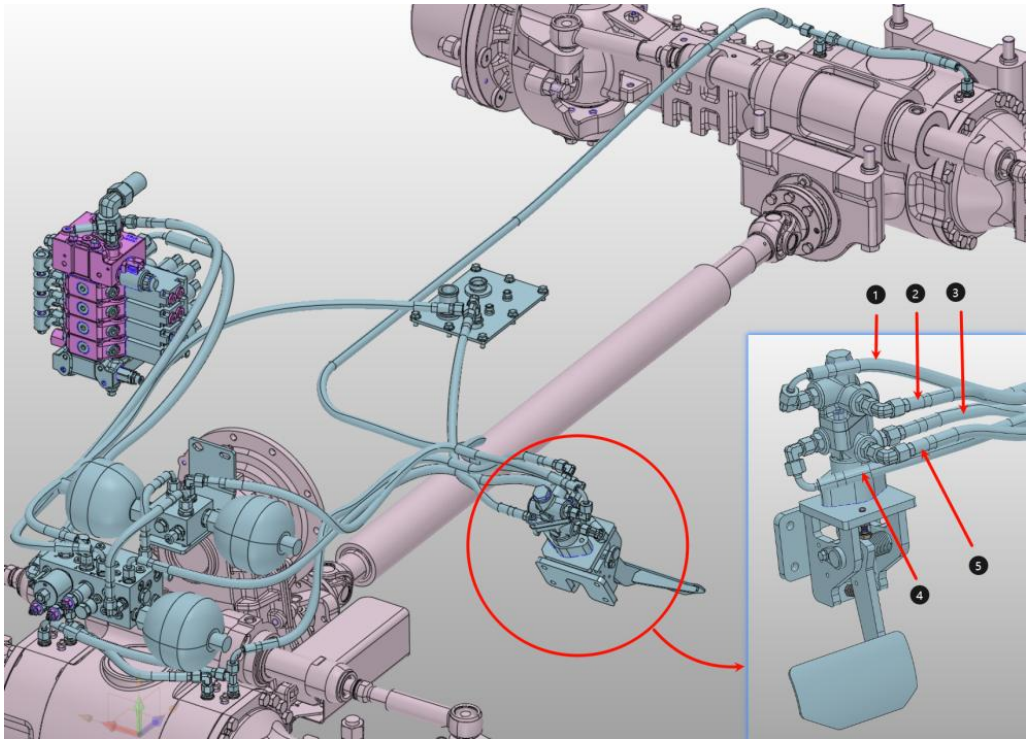
4) The pedal operation is absolutely free of jamming and other phenomena, and the opening pin connecting the brake pedal and the brake master cylinder push rod should be reliably installed;

5) The brake master cylinder cannot be installed without passing the test after replacement

4.2.Brake oil circuit

4.2.1.Brake oil system

The brake oil system is controlled by a dual circuit brake valve to regulate the brake hydraulic oil circuit. Refer to the diagram for details.



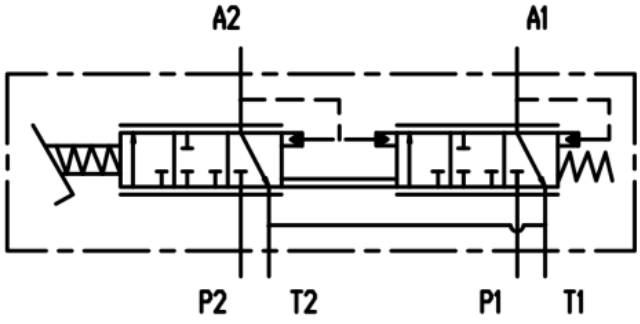


Figure 4-4 Brake control pipeline

1-P1 2-A1 3-T2 4-P2

5-A2

4.3.Dual circuit brake valve

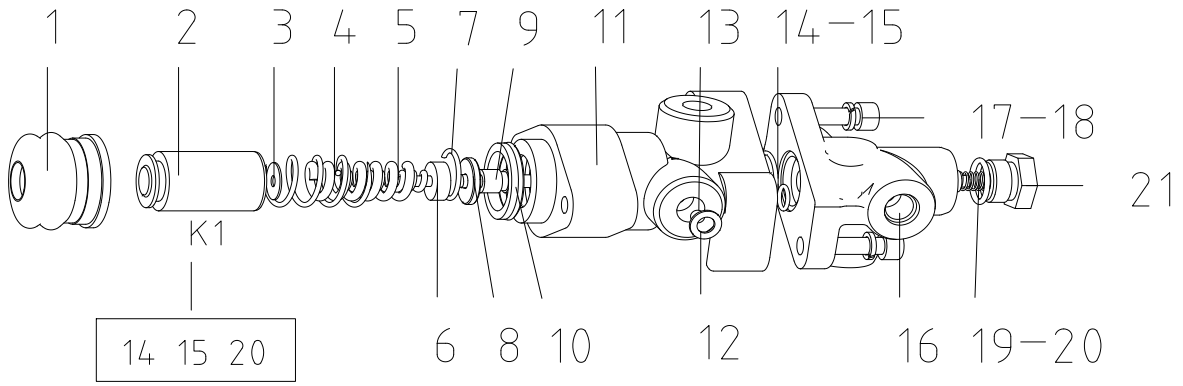


Figure 4-5 Structure diagram of brake valve

1-Dust cover	2-Sleeve	3-Shim	4-Spring
5-Compression spring	6-Compression seat component	7-Roundwire snap rings for hole	8-Backing plate
9-Spool valve	10-C1 type sealing ring	11-Upper Valve Body	12-Steel ball
13-Locking gasket	14-O-ring	15-O-ring	16-Lower Valve Body
17-Hexagonal socket head screw	18-Standard spring washer	19-One-way valve spring	20-O-ring
21-Plug screw			

Test

Clean all components in brake fluid and inspect their condition.

No.	Testing situation	Corrective action
1	There are obvious scratches or wear on the moving surfaces of the oil cylinder and piston	Replace
2	The clearance between the cylinder body and piston exceeds 0.15mm	Replace
3	Auxiliary leather ring and pressure leather ring are weak or damaged	Replace
4	Weak and damaged springs	Replace

Attention!

a. Remove the leather ring and discard it, replace it with a new one.

b. Disassemble the parts in a clean area and arrange them neatly in sequence.

c. Do not use other cleaning agents to clean the parts.

4.3.1.Air evacuation in the braking system

Warning

After installing or repairing brake system components or adding brake fluid, the air in the brake system should be removed. If there is air in the system, the brake will not operate correctly and may cause injury or damage.

① The vehicle is parked at the designated maintenance site, the telehandler is parked on a level road surface, the forks are lowered to the ground, the gear switch is placed in neutral, and the vehicle power is turned off.

② Remove the rubber dust cap from the oil drain port, and install the prepared transparent hose on both ends of the oil drain port and the waste oil collection bottle. Then use a wrench to loosen the oil drain screw counterclockwise, while the other person in the car repeatedly steps on the brake pedal. At this point, brake fluid will spray out from the drain port. Pay attention to the level of brake fluid in the reservoir and add new brake fluid as the level drops. After the oil is clear, tighten the drain screw.

③ The person in the car repeatedly steps on the brake pedal to the highest point and does not loosen their foot. The person in the car loosens the open oil port screw, and after the brake oil is sprayed out, tighten it and notify the person in the car to release it. Repeat the above operation several times until there are no bubbles in the released brake oil. Pay attention to the fluid level in the brake fluid reservoir and add new brake fluid as the fluid level decreases.

4.3.2.Troubleshooting

Problem	Possible cause	Program or action
Low or no brake pressure	The brake drive fluid is leaking.	Repair the brake system
The vehicle will not move	The hydraulic system is damaged.	Repair the hydraulic system.
Brake drag	The piston return spring assembly is damaged.	Repair or replace the piston return spring assembly.
	The piston cannot return to its original position.	Check for any expansion or damage to the piston seal and sealing diaphragm. If necessary, replacement should be carried out.
	Incorrect coolant and/or drive fluid was used.	Check for any expansion or damage to the piston seal and sealing diaphragm. If necessary, replacement should be carried out. Clean the system and use the specified liquid.
Severe changes or performance degradation in braking performance	The pressure is too low to drive the brake.	Check the brake pedal system. Check for leaks in the braking system or brakes and identify the correct cause.
	Friction disc wear or damage.	Check and replace the disk if necessary.
	Sealing and/or disk overheating.	Check and replace the disc and seal if necessary.
	The coolant becomes dirty or contaminated.	Release and flush the hydraulic oil.Replace with qualified liquid. (In some cases, it may be necessary to replace the friction disc) and then replace the filter.

Brake drive fluid leakage	The piston seal is worn or damaged.	Replace the piston seal.
	The piston seal melts or is compressed.	Eliminate the cause of overheating and replace the seal.
	The holes of the piston and/or brake housing have corrosion, dents, wear or other damage, marks, scratches in the sealing or sealing lip area.	Clean, polish, process or replace the affected parts.
	The air release screw is loose.	Tighten the air release screw to 20Nm-27Nm.
	Loose imported accessories or end plugs.	Tighten the imported accessories to 34Nm-47Nm.
	Imported accessories, end plugs, or bases are damaged.	Replace imported accessories or end plugs and O-rings (if used). Repair, level or replace the surface.
Coolant leaks out of the brake housing	Damaged, worn or improperly installed surface seal.	Reinstall and/or replace the face seal.
	Oil drain plug, oil injection plug, or forced cooling end plug becomes loose.	Tighten the end plug.
	End plug damaged.	Replace the end plug.
	The sealant at the joint has deteriorated or the amount used is insufficient.	Disassemble, clean, reseal, and reassemble the joint.
The bridge housing is filled with oil, and only forced cooling can work. The oil may leak out of the ventilation device	The seal between the core shaft and the wheel hub is worn or damaged.	Replace the seal between the core shaft and the wheel hub. Check the seal and shaft neck.
	The brush bristles are blocked in the lubricating grease under the lip seal between the wheel hub and the core shaft.	Never use a brush to apply lubricating grease on the sealing surface.

Chapter 5. Vehicle body system

T25-60XHYG model：

The T25-60XHYG body system is mainly composed of frame, cover plate, hood and other covering parts, right box body, bracket, etc. Its main function is to provide a solid support carrier for forklift trucks and protect the personal safety of drivers.

The body system adopts rigid suspension to ensure stability; The hydraulic oil tank is located at the center of the frame and is safe and reliable; The hood has a large opening angle and comes with a self-locking gas spring for easy maintenance and upkeep; The body parts are covered with cover plates to prevent rain and dust from invading.

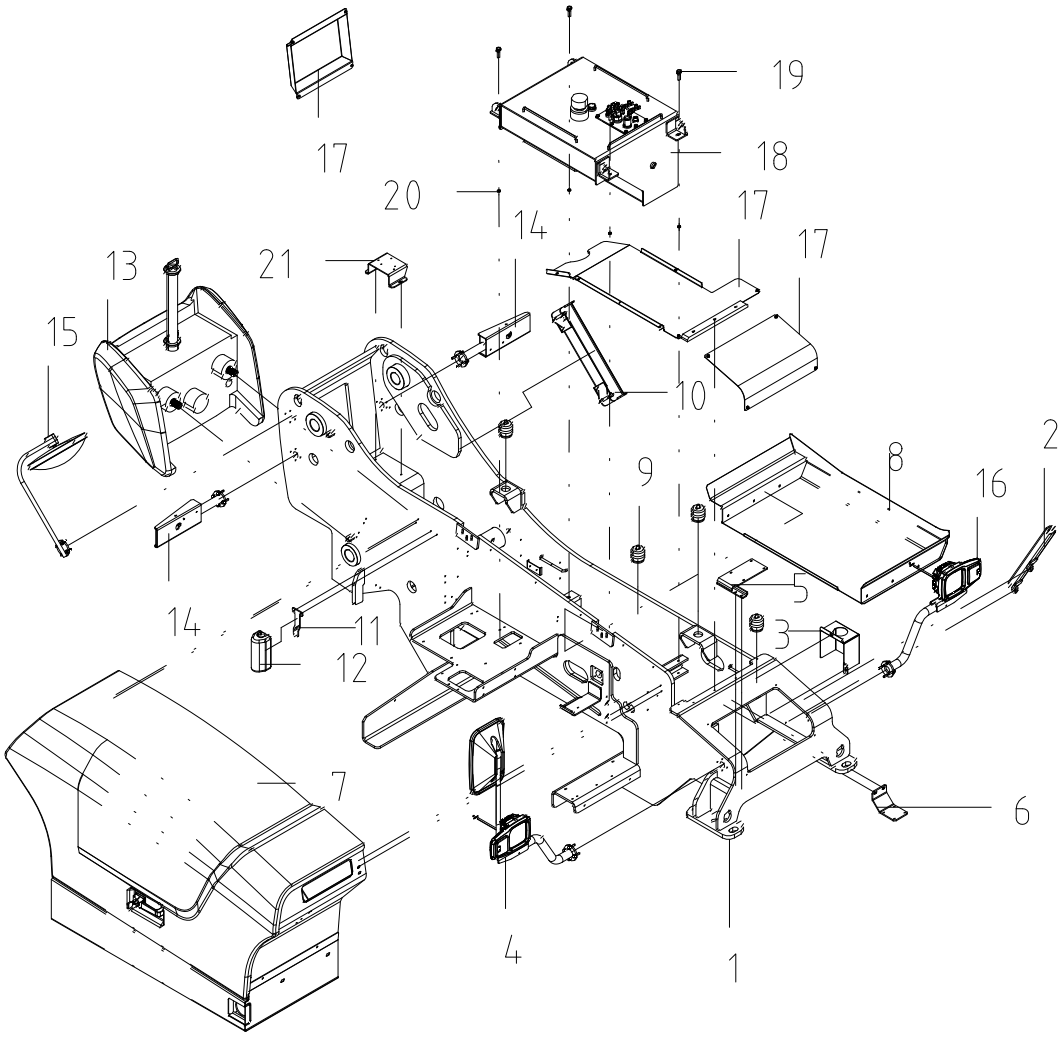


Figure 5-1 Vehicle body system（T25-60XHYG）

1-Frame	2-Pin axis fixing bracket	3-Kettle bracket	4-Right front headlight bracket assembly
5-Brake valve bracket A	6-Brake valve bracket B	7-Right box assembly	8-Lower cab cover assembly
9-Shock pad	10-Repair arm assembly	11-Expansion tank bracket	12-Expansion tank
13-Counterweight assembly	14-Rear light bracket assembly	15-Reflective mirror bracket assembly	16-Left front headlight bracket assembly
17-Cover assembly	18-Hydraulic oil tank assembly	19-Bolt M10 × 30	20-Nut M10
21-Tilt angle bracket			

T35-100XHYG model：

The T35-100XHYG body system mainly consists of frame, cover plate, hood and other covering parts, right box body, bracket, etc. Its main function is to provide a solid support carrier for forklift trucks and protect the personal safety of drivers.

The body system adopts a floating suspension, with a body leveling range of ± 9 °; The hydraulic oil tank is located at the center of the frame and is safe and reliable; The hood has a large opening angle and comes with a self-locking gas spring for easy maintenance and upkeep; The body parts are covered with cover plates to prevent rain and dust from invading.

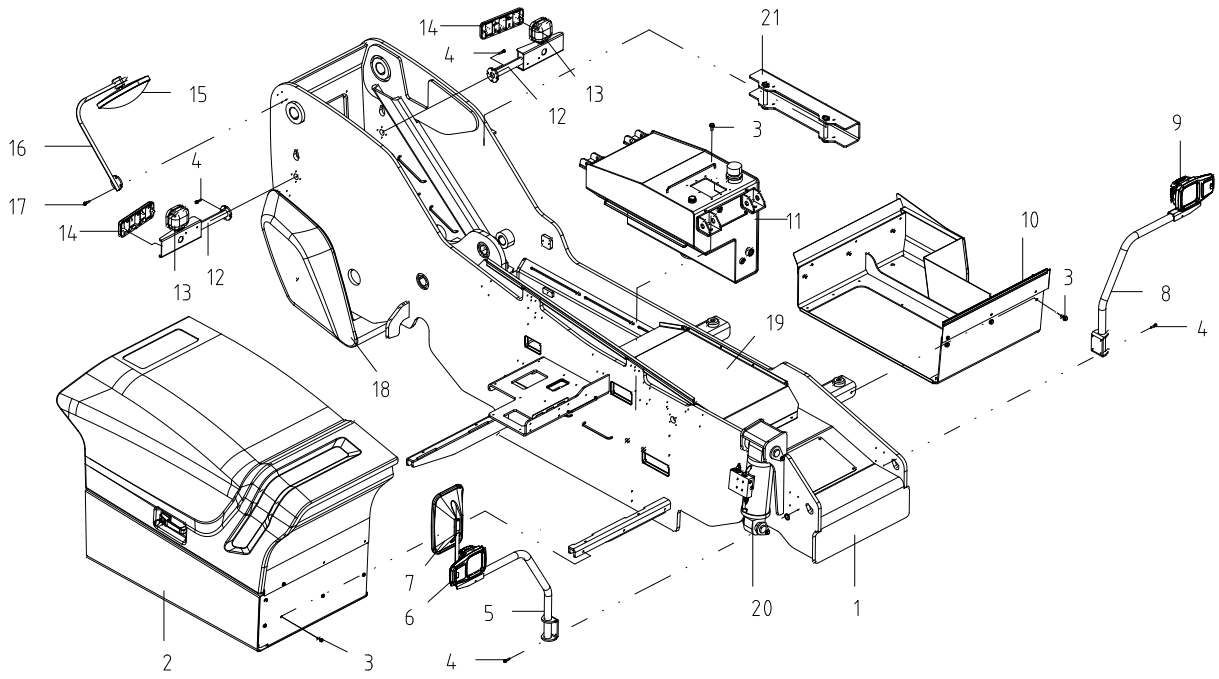


Figure 5-1 Vehicle body system（T35-100XHYG）

1-Frame components	2-Right box assembly	3-Bolt M12 × 25	4-Bolt M8 × 30
5-Right front headlight bracket	6-Right front headlight	7-Rearview mirror	8-Left front headlight bracket
9-Left headlight	10-Left box assembly	11-Hydraulic oil tank assembly	12-Rear light bracket
13-LED rear work light	14-Rear combination lamp	15-Rearview mirror	16-Reflective mirror bracket
17-Bolt M8 × 30	18-Balance weight assembly	19-Cover assembly	20-Vehicle body leveling component
21-Support plate component			

5.1.Cover assembly

T25-60XHYG model：

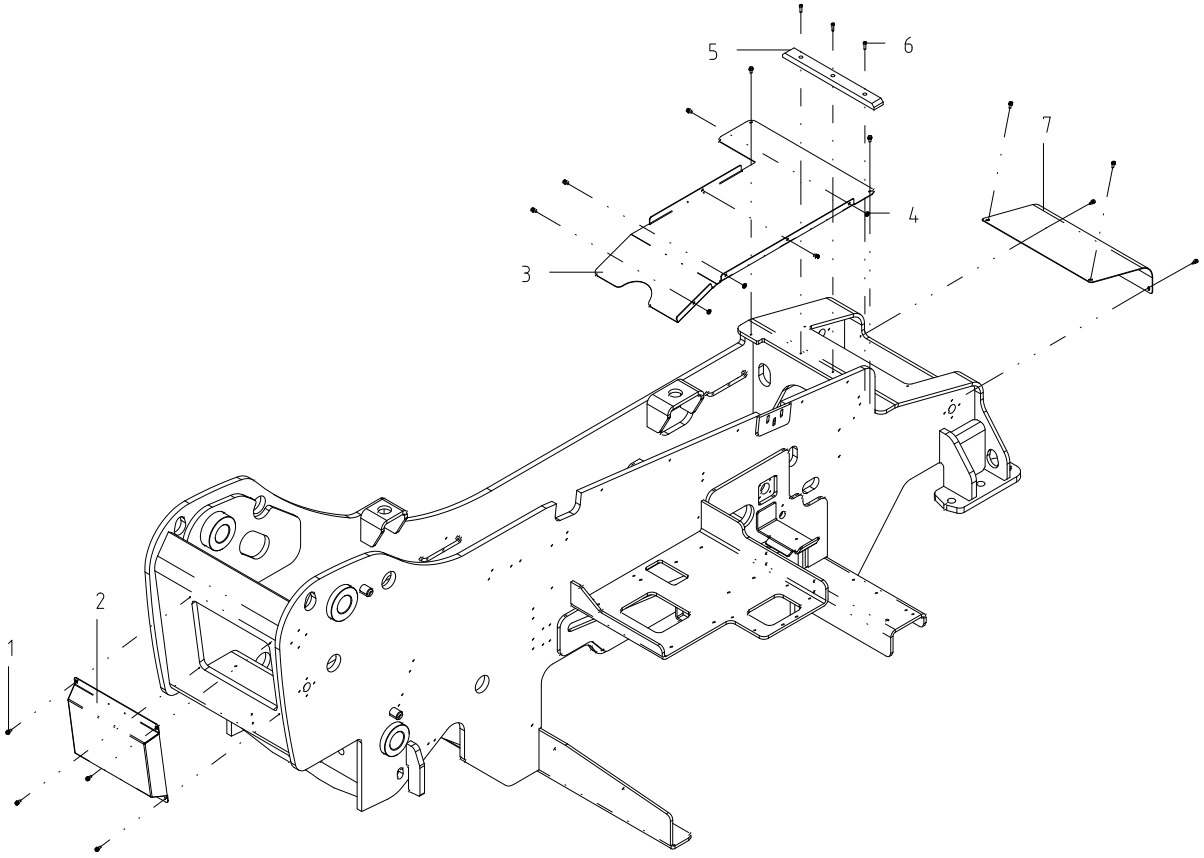


Figure 5.1-1 Cover Assembly（T25-60XHYG）

1-Flange bolt M6 × 20	2-Rear cover	3-Middle cover plate	4-Nut M6
5-Protective block	6-Screw M6 × 20	7-Front cover plate	

T35-100XHYG model：

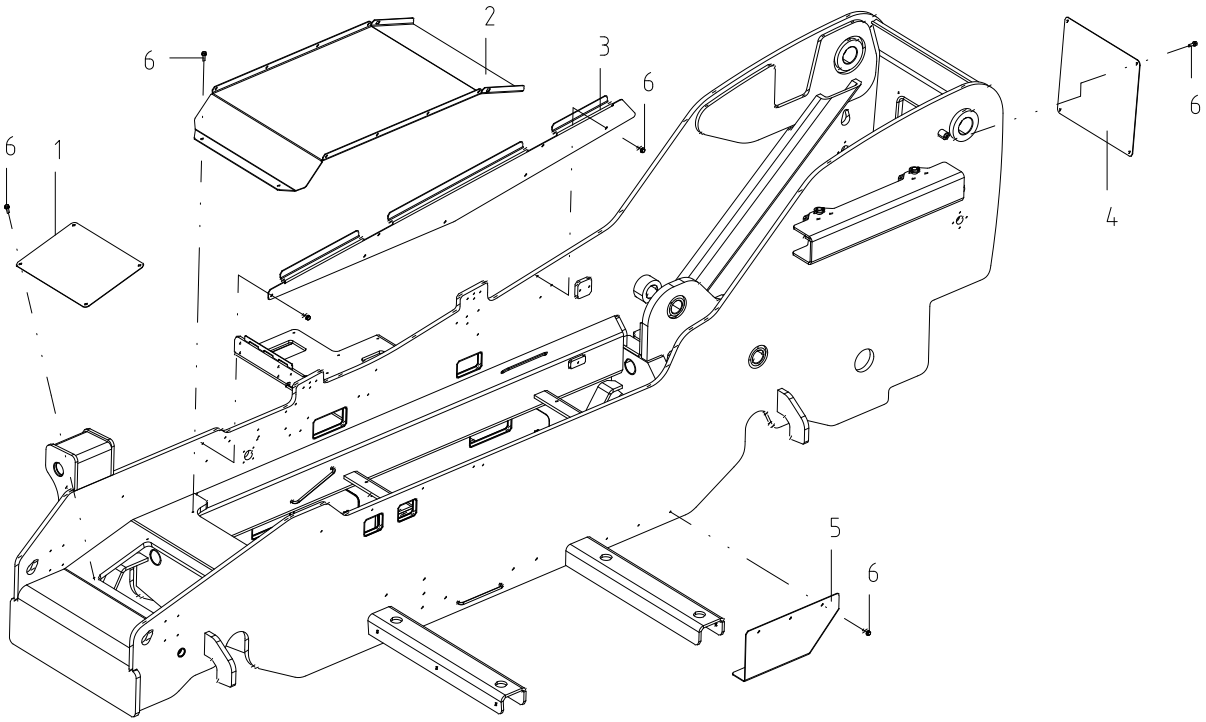


Figure 5.1-2 Cover Assembly（T35-100XHYG）

1-Front cover plate　2-Cover plate　3-Small wall panel　4-Rear cover plate

5-Barrier board　6-Screw

5.2.Right box assembly

T25-60XHYG model：

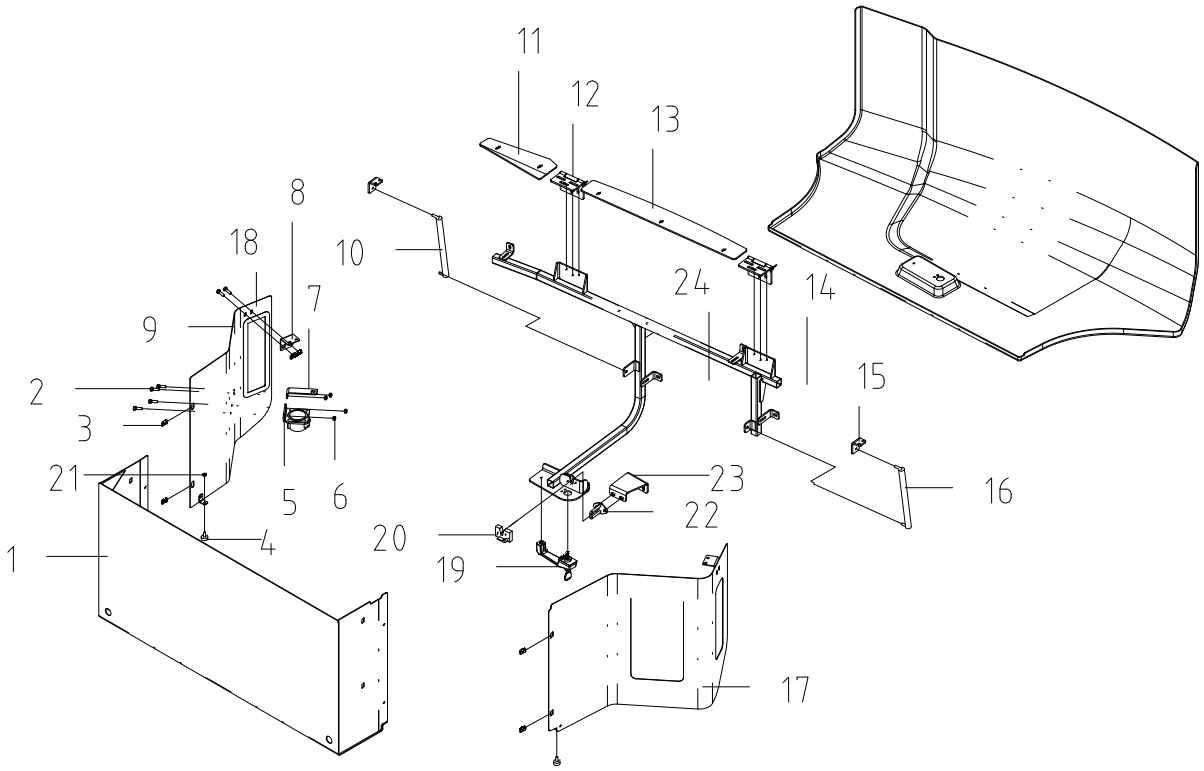


Figure 5.2-1 Switch Cover and Instrument Cover（T25-60XHYG）

1-Lower hood component	2-Flange bolt M6 × 16	3-Leaf spring nut M8	4-Shock absorber block
5-Socket bracket	6-Nut M6	7-Accumulator bracket	8-Side panel fixing bracket
9-Front panel component	10-Gas spring	11-Hood lining plate	12-Hinge
13-Hood lining plate B	14-Upper hood component	15-Gas spring bracket	16-Gas spring
17-Rear panel component	18-Bolt M8 × 20	19-Handle	20-Right lock body
21-Nut M8	22-Retaining ring	23-Lock hook bracket	24-Bolt M8 × 16

T35-100XHYG model：

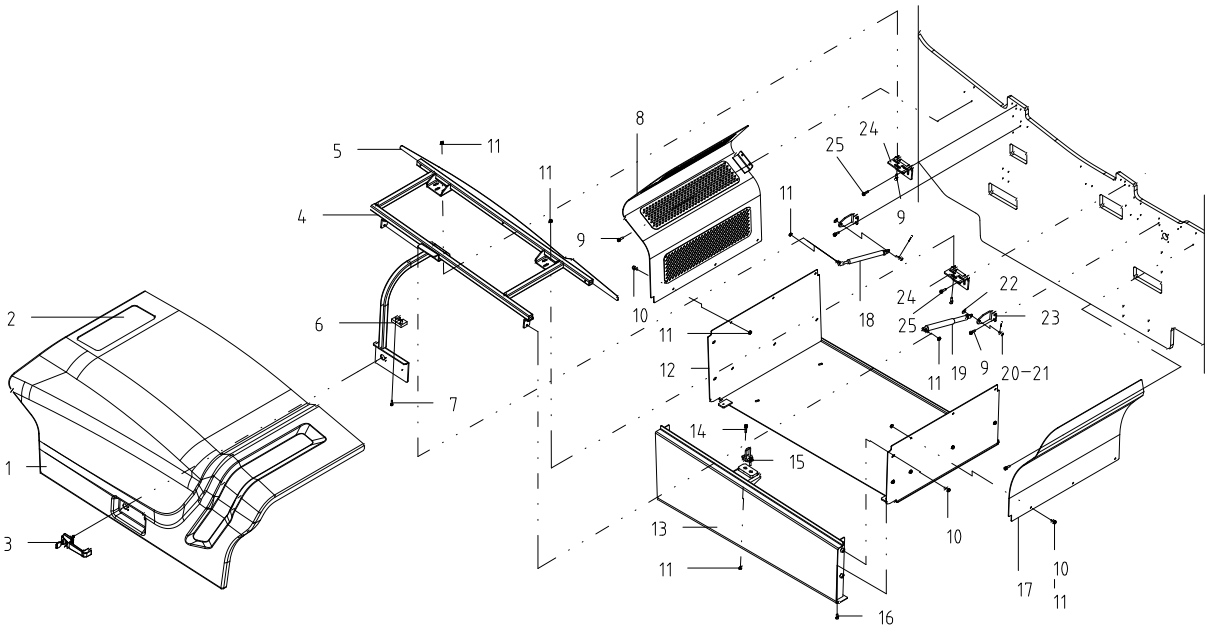


Figure 5.2-2 Switch Cover and Instrument Cover（T35-100XHYG）

1-Hood	2-Ventilation plate	3-Handle	4-Skeleton
5-Sealing plate	6-Right lock body	7-Combination bolt M6 × 25	8-Rear panel component
9-Bolt M8 × 25	10-Bolt M8×20	11-Nut M8	12-Welding components for the bottom plate of the lower hood
13-Welding components for the lower hood side panel	14-Bolt M8×35	15-Latch	16-Bolt M8×16
17-Front panel component	18-Gas spring	19-Gas spring	20-Pin axis B 8 × 22
21-Pin 2×24	22-Gasket 8	23-Gas spring bracket	24-Hinge
25-Combination bolt M8 × 30			

5.3.Lower cab cover assembly（T25-60XHYG）

T25-60XHYG model：

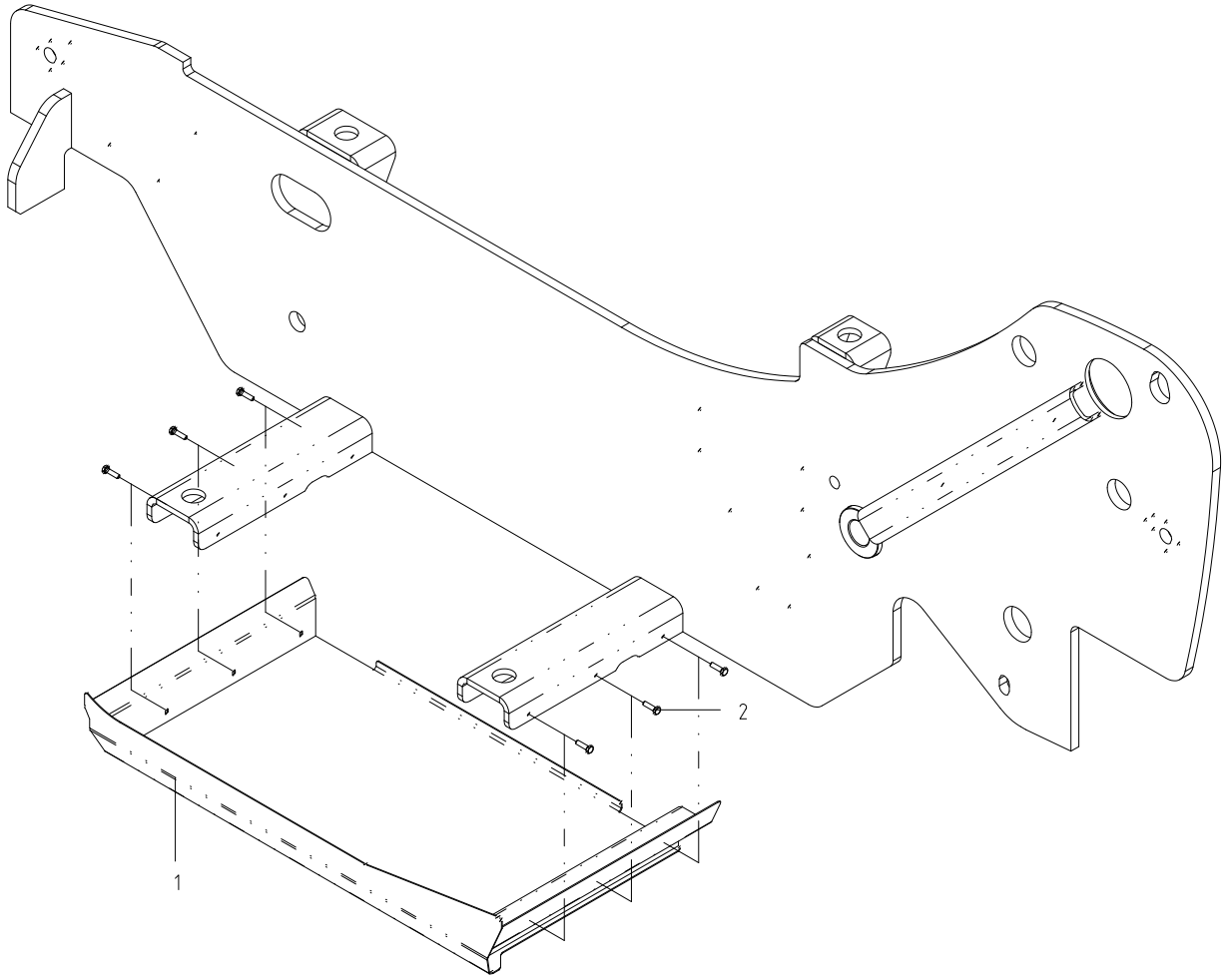


Figure 5.3 Lower cab cover assembly（T25-60XHYG）

1-Welding components for the lower cover of cab　　2-Bolt M8 × 16

5.4.Left cab box assembly（T35-60XHYG）

T35-100XHYG model：

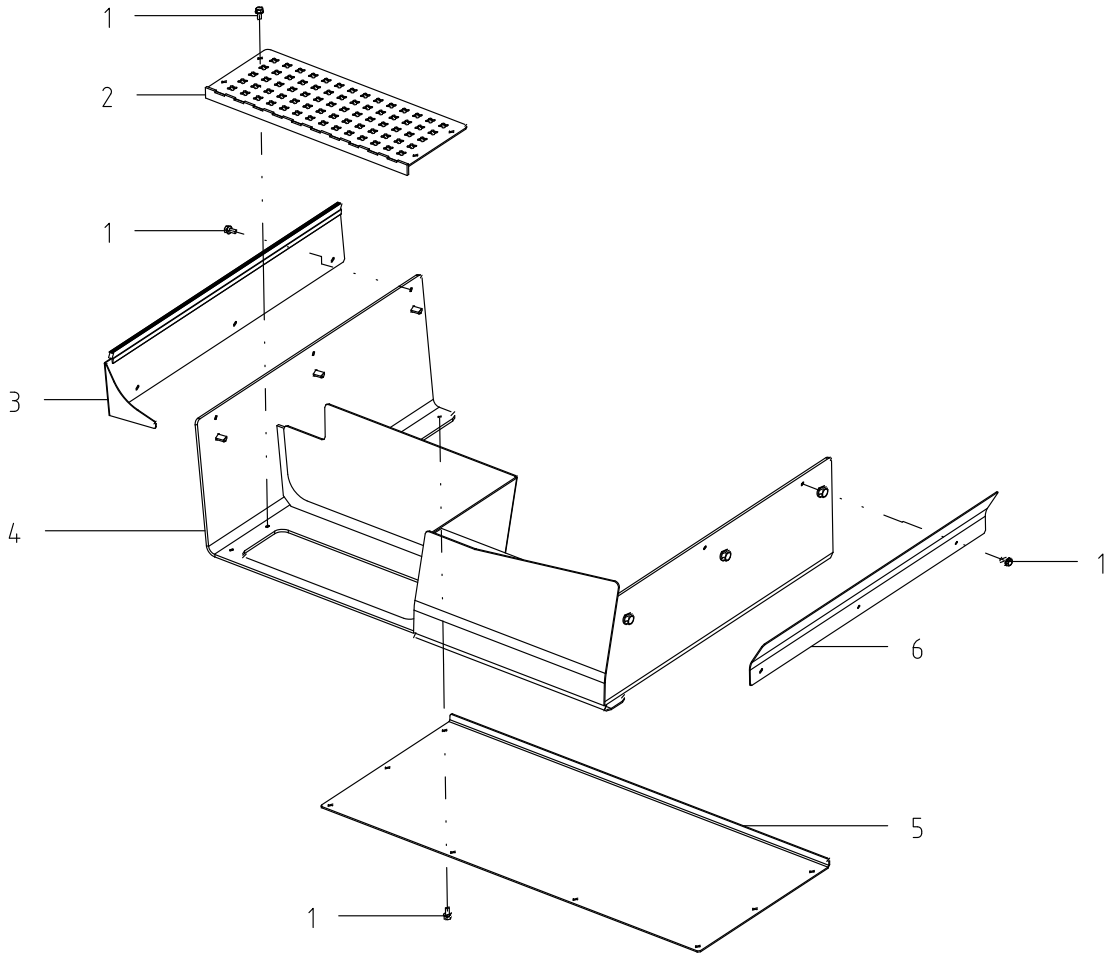


Figure 5.4 Driver's cab lower cover assembly (T35-100XHYG)

1-Bolt M8 × 16　　2-Lower pedal component　　3-Front baffle　　4-Left box component

5-Lower baffle　　6-Rear baffle

5.5.Balance weight assembly

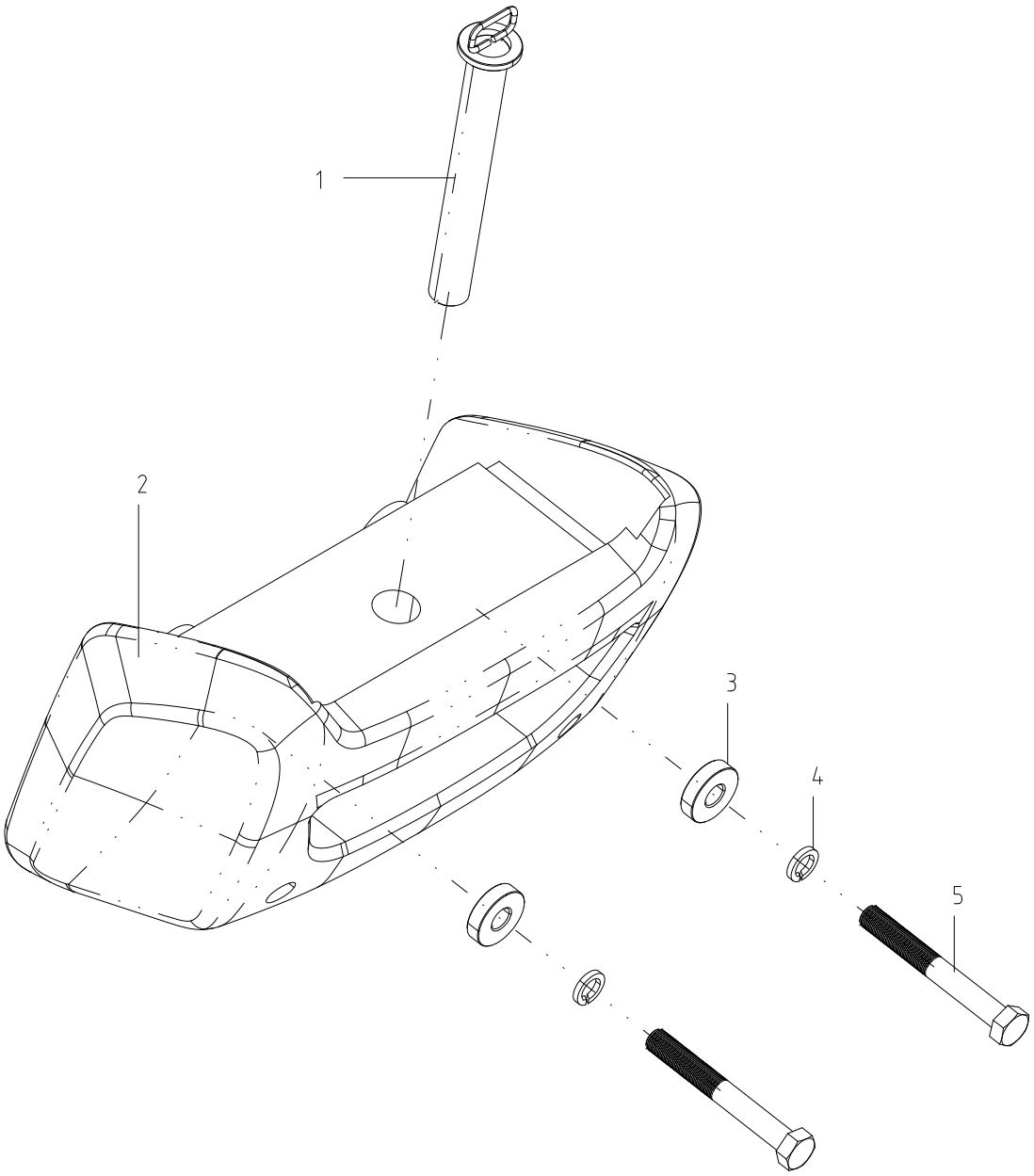


Figure 5.4-1 Counterweight Assembly（T25-60XHYG）

1-Towing pins 2-balance weight 3-Shim 4-Grommet30

5-BoltM30×216

T35-100XHYG model：

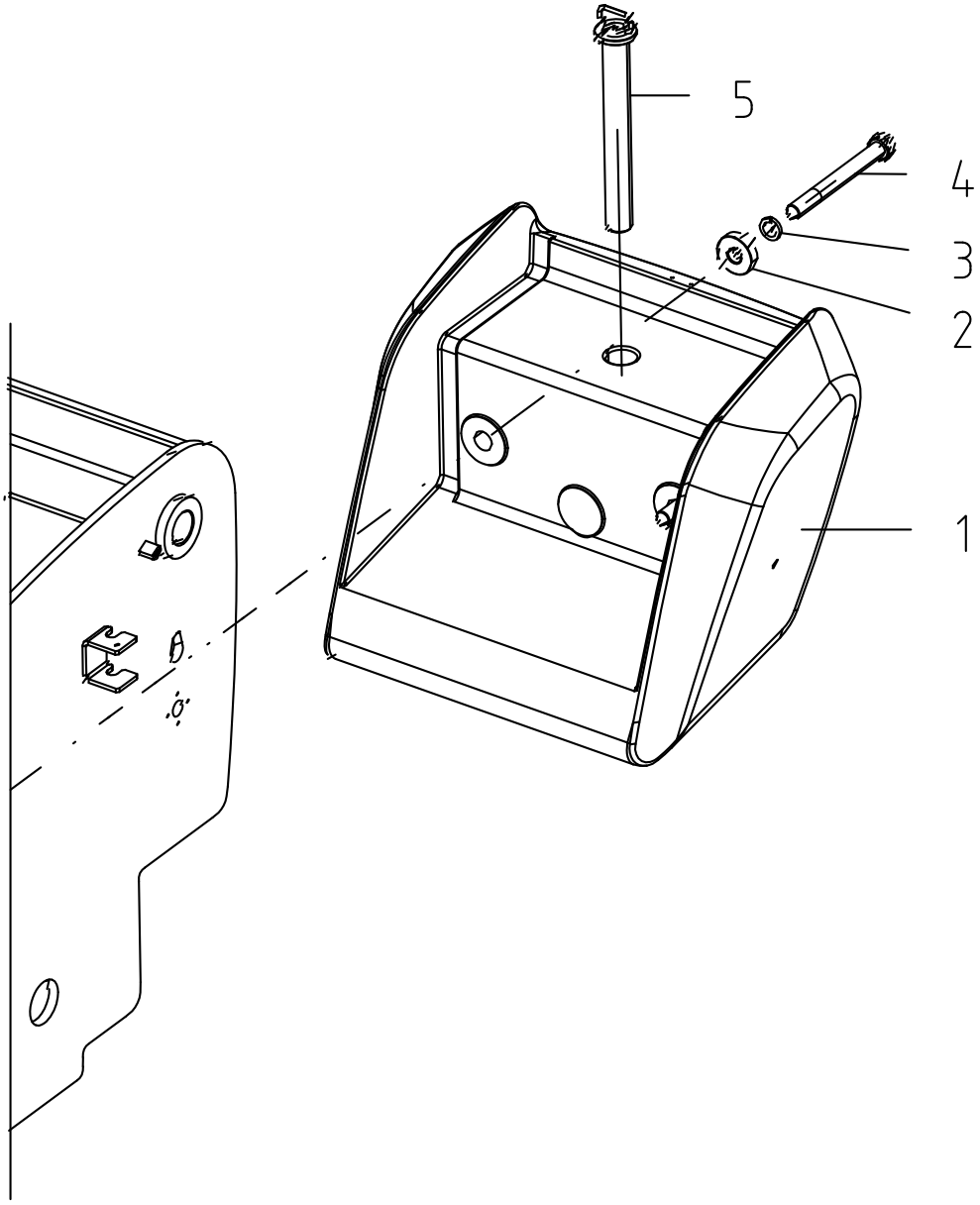


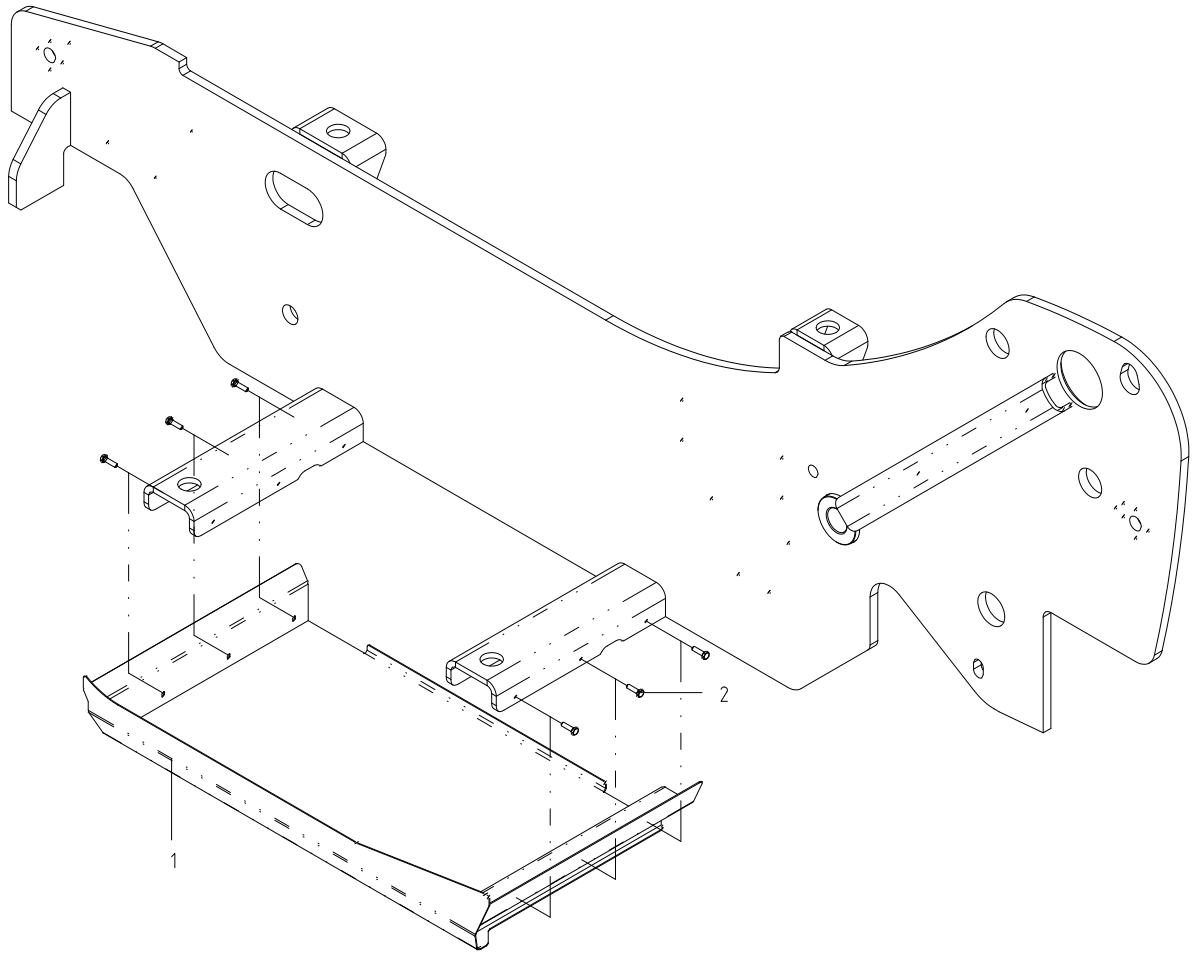
Figure 5.4-2 Counterweight Assembly（T35-100XHYG）

1-Balance weight 2-Shim 3-Grommet 30 4-Bolt M30×275

5-Traction pin

5.6.Dismantling and installation of the cab

5.6.1.Remove the cab lower cover assembly（T25-60XHYG）

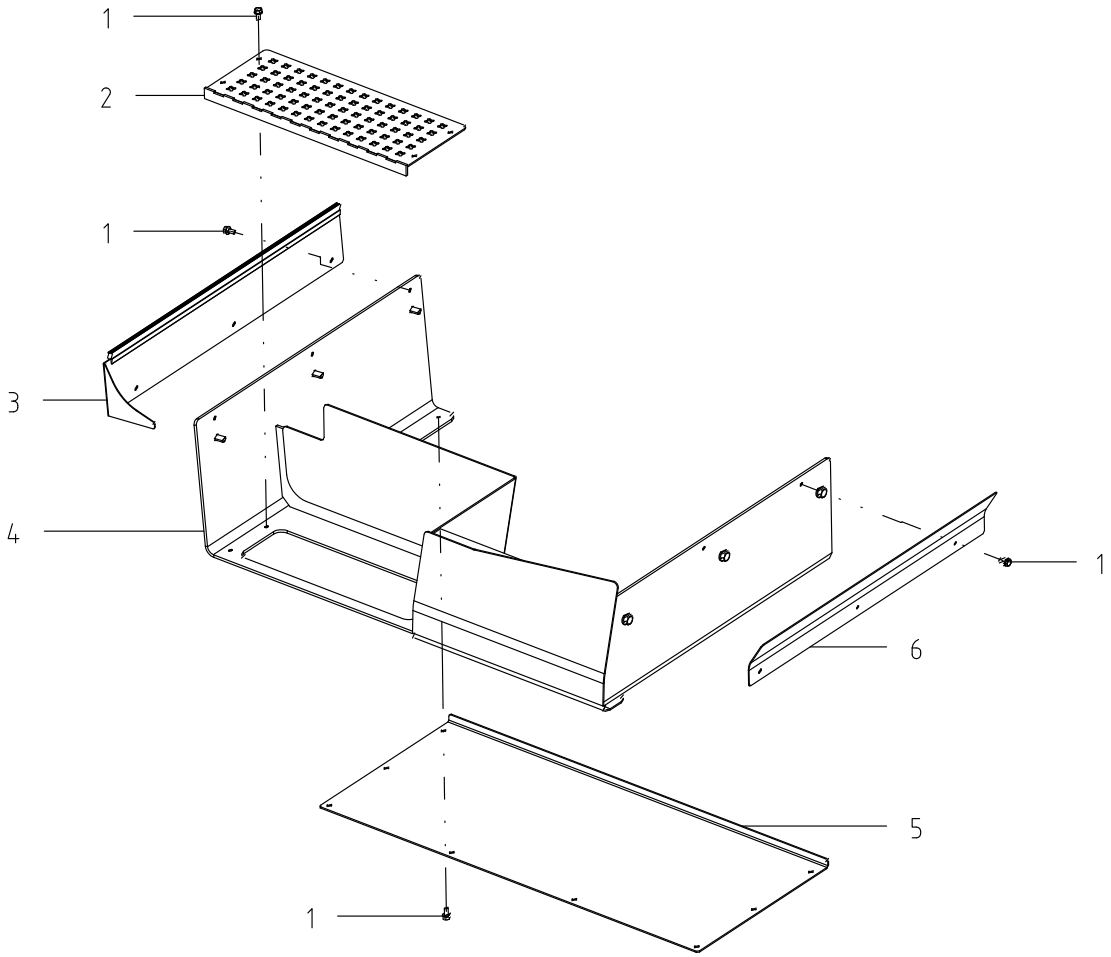


1) Remove 6 sets of M8 × 16 bolts (2) from the frame;

2) Remove the welding piece (1) of the lower cover plate of the driver's cab from the frame;

3) Disconnect the electrical cables and pipelines between the cab and the frame.

5.6.2.Remove the left cab body assembly (T35-100XHYG)



1) Remove 6 sets of M8 × 16 bolts (1) from the left box body;

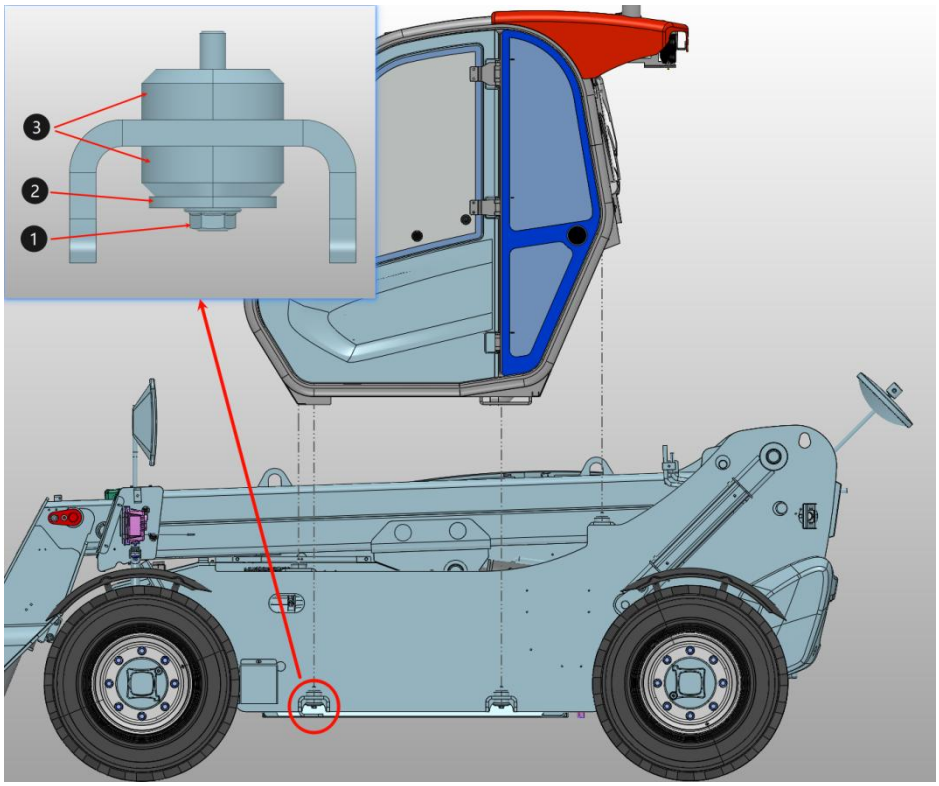
2) Detach the front baffle (3) and rear baffle (6) from the left box body (4);

3) Remove 6 sets of M12 × 25 bolts from the frame;

4) Detach the left box body (4) from the frame;

5) Disconnect the electrical cables and pipelines between the cab and the frame.

5.6.3.Remove the cab:



1) Ensure that the cable connection between the cab and the frame is disconnected, and then remove and disconnect the brake and steering oil pipes after releasing pressure;

2) Remove 4 bolts M14 × 90 (1) and washers (2);

3) Remove the cab from the frame using lifting equipment such as a crane;

4) The installation sequence is opposite to the disassembly sequence.

Chapter 6.Hydraulic system

6.1.Hydraulic system structure

Warning

a. During the maintenance of the hydraulic system, it may be necessary to disconnect the high-voltage cable on the oil pump motor electronic control two in one, which involves the high-voltage part! Therefore, it is necessary to strictly follow the safety regulations in Chapter 1 for operation!

b. Before carrying out maintenance, unplug the MSD maintenance switch on the lithium battery main box and let it stand for 15-20 minutes to power off the high-voltage system before operation!

The hydraulic system mainly consists of hydraulic oil tank and its accessories, oil pump motor and gear pump, steering gear, multi way valve, multiple functional oil cylinders, hydraulic pipelines, etc., as shown in Figure 6.1.

T25-60XHYG model：

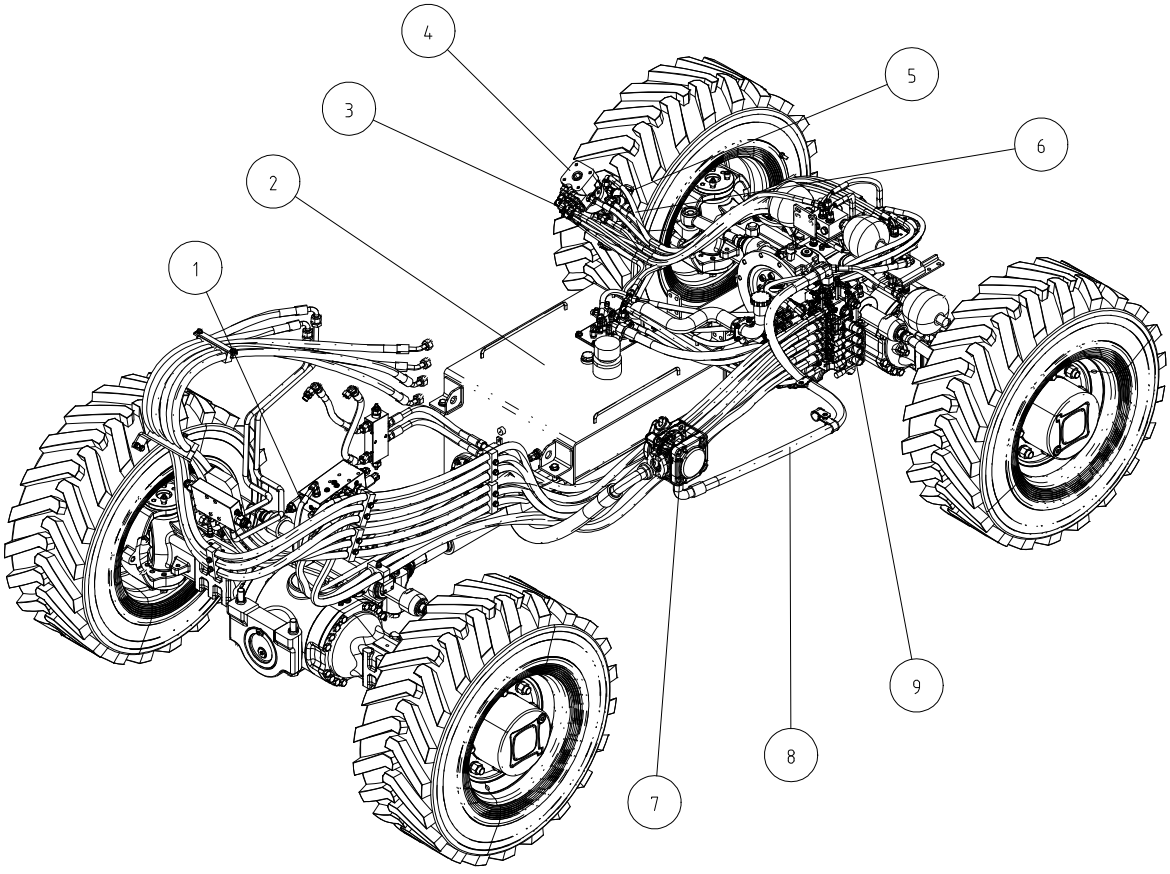


Figure 6.1-1 Hydraulic System (Frame Section)

1-Variable amplitude oil circuit	2-Fuel tank	3-Steering oil circuit	4-Steering valve
5-Brake valve	6-Brake oil circuit	7-Gear pump	8-Power oil circuit
9-Multi-way valve			

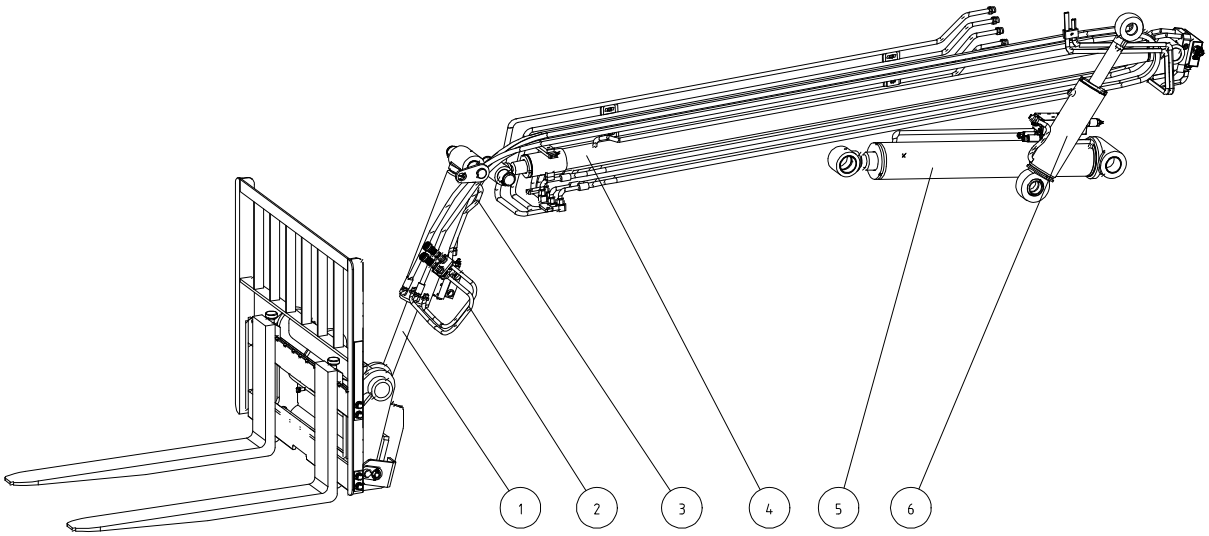


Figure 6.1-2 Hydraulic System (Arm Section)

1-Leveling oil cylinder	2-Accessory oil circuit	3-Leveling the oil circuit	4-Telescopic Cylinder
5-Lifting oil cylinder	6-Compensating cylinder		

T35-100XHYG model：

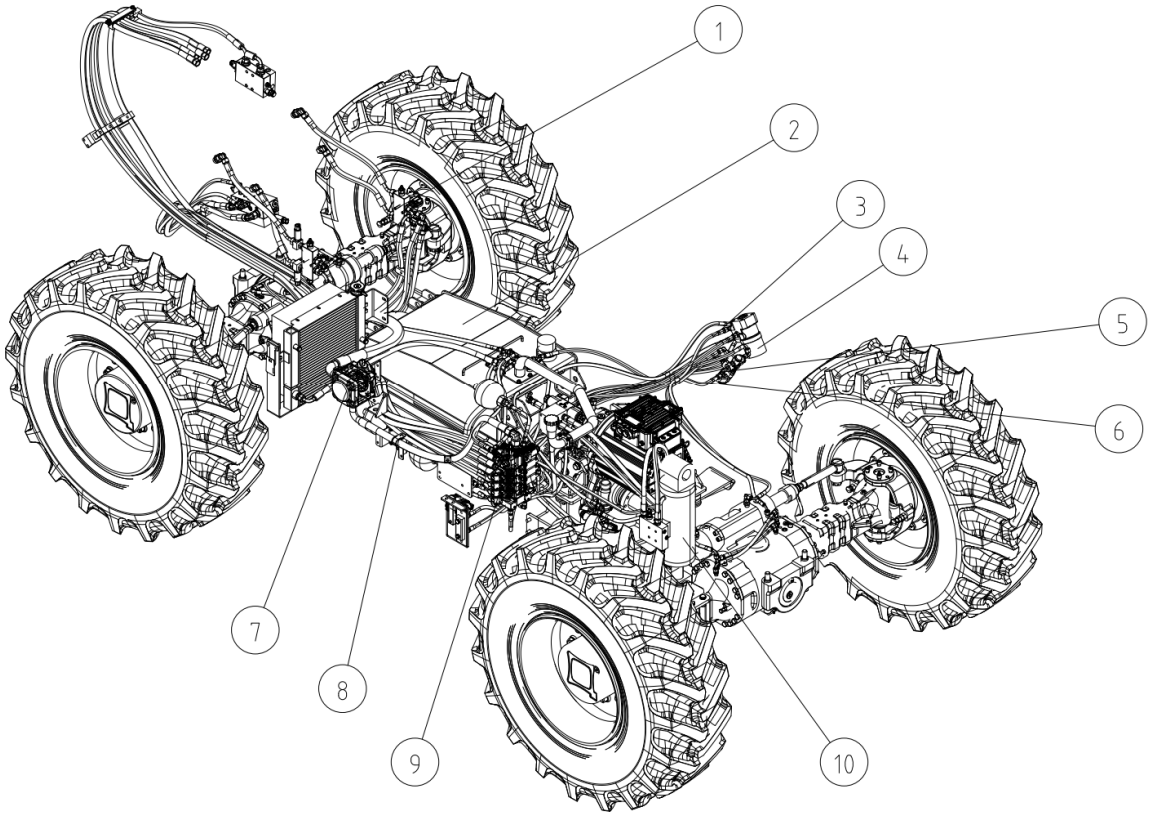


Figure 6.1-3 Hydraulic System (Frame Section)

1-Variable amplitude oil circuit	2-Fuel tank	3-Steering oil circuit	4-Steering valve
5-Brake valve	6-Brake oil circuit	7-Gear pump	8-Power oil circuit
9-Multi-way valve	10-Vehicle body leveling oil circuit		

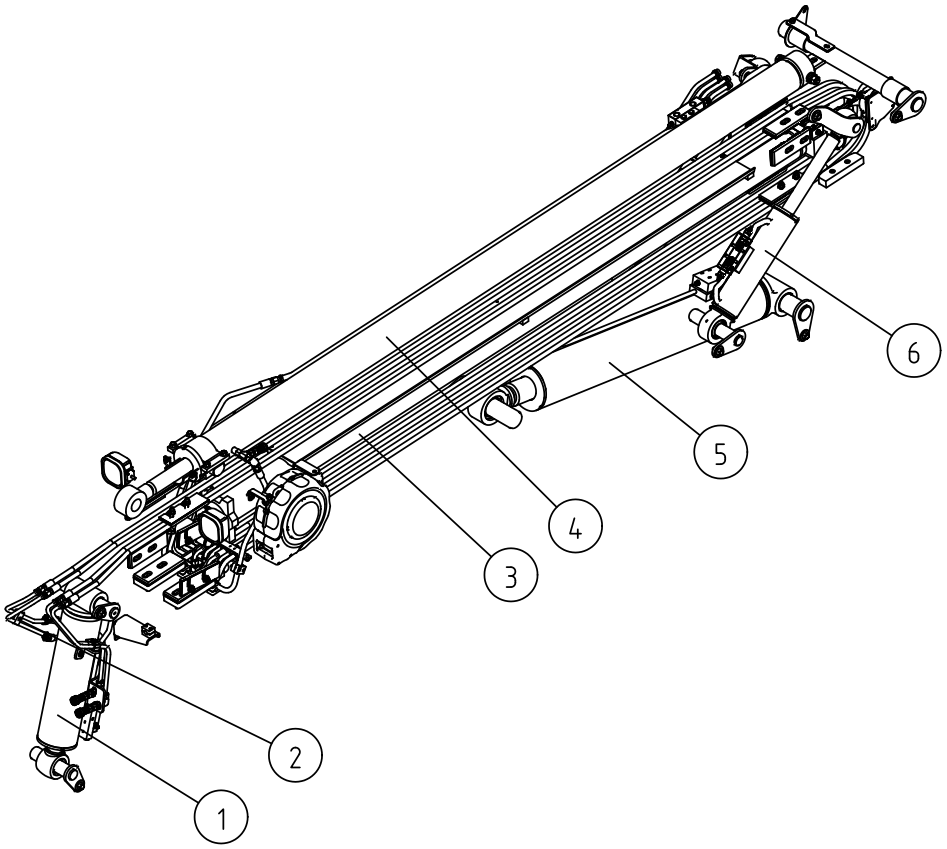


Figure 6.1-4 Hydraulic System (Arm Section)

1-Leveling the oil circuit	2-Accessory oil circuit	3-Internal telescopic oil circuit	4-External telescopic oil cylinder
5-Lifting oil cylinder	6-Compensating cylinder		

6.2.Principles of Hydraulic Systems

The high-pressure oil from the main oil pump is sent to the multi way valve, which then delivers it to the lifting cylinder, tilting cylinder, or telescopic cylinder. When controlling the lifting of the multi way valve, high-pressure oil flows from multi way valve A1 to balance valve V2 and then enters the rodless chamber of the lifting cylinder. When descending, high-pressure oil flows from multi way valve B1 to balance valve V1, and the pilot oil opens the balance valve to allow the rodless chamber oil to flow out. When controlling the telescopic action of the multi way valve, the same oil flows from the multi way valve A3 to V1, and the oil cylinder extends. The lower tilting oil cylinder and the amplitude changing oil cylinder are connected. When lifting and lowering, the extension and contraction of the lower tilting oil cylinder synchronously drives the upper tilting oil cylinder to achieve hydraulic leveling. The steering of the telehandler and the brake oil flow from the steering priority port D of the multi way valve first to the brake charging valve P port. Charging valves 11 and 22 are for the service brake, and port 33 controls the parking brake. The oil from the P1 port of the charging valve continues to flow to the P port of the steering gear, controlling the steering. At the same time, there is a steering switching valve between the front and rear axles, which can switch the steering mode.

T25-60XHYG model：

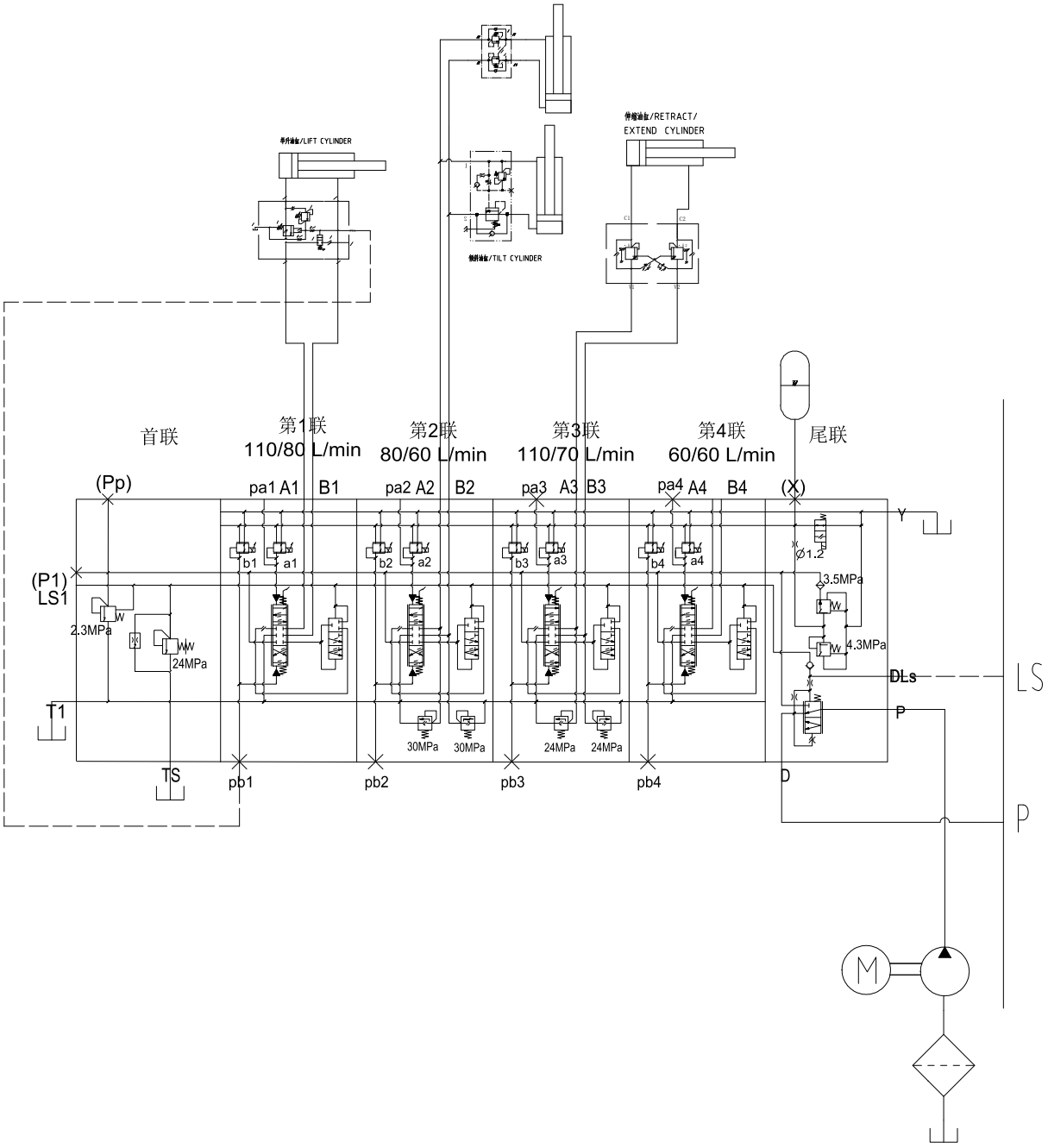


Figure 6.2-1 Schematic diagram of four-wheel drive hydraulic system (T25-60XHYG)

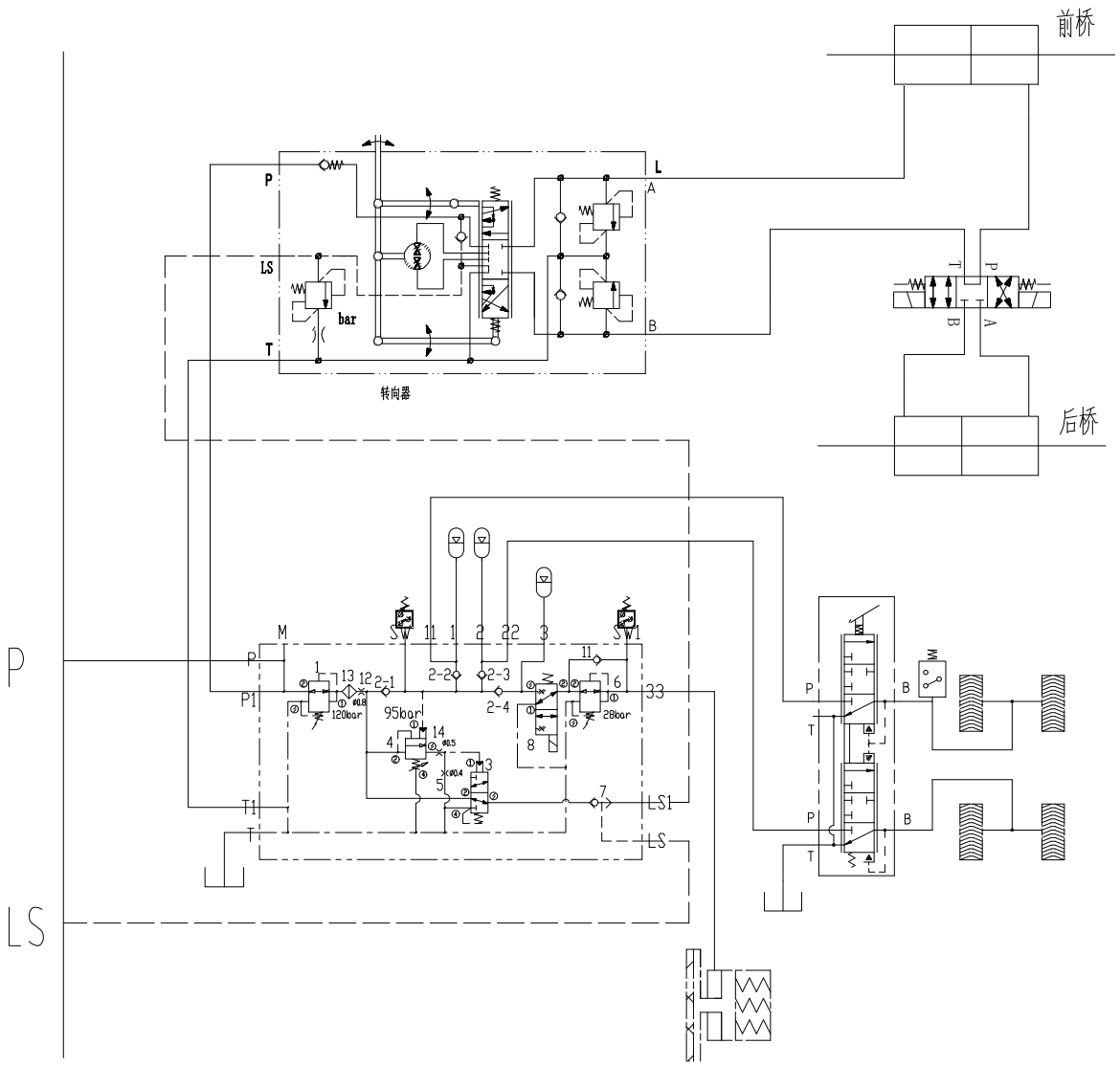


Figure 6.2-1 Schematic diagram of four-wheel drive hydraulic system (continued)

T35-100XHYG model：

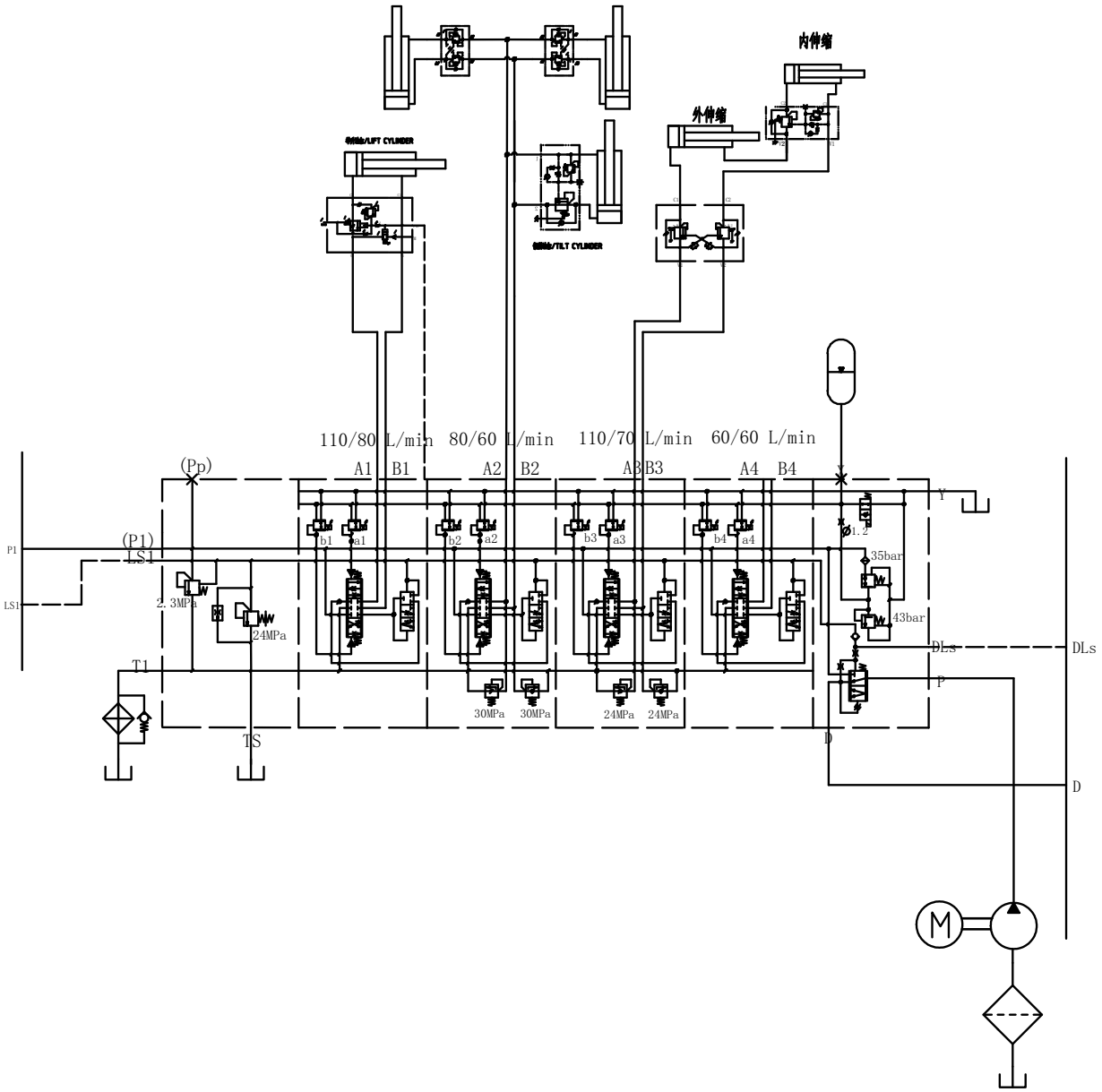


Figure 6.2-2 Schematic diagram of four-wheel drive hydraulic system (T35-100XHYG)

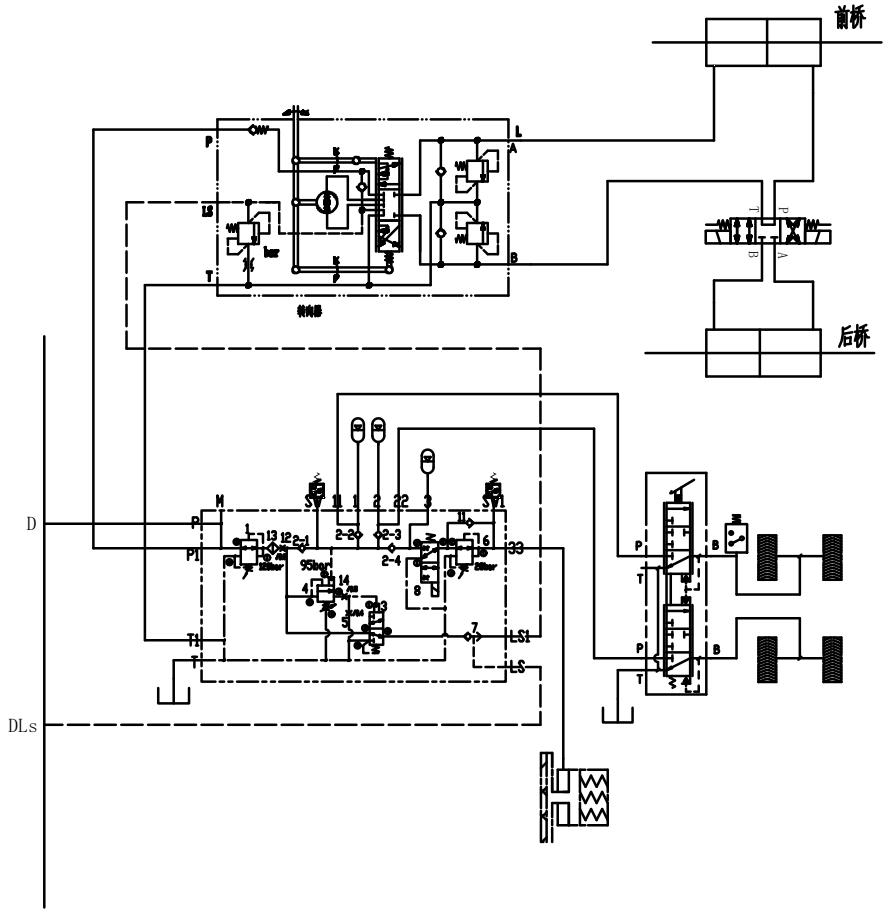


Figure 6.2-2 Schematic diagram of four-wheel drive hydraulic system (continued)

车身调平油缸/FRAME LEVELLING CYLINDER

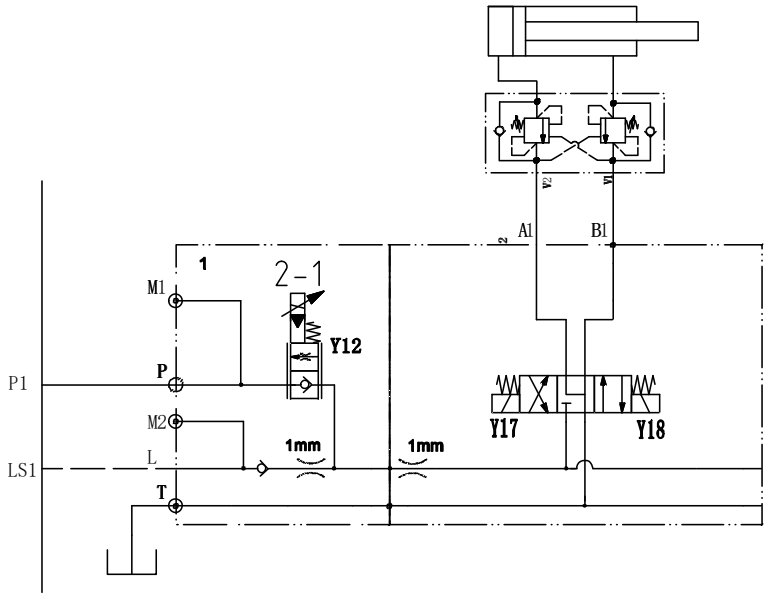


Figure 6.2-2 Schematic diagram of four-wheel drive hydraulic system (continued)

6.3.Malfunctions and troubleshooting

Main oil pump

Fault	Possible cause	Corrective action
Oil pump without oil pump output	Low oil level in the fuel tank	Add oil to the specified level
	Oil suction pipe or strainer clogged	Clean the oil circuit and fuel tank. If the hydraulic oil is dirty, replace it
Low output oil pressure of oil pump	Bearing wear; Damaged protective ring and O-ring	Replace faulty parts
	Safety valve adjustment error	Raise the pressure with a pressure gauge
	There is air in the oil pump	Tighten the loose connector on the suction side
		Add hydraulic oil to the fuel tank
		Check the oil pump oil seal
		After the bubbles in the fuel tank disappear, use the fuel pump again
The oil pump makes noise	Twisted suction side hose or clogged filter screen causing cavitation phenomenon	Adjust or replace hoses and clean filter screens
	Air is drawn in from the loose joint on the suction side	Re tighten each joint
	Cavitation caused by high viscosity of hydraulic oil	Replace with new hydraulic oil with viscosity suitable for the operating speed of the oil pump
		It only works when the oil temperature is normal
	There are bubbles in the hydraulic oil	First check the cause of the bubbles and then take measures
Oil pump leakage	The oil seal of the oil pump is damaged, the O-ring is damaged, or the sliding surface of the oil pump is worn	Replace faulty parts

Multi-way valve

Fault	Possible cause	Corrective action
The pressure of the safety valve is unstable or cannot be adjusted	Pressure regulating screw loose	Adjust the pressure again and lock it in place
	The pressure regulating spring is deformed or damaged	Replace
	The safety valve core is worn or jammed	Replace or disassemble and reassemble
	Pump failure	Maintenance pump
Turn off the lifting motor, operate the forward and backward tilt control lever, and tilt the frame forward	The tilt locking valve is worn or damaged	Replace the valve core and tilt lock valve as an assembly
	The inclined locking spring is broken	Replace the spring
	The inclined valve stem O-ring is damaged	Replace O-ring
Unstable when the frame tilts forward	Tilt pressure reducing valve malfunction	Replace the tilt pressure reducing valve assembly
When the lifting control lever is in the neutral position, the fork frame significantly descends	Excessive wear clearance between valve body and valve stem	Replace the valve stem according to the required gap
	The valve stem position is not aligned	Keep the valve stem position neutral
	Oil cylinder seal failure	Repair the oil cylinder
	Overload valve worn or stuck by dirt	Replace or clean the overload valve
Reset failure	Damaged or deformed reset spring	Replace the spring
	There is dirt between the valve body and stem	Clean
	Control mechanism stuck	Adjust
	The components of the reset part have different axes	Reinstall and maintain coaxiality
External leakage	O-ring damaged	Replace
	Poor sealing of oil port joint	Check the fastening and sealing of the corresponding parts
	Loose sealing plate	Clean the sealing plate and tighten the bolts again
	The locking nut of the safety valve and the connecting bolts between the plates are loose	Fastening
Multi way valve cannot move forward and backward	Multi way valve forward and backward movement adjustment handle interference	Adjust

6.4.Oil pump device

Overview of oil pump device: It consists of oil pump, suction pipe, return pipe, etc. See Figure 6-3.

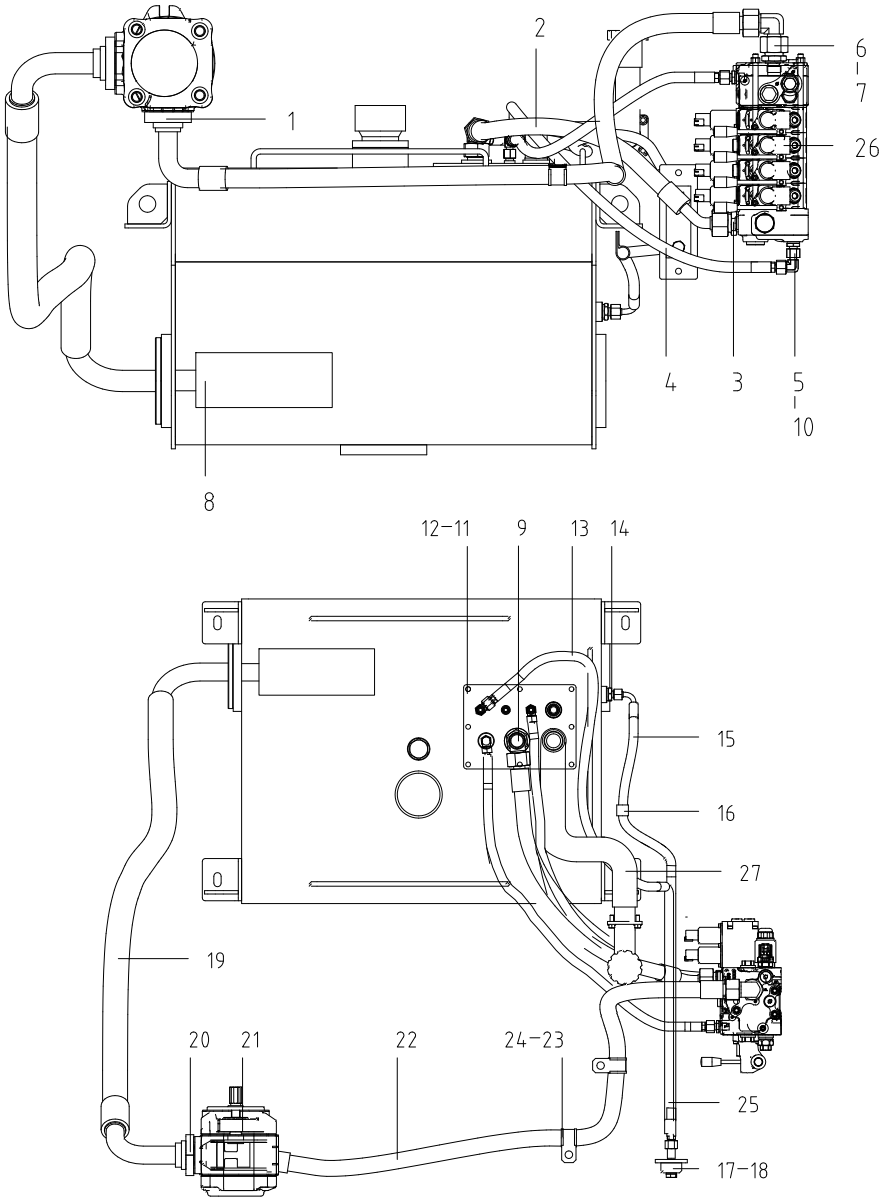


Figure 6-3 Oil pump device

1-Split flange clamp	2-High pressure rubber hose	3-Transition joint	4-High pressure rubber hose
5-Transition joint	6-Transition joint	7-Right angle joint	8-Oil absorption filter
9-Right angle joint	10-Right angle joint	11-Fuel tank cover plate	12-Bolt M8×20
13-High pressure rubber hose	14-Transition joint	15-High pressure rubber hose	16-Pipe clamp
17-Level gauge installation plate	18-Liquid level gauge	19-Low pressure rubber hose	20-Split flange clamp
21-Gear pump	22-High pressure rubber hose	23-Bolt M12×30	24-Pipe clamp
25-High pressure rubber hose	26-Multi-way valve	27-Filler pipe	

Table 6-1 Thread Tightening Torque Table

No.	Name	Tightening torque	Remark
2	High pressure rubber hose	80-120N·m	
3	Transition joint	90N·m	
4	High pressure rubber hose	20N·m	
5	Transition joint	40N·m	
6	Transition joint	90N·m	
7	Right angle joint	60-120N·m	
9	Right angle joint	80-120N·m	
10	Right angle joint	20N·m	
12	Bolt	25-43N·m	
13	High pressure rubber hose	20N·m	
14	Transition joint	40-60	
15	High pressure rubber hose	20N·m	
19	Low pressure rubber hose	150-220N·m	
22	High pressure rubber hose	60-70N·m	
23	Bolt	690N·m	
25	High pressure rubber hose	20N·m	

6.5.Gear pump

This gear pump is a low-noise gear pump, with a sturdy and compact two-piece cast iron gear pump housing. It has the following characteristics: impact resistance and high pressure, low noise emissions, can integrate built-in valves, long expected service life, compared to cast aluminum materials, cast iron gear pumps have higher volumetric efficiency and stability under high temperature and high pressure conditions.

6.5.1.Installation instructions

① Before installing the gear pump, it is necessary to first confirm whether the rotation direction of the gear pump meets the system requirements.

② The coaxiality between the active shaft of the gear pump and the output shaft of the motor shall not exceed 0.05mm.

③ Connect the inlet and outlet fittings, and do not connect them in reverse.

④ Install flanges and joints without any bumps, scratches, burrs, etc., to prevent oil leakage, air leakage, and noise generation.

⑤ Try to avoid subjecting the active shaft of the gear pump to axial and radial forces as much as possible. During installation, it should be smoothly introduced and not forcefully disassembled.

⑥ Apply a layer of HR-P high-temperature resistant grease to the connecting spline.

6.5.2.Usage and maintenance

① It should be used strictly according to the requirements and should not be overloaded.

② Oil requirements: Use L-HV46 or similar viscosity hydraulic oil in summer, and L-HV32 low-temperature hydraulic oil in winter.

③ For the first start-up, the air in the system should be discharged without load until there are no more bubbles.

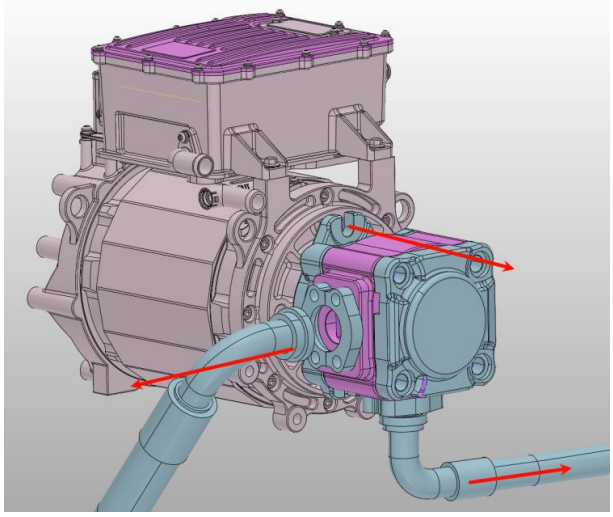
④ The oil should be kept clean, and the fuel tank and pipelines should be thoroughly cleaned before refueling.

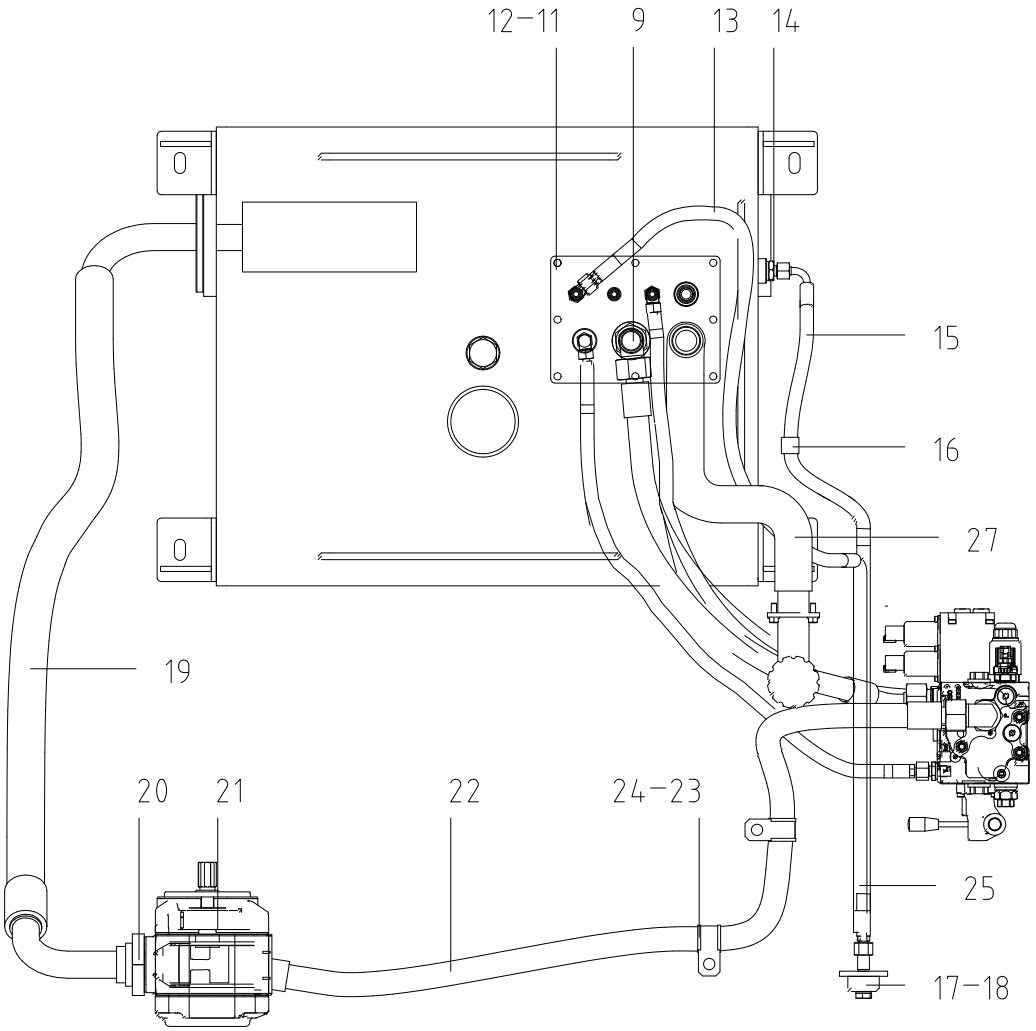
⑤ Regularly check the cleanliness of the oil and whether the oil filter is clogged, and replace it if necessary.

6.5.3.Dismantling and installation of gear pump

Attention!

Please retract all oil cylinders before disassembly.





1) Before cutting off the power, retract the oil cylinder and open the hood to release pressure.
2) Unscrew the bolts on the fixed part (20) that is fixed on the gear pump (21) and remove the split flange clamp.
3) Remove (19) low-pressure hose and (22) high-pressure hose.
4) Unscrew the fixing bolts between the pump motor and the gear pump.
5) Remove the gear pump and place it in a clean place.

6.6.Multi-way valve

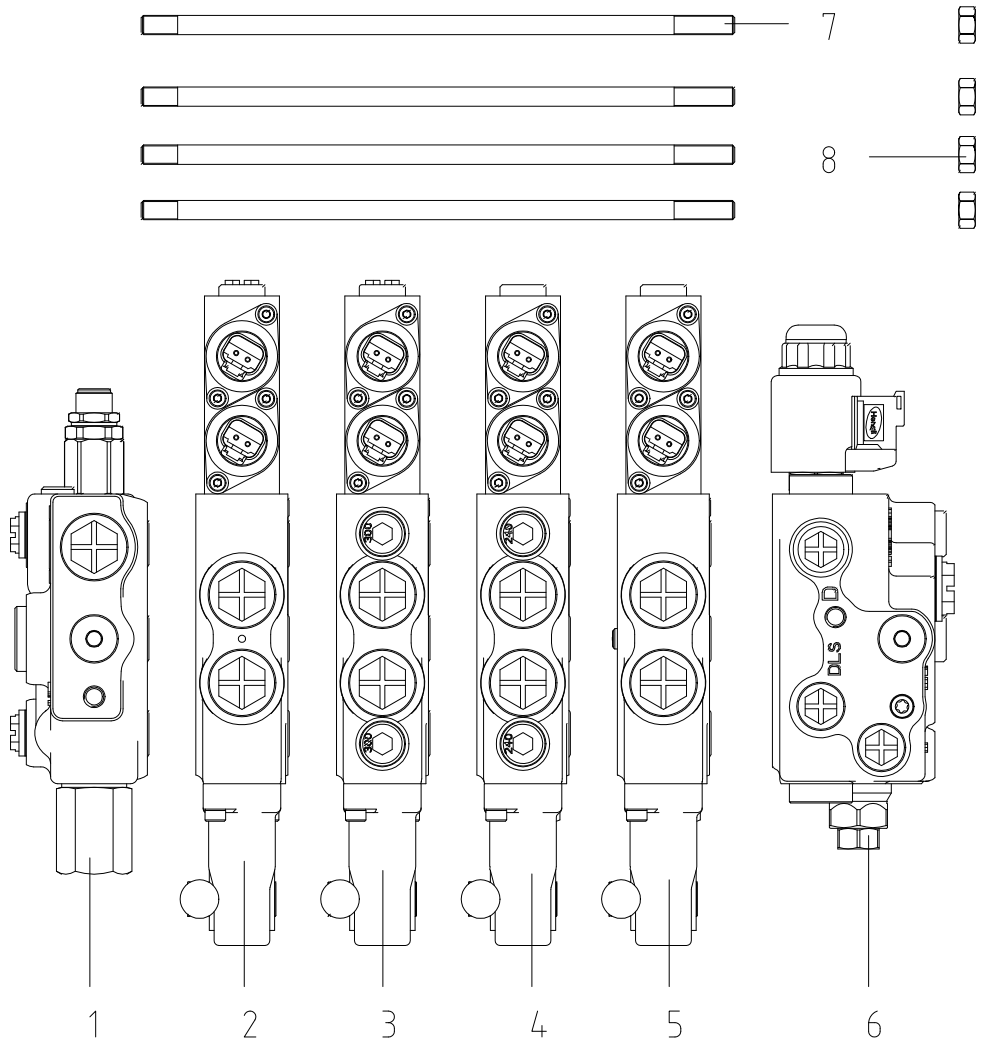


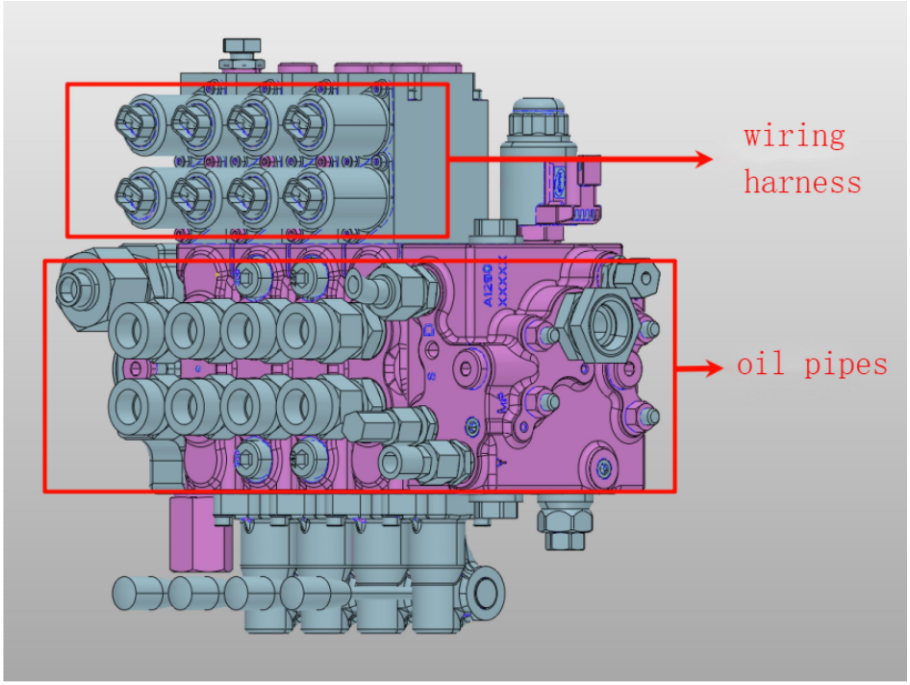
Figure 6-4 Multi way valve control handle

1-First way	2-The first way assembly	3-Second way assembly	4-Third way assembly
5-Fourth way assembly	6-Tail way assembly	7-Connecting bolts	8-Nut

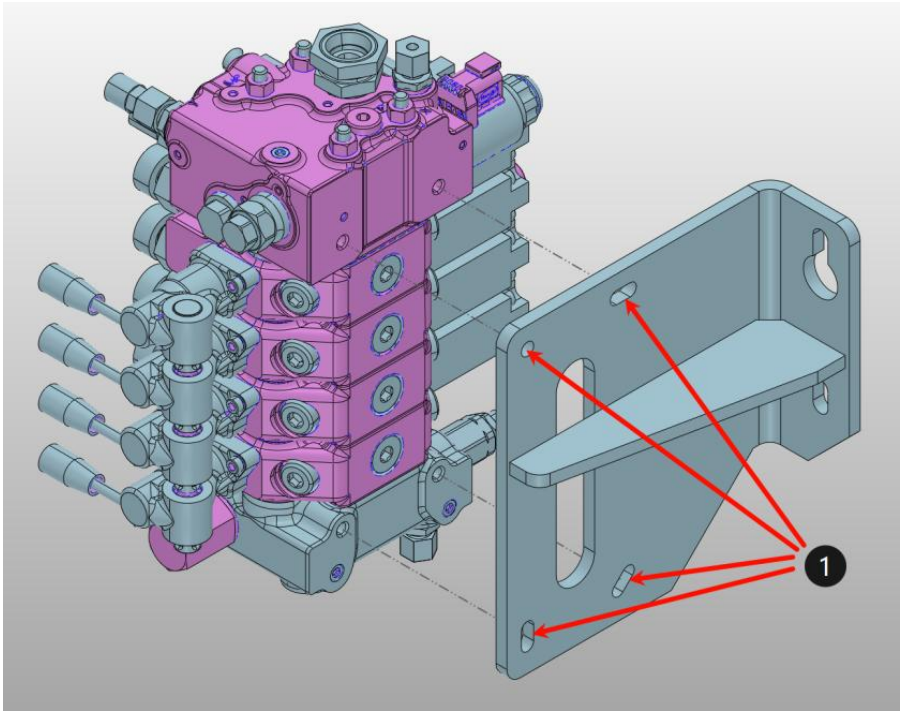
6.6.1.Disassembly and installation of multi way valve assembly

Attention！

Please retract all oil cylinders before disassembly.



1) Turn off the vehicle and cut off the power, manually release the pressure in the oil circuit.
2) Open the hood and disconnect the wiring harness and oil pipes related to the electrical interface of the multi way valve.



3) Remove the bolts on the four fixed holes (1) of the multi way valve bracket to separate the multi way valve from the bracket, and then remove the multi way valve.

6.7.Main safety valve pressure adjustment

Warning

The pressure of the main safety valve has been adjusted before leaving the factory. Generally, users are not allowed to adjust it arbitrarily.

The pressure adjustment method for the main safety valve is as follows:

1) The vehicle is parked on a solid and flat road surface, in neutral, with the oil cylinder retracted and the forks lowered to the ground. Turn off the power.

2) Open the front floor and connect the pressure measuring joint between the inlet of the multi way valve and the inlet pipe. Remove the screw from the pressure measuring joint and place it in a clean place. There is hydraulic oil flowing out, pay attention to protecting the environment.

3) Connect the pressure gauge.

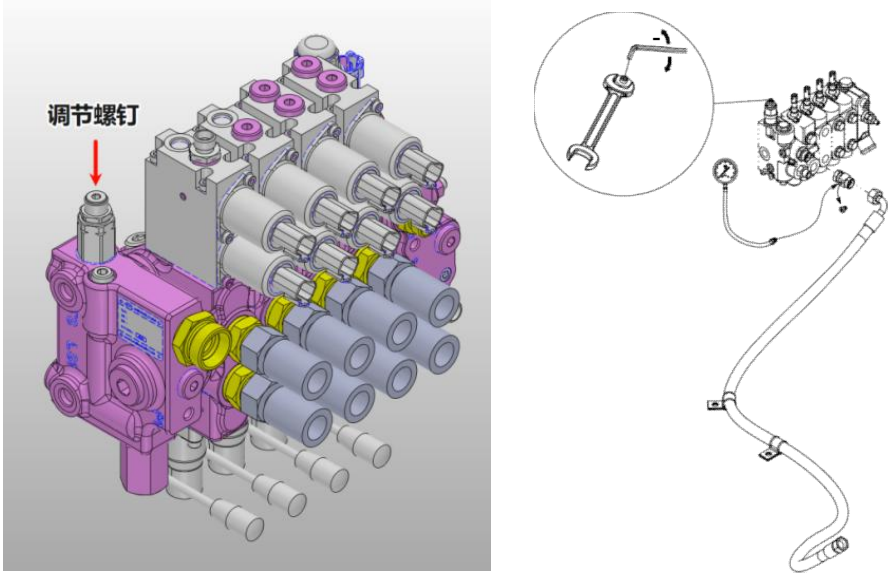


Figure 6.7 Pressure Adjustment of Main Safety Valve

Attention！

The specification of the pressure gauge is greater than 30MPa.

1) Start the telehandler, lift the fork 300mm off the ground, retract the fork and continue to hold pressure.
2) Read the pressure gauge and determine if the pressure of the main safety valve of the multi way valve is within the normal range.
3) Normal range: 25Mpa-26.3Mpa
4) If the pressure of the main safety valve of the multi way valve is not within the normal range, the locking nut of the main safety valve should be loosened and the adjusting screw should be adjusted. Adjust to the specified pressure (25MPa); Clockwise direction increases pressure, while counterclockwise direction decreases pressure;
5) Stabilize the pressure within the normal range for 30 seconds.
6) Loosen the pressure gauge, reinstall the bolts, retract the oil cylinder, place the fork to the bottom, turn off the power, remove the pressure measuring joint, screw in the oil inlet pipe, and tighten the locking nut again.

6.8.Fully hydraulic steering gear

This steering gear is a load sensing fully hydraulic steering gear with an integrated valve, which is connected to the priority valve in a tubular manner before use. The LS port of the steering gear is connected to the LS port of the charging valve, allowing the steering load pressure signal of the steering gear to be transmitted to the priority valve after passing through the charging valve, in order to control the amount of oil supplied to the steering gear by the system.

In a load sensing steering system, regardless of the load pressure and steering wheel speed, the corresponding flow rate can be prioritized according to the requirements of the steering oil circuit to ensure reliable, sensitive, and lightweight steering.

The flow output of the oil pump, in addition to the flow required by the steering system, can be supplied to the working oil circuit, thereby eliminating the power loss caused by excessive oil supply in the steering oil circuit and improving system efficiency.

When turning power, pressure oil enters the fixed rotor pair through the valve core and sleeve, pushing the rotor to follow the steering wheel and inject oil pressure into the left or right chamber of the steering cylinder. The cylinder piston rod pushes the steering wheel to achieve steering.

In the power-off state, the oil pump does not supply oil. The steering wheel drives the rotor through the valve core, valve sleeve, and coupling. At this time, the rotor and stator act as an oil pump, inputting oil into the steering cylinder to achieve manual steering.

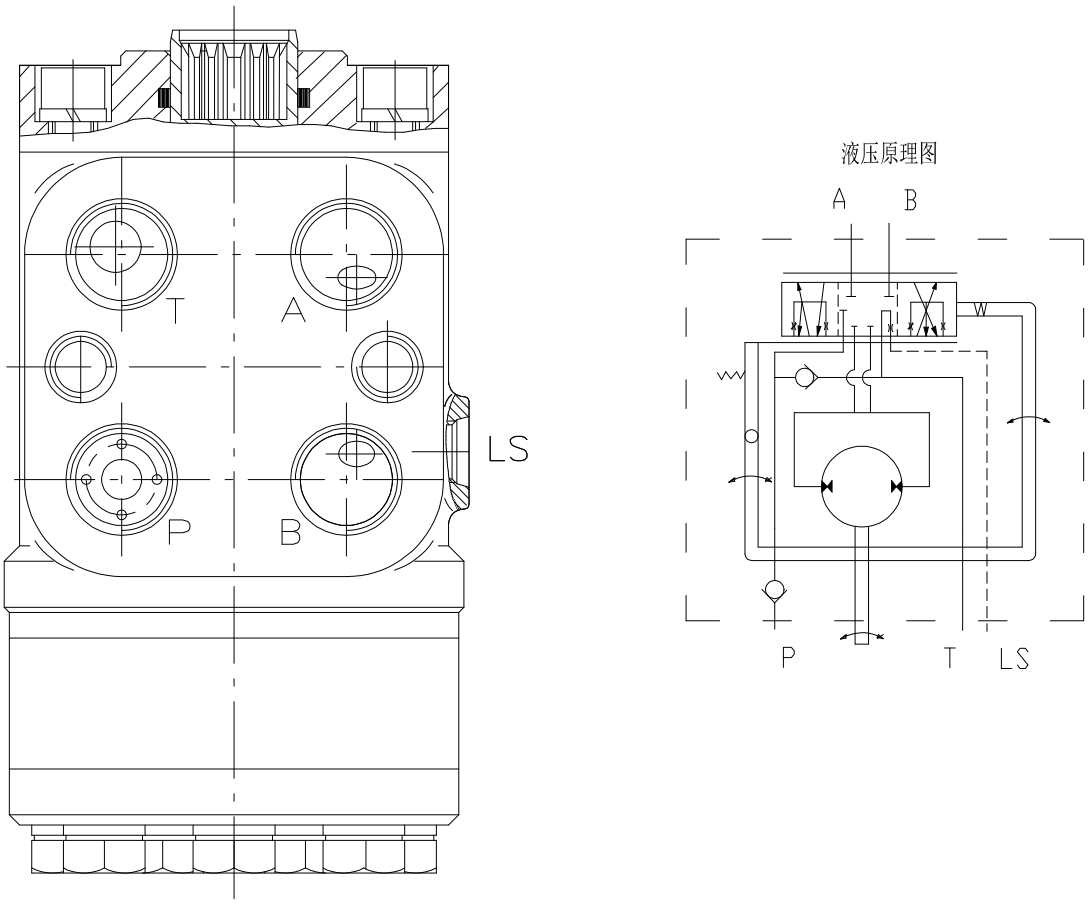


Figure 6.8 Steering gear

6.8.1.Precautions for installation and maintenance of steering gear

1) When installing the steering gear, it should be ensured that it is coaxial with the steering column and there should be a gap between the axial directions. After installation, check whether the steering wheel returns flexibly.

2) When installing the steering gear, it is important to avoid axial forces on the input end of the steering gear.

3) All parts should be kept clean to prevent dirt from entering the interior of the steering gear or hydraulic system.

4) The oil pipe joint should be clean, and do not use raw tape instead of sealing rings for sealing.

5) Ensure that all oil ports of the steering gear are installed correctly. The installation of pipelines should follow: P port (pressure oil inlet), connected to the PF port of the multi way valve; T port (low-pressure oil return port), connected to the hydraulic oil tank; LS port (load sensing) is connected to the LS port of the multi way valve; Connect port A to the right oil port of the steering cylinder; Connect port B to the left oil port of the steering cylinder.

6) A, B, P, T connection thread M20 × 1.5, T=50N·m～60N·m; LS port connection thread M12 × 1.5, T=30 N·m～36N·m。

7) Do not easily disassemble the steering gear. Only when it is confirmed that there is a malfunction in the steering gear can it be disassembled again.

8) When disassembling and assembling the steering gear, ensure that all components are clean and prevent collision.

9) When disassembling and assembling the valve core valve sleeve, it should be taken out or installed vertically to prevent the pin from being pulled out.

10) Pay attention to the corresponding marking points when assembling the linkage shaft and rotor.

11) Do not forget to install the steel ball and extraction pin of the one-way valve, and do not install the wrong bolt here.

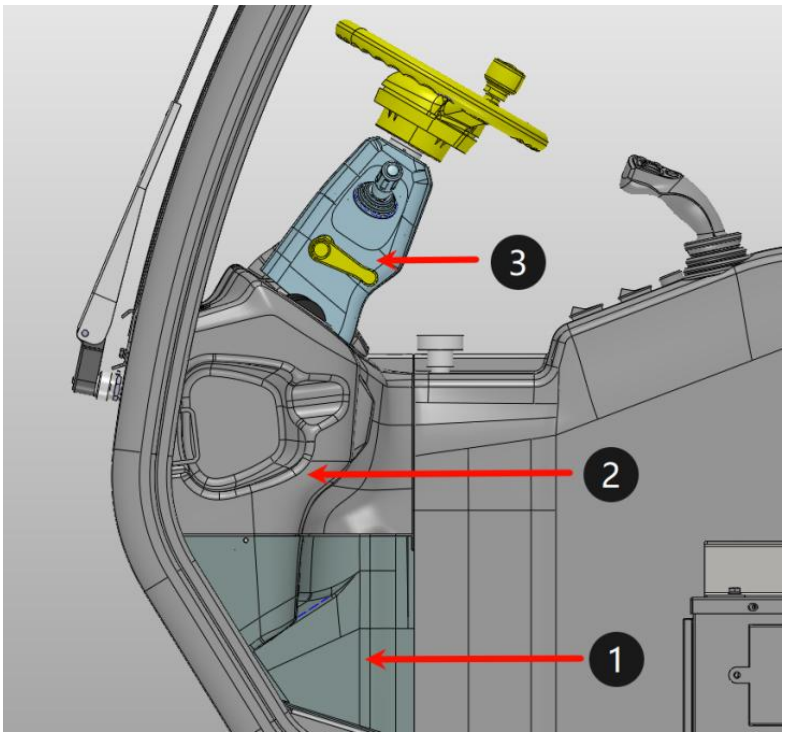
12) When assembling bolts, they should be tightened evenly and the torque should be ensured to be between 40 N · m and 50 N · m, otherwise dead spots or steering sinking may occur.

13) It is necessary to ensure that the oil is clean to prevent dirt from getting stuck in the internal parts of the steering gear, causing steering failure. To this end, it is necessary to regularly check the condition of the filter element and oil, and replace them if necessary.

14) If the steering gear is found to be heavy or malfunctioning during use, the cause should be carefully investigated first. Do not forcefully turn the steering wheel, and do not easily disassemble the steering gear to avoid damaging the parts. It is strictly prohibited for two people to turn the steering wheel at the same time.

15) The maximum allowable manual steering torque of the steering gear is 130N · m.

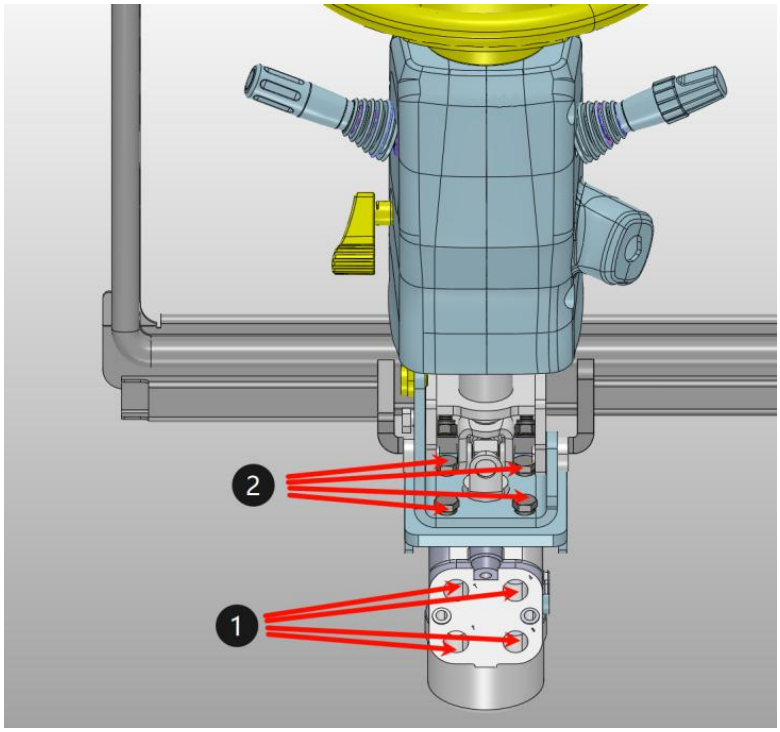
6.8.2.Disassembly and installation of steering gear



(1) Turn off the vehicle and cut off the power, manually release the pressure in the oil circuit

(2) Use tools to remove the cab cover (1) and cab cover (2)

(3) Observe the fixed connection relationship between the steering column (3) and the steering gear



(4) Before separating the steering column and steering gear, disconnect the steering gear from the 4 oil pipes (1) first

(5) The steering column and steering gear are fixed to the base with 4 bolts (2), and the 4 bolts (2) are removed

(6) Remove the steering gear and note that the steering column has lost its fixing after removing the bolts and needs to be temporarily fixed.

6.8.3.Common Fault Analysis and Troubleshooting Measures of Steering Gear

Fault	Reason for occurrence	Phenomenon	Exclusion measures
Oil leakage	Loose bolts in the joint area		Tighten the bolts
	The sealing ring at the joint surface or shaft neck is damaged		Replace the sealing ring
	Damaged gasket		Replace the gasket
Heavy steering	Insufficient oil supply from the oil pump	Slow turn steering wheel is light, fast turn steering wheel is heavy	Check if the oil pump is working properly
	There is air in the steering system	There is foam in the oil, which makes irregular noise. The steering wheel rotates but the oil cylinder does not move when it moves	Remove the air from the system and check if there is any leakage in the oil suction pipeline
	The oil level in the fuel tank is lower than the specified position		Refuel to the specified height
	The viscosity of the oil is too high		Use designated oil
	The one-way valve with steel ball inside the valve body has failed	Both fast and slow turn steering wheels are heavy, and there is no pressure when turning	If the steel ball is lost, install the steel ball; If the steel ball is stuck by stolen goods, it should be cleaned
	The steering system pressure is lower than the working pressure	Empty or light load turning to light, increasing load turning to heavy.	Identify the cause, restore or increase system pressure
Steering failure	The spring plate is broken	The steering wheel cannot automatically return to the center	Replace the spring plate
	The opening of the pin or linkage shaft is broken or deformed	The pressure oscillation has significantly increased, to the point where it cannot even rotate	Replace the pin or linkage shaft
	The opening of the rotor and linkage shaft is broken or deformed	Steering wheel rotation or left and right swing	Mesh the teeth with punch points on the linkage shaft with the grooves of the rotor with punched holes
No manpower steering	The radial or axial clearance of the stator is too large	When turning off the engine, the steering wheel rotates while the cylinder remains stationary	Replace the stator

Fault	Fault analysis	Exclusion measures
The steering wheel does not sink when turning slowly, but sinks quickly or there is no power steering	Low oil efficiency, unable to achieve the required pressure	
	Low pressure of system overflow valve or decreased spring strength	
	Low pressure of steering gear safety valve or safety valve spool stuck	
	The return oil of the steering system is not smooth	
	Excessive steering load.	
	The load sensing pipeline is leaking oil, not smooth, and twisted.	
	The steering gear itself leaks, causing it to turn off or stall, and the steering is one-way valve cannot reset, leakage, etc.	
	The one-way valve at the inlet is damaged and blocking the oil inlet of the steering gear.	
Both fast and slow rotations are heavy	The steering column itself has high resistance, the steering rod is bent, or there is interference between the steering rod and the steering valve core.	
	The mechanical resistance torque of the steering gear itself is high.	
	Gear pumps have low efficiency.	
	The pressure of the safety valve is low.	
The steering wheel is drifting and the vehicle is not moving in a straight line	The gear pump sucks air and generates air in the system.	
	The clearance between the steering wheel connecting rod is large or bent.	
	The seal inside the steering cylinder is damaged, resulting in internal leakage.	
	The buffer valve or oil replenishment valve has serious leakage.	
	The load holding capacity of ports A and B of the steering gear itself decreases.	
Vehicle deviation	The gap between the steering connection parts is large.	
	The buffer valve or oil replenishment valve has serious leakage.	
	Poor return characteristics of the steering gear.	
	The air pressure difference between the steering wheels of the vehicle is significant.	
The steering wheel has a small sense of finish	The steering gear itself has a large internal leakage.	
	The pressure setting of the safety valve or bidirectional overload valve is close.	
	There is a large leakage inside the steering cylinder.	
	Double directional overload or excessive leakage or jamming of the oil replenishment valve.	
	The oil return pipe is not connected.	
Inaccurate steering or crawling	There is air in the system.	
	Oil cylinder leakage.	

The steering wheel can be easily turned, but the steering wheel remains stationary or moves slowly without any pressure.	The steering mechanism connection has come loose.	
	The buffer valve or oil replenishment valve is stuck.	
	Steering cylinder series chamber, or cylinder rod piston detachment.	
	The internal components of the steering gear are damaged.	Replace the steering gear
	Insufficient oil.	Add hydraulic oil
The steering wheel has a large idle stroke	The gap between the steering gear and the steering column connection is large.	
	The clearance between the steering connection mechanism is large.	
	The system has air and severe oil cavitation.	Drain the air from the hydraulic system
	The buffer valve or oil replenishment valve cannot be reset properly.	Replace the steering gear
Poor return or following	The connection between the steering column and the steering gear interferes and does not rotate flexibly.	
	There are burrs on the valve core and valve sleeve.	
	Excessive back pressure of the return oil can also cause poor return.	
	The spring plate is damaged or has poor elasticity.	
	The friction resistance between the valve core shaft end and the front cover of the steering gear is high.	
The steering wheel rotates or oscillates repeatedly	The oil distribution relationship is incorrect during the assembly of the steering gear.	
	The oil inlet is connected to port A or B.	
	The valve core and sleeve are stuck.	
The steering wheel cannot be turned	The fixed rotor is stuck with dirt.	
	The pump source cannot establish pressure or the steering safety valve cannot establish pressure.	
	Oil circuit blockage or incorrect pipeline connection.	Check if the pipeline connection is correct
	The steering column is stuck.	Adjust the steering column
	The internal components of the steering gear are damaged.	Repair or replace the steering gear
	The one-way valve at the inlet of the steering gear blocks the oil port or gets stuck when the power is cut off.	
When the steering wheel rotates, the steering wheel rotates in the opposite direction	Connect ports A and B in reverse.	Correctly connect the steering pipeline
When the steering wheel rotates, it gnaws	The one-way valve at the inlet of the steering gear is damaged, and there is oil backflow	Repair or replace the steering gear
In the load sensing steering system, there is pipeline oscillation, hydraulic noise, and vehicle oscillation during rotation	There is air in the pipeline.	Drain the air from the hydraulic pipeline
	The load port throttle hole is small.	
	The pressure setting of the overflow valve is incorrect.	

6.9.Steering Piping

The steering cylinder is a double acting through type, with the piston rod connected to the steering knuckle at both ends through a connecting rod. The pressure oil from the hydraulic steering gear moves the piston rod left and right through the steering cylinder, thereby achieving left and right steering. The structure of the steering pipeline is shown in Figure 6-8, and the structure of the steering cylinder is shown in Figure 6.9.

T25-60XHYG model：

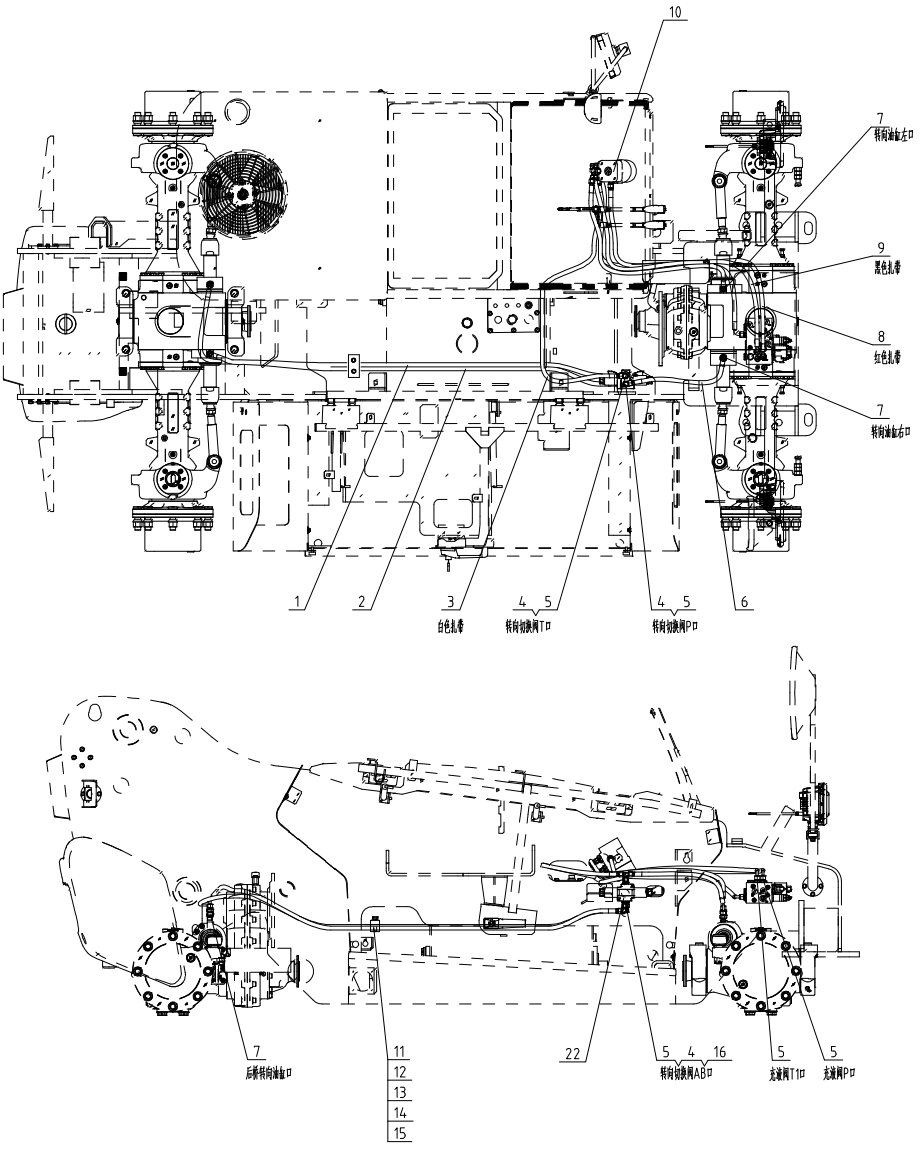


Figure 6.9-1 Steering Pipeline（T25-60XHYG）

1-High pressure rubber hose	2-High pressure rubber hose	3-High pressure rubber hose	4-Right angle joint
5-Transition joint	6-High pressure rubber hose	7-Transition joint	8-High pressure rubber hose
9-High pressure rubber hose	10-Steering gear	11-Pipe clamp	12-Hexagonal head bolt M8 × 45
13-Gasket 8	14-Gasket 8	15-Pipe clamp	16-Bolt M8×30
17-Transition joint	18-Transition joint	19-High pressure rubber hose	20-High pressure rubber hose
21-Transition joint	22-Steering mode switching valve		

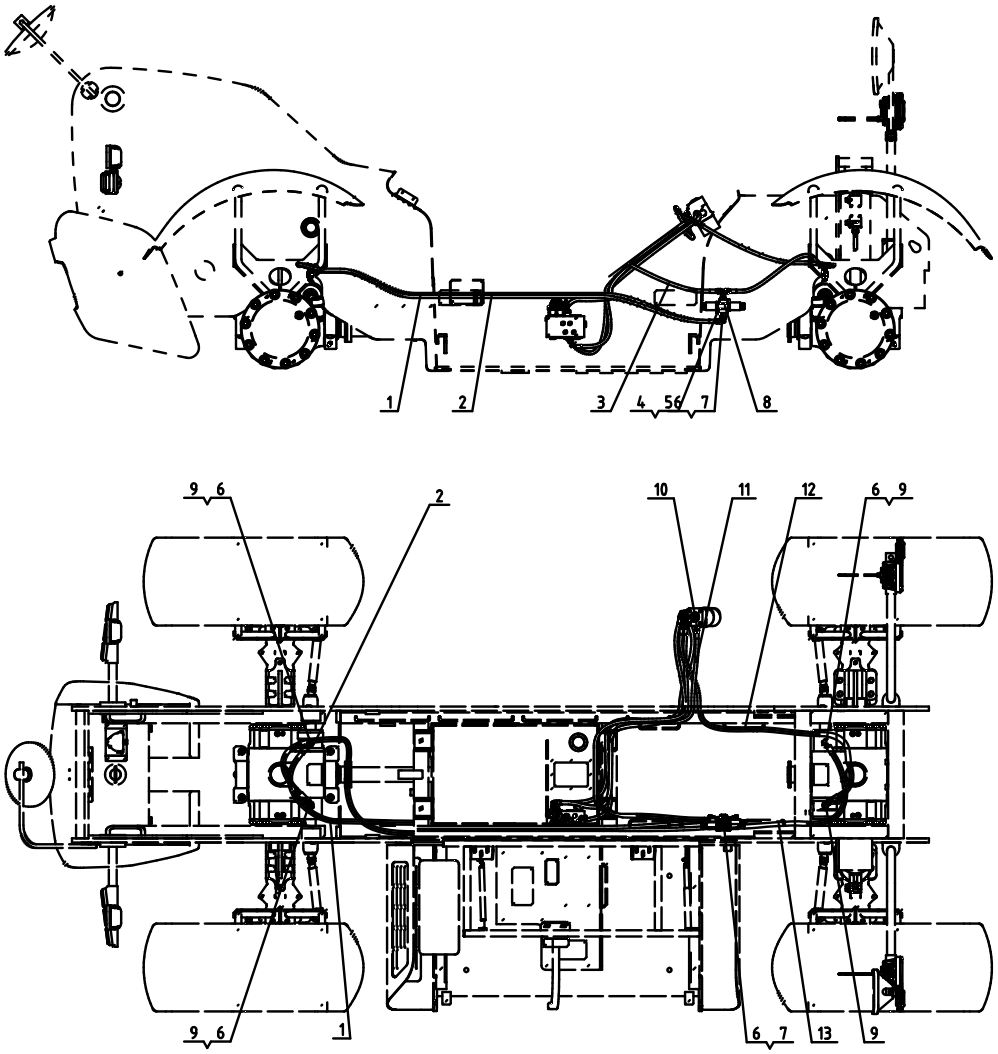


Figure 6.9-1 Steering Pipeline（T25-60XHYG）

1-High pressure rubber hose	2-High pressure rubber hose	3-High pressure rubber hose	4-Standard spring washer 8
5-Bolt M8×30	6-Right angle joint	7-Transition joint	8-Steering mode switching valve
9-Transition joint	10-Transition joint	11-High pressure rubber hose	12-High pressure rubber hose
13-High pressure rubber hose	14-Transition joint	15-High pressure rubber hose	16-Transition joint
17-Fully hydraulic steering gear			

6.10.Tilt cylinder

T25-60XHYG model:

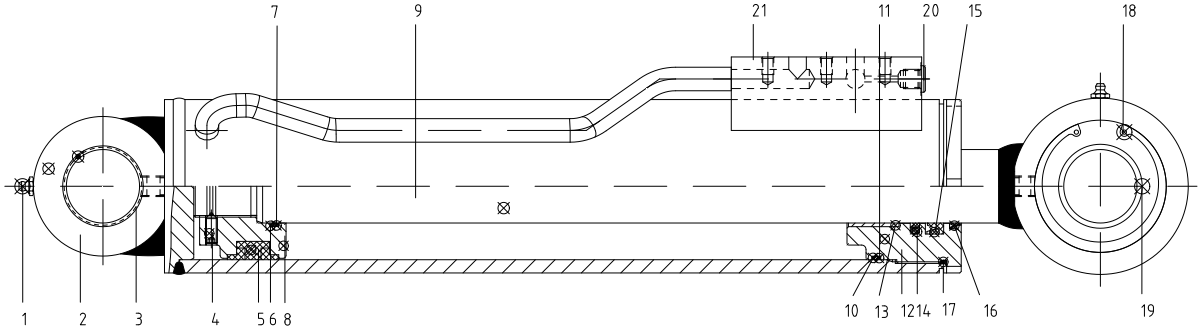


Figure 6.10-1 Tilt Cylinder Structure

1-Oil cup	2-Cylinder body	3-Composite bush	4-Screw	5-DAS sealing ring
6-Retaining Ring	7-O-rings	8-Piston	9-Piston rod	10-O-rings
11-Retaining Ring	12-Guide Sleeve	13-Composite bush	14-HBTS	15-U-rings
16-Dust ring	17-O-rings	18-Hole retaining ring	19-Spherical Plain Bearing	20-Plug
21-Protective pad				

T35-100XHYG model:

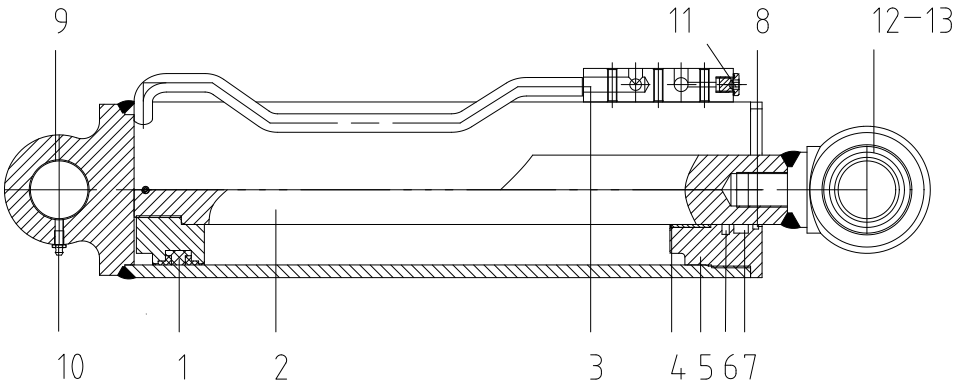


Figure 6.10-2 Tilt Cylinder Structure

1-DAS sealing ring D130	2-Piston rod assembly	3-Protective board	4-Composite bush 6035
5-Guide Sleeve	6-HBTS d60	7-RUJ Sealing ring 60×70×6	8-DKIDust ring d60
9-Composite bush 5040	10-Oil cup M8 × 1	11-Plug assembly	12-Spherical Plain Bearing
13-Wire retaining ring 90 for holes			

6.11.Telescopic Cylinder

T25-60XHYG model:

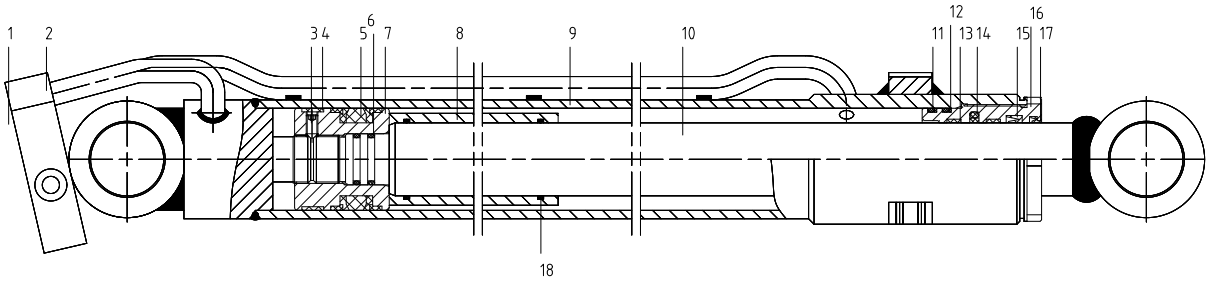


Figure 6.11-1 Structure of telescopic oil cylinder

1-Protective pad	2-Plug	3-Set screw	4-Support ring	5-DAS sealing ring
6-O-rings	7-Piston	8-Spacer sleeve	9-Cylinder body	10-Piston rod
11-O-rings	12-Retaining Ring	13-Support ring	14-HBTS	15-U-rings
16-Guide Sleeve	17-Dust ring			

T35-100XHYG model:

1. External telescopic oil cylinder

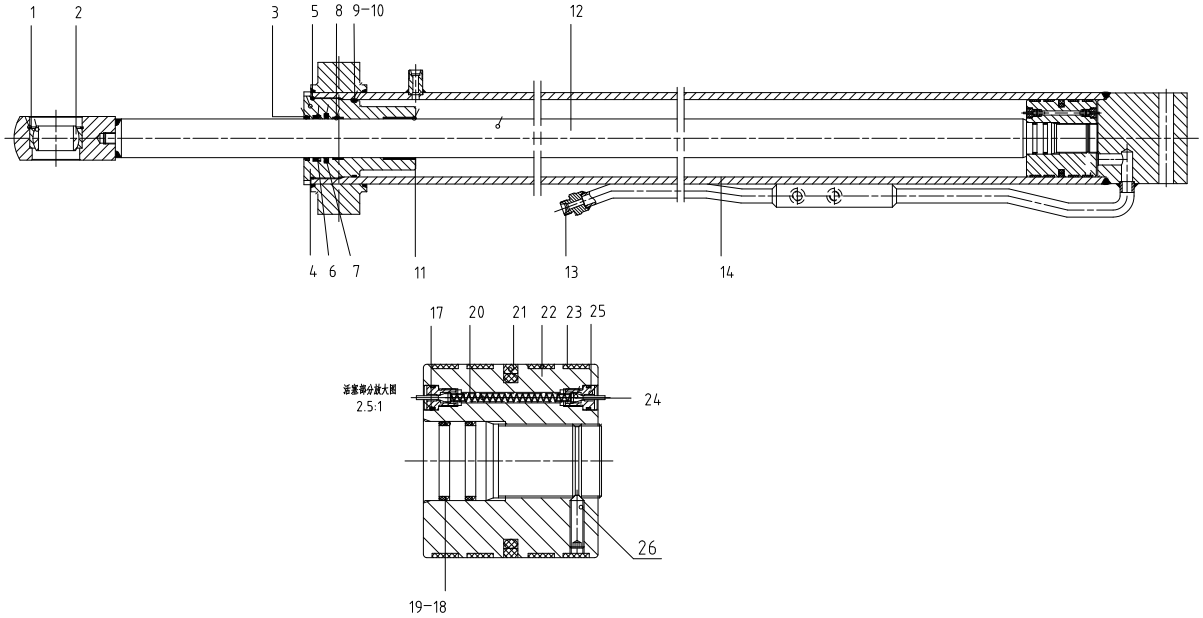


Figure 6.11-2 Structure of External Telescopic Oil Cylinder

1-Elastic retaining ring D75	2-Joint bearing GE50ET-2RS	3-Dust ring d55	4-Guide Sleeve
5-O-ring 115*3.1	6-U-shaped ring 55*65*10/11	7-HBTS d55	8-Support ring 60*55*14.8
9-Retaining ring 110*105.2*2	10-O-ring 110 * 3.1	11-Composite bush 5535	12-Piston rod Ø55*3457
13-Internal thread plug M20*1.5	14-Cylinder body	15-O-ring 14*1.9	16-O-ring 45*3.1
17-Retaining ring 45*40.2*2	18-Spring 0.4 * 5 * 72	19-OK sealing ring D110	20-Piston
21-Supporting ring 110*105*14.8	22-Valve needle	23-Valve sleeve	24-Screw M8*30

2. Internal telescopic oil cylinder

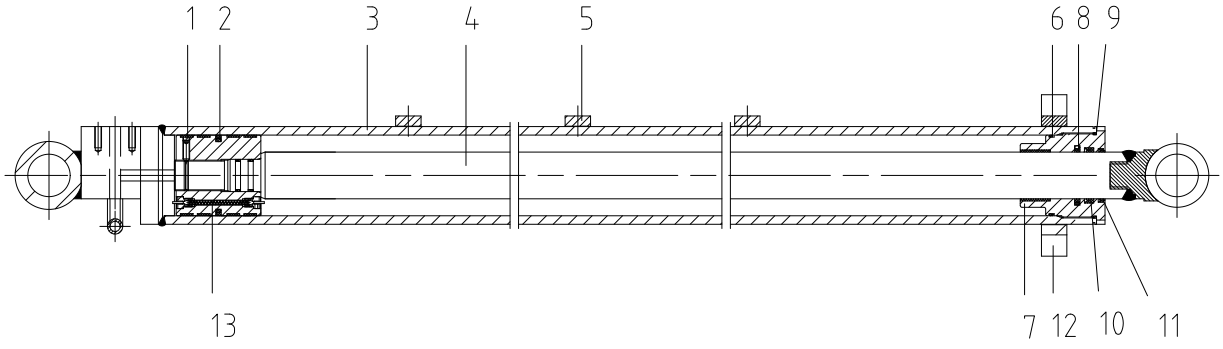


Figure 6.11-3 Structure of the internal telescopic oil cylinder

1-Support ring	2-Glay Circle D95	3-Cylinder body	4-Piston rod assembly
5-Fixed plate	6-O-sealing ring 95 × 3.1	7-Guiding sleeve component	8-HBTS d55
9-O-sealing ring 100×3.1	10-U-sealing ring 55×65×10	11-Dust ring d55	12-Board
13-Valve sleeve component			

6.12.Lifting oil cylinder

T25-60XHYG model:

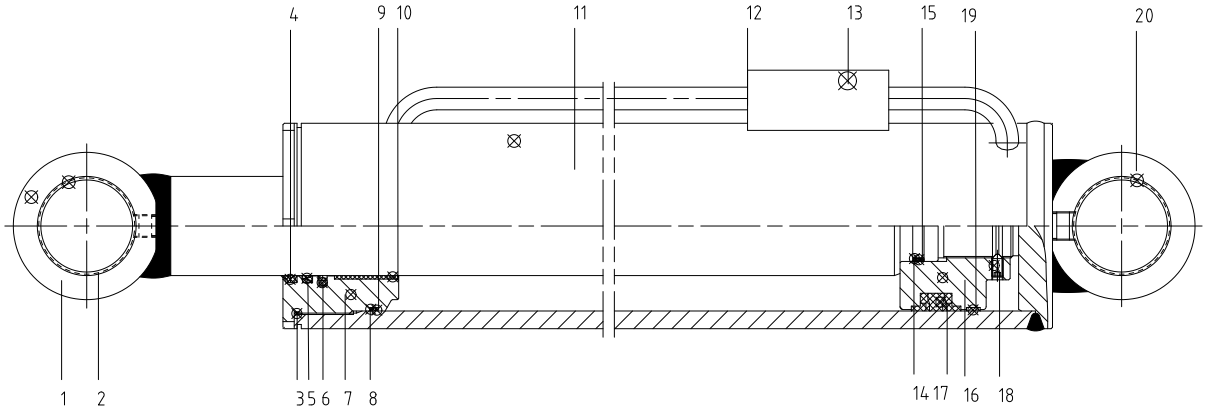


Figure 6. 12-1 Structure of lifting (variable amplitude) oil cylinder

1-Piston rod	2-Composite bush	3-O-ring	4-Dust ring	5-U-ring
6-HBTS	7-Guide Sleeve	8-Retaining Ring	9-O-ring	10-Composite bush
11-Cylinder body	12-Plug	13-Protective pad	14-Retaining Ring	15-O-ring
16-Piston	17-DAS Sealing element	18-Set screw	19-Support ring	20-Composite bush

T35-100XHYG model:

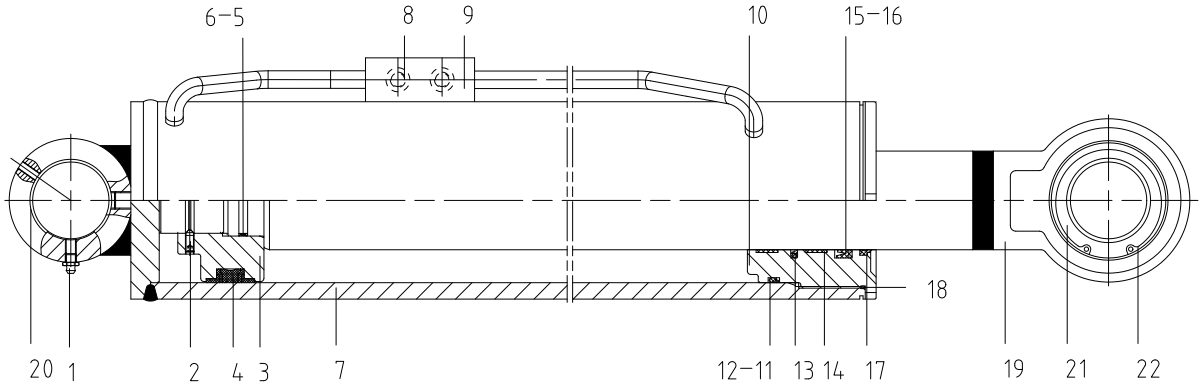


Figure 6.11-2 Structure of lifting (variable amplitude) oil cylinder

1-Oil cup M10*1	2-Set screw M8*20	3-Piston	4-DAS Combination seal D150
5-O-ring 65*3.1	6-Retaining Ring 65*60.2*2	7-Cylinder body	8-Plug G1/4
9-Protective pad	10-Guide Sleeve	11-O-ring 150*5.7	12-Retaining Ring 150*141*3
13-HBTS d90*105.1*6.3	14-Support ring 95*90*19.8	15-U-ring 90*105*11.4/12.5	16-Retaining Ring 105*90*3
17-Dust ring d90	18-O-ring 160*3.1	19-Piston rod Ø90*1420	20-Composite bush 7050
21-Retaining Ring D105	22-Spherical Plain Bearing GE70ES-2RS		

6.13.Compensating cylinder

T25-60XHYG model:

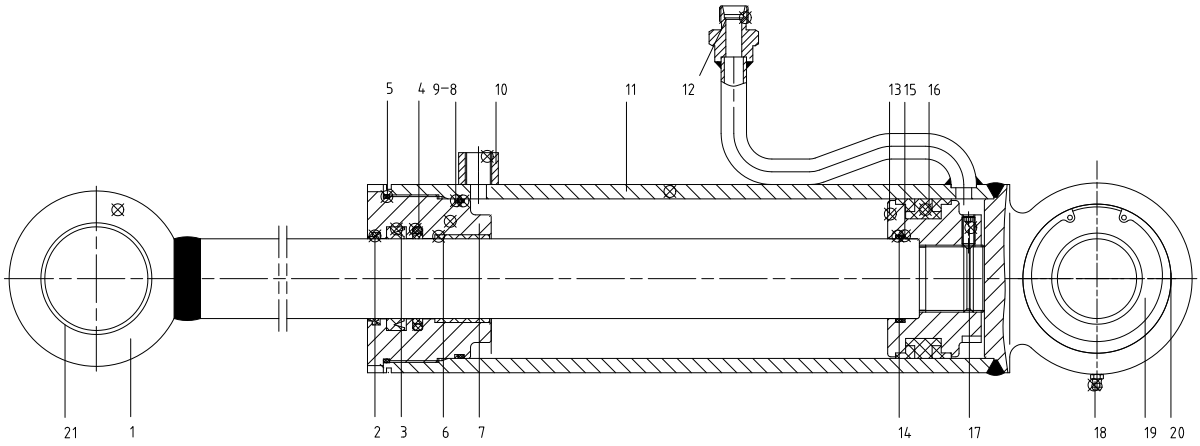


Figure 6.13-1 Compensation Cylinder Structure

1-Direct pressure injection oil cup	2-Screw	3-DAS sealing ring	4-Retaining Ring	5-O-ring
6-Piston	7-Cylinder body	8-Internal thread plug	9-Guide Sleeve	10-O-ring
11-External thread plug	12-Retaining Ring	13-Composite bush	14-HBTS	15-O-ring
16-U-ring	17-Dust ring	18-Piston rod	19-Hole retaining ring	20-Spherical Plain Bearing
21-Composite bush				

T35-100XHYG model:

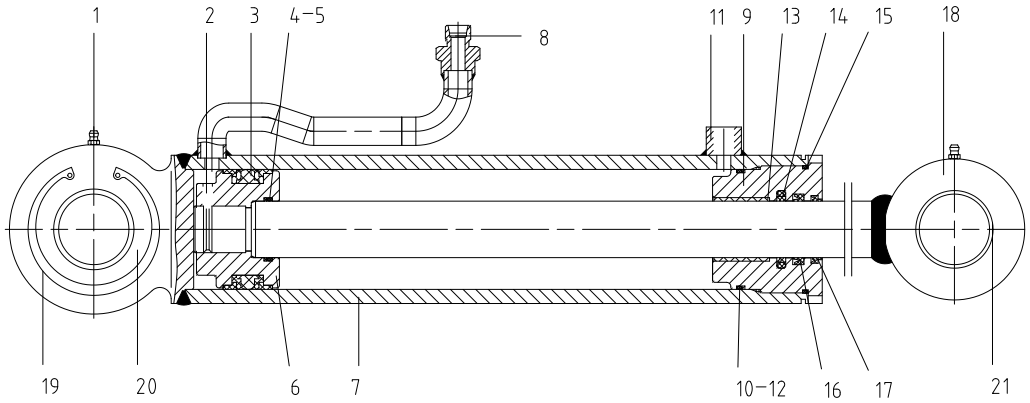


Figure 6.13-2 Compensation Cylinder Structure

1-Direct pressure injection oil cup M8*1	2-Screw M8*16	3-DAS sealing ring D85	4-Retaining Ring 44.8*40*2
5-O-ring 45*3.1	6-Piston	7-Cylinder body	8-Internal thread plug M18*1.5
9-Guide Sleeve	10-O-ring 85*3.1	11-External thread plug G3/8	12-Retaining Ring 85*80.2*2
13-Composite bush 4040	14-HBTS d40	15-O-ring 90*3.1	16-U-ring 40*50*7.3/8
17-Dust ring d40	18-Piston rod Ø40*821	19-Hole retaining ring D90	20-Spherical Plain Bearing GEG50ES-2RS
21-Composite bush 5060			

6.14.Leveling cylinder

T35-100XHYG model:

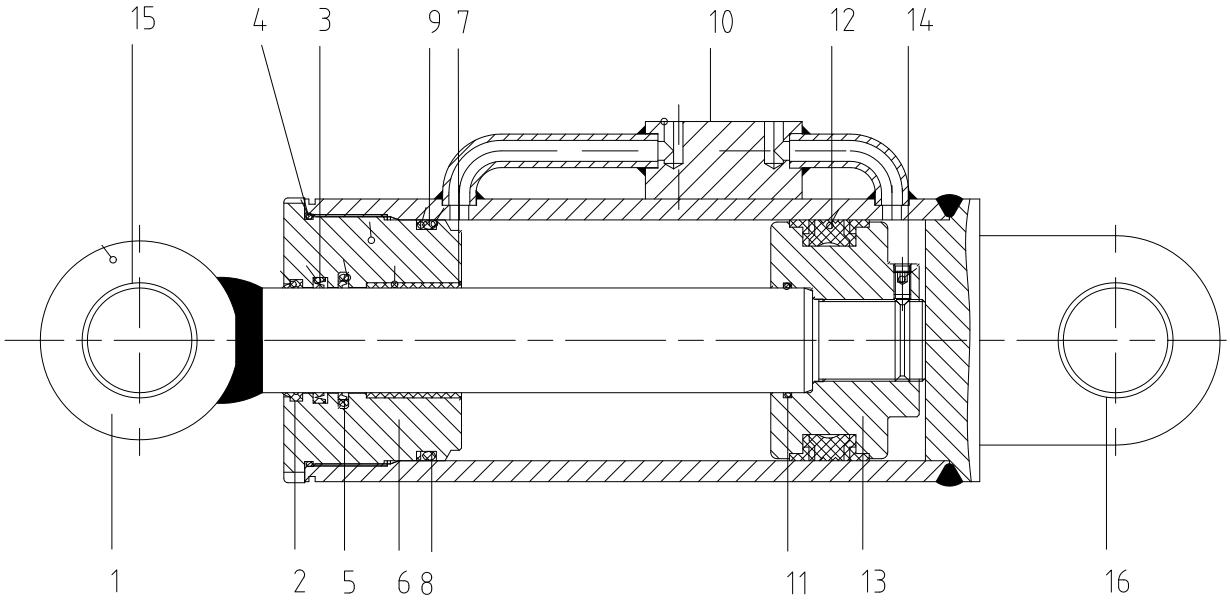


Figure 6.14-2 Leveling Cylinder Structure

1-Piston Rod Ø50*376	2-Dust ring d50	3-U-ring 50*60*6	4-O-ring 120*3.1
5-HBTS d50	6-Guide Sleeve	7-Composite bush 5045	8-Retaining Ring 115*106*2
9-O-ring 115*5.7	10-O-ring 16*2.4	11-O-ring 55*3.1	12-DAS sealing ring D115
13-Piston	14-Screw M8*16	15-Composite bush 5030	16-Composite bush 5045

Chapter 7. Lifting system

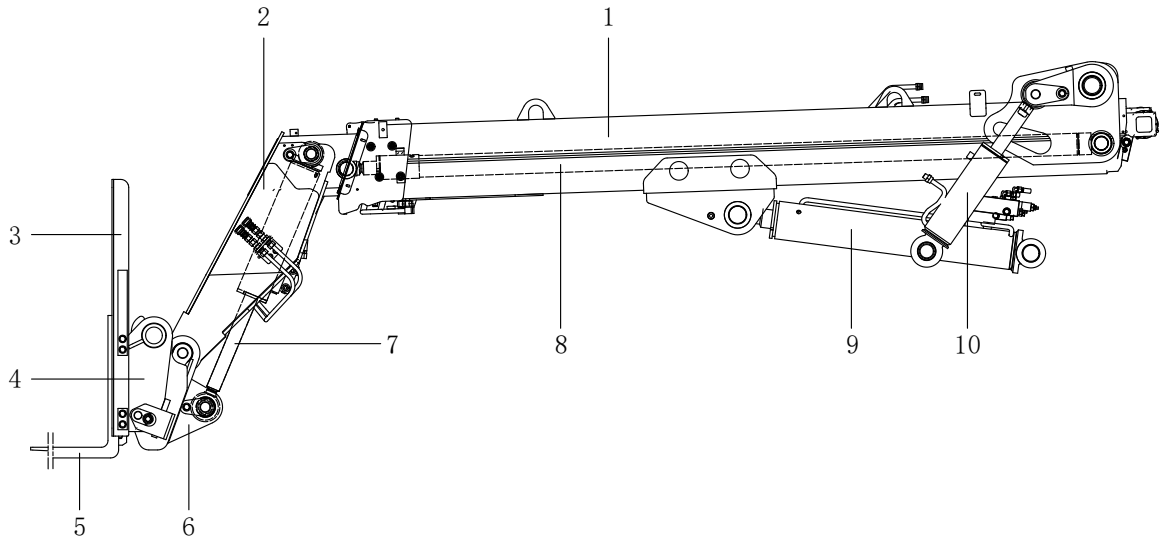
7.1. Overview

The lifting system of the telescopic telehandler is composed of an arm frame, a transition frame, accessories, chains, rollers, telescopic oil cylinders, variable amplitude oil cylinders, tilting oil cylinders, compensation oil cylinders, etc. It is the executing mechanism for loading and unloading operations of the telehandler. The lifting system can be classified according to the structure of the boom, and the telescopic boom can be divided into two stage, three stage, and four stage. Our T25-60XHYG telescopic telehandler is equipped with two-stage telescopic arms and internal telescopic oil cylinders; T35-60XHYG telescopic telehandler is equipped with a three stage telescopic arm, equipped with an external telescopic oil cylinder and an internal telescopic oil cylinder.

The boom of the telehandler is arranged on the right side of the cab to ensure a good view of the cab position. The boom can be extended or retracted through a telescopic oil cylinder, and the angle can be adjusted through a variable amplitude oil cylinder. By combining the two actions, the material handling function within the working range of the vehicle can be achieved; The compensating oil cylinder and the amplitude changing oil cylinder together form an automatic leveling oil circuit. When the boom amplitude changes, the piston rod of the compensating oil cylinder will be compressed/stretched, causing the piston rod of the leveling oil cylinder to expand and contract proportionally, thereby keeping the amplitude changing angle (relative to the ground) of the transition frame and the accessory unchanged, that is, the automatic leveling function. At the same time, the extension and retraction of the leveling cylinder can also be controlled separately through the hydraulic system to achieve the up and down tilting function of the accessory.

A two-stage boom is composed of a first stage telescopic arm that cannot be extended and a second stage telescopic arm that can be extended and retracted forward and backward. One end of the cylinder body of the telescopic oil cylinder is hinged to the end of the first stage telescopic arm, and one end of the piston rod is hinged to the head of the second stage telescopic arm; A three-stage boom is composed of a first stage telescopic arm that cannot be extended and a second and third stage telescopic arms that can be extended and retracted forward and backward. One end of the cylinder body of the external telescopic oil cylinder is hinged to the end of the first stage telescopic arm, one end of the piston rod is hinged to the head of the second stage telescopic arm, one end of the cylinder body of the internal telescopic oil cylinder is hinged to the end of the second stage telescopic arm, and one end of the piston rod is hinged to the third stage telescopic arm. One end of the cylinder body of the variable amplitude oil cylinder and compensation oil cylinder is hinged to the frame, and one end of the piston rod is hinged to the first stage telescopic arm; One end of the cylinder body of the leveling oil cylinder is hinged to the head of the telescopic arm, and one end of the piston rod is hinged to the transition frame; The oil cylinders are positioned using pin shafts and bolts.

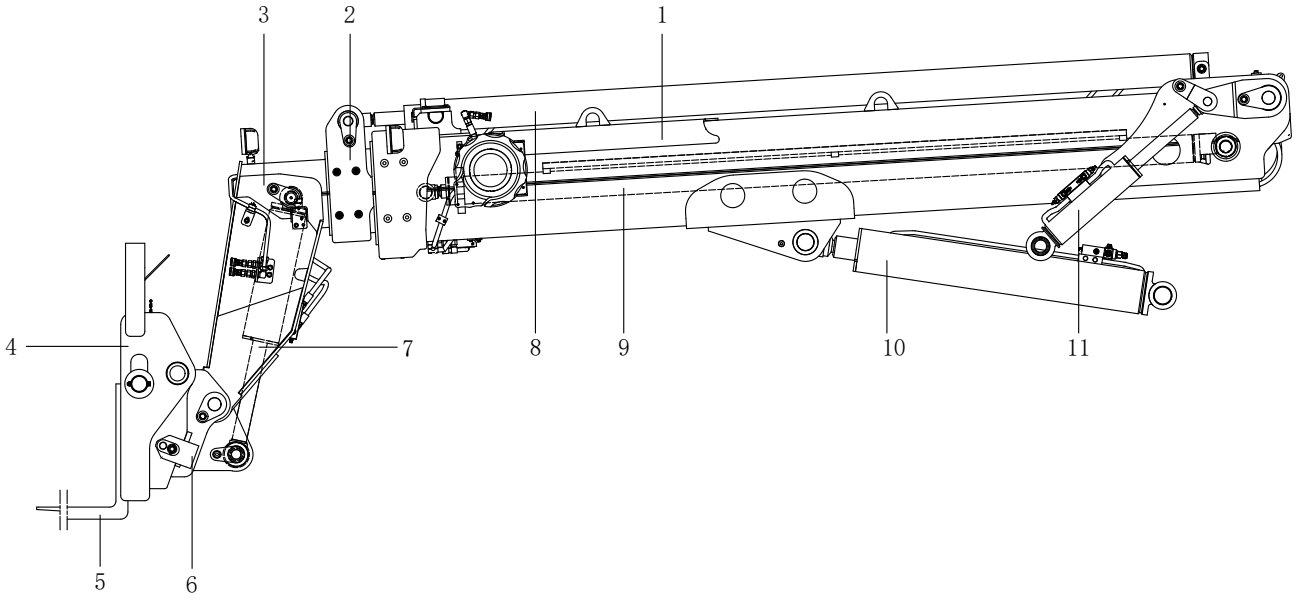
The fork of the secondary telescopic arm is hung on the fork frame by a hook, and the displacement of the fork is limited by a limit bolt; The fork of the three stage telescopic arm is hung on the fork frame through the installation shaft, and the displacement of the fork is limited by the limit pin.



1.One stage telescopic arm 2. Two stage telescopic arm 3. Shelves 4. Fork rack 5. Fork arm 6. Transition frame

7. Leveling oil cylinder 8. Telescopic oil cylinder 9. Variable amplitude oil cylinder 10. Compensation oil cylinder

Figure 7.1-1 Two stage telescopic arm



1. One stage telescopic arm 2. Two stage telescopic arm 3. Three stage telescopic arm 4. Fork rack and shelving 5. Fork arm

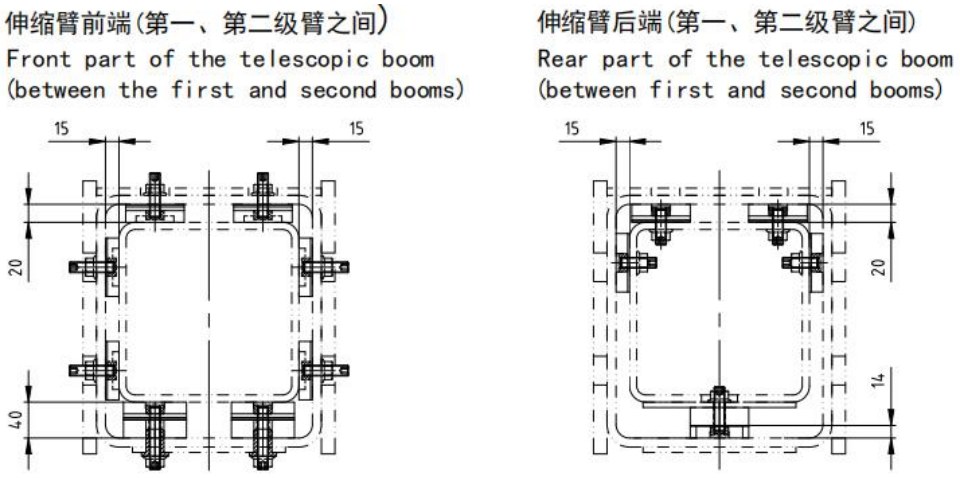
6. Transition frame 7. Leveling oil cylinder 8. External telescopic oil cylinder 9. Internal telescopic oil cylinder

10. Variable amplitude oil cylinder 11. Left and right compensation oil cylinders

Figure 7.1-2 Three stage telescopic arm

7.2. Assembly and debugging data

T25-60XHYG model：



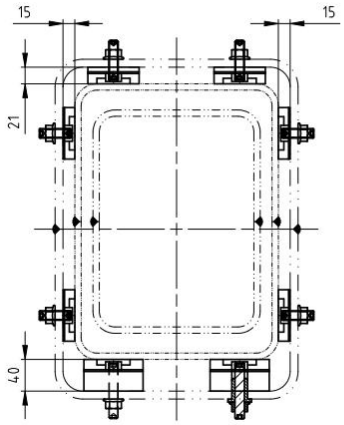
(1)Front end of boom (2)Rear end of boom

Figure 7.2-1 T2560-60XHYG slider assembly

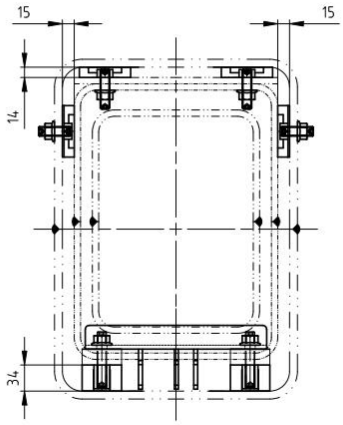
Detecting location	Unit	Front end of boom	Rear end of boom
The distance between the upper sides of the two-stage boom	mm	20.0	20.0
Allowable clearance between slider and arm during assembly	mm	0～0.5	0～0.5
Slider	mm	13.0	13.0
Shim	mm	1.0/2.0/4.0	1.0/2.0/4.0
The distance between the lower sides of the two-stage boom	mm	40.0	14.0
Allowable clearance between slider and arm during assembly	mm	0～0.5	0～0.5
Slider	mm	13.0	13.0
Shim	mm	1.0/2.0/4.0	0.5/1.0
Backing plate	mm	20	/
The distance between the left and right sides of the two-stage boom	mm	15.0	15.0
Allowable clearance between slider and arm during assembly	mm	0～0.5	0～0.5
Slider	mm	13.0	13.0
Shim	mm	1.0/2.0	1.0/2.0
The left and right clearances at the connection between the arm frame and the chassis	mm	3.0	
Shim	mm	2.0	

T35-100XHYG model：

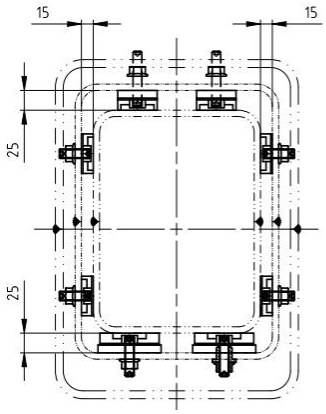
伸缩臂前端(第一、第二级臂之间)
Front part of the telescopic boom
(between the first and second booms)



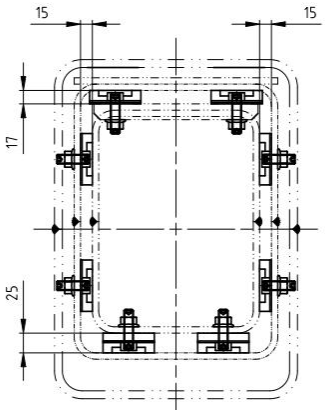
伸缩臂后端(第一、第二级臂之间)
Rear part of the telescopic boom
(between first and second booms)



伸缩臂前端(第二、第三级臂之间)
Front part of the telescopic boom
(between the second and third booms)



伸缩臂后端(第二、第三级臂之间)
Rear part of the telescopic boom
(between the second and third booms)



(1) Front end of boom　　(2) Rear end of boom

Figure 7.2-1 T3560-60XHYG slider assembly

Detecting position	Unit	Front end of boom	Rear end of boom
The distance between the upper side of the one and two stage boom	mm	21.0	15.0
Allowable clearance between slider and arm during assembly	mm	0～0.5	0～0.5
Slider	mm	13.0	13.0
Shim	mm	0.5/1.0/2.0	0.5/1.0/2.0
The distance between the lower sides of the one and two stage boom	mm	40.0	34.0
Allowable clearance between slider and arm during assembly	mm	0～0.5	0～0.5
Slider	mm	13.0	33.0
Shim	mm	0.5/1.0/2.0	0.5/1.0
Heel block	mm	25.0	/

The distance between the upper side of the two and three stage boom	mm	25.0	17.0
Allowable clearance between slider and arm during assembly	mm	0～0.5	0～0.5
Slider	mm	13.0	13.0
Shim	mm	0.5/1.0/2.0	0.5/1.0/2.0
Heel block	mm	10	/
The distance between the lower sides of the two and three stage boom	mm	25.0	25.0
Allowable clearance between slider and arm during assembly	mm	0～0.5	0～0.5
Slider	mm	13.0	13.0
Shim	mm	0.5/1.0/2.0	0.5/1.0/2.0
Heel block	mm	10	10
The distance between the left and right sides of the two-stage boom	mm	15.0	15.0
Allowable clearance between slider and arm during assembly	mm	0～0.5	0～0.5
Slider	mm	13.0	13.0
Shim	mm	0.5/1.0/2.0	0.5/1.0/2.0
The left and right clearances at the connection between the arm frame and the chassis	mm	4.0	
Shim	mm	1.0/2.0	

Tightening torque of main components

Position	Numerical value（N·m）
Sliding block fixing bolt	61～94（M12）
Pin axis positioning bolt	124～165（M14）
Oil cylinder positioning bolt	376～502（M20）

7.3.Fault diagnosis and troubleshooting measures

Fault	Fault analysis	Exclusion measures
Fork rack and arm rack tilt itself	The variable amplitude oil cylinder and sealing ring are excessively worn.	Replace the piston sealing ring or oil cylinder
	Multi way valve control valve stem spring failure.	Replace damaged parts
The boom and fork rack lifting amplitude operation is not flexible	The piston is stuck on the cylinder wall or the piston rod is bent.	Replace damaged parts
	Excessive accumulation of dirt in the cylinder.	Clean the oil cylinder
The fork rack does not telescopic smoothly	Improper adjustment of the telescopic arm assembly.	Adjust the gap between the inner and outer telescopic arms and the slider
	The slider is excessively worn.	Replace the slider
	There is dirt stuck between the moving parts.	Eliminate foreign objects
	Insufficient lubrication.	Apply lubricating grease (butter) on the contact surface of the slider
	Bending deformation of telescopic arm.	Repair or replace
Excessive noise from the boom	Insufficient lubrication.	Lubrication
	Improper adjustment of the upper and lower clearance of the telescopic arm can cause collision between the slider or other components and the outward telescopic arm when the inner telescopic arm extends.	Adjust slider component
	The slider is excessively worn.	Replace the slider
Lack strength to lift or unable to lift	Excessive wear and clearance between the oil pump gear and pump body.	Replace worn parts or oil pump
	The sealing ring of the lifting cylinder piston is worn and leaking internally.	Replace with a new Y-shaped sealing ring
	Multi way valve and safety valve spring failure.	Replace the new spring
	The control rod and valve body of the multi way valve are worn and leaking oil excessively.	Replace
	There is oil leakage between the valve bodies of the multi way valve.	After grinding, reassemble and tighten the screws in sequence
	Hydraulic pipeline leaks oil.	Tighten the joint nut and check for damage to the sealing gasket and connecting nut
	The hydraulic oil temperature is too high, the hydraulic oil is too thin, and the flow rate is insufficient.	Replace the hydraulic oil that does not comply with regulations or stop the vehicle to reduce the oil level, and check the cause of high oil temperature
	Overloaded.	Lift according to the specified load

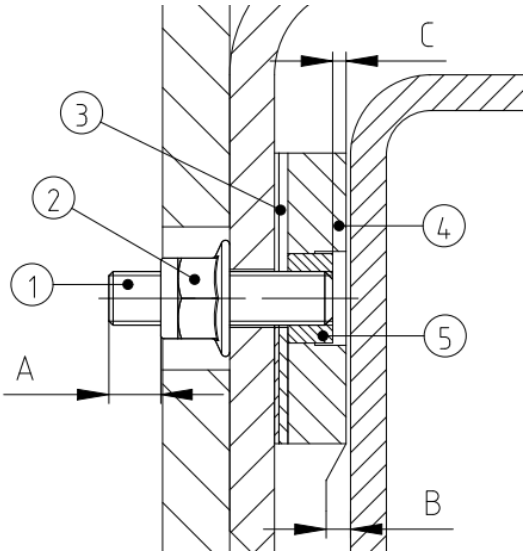
7.4.Installation and disassembly

Warning

Forks, fork racks, and telescopic arms are all heavy components, so special care should be taken when disassembling and assembling them.

7.4.1.Installation and disassembly of slider

Sliding block installation



①. Stud ② Nut ③ Shim ④ Slider ⑤ plugged impression

Figure 7.4 Schematic diagram of slider installation

1) When selecting bolts, ensure that the studs ① exceeds the nut ② The length of the outer end face is A=5-10mm.
2) The threaded joint between bolt ①, nut ②, and insert ⑤ needs to be coated with thread locking adhesive.
3) Install nut ② and tighten it to a torque of 80N · m.
4) The shim③ should be used reasonably, and the gap between the slider ④ and the corresponding arm should be adjusted to B=0-0.5mm.
5) Regularly check the wear of the slider. If the thickness C of the slider is less than 1mm, please replace it in a timely manner according to the above steps to ensure that the telescopic arm can work normally.

Sliding block lubrication

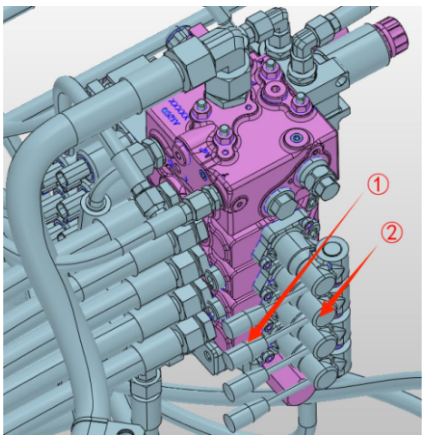
Attention !

After installing and replacing any telescopic arm slider, it is necessary to lubricate the corresponding telescopic arm.

1) Fully extend the telescopic arm.
2) Use a brush to apply lubricating grease on the four sides where the telescopic arm contacts the slider.
3) The telescopic arm can be extended and retracted multiple times to evenly apply lubricating grease.
4) Remove excess lubricating grease from the arm frame.

7.4.2.Operation before disassembling hydraulic components

1) Use the hydraulic joystick to fully retract the telescopic arm (after retracting the telescopic arm, maintain the retraction operation for 2-3 seconds);
2) Use the emergency handle ① (located in the storage box behind the driver's seat) equipped on the telehandler, and install it on the connection of the multi way valve ② corresponding to the oil circuit that needs to be disassembled;



①. Emergency Handle ② multi-way valve

Figure 7.4.2-1 Schematic diagram of multi way valve

3) Repeatedly turn the emergency handle left and right 15-20 times to release the pressure in the corresponding hydraulic circuit and drain the hydraulic oil in the oil circuit back to the hydraulic oil tank;

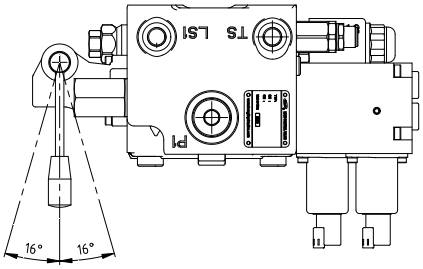
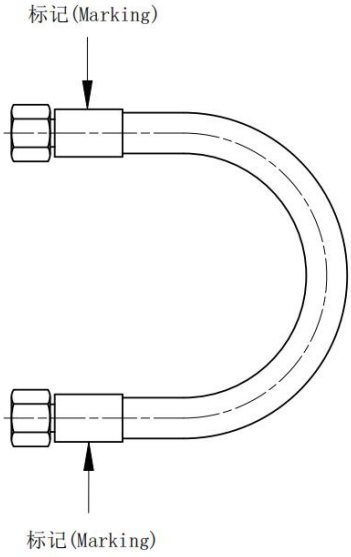


Figure 7.4.2-2 Manual Release Handle

4) Disassemble the hydraulic components in the corresponding oil circuit.

7.4.3. Installation and Disassembly of Arm Frame (T25-60XHYG Model)

7.4.3.1.Disassembly and installation of oil pipes



Attention！

a. When replacing or reinstalling hoses, it is necessary to always maintain their natural winding direction. During the connection process, there must be no twisting or stress to ensure that the hose does not experience excessive twisting when deployed inside the telescopic arm.

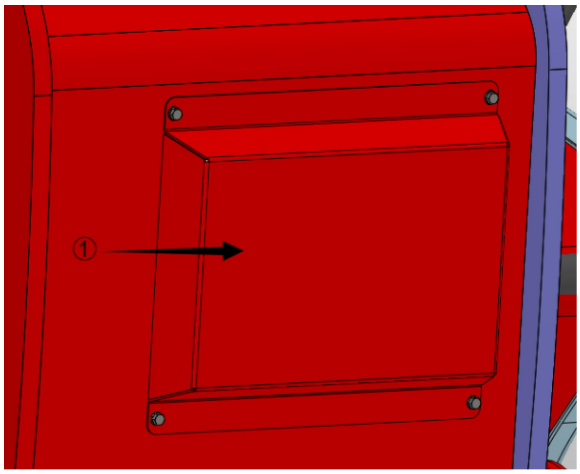
b. The markings on both ends of the oil pipe must be located on the outer side of the winding direction.

- **Disassemble and assemble the oil pipe at the telescopic oil cylinder of the boom**

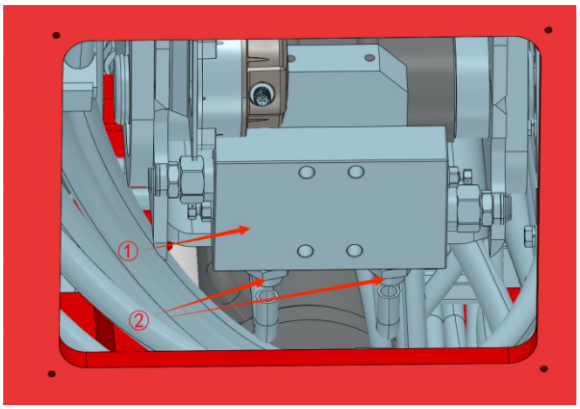
1) Use the hydraulic joystick to fully retract the telescopic cylinder (maintain the retraction operation for 5 seconds);

2) Use the emergency handle to release the pressure in the oil circuit of the third connection of the multi way valve and discharge the hydraulic oil in the oil pipe;

3) Remove the rear cover of the vehicle body ①;



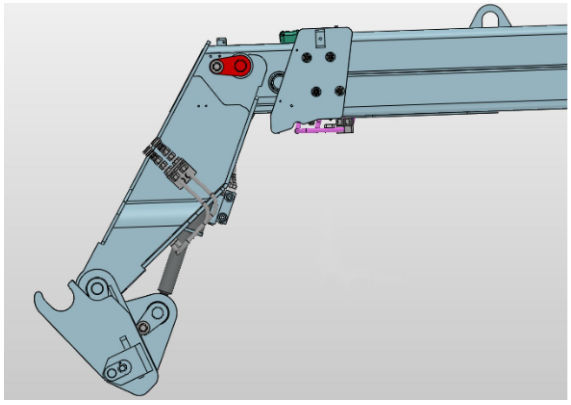
4) Remove the oil pipe ② joint connected to the telescopic cylinder balance valve ① from the observation window at the rear of the vehicle, with a total of 2 locations;



5) Follow steps 3) → 2) to reinstall the corresponding oil pipe.

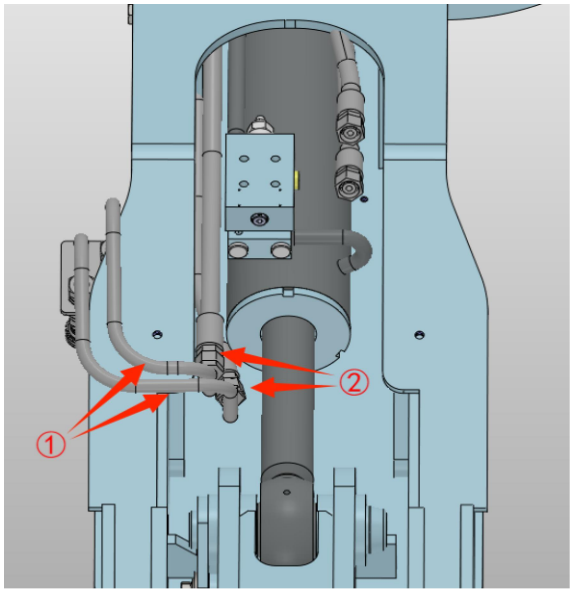
- **Spare oil pipe for disassembly and assembly of accessories**

1) Use a hydraulic joystick to extend half of the tilt cylinder stroke for easy disassembly of the oil pipe;

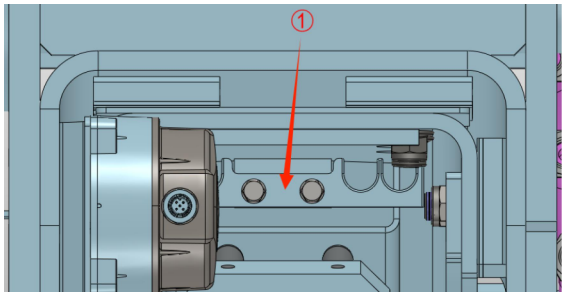


2) Use the emergency handle to release the pressure in the oil circuit of the fourth connection of the multi way valve and discharge the hydraulic oil in the oil pipe;

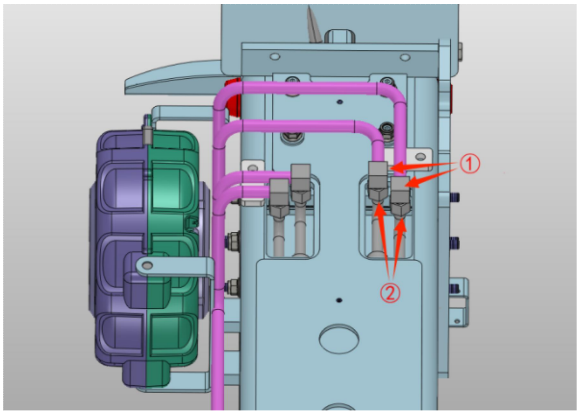
3) Remove the connection joint between the steel oil pipe ① at the front end of the boom and the accessory oil pipe ②, totaling 2 points;



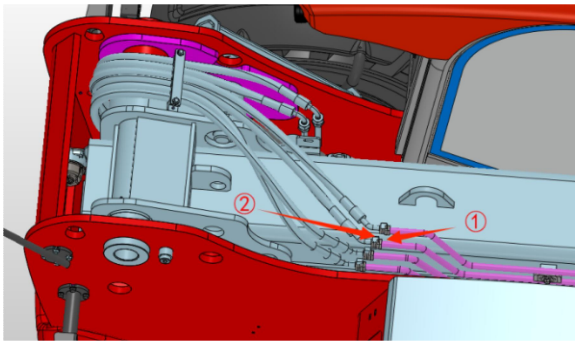
4) Remove the pipe clamp ① that fixes the oil pipe at the end of the arm support;



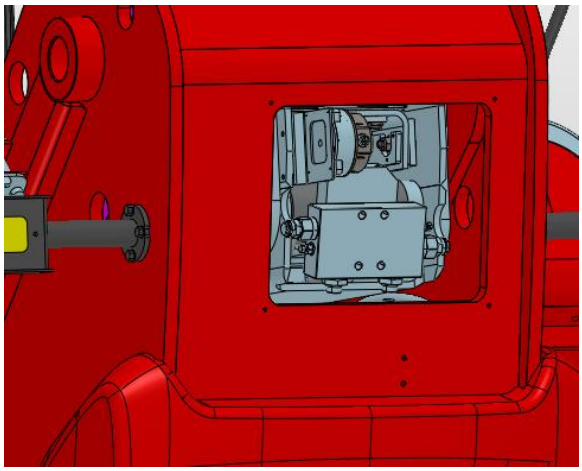
5) Remove the connection joint between the external steel oil pipe ① of the arm and the internal accessory oil pipe ② of the arm below the front end of the arm, a total of 2 locations;



6) Remove the oil pipe ② joint connected to the steel oil pipe ① at the rear upper arm of the vehicle, with a total of 2 joints;



7) Remove the accessory oil pipe from the rear end of the arm frame;



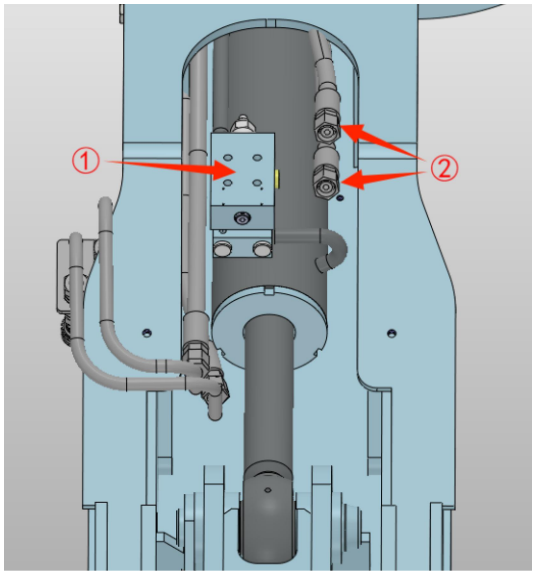
8) Follow the steps 7) → 6) → 5) → 4) → 3) in reverse to reinstall the accessory oil pipe

- **Dismantle the oil pipe at the tilt cylinder of the boom**

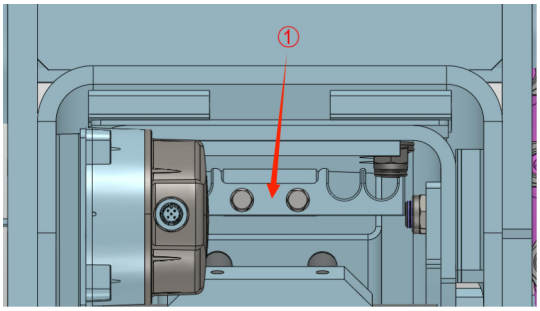
1) Use the hydraulic joystick to fully retract the tilt cylinder (after retracting the telescopic arm, maintain the retraction operation for 2-3 seconds);

2) Use the emergency handle to release the pressure in the oil circuit of the second connection of the multi way valve and discharge the hydraulic oil in the oil pipe;

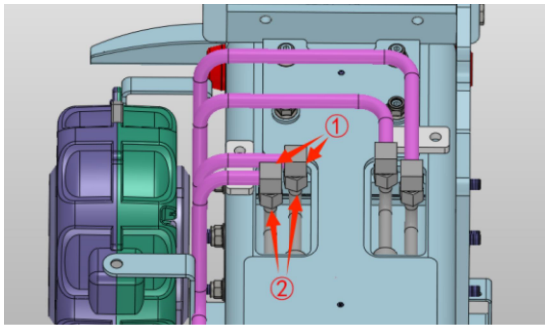
3) At the extension of the boom, remove the accessory oil pipe ② joint connected to the balance valve ① of the tilting oil cylinder, totaling 2 points;



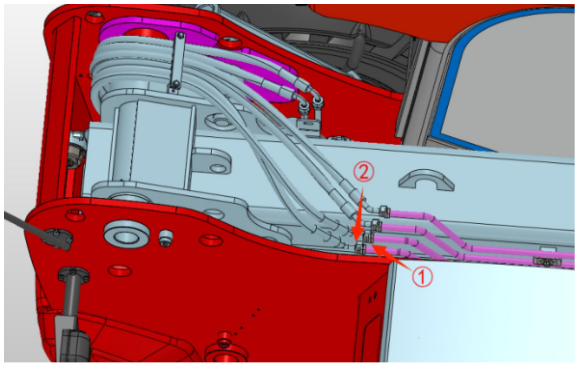
4) Remove the pipe clamp ① that fixes the oil pipe at the end of the arm support;



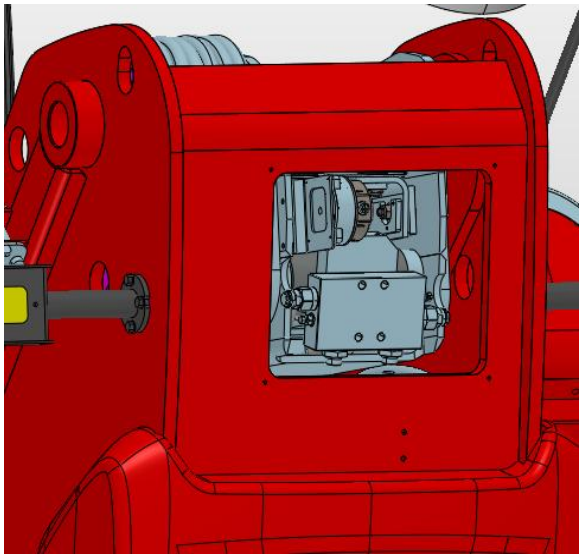
5) Remove the connection joint between the external steel oil pipe ① of the boom and the tilt oil cylinder oil pipe ② below the front end of the boom, totaling 2 points;



6) Remove the oil pipe ② connected to the steel oil pipe ① at the rear upper arm of the vehicle, a total of 2 locations;



7) Remove the tilting oil cylinder oil pipe from the rear end of the boom;



8) Follow steps 7) → 6) → 5) → 4) → 3) in reverse to reinstall the tilt cylinder oil pipe ①.

7.4.3.2.Disassembly and installation of oil cylinder

T25-60XHYG model：

Warning

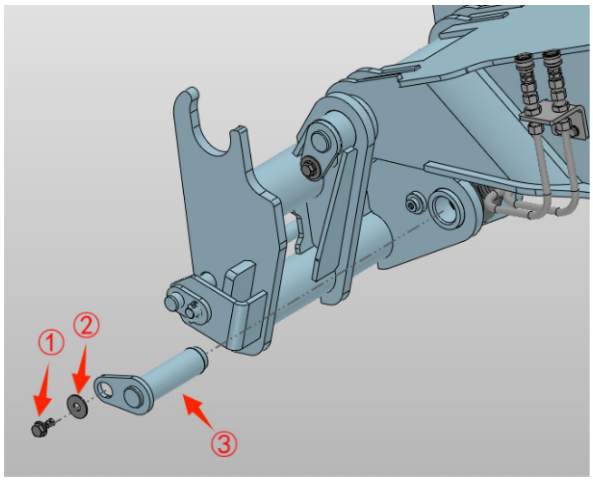
a. Before disassembling any oil cylinder, it is necessary to use an emergency handle to drain the hydraulic oil from the corresponding oil circuit on the multi way valve back to the oil tank, and remove the corresponding oil pipe connections and electrical circuits.

b. If it is necessary to disassemble the balance valve of the oil cylinder, as there may still be hydraulic oil and residual pressure inside the

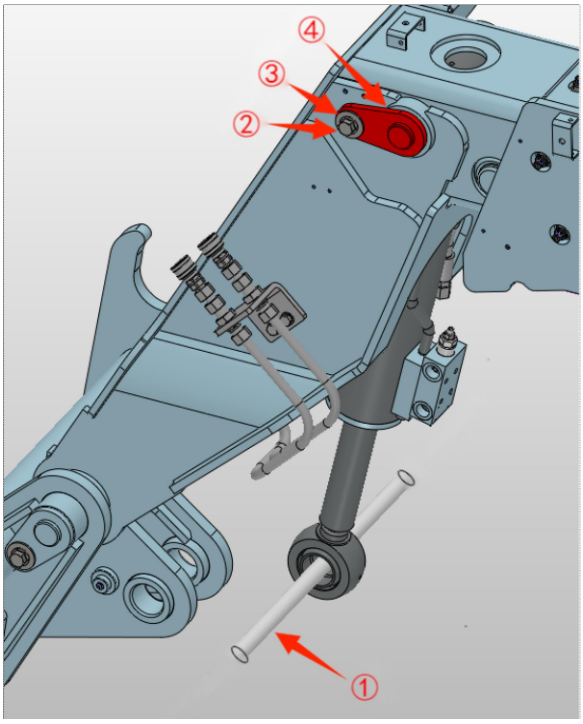
cylinder, operators need to wear protective gear and take protective measures to prevent personal injury and environmental pollution caused by hydraulic oil splashing.

- **Disassemble and assemble the tilting oil cylinder**

1) Use a hydraulic joystick to extend the piston rod of the tilt cylinder by half of its stroke;
2) After removing the pin positioning bolt ① and shim ②, pull out the pin ③ at the piston rod end of the tilting oil cylinder, and then fix the transition frame with a tie or pry bar to prevent it from rotating freely;
3) Use the hydraulic control handle to fully retract the tilt cylinder piston rod, then use the emergency handle to drain the hydraulic oil in the second oil circuit of the multi way valve back to the oil tank, and remove the corresponding oil pipe connection, as shown in **7.4.3.1. Oil pipe disassembly and installation;**



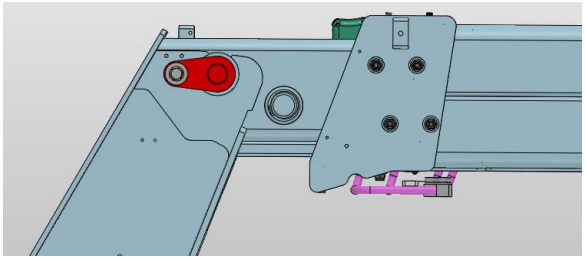
1) Use straps or pry bars to pull the piston rod end of the tilt cylinder, then remove the pin shaft positioning bolt ② and shim ③, and take out the pin shaft ④ from the cylinder body end of the tilt cylinder;
4) Place a tray under the oil cylinder, pull the piston rod end of the tilting oil cylinder, then gently lower the oil cylinder and place it on the tray to complete the disassembly of the tilting oil cylinder.



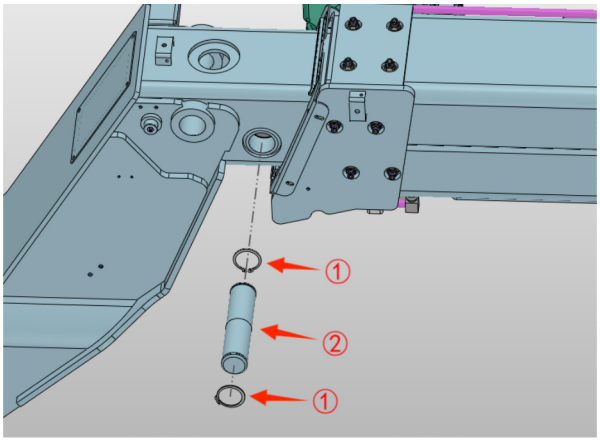
5) Follow steps 4) → 3) → 2) in reverse to reinstall the tilt cylinder.

- **Disassemble and assemble the telescopic oil cylinder**

1) Extend the telescopic arm 100-200mm to expose the pin shaft of the telescopic arm oil cylinder for disassembly;

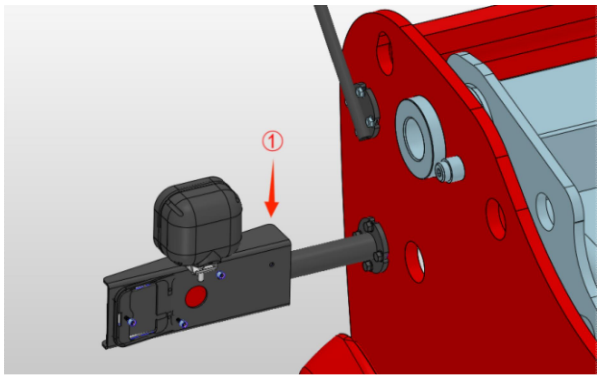


2) Use clamp pliers to remove clamp springs ① from both ends of the pin shaft, and then remove pin shaft ② from the piston rod end of the telescopic oil cylinder;

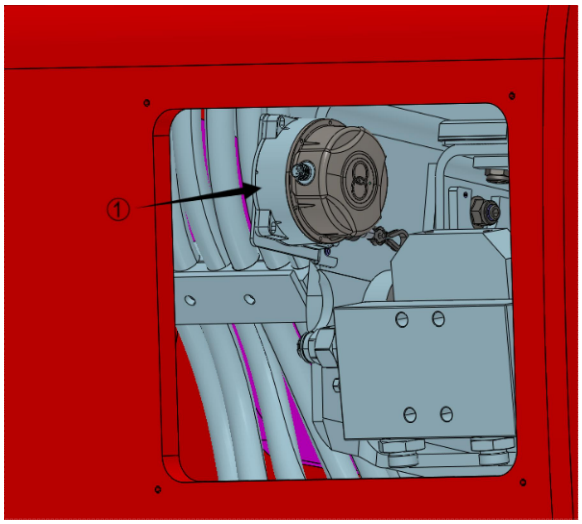


3) Use the hydraulic control handle to retract the piston rod of the telescopic oil cylinder, use the emergency handle to drain the hydraulic oil from the third oil circuit of the multi way valve back to the oil tank, and remove the corresponding oil pipe of the telescopic oil cylinder;

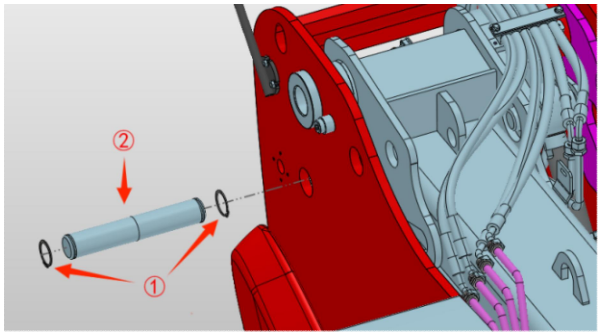
4) Remove the right rear light bracket ①;



5) Dismantle the cable sensor and its bracket ①;



6) First, use snap pliers to remove the snap springs ① from both ends of the pin shaft, and then remove the cylinder end pin shaft ② of the telescopic oil cylinder through the reserved hole on the frame;

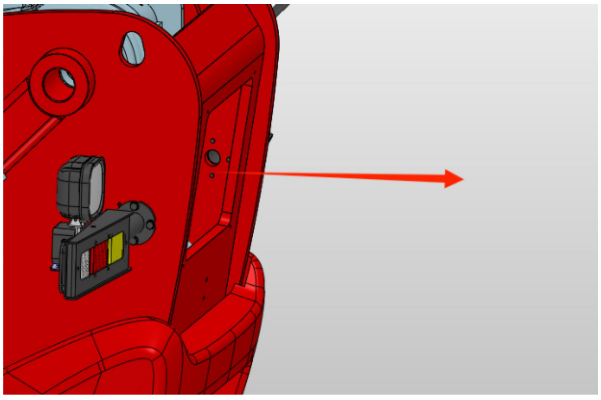


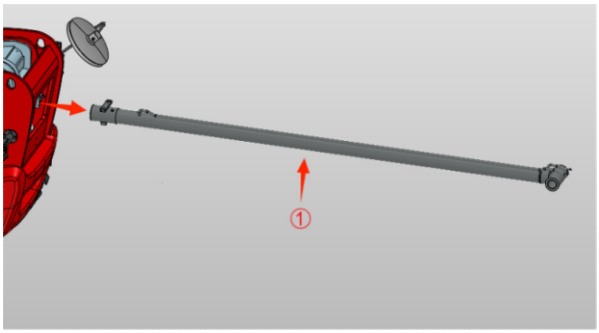
7) Use the joystick to lift the telescopic arm appropriately, up to a maximum of 5 ° (relative to the ground);

8) Pull out the telescopic cylinder ① through the observation window at the rear of the vehicle using tools such as pry bars and straps;

Attention !

If there is resistance during the process of pulling out the oil cylinder, the pry bar can be inserted into the base of the oil cylinder, and the oil cylinder and its guide device can smoothly pass over the internal devices of the arm frame (slider, bolt, etc.) through rotation.



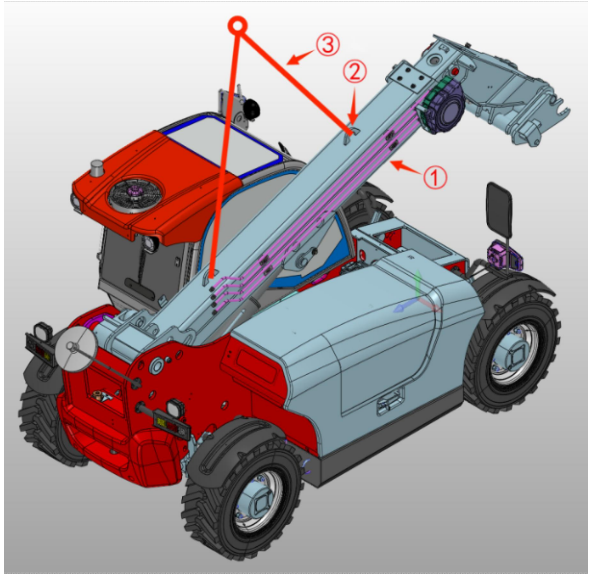


9) Lift the telescopic oil cylinder and completely remove it from the boom, then gently place it on the ground tray.

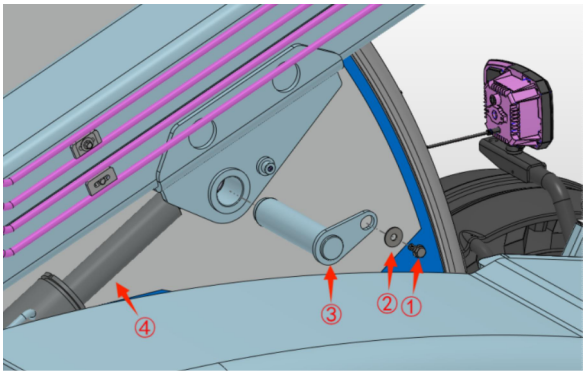
10) Follow the steps 9) → 8) → 7) → 6) → 5) → 4) → 3) in reverse to reinstall the telescopic oil cylinder.

- **Disassemble and assemble the variable amplitude oil cylinder**

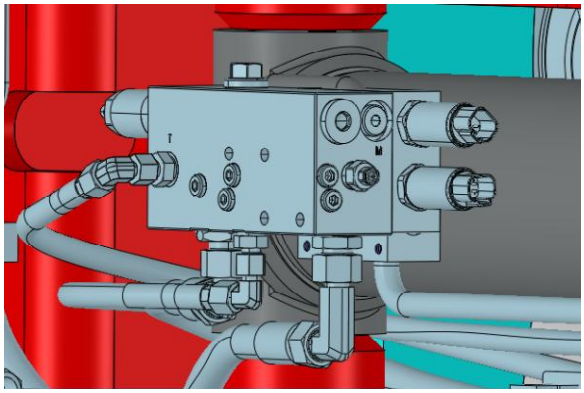
1) Use the hydraulic control handle to lift the boom ① to an appropriate angle, and then use the lifting points ② (2 in total) on the boom to lift it with chains or straps ③ that have sufficient load-bearing capacity;



2) After removing the pin positioning bolt ① and shim ②, take out the pin ③ at the piston rod end of the variable amplitude oil cylinder, and disconnect the arm from the variable amplitude oil cylinder ④;

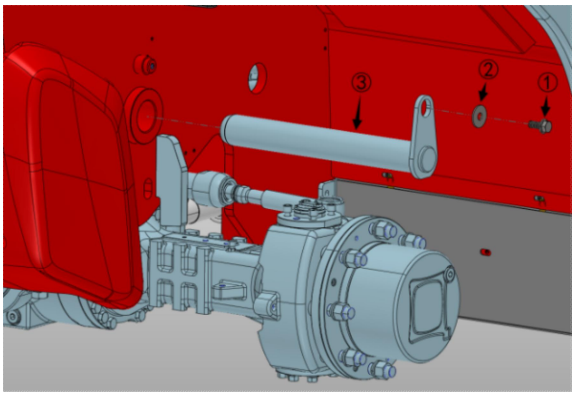


3) Use the hydraulic joystick to fully retract the piston rod of the variable amplitude oil cylinder, drain the hydraulic oil from the first connection of the multi way valve back to the oil tank, and then remove the oil pipe connection of the variable amplitude oil cylinder;



4) Before continuing to remove the variable amplitude oil cylinder, it is necessary to first remove the right rear wheel and its mudguard assembly;

5) After removing the locating bolt ① and shim ②, take out the cylinder end pin ③ of the variable amplitude oil cylinder and disconnect the variable amplitude oil cylinder from the vehicle body;

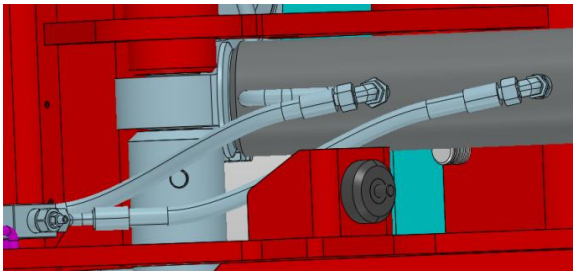


6) Lift the variable amplitude oil cylinder out with lifting equipment and place it steadily on the ground pallet;

7) Follow steps 6) → 5) → 4) → 3) → 2) → 1) in reverse to reinstall the amplitude cylinder.

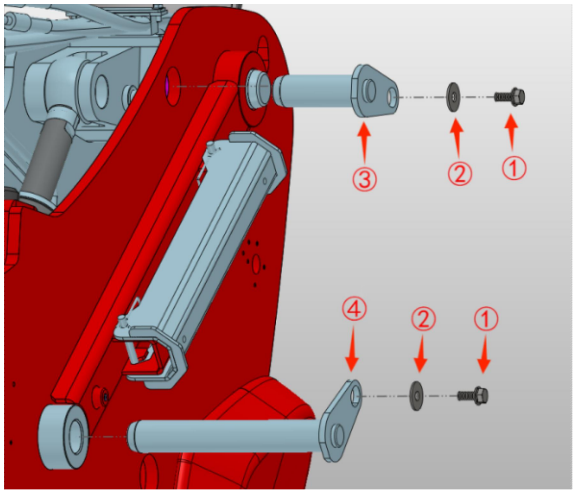
- **Disassemble and assemble the compensating oil cylinder**

1) Use the hydraulic control handle to minimize the amplitude of the boom and fully retract the tilt cylinder piston rod. Use the emergency handle to drain the hydraulic oil from the second connection of the multi way valve back to the oil tank, and then remove the oil pipe connection of the amplitude cylinder;



2) After removing the pin positioning bolt ① and shim ②, take out the piston rod end pin ③ of the variable amplitude oil cylinder, and disconnect the tilt oil cylinder from the boom;

3) After removing the pin positioning bolt ① and shim ②, take out the pin shaft ④ at the cylinder end of the variable amplitude oil cylinder, and disconnect the tilt oil cylinder from the vehicle body;



4) Lift the tilting oil cylinder out with lifting equipment and place it steadily on the ground pallet;

5) Follow steps 6) → 5) → 4) → 3) → 2) → 1) in reverse to reinstall the amplitude cylinder.

7.4.3.3. Disassembly and installation of arm frame structural components

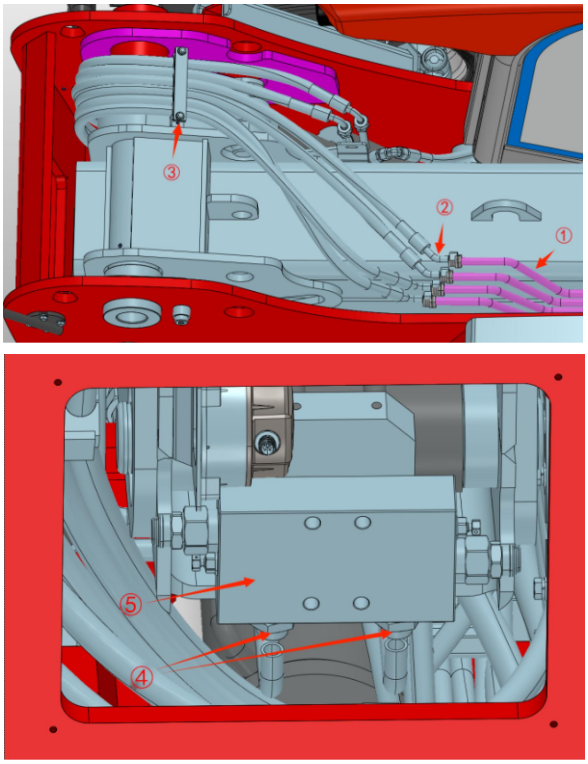
Warning

Forks, fork racks, and telescopic arms are all heavy components, so special care should be taken when disassembling and taking appropriate precautions.

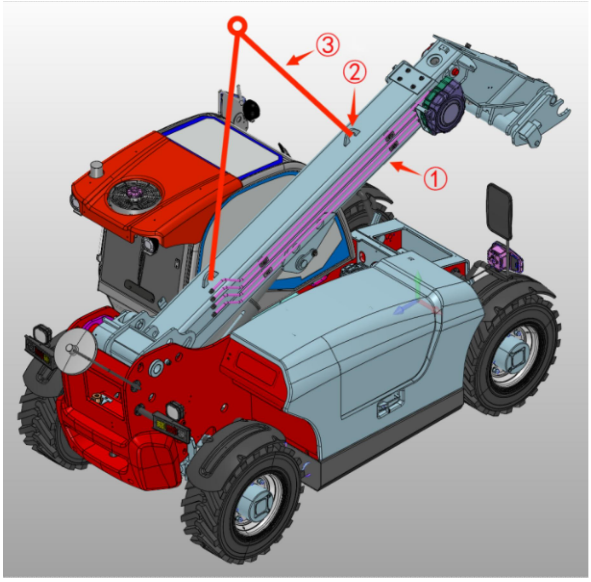
T25-60XHYG model:

- **Remove the boom from the vehicle body**

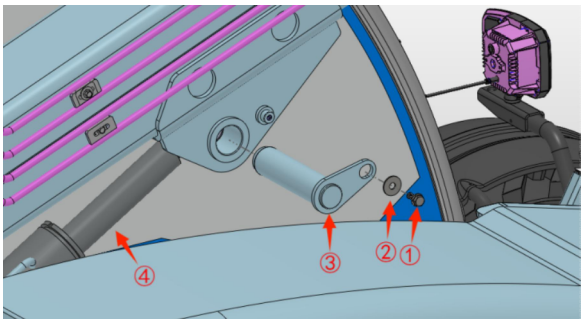
1) Use the emergency handle to drain the hydraulic oil from the 2nd, 3rd, and 4th oil circuits of the multi way valve back to the oil tank, then remove the connection between steel oil pipe ① and oil pipe ②, the connection between oil pipe ④ and balance valve ⑤, and remove pipe clamp ③, as shown in **7.4.3.1. Oil pipe disassembly and installation**;



2) Use the hydraulic control handle to lift the boom ① to an appropriate angle, and then use the lifting points ② (2 in total) on the boom to lift it with chains or straps ③ that have sufficient load-bearing capacity;

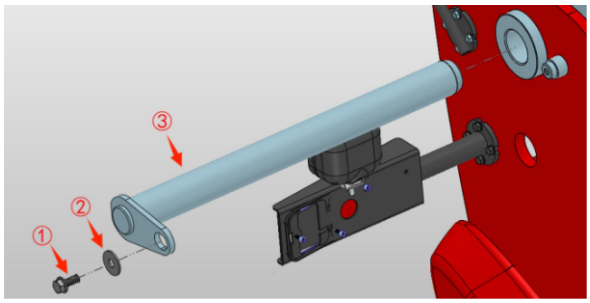


3) After removing the pin positioning bolt ① and shim ②, take out the pin ③ at the piston rod end of the variable amplitude oil cylinder, and disconnect the arm from the variable amplitude oil cylinder ④;

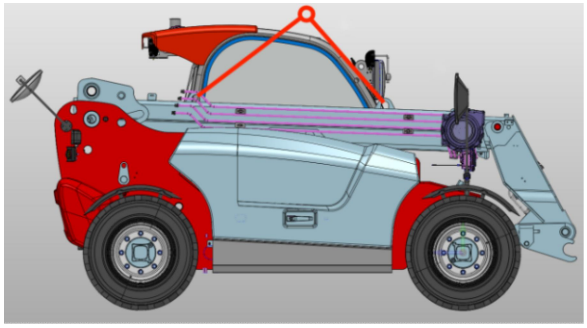


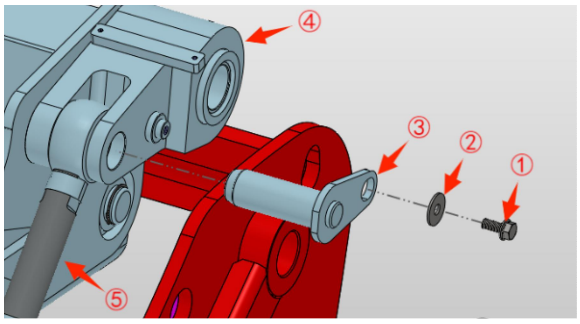
4) Use the hydraulic joystick to retract the piston rod of the amplitude cylinder, and support the amplitude cylinder with a wooden block, then reduce the amplitude angle of the boom.

5) After removing the pin positioning bolt ① and shim ②, take out the pin ③ at the hinge point between the arm and the frame, and disconnect the connection between the arm and the frame;



6) Lift the arm frame appropriately, then remove the pin axis positioning bolt ① and shim ②, take out the pin axis ③ at the hinge point between the arm frame ④ and the compensating oil cylinder ⑤, and disconnect the arm frame from the compensating oil cylinder;





7) Lift the arm frame and place it on a platform with sufficient height to avoid the head of the arm frame touching the ground;

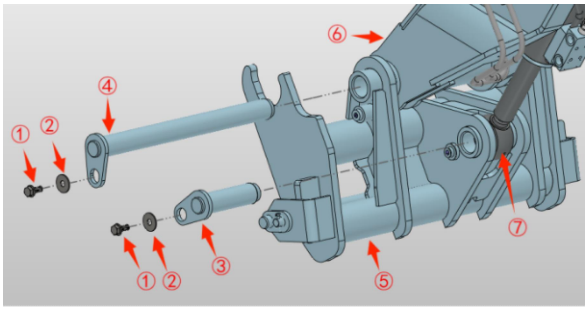
8) Follow steps 7) → 6) → 5) → 4) → 3) → 2) → 1) in reverse to reinstall the boom.

- **Dismantle the transition frame**

1) Extend the tilt cylinder halfway through its stroke;

2) After removing the pin positioning bolt ① and shim ②, take out the pin ③ at the piston rod end of the tilting oil cylinder, and disconnect the tilting oil cylinder ⑦ from the transition frame ⑤;

3) After removing the pin positioning bolt ① and shim ②, take out the pin ④ at the joint between the transition frame and the second stage telescopic arm, and disconnect the connection between the transition frame ⑤ and the second stage telescopic arm ⑥



4) Lift the transition frame and gently place it on a tray on the ground. As the transition frame is heavy, preventive measures should be taken;

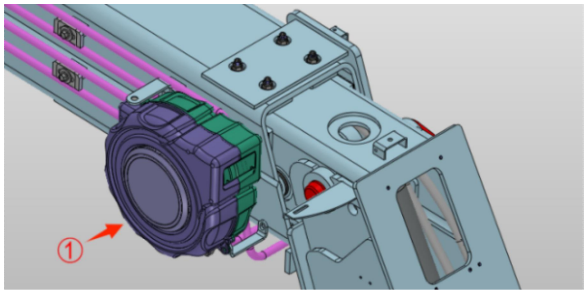
5) Follow steps 4) → 3) → 2) to reinstall the transition frame.

- **Dismantle the telescopic arm**

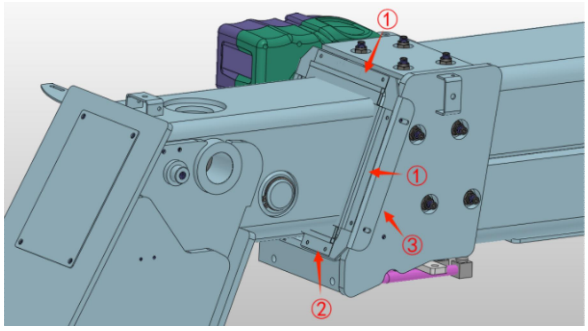
1) According to **7.4.2.2. Disassembly and installation of oil pipes** and **7.4.2.3. Disassembly and installation of oil**

cylinders, first disassemble the corresponding hydraulic oil pipes and telescopic oil cylinders;

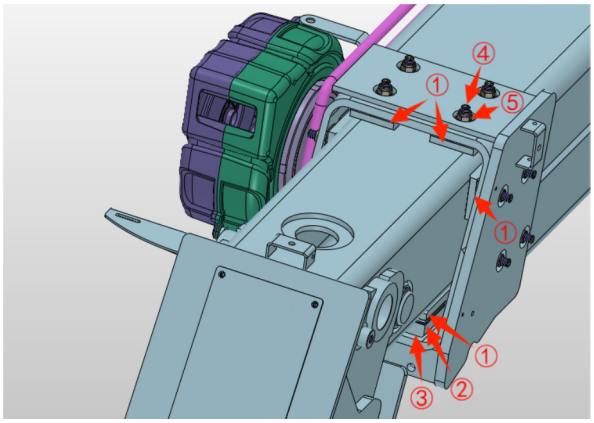
2) Dismantle the cable reel and its wiring ①;



3) Remove the dust brush components ①, ② and folding plate ③ from the telescopic arm;



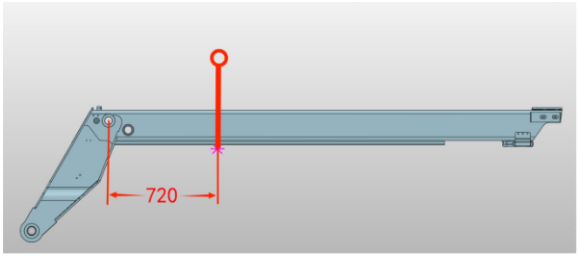
4) First, remove the fastening bolt ④ and nut ⑤, then lift or lower the second stage telescopic arm appropriately, and remove the slider ①, shim ②, and cushion block ③ at the front end of the telescopic arm;

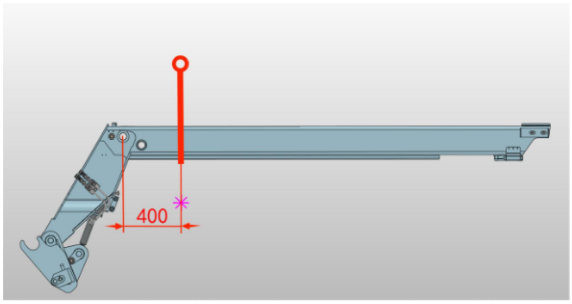


7.4.4.Installation and disassembly of arm frame(T35-100XHYG model)

5) Lift the second stage telescopic arm and then pull it out from the first stage telescopic arm;

6) When the transition frame is not installed, the lifting point of the first stage telescopic arm is 720mm away from the hinge point of the tilting oil cylinder; When equipped with a transition frame, the lifting point is 400mm away from the hinge point of the inclined oil cylinder;





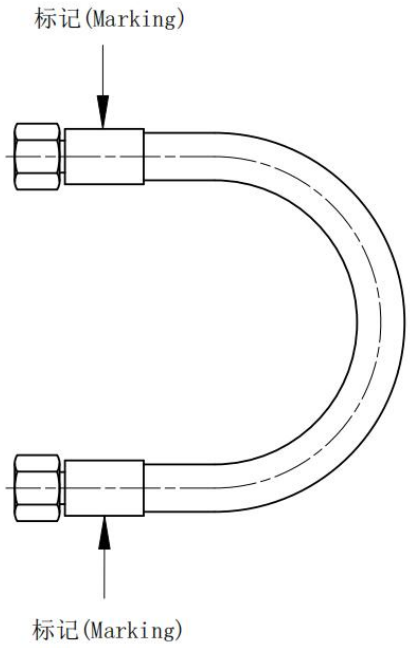
7) Follow steps 5) → 4) → 3) → 2) → 1) in reverse to reinstall the telescopic arm.

Attention !

a. When using adjustment shims, the number of shims on the left and right sides must be equal.

b. After adjusting the gap, push and pull the inner telescopic arm forward and backward while moving the outer telescopic arm, and check if its operation is correct.

7.4.4.1.Disassembly and installation of oil pipes



Attention！

a. When replacing or reinstalling the hose, it must always maintain its natural winding direction. During the connection process, there should be no twisting or stress, ensuring that the hose does not experience excessive twisting when extending inside the telescopic arm.

b. The markings on both ends of the oil pipe must be located on the outer side of the winding direction.

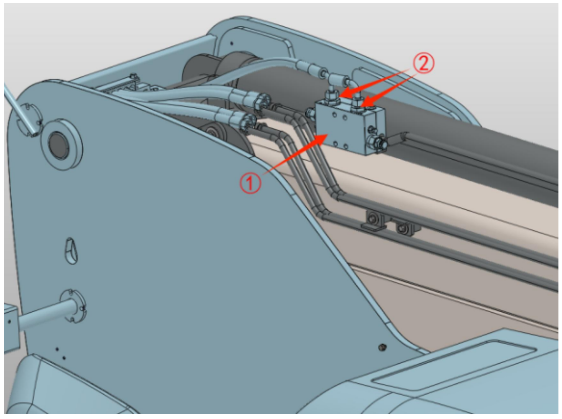
T35-100XHYG model：

- **Disassemble and assemble the oil pipe at the telescopic oil cylinder of the boom**

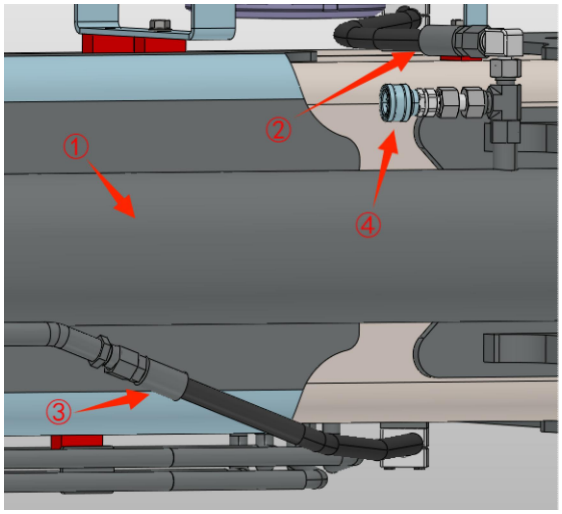
1） Use the hydraulic joystick to fully retract the outer and inner telescopic cylinders (maintain the retraction operation for 5 seconds);

2) Use the emergency handle to release the pressure in the oil circuit of the third connection of the multi way valve, and drain the hydraulic oil in the oil pipe back to the hydraulic oil tank;

3) Remove the oil pipe ② joint connected to the external telescopic cylinder balance valve ① at the upper arm of the rear of the vehicle, totaling 2 points;



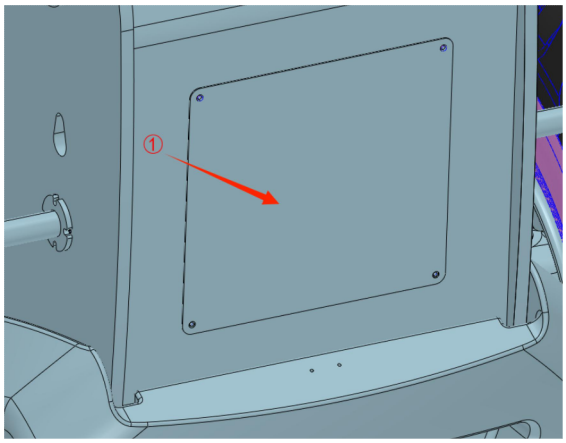
4) Use the equipped accessory quick change oil pipe, place one end in an empty oil drum and connect the other end to the spare quick change interface ④ of the external telescopic oil cylinder ①, drain the residual hydraulic oil in the oil circuit, and then remove the oil pipes ② and ③;



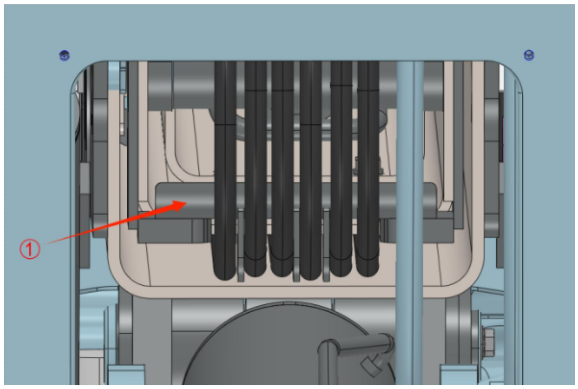
Warning

When disassembling the oil pipe of the external telescopic oil cylinder, due to the possibility of hydraulic oil and residual pressure in oil pipes ② and ③, operators need to wear protective gear and take protective measures to prevent personal injury or environmental pollution caused by hydraulic oil splashing.

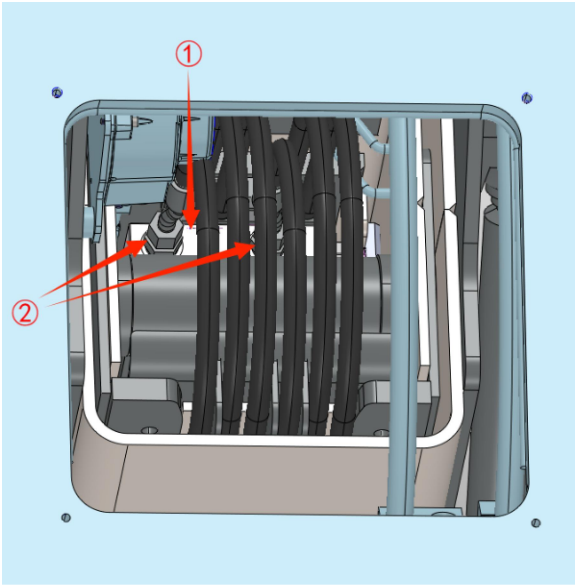
5) Remove the arm frame cover ①;



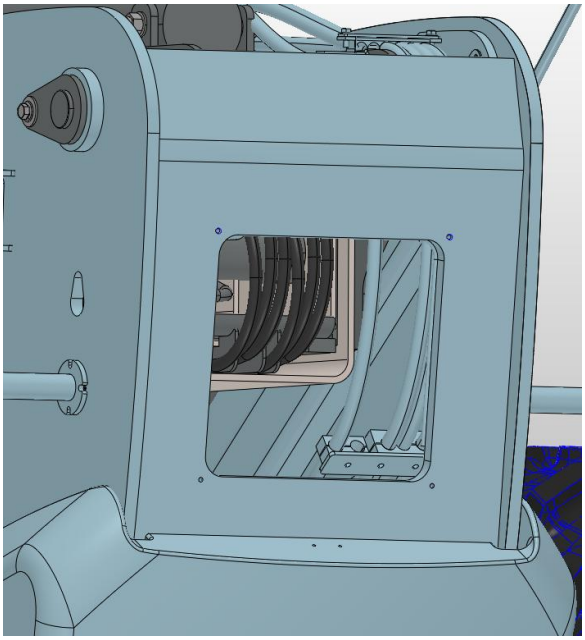
6) Remove the oil pipe guide component ① through the rear observation window of the vehicle;



7) Remove the joint of the oil pipe ② connected to the balance valve ① of the internal telescopic cylinder through the observation window at the rear of the vehicle, with a total of 2 locations;



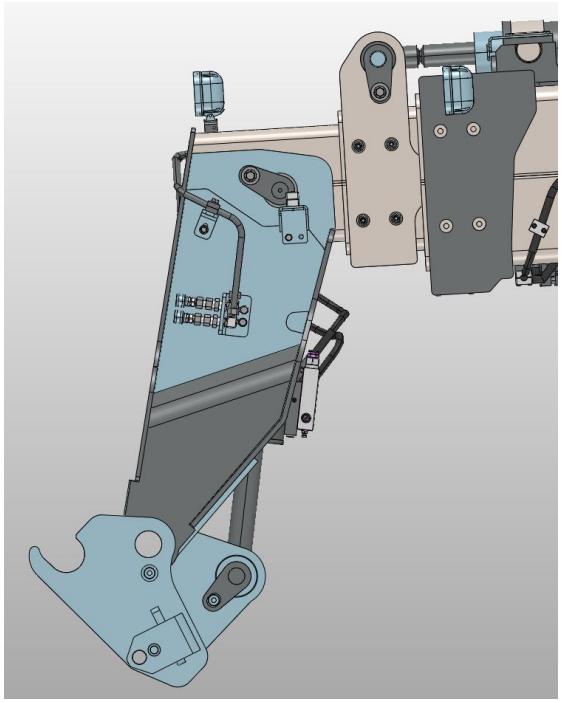
8) Take out the oil pipe of the telescopic cylinder from the observation window at the rear of the vehicle body;



9) Follow the steps 8) → 7) → 6) → 5) → 4) → 3) in reverse to reinstall the telescopic oil cylinder oil pipe ①.

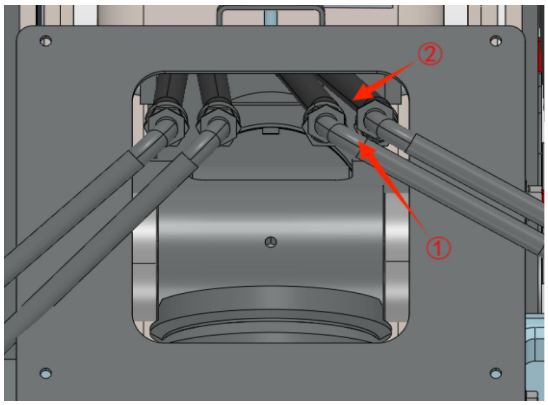
- **Disassemble and assemble the oil pipe of the arm frame accessory**

1) Use a hydraulic joystick to extend half of the tilt cylinder stroke for easy disassembly of the oil pipe;

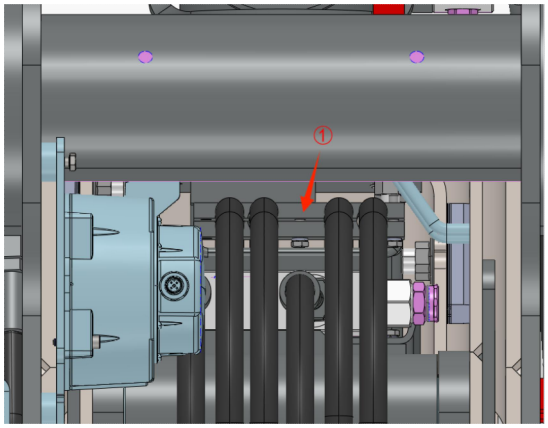


2) Use the emergency handle to release the pressure in the oil circuit of the fourth connection of the multi way valve and discharge the hydraulic oil in the oil pipe;

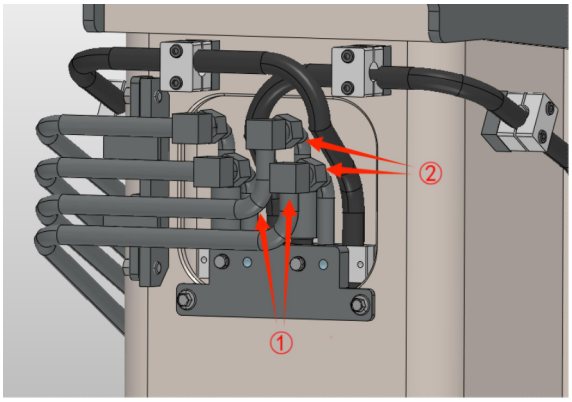
3) Remove the connection joint between the steel oil pipe ① at the head of the arm and the accessory oil pipe ② through the observation window at the head of the arm, totaling 2 points;



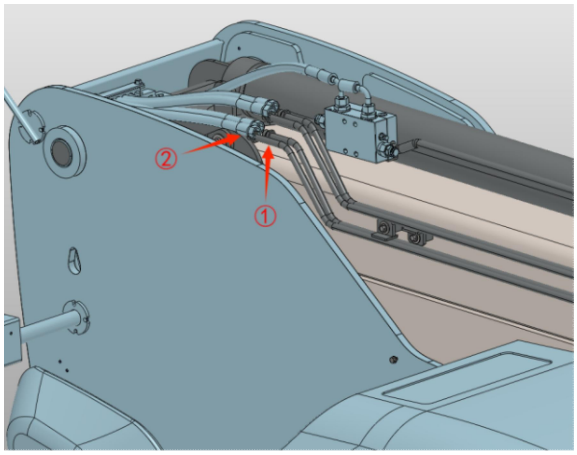
4) Remove the pipe clamp ① that fixes the oil pipe at the end of the arm support;



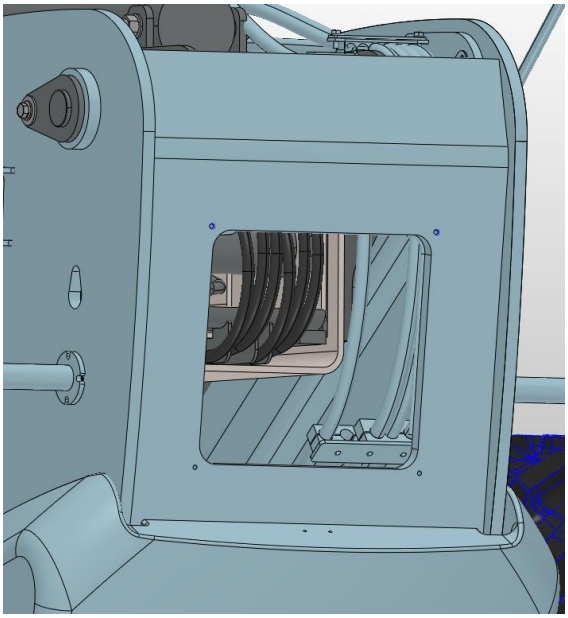
5) Remove the connection joint between the external steel oil pipe ① of the arm and the internal accessory oil pipe ② of the arm below the front end of the arm, a total of 2 locations;



6) Remove the oil pipe ② joint connected to the steel oil pipe ① at the rear upper arm of the vehicle, with a total of 2 joints;



7) Remove the accessory oil pipe from the rear end of the arm frame;



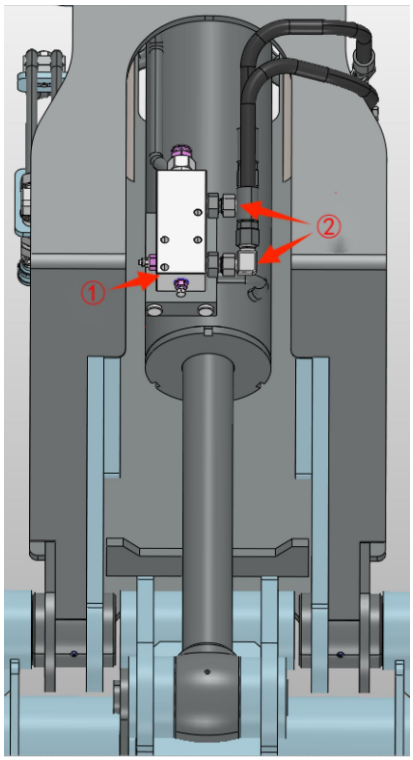
8) Follow the steps 7) → 6) → 5) → 4) → 3) in reverse to reinstall the accessory oil pipe ①.

- **Disassemble and assemble the oil pipe at the tilt cylinder of the boom**

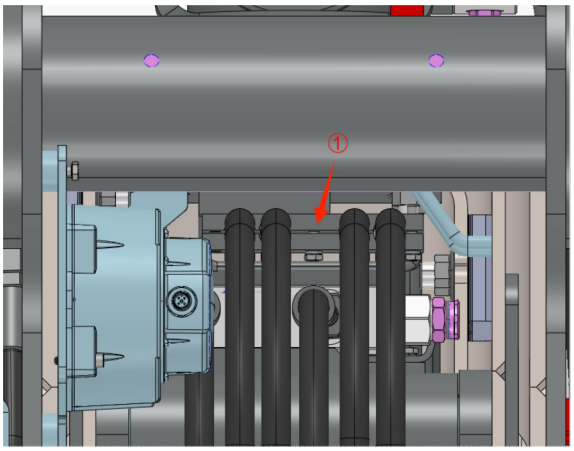
1) Use the hydraulic joystick to fully retract the tilt cylinder;

2) Use the emergency handle to release the pressure in the oil circuit of the second connection of the multi way valve and discharge the hydraulic oil in the oil pipe;

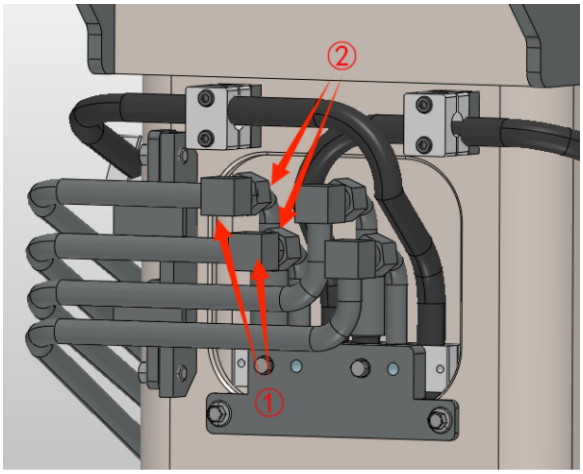
3) At the extension of the boom, remove the accessory oil pipe ② joint connected to the balance valve ① of the tilting oil cylinder, totaling 2 points;



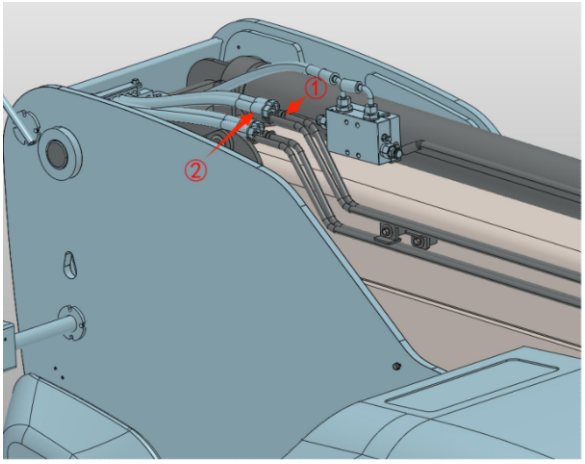
4) Remove the pipe clamp ① that fixes the oil pipe at the end of the arm support;



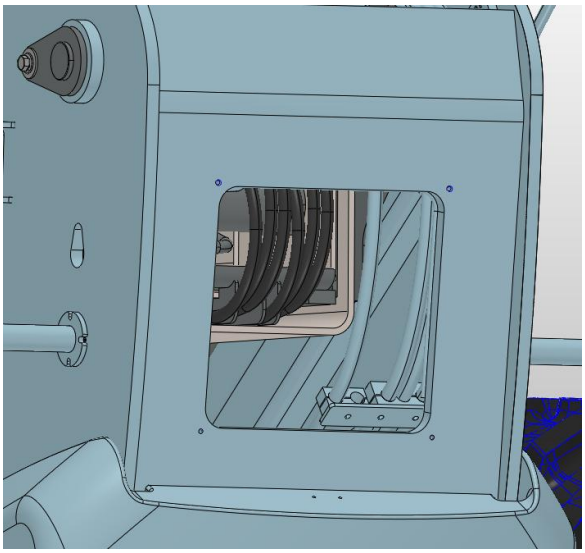
5) Remove the connection joint between the external steel oil pipe ① of the boom and the oil pipe ② of the tilt cylinder below the front end of the boom, totaling 2 points;



6) Remove the oil pipe ② joint connected to the steel oil pipe ① at the rear upper arm of the vehicle, with a total of 2 joints;



7) Remove the accessory oil pipe from the rear end of the arm frame;



8) Follow steps 7) → 6) → 5) → 4) → 3) in reverse to reinstall the accessory oil pipe.

7.4.4.2.Disassembly and installation of oil cylinder

Warning

a. Before disassembling any oil cylinder, it is necessary to use an emergency handle to drain the hydraulic oil from the corresponding oil circuit on the multi way valve back to the oil tank, and remove the corresponding oil pipe connections and electrical circuits.

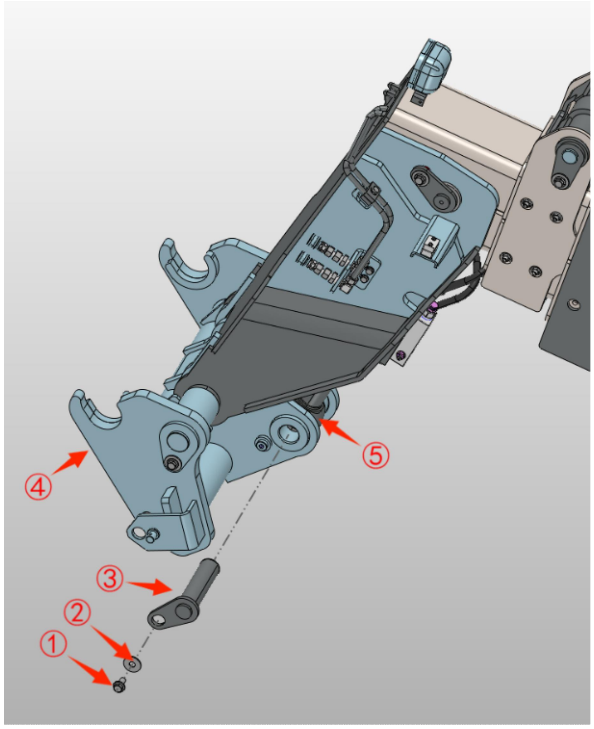
b. If it is necessary to disassemble the balance valve of the oil cylinder, as there may still be hydraulic oil and residual pressure inside the

cylinder, operators need to wear protective gear and take protective measures to prevent personal injury and environmental pollution caused by hydraulic oil splashing.

- **Disassemble and assemble the tilting oil cylinder**

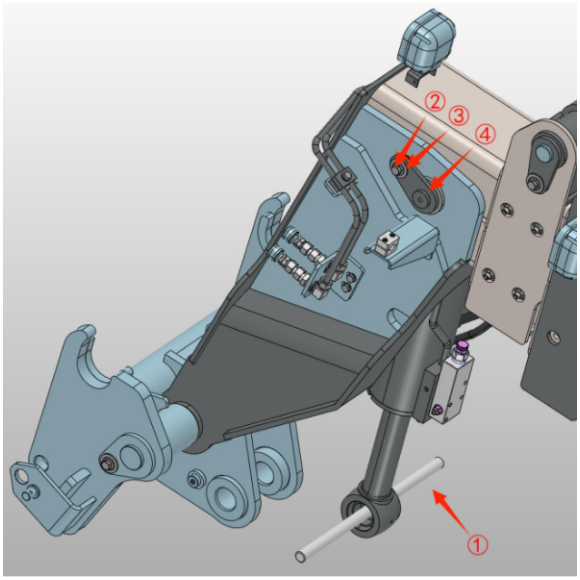
1) Use a hydraulic joystick to extend the piston rod of the tilt cylinder by half of its stroke;

2) After removing the pin positioning bolt ① and shim ②, pull out the pin ③ at the piston rod end ⑤ of the tilting oil cylinder, and then fix the transition frame ④ with a tie or pry bar to prevent it from rotating freely;



3) Use the hydraulic control handle to fully retract the tilt cylinder piston rod, then use the emergency handle to drain the hydraulic oil in the second oil circuit of the multi way valve back to the oil tank, and remove the corresponding oil pipe connection, as shown in **7.4.4.1. Oil pipe disassembly and installation;**

4) Use straps or pry bars to pull the piston rod end of the tilt cylinder, then remove the pin shaft positioning bolt ② and shim ③, and take out the pin shaft ④ from the cylinder body end of the tilt cylinder;

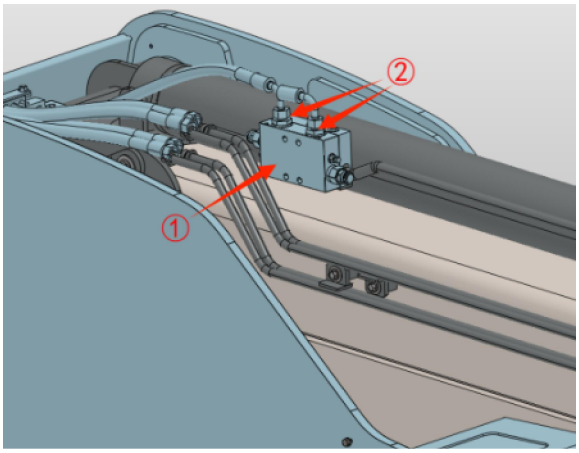


5) Place a tray under the oil cylinder, pull the piston rod end of the tilting oil cylinder, then gently lower the oil cylinder and place it on the tray to complete the disassembly of the tilting oil cylinder.

6) Follow steps 5) → 4) → 3) → 2) in reverse to reinstall the tilt cylinder.

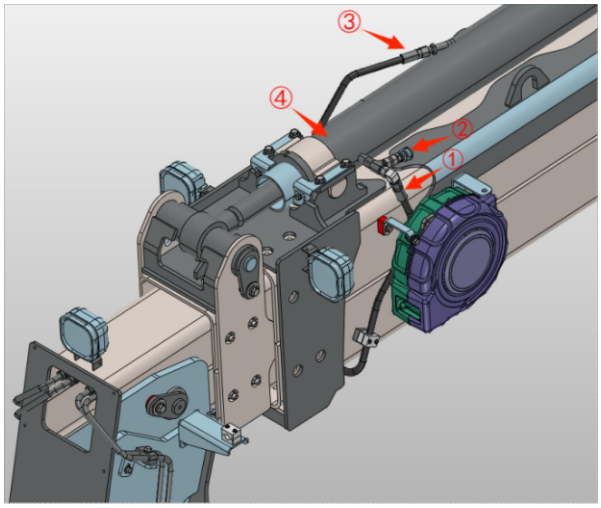
- **Disassemble and assemble the telescopic oil cylinder**

1) Use the hydraulic control handle to fully retract the external telescopic cylinder, then use the emergency handle to drain the hydraulic oil in the third oil circuit of the multi way valve back to the oil tank, and remove the corresponding external telescopic cylinder oil pipe connection, as shown in **7.4.4.1. Oil pipe disassembly and installation;**



2) Use the equipped quick change oil pipe, place one end in an empty oil drum and connect the

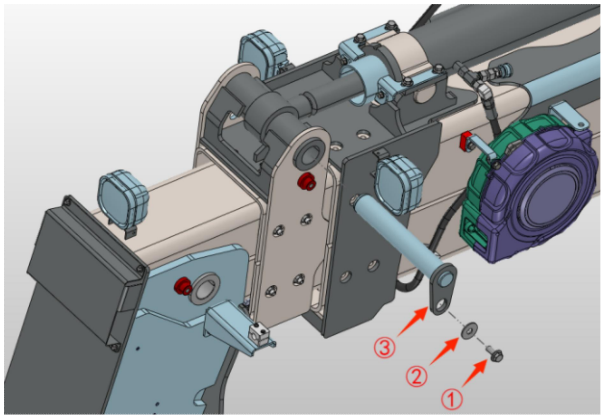
other end to the spare quick change interface ② of the external telescopic oil cylinder ④, drain the residual hydraulic oil in the oil circuit, and then remove the oil pipes ① and ③;



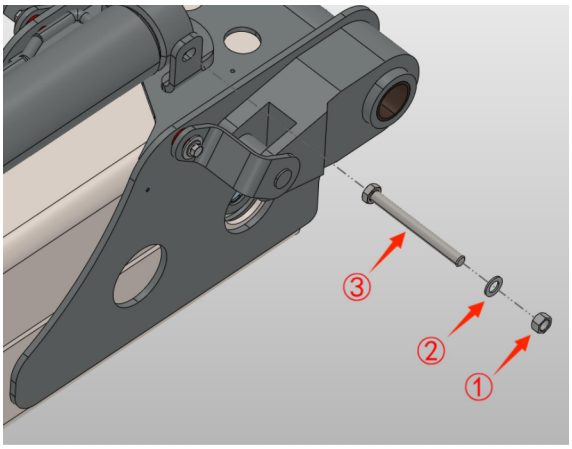
Warning

There may still be hydraulic oil and residual pressure in oil pipes ① and ③. When disassembling, operators need to wear protective gear and take protective measures to prevent hydraulic oil splashing from causing personal injury or environmental pollution.

3) After removing the locating bolt ① and shim ② of the rear end pin shaft of the external telescopic oil cylinder, pull out the pin shaft ③ at the piston rod of the external telescopic oil cylinder;

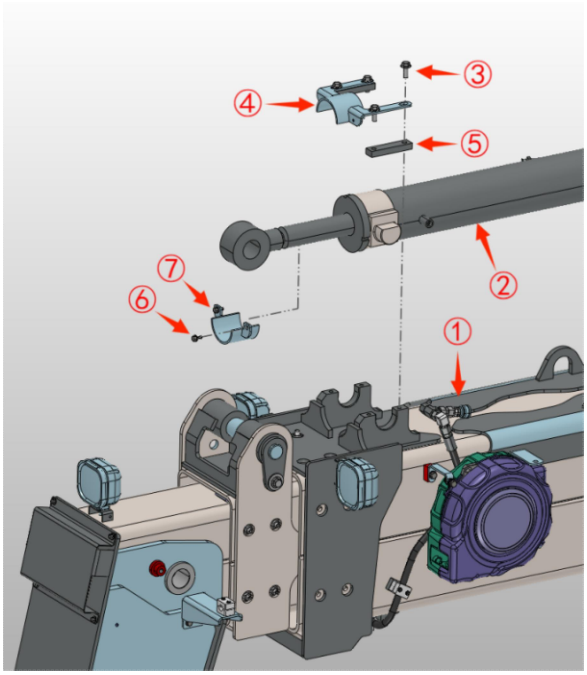


4) Remove the nut ①, washer ②, and bolt ③ used for positioning the external telescopic oil cylinder from the boom;



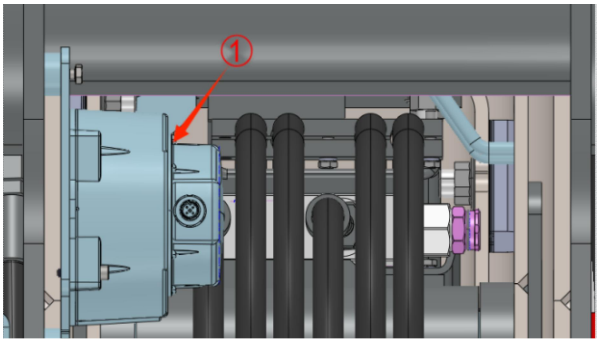
5) Remove fastening bolts ③, upper support bracket ④, stopper ⑤, fastening bolts ⑥, and lower support bracket ⑦ from arm frame ①;

6) Lift the telescopic oil cylinder ② and completely remove it from the boom, then gently place it on the ground tray;



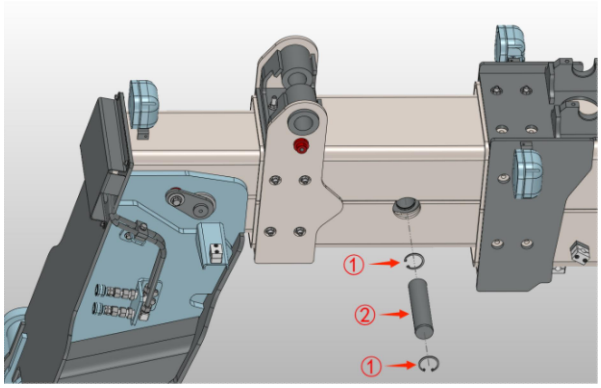
7) Follow steps 7) → 6) → 5) → 4) → 3) → 2) in reverse to reinstall the external telescopic oil cylinder.

8) Dismantle the cable sensor and its bracket ①;



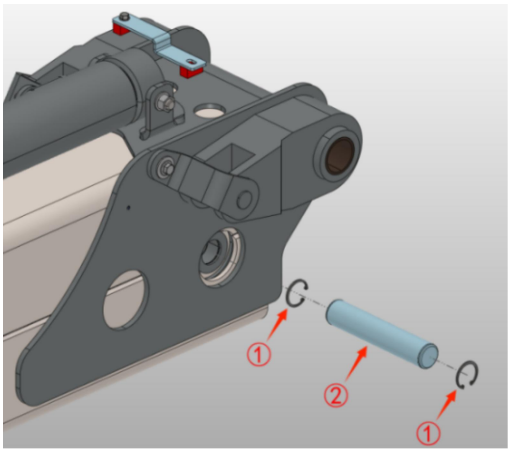
9) Lift the second and third stage telescopic arms and drag them forward of the boom with a stroke of 400mm-600mm (relative to the first stage telescopic arm);

10) Use clamp pliers to remove clamp springs ① from both ends of the pin shaft, then remove pin shaft ② from the piston rod end of the inner telescopic oil cylinder, and fully push the second and third stage telescopic arms back to the first stage telescopic arm;



11) Remove the telescopic arm as a whole from the vehicle body according to the instructions in **7.4.4.3. Disassembly and installation of the arm frame** before continuing to remove the internal telescopic oil cylinder;

12) Use clamp pliers to remove clamp springs ① from both ends of the pin shaft, and then remove pin shaft ② from the piston rod end of the inner telescopic oil cylinder;

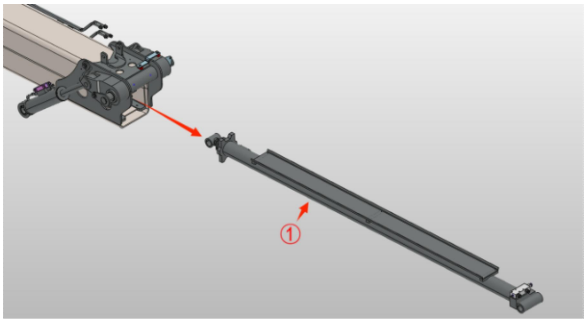


13) Tilt the telescopic arm back appropriately (up to a maximum tilt of 5 °);

14) Pull out the telescopic cylinder ① through the observation window at the rear of the vehicle using tools such as pry bars and straps;

Attention !

If there is resistance during the process of pulling out the oil cylinder, the pry bar can be inserted into the base of the oil cylinder, and the oil cylinder and its guide device can smoothly pass over the internal devices of the arm frame (slider, bolt, etc.) through rotation.

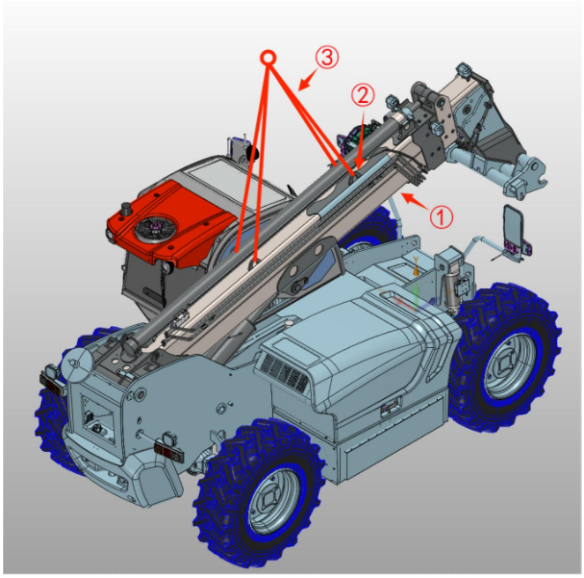


9) Lift the telescopic oil cylinder and completely remove it from the boom, then gently place it on the ground tray.

10) Follow the steps 15) → 14) → 13) → 12) → 11) → 2) in reverse to reinstall the internal telescopic oil cylinder.

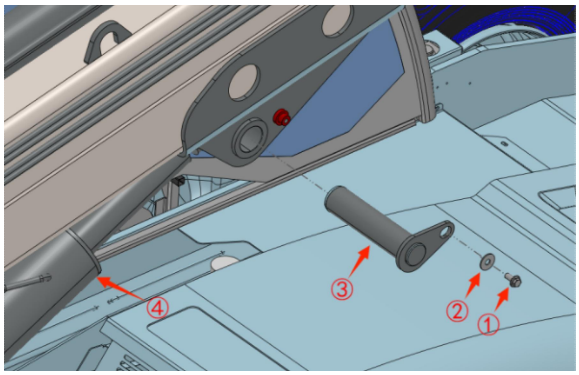
- **Disassemble and assemble the variable amplitude oil cylinder**

1) Use the hydraulic control handle to lift the boom ① to an appropriate angle, and then use the lifting points ② (2 in total) on the boom to lift it with chains or straps ③ that have sufficient load-bearing capacity;

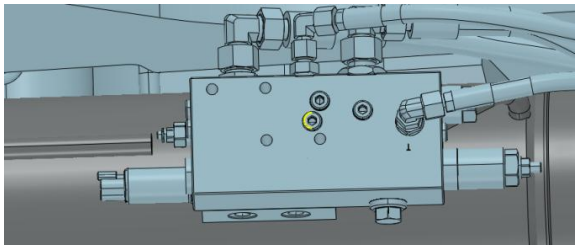


2) After removing the pin positioning bolt ① and shim ②, take out the pin ③ at the piston rod end of the variable amplitude oil cylinder,

and disconnect the arm from the variable amplitude oil cylinder ④;

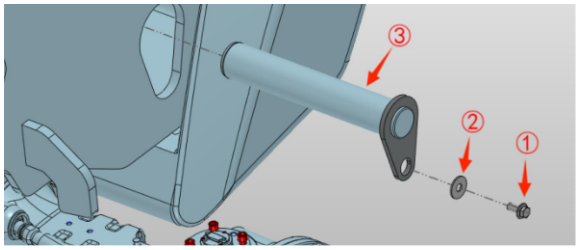


3) Use the hydraulic joystick to fully retract the piston rod of the variable amplitude oil cylinder, drain the hydraulic oil from the first connection of the multi way valve back to the oil tank, and then remove the oil pipe connection of the variable amplitude oil cylinder;



4) Before continuing to remove the variable amplitude oil cylinder, it is necessary to first remove the right rear wheel and its mudguard assembly;

5) After removing the locating bolt ① and shim ②, take out the cylinder end pin ③ of the variable amplitude oil cylinder and disconnect the variable amplitude oil cylinder from the vehicle body;

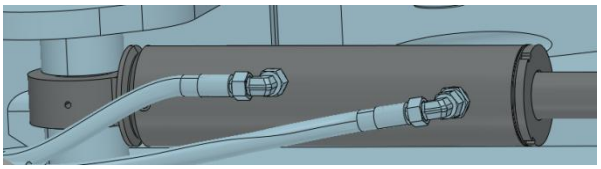


6) Lift the variable amplitude oil cylinder out with lifting equipment and place it steadily on the ground pallet;

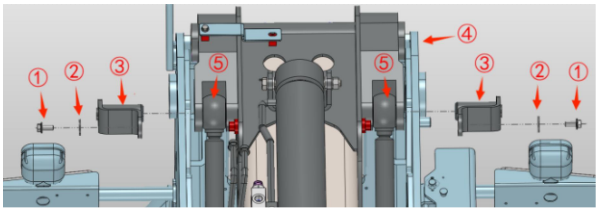
7) Follow steps 6) → 5) → 4) → 3) → 2) → 1) in reverse to reinstall the amplitude cylinder.

- **Disassemble and assemble the compensating oil cylinder**

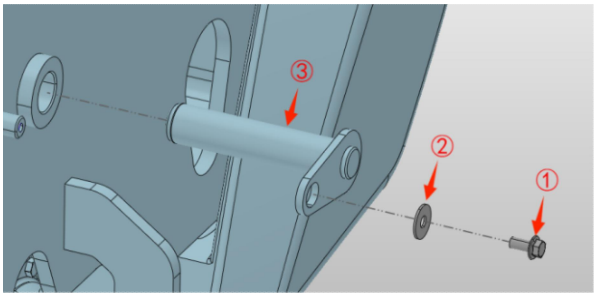
1) Use the hydraulic control handle to minimize the amplitude of the boom and fully retract the piston rod of the tilt cylinder. Use the emergency handle to drain the hydraulic oil from the second connection of the multi way valve back to the oil tank, and then remove the oil pipe connection of the amplitude cylinder;



2) After removing the pin positioning bolt ① and shim ②, take out the piston rod end pin ③ of the variable amplitude oil cylinder, and disconnect the tilt oil cylinder from the boom;



3) After removing the locating bolt ① and shim ②, take out the cylinder end pin ③ of the variable amplitude oil cylinder and disconnect the tilting oil cylinder from the vehicle body;



4) Lift the tilting oil cylinder out with lifting equipment and place it steadily on the ground pallet;

5) Follow steps 6) → 5) → 4) → 3) → 2) → 1) in reverse to reinstall the amplitude cylinder.

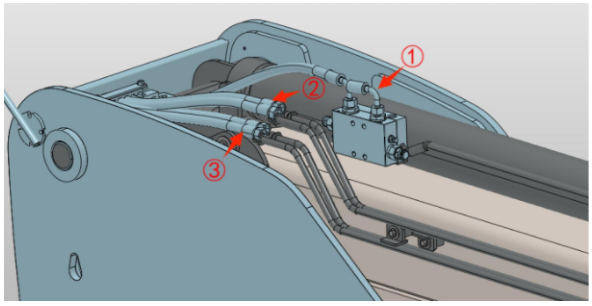
7.4.4.3.Disassembly and installation of arm frame structural components

Warning

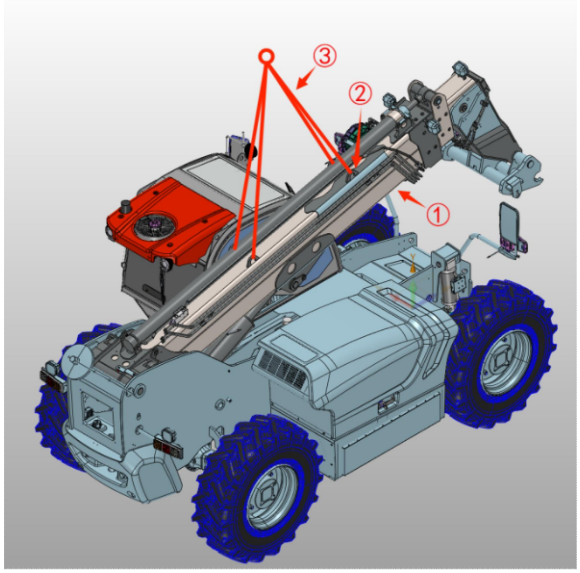
Forks, fork racks, and telescopic arms are all heavy components, so special care should be taken when disassembling and taking appropriate precautions.

- **Remove the boom from the vehicle body**

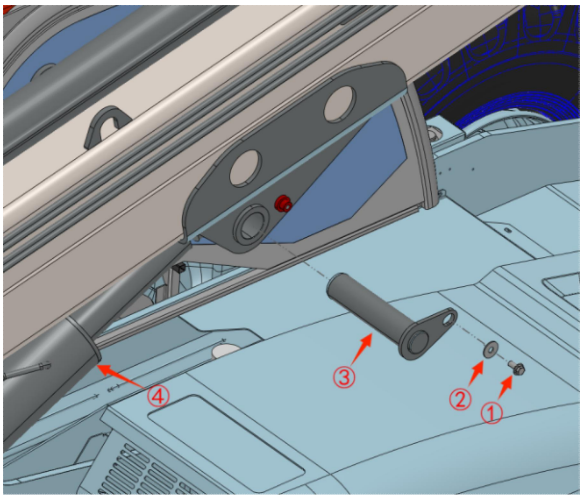
1) Fully retract the tilt cylinder and the inner and outer telescopic cylinders using the hydraulic control handle, drain the hydraulic oil from the 2nd, 3rd, and 4th oil circuits on the multi way valve back to the oil tank, and remove the corresponding oil pipes ①, ②, and ③, as shown in **7.4.4.1. Oil pipe disassembly and installation;**



2) Lift the boom ① to an appropriate angle using a hydraulic control handle, and then use a chain or strap ③ with sufficient load-bearing capacity to lift the boom through the lifting points ② (4 in total) on the boom;

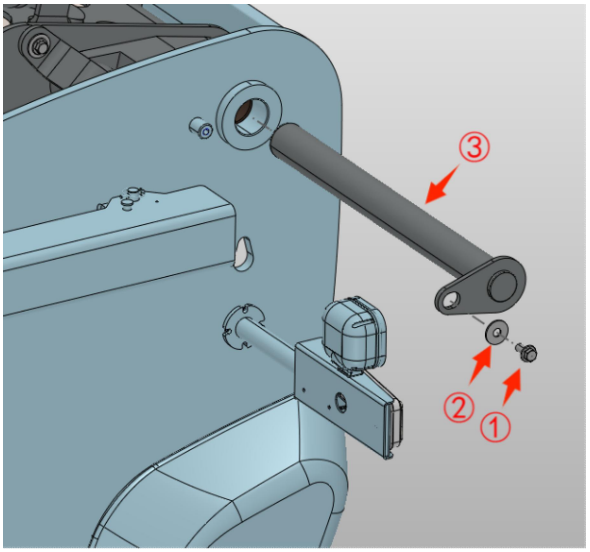


3) After removing the pin positioning bolt ① and shim ②, take out the pin ③ at the piston rod end of the variable amplitude oil cylinder, and disconnect the arm from the variable amplitude oil cylinder ④;



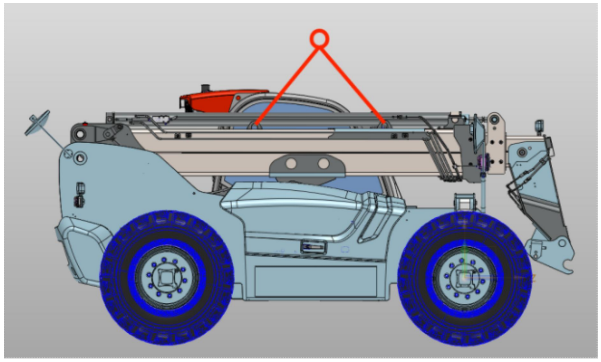
4) Use the hydraulic joystick to retract the piston rod of the amplitude cylinder, and support the amplitude cylinder with a wooden block, then reduce the amplitude angle of the boom.

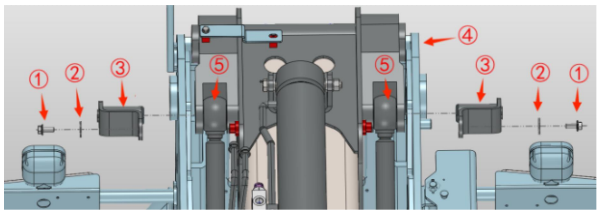
5) After removing the pin positioning bolt ① and shim ②, take out the pin ③ at the hinge point between the arm and the frame, and disconnect the connection between the arm and the frame;



6) Lift the arm frame appropriately, then remove the pin axis positioning bolt ① and gasket ②, and then take out the pin axis ③ at the hinge point between the arm frame ④ and the compensating oil cylinder ⑤, and disconnect

the arm frame from the compensating oil cylinder;





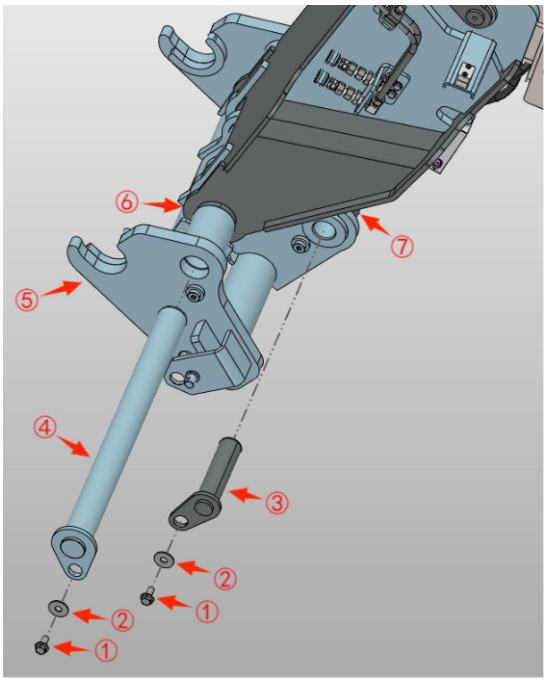
7) Lift the arm frame and place it on a platform with sufficient height to avoid the head of the arm frame touching the ground;

8) Follow steps 7) → 6) → 5) → 4) → 3) → 2) → 1) in reverse to reinstall the boom.

- **Dismantle the transition frame**

1) Extend the tilt cylinder halfway through its stroke;

2) After removing the pin positioning bolt ① and gasket ②, take out the pin ③ at the piston rod end of the tilting oil cylinder, and disconnect the tilting oil cylinder ⑦ from the transition frame ⑤;



3) After removing the pin positioning bolt ① and shim ②, take out the pin ④ at the joint between the transition frame and the second stage telescopic arm, and disconnect the connection between the transition frame ⑤ and the second stage telescopic arm ⑥;

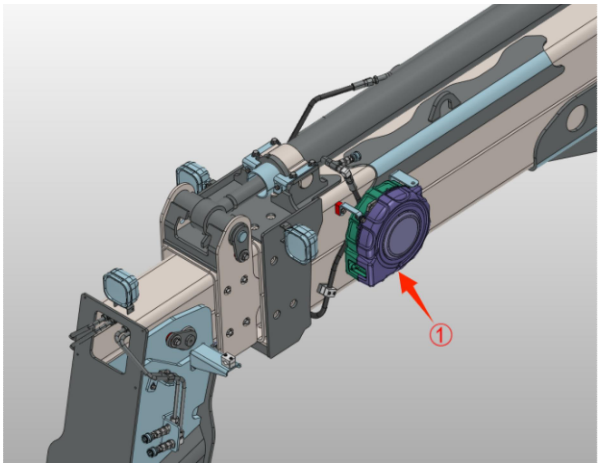
4) Lift the transition frame and gently place it on a tray on the ground. As the transition frame is heavy, preventive measures should be taken;

5) Follow steps 4) → 3) → 2) to reinstall the transition frame.

- **Dismantle the telescopic arm**

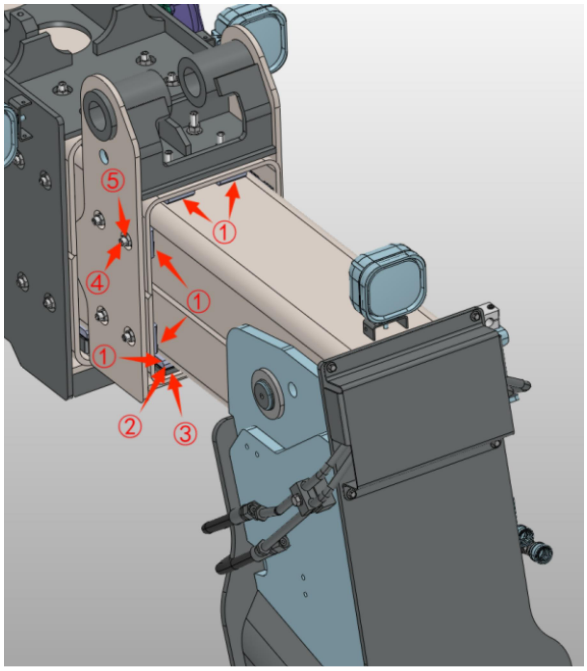
1) According to **7.4.4.2. Disassembly and installation of oil pipes and 7.4.4.3. Disassembly and installation of oil cylinders,** first disassemble the corresponding hydraulic oil pipes and telescopic oil cylinders;

2) Dismantle the cable reel and its wiring ①;



3) Pull out the third stage arm appropriately for easy disassembly;

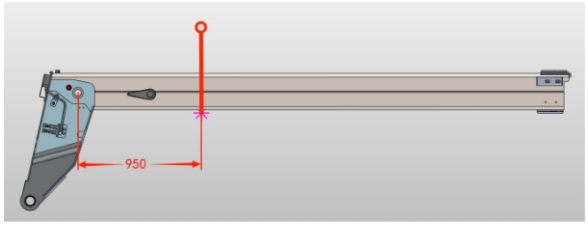
4) First, remove the fastening bolt ④ and nut ⑤, then lift or lower the third stage telescopic arm appropriately, and remove the slider ①, gasket ②, and cushion block ③ at the front end of the telescopic arm;

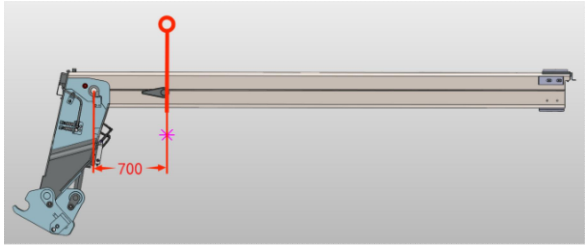


5) Lift the second stage telescopic arm and then pull it out from the first stage telescopic arm;

6) When the transition frame is not installed, the lifting point of the third stage telescopic arm is about 950mm away from the hinge point of the tilting oil cylinder; When equipped with a transition frame, the lifting point is about 700mm away from the hinge point of the tilting oil cylinder;

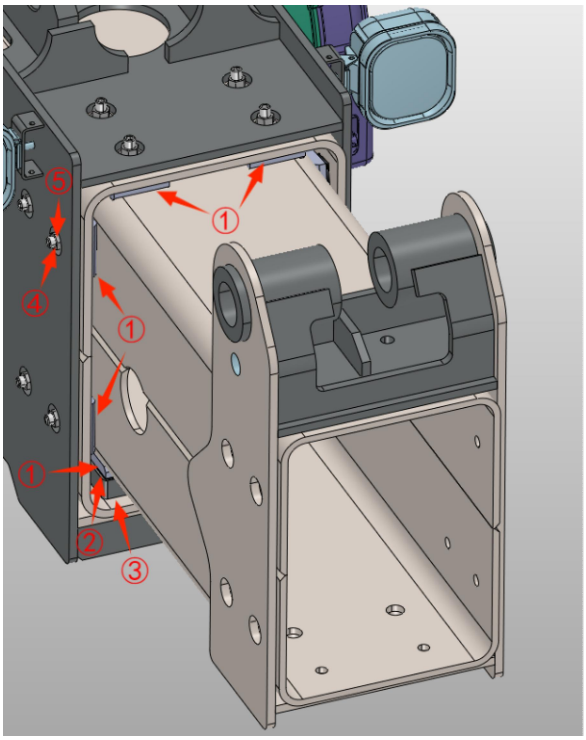
7) When the transition frame is not installed, the lifting point of the second stage telescopic arm is about 1450mm away from the hinge point of the inner telescopic oil cylinder;



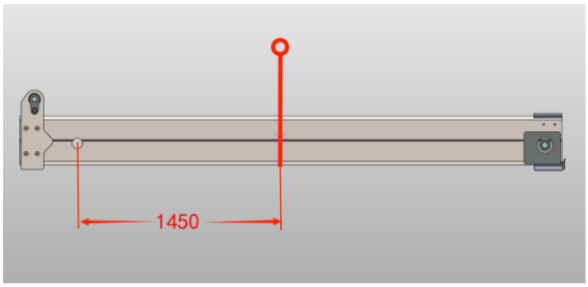


8) Follow the steps 5) → 4) → 3) → 2) → 1) in reverse to reinstall the third stage telescopic arm.

9) Pull out the second stage arm appropriately for easy disassembly;



10) First, remove the fastening bolt ④ and nut ⑤, then lift or lower the third stage telescopic arm appropriately, and remove the slider ①, shim ②, and cushion block ③ at the front end of the telescopic arm;



11) Follow steps 10) → 9) in reverse to reinstall the third stage telescopic arm.

Attention !

c. When using adjustment shims, the number of shims on the left and right sides must be equal.

d. After adjusting the gap, push and pull the inner telescopic arm forward and backward while moving the outer telescopic arm, and check if its operation is correct.

7.4.5.Installation and disassembly of attachments

Installation and disassembly of quick change attachments using a fork frame as an example.

Warning

a. Forks, fork racks, and telescopic arms are all heavy components, so special care should be taken when disassembling and assembling them. Personnel should stay away from the arm racks and attachments, and take appropriate preventive measures.
b. Do not disassemble attachments when the amplitude of the telescopic arm is large (exceeding 10 °)! Prevent attachments from falling and causing pressure injuries.

T25-60XHYG model：

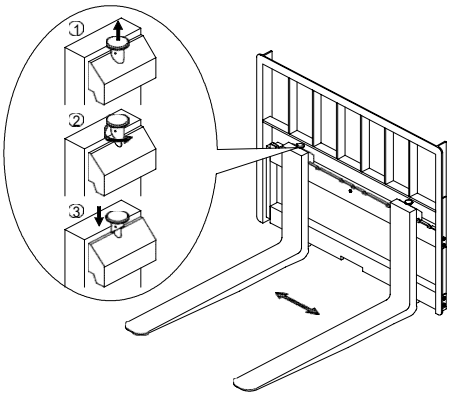


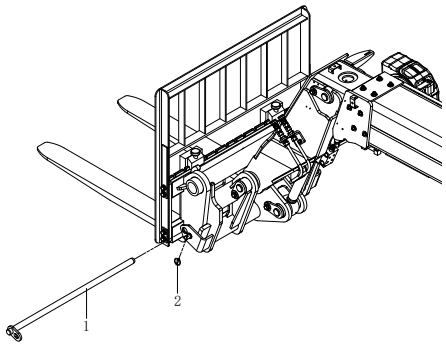
Figure 7.4.5-2 Fork Installation

Steps for adjusting the distance of the fork:

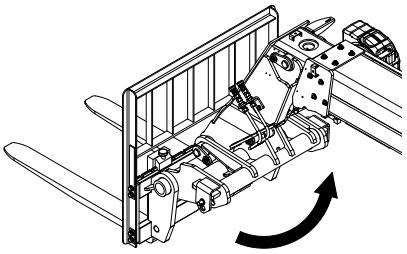
1) Pull up the fork positioning pin and rotate it 180 degrees in any direction to unlock the fork.
2) Adjust the fork position symmetrically towards both ends based on the centerline of the fork rack.
3) After adjusting the distance between the forks, pull up the fork positioning pin and rotate it back to its initial position. Then, move the fork slightly left and right to ensure that the positioning pin fits into the slot of the fork frame.

Quick change operation steps for attachments:

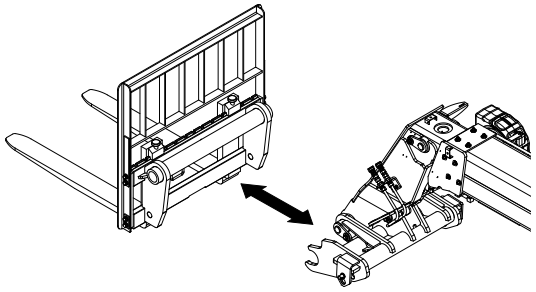
1) Retract and lower the telescopic arm (for ease of operation, the telescopic arm can be extended appropriately by 0-500mm), so that the accessory is close to the ground;
2) Remove the O-shaped pin (2), then pull out the limit pin shaft (1), and the transition frame and the accessory can rotate relative to each other;



3) Lift the telescopic arm appropriately (up to 10 °), and then use the hydraulic control handle to tilt the transition frame counterclockwise to the bottom (as indicated by the arrow in the figure);



4) Operate the vehicle to retract backwards or retract the telescopic arm, causing the transition frame to detach from the accessory installation shaft and complete the quick disassembly of the accessory.



5) Follow the steps 4) → 3) → 2) in reverse to complete the quick installation of the attachments.

T35-100XHYG model：

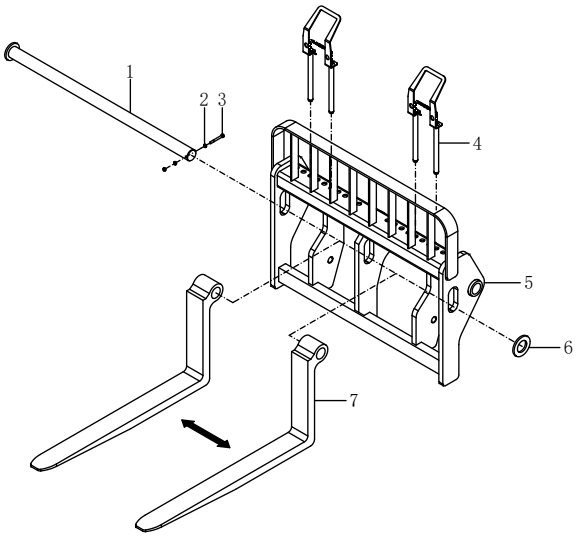


Figure 7.4.5-2 Fork Installation

1.Pallet fork installation shaft 2.Nut 3.Limit bolt

4.Limit pin seat 5.Fork rack 6.Retaining Ring

7.Pallet fork

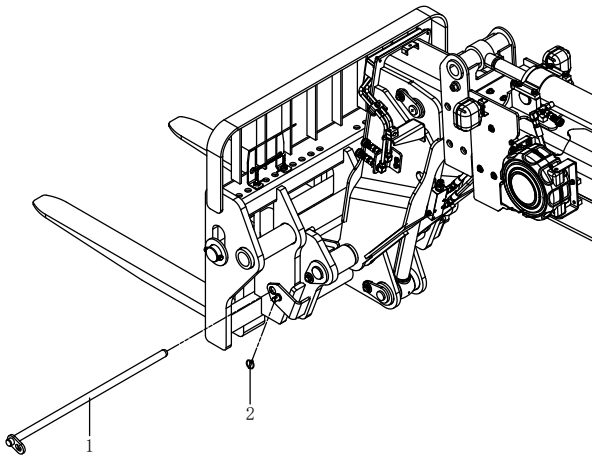
Fork installation shaft 1 is fixed on fork frame 5 by nut 2, limit bolt 3, and retaining ring 6. Fork 7 is installed on fork frame 5 through fork installation shaft 1, limited by limit pin seat 4, and adjusted to fit the hole position on the fork frame.

Pallet fork distance adjustment operation steps:

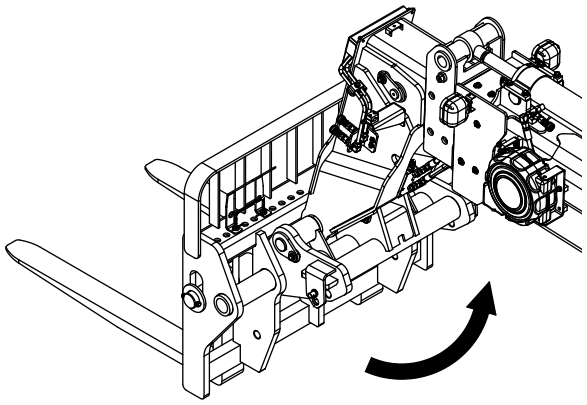
1) Pull up the limit pin of the fork by installing the limit seat, and the fork will be unlocked.
2) Adjust the fork position symmetrically towards both ends based on the centerline of the fork rack.
3) After adjusting the spacing between the forks, reinstall the limit seat pin into the corresponding positioning hole of the fork position.

Quick change operation steps for attachments:

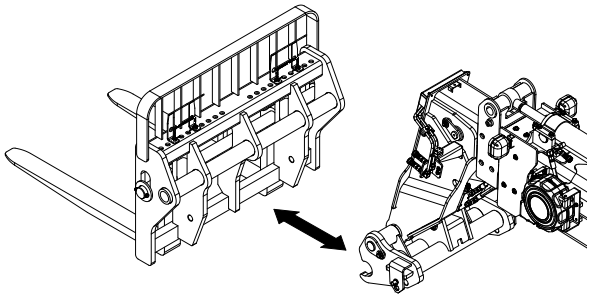
1) Retract and lower the telescopic arm (for ease of operation, the telescopic arm can be extended appropriately by 0-500mm), so that the accessory is close to the ground;
2) Remove the O-shaped pin (2), then pull out the limit pin shaft (1), and the transition frame and the accessory can rotate relative to each other;



3) Lift the telescopic arm appropriately (up to 10 °), and then use the hydraulic control handle to tilt the transition frame counterclockwise to the bottom (as indicated by the arrow in the figure);



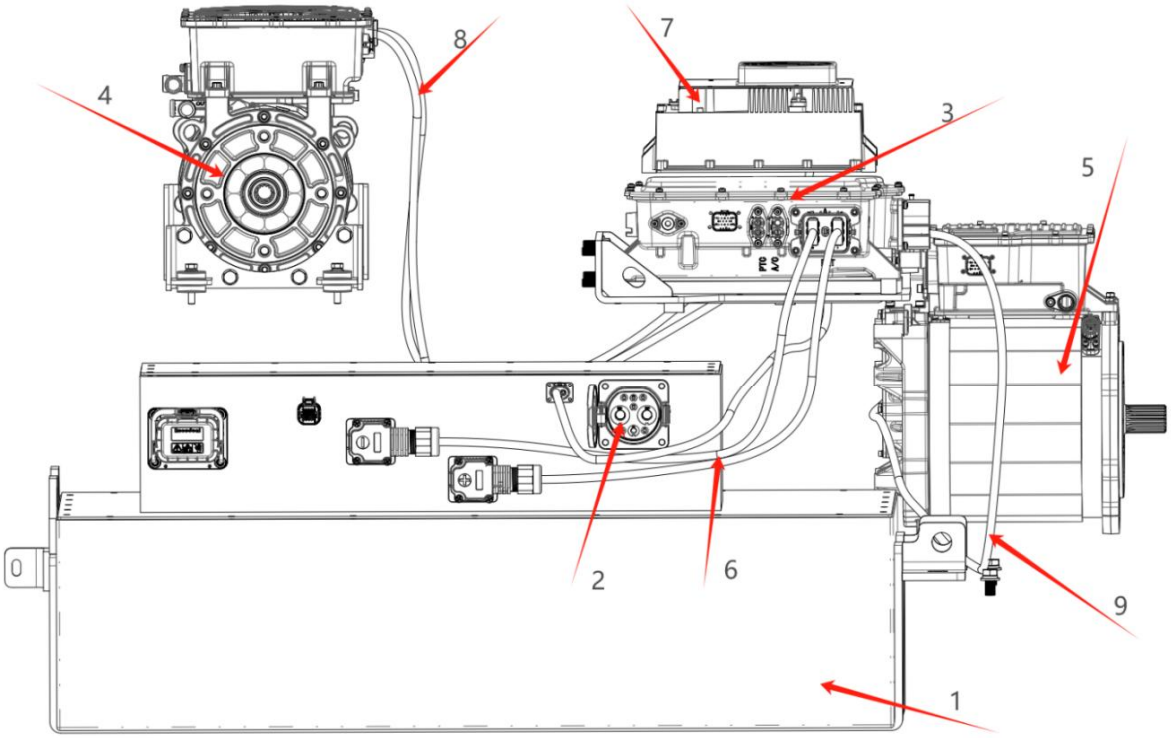
4) Operate the vehicle to retract backwards or retract the telescopic arm, causing the transition frame to detach from the accessory installation shaft and complete the quick disassembly of the accessory.



5) Follow the steps 4) → 3) → 2) in reverse to complete the quick installation of the accessory.

Chapter 8.Electrical system

The off-road telescopic telehandler has a DC voltage of 305V and provides a large amount of electrical energy during operation. The high-voltage electrical connection wires are orange, and there are warning signs on the high-voltage components.



The high-voltage components of the vehicle include: main oil pump motor controller 2-in-1, onboard charger, national standard charging dock combination, lithium battery assembly, power supply 2-in-1, traction motor controller 2-in-1, etc. The location of high-voltage components is shown in the following figure

Figure 8-1 Layout of High Voltage Components

1-Lithium battery assembly	2-Car charger (national standard)	3-Power supply 2-in-1	4-Main oil pump motor controller 2-in-1
5-Traction motor controller 2-in-1	6-Lithium battery discharge cable	7-Charger	8-Oil pump motor cable
9-Traction motor cable			

Warning

a. The high-voltage part is maintained by trained professional after-sales personnel

b. Before carrying out any electrical maintenance, it is necessary to confirm that the MSD maintenance switch is disconnected. Before inspecting any electrical components, please remove conductive items such as jewelry to prevent short circuits, and turn off the starting switch and disconnect the grounding wire.

High voltage electrical safety regulations

The safety precautions and operating procedures related to high voltage constitute extremely important safety rules. Please review and master again with relevant personnel:

1) Safety precautions for high voltage;
2) Safety operating procedures.

Warning

To inspect and repair the high-voltage part, one should receive special training on high-voltage electrical knowledge and obtain the corresponding certificate. The inspection and maintenance of lithium batteries must be completed by professional manufacturers.

① The off-road telescopic telehandler has a maximum DC voltage of 309V and provides a large amount of electrical energy during operation. The high-voltage electrical connection wires are orange, and there are warning signs on the high-voltage components. High voltage components cannot be touched casually, otherwise there is a risk of electric shock and personal injury! Refer to the front or electrical section of the maintenance manual for high-voltage components.

② Inspection or maintenance personnel should wear insulated shoes; Wear 1000V insulated gloves and check if the gloves are damaged or aged, otherwise they cannot be used. Without wearing gloves, direct contact with high-voltage electrical parts is prohibited.

③ Dry insulation pads should be laid on the lower part of the vehicle and the standing parts of maintenance personnel.

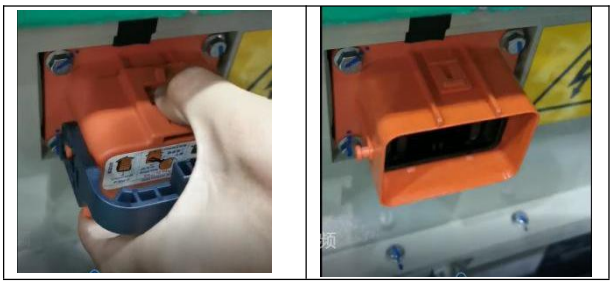
④ Place a "Danger of Touching During High Voltage Operations" warning triangle.

⑤ Inspection and maintenance personnel are prohibited from carrying or hanging metal objects.

⑥ First, confirm that there is no water on the maintenance floor and inside the vehicle. It is not allowed to work in a damp environment. Never perform high-pressure operations when your hands are wet, and never work while high-pressure components are wet. When the ground or surrounding humidity is too high, work should be stopped.

⑦ Dry powder fire extinguishers should be installed in the work area. Do not use other fire extinguishers.

⑧ Prepare the necessary maintenance tools, which have been insulated.



⑨ During maintenance, cut off the power supply of the high-voltage system, unplug the MSD maintenance switch on the lithium battery main box, and wait for 15-20 minutes for the high-voltage system to power off.

⑩ Before carrying out maintenance work, please adopt safety isolation measures (using guardrails for isolation) and place high-voltage warning signs to alert relevant personnel and avoid safety accidents.

⑪ Before repairing high-voltage components, please connect the vehicle body to the grounding wire of the electric telehandler dedicated repair station with a grounding wire.

⑫ The high-voltage components and battery parts are carried out by Hangcha or authorized institutions and personnel who have received special training (different from regular telehandler training).

⑬ When repairing high-voltage battery packs with electrolyte leaks, protective goggles should be worn to prevent electrolyte from splashing into the eyes.

⑭ Before turning on the key switch of the vehicle, pay attention to confirming whether there are still personnel performing high-voltage maintenance operations to avoid accidents.

⑮ When repairing high-voltage wiring harnesses, any removed high-voltage wiring should be immediately wrapped with insulating tape for insulation.

⑯ Do not touch the live parts inside the high-voltage wire harness connector with your fingers to avoid electric shock. Additionally, prevent small metal tools or iron bars from coming into contact with the live parts inside the connector.

⑰ In case of abnormal accidents and fires, operators should immediately cut off the high-voltage circuit, and other personnel should immediately use fire extinguishers to put out the fire (dry powder fire extinguishers are used, water-based fire extinguishers are strictly prohibited).

⑱ When a battery leaks electrolyte, do not touch it with your hands. The electrolyte should be diluted with calcium gluconate ointment and not with water.

⑲ Pay attention to the colors or markings used for high-voltage components and area prompts during homework.

⑳ Do not touch hands, body, components, or environment with water or moisture, otherwise operation is not allowed.

㉑ It is prohibited to park vehicles in rainy or humid environments.

8.1.Electric drive system

8.1.1.Overview

The electric drive system consists of a two in one traction motor controller and a two in one main oil pump motor controller, which are optimized and matched according to the vehicle performance indicators to ensure that the vehicle's power and economy meet the requirements. The two in one traction motor controller consists of a permanent magnet synchronous motor controller and a permanent magnet synchronous motor. The model of the permanent magnet synchronous motor controller is MC3906, with a rated voltage of 309V (DC) and a continuous working current of 180A. The model of the permanent magnet synchronous motor is TZ220XS45KW309VT, with a rated voltage of 309V (DC) and a rated power of 45KW; The 2-in-1 main oil pump motor controller consists of a permanent magnet synchronous motor controller and a permanent magnet synchronous motor. The permanent magnet synchronous motor controller model is MC3904, with a rated voltage of 309V (DC) and a continuous working current of 180A. The permanent magnet synchronous motor model is TZ180XS35KW309VP, with a rated voltage of 309V (DC) and a rated power of 35KW.

8.1.2.Fault code

(1) VCU alarm prompt code

VCU Alarm

No.	Name	Describe
1	ACO1_VPWAOfF	Controller output power supply 1-fold circuit
2	AC02_VPWBOfF	Controller output power supply 2 channels
3	AC03_VPWCDOff	Controller output power supply 34 open circuit
4	AC04_JoystickOff	Handle bus disconnected
5	AC05_ACQ CanbusOff	ACQ bus disconnected
6	AC06_TC_CanbusOff	Transmission bus disconnected
7	AC07_RH_StabilizerJoyOff	Right leg handle disconnected
8	AC08_LH_StabilizerjoyOff	Left leg handle disconnected
9	AC09_LevelingJoy_Off	The body leveling handle is disconnected
10	AC10_MidacOff	LMI controller bus disconnected
11	AC11_LH_Alarm	Left leg misoperation
12	AC12_RH_Alarm	Right leg misoperation
13	AC13_SAR_CanOff	SAR bus disconnected

VCU Warning

No.	Name	Describe
1	WC01_ByPassOp	The forced switch has been turned on
2	WC02_Sarcutoff	SAR cut-off
3	WC03_FuelLevelLow	Low fuel level
4	WC04_FuelSensorFaulty	Fuel sensor malfunction
5	WC05_EnergyWarning	Fan energy device malfunction alarm
6	WCO6_LMIL_CutOff	Force limiter cut-off alarm
7	WC07_LH_StabSensorFaulty INT	Left leg pressure sensor malfunction
8	WC08_RH_StabSensorFaulty INT	Right leg pressure sensor malfunction
9	WC09_SwlOver95	Torque percentage exceeds 95%
10	WC10_OilFilterWarning	Oil filter alarm
11	WC11_AirFilterWarning	Air filter alarm
12	WC12_StabDwTravel	Leg not retracted walking alarm

(2) BMS system fault level code

Fault No.	Fault name	Fault handling methods
1	Total undervoltage	Power limit
2		Request parking
3	Individual discharge under voltage	Power limit
4		Request parking
5	High temperature discharge	Power limit
6		Request parking
7	Low temperature discharge	Power limit
8		Request parking
9	Discharge overcurrent	Request parking
10	Discharge cell pressure difference	Power limit
11	Discharge temperature difference	Power limit
12	SOC too low	Power limit
13	Feedback overcurrent	Request parking
14	Single discharge overvoltage	Power limit
15		Request parking
16	Total pressure overvoltage	Power limit
17		Request parking
18	Charging unit too high	Stop charging

19	Charging socket high temperature	Charging reduces current by 50%
20		Stop charging
21	Charging unit too low	Stop charging
22	Charging high temperature	Stop charging
23	Charging low temperature	Stop charging
24	Charging overcurrent	Stop charging
25	Charging temperature difference	Charging reduces current by 50%
26	Charging voltage difference	Charging reduces current by 50%
27	Voltage cable detachment	Request to park or stop charging
28	The temperature sensing cable is detached	Request to park or stop charging
29	The current collection cable has come loose	Request to park or stop charging
30	BMU communication interruption	Request to park or stop charging
31	Charging positive relay adhesion	Stop charging
32	Positive discharge relay adhesion	Request parking
33	Negative discharge relay adhesion	Request parking
34	Insulation fault	Request to park or stop charging
35	Charging heating relay adhesion	Stop charging
36	Discharge heating relay adhesion	Request parking
37	High voltage interlock fault	Request to park or stop charging
38	Low voltage power supply abnormality	Request to park or stop charging

(3) Motor fault code (drive motor and pump motor fault)

NO.	Fault name	Fault handling methods
2	Power tube direct fault	Shutdown
3	Zero drift fault of current sensor	Shutdown
4	MCU undervoltage fault	Shutdown
5	MCU overvoltage fault	Shutdown
7	Encoder fault	Shutdown
8	Current sampling circuit fault	Shutdown
9	Hardware overcurrent	Shutdown
10	Controller overheating fault	Execute zero torque
11	Motor overheating fault	Execute zero torque
12	Phase current software overcurrent	Execute zero torque
13	Motor overspeed	Execute zero torque
14	Motor stalling	Reduce torque to 50% of maximum torque
15	MC feedback torque and torque command verification error	Execute zero torque
16	Motor temperature sensor malfunction	Reduce torque to 50% of maximum torque
17	Controller temperature sensor malfunction	Reduce torque to 50% of maximum torque
18	BusOff malfunction	Execute zero torque
19	I2C verification fault	
20	VCU communication loss fault	Execute zero torque
21	Battery malfunction	Execute zero torque
22	Bus voltage sampling circuit fault	Torque derating
45	MCU undervoltage warning	Torque derating
46	MCU overvoltage warning	Torque derating
47	Controller overheating warning	Torque derating
48	Motor overheating warning	Shutdown

(4) Force limit alarm prompt code (LMI Alarm and LMI Warning)

No.	Name	Describe	Methods
1	AL_E2promAlarm	MIDAC PLUS controller E2PROM malfunction	Power down and restart
2	AL_Can1_InitErr	MIDAC PLUS controller CAN LINE 1 initialization error	Power down and restart
3	AL_Can0_InitErr	MIDAC PLUS controller CAN LINE 0 initialization error	Power down and restart
4	AL_Mds_InitErr	MIDACPLUS controller low-level software configuration MDS unit initialization error	Power down and restart
5	AL_E2P_InitErr	MIDAC PLUS controller E2PROM initialization error	Power down and restart
6	AL_DataExc_InitErr	Initialization error of data exchange between master and slave CPUs in MIDAC PLUS controller	Power down and restart
7	AL_Task1_InitErr	TASK 1 initialization error of MIDAC PLUS controller main CPU	Power down and restart
8	AL_Task2_InitErr	TASK 2 initialization error of MIDAC PLUS controller main CPU	Power down and restart
9	AL_Task3_InitErr	TASK 3 initialization error of MIDAC PLUS controller main CPU	Power down and restart
10	AL_Task4_InitErr	TASK 4 initialization error of MIDAC PLUS controller main CPU	Power down and restart
11	AL_FlashInt_InitError	Initialization error of internal FLASH storage chip in MIDAC PLUS controller	Power down and restart
12	AL_ERam_NError	MIDAC PLUS controller RAM self-test error	Power down and restart
13	AL_DExc_Error	MIDAC PLUS controller master-slave CPU data exchange error	Power down and restart
14	AL_CFlash_NError	MIDAC PLUS controller FLASH EP100 storage chip error	Power down and restart
15	AL_TWdo_VIn_A	MIDAC PLUS controller watchdog supply voltage below 8vdc	Power down and restart
16	AL_TIn_Error	MIDAC PLUS controller input terminal low-level detection error	Power down and restart
17	AL_Outputs_Error	MIDAC PLUS controller output terminal low-level detection error	Power down and restart
18	AL_TWdo_Reset	MIDAC PLUS controller disconnected due to watchdog APP layer requirements	Power down and restart
40	AL_C1_InitRamAlarm	MIDAC PLUS controller CPU1 RAM initialization error	Power down and restart
41	AL_C1_IntFlashCRCError	MIDAC PLUS controller CPU1 FLASH chip CRC error	Power down and restart
42	AL_C1_IOSysTaskStatus	MIDAC PLUS controller CPU1 underlying hardware failure	Power down and restart
43	AL_C1_E2promAlarm	MIDAC PLUS controller CPU1 underlying hardware failure	Power down and restart
44	AL_C1_CAN_Init_ErrorCode	MIDAC PLUS controller CPU1 underlying hardware failure	Power down and restart
45	AL_C1_DataExc_InitError	Initialization error of data exchange between master and slave CPUs in MIDAC PLUS controller	Power down and restart
46	AL_C1_DExc_FrmError	MIDAC PLUS controller CPU1 underlying hardware failure	Power down and restart
47	AL_C1_DExc_NCrcError	MIDAC PLUS controller CPU1 underlying hardware failure	Power down and restart
48	AL_C1_DaM_Idle_RunError	MIDAC PLUS controller CPU1 underlying hardware failure	Power down and restart
49	AL_C1_DaM_Task3_RunError	MIDAC PLUS controller CPU1 underlying hardware failure	Power down and restart

50	AL_C1_SqM_Error	MIDAC PLUS controller CPU1 underlying hardware failure	Power down and restart
101	LM_MCyl_PL_A_Fault_TMin	Main cylinder rodless chamber channel A open circuit (analog value below 3000)	Power down and restart
102	LM_MCyl_PL_A_Fault_TMax	Main cylinder rodless chamber channel A short circuit (analog value above 21000)	Power down and restart
103	LM_MCyl_PH_A_Fault_TMin	The main oil cylinder has a rod chamber channel A open circuit (analog value below 3000)	Power down and restart
104	LM_MCyl_PH_A_Fault_TMax	The main oil cylinder has a short circuit in the rod chamber channel A (analog value higher than 21000)	Power down and restart
105	LM_MCyl_PL_B_Fault_TMin	Main cylinder rodless chamber channel B open circuit (analog value below 3000)	Power down and restart
106	LM_MCyl_PL_B_Fault_TMax	Main cylinder rodless chamber channel B short circuit (analog value above 21000)	Power down and restart
107	LM_MCyl_PH_B_Fault_TMin	The main oil cylinder has a rod chamber channel B open circuit (analog value below 3000)	Power down and restart
108	LM_MCyl_PH_B_Fault_TMax	The main oil cylinder has a short circuit in the rod chamber channel B (analog value higher than 21000)	Power down and restart
109	LM_CCyl_PL_A_Fault_TMin	Compensation cylinder rodless chamber channel A open circuit (analog value below 3000)	Power down and restart
110	LM_CCyl_PL_A_Fault_TMax	Compensation cylinder rodless chamber channel A short circuit (analog value higher than 21000)	Power down and restart
111	LM_CCyl_PH_A_Fault_TMin	Compensation cylinder has rod chamber channel A open circuit (analog value below 3000)	Power down and restart
112	LM_CCyl_PH_A_Fault_TMax	Compensation cylinder has rod cavity channel A short circuit (analog value higher than 21000)	Power down and restart
113	LM_CCyl_PL_B_Fault_TMin	Compensation cylinder rodless chamber channel B open circuit (analog value below 3000)	Power down and restart
114	LM_CCyl_PL_B_Fault_TMax	Compensation cylinder rodless chamber channel B short circuit (analog value higher than 21000)	Power down and restart
115	LM_CCyl_PH_B_Fault_TMin	Compensation cylinder has rod chamber channel B open circuit (analog value below 3000)	Power down and restart
116	LM_CCyl_PH_B_Fault_TMax	Compensation cylinder has rod chamber channel B short circuit (analog value higher than 21000)	Power down and restart
117	LM_MCyl_PL_D_Fault_MaxDiff	Main oil cylinder rodless chamber redundancy fault	Power down and restart
118	LM_MCyl_PH_D_Fault_MaxDiff	The main oil cylinder has a redundant rod chamber fault	Power down and restart
119	LM_CCyl_PL_D_Fault_MaxDiff	Compensation cylinder rodless chamber redundancy fault	Power down and restart
120	LM_CCyl_PH_D_Fault_MaxDiff	Compensation cylinder has rod cavity redundancy fault	Power down and restart
121	LM_A1A_Fault_RMin	The angle value of arm angle channel A relative to the chassis is lower than the minimum angle	Power down and restart
122	LM_A1A_Fault_RMax	The angle value of arm angle channel A relative to the chassis is higher than the maximum angle	Power down and restart
123	LM_A1B_Fault_RMin	The angle value of arm angle channel B relative to the chassis is lower than the	Power down and restart

		minimum angle	
124	LM_A1B_Fault_RMax	The angle value of arm angle channel B relative to the chassis is higher than the maximum angle	Power down and restart
125	LM_A1D_Fault_MaxDiff	Arm angle dual channel redundant fault	Self reset
126	LM_S1A_Fault_TMin	The analog value of arm length channel A is below the minimum value of 20	Power down and restart
127	LM_S1A_Fault_TMax	The analog value of arm length channel A is higher than the maximum value of 1000	Power down and restart
128	LM_S1A_Fault_RMin	The calibration value of arm length channel A is lower than the minimum length value	Power down and restart
129	LM_S1A_Fault_RMax	The calibration value of arm length channel A is higher than the maximum length value	Power down and restart
130	LM_S1B_Fault_TMin	The analog value of arm length channel B is below the minimum value of 20	Power down and restart
131	LM_S1B_Fault_TMax	The analog value of arm length channel B is higher than the maximum value of 1000	Power down and restart
132	LM_S1B_Fault_RMin	The calibration value of arm length channel B is lower than the minimum length value	Power down and restart
133	LM_S1B_Fault_RMax	The calibration value of arm length channel B is higher than the maximum length value	Power down and restart
134	LM_S1D_Fault_MaxDiff	Arm length dual channel redundant fault	Self reset
135	LM_AL_TOut_U2AMU_C1_A	U2AMU tilt sensor channel A bus timeout	Power down and restart
136	LM_AL_TOut_U2AMU_C1_B	U2AMU tilt sensor channel B bus timeout	Power down and restart
137	LM_AL_C1_A_Fault	U2AMU tilt sensor channel A fault	Power down and restart
138	LM_AL_C1_B_Fault	U2AMU tilt sensor channel B fault	Power down and restart
139	LM_ACXD_Fault_MaxDiff	U2AMU tilt angle X-axis dual channel redundant fault	Power down and restart
140	LM_ACYD_Fault_MaxDiff	U2AMU tilt Y-axis dual channel redundant fault	Power down and restart
149	LM_AL_TOut_Acq1A	Length angle sensor channel A bus timeout	Power down and restart
150	LM_AL_TOut_Acq1B	Length angle sensor channel A bus timeout	Power down and restart

8.1.3.Safety operation standards

8.1.3.1.Safety precautions before maintenance

1) This battery operates at a maximum DC voltage of approximately 309V and has a large current during operation. Its high-voltage connection line is orange and the high-voltage components are marked with warning signs. Maintenance personnel must obtain authorization from Hangcha Group; Having a national special vocational certificate. In addition, maintenance personnel must strictly follow the operating requirements for standardized operations;

Figure 8-2 Warning Signs

Figure 8-3 Orange High Voltage Connection Line

2) Before maintenance, a safety isolation area should be established and warning signs should be erected to alert relevant personnel and avoid safety accidents;

Figure 8-4 Safety Isolation Zone

3) Before repairing high-voltage components, gloves, shoes, goggles, etc. composed of insulation protective equipment must be worn;
4) It is strictly prohibited to wear metal decorations such as bracelets and rings during maintenance work;
5) Before repairing high-voltage components, ensure that all interfaces of the vehicle have been disconnected from the high-voltage power supply;
6) Before repairing high-voltage components, turn off the key switch and remove the MSD maintenance switch. Be sure to disconnect the power output line of the high-voltage power battery to prevent short circuits;

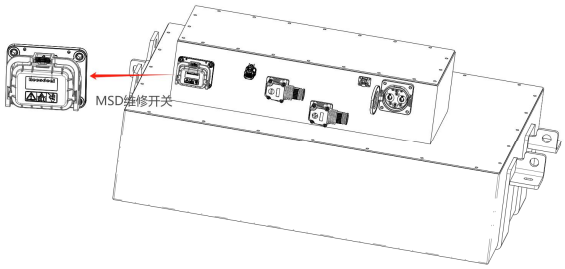


Figure 8-5 MSD maintenance switch

7) The maintenance site should be equipped with fire-fighting equipment, the battery pack storage area should be ventilated and dry, and there should be no combustibles around.

8.1.3.2.MSD usage: enable and disable

1) Located on the right side of the lithium battery main box, after removing the right side panel of the vehicle, the MSD maintenance switch can be seen.

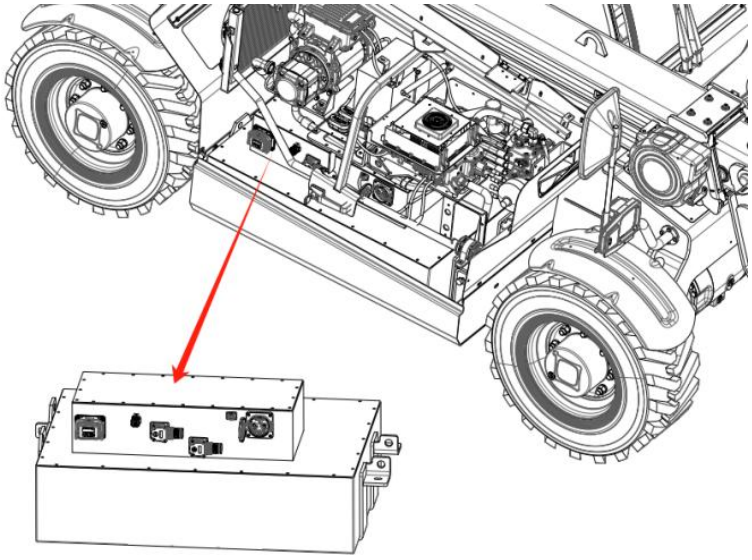


Figure 8-6

2) This MSD maintenance switch is used to cut off the high-voltage circuit, that is, to cut off the high voltage between the battery and the whole machine. When the vehicle is maintained, inspected, repaired, or in other emergency situations (such as electric shock, rain, floods, etc.), please unplug the switch and wait for 15-20 minutes for the high-voltage system to be powered off.

3) MSD cutting steps

The following figure shows the state of the high-voltage maintenance disconnect device (MSD) installed on the battery pack:

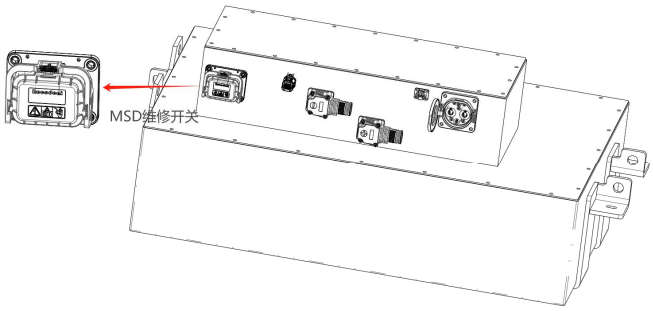


Figure 8-7

a. Pull out the locking terminal of the MSD handle, as shown in the following figure:

Figure 8-8

b. Rotate the MSD black handle to the position shown in the following image.

Figure 8-9

c. Press the MSD buckle.

Figure 8-10

d. Pull out the MSD switch with force to disconnect the MSD.

Figure 8-11

e. MSD installation can be carried out in the order of steps d/c/b/a.

8.1.3.3.Safety precautions during maintenance process

1) Identify maintenance personnel for the high-voltage system and prevent unrelated personnel from touching the battery box during maintenance;
2) If the repair cannot be completed in a short period of time, a "High Voltage Danger" label should be affixed to the high-voltage system components when not repaired;
3) If the power battery is severely damaged, deformed, damaged or cracked, do not touch the power battery without wearing insulation protective equipment;
4) After disconnecting the high-voltage components, immediately wrap the exposed ends of the copper busbar and the high-voltage components with electrical insulation cloth, and perform insulation treatment;
5) During maintenance, keep the power battery box clean and dry. Mark the disassembled components for accurate and error free installation;
6) Be sure to disassemble the power battery box according to the correct steps, and the disassembled components must be properly stored in a dedicated area;
7) It is strictly prohibited to inspect and repair the power battery box while the high-voltage relay is closed to prevent electric shock to personnel.

8.1.3.4.Installation safety precautions

1) During installation, strictly follow the sequence of operations;
2) Before connecting the positive and negative output copper bars of the battery, it is necessary to repeatedly check to ensure accuracy;
3) The wiring harness connectors and bolts should be checked for proper installation, and the bolts should be tightened to the specified torque and marked for tightening;
4) Only after confirming that all high and low voltage connectors of the power battery box are connected correctly, can they be connected to power on;
5) After installation and inspection, connect the diagnostic instrument (upper computer) to check whether the various parameter information of the battery pack is normal.

Warning

a) Wear protective equipment and use insulated tools during all disassembly and assembly processes; Before maintenance, the MSD maintenance switch must be removed and wait for 15-20 minutes for the high-voltage system to power off.
b) During the entire battery system maintenance process, it is prohibited to wear any metal jewelry to avoid accidental short circuits that may cause personal injury or death.
c) When disassembling and assembling, it is necessary to make marks and install in order.

8.1.3.5.Emergency treatment for high-voltage accidents

1) Emergency measures for electric shock accidents

When rescuing injured personnel in electrical accidents, never touch personnel who are still in contact with electricity. If possible, immediately power off the electrical system (turn off the ignition switch or unplug the maintenance switch). Separate the accident victim or conductive body from the discharge body using non-conductive objects (such as wooden strips, bamboo rafts, etc.).

When implementing first aid after an electric shock accident, if the victim does not respond, the following rescue measures should be taken: first, confirm that the victim has signs of life, such as pulse and breathing; Call the emergency doctor immediately, or have someone else call by the side of the horse; Perform artificial respiration and cardiopulmonary compression until the doctor arrives; If breathing stops, use non professional defibrillators (if available) for rescue.

If the accident victim can respond to the inquiry, the following first aid measures should be taken: cool down the burn area and wrap it with sterilized lint free cloth; Even if the accident victim refuses, they should be required to receive treatment (to avoid long-term sequelae)

2) Emergency measures for high-voltage battery accidents

When an electric vehicle or high-voltage battery catches fire, please perform the following operations according to the actual situation:

①Turn off the vehicle and disconnect the 12V battery if conditions permit

② Disconnect the maintenance switch.

③ Find a fire extinguisher nearby (do not use water-based fire extinguishers).

④ If the vehicle catches fire and the fire is small and slow, please use a dry powder fire extinguisher to extinguish the fire and immediately call for help.

If the fire is large and developing rapidly, please immediately stay away from the vehicle, call the fire phone and wait for rescue. If the high-voltage battery leaks (with obvious liquid flowing out), please operate the vehicle according to the following methods:

①Turn off the vehicle and disconnect the front cabin 12V battery if conditions permit.

② Disconnect the maintenance switch.

③ When a small amount of leakage occurs, please stay away from the fire source, use a absorbent cloth to absorb and place it in a closed container, or dispose of it by incineration. Before operation, please wear acid and alkali resistant gloves.

④ When a large amount of leakage occurs, please collect it uniformly and handle it according to hazardous chemicals. Calcium gluconate solution can be added to treat the generated gas HF.

⑤ When the human body accidentally comes into contact with leaked liquid, it should be immediately rinsed with plenty of water for 10-15 minutes. If there is pain, 2.5% calcium gluconate ointment can be applied, or 2% -2.5% calcium gluconate solution can be soaked to relieve pain. If there is no improvement or discomfort symptoms occur, please seek medical attention immediately.

8.2.Control box assembly

1) Disassemble the fuse
2) Turn the key switch to "OFF";
3) Rotate the lock on the control box cover and then open the cover;
4) Remove the fuse from the box;

Description

If the fuse or relay is damaged, replace it with a new one as shown below (please refer to the inside of the telehandler control box for details):

①If the fuse is damaged, the cause must be determined before installing a new fuse;

② Do not use fuses higher than the design value.

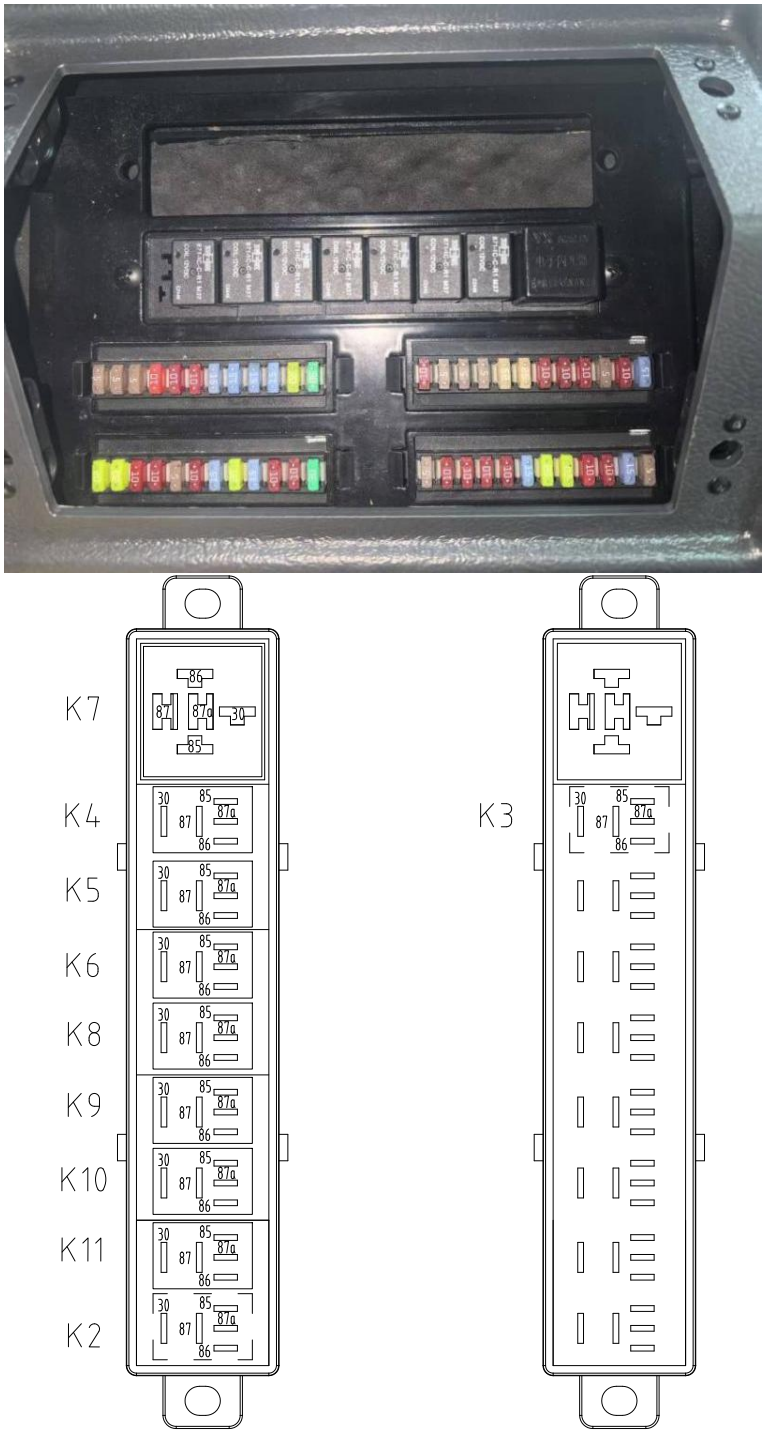


Figure 8-13

Schematic diagram of control box

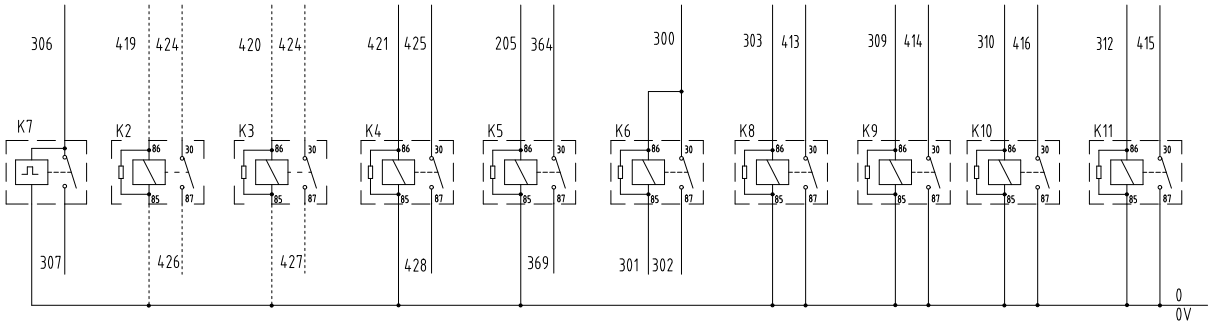


Figure 8-13

Function details of control box plug

Pin	Functional definition
K2-86	Fan low-speed signal
K3-86	Fan high-speed signal
K4-86	Water pump signal
K5-86	Reverse signal
K6-85	Horn signal
K8-86	Main positive relay signal
K9-86	Pre charge relay signal
K10-86	PTC signal
K11-86	Warm air blower signal
K2-87	Fan low-speed power supply
K3-87	Fan high-speed power supply
K4-87	Water pump power supply
K5-87	Reverse power supply
K6-87	Horn power supply
K8-30	Main positive relay power supply
K9-30	Pre charge relay power supply
K10-30	PTC power supply
K11-30	Warm air blower power suppler
K2~6-30	Input power supply
K6-86	Input power supply
K2~5-85	GND
K8~11-85	GND
K8~11-87	GND

Relay

R4-R12

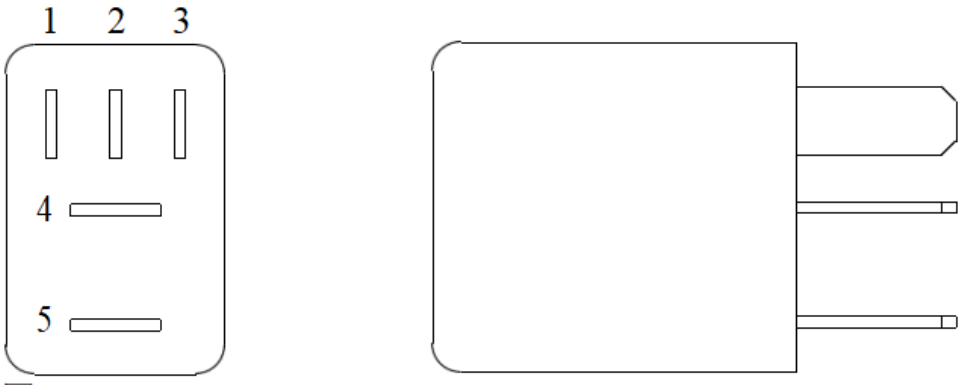


Figure 8-14 R4-R12

Test

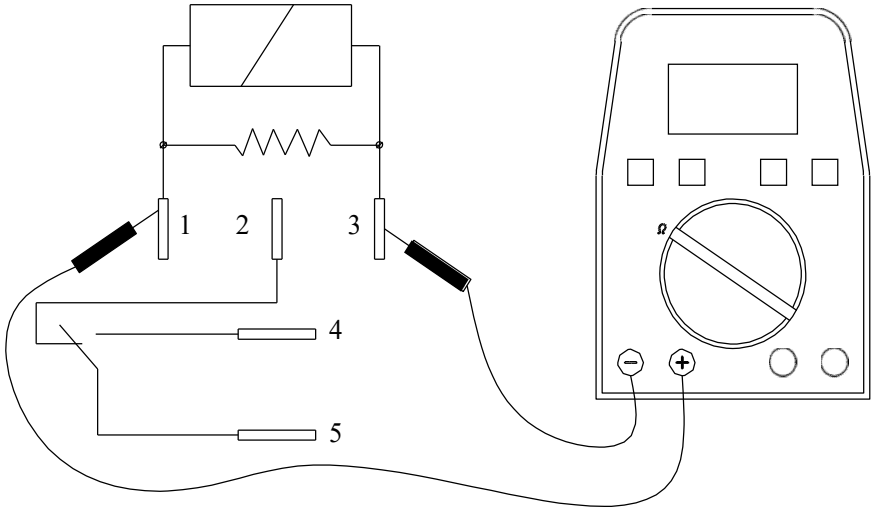


Figure 8-15

Turn the multimeter to the ohm range and measure the resistance between the corresponding terminals.

Connection port	Normal resistance value	Remark
1-3	（80-120）Ω	

Fusible wire

A melted fusible wire can be easily observed and touched with fingers. If it is uncertain whether it is broken, a multimeter or light bulb can be used for testing.

Attention！

a. If the fusible link burns out, it may be due to a short circuit in the circuit (excessive power or current). Regardless of the reason, please carefully inspect and troubleshoot.

b. Fusible wire will generate heat, do not wrap it with adhesive tape. Finally, do not place the fusible link near other wiring or rubber components.

8.3.Lighting System

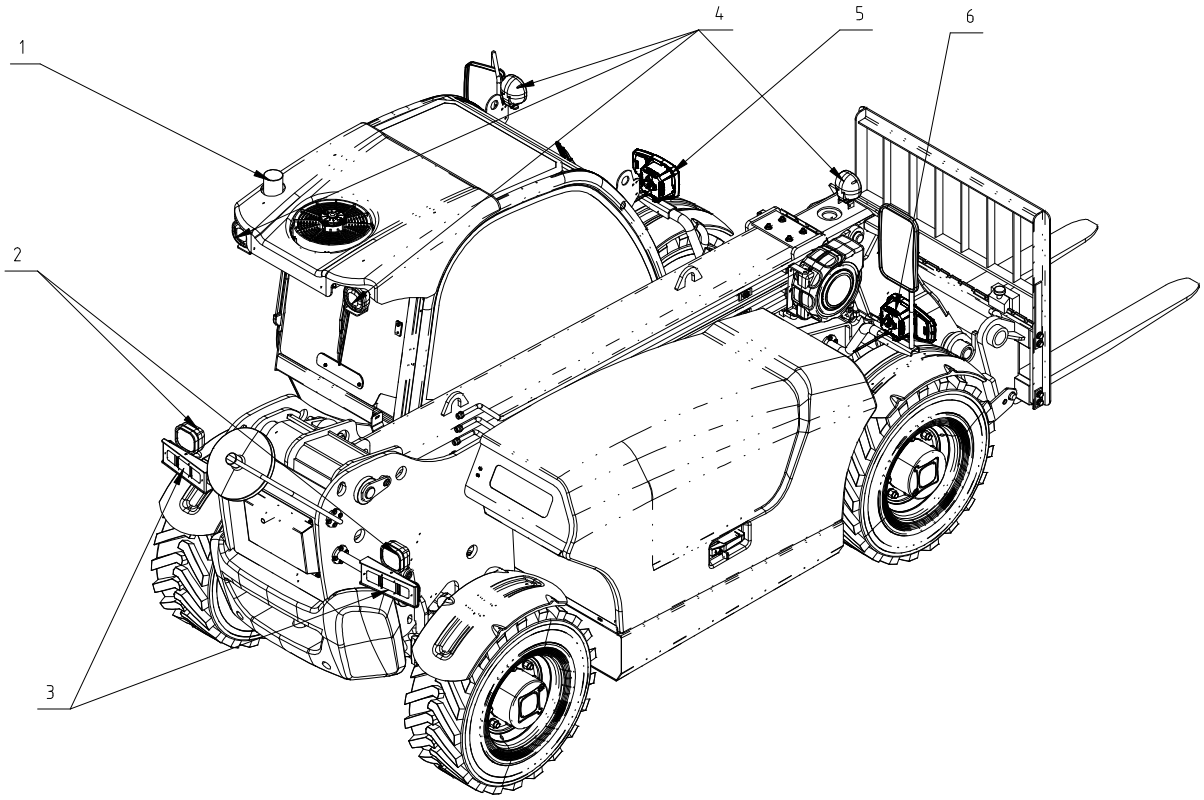


Figure 8-16 Lighting System

1-Alarm lamp	2-Rear work light	3-Tail lamp	4-Work light
5-Left front headlight	6-Right front headlight		

8.3.1.Front headlights

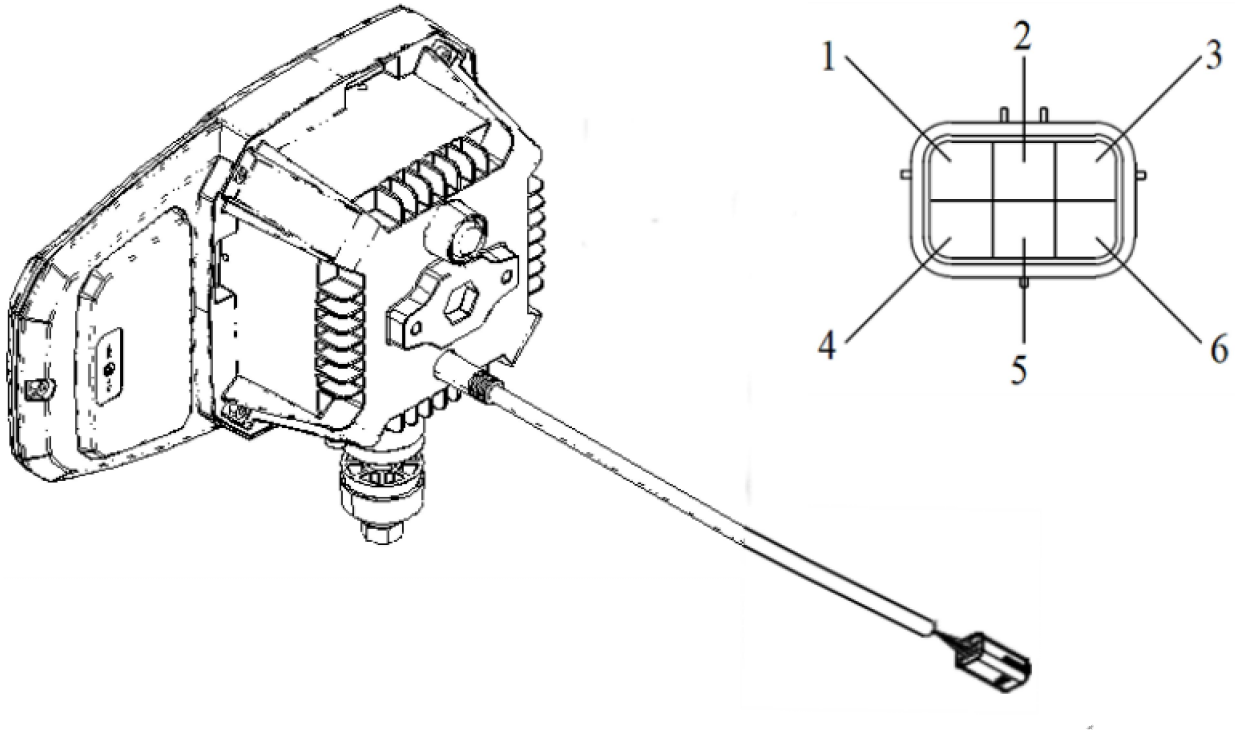


Figure 8-17 Front headlight assembly

Port	Function	Color	Remark
1	Earthing	Black	
2	Lower beam	Green Purple	
3	High beam	Red	
4	Front position	Green	
5	Turn	Green brown	
6	NC	NC	

Disassembly and installation of front headlights

1.Remove the bracket fixing screws.

2.Disconnect the wiring connectors.

3.Replace with a new LED light.

4.The installation and disassembly steps are reversed.

Test

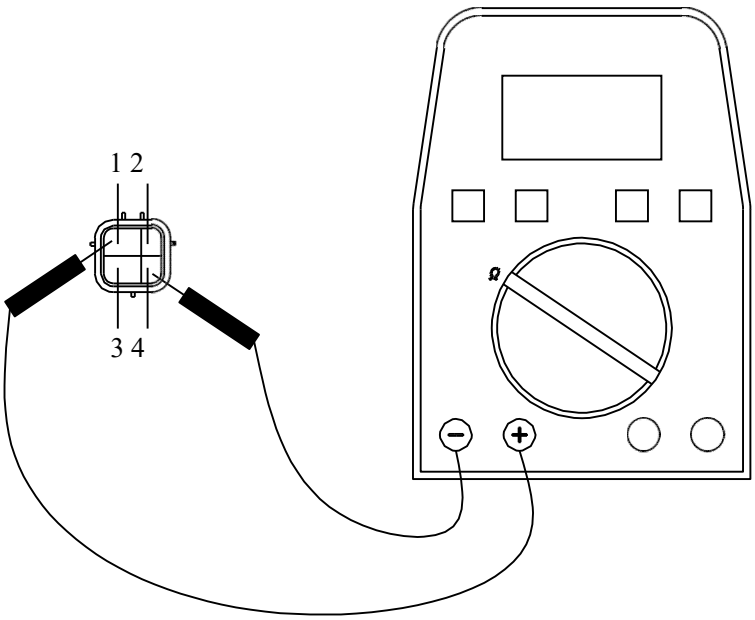


Figure 8-18

Turn the multimeter to the ohm range and measure the conductivity between the corresponding terminals.

Connection port	Function normal	Function abnormal	Remark
1-2	Display a certain numerical value	The resistance value is 0 or ∞	
1-3	Display a certain numerical value	The resistance value is 0 or ∞	
1-4	Display a certain numerical value	The resistance value is 0 or ∞	
1-5	Display a certain numerical value	The resistance value is 0 or ∞	

8.3.2.Tail lamp

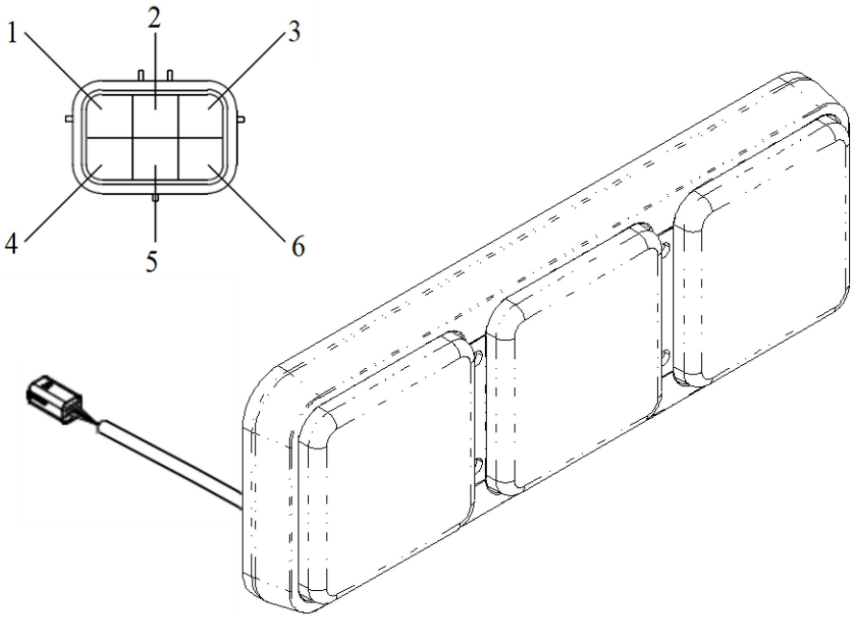


Figure 8-19 Rear taillight assembly

Port	Function	Color	Remark
1	Turn	Yellow	
2	Width indication	Brown	
3	Brake	Red	
4	Back the car	White	
5	Earthing	Black	
6	NC	NC	

Disassembly and installation of rear combination lamp

1.Remove the fixing screws of the rear combination lamp

2. Disconnect the wiring connectors.

3.Replace with a new LED light.

4.The installation and disassembly steps are reversed.

Test

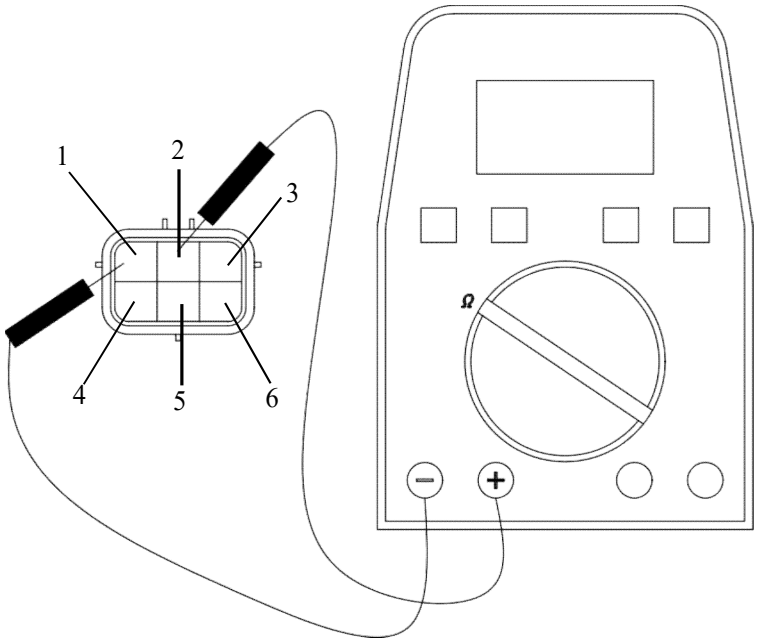


Figure 8-20

Turn the multimeter to the ohm range and measure the conductivity between the corresponding terminals.

Connection port	Function normal	Function abnormal	Remark
1-5	Display a certain numerical value	The resistance value is 0 or ∞	
2-5	Display a certain numerical value	The resistance value is 0 or ∞	
3-5	Display a certain numerical value	The resistance value is 0 or ∞	
4-5	Display a certain numerical value	The resistance value is 0 or ∞	

8.3.3.Alarm lamp

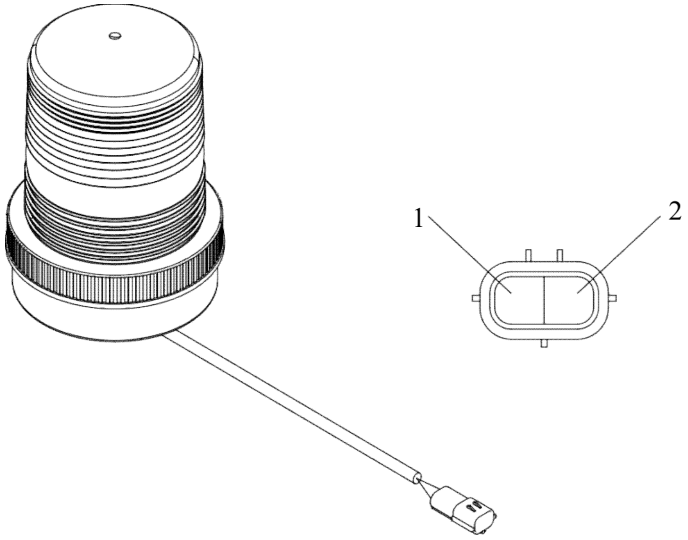


Figure 8-21

Port	Function	Color	Remark
1	Power supply	Red	
2	Earthing	Black	

Test

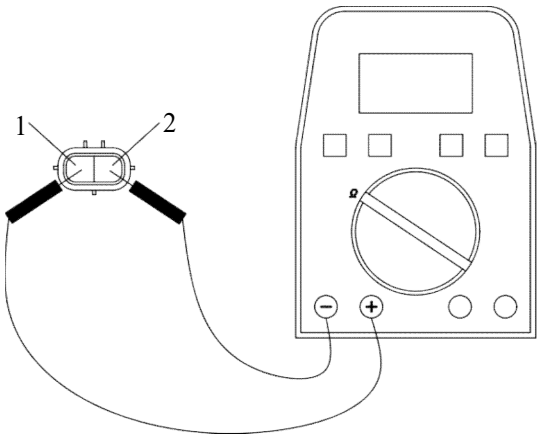


Figure 8-22

Turn the multimeter to the ohm range and measure the conductivity between the corresponding terminals.

Connection port	Function normal	Function abnormal	Remark
1-2	Display a certain numerical value	The resistance value is 0 or ∞	

8.3.4.Rear work light

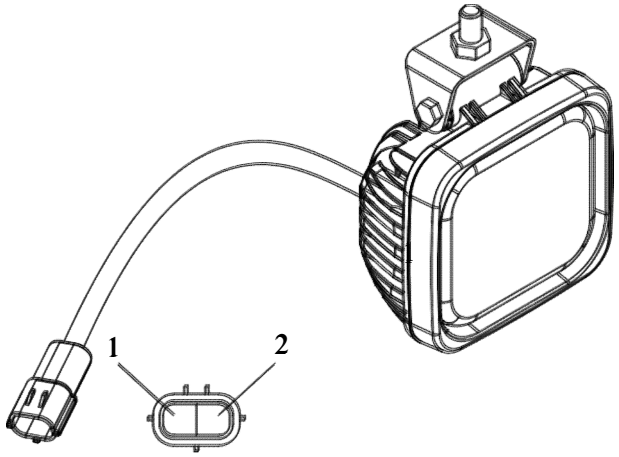


Figure 8-23 Rear work light

Port	Function	Color	Remark
1	Power supply	Red	
2	Earthing	Black	

Test

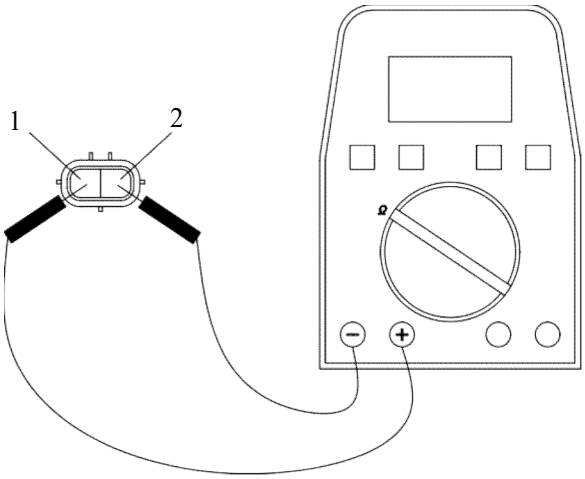


Figure 8-24

Turn the multimeter to the ohm range and measure the conductivity between the corresponding terminals.

Connection port	Function normal	Function abnormal	Remark
1-2	Display a certain numerical value	The resistance value is 0 or ∞	

8.3.5. LED rear work light

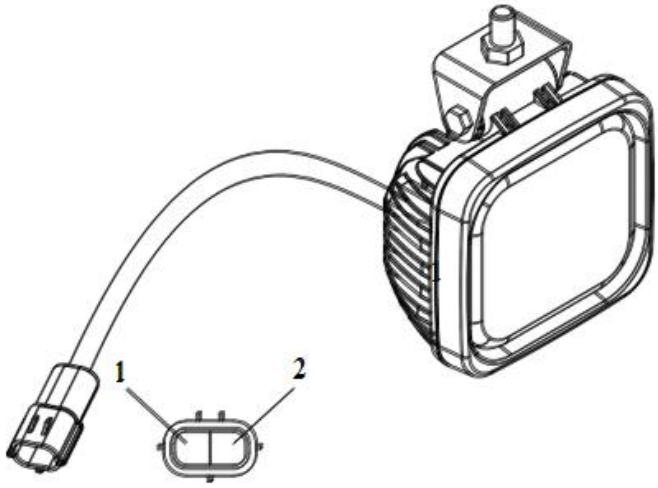


Figure 8-25 LED rear work light

Port	Function	Color	Remark
1	Power supply	Red	
2	Earthing	Black	

Test

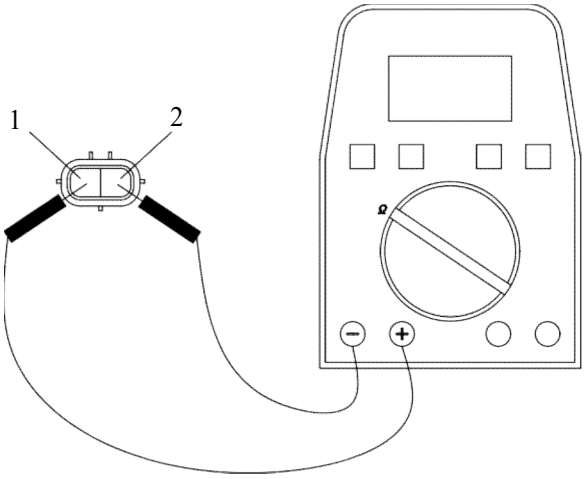


Figure 8-26

Turn the multimeter to the ohm range and measure the conductivity between the corresponding terminals.

Connection port	Function normal	Function abnormal	Remark
1-2	Display a certain numerical value	The resistance value is 0 or ∞	

8.4.Switch

8.4.1.Combination switch

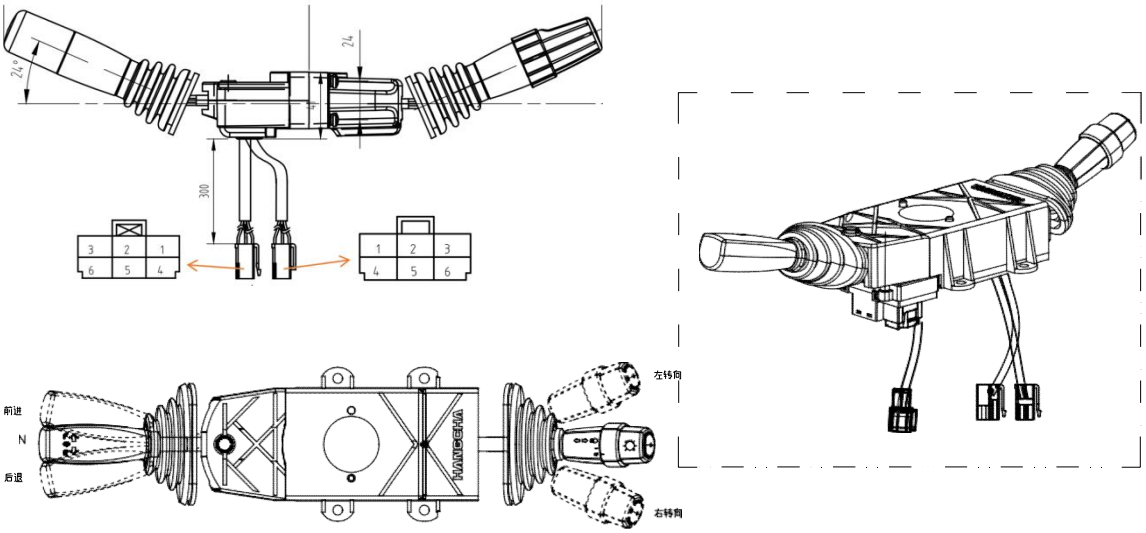


Figure 8-27

Port	Color	Remark
1	Blue	Left hand handle six wire plug
2	Green	Left hand handle six wire plug
3	Yellow green	Left hand handle six wire plug
6	White	Left hand handle six wire plug
1	White	Right handle six wire socket
2	Blue	Right handle six wire socket
3	Grey	Right handle six wire socket
4	Blue black	Right handle six wire socket
5	Brown	Right handle six wire socket
6	Red white	Right handle six wire socket

Disassemble

1. Remove the combination instrument panel.
2. Unscrew the screw and disconnect the wiring connector.
3. The installation sequence is opposite to the disassembly sequence.

Test

Left Handle Inspection

Place the left joystick in forward gear and measure the conductivity of ports 1-3; Afterwards, shift the left joystick to the reverse position and measure the conductivity of ports 2-3.

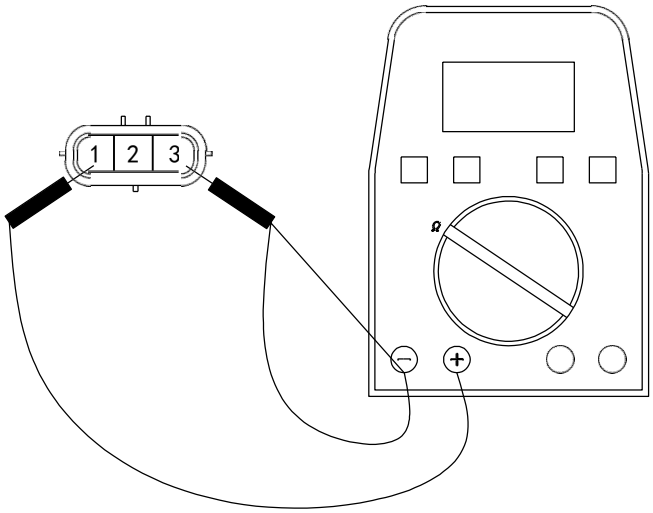


Figure 8-28

Connection port	Function normal	Function abnormal	Remark
1-3	The resistance value is 0	The resistance value is ∞	Forward gear
2-3	The resistance value is 0	The resistance value is ∞	Reverse gear

Right Handle Inspection

Place the right handle gear in the left turn signal gear and measure the conductivity of ports 1-2; Place the right handle in the right turn signal position and measure the conductivity of ports 1-3; Place the right joystick gear in the center position, turn the light switch to the width indicator position, and measure the conductivity of ports 4-5; Place the right lever in the center position, turn the light switch to the headlight position, and measure the conductivity of ports 4-6.

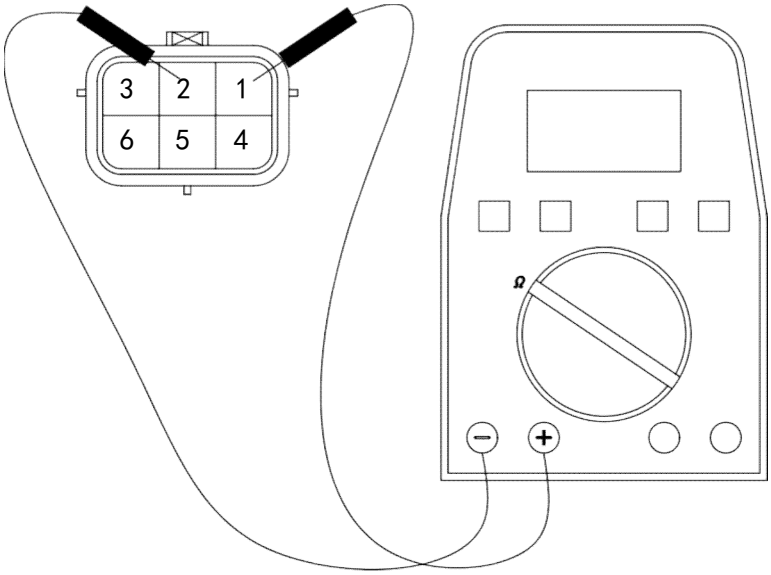


Figure 8-29

Connection port	Function normal	Function abnormal	Remark
2-3	The resistance value is 0	The resistance value is ∞	Left turn signal gear
1-3	The resistance value is 0	The resistance value is ∞	Right turn signal gear
5-6	The resistance value is 0	The resistance value is ∞	Small lamp
4-6	The resistance value is 0	The resistance value is ∞	Headlight

8.4.2.Key (start) switch

Figure 8-30

Disassemble

1. Remove the combination instrument panel.
2. Disconnect the wiring connectors.
3. Remove the nut, washer, spacer, and dashboard.
4. The installation and disassembly steps are reversed.
5. Adjust the protruding part of the switch to the appropriate length during installation.

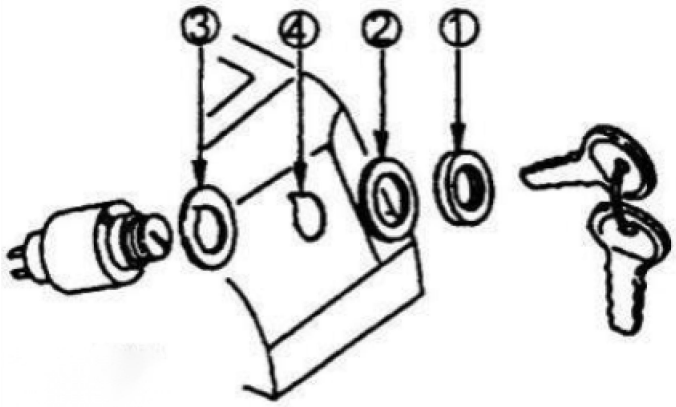


Figure 8-31

①-nut ②-washer ③-spacer ④-dashboard

Inspection

Turn the key switch to the "ON" position and use a multimeter (set to ohms) to measure the conductivity of ports 1-2.

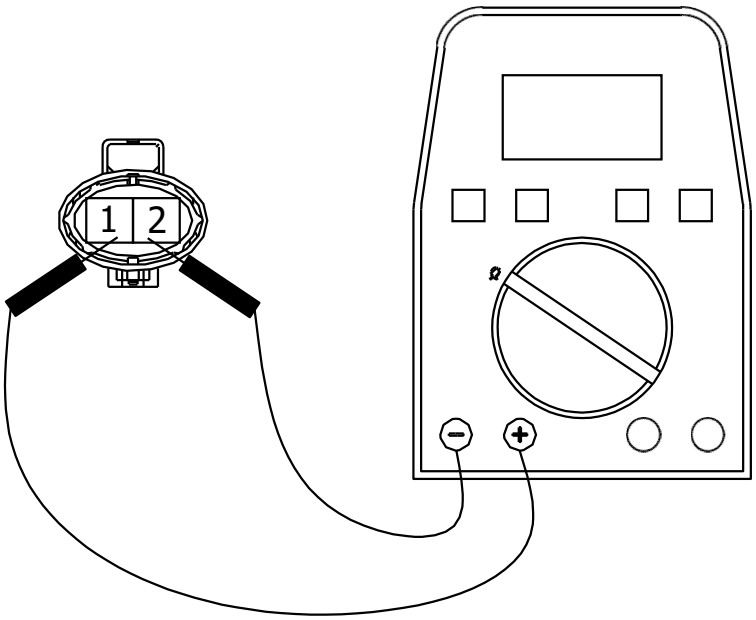


Figure 8-32

Connection port	Function normal	Function abnormal	Remark
3-4	The resistance value is 0	The resistance value is ∞	ON gear

8.4.3.Parking brake rocker switch

Disassemble

1. Remove the parking brake rocker switch.
2. Disconnect the wiring connectors.
3. The installation and disassembly steps are reversed.

Figure 8-33

Test

Release the handbrake switch and measure the conductivity of ports 1-5, 9-10; Afterwards, press the handbrake switch and measure the conductivity of ports 1-5, 9-10.

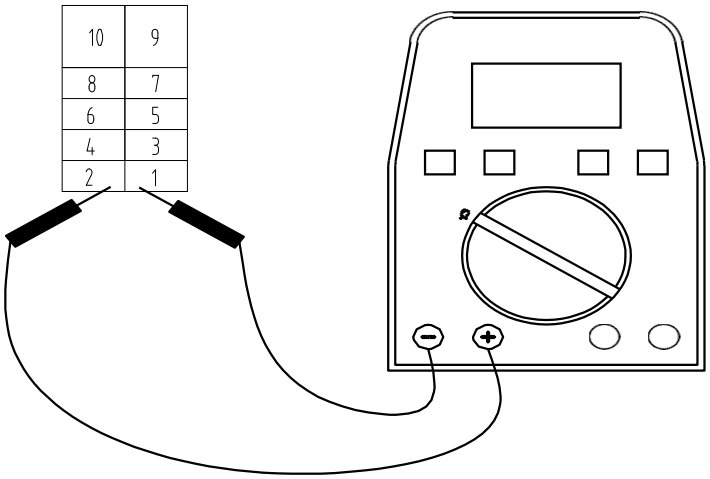


Figure 8-34

Connection port	Function normal	Function abnormal	Remark
1-5	The resistance value is 0	The resistance value is ∞	Release the handbrake
9-10	Display a certain numerical value	The resistance value is 0 or ∞	Release the handbrake
1-5	The resistance value is ∞	The resistance value is 0	Press the handbrake
9-10	Display a certain numerical value	The resistance value is 0 or ∞	Press the handbrake

8.4.4.Electronic accelerator pedal

Disassemble

1. Remove the screws and washers
2. Disconnect the wiring connectors.
3. Remove the electronic accelerator pedal.
4. The installation and disassembly steps are the same.

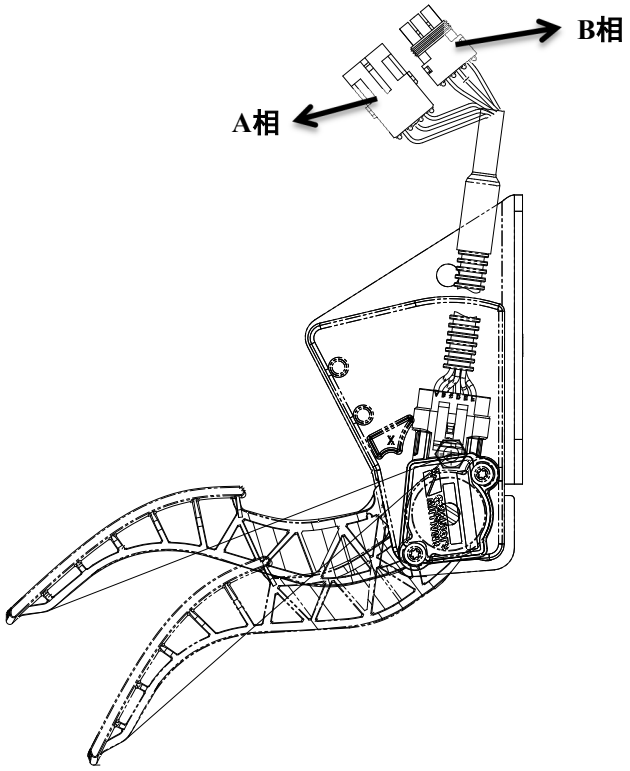


Figure 8-35

Port	Function	Color	Remark
A	Earthing	White	A direction
B	Pedal position signal 1	Black	A direction
C	Power input（+5V）	Red	A direction
A	Pedal position signal 2	Orange	D direction
B	Earthing	Blue	D direction
C	Power input（+5V）	Green	D direction

Test

A and D-direction detection method is the same. Release the electronic accelerator pedal and use a multimeter (set to ohms) to measure the conductivity of ports A-B and A-C.

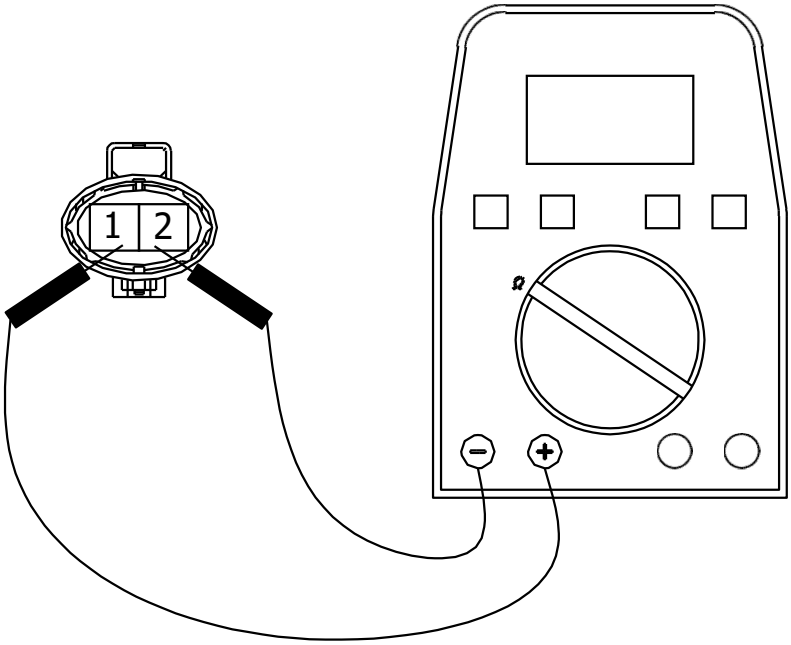


Figure 8-36

Connection port	Function normal	Function abnormal	Remark
A-B	Display a certain numerical value	The resistance value is 0 or ∞	
A-C	Display a certain numerical value	The resistance value is 0 or ∞	

8.4.5.Emergency power-off switch

Disassemble

1. Remove the screws and washers
2. Disconnect the wiring connectors.
3. Remove the emergency power-off switch.
4. The installation and disassembly steps are reversed.

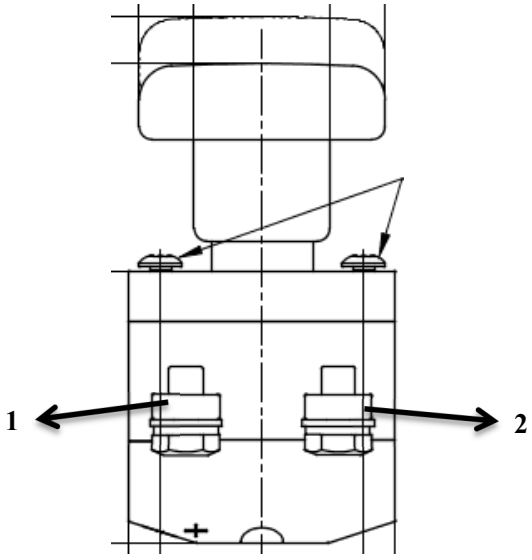


Figure 8-37

Test

Pull out the emergency stop button and use a multimeter (set to ohms) to measure the conductivity of ports 1-2.

Connection port	Function normal	Function abnormal	Remark
1-2	The resistance value is 0	The resistance value is ∞	Pull out the switch

8.5.Buzzer alarm

Dismantling and installation

1. Disconnect the wiring connector and remove the bolt.
2. The installation and disassembly steps are reversed.

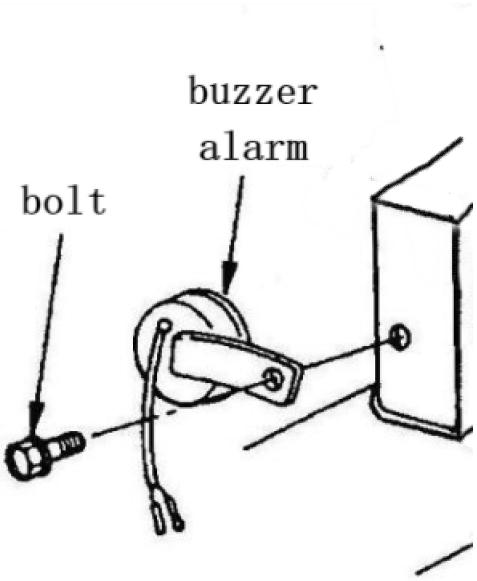


Figure 8-38

8.6.Horn

Dismantling and installation

1. Remove the plug connector of the horn connection.
2. Remove the bolts and horn.
3. The installation and disassembly steps are reversed.

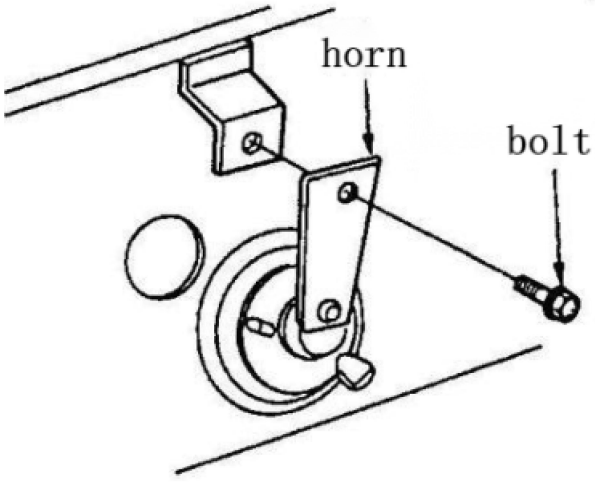
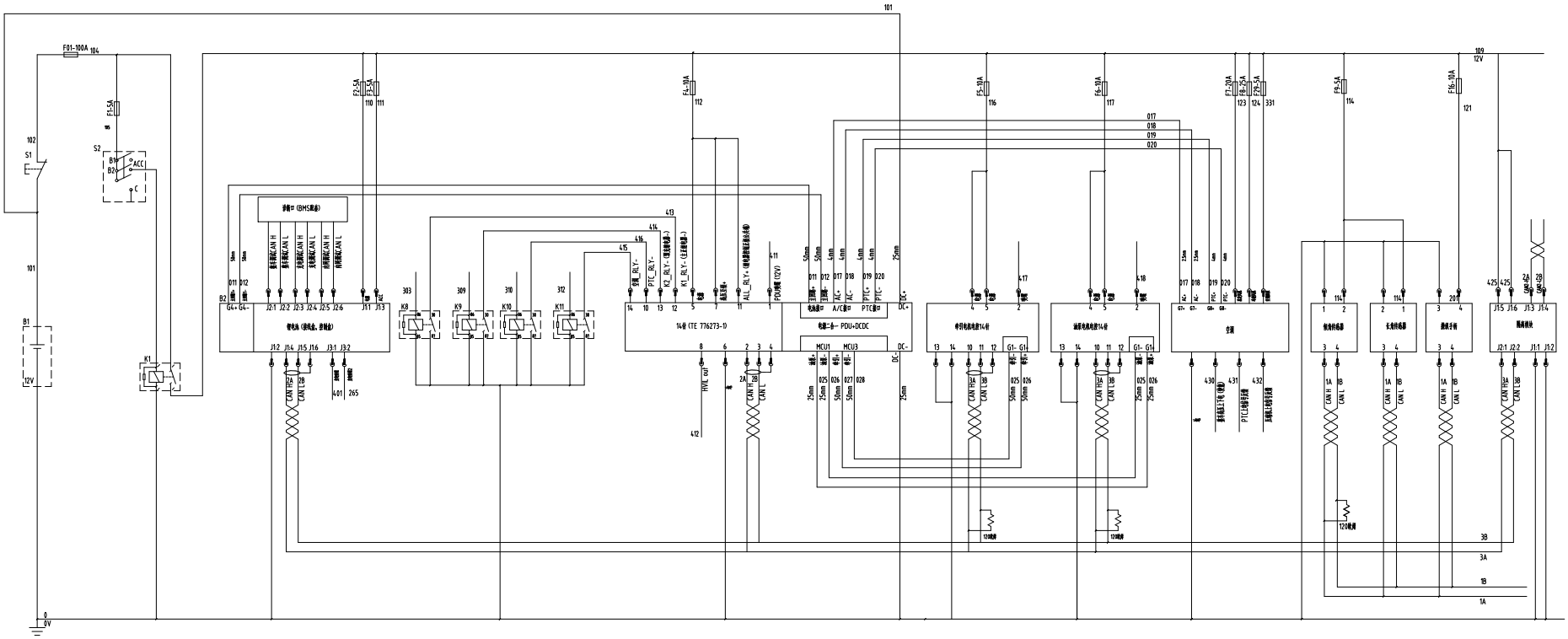
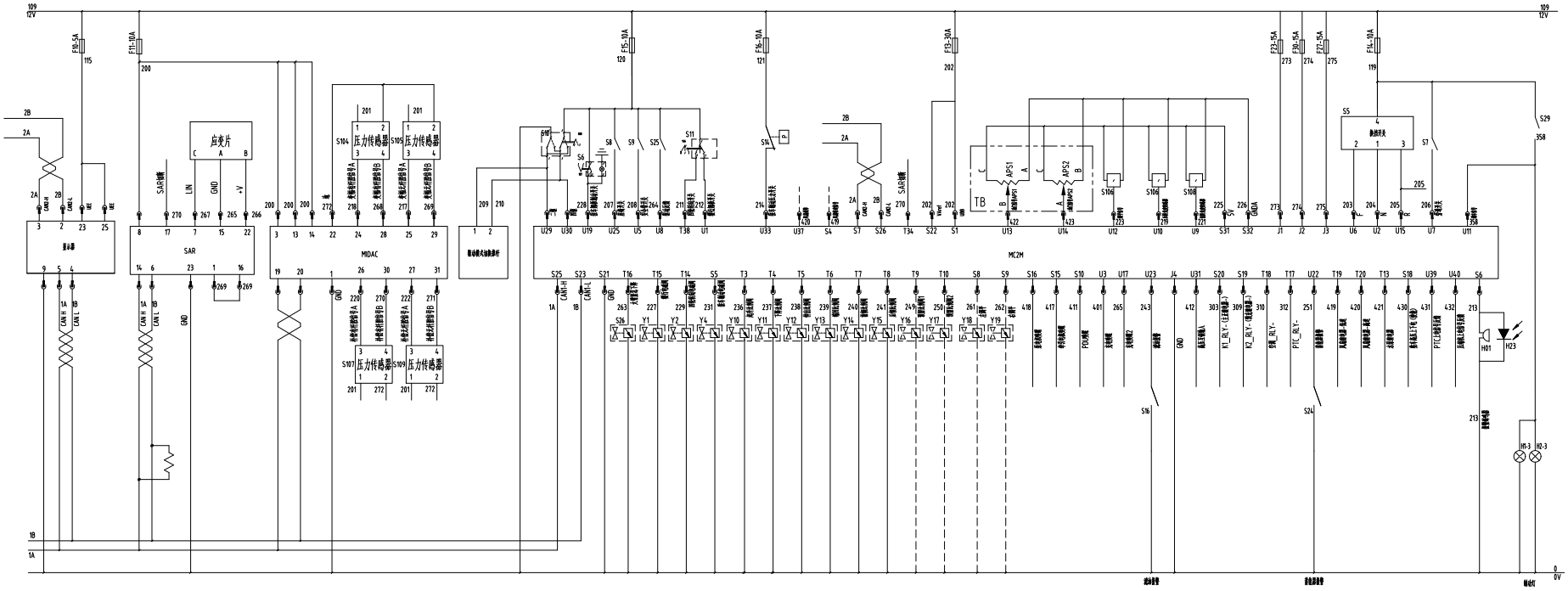


Figure 8-39

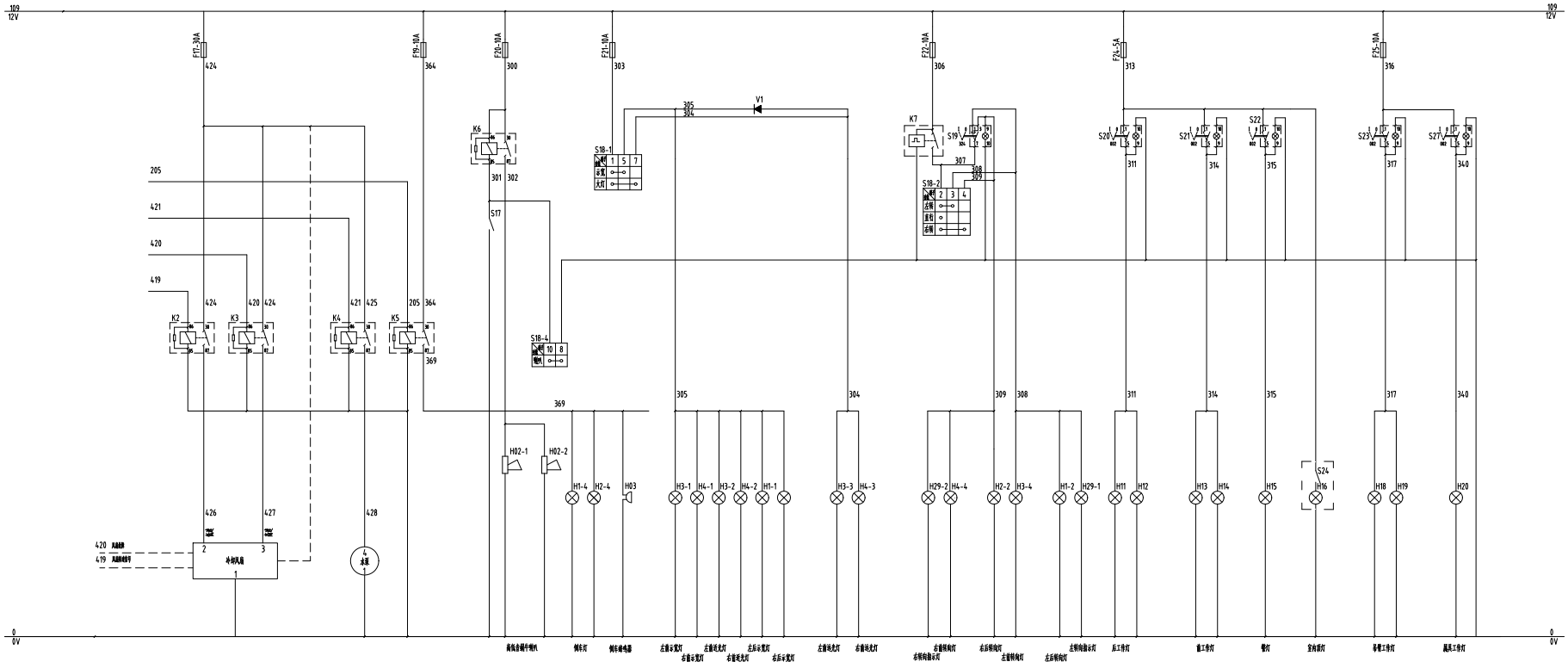
8.7.Electrical schematic diagram



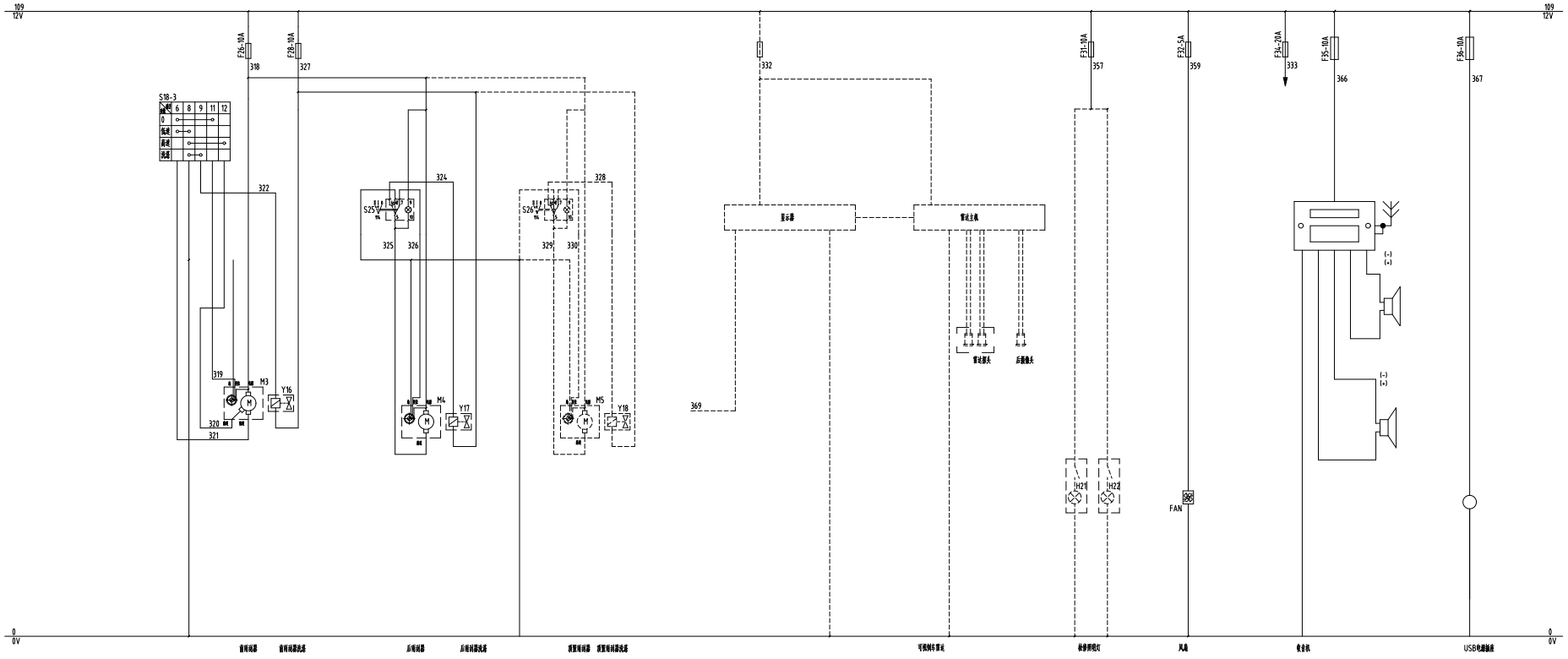
T25-60XHYG Electrical schematic diagram



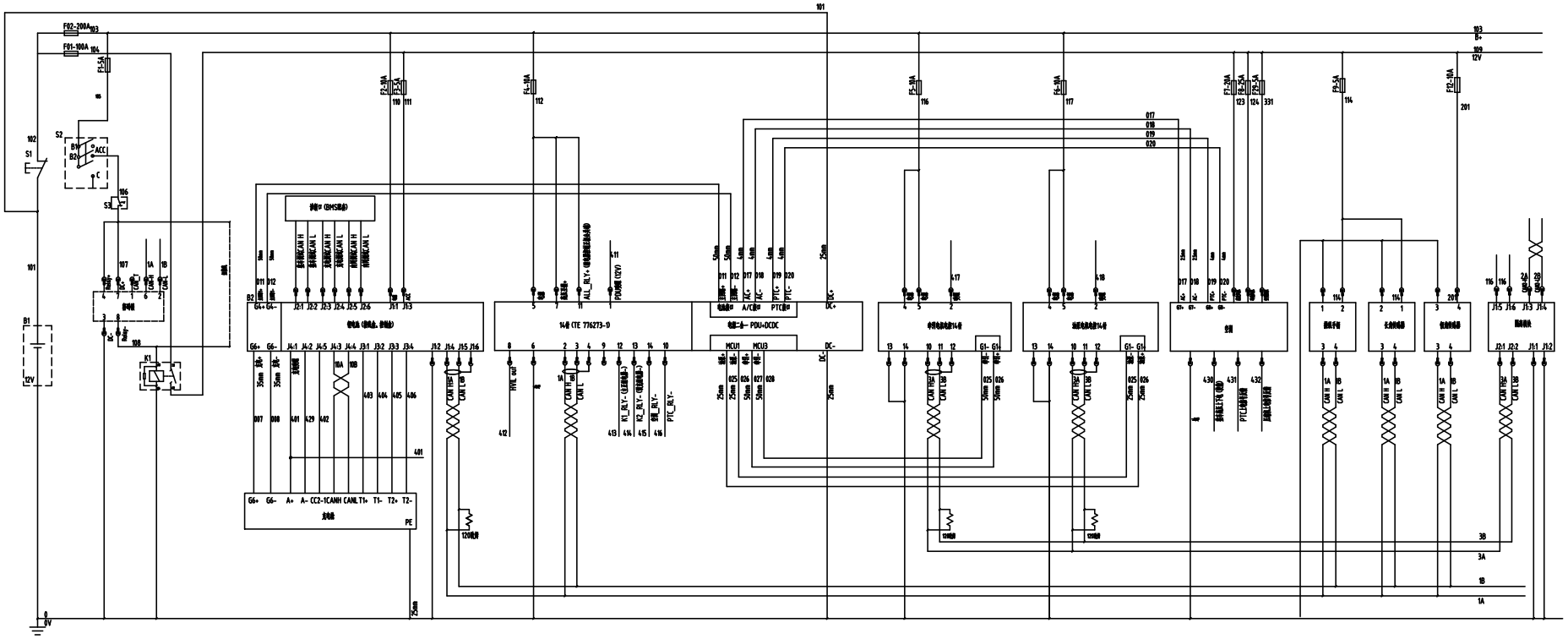
T25-60XHYG Electrical schematic diagram



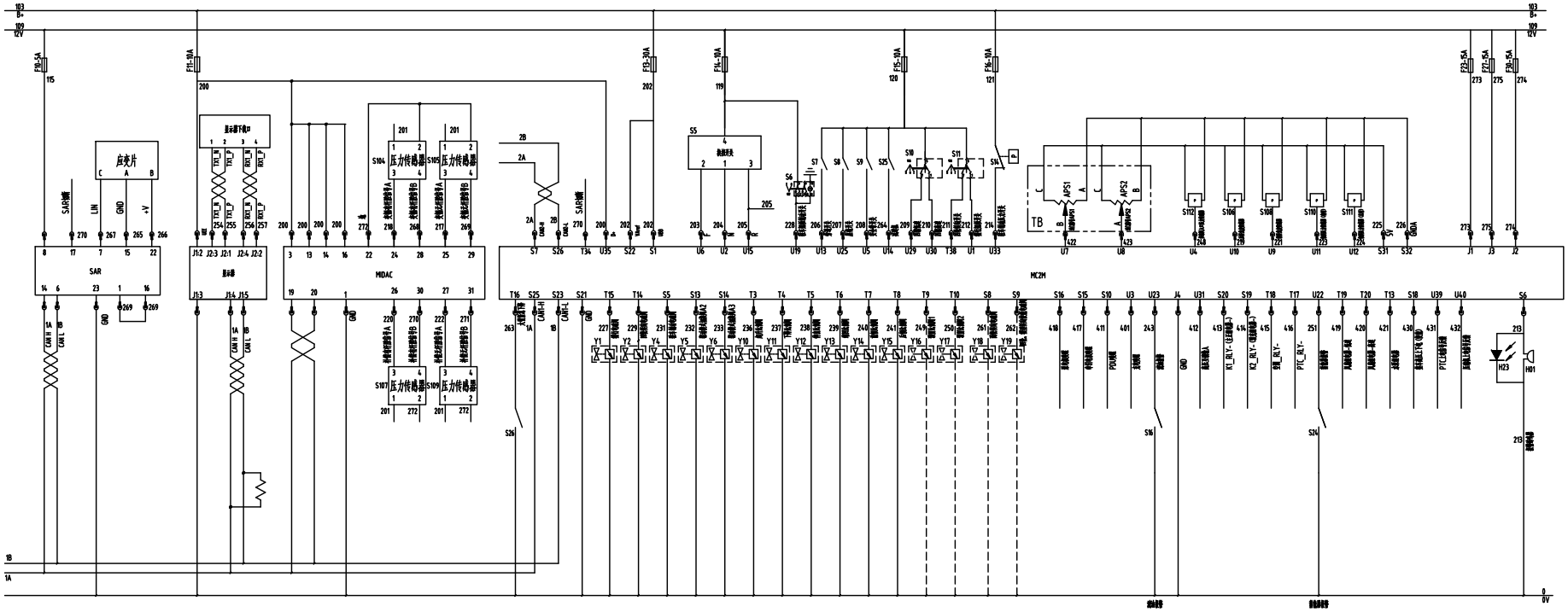
T25-60XHYG Electrical schematic diagram



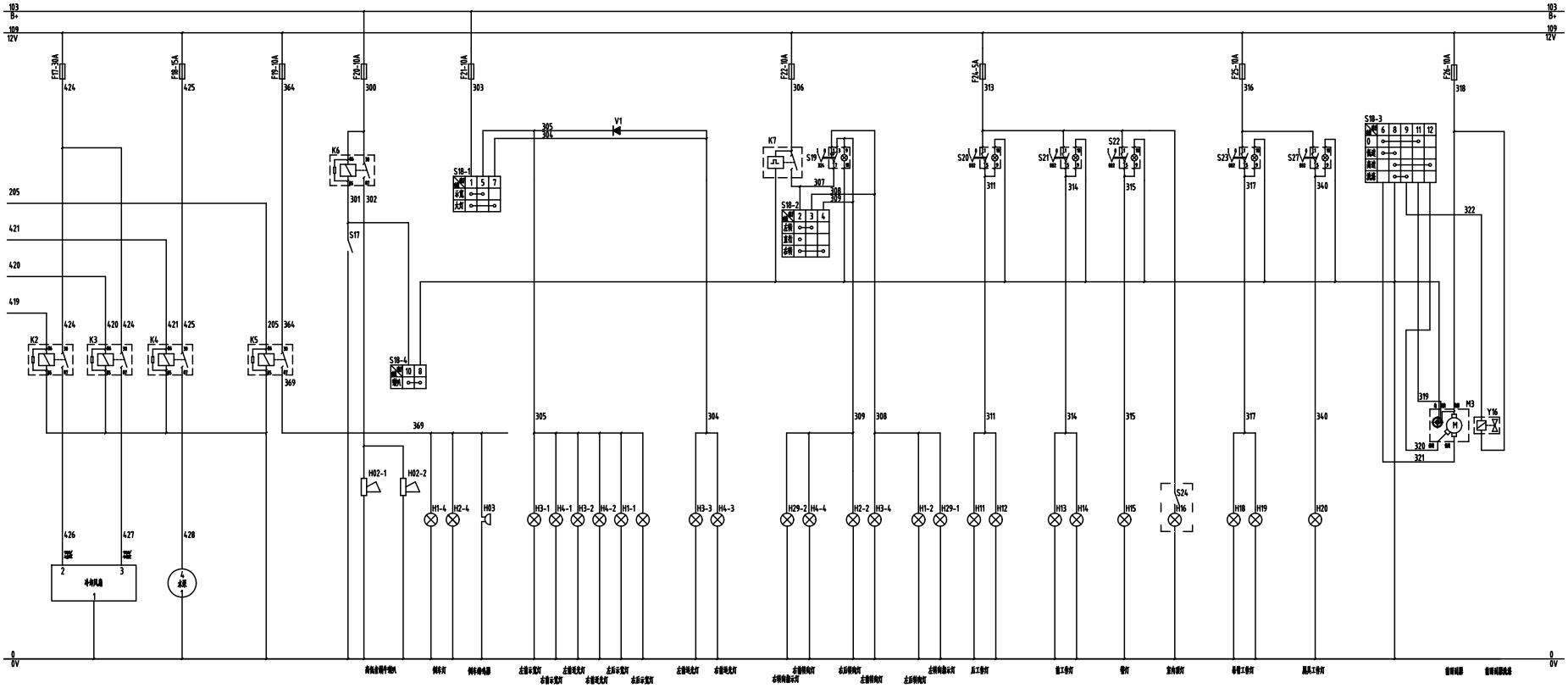
T25-60XHYG Electrical schematic diagram



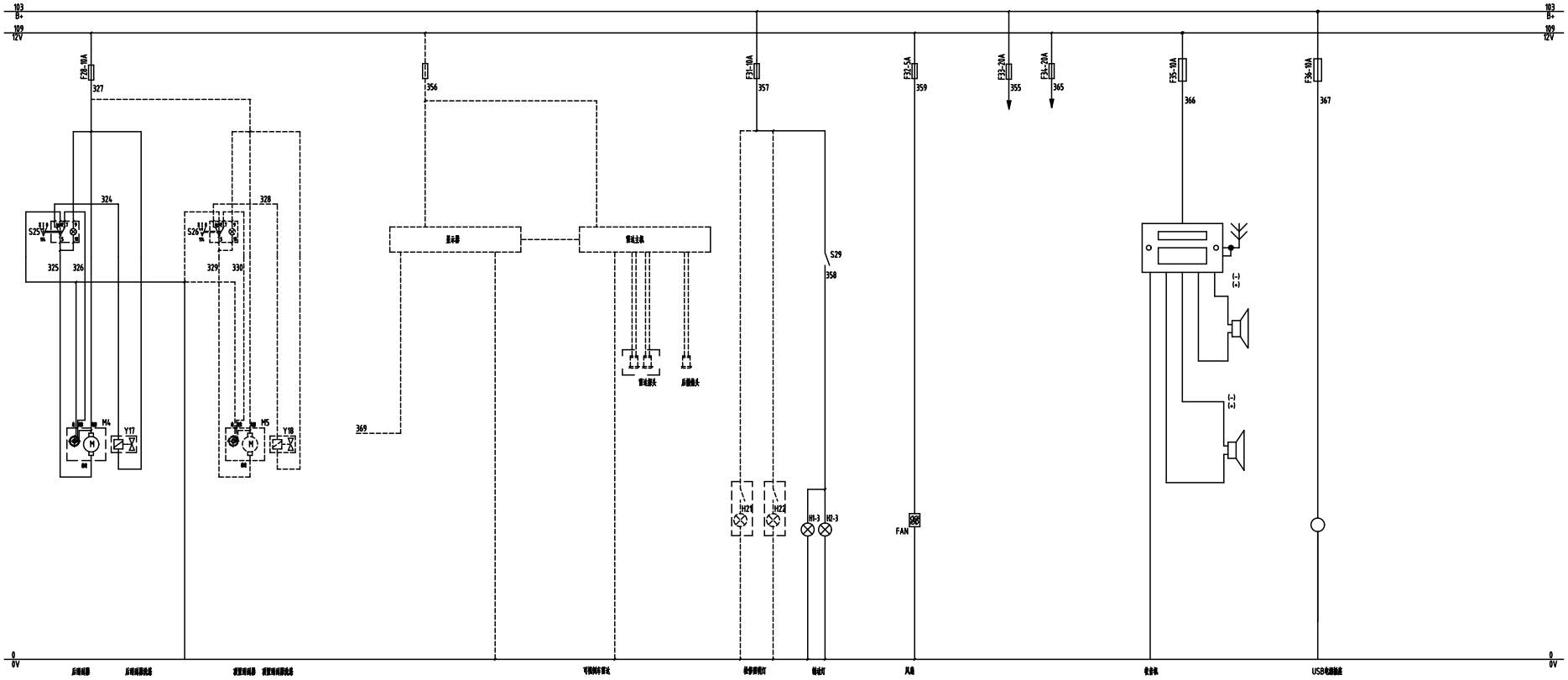
T35-100XHYG Electrical schematic diagram



T35-100XHYG Electrical schematic diagram



T35-100XHYG Electrical schematic diagram



T35-100XHYG Electrical schematic diagram

Appendix Maintenance Record

Time	Repair content	Signature	Remark

Time	Repair content	Signature	Remark

Time	Repair content	Signature	Remark

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