Service Manual

EK13A/EK15A/EK15A-189LI

Three Wheel Electric Forklift

warning

You must understand the operation instructions in this manual before using it.

Note:

· Please check the last page of this document and nameplate for all current product type identification.

Keep it for future use

Manual

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1 Regular maintenance

Only qualified and trained personnel should perform maintenance work on this vehicle.
Before maintenance, remove the cargo from the fork and lower the fork to the lowest position.
If you need to lift the vehicle, use the specified lashing or jacking equipment.Before operation, place safety devices (such as designated jacks, wedges or wood blocks) under the vehicle to prevent accidental drop, movement or sliding.
Use the original parts approved and released by your dealer.
Please consider that hydraulic fluid leakage may lead to machine failure and accidents.
Pressure valve adjustment is only allowed by trained service technician.
If you need to replace wheels, casters must be round and free of abnormal wear.
Check the items on the maintenance list.

1.1Maintenance List

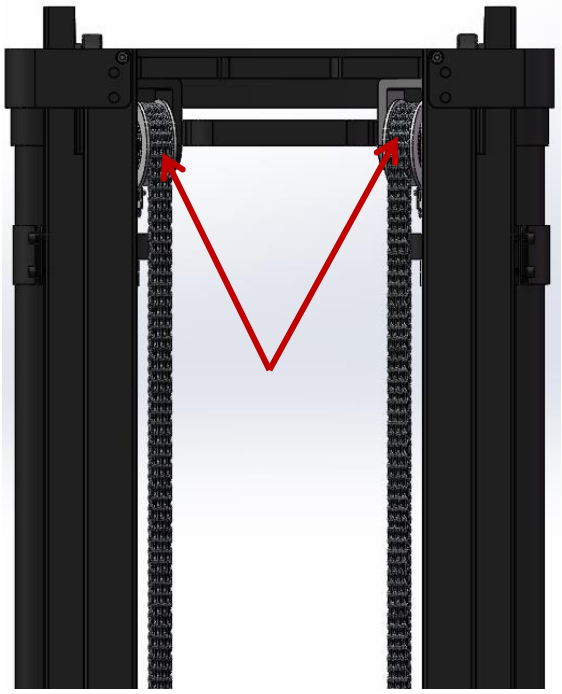
		Interval (month)			
		1	3	6	12
The hydraulic system					
1.1	Check the function of hydraulic system		?		
1.2	Check hoses, piping and joints for tightness, sealing and damage		?		
1.3	Inspect cylinder block and piston for damage, sealing and fixation			?	
1.4	Visually inspect the door stand roller and inspect the roller surface for wear			?	
1.5	Inspect forks and loading parts for wear and loss			?	
1.6	Check load chain Settings and re-tensioning if necessary			?	
1.7	Check oil level in fuel tank			?	
1.8	Replacement hydraulic fluid				?
Mechanical systems					
2.1	Check the fork for deformation and breakage		?		
2.2	Check chassis for deformation and cracking		?		
2.3	Check that all screws are in place		?		
2.4	Check gear box for noise and leakage		?		
2.5	Check wheel for deformation and damage		?		

2.6	Lubricated steering bearing				?
2.7	Check and lubricate the pivot points		?		
2.8	Lubricating grease nozzle	?			
Electrical system					
3.1	Check whether power cables are damaged		?		
3.2	Check the electrical connections		?		
3.3	Check the function of the emergency switch		?		
3.4	Check whether the power drive system is noisy or damaged		?		
3.5	Test electricity meter		?		
3.6	Check whether the correct fuse is used		?		
3.7	Detect warning signals		?		
3.8	Check the current contactor		?		
3.9	Check frame for leakage (insulation test)		?		
3.10	Check the function and wear of the drive controller		?		
3.11	Check the electrical system that drives the motor		?		
traveling system					
4.1	Check the gearbox for abnormal sound			?	
4.2	Check the driving mechanism and grease it		?		
4.3	Inspect driving and steering wheels for wear and damage			?	
4.4	Check wheel bearing and fastening condition			?	
4.5	Check the air gap of the electromagnetic brake			?	
4.6	Check the lifting, forward and backward tilt and left and right movement of the door frame		?		
4.7	Check and adjust braking effect		?		
Energy supply					
5.1	Check the voltage of the battery		?		
5.2	Check that battery cables are securely connected and grease the electrodes if necessary		?		
5.3	Check whether the battery cover is damaged		?		
5.4	Check the main cable for damage			?	
5.5	Check the start up protection program during charging			?	
Monolithic Construction					
6.1	Check all labels for clarity and completeness	?			
6.2	Check the frame for damage		?		
6.3	Check the fixing condition of lifting door frame			?	
6.4	Run a test run	?			

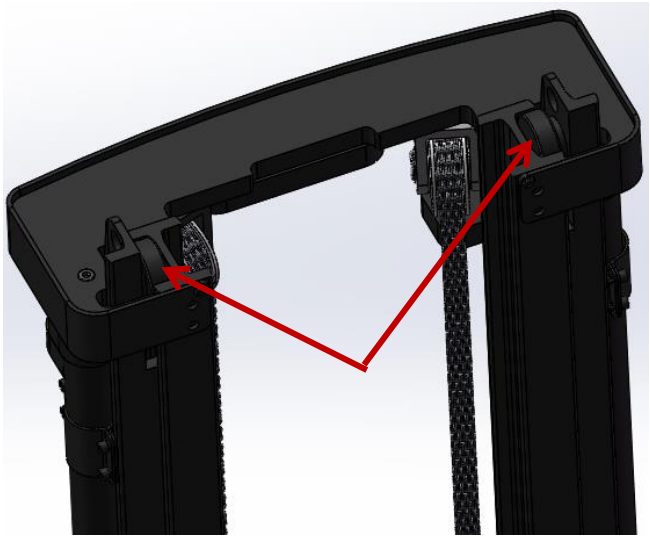
1. 2Lubrication point.

Lubricate marked points according to maintenance list.Required grease specification: DIN 51825 standard grease

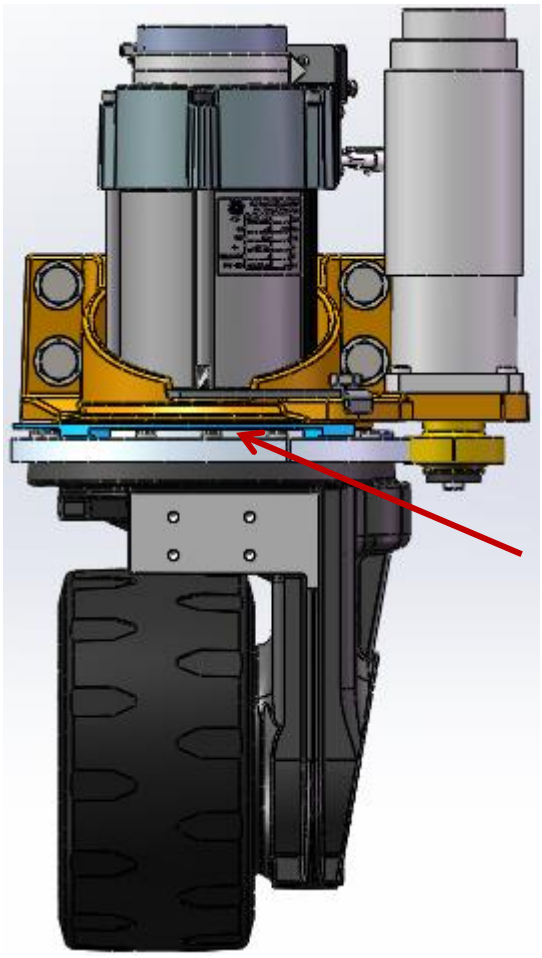
Pic1：transmission chain



Pic2： The rail of gantry



Pic3： Drive axle clamp



1. 3Check and refill hydraulic oil

Recommended hydraulic oil model according to temperature::

Ambient temperature	-5℃~25℃	>25℃
mark	HVLP 32， DIN 51524	HLP 46， DIN 51524
Viscosity	28.8-35.2	41.4 - 47
Oil	4-5 L	

Waste materials such as waste oil, waste batteries or other materials must be treated and recycled in accordance with national regulations, and returned to the recycling company for recycling if necessary. The oil level should not be lower than the minimum amount required to start the vehicle.

Fill up to refueling point if necessary。

2 Fault analysis

If the vehicle continues to malfunction, follow the instructions of the manual.

2.1 Common fault analysis

Hand and foot brake common faults and troubleshooting methods

Failure	cause	maintenance
Poor braking	1. Improper position of brake pedal	Adjust
	2. Brake system leaks oil	Repair or replacement
	3. Air is mixed in the brake system	exhaust
	4. The brake shoe clearance is not adjusted well	Adjust
	5, the total pump pump bowl deformation, damage or excessive wear	Check the cause of damage and replace
	6. There are oil stains on the surface of brake drum hole	Clean up
Brake uneven	1. There are oil stains on the surface of the friction plate	Cleaning and replacement
	2. The brake drum hole is partial, and the big hole is different	Bright hole, ensure roundness, concentricity
	3. The brake shoe clearance is not adjusted well	Adjust
	4, brake shoe return spring damage	replace
	5. Sub-pump failure	Repair or replacement
	6, self-adjusting mechanism failure	Reset spring deformation, repair, replacement
Brake noise	1, friction plate surface hardening or impurities	replace
	2. Bottom plate deformation or bolt loosening	repair
	3, brake shoe deformation or installation is not correct	Replacement or repair
	4. Excessive wear of friction plate	replace

	5. Hub shaft is loose	replace
Other poor braking	1. Brake overheating	Check for skid
	2. Impurities are mixed into the brake fluid	Check and replace brake fluid
	3, hand brake position cable deformation, joint off	Repair, replacement

2.1.2Steering system common faults and troubleshooting methods

Failure	cause	maintenance
steering hydraulic system problem	1. There is air in the hydraulic pipeline components of the steering system	exhaust
	2, the working oil oil level is too low, inhale air	Gas exhaust
	3. The shunt valve hole is blocked and the spool is stuck	Cleaning and replacement
	4. The piston rod of the steering cylinder is bent	Replace the piston rod
	5, knuckle and knuckle pin bite	Check method: lift the rear axle to see whether the swing is flexible Dismantle, repair
	6, other steering when the relative surface bite	
	7. The steel ball in the valve body of the steering gear fails and is blocked	Replacement spring
	8, steering reset failure, spring fracture	Check piston seal ring and replace
	9. Leakage in the steering cylinder is too large	Adjust pressure and flow
	10, the shunt valve pressure is lower than the working pressure, the flow is too low	Use specified oil
	11. The viscosity of oil is too large	replace
	12, spool, valve body excessive wear, clearance is too large	replace
	13. Excessive wear of oil pump	exhaust
oil leak	1, the joint is not pry tight	Pry tight

	2. There is dirt on the joint surface of the stator and rear cover of the valve body of the steering gear	cleaning
	3, oil cylinder leakage	Check guide sleeve seal joint seal
Abnormal sound	1, the oil level of the tank is too low, hydraulic noise	Refueling and exhaust
	2. Suction tank or oil filter is blocked	Cleaning and replacement

2. 1. 3Lifting system common faults and troubleshooting methods

Failure	cause	maintenance
Lifting, falling is not smooth, loud noise	1. The gap between the upper side roller of the outer door frame and the channel steel of the inner door frame is too large > 1mm	Reduce adjusting gasket
	2. The gap between the lower side roller of the outer frame and the channel steel of the inner frame is too large > 1mm	Add adjusting gasket
	3. The gap between the side roller of the fork frame and the channel steel of the inner door frame is too large > 1mm	Reduce adjusting gasket
	4. Fastening bolts of side roller shaft are loose	fastening
	5. There are debris in the channel steel of the sliding frame and the inner door frame	Yeah, oil on the tracks regularly
The cargo fork frame is skewed	1, the left and right tire pressure is inconsistent	Air replenishment and air pressure are consistent
	2. The tightness of the left and right chains is inconsistent	The tightness adjustment is consistent
	3. The oil channel in the speed limiting valve is blocked	Cleaning and replacement

	4. The oil inlet of the lifting cylinder is partially blocked	Maintenance and cleaning
The left and right elevations are not synchronized	1, the left and right lifting cylinder stroke is inconsistent	Use cylinder head 180 degree adjustment
	2. The height of the left and right cylinders is inconsistent	Adjusting bolts on the oil cylinder
	3, the left and right cylinder stroke is too inconsistent to exceed the cylinder head adjustment range	Add adjusting gasket on lifting cylinder piston rod
The over lift speed at full load cannot meet the requirements Or fail to lift	1. Insufficient amount of working oil	Come on
	2, speed limit valve throttle hole is blocked by stolen goods	Unpick and wash
	3, the safety valve slide blocked, stuck	Cleaning and repairing
	4. Leakage of suction pipe weld at the filter screen in the tank	Repair welding, bottom leakage
	5. The pipe joint is loose	Pry tight
	6, oil pump gear and pump body excessive wear, clearance is too large	Check oil cleanliness, grade 9-11 required
	7, lifting cylinder sealing ring damage or excessive wear internal leakage	Replace seal ring
	8, multi-way valve body and spool valve gap is too large, the main valve pressure is too low	Replacement and adjustment
	9, the shunt valve shunt improperly	Adjust

2. 1. 4Common faults and troubleshooting methods of electrical system

Failure	Fault cause and elimination method
Open key switch no voltage	1. Poor contact of key switch
	2, break
	3. Poor contact of the connector
	4. The battery connector is loose
Step on the accelerator pedal and the forklift will not walk	1, disconnect
	2. Poor contact of the connector
	3, the direction switch contact is poor
	4, thyristor speed regulating device failure
The lifting motor does not work	1. Contactor coil is open or open

	2. The lifting switch does not work normally
	3, disconnect
	4. Poor contact of connectors
	5. The main contact of contactor is burned out
Turn over the hoist	1. The lifting switch does not work normally
The light is not working properly	1, the fuse is broken
	2. Poor contact of connectors
	3. Light bulbs are broken
Speakers don't ring	1. Poor contact of connectors
	2, the horn switch contact is poor
	The speaker is broken
Long horn ring	1, horn switch contact long
The reversing buzzer doesn't work	1. The buzzer is broken
	2. Poor contact of reversing switch
	3. Poor line connection and plug

2.1.5Gearbox fault causes and troubleshooting methods

Failure	Fault cause and elimination method
efficiency decrease	1. The friction plate is stuck or worn.Check for gluing, uneven contact or warping of the friction plate
	2, bearing damage.Replace the bearing
	3. Check whether the lubricating oil road is blocked
oil leak	1. The sealing pad is damaged.Replace gasket
	2. Rubber parts are aging or damaged.Replacement parts
	3, parts damage crack.replace

2.1.6 · Multi-way valve fault causes and troubleshooting methods

Failure	cause	maintenance
External leakage	1, lip sealing parts wear	Replace seal ring
	2. The valve stem sealing part is damaged	Replace stem or disc sub assembly
	3. Foreign bodies such as paint and dust are embedded in the lip sealing part	Clean the paint and other foreign matters embedded in the lip sealing part, pay attention to not damage the valve stem and sealing surface

	4, O-ring damage (cut ring)	Replace the O-ring seal
	5. Aging and deformation of sealing ring between valve discs	Replace the new sealing ring
	6. The sealing plane of the valve plate is scratched (new valve) or there are foreign bodies	Remove foreign matter or replace valve disc
	7, valve body hole and sealing ring slot hole different heart (new valve)	Replace the valve plates
	8. Back pressure of oil return exceeds allowable value	Check the loop and lower the return oil pressure to the specified value
	9. The bolts between pieces are not evenly stressed or tightened	Tighten the stud bolts with specified torque
Stem cannot be reset	1, the control mechanism is not flexible	Check the control lever
	2, the valve stem is squeezed by dirt	Clean valves, fuel tanks and pipelines
	3, return spring deformation or fracture	Remove the back cover for inspection and replace the spring
	4. Stem deformation caused by external force	Refit stem or replace valve sub assembly
	5, the installation surface is uneven, the valve body deformation, resulting in stuck valve	Adjust the installation plane
Stem heavy drop in neutral position (leakage out of tolerance in neutral position)	1, stem and valve hole wear, gap increase serious internal leakage	Rein stall stem
	2, stem or valve hole scratch internal leakage increase	Refit stem or replace valve sub assembly
	3. Stem is not restored to neutral position	Check reversing mechanism
	4, overload valve or overload valve plug and valve body seal seal is not strict	Check whether the O-ring is cut. If damaged, replace it with a new O-ring
	5. Serious leakage in the cylinder	Check the cylinder piston seal for damage
	6. The groove size of valve body is out of tolerance and the length of sealing oil becomes smaller	Replace the valve plates

hard steering	1, the oil is not clean, the shunt valve core or the shunt safety valve core is stuck	Clean shunt valve core or shunt relief valve core and fuel tank and pipeline
	2. The opening and closing characteristics of the shunt safety valve are not good or the pressure regulation of the shunt safety valve is low	Replace the shunt relief valve or readjust the shunt relief valve pressure
	3. Insufficient flow of oil pump	Check why the oil supply system of the oil pump is insufficient
	4. Steering gear failure	Replace the steering gear
No action of oil cylinder (low pressure or no pressure)	1. There is foreign matter stuck between the overflow valve or overload valve main spool and valve seat	Clean valves, fuel tanks, pipelines, etc
	2. The damping hole is blocked	Hydraulic oil pollution is serious, clean the hydraulic system
	3, the cone spool has abnormal wear	Inspect for wear and replace relief valve assembly
	4, pressure regulating spring deformation	Check spring quality
	5. The adjustment screw of the relief valve is loose	After adjusting the pressure, tighten the nut according to the specified torque
	6. Oil pump failure	Replace the oil pump
The relief valve has vibration and dynamic and noise	1, the hydraulic system has air	The system will be discharged after repeated operation for a while
	2. The pump inhales air	Check oil absorption test of oil pump
	3, suction pipeline resistance is too large or the suction side of the oil pump produces negative pressure	Check the cause of negative pressure
	4. The oil suction filter is blocked	Clean the oil filter and filter the oil
	5, the relief valve has a pressure point vibration and noise	Adjust relief valve, slightly raise or lower pressure gauge 1 ~ 2 scale grid
There is no self-lock in	1, the oil is not clean, so that the forward control small spool stuck	Clean valves, fuel tanks, pipelines, etc

forward tilt or the self-lock in forward tilt exceeds the standard	2, the wrong oil port	Switch the wrong oil connection

2. 1. 7Gear pump failure reasons and troubleshooting methods

Failure	cause	maintenance
Pump suction oil or oil absorption is not smooth	1. The flow area of the oil suction filter is small or blocked by foreign bodies	Replace the filter with a suitable flow area or clean the blocked filter
	2. The tank level is too low	The tank is filled with hydraulic fluid as required
	3. The installation position of the oil pump is too high;Suction range exceeds specified	According to the suction range of the oil pump, it is within 500mm
	4, the oil temperature is too low, the oil viscosity is too high	Change oil or heat oil seasonally
	5, suction tubing is too thin or too long, too much resistance	Change the large diameter tubing, shorten the length of suction tubing
	6. The oil seal of the oil pump is damaged and the air is inhaled	Replace the new oil seal
	7. The rotation of the oil pump is not correct or the speed is too high	Change the oil pump rotation, make the speed to the specified value
	8, oil suction side leakage	Check the oil absorption part and its seal, and replace the failed seal
The oil outlet of the oil pump discharges oil but the pressure cannot rise	1. The side plate of the oil pump is severely worn and the volume efficiency is too low	Repair or replace the oil pump
	2. The cone spool of the relief valve is severely worn	Replace the new cone spool
	3. The overflow valve is stuck by stolen goods and loosely closed	Filter oil and remove dirt
	4. The pressure regulation of relief valve is too low	Adjust the overflow valve to the specified value
	5, oil suction suction air	Check whether the sealing ring at the oil suction port is damaged

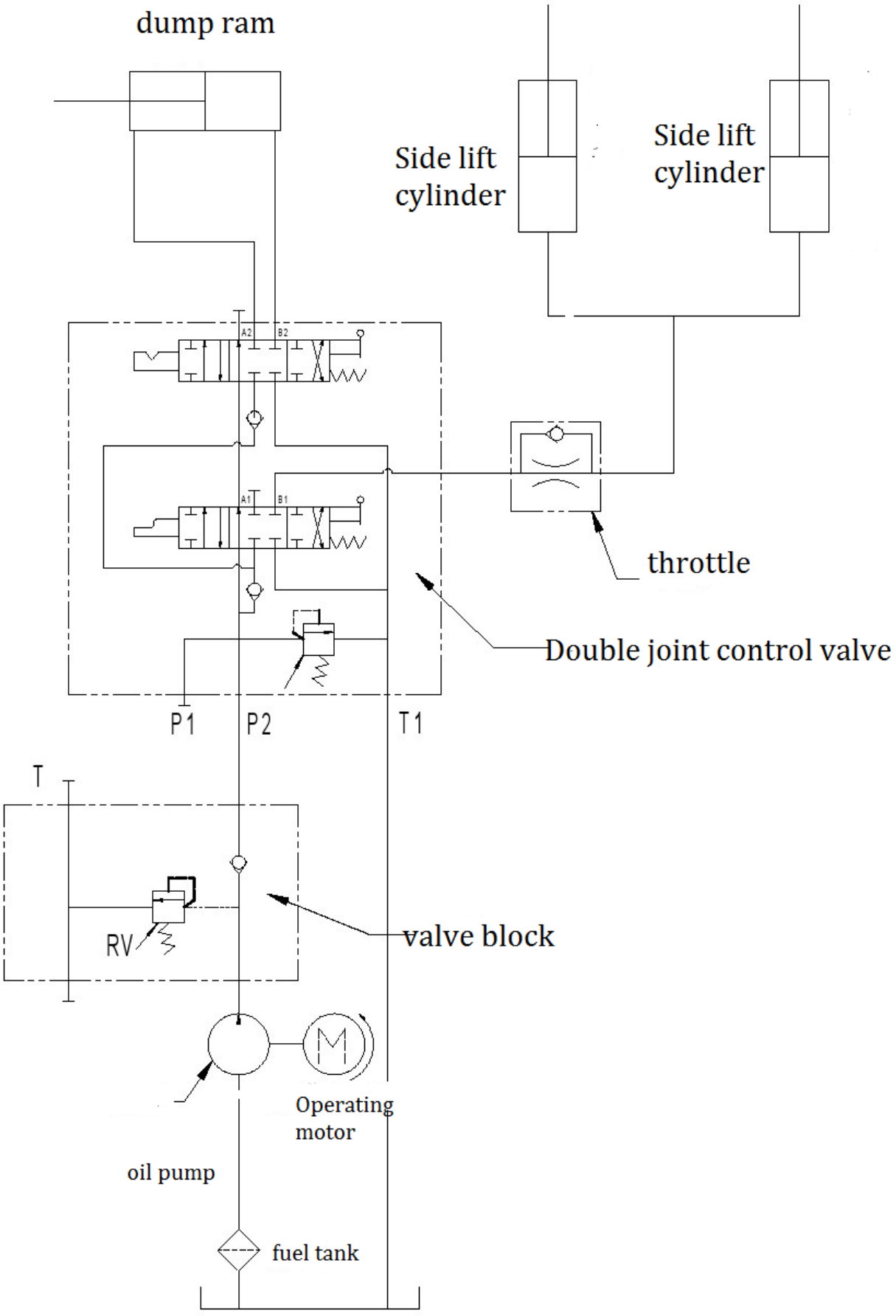
Low volume efficiency of oil pump	1. The sealing parts in the oil pump are damaged	Replace seal ring
	2, side plate wear	Replace the side panel
	3. There are stolen goods or too large clearance in the oil pump	Remove stolen goods and filter oil;Replacement of new oil pump
	4. The oil pump speed is too low or too high	Make the oil pump run within the specified speed range
	5. Negative pressure appears in the tank	Increase the capacity of air filters
Oil pump noise	1. Most cases are caused by insufficient oil absorption of oil pump, such as blockage of oil absorption filter;Oil level is too low;Inhalation of air;Suction air at oil seal, etc	Keep oil level high and seal must be reliable to prevent oil contamination
	2. The return pipe is higher than the oil level, and there are a lot of bubbles in the oil	Immerse the return pipe below the oil level
	3. The viscosity of oil is too high and the oil temperature is too low	Choose oil with proper viscosity according to the season, or heat it up
	4. The coaxial of the pump shaft and prime mover shaft is too large	Adjust the coaxiality of the two axes
	5. After maintenance, the driven gear is inverted, and the meshing area becomes smaller	Disassemble the oil pump and turn the driven gear
Oil pump temperature rises too high	1, the pressure is too high, the speed is too fast, the side plate burns	Properly adjust the overflow valve;Reduce the speed to the specified value;Repair the pump
	2. The oil viscosity is too high or the internal leakage is serious	Change the appropriate oil and check the seal
	3. The back pressure of oil return is too high	Eliminate the cause of high return back pressure
	4, the fuel tank is too small, poor heat dissipation	Increase the fuel tank

2. 1. 8Other common faults and troubleshooting methods

Failure	cause	maintenance

Abnormal sound during exercise	1, hydraulic oil, gear oil and other oil does not meet the requirements	Fuel until required
	2, front and rear hub bearings loose, broken	After tightening the bearing and locking the nut, retract about 1/8 turn, and the hub should be free to turn.Fracture will renew the bearing
	3, gearbox, gear, friction plate damage	replace
	4, differential and cross shaft damage	replace
	5. Fasteners are loose	Pry tight

3hydraulic principle diagram

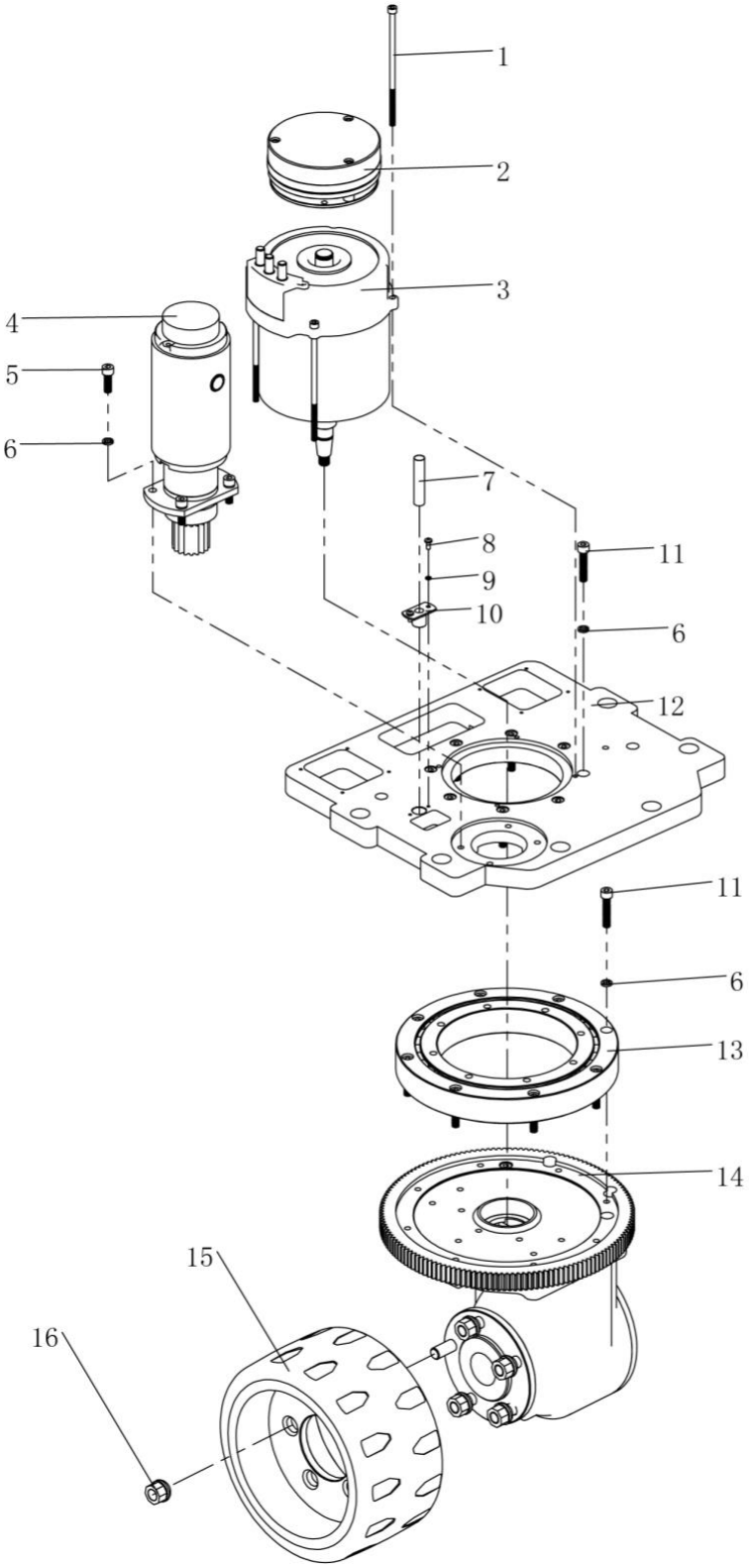

dump ram
Side lift cylinder
Side lift cylinder
throttle
Double joint control valve
A2
B2
A1
B1
P1
P2
T1
T
RV
valve block
M
Operating motor
oil pump
fuel tank

Hydraulic oil inspection

Appearance	odor	condition	results
Clear not discoloration	good	good	can be used
color transparency	good	with other oil mix	check viscosity, if qualified can continue to use
Color changes like milk	well	mixed with air and water	to separate moisture or replace hydraulic fluid
The color becomes dark brown	not good	for oxidation	replacement of hydraulic oil
Clear color but small black spots	good	mix with other particles	can be used after filtering

4 Main Components are removed

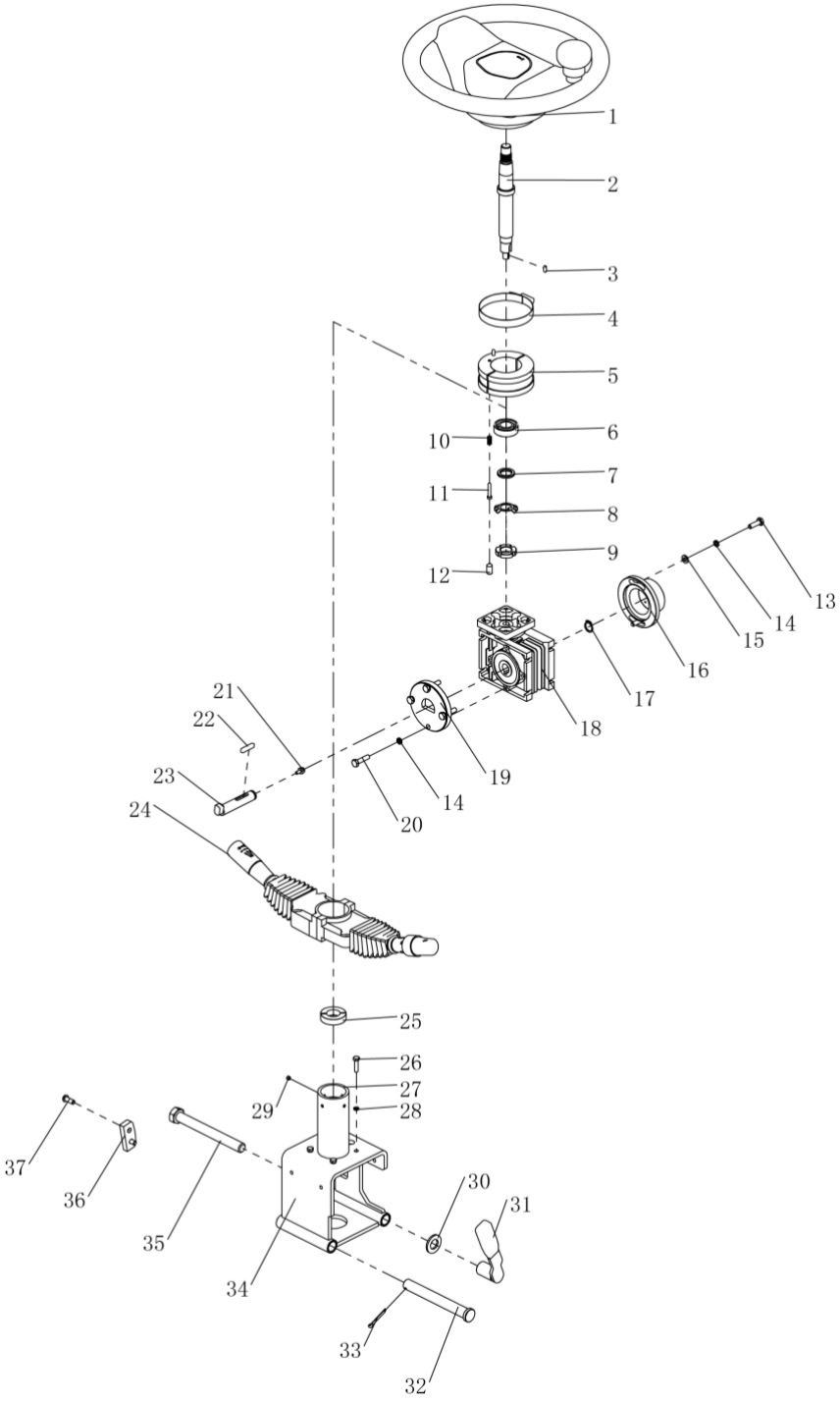
4.1 Driver Removal



NO.	model	name		quantity
1	GB/T 70.1-2000	Hexagon socket head screws	M6×150	4
2	QD1545.24-02	Electromagnetic brake magnetic sensor assembly		1

3	QD1545.24-3	Ac motor		1
4	TY-01.8	Steering motor		1
5	GB/T 70.1-2000	Hexagon socket head screws	M8×25	4
6	GB/T 93-1987	Elastic washer	Φ8	20
7	TY-01.40	Proximity switch	PM12-04N	1
8	GB/T 818-2000	Cross recessed pan head screws	M4×10	2
9	GB/T 93-1987	Elastic washer	Φ4	2
10	E10GS-02.2.3	The installation of		1
11	GB/T 70.1-2000	Hexagon socket head screws	M8×40	16
12	E10GS-02.2.1	Vertical drive connecting plate		1
13	DCU12-02-24	Giant rotary bearing		1
14	ZD-ZV21-500-001	Vertical gear box assembly		1
15	E10GS-02.2.2	Driving wheel (rubber wheel)		1
16	GB/T 804-1988	Spherical hexagon nut	M14	5

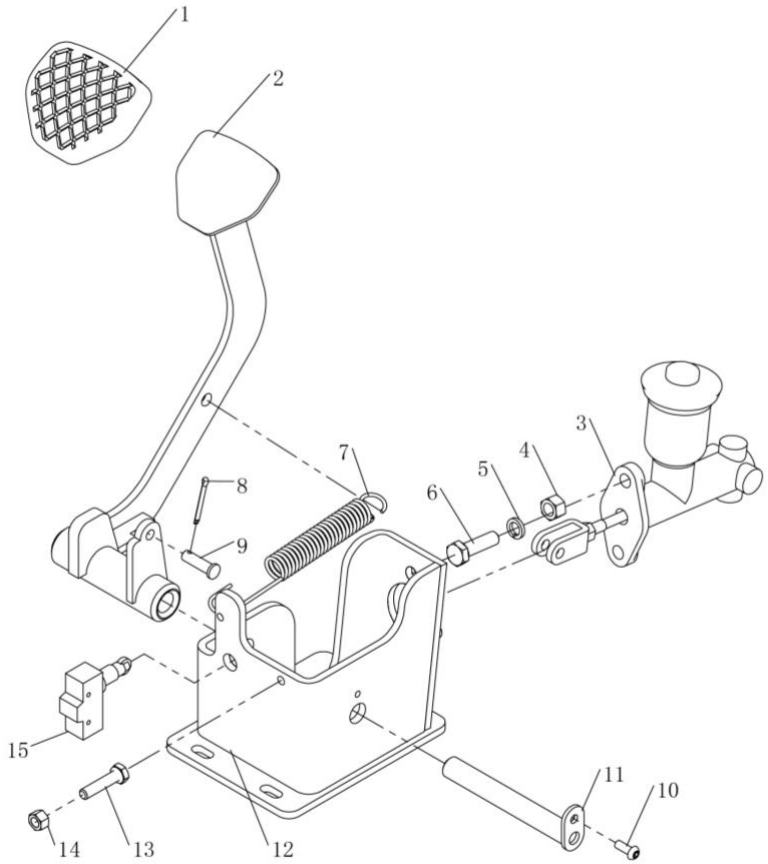
4.2Steering gear removed



NO.	model	name		quantity	remark.
1	249M4-10201	The steering wheel		1	
2	E10GS-01.3.7	Steering wheel guide		1	
3	GB/T 1096-2003	Flat key	3×10	1	
4		clamp	Φ59-82	1	
5	E10GS-01.3.3.2	Nylon ring 2		1	
6	GB/T 292-94	Angular contact ball bearing	7003 C	1	
7	E10GS-01.3.4	The gasket		1	
8	GB 858-1988	Stop washers for round nuts	Φ16	1	
9	GB/T 812-1988	Round nut	M16×1.5	1	
10		Compression spring	0.6×6×10	2	
11	E10GS-01.3.3.3	Contact lever		2	
12	GB/T 78-2000	Set screws with inner hexagon end	M8×16	2	
13	GB/T 5781-2000	Hexagon head bolts full thread	M6×20	2	
14	GB/T 93-1987	Elastic washer	Φ6	6	
15	GB/T 95-2002	Flat washer	Φ6	2	
16	E10GS-01.3.9.3	Steering sensor housing		1	
17	GB 894.1-86	Shaft with elastic retainer	Φ14	1	
18		Steering sensing gear box		1	
19	E10GS-01.3.9.2	Limit plate		1	
20	GB/T 5781-2000	Hexagon head bolts full thread	M6×25	4	
21		A small head		1	
22	GB/T 1096-2003	Ordinary flat key	5×25	1	
23	E10GS-01.3.9.1	The shaft		1	
24	JK804AB-HC	Combination switch		1	
25	E10GS-01.3.8	Nylon damper block		2	
26	GB/T 5781-2000	Hexagon head bolts full thread	M5×20	4	
28	GB/T 93-1987	Elastic washer	Φ5	4	
29	GB/T 77-2000	Hexagon socket set screws with flat end	M5×4	4	
30	GB/T 95-2002	Flat washer	Φ14	1	
31	E10GS-01.3.2.1	The regulating handle		1	
32	E10GS-01.3.6	The connection pin		1	

33	GB/T 91-2000	Cotter pin	Φ3.2×28	1	
34	E10GS-01.3.1	Directional string welding		1	
35	GB/T 5780-2000	Hexagon head bolt	M14×130	1	
36	E10GS-01.3.5	Bolt limit block		1	
37	GB/T 70.2-2000	Hexagon socket flat round head screws	M6×16	2	

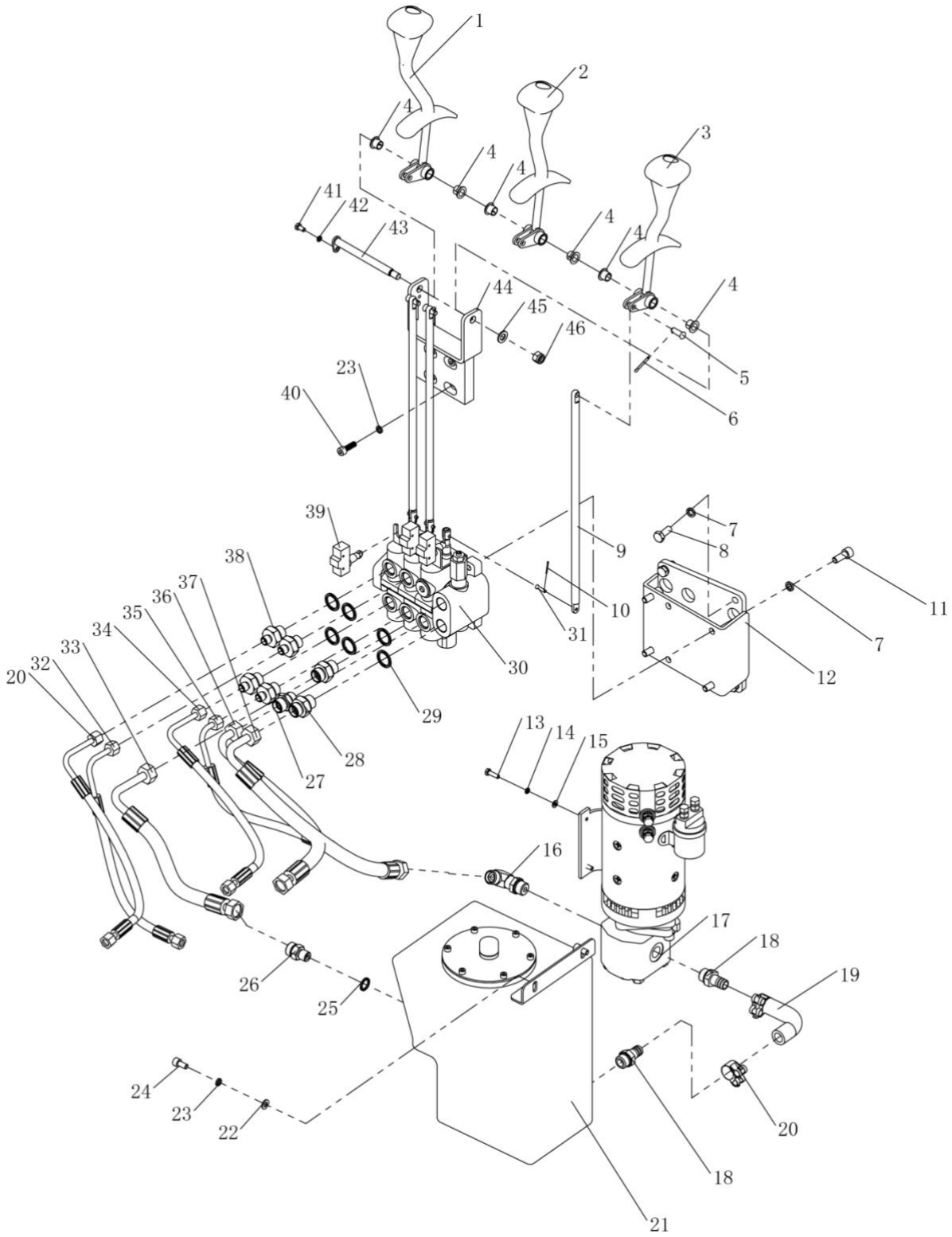
4.3 Brake removed



NO.	model	name		quantity	remark.

1		Solid slab		1	
2	E10GS-01.4.2	The brake pedal		1	
3		Brake pump		1	
4	GB/T 41-2000	Hexagonal nut	M10	2	
5	GB/T 93-1987	Elastic washer	Φ10	2	
6	GB/T 5781-2000	Hexagon head bolts full thread	M10×35	2	
7	E10GS-01.4.5	spring		1	
8	GB/T 91-2000	Cotter pin	Φ3.2×28	1	
9	E10GS-01.4.4	Fork lever pin		1	
10	GB/T 70.2-2000	Hexagon socket flat round head screws	M6×16	1	
11	E10GS-01.4.3	Foot brake lug shaft		1	
12	E10GS-01.4.1	Bracket welded		1	
13	GB/T 5781-2000	Hexagon head bolts full thread	M8×35	1	
14	GB/T 41-2000	Hexagonal nut	M8	1	
15	TY-01.35	Micro switch	RZ-15GQ22-B3	1	

4.4Hydraulic remove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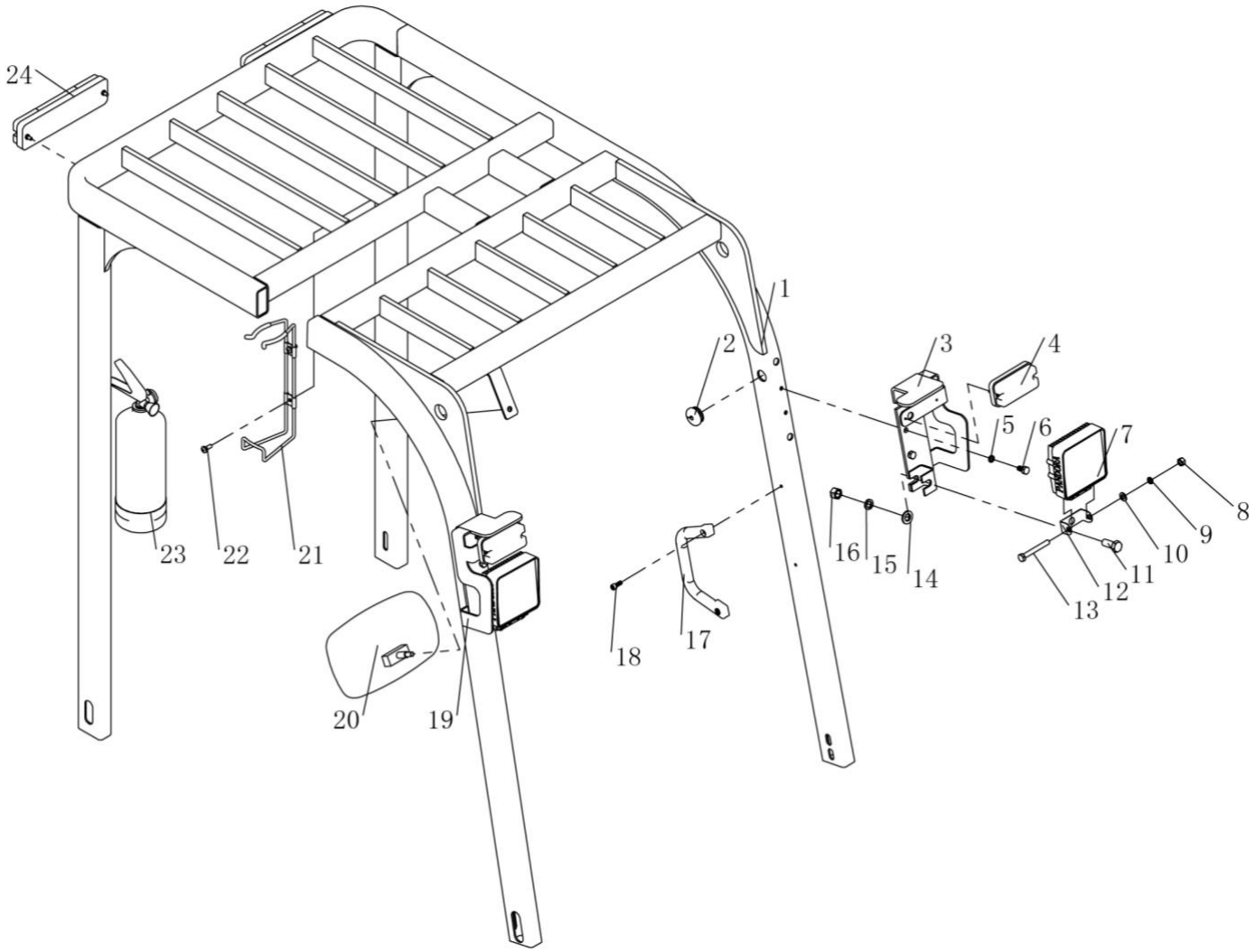
NO.	model	name		quantity	remark.
1	E10GS-01.11.3	The lateral handle		1	
2	E10GS-01.11.2	Tilt the handle		1	

3	E10GS-01.11.1	The lifting handle		1	
4	Q15GB-01.4.1.7	Composite sleeve with shoulder	Φ20×Φ14×Φ12×11	6	
5	GB 882-88	pin	Φ8×22	3	
6	GB/T 91-2000	Cotter pin	Φ3.2×25	3	
7	GB/T 93-1987	Elastic washer	Φ10	7	
8	GB/T 5781-2000	Hexagon head bolts full thread	M10×25	3	
9	E10GS-01.11.5	Tie rod		3	
10	GB/T 91-2000	Cotter pin	Φ1.6×16	3	
11	ISO12474-2010	Hexagon socket head screws	M10×1.25×25	4	
12	E10GS-01.11.4	Multiway valve mounting base plate		1	
13	GB/T 5781-2000	Hexagon head bolts full thread	M6×20	4	
14	GB/T 93-1987	Elastic washer	Φ6	4	
15	GB/T 97.2-1985	Flat washer	Φ6	4	
16	E10GS-01.7.1	Right Angle adjustable joint		1	
17	E10GS-01.7	Pump station assembly assembly		1	
18	E10GS-01.7.2	Pump suction port joint		2	
19	E10GS-01.15	Cotton woven tubing resistant		1	
20	Φ23-25	Embrace hoop		2	
21	E10GS-01.8	The fuel tank assembly		1	
22	GB/T 97.2-1985	Flat washer	Φ8	3	
23	GB/T 93-1987	Elastic washer	Φ8	7	
24	GB/T 70.1-2000	Hexagon socket head screws	M8×16	3	
25	GB982-77	Combination gasket	Φ16	2	
26	E10GS-01.8.8	Directly to the head		1	
27	Q15GB-01.4.8	Directly to the head		1	
28	E10GS-01.11.8	Through joint		2	
29	GB892-77	Combination gasket	Φ22	6	
30	MSV04-3123-114-01	Multi-way valve		1	
31	GB 882-88	pin	Φ4.5×18	3	
32	E10GS-01.11.13	High pressure tubing (inclined)		1	
33	E10GS-01.11.10	High pressure tubing (outlet and return)		1	
34	E10GS-01.11.12	High pressure tubing (lateral)		1	

35	E10GS-01.11.11	High pressure tubing (inclined)		1	
36	E10GS-01.11.9	High pressure tubing (pump oil)		1	
37	E10GS-01.11.14	High pressure tubing (outlet and return)		1	
38	E10GS-01.11.7	Through joint		4	

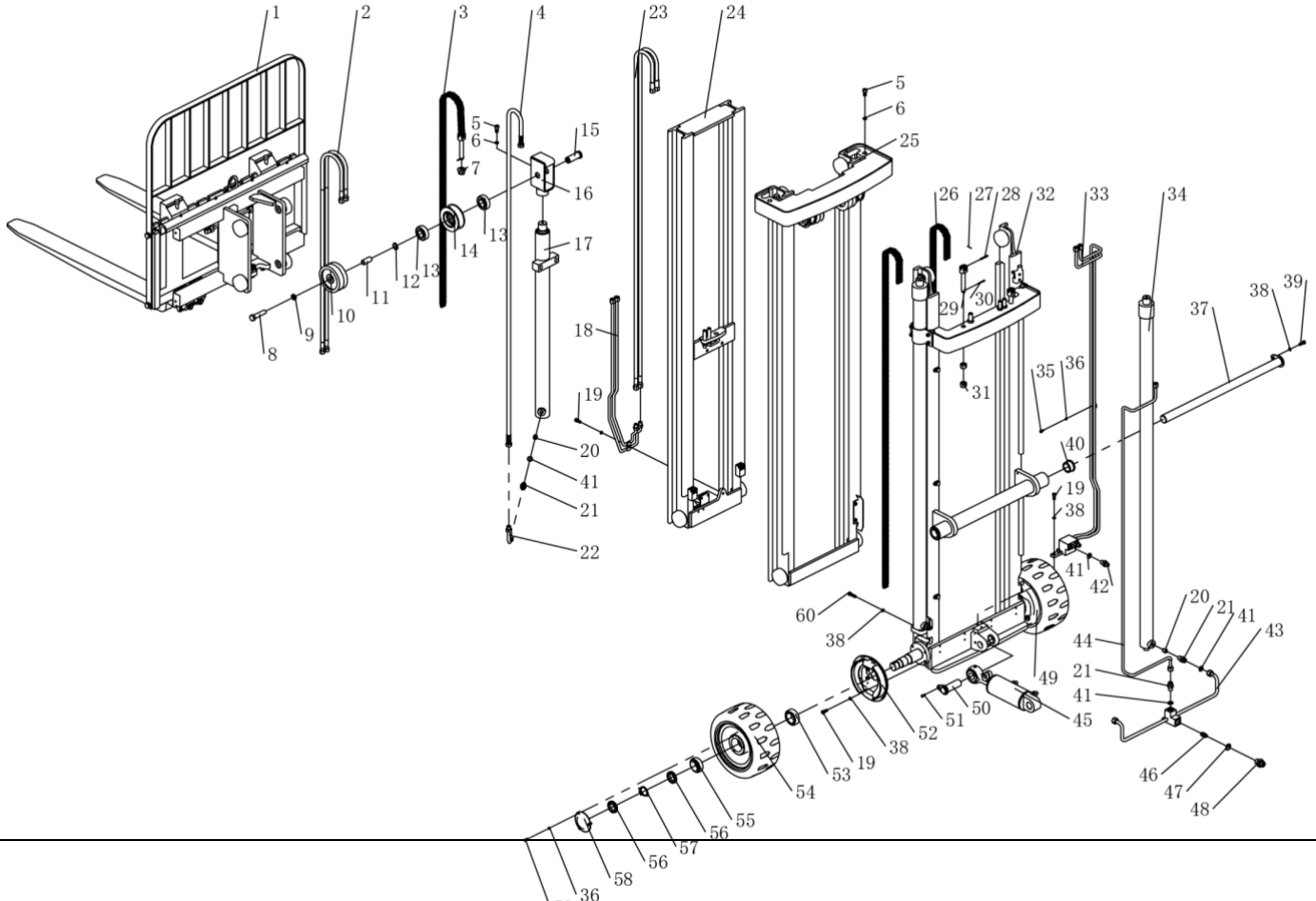
39	RZ-15GQ22-B3	Micro switch		3	
40	GB/T 70.1-2000	Hexagon socket head screws	M8×25	4	
41	GB/T 5781-2000	Hexagon head bolts full thread	M6×12	1	
42	GB/T 93-1987	Elastic washer	Φ6	1	
43	E10GS-01.11.15.1	Valve frame shaft		1	
44	E10GS-01.11.6	Handle bracket is welded		1	
45	GB/T 95-2002	Flat washer	Φ10	1	
46	GB/T 889.1-2000	Hexagon lock nuts	M10	1	



4.5Removal of roof guard frame

NO.	model	name		quantity	remark.
1	E10GS-05.1	Top guard frame welding		1	
2	CS1232.8-1	Anti-shock pad		3	
3	E10GS-05.2.1	Left guard is welded		1	
4	PDL-LXXD-01	Turn signal		2	
5	GB/T 93-1987	Elastic washer	Φ8	4	
6	GB/T 5781-2000	Hexagon head bolt	M8×16	4	
7	PDL-AS27-01	headlamps		2	
8	GB/T 6170-2000	Hexagonal nut	M8	2	
9	GB/T 93-1987	Elastic washer	Φ8	2	
10	GB/T 95-2002	Flat washer	Φ8	2	
11	GB/T 5781-2000	Hexagon head bolts full thread	M12×30	2	
12	PDL-AS27-01.1	Connection plate		2	
13	GB/T 5781-2000	Hexagon head bolts full thread	M8×65	2	
14	GB/T 95-2002	Flat washer	Φ12	2	
15	GB/T 93-1987	Elastic washer	Φ12	2	
16	GB/T 6170-2000	Hexagonal nut	M12	2	
17	TY-02.18	Shake handshandle		1	
18	GB/T 70.1-2000	Hexagon socket head screws	M6×16	2	
19	E10GS-05.3.1	Weld right guard		1	
20	HS200×110	Rear view mirror		1	
21	TY-02.59	1KG fire extinguisher bracket		1	
22	GB/T 818-2000	Cross recessed pan head screws	M6×16	2	
23	TY-02.59	1 kg of fire extinguisher		1	
24	PDL-LXHW-02	Tail lamp		2	

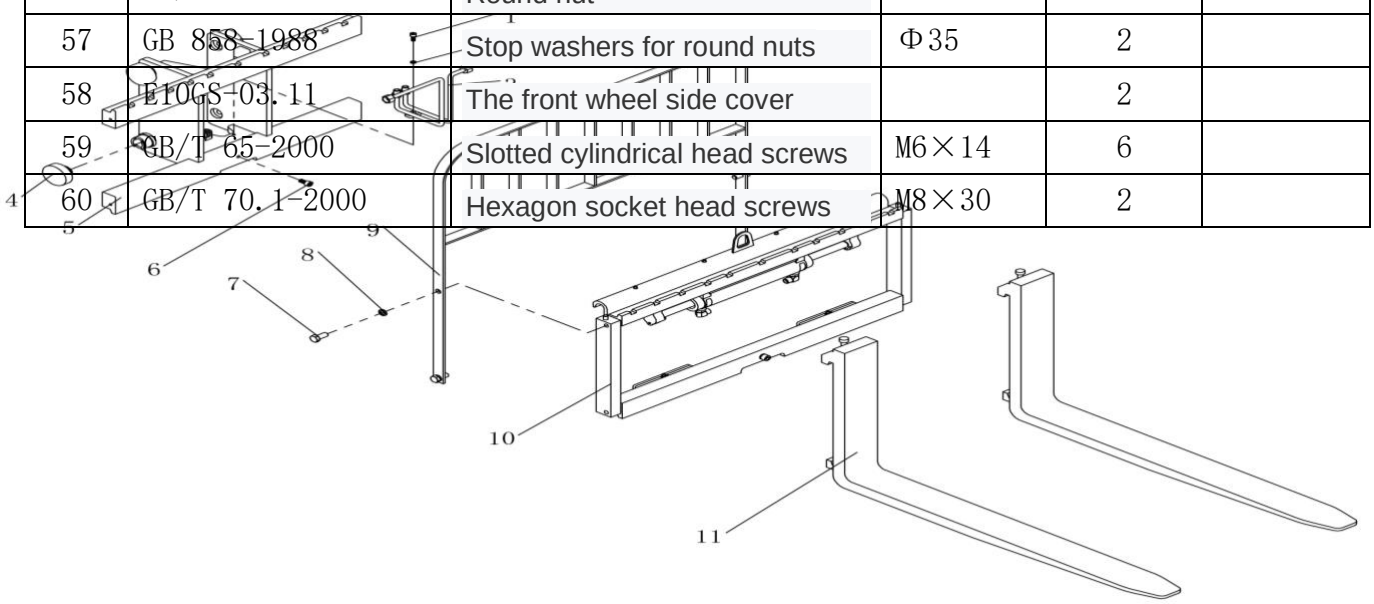
4.6The door frame to remove



NO.	model	name		quantity	remark.
1	E10GS-09.4	Carriage components		1	
2	E10GS-09.8	hose		2	
3	LH0866	Plate chain	93 节	1	
4	E10GS-07.9	High pressure hose		1	
5	GB/T 70.1-2000	Hexagon socket head screws	M10×20	3	
6	GB/T 93-1987	Elastic washer	Φ10	3	
7	GB/T 6183.2-2000	Hexagon flange locking nuts	M16	1	
8	GB/T 5780-2000	Hexagon head bolt	M16×70	1	
9	GB/T 93-1987	Elastic washer	Φ16	1	
10	Q1545-11.10	Tubing pulley		1	
11	Q1545-11.8	Pulley casing		1	
12	GB 894.1-86	Shaft with elastic retainer	Φ25	1	
13	GB/T 276-94	Deep groove ball bearing	6305-2Z	2	
14	CG1646.03.3-5	Sprocket a.		1	
15	Q1545-11.9	Sprocket shaft		1	
16	CL1555QD.02.07	Sprocket frame welding		1	
17	E10GS-09.5	Forward lift cylinder		1	
18	E10GS-9.7	Steel pipe		1	
19	GB/T 70.1-2000	Hexagon socket head screws	M8×20	12	
20	CL10.4.3	Riot valve		3	
21	E10GS-03.4.1	Directly to the head		4	

22	E10GS-07.11	Steel Pipe (2)		1	
23	E10GS-09.9	hose		2	
24	E10GS-09.3	Internal door frame assembly		1	
25	E10GS-09.2	Middle gantry assembly		1	
26	LH0866	Plate chain	137 节	2	
27	GB/T 91-2000	Cotter pin	Φ1.2×18	12	
28	GB 880-86	Perforated pin	Φ5×40	6	
29	CG1646.02-4	Chain bolt		3	
30	GB/T 91-2000	Cotter pin	Φ3×30	3	
31	GB/T 41-2000	Hexagonal nut	M16	4	
32	E10GS-09.1	External door frame assembly		1	
33	E10GS-9.6	Steel pipe		1	
34	E10GS-07.6	Rear lift cylinder assembly		2	
35	GB/T 70.1-2000	Hexagon socket head screws	M6×10	1	
36	GB/T 93-1987	Elastic washer	Φ6	7	
37	E10GS-03.7	Drive shaft welding		1	
38	GB/T 93-1987	Elastic washer	Φ8	15	
39	GB/T 5781-2000	Hexagon head bolt	M8×25	1	
40	E10GS-03.10	The door frame is connected with copper bushing		2	
41	GB982-77	Combination gasket	Φ16	6	
42	E10GS-03.5.1	Directly head		2	
43	E10GS-07.10	Steel Pipe (1)		1	
44	E10GS-07.7	Steel Pipe (3)		1	
45	E10GS-03.5	Tilting cylinder assembly		1	
46		Slow down the valve		1	
47	GB982-77	Combination gasket	Φ22	1	
48	E10GS-01.11.8	Through joint		1	
49	S11-3502020	Brake assembly right		1	
50	E10GS-01.6	Inclined cylinder pin shaft welding		1	
51	GB/T 70.2-2000	Hexagon socket flat round head screws	M6×16	1	
52	S11-3502020	Brake assembly left		1	
53	GB/T 297-94	Tapered roller bearing	33008	2	

54	CPD10A	Rubber wheel	305×140	2	
55	GB/T 297-94	Tapered roller bearing	33007	2	
56	GB/T 812-1988	Round nut	M35×1.5	4	
57	GB 858-1988	Stop washers for round nuts	Φ35	2	
58	E10GS-03.11	The front wheel side cover		2	
59	GB/T 65-2000	Slotted cylindrical head screws	M6×14	6	
60	GB/T 70.1-2000	Hexagon socket head screws	M8×30	2	

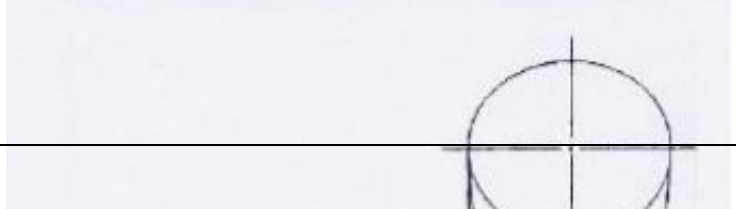


4.7Carriage to remove

NO.	model	name		quantity	remark.
1	GB/T 70.1-2000	Hexagon socket head screws	M8×20	1	
2	GB/T 93-1987	Elastic washer	Φ8	1	
3	E10GS-09.4.2	Steel pipe		1	
4	CRA70.4-4S	Composite roller		4	
5	E10GS-09.4.1	Carriage welded		1	
6	GB/T 70.1-2000	Hexagon socket head screws	M10×20	1	
7	GB/T 5781-2000	Hexagon head bolts full thread	M14×30	4	
8	GB/T 93-1987	Elastic washer	Φ14	4	
9	E10GS-10.3.2	Guardrail welded		1	
10	E10GS-10.3.3	Side shifter components		1	
11	Q1545.06.04-5	Pallet fork		2	

4.8Adjustment method of chain tightness

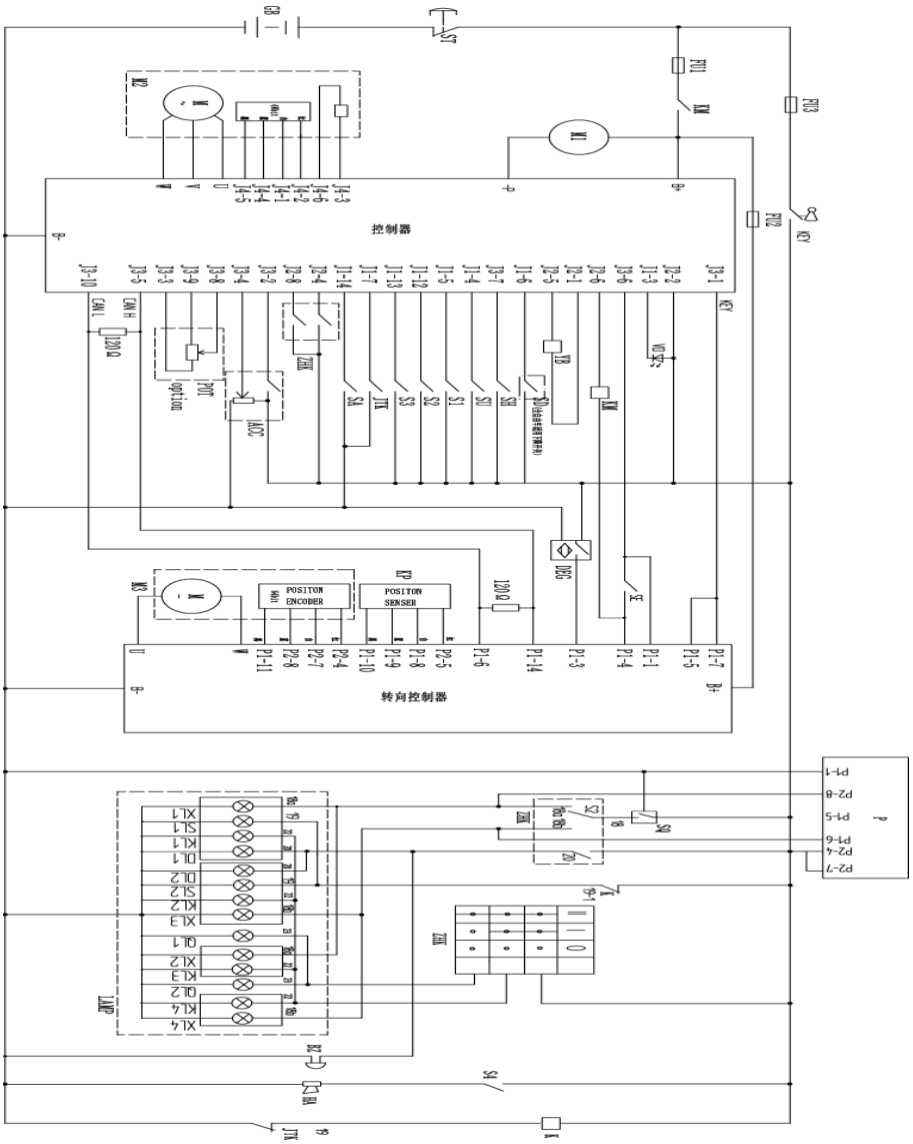
-Drive the forklift to a flat surface and lower the fork to the ground.
- Position with hinge bolts on one side of slide frame.
- After adjusting the length of chain section of hinge bolt on one side of lifting cylinder, tighten the nut on one side of lifting cylinder.
- At 1 meter above the ground, push the chain with your finger (about 5 kg force) so that the chain can move 20 mm.



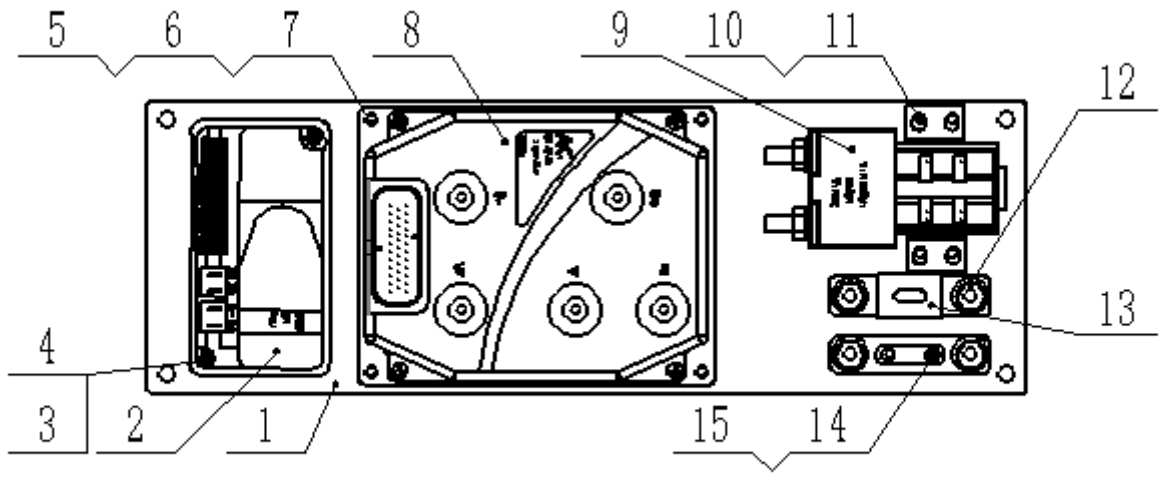
5 Electrical system

The electrical system mainly includes battery, traction motor, pump motor, traction motor controller and pump motor controller, steering combination switch, multi-way valve block controller, display instrument, combination control switch, instrument and light

5.1electrical schematic diagram



5.2 Electronic assembly



NO.	model	name		quantity	remark.
1		floor	δ/10	1	
2	1220C	Steering controller	Φ8	1	
3	GB/T 70.1-2000	Hexagon socket head screws	M5×30	2	
4	GB/T 93-1987	Elastic washer	Φ5 65Mn	2	
5	GB/T 70.1-2000	Hexagon socket head screws	M6×20	4	
6	GB/T 93-1987	Elastic washer	Φ6 65Mn	4	
7	GB/T 95-2002	Flat washer	Φ6	4	
8	1232SE-2421	Ac controller	350A	1	
9		Main contactor	24V/200A	1	
10	GB/T 818-2000	Cross recessed pan head screws	M5×16	4	
11	GB/T 93-1987	Elastic washer	Φ5	4	
12		The insurance holder		2	
13		The fuse	300A	2	
14	GB/T 818-2000	Cross recessed pan head screws	M5×12	4	
15	GB/T 93-1987	Elastic washer	Φ5	4	

5.3

instrument

1. Hxyb-827 is a small volume, integrated TFT display, CAN communication function of cost-effective display meter

* 1.8-inch TFT monitor, resolution: 128*160
*6 external control indicators, 1 external control dual-color indicator (high level effective)
*CAN communication interface
*1 external key interface (effective grounding, can be used for screen turning operation)
*1 channel pulse signal detection interface
*IP protection class: positive surface IP67;At the bottom of the IP54
* Supply voltage: 12-60V
* Maximum current: 200mA
*MOLEX 14-core physical interface

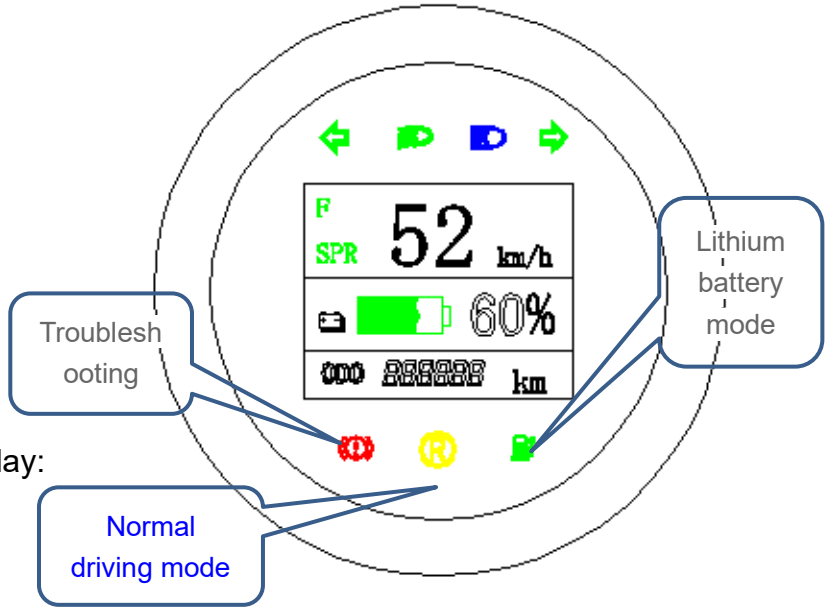
2.function

The meter is a terminal display for battery information, motor controller information, and vehicle electrical light indication.The practical application scheme supports the analog acquisition system, CAN bus communication system and the mixed application of CAN communication and analog data acquisition

Physical quantity display:

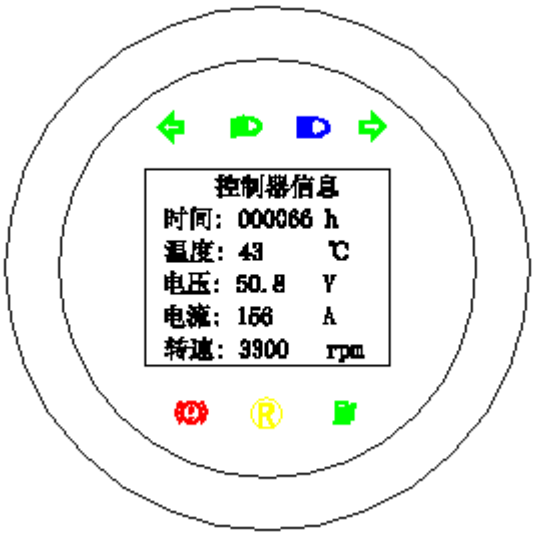
The speed km/h MPH
Km mileage mile
The battery %
Current A
The voltage V
Service time h
The RPM speed
Temperature ℃

Logical quantity display:
gear
Movement patterns
Fault code

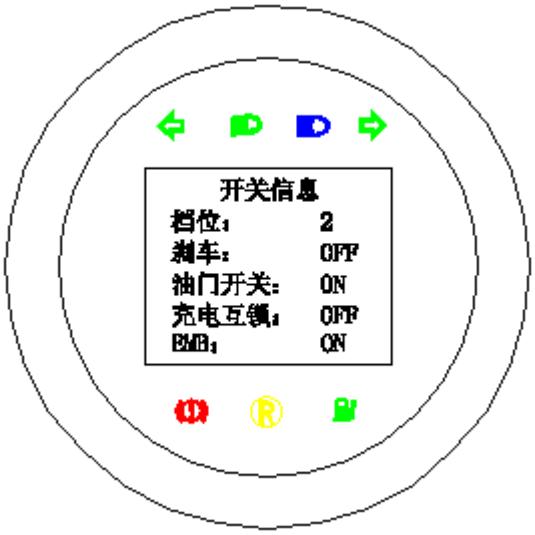


Double screen interface

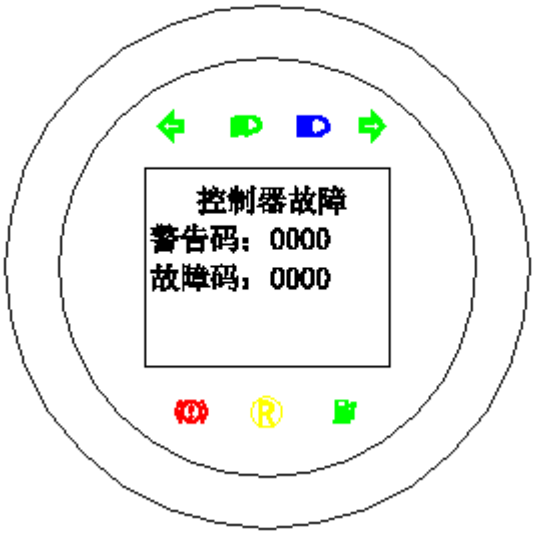
（Double screen interface1）



（Double screen interface2）

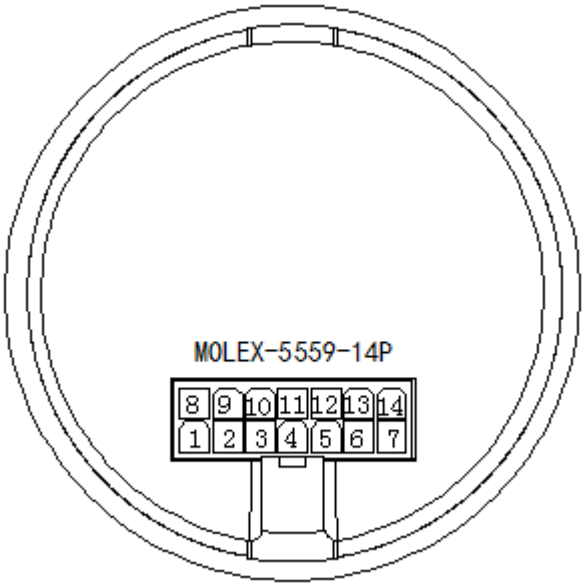


（Double screen interface3）



（Double screen interface4）

3.interface definition



Port definition and functions			
The port number	function		remark
	Chinese	Indicator color	
1	High beam	Blue	
2	The key to detect		
3	Charging indicator light	Green	
4	Charging indicator light	Red	
5	brake	Red	
6	The reverse gear	Yellow	
7	B+		
8	CANL		
9	CANH		
10	Right turn signal	Green	
11	The speed signal		
12	Dipped headlight	Green	
13	Left turn signal	Green	
14	B-		

5.4 storage battery

First open the cover of the electric bottle, and then use the lifting equipment to load and unload the battery. Ensure that the lifting equipment has sufficient load capacity.The lifting device must be pulled vertically to avoid damage to the battery case.The hook of the lifting device must be safe and reliable. The hook must not fall on a single cell in the battery pack.

- Press the emergency stop switch and power key switch to the OFF position so that it is in the cut OFF position.
- Remove the connector of the battery cable.
- Connect lifting device to lifting hole.
- Lift the battery from above and remove it with handling equipment.

5.5 Fault Diagnosis menu

1232SEProgrammable fault diagnosis menu and status display LED fault diagnosis table

There are two luminous LED lights, red and yellow, on the controller shell. Different flashing conditions represent different fault conditions, as shown in the following table:

According to situation	On behalf of the meaning
Neither light is on	The controller has no power because the batteries are dead or the wiring is faulty
The yellow lights flickered	Controller works normally
The yellow and red lights are always on	The controller is updating its software
The yellow and red lights were flashing	Controller is faulty.

code	fault display	probable cause
1, 2	Controller Overcurren	1. 1. The U, V, or W phases of the motor are short-circuited 2. 2. Motor parameters are incorrectly set 3. Controller failure 4.
1, 3	Current Sensor Fault	1. Short circuit of U, V, W relative to car body (short circuit of motor stator) 2. The controller is faulty
1, 4	Precharge Failed	1. An external load connected to the capacitor bank (terminal B+) prevents the capacitor from charging. 2.View the capacitor voltage under the Monitor menu.
1, 5	Controller Severe Undertemp	1. 1. The controller works in the limit environment (below -40℃). 2. View the controller temperature in the Monitoring menu.
1, 6	Controller Severe Overtemp	1. 1. The controller works under the limit temperature

		condition (higher than 95℃). 2. 2. Vehicle overload. 3. 3. The controller is improperly installed. 4. View the controller temperature in the Monitoring menu.
1, 7	Battery voltage is too low	1. 1. Battery voltage parameters are incorrectly set. 2. 2. The battery runs out. 3. 3. The battery internal resistance is too high. 4. 4. The battery is not connected. 5. 5. View the capacitor voltage in the monitoring menu. 6. B+ fuse is blown or main contactor is not closed.
1, 8	Battery voltage is too high	1. Battery voltage parameters are incorrectly set. 2. The battery resistance is too high when the regenerative braking current is generated. 3. The battery is not connected during regenerative braking. 4. View the capacitor voltage in the monitoring menu.
2, 1	Controller Undertemp Cutback	1. 1. The low-temperature reduction function of the controller takes effect. 2. 2. The controller works in the limit condition. 3. View the controller temperature in the Monitoring menu.
2, 2	Controller Overtemp Cutback	1. 1. The controller overheat reduction function takes effect. 2. 2. The controller works under extreme temperature conditions. 3. 3. Vehicle overload. 4. 4. The controller is improperly installed. 5. View the controller temperature in the Monitoring menu.
2, 3	Undervoltage Cutback	1. 1. Under normal operation, the battery needs to be charged, and the low-voltage limit function of the controller takes effect. 2. 2. Battery voltage parameters are incorrectly set. 3. 3. The battery runs out. 4. 4. The battery internal resistance is too high. 5. 5. The battery cable is disconnected. 6. 6. View the capacitor voltage under the programmer Monitor menu. 7. B+ fuse is blown or main contactor is not closed.
2, 4	Overvoltage Cutback	1. 1. The system runs properly. In the regenerative braking process, the regenerative braking current causes the battery voltage to be too high, and the controller overvoltage limit parameter takes effect 2. 2. Battery voltage parameters are incorrectly set. 3. 3. The battery resistance is too high when the regenerative braking current is generated. 4. 4. Open battery connection during regenerative braking.

		5. View the capacitor voltage under the programmer monitor menu.
2, 5	+5V Supply Failure	1. 1. External load resistance connected to +5V supply (pin26) is too low. 2. View the 5V and Ext supply current under the Programmer monitor menu.
2, 6	Digital Out 6 Overcurren	External load resistance connected at digital output driver 6 (pin19) is too low
2, 7	Digital Out 7 Overcurrent	1. External load resistance connected at digital output driver 7 (pin20) is too low
2, 8	Motor Temp Hot Cutback	1. 1. The motor temperature exceeds the parameter setting, so the requested current is reduced. 2. 2. The motor temperature control parameters are not adjusted correctly. 3. 3. View motor temperature and Analog2 input under programmer monitoring menu. 4. If the thermistor is not used, the temperature compensation and temperature cut-off should be set to OFF
2, 9	Motor Temp Sensor Fault	1. The motor temperature sensor is improperly connected. 2. If the thermistor is not used, temperature compensation and temperature cut-off should be set to OFF 3. The motor temperature exceeds the maximum temperature setting value.
3, 1	Coil1 Driver Open/Short	1. The connected load is open or short. 2. The connection terminal is contaminated. 3. The cable harness is damaged or incorrectly connected.
	Main Open/Short	1.The connected load is open or short. 2.The connection terminal is contaminated. 3.The cable harness is damaged or incorrectly connected
3, 2	Coil2 Driver Open/Short	1.The connected load is open or short. 2.The connection terminal is contaminated. 3.The cable harness is damaged or incorrectly connected
	EM Brake Open/Short	1.The connected load is open or short. 2.The connection terminal is contaminated. 3.The cable harness is damaged or incorrectly connected
3, 3	Coil 3 Driver Open/Short	1.The connected load is open or short. 2.The connection terminal is contaminated. 3.The cable harness is damaged or incorrectly connected
3, 4	Coil 4 Driver Open/Short	1.The connected load is open or short. 2.The connection terminal is contaminated. 3.The cable harness is damaged or incorrectly connected

3, 5	PD Open/Short	1.The connected load is open or short. 2.The connection terminal is contaminated. 3.The cable harness is damaged or incorrectly connected
3, 6	Encoder Fault	1. The motor encoder is faulty. 2. The cable harness is damaged or improperly connected. 3. View motor monitoring menu: Motor RPM
3.7	Motor Fault	1. Open motor U, V and W lines. 2. Cables are damaged or incorrectly connected.
3, 8	Main Contactor Welded	1. Contact adhesion of main contactor. 2. Motor U connection line is in bad contact or open circuit. 3. An alternating voltage path (e.g., an external precharged resistor) provides a current to the capacitor bank (B+ terminal).
3, 9	Main Contactor Fault	1. The main contactor is not closed. 2. The contact of the main contactor is burned or not in good contact. 3. The external load in the capacitor bank (B+ end) prevents the capacitor bank from charging. 4.B+ fuse is blown.
4, 1	The accelerator current input is too high	1. The sliding terminal voltage of the accelerator is too high. 2. View the monitoring menu accelerator input.
4, 2	The accelerator current input is too high	1. The voltage at the sliding end of the accelerator is too low. 2. View the monitoring menu accelerator input.
4, 3	Brake Wiper High	1. 1. The sliding end voltage of brake potentiometer is too high. 2. View monitoring menu brake potentiometer input.
4, 4	Brake Wiper Low	1. The sliding end voltage of brake potentiometer is too low. 2. Check the brake potentiometer input in the monitoring menu.
4, 5	Pot Low Overcurrent	1. 1. Potentiometer combination is connected to the low end of potentiometer to prevent it from being too low. 2. View monitoring menu potentiometer low end output.
4, 6	EEPROM Failure	1.Failed to write to the EEPROM memory. EEPROM memory is written by VCL, by CAN bus, by adjusting 1311 parameters, or by loading new software to the controller, which may be the cause of the failure.

4，7	HPD/Sequencing Fault	1. 1. Incorrect key switch, interlock, direction and accelerator input sequence. 2. 2. Key switch, interlock, direction and accelerator input connection is not good or switch failure. 3. View the programmer monitor menu input.
	Emer Rev HPD	1.Emergency reverse operation aborted, but the accelerator, forward and backward inputs, interlock switch did not return to neutral.
4，9	Parameter Change Fault	1. This is a safety fault caused by the change of a parameter setting in 1311, which can be eliminated by opening the new switch.For example, if the user changes the accelerator type, this error can occur and the vehicle can be controlled only after the switch is turned back on.
5，1-6，7	OEM Faults OEM级错误	1These faults are OEM level faults and require a higher level programmer to see them.
6，8	VCL Runtime Erro VCL运行错误（主接触器、电机、电磁制动器、调速器、互锁、驱动的 1-4 以及比例阀均不工作，满制动输入）	VCL Runtime Erro VCL operation error (main contactor, motor, electromagnetic brake, governor, interlock, drive 1-4 and proportional valve are not working, full brake input) 1.VCL code operation time error. 2. See 1311 Controller Monitoring menu: VCL Error Module and VCL Error. This failure can be likened to the runtime VCL module ID and error code defined in detail in the OS system information file.
6，9	External Supply Out of Range	1Either external load connected to 5V and 12V generates too much or too little input current. 2. The external maximum and minimum parameters of the fault check menu are incorrectly adjusted. 3. See 1311 Input Test menu: External Input Current.
7，1	OS General	1.The internal controller is faulty.
7，2	PDO Timeout CAN PDO	1. The communication receiving time of the CAN PDO exceeds the PDO timeout period.
7，3	Stall Detect	1. Motor stops. 2. The motor encoder is faulty. 3. The cable harness is damaged or improperly connected. 4. The power supply of the encoder is faulty. 5. See 1311 Motor Monitoring menu: Motor RPM.
8，7	Motor Characterization Fault	1The description of motor characteristics in the motor description step is incorrect.
8，8	Encoder Characterization Fault	1. The description of the encoder is incorrect. 2. Motor encoder pulse frequency is not a standard value (32,48,64,80 PPR)

8，9	Motor Type Fault	1The motor model parameter value is out of range.
9，2	EM Brake Failed to Set	1. The vehicle is still moving after the brake signal is issued. 2. The electromagnetic brake cannot hold the rotating motor tightly。
9，3	Limited Operating Strategy （LOS）	1. Either an encoder failure (code 36) or a stall detection failure (code 73) results in the restricted operation control mode being activated. 2. The motor encoder is faulty. 3. The cable harness is damaged or improperly connected. 4. Vehicle stall。
9，4	Emer Rev Timeout	1. 1. The emergency reverse is activated, but the emergency reverse has stopped working because the emergency reverse time has timed out. 2. Emergency reverse signal adhesion

65、CURTIS Hand held unit

Precautions for operation:

The attention function of the hand-held unit is to facilitate vehicle inspection and maintenance. It is not allowed to adjust the controller parameters without the approval of the vehicle manufacturer, so as to avoid vehicle and personal safety accidents.

The hand-held unit will automatically save the modification parameters, just need to close the key switch, restart.

The CURTIS hand held unit can be connected in the event of a controller power or power failure

Vehicle fault reading process:

1. After connecting the hand held unit with the controller, open the key switch

2, From the menu list of CURTIS hand held units, find: Faults...

3. When the vehicle is running and the hand-held cursor flashes, there will be English fault content, which can be interpreted by referring to the fault code table

Vehicle signal detection:

1. After connecting the hand held unit with the controller, open the key switch

2, According to the menu list of CURTIS hand held unit, find: Monitor.....

3. According to requirements, open the corresponding sub-item of the detection menu, run the vehicle, and observe the change of the hand-held value.

CURTIS Contents of hand held unit menu:

The Curtis 1313 hand held programmer is used to configure the Curtis electric control system.Through this programmer, you can adjust and save the set parameters, real-time monitoring of controller data and fault diagnosis

Warning: The control system can affect the vehicle's acceleration rate, deceleration rate, hydraulic system and braking.A dangerous situation can occur if the vehicle control system is not programmed correctly or exceeds safety.Only the vehicle manufacturer or an authorized service agent can program the control system

The programmer has two interfaces, one is used to communicate with the electric control, the other is used to communicate with the PC, the programmer has a battery box and a memory card slot

当编程器加载完控制器的信息后，编程器上会显示主菜单。

The programmer is powered on

The connection line of the hand held programmer can be connected to the controller by inserting the programming port of the controller. After connecting the controller, the hand held programmer will be powered on automatically and the control information will be displayed on the programmer.

The function keys

Since the function of the three keys is determined by the specified content, the three keys are blank.At any given time, the function of the button is displayed on the LCD screen above.

Direction arrow key

The displayed information can be selected up, down, or left by four directional buttons.

+ / - buttons

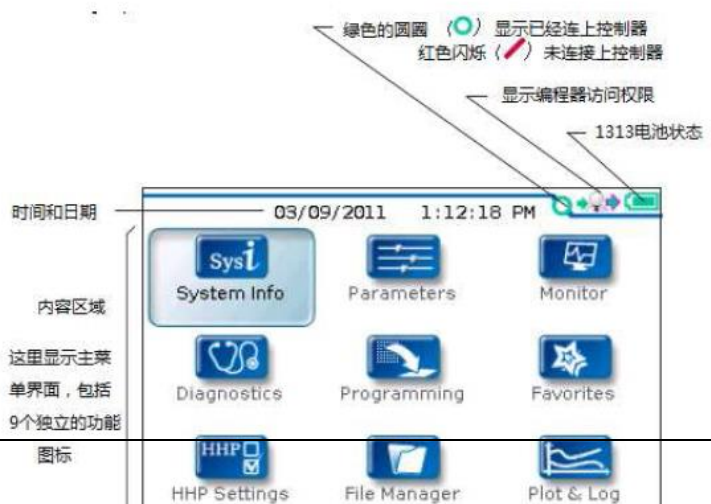
You can add and subtract parameters by using these two keys.In addition, "+" can mean "Yes" and "-" can mean "No".In some cases, it can also be used as a scrolling option.

Power key

When the programmer inserts a controller that has been powered on, the programmer does not have to press the power button to use it. The programmer wil

Collect keys

There are two ways to enter the Favorites menu. You can enter Favorites from the main menu or press this key



The menu structure

The main menu consists of nine sub-menus, and each sub-menu is displayed with a specific icon. Each item in the sub-menu is arranged by hierarchy.

Some menus contain only one item of information, but most menus contain more than one item of information, and open each item folder to access the next level of sub menus.Expand the table through the grid option, enter a group of execution commands through the dialog box option, and return to the upper menu regardless of the interface by pressing the left direction button.

The names of all nine sub menus are shown in bold on the main menu and below the icon.When entering the stepped menu, the name of the sub menu or the path you are in is displayed at the top of the screen.

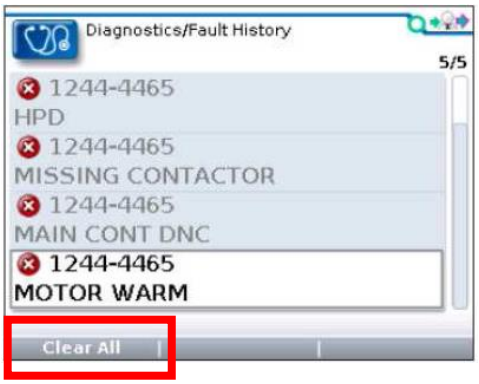
Nine menu

Fault Diagnosis menu

On the main menu, Select Diagnostics and press Select to access the Fault diagnosis menu. The Fault diagnosis menu contains Present Errors current faults and Fault History historical faults

Note: Sometimes a fault caused by a temporary event captured in the circuit is not a system fault. You can determine whether the fault exists by restarting the system and observing whether the fault disappears automatically.

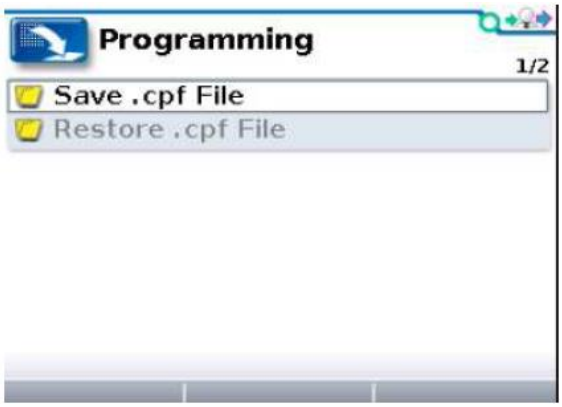
The historical faults folder lists all faults encountered after the last historical fault is cleared. By clearing the fault content in the entire folder, you can record the historical faults again.



Clear All is used to Clear historical fault folders.A function key is highlighted only when there are historical failures in the historical failures folder and grayed out when there are no historical failures.

Programming menu

On the main menu, Select The Programming icon and press Select to access the menu.Save and restore parameter Settings files (.cpf files) through programming menus



Save.cpf File (Save.cpf File)

Use the save. CPF file function in the programming menu to back up the currently set parameters.You can save as many.cpf files as you want, and you need to name each.cpf file differently

Restore. CPF File (Restore.cpf File)

Restore. CPF File The. CPF File saved earlier can be used to replace the. CPF File of the current controller.When the data recovery is complete, a dialog box is displayed