Service Manual

Counter Balanced Stacker

EK13, EK14, EK13S, EK14S

WARNING

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

Attention:

- Please check the last page of this document and all the current product type identification on the name plate.
- Keep it for future use

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EKKO

1. Maintenance List

A. Overview of main components

List 1: Maintenance List

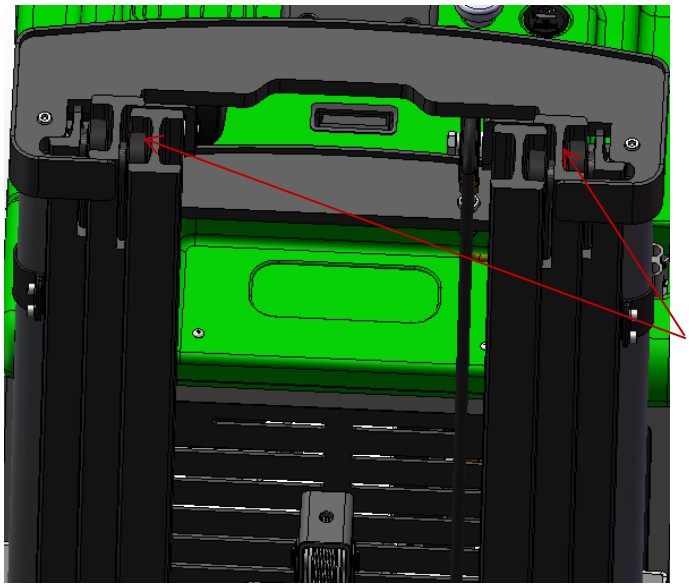
		Interval (month)			
		1	3	6	12
The hydraulic system					
1	Check the hydraulic cylinder, piston for damage noise and leakage		•		
2	Check hydraulic fittings and tubing for damage and leakage		•		
3	Check hydraulic oil level and refill if necessary		•		
4	Refill with hydraulic fluid (12 months or 1500 working hours)				•
Mechanical systems					
5	Check the fork for deformation and cracks		•		
6	Check the base for deformation and cracks		•		
7	Check that all screws are properly fastened		•		
8	Inspect door frame and chain for corrosion, deformation or damage and replace if necessary.	•			
9	Check gear box for noise and leakage		•		
10	Check wheel for deformation and damage and replace if necessary		•		
11	Lubricated steering bearing				•
12	Check and lubricate the pivot points		•		
13	Lubricating grease nozzle	•			
14	If the protection and/or protection plate is damaged, replace it	•			
Electric System					
15	Check for damaged wires		•		
16	Check electrical connections and terminals		•		
17	Test emergency stop switch function		•		
18	Check the electric drive motor for noise and damage		•		
19	Detection display		•		
20	Check that the correct fuse is used and replace it if necessary		•		
21	Check the buzzer		•		
22	Check the current contactor		•		
23	Check frame for leakage (insulation test)		•		
24	Check accelerator function and wear		•		
25	Check the electrical system driving the motor		•		

Driving system					
26	Check braking performance		•		
Storage Battery					
27	Checking the Battery voltage		•		
28	Clean and grease terminals and inspect for corrosion and damage		•		
29	Check whether the battery casing is damaged		•		
Charger					
30	Check whether the main power cable is damaged		•		
31	Check the startup protection program during charging		•		

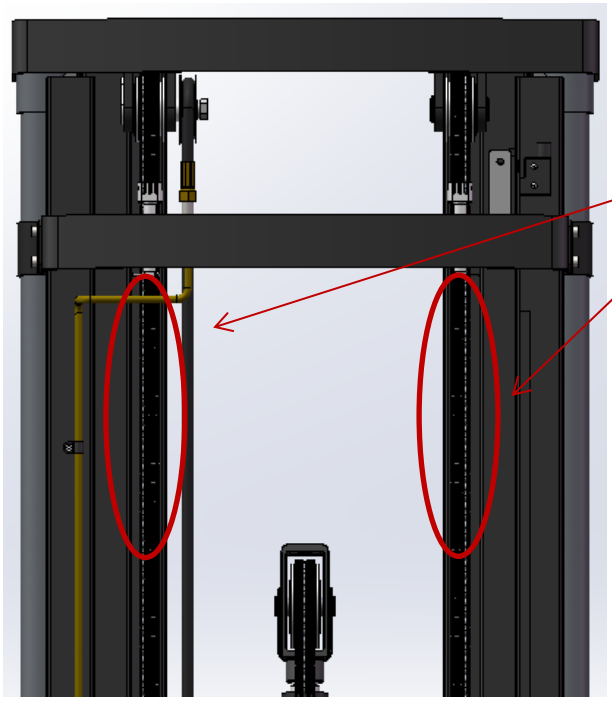
Function					
32	Check the buzzer	•			
33	Check the air gap of the electromagnetic brake	•			
34	Test emergency brake function	•			
35	Test reverse braking and regenerative braking functions	•			
36	Check steering function	•			
37	Check lifting and descending functions	•			
38	Check whether the key switch is damaged and functional	•			
39	Detection speed limit switch (lifting height >~400mm)	•			
synthesize					
40	Check all labels for clarity and completeness	•			
41	Check that the guard plate and/or guard are not damaged	•			
42	Check casters, if worn height adjustment or replacement		•		
43	Run a trial run	•			

B. Lubrication points

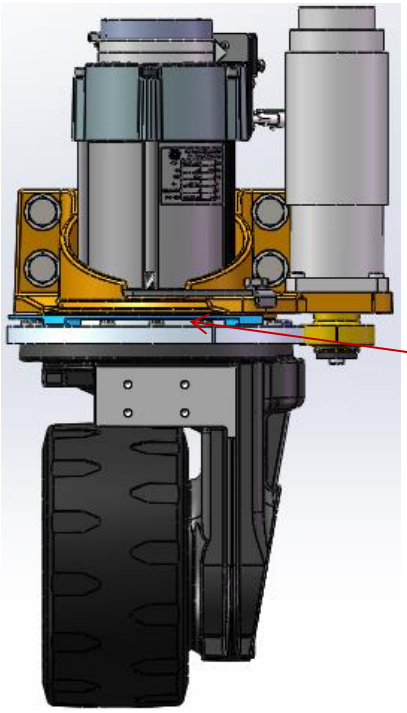
- Lubricate marked points according to maintenance list.
- Required grease specification: DIN 51825 standard grease.



Door frame track lubrication



Chain lubrication



A. Check and correct electrolytes

The electrolyte density is based on 25℃.Therefore, when measuring, if the temperature of the electrolyte is higher or lower than 25℃, every 1℃ higher, should be measured from the actual density value plus 0.0007; On the contrary, lower than 25℃, every 1℃, should be minus 0.0007;If the temperature difference is large.

Can be corrected by pressing the following formula:

Standard temperature of electrolyte (25℃) Density is converted according to the following formula:

D25 = Dt + 0.0007(T-25)

D25 -- electrolyte density at 25℃

Dt -- T ℃ measured electrolyte density

T -- Temperature of electrolyte when measuring density

Under the condition of normal working of charging function, the density of 1.26±0.005(25℃) temperature below 30℃ sulfuric acid electrolyte into the battery, liquid level requirements higher than the protection plate 15 ~ 25 ㎜.

Leave the battery to rest for 3-4 hours, no more than 8 hours. Initial charging can be carried out only when the liquid temperature drops below 35℃.If the electrolyte level drops after standing, the electrolyte should be replenished.

The discarded batteries must be recovered and stored in the specified environmental protection area or the specified waste disposal area in accordance with the local laws and regulations, and the work must be carried out by qualified professional companies.

C. Check the fuse

200Afuse

List 2: Fuse specification

	Specification
Fuse 1	200A

2. Fault analysis

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

A. Common fault analysis

Hand and foot break common faults and troubleshooting methods

Fault	Cause	Maintenance
Vehicles cannot move	The battery connector is not connected	Check the battery connector and connect it if necessary
	The electric lock switch is in "OFF" position	The electric lock switch is placed in the "0" position
	The emergency stop switch is not on	Turn on the emergency stop switch
	Battery running out	Check the charging status of the battery and recharge it if necessary
	The forklift is charging	Interrupt charging process
	Fuse damage	Check fuse
Cargo cannot be lifted	The vehicle is not running	Follow the procedure listed in the "Vehicle cannot Move" fault
	There's too little hydraulic fluid	Check hydraulic oil
	Fuse damage	Check fuse
	Load overweight	Note rated load
	The lift micro switch is in bad contact or damaged	Check fuse
Goods cannot be lowered You can't stop when you go up	Dirty oil clogs the control valve	Check the hydraulic oil and clean the control valve, replace the hydraulic oil if necessary
	The descent solenoid valve is not open or damaged	Check the drop solenoid or replace it
Moving in one direction	The lifting micro switch is damaged	Cut off the power supply and replace the lifting micro switch
Traffic moves slowly	Contact between micro switch and connecting cable is not good	Check the micro switch and connecting cable in the control handle
The vehicle started suddenly	The battery power is low or the corresponding cable is in poor contact	Check the battery indicator and corresponding cables
Goods cannot be lowered	Controller damage	Replacing a Controller
	Control forward and backward handle is not reset	To restore or replace

If the vehicle is malfunctioning and cannot be operated outside the work area, lift the vehicle up, place a load handling device under the vehicle and secure the vehicle, then remove the vehicle out of the channel.

B. The fault code display

Table 4:1212P fault codes

Programmer display	code	The fault phenomenon	fault diagnosis
BATTERY DISCONNECT FAULT	**4.5**	Battery don't answer	1) The battery is not connected
BRAKE OFF FAULT	**3.4**	Brake closing fault	2) Poor contact of battery end
BRAKE ON FAULT	**3.2**	Brake opening failure	1) Electromagnetic brake coil short circuit
CURRENTSENSE FAULT	**4.1**	Current detection fault	2) Electromagnetic brake drive open circuit
EEPROM CHECKSUM FAULT	**4.3**	EEPROM failure	1) Electromagnetic brake coil open
HARDWARE FAILSAFE	**4.2**	Motor voltage is out of range	2) Electromagnetic brake drive short circuit
HPD FAULT	**3.5**	HPD fault	1) Short circuit of motor or motor wiring
MAIN FAULT	**2.3**	The main contactor is faulty	2) The controller is faulty
MAIN OFF FAULT	**2.1**	Main contactor coil drive 'off' failure	1) EEPROM is faulty or invalid
MAIN ON FAULT	**2.4**	Main contactor coil drive 'on' failure	1) Motor voltage cannot match accelerator input
OVERVOLTAGE FAULT	**1.5**	Battery voltage is too high	2) Short circuit of motor or motor matching ring
PRECHARGE FAULT	**3.3**	Pre-charge failure	3) The controller is faulty
SPEED POT FAULT	**1.3**	The speed limiting potentiometer is faulty	1) Accelerator, key switch, promotion or prohibition
THERMAL FAULT	**1.1**	Over/under temperature cut-off	Input several actions out of order
THROTTLE FAULT	**1.2**	Potentiometer slip end or low	2) Wrong adjustment of accelerator
UNDERVOLTAGE FAULT	**1.4**	The terminal voltage is out of range	1) Main contactor adhesion or open

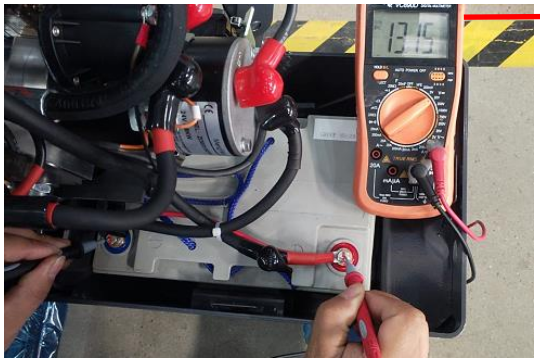
C. Methods for troubleshooting common faults

1、Code 4.5 Battery is not connected

Check whether the fastening of cable terminals of the car body is loose, as shown

Check whether the cable connection (including other secured parts) is loose

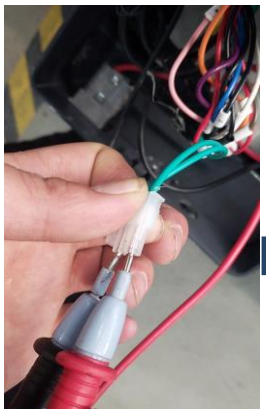
2. Use a multimeter to measure the monomer voltage of the battery with load. The specific operation is shown as follows:



Cell with load measurement, cell voltage drop should be When it's between 2 and 3V

1、Codes 3.4 and 3.2 Electromagnetic brake line problems, or electromagnetic brake failure

Use a multimeter to measure the resistance of the two cores on the controller to the plug-in. The specific operations are as follows:



Normally, it should be about 40 ω. If no resistance is displayed, there is a problem with

Code 4.1 Motor or motor line short circuit or controller failure

1. Remove the motor brake disc (the brake line is still connected), connect the motor M1 M2 directly to the positive and negative poles of the battery, observe whether the motor rotates normally, if not, the motor will fail.
2. If the motor turns normally, the controller should be replaced.

Operation sequence failure in 3.5 and 3.1

1, interlock switch under normal circumstances, use a multimeter to measure the controller 14 core plug-in between J1-6 and the negative pole, when the handle rod is in the switch working area, there is about 24V voltage. If not, check the interlock switch. For example, check whether the interlock switch is normal and whether the signal cable of the switch is connected to the controller.

4.2 Motor voltage cannot match accelerator input, motor or motor ring short circuit and controller fault, troubleshooting operations are shown as follows:

Switch the multimeter to 20V DC, insert the pen j1-1 (accelerator 0-5V speed signal) and 2 (negative pole) respectively, turn the accelerator after power on, and

If the voltage change of accelerator is normal, replace the controller

Six, determine the controller fault

Unplug the accelerator docking plug, if the controller is still reported fault after powering on (in addition to the above faults), the controller is faulty.

7. If the controller fault is steady on and there is no walking, the troubleshooting steps are as follows:

1. Measure whether there is voltage output of accelerator 0--5V (between J1-1 and negative electrode)

2. Short-circuit j1-6 on the 14-core plug of the controller with line 7 on the 5-pin. After restarting, turn the accelerator to see if there is a walk.

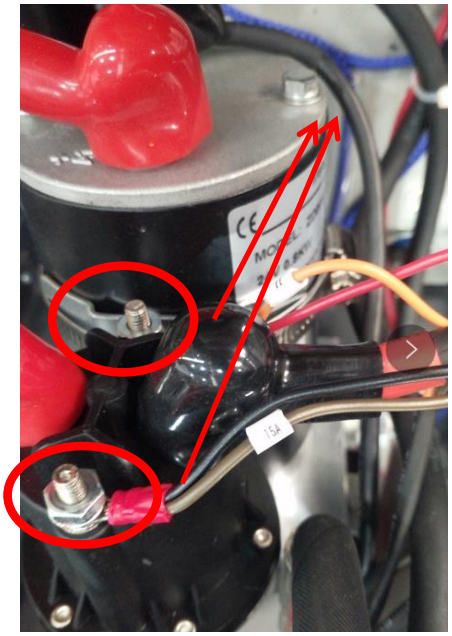
3. The brake is locked, remove the brake (the brake line is still connected), restart and turn the accelerator to check whether it is normal.

4, remove the motor brake disc (brake line is still connected), connect the motor M1 M2 directly to the battery positive and negative poles, observe whether the motor is normal rotation, if not, the motor failure.

5. If all the above tests are normal, judge the controller problem.

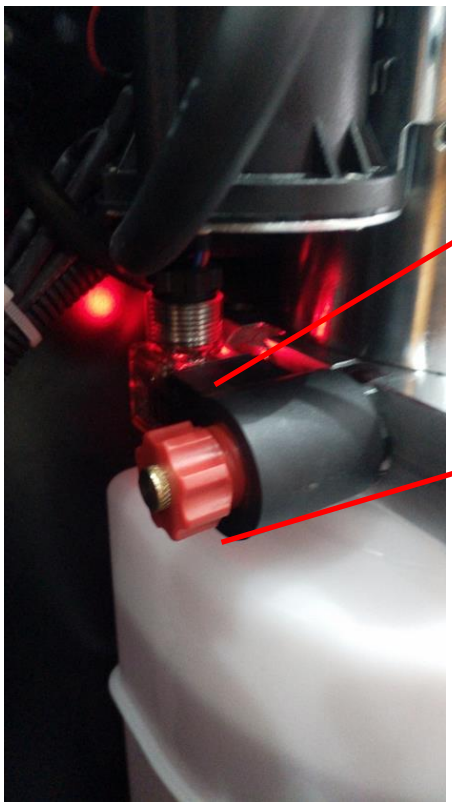
No lifting down or automatic cylinder drop, troubleshooting method is as follows

1、



Here is the coil wiring of the lifting contactor (line numbers are 2 and 15). After powering on, press the lifting button to measure whether there is a voltage of about 24V at these two places. If so, and there is no sound of pulling on the contactor, then the contactor is faulty. If there is no 24V voltage, then line 15 at the measuring handle is connected to line 15 at this point.

Press down button, down solenoid valve signal red light should be steady on



The red light is the signal light of the descending solenoid valve. If the light is not on, measure whether line 16 is connected to the handle connection.

If the cylinder drops after lifting to the top, check whether the red mark of the drop solenoid valve is loose. If not, clean or replace it.

1. If the vehicle cannot be lifted normally, for example, the original 2800-3300lbs vehicle can only be lifted less than 2000lbs, then the oil pump pressure can be adjusted, but this operation must be carefully, if the hydraulic pressure is adjusted so that the vehicle load exceeds the rated, it may make the frame deformation.

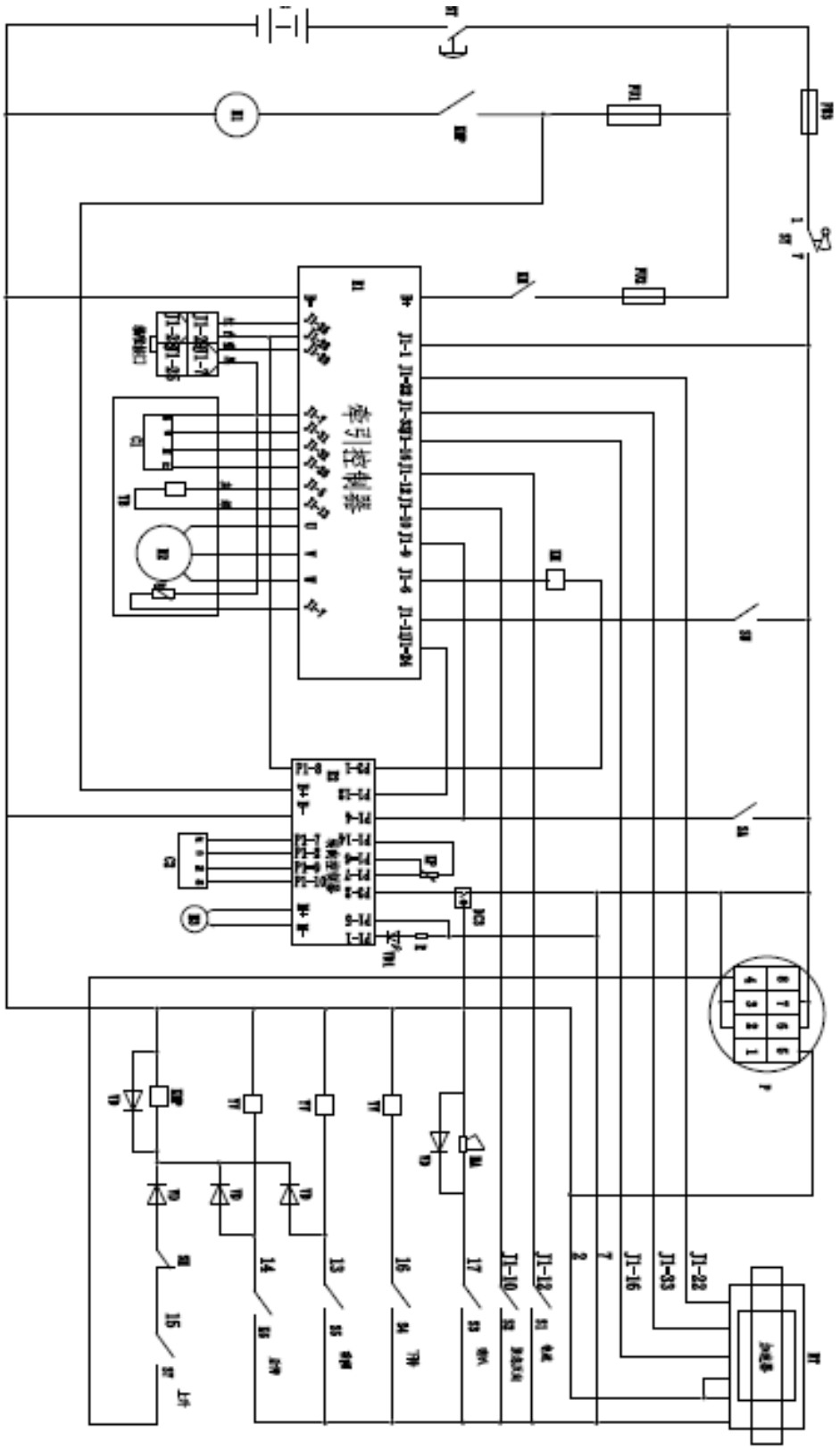
Specific operation are as follow:

The wrench unscrewed the pressure nut.

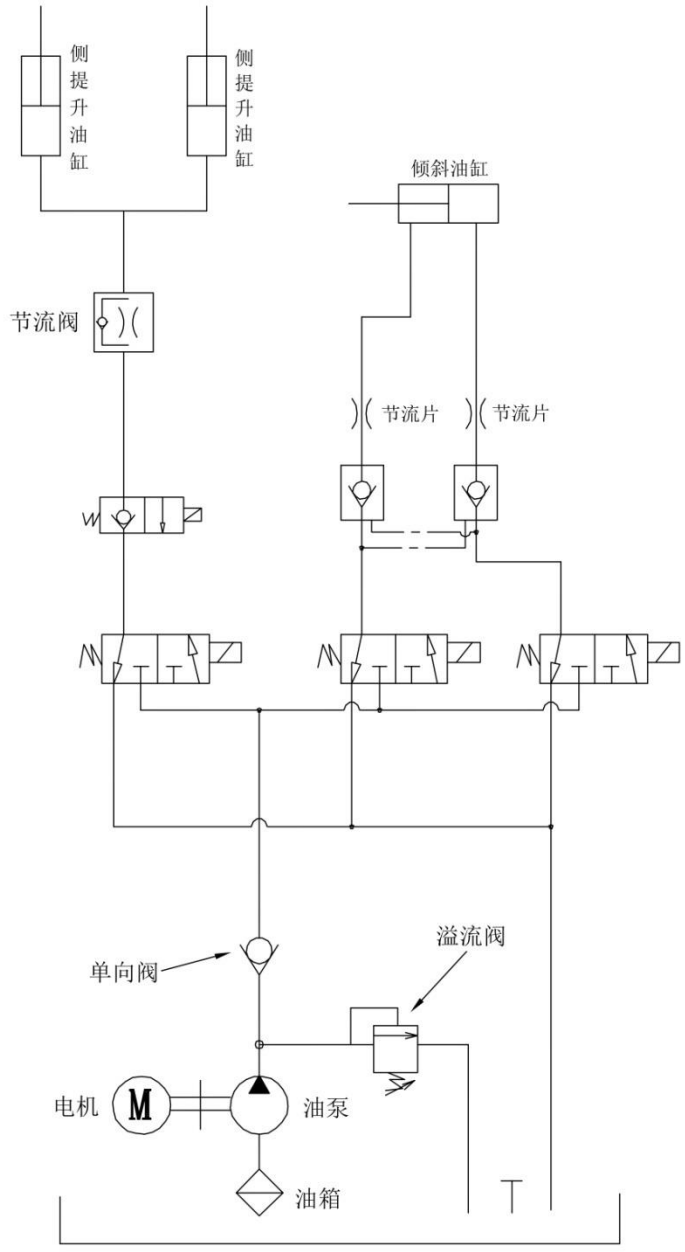
Using an inner hexagon wrench, adjust the pressure.

3. Wiring/circuit diagram

A. Schematic diagram and wiring diagram



B. Hydraulic circuit



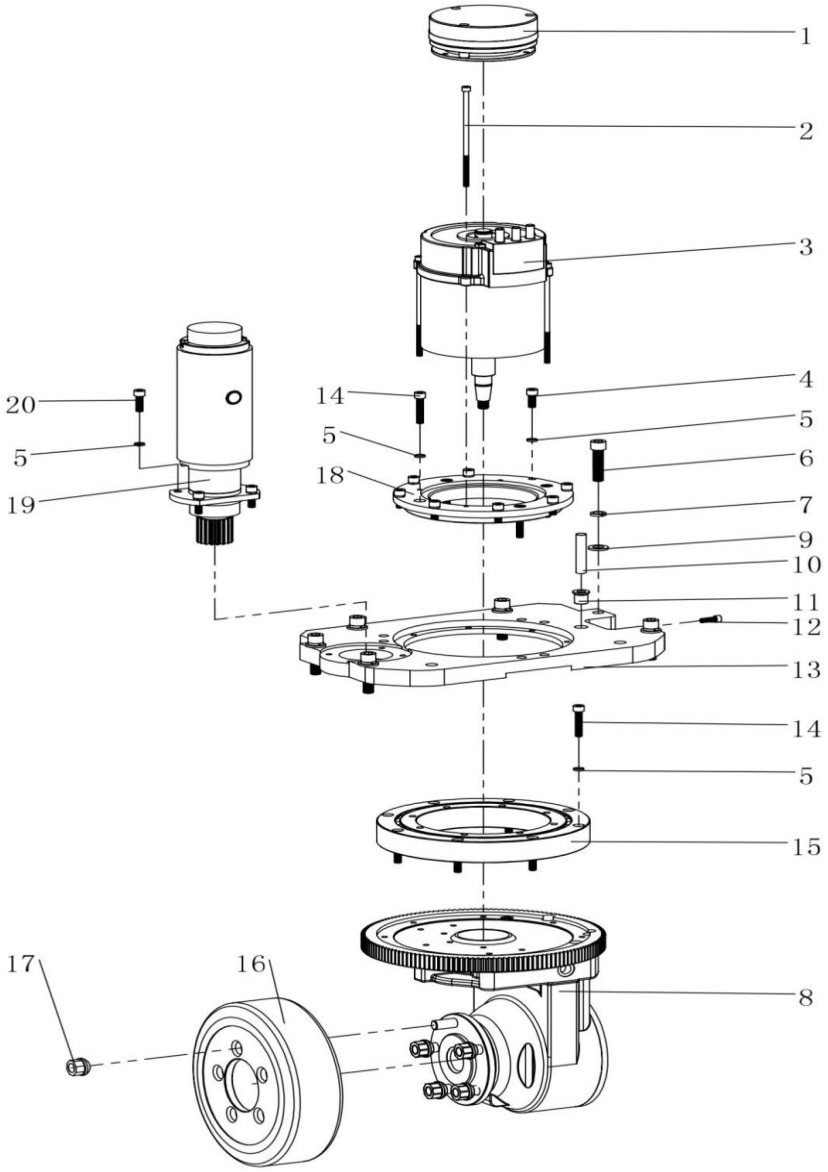
Hydraulic circuit

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

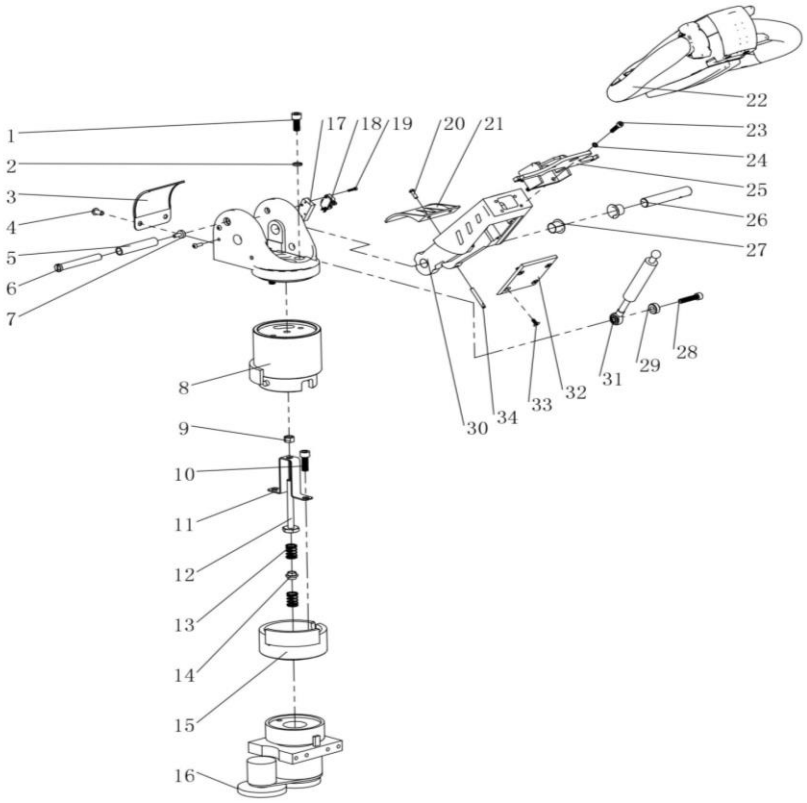
4. Disassembly of main parts

A. Removal of handle assembly



NO.	Code	Name		Quantity	Remark
1	SL20GA-01.6.3	Electromagnetic brake magnetic sensor assembly		1	
2	GB/T 70.1-2000	Hexagon socket head screws	M6×150	4	
3	SL20GA-01.6.7	Ac motor		1	
4	GB/T 70.1-2000	Hexagon socket head screws	M8×20	8	
5	GB/T 93-1987	Elastic washer	Φ8	24	
6	GB/T 70.1-2000	Hexagon socket head screws	M12×50	6	
7	GB/T 93-1987	Elastic washer	Φ12	6	
8	ZD-ZV21-500-001	reducer		1	
9	GB/T 95-2002	Flat washer	Φ12	6	
10	TY-01.40	Proximity switch PM12-04N		1	
11	SL20GA-01.6.6	The installation of		1	
12	GB/T 70.1-2000	Hexagon socket head screws	M6×20	1	
13	E10GL-01.9.1	Drive base plate (1)		1	
14	GB/T 70.1-2000	Hexagon socket head screws	M8×40	12	
15	SL20GA-01.6.4	Giant rotary bearing		1	
16	ZD-ZV21-BJL-001	Wheel drive	Φ248	1	
17		Big wheel nut		5	
18	E10GL-01.9.2	Drive base plate (2)		1	
19	TY-01.8	Steering motor	0.2KW	1	
20	GB/T 70.1-2000	Hexagon socket head screws	M8×25	4	

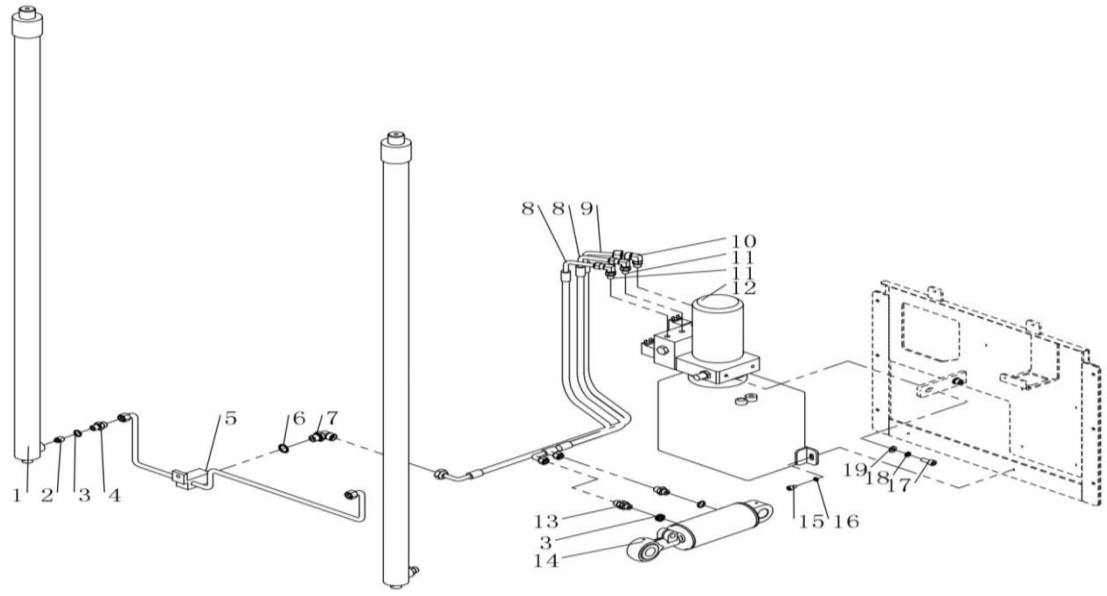
B. Removal of electric control component



NO.	Code	Name	Specification	Quantity	REMARK
1	GB/T 70.1-2000	Hexagon socket head screws	M10×25	2	
2	GB/T 93-1987	Elastic washer	Φ10	2	
3	SL20GA-01.10.6	The cover plate		1	
4	GB/T 70.2-2000	Hexagon socket flat round head screws	M8×16	2	
5	SL20GA-01.10.1.4	The silicone tube		1	
6	SL20GA-01.10.1.2	pin		1	
7	SL20GA-01.10.1.3	screw		1	
8	E10GL-02.1	Upper casing welding		1	
9	GB/T 41-2000	Hexagonal nut	M10	1	
10	GB/T 70.1-2000	Hexagon socket screw	M10×30	2	
11	E10GL-02.2.2	Spring support		1	
12	E10GL-02.2.4	Adjust the screw		1	
13	CL10.10.3-3	spring		2	

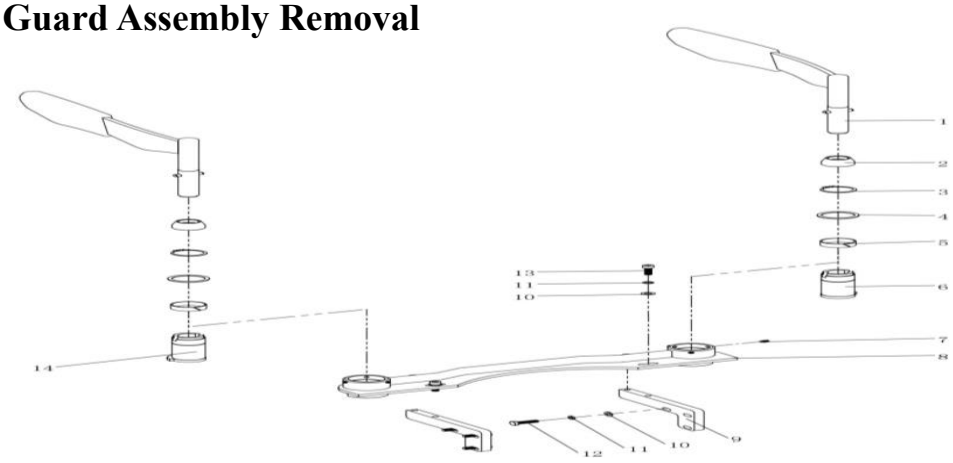
14	E10GL-02.2.3	Spring seat		1	
15	E10GL-02.2.1	Casing welding		1	
16	SL20GA-01.10.3	Steering sensor		1	
17	SL20GA-01.10.1.7	Mounting plate		1	
18	TY-01.7	Micros witch RV-166-1C25		1	
19	GB/T 70.1-2000	Hexagon socket screw		2	
20	GB/T 70.2-2000	Hexagon socket flat round head screws	M5×16	2	
21	SL20GA-01.10.7	Outer cover plate		1	
22	TY-01.12	handle T606-1		1	
23	GB/T 70.1-2000	Hexagon socket head screws	M6×25	4	
24	GB/T 93-1987	Elastic washer	Φ6	4	
25	SL20GA-01.10.04	Mounting plate welded		1	
26	SL20GA-01.10.8	pin		1	
27	TY-02.2	Composite sleeve with shoulder φ 28 x φ 20 x φ 18 x 16		2	
28	GB/T 70.1-2000	Hexagon socket head screws	M8×40	1	
29	SL20GA-01.10.12	spacer		1	
30	SL20GA-01.10.5	The handle bar		1	
31	SL20GA-01.10.02	Air spring assembly		1	
32	SL20GA-01.10.11	Cover plate		1	
33	GB/T 70.3-2000	Hexagon socket countersunk head screws	M5×12	4	
34	GB/T 879.2-2000	Elastic cylindrical pin	Φ5×45	1	

C. Hydraulic assembly removal



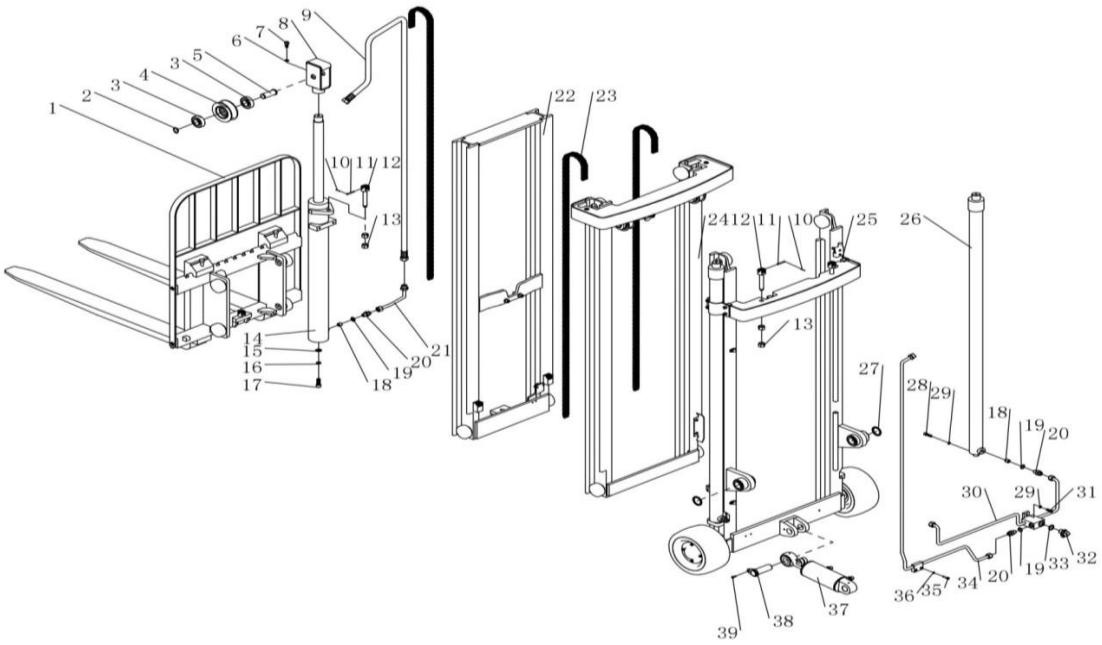
NO	Code	Name	Specification	Quantity
1	E10GS-03.4	Lift cylinder assembly		2
2	CL10.4.3	Anti-riot valve spool		1
3	GB982-77	Combination gasket	Φ16	4
4	E10GS-01.8.7	Directly to the head		2
5	E10GL-03.5	Steel pipe		1
6	GB892-77	Combination gasket	Φ20	1
7	E10GL-03.6	Right Angle adjustable joint		1
8	E10GL-01.6.5	Tilt hose		2
9	E10GL-01.6.4	Lifting hose		1
10	E10GS-01.7.1	Right Angle adjustable joint		1
11	E10GL-01.6.3	Right Angle adjustable joint		2
12	E10GL-01.6.2	Power unit		1
13	CG1646.05.1-4	Directly to the head		2
14	E10GL-03.4	Tilting cylinder assembly		1
15	GB/T 70.1-2000	Hexagon socket head screws	M8×12	2
16	GB/T 93-1987	Elastic washer	Φ8	2
17	GB/T 70.1-2000	Hexagon socket head screws	M10×25	2
18	GB/T 93-1987	Elastic washer	Φ10	2
19	GB/T 95-2002	Flat washer	Φ10	2

D. Arm Guard Assembly Removal



No.	Code	Name	Specification	Quantity	Remark
1	SL30GB-04.1	Boom guard welded		2	
2	SL30GB-04.2	shield		2	
3	GB 894.1-86	Shaft with elastic retainer	Φ48	2	
4	SL30GB-01.3.4	gasket		2	
5	SL30GB-01.3.5	bushing		2	
6	SL30GB-01.3.2	Shaft sleeve left		1	
7	GB/T 79-2000	Hexagon socket point set screws	M8×12	6	
8	SL30GB-01.3.1	Arm guard seat welded		1	
9	E10GL-04.2	Arm guard connecting plate		2	
10	GB/T 95-2002	Flat washer	Φ10	10	
11	GB/T 93-1987	Elastic washer	Φ10	10	
12	GB/T 5781-2000	Hexagon head bolt	M10×35	6	
13	GB/T 70.1-2000	Hexagon socket head screws	M10×35	4	
14	SL30GB-01.3.3	Shaft sleeve right		1	

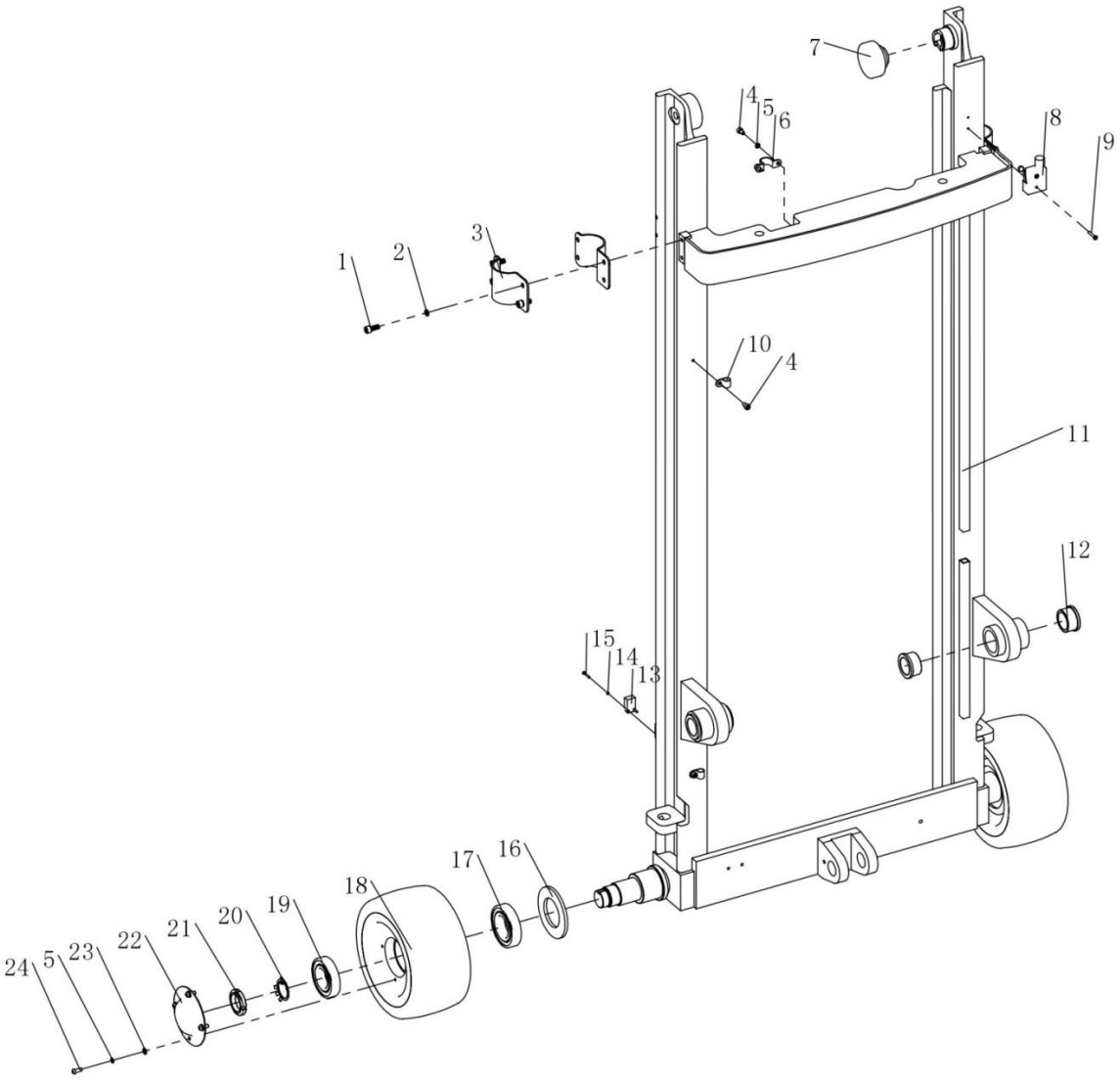
E. Mast Assembly



NO	Code	Name	Specification	Quantity
1	E10GL-06.4	Carriage components		1
2	GB 894.1-86	Shaft with elastic retainer	Φ25	1
3	GB/T 276-94	Deep groove ball bearing	6305-2Z	2
4	CG1646.03.3-5	Sprocket a.		1
5	CL1032C.02-09	Sprocket shaft		1
6	GB/T 93-1987	Elastic washer	Φ10	1
7	GB/T 70.1-2000	Hexagon socket head screws	M10×20	1
8	CL1555QD.02.07	Sprocket frame welding		1
9	E10GL-06.10	High pressure hose		1
10	GB/T 91-2000	Cotter pin	Φ1.2×18	2
11	GB 880-86	Perforated pin	Φ5×40	3
12	CG1646.02-4	Chain bolt		3
13	GB/T 41-2000	Hexagonal nut	M16	6
14	E10GL-06.5	Front lift cylinder assembly		1
15	GB/T 95-2002	Flat washer	Φ12	1
16	GB/T 93-1987	Elastic washer	Φ12	1
17	GB/T 70.1-2000	Hexagon socket head screws	M12×35	1
18	CL10.4.3	Anti-riot valve spool		3
19	GB982-77	Combination gasket	Φ16	4
20	E10GS-01.8.7	Directly to the head		4

21	E10GL-06.8	Steel Pipe (2)		1
22	E10GL-06.3	Internal door frame assembly		1
23	LH0866	Plate chain		3
24	E10GL-06.2	Middle gantry assembly		1
25	E10GL-03.1	External door frame assembly		1
26	E10GL-06.6	Rear lift cylinder assembly		2
27	E10GS-03.7	The door frame spacing		2
28	GB/T 70.1-2000	Hexagon socket head screws	M8×30	2
29	GB/T 93-1987	Elastic washer	Φ8	3
30	E10GL-06.7	Steel Pipe (1)		1
31	GB/T 70.1-2000	Hexagon socket head screws	M8×20	1
32	E10GS-01.7.1	Right Angle adjustable joint		1
33	GB892-77	Combination gasket	Φ20	1
34	E10GL-06.9	Steel Pipe (3)		1
35	GB/T 70.1-2000	Hexagon socket head screws	M6×25	2
36	GB/T 93-1987	Elastic washer	Φ6	2
37	E10GL-03.4	Tilting cylinder assembly		1
38	E10GS-01.6	Inclined cylinder pin shaft welding		1
39	GB/T 70.2-2000	Hexagon socket flat round head screws	M6×16	1

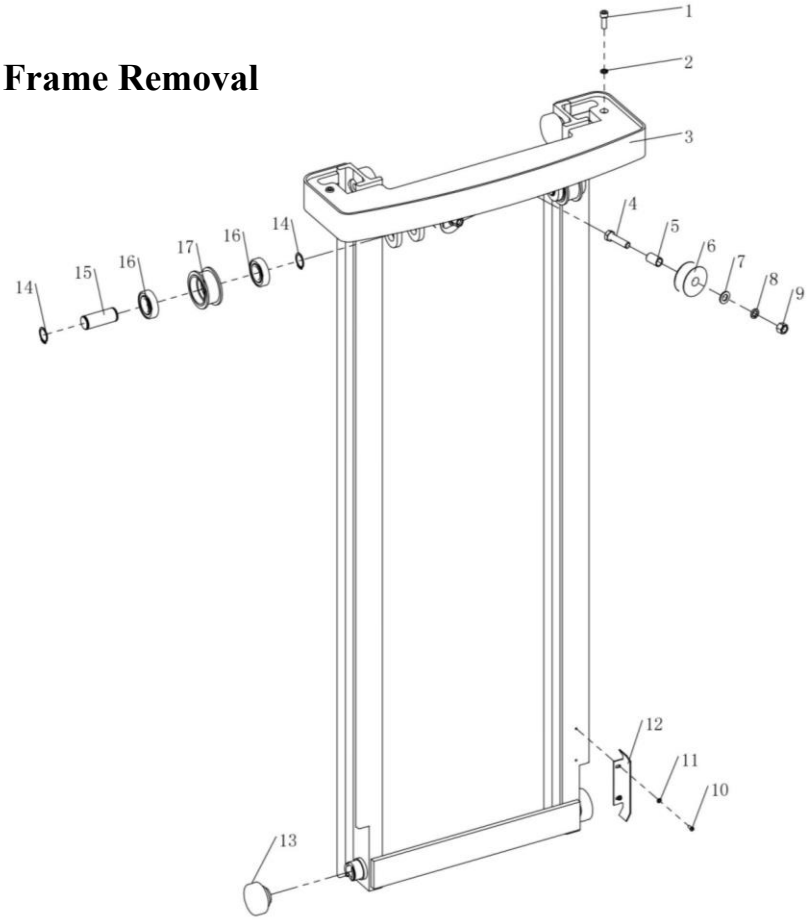
F. External door frame removed



No	Code	Name	Specification	Quantity	Remark
1	GB/T 70.1-2000	Hexagon socket head screws	M8×20	8	
2	GB/T 93-1987	Elastic washer	Φ8	8	
3	E10GS-03.1.4	Oil cylinder hoop		4	
4	GB/T 70.1-2000	Hexagon socket head screws	M6×10	4	
5	GB/T 93-1987	Elastic washer	Φ6	10	
6		the hoop	Φ21	1	
7	CRA70.4-4S	Composite roller		2	

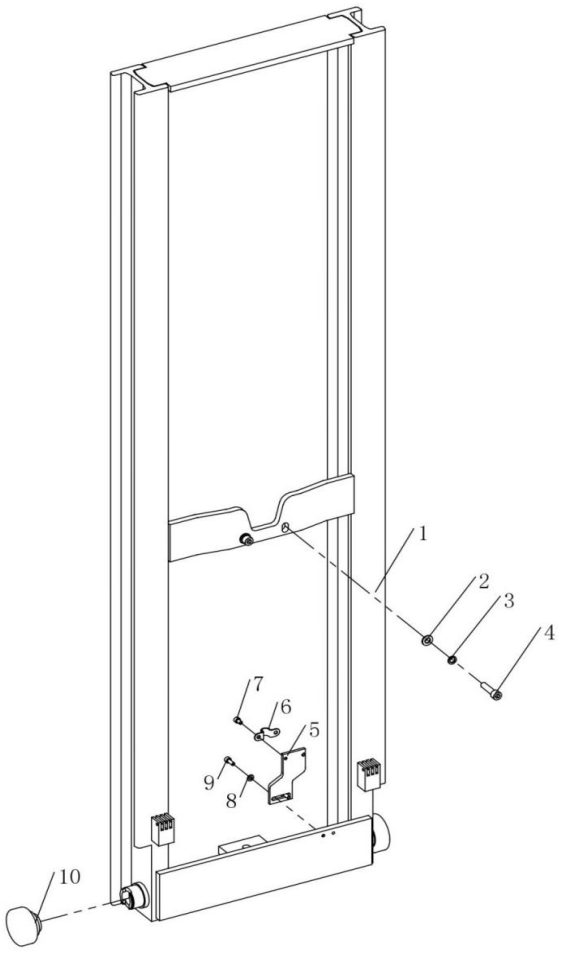
8	TY-01.35	Micro switch RZ-15GW2S-B3		1	
9	GB/T 818-2000	Cross recessed pan head screws	M4×25	2	
10		R type hoop	Φ12	2	
11	E10GL-06.1.1	The outer door frame is welded		1	
12	E10GS-03.10	The door frame is connected with copper bushing		4	
13	TY-01.38	Proximity switch CLJF20-05FA		1	
14	GB/T 93-1987	Elastic washer	Φ3	2	
15	GB/T 818-2000	Cross recessed pan head screws	M3×20	2	
16	E10GL-03.1.3.1	Felt seal ring		2	
17	GB/T 276-94	Deep groove ball bearing	6209-2Z	2	
18	TY-02.56	The front wheel body		2	
19	GB/T 276-94	Deep groove ball bearing	6208-2Z	2	
20	GB 858-1988	Stop washers for round nuts	Φ35	2	
21	GB/T 812-1988	Round nut	M35×1.5	2	
22	E10GL-03.1.5	The front-end cover		2	
23	GB/T 95-2002	Flat washer	Φ6	8	
24	GB/T 70.2-2000	Hexagon socket flat round head screws	M6×16	8	

G. Middle Door Frame Removal



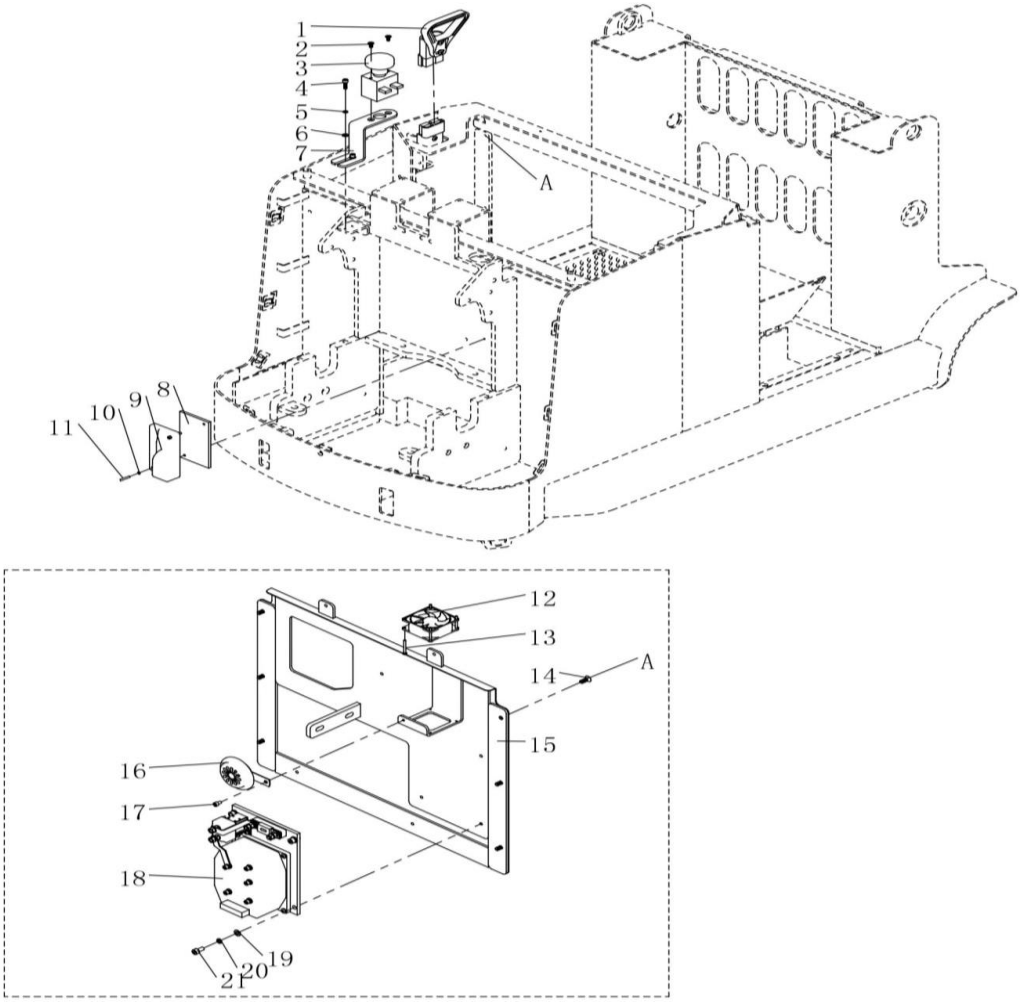
No	Code	Name	Specification	Quantity
1	GB/T 70.1-2000	Hexagon socket head screws	M10×30	2
2	GB/T 93-1987	Elastic washer	Φ10	2
3	E10GL-06.2.1	Middle frame welding		1
4	GB/T 5781-2000	Hexagon head bolt	M14×55	2
5	E10GS-07.2.3	Pulley casing		2
6	E10GS-07.2.2	The pulley		2
7	GB/T 95-2002	Flat washer	Φ14	2
8	GB/T 93-1987	Elastic washer	Φ14	2
9	GB/T 41-2000	Hexagonal nut	M14	2
10	GB/T 818-2000	Cross recessed pan head screws	M5×12	2
11	GB/T 95-2002	Flat washer	Φ5	2
12	E10GS-03.2.2	The limit board		1
13	CRA70.4-4S	Composite roller		4
14	GB 894.1-86	Shaft with elastic retainer	Φ30	4
15	CG1646.03.3-6	Sprocket shaft		2
16	GB/T 276-94	Deep groove ball bearing	6206-2Z	4
17	CG1646.03.2-7	Sprocket B		2

H. Inner Door Frame Removal



No	Code	Name	Specification	Quantity
1	E10GL-06.3.1	Inner door frame welded		1
2	GB/T 95-2002	Flat washer	Φ10	2
3	GB/T 93-1987	Elastic washer	Φ10	2
4	GB/T 70.1-2000	Hexagon socket head screws	M10×40	2
5	CL1555QD.02.03.01-1	Tubing fixing plate		1
6		The hoop	Φ12	1
7	GB/T 70.1-2000	Hexagon socket head screws	M6×10	2
8	GB/T 95-2002	Flat washer	Φ6	2
9	GB/T 70.1-2000	Hexagon socket head screws	M6×16	2
10	CRA70.4-4S	Composite roller		2

I. Electrical Assembly



No	Code	Name	Specification	Quantity	Remark
1	TY-02.57	Large power socket assembly		1	
2	GB 2673-86	Hexagon socket countersunk head screws	M6×12	2	
3	TY-01.14	Emergency stop switch ZDK31-250		1	
4	GB/T 70.1-2000	Hexagon socket head screws	M6×20	2	
5	GB/T 93-1987	Elastic washer	Φ6	2	
6	GB/T 95-2002	Flat washer	Φ6	2	
7	E10GL-01.15	Power off switch mounting bracket		1	
8	DK1220-01.1	Electric control mounting plate		1	

9	TY-01.49	Steering control 1212P-2502		1	
10	GB/T 859-1987	Spring washer	Φ4	2	
11	GB/T 70.1-2000	Hexagon socket head screws	M4×30	2	
12	TY-01.28	fan	80×80	1	
13	GB/T 818-2000	Cross recessed pan head screws	M4×40	4	
14	GB 2673-86	Hexagon socket countersunk head screws	M8×20	6	
15	E10GL-01.6.1	Neutral plate welding		1	
16	TY-01.18	The horn DC24 Φ - 125		1	
17	GB/T 70.1-2000	Hexagon socket head screws	M6×10	1	
18		Ac electric control module		1	
19	GB/T 95-2002	Flat washer	Φ8	4	
20	GB/T 93-1987	Elastic washer	Φ8	4	
21	GB/T 70.1-2000	Hexagon socket head screws	M8×16	4	

5. CURTIS Handheld 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 handheld unit can be connected in the event of a controller power or power failure

Vehicle fault reading process:
1. After connecting the handheld unit with the controller, open the key switch
2, From the menu list of CURTIS handheld 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 handheld unit with the controller, open the key switch
2, According to the menu list of CURTIS handheld 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 handheld unit menu:

The Curtis 1313 handheld 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

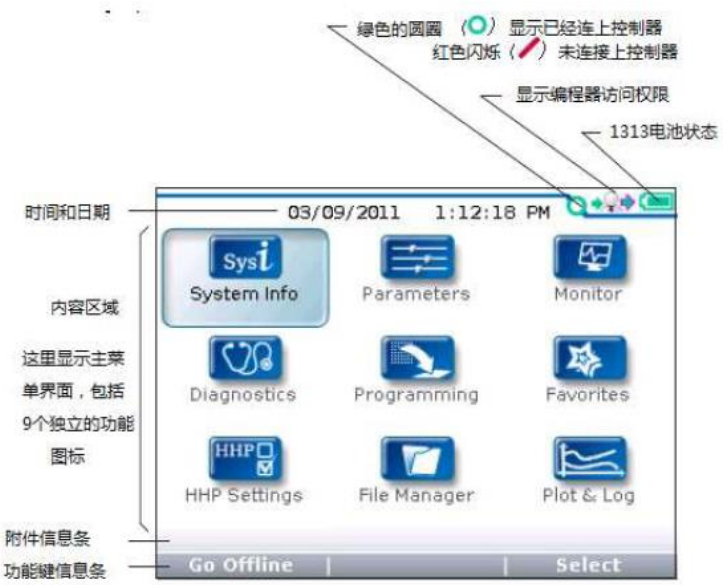
Warning: The control system can affect the vehicle's acceleration rate, deceleration rate, hydraulic system and braking. A dangerous situation can occur if the vehicle control system is not programmed correctly or exceeds safety. Only the vehicle manufacturer or an authorized service agent can program 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 handheld programmer can be connected to the controller by inserting the programming port of the controller. After connecting the controller, the handheld 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 will 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 structures

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.

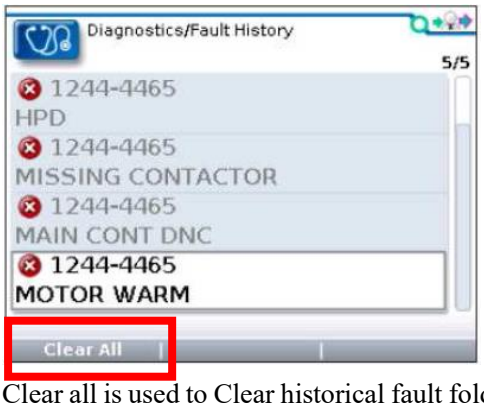
The names of all nine sub menus are shown in bold on the main menu and below the icon. When entering the stepped menu, the name of the sub menu or the path you are in is displayed at the top of the screen.

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

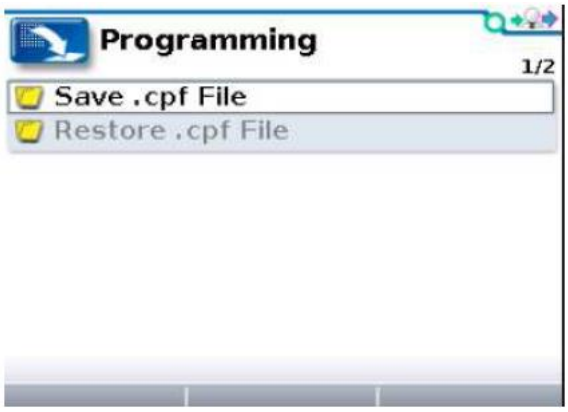
Note: Sometimes a fault caused by a temporary event captured in the circuit is not a system fault. You can determine whether the fault exists by restarting the system and observing whether the fault disappears automatically.

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.

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.



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