



Service manual

Full-electric stacker

EB18E/EB20E



Warning

You must read the operation instruction before using the manual:

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

Manual

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1. Maintain List

a. Main part overview

Table 1: Maintain List

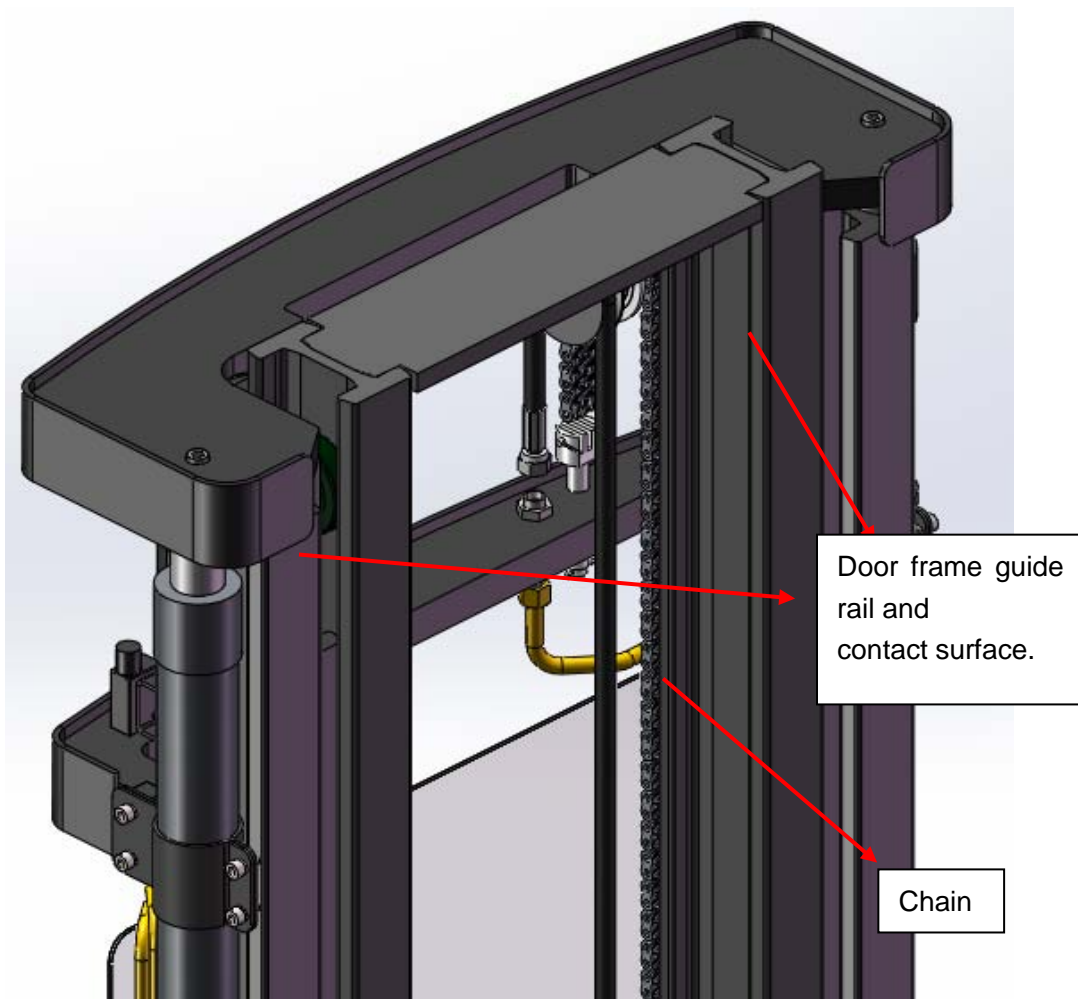
		Time Interval (Month)			
		1	3	6	12
Hydraulic System					
1	Check hydraulic cylinder and piston for damage, noise and leakage.		•		
2	Check hydraulic connector for damage and leakage.		•		
3	Check hydraulic oil level and refill it if necessary.		•		
4	Refill hydraulic oil after 12 months or 1500 hours.				•
5	Check and adjust the function of the hydraulic valve. (1500kg/2000kg +0/+10%)				•
Mechanical System					
6	Check whether the fork is deformed or broken.		•		
7	Check whether the chassis is deformed or broken.		•		
8	Check whether all screws are fastened.		•		
9	Check whether the push rod is deformed or damaged.		•		
10	Check the gearbox for noise and leakage.		•		
11	Check whether the wheel rod is deformed or damaged.		•		
12	Lubricate steering bearings				•
13	Check and lubricate the pivot point.		•		
14	Grease nipple	•			
Electrical system					
15	Check whether the power wiring is damaged.		•		
16	Check the electrical connection		•		
17	Check the emergency switch function.		•		
18	Check electric rive system for noise damage.		•		
19	Check electricity meter.		•		
20	Check whether the correct fuse is used.		•		
21	Detection warning signals.		•		
22	Check the contactor		•		
23	Check the leak in the frame(insulation test)		•		
24	Check the function and wear of the drive controller		•		
25	Check the electric system of the drive motor.		•		
Brake system					
26	Check the brake performance. Replace the brake disc or adjust the air gap if necessary.		•		
Battery					
27	Check the battery voltage.		•		
28	Check the terminal for corrosion and damage and lubricate the terminal.		•		
29	Check whether the battery cover is damaged.		•		
Charger					
30	Check whether the main cable is damaged.			•	
31	Check startup protection program in the process of charging.			•	

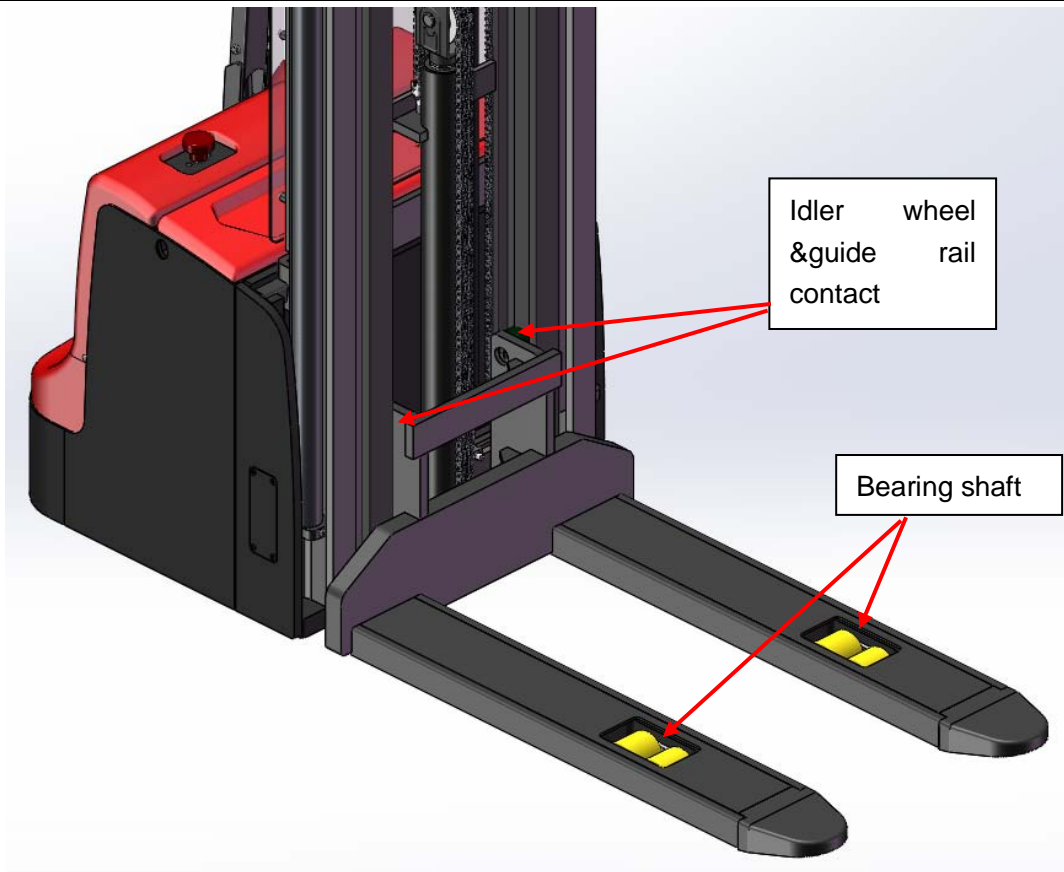
Function				
32	Check the horn function.	•		
33	Check air gap of solenoid valve.	•		
34	Detect emergency braking.	•		
35	Detect the reverse braking and regenerative braking.	•		
36	Check the emergency reverse switch function.	•		
37	Check steering function.	•		
38	Check lifting and lowering function.	•		
39	Check the handle proximate switch function.	•		
Comprehensive				
40	Check whether all labels are clear and complete.	•		
41	Check the bearing wheels and adjust the height, replace if it is worn.		•	
42	Perform a test run.	•		

b. Lubrication point

Lubricate the marked point according to the maintain list. The required grease specification is the DIN 51825 standard grease.

Picture.1: Lubrication point





c. Check and refill hydraulic oil

According to the temperature, we recommend the type of hydraulic oil as following:

Temperature	-5°C~ 25°C		>25°C
Model	HVLP 32, DIN 51524		HLP 46, DIN 51524
Viscosity	28.8-35.2		41.4 - 47
Oil volume		14~15L	

Wasted material such as waste oil, waste battery or other material must be processed and recycled in accordance with the national regulation. And if necessary, they need to be handed over to recycle companies to recycle. The oil level should not be lower than the minimum amount of oil required when the vehicle start out. If necessary, please add the oil to the filling points.

d. Check electric fuses

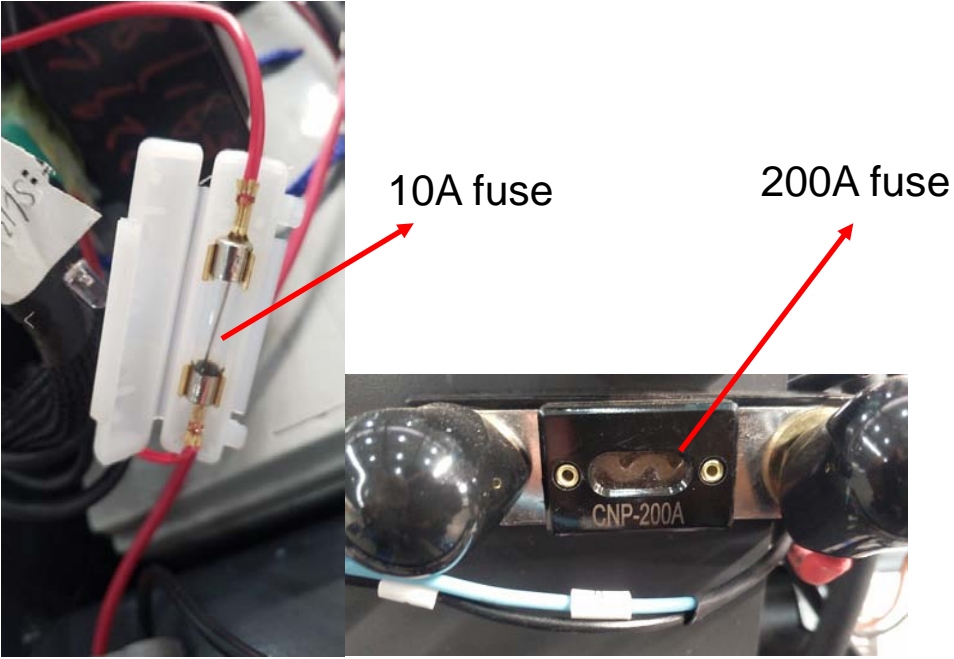


Table 2: fuse specification

	specification
Fuse 1	10A
Fuse 01	200A

2. Malfunction Analysis

a. Common malfunction analysis

If the vehicle still in problems, please follow the chapter 6 in this manual.

Table 3: Malfunction analysis

Malfunction	Cause	Solution
Goods can't be lifted up	Over load	Only lift the maximum capacity show on nameplate.
	Battery discharge	Charge the battery
	Lift fuse damaged	Check and replace the fuse
	Low hydraulic oil level	Check and refill hydraulic oil
	Oil leakage	Detect the sealing condition of oil cylinder.
Suction leak	High oiliness	Reducing oiliness
The vehicle can't be operated	Battery is charging	Full charge the battery, then unplug the main power plug from the outlet.
	Battery disconnected	Connect battery correctly.
	Fuse malfunction	Check and replace the fuse.
	Low battery	Charge the battery
	Emergency switch is activate	Unplug the emergency switch
	The handle is not in operating area	Move the handle to the braking area.
The vehicle drive to one direction	Accelerator and connector are damaged	Check the accelerator and connector
The vehicle move slowly	Battery discharging	Check the battery condition on the discharge monitor
	The electromagnetic brake has been activated.	Check the electromagnetic brake
	The handle wiring harness isn't connected or damaged	Check the handle wiring harness and connector
	At the 400mm altitude, the speed decreases and the sensor fails	Check the sensor
	Electric system overheated	Stop using and cool the vehicle
	The thermal sensor fails	Check, replace the thermal sensor if necessary
The vehicle suddenly start	Controller damage	Change the controller
	The accelerator has not moved back to the middle place.	maintain or replace accelerator

If the vehicle malfunction and can't operate outside work area, please hold up the vehicle, and place a load handing device under the vehicle and make sure it is secure , then move the vehicle from channel.

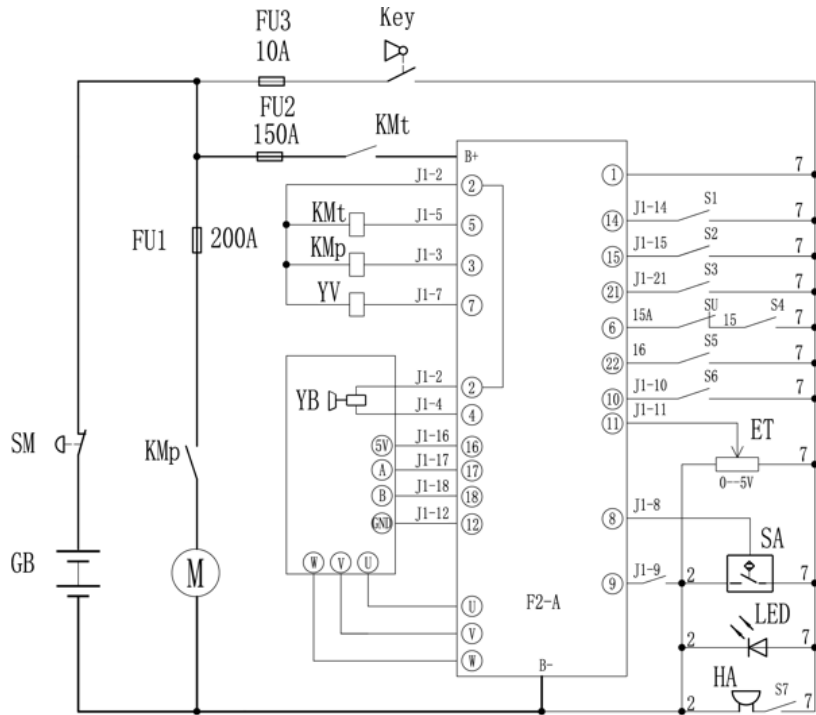
b. Fault code display

code	English name	中文名称
12	Controller Overcurrent	控制器过流
13	Current Sensor	电流传感器故障
14	Precharge Failed	预充失败
15	Controller Severe Undertemp	控制器温度过低
16	Controller Severe Overtemp	控制器过温
17	Severe B+ Undervoltage	B+欠压
17	Severe KSI Undervoltage	KSI 欠压
18	Severe B+ Overvoltage	过压
19	Speed Limit Supervision	最大速度受限
1A	Travel Control Supervision	行走控制监控异常
22	Controller Overtemp Cutback	控制器过温导致性能降低
23	Undervoltage Cutback	控制器欠压导致性能降低
24	Overvoltage Cutback	控制器过压导致性能降低
25	Ext 5V Supply Failure	5V电源故障
26	Ext 12V Supply Failure	12V电源故障
28	Motor Temp Hot Cutback	电机过热导致性能降低
29	Motor Temp Sensor	电机温度传感器故障
31	Main Driver	主接触器驱动异常
32	EM Brake Driver	电磁刹车驱动异常
35	Pdoportional Driver	比例阀驱动异常
36	Encoder Fault	电机编码器故障
37	Motor Open	电机开路
38	Main Contactor Welded	主接触器主触点粘连
39	Main Contactor Did Not Close	主接触器不吸合
42	Throttle Input	加速器输入异常
46	NV Memory Failure	控制器存储异常
47	HPD Sequencing	(上电)操作顺序故障
47	EMER Rev HPD	紧急反向操作顺序故障
49	Parameter Change	参数修改故障
4A	EMR Switch Redundancy	紧急反向开关冗余异常
51	User_1_Fault	(上电)紧急反向有效
52	User_2_Fault	(上电)互锁有限
53	User_3_Fault	BMS 报文超时
54	User_4_Fault	锂电故障
55	User_5_Fault	锂电过温告警
56	User_6_Fault	锂电过温故障
57	User_7_Fault	锂电漏液告警
58	User_8_Fault	锂电漏液故障

59	User_9_Fault	前拓CAN仪表通讯故障
61	User_10_Fault	前拓CAN仪表低电量
62	User_11_Fault	前拓CAN仪表继电器开路
68	VCL Run Time Error	程序或参数设置异常
72	PDO Timeout	PDO超时
73	Stall Detected	电机堵转
77	Supervision	(外部) 监控故障
87	Motor Characterization Error	电机匹配故障
88	Encoder Pulse Error	电机编码器脉冲异常
89	Parameter Out Of Range	参数超限
92	EM Brake Failed To Set	电磁刹车松闸失败
94	Emer Rev Timeout	紧急反向超时
99	Parameter Mismatch	参数不匹配
A1	Driver 1 Fault	驱动1故障 (下降电磁阀)
A2	Driver 2 Fault	驱动 2 故障 (电磁刹车)
A3	Driver 3 Fault	驱动3故障 (主接触器)
A4	Driver 4 Fault	驱动4故障
A5	Driver 5 Fault	驱动 5 故障 (起升接触器)

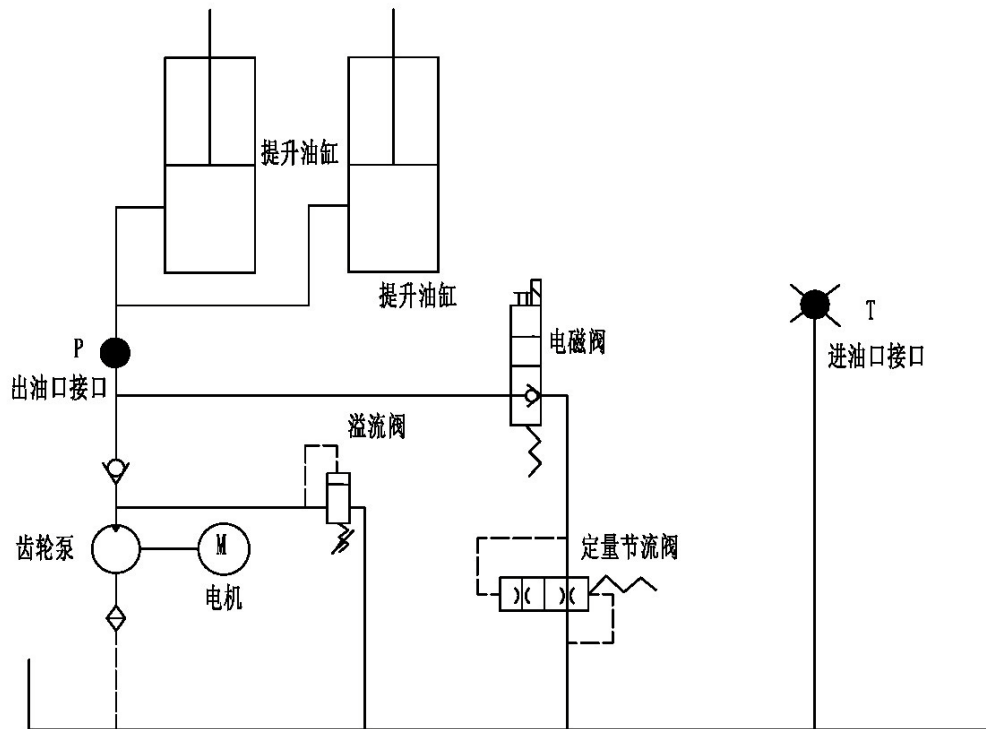
3、Circuit/circuit diagram

a、Circuit



S1	前进开关	S5	下降开关
S2	后退开关	S6	龟速开关
S3	紧急反向	S7	喇叭开关
S4	起升开关	GB	蓄电池
Key	钥匙开关	SM	急停开关
LED	电量指示灯	ET	加速器
YV	电磁阀	HA	喇叭
KMp	泵接触器	SA	互锁开关
Mp	泵电机	S5	龟速
Mt	牵引电机	S4	紧急反向
YB	电磁刹车	SU	起升限位
FU1, FU2, FU3	熔断器	KMp	泵接触器

B、Hydraulic circuit

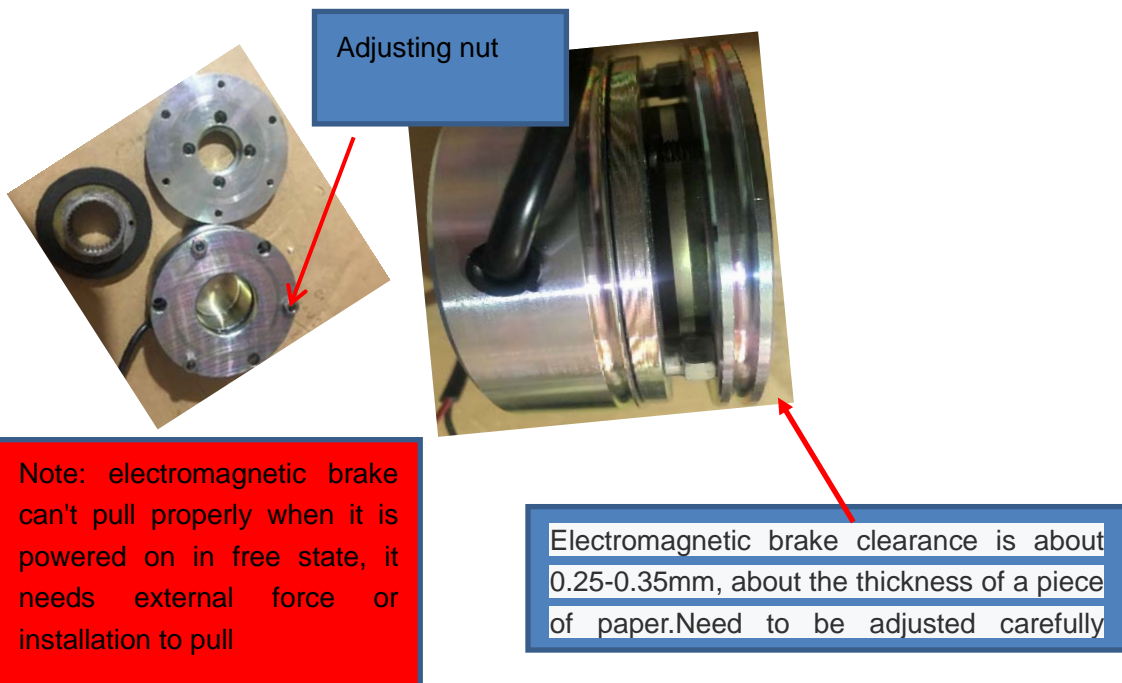


Hydraulic oil inspection

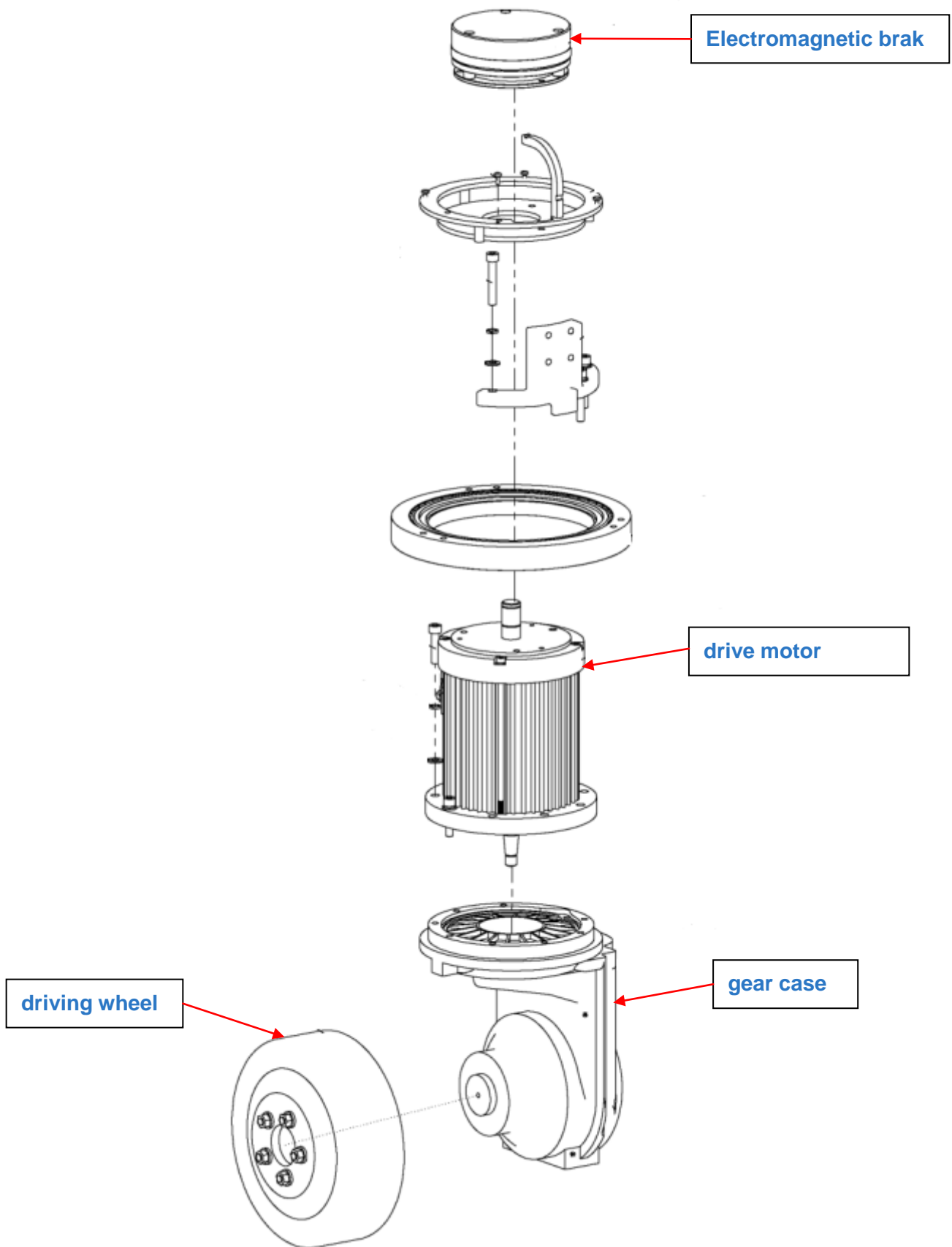
Appearance	odor	condition	results
Clear not discoloration	good	good	can be used
color transparency	good	with other oil mix	check viscosity, if qualified can continue to use
Color changes like milk	good	mixed with air and water	to separate moisture or replace hydraulic fluid
The color becomes dark brown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

4、 Disassembly of main parts

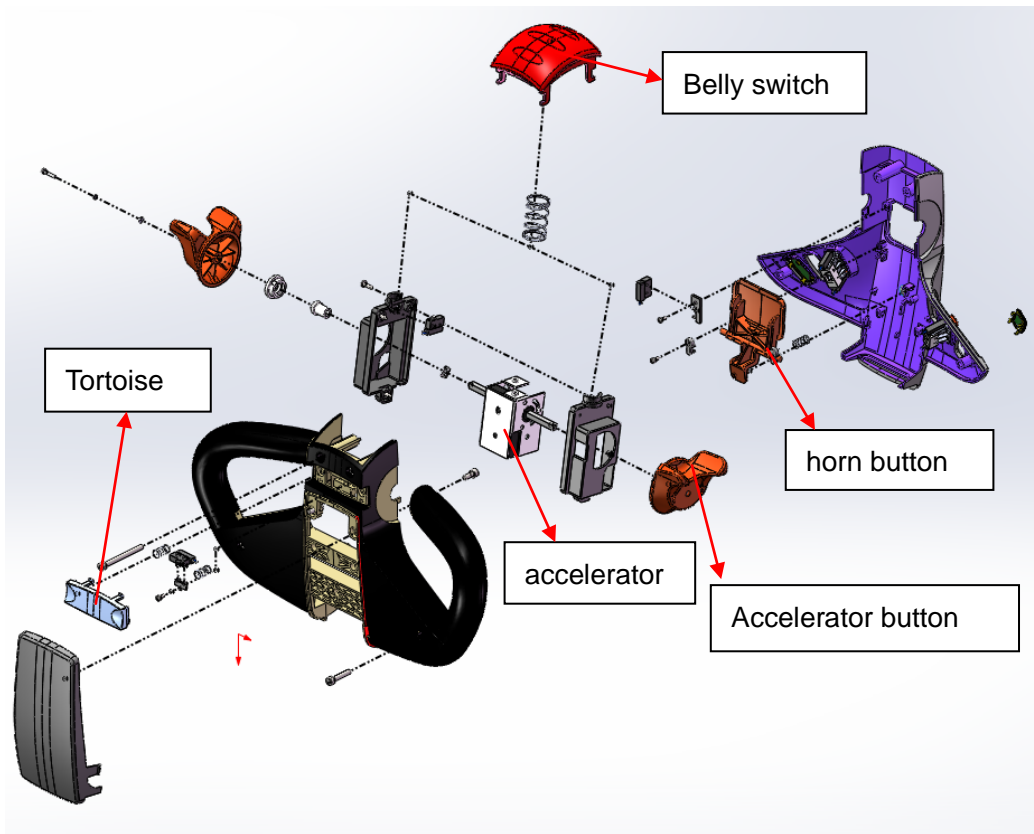
A、 electromagnetic brake adjustment



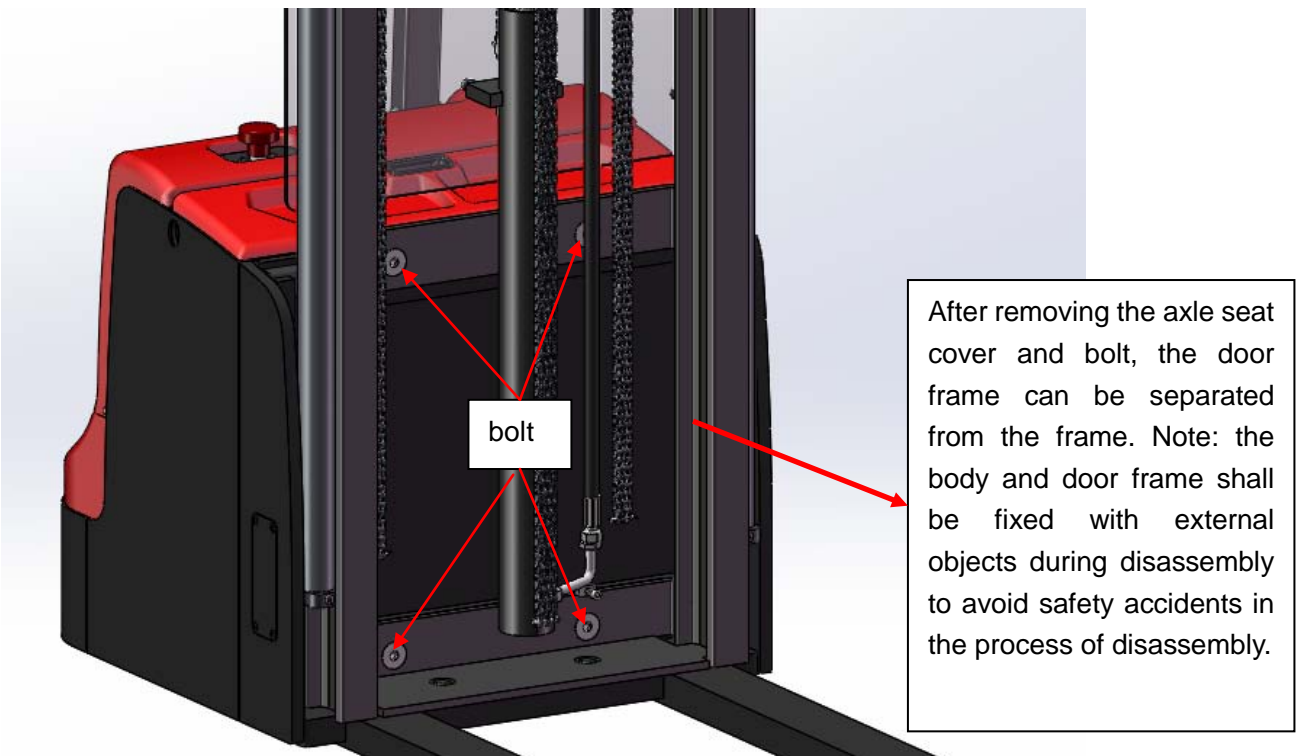
B、 Drive the disassembly diagram



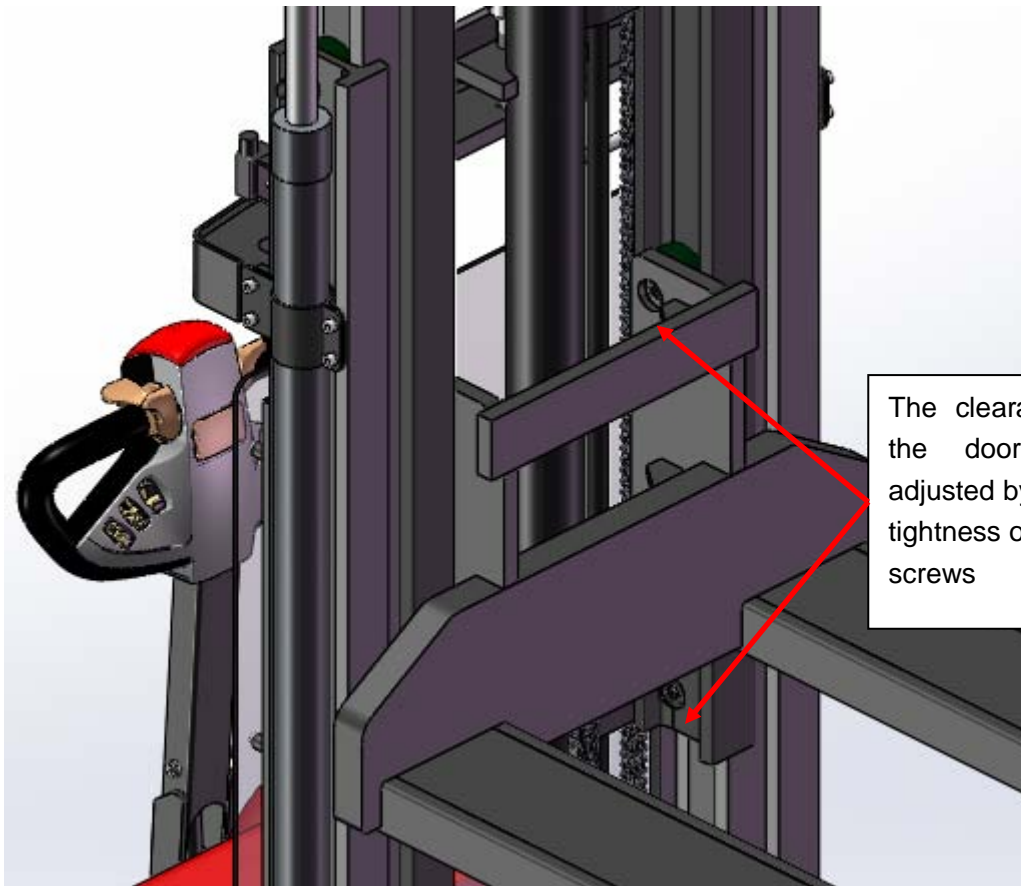
C、 Handle assembly



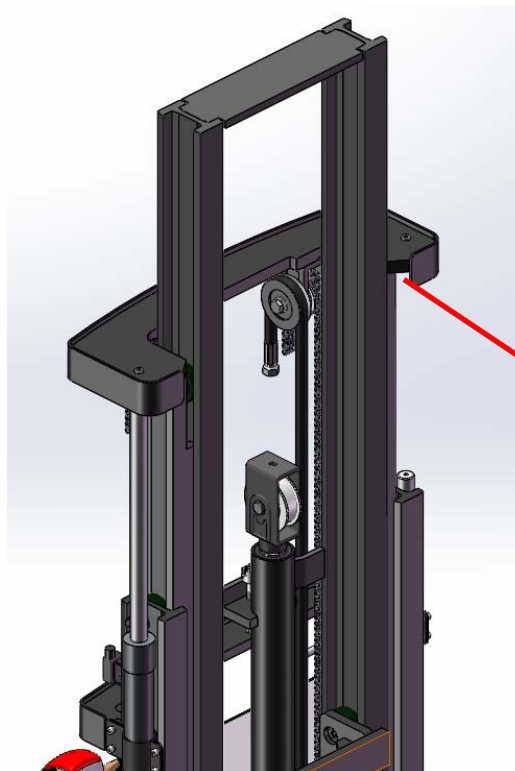
D、 Dismantling of frame and door frame



E、 Mechanical part of door frame



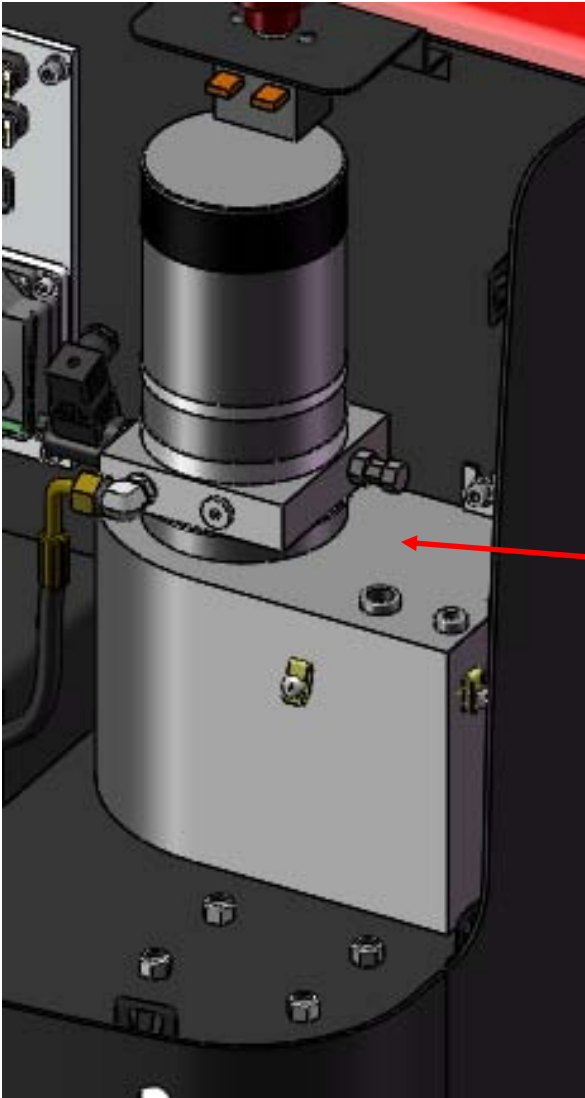
The clearance between the door frames is adjusted by adjusting the tightness of the adjusting screws



The door frame can be raised by loosening the adjusting screw

F、 Frame mechanical part

Pressure regulation diagram



The relief value is used to adjust the oil pressure, which should be adjusted to avoid excessive pressure causing damage to the car body

5、 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.

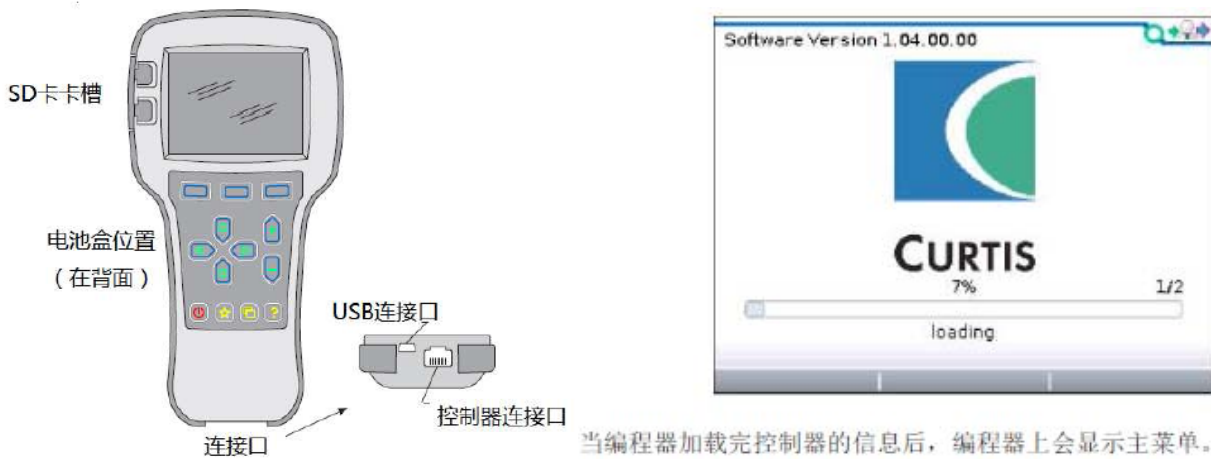
CURTIS Contents of hand held unit menu:

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, and 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 will start up automatically. When you hold it down for a few seconds, the programmer will prompt you whether to turn it off. You can decide whether to turn it off by selecting the "Yes" and "No" represented by the function key. After closing the programmer, press for a few seconds and the programmer will restart.

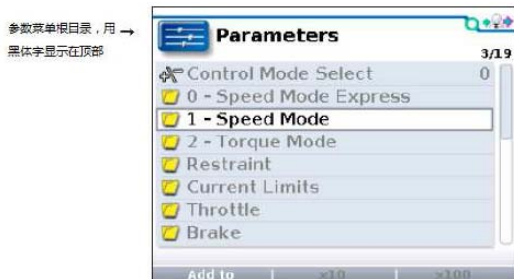
Collect keys

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

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.



参数菜单根目录，用 → 黑体字显示在顶部



Nine menus

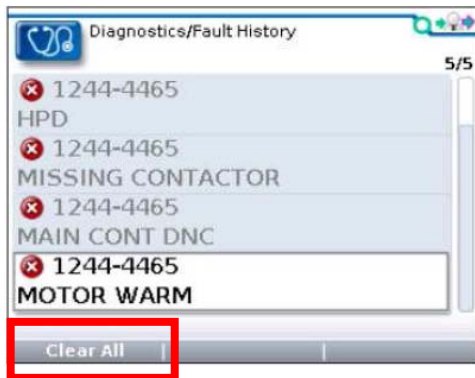


Fault Diagnosis menu

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.

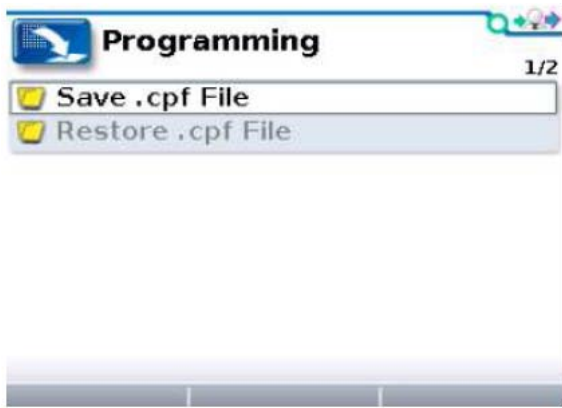
The historical faults folder lists all faults encountered after the last historical fault is cleared. By clearing the fault content in the entire folder, you can record the historical faults again.



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 asking you to restart the system.