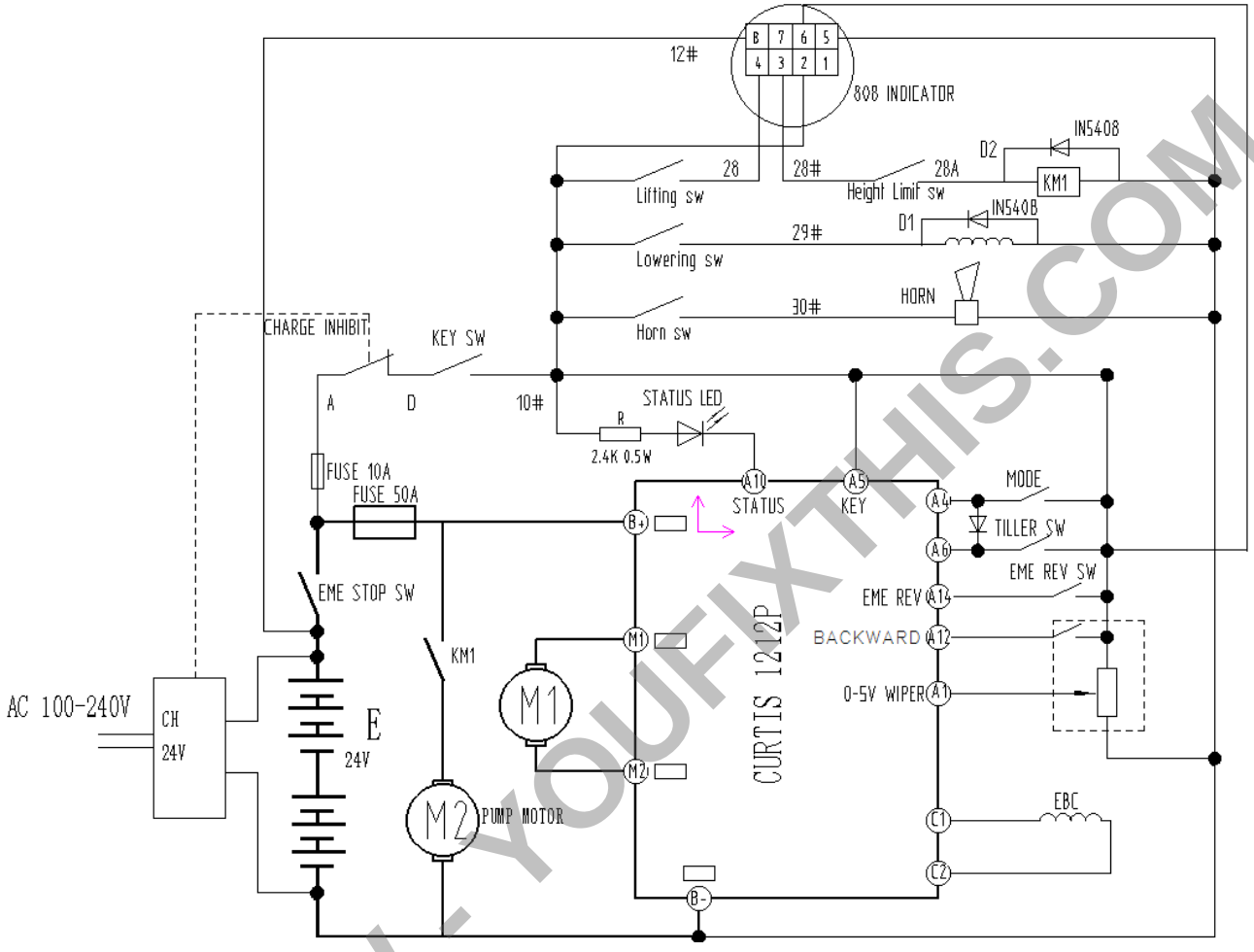
2.2 Electrical schematic diagram



Basic Operation：

1、 Travel: The truck is energizes by pulling on the emergency stop switch and turning key switch to-ON- position. By pressing down on the tiller handle, TILLER SWITCH (SW) closes allowing the controller A6 port to energize； further clockwise rotation increases the acceleration, and the controller A1 receives 0-5V analog voltage output by the accelerator. The controller power module drive motor rotates clockwise; the motor speed is proportional to the accelerator output voltage. By rotating the accelerator counterclockwise, the BACKWARD SWITCH (SW) closes allowing the controller A12 port to energize and activates the brake, the motor rotates counterclockwise. The motor speed is proportional to the accelerator output voltage.

2、 Other operations

Lift：By pressing on the lift button, the Lifting SWITCH (SW) closes allowing 28 wire to energize, crossing the relay in the INDICATOR (INDICATOR detects the battery charge level, if greater than 20%, the relay energizes, allowing the lift. If the battery level is less than 20%, the relay remains open forbidding the lift) activating the drive and lift contactor KM1 to make the hydraulic motor M2 and the pump to lift forks. At maximum lift, the Height Limit SWITCH (SW) activates stopping the lifting of the forks.

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- **Fault codes listed（see more details in 4.4.2 troubleshooting）**

Table 3 TROUBLESHOOTING CHART

LED CODE	PROGRAMMER LCD DISPLAY	EXPLANATION	POSSIBLE CAUSE
1,1	THERMAL FAULT	over-/under-temperature cutback	1. Temperature >80°C or < -10°C. 2. Excessive load on vehicle. 3. Operation in extreme environments. 4. Electromagnetic brake not releasing.
1,2	THROTTLE FAULT	PotLow and/or PotWiper out of range	1. Throttle input wire open or shorted. 2. Throttle pot defective. 3. Wrong throttle type selected.
1,3	SPEED POT FAULT	speed limit pot wiper out of range	1. Speed limit pot wire(s) broken or shorted. 2. Broken speed limit pot.
1,4	UNDERVOLTAGE FAULT	battery voltage too low	1. Battery voltage <17 volts. 2. Bad connection at battery or controller.
1,5	OVERVOLTAGE FAULT	battery voltage too high	1. Battery voltage >31 volts. 2. Vehicle operating with charger attached. 3. Intermittent battery connection.
2,1	MAIN OFF FAULT	main contactor driver Off fault	1. Main contactor driver failed open.
2,2	EMR SEQUENCING FAULT *[1212P]*	improper sequencing	1. Emerg. Rev. switch pressed before KSI on.
	MOTOR STALLED *[1212]*	motor stall fault	1. Motor is stalled.
2,3	MAIN FAULT	main contactor fault	1. Main contactor welded or stuck open. 2. Main contactor driver fault.
2,4	MAIN ON FAULT	main contactor driver On fault	1. Main contactor driver failed closed.
2,5	PUMP SRO FAULT *[1212P]*	improper sequencing	1. Pump switches pressed before KSI on.
3,1	WIRING FAULT	HPD fault present >10 sec.	1. Misadjusted throttle. 2. Broken throttle pot or throttle mechanism.
3,2	BRAKE ON FAULT	brake On fault	1. Electromagnetic brake driver shorted. 2. Electromagnetic brake coil open.
3,3	PRECHARGE FAULT	precharge fault	1. Brake driver shorted. 2. Precharge circuit damaged. 3. MOSFET failure.
3,4	BRAKE OFF FAULT	brake Off fault	1. Electromagnetic brake driver open. 2. Electromagnetic brake coil shorted.
3,5	HPD FAULT	HPD (High Pedal Disable)	1. Improper sequence of throttle and KSI, push, or inhibit inputs.
4,1	CURRENT SENSE FAULT	current sense out of range	1. Short in motor or in motor wiring. 2. Controller failure. ★
4,2	HARDWARE FAILSAFE	motor voltage out of range	1. Motor voltage does not correspond to throttle request. 2. Short in motor or in motor wiring. 3. Controller failure. ★
4,3	EEPROM CHECKSUM FAULT	EEPROM fault	1. EEPROM failure or fault.
4,4	MOTOR OPEN *[1212]*	motor open fault	1. Motor wiring is open.
4,5	BATTERY DISCONNECT FAULT	battery disconnected	1. Battery not connected. 2. Poor connection to battery terminals.

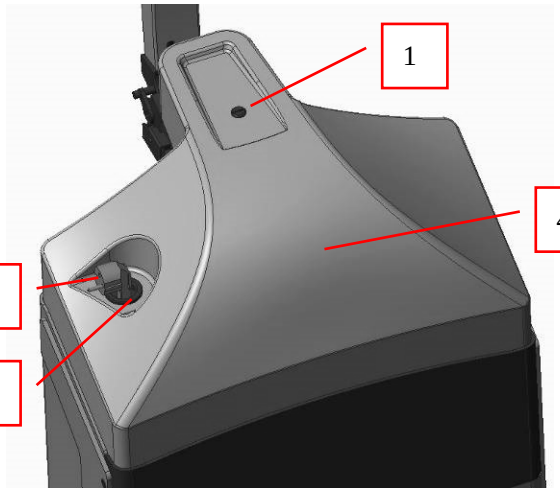
★ Jack up vehicle and retest to confirm diagnosis. Clean connections, inspect system wiring, and retest.

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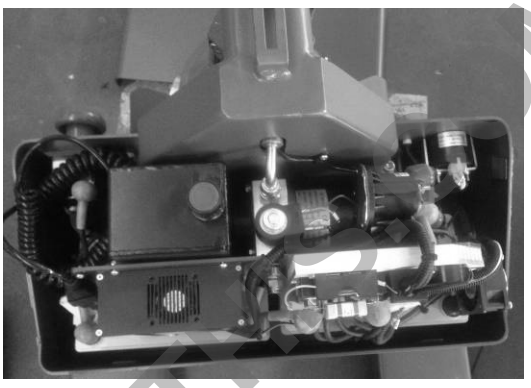
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1.1 How to disassemble the covering parts

1.1.1 How to disassemble the upper cover



View after Cover Removal



① Loosen screw (1);

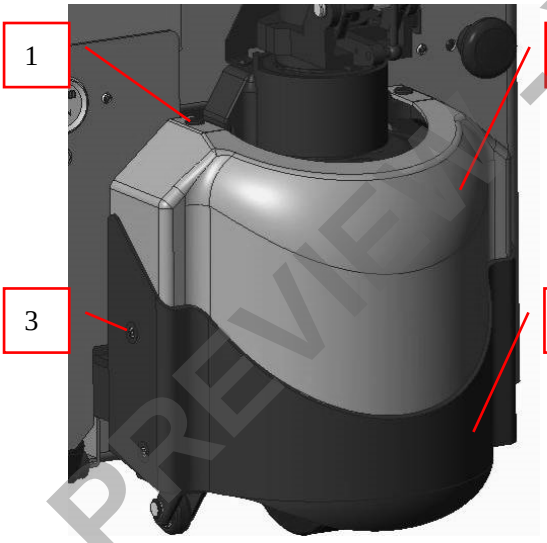
② Remove the coil (2) through the upper cover hole;

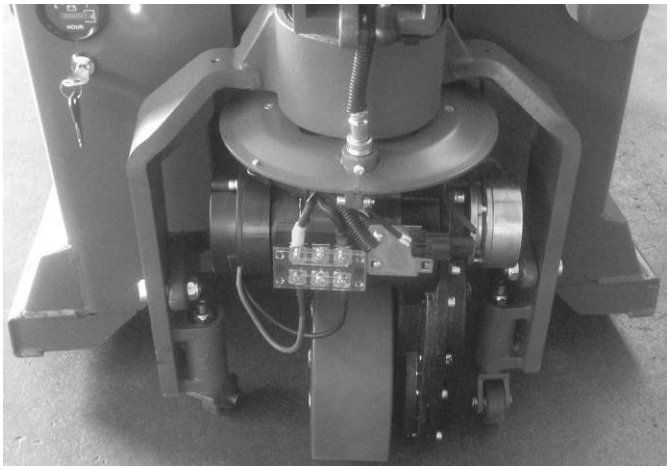
③ Push charging plug (3) inside cover through the hole;

④ Lift off the upper cover (4);

1.1.2 How to disassemble the rear cover and rear panel

View after Cover Removal





① Loosen screw (1) on each side;

② Lift off the rear cover (2);

③ Loosen two screws (3) on each side;

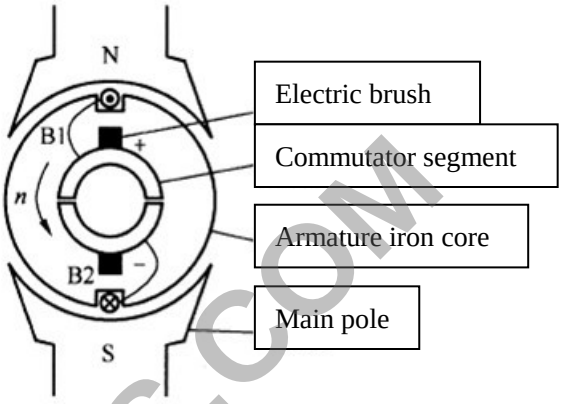
④ Remove the rear panel forwards;

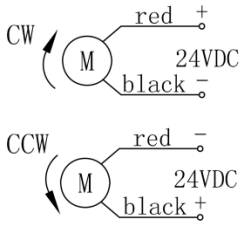
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2.3.4 Drive motor





Basic performance of motor			
Model	Z130D650-24A1-26.5S	Electric strength	660V/S
Rated voltage	24VDC	Insulation grade	F
Rated power	650W	IP grade	IP44
Rated current	38A	Service environment temperature	-10-+40
Rated RPM	2650 rpm	Noise	<60dB(L=100cm)
Rated torque	2.34N.m	Motor wiring	
Current, unload	<5A		
RPM, unload	3100 rpm		
Work system	S2(45min)		
Insulation resistance	>20MΩ		
Carbon brush lifetime	1200h		

2.4 Trouble shooting

2.4.1 Can not lift or lower

Check the following: lift switch, power meter, height limit switch, lift contactor; or lower solenoid valve and oil line according to 2.3 electrical schematic diagram (Basic Operation page 8).

- Can not Lift

After closing the lift switch, the voltage between 28 wire and B- should be 24V（If not the switch could be damaged or the wire could be broken），the voltage between 28# wire and B- should be 24V（if not, the power meter could be damaged or the battery voltage is too low），the voltage between 28A wire and B- should be 24V（if not, the height limit switch could be damaged or the wire could be broken），the voltage between the two motor terminals should be 24V(if not, the contactor could be damaged)，or the motor could be damaged or the oil line could have issues.

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Lower：By pressing on the lower button, the Lowering SWITCH (SW) closes allowing the solenoid valve to energize and the fork lowers.

Alarm：By pressing the horn switch, the Horn SWITCH (SW) closes allowing the alarm to energize and sound.

2.3 Component functions

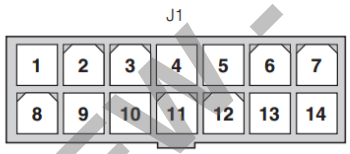
2.3.1 Controller



1

CONNECTIONS: Low Current

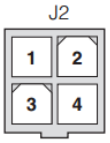
The low current logic control connections are provided by a 14-pin connector. The mating connector is a Molex Mini-Fit-Jr. receptacle p/n 39-01-2140 with appropriate 45750-series crimp terminals.



J1 **Pin 1** pot wiper
J1 **Pin 2** pot high
J1 **Pin 3** horn / lift lockout output*
J1 **Pin 4** mode switch (open=M1, closed=M2)
J1 **Pin 5** keyswitch input (KSI)
J1 **Pin 6** speed inhibit
J1 **Pin 7** B+

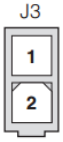
J1 **Pin 8** pot low
J1 **Pin 9** speed pot / pump SRO input* / lift lockout input*
J1 **Pin 10** status LED
J1 **Pin 11** BDI
J1 **Pin 12** reverse switch / neutral input*
J1 **Pin 13** I/O GND
J1 **Pin 14** push switch / emergency reverse*

J2 **Pin 1** Rx
J2 **Pin 2** I/O GND
J2 **Pin 3** Tx/charge inhibit
J2 **Pin 4** B+



A 4-pin low power connector is provided for the programmer and the battery charger. The mating connector is a Molex Mini-Fit-Jr. receptacle p/n 39-01-2040 with appropriate 45750-series crimp terminals. (A mating connector is provided with the handheld programmer.)

J3 **Pin 1** Brake +
J3 **Pin 2** Brake -



A 2-pin low power connector is provided for the electromagnetic brake. The mating connector is a Molex Mini-Fit-Jr. receptacle p/n 39-01-2020 with appropriate 45750-series crimp terminals.

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