SERVICE MANUAL

Starke LiftMaxx Series

PT30L-MINI

Electric Pallet Truck

Effective S/N: SMH2300021 to Present
2025-09

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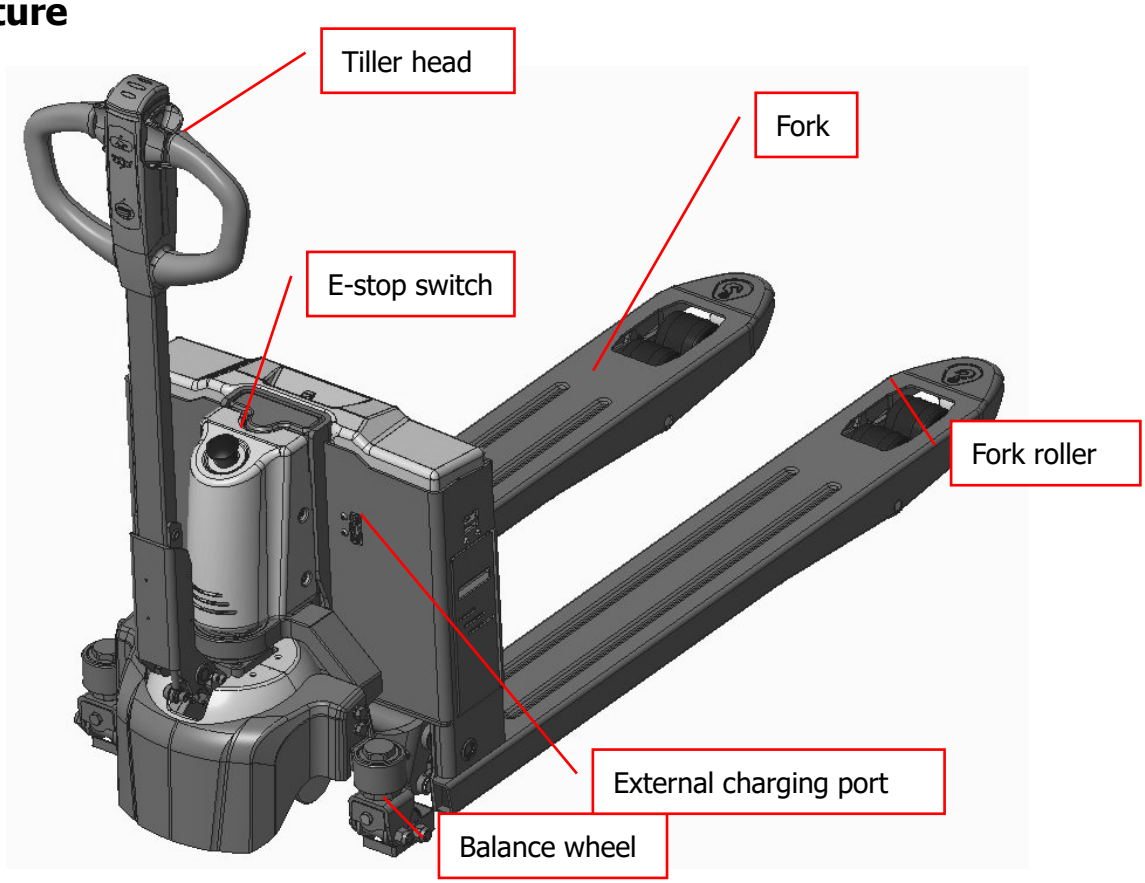
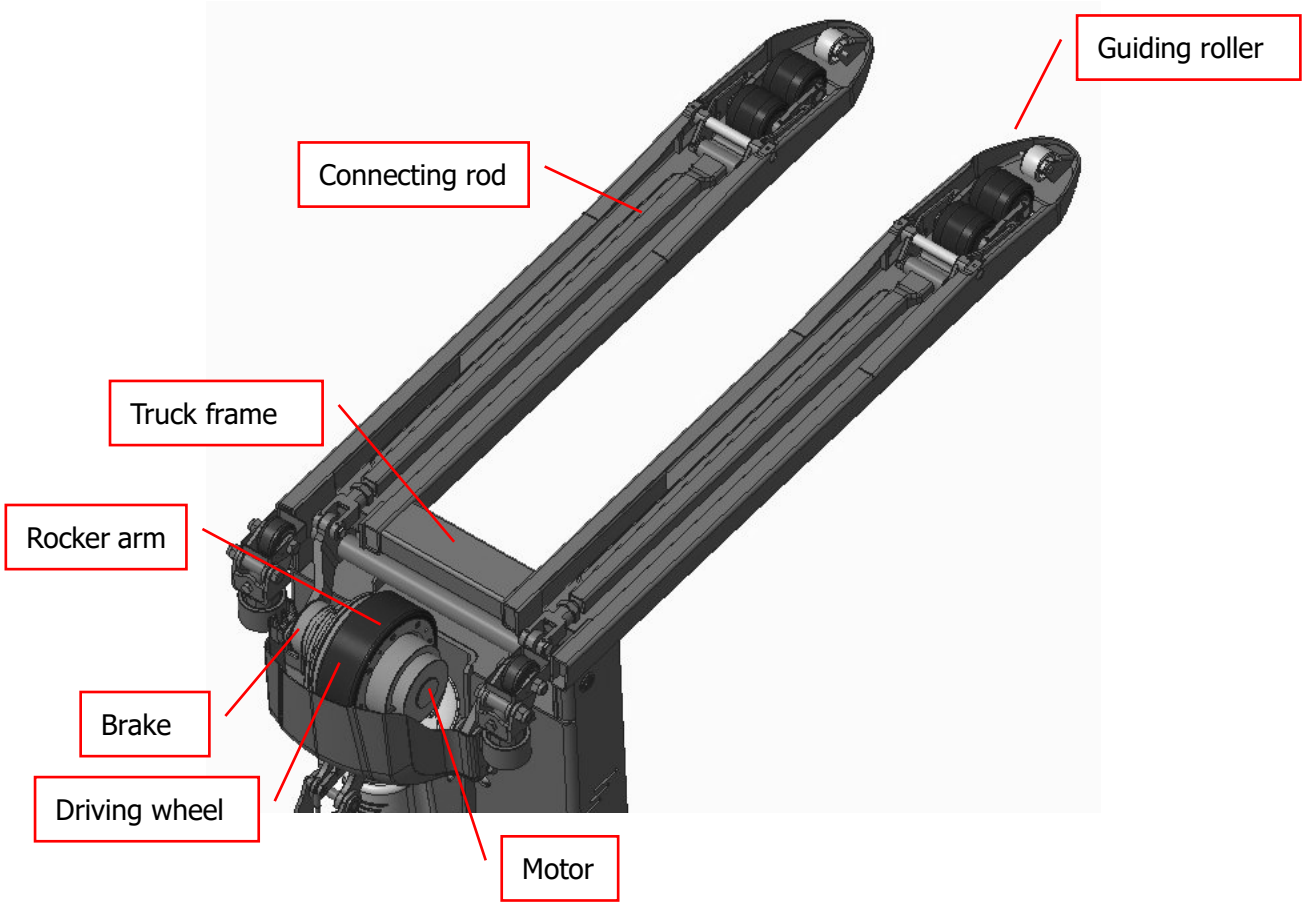
STARKE
LIFTMAXX

Contents

1. Structure

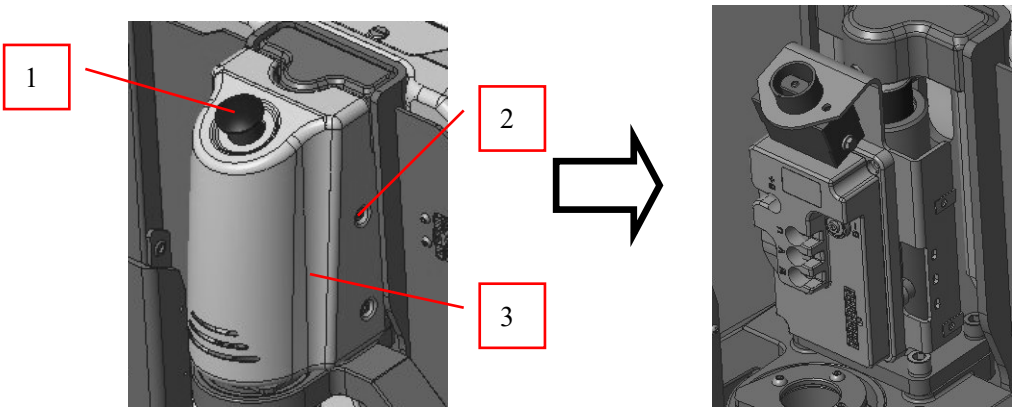

Tiller head
Fork
E-stop switch
Fork roller
External charging port
Balance wheel


Guiding roller
Connecting rod
Truck frame
Rocker arm
Brake
Driving wheel
Motor

After disassembly

1.1 Housing disassembly

1.1.1 Front housing disassembly



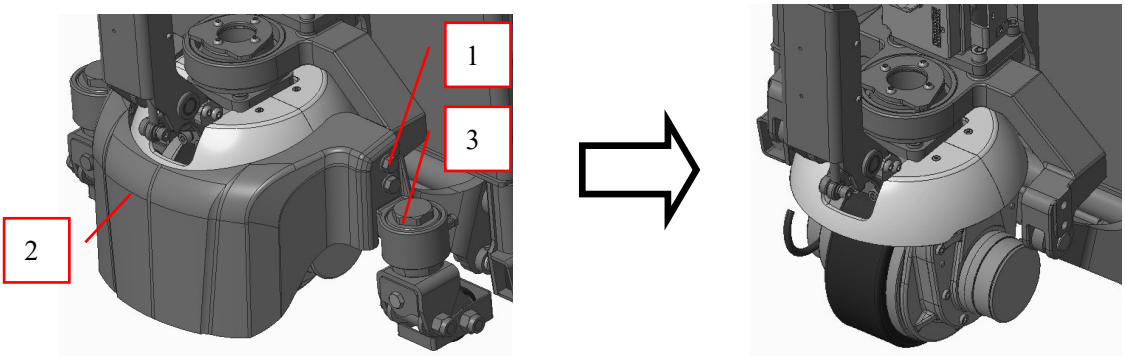
① Remove the red E-stop switch cover 1 by pressing it down and rotate 90°counterclockwise;

② Unscrew part 2, 4 pieces in all;

③ Remove the front housing assembly 3.

After disassembly

1.1.2 Rear housing and balance wheel disassembly

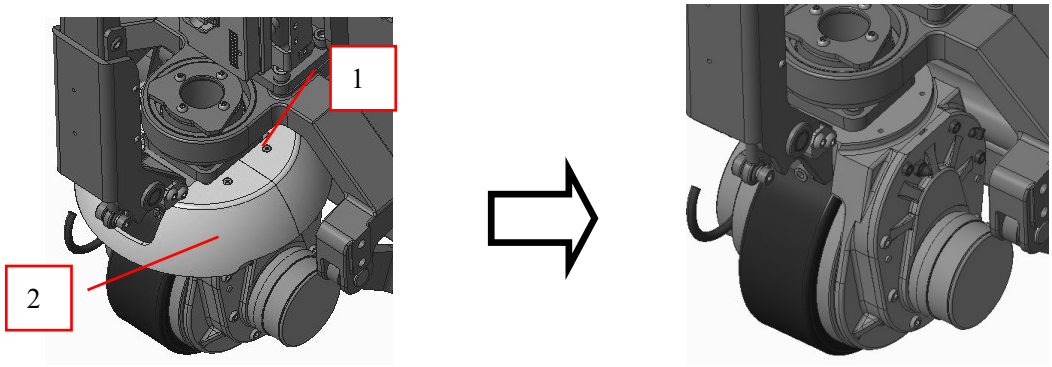


① Unscrew part 1, 4 pieces in all;

② Remove the rear housing 2 and the balance wheel assembly 3.

After disassembly

1.1.3 Front and rear plastic cover disassembly

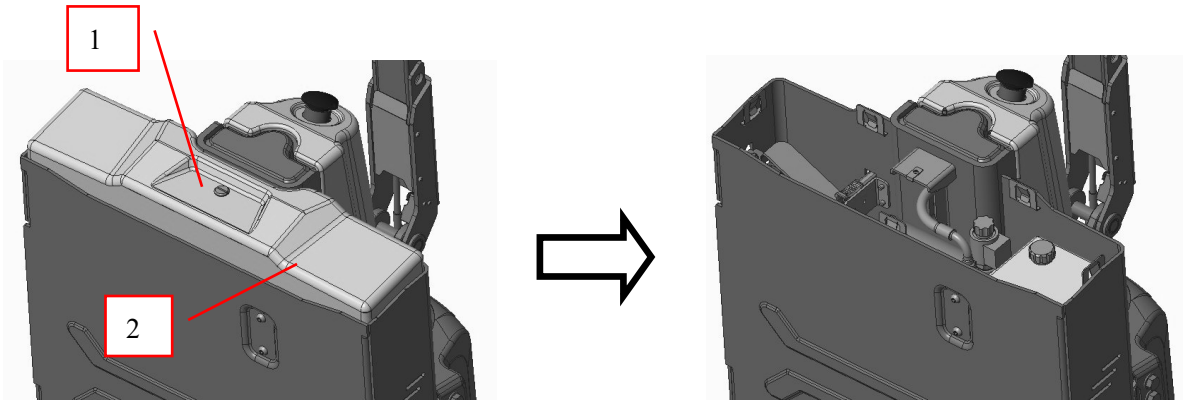


① Unscrew part 1, 4 pieces in all;

② Turn the steering gear 90°to take out the covers.

1.1.4 Upper housing disassembly

After disassembly

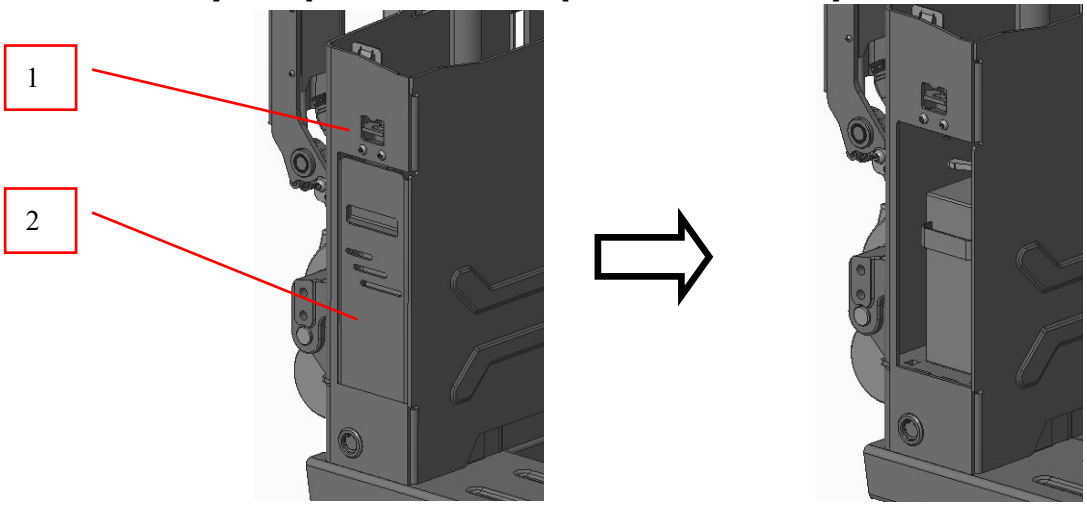


① Unscrew part 1, 1 piece in all;

② Remove the upper housing 2.

1.1.5 Battery compartment cover plate disassembly

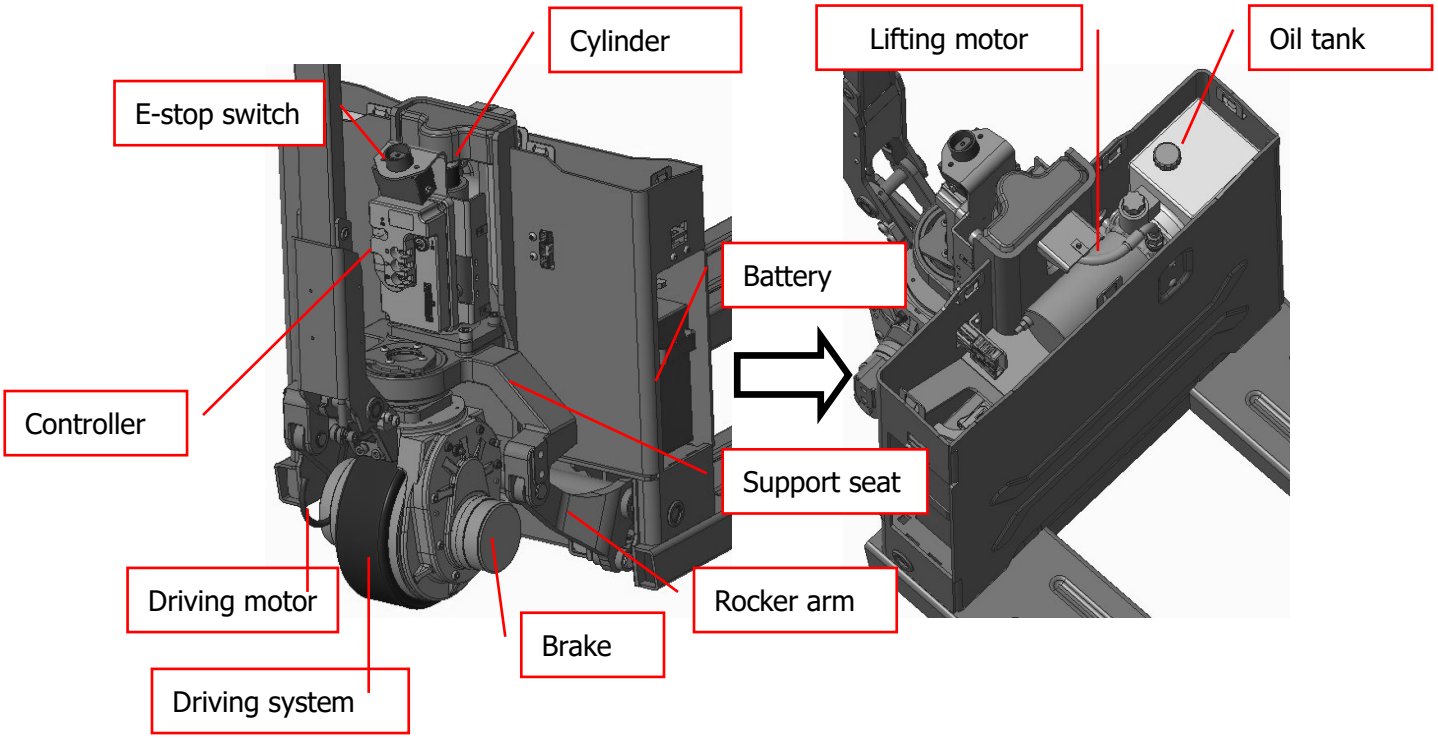
After disassembly



① Pull the lock 1 upward

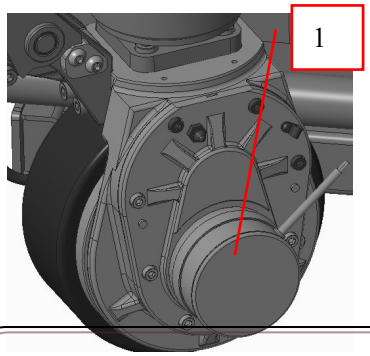
② Remove the battery compartment cover plate 2.

1.2 Detailed structure

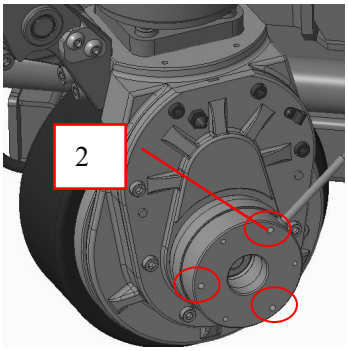


2. Mechanical structure

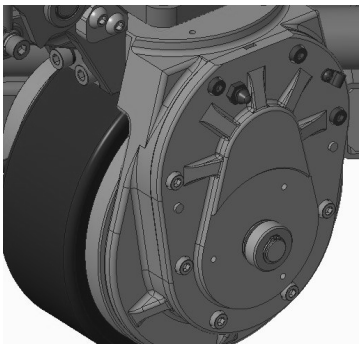
2.1 Brake disassembly



Disassemble the plastic cover 1 of the brake by disconnecting the power supply and the braking harness, and turning the steering gear right 90°



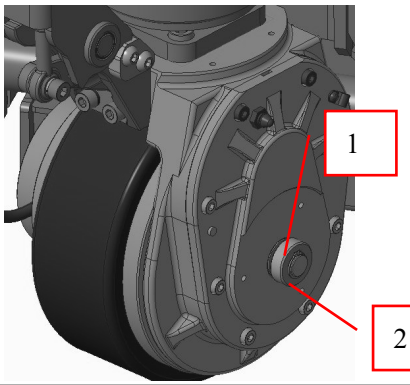
Unscrew the braking screw 2, 3 pieces in all



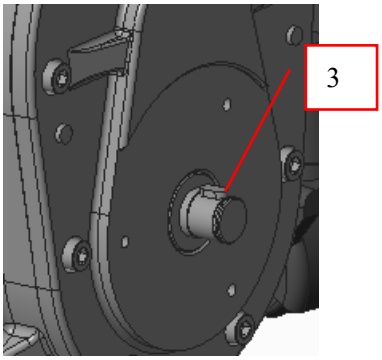
After brake disassembly

2.2 Braking shaft sleeve disassembly

Replace the shaft sleeve together with the brake. The braking shaft sleeve is included in the braking parts package.



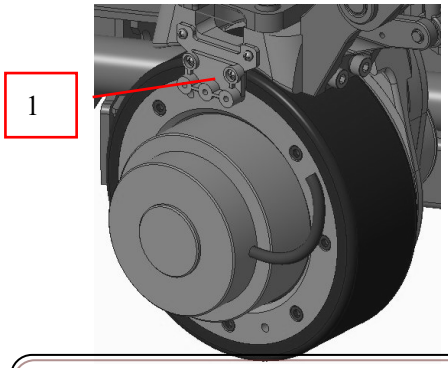
Remove the spring circlip 1 and the shaft sleeve 2



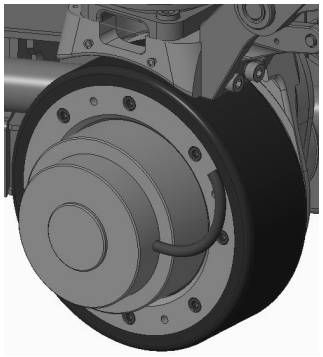
Remove the flat key 3, and keep it properly.

2.3 Motor disassembly

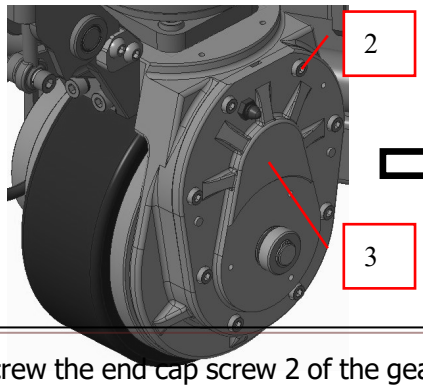
Disconnect the power first, then disassemble the motor(2.1) and the braking shaft sleeve(2.2)



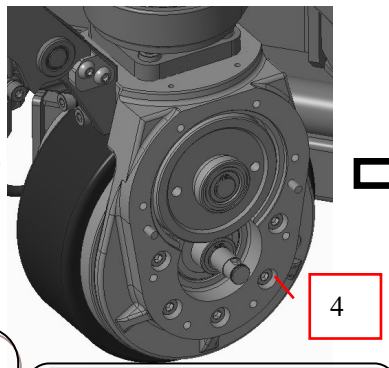
Disconnect the motor electric wiring and the terminal block 1.



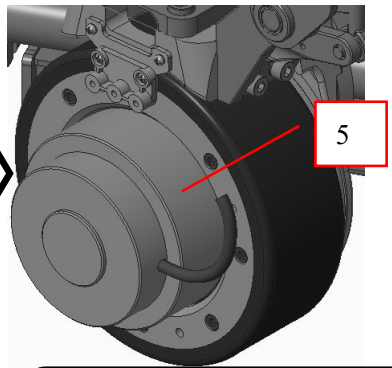
After disassembly



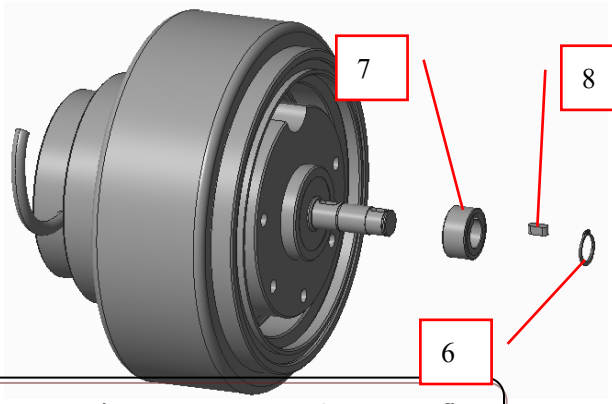
Unscrew the end cap screw 2 of the gear box, 8 pieces in all by turning the steering gear 90°,then remove the end cap 3.



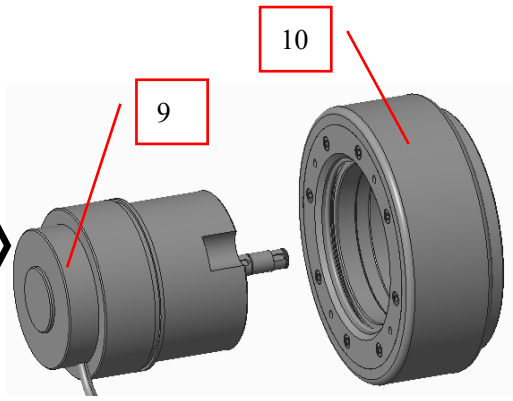
Unscrew the motor screw 4, 5 pieces in all



Take out the motor-wheel assembly 5

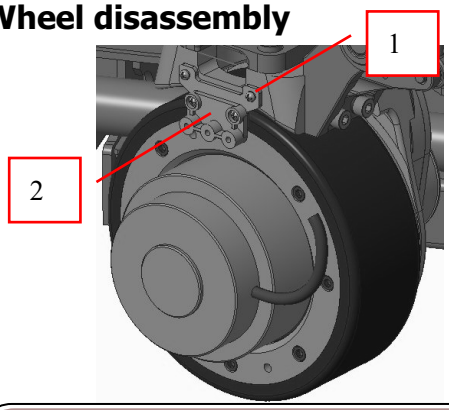


Remove the retaining ring 6, gear 7, flat key 8 at the end of the motor shaft

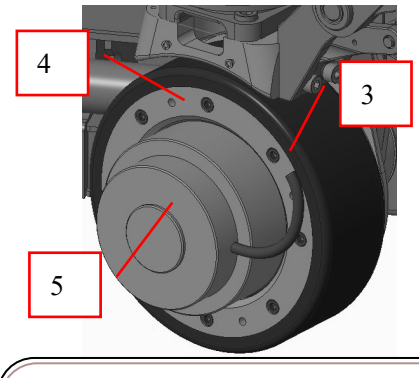


Separate the motor 9 and the wheel assembly 10

2.4 Wheel disassembly



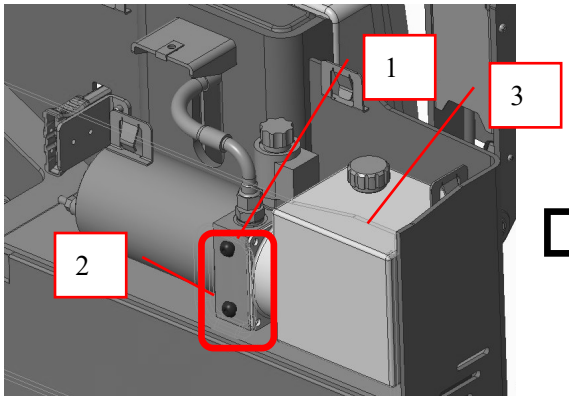
Unscrew part 1 and remove the terminal block by turning the steering gear left 90°and disconnecting the motor harness

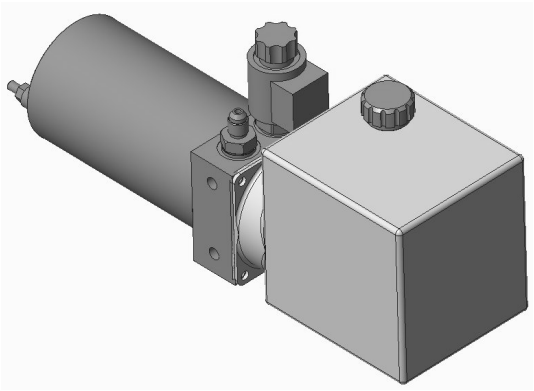


Keep on unscrewing the fixing screw 3, 8 piece in all; then screw a M6 screw(＞30mm) into the hole 4 to remove the wheel 5.

2.5 Hydraulic station disassembly

Disassemble the hydraulic station after disconnecting the power supply, electric wiring and removing the upper housing.

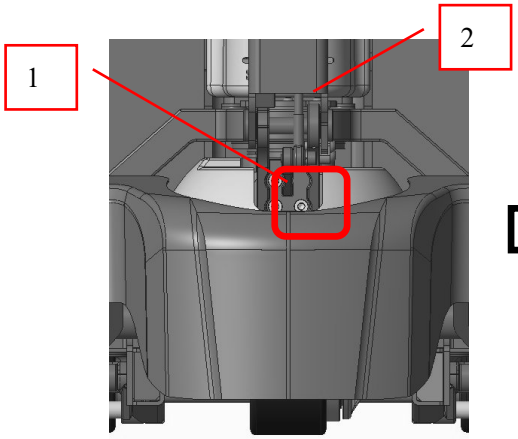


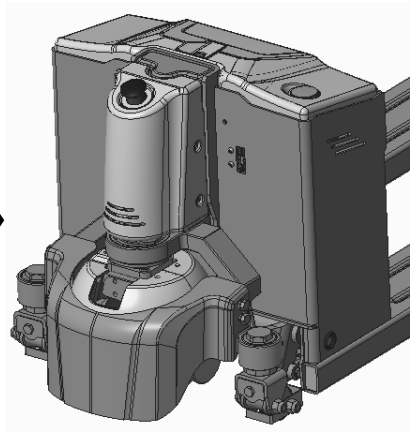


Lower the fork to the minimum height and remove the high pressure hose 1. Be careful to collect the oil flows from the pump oil tank now. Then unscrew the fixing screw 2 to remove the hydraulic station 3.

The hydraulic station

2.6 Handle disassembly

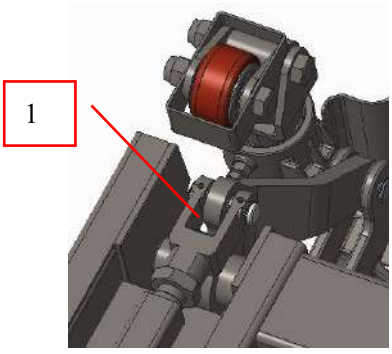


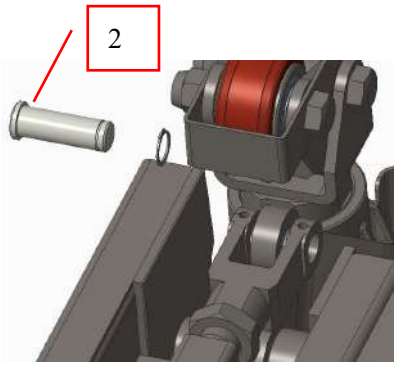


Disconnect the power supply, the connector between the handle and the truck frame;
unscrew part 1, 3 pieces in all;
Remove the handle assembly 2.

After disassembly

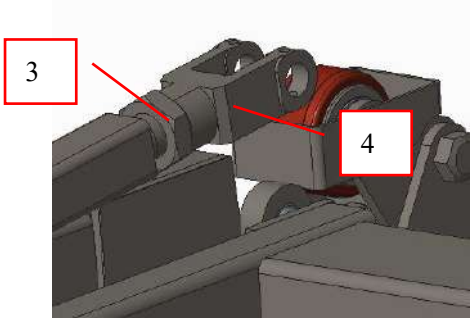
2.7 Connecting rod adjustment

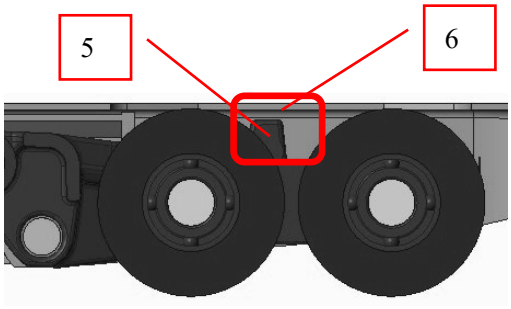




Remove the retaining ring 1 at the hinge point between the connecting rod and the rocker arm.

Take out the pin shaft 2 from the mounting hole

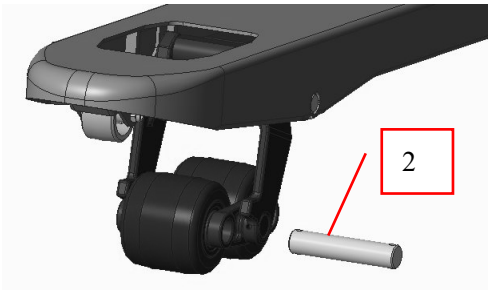




Reduce the connecting rod length clockwise by loosening nut 3 and rotating joint 4

After a proper adjustment, the lift and lower shall be smooth, and the clearance between the wheel carriage limit point 5 and the surface under the fork 6 shall be ＞1mm

2.8 Fork roller disassembly

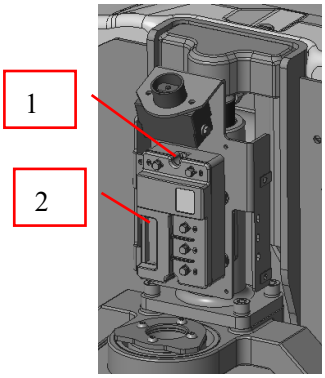


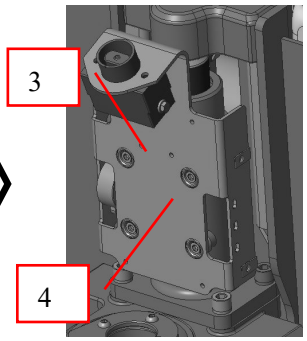
Remove the spring pin 1, 2 pieces in all.

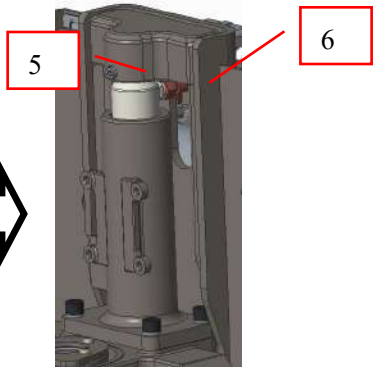
Take out pin shaft 2

Remove the roller 3. Disassembly methods are almost the same for single roller and double rollers.

2.9 Cylinder disassembly



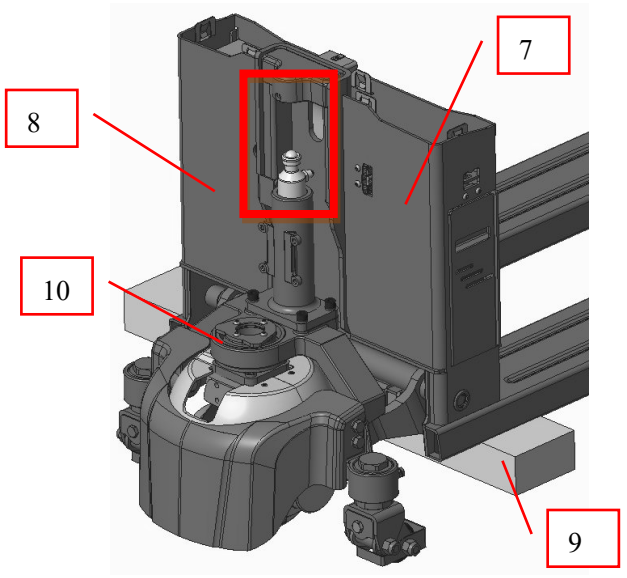




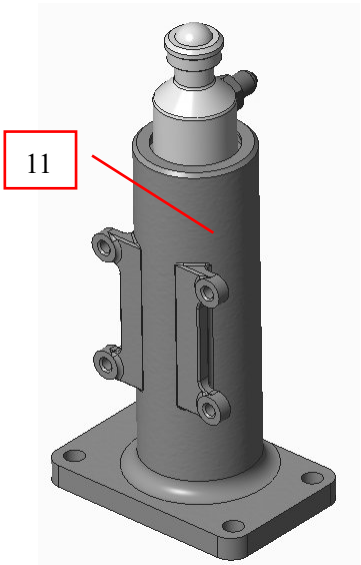
Unscrew part 1 to remove the controller 2.

Unscrew part 3 to remove the support frame assembly 4

Unscrew part 5 and oil pipe joint 6.Clean if there is oil out.

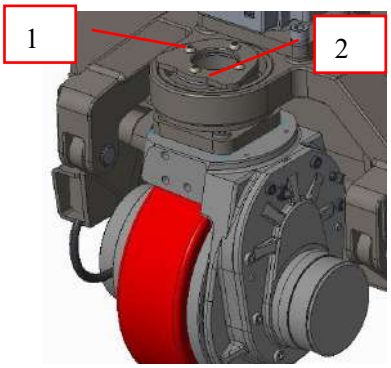


Separate the piston rod 8 from the truck frame by lifting the truck frame 7. Place a block 9 under the truck frame, and unscrew part 10, 4 pieces in all.

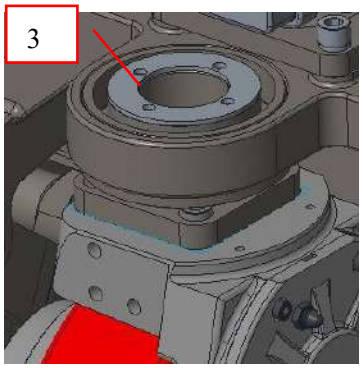


Remove the cylinder assembly 11

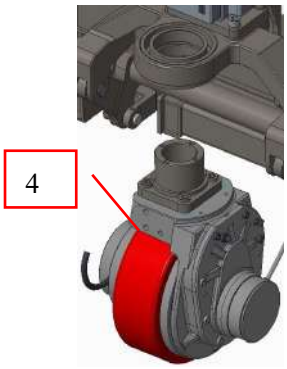
2.10 Driving wheel disassembly

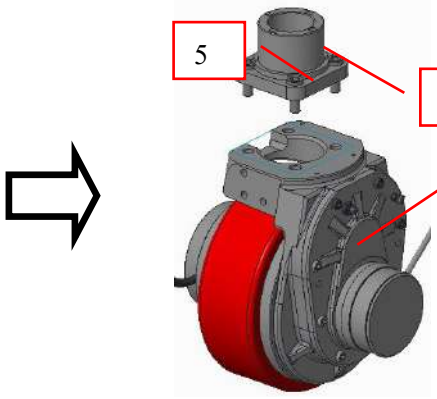


Unscrew part 1, 4 pieces in all, and remove the platen 2.



Take away the shim 3.



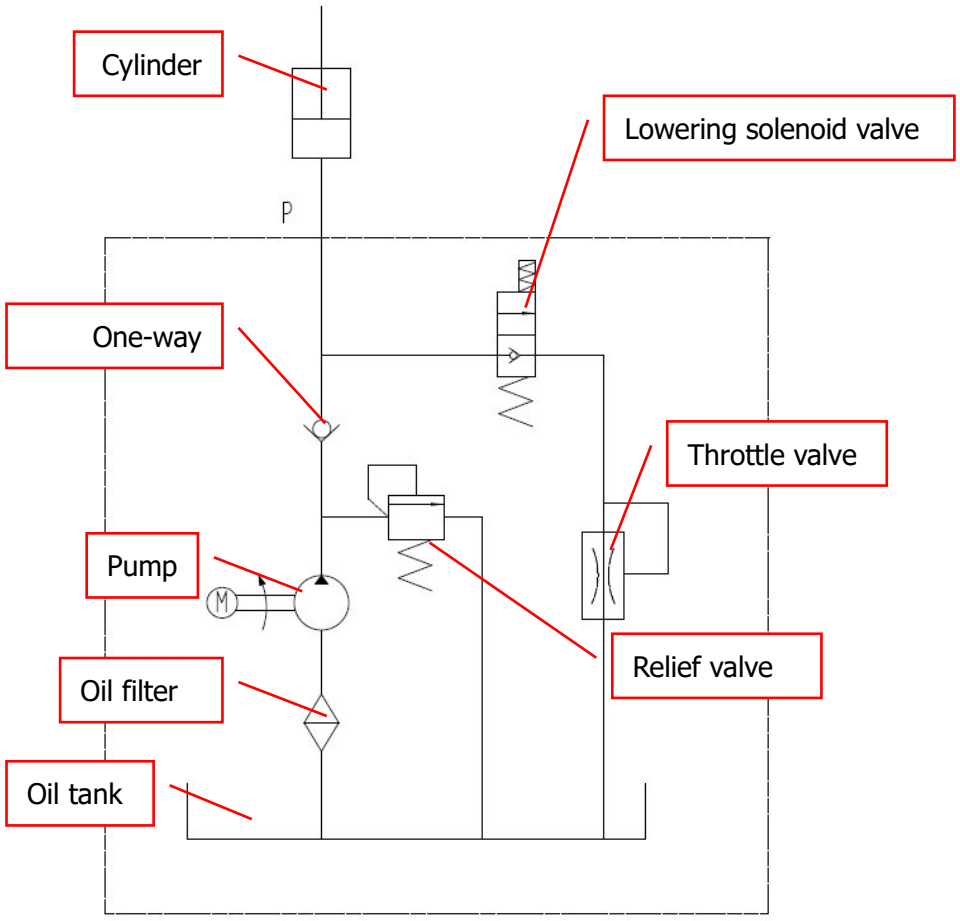


Remove the driving wheel assembly 4

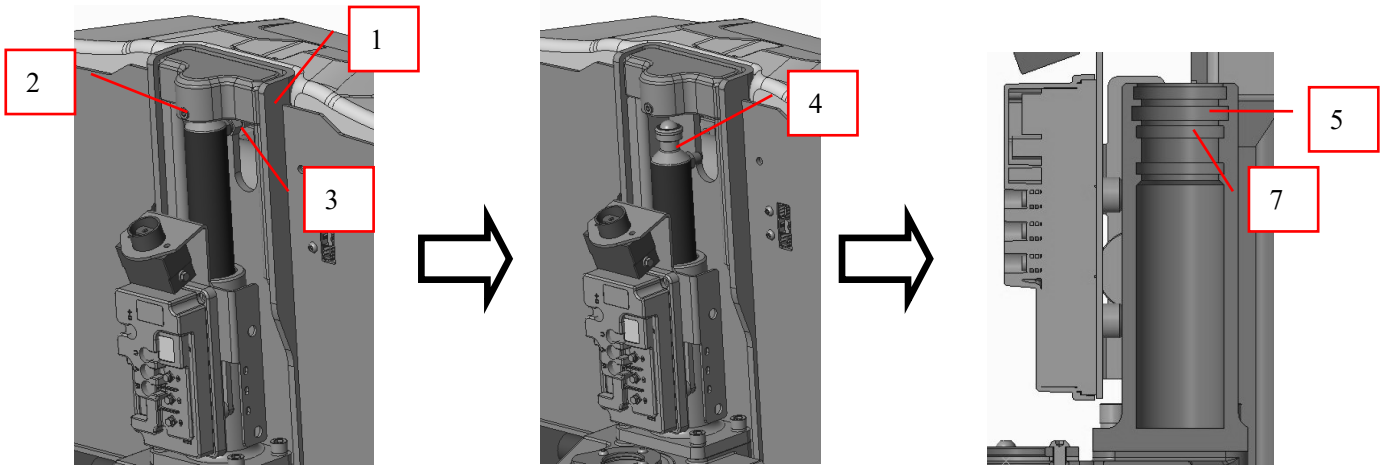
Unscrew part 5, 4 pieces in all to take away the base 6. Driving wheel assembly 7 is left.

3. Hydraulic system

3.1 Hydraulic schematic diagram



3.2 Cylinder seals replacement

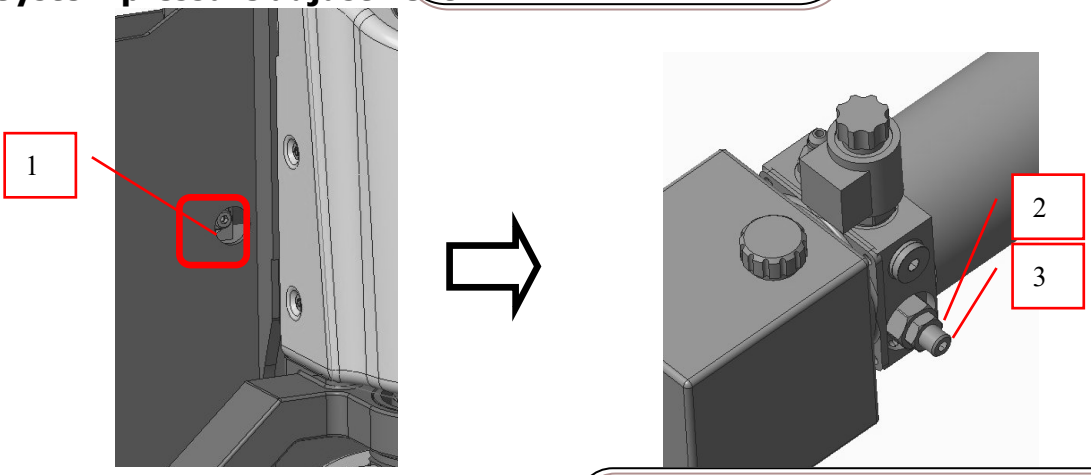


Lift the truck 1 a little to disassemble the screw 2 and oil pipe 3.

Separate the truck frame and the piston rod 4 by lifting the truck frame again, then take out the piston 4, and again piston rod 3 directly.

Replace the dust ring 6, seal ring 5 and the guide tape 7

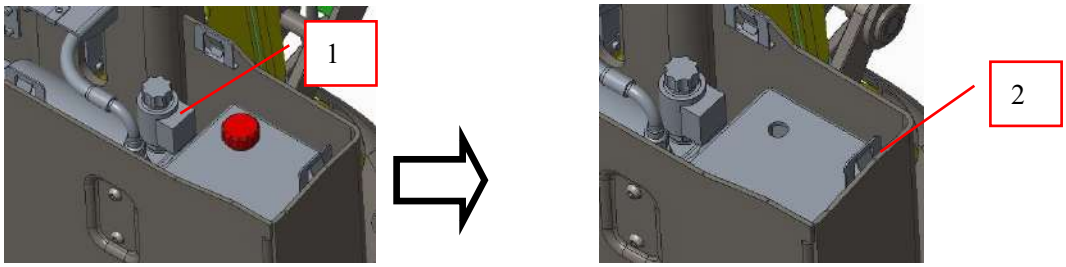
3.3 System pressure adjustment



Locate the pressure adjusting valve 1.

Loosen nut 2 and adjusting screw 3 to add the system pressure clockwise. The system pressure shall not be over than 115% of the rated capacity, and tighten the nut 2 after adjustment.

3.4 Add the hydraulic oil



Find the oi filler and remove the oil tank cover 1.

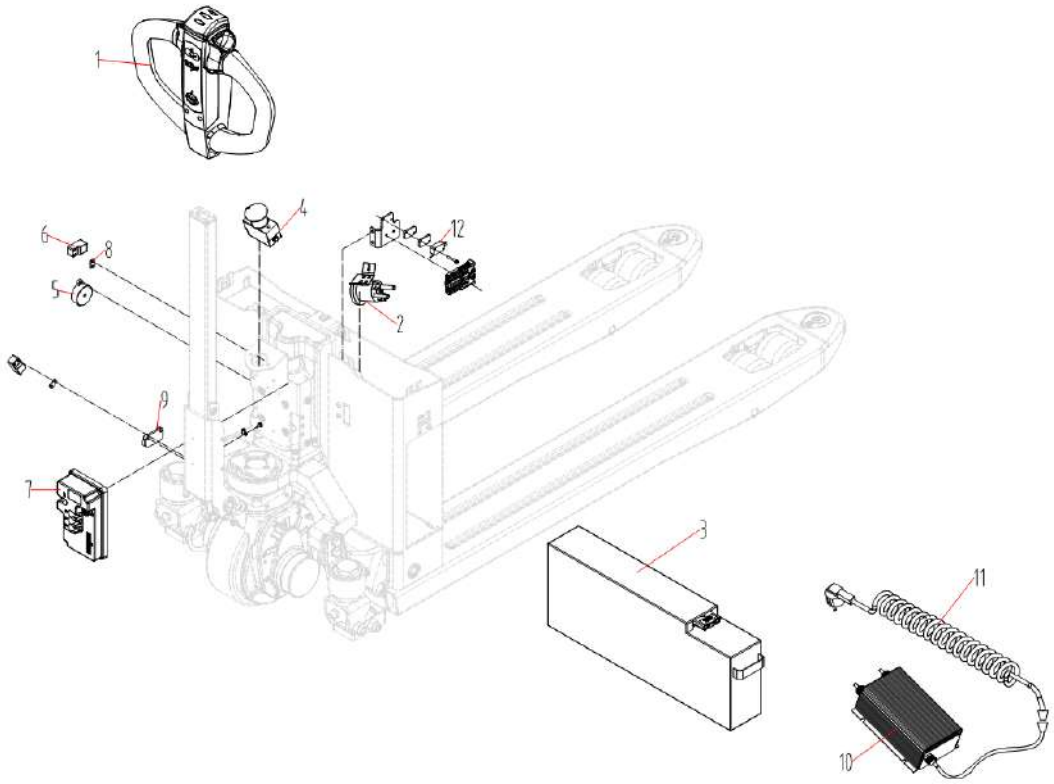
Fill the need oil into the tank. Required amount is 450ml. Tighten the screw at the filler after adding oil. Resume to the normal operation after 3 times of lifting without load.

3.5 Lubricating oil specification and required amount

Oil filler	Specification	Amount	Remark
Hydraulic power unit oil tank	L-HV32	450ml	
	L-HV15 (low temp.)	450ml	

4. Electric system

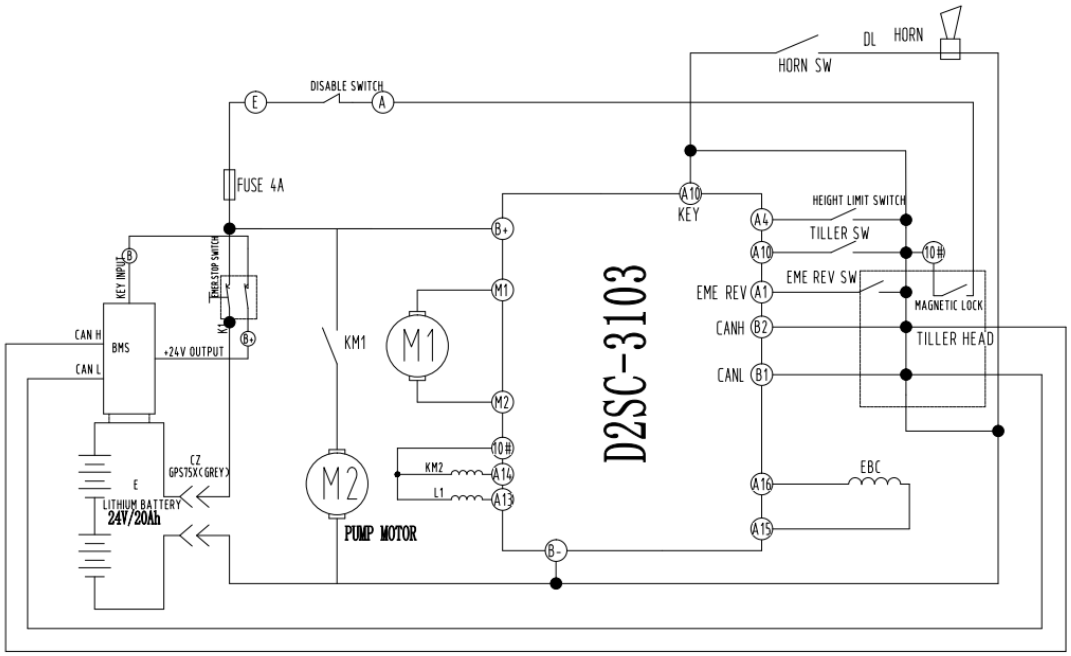
4.1 Electric system diagram



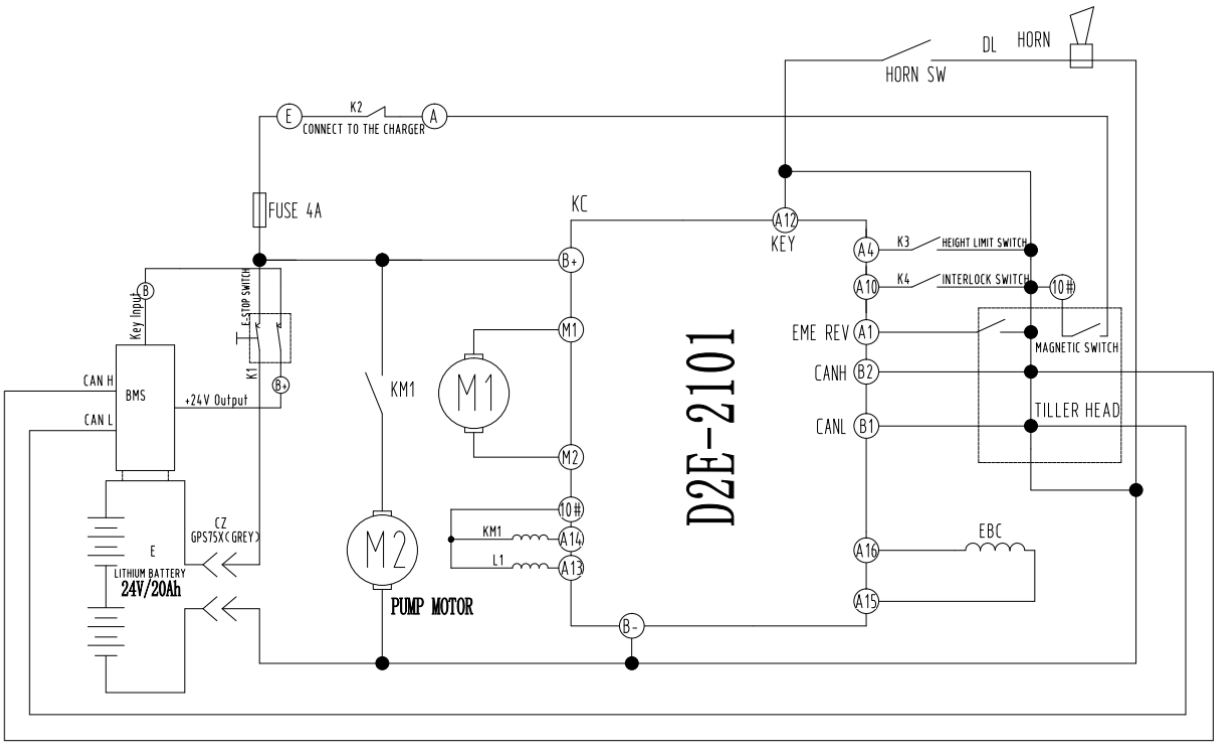
No.	Description	No.	Description
1	Tiller head	7	Controller
2	E-stop switch	8	Lithium battery
3	Proximity sensor	9	Charger
4	Platen	10	Power line
5	Buzzer	11	
6	Mounting plate	12	

4.2 Electrical schematic diagram

1.5T



1.5T New Euro standard



Brief Description of Operating Principles for Truck

1) **Traveling Section**:

Connect the battery connector, turn on the emergency stop switch (K1), and power up the 10# line. When the tiller is pulled down, the TILLER SW closes. Upon further forward rotation of the accelerator, the tiller's forward signal and acceleration signal are transmitted to the controller via CAN signal. The brake releases, and simultaneously, the controller's power module drives the motor to operate in the forward direction. The motor speed is proportional to the accelerator's rotation angle. For reverse operation, rotate the accelerator in the reverse direction. The tiller's forward signal and acceleration signal are transmitted to the controller via CAN signal, the brake releases, and the motor rotates in the reverse direction, with the speed proportional to the accelerator's rotation angle.

2) Lifting Section:

Press the lift button on the tiller, and the controller drives output 1. The contactor KM is powered up, its contacts close, and the motor M2 is energized, causing the truck to lift.
Press the lower button on the tiller, and the controller drives output 2. The solenoid valve L1 is powered up, causing the truck to lower.

4.3 Electrical components

4.3.1 Controller

4.3.1.1 Controller specification

1.5T brush controller

Item	Parameter
Model	D2SC-3101
20S output current (Arms)	90A
2Min output current (Arms)	50A
60Min output current (Arms)	25A
Matching motor	DC brush motor
Voltage	24VDC
Temperature	-25°C~+55°C

Item	Parameter
Model	D2E-2101
20S output current (Arms)	100A
2Min output current (Arms)	70A
60Min output current (Arms)	30A
Matching motor	DC brush motor
Voltage	24VDC
Temperature	-25°C~+55°C

4.3.1.2 Controller fault code table

1.5T controller

Fault description	Fault code
Hardware Fault	42
Current Sense Fault	41

Precharge Fault	33
Brake On Fault	32
Battery Disconnect Fault	45
Parameter Fault	43
Brake Off Fault	34
Main Relay DNC	21
Wiring Falut	31
Main Driver Fault	23
Main Relay Welded	24
Throttle Fault	12
HPD Fault	35
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1.5T controller (new EU standard)

Fault code	Display	Fault action	Possible causes	Troubleshooting
1,1	Controller Overtemp Cutback	Power limit	1. Controller temperature > 85°C; 2. Overloaded; 3. Inefficient heat dissipate of	controller temperature＜ 85°C

			the controller; 4. Electromagnetic brake is not released; 5. Temperature sensor failure;	
1,2	Throttle Fault	Close throttle	1. Accelerator input is disconnected or short-circuited; 2. Accelerator is damaged; 3. Accelerator type is configured incorrectly;	Find reason and restart key switch;
1,3	Temp Sensor Fault	Close throttle Turn off motor	1. Internal temperature sampling circuit of the controller is faulty.	Find reason and restart key switch;
1,4	Undervoltage Cutback	Power limit	1. Cell voltage is lower than 17V; 2. Poor wiring between the controller and the battery, resulting in excessive contact resistance;	Battery voltage ＞17V.
1,5	Overvoltage Cutback	Power limit	1. Battery voltage ＞ 30V. 2. Plug in charger to operate as a vehicle; 3. Bad wiring between controller and battery;	Battery voltage ＜30V.
1,6	Controller Undertemp Cutback	Power limit	1. Temperature of controller is < -10℃; 2. Controller operates at low ambient temperature; 3. Error in temperature detection of controller.	Controller temperature is ＞ -10℃
1,7	Controller Severe Undertemp	Close throttle	1. Temperature of controller ≤ -40℃; 2. Controller operates at low ambient temperature; 3. Error in temperature detection of controller.	Controller temperature＞ -40℃
2,1	Main Relay Did Not Close	Close throttle, close lifting, close lowering, close electromagnetic brake and close main relay.	1. The difference between battery voltage and capacitor voltage is greater than the DNC Voltage Threshold parameter 2. The internal relay is stuck and cannot be engaged. 3. Internal relay contact oxidation or poor contact	Find reason and restart key switch;
2,2	EMR SRO Fault	Close throttle	1. Before opening the key or interlock switch, the emergency reverse (abdominal button)	Emergency reverse switch released, and

			switch is pressed; 2. Emergency reverse action ends and throttle input is detected;	effective throttle is 0
2,3	Main Driver Fault	Close throttle Close lifting Close down Turn off electromagnetic brake. Turn off main relay	1. Internal relay drive circuit is open or short circuit; 2. Internal relay coil is damaged.	Find reason and restart key switch;
2,4	Main Relay Welded	Close throttle Close lifting Close lowering Turn off electromagnetic brake. Turn off main relay	1. After the relay is turned off, it is detected that the difference between the battery voltage and the capacitor voltage is less than 0.6V 2. Internal relay adhesion;	Find reason and restart key switch;
2,5	Pump SRO Fault	Close lifting Close lowering	1. Before turning on the key switch, the lifting/lowering switch is pressed; 2. When Lift On Interlock or LowerOn Interlock is set to on, the lift/lower switch is pressed before opening the interlock switch; 3. After starting, no CAN Lift or CAN Lower command has been received within 2 seconds;	Release lifting and lowering commands.
2,7	Interlock SRO	Close throttle	1. Before turning on the key switch, the interlock switch is triggered;	Recovery interlock switch
2,8	Direction SRO	Close throttle	1. Before turning on the key switch, the direction switch is triggered; 2. Before triggering the interlock switch, the direction switch is triggered;	Recovery direction switch
2,9	Severe Undervoltage	Close throttle	1. battery voltage＜14V 2. Bad wiring between controller and battery;	voltage is restored and key switch is restarted.
3,1	Wiring Fault	Close throttle	1. HPD Sequencing fault lasts for 10s;	Restart key switch
3,2	Brake On Fault	Close throttle Turn off motor	1. EM brake drive circuit is short-circuited;	If the electromagnetic

		Turn off electromagnetic brake.	2. EM brake coil is open;	brake coil is open, reconnect the coil; If it is invalid, find the cause and restart the key switch;
3,3	Precharge Fault	Close main relay Close throttle Close lifting Close down Close motor Close EM brake.	1. Short circuit of EM brake drive; 2. pre-charge circuit is damaged; 3. capacitor bank is overloaded and cannot be charged. 4. power MOSFET is damaged;	Find reason and restart key switch;
3,4	Brake Off Fault	Close throttle Close motor Close EM brake.	1. EM brake drive circuit is open; 2. Short circuit of EM brake coil;	Find reason and restart key switch;
3,5	HPD Sequencing	Close throttle	1. The operation sequence between the accelerator and the key switch or interlock input is incorrect; 2. Incorrect accelerator operation;	Recovery accelerator and interlock switch;
3,6	EEPROM Failure	Close main relay Close throttle Close lifting Close down Close motor Close EM brake.	1. The controller configuration parameter EEPROM Data corruption is damaged; 2. The controller program does not match the parameter version; 3. The EEPROM storage unit is damaged;	Check if the program matches the parameter version or reconfigure the parameters, and restart the key switch;
3,7	Embrake Failed To Set	/	1. After the electromagnetic brake is applied, it is detected that the motor speed is greater than the EM Brake Set Check Delay parameter value; 2. The electromagnetic brake is worn and unable to lock the wheels;	/
4,1	Current Sense Fault	Close main relay Close throttle Close motor	1. controller parameter configuration is abnormal; 2. controller current sampling circuit is abnormal;	Find reason and restart key switch;
4,2	Power 5V Fault Power 3V3 Fault	Close main relay Close throttle	1. controller power supply circuit is abnormal;	1. Find reason and restart key

	MOS Fault Driver Power Fault	Close lifting Close down Close motor Close EM brake.	2. controller power bridge is abnormal; 3. Hardware failure of controller;	switch. 2. Hardware maintenance.
4,3	Parameter Fault	Close throttle Close lifting Close down Close motor Close EM brake.	1. There is a conflict in parameter settings (the monitoring data Controller ->Parameter Conflict indication can be viewed);	Correctly modify configuration parameters and restart the key switch;
4,4	Motor Temp Hot Cut	Power limit	1. Motor stall protection; 2. Configure Boost Current, Boost Time, Current Rating, and Max Current time to match Cutback Gain.	Restrict current and restore according to Cutback Gain
4,5	Battery Disconnect Fault	Close motor Close EM brake.	1. Battery is not connected; 2. Bad battery wiring;	Find reason and restart key switch;
4,6	Motor Overtemperature	Power limit	1. Motor stall protection; 2. The configured Boost Current, Boost Time, and Current Rating, as well as Max Current time and Cutback Gain, match.	Restrict current and restore according to Cutback Gain
4,7	Inching SRO	Close throttle	1. Before turning on the key switch, the Inching switch is pressed; 2. When the Inching is running, it is detected that the interlock or direction or throttle has been triggered;	Restore inching switch
4,8	Creep SRO	Close throttle	1. Before turning on the key switch, the Creep switch is pressed; 2. When Creep is running, it is detected that the interlock has been triggered;	Restore Creep switch
5,1	Low BDI	Power limit	1. The battery level is lower than the Low BDI Threshold setting;	Charging, BDI battery level greater than Low BDI Threshold setting
5,2	Over Current Fault	Close main relay Close throttle Close lifting	1. Controller overcurrent; 2. Controller MOS tube is damaged.	1. Find reason and restart key switch.

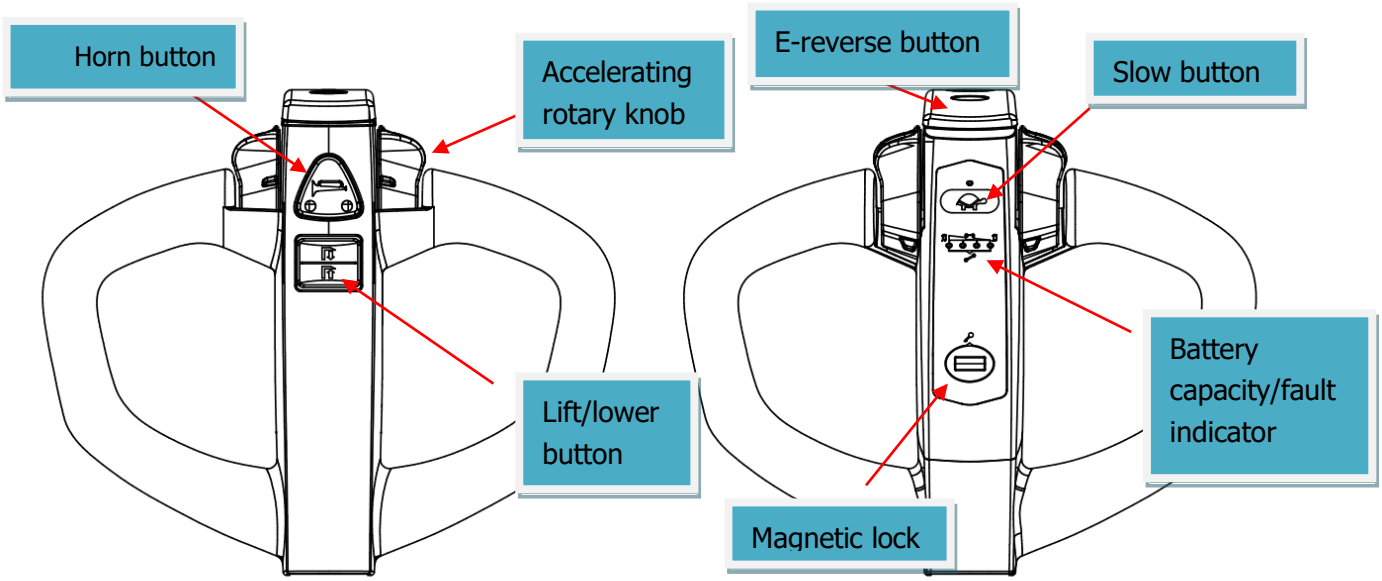
		Close down Close motor Close EM brake.	3. Short circuit of motor.	2. Hardware maintenance.
5,3	Controller Severe Overtemp	Close throttle	1. Controller temperature > 95℃. 2. load is too heavy. 3. Poor heat dissipation conditions. 4. temperature sensor is faulty.	Controller temperature is less than 95℃
5,4	BB Check Fault	According to configuration parameters Carry out power limitation Or Close throttle	1. Emergency reverse switch is disconnected; 2. Poor contact of emergency reverse switch;	Find the cause of the circuit and restart the key switch;
5,5	Parameter Change Fault	Close throttle Close EM brake Close motor	1. Modified the configuration parameters that require a reboot to take effect	Restart key switch;
5,6	Severe Overvoltage	Close throttle Close EM brake Close motor	instantaneous voltage of battery is greater than 34V.	1. If the voltage exceeds 35.5V, the key switch needs to be reset and the voltage can be restored. 2. If the instantaneous voltage does not exceed 35.5V, the fault will be eliminated after the voltage is restored.
5,7	Stall Detected	Close throttle, Close motor	1. The motor is blocked; 2. The current is greater than 90% of the current limit, and the motor speed is less than 10% of the maximum speed, with continuous Stall Fault Time.	Find reason and restart key switch.
6,2	Motor Open	Close throttle Close motor Close EM brake.	1. Motor is not connected or has poor contact; 2. Motor is damaged; 3. There is water stain on connection port of motor;	Find reason and restart key switch.

6,4	PDO Timeout	Close throttle Close lifting Close down	1. Communication of handle CAN bus is disconnected. 2. Terminal resistance of CAN bus does not match. 3. Baud rate setting is inconsistent.	1. Eliminate fault of CAN bus connection and restore. 2. Terminal resistance matching in CAN bus loop. 3. Set matching bus baud rate.
6,6	Lift On Fault	Close lifting	1. Lifting drive circuit is short-circuited; 2. Lifting coil is open;	If lifting coil is open, re-engage. Coil; If it is invalid, find reason and restart key switch;
6,7	Lower On Fault	Close down	1. Lowering drive circuit is short-circuited; 2. Lowering line Open loop;	If lowering coil is open, re-engage. Coil; If it is invalid, find reason and Restart key switch;
7,1	Lift Off Fault	Close lifting	1. lifting drive circuit is open; 2. Short circuit of lifting coil;	Find reason and restart key switch;
7,2	Lower Off Fault	Close down	1. Lowering driving circuit is open; 2. Lowering coil is short-circuited;	Find reason and restart key switch;
7,3	Cross Check Failed	Close throttle Close lifting Close down	1. The master-slave logical unit checks that the input port data does not match (the monitoring data Controller ->Corss Check indicator can be viewed);	1. Restart key switch; 2. Hardware maintenance;
7,4	Travel Control Supervision	Close throttle Close EM brake	1. When the vehicle is stationary (interlock ineffective, no direction, throttle), it is detected that the vehicle has speed and current for 64 ms;	Restart key switch
7,5	Interlock Braking Supervision	Close throttle Close EM brake	During the interlocking braking process, the motor speed exceeds the limit set by the	Restart key switch

			emergency reverse monitoring parameters.	
7,6	EMR Supervision	Close throttle Close EM brake	During the EMR process, the motor speed exceeds the limit set by the emergency reverse monitoring parameters.	Restart key switch
7,7	Speed Limit Supervision	Close throttle Close EM brake	1. The motor speed exceeds the set maximum speed limit.	Restart key switch
8,1	InterCommunicate Fault	Close main relay Close throttle Close lifting Close down Close motor Close EM brake.	1. Abnormal communication within controller. 2. Controller is damaged 3. Software version mismatch	1. Restart key switch 2. Update software version 3. Hardware maintenance
8,2	ParamSync Fault	Close main relay Close throttle Close lifting Close down Close motor Close EM brake.	1. Abnormal communication within controller. 2. Software version mismatch	1. Restart key switch 2. Update software version 3. Hardware maintenance
8,3	Cross Check Supervision	Close main relay Close throttle Close lifting Close down Close motor Close EM brake.	1. Abnormal communication within controller. 2. Controller is damaged	1. Restart key switch 2. Update software version 3. Hardware maintenance
8,4	Safety Braking Supervision	Close main relay Close throttle Close lifting Close down Close motor Close EM brake.	1. Abnormal communication within controller. 2. Controller is damaged	1. Restart key switch 2. Update software version 3. Hardware maintenance
8,5	Hazardous Load Handing Motion Supervision	Close main relay Close throttle Close lifting Close down Close motor Close EM brake.	1. Abnormal communication within controller. 2. Controller is damaged	1. Restart key switch 2. Update software version 3. Hardware maintenance
8,6	Software Fault	Close main relay Close throttle Close lifting	1. Software version mismatch 2. Controller is damaged	1. Restart key switch 2. Update

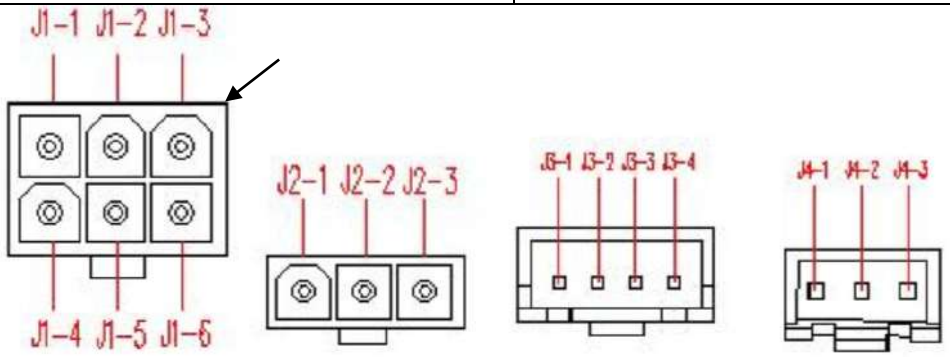
		Close down Close motor Close EM brake.		software version 3. Hardware maintenance
8,7	BMS PDO Timeout	Close throttle	1. Communication of battery CAN bus is disconnected. 2.Terminal resistance of CAN bus does not match. 3. Baud rate setting is inconsistent.	1. Restart the key switch 2. Check the CAN bus terminal resistance 3. Use the upper computer to reset the Baud

4.3.2 Handle



S/N	Function	Description
1	Voltage	24/48V DC
2	Communication type	CAN communication
3	Appearance	Magnetic lock +LED light
4	Accelerator type	Integrated in the tiller head
5	BDI	Receive battery capacity message and display it
6	Fault display	Controller fault and BMS fault
7	Lift signal	CAN OUTPUT
8	Lower signal	CAN OUTPUT
9	Horn signal	Horn signal output
10	Anti-collision signal	High voltage N/O

11	Drive forward signal	CAN OUTPUT
12	Drive backward signal	CAN OUTPUT
13	Accelerating signal	CAN OUTPUT
14	Mode signal	CAN OUTPUT
15	Unlocking signal	CAN OUTPUT

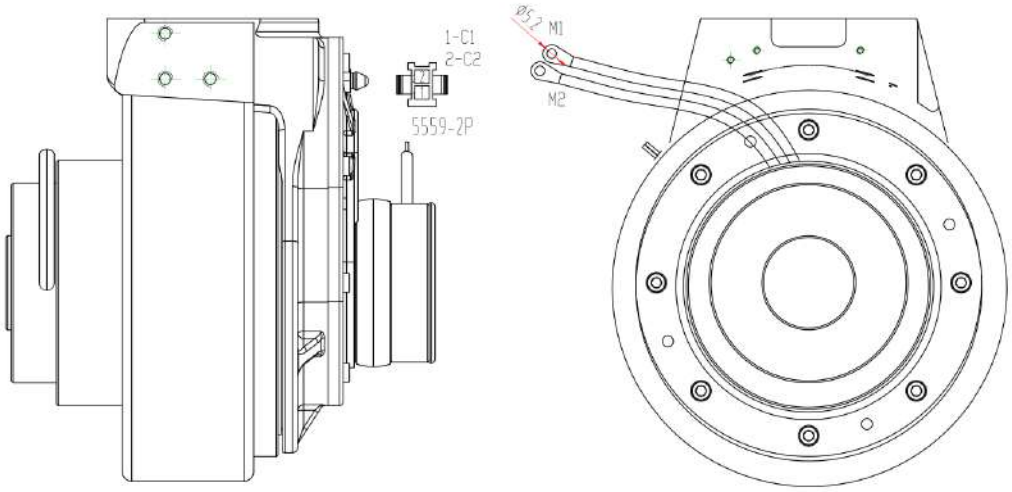


J1-1	B+	J2-1	Lift/lower B+（input)
J1-2	Anti-collision (output)NC	J2-2	Lift signal input
J1-3	GND	J2-3	Lower signal input
J1-4	CAN H(output)	Port identify	Function
J1-5	CAN L(output)		
J1-6	Horn(output)NO		
Port identify	Function		

J3-1	Horn B+(input)	J4-1	Key signal input
J3-2	Anti-collision B+(input)	J4-2	GND
J3-3	Horn(output)	J4-3	5V
J3-4	Anti-collision (input)	Port identify	Function
Port identify	Function		

4.3.2.2 Tiller head with a password lock

4.3.3 **Driving motor**



Basic performance parameters of the motor			
Rated voltage	24VDC	Protection level	IP44
Rated power	750W	Speed ratio of reducer	24.685K
Rated current	41A±10%	Brake voltage	24VDC
Rated speed	2650rpm±10%	Braking torque	8N.m
Rated torque	2.7N.m	Operating ambient temperature	-10℃~+40℃
Current, unladen	≤11A	Noise	＜65dB（A）（L=100cm）
Speed, unladen	3100rpm±10%		
Work system	S2（45min）		
Insulation resistance	＞20MΩ		
Life	1200h		
Electrical strength	660V/S		
Rated voltage	F		