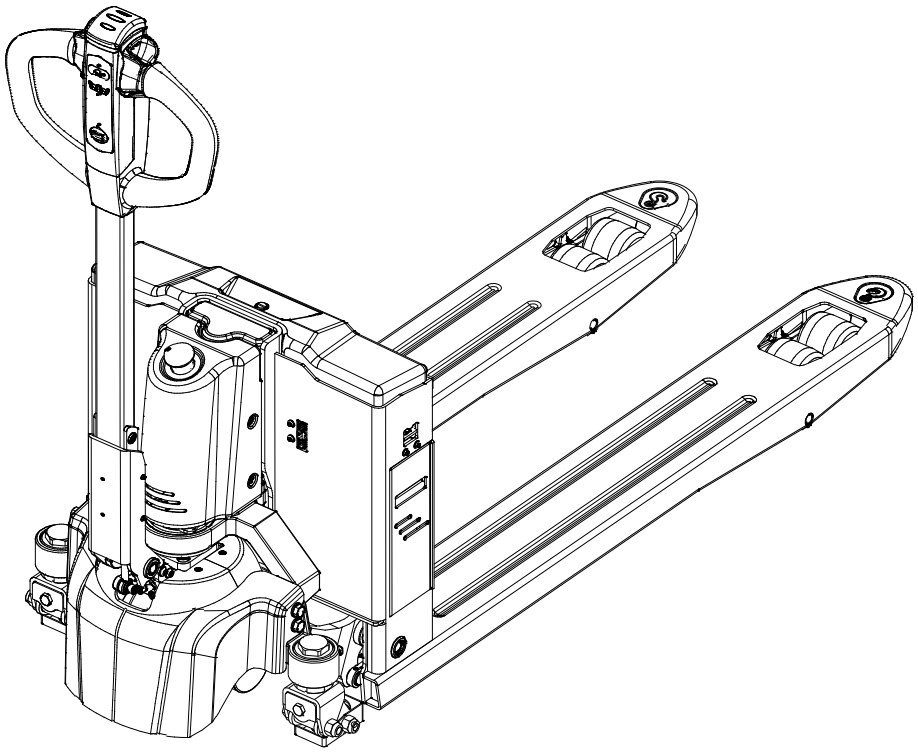
ELECTRIC PALLET JACK

ITEM# 58115



OWNER'S MANUAL AND SAFETY INSTRUCTIONS

SAVE THIS MANUAL. KEEP THIS MANUAL FOR SAFETY WARNINGS, PRECAUTIONS, ASSEMBLY, OPERATION, INSPECTION, MAINTENANCE AND CLEANING PROCEDURES. WRITE THE PRODUCT'S SERIAL NUMBER ON THE BACK OF THE MANUAL, OR THE MONTH AND YEAR OF PURCHASE IF PRODUCT HAS NO SERIAL NUMBER

FOR QUESTIONS, PLEASE CALL CUSTOMER SERVICE: 909.628.4900

Thank you for choosing our

electric pallet truck!

Hope they will provide great convenience for your work !

- Please read the manual carefully before starting the truck.
- This operation manual is general, and the right to make any technical modifications to the pallet jacks is reserved. Contents provided in this manual are for reference only.

Contents

1. Safety regulations

Safety shoes are always required to handle the pallet truck.

Safety glasses are recommended to avoid personal accidents while assembling or disassembling the pallet truck.

CAUTION

When the truck is damaged or has safety problems, stop using it immediately.

CAUTION

The pallet truck is designed for hard and flat floor only.

It's forbidden to use the truck when ：

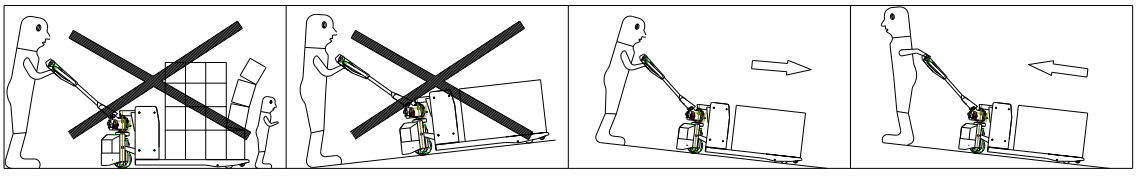
- the air contains dust or flammable and explosive gases that can cause fire or explosion。
- in freezer or some low temperature, salty or other corrosive environment.
- Rainy outdoor.
- Operate on gravel or grassland.
- the gradient of the ground is greater than the gradient of product design.

CAUTION

- Careful judgment and responsible attitude should be taken in the operation of pallet trucks.
- The pallet truck is not able to be operated with oily hands or shoes
- Operators shall not wear loose clothes or jewelry

CAUTION

- When operating the pallet truck, it is necessary to ensure that the ground has sufficient load bearing capacity, where the load is the sum of the weight of the pallet truck and the load.
- Special care should be taken if there are prominent objects that can cause personal injury
- Personnel are prohibited around the operating area of the pallet truck, which may cause personal injury, for example, when the goods fall.



CAUTION

Operators must be very carefully when handling the pallet truck on a slope. See the drawing, the operator should stand ahead of the truck. Operators must be very carefully when handling the pallet truck on a slope. See the drawing, the operator should stand ahead of the

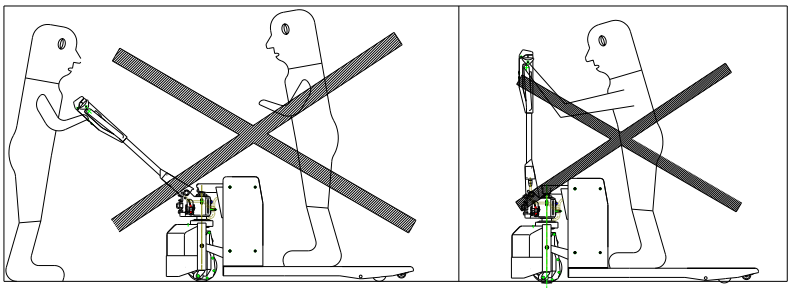
truck. When a truck runs on a ramp, the driving wheel can be quickly turned to the maximum angle to avoid the risk that the truck will continue to slide. This method allows operation only in emergencies.

WARNING!

- Avoid high-speed operation when turning to avoid the danger of overturning.
- The goods should not be too high to block sight.
- Brake gently and carefully to avoid cargo slipping off the pallet and causing material damage.
- The pallet truck is not allowed to turn on the slope。
- Before pushing the pallet into the elevator, the operator must ensure that the elevator can withstand the total load of the pallet and cargo, the total weight of the operator and other personnel on the elevator. Make sure the load goes into the elevator first, then the operator. The elevator should keep empty when the pallet truck with load is about to go in/out of it.

CAUTION!

- The load shall not exceed the rated load of the truck。
- When stacking goods, the goods should not be too high to avoid the danger of falling down or overturning the pallet truck during handling.
- It's forbidden to ride people with the pallet truck.
- Keep clear of the pallet truck's working area, avoiding personal injuries due to sudden accidents happened over its working.
- Standing and sitting on the pallet truck is strictly forbidden.



CAUTION!

- Keep the fork at the lowest position while it's parked.
- Don't leave the truck on a slope.
- Don't leave the truck at the emergency access.
- Don't leave the pallet truck to block the traffic or affect work.
- Don't use the pallet truck in rain.
- Turn off the power when the pallet truck is unattended.

2. Allowed environment for using

This truck is designed to work only on hard and flat floor, indoor. It is not allowed to work in an environment beyond the regulations.

- Ambient temperature shall not be higher than +104℉and no lower than -50℉;
- Hard and flat ground;
- It is prohibited to use in a flammable, explosive or corrosive environment with acid and alkali;

3. Technical parameters

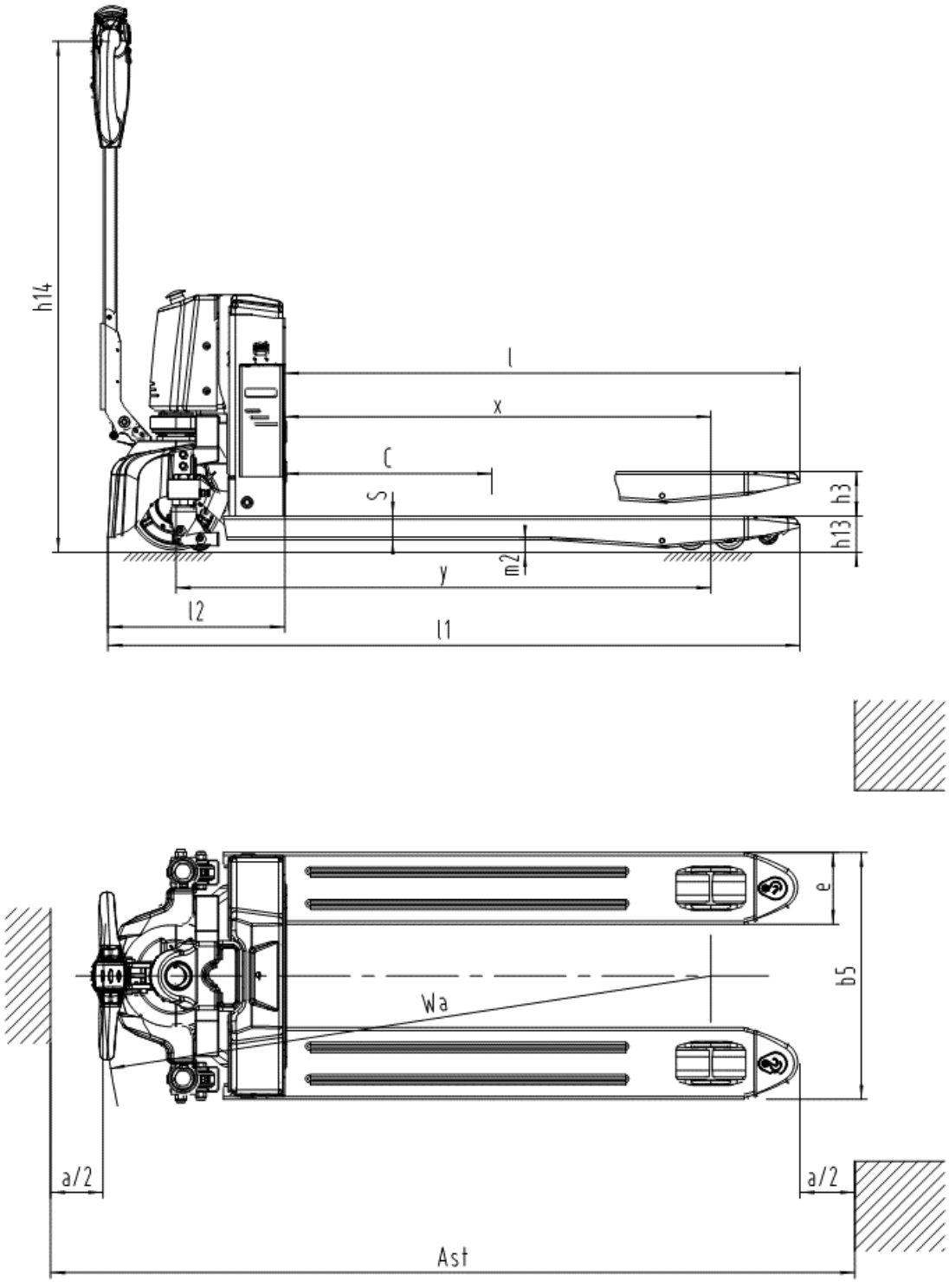


Figure 1

Characteristic	1.2	Model		SKU58115
	1.3	Drive: electric (battery type, mains, ...), diesel, petrol, fuel gas		Electric
	1.4	Operator type: hand, pedestrian, standing, seated, order-picker		Pedestrian
	1.5	Load capacity	Q (lbs)	3300
	1.6	Load center distance	c (inch)	23 3/5
	1.8	Load distance, centre of drive axle to fork	x (inch)	37/40
	1.9	Wheelbase	y (inch)	47/50
Weight	2.1	Service weight	lbs	298
	2.2	Axle loading, laden front/rear	lbs	1466/2138
	2.3	Axle loading, unladen front/rear	lbs	209/88
Wheel chassis	3.1	Tyres: solid rubber, superelastic, pneumatic, polyurethane		PU
	3.2	Tyre size, front		Φ8 1/2×2 3/5
	3.3	Tyre size, rear		Φ3×3 3/5 Φ3×2 3/5
	3.4	Additional wheels (dimensions)		Φ2 1/3×1 1/3(option)
	3.5	Wheel number, front/rear (x = driving wheel)		1X/2(4)
	3.6	Tread, front	b_{10} (inch)	18
	3.7	Tread, rear	b_{11} (inch)	15 / 20 1/2
	4.4	Lift	h_3 (inch)	4
	4.9	Height drawbar in driving position min./max.	h_{14} (inch)	25 1/2 / 44 3/5
	4.15	Height, lowered	h_{13} (inch)	3
	4.19	Overall length	l_1 (inch)	61/ 63 1/2
	4.20	Length to face of forks	l_2 (inch)	15 1/2
	4.21	Overall width	b_1/b_2 (inch)	21 3/5 / 26 3/5
	4.22	Fork dimensions	$S*e*l$ (inch)	2 3/5*6 1/5*45 1/5(48)
	4.25	Fork spread	b_5 (inch)	21 3/5 / 26 3/5
	4.32	Ground clearance, centre of wheelbase	m_2 (inch)	1
	4.34.1	Aisle width for pallets 1000x1200 crossways	A_{st} (inch)	84 3/5 / 87
	4.34.2	Aisle width for pallets 800x1200 lengthways	A_{st} (inch)	79/81
	4.35	Turning radius	W_a (inch)	53/ 55 3/5
Parameter	5.1	Travel speed, laden/unladen	km/h	4.3/4.5
	5.2	Lift speed, laden/unladen	inch/s	1/ 1 1/5
	5.3	Lowering speed, laden/unladen	inch/s	1 1/3 /1
	5.7	Gradeability, laden/unladen	%	5/20
	5.10	Service brake		EM brake
Motor	6.1	Drive motor rating S2 60 min	kW	0.75
	6.2	Lift motor rating at S3 15%	kW	0.8
	6.4	Battery voltage/nominal capacity	V/Ah	24/20
	6.5	Battery weight	lbs	11
	10.7	Noise level at operator's ear, according to DIN12053	dB (A)	70

4. Handle installment

The handle is removed before shipment in the consideration of the requirement of packing and the safety over transportation, and the steps to install the hand are list as following:

- As shown in Figure 2, take out the handle assembly 1, align it with the installation position A, and fix it reliably with screws 3 and washers 2.
- As shown in Figure 3, connect the connectors of the truck body harness 4 and the handle harness 5 (pay attention to the alignment direction). As shown in B, fix the harness firmly with the wire clamp 6 and the screw 7.
- As shown in Figure 4, fix the truck body harness 5 to the handle base 10 with screws 8 and line cards 9, press the handle down and slowly release it, observe whether the harness is properly fastened, and then test whether the truck functions normally according to the truck operation instructions.
- As shown in Fig. 5, fix the cover plate 12 to the handle assembly 13 with screws 11. After the above steps, the handle installation is completed.

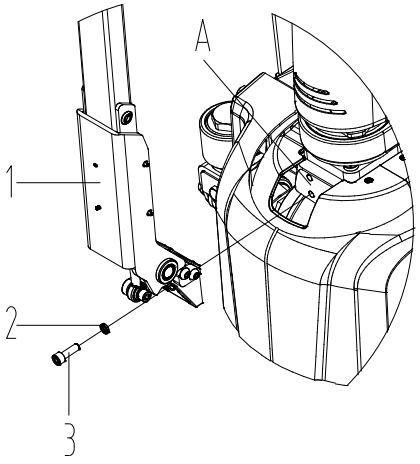


Figure 2

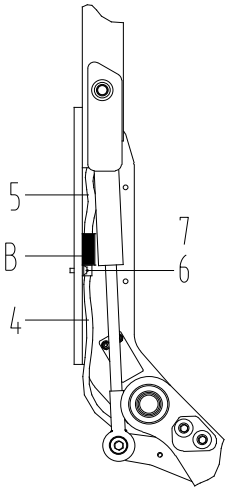


Figure 3

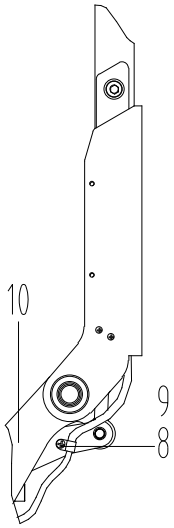


Figure 4

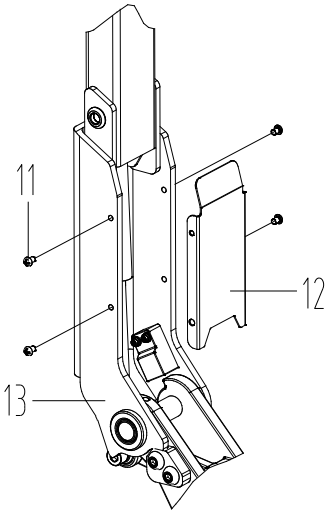


Figure 5

5. Operation

Truck electrified (magnetic lock)

- Turn on the electric lock
- Plug in the magnetic lock to turn on the truck easily.

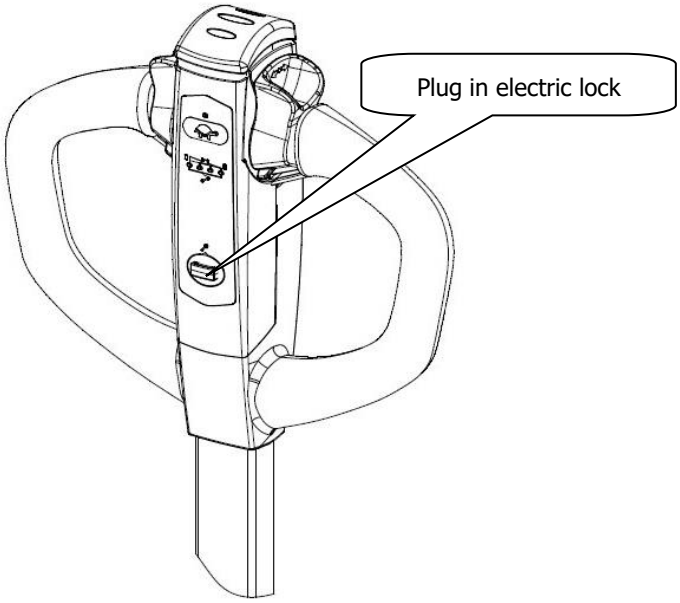


Figure 6

- Turn on the emergency stop switch

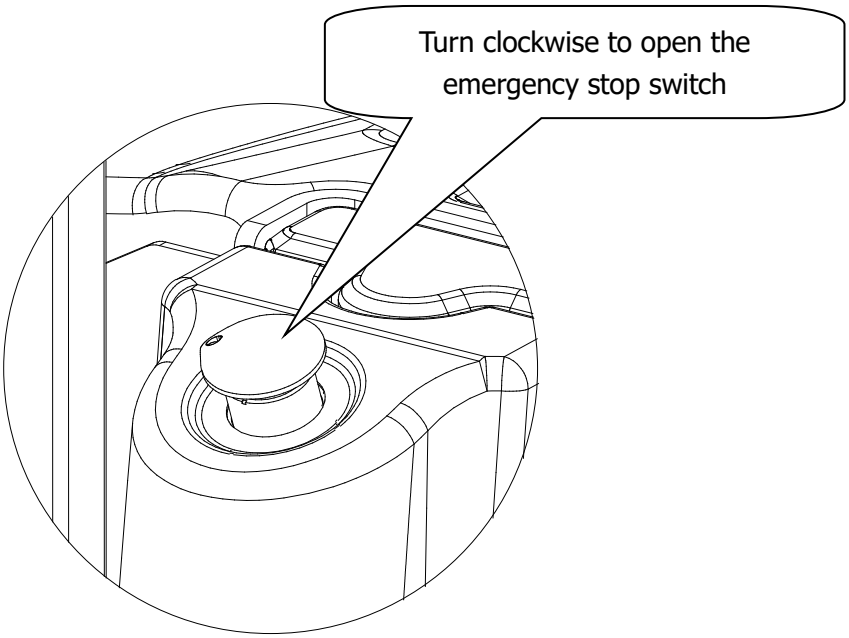


Figure 7

Truck electrified (password lock)

- Turn on the password lock by entering the right initial password 1234 and pressing ON.
- Password lock introduction

Fork lifting and lowering

- Lifting：Press the lifting button to lift
- Lowering：Press the lowering button to lower。

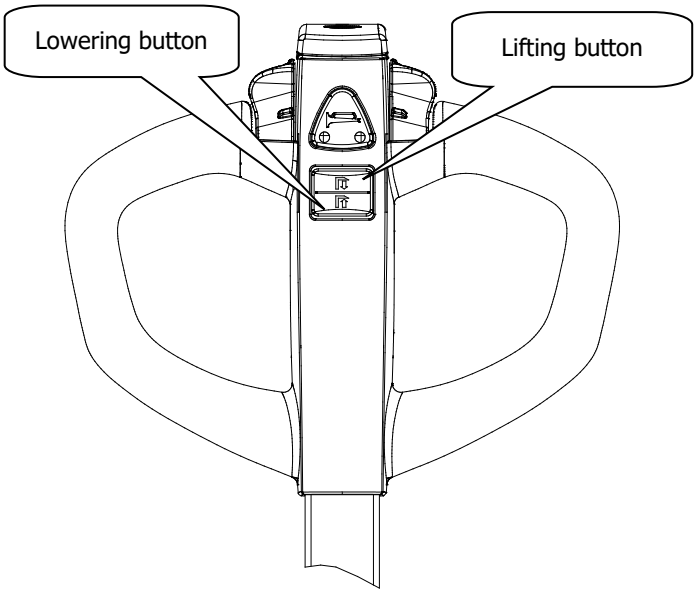


Figure 11

5.5 Traveling of the pallet truck

- Rotate the handle to the traveling zone:
  A and C are the braking zones;
  B is the traveling zone;

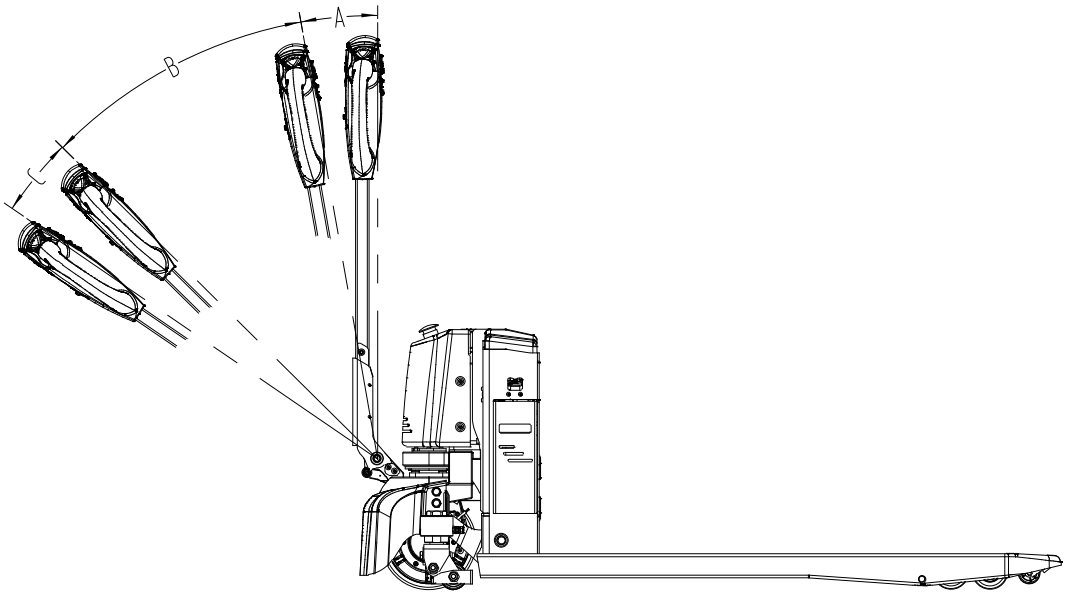


Figure 12

-Slowly rotate the accelerator to start. As shown in the figure, the rotation direction of the accelerator knob is the driving direction. The rotation angle of the knob is proportional to the driving speed. Release the accelerator knob and the knob will return to its original position automatically. At this time, the truck will slow down slowly until it stops (For safety reasons, do not accelerate rapidly)

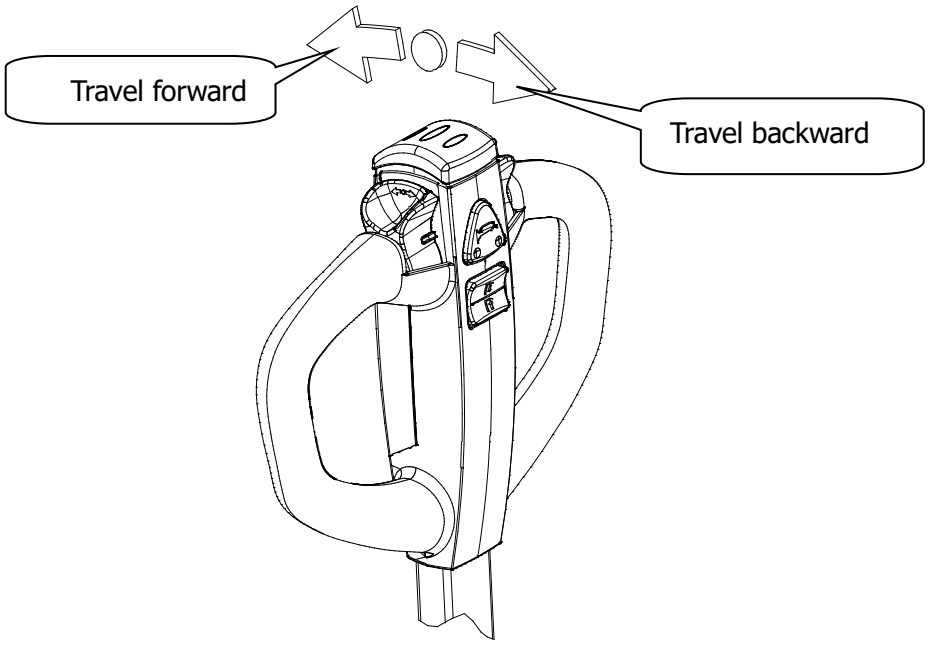


Figure 13

Braking

- When the accelerator is released during normal driving, the truck will slow down slowly until it stops, and finally the brake will automatically lock and park.
- Turn the handle to A or C quickly for emergency braking (Figure 12); the brake will lock the wheel to achieve an emergency braking.

Emergency reverse button

The emergency reverse button is at the end of the hand. When it's touched by operator's body, the truck will stop traveling immediately, and then travel backwards for a distance. The function is set to minimize possible squeeze injuries when the truck encounters into obstacles over its traveling.

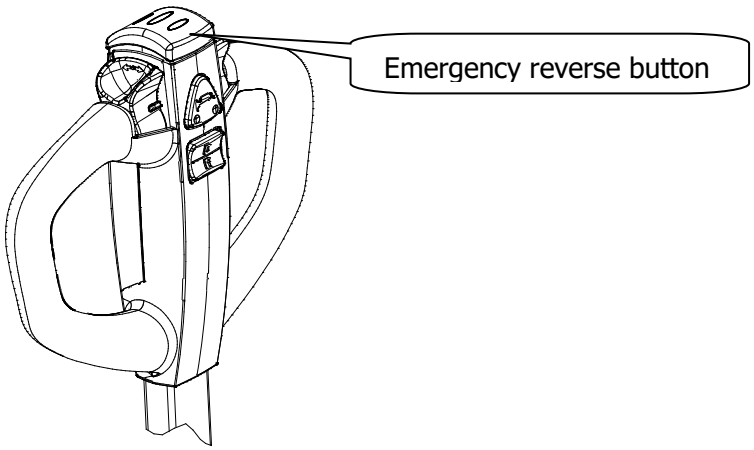


Figure 14

5.8 Parking

- Release the accelerator to stop the truck. The truck stops slowly until the brake engages and parks
- Lower the fork to the lowest position.
- Turn off the key switch.
- Disconnect the battery harness in order to park for a long time.

6. Use, maintenance and charging of storage battery

6.1 Battery maintenance

6.1.1 The battery type used is lithium ion battery, which is environment-friendly, free of chemical mercury, cadmium and other components.

6.1.2 Precautions

- Working ambient temperature of lithium battery is -10°C ~ 45°C.
- Charge and discharge the battery every 3 months when it is stored for a long time.
- Fully charge the battery before the first use or re-use after long-term idleness.
- Do not short circuit the battery, which may permanently damage it.
- Do not weld the battery by yourself.
- Do not keep the battery in an unfavorable environment, such as extreme temperature, deep cycle, or often overcharge or over-discharge.
- Do not touch the hot battery until it cools down.
- Taking down the battery by holding the plug, instead of pulling the charging line.
- The battery may be hot after charging, cool it down in a ventilated environment.
- Do not put batteries in water or sea water;
- Do not try to separate, squeeze, or hit the battery. Battery lye is harmful to skin and eyes, and will corrode clothes.
- Keep the battery out of children's reach.

6.2 Charging of battery

- When the battery indicator shows that the battery is low, charge it immediately, otherwise the battery will be damaged.
- Turn off the cable lock and emergency stop switch, connect the charging cable to the charging socket, and connect the plug to the power socket to start charging.
- When the charger indicator light is green, it indicates that the battery is fully charged. At this time, you can unplug the connecting cable.

6.3 Power display (magnetic lock)

- The green light is always ON: 78% - 100%
- Blue light is always ON: 52% - 77%
- Yellow light is always ON: 26% - 51%
- The red light is always ON: 16% - 25%
- Red light flashing: < 15%

When the red light is always on, please prepare to drive the truck to the charging place for charging; The red light flashes as a warning, indicating that the truck is about to stop working. Please charge the battery immediately. If it is used continuously, the battery life will be seriously damaged.

6.4 Power display (password lock)

- The green light is always ON: >50%
- The yellow light is always ON: 20%-50%
- The red light is always ON:<20%

7. Maintenance

Whether a truck can be used satisfactorily depends on careful maintenance. Neglect of maintenance, which may endanger personal safety and damage property. Therefore, checks should be made regularly, abnormal phenomena should be eliminated in time, and faulty cars should not be used to ensure safety and prolong the service life of cars.

Maintenance of this pallet truck is generally divided into three levels: daily maintenance, weekly

maintenance and Periodic Maintenance.

Daily maintenance：To keep the surface clean and examine if the power supply cable is damaged.

Weekly Maintenance: To check the condition of the operational components, all fastening items, if oil leakage, if abnormal wearing in mechanical components exists, if abnormal temperature rises or sparks in electric equipment, etc.

Periodic Maintenance

a) Mechanical maintenance：do it every 6 months. Main content is to check whether the fasteners are loose, whether the wheels work flexibly and whether the fork lifts normally. The running noise of the truck after maintenance is not more than 75 dB.

b) Hydraulic maintenance：do it yearly to check whether the cylinder is in normal condition, whether there are internal and external leakage. Whether the hydraulic oil is clean or not, which is usually replaced once in 12 months. Hydraulic oil adopts ISO standard. L-HV32 and L-HV15 cryogenic hydraulic oils are used when the ambient temperature is -41-104℉ and -50-41℉ respectively. The waste oil replaced shall be treated in accordance with the relevant local laws and regulations. Check whether the limit valve is working properly

c) Electrical Maintenance: do it every 3 months to check whether the electrical connectors are reliable, whether the switches are normal, and check whether the electrical insulation is normal (the insulation resistance between the electrical part and the car body should be greater than 0.5MΩ).

7.1 Adding hydraulic oil

Add hydraulic oil as shown in Figure 15 as follows:

- First close the electric lock and emergency stop switch, and operate when power off;
- Remove the screw 1 and take out the cover 2;
- Remove the oil tank cap 3, add an appropriate amount of hydraulic oil into the oil filler, and the liquid level must reach 60% of the oil tank 4 (the oil tank is made of white plastic, and the liquid level can be observed externally).

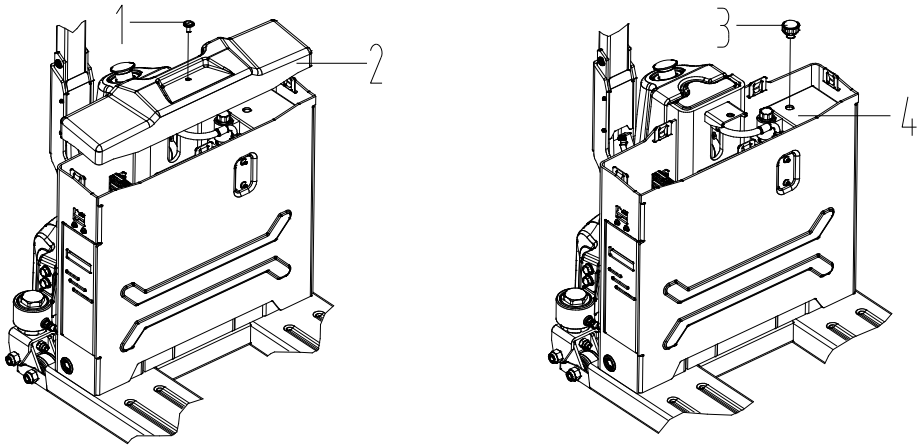
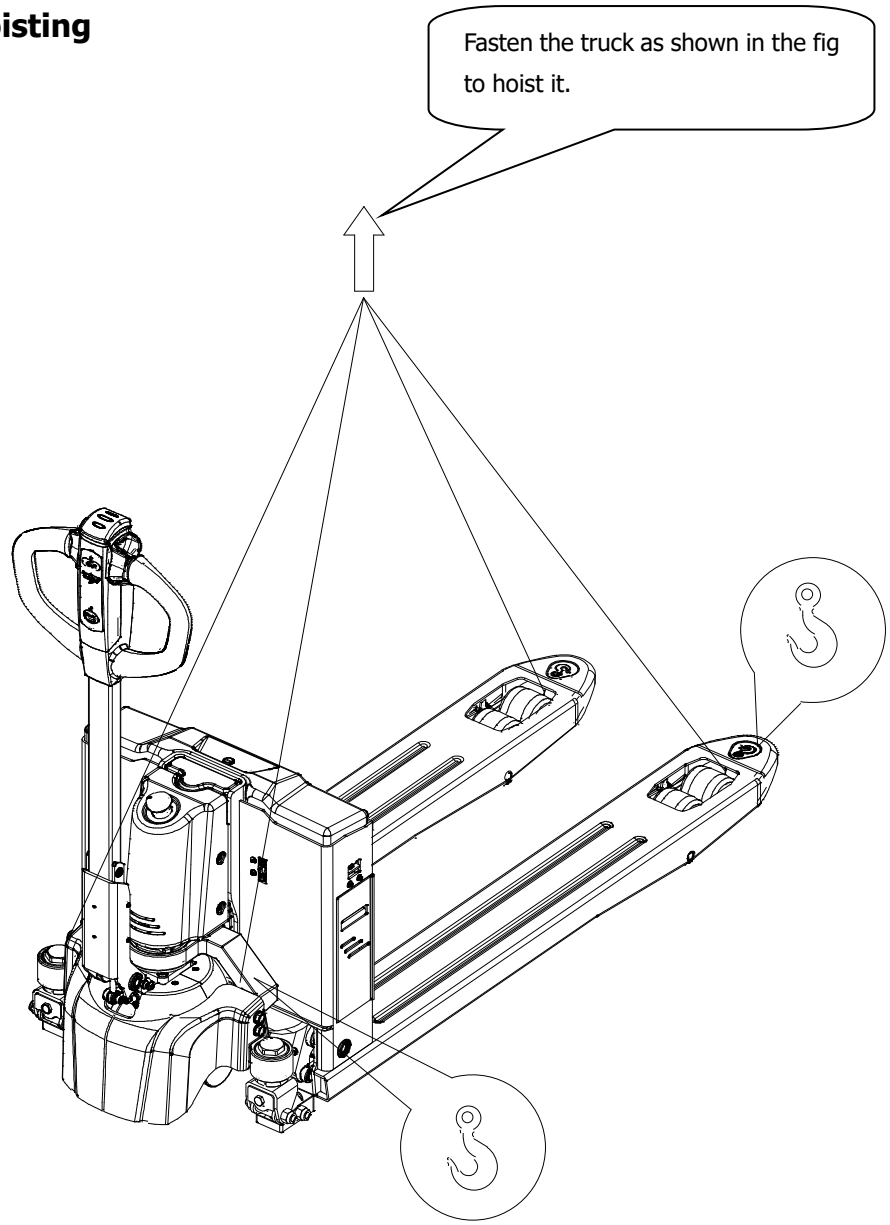


Figure 15

8. Truck hoisting



9. Trouble shooting

The table below provides some common failures of the truck in operation and the trouble shooting

No.	Fault	Cause analysis	Troubleshooting
1	Hydraulic oil leakage	1. Seal failure; 2. The surface of some parts is slightly damaged or worn; 3. The joint is loose;	1. Replace the seal; 2. Replace the damaged parts; 3. Re tighten the loose parts;
2	Fork lifting failure	1. The viscosity of working oil is too large or the working oil is not injected; 2. There are impurities in the oil; 3. The motor pump is damaged;	1. Change the working oil; 2. Remove the impurities in the oil circuit and renew the working oil; 3. Replace the hydraulic pump unit; 4. Readjust the relief valve value.
3	Fork lowering failure	1. The manual lowering solenoid valve is stuck or damaged.	1. Replace the solenoid valve

No.	Fault	Cause analysis	Troubleshooting
4	Lifting motor failure	1. The power supply is not turned on; 2. The battery has been completely discharged; 3. Motor damage; 4. The fuse is blown;	1. Turn on the power supply; 2. Charge; 3. Check whether the travel switch on the handle is pressed down due to collision and whether the brake is damaged; 4. Replace the fuse;
5	Charging failure	1. Charger is damaged 2. Battery is damaged 3. Wiring failure	1. Replace a charger 2. Replace a battery 3. Check the charging wiring

10. Waste treatment

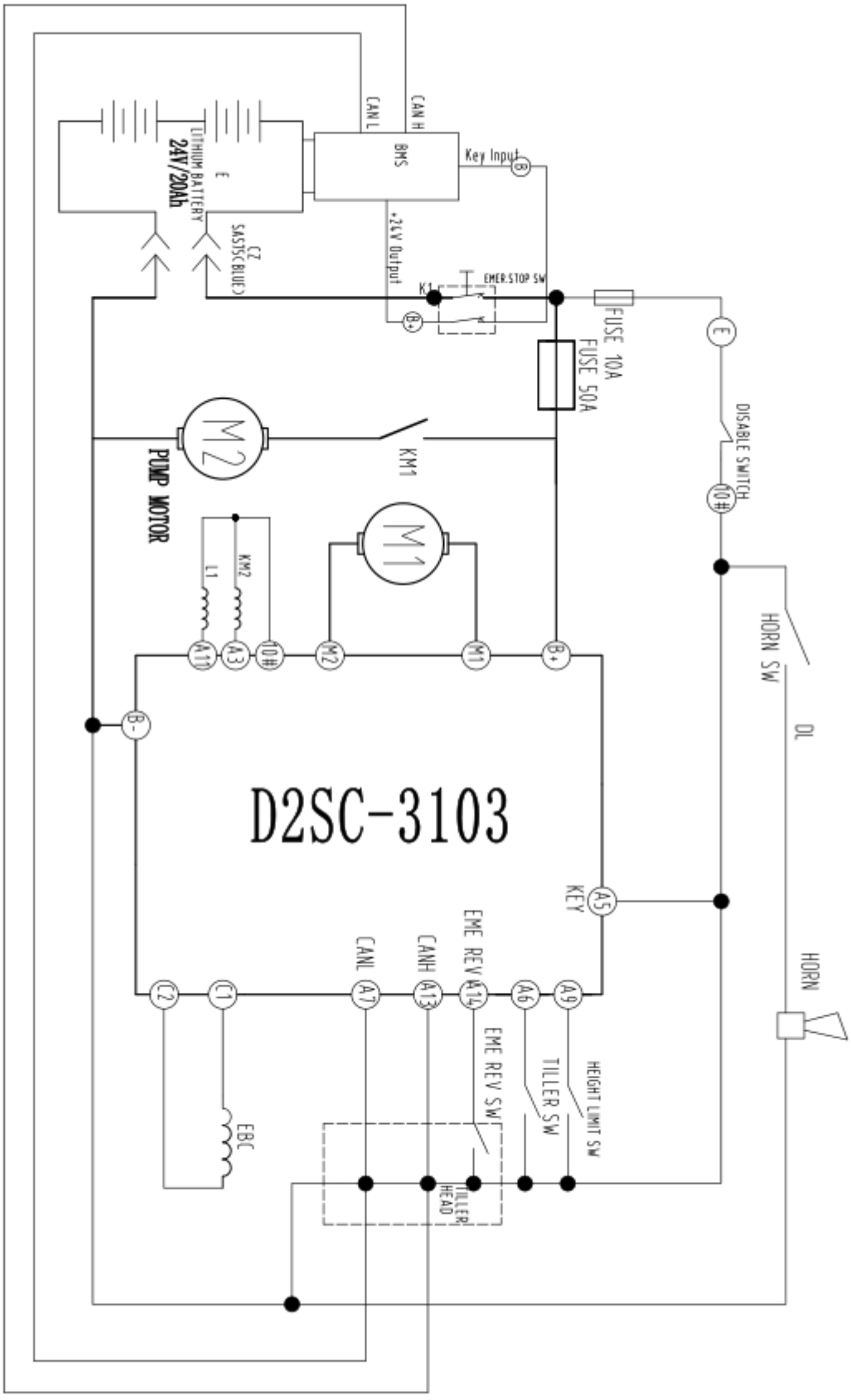
The abandoned batteries and hydraulic oil should not be placed carelessly and must be treated according to the relevant local regulations and laws. Attention must be paid to environmental protection.

11. Accessories and spare parts

No.	Name	Application site	Specification	Qty(pc)	Remarks
1	Key	To the lock		2	
2	Charger	Charge the battery		1	

12. Electrical schematic diagram and fault code

12.1 Model with magnetic lock (1.5T)

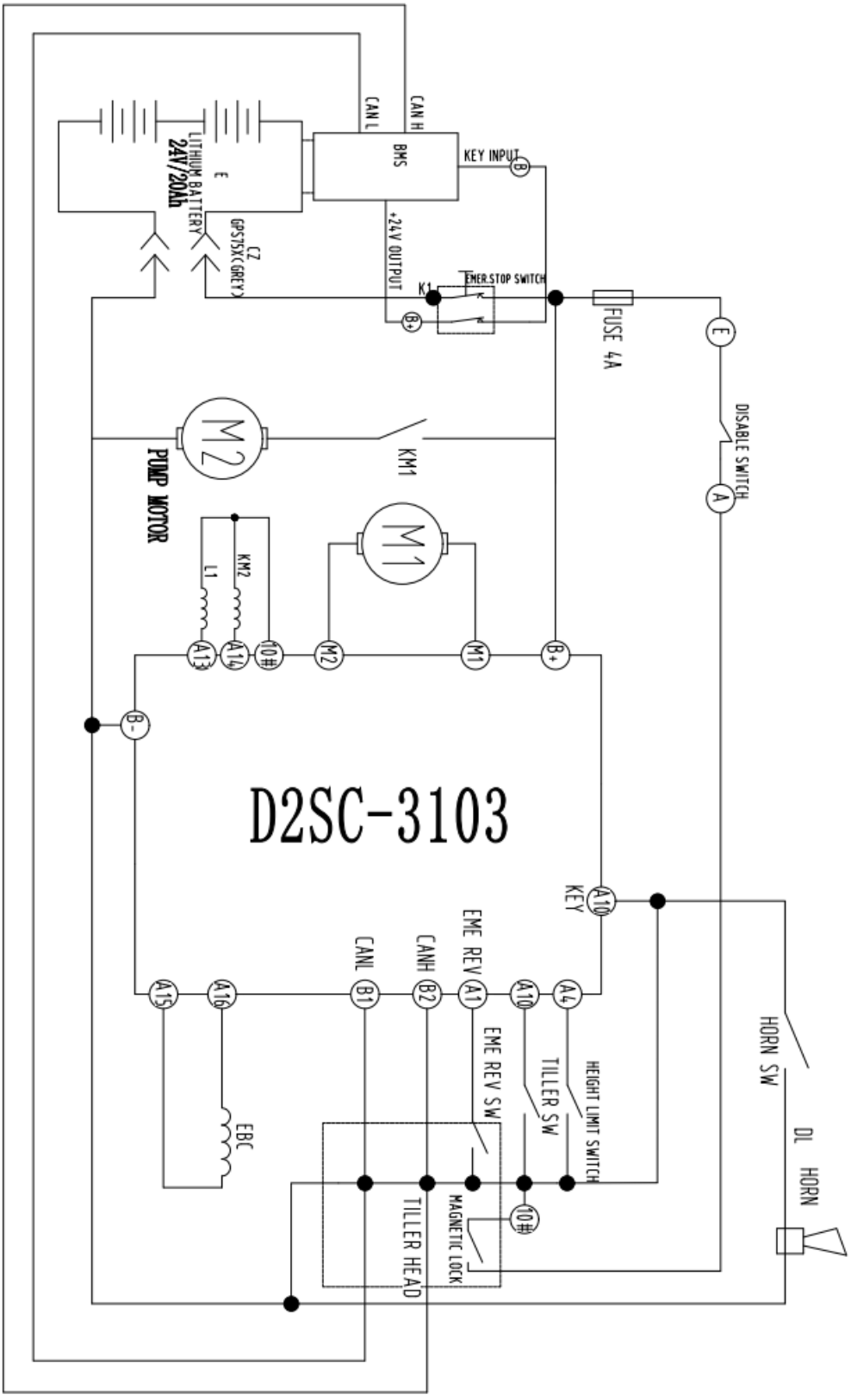


12.1.2 Fault code table

Fault English	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
EMR Sequencing Fault	22
Overvoltage Cutback	15
Undervoltage Cutback	14
Controller Overtemp Cutback	11
Pump SRO Fault	25
Creep Mode Fault	26
SRO Fault	27
Software Fault	36
Motor Temp Hot Cutback	44
Motor Overtemperature	46
Low BDI	51
Controller Overcurrent	52
Controller Severe Overtemp	53
Controller Undertemp Cutback	54
Parameter Change Fault	55
Severe Overvoltage	56
Motor Short	61
Motor Open	62
Gage PDO Timeout	63
PDO Timeout	64
BMS PDO Timeout	65
Driver 1 On Fault	66
Driver 2 On Fault	67
Driver 1 Off Fault	71
Driver 2 Off Fault	72
Severe Undervoltage	29

12.2 EURO type（1.5T）

12.2.1 Electrical schematic diagram

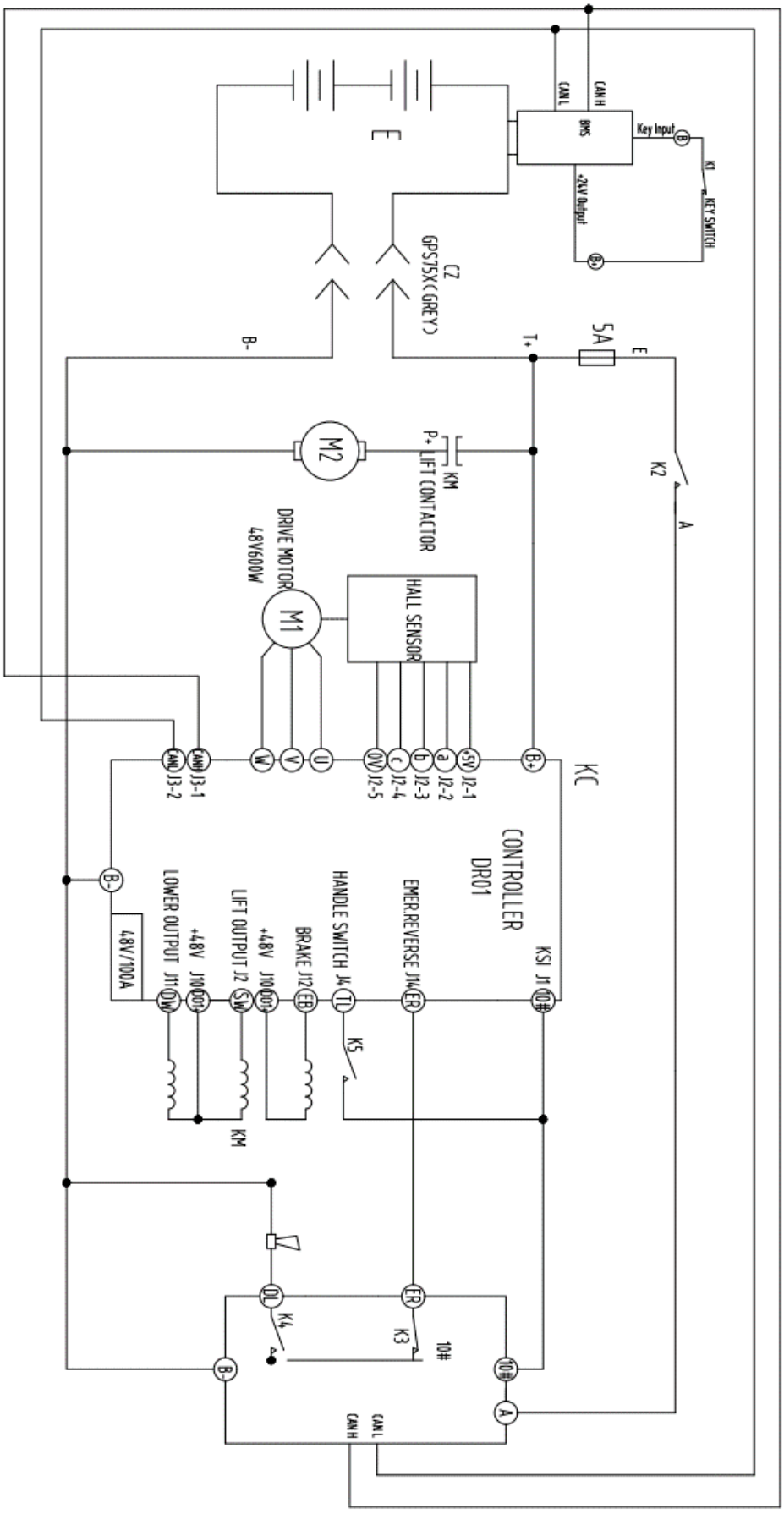


12.2.2 Fault code table

See 12.1.2

12.3 EURO type (2T)

12.3.1 Electrical schematic diagram



12.3.2 Fault code table

Fault code	Fault type	Possible causes	Trouble shooting
1	Power unit protection	1. The motor is locked; 2. The internal wiring of the motor is loose; 3. Abnormal operating conditions	◆ Whether the motor is stuck; ◆Contact the agent or manufacturer; ◆ Manual power on/off reset
2	Acceleration overcurrent	1. The acceleration curve is too steep; 2. The load is too large;	◆ Check the acceleration and deceleration time; ◆ Eliminate the cause of excessive load; ◆ Re learn the motor position; Manual power on/off reset
3	Deceleration overcurrent	1. The deceleration curve is too steep; 2. The load is too large;	
4	Constant speed overcurrent	1. The load is too large;	
5	Accelerating overvoltage	1. The input voltage is too high; 2. The acceleration curve is too steep;	◆ Adjust the input voltage; ◆ Check the acceleration and deceleration time; Manual power on/off reset
6	Deceleration overvoltage	1. The input voltage is too high; 2. The deceleration curve is too steep;	
7	Constant speed overvoltage	1. The input voltage is too high;	
9	Undervoltage fault	1. Instantaneous power failure of input power supply; 2. The input voltage is too low; 3. The power cord is too thin;	◆ Eliminate external power supply problems; Check whether the power supply is disconnected during operation and whether the power cord is thick enough; ◆ Adjust the input voltage; Manual power on/off reset
12	Motor overload	1. Improper parameter setting; 2. Excessive load;	◆ Adjust parameters; ◆ Reduce the load; ◆ Re learn the motor position; Manual power on/off reset
13	Motor phase loss	1. The internal wiring of the motor is loose; 2. The motor is damaged;	◆ Check the motor for internal damage caused by external force; Manual power on/off reset
14	Drive overtemperature fault	1. Drive temperature too high	◆ Heat dissipation instrument (electric fan, etc.) can be added when the temperature drops before operation Manual power on/off reset
23	Parameter setting fault	1. Parameter setting error;	◆ Set parameters correctly; Manual power on/off reset

24	Bus charging fault	1. Charging circuit fault	◆ Please contact the agent or manufacturer
25	Memory failure	1. Motor storage data is abnormal;	◆ Please contact the agent or manufacturer; Manual power on/off reset
26	Motor locked	1. Motor locked;	◆ Check the load; Manual power on/off reset
27	Motor reverse	1. Excessive reverse load;	◆ Check the load; Manual power on/off reset
28	Motor out of step	1. Acceleration time is too fast;	◆ Check the acceleration and deceleration time; Manual power on/off reset
29	Velocity loop saturation	1. Excessive load; 2. The speed setting is too large;	◆ Reduce the load; ◆ Check the set speed; Manual power on/off reset
30	IF startup failed	1. Drive loop fault	◆ Please contact the agent or manufacturer; Manual power on/off reset
36	Hall sensor fault, not between 1 and 6	1. Hall sensor fault inside the motor; 2. Hall detection loop fault	◆ Check whether the Hall level jump inside the motor is normal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
37	Hall sensor fault, phase sequence error, current 1	1. Hall sensor fault inside the motor; 2. Hall detection loop fault	◆ Check whether the Hall level jump inside the motor is normal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
38	Hall sensor fault, phase sequence error, current 2	1. Hall sensor fault inside the motor; 2. Hall detection loop fault	◆ Check whether the Hall level jump inside the motor is normal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
39	Hall sensor fault, phase sequence error, current 3	1. Hall sensor fault inside the motor; 2. Hall detection loop fault	◆ Check whether the Hall level jump inside the motor is normal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
40	Hall sensor fault, phase sequence error, current 4	1. Hall sensor fault inside the motor; 2. Hall detection loop fault	◆ Check whether the Hall level jump inside the motor is normal; ◆ Please contact the agent or manufacturer; Manual power on/off reset

41	Hall sensor fault, phase sequence error, current 5	1. Hall sensor fault inside the motor; 2. Hall detection loop fault	◆ Check whether the Hall level jump inside the motor is normal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
42	Hall sensor fault, phase sequence error, current 6	1. Hall sensor fault inside the motor; 2. Hall detection loop fault	◆ Check whether the Hall level jump inside the motor is normal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
43	hall sensor fault, the phase sequence obtained by CAP is the same for two consecutive times	1. Hall sensor fault inside the motor; 2. Hall detection loop fault	◆ Check whether the Hall level jump inside the motor is normal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
44	Entering CAP, the interval time is too small	1. Hall sensor fault inside the motor; 2. Caused by interference signal 3. Hall detection loop fault	◆ Check whether the Hall level jump inside the motor is normal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
45	Incoming CAP interrupt, non four channel capture signal exception	1. Hall sensor fault inside the motor; 2. Hall detection loop fault	◆ Check whether the Hall level jump inside the motor is normal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
47	Band brake load detection fault	1. Band brake circuit is open; 2. Holding brake circuit is short circuited	◆ Check whether the band brake load has been connected; ◆ Please contact the agent or manufacturer; Manual power on/off reset
48	Pump load detection fault	1. Open circuit of lifting pump circuit 2. The circuit of lifting pump is short circuited	◆ Check whether the lifting pump load has been connected; ◆ Please contact the agent or manufacturer; Manual power on/off reset
49	Valve load detection fault	1. The circuit of the lowering valve is open 2. The circuit of lowering valve is short circuited	◆ Check whether the lowering valve load has been connected; ◆ Please contact the agent or manufacturer; Manual power on/off reset
50	Parameter mismatch fault	1. Parameter configuration conflict	◆ Check whether the parameter configuration is correct; ◆ Please contact the agent or manufacturer; Manual power on/off reset

51	Precharge fault	1. The input voltage is too low; 2. KSI voltage is pulled down during use	Check whether the input voltage is reasonable; ◆ Check whether KSI voltage is pulled down during use; ◆ Please contact the agent or manufacturer; Manual power on/off reset
52	Holding brake speed fault	1. The speed is higher than the fault threshold under the condition of holding brake;	◆ Check whether the holding brake force is not enough to cause the slope to slide down; ◆ Please contact the agent or manufacturer; Manual power on/off reset
53	Band brake output detection fault	1. Band brake circuit is open; 2. Holding brake circuit is short circuited	◆ Check whether the band brake load has been connected; ◆ Please contact the agent or manufacturer; Manual power on/off reset
54	Pump output detection fault	1. Open circuit of lifting pump circuit; 2. The circuit of lifting pump is short circuited	◆ Check whether the lifting pump load has been connected; ◆ Please contact the agent or manufacturer; Manual power on/off reset
55	Drop valve output detection fault	1. The circuit of lowering valve is open; 2. The circuit of lowering valve is short circuited	◆ Check whether the lowering valve load has been connected; ◆ Please contact the agent or manufacturer; Manual power on/off reset
56	The input voltage slave of analog quantity 2 judges that the IO port is incorrect	1. Analog quantity 2 input circuit slave circuit open circuit 2. Analog quantity 2 input circuit slave circuit short circuit	◆ Check whether the slave circuit of analog quantity 2 input circuit is abnormal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
57	The lifting switch slave judges that the IO port is incorrect	1. Lift switch input circuit slave circuit open circuit 2. The lift switch input circuit is short circuited to the slave circuit	◆ Check whether the slave circuit of the lifting switch input circuit is abnormal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
58	The forward switch slave judges that the IO port is incorrect	1. Forward switch input circuit slave circuit open circuit 2. The slave circuit of the forward switch input circuit is short circuited	◆ Whether the slave circuit of the forward switch input circuit is abnormal; ◆ Please contact the agent or manufacturer; Manual power on/off reset

59	The mode switch slave determines that the IO port is incorrect	1. The mode switch input circuit slave circuit is open 2. The mode switch input circuit is short circuited to the slave circuit	◆ Whether the mode switch input circuit slave circuit is abnormal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
60	The reverse switch slave determines that the IO port is incorrect	1. Reverse switch input circuit slave circuit open circuit 2. The reverse switch input circuit is shorted to the slave circuit	◆ Check whether the slave circuit of the reverse switch input circuit is abnormal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
61	The input voltage slave of analog quantity 1 judges that the IO port is incorrect	1. Analog quantity 1 input circuit slave circuit open circuit 2. Analog quantity 1 input circuit slave circuit short circuit	◆ Check whether the slave circuit of analog quantity 1 input circuit is abnormal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
62	The interlocking switch slave judges that the IO port is incorrect	1. Interlock switch input circuit slave circuit open circuit 2. Interlock switch input circuit slave circuit short circuit	◆ Whether the slave circuit of the interlock switch input circuit is abnormal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
63	The emergency reverse switch slave judges that the IO port is incorrect	1. The slave circuit of the emergency reverse switch input circuit is open 2. The slave circuit of the emergency reverse switch input circuit is short circuited	◆ Whether the slave circuit of the emergency reverse switch input circuit is abnormal; ◆ Please contact the agent or manufacturer; Manual power on/off reset
64	Slave communication failure	1. Slave MCU is abnormal; 2. Communication circuit fault between MCU	◆ Please contact the agent or manufacturer; Manual power on/off reset
65	Third level fault of slave	1. The control of the main MCU is out of control, and the emergency response from the MCU	◆ Please contact the agent or manufacturer; Manual power on/off reset
66	The slave judges that the speed is too high	1. The speed is out of control and exceeds the maximum speed by 20%	◆ Please contact the agent or manufacturer; Manual power on/off reset
67	Abnormal internal 5V voltage	1. Internal 5V voltage fluctuation 2. Internal 5V fault threshold parameter setting error	◆ Check whether the parameter settings are correct ◆ Please contact the agent or manufacturer; Manual power on/off reset

68	Abnormal internal 15V voltage	1. Internal 15V voltage fluctuation 2. Internal 15V fault threshold parameter setting error	◆ Check whether the parameter settings are correct ◆ Please contact the agent or manufacturer; Manual power on/off reset
69	Abnormal external 5V voltage	1. External 5V voltage fluctuation 2. External 5V fault threshold parameter setting error	◆ Check whether the parameter settings are correct ◆ Please contact the agent or manufacturer; Manual power on/off reset
70	Communication failure between main controller and battery	1. Battery BMS is abnormal; 2. The communication line between the main controller and the battery is disconnected	◆ Check whether the harness is complete ◆ Please contact the agent or manufacturer; Manual power on/off reset
71	Lithium battery overvoltage fault	1. Overvoltage caused by lithium battery charging 2. Voltage rise caused by controller braking when the battery is fully charged	◆ Check whether the lithium battery has been charged with overvoltage ◆ Please contact the agent or manufacturer; Manual power on/off reset
73	Lithium battery serious failure	1. The battery BMS detects a serious fault. 2. The battery is extremely low	◆ Check the lithium battery for serious failure ◆ Check whether the battery power is extremely low; Manual power on/off reset
74	Low battery warning	1. Low battery warning	◆ Check whether the battery power is low; Replace the battery
75	Drive overvoltage protection fault	1. Instantaneous bus voltage is too high	◆ Check whether there is a working condition that causes the bus voltage to rise rapidly during use; Manual power on/off reset
76	Master slave MCU communication fault	1. Communication failure of master and slave MCU 2. Communication circuit fault between MCU	◆ Please contact the agent or manufacturer; Manual power on/off reset
77	Hall signal loss from MCU	1. Open circuit from MCU Hall circuit	◆ Please contact the agent or manufacturer; Manual power on/off reset
80	The power on self-test interlock switch is not reset	1. Interlock switch is not reset	Reset all switches

81	Power on self-test forward switch not reset	1. The forward switch is not reset	Reset all switches
82	The power on self-test backward switch is not reset	1. The back switch is not reset	Reset all switches
83	The power on self-test throttle switch is not reset	1. Throttle switch is not reset	Reset all switches
84	The emergency switch of power on self-test is not reset	1. Emergency switch is not reset	Reset all switches
85	Power on self-test lifting switch not reset	1. The lifting switch is not reset	Reset all switches
86	The power on self-test lowering valve switch is not reset	1. The lowering valve switch is not reset	Reset all switches
87	Control signal timing failure	1. Operation sequence error	Reset all switches
88	Direction key failure	1. Both forward and backward are effective	Reset all switches
89	Emergency reverse warning	1. Triggered after emergency reverse stop	Reset all switches
90	Sequence failure	1. Operation sequence error	Reset all switches

13. Packing list

Packing list

Consignee: Ex-work No：

Contract No.： Ex-work Date：

No.	Product Name	QTY	Net. Weight (lbs)	Dimension（L×W×H）	Remarks
1	Pallet truck	1			A complete set
2	Accessory box	1			Technical documents, accessories and spare parts.

Note：1. The following documents are in the file bag:

a) Operation manual 1 volume
b) Parts catalogue 1 volume
c) Qualification certificate 1 copy
d) Packing list 1 copy

2. Accessories and spare parts

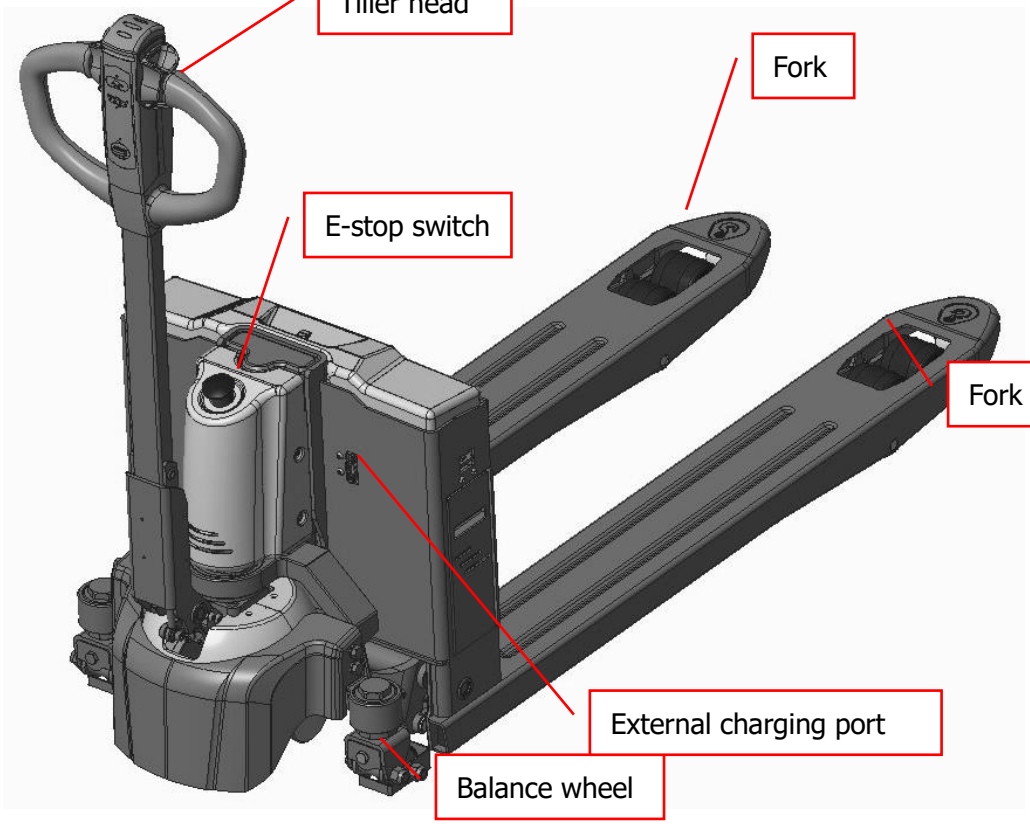
No.	Name	Application site	Specification	Qty(pc)	Remarks
1	Key	To the lock		2	
2	Charger	Charge the battery		1	

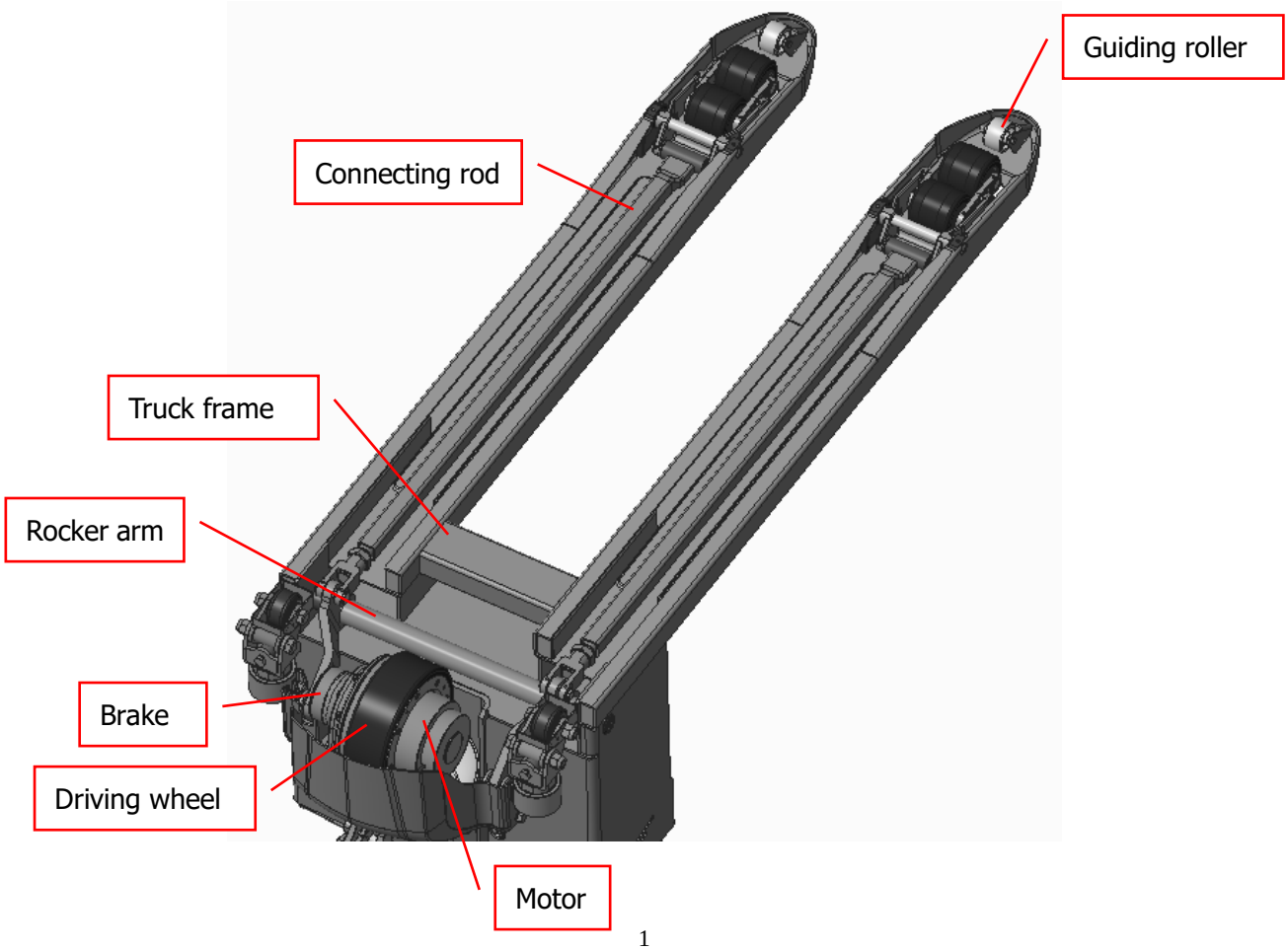
Consignor:

Service Manual

Contents

1. Structure

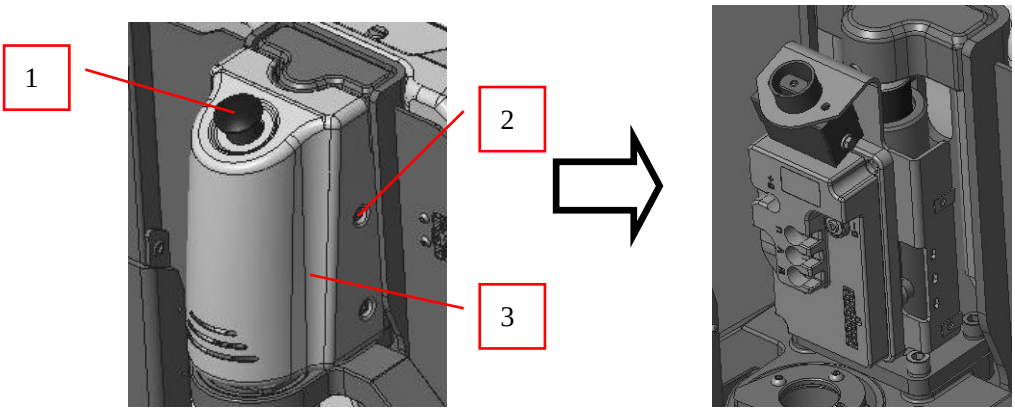

Tiller head
Fork
E-stop switch
Fork roller
External charging port
Balance wheel


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

1.1 Housing disassembly

1.1.1 Front housing disassembly

After disassembly



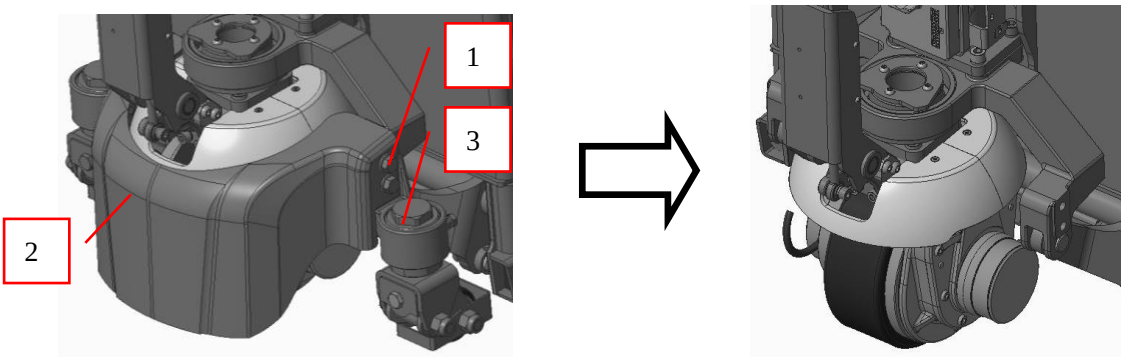
① Remove the red E-stop switch cover 1 by pressing it down and rotate 90°counterclockwise;

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

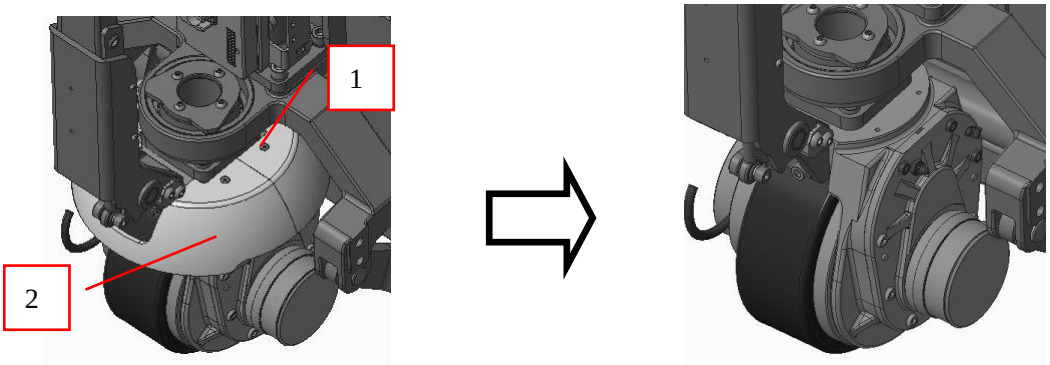


① Unscrew part 1, 4 pieces in all;

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

After disassembly

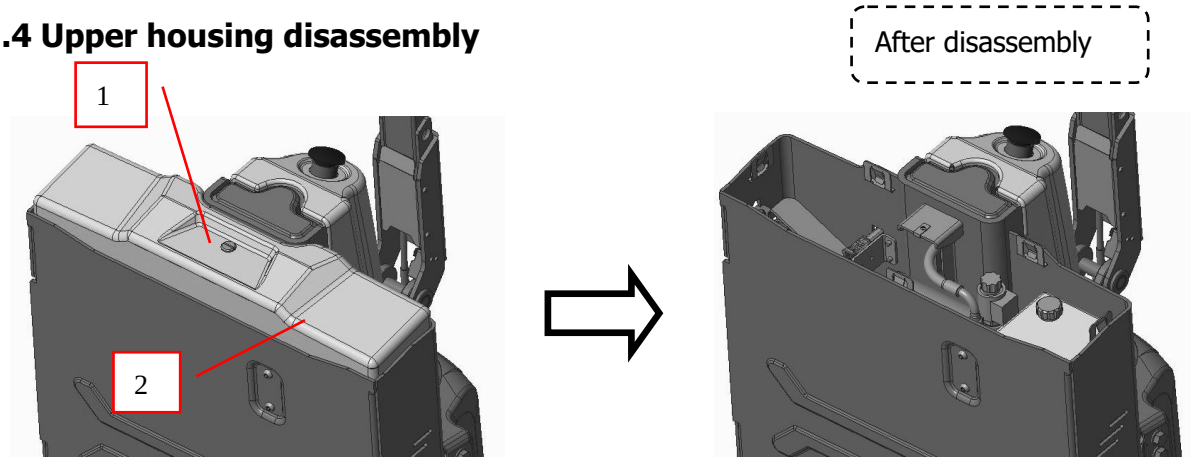
1.1.3 Front and rear plastic cover disassembly



① Unscrew part 1, 4 pieces in all;

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

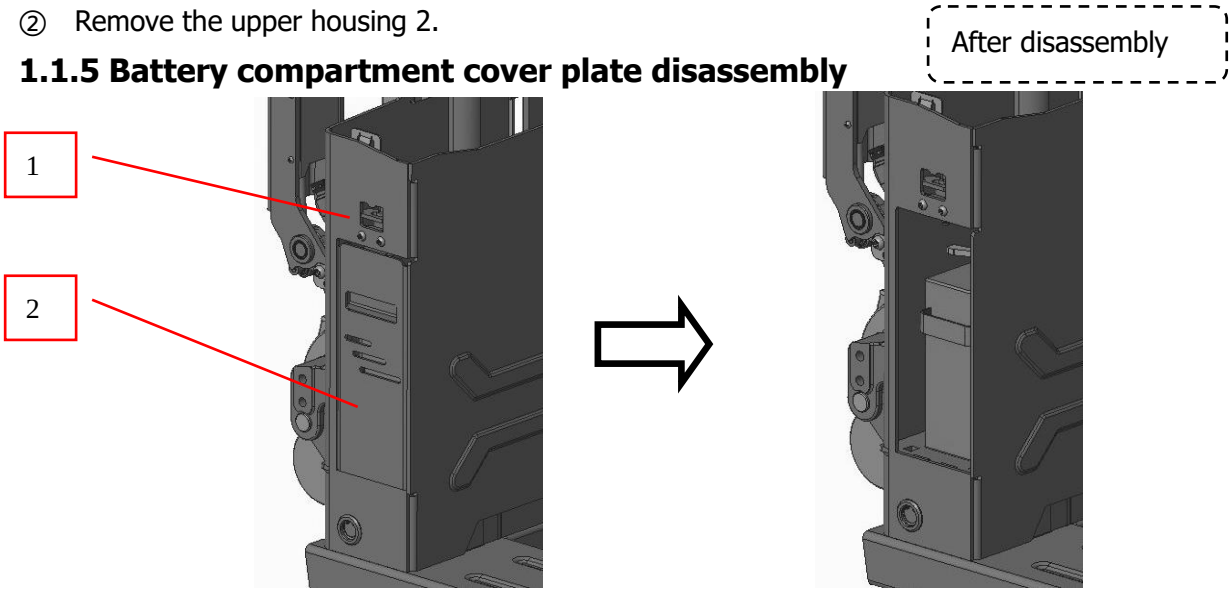
1.1.4 Upper housing disassembly



① Unscrew part 1, 1 piece in all;

② Remove the upper housing 2.

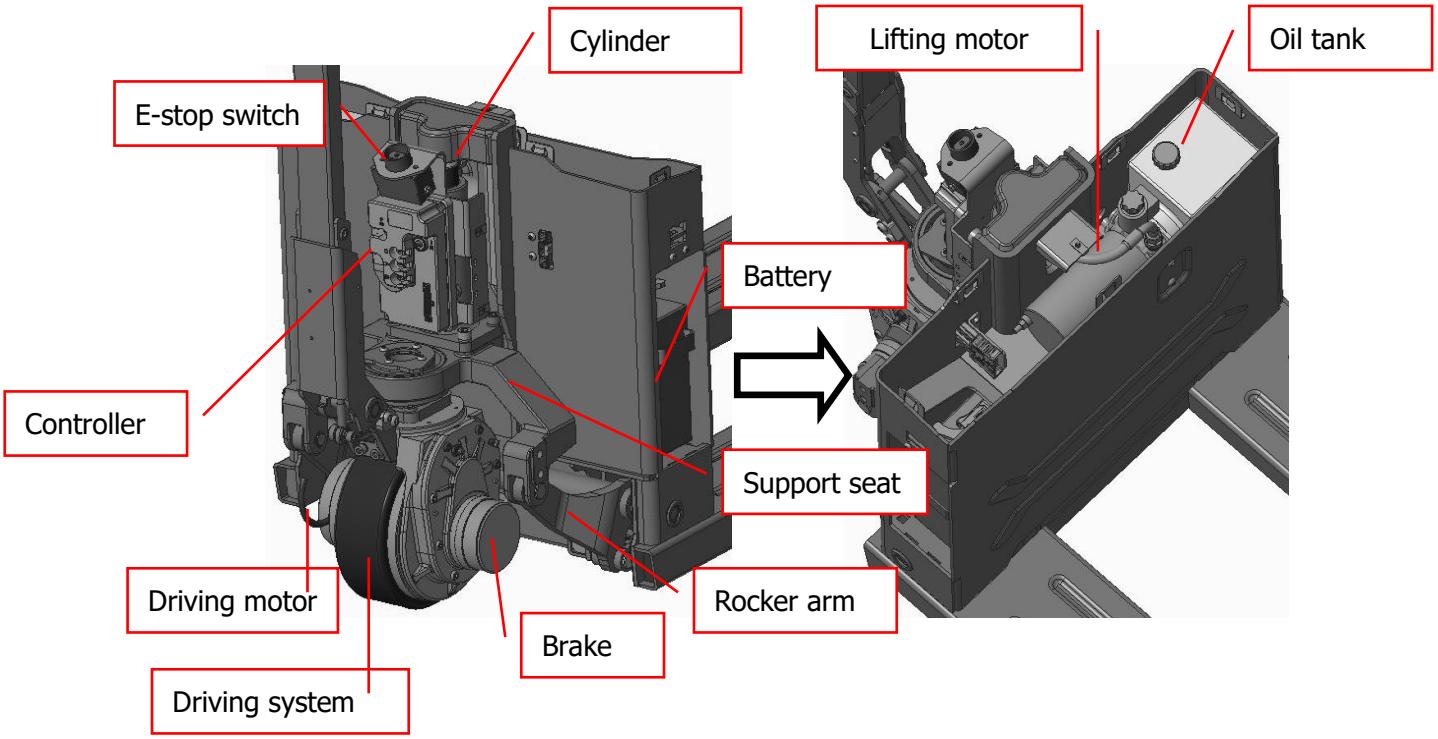
1.1.5 Battery compartment cover plate disassembly



① Pull the lock 1 upward

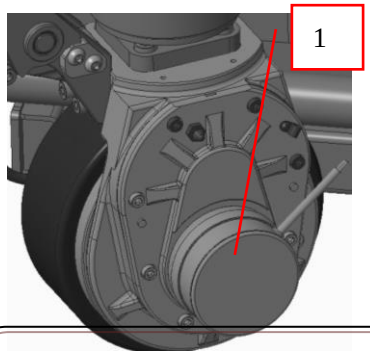
② Remove the battery compartment cover plate 2.

1.2 Detailed structure

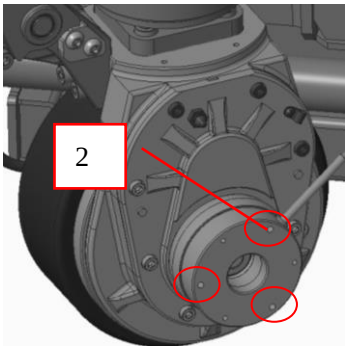


2. Mechanical structure

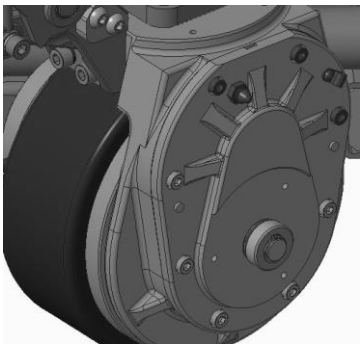
2.1 Brake disassembly



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



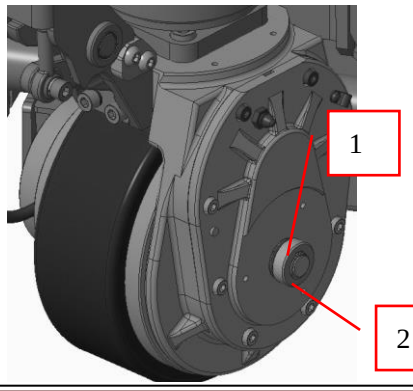
Unscrew the braking screw 2, 3 pieces in all



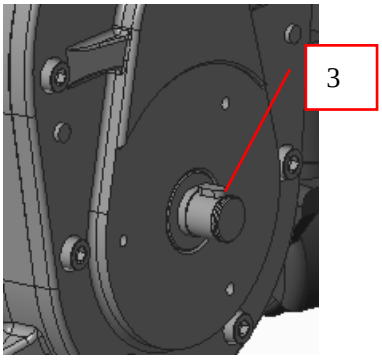
After brake disassembly

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.



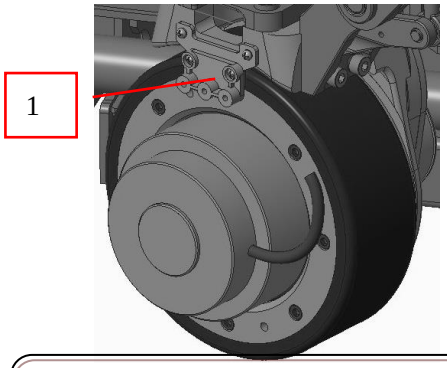
Remove the spring circlip 1 and the shaft sleeve 2



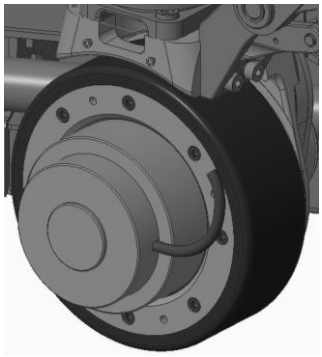
Remove the flat key 3, and keep it properly.

2.3 Motor disassembly

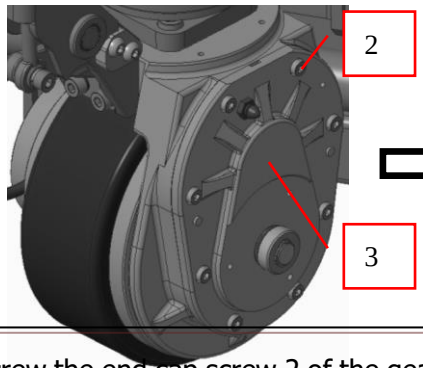
Disconnect the power first, then disassemble the motor(2.1) and the braking shaft sleeve(2.2)



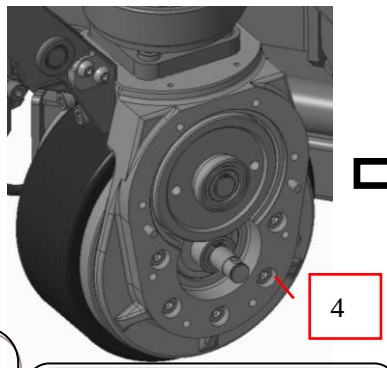
Disconnect the motor electric wiring and the terminal block 1.



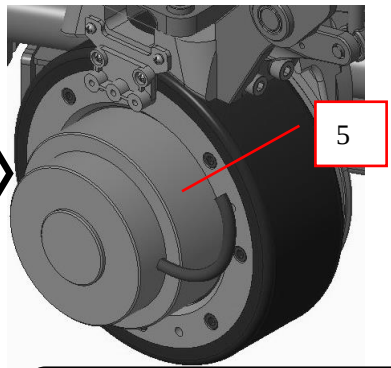
After disassembly



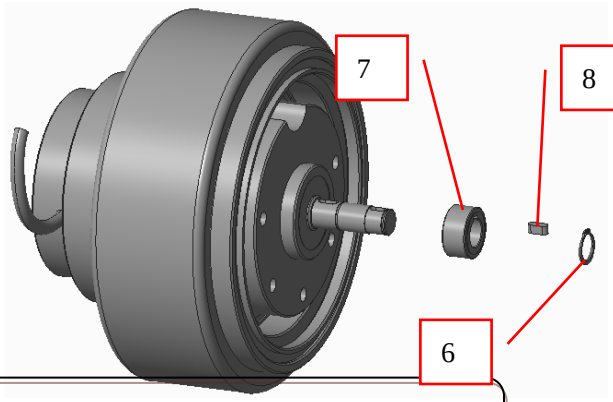
Unscrew the end cap screw 2 of the gear box, 8 pieces in all by turning the steering gear 90°,then remove the end cap 3.



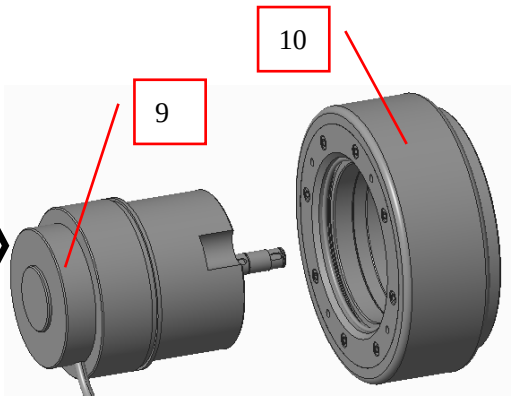
Unscrew the motor screw 4, 5 pieces in all



Take out the motor-wheel assembly 5

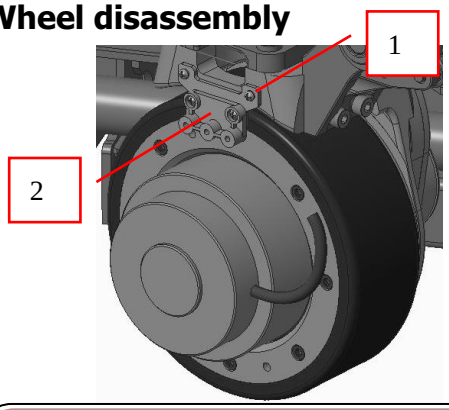


Remove the retaining ring 6, gear 7, flat key 8 at the end of the motor shaft

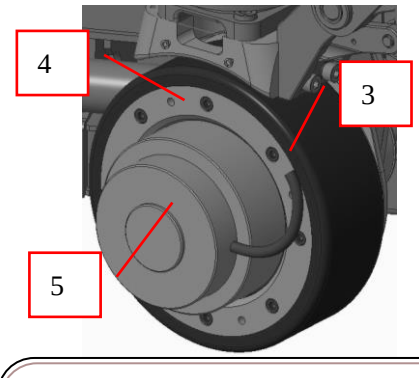


Separate the motor 9 and the wheel assembly 10

2.4 Wheel disassembly



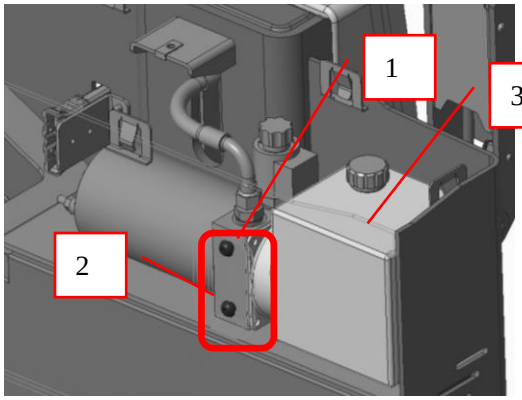
Unscrew part 1 and remove the terminal block by turning the steering gear left 90°and disconnecting the motor harness

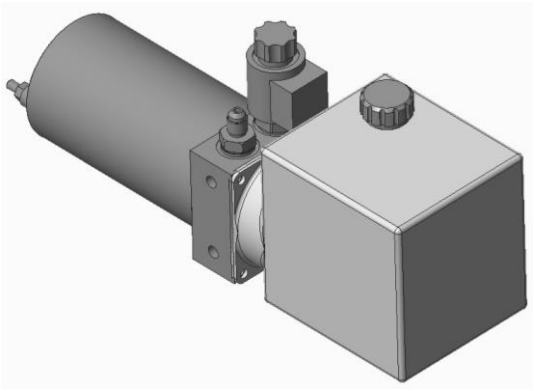


Keep on unscrewing the fixing screw 3, 8 piece in all; then screw a M6 screw(＞30mm) into the hole 4 to remove the wheel 5.

2.5 Hydraulic station disassembly

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

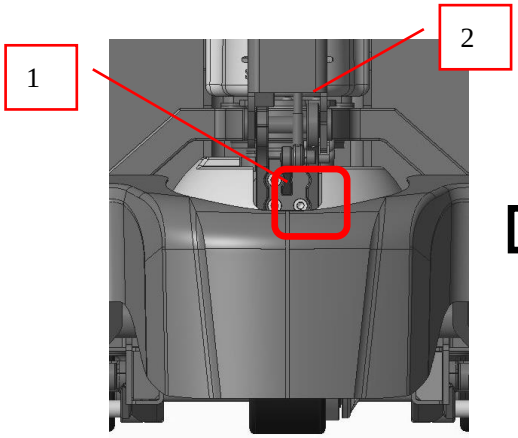


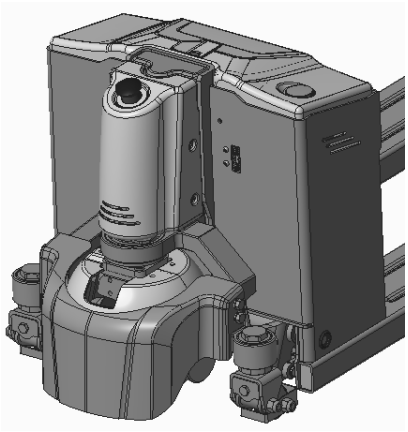


Lower the fork to the minimum height and remove the high pressure hose 1. Be careful to collect the oil flows from the pump oil tank now. Then unscrew the fixing screw 2 to remove the hydraulic station 3.

The hydraulic station

2.6 Handle disassembly

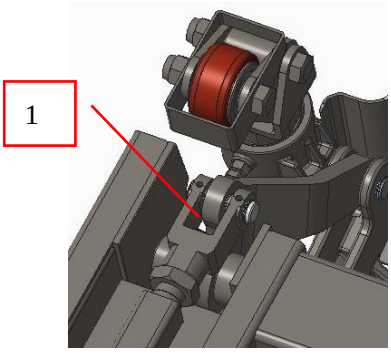


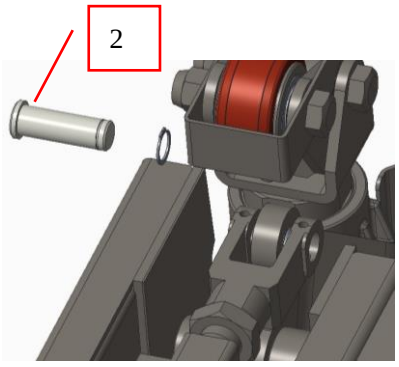


Disconnect the power supply, the connector between the handle and the truck frame;
unscrew part 1, 3 pieces in all;
Remove the handle assembly 2.

After disassembly

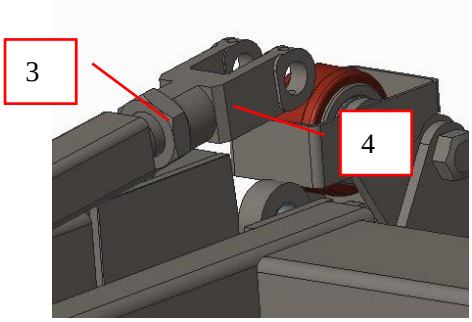
2.7 Connecting rod adjustment



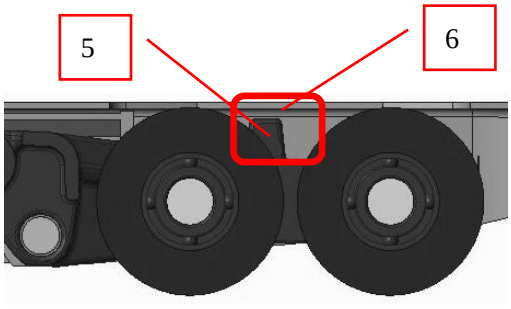


Remove the retaining ring 1 at the hinge point between the connecting rod and the rocker arm.

Take out the pin shaft 2 from the mounting hole



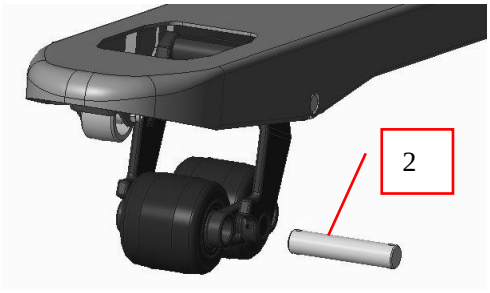
Reduce the connecting rod length clockwise by loosening nut 3 and rotating joint 4



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

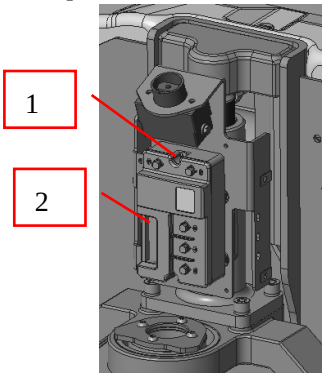
Remove the spring pin 1, 2 pieces in all.



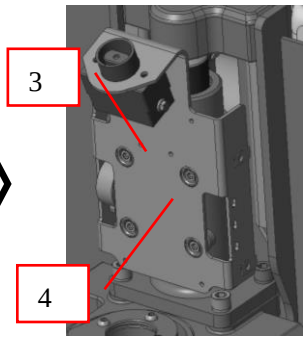
Take out pin shaft 2

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

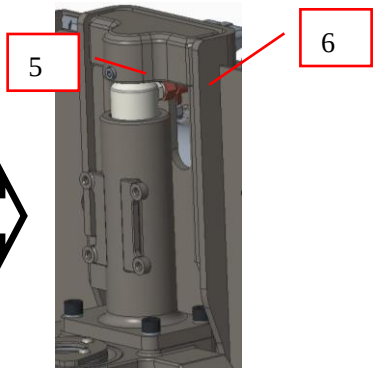
2.9 Cylinder disassembly



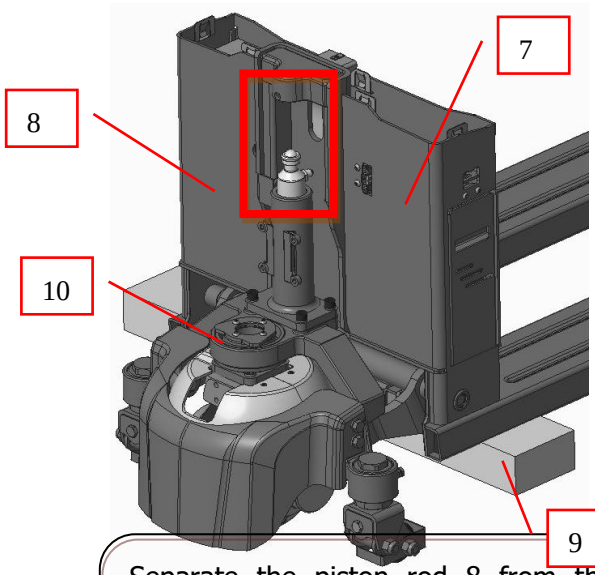
Unscrew part 1 to remove the controller 2.



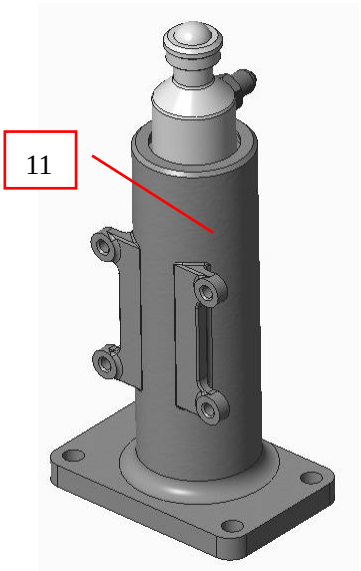
Unscrew part 3 to remove the support frame assembly 4



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

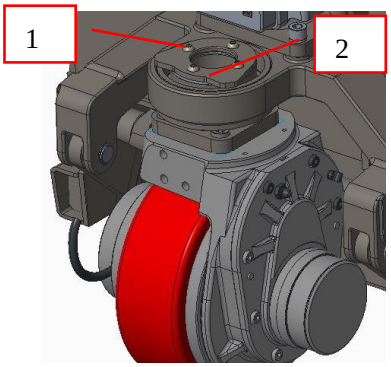


Separate the piston rod 8 from the truck frame by lifting the truck frame 7. Place a block 9 under the truck frame, and unscrew part 10, 4 pieces in all.

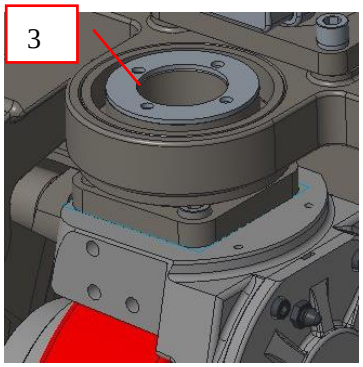


Remove the cylinder assembly 11

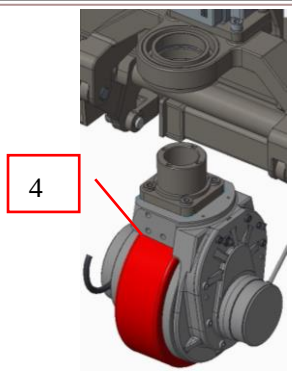
2.10 Driving wheel disassembly



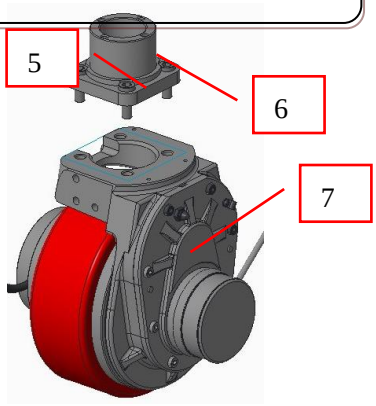
Unscrew part 1, 4 pieces in all, and remove the platen 2.



Take away the shim 3.



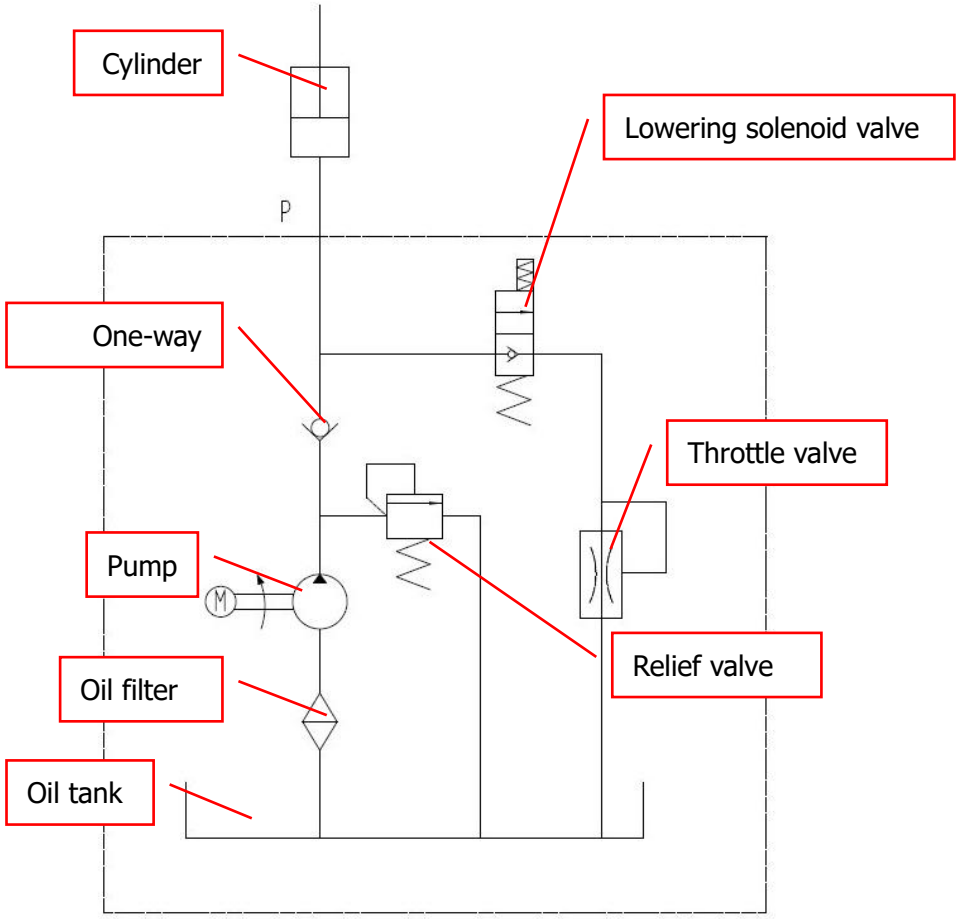
Remove the driving wheel assembly 4



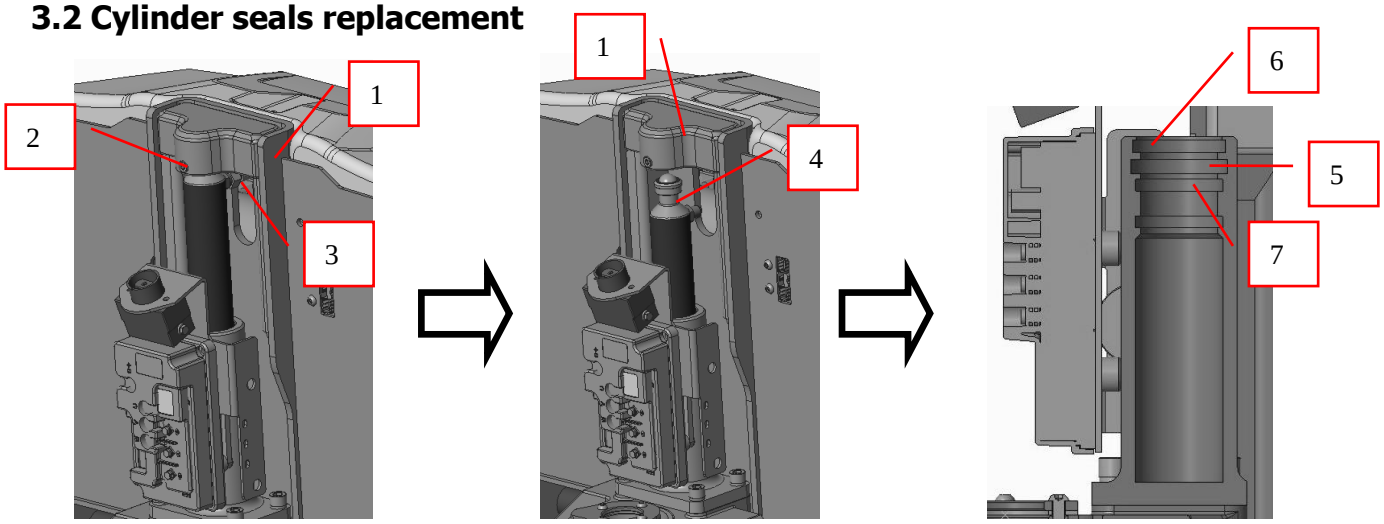
Unscrew part 5, 4 pieces in all to take away the base 6. Driving wheel assembly 7 is left.

3. Hydraulic system

3.1 Hydraulic schematic diagram



3.2 Cylinder seals replacement

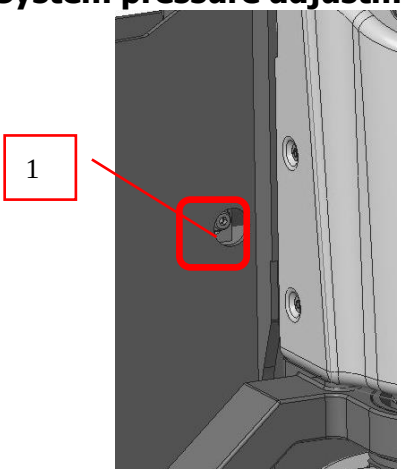


Lift the truck 1 a little to disassemble the screw 2 and oil pipe 3.

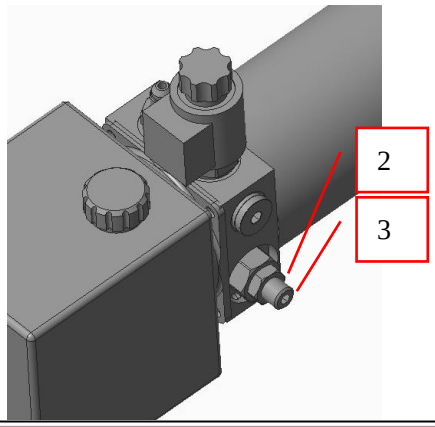
Separate the truck frame and the piston rod 4 by lifting the truck frame again, then take out the piston 4, and again piston rod 3 directly.

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

3.3 System pressure adjustment

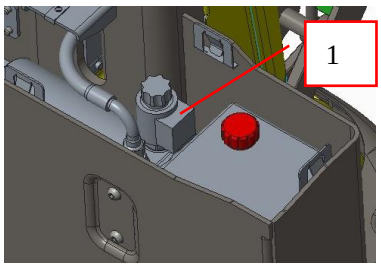


Locate the pressure adjusting valve 1.

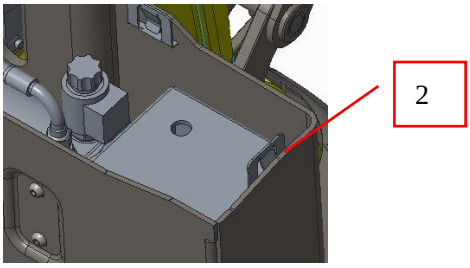


Loosen nut 2 and adjusting screw 3 to add the system pressure clockwise. The system pressure shall not be over than 115% of the rated capacity, and tighten the nut 2 after adjustment.

3.4 Add the hydraulic oil



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



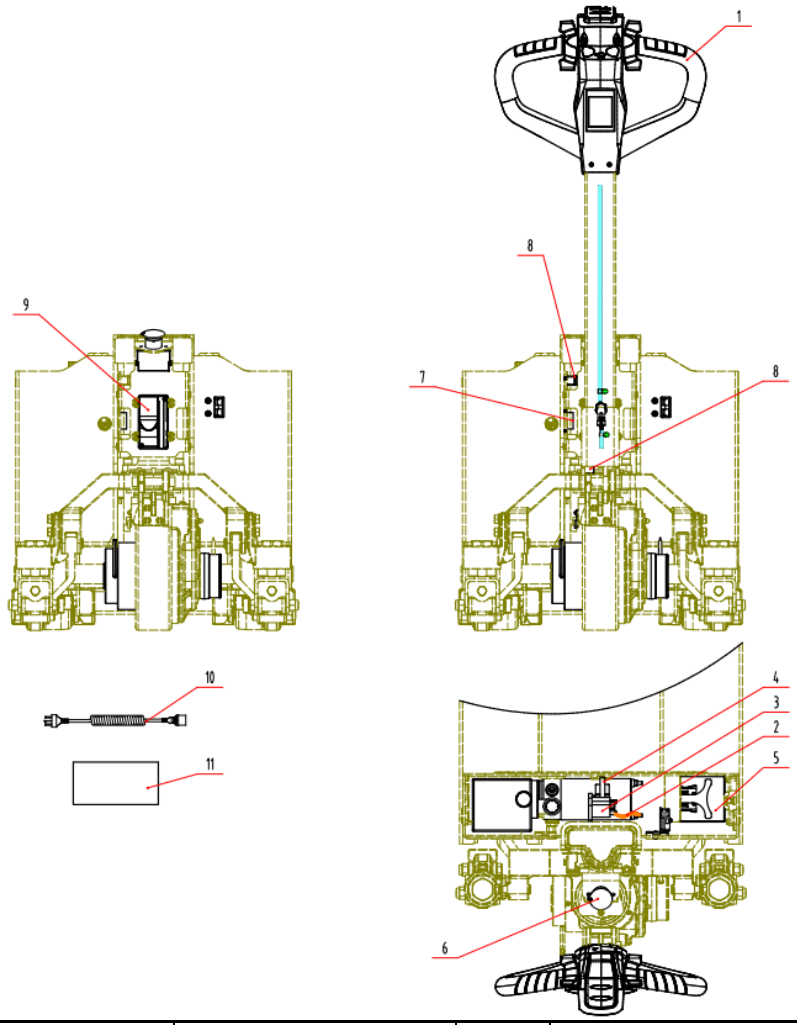
Fill the need oil into the tank. Required amount is 450ml. Tighten the screw at the filler after adding oil. Resume to the normal operation after 3 times of lifting without load.

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

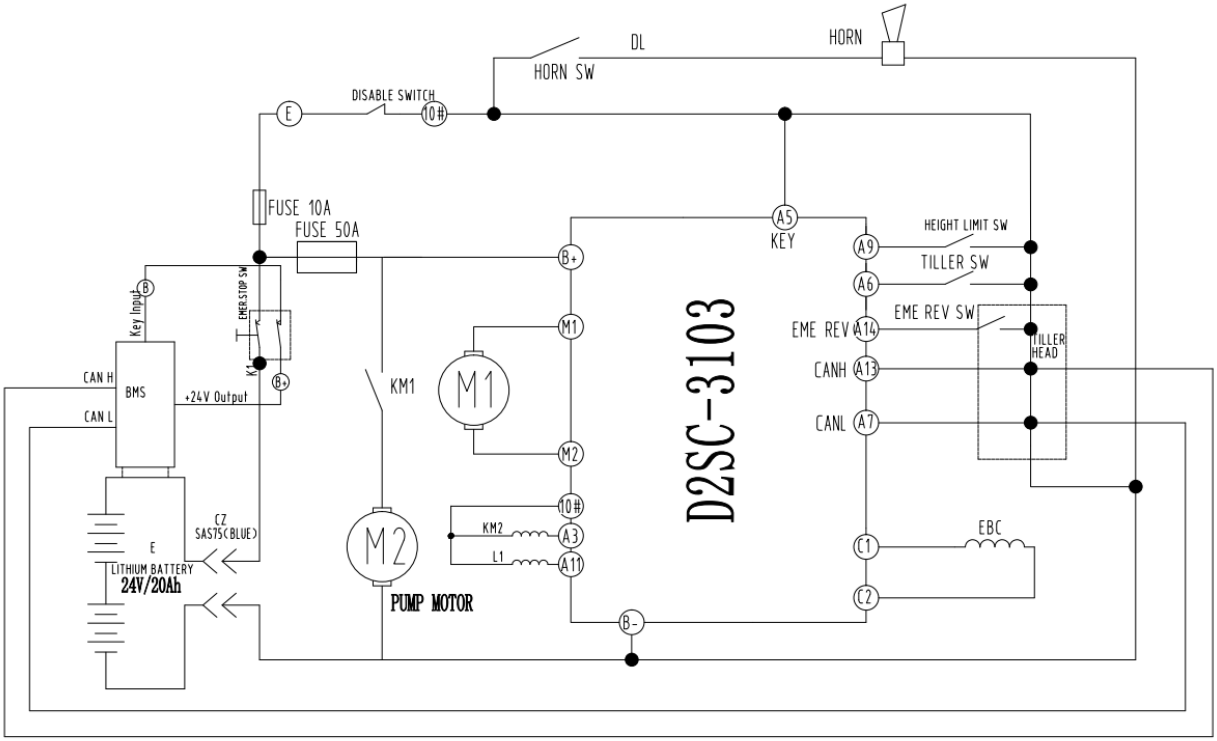
4.1 Electric system diagram



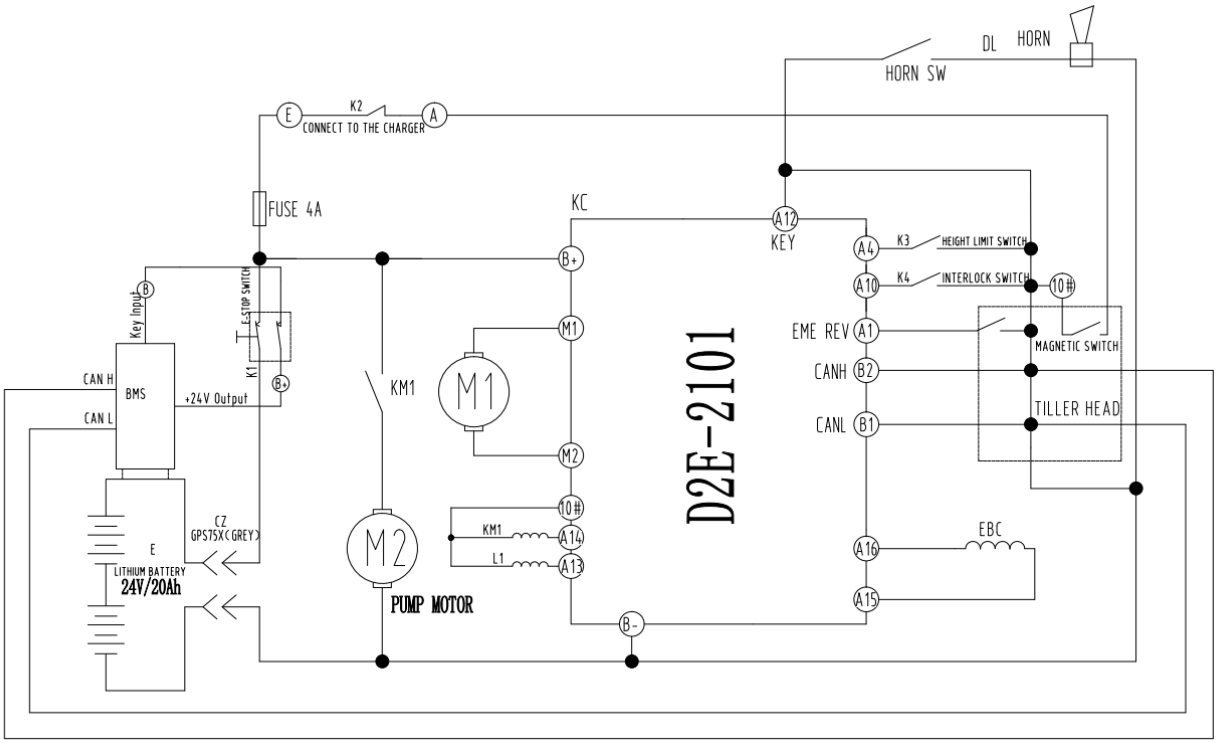
No.	Drawing No.	Description	No.	Drawing No.	Description
1	740.01.0013.01	Tiller head	7	CBD15WE.01.03-02	Buzzer
2	CBD12W-Li.01.02-03	P+ line	8	CBD18KD-I.01-03	Proximity sensor
3	761.02.2100.01	Contactor	9	CBD15W-IILi.01-01	Controller
4	226.02.0800.01	Hoop		831.03.0075.01	Power line
5	718.24.0020.04	Lithium battery		726.04.2406.03	Charger
6	730.01.0080.01	E-stop switch			

4.2 Electrical schematic diagram

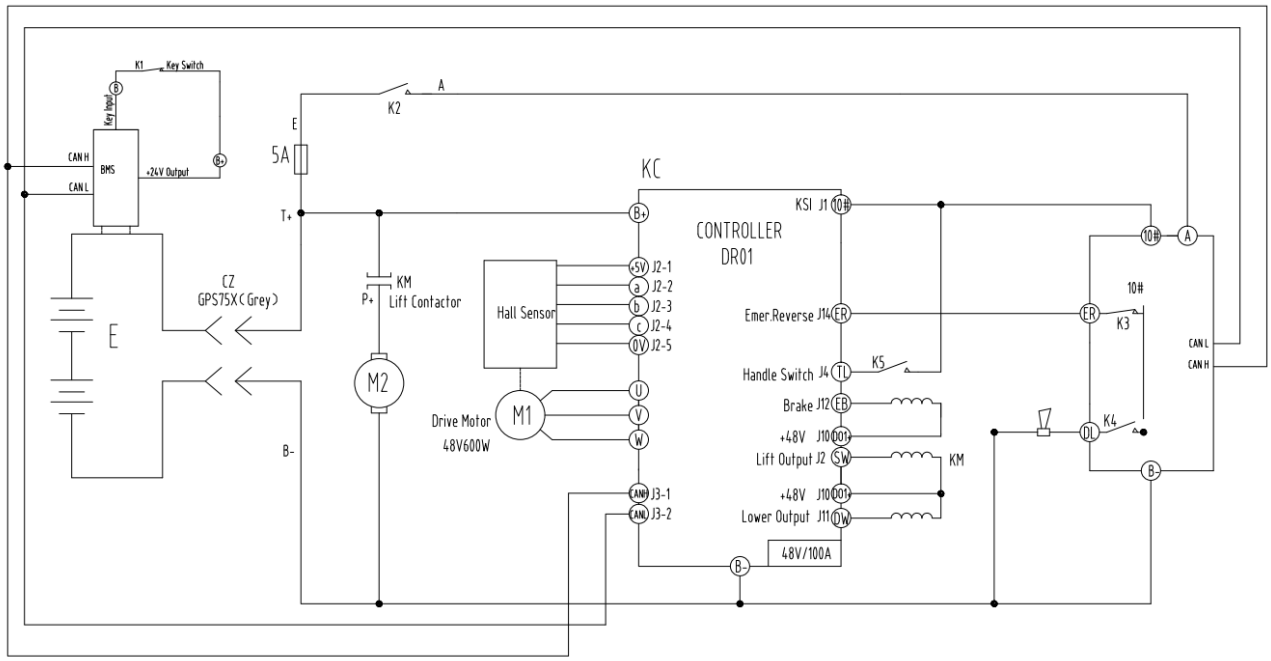
1.5T



1.5T Euro type (new)



2T Euro type (new)



4.3 Electrical components

4.3.1 Controller

4.3.1.1 Controller specification

1.5T brush controller

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	-13°F~+131°F

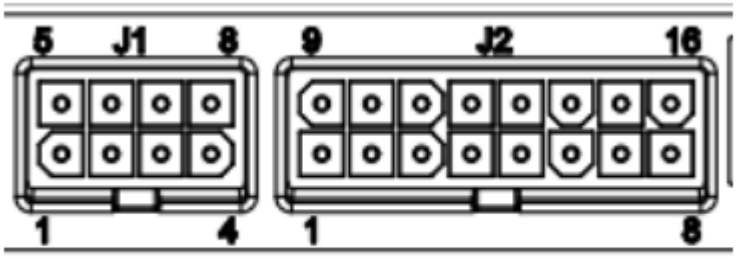
2T brushless controller

S/N	Item	Parameter
1	Rated voltage	48V
2	2min working current	50A
3	1 hour working current	35A
4	10S working current	70A
5	Working temperature	-13~122°F
6	Storage temperature	-40~185°F
7	Controller derating range	Derating at 185°F~203°F, Stop output at 203°F; derating at -40~-77°F, Stop output at-40°F.

8	Communication type	CAN communication
9	Working humidity	≤95% RH
10	Protection level	IP65（connnector IP54）
11	Tightening torque at terminal end U、V、W、B+、B-	1.7Nm±0.1Nm
12	Weight	1.6lbs
13	Design life	≥5000h
14	EMC standard	EN12895:2015
15	Safety standard	EN1175、EN13849-1
16	Vibration standard	EN60068-2-6、EN60068-2-27

4.3.1.2 Pin identification

4.3.1.3 1.5T controller



J1		J2	
J1-1	CANL	J2-1	Emergency reverse signal input
J1-2	CANH	J2-4	Lifting limit signal input
J1-6	GND	J2-8	+24V
		J2-10	Interlock signal input
		J2-12	
		J2-13	
		J2-13	

J1-7 CANL
J1-9
J1-11 Lowering signal input
J1-13 CANH
J1-14

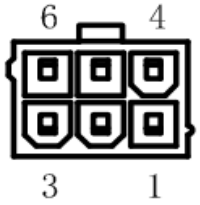
2T controller

The power terminal of this driver uses M5 studs, and the signal terminal uses Molex Minifit series connectors (18PIN, 6PIN, and 4PIN). The specific connector models are shown in the table below:

Position	Brand	Connector seat mode	Connector mode	Terminal mode
J1	Stark	39281063	39012065	45750

J2	Stark	39281043	39012045	45750
J3	Stark	39281183	39012185	45750

J1 connector diagram and pin definition



J1

Pin number	Description
1	**5V**
2	**HALL_A**
3	**HALL_B**
4	**HALL_C**
5	**GND**
6	**TEMP**

Description：

1) Equipped with a motor temperature detection port, which is able to detect the motor temperature.
2) Control algorithm can realize the function of motor Hall sensor disconnection protection.

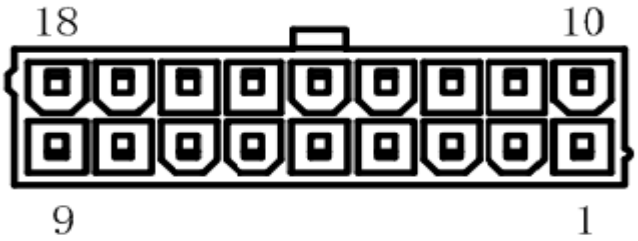
J2 connector diagram and pin definition

The host computer can set the operating parameters of the controller through this port.

J2

Pin number	Description
1	CANL
2	GND
3	CANH
4	14V

J3 connector diagram and pin definition



Pin number	Description:	Pin number	Description
1	KSI	10	Load circuit
2	Lift pump valve drive	11	Drive of lowering pump valve
3	Interlock switch	12	Band-type brake drive
4	Analog/digital port 2	13	Signal ground
5	Battery power output/fault lamp display	14	Emergency reverse switch
6	Analog/digital port 1	15	Charging prohibited
7	Throttle sliding end	16	Throttle high level terminal
8	Backward switch	17	Forward switch
9	Lift switch	18	Mode switch

Description

1. Analog/digital port 1 or analog/digital port 2 can be set as a lowering valve switch through parameters settings.

2. The fault light display port can be connected to an external LED, and the fault code display can be achieved by flashing the LED. Slow flashing is ten digits, fast flashing is one digit, and the LED positive pole is connected to the driver.

4.3.1.4 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
EMR Sequencing Fault	22
Overvoltage Cutback	15
Undervoltage Cutback	14
Controller Overtemp Cutback	11
Pump SRO Fault	25
Creep Mode Fault	26
SRO Fault	27
Software Fault	36
Motor Temp Hot Cutback	44
Motor Overtemperature	46
Low BDI	51
Controller Overcurrent	52
Controller Severe Overtemp	53
Controller Undertemp Cutback	54
Parameter Change Fault	55
Severe Overvoltage	56
Motor Short	61
Motor Open	62
Gage PDO Timeout	63
PDO Timeout	64
BMS PDO Timeout	65
Driver 1 On Fault	66
Driver 2 On Fault	67
Driver 1 Off Fault	71
Driver 2 Off Fault	72
Severe Undervoltage	29

2T controller

Fault code	fault type	Possible causes	Trouble shooting
1	Power unit protection	1.The motor is blocked; 2.The internal wiring of the motor is loose; 3.The working condition is abnormal	◆Check whether the motor is stuck; ◆Contact the agent or manufacturer; ◆Restart
2	Accelerating over current	1.Over steep acceleration curve; 2. Excessive load;	◆Check acceleration and deceleration time; ◆Remove the overload;

3	Deceleration overcurrent	1. Over steep deceleration curve; 2. Excessive load;	◆Restart
4	Constant speed overcurrent	1. Excessive load;	
5	Accelerating over voltage	1. Excessive input voltage; 2. The acceleration curve is too steep;	◆Regulate the input voltage; ◆Check acceleration and deceleration time; ◆Restart
6	Deceleration overvoltage	1. Excessive input voltage; 2. The deceleration curve is too steep;	
7	Constant speed overvoltage	1. Excessive input voltage;	
9	Under voltage fault	1. Instantaneous power failure of input power supply; 2. Too low input voltage; 3. The power line is too thin;	◆ Remove external power supply problems; Check whether the power supply is disconnected during operation and whether the power line is thick enough; ◆Adjust the input voltage; ◆Restart
12	Motor overload	1. Improper parameter setting; 2. Excessive load;	◆Adjust parameters; ◆Reduce load; ◆Restart
13	Motor phase loss	1. The internal wiring of the motor is loose; 2. The motor is damaged;	◆Check the motor for internal damage caused by external force extrusion; ◆Restart
14	Drive overtemperature fault	1. Drive temperature too high	◆Heat dissipation instrument (electric fan, etc.) can be added for operation after the temperature drops ◆Restart
23	Parameter setting failure	Parameter setting error;	◆Set parameters correctly; ◆Restart
24	BUS charging failure	1. Charging circuit failure	◆Contact the agent or manufacturer
25	Memory failure	Motor storage data is abnormal;	◆Contact the agent or manufacturer; ◆Restart
26	Motor locked-rotor	1. The motor is blocked;	◆Check the load; ◆Restart
27	Reverse rotation of motor	1. Excessive load reversal;	◆Check the load; ◆Restart
28	Motor out of synchronism	1. Too fast acceleration time;	◆Check acceleration and deceleration time; ◆Restart
29	Velocity loop saturation	1. Excessive load; 2. The rotation speed is set too high;	◆Reduce load; ◆Check the set speed; ◆Restart

30	IF startup failed	Drive loop fault	◆Contact the agent or manufacturer; ◆Restart
36	Hall sensor fault, not data between 1~6	1.The Hall sensor inside the motor is faulty; Hall detection loop fault	◆Check whether the level jump inside the motor is normal; ◆Contact the agent or manufacturer; ◆Restart
37	Hall sensor fault, wrong phase sequence 1	1.The Hall sensor inside the motor is faulty; Hall detection loop fault	◆Check if the internal Hall level jump of the motor is normal ◆Contact the agent or manufacturer; ◆Restart
38	Hall sensor fault, wrong phase sequence 2	1.The Hall sensor inside the motor is faulty; Hall detection loop fault	◆Check if the internal Hall level jump of the motor is normal; ◆Contact the agent or manufacturer; ◆Restart
39	Hall sensor fault, wrong phase sequence 3	1.The Hall sensor inside the motor is faulty; Hall detection loop fault	◆Check if the internal Hall level jump of the motor is normal; ◆Contact the agent or manufacturer; ◆Restart
40	Hall sensor fault, wrong phase sequence 4	1.The Hall sensor inside the motor is faulty; Hall detection loop fault	◆Check if the internal Hall level jump of the motor is normal; ◆Contact the agent or manufacturer; ◆Restart
41	Hall sensor fault, wrong phase sequence 5	1.The Hall sensor inside the motor is faulty; Hall detection loop fault	◆Check if the internal Hall level jump of the motor is normal; ◆Contact the agent or manufacturer; ◆Restart
42	Hall sensor fault, wrong phase sequence 6	1.The Hall sensor inside the motor is faulty; Hall detection loop fault	◆Check if the internal Hall level jump of the motor is normal; ◆Contact the agent or manufacturer; ◆Restart
43	Hall sensor failure, CAP acquiring same phase sequence for two consecutive times	1.The Hall sensor inside the motor is faulty; Hall detection loop fault	◆Check if the internal Hall level jump of the motor is normal; ◆Contact the agent or manufacturer; ◆Restart
44	CAP, interval too small	1.The Hall sensor inside the motor is faulty; Caused by interference signal Hall detection loop fault	◆Check if the internal Hall level jump of the motor is normal; ◆Contact the agent or manufacturer; ◆Restart
45	CAP interrupt, non-four-channel capture signal abnormal	1.The Hall sensor inside the motor is faulty; Hall detection loop fault	◆Check if the internal Hall level jump of the motor is normal; ◆Contact the agent or manufacturer; ◆Restart
47	Band-type brake load detection fault	1.Brake circuit is open; Short circuit of brake circuit	◆Check whether the brake load has been connected;

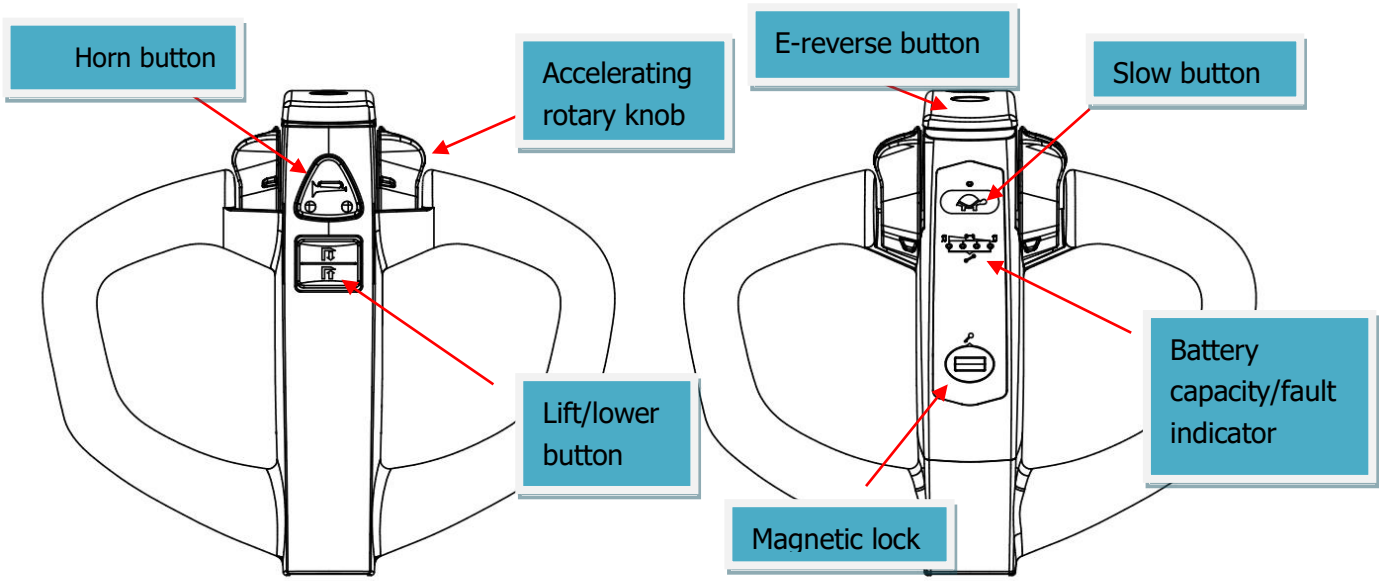
			◆Contact the agent or manufacturer; ◆Restart
48	Pump load detection failure	1.Open circuit of lifting pump circuit Short circuit of lifting pump circuit	◆Check whether the lifting pump load has been connected; ◆Contact the agent or manufacturer; ◆Restart
49	Valve load detection failure	1.Dropping valve circuit is open Short circuit of descending valve circuit	◆Check whether the lowering valve load has been connected; ◆Contact the agent or manufacturer; ◆Restart
50	Parameter mismatch fault	P1.arameter configuration conflict	◆ Check whether the parameter configuration is correct; ◆Contact the agent or manufacturer; ◆Restart
51	Pre-charge fault	1.The input voltage is too low; KSI voltage pulled down during use	◆Check whether the input voltage is reasonable; ◆Check whether KSI voltage is pulled down during use; ◆Contact the agent or manufacturer; ◆Restart
52	Brake speed fault	1.The rotating speed is higher than the fault threshold when the brake is applied;	◆Check whether the brake force is insufficient to cause the slope to slide down; ◆Contact the agent or manufacturer; ◆Restart
53	Brake output detection fault	1.Brake circuit is open; Short circuit of brake circuit	◆Check whether the brake load has been connected; ◆Contact the agent or manufacturer; ◆Restart
54	Pump output detection fault	1.Open circuit of lifting pump circuit; Short circuit of lifting pump circuit	◆Check whether the lifting pump load has been connected; ◆Contact the agent or manufacturer; ◆Restart
55	Dropping valve output detection fault	1.Dropping valve circuit is open; Short circuit of descending valve circuit	◆Check whether the lowering valve load has been connected; ◆Contact the agent or manufacturer; ◆Restart
56	The input voltage of analog quantity 2 is judged as incorrect by the slave computer	1.Open circuit of analog quantity 2 input circuit slave circuit Short circuit of analog 2 input circuit and slave circuit	◆Check whether the input circuit of analog quantity 2 is abnormal; ◆Contact the agent or manufacturer; ◆Restart
57	The lifting switch slave judges that the	1.The input circuit of lifting switch is in open circuit	◆Check whether the input circuit of lifting switch is abnormal;

	IO port is incorrect	The input circuit of lifting switch is shorted to the slave circuit	◆Contact the agent or manufacturer; ◆Restart
58	The forward switch slave judges that the IO port is incorrect	1.The input circuit of forward switch is in open circuit The input circuit of forward switch is shorted to the slave circuit	◆Check whether the input circuit of forward switch is abnormal; ◆Contact the agent or manufacturer; ◆Restart
59	The mode switch slave judges that the IO interface is incorrect	1.The mode switch input circuit is open to the slave circuit Short circuit of mode switch input circuit and slave circuit	◆ Check whether the mode switch input circuit is abnormal; ◆Contact the agent or manufacturer; ◆Restart
60	The reverse switch slave judges that the IO interface is incorrect	1.The input circuit of the reversing switch is in open circuit The input circuit of the reversing switch is shorted to the slave circuit	◆Check whether the input circuit of the reversing switch is abnormal; ◆Contact the agent or manufacturer; ◆Restart
61	Analog 1 input voltage slave judges that IO port is incorrect	1.The input circuit of analog quantity 1 is open to the slave circuit Short circuit of analog quantity 1 input circuit and slave circuit	◆Check whether the input circuit of analog quantity 1 is abnormal; ◆Contact the agent or manufacturer; ◆Restart
62	Incorrect IO port judged by interlocking switch slave	1.The input circuit of interlock switch is in open circuit The input circuit of interlock switch is shorted to the slave circuit	◆ Whether the input circuit of interlocking switch is abnormal; ◆Contact the agent or manufacturer; ◆Restart
63	The emergency reverse switch slave judges that the IO interface is incorrect	1.The input circuit of emergency reverse switch is in open circuit The input circuit of emergency reverse switch is shorted to the slave circuit	◆ Whether the input circuit of emergency reverse switch is abnormal; ◆Contact the agent or manufacturer; ◆Restart
64	Slave communication failure	1.The slave MCU is abnormal; MCU communication circuit failure	◆Contact the agent or manufacturer; ◆Restart
65	Third-level fault of slave	1.The control of main MCU is out of control, and emergency treatment from MCU	◆Contact the agent or manufacturer; ◆Restart

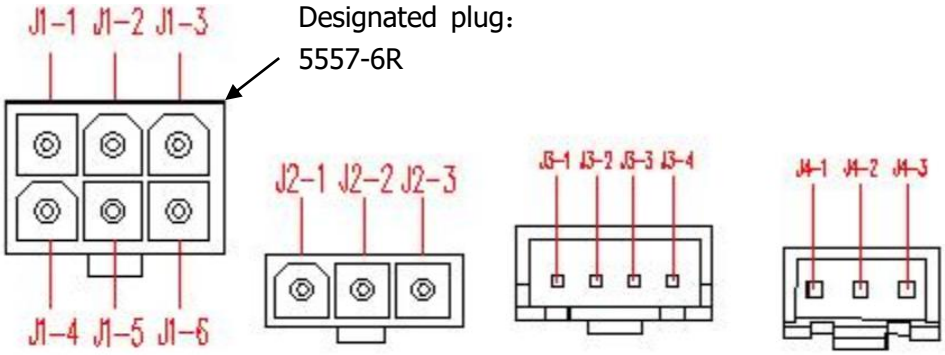
66	The slave judges that the rotating speed is too high	1.The speed is out of control and exceeds the maximum speed by 20%	◆Contact the agent or manufacturer; ◆Restart
67	The internal 5V voltage is abnormal	1.Internal 5V voltage fluctuation Setting error of internal 5V fault threshold parameter	◆Check whether the parameter setting is correct ◆Contact the agent or manufacturer; ◆Restart
68	Internal 15V voltage abnormal	1.Internal 15V voltage fluctuation Internal 15V fault threshold parameter setting error	◆Check whether the parameter setting is correct ◆Contact the agent or manufacturer; ◆Restart
69	External 5V voltage abnormal	1. Fluctuation of external 5V voltage 2. External 5V fault threshold parameter setting error	◆Check whether the parameter setting is correct ◆Contact the agent or manufacturer; ◆Restart
70	Main controller and battery communication failure	1.Battery BMS is abnormal; The communication line between the main controller and the battery is disconnected	◆ Check whether the harness is complete ◆Contact the agent or manufacturer; ◆Restart
71	Lithium battery overvoltage fault	1. Overvoltage caused by charging of lithium battery 2. Voltage rise caused by electricity generated by the brake of the controller under full battery condition	◆Check whether the lithium battery has been charged and over-voltage ◆Contact the agent or manufacturer; ◆Restart
73	Serious failure of lithium battery	1. The battery BMS detects a serious fault. 2. The battery power is extremely low	◆Check whether the lithium battery has serious fault ◆Check whether the battery power is extremely low; ◆Restart
74	Low battery warning of lithium battery	1.Low battery warning	◆Check whether the battery power is low; ◆Replace the battery
75	Drive overvoltage protection failure	1.Instantaneous BUS voltage is too high	◆ Check whether there is working condition causing rapid rise of BUSbar voltage during use; ◆Restart
76	Master and slave MCU communication failure	1.Master and slave MCU communication failure MCU communication circuit failure	◆Contact the agent or manufacturer; ◆Restart

77	Loss of Hall signal from MCU	1.Open circuit from MCU Hall circuit	◆Contact the agent or manufacturer; ◆Restart
80	The power-on self-test interlock switch is not reset	1.The interlocking switch is not reset	◆Reset all switches
81	Power-on BIT forward switch not reset	1.The forward switch is not reset	◆Reset all switches
82	Power-on self-test backward switch not reset	1.The backward switch is not reset	◆Reset all switches
83	The throttle switch is not reset during power-on self-inspection	1.Throttle switch is not reset	◆Reset all switches
84	Power-on BIT emergency switch not reset	1.The emergency reverse switch is not reset	◆Reset all switches
85	The lifting switch is not reset during power-on self-inspection	1.The lifting switch is not reset	◆Reset all switches
86	Power-on self-test lowering valve switch not reset	1.The lowering valve switch is not reset	◆Reset all switches
87	Control signal timing fault	1.Incorrect operation sequence	◆Reset all switches
88	Vehicle running direction key failure	1.Forward and backward are effective at the same time	◆Reset all switches
89	Emergency reverse warning	1.Triggered after emergency stop	◆Reset all switches
90	Time sequence fault	1.Incorrect operation sequence	◆Reset all switches

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



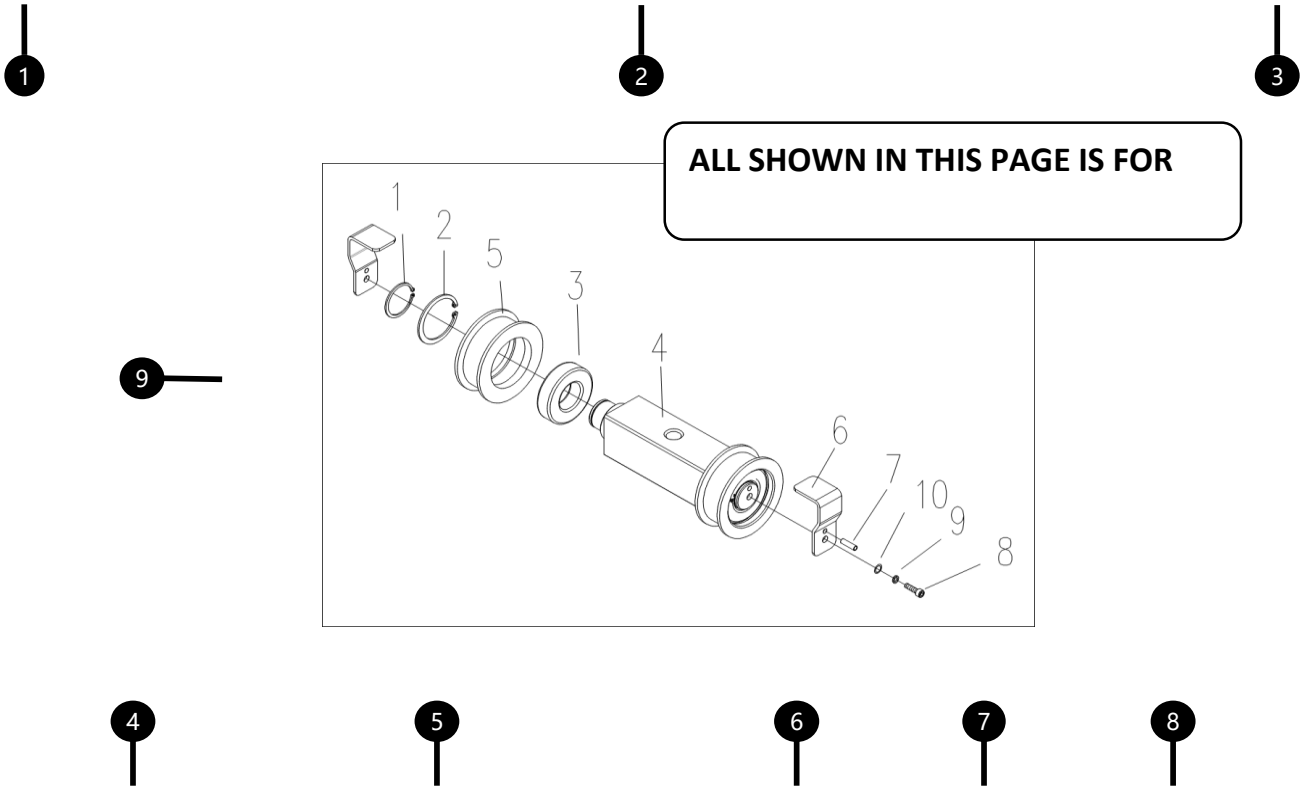
J1-1	B+	J2-1	Lift/lower B+（input)
J1-2	Anti-collision (output)NC	J2-2	Lift signal input
J1-3	GND	J2-3	Lower signal input
J1-4	CAN H(output)	Port identify	Function
J1-5	CAN L(output)		
J1-6	Horn(output)NO		
Port identify	Function		

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

Chain roller assy (130.04.0760.01)

Index No.: 0.03

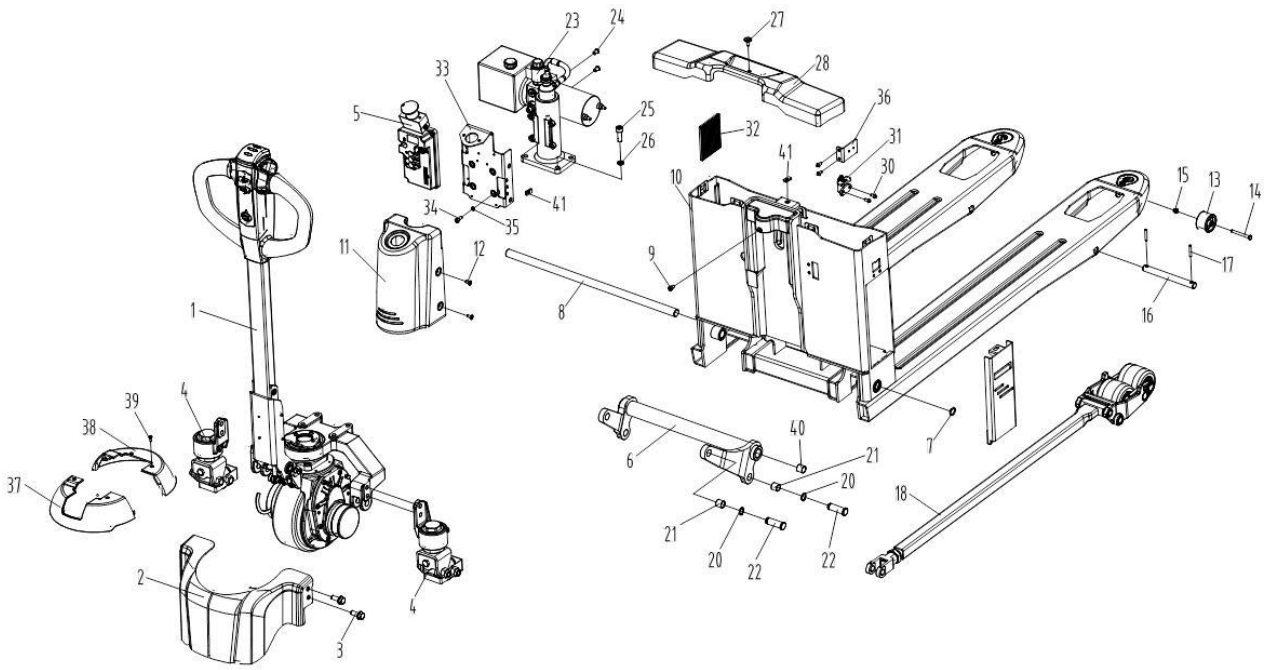


No.	Part No.	Description	Specification	Qty	Remark	
1	41305000018	Retaining ring 30		2		
2	41304000021	Retaining ring 62		2		
3	43001000046	Bearing 6206-2RS		2		
4	21703000178	Step shaft		1		
5	21311000010	Chain roller		2		
6	22003000044	Bent plate		2		
7	41402000009	Pin 4X20		2		
8	41100000041	Screw M6X16		2		
9	41300000004	Washer 6		2		
10	41301000004	Washer 6		2		

Contents

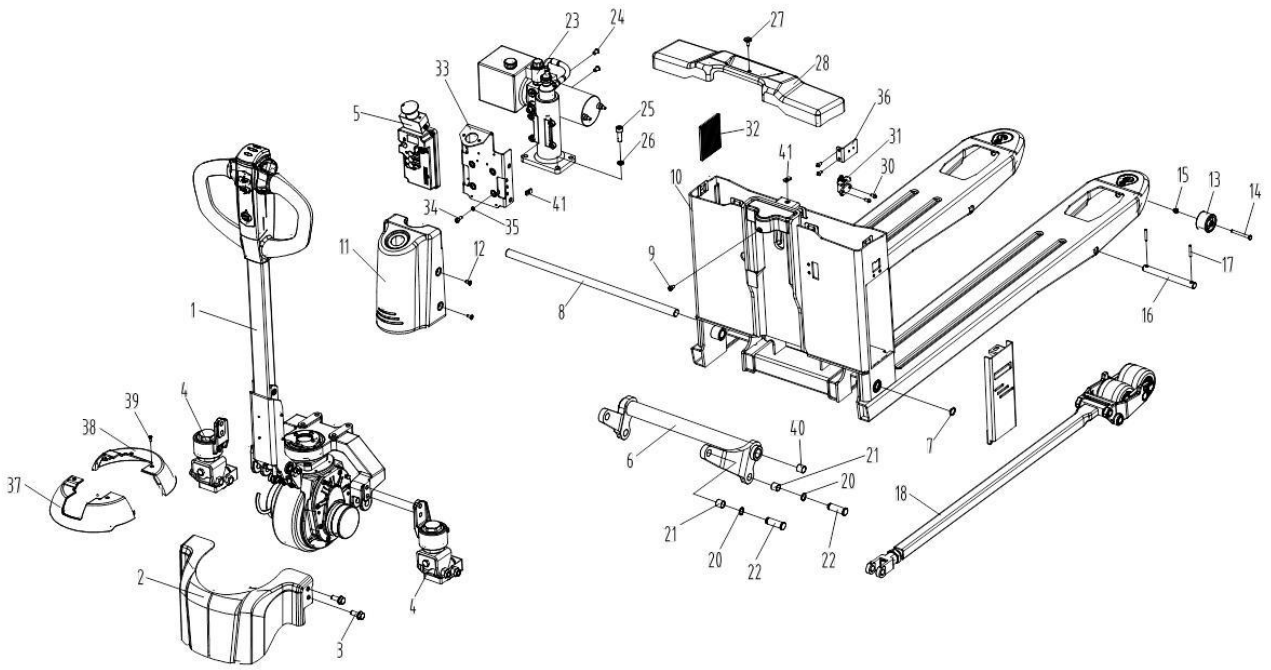
Master assy （CBD15W-ⅡLi-00）

Index No.：0.00



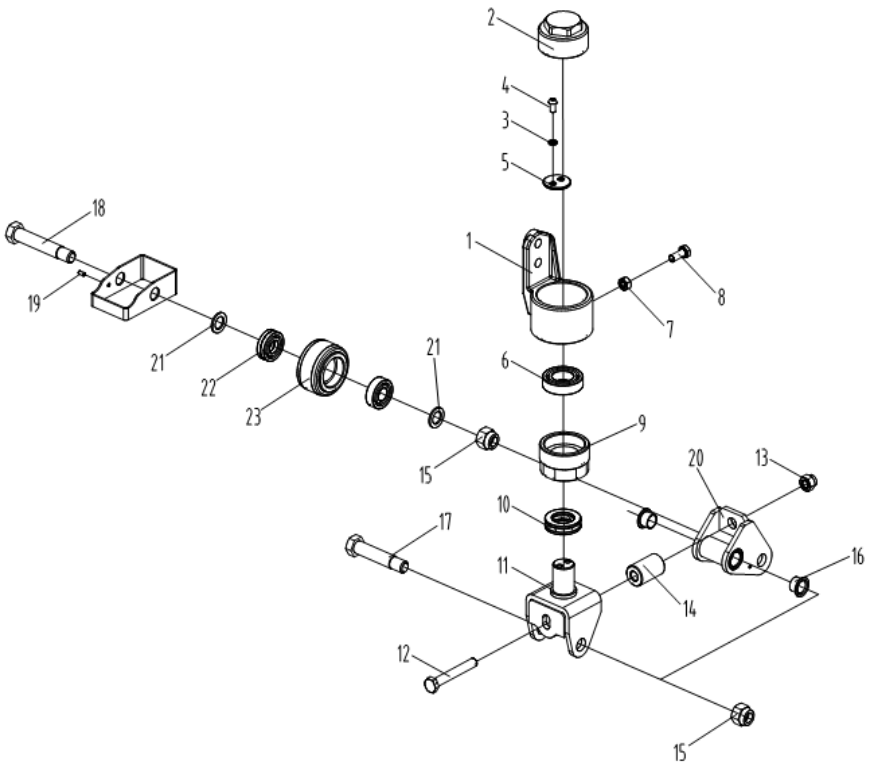
No.	Part No.	Description	Specification	Qty	Remark	
1	30402000225	Steering gear master assy		1	Y	See 3.00
2	20521000227	Rear housing		1		
3	41004000028	Bolt M10X25		4		
4	31303000033	RH balance wheel assy	Option	1	Y	See 0.01
4	31303000034	LH balance wheel assy	Option	1	Y	See 0.02
4	21901003056	Rectangular plate	For truck without balance wheel	2		
5	NULL	Electric system		1	Y	See 1.00
5	NULL	Electric system	Euro type	1	Y	See 1.00A
6	31601000211	Rocker arm assy	550	1		
6	31601000223	Rocker arm assy	685	1		
7	41304000005	Retaining ring 20		2		
8	21704000030	Pin shaft		1		
9	41101000027	Screw M6X8		1		
10	30701004378	Truck frame assy	550X1150	1		
10	30701004379	Truck frame assy	550X1220	1		
10	30701004528	Truck frame assy	550X1150/guide roller	1		
10	30701004529	Truck frame assy	550X1220/guide roller	1		
10	30701004380	Truck frame assy	685X1150	1		
10	30701004381	Truck frame assy	685X1220	1		
10	30701004532	Truck frame assy	685X1150/guide roller	1		
10	30701004533	Truck frame assy	685X1220/guide roller	1		
11	30806000129	Front housing assy		1		
12	41102000002	Screw M6X16		4		
13	21312000094	Roller	Option	2		
14	41001000003	Bolt M6X55	Option	2		
15	41208000005	Nut M6	Option	2		
16	21702000031	Hole pin shaft		2		

Date: 2022/11/10	Master assy （CBD15W-ⅡLi-00）	Index No.: 0.00



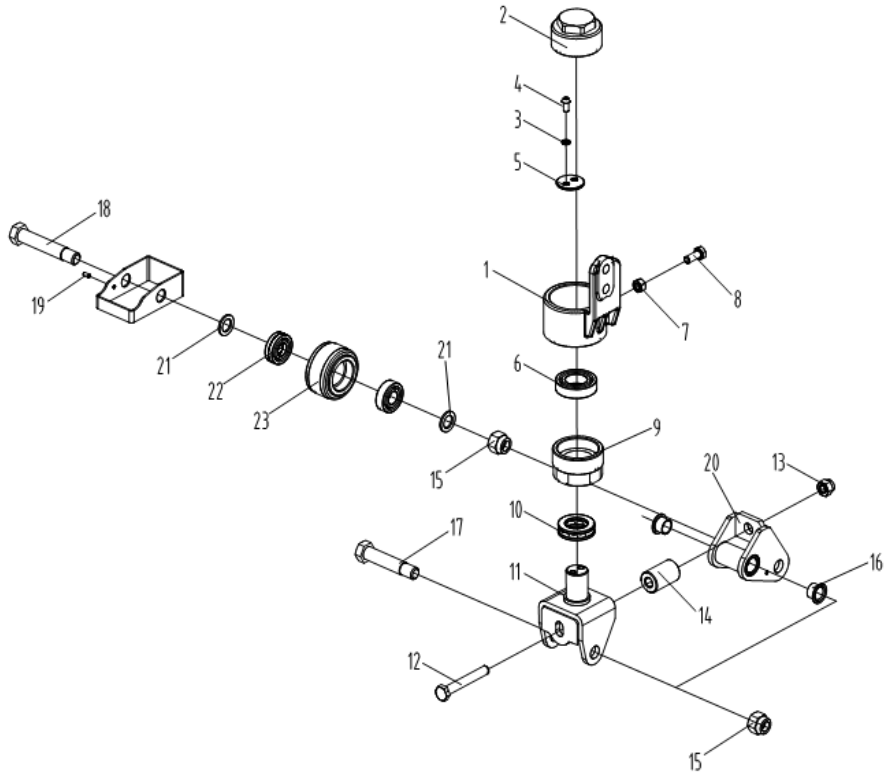
No.	Part No.	Description	Specification	Qty	Remark	
17	41402000022	Pin 5X32		4		
18	31605001910	Connecting rod and roller carriage assy	1150/single roller/Lithium battery	2	Y	See 4.00
18	31605001911	Connecting rod and roller carriage assy	1220/single roller/Lithium battery	2	Y	See 4.00
18	31605001912	Connecting rod and roller carriage assy	1150/double rollers/Lithium battery	2	Y	See 4.00
18	31605001913	Connecting rod and roller carriage assy	1220/double rollers/Lithium battery	2	Y	See 4.00
20	41305000008	Retaining ring 16		4		
21	43100000018	Bearing SF-1-16.16		4		
22	21703000075	Step shaft		4		
23	30201001162	Hydraulic system		1	Y	See 2.00
24	41101000014	Screw M8X12		2		
25	41100000099	Screw M10X30		4		
26	41300000008	Washer 10		4		
27	20101000021	Screw		1		
28	20521000229	Housing		1		
29	30801000114	Side door assy		1		
30	41101000008	Screw M6X12		4		
31	31128000014	Lock catch assy		1	Y	See 0.03
32	21412000095	Rubber pad		1		
33	31111000189	Support frame assy		1		
34	41100000039	Screw M6X14		4		
35	41300000004	Washer 6		4		
36	22003003723	Bent plate		1		
37	20521000230	Front housing		1		
38	20521000231	Rear housing		1		
39	41102000018	Screw M4X8		4		
40	43100000033	Bearing SF -1-20.20		2		
41	20102000025	Nut		5		

Date: 2022/11/10	RH balance wheel assy （010.02.1060.03）	Index No.：0.01



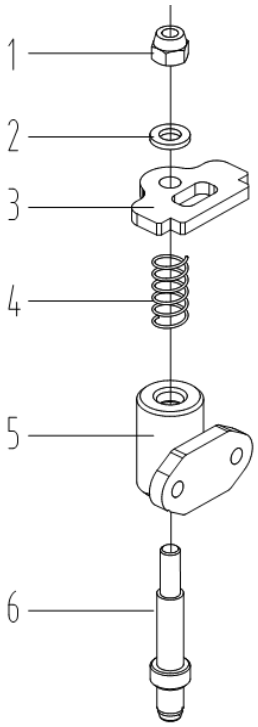
No.	Part No.	Description	Specification	Qty	Remark	
1	21304000008	RH balance wheel seat		1		
2	21206000147	Fixing seat		1		
3	41300000004	Washer 6		2		
4	41101000008	Screw M6X12		2		Blackening
5	21809000008	Washer		1		
6	43005000006	Bearing 6105-2RS		1		
7	41200000008	Nut M8		1		
8	41002000012	Bolt M8X20		1		
9	21216000046	Bearing seat		1		
10	43010000006	Bearing 51105		1		
11	31304000017	Blance wheel carriage assy		1		
12	41002000026	Bolt M10X70		1		
13	41208000008	Nut M10		1		
14	21605000038	Compression spring		1		
15	41208000009	Nut M14		2		
16	43101000021	Bearing SF-1F-150.120		2		
17	20104000051	Bolt		1		
18	20104000037	Bolt		1		
19	41402000015	Pin 4X8		1		
20	31308000033	Wheel carriage assy		1		
21	21809000192	Washer		1		
22	43001000011	Bearing 6202-ZZ		2		
23	21312000121	Roller		1		
24	30810000034	Protective plate assy		1		

Date: 2022/11/10	LH balance wheel assy （010.02.1060.04）	Index No.：0.02



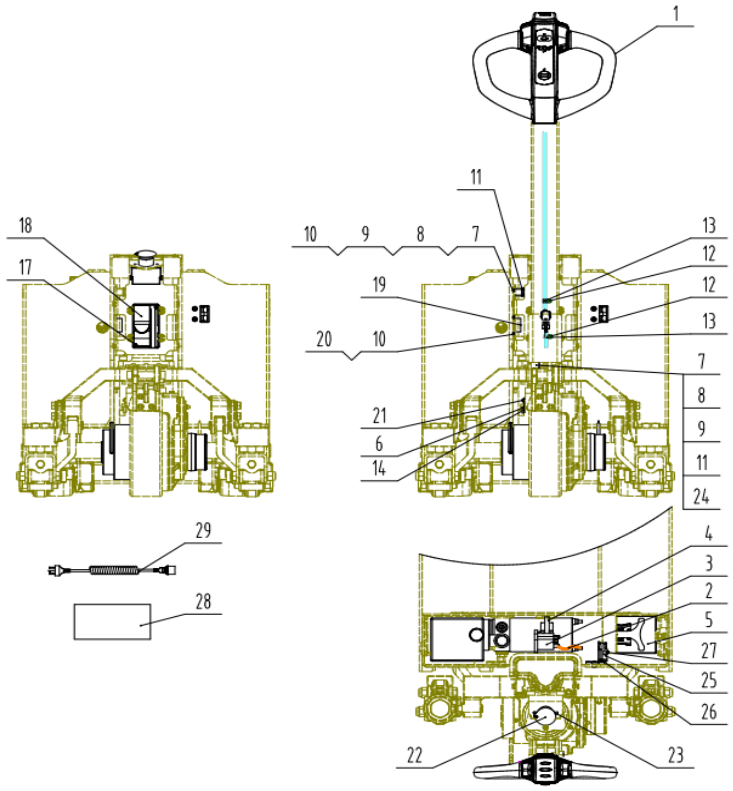
No.	Part No.	Description	Specification	Qty	Remark	
1	21304000009	LH balance wheel seat		1		
2	21206000147	Fixing seat		1		
3	41300000004	Washer 6		2		
4	41101000008	Screw M6X12		2		Blackening
5	21809000008	Washer		1		
6	43005000006	Bearing 6105-2RS		1		
7	41200000008	Nut M8		1		
8	41002000012	Bolt M8X20		1		
9	21216000046	Bearing seat		1		
10	43010000006	Bearing 51105		1		
11	31304000017	Blance wheel carriage assy		1		
12	41002000026	Bolt M10X70		1		
13	41208000008	Nut M10		1		
14	21605000038	Compression spring		1		
15	41208000009	Nut M14		2		
16	43101000021	Bearing SF-1F-150.120		2		
17	20104000051	Bolt		1		
18	20104000037	Bolt		1		
19	41402000015	Pin 4X8		1		
20	31308000033	Wheel carriage assy		1		
21	21809000192	Washer		1		
22	43001000011	Bearing 6202-ZZ		2		
23	21312000121	Roller		1		
24	30810000034	Protective plate assy		1		

Date: 2022/11/10	Lock catch assy （CBD15W-ⅡLi.19-00）	Index No.：0.03 31128000014



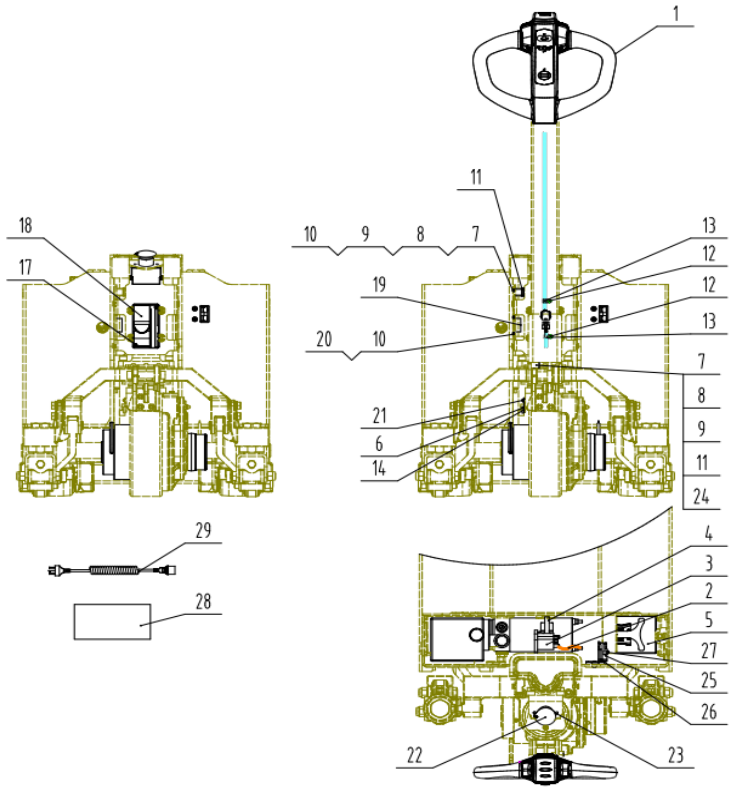
No.	Part No.	Description	Specification	Qty	Remark	
1	41208000005	Nut M6		1		
2	41301000004	Washer 6		1		
3	21920002149	Irregular plate		1		
4	21605000115	Compression spring		1		
5	31115000106	Support seat assy		1		
6	21703000682	Step shaft		1		

Date: 2022/11/10	Electric system （CBD15W-ⅡLi.01-00）	Index No.：1.00



No.	Part No.	Description	Specification	Qty	Remark	
1	30910000049	Tiller head		1		
2	35404000058	Power line		1		
3	35902000034	Contactor		1		
4	21009000044	Hoop		1		
5	35304000234	Lithium battery		1		20AH
5	35304000235	Lithium battery		1		30AH
5	35304000236	Lithium battery		1		50AH
6	41134000005	Screw M4X10		2		
7	41100000003	Screw M3X20		4		
8	41300000001	Washer 3		4		
9	41301000001	Washer 3		4		
10	41208000001	Nut M3		4		
11	35806000019	Proximity sensor		2		
12	41108000011	Screw M4X8		2		
13	21006000009	Fixing buckle		2		
14	20431000006	Terminal box		1		
15	35401000752	Control wiring harness		1		Mounted in the harness
15	20416000026	Fuse		1		
16	35401000753	Control wiring harness		1		
17	41134000012	Screw M4X25		2		Blackening
18	35105000048	Controller		1		
19	35703000008	Alarm		1		
20	41108000004	Screw M3X12		2		
21	41108000013	Screw M4X10		2		
22	35601000008	Emer.stop switch		1		
23	41109000015	Screw M5X12		2		
24	21901003405	Rectangular plate		2		

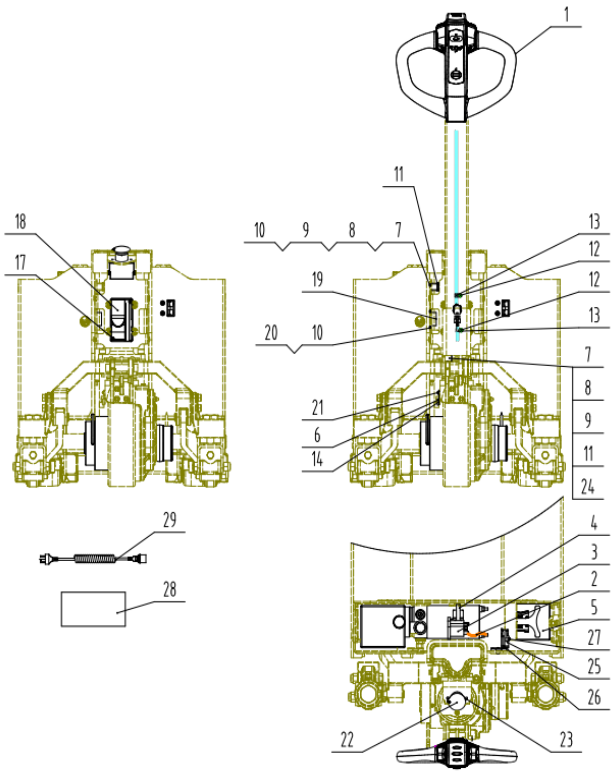
Date: 2022/11/10	Electric system （CBD15W-ⅡLi.01-00）	Index No.：1.00



No.	Part No.	Description	Specification	Qty	Remark	
25	35612000044	Micro switch		1		
26	21912000035	Spacer		2		
27	41134000002	Screw M3X25		2		Blackening
28	35206000323	Charger		1		European type
29	20413000022	Power line		1		Chinese type
29	20413000023	Power line		1		Asian type
29	20413000024	Power line		1		American type
29	20413000025	Power line		1		British type
29	20413000026	Power line		1		Swiss type
29	20413000027	Power line		1		Australian type
29	20413000028	Power line		1		Japanese type
29	20413000029	Power line		1		Brazilian
29	20413000030	Power line		1		

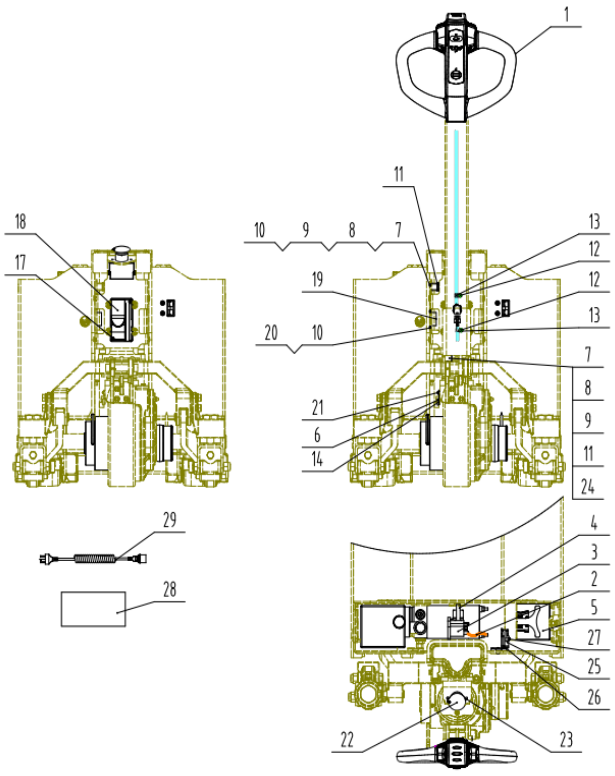
Electric system （CBD15W-ⅡLi/Y.01-00）

Index No.：1.00A



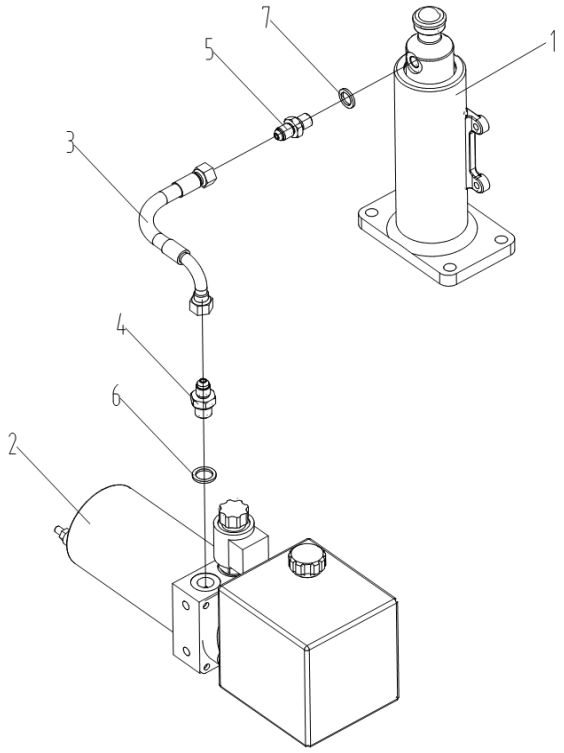
No.	Part No.	Description	Specification	Qty	Remark	
1	30910000060	Tiller head		1		
2	35404000058	Power line		1		
3	35902000034	Contactor		1		
4	21009000044	Hoop		1		
5	35304000294	Lithium battery		1		
6	41134000005	Screw M4X10		2		
7	41100000003	Screw M3X20		4		
8	41300000001	Washer 3		4		
9	41301000001	Washer 3		4		
10	41208000001	Nut M3		4		
11	35806000019	Proximity sensor		2		
12	41108000011	Screw M4X8		2		
13	21006000009	Fixing buckle		2		
14	20431000006	Terminal box		1		
15	35401000905	Control wiring harness		1		
15	20416000026	Fuse		1		Mounted in the harness
16	35401000906	Control wiring harness		1		
17	41134000012	Screw M4X25		2		Blackening
18	35105000056	Controller		1		
19	35703000008	Alarm		1		
20	41108000004	Screw M3X12		2		
21	41108000013	Screw M4X10		2		
22	35601000008	Emer.stop switch		1		
23	41109000015	Screw M5X12		2		
24	21901003405	Rectangular plate		2		
25	35612000044	Micro switch		1		
26	21912000035	Spacer		2		

Date: 2022/11/10	Electric system （CBD15W-ⅡLi/Y.01-00）	Index No.：1.00A



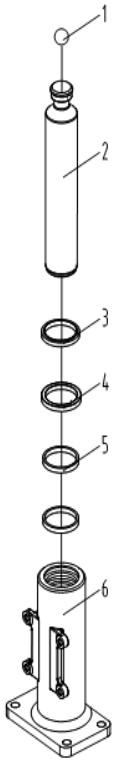
No.	Part No.	Description	Specification	Qty	Remark	
27	41134000002	Screw M3X25		2		Blackening
28	35206000376	Charger		1		
29	20413000022	Power line		1		European type
29	20413000023	Power line		1		Chinese type
29	20413000024	Power line		1		Asian type
29	20413000025	Power line		1		American type
29	20413000026	Power line		1		British type
29	20413000027	Power line		1		Swiss type
29	20413000028	Power line		1		Australian type
29	20413000029	Power line		1		Japanese type
29	20413000030	Power line		1		Brazilian

Date: 2022/11/10	Hydraulic system（CBD15W-ⅡLi.02-00）	Index No.：2.00



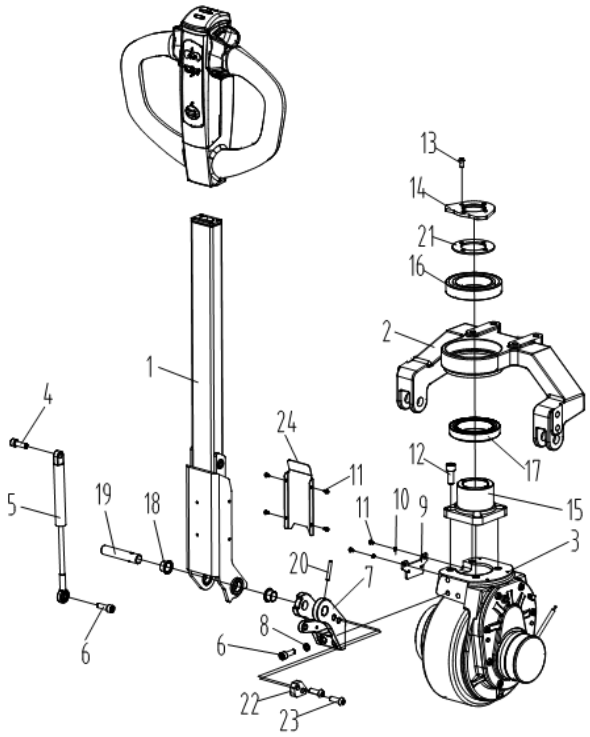
No.	Part No.	Description	Specification	Qty	Remark	
1	31003000855	Cylinder master assy		1	Y	See 2.01
2	30217000095	Hydraulic station assy		1		
3	31016000790	High pressure hose		1		
4	20313000290	Joint		1		
5	20313000003	Joint		1		
6	44007000008	Bonded washer 14		1		
7	44007000026	Bonded washer 12		1		

Date: 2022/11/10	Cylinder master assy （495.01.0400.20）	Index No.: 2.01 31003000855



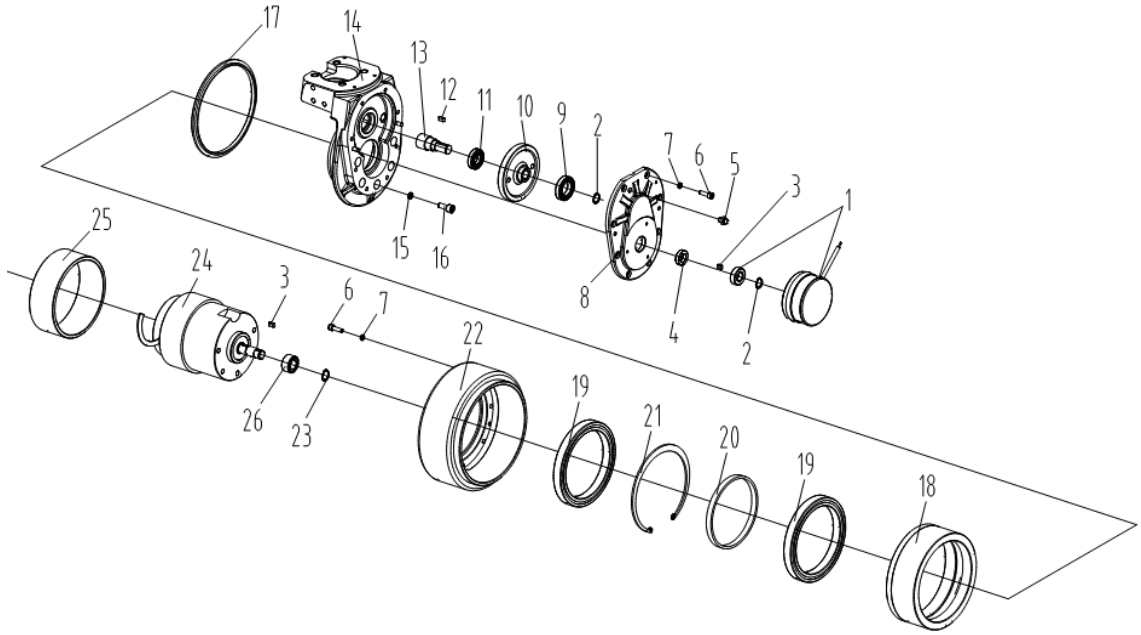
No.	Part No.	Description	Specification	Qty	Remark	
1	40002000017	Steel ball 19.05		1		
2	20304000430	Piston rod		1		
3	44112000017	Dust ring DH40-48-5/6.5		1		
4	44100000020	Seal ring UHS40-50-6		1		
5	44115000003	Guide tape BST5806-6-2.5		2		
6	21205000118	Base seat		1		

Date: 2022/11/10	Master assy （CBD15W-ⅡLi-00）	Index No.：3.00



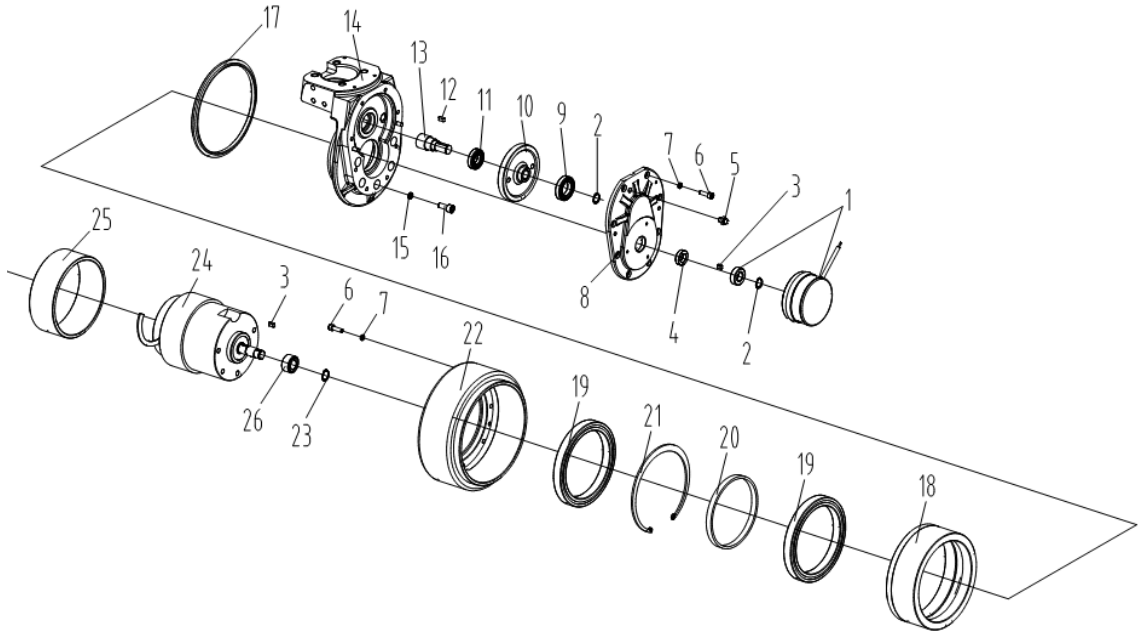
No.	Part No.	Description	Specification	Qty	Remark	
1	30907000163	Tiller assy		1		
2	21213000083	Support seat		1		
3	30304000019	Driving wheel master assy		1	Y	See 3.01
4	20101000010	Screw		1		
5	21607000031	Damping gas spring		1		
6	41100000068	Screw M8X25		4		
7	21212000008	Tiller seat		1		
8	41300000005	Washer 8		3		
9	21920002141	Irregular plate		1		
10	41300000002	Washer 4		2		
11	41108000014	Screw M4X10		6		
12	41100000097	Screw M10X25		4		
13	41101000009	Screw M6X16		4		
14	21809000190	Washer		1		
15	21207000009	Pedestal		1		
16	43001000084	Bearing 6013-2RS		1		
17	43005000005	Bearing 32913		1		
18	43101000004	Bearing SF-1F-160.120		2		
19	21702000231	Hole pin shaft		1		
20	41402000024	Pin 5X35		1		
21	21809000191	Washer		1		
22	21920002214	Irregular plate		1		
23	41101000025	Screw M8X25		2		
24	22003003558	Bent plate		1		

Date: 2022/11/10	Driving wheel with horizontal mounted motor master assy （082.01.0210.04）	Index No.: 3.01



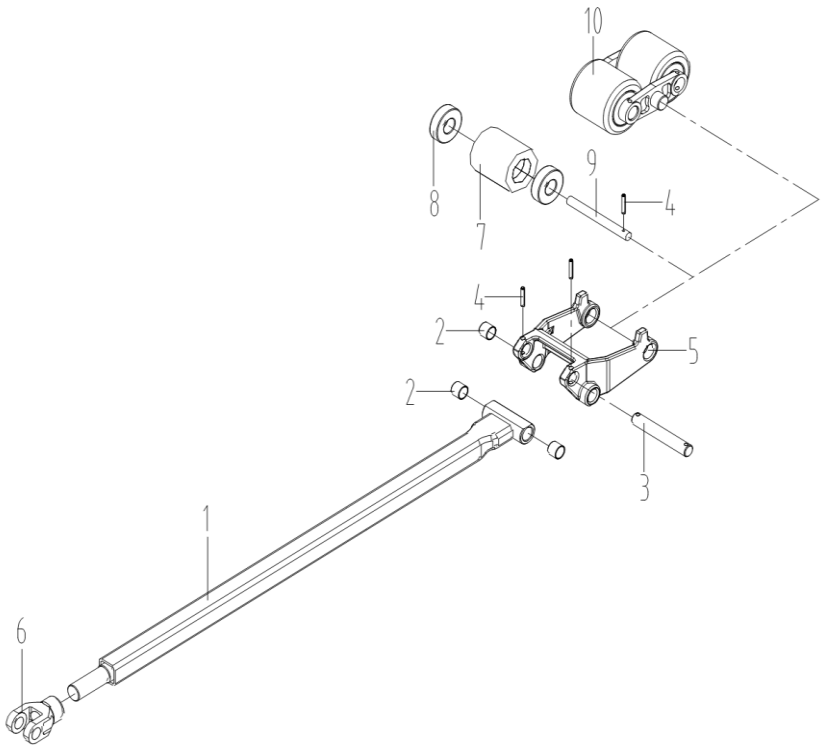
No.	Part No.	Description	Specification	Qty	Remark	
1	90030000501	Brake		1		
2	41305000007	Retaining ring 15		2		
3	42001000006	Flat key 5X5X14		2		
4	44005000036	Skeleton oil seal 16X28X7(TC)		1		
5	44001000003	Oil inlet M8X1		1		
6	41100000043	Screw M6X20		16		
7	41300000004	Washer 6		16		
8	90010000147	Case cover		1		
9	43001000035	Bearing 61905-ZZ		1		
10	90010000146	Tooth plate		1		
11	43001000124	Bearing 16003-2Z		1		
12	42001000009	Flat key 5X5X20		1		
13	90010000145	Straight tooth		1		
14	90010001058	Case		1		
15	41300000005	Washer 8		5		
16	41100000071	Screw M8×35		5		
17	90010000143	Oil seal OTC155X173.2X8.5		1		
18	90010000142	Straight ring		1		
19	43001000119	Bearing 61824-2RS		2		
20	90010000141	Washer		1		
21	41304000038	Retaining ring 150		1		
22	90010001059	Wheel		1		
23	41305000008	Retaining ring 16		1		
24	90030000502	Brush motor		1		
25	90010001060	Protective ring		1		
26	90010000140	Helical tooth		1		

Driving wheel with horizontal mounted motor master assy （082.01.0210.04）	Index No.: 3.01



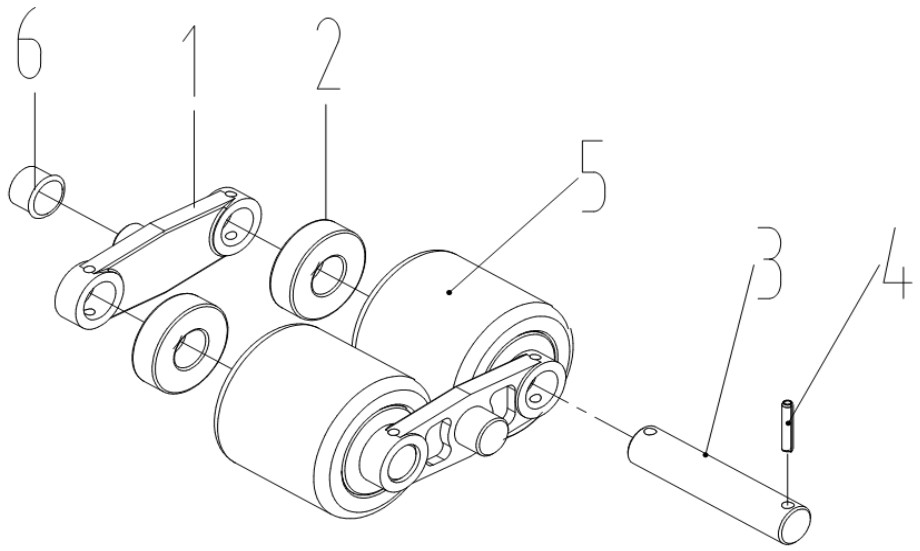
No.	Part No.	Description	Specification	Qty	Remark	
1	90030000501	Brake		1		
2	41305000007	Retaining ring 15		2		
3	42001000006	Flat key 5X5X14		2		
4	44005000036	Skeleton oil seal 16X28X7(TC)		1		
5	44001000003	Oil inlet M8X1		1		
6	41100000043	Screw M6X20		16		
7	41300000004	Washer 6		16		
8	90010000147	Case cover		1		
9	43001000035	Bearing 61905-ZZ		1		
10	90010000146	Tooth plate		1		
11	43001000124	Bearing 16003-2Z		1		
12	42001000009	Flat key 5X5X20		1		
13	90010000145	Straight tooth		1		
14	90010001058	Case		1		
15	41300000005	Washer 8		5		
16	41100000071	Screw M8×35		5		
17	90010000143	Oil seal OTC155X173.2X8.5		1		
18	90010000142	Straight ring		1		
19	43001000119	Bearing 61824-2RS		2		
20	90010000141	Washer		1		
21	41304000038	Retaining ring 150		1		
22	90010001059	Wheel		1		
23	41305000008	Retaining ring 16		1		
24	90030000502	Brush motor		1		
25	90010001060	Protective ring		1		
26	90010000140	Helical tooth		1		

Date: 2022/11/10	Connecting rod and roller carriage assy （CBD15W-IILi.16-00）	Index No.：4.00



No.	Part No.	Description	Specification	Qty	Remark	
1	31603000507	Connecting rod assy	1150	1		
1	31603000508	Connecting rod assy	1220	1		
2	43100000019	Bearing SF-1-16.20		4		
3	21702000023	Hole pin shaft		1		
4	41402000022	Pin 5X32	For single roller	2		
5	21306000023	Wheel carriage		1		
6	21106000021	Joint		1		
7	21312000148	RollerΦ80X93		1		
8	43001000025	Bearing 6204-2RS	For single roller	2		
9	21702000059	Hole pin shaft	For single roller	1		
10	31302000075	Double rollers assy		1	Y	See 4.01

Date: 2022/11/10	Double rollers assy （010.01.2080.08）	Index No.：4.01 31302000075



No.	Part No.	Description	Specification	Qty	Remark	
1	21221000016	Support plate		2		
2	43001000025	Bearing 6204-2RS		4		
3	21702000049	Hole pin shaft		2		
4	41402000022	Pin 5X32		4		
5	21312000152	RollerΦ80X70		2		Red
6	43101000006	Bearing SF-1F-180.120		2		

DISCLAIMER

PLEASE READ THE FOLLOWING CAREFULLY

THE MANUFACTURER AND/OR DISTRIBUTOR HAS PROVIDED THE PARTS LIST AND ASSEMBLY DIAGRAM IN THIS MANUAL AS A REFERENCE TOOL ONLY. NEITHER THE MANUFACTURER OR DISTRIBUTOR MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND TO THE BUYER THAT HE OR SHE IS QUALIFIED TO MAKE ANY REPAIRS TO THE PRODUCT, OR THAT HE OR SHE IS QUALIFIED TO REPLACE ANY PARTS OF THE PRODUCT. IN FACT, THE MANUFACTURER AND/OR DISTRIBUTOR EXPRESSLY STATES THAT ALL REPAIRS AND PARTS REPLACEMENTS SHOULD BE UNDERTAKEN BY CERTIFIED AND LICENSED TECHNICIANS, AND NOT BY THE BUYER. THE BUYER ASSUMES ALL RISK AND LIABILITY ARISING OUT OF HIS OR HER REPAIRS TO THE ORIGINAL PRODUCT OR REPLACEMENT PARTS THERETO, OR ARISING OUT OF HIS OR HER INSTALLATION OF REPLACEMENT PARTS THERETO.

Record Product's Serial Number Here: _____
Note: If product has no serial number, record month and year of purchase instead.

Note: Some parts are listed and shown for illustration purposes only and are not available individually as replacement parts.

Questions, issues or missing parts?

Before returning to your retailer, our customer service team is here to help.

Call Us: 909.628.4900
Email Us: info@starktoolsusa.com

Hours of Operation: 9am - 3pm PST Monday - Friday

MADE IN CHINA