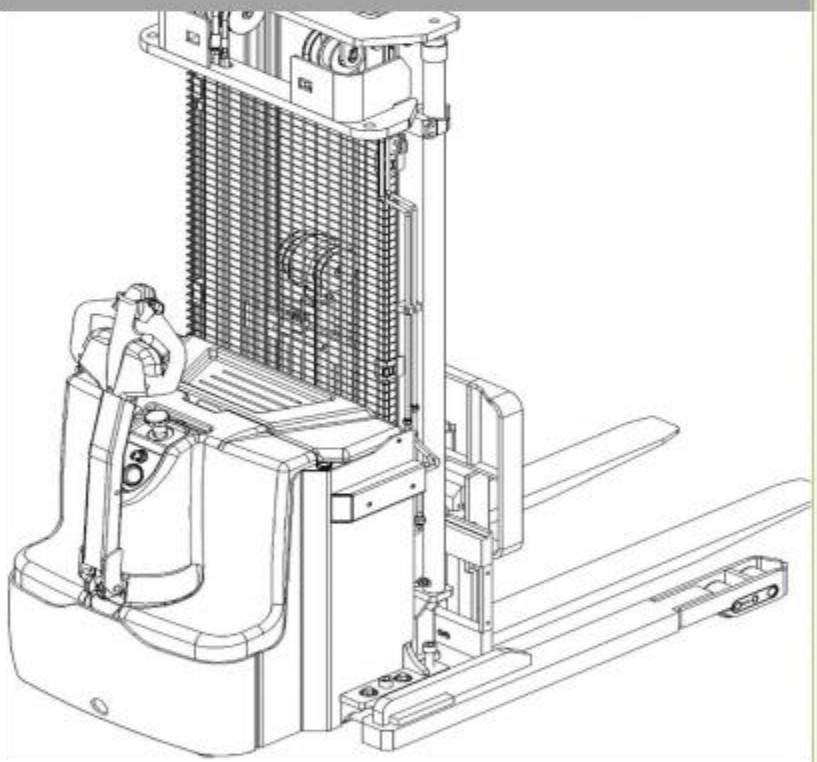
NOBLELIFT

Service & Maintenance Manual

PS 12 16 18TSL



Version 02/2021

Foreword

Proper operation, maintenance, trouble shooting and repair are necessary for long-term use of the vehicle while ensuring that the vehicle does not breakdown again. The purpose of this service manual is to provide the necessary information especially for inspection, repair and maintenance.

The main material of this car is steel, which can be completely recycled. Waste from repair, maintenance and cleaning must be disposed of in an environmentally friendly manner and in accordance with the instructions of the respective countries. Recyclable materials should be handled by a specialized department. Environmentally harmful Hazardous waste, such as waste batteries, waste oil and electronic products, if not handled properly, will have a negative impact on the ecological environment or human health。

All the information here is what we gathered before printing the manual. Our products are constantly developed and updated, we have the right to modify our products at any time without notice. Therefore, we recommend that you verify the updated content。

Content

1.GENERAL

1.1 Introductions – Maintenance safety precautions

Maintenance work may cause injuries. Always take care to perform work safe, at least observing the following. It is of utmost importance that maintenance personnel pay strict attention to these warnings and precautions to avoid possible injury to themselves, others or damage to the equipment. A maintenance program must be followed to ensure that the machine is safe to operate.

The specific precautions to be observed during maintenance are inserted at the appropriate point in the manual. These precautions are, for the most parts, those that apply when servicing hydraulic and larger truck component parts.

MODIFICATION OF THE TRUCK WITHOUT CERTIFICATION BY A RESPONSIBLE AUTHORITY THAT THE TRUCK IS AT LEAST AS SAFE AS ORIGINALLY MANUFACTURED, IS A SAFETY VIOLATION.

SINCE THE TRUCK MANUFACTURER HAS NO DIRECT CONTROL OVER THE FIELD INSPECTION AND MAINTENANCE, SAFETY IN THIS AREA RESPONSIBIUTY OF THE OWNER OR OPERATOR.

△ **FAILURE TO COMPLY WITH SAFETY PRECAUTIONS, LISTED IN THIS SECTION MAY RESULT**

- When carrying out any operation or maintenance, have trained and experienced personnel to carry out the work.
- When carrying out any operation or maintenance, carefully read operation and maintenance handbook.
- Read all the precautions given on the decals which are fixed to the truck.
- Be sure you fully understand the content of the operation. It is important to prepare necessary tools and parts for maintain the truck.
- Your safety, and that of others, is the first consideration when engaging in the maintenance of equipment. Always be conscious of weight. Never attempt to move heavy parts without the aid of a mechanical device. Do not allow heavy objects to rest in an unstable position. When raising a portion of the equipment, ensure that adequate support is provided.

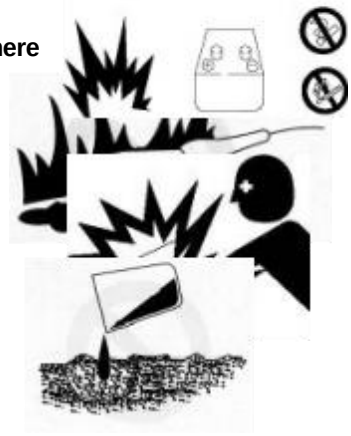
- It should be noted that the machines hydraulic systems operate atextremely high potentially dangerous pressures. Every effort should be made to relieve any system pressure prior to disconnecting or removing any portion of the system. Relieve system pressure by cycling the applicable control several times with the engine(motor) stopped and ignition on, to direct any line pressure back into the reservoir. Pressure feed lines to system components can then be disconnected with minimal fluid loss.

- Remove all rings, watches and jewelry when performing any maintenance.
- Wear well-fitting helmet, safety shoes and working Clothes When drilling grinding or hammering always. Wear protective goggles. Always do up safety clothes properly so that they do. Not catch on protruding parts of machines. Do not wear oily clothes. When checking, always release battery plug. DO NOT

WEAR LONG HAIR UNRESTRAINED, OR LOOSE-FITTING CLOTHING AND NECKTIES WHICH ARE APT TO BECOME CAUGHT ON OR ENTANGLED IN EQUIPMENT.

- **During maintenance do not allow any unauthorized person, to stand near the machine.**
- **Flames should never be used instead of lamps. Never use a naked flame to check leaks or the level of oil or electrolyte.**

- **Immediately remove any oil or grease on the floor of the operator's compartment or on the handrail. It is very dangerous if someone slips while on the machine.**
- **Always use pure oil or grease, and be sure to use clean containers.**
- **Oil is a dangerous substance. Never handle oil, grease or oily clothes in places where there is any fire or flame. As preparation for use of fire extinguishers and other fire- fighting equipment.**



- **Keep the battery away from fire hazards. The generated gases are explosive.**
- **Store all the oils in a specified place.**
- **Keep the flammable things away from the machine. Do not smoke at the working place.**
- **Battery should always be disconnected during replacement of electrical components.**
- **Always use the grades of grease and oil recommended by NOBLELIFT choose the viscosity specified for the ambient temperature.**
- **Exhaust gas is dangerous provide ventilation when working in a closed space.**

- **Avoid breathing dust that may be generated when handling components containing asbestos fibers. Wear a gas mask if necessary.**
- **When working on top of the machine, be careful not to lose your balance and fall.**

- **Hand a caution sign in the operator's compartment (for example "Do not start" of "Maintenance in progress"). This will prevent anyone from starting or moving the machine by mistake.**
- **When welding on the machine or working on the electrical system, ALWAYS turn the key switch OFF and remove the battery plug from the battery. Park the machine on firm, flat ground. Lower the fork to the min. height and stop the motor.**

- **Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin and eat holes in clothing. If you spill acid on your clothes or skin, immediately flush with large quantities or water.**
- **When working on the battery, wear goggles or safety glasses. If splashed into the eyes, flush with water and get medical attention immediately.**
- **Battery terminals touched by metal objects can cause short circuit and burn you. Keep tools away from the terminals.**
- **Keep sparks, lighted matches, and open flame away from the top of battery. Battery (hydrogen) gas can explode.**

- **When disassembling and assembling the battery, make sure that the battery terminals (+, –) are correctly connected.**
- **If water gets into the electrical system, abnormal operation or failure can result. Do not use water or**

steam on sensors, connectors and instruments in the cab.

- Do not handle electrical equipment while wearing wet gloves, or in wet places, as this can cause electric shock.
- When working with other, choose a group leader and work according to his instructions. Do not perform any maintenance beyond the agreed work.

- Unless you have special instructions to the contrary, maintenance should always be carried out with the motor stopped. If maintenance is carried out with the motor running, there must be two technicians present: One operating the stacker and the other one performing the maintenance. In such a case, never touch any moving part.
- Before making adjustment, lubricating or performing any other maintenance, shut off all power controls.
- When removing parts containing O-ring Gaskets or seal clean the mounting surface and replace with new sealing parts.
- Thoroughly clean the machine. In particular, be careful to clean the grease fittings and the area around the dipsticks. Be careful not to let any dirt or dust into the system.
- Use only approved nonflammable cleaning solvents.
- When changing the oil or fitter, check the drained oil and filter for any signs of excessive metal particles or other foreign materials.
- Always use NOBLELIFT genuine parts for replacement. ENSURE REPLACEMENT PARTS OR COMPONENTS ARE IDENTICAL OR EQUIVALENT TO ORIGINAL PARTS OR COMPONENTS.
- When checking an open gear case, there is a risk of dripping things in. Before removing the covers to inspect such cases, empty everything from your pockets. Be particularly careful to remove wrenches and nuts.

1.2 Measurement conversions

Length

Unit	cm	m	km	in	ft	yd	mile
cm	1	0.01	0.00001	0.3937	0.03281	0.01094	0.000006
m	100	1	0.001	39.37	3.2808	1.0936	0.00062
km	100000	1000	1	39370.7	3280.8	1093.6	0.62137
in	2.54	0.0254	0.000025	1	0.08333	0.02777	0.000015
ft	30.48	0.3048	0.000304	12	1	0.3333	0.000189
yd	91.44	0.9144	0.000914	36	3	1	0.000568
mile	160930	1609.3	1.6093	63360	5280	1760	1

1mm=0.1cm, 1 m=0.001mm

Area

Unit	cm2	m2	km2	a	ft2	yd2	in2
cm2	1	0.0001	–	0.000001	0.001076	0.000012	0.155000
m2	10000	1	0.000001	0.01	10.764	1.1958	1550.000
km2	–	1000000	1	10000	1076400	1195800	–
a	0.01	100	0.0001	1	1076.4	119.58	–
ft2	–	0.092903	–	0.000929	1	0.1111	144.000
yd2	–	0.83613	–	0.008361	9	1	1296.00
in2	6.4516	0.000645	–	–	0.006943	0.000771	1

1ha=100a, 1mile2=259ha=2.59km2

Volume

Unit	cm3 = cc	m3	l	in3	ft3	yd3
cm3 = m l	1	0.000001	0.001	0.061024	0.000035	0.000001
m3	1000000	1	1000	61024	35.315	1.30796
l	1000	0.001	1	61.024	0.035315	0.001308
in3	16.387	0.000016	0.01638	1	0.000578	0.000021
ft3	28316.8	0.028317	28.317	1728	1	0.03704
yd3	764529.8	0.76453	764.53	46656	27	1

1gal(US)=3785.41 cm3=231 in3=0.83267gal(US)

Weight

Unit	g	kg	t	oz	lb
g	1	0.001	0.000001	0.03527	0.0022
kg	1000	10	0.001	35.273	2.20459
t	1000000	1000	1	35273	2204.59
oz	28.3495	0.02835	0.000028	1	0.0625
lb	453.592	0.45359	0.000454	16	1

1 tone (metric)= 1.1023 ton(US)=0.9842 ton(UK)

Pressure

Unit	kgf/cm2	bar	Pa=N/m2	kPa	lbf/in2	lbf/ft2
kgf/cm2	1	0.98067	98066.5	98.0665	14.2233	2048.16
bar	1.01972	1	100000	100	14.5037	2088.6
Pa=N/m2	0.00001	0.001	1	0.001	0.00015	0.02086
kPa	0.01020	0.01	1000	1	0.14504	20.886
lbf/in2	0.07032	0.0689	6894.76	6.89476	1	144
lbf/ft2	0.00047	0.00047	47.88028	0.04788	0.00694	1

kgf/cm2=735.56 Torr(mmHg)=0.96784atm

Standard tightening torque

The following charts give the standard tightening torques of bolts and nuts.

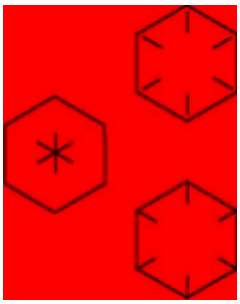
Exceptions are given in sections of "Disassembly and Assembly"

METER TABLE

Classification	4T, 5T	10T
Bolt type		 10.9
Bolt size	Torque kgf · m (lbf · ft)	Torque kgf · m (lbf · ft)
M4	0.2 ± 0.02	0.4 ± 0.04
M5	0.3 ± 0.03	0.8 ± 0.08
M6	0.5 ± 0.05	1.4 ± 0.14
M8	1.2 ± 0.12	3.3 ± 0.3
M10	2.3 ± 0.23	6.5 ± 0.7
M12	4.0 ± 0.4	11.3 ± 1.1
M14	6.4 ± 0.6	17.9 ± 1.8
M16	9.5 ± 0.9	26.7 ± 2.7
M18	13.5 ± 1.4	38.0 ± 3.8
M20	18.6 ± 1.9	52.2 ± 5.2
M22	24.7 ± 2.5	69.4 ± 6.9
M24	32.1 ± 3.2	90.2 ± 9.0
M30	62.6 ± 6.3	176.1 ± 17.6
M36	108.2 ± 10.8	304.3 ± 30.4
M42	171.8 ± 17.2	483.2 ± 48.3
M45	211.3 ± 21.1	594.3 ± 50.4

INCH TABLE

	4T, 5T	10T

Classification Bolt type		
Bolt size	**Torque kgf · m (lbf · ft)**	**Torque kgf · m (lbf · ft)**
1/4	0.6 ± 0.06	1.7 ± 0.2
5/16	1.2 ± 0.12	3.0 ± 0.3
3/8	2.0 ± 0.20	5.6 ± 0.5
7/16	3.2 ± 0.32	8.9 ± 0.9
1/2	4.7 ± 0.47	13.4 ± 1.3
9/16	6.8 ± 0.68	19.0 ± 1.9
5/8	9.3 ± 0.93	26.1 ± 2.6
3/4	16.0 ± 1.60	45.1 ± 4.5
7/8	25.5 ± 2.55	71.6 ± 7.2
1	38.0 ± 3.80	106.9 ± 10.7
1-1/8	54.1 ± 5.41	152.2 ± 15.2
1-1/4	74.2 ± 7.42	208.9 ± 20.9
1-3/4	98.8 ± 9.88	277.8 ± 27.8
1-1/2	128.2 ± 12.82	360.7 ± 36.1

The torque in above table shall not be applied to nylon or nonferrous bolts or washer. The same is valid for not standardized ones.

H Newton meter : 1 Nm = 0.1kgfm

TIGHTENING TORQUE OF SPLIT FLANGE BOLTS

The following torque shall be applied to the split flange bolts.

Diameter (mm)	Flat width (mm)	kgf·m
10	14	6.7 ± 0.

.

PF THREAD

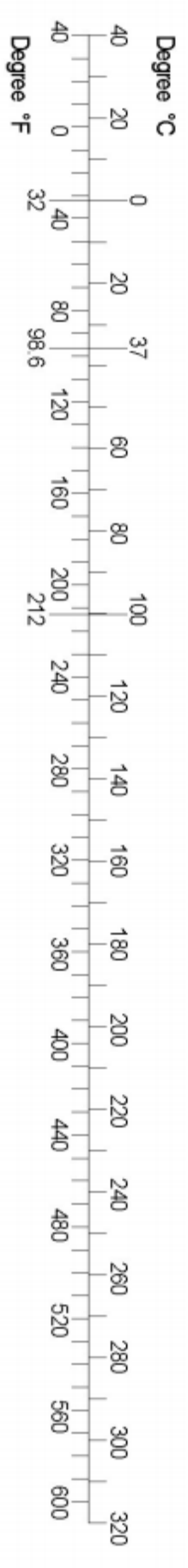
Thread	Torque (kgf·m)
1/8	1.1 ± 0.1
1/4	2.6 ± 0.2
3/8	4.6 ± 0.3
1/2	8.5 ± 0.4
3/4	19 ± 1.0
1	33 ± 2.0

TORQUE FOR SWIVEL NUT WITH O-RING

Tube O.D (inch)	Thread (in)	Torque (kgf·m)
1/2	UN 13/16 - 16	9.5 ± 0.95
3/4	UN 1 3/16 - 12	18 ± 1.8
1	UN 1 7/16 - 12	21 ± 2.1

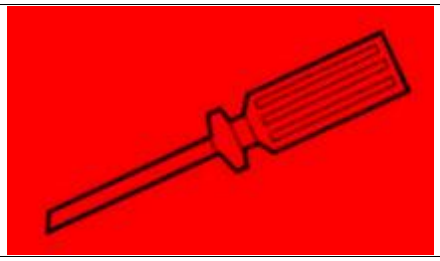
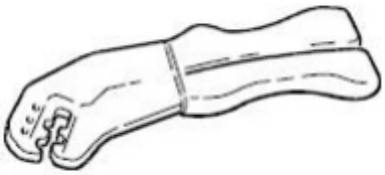
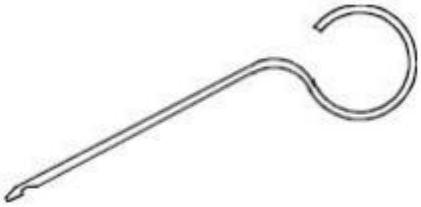
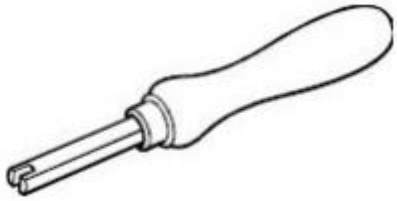
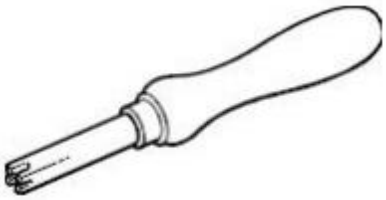
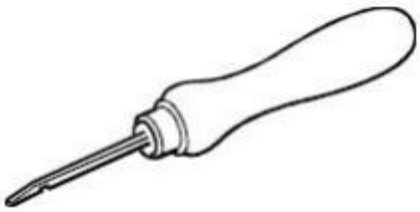
SI APPROXIMATE CONVERSIONS	Conv Factor	Non–SI Unit Unit	Conv Factor	SI Unit
Torque				
Newton meter (N·m)	× 8.9	= lnꞏin	× 0.113	= N·m
Newton meter (N·m)	× 0.74	= lbꞏft.	× 1.36	= N·m
Newton meter (N·m)	× 0.102	= kg·m	× 7.22	= lbꞏft.*
Pressure (Pa = N/m²)				
kiloPascal (kPa)	× 4.0	= in. H_2O	× 0.249	= kPa
kiloPascal (kPa)	× 0.30	= in. Hg	× 3.38	= kPa
kiloPascal (kPa)	× 0.145	= psi	× 6.89	= kPa
(bar)	× 14.5	= psi	× 0.069	= bar*
(kg/cm²)	× 14.22	= psi	× 0.070	= kgf/cm²*
Newton/mm²	× 145.04	= psi	× 0.069	= bar*
MegaPascal (MPa) (Pa=N·m²)	× 145	= psi	× 0.00689	= MPa
Power r (W = J/s)				
kiloWatt (kW)	× 1.36	= PS (cv)	× 0.736	= kW
kiloWatt (kW)	× 1.34	= HP	× 0.746	= kW
kiloWatt (kW)	× 0.948	= Btu/s	× 1.055	= kW
Watt (W) (W=J/s)	× 0.74	= ftꞏlb/s	× 1.36	= W
Energy (J = N·m)				
kiloJoule (kJ)	× 0.948	= Btu	× 1.055	= kJ
Joule (J) (J=N·m)	× 0.239	= calorie	× 4.19	= J
Velocity and acceleration				
meter per sec² (m/s²)	×3.28	= ft/s²	× 0.305	= m/s²
meter per sec (m/s)	× 3.28	= ft/s	× 0.305	= m/s
kilometer per hour (km/h)	× 0.62	= mph	× 1.61	= km/h
Horse Power/Torque				
BHP × 5252 R.P.M. = TQ (lbꞏft)		TQ Z R.P.M. 5252 = B.H.P.		
Temperature				
°C = (°F–32) ÷ 1.8		°F= (°C Z 1.8) + 32		
Flow Rate				
liter/min (dm³/min)	× 0.264	= US gal/minZ3.785		= l/min

Note : ( ) Non–SI Unit



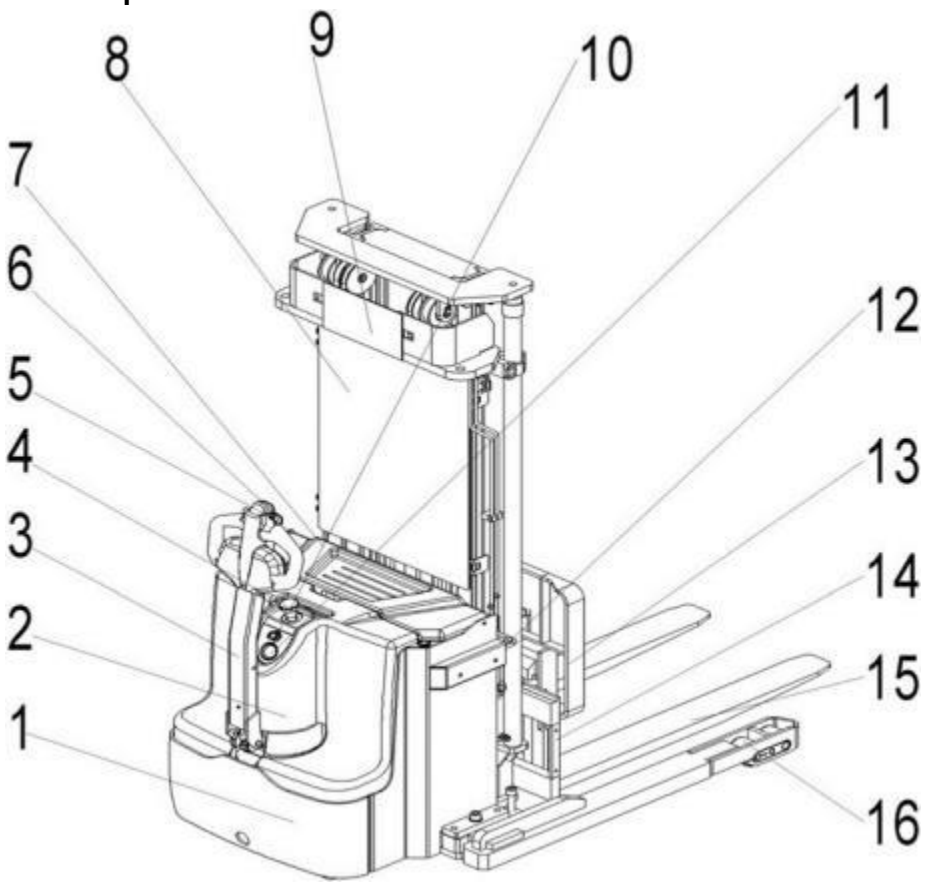
Replacement tool for electrical plug-in connection

No.	PIc	Application

1		Remove pin
2		Install pin
3		Loose lock
4		Two-hole lock
5		Four-hole lock
6		Remove pin

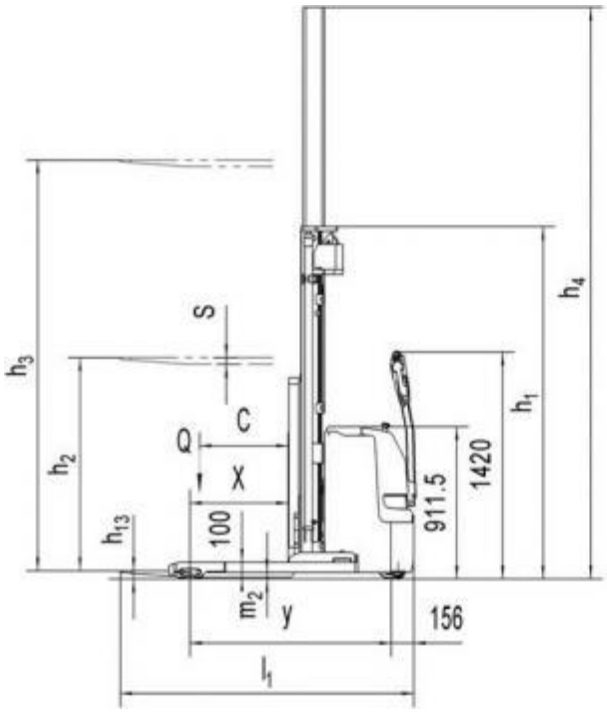
2.Sepcification

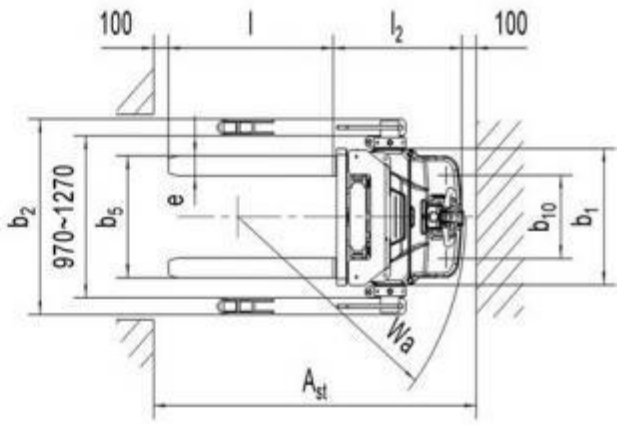
2.1 Overview of the main components



1. Chassis
2. Main cover
3. Tiller
4. Emergency switch
5. Belly button
6. Accelerator
7. Battery cover
8. Protective mesh
9. Mast
10. Key switch
11. Indicator
12. Hydraulic system assembly
13. Load backrest
14. fork carriage
15. Fork
16. Load roller assembl

2.2Main technical data





Main technical data for standard version

	Type sheet for industrial truck acc. to VDI 2198					
Distinguishing mark	1.2	Manufacturer`s type designation		PS12T SL(3600)	PS16TSL (4600)	PS18T SL(4600)
	1.3	Power (battery ,diesel, petrol, gas, manual)		Battery		
	1.4	Operator type		Pedestrian		
	1.5	Load Capacity / rated load	Q(t)	1.2	1.6	1.8
	1.6	Load centre distance	C(mm)	600	600[1)]	
	1.8	Load distance ,centre of drive axle to fork	x(mm)	647	664[2)]	647[2)]
	1.9	Wheelbase	y(mm)	1331	1378	1378
Weight	2.1	Service weight	Kg	1190	1480	1560
	2.2	Axle loading, laden front/rear	Kg	774/1598	827/2253	892/2378
	2.3	Axle loading, unladen front/rear	Kg	796/394	864/616	924/636
Tires, chassis	3.1	Tires		Polyurethane (PU)		
	3.2	Tire size, front	∅xW (mm)	∅230×70		
	3.3	Tire size, rear	∅xW (mm)	∅84×70		
	3.4	Additional wheels(dimensions)	∅xW (mm)	∅100x40		
	3.5	Wheels, number front/rear(x=driven wheels)		1x+2/4		
	3.6	Track, front	b10(mm)	500		
Dimensio n	4.2	Lowered mast height	h1(mm)	2308	2108	2228
	4.3	Free Lift height	h2(mm)	1760	1520	1520
	4.4	Lift height	h3(mm)	3560	4530	4530

	4.5	Extended mast height	h4(mm)	4088	5088	5208
	4.9	Height of tiller in drive position min./ max.	h14(mm)	890/1420		
	4.15	Height, lowered	h13(mm)	50		
	4.19	Overall length	l1(mm)	1990	2075	2092
	4.20	Length to face of forks	l2(mm)	840	925	942
	4.21	Overall width	b1/b2(mm)	816/1170-1470		
	4.22	Fork dimensions	s/e/l(mm)	35x100x1150	40x120x115	
	4.25	Width across forks	b5(mm)	235-710	255-730	
	4.32	Ground clearance, centre of wheelbase	m2(mm)	40		
	4.33	Aisle width for pallets 1000X1200 crossways	Ast(mm)	2396	2437	2446
	4.34	Aisle width for pallets 800X1200 lengthways	Ast(mm)	2382	2418	2432
	4.35	Turning radius	Wa(mm)	1500	1550	1550
Performance data	5.1	Travel speed, laden/ unladen	km/h	5.4/6.0	5.4/6.0	5.4/6.0
	5.2	Lift speed, laden/ unladen	m/s	0.09/0.14	0.13/0.18	0.13/0.18
	5.3	Lowering speed, laden/ unladen	m/s	0.25/0.2	0.20/0.14	0.20/0.14
	5.8	Max. gradeability, laden/ unladen	%	6/12	6/12	6/10
	5.10	Service brake		Electromagnetic		
Electric- engine	6.1	Drive motor rating S2 60min	Kw	1.3	1.4	1.4
	6.2	Lift motor rating at S3 10%	Kw	1.5	3.2	3.2
	6.3	Battery acc. to DIN 43531/35/36 A, B, C, no		2PZB	3VBS	3VBS
	6.4	Battery voltage, nominal capacity K5	V/Ah	24/180	24/270	24/270
	6.5	Battery weight	Kg	175	230	230
	6.6	Energy consumption acc: to VDI cycle	kWh/h	0.95	1.59	1.70
Additional data	8.1	Type of drive control		AC- speed control		
	8.4	Sound level at driver`s ear acc. to EN 12053	dB(A)	＜70		

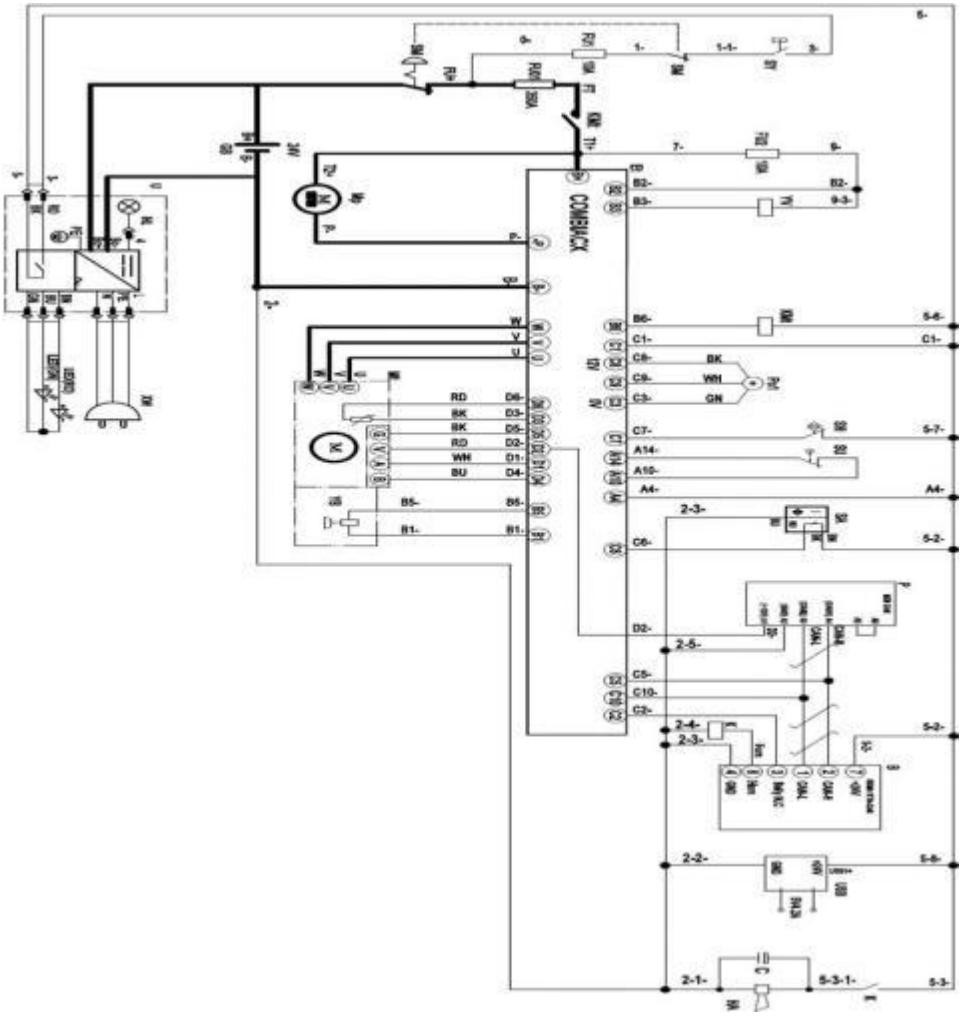
Note: 1) The center distance of load with side moving section is 500

2) The suspension distance before side moving is reduced by 55

Designation	Lowered mast height h1(mm)	Free Lift height h2(mm)	Lift height h3(mm)	Extended mast height h4(mm)	Lift+fork height h3+h13(mm)
PS12TSL					
Two stage mast	1958	-	2830	3380	2880
	2108	-	3130	3680	3180
	2308	-	3530	4080	3580
Two stage mast FFL (Full-Free-Lift)	1958	1410	2830	3380	2880
	2108	1560	3130	3680	3180
	2308	1760	3530	4080	3580
PS16TSL					
Two stage mast	1958	—	2830	3380	2880
	2108	—	3130	3680	3180
	2308	—	3530	4080	3580
Two stage mast FFL (Full-Free-Lift)	1958	1410	2830	3380	2880
	2108	1560	3130	3680	3180
	2308	1760	3530	4080	3580
Three stage mast	2008	—	4230	4780	4280
	2108	—	4530	5080	4580
Three stage mast FFL (Full-Free-Lift)	1908	1320	3930	4480	3980
	2008	1420	4230	4780	4280
	2108	1520	4530	5080	4580
	2343	1756	5230	5780	5280
PS18TSL					
Two stage mast	2078	—	2830	3500	2880
	2228	—	3130	3800	3180
	2428	—	3530	4200	3580
Two stage mast FFL (Full-Free-Lift)	1978	1310	2630	3300	2680
	2078	1410	2830	3500	2880
	2228	1560	3130	3800	3180
	2428	1760	3530	4200	3580
Three stage mast	2128	—	4230	4900	4280
	2228	—	4530	5200	4580
Three stage mast FFL (Full-Free-Lift)	1978	1310	3930	4600	3980
	2128	1420	4230	4900	4280
	2228	1520	4530	5200	4580

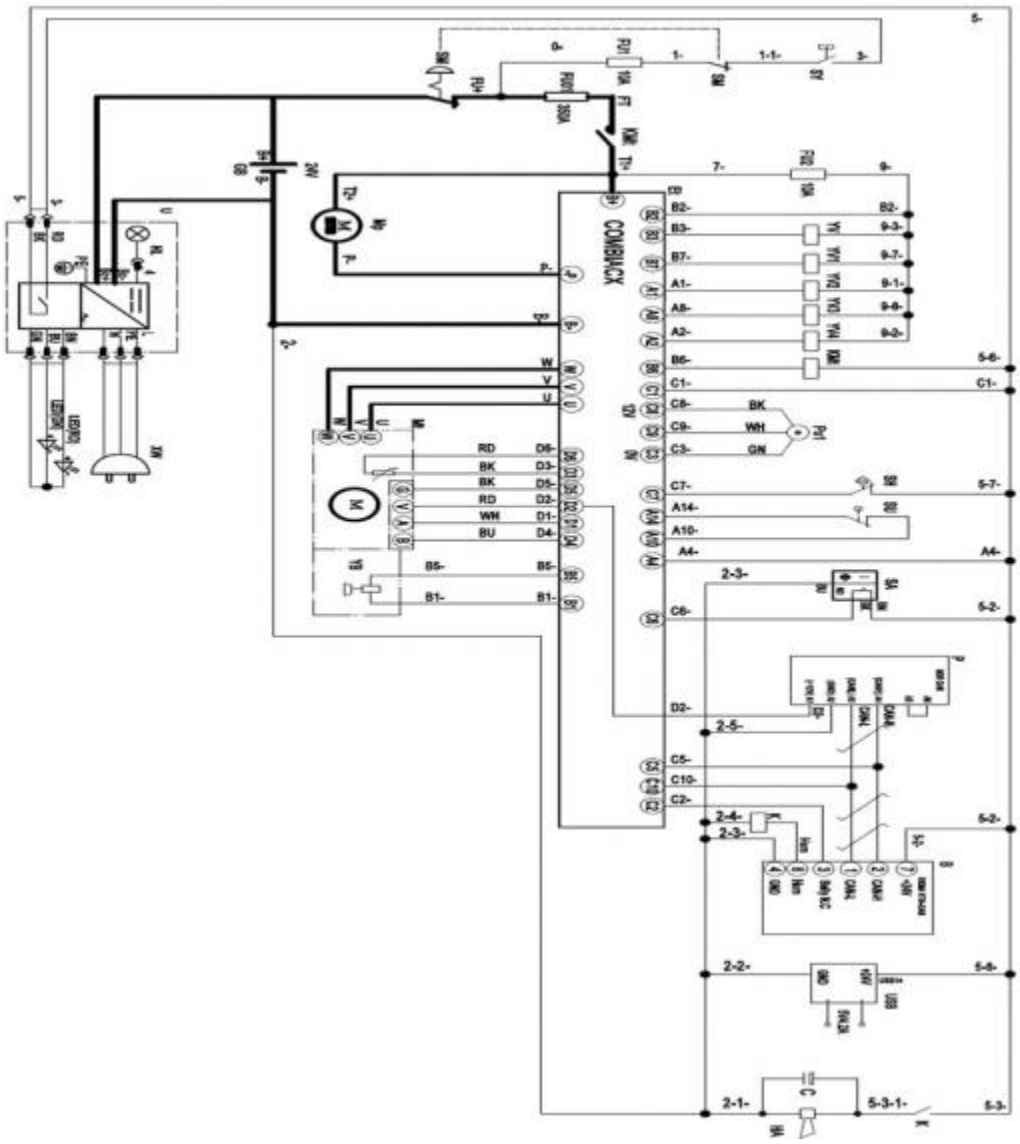
3. Electrical system

3.1 Electrical circuit diagram



Code	Item Description	Code	Item Description
B	The handle	Mp	Pump motor
C	capacitance	Mt	Traction motor
Et	Traction controller	P	Electricity meter
FU01	Fuse 350A	SH	Magnetic switch
FU1/FU2	Fuse 10A	SA	Proximity switch
GB	battery	SM	DC power switch
HA	The horn	SU	Micro switch
HS	Proximity switch	SY	Key switch
K	relay	VD	diode
KMt	Main contactor	YB	Electromagnetic brake
YV	Proportional solenoid valve	Po1	Angle sensor
USB	USB power supply		

Manual-steering Electrical circuit diagram

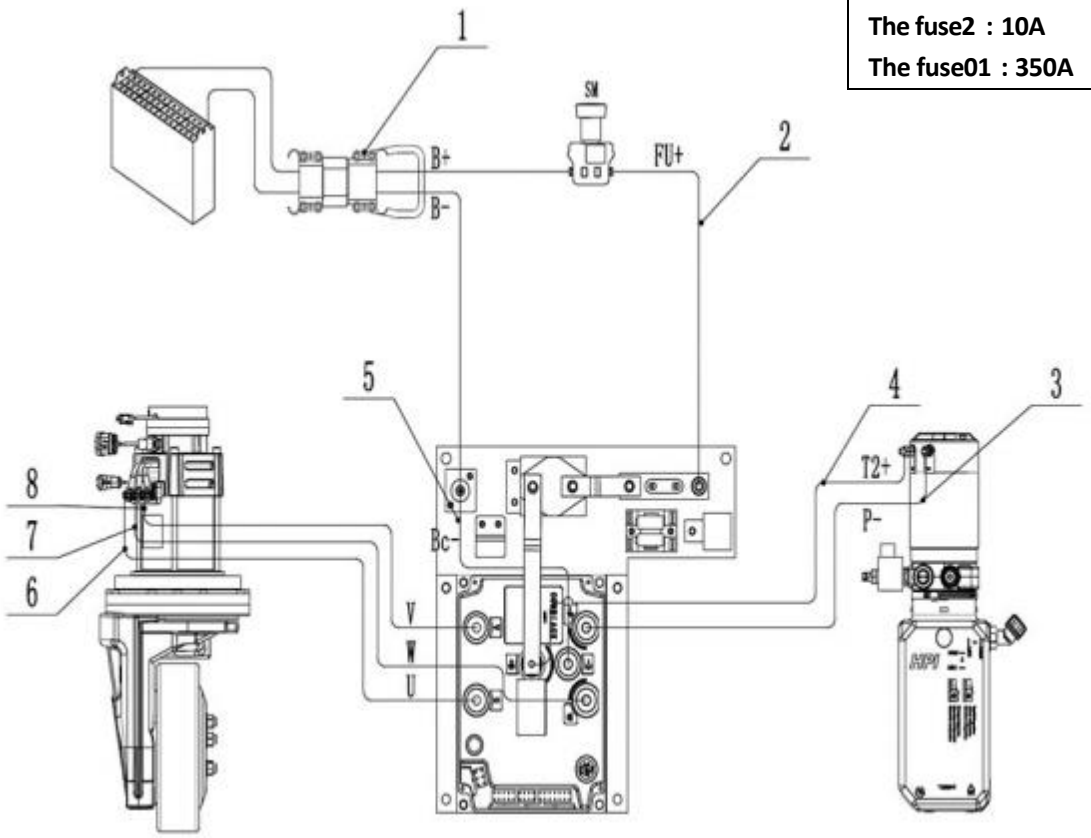


Item Code.	Item Description	Item Code	Item Description
B	handle	Mp	Pump motor
C	capacitance	Mt	Traction motor
Et	Traction controller	P	Electricity meter
FU01	Fuse 350A	SH	Magnetic switch
FU1/FU2	Fuse 10A	SA	Proximity switch
GB	battery	SM	DC power switch
HA	horn	SU	Micro switch
HS	Proximity switch	SY	Key switch
K	relay	VD	diode
KMt	Main contactor	YB	Electromagnetic brake
YV	Proportional	YV1/YV2/YV3/YV4	Solenoid valve
Po1	Angle sensor	USB	USB power supply

3.2Cable System

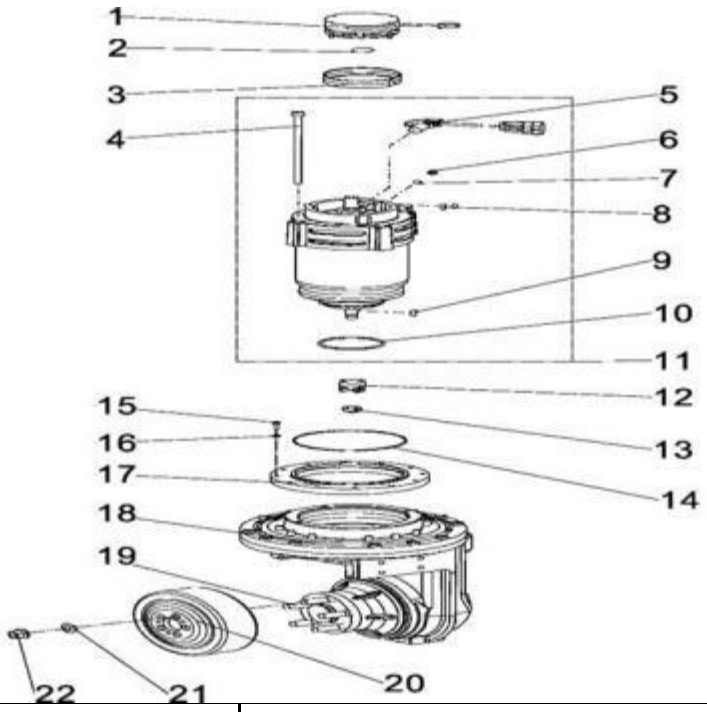
Main loop wiring harness

The fuse1: 10A
The fuse2 : 10A
The fuse01 : 350A



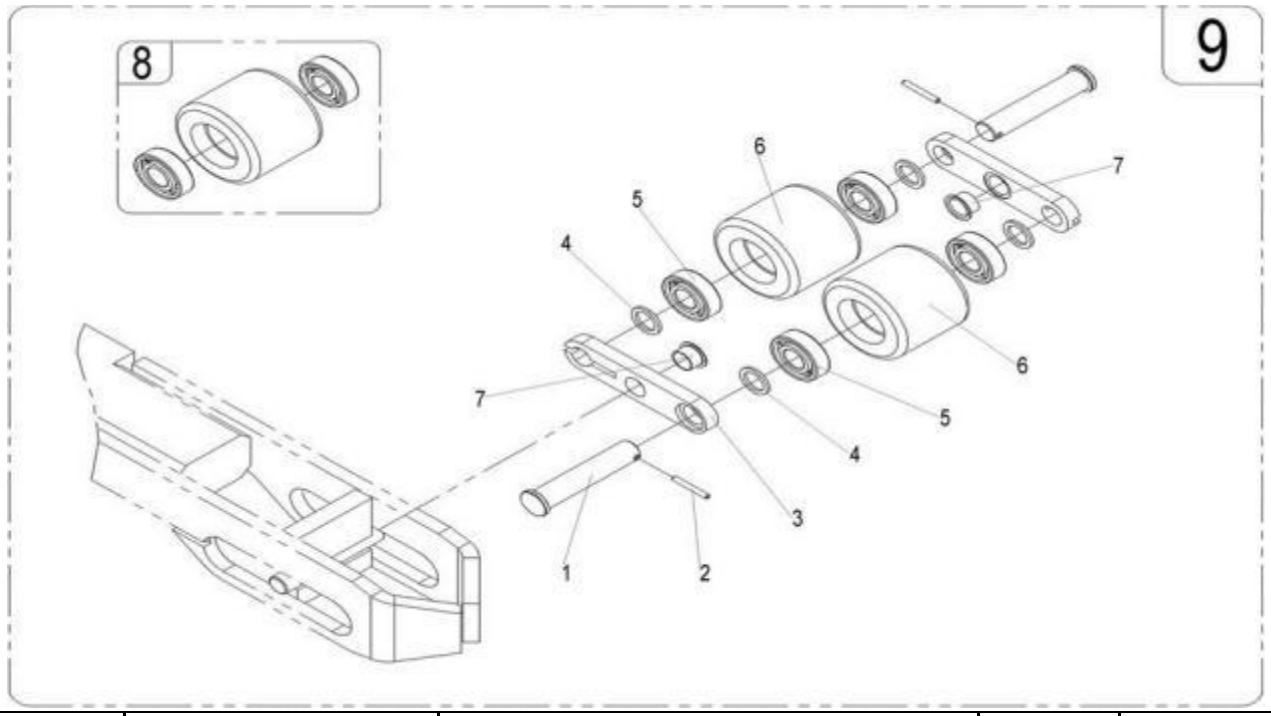
No.	Item Code	Item Description	Qty.	Note
1	534833010008	Main power harness	1	
2	534833010009	cable	1	FU+
3	534833010006	cable	1	P-
4	534833010007	cable	1	T2+
5	534833010013	cable	1	BC-
6	534833010003	cable	1	U
7	534833010005	cable	1	W
8	534833010004	cable	1	V

3.3 drive wheels



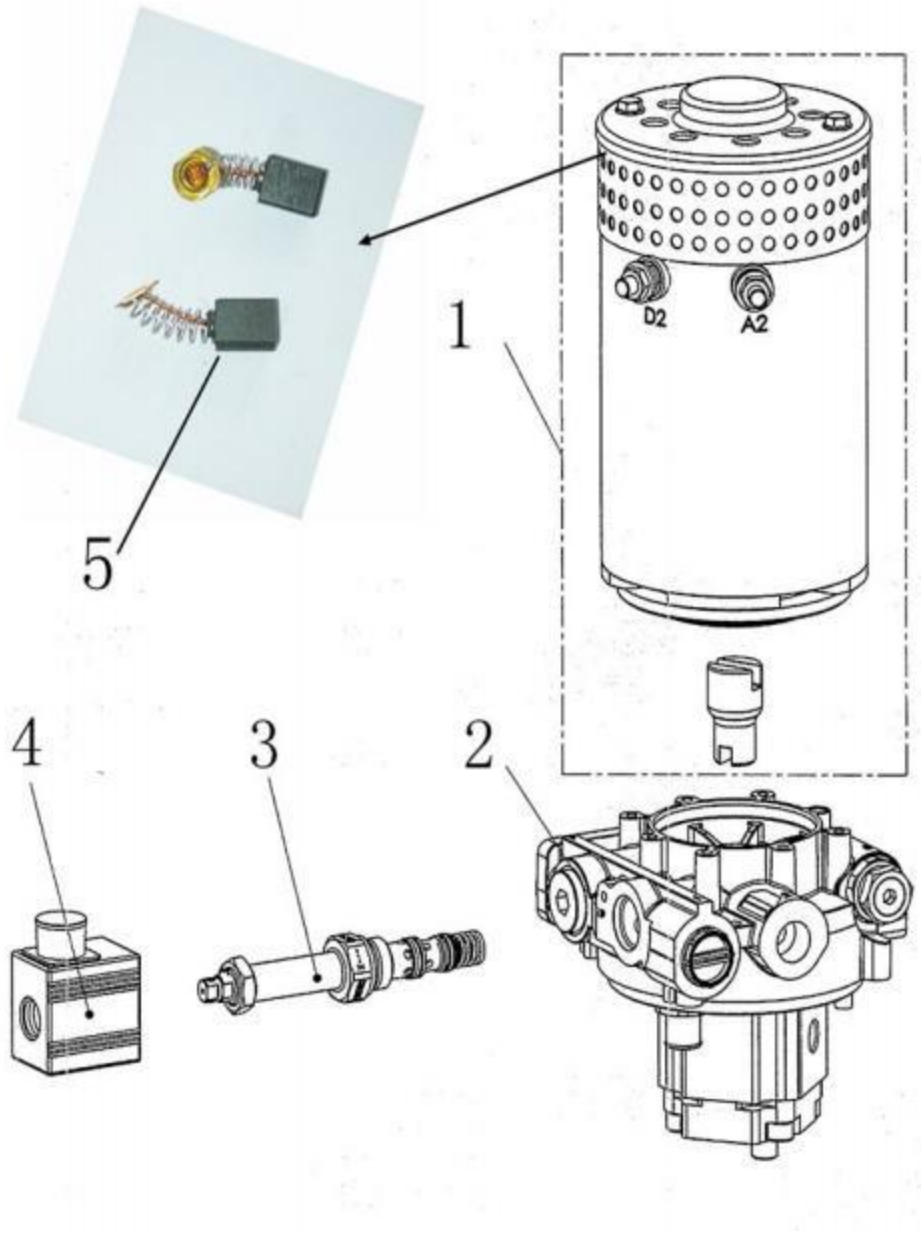
No.	Item Code	Item Description	Qty.	Note
1	535998510001	Brake	1	
2	535998520000	Locating Ring	1	15
3	535998520001	Division Plate	1	
4	535998520002	Screw	4	M8x175
5	535998510002	Sensor	1	
6	535998520003	Nut	1	M6x8
7	535998520004	Safety Element	1	
8	535998520005	Feather Key	1	5x5x14
9	535998520006	Key	1	
10	535998520007	O-Ring	1	
11	535998510003	Motor	1	
12	535998520014	Gear	1	
13	535998520008	Nut	1	
14	535998520009	O-Ring	1	146x3
15	910200200060	screw	9	M8x35
16	910400500006	Spring Washer	9	8
17	535998520010	Plate	1	
18	535998510004	Gearbox Assembly	1	
19	535998520011	Bolt	5	
20	940300400005	WheelΦ230x70	1	Φ230x70
21	535998520012	Spring washer	5	
22	535998520013	Nut	5	

Bearing wheel assembly



No.	Item Code	Item Description	Qty.	Note
1	534717020001	Pin	2	
2	910600400017	Spring Pin	2	4x35
3	534717020002	Plate	2	
4	940600500004	Washer	4	
5	910700200019	Bearing	4	6204-2RS
6	940300300009	WheelΦ84x70	2	
7	940500200003	Bushing	2	
8	532998510001	Wheel	4	
9	534717001001	Bearing wheel assembly	2	

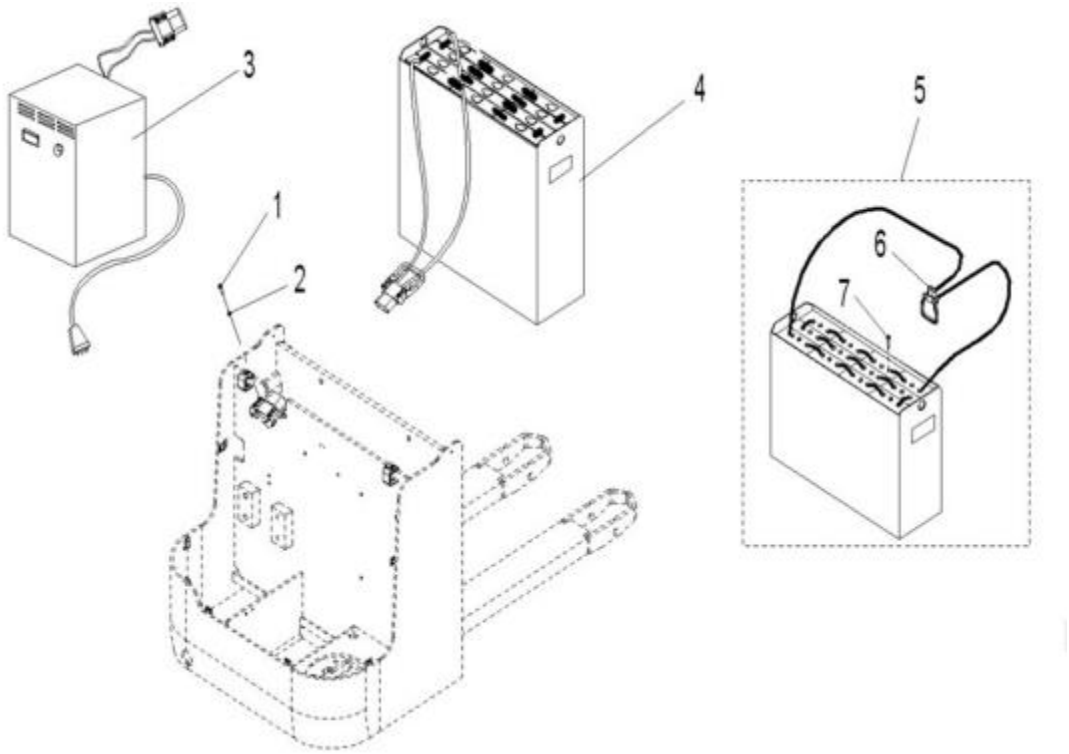
3.4 The pump station system4.Battery Using



No.	Item Code	Item Description	Qty.	Note
1	534798510006	Motor	1	3.2KW
2	534798510007	Valve Block	1	
3	534798520024	Magnetic Valve	1	
4	534798520025	Coil	1	
5	534798520026	Carbon Brush	1	

4. The Storage Battery

Power supply



△ **• Only professionals are allowed to repair or charge the battery. Be sure to follow this manual and the battery manufacturer's instructions**

• The batteries used are lead-acid batteries

• Battery recycling is subject to national regulations. Please comply with these regulations

• Do not use open flames when handling batteries, which may cause gas explosions

• No burning materials or liquids in the battery charging area, no smoking, and good ventilation must be ensured

• Keep the vehicle safely parked before starting charging or installing/replacing the battery

• Ensure that all cables are properly connected and have no interference with other parts of the vehicle before completing the repair work

△ **•Only lead-acid batteries are allowed**

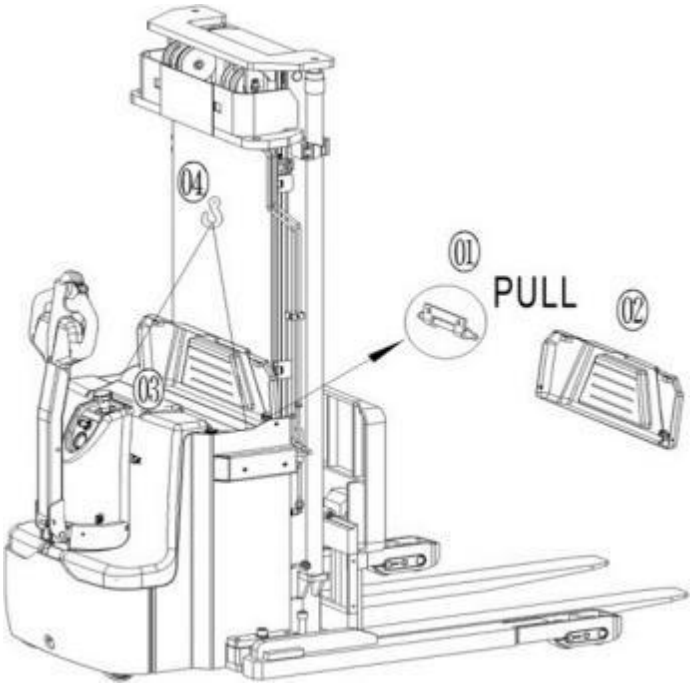
•The weight of the battery has a certain impact on the vehicle's operating behavior. Please consider the maximum operating temperature of the battery.

4.1 Battery replacement

Park the vehicle safely, close the stacker with the key (8) and press the emergency stop switch (6). Open the lid of the battery case, remove the hinge, and remove the lid. , remove the battery connector, and then hoist the battery out.

Installation is the opposite procedure of removal. Please connect the positive terminal first, otherwise the vehicle is vulnerable to damage.

Lifting out



1. Remove the hinge and remove the battery case cover.

	
2. Unplug the battery	3. Use a tool to connect here, such as a hook, and then remove the battery

Side-shift

	
1. Open the lid of the battery case	2. Unplug the power plug
	
3. Unscrew the bolt with the 5mm inner hexagon wrench	4. Remove the bolt

5. Take out the battery according to the direction indicated by the arrow, and the installation process is the reverse process of disassembly.

4.2 Maintenance of batteries (lead-acid batteries)

1. Cause of water supply of battery

The battery recharge is due to the electrolytic effect of the battery at the later charging stage, which makes the moisture part of the electrolyte electrolyze. After a long period of charge and discharge, the water content of the battery will be more electrolytic, which will increase the electrolyte potency and decrease the liquid level. At this time, it is necessary to supplement distilled water to restore the liquid level to the original height and maintain the normal potency of electrolyte to ensure the service life of lead-acid battery.

2.Note:

(1) Remember not to drop the liquid level below plate before starting to replenish water. Once the plate is exposed to air, the battery performance can be seriously affected.

(2) In order to reduce the number of water recharging, battery charging should be strictly required by the instructions, do not overcharge. Overcharge will aggravate the battery water loss.

3. Distill-Water-adding materials and tools

(1) Water requirements: it is recommended to use battery special supplementary liquid or distilled water. In case of emergency, pure water for drinking water on the market can also be used, but remember not to use tap water, mineral water and other water containing impurities.

(2) Water filling tool: water funnel, water ladle. If the tool used can be made of plastic or glass, it shall not be made of metal.

(3) for users with large amount of water, the self-made water filling device in large bucket is adopted.

4. When the water supply does not lead to the water shortage of the battery in time, it can cause:

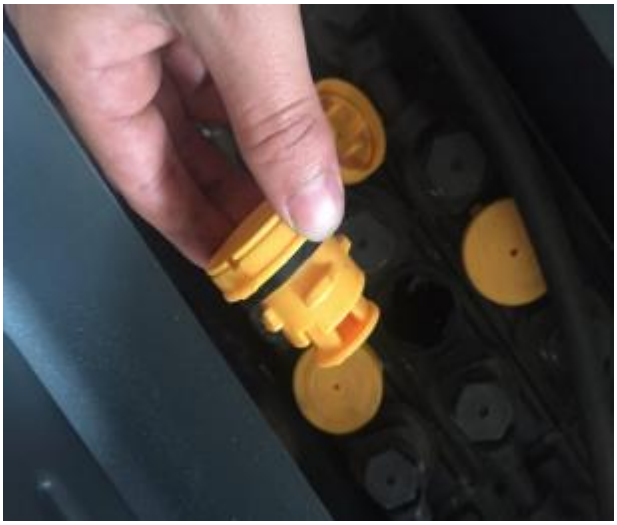
1) As the electrolyte surface decreases, the temperature rise is high when the battery is charged;

2) the capacity of the battery is reduced;

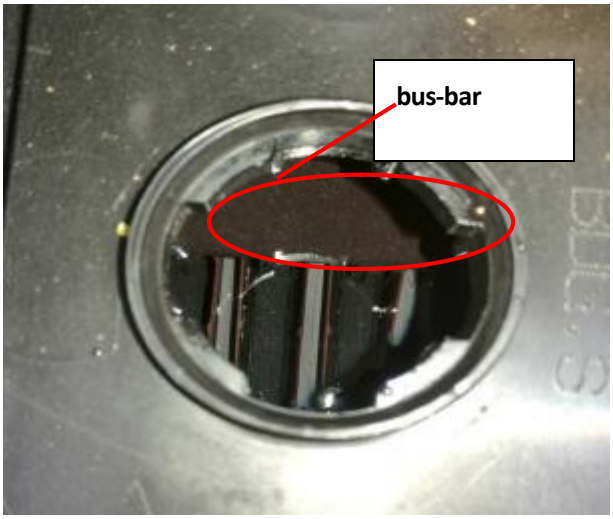
3) If the plate is exposed to the air, it can be oxidized

4) the specific gravity of the electrolyte is increased, and the corrosion of the polar plate can be easily degraded.

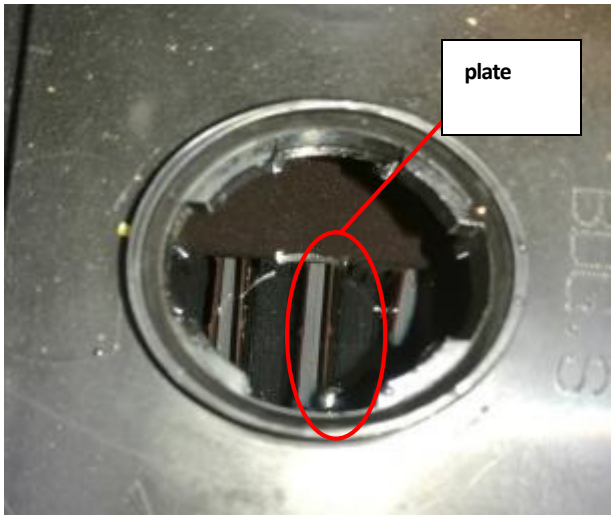
1.Unplug battery switch



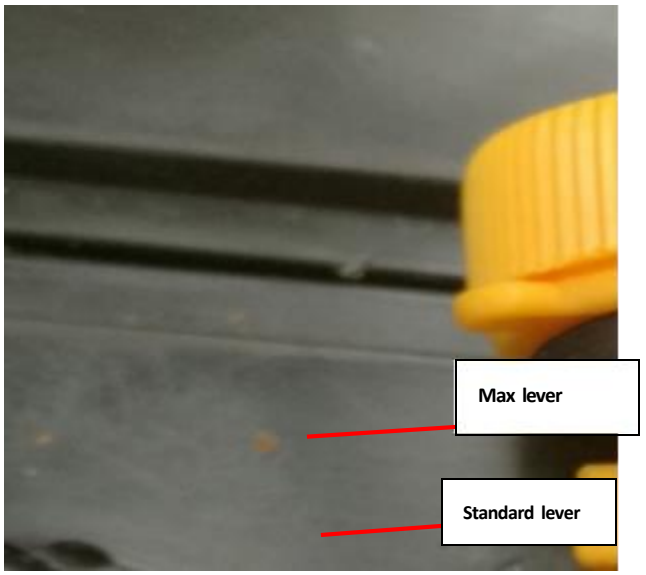
2.Uncap



3. Electrolyte lever is lower than bus-bar, then add distill water



4. Can't see the bus-bar for some models
Liquid lever is 10mm lower than plate, then add distill water

	
5. Use a plastic funnel to add water.	6. add-water lever

4.3 Battery display

The discharge condition is represented by 10 black block display segments.

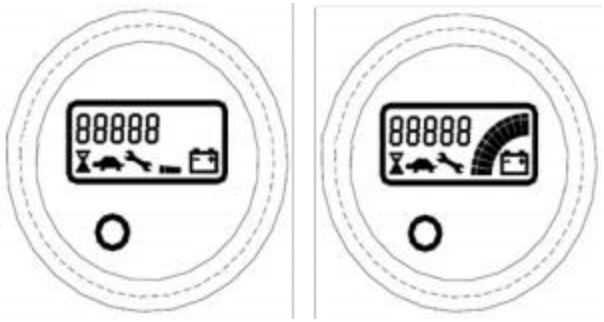


图.13: 电池电量显示器

Only when the battery is fully charged correctly, the LED10 grid black block on the far right is all displayed. As the battery's charge status drops, the power display block lights decrease in turn, but only one at a time.

•When 2 blocks are left and do not flicker, indicating "energy reserve" (70% discharge depth).

•The last block is left and blinks, indicating "empty charge" (80% discharge depth). It needs to be recharged immediately.

•On the meter, it also has the vehicle fault information (code), the information prompt of the turtle speed enabling, and the record of the use time. When the vehicle fails, the light in the lower left corner of the battery level display will light up, showing red.

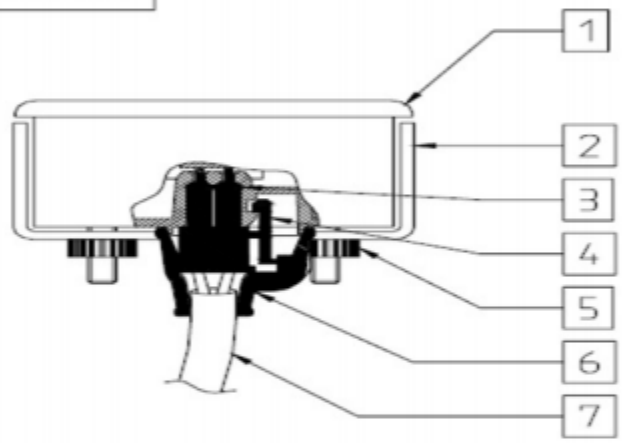
This electric meter has the function of error reporting. See Appendix 1 for details.

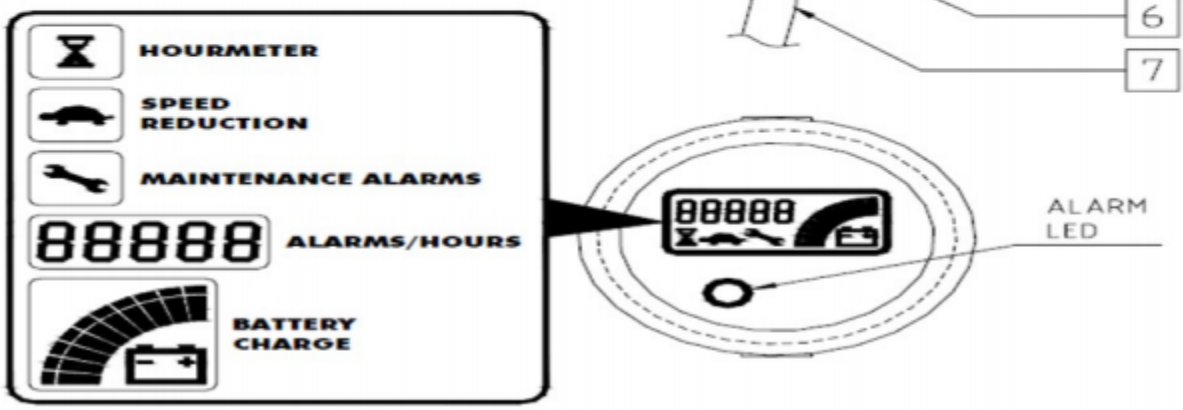
4.3.1 Description of electricity meter

REF.	DESCRIPTION
1	PLASTIC CASE
2	FIXING BRACKET
3	GASKET CONNECTOR
4	MOLEX MINI FIT CONNECT. 6 PIN RECEPT. (5557), WITH FEMALE CRIMP TERMINALS (5556)
5	FIXING BOLT
6	RUBBER CAP
7	MACHINE WIRING

NOTE: THE REF. 4 - 5 - 6 - 7 ARE CUSTOMER HARNESS

DESCRIPTION 6 PIN CONNECTOR MDI CAN
(MALE CRIMP TERMINALS)
POS.1 +12V
POS.2 GND
POS.3 CANL/NCLTXD
POS.4 CANH/PCLTXD
POS.5 CANT/PCLRXD
POS.6 CANHT/NCLRXD





5. The Charger

5.1 an overview of the charger

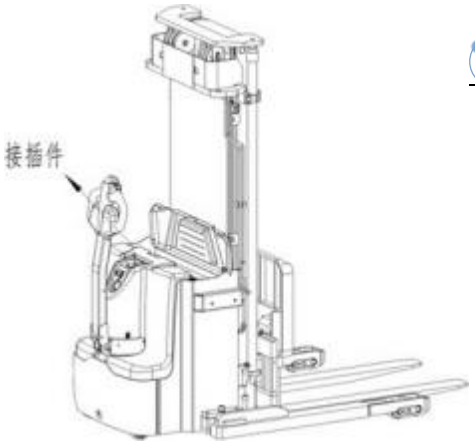
This charger is suitable for charging common lead-acid batteries on various electric vehicles such as electric pallet truck, electric moving truck, electric forklift truck, electric lift truck, electric tour bus, etc.

5.2 Main technical data

Type / project	CBZ3F-25A/24V	CBZ3F-30A/24V	CBZ3F-35A/24V	CBZ3F-40A/24V	CBZ3F-45A/24V	CBZ3F-50A/24V	CBZ3F-55A/24V	CBZ3F-30A/36V	CBZ3F-40A/36V	CBZ3F-25A/48V
Input Power V，HZ	Single phase 220-240V 50-60HZ									
Input power KW	0.9	1.1	1.3	1.5	1.7	1.9	2.1	1.7	2.3	1.9
Input current A	4.3	5.1	6.0	6.8	7.7	8.5	9.4	7.7	10.2	8.5
Output current A	25	30	35	40	45	50	55	30	40	25
Rated voltage V	24	24	24	24	24	24	24	36	36	48
9-12hCharging time corresponds to battery capacity Ah	145-200	175-240	205-280	230-320	260-360	290-400	320-440	175-240	230-320	145-200
Overall dimensionsmm	240*350*260									
The overall size kg	21.5			23.5		25.5		23.5	24.5	

5.3 charging

- Charge only with the included charger
- Please fully understand the contents of the charger instruction manual before using the charger
- Please comply with these rules
- The charging room must be well ventilated.
- Full charging can only be viewed from the discharge display. To control this situation, interrupt the charging process and start the vehicle



Park the vehicle in a special secure area with dedicated power supply.

Lower forks and remove cargo.

Remove the cap and keep it upright.

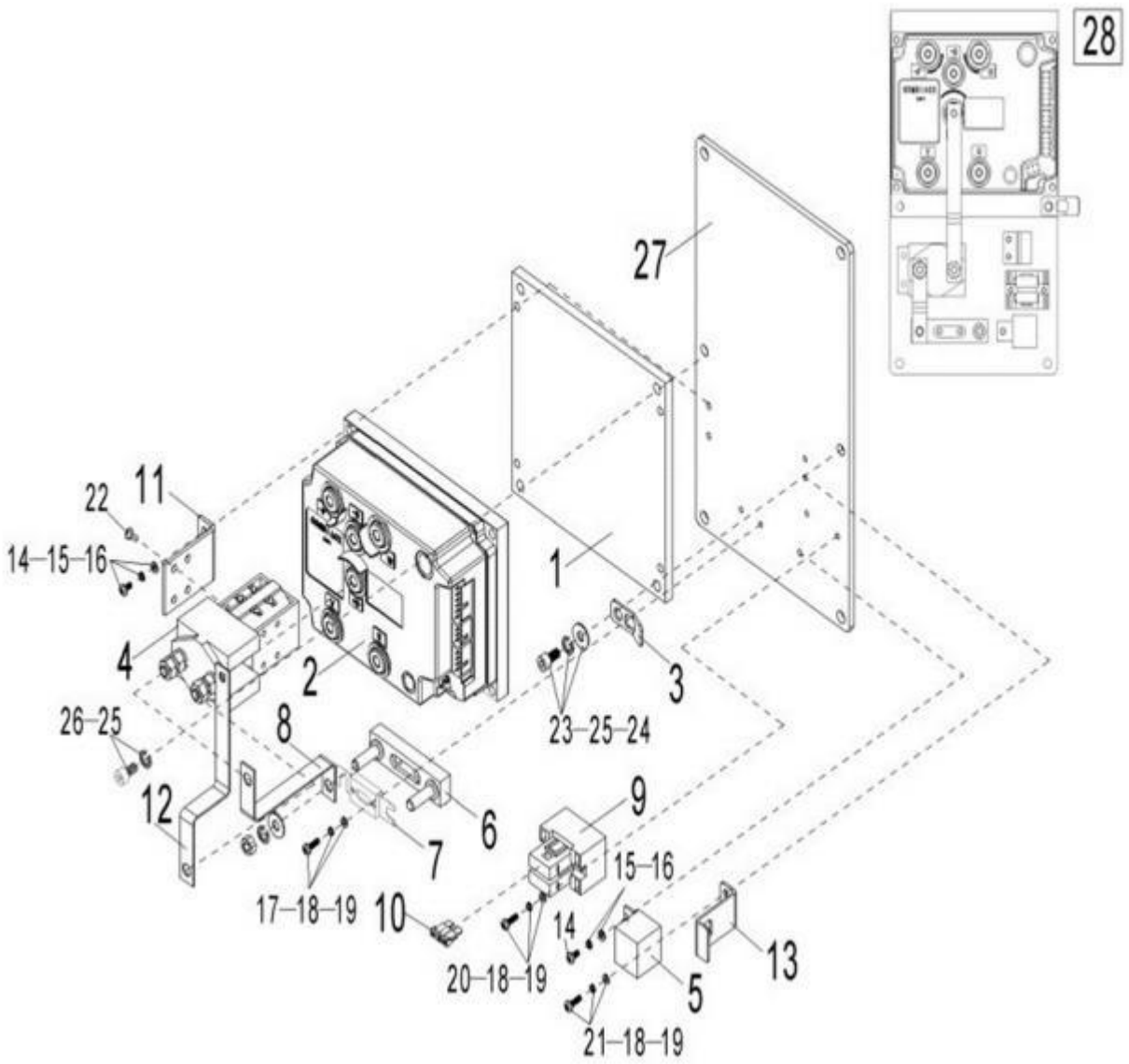
Turn off the power of the vehicle and connect the connector and charger.

The charger starts charging.

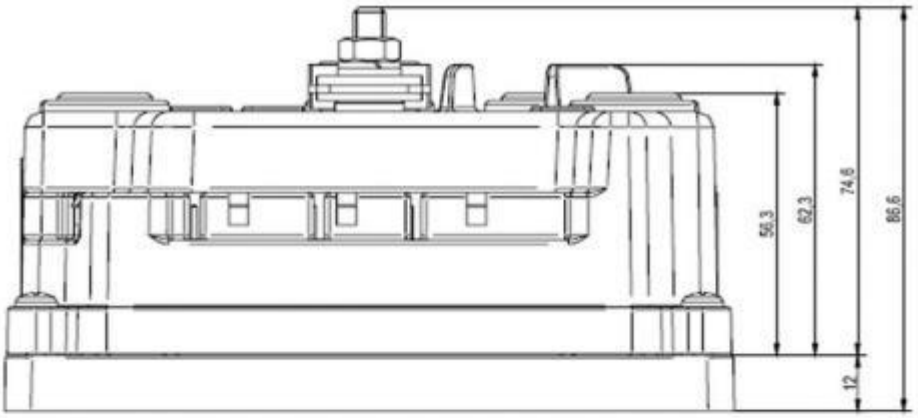
1. The connector of the product is connected with the connector of the charger to charge the battery.

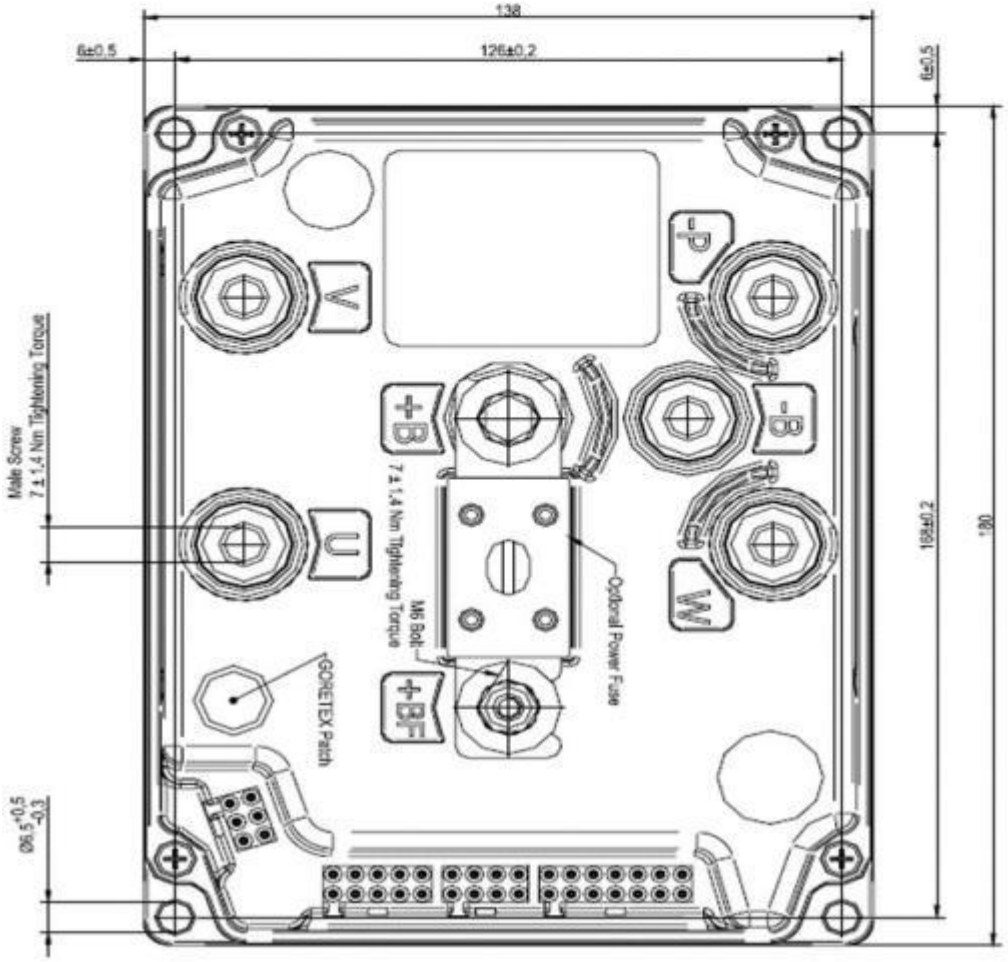
6.Controller

6.1 Controller Unit



N0.	Item Description	Qty.	Note
2	Controller	1	COMBIACX24V/240A+270A
4	contactor	1	SW180B-4 DC24V
5	relay	1	ACR01F-F-1AD DC24V
7	Bolted fuse	1	CNL 350A CH MIC
10	Plug-in type fuse	2	10A


56.3
62.3
74.6
86.6
12


138
126±0.2
6±0.5
6±0.5
Male Screw
7±1.4 Nm Tightening Torque
V
-D
+B
-B
U
W
+BF
M6 Bolt
7±1.4 Nm Tightening Torque
Optional Power Fuse
GORETEX Patch
Ø6.5+0.5 -0.3
156±0.2
180

6.2Fault code

MDICODE	CANCODE	ALARM	The fault name	The measures
0	200	TEACH ERROR		The operator to recompile REMA handle, this failure.
0	201	END TEACH OK		The operator to recompile REMA handle, this failure.
0	202	END TEACH ERROR		The operator to recompile REMA handle, this failure.
0	228	STEERHAZARD	Low battery level	The battery is low and needs to be charged Battery malfunction,replace the battery
0	247	DATA ACQUISITION	The data collection	The fault is activated to prove in the data acquisition phase, please wait for the data acquisition to complete.
0	249	CHECK UP NEEDED	Maintenance time	The maintenance time, need to repair,
8	8	WATCHDOG	Watchdog fault	Startup, before starting the watchdog circuit in the software is activated. When standby or running state guard dog signal is invalid (alarm). Failure analysis: watchdog hardware circuit or micro controller output part was damaged. Both of which have nothing to do with external components, replace the controller.
8	221	FLASH CHECKSUM	Flash memory fault	After turn on the key procedures in the flash memory value is positive, if is negative The fault signal is produced. Failure analysis: the problem on the flash memory of microcontrollers. Flash memory may have After destruction, damage to or stored procedures. Try to set up Logic card program. If the fault still exists, the fault exists in the micro control In the controller. Replace the controller.
8	231	WATCHDOG#2	Watchdog fault 2	Reason: startup, before starting the watchdog circuit in the software is activated. in Standby or running state guard dog signal is invalid (alarm). Failure analysis: watchdog hardware circuit or micro controller output part was broken The bad. Both of which have nothing to do with external components, replace the controller.
10	212	WRONG RAM	Dynamic memory fault	The discovery of the error detection of main memory in the implementation of the content: the registered address As a "DIRTY", the fault will limit the vehicle's operation. Failure analysis: close the key switch to open, if the fault is still there, and more In the controller.
11	211	STALL ROTOR	Motor blocked	1. The motor stalling. 2. The motor encoder failure. 3. The wire damaged or wrong wiring. 4. The encoder power supply problems.
12	239	CONTROLLER MISM.	Controller and the software does not match	Please use the software
13	208	EEPROM KO	Memory damage	Vehicles don't walk, parameter storage area of the existing problems of failure to make the vehicle stop working. If the fault is still there, after repeated closed electric lock logic card is replaced. If the fault disappear, previously stored parameters was wrong, should be set anew.
13	209	PARAM RESTORE	Parameters of the stored	Only need to walk vehicles, the failure to eliminate.
17	17	LOGIC FAILURE #3	Logic card fault 3	Logic card fault current protection function. A controller should be replaced
21	195	BMS HIGH TEMP.	Lithium battery temperature is too high	
22	190	RESETCB2		If the height switch 2 is faulty,the height switch needs to be checked, and the reset height switch solves the fault, and the decryption method is similar to 02A22
23	198	TR. SPEED OPEN	Abnormal magnetic switch	300 mm and 1800 mm switch, reset, eliminate the malfunction.
28	28	PUMP VMN LOW	Low oil pump VMN	Reason: When starting up, the low voltage of MOS tube is higher than 10% of normal battery voltage, or the phase voltage is higher than 1/2 battery voltage。 Possible reasons: 1, electrical wiring is wrong, or there is something wrong with the motor circuit; Check the motor of the three Connecting is correct; Motor of whether there is leakage, whether to have the motor Coil circuit. 2, replace the controller.

29	29	PUMP VMN HIGH	High oil pump VMN	Reason: When starting up, the low voltage of MOS tube is higher than 10% of normal battery voltage, or the phase voltage is higher than 1/2 battery voltage。 Possible reasons: 1, electrical wiring is wrong, or there is something wrong with the motor circuit; Check the motor of the three Connecting is correct; Motor of whether there is leakage, whether to have the motor Coil circuit. 2, replace the controller
31	31	VMN HIGH	VMN high	Reason: When starting up, the low voltage of MOS tube is higher than 10% of normal battery voltage, or the phase voltage is higher than 1/2 battery voltage。 Possible reasons: 1, electrical wiring is wrong, or there is something wrong with the motor circuit; Check the motor of the three Connecting is correct; Motor of whether there is leakage, whether to have the motor Coil circuit. 2, replace the controller. 3, motor three-phase connection exception, cause fever down bad connection column.
31	206	INIT VMN HIGH	Walking drive motor power line voltage is too high	Before the main contactor and software under the condition of not driving power bridge, check the drive axle voltage. Software expects the voltage in a stable state, if the voltage is too high, will be submitted to the fault. Needed to check: 1. The motor U/V/W interior connection; 2. The motor power line connection; 3. The motor whether U/V/W for car body leakage; 4. If the above are no problem, then replace the controller.
32	203	PUMP VMN NOT OK	Oil pump lifting speed sensor	Testing time: standby mode The alarm display hoisting speed sensor voltage than the accelerator signal range (PROGRAMVACC) in the setting of the minimum 1 v above. Possible reasons: 1. The lifting speed sensor voltage upper limit and lower limit value no acquisition, into the collection PROGRAMVACC menu again. 2. The lifting speed sensor error. 3. The controller failure.
40	254	AUX DRIV. SHRT.	Auxiliary drive short circuit	Electromagnetic braking or auxiliary driving circuit short circuit of electric braking. Check the A16 and - whether there is a short circuit or low impedance between BATT push-pull lose And out the other. Logic card drive circuit fault, replace the controller.
41	251	WRONG BATTERY	The battery set fault	Starts, the controller detection and check whether the battery voltage in the range of nominal voltage. 1, check the TESTER menu of BATTERYVOLTAGE whether the value of the parameter and the voltage meter shows that the value of the agreement. If they don't match each other, then use ADJUSTBATTERY feature the battery voltage is consistent with the measured values instead. 2. Replace the battery.
42	246	AUX DRIV. OPEN	Aux output drive failure	Auxiliary coil drive circuit can't drive load. The device itself or drive line The ring was damaged. Replace the controller.
43	218	SENS MOT TEMP KO		
46	196	LIFT+TRAC	Lifting and walking closed at the sametime	Only under the condition of lithium battery.
48	240	EVP DRIVER OPEN	Proportional valve drive	View the proportional valve is open.
49	241	MANYPUMPREQS	Multiple oil pump signals	Check if multiple oil pump signals are closed
50	214	EVP COIL OPEN	Proportional valve coil	Check to see if proportional valve coil open.
50	215	EVP DRIV. SHORT.	EV coil short-circuit	Check to see if the EV1 / EV2 / EV3 low-end and B - short circuit, if is normal, need to change controller;
51	228	TILLER OPEN	Handle disconnected	When the handle input switch is disconnected, after a period of time, about 30 seconds, the main contactor is disconnected, and the warning occurs. The next time you run it, the warning disappears.
52	52	PUMP I=0 EVER	Oil pump = 0 fault	Connect the power cord to check the oil pump motor is in good condition, if in good condition, replace the controller;

53	53	STBY I HIGH	Standby current high	Micro control system detects current sensor output signal is beyond the not Running current allow. This failure isn't related to the peripheral components, should be Replace the controller.
53	252	WRONG ZERO	Zero voltage error	High voltage feedback value of the startup VMN. Not about 2.5 V. control Circuit is destroyed. Failure analysis: it is recommended that check the following. The motor internal connection The motor power cable connection. The drain current between the motor vehicles and housing. If the motor connection is good, the problem within the controller, the change of control Device.
54	19	LOGIC FAILURE #1	Logic card failure 1	Low voltage or over voltage protection function when the fault. In the 24 v system Detects the voltage, the controller more than 45 v or below 9 v. In 48 v system, the controller detected voltage exceeds 65 v or below 11 v. Possible reasons: 1. For the short circuit in the circuit system, such as DC - DC, brake coil, etc., or the controller input power contacts are in good condition. 2. The battery voltage is too low or too high. 3. Test B, B, above the main contactor and terminal power cable is tighten. 4. Whether controller voltage calibration parameter and the actual voltage. 5. Hardware circuit fault overvoltage protection logic card, replace the controller.
55	18	LOGIC FAILURE #2	2 logic card malfunction	Logic card photogenic voltage feedback circuit hardware part failure, replace the controller.
56	217	PUMP I NO ZERO	No action of the pump motor current overrun	In standby mode (pump motor drive), feedback from the pump in the chopper current sensor is given a value, beyond the allowed because the pump current is not zero. Replace the controller;
59	197	NO CAN MSG. BMS	Lithium battery not CAN information	Battery side and bodywork and CAN communication line
60	60	CAPACITOR CHARGE	Capacitance charging error	When the electric lock, controller will be via the power resistor capacitor charging, and whether the detection capacitance within the prescribed time, adequate electricity, if there is no sufficient electricity, capacitor voltage is less than 20 % battery voltage, the controller will call the police, main contactor will not be closed. Possible reasons: 1, peripheral devices, such as DC - DC motor or other equipment interferes with the controller of the charging process, to eliminate these devices to produce interference. 2, charging resistor disconnected, charging circuit fault, power supply module has a problem, need to change the controller.
61	250	THERMIC SENS. KO	Temperature sensor failure	The controller temperature sensor output signal is beyond the scope. The fault has nothing to do with external components, replace the controller.
62	62	TH. PROTECTION	Controller over temperature protection	Make the controller temperature dropped to below 85 ° itself, if the problem still exists, is likely the temperature sensor failure or the controller itself logic board failure, at this point, the need to replace the controller.
63	63	EMERGENCY	P - terminal voltage instability	A n emergency reverse fault occurs. You need to reset the emergency reverse switch
64	238	TILLER ERROR	Interlock and H	There is nothis fault code in configuration

65	65	MOTOR TEMPERAT.	High temperature in the motor	1, if the motor temperature digital switch, or analog signal than the cut-off value, the fault is generated. 2, motor temperature reaches 120 ℃, alarm controller, the vehicle can also walk, but the maximum current is cut, the vehicle performance. When the motor temperature reaches 125 ℃, the machine stop working. At this point should try to cool the motor. 3, when the motor cooling failure still exist, check the wiring. If all is good, replace the controller.
66	66	BATTERY LOW	Battery power is low	If battery detection "BATTERYCHECK" parameter is not set to 0, when the battery capacity is less than 15 %, instrument when there is no case number, fault alarm, ascension to be locking function. At this point it shall timely charging. If it is found that the battery has electricity, the detection of the controller "ADJUSTBATTERY" the value of this parameter for consistency and battery voltage.
67	218	SENS MOT TEMP KO	Temperature sensor failure	Phenomenon: the motor temperature sensor output signal is beyond the scope. Solution: check the value of the sensor and the wire connection. if No problem, then the problem inside the controller. (N series controller temperature sensor resistance of 600 ohms)
67	248	NO CAN MSG.	No CAN signal	The CAN communication failure between steering and traction. Testing CAN wiring and software Set up and version information.
68	222	SMARTDRIVER KO	Electromagnetic brake drive failure	See if electromagnetic brake drive high-end CNB# (1) and B - short circuit, if normal, internal driver module may be damaged.
68	224	WAITING FOR NODE	Waiting for the signal node	In CAN communication network, a controller to another point Controller can't normal communication signals, the proposed controller has been waiting for All normal state, until CAN communication network. Check cannot communication Why don't the module connection is normal, check the software or this edition parameters Settings are correct.
70	205	EPS RELAY OPEN	EPS internal contactor disconnect	See if there are any more failure, traction and EPS internal troubleshooting after the restart, eliminate the malfunction.
70	218	SENS MOT TEMP KO	Temperature sensor failure	Phenomenon: the motor temperature sensor output signal is beyond the scope. Solution: check the value of the sensor and the wire connection. if No problem, then the problem inside the controller.
71	13	EEPROM KO	Memory damage	Vehicles don't walk, parameter storage area of the existing problems of failure to make the vehicle stop working. If the fault is still there, after repeated closed electric lock logic card is replaced. If the fault disappear, previously stored parameters was wrong, should be set anew.
71	210	WRONG RAM MEM.		This alert is issued if an internal alert problem is detected
72	30	VMN LOW	VMN low	Reason: boot, MOS tube high voltage capacitor voltage of less than 66 % or in the process of the motor running, the voltage less than the required value. Possible reasons: 1. Electrical wiring is wrong, or there is something wrong with the motor circuit; Check the motor Three-phase connection is correct; The motor of whether there is leakage, whether or not A motor coil circuit. 2. Whether the main contactor and firm. Contact with and without abrasion. 3. Replace the controller.
72	207	INIT VMN LOW	Internal alarm controller	Replace the controller
74	74	DRIVER SHORTED	Drive the short circuit	Electric locking timeliness, the microprocessor will test drives are main contactor No short circuit, if a short circuit will alarm; Testing main contactor coil the anode Whether negative short circuit of the B6 or power, if everything is in order, the periphery Replace the controller.
74	213	AUX BATT. SHORT.	Auxiliary driving voltage breakdown	View the B2 and drive cable is correct, if correct, replace the controller;
74	234	DRV. SHOR. EV	EV coil short-circuit	Check to see if the EV1 / EV2 / EV3 low-end and B - short circuit, if is normal, need to change controller;

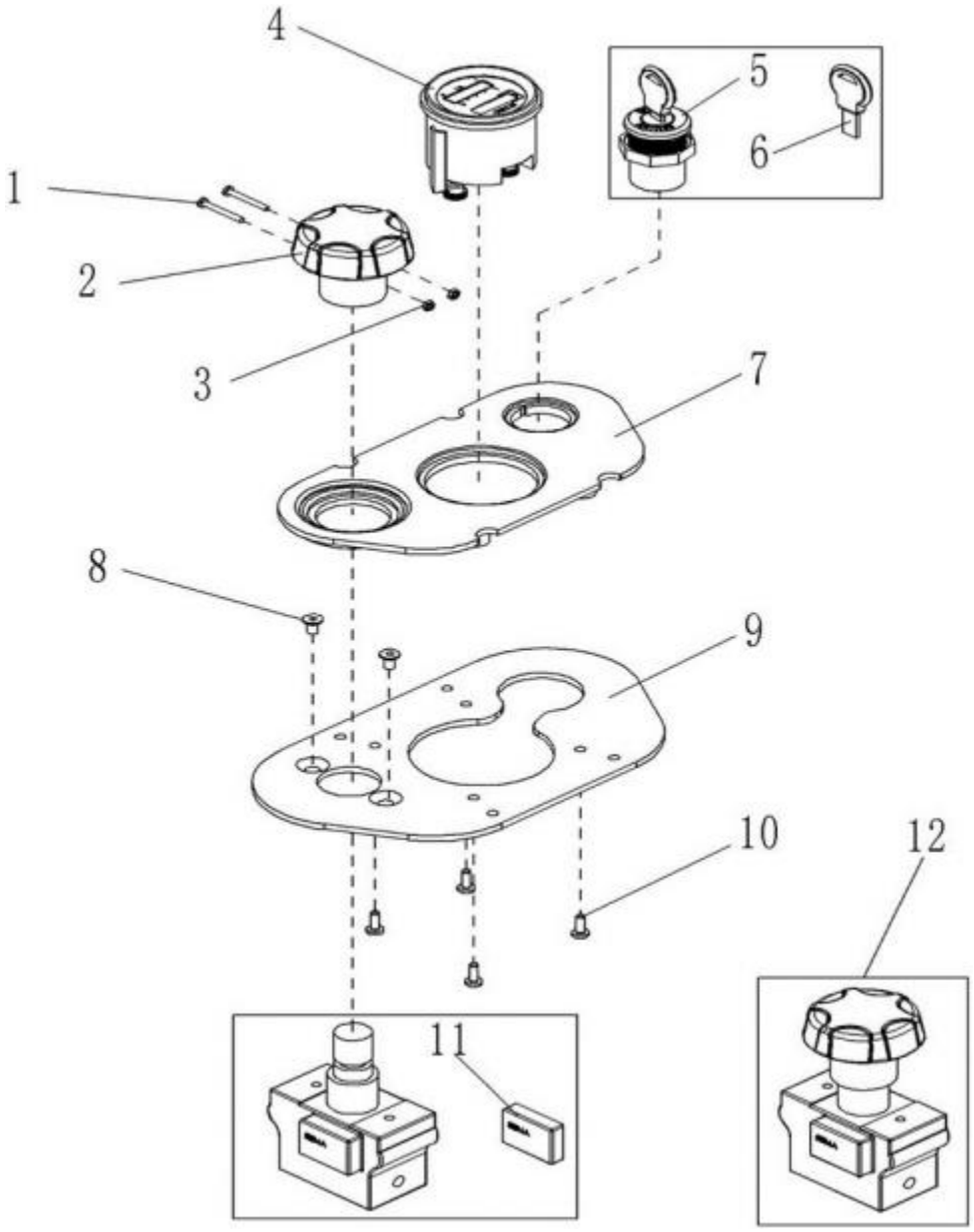
75	37	CONTACTOR CLOSED	Contactor adhesions	When closing the main coil before contact, controller to test main contactor whether contact adhesive. Try to discharge the capacitor, if the capacitor voltage reduces the battery 20 % of the voltage fault may be produced. 1, advice, check whether contactor contact adhesion, or change the contactor
75	75	CONTACTOR DRIVER	Drive the short circuit	Electric locking timeliness, the microprocessor will test drives are main contactor No short circuit, if a short circuit will alarm; Testing main contactor coil the anode Whether negative short circuit of the B6 or power, if everything is in order, the periphery Replace the controller
75	232	CONT. DRV. EV	Controller for EV drive is not available	One or more of the switch valve drive properly when the faults. Drive connections, if no problem, replace the controller;
76	220	KEY OFF SHORTED	Key switch short-circuit	In the startup phase, when the controller to detect the key switch low Logic level signal, according to the fault. Failure analysis: very may be due to the voltage is too low, suggest to check the following Items. - key switch based on external load (such as DC - DC converter of rev Still, relay or contactor switch input signal is lower than the start-up electricity Pressure). - check the power cable with the cathode, and with the main contactor and the battery Controller - BATT, the connection between BATT situation, must be With screw connection, the scope of the torque for 13 nm present 15 nm. - if there is notest on power lines to the pressure drop, at a time when the key Can produce fault signal switch to ON. Failure may occur in the control Of hardware, so it is necessary to replace the controller.
76	223	COIL SHOR. MC-EB	Main contactor or electromagnetic brake load is too large	1, whether the view controller output and the load is too large; 2, replace the controller;
76	235	COIL SHOR. EV.	PEV coil fault	Driven by PEV coil, a failure, see the PEV drive coil connected with coil itself are in good condition;
77	38	CONTACTOR OPEN	Contactor don't suck	Logic card drive main contactor coil, but didn't closed contactor, possible reasons: 1. The contactor mechanical failure, stuck, etc 2. Touch the point contact undesirable contactor 3. If the contactor work is normal, replace the controller
77	199	TILLER ERROR		This fault is reported if there is an error with the REMA handle.
78	78	VACC NOT OK	Accelerator fault	Testing time: standby mode The alarm display than accelerator accelerator voltage signal range (PROGRAMVACC) in the setting of the minimum 1 v above. Possible reasons: 1. The accelerator voltage upper limit and lower limit of no collection, gathering into PROGRAMVACC menu again. 2. The accelerator error, may not have return accelerator pedal, or accelerator internal error. 3. The controller failure.
79	79	INCORRECT START	Startup sequence fault	Startup sequence is wrong, possible reasons: 1. In front of the boot, the direction switch has been closed. 2. The sequence of operation error. 3. The wire connection is not correct. 4. If we can't rule out the fault, the need to replace the controller. 5. Turn not at fault, under the pressure interlock fault, steering motor abnormalities.
79	242	PUMP INC START	Oil pump startup sequence of failure	Oil pump startup sequence is wrong, possible reasons: 1. Before turning, lifting, such astilt switch is closed. 2. The sequence of operation error. 3. The wire connection is not correct. 4. If we can't rule out the fault, the need to replace the controller.

80	80	FORW+BACK	Forward and backward signals exist at the sametime switch adhesion (direction)	Controller will detect when running at the sametime, there are two directions request signal will report to the police. Possible reasons: 1. The wire breakage 2. The direction of the switch failure 3. The improper operation 4. If the fault can't be ruled out, it is need to change the controller
82	82	ENCODER ERROR	Encoder failure	Controller to detect the speed of encoder two consecutive readings have very big difference, because the system internal encoder can't change a lot of speed in a very short period of time, possible encoder failure (one or two encoder line wear or broken), check the encoder mechanical and circuit function part; May cause electromagnetic interference of the sensor on the bearing of the police. The above Are not, then replace the controller. Please note that the artificial operation may cause the controller according to the fault, the need to restart the power of the vehicle. Such as the following: 1, car suddenly hit the barrier, which leads to the vehicle cannot walk; 2, when car speeding, nasty brake suddenly.
85	226	VACC OUT RANGE	Input accelerator beyond	1, accelerator voltage upper limit and lower limit of no acquisition, right into the collection PROGRAMVACC menu again; 2, check the accelerator cable is properly connected;
86	86	PEDAL WIRE KO	The accelerator is negative connection failure	Check the accelerator is negative if they pick up on the controller;
86	229	POS. EB. SHORTED	Electromagnetic brake drive high-end output in advance	Interlock without closing, electromagnetic brake drive high-end high output voltage. 1, see if any other high voltage lines connected to the electromagnetic brake high-end outlets; 2, if the electromagnetic brake high-end outlet connection, the high voltage is still exists, the controller internal drive circuit is damaged;
88	233	POWER MOS SHORT	Power MOS tube short circuit	In front of the main contactor closing, the software will check the power bridge: converting MOS The low end of the power, voltage drop to - BATT (up to BATT), if the instruction is inconsistent with the change of phase voltage value, are produced by the fault signal. Replace the controller.
89	245	PUMP VACC NOT OK	Oil pump lifting speed sensor	Testing time: standby mode The alarm display hoisting speed sensor voltage than the accelerator signal range (PROGRAMVACC) in the setting of the minimum 1 v above. Possible reasons: 1. The lifting speed sensor voltage upper limit and lower limit value no acquisition, into the collection PROGRAMVACC menu again. 2. The lifting speed sensor error. 3. The controller failure.
90	191	BMS LOW CAP.	Lithium battery is low	Verify the lithium battery capacity is too low
90	243	PUMP VACC RANGE	Oil pump lifting speed sensor is beyond	1, lifting speed sensor voltage upper limit and lower limit value no acquisition, right into the collection PROGRAMVACC menu again; 2, check the lifting speed sensor cable is properly connected;
90	244	PROGRAM TOOTHS	Motor type error	Check the actual use of the motor, whether with the same parameters.
91	192	BMS VOLT. DIFF	Lithium battery voltage error	Verify the lithium battery internal monomer voltage differential pressure is too large.
92	193	BMS MONOMER OV	BMS feedback battery voltage is too high	Verify the lithium battery voltage is too high. Normal voltage (22-25.6 - V)
92	236	CURRENT GAIN	Current gain fault	Maximum current gain parameters for the factory Settings. Shows that maximum current adjustment Parameter program has not yet been enabled. Solution: by ZAPI technology personnel to correct current gain parameters The application Settings.
93	194	BMS MONOMER UV	BMS feedback battery voltage is too low	Verify the lithium battery voltage is too low. Normal voltage (22-25.6 - V)
94	0	NONE	Hour meter do not agree with the controller	In using the system, if change the instrument or traction controller, will quote this fault. After startup, wait for 5 minutes, after hour meter instrument and traction controller is consistent, the automatic fault elimination.
94	195	BMS HIGH TEMP.	Lithium battery temperature is too high	Verify the lithium battery temperature is too high. Or the li-ion battery temperature sensor failure
95	98	INPUT ERROR #2	Emergency reverse CAN signal and the actual state	Verify the handle emergency reverse switch wiring (C2 pins)

96	237	ANALOG INPUT	Analog signal input fault	When all analog signal input of the A/D conversion to A fixed value The fault signal, the time delay of more than 400 milliseconds. This function is used to detect the A/D Converter fault or analog signal Failure analysis: if the failure, replace the controller.
98	98	INPUT ERROR #1	Emergency reverse CAN signal and the actual state	Verify the handle emergency reverse switch wiring (C2 pins)
98	219	DEADMANABSENT		If there is voltage at B2 disconnect, this fault is reported.
99	99	INPUT ERROR #2	Emergency reverse CAN signal and the actual state	Verify the handle emergency reverse switch wiring (C2 pins)
99	253	SLIP_PROFILE	Slip fault	SLIPPROFILE parameter selection error. Check the hardware setup parameters, these values are set.

7.Meter

Display Assembly



N0.	Item Description	Qty.	Note.
4	Electricity meter	1	ZAPI F04264-MDI CAN 12V
5	Universal key switch	1	LKS-101A
11	DC power switch	1	ZDK32-350

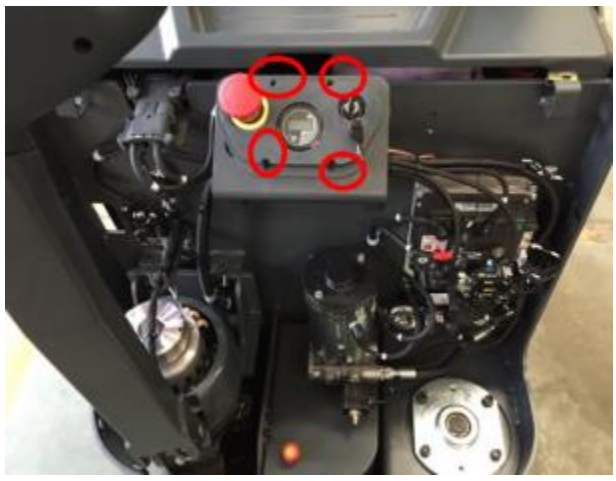
8. Replace electrical parts

Power must be disconnected before replacing electrical parts

Note: Lower the fork to the bottom before servicing, then turn off the key switch and disconnect the power.

1.Remove the bolts shown below with an inner 6mm hexagon wrench.

2. Disconnect the power supply of the vehicle, i.e. unplug the battery connection port in the picture below.



3. Unscrew the four screws with the 6mm inner hexagon wrench, and cut off the binding belt of the surrounding wiring harness

4. Unplug three plugs

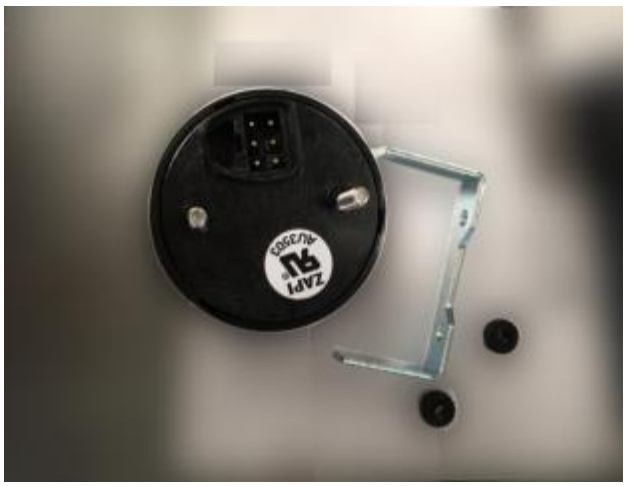
5. Loosen the wiring nuts on both sides of the emergency stop switch box with a 14mm wrench, and then remove the wiring

6. Remove the meter

8.1 Replace the electric meter

1. Unscrew the two fixed nuts of the meter by hand

2. Remove metal ring

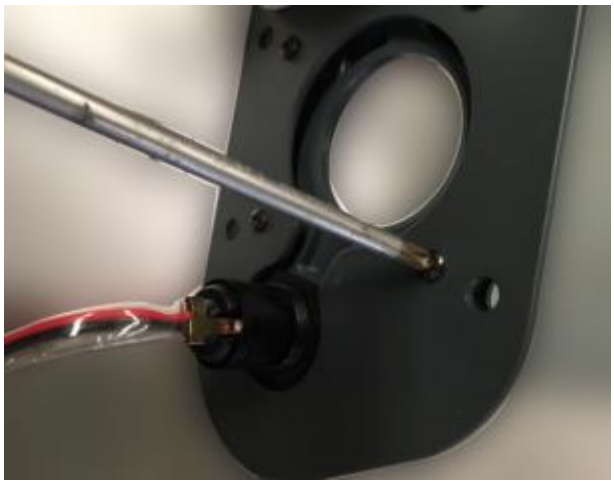


3. Replace the electric meter

8.2 Replace the emergency button

1. Unscrew the two screws of the emergency button with a cross screwdriver

2. Remove the screw and then remove the mushroom head



3. Unscrew the screw with a cross screwdriver

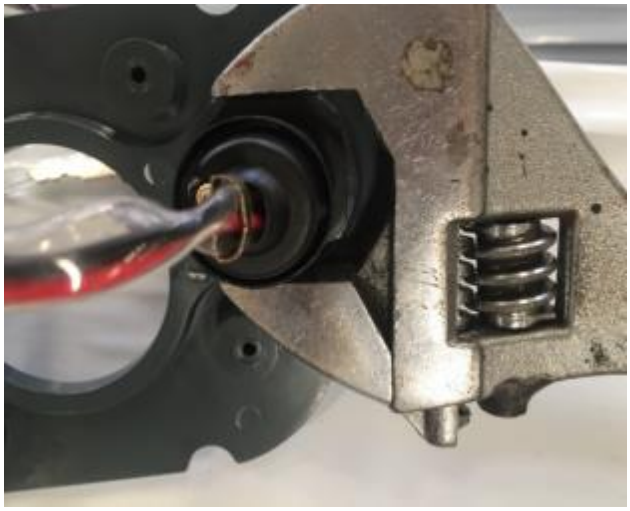
4. Separate the integrated blade panel from the instrument fixing plate

5. Unscrew the two setting screws with a cross screwdriver

6. Remove the DC power switch

7. Press the buckle on both sides of the micro switch by hand to unplug the micro switch, the installation process and the reverse process of the above process.

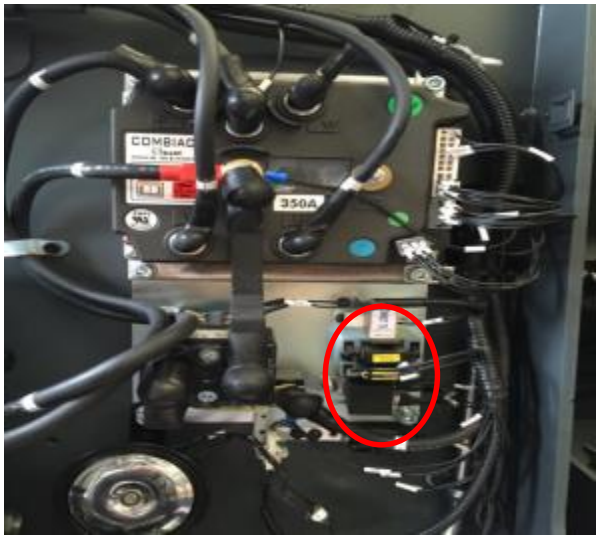
8.3 Replace the universal key switch



1. Use a wrench to unscrew the retaining nut on the key switch

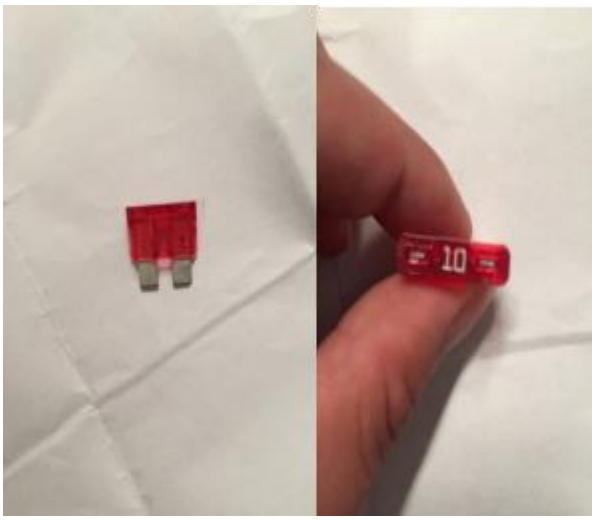
2. Remove the key switch, can be replaced

8.4 Replace fuse 1, fuse 2, fuse 01 (refer to 3.1 circuit diagram)

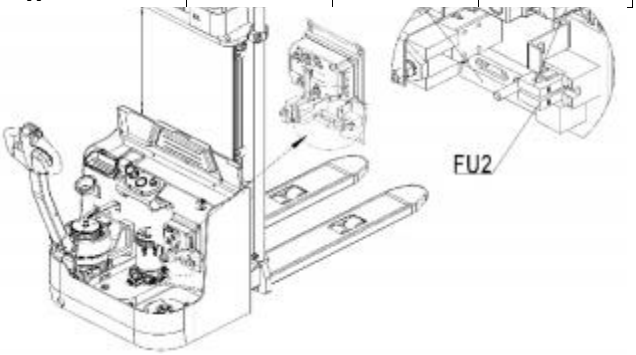


1. Open the fuse box

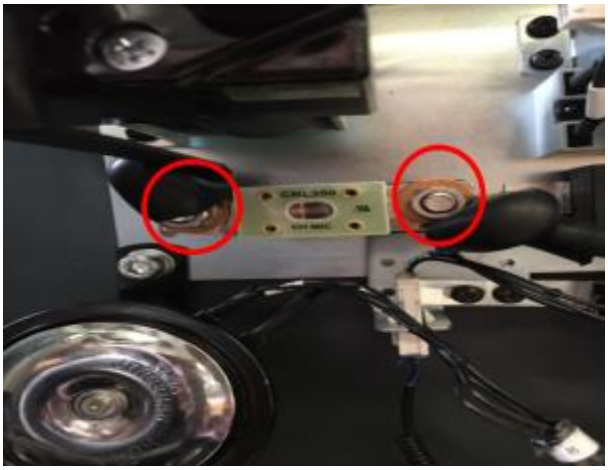
2. After opening the fuse box, take out the old fuse, replace the new fuse, the installation process and the reverse process of the above process.



Fuse	Fuse1	Fuse2	Fuse01
specification	10A	10A	350A



Fuse position



1. Unscrew the nut with a 13mm open wrench, remove the fuse, and replace it with a new fuse, the installation process and the reverse process of the above process.

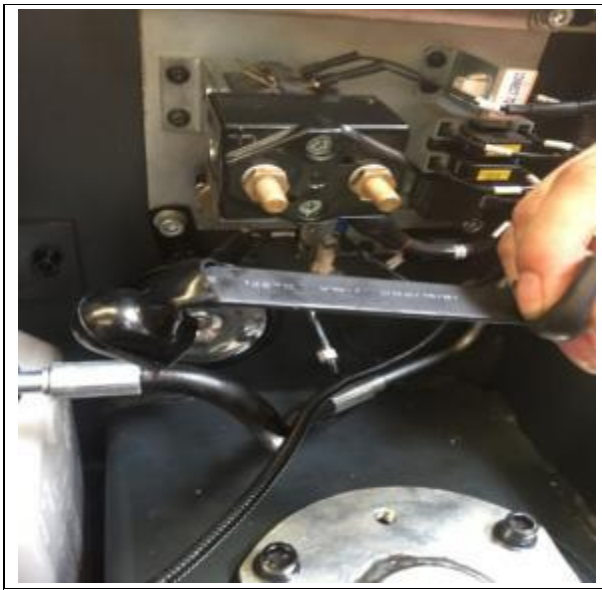
8.5 Replace the contactor (refer to 3.7 Electronic Control Module 4)

1. Unscrew the two screws with a 13mm wrench.

2. Unscrew the screws on the controller with a 10mm open wrench

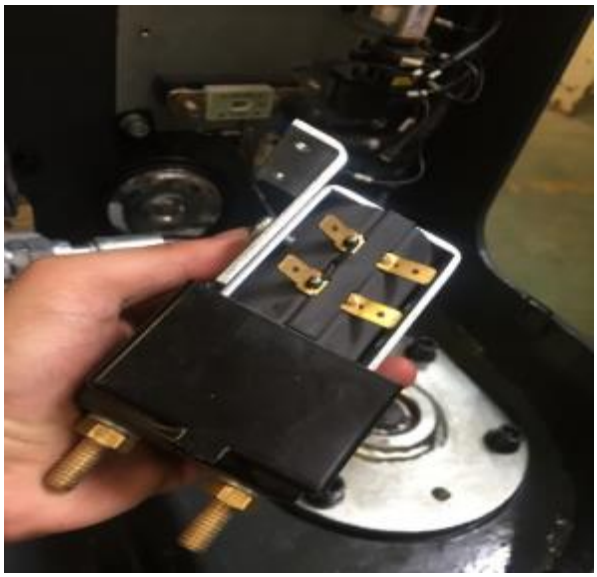
3 Remove the copper bar

4. Unscrew the bolt with a 13mm open end wrench



5. Remove the copper bar

6. Unscrew the two screws with a cross screwdriver

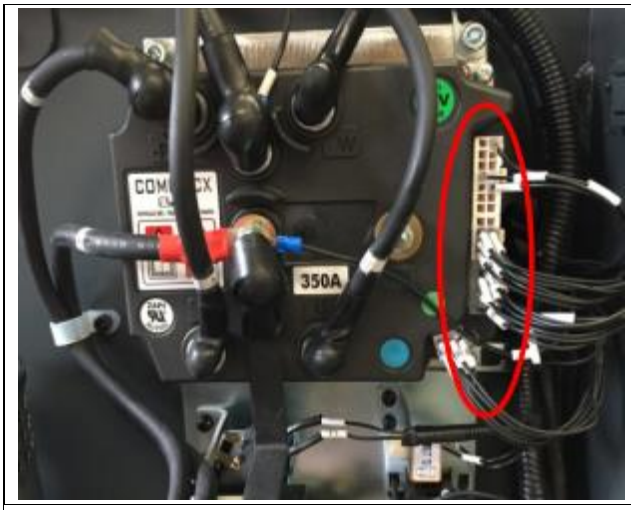


7. Remove the contactor with mounting frame

8. Unscrew two screws with a screwdriver.

9. Remove the mounting frame, and the contactor can be replaced. The installation process is the reverse process of disassembly

8.6 Replace the electric control



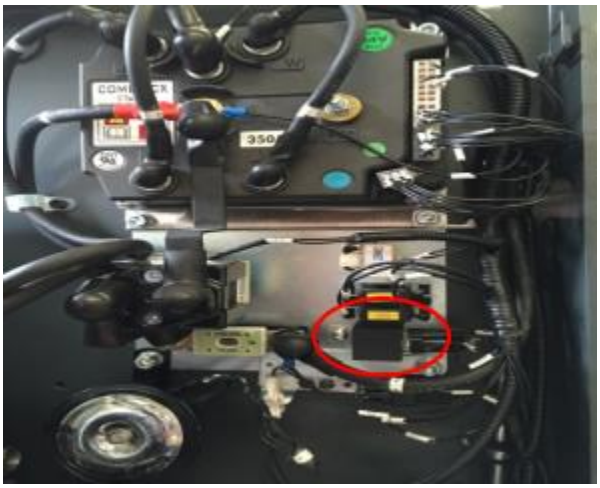
1. Remove the wiring on the electronic control in turn, pull out the connector, and note down the different ports corresponding to different wiring

2. Unscrew the five screws V, U, W, -P and -B with a 10mm open wrench, and remove the wiring in turn

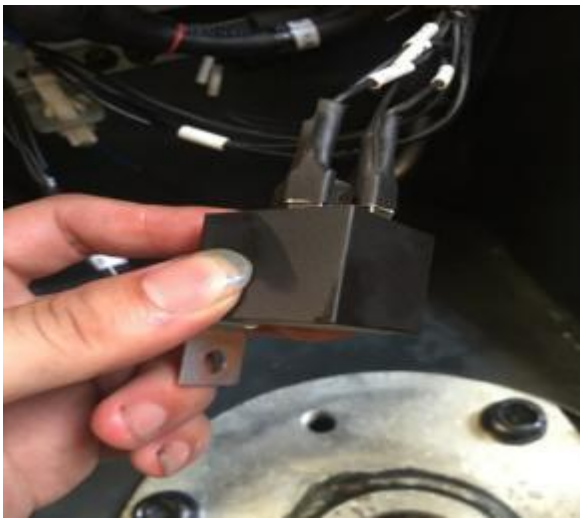
3. Unscrew four controller fixing screws with a cross screwdriver, that is, remove the controller, the installation process is the reverse process of disassembly

52

8.7 Replace the relay



1. Unscrew the setting screw with a cross screwdriver

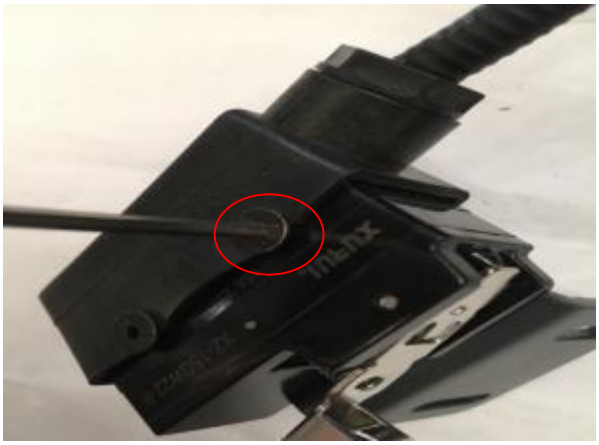


2. Remove the relay and pull out the wiring

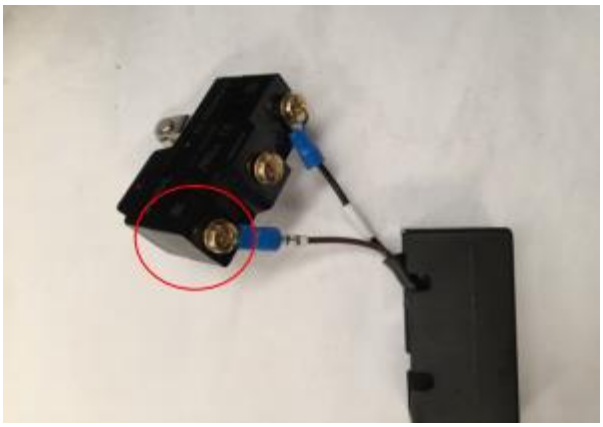
3. Relays can be replaced, and the installation process is the reverse process of disassembly

8.8 Replace micro switch

1. 1. Unscrew the bolt with a cross screwdriver and remove the micro switch.



2. Remove shell with 2mm inner hexagon



3. Remove the wiring with a cross screwdriver and it can be replaced

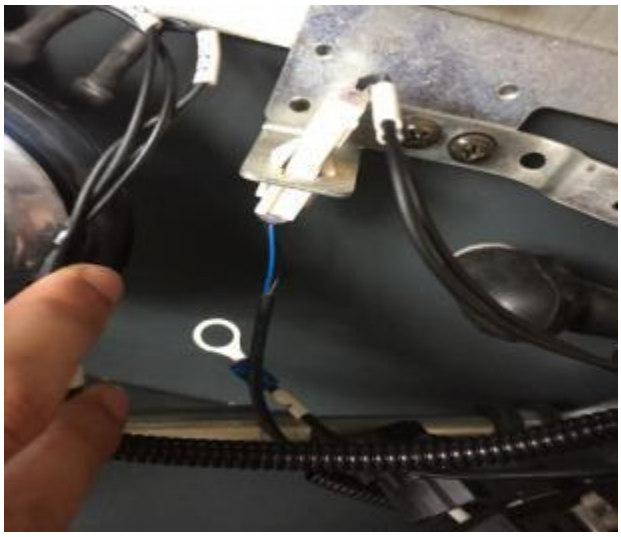
8.9 Replace the magnetic switch

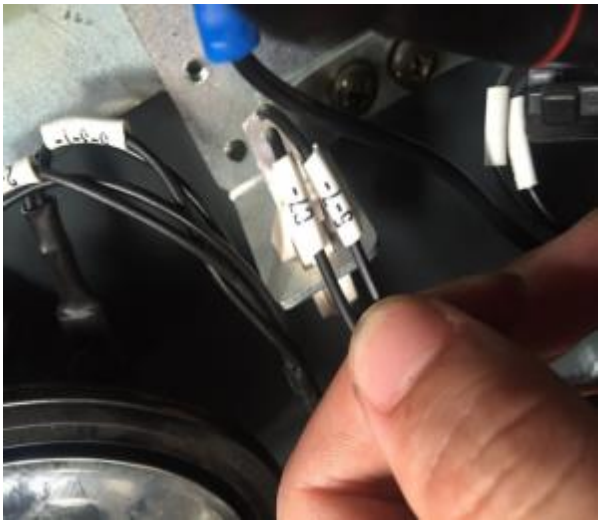
2. Unplug the wire harness connector at the other end of the magnetic switch, and cut the tie that binds the wire harness, that is, remove the magnetic switch and replace it.

8.10 Replace wiring harness

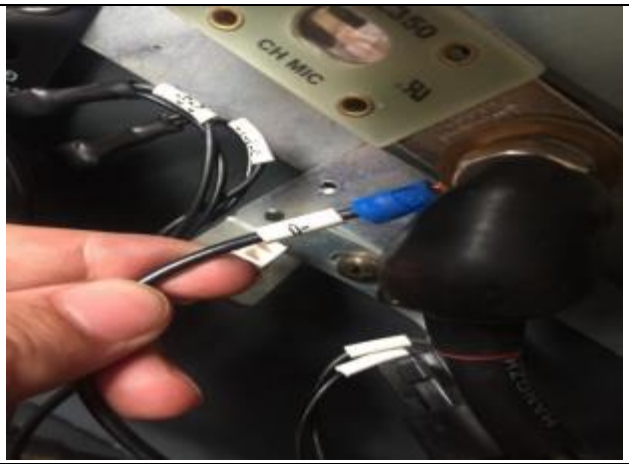
Pay attention to the corresponding position of each plug when replacing, and do not insert it wrong when installing.

1. Unplug the two plugs on the contactor





2. Unplug and remember the line number



3. Unscrew the screw with 13mm wrench, unplug the plug, and write down the line number

0-	1-
7-	9-

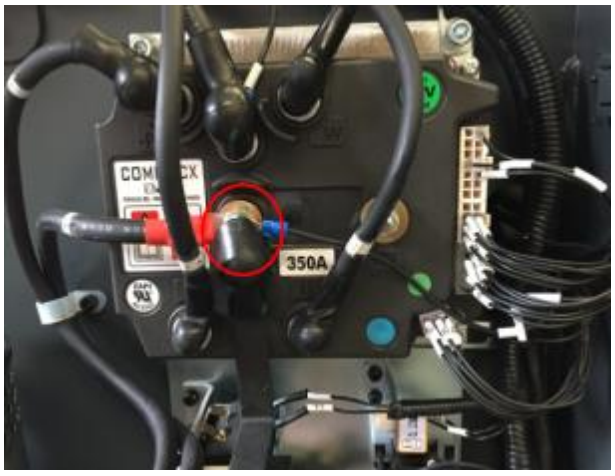
4. Unplug the plug and write down the line number. The position of the line number is shown in the table on the right

5. Unscrew the relay with a cross screwdriver, unplug the plug,

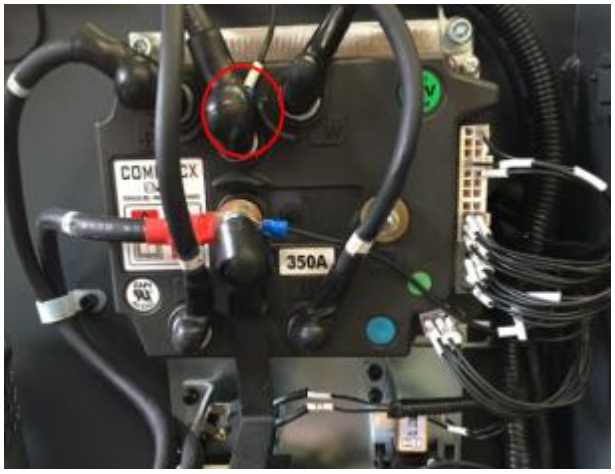
	5-3-	
9-7-		87-
	5-3-1	

6. Remember the plug corresponding to each line number, as shown in the picture on the right.

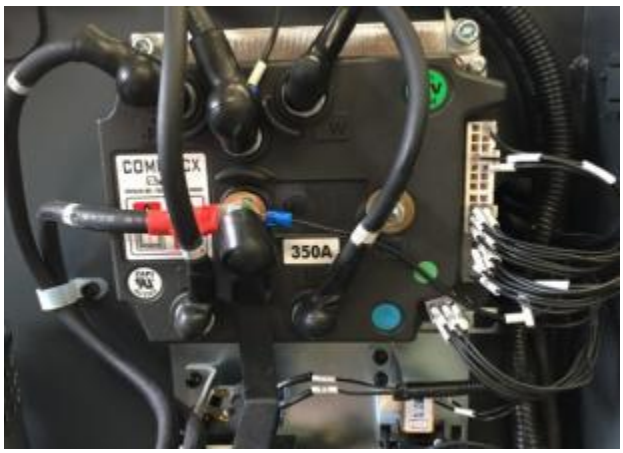
7. Unplug the two plugs on the speaker and write down the line number



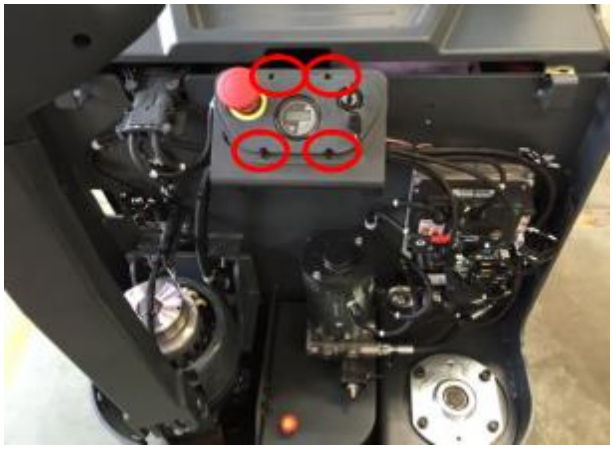
8. Unscrew the screw with 13mm wrench, remove the wiring, and write down the wiring number



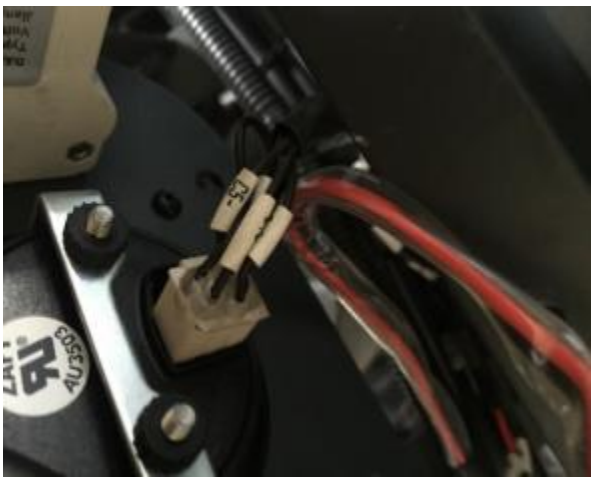
9. Unscrew the screws with a 13mm wrench, remove the wiring, and write down the wiring number.

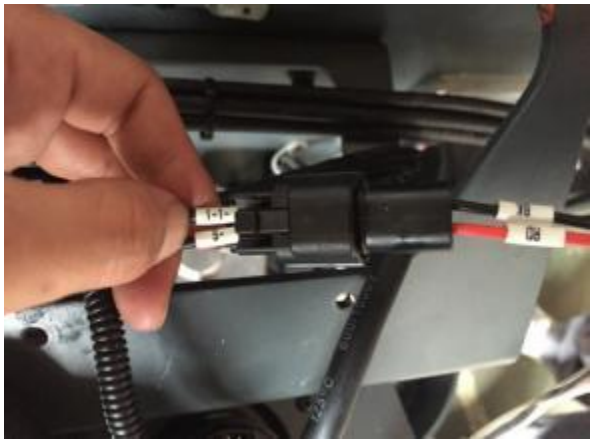


10. Unplug all plugs on the right side, which are one-to-one corresponding.



11. Remove the instrument panel by unscrewing the four screws with a 6mm inner hexagon wrench.





12. Unplug the plug one by one and write down the line number

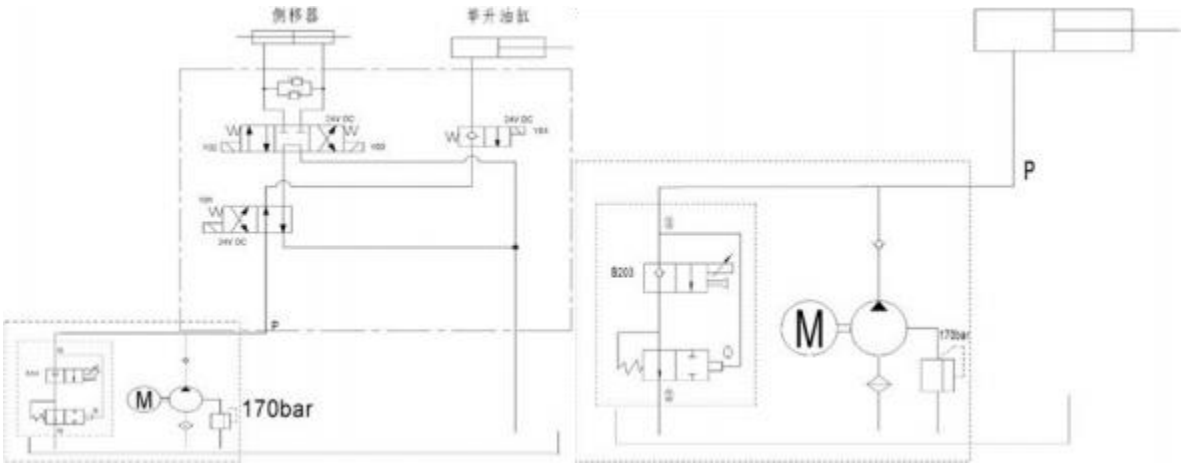
13. Unplug each plug in turn. This plug is one-to-one corresponding

14. Unscrew the wire harness holder with a 14mm cross screwdriver

15. The wiring harness can be removed and replaced

9. Hydraulic system

The hydraulic circuit



9.1 Replace the pump station

The pallet rack must be lowered before replacement to allow the hydraulic oil in the tubing to return to the hydraulic tank of the pump station.

	
1. Unscrew the screws with a 13mm wrench and remove the wiring	

2. Remove the hydraulic tubing with 22m and 22mm open end wrenches. Note: hydraulic oil will leak out when removing the tubing. It is recommended to put back yarn or rag on the pad when removing the tubing.

3. Unplug the connector by hand

4. Unscrew two fixing screws with 5mm inner hexagon, then take out the oil pump

9.2 Replace hydraulic oil

	
1. Take out the oil pump, unscrew the cap of the oil tank, waste oil can be poured out, then the oil tank can be installed to the car, the installation process is the reverse process of disassembly.	

	
3. Inject hydraulic oil through tubing and screw the cap	

Check and refill the hydraulic fluid

The type of hydraulic oil required is:

• H-LP 46, DIN 51524

• Viscosity is 41.4 -- 47

• According to the model, the amount of oil is 6.0~9.5L

Waste materials such as waste oil, batteries or other materials must be treated and recycled according to national regulations, and if necessary, sent to the recycling company for recycling.

The oil level should not be lower than the minimum amount of oil required for lifting the cargo.

Add oil to the fueling point mark if necessary.

9.3 Replace the filter

1.Use a 5mm hexagon wrench to unscrew the bolt and remove the pump

2. After removing the oil pump, the filter can be replaced

9.4 Replace carbon brush

1. Unscrew the bolt with a 10mm open end wrench

2. Lift the cover.

3. Unscrew the screw with a cross screwdriver, then take out the carbon brush and replace it. The installation process is the reverse of the above process.

9.5 Adjust oil pump pressure

1. Unscrew the horn fixing bolt and remove the horn

2. Loosen the bolts with a 24mm socket wrench

3. Adjust the pressure of the oil pump with a 6 mm inner hexagon wrench

4. Tighten bolts with a 24 mm hexagon socket wrench

9.6 Replace the outer oil cylinder

The outer cylinder on the right

1. Remove the oil pipes at the lifting cylinder on both sides with 19mm open spanner. Note: hydraulic oil will leak out when removing the oil pipes.

2. Use a 12mm wrench to remove both sides of the return tubing

3. Remove the bolt at the top of the oil cylinder by the 12mm inner hexagon

4. Using the 6mm inner hexagon screw down the cylinder pressure plate fixing bolt

5. Remove the fixing bolt of the cylinder base with a 12mm inner hexagon wrench.

6. Remove the oil cylinder, and the installation process is the reverse of the above process

The outer cylinder on the left

1. Remove the oil pipe at the bottom of the cylinder with a 22mm open spanner

2. Remove the top oil pipe of the cylinder with a 22mm open end wrench

3. Remove the two bolts fixed between the top of the left and right oil cylinders and the door frame with the 12mm inner hexagon

4. Remove the four bolts on the press plate of the left and right oil cylinders with the 6mm inner hexagon

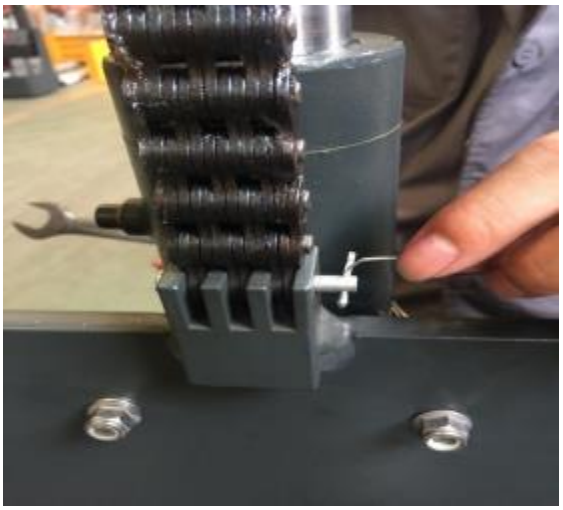
5. Remove the fixing bolt of the cylinder base with a 12mm inner hexagon wrench

6. Remove the entire oil cylinder

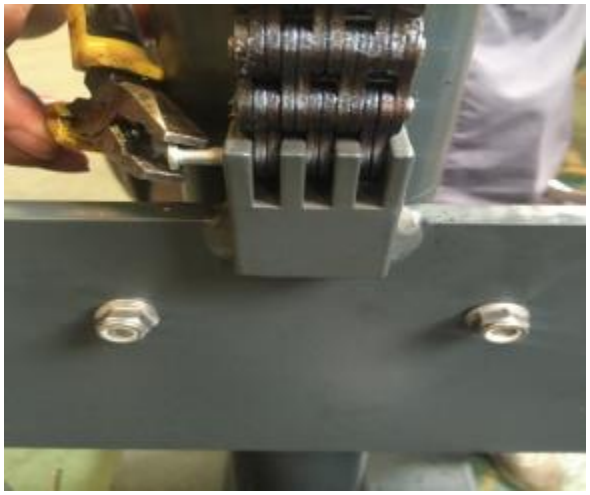
9.7 Replace the middle oil cylinder

1. Knock down the spring clamp with the punch and remove the protection plate

2. Unscrew the oil pipe at the bottom of the middle oil cylinder with a 22mm open spanner



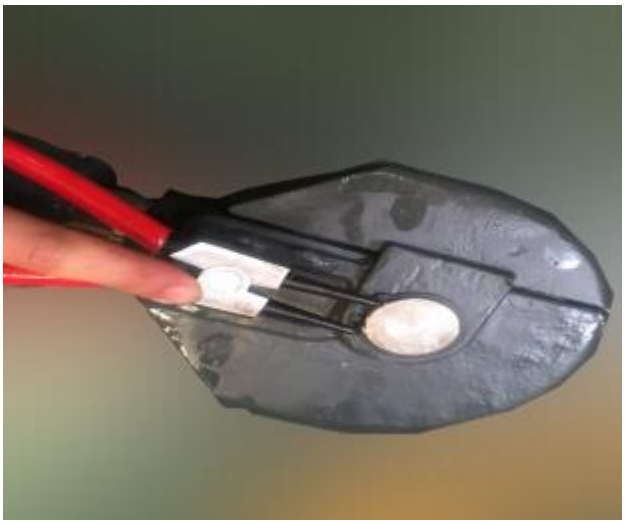
3. Remove split pin



4. Remove the pin shaft and remove the chain

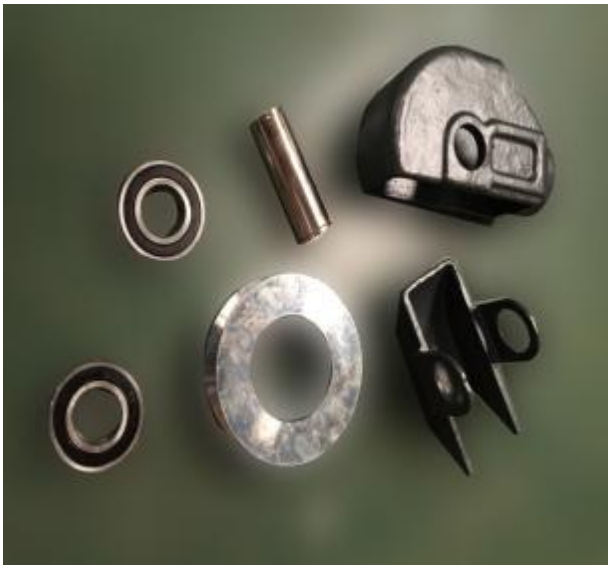
5. Unscrew the hoop bolt with a 13mm open wrench and take the hoop

6. Remove the middle oil cylinder



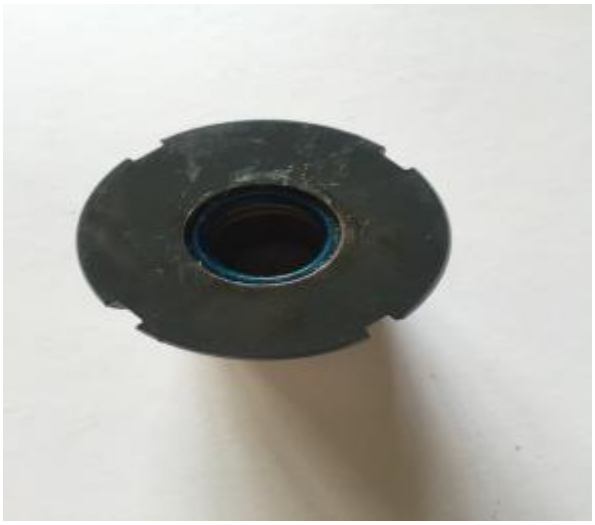
7. Remove the snap with the snap pliers

8. Remove sprocket shaft

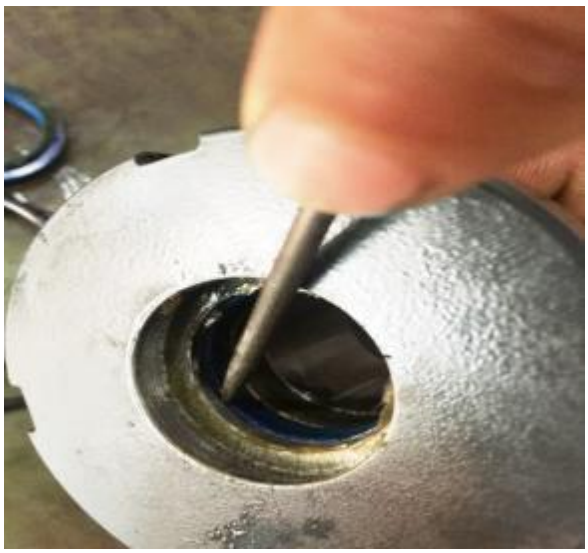


9. Remove the side cover with 12mm inner hexagon wrench, and then remove all parts for replacement and maintenance. The installation process is the reverse process of disassembly.

9.8 Replace the sealing ring of the outer oil cylinder (outer cylinder on the right)



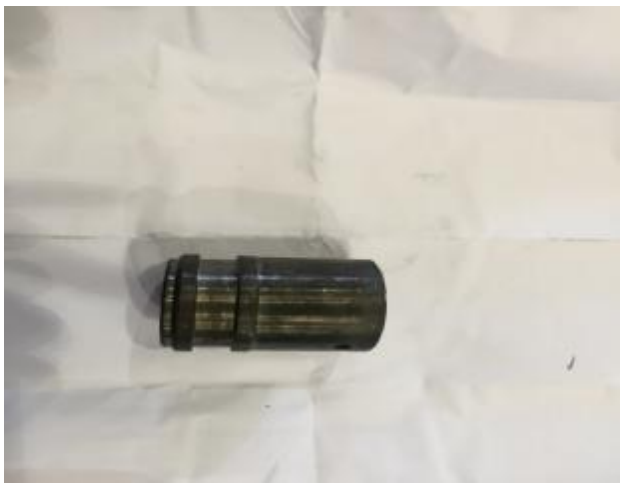
1. Use the Crescent Tool to remove the oil cylinder cap

	
2. Remove the new o-ring with a small screwdriver	3. Use a screwdriver to remove the dust ring
	
4.Take out sealing ring used for shaft	5. Take out the Stepseal, the oil cylinder head sealing ring can be disassembled and replaced

The left cylinder

1. Unscrew the oil cylinder head with a crescent wrench.

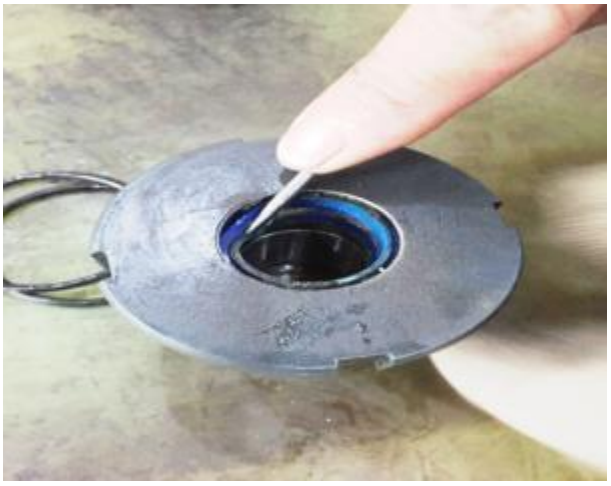
2. Pull out the piston rod.



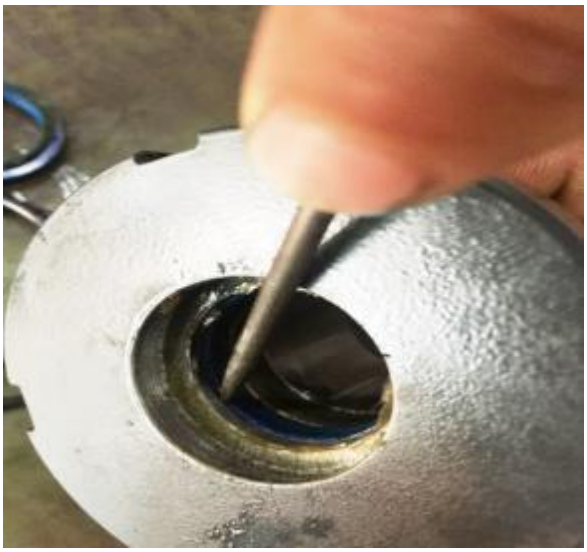
3. Remove the piston with pipe tongs. Heat the connection between the piston and the piston rod before using the pipe tongs because there is threaded glue inside.

4. Remove oil cylinder cap

5. Use a small screwdriver to take out the new O-ring,



6.Take out the dust ring with a screwdriver



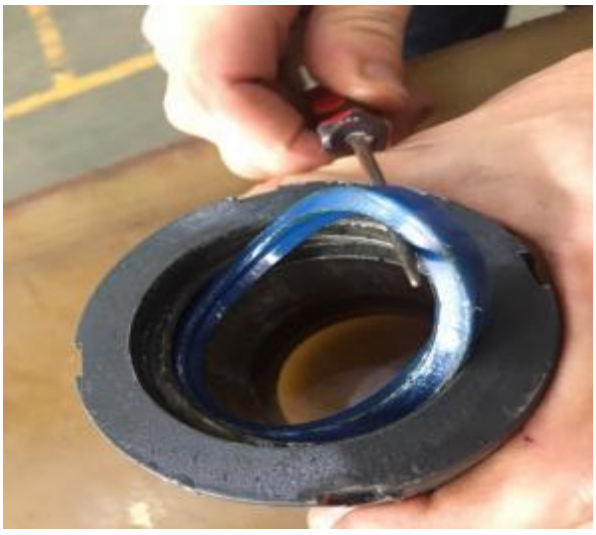
7. Take out the the sealing ring used for shaft

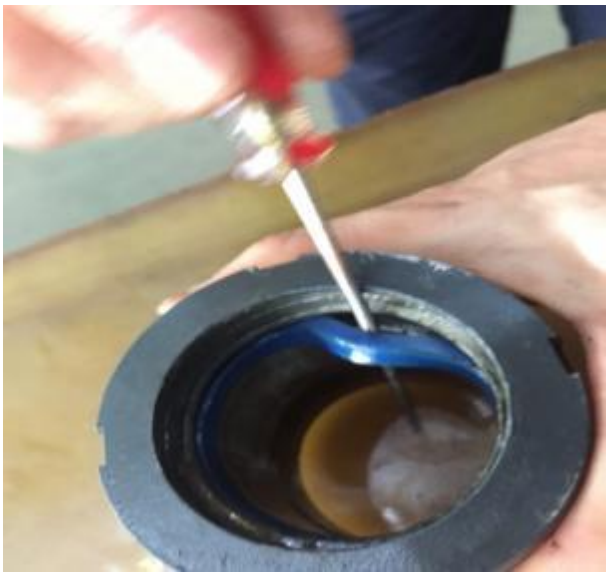
8. Take out the stepseal, the cylinder head sealing ring can be disassembled and replaced

9.9 Replace the sealing ring of the middle cylinder

1. Remove the oil cylinder head with pipe tongs after removing the middle oil cylinder according to instruction 9.6.

2. Pull out the piston rod and remove the shaft at the bottom of the piston rod with the support ring



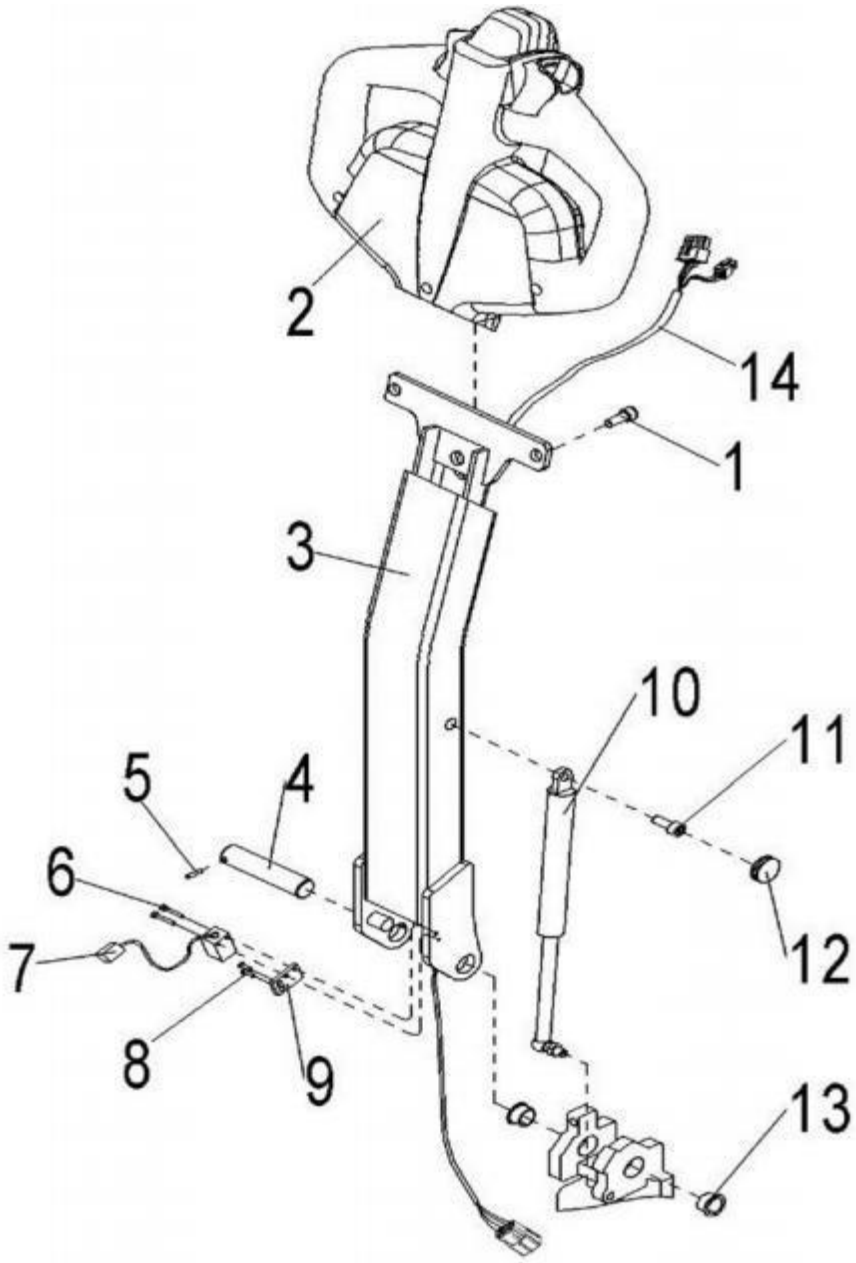



3. Use a small word screwdriver to take out the dust ring, retaining ring and Y-type sealing ring in the cylinder head.

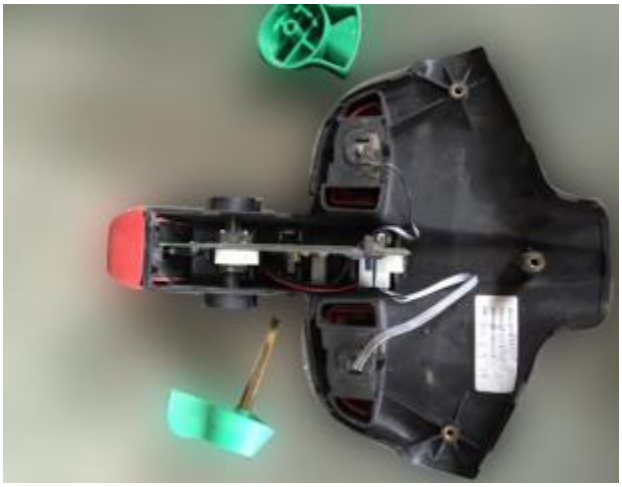
4. Remove the O-ring and retaining ring on the cylinder head to repair the entire tubing. The installation process is the reverse process of disassembly.

10.Tiller

Handle assembly



10.1 Replace PCB motherboard

	
1. Unscrew the outer cover screw with 6mm inner hexagon wrench	2. After unscrewing the screw, carefully open the handle housing and unplug the connecting plug
	
3. Unscrew the screw fixing the drive switch with a 2mm inner hexagon wrench	4. Carefully remove the drive switch

	
5.Remove the retaining screw with a Phillips head screwdriver	6. Remove the old PCB board and unplug the plug in turn. The installation process is the reverse process of the above process.

10.2 Replace air spring (refer to handle assembly drawing)

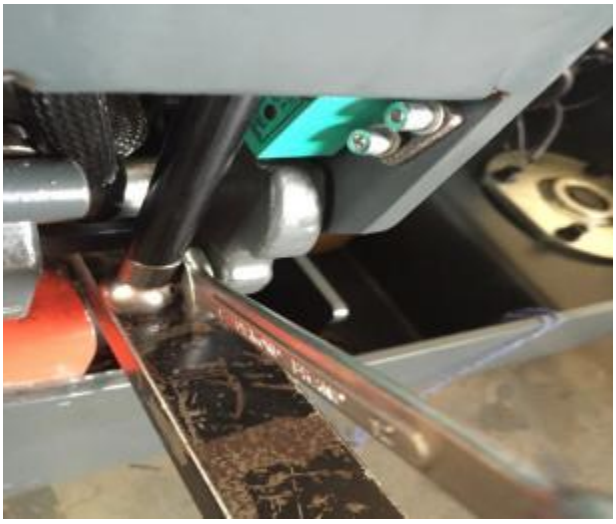
	
1. Pull out the rubber stopper	

2. Unscrew the bolt with 6mm inner hexagon wrench.

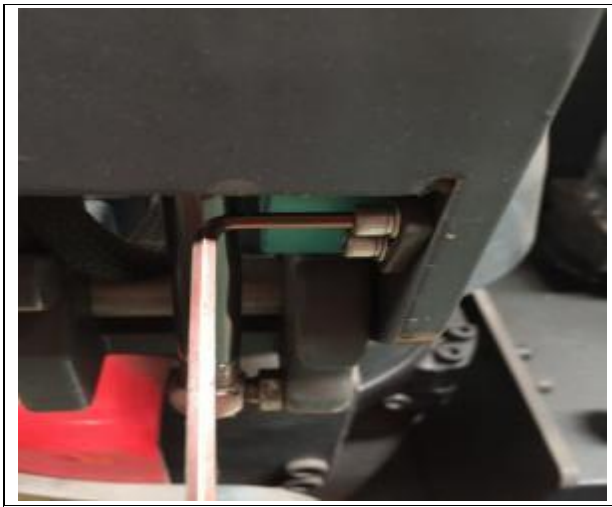
3. Unscrew the screws at the lower end of the fixed air spring with a 13mm open wrench.

4. Remove gas spring

10.2.1 Mounting air spring

	
1. Put the gas spring into the handle and tighten the upper bolt	2. Use the iron rod to Jack up the air spring and tighten the bolt to the bolt hole

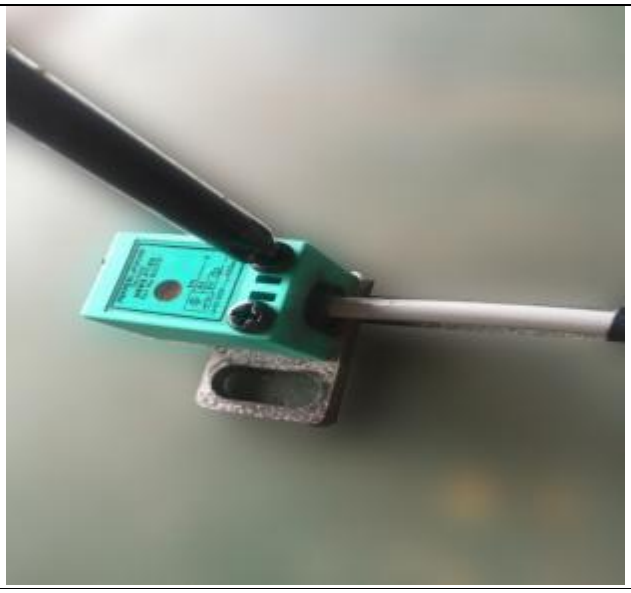
10.3 Replace the interlock switch

	
1. Unscrew the bolt with 2mm inner hexagon wrench	2. Use a 6mm hexagon socket wrench to unscrew the housing

3. Open the handle housing

4.Unplug the connector (pay attention to the harness number)

5. Remove the entire switch



6. Unscrew the screw with a cross screwdriver

7. The interlock switch can be replaced

11. Driving wheel

11.1 Replace the small wheel

1. Place the jack on the side of the drive wheel to lift the body.

2. Rotate the handle to this position

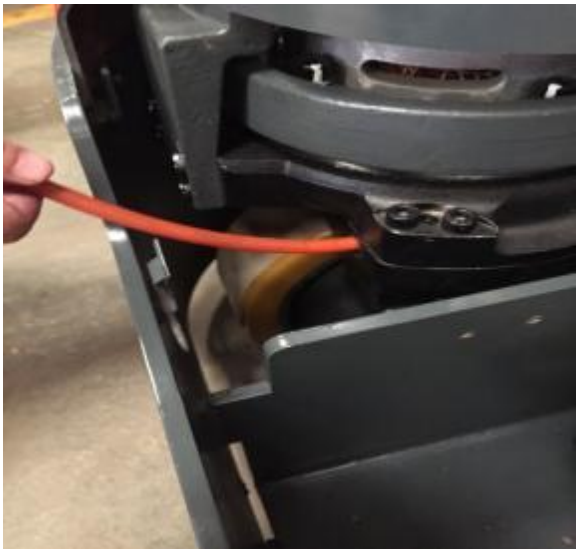
3. Unscrew 5 fixing bolts with 17mm socket wrench through the repair hole on the car body. Due to the small area of the hole, before each screw is unscrewed, it is necessary to control the driving wheel rotation through the handle and align the bolt that needs to be unscrewed with the maintenance hole so that the socket wrench can unscrew the bolt.

4. Remove the wheel by unscrewing five retaining bolts.

5. Take out the driving wheel from the bottom and replace it. The installation process is the reverse process of disassembly.

11.2 Replace lubricating oil in drive wheel gearbox

	
1.There is an oil injection hole on the front of the driving wheel	2. There is an oil drain hole at the bottom of the driving wheel.
	
3. Raise the car to a certain height with a jack	4. Unscrew the bolt of the oil drain hole at the bottom with the 7mm inner hexagon wrench, and quickly place the waste oil collection container at the bottom to collect the waste oil, so as to avoid the waste oil flowing out and polluting the environment. When the waste oil runs out, screw on the bolts.

	
5. Use a 7 mm hexagon socket wrench to unscrew the oil hole bolts	6. Lubricating oil through tubing. The lubricant used is 85W/90 GL-5 heavy duty vehicle gear oil.

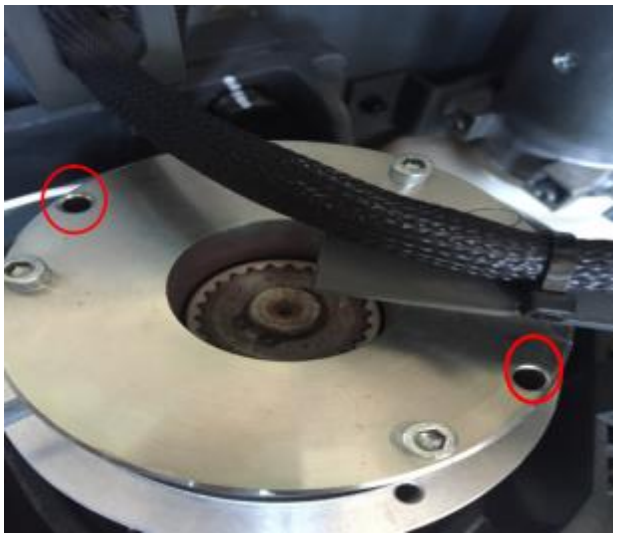
11.3 Replace the sensor

	
1. Unscrew the fixing bolt with 4mm inner hexagon wrench	

	
2. Unplug the sensor	3. Take out the connecting plug from the cable mounting frame.
	
5. Separate the plug,	6. Use diagonal pliers to cut the tie that binds the wire harness.

7. Remove the sensor and it can be replaced. The installation process is the reverse process of disassembly

11.4 Braking part



1. Two bolts are screwed into the bolt hole of the brake with a 4mm hexagon wrench. The size of the bolt is M6 × 40.

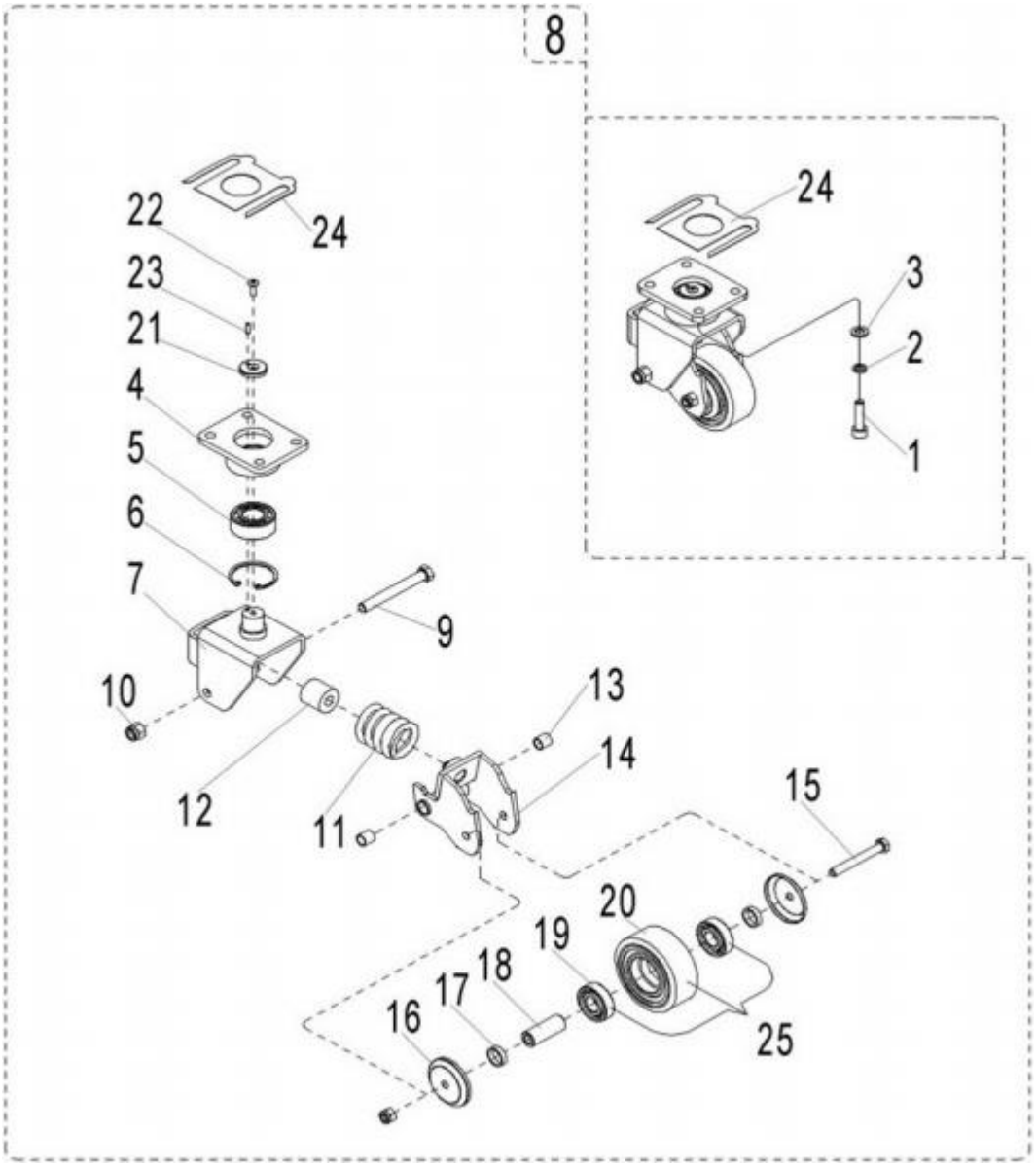
2. Unscrew the 3 bolts of installing the brake with 4mm inner hexagon wrench

3. Unplug the plug and cut the tie

4. Take out the brake, and the installation process is the reverse process of disassembly.

Brake clearance adjustment: use 4mm hexagonal wrench to twist the three screws, use the feeler to measure the brake clearance, control at 0.3mm. The three bolt fixing points need to be measured one by one by a feeler to ensure that the clearance is 0.3mm.

12.Steering wheel



No.	Item Code	Item Description	Qty	Note
1	910200200076	Screw	8	M10x25
2	910400500007	Spring Washer	8	10
3	910400100007	Flat Washer	8	10
4	505616510002	Plate	2	
5	910700500002	Bearing	2	3205A-2RS
6	910401400016	Circlip	2	52

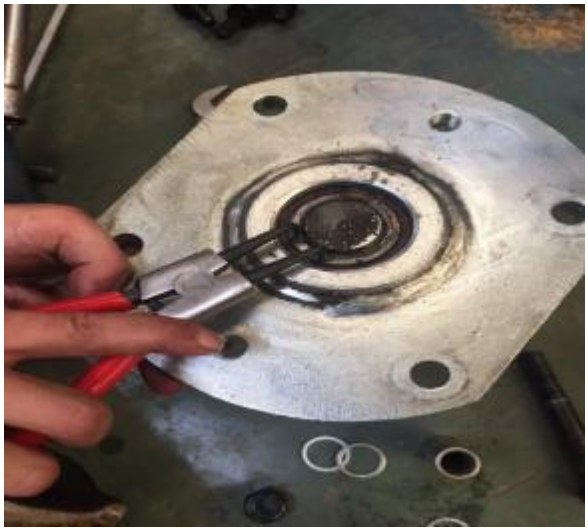
7	505616510001	Wheel Carrier	2	
8	505616510000	Caster Assembly	2	
9	941100200002	Bolt	2	M12x100
10	910300500006	Nut	2	M12
11	940400500007	Spring	2	Φ43Xφ9x62
12	505616520000	Spring	2	
13	940500100002	Bushing	4	
14	505616510003	Whirling Arm	2	
15	910100100038	Bolt	2	M10x80
16	505616520011	Dust Cap	4	
17	505616520012	Check Ring	4	
18	505616520013	Bushing	2	
19	910700200019	Bearing	4	6204-2RS
20	940300300018	WheelΦ100x40	2	
21	505616520007	Retaining Ring	2	
22	941100300001	Screw	2	M6x14
23	910600100004	Cylindrical Pin	2	4x14
24	505616520014	Pad	Several	t=0.5～2.5
25	505698510000	Wheel	2	

12.1 Maintenance of wheelset

1. Unscrew the bolts with 16mm open spanner and disassemble the wheel group

	
2. Punch the axle out	3. When the axle is removed, the axle and other components of the wheel group can be replaced. The installation process is the reverse process of disassembly

12.2 Maintenance steering group

	
1. Remove the clamp spring with clamp pliers	

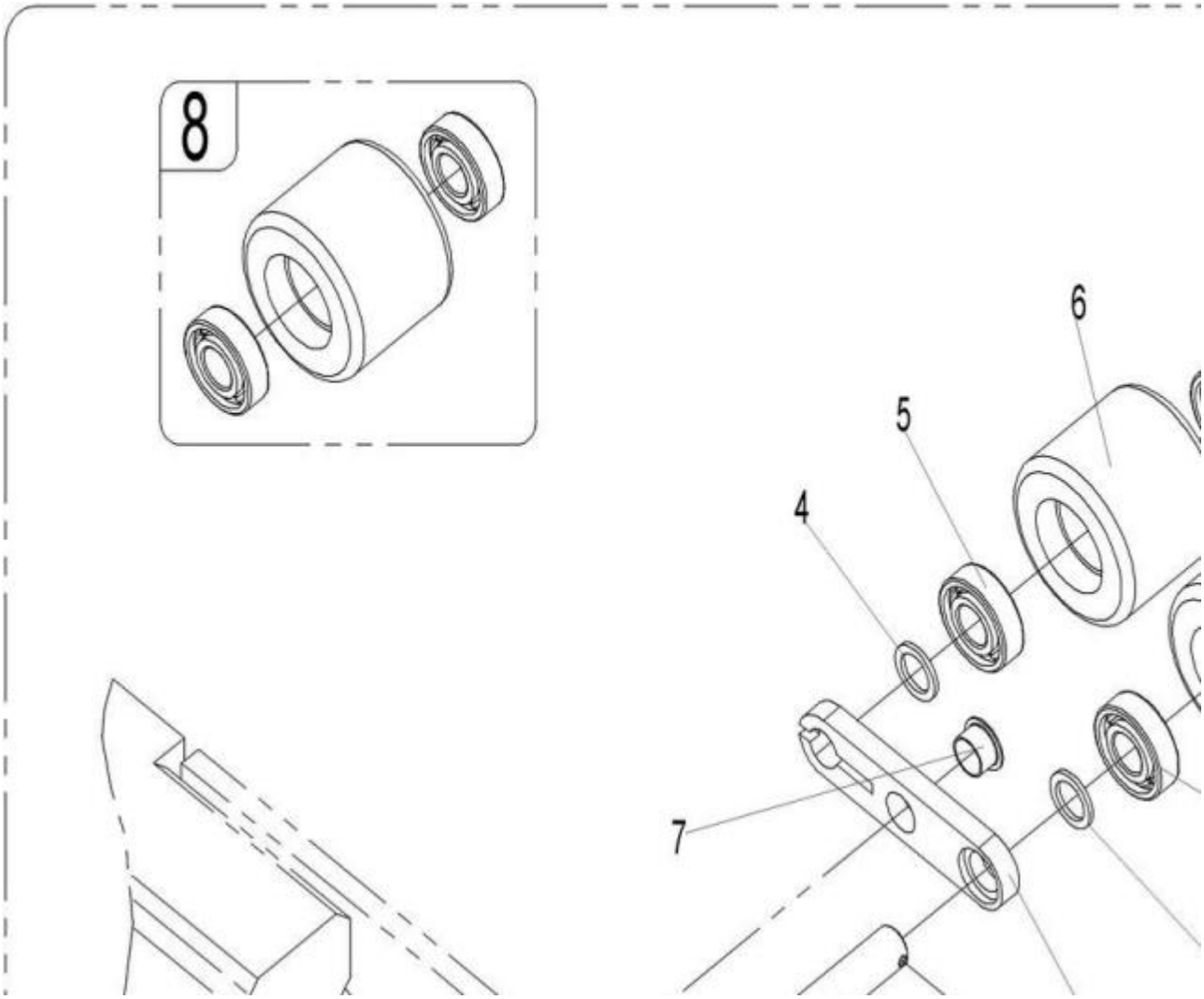
2. Remove the wheel frame with punch

3. Take out the clamping spring at the bottom of the bearing seat with clamping spring pliers.

4. Take out both axles with punch.

5. Take out the axle, sleeve, clamp spring and other parts, can be replaced and maintained, the installation process is the reverse process of disassembly.

13 Bearing wheel



No.	Item Code	Item Description	Qty.	Note
1	534717020001	Pin	2	
2	910600400017	Spring Pin	2	4x35
3	534717020002	Plate	2	
4	940600500004	Washer	4	
5	910700200019	Bearing	4	6204-2RS
6	940300300009	WheelΦ84x70	2	
7	940500200003	Bushing	2	
8	532998510001	Wheel	4	
9	534717001001	Bearing wheel assembly	2	

13.1 Replace the bearing wheel

1. First lift the tray rack to a certain height

2.Jack the car to a certain height

3. Place the body on the repair rack and remove the elastic cylindrical pin with a punch.

4. Remove the axle and remove the entire component.

5.Take out the elastic pin with punch

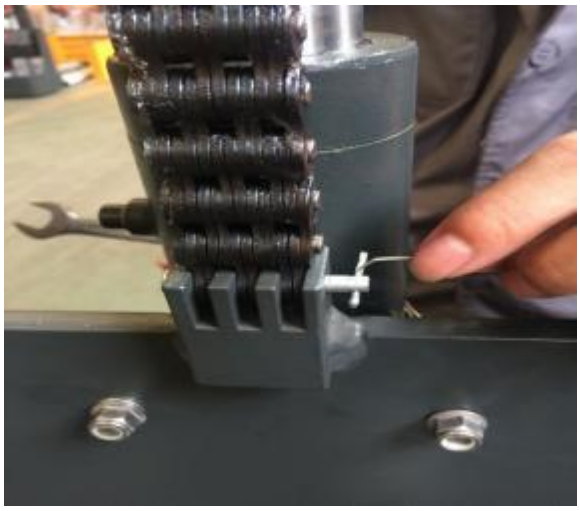
6. Take out the axle and the wheel

7. Take out the two bearings with the punch and then repair and replace them. The installation process is the reverse process of disassembly.

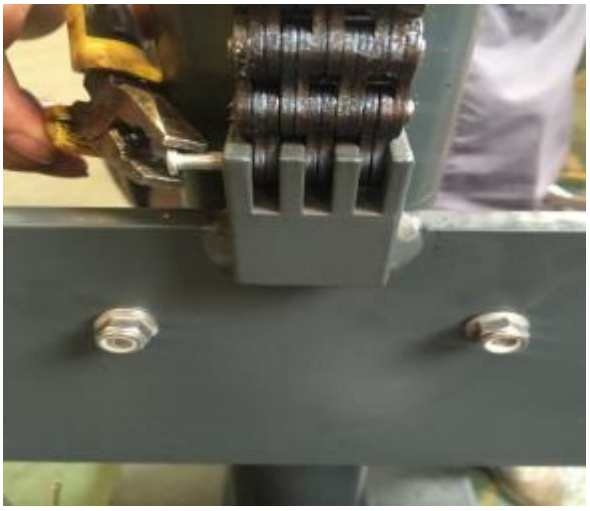
14. The chain

14.1 Replace the chain

1. Lift the tray rack and pad it with wood, so that the chain can reach the state of no stress



2. Remove the cotter pin from the top of the chain



3. Remove pin shaft

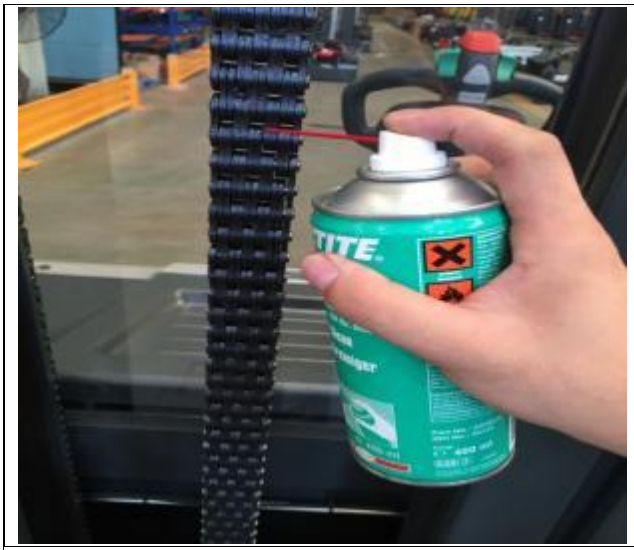
4. Take out the split pin at the bottom of the chain

5. Take out the pin shaft

5. Remove the chain and replace it. The installation process is the reverse process of disassembly

14.2 maintain the chain

1. In the long-term use of products, there will be a loose chain phenomenon, we need to use two 24mm open-ended spanner to tighten the chain bolt, so that the pallet in the lowest position of the chain is still stressed. Press each chain with your finger until you feel the same rebound force.



2. In the process of long-term use of the product, there will be a lot of dirty things on the chain, so it is necessary to clean the chain and use fat-soluble cleaning agent.

3. In the process of using the product for a long time, the chain will rust. In order to avoid this phenomenon, we need to lubricate the chain. Required grease specification: DIN 51825 standard grease.

15.Mast System

15.1 Remove the mast

1. Remove split pin

2. Pull out the latch

3. Unscrew the fixing bolt at the top of the oil cylinder with a 12mm inner hexagon wrench

4. Raise the door frame.

5. Raise the tray rack

6. Lower tray rack

7. Raise the maste and remove the tray frame.

15.2 Replace the roller

The whole mast system has the same roller, which will be damaged in the process of use and needs to be replaced.

1. Remove the snap spring with the snap pliers

2. Remove the gasket

3. Remove the roller

4. Use the punch to remove the roller so that it can be replaced

15.3 adjustable roller

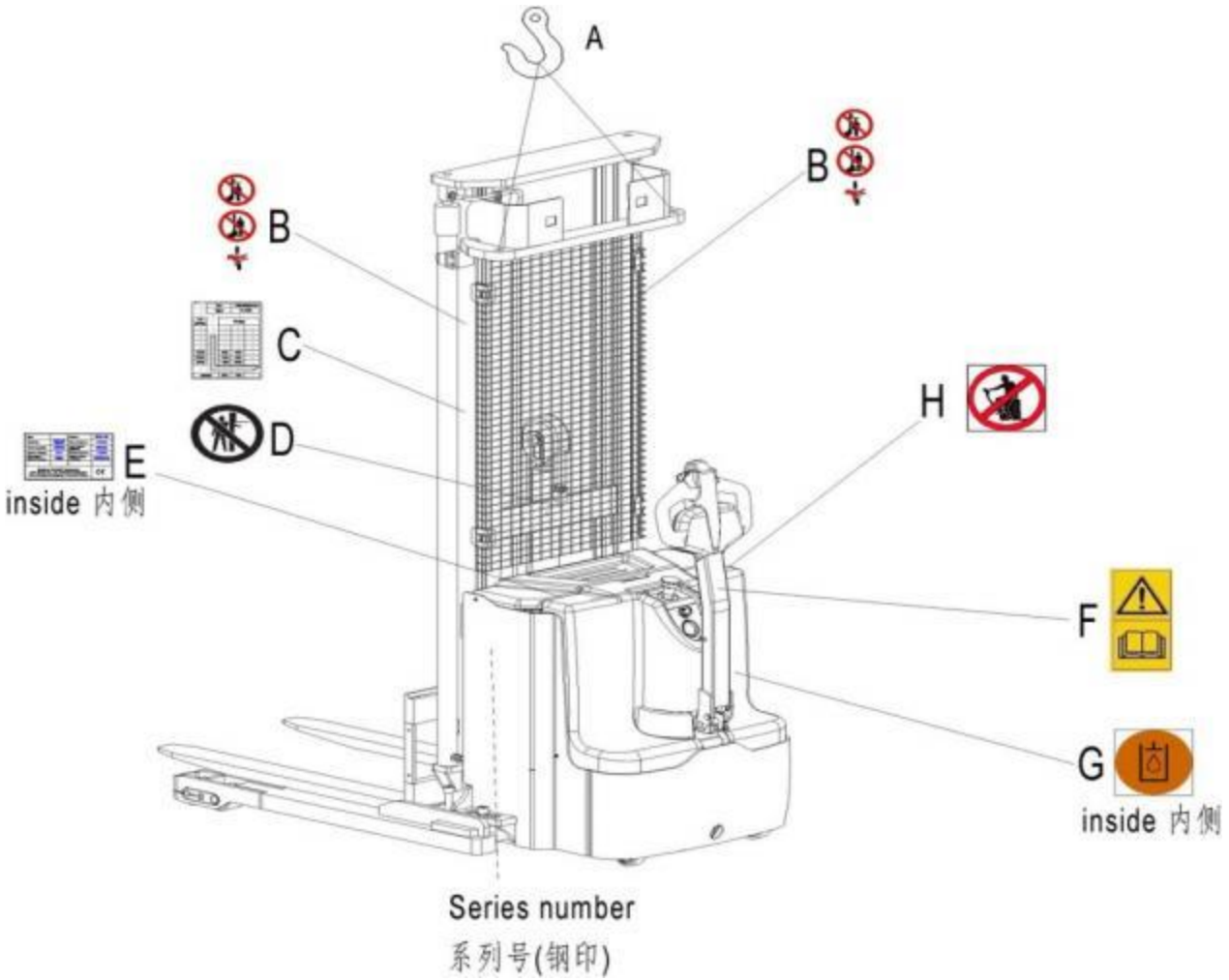
In the use process, the gap between the portal frame and the portal frame will become larger and need to be adjusted.

1. Open the locating pin

2. With a word screwdriver screw bolts to adjust, also desirable bolt, for replacement.

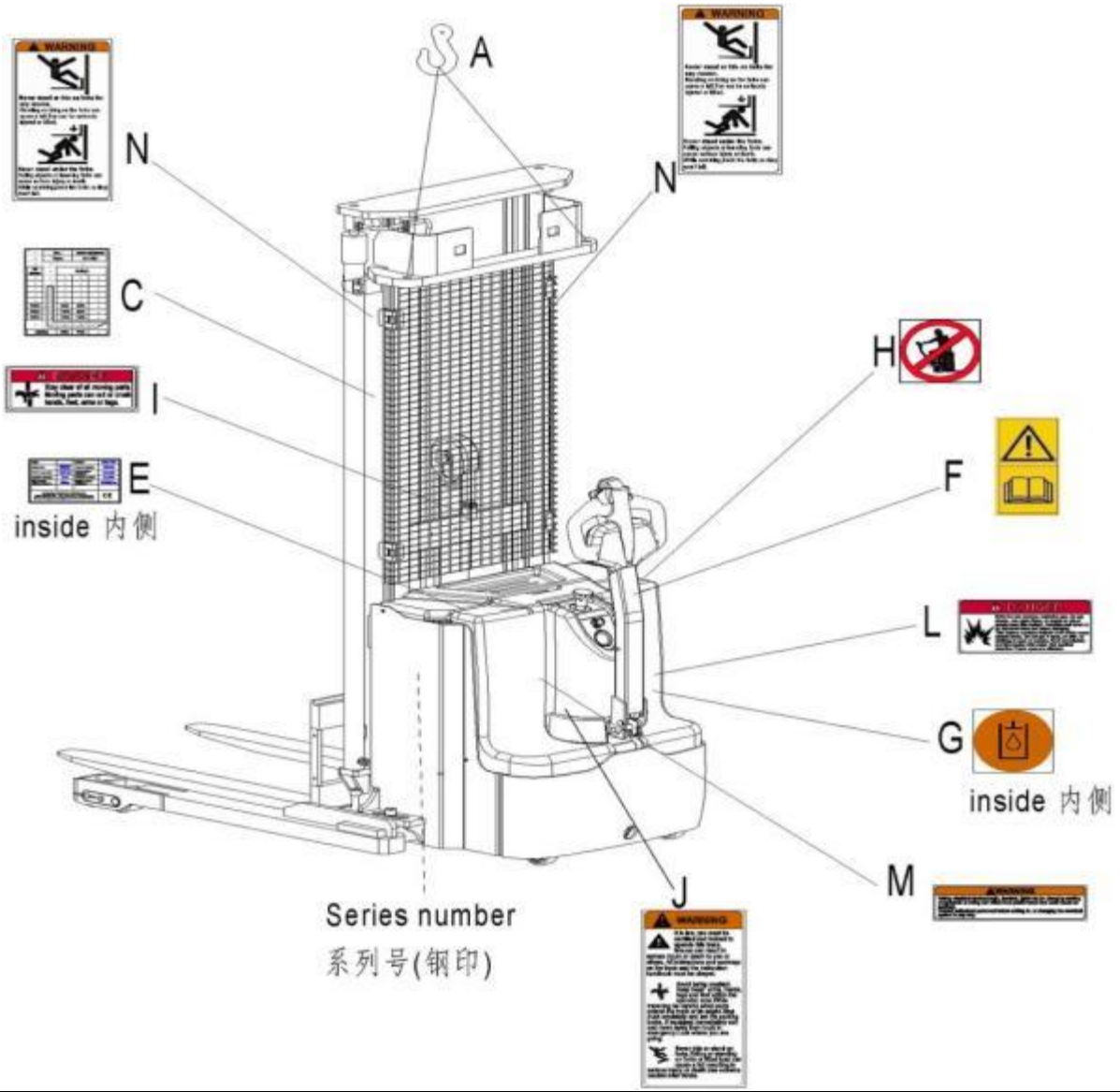
16 Lable

Label (European)



No.	Item Code	Item Description	Qty.	Note
A	941200300001	Label	2	
B	941200100004	Label	2	
C	534847520000	Lable	1	
D	941200100006	Lable	1	
E	534847020001	CE Lable	1	
F	941200300002	Label	1	
G	941200300003	Lable	1	
H	941200300018	Lable	1	

Label (American)



No.	Item code	Item Description	Qty.	Note
A	941200300001	Label	2	
C	534847520000	Label of Load Capacity Diagram	1	
F	941200300002	Label	1	
G	941200300003	Label	1	
H	941200300018	Label	1	
I	941200100014	Label	1	
J	941200100009	Label	1	
L	941200100013	Label	1	
M	941200100010	Label	1	
N	941200100016	Label	1	

17.Maintenance list

Maintenance list		Intervals（Month）			
		1	3	6	12
Hydraulic system					
1	Check hydraulic cylinder if there is noise and leakage of piston		.		
2	Check hydraulic connectors and tubing if there is damage and leakage		.		
3	Check hydraulic oil level and recharge if necessary		.		
4	Add hydraulic oil after 12 months or 1500 hours of work				.
5	Check and adjust the function of hydraulic valve (1600/2000/2500kg +0/+10%)				.
Mechanical system					
6	Check if there is deformation and damaged on fork		.		
7	Check if there is deformation and damaged in chassis		.		
8	Check if all bolts are tightened		.		
9	Check if push rod is deformation and damaged		.		
10	Check if there is noise and leakage in transmission		.		
11	Check if there is deformation and damaged for tire		.		
12	Steering bearing				.
13	Check and lubricate spindle center points		.		
14	Lubricating grease nozzle	.			
15	Replace guard and/or guard plates if damaged	.			
Electrical system					
16	Check if there is wire damaged		.		
17	Check wire connecting		.		
18	Check emergency switch		.		
19	Check if there is noise and damaged in driving system		.		
20	Check monitor		.		
21	Check if correct fuse is used		.		
22	Check warning signal		.		
23	Check contactor		.		
24	Check if frame is leakage (insulation test)		.		
25	Check the function and wear of the drive controller		.		
26	Check the electrical system		.		
Brake system					
27	Check brake function, replace brake shoe or adjust if necessary		.		
Battery					
28	Check battery volatge		.		
29	Check if wiring end is corrosion and damage, lubricate the wiring end		.		
30	Check if battery cover is damaged		.		
Charger					

31	Check if main cable is damage			.	
32	Check startup protection procedures during charging			.	
Function					
33	Check Horn	.			
34	Check electromagnetic valve	.			
35	Check emergency brake	.			
36	Check reverse braking and regenerated braking	.			
37	Check belly button	.			
38	Check steering	.			
39	Check Lift up and down	.			
40	Check proximity switch of tiller	.			
41	Check the key switch for damage and function				
42	Detect speed limit switch (lifting height >~300mm)				
Summary					
43	Check label	.			
44	Check bearing wheel and adjust height , replace if worn out		.		
45	Test one more time	.			

18. Failure analysis

Failure	Cause of failure	Maintance
The electric meter does not show	Power master connector	Check whether the power supply connector is properly connected
	The 10A fuse of the control loop is damaged	Check and finally replace the 10A fuse
The main contactor cannot connect well	Damage to controller input port	Check and finally replace the controller
	Interlock switch damaged	Check and finally replace interlock switch
	Main contactor damaged	Check and eventually replace the main contactor
	Traction motor brake damaged	Check and eventually replace traction motor brakes
	Controller input port is damaged	Check and finally replace the controller
	Traction motor damaged or wiring problem	Check and eventually replace the traction motor
Goods cannot be raised	Excess weight of cargo	Only lift the maximum load shown on the nameplate
	Battery overdischarge	Full battery
	The lifting fuse is out of order	Check and finally replace the hoisting fuse

	Hydraulic oil level is too low	Check and finally fill with hydraulic fluid
	The spill	Check the sealing of tubing and cylinder
	The height limiting micro switch is wrong	Check and repair the microswitch
	Controller driver port is damaged	Check and verify that the port is working and replace the controller
	The rise button on the handle is damaged	Check whether the rise button on the handle is functioning properly
The cargo can not be lowered	The drop button on the handle is damaged	Check whether the drop button on the handle is functioning properly
	Descending solenoid valve damaged	Check and replace the drop solenoid valve
	Controller solenoid valve drive port damaged	Check and verify that the port is working and replace the controller
Leakage due to inhalation	Oil is too high	Reduce oil
Vehicle inoperable	The battery is recharging	Fully charge the battery, then pull the main power plug from the outlet
	Battery not connected	Connect the battery properly
	The fuse failure	Check and finally replace the fuse
	Battery discharge	Battery charging
	The emergency stop switch is activated	Insert and pull the knob to stop the emergency stop switch function
	The handle is in the operating area	First move the handle to the brake area
Traffic is only going in one direction	Accelerator and connector damaged	Check the accelerator and connector
The stacker moves slowly	Battery discharge	Check the battery condition of the discharge display
	Electromagnetic brake activated	Check the electromagnetic brake
	Related handle harness not connected or damaged	Check the handle harness and connectors
	The sensor failed when the speed was reduced at a height of 300mm	Check sensor
	Controller overheat	Discontinue use and cool the vehicle
	Traction motor overheating	Discontinue use and cool the vehicle
	The accelerator on the handle is damaged	Check handle function

	The thermal sensor is out of order	Inspect and replace the heat sensor if necessary
The stacker's electric meter has power, but it can't walk	Controller parameters do not match	Check and verify the controller parameters
	Interlock switch damaged	Check and finally replace the interlock switch
	Main contactor damaged	Check and eventually replace the main contactor
	Traction motor brake damaged	Check and eventually replace traction motor brakes
	Damage to temperature sensor of traction motor	Check and finally replace the traction motor
	Damage to the handle or the accelerator	Check and finally replace the handle
The stacker suddenly started	The controls are damaged	Replace the controller
	The accelerator is not moved back to the middle position	Repair or replace the accelerator

If the vehicle fails and cannot be operated outside the work area, lift the vehicle and place a load handling device under the vehicle to ensure the safety of the vehicle before moving the vehicle out of the aisle.