

Workshop literature

Electric Pallet Truck

ECH12-12



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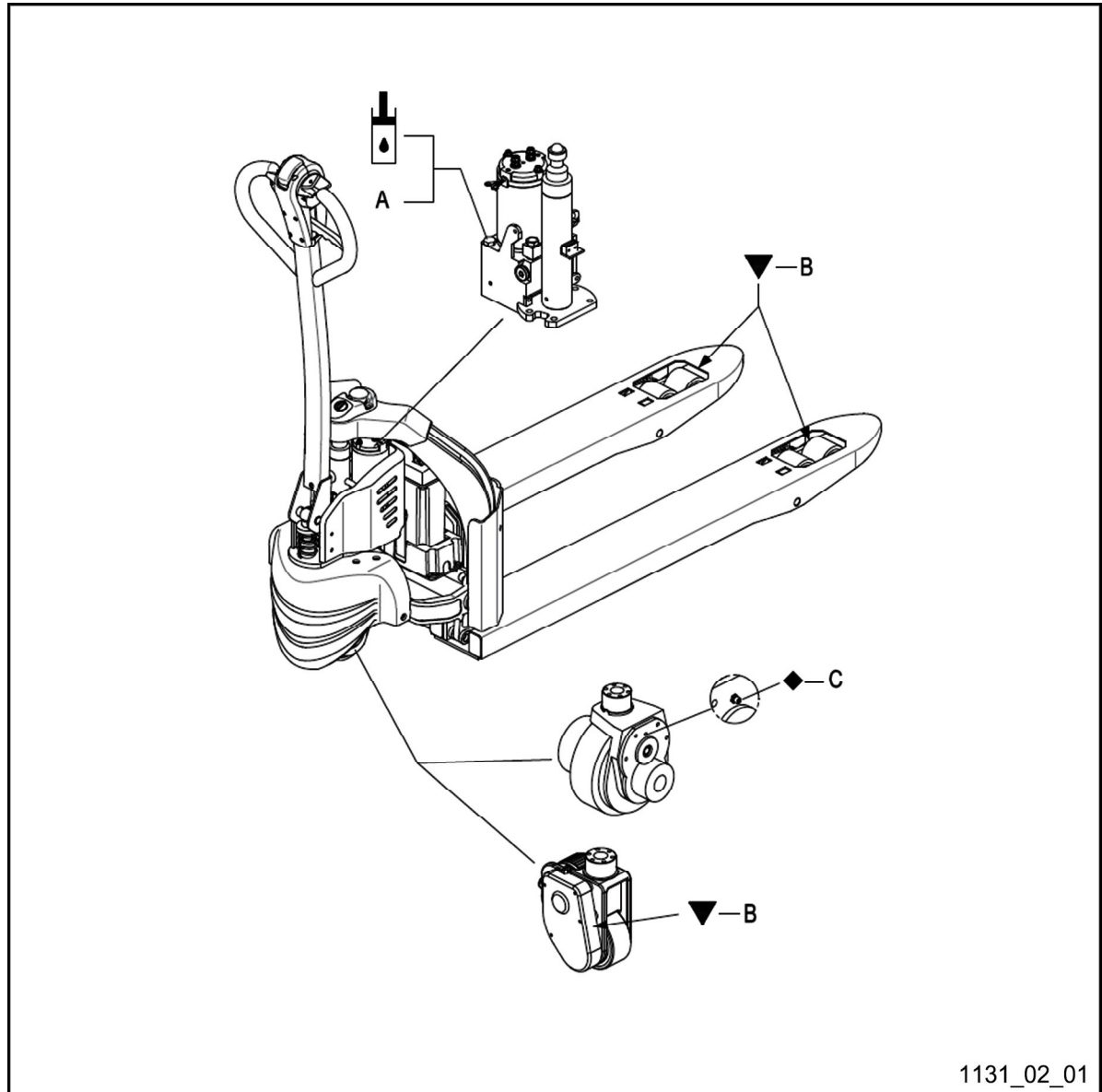
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Lubrication



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- A Hydraulic oil injection nozzle
- B Sliding surface
- C Gear oil injection nozzle

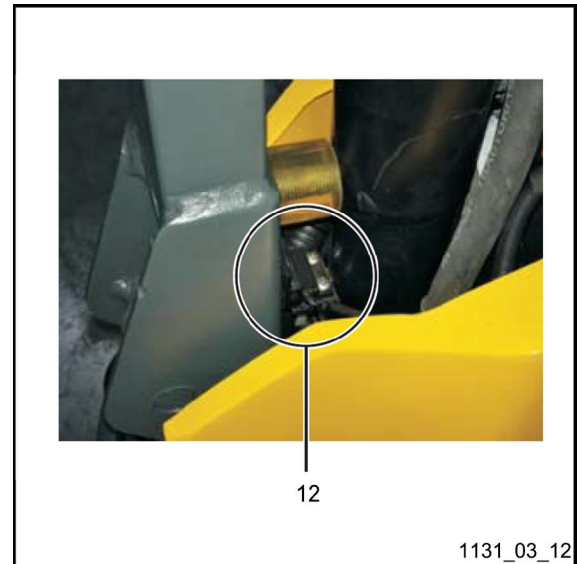
Interlock Switch

Location: cylinder(12);

Function: the truck cannot be operated if the interlock switch is not closed;

Description: to prevent misuse of truck;

Note: Unserviceable.

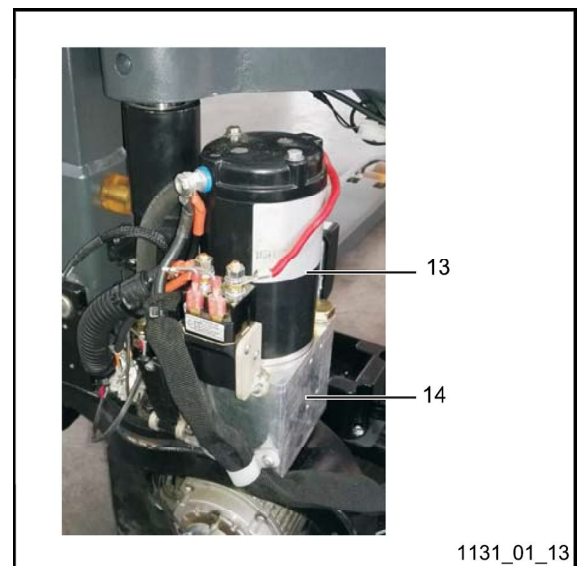
**Pump Motor**

Location: on the valve body(13);

Function: to provide power for gear pump for lifting the loading rack;

Description: upon receiving the signal input by control switch, traction controller to control the power transmission of pump motor;

Note: Unserviceable.

**Gear Pump**

Location: in the valve body(14) ;

Function: to provide pressure for hydraulic system of the entire vehicle;

Description: N/A;

Note: Unserviceable.

Removal and Installation

- Fully lower the forks and switch off the power supply;
- Tilt the vehicle to the left or right and support it with a block and other supporting stuff;

⚠ CAUTION

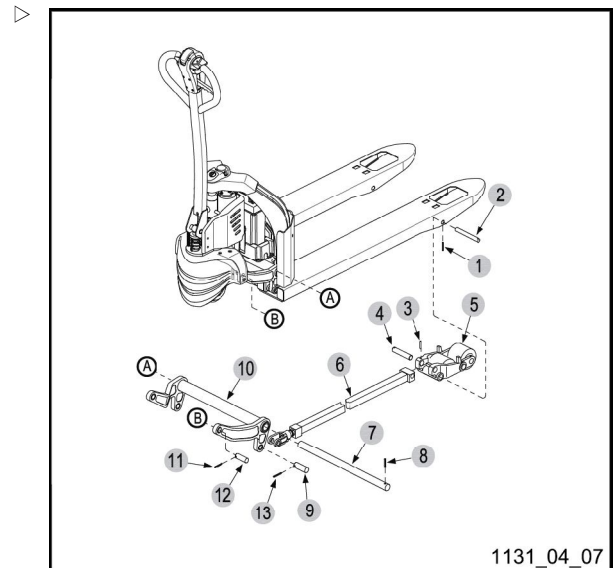
Before going on with the next step, please fix the wheel bracket first. Be sure to avoid the falling of wheel bracket during removal, resulting in personal injury.

- Tap the coiled elastic cylinder (1) into the axle (2), and tap the axle (2) out from the side to separate the wheel frame from the front chassis;
- Remove the cover;
- Tap the coiled elastic cylinder (11) out from the bearing bridge, and tap the short axis (12) out from the side to separate the lower connecting rod (10) with the bearing bridge;
- Tap the coiled elastic cylinder (13) out from the long connecting rod (6), and tap the short axis (9) out from the side to separate the lower connecting rod (10) with the long connecting rod (6);
- Tap the coiled elastic cylinder (8) out from the chassis, and tap the long axis (7) out from the side to separate the lower connecting rod (10) with the chassis.
- Tap the coiled elastic cylinder (3) out, tap the long connecting rod pin shaft (4) out from the side, and remove the wheel frame assembly (5).

- Install according to the reverse order of removal.

⚠ CAUTION

When replacing the long connecting rod, the connecting rod must be adjusted so that the fork surface height can reach the specified value.



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Carbon Brush

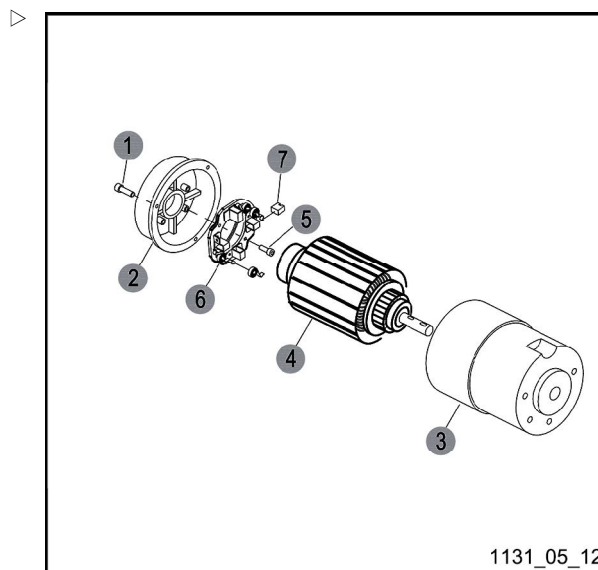
- Unscrew the three screws (1) and remove motor end cover (2) ;
- Unscrew the two screws (5) and remove the carbon brush (7) on the holder (6).
- Install according to the reverse order of removal.

⚠ CAUTION

When replacing the carbon brush, replace the complete set of carbon brushes.

⚠ WARNING

Due to magnetic force, the rotor and the stator may pull each other, therefore, when dismantling motor rotor, do not hold your hand between the rotor and the stator to avoid pinch hazard!



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Adjustment

- After replacing the motor or carbon brush, conduction test must be carried out to the motor (see Section 5.4.3).
- After replacing carbon brush, running operation must be carried out to the carbon brush: By running the motor with repeated lifting, letting the carbon brush to be fully running, making its surface smooth to fit the rotor.

Faults and Causes

1	Fault	Motor does not rotate
	Cause	(1)Negative electrode cable broken; (2)Motor positive and negative electrode with loose terminals; (3)Armature winding with broken circuits; (4)Motor bearing damaged and blocked; (5)Serious wearing of carbon brush.
2	Fault	Motor speed is turning slow
	Cause	(1)Insufficient voltage of battery; (2)Carbon brush worn or carbon brush spring pressure decreases; (3)Bearing wear or lack of lubricating oil; (4)Armature winding has short circuit elements; (5)Carbon brush winding grounded.
3	Fault	Carbon brush winding grounded.
	Cause	(1)Motor positive and negative electrode with loose terminals and poor connection; (2)Carbon brush wear and tear; (3)Armature winding has circuit broken unit.

Hydraulic System

Hydraulic System

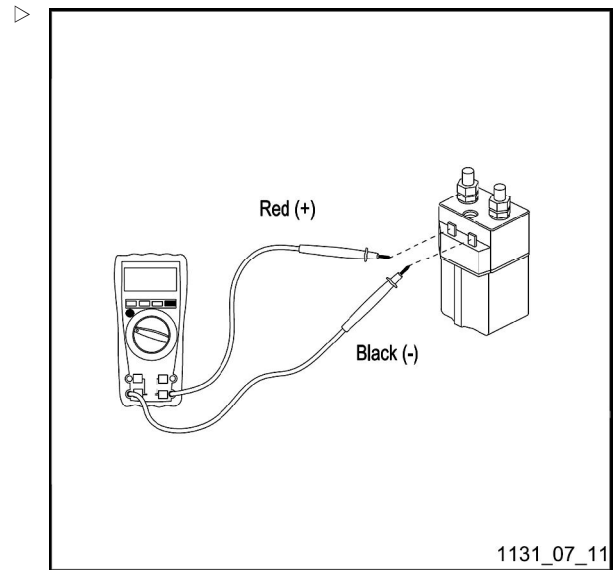
The system pressure of the entire hydraulic system pressure is provided by hydraulic power unit system, which is used for lifting. While the hydraulic power unit is equipped with a relief valve to ensure that the entire system pressure is always within the safety limits that can lift the maximum load capacity.

Solenoid valve on the valve body is used for the control of lowering. Throttle valve is used for the control of lowering speed. Inlet is equipped with a filter to prevent the impurities in the hydraulic oil from entering into the pump.

Overview

- Lower the fork to the bottom, remove the air filter on cylinder, observe the oil level with the oil dipstick. When adding hydraulic oil, please use hydraulic oil of the same specifications.
- When the fork occasionally jitters, that may be leaks in the cylinder, or there could be leaks on the valve body. Dismantle and clean (to clean with hydraulic oil of the same specifications) the valve on the valve body, discharge the foreign bodies within the valve body through repeatedly lifting and lowering of the mast.
- If hydraulic oil is becoming less, please thoroughly check the hydraulic system for leaks.
- Disassembly of cylinder needs to be performed in a clean environment. Before removing the cylinder, the stains on the cylinder must be removed first. Carefully remove the piston rod to prevent the cylinder wall from being scratched by its end surface or damaged part. Every time when replacing the cylinder, also replace the cylinder seals.

- Check the resistance of the coil with a multi-meter:
- Identify if the contactor is normal according to the readings of resistance on the multi-meter. As shown in the following table:



Resistance Measurement	Judgment
Approx. 30 Ω	Normal
0 Ω	Coil shorting (replace the contactor)
$\infty \Omega$	Coil breaking (replace the contactor)

Contact Checks:

- Check if the surface of contact surface is smooth and symmetrical;
- Separately provide the contact with a voltage of 24V to observe if the contact can absorb;
- If the surface is uneven or the contact does not absorb, replace the main contactor.

Control Circuit Troubleshooting

Pump Contactor Control Circuit: Check if the circuit is broken by using a multi-meter.

- Set the multi-meter to ON-OFF;
- Check if #0/#2 circuit (circuit between pump contactor and controller) is conducted.



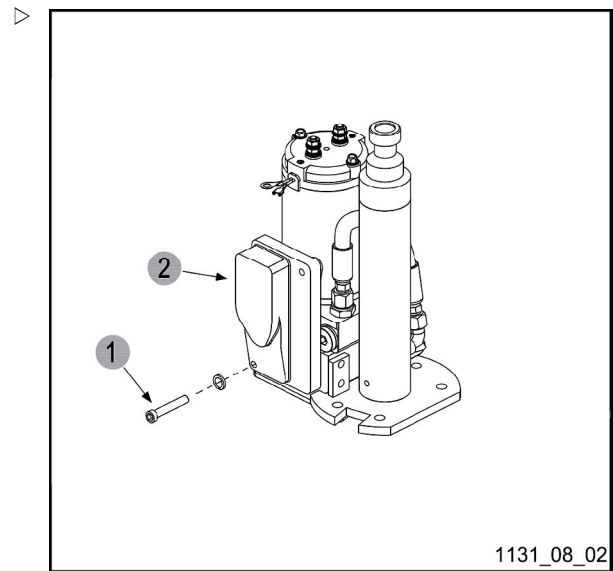
Electrical System Controller



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Removal and Installation

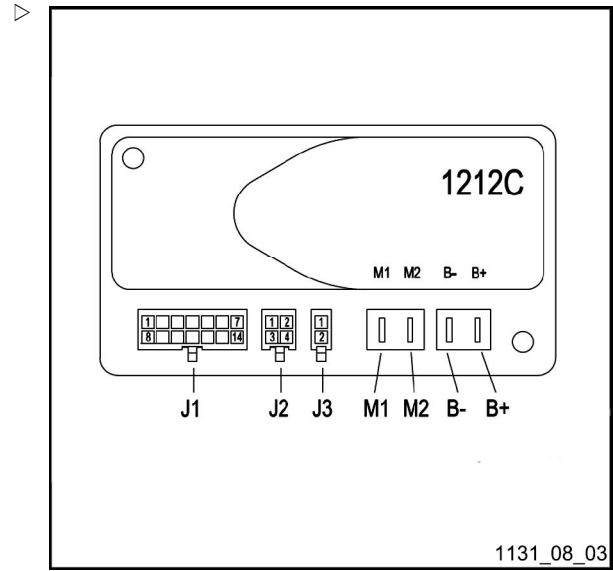
- Remove the protective cover;
- Remove the wiring harness and cables on the controller;
- Unscrew the two screws (1) with a wrench and remove the controller (2) ;
- Apply appropriate amount of thermal grease on the back of controller;
- Place the controller onto the valve body, tighten the two screws with a wrench;
- Plug the wiring harness and cables into corresponding ports.



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Controller Interface Function

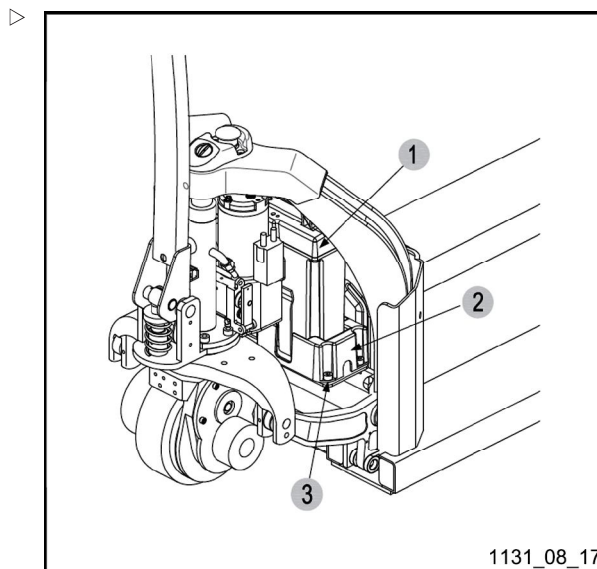
Traction Controller (1212C)



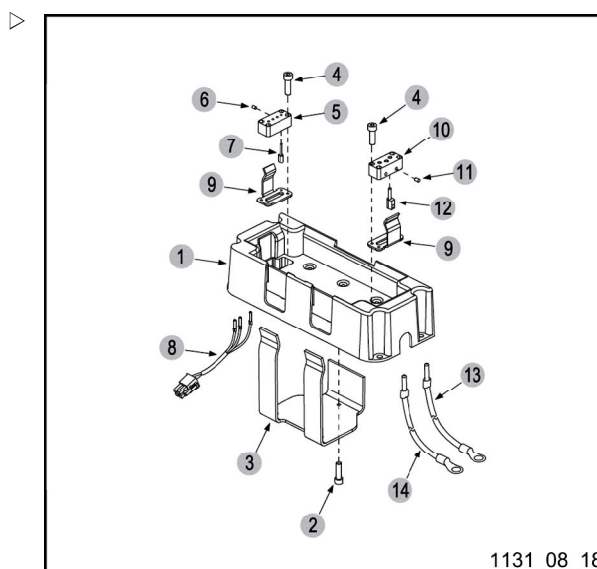
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Removal and Installation

- Turn off the power supply and lift the battery (1) from the holder (2);
- Remove the protective cover;
- Remove the positive electrode power supply cable from the pump contactor and remove the negative electrode power supply cable from the pump motor;
- Disconnect the power supply cable from the power supply communication cable (see wiring harness and connector diagram);



- Unscrew the four screws (3) with a wrench, and remove the battery holder assembly (2) from the chassis;
- Remove the front guard;
- Unscrew the four screws (4) with a wrench, and remove the socket (5) from the battery holder (1);
- Unscrew the set screw (6) in the socket (5) and remove the power supply battery cable (8) from the pin (7);
- Unscrew the four screws (4) with a wrench, and remove the socket (10) from the battery holder (1);
- Unscrew the set screw (11) in the socket (10) and remove the positive electrode power supply cable (14) and the negative electrode power supply cable (13) from the pin (12).
- Install according to the reverse order of removal.



Faults and Causes

1	Fault	Whole vehicle power outage
	Cause	(1)Battery failure; (2)Battery with broken circuit.

Checking and Testing

Checking:

- Check if the appearance of battery and battery holder are in good condition, and if the connectors are connected securely;

Testing:

3,6	Gage Handshake Failed	Motor speed reduced to 20%	1.The handshake with gage failed at start up.
4,1	Current Sense Fault	a.Kill the throttle input; b.Shut down main relay and EM brake driver; c.Shut down the fullbridge driver.	1.Controller defective.
4,2	EMR Sequencing Fault	a.Kill the throttle input; b.Shut down main relay and EM brake driver; c.Shut down the fullbridge	1.Controller defective.
4,3	Hardware Fault	a.Kill the throttle input; b.Shut down main relay and EM brake driver; c.Shut down the fullbridge driver.	1. Motor voltage does not correspond to throttle request. 2. Controller defective.
4,4	Software Fault	a.Kill the throttle input; b.Shut down main relay and EM brake driver; c.Shut down the fullbridge driver.	1. Software defective. 2. Controller defective.
4,5	Battery Disconnect Fault	a.Kill the throttle input; b.Shut down EM brake driver; c.Shut down the motor armature.	1. Battery not connected. 2. Poor connection to battery terminals.
4,6	Motor Overtemperature	Motor speed reduced	1. The motor is in high temperature.
4,7	Tiller Handshake Failed	Kill the throttle input	1. The handshake with tiller failed at start up. 2. The Stuffing Bit check failed while the stuffing bit check is enabled.
5,1	Low BDI	Motor speed reduced	1.The battery discharge falls below the programmed threshold.
5,2	Controller Overtemp Cutback	Current limit cutback starts at 80 °C	1.Excessive load on vehicle. 2.Controller is operating in high temperature.
5,3	Controller Severe Overtemp	Current limit cut off	1.Excessive load on vehicle. 2.Controller is operating in high temperature.
5,4	Controller Undertemp Cutback	Current limit cutback starts at -10 °C and is reduced to 50% at -25°C	1. Controller is operating in extreme low temperature. 2. The temperature sensor is broken.

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