



SERVICE MANUAL

NO12N2F(P)
NO20N2(P)
NO25N2(P)



The traction controller controls the traction motor. In the schematic diagram, the M1 contacts are presented on page 2. The main voltage is supplied to the terminal B+ on the traction controller.

6.5 Traction

The traction controller controls the movement of the truck. Before the truck can be operated, the battery must be connected, the key switch must be closed and the system must have passed the self-test procedure.

When the power of the truck is set to ON and the truck in the standby mode, it can be operated by turning the accelerator at the steering wheel forward or backward. In the electrical schematic diagram, the accelerator is presented on page 5. Acceleration and travel speed varies according to the movement of the accelerator.

6.6 AC motor operation

In the induction motor (= asynchronous motor), the stator is powered with alternating current and designed to create a rotating magnetic field, which rotates in time with the AC oscillations. In the induction motor, the rotor rotates at a slower speed than the stator field and thus the magnetic field through the rotor is changing (rotating). The rotor has windings in the form of closed wire loops. The rotating magnetic flux induces currents in the rotor windings as in a transformer. These currents in turn create magnetic fields in the rotor that interact with the stator field. Due to Lenz's law, the direction of the created magnetic field is such as to oppose the change in current through the windings. The cause of induced current in the rotor is the rotating stator magnetic field, so to oppose it, this rotor starts to rotate in the direction of the rotating stator magnetic field to make the relative speed between the rotor and the rotating stator magnetic field zero.

For these currents to be induced, the speed of the physical rotor must be lower than that of the stator's rotating magnetic field, or the magnetic field would not be moving relative to the rotor conductors and no currents would be induced. As the speed of the rotor drops below synchronous speed, the rotation rate of the magnetic field in the rotor increases, inducing more current in the windings and creating more torque. The ratio between the rotation rate of the magnetic field as seen by the rotor (slip speed) and the rotation rate of the stator's rotating field is called "slip". Under load, the speed drops and the slip increases enough to create sufficient torque to turn the load. For this reason, induction motors are sometimes referred to as asynchronous motors. An induction motor can be used as an induction generator, or it can be unrolled to form the linear induction motor, which can directly generate linear motion.

13 Alarm codes



TRUCKTOOL

To view the possible alarms, see the instructions of TruckTool.

NOTE: During resistance measurements, make sure that the battery connector is disconnected, and that the voltage at the measured circuit is 0 V.

Before you start to do troubleshooting to the truck:

- Make sure that all the power supplies, fuses and connections are not damaged.
- Make sure that the wiring harness is not damaged. Make sure that the related connections do not have loose pins and so on.
- Make sure that the truck frame is isolated from the battery positive and negative. Measure this from both sides of the drive contactor. Make sure that there is no short-circuit or low resistance between the positive and negative from the terminals of any controller (B+ and B- terminals).
- Make sure that the battery is not damaged. Measure the battery voltage when idle, and during full speed lift. The battery voltage must stay over 16.8 V.
- Make sure that the battery is fully charged. Low battery voltage can cause error messages.
- Set the power of the truck OFF and ON again. This can clear some error messages.
- Look at the status of the truck display (warning/alarm/info code).
- Read the alarm status from each controller. Try to make an overall picture of the root cause for the event code(s).

NOTE: During resistance measurements, make sure that the battery connector is disconnected, and that the voltage at the measured circuit is 0 V.

APPENDIX B: Truck display languages

The following truck display languages are available:

- Bulgarian – Български
- Croatian – Hrvatski
- Czech – Čeština
- Danish – Dansk
- Dutch – Nederlands
- English
- Estonian – Eesti
- Finnish – Suomi
- French – Français
- German – Deutsch
- Greek – Ελληνικά
- Hungarian – Magyar
- Italian – Italiano
- Latvian – Latviešu
- Lithuanian – Lietuvių
- Norwegian – Norsk
- Polish – Polski
- Portuguese – Português
- Romanian – Română
- Russian – Русский
- Slovak – Slovenčina
- Slovene – Slovenščina
- Spanish – Español
- Swedish – Svenska
- Turkish – Türkçe

9.3 Insulation resistance test

9.3.1 Test voltage

The insulation resistance of the truck and the traction battery are examined separately. The test voltage is greater than the nominal voltage but no more than 100 V or three times the nominal voltage:

Nominal voltage	Test voltage
24 V	50 V

9.3.2 Insulation tester check

Connect the test probe to the frame of the truck (for example, to a non-painted bolt or bracket) and the other test probe to another bolt or bracket. The tester must show a zero value.

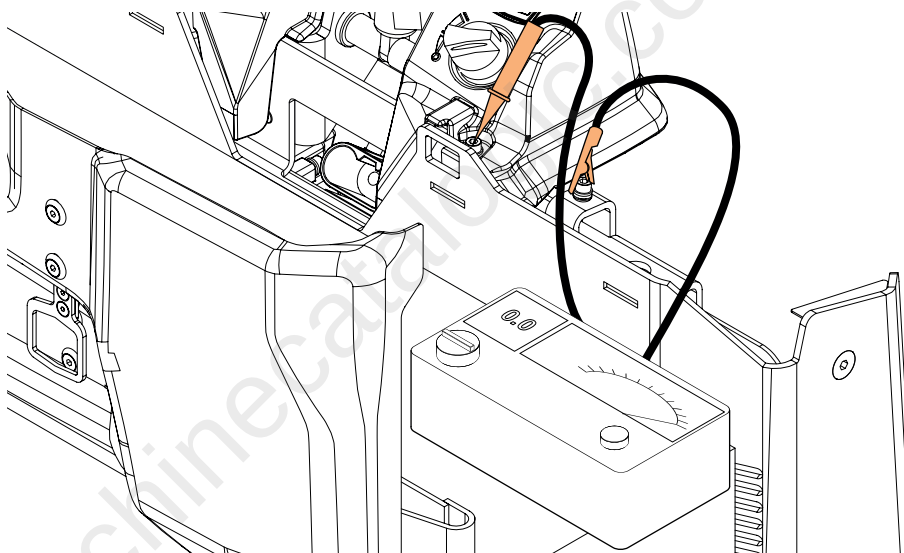


Figure 112: Insulation tester check

9.3.3 Measure the insulation resistance

The test is done with the battery disconnected from the truck. All the electrical components must be in place.

1. Release the emergency stop and set the key switch to the ON position.
2. Connect the test probe to the frame of the truck (for example, to a non-painted bolt or bracket) and the other test probe to the positive terminal of the battery connector.
3. Read the resistance value.
4. Measure and read the negative terminal of the battery connector in the same way.

Full Version Available

Caterpillar NO20N2 Order Picker Service, Operator and Schematic Manual (639785-EN-A)

Caterpillar NO20N2 Order Picker service manual, covers mast, hydraulics, drive, wiring, and diagnostics. Searchable PDF download.

[VIEW THE FULL MANUAL](#)