AUTOEDU
Automotive technical education equipment

MSAE1019

NISSAN LEAF ZE0
SERVICE PLUG

Car high voltage power supply
safe disconnection simulator

INSTRUCTION

https://autoedu.lt/

https://bads.lt/

https://automotivetrainingequipment.com/

2023 Kaunas, Lithuania

CONTENTS

1. SAFETY REQUIREMENTS

Attention:

Read the training equipment manual before beginning any work on the equipment.

1.1. General safety requirements

Training equipment may only be used for the training purposes specified in the instructions.

The staff conducting the training (teacher, teacher, instructor and others) must be familiar with the instructions for the training equipment, know the methods and principles of use, settings, control of the equipment, be able to switch off (stop) the training equipment in an emergency.

The training staff (lecturer, teacher, instructor and others) acquaint those working and learning with the training equipment with the requirements of work safety.

It is forbidden to work with educational equipment for children, unqualified staff.

It is forbidden to work with training equipment for persons under the influence of alcohol or other psychotropic substances.

It is forbidden to improve, modify or otherwise change the design of training equipment without the written consent of the manufacturer.

Do not ignore the information on potential hazards provided by the warning signs on the training equipment.

Beware of the dangers indicated on the warning signs.

The training equipment must be switched off completely during cleaning work.

It is forbidden to wash the training equipment with running water or any chemical cleaning agents.

It is forbidden to clean the electronic components of the training equipment with damp cloths.

The equipment must be completely switched off during maintenance and repair work on the training equipment.

Before working with the training equipment, check that:

- Equipment is not mechanically damaged or broken;
- All protective shields are assembled;
- All components (e.g., wires, jumpers, fuses, handles, etc.) are available;
- The equipment components are free of foreign bodies;
- Undamaged power cords;
- Neat power supplies (battery or stand power supply);
- Power supplies are properly connected (e.g., battery terminals are screwed on, polarity is not mixed, proper power supply is used according to local electrical installation standards);
- The equipment will not pose any danger to operating personnel during operation;
- There are other factors not specified in the instructions that may endanger the health of personnel working with the equipment and others.

When working with the equipment, make sure that:

- Does not smell of glowing, burning objects;
- Power supplies are working properly;
- There are no factors or processes other than those specified in the instructions that could endanger the health of personnel or other persons working with the equipment.

1.2. Safety requirements for working with high voltage electrical components

Employees, lecturers, students, support and service personnel must be familiar with the requirements of the work instructions for work with electrical devices after listening to the instructions and must sign the work safety logs. Instruction of employees and other personnel is carried out in accordance with the normative legal acts, laws and by-laws in force in that state (country). The "Safety Regulations for the Operation of Electrical Equipment" are followed.

Only suitably qualified persons may work with high voltage components and circuits.

Elements marked in orange (wires, connectors, control units, voltage converters, etc.) are constantly or periodically high in the fuel.

Follow the rules for safe work when operating cars.

The high voltage system can turn on automatically. Before starting work on the stand, it is necessary to make sure that the air conditioning control timer is not set.

Note:

If the timer is set to the air conditioning system, the battery charging procedure starts automatically even when the power switch is in the OFF position.

Precautions when removing / replacing the 12 V battery.

When removing / replacing the 12 V battery, turn the power switch on / off and check that the charge status indicator does not flash. The 12V battery must be removed within one hour of checking the indicator.

Note:

• Automatic 12 V battery charge control can start even when the power switch is in the OFF position.

• The automatic 12 V battery charge control does not turn on for about an hour when the power switch is turned on and off.

Warning:

• Due to the presence of high-voltage batteries in electric vehicles, improper use of high-voltage components and the vehicle can result in electric shock, electric leakage, or similar accidents. Be sure to follow proper work procedures when performing inspection and maintenance.

• Before inspecting or servicing the circuits and components of the high voltage system, be sure to remove the maintenance connector (fuse) from the socket in the battery box of the high voltage battery. This will turn off the high voltage circuit.

• Place the maintenance connection (fuse) safely out of the reach of other persons to prevent it from being accidentally connected by another person during maintenance and service work.

• Before working on high voltage components, take care of personal protective equipment and equipment: gloves, shoes, face shield, rubber mat, earthing circuit, etc.

• Take care of the safety of the work area around the high-voltage battery: the work area must be marked, a responsible employee must be appointed, and the work area must be fenced.

When work is not in progress, high-voltage parts and components must be covered with insulating covers or shields to prevent them from touching them.

CAUTION: HIGH VOLTAGE. DO NOT TOUCH DURING OPERATION.

To draw the attention of other employees, set up an information warning sign.

CAUTION:

HIGH VOLTAGE. DO NOT TOUCH DURING OPERATION

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The table must be printed, folded into a triangle (the bends are marked with a dotted line) and placed on the car.

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High voltage wires, regardless of their polarity, are marked with orange insulation.

Attention!

Before inspecting or servicing the high-voltage system, be sure to follow safety measure, such as wearing insulated gloves and removing the service plug to prevent electrocution. Carry the removed service plug in your pocket to prevent other technicians from reinstalling it while you are servicing vehicle.

After removing the service plug, wait 10 minutes before touching any of the high – voltage connectors and terminals.

When working with high voltage components, the battery must use protective equipment:

- glasses
- face shield
- rubber, latex gloves;
- protective clothing and apron;
- rubber boots:
- rubber mats.

All protective and working equipment must meet the requirements of electrical safety standards, be metrologically inspected and have valid metrological inspection documents.

When disconnecting high-voltage wires or other electrical connections, it is mandatory to insulate the open contacts with insulating materials.

After disconnecting the electrical components, make sure that there is no residual voltage.

Protective equipment must be used when working with high voltage circuits. Measure the voltage inside the electrical components before working on them. The devices must display 0 V. It is only possible to work with high-voltage circuit elements at least 10 minutes after the circuit has been switched off. There are capacitors in the system that need to be discharged (discharged).

Attention!

Work safety instructions must be observed when working with high voltage circuits. Workers working on high-voltage circuits can be shocked by high-voltage electricity and injured by improper handling of measuring and repair equipment due to sparks. At the beginning of the work, it must be ensured that all repair and maintenance work is carried out only with the high-voltage lines disconnected.

When disconnecting high voltage cables, they must be insulated. This avoids short circuits, self-coupling and human protection. Use only fully insulated tools for this purpose.

It is forbidden to remove the clear plastic covers from the frame holding the high-voltage battery.

2. GENERAL INFORMATION

2.1. Purpose of training equipment

Training equipment for educational activities. It is a visual aid for the interpretation and demonstration of the structure and operation of various automotive parts, assemblies, structures, systems. The equipment is used as a teaching and learning tool for monitoring and analysing the work processes of various car systems. It is possible to perform various measurements of the parameters of the ongoing processes installed in the training equipment. A variety of laboratory tasks can be performed using the training equipment. The equipment is designed and manufactured in order to provide learners with the clearest and most convenient information about the structure of the unit, the composition of the system and the principle of operation.

2.2. Transport and storage conditions

During transport, the equipment must be protected from falling, tipping over, shocks, humidity, temperature, vibration.

Export or import procedures must take into account the legislation in force between the parties.

Import export procedures and various taxes apply to various technical fluids, oils, batteries, tires and more. Training equipment must be stored in a room with a minimum ambient temperature of at least +10 ° C.

Relative humidity not more than 60%. Training equipment must not be exposed to direct sunlight.

The equipment must be covered with protective equipment if the equipment is exposed to direct sunlight.

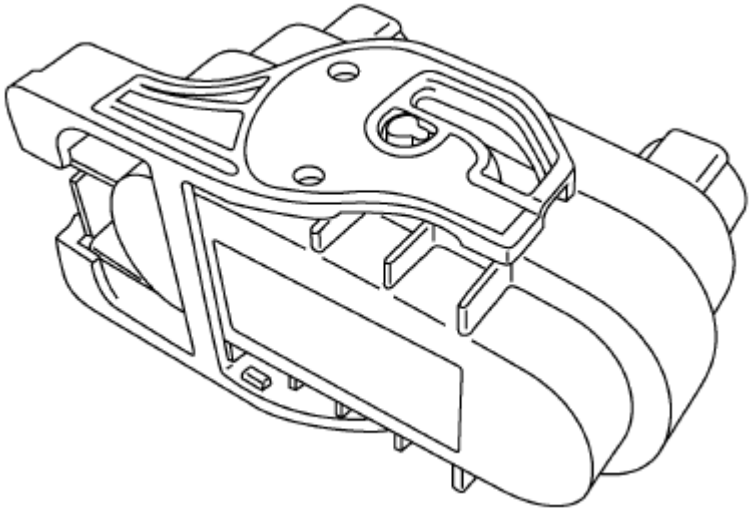
3. TRAINING EQUIPMENT

Service plug

When performing any work with a high-voltage (200 V) electrical circuit, it is necessary to remove the maintenance connection.

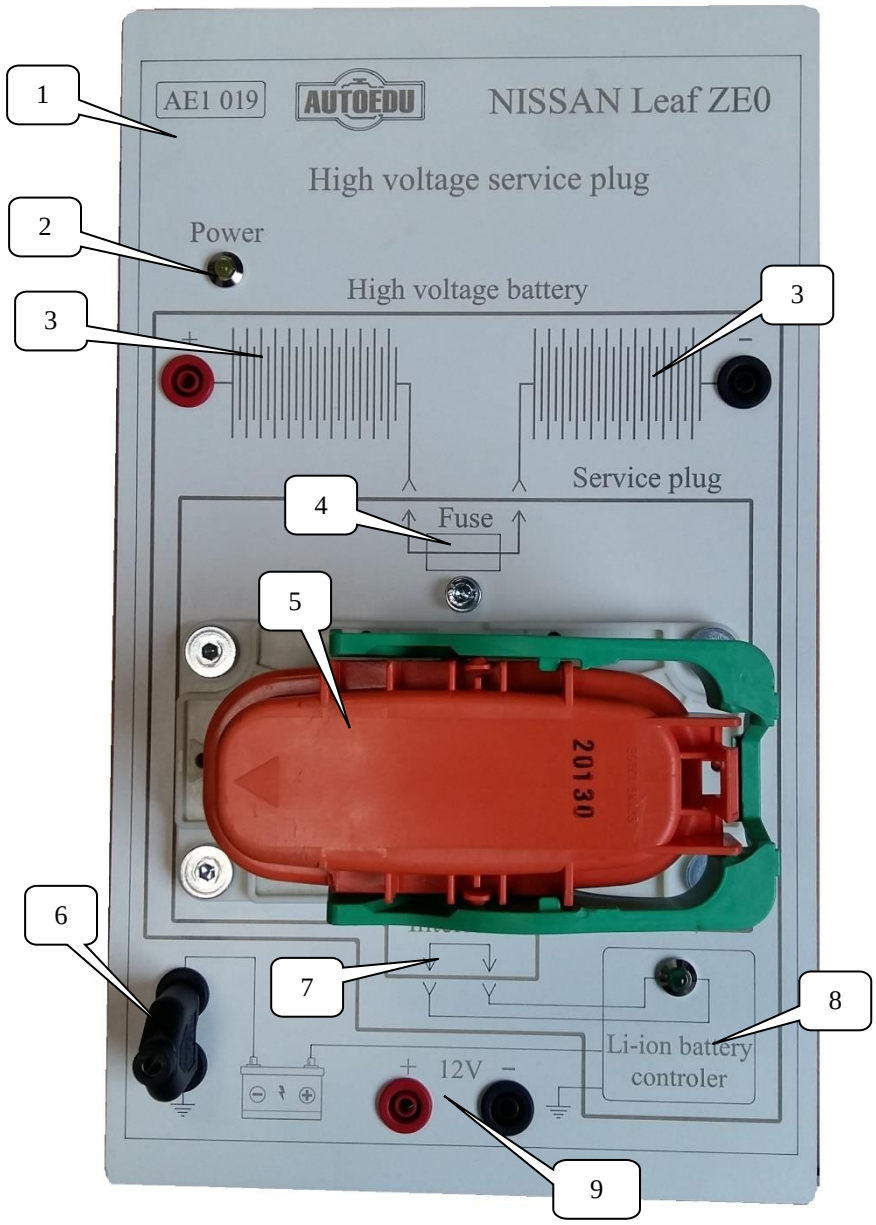
Before removing the service plug, it is necessary to turn off the electric car. On the dashboard, the inscription READY or the symbol indicating the standby status must be extinguished. After performing these actions, the negative contact terminal of the 12 V battery is disconnected.

After removing the maintenance connection, it is possible to start work on high-voltage electrical circuits after only 10 minutes. This time is required for the discharge of high-voltage capacitors.



Service plug

Training stand



1.Training equipment panel
2. 12 V power supply indicator
3. High voltage battery
4. High voltage fuse (installed in the service plug)
5. Service plug
6. 12 V battery disconnect simulation jumper
7. Service plug correct socket control contacts
8. High voltage battery controller
9. 12 V power supply

1. Training equipment panel.

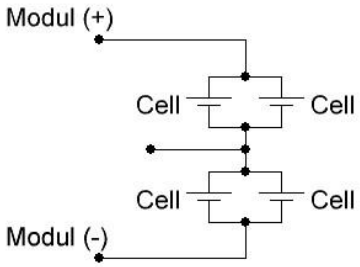
All components of the training equipment are mounted on the panel.

2. 12 V power supply indicator.

The 12 V power supply indicator shows that the 12 V DC power supply is properly connected. The power supply for the training stand can be a 12 V battery or another 12 V DC power supply running from the mains.

3. High voltage battery.

The rated voltage of the Nissan Leaf battery is 300 - 420 V depending on the charge level. The high voltage battery consists of 48 modules consisting of 4 cells. In the module, cells are connected in two parallel and two in series.



Module voltage 6.4 - 8.4 V, (voltage of two cells connected in parallel 3.2 - 4.2 V). The service plug is inserted in the middle of the high-voltage battery. Disconnecting the service plugs terminates the circuit. When the circuit is interrupted, the meter will no longer display the voltage between the positive and negative contacts of the high voltage battery. However, this does not mean that there is no voltage left in the battery.

4. High voltage fuse.

It is installed in the service plug and can only be accessed by disassembling the service plug.

5. Service plug.

The service plug consists of two groups of contacts, one for the high voltage circuit (big contacts) and the other for the low voltage circuit (small contacts). When inserting the service plug into the socket, the high voltage circuit contacts are connected first and then the low voltage circuit contacts. When you turn the service plug lever, the service plug locks into its socket. The lever turns 90 °. Connecting the low voltage contacts informs the high voltage battery controller that the contacts of the high voltage circuit are already connected and if the other conditions are met, it will be possible to turn on the relays in the high voltage battery. When removing the service plug, the contacts of the low voltage circuit are first disconnected. When this circuit breaks, the high voltage battery controller switches off the relays in the high voltage battery and interrupts the supply of high voltage power to the consumers. In this way, the high voltage circuit is turned off and no electricity is supplied to it. This allows the high voltage circuit to be disconnected without sparking (current no longer flows through the contacts of the high voltage circuit). The high voltage circuit is disconnected by turning the lever handle 90 ° and pulling it out of the socket. The lever is locked with a latch that must be unlocked when the service plug is removed.

6. 12 V battery disconnect simulation jumper.

Removing the jumper from the stand corresponds to disconnecting the negative terminal of the car battery.

7. Service plug correct socket control contacts.

The contacts are installed in the service plug itself.

8. High voltage battery controller.

Controls the conditions of switching on, off and charging the high voltage battery. Improper conditions (removed or improperly installed maintenance connection) prevent the activation of high-voltage battery-powered relays that supply high voltage to consumers.

9. 12 V power supply.

A 12 V power supply or a 12 V battery is connected to these contacts. Training equipment is fed through these contacts.

6. WARRANTY CONDITIONS

Our products meet modern technical standards. We guarantee that our product is perfectly constructed and manufactured. They operate reliably if used correctly and in accordance with the provided maintenance rules.

Educational training board is used for educational purposes and can be used only with the components and operating fluids that are fitted on the board.

The guarantee of ____ months is provided for the educational training board. The guarantee begins to run from the sale date of the stand.

In order to warrant the setting of the appropriate date of sale, we ask the buyer to save the relevant contract documents: purchase check, invoice, transfer-acceptance act, warranty card with a product name filled correctly and clearly, number, date of sale, store stamp, signature and the signature of the seller.

The warranty is not applied:

- if the user did not comply with the usage, transportation and storage conditions, used not appropriate operating fluids and aggressive cleaning agents;
- if the stand was damaged by the third parties, force majeure (fire, catastrophe etc.) or another side effect;
- for mechanical breakings and other breaches;
- for warn out parts of the stand, fuses and if non-original spare parts are used;
- when the stand is regulated, improved or remade by unauthorized persons who cannot carry out this work;
- for naturally worn parts such as collars, straps and filters;
- in case of the fluid spill;
- when using the incomplete kit;
- if extraneous objects or some water gets into the product;
- when operating incorrectly or plugging into a messy electric network.

Warranty conditions do not cover the costs related with dismantlement of the product and transportation to the authorized warranty service enterprise. Also, it does not cover consultation, actuation and adjustment work costs. If the elements necessary for repairing the board have to be ordered from the supplier, the repair work may be prolonged.

Warranty repair is done at technical service stations authorized by the manufacturer. During the warranty period defective product components are repaired or replaced free of charge. Technical service station has the right to make a decision about the repair or replacement of the components. The elements that are being changed become the property of the service station.

After completion of the warranty repairs, the guarantee is not extended but remains valid until the time limit provided. The manufacturer reserves the right to change the appearance, design and structure of the product. Service center has the right to suspend the guarantee if the stand was used for other purposes.

Warranty maintenance coupon

Name	_____
Product number	
Date of sale	
Training equipment owner	_____
Trading partner / representative	_____

Description of work performed

Data	Description of the fault and its elimination process	Technician / Signature
	_____ _____ _____ _____ _____	
	_____ _____ _____ _____ _____	
	_____ _____ _____ _____ _____	
	_____ _____ _____ _____ _____	
	_____ _____ _____ _____ _____	

NOTES

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