

MVMC01

EDUCATIONAL MOTORCYCLE ENGINE WITH A FUEL INJECTION SYSTEM

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1. SAFETY REQUIREMENTS

Attention:

Before using the training board, take a look at the user manual.

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

The staff conducting the training (lecturer, 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 work safety requirements.

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 for people who do not have the appropriate qualifications to open the electrical input boxes, connect or change anything there.

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

Do not ignore the information on possible dangers provided by the warning signs on the training equipment. Beware of the hazards 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.

It is forbidden to disconnect the power cords of the electrical elements of the training equipment. Careless or repeated disconnection of these wires will result in damage to the connectors and loss of contact. The desired electrical measurements can be performed at specially designed and installed banana-type connectors in the training equipment. Banana type connectors are resistant to multiple joints.

Before working with training equipment, check that:

- Equipment is not mechanically damaged, broken;

- All protective shields are assembled;

- All heated, rotating parts (e.g., heating plugs, pulleys, gears, etc.) are covered;

- All components (e.g., wires, jumpers, fuses, handles, etc.) are available;

- Sufficient technical fluids (e.g., brake fluid, oil, coolant, etc.);

- Liquids do not leak through the joints;

- 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 use of training equipment with internal combustion engines ensures the removal of burns from the auditorium;

- The training equipment is properly constructed and locked (e.g., the equipment is placed on a sufficiently solid base, the transport wheels are locked);

- During operation, the equipment will not pose any danger to those working with it and the surrounding staff;

- There are other factors not specified in the instructions that may endanger the health of personnel working with the equipment and others.

Observe during work with the equipment:

- The noise emitted by the equipment is characteristic of such a work process (no extraneous sounds);

- No leakage of liquids from the equipment;

- The exhaust gas extraction system is working properly;

- Odour 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 working with the equipment or other persons.

2. GENERAL INFORMATION

2.1. Purpose of training equipment

Teaching equipment for educational activities. It is a visual tool for explaining and demonstrating the structure and operation of various automotive parts, assemblies, structures, systems. The equipment is used as a teaching and learning tool for monitoring and analysis of various car systems work processes. It is possible to perform various measurements of the system parameters installed in the training equipment, to perform fault simulations, to diagnose. 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.

The training equipment is intended for demonstration, training and learning of the design, construction, principle of operation, settings and adjustments of the motorcycle gasoline engine.

2.2. Training equipment parameters

Length	1160 mm;
Width	950 mm;
Height	1520 mm;
Weight	218 kg;
Power supply	12 V battery
Fuel	Gasoline (higher than RON 92 (V))

Training equipment is made using car elements:

Manufacturer:	CF Moto
Model:	650 MT
Engine type:	2 cylinder, 4 strokes, DOHC
Engine Output:	52 kW, 70,6 HP
Engine displacement:	$0,649,3 \text{ cm}^3$

2.3. Transport and storage conditions

Training equipment is installed in a dedicated box. Do not overturn or lay the equipment during transport. During transport, the equipment must be protected from falling, tipping, shocks, humidity, temperature, vibration.

Put the training equipment only on a suitable, solid base (table, cupboard).

Export or import procedures must take into account the legislation in force between the countries. 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. Equipment must be covered by protective equipment if it is stored in a place exposed to direct sunlight.

Unused training equipment is kept completely switched off. The training stands are switched off with the control key and by disconnecting the 12 V battery.

It is necessary to take care and regularly charge the battery of 12 V batteries.

2.4. Preparation and use of equipment

Attention:

Equipment with internal combustion engines must be connected to a functioning exhaust gas removing system. The room must be well ventilated even when the exhaust gas removing system is operating.

The training equipment is maintained as conventional mechanical, hydraulic, pneumatic, electrical machines and systems. Training equipment requires minimal maintenance and service.

Training equipment - a engine, maintained and serviced according to the manufacturer's recommendations.

It is necessary to constantly monitor the leakage of fluids from the training equipment units.

All components of the training equipment must be controlled and ensured.

Damaged, broken parts, blown fuses, damaged connecting cables and other parts are replaced with new ones.

In the case of training equipment with internal combustion engines, gearboxes and airconditioning systems, maintenance and service shall be carried out in accordance with the vehicle used in the training equipment.

Only technical fluids of the appropriate quality and technical specification (engine, transmission oil, coolant, brake fluid, etc.), quality filters and other spare and component parts must be used for maintenance and service work on the training equipment.

The technical condition of the equipment, attachment of protective shields, complete set and other things are checked. For more information on safe work requirements, see the section "Safety requirements \rightarrow Before working with the training equipment, check that: and Observe during work with the equipment:".

Engine oil and filter are changed using good quality parts and oils that meet specifications once a year.

In equipment with internal combustion engines, the level of engine oil and coolant must be constantly monitored.

The position of the emergency stop switch is checked. If the training equipment has been stopped in an emergency, the emergency stop switch will remain depressed and the equipment will not start. When the emergency stop switch is unlocked, it pops out when its upper part is turned clockwise (the upper part moves to the right).

If the emergency stop switch needs to be used, it is pressed with your finger or palm. There is no need to turn anything.

The training equipment is activated by ignition key.

In training equipment with an in dashboard, all indications of equipment operation are reflected on the dashboard.

2.5. Symbols and markings

Automotive symbols for marking wiring diagrams and components are used in the training equipment. The figure below shows an example of component marking in a wiring diagram.



Example of wiring diagram and component marking.

Marking of wiring diagrams:

Black line connecting wires;

+	the wires are connected to each other;
30	a numbered wire is an electrical circuit having a constant voltage of +12 V from a battery;
15	the numbered wire is an electrical circuit in which a $+12$ V DC voltage is turned on by the ignition key;
31	is the electrical circuit connected to the car body and the negative terminal of the battery (ground $\frac{1}{-}$);



4-pin relay. Numbers 86 and 85 denote the contact numbers on the relay through which the relay electromagnet connecting contacts 30 and 87 is controlled. Numbers 30 and 87 denote contact numbers through which a current of 30 A (or greater) may be transmitted;



Fuse. Fuse marking symbol. In the circuit it is an F7 fuse.



A35 vehicle system (unit) control unit (computer) (e.g., engine control unit, airbag control unit, brake ABS control unit or other). The letters A, B, C denote the connection used to connect the electrical wiring to the control computer. The symbols g1, c3, k2, b2, d3 denote the contact of the control unit connector.



B262-1 Temperature Sensor 1. Numbers 1, 2 temperature sensors contact numbers.

A 4 (2) mm banana was installed in the training equipment and connected to that cable. connector (socket) for connecting measuring equipment or a jumper.



Two banana connectors (sockets) are mounted on the cable for connecting the jumper. A jumper removed from the connectors breaks the circuit of this wire. Electric current cannot flow. The wiring diagram of the stand does not show this disconnection of the cord, because in real cars banana connectors are not installed. These connections are installed in the electrical circuit of the training equipment, enabling measurements to be made and faults to be simulated.



Jumper. Connector with banana type 4 mm contacts (plugs) at the bottom and one banana type 4 mm contact (socket) at the top. All three contacts inside the jumper are connected to each other.

Attention:

It is recommended to connect measuring wires with 4 mm banana type contacts (plugs) to the training equipment when performing various measurements of electrical parameters.

3.1. General overview of training equipment

A general view and structure of the training equipment is given in the illustrations below.



Training equipment

- 1. Console
- 2. Frame
- 3. Motorcycle engine
- 4. Transport wheels
- 5. Accelerator
- 6. Gear shift lever



Control panel

- 1. Dash board
- 2. Electrical diagram with measuring contacts and jumpers
- 3. Fuse box
- 4. Battery connection indication5. STOP switch
- 6. OBD II diagnose connector
- 7. Ignition Key

3.2. Wiring diagram

The wiring diagram contains all the elements: sensors, actuator components, data transmission lines, diagnostic connection. This diagram shows the connection circuits of the elements, the connection contact numbers, the component numbers, the mounting locations of the jumpers.



Motronic MSE 6 wiring diagram

Legend

- A1 EFI control unit
- A2 Regulator
- B1 Air intake temperature sensor
- B2 Air intake pressure sensor
- B3 Throttle position sensor
- B4 Coolant temperature sensor
- B5 Roll-over switch
- B6 Oxygen sensor 1
- B7 Oxygen sensor 2
- F1 Fuse 7,5 A
- F2 Fuse 10 A
- F3 Fuse 15 A
- F4 Fuse 15 A
- G1 3 phase magneto
- H1 EFI indicator
- K1 Main relay
- $K2-Fuel \ pump \ relay$
- M1 Fuel pump
- N1 Canister magnetic valve
- N2 Gulp valve
- N3 Fuel injector 1
- N4 Fuel injector 2
- N5 Ignition coil 1
- N6 Ignition coil 2
- N7 Stepping motor
- R1 Ignition diagnostic resistor 1
- R2-Ignition diagnostic resistor 2
- S1 Side stand switch
- S2 Clutch switch
- S3 Confort / Sport mode switch
- S4 Neutral switch
- S5-Stop switch
- T16-16-pin Diagnostic link connector

4. WORKING WITH EDUCATIONAL EQUIPMENT

The training gasoline engine works and is used in the same way as the conventional internal combustion engine used in motorcycles. To make it convenient to work with the engine and conduct the training process, the engine is removed from the motorcycle and installed in a metal frame with transport wheels. The engine is controlled via the control panel of the stand. All the controls are installed here, the engine wiring diagram with components labelled and a legend is provided. The circuit diagram contains jumpers and electrical contacts for measuring and monitoring the working parameters of various components. After removing the jumpers, it is possible to simulate failures, to observe changes in the operation of the motor. After connecting to the OBD II diagnostic connector with a system scanner, it is possible to monitor engine operating parameters, read and delete errors, perform activation of performance elements, diagnose.

Fault codes appear in the memory of the bench engine control unit if e.g., the jumper is pulled out of its socket. These fault codes are erased with the help of diagnostic equipment.

To read fault codes on the motorcycle's engine control panel, a cap must be placed on the diagnostic connector.

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
		6

NOTES



ANEX

Item	Standard	Service limit
EFI		
Throttle Grip Free Play	2mm~3mm (0.08in~0.12in.)	
Idle Speed	1450r/min±145r/min(rpm)	
Air Filter Element	Polyurethane Foam	
Cooling System		
Coolant:		
Type (recommended)	Permanent type of antifreeze	
Color	Green	
Mixed Ratio	Soft water 50%, Coolant 50%	
Freezing Point	-35°C (-31°F)	
Total Amount	2.0L (2.1USqt)	
Cylinder Head		
Valve Clearance		
Exhaust	0.20mm~ 0.26mm (0.0078in~0.0102in .)	
Intake	0.08mm~0.13mm (0.0031in~0.0051in.)	
Clutch		
Clutch Lever Free Play	2mm~3mm (0.08in~0.12in.)	
Engine Lubrication System Engine Oil:: Type Viscosity Capacity Level	ELF 10W-40/SJ JASO MA2 10W-40 2.0L (1.8USqt)(when filter is not replaced) 2.2L (2.0USqt) (when filter is replaced) 2.6L (2.5USqt)(total capacity) Between upper and lower level lines (after idling or running)	
Wheels/Tires Tread Depth: Front Rear Air Pressure (when Cold): Front Rear	4.5mm (0.18in.) 5.5mm (0.22in.) 225kPa (1 or 2 person(s)) 250kPa (1 person) 280kPa (2 persons)	0.8mm~1.0mm 0.8mm~1.0mm

Item	Standard	Service Limit
Chain reduction system		
Drive Chain Tightness	30mm~40mm (1.18in~1.575in.)	
Drive Chain Wear	317.5mm~318.2mm	320mm
(20-link Length)	(12.50in~12.53in.)	(12.6in.)
Standard Chain:		
Make in	Japan RK or DID 520×S01 or	
Туре	520VP2-T	
Link	116 Links	
Brake		
Brake Fluid:	DOT	
Grade	DO14	
Brake Pad Lining		
Front	(mm (0.15in.)	1mm (0.04in.)
Dear	5mm (0.196in.)	1mm (0.04in.)
Roke light timing	On	111111 (0.04111.)
Front	- On	
Rear	About 10mm (0.39in.) after pedal play	
Electrical System		
Spark Plug Gap	0.7mm~0.9mm (0.027in~0.035in.)	

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