

TECHNICAL DATA SHEET AND OPERATING MANUAL FOR STARTER STORAGE BATTERY



**ATTENTION! BEFORE PUTTING THE BATTERY INTO OPERATION,
READ THIS MANUAL AND FOLLOW ITS RECOMMENDATIONS.**

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1. BATTERY PURPOSE

1.1. The lead-acid starter storage battery (hereinafter — the battery) with a rated voltage of 12 V, filled with electrolyte, charged and ready for operation in accordance with the requirements of the European standard EN 60095-1, and the technical specifications TU BY 809001284.001-2019, TU BY 800000637.001-2017, is intended for starting internal combustion engines and powering the electrical equipment of automotive and tractor vehicles (cars, buses, tractors, etc.) and watercraft.

1.2. The batteries are manufactured using equipment from O.M. Impianti (Italy), WIRTZ (USA), Moojin (South Korea), LaPneumatica (Italy), Accurate Product (Denmark), TBS (England), SOVEMA (Italy), Digatron (Germany), Ateliers Roche (France), KUKA AG (Germany), MAC (USA), Sanhuan (China), Oxmaster (USA).

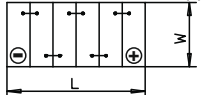
1.3. The batteries are manufactured in two configurations — direct and reverse polarity; see the arrangement of the terminals.

EXAMPLE OF A POSSIBLE BATTERY DESIGNATION

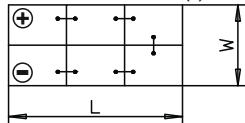
6 ST – 190 L (4) — where 6 is the number of cells; ST — starter battery; 190 (55) — capacity in A·h; N — battery with normal water consumption; VL — battery with very low water consumption; AGM — battery with electrolyte held in an absorbent glass mat separator; 4 (1) — direct polarity; 3 (0) — reverse polarity.

BATTERY POLARITY

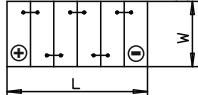
PASSENGER "REVERSE», R(0)



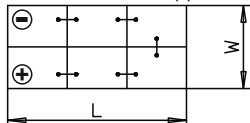
COMMERCIAL "REVERSE" (3)



PASSENGER "DIRECT», L(1)



COMMERCIAL "DIRECT" (4)



2. SAFETY PRECAUTIONS

- 2.1. ATTENTION! A mixture of hydrogen and air is explosive.
- 2.2. It is STRICTLY PROHIBITED to smoke, use an open flame, or allow sparking near the battery, including short-circuiting its terminals.
- 2.3. Operations involving the preparation, filling, and adjustment of the electrolyte level and specific gravity should be carried out at service stations.
- 2.4. THE ELECTROLYTE IS A CORROSIVE LIQUID. When handling the battery, wear safety goggles and gloves. If electrolyte comes into contact with unprotected areas of the body, immediately rinse them thoroughly with water and a 10% baking soda solution. If it gets into the eyes, rinse thoroughly with running water and consult a doctor.
- 2.5. Keep the battery out of the reach of children.
- 2.6. When operating a battery with a central gas vent, one outlet of the gas vent channel must be closed with a flame arrester, and the other with a plastic plug.
- 2.7. Connection and disconnection of the battery must be performed with all current consumers switched off and the charger turned off. Connect the positive terminal first, then the negative one. Disconnection is carried out in the reverse order.
- 2.8. The lead terminals of the connecting cables must be tightly clamped onto the battery terminals, while the cables themselves must be slack.

3. TRANSPORTATION AND STORAGE

- 3.1. Batteries shall be transported in enclosed vehicles that protect them from mechanical damage and contamination, as well as from exposure to precipitation and direct sunlight. During transportation and storage, batteries must be positioned with their covers facing up. Tilting of more than 45 °C is not permitted.
- 3.2. Storage batteries should be stored in unheated premises away from heating appliances and direct sunlight.
- 3.3. The recommended storage period for the battery without additional charging is no more than 3 months. If the electrolyte specific gravity drops by 0.03 g/cm³ or more, the battery must be charged. Check the OCV (open-circuit voltage) and the electrolyte specific gravity at least once a month.
- 3.4. Before a prolonged parking period (more than 10 days), the battery must be disconnected, fully charged, and stored in a cool room. For short parking periods with a fully charged battery installed in the vehicle, it is recommended to disconnect the negative cable.

4. BATTERY INSTALLATION

- 4.1. Before installing the battery, completely remove the transport packaging (film), if present.
- 4.2. The storage battery must be secured in the mounting location of the vehicle or watercraft. When installing the battery, the "+" terminal is connected first; when removing it, the "-" terminal is disconnected first.
- 4.3. Be careful when connecting the cable terminals to the battery posts! Connecting the "-" cable to the "+" terminal of the battery, and vice versa, will damage the vehicle's electrical equipment.
- 4.4. When installing or removing the battery in the vehicle, avoid sparking and ensure that the terminals and wiring are in good condition. The terminals must ensure a reliable contact with the battery posts. It is recommended to clean the battery posts and terminals and lubricate them with technical petroleum jelly (or Litol grease, WD-40). It is prohibited to strike the terminal clamps in order to force them onto the battery posts.

4.5. When working with metal tools, avoid short circuits caused by touching battery terminals of opposite polarity at the same time. Begin removing the terminal clamps from the negative terminal "-", then proceed to the positive terminal "+".

5. OPERATING RULES AND BATTERY MAINTENANCE

5.1. Due to possible storage, it is recommended to recharge the battery before selling it and installing it in the vehicle. For proper and long-term battery operation, each vehicle must undergo scheduled maintenance MS-2 (at approximately every 30,000 km), one item of which includes checking the vehicle's electrical equipment and testing the battery.

5.2. The purchaser must periodically check the electrolyte level if the storage battery is of the serviceable type with liquid electrolyte.

5.3. The rated capacity of the battery must correspond to the recommendations of the vehicle manufacturer.

5.4. The lead terminals of the connecting cables must be cleaned and coated with a thin layer of technical petroleum jelly.

5.5. If additional electrical equipment is used, it must be in good working order, factory-made, and installed by qualified specialists with due regard to the alternator output, in order to ensure normal battery charging.

5.6. The battery must be complete and securely fastened in the vehicle in accordance with its operating manual. Insecure mounting of the battery leads to mechanical damage, premature deterioration of the plates, and short circuits.

5.7. Do not allow deep discharges of the battery (the electrolyte specific gravity must be no lower than 1.20 g/cm³ (50% charge) and no higher than 1.30 g/cm³).

5.8. Do not allow overcharging of the battery or an increase in the electrolyte temperature above 45 °C during charging.

5.9. With the engine running, the vehicle's on-board voltage — regardless of the number of consumers switched on — must be no lower than 13.8 V, and no more than 14.5 V under no load. For 24-volt electrical systems: from 27.48 V to 30.2 V.

5.10. The electrical power consumption in the on-board network of a non-running vehicle must not exceed 0.04 A.

5.11. Contamination of the battery leads to increased self-discharge. The voltage between either terminal and the surface of the cover must not exceed 0.5 V.

5.12. Contamination of the gas vent openings may result in damage to the battery.

5.13. When the battery is stored and operated at a temperature of 45 °C or higher, its service life is reduced by half.

5.14. Do not allow the battery to remain fully discharged (below 11.8 V) for a prolonged period exceeding 24 hours. Irreversible electrochemical processes begin in a discharged battery, leading to its premature failure. To avoid deep discharges or excessive overcharging of the battery, ensure the proper functioning of the vehicle's electrical equipment and its alternator.

5.15. The engine is started with the clutch depressed, for no longer than 5–7 seconds, with an interval of at least one minute between attempts. If the engine fails to start after five attempts, the battery should be charged and the engine starting system checked.

Violation of the engine starting rules (repeated, prolonged starting attempts) leads to deep discharge of the battery, sulfation of the plates, deterioration of the plates, and battery failure.

5.16. For uninterrupted battery operation, it is recommended to check the state of charge in a timely manner, i.e., to measure the voltage between the battery terminals (OCV) when the battery is disconnected from the vehicle's on-board network (see Table 1).

6. THE FOLLOWING IS NOT PERMITTED:

6.1. Storing the battery in a discharged state (electrolyte specific gravity below 1.24 g/cm³).

6.2. Adding electrolyte or other substances to the battery instead of distilled water.

6.3. Short-circuiting the terminals.

6.4. Charging the battery on stationary chargers with a current exceeding 10% of the rated capacity.

6.5. Applying alternating current to the battery.

6.6. Using the battery to "jump-start" a second vehicle.

6.7. Operating or storing the battery with the electrolyte level below the minimum mark on the battery case or with exposed plates.

Table 1. Determination of the Battery State of Charge.

Battery state of charge, %	Battery state of discharge, %	OCV (open-circuit voltage)	Electrolyte specific gravity, corrected to t +25 °C,
100	0	12,6-12,7	1,27-1,28
80	20	12,5	1,24
60	40	12,3	1,21
0	60	12,1	1,175

7. BATTERY CHARGING

7.1. If the storage battery is of the serviceable type, open the plugs and check the specific gravity and level of the electrolyte. In the case of a battery with no access to the electrolyte, the filler plugs are not removed. Use a glass tube to measure the electrolyte level.

7.2. Connect the positive terminal of the battery "+" to the positive pole of the charger, and the negative terminal of the battery "-" to the negative pole of the charger. After connecting the conductors, plug the charger into the mains. Switch off the charger once charging is complete.

7.3. Charge the battery in a well-ventilated area.

7.4. Use only devices specifically designed for charging storage batteries.

7.5. Charge the battery with a current equal to 10% of the rated capacity.

7.6. Charge batteries with liquid electrolyte until intense gassing begins in all cells, after which the charging current should be halved and charging continued until the voltage and electrolyte specific gravity remain constant for two hours, i.e., until the battery is fully charged.

7.7. The electrolyte specific gravity in fully charged batteries is within the range of 1.27–1.28 g/cm³ (at a temperature of 25 °C).

7.8. During charging, periodically check the electrolyte temperature, AVOIDING OVERHEATING above +45 °C; otherwise, interrupt charging to reduce the temperature and then resume the charging process.

7.9. A deviation in the electrolyte specific gravity between the battery cells of 0.01 g/cm³ is permissible.

7.10. The electrolyte specific gravity is determined at 25 °C. For each 1 °C change in the measured electrolyte temperature, the specific gravity changes by 0.0007 g/cm³.

7.11. When charging batteries manufactured using AGM or Gel technology, use dedicated chargers. Do not allow the battery to be charged at a voltage above 14.8 V, as this may lead to premature battery failure. During charging, continuously monitor the temperature of the battery case.

8. PROCEDURE FOR FILING A CLAIM

8.1. In the event of a battery malfunction during the warranty period, claims shall be submitted to the seller together with a completed warranty card.

NOTE: Readings from measuring instruments not listed in the State Register of Measuring Instruments do not constitute grounds for filing a claim.

8.2. Claims are not accepted in the following cases:

8.2.1. the completed warranty card is missing;

- 8.2.2. the warranty card does not indicate the battery number, the seller's stamp, the location of the point of sale, the seller's name, the seller's signature, or the purchaser's signature;
- 8.2.3. the surface of the battery is contaminated in a way that promotes increased self-discharge of the battery;
- 8.2.4. the battery marking (label) applied by the manufacturer is missing or does not correspond to the information indicated in the warranty card;
- 8.2.5. the battery has mechanical damage (dents, cracks, melting, etc.), or the battery has been opened and repaired;
- 8.2.6. the battery has damaged or melted terminals, or chemical or thermal damage to the case or terminals;
- 8.2.7. the battery is submitted with separators or plates deformed at the top;
- 8.2.8. the battery has an electrolyte leak due to mechanical damage or poor battery mounting;
- 8.2.9. the battery was operated or stored with an electrolyte specific gravity below 1.24 g/cm³;
- 8.2.10. the battery was subjected to unqualified maintenance during storage and operation, resulting in the electrolyte specific gravity in the cells being below 1.24 g/cm³ or above 1.32 g/cm³ (specific gravity values are measured after charging the battery);
- 8.2.11. for a battery that has exploded or frozen as a result of discharge and low electrolyte specific gravity;
- 8.2.12. a mismatch between the technical data of the vehicle and the battery used, or the battery was operated in a vehicle with a faulty electrical power supply system; the use of a lower-capacity battery may lead to its premature failure;
- 8.2.13. the battery was operated or stored with a low electrolyte level, resulting in significant water consumption with exposure of the upper edge of the plates and, consequently, shedding of the active mass;
- 8.2.14. reverse polarity of the battery;
- 8.2.15. the battery is submitted with the electrolyte drained, with the electrolyte level below the "min" mark on the case, or with a non-uniform electrolyte composition colored an atypical color;
- 8.2.16. clouding of the electrolyte in all battery cells and/or degradation of the plates manifested as a large amount of sludge;

These conditions are the result of improper operation and maintenance of the battery or a malfunction of the vehicle's electrical equipment.

The manufacturer shall not be liable for any damage caused by ignorance of, or negligent attitude toward, the operating rules.

Manufacturer's Details

Zubr Energy LLC

Belarus, 225710, Brest Region, Pinsk, Kalinovskogo St., 9.

Battery Alliance LLC

Belarus, 24010, Brest Region, Brest District, Telminsky Village Council, 14

1.0 km southwest of the village of Khaby, administrative and amenity complex

WARNING SIGNS (PICTOGRAMS)



Follow the instructions provided in the vehicle's Operating Manual



Explosive



Avoid sparks and open flames



Storage batteries are subject to recycling

Pb



The product is certified for the Eurasian Economic Union. The product has undergone all conformity assessment procedures established in the technical regulations and complies with the requirements of all technical regulations applicable to this product.



Wear safety goggles when handling the storage battery



The storage battery contains corrosive acid

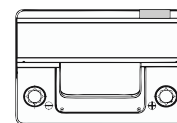
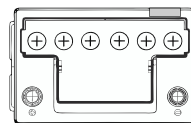


Keep the storage battery out of the reach of children



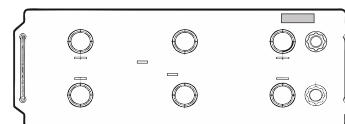
Spent batteries must not be disposed of together with municipal waste

FACTORY MARKING



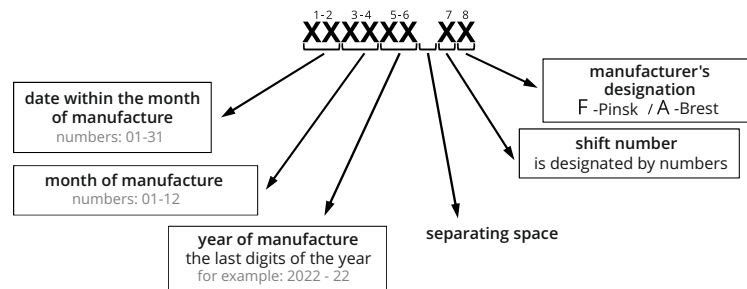
The factory marking (battery serial number) is applied to the rear rim of the battery cover.

For commercial batteries, two marking placement options are permitted:



- on the rear rim of the battery cover;
- on top of the cover between the terminals.

The battery part number consists of 8 characters. The production date is contained in the first three pairs of digits before the space. The production date is in the format day of the month, month, and year.



WARRANTY CARD

BATTERY INFORMATION

Country of manufacture:
Name and address of manufacturer:
Battery brand:
Battery number: Additional battery number:
Battery capacity:
Warranty period:
Price:
Completeness: Starter battery, service card.

SELLING ORGANIZATION INFORMATION

Name of organization and legal address:
Address (point of sale):
Telephone:
Date of sale:
Seller's signature: Signature transcript:
Warranty period:
Seal

« »

**THE BATTERY WAS ACCEPTED WITHOUT MECHANICAL DAMAGE AND INSPECTED
IN MY PRESENCE. I HAVE READ AND AGREE TO THE TERMS OF WARRANTY SERVICE.**

Battery selection by type and capacity was made at the Buyer's request: Buyer's signature:
Storage battery:
Sold for a vehicle of make:
Engine type: Main vehicle operating mode:
Engine displacement: Vehicle mileage:

DATA ON THE TECHNICAL CONDITION OF THE BATTERY AT THE TIME OF SALE:

Test result		Date					
electrolyte specific gravity (g/cm ³)							
electrolyte properties							

Battery voltage: , under load:
Alternator voltage at idle: ; with electrical consumers switched on:
Remarks:
Results obtained in my presence: Date:
Work performed:
Recommendations:
Signature:

* - parameters of individual battery cells, starting from the cell with the positive terminal in the series electrical circuit and toward the negative terminal

Nº	Description of work	Date	Full name	Signature
1				
2				
3				