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MIDAC BATTERIES

MFT
Valve Regulated Lead-Acid STANDBY POWER BATTERIES

OPERATING, INSTALLATION AND MAINTENANCE INSTRUCTIONS

MFT

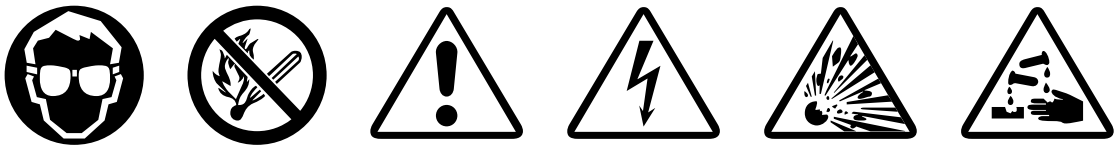
1. INTRODUCTION

Standby batteries are generally used as back-up power, to support all those users who need a reliable service continuity in case of black-out of the distribution network of electricity, hybrid and off-grid installations.
Lead-acid standby batteries are components of a system and they require the observance of suitable precautions and behavioral norms to guarantee safe working conditions and to ensure the best performance of the battery during its entire life. Scope of this document is to supply the necessary instructions for the correct cure, handling, installation, use and maintenance of MIDAC MFT VRLA Standby Power batteries.

2. RECOMMENDATIONS

Carefully read this manual in all its parts upon receipt of MIDAC MFT VRLA standby batteries.
The non-compliance with the instructions given herein may cause injury to people and damages to the equipment, as well as the bad operation of the battery.
Keep this manual in the battery room in a place easily accessible to the staff.

3. SAFETY RULES

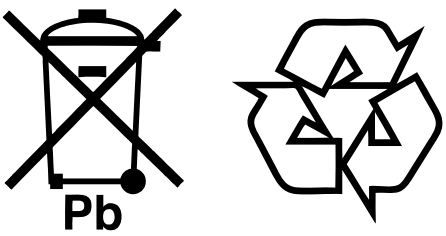


Observe the following precautions at all times.

Exposed metal parts of the battery always carry a voltage and are electrically live with the risk of short circuits.
Avoid any electrostatic charge; before starting your work on the battery, first discharge any possible electricity from yourself by touching an earth-connected part; repeat this action occasionally until the work is complete.

Always take the following precautions:
- Use protective equipment, such as protective clothing, rubber gloves and goggles.
- Use insulated tools.
- DO NOT place or drop metal objects on top of the battery.
- DO NOT wear rings or bracelets. Remove any articles of clothing with metal parts that might come in contact with the battery terminals.
- DO NOT smoke and DO NOT use open flames or create electric sparks.
- Take all precautions when using the main supply.
- Make sure that the first aid kits and fire extinguishers are easily accessible.

Used batteries contain recyclable materials. They must not be disposed with the house waste but as a special waste. Methods of return and recycling must conform to the regulations in operation at the site where battery is located.



4. DELIVERY AND STORAGE

Unpack the batteries as soon as they are delivered.
Verify that the equipment has been delivered in good condition. Any damage must be reported immediately to the carrier and the damaged items retained for inspection by the carrier's representative.

If the battery cannot be immediately installed, store it in a dry, cool and clean place.
Do not expose the battery to direct sunlight, to avoid any damage to containers and lids.

Important Note! Storage time for charged cells is limited. The recommended storage time is as follows:

Ambient Temperature	Storage Time
20°C (68°F)	6 months
30°C (86°F)	3 months
40°C (104°F)	6 weeks

During the storage time, the open circuit voltage (OCV) must periodically be checked.
Batteries with OCV below 2.10 Vpc must be recharged providing constant voltage of 2.35 Vpc with current limitation of 0.15 C10 (A), for 24 hours.
The OCV of a fully charged battery should result between 2.15-2.19 Vpc.
Failure to observe the above conditions may result in a greatly reduced capacity and service life or in permanent damage to the batteries.

5. BATTERY ROOM (NORM REF. EN 50272-2)

The battery room must be dry, clean and not subject to vibrations.
It must be properly sized to enable installation, inspection and maintenance. Its temperature should be as moderate as climate allows, preferably between 10°C (50°F) and 30°C (86°F). The battery will give its best performance when working in a temperature of 20°C (68°F) - 25°C (77°F), but will be functioning even operating in temperatures between -10°C (14°F) and 60°C (140°F).
High temperatures increase the performance but reduce battery life, while low temperatures reduce the performance.
The entry doors of battery room must be provided with warning signs banning smoking, sparks and naked flames.
The batteries should be installed on suitable racks, shelves or cabinets, properly sized in loading capacity and dimensions. The layout must enable easy access to all battery units.
Racks or shelves can be made of wood or metal with acid-proof coating. If metal racks are used, they must be equipped with rubber or plastic insulators to avoid any contact between the battery and the metal.
Layout and ventilation system should be such that the maximum temperature differential between individual batteries does not exceed 3°C (5°F).

Good ventilation is extremely important for battery cabinets.
Ventilation openings should be at the base of the cabinet, and as close as possible to the top, to prevent any build-up of hydrogen gas in abusive situations.
As with battery stands, cabinets should be level and firmly placed to the floor.

PAY SPECIAL ATTENTION TO BATTERY ROOM STANDARDS, EFFECTIVE AT THE MOMENT OF THE INSTALLATION OF THE BATTERY.

6. INSTALLATION

Before installing the batteries, clean all parts. Remove the protections from the terminal posts and clean them with a soft clean cloth.

Place the batteries on the rack (or cabinet) and make sure that the spacing allows the accommodation of the supplied connectors (around 10 mm).

Take particular care to preserve the positive to negative sequence when using flexible inter-tier, inter-step or inter-rack connectors between rows of batteries. Leave the main positive and negative terminals of the system free for connection to the charging source.
Prepare connectors by deeply clean the contact surfaces with soft clean cloth.

Apply a light coating of no-oxide grease to the contact-making areas of each connector.

Fit connectors using hardware supplied. Before assembly, lightly smear no-oxide grease on the surfaces of all hardware. Use insulated wrenches to tighten the parts firmly together, with torque setting of 12-16 Nm (106-142 in lbs).
Pay special attention to avoid short-circuiting the batteries with any of the battery hardware.

Check tightness and cleanliness.

Connect the positive terminal of the battery to the positive terminal of the charger and the battery negative to the charger negative.

Number the batteries by using the set of numbering stickers supplied with the system.
It is common practice to number the batteries beginning with #1 at the positive end of the system and following the sequence of electrical connection of the batteries, through to the negative end.

7. CHARGING

7.1 Temperature compensation

Temperature compensation must be as follows:

±3.5 mVpc each °C out of the range 20°C / 25°C
- from 20°C to 25°C: no need of temperature compensation
- below 20°C (68°F): voltage +0.0035 Vpc/°C
- above 25°C (77°F): voltage -0.0035 Vpc/°C

7.2 Commissioning

Batteries lose charge while in transit or during storage. For this reason, a freshening charge should be given before putting the battery into service.
Recommended charge settings - at the ambient temperature range of 20°C to 25°C - are as follows:

12 hours at constant voltage of 2.35 Vpc at 20°C (68°F)
(Current limitation 0.15 C10 Amps)

7.3 Charging in service

Once put into service, MIDAC MFT VRLA Standby Power batteries should be charged as follows:

7.3.1 Float charge at constant voltage

To maintain the battery in fully charged condition during normal battery operation or, after a discharge, to recover 90% of nominal capacity within 20 hours, a recommended float charge has to be applied.
Recommended float voltage settings are as follows:

Constant voltage 2.24 - 2.28 Vpc at 20°C (68°F)
(Current limitation 0.20 C10 Amps)

With the method described above, the effective charging current is limited to very low values; such current increases as a function of temperature and age of the battery.

7.3.2 Fast charge

Increasing the charge voltage to 2.35 - 2.40 Vpc with a current limited to 0.15 C10 can reduce recharge times.
Boost charge should be stopped after approximately 10 to 15 hours.
In order to achieve a normal service life, this charge regime must not be used more than once per month.

8. BATTERY MAINTENANCE

MIDAC MFT are sealed - maintenance free lead-acid batteries and need no water addition.

The containers and lids must be kept dry and free from dust.
Cleaning must be done only with a damp cotton.
Avoid static discharges generated during cleaning.

DO NOT USE ANY TYPE OF OIL, SOLVENT, DETERGENT, PETROLEUM-BASED SOLVENT OR AMMONIA SOLUTION TO CLEAN THE BATTERY CONTAINERS OR LIDS. THESE MATERIALS WILL CAUSE PERMANENT DAMAGE TO THE BATTERY.

Monthly
1 Check the evidence of damages on battery and equipment;
2 Check and record the total battery floating voltage and temperature.

Yearly
1 Check and record individual battery voltages. A variation of 4.5% from the average voltage is acceptable;
2 Perform a discharge test according to IEC or IEEE Standards until the battery shows signs of degradation and every six months thereafter.

Keep a log book to record all maintenance and inspection operations, which will be helpful to monitor long-term changes of the battery condition.

9. ADDITIONAL INFORMATION

For any further information on MIDAC MFT VRLA Standby Power batteries, please contact:

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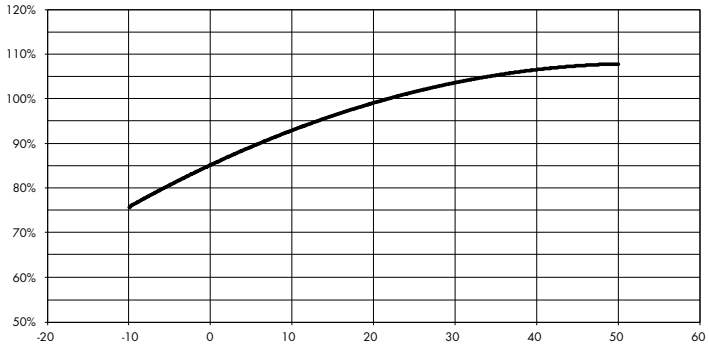
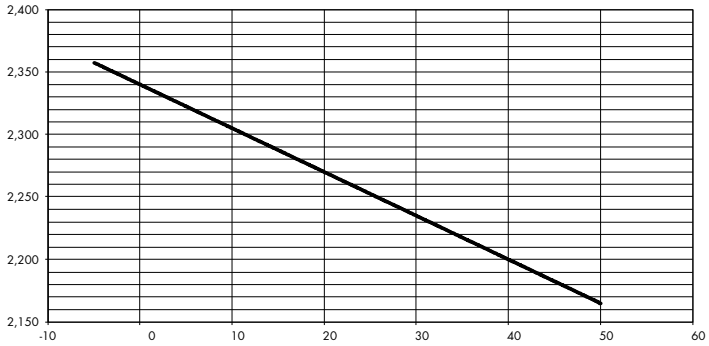
10. TECHNICAL DATA

Type	Nominal Voltage	Actual Capacity	Ri	Isc	Dimensions (mm)			Weight	Terminals
	V	Ah/10hrs	mOhm	kA	Length	Width	Overall Height	Kg	
MFT 12-100A	12	**100,0**	6,169	2,040	**558**	**125**	**230**	**37,5**	**(2x) D18 M8 + FT**
MFT 12-150A	12	**150,0**	5,508	2,284	**558**	**125**	**311**	**54,0**	**(2x) D18 M8 + FT**
MFT 12-175A	12	**175,0**	5,211	2,469	**558**	**125**	**311**	**55,0**	**(2x) D18 M8 + FT**
MFT 12-100B	12	**100,0**	5,819	2,712	**508**	**110**	**238**	**33,2**	**(2x) D18 M8 + FT**
MFT 12-155B	12	**155,0**	4,782	2,630	**551**	**110**	**320**	**51,0**	**(2x) D18 M8 + FT**

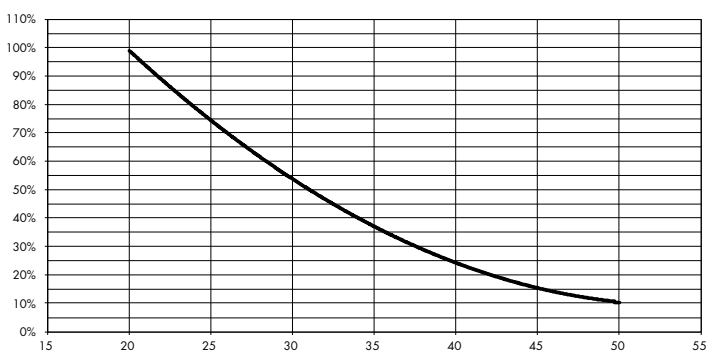
PERFORMANCE Capacity vs Temperature (°C)



TEMPERATURE COMPENSATION Float Voltage vs Temperature (°C)



THERMAL DEGRADATION Lifetime vs Temperature (°C)



LIFECYCLES No. of Cycles vs D.o.D. (% C10)