

# MASTERVOLT

## MLS

### 12/80, 12/130, 12/260, 12/390 & 24/260

Lithium-ion battery



EN

USER'S AND INSTALLATION MANUAL

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## WARNINGS

	Observe these instructions and keep them located near the battery for future reference. Work on the battery should only be carried out by qualified personnel.
	While working on batteries wear protective eye-glassing and clothing. Observe accident protection rules.
	Any uncovered battery material such as electrolyte or powder on the skin or in the eyes must be flushed with plenty of water immediately. Then seek medical assistance. Spillages on clothing should be rinsed out with water.

	Explosion and fire hazard. Terminals of the battery are always alive; therefore do not place items or tools on the battery. Avoid short circuits, too deep discharges and too high charge currents. Use insulated tools. Do not wear any metallic items such as watches, bracelets, etc. In case of fire, use a type D, foam or CO2 fire extinguisher.
	Never try to open or dismantle the battery. Electrolyte is very corrosive. In normal working conditions, contact with the electrolyte is impossible. If the battery casing is damaged do not touch the exposed electrolyte or powder because it is corrosive.
	Ensure adequate and secure mounting. Handle with care because batteries are sensitive to mechanical shock.

## SPECIFICATIONS

Model	MLS 12/80	MLS 12/130	MLS 12/260	MLS 12/390	MLS 24/260
Article number	65010006	65010010	65010020	65010030	65020010
Chemistry	Li Fe PO4, Lithium iron phosphate				
<b>Charge/discharge specifications</b>					
Nominal voltage	12.8 V	12.8 V	12.8 V	12.8 V	25.6 V
Nominal capacity	6 Ah	10 Ah	20 Ah	30 Ah	10 Ah
Nominal energy capacity	77 Wh	128 Wh	256 Wh	384 Wh	256 Wh
Maximum charge current	6 A (1C)	10 A (1C)	20 A (1C)	30 A (1C)	10 A (1C)
Maximum continuous discharge current	6 A (1C)	10 A (1C)	20 A (1C)	30 A (1C)	10 A (1C)
Maximum pulse (30s) discharge current	12 A (2C)	25 A (2C)	40 A (2C)	60 A (2C)	25 A (2C)
Charge Voltage Bulk/absorption	14.25 V	14.25 V	14.25 V	14.25 V	28.5 V
Charge voltage Float	13.5 V	13.5 V	13.5 V	13.5 V	27.0 V
Over voltage cut off limit	15.2 V	15.2 V	15.2 V	15.2 V	30.4 V
Under voltage cut off limit	9.2 V	9.2 V	9.2 V	9.2 V	18.4 V
<b>Mechanical specifications</b>					
Length (mm/inch)	90 mm / 3.5 in	151 mm / 5.9 in	180 mm / 7.1 in	182 mm / 7.2 in	180 mm / 7.1 in
Width (mm/inch)	70 mm / 2.8 in	65 mm / 2.6 in	77 mm / 3.0 in	127 mm / 5.0 in	77 mm / 3.0 in
Height excl. terminals (mm/inch)	103 mm / 4.1 in	97 mm / 3.8 in	154 mm / 6.1 in	134 mm / 5.3 in	154 mm / 6.1 in
Height incl. terminals (mm/inch)	109 mm / 4.3 in	103 mm / 4.1 in	160 mm / 6.3 in	140 mm / 5.5 in	160 mm / 6.3 in
Approximate weight	0.8 kg (1.8 lbs)	1.5 kg (3.3 lbs)	3.1 kg (6.8 lbs)	4.9 kg(10.8 lbs)	3.1 kg (6.8 lbs)
Terminal	Thread M5	Thread M5	Thread M5	Thread M5	Thread M5
<b>General</b>					
Parallel configuration	Yes (see section "Parallel Connection")				
Series configuration	No				
Nominal operating temp.	5 to 30 °C (41 to 86 °F), Recommended: 25 °C (77 °F)				
Max. operation temperature	-20 to 60 °C (-4 to 140 °F)				
Over temperature cut off	≥90 °C (194 °F)				
Storage temperature	-20 to 60 °C (-4 to 140 °F)				
Protection degree	IP65 (enclosure)				
Safety protections (BMS)	Integrated disconnect: Overvoltage, under voltage, over temperature				
Cell balancing	Yes, passive				
Warranty	2 years				
Self-discharge	<2% per month @ 20 °C (68 °F)				
Cycle life	>2500 cycles (@1C charge/discharge @100% DOD @20 °C, 80% capacity remaining)				

## General

Mastervolt MLS batteries must be installed and used in accordance with the instructions and specifications in this manual as well as DIN VDE 0510.

MLS batteries are protected against over voltage, under voltage or over temperature; see Trouble shooting section.

## Installation

- Prior to installation check MLS battery for mechanical damages and firmly tightened terminals.
- During installation all loads and chargers must be switched off.
- Installation in upright position is recommended. Installation on either long side (90°) is allowed
- Keep >2cm (>0.8 inch) space between the batteries.
- Keep away from heat sources. See specifications for allowed operation temperatures. Temperatures below 5 °C (41 °F) and above 30 °C (86 °F) may affect battery capacity, life time and cycle life.
- Clean the terminals before connection.
- Use properly sized and reliable cable lugs, battery terminals, terminal insulators and fuses. Tighten all connections firmly. Recommended torque for battery terminal connections: 2 to 3 Nm (18 to 27 InLbs).
- **Connect the Li-ion battery with correct polarity. The position of the battery terminals may differ from previous installed batteries!**
- Connect the minus cable last of all.
- The described MLS batteries can be used in parallel up to as many pieces as is needed to reach the required power/Wh. Batteries must be of the same type, capacity and state of charge. Do not mix old and new batteries. See section "Parallel Connection". Series connection is not permitted!

## Charging

MLS batteries must be fully charged before its first use. Use only chargers with IUoU characteristic. Charger settings, depending on battery nominal voltage 12 V / 24 V: absorption charge 14.25 V / 28.5 V; float charge 13.5 V / 27.0 V. Maximum charge current: 100% of nominal capacity (1C).

## Discharge

Maximum continuous discharge current: 100% of nominal capacity (1C). Maximum 30 sec pulse discharge: 200% of nominal capacity (2C). Do not discharge below the under voltage cut off limit.

## Maintenance

Check batteries and connections on a regular base, at least every three months. Defects such as loose or corroded connections must be corrected immediately. Keep the battery dry and clean. Use only a wet soft cloth to clean the battery. Never use any additives, acids and/or abrasives.

Do not open the battery.

## Trouble shooting

Failure	Possible cause	What to do
No battery voltage	High temperature	Let the battery cool down. Check installation environment.
	Battery discharged below under voltage cut-off limit	Disconnect load(s). Charge the battery.
	Charge voltage higher than overvoltage cut off limit	Check/reduce charge voltage.

## Storage

The Li-ion battery should be stored in a dry and well ventilated environment. The rate of self-discharge is less than 2% per month. Elevated environmental temperatures increase the self-discharge rate of the batteries and natural aging. If the Li-ion battery will not be used for a period exceeding 3 months, we advise:

- If external power is available: switch off all loads and switch on the charger. Apply a float voltage as specified in section 'Charging'
- If no external power is available: switch off all loads. In this setup the batteries can be kept at least 6 months without maintenance.

## Transportation warnings



The Li-ion battery must be transported in its original or equivalent package and in an upright position.

Never lift the battery at the terminals.

Batteries are tested according to UN Handbook of Tests and Criteria, part III, sub section 38.3 (ST/SG/AC.10/11/Rev.5).

For transport the batteries belong to the category UN3480, Class 9, Packaging Group II and have to be transported according to this regulation. This means that for land and sea transport (ADR, RID & IMDG) they have to be packed according to packaging instruction P903 and for air transport (IATA) according to packaging instruction P965. The original packaging satisfies these instructions.



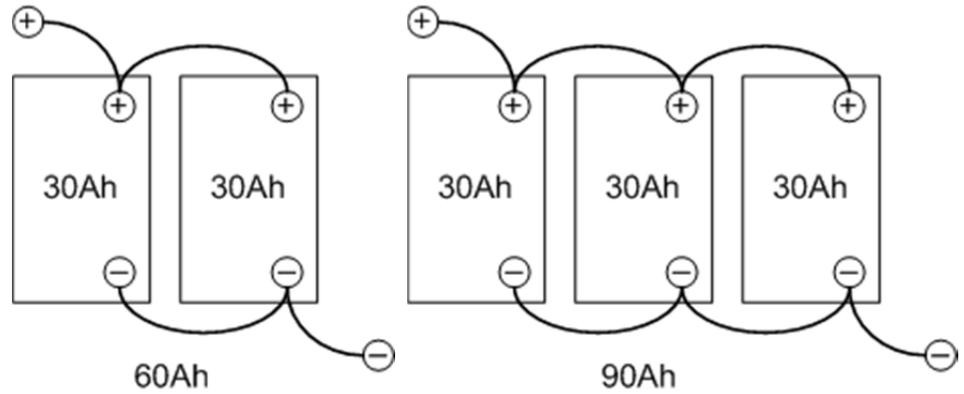
## Disposal of batteries

Used batteries are harmful to health and the environment. Therefore batteries may not be mixed with domestic or industrial waste but must be collected and recycled separately. Contact your supplier for recollection and recycling of batteries or contact an authorized waste management company.



# PARALLEL CONNECTION

Parallel connection



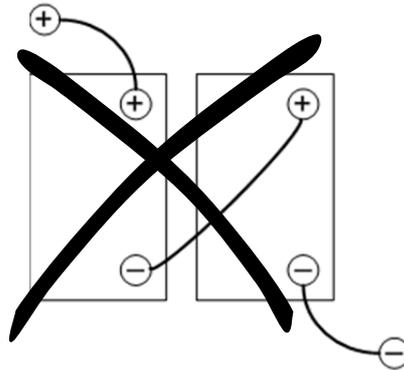
Connection of the plus and minus wiring must be crosswise.



Never conduct the total accumulated current via the battery poles! Always install a proper bus bar construction.



Series connection is not permitted!



**MASTERVOLT**  
THE POWER TO BE INDEPENDENT

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