

MASTERVOLT

USER'S MANUAL / GEBRUIKERSHANDLEIDING / BETRIEBSANLEITUNG
MODE D'EMPLOI / MANUAL DE UTILIZACION / INSTRUZIONI PER L'USO

Lithium-ion battery

MLS series: 12/80, 12/130, 12/260, 12/390 & 24/260



MASTERVOLT
Snijdersbergweg 93, 1105 AN Amsterdam
The Netherlands
Tel.: +31-20-342 21 00
Fax.: +31-20-697 10 06
www.mastervolt.com

10000010505/02

ENGLISH

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 | | | | |
| Charge/discharge specifications | | | | | |
| Nominal voltage | 12.8V | 12.8V | 12.8V | 12.8V | 25.6V |
| Nominal capacity | 6Ah | 10Ah | 20Ah | 30Ah | 10Ah |
| Nominal energy capacity | 77Wh | 128Wh | 256Wh | 384Wh | 256Wh |
| Maximum charge current | 6A (1C) | 10A (1C) | 20A (1C) | 30A (1C) | 10A(1C) |
| Maximum continuous discharge current | 6A (1C) | 10A (1C) | 20A (1C) | 30A (1C) | 10A(1C) |
| Maximum pulse (30s) discharge current | 12A | 25A | 40A | 60A | 25A |
| Charge Voltage Bulk/absorption | 14.25V | 14.25V | 14.25V | 14.25V | 28.5V |
| Charge voltage Float | 13.5V | 13.5V | 13.5V | 13.5V | 27.0V |
| Over voltage cut off limit | 15.2V | 15.2V | 15.2V | 15.2V | 30.4V |
| Under voltage cut off limit | 9.2V | 9.2V | 9.2V | 9.2V | 18.4V |
| Mechanical specifications | | | | | |
| Length (mm/inch) | 90mm / 3.5in | 151mm / 5.9in | 180mm / 7.1in | 182mm / 7.2in | 180mm / 7.1in |
| Width (mm/inch) | 70mm / 2.8in | 65mm / 2.6in | 77mm / 3.0in | 127mm / 5.0in | 77mm / 3.0in |
| Height excl. terminals (mm/inch) | 103mm / 4.1in | 97mm / 3.8in | 154mm / 6.1in | 134mm / 5.3in | 154mm / 6.1in |
| Height incl. terminals (mm/inch) | 109mm / 4.3in | 103mm / 4.1in | 160mm / 6.3in | 140mm / 5.5in | 160mm / 6.3in |
| Approximate weight | 0.8kg (1.8lbs) | 1.5kg (3.3lbs) | 3.1kg (6.8lbs) | 4.9kg(10.8lbs) | 3.1kg (6.8lbs) |
| Terminal | Insert M5 | Insert M5 | Insert M5 | Insert M5 | Insert M5 |
| General | | | | | |
| Parallel configuration | Yes, up to 3 (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.
- Max allowed batteries in parallel: 3. 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 12V/24V: absorption charge 14.25V/28.5V; float charge 13.5V/27.0V. Maximum charge current: 100% of nominal capacity (1C).

Discharge

Maximum continuous discharge current: 100% of nominal capacity (1C). Maximum 30 sec pulse discharge: 150% of nominal capacity (1.5C). 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.

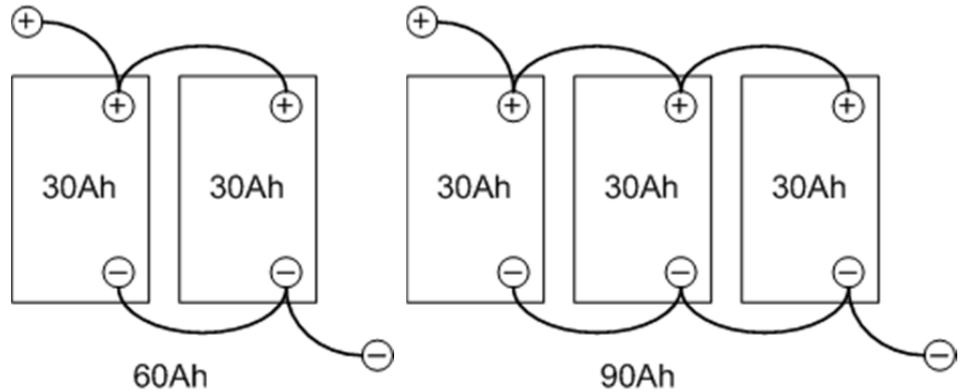


Disposal of batteries

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

Parallelschakeling
Parallel connection
Parallelschaltung
Connexion en parallèle
Conexión en paralelo
Collegamento in parallelo



Maximum number of batteries: 3
Maximum aantal accu's: 3
Maximale Anzahl an Batterien: 3
Nombre maximum de batteries : 3
Número máximo de baterías: 3
Numero massimo di batterie: 3

Connection of the plus and minus wiring must be crosswise.

Aansluiting van de plus- en min-bedrading moet diagonaal worden uitgevoerd

Der Anschluss der Plus- und Minus-Verdrahtung muss diagonal ausgeführt werden

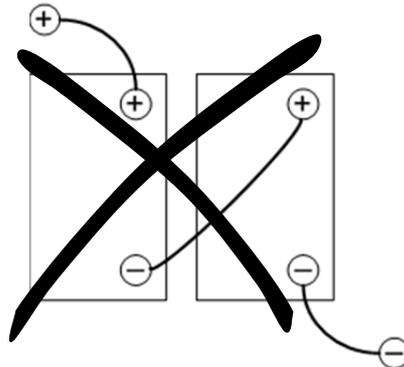
Les bornes de câblage plus et moins doivent être connectées de façon transversale

Las conexiones de los cables positivos y negativos deben ser del tipo de cruzamiento

Il cablaggio negativo e quello positivo devono essere incrociati



Series connection is not permitted!
Serieschakeling is niet toegestaan!
Reihenschaltung is nicht erlaubt!
Ne pas brancher en série !
¡No conecte la batería en serie!
Non collegare le batterie in serie



MASTERVOLT
THE POWER TO BE INDEPENDENT

© 2015, Mastervolt BV, Snijdersbergweg 93, 1105 AN Amsterdam, Netherlands
Tel: + 31-20-3422100 Fax: + 31-20-6971006 Email: info@mastervolt.com

Mastervolt cannot be held liable for possible errors in the manual and the consequences of these

Mastervolt kan niet aansprakelijk worden gesteld voor eventuele fouten in de handleiding en de gevolgen daarvan.

Mastervolt kann nicht haftbar gemacht werden für: eventuelle Fehler in der Anleitung und die daraus entstehenden Folgen.

Mastervolt décline toute responsabilité dans les cas suivants éventuelles erreurs dans le manuel et leurs conséquences.

En ningún caso Mastervolt asumirá responsabilidad alguna derivada de eventuales errores en el manual de instrucciones y sus posibles consecuencias.

La Mastervolt declina ogni responsabilità per eventuali errori o omissioni nelle istruzioni per l'uso e le conseguenze che ne derivano.