

## MG Master LV – Battery Management Controller

### General

The MG Master LV is the safety and control unit of the battery system. It protects the connected battery modules against over-charging, over-discharging, over-temperature, under-temperature and controls the balancing of the battery cells.

### Main features

- Integrated pre-charge circuit;
- Safety contactors in positive power path;
- High-Voltage Interlock Loop (HVIL) (only on M12 model);
- Internal event logging;
- CAN-Bus communication;
- State-Of-Health and State-Of-Charge tracking;
- Monitoring of all battery parameters (cell voltage, temperatures, balancing);
- DC distribution and fuse box;



### Battery system components

MG's Lithium-Ion battery system consists of the following components:

- One or more MG Master LV battery management controllers;
- One or more MG Lithium-Ion battery modules;

Consult MG Energy Systems B.V. for compatibility with the different battery types.

### Functional description

The main function of the BMS is to avoid electrical abuse of the battery cells and therefore it monitors different parameters to detect battery failures. This is key to lower the risks of using a Lithium-Ion battery system.

MG's system philosophy is to have one master BMS (MG Master LV) which communicates with slave BMS's (Lithium-Ion battery modules). The Slave BMS's are capable of monitoring the battery cell parameters like, cell voltage, cell temperature and balancing control. All these parameters are send to the MG Master LV via a separated CAN-Bus which collects all the data and monitors these parameters with different limits. When a parameter exceeds the limit this will first be communicated to the user (via the AUX. CAN-Bus). If the exceeded limit will stay, the MG Master LV has the possibility to disconnect the batteries from the system by opening its main contactors.



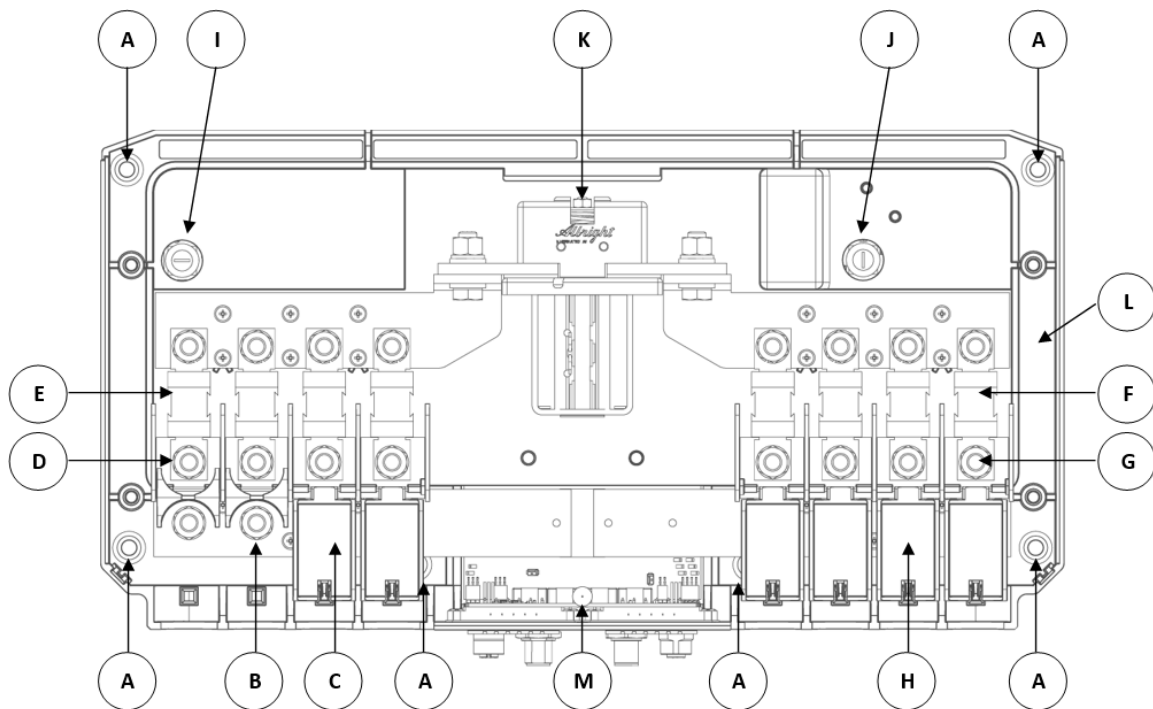
## Technical specifications: 24-48 V and 72-96 V Master LV's

Technical specifications	24-48 V 150 A MGMLV48X150	24-48 V 400 A MGMLV48X400	24-48 V 600 A MGMLV48X600	24-48 V 1000 A MGMLV48100X	72-96 V 500 A MGMLV96X500
Maximum number of connected batteries	96 battery modules of type LFP, HE, UHE, HP or 48 battery modules of type RS				
Supply voltage range	18 ... 58 VDC				40 ... 120 VDC
Standby mode power usage	73 mW @ 26,2 V and 138 mW @ 52,4 V				< 2 mW
Active mode power usage	8,7 W				5,6 W
Main safety contactor current continuous	150 A	400 A	600 A	1000 A	500 A
Communication	CAN-Bus (Victron VE.CAN, NMEA2000, SMA)				
<b>IO</b>					
Aux. output	13,5 V / 1 A, short circuit protection, overcurrent protection				
Allow-to-charge (switched voltage)	13,5 V / 1 A, short circuit protection, overcurrent protection				
Allow-to-discharge (switched voltage)	13,5 V / 1 A, short circuit protection, overcurrent protection				
Allow-to-charge (relay output)	0,8 A @ 60 VDC, potential free				
Allow-to-discharge (relay output)	0,8 A @ 60 VDC, potential free				
Programmable contact (relay output)	0,8 A @ 60 VDC, potential free				
External status signal	13,5 V / 140 mA short circuit protection, overcurrent protection				
Emergency shutdown input (available on M12 CAN-bus connectors)	Emergency shutdown to open main contactor hardwired.				
<b>Enclosure</b>					
Material	ABS (reinforced)				
Dimensions	426 x 225 x 117 mm				
Weight	3,8 kg	4,6 kg	5,7 kg	9,4 kg	4.6 kg
<b>Enviromental</b>					
Operating temperature range	-20 °C to 50°C				
Humidity	Max. 95% (non-condensing)				
Protection class	IP22				
<b>Standards</b>					
EMC: Emission	EN-IEC 61000-6-3:2007/A1:2011/C11:2012				
EMC: Immunity	EN-IEC 61000-6-1:2007				
Low voltage directive	EN 60335-1:2012/AC:2014				
RoHs	EN 50581:2012				

## Technical specifications: 12 V Master LV's

Technical specifications	12 V 150 A	12 V 400 A	12 V 600 A	12 V 1000 A
	MGMLV120150	MGMLV120400	MGMLV120600	MGMLV121000
Maximum number of connected batteries	96 battery modules of type MGLFP120210			
Supply voltage range	8 ... 15 VDC			
Standby mode power usage	63 mW			
Active mode power usage	10.3 W			
Main safety contactor current continuous	150 A	400 A	600 A	1000 A
Communication	CAN-Bus (Victron VE.CAN, NMEA2000, SMA)			
<b>IO</b>				
Aux. output	13,5 V / 1 A, short circuit protection, overcurrent protection			
Allow-to-charge (switched voltage)	13,5 V / 1 A, short circuit protection, overcurrent protection			
Allow-to-discharge (switched voltage)	13,5 V / 1 A, short circuit protection, overcurrent protection			
Allow-to-charge (relay output)	0,8 A @ 60 VDC, potential free			
Allow-to-discharge (relay output)	0,8 A @ 60 VDC, potential free			
Programmable contact (relay output)	0,8 A @ 60 VDC, potential free			
External status signal	13,5 V / 140 mA short circuit protection, overcurrent protection			
<b>Enclosure</b>				
Material	ABS (reinforced)			
Dimensions	426 x 225 x 117 mm			
Weight	3,8 kg	4,6 kg	5,7 kg	9,4 kg
<b>Environmental</b>				
Operating temperature range	-20 °C to 50°C			
Humidity	Max. 95% (non-condensing)			
Protection class	IP22			
<b>Standards</b>				
EMC: Emission	EN-IEC 61000-6-3:2007/A1:2011/C11:2012			
EMC: Immunity	EN-IEC 61000-6-1:2007			
Low voltage directive	EN 60335-1:2012/AC:2014			
RoHs	EN 50581:2012			

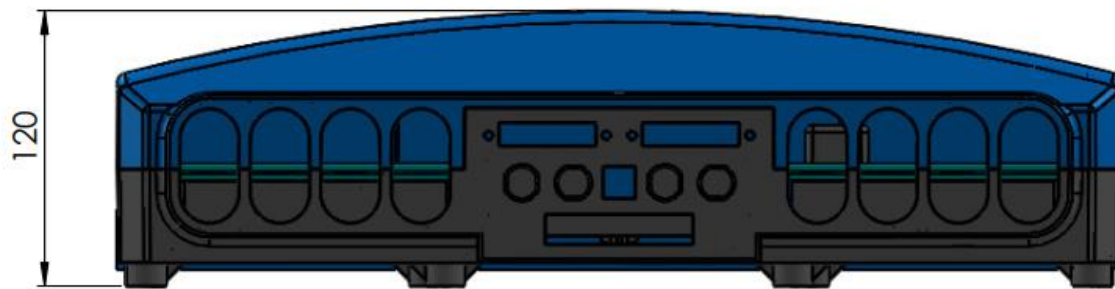
## Connection overview



Part	Description
A	Mounting holes
B	'-' minus battery connections (M8 bolt connections)
C	Plastic insulation part
D	'+' positive battery connections (M8 bolt connections)
E	Battery side fuses
F	Loads/Chargers side fuses
G	'+' positive Loads/Chargers connections (M8 bolt connections)
H	'-' minus Loads/Chargers connections (below plastic insulator) (M8 bolt connections)
I	Fuse of main control unit (Fuse 5X20mm Fast acting 250V 6,3A; Eska: 520.525)
J	Pre-charge fuse (Fuse 5X20mm Fast acting 250V 10A; Eska: 520.527)
K	Safety contactor (can be 150A/400A/600A/1000A)
L	Bluetooth Smart (NFC antenna )
M	Status LED

## Dimensions

Dimensions in mm.



## Ordering information

### Master LV for 12 V systems

Product	Article number
MG Master LV 12V/150A	MGMLV120150
MG Master LV 12V/400A	MGMLV120400
MG Master LV 12V/600A	MGMLV120600
MG Master LV 12V/1000A	MGMLV121000

### Master LV for 24 V and 48 V systems

Product	Article number
MG Master LV 24-48V/150A	MGMLV480150
MG Master LV 24-48V/150A (M12)	MGMLV481150
MG Master LV 24-48V/400A	MGMLV480400
MG Master LV 24-48V/400A (M12)	MGMLV481400
MG Master LV 24-48V/600A	MGMLV480600
MG Master LV 24-48V/600A (M12)	MGMLV481600
MG Master LV 24-48V/1000A	MGMLV481000
MG Master LV 24-48V/1000A (M12)	MGMLV481001

### Master LV for 72 V and 96 V systems

Product	Article number
MG Master LV 72-96V/500A	MGMLV960500
MG Master LV 72-96V/500A (M12)	MGMLV961500