



MG Master HV – Battery Management Controller

General

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

The system works stand-alone and requires no user interactions during normal operation. If, however, user input is required, e.g. during an error, a warning is raised. Actions required depending on the type of warning.



Features

- Integrated pre-charge circuit;
- Safety contactors in positive and negative power paths;
- High-Voltage Interlock Loop (HVIL);
- Internal event logging;
- CAN-Bus communication;
- State-Of-Health and State-Of-Charge tracking;
- Monitoring of all battery parameters (cell voltage, temperatures, balancing);

Battery system components

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

- One or more MG Master HV battery management systems (**MG Master HV 900V-500 - MGMHV800500 or MG Master HV 900V-300 - MGMHV800300**);
- One or more Lithium-Ion battery modules (NMC, HE or HP 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 limit the risk of thermal abuse coming from electrical origin. In order to avoid electrical abuse the BMS monitors different parameters to detect battery failures.

MG's system philosophy is to have one master BMS, e.g. a MG Master HV, per string of battery modules which communicates with one or more slave BMSs integrated in the Lithium-Ion battery module(s). The slave BMSs are monitoring the battery cell parameters like, cell voltage, cell temperature, and humidity inside the enclosure. Besides monitoring, the slave BMS also controls balancing of cells based on the input of the master BMS.



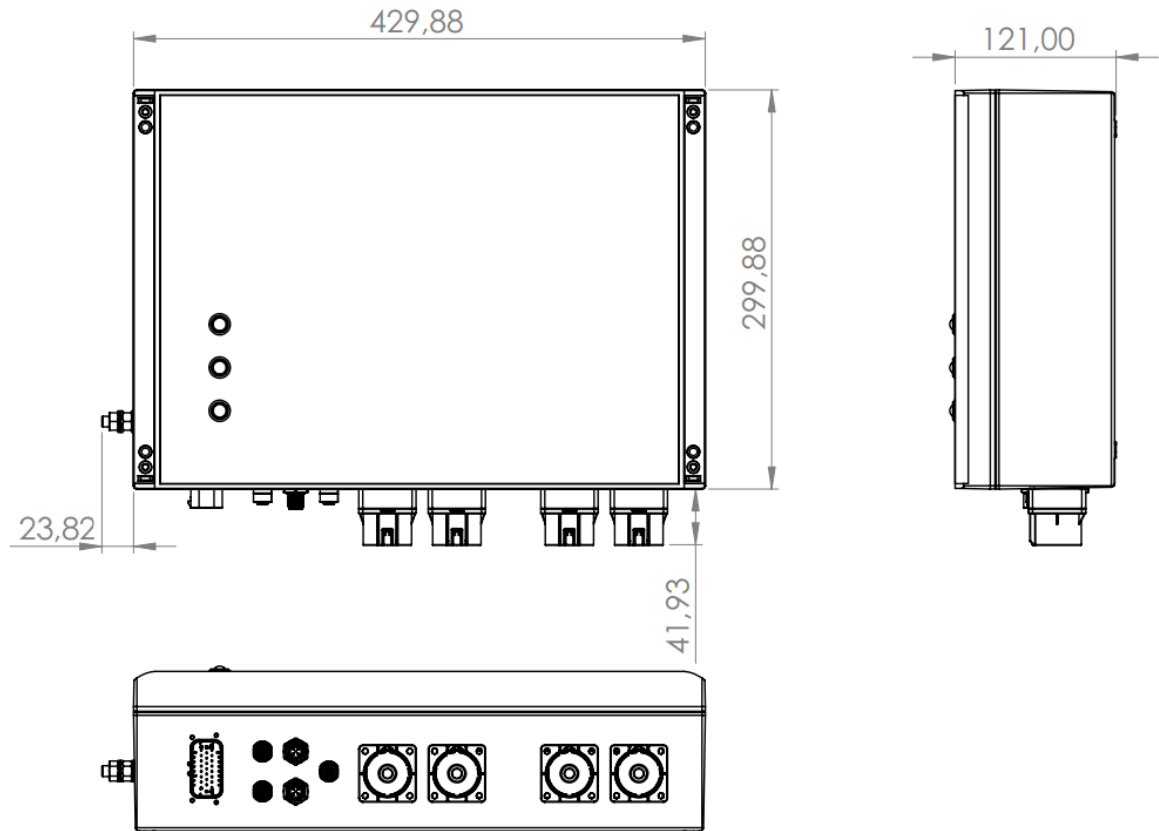
All these parameters are sent to the MG Master HV via a dedicated CAN-bus which collects all the data and monitors these parameters with different thresholds. When a parameter exceeds the threshold this will first be communicated to the user via the, separated, auxiliary CAN-bus. If the exceeded threshold stays, the master BMS has the possibility to disconnect the batteries from the system by opening the main contactors.

Technical specifications

Technical specifications	MG Master HV 800V - 300 MGMHV800300	MG Master HV 800V - 500 MGMHV800500
Supply voltage	24 VDC (18 VDC to 32 VDC)	24 VDC (18 VDC to 32 VDC)
Supply current	2,5 A	2,5 A
Maximum HV voltage	900 VDC	900 VDC
Maximum HV current continuous	300 A	500 A
Weight	11 kg	11 kg
Dimensions (lxwxh)	430x329x121 mm	430x329x121 mm
Features		
Fuse	No, external fuse need to be added	No, external fuse need to be added
Integrated main contactors	2x contactor (in positive and negative HV line)	2x contactor (in positive and negative HV line)
Integrated pre-charge circuit	Yes	Yes
Event logging	Internal event logging memory	Internal event logging memory
Input/Output		
Emergency switch connection	Yes	Yes
Allow-to-charge (relay output)	Max. 30 VDC fused 1,5 A	Max. 30 VDC fused 1,5 A
Allow-to-discharge (relay output)	Max. 30 VDC fused 1,5 A	Max. 30 VDC fused 1,5 A
Programmable output (relay output)	Max. 30 VDC fused 1,5 A	Max. 30 VDC fused 1,5 A
Digital input 1	24 VDC, 5 mA	24 VDC, 5 mA
Digital input 2	24 VDC, 5 mA	24 VDC, 5 mA
Digital input 3	24 VDC, 5 mA	24 VDC, 5 mA
Environmental		
Operating temp. charge	-20 to +50 °C	-20 to +50 °C
Humidity	Max. 95% (non-condensing)	Max. 95% (non-condensing)
IP-Protection class	IP 65	IP 65
Connections		
Power connections	Amphenol PowerLok 300 series	Amphenol PowerLok 500 series
CAN-Bus connection (batteries)	2x M12	2x M12
CAN-Bus connection (aux.)	2x M12	2x M12
Diagnostic port (CAN-Bus)	1x M12	1x M12
Standards		
EMC: Emission	CISPR 16-2-1:2014, CISPR 16-2-3+A1+A2:2010	
EMC: Immunity	IEC 60533:2015, IEC 61000-4-2:2008, IEC 61000-4-3+A1+A2, IEC 61000-4-4:2012, IEC 61000-4-5:2014, IEC 61000-4-6:2013	

Dimensions

Dimensions in mm.



Ordering information

There are two models of the MG Master HV. The **MGMHV800500** and **MGMHV800300**.

	MGMHV800300	MGMHV800500
Connector series	Amphenol PowerLok® 300-Series	Amphenol PowerLok® 500-Series
Maximum current	300 A ¹	500 A ¹

¹ Maximum current is depending on the cross section of the connected battery cables.

The differences between the two models are the power connectors. The table below shows an overview of the connector types in relation with the models and the maximum current.

MGMHV800500 – power connectors		
Brand	Amphenol PowerLok®	
Series	500 series	
	Positive terminal (orange)	Negative terminal (black)
Receptacle types (mounted on MG Master HV)	PL00X-501-10-M10	PL00Y-501-10-M10
Plug types <ul style="list-style-type: none"> - HVIL type required. - Use only straight versions. - Over-molded cable assembly only. 	Over-molded cable assembly: PL10X-501-120: 350A PL10X-501-135: 400A PL10X-501-150: 500A	Over-molded cable assembly: PL10Y-501-120: 350A PL10Y-501-135: 400A PL10Y-501-150: 500A

MGMHV800300 – power connectors		
Brand	Amphenol PowerLok®	
Series	300 series	
	Positive terminal (orange)	Negative terminal (black)
Receptacle types (mounted on MG Master HV)	PL00X-301-10-M10	PL00Y-301-10-M10
Plug types <ul style="list-style-type: none"> - HVIL type required. - Use only straight versions. 	Over-molded cable assembly: PL10X-301-35: 150A PL10X-301-50: 200A PL10X-301-70: 250A PL10X-301-95: 300A Plug connector: PL18X-301-35: 150A PL18X-301-50: 200A PL18X-301-70: 250A	Over-molded cable assembly: PL10Y-301-35: 150A PL10Y-301-50: 200A PL10Y-301-70: 250A PL10Y-301-95: 300A Plug connector: PL18Y-301-35: 150A PL18Y-301-50: 200A PL18Y-301-70: 250A