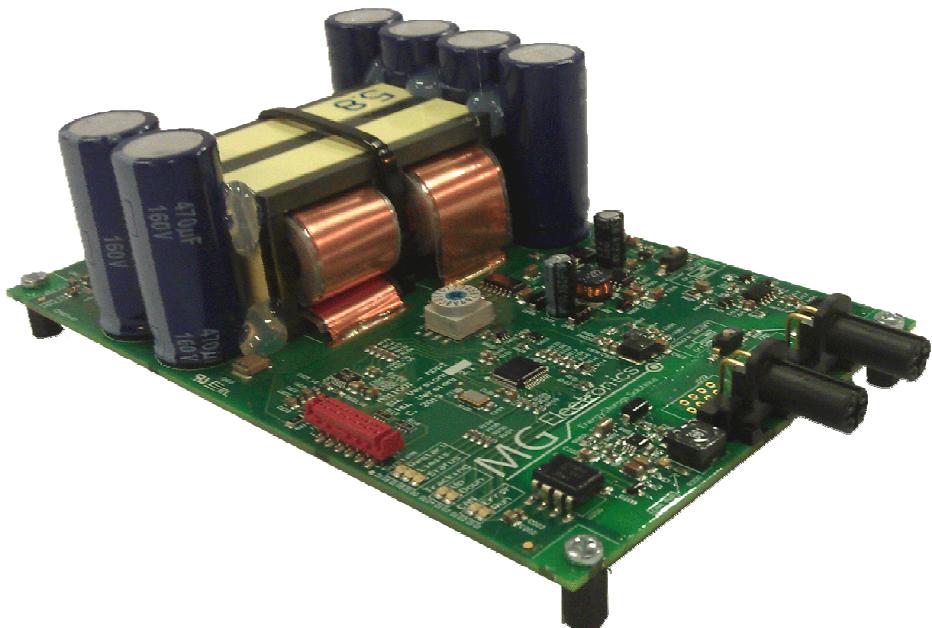


MANUAL

MG Solar MPPT



Type	:	MG11001-MPPT v2.1
Date	:	19-05-2014
Manual Version : 1.1		

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2 PREFACE

The manufacturer is never responsible for any damage caused by use which is in violation with the contents of this manual.

For that reason we advise you to read this manual carefully, before using the system. In case of any questions, please don't hesitate to contact the dealer or manufacturer.

Safety instructions and warnings in this manual will be marked by the following pictogram.



CAUTION !

Operation procedures, practices, etc. which, if not carefully followed, could result in damage to the system.

The numbered instructions in this manual have to be carried out in that same mentioned numbered sequence, without missing out one or more.

MG Electronics cannot be held responsible for any damage due to information in documentation of component suppliers

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3 INTRODUCTION

3.1 General description

The MG Maximum Power Point Tracker (MPPT) is developed to convert the voltage of a PV-panel to a higher battery voltage(boost converter).

The MG MPPT has some special functions:

- Ultra-fast MPPT algorithm that anticipates on fast changes in light intensity;
- High converter and tracking efficiency;
- MCU power supplied by the battery;
- Low quiescent current when in shutdown;
- Suitable to charge Lithium-Ion batteries;
- On/Off control by switching the CAN-Bus supply voltage;
- CAN-Bus interface;
- Power level control for adjusting charge power if the battery is fully charged;

3.2 Overview

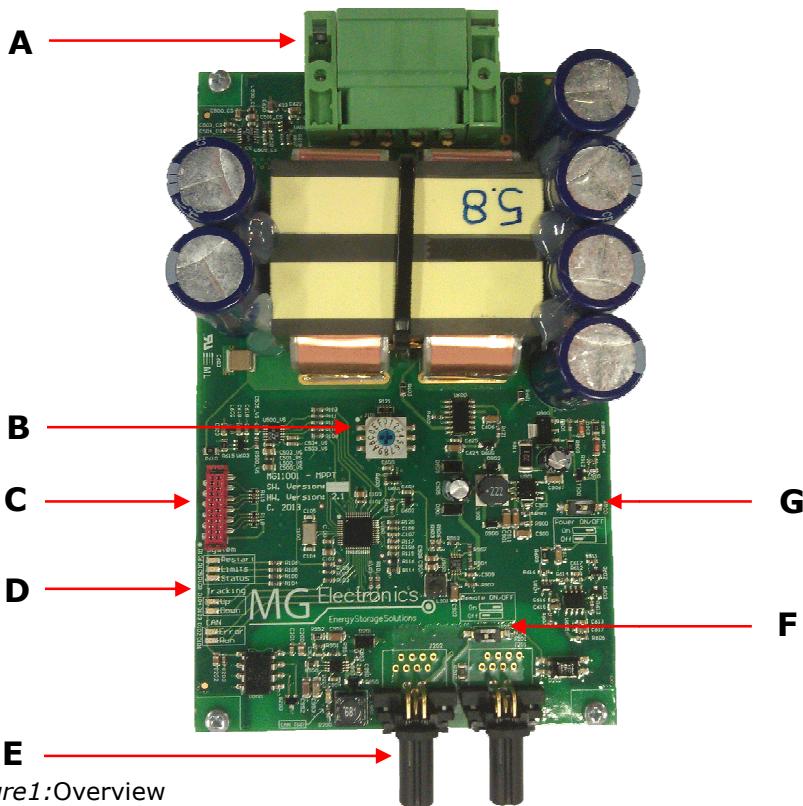


Figure1:Overview

Overview		
Connector	Description	Used for
A	Power connector	Connector for the PV-panel and the battery.
B	CAN ID rotary switch	Rotary switch to set the CAN address of the MPPT (0-15).
C	MCU JTAG/ISP connector	Connector that can be used to program/debug the MPPT.
D	Status LED's	LEDs that show the current status of the MPPT.
E	CAN Connectors	Two connectors to connect the MPPT to the CAN-bus.
F	CAN Remote enable DIP Switch	Switch to enable/disable MPPT with the CAN bus power.
G	Power enable DIP-switch	Switch to enable/disable MPPT with the battery power.

3.3 Specifications

General	
Type	MG11001 v2.1
PV-panel voltage range	22 – 60 VDC*
Input power range	2 – 250 W
Maximum input current	6,5 A*
Battery voltage range	25 – 60 VDC*
Output voltage (charge voltage)	51 VDC*
Peak efficiency	99%
Output to input ratio range	1,0 – 3,5
CAN-bus supply voltage	10 – 60 VDC
Weight	300g*
Temperature	
Operating temperature	-20 °C to +65 °C

*depends on configuration. See label on MPPT for details.

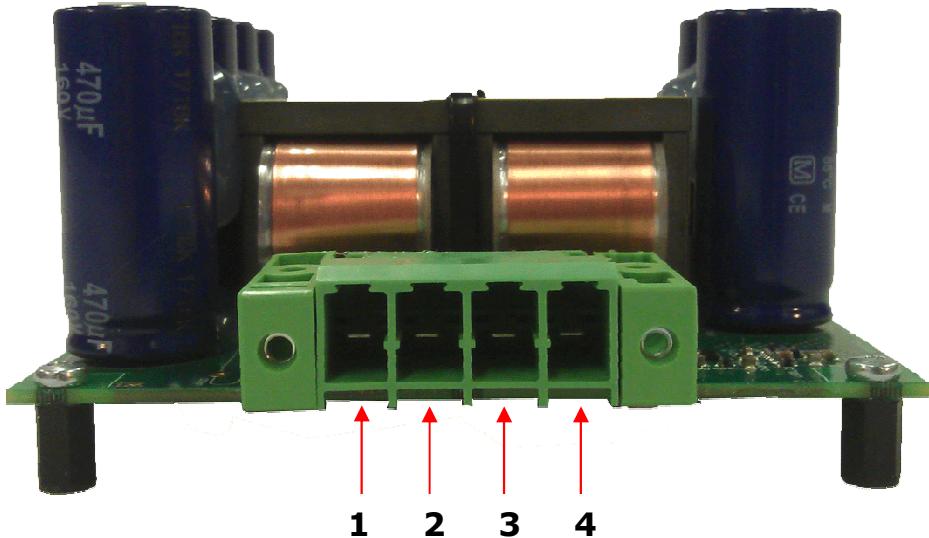
3.4 Maximum voltages

The MPPT will start tracking when **both** the PV-panel and the battery have reached a minimum level of 22V. When there is only a solar panel connected to the MPPT the voltage on the output will reach the maximum battery voltage. This voltage is also stated on the label on the back of the MPPT.

4 CONNECTIONS

The MPPT has four connectors, one power connector for the PV-panel/battery, two CAN connectors and a connector to program the MPPT.

4.1 Power Connector



Power Connector	
Pin no.	Description
1	- Battery
2	+ Battery
3	+ PV Panel
4	- PV Panel

4.2 CAN Connector

CAN Connector	
Pin no.	Description
1	Shield
2	V+ (Positive supply)
3	V- (Negative supply)
4	CAN High
5	CAN Low

5 USER INSTRUCTIONS

For proper use of the MPPT follow the instructions in this chapter.

5.1 Using the MPPT

There is only one correct way to connect the MPPT to the system. If these instructions aren't followed it can damage the MPPT. You always have to make sure the battery is pre-charged to the MPPT to prevent a high inrush current ($>100A$) destroying the power connector and output capacitors.

5.1.1 Connecting the MPPT to the battery

Before the battery can be connected to the MPPT, the two systems have to be on the same voltage. This is generally done by pre-charging the capacitors of the MPPT with a low current signal from the battery. When the battery and the MPPT are within 10V from each other, the two systems can be connected.

5.1.2 Connecting the MPPT to the PV-panel

The PV-panel can directly be coupled to the MPPT. This is because the PV-panel is current limited and the parasitic capacitance of the panel is very low ($<100\mu F$). This still can lead to inrush currents of $>10A$.

5.1.3 MPPT shutdown

The MPPT can remotely be switched on/off by the power supply of the CAN-bus ("Remote" ON/OFF switch). The "Power ON/OFF" switch can be used to turn on the MPPT and bypassing the "Remote" ON/OFF switch. When the MPPT is in shutdown mode, the quiescent current is equal to a 3.3M resistor.

DIP-Switch shutdown table		
Power switch	Remote switch	MPPT status
Off	Off	Off
Off	On	On
On	Off	On
On	On	On

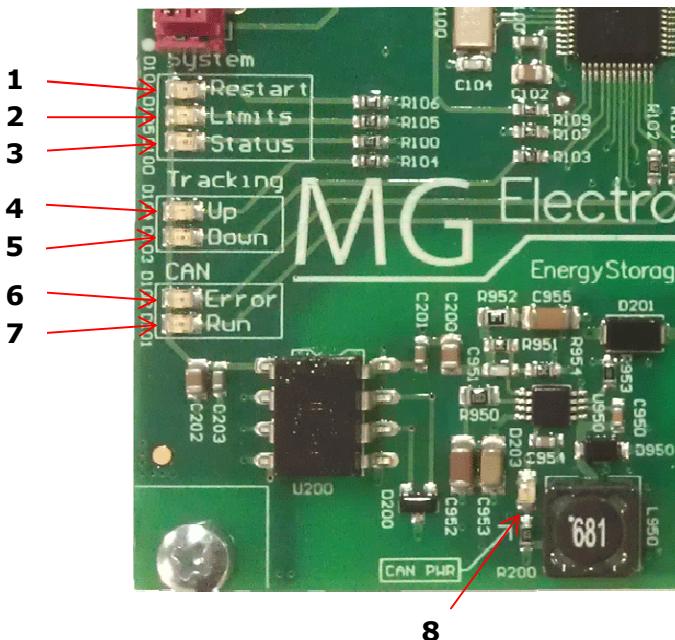
CAUTION!



Never connect the MPPT to the battery without pre-charging.

5.2 Status LED's

There are a total of 8 status LED's on the MPPT.



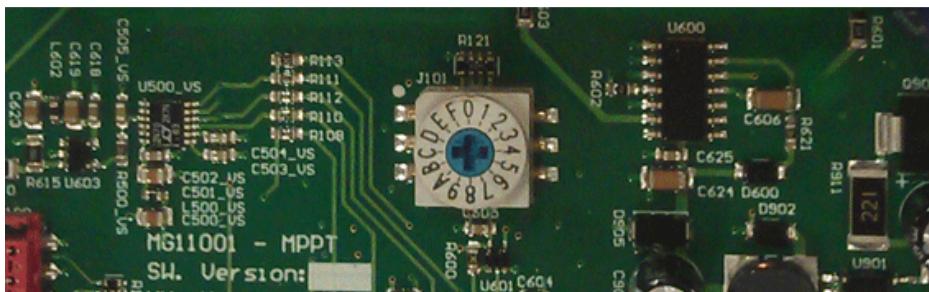
No.	Silkscreen	Description
1	Restart	If the initialization failed the MPPT will restart. This mainly happens when the battery voltage is within range but the PV-panel voltage is <22V.
2	Limits	PV-panel output current is <1A.
3	Status	System OK, and tracking.
4	Up	Tracking up.
5	Down	Tracking down.
6	Error	CAN error. Passive error and Bus off.
7	Run	CAN bus is detected and running properly.
8	CAN PWR	CAN supply voltage OK.

6 CAN PROTOCOL

The MPPT is delivered with two CAN-bus connectors. The specifications of the CAN-bus are provided in this chapter. The baud rate of the CAN-bus is 250Kbps.

6.1 CAN address

The MPPT broadcasts two CAN messages every 500ms. The offset of the CAN base ID can be set by the rotary switch that is in the center of the MPPT. The switch makes it possible to add a number of 0-15 (0-F) to the base ID. For example: if CAN ID is set to 3 then the addresses of the messages will be 0x186 and 0x286.



6.2 CAN messages

MPPT CAN broadcast messages					
CAN Base ID	Interval	Byte	Name	Type	Unit
0x183	500ms	Byte 0-3	Current IN	FLOAT	A
		Byte 4-7	Voltage IN	FLOAT	V
0x283		Byte 0-3	Voltage OUT	FLOAT	V
		Byte 4-7	Power IN	FLOAT	W

The MPPT can also receive a CAN message to adjust the power level.

MPPT CAN receive messages					
CAN Base ID	Range	Byte	Name	Type	Unit
0x202	0-100	Byte 0	Power Level	UN8	%

Standard the MG Solar Battery send the power level message over the CAN-Bus to reduce charge current when the battery is almost fully charged.



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