

3KVA to 30KVA interleaved switching MPPT

Specification:

| | | |
|---|---|-----------------|
| Control device | - | DSP |
| Switching device | - | IGBT module |
| Input panel voltage | - | 90V to 850V |
| Power | - | 3KVA to 30KVA |
| Switching frequency | - | 20KHz per phase |
| Resultant switching frequency of four phase interleaved switching | - | 80KHz |

Maximum buck - 370V to 80V*

*Panel VOC – 440V (VOC 44V X 10 nos in series) and VMP 370V.

Battery voltage – 96V (12V X 8 nos in series). In fully discharged condition – 80V

The unit will buck from 370V to 80V.

In this buck condition, if the panel current is 10A the battery charging current will be 46A.

IGBT module power stage – The unit is designed in a way, when you use one IGBT module and one inductor you can make up to 7.5KVA, with two IGBT modules and two inductors you can make up to 15KVA and with four IGBT modules and four inductors you can go up to 30KVA.

In the control board, the appropriate number of drivers should be used, if only one IGBT module is used you can use only one driver in the control board. In this case, when you use only one IGBT module, there will not be interleaved switching. When you use two IGBT modules you will get two phased interleaved switching (each drive 180 degree out of phase) and when you use four IGBT modules you will get four phased interleaved switching (each drive 90 degree out of phase).

If you want to make lower KVA but using four phased interleaved switching, use four IGBT modules and four inductors, with low current IGBT modules and low current inductors.

MPPT tracking method –

MEDI's tracking method of MPPT is our very own software algorithm. Our method of tracking is a hybrid method in which we are tracking both the percentage of VOC and perturb and observe at the same time. Doing this, the tracking efficiency achieved will be above 99% at low or high panel current and in low or high panel temperature or any other parameter that can change the VMP.

CCCV four-level battery charger with temperature compensation and MCCV to the load -

Four-stage battery charger with Constant Current Constant Voltage (CCCV) means until the battery reaches full charge voltage the MPPT will give constant current to the battery. After reaching full charge voltage, the MPPT will give constant voltage to the battery and the current will reduce. When the current reaches 10% of the full charge current, the MPPT will cut-off the battery current and wait for the voltage drop to the trickle charge voltage. When the battery voltage drops to the trickle charge level, the MPPT will maintain the battery voltage in the trickle charge level by giving a trickle charging current, which will be in milli-amps. Simultaneously, MPPT will give maximum current and constant voltage to the load. At this point, the voltage will be the same as the trickle charge voltage.

Temperature compensated charging -22mV to -30mV per Deg C per battery (settable).

Internal monitoring and recording of data like panel current, panel voltage, battery current, battery voltage is done using RTC and flash memory with year, month, date, day, hour, minute with leap year correction.

Every 55 micro-second the unit will read various data. Average of these samples will be taken and the display on the LCD. This averaged data is also used for data logging as well as uploading to remote server. Even if the data is not uploaded to remote server data can be stored for six years which can be monitored / downloaded in a computer or uploaded to the remote server.

A four line LCD will display the following parameters –

- Panel current
- Panel voltage
- Panel power in Watt
- Battery voltage
- Battery charging current
- Total output current (load current + battery current)
- Total energy used in KWH
- Excess panel voltage
- Excess panel current
- Excess load current
- Excess temperature
- Short circuit trip

Protections –

- Panel input high voltage – usually the panel voltage should be equal or lesser than the rated voltage of the MPPT. But if accidentally, the connected panel is more voltage than the MPPT's rated voltage, it will be protected.

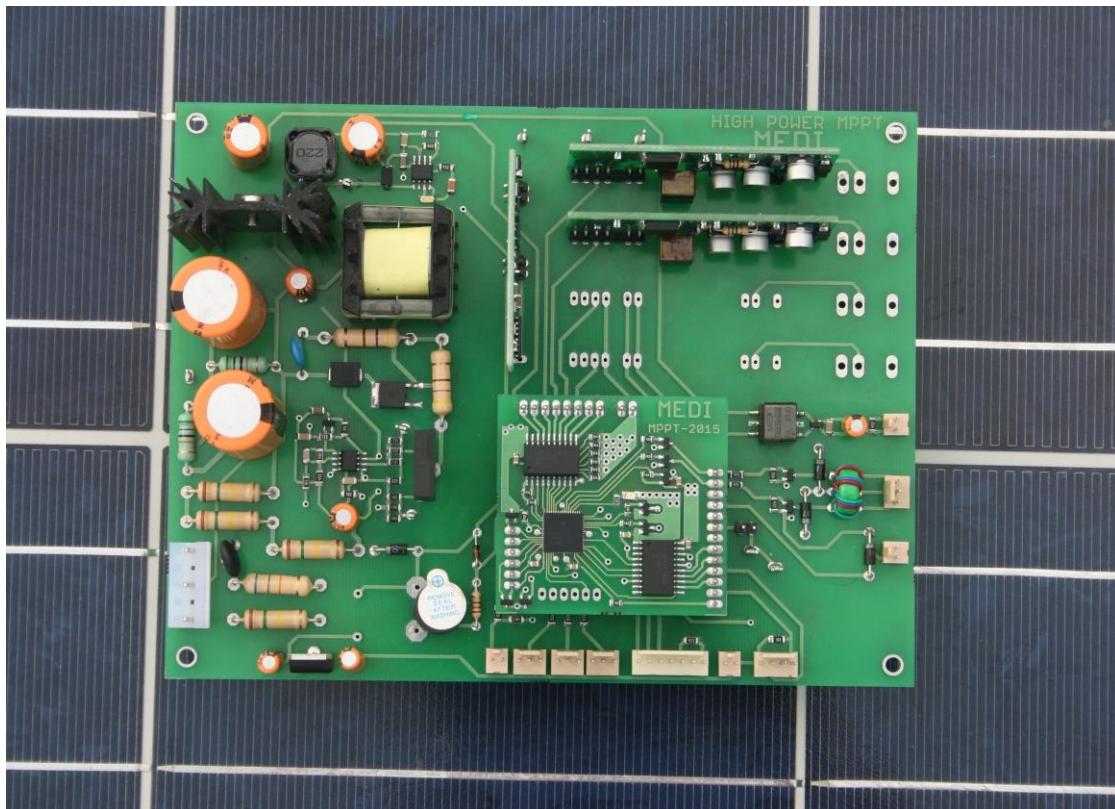
- Lightning surges at panel input – due to lightning, high voltage spikes coming to the panel input will be suppressed.
- Accidental high current panel connection – usually the panel current and VA should be equal or lesser than the rated current and VA of the MPPT. But if accidentally, the connected panel is more current and more VA than that of MPPT, the MPPT will limit the current and indicate “Over-rated panel” in the LCD.
- Battery full charge cut off

Material cost of 30KVA MPPT solar charger is approx. Rs.25000

The cost of MEDI's programmed DSP control module is Rs.2000.

Technical know-how cost is Rs.8 lacs.

A discount of Rs.5 lac is available to all companies that have purchased MEDI's eight phased interleaved switching up to 10KVA.



Assembled PCB