ZERO DROP SOLAR CHARGER

MEDI's low cost zero drop solar chargers are available in various ranges 12V to 120V and 5A to 60A which is compatible with MEDI's inverter design and can be used with other inverter designs as well.

These chargers are called 'zero drop solar chargers' as they do not have any diode drop of 0.7V. This is a MOSFET based design which has very negligible voltage drop of 0.05V or less which means the loss is very less, ideal for solar applications.

Since the drop is less, the losses are negligible so the efficiency achieved is > 99.5%.

This is a micro-controller based charger, the micro-controller will sense the battery full charge voltage and will cut-off the battery when it reaches full charge. It will reconnect the battery if the battery drops to a preset level. The charger will also disconnect the panel from the battery, this is to avoid the reverse current flow from the battery to the panel during night. Moreover, if you connect the panel reverse, the micro-controller will not switch on the charger, similarly if you connect the battery reverse, the charger will not function. Battery reverse and panel reverse protections are incorporated in the design. If you connect both panel and battery reverse at the same time, the micro-controller will not switch on the charger. In all the above cases, the circuit will not damage and there will not be any current flow from the panel or battery.

MEDI has recently upgraded zero drop solar chargers to SMD version for 12V and 24V with a few improvements. The design has opto-coupler based signal sensing which makes it completely isolated and there will be no grounding issues. Two stage higher voltage regulator is incorporated in this design to withstand open circuit voltage of the panel.

The new SMD PCB is also smaller than our through-hole version.
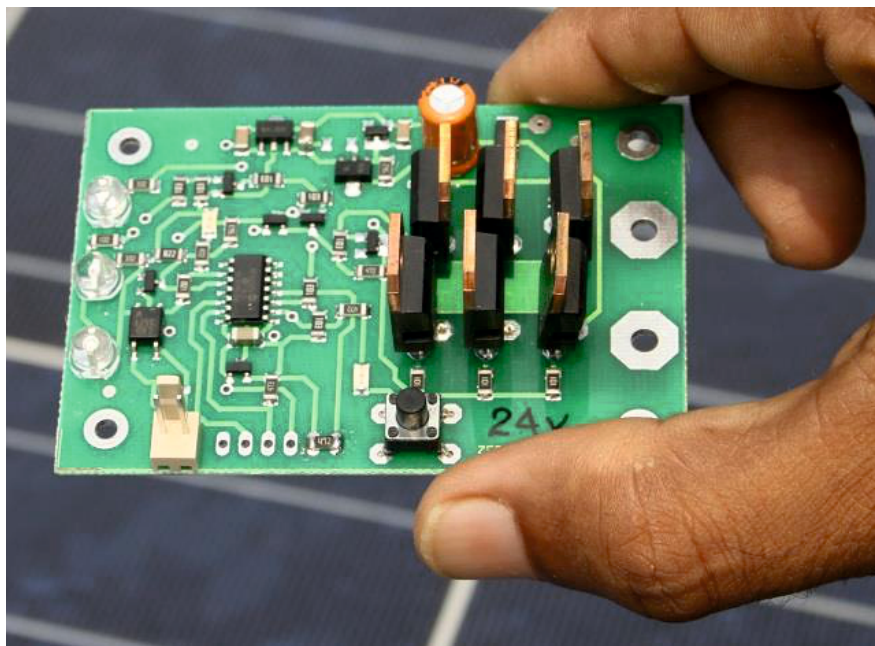
SMD component based PCB for 12V/24V

SPECIFICATION

VOLTAGE	-	12V - 96V
CURRENT	-	10A - 80A
EFFICIENCY	-	> 99.5%
PROTECTIONS AGAINST	-	Battery reverse
		Panel reverse
		Battery Overcharge (full charge cut-off level is settable)
		Battery current reverse flow to panel (during nights)
INDICATIONS	-	Battery reverse LED
		Panel reverse LED
		Charging LED
		Opto-Coupler output for Charging signal to external circuits (like inverters)

ZERO DROP SOLAR CHARGER PRICE LIST

Sl.No	PARTICULARS	CAPACITY	NEW PRICE
1	ZERO DROP SOLAR CHARGER	12V/10A	475.00
2	ZERO DROP SOLAR CHARGER	24V/10A	475.00
3	ZERO DROP SOLAR CHARGER	12V/30A	750.00
4	ZERO DROP SOLAR CHARGER	24V/30A	750.00
5	ZERO DROP SOLAR CHARGER	12V/60A	1,000.00
6	ZERO DROP SOLAR CHARGER	24V/60A	1,000.00
7	ZERO DROP SOLAR CHARGER	36V to 96V/10A	2,350.00
8	ZERO DROP SOLAR CHARGER	36V to 96V/25A	2,850.00
9	ZERO DROP SOLAR CHARGER	36V to 96V/30A	3,300.00
10	ZERO DROP SOLAR CHARGER	36V TO 96V/40A	3,500.00
11	ZERO DROP SOLAR CHARGER	36V to 96V/50A	3,750.00
12	ZERO DROP SOLAR CHARGER	36V to 96V/60A	4,300.00
13	ZERO DROP SOLAR CHARGER	36V to 96V/80A	4,600.00

The Minimum Quantity of Zero Drop Solar Charger we supply is 5 nos.

N.B**: Please note that Sales Tax charges and delivery charges are exclusive.

Setup Mode

The system need to sense the battery full charge voltage and do the panel calibration. For this a setup mode is to be run. This is done as below:

To avoid accidental entry to setup a simple procedure is to be followed.

1. Take a variable voltage power supply. Set the output of the supply to the desired battery full voltage level. For example for 12V (single battery) system the full charge voltage is 1 4.0V
2. Connect the supply to the PCB to the terminals OUTPUT- and +COMMON. Press the switch SW1 and **then only** switch on the power supply.
3. Now the LED3 will turn on for few seconds. DO NOT release the switch until the LED is turned off. When the LED turn off release the switch without much delay.
4. Wait for a while. The system will do the setup automatically. As an indication of the successful completion of setup the LED will be blinked in **high speed** for a while and after that start blinking at **low speed**. This is an indication of successful setup.
5. Now the setup is complete.

Important

The circuit will not function without battery. Panel connected to the circuit and a load connected instead of battery is not a proper connection. When battery is absent the microcontroller power will not be stable and it will lead to unpredictable behavior.
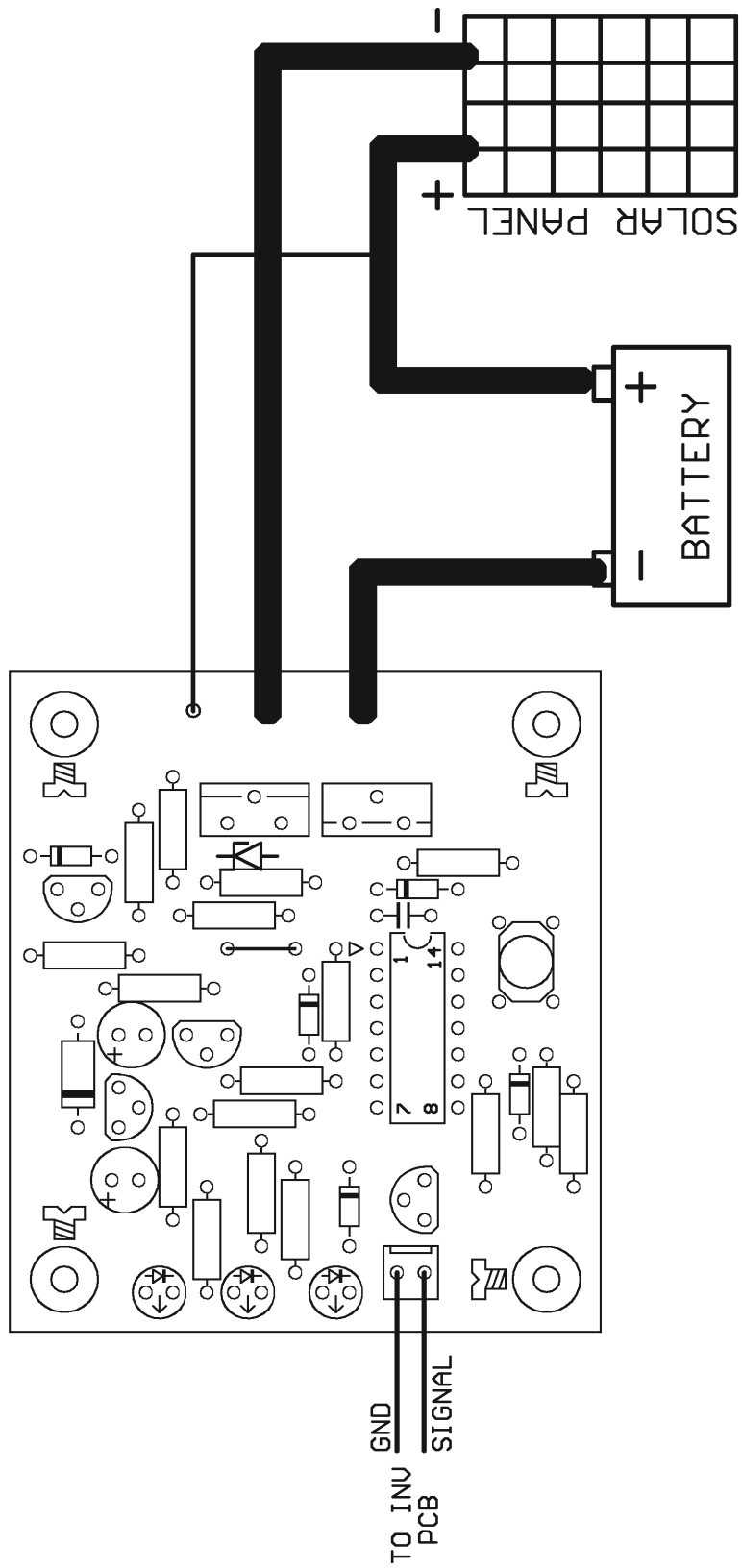
Wiring of 10A zero-drop solar charger PCB. Similar wiring can be done for 40A PCB also.

SOLAR PANEL

BATTERY

Setup Switch

Medi Zero Drop
Solar Charger
MEDI-280707-B

SIGNAL **To INV PCB**
GND
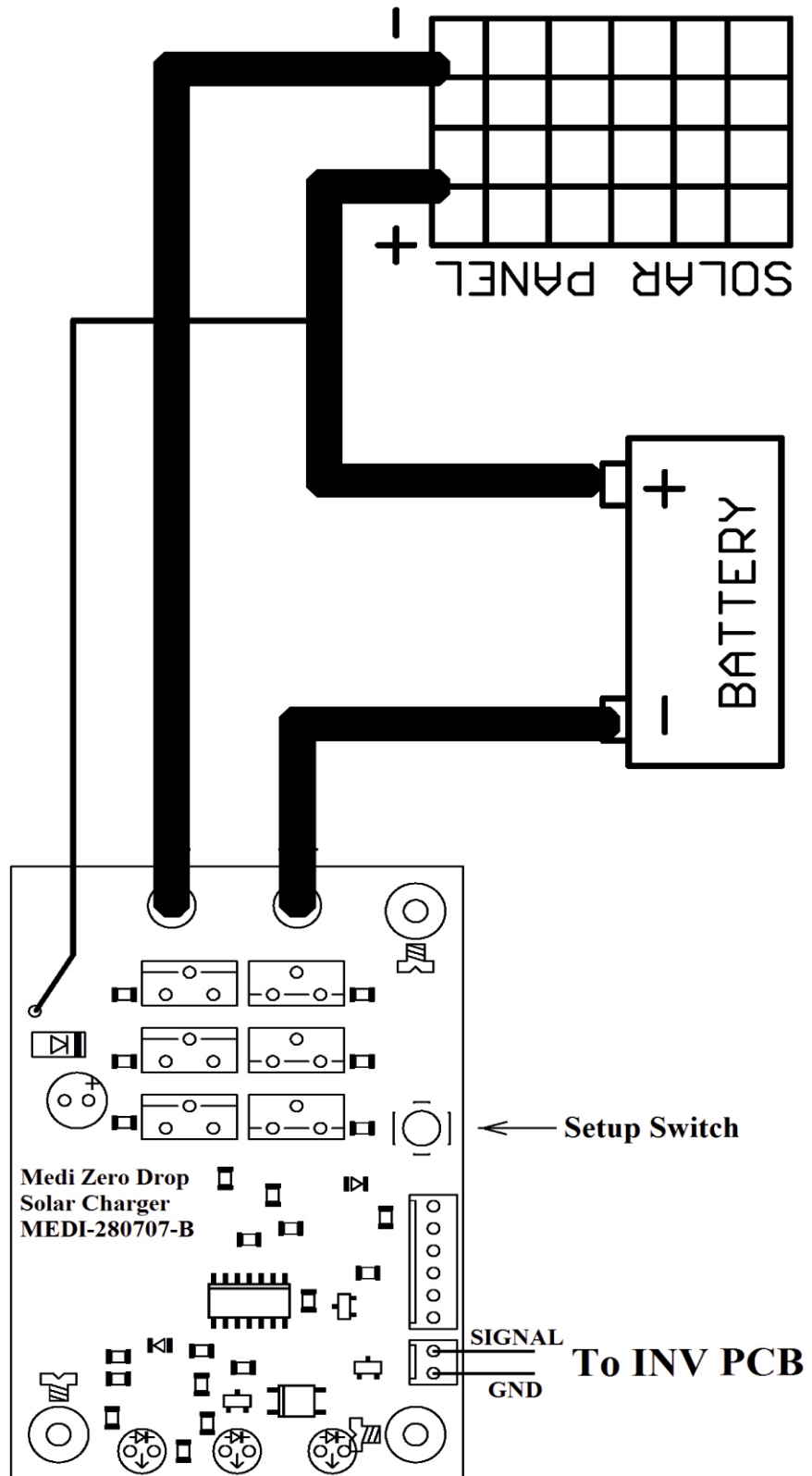
Wiring of 10-30A zero-drop solar charger **SMD** PCB.

Working of Medi solar chargers along with Medi Sinewave Inverter

When it is charging from solar, whatever be the charging current, it will not use mains for charging. This will work if the solar charging signal is given to the inverter. In our zero drop solar charger there is a two-pin relemate connector, this should be connected to the Medi inverter solar sense point.
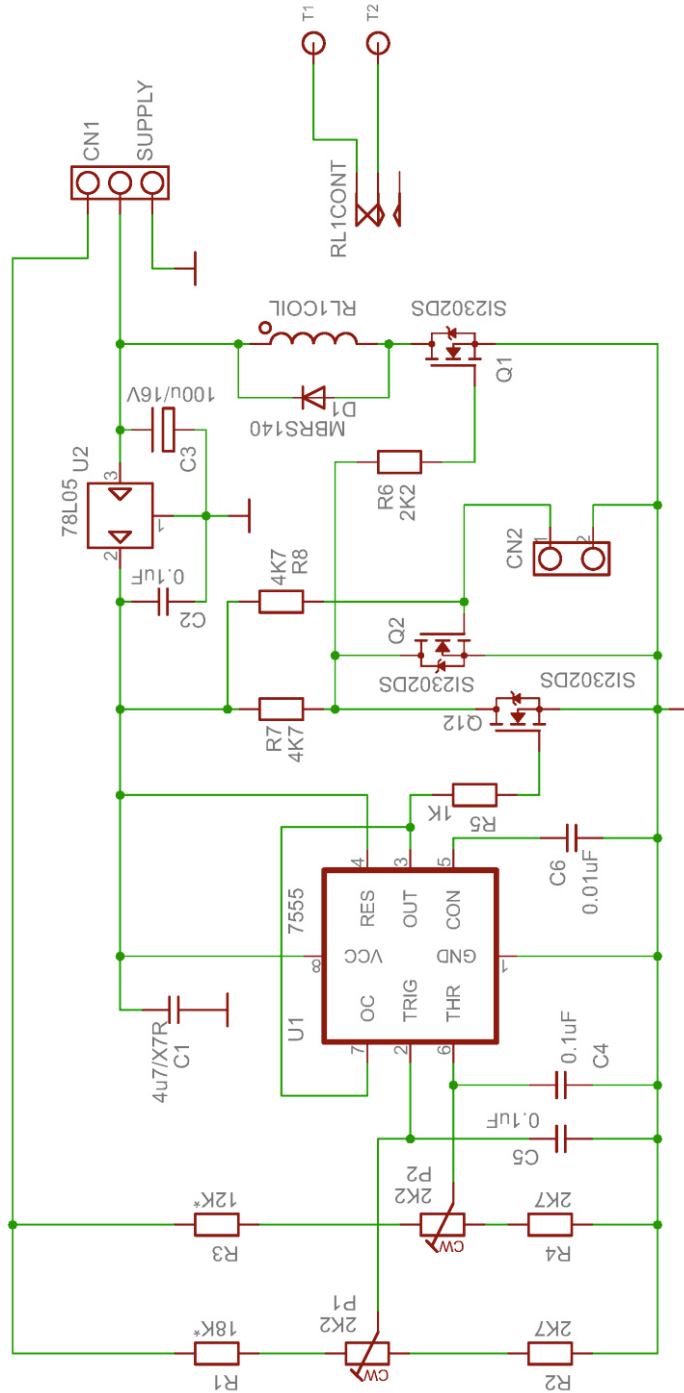
Priority Solar Charging -
Our solar charger along with our inverter will have first priority solar charging. i.e, when it is charging from solar, it will not charge from the mains. Also, when it is charging from solar and battery is nearly full charged (for Medi Inverter this voltage is settable in menu), the inverter will start working by disconnecting the mains bypass. So the solar power will go to the load through inverter and also charge the battery (online function) if the solar current is more than the inverter current.
If solar current is less than the inverter current, inverter will take the balance current from the battery. When the battery reaches the reserve charge (in Medi Inverter this value is settable), inverter will stop and mains will bypass, and the battery will be charged by solar. During nights, if the battery is not charged from the solar, battery will charge from the mains but only to a certain percent (in Medi Inverter this value is settable) so the next day the battery can be charged from solar. If the battery is fully charged using mains the previous night then the solar energy during the next day will be wasted. This way the first priority is always given to solar.
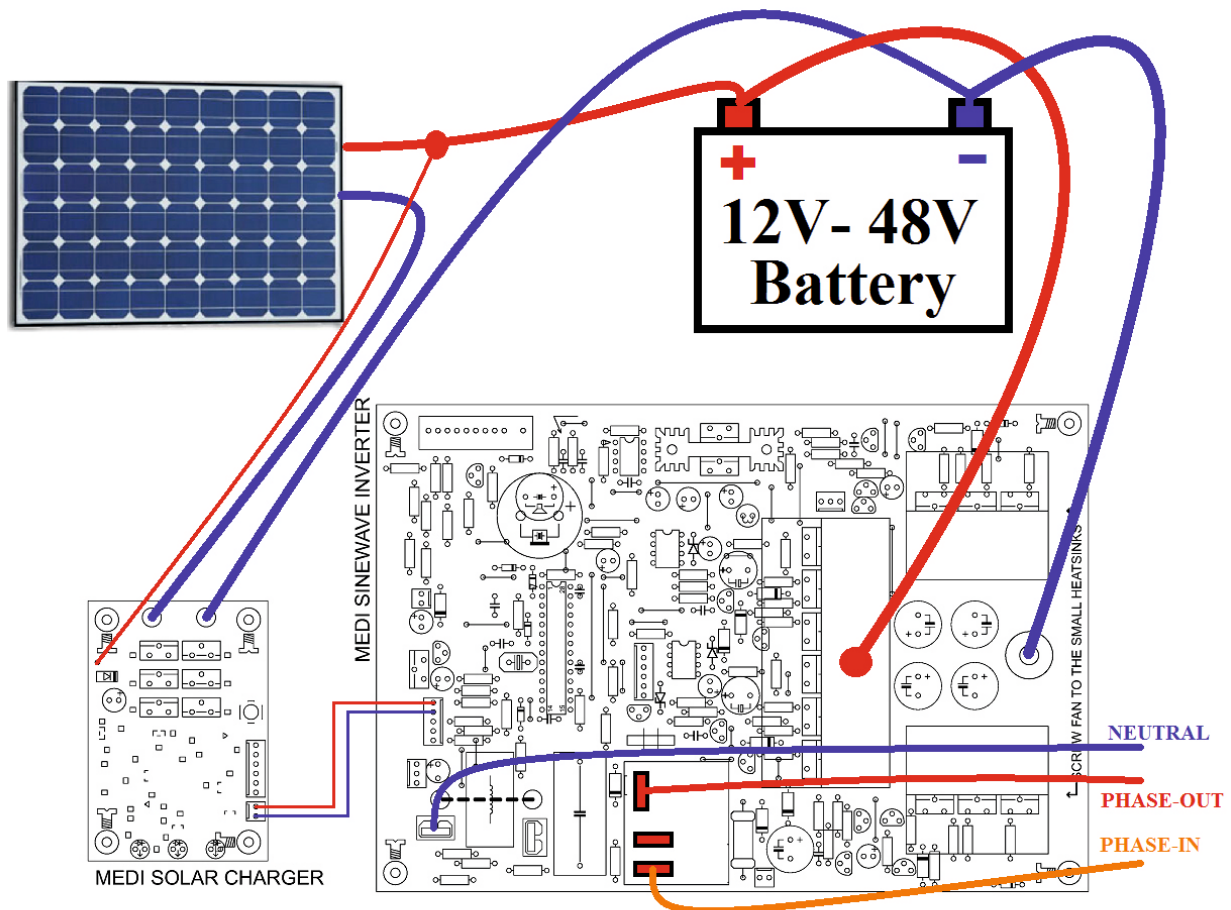
CIRCUIT FOR AUTO MAINS DISCONNECTION (AND INV START) WHEN BATTERY FULLY CHARGED FROM SOLAR (WIRING FOR MEDI SOLAR CHARGERS (ZERO DROP / MPPT) WITH MEDI SINEWAVE INVERTERS)

Using Medi solar chargers along with Other brand Inverters

When using other brand inverters with Medi Solar chargers, the circuit below can be used for Auto mains disconnection (and inverter start) when battery is fully charged from Solar.

Auto mains disconnection and inverter start circuit

MAINS INPUT
PHASE
NEUTRAL

INVERTERS
(OTHER THAN MEDI)

SOLAR PANEL

12V

Medi Solar Charger

R1	R3	
12V	18K	12K
24V	47K	33K
36V	68K	47K
48V	100K	68K

P1 = Set for Inverter Stop Level
P2 = Set for Inverter Start Level

Suggested levels (Per battery)
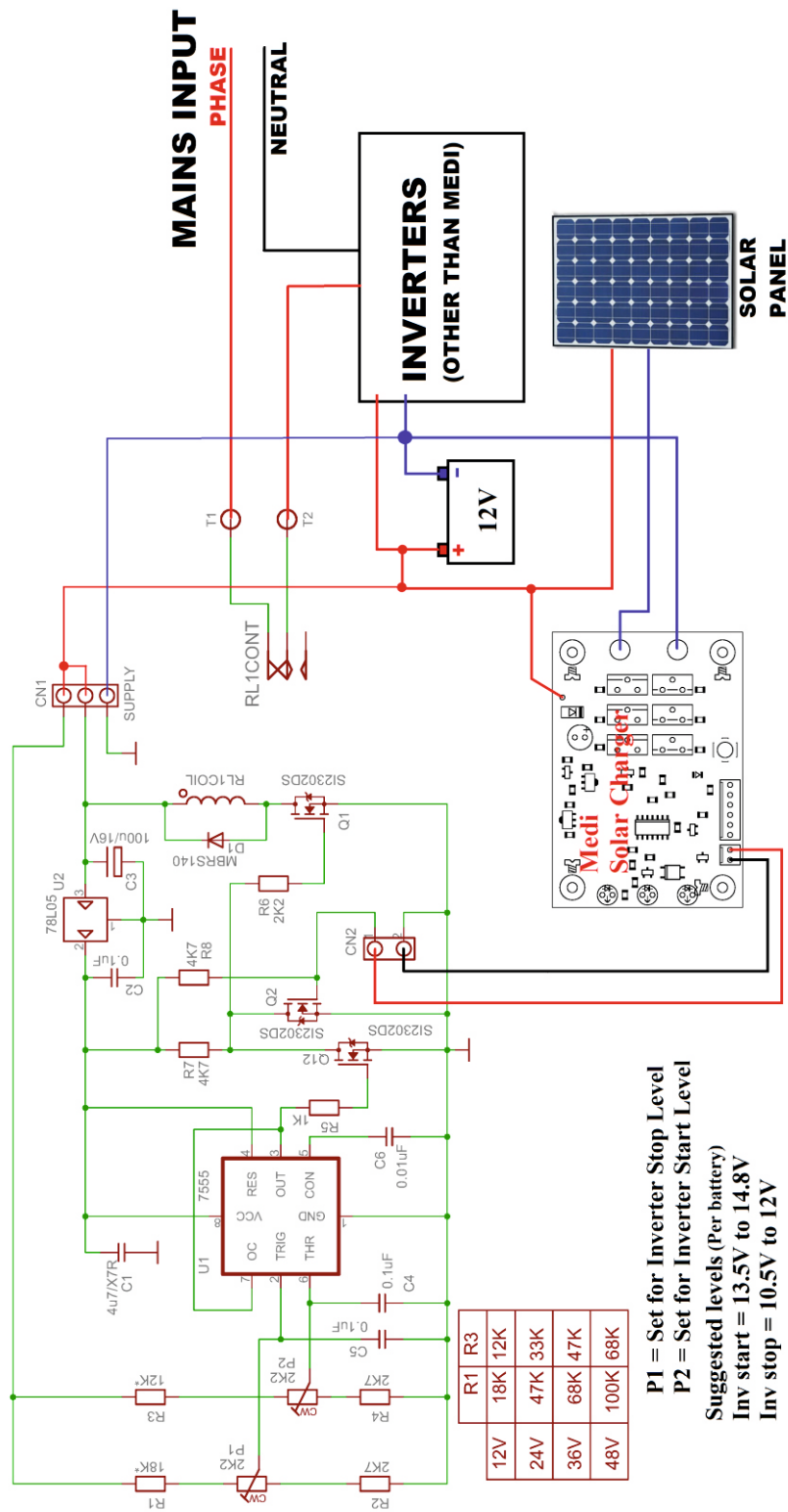Inv start = 13.5V to 14.8V
Inv stop = 10.5V to 12V

CIRCUIT FOR AUTO MAINS DISCONNECTION (AND INV START) WHEN BATTERY FULLY CHARGED FROM SOLAR
(WIRING FOR MEDI SOLAR CHARGERS (ZERO DROP / MPPT) WITH OTHER BRAND INVERTERS

Wiring of auto mains disconnection circuit with other brand inverters (for 12V battery)
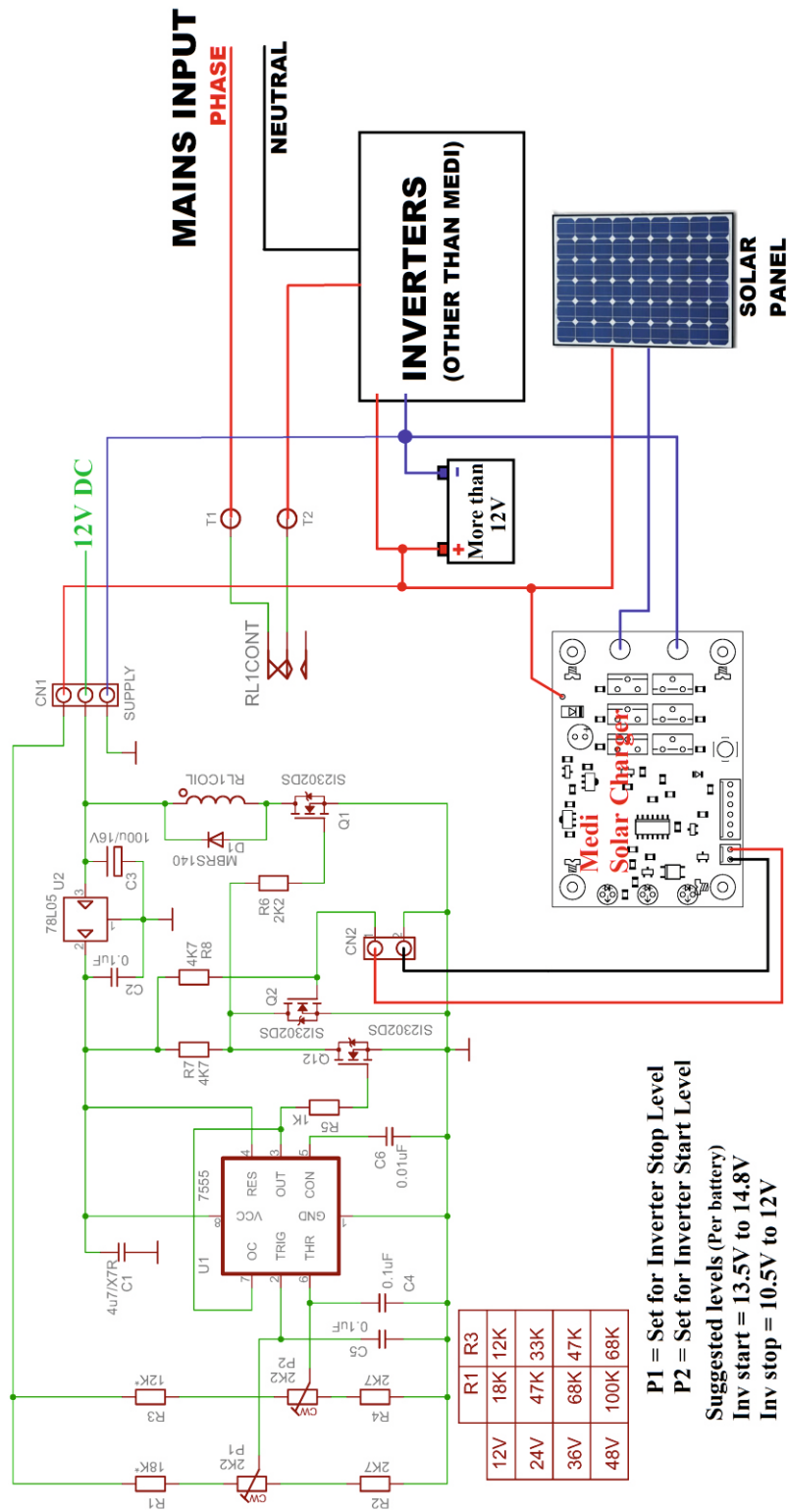
MAINS INPUT **PHASE**

NEUTRAL

INVERTERS (OTHER THAN MEDI)

SOLAR PANEL

12V DC

More than 12V

Medi Solar Charger

T1
T2

RL1CONT

SUPPLY
CN1

RL1COIL
78L05 U2
100u/16V
D1
MBRS140
Q1
SI2302DS
R6 2K2
C3
C2 0.1uF
R8 4K7
Q2
SI2302DS
CN2
SI2302DS
Q12
R7 4K7
R5 1K

7555
RES OUT CON
VCC GND
OC TRIG THR
U1
C6 0.01uF
C1 4u7/X7R
C4 0.1uF
C5 0.1uF
P2 2K2
R4 2K7
R3 12K*
P1 2K2
R2 2K7
R1 18K*

	R1	R3
12V	18K	12K
24V	47K	33K
36V	68K	47K
48V	100K	68K

P1 = Set for Inverter Stop Level
P2 = Set for Inverter Start Level

Suggested levels (Per battery)
Inv start = 13.5V to 14.8V
Inv stop = 10.5V to 12V

CIRCUIT FOR AUTO MAINS DISCONNECTION (AND INV START) WHEN BATTERY FULLY CHARGED FROM SOLAR (WIRING FOR MEDI SOLAR CHARGERS (ZERO DROP / MPPT) WITH OTHER BRAND INVERTERS

Wiring of auto mains disconnection circuit with other brand inverters (for more than 12V battery)