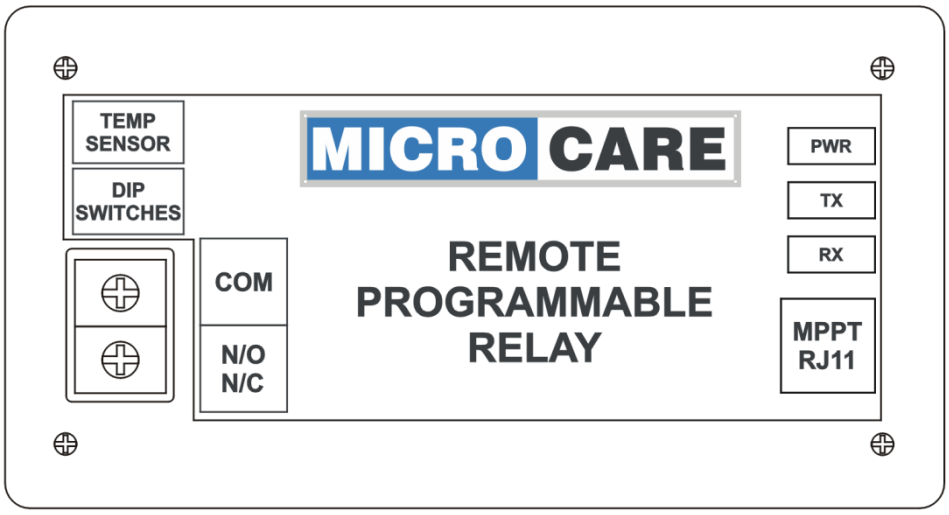
MICRO CARE

PROGRAMMABLE RELAY

User Manual



Manual Version: RPR-2016-1-C

Table of Contents

1. IMPORTANT INFORMATION AND SAFETY INSTRUCTIONS

- Installers should be qualified electricians or technicians
- The installation information in the manual is for information purposes only.
- Read the instructions carefully before installing the programmable relay.
- The unit should only be opened by skilled personal.
- Retain the load within in the relay contact rating to prevent faults.
- Sketches are intended for illustrative purposes only and are not intended to provide an electrical design.

WARNING
HIGH VOLTAGES PRESENT **Voltages capable of causing severe injury or death by electrical shock are present in this unit.** .

2. INTRODUCTION

2.1 General Description

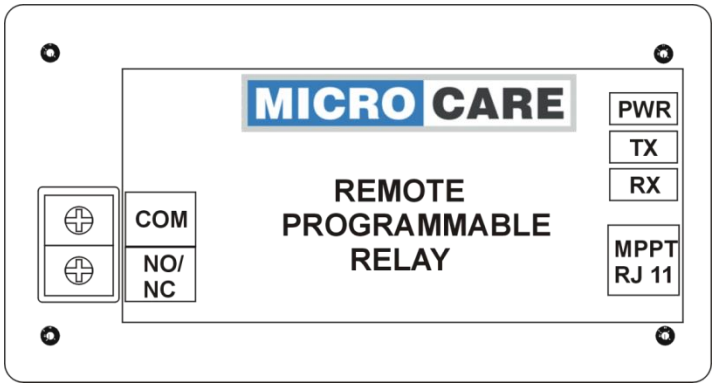
The MICROCARE Programmable Relay Interface can be used in conjunction with any of the range of MICROCARE LCD MPPT's.

- The MPPT can be programmed to switch the Programmable Relay at selectable voltages / conditions / parameters.
- The Programmable Relay Interface can be used as a Load shed controller.
- Grid assist relay.
- Day Night Switch without load shed.
- Night Switch with load shed.
- Day Switch with load shed.
- Generator controller

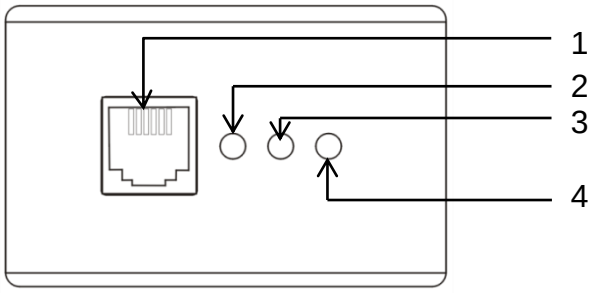
3. OVERVIEW

3.1 Programmable Relay

Figure 3-1

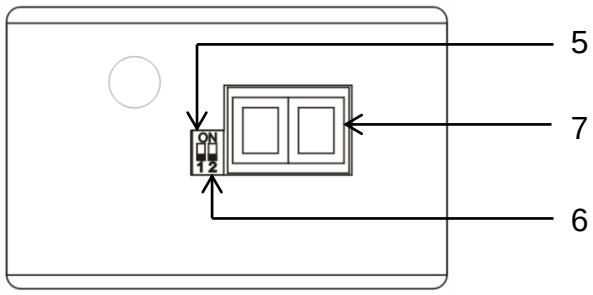


Comms Port

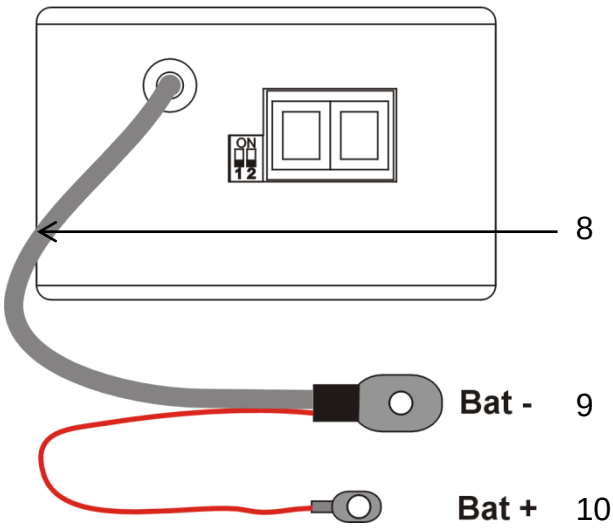


No	Description
1	RJ11/RS232 Comms Port
2	Green LED, Power is present
3	Red LED, Transmitting Data (TX)
4	Red LED, Receiving Data (RX)
	The PWR LED should be on at all times. The Two RED LED's TX & RXs should be flashing with one second intervals
5	Dipswitch 1 – BVT Probe Selection
6	Dipswitch 2 – Relay NO/NC
7	Output terminal block
8	Voltage/Temperature Probe - BVT
9	Batt – If supplied with BVT cable
10	Batt + If supplied with BVT cable

Programmable Relay without BVT



Programmable Relay with BVT



4. DIP SWITCH SETTINGS

 DIP switch 1 “Down” = Battery Voltage/Temp Sensor Enabled

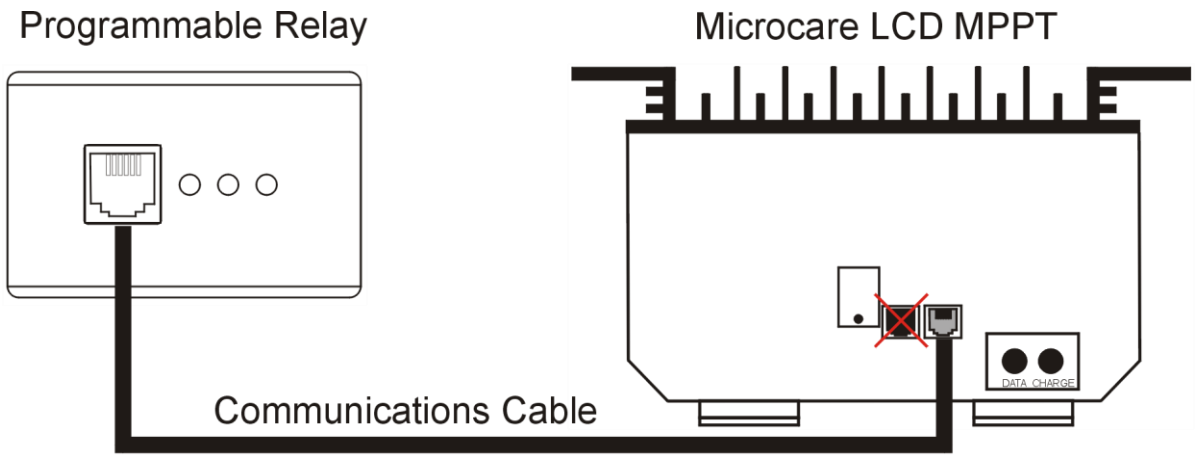
 DIP switch 1 “Up” = Battery Voltage/Temp Sensor Disabled

 DIP switch 2 “Down” = Relay N/C (Normally Closed)

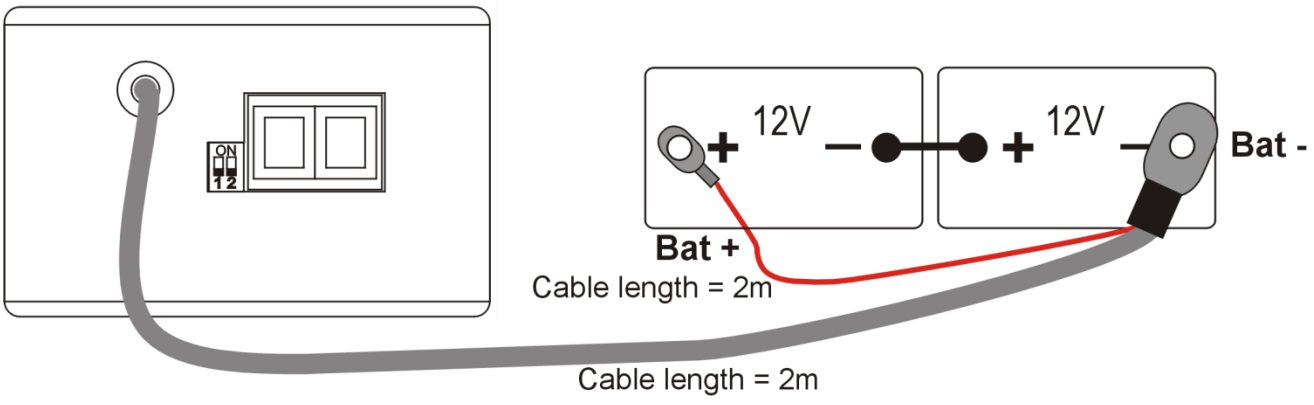
 DIP switch 2 “Up” = Relay N/O (Normally Open)

4.1 Communications Cable Connection

Fig: 4:1



4.2 BVT Sensor Connection



5. PROGRAMMING THE LCD MPPT EXTERNAL CONNECTIONS

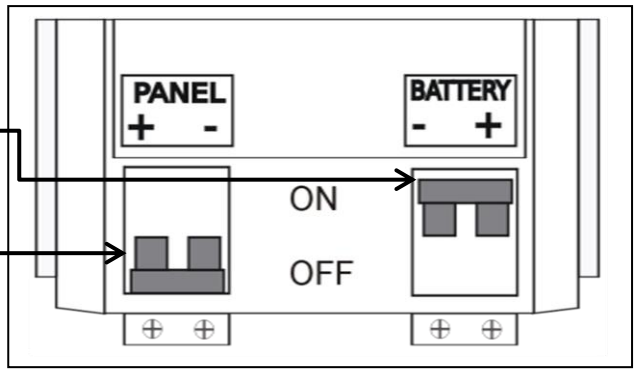
All settings are for 12 Volt nominal systems.
Divide the required settings:
/ 2 for 24 Volt Systems. / 3 for 36 Volt Systems. / 4 for 48 Volt systems.

Eg: If the required Disconnect voltage for a 48V system is 44.0V,
The setting on the MPPT = (44/4) =11.0V
Set the disconnect voltage on the MPPT to 11.0V

Programming mode

To enter the programming mode the MPPT must be connected to the batteries:

The **Battery Circuit Breaker** must be turned **ON**
The **Panel Circuit Breaker** must be turned **OFF**
.

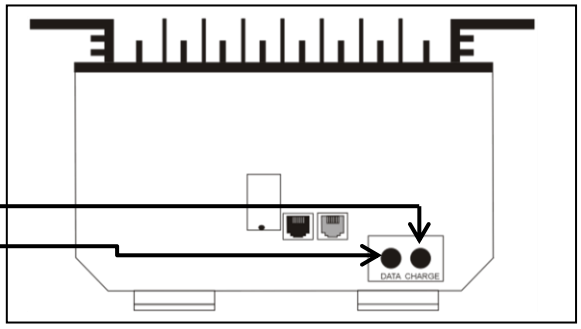


When the Panel circuit breaker is turned off the MPPT will enter the sleep mode and the MPPT must be in SLEEP MODE to enter the programming mode

MICROCARE MPPT 40Amp
Panel is LOW
. . . MPPT sleeping . . .
Battery = 25.0V

- Press and hold the <**CHARGE>** button for 6 seconds

The following screen will be displayed on the MPPT LCD Screen.



Float Voltage

FLOAT CHARGE VOLTAGE
= 13.8v DEFAULT
press CHRG to save
press DATA to change

- Press the **<CHARGE>** button until the menu **EXTERNAL OUTPUT IS A UNUSED OUTPUT N/C** appears.

EXTERNAL OUTPUT IS A
UNUSED OUTPUT N/C
press CHARGE to save
press DATA to change

The external output is only to be used with MICROCARE MPPT CHARGER accessories

- Press the **<DATA>** button once, this changes the external output from an UNUSED output to a:

5.1 SOLAR ASSIST SIGNAL N/A

Switches the relay for 10 seconds when the MPPT switches from BOOST to FLOAT

- Press the <**DATA**> button once to select the next option **"OR"**
- Press the <CHARGE> button once to save this option, press the <CHARGE> button until the MPPT restarts

5.2 DAY NIGHT no L-S SIGNAL (L-S = Load Shed)

Light switches on at dawn or when the panels are not producing enough power.

This function does not allow for load shed capability, it turns on when the panel power is LOW and stays ON until the panel voltage is higher than the battery voltage.

- Typical application: Turns on a light at dawn and switches a light off at dusk.

- Press the <**DATA**> button once to select the next option **"OR"**
- Press the <CHARGE> button once to save this option, press the <CHARGE> button until the MPPT restarts

5.3 LOAD SHED SIGNAL

- The MPPT monitors the battery voltage and can either disconnect an AC load via the Programmable Relay when the battery reaches the set disconnect voltage and reconnects the load when the battery reaches the set reconnect voltage.
  OR
- The MPPT monitors the battery voltage and can connect the grid via the Programmable Relay when the battery reaches the set disconnect voltage and disconnects the grid when the battery reaches the set reconnect voltage.

- Press the <**DATA**> button once to select the next option **"OR"**
- Press the <CHARGE> button once to save this option, the menu changes to

5.3.1 Load Shed Disconnect Voltage

The user can program the Voltage at which the RELAY operates.
This is between 10-12 volts per pack in increments of 0.1 volt.

LOAD DISCONNECTING @
= 11.0V PER BAT PACK
press CHARGE to save
press DATA to change

- Press the **<DATA>** button to change the LOAD DISCONNECT VOLTAGE
- Press the **<CHARGE> button** to save the setting

The menu changes to:

5.3.2 Load Reconnect Voltage

The LOAD SHED RECONNECT voltage can be programmed between 12-14 volts per pack in increments of 0.1 volt.

LOAD RECONNECTING @
= 13.0V PER BAT PACK
press CHARGE to save
press DATA to change

- Press the **<DATA>** button to change the LOAD RECONNECT VOLTAGE
- Press the **<CHARGE> button** to save the setting
- press the <CHARGE> button until the MPPT restarts

5.4 SOLAR ASSIST SIGNAL V2 - N/A

Switches the relay for 10 seconds when the MPPT switches from BOOST to FLOAT
Switches the relay for 10 seconds when the battery voltage is limiting the current into the system. This is when the * is flashing next to the Battery display. V2

- Press the <**DATA**> button once, the menu changes to

5.5 SOLAR AST UPS CNTR1 - N/A

- Press the <**DATA**> button once, the menu changes to

5.6 WIND TURBINE BRAKE - N/A

- Press the <**DATA**> button once, the menu changes to:

5.7 DAY + L-S SIGNAL (L-S = Load Shed)

- Light switches on at dawn and switches off at dusk.
- Lights switches on when the when the Panel Voltage is high enough for the MPPT to track the PV voltage and switches off when MPPT is sleeping.
- It also switches off the light at the set low battery disconnect voltage and reconnects at the set reconnect voltage during the period from dawn to dusk.

- Press the <**DATA**> button once to select the next option **"OR"**
- Press the <CHARGE> button once to save this option, the menu changes to

5.7.1 Load Shed Disconnect Voltage

The user can program the Voltage at which the RELAY operates.
This is between 10-12 volts per pack in increments of 0.1 volt.

LOAD DISCONNECTING @
= 11.0V PER BAT PACK
press CHARGE to save
press DATA to change

- Press the **<DATA>** button to change the LOAD DISCONNECT VOLTAGE
- Press the **<CHARGE> button** to save the setting

The menu changes to:

5.7.2 Load Reconnect Voltage

The LOAD SHED RECONNECT voltage can be programmed between 12-14 volts per pack in increments of 0.1 volt.

LOAD RECONNECTING @
= 13.0V PER BAT PACK
press CHARGE to save
press DATA to change

- Press the **<DATA>** button to change the LOAD RECONNECT VOLTAGE
- Press the **<CHARGE> button** to save the setting
- Press the <CHARGE> button until the MPPT restarts

5.8 NIGHT + L-S SIGNAL (L-S = Load Shed)

- Light switches on at dusk and switches off at dawn.
- Lights switches on when the MPPT is sleeping and will switch off when the Panel Voltage is high enough for the MPPT to track the PV voltage.
- It also switches off the light at the set low battery disconnect voltage and reconnects at the set reconnect voltage during the period from dusk to dawn.

- Press the <**DATA**> button once to select the next option **"OR"**
- Press the <CHARGE> button once to save this option, the menu changes to

5.8.1 Load Shed Disconnect Voltage

The user can program the Voltage at which the RELAY operates.
This is between 10-12 volts per pack in increments of 0.1 volt..

LOAD DISCONNECTING @
= 11.0V PER BAT PACK
press CHARGE to save
press DATA to change

- Press the **<DATA>** button to change the LOAD DISCONNECT VOLTAGE
- Press the **<CHARGE> button** to save the setting

The menu changes to:

5.8.2 Load Reconnect Voltage

The LOAD SHED RECONNECT voltage can be programmed between 12-14 volts per pack in increments of 0.1 volt.

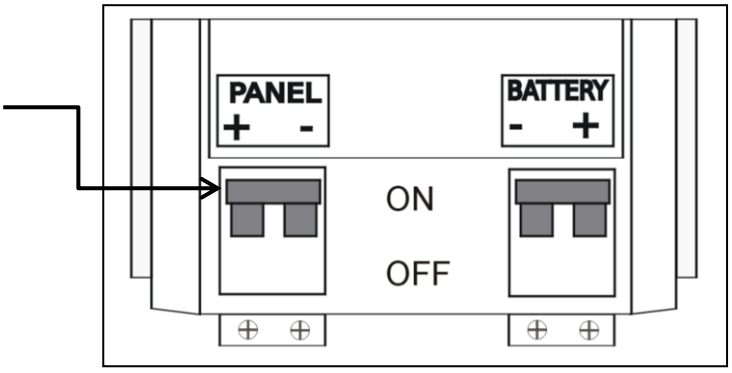
LOAD RECONNECTING @
= 13.0V PER BAT PACK
press CHARGE to save
press DATA to change

- Press the **<DATA>** button to change the LOAD RECONNECT VOLTAGE
- Press the **<CHARGE> button** to save the setting
- Press the <CHARGE> button until the MPPT restarts

When the programming is completed and the following screen appears

MICROCARE MPPT 40A
Panel is LOW
…MPPT sleeping…
Battery = 12.7V

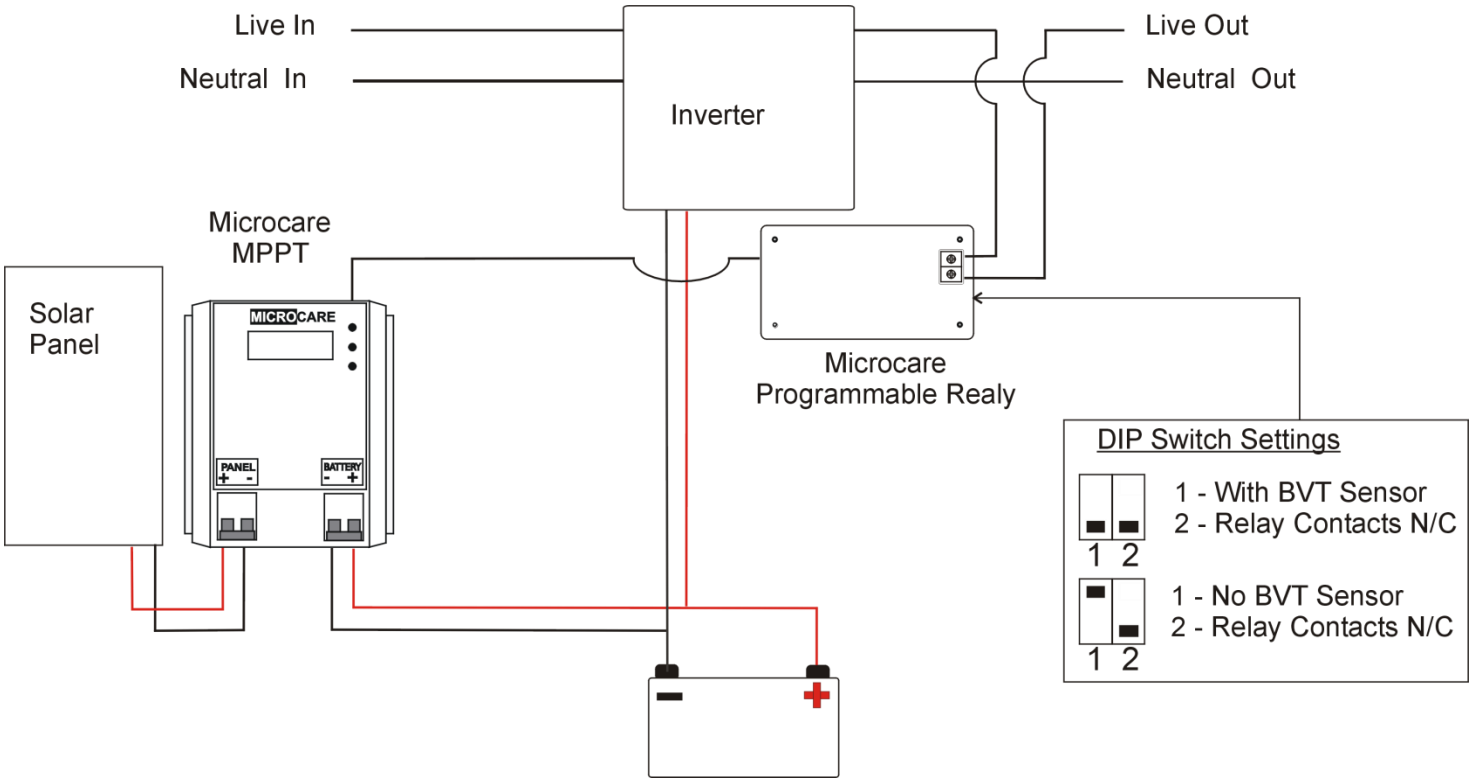
Turn the **Panel Circuit Breaker ON**



6. GENERAL WIRING OPTIONS

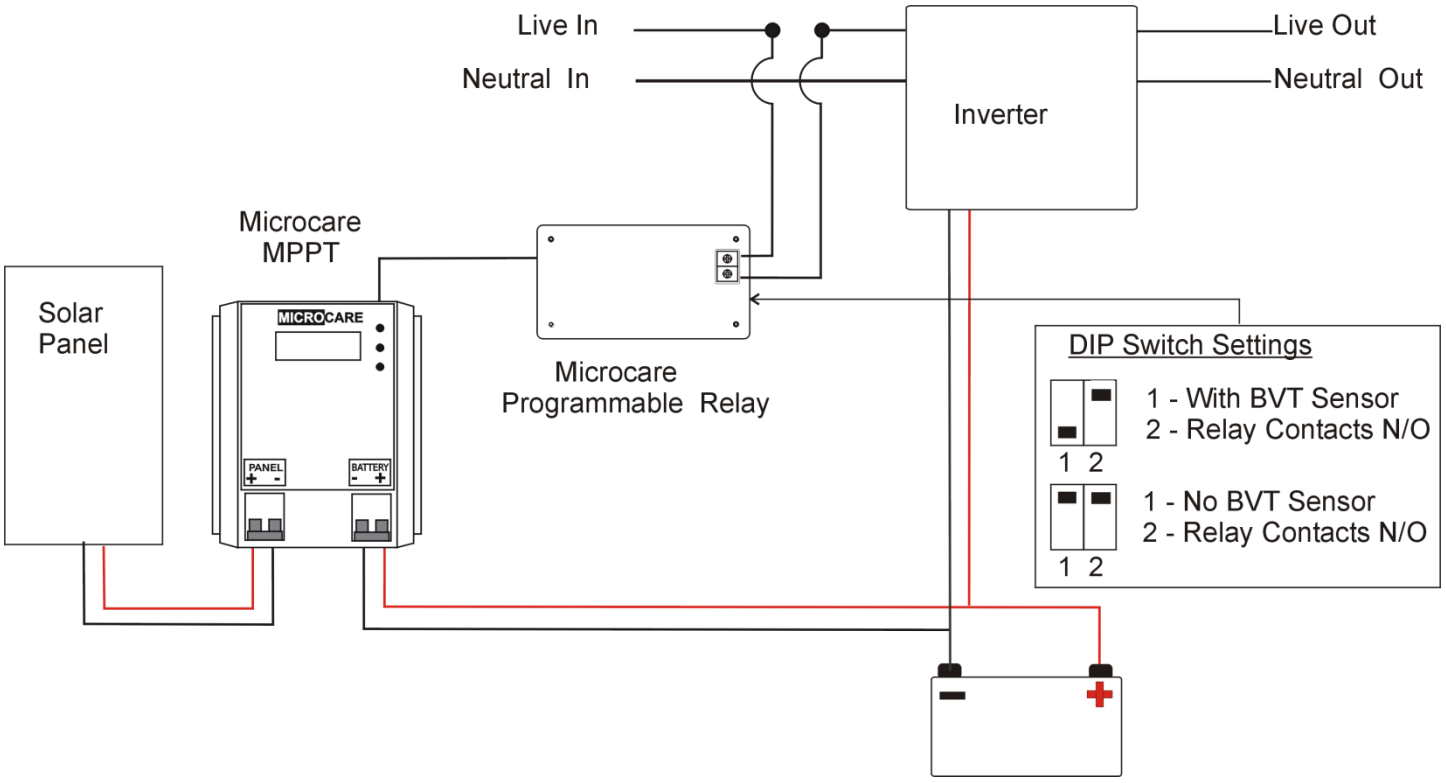
6.1 Load Shed /Load Disconnect

Refer to section 5.3 for the programming option.



6.2 Grid Connect/Disconnect

Refer to section 5.3 for the programming option



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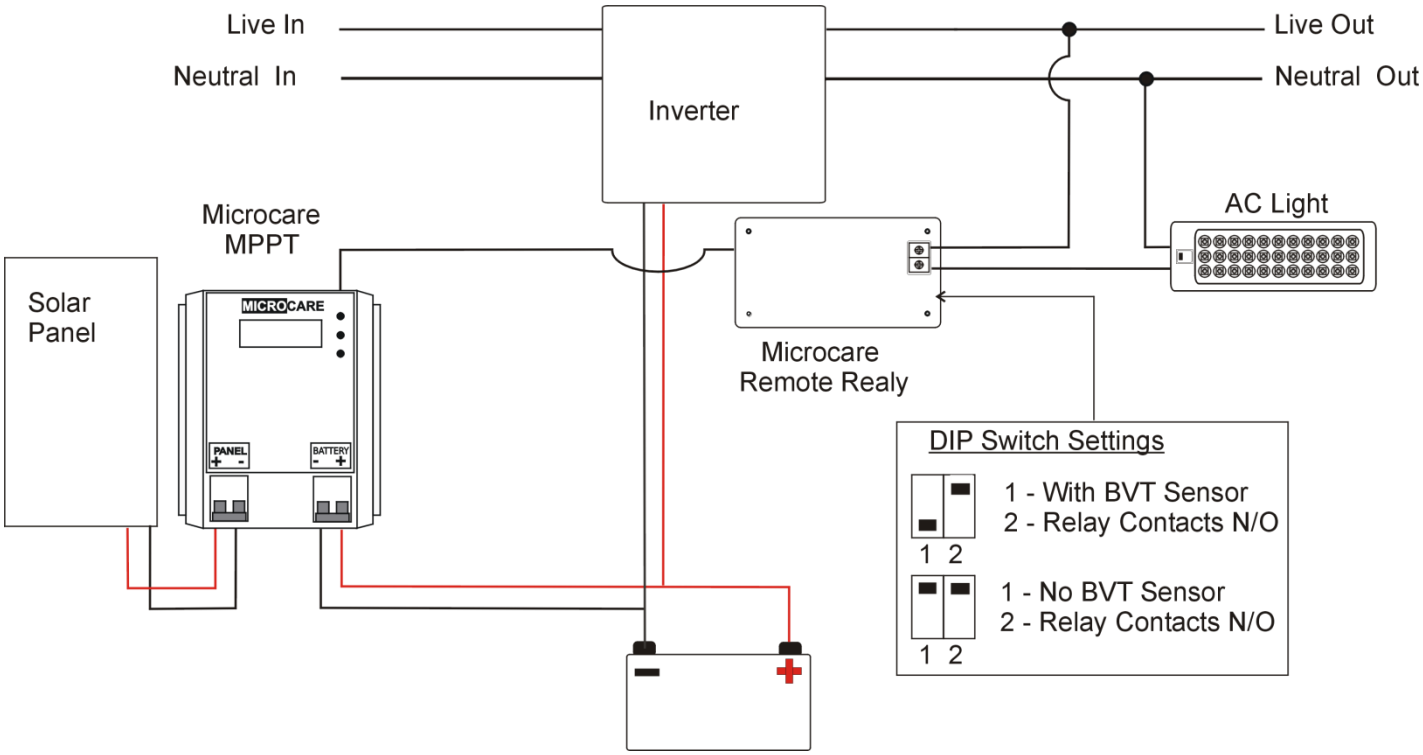
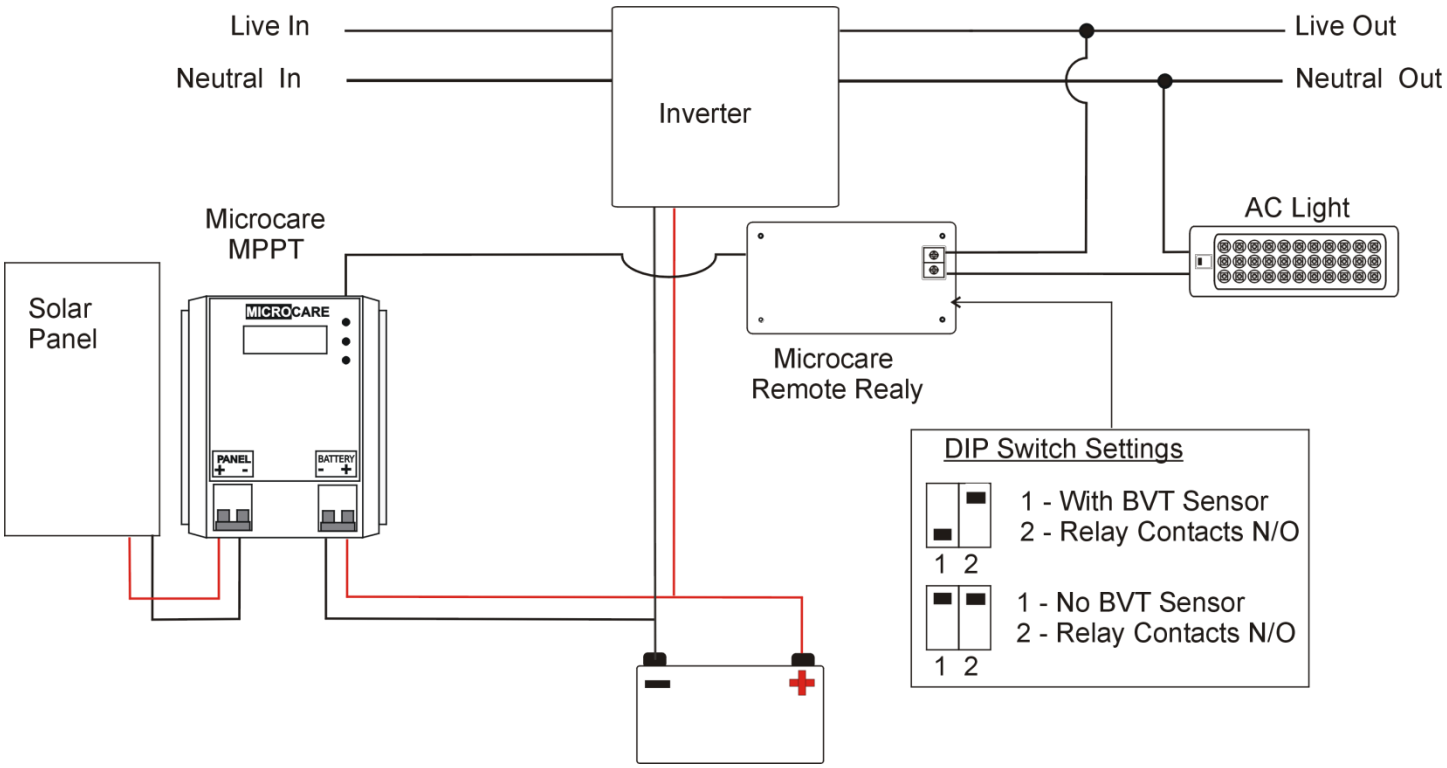
6.3 AC Night Light Switch With Load Shed

Refer to section 5.8 for the programming option



6.4 AC Day Light Switch With Load Shed

Refer to section 5.7 for the programming option



7. BATTERY VOLTAGE & TEMPERATURE SENSING

The programmable relay with BVT works in conjunction with the Microcare LCD MPPT and continuously communicates with the MPPT. The main purpose of the BVT is to adjust the charging voltage according to the change in battery temperature.

The MPPT changes the Boost and Float voltage according to the difference in battery temp above and below 25 Deg C. High battery temperatures can cause the batteries to overcharge and very low battery temperatures can lead to undercharging.

Set the dipswitch to enable the BVT Sensor (ref). Connect the BVT Sensor to the battery bank (Fig: 7.1)). Connect the RJ12 communications cable between the Programmable relay and the LCD MPPT.(Fig 4:1)

The following screen appears on the MPPT screen for 1 minute.

Battery voltage at the output of the MPPT.
BV shows the voltage at the battery terminals.

REMOTE BVT CONNECTED
VOLTAGE MPPT = xx.xV
BV= 12.00V ADJ- xx.xV
BT=25.0'C ADJ+ xx.xV

If the battery temperature increases this voltage decreases: **ADJ** -
If the battery temperature decreases this voltage increases: **ADJ +**

The difference between the MPPT battery voltage and the Sensor battery voltage.

The correction is shown as either +/-.
The Battery Temperature (BT) is then shown with the ADJ compensation.
If the Battery Voltage Temperature is disconnected, the MPPT will revert back to stand alone readings.

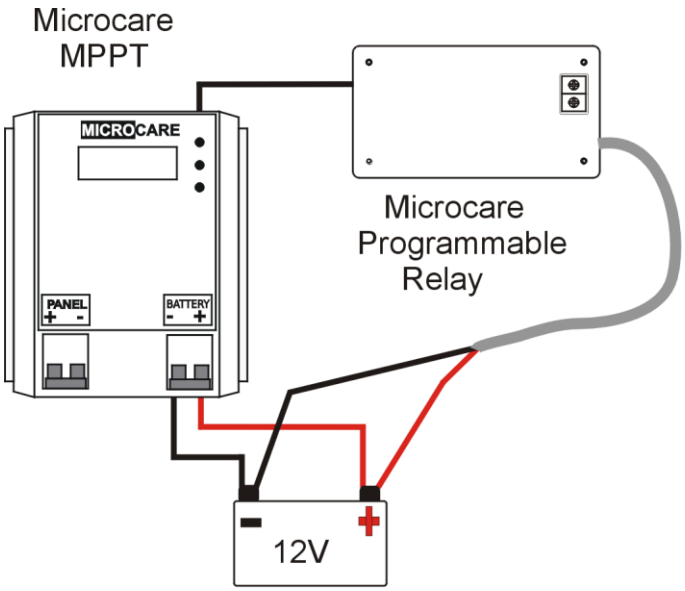
If a problem occurs with the BVT sensor the following error message is displayed on the MPPT screen and will display until the problem is fixed. Possible cause: BVT cable not connected or a bad cable connection.

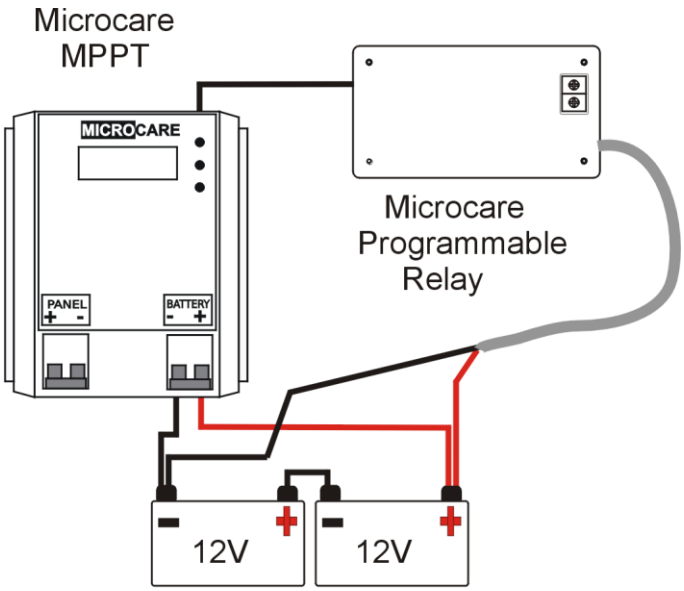
REMOTE BVT ERROR !!!
VOLTAGE MPPT = xx.xV
BV= 12.00V ADJ- xx.xV
BT=25.0'C ADJ+ xx.xV

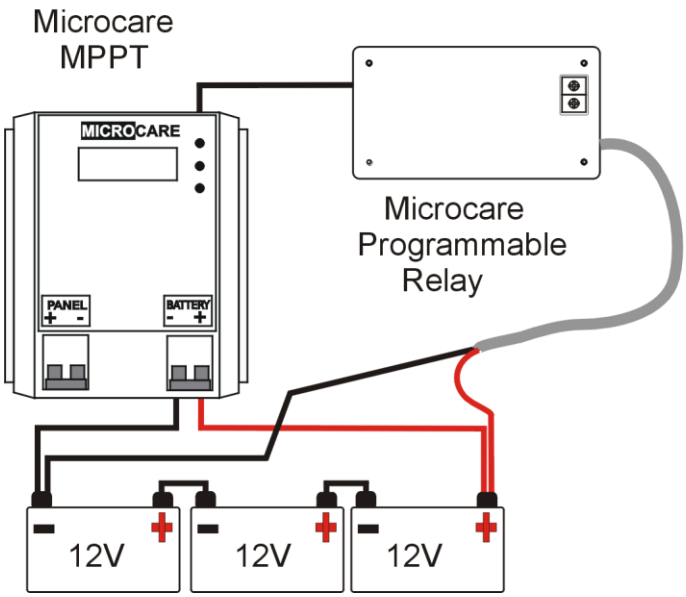
REMOTE BVT CABLE ERR
VOLTAGE MPPT = xx.xV
BV= 12.00V ADJ- xx.xV
BT=25.0'C ADJ+ xx.xV

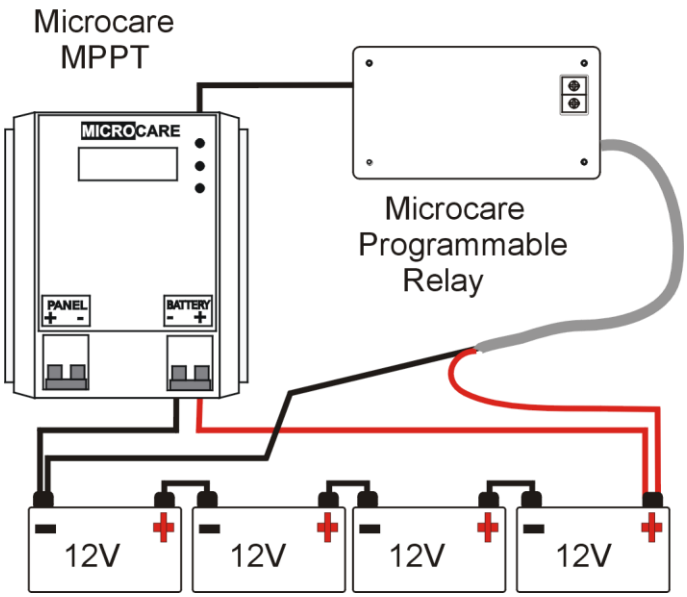
7.1 BVT Sensor Battery Connection 12V - 48V Battery Bank

Fig 7:1









8. PROGRAMMABLE RELAY SPECIFICATIONS

Model	With BVT Sensor
BVT Sensor	Lug mounting hole size 10mm
Battery voltage range	12-48V Battery Bank
Relay	Programmable by dipswitch N/O or N/C
Relay Type	Latching Relay
Relay Current Rating	40A @ 230V AC
Communication	RS232
Dimensions (H x W x D)	180 x 67 x 43mm
Warranty	1 year

Model	Without BVT Sensor
Relay	Programmable by dipswitch N/O or N/C
Relay Type	Latching Relay
Relay Current Rating	40A @ 230V AC
Communication	RS232
Dimensions (H x W x D)	180 x 67 x 43mm
Warranty	1 year

9. DESTRIER ELECTRONICS LIMITED CARRY- IN WARRANTY

Destrier Electronics warrants the Remote Programmable Relay against defects in workmanship and materials, fair wear and tear accepted, for a period of 1 (one) year from the date of delivery/collection for all equipment and is based on a carry-in basis. Where the installation of the product makes it impractical to carry-in to our workshops, Destrier Electronics reserves the right to charge for travel time and kilometres travelled to and from the site where the product is installed.

During this warranty period, Destrier Electronics will, at its own discretion, repair or replace the defective product free of charge. This warranty will be considered void if the unit has suffered any physical damage or alteration, either internally or externally, and does not cover damages arising from improper use such as, but not exclusive to:

- Reverse of battery polarity.
- Inadequate or incorrect connection of the product and/or of its accessories.
- Mechanical shock or deformation.
- Contact with liquid or oxidation by condensation.
- Use in an inappropriate environment (dust, corrosive vapour, humidity, high temperature, biological infestation.)
- Breakage or damage due to lightning, surges, spikes or other electrical events.
- Connection terminals and screws destroyed or other damage such as overheating due to insufficient tightening of terminals.
- When considering any electronic breakage except due to lightning, reverse polarity, over-voltage, etc. the state of the internal control circuitry determines the warranty.

This warranty will not apply where the product has been misused, neglected, improperly installed, or repaired by anyone else than Destrier Electronics or one of its authorised Qualified Service Partners. In order to qualify for the warranty, the product must not be disassembled or modified. Repair or replacements are our sole remedies. Destrier Electronics shall not be liable for damages, whether direct, incidental, special, or consequential, even caused by negligence or fault. Destrier Electronics owns all parts removed from repaired products. Destrier Electronics uses new or re-conditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Destrier Electronics repairs or replaces a part of a product, its warranty term is not extended. Removal of serial nos. can void the warranty.

All remedies and the measure for damages are limited to the above. Destrier Electronics shall in no event be liable for consequential, incidental, contingent or special damages, even if having been advised of the probability of such damages. Any and all other warranties expressed or implied arising by law, course of dealing, course of performance, usage of trade or otherwise, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited in duration to a period of 1 (one) year from the date of purchase.

Life Support Policy:
As a general policy, Destrier Electronics does not recommend the use of any of its products in life support applications where failure or malfunction of the Destrier Electronics product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness.

Destrier Electronics does not recommend the use of any of its products in direct patient care. Destrier Electronics will not knowingly sell its products for use in such applications unless it receives in writing assurances satisfactory to Destrier Electronics that the risks of injury or damage have been minimised, the customer assumes all such risks, and the Liability of Destrier Electronics is adequately protected under the circumstances.

Caution:
Our products are sensitive. While all care is taken by us to dispatch goods with adequate packaging, Destrier Electronics is not responsible for any damages caused to products after they have left our premises.

10. REGISTRATION OF MY MICROCARE PRODUCT

Product Serial Number: _____

Product Description: _____

Date Purchased _____

Where was the Product Purchased?

Company Name _____

Contact Person _____

Contact Number _____

E-mail Address _____

Installation Company Information:

Company Name _____

Contact Person _____

Contact Number _____

E-mail Address _____

Details of Product Owner

Name & Surname _____

Address _____

City & Province _____

Contact Number _____

E-mail Address _____

Date Installed _____

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Registration by e-mail: support@microcare.co.za
Online Registration: www.microcare.co.za/register-my-product