Mi

Innovative Electronics for a Changing World

NPM-R10-PW *(pre-wired) Remote Network Power Monitor- 19"Rack mount*

*With optional RS232-GSM module and optional **Bluetooth** module*

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Network Based Remote Power Monitor

NPM-PW SNMP

FOR 12V and 24V BATTERY SYSTEMS ONLY !!

FOR 48V BATTERY SYSTEMS SEE NPM-R10-RM

Factory Reset – bridge the 2 copper pins with the supplied jumper (rear of unit – through the slot in the casing)

Power unit, keep short until the display indicates "Reset Complete", remove the jumper

Default IP address: 192.168.1.2

1. SYSTEM DESCRIPTION

Main Unit

Internal Relay Board with 5 relays – relay 1 to 3 can toggle and relay 4 and 5 switch and keep the position

GSM module (optional)

Bluetooth module (optional)

The NPM-RM (NETWORK POWER MONITOR RACK MOUNT) was designed to assist Network specialists with Power related information via **Ethernet, Bluetooth** and **GSM** Communication.

Total Battery Voltage as well as separate Battery voltages for series connected Battery banks, Charging Current, Load current to equipment, Mains 220Vac Status, Alarm input and temperature information is available via web pages, SMS, Bluetooth and SNMP.

Embedded Web pages for monitoring and configuration of the system.

The unit supports the SNMP V1 and SNMP V2C communication platform to be compatible with any SNMP monitoring software platforms as well with the free to use Mi-SNMP Manager software for Windows.

2x16 LCD display on board for quick access and indication of power related information on site
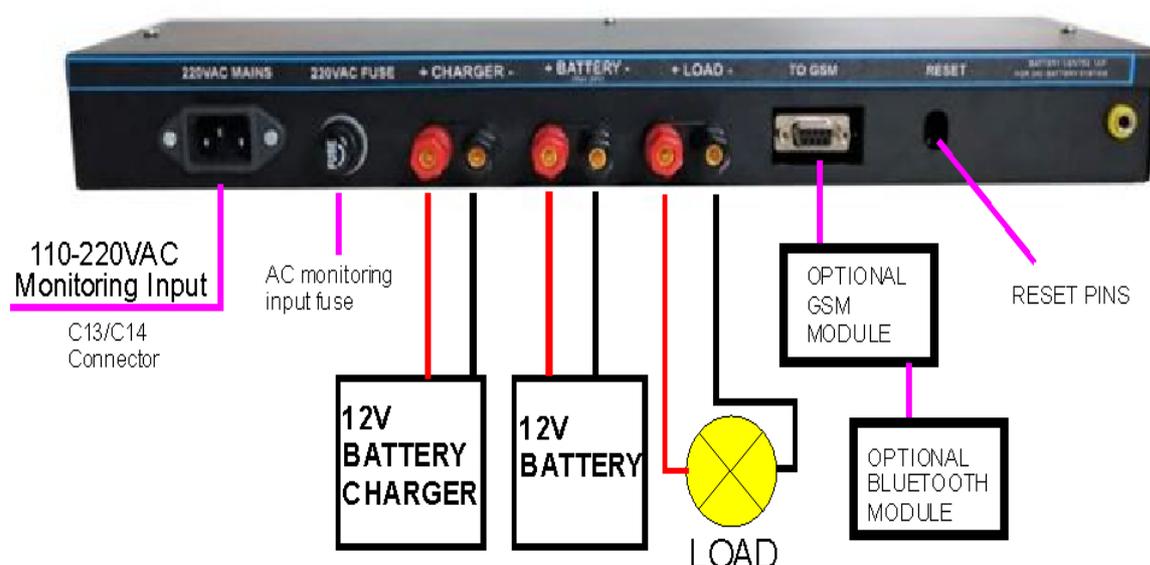
Indicating:

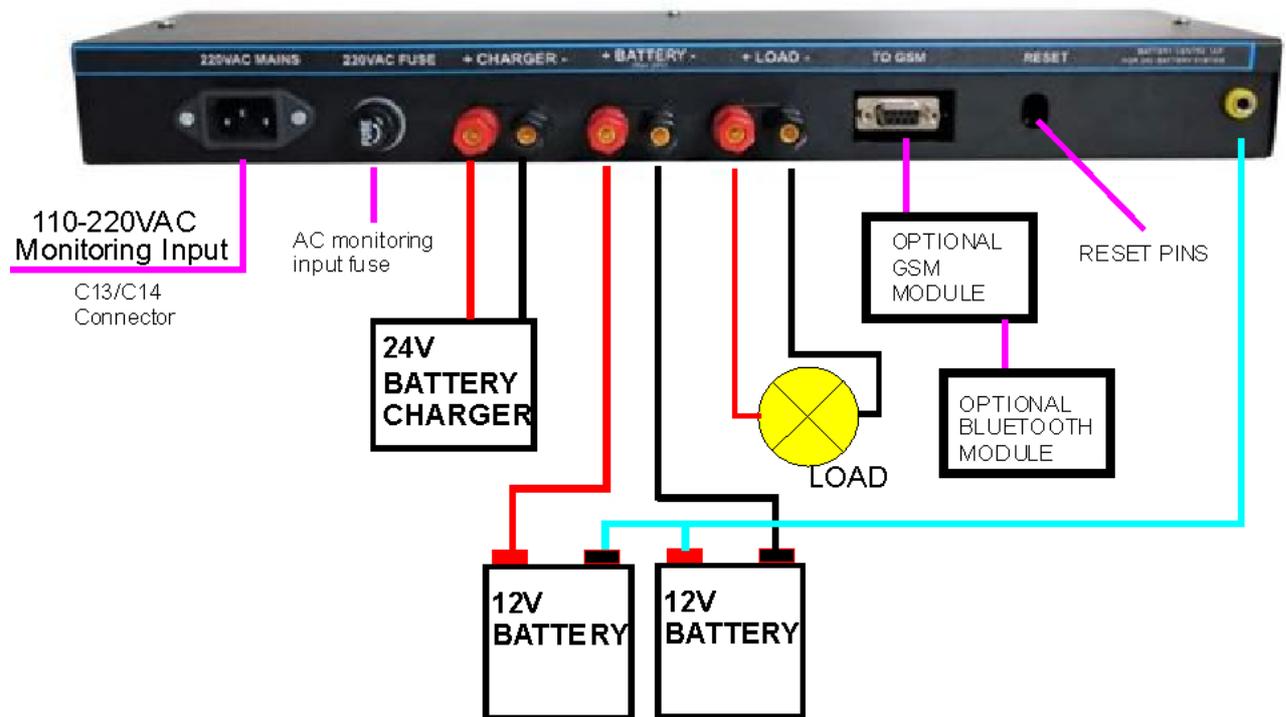(B:) Total Battery pack voltage

(Mains :) ON or OFF

(I:) Charge current

(i:) Load current - in case of alarm active (i:) will be replaced with (AL) for Alarm

2. System Wiring – 12V example

System Wiring – 24V example

Current consumption in total with LAN port connected 110mA @ 12Vcdc / 55mA @ 24Vdc

The NPM-R10-**PW** (pre-wired) ease onsite installation, wiring through the current ports is completed inside the unit by the factory.

Connect the mains supply 220VAC via the supplied C13 power cord. (The AC input is only monitored and the unit does not function of this supply)

Connect The 12V or 24V Battery charger to the terminal marked **+Charger-** , use large enough gauge wire to carry the current from the charger.

Connect the 12V or 24V Battery bank to the terminal marked **+BATTERY-** , use large enough gauge wire to carry the current to the batteries.

FOR 24V battery systems the centre tap between the two batteries should be connected with the **banana connector lead supplied with the unit to the banana female connector marked **"Battery centre tap"**

Through connecting this banana wire lead from the battery centre tap the user will be able to see the **total** as well as the **separate** battery voltages of the series connected batteries.

Connect the load output terminal to the load , eg: equipment and DC-DC converters etc.

The RS232 GSM output port connects to the optional GSM module, the Bluetooth module or both at the same time.

**** IMPORTANT NOTE**** The Alarm input is a potential free contact input only and **NO** voltages should be injected here- Permanent Damage to the unit will occur.

After the Alarm is triggered the (i:) indication of the Load current in the bottom right corner of the LCD will change to AL: to indicate the Alarm condition.

The Alarm SNMP (OID) data will change from a 0 to a 1 , as soon as the Alarm input is restored the screen will be cleared from AL: for alarm and return to i: for Load current indication but the Alarm SNMP OID will stay at data 1 for about 5 minutes after the alarm was cleared.

This is working well with PIR alarm detectors etc. so that the alarm condition is not missed by the SNMP manager software

LCD Display on front of unit

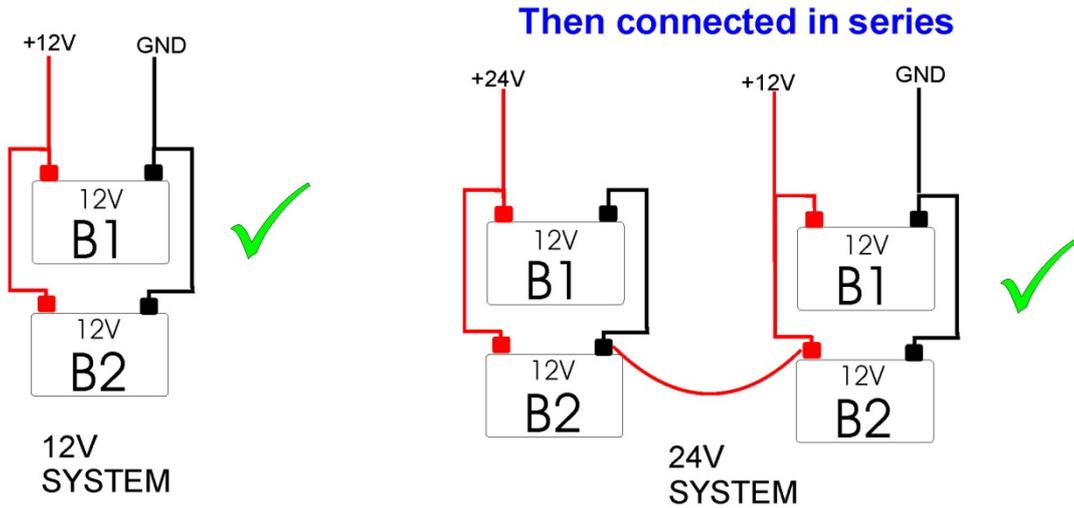5 Way relay output board available on front of unit

3. SERIES CONNECTED BATTERY SYSTEMS IN PARALLEL

Correct series / parallel connection of Multiple Battery banks
to double the A/h capacity but still be able to sense all Batteries

**2 x 12V Batteries in parallel
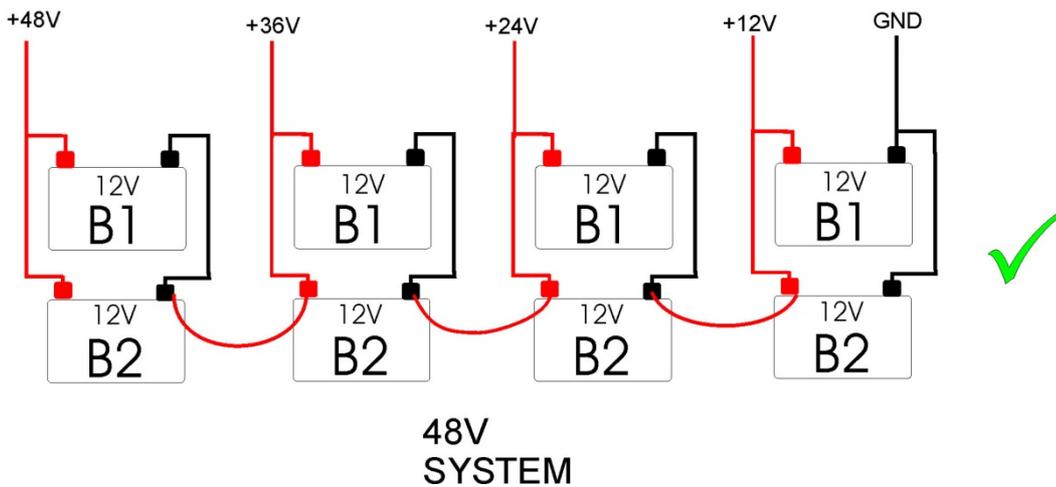to Double the A/h capacity**

**2 x 12V Batteries inparallel
to Double the A/h capacity**

**2 x 12V Batteries inparallel
to Double the A/h capacity**

Then connected in series

+12V   GND

12V
B1

12V
B2

✓

12V
SYSTEM

+24V   +12V   GND

12V
B1

12V
B2

12V
B1

12V
B2

✓

24V
SYSTEM

**2 x 12V Batteries
in parallel**

**2 x 12V Batteries
in parallel**

**2 x 12V Batteries
in parallel**

**2 x 12V Batteries
in parallel**

Then connected in series

+48V   +36V   +24V   +12V   GND

12V
B1

12V
B2

12V
B1

12V
B2

12V
B1

12V
B2

12V
B1

12V
B2

✓

48V
SYSTEM

4. Relay Board functions

Relay 1,2,3 can only be toggled to activate for the **user specified seconds** then return to the off position again and is used to reset devices. (Time adjustable from **1 to 99** seconds)

Relay 4 and 5 can be controlled to the ON or OFF position by the user and will keep the selected position until changed by the user.

The status of all 5 relays is displayed on the home page of the unit by means of green dots

In the "Relay" control page the user can assign names to the relays to help remember what is connected to the relays at the remote site.

5. OPTIONAL RS-232 GSM module and functions

The NPM-RM **GSM** module interfaces to the main unit with a RS232 serial cable.

Setup of GSM module

Insert a SIM card with no pin code request and connect the GSM module to the NPM-RM with the serial cable supplied.
Notice the STATUS led will glow and the NETWORK led will flash at a fast rate
After about 8 sec if the unit finds a Network connection the NETWORK led will start to blink
Slowly, wait about 20 sec before sending an SMS

2 x Cell numbers can be added to the NPM-RM via the Network and GSM setting web page and the cell numbers is stored in the NPM-RM and not in the GSM module, this makes administration of the cell numbers easy to change in future.

Any alarm from the system will be send via SMS to these configured numbers, when the alarm input goes open circuit and when the mains supply fails and restores.***Only if "Enable SMS send from NPM-RM" is marked***

The system will send a **Battery low SMS** if the battery voltage threshold level is reached as configured

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Network Power Monitor R10-SNMP

Home Page
Status
Relay Control
Network & GSM Configuration
SNMP Configuration

Network Configuration

This page allows the configuration of the network and GSM settings.

CAUTION: Incorrect settings may cause the unit to lose network connectivity.

Enter the new Network/GSM settings below:

Cell 1: [08xx]

Cell 2: [08xx]

Low Batt: [Sms@Vdc] 11.8

Uncheck box below-user can still send SMS to unit for control with reply SMS, but SMS(Alarm,Mains and Battery low)send from unit will be disabled

☑ Enable SMS send from NPM-R10
MAC Address: 00:19:F6:00:21:4D
Host Name: NPM-R10
Password: [max 9] admin
IP Address: 192.168.1.2
Gateway: 192.168.1.1
Subnet Mask: 255.255.255.0
Save Config and Reboot

SMS Commands

SMS to send	Reply	Action
Help	Returns a list of SMS commands the unit will respond to as below	
Stat or Status	Returns the Status: Mains power status Current battery voltage Charge and load current Relay 4 and 5 status	
Sig	Returns the current GSM signal strength in %	
Balance	Returns the available airtime and SMS available on the SIM card	
Rr1	Reset Relay 1 OK	Toggle relay 1 for time (programmed by user under relay control page)
Rr2	Reset Relay 2 OK	Toggle relay 2 for time (programmed by user under relay control page)
Rr3	Reset Relay 3 OK	Toggle relay 3 for time (programmed by user under relay control page)
R4on	Relay 4 = ON	Switch Relay 4 ON
R4off	Relay 4 = OFF	Switch Relay 4 OFF
R5on	Relay 5 = ON	Switch Relay 5 ON
R5off	Relay 5 = OFF	Switch Relay 5 OFF

The GSM system software will test for a valid GSM connection every 2 minutes and will auto reboot the module in case the connection was lost to try to re connect the module

5. OPTIONAL Bluetooth module and functions – with free Android app.

The **NPM-BT Bluetooth module** connects to the NPM-R10 via a serial cable supplied.

The Bluetooth module can be used alone just as the GSM module can be used alone

The **Bluetooth module and GSM module can also be used simultaneously**, the Bluetooth module connects to the NPM-R10 main unit and the GSM connects to the Bluetooth modules port marked to GSM.

Mains status (ON or OFF), battery voltage,external 0-100V DC input volts, Charge current, Load current and temperature information is broadcasted over Bluetooth.

Download the free **Mi Bluetooth** app from the google play-store for Android.

The Bluetooth module was originally designed for mining maintenance teams that looks after Wi-Fi trailers in the field that was difficult to access.

The Bluetooth module can be used in any situation where the NPM-R10 is installed in access restricted areas or difficult to reach areas.

No control to the NPM-R10 is possible over Bluetooth, the app and module is read only.
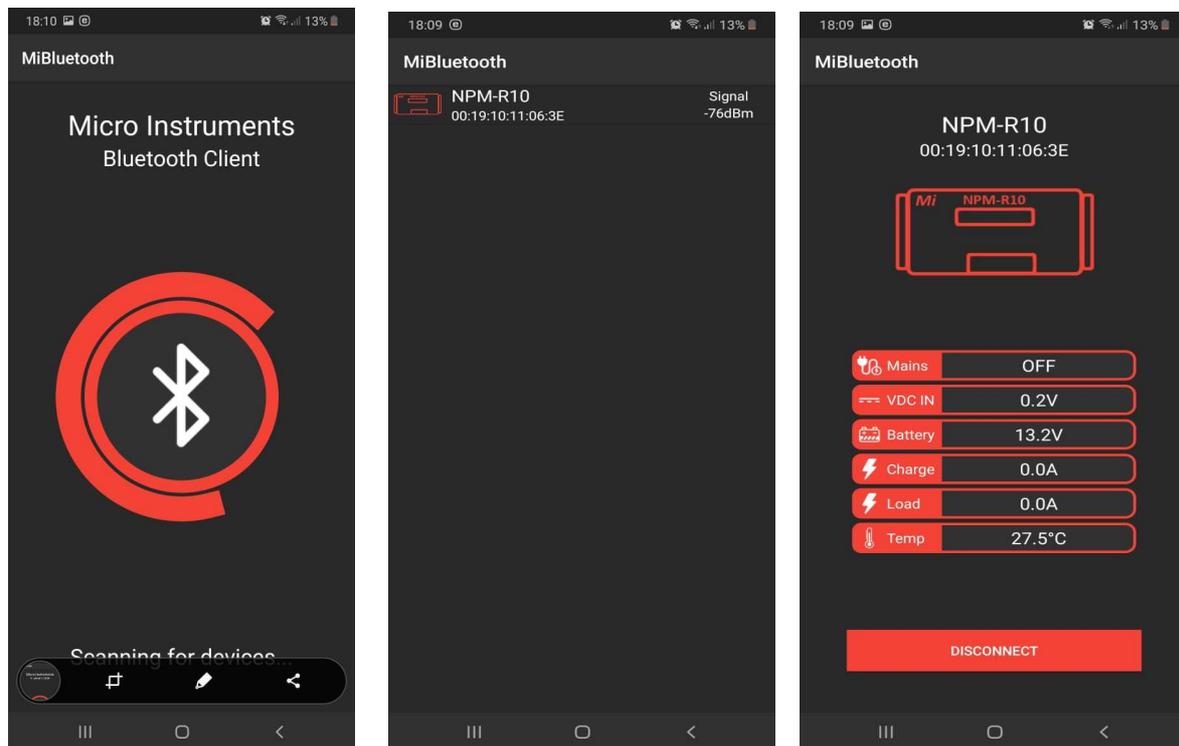
6. START UP

By default the unit is shipped with a default IP address of

192.168.1.2

Micro Instruments Network Power Monitor RM will be displayed where after the current TCPIP stack functions will be displayed.

192.168.1.2 appear on the LCD as the default IP address or the user defined IP if already configured.

Connect to the IP address via a web browser.

Micro Instruments registered private enterprise number (PEN) 45501

To login to the Relay control page , Network settings or SNMP configuration pages the following passwords must be used.

Default : username = admin

Default Password = admin

Login to the Network Configuration page : Password(max 9 characters) User defined Password can be configured and click save

Username : admin

Password : xxxxx (user configured Password)

Please note the there is no backdoor for a forgotten Password and the board will have to be reset to factory defaults

7. HOME PAGE

The Stack version is displayed, the build date of the firmware programmed on to the device, the units serial number as well as the model number.

A visual indication of the status of Relays 5 to 1 is given and indicated by a green dot if the relay is active (powered)

A "module heartbeat" indication by a green dot flashes once per second as the software runs through the TCPIP applications.

Alarm – ON/OFF and Mains –ON/OFF is displayed

 AJAX Browser code for Battery voltage measurements for quick updating of displayed information.

Left hand menu will navigate to different applications on the unit.

8. STATUS PAGE

STATUS

build date of the HEX file programmed and serial number:.

| Feb 14 2020 serial # Mi-0725 |

External Temperature sensor in Degrees Celcius:.

| +28.9 D |

External Voltage 1 input:.

| 00.0V |

Battery 1 Volts(12V):.

| 00.00 V |

Battery 2 Volts(24V):.

| 13.15 V |

Current LCD Display image:.

B: = Battery Voltage

I: = Charge Current to Battery

i: = Load Current to Equipment

Mains: = 220Vac input Status on/off

Load current reading will be replaced with "ALARM !" if active

```
B:13.1 V I:00.0A
MAINS:OF i:00.0A
```

Copyright © 2016-2019 Micro Instruments.

Manufacturing date and serial number is displayed.

External temperature sensor is displayed in degrees Celsius.

External Voltage input V1 is displayed as 0 to 100Vdc

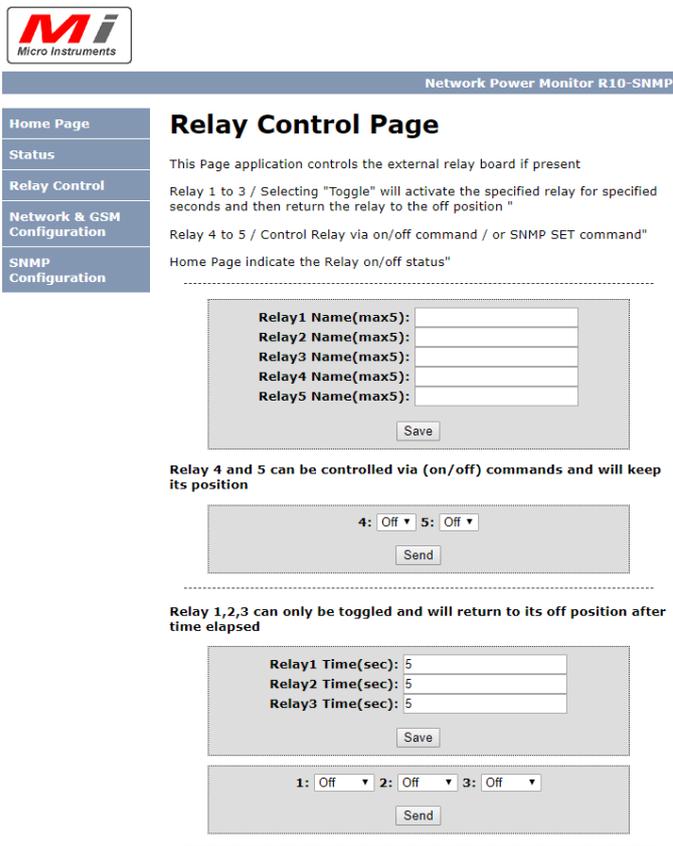**Battery voltage displayed, or both batteries separate and total for 24V systems**

A reflection of the module's LCD display is captured and displayed on this page

Battery voltage, charge current, Mains status on or off and the Load current.

9. RELAY CONTROL PAGE
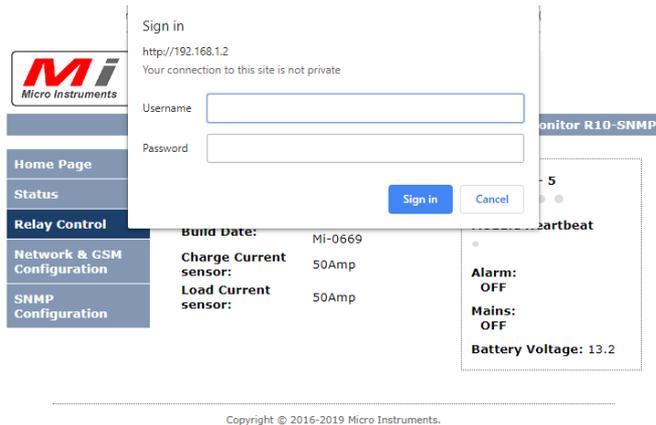
Admin and admin or admin and user defined password to access

Relay 4 and 5 can be controlled to the on/off status or SNMP "SET" commands and will keep their positions, Relay 1 to 3 can only be toggled for the **seconds as programmed** and is typically used to reset radios or routers without logging yourself out completely from the remote site after a relay was accidently switched, relay 1 to 3 will return automatically after the pre-defined seconds to the off position. Names can be assigned to relays to help the user remember what is connected to the relays in the field.

10. SNMP Configuration

admin and admin or admin and user defined Password gains access.

Configure read and write communities

Usually this can be left unaltered

Ireasoning SNMP Walk screenshot

Name/OID	Value	Type	IP:Port
.1.3.6.1.2.1.1.1.0	NPM-R10	OctetString	192.168.1.2...
.1.3.6.1.2.1.1.2.0	.1.3.6.1.4.1.45501	OID	192.168.1.2...
.1.3.6.1.2.1.1.3.0	2 minutes 58 seconds (17805)	TimeTicks	192.168.1.2...
.1.3.6.1.2.1.1.4.0	admin	OctetString	192.168.1.2...
.1.3.6.1.2.1.1.5.0	Micro Instruments	OctetString	192.168.1.2...
.1.3.6.1.2.1.1.6.0	Remote	OctetString	192.168.1.2...
.1.3.6.1.2.1.1.7.0	17	Integer	192.168.1.2...
.1.3.6.1.4.1.45501.1.1.1.0	SNMPv1/2Agent	OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.1.2.0	V10	OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.1.3.0	June 16	OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.2.1.1.1.0	0	Integer	192.168.1.2...
.1.3.6.1.4.1.45501.1.2.1.1.1.1	1	Integer	192.168.1.2...
.1.3.6.1.4.1.45501.1.2.1.1.2.0	0	Integer	192.168.1.2...
.1.3.6.1.4.1.45501.1.2.1.1.2.1	0	Integer	192.168.1.2...
.1.3.6.1.4.1.45501.1.2.1.1.3.0	0.0.0.0	IpAddress	192.168.1.2...
.1.3.6.1.4.1.45501.1.2.1.1.3.1	0.0.0.0	IpAddress	192.168.1.2...
.1.3.6.1.4.1.45501.1.2.1.1.4.0		OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.2.1.1.4.1		OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.1.0	0	Integer	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.2.0	0	Integer	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.3.0	0	Integer	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.4.0	13.1	OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.5.0	00.0	OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.6.0	00.0	OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.7.0	00.1	OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.8.0	+28.9	OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.9.0	0	Integer	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.10.0	B:13.1 V I:00.0AMAINS:OF i:00.0A	OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.11.0	00.00	OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.12.0	13.15	OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.13.0	00.00	OctetString	192.168.1.2...
.1.3.6.1.4.1.45501.1.3.14.0	00.00	OctetString	192.168.1.2...

11. NETWORK CONFIGURATION PAGE

Admin and **admin** or **admin** and **user defined Password** gains access

MAC address and Host name is displayed and cannot be changed

Setup IP address, Gateway and Subnet Mask

Enter Cell numbers and battery low level if GSM module is connected

Save Configuration – unit will reboot

The system will also reboot the GSM module if connected

12. TFTP Boot-loader

NPM-RM supports **TFTP** Boot-loader for upgrading device software remotely over a network.The MAC address of the unit is hard coded into software for safety reasons so first obtain a .hex file from us for the specific unit before attempting TFTP.

Use TFTP file up-loader downloadable from our website

The user can TFTP to the units current IP address while running or to the private IP address 192.168.97.60 in the first 5 seconds from powering the board.

A TFTP session can also be initiated while the unit is in run mode to the current configured IP address of the unit.

Should the user also have to re-load the webpage files obtained from us

Enter into a web Browser (if default IP address – or enter current IP address of the board)   http://192.168.1.2 /mpfsupload

A window will appear in the browser giving the user the option to browse for the web page files and to upload them to the NPM-RM internal memory.

13. OID Table

1.3.6.1.4.1.45501.1.3.1.0 = Relay 4 status (integer) 0 off / 1 on

1.3.6.1.4.1.45501.1.3.2.0 = Relay 5 status (integer) 0 off/1 on

1.3.6.1.4.1.45501.1.3.3.0 = Mains status (integer) 0 off / 1 on

1.3.6.1.4.1.45501.1.3.4.0 = Total Battery voltage (octet string)

1.3.6.1.4.1.45501.1.3.5.0 = Charge current (octet string)

1.3.6.1.4.1.45501.1.3.6.0 = Load current (octet string)

1.3.6.1.4.1.45501.1.3.7.0 = External Input voltage (octet string)

1.3.6.1.4.1.45501.1.3.8.0 = Temperature (octet string)

1.3.6.1.4.1.45501.1.3.9.0 = Alarm status 0 off / 1 on

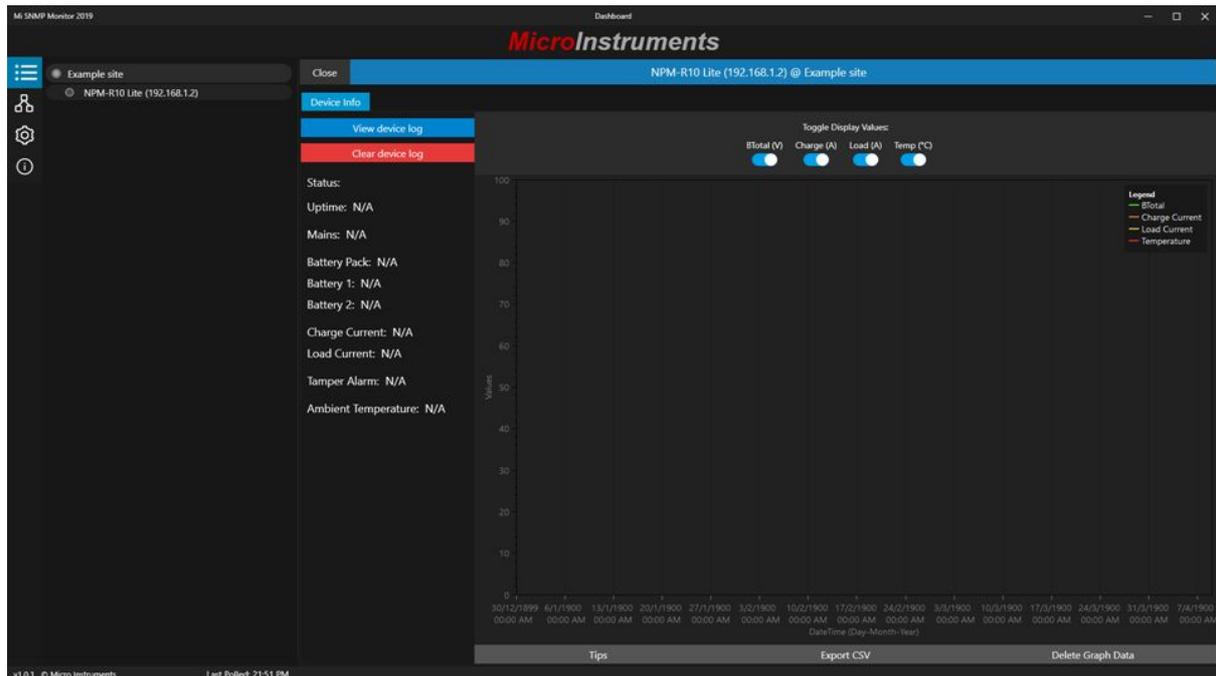**1.3.6.1.4.1.45501.1.3.10.0 =** LCD display string image

1.3.6.1.4.1.45501.1.3.11.0 = Battery 1 (12V) value

1.3.6.1.4.1.45501.1.3.12.0 = Battery 2 (24v) value

1.3.6.1.4.1.45501.1.3.13.0 = NOT USED

1.3.6.1.4.1.45501.1.3.14.0 = NOT USED

MI SNMP Monitor software for Microsoft Windows

Mi SNMP Monitor is a standalone Microsoft Windows SNMP (simple Network Management Protocol) software application to monitor all Remote power monitoring products manufactured by Micro Instruments. It will also be future compatible with all new products supporting SNMP.

Features:

Plug and Play setup – Quick and easy setup of Mi remote monitoring devices

Can add 3rd party devices to ping the equipment to indicate online / offline status

Graphing – each device added will have its own graphical presentation of all measured data and is unit specific.

Email alerts – Multiple email addresses can be added to the system for all alarm notifications, units going offline and online etc. via email

Import and Export – Easily import and export all devices & application settings for easy restore of all information.

Mi SNMP Monitor can be downloaded **FREE** from www.microinstruments.co.za as a fully functional SNMP monitor application for windows. The software package monitors all Mi remote power monitors and also include a ping feature for other devices on the network

14.Physical dimensions

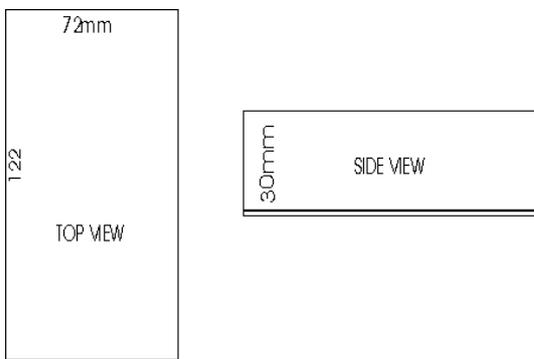**NPM-RM / 19" Rack mount Network based Power Monitor System**

(L) = 440mm

(H) = 50mm

(W) = 100mm

Weight = 1.1 kg

RS232- GSM Module

Bluetooth module