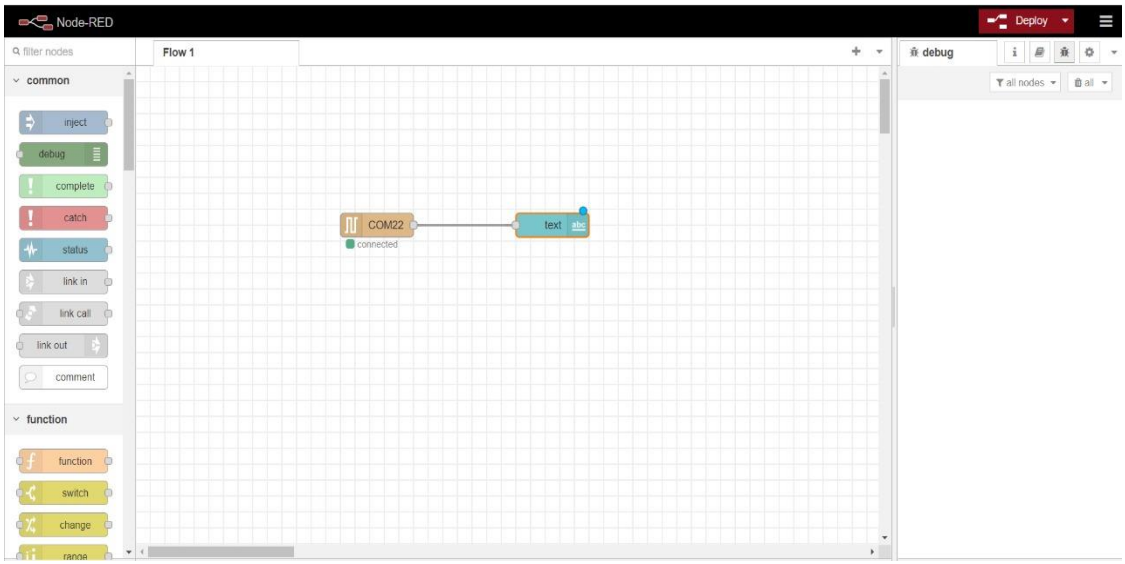
Power Meter Monitor

Business and Mission-

Critical Solutions Provider

PMM06 Integration with Node-RED

User Manual



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1. INTRODUCTION

This Document is a fully descriptive guidelines for integrating PMM06 series with Node-RED. Providing the operator with the needed information in terms of instructions and screen layout allowing for easy use.

1.1 Description

PMM PLC Systems are built to be Arduino compatible programming environment, where our PLC Range is not just compatible with Arduino IDE, but with lots of other Arduino-compatible programming software such as Node-RED.

Node-RED is a flow-based programming tool, ideal for Internet of Things applications. It wires together hardware devices, APIs and online services It provides a browser-based editor that makes it easy to wire together flows using the wide range of nodes in the palette that can be deployed to its run time. - 100% Free software license - Ready for Industrial and home IoT systems based on Node.js - Very active community.

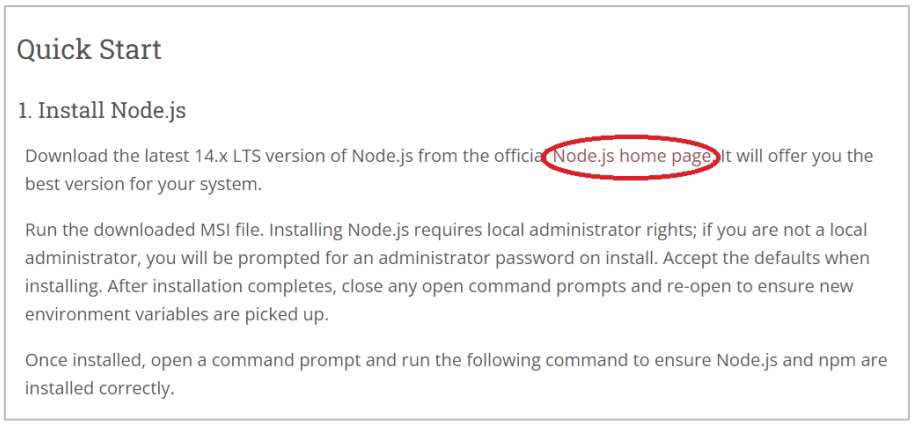
1.2 List of Compatible devices

- PMM0612
- PMM0620
- PMM0625
- PMM0626
- PMM0627
- PMM0628
- PMM0630
- PMM0631
- PMM0632
- PMM0635
- PMM0636
- PMM0638
- PMM0639

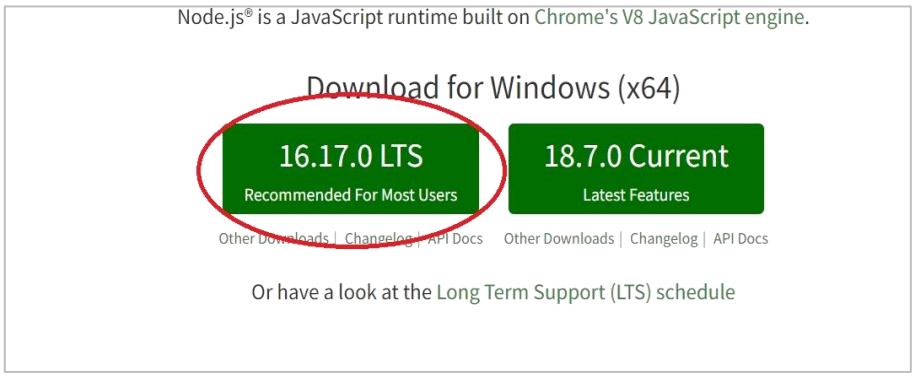
2. INTEGRATION GUIDELINES

2.1 Node-RED Installation Guidelines

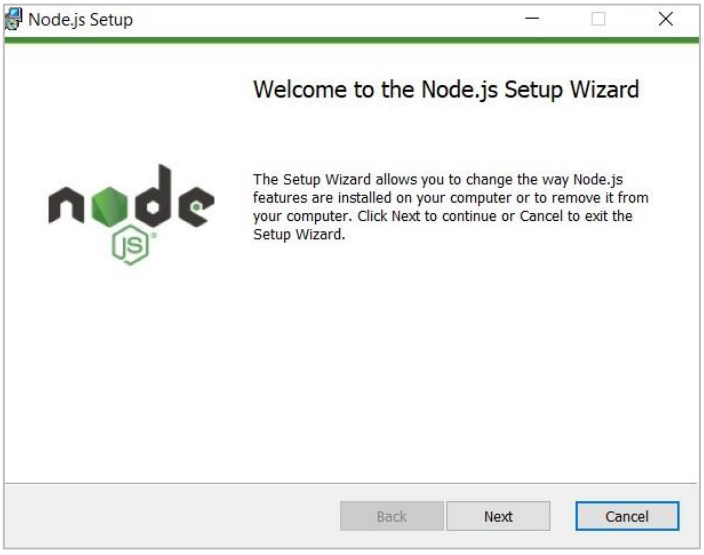
1. Click Here to get to the installation page.
2. Once the main page is opened, go to “Quick Start” section and click on “Nodes.js home page” as shown in the figure below.

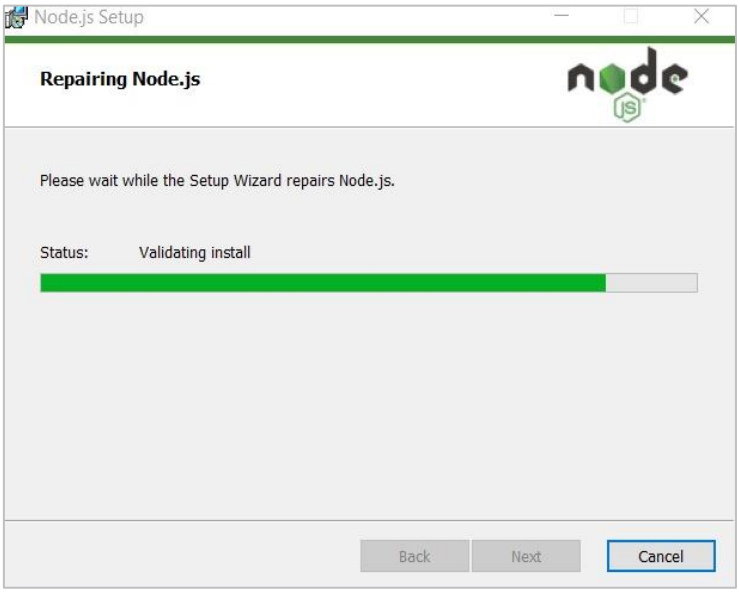


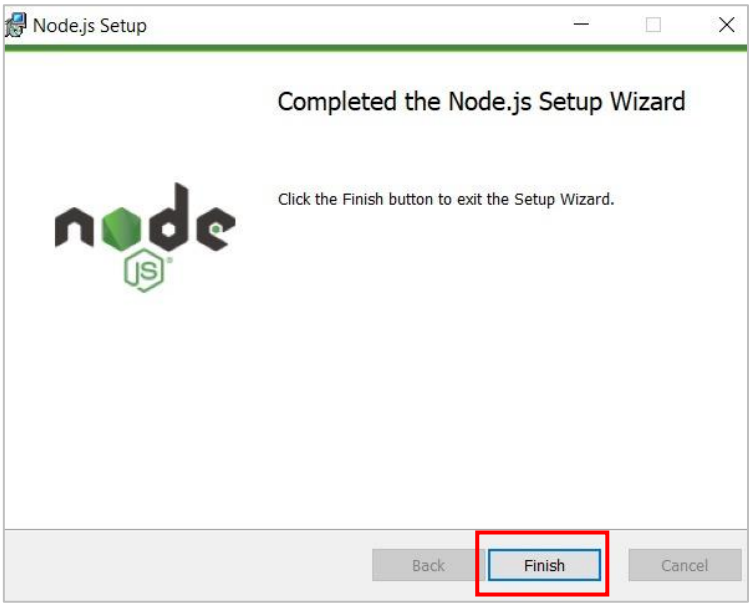
3. Choose which version to download. Most users download Version 16.17.0 LTS which is recommended for most users as shown below.



4. Node.js setup process will start, click on “Next” to continue the setup to the completion as shown in the figures below.







5. Once installed, open a command prompt and run the following command to ensure Node.js is installed correctly.
6. Type the command “node -v” to view the version of the installed node red. You should receive back output that looks similar to:

```
v14.17.2.0
6.14.13
```

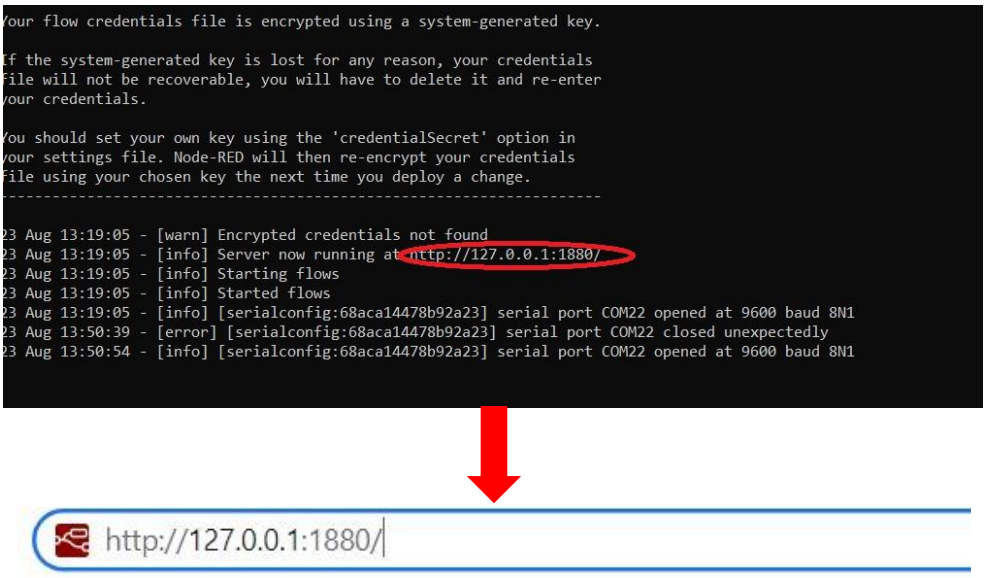
7. Installing Node-RED as a global module adds the command node-red to your system path. Execute the following at the command prompt:

```
npm install -g --unsafe-perm node-red
```

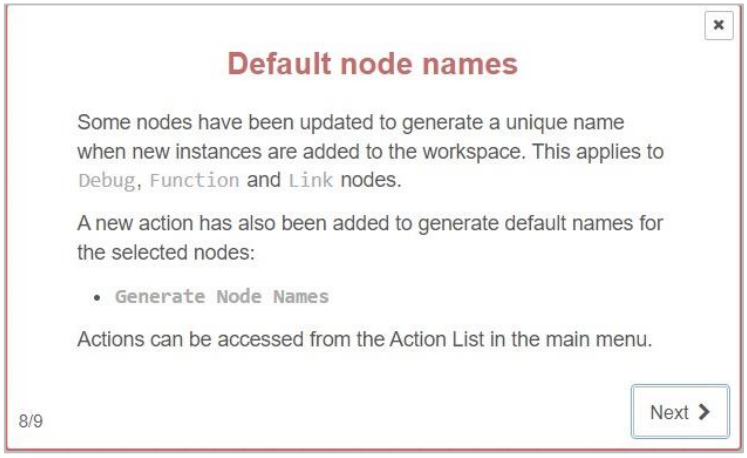
8. Now close the command prompt, and reopen it.
9. To enable npm to compile binaries on the Windows platform, install the windows-build-tools module using the command prompt as an Administrator:

```
npm install --global –production windows-build-tools
```

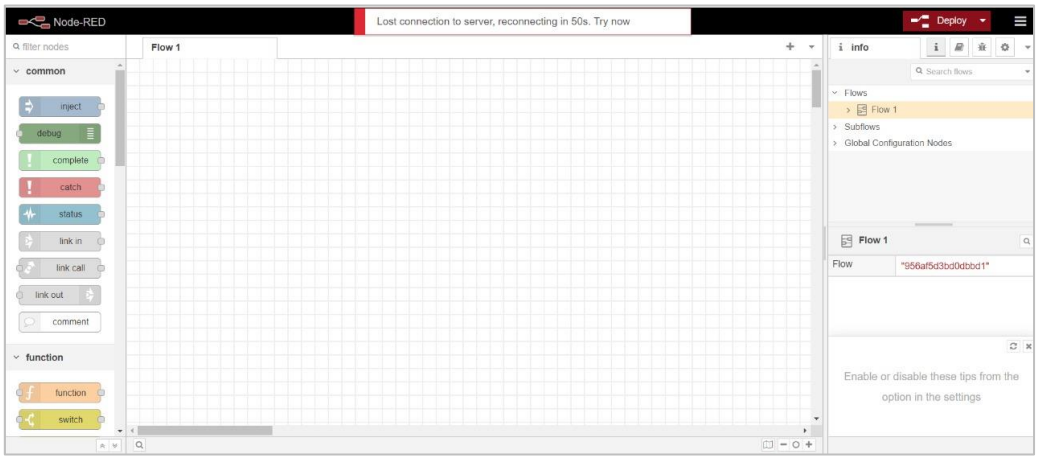
10. Type the command “node-red”, a server link will be displayed as shown below. Copy and paste the link to any browser and press enter as shown in the figures below.



11. The default node names window will be displayed, click on “Next” as shown in the figure below.



12. Now everything is setup and the user can start with the device.



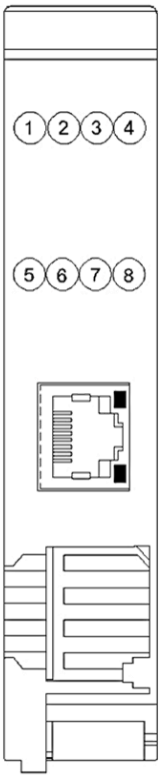
3. PMM0620 INTEGRATION with Node-RED TUTORIAL

This section is full descriptive of the instructions related to connecting PMM0620 to Node-RED. PMM0620-024 is a reliable, and simple to set up digital Input module that has 12 isolated channels. The module receives digital signals from sensors and field devices of 24V range. The LED indicators indicate the instantaneous status of the field devices whether ON or OFF. PMM0620-024 is widely used in signal interface switching of PLC, single chip or other industrial control board.
Moreover, PMM0620-024 operates under three operational modes:

- **Modular operation mode**: the module is connected to a PLC by RS485 and implement specific function assigned by the PLC.
- **Fail Safe mode**: the module should be pre-programmed in case of lost connection with the PLC to carry on its function effectively.
- **Stand-alone**: the module can be programmed to work as PLC and control the field devices.

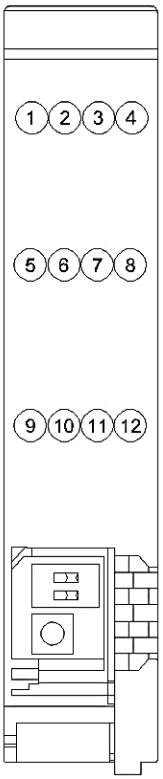
3.1 Pin Assignments

TOP VIEW



1. D+ (RS485)
2. D- (RS485)
3. Common
4. Common
5. V DC+ (10-60)
6. V DC- (10-60)
7. Earth
8. Earth

BOTTOM VIEW



1. Digital Input 01
2. Digital Input 02
3. Digital Input 03
4. Digital Input 04
5. Digital Input 05
6. Digital Input 06
7. Digital Input 07
8. Digital Input 08
9. Digital Input 09
10. Digital Input 10
11. Digital Input 11
12. Digital Input 12

3.2 HARDWARE CONNECTIONS

Connecting Power

PMM0620-024 has two power supply options 10-60V DC or 10-40 V AC, the user has to connect the positive power line (+) to pin no.5 in the top view and the negative line (-) to pin no.6 as illustrated in the pin's assignments.

Note: the power is protected against overvoltage and reverse polarity in case of wrong connection.

Connecting Serial Device

The unit's serial port is located on the top panel. If you are connecting an RS485 multidrop network with multiple devices, note the following:

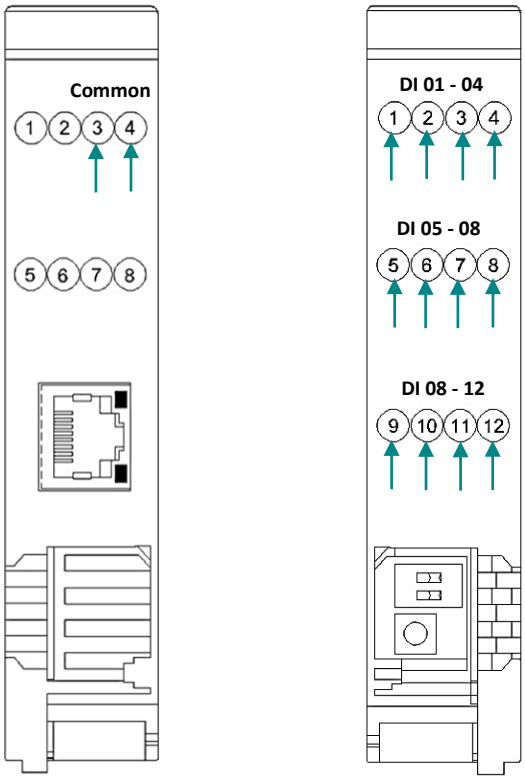
- All devices that are connected to a single serial port must use the same protocol (i.e., either Modbus RTU or Modbus ASCII).
- Connect the D+ with pin no.1 and D- with pin no.2 and Earth with pin no.4 as illustrated in the pin's assignments to complete the connection successfully.
- Turn on the dip switch to have 120 Ω termination resistor between the D+ and D- lines. Refer hardware configuration section.

Connecting to a Host or the Network

There is a 10/100 Ethernet port at the module's top panel. This port is used to connect the module with a host or Ethernet network.

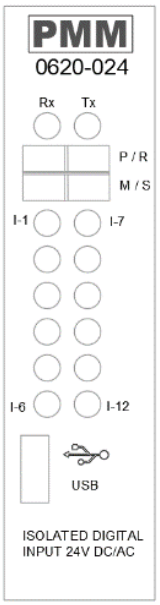
Connecting Digital Input

Connect the signal line with one of the twelve digital input pins on the bottom view (01-12) and the common line with pin no.3 or 4.



There are 14x LED indicators at the front panel. 2x LED are for communication indication through RS485 port and 12x LED for indicating the inputs status.

LED No.	Indication
Rx, Tx	Indicating the communication through RS485 port OFF: No Data is being transmitted or received through the port Steady-Green: Data is being transmitted or received through the port
Ix-I12	Indicating the status of Input x OFF: Input x is off Steady-Green: Input x is on



Connecting the USB

Connect the USB to the device through the USB port in the front panel (Micro-USB type), and connect the other side with personal computer (PC). Once the USB is connected correctly between the device and PC, the user can start the integration as explained in the Integration Guidelines:

1. Upload the desired code on the device by using the Arduino IDE or Visual Studio or any other platform. Click here for more detailed guidelines PLC Software.

Note: the following code example aims to define Pin No.4 as an input and monitor its status between ON/OFF when an input device is connected to it, as shown in the figure below.

sketch_aug03a | Arduino 1.8.19 (Windows Store 1.8.57.0)

File Edit Sketch Tools Help

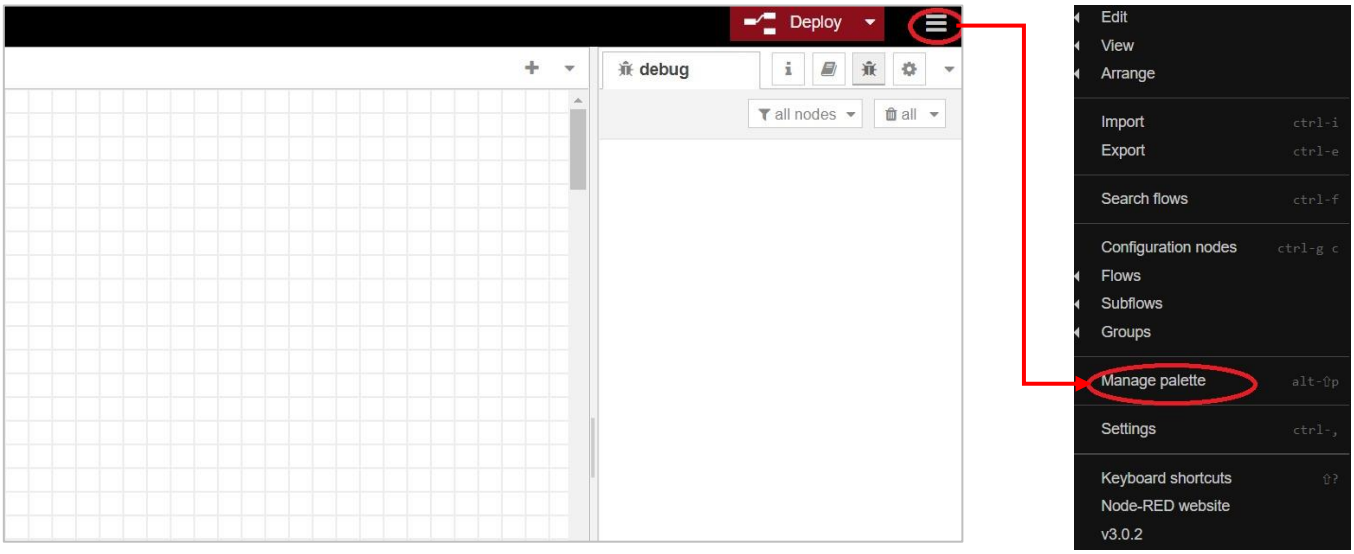
sketch_aug03a §

```
#include <Arduino.h>

int ledPin = 4; // LED connected to digital pin 4

void setup()
{
  Serial.begin(9600);
  SerialUSB.begin(9600);
  pinMode(ledPin, INPUT_PULLUP); // sets the digital pin 4 as INPUT
  delay(2000);
  SerialUSB.println("hello");
}

void loop()
{
  int val = digitalRead(ledPin); // read the input pin
  if (val == HIGH)
  {
    SerialUSB.println(0);

  }
  else
  {
    SerialUSB.println(1);

  }
}
```

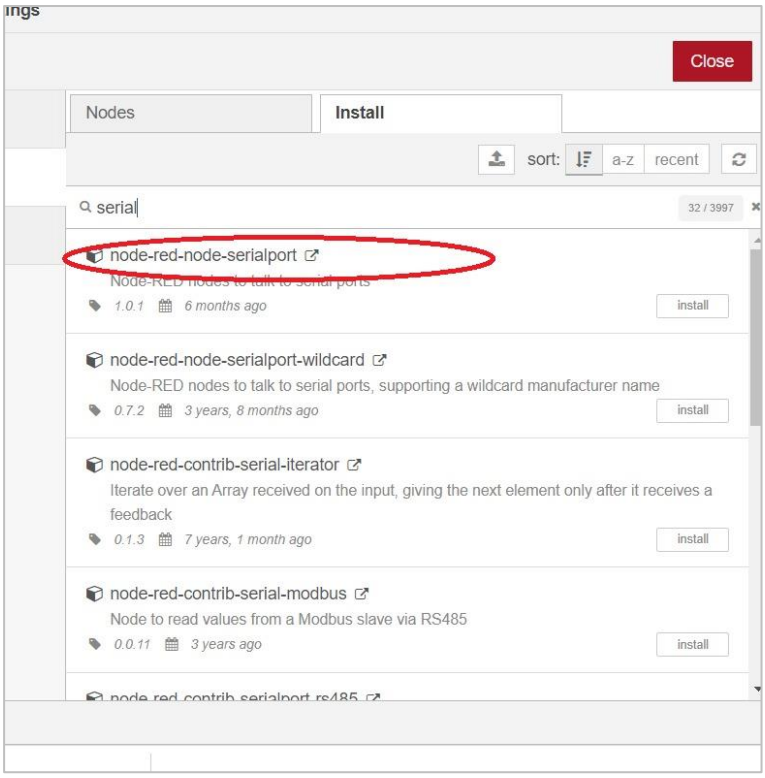
2. Once the code is successfully uploaded on PMM0620, close Arduino IDE or any other used platform.

Note: It is not possible to have two different applications sharing the same serial port connection.

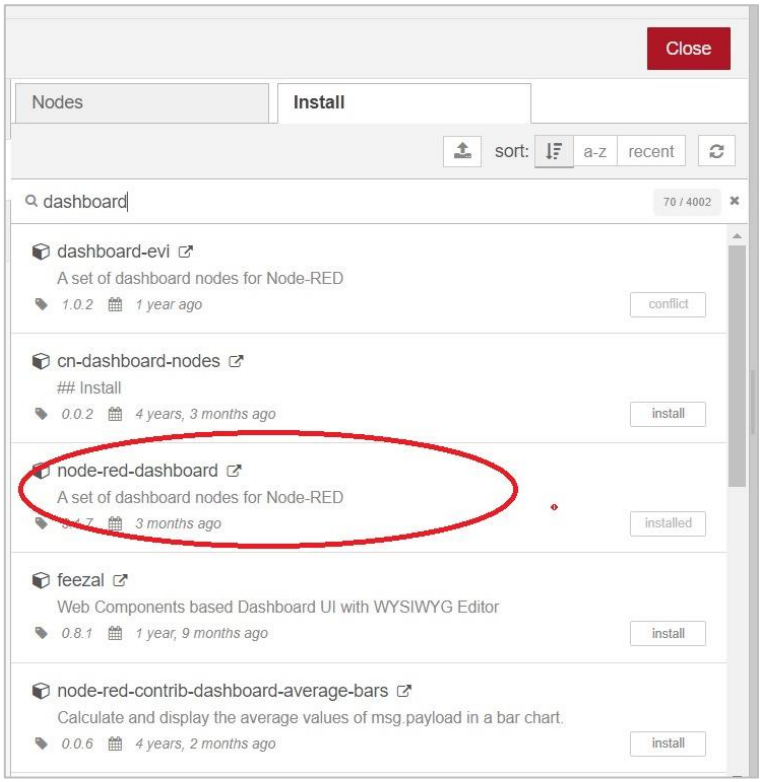
3. Open Node-RED platform, and click on “Manage Palette” to add the needed modules as shown below.



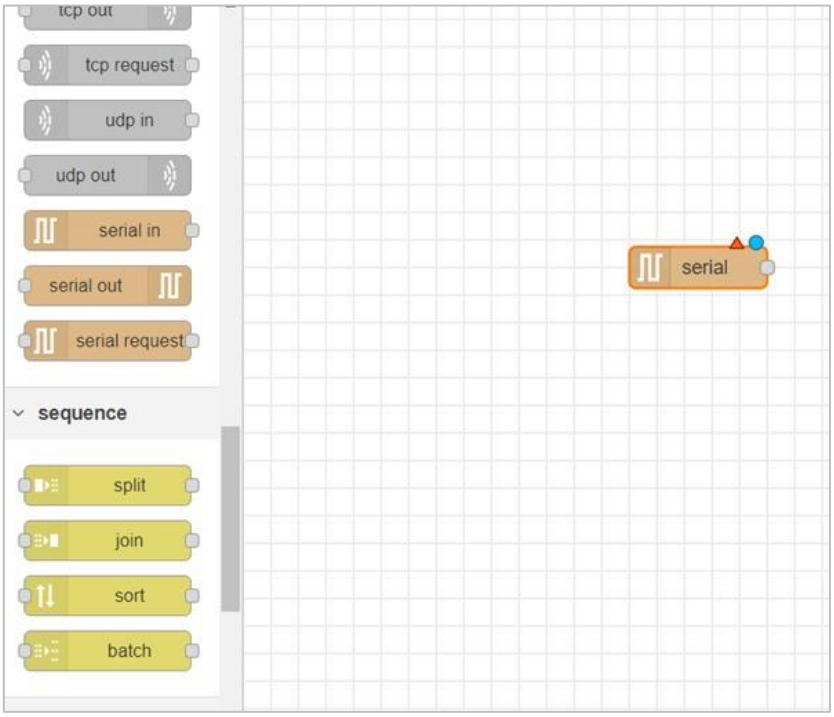
4. Search for “Serial” options then choose “node-red-node-serialport” as shown below.
5. Click on “install”.



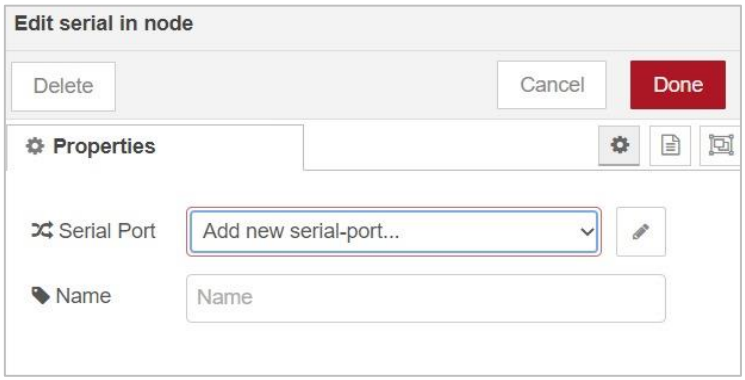
6. Search for “dashboard” module that opens new blocks which display the input value (0 or 1), then choose “node-red-dashboard”.
7. Click on “install”.



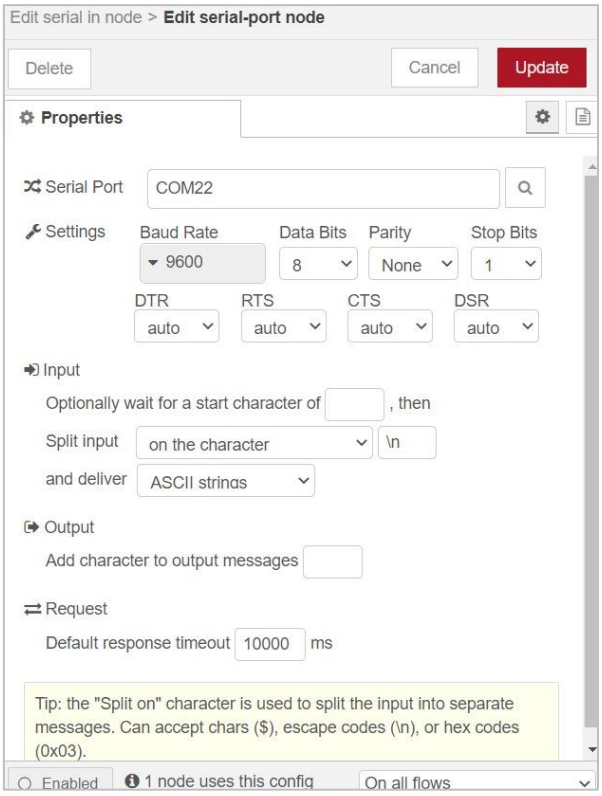
8. The installed modules will be found in the workspace.
9. Drag the serial port block and drop it where it is needed.



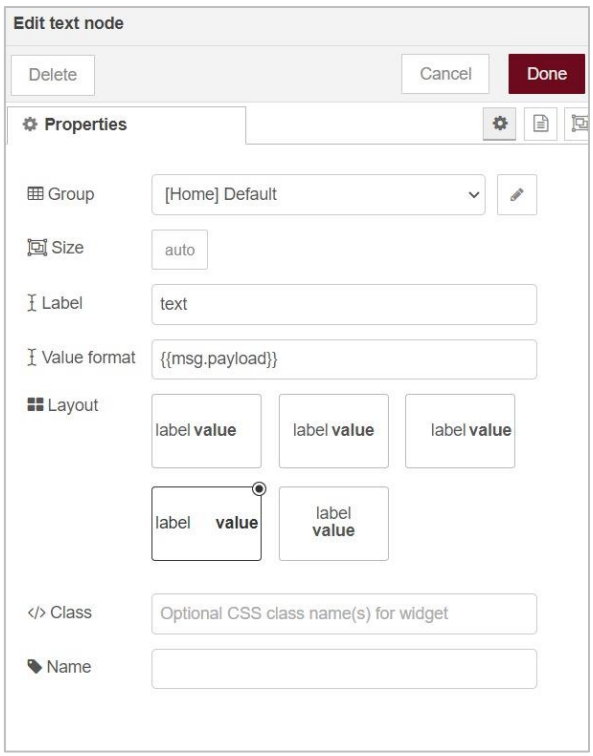
10. Double click on the serial module to edit the properties.



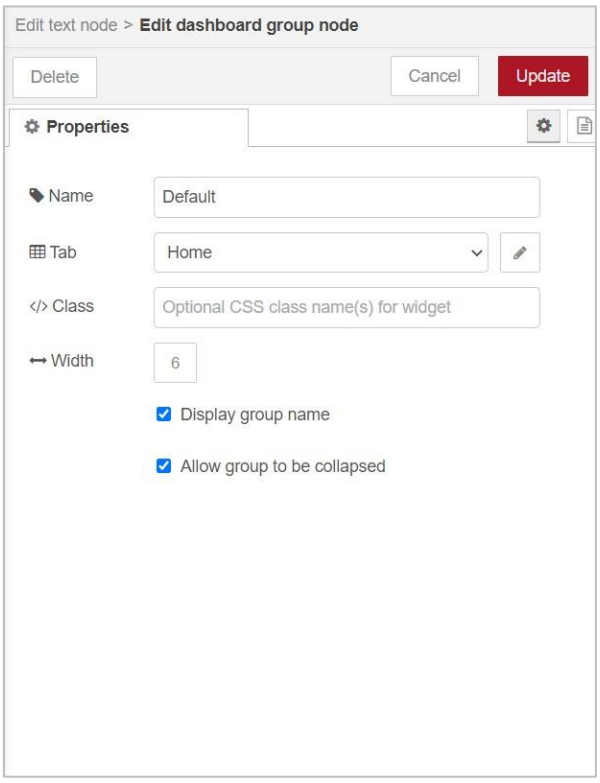
11. Type the desired name in the specified space.
12. Click on the “pin icon” to edit the properties. The following window will be displayed.



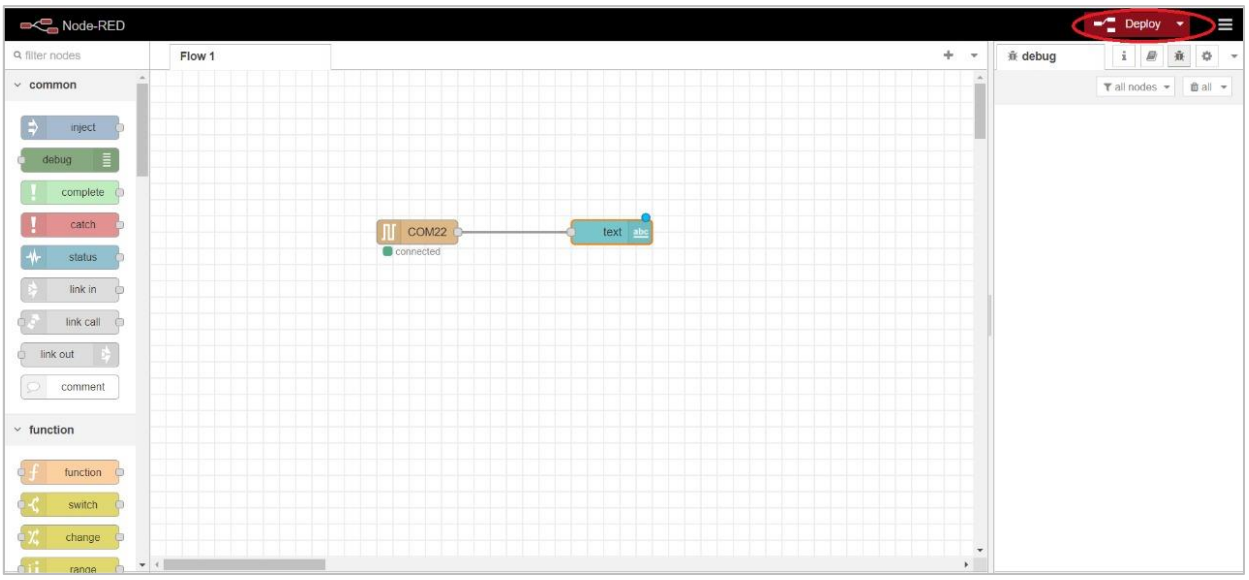
13. Choose from the drop lists the desired settings based on the code such as baud rate, data bits, parity and stop bits.
14. Once the port configuration is completed click on “update”
15. Drag the dashboard block and drop it where it is needed.
16. To edit the “Dashboard” block name and settings double click on the block.
17. The following window will be displayed.



18. Click on the “pen icon” the following window will be displayed.

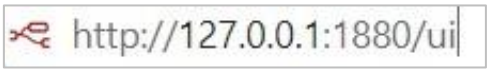


19. Make sure that “Display group name” and “allow group to be collapsed” are both enabled.
20. After completing the settings click on “Done”.
21. Connect the two blocks together in the workspace.
22. And click on “Deploy”.



23. Open the user interface page to monitor the status of the input.
24. Copy the same http address that has been used.

25. Type “ui” after the / and press enter.



26. Connect a digital input with PMM0620 to pin no.4 to monitor its status. If the input is on the text value will be **1** if it is off the text value will be **0**.