

Setting up Power Meters using Modbus Poll

Notes

- This document describes how to use **Modbus Poll** to update modbus settings. Disregard this document if you use another program.

Warnings

- Make sure you connect the Power Meter to **24vDC** otherwise permanent damage can be done to the Modbus Integrator.
- Power meters communicate in Hex format, **not** binary.
- Take care to ensure that you are sending the right commands otherwise permanent damage can be done to the power meter.

Tools and Equipment needed

(not included in power meter pack)

- 24vDC Power Supply
- USB/RS485 Converter
- Modbus Poll software

Modbus Poll is a Modbus master simulator that allows you to update Modbus settings of your product. You can download Modbus Poll software from <https://www.modbustools.com/download.html>

Note: the free version of Modbus Poll only allows you to connect to a sensor for limited periods, however this is generally enough time to program the Modbus integrator. If you intend to use Modbus Poll for more than 30 days, you will need to buy a license. Refer to the Modbus Poll website for more information.

How to Update the Power Meter's Modbus Settings

- Connect Power Meter to (i) USB/RS485 Converter, (ii) Power Supply and (iii) Computer
 - See Steps 1, 2, 3
- Connect Power Meter to Modbus Poll Software
 - See Step 4
- Change Modbus settings to preferred settings
 - See Step 5
- Check Rogowski Coil settings, Wire settings and Modbus Communication settings.
 - See Step 6
- Disconnect Power Meter. It's now ready to use.
 - See Step 7

Step 1 – Connect the USB/RS485 Converter to the Power Meter

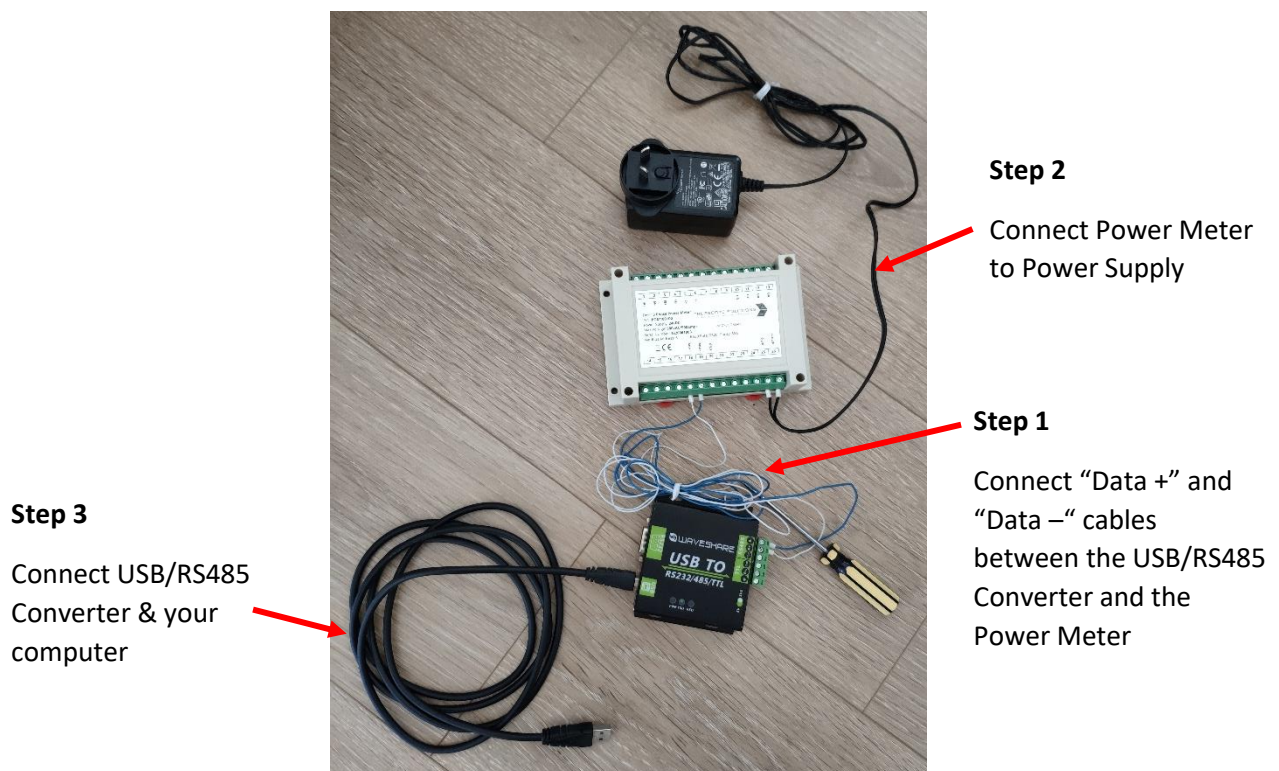
- Connect the data cables between the USB/RS485 Converter and the power meter.
 - Make sure to match the “Data –” and “Data +” cables on both units.

Step 2 – Connect the Power Meter to Power Adapter

- Connect the 12V power adapter to the power meter
 - Make sure to match the Positive wires (+24v DC) and Negative wires (0 vDC) on the Power meter and power adapter

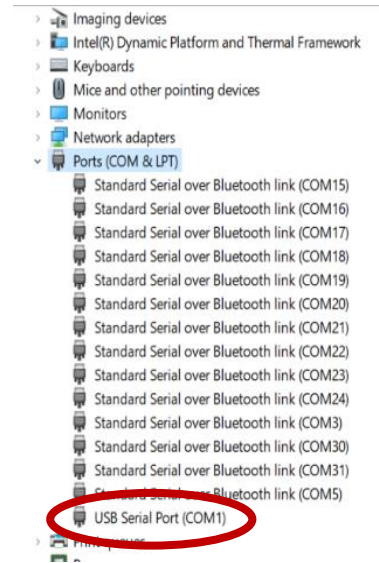


Warning: Make sure you connect the Power Meter to **24vDC** otherwise permanent damage can be done to the Modbus Integrator.



Step 3 - Connect USB/RS485 converter to computer

- Plug the USB/RS485 converter into one of your computer’s USB ports. The preference is to connect the converter to the COM1, COM2 or COM3 port.
- On your computer, go to “Device Manager” > “Ports (COM & LPT)” and check which port the USB/RS485 Converter is assigned to.
 - The USB/RS485 Converter should be assigned to:
 - “USB Serial Port (COM1)”, OR
 - “USB Serial Port (COM2)” OR
 - “USB Serial Port (COM3)”
 - In the diagram (right), the USB/RS485 Converter is assigned to “USB Serial Port (COM1)”.
- If the USB/RS485 Converter is assigned to another COM Port (eg COM4, COM5, etc), you will need to reassign the converter to COM1, COM2 or COM3. To do this:
 - right click on device and select “Properties”
 - select “Port Settings” tab > “Advanced” settings
 - change the COM port accordingly.
 - **DO NOT CHANGE ANY OTHER SETTINGS IN THESE TABS.**



Step 4 – Connect Power Meter to Modbus Poll

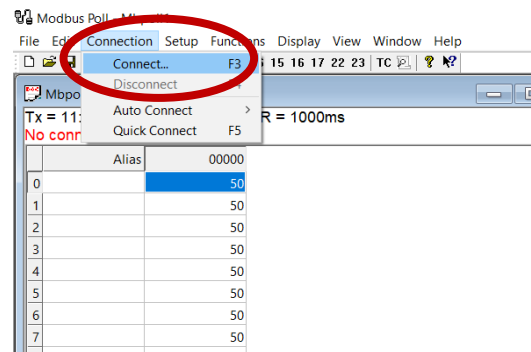


Refer to the Power Meter’s User Manual for the Modbus communication protocol.

- On your computer, open “Modbus Poll” software
 - If you don’t have the software, you can download it from here: https://www.modbustools.com/modbus_poll.html

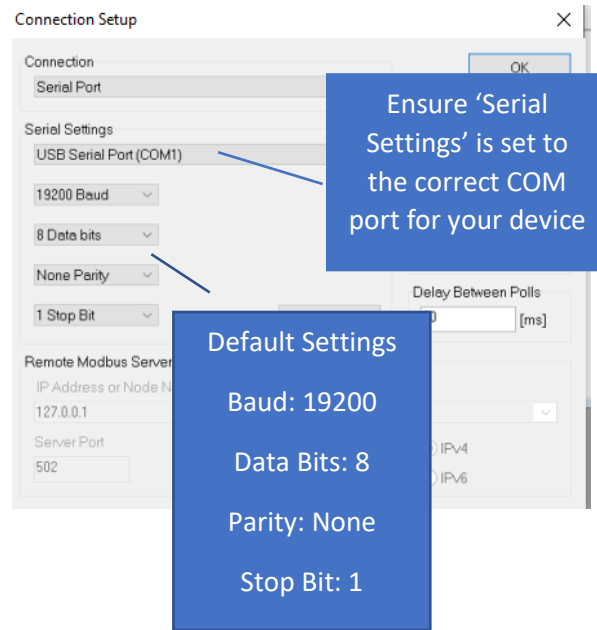
In the Modbus Poll Software:

- Select the “**Connection**” Tab > “**Connect**”

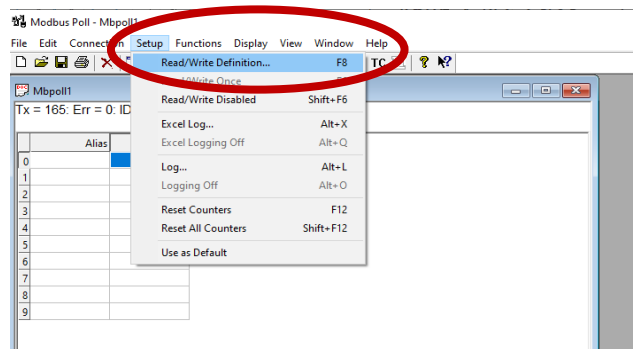


In **'Serial Settings'**,

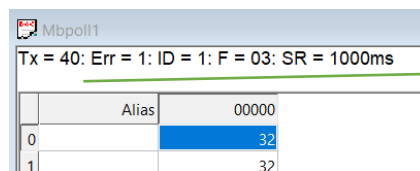
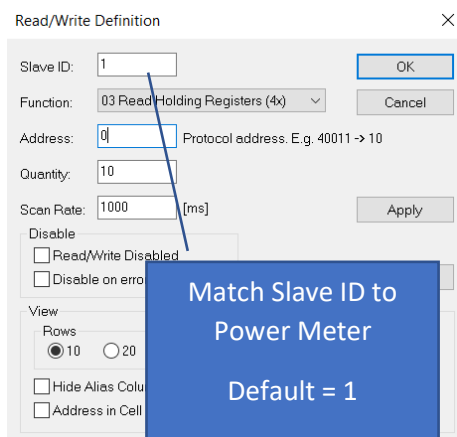
- select the correct USB Serial Port (COM) for your device.
 - Eg, if you connected the USB/RS485 Converter to COM2, then select 'USB Serial Port (COM2)' from the drop down list
- Set Modbus settings to default of power meter, which are:
 - Baud Rate: 19200
 - Data Bits: 8
 - Parity: N
 - Stop Bit: 1
- Click **"OK"**



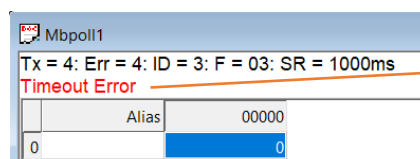
- Go to the **"Setup"** Tab > **"Read/Write Definition"**



- Match Slave address to the power meter.
 - The default setting is 1. However, you may need to try several different numbers to find the right one.
- Click **OK** to test if the slave address is correct.



Slave address is correct
No error msg



Slave address is WRONG
Timeout error msg

Step 5 – Change Modbus settings



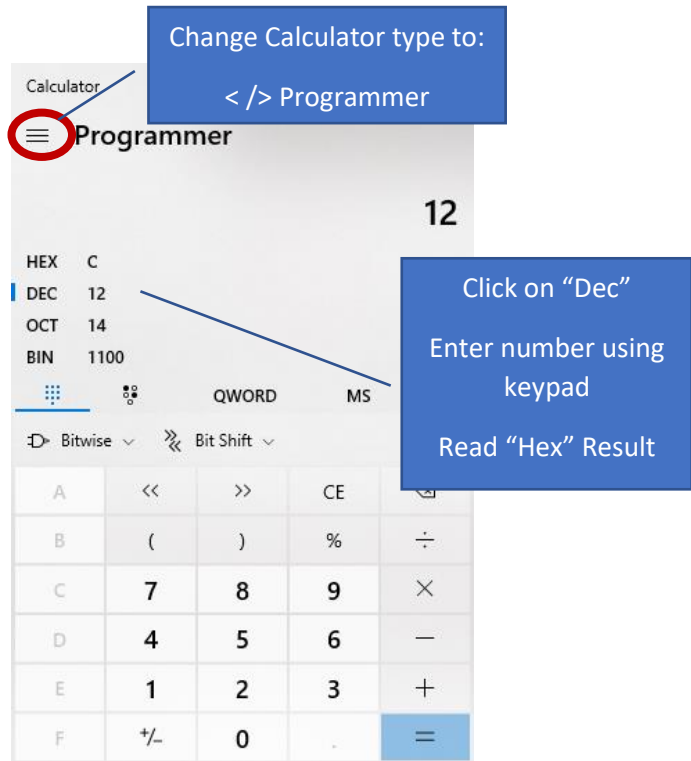
Warning: Power meters communicate in Hex format, **not** binary.

Converting Decimal to Hex

You can use the **Programmer** option on your calculator to work out the HEX codes.

Example: To calculate the Hex number for a Modbus Address of 12:

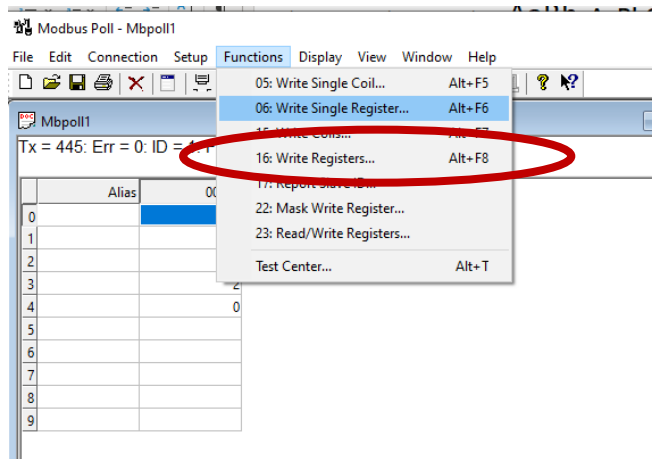
- Select “Dec”
- Type in 12 using the calculator’s keypad
- Read the Hex Result. In this example, the Hex number is C
- Enter “C” into register 301 of Modbus Poll



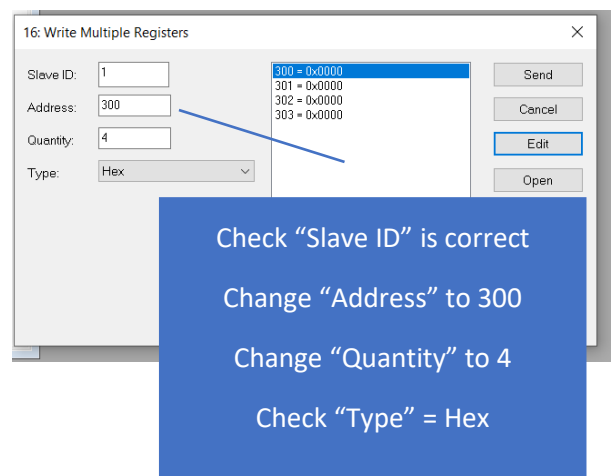
Hex Codes

	Modbus Setting	Decimal	Hex Code
Register 300	03EA	1002	03EA
Modbus Address (Register 301)	1	1	0001
	2	2	0002
		
	247	247	F7
Baud Rate (Register 302)	1200	0	0000
	2400	1	0001
	4800	2	0002
	9600	3	0003
	19200	4	0004
Parity (Register 303)	Odd	0	0000
	Even	1	0001
	None	2	0002

- Click on **Functions > 16: Write Registers**



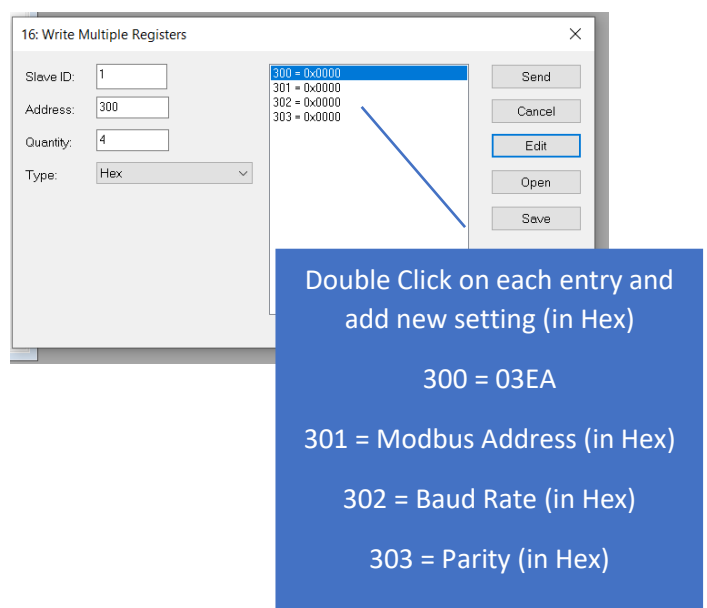
- Make sure the **Slave ID** matches the power meter.
- Change Address to **300**
- Change Quantity to **4**
- Change Type to **Hex**



WARNING: All 4 registers (300, 301, 302, 303) must be filled in prior to selecting "Send". Make sure all 4 registers have the correct information. Failure to do so will result in a permanent setting error of the sensor that cannot be recovered.

Edit the 300, 301, 302 and 303 registers as follows:

- Double click on register **300**
- Change value to 03EA (Register 300 is always set to 03EA)
- Double click on Register **301**
- Enter new Modbus address (in Hex format, see previous page)
- Double click on Register **302**
- Enter new Baud Rate (in Hex format, see previous page)
- Double click on Register **303**
- Enter new Party (in Hex format, see previous page)



- **Tip:** Write the Modbus settings on the front of the Power Meter so you don't forget them



WARNING: All 4 registers (300, 301, 302, 303) must be filled in prior to selecting "Send". Make sure all 4 registers have the correct information. Failure to do so will result in a permanent setting error of the sensor that cannot be recovered.

- Once all 4 registers are set, click **Send**
 - When you hit Send, you will get an error message. **This is normal.** The error message appears because the Modbus settings have changed and the Power Meter can't communicate with Modbus Poll.
- Close the error message and close the setting box.
- Disconnect then reconnect the Power Meter using the new Modbus settings (see below).

Example:

This device is set to:

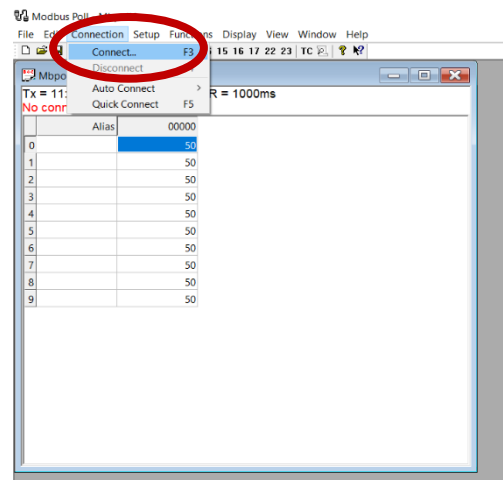
- Modbus Address: 2
(Register 301 - Hex code: 0002)
- Baud Rate: 9600
(Register 302 - Hex code: 0003)
- Parity: NONE
(Register 303 - Hex code: 0002)

300 = 0x03EA
 301 = 0x0002
 302 = 0x0003
 303 = 0x0002

The Communication Code =
 03 FA 00 02 00 03 00 02

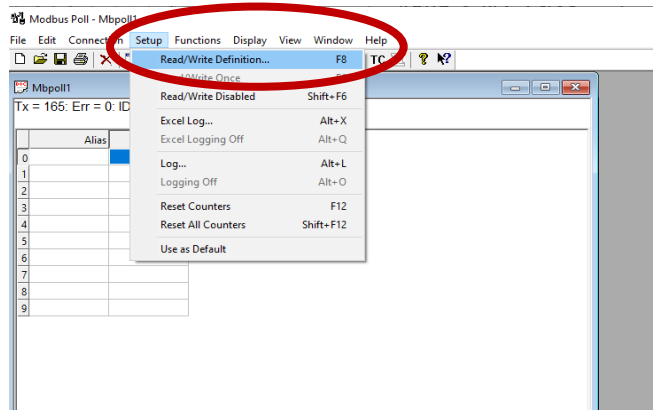
To disconnect, then reconnect the Power Meter to Modbus Poll, go to:

- "Connection" > "Disconnect"
- "Connection" > "Connect"
- Follow Step 4 (above) to enter the correct Modbus settings (Baud Rate, Parity & Slave ID)
- Go to **Setup > Read/Write Definition** and change the Slave ID to the new address.

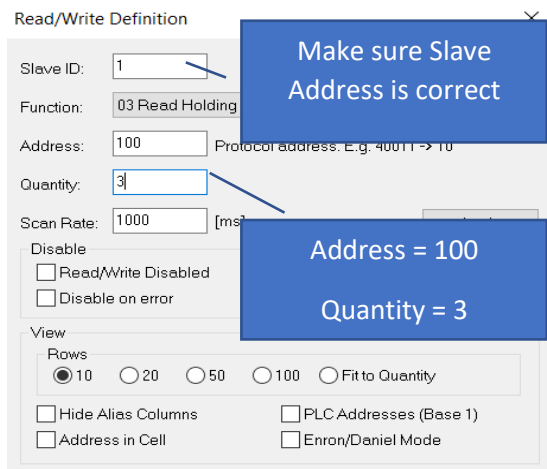


Step 6 – Check Settings

- Go to **“Setup” > “Read/Write Definition”**

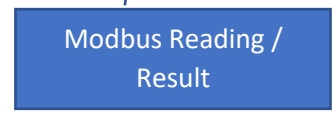
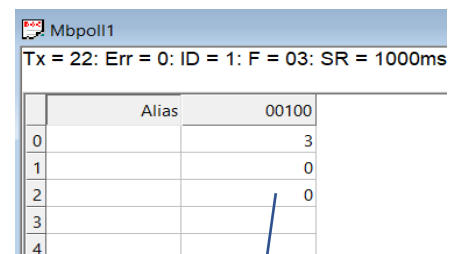


- Change **‘Address’** to the first register you want to read (see following pages for the Addresses).
 - Example: if you want to check the Rogowski Coil Current rating, change the Address to ‘100’
 - Example: if you want to check the Modbus Address and Baud Rate, change the Address to ‘80’
- Change **‘Quantity’** to 3. This will show you 3 registers. If you want to see 10 registers, change **‘Quantity’** to 10
 - Example: If the Address = 100 and the Quantity = 3, only 3 Registers will be shown, ie Registers 100, 101 and 102 will be displayed.



	Address	Quantity
Check Rogowski Coil Rated Current	100	3
Check Modbus Configuration	80	3
Check Wiring Type	90	2

- The Modbus reading will be shown in the second (2nd) column. Check the results against the tables on the following pages.



To check the Rogowski Coil Rated Current

	Register	Modbus Reading	Description
Rogowski Coil Rated Current	100	1	100A
		2	600A
		3	1000A
		4	3000A
		5	6000A
Voltage Connection	104	0	Direct Connect
		1	3PH4W (3 VTs)
Current Connection	105	0	Rogowski coil
		1	CT

- Go to **"Setup" > "23.Read/Write Definition"**
- Make sure the Slave Address is correct.
- Change:
 - Address to 100
 - Quantity to 3
- The Reading on **Row 0 (Register 100) = Rogowski Coil Rated Current.**
 - Example: If row 0 (Register 100) = 3, the Rogowski Coil is rated for 1,000A
- The reading on Row 1 (Register 104) = Voltage Connection. This should = 0 for Direct Current
- The reading on Row 2 (Register 105) = Current Connection. This should = 0 for Rogowski coil

The screenshot shows the Modbus Poll interface with a table of register data. The table has columns for 'Alias' and '00100'. The data rows are as follows:

	Alias	00100
0		3
1		0
2		0
3		
4		

Callouts from the image:

- Reading 3 Registers (rows 0, 1, 2) starting at Register 100
- Row 0 = Register 100 = Coil Rating
- Row 1 = Register 104 = Voltage Connection
- Row 2 = Register 105 = Current Connection

To check the Modbus Communication Settings

	Register	Modbus Reading	Description
Address	80	1 to 247	Slave address
Baud Rate	81	0	1200
		1	2400
		2	4800
		3	9600
		4	19200
		5	38400
Parity	82	0	Odd
		1	Even
		2	None
Data Bit	-	8	8
Stop Bit	-	1	1

- Go to **"Setup" > "23.Read/Write Definition"**
- Make sure the Slave Address is correct.
- Change:
 - Address to 80
 - Quantity to 3
- The Reading on Row 0 (Register 80) = Slave Address. (Default Slave Address = 1).
- The reading on Row 1 (Register 81) = Baud Rate
 - Example: If Row 2 (Register 81) = 5, the Baud rate is set to 38400
- The reading on Row 3 (Register 82) = Parity

To check the Wiring Type and Frequency

	Register	Modbus Reading	Description
Wiring Type	90	0	1PH2W L-N
		1	1PH2W L-L
		2	3PH4W
		3	3PH3W
		4	1PH3W_LLN
Nominal Frequency	91		Nominal Frequency, in Hz

- Go to **"Setup" > "23.Read/Write Definition"**
- Make sure the Slave Address is correct.
- Change:
 - Address to 90
 - Quantity to 2
- The Reading on Row 0 (Register 90) = Wiring Type, eg 3 phase, 3 wires (3PH3W)
- The reading on Row 1 (Register 91) = Nominal Frequency. This should = 50Hz

Step 7 – Disconnect Power Meter

- Disconnect Power Meter from Modbus Poll
 - Go to Connection > Disconnect.
- Disconnect Power Meter from USB/RS485 Converter and Power Adaptor.