

Aquatemp / [heatpumps4pools](https://heatpumps4pools) Thermotec integration with Node-RED via Modbus RS485



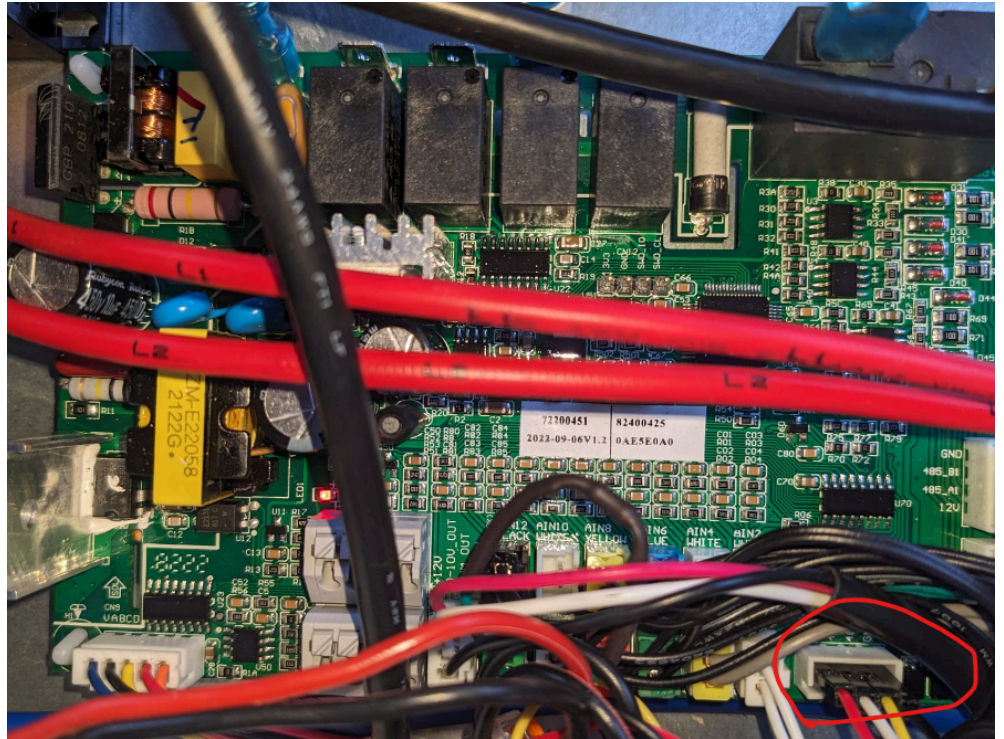
I wanted to control my swimming pool heat pump via node red. This was quite a journey as documentation was sparse.

Most of my information was gleaned from the following, so thank you to all who contributed.

- A PDF supplied by [heatpumps4pools.com](https://heatpumps4pools.com) (not quite enough information), but a really good starting point.
- A forum discussion <https://control.com/forums/threads/first-venture-into-modbus-how-to-send-a-password.49759/>
- A better set of docs on that thread, goto post #27 (just for the attachments) <https://control.com/forums/attachments/modbus%20oasis-i-oasis-ci%20series-zip.1414/> <https://control.com/forums/attachments/rs485-modbus-protocol-of-1-7-pdf.1415/>
- Another forum <https://community.home-assistant.io/t/implementation-of-aquatemp-controlle/230400/21>

## Step 2 - Install RS485 to Ethernet

Open up your heat pump and you will find a PCB like this



The RS485 connection you want is labelled **CN13 (circled in red)**

Don't try to hook into the RS485 connecting the display or Wifi module, it's a blind alley as those forums seem to conclude.

You need to connect your RS485 to ethernet controller to CN13  
RS485 A to RS485 A  
RS485 B to RS485 B  
Ground to Ground

I picked up the +v for the converter here too.

You also of course need to get a network connection into there too and plug it into you LAN

## Step 3 - Configure RS485 to Ethernet

Download the Vircom windows program  
[https://www.waveshare.com/wiki/File:VirCom\\_en.rar](https://www.waveshare.com/wiki/File:VirCom_en.rar)

Install and open and you will get a screen like this.

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Information

[2023-06-29,19:27:03] COM12 Create ok!  
[2023-06-29,19:27:00] Listen at port 4196 OK.

Click Device and you will get

Device Management

In...	Type	Name	Dev IP	Loca...	Dest IP	Work M...	TCP C...	Virtual S...	Vircom Stat...	Dev ID	TXD	RXD
1	Su...	WSDEV00...	192.168.2.169	502	192.168.1.3	TCP Server	Establ...	Haven't B...	Not Linked	2E2BFF9C	31...	101...

Auto Se  
Add Mar  
Search S  
P2P De  
Edit De  
Search  
Bac

Double click the device and you will see this - these are my settings

Device Settings

Device Info

Virtual Serial: Not Use

Dev Type:

Dev Name: WSDEV0001

Dev ID: 28642E2BFF9C [-]

Firmware Ver: V1.452

Function of the device

Web Download

DNS System

REAL\_COM Protocol

Modbus TCP To RTU

Serial Commnad

DHCP Support

Storage Extend

Multi-TCP Connection

Network

IP Mode: Static

IP Address: 192 . 168 . 2 . 169

Port: 502

Work Mode: TCP Server

Net Mask: 255 . 255 . 255 . 0

Gateway: 192 . 168 . 2 . 1

Dest. IP/Domain: 192.168.1.3 Local IP

Dest. Port: 4196

Serial

Baud Rate: 9600

Data Bits: 8

Parity: None

Stop Bits: 1

Flow Control: None

Advanced Settings

DNS Server IP: 8 . 8 . 4 . 4

Dest. Mode: Dynamic

Transfer Protocol: Modbus\_TCP Protocol

Keep Alive Time: 60 (s)

Reconnet Time: 12 (s)

Http Port: 80

UDP Group IP: 230 . 90 . 76 . 1

Register Pkt:  AS

Restart for no data every 300 (s)

Enable send parameter every 5 (M)

More Advaced Settings...

Framing Rule

Max Frame Length: 1300 (B)

Max Interval(Smaller will better): 3 (M)

Get Default Save As Default Load Default Modify Key Firmware/Config Restart Dev Modify Setting Cancel

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work mode - TCP Server

Serial  
Baud rate - 9600  
Data Bits - 8  
Parity - None  
Stop bits - 1  
Flow Control - None

TBH - all the defaults apart from baud rate

Advanced settings.  
Transfer Protocol - Modbus\_TCP protocol

Click **Modify Settings**

**Step 4 - Slave address. This one had me guessing for days and days.**

In the documentation it states Slave address parameter:H37 which I and a lot of other people took as being Hex 37. ie 55 Decimal.

Nope it's a tad more simple than that, it's the menu item in the display at the front of the Heat Pump.

Click settings and it will ask for a password mine was set to 022 - Scroll through the menus and you will find menu H37 and set it to something other than 1 - I have mine set to 50.

**Step 5 - Node red.**

I am making the assumption that you already have Node red running - if not there is plenty of stuff out there to help you with that one.

In node red you need to install  
Node-red-contrib-modbus

Once installed drag a Modbus getter onto a flow and put an input to the input and a debug on the output.

Double click the Modbus getter and in Edit modbus-getter node edit the server settings

Name = Give it a name, I called mine TCP  
Type = TCP  
Host = IP address of your RS485 to Ethernet adaptor  
Port = 502  
TCP Type - RTU-BUFFERED  
Unit id can be set to 1 or 50

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Name

Type

Host

Port

TCP Type

Unit-Id

Timeout (ms)

Reconnect on timeout

Reconnect timeout (ms)

Click Update

**Lets get some data**

Settings

Optionals

Name

Unit-Id

FC

Address

Quantity

Delay to activate input

Server

Name - Give it a name - I called this one First 3 addresses

Unit Id - This is the number you set on the Heat pumps display/ control panel

FC - FC 3 : Read holding register

Quantity - 3 - I wanted the first 3 items

As per the PDF <https://control.com/forums/attachments/rs485-modbus-protocol-of-1-7-pdf.1415>

Data starts at 1011 and I want to get the first 3 items.

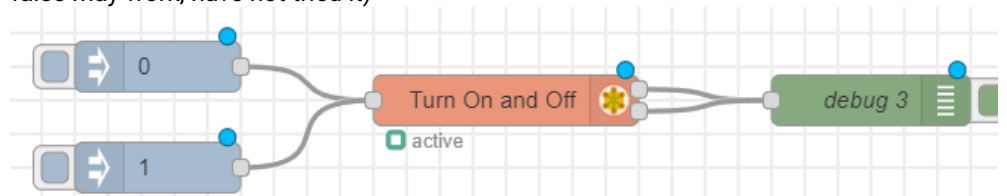
Get yourself into debug mode and click the input button

My results  
0: 0  
1: 1  
2: 270

Return data	Modbus address	Notes
0: 0	1011	Heating Off
- 0-OFF/1-ON		
1: 1	1012	Mode = Heating - 0-Cooling/1-Heating/2-Auto
2: 270	1013	Target temp = 270/10 = 27 degrees

Let's turn the heating off  
PDF say's address 1011

Drag a Modbus write onto the flow and add two injects one that sends a 0 and one a 1 (true or false may work, have not tried it)



**Edit Modbus-Write node**

Delete Cancel Done

**Properties**

**Settings** Optionals

Name: Turn On and Off

Unit-Id: 50

FC: FC 6: Preset Single Register

Address: 1011

Delay to activate input

Server: TCP

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