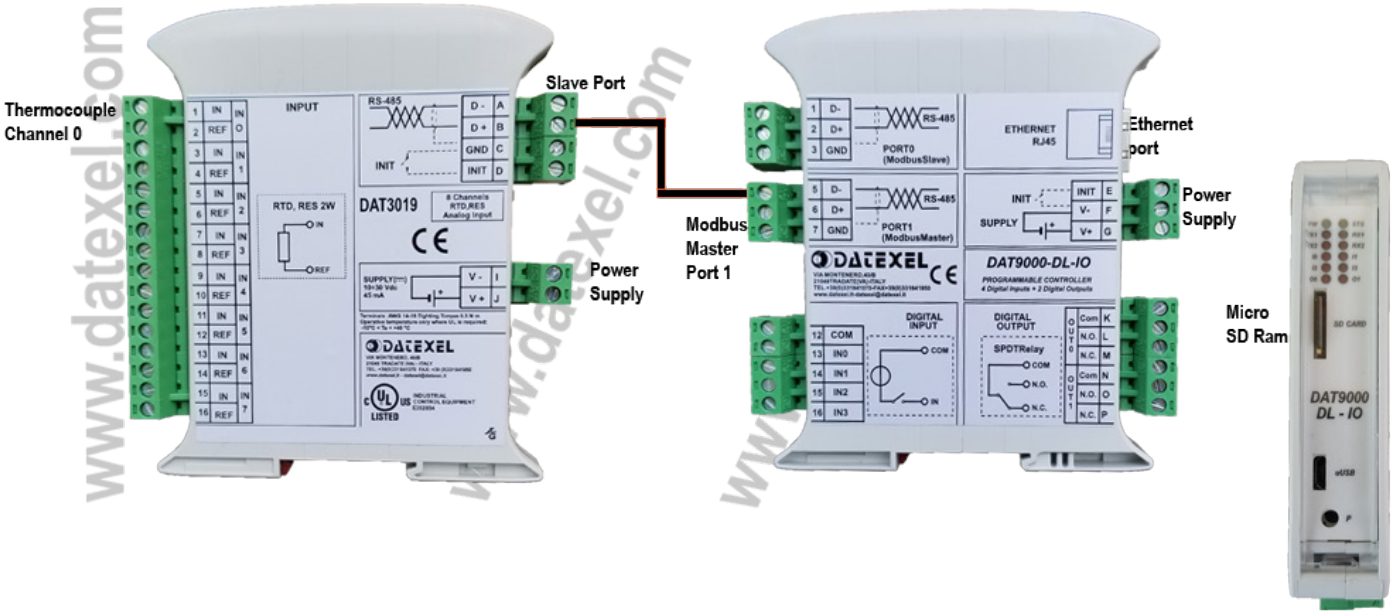
# Logging Temperatures over Modbus RTU RS485 with DAT9000DL Version 2.

This application is converting an RTD Sensor input on a DAT3019 to a register. The DAT9000DL Modbus Master polls the DAT3019 and stores the temperature reading to it's own register and then saves it to an SD RAM card.

## Start-up.

1. The DAT3019 eight channel Modbus Slave has a Baud rate of 9600, Parity None, 1 Stop bit and it is Address 20.
2. You can connect to the DAT9000 V2 with Ethernet, uUSB or on the RS485 Slave port. For this application we have decided to connect with the Ethernet Port using a cross-over Cat-5 cable.
3. The minimum time period between logs is 10 Seconds.




Wiring connections for DAT3019 and the DAT9000DL.

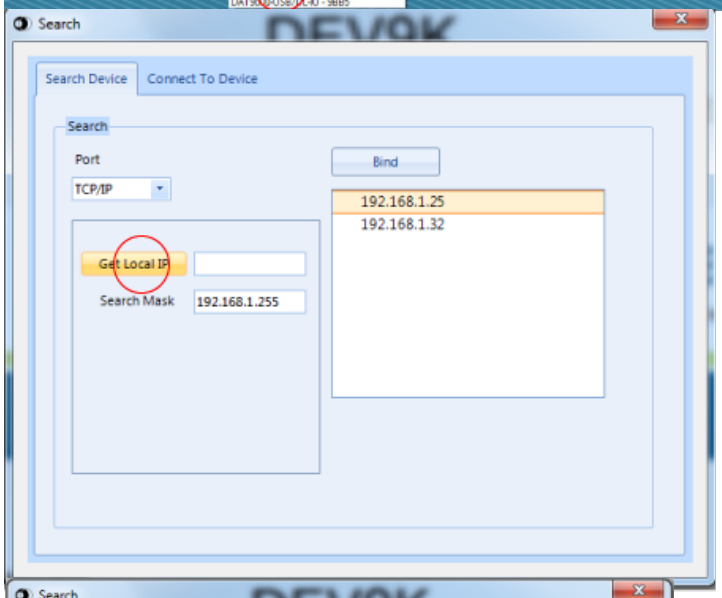
1. Connect power to the DAT3019 and the DAT9000 DL Version 2 Modbus Data Logger Master Controller.
2. Connect the DAT3019 Modbus Slave port to the DAT9000 Modbus Master Port.
3. Connect Cat 5 crossover cable to the Ethernet port and PC.
4. Connect an RTD Temperature calibrator to the channel 0 input.
5. Download Dev9K Version 2 software from Datexel download page and run software.

## Connecting to the Dev 9K V2.

1. Select English.
2. Select DAT9000DL from the drop down menu.
3. Click Connect.

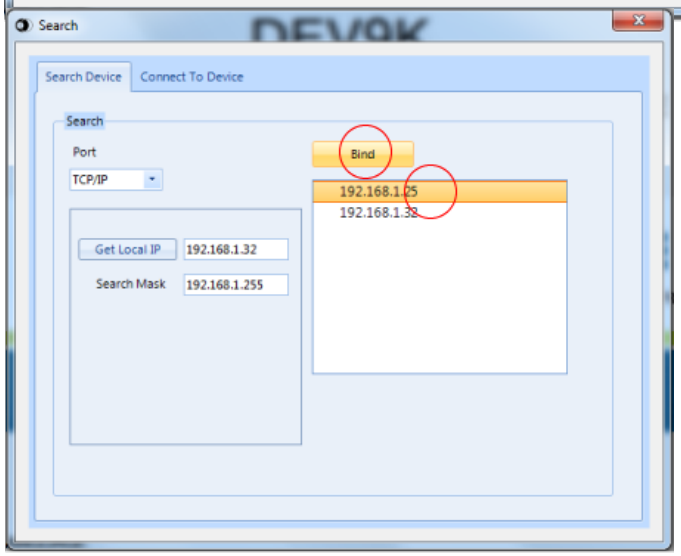

## Search for the Modbus Master.

1. Click Get Local IP.
2. This will display the Local IP address of the PC.



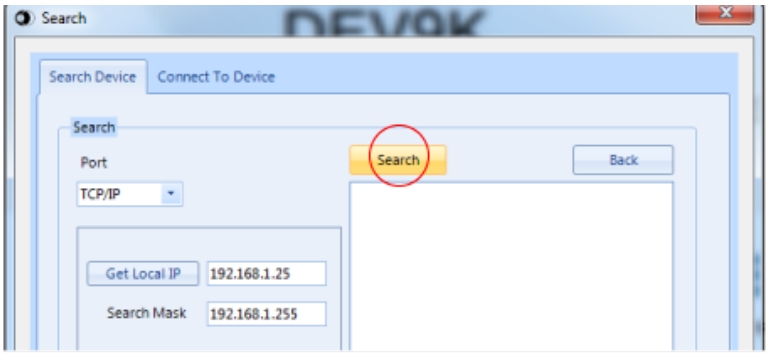

## Bind the IP Address.

1. Click on the IP address of the network of the DAT9000DL.
2. Click Bind.



## Search for the Modbus Controller.

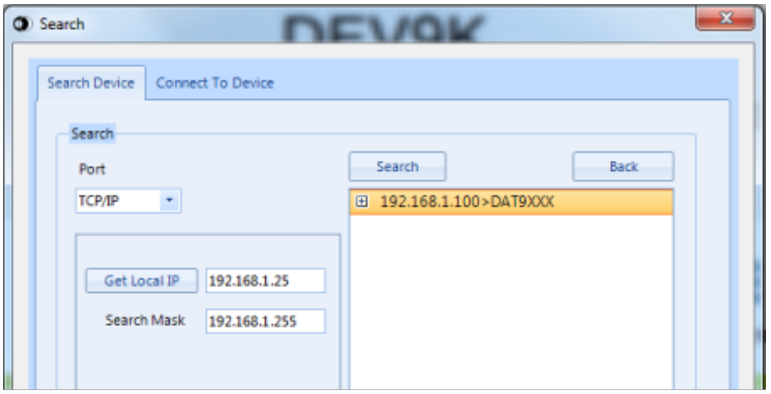
1. The Search Button should appear.
2. Click Search.






## The IP Address Appears.

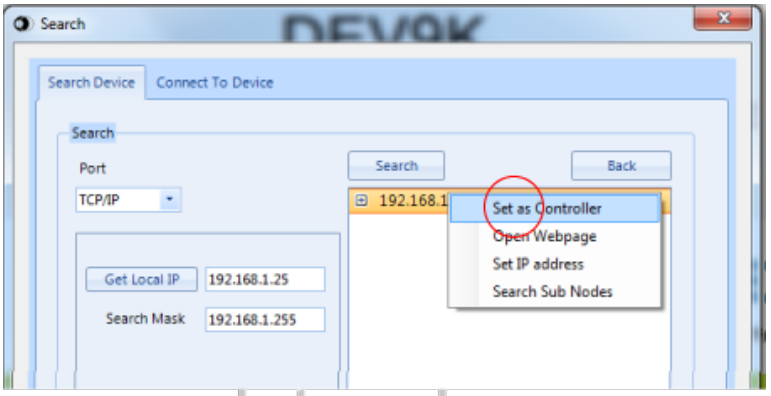
1. The IP address on the DAT9000DL should appear.
2. If the IP address does not appear turn off the virus protect or firewall and check that you have a cross-over cable.





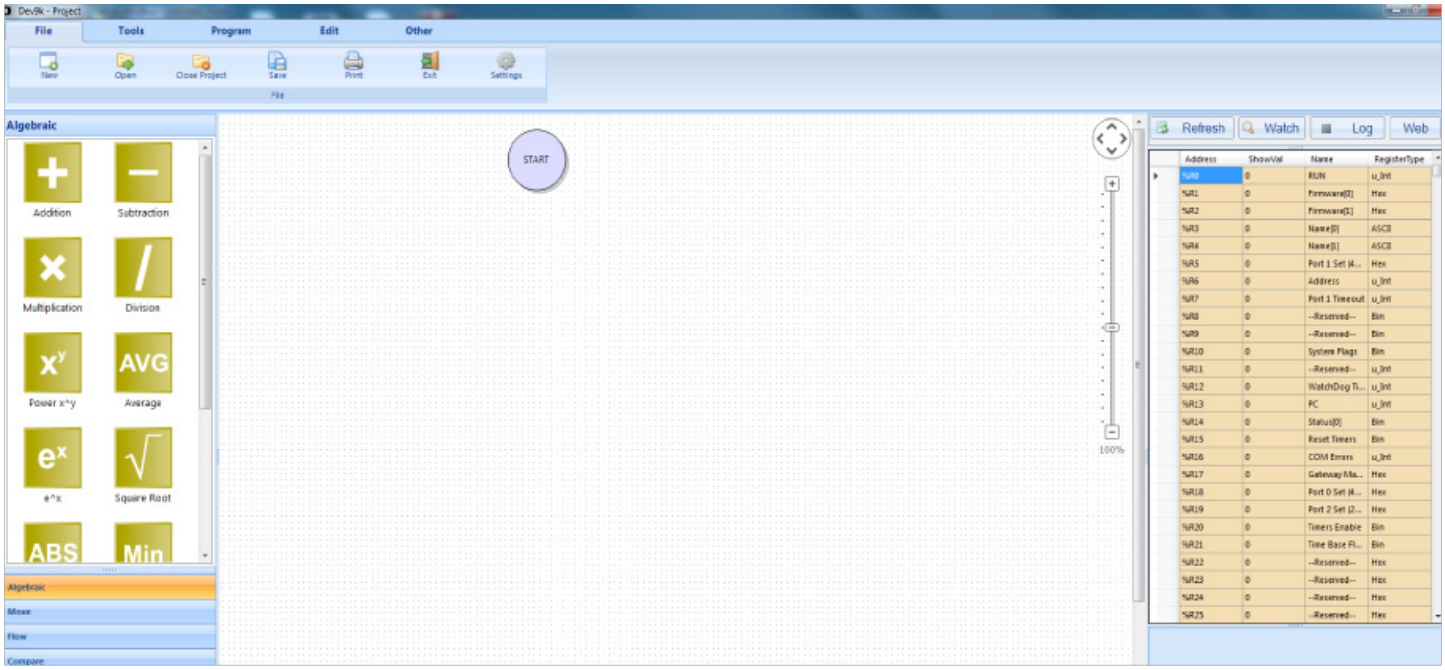

## Set as Controller.

1. Right click “Set as Controller”.
2. The Program page should now open.



# The Control Screen Opens.

This is the main control screen for the Dev 9k Version 2. From here you can configure the Communication ports. Design and save new projects and open existing projects. In the left panel you have the function blocks. The center is the layout page for the program with the START position. On the right panel you have the registers. By Clicking the Refresh you can see what is stored in the registers.

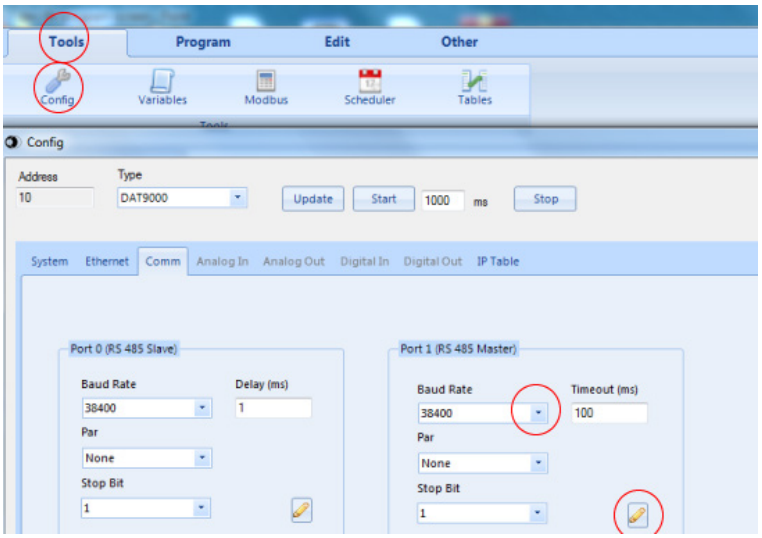





# Set the Communication Port.

The DAT3019 and the DAT9000DL Modbus Controller need to have the same communication settings. The Master control port (1) on the DAT-9000DL needs to be set up.

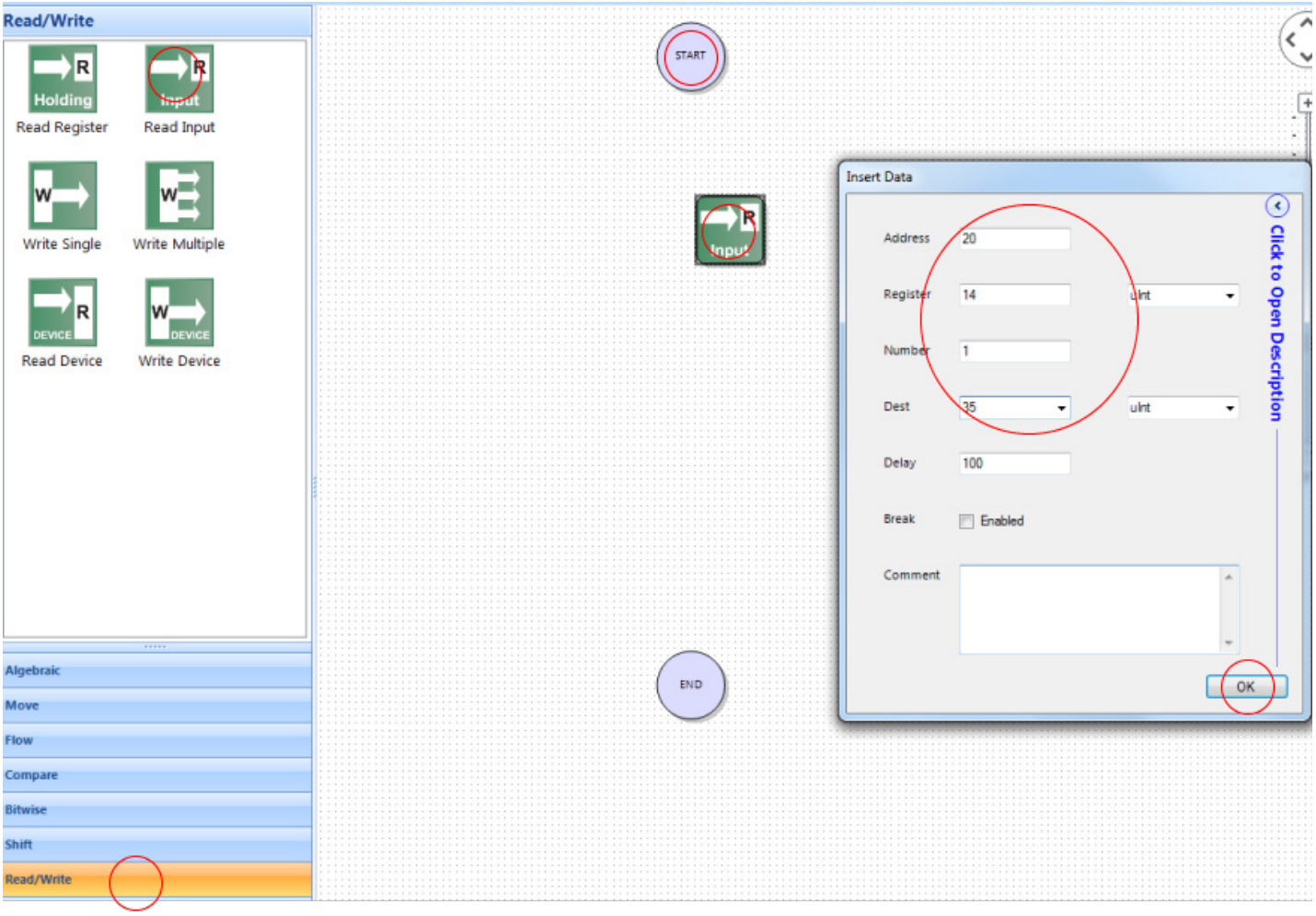
1. To change the Communication settings of the DAT9000DL Master port click Tools.
2. Click Config.
3. Change the Baud Rate to 9600 to match the Baud Rate of the DAT3019.
4. Click the pencil to write to the DAT9000DL.



# Build the Function Block Program.

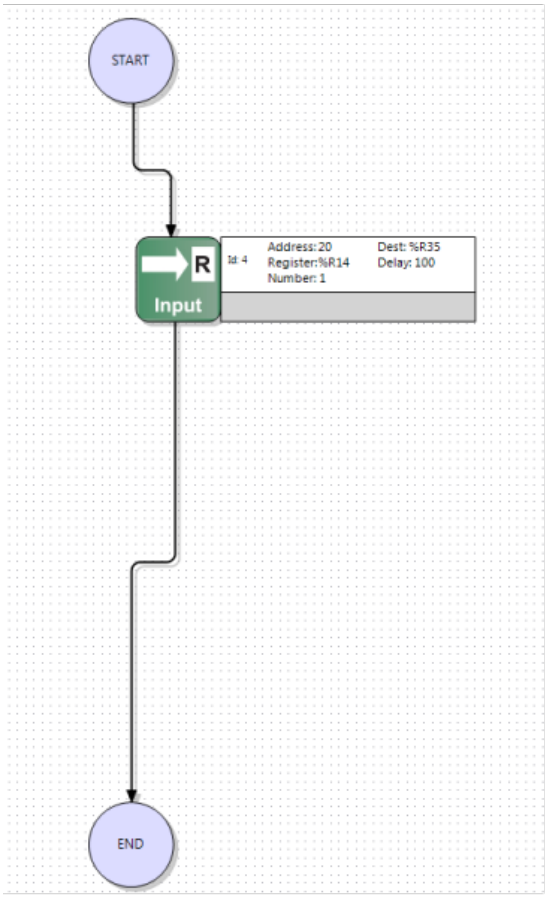
There is only 1 Function block in the program. The Function Block will read register 40015 which is Channel 0 on the DAT3019 and the Address of the DAT3019 is 20. The Function block will poll the DAT3019 and obtain the Interger and place it into the DAT9000DL on register 35. We will be using a Read Input and must deduct 40001 from the register table so the actual Register we use on the read Input Function Block will be 14.

1. Click the Read/Write label on the lower left panel.
2. Drag the Read Input Function block to below the Start Icon.
3. The Insert Data Block will open and you can enter the data needed to obtain the Register.
4. Address 20, Register 14, Number 1 (we only need the Temperature input register), Dest 35 (we will store the register reading in Register 35 on the DAT9000DL) Click OK.



## Complete the Function Block sequence.

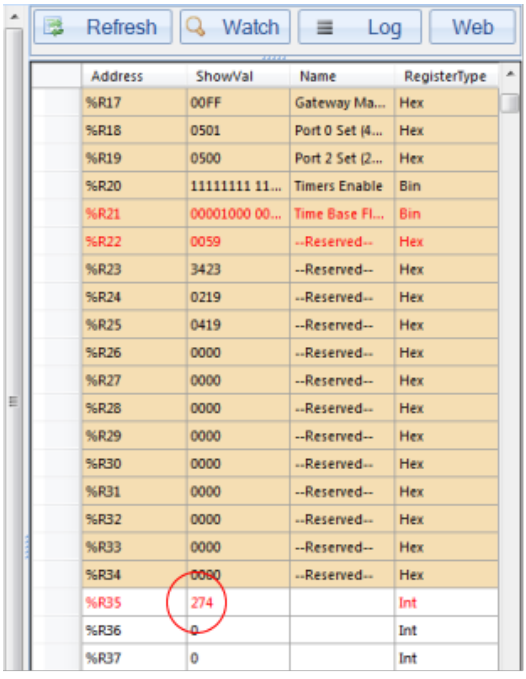
1. Hover over the bottom of the Start circle until a hand is present and pull the line generated down to the Read Input function block.
2. Do the same from the Read Input Function block to the top of the End circle.
3. Click Compile and OK.
4. Click File.
5. Click Save.
6. Save as temperature-read.





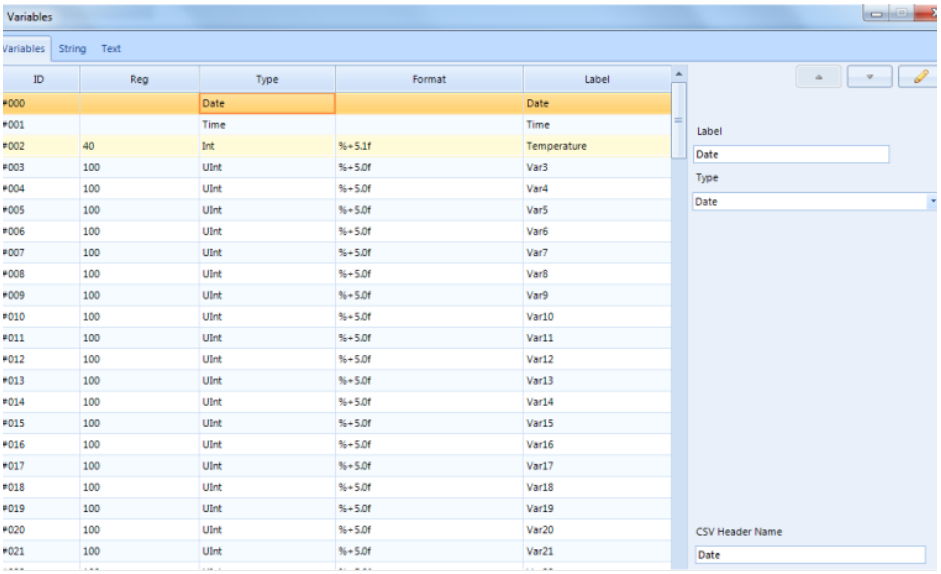

## Downloading the Program to the Modbus Master.

1. Click Program.
2. Click Connect, if not connected to the DAT-9000DL. It could have timed out. The bottom of the panel should say Connected.
3. Click Debug.
4. Now the Download is visible and click “Download”.
5. Accept the download twice.
6. Click Release.
7. Click Refresh and there should be a reading in %R35. It will be the temperature reading in Celsius and be x 10.
8. Should no reading be present in R35 check the communication port settings or wiring.

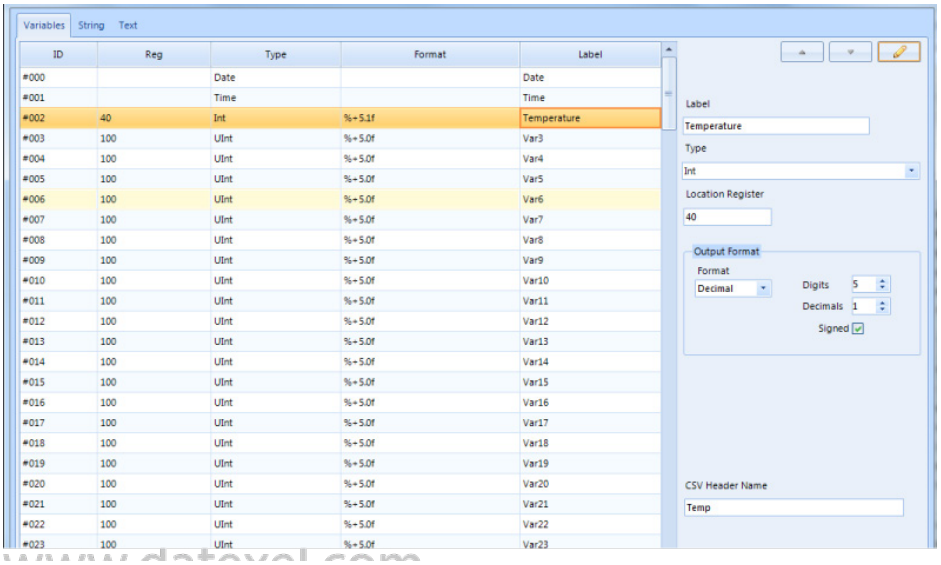


# Now set up what needs to be Logged (Variables).

1. Click Tools.
2. Click Variables.
3. In the First line type Date in the Label box.
4. Under Type Click the Date in the drop down box.
5. Under CVS Header Name Type Date.
6. Click the pencil to write to the program.
7. Repeat on the next line for Time.
8. Click the third line.
9. Enter Temperature Under Label.
10. The type will be Int for Interger.
11. The Output Format will be 5 digits and 1 decimals. This is because the current reading is 233 which is actually 23.3.
12. Click the pencil and then Click OK.

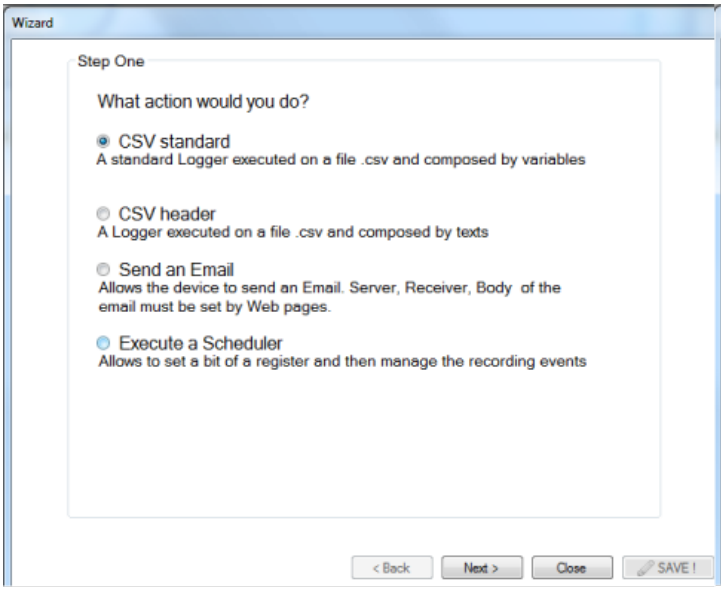


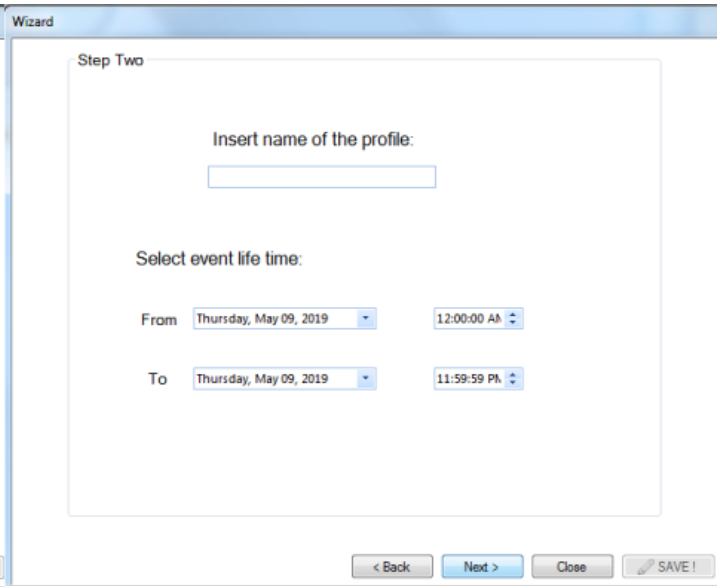


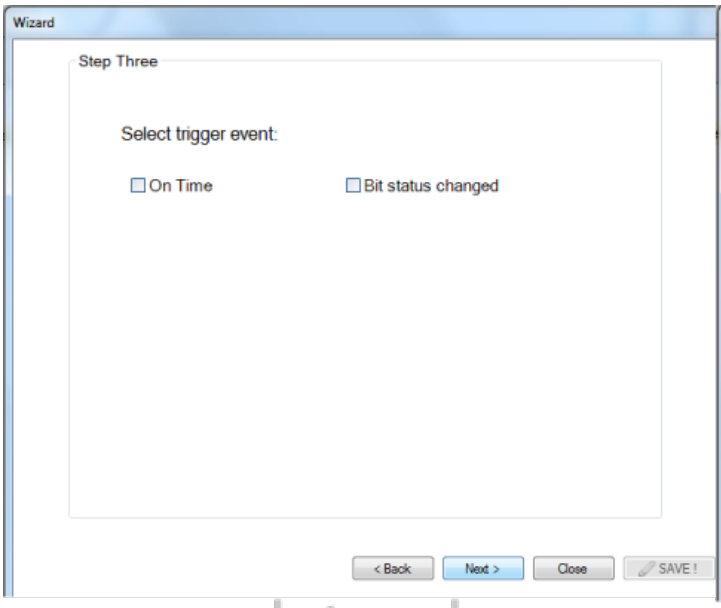
# Scheduler, at what period of time it will log.

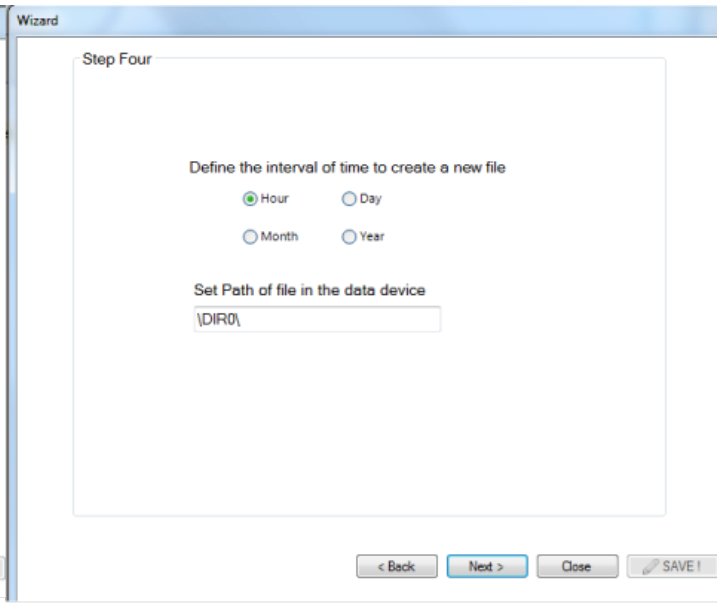
1. Click Scheduler and the Scheduler box will open.
2. Click “Create New” at the bottom.
3. Step One, and select CSV standard and then click Next.
4. Step Two, insert a Temperature in Insert name of Profile.
5. Select time from as todays date and change the date to December 2099. Which should happen by clicking the down arrow. Click Next.
6. Step Three now select at what period of time you want to log. Write in Clock 1 and select Minute. The DAT-9000DL will now log every 1 Minute. Click Next.
7. Step four, select how often you require a new file to be written click Hour. Click Next.
8. Step Five, drag over which ID you want to log. Drag over #000, for the Date, #001, for Time, #002, for the Temperature. Now click Save.
9. Check the screen and make any changes that may be needed.

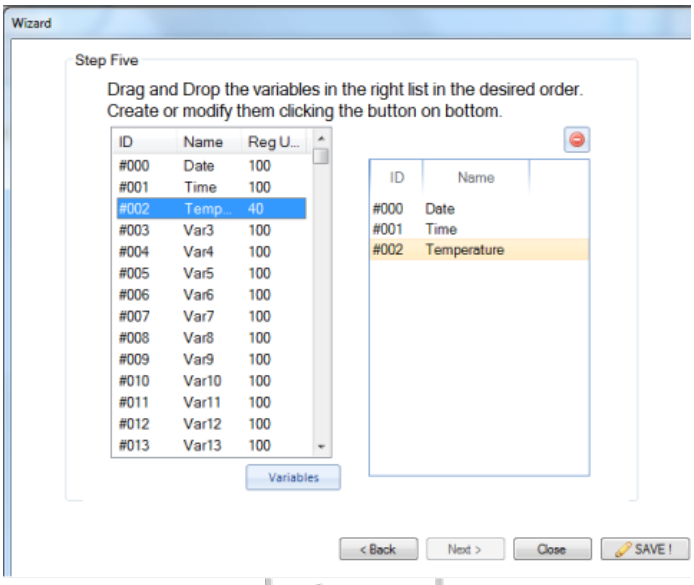


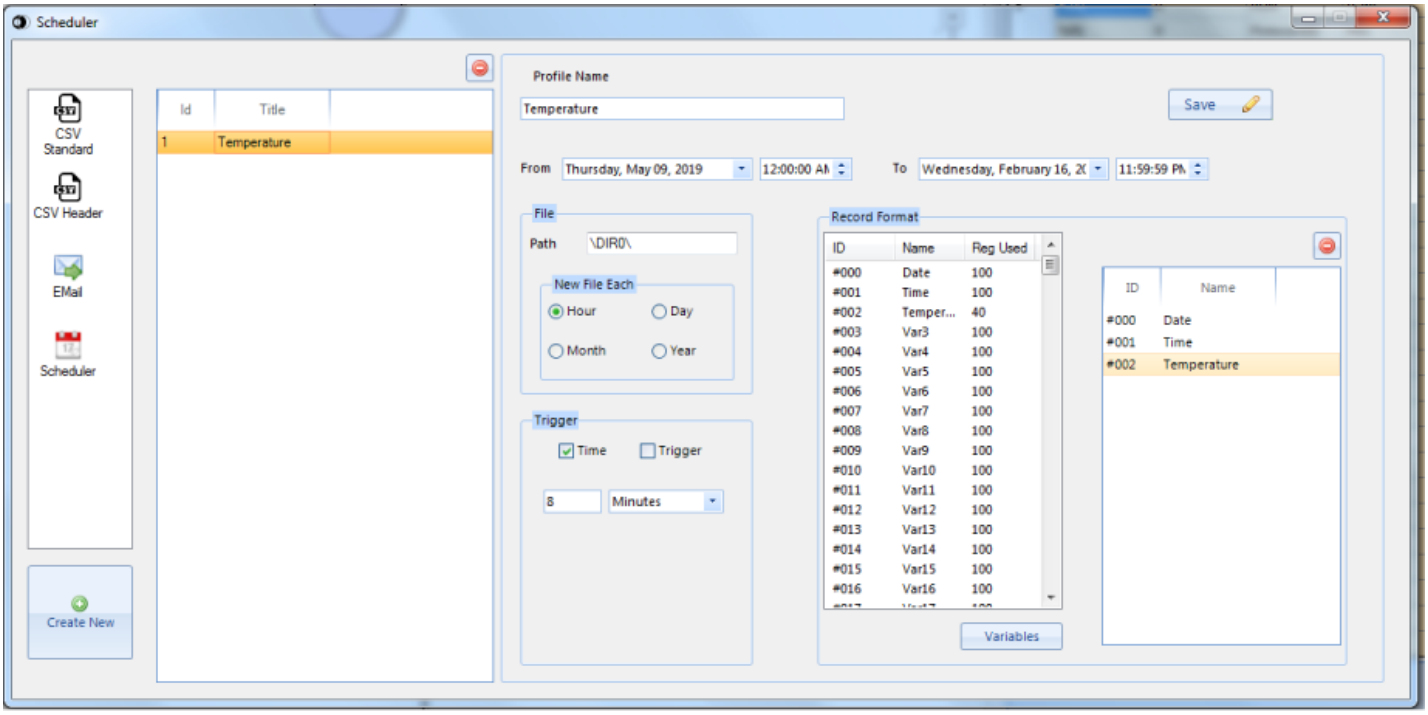






## Save and Run the Program.

1. Click Save, reconnect to the DAT9000DL, Debug, Download wait for the download to finish. This may happen twice. Very Important, click release to write to the epprom.
2. Wait about 10 minutes and remove the SD Ram or USB Stick and Check on a PC for the logged file. Or you can click Web above the Register table.
3. Enter the User name Fact_user and password Fact_pwd.
4. Click Log Data.
5. Click DIR0 and drill down to the CSV file and open with Notepad.

## Explanation of the Project.

- Connected to a DAT9000DL Modbus Data logger with Ethernet.
- Configured the DAT9000DL Modbus Data Logger to be a Modbus Controller.
- Set up communication ports on the DAT3019 Modbus RTD to Modbus Slave and the DAT9000DL Modbus Master Data logger.
- Read the internal register of the DAT3019 RTD Modbus Slave with a read input Function Block and move it to the Modbus Data Logger.
- Selected which Variables to Store to the SD RAM or USB storage device.
- Scheduled a time period to log the variables to the SD RAM or USB storage device.