Connection and Interface Instructions

Form:Connection and Interface Instructions:11-26

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Connection and Interface Instructions

AFR-500 Air Fuel Regulation System



1. Overview and Description

In order to commission and interface with the AFR-500 system a browser based application has been designed for not only this AFR controller, but all new and legacy products. While there are some benefits of being online for the latest updates and build options, its main intent is to be fully functional off-line while still hosted in a browser window.

There is no need to download any third party software, install anything, or worry about updates to your operating system. This new browser based Device Display Application replaces the traditional “terminal program” for the AFR-500 system. One additional feature of the browser based tool is that it very easily becomes the same view for a permanently mounted display, which will be discussed further in this document.

2. Connecting to The System

2.1 RS485 Modbus connection

The backbone of the communication system is modbus and its associated registers. Regardless of the protocol being used, all information passed to and from the controller and its application uses the internal modbus registers. Currently there are two RS485 ports, while only one is active for modbus slave operation. Future provisions are there to allow for a modbus master port. To connect over RS485 and using the modbus protocol connect the two wires to port 1 on the controller as shown below

The other end of the two wire connection goes to any standard converter such as the BandB modem

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that is conventionally used with Altronic products. A PC or any other RS485 master device can then poll and interact with the AFR-500.

The following setting are used for the modbus protocol connection over RS485:

2.2 Ethernet Connection

As a direct connection over ethernet, an RJ-45 port is vertically mounted on the AFR-500. Using a standard ethernet cable plug one end into the AFR-500 controller, and the other end goes to a device that can send HTTP requests following the modbus/TCP or Ethernet/IP protocols. In general, the two use cases will be with the Altronic terminal builder application on a computer or permanently displayed on an HMI.

While a direct connection to a computer ethernet port is capable, it is recommended to utilize a USB to ethernet adapter. While using a USB to ethernet adapter it is still possible to use wireless internet. Plugging in to the native ethernet port of a computer diverts the operating system to try and use what is plugged in as the internet connection. This in turn does not allow the wireless and the ethernet port to work in conjunction with each other.

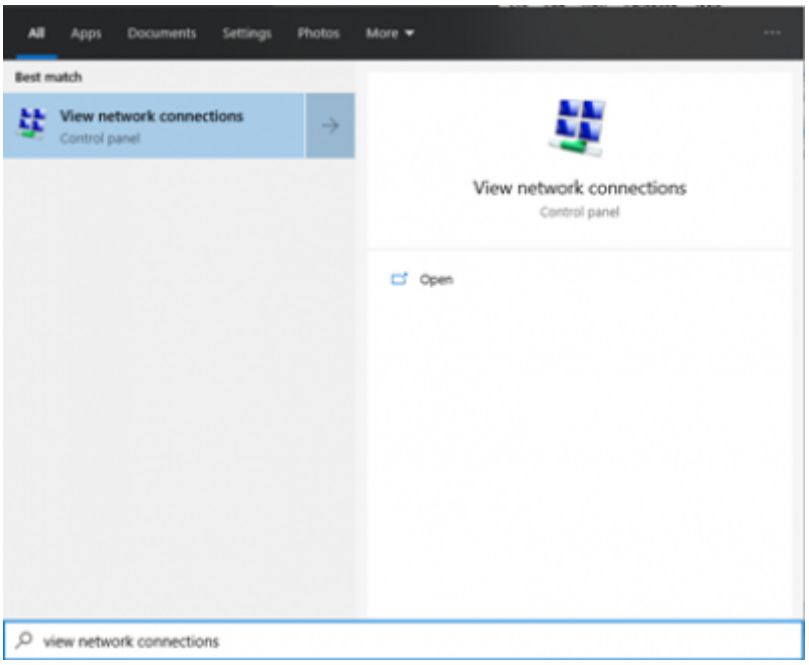
User Interface with a Computer

It is best to set up the network adapter or ethernet port without having the AFR-500 device connected, then plug in the ethernet cable, and lastly power up the AFR-500. Once all communications have been established with the terminal builder and the computer, hot swapping the ethernet and power up/down is not an issue. If all connections are performed for the first time while the AFR-500 is powered, the device will need to be power cycled once all connections and settings have been made.

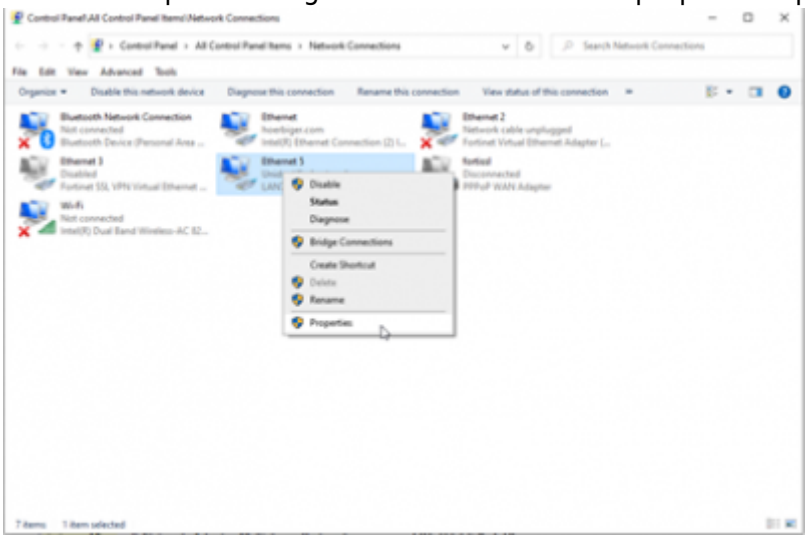
In order to communicate with the device over ethernet, the IP address of our computer needs changed.

1. In windows go to the search bar and type “View Network Connections”'

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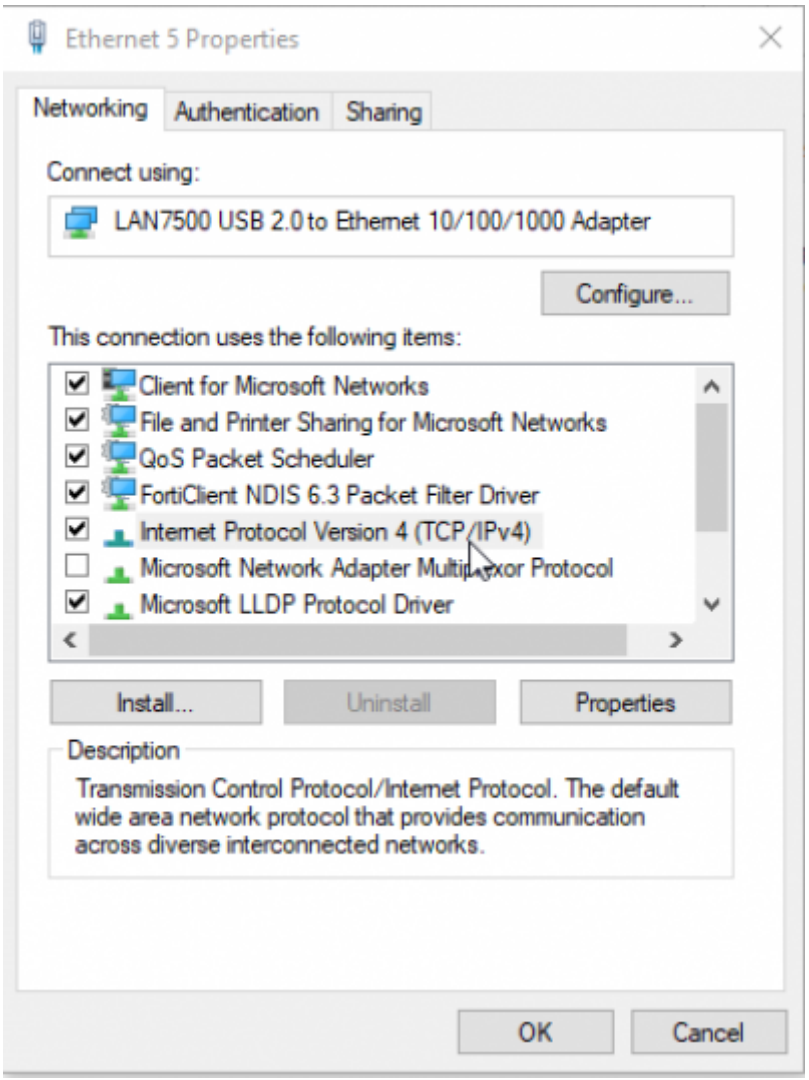


2. Find your USB to ethernet adapter and right click on it to find the properties option



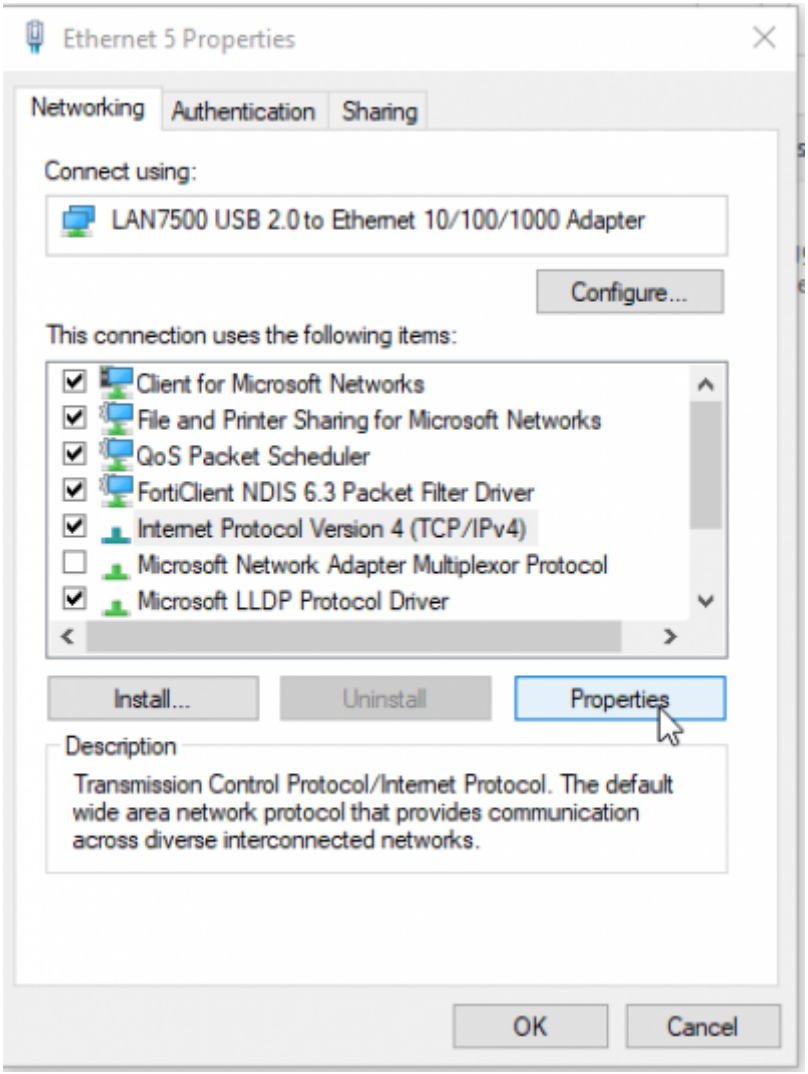
3. Under properties, select the (TCP/IPv4) option

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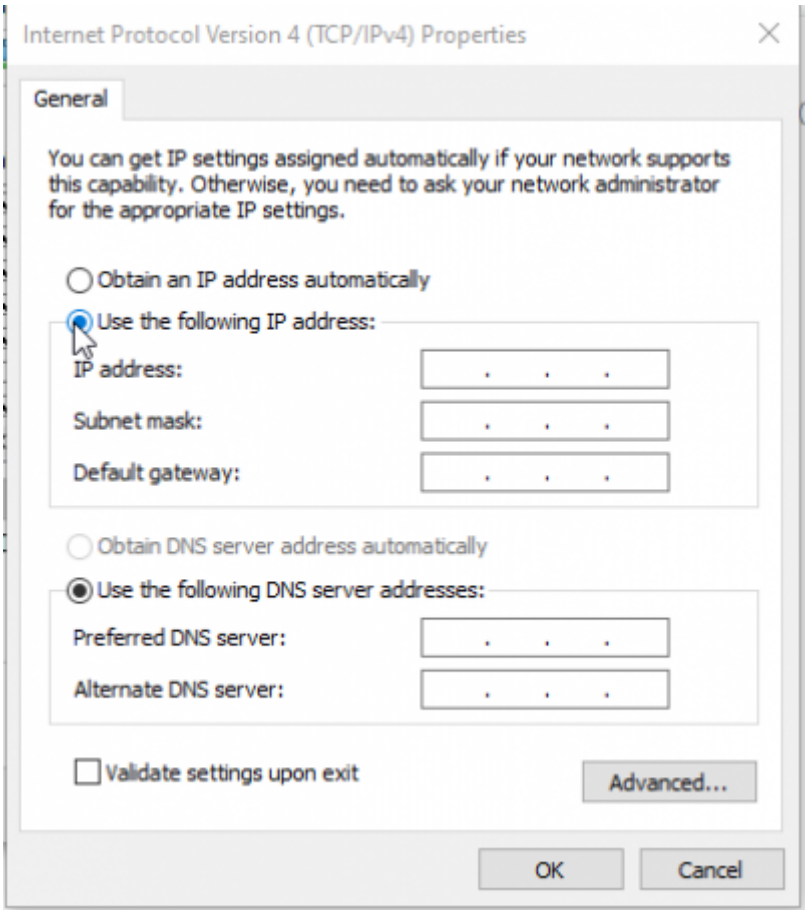
4. Select properties which allows editing of the (TCP/IPv4) option

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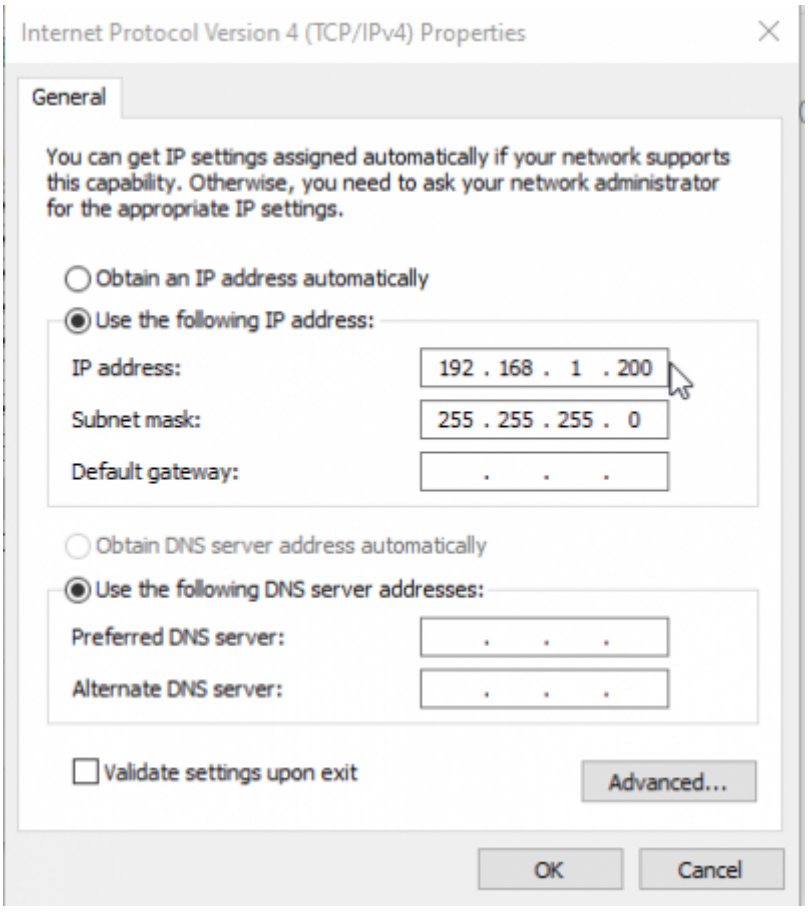


5. Select “use the following IP address”

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6. Enter in the IP address 192.168.1.200

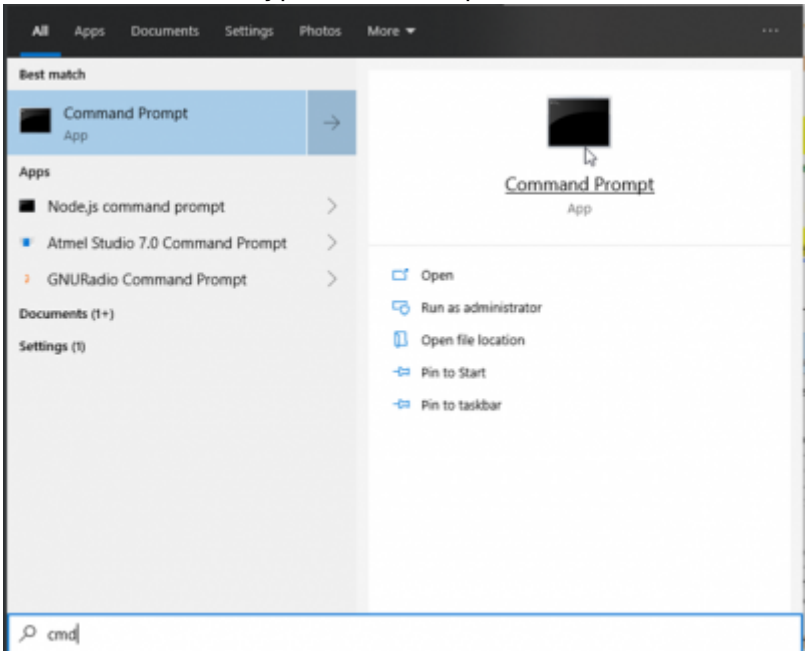


7. More than likely the subnet mask will populate automatically, however it should be 255.255.255.0
8. Leave the preferred and alternate DNS server options blank
9. Click OK

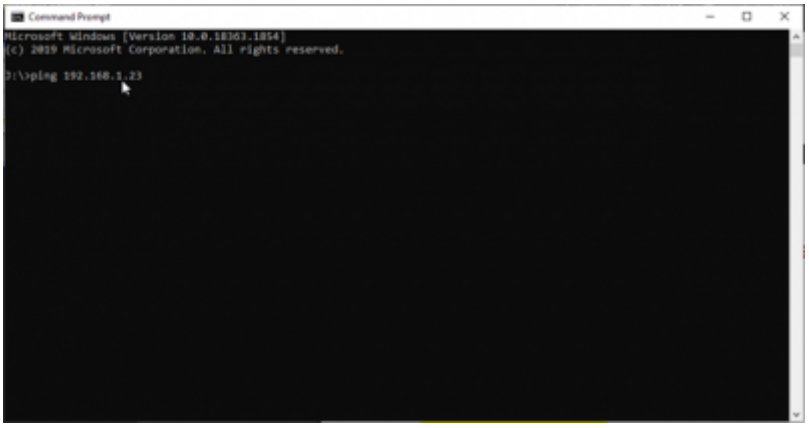
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Communication Test - Pinging the AFR-500

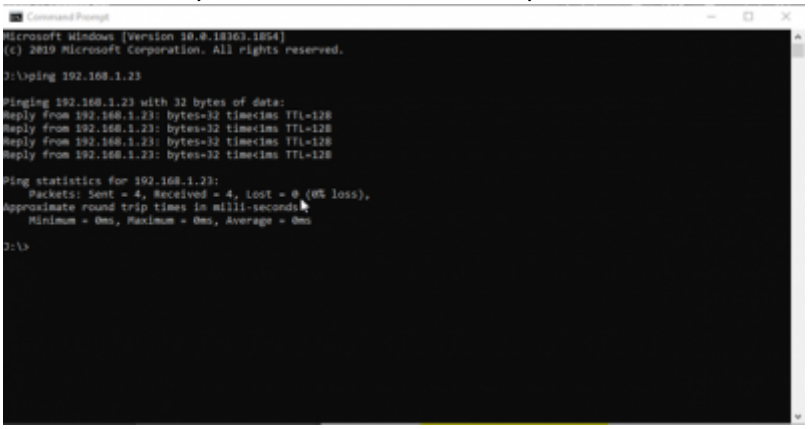
1. In windows go to the search bar and type “cmd” to open the command line window application



2. Type “ping 192.168.1.23” which is the IP address of our AFR-500



3. Press enter and there should be packets sent that match packets received and lost = 0



Launching the Terminal Builder Application

As previously discussed, there is a browser based user interface tool that now allows commissioning and interaction with Altronic products. All that is needed is the html file that can be found here: XXXXXXX and is called “AFR-500 Rev 0”

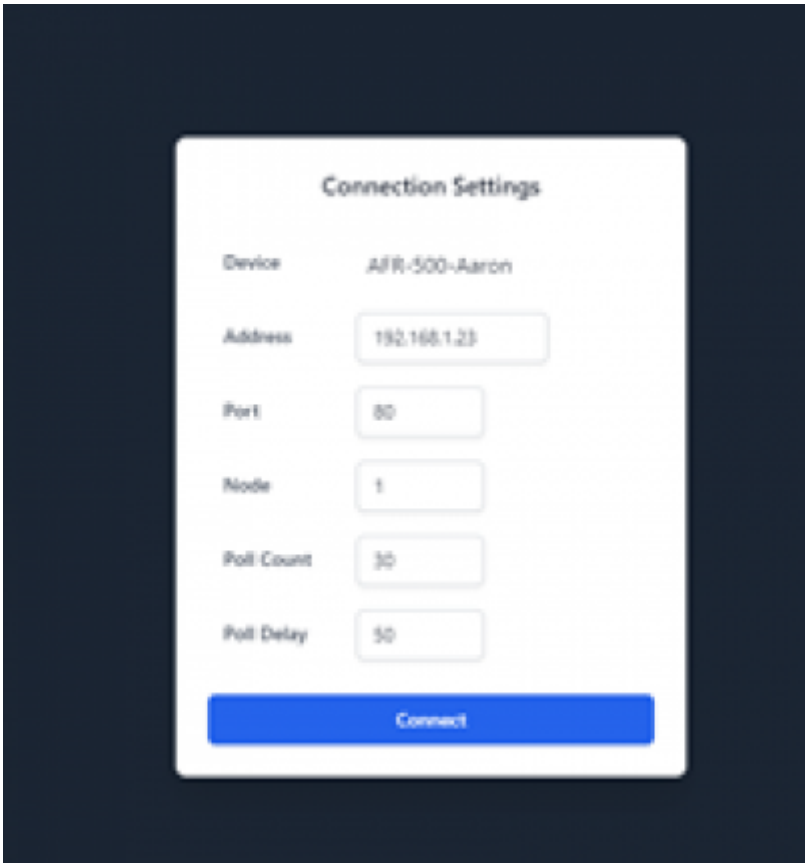
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Connection Parameters

Upon launching the html file a prompt will ask for the connection settings. The device name should already be listed then the following settings need entered.

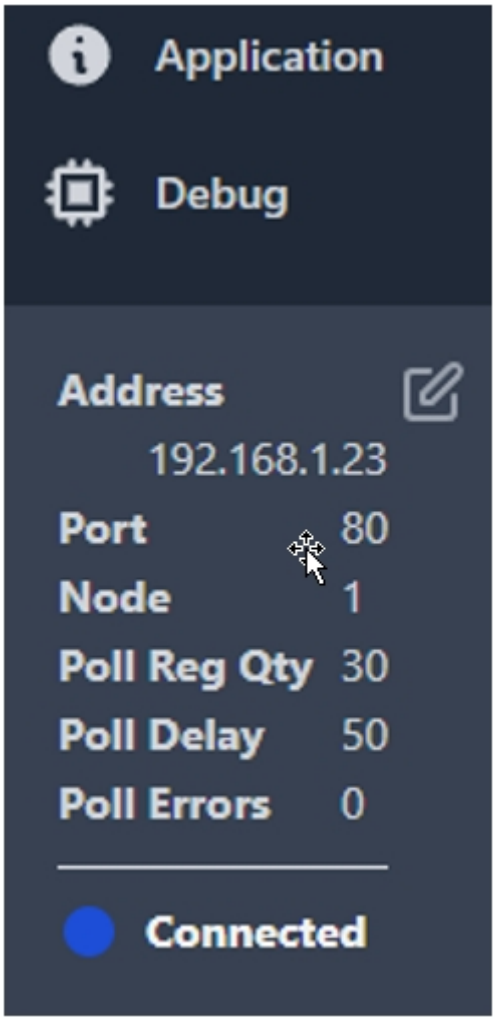
- Address - 192.168.1.23 (this is the IP address of the AFR-500)
- Port - 80
- Node - 1
- Poll count - 30
- Poll Delay - 50

After entering these settings, press connect.

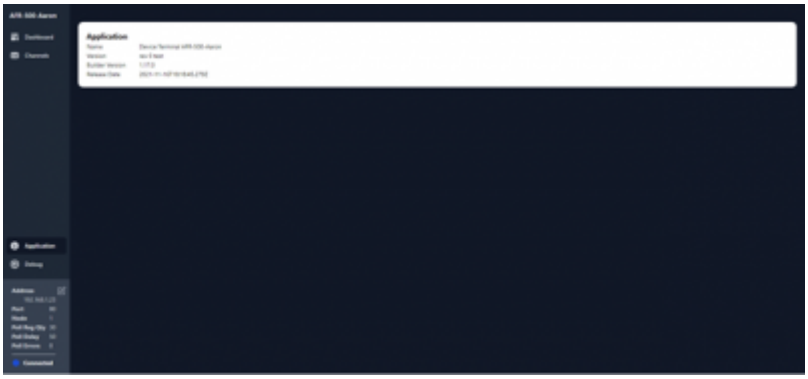


After connecting, the terminal builder will be launched. A dashboard screen will be visible, and a menu and status bar will be available on the left side of the user's screen. At the bottom left corner, there will be connection details as shown below. As long as the status says connected and there is a blue light, then the system is communicating with the computer.

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Available views are the dashboard, channels, application, and debug screens. Selecting the application view brings up the builder version that was used to build the dashboard, the name of the terminal window release, and its version information along with the date that it was built.



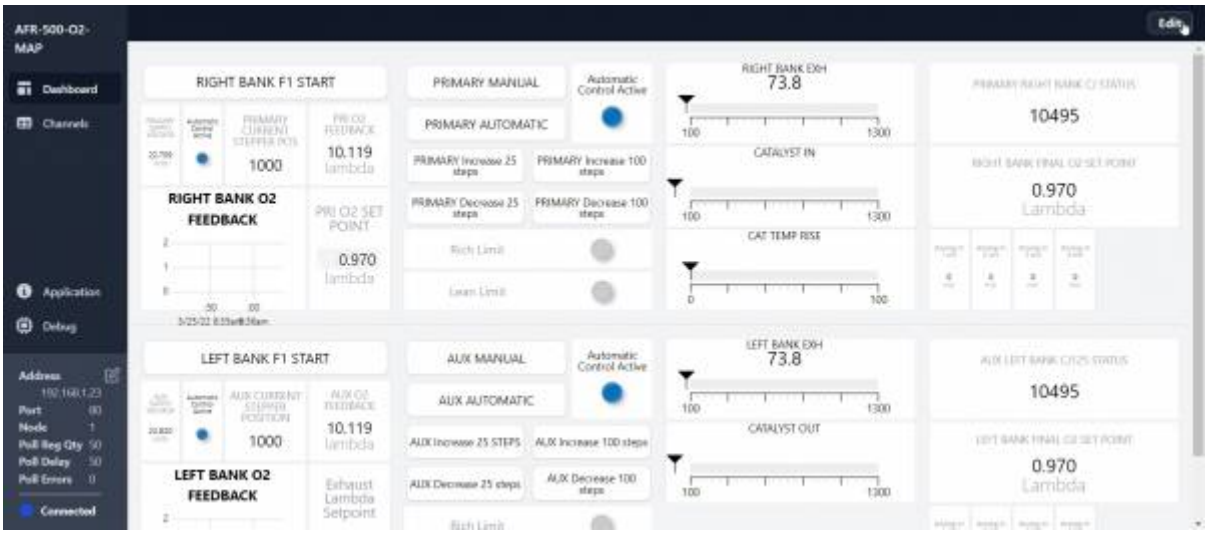
Selecting the debug screen brings up a list view of all available registers which also allows writing into a text field for applicable registers. Additionally, it provides information for the data type and whether the register is read only or read/write.

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2.3 The Edit Button

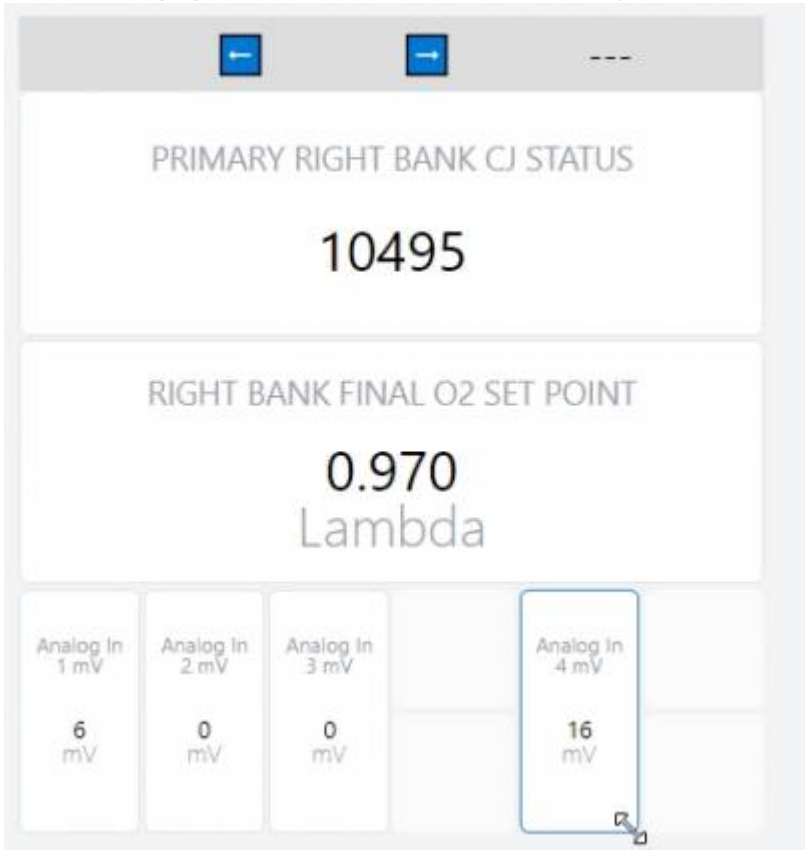
The edit button allows the user to add, remove, change, and move elements on the dashboard page. The edit button is available on the dashboard page, but only on a non-locked (non-read only) device terminal builder (see application exporting options). Also, selecting the edit button allows for the options to import or export a dashboard.



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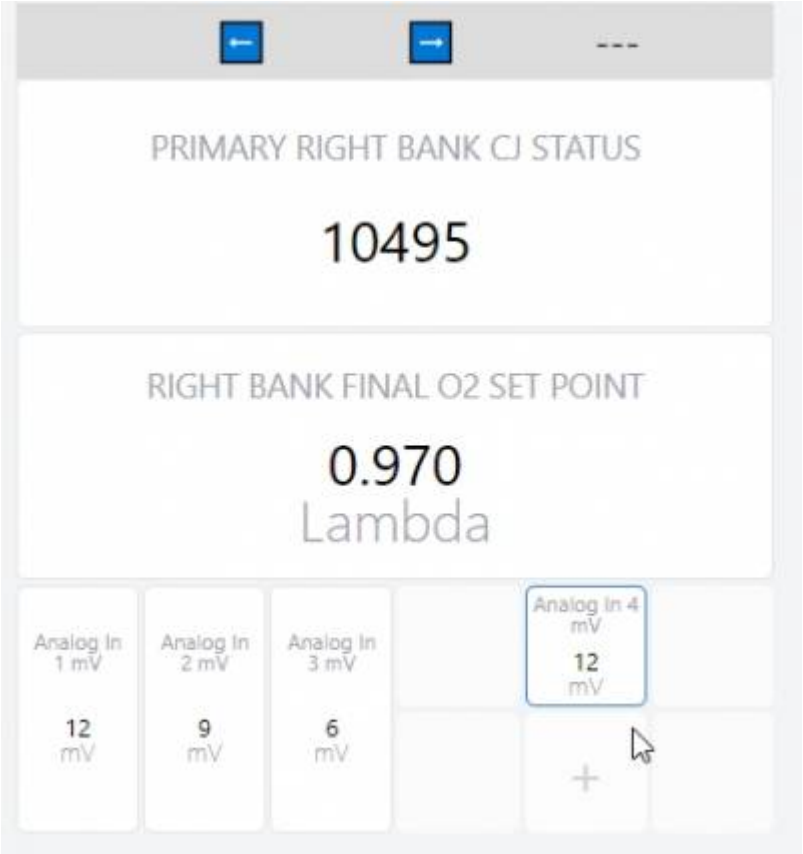


To resize an element on the dashboard, hover your mouse on the right hand corner of the element. If on a desktop, you should see the mouse change to an arrow as shown below.



Next, hold the left mouse button down and drag the mouse in the desired direction to resize the element. Let go of the mouse button to finalize the resizing.

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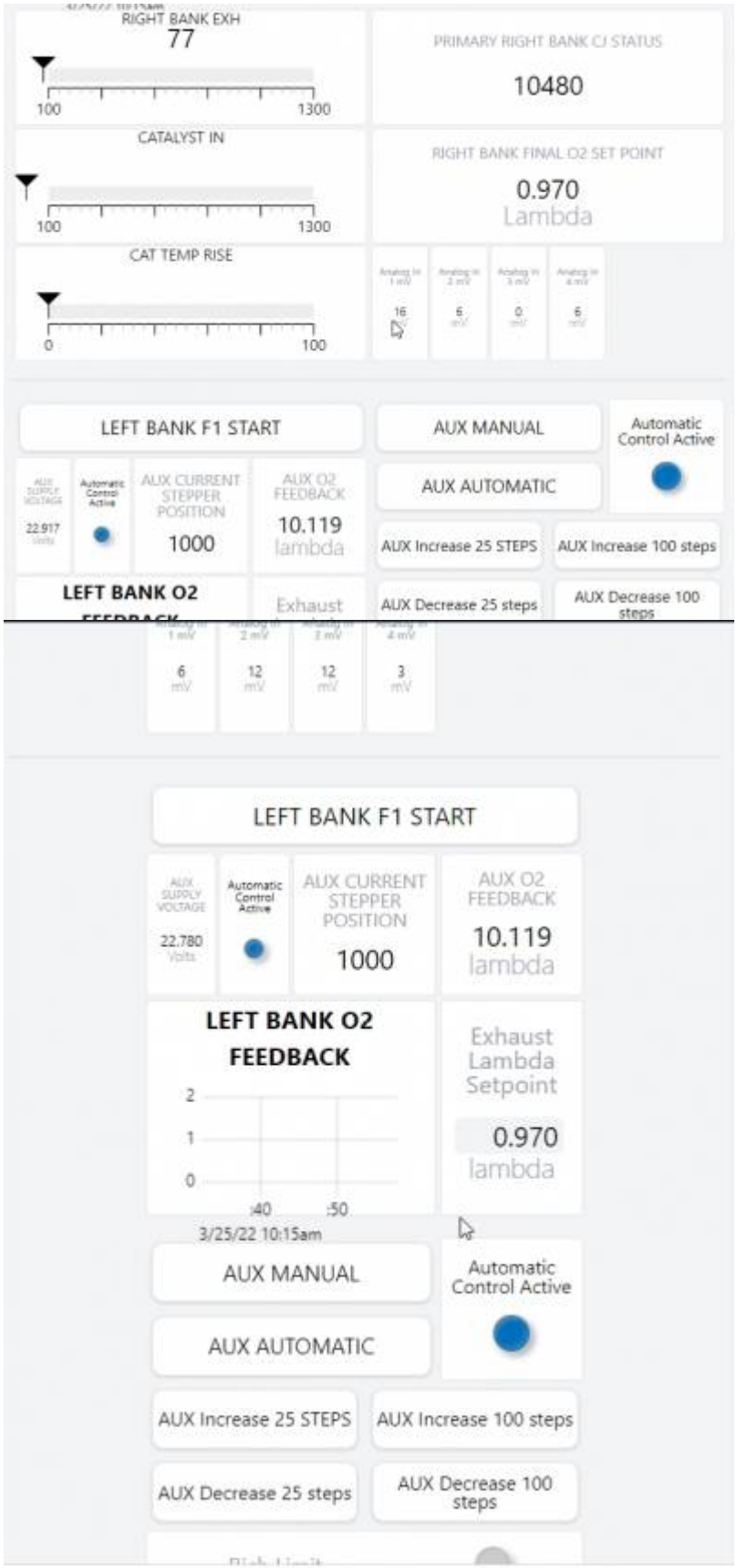
To delete an element, click on the element in edit mode and hit the delete key.

To move an element on the dashboard, left click in the middle of the element and drag the element to the desired location. Elements cannot be moved to another 6×6 grid.

Breakpoints are useful for keeping sections separated. For example, a breakpoint can be added to separate the left and right bank of a dashboard as in the AFR-500. A breakpoint is shown as a gray horizontal bar. When the user resizes the window, the leftmost grid below the breakpoint is always going to be the leftmost grid no matter how the window is resized. The grids after the leftmost grid will flow to the right until there is no more screen space, and then the next grid will be to the left and below.



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To add a new breakpoint in the middle of two grids, click the 3 dashes and a new breakpoint will be inserted above the grid you selected. To add a new breakpoint at the end of the dashboard, add a new grid below the last breakpoint. This will add a new section, along with a breakpoint below the

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new section. 

2.4 The Application Tab

The application tab allows for downloading the device terminal builder with three options along with a name, version, and release notes.

The first export option is locked (read-only) which makes the downloaded device terminal builder not editable. The edit button will not be available to make changes to the dashboard.

The second option for exporting is “Auto connect” which allows for the device terminal builder to skip the connect screen and go straight to the dashboard and use the connection settings that were selected before exporting the device terminal builder.

The third and final option is “Dashboard only” which will export the device terminal builder without the channel tab, application tab and debug tab available. The dashboard will be wider as a result of not having the additional tabs available.

After all options look correct, click the “Download” button and a .html file with the entered information and options will be downloaded. You can then, distribute or use this .html file as needed. The name, version, and release notes will be in the application tab of the downloaded .html file.

2.5 Setting up for DE-4000

Add the AFR-500 as an external device Import the modbus list into the external device configuration

Insert instructions for getting the JSON for the modbus map

When adding the external device you specify the IP address of the device (AFR-500) plus the node appended as a .X at the end of the ip address

Assigning the DE-4000 a secondary IP address that is in the same subnet as the AFR-500

Once the AFR-500 is available as an external device you drop the registers onto any dashboard page

Connect the ethernet cable

If using 485 you select the baud rate and the node.

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