L24 - Basic Drive Programming with PowerFlex 755

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Rockwell Automation

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Contents

Before you begin

About this lab

This hands-on lab will provide you with an opportunity to explore the PowerFlex 755 AC drive. In this session, you will learn to:

- Use the Assisted Startup for simple Speed Controlled Applications
- Control the drive and spin a motor

This lab takes approximately 50 minutes to complete.

Lab Objective

At the end of this lab, you should have successfully completed the Assisted Startup routine of the PF 755 drive and

1. Programmed the Drive to start the drive/motor using the selector switch labeled 'Di 1'.
2. Programmed the Drive to stop the drive/motor using the selector switch labeled 'Di 0'.
3. Programmed the Drive to forward or reverse the drive/motor using the selector switch labeled 'Di 2'.
4. Programmed the Drive to get Speed Reference from an Analog Source, the potentiometer labeled '0-10 VDC IN 0'.

Tools & prerequisites

- Windows 7 PC with Connected Components Workbench
- IMC Demo Box
- Motor Demo Box
- ControlLogix CL-41 Demo Box

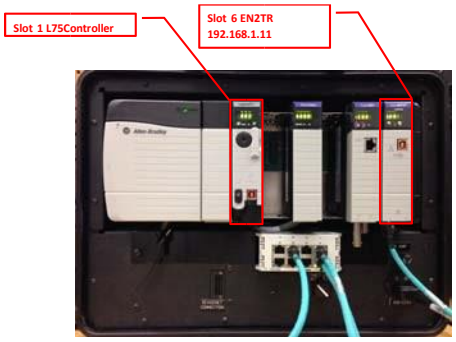
Introduction to Your Lab Hardware

Your lab hardware consists of an IMC demo box and a motor demo box. Please take a minute to get familiar with the hardware and the device names, as they will be referenced throughout this lab.

IMC Demo Box

Motor Demo Box

ControlLogix CL-41 Demo Box



Section 1: Assisted Startup using the H.I.M.

About This Section

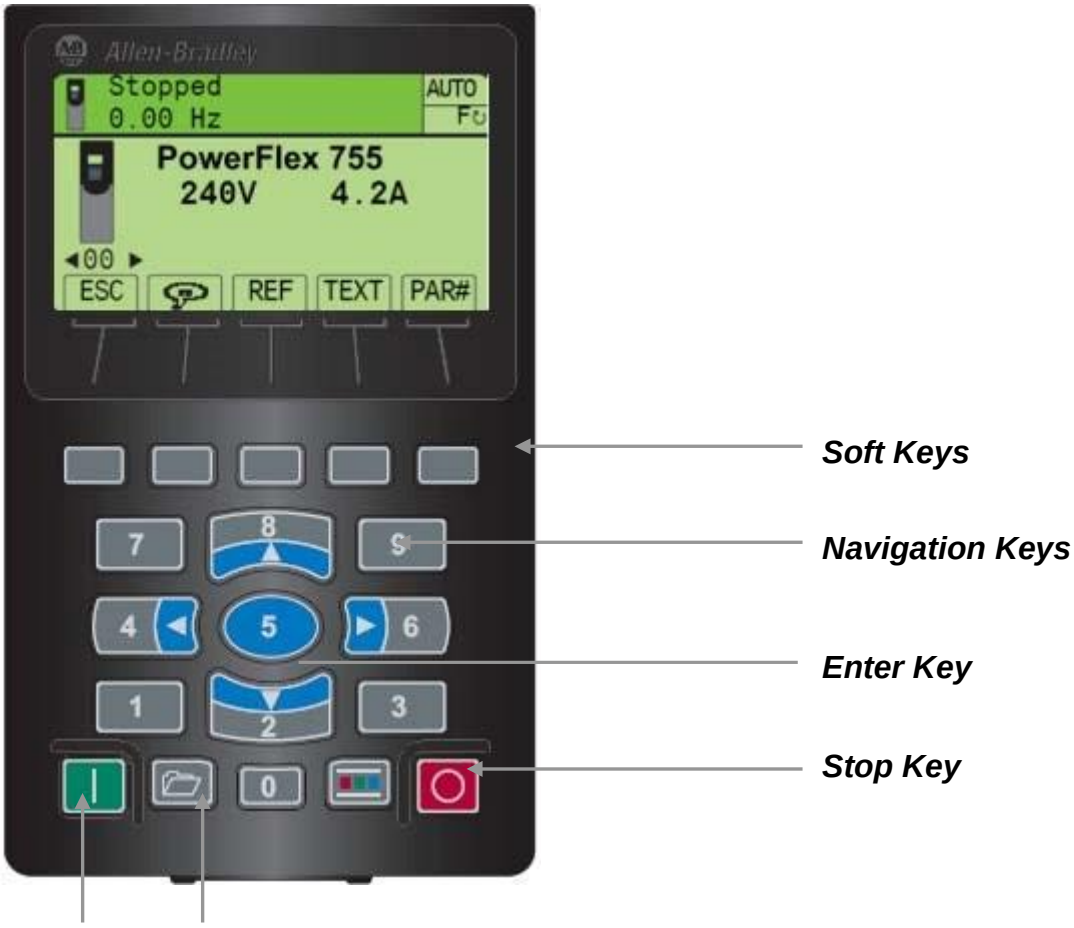
Using the Human Interface Module (H.I.M.) is the fastest way to access the parameters in a drive. This section will lead you through the Startup Wizard, will take approximately 50 minutes, and you will:

- Reset the drive to factory defaults
- Set the motor control mode and enter motor nameplate data

- Set the speed feedback device and speed limits
- Perform direction tests and inertia tests
- Configure speed references, ramp rats, inputs, and outputs

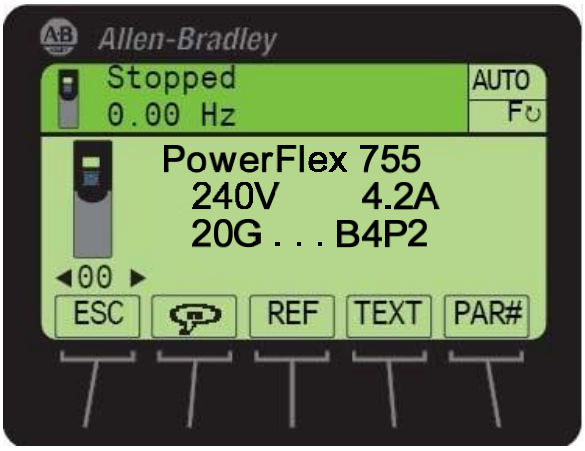
Using the Human Interface Module (H.I.M.)

The image below shows some of the essential keys which you will be using in this session. Please familiarize yourself with these keys (buttons)

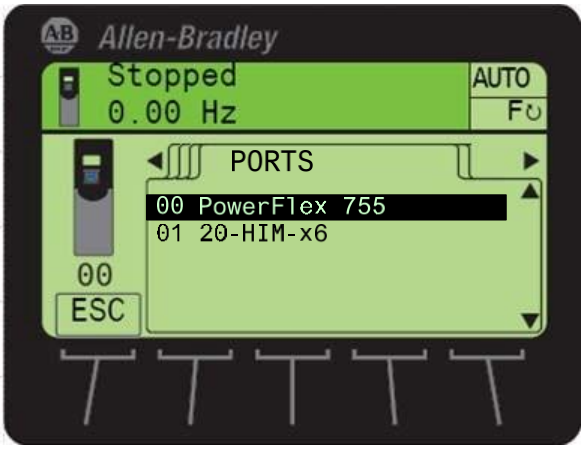


One of the ways to perform an Assisted Startup on the PowerFlex 755 is using the Startup routine in the H.I.M. The following steps will lead you through that:

1. Access the Status screen which is displayed on HIM Power Up.

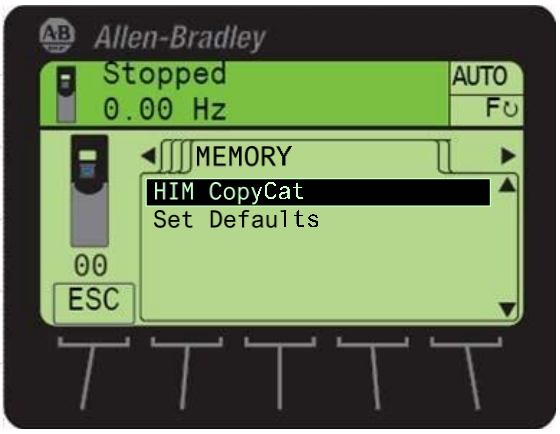


2. Press the ‘Folders’ button  on the HIM keypad. The button is located on the bottom row of the HIM Keypad (shown circled in the left image below).Pressing the ‘Folders’ button changes the HIM screen display to the Folders screen, shown below to the right. Depending on your drive configuration, the text next to each number may vary.



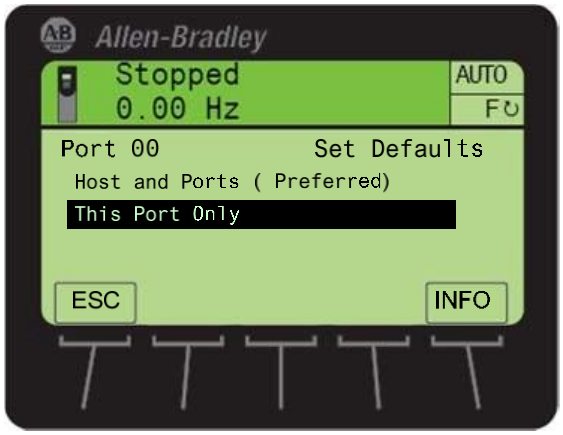
Resetting Factory Defaults and Starting Wizard

3. Use the left  or right  arrow keys to scroll through the different folders, to locate the folder called ‘MEMORY’.



4. Use the down arrow key   to highlight ‘Set Defaults’ if necessary and press the Enter key located in the center of the HIM keypad to make this your selection.

5. The screen which follows after completion of the previous step is shown. Use the down arrow key  to highlight ‘This Port Only’. Press the Enter key  located in the center of the HIM keypad to make this your selection.

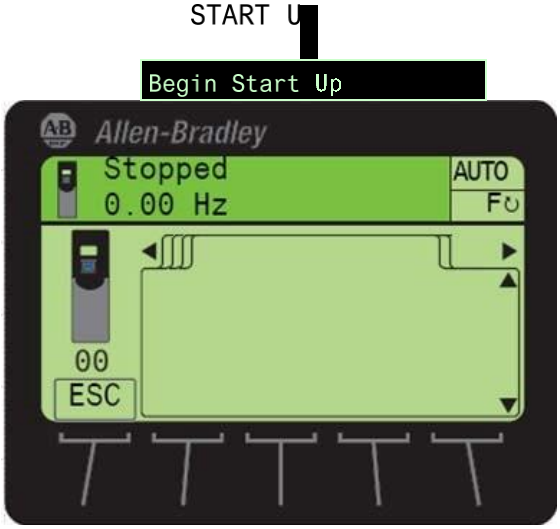


6. Use the soft key labeled ‘ALL’ to reset default all parameter settings in the Drive.

7. Use the ‘CLR’ soft key to acknowledge and clear the ‘Module Defaulted’ fault.

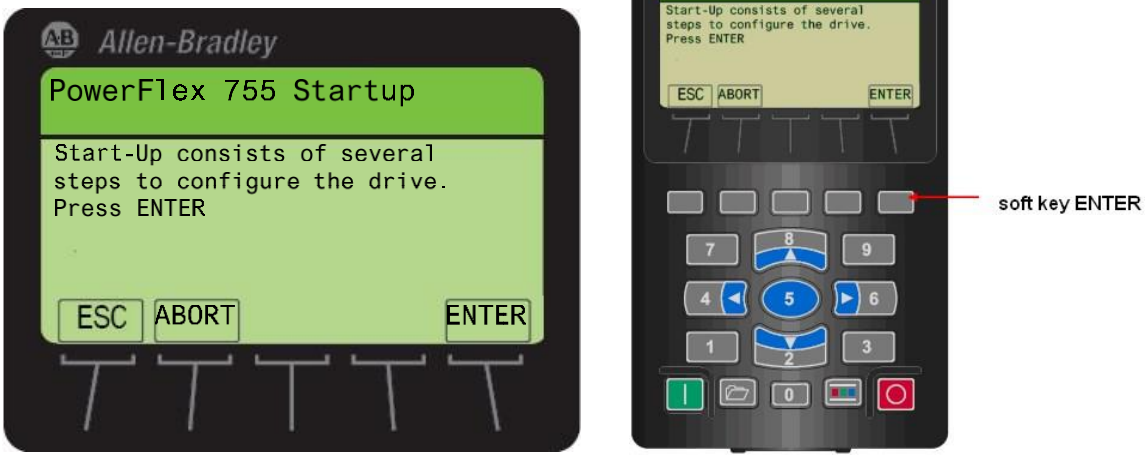
8. Press the ‘Folders’ button  on the HIM keypad again to access the Folders Menu.

9. Now use the left  or right  arrow keys to scroll through the different folders, to locate the folder called ‘START UP’.



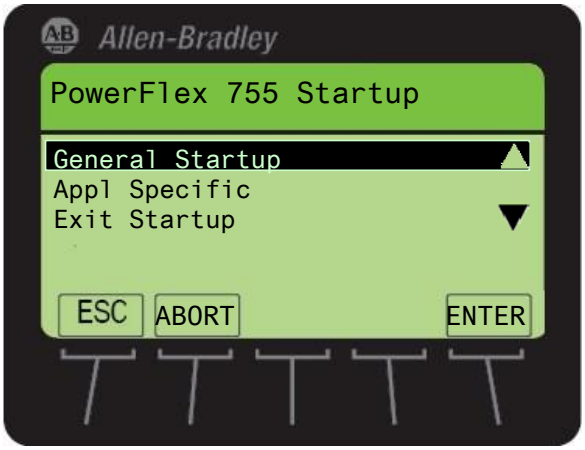
10. The first item listed in the ‘START UP’ folder is ‘Begin Start Up’ and this is highlighted by default. Press the Enter key  located in the center of the HIM keypad to make this your selection.

11. The startup routine starts with an Introduction screen. Press the ‘ENTER’ soft key to continue. The ‘ENTER’ soft key is located on the top row of the HIM keypad.



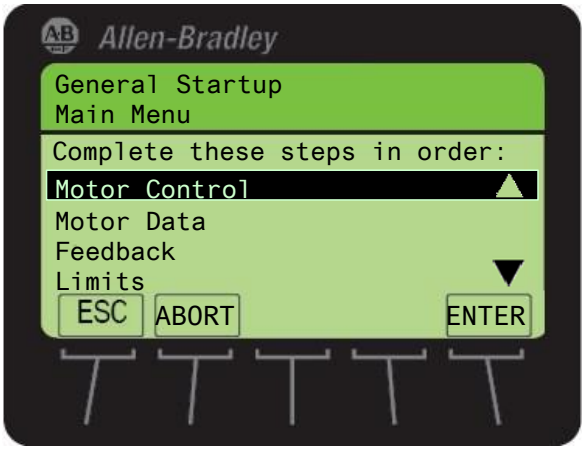
- Note: You can always use the ESC soft key to return to a previous step.

12. Pressing the ‘ENTER’ soft key in the previous step has led you to a new screen, which allows you to select the type of startup you wish to perform. For this lab session, we will choose ‘General Startup’. This is highlighted by default. Press the ‘ENTER’ soft key located on the top row of the HIM keypad to make this your selection.

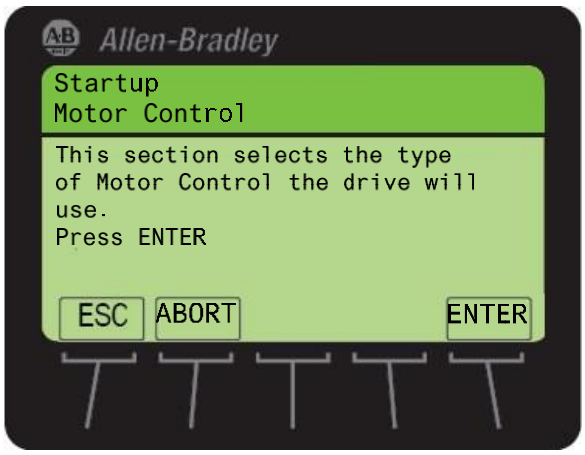


Setting the Motor Control Mode

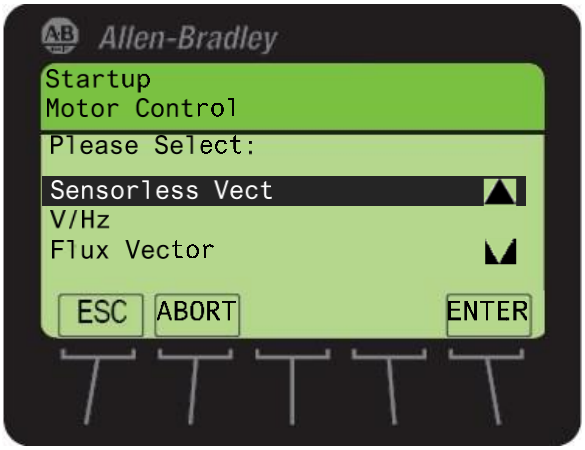
13. Pressing the ‘ENTER’ soft key in the previous step has led you to the ‘General Startup Main Menu’. You will go through steps listed in this menu to configure your drive. Press ‘ENTER’ soft key to enter the first section ‘Motor Control’.



14. The introduction screen provides information about the ‘Motor Control section. Press the ‘ENTER’ soft key to continue.

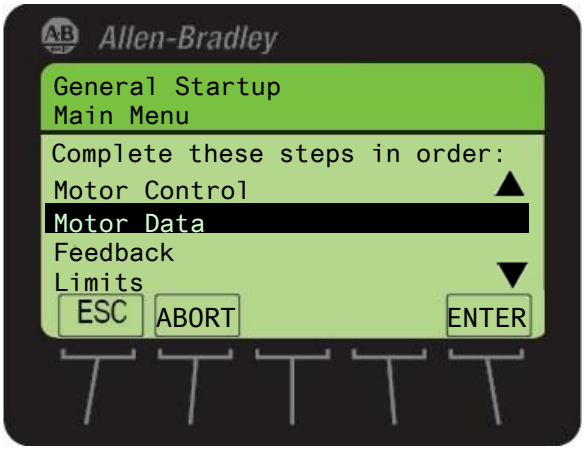


15. Pressing the ‘ENTER’ soft key in the previous step leads you to a screen which lists the available motor control modes in the PowerFlex 755. For this lab session, we will choose the Sensorless Vector mode. Press the ‘ENTER’ soft key to make this your selection.



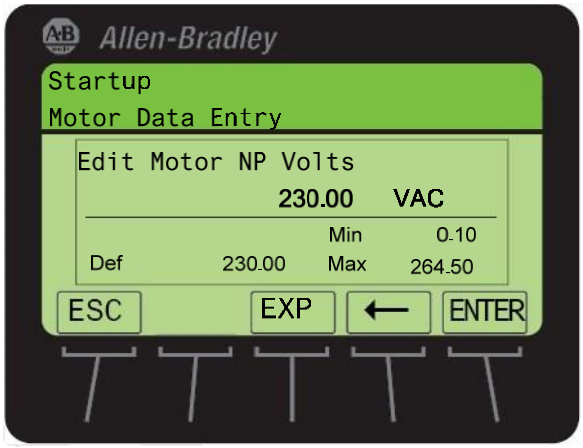
Entering Motor Nameplate Data

16. After selecting the motor control mode in the previous step, you are directed back to the General Startup Main Menu. ‘Motor Data’ should be highlighted now. Press the ‘ENTER’ soft key to make this your selection. The next few steps will require you to input the nameplate information of the motor you are doing a Startup on.

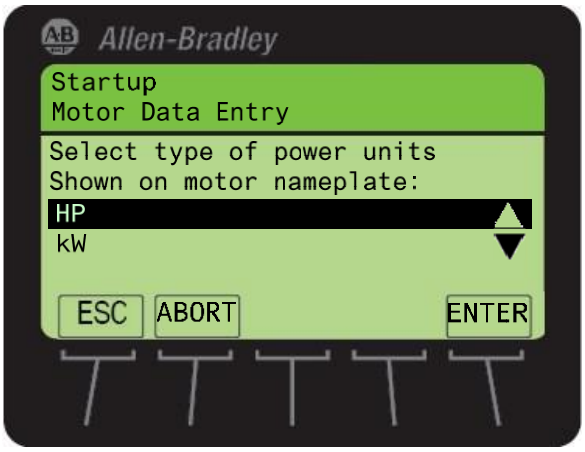


17. Pressing the ‘ENTER’ soft key in the previous step has led you to the ‘Startup Motor Data Entry’ screen. The first information you will provide is the Motor Nameplate (NP) Volts. The Motor in the

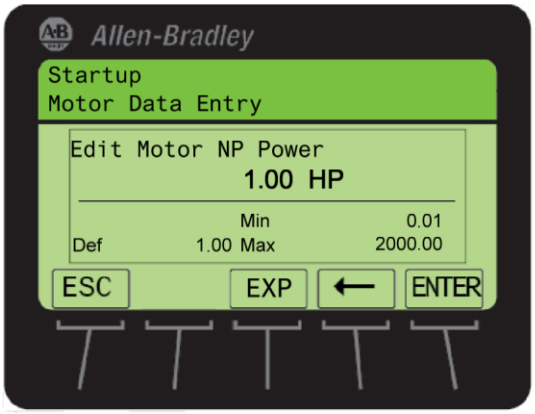
demo is rated for 230 V. This should be the default value for this parameter. Press the 'ENTER' soft key to confirm your input and move to the next screen.

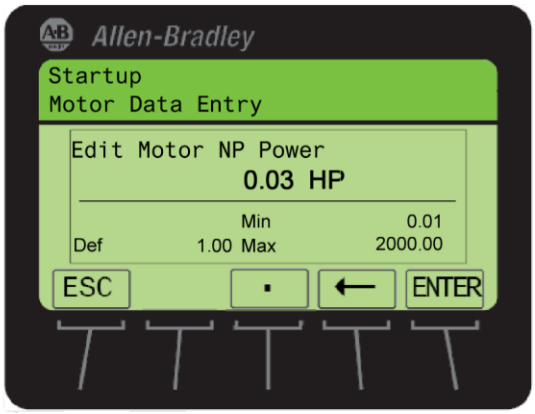


18. The next information you need to provide is the Power Units. By default the value of the parameter should be set to 'HP'. Press the 'ENTER' soft key to confirm your selection and move to the next screen.

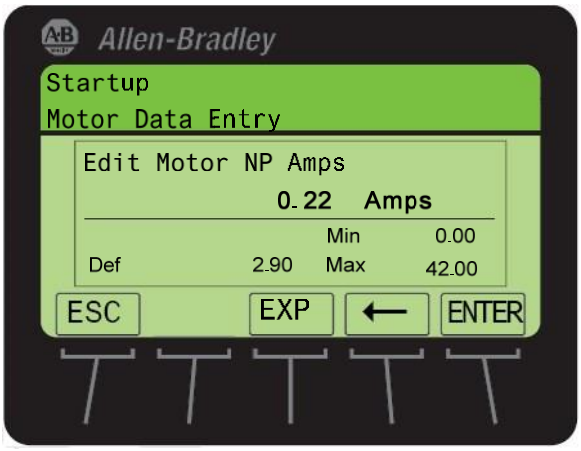


19. You will now be required to input the Motor Nameplate (NP) Power. The motor internal to the demo is rated 25 Watts (0.025 kW) or 0.033 HP. Notice that there are no designated buttons on the HIM keypad for entering a decimal point. The PowerFlex 755 HIM keypad uses a soft key to provide a 'decimal point' button. This 'decimal point' soft key is activated when the first digit in the numeric value is entered. In this case, start by entering '0'. Notice how one of the soft keys (top row of the HIM keypad) is now a 'decimal point' button. Use the 'decimal point' soft key button and the appropriate number keys to input a value of '0.033'. Press the 'ENTER' soft key to confirm your input and move to the next screen.





20. You will now be required to input the Motor Nameplate (NP) Amperes. The Motor in the demo is rated for 0.22 amps. Use the ‘decimal point’ soft key button and the appropriate number keys to input a value of ‘0.22’. Press the ‘ENTER’ soft key to confirm your input and move to the next screen.

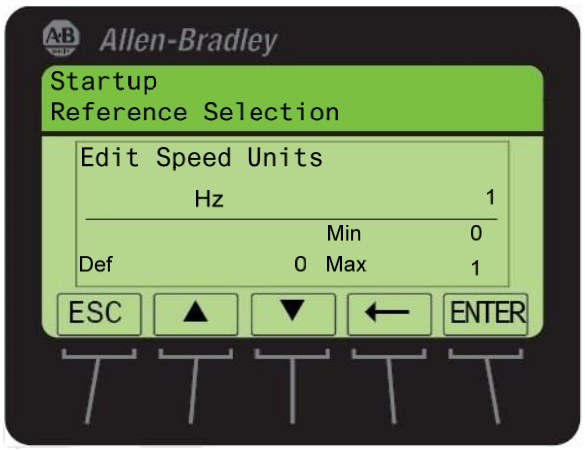


21. You should be in the ‘Edit Motor NP Hertz’ screen. The Motor in the demo is rated for 60 Hz. The Default value should be ‘60’ Hz. Press the ‘ENTER’ soft key to confirm your input and move to the next screen.

22. You will now be required to input the Motor Nameplate (NP) RPM. The Motor in the demo is rated for 1600 RPM. Use the appropriate number keys to input a value of ‘1600’.Press the ‘ENTER’ soft key to confirm your input and move to the next screen.
23. You should now be in the ‘Edit Mtr OL Factor’ screen. This screen allows you to enter the Motor Overload factor. By default this parameter value is set to a value of ‘1.00’. We will use this as our selection for this lab session. Press the ‘ENTER’ soft key to confirm this and move to the next screen.

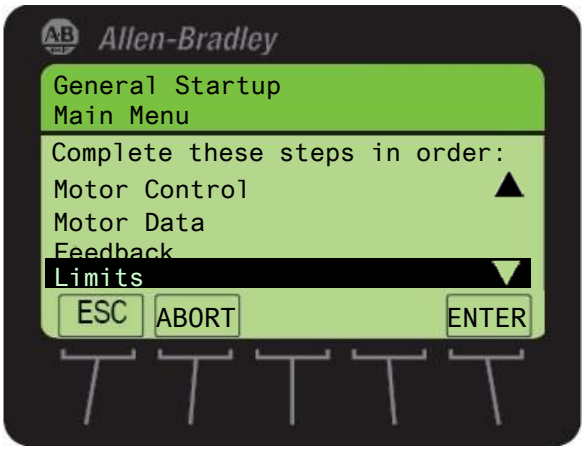
24. You should be in the ‘Edit Motor Poles’ screen. The Motor in the demo is a 4 Pole motor. By default, this parameter value is set to a value of ‘4’. Press the ‘ENTER’ soft key to confirm this as your selection and move to the next screen.

25. You will now be required to input the Speed Units. For this lab we will use ‘Hz’ for our Speed Units. After this setting has been selected, press the ‘ENTER’ soft key to confirm this and move to the next screen.



Setting the Speed Limits

26. You should now have been directed back to the General Startup Main Menu. Configuring the limits is the next step in the Startup routine. Press the 'ENTER' soft key to access 'Limits' section.

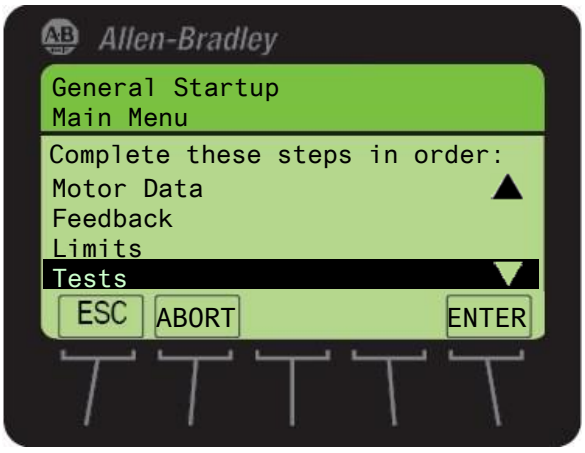


27. For this lab session, we will be making the following changes in the 'Limits' section. Use the number keys to input the values listed for each item and press the 'ENTER' soft key to move forward to the next screen. After the four values have been entered, you will be exited out of this section.

- Max Fwd Speed = 60 Hz
- Max Rev Speed = -60.00 Hz (you can directly enter a value of '60'; the negative sign is defaulted)
- Min Fwd Speed = 0.00 Hz
- Min Rev Speed = 0.00 Hz

Direction Auto Tune and Inertia Tests

28. You should now have been directed back to the General Startup Main Menu. The 'Tests' section is next and should be highlighted by default at this stage. Press the 'ENTER' soft key to access 'Tests' section.



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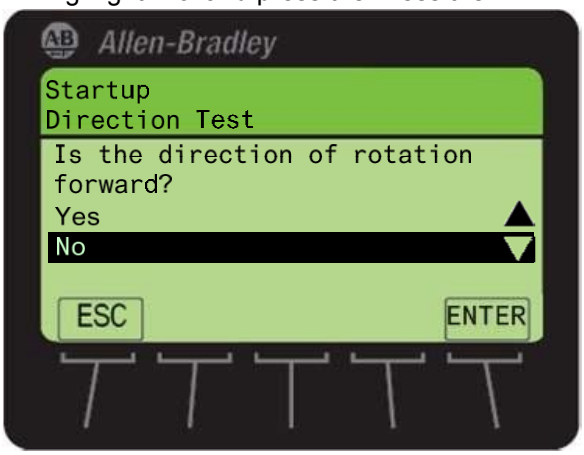
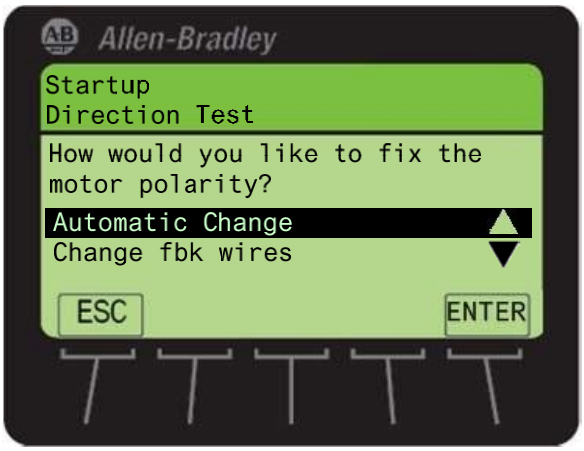
29. There are two tests which are part of the Startup Routine. You will perform these tests in the next few steps. You will run the Direction test first. The 'Direction Test' list item should be highlighted by default. Press the 'ENTER' soft key to make this your selection. Press the Start key  to start the motor.
30. The next screen asks the question 'Is the direction of rotation forward?' To demonstrate the ability of the PowerFlex 755 to electronically swap motor leads to change motor direction, let us

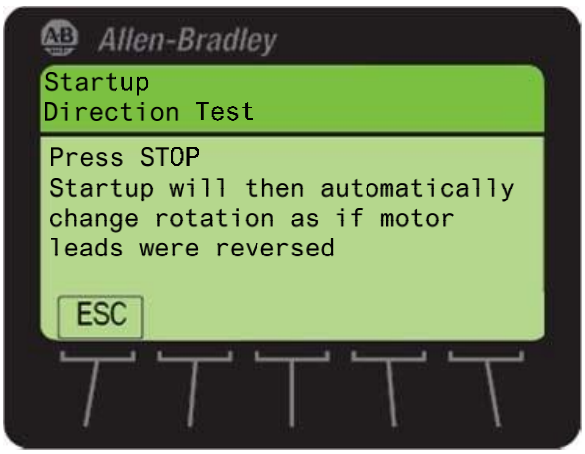
choose ‘No’ as the answer to this question. Use the  down arrow key to select and highlight ‘No’ and press the Press the ‘ENTER’ soft key.



31. The next screen asks the question ‘How would you like to fix motor polarity? ’. Select the default highlighted option ‘Automatic change’ by using the ‘ENTER’ soft key.



32. The screen that follows asks you to stop the drive so this change in direction, initiated in the 



previous step, can take place. Press the ‘STOP’ key to stop the drive.

33. Follow the direction on the next screen which asks you to ‘START’ the drive. You can start the drive and by using the START  key.

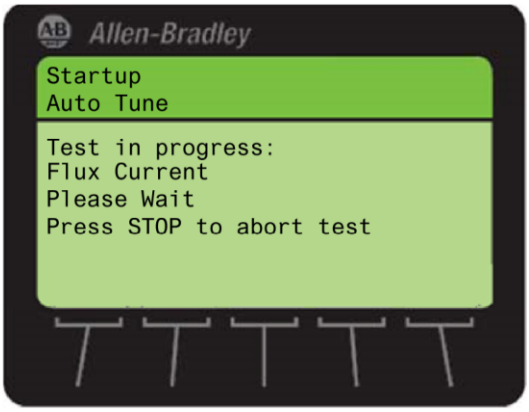
34. The next screen asks the question ‘Is the direction of rotation forward?’ and requires confirmation that the changes to direction are acceptable. Select ‘Yes’ by pressing the ‘ENTER’ soft key.

35. Press the Stop key  .This should successfully complete the Direction test.

36. You should now be back in the ‘Motor Test Menu’ screen. Now use the ‘ENTER’ soft key to select the ‘Auto tune’ Test. Read the important information on the screen and press the ‘ENTER’ soft key.

37. Pressing the ‘ENTER’ soft key in the previous step has directed you to the ‘Select the tuning mode’ screen. For this lab session, we will perform a rotate tune on the demo motor. Select the default highlighted option ‘Rotate Tune’ by pressing the ‘ENTER’ soft key.

38. As directed by the HIM screen information, press the START key  to start the ‘Auto tune’ Test. Notice the changing information on the HIM (as the different parts of the Auto tune tests are completed).Wait till the test is completed.



39. The completion of the test is indicated by the ‘Test Completed Successfully’ screen. Press the ‘ENTER’ soft key.

40. Pressing the ‘ENTER’ key in the previous step has directed you back to the ‘Motor Test Menu’. Use the ‘ENTER’ soft key to select ‘Done’ in the ‘Motor Test Menu’ screen.

Configuring the Speed Reference and Ramp rates

41. At this time you should be in the 'General Startup Main Menu'. The next item on the Startup menu list' Ref Ramp Stop' should be highlighted by default. Press the 'ENTER' soft key to make this your selection.

42. The 'Edit Direction Mode' box should be on the screen now. We will use the default parameter value of 'Unipolar' for this lab session. Press the 'ENTER' soft key to confirm and save your selection.

43. You should be on the 'speed reference source' selection screen. Use the down arrow  or up arrow  keys to highlight 'Analog Input' as your Speed Reference source. Use the 'ENTER' soft key to make this your selection.

44. In the window 'Select Port to Use' that appears following the previous step, use the down arrow  or up arrow  keys to highlight 'Port 07 I/O module 24V'. Use the Enter key  to make this your selection.

45. Use the down arrow  and up arrow  keys, if necessary, to highlight 'Par 0050 Anlg In0 Value'. Use the Enter key to make this your selection. Press the 'ENTER' soft key to confirm and save your selection.

46. The next few steps will configure the Analog Input you chose as Speed Reference. For this lab session we will use the 0-10V potentiometer (labeled 0-10VDC IN 0) on the demo as our Analog Input speed reference. Pressing the 'ENTER' soft key in the previous step has led you to the first item required to configure the Analog Input. You should be in 'Edit Anlg In0 Hi' screen. Press the 'ENTER' soft key to accept the default value of '10.000' Volt.

47. In the 'Edit Anlg In0 Lo' screen that follows, press the 'ENTER' soft key to accept the default value of '0.000' Volt.

48. In the next few screens input these values:

- 'Speed Ref A Anlg Hi'= 60 Hz
- 'Speed Ref A Anlg Lo'= 0 Hz

Press the 'ENTER' soft key.

49. You should be in the 'Startup / Stop Config' screen now, press the 'ENTER' soft key to accept the default selection of 'Ramp 1' to be used as 'Stop Mode A'.

50. Pressing the 'ENTER' key in the previous step has directed you to the screen to configure the 'Bus Reg Mode A'. Select the default of 'Adjust Freq 1' using the 'ENTER' soft key.

51. Following the step to set bus regulation you will now set Ramp (Accel and Decel) times. In the 'Edit Accel Time 1' screen, use the appropriate number key to enter a value of '3' seconds. Press the 'ENTER' soft key.

52. Similarly enter a value of 3 seconds for the deceleration time in the 'Edit Decel Time 1' screen. Press the 'ENTER' soft key.

53. The next screen continues the ramp speed configuration and asks the question ‘Do you want to perform S-curve for Accel/Decel? ‘. We will select ‘No’ as the answer for this lab session. You can select ‘No’ by highlighting it using the  down and  up arrow keys and then using the ‘ENTER’ soft key to confirm and save your selection.

Configuring the Inputs and Outputs

54. Completing the previous step successfully has led you to the ‘General Startup Main Menu’ with the item ‘I/O’ highlighted. Press the ‘ENTER’ soft key to enter the ‘I/O’ section.

55. You should be in the ‘Start Stop I/O’ screen now. The first item to configure on this list is ‘Start Stop & Dir’. Press the ‘ENTER’ soft key to enter this section. Read the Introductory screen to this section and press the ‘ENTER’ soft key to continue.

56. The next screen requires you to answer the question ‘Will a Digital Input be used as a START Source? Select ‘Yes’ using the  down and  up arrow keys and then using ‘ENTER’ soft key to confirm and save your selection. We will use the switch labeled ’Di 1’ in the demo as our Start Source in a later step.

57. The next screen will ask the question ‘Is Reverse required from a digital input?’? Select ‘Yes’ using the  down and  up arrow keys and then using ‘ENTER’ soft key to confirm and save your selection. We will use the switch labeled ’Di 2’ in the demo as forward/reverse in a later step.

58. Select ‘3 wire’ as your choice for the question ‘Enter Choice for the control method’.

59. In the ‘Select Port To Use’ window use the up and down arrow keys to highlight ‘Port 07 I/O Module 24V’ Press the ‘ENTER’ soft key to make this your selection.

60. In the ‘Param to Use’ window Press the Enter soft key to select

61. First, you will select the bit/Digital Input you want to use as your START. We are going to use the selector switch labeled ‘Di 1’ as our start input. To do this scroll to Bit 01 Input 1 and press the Enter soft key.

62. Repeat to select the selector switch labeled ‘Di 0’ as your Stop switch (Bit 00 Input 0) and the selector switch labeled ‘Di 2’ as your Forward/Reverse switch (Bit 02 Input 2) in that order.

63. You should now be back in the ‘Start Stop I/O’ menu screen. This is all we will configure in this section so use the  down arrow keys to scroll down to the last item on the list ‘Done’. After ‘Done’ is highlighted, use the ‘ENTER’ soft key to make this your selection.

64. You should now be back in the General Startup Main Menu screen .you have finished with the Startup routine steps required for this lab session. Select ‘Done’ using the ‘ENTER’ soft key to exit out this screen.

65. Select ‘Exit Startup’ using the ‘ENTER’ soft key to exit out of the Startup routine.
    You can now test your drive to perform the functions you configured during the startup routine namely, Start toggling the selector switch Di 1 to Start, Stop using the selector switch Di 0, change direction using Di 2 and provide speed reference using the ‘0-10VDC IN 0’ pot.

Section 2: Assisted Drive Startup using Connected Components Workbench

Besides the HIM, the drive parameters and programming can be accessed via software tools. These tools include DrivesTools SP, Connected Components Workbench, Logix Designer, or RSLogix5000 v16 (or greater) with Drive AOP 3.01 (or greater).

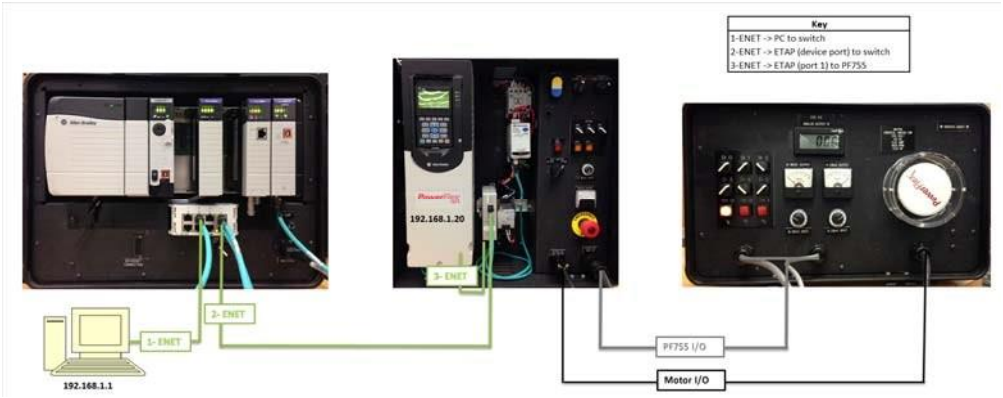
About This Section

In this section, we will introduce you to Connected Components Workbench software and some of the features that are common across all the software tools. This section is designed to take 50 minutes, and you will:

- Connect to a PowerFlex drive using Connected Components Workbench software.
- Display the Status View
- Display and edit parameters with the Linear List View
- Display and edit parameters with the File / Group View
- Use the Control Bar to control a drive
- Use a Wizard
- Upload configuration from drive to PC
- Download configuration to drive from PC

Starting Connected Components Workbench and Connecting to the Drive

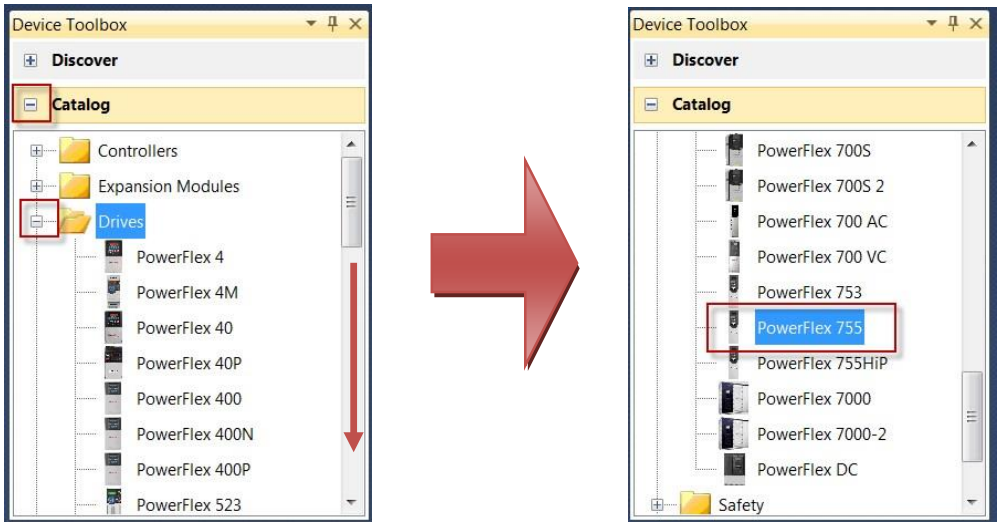
1. Verify that the demo boxes are connected as shown.



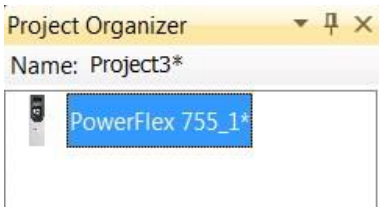
2. Double-click the Connected Components Workbench icon  from the desktop to start the software

3. Maximize the Connected Components Workbench window so it fills the entire screen

4. Expand the ***Catalog*** and ***Drives*** tabs in the Device Toolbox section on the right side of the screen. Double-click the ***PowerFlex 755*** drive.



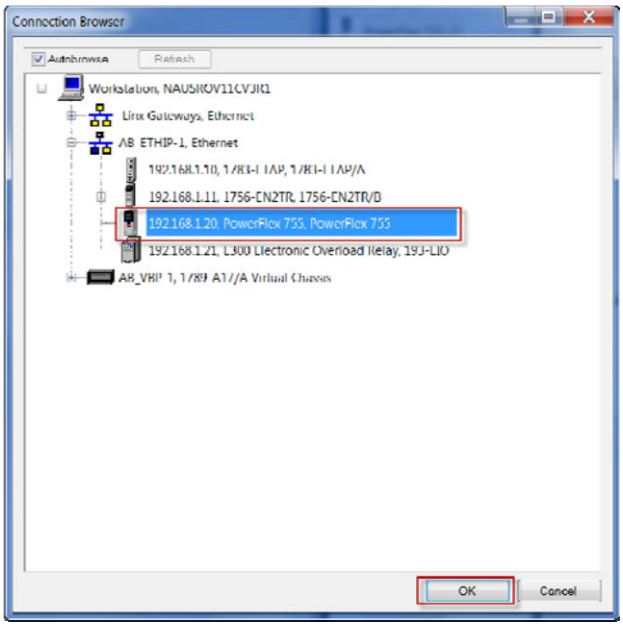
5. The PowerFlex 755 drive will now appear in the Project Organizer window as ***PowerFlex 755_1****.



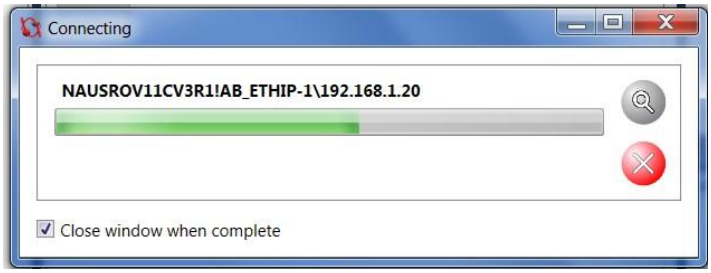
6. Click the 

button in the top right corner to connect to the PowerFlex 755 drive.

7. Expand the ***AB_ETHIP-1, Ethernet*** drive and navigate to the PowerFlex 755 drive. Click ***OK***.



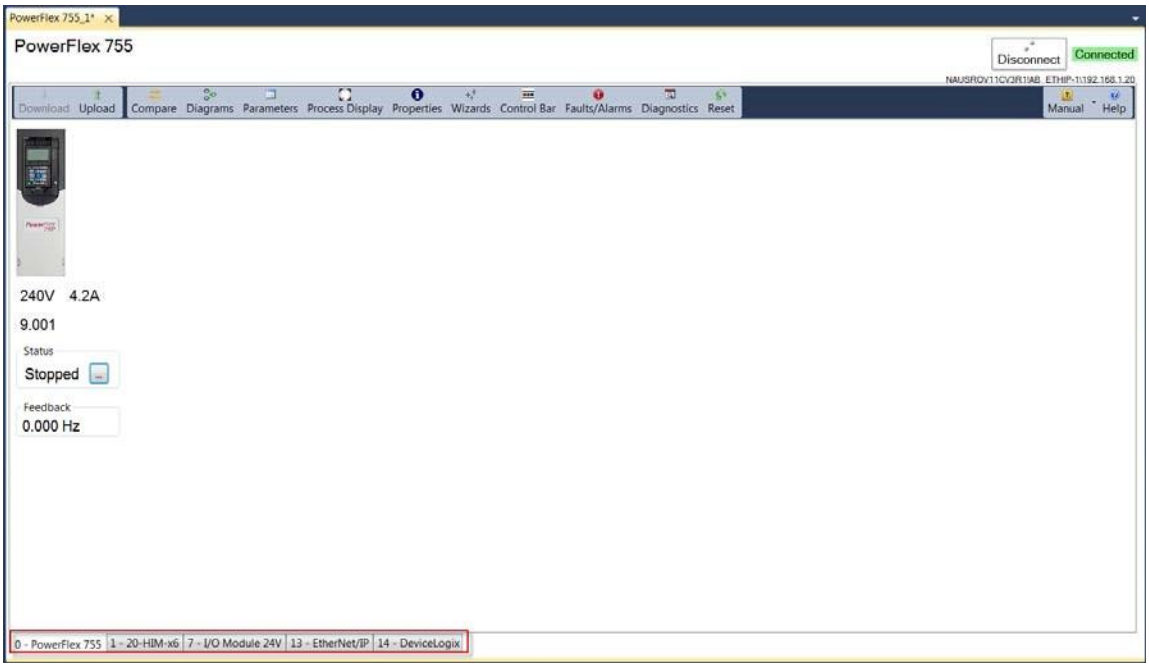
8. Wait as the Connected Components Workbench uploads parameters from the drive.



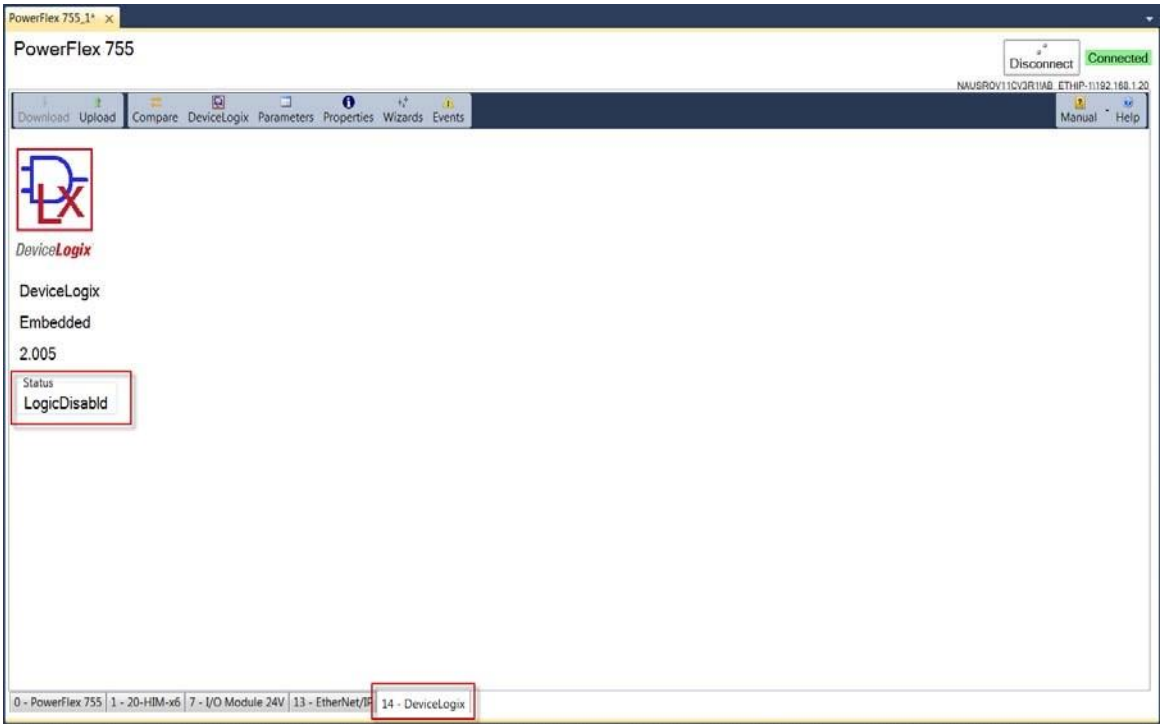
9. A Connected status will be shown in the right hand corner of the PowerFlex 755 window.

Displaying the Status View

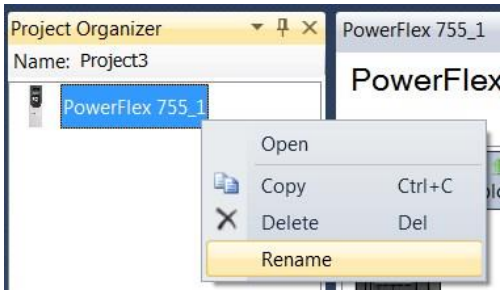
10. Observe the multiple tabs available for each module available in the drive. This tabbed view displays important drive information, such as voltage and amp ratings, series, revision, and operational status



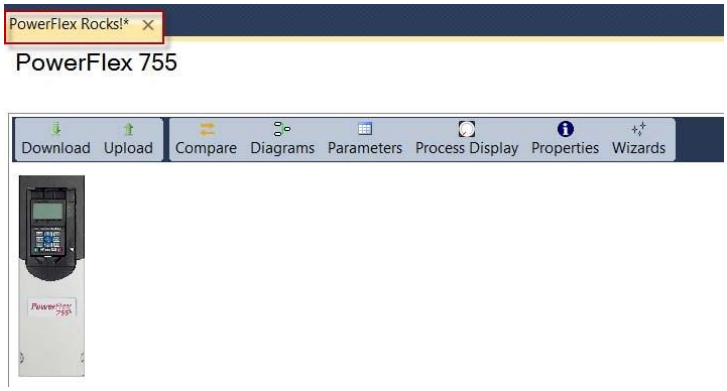
11. You can display the status view for any peripheral (e.g. the DeviceLogix adaptor or other communication adaptor) by selecting the peripheral's tab.



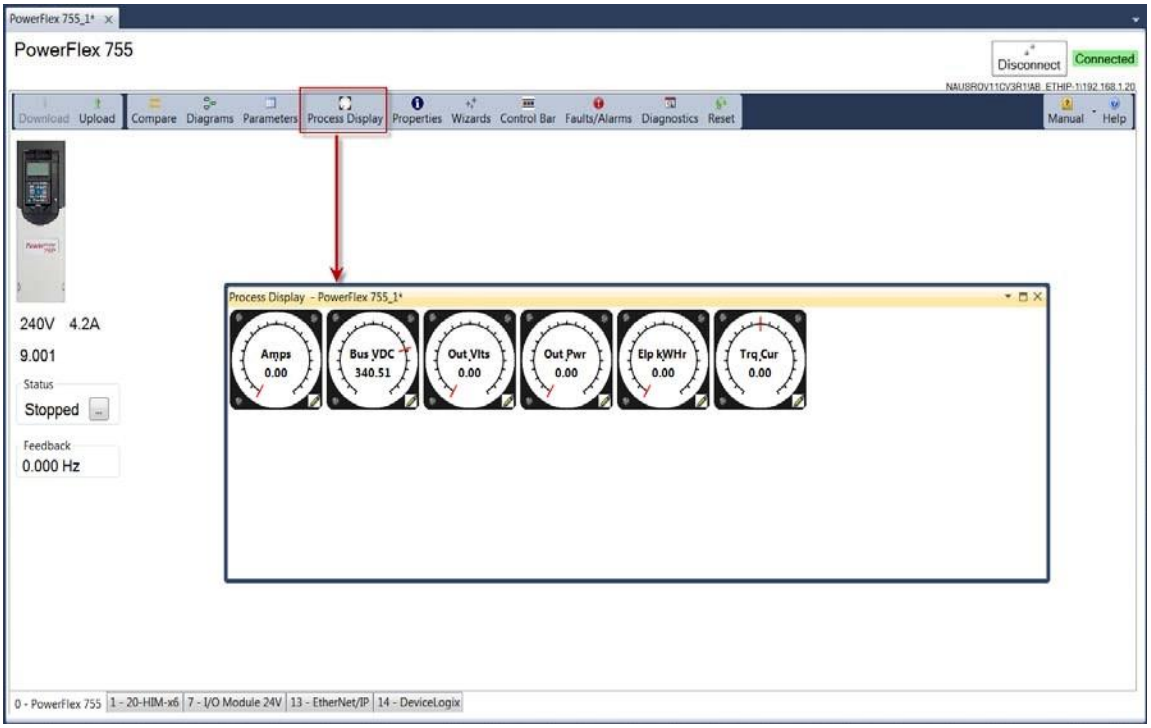
12. Navigate to the ***Project Organizer*** window. Right click on the drive's User Text (in the image, it is "*PowerFlex 755_1*") and select ***Rename*** to edit it. Enter new text such as "*PowerFlex Rocks!"* and hit **Enter**.



13. The new User Text is now displayed on the device tab.

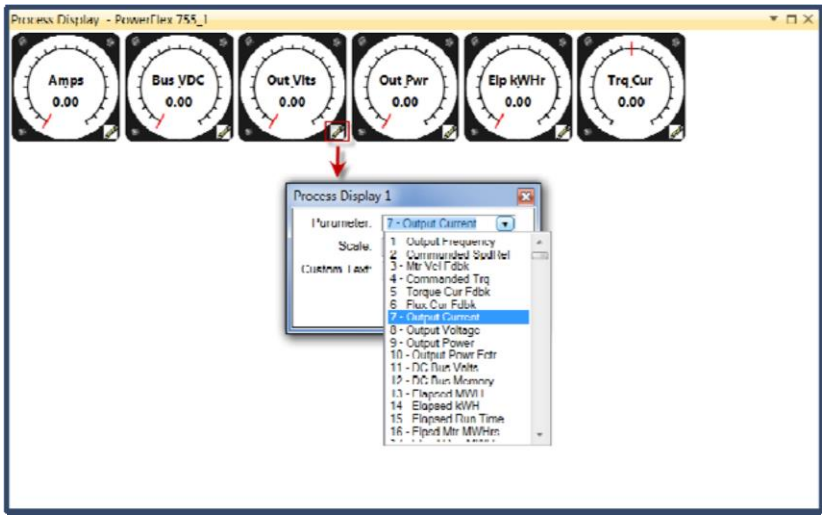


14. Select the ***Process Display***.



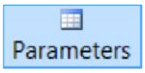
The Process Display allows you to view parameter values in an easy to read graphical display.

15. Navigate back to the Process Display, and click on the Pencil icon  for the middle display item. In this window, you can select, scale, and assign text to Display Item 1

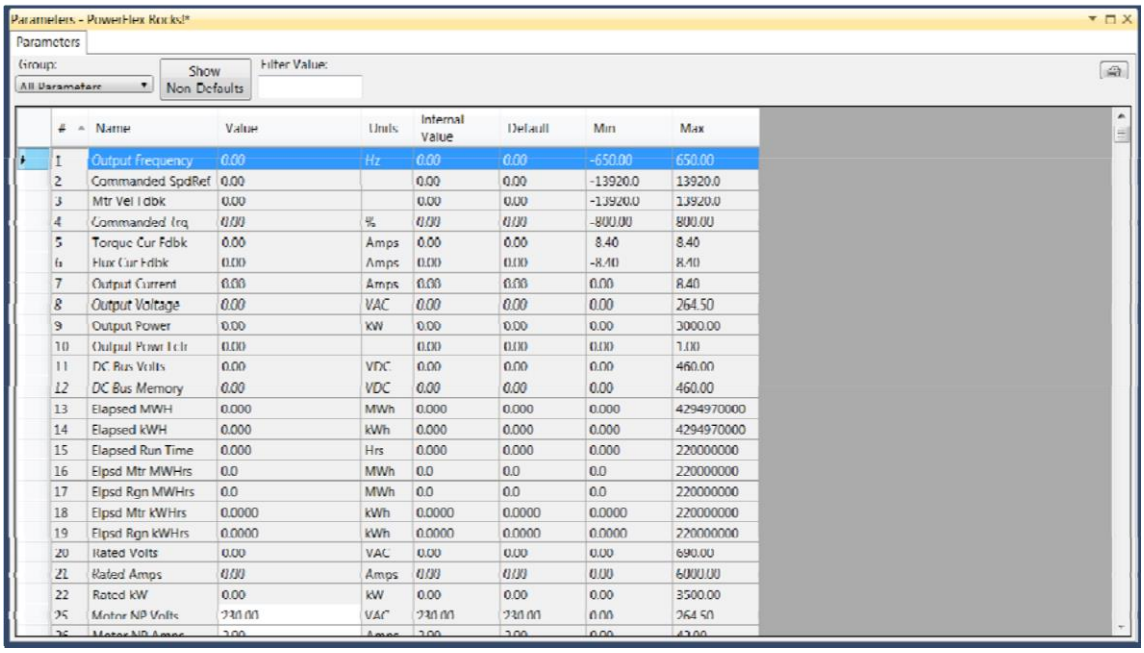


In this lab we will leave the parameter as is. Close the Process Display window.

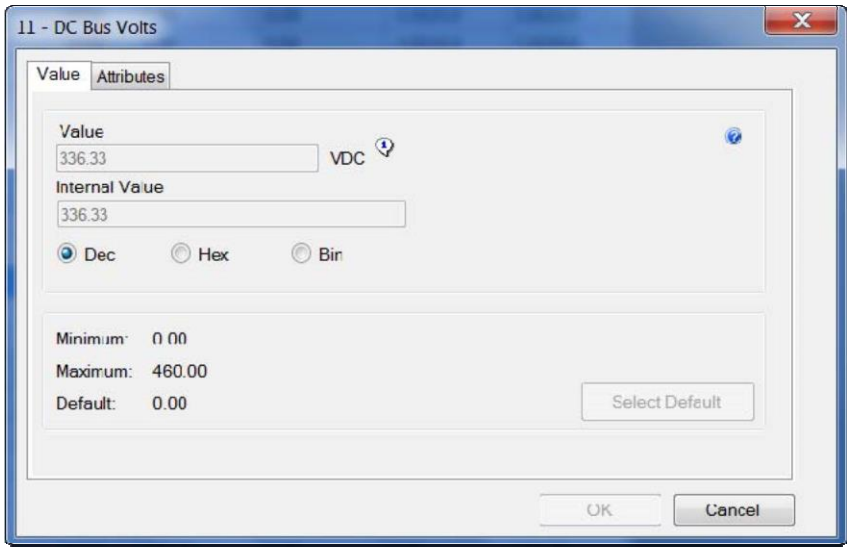
Displaying Parameters with the Linear List View

16. Click on the 

button to display a linear list of the drive parameters.

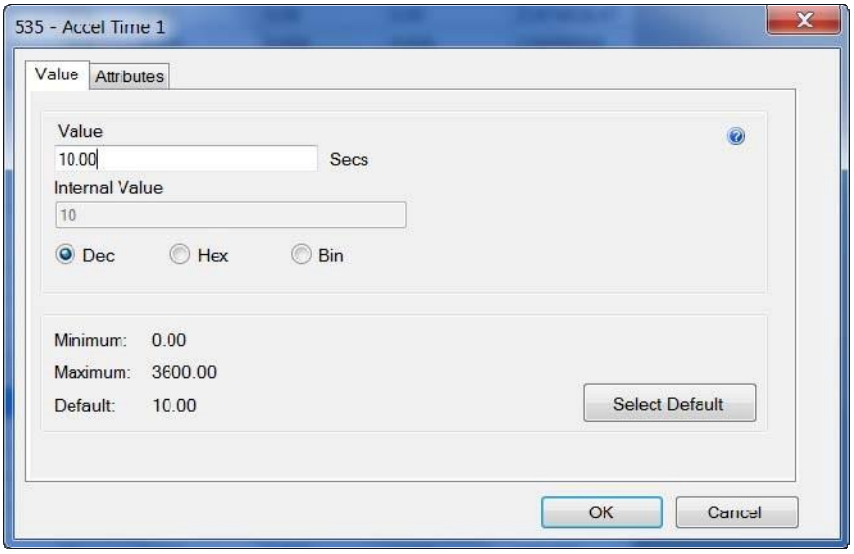


17. Scroll down to view or type *"11"* in the ***Filter Value*** window to view Parameter 11 [DC Bus Volts]. Double-click on this parameter to view it.



This is a read-only parameter that displays the value of the DC Bus Volts. This value changes as the DC Bus Volts varies, and you can see that here. Click **Cancel**.

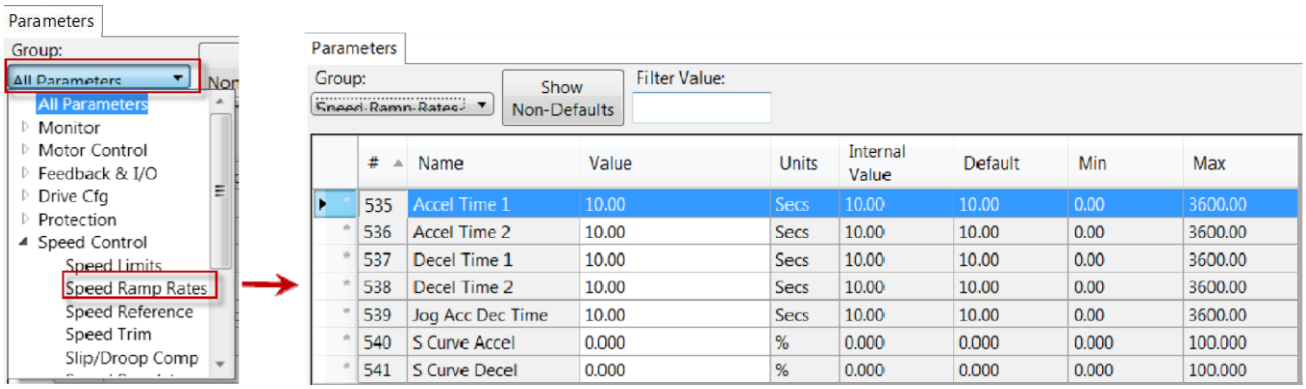
18. Scroll down even further to Parameter 535 [Accel Time 1], and then double-click on this parameter to view and edit it.



This is a writeable parameter that determines the acceleration rate it takes to go from 0 Hz to Parameter 27 [Motor NP Hertz] or Parameter 28 [Motor NP RPM], according to the setting in Parameter 300 [Speed Units]. To edit this parameter, a new value would be entered, followed by clicking **OK**. In this case though, click **Cancel**.

Displaying Parameters with the File / Group View

19. From the parameter tab, click on the drop down menu labeled ***All Parameters*** and expand the "Speed Control" file and then the "Speed Ramp Rates" group to display those parameters.



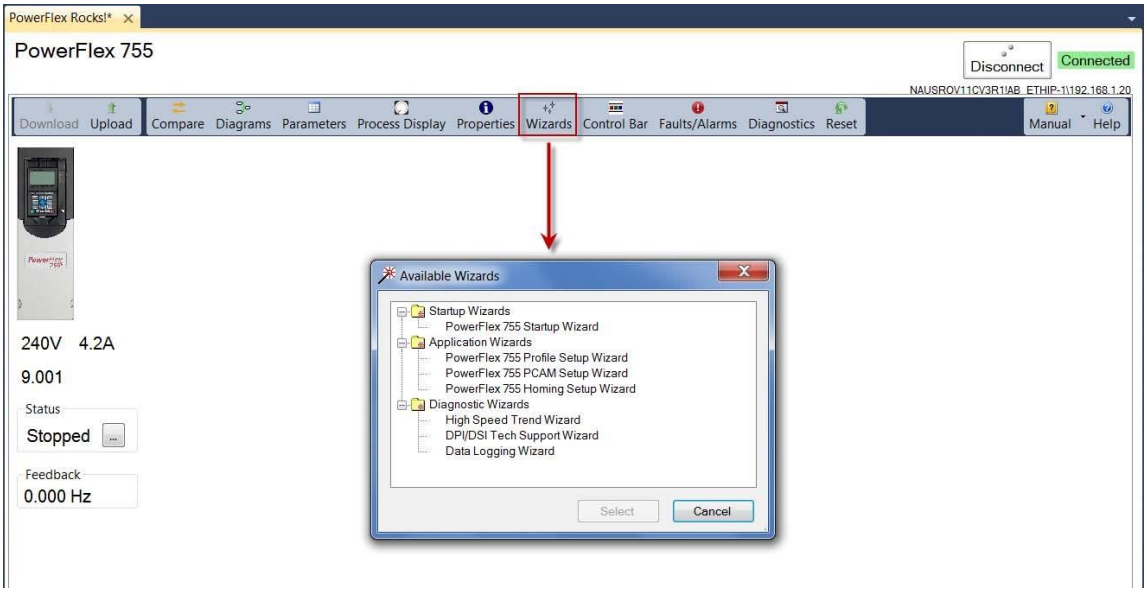
See how getting to the same parameter as what was previously scrolled to using the Linear List function can be accessed by grouping? If you do not know a parameter's number, it may be easier to find it with the File / Group view.

Using the Startup Wizard

The Startup Wizards eliminate the need to search for setup parameters because commonly used parameters are contained in a single wizard. Configuration becomes a guided, step-by-step process using graphics and parameter names (not numbers!), which simplifies drive setup.

20. Click on the Wizard Browser icon 

to launch the Wizard Browser and display the available wizards.



The PowerFlex 755 Startup Wizard is similar to performing the HIM Assisted Startup. Configuration parameters that are common to most applications are displayed in text / graphic forms and presented in a sequential step-by-step process.

The DPI/DSI Tech Support Wizard is used to collect information for a remote support person to help troubleshoot a problem. Drive and peripheral information such as series and revision is collected along with changed parameters, fault & event queues, diagnostic items, etc. This information is saved to a text file which can be emailed to RA Tech Support, the OEM that supplied the machine, or the Corporate Engineer responsible for the remote plant, etc.

Some additional wizards are already loaded on the drive, and even more additional wizards will be available in the future and can be added to Connected Components Workbench at any time. New wizards will be posted on the AB Drives Web Updates page for free download:

http://www.ab.com/support/abdrives/webupdate/index.html

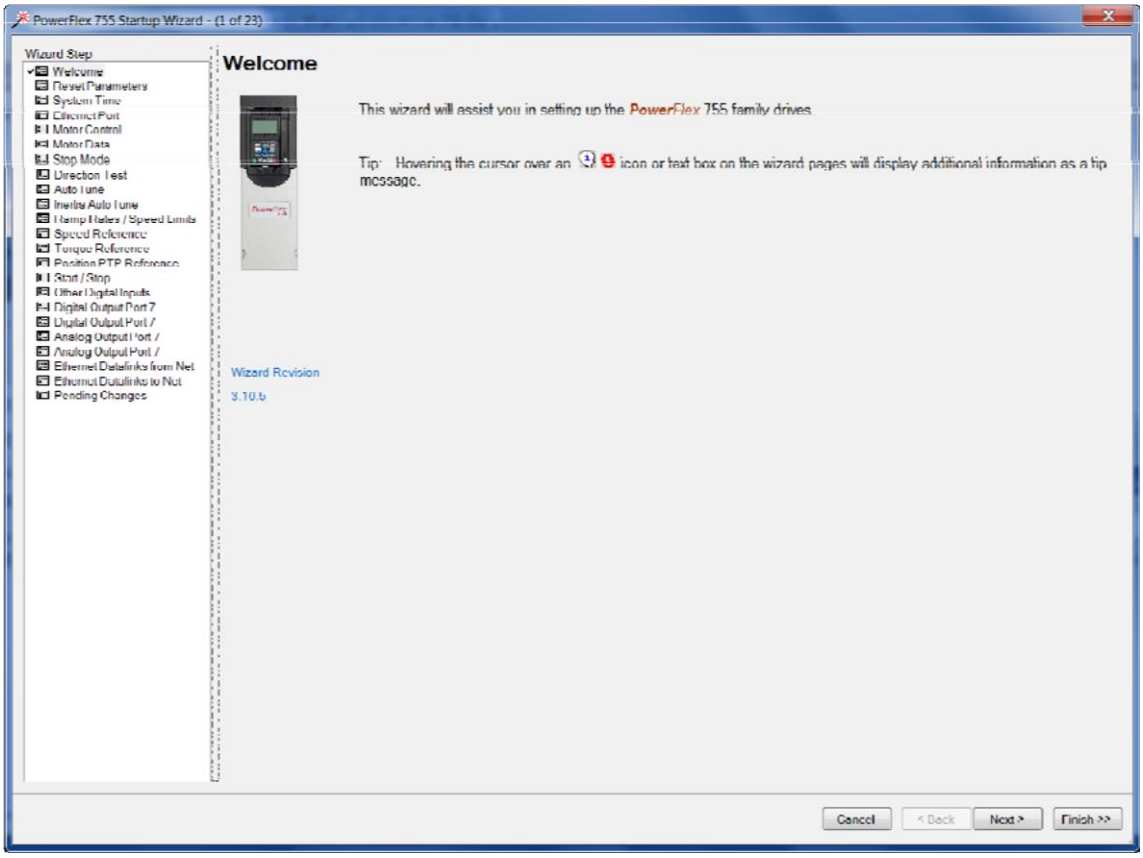
- Note: The same wizards also work with DriveTools SP v6.02 (or higher), Logix Designer, and RSLogix

5000 v16 (or higher) with Drive AOP 3.01 (or higher)

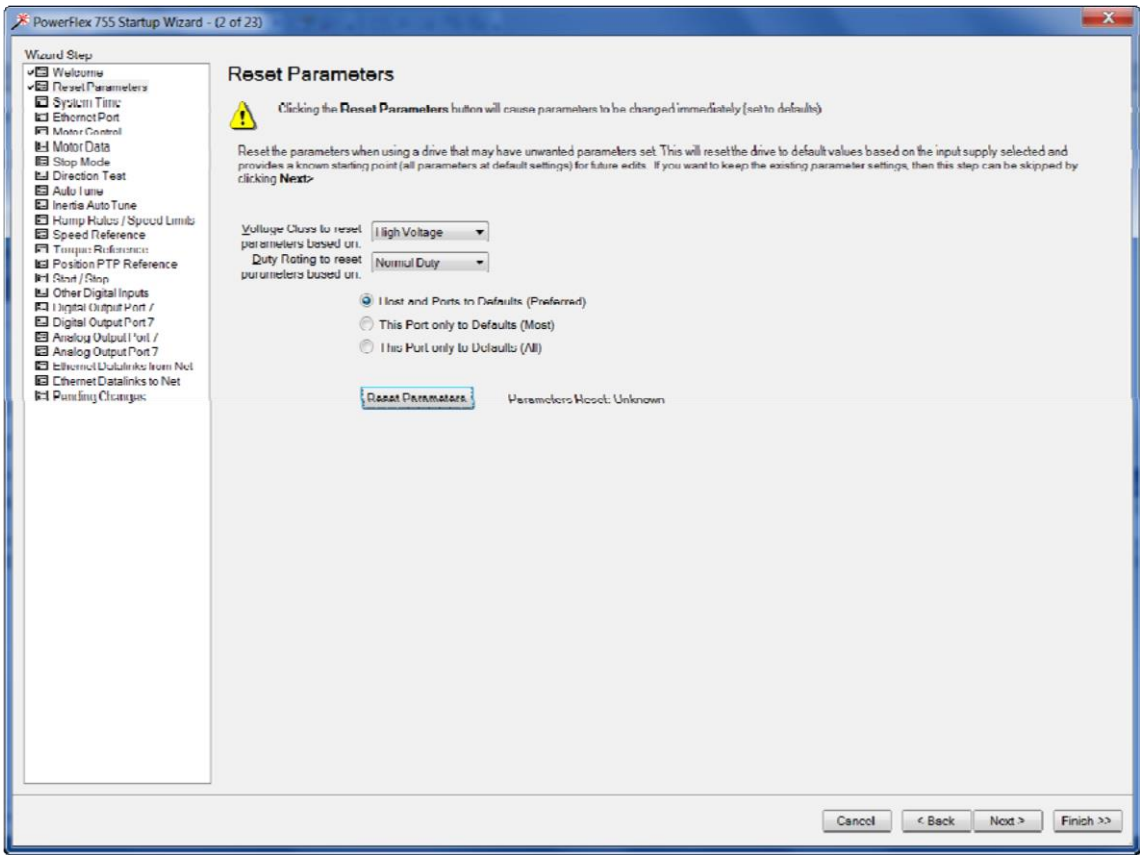
21. Select the PowerFlex 755 Startup Wizard and click **Select**.

The wizard will first upload the parameters for each of the wizard pages.

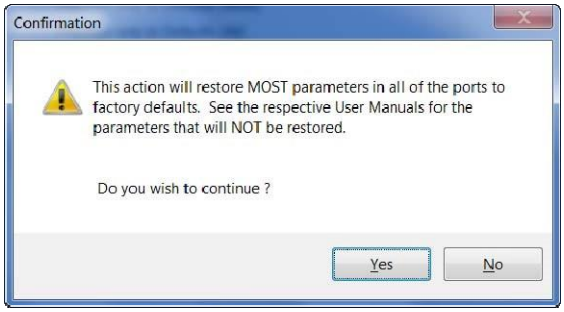
22. The first step in the wizard is the *Welcome* page. It explains the wizard and gives hints and tips for using the wizard. Click **Next >**.



23. The Reset Parameters page is next. It allows you to reset the parameters back to factory defaults. Verify that both **High Voltage** and **Normal Duty** are selected from the pull down menus. Make sure the radio button for **Host and Ports to Defaults (Preferred)** is selected. Then click **Reset Parameters**.



In the confirmation window, click **Yes**.

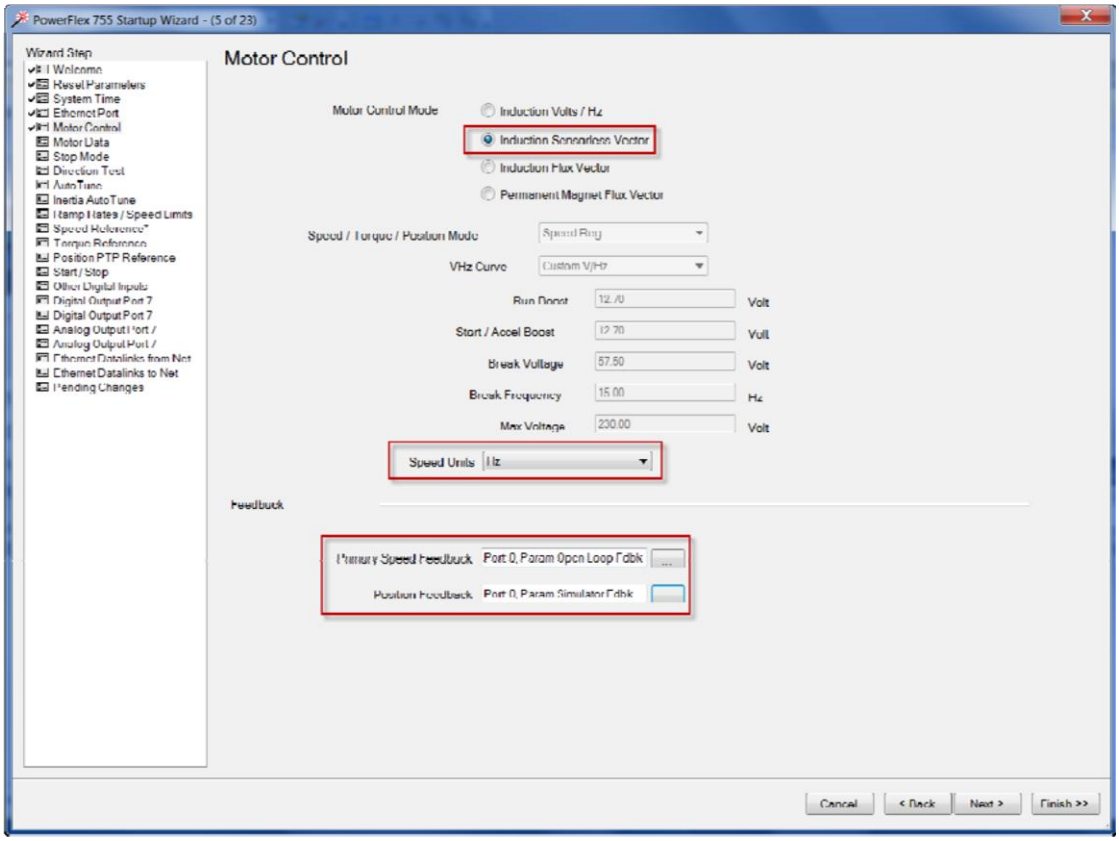


Observe the on screen confirmation of the parameters being reset.

Click **Next >** to continue, viewing the sequential process and continuing to click **Next >** until you read the *Motor Control* step of the wizard.

24. Perform the *Motor Control* step of the PowerFlex 755 Startup Wizard. Make the selections shown.

- Motor Control Mode: Induction Sensorless Vector
- Primary Speed Feedback: Port 0, Param Open Loop Fdbk
- Position Feedback: Port 0, Param Simulator Fdbk

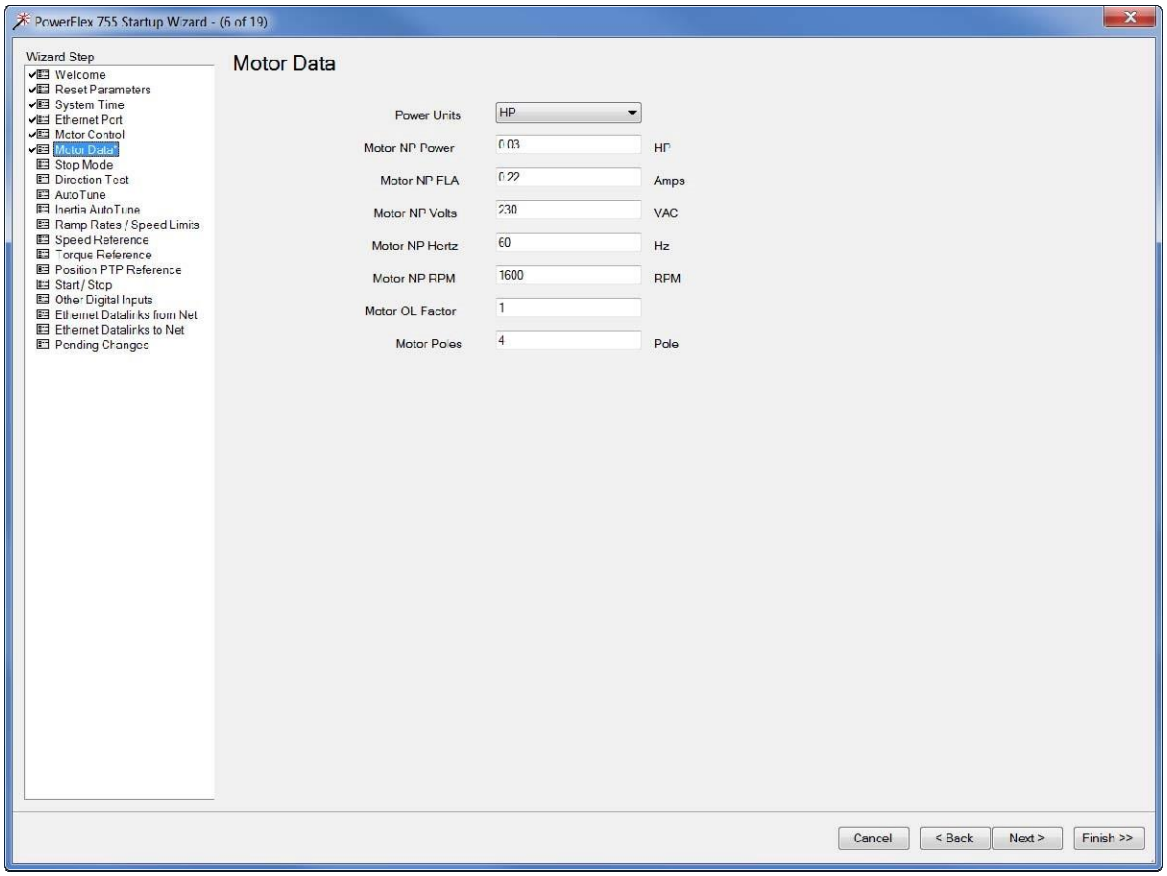


Click **Next >** to the *Motor Data* step of the wizard.

25. The *Motor Data* step is next. This step assists in entering the data from your motor's nameplate into the drive. Change the parameters to the following:

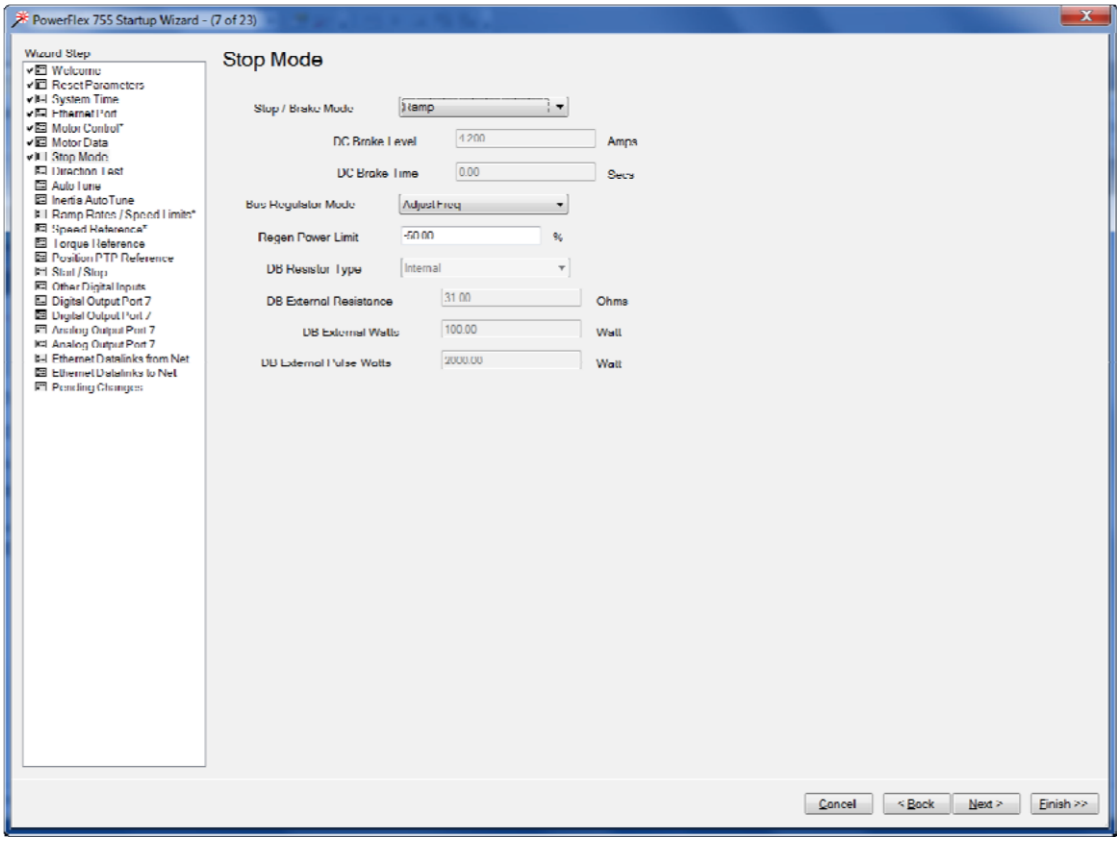
- Power Units: HP
- Motor NP Power: 0.03 HP
- Motor NP FLA: 0.22 Amps

- Motor NP Volts: 230 VAC
- Motor NP Hertz: 60 Hz
- Motor NP RPM: 1600 RPM
- Motor OL Factor: 1.00
- Motor Poles: 4 Pole



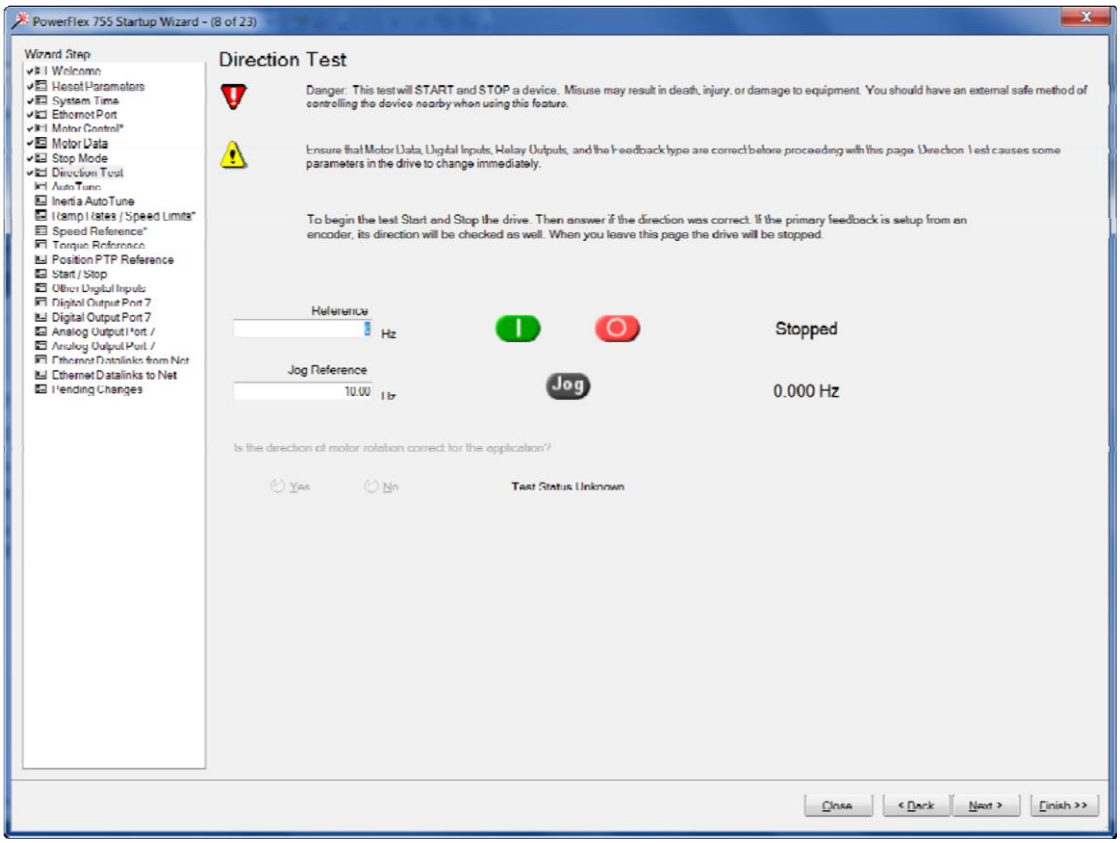
Click **Next >** to the *Stop Mode* step of the wizard.

26. The *Stop Mode* step is next. This step assists in selecting the drive's stop mode and dynamic brake (DB) resistor type. No selections need to be changed in this step; keep the default selections.



Click **Next >** to the *Direction Test* step of the wizard.

27. The *Direction Test* step is next. It helps you determine if the motor is rotating in the proper direction for your application. No selections need to be change on this screen.



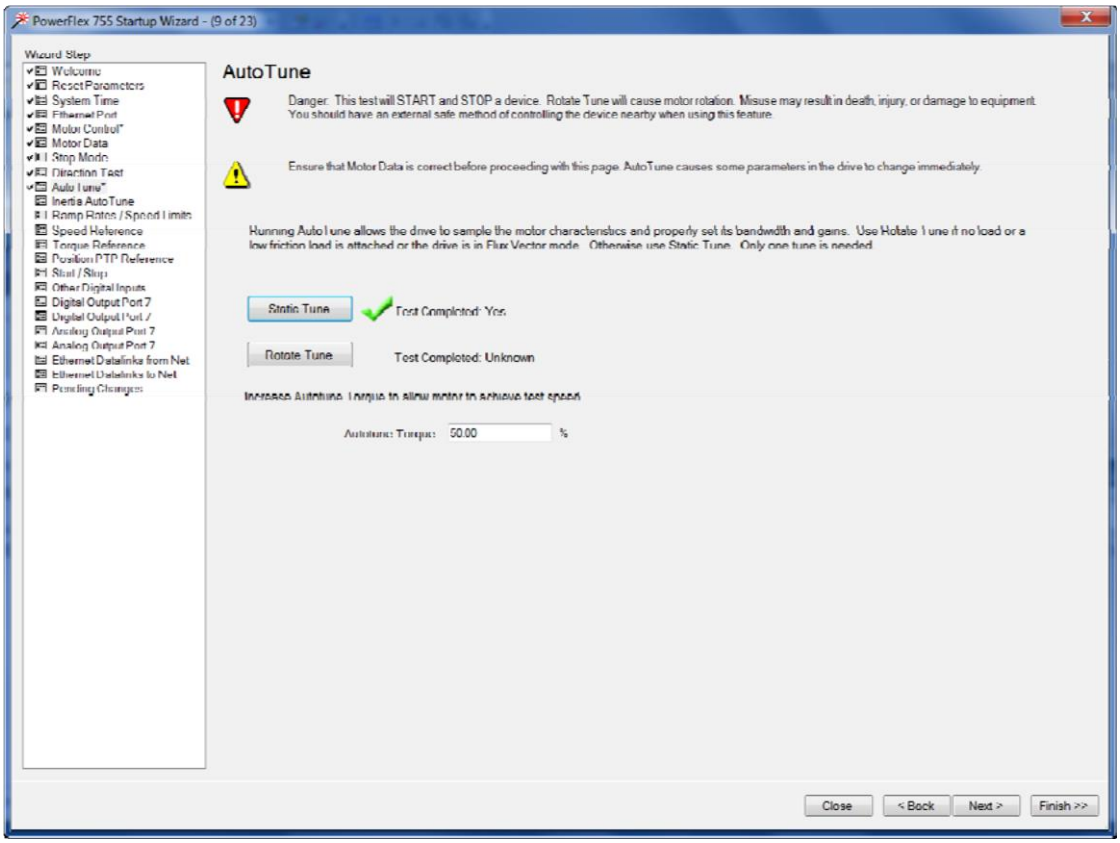
Direction tests are not needed for this example; however they can be ran if you desire. If you do perform the test, note the following:

Click the Jog button and hold it for a few seconds to run the drive. As long as you hold the jog button, the drive will run. Once you let go of the button, the drive will stop. After the motors stops, click the **Yes** radio button. Observe how clicking the **Yes** radio button updated the screen with a **Test Passed** status as well as adding the **Change Direction** option.

- Note: The number labeled “Encoder Feedback” might not match the reference speed you typed – that is okay for this step, and you can proceed with the lab.

Click **Next >** to the *AutoTune* step of the wizard.

28. The *AutoTune* step is next. This step is where you can use the automatic tuning algorithms (AutoTune). When running these algorithms, the drive energizes the motor and makes measurements, which are used to make parameter settings.



AutoTune tests are not needed for this example; however they can be ran if you desire. If you do perform the AutoTune, please note the test status:

Leaving the *AutoTune* page while the test is in process will abort the test, faulting the drive. Do not leave *AutoTune* page until the test is complete:

- Note: In some cases, an Over Speed Fault may occur during a Rotate Tune. Just acknowledge it and move on with the lab.

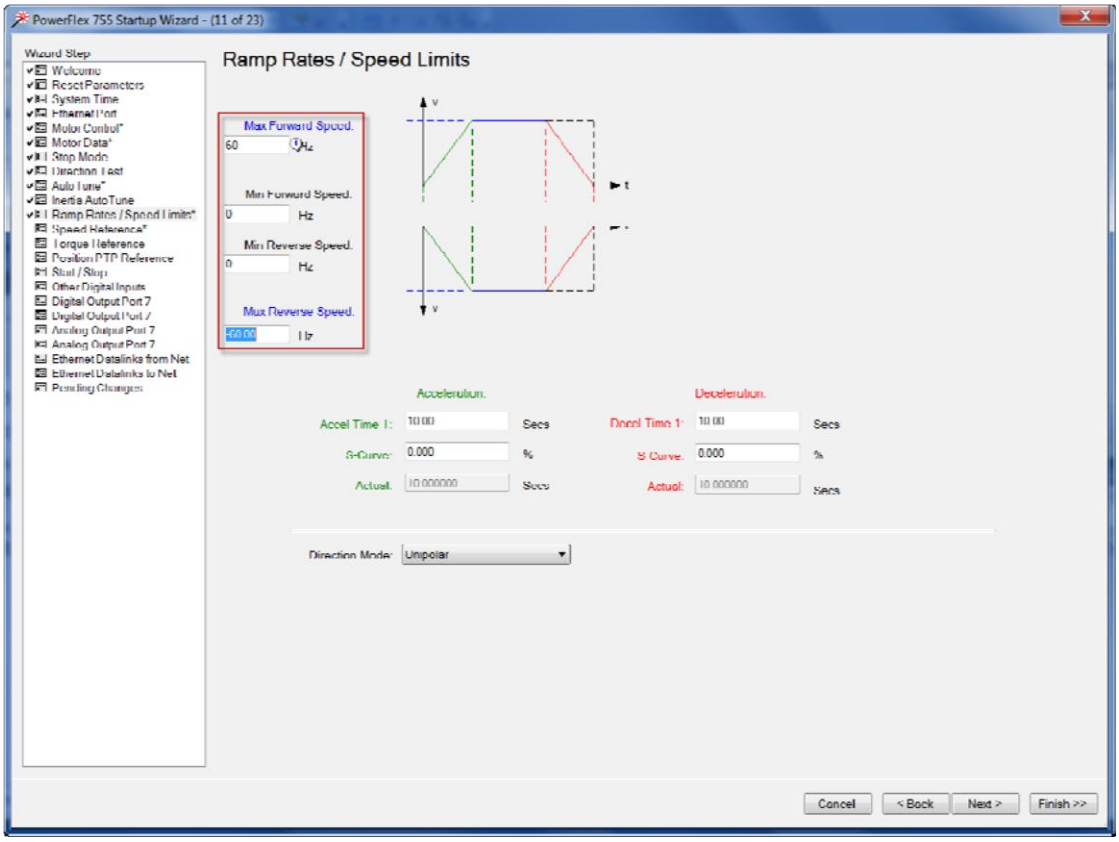
Click **Next >** until you reach the *Ramp Rates / Speed Limits* step of the wizard.

- Note: Clicking **< Back**, **Next >**, or leaving step by any means will abort the test.

29. The *Ramp Rates / Speed Limits* step is next. Set the following values:

- Max Forward Speed: 60 Hz
- Min Forward Speed: 0 Hz

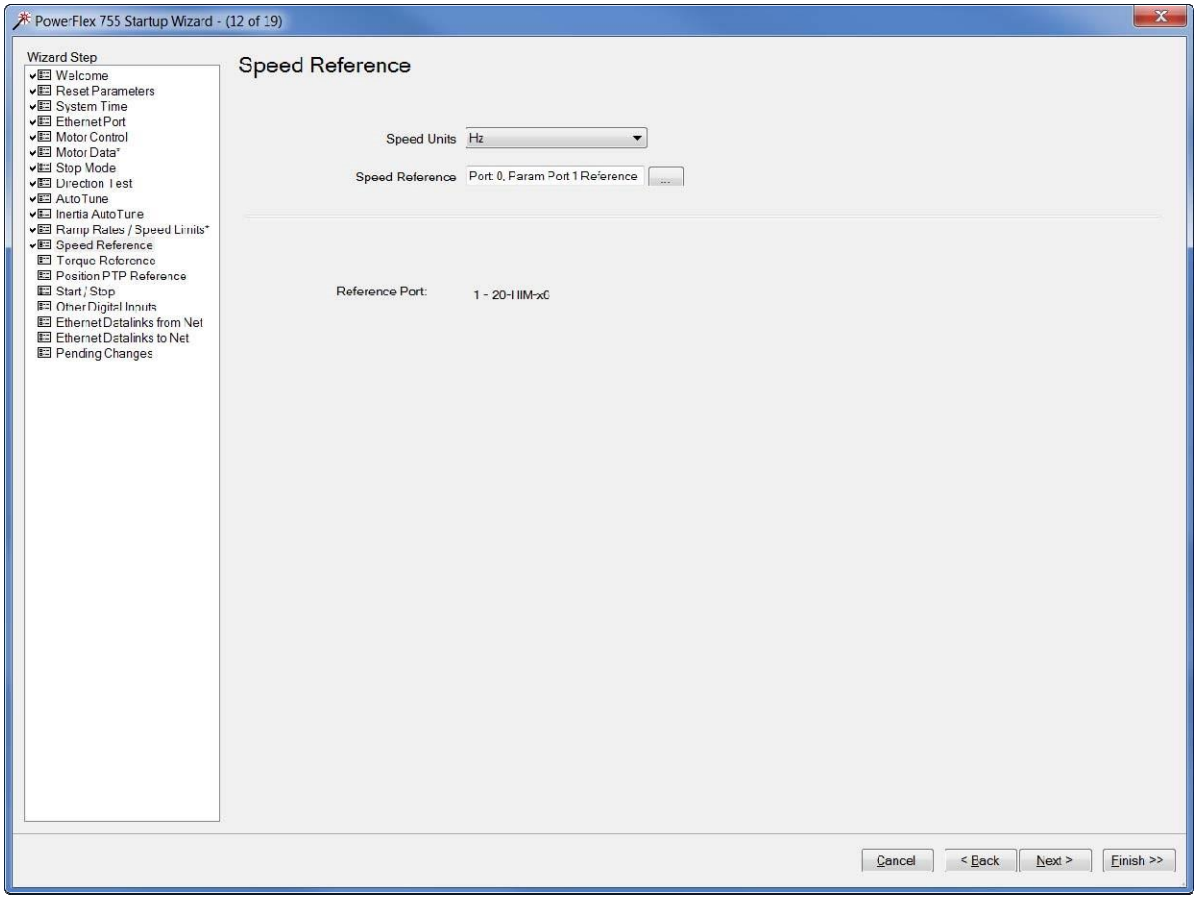
- Min Reverse Speed: 0 Hz
- Max Reverse Speed: -60 Hz



Adjust the S-Curve values and see how that changes the shape of the ramps. Set it back to zero before moving on.

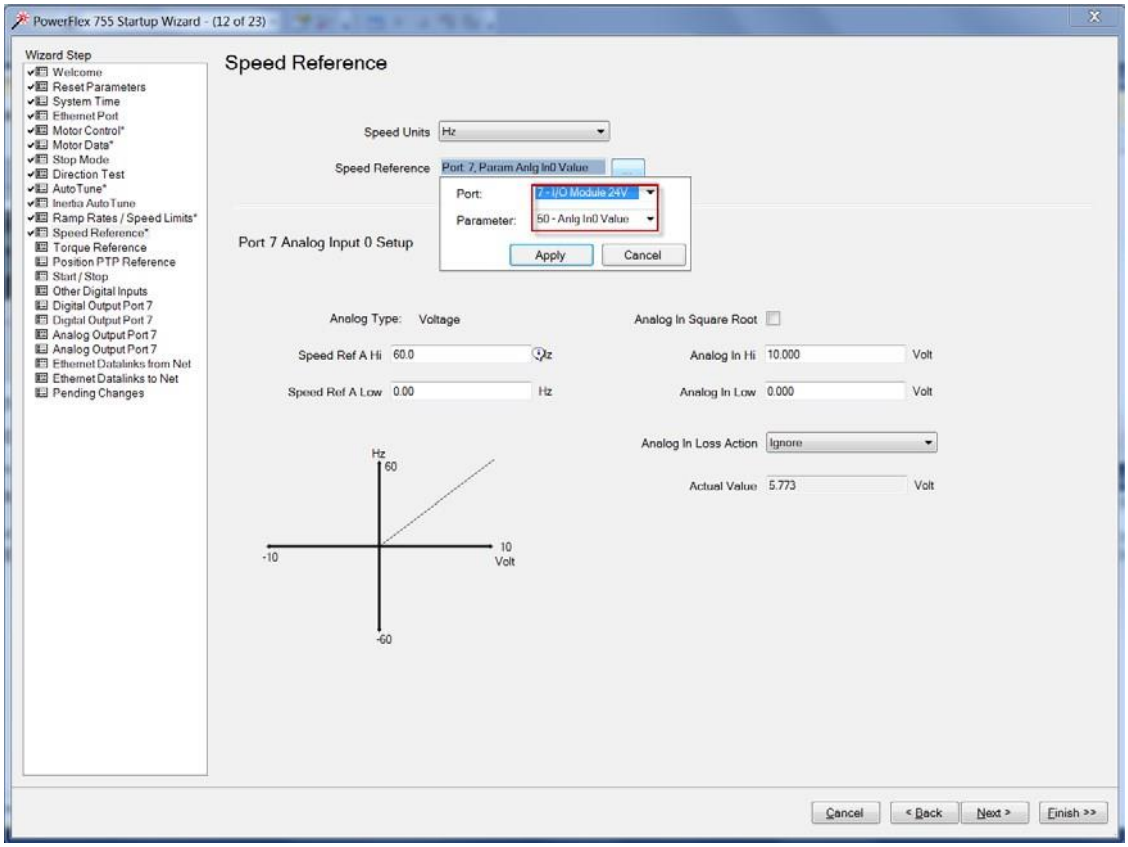
Click **Next >** to the *Speed Reference* step of the wizard.

30. The *Speed Reference* step is next. It helps you select where the drive gets its speed reference. Observe the screen with the default value of Port 0: Parameter 871 [Port 1 Reference].



31. Now select the reference to be from Port 7: Parameter 50 [Anlg In0 Value], observe how the wizard shows the pertinent parameters for this analog input. Also change the following:

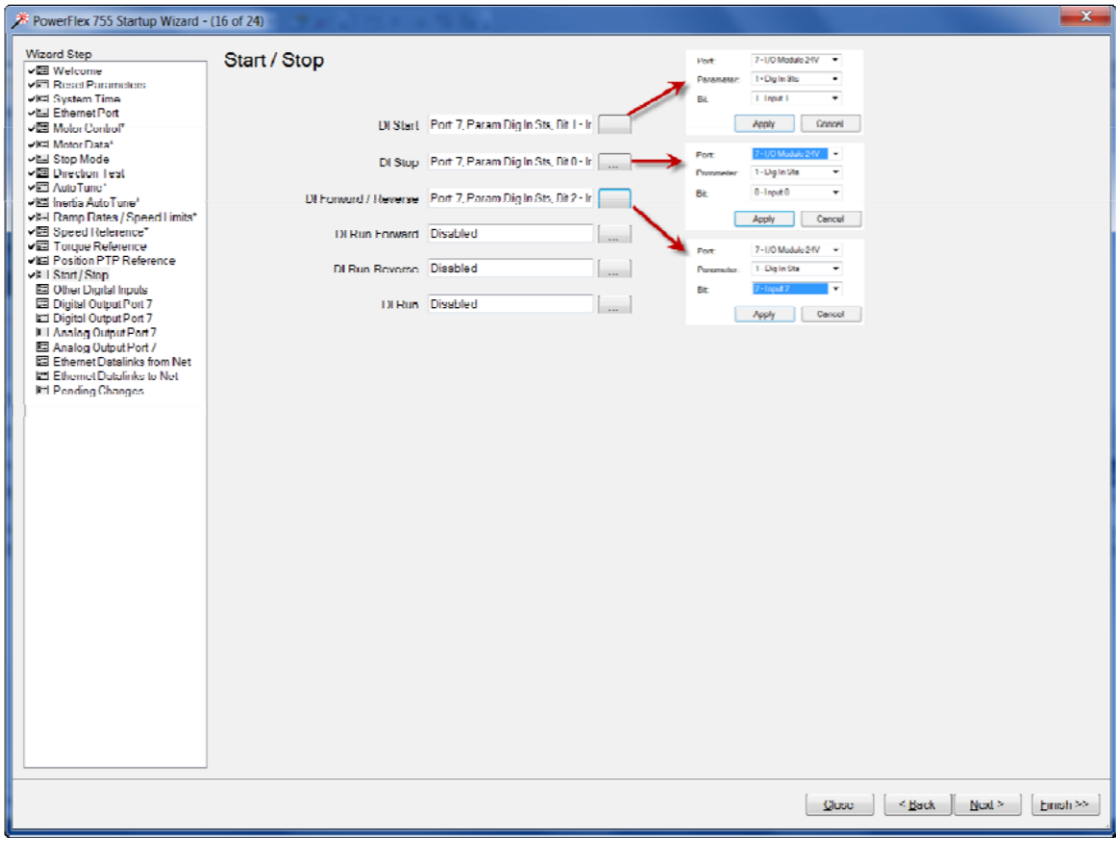
- Speed Ref A Hi: 60 Hz



Click **Next >** to continue, viewing the sequential process, continue to click **Next >** until you reach the *Start / Stop* step of the wizard.

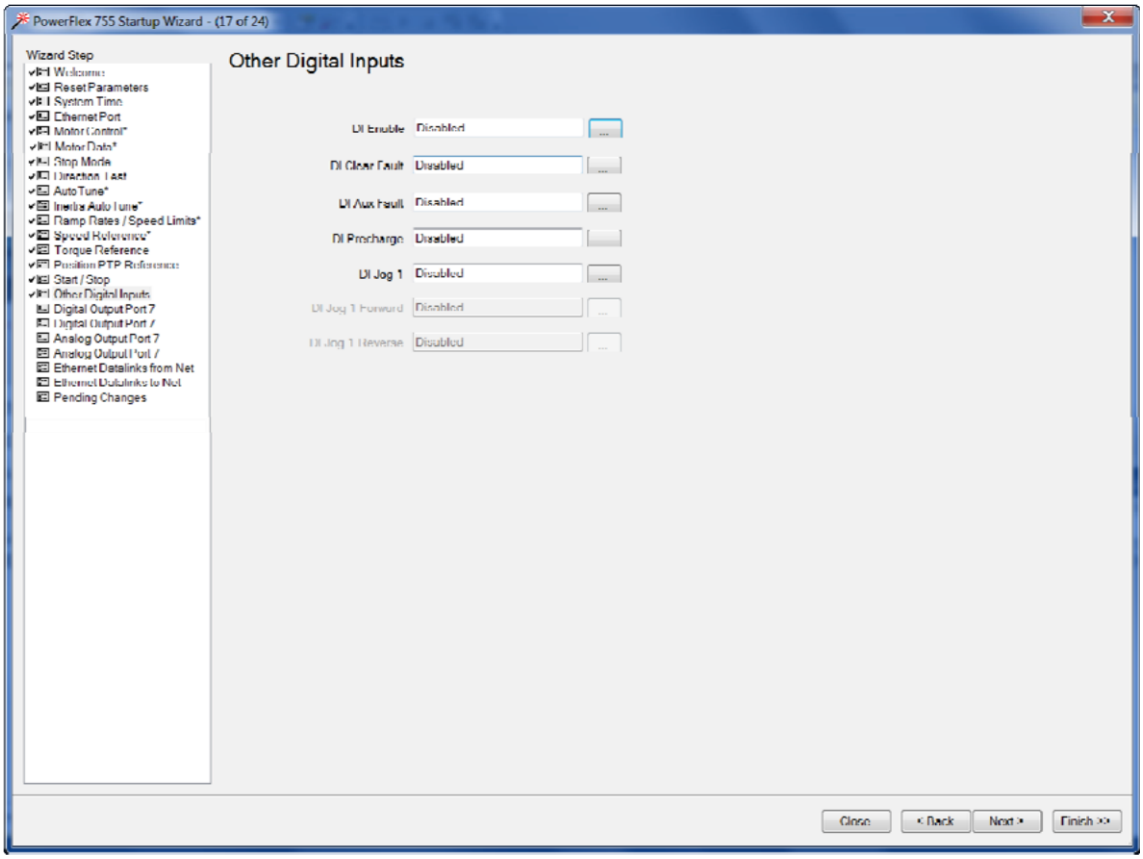
32. The *Start / Stop* step of the drive is next. Make the selections below:

- DI Start: Port 7 [I/O Module 24 V] Parameter 1 [Dig In Sts] Bit 1 [Input 1]
- DI Stop: Port 7 [I/O Module 24 V] Parameter 1 [Dig In Sts] Bit 1 [Input 0]
- DI Forward / Reverse: Port 7 [I/O Module 24 V] Parameter 1 [Dig In Sts] Bit 1 [Input 2]



Click **Next >** to the *Other Digital Inputs* step of the wizard.

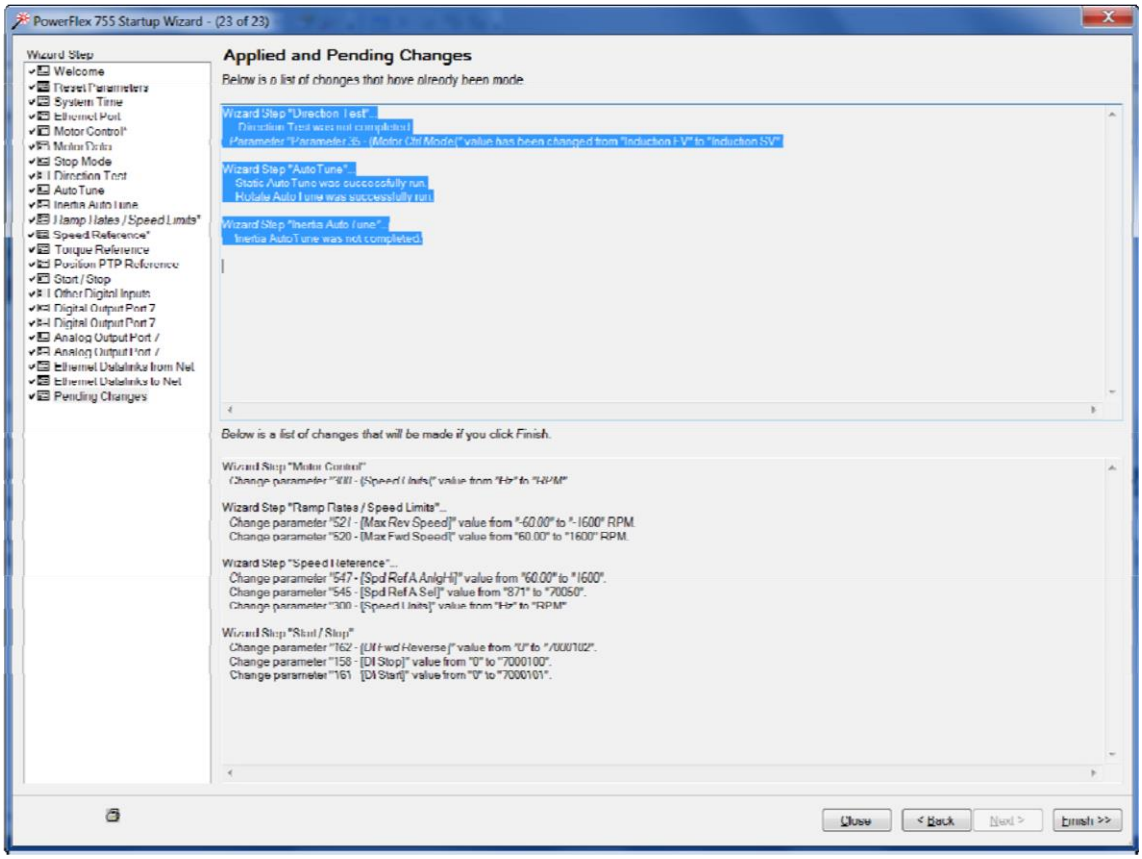
33. The *Other Digital Inputs* step is next. No changes need to be made here.



Click **Next >** to continue, viewing the sequential process, continue to click **Next >** until you reach the *Pending Changes* step of the wizard.

- Note: There are other digital inputs available to the user; however the wizard shows the commonly programmed inputs. All the available digital inputs can be accessed via the HIM or software tool. See the user manual for those parameter numbers.

34. The *Pending Changes* step is next, and last. The purpose of this step is to verify all of the changes you made in the wizard, and then apply the changes to the drive. The below screen is for your reference, and there may be some differences between your actual screen and the one shown.

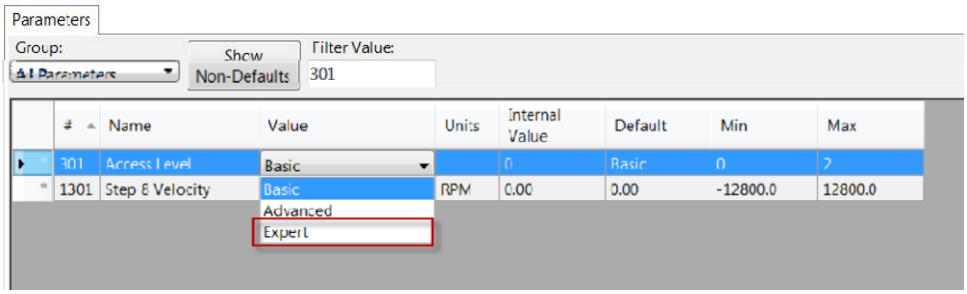


Click **Finish >>**. The wizard will write your changes to the drive.

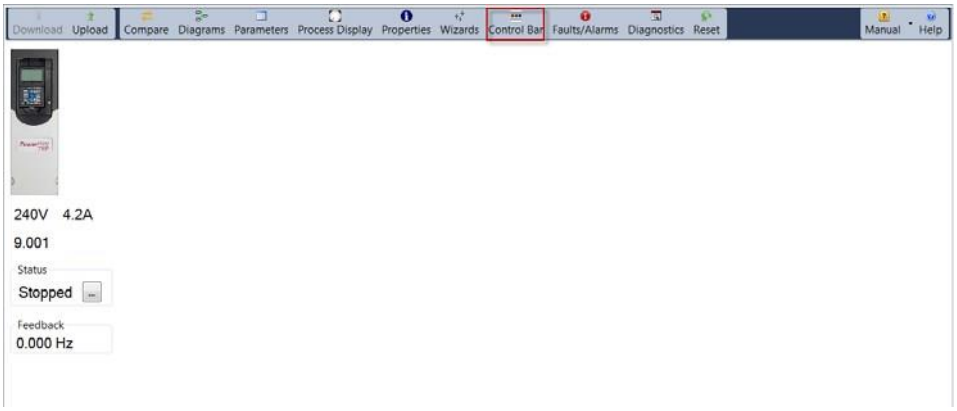
- Note: The Pending Changes step can be used a reference tool. You can print the summary with the print button  at the bottom of the window. You can refer to the printed summary when commissioning duplicate drives or replacing a faulted drive.

Using the Control Bar Tool

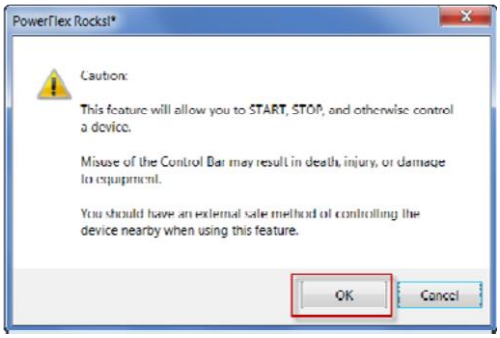
35. Change Parameter 301 [Access Level] to Expert to allow all of the parameters to be visible.



36. Click on the  button in the tool bar at the top of the window.

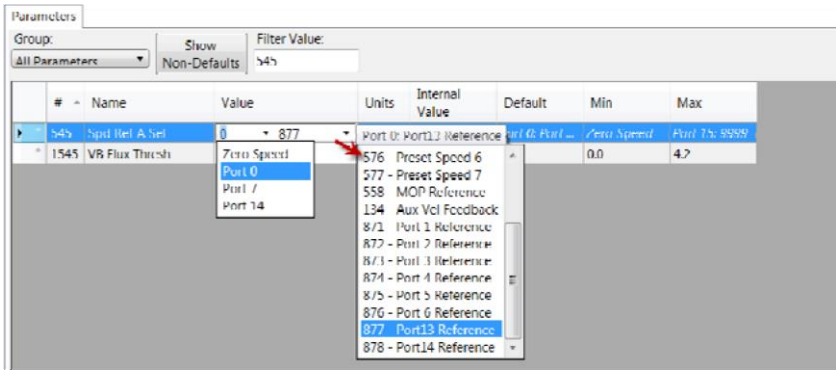


37. Read the *Caution Advisory* window and click **OK**.



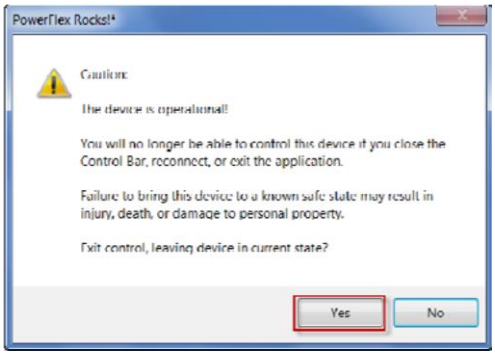
38. Use the buttons on the left-hand side of the control bar to start, stop, jog, and control the direction of the drive.

The speed reference was selected earlier to be Port 7 [I/O Module 24V] Parameter 50 [Anlg In0]. To allow the control bar to have control of the speed reference, change Port 0 Parameter 545 [Sped Ref A Sel] while the drive is not running. Stop the drive, and change it to Port 0 Parameter 877 [Port 13 Reference].



Start the drive again and use the slider on the right-hand side to control the speed reference.

39. Stop the drive and turn off the control bar by clicking the  button again. Observe the *Caution Advisory* window and click **Yes**.



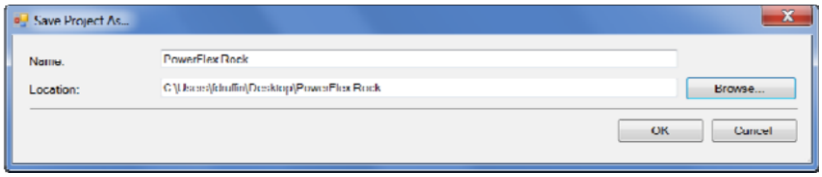
Using Off-line Files

This feature allows you to save your drive configuration to a computer. It is useful for several reasons:

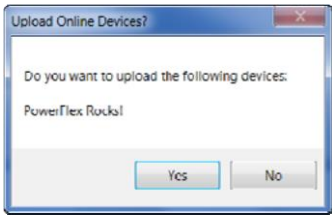
- You can use the configuration if you replace the drive or install an identical one
- You can use the configuration to troubleshoot the drive if it begins to malfunction because the settings have changed

Uploading and Saving the Drive's Configuration to a PC

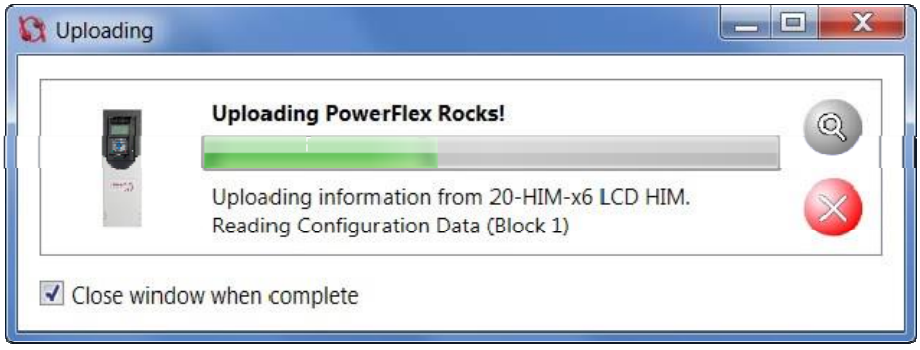
40. From the **Toolbar** menu, ***select File -> Save As***. In the *Save As…* window, define the filename and location of the file. Take note of the name and remember where you save this file, it will be needed later.



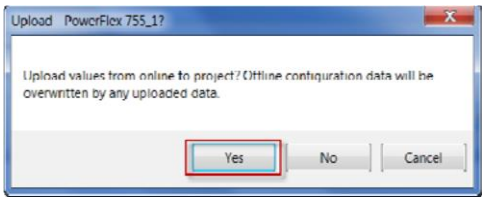
41. Click ***Yes*** to confirm upload.



42. Each of the ports' parameters will be uploaded. As indicated by the below screen, each port will be displayed as its parameters are uploaded.

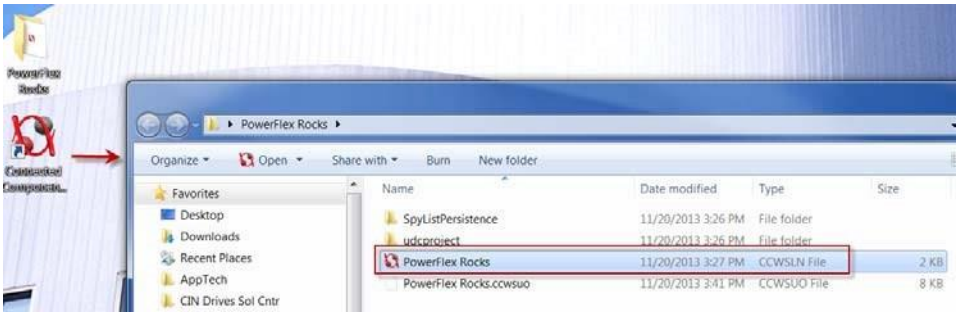


43. Click ***Yes*** to confirm upload overwrite of offline file.

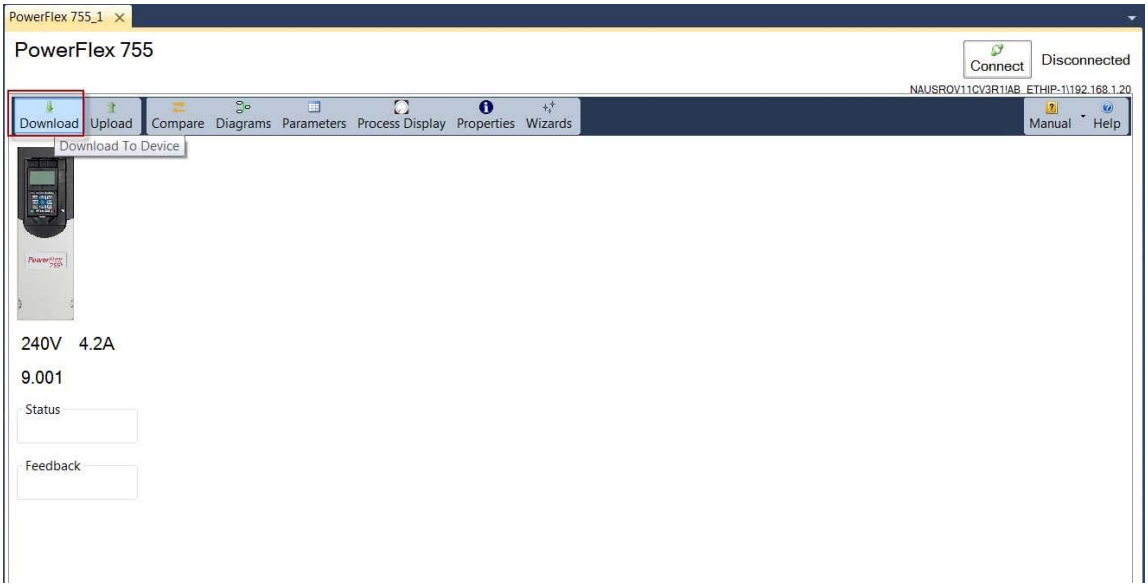


Downloading a saved Configuration CCW file to a Drive

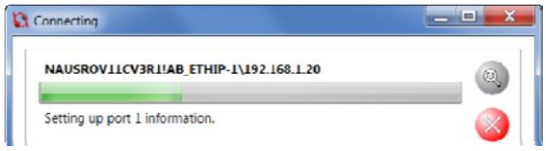
44. After your file is saved, exit CCW. Using what you learned previously set the drive to defaults using the HIM.
45. Now navigate to your previously saved file, in this example it is located on the desktop. Double Click to open launching CCW.



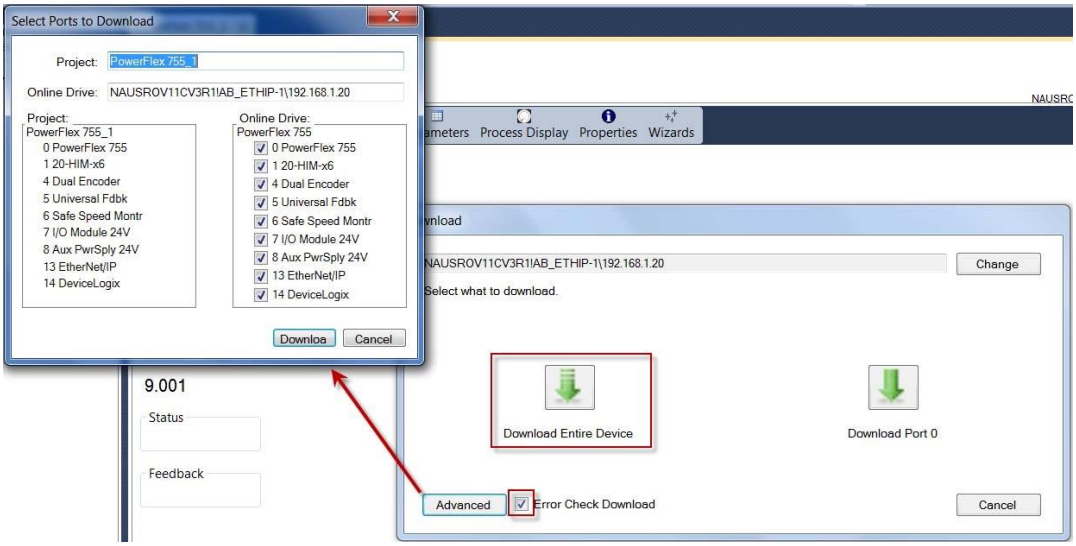
46. Double Click on the PowerFlex 755_1* drive and click the  button.



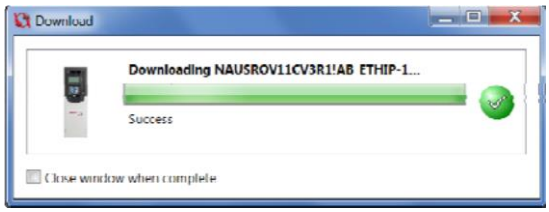
47. Wait as CCW gathers port information.



48. Select the ***Error Check Download*** check box to get detailed information on any download errors and click the ***Advanced*** button to specify which ports to download. Finally click the ***Download Entire Device*** button to download to the drive.



49. Close the download status bar upon successful completion.



Note: This concludes the guided portion of the lab.

Appendix A: Configuration/Setup Guide

Lab 9 – Basic Drive Programming with PowerFlex 755

Lab Setup and Configuration Information

Lab Information

Lab Name	Basic Drive Programming with Power Flex 755
Lab Description	
Lab Creator	Sharon James
Date Created	9/10/2008
Updates:	
9/10/2009	Greg Arft – Updated for Automation Fair 2009
12/1/2009	Greg Arft – Updated for RATOM
9/10/2010	Oliver Haya – Updated for Automation Fair 2010
11/20/13	Franklin Ruffin – CCW Update for RATOM 2014
12/8/14	Franklin Ruffin – Touchup for RAOTM 2015

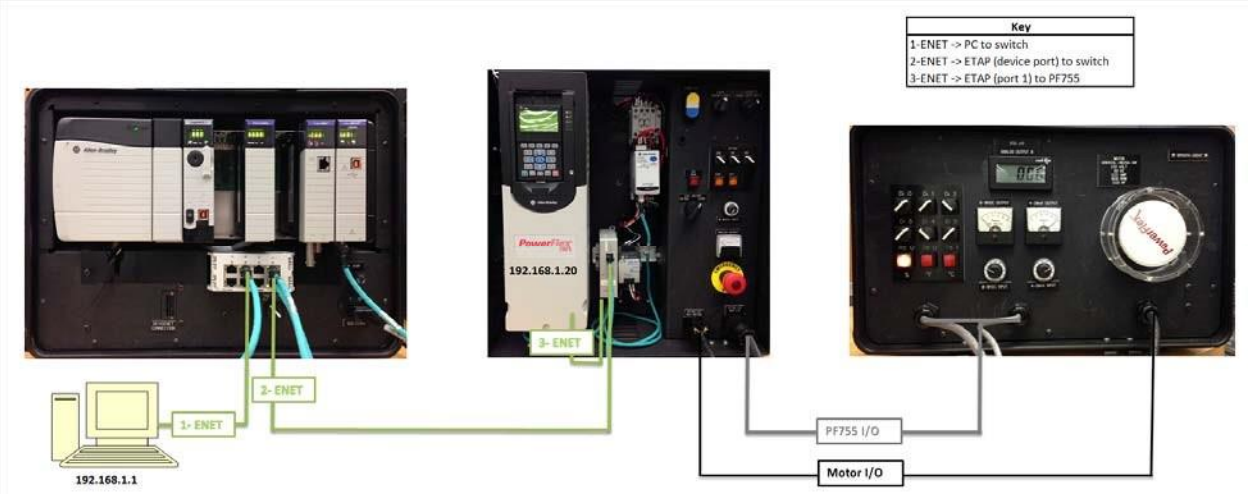
Hardware Configuration

Qty	Demo Cat.# / Description	Communication	Location	Firmware
12	***DEMO-PF755DHQ1 PowerFlex 755 Demo Box***			
	PowerFlex 755	192.168.1.20	Port 0	V1.010
	20-HIM-A6		Port 1	V1.007
	2262C-2R I/O Option		Port 7	V1.008

Computer/Host Settings

Location	***Files***
Computer Name	CORE
IP Address	192.168.1.1
Operating System	Windows 7 via Virtual Machine

Basic Setup Diagram:



Confirm cable connections as shown in the above diagram.

Additional Equipment Required

Qty	***Items***
3	Ethernet Cable

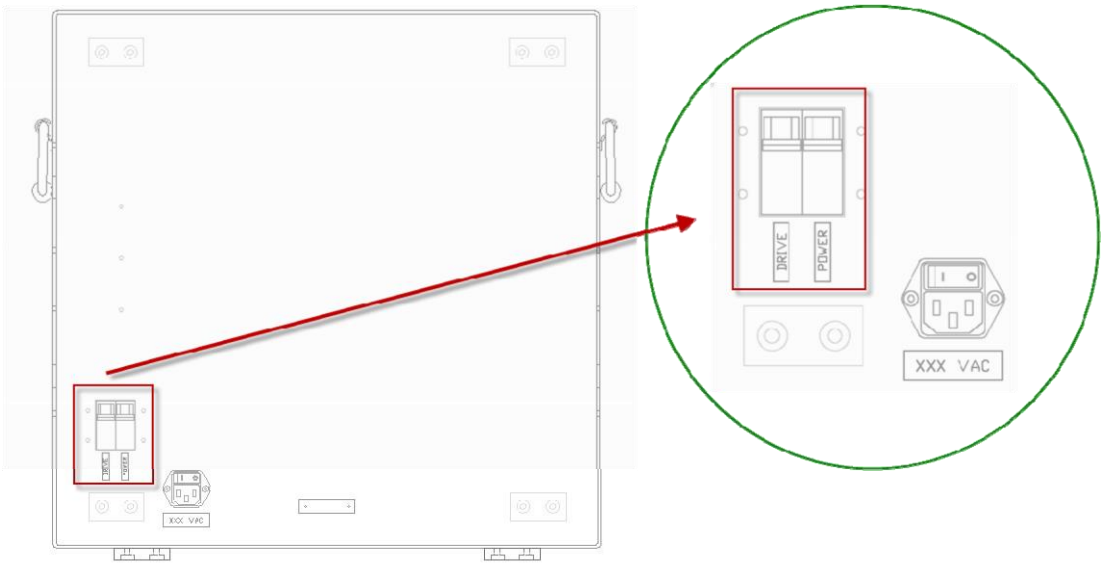
Application Versions

Vendor	***Software***	***Version***	***Service Pack***
Rockwell	Connected Components Workbench	6.01	

Required Pre-Lab Configuration

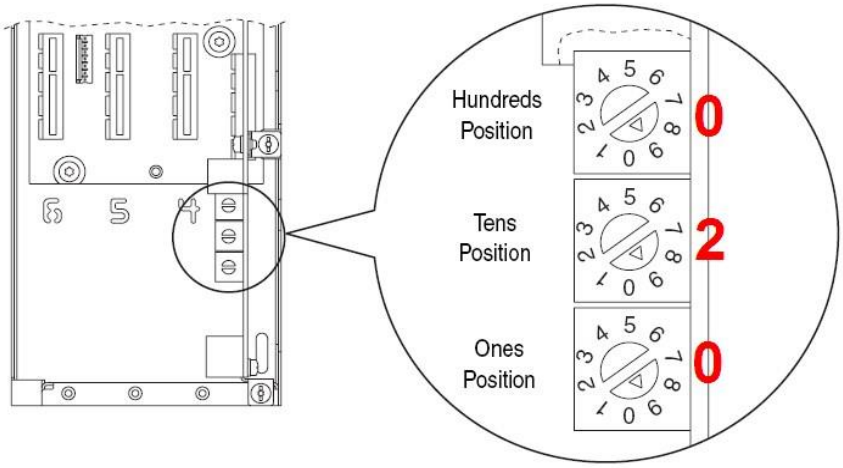
1. Verify the ***I/O option module*** has been added to S***lot 7***. Options modules should be added prior to energizing the demo.

2. Energize the drive demo: back view of IMC Demo box. Put the switch by the plug in the | position and put the breaker switch in the up position.



Make sure the “E-Stop” is pulled out (toward you)

3. Verify that the ***IP Address Switches*** are set to ***‘020’***.



If the address is not ‘020’, set this by adjusting the rotary switches. After adjusting the switches, cycle power to drive demo.

4. If the PowerFlex 755 is faulted, then reset the fault by clicking the O button on the HIM.

5. Set the ***EXT. MOTOR*** switch to PF755 for the lab.