

# How To Operate Test Motor, LabView and PLECS Code Guide

## Step One - First Locate All Relevant Hardware

Below are images and info for all equipment required.

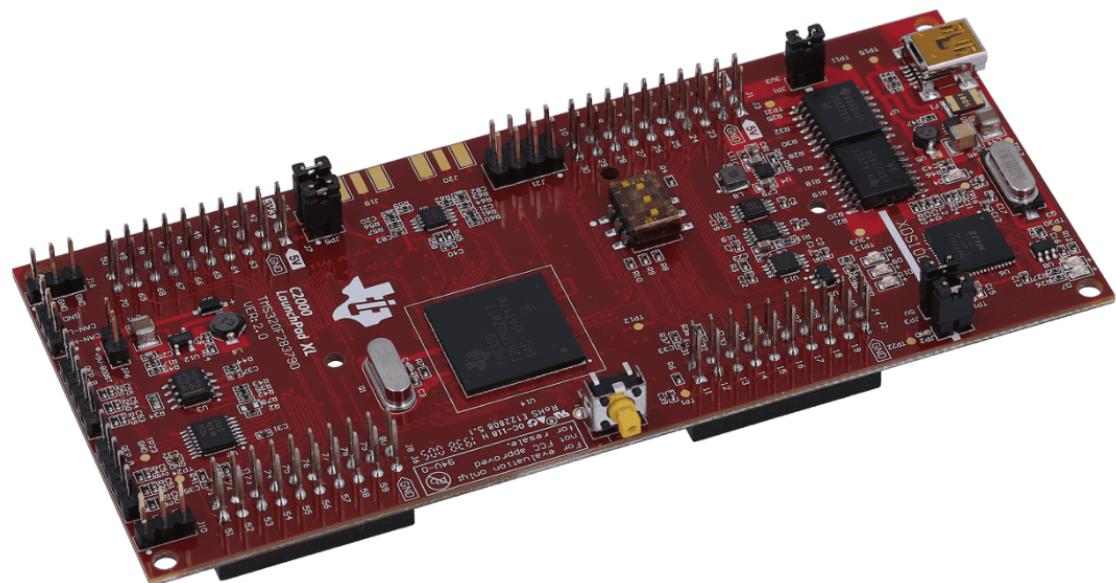
### Primary Equipment

1x Flycat 2805 140KV Gimbal Brushless Motor (Test Motor)



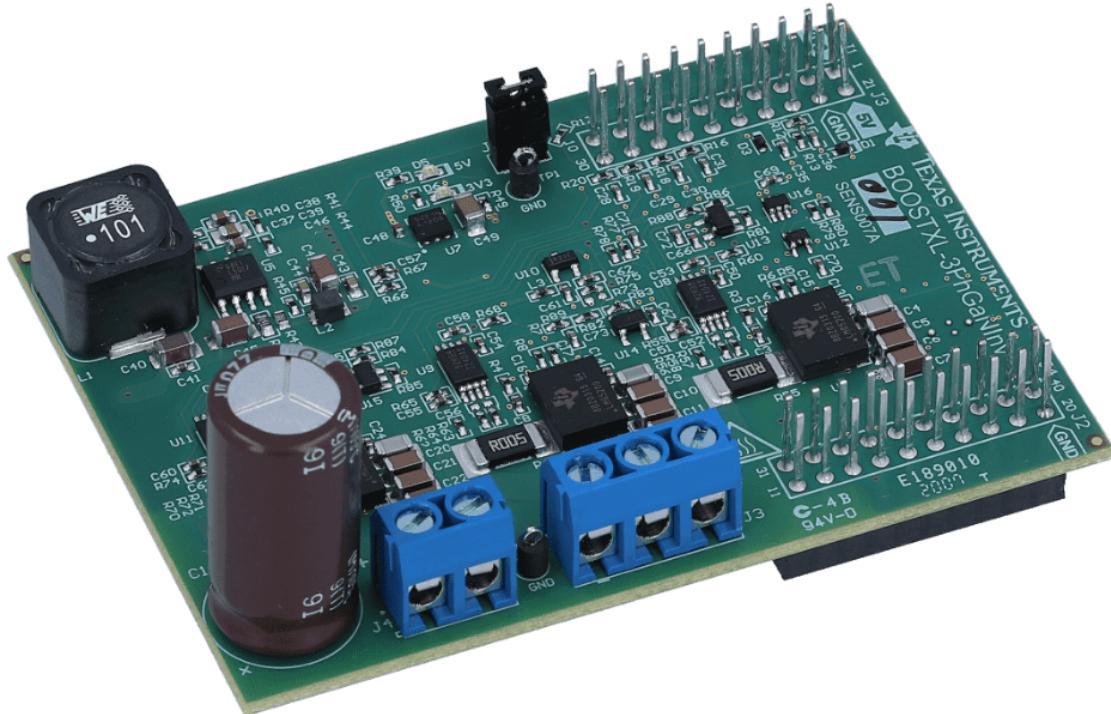
- More info (<https://robu.in/product/2805-140kv-gimbal-brushless-motor/>)

1x Texas Instruments (TI) LAUNCHXL-F28379D F28379D (Launchpad)



- F28379D LaunchPad™ development kit for C2000™ Delfino™ MCU
  - More info (<https://www.ti.com/tool/BOOSTXL-3PHGANINV>)

1x Texas Instruments (TI) BOOSTXL-3PHGANINV (Booster)



- 48-V Three-Phase Inverter With Shunt-Based In-Line Motor Phase Current Sensing Evaluation Module
  - More info (<https://www.ti.com/tool/LAUNCHXL-F28379D>)

1x National Instruments (NI) C Series Voltage Output Module (DAQ) Label No. NI9263



- More info (<https://www.ni.com/en-nz/support/model.ni-9263.html>)

1x National Instruments (NI) Compact Data Aquistion Chassis (cDAQ) Label No. cDAQ9189



- More info (<https://www.ni.com/en-nz/support/model.cdaq-9189.html>)

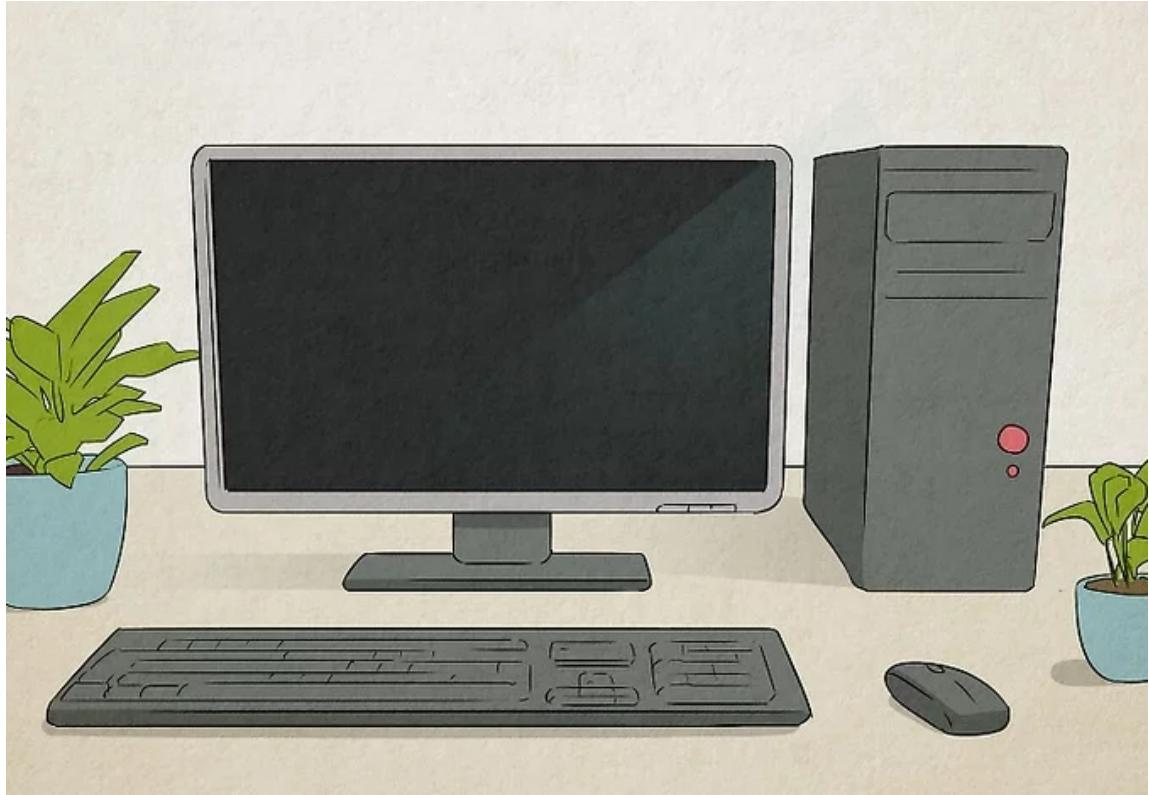
1x VOLTCRAFT EP-925 Bench PSU (Power Supply)



- More info (<https://www.conrad.com/p/voltcraft-ep-925-bench-psu-adjustable-voltage-3-15-v-dc-2-25-a-375-w-no-of-outputs-1-x-511492>)

## Secondary Equipment

1x Computer, Keyboard, Mouse and Monitor



1x TP-Link Desktop Network Switch (Link)



- More info ([https://www.mightyape.co.nz/product/tp-link-5-port-10100mbps-desktop-switch/21010864?gclid=EAIAIQobChMIsJPnrJj7\\_gIVWxpyCh3mXAHZEAQYAiABEgKlw\\_D\\_BwE](https://www.mightyape.co.nz/product/tp-link-5-port-10100mbps-desktop-switch/21010864?gclid=EAIAIQobChMIsJPnrJj7_gIVWxpyCh3mXAHZEAQYAiABEgKlw_D_BwE))

2x Ethernet Cables (Computer to Link, Link to cDAQ)



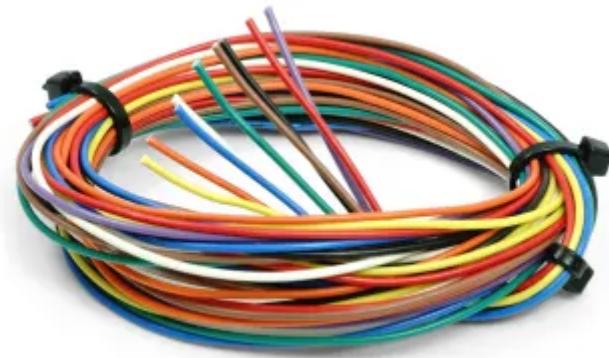
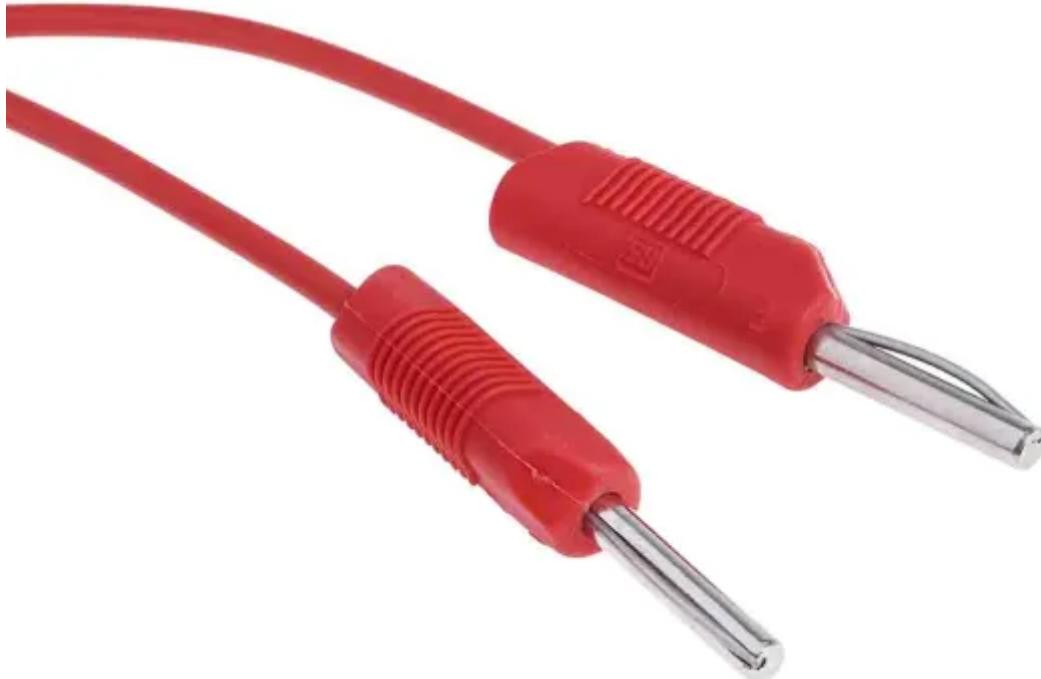
3x 150mm Plug to Socket Jumper Leads (DAQ to Launchpad)



- More info (<https://www.jaycar.co.nz/150mm-plug-to-socket-jumper-leads-40-pieces/p/WC6028?>)

[gclid=EA1aIQobChM1nbXXtpr7\\_gIVyxJyCh3cMwSDEAQYBCABEgInXfD\\_BwE](#)

2x Test Leads with Wires (Booster to Power Supply)

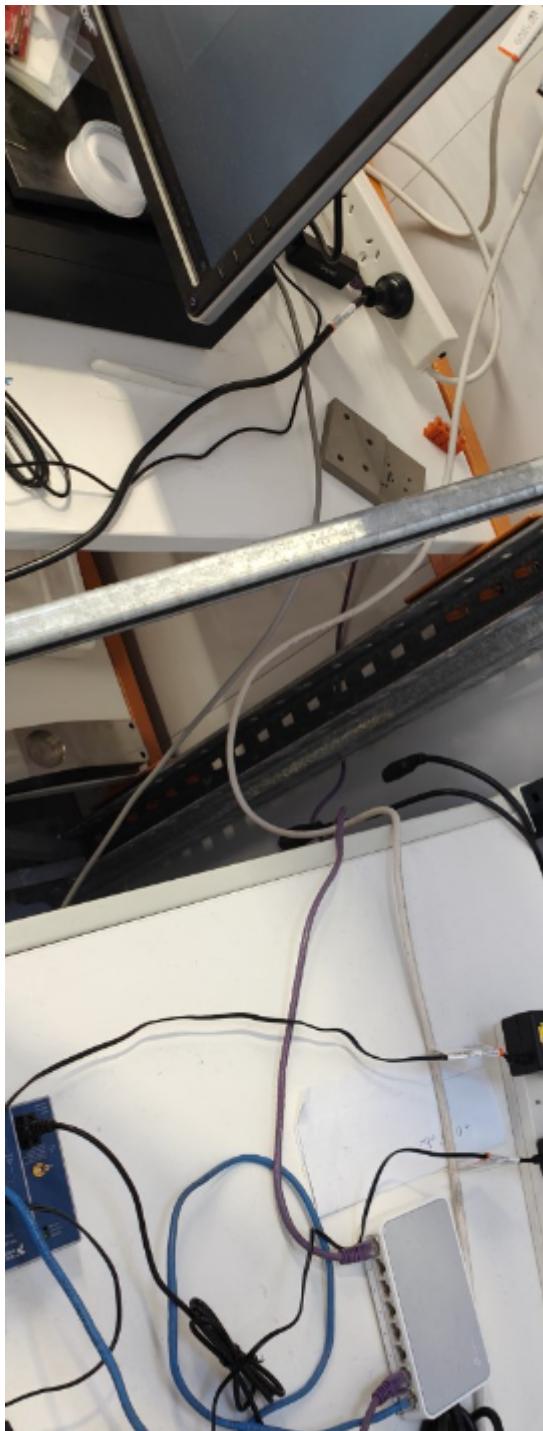


3x Thin Wires (Booster to Motor)

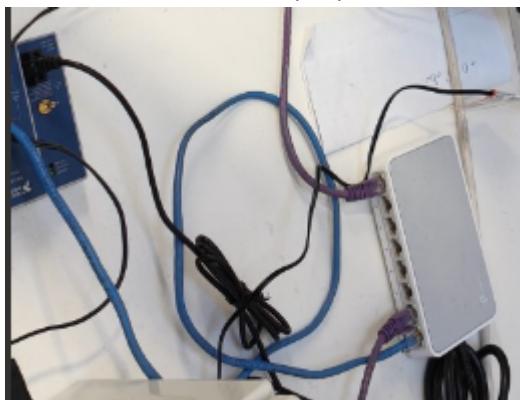
## Step 2 - Assemble the Test Motor Set-Up

Below are images and info on how to set up the Test Motor.

1. Plug the first ethernet cable (purple) into the Computer and Link. (Only if necessary)

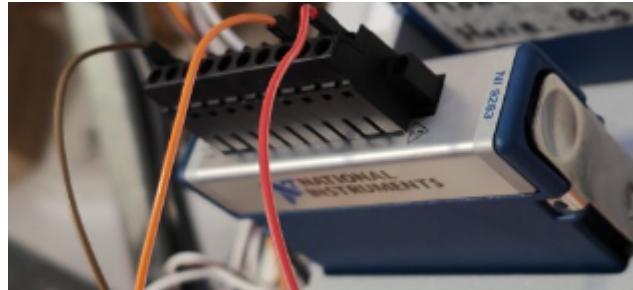


1. Connect chassis NI-cDAQ No.9189 to a power socket or multibox. Then plug the second ethernet cable (purple) into the Link and the cDAQ.



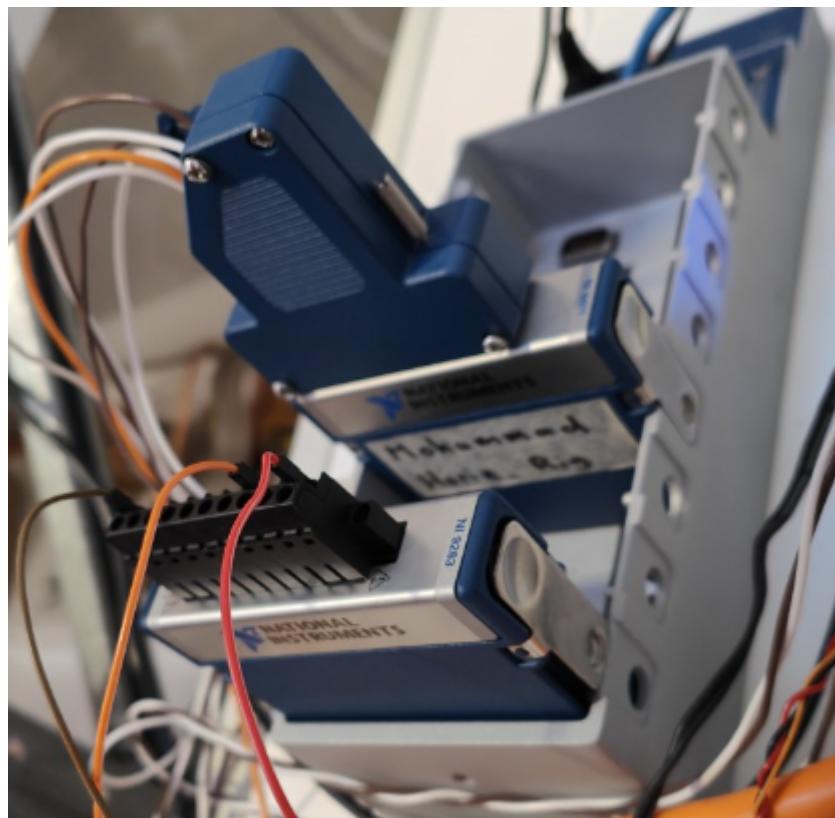
- Connecting through the Link is only necessary if a direct connection is not possible, otherwise connect Computer to cDAQ directly

1. Attach 3x 150mm Plug to Socket Jumper Leads into NI-DAQ No.9263.



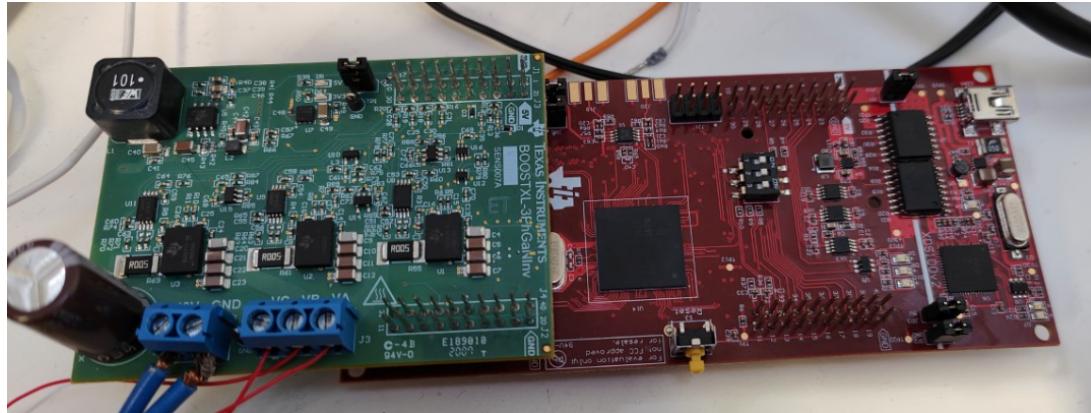
- Use the male side, (side with pins) and slot them into the DAQ in slot numbers 0, 2 and 9
- Use Red for slot 0, Orange for slot 2 and Brown for slot 9

1. Insert NI-DAQ No.9263 into a free slot in the chassis NI-cDAQ No.9189.



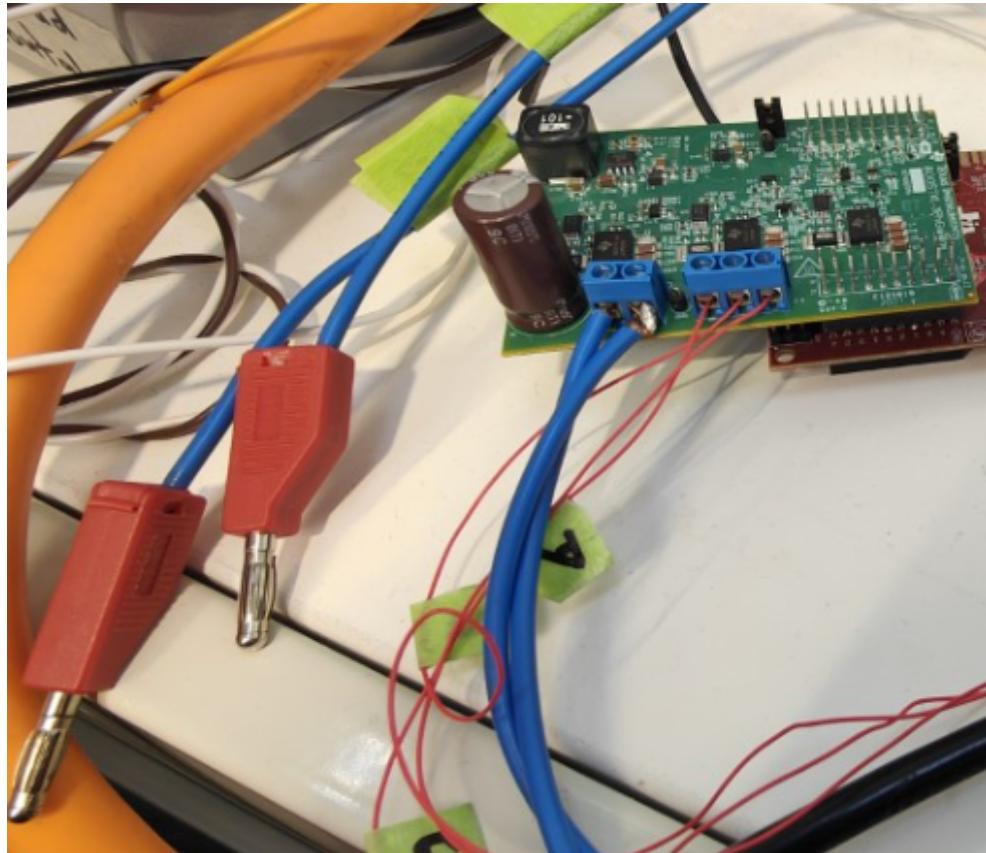
- The computer should now register the DAQ

1. Attach the Booster to the Launchpad.



- The pins on top of the Launchpad should line up with the sockets on the back of the booster

1. Attach the wire end of 2x Test Leads (Blue) to the Booster.



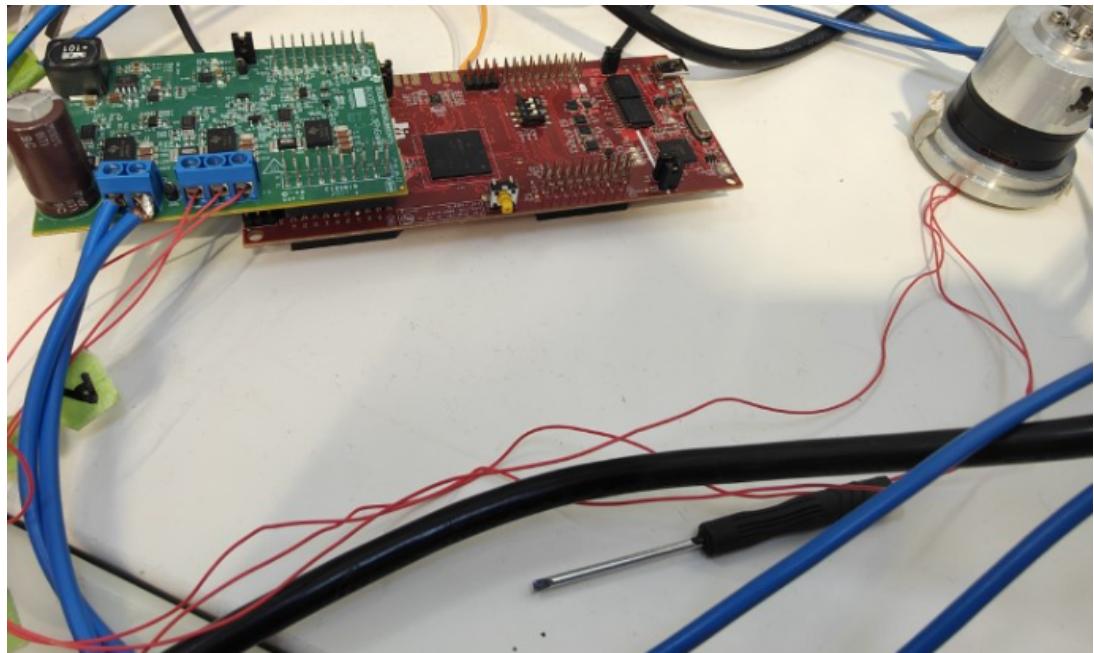
- Secured in the housing (Blue) with only 2 gates on the left, not right
- Out of the 2 wires, label the end on the left Positive (+), and the right Negative (-)
- Make sure to use the correct size flat head screw driver to secure the ends

### 1. Solder the ends of 3x Thin Wires to the Test Motor



- Will need to remove silver components to access connection points
- Label wires A,B & C (left to right)

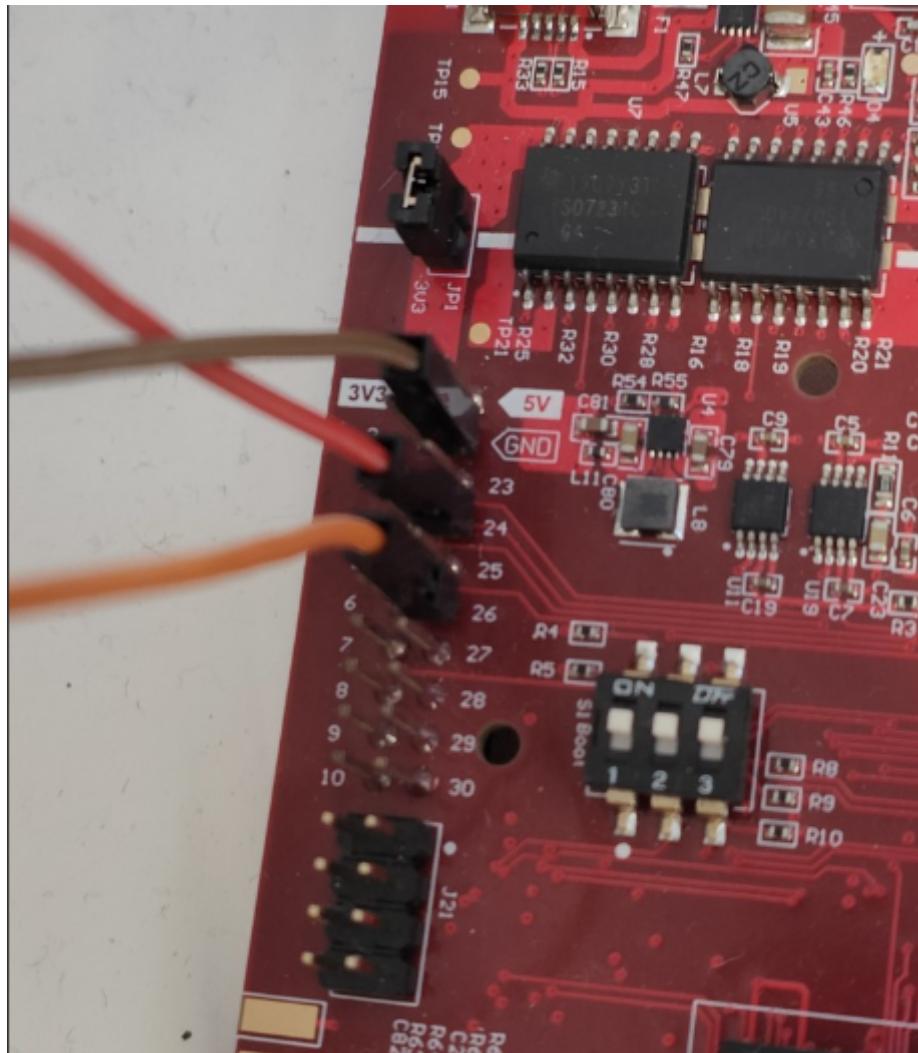
### 1. Connect the other end of 3x Thin Wires (Red) to the Booster



- Secured in the housing (Blue) with 3 gates on the right, not left
- Attach in order A, B, and C (left to right)

- Make sure to use the correct size flat head screw driver to secure the ends

1. Connect wires from DAQ to Launchpad.



- Brown wire goes to PIN 22/GND (Ground)
- Red wire goes to PIN 24
- Orange goes to PIN 26

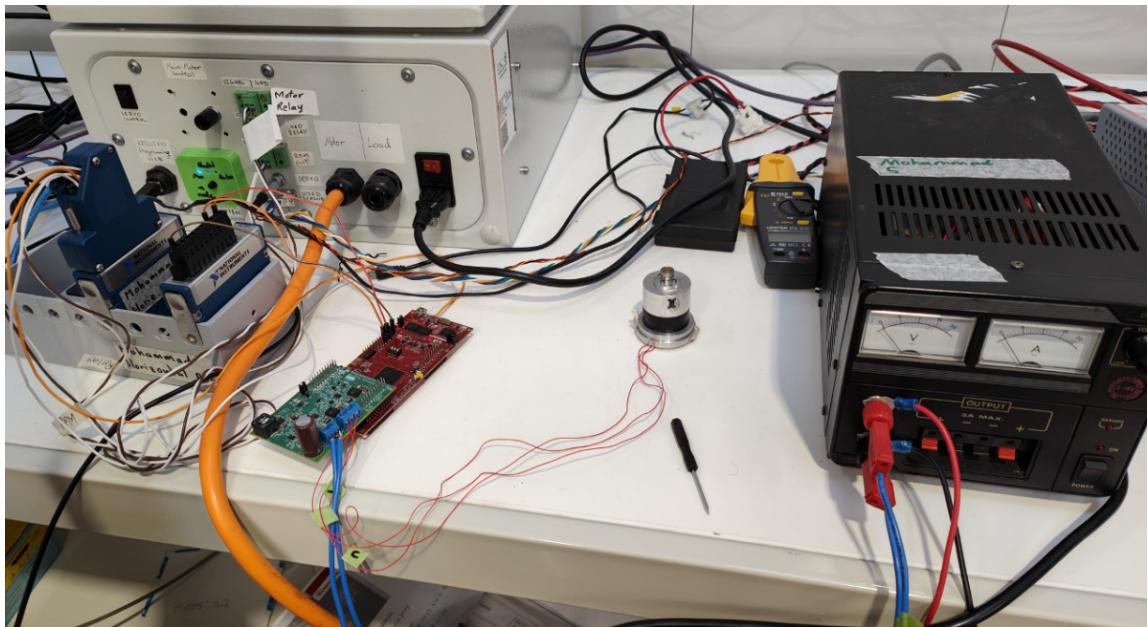
1. Plug Power Supply into power socket or multibox. Plug Test Leads into the Power



Supply. (WARNING!)

- MAKE SURE POWER SUPPLY IS OFF BEFORE PLUGGING ANYTHING IN!
- Also set the voltage dial to Low before switching power on

Now everything should be set up correctly. If you're still unsure about any step, ask first.



## Step 3 - Open LabView Program

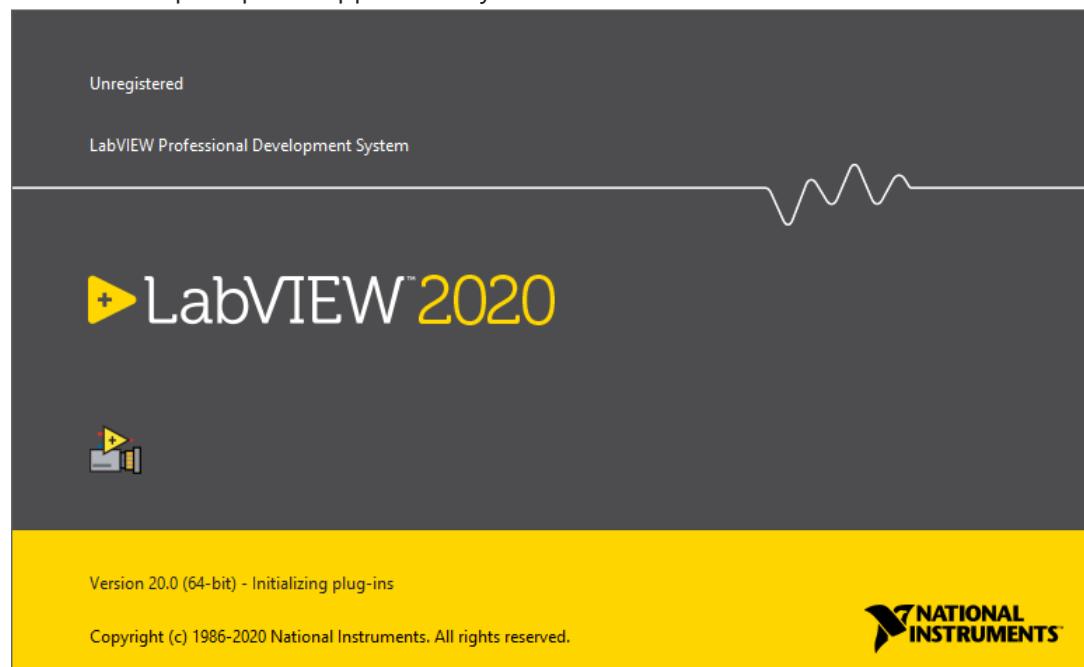
Locate and set up the necessary program for the Test Motor.

## 1. Search in R Drive for the LabView Program 'Horizontal Bearing Control'.

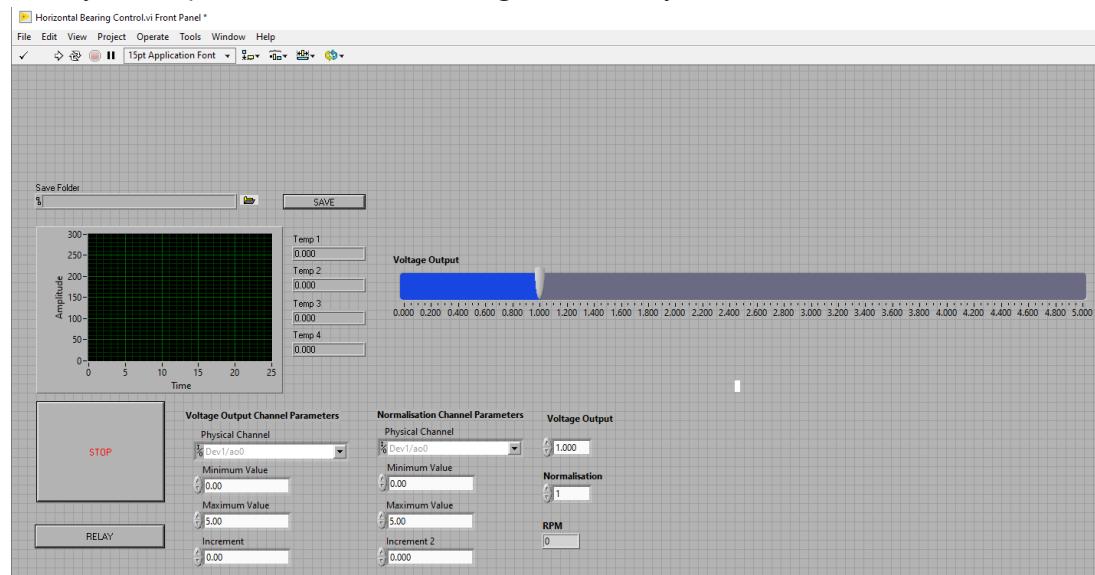
	Name	Date modified	Type	Size
is	calprj	12/01/2023 8:14 am	File folder	
is	LED_Pulse_Signal_ert_rtw	12/01/2023 11:05 am	File folder	
ts	Rahul1_ert_rtw	16/01/2023 11:40 am	File folder	
	slprj	16/01/2023 11:35 am	File folder	
	Three_Phase_Invertor_Good_ert_rtw	12/01/2023 10:25 am	File folder	
	Three_Phase_PWM_Inverter_ert_rtw	12/01/2023 10:54 am	File folder	
	untitled_ert_rtw	12/01/2023 10:45 am	File folder	
	Vijay_ert_rtw	16/01/2023 11:49 am	File folder	
	Analog DC Voltage	1/02/2023 3:11 pm	LabVIEW Instrume...	28 KB
	Analogue Voltage Output VI	27/01/2023 3:59 pm	LabVIEW Instrume...	54 KB
	Horizontal Bearing Control	3/02/2023 2:23 pm	LabVIEW Instrume...	88 KB

- R:\01 HTS Large Scale\12 Fastest machine\13 Student work\Andrew Moore\Code

### 1. The LabView prompt will appear briefly.



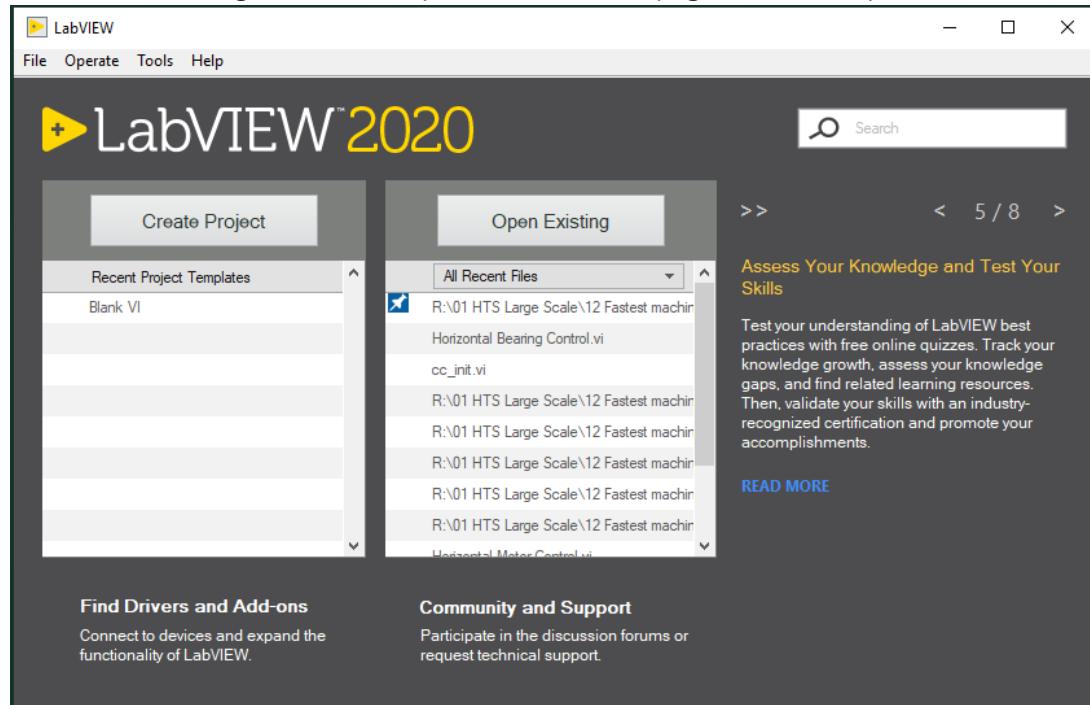
### 1. Once you've opened "Horizontal Bearing Control.vi", you should see this.



1. If you somehow don't see this, then open the LabView prompt in the taskbar.



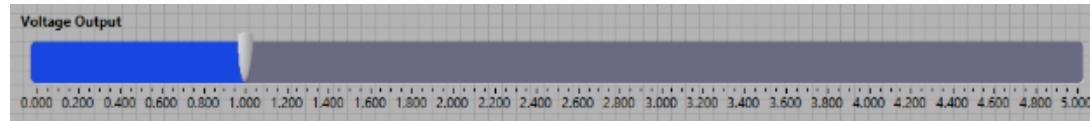
1. "Horizontal Bearing Control.vi" is pinned to this viewpage. Click and open it.



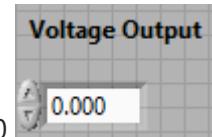
## Step 4 - Run the test Motor

Below are images and info for running the Test Motor through LabView.

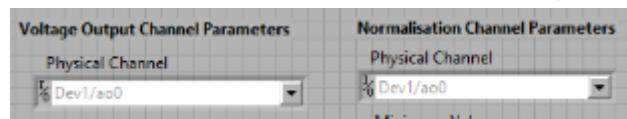
1. Set the voltage output to 0.000 using the side scroller.



- The value displayed in the Voltage Output Box should read 0.000



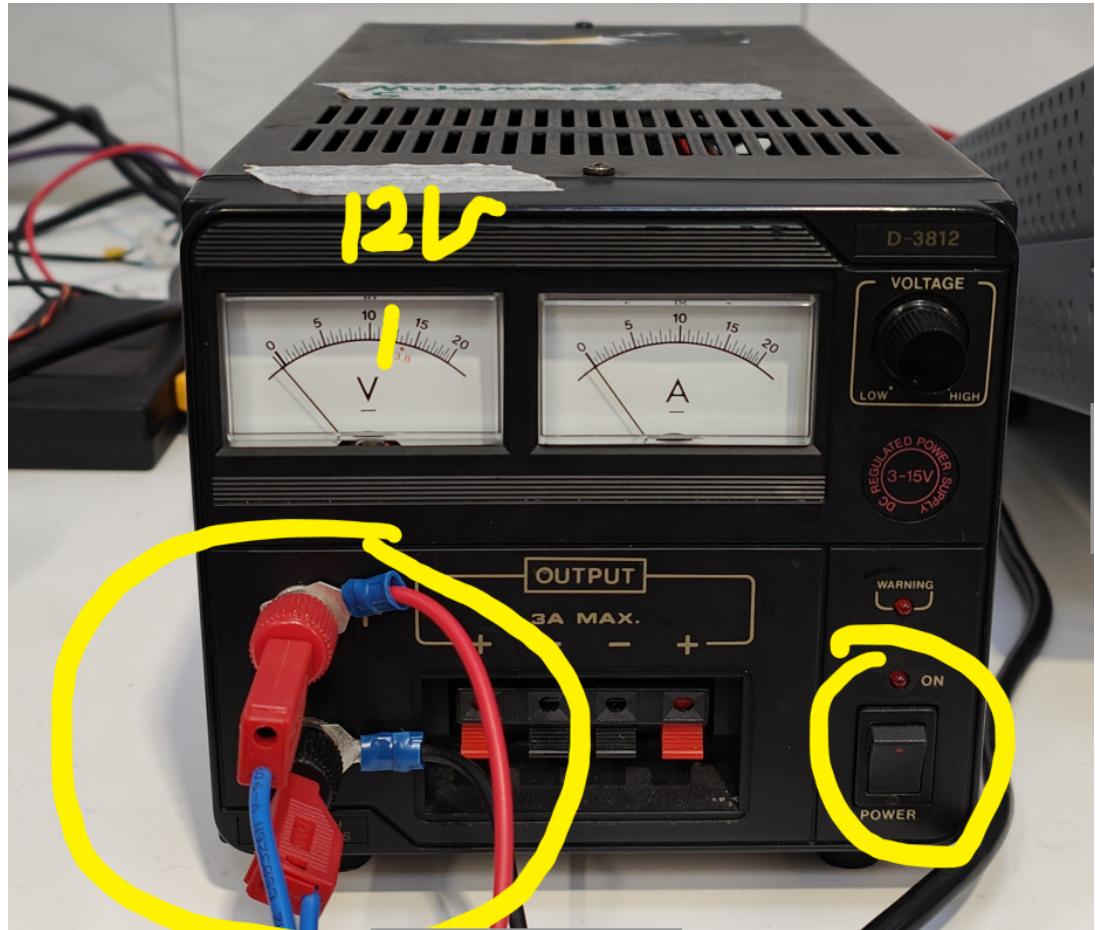
1. Change both the 'Voltage Output Channel Parameter' and 'Normalisation Channel Parameters' to 'cDAQ9189-horizontalMod8/ao0'



1. Set the increments to 0.005 on both boxes.

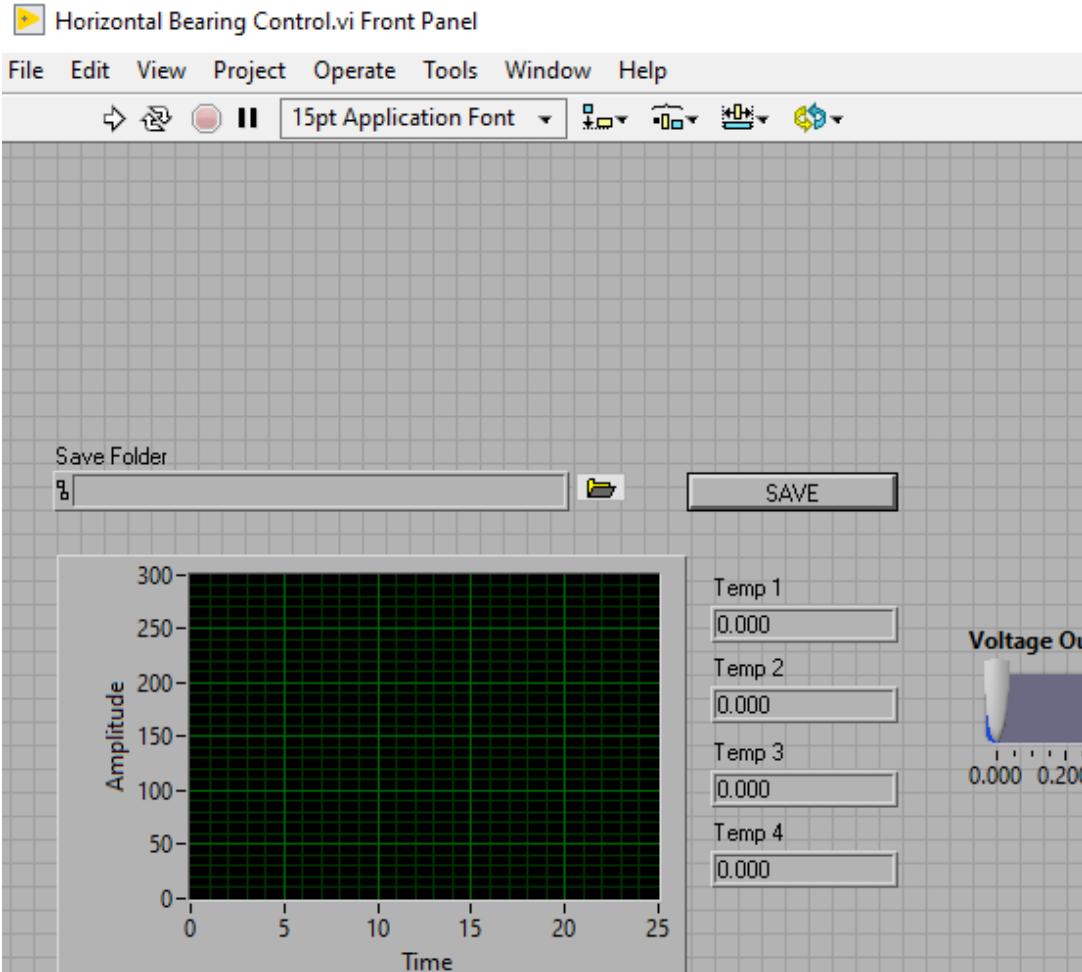


1. Check connection and then switch the power on. Turn the Voltage Dial up slowly and stop at 12V



- The booster and launch pad should turn on at this point and test motor "may" jump on starting.
1. 'Run' the program and you should see the motor begin to spin. You can change the speed by using the scroller. Although the arrows on the 'Voltage Output Box' is more

accurate.



- Changing the voltage in large increments may cause the test motor to stop sharply

## Step 5 - PLECS Code

At this point, there should be no reason to access the PLECS Code. However, if there is a need to update the code, then there is only one way to access the software needed to update this. You must seek out Engineer D. Guja for access.