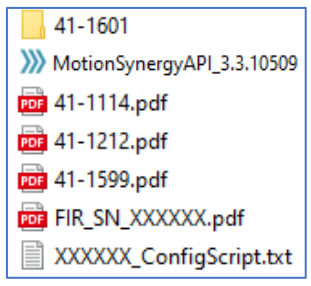
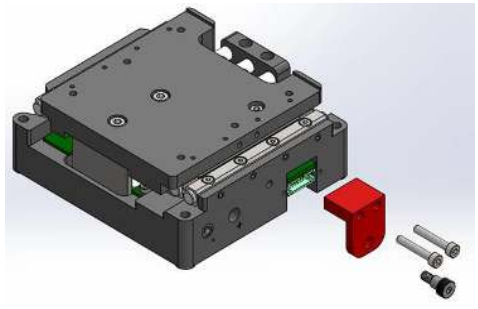
Dover Motion DOF-5 Quick Start Guide for RS-485 Communication

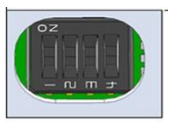
This guide covers the basic steps for using a DOF-5 stage with Pro-Motion for basic control & testing. See the DOF-5 User Guide for more information.

1) The USB drive included with the stage has the following materials:
   a. 41-1601 (MOXA Driver Install)
   b. MotionSynergyAPI_3.3.10509 (Software Dev. Kit)
   c. 41-1114.pdf (DOF-5 User Guide)
   d. 41-1212.pdf (DOF-5 Software Guide)
   e. 41-1599.pdf (DOF-5 Quick Start Guide, RS485)
   f. ######_Config.txt (Configuration File)
   g. FIR_SN_######.pdf (Final Inspection Report)



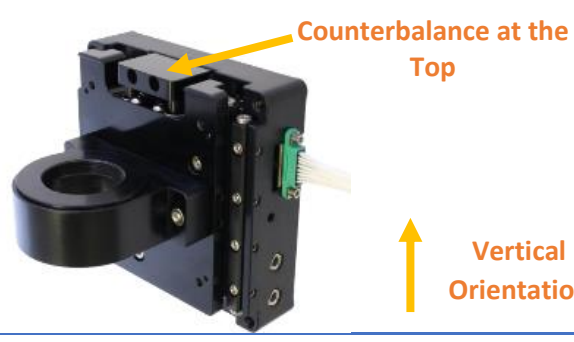


2) Remove the shipping stop (See image)
3) The User Guide (41-1114.pdf) and troubleshooting section 15) below have information on the DIP switches for communications setup.
   a. The DOF-5 ships with these switches pre-set per the order, reference Final Inspection Report on USB drive for shipped configuration.

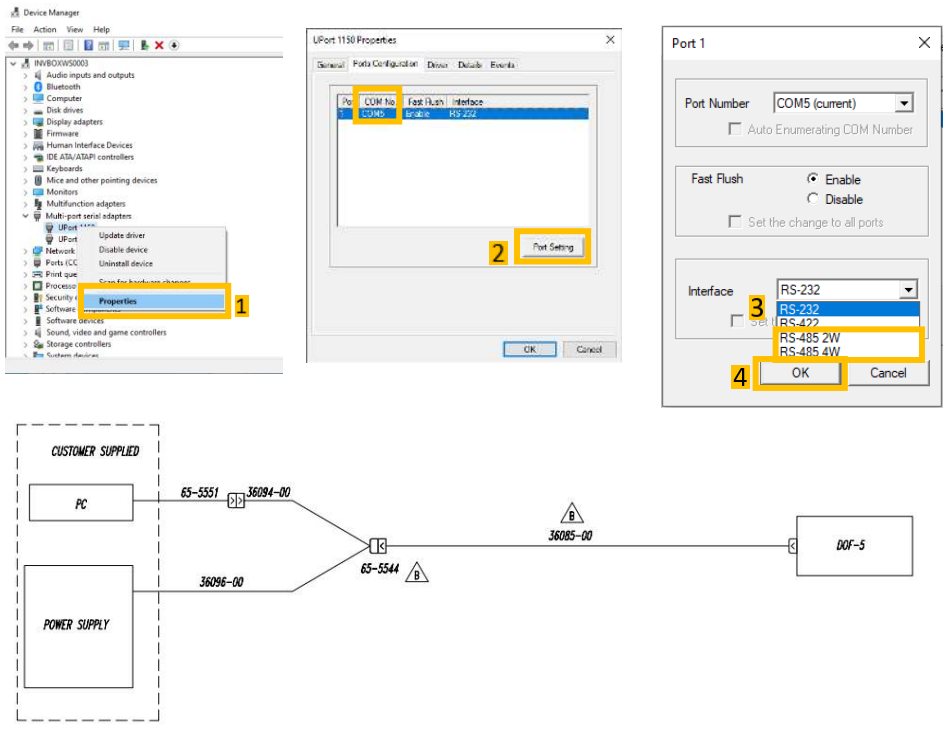


Communication Type	1	2	3	4
RS485 Low Z Full Duplex (G06)	ON	OFF	OFF	ON
RS485 Low Z Half Duplex (G02)	ON	OFF	OFF	OFF
RS485 High Z Full Duplex (G07)	ON	OFF	ON	ON
RS485 High Z Half Duplex (G05)	ON	OFF	ON	OFF

4) Mounting the stage for powerup
   Note that these are calibrated stages, orientation and load matter!
   a. Attach the specified load to the stage (the objective, lens, etc.) or a dummy mass. **Without the load stage will be unstable and/or buzz.**
   b. Ensure the correct orientation, counterbalance at the top (See image) when mounted vertically. Mount in a horizontal orientation if ordered without counterbalance.



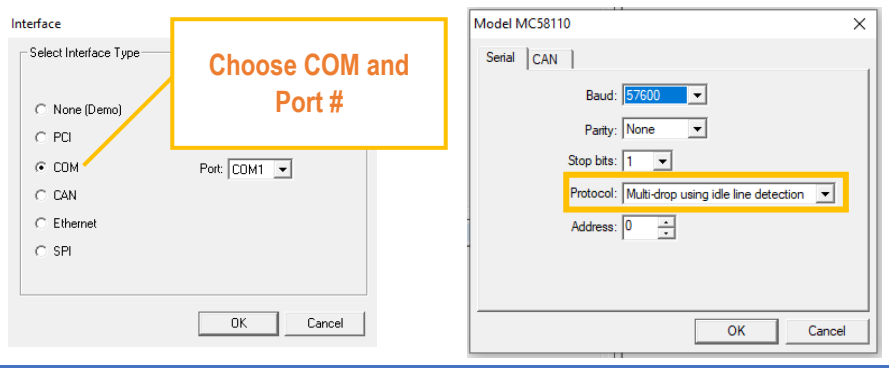
5) If using Moxa UPort Adapter, install Moxa Drivers included on USB (41-1601)
   a. After successful installation, connect the MOXA to host computer and open Device Manager. Under "Multi-port serial adapters," right click the Moxa UPort Adapter and select "Properties."
   b. Under "Properties," note the COM Number for Step 8)a. Select "Port Setting."
   c. Under "Interface," select either RS-485 2W or RS-485 4W
      i. RS-485 2W is for half duplex units (G02 or G05 in Configurator String)
      ii. RS-485 4W is for full duplex units (G06 or G07 in Configurator String)
   d. Click "OK" to save the setting and close the Device Manager.
6) If using Dover Motion supplied cabling (36101-00), connect cable to stage and tighten retention screws. Connect cable to serial communications adapter. With power supply powered OFF, connect to 24V power supply. Turn power on.



7) Download and install the Pro-Motion user interface from the provided USB

Install file is named: Pro-Motion5.20.exe. Note: The DOF requires Pro-Motion version 5.20 to work properly

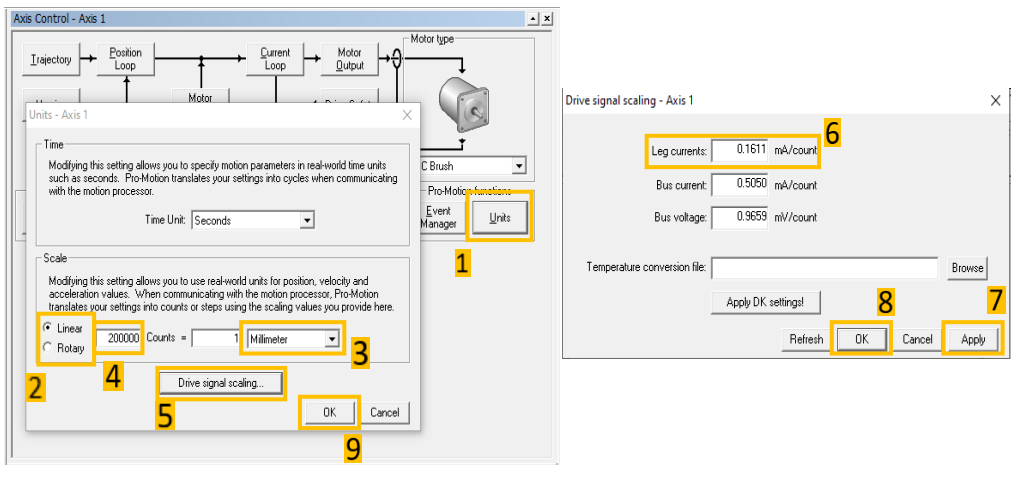
8) Start Pro-Motion, and the Select Interface Type box opens automatically
   a. Select the "COM" communications type for RS485 Communication and the Port the DOF-5 is connected to (See Step 5)b.
   b. Set "Protocol" to "Multi-drop using idle line detection"



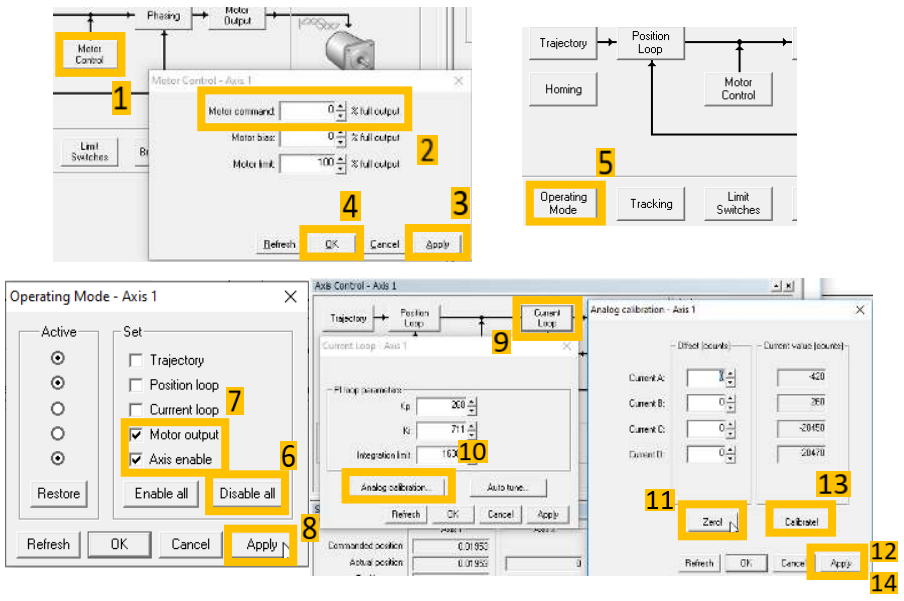
9) Set the Stage Units
   a. Click Units, select Linear units, change Count to Millimeters, and enter one of the following numbers depending on the resolution of the encoder you ordered. The resolution is shown on page 1 of the FIR Test Report:

Part Number:	11-0389	DOF Config : DOF-5-E38-G01-TH01-R1-180		FIR Test Date:	2/13/2019
Part Number Rev:	A	Test Software Rev:	36087-01(Ver 2.1.4)	Payload (grams):	180
Serial Number :	244099	Sales Order No. :	454	Encoder Resolution :	5.00 nm

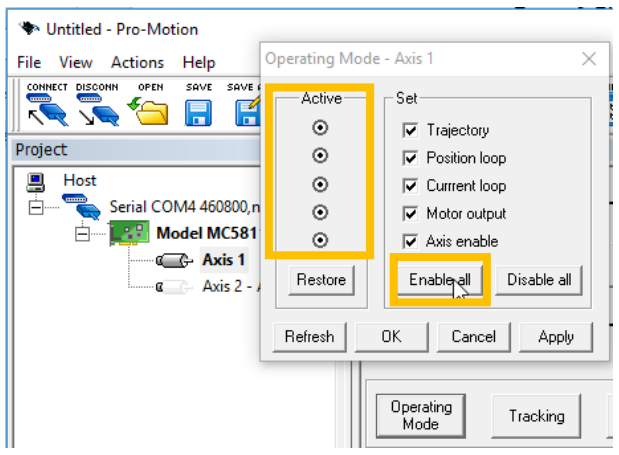
   i. 5nm resolution encoders: 200000 counts/mm
   ii. 1.25nm resolution encoders: 800000 counts/mm
10) Click "Drive Signal Scaling…" and change "Leg Currents" to "0.1611." Then click "Apply" and "OK." Click "OK" on the "Units" window to close it.



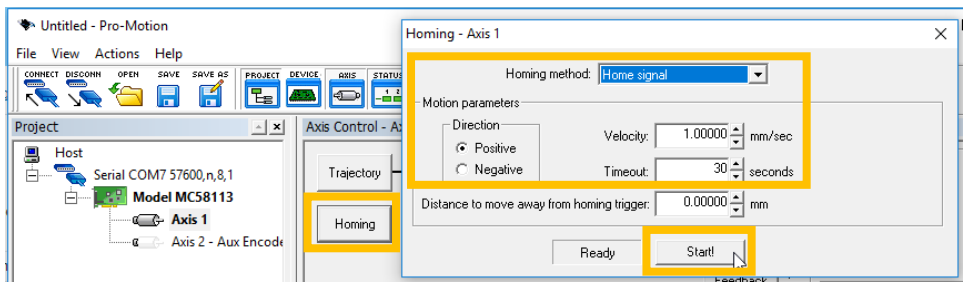
11) Analog Calibration
   a. Click “Motor Control” and set “Motor Command” to “0.” Click “Apply” and “OK”
   b. Click Operating Mode
   c. Disable the motor by clicking “Disable All”
   d. Check “Axis enable” and “Motor output.” Click “Apply.”
   e. Click “Current Loop,” then “Analog calibration.”
   f. Click “Zero!” then “Apply”
   g. Click “Calibrate!” then “Apply” and “OK”



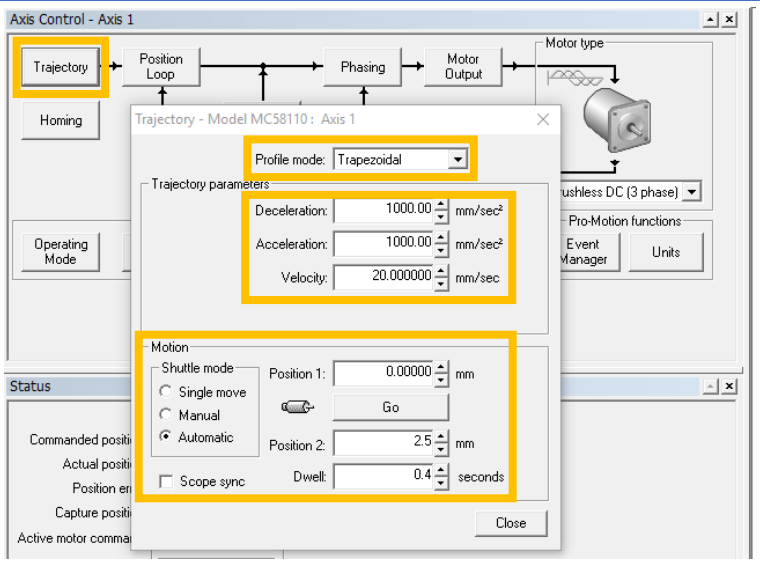
12) Enable the DOF-5 Servo with the Operating Mode
   a. Click “Operating Mode”, then “Enable All.” **Do not Calibrate Current Feedback Signals again (already completed in Step 11).**
   b. The DOF-5 servo should now be on and it will hold position
   c. The Active indicator for *ALL* items must be “on” as shown in the image to the right (see orange box). Otherwise the motor may be enabled, but the stage will not move



13) Homing the DOF-5
   a. Prior to motion, each time the stage is powered off, or the motor is disabled, it will need to be homed before any position moves can be made
   b. Click “Homing”
   c. Enter the selections shown in the screenshot
   d. Click “Start!”
   e. The box to the left of the “Start!” button will read “Completed” when homing is completed.

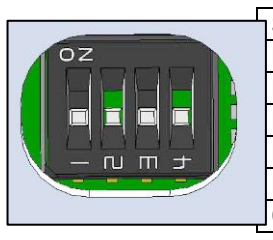


14) To move the DOF-5 stage, click “Trajectory”
   a. “Profile mode” controls the motion type, use “Trapezoidal” for basic motion.
   b. “Shuttle Mode” controls how the stage moves:
      i. “Single Move” moves the stage once to a set position after “Go” is clicked.
      ii. “Manual” moves the stage back and forth between two set positions each time “Go” is clicked.
      iii. “Automatic” cycles back and forth between two positions with the set dwell time when “Go” is clicked, and stops when “Stop” is clicked.
   c. “Scope sync” allows plotting to be automatically started at the same time as a movement.



Troubleshooting Instructions

15) Can’t connect to the stage
   a. Ensure the stage is connected to a 24V power supply, there should be a red power led in the stage.
   b. Ensure the correct port, address, and connection settings are used when connecting, use the Device Manager to find out which port numbers are in use

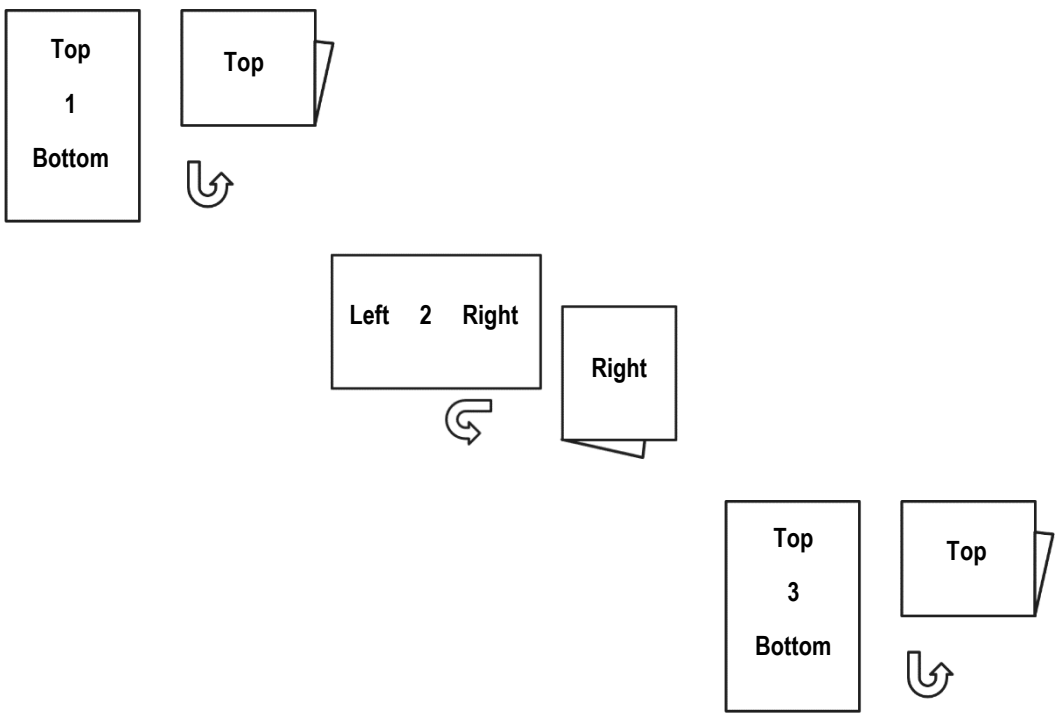


Switch No.	1	2	3	4
RS232	ON	ON	N/A	N/A
RS485 Low Z Full Duplex	ON	OFF	OFF	ON
RS485 Low Z Half Duplex	ON	OFF	OFF	OFF
RS485 High Z Full Duplex	ON	OFF	ON	ON
RS485 High Z Half Duplex	ON	OFF	ON	OFF
CAN	OFF	N/A	N/A	N/A

16) The stage is unstable
   a. Ensure that the correct mass has been installed on the stage
   b. Ensure the stage is operating in the correct orientation
   c. Ensure the stage is in a stable operating environment (stationary work surface, no ambient vibration, etc.)
   d. Re-load the configuration file included on the USB, see the DOF-5 User Guide for more detail
   e. The stage may need to be re-tuned, contact Dover Motion

Printing Instructions:

1) Print only pages 1 and 2 double sided, full color, size 11x17
    a. Do not print page 3
2) Fold in half hamburger style 3 times such that the top right corner is visible on top when completely folded:



Document	Revision	Date	Summary	ECO Number	Write/Revisor
41-1599	A	02/18/22	Initial Release	DM12007	Kevin Kezar
41-1599	B	09/27/22	Replace 36105-01 with MotionSynergyAPI_3.3.10509 (Software Dev. Kit)	DM12321	John C.