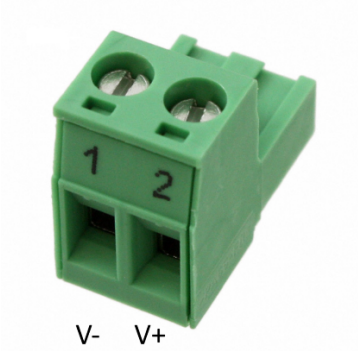
Operating Instructions for ECM 0.5HP Shelf stock motor.

Please contact us with any questions at: techsupport@pcbstator.com

Please read all instructions completely before proceeding to ensure all steps are understood. Ensure that the motor is safely and rigidly mounted before operating.

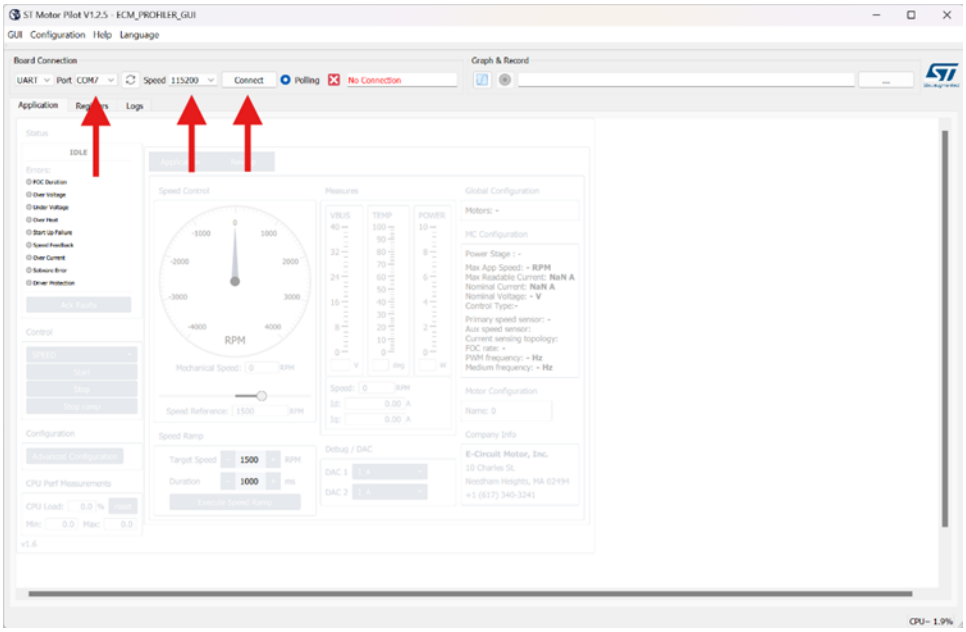
1. Download and Install X-CUBE-MCSDK 6.2.1 software package from https://www.st.com/en/embedded-software/x-cube-mcsdk.html
2. Open Motor Pilot 6.2.1

3. Click “Load UI” and select the provided file named “ECM_GUI_2_0_0.qml”.
4. Connect the provided USB-C cable between your PC and USB-C port in controller cover.
5. Connect 50VDC to the removable 2 pin screw connector (color and markings may vary). V+ = right side. V- = left side as shown.

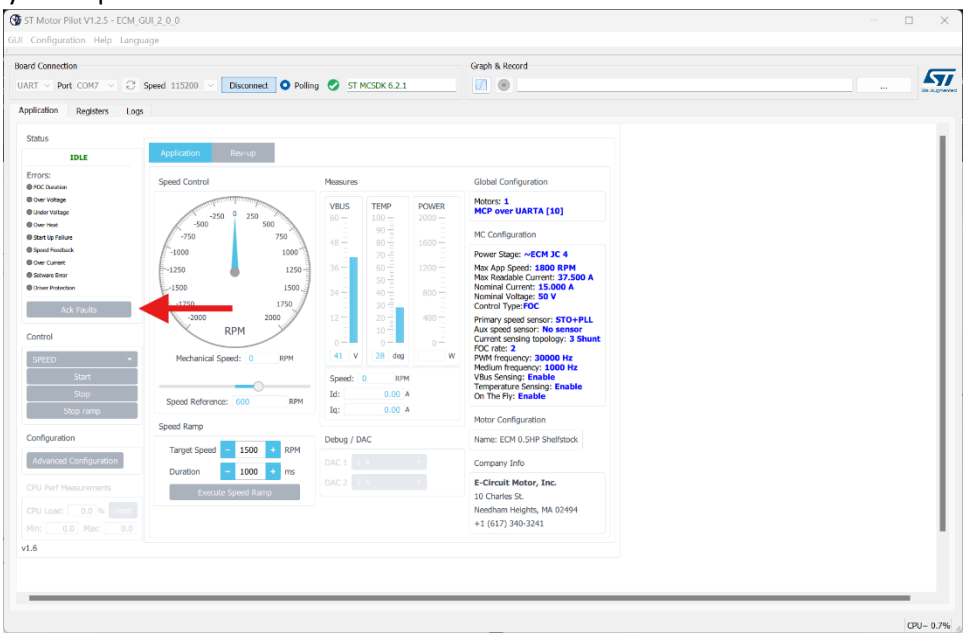


e-circuit motors inc.
10 Charles Street
Needham Heights
MA 02494-2906
t: +1.617.340.3241
e: info@pcbstator.com
www.pcbstator.com

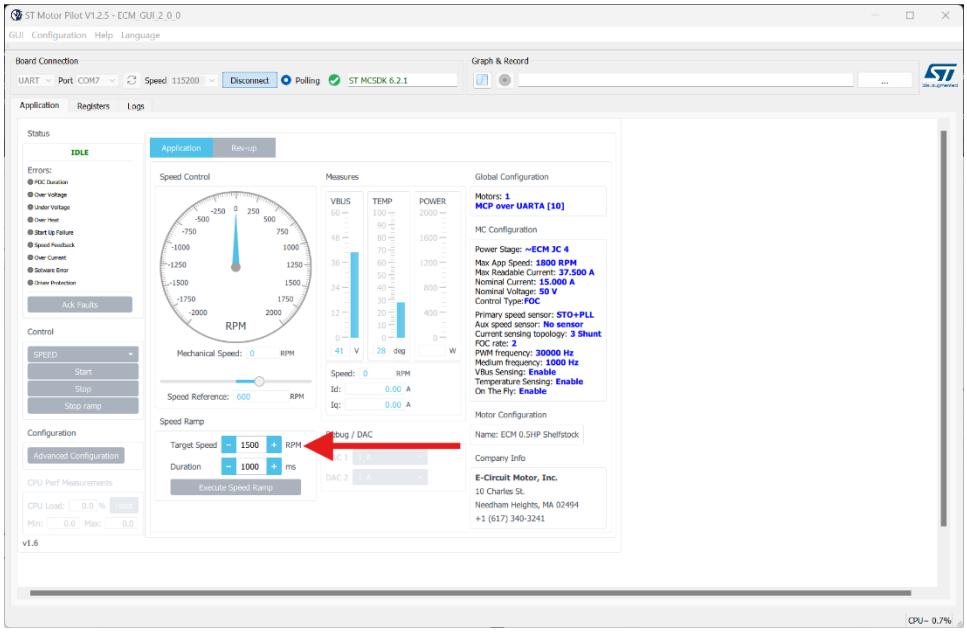
6. Select appropriate COM port, set the speed to 115200, and click “Connect” button.



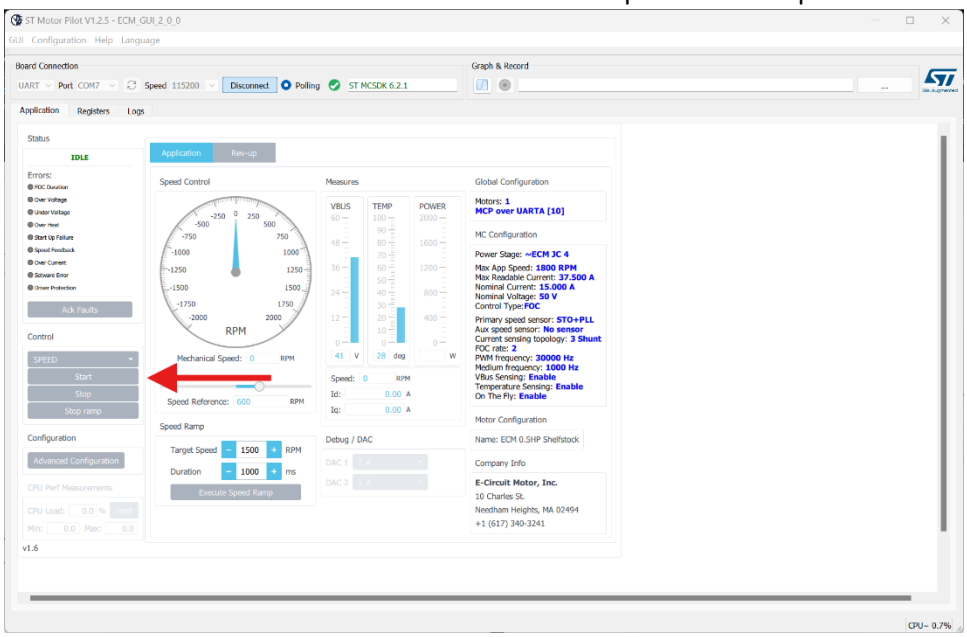
7. Acknowledge any startup faults.



8. Enter the desired operating point speed and startup duration here and press “Execute Speed Ramp”. (Operating point speed is 1800 RPM, duration should be set to 10,000). **It is important that you do this every time you restart the software, power-cycle the motor, or change the speed or ramp duration.**



9. Click “Start Motor” to start the motor. Motor will accelerate to the speed set in step 8.



10. It is strongly recommended to use the speed ramp for ALL speed changes. Deceleration should be limited to 100 RPM/second or less.
11. Continue testing as needed and click “Stop Motor” when finished. Note that “Stop Motor” disables the motor drive and allows the motor to coast to a stop.
12. Turn off the power supply.

The standard method for motor testing was as follows.

1. Motor is attached to a test stand containing a dynamometer.
2. The motor is run up to desired test speed.
3. Load is applied via dynamometer.
4. Power into the motor is measured via a power analyzer.
5. Power out of motor is measured by the dynamometer.
6. Motor performance is determined using the 2 measurements.

ECM measures motor performance at the leads of the motor to determine motor only performance. This means the controller system and any losses associated are not included in the motor performance.

Thermal Information Disclaimer

This model motor was determined to have a thermal resistance of ~1.89 W/°C. Meaning that for each 1.89W of power loss there should be a 1°C delta between the housing temperature and the peak stator temperature at steady state. The performance at the expected operating point, based on a sample motor in the lab, is shown in the table below. Individual motor performance may vary. Housing temperature must be monitored during testing.

Speed (RPM)	Torque (Nm)	Power Out (W)	Efficiency (%)	Power Loss (W)	Delta Expected (°C)	Max Housing Temperature for 100°C Stator Limit
1800	2.0	376.8	82.33	80.85	42.7	57.3

The motor can run at increased temperatures, but the lifetime of the machine will be affected an unknown amount. ECM cannot predict the lifetime effect of increased temperature as this is largely dependent on the final installation and environmental conditions experienced while in use. The motor should be ok to run up to 120°C stator temperature without too much risk to the motor, however, as with all motors when running to higher temperatures, it is likely motor performance will change and should be monitored.

It is necessary to monitor performance to ensure it is not in a thermal run-away situation. Preventing a thermal run-away is not something unique to ECM. This means there are already a variety of established solutions. Solutions such as a thermal shut off switch mounted to housing, software limits on current, directly monitoring stator temp with sensors, etc.