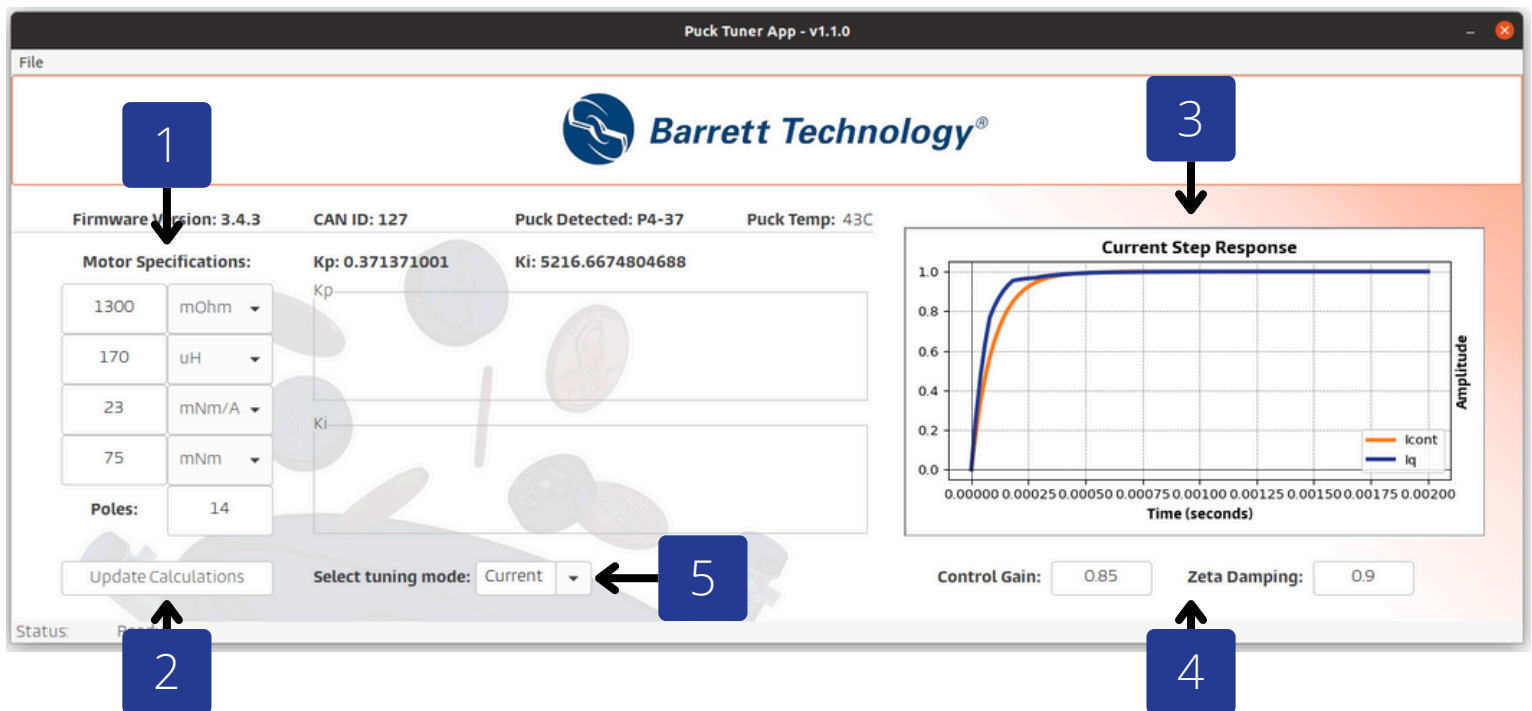# Barrett™ DRIVE SYSTEMS

Puck Tuning App Guide

Follow this guide to navigate the Puck Tuner App with ease. Follow page by page for full tuning procedure. For help troubleshooting common issues, view page 5.

Puck Tuner App - v1.1.0

File

Barrett Technology®

1

Firmware Version: 3.4.3   CAN ID: 127   Puck Detected: P4-37   Puck Temp: 43C

Motor Specifications: Kp: 0.371371001   Ki: 5216.6674804688

		Kp
1300	mOhm ▼	
170	uH ▼	
23	mNm/A ▼	Ki
75	mNm ▼	
Poles:	14	

Update Calculations   Select tuning mode: Current ▼   **5**

Status:

2

3

Current Step Response

Amplitude

1.0
0.8
0.6
0.4
0.2
0.0

0.00000 0.00025 0.00050 0.00075 0.00100 0.00125 0.00150 0.00175 0.00200
Time (seconds)

— Icont
— Iq

Control Gain: 0.85   Zeta Damping: 0.9

4

PUCK TUNER APP

Motor Tuning Procedure - Current Step Response

1 **Motor Specifications -** Start by entering correct motor parameters from the motor datasheet.
   Note: Motor specifications are crucial for a Pucks motor commutation. Incorrect parameters can damage the Puck / Motor assembly.

2 **Update Calculations -** Once all parameters are complete, press here to calculate current gains.
   Note: For new configurations, this button will turn orange, indicating calculations must completed prior to continuing the tuning procedure.

3 **Current Step Response Graph -** Verify Iq closely matches the response time of Icont in the graph.
   Note: If the graph is significantly different than the example above, this may indicate an issue with the motor parameter inputs.

4 **Control Parameters -** Adjust control gain / zeta damping to fit the curve.
   Note: Control gain must be greater than 0.
   Zeta damping must be greater than 0, but less than 5.

5 **Select Tuning Mode -** Once current step response tuning is complete, select velocity.
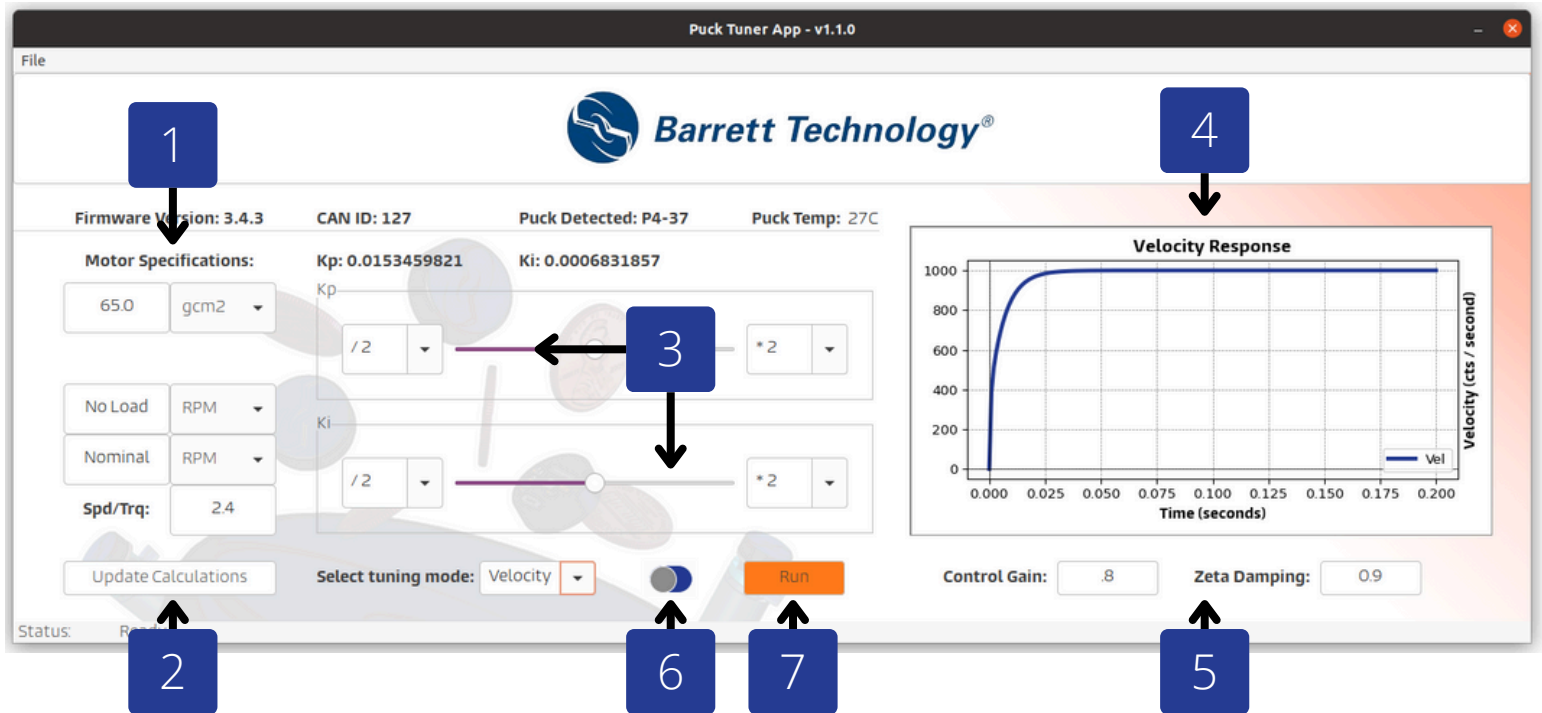   Note: Tuning Mode selection is locked until current response is complete.

Velocity Response
↓

Contact Us

📞 (617) 252-9000   🌐 barrett.com   ✉ support@barrett.com

Document B7373 Rev AA

Barrett™
DRIVE SYSTEMS

Puck Tuning App Guide

Follow this guide to navigate the Puck Tuner App with ease. Follow page by page for full tuning procedure. For help troubleshooting common issues, view page 5.

Barrett Technology®

Puck Tuner App - v1.1.0

File

Firmware Version: 3.4.3   CAN ID: 127   Puck Detected: P4-37   Puck Temp: 27C

Motor Specifications: Kp: 0.0153459821   Ki: 0.0006831857

65.0 gcm2

No Load RPM

Nominal RPM

Spd/Trq: 2.4

Kp
/ 2   * 2

Ki
/ 2   * 2

Update Calculations

Select tuning mode: Velocity   Run

Velocity Response

Control Gain: .8   Zeta Damping: 0.9

Status:

Motor Tuning Procedure - Velocity Response

1 Motor Specifications - Enter inertial parameters for the motor from the motor datasheet.

Note: If no speed / torque gradient is provided, input no load and nominal motor speed in the input boxes.

2 Update Calculations - Once all parameters are complete, press here to calculate velocity gains.

Note: For new configurations, this button will turn orange, indicating calculations must completed prior to continuing the tuning procedure.

3 Kp / Ki Slider - After calculating gains, adjust the slider to fine tune gains for smooth output.

Note: Use the adjustable multipliers to increase / decrease the the range of the sliders for fine / coarse adjustments.

4 Velocity Response Graph - Verify the velocity response curve on the graph.

Note: Quick response is important, but balancing a smooth curve with fast response time will provide optimal results.

5 Control Parameters - Adjust parameters to optimize response / alter live graph output.

Note: Control parameters change based on Graph Mode. Adjust the window dimensions to control the response / graph.

6 Graph Mode - Switch between response curve and live velocity output with this switch.

Note: Run the motor in velocity mode and monitor the output velocity at various speeds to fine tune the Kp / Ki sliders for optimal performance.

7 Run - Press Run to enable the Puck in velocity mode for final adjustments.

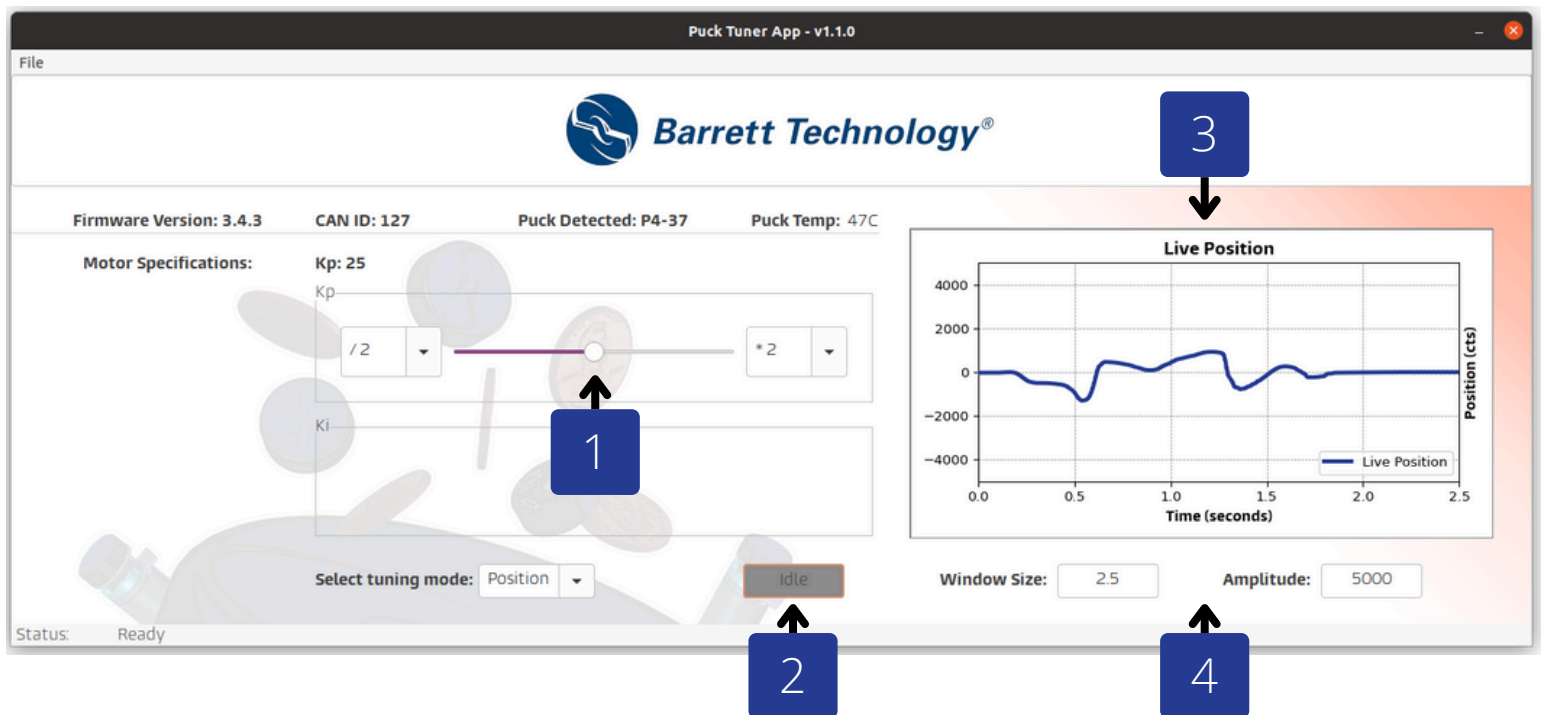Note: The Puck will hold 0 velocity in response mode. With Live Graph Mode enabled, the output velocity is adjustable.

Position Response

Contact Us

📞 (617) 252-9000   🌐 barrett.com   ✉ support@barrett.com

Puck Tuning App Guide

Follow this guide to navigate the Puck Tuner App with ease. Follow page by page for full tuning procedure. For help troubleshooting common issues, view page 5.

Barrett™ DRIVE SYSTEMS

Puck Tuner App - v1.1.0

File

Barrett Technology®

Firmware Version: 3.4.3   CAN ID: 127   Puck Detected: P4-37   Puck Temp: 47C

Motor Specifications: Kp: 25

Kp

/2   * 2

Ki

Select tuning mode: Position   Idle

Live Position

Window Size: 2.5   Amplitude: 5000

Status: Ready

PUCK TUNER APP

Motor Tuning Procedure – Position Response

1 **Kp Slider -** Adjust the slider to fine tune gains for smooth output.
   Note: Use the adjustable multipliers to increase / decrease the the range of the sliders for fine / coarse adjustments.

2 **Run -** Press Run to enable the Puck in position mode for final adjustments.
   Note: The Puck will hold position at the location at the time the button is pressed.

3 **Live Position Graph -** Verify the position response in real time.
   Note: Run the motor in position mode and briefly disrupt the position. Monitor the response and adjust gains for smooth output.

4 **Control Parameters -** Adjust window size and amplitude of the Live Graph.
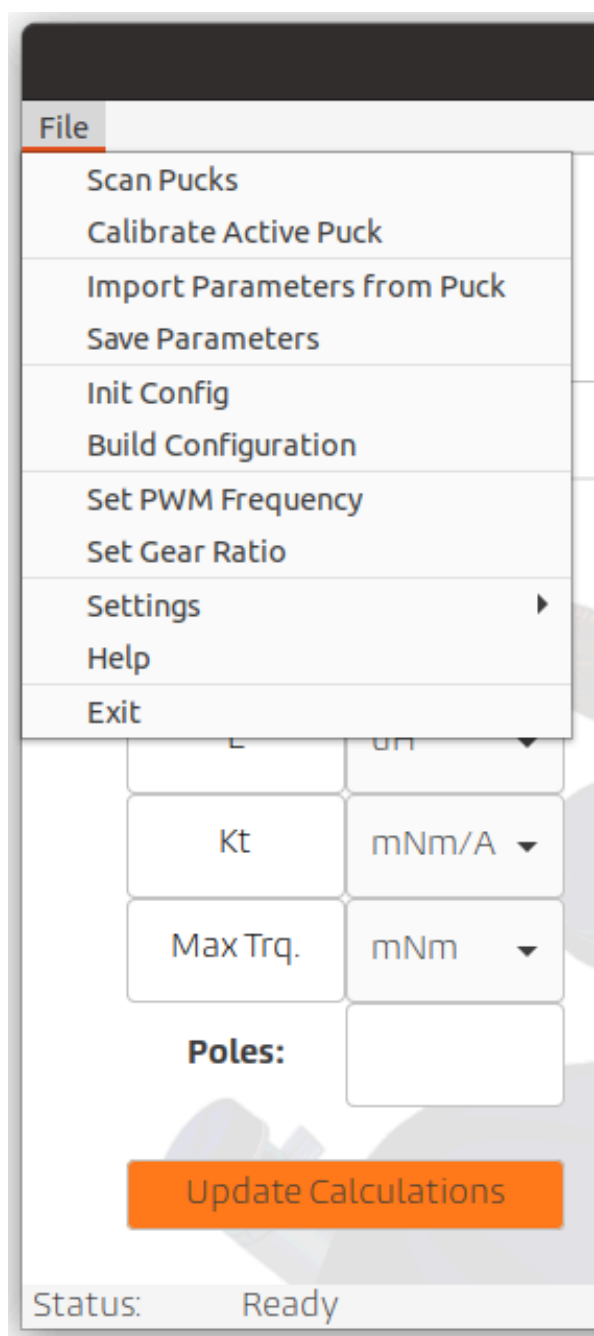   Note: Adjust the window parameters to control the graph dimensions.

File Menu

Contact Us

(617) 252-9000   barrett.com   support@barrett.com

Document B7373 Rev AA

Puck Tuning App Guide

Follow this guide to navigate the Puck Tuner App with ease. Follow page by page for full tuning procedure. For help troubleshooting common issues, view page 5.

File

- Scan Pucks
- Calibrate Active Puck
- Import Parameters from Puck
- Save Parameters
- Init Config
- Build Configuration
- Set PWM Frequency
- Set Gear Ratio
- Settings ▶
- Help
- Exit

L	uH ▾
Kt	mNm/A ▾
Max Trq.	mNm ▾
Poles:	

Update Calculations

Status: Ready

File Menu

Main Features

1 **Scan Pucks -** Scans all nodes and automatically connects to lowest ID.
Note: Scan runs automatically at startup. Scan is only required if power or CAN were not connected at startup.

2 **Calibrate Active Puck -** Automatically calibrates the Puck for the motor.
Note: All calibration steps run automatically. Verify motor parameters and test setup if calibration fails.

3 **Import Parameters** - Import all data from the current Puck.
Note: Import automatically runs at startup. Use this feature to create an updated configuration.

4 **Save Parameters** - Save (store) all parameters to the Active Puck.
Note: This overwrites previous data and stores updated parameters to the EEPROM.

5 **Build Configuration** - Build a csv from the parameters stored on the Puck.
Note: The Puck Tuner App automatically places formats-'configuration-name-input'-date.csv.

6 **Set PWM Frequency -** Update the PWM frequency for motor control.
Note: PWM Frequency is set automatically based on motor tau in new configs.

7 **Set Gear Ratio -** Add motor revolutions to shaft revolutions.
Note: This feature allows the Puck Tuner App and other apps to automatically configure gear ratio at start up.

8 **Settings -** Select active CAN device from the drop down menu.

Troubleshooting
↓

Puck Tuning App Guide

TROUBLESHOOTING

No CAN bus Found!

⚠ CAN network was unable to initialize. This could be a missing driver or an issue with the CAN adapter.

💡 Verify the CAN driver is installed and active on the computer.
Check connections between the computer and Peak CAN adapter.

No Pucks found!

⚠ CAN network is initialized, but no active Pucks were found on the bus. This could be an issue with power or CAN connection.

💡 Ensure cables are properly connected.
Verify 5V and 3.3V LEDs are on.
If the issue persists, try reconnecting the CAN adapter to the computer.

Motor not spinning

⚠ A test is run but the motor does not spin or has significant cogging. This could be caused by an incomplete calibration or insufficient bus voltage.

💡 Use the ADC Monitor to verify the Puck is operating correctly.
Open the Calibrate menu and run through each calibration.
Verify correct configuration is in use.

Other issues

Incomplete Specifications! - Calculations failed due to missing parameters.
Puck Must Be Calibrated Before Use! - The Puck must be calibrated before running.
No Configuration Detected! - A blank Puck has been detected. Import data failed.

If a new issue occurs, please reach out for support from Barrett Engineers!

Contact Us

📞 (617) 252-9000   🌐 barrett.com   ✉ support@barrett.com