Update the firmware

1. Overview

This tutorial will guide you through the firmware upgrade process for AESC controllers. Regularly updating the firmware ensures your controller obtains the latest features, performance optimizations, and security fixes.

2. Software Preparation

- **Download VESC Tool: https://vesc-project.com/vesc_tool**
- **You can find the download tutorial here:**

Figure 1: AESC configuration tutorial QR code

- **Run the VESC Tool software**

3. Hardware Preparation

3.1.Required Components

- AESC motor controller (e.g., AESC V4, AESC V6.7,AESC V4 Pro,AESC V6.7 Pro)
- Li-ion battery pack/LiPo battery pack/DC power supply(e.g.,32V,36V,48V)
- PC
- USB Type-C

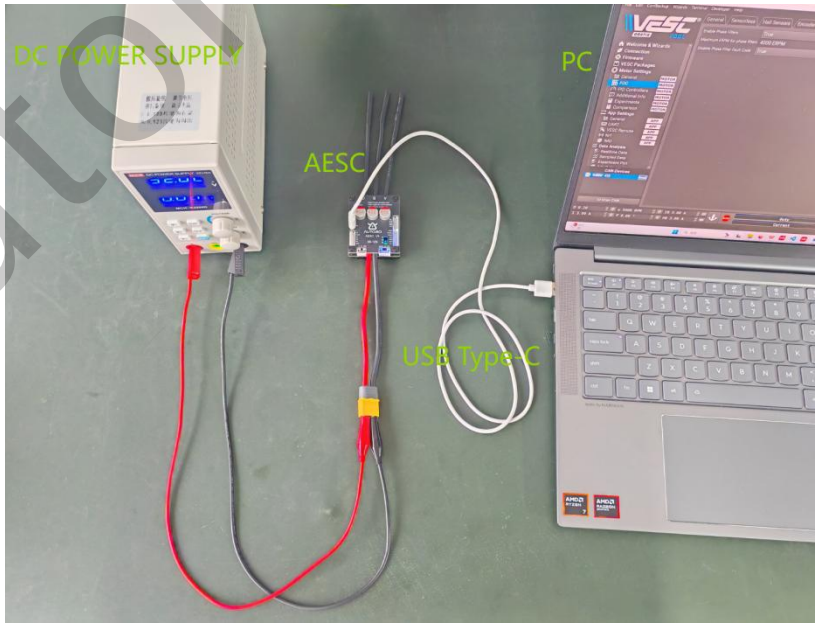

Figure 2: Overall hardware connection diagram

3.2.Hardware Connections

a. Power down everything

- Ensure all components are disconnected from power sources before making any connections. This is a critical safety precaution.

b. Verify Power System Compatibility

- **Before connecting the battery,** it is **critica**l to ensure your power source (battery) is compatible with both your AESC and your motor.
- **Voltage Check:** Confirm that your battery's **nominal voltage** and **fully-charged voltage** are within the **input voltage range** specified in your AESC's user manual. Exceeding the maximum voltage will permanently destroy the controller.
- **Current Check:** Ensure your battery can supply enough **continuous current** to meet the demands of your motor and AESC setup. The battery's current output (in Amps) should be greater than the **maximum current** you plan to draw.
- **Motor Compatibility:** The power system must be able to drive your specific motor at its required voltage and current.

c. Connect battery to AESC

- **Warning: Observe Polarity**! Connect the battery's **positive (+)** wire to the AESC's **polarity+** input and the **negative (-)** wire to the **polarity-** input. Reverse polarity will instantly destroy the controller.

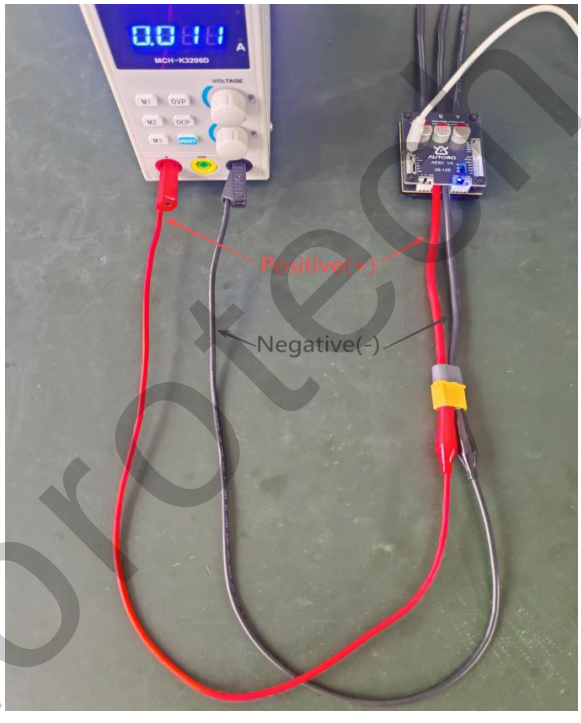

Figure 3: Correct power supply polarity connection

d. Connect AESC to computer

- Use the USB Type-C cable to connect the AESC to your computer for configuration and firmware updates.
- You should see status LEDs light up on the controller.

3.3.Final connection check

- Visually double-check all connections for correctness and secureness, especially battery polarity.
- Ensure there are no loose wires or potential short circuits.

3.4.Apply power

- Once all connections are confirmed correct, connect the battery to power up the AESC.

4. Update the firmware

⚠ Critical safety precautions before starting:

- It is absolutely critical to provide stable and appropriate power to the VESC (e.g., a 24V battery or DC power supply). An unstable connection or insufficient power can cause the update to fail and potentially brick the controller.
- A firmware update will restore all parameters to their default values and erase your current configuration. If you wish to preserve your existing settings, you can create a backup of your configuration before proceeding with the update.

  Menu bar: “**ConfBackup**” → “**Backup Configuration**” or “**Backup Configurations(including CAN)** ” .

4.1.Connection

a. Devices found.

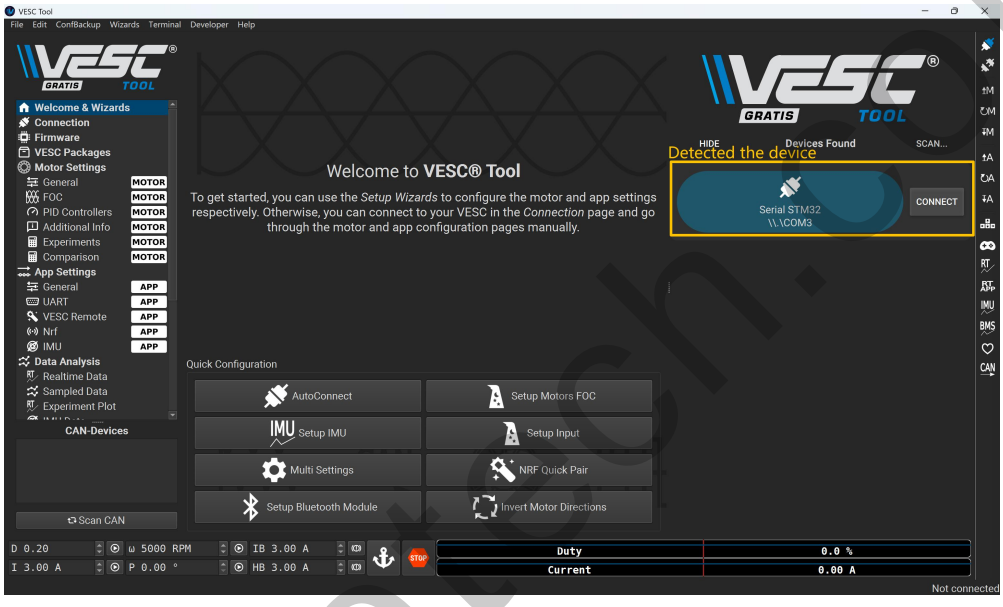

Figure 4: Detected the motor controller

b. Click "AutoConnect". A successful connection is indicated by the status "Connected (serial) to COM*" in the bottom-right corner.

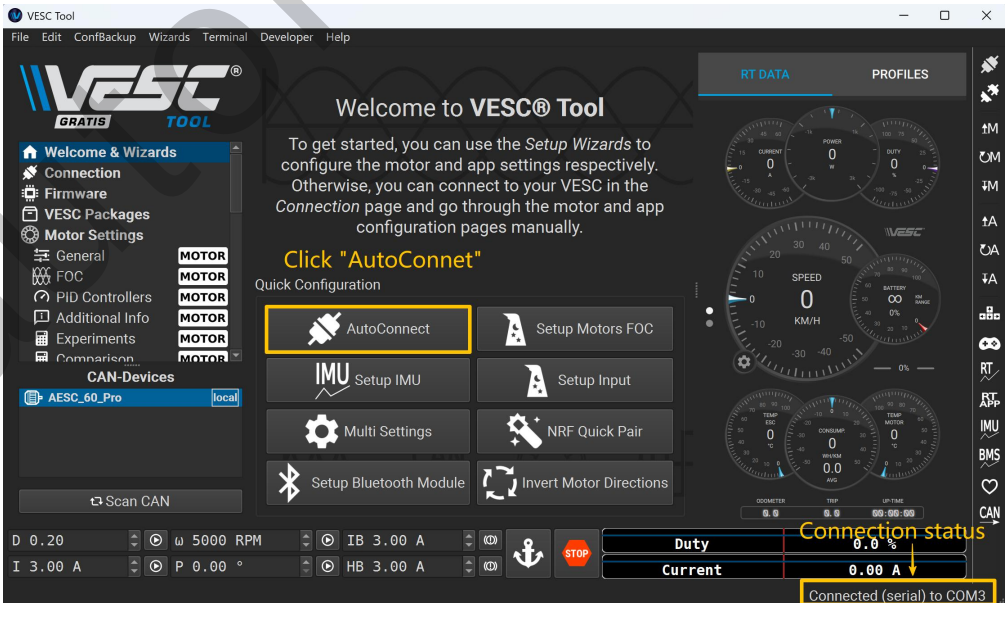

Figure 5: Connection status

4.2.Updating Official Firmware

a. Open the “Firmware” Tab: After a successful connection, navigate to the “Firmware” tab in the application.

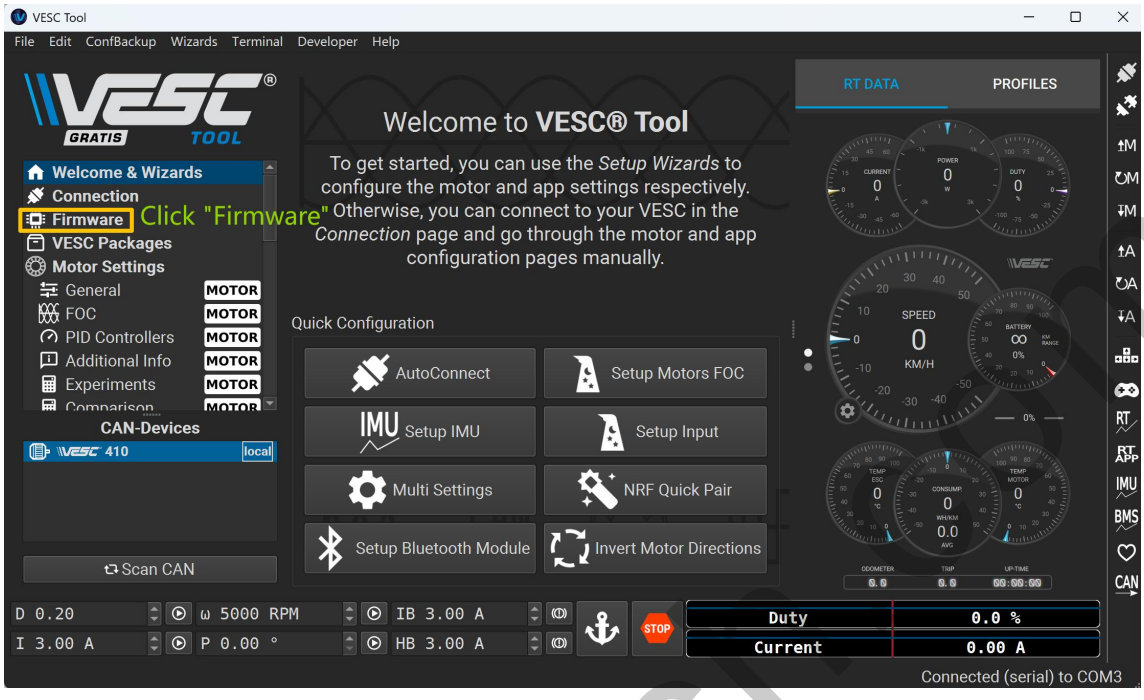

Figure 6: Open the Firmware Tab

b. Select and Update Firmware:

- In the “**Firmware**” page, you will see a list of available official firmware versions. Select the appropriate version for your specific VESC hardware (e.g., VESC 4, VESC 6, VESC 75) and your desired feature set (e.g., VESC_default.bin or a specific hardware version like VESC_default_no_hw_limits.bin).
- Click the Upload button to start the flashing process.

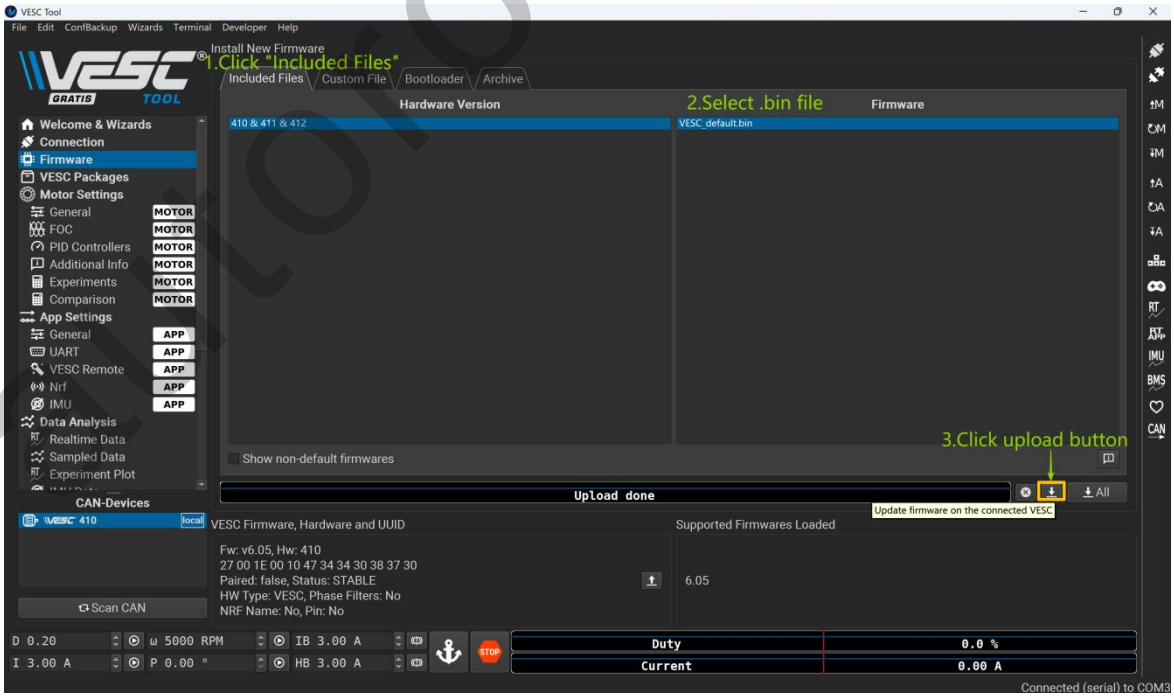

Figure 7: Upload button

c. Please review the warning message. If everything is correct, click “Yes” to proceed.

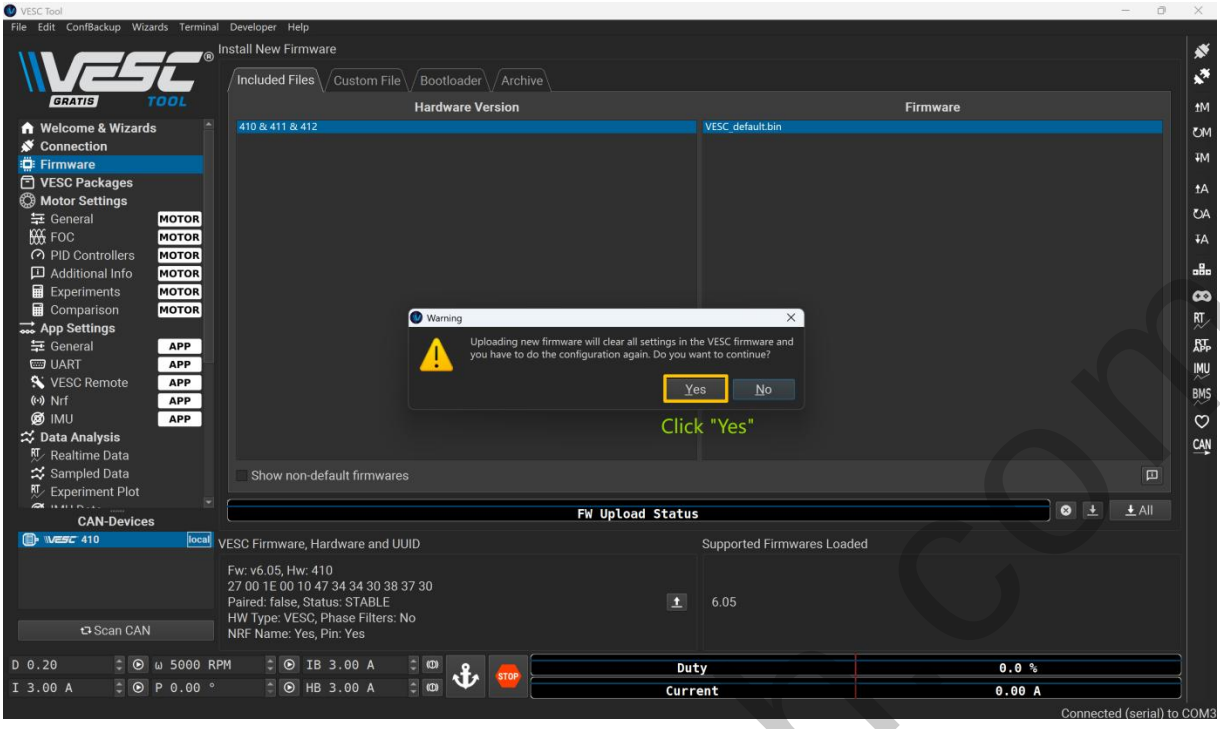

Figure 8: start the flashing process

d. Please review the warning message.Then Click “OK”.

- Waiting for the reboot to complete.

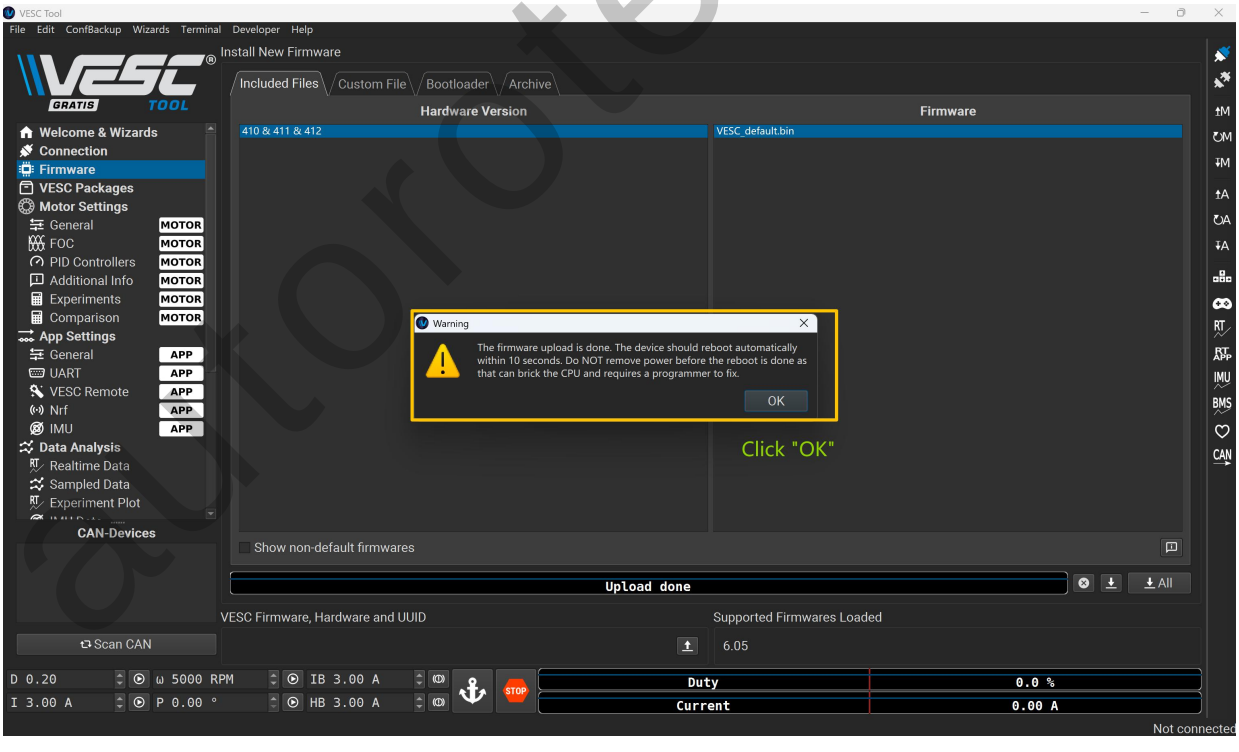

Figure 9: Waiting for the device to reboot

e. Congratulations! Firmware upgrade completed.

4.3.Updating Third-Party Firmware

Third-party firmware is custom firmware built by the community or specific manufacturers to enable special features or hardware compatibility.

The process is **essentially identical** to updating official firmware. The key difference is the **source and selection of the firmware file.**

⚠ WARNING: Ensure firmware compatibility. Flashing incorrect third-party firmware can permanently damage your ESC and motor.

a. Obtain the Firmware File: Acquire the firmware file (usually a .bin or .hex file) from a trusted third-party source (e.g., Autoro AESC).Ensure the firmware is specifically designed for your exact AESC hardware model.

b. Open the "Firmware" Tab: After a successful connection, navigate to the "Firmware" tab in the application.

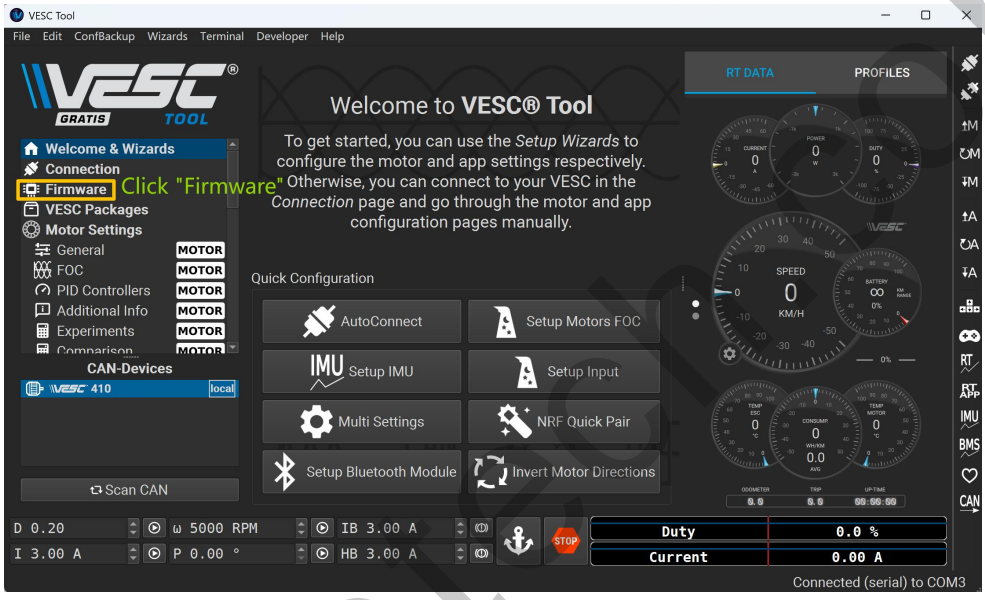

Figure 10: Open the Firmware Tab

c. Choose the Local File: In the "Firmware" tab, click "Custom File",then choose file.Use this to browse to and select the third-party firmware file you downloaded.

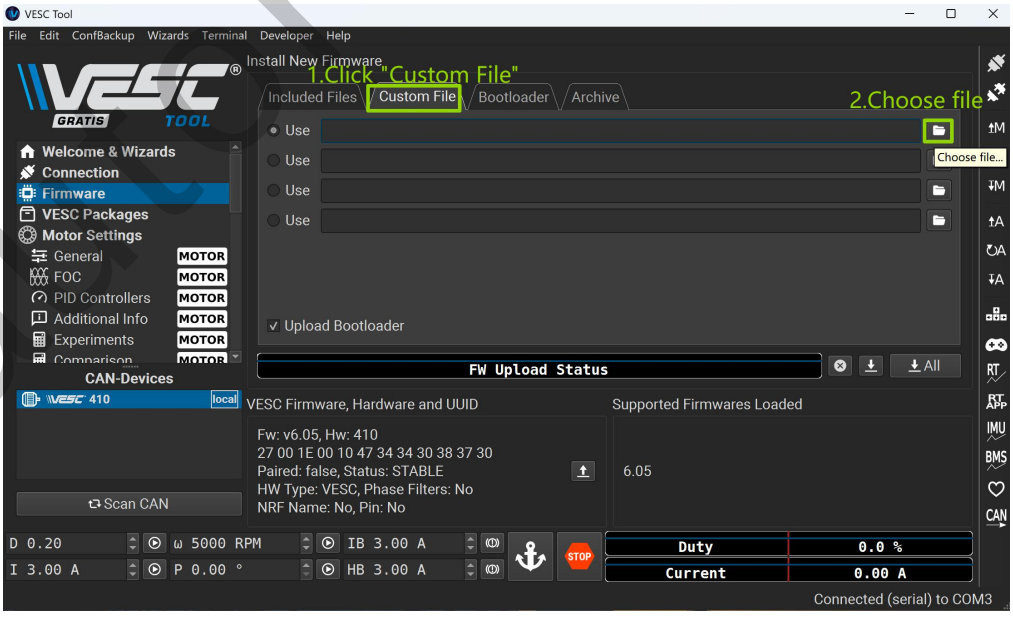

Figure 11: Choose file

d. Select the correct firmware.

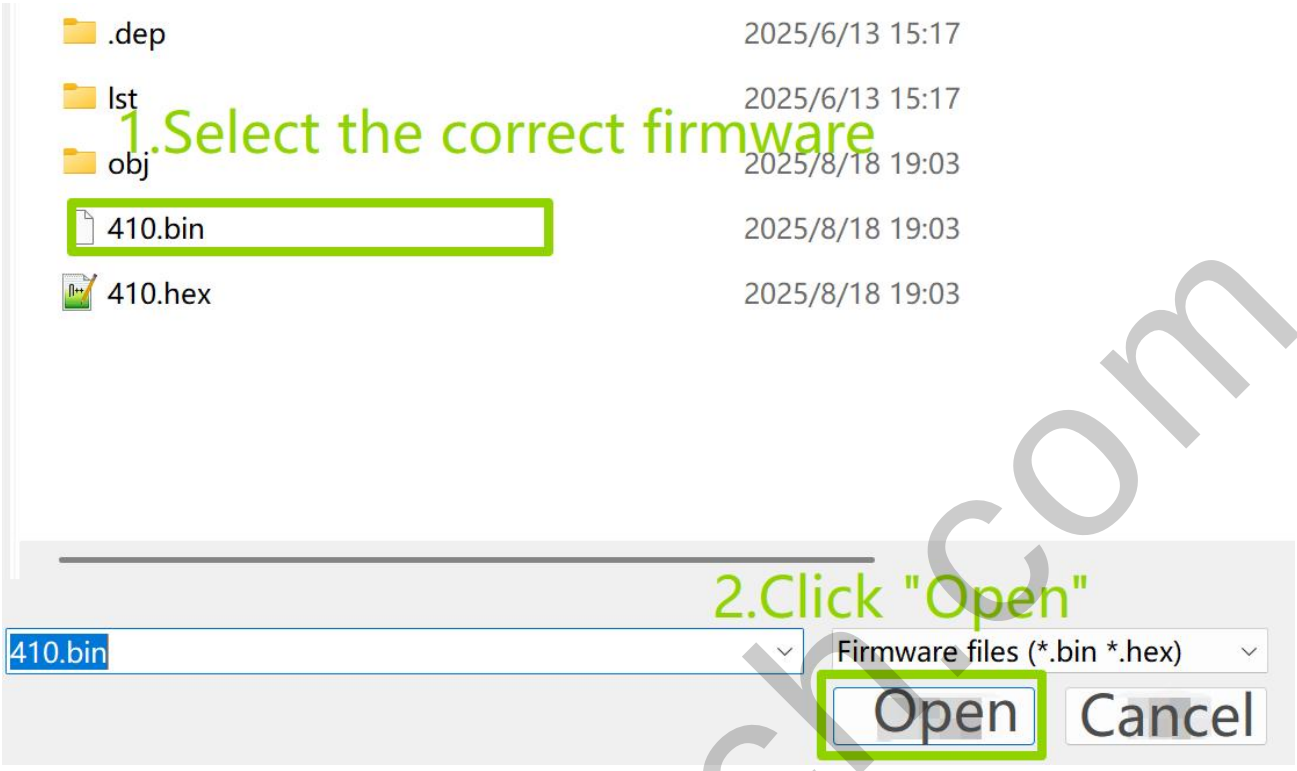

Figure 12: Open file

e. Click upload button.

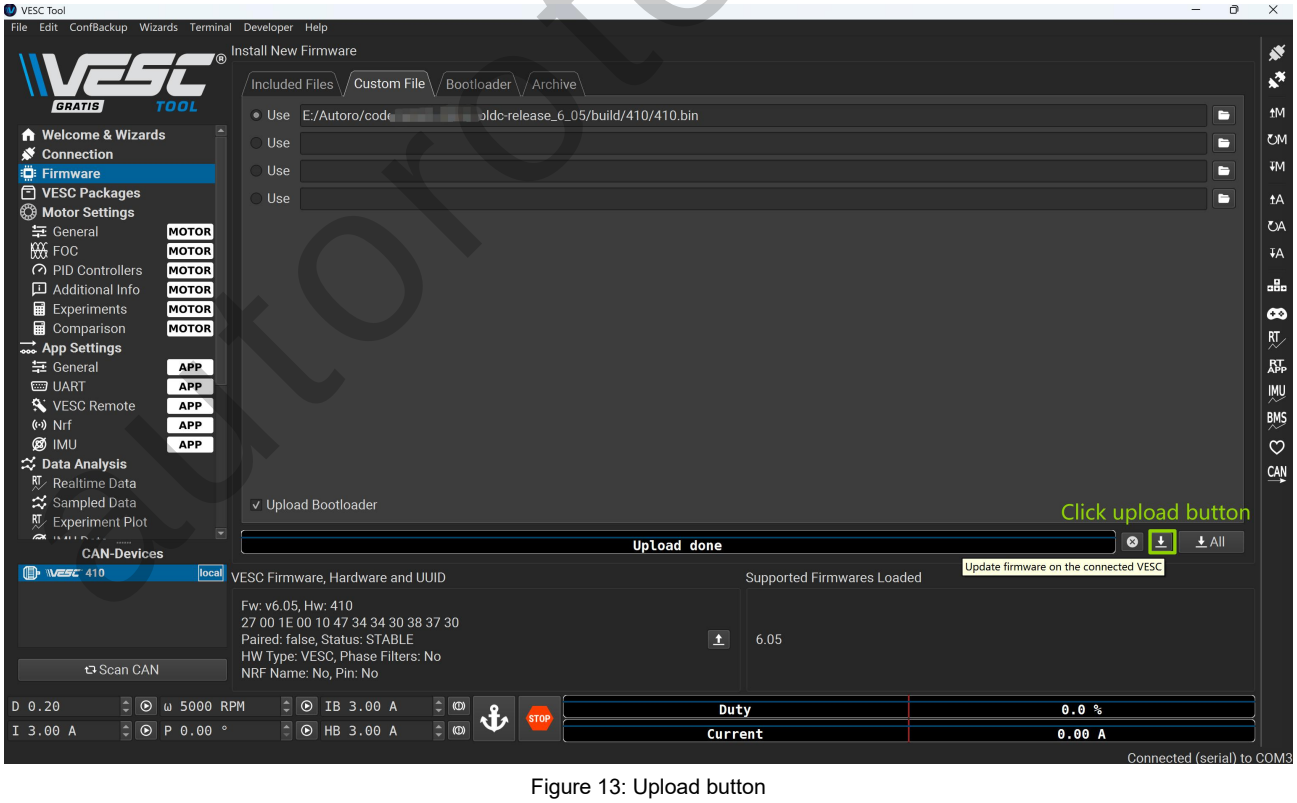

Figure 13: Upload button

f. Please review the warning message. If everything is correct, click “Yes” to proceed.

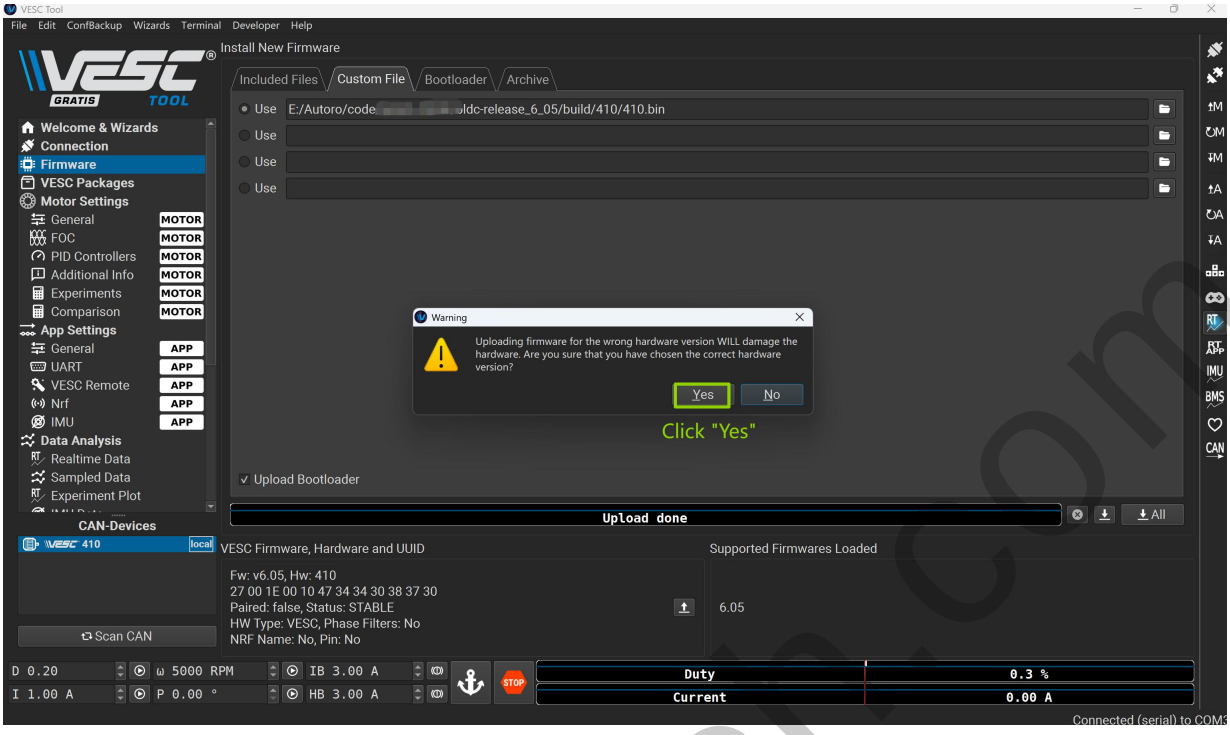

Figure 14: start the flashing process

g. Please review the warning message.Then Click “OK”.

- Waiting for the reboot to complete

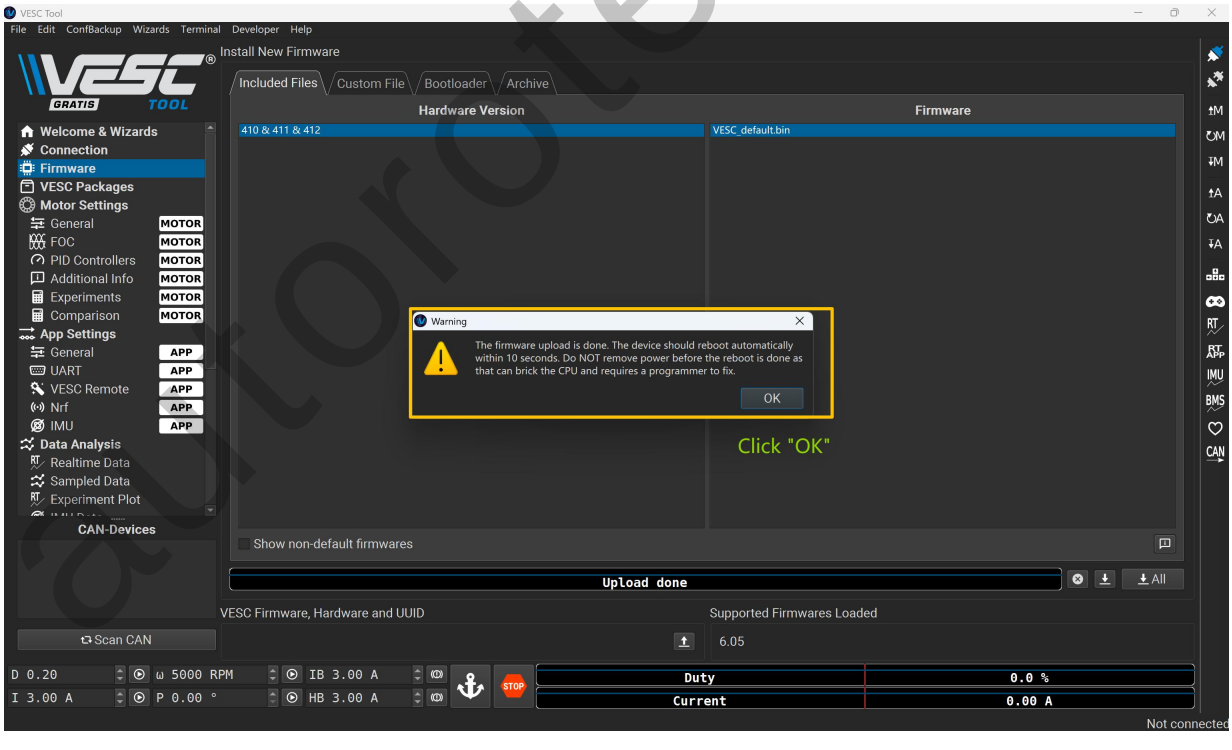

Figure 15: Waiting for the device to reboot

h. Congratulations! Firmware upgrade completed.

4.4.Post-Update Checks and Configuration

After the firmware update is complete, it's good practice to do the following:

- **Reconnect and Verify:** The AESC will often reboot and disconnect. Reconnect VESC Tool and verify that the new firmware version is displayed**.**
- **Perform Initial Setup:** If the update reset your configuration, you may need to run the setup wizards again (e.g., Setup Motors FOC, Setup Input). Note: Some newer firmware versions (e.g., for VESC6) may require you to manually adjust specific parameters in the FOC settings (e.g., "**Motor Settings**" → "**FOC**" → **"Filters**" → "**Phase Enable Filters***"* to **False**).
- **Restore Configuration (Use with Caution):** If you backed up your configuration and it's compatible with the new firmware, you can try using "*Restore configuration"* to restore it. **Be cautious**, as configuration structures can change between firmware versions. Restoring an old configuration can sometimes cause issues; re-configuring from scratch is often safer.

5. Troubleshooting

5.1. Update Failure

- **Problem:** If the update fails or the AESC becomes unresponsive.
- **Solution:**

- Close VESC Tool, completely power cycle the AESC (USB and main power), and try again.
- Try entering Bootloader Mode (often available in a "**Bootloader**" tab within the "**Firmware**" page) to re-flash the bootloader and/or firmware.
- Check your USB cable, computer USB port, and most importantly, the power supply to the AESC.

5.2. Firmware Compatibility

- **Problem:** Incorrect firmware.
- **Solution:**

- **Always use firmware verified to be compatible with your specific hardware.** Flashing incorrect firmware can render the AESC inoperable or damage it.

5.3. Outdated Firmware Warning

- **Problem:** After updating VESC Tool to a newer version, it may warn you that the connected AESC's firmware is too old.
- **Solution:**

- You can simply follow the prompts to update the AESC's firmware.

6. Contact & Support

For technical support,contact : Autoro.service@hotmail.com

Website : https://www.autorotech.com