Firmware Update Guide (Linux)

Applicable Conditions:

- Operating System: **Ubuntu/Debian/Deepin**
- Current Firmware Version: **V.33 or later**

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1. Python 3 Environment Configuration

If Python 3 is not pre-installed or requires upgrade:

```
sudo apt update
sudo apt install python3
```

Verify installation:

```
python3 --version  # Should display version (e.g., Python 3.9.2)
```

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2. pip Package Manager Installation

Install Python package manager:

```
sudo apt install python3-pip
```

Verify installation:

```
pip3 --version  # Displays pip version and installation path
```

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3. Unzip Utility Installation

Install decompression component:

```
sudo apt install unzip
```

Verify installation:

```
unzip -v | head -n1  # Displays core version (must be ≥ 6.00)
```

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4. File Download Utility Installation

Install wget component:

```
sudo apt install wget
```

Verify installation:

```
wget --version | head -n1  # Displays core version
```

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5. Virtual Environment Module Installation

Install Python virtual environment support:

```
sudo apt install python3-venv
```

Verify installation:

```
python3 -m venv -h  # Displays help information
```

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6. Serial Device Permission Configuration

Check device permission status:

```
ls -l /dev/ttyUSB0  # Confirm permissions are 666
```

Temporary permission elevation:

```
sudo chmod 666 /dev/ttyUSB0  # Valid until system reboot
```

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7. Working Directory Creation

Create firmware storage path:

```
sudo mkdir -p /home/enova/Downloads && chmod 755 /home/enova/Downloads
```

Verify path:

```
file /home/enova/Downloads  # Should display "directory"
```

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8. Firmware Package Acquisition

Download via HTTPS:

```
sudo wget https://enovapura.com/wp-content/uploads/2025/03/S4000Pro_3.2.53_FW.zip \
     -O /home/enova/Downloads/S4000Pro_3.2.53_FW.zip
```

Extract firmware files:

```
sudo unzip /home/enova/Downloads/S4000Pro_3.2.53_FW.zip \
     -d /home/enova/Downloads/
```

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9. Virtual Environment Setup

Create isolated environment:

```
python3 -m venv /home/enova/fw_update_env
```

Activate environment:

```
source /home/enova/fw_update_env/bin/activate
```

(Use `deactivate` to exit after operations)

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10. YMODEM Protocol Tool Installation

Install transfer tool in virtual environment:

```
pip install ymodem
```

Verify installation:

```
which ymodem  # Should display virtual environment path
```

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11. Serial Port Parameter Configuration

Set serial communication parameters:

```
stty -F /dev/ttyUSB0 115200 cs8 -cstopb -parenb
```

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12. Entering Bootloader Mode

Send reboot command:

```
echo '*fwupdrst' > /dev/ttyUSB0
```

(Note: Device will enter firmware update mode after execution)

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13. Firmware Updating Operation

Execute firmware transfer:

```
ymodem send -p /dev/ttyUSB0 \
    /home/enova/Downloads/S4000Pro_3.2.53_FW/GYRFALCON_S4000_3.2.53_Firmware.bin
```