POWERMATE LITE / PRO USER MANUAL

1. Product Overview

Welcome to PowerMate, your intelligent solution for precision power control and automation. PowerMate devices are designed for critical tasks where reliability, local control, and advanced scheduling are paramount, freeing you from reliance on cloud services and internet connectivity for core functionality.

Important Safety Note: Before use, ensure the device is plugged into a compatible 100-240V AC outlet. Do not exceed the maximum load (4A/920W for Lite; specify for Pro). Avoid exposure to water or extreme temperatures.

We offer two distinct versions to suit your needs:

- **PowerMate Lite:** Built on the ESP8266 platform, this version is a robust, user-friendly, and highly optimized controller. It excels at essential automation tasks, providing reliable performance and a streamlined user experience within its resource-constrained environment.
- **PowerMate Pro:** Powered by the more capable ESP32 microcontroller, the Pro version features a completely refactored, modular architecture. It offers enhanced stability, greater durability, and advanced functionalities like wear-leveled logging and comprehensive remote management options, making it ideal for demanding applications and long-term, high-performance operation.

Both PowerMate versions empower you with total local control, ensuring your schedules and automations run flawlessly, even offline

2. Getting Started with PowerMate

PowerMate devices can operate in two primary modes:

- **Node Mode (Station Mode):** The PowerMate connects to your existing home or office WiFi network. This is ideal for integration into current network infrastructure.
- **AP Mode (Access Point Mode):** The PowerMate creates its own WiFi network, allowing you to connect directly to it from your phone or computer. This is useful for initial setup, troubleshooting, or environments without an existing WiFi network.

Setting Up Your PowerMate Lite (Node Mode - Connects to Home WiFi)

1. **Connect Power:** Plug your PowerMate Lite into a 100-240V AC outlet.
2. **Connect to PowerMate WiFi:** On your phone or computer, search for a WiFi network named "PMXXX" (where XXX is a unique identifier for your device) and connect to it.
3. **Access Setup Portal:** Open your web browser and navigate to http://192.168.4.1/. This will open the PowerMate setup dashboard.
4. **Enter Home WiFi Credentials:** On the setup page, you'll find fields to enter the **SSID** (name) and **Password** of your home WiFi network.
5. **Submit & Restart:** Click the "Submit" button. Your PowerMate Lite will then restart and attempt to connect to your specified home WiFi network.
6. **Access Dashboard:** Once connected, you'll need to find the new IP address assigned to your PowerMate Lite by your home router. You can usually find this in your router's connected devices list, or by using a network scanner app. Enter this IP address into your web browser to access the main dashboard.
7. **Continue Configuration:** From the dashboard, you can proceed to configure timers and other settings as described in subsequent sections.

Tip: If connection fails, ensure your WiFi signal is strong and retry. For Pro users, MQTT setup can be done later for advanced integration.

Comparison Table:

Feature	PowerMate Lite	PowerMate Pro
Microcontroller	ESP8266	ESP32
Max Triggers	Up to 3	Up to 6
Logging	Basic activity feedback	Wear-leveled logging
RTC	Optional DS1302/DS3231	Integrated DS3231
MQTT Integration	No	Yes
Ideal For	Simple home use	Advanced

3. Connecting via Access Point (AP) Mode

This section details how to connect directly to your PowerMate when it's operating in Access Point (AP) Mode. This is often the first step for initial setup or if you need to access the device without it being connected to your main WiFi network.

1. **Power On:** Ensure your PowerMate device is on.
2. **Scan for WiFi Networks:** On your computer, smartphone, or tablet, open your WiFi settings and scan for available networks.
3. **Identify PowerMate Network:** Look for a network named "PMXXX" (for PowerMate Lite) or "PowerMate-XXXX" (for PowerMate Pro), where "XXX/XXXX" will be a unique identifier for your device.
4. **Connect:** Select the PowerMate network and connect to it. The default password is listed on the label at the bottom of the device. For security, consider changing this password via the Network Configuration page after setup.
5. **Access Dashboard:** Once connected, open your web browser and navigate to http://192.168.4.1/. This will load the PowerMate dashboard.

When to Use AP Mode: Ideal for isolated environments or quick troubleshooting. Note: In AP Mode, internet-dependent features like NTP sync are unavailable.
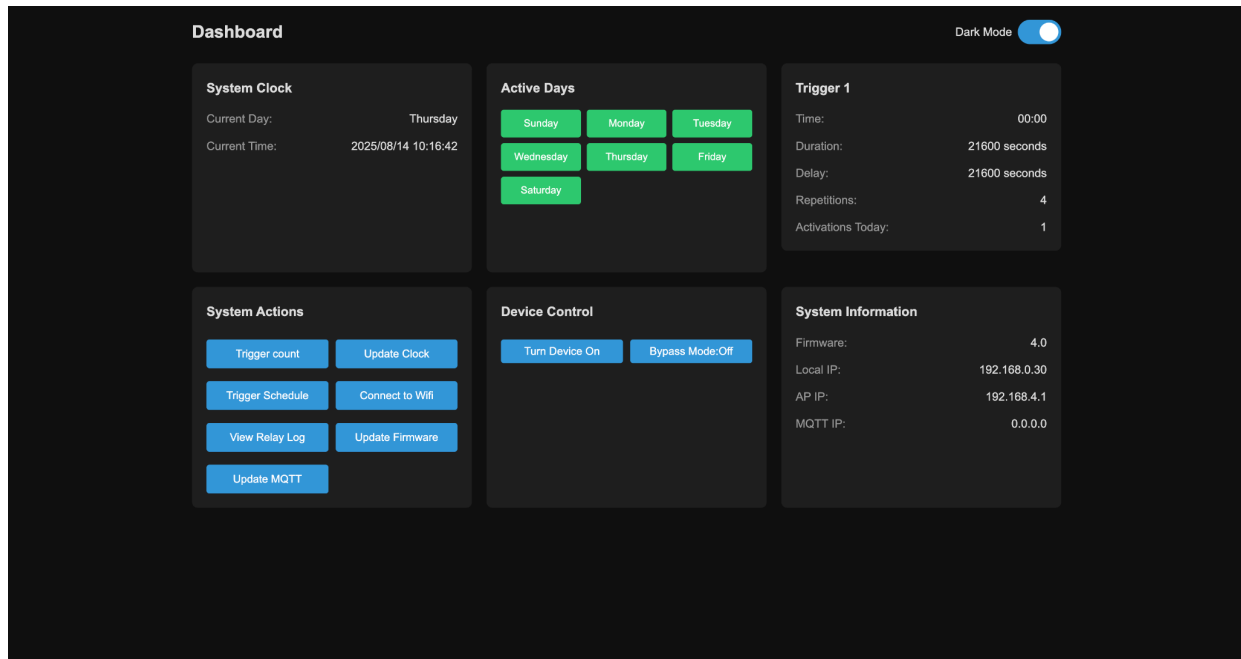
4. Dashboard Overview

The PowerMate Dashboard is your central hub for monitoring device status and managing its operations. It provides real-time information and quick access to key controls.

Key Sections & Parameters:

- **Current Time / Time Now:** Displays the current date and time from the device's internal clock. This is crucial for verifying schedules and logging events.
- **System Information / Firmware Version:** Shows the specific software version running on your PowerMate.
- **IP Address (IP ADD):** Displays the unique network address assigned to your device.
- **Device Status:** Often indicates whether the connected device is currently ON or OFF.
- **Trigger Summaries:** Provides a quick overview of each configured trigger, including its set time, activation duration, repetitions, and current activation count.
- **Active Days:** Visually indicates which days of the week are currently enabled for your schedules.
- **Activity Log:** (PowerMate Pro) Displays a log of recent relay actions with timestamps, providing a history of device operations. (PowerMate Lite provides basic activity feedback, such as the time of the last activation.)

Example Dashboard View:

Dashboard — Dark Mode ⬤

System Clock
Current Day: Thursday
Current Time: 2025/08/14 10:16:42

Active Days
Sunday Monday Tuesday
Wednesday Thursday Friday
Saturday

Trigger 1
Time: 00:00
Duration: 21600 seconds
Delay: 21600 seconds
Repetitions: 4
Activations Today: 1

System Actions
Trigger count   Update Clock
Trigger Schedule   Connect to Wifi
View Relay Log   Update Firmware
Update MQTT

Device Control
Turn Device On   Bypass Mode:Off

System Information
Firmware: 4.0
Local IP: 192.168.0.30
AP IP: 192.168.4.1
MQTT IP: 0.0.0.0

Key Controls:

- **Refresh Button:** Updates the on-page information to show the very latest status without a full page reload.
- **Turn On / Turn Off Button (Manual Activation):** Allows you to manually toggle the power state of the connected device. This overrides any active schedules.
- **Bypass Mode Button:** Enables or disables "Bypass Mode." When active, scheduled triggers are temporarily skipped, allowing for manual control. However, the controller continues to count these skipped activations, ensuring the total configured number of daily activations is met once Bypass Mode is disengaged. Note: If activations exceed limits after disengaging, the device prioritizes safety by capping at configured reps.
- **Dark Mode Toggle:** Switches the dashboard's visual theme between a light and dark mode for enhanced viewing comfort. Your preference is saved automatically.

Tip: Bookmark the dashboard IP for quick access

5. Configuring Timers & Schedules

This page is where you define and fine-tune your PowerMate's automated schedules. This enables highly precise and flexible control over your connected devices.

How to Access: From the main Dashboard, look for a button or link labeled "Update Trigger Schedule" or similar.

Configurable Parameters:

- **Trigger Number:** You can configure multiple independent triggers (up to 3 for PowerMate Lite and up to 6 for PowerMate Pro). Each trigger can have its own settings.
- **Set Time (Hour & Minute):** The specific time of day (e.g., 08:00 for 8:00 AM) when the trigger should begin its activation sequence. Use 24-hour format.
- **Activation Duration:** The length of time (in seconds, minutes, or hours; max 24 hours) the connected device will remain ON during each activation.
- **Delay Between Activations:** If repetitions are set, this defines the pause (in seconds, minutes, or hours; min 1 second) between each individual activation within a single trigger cycle.
- **Repetitions:** The number of times the device will activate for the specified duration within a single trigger event (max 99). For example, 3 repetitions with a 10-second duration and 5-second delay would mean ON for 10s, OFF for 5s, ON for 10s, OFF for 5s, ON for 10s.
- **Active Days of the Week:** Select specific days (Sunday, Monday, etc.) on which this trigger should be active.

Example Use Case: For plant watering: Set Time 07:00, Duration 300 seconds (5 min), Repetitions 2, Delay 600 seconds (10 min), Active Days Mon-Fri.

Saving Settings: After making your adjustments, always click the "Submit" or "Save Settings" button to apply your changes. A success banner will typically confirm that your settings have been saved.

Trigger Settings

Toggle Dark Mode

Trigger 1

Time:

00:00 🕐

Activation Duration:

6

Hours ⌄

Repetitions:

4

Delay Between Activations:

6

Hours ⌄

Active Days

☑ Sun
☑ Mon
☑ Tue
☑ Wed
☑ Thu
☑ Fri
☑ Sat

Save	Clear All	Back to Dashboard

System Time: 2025/08/14 10:17:43

Version: 4

6. Managing Your Timers

This section is sparse; expand on why managing trigger count matters (e.g., resource optimization). Add warnings about reducing triggers (e.g., it may reset configs).

- **Suggested Revised Content:**

This page (often labeled "Configure Timers" or "Number of Timers") allows you to specify how many independent automation triggers you want to enable and configure on your PowerMate device. This helps manage resource usage and simplifies the interface by only showing the number of triggers you actively use.

How to Access: From the main Dashboard, look for a button or link labeled "Configure Timers" or "Set Number of Timers."

Functionality:

- On this page, you will typically find an input field or a selection mechanism (e.g., a dropdown or numerical input) where you can enter the desired number of active triggers (1-3 for Lite, 1-6 for Pro).
- After setting the number, click "Submit" or "Save." The dashboard and trigger setting pages will then dynamically update to show exactly that many trigger configuration sections.
- **Note:** Reducing the number of triggers may reset configurations for the removed ones. Always save your schedules first.

Dashboard

Toggle Dark Mode

Trigger count

Number of Triggers:

1

Choose between 1-6 triggers

| Update | Back to Dashboard |

Tip: Start with fewer triggers for simple setups to avoid overwhelming the interface.

7. Network Configuration

The Network Configuration page is crucial for connecting your PowerMate to your existing wireless network (Node Mode) or for managing its own Access Point settings.

How to Access:

- **Initial Setup (AP Mode):** After powering on for the first time, or if the device cannot connect to a saved network, it will enter Access Point mode, and you can access this page via http://192.168.4.1/.
- **From Dashboard:** There may be a "WiFi Settings" or "Network Setup" link on the main dashboard once the device is operational.

Configurable Parameters:

- **Scan for Networks:** A button to scan for available WiFi networks in your area. This populates a list of SSIDs.
- **SSID (Network Name):** The name of the WiFi network you wish to connect your PowerMate to.
- **Password:** The password for the chosen WiFi network.
- **Advanced (Optional):** Set a static IP or change the AP Mode password for enhanced security.

Security: PowerMate securely stores your WiFi credentials with checksum validation, ensuring they persist through reboots and are protected. Always use strong passwords and avoid public WiFi for setup.
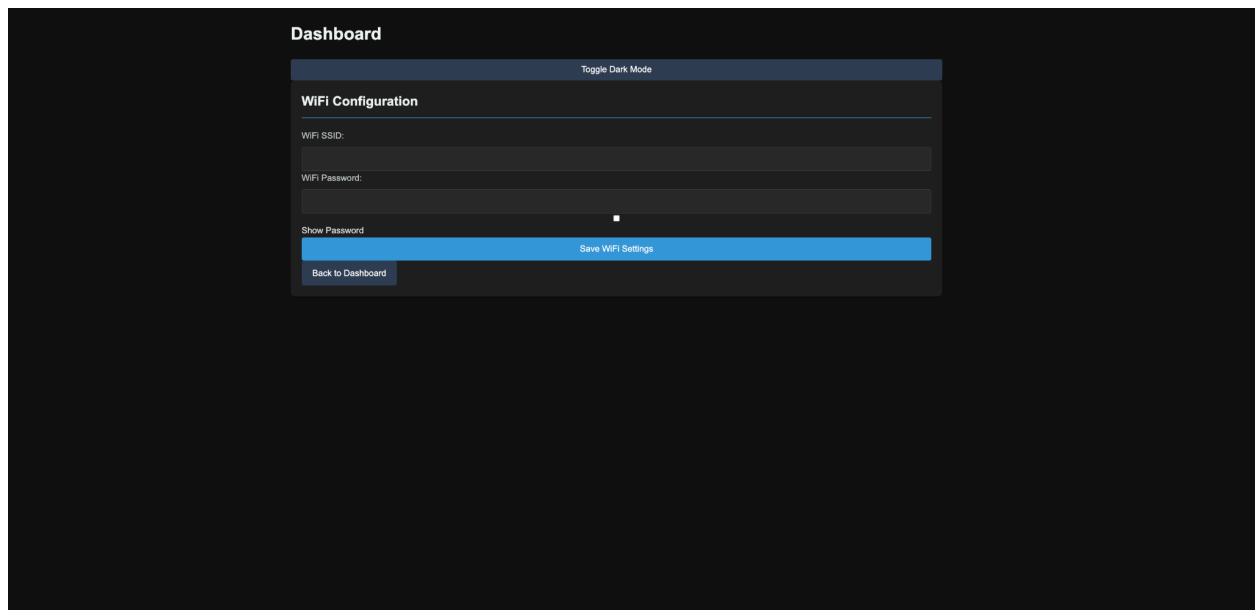
Tip: If using 5GHz WiFi, ensure compatibility (PowerMate supports 2.4GHz primarily).

8. Firmware & Filesystem Updates (OTA)

The OTA (Over-The-Air) Update page allows you to remotely update your PowerMate's firmware and filesystem wirelessly, without needing a physical USB connection. This ensures your device always has the latest features, bug fixes, and performance improvements.

How to Access: From the main Dashboard, look for a link or button labeled "Firmware Update," "OTA Update," or similar.

Functionality:

- **Unified Update Handler (PowerMate Pro):** The PowerMate Pro offers a single interface to upload both:
    - **Application Firmware (firmware.bin):** Updates the core C++ logic and functionality of the device.
    - **Filesystem Image (littlefs.bin):** Updates the web interface (HTML, CSS, JavaScript files) and other data stored on the internal filesystem. (LittleFS is a file system for efficient storage on microcontrollers.)
- **Firmware & Filesystem Upload (PowerMate Lite):** The PowerMate Lite also supports separate uploads for firmware and filesystem, providing comprehensive remote update capabilities.
- **Upload Mechanism:** You will typically find a file selection input where you can browse for the .bin file on your computer and an "Upload" or "Update" button to initiate the process.
- **Progress Indicator:** The page may show a progress bar or status messages during the update process.
- **Remote Manageability:** This feature provides complete remote manageability, allowing you to maintain and expand your device's capabilities wirelessly.

Caution: Download updates only from https://iotgrowsolutions.com/resources.html. Back up your configurations before updating, and do not power off during the process.

Firmware Update

○ Firmware (.bin)   ○ Filesystem (.bin)

Choose file No file chosen

Update Now

Warning: Do not power off the device during update!

← Back to Dashboard

9. Time & Timezone Settings

Comprehensive, but add examples for different timezones and how DST works in specific regions. Clarify RTC battery replacement.

Suggested Revised Content:

This page allows you to manage your PowerMate's internal clock, ensuring accurate timing for all your schedules, especially when an internet connection for NTP synchronization is not always available.

How to Access: From the main Dashboard, look for a link or button labeled "Set Clock," "Time Settings," or "Clock & Timezone."

Configurable Parameters:

- **Set Current Date & Time (Manual):**
    - You can manually input the current date and time (Year, Month, Day, Hour, Minute, Second). This is particularly useful for initial setup or if the device operates without a continuous internet connection.
    - For PowerMate Pro, this manually adjusts the high-precision DS3231 Temperature-Compensated RTC. PowerMate Lite also supports DS3231/DS1302 RTCs. (If battery fails, replace with CR2032; see Troubleshooting for wiring.)
- **Set Timezone (UTC Offset):**
    - Select your local timezone by choosing a UTC offset (e.g., UTC-5 for Eastern Standard Time, UTC+1 for Central European Time). This ensures that your schedules run according to your local time, regardless of the device's internal UTC time.
- **Automatic Daylight Saving Time (DST):**
    - A setting (often a checkbox) to enable or disable automatic adjustments for Daylight Saving Time. When enabled, the device will automatically shift its clock forward or backward as required by your selected timezone. (Example: In US Eastern Time, clocks spring forward 1 hour in March.)
- **NTP Synchronization:**
    - NTP (Network Time Protocol) synchronization is handled automatically in the background when connected to WiFi, ensuring your PowerMate's clock is always accurate.

Importance: Accurate timekeeping is fundamental to PowerMate's reliability, ensuring your schedules execute precisely as planned.

Tip: Sync with NTP regularly for best accuracy; manual set is a fallback.

Dashboard

Toggle Dark Mode

Clock Setup

Update System Clock

Enable Daylight Saving Time: ☑

Timezone:
UTC+1 (Paris, Berlin)

Year:
Year

Month:
Month

Day:
Day

Hour:
Hour

Minute:
Minute

Second:
Second

Update Clock

Back to Dashboard

10. MQTT Integration (PowerMate Pro Only)

The MQTT (Message Queuing Telemetry Transport) Page provides configuration options for integrating your PowerMate Pro with smart home platforms like Home Assistant or Node-RED, enabling advanced remote control and real-time data exchange. This feature is exclusive to the PowerMate Pro due to improved processing capabilities.

How to Access:
From the main Dashboard, look for a link or button labeled "MQTT Settings," "Integrations," or similar.

Configurable Parameters:

- **MQTT Broker Address/IP:** The network address or IP of your MQTT broker (e.g., mqtt.yourhome.com or 192.168.1.100).
- **MQTT Broker Port:** The port number your MQTT broker listens on (e.g., 1883 for standard MQTT, 8883 for MQTTs).
- **Client ID:** A unique identifier for your PowerMate on the MQTT network.
- **Username & Password (Optional):** Credentials for authenticating with your MQTT broker, if required.
- **Control Topic:** The MQTT topic where your PowerMate will listen for commands (e.g., powermate/control).
- **Status Topic:** The MQTT topic where your PowerMate will publish its status updates (e.g., powermate/status).
- **Last Will and Testament (LWT) Topic & Message (Optional):** Configures a message to be published if the PowerMate unexpectedly disconnects from the broker, indicating its offline status.

Benefits of MQTT Integration:

- **Remote Operation:** Control your PowerMate from anywhere via your smart home platform.
- **Real-time Updates:** Receive instant status updates from your PowerMate (e.g., device ON/OFF, current time, log entries).
- **Efficient Data Transmission:** MQTT is a lightweight messaging protocol, ideal for efficient data exchange with minimal network bandwidth use.
- **Seamless Smart Home Integration:** Easily incorporate PowerMate into complex automation routines within Home Assistant, Node-RED, or other MQTT-compatible systems.

Note: Ensure your MQTT broker is properly set up and accessible from your PowerMate's network for this feature to function correctly.

Dashboard

Toggle Dark Mode

MQTT Configuration

MQTT IP:

e.g., 192.168.1.1

Please fill in this field.   Save MQTT Settings

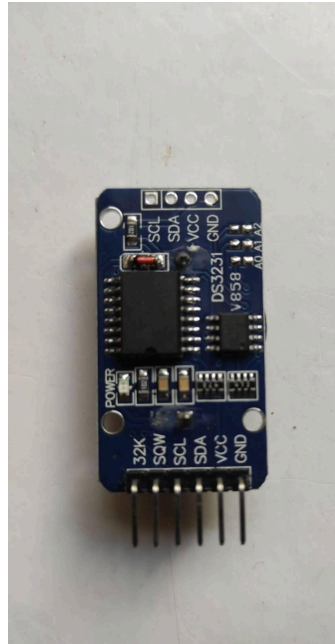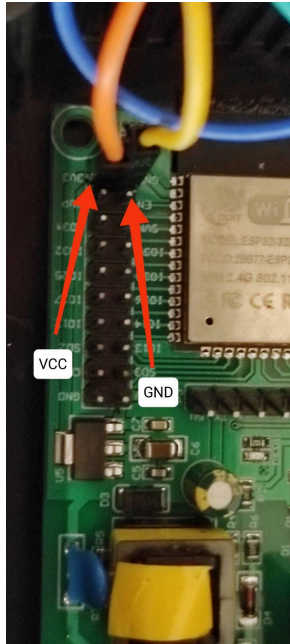Back to Dashboard
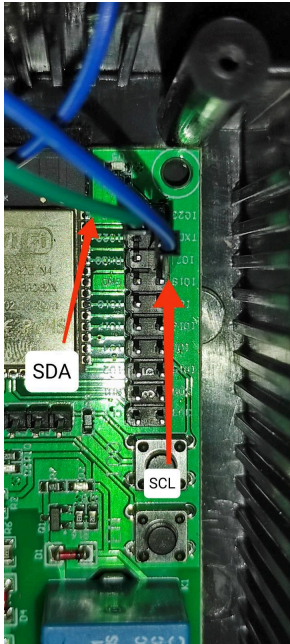
11. Troubleshooting

This section will provide solutions to common issues you might encounter with your PowerMate device.

- **Common Issues:**
  - **Device not connecting to WiFi:**
    - Verify correct SSID and password.
    - Check WiFi signal strength at the device location.
    - Ensure your router isn't blocking new devices or has MAC address filtering enabled.
    - Try restarting your router and the PowerMate device.
  - **Schedules not activating:**
    - Verify the current time and timezone on the PowerMate dashboard are correct. Update if needed.
    - Check if "Bypass Mode" is active.
    - Ensure the "Active Days of the Week" are correctly set for the trigger.
    - Double-check the "Set Time," "Activation Duration," and "Repetitions" settings.
  - **Dashboard not loading (after connecting to home WiFi):**
    - Confirm the PowerMate is connected to your home WiFi.
    - Find the new IP address assigned by your router (check router's connected devices or use a network scanner).
    - Ensure your device (phone/computer) is on the same network as the PowerMate.
  - **Firmware update failed:**
    - Ensure a stable power supply during the update.
    - Verify the `.bin` file is not corrupted and is the correct version for your device (Lite/Pro).
    - Try the update again, ensuring a strong WiFi connection.

  - **RTC Battery wires disconnected or battery failed**
    - ATTENTION !!! Remove cover slowly to avoid disconnecting the wires. The wires from the RTC should be connected as in the image below.

      VCC -> VCC, GND -> GND, SCL -> GPIO 21, SDA -> GPIO 22

      Battery: CR 2032

SDA

SCL

VCC

GND

SCL SDA VCC GND

DS3231

V858

A0 A1 A2

POWER

32K SQW SCL SDA VCC GND

12. Specifications

This section provides technical specifications for both PowerMate Lite and PowerMate Pro models.

- **PowerMate Lite:**
  - **Microcontroller:** ESP8266
  - **Input Voltage:** 100-240V AC, 50/60Hz
  - **Max Load:** [4 Amp/ 920 W]
  - **WiFi Standard:** 802.11 b/g/n
  - **RTC:** Optional DS1302 or DS3231 (if integrated)
  - **Dimensions:** 10cm x 5 cm x 4cm
  - **Operating Temperature:** −20 °C to +60 °C"

- **PowerMate Pro:**
  - **Microcontroller:** ESP32
  - **Input Voltage:** 100-240V AC, 50/60Hz
  - **Max Load:** [Specify Max Amperage/Wattage, e.g., 16A/3680W]
  - **WiFi Standard:** 802.11 b/g/n
  - **Bluetooth:** Yes (BLE 4.2)
  - **RTC:** Integrated DS3231 (Temperature-Compensated)
  - **Logging:** Wear-leveled SPIFFS/LittleFS logging
  - **Dimensions:** 10cm x 5 cm x 4cm
  - **Operating Temperature:** −20 °C to +60 °C"

13. Regulatory Compliance & Safety Information

This section will detail important regulatory information and safety guidelines.

- **Safety Precautions:**
  - Do not open the device casing.
  - Max load 3 Amps
  - Do not expose to water or extreme humidity.
  - Ensure proper ventilation.
  - Operate within specified voltage and load limits.
  - Keep out of reach of children.
- **Disposal:** Information on proper disposal of electronic waste in accordance with local regulations.

14. Support

Information regarding the product support.

- **Warranty Period:** 1-year limited warranty
- **Contact Support:**
  - **Email:** info@iotgrowsolutions.com
  - **Website:** https://iotgrowsolutions.com
  - **User Manual:** https://iotgrowsolutions.com/resources.html