

Greenhouse Product User Manual

Introduction:

Greenhouse Product helps you maintain optimal conditions for plant growth. User manual provides you with a quick overview on how to use the machine.

Key Features:

- CO2: Shows real-time CO2 levels in your greenhouse.
- Temperature and Humidity: Monitors environmental conditions.
- Setpoint Control: Adjust the desired CO2 level using the rotary encoder.
- Automatic Valve Control: Regulates the CO2 tank valve to maintain the setpoint.

Getting Started:

1. **Power On:**
 - Connect the greenhouse product to a power source.
 - The screen will display current CO2 levels, temperature, humidity, and the setpoint.
2. **Setpoint Adjustment:**
 - Use the rotary encoder to set the desired CO2 level.
 - Rotate clockwise to increase the setpoint.
 - Rotate counter-clockwise to decrease the setpoint.
 - Setpoint is stored in memory incase machine powers off at some point
3. **Monitoring:**
 - The screen constantly updates with real-time data.
 - Ensure the values align with your plant's requirements.

Data Transmission:

- Every 5 minutes, the product sends sensor data to the cloud server via MQTT.
- This data transmission allows you to track and analyze greenhouse conditions remotely on address: <https://thingspeak.com/channels/2352903>.

CO2 Valve Control:

- The product automatically controls the CO2 tank valve to maintain the desired setpoint.
- No manual intervention is needed for CO2 regulation.

Implementation principles:

- Clean UI
 - succeeded, all data is shown at the same time cleanly on the UI. Even if modbus read fails and it returns garbage value, code will ignore it and displays the last valid value on screen until new successful modbus read has happened
- Well commented code
 - succeeded all code is well commented
- Code separated in own files
 - succeeded to a certain point. MCUexpresso IDE had issues with MQTT code being in own files and thus we had to include MQTT functions in main file
- Smooth user operation
 - succeeded to a certain point. When a user modifies the setpoint it operates smoothly if modbus reads are successful. If modbus reads fail, the setpoint adjustment has a small lag spike that user can notice if they pay attention