

Product explanation

The module is a technical device for monitoring and controlling plant growth conditions, consisting of a 220 cm high stand with integrated sensors, motors and cameras. The main functions and technical characteristics are as follows:

1. Lighting height adjustment: An electric motor allows the lighting unit to move horizontally along the stand. A contact sensor is integrated to detect when the maximum height has been reached.
2. Environmental sensors: Equipped with sensors to measure humidity, temperature, CO2 concentration, air pressure and soil conditions. These sensors continuously collect data that is used to analyze growing conditions.
3. Camera monitoring: Three cameras are attached to the module, which take video recordings of the plants. These recordings are sent to a Raspberry Pi, where they are analyzed to provide insights into the health of the plants.
4. Controllable power sockets: The module has sockets whose power consumption can be measured and controlled.

The data collected by the sensors is forwarded to a microchip, which takes over the data processing. They are then passed on to a Raspberry Pi, which serves as a central interface for data transfer to a Home Assistant system. This system allows monitoring and control of the module.

The module is designed to provide precise data on the plant environment and enables centralized, automated control of growing conditions.

Project specification

Development of measurement and
control tools

Step 1: Concept development

1. Develop initial concept:

Develop a basic design of the module, including all functions such as lighting controls, sensors, cameras and power sockets.

Step 2: Planning and design

1. Planning and creating a functional circuit:

Design an electronic circuit that connects all sensors, motors and cameras to the microchip and Raspberry Pi.

2. Selection of components:

Decision on specific sensors, motors, cameras and other hardware components.

Step 3: Procurement and construction

1. Ordering components:

Procurement of all necessary parts for the module.

2. Building a prototype:

Assembling the components into a working prototype.

Step 4: Programming and configuration

1. Configuration and programming of the microchips:

Development of the software for controlling the sensors and integration with the Raspberry Pi.

2. Data connection to Home Assistant:

Setting up the connection between the module and Home Assistant for data transfer.

Step 5: Test and optimization

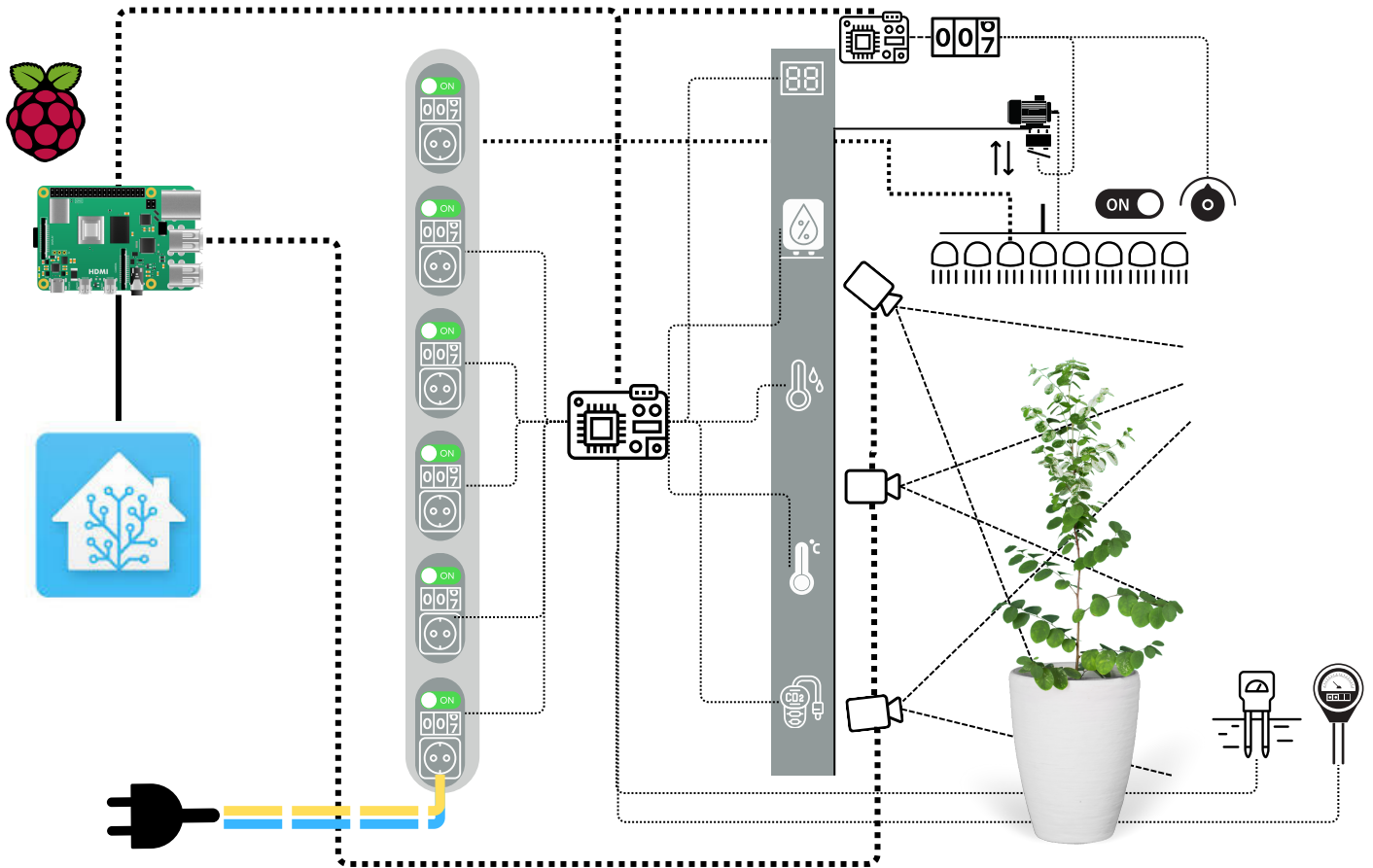
1. Ensure that all information and data arrive correctly at Home Assistant:

Verification of data transmission and processing.

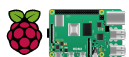
2. Control via Home Assistant:

Setting up and testing the remote control of the module via Home Assistant.

Circuit



Components



Raspberry Pi



home assistant



Microcontroller



camera



Electricity on-
off switch
electricity meter



220v power
connection



Display device number



Air pressure



humidity



air temperature



CO₂ content of the room air



soil moisture
Soil temperature



Bod-pH-Wert



Rotary
motor



Contact switch



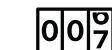
lighting systems



On-off switch



Rotary control



Electricity meter

Measurement and control tool

