

## Case Study

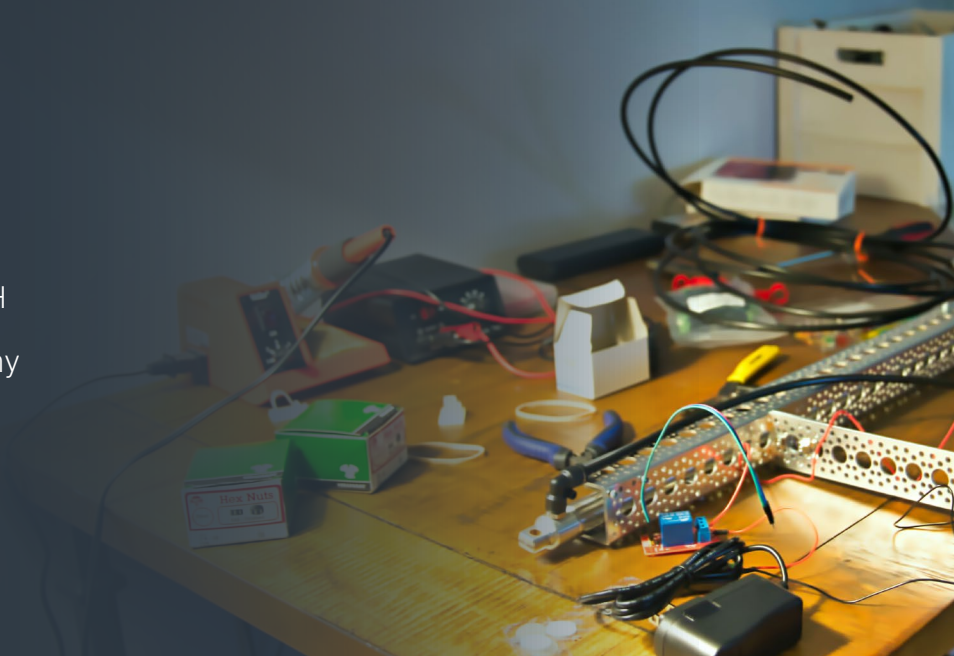
# Monitoring smart home devices by Watterott Electronic with a single click

# THE CLIENT

**Company:** Watterott Electronic GmbH




**Location:** Leinefelde-Worbis, Germany

**Website:** [www.watterott.net](http://www.watterott.net)



Watterott Electronic is an electronics company specializing in open hardware, DIY (Do-It-Yourself) and development components. The product range has been growing steadily since Stephan Watterott founded the company in 2008. As well as producing electronics kits, development kits, assemblies and other components, Watterott Electronic also develops prototypes for other organizations.

## KEY POINTS

-  The collaboration between Checkmk and Watterott began as part of a maker project. A user wrote a monitoring extension for the Checkmk agent and installed it on the “CO<sub>2</sub> traffic light pro” from Watterott Electronic. Checkmk is thus able to monitor not only the hardware’s status of the device, but also record data from the environment sensors.
-  Since then, Watterott Electronic has integrated the customized Checkmk agent into the CO<sub>2</sub> monitor’s firmware. This uses the open-source Arduino physical computing platform and is thus freely-adaptable.
-  Among other things, Watterott Electronic continuously measures the carbon dioxide concentration in factory facilities with its CO<sub>2</sub> traffic lights. In this way, with minimal effort, Watterott Electronic ensures smart monitoring of the indoor climate.

## A PULL REQUEST LEADS TO A PARTNERSHIP

Watterott Electronic's customers appreciate the in-depth technical expertise combined with fast and direct communication channels. This is why Watterott Electronic has grown so successfully and has expanded its production facilities a number of times in recent years. A cornerstone of the company's development is the use of open source technology, as well as a direct exchange with customers and the maker scene.

It's no surprise that the collaboration with Checkmk started with a pull request on Github. Watterott Electronic has published over 80 repositories on the hub, including the source code for the firmware of its "CO<sub>2</sub> traffic light pro", a microcontroller with sensors for carbon dioxide concentration, humidity, air pressure and temperature.



Figure 1: The CO<sub>2</sub> traffic light pro includes the Checkmk agent

The CO<sub>2</sub> monitor signals the status of the measured values via a buzzer and LEDs. In addition, the microcontroller transmits the readings to a web interface. A Checkmk user wrote an own script to extend the Checkmk Linux agent and successfully installed it on their own CO<sub>2</sub> traffic light. This agent allows Checkmk to not only monitor the functioning of the installed hardware, but also to collect the data from the environmental sensors as monitoring service in Checkmk.

## THE CHALLENGE

Especially in the field of production, organizations are looking for a reliable and efficient method for monitoring the climate in factory halls, as well as in office environments. However, the effort for installation and verification for common smart home and smart building approaches is often high. CO<sub>2</sub> traffic lights are an inexpensive tool for monitoring CO<sub>2</sub> concentration, humidity, air pressure, and temperature. Previously, however, there has been no way of systematically recording and centrally evaluating these metrics.

## MONITORING OF OTHER DIY PROJECTS

Since the CO<sub>2</sub> traffic light relies on an Arduino-compatible bootloader, anyone can customize the software via the Arduino IDE. This makes it possible to install the Checkmk agent. The concept works well because the Checkmk agent is only a few kilobytes small and Checkmk does not need to establish an active connection to the monitoring server, so the hardware resources required are fairly low. Watterott Electronic therefore not only accepted the pull request for the firmware, it has been including the Checkmk agent as standard since 2022.



*The lean design of the Checkmk agent is great and fits to our product. Adding it into the firmware was easy.*

**Stephan Watterott**, Founder and CEO of Watterott Electronic

By monitoring the CO<sub>2</sub> traffic lights using Checkmk, metrics for the indoor air quality can be collected, allowing preventative measures to be taken against unhealthy ambient conditions. For example, based on such monitoring data, Checkmk can generate notifications, and also create forecasts.

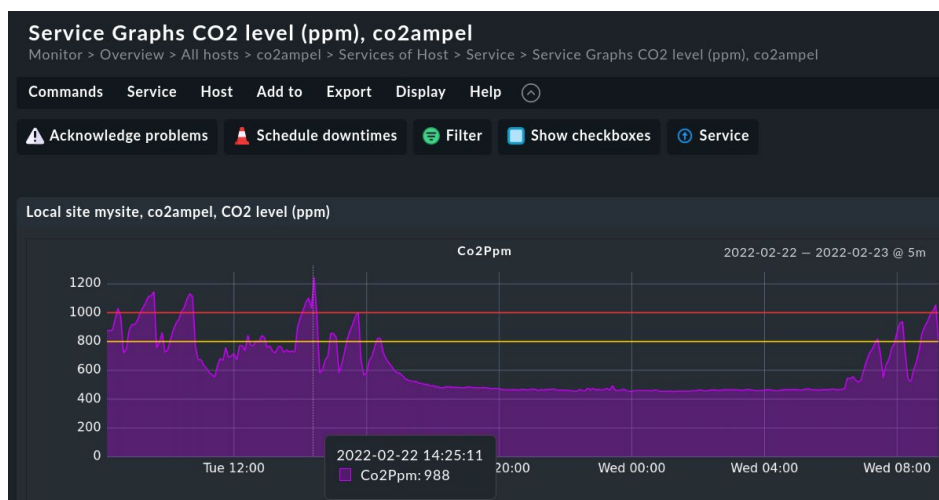


Figure 2: The CO<sub>2</sub> values as a metric in Checkmk

## THE SOLUTION

A member of the Checkmk community has written an extension for the Checkmk agent that allows Checkmk to monitor microcontrollers, including sensors. In this way Checkmk not only monitors the functioning of the CO<sub>2</sub> monitors, but also transfers the data on CO<sub>2</sub> concentration, humidity, air pressure and temperature as a monitoring service to Checkmk.

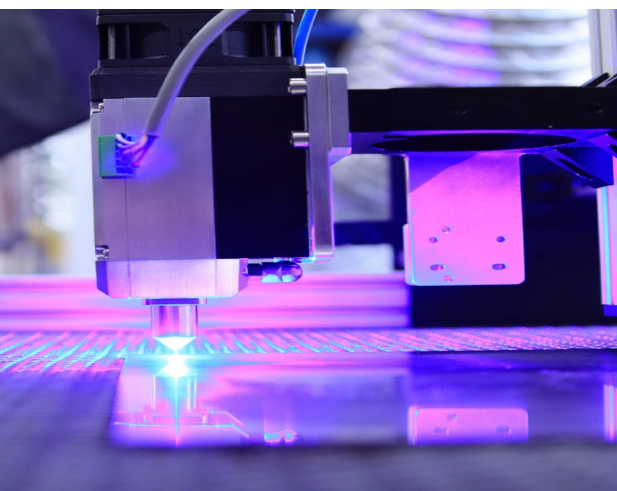


Fig. 3: Machine operations have an impact on the indoor climate

Users can analyze and evaluate the collected data with Checkmk. This allows operating and working times to be optimized, for example.

Watterott Electronic has decided to also monitor the CO<sub>2</sub> traffic lights in its own workshops with Checkmk. This is a great advantage, especially when working with laser cutting machines, as staff cannot always be aware of the visual warnings by the CO<sub>2</sub> monitors during operating hours.



*There is a wide field of application options. For example, other microcontrollers can easily be included in the monitoring on this basis. The required customizations are minimal.*

**Stephan Watterott**, Founder and CEO of Watterott Electronic

The monitoring is not limited to the CO<sub>2</sub> monitors. The Checkmk agent is also open source and can easily be adapted to other Arduino-compatible microcontrollers.

## THE ADVANTAGES

Since the Checkmk Agent is included as a part of the firmware, users can easily add the “CO<sub>2</sub> traffic light pro” to their Checkmk monitoring in a matter of seconds. This enables smart monitoring of the room climate based on open source components. The Checkmk agent can also be easily adapted for other microcontrollers. This opens up a wide range of additional applications, especially in the field of smart buildings.

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