

User Manual v2.1, Aug.26

Welcome to the world of Climeo Systems. Thank you for the trust you have placed in us. In the following, we will introduce you to the system in more detail and shed light on various aspects of the system.

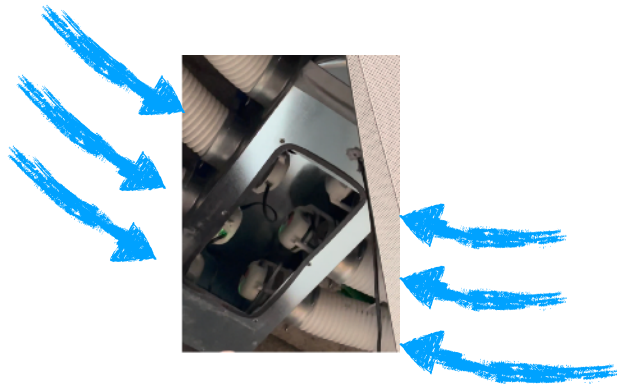
If you are only interested in operating our devices, then jump directly to section 6 for the RoomMaster or section 7 for operation via the web app.

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1. The Climeo System

The Climeo system consists of the following 4 components:



The **AirGate** regulates and measures the air in each individual room: temperature, humidity, quality, and airflow. It is the innovative, central element of the Climeo System. They are built into the air distribution boxes. It is described in more detail on the upcoming page 3.

The **FlatMaster** is built into the electrical distribution cabinet. Next to it is a 24V power supply, which powers the entire system. The FlatMaster is connected to the internet via an Ethernet cable, so that its data is available on the server at any time. In addition to the RoomMaster, heat meters and the ventilation unit are connected via ModBus.



The **RoomMaster** is mounted flush using a mounting plate. It is connected to the FlatMaster via a 4-wire ModBus connection. It receives its information from the FlatMaster and requires no configuration.

The **TempGate** is the complement to the AirGate. It regulates the temperature (heating/cooling) in up to 32 rooms. The TempGates are installed in the heating manifold, with one valve actuator for each heating circuit.



2. The temperature, humidity, and air quality measurement:

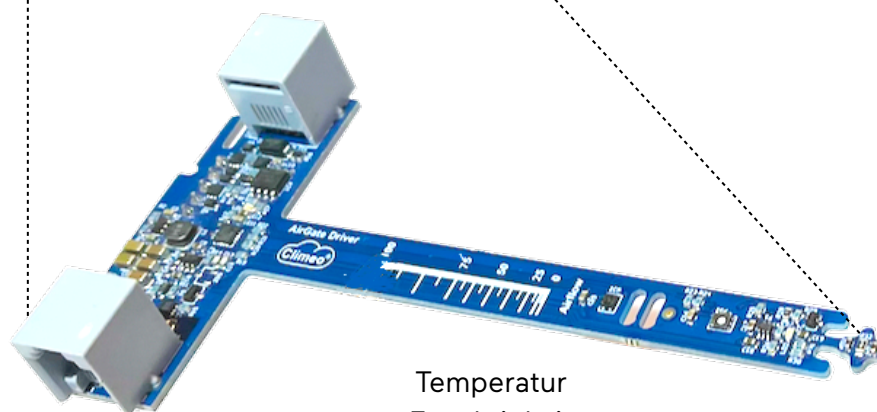
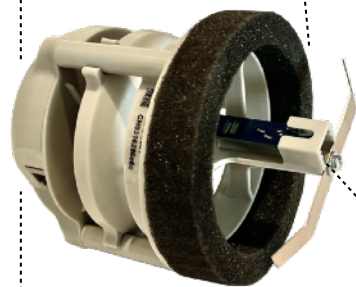
Temperature and humidity are measured in each AirGate using high-quality sensors from Sensirion. At the top of the AirGate, you'll find the temperature and humidity sensor SHTC3, followed by the air quality sensor (VOC sensor) SGP30.



The flow sensor is mounted at the very tip; reliable calorimetric measurement technology with heating sensors and NTC temperature measurement. The cooling of the heating element by the airflow is measured.

The sensor data is read, processed, and stored once per minute. This data is then transferred to the IoT server and stored by it. After a certain time, the data is reduced to 10-minute intervals.

A valve plate is installed between the measurement point and the electronics with the connection plugs, which regulates the airflow. When the air valve is completely open, the plate is at the back; when it's closed, the plate is at the front.



Temperatur
Feuchtigkeit
SHT3

Luftqualität VOC
SGP30

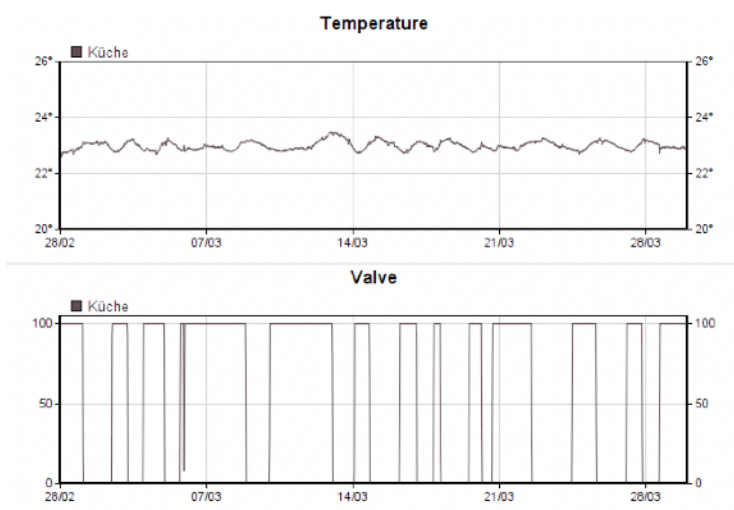
Flowmessung

3. Temperature Control

The temperature control is a simple on/off regulation. If the actual (measured) value is greater than the set target value, the valve closes completely. If the actual value is less than the target value, the valve opens completely. Between this open/close state, there is a so-called hysteresis of 0.2°C, which must be exceeded before the valve switches to the other position.

This means, in the case of the kitchen, that the valve **OPENS** at 22.2°C and **CLOSES** again at 21.8°C.

This means that you can immediately see from the settings how the valve should be positioned, except within the range of



Da eine Fussbodenheizung sehr träge reagiert geht es nach Gebäude Stunden bis die Regelung einen entsprechende Änderung zeigt. Wenn der Boden warm wird, dauert es immer noch lange bis diese Temperatur sich im ganzen Raum etabliert hat.

Auf der Graphik sieht man wie ein solches System funktioniert; oben die Temperatur und unten die Stellung des Ventils. Für die nächste Heiz-Saison werden wir eine verbesserte stetige Regelungsart einführen, die diesem Umstand besser Rechnung trägt und

stabilere Regelungen ohne das sogenannte Dead-Band zulässt.

Free Cooling oder Active Coling

In vielen Anlagen gibt es heute sogenanntes Free Cooling. Das Free Cooling beruht auf einer Wärmepumpe, die an einem Erdregister oder einer Tiefen-Bohrung angeschlossen ist. Im Winter entnimmt die Wärmepumpe dem Boden Wärme, um das Haus zu kühlen. Im Sommer wird der Prozess umgekehrt und das kalte Wasser aus der Bohrung (normalerweise 12-20°C) über einen Wärmetauscher der „Heizung“ zugeführt. Wenn die Wärmepumpe dabei umgangen wird, so spricht man von Free Cooling, weil die Energie nichts kostet, wenn die Wärmepumpe umgekehrt aktiv kühlt, dann spricht man von Active Cooling, Weill es dazu Energie benötigt.

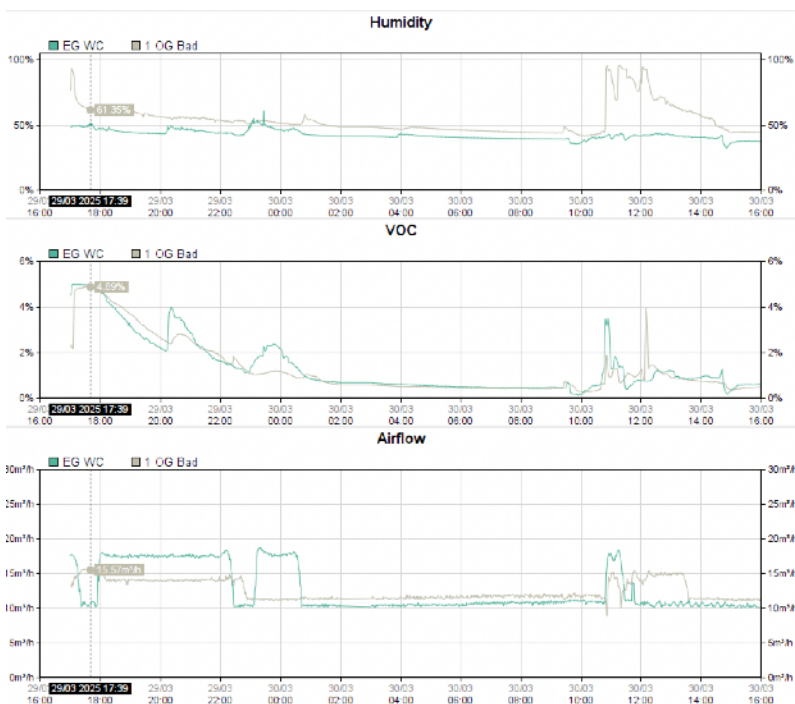
Was bedeutet dies für die Heizungssteuerung? Nun diese muss ihren Wirksinn ändern, das Ventil muss nicht mehr öffnen wenn es zu kalt ist, sondern wenn es zu warm ist.

4. AirFlow Control

The two signals, humidity and air quality, are used to control the air. This involves, on the one hand, dehumidifying wet rooms and, on the other, replacing the air in the right rooms. Using signal analysis, a humidity event or an air quality event is detected and the air is then brought to the maximum volume flow. After the signal has subsided, the volume flow is again set to the minimum air volume.

It is important to know that gases propagate in two different ways: air flow and diffusion. Air flow is easy to understand; it is also what we measure with the AirGate. Diffusion is a bit more complicated. With diffusion, a new gas, such as a perfume cloud, spreads through the air. It spreads in a spherical shape, even if there is no air flow. After a certain time, the gas has diluted and the spread appears to be slower. Air flow and diffusion always occur together and overlap.

Humidity is water vapor in the air, its spread is partly diffusion, partly air flow, the spread is a good mix of both, mainly because the conversion of water to water vapor takes energy from the air and thus also has an influence on the air temperature and the flow.



Smells and used air spread to a large extent by diffusion. This is partly faster than the air flow. This can be so fast that it spreads against the air flow. We notice this when in the case of an odor event not only one AirGate reacts, but also the neighboring ones perceive the smell. This makes the detection of the right room more difficult than in the case of humidity. The graph on the right shows both situations. In the WC it is the bad smells that are measured by the VOC sensor, which increase the air flow in the bathroom is a combination of both, but mainly humidity.

5. RoomMaster

With the RoomMaster, the sensor data from an apartment or several rooms can be viewed and setpoints can be changed. The control has three levels, each with a control point on the left (-) and right (+). With the top level 1, the room is selected.

On the second level (2 -/+), the setpoint temperature can be changed in 0.5° steps.

On the lowest level (3 -/+), the ventilation strength can be manually changed. There are 3 levels: Min - Auto - Max.

Left Top Control Point:
Goes to the previous room.

Left Center Control Point: Reduces the set temperature by 0.5°C

Left Bottom Control Point: Reduced to ventilation level.

Right Top Control Point: Goes to the next room.

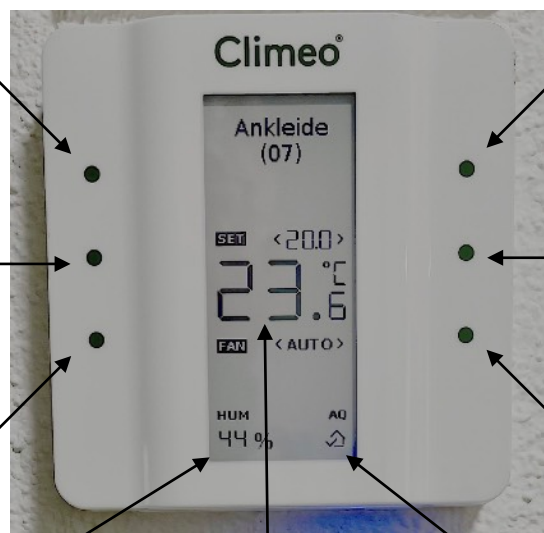
Right Middle Control Point: Increases the set temperature by 0.5°C.

Right Bottom Control Point: Increases the ventilation level.

Humidity in the Room

Temperature in the selected room

Room air quality, classified as Good - Average - Poor



6. Operation of the Web interface



On the web page app.climeo.net the user can see the values of each room and make the settings for the temperature and the ventilation. To do so, he has to create an account and get the corresponding access. For an account, all that is needed is an email address and a password. The owner of the apartment can then give access to the corresponding email address.

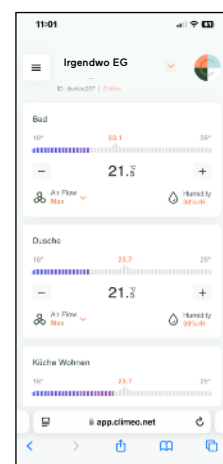
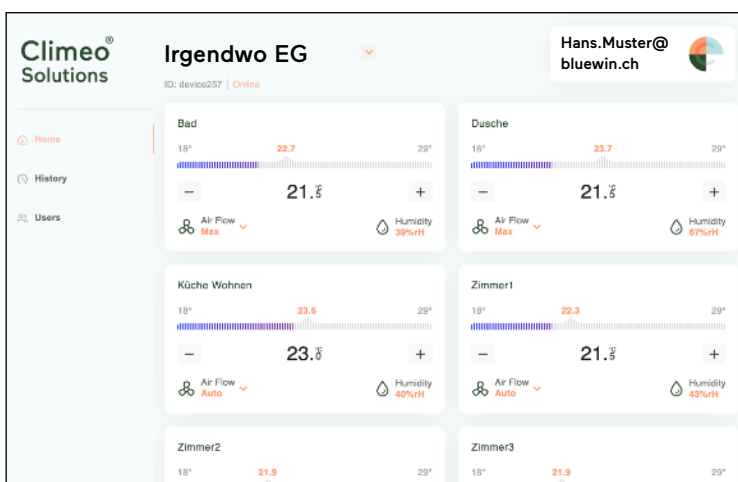


Click here if you have forgotten your password

Click here to create an account

If you are logged in, you should see the following image:
On your computer or tablet:

on the mobile:



Below is the explanation of the operation on the mobile, on the computer or pad it is exactly the same, except that you see more at a glance.

Here they come to the menu that is always displayed on the computer. (Listed below)

The name of the apartment

If they have access to more than one apartment, then the selection is here.

Here you can log out

Name of the room

The temperature bar shows the setpoint temperature in relation to the actual temperature. If the bar is below the orange actual temperature, then heating is required.

Click here to reduce the target temperature

Click here to change the ventilation levels in this room

actual temperature

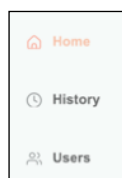
Target temperature

Actual humidity

Click here to increase the set temperature

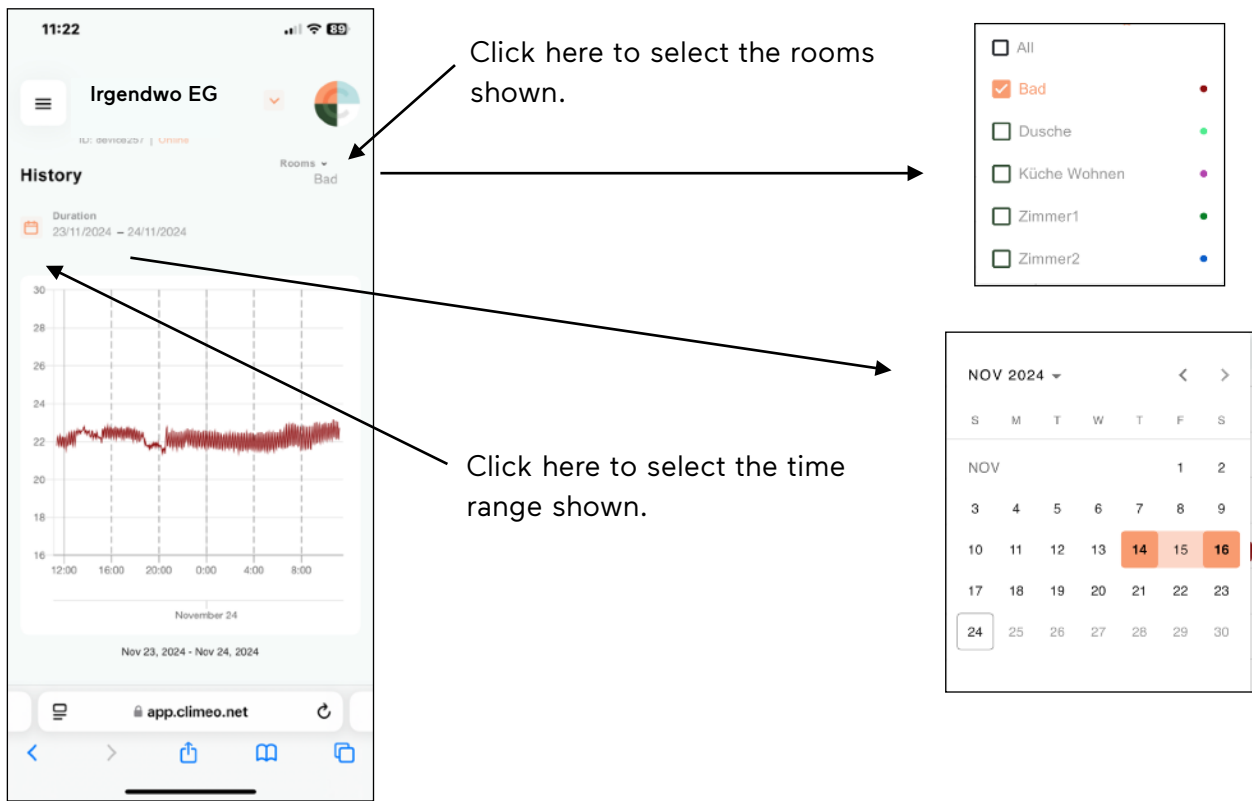
Min
Auto
Max

The Min and Max settings set the respective minimum or maximum set air flow rate. While the Auto setting adjusts itself according to the situation (humidity, air quality, the ventilation controls.)



Menu selection
Home: Top-level overview of the rooms.
History: Daily temperature history
Users: Manage authorized users

The "History" page displays temperature trends.



On the "Users" page, users can be created and deleted.

Click here to create a new user

Click here to remove a user

Share project

To share project, enter registered user email

Email