

H M I N S I G H T H U B

User Documentation

This user documentation serves as your guide to using HM InsightHub effectively. It explains the dashboard's key features, login procedure, and how to customize, compare, and view sensor data. We're committed to providing you with reliable data and a seamless user experience. If you have any questions or encounter any issues, please don't hesitate to contact support for assistance.

Learning more about HM InsightHub

About HM InsightHub

HM InsightHub is a dashboard designed to provide HM lecturers with access to sensor data collected at HM buildings that they can give to their students to practise what they learned in class (e.g., data analytics or statistics) or to support their research projects.

How HM InsightHub differs from previous HM offerings

HM Insight Hub aims to enable students and teachers to access and download the sensor data stored in the FROST servers more easily than before. HM InsightHub provides three key improvements:

1. Sensor data is accessible faster through an intuitive self-service dashboard.
2. HM lecturers and students can access the sensor data directly and independently which drastically reduces the necessary level of involvement of the data owner.
3. HM InsightHub lays the foundation for scaleable growth as well as support for administrative tasks such as monitoring sensor battery level.

Data Source

The data available on HM InsightHub is collected by sensors located in various HM buildings. It is stored on a FROST server. The application fetches data from the existing FROST-servers and displays it to the user. New sensors can be added to it through API-requests. Location data was manually added to a dynamoDB-database, but no other data is being stored on any databases.

My HM InsightHub Account

User permissions

Standard user: Standard users can use the dashboard to customize a dataset by selecting the sensors, variables, and measures they would like to include and downloading this data in the file type of their choice. They can furthermore use the dashboard to customize visualizations in the form of graphs.

Admin user: The administrative user role has the same capabilities as the standard user as well as additional permissions that cover administrative tasks. He can also

assign it to others. Administrative users have full access to all features and functionalities and can manage the dashboard by customizing settings and configurations and have full rights to make changes in the system and source code. Admin users are designated by the system developers during setup.

How to login

Users need to log in to also view location data. Access is based on existing HM credentials and verified via Gitlab.

- (1) To log in, click “Log in with Gitlab” in the navigation bar on the top right.
- (2) Type in your HM username as hm-username.
- (3) Type in your password.
- (4) Click “Sign In”. You will be redirected to HM InsightHub.

The screenshot shows the HM InsightHub login interface. At the top, there's a red header bar with the 'INSIGHT HUB' logo on the left and a 'Login with GitLab' button on the right. Below the header, there's a 'Sensor explorer' search bar. The main content area has a 'Welcome to HM InsightHub!' message. Below it is a login form with two tabs: 'LDAP (User ID)' (which is selected) and 'Standard'. The 'LDAP (User ID)' tab has fields for 'Username' (containing 'hm-username') and 'Password' (containing '*****'). There's also a 'Remember me' checkbox and a 'Sign in' button. The number '2' is highlighted next to the 'Username' field, '3' next to the 'Password' field, and '4' next to the 'Sign in' button.

How to delete your account

To log in to HM InsightHub, you are using your HM credentials. Thus, there is no need to delete any account should you decide not to use HM InsightHub anymore. Once you are no longer a student or faculty member, your account will be deleted automatically.

Access to HM InsightHub as a non-HM member

Access to HM InsightHub in general is not restricted. However, location data is only available for users logged in with HM credentials. Currently, it is unfortunately not possible to get access to location data as a non-HM member.

Security and Privacy Guidelines

Log in is based on existing HM/Gitlab access. DynamoDB contains sensor location

data, but no other data is being stored on any databases. The application only fetches data from already existing FROST-servers and displays it to the user.

Using HM InsightHub

How to fetch sensor data

To view, compare, or download sensor data, you first need to fetch sensor data.

Fetch all sensors:

Welcome to HM InsightHub: Empowering Your Campus with Data-Driven In...
Unlock the power of data with HM InsightHub, your centralized access point...
Whether you're an academic or student, the tools for applied research and si...

Sensor explorer

1 For sensors using name as filter, leave empty
2 results based on the faculty: Any

hm sensor **3** Search

How to get started:
1. Fetch a list of available sensors on the left.
In the search bar, type in "hm sensor", select a faculty location (if applicable).
2. Select the variables you would like to download and customize your data.
Click the "Download" button in the ribbon on the top of the page and further below.
3. Review the output table and download your file.
Select your desired file format (csv or JSON) and download the file.

Fetch one sensor:

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Sensor explorer

1 For sensors using name as filter, leave empty
2 results based on the faculty: Any

hm sensor **3** Search

HM Sensor 11
HM Sensor 11-1
HM Sensor 12
HM Sensor 12-1
HM Sensor 13
HM Sensor 14
HM Sensor 15
HM Sensor 16
HM Sensor 17

How to get started:
1. Fetch a list of available sensors on the left.
In the search bar, type in "hm sensor", select a faculty location (if applicable).
2. Select the variables you would like to download and customize your data.
Click the "Download" button in the ribbon on the top of the page and further below.
3. Review the output table and download your file.
Select your desired file format (csv or JSON) and download the file.

- (1) Use the search bar / drop down to select the sensor you are looking for. To fetch all sensors, type in “HM Sensor”, to fetch a specific sensor, select the sensor from the drop down.
- (2) If applicable, filter by location.
- (3) Click “Search”.
- (4) Review the list of results.

Fetch all sensors:

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Sensor explorer

Search for sensors using name as filter, leave empty to show all.
Type to search... **6** Search

5 results based on the faculty: Any

+ HM Sensor 02
Sensor ID: 196
Description: LineMetrics Air Quality Sensor at Hochschule München
Room Temperature **7** Add to compare
Humidity **8** Add to compare
CO2 **9** Add to compare
Light **10** Add to compare
Motion **11** Add to compare
VDD **12** Add to compare

+ HM Sensor 03
Sensor ID: 197
Description: LineMetrics Air Quality Sensor at Hochschule München

How to get started:
1. Fetch a list of available sensors on the left.
In the search bar, type in "hm sensor", select a faculty location (if applicable).
2. Select the variables you would like to download and customize your data.
Click the "Download" button in the ribbon on the top of the page and further below.
3. Review the output table and download your file.
Select your desired file format (csv or JSON) and download the file.

Ready to Explore? Dive into the Data Now!

Download user manual.

Fetch one sensor:

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Sensor explorer

Search for sensors using name as filter, leave empty to show all.
Type to search... **6** Search

5 results based on the faculty: Any

+ HM Sensor 09
Sensor ID: 181
Description: LineMetrics Air Quality Sensor at Hochschule München
Faculty: FK06
Room: A202a
Room Temperature **7** Add to compare
Humidity **8** Add to compare
CO2 **9** Add to compare
Light **10** Add to compare
Motion **11** Add to compare
VDD **12** Add to compare

How to get started:
1. Fetch a list of available sensors on the left.
In the search bar, type in "hm sensor", select a faculty location (if applicable).
2. Select the variables you would like to download and customize your data.
Click the "Download" button in the ribbon on the top of the page and further below.
3. Review the output table and download your file.
Select your desired file format (csv or JSON) and download the file.

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How to view a detailed datastream for one sensor

First fetch the sensor data (see above). From the list, select the sensor and datastream you would like to review. Wait for the datastream to load on the right and review the details information.

The screenshot shows the HM InsightHub interface. On the left, there's a 'Sensor explorer' sidebar with a search bar and a dropdown for faculty. Below it, a list of sensors includes 'HM Sensor 11' and 'HM Sensor 12'. A green arrow points from the 'HM Sensor 12' entry to the main content area. The main area has tabs for 'Sensor explorer', 'Graph Comparison 0', 'Download', and 'Quick: HM Sensor batteries'. The 'Sensor explorer' tab is active. It displays a 'Datastream' section for 'VDD id: 362' with details like 'Name: VDD id: 362', 'Description: VDD of the Sensor', 'Unit of Measurement: mV()', 'Observed Property: Voltage', and a 'Definition' link. To the right is an 'Observations' section with a table of data and a graph showing voltage fluctuations over time.

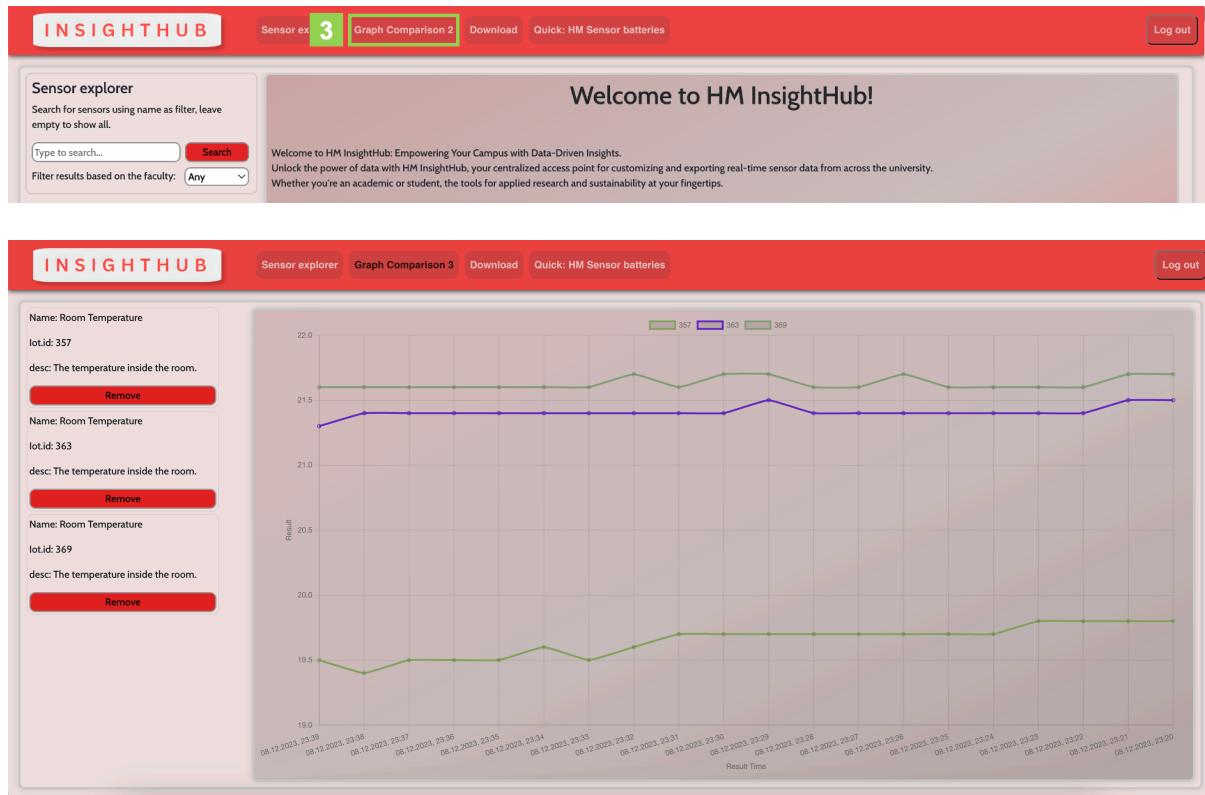
How to view and compare sensor data from multiple sensors

First fetch the sensor data (see above).

- (1) For the datastream you would like to compare, click "Add to compare".
- (2) Do this for every sensor you would like to include.

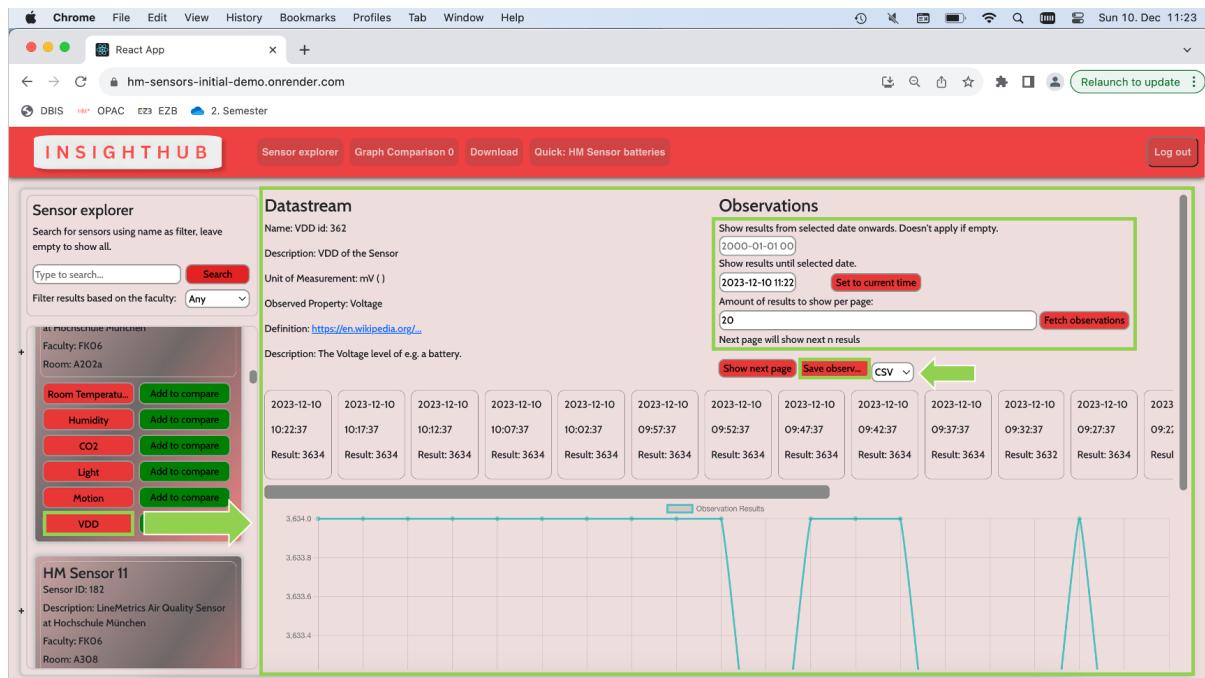
The screenshot shows the HM InsightHub interface. On the left, there's a 'Sensor explorer' sidebar with a search bar and a dropdown for faculty. Below it, a list of sensors includes 'HM Sensor 02' and 'HM Sensor 03'. A green arrow points from the 'HM Sensor 03' entry to the main content area. The main area has tabs for 'Sensor explorer', 'Graph Comparison 0', 'Download', and 'Quick: HM Sensor batteries'. The 'Sensor explorer' tab is active. It displays a 'Welcome to HM InsightHub!' message and a 'How to get started:' section with three numbered steps: 1. Fetch a list of available sensors on the left. 2. Select the variables you would like to download and customize your dataset. 3. Review the output table and download your file. A 'Download user manual' button is also present.

(3) Click “Graph comparison” in the navigation bar.



How to download sensor data from one datastream from one sensor

Fetch the sensor data (see above) and then select one datastream for one sensor (see above). **On the right**, filter the observations, select your desired file type (csv or JSON) and then click “Save observations as...”.



How to download all sensor data from one sensor

- (1) Use the search bar / drop down to select the sensor you are looking for.
- (2) Click “Search”.

Welcome to HM InsightHub! Empowering Your Campus with Data-Driven Insights.

Unlock the power of data with HM InsightHub, your centralized access point for customizing and exporting real-time sensor data from across the university. Whether you're an academic or student, the tools for applied research and sustainability at your fingertips.

Enhance research and course content with real-world data, fostering a data-driven academic environment.

How to get started:

1. Fetch a list of available sensors on the left. In the search bar, type in "hm sensor", select a faculty location (if applicable) and click "Search".
2. Select the variables you would like to download and customize your dataset. Click the "Download" button in the ribbon on the top of the page and further filter your data there if you need to.
3. Review the output table and download your file. Select your desired file format (csv or JSON) and download the file.

Ready to Explore? Dive into the Data Now!

- (3) The list should now have loaded the selected sensor.
- (4) Click “Download”.

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Enhance research and course content with real-world data, fostering a data-driven academic environment.

How to get started:

1. Fetch a list of available sensors on the left. In the search bar, type in "hm sensor", select a faculty location (if applicable) and click "Search".
2. Select the variables you would like to download and customize your dataset. Click the "Download" button in the ribbon on the top of the page and further filter your data there if you need to.
3. Review the output table and download your file. Select your desired file format (csv or JSON) and download the file.

Ready to Explore? Dive into the Data Now!

[Download user manual](#)

- (5) Set the start and end date (if applicable) as well as the maximum number of observations you would like to download.

Sensor ID	Sensor Name	Date	Datasream Name	Unit of Measurement	Faculty	Room	Observation Count	First Result
181	HM Sensor 09	357	Room Temperature	Degree Celcius	FK06	A202a		
181	HM Sensor 09	358	Humidity	% Humidity	FK06	A202a		

- (6) Click “Fetch Observations” and wait for the tool to load the observations (complete when status turns green and say “Finished loading observations”).

Sensor explorer

FETCH OBSERVATIONS

6 Loading observations... 0:1

Sensor ID	Sensor Name	Datastream ID	Datastream Name	Unit of Measurement	Faculty	Room	Observation Count	First Result
181	HM Sensor 09	357	Room Temperature	Degree Celcius	FK06	A202a	1000	19.8
181	HM Sensor 09	358	Humidity	% Humidity	FK06	A202a	1000	37

INSIGHT HUB

Sensor explorer

EXPORT ALL DATA

FETCH OBSERVATIONS

EXPORT SELECTED ROWS

Finished loading observations

(7) Click “EXPORT ALL DATA”. You will download two files: one file containing sensor, datastream and location information and one file containing the observations.

Sensor explorer

FETCH OBSERVATIONS

7 Finished loading observations

Sensor ID	Sensor Name	Datastream ID	Datastream Name	Unit of Measurement	Faculty	Room	Observation Count	First Result
181	HM Sensor 09	357	Room Temperature	Degree Celcius	FK06	A202a	1000	19.8
181	HM Sensor 09	358	Humidity	% Humidity	FK06	A202a	1000	37

File: "SensorData"

File: "Observations"

datastreamId	sensorId	sensorName	faculty	room	datastreamName	unitOfMeasurement	observationCount
1	1,181	"HM Sensor 09"	"FK06"	"A202a"	"Room Temperature"	"Degree Celcius"	
2	2,181	"HM Sensor 09"	"FK06"	"A202a"	"Humidity"	"% Humidity"	
3	3,181	"HM Sensor 09"	"FK06"	"A202a"	"CO2"	"CO2 ppm"	
4	4,181	"HM Sensor 09"	"FK06"	"A202a"	"Light"	"Lux"	
5	5,181	"HM Sensor 09"	"FK06"	"A202a"	"Motion"	"Movement"	

datastreamId	resultTime	result
1	"2023-12-08T22:02:19.8"	
2	"2023-12-08T22:02:19.8"	
3	"2023-12-08T22:02:19.8"	
4	"2023-12-08T22:02:19.8"	
5	"2023-12-08T22:02:19.8"	
6	"2023-12-08T22:02:19.8"	

How to download sensor data from multiple sensors

(1) Fetch the HM sensors based on the instructions listed above.

Then follow the instructions below.

(2) Click “Download” in the top ribbon.

INSIGHT HUB

Sensor explorer

Graph Comparison

Download

Quick: HM Sensor batteries

Sensor explorer

Search for sensors using name as filter, leave empty to show all.

Type to search... Search

Results based on the faculty: Any

1

HM Sensor O2
Sensor ID: 196
Description: LineMetrics Air Quality Sensor at Hochschule München

Room Temperature Add to compare

Humidity Add to compare

CO2 Add to compare

Light Add to compare

Motion Add to compare

VDD Add to compare

HM Sensor O3
Sensor ID: 197
Description: LineMetrics Air Quality Sensor at Hochschule München

(3) Set the start and end date (if applicable) as well as the maximum number of observations you would like to download.

Sensor ID	Sensor Name	Datastream ID	Datastream Name	Unit of Measurement	Faculty	Room	Observation Count	First Result
243	HM Sensor 53	727	Room Temperature	Degree Celcius	FK07	R2.014		

(4) Click “Fetch Observations” and wait for the tool to load the observations (complete when status turns green and say “Finished loading observations”).

(5) Click “EXPORT ALL DATA”. You will download two files: one file containing sensor, datastream and location information and one file containing the observations.

File: "SensorData"

datastreamId	sensorId	sensorName	faculty	room	datastreamName	unitOfMeasurement	observationCount
1	243	"HM Sensor 53"	"FK07"	"R2.014"	"Room Temperature"	"Degree Celcius"	
2	243	"HM Sensor 53"	"FK07"	"R2.014"	"Humidity"	"% Humidity"	
3	243	"HM Sensor 53"	"FK07"	"R2.014"	"CO2"	"CO2 ppm"	
4	243	"HM Sensor 53"	"FK07"	"R2.014"	"Light"	"Lux"	
5	243	"HM Sensor 53"	"FK07"	"R2.014"	"Motion"	"Movement"	
6	243	"HM Sensor 53"	"FK07"	"R2.014"	"VDD"	"mV"	
7	235	"HM Sensor 46"	"FK10"	"LO-309"	"Room Temperature"	"Degree Celcius"	
8	235	"HM Sensor 46"	"FK10"	"LO-309"	"Humidity"	"% Humidity"	
9	235	"HM Sensor 46"	"FK10"	"LO-309"	"CO2"	"CO2 ppm"	

File: "Observations"

datastreamId	resultTime	result
1	"08-12-2023 22:47"	"19.7"
3	"08-12-2023 22:42"	"19.7"
4	"08-12-2023 22:37"	"19.7"
5	"08-12-2023 22:32"	"19.7"
6	"08-12-2023 22:27"	"19.7"
7	"08-12-2023 22:22"	"19.7"
8	"08-12-2023 22:17"	"19.8"
9	"08-12-2023 22:12"	"19.8"
10	"08-12-2023 22:07"	"19.8"

How to return to home

- (1) To navigate back to the home page, click “Sensor explorer” on the top left of the top ribbon.

The screenshot shows a browser window titled "React App" with the URL "hm-sensors-initial-demo.onrender.com/selectedDataset". The top navigation bar includes links for DBIS, OPAC, EZB, and "2. Semester". Below the navigation is a red header bar with the "INSIGHTHUB" logo and a "Sensor explorer" button, which is highlighted with a green border. Other buttons in the header include "Graph Comparison 10", "Download", and "Quick: HM Sensor batteries". On the right side of the header is a "Log out" button. The main content area features a table with the following columns: Sensor ID, Sensor Name, Datastream ID, Datastream Name, Unit of Measurement, Faculty, Room, Observation Count, and First Result. The table contains two rows of data:

Sensor ID	Sensor Name	Datastream ID	Datastream Name	Unit of Measurement	Faculty	Room	Observation Count	First Result
181	HM Sensor 09	357	Room Temperature	Degree Celcius	FK06	A202a		
181	HM Sensor 09	358	Humidity	% Humidity	FK06	A202a		

Glossary

Definitions of key terms used in the dashboard:

- | | |
|-------------------|--|
| CO2 | – CO2 concentration (CO2 in ppm). |
| <i>Datastream</i> | – Datastream refers to a sequence of observations collected from a specific sensor. It represents a real-time or near-real-time stream of data that provides information about a particular aspect of the environment being monitored. |
| Humidity | – The humidity inside the room (% Humidity). |
| Light | – Amount of light in the room (Lux). |
| Motion | – Number of motion counts (Movement). |
| Observation | – An observation is a specific datapoint or set of datapoints that have been recorded or measured by a sensor. |
| Room Temperature | – The temperature inside the room (Degree °C). |
| VDD | – Voltage of the sensor (mV). |

Troubleshooting

No reaction

The tool can be quite slow, so if the page seems to not be reacting, wait a few minutes.

Location data is missing

Not all sensors have location data assigned, if it is missing it is likely one of those sensors.

Other issues

For all other issues, contact Johannes.Ebke@hm.edu