

Brick Ontology Class Requests

Background

In a collaborative project involving several medium-sized and large property owners in Sweden, as well as proptech companies, we are using the Brick ontology to map HVAC systems in office and industrial buildings. We are developing smart functions to achieve sustainable energy consumption and add value for property owners. To achieve this at scale, we are also developing automated mapping tools. Currently, these tools are based solely on text string information from within the systems, but our goal is to incorporate image recognition mapping capabilities.

Our ambition is that the mapping should, as much as possible, follow the Brick Ontology and its class definitions, making it logical to use even for people who are not experts in the field. Additionally, it should be scalable to apply to a large set of properties with minimal manual input.

To achieve this, we need the fine granularity that the Brick ontology largely provides, enabling us to distinguish all the points within a system from one another—ensuring that no two points are the same. However, as we delve deeper into working with Brick, we have identified some gaps that need to be addressed for us to succeed in our mission. While we are aware that we can create our own classes, it is crucial for scalability and future updates that we use classes that already exist within the Brick ontology. Therefore, we are submitting the following requests: classes to add, deprecated classes that we believe should remain, and some additional requests.

Requests per system type

Ventilation_Air_System

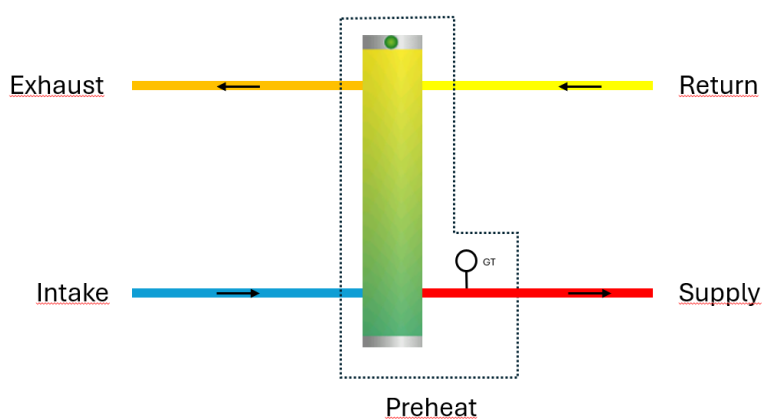


Figure 1. Basic principles for Ventilation_Air_System mapping

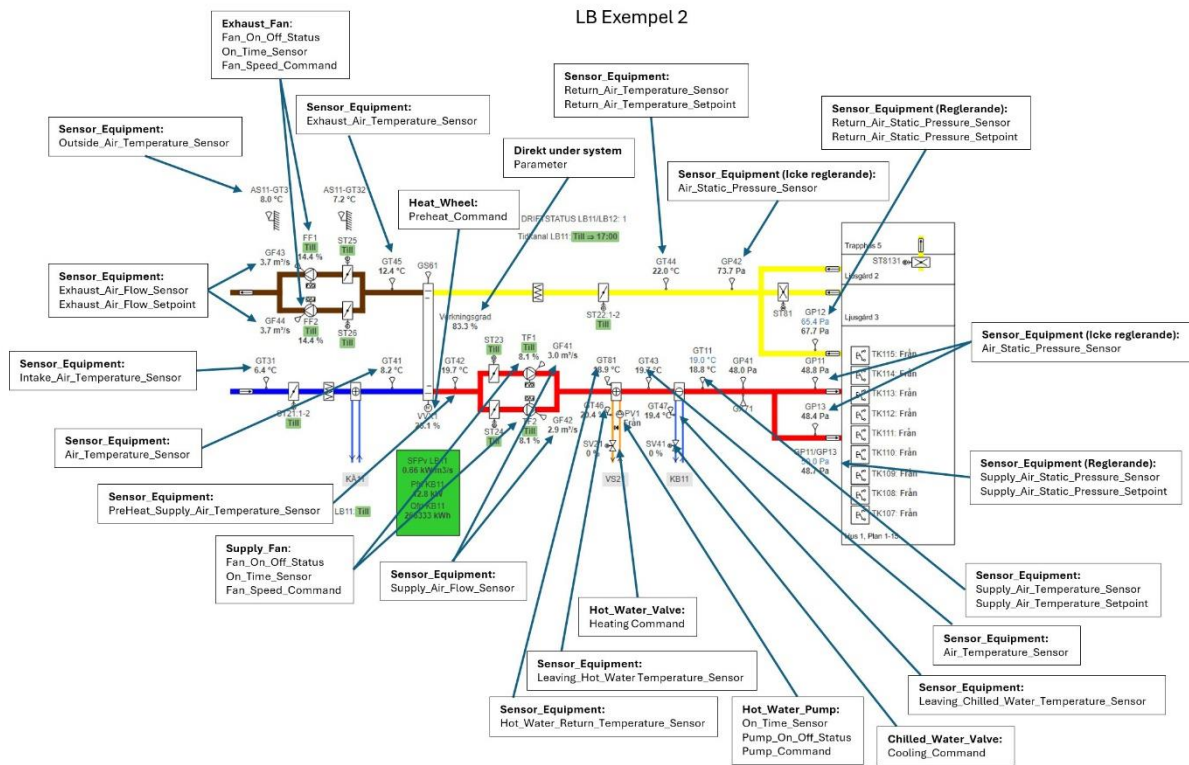


Figure 2. AHU practical example

Request 1:

To logically map pressure sensors in the return duct for users who are not experts, to be able to distinguish between controlling and non-controlling pressure sensors, and to harmonize with the Supply_Air_Static_Pressure_Sensor and Supply_Air_Static_Pressure_Setpoint classes, we request to add the following point classes:

- Return_Air_Static_Pressure_Sensor
- Return_Air_Static_Pressure_Setpoint

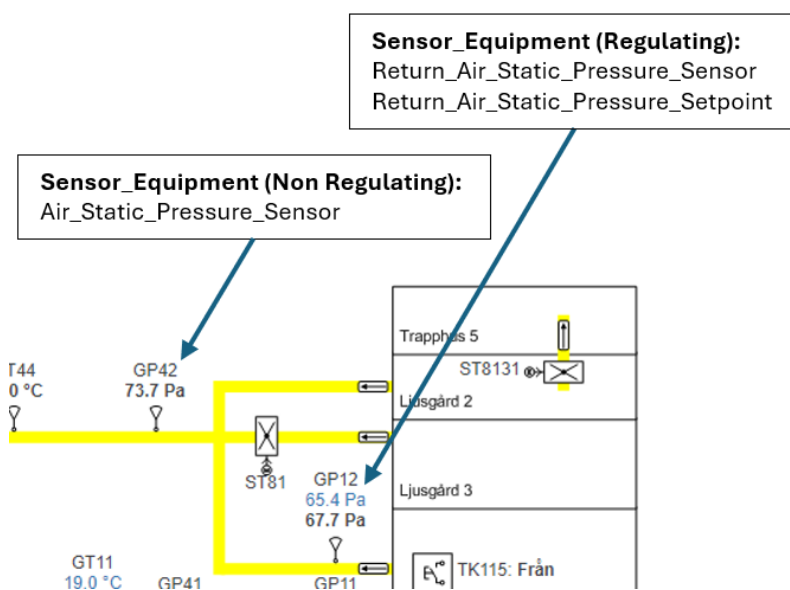


Figure 3. Pressure sensors in return duct

Request 2:

Currently, there is a Return_Air_Flow_Sensor but no corresponding Setpoint, which is important to be able to map flow sensors in the return duct. Therefore, we request the addition of the following non-existing point class:

- Return_Air_Flow_Setpoint

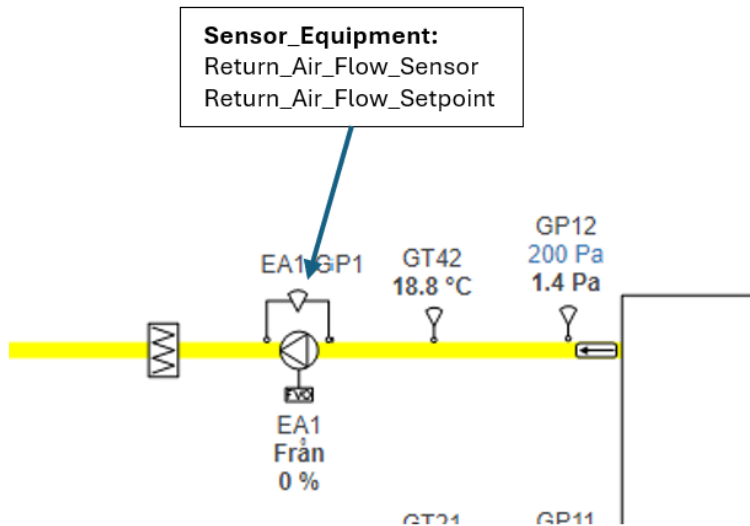


Figure 4. Flow sensor in return duct

Request 3:

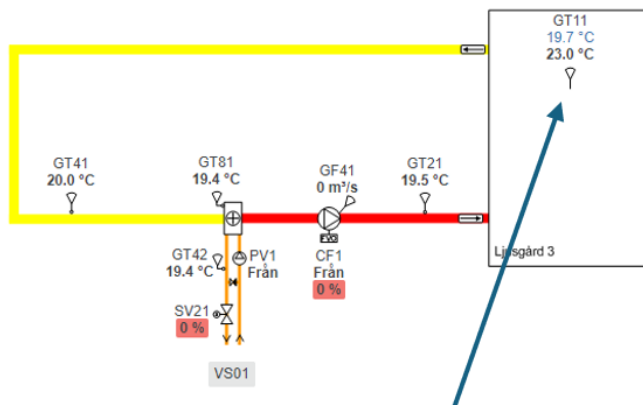
To be able to map the occupied areas of a building, we need point classes for room temperature sensors, zone temperature sensors, and their respective setpoints.

Currently, there is a Zone_Air_Temperature_Sensor while the Zone_Air_Temperature_Setpoint is deprecated and replaced by Effective_Target_Zone_Air_Temperature_Setpoint. And even though it is possible to use the class Effective_Target_Zone_Air_Temperature_Setpoint, it is illogical when we have a Zone_Air_Temperature_Sensor, and we think it will make it more difficult for non-experts to map these points. Therefore, we request to retain the deprecated point class:

- Zone_Air_Temperature_Setpoint

Additionally, while there is currently a Room_Air_Temperature_Setpoint, there is no corresponding sensor. Therefore, we request to add the non-existing point class:

- Room_Air_Temperature_Sensor



Sensor_Equipment:
 Zone_Air_Temperature_Sensor
 Zone_Air_Temperature_Setpoint
 Or:
 Room_Air_Temperature_Setpoint
 Room_Air_Temperature_Sensor

Figure 5. Zone or room temperature sensor/setpoint

Request 4:

To logically and consistently map CO and CO₂ sensors in return ducts as well as in rooms/zones, we need point classes for both the sensors and their setpoints. Currently, for CO₂, there are classes for Return_Air_CO2_Sensor, Return_Air_CO2_Setpoint, and Zone_CO2_Level_Sensor. For CO, there is only a Return_Air_CO_Sensor. Therefore, we need to add the following missing point classes:

- Zone_CO2_Level_Setpoint
- Zone_CO_Level_Sensor
- Zone_CO_Level_Setpoint
- Return_Air_CO_Setpoint

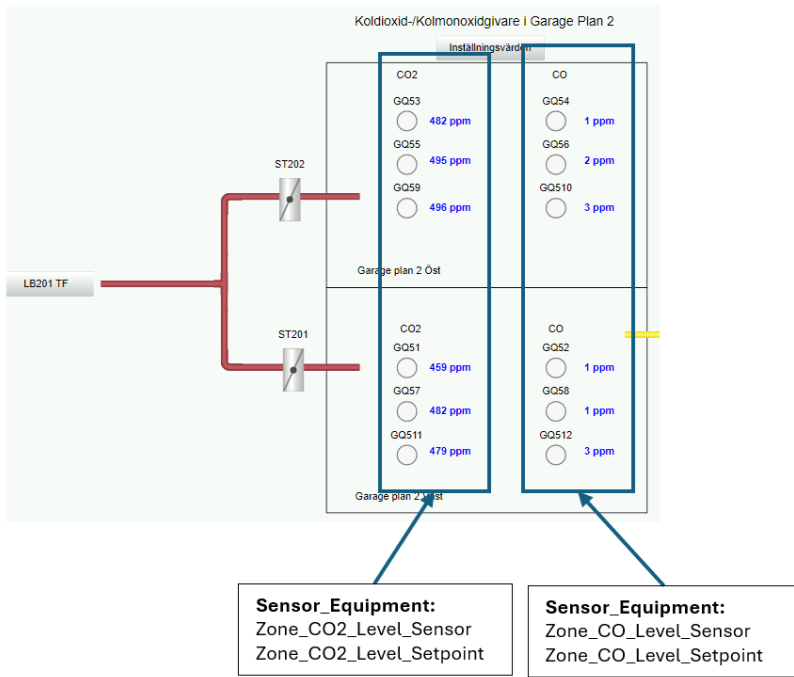


Figure 6. Zone Co2 and CO Sensors/Setpoints

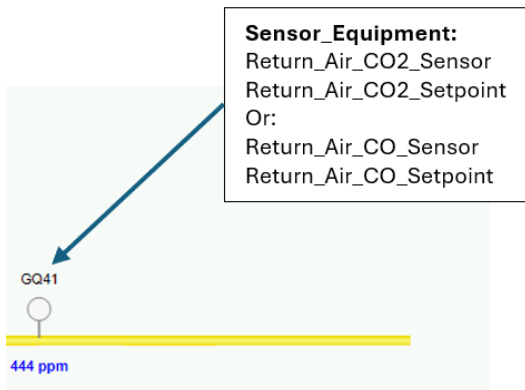


Figure 7. Return duct Co2 and CO Sensor/Setpoint

Hot_Water_System/Chilled_Water_System

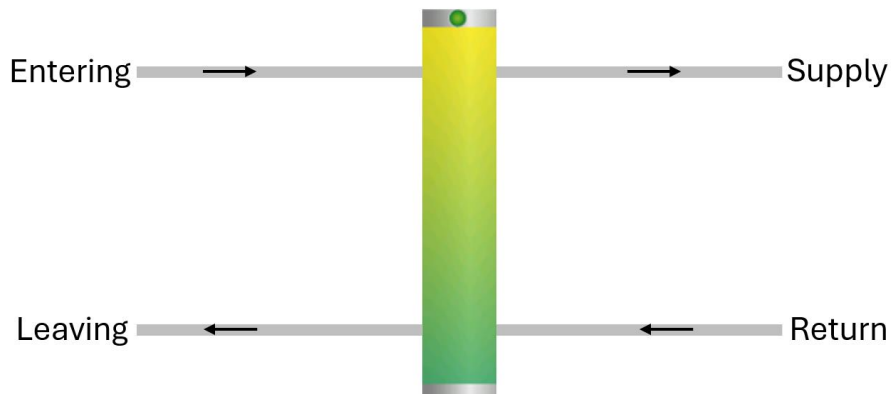


Figure 8. Basic principles for Hot_Water_System/Chilled_Water_System mapping

VS Exempel 1

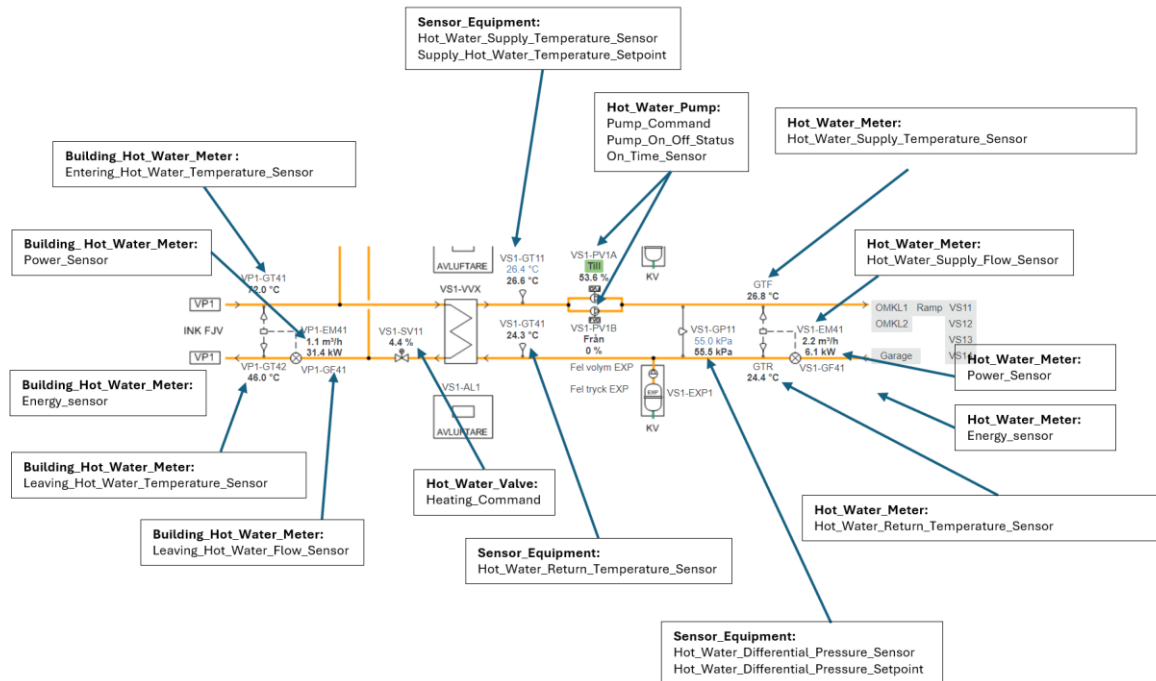


Figure 9. Hot_Water_System practical example

Request 5:

To consistently and logically map the supply and return lines on the primary and secondary sides of a Hot_Water_System or Chilled_Water_System, we need to divide the system into four parts (see Figure 8 and Figure 9), just as we do for ventilation air systems. Therefore, we need both entering/leaving **and** supply/return classifications. Consequently, we request to retain the following deprecated classes:

- Hot_Water_Supply_Temperature_Sensor
- Supply_Hot_Water_Temperature_Setpoint
- Chilled_Water_Supply_Temperature_Sensor
- Supply_Chilled_Water_Temperature_Setpoint
- Hot_Water_Return_Temperature_sensor
- Return_Hot_Water_Temperature_Setpoint
- Chilled_Water_Return_Temperature_Sensor
- Return_Chilled_Water_Temperature_Setpoint
- Hot_Water_Supply_Flow_Sensor
- Hot_Water_Return_Flow_Sensor
- Chilled_Water_Supply_Flow_Sensor
- Chilled_Water_Return_Flow_Sensor

Request 6:

As an additional request, to follow Brick's naming conventions and to harmonize sensors and setpoints, we propose renaming the following classes (see also Request 5:) as follows:

- Hot_Water_Supply_Temperature_Sensor >> Supply_Hot_Water_Temperature_Sensor
- Chilled_Water_Supply_Temperature_Sensor >> Supply_Chilled_Water_Temperature_Sensor

- Hot_Water_Return_Temperature_sensor >> Return_Hot_Water_Temperature_Sensor
- Chilled_Water_Return_Temperature_Sensor >> Return_Chilled_Water_Temperature_Sensor
- Hot_Water_Supply_Flow_Sensor >> Supply_Hot_Water_Flow_Sensor
- Hot_Water_Return_Flow_Sensor >> Return_Hot_Water_Flow_Sensor
- Chilled_Water_Supply_Flow_Sensor >> Supply_Chilled_Water_Flow_Sensor
- Chilled_Water_Return_Flow_Sensor >> Return_Chilled_Water_Flow_Sensor

Domestic_Hot_Water_System/Domestic_Water_System

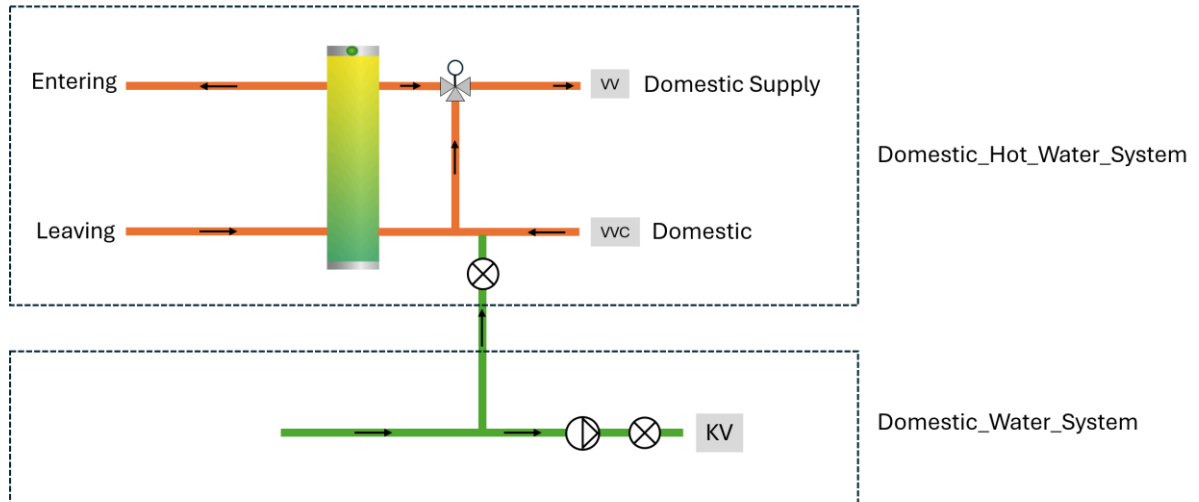


Figure 10. Basic principles for Domestic_Hot_Water_System/Domestic_Water_System

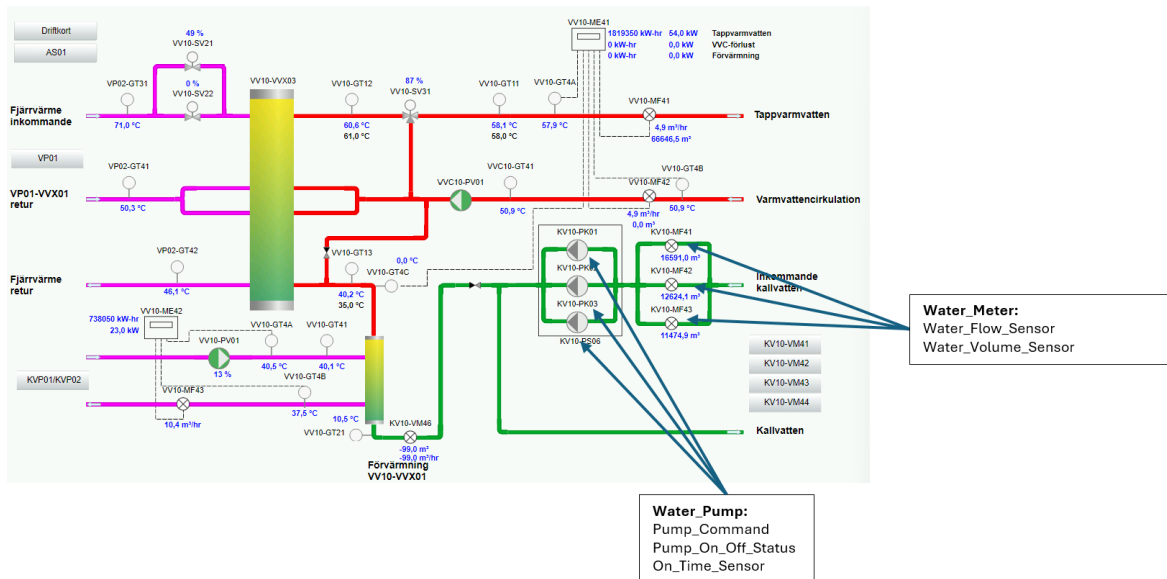


Figure 11. Domestic_Water_System practical example

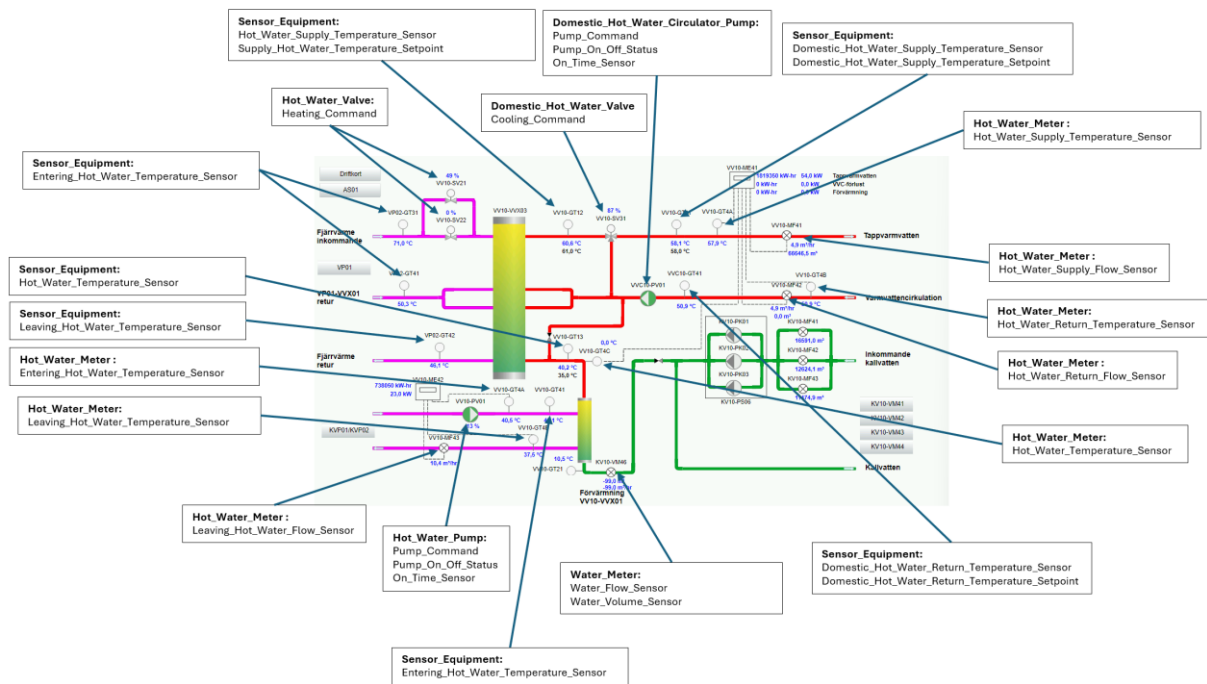


Figure 12. Domestic_Hot_Water_System practical example

Request 7:

Apart from making it more logical, it is valuable for us to be able to distinguish water meters in particular. Therefore, there is a need to separate the domestic water systems into one for domestic hot water and one for domestic cold water (see Figure 10, Figure 11 and Figure 12). Therefore, we request that the following system be added:

- Domestic_Water_System or Domestic_Cold_Water_System

Request 8:

To map circuits with domestic hot water circulation, there is currently no class for a temperature sensor and its setpoint in the return line and it is deprecated in the supply line. Therefore, we would like to add the following non-existing point classes:

- Domestic_Hot_Water_Return_Temperature_Sensor
- Domestic_Hot_Water_Return_Temperature_Setpoint

And retain the following deprecated point classes:

- Domestic_Hot_Water_Supply_Temperature_Sensor
- Domestic_Hot_Water_Supply_Temperature_Setpoint

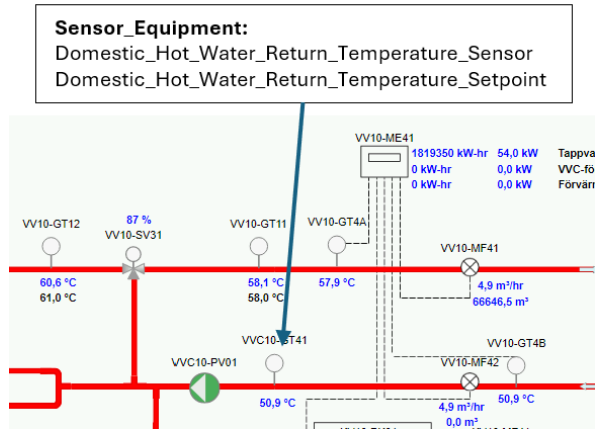


Figure 13. Domestic_Hot_Water_Return_Temperature_Sensor/Setpoint

Request 9:

Currently, there is no point class for a sensor that measures water volume, which is commonly found in meters across various systems. Therefore, we wish to add the following non-existing point class:

- Water_Volume_Sensor

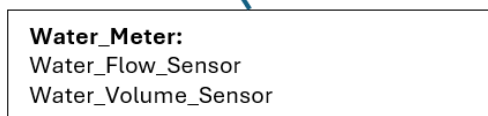
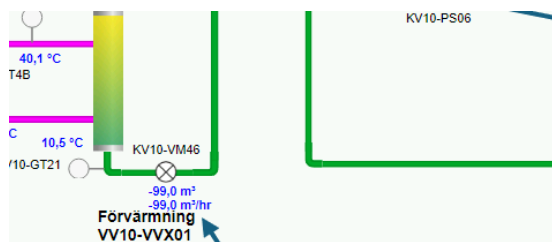


Figure 14. Water_Volume_Sensor

Summary

Below is a summary of all the requests divided by category:

Non existing classes to Add:

- Return_Air_Static_Pressure_Sensor
- Return_Air_Static_Pressure_Setpoint
- Return_Air_Flow_Setpoint
- Room_Air_Temperature_Sensor
- Zone_CO2_Level_Setpoint
- Zone_CO_Level_Sensor
- Zone_CO_Level_Setpoint
- Return_Air_CO_Setpoint

- Domestic_Hot_Water_Return_Temperature_Sensor
- Domestic_Hot_Water_Return_Temperature_Setpoint
- Water_Volume_Sensor

Deprecated classes to retain:

- Zone_Air_Temperature_Setpoint
- Hot_Water_Supply_Temperature_Sensor
- Supply_Hot_Water_Temperature_Setpoint
- Chilled_Water_Supply_Temperature_Sensor
- Supply_Chilled_Water_Temperature_Setpoint
- Hot_Water_Return_Temperature_sensor
- Return_Hot_Water_Temperature_Setpoint
- Chilled_Water_Return_Temperature_Sensor
- Return_Chilled_Water_Temperature_Setpoint
- Hot_Water_Supply_Flow_Sensor
- Hot_Water_Return_Flow_Sensor
- Chilled_Water_Supply_Flow_Sensor
- Chilled_Water_Return_Flow_Sensor
- Domestic_Hot_Water_Supply_Temperature_Sensor
- Domestic_Hot_Water_Supply_Temperature_Setpoint

Additional requests:

- Add system: Domestic_Water_System or Domestic_Cold_Water_System
- Rename the following classes as follows:
 - Hot_Water_Supply_Temperature_Sensor >> Supply_Hot_Water_Temperature_Sensor
 - Chilled_Water_Supply_Temperature_Sensor >> Supply_Chilled_Water_Temperature_Sensor
 - Hot_Water_Return_Temperature_sensor >> Return_Hot_Water_Temperature_Sensor
 - Chilled_Water_Return_Temperature_Sensor >> Return_Chilled_Water_Temperature_Sensor
 - Hot_Water_Supply_Flow_Sensor >> Supply_Hot_Water_Flow_Sensor
 - Hot_Water_Return_Flow_Sensor >> Return_Hot_Water_Flow_Sensor
 - Chilled_Water_Supply_Flow_Sensor >> Supply_Chilled_Water_Flow_Sensor
 - Chilled_Water_Return_Flow_Sensor >> Return_Chilled_Water_Flow_Sensor

Conclusion

We are grateful for your contribution in helping us achieve our project goals. We are more than happy to receive your suggestions for improvements or alternative interpretations of the Brick Ontology. We would appreciate a prompt response regarding your position on the above requests. We are available if you have any questions or would like to discuss the matter further.

Thank you very much!