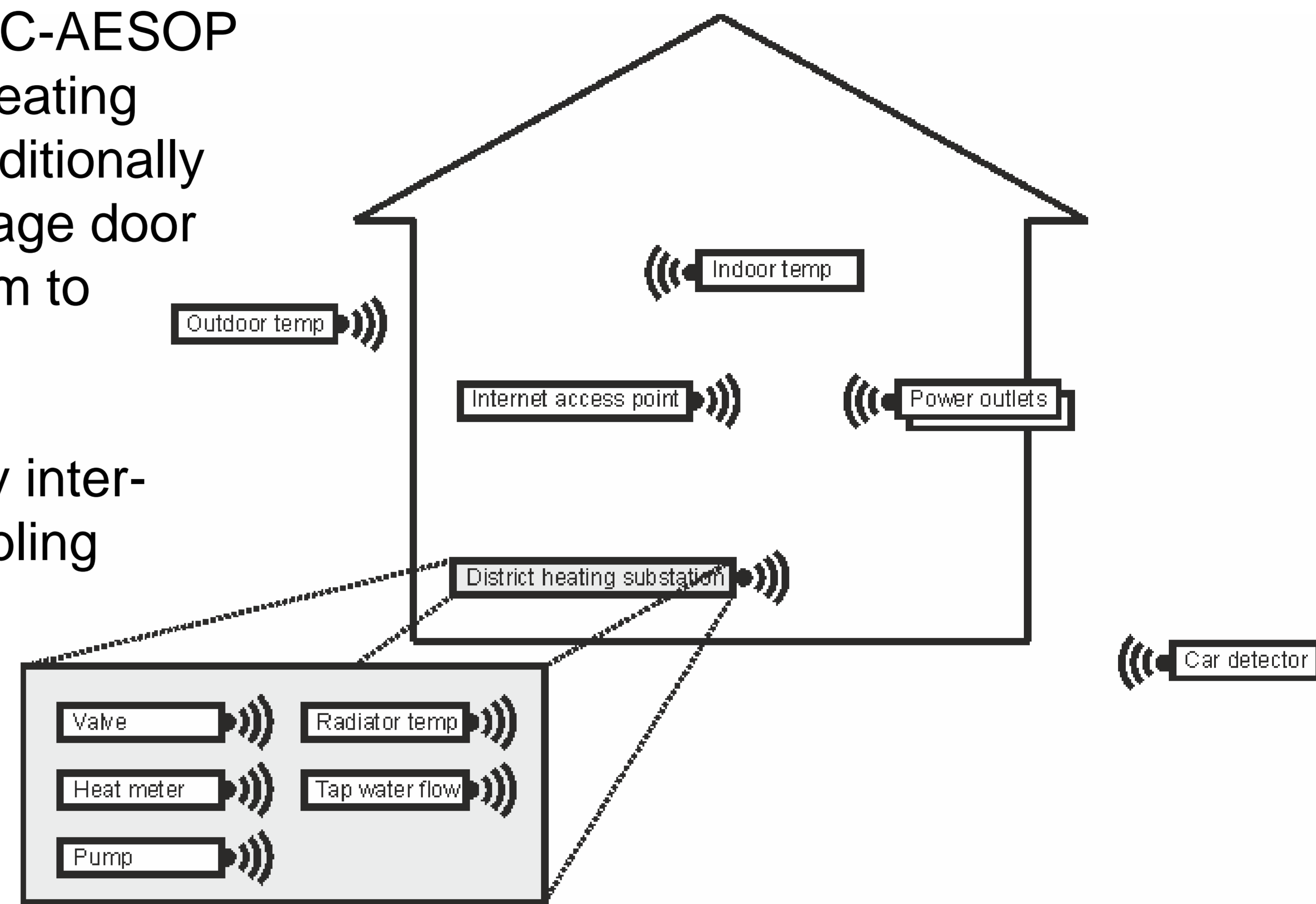
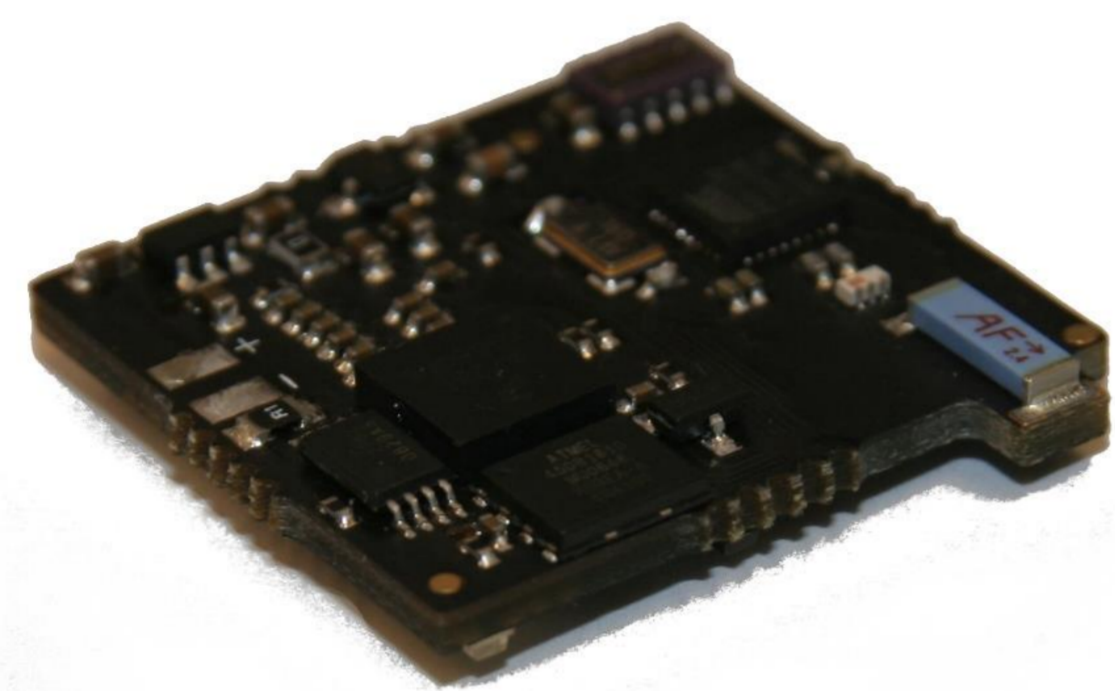




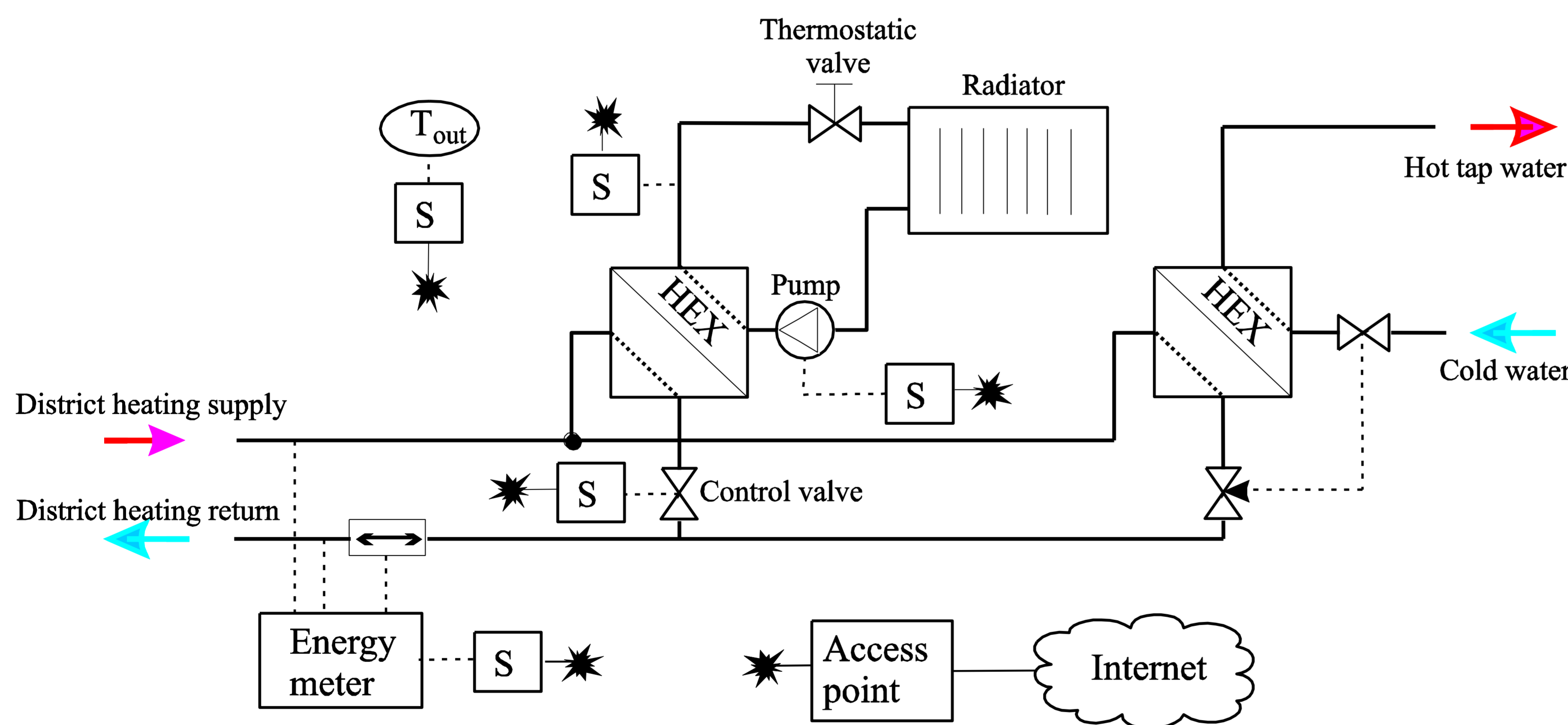
Demonstrator 4, shown to the right, demonstrates how IMC-AESOP technology can be used to monitor and control a district heating substation using SOA technologies. This demonstrator additionally exemplifies how other system, such as electricity and garage door operation can be integrated with the district heating system to improve the overall energy efficiency.

The concept of Systems of Systems is hereby realized, by inter-connecting different subsystems with each other and enabling information to flow between them.



### Statistics

The demonstrator is composed of wireless sensors and actuator platforms based on the Mulle device, shown above. The demonstrator is using 6LoWPAN, IPv6, CoAP and SenML/EXI. CoAP-services are executed on nodes, gateways and in the cloud. Several control loops are used to control heating, electrical appliances and garage doors.



Above is a schematic overview of the district heating measurement and control system

To the right an excerpt from a web page showing information about the operation in real time

### Misc.

Date, time:	2013-10-24 13:46:18
Database status:	Online
Last update:	2013-06-25 11:26:29
T <sub>outdoor</sub> :	22.4°C
T <sub>indoor</sub> :	25.8°C
Installation ID:	BD-P736446546

### Energy meter: #1

Flow temp.:	18.7°C
Return flow temp.:	38.2°C
Flow:	0 l/h
Heat power:	201.7 W
Heat energy:	0 W

### Energy meter: #2

Flow temp.:	20.4°C
Return flow temp.:	20.5°C
Flow:	442 l/h
Heat power:	166.6 W
Heat energy:	0 W

### Valve:

Pos:	0 % open
Pos:	20.2°C

### Pump:

RPM:	n/a
Temp.:	n/a
Pressure:	n/a

### Power outlets:

Outlet #1:	0 W
off	<input type="button" value="Toggle #1"/>
Outlet #2:	23.4 W
off	<input type="button" value="Toggle #2"/>

### Vehicle detector:

Detector #1:	1
Detector #2:	1
Decision:	0

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