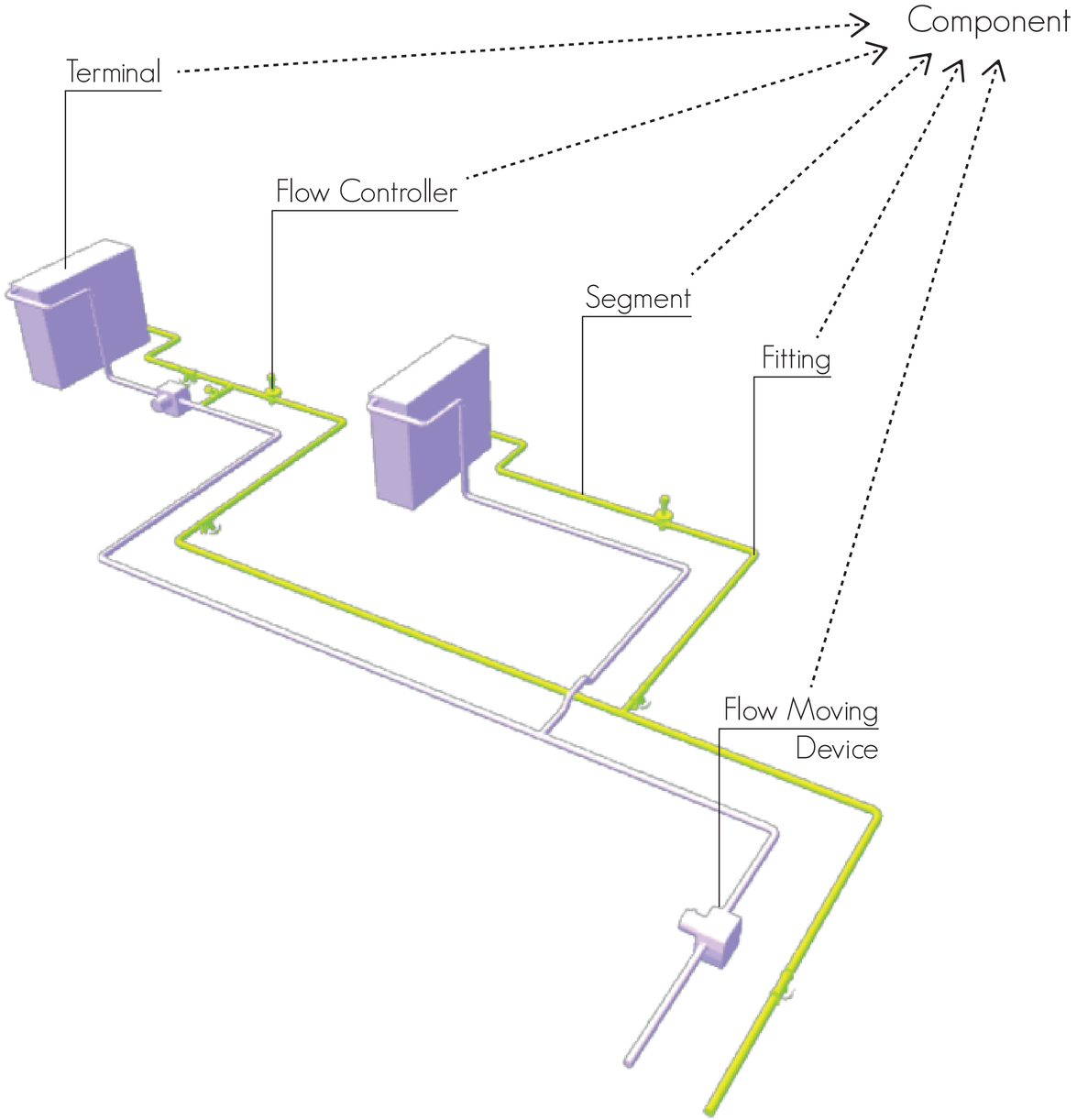
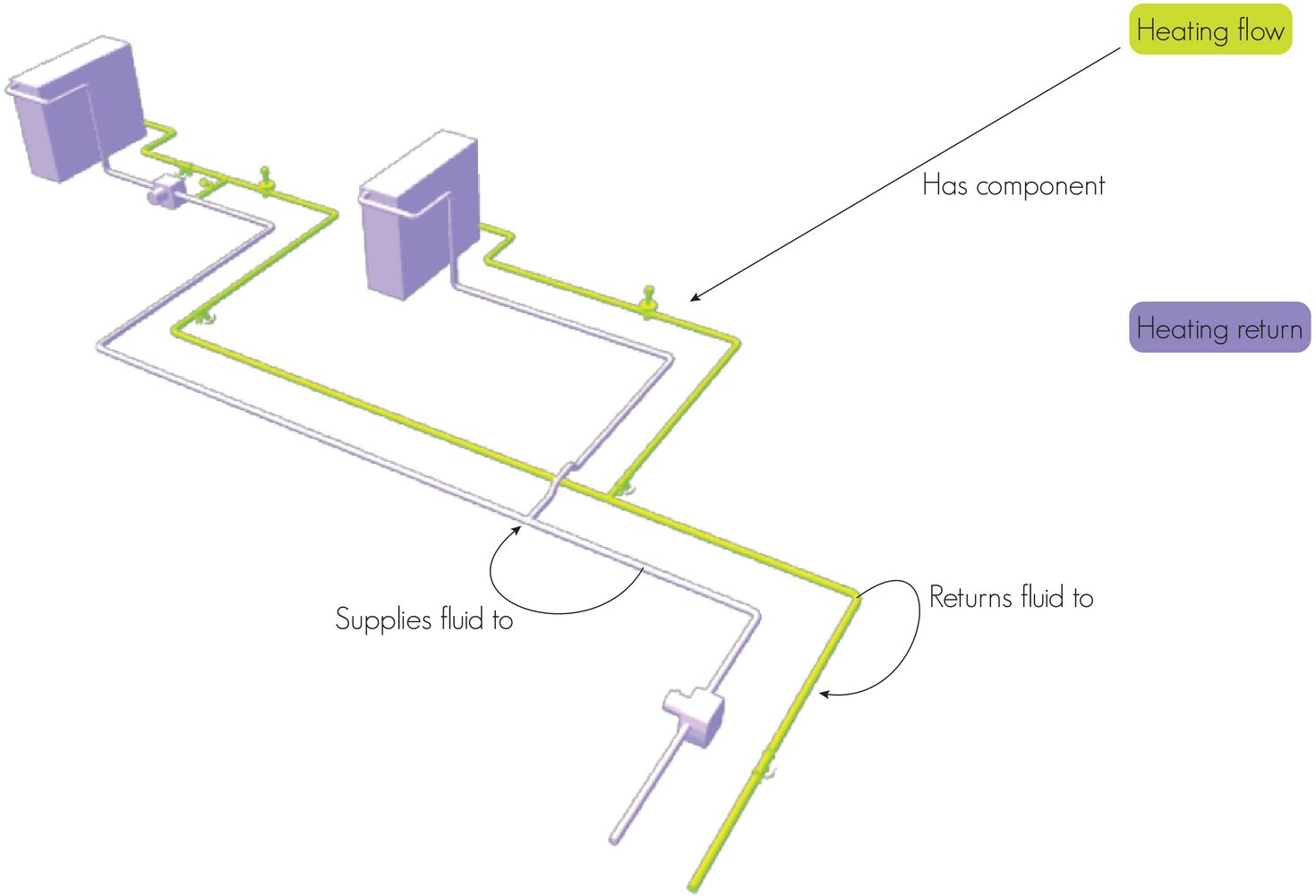
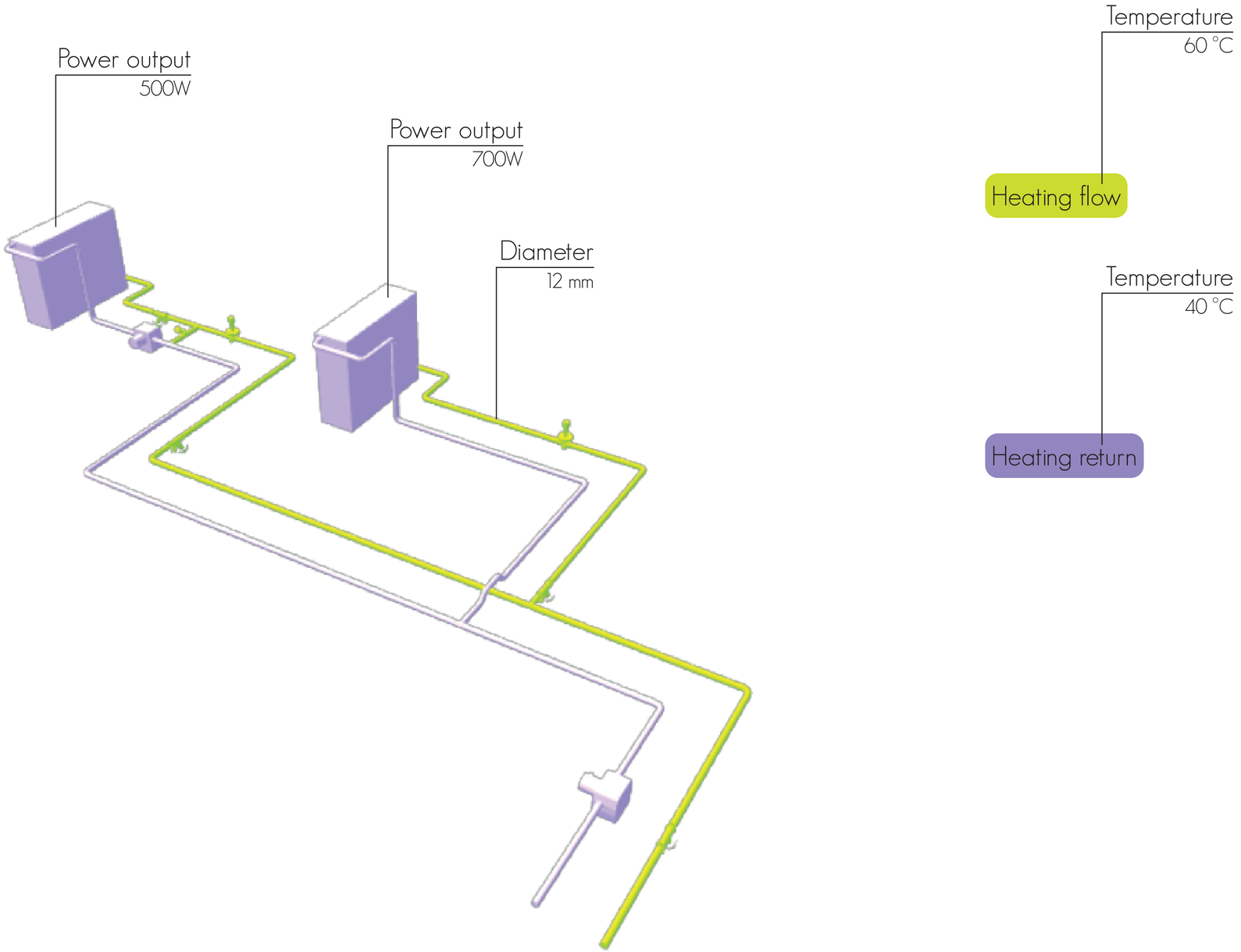
Subclass of



System
Return System
Heating flow
Supply System
Heating return


Heating flow
Has component
Heating return
Supplies fluid to
Returns fluid to


Power output
500W
Power output
700W
Diameter
12 mm
Temperature
60 °C
Heating flow
Temperature
40 °C
Heating return

Infer

Δtemperature → dt

Where

type → Terminal

has component → ●

has component → ●

type → Return System

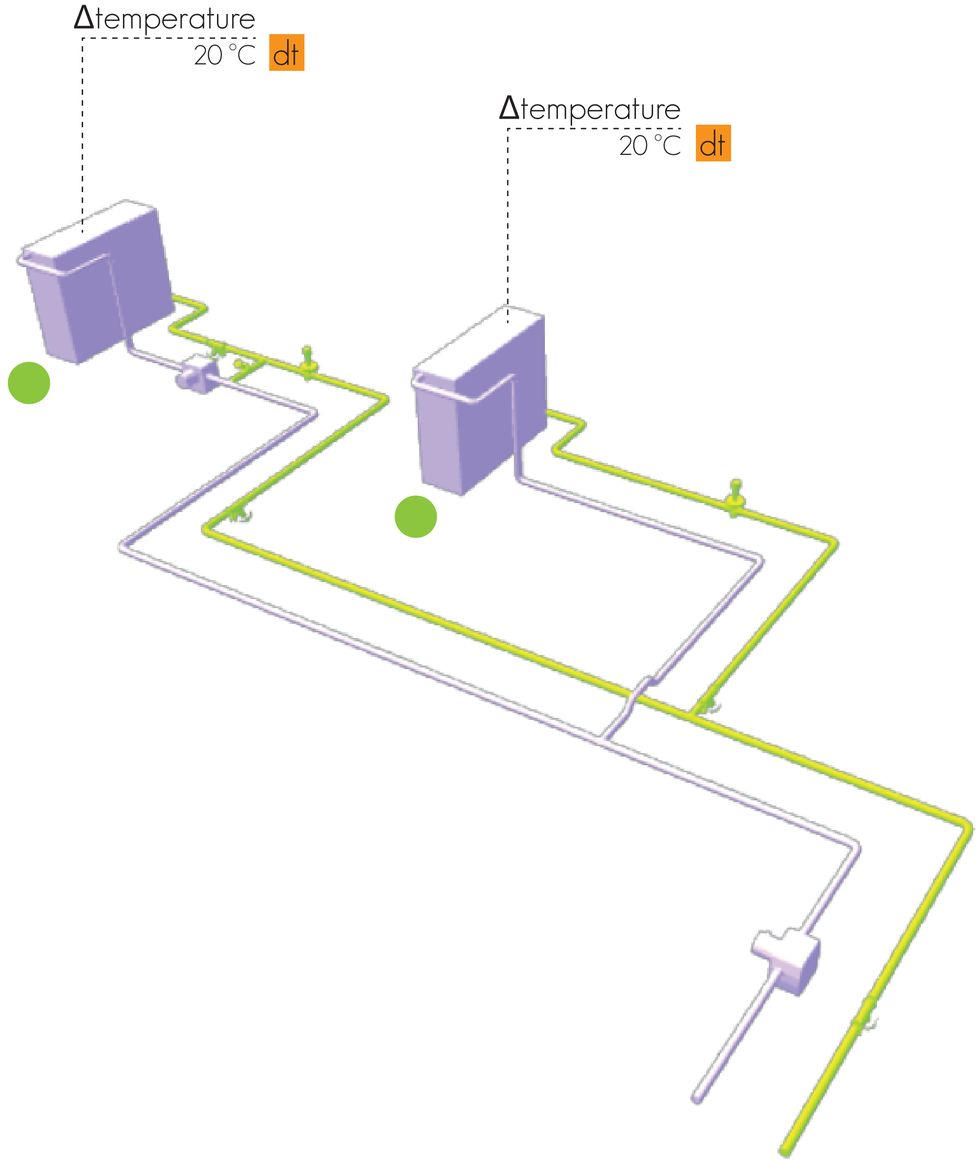
type → Supply System

temperature → tR

temperature → tF

BIND abs(tR - tF) AS dt

7/5



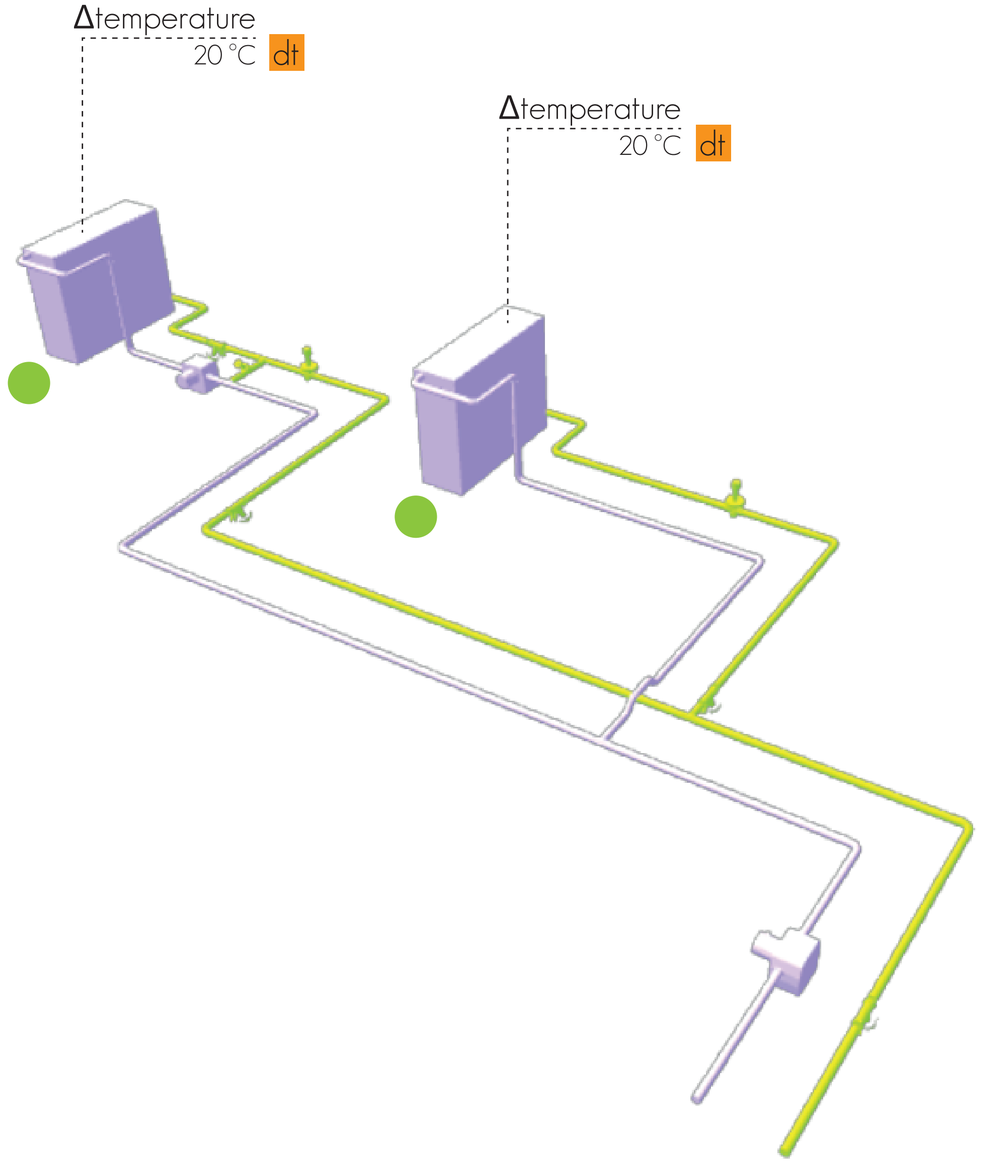
Temperature
60 °C tF

● Heating flow

Temperature
40 °C tR

● Heating return

```
[ ?t , ex:fluidTemperatureDifference, ?dt ]
:-
[ ?t , a, fso:Terminal ],
[ ?sysR , fso:hasComponent, ?t ],
[ ?sysF , fso:hasComponent, ?t ],
[ ?sysR , a, fso:ReturnSystem ],
[ ?sysF , a, fso:SupplySystem ],
[ ?sysR , ex:temp, ?tR ],
[ ?sysF , ex:temp, ?tF ],
BIND(abs(?tR-?tF) AS ?dt).
```



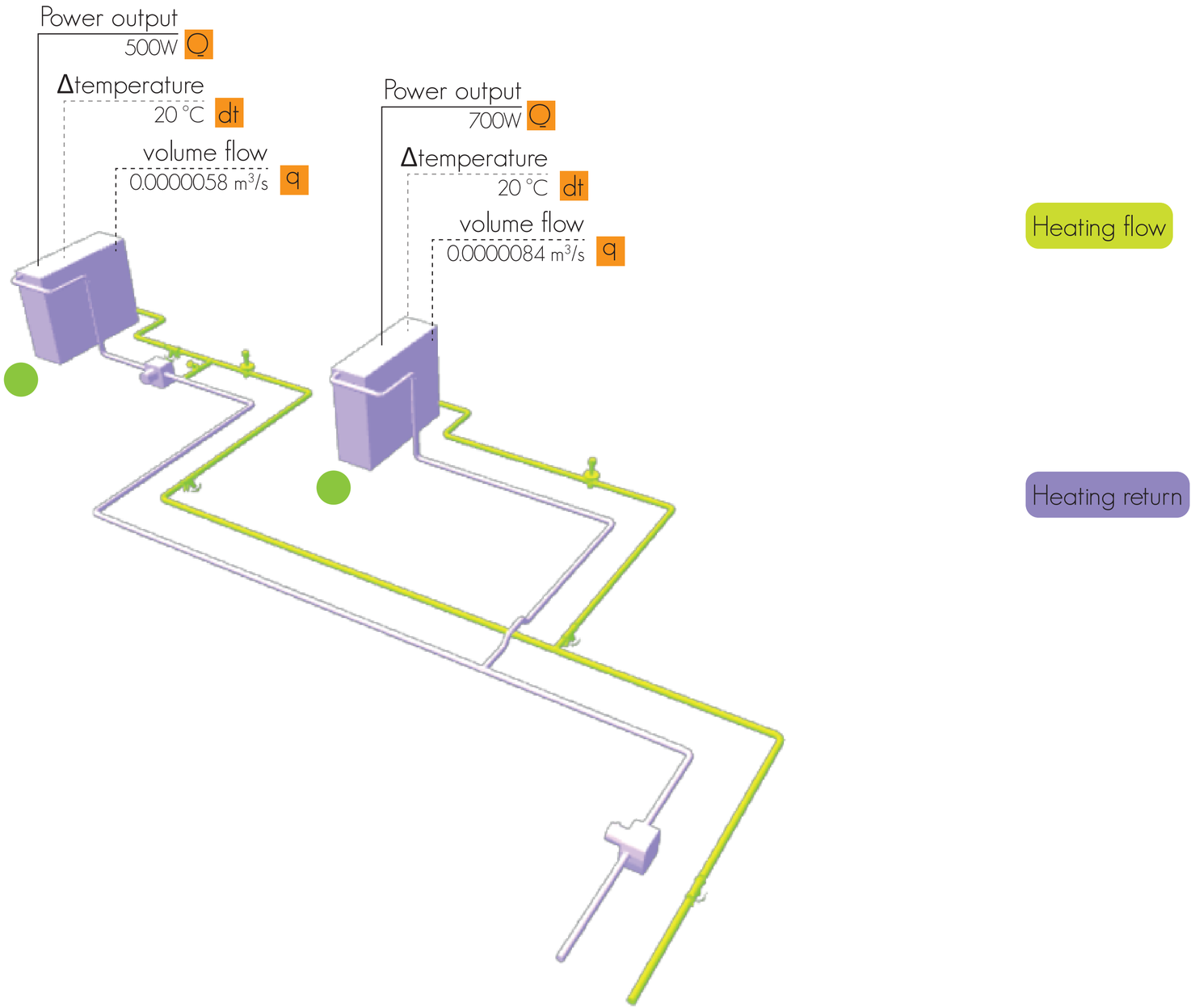
Temperature
60 °C tF

Heating flow

Temperature
40 °C tR

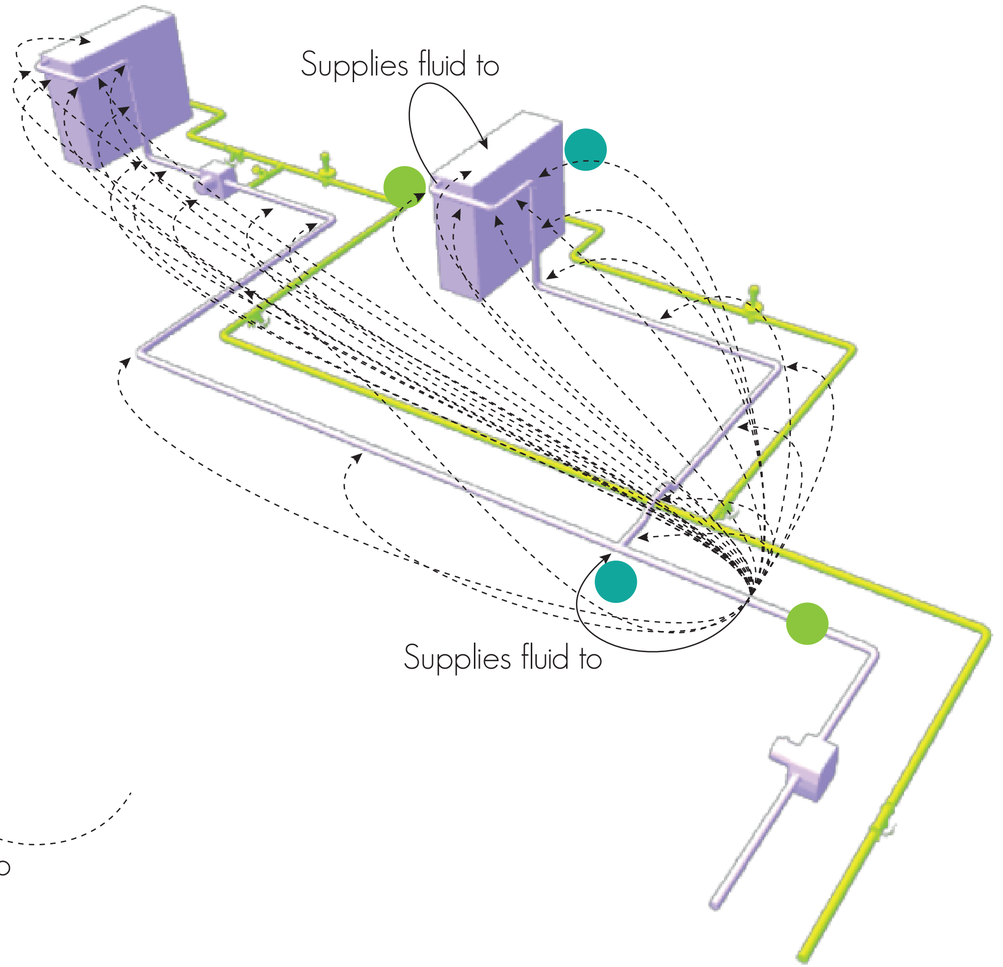
Heating return

```
[ ?t , ex:terminalVolumeFlow, ?q ]
:-
[ ?t , a, fso:Terminal ],
[ ?t , ex:fluidTemperatureDifference, ?dt ],
[ ?t , ex:powerOutput, ?Q ],
BIND( (0.86 *(?Q/?dt)/1000/3600) AS ?q ).
```



```
[?x, ex:indirectlySuppliesFluidTo, ?y]
:-
[?x, fso:suppliesFluidTo, ?y] .
```

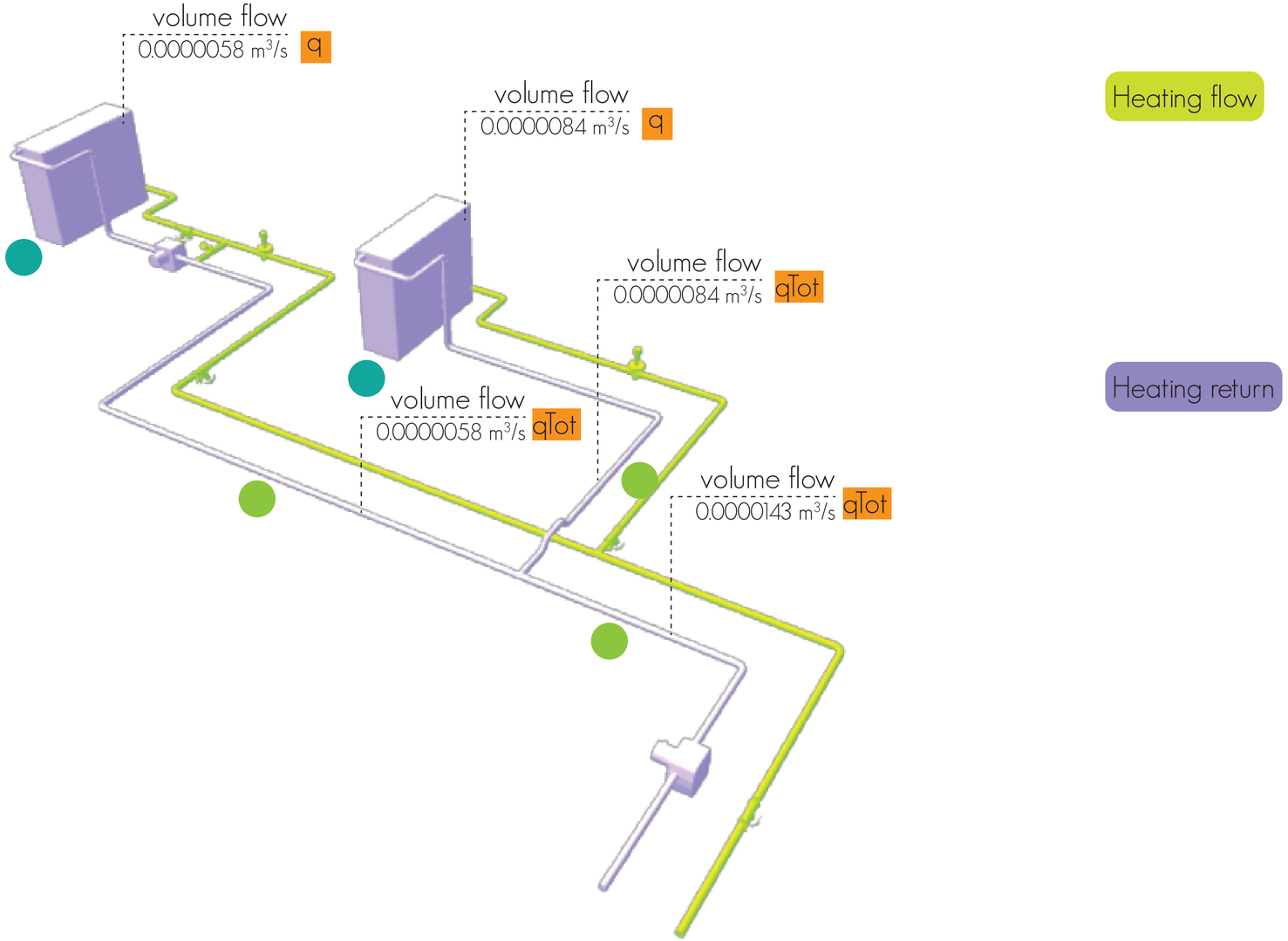
```
[?x, ex:indirectlySuppliesFluidTo, ?z]
:-
[?x, fso:suppliesFluidTo, ?y],
[?y, ex:indirectlySuppliesFluidTo, ?z].
```



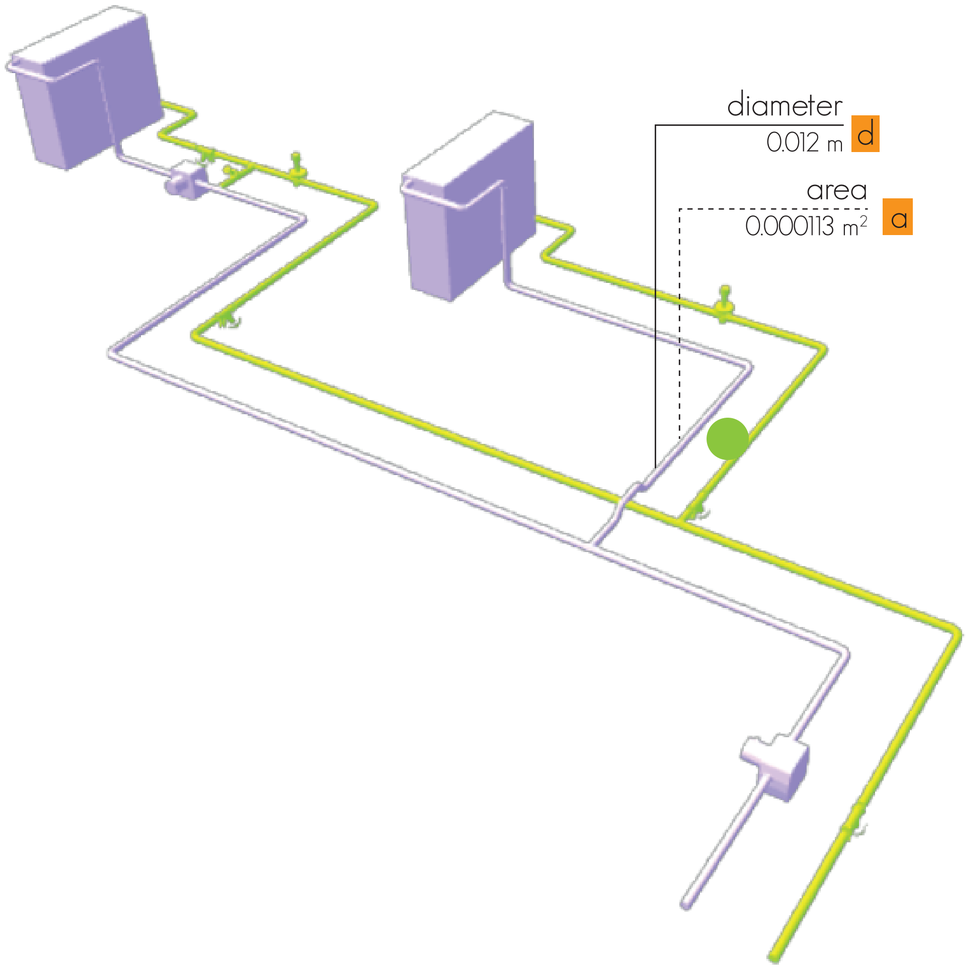
Heating flow

Heating return

```
[?s, ex:segmentVolumeFlow, ?qTot]
:-
[?s, a, fso:Segment],
AGGREGATE(
    [?s, ex:indirectlySuppliesFluidTo, ?t],
    [?t, a, fso:Terminal],
    [?t, ex:terminalVolumeFlow, ?q]
    ON ?s
    BIND SUM(?q) AS ?qTot
) .
```



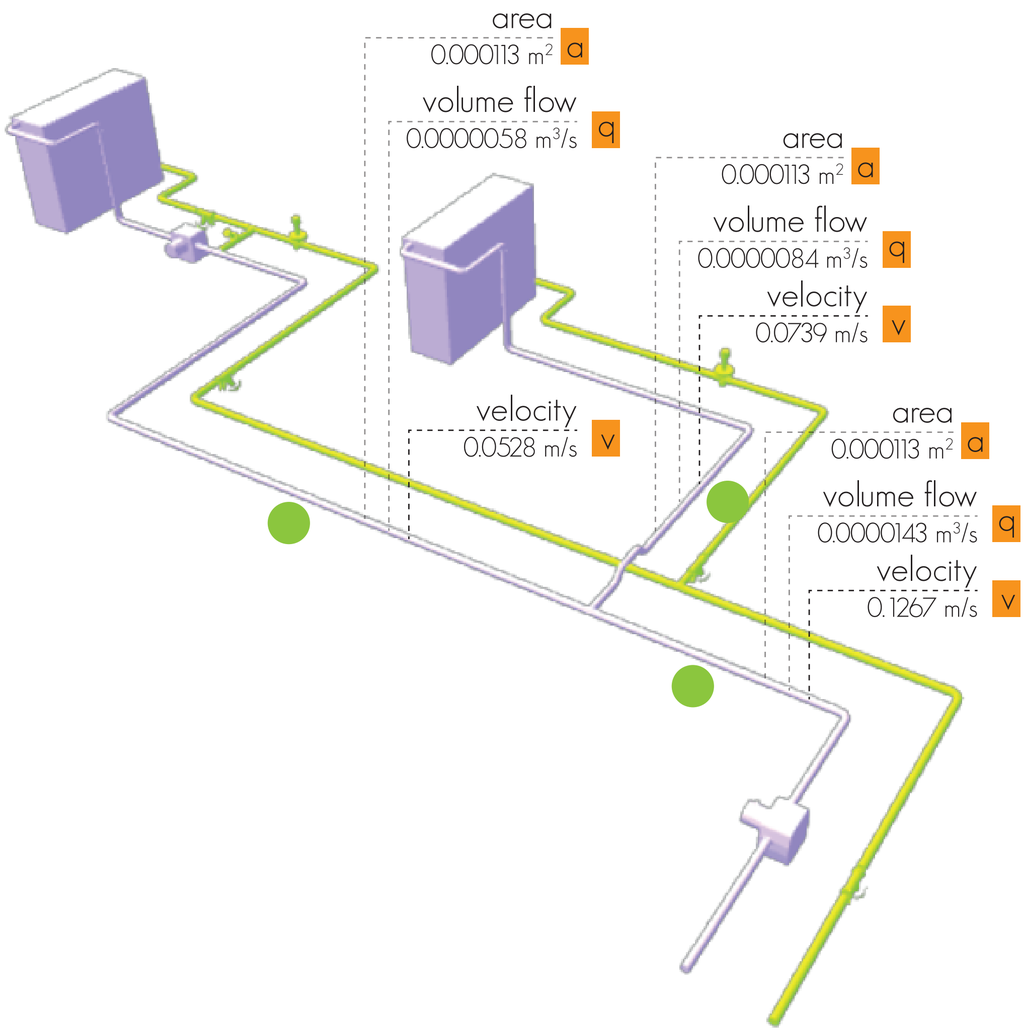
```
[?s, ex:innerCrossSectionalArea, ?a]
:-
[?s, a, fso:Segment],
[?s, ex:innerDiameter, ?d],
BIND(PI() * POW((?d/2), 2) AS ?a).
```



Heating flow

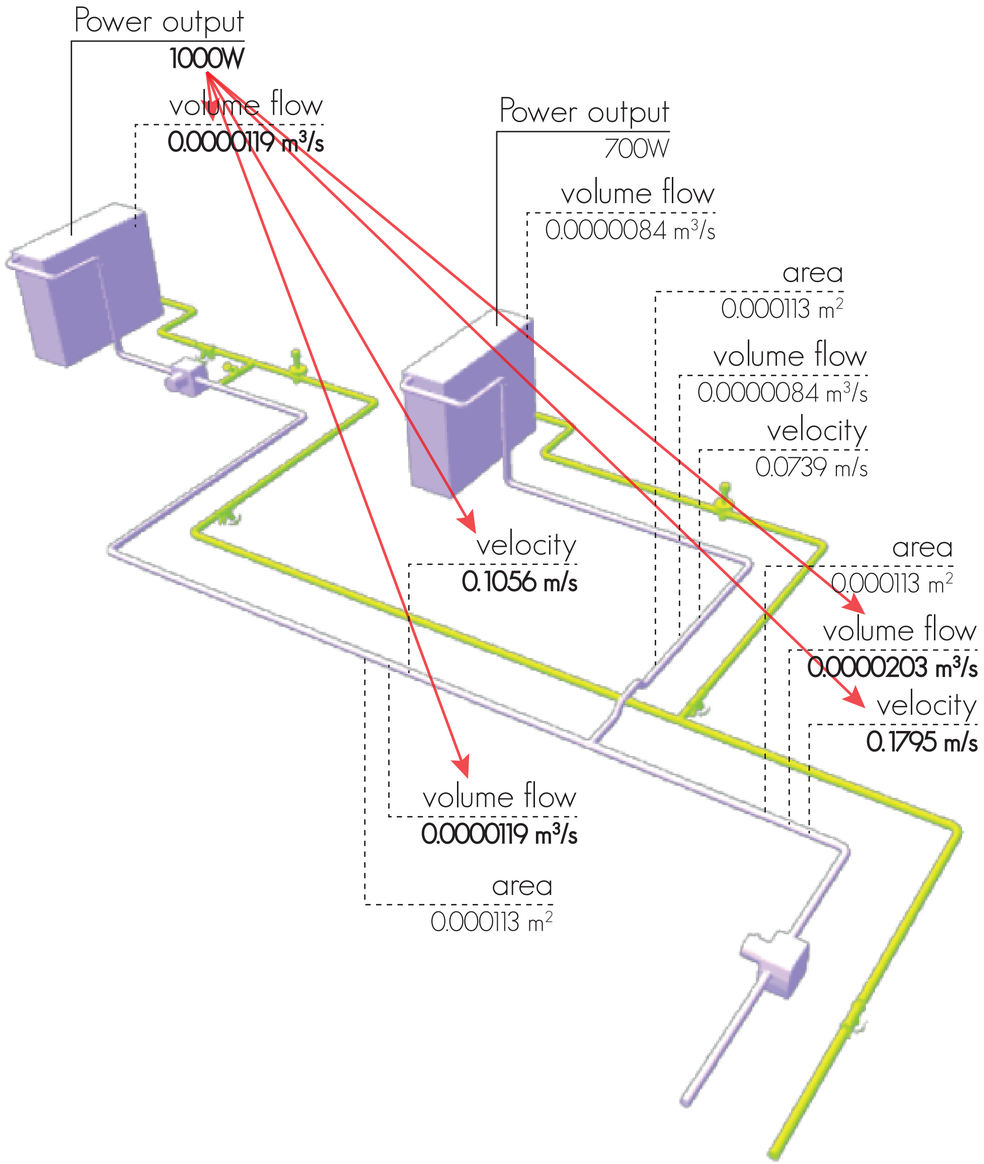
Heating return

```
[?s, ex:fluidVelocity, ?v]
:-
[?s, a, fso:Segment],
[?s, ex:innerCrossSectionalArea, ?a],
[?s, ex:segmentVolumeFlow, ?q],
BIND(?q/?a AS ?v).
```



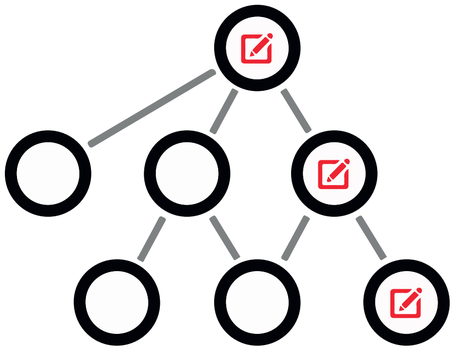
Heating flow

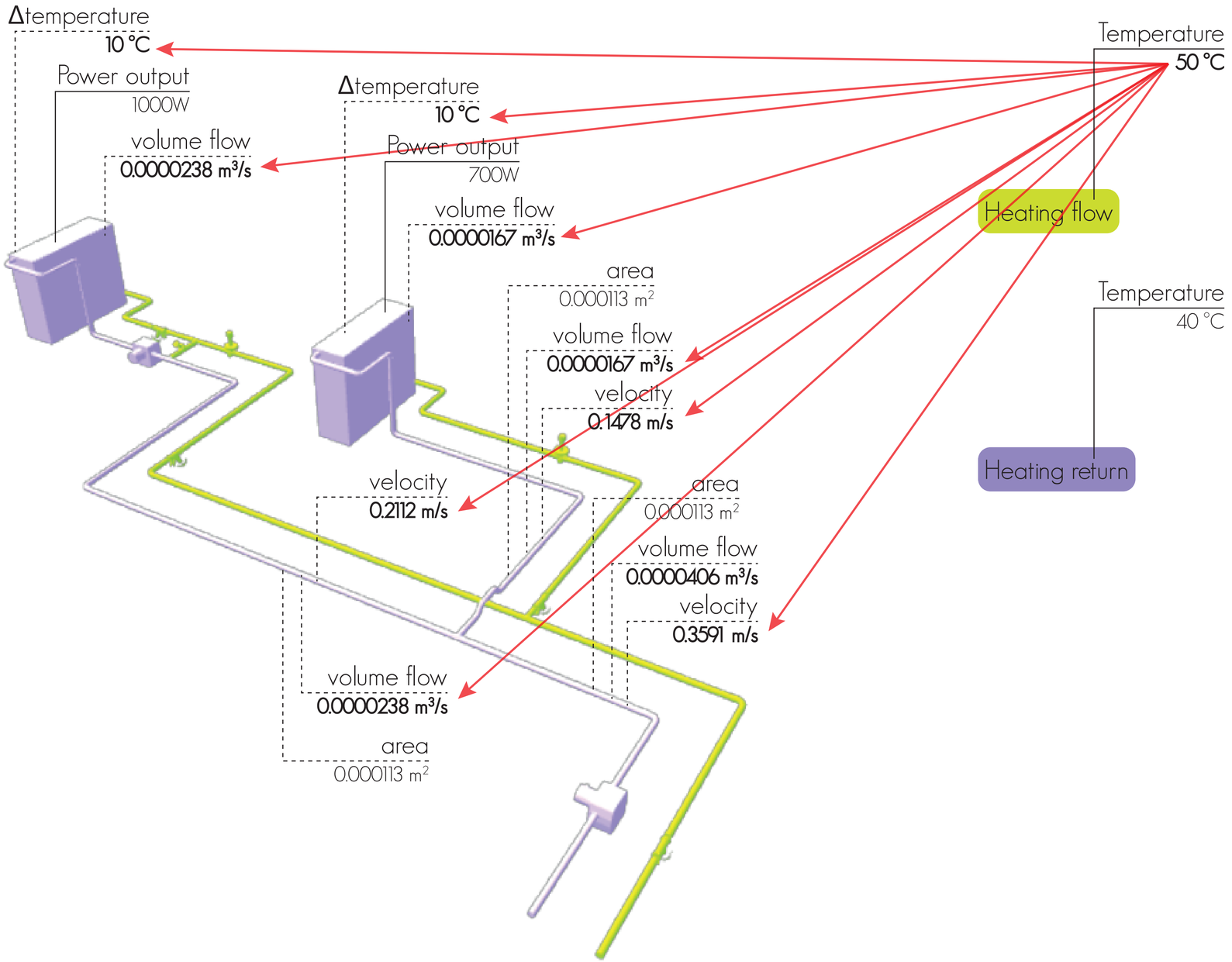
Heating return



Heating flow

Heating return




Δtemperature
10 °C
Power output
1000W
volume flow
0.0000238 m³/s
Δtemperature
10 °C
Power output
700W
volume flow
0.0000167 m³/s
Temperature
50 °C
Heating flow
area
0.000113 m²
volume flow
0.0000167 m³/s
velocity
0.1478 m/s
Temperature
40 °C
Heating return
velocity
0.2112 m/s
area
0.000113 m²
volume flow
0.0000406 m³/s
velocity
0.3591 m/s
volume flow
0.0000238 m³/s
area
0.000113 m²