

ENGINEERING  
TOMORROW

*Danfoss*

Hydronic floor heating control

# Danfoss *Icon*<sup>TM</sup> Room thermostats made to match your switch frames

Advanced room controls for hydronic floor heating and other applications with actuators.



**Fits**

into compatible  
switch frames from  
manufacturers such  
as Busch-Jaeger, Gira,  
Berker and Merten.

[icon.danfoss.com](http://icon.danfoss.com)



# Matches the switch frames

## Complements the interior

The Danfoss *Icon*™ room thermostat has been designed to blend in with any interior. This is why we consciously chose to make it look like most common switch frames.

When not in use, the room thermostat display turns off and becomes virtually invisible. When the screen is touched, the display comes to life instantly and displays the current room temperature.

## Build it into a switch frame

To achieve a perfect match between thermostat, light switches and electrical sockets, Danfoss *Icon*™ in-wall versions can be easily fitted into many of the most popular switch frames.

You can find an overview of compatible switch frames at:

[icon.danfoss.com](https://icon.danfoss.com)



Berker Q3 frames

Merten M-plan frames

Gira E2 frames





# Danfoss *Icon*™ room thermostats

## Easy to install and functional design

Danfoss *Icon*™ is designed to make people's life easier – in every touchpoint from installation to daily use.

For instance, the angle of the frame on the in-wall versions can be slightly adjusted to compensate for inaccurate junction box installation. Additionally, the plastic material is UV-resistant and is easy to clean thanks to its glossiness.

### In-wall

**Front module**  
50x50mm.

Placed inside the wall frame and snapped onto the rear module. Holds the wall frame in place and makes it possible to adjust the angle for perfect aesthetic result.

**Wall frame**  
80x80mm.

Can be exchanged with any compatible switch frame.

**Rear module**

Connected with wires and mounted inside a junction box.

### On-wall

**Front module**  
50x50 mm.

Place inside the frame once this is snapped onto the rear part.

**Frame**  
86x86 mm.

Snap the frame onto the rear part.

**Rear part**

Mount the rear part on the wall or on top of a junction box and connect the wires to the terminal.

In-wall



On-wall



### In-wall or on-wall?

If the Danfoss *Icon*™ room thermostat fits into the junction box, we recommend choosing the in-wall version. With a depth of only 11 mm and 80 x 80 mm square, it effortlessly blends in with the interior design scheme.

The on-wall version is the ideal choice if the junction box is not compatible or not present. At just 25 mm in depth and 86 x 86 mm square, the on-wall version is no more obtrusive than a standard light switch.



# Danfoss *Icon*™ Master Controllers

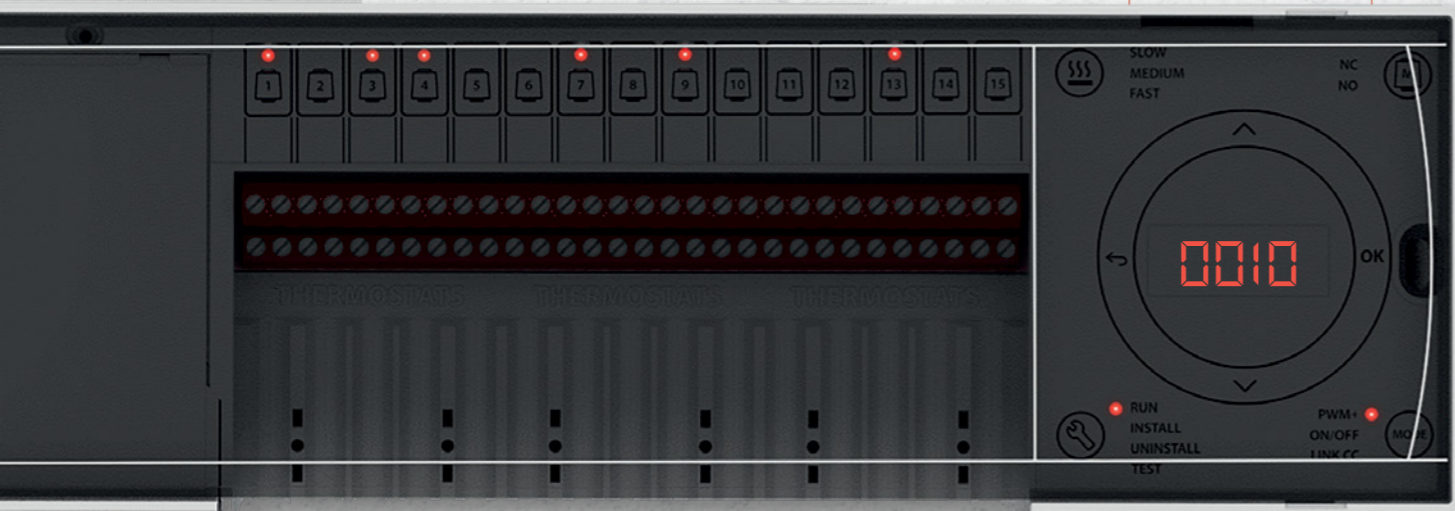
## Modular concept to cover every application

The 24V/wireless master controller offers several advanced features which can be expanded even further with the Expansion Module. For instance, you can choose between 10 pre-defined applications that define the actions of inputs and outputs on the master controller.

To get a full overview of all applications please visit:

[icon.danfoss.com](http://icon.danfoss.com)

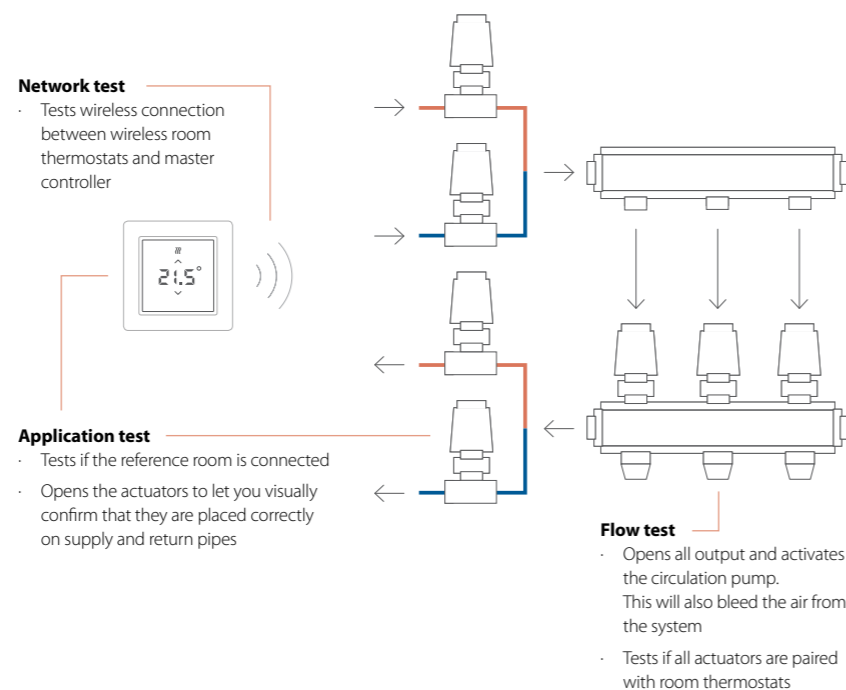
**Example:**  
When choosing Application "0010" on the master controller, outputs 1-4 are reserved for controlling four actuators in a 4-pipe heating/cooling system.



## Commissioning test

Based on the application chosen, the 24V/wireless master controller will check if the system is installed correctly. The feature ensures that everything works correctly, allowing you to leave the site with a peace of mind.

**See example to the right** of a 3 step commissioning tests for "Application 0010" (heating/cooling in 4-pipe system).



## Use scheduling to **save energy**

Danfoss *Icon*™ enables you to automatically change the room temperature throughout the day. The adaptive learning feature turns the heating on at precisely the right moment to achieve the desired temperature at the scheduled time. Every degree the temperature is lowered **saves 5% of energy use.**

Bear in mind that changing the temperature in a room with standard hydronic floor heating may take several hours.

## Pre-defined scheduling

The 230V programmable Danfoss *Icon*™ room thermostat features seven pre-defined schedules that can be selected at the touch of an icon. This eliminates the tedious business of setting up schedules, improves comfort and contributes to reducing energy use. The chosen schedule can be overridden at any time by simply pressing the "Away", "At home" or "Asleep" icons.



## Danfoss *Icon*™ App

### Try it out

The 24V/wireless master controller can be expanded with the App Module, allowing system operation, scheduling of times and temperatures, and much more from any Apple or Android mobile device.

Search for "Danfoss Icon" in the App Store or Google Play to try out the App in demo mode.





## Automatic balancing for energy savings and comfort

### Why balance?

Water chooses the easiest path with the least resistance. In floor heating systems, the consequence is an uneven heat distribution where the shortest loop will get the most water, resulting in a faster warming of smaller rooms at the expense of the larger rooms. To achieve harmonic room temperatures, the floor heating system should be hydraulically balanced as it provides maximum comfort with minimum energy costs.



**Small rooms** with short pipes experience limited pressure losses. Therefore, the short pipe will "steal" most of the energy / water at the expense of the long pipes and will be heated quickly.

## Demand based supply temperature for increased comfort and easy installation

### Why outdoor temperature compensation is not always optimal:

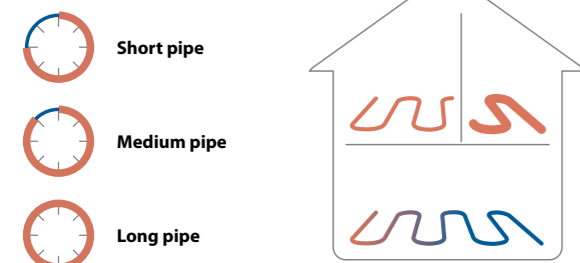
The supply temperature is often controlled via outdoor temperature compensation. However, outdoor temperature compensation requires wiring to an outdoor sensor and heat curve settings. Furthermore, the outdoor temperature does not necessarily reflect the actual heat demand inside of the house.

### How automatic balancing works

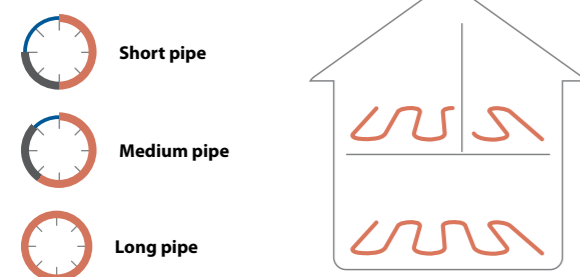
Based on the ability to meet the setpoint in each room, the Danfoss *Icon™* system will know the approximate size of each output (pipe length). With Danfoss *Icon™* automatic balancing, the system will reduce the "ON time" for the shorter pipes / small rooms and prioritize the longer pipes / large rooms. Thereby all rooms will get their fair ratio of the available flow when heat demand increases.

○ ON time   ● OFF time   ◐ Forced OFF time

System **without** automatic balancing when heat demand suddenly increases



System **with** automatic balancing when heat demand suddenly increases



**Large rooms** with long pipes experience pressure losses. When heat demand suddenly increases the long pipes need to be prioritized at the expense of short pipes. Or else it will take too long to heat the room.

### How demand based supply temperature works

Danfoss *Icon™* 24V and wireless systems detect actual and required temperatures in each room. Based on the information, an actuator on the mixing shunt will constantly adapt the supply temperature to the actual heat demand. In effect, comfort will increase and the return temperature will decrease for improved energy efficiency.



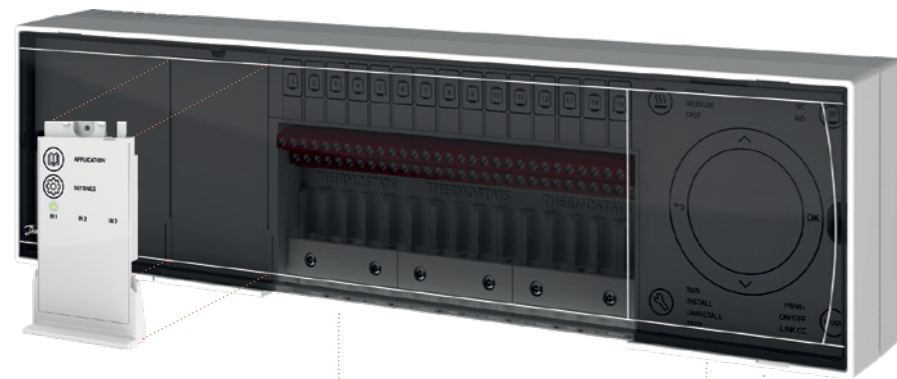
### The sun can heat up a room - even when it is cold outside.

By basing the supply temperature on the actual room demand, the Danfoss *Icon™* system takes heat from appliances, sunshine, and people in the room into account when setting the supply temperature.

The result is a comfortable and welcoming room temperature no matter the circumstances.



# 24V and wireless systems with advanced features and optional modules



**Master Controller**  
With automatic balancing, active pump relay, boiler relay, commissioning test, PWM for accurate control, adaptive learning, and other advanced heating control options. Works with 24V and/or wireless room thermostats. Available with 10 and 15 outputs and can be extended with up to three masters in a system.

**Expansion Module**  
With ten pre-defined applications that can handle global away input, cooling input, dew point sensor, automatic cooling change-over and supply temperature control.

**App Module**  
To establish Wi-Fi connection to the router which enables remote access via the Danfoss Icon™ App.

**Radio Module**  
To establish wireless connection to wireless room thermostats.

**Wired bus communication either as star configuration or daisy chain.** Wired and wireless room thermostats can be mixed in the same system.



**24V Room Thermostats (in-wall or on-wall)**

- Noiseless switching
- Can be build into compatible switch frames (in-wall only)
- Temperature limitation
- Optional floor sensor (088U1110)



**Wireless Room Thermostats (on-wall only)**

- Noiseless switching
- Temperature limitation
- Available with infrared floor sensor

# 230V room thermostats with optional master controllers



**Danfoss Icon™ Dial**

- Can be build into many switch frames (in-wall only)
- Up to 5x2W NC or NO actuators
- Thermal feedback for accurate control
- Temperature limitation



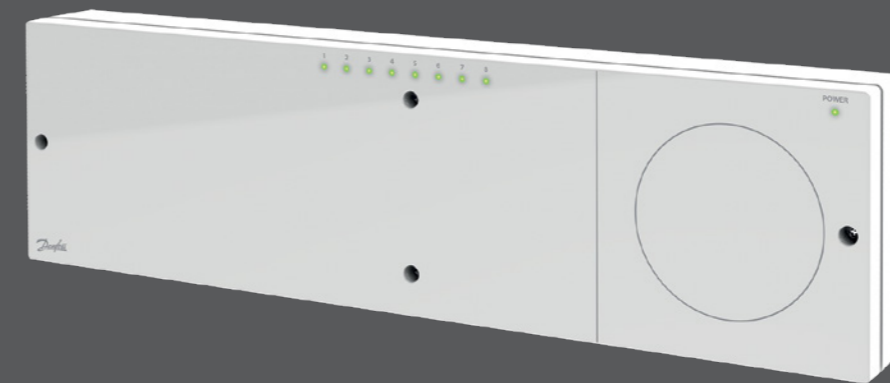
**Danfoss Icon™ Display**

- Noiseless switching
- Can be build into many switch frames (in-wall only)
- Up to 5x2W NC or NO actuators
- PWM for accurate control
- Temperature limitation
- Choose between radiator, light floor heating and heavy floor heating PWM setting



**Danfoss Icon™ Programmable**

- Noiseless switching
- Can be build into many switch frames (in-wall only)
- Up to 5x2W NC or NO actuators
- PWM for accurate control
- Temperature limitation
- Choose between radiator, light floor heating and heavy floor heating PWM setting
- Seven pre-defined schedules
- Adaptive learning
- Input for cooling and central 'away'
- Optional floor sensor (088U1110)



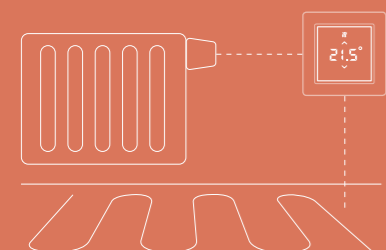
**Master Controller**

**Basic version:**

- Pump relay (potential free)
- Boiler relay (potential free)
- 8 channels, 8 outputs

**Featured version:**

- Active 230V pump output
- Boiler relay (potential free)
- Global away input (230V)
- Cooling input (230V)
- 8 channels, 14 outputs

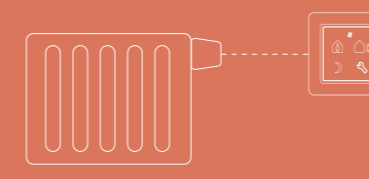


**24V/wireless supports multiple heat emitters**

- Control radiators and floor heating in the same room. The system will ensure that the radiator is only heated when the floor heating is unable to provide enough heat. An infrared or wired floor temperature sensor is required.

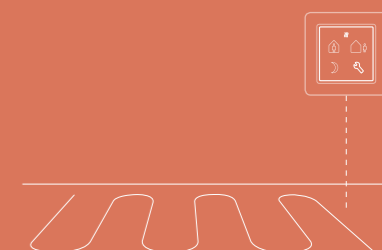
**or ...**

- Control radiators and/or floor heating in separate rooms
- In all cases it is required that an actuator is electronically controlled via the Master Controller.









**230V supports multiple heat emitters in separate rooms**


Control radiators and/or floor heating in separate rooms. Requires that an actuator is electronically controlled via the room thermostat.









# The Danfoss *Icon*<sup>™</sup> family





| In-wall Room Thermostats  |              | Type  | Code     |
|---|--------------|-------|----------|
|  | Dial         | 230 V | 088U1000 |
|  | Display      | 230 V | 088U1010 |
|   | Display      | 24 V  | 088U1050 |
|  | Programmable | 230 V | 088U1020 |

| On-wall Room Thermostats  |              | Type              | Code     |
|---|--------------|-------------------|----------|
|  | Dial         | 230 V             | 088U1005 |
|   | Dial         | Wireless          | 088U1080 |
|   | Display      | 230 V             | 088U1015 |
|  | Display      | 24 V              | 088U1055 |
|   | Display      | Wireless          | 088U1081 |
|   | Display      | Wireless Infrared | 088U1082 |
|  | Programmable | 230 V             | 088U1025 |

| 24 V Master Controllers   |   | Code     |
|---|---|----------|
|  | 10 channels<br>Combine with Radio Module for wireless | 088U1071 |
|   | 15 channels<br>Combine with Radio Module for wireless | 088U1072 |

| 230 V Master Controllers  |          | Code     |
|---|----------|----------|
|  | Basic    | 088H0016 |
|  | Featured | 088U1031 |

| Accessories only for 24 V Master Controllers  |                  | Feature  | Code     |
|---|------------------|--|----------|
|  | Expansion Module | Add more features to 24 V Master Controllers                             | 088U1100 |
|  | App Module       | Control 24 V Master Controllers via Danfoss <i>Icon</i> <sup>™</sup> App | 088U1101 |
|  | Repeater         | Extend the wireless signal   | 088U1102 |
|  | Radio Module     | For wireless connection to 24 V Master Controllers                       | 088U1103 |

| Accessories   |                                    | Feature   | Code     |
|---|------------------------------------|---|----------|
|  | Floor Sensor                       | For 230 V programmable and 24 V display version   | 088U1110 |
|  | Dew Point Sensor                   | To prevent condensation in cooling application. Mounted on manifold. Powered by Expansion Module              | 088U0251 |
|  | Surface Temperature Sensor, ESM-11 | For automatic change over between cooling and heating and for controlling supply temperature                  | 087B1165 |
|  | Actuator                           | For demand based supply temperature which requires high IP class. Requires adapter 193B2005 for RA connection | 193B2148 |

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