

This file is available at
<ftp://ftp.zwaveeurope.com/pub/doc/DanfossplusVERA.pdf>

How to include and use the Danfoss Living Connect with VERA

Inclusion

This setup works from firmware version **1.1.1338 and up**. In case you have a older firmware, visit the webpage micasaverde.com/vera2 for an update. Its best practice to make sure the Danfoss living connect is in reset state. Push the M button when inserting the batteries and keep the button pushed for 5 seconds. After this procedure the Danfoss device will be in reset state and the M symbol appears on the LCD screen.

Now turn the VERA into inclusion mode and press the M button shortly. VERA should start including the device.

- a) Stop the Inclusion mode on VERA by short pressing the Z-Wave button. You will now see the message „Server Busy“ on VERAs console
- b) After the VERA has done the initial configuration, you will see the new thermostat widget on the dashboard. It is marked with the message „Wakeup to Configure“.

Press the M button again to manually wakeup the Danfoss device for final configuration.

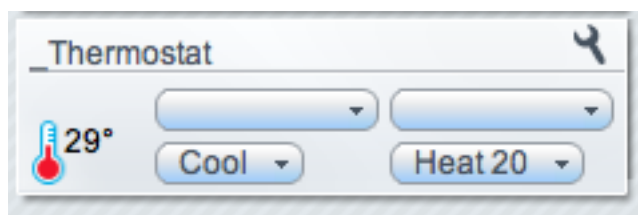
Now the device is ready to be used.

The Danfoss Thermostat is a battery powered device and will only wakeup after a certain time interval to receive new commands. There is a tradeoff. A more frequent wakeup will drain the battery faster while a less frequent wakeup may cause delays between the moment a new temperature is set in VERA and the moment the thermostat starts to control the temperature in the room accordingly.

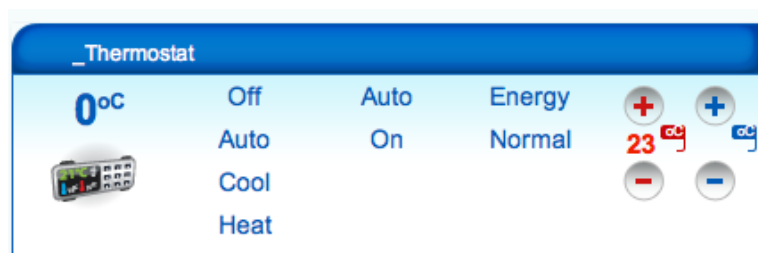
VERA will set a wakeup time of 1800 s = 30 min on default. The wakeup time can be as short as 5 min = 300 s. You can change the wakeup time by clicking on the wrench symbol in the right upper corner of the widget and chose “device configuration”. After changing the wakeup time, make sure that the new time is saved using the central SAVE button of VERA. Beware that you have to wait one more time the old wakeup interval before the new wakeup become effective.

Usage by VERA

Vera shows all thermostats with a generic widget that allows to control cooling set-point, heating mode (heating is on of off) and the heating set point.



Control Widget for UI 4



Control Widget for UI 5

For the Danfoss thermostat only the Heating set point is relevant and all other settings can be ignored.

The basic work principle of the Danfoss Thermostat

The thermostat measures the temperature in the room using a temperature sensor in the device itself. The user can define a comfort temperature in the room the thermostats will try to achieve by moving the valve of the heating. Additionally the thermostat can contain a heating schedule. A heating schedule defines deviations from the comfort temperature. For every weekday the device accepts up to nine times where a new temperature and a time can be defined. This definition however is always relative to the comfort temperature and is supposed to allow energy saving in case no comfort temperature is needed.

Here are a couple of definitions to better understand the work of the thermostat:

1. **Actual Room Temperature:** This is the actual temperature in the room.
2. **Comfort Temperature:** This temperature is set as the desired normal room temperature and will be used to control the heat unless there is a setback point defined.
3. **Setback Temperature:** A schedule can define a temperature at a certain time different from the comfort temperature. This temperature will then be used to control the heat until a new or no setback temperature is defined.

This means that the thermostat is either controlled by changing the comfort temperature (manually or wirelessly via Z-Wave) or using a schedule of times and setback points that will use the comfort temperature as reference point. Changing the comfort temperature will impact the control by schedule because the reference temperature is changed.

Temperature measuring

The VERA widget shows the temperature in the room when reported by the thermostat controlled. The Danfoss device does not report the temperature. The reason is that the device can't measure the perceived temperature in the room but the temperature in the device only. Since the device is very close to the heating and even physically connected to the heating, this measured temperature is not the temperature in the room. The thermostat will however use this temperature, the position of the valve, the history of changes of the measured temperature in relation to the change of the valve and some other historical data to estimate the perceived room temperature. Danfoss has decided neither to report the obviously wrong measured value nor the calculated value via Z-Wave to avoid any irritation of the user.

If the user wants to know the correct room temperature it is recommended to add a simple temperature sensor on a position the user finds appropriate as a reference point for the temperature in the room.

Comfort Temperature

The comfort temperature can be changed in two ways:

- Using the buttons UP and DOWN on the device itself. The LCD display will show the actual comfort temperature.
- Using the Heat Set Point Dialog on VERA and send the new comfort temperature to the device.

Any change of the Set Point on the device will update the heating temperature display on VERA within a couple of seconds. A change of the temperature in the VERA UI will be transferred to the device and shown there only after the

next wakeup of the device. In case the temperature on the device and on the VERA was changed simultaneously the manual setting on the device will win.

Control of the valve

The Danfoss thermostat will control the valve according to the set point and possible scheduled setback points. Depending on the temperature difference between actual ambient temperature and desired room temperature and some historical data an algorithm in the device decides when, how often and how far the valve will be turned. It's possible that the device moves the valve completely immediately after setting the new temperature – in this case the move can be heard. It's also possible that the algorithm decides to move the valve in a series of micro steps that will not generate any sound.

If the user pushed the middle button, the thermostat will conclude that the user is concerned about the temperature and will speed up the valve setting.

Scheduled Setback

The scheduled setback mechanism gives users the chance to change the comfort time with a regular schedule. One example of such a schedule would suggest keeping the comfort temperature in the morning between 6 and 9 and in the evening between 17 and 23 o'clock. In the time between this the thermostat shall reduce the heat by 4 degree to save energy.

In this case the user has to define setback point for every day of the week for 6,9,17 and 23 o'clock.

The scheduled setback mechanism is a very comfortable way to implement energy saving schedules and it gives the thermostat the information to smoothly change the temperature to the desired level without overshooting the heat.

Hence it is recommended to use scheduled setbacks. Unfortunately VERA does not support to program scheduled setbacks at the moment. Its possible to emulate the very same behavior using the scene logic of VERA but this will require more work, introduces the delay of the wakeup intervals to the calculation of the timings and does not prevent the thermostat from overshooting.