Data Sheet

living connect®, Z-Wave Certified Electronic Radiator Thermostat

Application

This documents provides information about the Z-Wave commands supported by *living connect*® and guidelines on the implementation of Z-Wave controllers as well as general description of the *living connect*® and how to mount it on a radiator.

living connect® is a electronic radiator thermostat. It can be controlled by either a Danfoss Link™ CC (Central Controller) or a Z-Wave certified controller.

(For control by Danfos Link™ CC see separate data sheet)

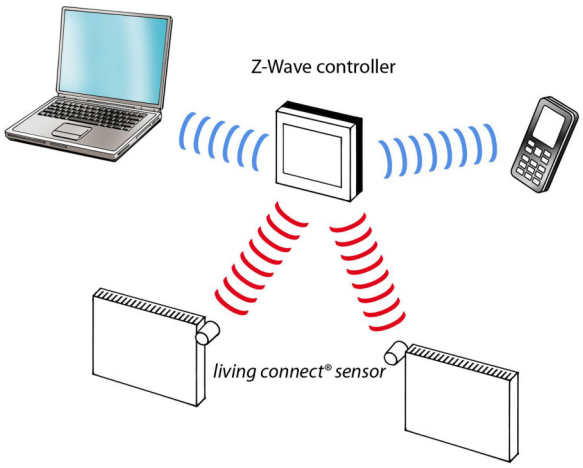
living connect® uses Z-Wave wireless communication technology, is easy to install and is supplied with adapters for all thermostatic valves manufactured by Danfoss and most other radiator valve manufacturers.

living connect® is battery powered, compact and very easy to operate with only three buttons on the front.

The temperature can be changed at any time using the buttons on *living connect*®. The change is transmitted directly to the controller, which can synchronize the other electronic radiator thermostats in the same room. *living connect*® features an open-window function, which closes the valve if the temperature in the room is falling dramatically. Main features in a system with the controller:

- Energy saving
- Easy to install
- Easy to operate - only three buttons
- Provides high comfort
- Open window function
- Valve exercise function
- PID control
- Weekly programs with variable set points for each day
- Battery lifetime 2 years, if properly supported by the Z-Wave controller
- Child lock
- Frost protection
- Backlit display

System example



Code numbers

Code no.	Adapter (included)	Language instructions
014G0001	Danfoss RA	UK/DE/DK/NL FR/PL/SE/FI
014G0002	Danfoss RA and M30 x 1.5 (K)	UK/DE/DK/NL FR/PL/SE/FI

Accessories

Type	Code no.
RAV & RAVL adaptor	014G0250
RA adaptor	014G0251
M30 x 1.5 (K) adaptor	014G0252
RTD adaptor	014G0253

Specification

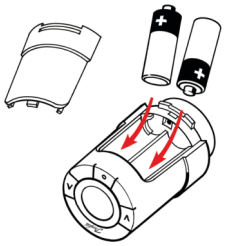
Control system/input	Standard Z-Wave control units
Transmission frequency	Wireless Z-Wave/868.42 MHz
Transmission range	Up to 30 meters
Synchronizing	Configurable (5 min. recommended)
Screen/display	Grey digital with backlit
Actuator type	Electromechanical
Software classification	A
Control	PID
Power supply	2x1.5V AA alkaline, class III (SELV)
Battery life	2 years
Low battery signal	Battery icon and alarm bell will flash in display. If the battery level is critical, the whole display will flash.
Ambient temperature	0 to 40°C
Transportation temperature range	-20 to 65°C
Temperature setting range	4 to 28°C
Recommended use	Residential
Open-window function	Yes
Size	RA: L: 91 mm Ø:51 mm/K: L78 mm Ø: 51 mm
Noise level	< 30 dBA
Weight incl. battery	177 g
Safety classification	Type 1
Mechanical strength	70 N (max. force from valve)
Maximum water temperature	90°C
Movement type	Linear
Spindle movement	2-3 mm on valve
Maximum extension	4.5 mm
Temperature sampling	Measures temperature every minute
Speed of adjustment	1 mm/s
Power consumption	3 mW in standby, 1.2 W when active
Ball pressure test	75°C
IP class*	20

* This thermostat should not be used in hazardous installations or in places where it will be exposed to water.

Marking

Installation

living connect® is supplied with adapters for Danfoss RA valves and valves with M30X1.5 (K) connections (code no. 014G0002), two alkaline AA batteries and a 2 mm Allen key.

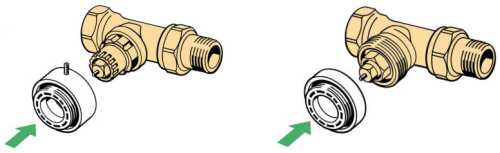


Inserting the batteries

Remove the battery cover and insert the two batteries. Ensure that the batteries are correctly inserted. A capital "M" must flash on the display before installation.

RA **K**

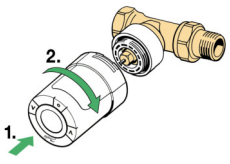
- Start by mounting the adapter.



- Tighten the RA adapter using the Allen key. Tighten the K adapter by hand (max. 5 Nm).
- Screw the thermostat onto the adapter and hand-tighten (max. 5 Nm).

2 mm Allen key

- Press and hold ⏺ for approx. 3 seconds to fix the thermostat.



Connecting *living connect*® to a Z-Wave controller

In Z-Wave connecting a device is called “Inclusion” or “Learn mode”.

To connect *living connect*® to a Z-Wave controller then:

- Ensure *living connect*® is factory reset as explained in the user manual.
- Activate "Inclusion" on the Z-Wave controller.
- Quickly press and release the select button on *living connect*®.
- Observe both controller and *living connect*® for status of the process.

Technical requirements:

- After a succesful "Inclusion" the controller must send a WAKE_UP_INTERVAL_SET command to *living connect*® in order to specify where and when *living connect*® should communicate wirelessly.
- After sending the WAKE_UP_INTERVAL_SET command, the controller must assign return routes, so *living connect*® can reach its destination i.e. the nodeID set in the WAKE_UP_INTERVAL_SET command.
- *living connect*® will not commence its periodic communications if it is in "Installation mode". "Installation mode" is for physical installation and should not be confused with "Inclusion". Please consult the user manual of *living connect*® for instructions on how to leave "Installation mode".
- A Z-Wave controller will have access to all *living connect*® features, which are exposed using standard Z-Wave command classes.

See other section of this document for more information.

Disconnecting *living connect*® from a Z-Wave controller

In Z-Wave disconnecting a device is called “Exclusion”.

To disconnect *living connect*® from a Z-Wave controller then:

- Activate "Exclusion" on the Z-Wave controller.
- Quickly press and release the select button on *living connect*®.
- Observe both controller and *living connect*® for status of the process.

Activate special awake mode on *living connect*®

living connect® will turn on radio communication for short periods of time at specific intervals in order to communicate with its controller, unless such a controller has yet to be configured. When radio communication is not needed by *living connect*® it will turn the radio off to conserve battery life.

If a user needs to configure a controller for *living connect*® or send more information to *living connect*® then the user can activate a special 5 seconds awake mode by pressing the select button on *living connect*®.

Important

- The nodeID set in the WAKE_UP_INTERVAL_SET command must be for a permanently listening device which reponds to the commands sent from *living connect®*. This means PC's with USB sticks will only work if the PC is never turned off. If the controller is turned off for extended periodes, *living connect®* will use the batteries too fast.
- To preserve battery - Wake_Up_intervals should not be set to less than 5 min. Increasing the time between intervals will increase battery life but can reduce user satisfaction due to long reaction times.
- Although *living connect®* supports single commands, multi commands must always be used to ensure two years battery lifetime.
- If multiple thermostats are installed in the same room it is important that the controller ensures that they all have the same schedule and the same setpoint.
- In order to ensure proper routing with battery operated devices, the controller must support SUC.

living connect® and Z-Wave repeaters

living connect® may benefit if more mains powered Z-Wave devices are added to a Z-Wave network.

Mains powered Z-Wave devices improve the reliability of a Z-Wave network as they can act as repeaters and thus provide alternate routes for communication.

Implemented Z-Wave device classes

Z-Wave Device Classes	Device Class Implemented
Generic Device	GENERIC_TYPE_THERMOSTAT
Specific Device	SPECIFIC_TYPE_SETPOINT_THERMOSTAT

Supported and controlled Z-Wave command classes

Z-Wave Command Classes Supported	Description
COMMAND_CLASS_BATTERY	Get current battery status of *living connect®*.
COMMAND_CLASS_CLIMATE_CONTROL_SCHEDULE	Control a temperature offset to the thermostat setpoint of *living connect®*. The temperature offset is defined by schedules and schedule overrides.
COMMAND_CLASS_CLOCK	Set or get the current *living connect®* clock.
COMMAND_CLASS_MANUFACTURER_PROPRIETARY	Special command used for communication with a Danfoss Link system.
COMMAND_CLASS_MANUFACTURER_SPECIFIC	Get manufacturer ID of system.
COMMAND_CLASS_MULTI_CMD	A special Z-Wave command used by *living connect®* to encapsulate multiple commands in one command and thereby conserve battery life.
COMMAND_CLASS_PROTECTION	Set or get *living connect®* local protection mode.Possible local protection values are: 0 = no protection 2 = fully locked (tamperproof)
COMMAND_CLASS_THERMOSTAT_SETPOINT	Set or get current thermostat setpoint of *living connect®*.Heating setpoint is the only supported setpoint type.
COMMAND_CLASS_VERSION	Get version of product and command classes.
COMMAND_CLASS_WAKE_UP	A special Z-Wave command used by *living connect®* to synchronize communication with its controller.

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