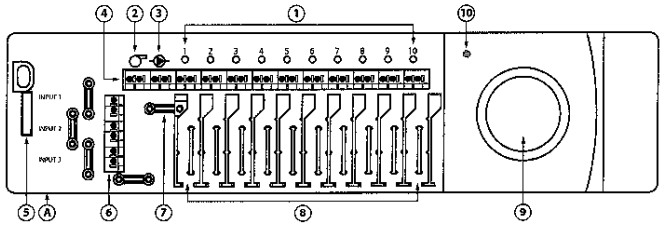
1. Overview



1. Output LEDs
2. Boiler relay
3. Pump relay
4. Output connections
5. Front cover release
6. Input connections (not used)
7. Relay cable fixing
8. Output cable fixing
9. Install button
10. Power LED
A. External antenna connection

2. Mounting and Installation Procedure

2.1 Danfoss Hydronic Controller

Mount the Danfoss Hydronic Controller in an horizontal upright position.

Wall: Remove the front and side covers.
Mount with screws and wall plugs.

DIN-rail:

Mount DIN-rail parts | Click on DIN-rail | Release from DIN-rail

Important! *Complete all the installations on the Danfoss Hydronic Controller as described below, before connecting to a 230 V power supply!*

2.2 24 V Actuators

- Connect the two actuator wires to an output (**4**).
- Fix the cable (**8**).

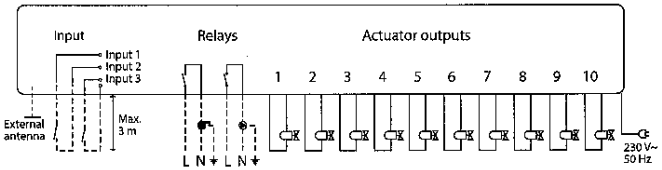
Note! *NC (normally closed) actuator output configuration is default.*

2.3 Relays for Pump and Boiler Control

- Connect wires for pump and boiler controls to their respective output (**2/3**).
- Fix the cable (**7**).

Note! *The relays for pump and boiler are potential free contacts and can therefore NOT be used as direct power supply. Max. load is 230 V and 8 A/2 A*

2.4 Wiring



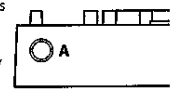
2.5 Power Supply

Connect all actuators before mains powering the unit!
Then, connect the Danfoss Hydronic Controller power supply plug to a 230 V power supply, when all actuators, pump and boiler controls and other inputs are installed.
Note! *If the power supply plug is removed from the power supply cable during installation, ensure that the connection is made according to existing law/legislation.*

2.6 External Antenna *(not included)*

An external antenna is installed as diverter, when the transmission is disrupted through a large building, heavy construction or metal barrier, e.g. if the Danfoss Hydronic Controller is located in a metal cabinet/box.

- Break off the plastic tap over the antenna connection on the Danfoss Hydronic Controller.
- Connect the external antenna (**A**).
- Place the antenna on the other side of the transmission barrier away from the Danfoss Hydronic Controller.



External antenna: Danfoss CF-EA, order no. 088U0250.

2.7 Factory reset

- Disconnect the power supply for the Danfoss Hydronic Controller.
- Wait for green LED to turn off.
- Press and hold the Install button (**9**).
- While holding the Install button, reconnect the power supply.
- Release the Install button, when the Power LED (**10**) is on.

3. MMI explanation

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Power LED	Explanation
Green	The Hydronic Controller is included in a Z-Wave network.
Green flash	The Hydronic Controller is NOT included in a Z-Wave network.
Green fast flash	Inclusion is in progress. The process might be so fast that no flash occurs.
Red	Factory reset in progress.
Red flash	Fail mode for one or more thermostats

Output LEDs 1-5/10	Explanation
Off	The valve for the string is closed
Green	The valve for the string is open
Green flash	The string is in fault mode or indication is requested.

4. Inclusion

To include the Hydronic Controller in Z-Wave follow the procedure:

- Verify Hydronic Controller indicates "not included" on the MMI.
- Activate "Inclusion" on the Z-Wave controller.
- Press the button on the Hydronic Controller
- Observe Hydronic Controller indicate included on the MMI

5. Exclusion

Exclusion can be done in two ways:

1. Initiated from the Controller

- Verify Hydronic Controller indicate "Included" on the MMI. "Fault" indication also covers "Included".
- Activate "Exclusion" on the controller
- Press the button the Hydronic Controller
- Observe Hydronic Controller indicate not included in a network on the MMI

2. Initiated from the Hydronic Controller by a factory reset to default

- Verify theHydronic Controller indicate "Included" or "Fault" on the MMI
- Remove the mains power from the Hydronic Controller
- Wait for 15 seconds.
- Press and hold the button while applying mains power. LED will light RED while leaving network.
- Observe the Hydronic Controller indicate not included in a network on the MMI

6. Z-Wave Node Information Frame

Each time the button is pressed the Hydronic Controller will send a NIF if not in a inclusion/exclusion process.

7. Factory Reset

The Hydronic Controller can be reset to factory defaults when suitable. This operation will get the Hydronic Controller to leave the Z-Wave network if included.

Procedure:

- Remove the mains power from the Hydronic Controller
- Wait for 15 seconds.
- Press and hold the button while applying mains power. LED will light RED while leaving network.

8. Z-Wave info

Attribute	Value
Generic Device Class (root)	Generic Type Thermostat
Specific Device Class (root)	Specific Type Thermostat General V2
Device type	Enhanced Slave
SDK	4.55
NWI	Supported
Explore frames	Supported
Manufacturer ID	0x0002
Product Type ID	0x0002
Product ID	0x4005 0x400A
Endpoints	Root plus 5/10 thermostat plus 2 binary
Generic Device Class (root & thermostat)	Generic Type Thermostat
Specific Device Class (root & thermostat)	Specific Type Thermostat General V2
Generic Device Class (binary)	Generic Type Binary Switch
Specific Device Class (binary)	Specific Type Power Switch Binary

9. Z-Wave Classes supported on root

Command class	Version	Note
ASSOCIATION	V2	Max nodes supported for group 1 (Lifeline): 1
ASSOCIATION_GRP_INFO	V1	One group supported: 1 with profile "General:Lifeline" Lifeline for endpoints Unsolicited reports: • Device Reset Locally Notification • Notification Report (Thermostat 1 only)
BASIC	V1	Maps to thermostat 1
CONFIGURATION	V1	Configuring of • Parameter 1: Valve type, • Parameter 2: Heat load strategy
DEVICE_RESET_LOCALLY	V1	
INDICATOR	V1	Maps to thermostat 1
MANUFACTURER_SPECIFIC	V1	
MULTI_CHANNEL	V3	
MULTI_CHANNEL_ASSOCIATION	V2	Max nodes supported for group 1 (Lifeline): 1
NOTIFICATION	V7	Maps to thermostat 1
SWITCH_BINARY	V1	
THERMOSTAT_SETPOINT	V1	Maps to thermostat 1
THERMOSTAT_MODE	V3	Maps to thermostat 1
VERSION	V2	
SENSOR_MULTILEVEL	V1	Control only! Maps to thermostat 1

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10. Z-Wave Classes supported for thermostats

Command class	Version	Notes
ASSOCIATION	V2	Max nodes supported for group 1 (Lifeline): 0
ASSOCIATION_GRP_INFO	V1	One group supported: 1 with profile "General:Lifeline" Lifeline through root device Unsolicited reports: • Device Reset Locally Notification • Notification Report
BASIC	V1	
CONFIGURATION	V1	Configuring of Parameter 3: PWM period.
INDICATOR	V1	LED for the corresponding will flash green for 10 seconds.
MULTI_CHANNEL	V3	
MULTI_CHANNEL_ASSOCIATION	V2	
NOTIFICATION	V7	Notification type: Water Valve (0x0f) Event: Valve Operation (0x01), Param 1 = 0(Off)/1(On) Event : Valve Current Alarm (0x05), Param 1 = 1(No error)/2(Open Circuit)/3(Short Circuit)
THERMOSTAT_SETPOINT	V1	
THERMOSTAT_MODE	V3	
SENSOR_MULTILEVEL	V1	Control only!

11. Z-Wave Classes supported for binary switch

Command class	Version	Notes
BASIC	V1	
SWITCH_BINARY	V1	Maps to binary switch 1. Endpoint 6/11 for Hydronic Controller 5/10

12. Interpretation of values different from standard specification

Command Class	Value	Meaning
Basic for Thermostats	0x00	Maps to "Energy Saving Mode". I.e. Thermostat Mode Off. (No heat)
	0x01 – 0xfe	Ignored
	0xff	Maps to "Comfort Mode". I.e. Thermostat mode Heat (regulation toward setpoint)
Basic for Switch Binary	0x00	Binary Switch Off
	0x01 – 0xfe	Ignored
	0xff	Binary Switch On
Configuration, all of size 1 byte (8 bit)		
Parameter 1, root only	0x00	Valve type: Normally closed (default)
Parameter 1, root only	0x01	Valve type: Normally open
Parameter 2, root only	0x00	Heat Load Strategy: Stacking (default)
Parameter 2, root only	0x01	Heat Load Strategy: Spreading
Parameter 3, thermostat only	0x00	PWM period: Short (15 min)
Parameter 3, thermostat only	0x01	PWM period: Medium (30 min)
Parameter 3, thermostat only	0x02	PWM period: Long (60 min) (default)
Notification supported types		
Bit Mask 1	0x00	
Bit Mask 2	0x80	Water Valve
Notification Events supported for Water Valve		
Bit Mask 0	0x22	Valve Operation & Valve Current Alarm
Thermostat Setpoint supported modes	0x01	Heat

13. Devices from multiple manufacturers

This product can be included and operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers and/or other applications. All non-battery operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

14. Technical Specifications

Transmission frequency	868.42 MHz
Transmission range in normal constructions	up to 30 m
Transmission power	< 1 mW
Supply voltage	230 V AC
Actuator outputs	5 or 10 x 24 V DC
Max. continued output load (total)*	25 VA
Relays	230 V AC/8 (2) A
Ambient temperature	0 - 50° C
IP class	30

***Note!** To avoid output overload we recommend using 2 W actuators.*

15. Troubleshooting

Error indication	Possible Causes
Flashing output/alarm LEDs	• Output or actuator is short-circuited • The actuator is disconnected
High room temperature (typically above comfort settings)	Fault mode, the actuator will be activated with a 25% duty cycle - caused by lost connection to a device
Resetting alarm	Disconnect mains power until power LED turns off, then reconnect mains power.

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