Qubino

The **INNOVATIVE** and **SMALLEST**

Flush heat & cool thermostat

ORDERING CODE	Z-WAVE FREQUENCY
ZMNHKA2	868,4 MHz
ZMNHKA3	921,4 MHz
ZMNHKA4	908,4 MHz
ZMNHKA5	869,0 MHz
ZMNHKA6	916,0 MHz

This Z-Wave module is used to regulate temperature in heating and cooling mode. The module can be controlled either through Z-wave network or through the wall switch.

The module is designed to be mounted inside a “flush mounting box” and is hidden behind a traditional wall switch. Module measures power consumption of connected device. It is designed to act as repeater in order to improve range and stability of Z-wave network.

Supported switches

Module supports **mono-stable** switches (push button) and **bi-stable** switches. The module is factory set to operate with bi-stable switches.

Installation

- Before the installation disconnect power supply.
- Connect the module according to electrical diagram.
- Locate the antenna far from metal elements (as far as possible).
- Do not shorten the antenna.

Danger of electrocution!

- Module installation requires a great degree of skill and may be performed only by a qualified and licensed electrician.
- Even when the module is turned off, voltage may be present on its terminals. Any works on configuration changes related to connection mode or load must be always performed by disconnected power supply (disable the fuse).

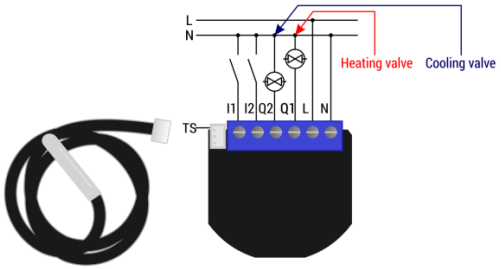
Note!

Do not connect the module to loads exceeding recommended values. Connect the module only in accordance to the below diagrams. Improper connections may be dangerous.

Package contents

- Flush heat and cool thermostat module + Temperature sensor

Electrical diagram 230VAC

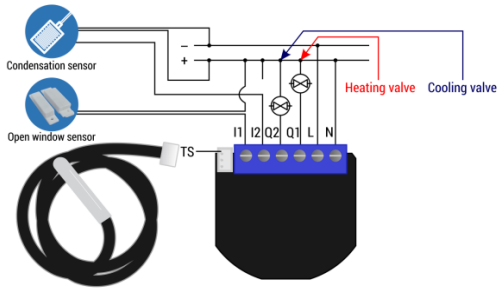


Notes for the diagram:

N	Neutral lead
L	Live lead
Q1	Output for Heating valve
Q2	Output for Cooling valve
I2	Input for switch (configurable) *
I1	Input for switch (configurable) *
TS	Terminal for digital temperature sensor (only for Flush on/off thermostat module compatible digital temperature sensor).

*For details please check parameter 11 and 12 description

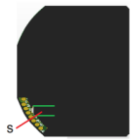
Electrical diagram 24VDC



Notes for the diagram:

N	+ VDC
L	- VDC
Q1	Output for Heating valve
Q2	Output for Cooling valve
I2	Input for switch (configurable) *
I1	Input for switch (configurable) *
TS	Terminal for digital temperature sensor (only for Flush on/off thermostat module compatible digital temperature sensor).

*For details please check parameter 11 and 12 description



S Service button (used to add or remove module from the Z-Wave network).

Durability of the module relay depends on applied load. For resistive load (light bulbs, etc.) and 4A current consumption of each individual electrical device, the durability exceeds 70 000 switches of each individual electrical device.

Module Inclusion (Adding to Z-wave network)

- Connect module to power supply (with temperature sensor connected),
- bring module within max. 1 meter (3 feet) of the main controller
- enable add/remove mode on main controller
- auto-inclusion (30 minutes after connected to power supply) or
- press service button **S** for more than 2 second or
- press push button **I1** three times within 3s (3 times change switch state within 3 seconds)

Module Exclusion/Reset (Removing from Z-Wave network)

- Connect module to power supply,
- bring module within max. 1 meter (3 feet) of the main controller,
- enable add/remove mode on main controller
- press service button **S** for more than 6 second or
- press push button **I1** five times within 3s (5 times change switch state within 3 seconds) in the first 60 seconds after the module is connected to the power supply.

By this function all parameters of the module are set to default values and own ID is deleted. If service button S is pressed more than 2 and less than 6 second module is excluded, but configuration parameters are not set to default values.

Association

Association enables Flush Heat and Cool thermostat module to transfer commands inside Z-Wave network directly (without main controller) to other Z-Wave modules.

Associated Groups:

Group 1: basic on/off (triggered at change of the output Q1 state and reflecting its state) up to 16 nodes.

Group 2: basic on/off (triggered at change of the output Q2 state and reflecting its state) up to 16 nodes.

Group 3: basic on/off (triggered at change of thermostat mode Off/Auto and reflecting its state) up to 16 nodes.

Group 4: basic on/off (triggered by Too high temperature limit, it send FF) up to 16 nodes.

Group 5: basic on/off (triggered by Too low temperature limit, it send FF) up to 16 nodes.

Group 6: default reporting group (reserved for the main controller).

Configuration parameters

Parameter no. 1 – Input 1 switch type

Available configuration parameters (data type is 1 Byte DEC):

- default value 1
- 0 mono-stable switch type (push button)
- 1 bi-stable switch type

Parameter no. 2 – Input 2 switch type

Available configuration parameters (data type is 1 Byte DEC):

- default value 1
- 0 mono-stable switch type (push button)
- 1 bi-stable switch type

Parameter no. 3 – Input 1 contact type

Available configuration parameters (data type is 1 Byte DEC):

- default value 0
- 0 NO (normally open) input type
- 1 NC (normally close) input type

Parameter no.4 – Input 2 contact type

Available configuration parameters (data type is 1 Byte DEC):

- default value 0
- 0 NO (normally open) input type
- 1 NC (normally close) input type

Parameter no. 5 – Input 1 status on delay

Available configuration parameters (data type is 2 Byte DEC):

- default value 0
- 1 – 32000 seconds

If the value of parameter is different to 0, means that the status of the digital input will switch to tripped after the inserted time has expired.

Parameter no. 6 – Input 1 status off delay

Available configuration parameters (data type is 2 Byte DEC):

- default value 0
- 1 – 32000 seconds

If the value of parameter is different to 0, means that the status of the digital input will switch from tripped to untripped after the inserted time has expired.

Parameter no. 7 – Input 2 status on delay

Available configuration parameters (data type is 2 Byte DEC):

- default value 0
- 1 – 32000 seconds

If the value of parameter is different to 0, means that the status of the digital input will switch to tripped after the inserted time has expired.

Parameter no.8 – Input 2 status off delay

Available configuration parameters (data type is 2 Byte DEC):

- default value 0
- 1 – 32000 seconds

If the value of parameter is different to 0, means that the status of the digital input will switch from tripped to untripped after the inserted time (seconds) has expired.

Parameter no. 10 - Activate / deactivate functions ALL ON/ALL OFF

Available configuration parameters (data type is 1 Byte DEC):

- default value 255
- 255 - ALL ON active, ALL OFF active.
- 0 - ALL ON is not active ALL OFF is not active
- 1 - ALL ON is not active ALL OFF active
- 2 - ALL ON active ALL OFF is not active

Flush on/off thermostat module responds to commands ALL ON / ALL OFF that may be sent by the main controller or by other controller belonging to the system.

Parameter no. 11- I1 Functionality selection

Available configuration parameters (data type is 2 Byte DEC):

- default value 1
- 65535 – input I1 does not influence on the heat/ cool process
- 1 – input I1 changes the mode of the thermostat between Off and Auto. In this case function on window sensor is disabled
- 2 – input I1 influences on cooling and heating valves according to status of window sensor. In this case function of Off and Auto selection by I1 is disabled

Parameter no. 12 – I2 Functionality selection

Available configuration parameters (data type is 2 Byte DEC):

- default value 65535
- 65535 – input I2 does not influence on the heat/ cool process
- From 0 to 990 – Temperature set point from 0.0 °C to 99.0 °C. When I2 is pressed, it is automatically set temperature setpoint according to value defined here. In this case function of condense sensor is disabled
- From 1001 to 1150 – Temperature set point from -0.1 °C to -15.0 °C When I2 is pressed, it is automatically set temperature setpoint according to value defined here. In this case function of condense sensor is disabled
- 2000 – Input I2 influences on the cooling valve according to status of condense sensor, In this case function of setpoint selection with I2 is disabled

Parameter no. 30 - Saving the state of the relay after a power failure

Available configuration parameters (data type is 1 Byte DEC):

- default value 0
- 0 –module saves its state before power failure (it returns to the last position saved before a power failure)
- 1 - module does not save the state after a power failure, it returns to "off" position.

Parameter no. 40–Power reporting in Watts on power change for Q1
Set value means percentage, set value from 0 - 100=0% - 100%.
Available configuration parameters (data type is 1 Byte DEC):
- default value 3
- 0 – Reporting Disabled
- 1–100 = 1%-100% Reporting enabled. Power report is send (push) only when actual power in Watts in real time changes for more than set percentage comparing to previous actual power in Watts, step is 1%.

NOTE: If power changed is less than 1W, the report is not send (pushed), independent of percentage set.

Parameter no. 41–Power reporting in Watts on power change for Q2
Set value means percentage, set value from 0 – 100 = 0% - 100%.
Available configuration parameters (data type is 1 Byte DEC):
- default value 1
- 0 – Reporting Disabled
- 1 – 100 = 1% - 100% Reporting enabled. Power report is send (push) only when actual power in Watts in real time changes for more than set percentage comparing to previous actual power in Watts, step is 1%.

NOTE: if power changed is less than 1W, the report is not send (pushed), independent of percentage set.

Parameter no. 42 – Power reporting in Watts by time interval for Q1
Set value means time interval (0 – 65535) in seconds, when power report is send. Available config. parameters (data type is 2 Byte DEC):
- default value 300 (power report in Watts is send each 300s)
- 0 – Reporting Disabled
- 1 – 65535 = 1second – 65535 seconds. Reporting enabled. Power report is send with time interval set by entered value.

Parameter no. 43 – Power reporting in Watts by time interval for Q2
Set value means time interval (0 – 65535) in seconds, when power report is send. Available config. parameters (data type is 2 Byte DEC):
- default value 300 (power report in Watts is send each 300s)
- 0 – Reporting Disabled
- 1 – 65535 = 1 second – 65535 seconds. Reporting enabled, Power report is send with time interval set by entered value.

Parameter no. 50 – Hysteresis Heating On
This parameter defines temperature difference between measured temperature and set-point temperature to turn heating on. Parameter can be set from 0 to 255 where 0 to 127 means from 0.0 °C to 12.7 °C and from 128 to 255 means from - 0.1 °C to -12.7 °C.
Available configuration parameters (data type is 1 Byte DEC):
- default value 137 (-1.0 °C)

Parameter no. 51 - Hysteresis Heating Off
This parameter defines temperature difference between measured temperature and set-point temperature to turn heating off. Parameter can be set from 0 to 255 where 0 to 127 means from 0.0 °C to 12.7°C and from 128 to 255 means from - 0.1 °C to -12.7 °C.
Available configuration parameters (data type is 1 Byte DEC):
- default value 132 (-0.5 °C)

Parameter no. 52 – Hysteresis Cooling On
This parameter defines temperature difference between measured temperature and set-point temperature to turn cooling on. Parameter can be set from 0 to 255 where 0 to 127 means from 0.0 °C to 12.7 °C and from 128 to 255 means from - 0.1 °C to -12.7 °C.
Available configuration parameters (data type is 1 Byte DEC):
- default value 10 (1.0 °C)

Parameter no. 53 – Hysteresis Cooling Off
This parameter defines temperature difference between measured temperature and set-point temperature to turn cooling off. Parameter can be set from 0 to 255 where 0 to 127 means from 0.0 °C to 12.7 °C and from 128 to 255 means from - 0.1 °C to -12.7 °C.
Available configuration parameters (data type is 1 Byte DEC):
- default value 5 (+0.5 °C)

Parameter no. 54 – Antifreeze
Set value means at which temperature the heating will be turned on (to prevent freezing) even if the thermostat was manually set to off. Parameter can be set from 0 to 255 where 0 to 127 means from 0.0 °C to 12.7 °C and from 128 to 254 means from - 0.1 °C to -12.6 °C.
Available configuration parameters (data type is 1 Byte DEC):
- default value 50 (5,0 °C)
- 255 – antifreeze functionality disabled

Parameter no. 60 – Too low temperature limit
Available configuration parameters (data type is 2 Byte DEC):
- Default value 50 (Too low temperature limit is 5.0°C)
- 1 - 1000 = 0.1°C – 100.0°C, step is 0.1°C. Too low temperature limit is set by entered value. In case is set value out of this range, module is changing set value automatically to default value.

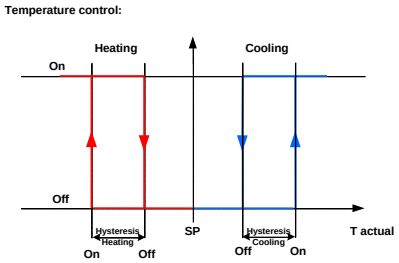
Parameter no. 61 – Too high temperature limit
Available configuration parameters (data type is 2 Byte DEC):
- Default value 700 (too high temperature limit is 70.0°C)
- 1 - 1000 = 0.1°C – 100.0°C, step is 0.1°C. Too high temperature limit is set by entered value. In case is set value out of this range, module is changing automatically set value to default value.

Parameter no. 64 – Q1 Switch selection
Set value means the type of the heating device that is connected to the relay output. The heating device type can be normally open (NO) or normally close (NC).
Available configuration parameters (data type is 1 Byte DEC):
- default value 0
- 0 - When system is turned off the output is 0VAC.
- 1 - When system is turned off the output is 230VAC

Parameter no. 65 – Q2 Switch selection
Set value means the type of the cooling device that is connected to the relay output. The heating cooling type can be normally open (NO) or normally close (NC).
Available configuration parameters (data type is 1 Byte DEC):
- default value 0
- 0 - When system is turned off the output is 0VAC.
- 1 - When system is turned off the output is 230VAC

Functionality

Thermostat has 2 working mode, Off or Auto. Selection between Off and Auto is possible to select with I1 push button or from gateway. When the thermostat is turned On, it automatically regulates temperature according to picture below:



When the temperature is decreasing and reaches point 'Heating On' (defined by parameter 50), heating is turned on and remains active until the temperature in the room is not increased to reach 'Heating Off' (defined by parameter 51). At this point heating and cooling valve are turned off – deadband zone. If the temperature rises over 'Cooling On' point the cooling valve will switch on. The consequence will be temperature dropping, and when temperature drops below 'Cooling Off' cooling valve will switch off.
When the thermostat is turned off, then it is working in antifreeze regime. The antifreeze regime turns on heating when the temperature is lower or equal to the temperature set by parameter 54 (Default 5.0C).

Energy saving mode:
If parameter 11 is set to value 2 and if the state of the input I1 is active (window opened active) both outputs (Q1 and Q2) are turned off.

Condensation:
If parameter 12 is set to value 2000 and if the state of the input I2 is active (condensation sensor active) Q2 output (cooling) is turned off.

Temperature limits

- Temperature too low is send when the actual temperature is equal or smaller to the value set by parameter 60 (Check Associated Groups)
- Temperature too high is send when the actual temperature is equal or higher to the value set by parameter 61. (Check Associated Groups)

Technical Specifications

Power supply	110-230VAC ±10% 50/60Hz, 24-30VDC
Rated load current of AC output (resistive load)	2 X 4A / 230VAC
Rated load current of DC output (resistive load)	2 X 4A / 30VDC
Output circuit power of AC output (resistive load)	2 X 920W (230VAC)
Output circuit power of DC output (resistive load)	2 X 96W (24VDC)
Power monitoring accuracy	P=0-2000W, +/-2W; P>200W, +/-3%
Frequency Range	868.4 MHz, 921.4 MHz, 908.4 MHz, 869.0 MHz, Z-Wave
Operation temperature	-10 ~ 40°C
Distance	up to 30 meters indoors (depending on building materials)
Dimensions (W x H x D)	41,8 x 36,8 x 16,9mm
Weight	48g
Electricity consumption	0,4W
For installation in boxes	Ø ≥ 60mm or 2M
Switching	Relay (2x)
Digital temperature sensor range	-50.0 ~ 125.0°C, resolution 0.1°C
Digital temperature sensor cable length	1000mm

* In case of load other than resistive, pay attention to the value of cos φ and if necessary apply load lower than the rated load. Max current for cos φ=0,4 is 3A at 250VAC, 3A at 24VDC L/R=7ms.

Z-Wave Device Class:
BASIC_TYPE_ROUTING_SLAVE
GENERIC_TYPE_THERMOSTAT
SPECIFIC_TYPE_SETPOINT_THERMOSTAT

Z-Wave Supported CommandClasses:
COMMAND_CLASS_THERMOSTAT_SETPOINT v2
COMMAND_CLASS_VERSION v1
COMMAND_CLASS_MANUFACTURER_SPECIFIC v1
COMMAND_CLASS_MULTI_CMD v1
COMMAND_CLASS_SENSOR_MULTILEVEL v3
COMMAND_CLASS_ASSOCIATION v1
COMMAND_CLASS_CONFIGURATION v1
COMMAND_CLASS_POWERLEVEL v1
COMMAND_CLASS_METER v3
COMMAND_CLASS_THERMOSTAT_MODE v2
COMMAND_CLASS_MARK
COMMAND_CLASS_BASIC v1
COMMAND_CLASS_NO_OPERATION

Endpoint 1 (I1):
Device Class:
GENERIC_TYPE_SWITCH_BINARY
SPECIFIC_TYPE_POWER_SWITCH_BINARY

Command Classes:
COMMAND_CLASS_SWITCH_BINARY
COMMAND_CLASS_METER_V3

Endpoint 2 (I2):
Device Class:
GENERIC_TYPE_SWITCH_BINARY
SPECIFIC_TYPE_POWER_SWITCH_BINARY

Command Classes:
COMMAND_CLASS_SWITCH_BINARY
COMMAND_CLASS_METER_V3

This product can be included and operated in any Z-Wave network with other Z-Wave certified devices from any other manufacturers. All constantly powered nodes in the same network will act as repeaters regardless of the vendor in order to increase reliability of the network.

COMMAND_CLASS_BASIC
The basic command class supports the functions BASIC SET and BASIC GET. Through the function basic SET is possible to set the mode of the module. Basic SET can send the values 0xff which means Auto and 0x00 which mean Off. Through the function basic GET is possible to read the mode of the module. The module returns 0xff which means Auto or 0x00 which means Off.

COMMAND_CLASS_SENSOR_MULTILEVEL
The Flush on/off thermostat supports reading of actual temperature which is 2 bytes long, scale is °C and its precision is 1(it means 0,1°C).

COMMAND_CLASS_THERMOSTAT_MODE
The Flush on/off thermostat supports the following modes:
- Mode Off
- Mode Auto

COMMAND_CLASS_THERMOSTAT_SETPOINT
The Flush on/off thermostat supports temperature set point, which is 2 bytes long, scale is °C and its precision is 1(it means 0,1°C).

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Important disclaimer

Z-Wave wireless communication is inherently not always 100% reliable, and as such, this product should not be used in situations in which life and/or valuables are solely dependent on its function.

Warning!

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.
Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being. When replacing old appliances with new once, the retailer is legally obligated to take back your old appliance for disposal at least for free of charge.
This user manual is subject to change and improvement without notice.

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