output shouldn't be active more than 120 s. Beyond this time overheating protection can be activated (in this case outputs will switch off for 60s).

## Package contents

## - Flush shutter DC

Electrical diagram 12-24VDC

The INNOVATIVE and SMALLEST

## Flush shutter DC

| ORDERING CODE | Z-WAVE FREQUENCY |
| :---: | :---: |
| ZMNHOD1 | $868,4 \mathrm{MHz}$ |
| ZMNHOD2 | $921,4 \mathrm{MHz}$ |
| ZMNHOD3 | $908,4 \mathrm{MHz}$ |
| ZMNHOD4 | $869,0 \mathrm{MHz}$ |
| ZMNHOD5 | $916,0 \mathrm{MHz}$ |

This Z-Wave module is used to control the motor of blinds, rollers, shades, venetian blinds, etc.. The module can be controlled either through a Z-Wave network or through the wall switch.
Precise positioning is supported for motors equipped with mechanical or electronic end switches. The module is designed to be mounted inside a "flush mounting box", hidden behind a traditional wall switch. Module measures power consumption of motor and support connection of digital temperature sensor. 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.

## 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.
- When device is loaded with max. rated current 2A,
enable add/remove mode on main controller,
- press service button $\mathbf{S}$ for more than 6 second or
- press push button I1 five times within 3s (5 time 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.


## Associations

Association enables Flush shutter DC module to transfer commands inside Z-wave network directly (without main controller) to other Z-Wave modules.

## Associated Groups:

## Root device:

Group 1: default reporting group (reserved for the main controller).
Group 2: basic on/off (triggered at change of the input I1 state and reflecting its state) up to 16 nodes. Group 3: basic on/off (triggered at change of the input 12 state and reflecting its state) up to 16 nodes. Group 4: basic on/off (triggered at sensing moving direction of roller: up=FF, down=0) up to 16 nodes. Group 5: basic on/off (triggered at reaching roller position: bottom=FF, top $=0$ ) up to 16 nodes.
Group 6: basic on/off (triggered at reaching roller position bottom=FF, not bottom=0) up to 16 nodes.
Group 7: multilevel set (triggered at changes of value of the Flush shutter DC position) up to 16 nodes. Group 8: multilevel set (triggered at changes of value of slats tiling position) up to 16 nodes.
Group 9: multilevel sensor report (triggered at change of temperature sensor) up to 16 nodes.
End point 1:
Group 1: Lifeline group, 0 nodes allowed.
Group 2: basic on/off (triggered at change of the input I1 state and reflecting its state) up to 16 nodes. Group 3: basic on/off (triggered at change of the input 12 state and reflecting its state) up to 16 nodes. Group 4: basic on/off (triggered at sensing moving direction of roller: up=FF, down=0) up to 16 nodes. Group 5: basic on/off (triggered at reaching roller position bottom=FF, top $=0$ ) up to 16 nodes.
Group 6: basic on/off (triggered at reaching roller position bottom=FF, not bottom=0) up to 16 nodes.
Group 7: multilevel set (triggered at changes of value of the Flush shutter DC position) up to 16 nodes.

## End point 2:

Group 1: Lifeline group, 0 nodes allowed.
Group 2: multilevel set (triggered at changes of value of slats tiling position) up to 16 nodes.
End point 3:
Group 1: Lifeline group, 0 nodes allowed.

Group 2: multilevel sensor report (triggered at change of

## temperature sensor) up to 16 nodes.

## Automatic calibration

Automatic calibration is a process during which the Flush shutter DC learns the position of the limit switches. Shutter positioning calibration
(par. 71 set to 0 )
There are two procedures of calibration.

## Calibration through main controller U

1) Include the module into the $Z$-wave network, according to module include instructions.
2) Set the parameter 78 (Forced Flush shutter DC calibration) value to 1
3) Flush shutter DC performs the calibration process, completing full cycle - up, down and up again.
4) Set the parameter 78 (Forced Flush shutter DC calibration) value to 0 .
Calibration through the inputs I1 and I2
5) Include the module into the wireless network, according to module inclusion instructions. 2) Quick press the switch/push-button connected to It input and wait until the shutter reach upper limit switch. 3) Quick press the switch/push-button connected to l2 input and wait until the shutter reach lower limit switch. 4) Quick press the switch/push-button connected to I1 input and wait until the shutter reach upper limit switch. Slates tilting position calibration

## (par. 71 set to 1)

When enabling venetian blind mode, position calibration for slats titing must be done. After doing this, position and angle of slates can be set. By default full turn time for slates is set to $1,5 \mathrm{~s}$. This value can be changed with parameter 72 .

1) Include and make module calibration according to section 'Shutter positioning calibration'
2) Set parameter 71 to 1 'Venetian blinds'
3) Exclude the module (without reset!)
4) Include the module.
5) After module inclusion beside main shutter widget, another widget for slates control will appear on UI
6) By default full turn movement is set to $1,5 \mathrm{~s}$. If this time is too long (if after slates full cycle shutter starts moving up or down), decrease this time defined with parameter 72. If this time is to short (if slats will not furn for full cycle), increase this time defined with parameter 72.

## Manual operation for shutter

(par. 71 set to 0 )
Module allows connecting of push-buttons (mono-stable) or switches (bi-stable) to 11 and 12 terminals.
Clicking push-button (<2s) connected to I1 (up), initiates up movement.
Clicking push-button (<2s) connected to 12 (down), initiates down movement.
If the shutter is moving, each click, of any push-button, will
stop the movement.
Keeping pressed push-button (>2s) connected to 11 (up), initiates up movement, until push-button is released.
Keeping pressed push-button (>2s) connected to 12 (down), initiates down movement, until push-button is released.

## Manual operation for venetian blinds

(par. 71 set to 1)
Slates on start position - 0 degree
Clicking push-button (for time < full turn slates time-par.72) connected to I1 (up), initiates slates turning towards end 180 degree position, until push-button is released
Clicking push-button (for time < full turn slates time-par.72) connected to IL (down), initiates shutter down movement. If the shutter is moving, each click, of any push-button, will stop the movement.
Keeping pressed push-button (for time > full turn slates time-par.72) connected to 11 (up), initiates full slates turn and up movement, until the push-button is released.
Keeping pressed push-button (for time > full turn slates time-par.72) connected to 12 (down), initiates shutter down movement, until the push-button is released.
Keeping pressed push-button (for time > (full turn slates time +2 s )) connected to II (up), initiates up movement, until push-button is released

## Slates on end position - 180 degree

Clicking push-button (for time < full turn slates time-par.72) connected to 11 (up), initiates shutter up movement.
Clicking push-button (for time < full turn slates time-par.72) connected to I 2 (down), initiates slates turning towards start - 0 degree position, until the push-button is released. If the shutter is moving, each click, of any push-button, will stop the movement.
Keeping pressed push-button (for time > full turn slates time-par.72) connected to 11 (up), initiates shutter up movement, until the push-button is released.
Keeping pressed push-button (for time > full turn slates time-par.72) connected to 12 (down), initiates full slates turn and down movement, until the push-button is released.
Keeping pressed push-button (for time > (full turn slates time +2 s )) connected to 12 (down), initiates down movement, until push-button is released.

## Configuration parameters

## Parameter no. 10-Activate/deactivate functions ALL

## ON/ALL Of

Available config. param

- 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
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. 40 - Power reporting in Watts on power change for Q1 or 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 1 W , the report is not send (pushed), independent of percentage set.
Parameter no. 42 - Power reporting in Watts by time interval for Q1 or Q2
Set value means time interval $(0-32767)$ in seconds, when power report is send. Available configuration parameters (data type is 2 Byte DEC)
- default value $300=300$ s
- 0 - Reporting Disabled
- $1-32767=1$ second -32767 seconds. Reporting enabled, power report is send with time interval set by entered value.


## Parameter no 71 - Operating modes

This parameter defines selection between two available operating modes. Available configuration parameters (data type is 1 Byte DEC):

- default value 0
- 0 - Shutter mode

1 - Venetian mode (up/down and slate rotation)
NOTE: When setting parameter, module needs to be excluded and included again! Please check detailed description in this manual.

## Parameter no. 72 - Slats tilting full turn tim

This parameter defines the time necessary for slats to make full turn ( 180 degrees). Available contiguration parameters (data type is 2 Byte DEC):

- default value $150=1,5$ seconds
- 0 - Tilting time disabled
- $1-32767=0,01$ seconds $-327,67$ seconds

NOTE: If time set is too high, this will result that after full turn, shutter will start move up/down, for time remaining. Parameter no. 73 - Slats position
This parameter defines slats position after up/down movement through Z-wave or push-buttons. Available configuration parameters (data type is 1 Byte DEC):

- default value 1
- 0-Slats return to previously set position only in case of Z-wave control (not valid for limit switch positions).
- 1 - Slats return to previously set position in case of Z-wave control, push-button operation or when the lower limit switch is reached.
Parameter no. 74 - Motor moving up/down time

This parameter defines shutter motor moving time of complete opening or complete closing. Available configuration parameters (data type is 2 Byte DEC):

- default value 0
- 0 - moving time disabled (working with limit switches)
- $1-32767=0,1$ seconds $-3276,7$ seconds. After that time motor is stopped (relay goes to off state)
NOTE: Important is that the reference position to manually set moving time is always shutter lower position!
Set parameter 74 to 0 and move the shutter (using up/down push buttons or main controller UI) to the lowest desired position. On this shutter position, set parameter 74 to time for complete opening or complete closing. At this point shutter can be moved up (open) for set time, but can't be moved down because this position is already set as lower shutter position.
To change shutter lower position below already set (manual recalibration), parameter 74 must be set to 0 and repeat the procedure described above.
In case shutter has limit switches, but anyhow you would like to limit opening/closing position by time, you can still do it. In case you put time that is longer that opening/closing real time limited by limit switches, shutter will stop at limit switch, but the module relay will switch off after define time, not by shutter limit switch. Take in consideration that in this condition, the positioning with slider through UI will not show correct shutter position. Parameter no. 76 - Motor operation detection
Power threshold to be interpreted when motor reach the limit switch. Available configuration parameters (data type is 1 Byte DEC):


## default value $6=0,6 \mathrm{~W}$

- Available settings: 5-100 $(0,5 \mathrm{~W}-10 \mathrm{~W})$, step is 0,1W.
NOTE: Motors with power consumption less than $0,5 \mathrm{~W}$ could not be auto calibrated. In that case set time manually (par. 74).


## Parameter no. 78 - Forced Shutter DC calibration

By modifying the parameters setting from 0 to 1 a Shutter DC module enters the calibration mode. Available configuration parameters (data type is 1 Byte DEC ): - default value 0

- 1 - Start calibration process (when calibration process is finished, completing full cycle - up, down and up, set the parameter 78 (Forced Shutter calibration) value back to 0 .
Parameter no. 85 - Power consumption max delay time
This parameter defines the max time before motor power consumption is read after one of the relays is switched ON . If there is no power consumption during this max time (motor not connected, damaged or requires higher time to start, motor in end position,...) the relay will switch OFF. Time is defined by entering it manually. Available
onfiguration parameters (data type is 1 Byte DEC ) default value $8=800 \mathrm{~ms}$
- $3-50=0,3$ seconds -5 seconds ( 100 ms resolution) Parameter no. 86 - Power consumption at limit switch delay time
This parameter defines the max time at limit switch, when power consumption is below power threshold. If the power consumption during this time is below power threshold (par. 76), the active output will switch off, means that limit switch is reached. Available configuration parameters (data type is 1 Byte DEC):
> default value $8=800 \mathrm{~ms}$

$3-50=0,3$ seconds -5 seconds ( 100 ms resolution) Parameter no. 90 - Time delay for next moto movement
This parameter defines the minimum time delay between next motor movement (minimum time between switching motor off and on again). Available configuration parameters (data type is 1 Byte DEC):

- default value $5=500 \mathrm{~ms}$
$1-30=0,1$ seconds -3 seconds ( 100 ms resolution) Parameter no. 110 - Temperature sensor offset


## settings

Set value is added or subtracted to actual measured value by sensor. Available configuration parameters (data typ is 2 Byte DEC):
default value 32536

- 32536 - offset is 0.0 C
- From 1 to 100 - value from $0.1^{\circ} \mathrm{C}$ to $10.0^{\circ} \mathrm{C}$ is added to actual measured temperature.
From 1001 to 1100 - value from $-0.1^{\circ} \mathrm{C}$ to $-10.0^{\circ} \mathrm{C}$ is subtracted to actual measured temperature.


## Parameter no. 120 - Digital temperature senso

 reportingIf digital temperature sensor is connected, module reports measured temperature on temperature change defined by this parameter. Available configuration parameters (data type is 1 Byte DEC):
Default value $5=0,5^{\circ} \mathrm{C}$
$0-$ Reporting disabled
$1-127=0,1^{\circ} \mathrm{C}-12,7^{\circ} \mathrm{C}$, step is $0,1^{\circ} \mathrm{C}$

| Technical Specifications |
| :--- |
| Power supply $12-24 \mathrm{VDC}+/-10 \%$ <br> Rated load current 2 A <br> Overcorrect protection 5 A <br> Output circuit power of DC <br> output (resistive load) $48 \mathrm{~W}(24 \mathrm{VDC})$ <br> Power measurement <br> accuracy $+/-5 \%$ <br> Digital temperature sensor <br> range (sensor must be <br> ordered separately) $-50 \sim+125^{\circ} \mathrm{C}$ <br> Operation temperature $-10 \sim+40^{\circ} \mathrm{C}$ <br> Electricity consumption cca. $0,3 \mathrm{~W}$ |


| Distance | up to 30 m indoors <br> (depending on building <br> materials) |
| :--- | :--- |
| Dimensions (WxHxD) <br> (package) | $41,8 \times 36,8 \times 15,4 \mathrm{~mm}$ <br> $(79 \times 52 \times 22)$ |
| Weight (Brutto with package) | $28 \mathrm{~g}(34 \mathrm{~g})$ |
| For installation in boxes | $\varnothing \geq 60 \mathrm{~mm}$ or 2 M |
| Switching | H bridge |

## Z-Wave Device Class: BASIC TYPE ROUTING SLAV

GENERIC TYPE SWITCH MULTLLEV
SPECIFIC_TYPE_CLASS_C_MOTOR_CONTROL
Z-Wave Supported Command Classes:
COMMAND_CLASS_ZWAVEPLUS_INFO_VZ
COMMAND_CLASS_VERSION_V2
COMMAND_CLASS_MANUFACTURER SPECIFIC V2 COMMAND_CLASS_DEVICE_RESET_LOCALLY V1
COMMAND_CLASS_POWERLEVEL_V1
COMMAND_CLASS_BASIC_VV
COMMAND_CLASS_SWITCH_ALL_V1
COMMAND_CLASS SWITCH BINARY
COMMAND_CLASS_SWITCH_MULTLEVEL_V
COMMAND_CLASS_METER_V4
COMMAND_CLASS_SENSOR_MULTLLEVEL_V7
COMMAND_CLASS_MULTI_CHANNEL_V
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION V
COMMAND_CLASS_ASSOCIATION_GRP_INFO_V2
COMMAND_CLASS_CONFIGURATION_V1
COMMAND_CLASS_MARK
COMMAND_CLASS_BASIT_V MUTUEVEL
Endpoint1:
Endpoint1:
BAEIC_TYPE_ROUTING_SLAVE
GENERIC_TYPE_SWITCH_MULTILEVEL
SPECIIIC_TYPE_CLASS_C_MOTOR_CONTROL
COMMAND_CLASS_ZWAVEPLUs_INFO_V2
COMMAND_CLASS_VERSION_V2
COMMAND_CLASS_BASIC_V1
COMMAND_CLASS_SWITCH_ALL_V1
COMMAND_CLASS SWITCH BINARY
COMMAND_CLASS_SWITCH_MULTILEVEL_V 3
COMMAND_CLASS_METER_V4
COMMAND_CLASS_ASSOCIATION_V2
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION v3
COMMAND_CLASS_ASSOCIATION_GRP_INFO_V2
COMMAND_CLASS_BASIC v
COMMAND_CLASS_SWITCH_MULTLLEVEL_V
Endpoint2:
Device Class:
GENERIC_TYPE_SWITCH_MULTLLEVEL
SPECIFIC_TYPE_CLASS_C_MOTOR_CONTROL Command Classes:
COMMAND_CLASS_ZWAVEPLUS_INFO V2 COMMAND_CLASS_VERSION_V2
COMMAND CLASS BASIC V1 COMMAND_CLASS_SWITCH_ALL
COMMAND_CLASS_SWITCH_BINARY V
COMMAND_CLASS_SWITCH_MULTLEVEL_V
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION V COMMAND_CLASS_ASSOCIATION_GRP_INFO_V2 COMMAND_CLASS_MARK
COMMAND_CLASS_BASIC_V
COMMAND_CLASS SWITCH_MULTILEVEL _ 3 Endpoint 3:
GENERIC_TYPE_SENSOR_MULTILEVEL SPECIFIC_TYPE_ROUTING_SENSOR_MULTILEVEL Command Classes:

COMMAND_CLASS_ZWAVEPLUS_INFO_V2 COMMAND_CLASS_VERSION_V2
COMMAND_CLASS_SENSOR_MULTLLEVEL_V7 COMMAND_CLASS_ASSOCIATION_V2
COMMAND CLASS ASSOCIATION GRP INFO
NOTE: The above list is valid for the product with
temperature sensor connected to TS terminal at of inclusion. In case the sensor is nerminal at the time folling. In cose tis supported:
COMMAND_CLASS_SENSOR_MULTLLEVEL_V7
Endpoint 2 is supported by the module only when the parameter no. 71 is set to the value 1 and the module is excluded and re-included into the network.
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.

## 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.
NOTE: User manual is valid for module with SW version S3 (SW version is part of P/N)!
Example: P/N: ZMNHODx H1S3 ${ }^{\text {P }}$

## Qubino

Goap d.o.o. Nova Gorica
Ulica Klementa Juga 007

## 5250 Solkan



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Date: 15.10.2015
Document: Qubino_Flush shutter DC PLUS user manual_V1.2_eng

