# Z-GATE
## ZIF5020 Z-Wave DIN-Rail module

![Z-GATE Image](image.png)

**Installation- and user manual**

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1. Use.

ZIF5020 DIN-rail module is a unit with built-in wireless Z-Wave communication, 10 digital outputs, and 4 digital inputs.

The module is a general Z-Wave I/O module that can be used for a variety of purposes. For example, ZIF5020 can provide the ability to control other systems via the Z-Wave network by using the 10 outputs as a kind of transfer function to another automation system.

It is also possible to use the ZIF5020 as a control unit for controlling water-based floor heating valves. The 10 outputs can directly be connected to 24V valve actuators (requires ZIF5020 to be fitted with 24Vdc) and ZIF5020 is then able to control 10 pieces of floor-heating actuators.

The actual heat regulation itself will have to take place in the Z-Wave Controller, where the temperature measurement for the heating circuits can come from different Z-Wave temperature sensors or thermostats and the Controller will send on/off commands to the ZIF5020 to regulate the floor heating.

The 4 digital inputs in the ZIF5020 are generally usable for different purposes, as both potential free contacts can be connected, and outputs with a voltage up to 10Vdc (DIN 43864).

The inputs can be configured to have different trigger functions; Leading edge-, trailing edge- or level trigged.

As for the firmware, the ZIF5020's inputs can be used to control other Z-Wave Devices in the Z-wave network, such as relay modules, dimmer devices, etc. ZIF5020 can send different Z-Wave commands by means of the different association groups for the 4 inputs.

In addition, ZIF5020 also works as a repeater extending the range of the Z-Wave network.
ZIF5020 must be connected to a DC power supply on the terminals marked with 0V and Vin. The power supply must be dimensioned to be able to source the loads connected to the outputs of the module. For example, if it is connected to 10 pieces of 24V 2W actuator on the outputs, then the power supply should at least be able to supply:

\[10 \times 2\, \text{W} + 1\, \text{W} = 21\, \text{W}, \text{ equivalent to } 24\, \text{V} \times 0.875\, \text{A}\]

The voltage on the output terminals marked +Vo comes directly from the supply terminal marked Vin.

It is possible to source a maximum of 100 mA (0.1 A) on each +Vo terminal, or a maximum of 1A from all +Vo terminals together (for example if only two +Vo terminals are used, 0.5 A can be sourced from each).

The module can be powered with a supply voltage from 10V to 24V. But note that it is the supply voltage that is directly carried out on the +Vo terminals.
2.1. Outputs.

The ZIF5020 module outputs are so-called "low-side switches", or open-Collector outputs. Which means when an output is activated, the output is pulled down to the 0V.

The internal transistor located in the ZIF5020 module can handle a maximum of 60V 1A, but ZIF5020 is "only" sized to be able to supply the module's supply voltage, and a maximum of 1A in total on the + Vo terminals (or 0.125A from each of the 8 + Vo Maximum 1A total).

However, if you want to use larger loads or voltages on the outputs, it is possible to connect an external supply directly to the load and then connect this external supply 0V to the ZIF5020's 0V supply terminal.
2.2. Inputs.

ZIF5020 module’s digital inputs can be connected to different types of switches, relays, open-collector outputs, etc.

The inputs marked IN1, IN2, IN3 and IN4, provides an output voltage of approximately 7.5V, which can then be short-circuited to the 0V by mounting, for example a switch between INx and 0v terminals.

It is also possible to connect the inputs to an external voltage up to 10V where a voltage above 1.7V means that the input is interpreted as a logical “1” and voltages below as a logical “0”. If an external voltage is used on the inputs, the supply of the input should be “switched off” first. This is done using the configuration parameters 2, 3, 4, and 5.

The input can be configured for various trigger functions using configuration parameters 9, 10, 11 and 12.

3. Resetting the device.

ZIF5020 can be reset back to factory default settings. This means that all configurations and the address of the device will be reset and reverted to the values as they were in fabrication. The device must subsequently be re-included into the Z-Wave network.

The reset is done by holding down the small push button that is found by using a thin tool through the hole in the front of the module (marked with the text “INCLUSION”) and activating the pushbutton for at least 10 seconds until the LED gives a short blink.

Please use this procedure only in cases where the primary network check does not exist or is not operational.


When the ZIF5020 is delivered, the device is not connected to a Z-Wave network. In order for the device to be able to communicate with other devices in the Z-Wave network, ZIF5020 must be included into the network. This process is called Include device in the Z-Wave network. Devices can also be excluded from the Z-Wave network, for example, if they are to be used in another installation, this is called Exclude device from the Z-Wave network.

Both processes start by putting the central controller in either Include mode or in Exclusion mode. Please refer to the manual of the network controller how to put the controller in either Include mode or Exclusion mode.
Then activate **Include mode/Exclusion mode** on the ZIF5020 device. Press the small button in the hole in the front of the module, marked with the text "INCLUSION", three times, after which the status LED will start flashing.

Include button **Must** Have exactly 3 short-term taps, no more, no less, to start the include process.

If the device already belongs to a network, the device needs to be **Excluded** before it can be **Included** In the current network, or the include process will fail.

5. **Association groups.**

ZIF5020 consists of 15 virtual devices (Endpoints); Base device (root device or endpoint (0), and 14 sub-devices (14 endpoints).

The root device is used by the controllers that do not support Multichannel communication, which will provide a very limited use of this module.

The 14 virtual devices consist of 10 devices for controlling the outputs of the module and 4 devices for reporting the module inputs.

Below is an overview of the different association groups for each of the virtual devices.

In the group numbers, the first number indicates the number on each virtual device and the second number indicates the group number on the root device (endpoint 0).
Output 1

Device 1
(End Point 1)

Group 1/1  Lifeline. Applies to the entire module.
Max. Number of devices in group: 1

Group 2/2  Send Basic Report On/Off when output 1 is activated.
This group is typically used to send status information to the central
controller device, for visualization of the status of the output (for
example to VERA or Fibaro Home Center).
Max. Number of devices in group: 5

Output 2

Device 2 (End Point 2)

Group 1/-  Lifeline.
Max. Number of devices in group: 0

Group 2/3  Send Basic Report On/Off when output 2 is activated.
This group is typically used to send status information to the central
controller device, for visualization of the status of the output (for
example to VERA or Fibaro Home Center).
Max. Number of devices in the group: 5

Output 3

Device 3 (End Point 3)

Group 1/-  Lifeline.
Max. Number of devices in group: 0

Group 2/4  Send Basic Report On/Off when output 3 is activated.
This group is typically used to send status information to the central
controller device, for visualization of the status of the output (for
example to VERA or Fibaro Home Center).
Max. Number of devices in the group: 5

Output 4
Group 1/- *Lifeline.*
Max. Number of devices in the group: 0

Group 2/5 Send **Basic Report On/Off** when output 4 is activated.
This group is typically used to send status information to the central control device, for visualization of the status of the output (for example to VERA or Fibaro Home Center).
Max. Number of devices in the group: 5

Device 5 *(End Point 5)*

Group 1/- *Lifeline.*
Max. Number of devices in the group: 0

Group 2/6 Send **Basic Report On/Off** when output 5 is activated.
This group is typically used to send status information to the central control device, for visualization of the status of the output (for example to VERA or Fibaro Home Center).
Max. Number of devices in the group: 5

Device 6 *(End Point 6)*

Group 1/- *Lifeline.*
Max. Number of devices in the group: 0

Group 2/7 Send **Basic Report On/Off** when output 6 is activated.
This group is typically used to send status information to the central control device, for visualization of the status of the output (for example to VERA or Fibaro Home Center).
Max. Number of devices in the group: 5

Device 7 *(End Point 7)*

Group 1/- *Lifeline.*
Max. Number of devices in the group: 0

Group 2/8 Send Basic Report On/Off when output 7 is activated.
This group is typically used to send status information to the central control Unit, for visualization of the status of the output (e.g. to VERA or Fibaro Home Center).
Max. Number of devices in the group: 5
Device 8 (End Point 8)  
Output 8  
Group 1/  
*Lifeline.*  
Max. Number of devices in the group: 0  
Group 2/9  
Send **Basic Report On/Off** when output 8 is activated.  
This group is typically used to send status information to the central control unit, for visualization of the status of the output (for example to VERA or Fibaro Home Center).  
Max. Number of devices in the group: 5

Device 9 (End Point 9)  
Output 9  
Group 1/-  
*Lifeline.*  
Max. Number of devices in group: 0  
Group 2/10  
Send **Basic Report On/Off** when output 9 is activated.  
This group is typically used to send status information to the central control Unit, for visualization of the status of the output (for example to VERA or Fibaro Home Center).  
Max. Number of devices in the group: 5

Device 10 (End Point 10)  
Output 10  
Group 1/-  
*Lifeline.*  
Max. Number of devices in group: 0  
Group 2/11  
Send **Basic Report On/Off** when output 10 is activated.  
This group is typically used to send status information to the central control unit, for visualization of the status of the output (for example to VERA or Fibaro Home Center).  
Max. Number of devices in the group: 5

Device 11 (End Point 11)  
Input 1  
Group 1 / -  
*Lifeline.*  
Max. Number of devices in the group: 0  
Group 2/12  
Send **Basic Report On/Off** when input 1 is activated.  
This group is typically used to send status information to the central controller, for visualization of the status of the entrance (for example, to VERA or Fibaro Home Center).  
Max. Number of devices in the group: 5  
Group 3/13  
Send **Basic Set On/Off** When input 1 is activated.
May, for example, used to control relay modules, or for visualization in the central control device (for example Fibaro Home Center).
Max. Number of devices in the group: 5

Group 4/14  Send Binary Switch Set On/Off when input 1 is activated.
May for example be used to control relay modules.
Max. Number of devices in the group: 5

Group 5/15  Send Multi level Switch Set / Multi level Switch Start Level Change / Multi Level Switch Stop Level Change when input 1 is activated.
Can typically be used to control dimmers, curtain controls, etc.
Max. Number of devices in the group: 5

Unit 12 (End Point 12)

Input 2

Group 1 / -  Lifeline.
Max. number of devices in the group: 0

Group 2 / 16  Send Basic Report On/Off when input 2 is activated.
This group is typically used to send status information to the central controls device, for visualization of the status of input (for example, to VERA or Fibaro Home Center).
Max. number of devices in the group: 5

Group 3 / 17  Send Basic Set On/Off when input 2 will be activated.
May, for example be set to control relay modules, or for visualization in the central control device (for example Fibaro Home Center).
Max. Number of devices in the group: 5

Group 4 / 18  Send Binary Switch Set On / Off when input 2 is activated.
May, for example, be set to control relay modules.
Max. number of devices in the group: 5

Group 5 / 19  Send Multi level Switch Set / Multi level Switch Start Level Change / Multi Level Switch Stop Level Change when Input 2 is activated.
Can typically be used to control dimmers, curtain controls, etc.
Max. number of devices in the group: 5
Unit 13 (End Point 13)

Unit 13 (End Point 13)

**Input 3**

Group 1 / -  
*Lifeline.*

Max. number of devices in the group: 0

Group 2 / 20  
Send **Basic Report On/Off** when input 3 is activated.  
This Group is typically used to send status information to the central control device, for visualization of the status of input (for example, to VERA or Fibaro Home Center).  
Max. number of devices in the group: 5

Group 3 / 21  
Send **Basic Set On/Off** when input 3 will be activated.  
May for example, be used to control relay modules, or for visualization in the central controls device (for example Fibaro Home Center).  
Max. number of devices in the group: 5

Group 4 / 22  
Send **Binary Switch Set On/Off** when input 3 will be activated.  
May for example, be used to control relay modules.  
Max. number of devices in the group: 5

Group 5 / 23  
Send **Multilevel Switch Set/Multilevel Switch Start Level Change/Multilevel Switch Stop Level Change** when input 3 is activated.  
Can typically be used to control dimmers, curtain controls, etc.  
Max. number of devices in the group: 5

Unit 14 (End Point 14)

Unit 14 (End Point 14)

**Input 4**

Group 1 / -  
*Lifeline.*

Max. number of devices in the group: 0

Group 2 / 24  
Send **Basic Report On/Off** when input 4 is activated.  
This group is typically used to send status information for the central control device, for visualization of the status of input (for example, to VERA or Fibaro Home Center).  
Max. number of devices in the group: 5

Group 3 / 25  
Send **Basic Set On/Off** when input 4 is activated.  
May for example be used to control relay modules, or for visualization in the central controls unit (for example Fibaro Home Center).  
Max. number of devices in the group: 5

Group 4 / 26  
Send **Binary Switch Set On/Off** when input 4 is activated.  
May for example, be used to control relay modules.  
Max. number of devices in the group: 5

Group 5 / 27  
Send **Multi level Switch Set/Multi level Switch Start Level Change/Multi Level Switch Stop Level Change** when input 4 is activated.  
Can typically be used to control dimmers, curtain controls, etc.  
Max. number of devices in the group: 5
6. Configuration parameters.

Z-Wave device is able to function directly after they have been included in the Z-Wave network, but with different configuration parameters on a device can be changed to better coverage of the individual user's wishes or needs, as well as allow for additional functionality.

Parameter 1, parameter size 1 byte. Status LED.
This parameter can be used to change how the status led in the front of the module should light.

**Value Description**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>LED off.</td>
</tr>
<tr>
<td>1</td>
<td>LED light steady. (Default)</td>
</tr>
<tr>
<td>2</td>
<td>LED blinks at 1 second interval (½ Hz).</td>
</tr>
<tr>
<td>3</td>
<td>LED blinks at ½ second interval (1 Hz).</td>
</tr>
</tbody>
</table>

Parameter 2, parameter size 1 byte. Loop voltage of Input 1.
Can be used to turn off the voltage on the input 1, so that the input can be connected to an external voltage.

**Value Description**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Voltage of input off.</td>
</tr>
<tr>
<td>1</td>
<td>Voltage of input on. (Default)</td>
</tr>
</tbody>
</table>

Parameter 3, parameter size 1 byte. Loop voltage of input 2.
Can be used to turn off the voltage on the input 2, so that the input can be connected to an external voltage.

**Value Description**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Voltage of input off.</td>
</tr>
<tr>
<td>1</td>
<td>Voltage of input on. (Default)</td>
</tr>
</tbody>
</table>

Parameter 4, parameter size 1 byte. Loop voltage on input 3.
Can be used to turn off the voltage on the input 3, so that the input can be connected to an external voltage.

**Value Description**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Voltage of input off.</td>
</tr>
<tr>
<td>1</td>
<td>Voltage of input on. (Default)</td>
</tr>
</tbody>
</table>

Parameter 5, parameter size 1 byte. Loop voltage of input 4.
Can be used to turn off the voltage on the input 4, so that the input can be connected to an external voltage.

**Value Description**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Voltage of input off.</td>
</tr>
<tr>
<td>1</td>
<td>Voltage of input on. (Default)</td>
</tr>
</tbody>
</table>
Parameter 6, parameter size 1 byte. Prel Filter-time on the inputs.
Specifies the time used for the snubber - filter on the input in 0.01 seconds resolution.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 255</td>
<td>0 – 2.55 seconds. Default value is 5, equivalent to a snubber-filter time on 50 milliseconds (0.05 seconds).</td>
</tr>
</tbody>
</table>

Parameter 7, parameter size 1 byte. Threshold value for input activation
Indicates the time as an input must be stable before being accepted as active/inactive for 0.01 seconds resolution.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 255</td>
<td>0 – 2.55 seconds. Default value is 20, equivalent to 200 milliseconds (0.2 seconds).</td>
</tr>
</tbody>
</table>

Parameter 8, parameter size 1 byte. Threshold value for input "held" Mode.
Indicates the time as an input must have been activated before it will assume "button held down" mode in 0.01 seconds of resolution.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 255</td>
<td>0 – 2.55 seconds. Standard value is 50, equivalent to 500 milliseconds (0.5 seconds).</td>
</tr>
</tbody>
</table>

Parameter 9, parameter size 1 byte. Setup functions for Input 1.
There are different ways of selecting input to operate, see the section on input features.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Inactive.</td>
</tr>
<tr>
<td>1</td>
<td>Mode 1, level-controlled input. (Default)</td>
</tr>
<tr>
<td>2</td>
<td>Mode 2, falling-edge controlled input.</td>
</tr>
<tr>
<td>3</td>
<td>Mode 3, rising-edge controlled input.</td>
</tr>
</tbody>
</table>

Parameter 10, parameter size 1 byte. Function setup for input 2.
There are different ways of selecting input to operate, see the section on Input features.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Inactive.</td>
</tr>
<tr>
<td>1</td>
<td>Mode 1, level-controlled input. (Default)</td>
</tr>
<tr>
<td>2</td>
<td>Mode 2, falling-edge controlled input.</td>
</tr>
<tr>
<td>3</td>
<td>Mode 3, rising-edge controlled input.</td>
</tr>
</tbody>
</table>
Parameter 11, parameter size 1 byte. Function Setup for Input 3.
There are different ways of selecting the inputs to operate, see the section on Input features.

**Value Beskrivelse**

0  Inactive.
1  Mode 1, level-controlled input. (Default)
2  Mode 2, falling-edge controlled input.
3  Mode 3, rising-edge controlled input.

Parameter 12, parameter size 1 byte. Function Setup for Input 4.
There are different ways of selecting input to operate, see the section on input features.

**Value Description**

0  Inactive.
1  Mode 1, level-controlled input. (Default)
2  Mode 2, falling-edge controlled input.
3  Mode 3, rising-edge controlled input.

Parameter 13, parameter size 1 byte. Enable Central Scene notifications.
It is possible to activate the is sent Central Scene Notifications when the 4 inputs are activated.

**Value Description**

0  Central Scene notifications are turned off. (Default)
1  Central Scene notifications are on.
7. Command classes.

Supported command classes.

- Association (version 2)
- Association Group Information (version 1)
- Multi Channel Association (version 2)
- Version (version 2)
- Configuration (version 1)
- Manufacturer Specific (version 2)
- Z-Wave Plus Information (version 2)
- Unit Reset Locally (version 1)
- Powerlevel (version 1)
- Firmware Update (version 2)
- Multi Channel (version 3)
- Basic (version 2)
- Binary Switch (version 2)

Controlled Command Classes

- Basic (version 2)
- Binary Switch (version 2)
- Multilevel Switch (version 4)
- Central Scene (version 2)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>10 - 24V DC</td>
</tr>
<tr>
<td>Outputs</td>
<td>A maximum of 1A can be sourced from the outputs of the module. Open-collector outputs, max. 60Vdc 1A.</td>
</tr>
<tr>
<td>Inputs</td>
<td>Digital <strong>potential free</strong>, max. 10Vdc, Inputs <strong>impedance</strong> 10Kohm. Screw terminals: 0.2 – 2.5 mm²</td>
</tr>
<tr>
<td>Connection Terminals</td>
<td>Outputs: 18 pin connection, 10 x low-side switch, 8 x supply out. Input: 8 pin connection, 4 x Input, 4 x 0V.</td>
</tr>
<tr>
<td>Power consumption</td>
<td>0.6 W.</td>
</tr>
<tr>
<td>Radio protocol</td>
<td>Z-Wave®: EU 868.4MHz – 500 Series.</td>
</tr>
<tr>
<td>Approvals</td>
<td>CE</td>
</tr>
<tr>
<td>Explorer Frame Support</td>
<td>Yes</td>
</tr>
<tr>
<td>SDK</td>
<td>6.61.00</td>
</tr>
<tr>
<td>Devicetype</td>
<td><strong>Slave</strong> with router/repeater functionality.</td>
</tr>
<tr>
<td>Generic Unit Class</td>
<td>Binary Switch.</td>
</tr>
<tr>
<td>Specific Unit Class</td>
<td>Valve Open/Close</td>
</tr>
<tr>
<td>Routing</td>
<td>Yes</td>
</tr>
<tr>
<td>FLIRS</td>
<td>No</td>
</tr>
<tr>
<td>Z-Wave Plus</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware Version</td>
<td>0.02</td>
</tr>
</tbody>
</table>