myTEM SmartHome

myTEM Radio IO Modul / Radio IO Modul Floor
MTIOM-100-WL / MTIOM-101-WL

The Radio IO Modul MTIOM-100-WL and the Radio IO Modul Floor MTIOM-101-WL are universal, Z-Wave compatible modules from myTEM for extending your smart home system with additional inputs and outputs. For this, the devices are connected to your central myTEM Radio Server via the Z-Wave mesh network.

The programmable behavior allows a flexible use of the devices in the house.

Further information can be found on our website:
www.mytem-smarthome.com/web/en/downloads/

ATTENTION:
This device is not a toy. Please keep it away from children and animals!

Please read the manual before attempting to install the device!

These instructions are part of the product and must remain with the end user.

Warning and safety instructions

WARNING!
This word indicates a hazard with a risk that, if not avoided, can result in death or serious injury. Work on the device must only be carried out by persons with the necessary training or instruction.

CAUTION!
This word warns of possible damage to property.

SAFETY INSTRUCTIONS

- Operate this device only as described in the manual.
- Do not operate this device if it has obvious damage.
- This device shall not be altered, modified or opened.
- This device is intended for use in buildings in a dry, dust-free location.
- This device is intended for installation in a control cabinet. After installation, it must not be openly accessible.
- Electrical equipment may only be installed and fitted by qualified electricians who are familiar with and comply with the applicable regulations and standards.
- Analog inputs / outputs, digital inputs and device supply must comply with the ELV requirements. Do not connect ELV and mains voltage together. (ELV = extra-low voltage)
- If several motors are to be connected in parallel at one output, be sure to observe the manufacturer's instructions and, if necessary, use isolating relays.
- Only use blind motors with mechanical or electronic limit switches. Limit switches must be checked for correct adjustment.
- Do not connect three-phase motors.

DISCLAIMER

Trademarks

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What is Z-Wave®?

Z-Wave is the international wireless protocol for communication in the smart home. Z-Wave ensures a reliable communication by reconfirming every message (**two-way communication**) and every mains powered node can act as a repeater for other nodes (**meshed network**) in case the receiver is not in direct wireless range of the transmitter.

Z-Wave **products from different manufacturers can be used together** in a wireless network. Thus, this product with any Z-Wave product from other manufacturers can be used in a common Z-Wave wireless network. All mains operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

The myTEM Radio IO Modul and the myTEM Radio IO Modul Floor are Z-Wave devices with **secure communication (S2)** and use the radio frequency of 868.4 MHz. If other devices also support the same secure communica-

tion, the data is exchanged in this secure mode. Otherwise it will switch automatically to a lower level of security to maintain backward compatibility.

For more information about frequency regulations please refer to the homepage of Silicon Labs. For more information about Z-Wave technology, devices, tutorials, etc. please refer to www.z-wave.info.

Product description

The myTEM Radio IO Modul and the myTEM Radio IO Modul Floor are Z-Wave devices of the type **Binary Switch** for use in **Europe / Switzerland**.

- Switching of lights
- Switching of single-phase fan motors
- Switching of electric blinds or similar shading devices
- Operation by means of buttons, sensors via the central server
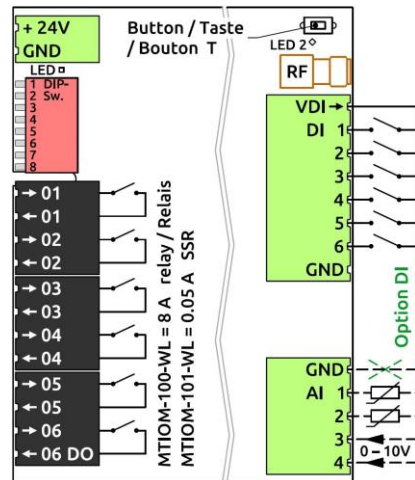
Functions:

- Supply voltage 24 VDC ± 10%
- Communication via Z-Wave mesh network
- 6 digital inputs 24 VDC (DI1 – DI6) for e.g. external switches
- 24 VDC power supply, 100 mA, for the digital inputs DI1 – DI6 (VDIout)
- 4 analog inputs (AI1 – AI4), which can be used for 0-10 VDC or NTC-, PTC- or PT1000 sensors. Analog inputs can also be used as digital inputs 24 VDC. They must then be connected to VDIout.
- 6 digital outputs with potential-free relays 8 A, 250 VAC or 30 VDC (DO1 – DO6) in case of the myTEM Radio IO Modul and noiseless SSR 0.05 A, 250 VAC in case of the Radio IO Modul Floor.
- Manual positions of the outputs via DIP switch for easy commissioning
- The device is installed in a control cabinet, mounted on a 35 mm DIN rail

Preparation for the installation

In order to include ("Add") a Z-Wave device to a network it **must be in factory default state**. Please make sure to reset the device into factory default. After power-up the status is displayed as below:

Status "Add" (included in a Z-Wave network):
The **LED 2** lights **green** for 1-2 seconds

Status "Remove" (not included):
The **LED 2** flashes **red** for 1-2 seconds

Device Reset Locally (Reset to factory default)

Please use this procedure only when the network primary controller is missing or otherwise inoperable.

Power-up the device and then press the button (**T**) for 10 seconds.

Reset: The **LED** lights up **briefly** in **red**

The device reset deletes the memory chip, including all Z-Wave network settings.

Installation

WARNING! Depending on national safety standards, only authorized and/or trained technicians may be allowed to perform electrical installations on the power grid. Please inform yourself about the legal situation before installation.

WARNING! Different voltages (e.g. 24 VDC, 230 VAC L1 or 230 VAC L2) may only be connected to the digital outputs (relays / SSR's) **if one output is left out between them**.

Please install the device according to the following steps:

1. **WARNING!** Make sure that the device is disconnected from the power supply or that the devices in the control cabinet are disconnected from the mains.
2. **WARNING!** Connect the device according to the circuit diagram of the myTEM ProgTool or the terminal assignment from the pictures in this manual. Incorrect wiring can result in injury or death or damage the device.
3. **CAUTION!** The device shall only be operated with stabilized power supplies (24 VDC). Connecting to higher voltages will damage the device.
4. **WARNING!** Switch on the power supply and, if necessary, check the wiring with the manual positions via the DIP switch. **Take care of your safety as the devices are live.**
5. Include (Add) the module into the Z-Wave network as described below.

Inclusion/Exclusion ("Add/Remove") of the device

On factory default, the device does not belong to any Z-Wave network. In order to communicate with other Z-Wave devices, it must be included into an existing network or a new network has to be established. In Z-Wave, this process is called "Add".

Devices can also be removed from networks. In Z-Wave, this process is called "Remove". The primary controller of the Z-Wave network initiates both processes. This controller is put into the "Add", respectively the "Remove" mode. The manual of the controller will contain the information on how to switch it into these modes. Only when the primary controller of the Z-Wave network is in the "Add" mode can devices be added. Removing a device from the network will reset it to the delivery state.

SmartStart

SmartStart enabled products can be added into a Z-Wave network by scanning the Z-Wave QR code present on the product with a controller providing SmartStart inclusion. No further action is required and the SmartStart product will be added automatically within 10 minutes of being switched on in the network vicinity.

The DSK label (QR code) is located on the long side of the housing.

When the device is in the "Add" mode, the LED flashes **green**. When finished, the new status is:
Add: The **LED 2** lights up **briefly** in **green**
Remove: The **LED 2** lights up **briefly** in **red**

Manual inclusion/exclusion ("Add/Remove")

If the myTEM Radio IO Modul or myTEM Radio IO Modul Floor shows status "Add", the "Remove" can be performed with any controller in the network or with the help of a new controller. However, it is recommended to use the primary controller of the previous network unless it is no longer available or damaged.

"Remove" deletes the memory chip, including all Z-Wave network settings.

1. Activate the "Add" or "Remove" mode on your controller.
2. Press the button (**T**) four times in quick succession to start include / exclude ("Add / Remove").

When the device is in the "Add" mode, the LED flashes **green**. When finished, the new status is:
Add: The **LED 2** lights up **briefly** in **green**
Remove: The **LED 2** lights up **briefly** in **red**

Manual positions via DIP switch

With the aid of the DIP switch, the outputs can be checked after installation.

- **CAUTION!** While manual settings are used, the control commands from the myTEM Smart Server or myTEM Radio Server are ignored.
- **CAUTION!** Before starting, set all DIP switches to position OFF, i.e. upwards. This avoids that e.g. OPEN / CLOSE commands are set at the same time.
- To check the digital outputs (relays / SSR's) set DIP switch 8 down to ON.
  With the DIP switches 1 - 6 you can now switch the outputs DO1 – DO6 on and off.

LED 1 display

The LED 1 next to the power connector may show the following states:

LED 1 green: Device started and working according to commands from the myTEM Smart Server or myTEM Radio Server

LED 1 flashing green: Device is in manual position, i.e. the outputs are according to the DIP-switch setting

LED 1 off: Device not powered, not started or broken

Quick trouble shooting

The following hints may help solving trouble:

1. Make sure that the power supply is connected with the correct polarity. With wrong polarity the device does not start.
2. Make sure that new devices are in factory reset state. The Z-Wave status is displayed at power up.
3. If a connection cannot be established, check that the controller and the device are working on the same radio frequency.
4. If a connection cannot be established, the control cabinet may reduce the radio signal. **Please use in this case an external antenna**, such as, for example, the myTEM MTANT-100-WL.
5. Remove devices that are no longer available in the Z-Wave network from all association groups. Otherwise significant delays in the execution of commands are possible.
6. Make sure you have enough mains powered devices to benefit from the meshing network.
7. Never use "sleeping" battery powered devices without a central controller and do not poll battery powered devices.

Technical specifications

Dimensions (W × H × D)	106.6 × 101.1 × 62.5 mm (height with connectors 106.8 mm)	
Installation / mounting	On 35 mm DIN rail	
Operating voltage	24 VDC ± 10%	
Power consumption in standby	Continuous operation for wireless network, therefore no standby operation	
Power consumption in operation (module only, without external loads)	0.5 W, if the inputs are open and the outputs are turned off 5.0 W, if the inputs are short-circuited to VDIout and the outputs are turned on	
Switchable load MTIOM-100-WL MTIOM-101-WL	6× 8.0 A, 250 VAC or 30 VDC, cos(φ) =1.0 (Relay version – Radio IO Modul) 6× 0.05 A, 250 VAC or 30 VDC, cos(φ) =1.0 (SSR version – Radio IO Modul Floor)	
Ambient temperature for operation	0 °C – 50 °C	
Ambient temperature for storage	-20 °C – 60 °C	
Ambient humidity	5 %RH – 85 %RH (non condensing)	
Wire cross-section connectors	0.25 mm² – 2.5 mm²	
Stripping length for connectors	ca. 7 mm	
Tightening torque for connectors	0.5 Nm	
Degree of protection provided by enclosure	IP 20 (after installation)	(according to EN 60529)
Protection class	II	(according to EN 60730-1)
Overvoltage category	II	(according to EN 60730-1, resp. EN 60664-1)
Pollution degree	2	(according to EN 60730-1)
Safety main unit	EN 60730-1:2016 + A1:2019	
EMC main unit	EN 60730-1:2016 + A1:2019 EN IEC 61000-6-2:2019	EN 61000-6-3:2007 + A1:2011 / AC:2012
Safety radio part	EN 62368-1:2014 / AC:2017	EN 62479:2010
EMC radio part	EN 301 489-1 V2.2.3	EN 301 489-3 V2.1.1
Radio spectrum	EN 300 220-2 V3.2.1	
RoHS	EN IEC 63000:2018	
CE conformity CE	2014/35/EU (LVD) 2014/30/EU (EMC)	2014/53/EU (RED) 2011/65/EU (RoHS)
Z-Wave hardware platform	Z-Wave series 700 (ZGM130)	
Device Type	Binary Switch	
Role Type	Always On Slave (AOS)	

Explanation of some Z-Wave specific terms

Controller ... is a Z-Wave device with the capability to manage a network. They are typically gateways, remote controls or wall controllers.

Primary controller ... is the central administrator of the Z-Wave network. In a Z-Wave network, only one primary controller is allowed.

Slave ... is a Z-Wave device without the ability to manage a network. Slaves can be sensors, actuators and even remote controls.

Add (Inclusion) ... is the process of adding new Z-Wave devices into a network.

Remove (Exclusion) ... is the process of removing Z-Wave devices from the network.

Wakeup Notification ... is a special wireless message issued by battery powered Z-Wave devices to announce that they are awake and able to communicate.

Node Information Frame (NIF) ... is a special wireless message issued by a Z-Wave device to announce its capabilities and functions.
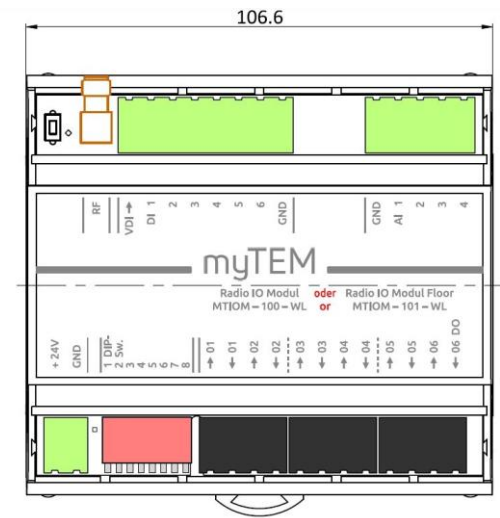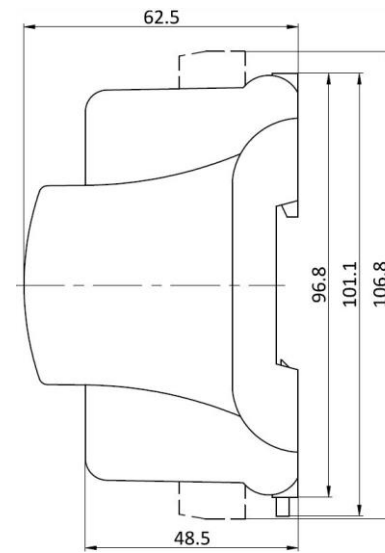
Belegungsplan / Assignment plan / Plan d'affectation / Piano di assegnazione

AI als DI verwendet
AI used as DI
AI utilisé comme DI
AI usato come DI
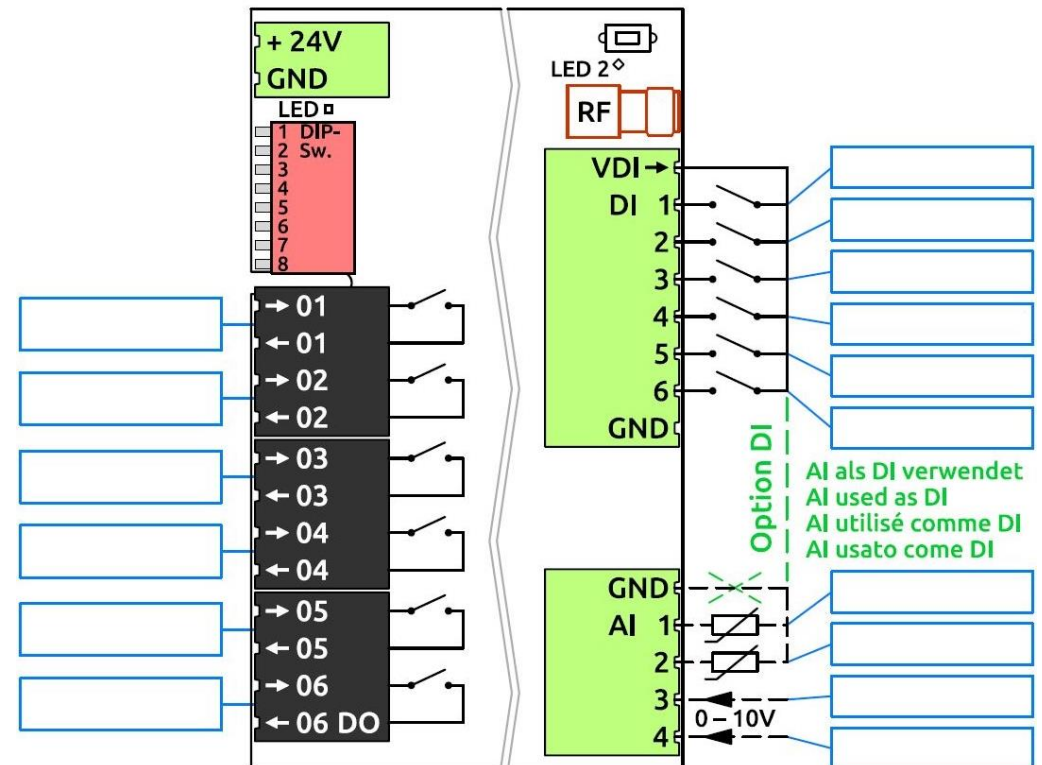
Z-Wave Association - Devices control each other

The Association Command Class is used to manage associations to NodeID destinations. An association group sends commands to the configured destinations when triggered by an event.

Association groups:

Group ID	Profile / Name	Max. no of units	Command Class	Type / Event	Description
1	General: Lifeline / Lifeline	5	Notification Report	T: System (0x09) E: Heartbeat (0x05)	Reports to be alive (interval according to configuration)
				T: Power Management (0x08) E: Power has been applied (0x01)	Reports the device had a start-up (sent after each power-up only)
			Device Reset Locally		Reports resetting network and configuration parameter
			Central Scene		Actuation of digital inputs DI1 – DI6

The reports "Heartbeat" and "Power Management" can be activated / deactivated separately via the command class **Notification**.

Endpoints 1 ... 6 (DO1 – DO6, n = 1 ... 6)
Each endpoint reflects a digital output.

Group ID	Profile / Name	Max. no of units	Command Class	Description
1	General: Lifeline / Lifeline	5	Binary Switch Report	Reports output DO\<n> state, when it changed

Endpoints 7 ... 12 (DI1 – DI6, n = 1 ... 6)
Each endpoint reflects a digital input.

Group ID	Profile / Name	Max. no of units	Command Class	Type / State	Description
1	General: Lifeline / Lifeline	5	Notification Report	T: System S: High state / Open	Report "Open" (input open), "High state" (input closed) DI\<n>

Endpoints 13 ... 16 (AI1 – AI4, n = 1 ... 4)
Each endpoint reflects an analog input.

Group ID	Profile / Name	Max. no of units	Command Class	Description
1	General: Lifeline / Lifeline	5	Multilevel Sensor Report	Temperature or voltage value input AI\<n>
		5	Multilevel Sensor Supported Report	Reports the actual supported sensor type (temperature or voltage)

Z-Wave configuration parameters

Z-Wave products can be used out of the box after inclusion ("Add") into the network. With the configuration, however, the behavior can be better adapted to the application. **CAUTION! Depending on the function the server may change some default settings.**

Par#	Description	Unit	Min	Max	Default	Digits	R/W	Size
1	Heartbeat rate	min	1	1440	60	0	r/w	2 bytes
2	Digital input 1 type (0 = disabled; 1 = binary / Binary Sensor Report; 2 = key / Central Scene Report) [X]	–	0	2	0	0	r/w	2 bytes
3	Digital input 1 send interval	min	0.1	120.0	5.0	1	r/w	2 bytes
4	Digital input 2 type (see Par# 2) [X]	–	0	2	0	0	r/w	2 bytes
5	Digital input 2 send interval	min	0.1	120.0	5.0	1	r/w	2 bytes
6	Digital input 3 type (see Par# 2) [X]	–	0	2	0	0	r/w	2 bytes
7	Digital input 3 send interval	min	0.1	120.0	5.0	1	r/w	2 bytes
8	Digital input 4 type (see Par# 2) [X]	–	0	2	0	0	r/w	2 bytes
9	Digital input 4 send interval	min	0.1	120.0	5.0	1	r/w	2 bytes
10	Digital input 5 type (see Par# 2) [X]	–	0	2	0	0	r/w	2 bytes
11	Digital input 5 send interval	min	0.1	120.0	5.0	1	r/w	2 bytes
12	Digital input 6 type (see Par# 2) [X]	–	0	2	0	0	r/w	2 bytes
13	Digital input 6 send interval	min	0.1	120.0	5.0	1	r/w	2 bytes
14	Analog input 1 enable (0 = disabled / 1 = enabled)	–	0	1	0	0	r/w	2 bytes
15	Analog input 1 select NTC5k (0), NTC10k (1), PTC1k (2), PT1000 (3), 0-10V (4), digital (5)	–	0	5	0	0	r/w	2 bytes
16	Analog input 1 send interval	min	0.1	120.0	5.0	1	r/w	2 bytes
17	Minimum delta temperature 1 send [Y]	K	0.1	10.0	0.5	1	r/w	2 bytes
18	Minimum delta voltage 1 send [Y]	V	0.1	10.0	0.5	1	r/w	2 bytes
19	Analog input 2 enable (0 = disabled / 1 = enabled)	–	0	1	0	0	r/w	2 bytes

Par#	Description	Unit	Min	Max	Default	Digits	R/W	Size
20	Analog input 2 select NTC5k (0), NTC10k (1), PTC1k (2), PT1000 (3), 0-10V (4), digital (5)	–	0	5	0	0	r/w	2 bytes
21	Analog input 2 send interval	min	0.1	120.0	5.0	1	r/w	2 bytes
22	Minimum delta temperature 2 send [Y]	K	0.1	10.0	0.5	1	r/w	2 bytes
23	Minimum delta voltage 2 send [Y]	V	0.1	10.0	0.5	1	r/w	2 bytes
24	Analog input 3 enable (0 = disabled / 1 = enabled)	–	0	1	0	0	r/w	2 bytes
25	Analog input 3 select NTC5k (0), NTC10k (1), PTC1k (2), PT1000 (3), 0-10V (4), digital (5)	–	0	5	0	0	r/w	2 bytes
26	Analog input 3 send interval	min	0.1	120.0	5.0	1	r/w	2 bytes
27	Minimum delta temperature 3 send [Y]	K	0.1	10.0	0.5	1	r/w	2 bytes
28	Minimum delta voltage 3 send [Y]	V	0.1	10.0	0.5	1	r/w	2 bytes
29	Analog input 4 enable (0 = disabled / 1 = enabled)	–	0	1	0	0	r/w	2 bytes
30	Analog input 4 select NTC5k (0), NTC10k (1), PTC1k (2), PT1000 (3), 0-10V (4), digital (5)	–	0	5	0	0	r/w	2 bytes
31	Analog input 4 send interval	min	0.1	120.0	5.0	1	r/w	2 bytes
32	Minimum delta temperature 4 send [Y]	K	0.1	10.0	0.5	1	r/w	2 bytes
33	Minimum delta voltage 4 send [Y]	V	0.1	10.0	0.5	1	r/w	2 bytes

[X] With buttons at the input the Central Scene Report should be used, with switches at the input the Binary Sensor Report should be used

[Y] Delta value in relation to the last sent value

Central Scene Command

The digital inputs can be used for Central Scene Commands. The assignment of the scene number is according to the table.

Digital input.(use buttons)	DI1	DI2	DI3	DI4	DI5	DI6
Scene number	1	2	3	4	5	6

Supported Command Classes
Root Device:

Command Class (CC)	Version	Not added	Non-secure added	Securely added, non-secure CC	Securely added, secure CC
Application Status CC	2	Support	Support		Support
Association CC	2	Support	Support		Support
Association Group Information CC	3	Support	Support		Support
Basic CC	2	Support	Support		Support
Binary Switch CC	2	Support	Support		Support
Central Scene CC	3	Support	Support		Support
Configuration CC	4	Support	Support		Support
Device Reset Locally CC	1	Support	Support		Support
Firmware Update Meta Data CC	5	Support	Support		Support
Indicator CC	3	Support	Support		Support
Manufacturer Specific CC	2	Support	Support		Support
Multi Channel Association CC	3	Support	Support		Support
Multi Channel CC	4	Support	Support		Support
Notification CC	8	Support	Support		Support
Powerlevel CC	1	Support	Support		Support
Security_2 CC	1	Support	Support	Support	
Supervision CC	1	Support	Support	Support	
Transport Service CC	2	Support	Support	Support	
Version CC	3	Support	Support		Support
Z-Wave Plus Info CC	2	Support	Support	Support	

Announced CC in endpoints:

The inputs and outputs are mapped to the following endpoints:

Input / Output	Fix / Dynamic	Number	Remark	Abbreviation	Default
Digital outputs	Fix	6		DO1 ... DO6	
Digital inputs	Fix	6		DI1 ... DI6	
Analog inputs	Fix	4	Individually selectable between: ▪ Temperature sensor ▪ 0-10 VDC sensor	AI1 ... AI4	Temperature sensor

Endpoints 1 ... 6 (DO1 – DO6, n = 1 ... 6)

Device Type: Switch Binary

Command Class (CC)	Version	Non-secure added	Securely added, non-secure CC	Securely added, secure CC
Association CC	2	Support		Support
Association Group Information CC	3	Support		Support
Binary Switch CC	2	Support		Support
Multi Channel Association CC	3	Support		Support
Security_2 CC	1		Support	
Supervision CC	1	Support	Support	
Z-Wave Plus Info CC	2	Support	Support	

Endpoints 7 ... 12 (DI1 – DI6, n = 1 ... 6)

Device Type: Notification Sensor

Sensor Type: System (0x09)

Event/State: digital input short-circuited (0x09), digital input open (0x0B)

Command Class (CC)	Version	Non-secure added	Securely added, non-secure CC	Securely added, secure CC
Association CC	2	Support		Support
Association Group Information CC	3	Support		Support
Central Scene CC	3	Support		Support
Multi Channel Association CC	3	Support		Support
Notification Sensor CC	8	Support		Support
Security_2 CC	1		Support	
Supervision CC	1	Support	Support	
Z-Wave Plus Info CC	2	Support	Support	

Endpoints 13 ... 16 (AI1 – AI4, n = 1 ... 4; change capabilities)

Device Type: Multilevel Sensor

Sensor Type: Air Temperature (0x01) / Voltage (0x0F)

Scale: Celsius (0x00) / Volt (0x00) or mV (0x01)

Command Class (CC)	Version	Non-secure added	Securely added, non-secure CC	Securely added, secure CC
Association CC	2	Support		Support
Association Group Information CC	3	Support		Support
Multi Channel Association CC	3	Support		Support
Multilevel Sensor CC	11	Support		Support
Security_2 CC	1		Support	
Supervision CC	1	Support	Support	
Z-Wave Plus Info CC	2	Support	Support	