SEC_SRT321

Wall Thermostat with LCD display

Firmware Version : 2.0

Quick Start

A This is a wireless Actor. For Inclusion of Z-Wave devices into the thermostats network do the following steps: Set DIL switch 1 on the back of the unit to 'ON' position, scroll through the function menu by rotating the dial, select "I" to include nodes into the network or "E" to exclude a node from network. For including the SRT321 as a secondary controller into an existing the Z-Wave network do the following steps: Set DIL switch 1 on the back of the unit to 'ON' position, scroll through the function menu by rotating the dial, select "L".

Please refer to the chapters below for detailed information about all aspects of the products usage.

What is Z-Wave?

This device is equipped with wireless communication complying to the Z-Wave standard. Z-Wave is the **international standard for wireless communication** in smart homes and buildings. It is using the **frequency of 868.42 MHz** to realize a very stable and secure communication. Each message is reconfirmed (**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 differentiates between Controllers and Slaves. Slaves are either sensors **(S)** transmitting metered or measured data or actuators **(A)** capable to execute an action. Controllers are either static mains powered controllers **(C)** also referred to as gateways or mobile battery operated remote controls **(R)**. This results in a number of possible communication patterns within a Z-Wave network that are partly or completely supported by a specific device.

1. Controllers control actuators
2. Actuators report change of status back to controller
3. Sensors report change of status of measured values to controller
4. Sensors directly control actuators
5. Actuators control other actuators
6. Remote controls send signals to static controllers to trigger scenes or other actions
7. Remote controls control other actuators.
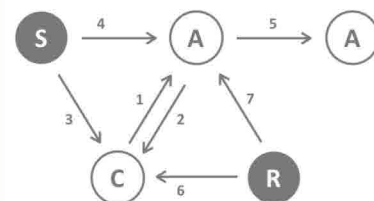
There are two different role a controller can have. There is always one single primary controller that is managing the network and including/excluding devices. The controller may have other functions - like control buttons - as well. All other controllers don't manage the network itself but can control other devices. They are called secondary controllers. The image also shows that its not possible to operate a sensor just from a remote control. Sensors only communicate with static controllers.

Product description

The SRT321 is a battery operated wall thermostat. Using a big wheel on the device the user can preset the desired target temperature in the room. By verifying the target temperature with the measured real temperature closed to the device the unit decides how to operate a wirelessly attached power switch that is attached to the heater. In parallel a central gateway of Z-Wave control software can set the target temperature using Z-Wave. This enables to realize a time scheduled zone heating. The thermostat itself does not have any internal timers but executes the wireless settings (COMMAND CLASS THERMOSTAT_SETPOINT) and the local setup.

Batteries

The unit is operated by batteries. Use only batteries of correct type. Never mix old and new batteries in the same device. Used batteries contain hazardous substances and should not be disposed of with household waste!

Battery Type: 2 * AAA

Installation Guidelines
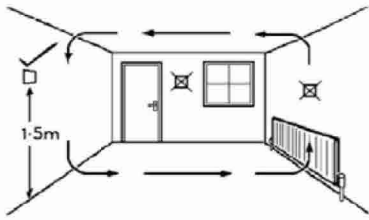
Choose a suitable mounting position in your room for installing the device. The SRT321 should be mounted on an internal wall approximately 1.5 metres from floor level using the wall plate provided and should be in a position away from draughts, direct heat and sunlight. Ensure that there will be enough space to allow easy access to the two retaining screws located at the base of the wall plate. Avoid installing the thermostat against or behind any large metal surfaces which could interfere with the radio signals.
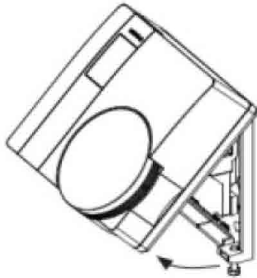
Offer the plate to the wall in the position where the SRT321 is to be mounted and mark the fixing positions through the slots in the wall plate. Drill and plug the wall, then secure the plate into position. The slots in the wall plate will compensate for any misalignment of the fixings. Undo the screws of the base of the thermostat and swing it away from the wallplate. Place the 2 x AAA batteries correctly into the battery compartment. Complete the installation by swinging the room thermostat into position by engaging with the lugs at the top of the wall plate before pushing it carefully into its plug-in terminal block. Tighten the 2 captive screws on the underside of the unit.

Behavior within the Z-Wave network

On factory default the device does not belong to any Z-Wave network. The device needs to join an existing wireless network to communicate with the devices of this network. This process is called **Inclusion**. Devices can also leave a network. This process is called **Exclusion**. Both processes are initiated by the primary controller of the Z-Wave network. This controller will be turned into exclusion respective inclusion mode. Please refer to your primary controllers manual on how to turn your controller into inclusion or exclusion mode. Only if the primary controller is in inclusion or exclusion mode, this device can join or leave the network. Leaving the network - i.e. being excluded - sets the device back to factory default.

If the device already belongs to a network, follow the exclusion process before including it in your network. Otherwise inclusion of this device will fail. If the controller being included was a primary controller, it has to be reset first.

For including the thermostat as a secondary controller into an existing the Z-Wave network do the following steps: Bring your primary controller into inclusion mode. Set DIL switch 1 on the back of the unit to 'ON' position, scroll through the function menu by rotating the dial, select "L". Once the character starts flashing the installer has 60 sec to activate the 3rd party unit, once the 3rd party unit has been activated the process must be completed within 240 sec or the thermostat will timeout.

Operating the device
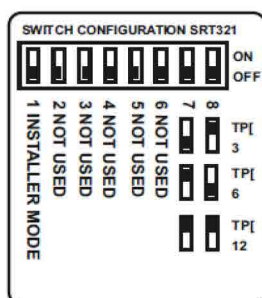
Switch positions for different TPI settings.

Thermostats using TPI (Time Proportional Integral) control algorithms will reduce the temperature swing that normally occurs when using traditional bellows or thermally operated thermostats. As a consequence, a TPI regulating thermostat will maintain the comfort level far more efficiently than any traditional thermostat.

When used with a condensing boiler, the TPI thermostat will help to save energy as the control algorithm allows the boiler to operate in condensing mode more consistently compared to older types of thermostat.

- DIL switch numbers 7 and 8 should be set as diagram opposite.
- For Gas boilers set the TPI setting to 6 cycles per hour. (Default setting)
- For Oil boilers set the TPI setting to 3 cycles per hour.
- For Electric heating set the TPI setting to 12 cycles per hour.

The **DIL switch 1** has to be set to position "ON" for **configuration mode**. To go bacj to normal mode switch the DIL switch 1 to the "OFF" position.

Turn the rotating dial on the front within configuration mode and select the desired function by pushing the dial once:

- **I** Include Node onto network
- **E** Exclude Node from network
- **N** Transmit Node Information Frame (NIF)
- **L** Learn Mode - use this command for Include or Exclude with another controller (does not support control group replication) Inclusion and reception of a primary role (Controller Shift)
- **Li** Receive Period Enabled (Listening). This function will keep the unit awake for 60sec, no Pass or Fail response will be provided
- **P** Protocol Reset - Press twice to activate Will restore all parameters back to factory default settings
- **A** Associate Control Unit
- **D** Disassociate Control Unit
- **C** (Primary Shift) This function allows the installer to manually relinquish the primary controller role of the SRT321 to become a secondary or inclusion controller

Wakeup Intervals - how to communicate with the device?

W This device is battery operated and turned into deep sleep state most of the time to save battery life time. Communication with the device is limited. In order to communicate with the device, a static controller **C** is needed in the network. This controller will maintain a mailbox for the battery operated devices and store commands that can not be received during deep sleep state. Without such a controller, communication may become impossible and/or the battery life time is significantly decreased.

This device will wakeup regularly and announce the wakeup state by sending out a so called Wakeup Notification. The controller can then empty the mailbox. Therefore, the device needs to be configured with the desired wakeup interval and the node ID of the controller. If the device was included by a static controller this controller will usually perform all necessary configurations. The wakeup interval is a tradeoff between maximal battery life time and the desired responses of the device.

To wake up the device do the following steps: Set DIL switch 1 on the back of the unit to 'ON' position, and select one of the konfiguration functions by pushing the rotating dial once.

It is possible to set the node ID to 255 to send wakeup notifications as broadcast. In this mode device takes more time to go to sleep and drains battery faster, but can notify all it's direct neighbors about a wakeup.

Node Information Frame

NI The Node Information Frame is the business card of a Z-Wave device. It contains information about the device type and the technical capabilities. The inclusion and exclusion of the device is confirmed by sending out a Node Information Frame. Beside this it may be needed for certain network operations to send out a Node Information Frame.

To send out a Node Information Frame do the following steps: Set DIL switch 1 on the back of the unit to 'ON' position, scroll through the function menu by rotating the dial, select "N".

Associations

A Z-Wave devices control other Z-Wave devices. The relationship between one device controlling another device is called *association*. In order to control a different device, the controlling device needs to maintain a list of devices that will receive controlling commands. These lists are called **association groups** and they are always related to certain events (e.g. button pressed, sensor triggers, ...). In case the event happens all devices stored in the respective association group will receive a common wireless command.

Association Groups:

1	Nodes controlled by Thermostat Node Set command (max. nodes in group: 4)
2	Nodes controlled by Binary Switch SET command (max. nodes in group: 1)
3	Nodes to receive unsolicited Battery Level Reports (max. nodes in group: 1)
4	Nodes to receive Thermostat Set Point Reports (max. nodes in group: 1)
5	Nodes to receive unsolicited Sensor Multilevel Reports (max. nodes in group: 1)

Set and unset associations to actuators

Associations can be assigned and remove either via Z-Wave commands or using the device itself.

> **SA**

To assign associations with devices you wish to control with the thermostat do the following steps: Set DIL switch 1 on the back of the unit to 'ON' position, scroll through the function menu by rotating the dial, select "A". Press the dedicated button on the target device you wish to control.

To disassociate an association do the following steps: Set DIL switch 1 on the back of the unit to 'ON' position, scroll through the function menu by rotating the dial, select "D". Press the dedicated button on the target device you wish to disassociate.

Special Functions as Z-Wave Controller

As long as this device is not included into a Z-Wave network of a different controller it is able to manage its own Z-Wave network as primary controller. As a primary controller the device can include and exclude other devices in its own network, manage associations, and reorganize the network in case of problems. The following controller functions are supported:

Include other device in own network

> **CI** Communication between two Z-Wave devices only works if both belong to the same wireless network. Joining a network is called inclusion and is initiated by a controller. The controller needs to be turned into the inclusion mode. Once in this inclusion mode the other device needs to confirm the inclusion - typically by pressing a button.

For Inclusion of Z-Wave devices into the thermostats network do the following steps: Set DIL switch 1 on the back of the unit to 'ON' position, scroll through the function menu by rotating the dial, select "I". Press the dedicated button on the target device to include it. Once the character starts flashing the installer has 60 sec to activate the 3rd party unit, once the 3rd party unit has been activated the process must be completed within 240 sec or the thermostat will timeout.

If current primary controller in your network is in special SIS mode this and any other secondary controller can also include and exclude devices.

To become primary a contoller have to be resetted and then include a device.

Exclude device from network

The primary controller can exclude devices from the Z-Wave network. During exclusion the relationship between the device and the network of this controller is terminated. No communication between the device and other devices still in the network can happen after a successful exclusion. The controller needs to be turned into the exclusion mode. Once in this exclusion mode the other device needs to confirm the exclusion - typically by pressing a button.

Attention: Removing a device from the network means that it is turned back into factory default status. This process can also exclude devices from it's previous network.

For Exclusion of Z-Wave devices from the thermostats network do the following steps: Set DIL switch 1 on the back of the unit to 'ON' position, scroll through the function menu by rotating the dial, select "E". Press the dedicated button on the target device to exclude it. Once the character starts flashing the installer has 60 sec to activate the 3rd party unit, once the 3rd party unit has been activated the process must be completed within 240 sec or the thermostat will timeout.

Shift Primary Role to a different Controller

The device can hand over its primary role to another controller and become secondary controller.

Set DIL switch 1 on the back of the unit to 'ON' position, scroll through the function menu by rotating the dial, select "C". The thermostat will become the secondary controller.

Update Network Information

As a battery operated controller the device will not automatically received updates about the network structure. This process should be initiated when the primary controller has included/excluded devices and it will result in an update of the network information in the battery operated controller. This prevents wrong communication that may cost battery life and delay other communication.

When the unit is a secondary or inclusion controller with a SUC/SIS present, the unit will request network updates once every 23 hours.

it is possible that a network update fails if the network was changed too much after the last update. In this case the the device need to be reincluded. Re-Inclusion is similar to a normal inclusion. Its just not needed to exclude the device before. Re-Inclusion makes sure that the node ID of the device remails unchanged.

Reset the Controller

For reseting the device do the following steps: Set DIL switch 1 on the back of the unit to 'ON' position, scroll through the function menu by rotating the dial, select "P". Confirm the procedure by double tapping the dial. Now your device is reset to factory defaults.

Configuration Parameters

Z-Wave products are supposed to work out of the box after inclusion, however certain configuration can adapt the function better to user needs or unlock further enhanced features.

IMPORTANT: Controllers may only allow to configure signed values. In order to set values in the range 128 … 255 the value sent in the application shall be the desired value minus 256. For example: to set a parameter to 200 it may be needed to set a value of 200 minus 256 = minus 56. In case of two byte value the same logic applies: Values greater than 32768 may needed to be given as negative values too.

Enables Temperature Sensor (Parameter Number 1, Parameter Size 1)
controls the use of the temperature sensor on the device

Value	Description
0 — 127	Disable (Default 0)
255 — 128	Enabled

Temperature Scale (Parameter Number 2, Parameter Size 1)
Sensor will report temperature in this scale

Value	Description
0 — 127	Celsius (Default 0)
255 — 128	Fahrenheit

Delta T (Parameter Number 3, Parameter Size 1)
defines the temperature steps of the heating control value is 0.1 K

Value	Description
0 — 100	Kelvin (Default 10)

Command Classes

Supported Command Classes

- Basic (version 0)
- Thermostat Mode (version 1)
- Thermostat Setpoint (version 1)
- Wake Up (version 2)
- Binary Switch (version 1)
- Version (version 1)
- Battery (version 1)
- Configuration (version 1)
- Multilevel Sensor (version 1)
- Manufacturer Specific (version 1)
- Association (version 1)

Technical Data

Battery Type	2 * AAA
Explorer Frame Support	No
SDK	5.02 pl3
Device Type	Portable controller
Generic Device Class	Thermostat
Specific Device Class	Specific Device Class not used
Routing	Yes
FLiRS	No
Firmware Version	2.0

Explanation of Z-Wave specific terms

- **Controller** — is a Z-Wave device with capabilities to manage the network. Controllers are typically Gateways, Remote Controls or battery operated wall controllers.

- **Slave** — is a Z-Wave device without capabilities to manage the network. Slaves can be sensors, actuators and even remote controls.
- **Primary Controller** — is the central organizer of the network. It must be a controller. There can be only one primary controller in a Z-Wave network.
- **Inclusion** — is the process of bringing new Z-Wave devices into a network.
- **Exclusion** — is the process of removing Z-Wave devices from the network.
- **Association** — is a control relationship between a controlling device and a controlled device.
- **Wakeup Notification** — is a special wireless message issued by a Z-Wave device to annonces that is is able to communicate.
- **Node Information Frame** — is a special wireless message issued by a Z_Wave device to announce its capabilities and functions.

Disposal Guidelines

The product contains batteries. Please remove the batteries when the device is not used.

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.