

AC301

Thermostatic Radiator Valve

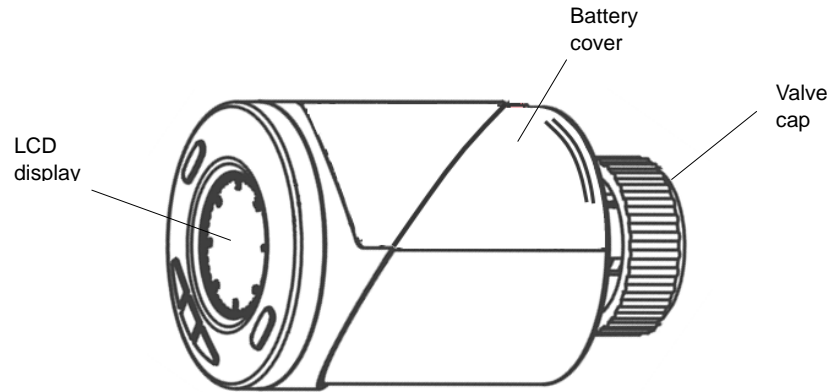
Thermostatic Radiator Valves (TRVs) sense the air temperature around them and regulate the flow of water through the radiator which they are fitted to.

They can be set at a level that gives you the room temperature you want. These settings may have to be different in each room, and you can set the TRVs to suit each room and then leave them to do their job.

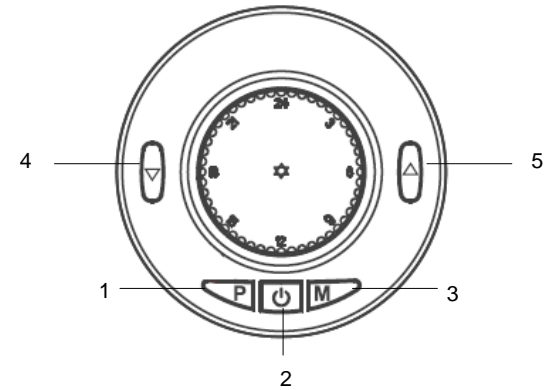
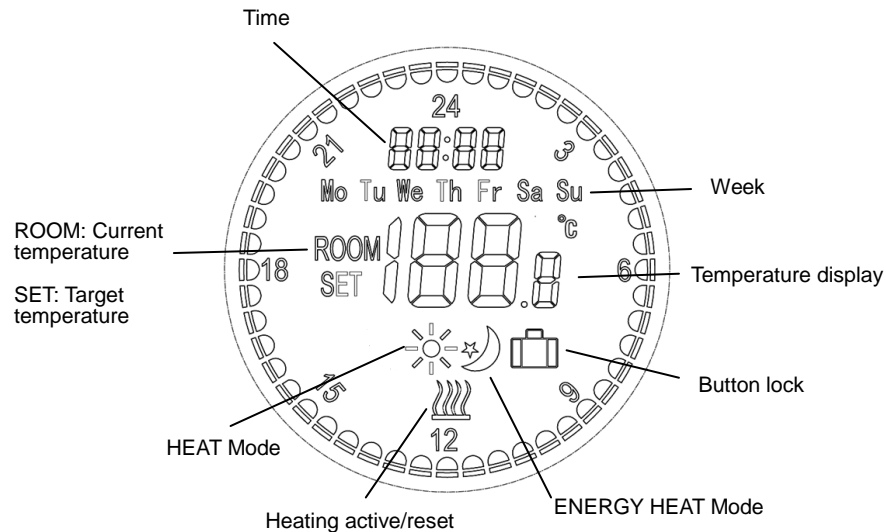
The device can be set temperature by manual or by gateway and schedule are created by gateway.

This product can be operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers. All mains operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

Product Overview



LCD Display



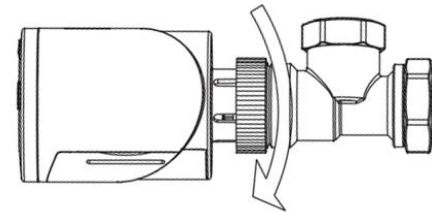
	Button name	Function
1.	P button	For RF inclusion
2.	Power on/off	Turn on/off TRV
3.	M button	Mode select : HEAT/ ENERGY HEAT
4.	Down button	Reduce Target Temperature
5.	Up button	Increase Target Temperature

Installation

Mounting

Do not insert the batteries yet.

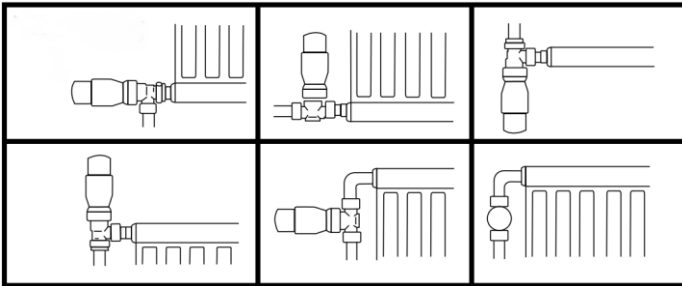
1. Remove any existing control from the radiator valve
2. Mount the TRV on the valve and tighten it by turning the Valve cap clockwise.



3. You may need to use one of the adaptors supplied to fit your radiator valve:



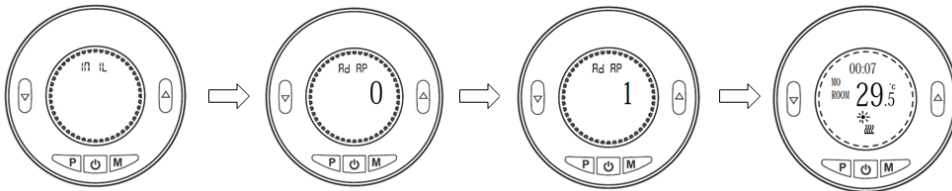
- The TRV can be mounted at various orientation as shown below:



Note: The TRV needs a free flow of air to sense the temperature so they must not be covered by curtains or blocked by furniture

Calibration

- The unit supports SmartStart function, 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.
- After finished inclusion, the unit will start initializing itself. During this period the LCD will display **INIL** with backlight flashing for 2 minutes.
- When the TRV displays **AdAP**, press **UP** button to start the calibration. The number **0** will change to number **1**. If it does not change to **1**, press **UP** button again.
- The TRV will start to adapt itself to the stroke of the valve's body by opening and closing the valve twice to store the end points. This could take up to 1 minute.



- Calibration is complete when temperature readings appear on the LCD.

Note: Temperature readings will become accurate 10 minutes after installing the batteries.

Operation

- The user can choose between two heat levels for automatic temperature control without user intervention. This can be selected either by button **M** or set through the gateway.

“HEAT” mode: This is a higher temperature level for indoor comfort and normally used when a room is occupied.

“ENERGY HEAT” mode: This is the lower temperature level for energy saving, typically used during sleeping or when a room is empty.

Setpoints for these two modes must first be preset through the gateway. The TRV will activate heating whenever room temperature falls below these setpoints.

- User can use the gateway's scheduler or scenes controller to switch between these two modes at anytime depending on their lifestyle. Refer to the gateway's instruction manual for this.
- Manual Over-ride:** the user can override the preset settings at anytime allowing for on-demand manual control of the TRV. Pressing the **Up**, **Down** and **M** button on the TRV will bypass the setpoints temporarily for 4 hours (Configure 10). After 4 hours, it will restore the last mode and temperature.
- Open window detection:** When enabled, the TRV will automatically stop heating when it detects a sudden drop in room temperature (default: 2°C in 15 minutes). This usually happens when a window or door is opened without turning off the heating device. The LCD will display **OP**. The device will return to the previous mode of operation after 30mins, or press any button to exit.
- Key lock:** When enabled, the button keys on the TRV will be locked to prevent any tampering, shown by the **LOCK** icon on the LCD. Key lock can also be activated by pressing and hold buttons **P** and **M** simultaneously for 5 seconds.
- OFF:** This mode turns off the thermostat control of the TRV. Note that this does not switch off the device itself.

Maintenance

Low Battery: Under low battery condition, the TRV will remit RF signals to the gateway to alert the user of its low battery condition. Replace the batteries as soon as possible.

Decalc : When the TRV is inactive for long periods in use, e.g. during summer, it will automatically rotate the valve once every two weeks. This helps to prevent clogging of the radiator pipes and stiffening of the valve caused by build up of minerals.

Programming

Z-Wave Group

The TRV supports 1 Association Group:

Group 1: Association with 1 Controller node.

Group 1 command:

- When the unit is powered up first time, the unit will send a Notification Report and Clock report to the node of Group 1.
- When the battery level of the unit drops to an unacceptable level, the unit will emit Battery report to the nodes of Group 1.
- When performing Factory Reset the unit will send Device Reset Locally Notification to the node of Group1.
- The unit will send Sensor Multilevel Report to the node of Group 1 every two hours.
- When changing mod of the unit, it will send Thermostat Mode Report to the node of Group 1.
- When changing target value of temperature, the unit will send Thermostat Setpoint Report to the node of Group 1.
- When changing the state of button lock, the unit will send Protection Report to the node of Group 1.

Z-Wave Plus Info

Role Type	Node Type	Installer Icon	User Icon
Slave Sleeping Listening	Z-Wave Plus node	Generic_Thermostat	Generic_Thermostat

Association Command Class

Group	Max Node
1	1

Version

Protocol Library	3 (Slave_Enhance_232_Library)
Protocol Version	6.04(6.81.03)

Manufacturer

Manufacturer ID	Product Type	Product ID
0x0060	0x0015	0x0001

AGI (Association Group Information) Table

Group	Profile	Command Class & Command (List) N bytes	Group Name(UTF-8)
1	General	Battery Report, Device Reset Locally Notification, Notification Report Sensor Multilevel Report Thermostat Mode Report Thermostat Setpoint Report Protection Report Clock Report	Lifeline

Notification

Event	Type	Event	Event Parameter Length	Event Parameter
The power is applied for the first time	0x08	0x01	0x00	

Battery

Battery Report (value)	Description
20~100	Battery Level %
0xFF	Low Battery

Command Classes

The module supports Command Classes including...

- COMMAND_CLASS_ZWAVEPLUS_INFO_V2
- COMMAND_CLASS_ASSOCIATION_V2
- COMMAND_CLASS_ASSOCIATION_GRP_INFO
- COMMAND_CLASS_TRANSPORT_SERVICE_V2
- COMMAND_CLASS_VERSION_V3
- COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2
- COMMAND_CLASS_DEVICE_RESET_LOCALLY
- COMMAND_CLASS_POWERLEVEL
- COMMAND_CLASS_SECURITY
- COMMAND_CLASS_SECURITY_2
- COMMAND_CLASS_SUPERVISION
- COMMAND_CLASS_FIRMWARE_UPDATE_MD_V4

- COMMAND_CLASS_BATTERY
- COMMAND_CLASS_NOTIFICATION_V8
- COMMAND_CLASS_CONFIGURATION
- COMMAND_CLASS_SENSOR_MULTILEVEL
- COMMAND_CLASS_APPLICATION_STATUS
- COMMAND_CLASS_THERMOSTAT_MODE_V3
- COMMAND_CLASS_THERMOSTAT_SETPOINT_V3
- COMMAND_CLASS_PROTECTION
- COMMAND_CLASS_CLOCK

Basic Command Class

- Basic Get: Command to inquire the status of the device.
- Basic Report: Report the status of the device.
- Basic Set: Set the status of the device.

Basic Set Value	Description
0x00	Energy Heat
0x0F	Off
0xFF	Heat

Z-Wave Configuration

- Temperature Auto Report period setting

Parameter Number	Size	Range	Default
1	2	1~255 (min)	120mins

- Temperature offset for internal sensor

Parameter Number	Size	Range	Default
2	1	-80~+80 Offsets the measured temperature by -8.0°C~+8.0°C	00=0.0°C Offset

- Maximum Set point value

Parameter Number	Size	Range	Default
3	1	5~35 for 5°C~35°C	35=35°C

- Minimum Set point value

Parameter Number	Size	Range	Default
4	1	5~35 for 5°C~35°C	5=5°C

- Frost protection temperature

Parameter Number	Size	Range	Default
5	1	5~15 for 5°C~15°C	5=5°C

- Open window detect function

Parameter Number	Size	Range	Default
6	1	0: Disable 1: Enable	0

- Open window detect time period

Parameter Number	Size	Range	Default
7	1	2~30 (min)	15mins

- Open window detect temperature drop setting

Parameter Number	Size	Range	Default
8	1	4=2°C, 5=2.5°C 6=3°C, 7=3.5°C, 8=4°C	4=2°C

- Open window detect delay time select

Parameter Number	Size	Range	Default
9	1	10~60 (min)	30mins

10. Manual Override takeover period

Parameter Number	Size	Range	Default
10	1	1~48, means 30mins to 24hrs	8=4hrs

Note: When adjusting temperature by manual override, the unit will send Thermostat SetPoint Report to the gateway, but the mode will remain the same mode.

Supported Thermostat Mode (from COMMAND CLASS THERMOSTAT_MODE_V3)

Mode	Name	Description
0x00	Off	This mode is used to switch off the thermostat.
0x01	Heat	This mode is used to use activate heating when the temperature is below the Heating (0x01) setpoint.
0x0B	Energy Heat	This mode is used to use activate heating when the temperature is below the Energy Save Heating (0x0B) setpoint. The Energy Save Heating (0x0B) setpoint is usually lower than the Heating (0x01) setpoint in order to save energy

Thermostat SetPoint

Mode	Name	Size	Precision	Scale	Temp. Range
0x01	Heat	2	1(one decimal place)	0:Celsius	Parameter 3&4
0x0B	Energy Heat	2	1(one decimal place)	0:Celsius	Parameter 3&4

Troubleshooting

The table below lists the several steps involved when adding or removing the TRV from the Z-Wave network.

Action/Status	Description	Rings around the LCD display
No node ID	The Z-Wave Controller does not allocate a node ID to the unit.	Blinks 2-second on, 2-second off for 2 minutes
Auto Inclusion	The power is applied for the first time and no node ID has been stored in the module, or after executing reset.	
Manual Inclusion	1. Put the Z-Wave Controller into inclusion mode.	
	2. Press the P button 3 times within 1.5 seconds to put the unit into inclusion mode.	
Exclusion	1. Put the Z-Wave Controller into exclusion mode.	
	2. Press the P button 3 times within 1.5 seconds to put the unit into exclusion mode.	
Factory Reset (This procedure should only be used when the controller is inoperable.)	1. Press the P button 3 times within 1.5 seconds to put the unit into exclusion mode.	
	2. Within 1 second of step 1, press the button P again and hold for 5 seconds.	
	3. Node ID is excluded. The device reverts to factory default state.	2-second on, 2-second off For 2 minutes

× Failed or successful results in including/excluding the ID can be viewed on the Z-Wave Controller.

Note: If you are connecting this unit to a Z-wave Controller that utilizes the S2 security protocol, you may be asked by your controller to enter a 5 digit Device Specific Key (DSK) that is unique to each unit. This can be found in one of two places:

- on the QR code label on the back of the unit
- on the insert card inside the packaging

The table below lists typical problems encountered:

Symptom	Possible Cause	Recommendation
Cannot work	Battery is not fitted properly or run out of battery power.	Check if batteries are fitted or replace a new battery.
Cannot carry out inclusion and association	Device has been paired to other Z-Wave controller.	1. Perform Exclusion from other controller first then carry out inclusion with new controller. 2. Perform Factory Reset on device and then carry out Inclusion with new controller
	Device is out of range.	1. Relocate the controller closer to the unit. 2. Install a Z-Wave repeater such as smart plugs or other AC devices that can operate as a Repeater.

Specifications

Battery	1.5V AA Battery*2
Range	Up to 50 meters line of sight
Frequency Range	EU: 868.42HMz,
Type of valves	M30 x 1.5 , Danfoss RAV/RA/RAVL type
Temperature settings	5°C~35°C, 0.5°C increments

Specifications are subject to change without notice



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 ones, the retailer is legally obligated to take back your old appliance for disposal at least for free of charge.



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