

# Thermostat Radiator Valve User Manual



## Introduction:

The TRV based on Z-Wave™ Slave library of V7.16.03. This TRV integrated Z-Wave communication module to connect with Z-Wave gateway.

The TRV can be included and operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers and/or other applications. All non-battery operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

The TRV is a security Z-Wave device (S0/S2), so a security enabled controller is needed for take full advantage of all functionality for the TRV.

## Features:

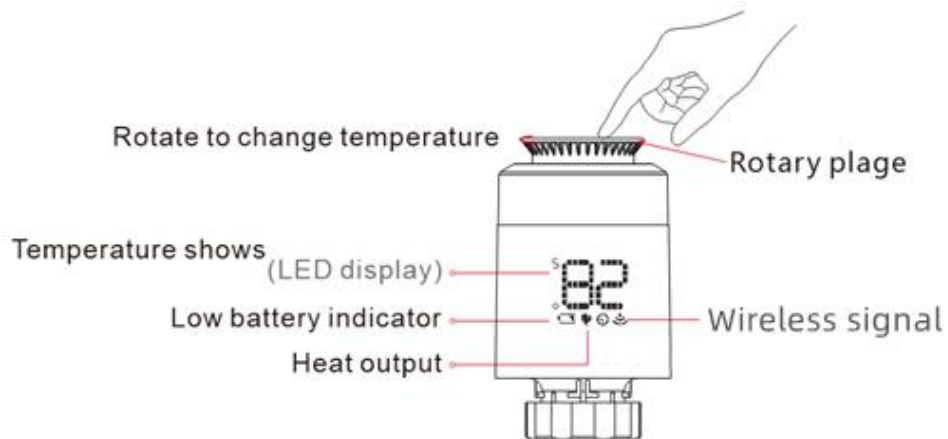
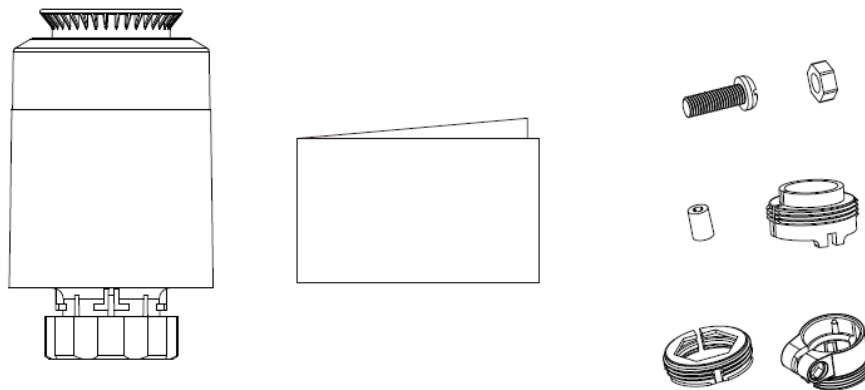
- Manual or Z-Wave setpoint set heating control with instant status updates.
- 700 series Z-Wave chip for better range and faster control.
- SmartStart and S2 Security for a safer network.

## 1 Technical Specifications

Communication Protocol	Z-TRV-V01
Radio Frequency	868.42MHz (EU)
Wireless Range	Up to 300 feet line of sight
Power Source	AA*2
Working current	~20mA
Standby current	~30uA
Temperature setting accuracy	0.5° C
Room temperature display range	0-50° C
Operating temperature range	5-30° C
Operating humidity	Up to 85% non-condensing

## 2 Familiarize yourself with your TRV

What is in the box?



## Notice for use

### ON / OFF

The temperature < 5°C , display "0F" . The temperature > 30°C , display "0n"

### Open window function

When use radiator to heating , the window is opened ,when room temperature drop 6°C in 4 minutes , TRV will close valve automatic,disply will show "0P" , When window is closed , meanwhile room temperature increase 2°C , TRV will open valve automatic , back to operation mode .

### Anti-scale function

If radiator not open within two weeks or long time not open will let valve clogged as scale , radiator will be damaged. In order to let radiator to use normally , TRV will open valave running 30 seconds every two weeks , display will show "85" , when run finished will recovery running condition .

### Child lock function

In order to prevent TRV setting from children,it could activate child lock functin by long press rotary plate until display show "LC" . Long press rotrary plate again over 10s to unlock.


### Anti-freezing function

In the power off state, the screen show "fl"  
Anti-freezing function: the valve will be opened when the temperature is below 5°C , when the temperature rises to 8°C , the valve will be closed.

### Alarm

In the normal operation range:  
NTC sensor damage , display: Er

### Low power alarm

When the battery voltage is extremely low , display the alarm symbol  , which remind that the user shall replace battery.

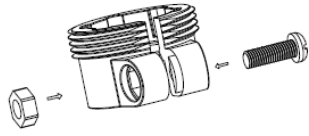

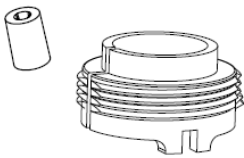
## 3 Installation

**IMPORTANT: Please include your TRV to the network (refer to 4.1) before doing the installation. Below is the installation process:**

- a. Choose the right adapter and install it to the valve if the TRV can not install to your valve directly.

## Adapter Selection

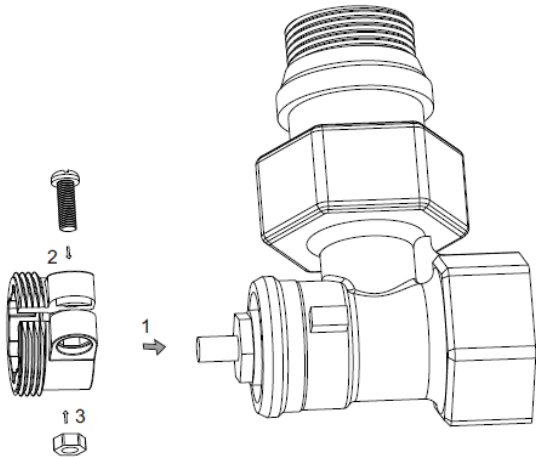
Pls confirm valve diameter

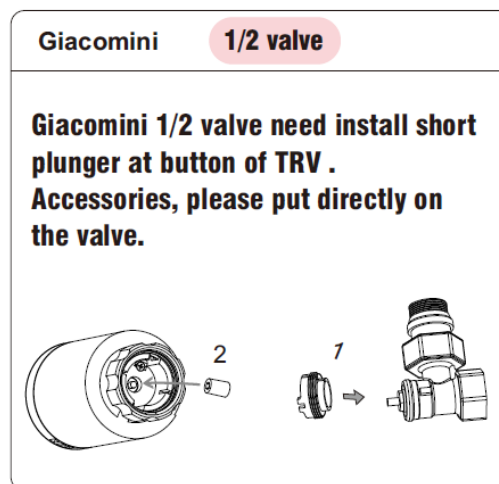
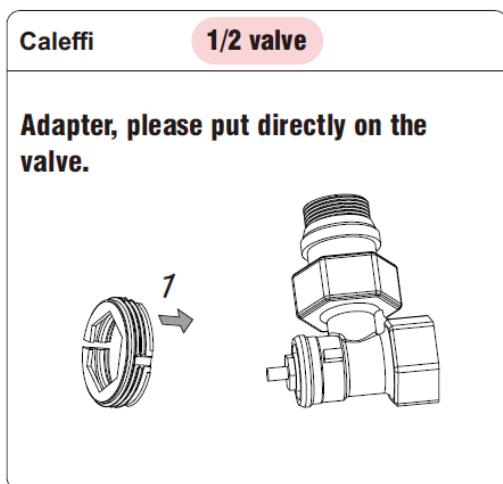
Danfoss	Caleffi	Giacomini
1/2 valve (RA)	1/2 valve	1/2 valve + short plunger
		

## Adapter Installation

**Danfoss** 1/2 valve (RA)

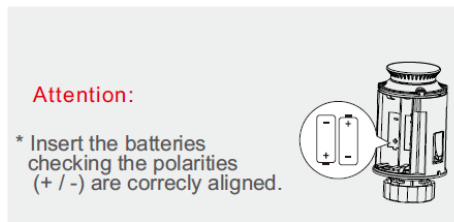
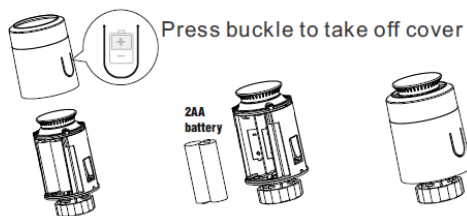
**Please tighten the screws after fixing the valve connector**





- b. **Take off the batteries and put them on again to REPOWER the TRV;**
- c. **The screen will blink "LA" until it become solid;**
- d. **Install the TRV to the valve;**
- e. **Click the rotary plate once and the "LA" will start blinking again;**
- f. **Installation completed ("LA" disappears and shows the temperature).**

- 1 Put battery in battery compartment



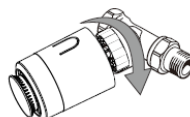
- 2 Display show "LA" flashing.



- 3 Once valve needle is flush with the base.



- 4 Install TRV with M30\*1.5 screw thread Interface of valve .Tighten the copper ring.



- 5 Press button on rotary plate lightly, it would flash "LA" TRV will match valve stroke, if match successfully, will active initial setting.



## 4 Inclusion, Exclusion and Reset

## 4.1 Inclusion

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.

### **Include the TRV into the Z-Wave network via SmartStart:**

- a. Add TRV DSK into the primary controller SmartStart Provisioning List (If you don't know how to do this, refer to its manual, DSK usually print on the main body).
- b. Remove the battery from the TRV. A few seconds later, repowered in the TRV.
- c. The TRV will send "Z-Wave protocol Command Class" frame to start SmartStart Inclusion.

### **Include the TRV into the Z-Wave network manually:**

- a. Power on your TRV,
- b. Set your Z-Wave controller into add/inclusion mode.
- c. In "OF" state, short press rotary plate three times until the screen shows " --- ".
- d. The screen will show " PR " after few seconds, which meant the inclusion is successful. And the "📶" will light on. Otherwise, the inclusion is failed, which you will need to repeat the process from step b.

## 4.2 Exclusion

### **Exclude TRV from a Z-Wave network:**

- a. Power on your TRV
- b. Set the Z-Wave primary controller into remove/exclusion mode.
- c. In "OF" state, short press rotary plate three times until the screen shows " --- ".
- d. The screen will turn back to "OF" after few seconds, which meant the inclusion is successful. The "📶" light will be off. Otherwise, the exclusion is failed which you will need to repeat the process from step b.

## 4.3 Reset TRV to factory default

In "OF" state, press and hold rotary plate for at least 5 seconds and release when the screen will blink "OF". When the reset is successful, the screen will show "OF" in solid for 2 seconds then turn off. And TRV will reset itself to factory default by sending a "Device Reset Locally Notification" to gateway.

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

## 5 Security and non-Security features of TRV

This device is a security enabled Z-Wave Plus™ product that is able to use encrypted Z-Wave Plus messages to communicate to other security enabled Z-Wave Plus products.

When a node includes into a S2 Z-Wave network, the node supports S2 unauthenticated class, S2 authenticated and so do the supported CCs.

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.

### 5.1 Supported Security Levels

- SECURITY\_KEY\_S0\_BIT
- SECURITY\_KEY\_S2\_AUTHENTICATED\_BIT
- SECURITY\_KEY\_S2\_UNAUTHENTICATED\_BIT

### 5.2 Library

Basic Device Class: BASIC\_TYPE\_ROUTING\_SLAVE

Generic Device Class: GENERIC\_TYPE\_THERMOSTAT

Specific Device Class: SPECIFIC\_TYPE\_THERMOSTAT\_GENERAL\_V2

### 5.3 Commands List

Command Classes	Version	Required Security Class
COMMAND_CLASS_ZWAVEPLUS_INFO_V2	2	None
COMMAND_CLASS_TRANSPORT_SERVICE_V2	2	None
COMMAND_CLASS_SECURITY_2_V1	1	None
COMMAND_CLASS_SUPERVISION_V1	1	None
COMMAND_CLASS_APPLICATION_STATUS	1	None
COMMAND_CLASS_BASIC	2	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_VERSION_V2	3	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_ASSOCIATION_V2	2	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_ASSOCIATION_GRP_INFO_V3	3	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V3	3	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2	2	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_DEVICE_RESET_LOCALLY_V1	1	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_BATTERY_V1	1	S0 or S2 Authenticated/Unauthenticated



COMMAND_CLASS_CONFIGURATION_V4	4	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_SWITCH_MULTILEVEL_V4	4	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_SENSOR_MULTILEVEL_V11	11	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_THERMOSTAT_MODE	3	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_THERMOSTAT_SETPOINT	3	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_FIRMWARE_UPDATE_MD_V5	5	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_POWERLEVEL_V1	1	S0 or S2 Authenticated/Unauthenticated
COMMAND_CLASS_INDICATOR_V3	3	S0 or S2 Authenticated/Unauthenticated

## 6 Special Rule of Each Command

### 6.1 Z-Wave Plus Info Report Command Class

**Z-Wave Plus Version:** 0x02

**Role Type:** 0x05 (ZWAVEPLUS\_INFO\_REPORT\_ROLE\_TYPE\_SLAVE\_ALWAYS\_ON)

**Node Type:** 0x00 (ZWAVEPLUS\_INFO\_REPORT\_NODE\_TYPE\_ZWAVEPLUS\_NODE)

**Installer Icon Type:** 0x1200 (ICON\_TYPE\_GENERIC\_THERMOSTAT)

**User Icon Type:** 0x1200 (ICON\_TYPE\_GENERIC\_THERMOSTAT)

### 6.2 Multilevel Sensor Command Class

Supported the sensor type for Temperature.

### 6.3 Association Command Class

The Thermostat supports 1 association groups and max 5 nodes for each group.

Grouping Identifier	Max Nodes	Send Commands
Group 1 (Lifeline Group)	0x05	<p>1. Battery Report The TRV will send a Battery Report When Battery level change is greater than 5%(configurable) or the report interval is reached.</p> <p>2. Switch Multilevel Report The TRV will send a Switch Multilevel Report when valve opening level changes.</p> <p>3. Sensor Multilevel Report The TRV will send a Sensor Multilevel Report When Room temperature change is greater than 0.5°C (configurable) or the</p>

		<p>report interval is reached.</p> <p>4. Thermostat Mode Report The TRV will send a Thermostat Mode Report when the TRV mode changed.</p> <p>5. Thermostat Setpoint Report The TRV will send a Thermostat Setpoint Report when setting temperature changed.</p> <p>6. Indicator Report</p>
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## 6.4 Basic Command Class

Value	Description	Function
0x00	OFF	No Heating, Only Frost-protection
0xFF	Heat Mode	TRV into comfort heating mode. The room temperature will be kept at the configured comfortable level.

## 6.5 Switch Multilevel Command Class

Allows to request the valve opening in percent. 0% represents a fully shut valve. 100% a fully open valve. The valve opening can be reported on change. If the configuration parameter is set.

## 6.6 Thermostat Mode Command Class

Thermostat Mode Value	Supported Thermostat Mode	Defined By
0x01	THERMOSTAT_MODE_REPORT_MODE_HEAT_V3	Z-Wave Standard
0x00	THERMOSTAT_MODE_REPORT_MODE_OFF_V3	Z-Wave Standard

## 6.7 Thermostat Setpoint Command Class


Supported the Setpoint type:

- THERMOSTAT\_MODE\_REPORT\_MODE\_HEAT

## 6.8 Indicator Command Class

The Receptacle support the Indicator Command Class, version 3 and support the Indicator ID 0x50 (Identify) and Properties ID 0x03, 0x04 and 0x05

## 6.9 Configuration Command Class

#	Name	Size	Range	Description	Default
1	Open window detect function	1	0~1	When use radiator to heating,the window is opened,when room temperature drop 6°C in 4 minutes,TRV will close valve automatic,disply will show "□P",When window is closed , meanwhile room temperature increase 2°C,TRV will open valve automatic,back to operation mode. 0 = Disable 1 = Enable	0
2	Anti-freezing function	1	0~1	The TRV is at "off" state, the screen show  . Anti-freezing function: the valve will be opened when the temperature is below 5°C,when the temperature rises to 8°C,the valve will be closed. 0 = Disable 1 = Enable	0
3	Measured temperature offset	1	-6~6	Offsets the measured temperature by-6.0°C – (+)6.0°C. 0x0 = 0°C Offset 0xFA~0x06 = -6~(+)6°C Offset	0
4	Set away home mode	1	0~1	Set away home 0 = No 1 = Yes	0
5	Anti-scale function	1	0~1	If radiator not open within two weeks or long time not open will let valve clogged as scale, radiator will be damaged. In order to let radiator to	0

				use normally, TRV will open valve running 30 seconds every two weeks, display will show "RS", when run finished will recovery running condition. 0 = Disable 1 = Enable	
6	Valve opening level report threshold	1	0~100	Valve opening level change threshold. The unit = % 0 = Disable 1-99 = Valve opening level	1
7	Temperature auto report interval time	4	0~267840 0	The time interval when to send the temperature report. The unit= second 1. Valid values: 0x00-0x28DE80 2.0x00 = Disable	0
8	Temperature change report threshold	1	0~100	Temperature change threshold. unit 0.1°C 0 = Disable	5
9	Battery auto report interval time	4	0~267840 0	The time interval when to send the battery report. The unit= second 1. Valid values: 0x00-0x28DE80 2.0x00 = Disable	0
10	Battery change report threshold	1	0~100	Battery power change threshold. The unit = % 0 = Disable	5
11	Enable child lock	1	0~1	Enable or disable child lock 0 = Disable 1 = Enable	0