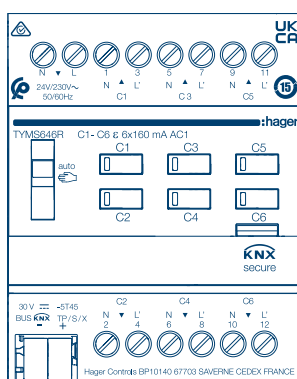**Application description**

KNX Building system technology
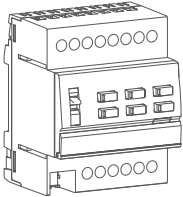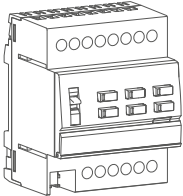# Heating actuator

Heating actuator 6 channels 24/230V
TYMS646T / TYMS646R

:hager

Product overview

	Reference no.	Product designation	Application software ref.	TP device Radio device
	TYMS646T	Flush mounted input device 2 -fold, KNX Secure		
	TYMS646R	Flush mounted input device 4 -fold, KNX Secure		

Subject to technical changes!

Content

1 General

1.1 About this guide

The purpose of this manual is to describe the operation and configuration of the KNX-devices using the Easy tool program.

It consists of 3 parts:
- General information.
- The Easy tool configurations are available.
- Technical characteristics.

1.2 About the program Easy tool

This product can also be configured using the configuration tool.

Compatible software version: V 7.0.9 or higher

Kompatible Server :
- TJA470: Domovea expert
- TJA670: Domovea basic
- TJA665: Konfigurationsserver KNX easy

It is essential to update the configuration server software version. (Please refer to the user manual).

2 General Description

2.1 Installation of the device

2.1.1 Overview presentation

KNX

Thermostat

TYMS646R

Control-Thermostat

TYMS646T

Thermostat

Local server

TCP/IP

Touchscreen

Touchpad

Smartphone

Underfloor heating

Thermal actuator

Hot water radiator
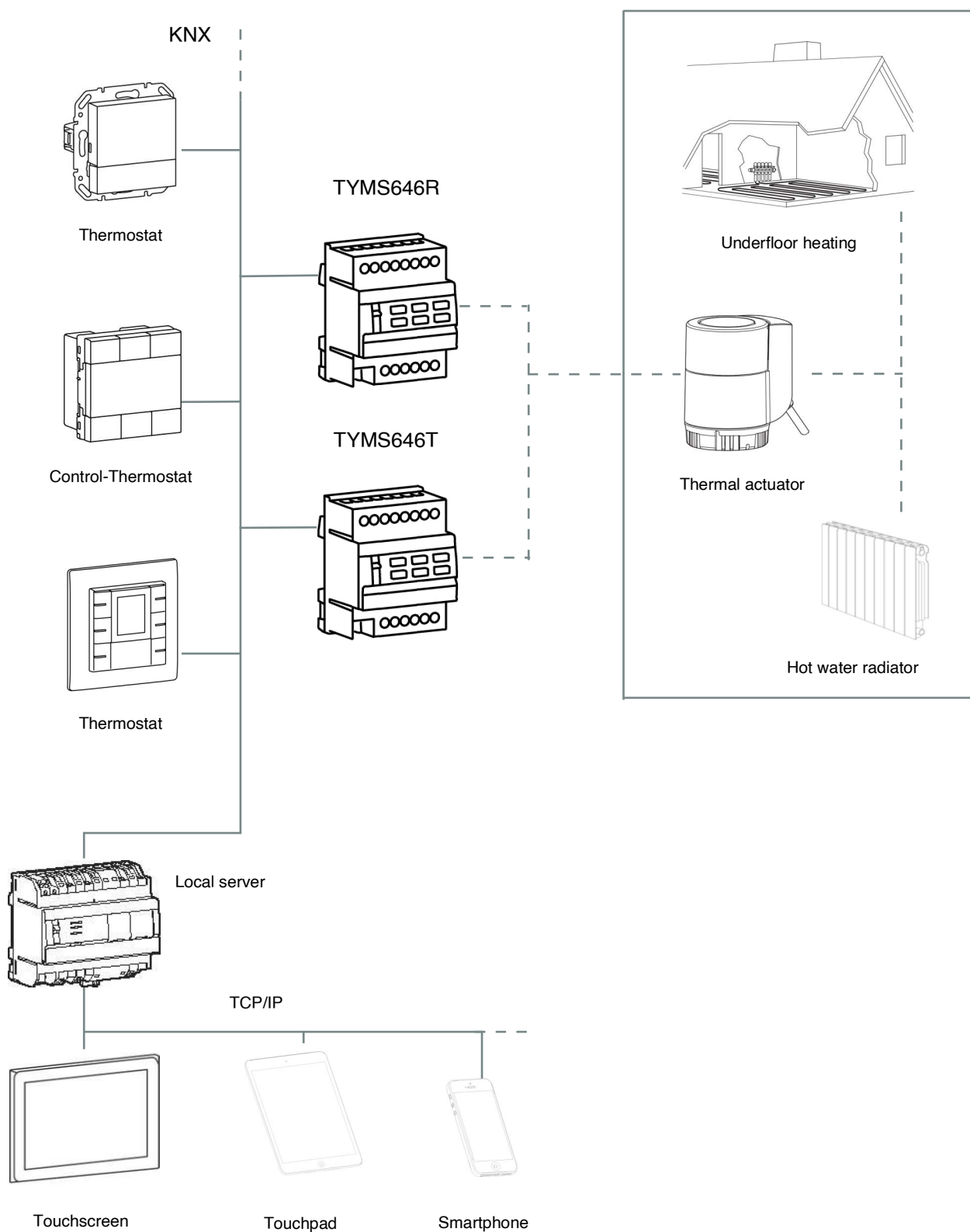
2.1.2 Description of the device

① Auto/Manu change-over switch (auto / 🖐 1)
② KNX bus connection terminal
③ Connection of the thermal valve drives
　　• Top group: Outputs C1 + C3 + C5
　　• Bottom group: Outputs C2 + C4 + C6
④ Labelling field
⑤ Illuminated programming button
⑥ Operation button for manual operation with status LED
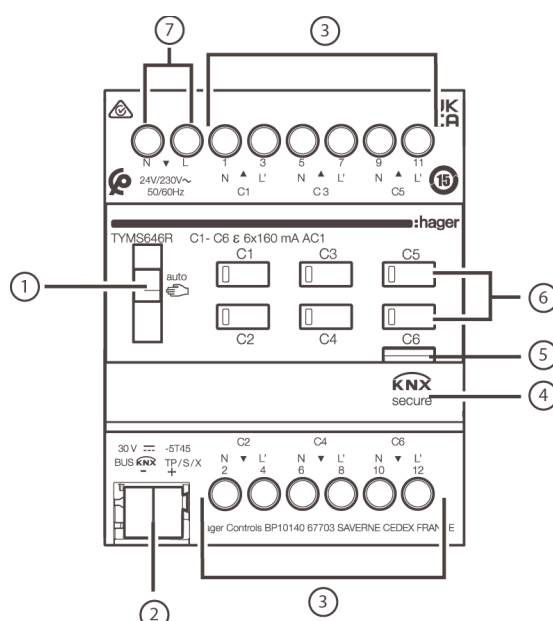⑦ Power supply connection (N, L)

2.1.3 Physical addressing

In order to perform the physical addressing or to check whether or not the bus is connected, press the lighted push button (6) on the right-hand side above the identification plates on the front of the device.

Light on = bus connected and ready for physical addressing.

Programming mode is activated, until the physical address is transferred from ETS. Pressing the button again, exits programming mode. Physical addressing can be carried out in automatic or manual mode.

2.1.4 Connection

- Valves equipped with thermal actuators with 230 V ~ power supply
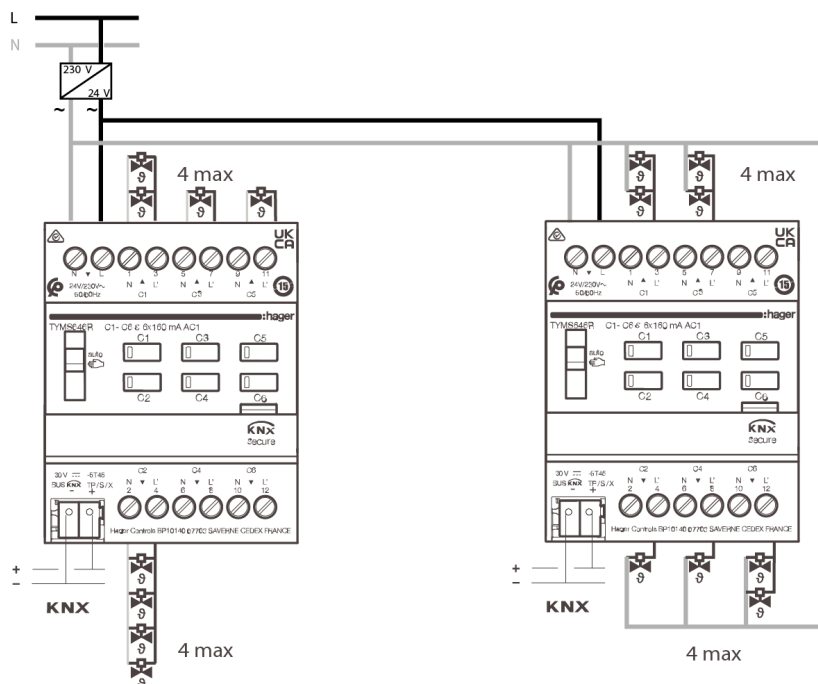
- Valves equipped with thermal actuators with 24 V ~ power supply

2.1.5 LED meaning

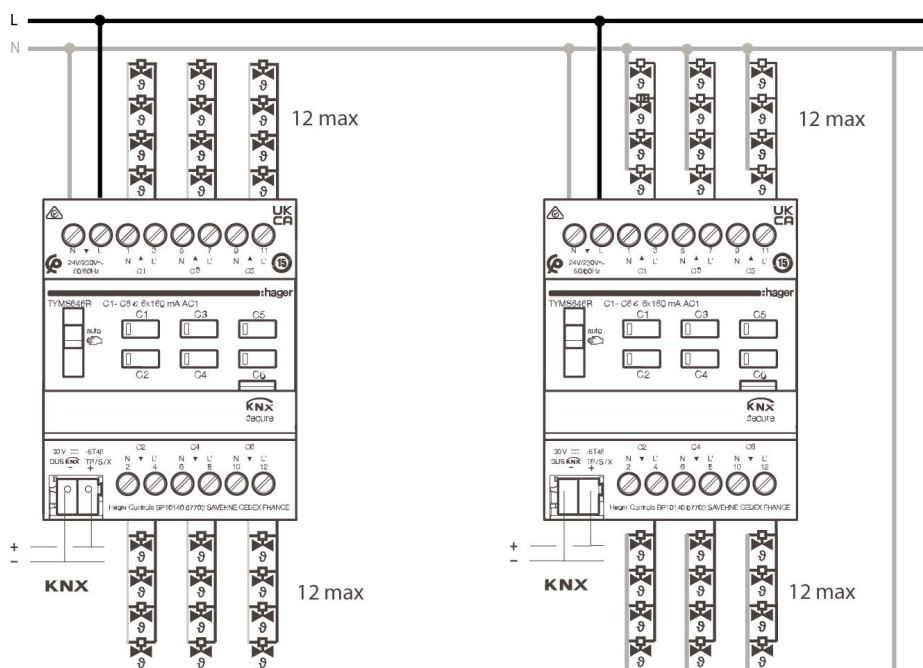| LED	Pattern	Meaning
Cx Red	▬ (steady)	※OK
	▮▮▮▮ (blink)	※⚠
Cx Blue	▬ (steady)	❄OK
	▮▮▮▮ (blink)	❄⚠
Cx Orange	▯▯▯▯ (blink)	⚡👁 Short circuit detection running
	▬ (steady)	⚡⚠ Short circuit detected
Cx White	▭ (steady)	🏠stop Overload detected, load shedding running
C1 → C6 Orange	▯▮▯▮ (blink)	☑ 30 V ⎓ / ☑ 230 V ∼ (crossed out)
C1 → C6 Green	▮▮▮▮ (blink)	✋ 50 %
	▬ (steady)	✋ 100 %

2.2 Function modules of the application

2.2.1 Outputs

The applications allow individual configuration of the device outputs.
The most important functions are:

- Valve control

The product has 6 independent outputs. These outputs are used to control valves fitted with thermal actuators supplied with 24 V ~ or 230 V ~ to control heating or air conditioning systems using water distribution circuits. The default status of the valve is configurable for each output (normally open or normally closed).

- Priority

The Priority function is used to force the output into a defined state. Priority is activated through objects in 1 or 2 bit format.
Only a Priority OFF command authorizes the output for control.
Each valve output can be locked in forced position via the bus. Different parameter values can be configured for the summer and winter mode.

- Status indication

The behaviour of the status indication of each switching channel can be configured for the entire device. The Status indication function transmits the status of each valve output on the KNX bus.

- Manual mode

Manual mode allows the device to be disconnected from the bus. In this mode, each output can be priority controlled locally.

- Valve protection

A valve can jam if it is not activated for too long a time. To avoid this, the product incorporates a valve protection function. If the output has not been activated for a certain length of time, whatever the current mode, it will be automatically activated.

- Heat requirement

The product constantly assesses the output control values. Depending on the energy need, the product can be used to activate or deactivate a boiler or burner.

2.2.2 Thermostats

This chapter is only valid for reference TYMS646R.

The applications are used to configure each regulator individually.
The most important functions are:

- Room temperature regulation for the heating and cooling systems

The Regulation function is used to control the following installations:
- Heating.
- Cooling.
- Heating / cooling.

The product has 12 independent room thermostats.
The switch between heating and cooling can be automatic or manual.
Regulation is based on measurement of the room temperature. This temperature is compared to the setpoint defined by the user.
The types of regulation available are as follows:
- Switching PI-control (PWM)
- Continuous PI-control
- Switching 2-point control

■ Setpoint selection

The thermostat can operate in the following modes:
- Auto.
- Comfort.
- Night setpoint.
- Standby.
- Heat protection / Frost protection.

The operating mode can be selected by push-button, priority, override, timer, clock or activation of a scene.
A temperature setpoint is linked to each operating mode.

■ Timer

The Timer function is used to select a heating or cooling setpoint for a configurable duration. The timer may be interrupted before expiry of the delay time. The timer duration can be modified via the bus KNX.
When the timing function expires, return to the previous operating mode.

■ Priority

The Priority function is used to force the thermostat with a defined heating or cooling setpoint.
Priority is activated through objects in 1 or 2 bit format.
Only a Priority OFF command authorizes the output for control.
The setpoints used for thermostat priority are Frost protection / Heat protection and Comfort.

■ Automatic control

The Automatic control function is used to control a thermostat in parallel to the Setpoint selection function. The two functions have the same level of priority. The last control received will act on the thermostat status.
An additional command object is used to activate or deactivate the Automatic control.

■ Scene

The Scene function is used to switch groups of outputs into a configurable predefined state. A scene is activated by receipt of a 1-byte command. Each thermostat can be integrated into 64 different scenes.
When the scene is activated, the thermostat can switch to one of the following modes:
- Auto.
- Comfort.
- Standby.
- Night setpoint.
- Frost protection / Heat protection.

■ Status indication

The following information can be sent on the bus:
- Current mode (Comfort, ...).
- Room temperature.
- Choice of the type of installation (heating, air conditioning).
- Heating temperature setpoint.
- Air conditioning temperature setpoint.

■ Windows contact

The Frost protection / Heat protection setpoint can be activated by a windows contact integrated into the installation.

Communication objects

Heating Cooling

General

Heating activation →

→ Heat requirement

Output

ON/OFF →
Valve position in % →
Priority →

→ Status indication ON/OFF
→ Status valve position in %
→ Status indication priority

KNX

KNX

Thermostat

Setpoint selection →
Automatic control →
Heating/Cooling - changeover →
Windows contact →

→ Status indication setpoint selection
→ Automatic control deactivation status
→ Heating/Cooling - status indication

Priority →
Scene →
Timer →

→ Status indication priority
→ Status indication room temperature
→ Status indication setpoints heating
→ Status indication setpoints cooling

Setpoints heating →
Setpoints cooling →
Override setpoint →

→ ON/OFF
→ Valve position in %

Room temperature 1 →

3 Programming by Easy Tool

3.1 Product overview

- TYMS646T: Heating actuator 6 channels KNX 24/230V

Product view:

View of channels:

1 Input	
	TYMS646T - 1 - 1 *Housing*

7-fold output	
	TYMS646T - 1 - 1 *Housing*
	TYMS646T - 1 - 2 *Housing*
	TYMS646T - 1 - 3 *Housing*
	TYMS646T - 1 - 4 *Housing*
	TYMS646T - 1 - 5 *Housing*
	TYMS646T - 1 - 6 *Housing*
stop	TYMS646T - 1 - 7 *Housing*

■ TYMS646R: Heating actuator 6 channels KNX, with regulation, 24/230V

Product view:

Product	⌄		🔁 13 Inputs	⇤ 7 Outputs	
Name:	*TYMS646R - Heating actuator 6 channels KNX, with regulati...*	1	✋	TYMS646R - 1 - 1 *House*	⇄
Use:	*Heating/Cooling*	2	✋	TYMS646R - 1 - 2 *House*	⇄
Place:	House ⌄	3	✋	TYMS646R - 1 - 3 *House*	⇄
Electrical tracking:	*TYMS646R - 1*	4	✋	TYMS646R - 1 - 4 *House*	⇄
ⓘ Product :	**TYMS646R** *Heating actuator 6 channels KNX, with regulation, 24/230V*	5	✋	TYMS646R - 1 - 5 *House*	⇄
		6	✋	TYMS646R - 1 - 6 *House*	⇄
Actions	❯	7	✋	TYMS646R - 1 - 7 *House*	⇄
		8	✋	TYMS646R - 1 - 8 *House*	⇄
		9	✋	TYMS646R - 1 - 9 *House*	⇄
		10	✋	TYMS646R - 1 - 10 *House*	⇄
		11	✋	TYMS646R - 1 - 11 *House*	⇄
		12	✋	TYMS646R - 1 - 12 *House*	⇄
		13	🏠	TYMS646R - 1 - 13 *House*	

View of channels:

13 inputs	
✋	TYMS646R - 1 - 1 *Housing*
✋	TYMS646R - 1 - 2 *Housing*
✋	TYMS646R - 1 - 3 *Housing*
✋	TYMS646R - 1 - 4 *Housing*
✋	TYMS646R - 1 - 5 *Housing*
✋	TYMS646R - 1 - 6 *Housing*
✋	TYMS646R - 1 - 7 *Housing*
✋	TYMS646R - 1 - 8 *Housing*

7-fold output	
〰	TYMS646R - 1 - 1 *Housing*
〰	TYMS646R - 1 - 2 *Housing*
〰	TYMS646R - 1 - 3 *Housing*
〰	TYMS646R - 1 - 4 *Housing*
〰	TYMS646R - 1 - 5 *Housing*
〰	TYMS646R - 1 - 6 *Housing*
〰 stop	TYMS646R - 1 - 7 *Housing*

13 inputs		7-fold output
✋≫	TYMS646R - 1 - 9 *Housing*	
✋≫	TYMS646R - 1 - 10 *Housing*	
✋≫	TYMS646R - 1 - 11 *Housing*	
✋≫	TYMS646R - 1 - 12 *Housing*	
⌂≫	TYMS646R - 1 - 13 *Housing*	

- Pathway parameters
  - Input (Only for TYMS646R)
    This parameter window is used to set the device inputs. These parameters are available for each input individually.

Settings	∨
Function selection:	Cooling ∨
Type of basic heating:	warm water heating ∨
Type of basic heating control:	Switching PI-control (PWM) ∨
Type of basic cooling:	ceiling cooling ∨
Comfort setpoint:	*21*

  - Output
    This parameter window is used to set the device outputs. These parameters are available individually for each output.

| Settings	∨
Valve type:	Normally closed ∨
Cycle time (s):	*900*

3.2 Input operation mode

3.2.1 Heat requirement

The product itself can evaluate the parameters of its outputs and transmit a general heating requirement according to a monitoring limit value. With the help of an ON/OFF switch, it is therefore possible to create a heating control on boilers with adapted inputs.

Inputs			Outputs	
⧆	TYMS646R - 1 - 13￼ *Housing*	◯◯	☀	TYAS608D - 1 - 1￼ *Housing - Lighting*
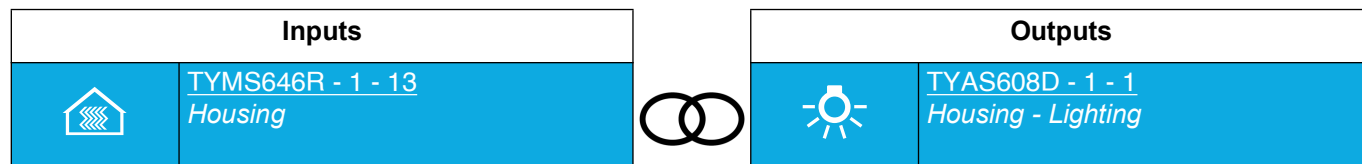
The input controls the switching output for the boiler heat requirement control.
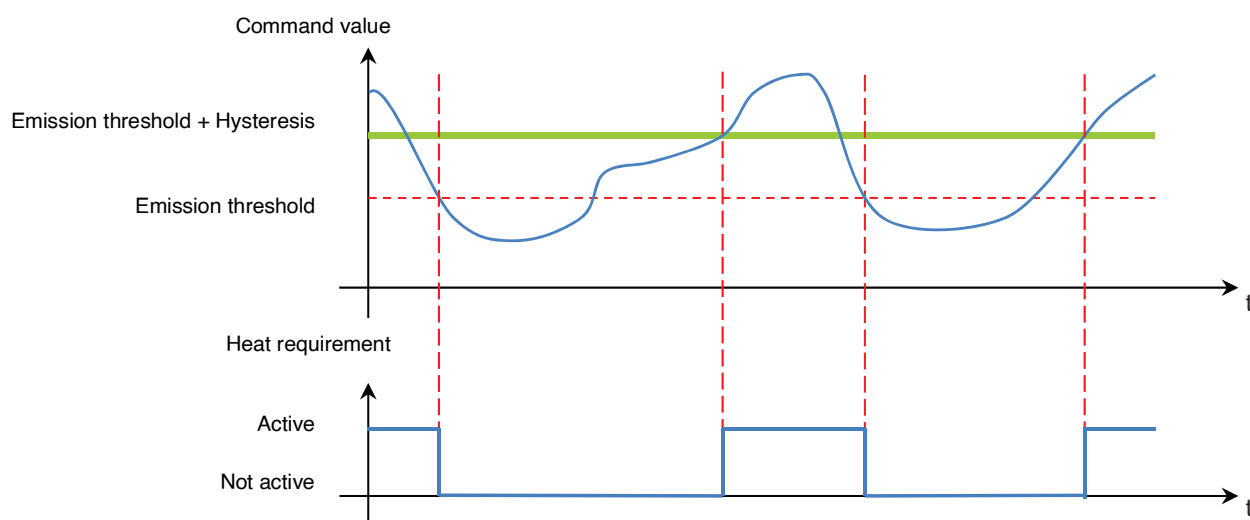
A heat requirement is indicated by the product only if one of the configured values for the assigned outputs exceeds one of the limit values defined with added hysteresis. Cancellation of a heat requirement message occurs as soon as the value falls below the limit value.

The following values are predefined and fixed:
- Emission threshold: 1%
- Hysteresis: 1%
- Heat requirement activation delay: 5 min

## 3.3 Input operating mode for the thermostat

This chapter is only valid for reference TYMS646R.

These inputs are used to regulate the room temperature of the heating and air conditioning systems. Regulation is based on measurement of the room temperature. This temperature is compared to the setpoint defined by the user. Either heating outputs or lighting outputs can be used to control the radiator valves.
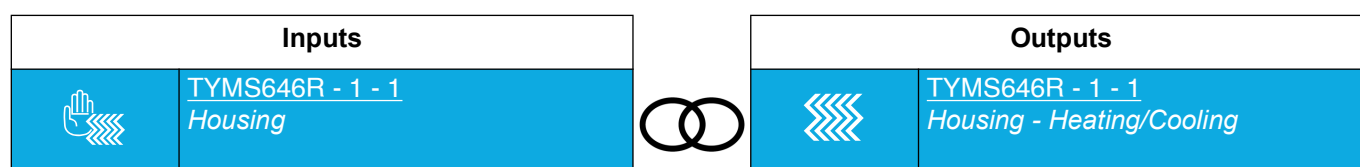
3.3.1 Heating control

The thermostat is used to regulate the room temperature for the heating systems.

- Heating control ON/OFF (0/1)

Inputs	
	TYMS646R - 1 - 1 *Housing*

Outputs	
	TYAS608D - 1 - 1 *Housing - Lighting*
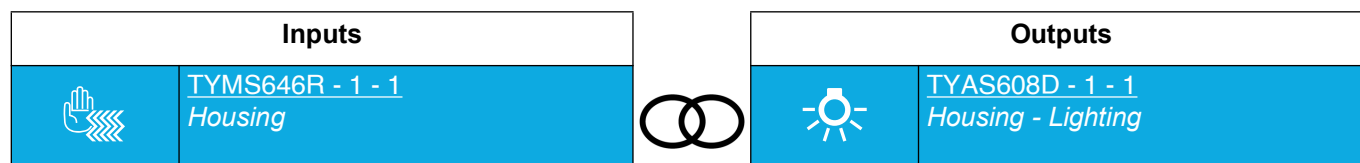
The input controls the switching heating output.

- Heating control in % (0-100%)

Inputs	
	TYMS646R - 1 - 1 *Housing*

Outputs	
	TYMS646R - 1 - 1 *Housing - Heating/Cooling*

The input controls the heating output by a value in %.

These parameters are available for each input individually.

Settings	∨
Function selection:	Cooling ∨
Type of basic heating:	warm water heating ∨
Type of basic heating control:	Switching PI-control (PWM) ∨
Type of basic cooling:	ceiling cooling ∨
Comfort setpoint:	*21*

- Operation

The room thermostat maily offers 2 operating modes: Heating and cooling modes. It is also possible to activate a mixed mode.

The following diagram illustrates the 3 selection modes.
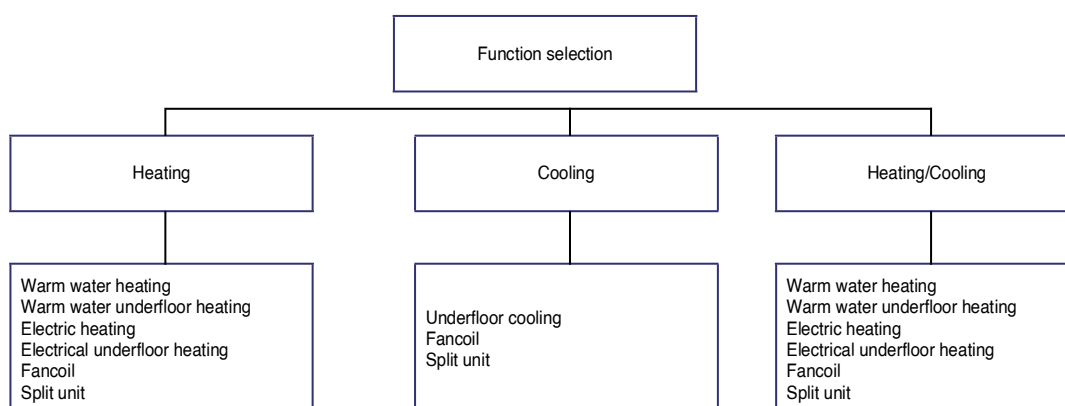
Parameter	Description	Value
Function selection	The product operates in the following mode:	
	Heating	**Heating***
	Cooling	Cooling
	Mixed	Heating/Cooling

■ Heating

In heating mode, the thermostat activates the heating of the room temperature falls below the requested temperature plus a hysteresis. The regulation deactivates the heating as soon as the requested temperature corresponding to the heating mode is reached.

Parameter	Description	Value
Type of heating control	This parameter is used to select the heating regulation type.	**Switching PI-control (PWM)***
		Switching 2-point control

The type of regulator is used to select the regulation valve control.

- Switching 2-point control

Switching 2-point control is the simplest type of regulation. This regulation algorithm cuts off the output as soon as the upper setpoint temperature is exceeded. It rearms it when the temperature falls again. The regulator has a built-in hysteresis to avoid it constantly switching the output value. The regulator then calculates the switching and tripping threshold according to the hysteresis and requested value. This type of regulator is used when the output value only accepts the two statuses (ON or OFF) and the real temperature does not need to be accurately controlled in relation to the setpoint value. Due to the inertia of the heating system, the real temperature oscillates slightly below the switching point and slightly exceeds the tripping point. The real temperature therefore always varies in a range slightly higher than the configured hysteresis.

The following values are predefined and fixed:
- Hysteresis: +/-0.5K
- Hysteresis duration: 5 min

-   Switching PI-control (PWM)

This regulation is based on the principle of continuous PI-control. However, for this type of regulation, the output signal (0 to 100%) for the PID regulation is not sent but only processed internally. Based on the PID regulation output signal, the regulation then converts the output signal to an ON and OFF pulse. This pulse does not have a fixed ON/OFF point as with the 2 point control, but the pulse length is determined using the output value calculated by the PID regulation (cycle time). The higher the calculated output value, the higher the time ratio between ON and OFF.

A short cycle time causes ON pulses at relatively short intervals. This avoids too great a temperature drop and the real value remains largely stable. However, this may also lead to the switching frequency being too high, which may affect the system or overload the KNX communication bus.

The following values are predefined and fixed:

-   Cycle time: 15 min.

Example:
Value 100%: Always ON
Value 0%: Always OFF
20% value with cycle duration of 15 minutes: 3 min ON and 12 min OFF

Parameter	Description	Value
Type of heating equipment	This parameter is used to select the type of heating.	**Warm water heating*** Warm water underfloor heating Electric heating Electrical underfloor heating Fancoil Split unit

Note: A fancoil is an air treatment device designed to heat or cool the air. The thermal energy is provided by a fluid (water or refrigerant fluid) or by Joule effect (electricity).
Note: A Split unit is an air conditioner in which the cool air blower is separated into two parts connected by a refrigerant link transporting the calories from the inside unit to the external unit.

-   Cooling

In cooling mode, the thermostat activates cooling if the room temperature rises above the requested value plus a hysteresis. The regulation deactivates cooling as soon as the requested temperature corresponding to the cooling mode is reached.

Parameter	Description	Value
Type of cooling control	This parameter is used to select the cooling regulation type.	**Switching PI-control (PWM)*** Switching 2-point control

Note: For the operation of the different types of regulation, please refer to chapter Heating/Cooling.

Parameter	Description	Value
Type of cooling equipment	This parameter is used to select the cooling type.	**Cooling ceiling*** Fancoil Split unit

Note: A fancoil is an air treatment device designed to heat or cool the air. The thermal energy is provided by a fluid (water or refrigerant fluid) or by Joule effect (electricity).
Note: A Split unit is an air conditioner in which the cool air blower is separated into two parts connected by a refrigerant link transporting the calories from the inside unit to the external unit.

*Note: The **Type of heating control** and **Type of heating equipment** parameters are used to adjust the heating only. The **Type of cooling control** and **Type of cooling equipment** parameters are used to adjust the air conditioning only. These parameters are always displayed, whatever the type of function selected (Heating, Cooling, Heating/Cooling).*

- Setpoint values

The operating modes are designed for heating and air conditioning. The temperature setpoint values for comfort mode are configurable. All the other setpoint values are fixed in the software for both modes.

To facilitate the configuration of the setpoint values, the temperatures for the Night setpoint and Standby modes are calculated automatically according to the comfort setpoint value.

Mode	Setpoint values Heating	Setpoint values Cooling
Comfort	Configurable	Configurable
Standby	Comfort temperature - 2 °C	Comfort temperature + 2° C
Night setpoint	Comfort temperature - 5 °C	Comfort temperature + 5° C
Protection	+ 7 °C	+ 35 °C

Example: For a comfort mode temperature of **21 °C**.

Mode	Setpoint values Heating	Setpoint values Cooling
Comfort	+ 21 °C	+ 21 °C
Standby	+ 19 °C	+ 23 °C
Night setpoint	+ 16 °C	+ 26 °C
Protection	+ 7 °C	+ 35 °C

Note: The temperature values for the Frost protection and Heat protection setpoint are predefined and fixed.

Parameter	Description	Value
Comfort setpoint	This parameter defines the temperature taken into account as the basic setpoint value (Comfort mode).	7 … **21*** … 40 °C

3.3.2 Regulation input control

It is also possible to send a heating control to the thermostat using an input contact. To do so, it is necessary to make a connection between two inputs.

The functions available to control the input are given below:

Heating/Cooling		Heating/Cooling		Common function	
	Comfort mode		Comfort priority		Scene
	Eco mode		Protection priority		Scene switch
	Standby mode		Comfort Priority push-button		Automatic control deactivation
	Protection mode		Protection priority push-button		Automatic control deactivation toggle
	Auto mode		Heating/Cooling		
	Switch mode		Heating/Cooling push-button		
	Comfort/eco mode		Comfort mode automatic control		
	Comfort/standby mode		Eco mode automatic control		
	Protection/Auto mode		Standby mode automatic control		
	Setpoint shift		Protection mode automatic control		
	Window status		Switch mode automatic control		

3.3.2.1 Heating mode

The heating command operates according to a heating instruction.

- **Comfort mode**: Activates Comfort mode for the heating. The device adjusts the room temperature to a predefined value on the thermostat (Presence).

Inputs	
✋	TYMS646R *Housing*
🤸	WST316 - 1 - 1 *Housing*

Closing the input contact activates Comfort mode.
The effect of the command is cancelled by any other mode activation command.

- **Standby mode**: Activates StandBy mode for the heating. The device reduces the room temperature to a predefined value on the thermostat when you leave the room (Short absence).

Inputs	
✋	TYMS646R *Housing*
🏠	WST316 - 1 - 1 *Housing*

Closing the input contact activates StandBy mode.
The effect of the command is cancelled by any other mode activation command.

- **Eco mode**: Activates Eco mode for the heating. The device reduces the room temperature to a predefined value on the thermostat when you leave the house (Long absence).

Inputs	
✋	TYMS646R *Housing*
🌙	WST316 - 1 - 1 *Housing*

Closing the input contact activates Eco mode.
The effect of the command is cancelled by any other mode activation command.

- **Protection mode**: Activates Protection mode for the heating. The device reduces the room temperature to a minimum value on the thermostat when you are absent for several days (Frost protection).

Inputs
🖐〰 TYMS646R *Housing*
❄ WST316 - 1 - 1 *Housing*

Closing the input contact activates Protection mode.
The effect of the command is cancelled by any other mode activation command.

- **Switch mode**: Switches between 2 heating modes.

Inputs
🖐〰 TYMS646R *Housing*
〰 TYBS692F - 1 - 1 *Housing*

Closing the input contact activates heating mode 1.
Opening the input contact activates heating mode 2.
The effect of the command is cancelled by any other mode activation command.

Note: At the time of the connection, one must define the heating mode for input contact closing and opening.

Select function   ✕

Outputs selected :

TYBS692F - 1 - 1 〰 | Mode switch   ˅ | 1 〰

Function 1 HVAC: | Comfort ˅ | Function 2 HVAC: | Night setpoint ˅ |

| **Link** | **Cancel** |

Heating mode available: **Auto**, **Comfort**, **Standby**, **Night setpoint** and **Freeze protection**.

Note: If the product does not have switch mode, the Comfort/Eco, Comfort/Standby and Protection/Auto modes are available.

- **Comfort/eco mode**: Used to toggle between Comfort mode and Eco mode for the heating.

Inputs	
✋	**TYMS646R** *Housing*
🚶	**TYBS702A - 1 - 1** *Housing*

Closing the input contact activates Comfort mode.
Opening the input contact activates the Eco mode.
The effect of the command is cancelled by any other mode activation command.

- **Comfort/standby mode**: Used to toggle between Confort mode and Standby mode for the heating.

Inputs	
✋	**TYMS646R** *Housing*
🚶	**TYBS702A - 1 - 1** *Housing*

Closing the input contact activates Comfort mode.
Opening the input contact activates the Standby mode.
The effect of the command is cancelled by any other mode activation command.

- **Protection/Auto mode**: Used to toggle between the Protection mode and the Auto mode for the heating.

Inputs	
✋	**TYMS646R** *Housing*
🚶	**TYBS702A - 1 - 1** *Housing*

Closing the input contact activates Protection mode.
Opening the input contact activates the Auto mode.
The effect of the command is cancelled by any other mode activation command.

3.3.2.2 Windows contact

The devices have different possibilities to switch to Protection/Auto mode. This mode can be activated via a window contact.

- Links
  - **Windows contact**: The open and/or closed status of a window is sent to the thermostat.

Inputs
TYMS646R *Housing*
TRC301B - 1 - 1 *Housing*

It is used to indicate the position of the window.
0 = Window closed: Auto mode
1 = Window open: Protection mode

3.3.2.3 Setpoint shift

This function is used to modify the setpoint temperature of the thermostat by pressing successively.

- Links
  - **Setpoint shift**: The setpoint temperature of the thermostat is shifted by X degrees each time the push-button is pressed.

Inputs
TYMS646R *Housing*
WST316 - 1 - 1 *Housing*

Activating the input by a short press causes an increase or decrease of X degrees in the setpoint temperature of the thermostat.
Successive activations increase or decrease the setpoint temperature of the thermostat by X degrees.

Note: The value by which the setpoint shifts is configurable on the input product. The value can be between -1 and +1 in increments of 0.1.

Settings	⌄
Override set point:	*0*
LED function:	Always OFF ⌄

3.3.2.4 Scene

This function enables scenes to be saved or selected. These concern different types of output (lighting, blind, shutter, heating) to create ambiances or scenarios (leaving scenario, reading ambiance etc.).

Operating principle:
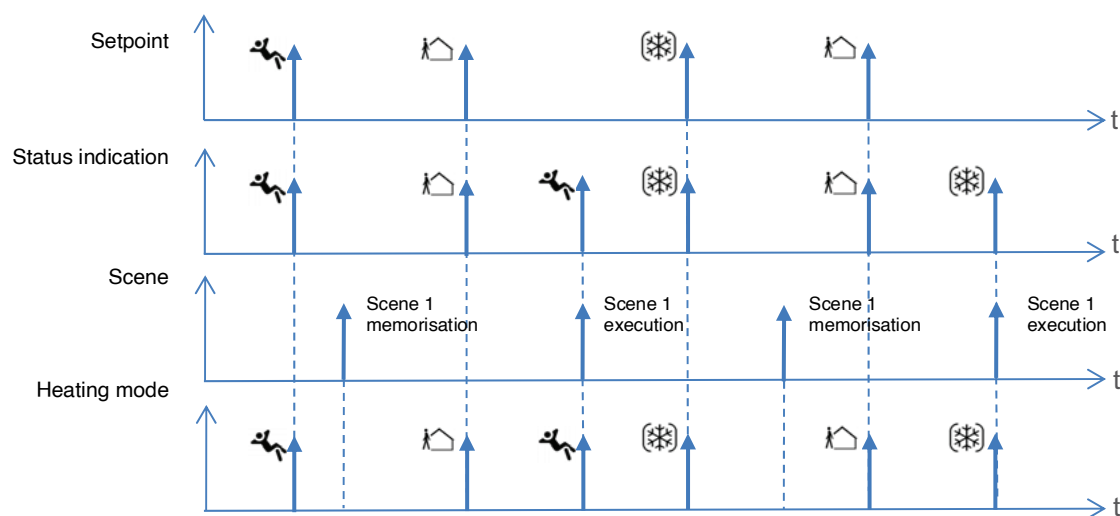
Mode	Symbols
Comfort	
Standby	
Night setpoint	
Frost/heat protection	

Learning and storing scenes

This process is used to change and store a scene. For example, by locally pressing the key in the room or by emission of the values from a visualization.

To access and store scenes, the following values must be sent:

Scene number	Access scene (Object value: 1 byte)	Store scene (Object value: 1 byte)
1-64	= Scene number -1	= Scene number +128
Examples		
1	0	128
2	1	129
3	2	130
...	...	
64	63	191

Here is the scene memorisation for local switches, for example.
- Activate scene by briefly pressing the transmitter that starts it.
- The outputs (lights, shutters, etc.) are set in the desired state using the usual local control devices (buttons, remote control, etc.).
- Memorise the status of the outputs with a press greater than 5 seconds long on the transmitter that starts the scene. The memorisation can be displayed by short-term activation of the outputs.
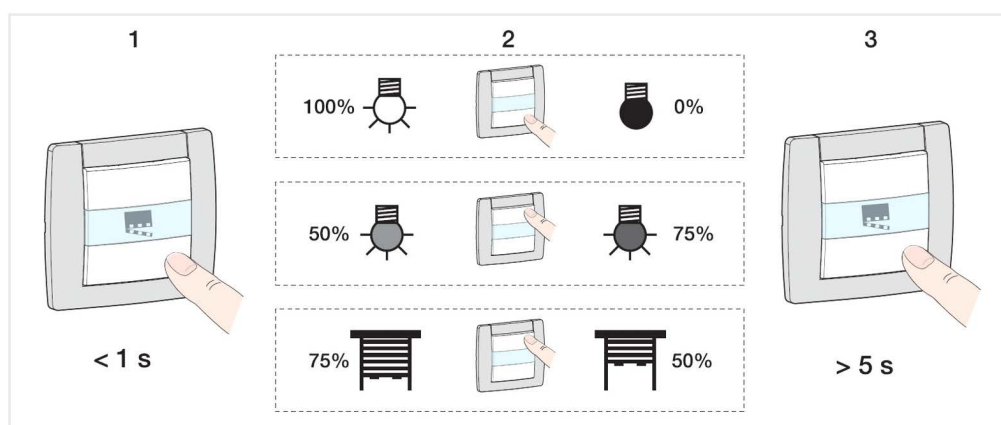
Product learning and memorisation

This procedure allows modifying a scene using a local action on the push buttons located on the front side of the product.
- Activate the scene using a short press on the ambiance push button, which triggers the scene,
- Set the product to manual mode and set the outputs to the desired status by pressing the push-buttons associated with the outputs,
- Return to Auto mode,
- Save the scene using a long push for more than 5 seconds on the push-button that triggers the scene,
- Memorisation is signalled by the inversion of the concerned output status for 3 sec.

* Default value

- Links
  - **Scene**: The scene is activated by pressing the push-button.

Inputs
TYMS646R *Housing*
TYBS692F - 1 - 1 *Housing*

Activating the input activates the scene.

Note: At the time the connection is made, the scene number must be defined for the closing input contact.

- **Scene switch**: The scene is activated according to the closing or opening input contact.

Inputs
TYMS646R *Housing*
TYBS692F - 1 - 1 *Housing*

Closing input contact: scene activation 1.
Opening input contact: scene activation 2.

Note: At the time the connection is made, the scene number must be defined for the closing and opening input contact.

* Default value

3.3.2.5 Automatic control deactivation

The Automatic control function enables an output to be controlled in parallel to the standard control. An additional command object (Automatic control deactivation) is used to activate or deactivate Automatic control.

- **Automatic control deactivation**: Deactivates automatic control.

Inputs	
🤚	TYMS646R *Housing*
ⓐ	TYBS692F - 1 - 1 *Housing*

Closing the input contact deactivates automatic control.
Opening the input contact activates automatic control.

- **Automatic control deactivation toggle**: Deactivates automatic control.

Inputs	
🤚	TYMS646R *Housing*
ⓐ	TYBS692F - 1 - 1 *Housing*

Closing input contact: deactivated automatic control.
Opening input contact: no action.
A second closing input contact triggers activation of the automatic control.

Note: This function is only available with push-button input products with LEDs indicating status.

3.3.2.6 Heating automatic control

The Automatic control function enables the heating mode to be controlled in parallel to the standard control. An additional command object (Automatic control deactivation) is used to activate or deactivate Automatic control.

- **Comfort mode automatic control**: Activates Comfort mode for heating using automatic control. The device adjusts the room temperature to a predefined value on the thermostat (Presence).

Inputs	
🖐	TYMS646R *Housing*
🧑	TYBS692F - 1 - 1 *Housing*

Closing the input contact activates Comfort mode.
The effect of the command is cancelled by any other mode activation command.

- **Eco mode automatic control**: Activates Eco mode for heating using automatic control. The device reduces the room temperature to a predefined value on the thermostat when you leave the house (Long absence).

Inputs	
🖐	TYMS646R *Housing*
🌙	TYBS692F - 1 - 1 *Housing*

Closing the input contact activates Eco mode.
The effect of the command is cancelled by any other mode activation command.

- **Standby mode automatic control**: Activates StandBy mode for the heating using automatic control. The device reduces the room temperature to a predefined value on the thermostat when you leave the room (Short absence).

Inputs	
🖐	TYMS646R *Housing*
🚶	TYBS692F - 1 - 1 *Housing*

Closing the input contact activates StandBy mode.
The effect of the command is cancelled by any other mode activation command.

- **Protection mode automatic control**: Activates Protection mode for heating using automatic control. The device reduces the room temperature to a minimum value on the thermostat when you are absent for several days (Frost protection).

Inputs	
✋〿	TYMS646R *Housing*
❄️ⓐ	TYBS692F - 1 - 1 *Housing*

Closing the input contact activates Protection mode.
The effect of the command is cancelled by any other mode activation command.

- **Switch mode automatic control**: Switches between 2 heating modes using automatic control.

Inputs	
✋〿	TYMS646R *Housing*
〿ⓐ	TYBS692F - 1 - 1 *Housing*

Closing the input contact activates heating mode 1.
Opening the input contact activates heating mode 2.
The effect of the command is cancelled by any other mode activation command.

Note: At the time of the connection, one must define the heating mode for input contact closing and opening.

Select function   ✕

Outputs selected :

TYBS692F - 1 - 1 〿 | Mode switch automatic control   ⌄ | 1 〿

Function 1 HVAC: | Comfort   ⌄ | Function 2 HVAC: | Night setpoint   ⌄ |

| Link | Cancel |

Heating mode available: **Auto**, **Comfort**, **Standby**, **Night setpoint** and **Freeze protection**.

3.3.2.7 Heating/Cooling

- **Heating/Cooling**: Enables switching between heating mode and cooling mode.

Inputs	
✋≋	TYMS646R *Housing*
	⧂
❄≋	TYBS692F - 1 - 1 *Housing*

Closing the input contact activates the heating mode.
Opening the input contact activates the cooling mode.
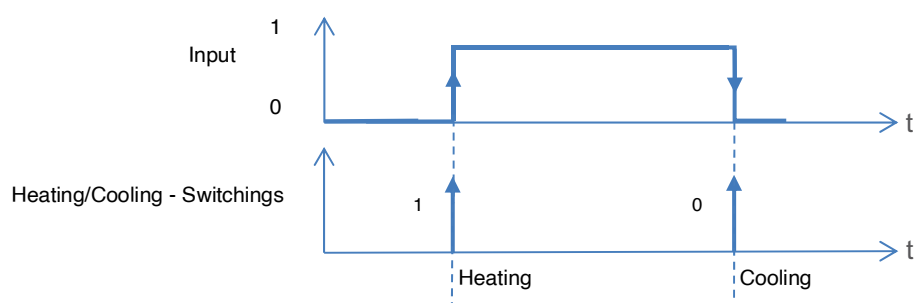
- **Heating/Cooling push-button**: Used to switch between heating mode and cooling mode using a push-button.

Inputs	
✋≋	TYMS646R *Housing*
	⧂
❄≋	WST316 - 1 - 1 *Housing*

Closing input contact: activation of heating mode.
Opening input contact: no action.
Closing the input contact a second time activates cooling mode.
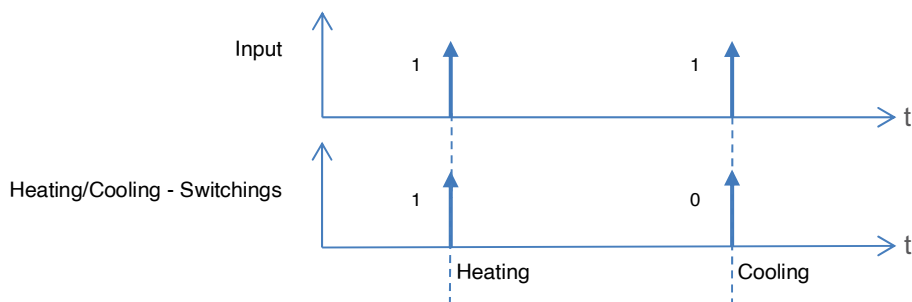
*Note: For switching to function, the thermostat must be configured in **Heating-Air conditioning**..*

Settings	⌄
Function selection:	Cooling ⌄
Type of basic heating:	warm water heating ⌄
Type of basic heating control:	Switching PI-control (PWM) ⌄
Type of basic cooling:	ceiling cooling ⌄
Comfort setpoint:	21

3.3.2.8 Priority

The Priority function forces a heating mode.
This function the priority or priority cancellation controls to be issued.
No other command is taken into account when the Priority is active.

Comfort priority: Activates and maintains Comfort mode.

Inputs	
✋	**TYMS646R** *Housing*
🧗	**TYBS692F - 1 - 1** *Housing*

Closing the contact activates and maintains Comfort mode.
Closing the contact cancels the priority and returns to the usually active mode.

- **Protection priority**: Activates and maintains Protection mode.

Inputs		
✋	TYMS646R *Housing*	
		⬭⬭
❄	TYBS692F - 1 - 1 *Housing*	

Closing the contact activates and maintains Protection mode.
Closing the contact cancels the priority and returns to the usually active mode.

- **Comfort Priority push-button**: used to activate and maintain Comfort mode using a push-button.

Inputs		
✋	TYMS646R *Housing*	
		⬭⬭
🧍	WST316 - 1 - 1 *Housing*	

Closing input contact: activation of comfort mode.
Opening input contact: no action.
Closing the input contact a second time cancels the priority and returns to the mode normally active.

Note: This function is only available with push-button input products with LEDs indicating status.

- **Protection priority push-button**: used to activate and maintain Protection mode using a push-button.

Inputs		
✋	TYMS646R *Housing*	
		⬭⬭
❄	WST316 - 1 - 1 *Housing*	

Closing input contact: activation of protection mode.
Opening input contact: no action.
Closing the input contact a second time cancels the priority and returns to the mode normally active.

Note: This function is only available with push-button input products with LEDs indicating status.

3.4 Closing type for the outputs

3.4.1 Heating control

The thermostat is used to regulate the room temperature for the heating systems.

- Heating control in % (0-100%)

Inputs		Outputs	
✋	TYMS646R - 1 - 1 *Housing*	⫸	TYMS646T - 1 - 1 *Housing - Heating/Cooling*

The input controls the heating output by a value in %.

This parameter window is used to set the device outputs. These parameters are available individually for each output.

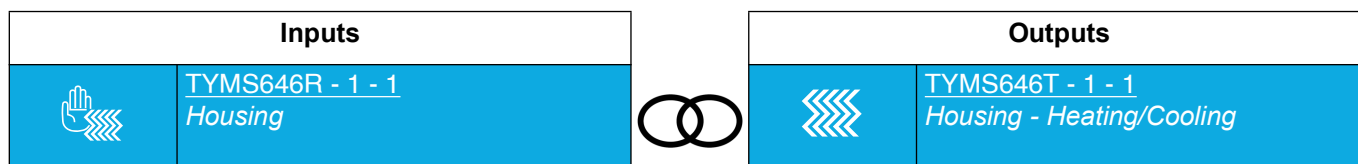| Settings	⌄
Valve type:	Normally closed ⌄
Cycle time (s):	900

- Valve

There are 2 types of valves which can be connected to the outputs. The valves can be opened or closed when they are switched off. This parameter is used to configure the output thus determining the direction in which the valves are driven.

Parameter	Description	Value
Default valve status	The valves connected to the output are of the type: - The valves are opened when they are switched off - The valves are closed when they are switched off	**Normally open*** Normally closed

- Command value

The product receives information from the KNX bus in 1 bit or 1 byte format from a KNX room thermostat for example. In general, based on room temperature, the regulator determines the values to be sent to the output product.

The different formats of the control value for the valve outputs are:

- ON/OFF (1 bit)

Valve output is controlled using an object in 1 bit format (ON/OFF). The value of the object depends on the **Default valve status** parameter.

Normally open:
On reception of an OFF control, the valve is powered and closes.
On reception of an ON control, the valve is not powered and opens.

Normally closed:
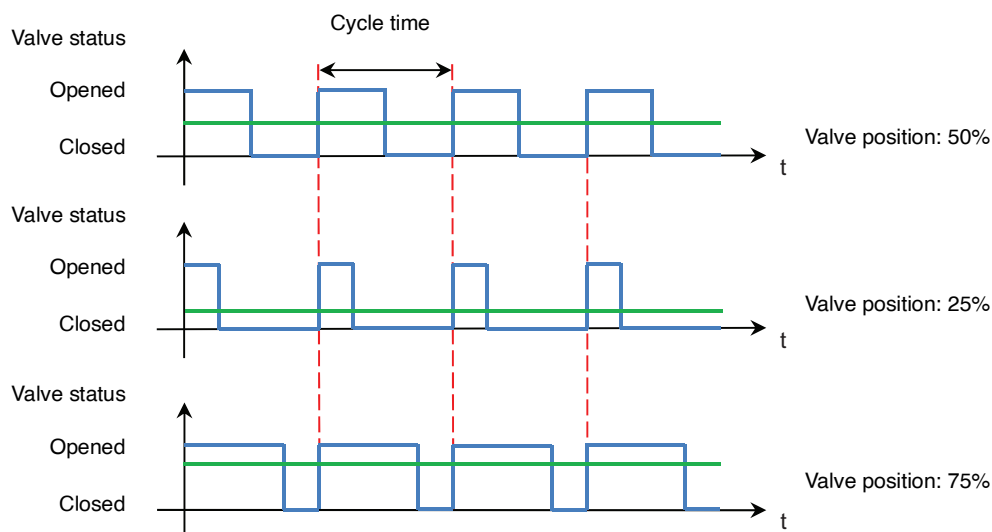On reception of an OFF control, the valve is not powered and closes.
On reception of an ON control, the valve is powered and opens.

Note: The ON/OFF command value (1 bit) is only used if the command value in % (1 byte) is not available on the thermostat.

- Continous with PWM (1 byte)

The value of the valve output control is converted by the product into a pulse-width modulation switching signal. The behaviour of the output is constantly adapted according to the parameter received. The cycle time can also be configured using the **Cycle time for continous control with PWM** parameter.

Taking into account the default valve status, the output is powered or not depending on the position the valve is to adopt.

| Parameter	Description	Value
Cycle time for continous control with PWM	This parameter defines the switching frequency of the pulse-width modulation output signal of the valve output. It allows an adaptation of the operation of the different actuators having different cycle times (duration of movement between the valve's open and closed position).	00:00:01 ... **00:15:00*** ... 23:59:59 (hh:mm:ss)

3.4.2 Priority

The Priority function forces a heating mode.
This function the priority or priority cancellation controls to be issued.
No other command is taken into account when the Priority is active.

Comfort priority: Activates and maintains Comfort mode.

Inputs		Outputs	
	TYBS692F - 1 - 1￼ *Housing*		TYMS646T - 1 - 1￼ *Housing - Heating/Cooling*
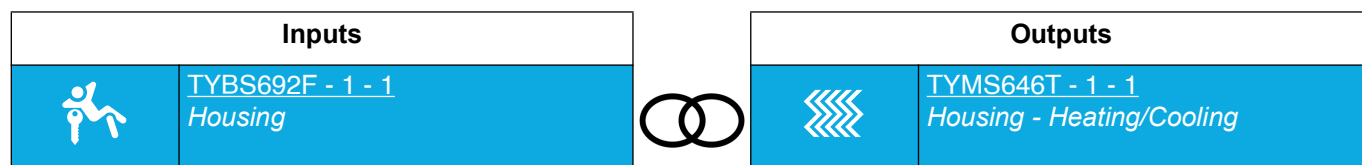
Closing the contact activates and maintains Comfort mode.
Closing the contact cancels the priority and returns to the usually active mode.
Note: when this priority mode is activated, the output in question switches to 30%.

Protection priority: Activates and maintains Protection mode.
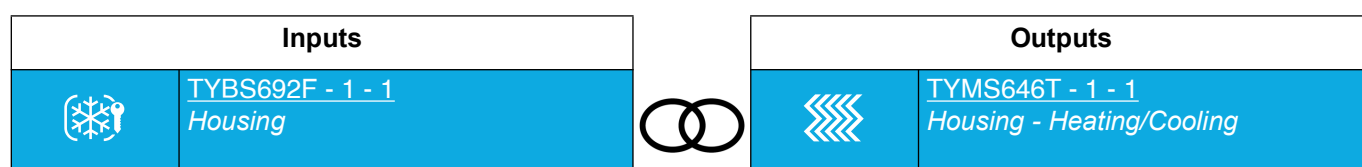
Inputs		Outputs	
	TYBS692F - 1 - 1￼ *Housing*		TYMS646T - 1 - 1￼ *Housing - Heating/Cooling*

Closing the contact activates and maintains Protection mode.
Closing the contact cancels the priority and returns to the usually active mode.
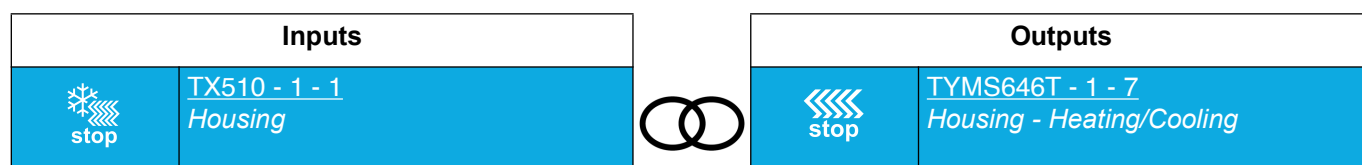*Note: when this priority mode is activated, the output in question switches to 0%.*

3.4.3 Heating/cooling off

This function is used to control the activation and deactivation of all the valve outputs at the same time by the KNX bus.

Inputs		Outputs	
	TX510 - 1 - 1￼ *Housing*		TYMS646T - 1 - 7￼ *Housing - Heating/Cooling*

Closing the contact activates all the valve outputs at the same time.
Opening the contact deactivates all the valve outputs at the same time.

Note: When the product starts up, all the valve outputs are activated.

4 Appendix

4.1 Specifications

Média KNX	TP1-256
Supply voltage KNX	21...32 V⎓ SELV
Supply voltage of the product and the valves	230 V~ +10/-15 % 50/60 Hz
	240 V~ +/-6 % 50/60 Hz
	24 V~ +/- 5 % 50/60 Hz
Surge voltage	4 kV
Protection switch	16 A
Operating altitude	max.2000 m
Degree of contamination	2
Heat class	2
Operating temperature	-5° ... +45°C
Current consumption KNX	typ. 18.5 mA
Dimension	4 TE, 4 x 17.5 mm
Action type	2Y
Voltage and current signalled for EMC testing of interference radiation	230 V~ 1 A/24 V~ 1 A
Power loss	max. 2.7 W

4.2 Characteristics

Device	TYMS646T	TYMS646R
Max. number of group addresses	3568	3568
Max. number of allocations	3569	3569
Objects	203	1391