Application Descriptions

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HVAC ObIS

Temperature On/Off Control

Summary

This object is applicable for room temperature control e.g. in room thermostats.

Version 01.00.01 is a KNX Approved Standard.

This document is part of the KNX Specifications v2.1.

Document updates

Version	Date	Modifications
1.0	2002.04.03	Editorially restyled; based on " 16-01_ObIS_TOOC.doc"
1.0	2009.05.16	Editorial update in view of inclusion in the KNX Specifications v2.0.
01.00.01	2013.10.29	Editorial updates for the publication of KNX Specifications 2.1.

References

None.

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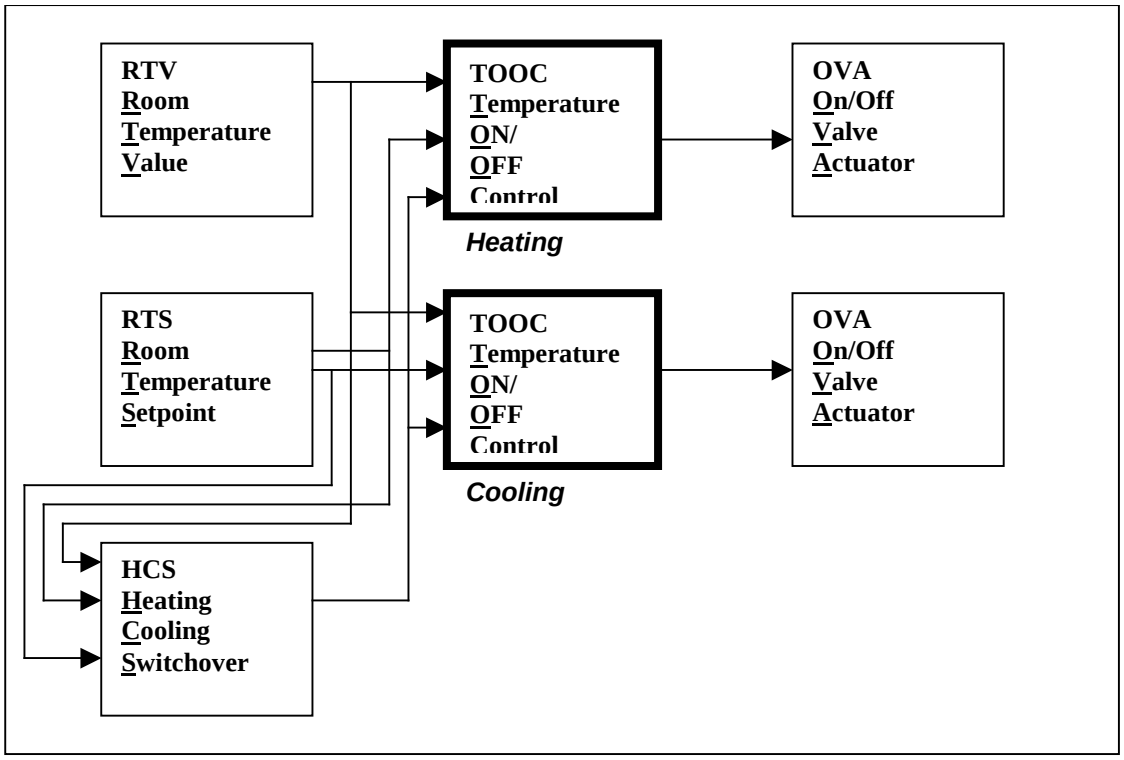

Figure 1 - Example for Individual Room Temperature Control with Heating and Cooling with ON/OFF Control

2 ObIS Function Model(s)

2.1 ObIS Function Model "Temperature ON/OFF Control"

2.1.1 Aims and objectives

This object is applicable for room temperature control e.g. in room thermostats.

2.1.2 Functional specification

This object can be used for ON/OFF control of a temperature e.g. of a room temperature. The actuating value Y has only two discrete states: ON and OFF. Y depends on the controlled value X (temperature) and the setpoint value W. The hysteresis may be defined as symmetrical or asymmetrical. Furthermore the actuating value Y can be activated or deactivated by an optional Group Object. The type of control (heating or cooling) is defined by a parameter.

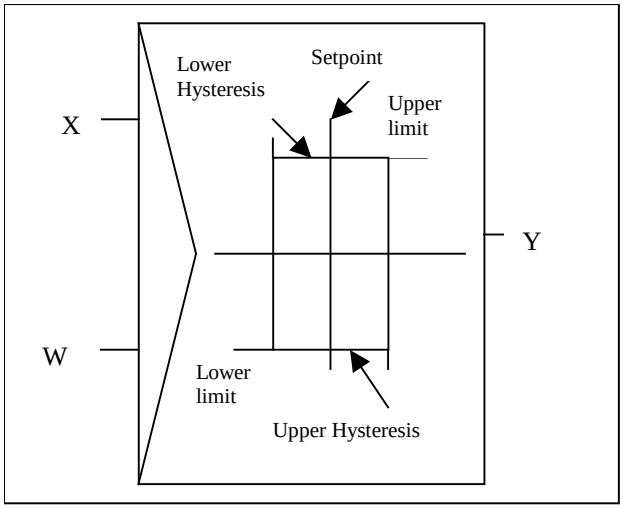

Figure 2 – On/Off control by a hysteresis

2.1.3 Constraints

No constraints are defined for the ObIS Temperature On/Off Control.

2.1.4 Functional Block

Input(s)		**Temperature On/Off Control**			**Output(s)**
Actual Room Temperature Value	DPT 9.001 --------	ARTV	OAC	EIS 1 ---------	ON/OFF Actuating Command
Actual Temperature Setpoint Value Heating/Cooling	DPT 9.001 --------	ATSVH/ ATSVC	RA	See 3.1 ---------	Range Alarm
Heating/Cooling Mode	See 3.1 --------	HCM	CS	See 3.2 ---------	Controller Status
Parameter(s)					
Lower Hysteresis	KNX 5.020 See 3.3 ---------	LH			
Upper Hysteresis	KNX 5.020 See 3.3 ---------	UH			
Lower Limit Controlled Value	DPT 9.001 ---------	LLCV			
Upper Limit Controlled Value	DPT 9.001 ---------	ULCV			
Lower Limit Setpoint Value	DPT 9.001 ---------	LLSV			
Upper Limit Setpoint Value	DPT 9.001 ---------	ULSV			
Controller Type	See 3.1 ---------	CT			
Actuating Value if Controller Inactive	EIS 1 ---------	AVCI			
Control Cycle Time	See 3.4 ---------	CCT			
Cycle Time Transmit Y	See 3.5 ---------	CTTY			

2.1.5 Properties

ID	Name	Abbr.	Description	Datapoint Type	M/O
1	**PID_OBJECT_TYPE**		Object Type	KNX_PropDataType	M

Input(s)

ID	Name	Abbr.	Description	Datapoint Type	M/O
<tbd>	**PID_VALUE_ACTUAL_ROOM_TEMPERATURE**	ARTV	Actual Room Temperature Value	DPT 9.001	M
<tbd>	**PID_SETPOINT_VALUE_ACTUAL_TEMPERATURE_HEATING/COOLING**	ATSVH/ATSVC	Actual Room Temperature Setpoint Heating or Actual Room Temperature Setpoint Cooling	DPT 9.001	M
<tbd>	**PID_MODE _HEATING_COOLING**	HCM	Heating/Cooling Mode	See 3.1	O

Output(s)

ID	Name	Abbr.	Description	Datapoint Type	M/O
<tbd>	**PID_COMMAND_ACTUATING_ON/OFF**	OAC	ON/OFF Command	EIS 1	M
<tbd>	**PID_ALARM_RANGE**	RA	Range Alarm	See 3.1	O
	PID_STATUS_CONTROLLER	CS	Controller Status	See 3.2	O

Parameter(s)

ID	Name	Abbr.	Description	Datapoint Type	M/O
<tbd>	**PID_HYSTERESIS_LOWER**	LH	Lower Hysteresis	KNX 5.020 See 3.3	M/O
<tbd>	**PID_HYSTERESIS_UPPER**	UH	Upper Hysteresis	KNX 5.020 See 3.3	M/O
<tbd>	**PID_VALUE_CONTROLLED_LOWER_LIMIT**	LLCV	Lower Limit Controlled Value	DPT 9.001	O
<tbd>	**PID_VALUE_CONTROLLED_UPPER_LIMIT**	ULCV	Upper Limit Controlled Value	DPT 9.001	O
<tbd>	**PID_VALUE_SETPOINT_LOWER_-LIMIT**	LLSV	Lower Limit Setpoint Value	DPT 9.001	O
<tbd>	**PID_VALUE_SETPOINT_UPPER_LIMIT**	ULSV	Upper Limit Setpoint Value	DPT 9.001	O
<tbd>	**PID_TYPE_CONTROLLER**	CT	Controller Type	See 3.1	O
<tbd>	**PID_VALUE_ACTUATING_CONTROL_INACTIVE**	AVCI	Actuating Value if Control Inactive	EIS 1	O
<tbd>	**PID_TIME_CYCLE_CONTROL**	CCT	Control Cycle Time	See 3.4	O
<tbd>	**PID_TIME_CYCLE_TRANSMIT_Y**	CTTY	Cycle Time Transmit Y	See 3.5	O

2.1.5.1 Property PID_ VALUE_ACTUAL_ROOM_TEMPERATURE ARTV

Unit: °C
Range: min. 5 … 35
Default Value: -
Group Object/Parameter: C
Input/Output: I
R/W Rate >> 10/day
Description: This value is the controlled value of the ON/OFF controller e.g. the actual room temperature value.

2.1.5.2 Property PID_SETPOINT_VALUE_ACTUAL_TEMPERATURE_HEATING or PID_SETPOINT_VALUE_ACTUAL_TEMPERATURE_COOLING ATSVH/ATSVC

Unit:	°C
Range:	min. 5 … 35
Default Value:	-
Group Object/Parameter:	C
Input/Output:	I
R/W Rate	>> 10/day
Description:	This value is the setpoint value of the ON/OFF controller.

2.1.5.3 Property PID_MODE_HEATING_COOLING HCM

Unit:	-
Range:	0;1
Default Value:	-
Group Object/Parameter:	C
Input/Output:	I
R/W Rate	> 1/day
Description:	HCM is used in combination with the parameter CT (Controller Type) to activate or deactivate the controller. The controller is active, if CT and HCM have the same value. If the controller becomes inactive the actuating value (OAC) is set to the state defined by the property „Actuating value if controller is inactive“ (AVCI). (Coding of HCM see 3.1)

2.1.5.4 Property PID_COMMAND_ACTUATING_ON/OFF_ OAC

Unit:	-
Range:	0;1
Default Value:	-
Group Object/Parameter:	C
Input/Output:	O
R/W Rate	>> 10/day
Description:	This is the actuating value of the Temperature ON/OFF Control (TOOC). OAC = f(ARTV,ATSVH/C,LH,UH,IO,CI,AVCI) After reset/restart OVAY remains „0“ and will not be transmitted until ATSVH/C and ARTV have been updated.

2.1.5.5 Property PID_ALARM_RANGE RA

Unit:	-
Range:	0;1
Default Value:	0
Group Object/Parameter:	C
Input/Output:	O
R/W Rate	< 1/day
Description:	If either the setpoint value ATSVH/C or the controlled value ARTV are below their minimum value or above their maximum value the „Range Alarm“ RA will be set and bit 3 to bit 7 in the „Controller Status“ CS will be set accordingly. (Coding of RA see: 3.1) RA = 1: Range Alarm RA = 0: no Range Alarm

2.1.5.6 Property PID_STATUS_CONTROLLER CS

Unit:	-
Range:	-
Default Value:	-
Group Object/Parameter:	C
Input/Output:	O
R/W Rate	< 10/day
Description:	Controller Status CS is an optional Group Object, which is read only (coding of CS see 3.2).

2.1.5.7 Property PID_HYSTERESIS_LOWER LH

Unit:	0,1 K
Range:	min. 10 ... 20 (positive values only)
Default Value:	free
Group Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	The lower limit of the ON/OFF Control is defined as the difference of setpoint value ATSVH/C minus lower hysteresis LH (see figure 2). LH or UH can be set to zero, but at least one of them must be greater than zero LH + UH > 0 !

2.1.5.8 Property PID_ HYSTERESIS_UPPER UH

Unit:	0,1 K
Range:	min. 10 ... 20 (positive values only)
Default Value:	free
Group Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	The upper limit of the ON/OFF Control is defined as the sum of setpoint value ATSVH/C plus upper hysteresis UH (see figure 2). LH or UH can be set to zero, but at least one of them must be greater than zero LH + UH > 0 !

2.1.5.9 Property PID_VALUE_CONTROLLED_LOWER_LIMIT LLCV

Unit:	°C
Range:	-
Default Value:	free
Group Object/Parameter:	P
Input/Output:	R
R/W Rate	<<1/day
Description:	This parameter is the minimum value of the Controlled Value ARTV which can be operated by the TOOC. This value is read only and must be defined by the manufacturer. If ARTV is lower than LLCV, ARTV must be set to LLCV.

2.1.5.10 Property PID_VALUE_CONTROLLED_UPPER_LIMIT ULCV

Unit:	°C
Range:	-
Default Value:	free
Group Object/Parameter:	P
Input/Output:	R
R/W Rate	<<1/day
Description:	This parameter is the maximum value of the Controlled Value ARTV which can be operated by the TOOC. This value is read only and must be defined by the manufacturer. If ARTV is higher than ULCV, ARTV must be set to ULCV.

2.1.5.11 Property PID_VALUE_SETPOINT_LOWER_ LIMIT LLSV

Unit:	°C
Range:	-
Default Value:	free
Group Object/Parameter:	P
Input/Output:	R
R/W Rate	<<1/day
Description:	This parameter is the minimum value of the Setpoint Value SVY which can be operated by the TOOC. This value is read only and must be defined by the manufacturer. If SVY is lower than LLSV, SVY must be set to LLSV.

2.1.5.12 Property PID_VALUE_SETPOINT_UPPER_LIMIT ULSV

Unit:	°C
Range:	-
Default Value:	free
Group Object/Parameter:	P
Input/Output:	R
R/W Rate	<<1/day
Description:	This parameter is the maximum value of the Setpoint Value SVY which can be operated by the TOOC. This value is read only and must be defined by the manufacturer. If SVY is higher than ULSV, SVY must be set to ULSV.

2.1.5.13 Property PID_TYPE_CONTROLLER CT

Unit:	-
Range:	0;1
Default Value:	free
Group Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This Parameter defines whether the controller is used for heating (CT = 1) or for cooling (CT = 0) and in combination with the object HCM if the controller is active or inactive. The controller is active if CT = HCM.

2.1.5.14 Property PID_VALUE_ACTUATING_CONTROLLER_INACTIVE AVCI

Unit:	-
Range:	0;1
Default Value:	free
Group Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	When TOOC is switched in the inactive state, the actuating value (OAC) is set to the state defined by this property (AVCI). This state is transmitted one times only.

2.1.5.15 Property PID_TIME_CYCLE_CONTROL CCT

Unit:	s
Range:	free
Default Value:	free
Group Object/Parameter:	P
Input/Output:	O
R/W Rate	>> 10/day
Description:	This parameter determines the time interval after which the control algorithm is executed again. (Coding see 3.4)

2.1.5.16 Property PID_TIME_CYCLE_TRANSMIT_YCTTY

Unit:	minutes ("0" = no transmission)
Range:	min 0; 15 … 60 minutes
Default Value:	free
Group Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	The actuating value OAC will be transmitted cyclically after the given cycle time. It will not be transmitted cyclically, if CTTY is set to “0”. In this case OAC is only transmitted if OAC has changed. (Coding see 3.5)

3 Datapoint Type(s)

3.1 1-Bit Datapoint Types

Format:	1 bit		
	V		
Encoding:	See below		
Range:	V = {0,1}		
Unit:	-		
Datapoint Types			
Code:	Symbol:	Encoding: V = 0	V = 1
1.100	DPT_Heat/Cool	Cooling	Heating
1.005	DPT_Alarm	No Alarm	Alarm

3.2 Datapoint Type "Controller Status"

Format:	1 octet	
	HGFEDCBA	
Encoding:	See below	
Range:	A ...H = {0,1}	
Unit:	-	
Datapoint Types		
Code:	Symbol:	Encoding:
<tbd>	<tbd>	A =1 : Control is inactive B =1 : Output is inverted C: Not used, always zero D=1 : ARTV>ULCV E=1 : ARTV<LLCV F=1 : SVY>ULSV G=1 : SVY<LLSV H=1 : Range Alarm

3.3 Datapoint Type "8 bit signed integer"

Format:	1 octet VVVVVVVV			
Encoding:	See below			
Range:	V = [-128 … 127] binary encoded			
Unit:	See below			
Datapoint Types				
Code:	Symbol:	Encoding:	Range:	Unit:
KNX 5.020	DPT_TempHVACRel8	"temperature"	-128…127	0,1 K

This Datapoint Type shall only be used for the encoding of parameters. It shall not be used for the encoding of any temperature value (real temperatures, shift values, offset values, …) that are transmitted on the bus using group communication.

3.4 Datapoint Type "8-bit unsigned multiplier without zero"

Format:	1 octet VVVVVVVV			
Encoding:	See below			
Range:	V = [1…255] binary encoded			
Unit:	See below			
Datapoint Types				
Code:	Symbol:	Encoding:	Range:	Unit:
<tbd>	<tbd>	"time"	1…255	1 s

3.5 Datapoint Type "8-bit unsigned multiplier with special function for zero"

Format:	1 octet VVVVVVVV			
Encoding:	See below			
Range:	V = [0…255] binary encoded			
Unit:	See below			
Datapoint Types				
Code:	Symbol:	Encoding:	Range:	Unit:
<tbd>	<tbd>	"time"	1…255 0 = corresponding function disabled	1 min

