Application Descriptions

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HVAC ObIS

Room Temperature Setpoint (RTS)

Summary

This function generates the setpoint value of the room temperature for a single room. The temperature control bases on the mode of operation and other Inputs.

Version 01.00.01 is a KNX Approved Standard.

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Document updates

Version	Date	Modifications
1.0	2002.04.02	Editoriall restyled, based on "03-02_ObIS_RTS.doc".
1.0	2009.06.15	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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1 Application Model(s)

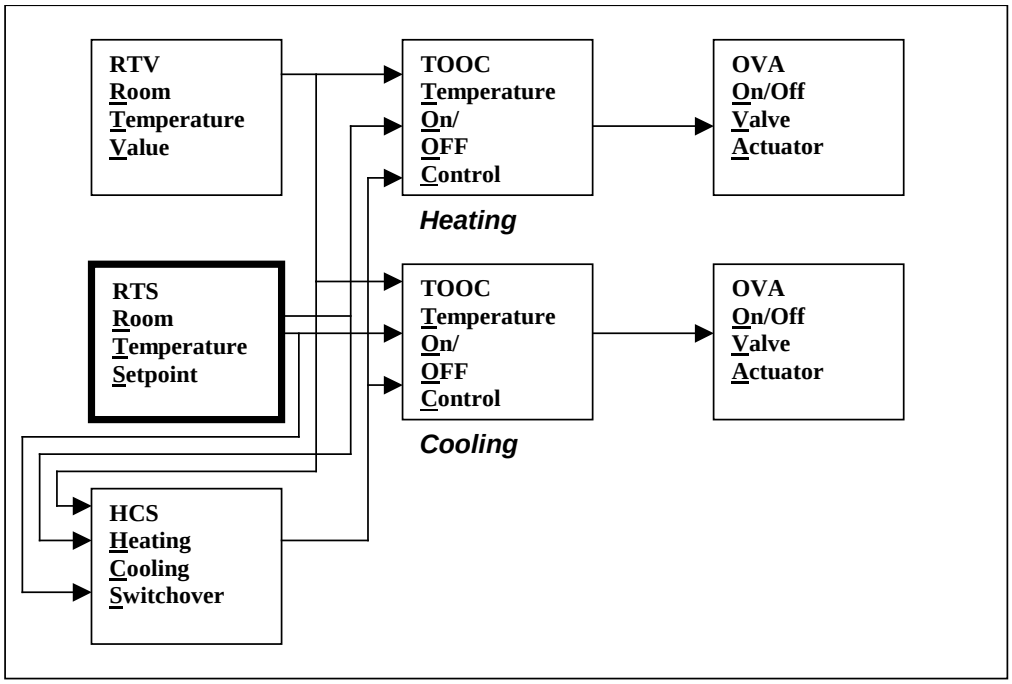


Figure 1 - Example for Individual Room Temperature Control with Heating and Cooling with ON/OFF Control

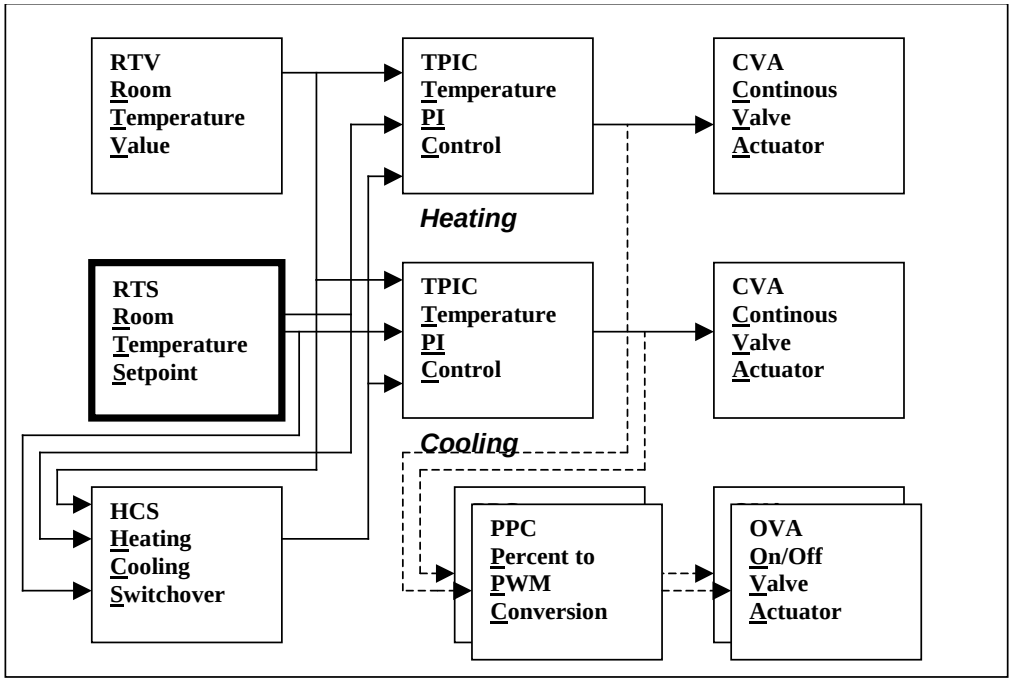


Figure 2 - Example for Individual Room Temperature Control with Heating and Cooling with PI Control

2 ObIS Function Model(s)

2.1 ObIS Function Model "Room Temperature Setpoint"

2.1.1 Aims and objectives

This function generates the setpoint value of the room temperature for a single room. The temperature control bases on the mode of operation and other Inputs.

2.1.2 Functional specification

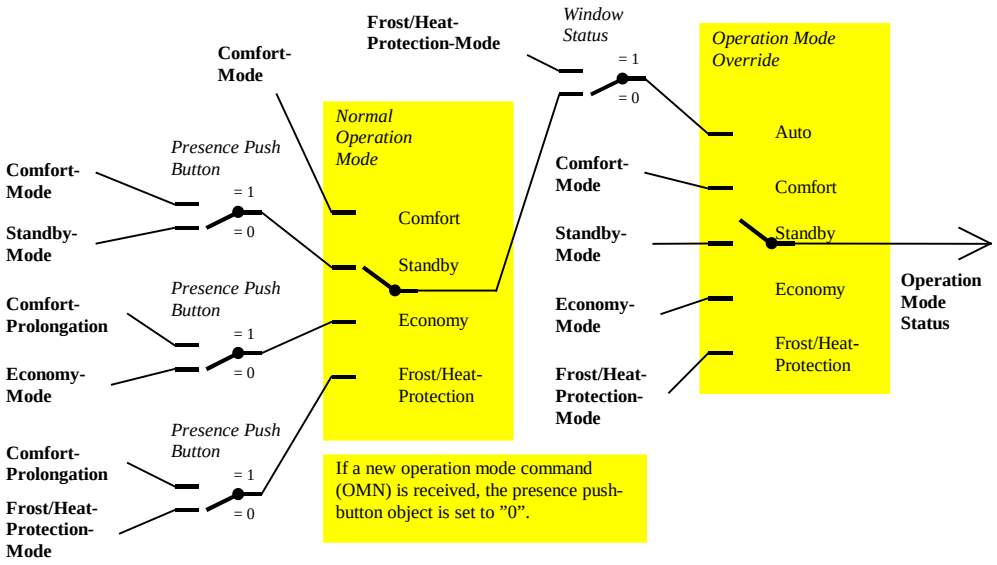


Figure 3 - Operation Mode Diagram, if UCPS = Presence Push Button

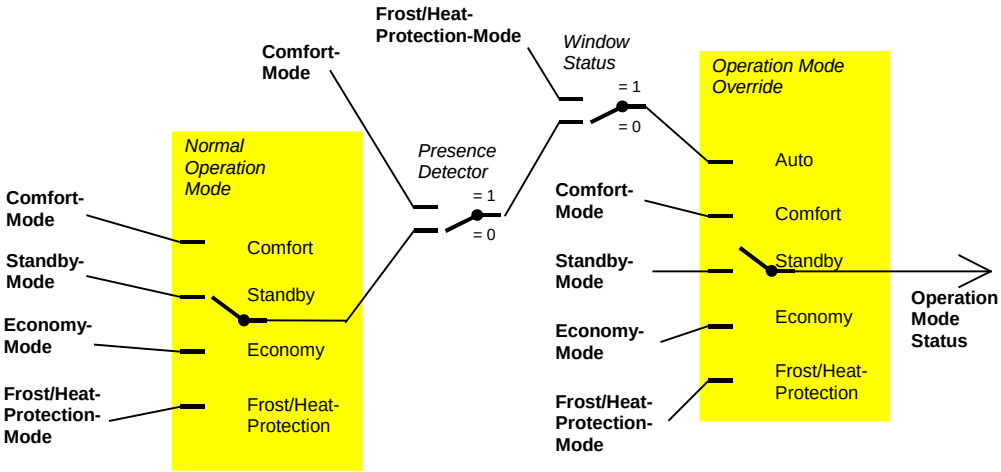


Figure 4 - Operation Mode Diagram, if UCPS = Presence Detector

This functional specification is mandatory. Other additional functional specifications are allowed.

Table 1 - Actual Temperature Setpoint Value if PDB = 0

Operation Mode (OMN)	Actual Temperature Setpoint Value Heating (ATSVH)	Actual Temperature Setpoint Value Cooling (ATSVC)
Comfort-Mode	BSV + SCV – ½ DBHC	BSV + SCV + ½ DBHC
Standby-Mode	BSV + SCV + SRV – ½ DBHC	BSV + SCV + SIV + ½ DBHC
Economy-Mode	BSV + SCV + ERV – ½ DBHC	BSV + SCV + EIV + ½ DBHC
Frost/Heat-Protection-Mode	FPSV	HPSV

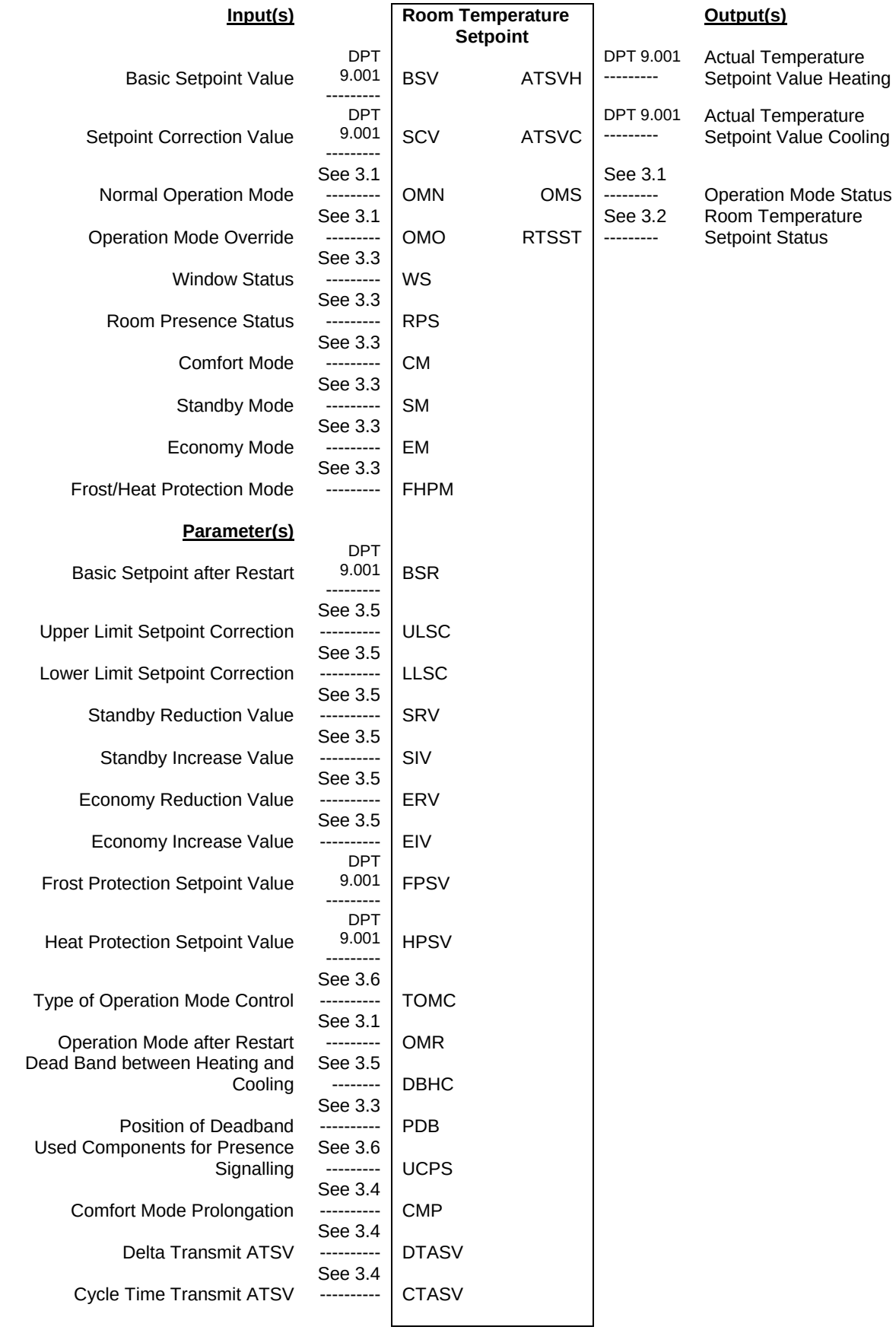
Table 2 - Actual Temperature Setpoint Value, if PDB = 1

Operation Mode (OMN)	Actual Temperature Setpoint Value Heating (ATSVH)	Actual Temperature Setpoint Value Cooling (ATSVC)
Comfort-Mode	BSV + SCV	BSV + SCV + DBHC
Standby-Mode	BSV + SCV + SRV	BSV + SCV + SIV + DBHC
Economy-Mode	BSV + SCV + ERV	BSV + SCV + EIV + DBHC
Frost/Heat-Protection-Mode	FPSV	HPSV

2.1.3 Constraints

No constraints are defined for the ObIS Room Temperature Setpoint.

2.1.4 Functional Block



2.1.5 Properties

ID	Name	Abbr.	Description	Variable Type	M/O
1	**PID_OBJECT_TYPE**		Object Type	KNX_Prop DataType	M

Input(s)

ID	Name	Abbr.	Description	Datapoint Type	M/ O
<tbd>	**PID_SETPOINT_VALUE_BASIC**	BSV	Basic Setpoint Value	DPT 9.001	M
<tbd>	**PID_SETPOINT_VALUE_CORRECTION**	SCV	Setpoint Correction Value	DPT 9.001	O
<tbd>	**PID_OPERATION_MODE_NORMAL**	OMN	Normal Operation Mode	See 3.1	M*
<tbd>	**PID_OPERATION_MODE_OVERRIDE**	OMO	Operation Mode Override	See 3.1	O
<tbd>	**PID_WINDOW_STATUS**	WS	Window Status	See 3.3	O
<tbd>	**PID_ROOM_PRESENCE_STATUS**	RPS	Room Presence Status	See 3.3	O
<tbd>	**PID_COMFORT_MODE**	CM	Comfort Mode	See 3.3	M**
<tbd>	**PID_STANDBY_MODE**	SM	Standby Mode	See 3.3	O
<tbd>	**PID_ECONOMY_MODE**	EM	Economy Mode	See 3.3	M**
<tbd>	**PID_FROST_HEAT_PROTECTION_MODE**	FHPM	Frost/Heat Protection Mode	See 3.3	M**

Output(s)

ID	Name	Abbr.	Description	Datapoint Type	M/O
<tbd>	**PID_SETPOINT_VALUE_ACTUAL_TEMPERATURE_HEATING**	ATSVH	Actual Temperature Setpoint Value Heating	DPT 9.001	M
<tbd>	**PID_SETPOINT_VALUE_ACTUAL_TEMPERATURE_COOLING**	ATSVC	Actual Temperature Setpoint Value Cooling	DPT 9.001	O
<tbd>	**PID_OPERATION_MODE_STATUS**	OMS	Operation Mode Status	See 3.1	O
<tbd>	**PID_ROOM_TEMPERATURE_SETPOINT_STATUS**	RTSST	Room Temperature Setpoint Status	See 3.2	O

Parameter(s)

ID	Name	Abbr.	Description	Datapoint Type	M/O
<tbd>	**PID_BASIC_SETPOINT_RESTART**	BSR	Basic Setpoint after Restart	DPT 9.001	O
<tbd>	**PID_SETPOINT_CORRECTION_UPPER_LIMIT**	ULSC	Upper Limit Setpoint Correction	New: KNX 5.020 See 3.5	O
<tbd>	**PID_SETPOINT_CORRECTION_LOWER_LIMIT**	LLSC	Lower Limit Setpoint Correction	New: KNX 5.020 See 3.5	O
<tbd>	**PID_VALUE_STANDBY_REDUCTION**	SRV	Standby Reduction Value	New: KNX 5.020 See 3.5	O
<tbd>	**PID_VALUE_STANDBY_INCREASE**	SIV	Standby Increase Value	New: KNX 5.020 See 3.5	O
<tbd>	**PID_VALUE_ECONOMY_REDUCTION**	ERV	Economy (Night) Reduction Value	New: KNX 5.020 See 3.5	O
<tbd>	**PID_VALUE_ECONOMY_INCREASE**	EIV	Economy (Night) Increase Value	New: KNX 5.020 See 3.5	**O**

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ID	Name	Abbr.	Description	Datapoint Type	M/O
<tbd>	**PID_SETPOINT_VALUE_PROTECTION_FROST**	FPSV	Frost Protection Setpoint Value	DPT 9.001	O
<tbd>	**PID_SETPOINT_VALUE_PROTECTION_HEAT**	HPSV	Heat Protection Setpoint Value	DPT 9.001	O
<tbd>	**PID_TYPE_OF_OPERATION_MODE_CONTROL**	TOMC	Type of Operation Mode Control	See 3.3	O
<tbd>	**PID_OPERATION_MODE_RESTART**	OMR	Operation Mode after Restart	See 3.1	O
<tbd>	**PID_HEATING_COOLING_DEADBAND**	DBHC	Dead Band between Heating and Cooling	New: KNX 5.020 See 3.5	O
<tbd>	**PID_DEADBAND_POSITION**	PDB	Position of Deadband	See 3.3	O
<tbd>	**PID_PRESENCE_SIGNALLING_COMPONENTS**	UCPS	Used Components for Presence Signalling	See 3.6	O
<tbd>	**PID_COMFORT_MODE_PROLONGATION**	CMP	Comfort Mode Prolongation	See 3.4	O
<tbd>	**PID_ACTUAL_SETPOINT_TRANSMIT_DELTA**	DTASV	Delta Transmit Actual Temperature Setpoint Value	See 3.4	O
<tbd>	**PID_ACTUAL_SETPOINT_TRANSMIT_CYCLE**	CTASV	Cycle Time Transmit Actual Temperature Setpoint Value	See 3.4	O

Remarks

M*

In new developements this object has to be implemented. The objects „comfort mode“ CM, „standby mode“ SM, „economy mode“ EM and „frost/heat protection mode“ FHPM may be implemented additionally. But if implemented, the parameter „type of operation mode control“ TOMC has to be implemented, too.

M**

These objects are used in existing BCU 1 and BCU 2 based devices instead of the object „Normal Operation Mode“ OMN. The manufacturer has to explain in the corresponding instruction for use which type of operation mode control is implemented.

2.1.5.1 Property PID_SETPOINT_VALUE_BASIC BSV

Unit: °C
Range: min. 15 … 25
Default Value: -
Communication Object/Parameter: C
Input/Output: I
R/W Rate < 10/day
Description: This is the basic setpoint value for the comfort operation mode. This value should be saved in case of device reset (e.g. busvoltage failure). If not, the default value parameter shall be implemented and evaluated after restart. See 2.1.5.15.

2.1.5.2 Property PID_SETPOINT_VALUE_CORRECTION SCV

Unit:	K
Range:	min. -3 K .. + 3 K
Default Value:	0
Communication Object/Parameter:	C
Input/Output:	I
R/W Rate	< 10/day

Description: The setpoint correction value allows the user of the room to modify the setpoint temperature to a higher or lower value in the range between upper and lower limits. See 2.1.5.16 and 2.1.5.17.
The setpoint correction is recommended to be saved in case of busvoltage failure.
Remark for the sender of the SCV-Value:
The used EIS 5- format has different resolutions depending of the used exponent. To have a user-friendly resolution in which it is possible to offer steps of 0,1 K and in order to have no problems with rounding it is recommended to use the exponent 1 (resolution 0,02K).

2.1.5.3 Property PID_OPERATION_MODE_NORMAL OMN

Unit:	-
Range:	1 … 4; 0 not allowed (see 3.1)
Default Value:	free
Communication Object/Parameter:	C
Input/Output:	I
R/W Rate	< 10/day

Description: This input is used to set the operation mode. This value should be saved in case of device reset (e.g. busvoltage failure). If not, the default value parameter shall be implemented and evaluated after restart. See 2.1.5.25.

2.1.5.4 Property PID_OPERATION_MODE_OVERRIDE OMO

Unit:	-
Range:	0 … 4 (see 3.1)
Default Value:	auto
Communication Object/Parameter:	C
Input/Output:	I
R/W Rate	< 10/day

Description: This input is used to force the operation mode. If it is set to “Auto” the forcing is inhibited. In the other case the given operation mode is forced. See **Error! Reference source not found.**.

2.1.5.5 Property PID_WINDOW_STATUS WS

Unit:	-
Range:	0; 1 (see 3.3)
Default Value:	0
Communication Object/Parameter:	C
Input/Output:	I
R/W Rate	< 10/day

Description: This input is used to switch over to frost/heat protection mode as long as the window is open. See 2.1.5.22 and 2.1.5.23.

2.1.5.6 Property PID_ ROOM_PRESENCE_STATUS RPS

Unit:	-
Range:	0; 1 (see 3.3)
Default Value:	0
Communication Object/Parameter:	C
Input/Output:	I
R/W Rate	> 10/day
Description:	This input can be used if a presence detector or a presence pushbutton is installed in the room. Depending on the used component for presence signalling (UCPS: 2.1.5.28) two different functions are possible. 1. A presence detector is installed: It switches over from the set operation mode (see 2.1.5.3) to comfort mode and vice versa. 2. A presence push button is installed: This input switches over from standby mode to comfort mode and vice versa or from economy (night) mode respectively frost/heat protection mode to comfort mode for a limited time (comfort mode prolongation). See 2.1.5.29.

2.1.5.7 Property PID_COMFORT_MODE CM

Unit:	-
Range:	0; 1 (see 3.3)
Default Value:	0
Communication Object/Parameter:	C
Input/Output:	I
R/W Rate	> 10/day
Description:	This input is used to switch to comfort mode if this object is set to „1“ This input may be used together with the objects „standby mode“ SM ; „economy mode“ EM and „frost/heat Protection mode“ FHPM instead of the object „Normal Operation mode“ OMN

2.1.5.8 Property PID_STANDBY_MODE SM

Unit:	-
Range:	0; 1 (see 3.3)
Default Value:	0
Communication Object/Parameter:	C
Input/Output:	I
R/W Rate	> 10/day
Description:	This input is used to switch to standby mode if this object is set to „1“ This input may be used together with the objects „comfort mode“ CM ; „economy mode“ EM and „frost/heat Protection mode“ FHPM instead of the object „Normal Operation mode“ OMN

2.1.5.9 Property PID_ECONOMY_MODE EM

Unit:	-
Range:	0; 1 (see 3.3)
Default Value:	0
Communication Object/Parameter:	C
Input/Output:	I
R/W Rate	> 10/day
Description:	This input is used to switch to economy mode if this object is set to „1“ This input may be used together with the objects „comfort mode“ CM, standby mode“ SM and „frost/heat Protection mode“ FHPM instead of the object „Normal Operation mode“ OMN

2.1.5.10 Property PID_FROST/HEAT_PROTECTION_MODE FHPM

Unit:	-
Range:	0; 1 (see 3.3)
Default Value:	0
Communication Object/Parameter:	C
Input/Output:	I
R/W Rate	> 10/day
Description:	This input is used to switch to frost/heat protection mode if this object is set to „1“ This input may be used together with the objects „comfort mode“ CM, „standby mode“ SM and „economy mode“ EM instead of the object „Normal Operation mode“ OMN

2.1.5.11 Property PID_SETPOINT_VALUE_ACTUAL_TEMPERATURE_HEATING ATSVH

Unit:	°C
Range:	min. 5 … 25
Default Value:	-
Communication Object/Parameter:	C
Input/Output:	O
R/W Rate	< 10/day
Description:	This communication object contains the actual value of the room temperature setpoint for heating, depending on the actual operation mode. See **Error! Reference source not found.**.

2.1.5.12 Property PID_SETPOINT_VALUE_ACTUAL_TEMPERATURE_COOLING ATSVC

Unit:	°C
Range:	min. 20 … 35
Default Value:	-
Communication Object/Parameter:	C
Input/Output:	O
R/W Rate	< 10/day
Description:	This communication object contains the actual value of the room temperature setpoint for cooling, depending on the actual operation mode. See **Error! Reference source not found.**.

2.1.5.13 Property PID_OPERATION_MODE_STATUS OMS

Unit:	-
Range:	-
Default Value:	-
Communication Object/Parameter:	C
Input/Output:	O
R/W Rate	< 10/day
Description:	This communication object contains the actual operation mode. Coding see 3.1.

2.1.5.14 Property PID_ROOM_TEMPERATURE_SETPOINT_STATUS RTSST

Unit:	-
Range:	-
Default Value:	-
Communication Object/Parameter:	C
Input/Output:	O
R/W Rate	< 10/day
Description:	This communication object contains the status of the RTS-controller. Coding see 3.2.

2.1.5.15 Property PID_BASIC_SETPOINT_RESTART BSR

Unit:	°C
Range:	min. 15 … 25
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter serves as default value for the basic setpoint value after restart.

2.1.5.16 Property PID_SETPOINT_CORRECTION_UPPER_LIMIT ULSC

Unit:	0,1 K
Range:	0 .. min. 30
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter limits the setpoint correction to a maximum value (e.g. + 3 K).

2.1.5.17 Property PID_SETPOINT_CORRECTION_LOWER_LIMIT LLSC

Unit:	0,1 K
Range:	0 ..min. -30
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter limits the setpoint correction to a minimum value (e.g. - 3 K).

2.1.5.18 Property PID_VALUE_STANDBY_REDUCTION SRV

Unit:	0.1 K
Range:	0..min. -30
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This value is used for the correction of the comfort setpoint value in order to save energy in the standby mode. It is used to calculate the ATSVH. See **Error! Reference source not found.**.

2.1.5.19 Property PID_VALUE_STANDBY_INCREASE SIV

Unit:	0.1 K
Range:	0 .. min. 30
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This value is used for the correction of the comfort setpoint value in order to save energy in the standby mode. It is used to calculate the ATSVC. See **Error! Reference source not found.**.

2.1.5.20 Property PID_VALUE_ECONOMY_REDUCTION ERV

Unit:	0.1 K
Range:	0 ..min. -60
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This value is used for the correction of the comfort setpoint value in order to save energy in the economy (night) mode. It is used to calculate the ATSVH. See **Error! Reference source not found.**.

2.1.5.21 Property PID_VALUE_ECONOMY_INCREASE EIV

Unit:	0.1 K
Range:	0 .. min. 60
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This value is used for the correction of the comfort setpoint value in order to save energy in the economy (night) mode. It is used to calculate the ATSVC. See **Error! Reference source not found.**.

2.1.5.22 Property PID_SETPOINT_VALUE_PROTECTION_FROST FPSV

Unit:	° C
Range:	min. + 5 °C
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This value is used as setpoint value in order to protect the building in the frost/heat protection mode. It is used to calculate the ATSVH. See **Error! Reference source not found.**.

2.1.5.23 Property PID_SETPOINT_VALUE_PROTECTION_HEAT HPSV

Unit:	° C
Range:	min. + 35 °C
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This value is used as setpoint value in order to protect the building in the frost/heat protection mode. It is used to calculate the ATSVC. See **Error! Reference source not found.**.

2.1.5.24 Property PID_TYPE_OF_OPERATION_MODE_CONTROL TOMC

Unit:	-
Range:	0 … 2
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter defines the used type of operation mode control. See 3.6

2.1.5.25 Property PID_OPERATION_MODE_RESTART OMR

Unit:	-
Range:	1 … 4; 0 not allowed
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter defines the default operation mode after restart.

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2.1.5.26 Property PID_HEATING_COOLING_DEADBAND DBHC

Unit:	0.1 K
Range:	min.: 10 … 30 (positive values only)
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter shall guarantee, that heating and cooling mode can not be active at the same time, if the controller can switch automatically over from heating to cooling mode and vice versa. If the RTS only supports heating or cooling mode the deadband should be set unchangeable to zero. In this case the basic setpoint is the setpoint for the comfort mode.

2.1.5.27 Property PID_DEADBAND_POSITION PDB

Unit:	-
Range:	0,1
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter defines wether the deadband has a symmetrical or an asymmetrical position to the actual setpoint at comfort mode. See 3.3 and 2.1.2 Table 1 and Table 2

2.1.5.28 Property PID_PRESENCE_SIGNALLING_COMPONENTS UCPS

Unit:	-
Range:	-
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter is used to define whether a presence push button or a presence detector is used or not.

2.1.5.29 Property PID_COMFORT_MODE_PROLONGATION CMP

Unit:	minutes ("0" = no prolongation)
Range:	min. 30 … 60 minutes
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter determines the time of comfort mode prolongation.

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2.1.5.30 Property PID_ACTUAL_SETPOINT_TRANSMIT_DELTA DTASV

Unit:	K ("0" = no transmission)
Range:	min. 0.5 … 1 K
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	The actual setpoint value will be transmitted automatically if the difference between old and new setpoint value is greater than the given delta value. It will not be transmitted automatically, if the delta value is set to “0”.

2.1.5.31 Property PID_ACTUAL_SETPOINT_TRANSMIT_CYCLE CTASV

Unit:	minutes ("0" = no transmission)
Range:	min 0; 15 … 60 minutes
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	The actual setpoint value will be transmitted cyclically after the given cycle time. It will not be transmitted cyclically, if the cycle time is set to “0”.

3 Datapoint Types

3.1 Datapoint Type "Operation Mode"

Format:	1 octet	
	00000MMM	
Encoding:	See below	
Range:	M = {1 … 4}	
Unit:	-	
Datapoint Types		
Code:	Symbol:	Encoding:
<tbd>	OMN	1 Comfort Mode 2 Standby Mode 3 Economy Mode (= Night Mode) 4 Frost- and Heat Protection Mode
<tbd>	OMO	0 Auto 1 Comfort Mode 2 Standby Mode 3 Economy Mode (= Night Mode) 4 Frost- and Heat Protection Mode

3.2 Datapoint Type "Room Temperature Setpoint Status"

Format:	1 octet	
	00000CBA	
Encoding:	See below	
Range:	A = {0,1} B = {0,1} C = {0,1}	
Unit:	See below	
Datapoint Types		
Code:	Symbol:	Encoding:
<tbd>	<tbd>	A: Comfort Mode Prolongation <tbd> B: Presence See 3.3 C: Window open. See 3.3

3.3 Datapoint Types “Boolean”

Format:	1 bit		
	V		
Encoding:	See below		
Range:	V = {0,1}		
Unit:	-		
Datapoint Types			
Code:	Type	Encoding: V = 0	V = 1
<tbd>	RPS	Absence	Presence
<tbd>	WS	Window closed	Window open
<tbd>	CM	Comfort mode OFF	Comfort mode ON
<tbd>	SM	Standby mode OFF	Standby mode ON
<tbd>	EM	Economy mode OFF	Economy mode ON
<tbd>	FHPM	Frost/Heat protection mode OFF	Frost/Heat protection mode ON
<tbd>	PDB	Symmetrical (see 2.1.2 Table 1)	Asymmetrical (see 2.1.2 Table 2)

3.4 Datapoint Type "8-bit unsigned integer with special function for zero"

Format:	1 octet			
	VVVVVV			
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
<tbd>	<tbd>	"temperature"	1…255 0 = corresponding function disabled	0.1 K

This format is only for parameters

3.5 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:
5.020	DPT_TempHVACRel8	"temperature"	-128…127	0.1 K

This format may not be used for absolute temperatures, it may only be used for parameters

3.6 Datapoint Type "2-Bit enumerated"

Format:	2 bits CC
Encoding:	See below
Range:	See below
Unit:	-

Datapoint Types

Code:	Type	Encoding:
<tbd>	UCPS	CC 00b None 01b Presence Push Button 10b Presence Detector 11b (Invalid)
<tbd>	TOMC	CC 00b OMN is used 01b CM, EM, FHPM is used 10b CM, SM, EM, FHPM is used 11b (Invalid)