



Application Descriptions

7

HVAC ObIS

19

Percent to PWM Conversion

8

Summary

This object is used to convert an actuating value in percent into a pulse width modulated (PWM) On/Off command. It is used e.g. for the control of thermally driven valve positioners.

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	2002.04.04	Editorially restyled: based on " 20-01_ObIS_PPC.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.

Filename: 07_19_08 ObIS PPC v01.00.01 AS.docx
Version: 01.00.01
Status: Approved Standard
Savedate: 2013.10.29
Number of pages: 13

Contents

1	Application Model(s).....	4
2	ObIS Function Model(s)	5
2.1	ObIS Function Model "Percent to PWM Conversion"	5
2.1.1	Aims and objectives	5
2.1.2	Functional specification	5
2.1.3	Constraints	5
2.1.4	Functional Block	5
2.1.5	Properties	7
3	Datapoint Type(s).....	12
3.1	Datapoint Type "Boolean"	12
3.2	Datapoint Type "PPC Status"	12
3.3	Datapoint Type "8-bit unsigned multiplier with special function for zero"	13

1 Application Model(s)

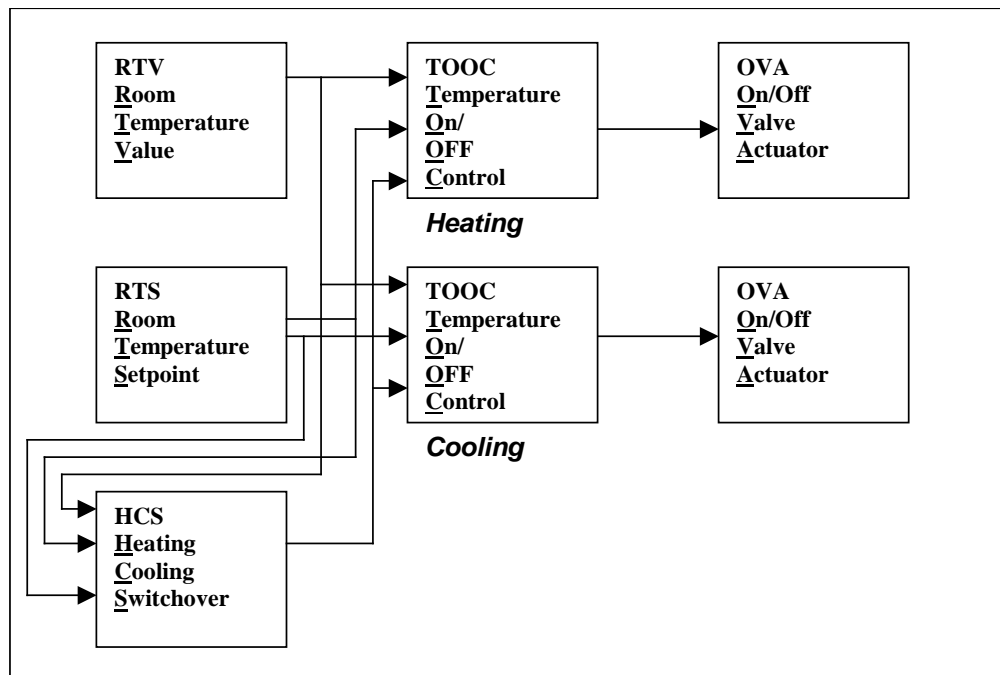


Figure 1 - Example for Individual Room Temperature Control with Heating and Cooling with ON/OFF Control

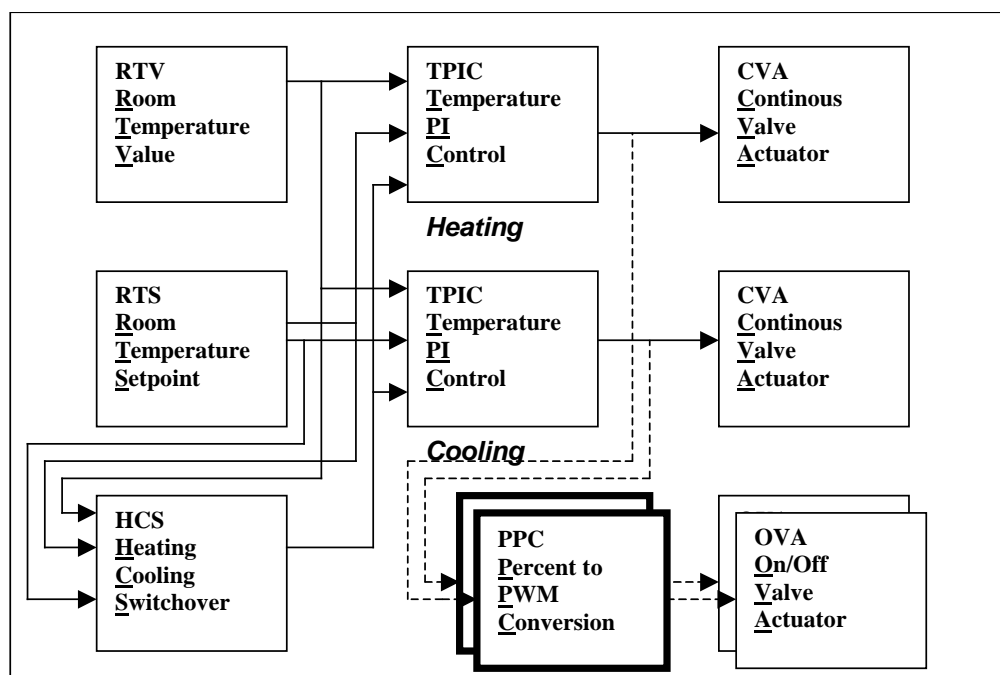


Figure 2 - Example for Individual Room Temperature Control with Heating and Cooling with PI Control

2 ObIS Function Model(s)

2.1 ObIS Function Model "Percent to PWM Conversion"

2.1.1 Aims and objectives

This object is used to convert an actuating value in percent into a pulse width modulated (PWM) On/Off command. It is used e.g. for the control of thermally driven valve positioners.

2.1.2 Functional specification

This ObIS converts a positioning value in percent into a pulse width modulated (PWM) On/Off signal under consideration of the optional inputs „Manual Override Enable“, „Manual Override Value“ and „Forced Position Enable“ and the parameter „PWM Cycle Time“. The PPC status information is available as optional output.

2.1.3 Constraints

No constraints are defined for the ObIS Percent to PWM Conversion.

2.1.4 Functional Block

<u>Input(s)</u>		Percent to PWM Conversion		<u>Output(s)</u>	
Continuous Actuating Value	5.001 -----	CAV	OAC	1.009 -----	ON/OFF Actuating Command
Manual Override Enable	See 3.1 -----	MOE	PPCS	See 3.2 -----	PPC Status
Manual Override Value	5.001 -----	MOV			
Forced Position Enable	See 3.1 -----	FPE			
<u>Parameter(s)</u>					
PWM Period	See 3.3 -----	PP			
Position of deenergized Valve	See 3.1 -----	PDV			
Min Actuating Value	5.001 -----	MINAV			
Max Actuating Value	5.001 -----	MAXAV			
Timeout Period	See 3.3 -----	TP			
Actuating Value at Timeout	5.001 -----	ATV			
Forced Position Value	5.001 -----	FPV			
Transmit PPC Status on Change Enable	See 3.1 -----	PSCT			
Transmit Cycle Time PPC Status	See 3.3 -----	TCTPS			
Enable Transmit OAC at end of PP	See 3.1 -----	ETOEP			

2.1.4.1 Priority of the inputs

The value which is used for PWM-conversion is controlled by the inputs “Manual Override Enable” and “Forced Position Enable”. The priority of these inputs is shown in the table below:

Table 1 – Priority rules for the ObIS PPC

Manual Override Enable MOE	Forced Position Enable FPE	Used Value for PWM-Conversion
0	0	Continuous Actuating Value CAV
0	1	Forced Position Value FPV
1	0	Manual Override Value MOV
1	1	Manual Override Value MOV

2.1.5 Properties

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

Input(s)

ID	Name	Abbr.	Description	Datapoint Type	M/O
<tbid>	PID_VALUE_ACTUATING_CONTINUOUS	CAV	Continuous Actuating Value	5.001	M
<tbid>	PID_OVERRIDE_MANUAL_ENABLE	MOE	Manual Override Enable	See 3.1	O
<tbid>	PID_OVERRIDE_VALUE_MANUAL	MOV	Manual Override Value	5.001	O
<tbid>	PID_POSITION_FORCED_ENABLE	FPE	Forced Position Enable	See 3.1	O

Output(s)

ID	Name	Abbr.	Description	Datapoint Type	M/O
<tbid>	PID_COMMAND_ON_OFF	OAC	ON/OFF Actuating Command	1.009	M
<tbid>	PID_STATUS_PPC	PPCS	PPC Status	New: See 3.2	O

Parameter(s)

ID	Name	Abbr.	Description	Datapoint Type	M/O
<tbid>	PID_PERIOD_PWM	PP	PWM Period	New: See 3.3	O
<tbid>	PID_POSITION_VALVE_DEENERGIZED	PDV	Position of deenergized Valve	New: See 3.1	O
<tbid>	PID_VALUE_ACTUATING_MINIMUM	MINAV	Minimum Actuating Value	5.001	O
<tbid>	PID_VALUE_ACTUATING_MAXIMUM	MAXAV	Maximum Actuating Value	5.001	O
<tbid>	PID_PERIOD_TIMEOUT	TP	Timeout Period	See 3.3	O
<tbid>	PID_VALUE_ACTUATING_TIMEOUT	AVT	Actuating Value at Timeout	5.001	O
<tbid>	PID_VALUE_POSITION_FORCED	FPV	Forced Position Value	5.001	O
<tbid>	PID_TRANSMIT_CHANGE_PPC_STATUS	PSCT	PPC Status Change Transmit Enable	See 3.1	O
<tbid>	PID_CYCLE_TIME_TRANSMIT_PPC_STATUS	TCTPS	PPC Status Transmit Cycle Time	See 3.3	O
<tbid>	PID_TRANSMIT_ENABLE_OAC_AT_END_OF_PP	ETOEP	Enable Transmit OAC at the end of PP	See 3.1	O

2.1.5.1 Property PID_VALUE_ACTUATING_CONTINUOUS

CAV

Unit: %
 Range: 0 ... 100
 Default Value: -
 Communication Object/Parameter: C
 Input/Output: I
 R/W Rate: >> 10/day
 Description: This value is the positioning input value in percent. Percent

2.1.5.2 Property PID_OVERRIDE_MANUAL_ENABLE**MOE**

Unit	-
Range:	0,1
Default Value:	0
Communication Object/Parameter:	C
Input/Output:	I
R/W Rate	< 1/day
Description:	This object serves to switch over from automatic mode (0) to manual mode (1). In manual mode the input Manual Override Value MOV is used for positioning instead of the „Continuous Actuating Value“ CAV. See 3.1.

2.1.5.3 Property PID_OVERRIDE_VALUE_MANUAL**MOV**

Unit	%
Range:	0 .. 100
Default Value:	-
Communication Object/Parameter:	C
Input/Output:	I
R/W Rate	< 1/day
Description:	If the Manual Override Enable is set (MOE = 1) the „Manual Override Value“ MOV is used for positioning instead of the „Continuous Actuating Value“ CAV.

2.1.5.4 Property PID_POSITION_FORCED_ENABLE**FPE**

Unit:	-
Range:	0,1
Default Value:	0
Communication Object/Parameter:	C
Input/Output:	I
R/W Rate	<1/day
Description:	This communication object is used to switch the output to a pre-programmed PWM-signal.

2.1.5.5 Property PID_COMMAND_ON_OFF**OAC**

Unit:	-
Range:	0,1
Default Value:	free
Communication Object/Parameter:	C
Input/Output:	O
R/W Rate	>> 10/day
Description:	This output signal is a pulse width modulated On/Off command.

2.1.5.6 Property PID_STATUS_PPC**PPCS**

Unit:	-
Range:	coding see 3.2
Default Value:	-
Communication Object/Parameter:	C
Input/Output:	O
R/W Rate	>> 10/day
Description:	PPC status (coding: see 3.2) is an optional communication object which is read only.

2.1.5.7 Property PID_PERIOD_PWM**PP**

Unit:	min
Range:	min. 1 ... 10
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<1/day
Description:	This parameter defines the PWM period. This is the ON-time of the output signal OAC which corresponds to a 100 % actuating value.

2.1.5.8 Property PID_POSITION_VALVE_DEENERGIZED**PDV**

Unit:	-
Range:	0,1
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter defines the direction of control action of the connected valve positioner. The parameter must be set to „0“ if the valve is deenergized closed. It must be set to „1“ if the valve is deenergized open.

2.1.5.9 Property PID_VALUE_ACTUATING_MINIMUM**MINAV**

Unit:	%
Range:	min 0 ... 50
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	If the actuating value is less than MINAV the connected valve shall remain closed. This parameter is used to reduce the number of cycles and so to increase the lifetime of the valve positioner.

2.1.5.10 Property PID_VALUE_ACTUATING_MAXIMUM**MAXAV**

Unit:	%
Range:	min 51 ... 100
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	If the actuating value is greater than MAXAV the connected valve shall remain open. This parameter is used to reduce the number of cycles and so to increase the lifetime of the valve positioner.

2.1.5.11 Property PID_PERIOD_TIMEOUT**TP**

Unit:	min
Range:	0; 1 ... 60
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter defines the time during which at least one actuating value must have been received; else AVT is used instead of CAV

2.1.5.12 Property PID_VALUE_ACTUATING_TIMEOUT**AVT**

Unit:	%
Range:	0 ... 100
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter is used as actuating value if no „Continuous Actuating Value“ CAV has been received during the timeout period.

2.1.5.13 Property PID_VALUE_POSITION_FORCED**FPV**

Unit:	%
Range:	0 ... 100
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter is used as actuating value if the „Forced Position Enable“ FPE object is set.

2.1.5.14 Property PID_TRANSMIT_CHANGE_PPC_STATUS**PSCT**

Unit:	-
Range:	0,1
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	This parameter defines whether the PPC status is transmitted on change or not.

2.1.5.15 Property PID_CYCLE_TIME_TRANSMIT_PPC_STATUS**TCTPS**

Unit:	min.
Range:	0; 15 ... 60
Default Value:	free
Communication Object/Parameter:	P
Input/Output:	R/W
R/W Rate	<< 1/day
Description:	The PPC Status will be transmitted cyclically after the given cycle time. It will not be transmitted cyclically if the cycle time is set to “0”.

2.1.5.16 Property PID_TRANSMIT_OAC_AT_END_OF_PP_ENABLE**ETOEP**

Unit: -.

Range: 0,1

Default Value: free

Communication Object/Parameter: P

Input/Output: R/W

R/W Rate << 1/day

Description: The parameter defines whether the ON/OFF Actuating Command is transmitted at the end of a „PWM Period“ PP at any rate or whether it is only transmitted on change.

(Explication: If the „Continuous Actuating Value“ CAV remains at 0 % or 100 % then OAC remains Off or On during the whole PWM period; so there will be no change at the end of a PWM period and no transmission of an new OAC. ETOEP enables the transmission of OAC at any rate.)

3 Datapoint Type(s)

3.1 Datapoint Type “Boolean”

Format:

1 bit

V

Encoding:

See below

Range:

V = {0,1}

Unit:

-

Datapoint Types

Code:	Symbol:	Encoding: V = 0	V = 1
1.003	FPE (Forced_position_enable)	disable	enable
1.003	MOE (Manual_override_enable)	disable	enable
1.009	PDV Position of deenergized valve	closed	open
1.003	TOVASC Transmit_on_change_enable	disable	enable
1.003	TPSC Transmit_on_change_enable	disable	enable

3.2 Datapoint Type "PPC Status"

<u>Format:</u>	1 octet		
	<div>0000DCBA</div>		
<u>Encoding:</u>	See below		
<u>Range:</u>	A ...H = {0,1}		
<u>Unit:</u>	-		
Datapoint Types			
<u>Code:</u>	<u>Symbol:</u>	<u>Encoding:</u>	
<td>	<td>	A : 0 = automatic; 1 = manual B: 0 = unforced position; 1 =forced position C: 1 = timeout actuating value active D: 1= malfunction of the valve positioner E:: 0 = closed/OFF 1 = not closed/ON(open)	

See TF 5.1.2 40-99 PPC-Status (clause 3.3).

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

<u>Format:</u>	1 octet			
	<div>VVVVVVVV</div>			
<u>Encoding:</u>	See below			
<u>Range:</u>	V = [0...255] binary encoded			
<u>Unit:</u>	See below			
Datapoint Types				
<u>Code:</u>	<u>Symbol:</u>	<u>Encoding:</u>	<u>Range:</u>	<u>Unit:</u>
<td>	<td>	"time"	1...255 0 = corresponding function disabled	1 min
<td>	<td>	„percent“	1..100 0 = corresponding function disabled	%