8 x Temperature SK08-T8 KNX-Sensor / Controller

SK08-T8

Aufputzmontage IP54/65

The SK08-T8 can be used to connect platinum measuring resistors PT1000, PT500 or PT100 of any design. It is not possible to mix the different measuring resistors.

Article description	Article number	Measuring resistor
SK08-T8	30801000	PT1000
SK08-T8-PT100	30801100	PT100
SK08-T8-PT500	30801500	PT500

> The temperature sensors are not included in the delivery.

Device Description

KNX sensor / 8-channel temperature controller for measuring and controlling up to eight temperatures.
the temperatures are measured with external temperature sensors (PT1000 / PT100 / PT500).
different types of sensors can be connected.
For indoor, outdoor and damp room use IP54/65

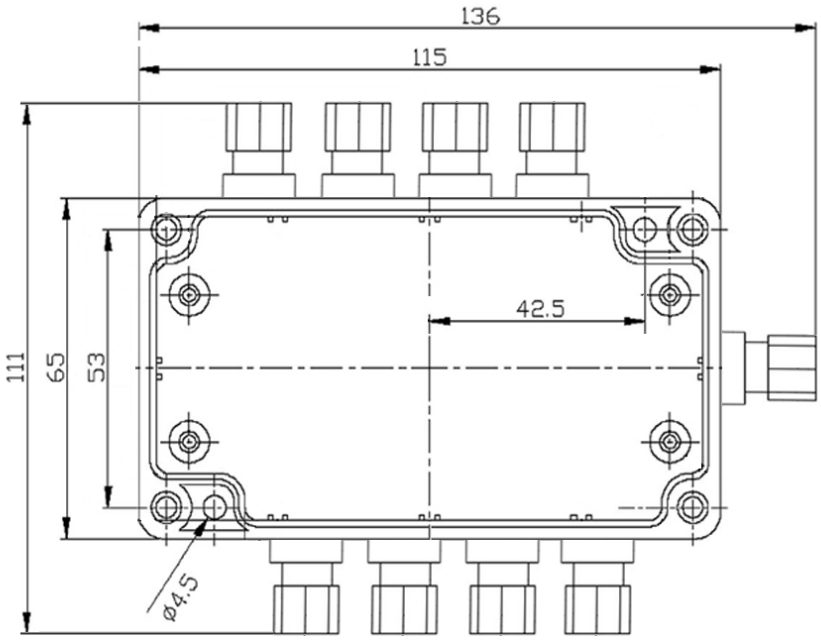
Applications

Monitoring and control of temperatures for heating/cooling purposes and for logging.

Technical Data

SK08-T8	
Supply voltage	KNX 21 .. 32V DC
KNX Last	10mA
Operating/storage temperature Bus coupler	-25 .. +80°C / -25 .. +80°C
Ambient humidity	0 .. 100% non-condensing
Dimensions	see diagram
ETS-application	Arc_S8.knxprod / S8-T8
Protection class Bus coupler	IP54/65
Sensor PTxxxx	
Measuring range depending on the measuring resistance	-50 .. +400°C
resolution	± 0,01°C
accuracy	± 0,3°C

Dimensions



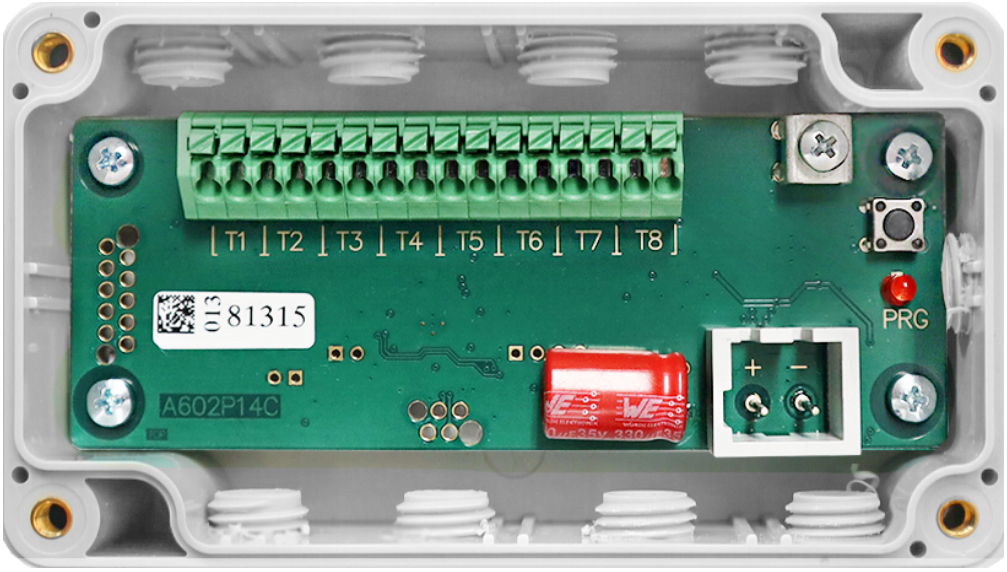
Commissioning

Connect the temperature sensors to terminals T1 to T8.
When using fewer than 8 temperature sensors, no order needs to be observed.
Any inputs can be used.

In cases where irradiation can distort the measured values, shielded cables must be used. There is a connection option on the circuit board for the shielding.

ETS Application: S8-T8

Inside view



Measured Value Adjustment For Long Sensor Cables

With long sensor cables, the measured values can be distorted by the cable resistance. This measurement error can be corrected with the parameter **"Measurement value shift"** in the parameter field **"Measurement value"** The resistance of the cable is required for this.

Resistance change of the various PTx sensors

Typ measuring resistance	resolution
PT1000	3,85 Ω / °C
PT100	0,385 Ω / °C
PT500	1,925 Ω / °C

Calculation Of The Line Resistance For The Correction Value

Formulas	Description
$\rho = \frac{R \cdot A}{l}$ $R = \rho \cdot \frac{l}{A}$	**ρ** specific resistance [Ω•mm²⁄m] (material constant) **l** length [m] (line length, forward and return line) **A** Cross section [mm²] (Cable cross section) **R** Resistance [Ω] (line-resistance)

Exampel PT1000:

Cable length = 15m ; Cross section 0,25 mm² ; ρ_{copper} = 0,017 Ω•mm²⁄m

l 15m•2 = 30m
A = 0,25 mm²
ρ = 0,017 Ω•mm²⁄m **Result: R = 2,04 Ω**

This resistance value would cause a temperature error of **+0.53°C**.
This results in a correction value of **-53°C**

In cases where irradiation could distort the measured values, shielded cables must be used.
A connection for the shielding is provided on the circuit board.

> Limit value settings and controller functions can only be set in a temperature range of -50 .. 200°C. If actual temperatures above 200°C are to be used for limit values and control functions, the measured value shift must be adjusted with a negative value in the "Measured value" parameter field. It should be noted that the value output on the bus corresponds to the measured value including the measured value shift.

In Case of Bus Voltage Recurrence

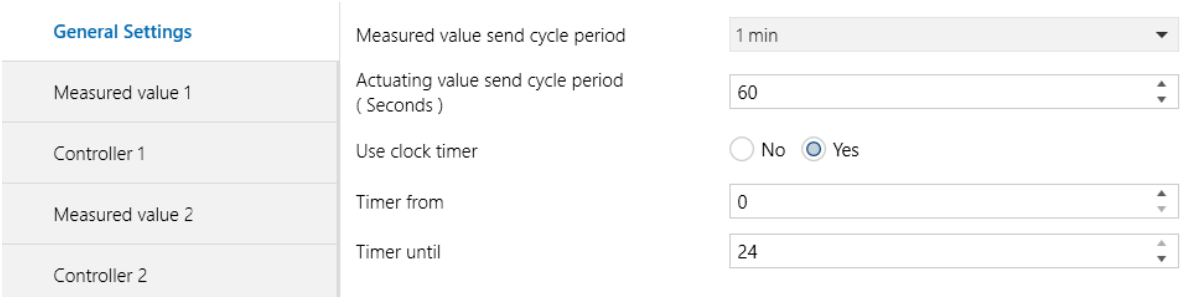
All changes made via the KNX bus are retained if the device has been parameterized accordingly. The measurement and controller values start with their current values (for PI controllers with an integral component of 0). The ETS parameter settings are retained.

Discharge Program and Reset Sensor

To delete the programming (project planning) or to reset the module to the delivery status, it must be disconnected from the power supply (disconnect the KNX bus voltage). Now press and hold the programming button while reconnecting the KNX bus voltage and wait until the programming LED lights up (approx. 1-2 seconds). Now you can release the programming button again and the module is ready for a new configuration.
If you release the programming button too early, repeat the procedure.

ETS Settings

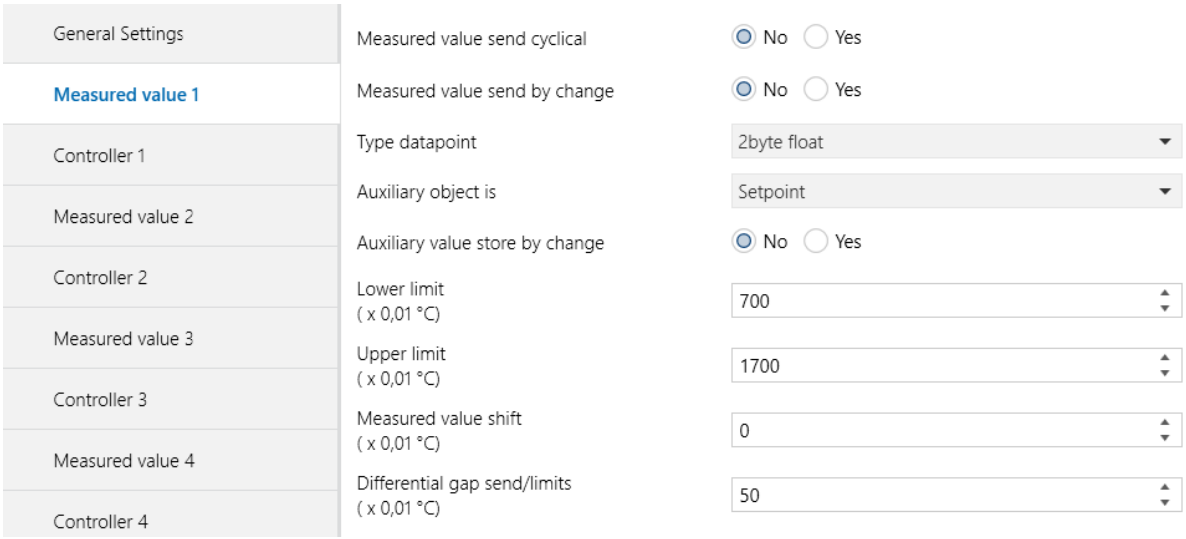
General Settings



Parameter	Setting
Period measurement value send cyclically	1 .. 120 minutes
Period manipulated variable send cyclically	10 .. 250 seconds
use timer	No / Yes
timer from	0 .. 24 o'clock
timer to	0 .. 24 o'clock

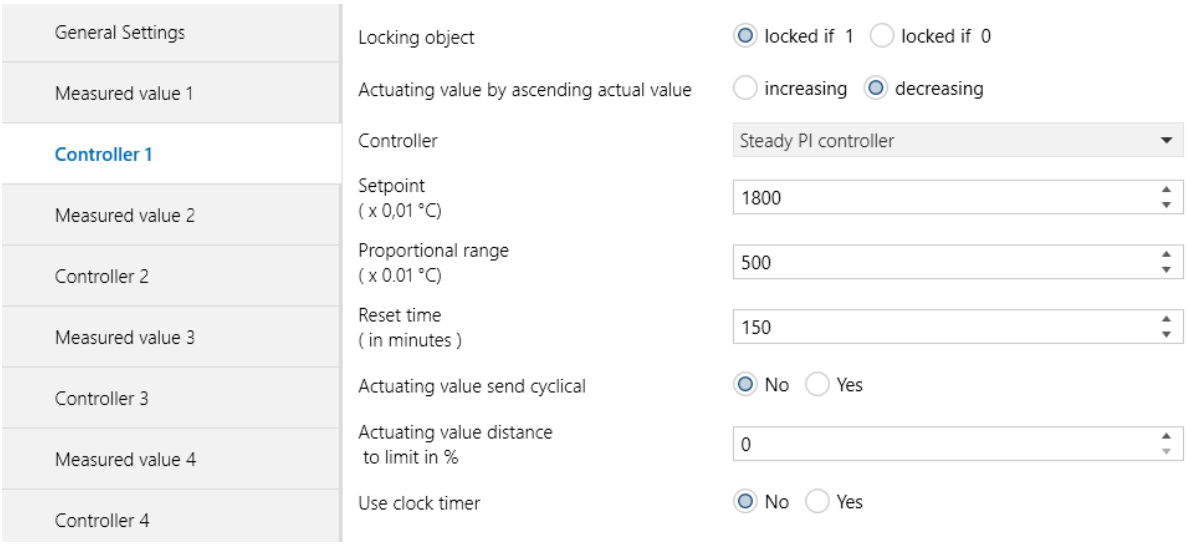
If the timer is used, the controls are active in the times between
"timer from" and **"timer to"**.
It is necessary that the parameter **"use timer"** is activated in the parameter field **"Controller"**.

Measured value



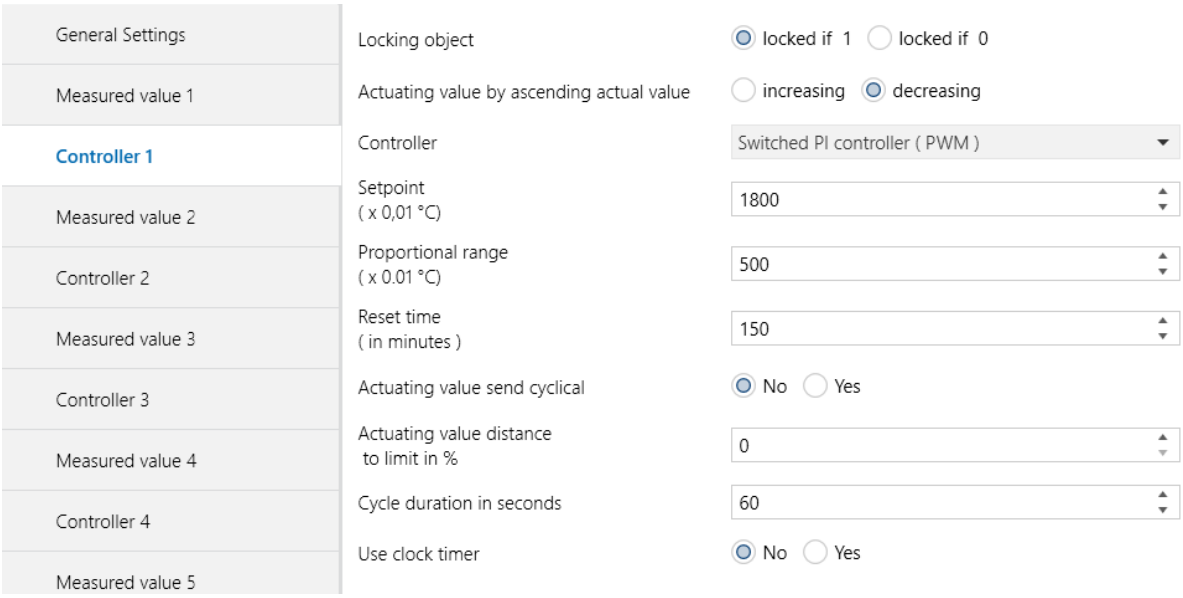
Parameter measured value	Setting /Description
Send measured value cyclically	No / Yes
Measured value send if changes	No / Yes
Value type	KNX data type for measured value
Auxiliary size is	- Setpoint - Lower limit - upper limit parameter that can be changed via the auxiliary size object.
lower limit (x 0,01°C)	-9999 .. 19999 If the measured value falls below this limit, the object "lower Limit" is set. Note possible changes due to auxiliary size.
upper limit (x 0,01°C)	-9999 .. 19999 If the measured value exceeds this limit, the "Upper Limit" object is set. Note possible changes due to auxiliary size.
Measuring value shift (x 0,01°C)	-32768 .. 32767
switching difference send/Limits (x 0,01°C)	-32768 .. 32767 Is symmetrically above the limit values as hysteresis.

Continuous PI controller



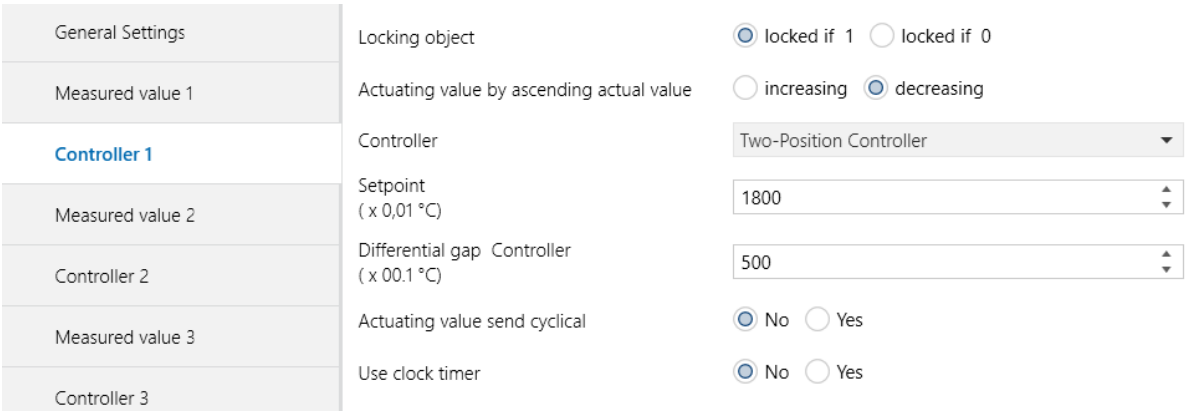
Parameters Continuous PI controller	**Settings / Description**
Lock object	1 / 0 Locks the controller at "1" or "0"
Controlled variable with increasing actual value	rising / falling Direction of control
Controller	Selection type of Controller
Setpoint (x 0,01°C)	-9999 .. 19999 Note possible changes due to auxiliary size.
Proportional band (x 0,01°C)	-9999 .. 19999
reset time (in minutes)	0 .. 250
Send controller value periodically	No / Yes
Controlling variable limit distance in %	0 .. 50
use timer	No / Yes Time setting is done in the parameter field**"General settings"**

Switched PI controller (PWM)



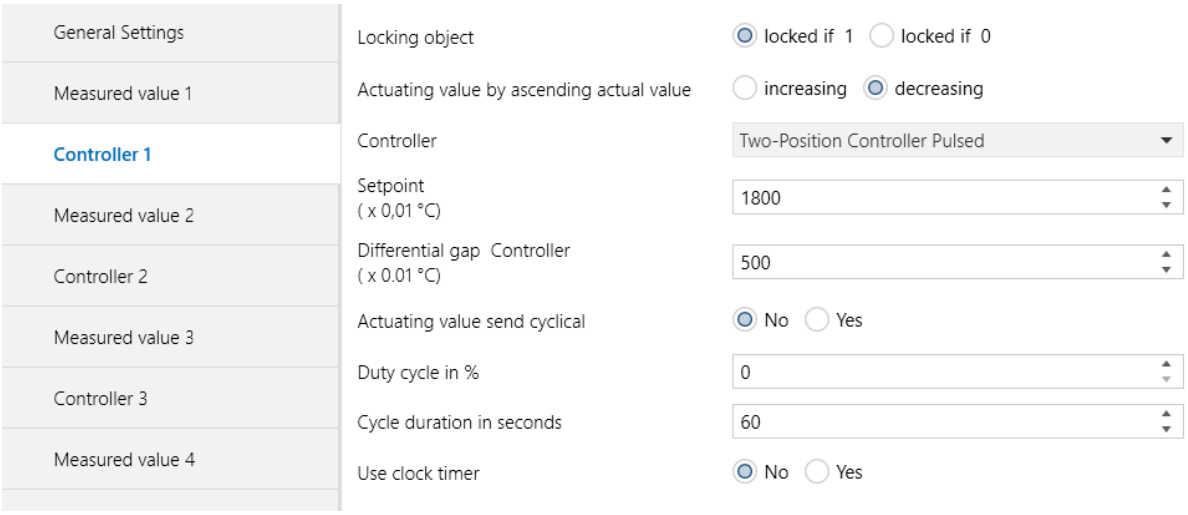
Parameters Switched PI controller (PWM)	Settings / Description
Lock object	1 / 0 locks the controller at "1" oder "0"
Controlled variable with increasing actual value	rising / falling Direction of control
Controller	Selection type of Controller
Setpoint (x 0,01°C)	-9999 .. 19999 Note possible changes due to auxiliary size.
Proportional band (x 0,01°C)	-9999 .. 19999
reset time (in minutes)	0 .. 250
Send controller value periodically	No / Yes
Controlling variable limit distance in %	0 .. 50
Period duration in seconds	0 .. 65535
use timer	No / Yes Time setting is done in the parameter field "General settings"

Two-Point Controller



Parameters Two-Point Controller	Settings / Description
Lock objekt	1 / 0 locks the controller at "1" or "0"
Controlled variable with increasing actual value	rising / falling Direction of control
Controller	Selection type of Controller
Setpoint (x 0,01°C)	-9999 .. 19999 Note possible changes due to auxiliary size.
Proportional band (x 0,01°C)	-9999 .. 19999 The switching point hysteresis is symmetrical above the setpoint.
Send controller value periodically	No / Yes
use timer	No / Yes Time setting is done in the parameter field "General settings"

Two-point controller with pulsed output



Parameters Two-point controller with pulsed output	**Settings / Description**
Lock objekt	1 / 0 locks the controller at "1" or "0"
Controlled variable with increasing actual value	rising / falling Direction of control
Controller	Selection type of Controller
Setpoint (x 0,01°C)	-9999 .. 19999 Note possible changes due to auxiliary size.
Proportional band (x 0,01°C)	-9999 .. 19999 The switching point hysteresis is symmetrical above the setpoint.
Send controller value periodically	No / Yes
Touch ratio in %	0 .. 50
Period duration in seconds	0 .. 65535
use timer	No / Yes Time setting is done in the parameter field "General settings"

Status objects

The object "Sensor Status Short Circuit" is a 4-byte data type.
Only the 8 bits of the lower byte are required for short circuit detection.

channel	Bit-Nr.	Hexadecimal	Decimal
1	0	$01	1
2	1	$02	2
3	2	$04	4
4	3	$08	8
5	4	$10	16
6	5	$20	32
7	6	$40	64
8	7	$80	128

The values of the individual bits are added and output on the bus.

The "Sensor Status Interrupt" object is no longer used.

The object "Object Status K1-K8" is used to monitor channel states.

Meaning	Bit-Nr.	Hexadecimal	Decimal
Upper limit exceeded	0	$01	1
Lower limit exceeded	1	$02	2
Control variable not equal to ZERO	2	$04	4
Lock active	3	$08	8
Auxiliary size is saved	4	$10	16
timer active	5	$20	32

Notes

Measured values above 200°C

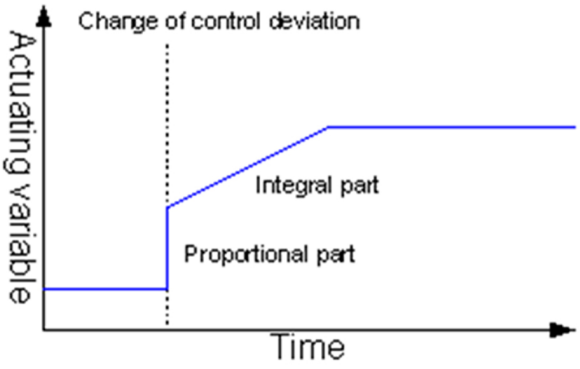
> Limit value settings and controller functions can only be set in a temperature range of -50 .. 200°C. If actual temperatures above 200°C are to be used for limit values and control functions, the measured value shift must be adjusted with a negative value in the "Measured value" parameter field. It should be noted that the value output on the bus corresponds to the measured value including the measured value shift.

Controller

The control can be carried out via PI or two-point control, also with pulsed outputs. The pulsed two-point controller operates with a constant duty cycle, which is fixedly parameterized as is the period duration. The duty cycle of the pulsed PI controller is variable and depends on the manipulated variable
(Pulse width modulation). The controller calculates the control variable to be output every second. SIt can always be read out in real time and is output cyclically by the continuous PI controller (Value can be parameterized). The integral component regulates a control deviation to 0 over time.

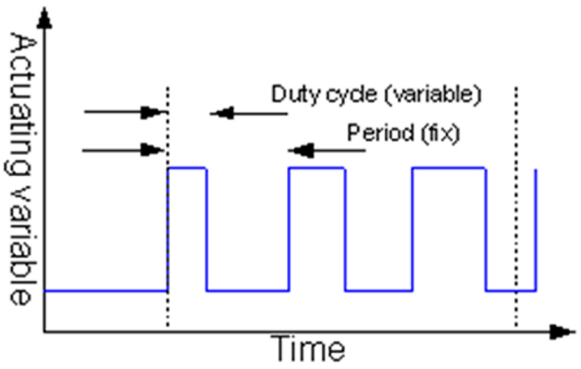
Continuous PI control

A PI control is an algorithm that consists of a proportional and an integral component. By combining these two components, a fast yet accurate adjustment of the manipulated variable can be achieved.



Switched PI controller (PWM)

The control is analogous to the PI controller. The manipulated variable is output in pulsed form. In PWM control, the parameterized period duration determines the transmission interval. This results in a permanent switching on and off within the period, whereby a constant valve position is achieved on average. The touch ratio is determined indirectly via the reset time (integration time).



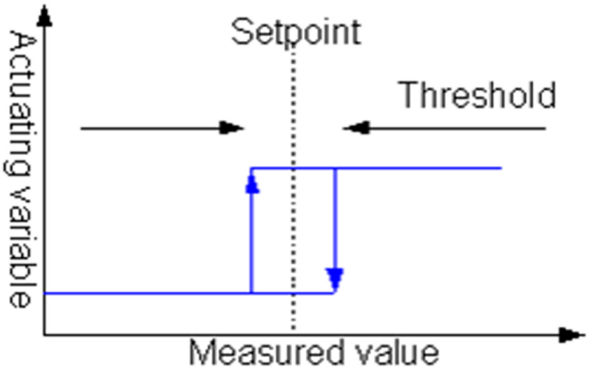
General rules for setting the PI parameters

The reset time must be significantly greater than the time constant of the controlled system.
The proportional band corresponds to the gain of the control loop.
The smaller the proportional band, the greater the gain.

Parameter specification	**Effect**
lower proportional band	Quick adjustment to the setpoint Large overshoot during setpoint compensation (possibly also continuous oscillation)
high proportional band	Slow correction of the control deviation No or little overshoot
short reset time (Integration time)	Fast correction of control deviations Danger of continuous vibrations
long reset time (Integration time)	Slow correction of control deviations Low risk of over- or continuous vibrations

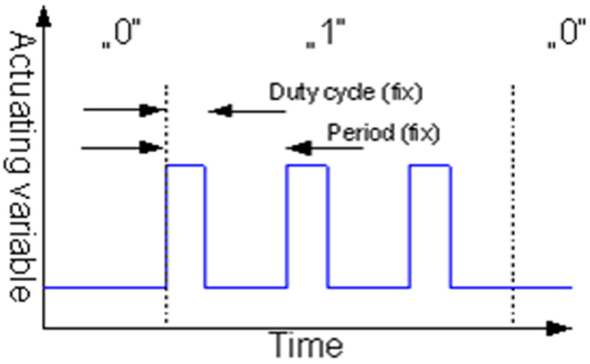
Two-point controller

The two-point control is a very simple type of control. As soon as the actual value deviates from the setpoint (± half the switching difference), a switch-on or switch-off object is sent to the bus. Make the switching differential large enough to keep the bus load low. Configure the switching differential small enough to avoid extreme actual value fluctuations. The two-point controller is parameterized via the setpoint and the switching differential.



Two-point controller with pulsed output

The control is analogous to the two-point controller. The manipulated variable is output in pulsed form. With a duty cycle of 40% and a period of 10 minutes, the object is repeatedly switched on for 4 minutes and off for 6 minutes.



Imprint

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Manufacturer

Arcus-EDS GmbH
Rigaer Str. 88
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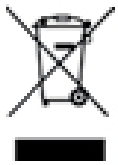

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