

# TEMPERATURE CONTROLLER WITH SERVMOTOR DRIVE OUTPUT

1/8 DIN - 48 x 96  
KX6E model

Quick Guide • ISTR-FKX6EENG00



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## DECLARATION OF CONFORMITY AND MANUAL RETRIEVAL

KX6E is a panel mounting, Class II instrument. It has been designed with compliance to the European Directives. All information about the controller use can be found in the Engineering Manual: ISTR-MKX6E-ENG0x ("x" is the revision). The Declaration of Conformity and the manual of the controller can be downloaded (free of charge) from the web-site:

[www.ascontecnologic.com](http://www.ascontecnologic.com)

Once connected to the web-site, search:

**KX6E**

then click on **KX6E**.

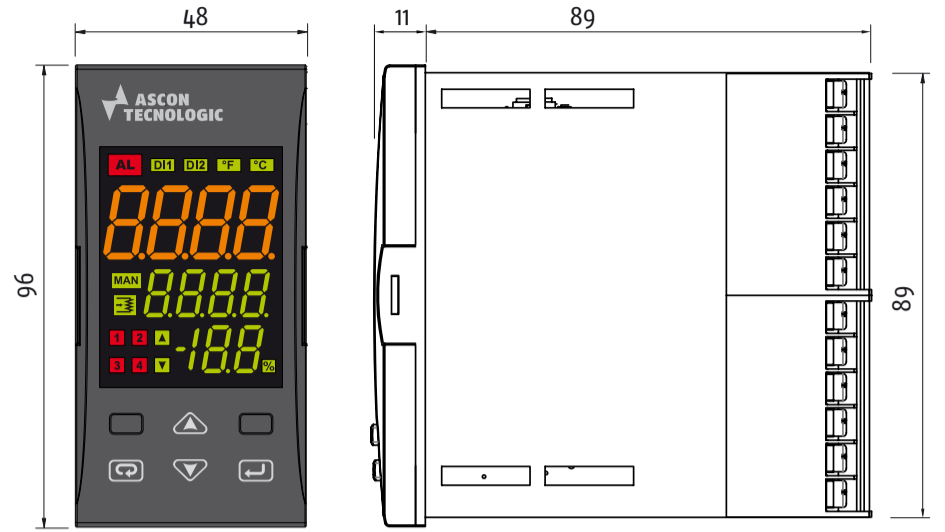
In the lower part of the product page (in any language) is present the download area with links to the documents available for the controller (in the available languages).

### Warning!

- Whenever a failure or a malfunction of the device may cause dangerous situations for persons, things or animals, please remember that the plant must be equipped with additional devices which will guarantee safety.
- We warrant that the products will be free from defects in material and workmanship for 18 months from the date of delivery. Products and components that are subject to wear due to conditions of use, service life and misuse are not covered by this warranty.

## DIMENSIONS

Overall dimensions (W x H x D): 48 x 96 x 75.9 mm  
(1.89 x 3.78 x 2.99 in.)  
Panel Cut-out (W x H): 45+0.6 x 89+0.6 mm  
(1.78+0.023 x 3.50+0.023 in.)



## MODEL CODE

The Hardware resources are identified by the following Model Code.

Model: **KX 6E A B C D E F G**

Line	KX	6E
<b>Power Supply</b>	A	H
100... 240Vac (-15... +10%)		
<b>Analogue Input</b>	B	
TC, mA + Digital Input 1		
<b>Output OP1 and OP2</b>	C	D
Output 1 + Output 2: Servomotor relays SPST 2 A (resistive load)		
<b>Output OP3</b>	E	
Relay (SPST NO, 2 A/250 Vac)		

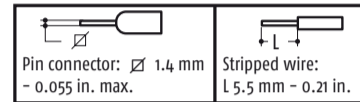
<b>Output OP4</b>	F
Relay (SPST NO, 2 A/250 Vac)	
<b>Options (a TTL Modbus port is always present)</b>	G
No options	-
Potentiometer input + Digital Input 2 + RS 485 Modbus	C
Potentiometer input + Isolated Digital Input 2	P
RS485 Modbus	S

Model Code example: **KX6E HBMRRP**

Controller KX6E, 100... 240 Vac, mA + Digital Input 1, 2 Relay Outputs for Servomotor Control, Potentiometer + Digital Input 2.

## ELECTRICAL CONNECTIONS

### Terminals

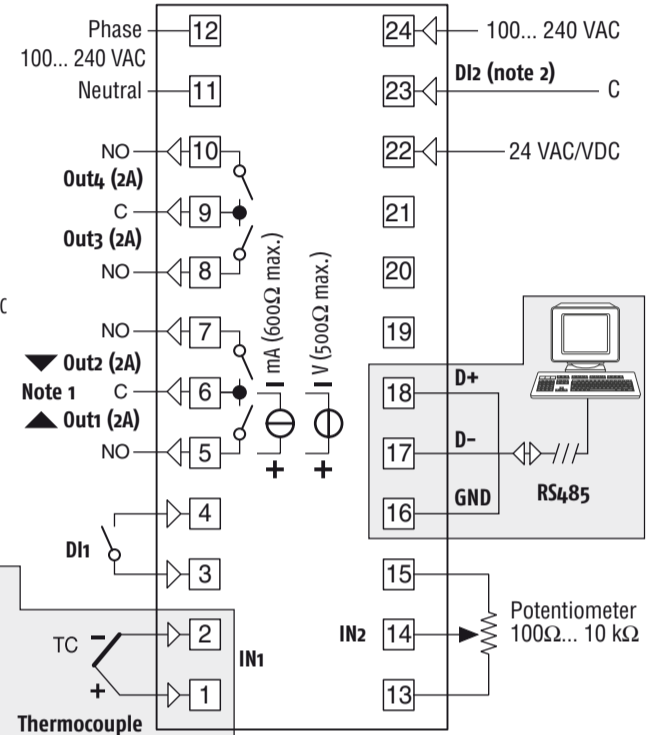


- Notes:**
1. Output OP1 controls the valve opening; Output OP2 controls the valve closing.
  2. The isolated Di2 Digital Input can be:
    - Low level input driven by a 24 VAC/DC applied to terminals 22 and 23;
    - High level input driven by a 100... 240 VAC applied to terminals 23 and 24.

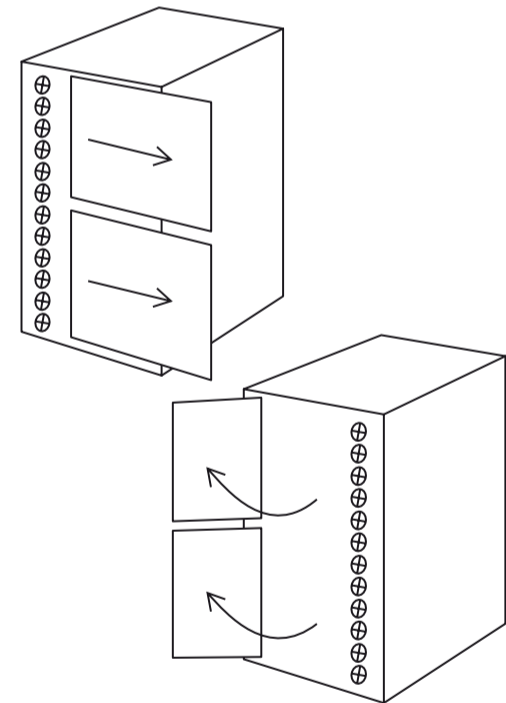
### Warning!

The isolated Di2 Digital Input must be used in only one of the two available connections:

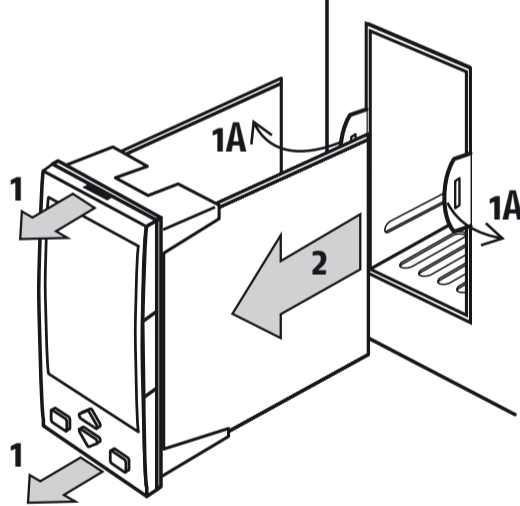
- Low Level input (24 VDC/AC);
- High Level input (100... 240 VAC).



## TERMINALS PROTECTION FLAPS



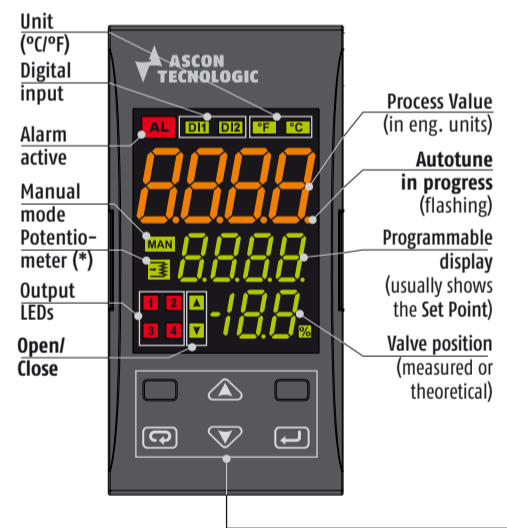
## FRONT REMOVABLE



### Extraction procedure

- 1, 1A: Pulling the controller from the upper and lower sides, carefully open in sequence the 2 retainers;
- 2: Extract the controller module from the external housing.

## DISPLAY AND KEYS



**(\*) Warning**  
This LED flashes when the controller detects a potentiometer failure

Operator Mode	Editing Mode
Access to: - Operator Commands (Setpoint selection ...) - Parameters - Configuration	Confirm and go to Next parameter
Access to: - Operator additional information (Output value)	Increase the displayed value or select the next element
Access to: - Set Point modification	Decrease the displayed value or select the previous element
Start the programmed function (Auto/Man ...)	Exit from Operator commands/Parameter setting/Configuration

## Potentiometer self calibration with servomotor time auto-learning function

This function does not require the operator supervision, after it has been started by the keyboard, the rest of the operations are automatic. From the parameters select, using the **▲** and **▼** keys the **P<sub>cRL</sub>** Automatic potentiometer calibration parameter.

Press the **▲** and **▼** keys to set the parameter to YES.

The **▶** key starts the "Potentiometer self-calibration function with servomotor time auto-learning".

The calibration process is illustrated in the drawing on the right.

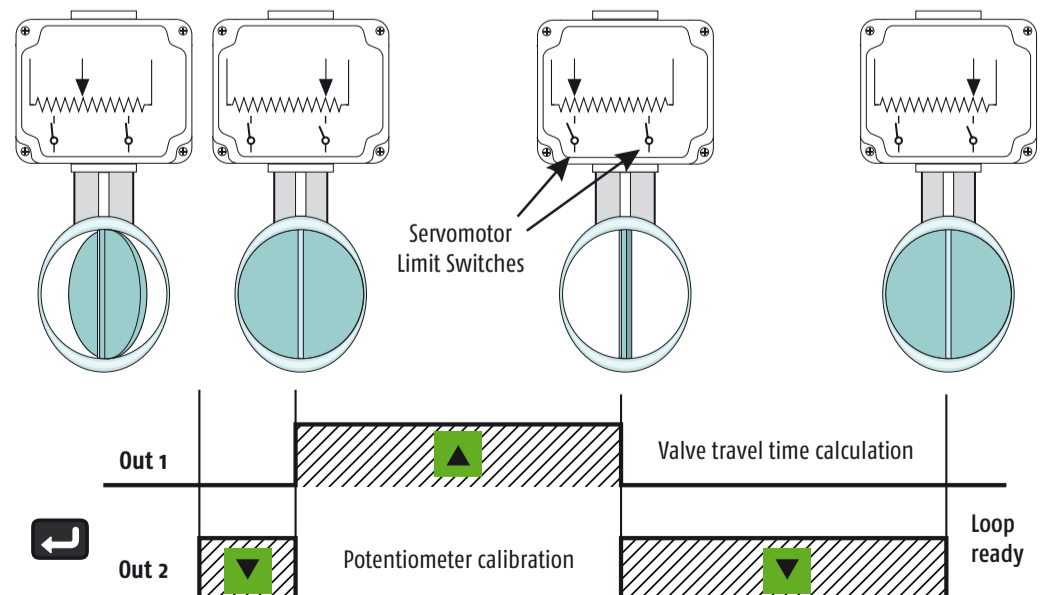
At the end of the automatic potentiometer calibration the instrument moves the valve to zero and shows one of the following messages:

Value shown	Description
<i>done</i>	Calibration successfully ended, the potentiometer has been calibrated and the valve stroke time has been written in the <b>St<sub>rL</sub></b> (Stroke time) parameter
<i>EP<sub>r</sub>E</i>	Potentiometer reversed
<i>noPt</i>	No potentiometer
<i>EP<sub>c</sub>R</i>	Potentiometer calibration error

The indication disappears when the **▶** button is pressed (the instrument returns to the **P<sub>cRL</sub>** parameter).

In case of errors, execute the necessary actions and restart the calibration procedure:

Value shown	Correction action
<i>EP<sub>r</sub>E</i>	Potentiometer reversed. The connection of the potentiometer terminals, must be inverted (terminals 13 and 15), then run the potentiometer calibration again.
<i>noPt</i>	No potentiometer. In case the potentiometer is present, carefully control the potentiometer cables and connections (terminals 13, 14 and 15), then run the potentiometer calibration again. If the problem persists, the potentiometer can be out of range (less than 100 Ω or more than 10 kΩ) or damaged.
<i>EP<sub>c</sub>R</i>	Potentiometer calibration error. The limit switches of the servomotor are set too close. Correct the position of the servomotor limit switches, then run the potentiometer calibration again



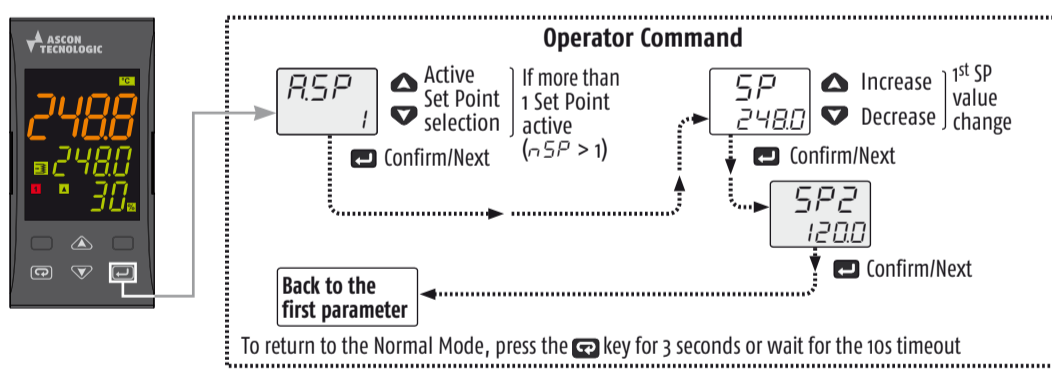
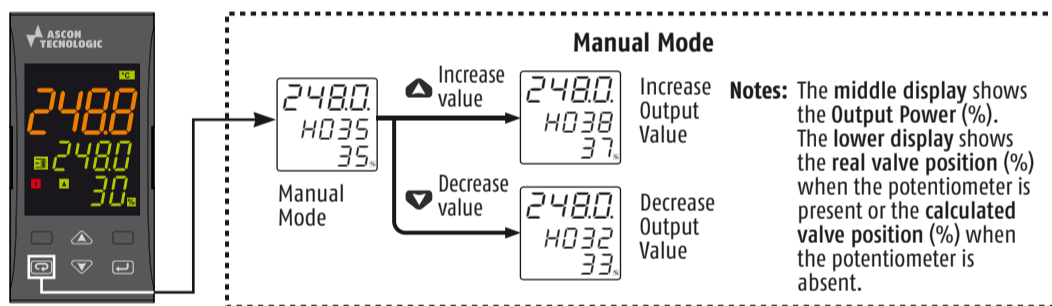
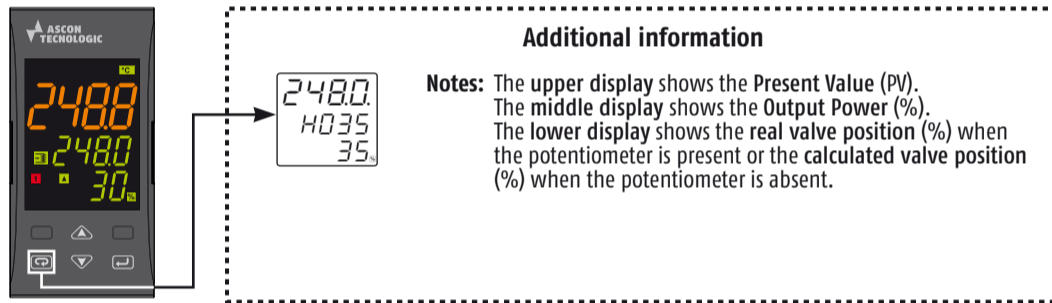
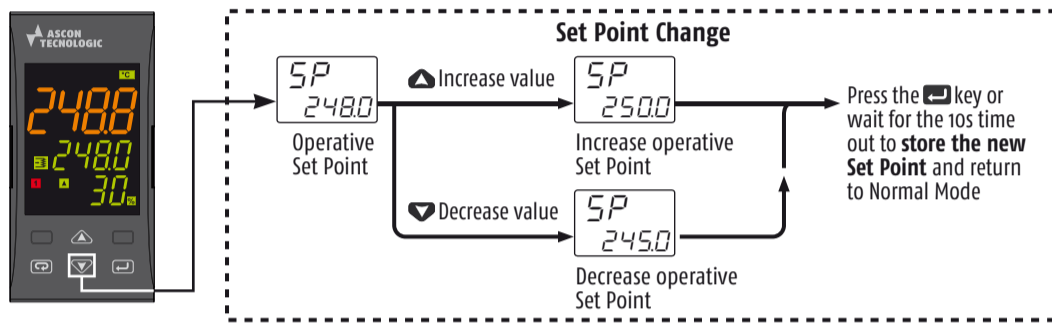
## PARAMETERS SETTING



Parameters setting	
	Confirm and go to Next parameter
	Increase the displayed value or select the next item in the list
	Decrease the displayed value or select the previous item in the list

To exit the parameter setting procedure press the key (for 3 s) or wait until the timeout expiration (about 30 seconds).

## CONTROLLER OPERATION



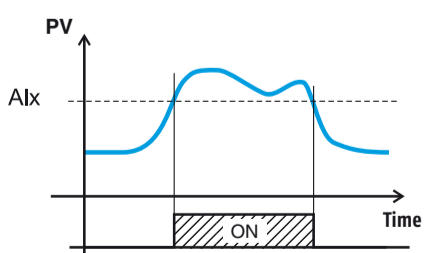
## Parameters List (PASS: 20) (in gray the parameters related to optional features)

Group	Param.	Description	Range value or selection list elements	Default	User value	Note
Commands	<i>oPEr</i>	Operative mode selection	Auto = Auto mode; oPlo = Manual mode.	Auto		
	<i>tunE</i>	Autotuning manual start	oFF = Not active; on = Active	oFF		
Control	<i>Pb</i>	Proportional band	1... 9999 (E.U.)	50		
	<i>tI</i>	Integral time	From 0 (oFF) to 9999 (s)	200		
	<i>tD</i>	Derivative time	From 0 (oFF) to 9999 (s)	oFF		
	<i>dbS</i>	Servomotor dead band	0... 100%	50		
Alarms	<i>RL 1</i>	AL1 threshold	-1999... 9999	0		
	<i>HRL 1</i>	AL1 hysteresis	1... 9999 (E.U.)	1		
	<i>RL 1t</i>	Alarm 1 type	nonE = Alarm not used; LoAb = Absolute low alarm; HiAb = Absolute high alarm; LHAo = Window alarm in alarm outside the window; LHAi = Window alarm in alarm inside the window; SE.br = Sensor Break; LodE = Deviation low alarm (relative); HidE = Deviation high alarm (relative); LHdo = Relative band alarm in alarm out of the band; LHdi = Relative band alarm in alarm inside the band.	Hi.Ab		
	<i>RL 2</i>	AL2 threshold	-1999... 9999	0		
	<i>HRL 2</i>	AL2 hysteresis	1... 9999 (E.U.)	1		
	<i>RL 2t</i>	Alarm 2 type	nonE = Alarm not used; LoAb = Absolute low alarm; HiAb = Absolute high alarm; LHAo = Window alarm in alarm outside the window; LHAi = Window alarm in alarm inside the window; SE.br = Sensor Break; LodE = Deviation low alarm (relative); HidE = Deviation high alarm (relative); LHdo = Relative band alarm in alarm out of the band; LHdi = Relative band alarm in alarm inside the band.	Hi.dE		
Set Point	<i>RSP</i>	Active set point selection	From 1 (SP 1) to nSP	1		
	<i>SP</i>	Set point 1	From SPLL to SPLH	0		
	<i>SP 2</i>	Set point 2	From SPLL to SPLH	0		
	<i>SPLL</i>	Minimum set point value	From -1999 to SPHL	-1999		
	<i>SPHL</i>	Maximum set point value	From SPLL to 9999	9999		
	<i>nSP</i>	Number of used set points	1... 4	2		
Configuration	<i>POt</i>	Potentiometer enabling	nonE = Potentiometer not used; pot.o = Potentiometer used for indication.	Pot.o		
	<i>PcAL</i>	Automatic potentiometer calibration	no = Potentiometer calibration disabled; YES = Potentiometer calibration enabled.	no		
	<i>St.rE</i>	Servomotor stroke time	5... 300 seconds	60		
	<i>SEnS</i>	Input type	J = TC J (0... 1000°C/32... 1832°F); crAL = TC K (0... 1370°C/32... 2498°F); S = TC S (0... 1760°C/32... 3200°F); r = TC R (0... 1760°C/32... 3200°F); t = TC T (0... 400°C/32... 752°F); 0.20 = 0... 20 mA; 4.20 = 4... 20 mA.	J		
	<i>dP</i>	Decimal Point Position	0... 3	0		
	<i>SSC</i>	Initial Scale Value	-1999... 9999	0		
	<i>FSC</i>	Full Scale Value	-1999... 9999	1000		
	<i>unIt</i>	Engineering unit	°C / °F	°C		
	<i>oPE</i>	Safety output value	-100... 100 (% of the output)	0		
	<i>dIF 1</i>	Digital Input 1 function	oFF = Not used; 1 = Alarm reset; 2 = Alarm acknowledge (ACK); 3 = Hold of the measured value; 4 = Reserved; 5 = Manual mode;	oFF		
<i>dIF 2</i>	Digital Input 2 function	6 = HEAT with SP1 and Cool with SP2; 7 = SP1 - SP2 selection.	oFF			
<i>uSrb</i>	button function during RUN TIME	nonE = No function; tunE = Auto-tune/self-tune enabling; oPlo = Manual mode; AAc = Alarm reset; ASi = Alarm acknowledge; St.by = Reserved; SP1.2 = SP1/SP2 selection.	oPlo			
<i>PRs2</i>	Level 2 password (limited access level)	- oFF (Level 2 not protected by password); - 1... 200.	20			

Complete Configuration and Parameter setting can be easily uploaded from the controller and downloaded to other controllers using the: **Configuration Key and Communication Adapter model: A-01.**

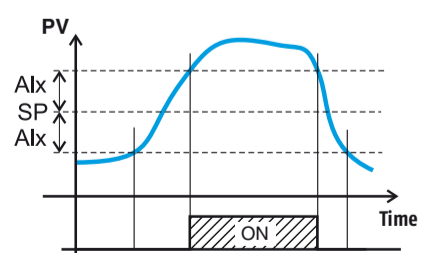
## Alarm Types

### Absolute Alarm



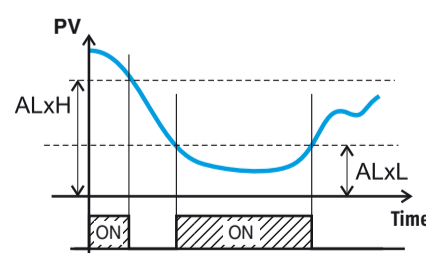
When Absolute High is selected

### Deviation Alarm



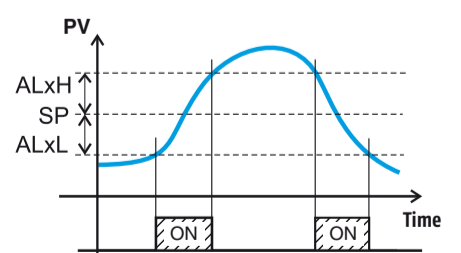
When Deviation High is selected

### Absolute High-Low Alarm

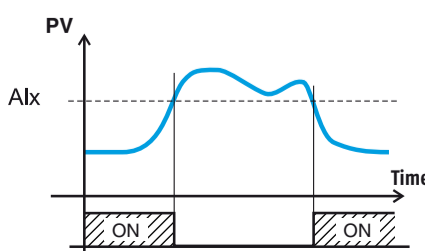


When Absolute External is selected

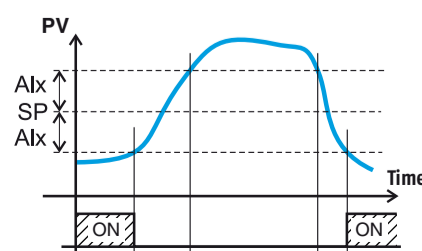
### Band Alarm



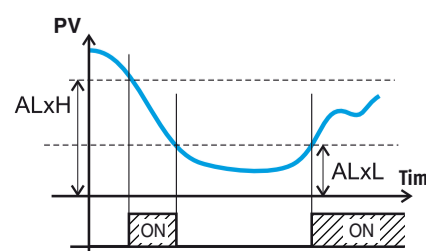
When Internal Band is selected



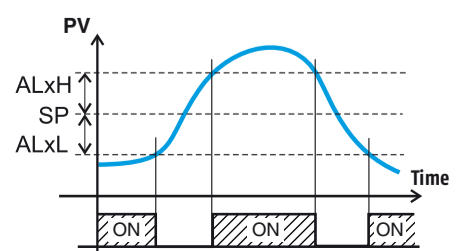
When Absolute Low is selected



When Deviation Low is selected



When Absolute Internal is selected



When External Band is selected