



Switch devices and housing for HEP Sensilevel level controls

Description

SENSILEVEL switch devices consist of an AISI 304 stainless steel frame, equipped with a lever, on whose end is mounted a permanent magnet which provides the required energy to operate the switch. Switch devices can be fitted with electric switches (only one switch with SPDT function, or two switches simultaneously operated with DPDT function) or with a pneumatic shutoff device (3-port valve). Switch devices are fitted in special housing, available in standard and explosion-proof version and various protection degrees (see pag. 4).

The widespread use of stainless steel and careful selection of insulating materials for cables and terminal block, make the switch devices also suitable for tropical environment.

As the temperature inside the housing is influenced by the process fluid, there are specific limits for switches use; the table below shows the maximum design temperatures for process fluid, for various types of switches, in different configurations of level switches.

Switch devices operating limits

Description		Maximum temperature of the process fluid ⁽¹⁾		Pressure and maximum temperature of saturated steam ⁽²⁾	
		Standard	Cooling extension	Standard	Cooling extension
Type 2 e Type 4 Standard microswitch	- Normal - dc - Gold plated contacts	250° C	400°C*	4 bar 150°C	4 bar 150°C
	- High temperature	540°C	-	16 bar 203°C	46 bar 260°C
Type 3 Hermetically sealed microswitch	- Standard - Gold plated contacts	400°C	540°C	16 bar 203°C	46 bar (260°C) 400°C
	- High temperature	540°C	-	-	-
Type 5 Pneumatic	- Nylon fittings	120°C	300°C	-	-
	- Stainless steel fittings	400°C	540°C	16 bar 203°C	46 bar (260°C) 400°C

Note: ⁽¹⁾ Processes in which the liquid is overhanged by not condensable gas

⁽²⁾ In parentheses, the temperature of the saturated steam pressure indicated

(*) 540°C for special realization

Electric switch devices - Type 2, Type 3 and Type 4 with dry foil contacts (microswitches)

Type 2 - Standard microswitches - "BZ" Series

This device is interchangeable with Type 1. It is fitted with standard microswitches ("BZ" series). In addition to standard type, the following switches for special uses are available:

- for dc
- gold plated contacts
- for high temperature

Both standard microswitch and gold-plated contacts are available in waterproof implementation.

For applications requiring interventions at multiple levels, it's possible to employ up to 3 switch devices SPDT, or up to 2 DPDT, one on the other housed into the usual housing.

Type 3 - Hermetically sealed microswitches - "HM" Series

This switching device has the same features of Type 2, and additionally is fitted with hermetically sealed microswitches with inert gas contacts. These microswitches are also available for high temperature and gold-plated.

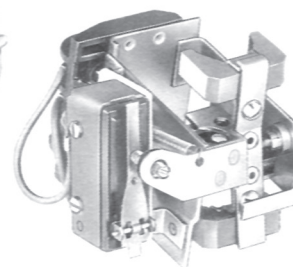
Type 4 - Antivibration

Type 4 device utilizes the same microswitches of Type 2, but in addition is fitted with a special double-magnet lever system that guarantees a particularly steady anchorage in both working positions. This is the most suitable model in case of utilize in nuclear plants or on board of ships.

In SPDT or DPDT versions, the Type 4 device is only suitable for single-stage applications.



Type 2 (SPDT)



Type 4 (SPDT)

Microswitches electric features

Description		Duty	ac			dc		
			120V	240V	380V	30V	120V	240V
Type 2 and Type 4	Standard	Resistive (A)	15	15	15	6	0.4	0.2
		Inductive (A)	3.8	2.9	-	5	0.05	0.03
		Motor (W)	100	200	-	-	-	-
	dc	Resistive (A)	10	-	-	-	10	3
		Inductive (A)	3.8	-	-	-	2.2	-
		Motor (W)	100	-	-	-	100	-
	High temperature	Resistive (A)	5	5	5	0.4	0.4	0.2
		Inductive (A)	-	-	-	0.05	0.05	0.03
	Gold-plated contacts	Resistive (A)	1	-	-	1	-	-
		Inductive (A)	0.05	-	-	0.5	-	-
Type 3	Standard	Resistive (A)	0.25	-	-	4	0.25	-
		Inductive (A)	0.25	-	-	2	0.25	-
	Gold-plated contacts	Resistive (A)	-	-	-	1	-	-
		Inductive (A)	-	-	-	0.25	-	-
	High temperature	Resistive (A)	-	-	-	4	-	-
		Inductive (A)	-	-	-	2	-	-

Pneumatic switch device - Type 5

Type 5 device utilizes a non-bleed pneumatic switch with "on-off" action, constituted by an aluminium and stainless steel 3-port valve. Connections to pneumatic circuit are got into the housing basis, and they are 1/4" NPT.

The tubes and internal connections that link the valve to connections are nylon-made as standard type, but they are also available in stainless steel, suitable for applications with higher temperature limits. The switch is both supplied with instruments compressed air and non-corrosive gases with maximum pressure 10 bar g.

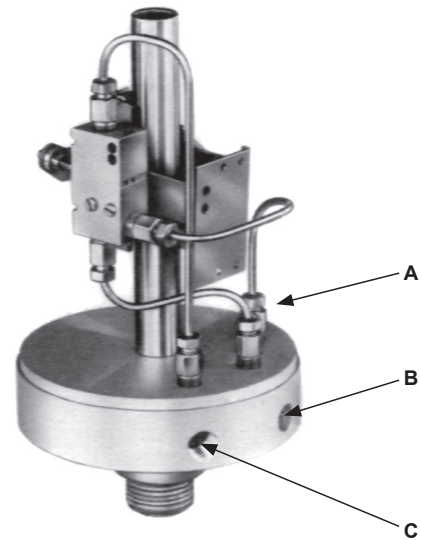
The flowrate with tubes in nylon, expressed in Nm³/h, can be calculated by applying the rate $K_v = 0.4$.

Each level control can fit only a single type 5 device.

Connection	2-port N.O.	2-port N.C.	3-port N.O.	3-port N.C.
A	plugged	inlet	vent	inlet
B	inlet	plugged	inlet	vent
C	outlet	outlet	outlet	outlet

Attention:

The table is referred to low level operation, except for 4400 and 6600 series, where the action is reversed due to their operation by lever.



For example, if it is required a N.C. 2-port operation for low level with a 4400 or 6600 series device it must be plugged the A connection, inlet will be in B and outlet in C (in this case are therefore reversed the captions of the A and B lines).

Selection and encoding guide for Switch devices

To identify SENSILEVEL switch devices, please specify the type, electric function and code number, as defined in tables listed below.

1 st Digit	Device
2	Type 2
3	Type 3
4	Type 4
5	Type 5

2 nd Digit (¹) (²)	Sequence and electric function (³)		
	1° Mech.	2° Mech.	3° Mech.
1	SPDT	-	-
2	SPDT	SPDT	-
3	SPDT	SPDT	SPDT
4	DPDT	-	-
5	DPDT	DPDT	-
6	DPDT	SPDT	-
7	SPDT	DPDT	-

3 rd Digit (⁴)	Switch
0	Standard
2	High temperature
3	dc
4	Gold-plated contacts
5	waterproof
6	Gold-plated/waterproof contacts
9	Special

Note: (¹) As second digit, only code 1 or 4 in type 4 device

(²) As second digit, only 0 for pneumatic type 5 device

(³) The sequence of mechanisms is equal to the sequence of operations from low to high level

(⁴) As third digit, only code 0 and 2 in type 5 device

Example:

Code 263 = 1 DPDT device and 1 SPDT device, with dc microswitches

Code 312 = 1 device with sealed SPDT microswitch for high temperature

Switch devices Housings

Sensilevel housings for switch devices are suitable for wide-ranging environmental and safety conditions. It's available in standard version for all-purpose employ, and explosion-proof for use in areas with danger of explosion.

Type 1 - Standard

- Base in die-cast aluminium and cap in painted steel
- 3/4" NPT Electrical connection, 360° adjustable
- 1/4" NPT Pneumatic connections (no. 3), nonorientable (for type 5 switch device)

Protection degree

- IP 55 standard (IP 40 with manual reset)

Type 2 - Increased protection

- Similar to Type 1, but with base in anodized aluminium and cap in AISI 316L stainless steel
- Suitable for special type installations in corrosive and saline environments (marine or refinery)

Protection degree

- IP 55
- IP 67 on request (except Type 5 device)

Type 4 - Explosion-proof - IIC Class

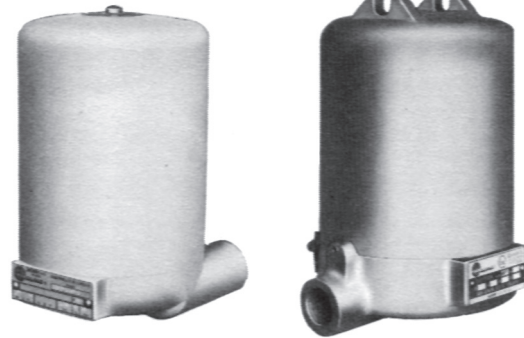
- Cap basis in painted cast iron, connected by threaded joint, suitable for environments with presence of hydrogen
- Available on request in SG iron for environmental temperatures up to -45°C

TÜV 7039-X Approvals

- IIC Class - T6
- Protection degree IP 67
- 3/4" NPT Nonorientable electric connection

Selection and encoding guide for Housing

Code	Execution
1	Type 1 - Housing standard
2	Type 2 - Housing standard with improved protection
4	Type 4 - Explosion-proof housing for hydrogen - IIC class -T6



Type 1 and 2
(standard or improved protection)

Type 4
(explosion-proof)

Dimensions

Type	W connection	x mm	Y mm	Z mm
1 e 2 (*)	Electric 3/4" NPT	173	118	70
	Pneumatic 1/4" NPT	166	118	59
4	3/4" NPT	213	150	100

(*) For models 5501 + 5504 and 2220 A/B : X = 123 mm
For series 7700 three stages and for double stage devices, solution C/D : X = 208 mm

Note - Housings are 360° steerable with exception of types 1 e 2 with pneumatic switch and Type 4.