

Pressure and temperature switches, type KP

Features



- Wide regulating range
- Small dimensions
Space-saving, easy to install in panels
- Shock and impact resistant
- Ultra-short bounce time.
Limits wear to an absolute minimum and increases reliability
- Snap action electrical contacts minimize chatter, bounce, and wear, and ensure long term electrical and mechanical reliability
- Electrical connection from front of the unit.
Makes rack mounting easier and also saves space
- Suitable for alternating current and direct current
- Manual trip allows electrical function test without tools
- Versions with automatic and manual reset available

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Description

Danfoss KP switches are used for regulating, monitoring and alarm systems in the industry. They provide automatic limit protection or manual reset limit protection for pressure systems. Can be used with steam, air, gaseous and liquid media.

The pressure switches are fitted with single-pole changeover switch (SPDT). The position of the switch depends on the setting of the pressure switch and the pressure in the connector.

Approvals

UL listed for USA and Canada according to UL 353 and UL 873.

CE marked in accordance to EN 60947-4/05 .

Ordering

Pressure switches, type KP

Type	Range [psig]	Differential [psi]	Reset	Pressure connection	Max. operating pressure [psig]	Min. burst pressure [psig]	Code nos
KP 34	2....15	2....6	Automatic	1/4" 18 NPT	58	435	060-214966
KP 34	2....15	3 fixed	Manual		58	435	060-214866
KP 35	6....50	6....32	Automatic		145	1015	060-215166
KP 35	6....50	7 fixed	Manual		145	900	060-215066
KP 36	15....150	10....58	Automatic		245	1015	060-214466
KP 36	15....150	10 fixed	Manual		245	1015	060-214566
KP 37	58....300	26....45	Automatic		405	1450	060-214666
KP 37	58....300	43 fixed	Manual		405	1450	060-214766

Technical data

Ambient temperature

-40 to 150 °F (175 °F for short period of time)

Media temperature

-40 to 212 °F

Parts in contact with medium:

Bellows: stainless steel
Pressure connection: free-cutting steel, nickel plated

Enclosure

NEMA 1

Wire dimension

12 AWG max

Contact system

Single pole changeover switch (SPDT)

Contact material AgCdO

Contact load

Alternating current

FLA = 16 A @ 120 Vac

8 A @ 240 Vac

LRA = 96 A @ 120 Vac

48 A @ 240 Vac

Direct current

240 VDC: 12W pilot duty

Cable entry

Integral 1/2 in. female NPSM swivel cable connector, allows direct attachments of 1/2 in. male pipe thread connector

Contact system and application

Switch type - single pole double throw	Switch action	Application
	<p>1. Terminals 1 - 4 close high and open low Terminals 1 - 2 can be used as low pressure alarm</p> <p>2. Terminals 1 - 2 open high and close low Terminals 1 - 4 can be used as high pressure alarm</p>	<p>1. Low pressure cut-out</p> <p>2. High pressure cut-out</p>

Setting

Cut-in and cut-out pressures of the system should always be checked with an accurate pressure gauge.

Pressure setting for switches with automatic reset.

Set the cut-out pressure on RANGE scale and differential on DIFF scale.

Note:

Restart pressure is equal to cut-out pressure minus differential value.

Pressure switches with manual reset

Set the cut-out pressure on the RANGE scale. Pressure limiters can be manually reset by pressing reset button when the pressure is equal to the cut-out pressure minus fixed value of the differential.

Terminology**Set point**

A predetermined value to which a switch is adjusted and at which it performs its intended function.

Reset**1. Manual reset**

A unit with manual reset can only be restored to operational mode by activation of the external reset button.

2. Automatic reset

A unit with automatic reset is restored to operational mode automatically.

Maximum working pressure

The maximum permissible pressure for safe functioning of a heating system or any of its part.

Snap function

A specific contact force is maintained until snap is initiated. The time over which contact force reaches zero is a few milliseconds; therefore, contact bounce cannot occur as a result, for example, of slight vibrations before cut-out.

The snap-action contact system will continue to function even when micro-welds are created between the contacts during cut-in.

The force created to separate the contacts is strong, and instantly shears off all contact surface welds that have been created as the result of cut-in action.

These design features ensure that the cut-out point of the KP switch remains very accurate and completely independent of the magnitude of the current load.

FLA - Motor Full Load Amperes

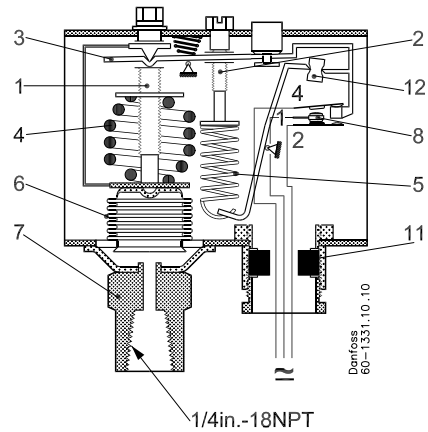
The current rating, in amperes, of the motor when a full load is applied to it for work being done.

LRA - Locked Rotor Amperes

The current drawn, in amperes, by an electric motor with the shaft or rotor stopped and locked in position.

Design and function

1. Range setting spindle
2. Differential setting spindle
3. Main arm
4. Main spring
5. Differential spring
6. Bellows
7. Pressure connector
8. Contact system
9. Switch terminals
10. Ground terminal
11. Cable entry: 1/2 in. female cable gland
12. Tumbler
13. Locking screw
14. Manual reset
15. Distance plate

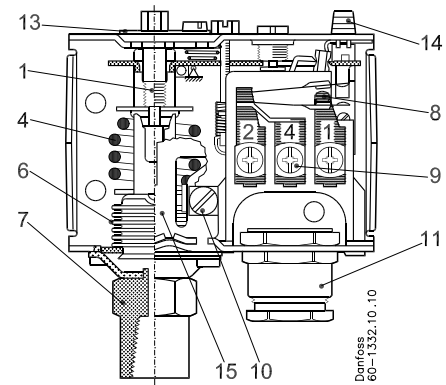


Key sketch of KP pressure switch

The contact system of KP switches has a snap-action function and the bellows moves only when cut-in or cut-out set point is reached.

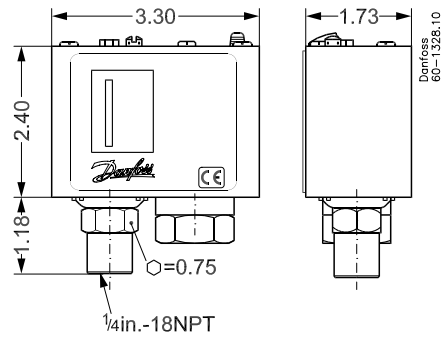
The design has the following advantages:

- higher contact load
- ultra short bounce time
- long mechanical and electrical lifetime
- high resistance to vibrations and pulsations

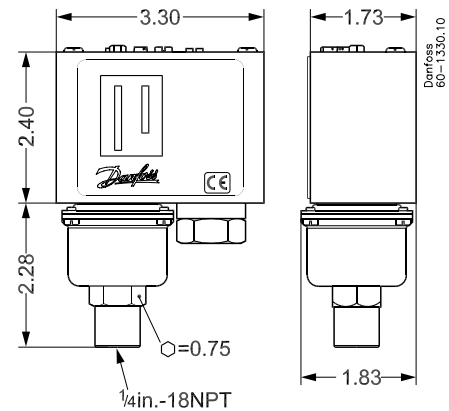


Simplified drawing of KP pressure switch without front cover and scale. Version with manual reset.

Dimensions and weight



KP 35, KP 36 and KP 37
(all dimensions in inches)
Approximate weight: 0.83 lb



KP 34 pressure switch
(all dimensions in inches)
Approximate weight: 0.9 lb

Features



- Wide regulating range
- Small dimensions
Space saving, easy to install in panels
- Shock and impact resistant
- Ultra-short bounce time
- Snap action electrical contacts minimize chatter, bounce, and wear, and ensure long term electrical and mechanical reliability
- Electrical connection at front of the unit.
Makes rack mounting easier and save space.
- Suitable for both alternating and direct current
- Screwed wiring, makes rewiring easy
- Manual trip allows electrical function test without the tools
- Version with automatic and manual reset available

Description

Danfoss KP temperature switches are used for regulating, monitoring and alarm systems in industry.
KP thermostats are temperature-operated electric circuit breakers. The thermostats are fitted with single-pole changeover switch (SPDT).

The position of the switch depends on the thermostat setting and sensor temperature.
A KP thermostat can be connected and switch to single-phase alternating current motors of up to 2 kW.

Approvals

UL listed for USA and Canada according to UL 353 and UL 873.

CE marked in accordance to EN 60947-4/-5 .

Ordering

Temperature switches, type KP

Type	Setting range [°F]	Differential [°F]	Reset function	Capillary tube length [in]	Max. sensor temperature [°F]	Code number
KP 79	122 to 210	9 to 27	Auto	80	300	060L223866
KP 79	122 to 210	10 fixed	Manual		300	060L223966
KP 79	140 to 240	9 to 27	Auto		300	060L224266
KP 79	140 to 240	10 fixed	Manual		300	060L224366
KP 81	176 to 240	9 to 45	Auto		480	060L224066
KP 81	176 to 240	16 fixed	Manual		480	060L224166

Technical data

Ambient temperature
-40°F to 150 °F (for short periods up to 175 °F)
Sensor material
Tinned copper Cu/Sn5
Contac system
SPDT – single pole double throw
Contact load
Alternating current
FLA = 16A @120 Vac
LRA = 96A @ 120 Vac
Direct current
240 Vdc: 12 W pilot duty

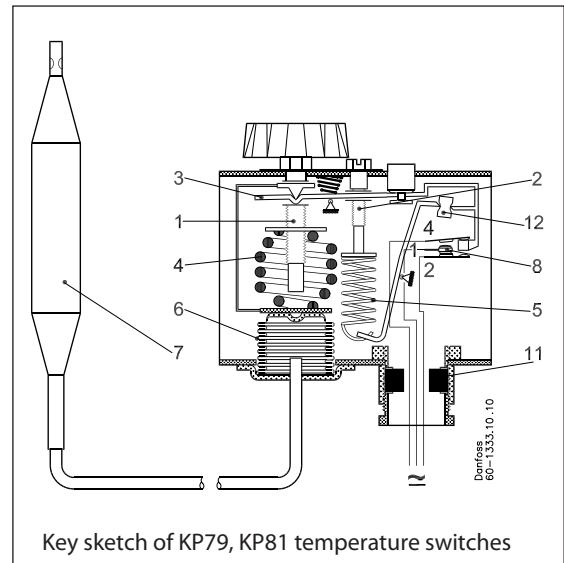
Cable entry
Integral ½ in. female NPSM swivel cable connector, allows direct attachments of ½ in. male pipe thread connector
Wire dimension
12 AWG max
Enclosure
NEMA 1

Contact system and application

Switch type - single pole	Switch action	Application
	<ol style="list-style-type: none"> 1. Terminals 1 - 4 close high and open low Terminals 1 - 2 can be used as low temperature alarm 2. Terminals 1 - 2 open high and close low Terminals 1 - 4 can be used as high temperature alarm 	<ol style="list-style-type: none"> 1. Low temperature cut-out 2. High temperature cut-out

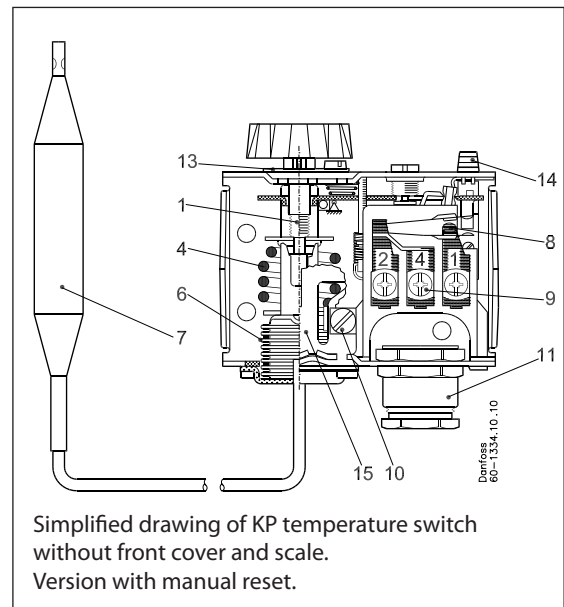
Design and function

1. Temperature setting spindle
2. differential setting spindle
3. Main arm
4. Main spring
5. Differential spring
6. Bellows
7. Temperature sensor
8. Contact system
9. Terminals
10. Ground terminal
11. Cable entry: 1/2 in. female cable gland
12. Tumbler
13. Locking screw
14. Manual reset
15. Distance plate



The contact system of KP switches has a snap-action function and the bellows moves only when cut-in or cut-out set point is reached. The design has the following advantages:

- higher contact load
- ultra short bounce time
- long mechanical and electrical lifetime
- high resistance to vibrations and pulsations



Setting

Temperature switches with automatic reset

Set the cut-out temperature on the RANGE scale and differential on the DIFF scale.

Restart temperature is equal to the cut-out temperature minus differential value.

Please note that the differential scale is only a reference. The exact value of distances on the scale depends on where in its range the switch cut-in is set. Use the differential scale as a guide, and if precise function is required, establish the differential setting by comparing function with an accurate thermometer in the controlled zone.

Temperature switches with manual max. reset

Set the cut-out temperature on the range scale. The differential is fixed.

Restart the system by pressing the reset button after the temperature of the sensor falls to a value equal to the range scale setting minus the fixed differential.

Terminology

Differential

The differential is the difference between the cut-in and cut-out temperatures.

The differential is necessary for satisfactory automatic operation of the controlled system.

Mechanical differential (intrinsic differential).

The mechanical differential is the differential set by the differential spindle.

Snap function

A specific contact force is maintained until snap is initiated. The time over which contact force reaches zero is a few milliseconds; therefore, contact bounce due to vibration, for example, cannot occur at cut-out.

The snap-action contact system will continue to function even when micro-welds are created between the contacts during cut-in. The force created to separate the contacts is strong enough to instantly shear off all contact surface welds that may have been created by cut-in action.

Reset

1. Manual reset:

units with manual reset can only be restarted after activation of the reset button. On max. reset units the set value is equal to cut-out value for rising temperature.

2. Automatic reset:

These units are automatically reset after operational stop.

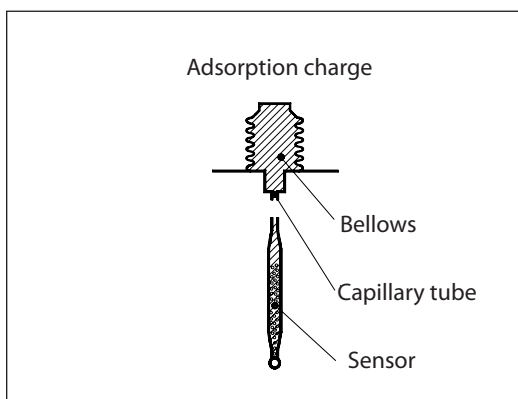
FLA - Motor Full Load Amperes

FLA is the largest current that a motor or other device is designed to carry at rated voltage and other specific conditions. Also often called current at rated conditions.

LRA - Locked Rotor Amperes

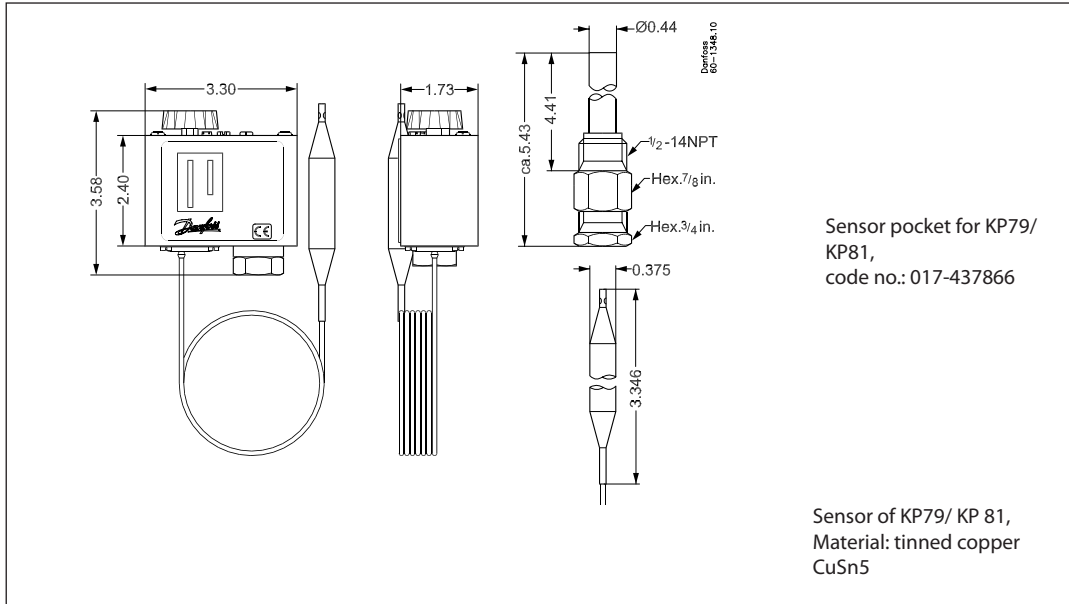
LRA is the current in amperes drawn by an electric motor with the shaft or rotor immobilized.

Charge



Sensors with adsorption charges contain a superheated gas together with a solid having a large adsorption surface. The sensor can be placed in zones that are warmer or colder than the switch housing and capillary tube, but variations of more than +70°F may influence scale accuracy.

Dimensions and weights



Accessories for KP pressure and temperature switches

Part	Symbol	Description	Code no.
Brackets with mounting screws and washers for pressure and temperature switches		Wall bracket Angle bracket 4 screws 10-32 UNC + 4 washers	060-105266 060-105366 060-105166
Top cover for pressure and temperature switches		When the bracket is mounted on the back plate of the housing, the grade of enclosure of the KP switch is IP 44. Top cover covers the setting spindles.	060-109766
Brass made sensor pocket for KP temperature switch		Sensor pocket, gasket and union nut to screw into 1/2 in. connector welded onto tubes, containers etc.	017-437866
Knob for KP temperature switch			060-106366

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