ENGINEERING TOMORROW

Data sheet

Pressure switches and Thermostats
KP

KP Pressure Switches
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.

KP Thermostats
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.

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
- Screwed wiring, makes rewiring easy
- Manual trip allows electrical function test without tools
- Versions with automatic and manual reset available

Approvals

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

CE marked in accordance to EN 60947-4/05

PRESSURE SWITCHES

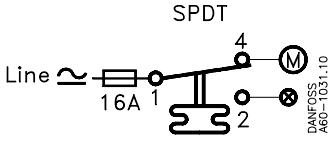
Technical data

Ambient temperature			-40 – 150 °F (175 °F for short period of time)
Media temperature			-40 – 212 °F
Sensor material			Tinned copper Cu/Sn5
Parts in contact with medium:		Bellows:	stainless steel
		Pressure connection:	free-cutting steel, nickel plated
Wire dimension			12 AWG max.
Contact system			SPST (close on temp. rise), SPDT
			Contact material AgCdO
Contac load	Alternating current	FLA	0.5 ~ 16 A/120 V AC 0.5 ~ 8 A/240 V AC
		LRA	96 A/120 V AC 48 A/240 V AC
	Direct current		240 V DC: 12W pilot duty
Enclosure			NEMA ~1 (when mounted on a flat surface with all unused holes covered)
Cable entry			Integral ½ in female NPSM swivel cable connector, allows direct attachenments of ½ in. male pipe thread connector

Ordering

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	¼" 18 NPT	58	435	**060-214991**
KP 34	2 – 15	3 fixed	Manual	¼" 18 NPT	58	435	**060-214891**
KP 35	6 – 50	6 – 32	Automatic	¼" 18 NPT	145	1015	**060-215191**
KP 35	6 – 50	7 fixed	Manual	¼" 18 NPT	145	900	**060-215091**
KP 36	15 – 150	10 – 58	Automatic	¼" 18 NPT	245	1015	**060-214491**
KP 36	15 – 150	10 fixed	Manual	¼" 18 NPT	245	1015	**060-214591**
KP 37	58 – 300	26 – 45	Automatic	¼" 18 NPT	405	1450	**060-214691**
KP 37	58 – 300	43 fixed	Manual	¼" 18 NPT	405	1450	**060-214791**

Contact system and application

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

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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**
   Units with manual reset can only be restored to operational mode by activation of the external reset button.
2. **Automatic reset**
   Units 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.

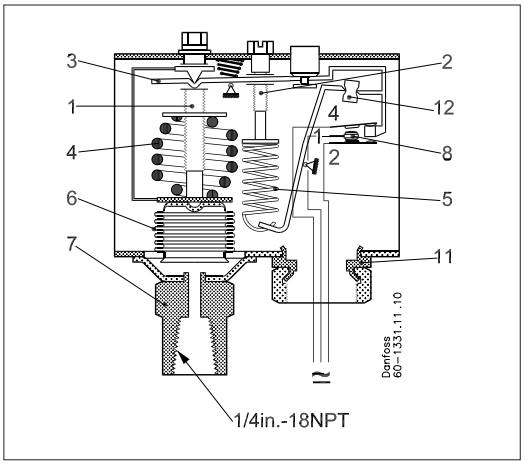
FLA -Motor Full Load Amperes
FLA is the largest current that a motor or other device is designed to carry at rated voltage and other specific conditions. Also often called current at rated conditions.

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

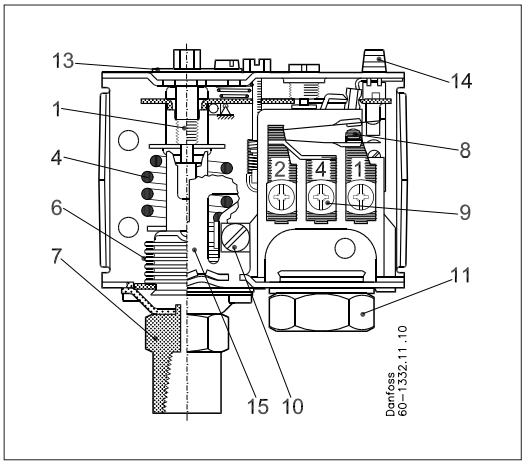
Design and function

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: ½ in female NPSM
12. Tumbler
13. Locking screw
14. Manual reset
15. Distance plate

Key sketch of KP pressure switch



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

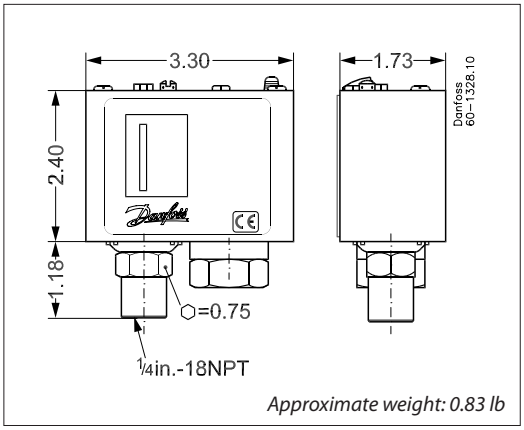


The contact system of KP switches has a snap-action function and the bellows moves only when cut-in or cut-out set point is reached.
The design has the following advantages:

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

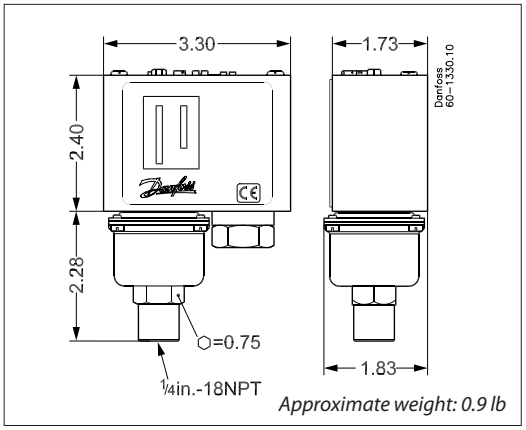
Dimensions [in]

KP 35, KP 36 and KP 37



Approximate weight: 0.83 lb

KP 34



Approximate weight: 0.9 lb

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THERMOSTATS

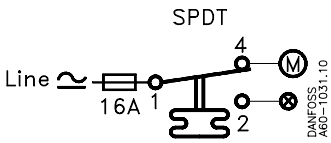
Technical data

Ambient temperature			-40 – 150 °F (175 °F for short period of time)
Sensor material			Tinned copper Cu/Sn5
Wire dimension			12 AWG max.
Contact system			SPDT – single pole double throw
Contac load	Alternating current	FLA	0.5 ~ 16 A/120 V AC 0.5 ~ 8 A/240 V AC
		LRA	96 A/120 V AC 48 A/240 V AC
	Direct current		240 V DC: 12W pilot duty
Enclosure			NEMA ~1 (when mounted on a flat surface with all unused holes covered)
Cable entry			Integral ½ in female NPSM swivel cable connector, allows direct attachenments of ½ in. male pipe thread connector

Ordering

Type	Setting Range [°F]	Differential [°F]	Reset function	Capillary tube length [in]	Max. sensor temperature [°F]	Code nos
KP 79	122 – 210	9 – 27	Automatic	80	300	**060L223866**
KP 79	122 – 210	10 fixed	Manual	80	300	**060L223966**
KP 81	176 – 240	9 – 45	Automatic	80	480	**060L224066**
KP 81	176 – 240	16 fixed	Manual	80	480	**060L224166**

Contact system and application

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

Setting

Thermostats 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.

Thermostats with manual 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.

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**
   Units with automatic reset is restored to operational mode automatically.

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.

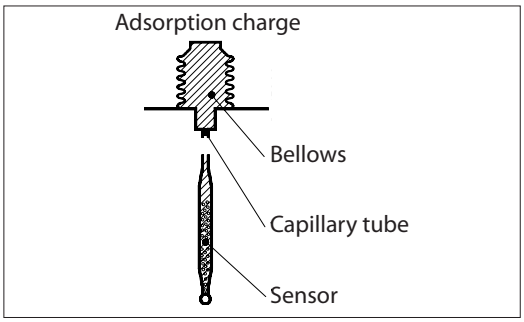
FLA -Motor Full Load Amperes

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.

Thermostat charge

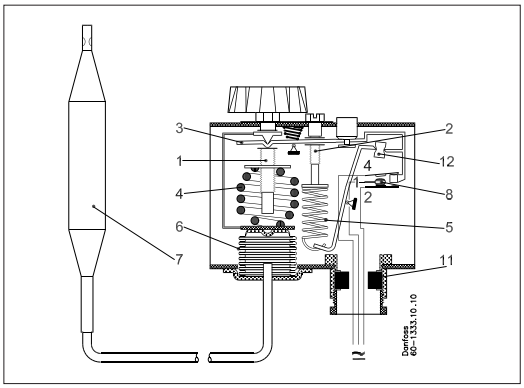


Sensors with adsorption charges contain a superheated gas together with a solid having a large adsorption surface. The sensor can be placed in zones that are warmer or colder than the switch housing and capillary tube, but variations of more than 70 °F may influence scale accuracy.

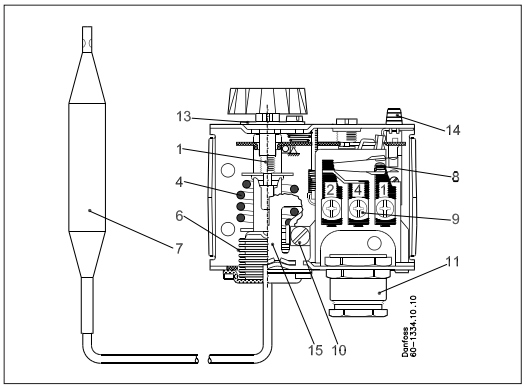
Design and Function

1. Range setting spindle
2. Differential setting spindle
3. Main arm
4. Main spring
5. Differential spring
6. Bellows
7. Temperature sensors
8. Contact system
9. Terminals
10. Ground terminal
11. Cable entry: ½ in female cable gland
12. Tumbler
13. Locking screw
14. Manual reset
15. Distance plate

Key sketch of KP 79, KP 81 thermostats



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



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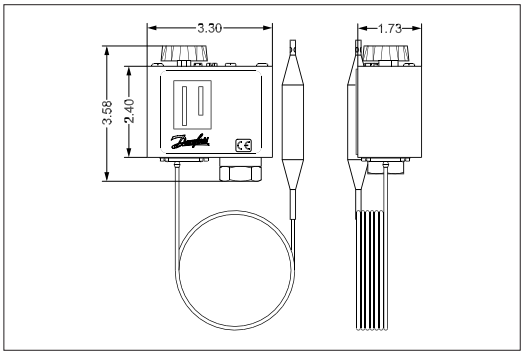
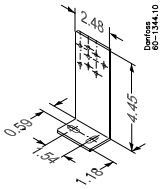
Dimensions [in]

KP 79, KP 81



Accessories

Part	Symbol	Description	Code no.
Brackets with mounting screws and washers for pressure switches and thermostats		Angle bracket 4 screws 10–32 UNC + 4 washers	**060-105366**
Top cover for pressure switches and thermostats		When the bracket is mounted on the back plate of the housing, the grade of enclosure of the KP switch is IP44. Top cover covers the setting spindles.	**060-109766**

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