

## Data sheet

# Pressure switch

## KP



The KP pressure switches can be used as safety switches against too low a suction pressure and / or too high a discharge pressure in refrigeration and air conditioning systems. They can also be used to start / stop compressors and fans for air-cooled condensers.

They are available in both single and dual versions and include a single pole double throw (SPDT) switch.

**Features**

- Ultra-short bounce time thanks to snap-action function (reduces wear to a minimum and increases reliability)
- Available with gold-plated contacts
- SPDT switch design
  - Offers open or close switching action on pressure rise or fall
- Fail safe double bellows
  - Prevent refrigerant loss and system contamination - standard on KP 7 and KP 17 pressure switches
- Convenient manual trip feature
  - To test electrical contact function
  - no tools needed
- Pressure wire connectors
  - For easy electrical wiring
- No spade or lug terminals required
- Integral  $\frac{1}{2}$  NPSM swivel cable connector
  - Allows direct attachment of  $\frac{1}{2}$  in male pipe thread connector
- Lockplate
  - Prevents tampering with range and differential settings
- Universal mounting hole patterns

**Approvals**

UL listed for USA and Canada, file E31024

## Data sheet | Pressure switch, type KP

### Technical data

Ambient temperature	-40 – 149 °F (175 °F for maximum 2 hours)
Maximum working pressure	LP: MWP = 245 psig
	HP: MWP = 465 psig
Maximum test pressure	LP: $p_e = 285$ psig
	HP: $p_e = 510$ psig
Switch	Single pole changeover switch (SPDT)
Contact load	120 V AC: 16 FLA, 96 LRA
	240 V AC: 8 FLA, 48 LRA
	240 V DC: 12 W pilot duty
Terminal D, dual switches	240 V, 50 VA

### Cable entry

Integral  $\frac{1}{2}$  in female NPSM swivel cable connector allows direct attachment of  $\frac{1}{2}$  in male pipe thread connector.

### Enclosure

~NEMA 1

This grade of enclosure is obtained when the units **without** top cover are mounted on a flat surface or bracket. The bracket must be fixed to the unit so that all unused holes are covered.

~ NEMA 2

This grade of enclosure is obtained when the units **with** top cover are mounted on a flat surface or bracket. The bracket must be fixed to the unit so that all unused holes are covered.

### Materials in contact with the medium

Control type	Material
KP 1, KP 2, KP 5, KP 7, KP 15, KP 17, KP 25	Tin bronze, no. CW452K, EN 1652 Nickel plated free cutting steel, no. 1.0737 / 1.0718 to EN 10277
KP with cap. tube	Copper SF-Cu, no. 2.0090 to DIN 1787

## Technical data

## Electrical wiring



Load



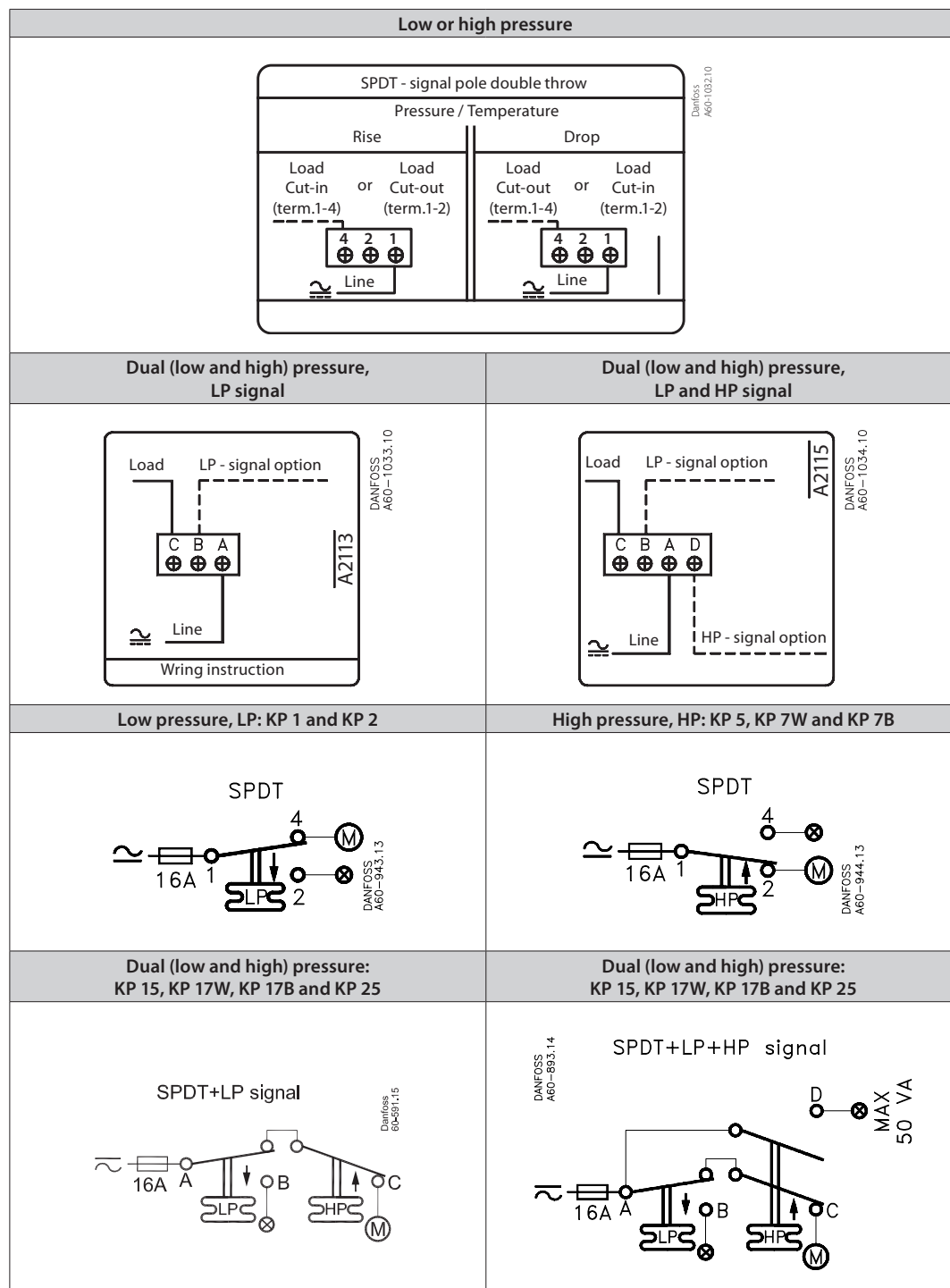
Signal option



Bellows movement  
on pressure rise



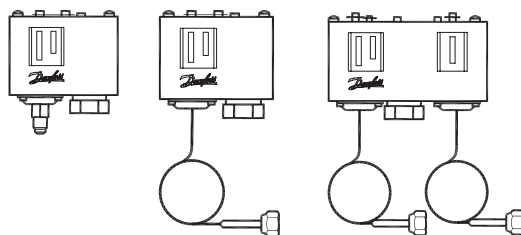
Bellows movement  
on pressure drop



Metric conversions  
 1 psi = 0.07 bar  
 $\frac{5}{9} (t_1 ^\circ\text{F} - 32) = t_2 ^\circ\text{C}$

## Data sheet | Pressure switch, type KP

### Ordering



For R22, R134a, R404A, R407A, R407C, R407F, R422B, R422D, R448A, R449A, R450A, R452A, R507A, R513A

For complete list of approved refrigerants, visit [www.products.danfoss.com](http://www.products.danfoss.com) and search for individual code numbers, where refrigerants are listed as part of technical data.

Type	Pressure	Low pressure (LP)		High pressure (HP)		Reset		Contact function	Code no.	
		Regulating range	Differential $\Delta p$	Regulating range	Differential $\Delta p$	Low pressure	High pressure		connection	
		[inHg] [psig]	[psi]	[psig]	[psi]	[LP]	[HP]		1/4 in flare	Cap. tube w. 1/4 in flare nut 36 in
KP 1	Low	6 in – 108	10 – 58	–	–	Auto	–	SPDT	060-200191	–
KP 1	Low	6 in – 108	10 – 58	–	–	Auto	–	SPDT	–	060-205191
KP 1	Low	27 in – 100	10	–	–	Man. (Min.)	–	SPDT	–	060-205291 <sup>1)</sup>
KP 2	Low	6 in – 50	6 – 32	–	–	Auto	–	SPDT	060-201366	–
KP 2	Low	6 in – 50	6 – 32	–	–	Auto	–	SPDT	–	060-206391
KP 5	High	–	–	115 – 465	25 – 85	–	Auto	SPDT	060-201491	–
KP 5	High	–	–	115 – 465	25 – 85	–	Auto	SPDT	–	060-206491
KP 7W <sup>2)</sup>	High	–	–	115 – 465	58 – 140	–	Auto	SPDT	060-200391	–
KP 7W <sup>2)</sup>	High	–	–	115 – 465	58 – 140	–	Auto	SPDT	–	060-205391
KP7B <sup>2)</sup>	High	–	–	115 – 465	58	–	Man. (Max.)	SPDT	060-200491	–
KP7B <sup>2)</sup>	High	–	–	115 – 465	58	–	Man. (Max.)	SPDT	–	060-205491
KP 15	Dual	6 in – 108	10 – 58	115 – 465	58	Auto	Auto	SPDT/w. L P signal	060-200891	–
KP 15	Dual	6 in – 108	10 – 58	115 – 465	58	Auto	Auto	SPDT/w. L P signal	–	060-205891
KP 15	Dual	6 in – 108	10 – 58	115 – 465	58	Auto	Man. (Max.)	SPDT/w. L P signal	–	060-205991
KP 15	Dual	6 in – 108	10 – 58	115 – 465	58	Man. (Min.)	Man. (Max.)	SPDT/w. L P signal	–	060-206091
KP 15	Dual	6 in – 108	10 – 58	115 – 465	58	Auto	Auto	SPDT/w. LP + HP signal	–	060-203191
KP 15	Dual	6 in – 108	10 – 58	115 – 465	58	Auto	Man. (Max.)	SPDT/w. LP + HP signal	060-202691	–
KP 17W <sup>2)</sup>	Dual	6 in – 108	10 – 58	115 – 465	58	Auto	Auto	SPDT/w. LP + HP signal	–	060-202991
KP 17W <sup>2)</sup>	Dual	6 in – 108	10 – 58	115 – 465	58	Auto	Auto	SPDT/w LP signal	–	060-205566

<sup>1)</sup> With dial knob

<sup>2)</sup> With fail safe double bellows

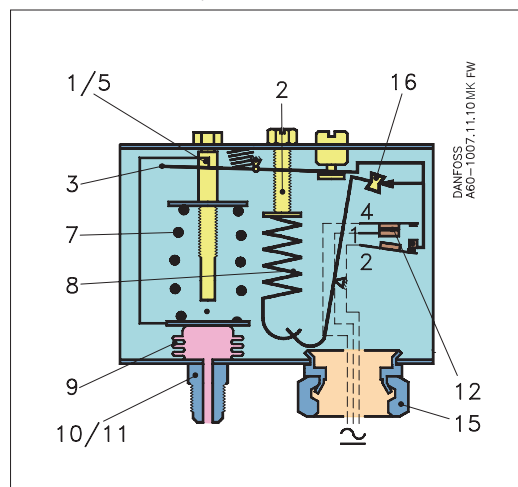
### Metric conversions

1 psi = 0.07 bar

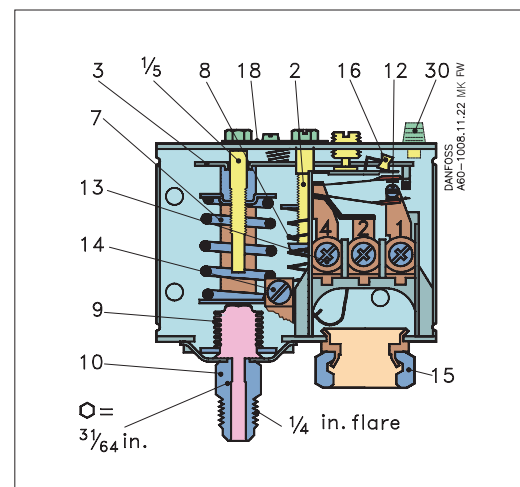
$\frac{5}{9}(t_1^{\circ}\text{F} - 32) = t_2^{\circ}\text{C}$

## Design

### Pressure switch, type KP

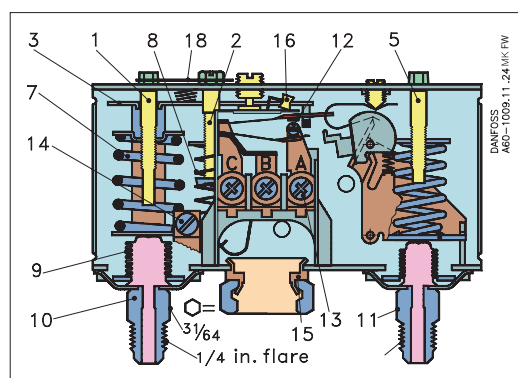


### KP 1, KP 2, KP 5

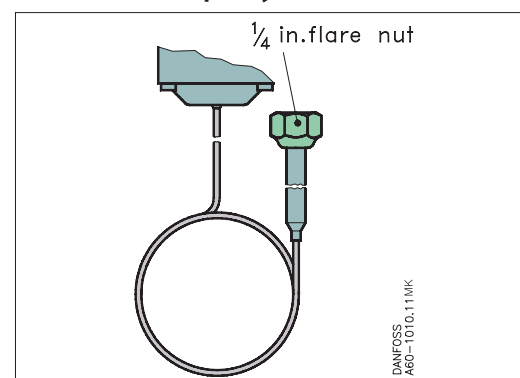


1. Low pressure setting spindle, (LP)
2. Differential setting spindle
3. Main arm
5. High pressure setting spindle, (HP)
7. Main spring
8. Differential spring
9. Bellows
10. LP connection
11. HP connection
12. Switch
13. Terminals
14. Earth terminal
15. Cable entry
16. Tumbler
18. Locking plate
19. Arm
30. Reset button

### KP 15, KP 25 flare



### KP 1, KP 2, KP 5, KP 15, KP 25, KP 7W, KP 7B, KP 17W, capillary tube



The switch in the KP has a snap-action function where the bellows move only when the cut-in or cut-out value is reached.

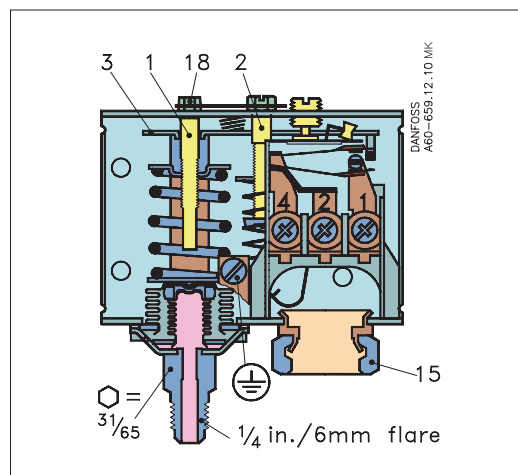
The bellows are connected to the low or high pressure side of the system through connection (10) or (11).

### The design of the KP gives the following advantages:

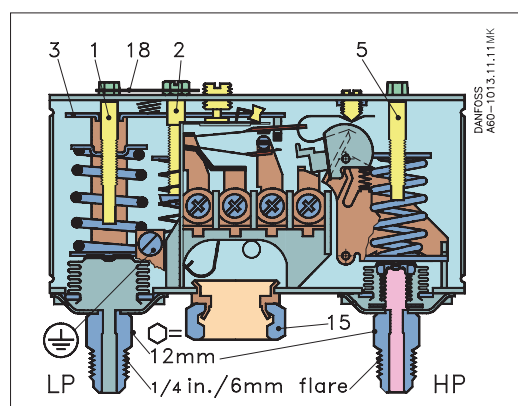
- high contact load
- ultra-short bounce time
- high resistance to pulsation
- vibration resistance up to 4 g in the range 0 – 1000 Hz
- long mechanical and electrical life

**Design**  
(continued)

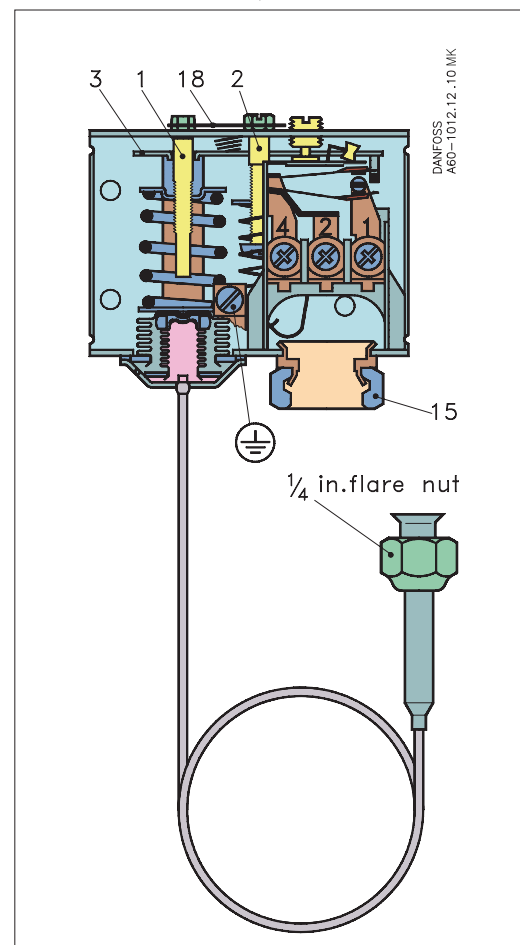
**KP 7W (KP 7B), flare**



**KP 17W (KP 17B), flare**



**KP 7W (KP 7B), capillary tube**



- 1. Pressure setting spindle, (LP)
- 2. Differential setting spindle
- 3. Main arm
- 5. Pressure setting spindle, (HP)
- 15. Cable entry
- 18. Locking plate

The KP with designations W or B have been tested and approved by TÜV (Germany) in accordance with EN 12263.

Versions with designation W will cut in automatically when the pressure has fallen to the setpoint minus the differential.

Versions with designation B can be cut in manually using the external reset button when:

KP 1 – the pressure has increased to 10 psi above the setpoint.

KP 7 – the pressure has fallen 58 psi below the setpoint.

KP 7 and KP 17 are equipped with fail-safe double bellows; a regulation bellows and an outer bellows. The double bellows system protects against loss of system charge in the event of a bellows rupture.

A rupture in the outer bellows will cause the control to trip approximately 43 psi lower than the actual control setting. This features provides a warning without a loss of charge.

All KP pressure switches, including those which are PED-approved, operate independently of changes in the ambient temperature around the control housing. Therefore the set cut-out pressure and differential are kept constant provided the permissible ambient temperatures are not exceeded.

## Terminology

### Reset

#### 1. Manual reset:

Units with manual reset can only be reset during operation by activation of the reset button.

#### 2. Automatic reset:

After operational stop, these units reset automatically.

### Maximum working pressure

The Maximum working pressure is determined by the pressure that can be safely allowed in the refrigerating system or any of the units within it. The maximum working pressure is designated MWP.

### Test pressure

The test pressure is the pressure used in strength tests and / or leakage tests on refrigerating systems or individual parts in systems. The test pressure is designated Pe.

### “Snap function”

A certain contact force is maintained until irrevocable “snap” is initiated. The time during which the contact force approaches zero is thus limited to a very few milliseconds. Therefore contact bounce cannot occur as a result of, for example, slight vibrations, before the cut-out point. Contact systems with “Snap function” will change over even when micro-welds are created between the contacts during cut-in. A very high force is created during cut-out to separate the contacts. This force immediately shears off all the welds. Thus the cut-out point of the unit remains very accurate and completely independent of the magnitude of the current load.

## Setting

### Pressure switches with automatic reset – LP:

Set the LP start pressure on the “CUT-IN” scale (range scale). One rotation of the low pressure spindle ~10 psi. Set the LP differential on the “DIFF” scale. One rotation of the differential spindle ~ 3 psi. The LP cut-out pressure is the LP cut-in pressure minus the differential.

#### Note:

The LP cut-out pressure must be above absolute vacuum  $p_e = 30$  in Hg. If compressor will not stop at low cut-out pressure, check whether the differential value is set at too high a value!

### Pressure switches with automatic reset – HP:

Set the HP cut-out pressure on the “CUT-OUT” scale. One rotation of the HP spindle ~ 33 psi. Set the HP differential on the “DIFF” scale. One rotation of the differential spindle ~ 4 psi. The HP cut-in pressure is the HP cut-out pressure minus the differential. Pressure switches with manual reset. Set the cut-out pressure on “CUT-OUT” scale (range scale). Low pressure controls can be manually reset when the pressure is equal to the cut-out pressure plus the differential.

High pressure switches can be manually reset when the pressure is equal to the cut-out pressure minus the differential.

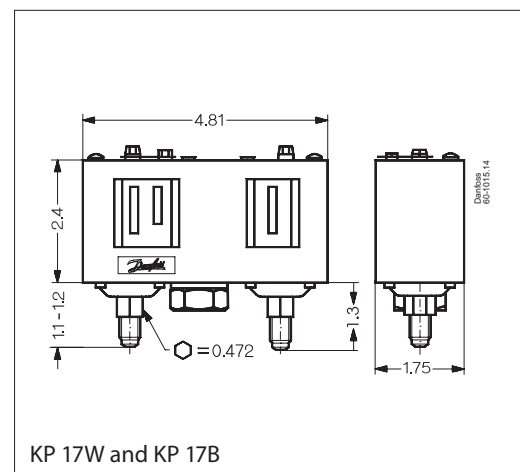
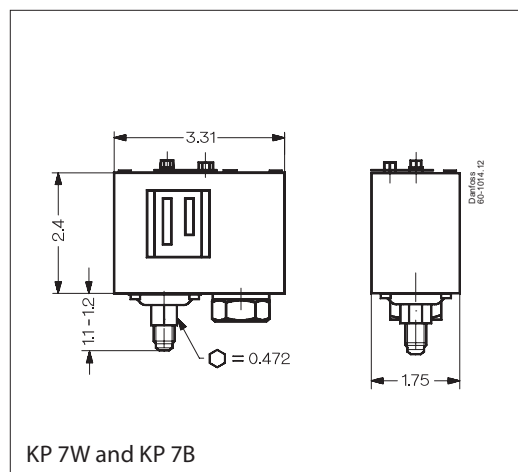
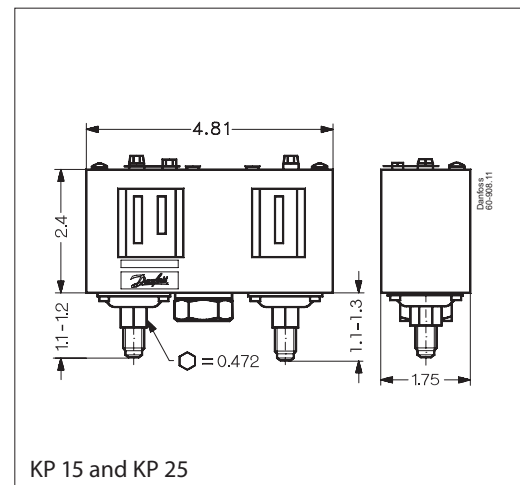
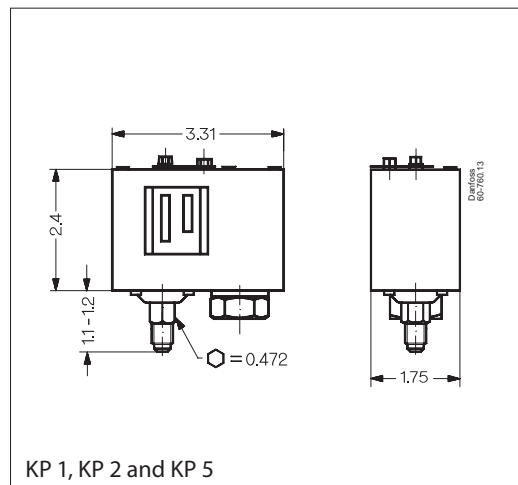
Cut-in and cut-out pressures for both the LP and HP sides of the system should always be checked with an accurate pressure gauge.

## Metric conversions

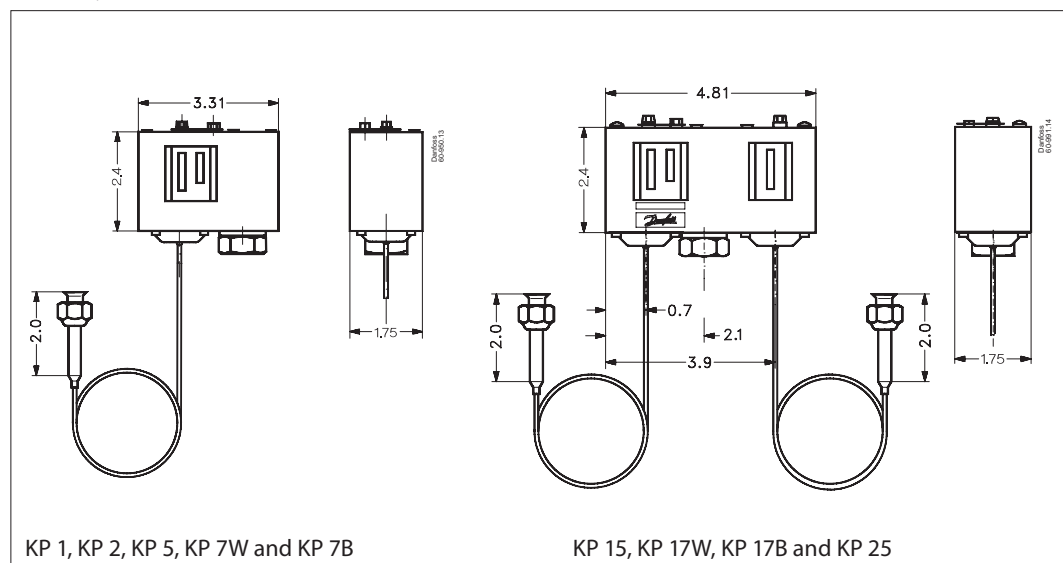
1 psi = 0.07 bar

**Dimensions [in]  
and weight [lb]**

**Flare connection**



**Capillary tube connection**



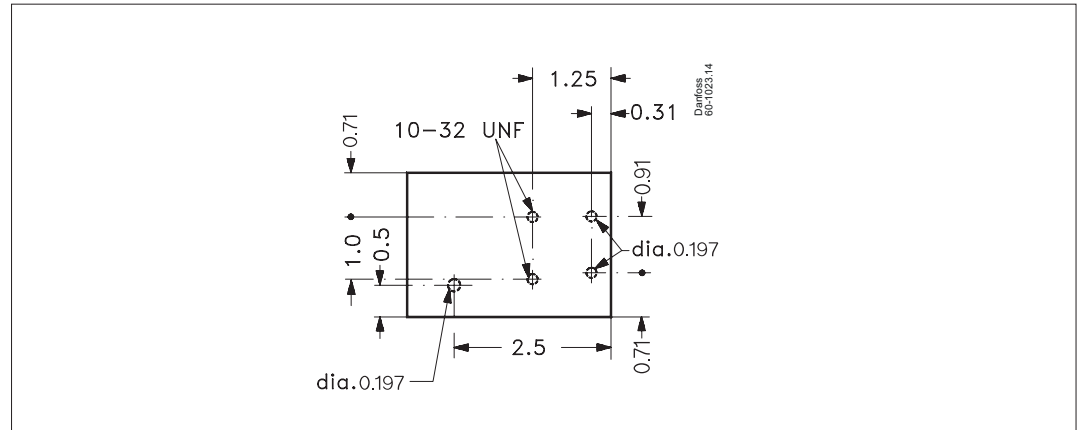
Net weight:  
KP 1, KP 2, KP 5 and KP 7:  
approx. 0.7 lbs.  
KP 15, KP 17 and KP 25:  
approx. 1.1lbs.

Metric conversions  
1 in = 25.5 mm  
1 lb = 0.454 kg

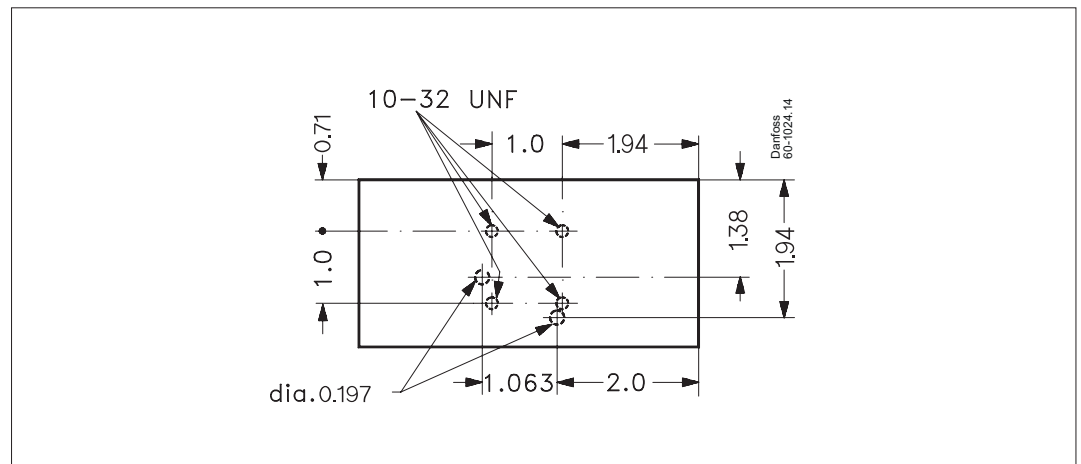


## Dimensions [in]

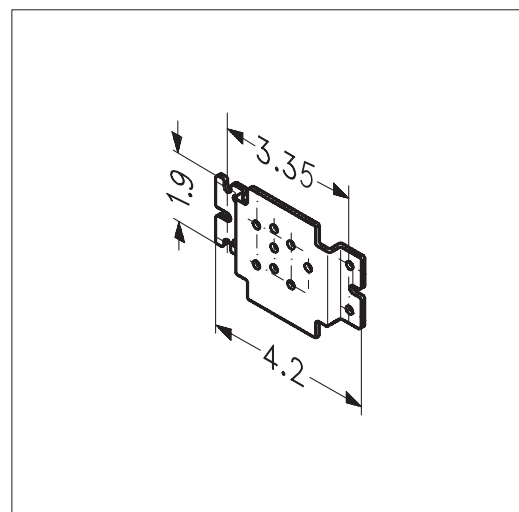
### KP single switches, rear side



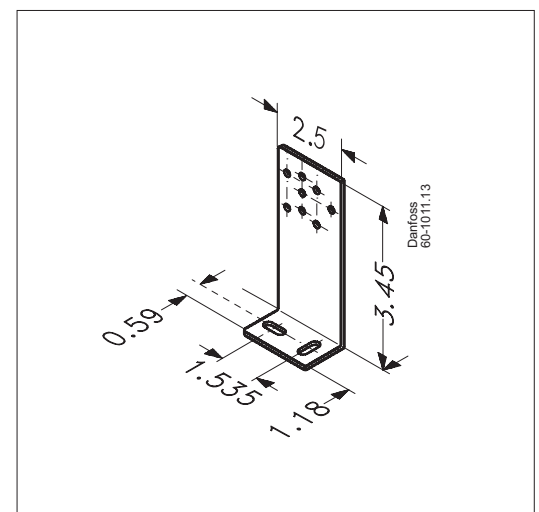
### KP dual switches, rear side



### Wall bracket



### Angle bracket



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