



Pressure Switch

KP-E

Description

KP-E pressure switches for use in refrigeration and air conditioning systems are equipped with SPDT gold plated contacts and stainless steel bellows.

Versions with manual reset act as pressure limiter (pressure sensing control which is intended to keep a pressure below or above a predetermined value during normal operating conditions and may have a provision for setting by the user). Versions with automatic reset act as pressure operating control (pressure sensing control set at high or low pressure between which limits the switch is normally intended to operate). The high-pressure switches are equipped with failsafe double bellows, whereas the low pressure switches are equipped with reduced bellow travel to enhance bellows lifetime. KP-E pressure switches are used to limit or regulate the pressure against excessively low suction pressure or excessively high discharge pressure.

The units are designed to operate in explosive zones acc. to 2014/34/EU, Atex directive, explosive zone 2, surface equipment, category 3.

KP-E pressure switches are suitable for HCFC, HFC and HC refrigerants.

Features & benefits

- Ultra-short bounce time thanks to snap-action function (Reduces wear to a minimum and increases reliability)
- Manual trip function (Electrical contact function can be tested without the use of tools)
- Vibration and shock resistant
- Compact design
- Bellows without any welding points
- Stainless steel bellows
- High reliability both electrically and mechanically

Ordering

Product code numbers

For R290, R32, R444B, R600, R600a, R1234ze, R1270

For complete list of approved refrigerants, visit www.products.danfoss.com and search for individual code numbers, where refrigerants are listed as part of technical data.



This product is validated in accordance to EN 60079-0:2012 + A11:2013.
Ignition risk is evaluated in accordance to EN 60079-11:2012.
See safety requirements on warning section.

Product Type	Regulation range [bar] Pe [min]	Regulation range [bar] Pe [max]	Differential [bar] [min]	Differential [bar] [max]	Reset function	Pressure connection type	Pressure connection size	Code number
KP1E	-0.20	7.50	0.70	4.00	Auto	Flare	1/4	060-533666
KP1E	-0.20	7.50	0.70	4.00	Auto	Solder, ODF	1/4	060-530066
KP1E	-0.90	7.00			Manual Min	Solder, ODF	1/4	060-530266
KP6EB	8.00	42.00			Manual Max	Solder, ODF	1/4	060-522566
KP6EW	8.00	42.00	4.00	10.00	Auto	Solder, ODF	1/4	060-522466
KP7EB	8.00	32.00			Manual Max	Solder, ODF	1/4	060-530666
KP7EB	8.00	32.00			Manual Max	Flare	1/4	060-533766
KP7EW	8.00	32.00	4.00	10.00	Auto	Flare	1/4	060-533866
KP7EW	8.00	32.00	4.00	10.00	Auto	Solder, ODF	1/4	060-530466

* PSL, PZL, PSH, PZH according to EN 12263:1998

Functions

Settings

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 ~0.7 bar.

Set the LP differential on the “DIFF” scale.

One rotation of the differential spindle ~0.15 bar.

The LP stop pressure is the LP start pressure minus the differential.

Note:

The LP stop pressure must be above absolute vacuum ($P_e = -1$ bar)!

If with low stop pressure the refrigeration compressor will not stop, check to ensure that the differential value has not been set too high!

Pressure switches with automatic reset – HP

Set the HP pressure on the “CUT-OUT” scale. One rotation of the HP spindle ~2.3 bar.

Set the HP differential on the “DIF” scale.

One rotation of the differential spindle ~0.3 bar.

The HP start pressure is the HP stop pressure minus the differential.

Note:

Start and stop pressures for both the LP and HP sides of the system should always be checked with an accurate pressure gauge.

Pressure switches with manual reset

Set the stop pressure on “CUT-OUT” scale (range scale).

Low pressure switches can be manually reset when the pressure is equal to the stop pressure plus the differential.

Note:

High pressure switches can be manually reset when the pressure is equal to the stop pressure minus the differential.

Product details

General data

Ambient temperature	-20 – 60 °C	
Shipping and storage temperature	-40 – 60° C	
Max. working pressure	KP 1E: PS / MWP = 17.0 bar *)	
	KP 6EW, KP 6EB: PS / MWP = 46.5 bar	
	KP 7EW, KP 7EB: PS / MWP = 32 bar	
Max. test pressure	KP 1E: Pe = 20 bar	
	KP 6EW, KP 6EB: Pe = 46.5 bar	
	KP 7EW, KP 7EB: Pe = 35 bar	
Type of action and cycles (UL)	1.B: 100 000 cycles (auto reset)	
	1.B: 6 000 cycles (manual reset)	
Controlled load (UL)	Resistive (for UL/CSA 60730-1 and 60730-2-6)	
Cable connection	Screwed cable entry for 6 – 14 mm cable	
Contact system	SPDT (single pole double throw)	
Contact rating (class III control - UL)	Pi max: 1 W	
	SELV class 2 power source limited to max 15 W	
	Ui max: 30 V	
	Ii max: 0.1 A	
	Ci max: 0.5 nF	
	Li max: 0.2 µH	
Wire dimensions	solid / stranded	0.75 – 2.5 mm ²
	flexible, without ferrules	0.7 – 2.5 mm ²
	flexible, with ferrules	0.7 – 2.5 mm ²
Tightening torque	max. 2 Nm	
Rated impulse voltage / Overvoltage category	800 V / III	
Pollution degree	3	
Short circuit protection, fuse	10 A	
Insulation	400 V	
Enclosure	IP30 / IP44	

*) Low pressure protection

Enclosure

IP30 to EN 60529 / IEC 529

Enclosure IP30 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.

IP44 to EN 60529 / IEC 529

Enclosure IP44 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. KP pressure switches with auto reset are supplied with top cover. For KP pressure switches with manual reset, the top cover must be separately ordered (**code no. 060-109766**)

Design

The switch in the KP-E has a snap-action function when the cut-in or cut-out value is reached.

The design of the KP-E affords the following advantages:

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

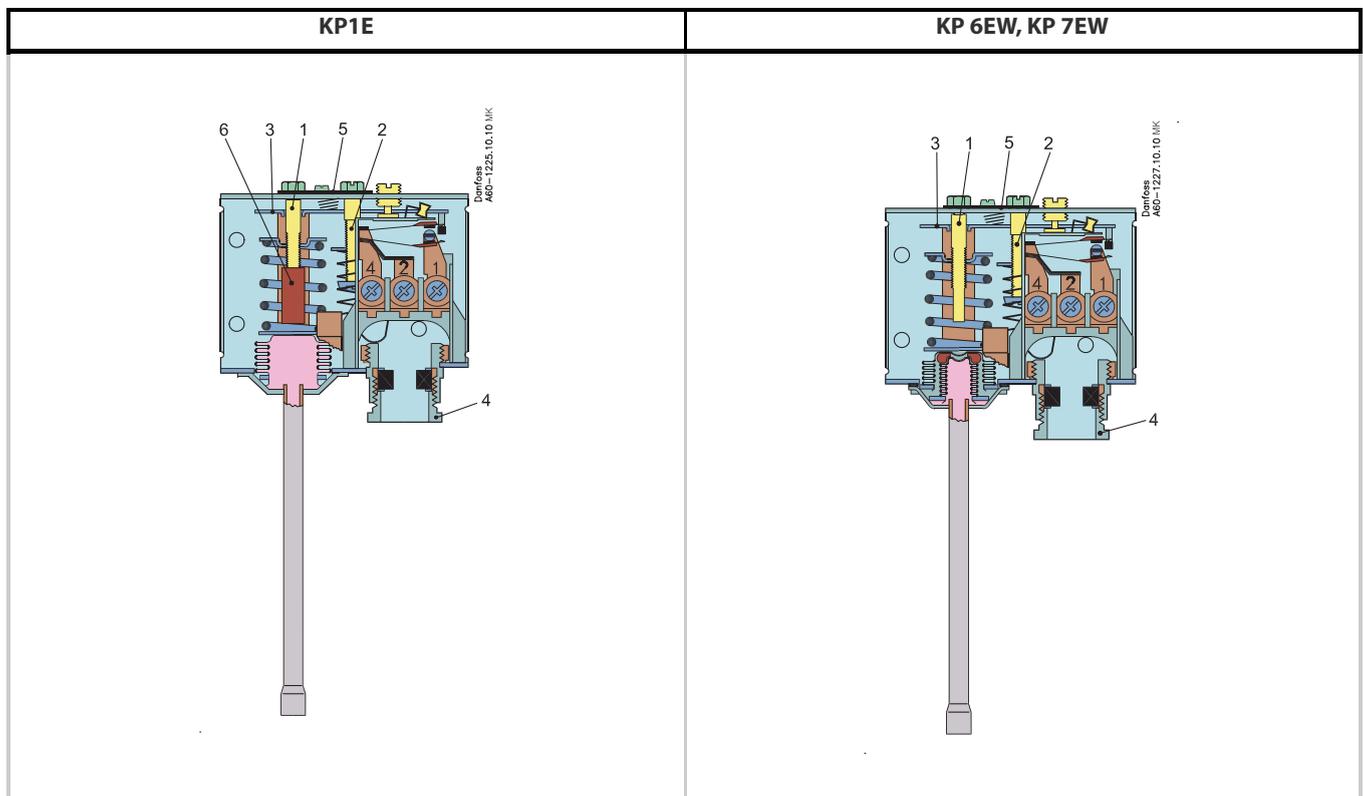
The KP 1E, KP 6EW, KP 6EB, KP 7EW and KP 7EB switches have been tested and approved by TÜV (Germany) in accordance with Directive 2014/68/EU.

KP 6E and KP 7E have a double bellows: an outer bellows and a regulating bellows. When system pressure exceeds the set value, the KP-E will automatically stop the plant. The double bellows system prevents loss of charge in the event of bellows rupture.

A rupture in the outer bellows will cause the control cut-out pressure to fall to about 3 bar under the set value, thus providing a fail-safe function.

Versions with designation W cut in again automatically when the pressure has fallen to the set value minus the differential.

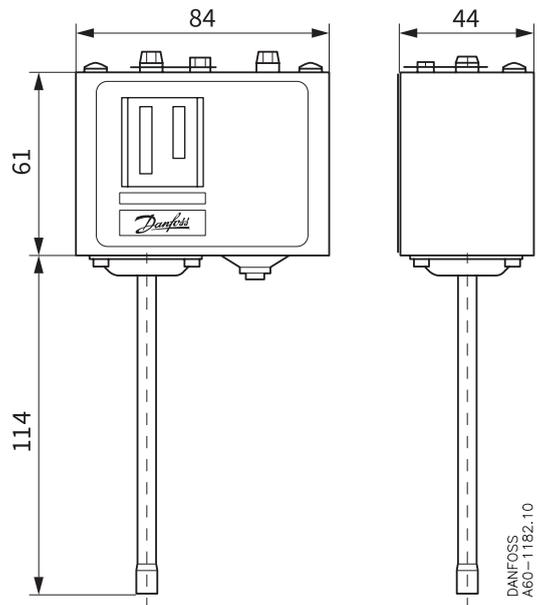
Versions with designation B can be cut in manually with the external reset button when the pressure has fallen 4 bar under the set value.



1	Pressure setting spindle
2	Differential setting spindle
3	Main arm
4	Cable entry
5	Locking plate
6	Bellows travel reducer (only KP 1E)

Dimensions

Figure: Solder connection, types KP 1E, KP 6EW, KP 6EB, KP 7EW, KP 7EB



Net weight: approx. 0.3 kg

Connections

Electrical connection

The KP-E pressure switch placed in explosive zone must always be wired through reliable Ex zener barrier, placed outside ex-zone, to ensure insufficient energy supply to cause the ignition of surrounding atmosphere by an electrical spark or the heating of components of circuitry.

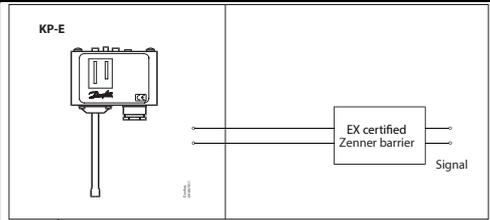
The equipment to be used for electrical load limiting must always be approved for use in the zone concerned.

Cables and cable entries approved for the application must be used and cannot be in contact with sharp edges. Cables must be connected with adequate stress relief that way that pulling forces cannot be carried through the cable to the terminal.

Note:

A particular system can be classified in different zones, for different parts of the system.

Intrinsic safety protection method

Ex - zone	Non Ex - zone	Electrical data for intrinsically safe specification (for all KP-E types)
		Pi max: 1 W Ui max: 30 V li max: 0.1 A Ci max: 0.5 nF Li max: 0.2 μH

Must be used with certified Ex ic barrier (product matching) satisfying the input parameters

Warnings

Safety requirements



The KP-E can be applied on systems with R290, R32, R444B, R600, R600a, R1234ze, R1270 as the working fluid.

For countries where safety standards are not an indispensable part of the safety system Danfoss recommend the installer to get a third party approval of the system containing flammable refrigerant.

Note, please follow specific selection criteria stated in the datasheet for these particular refrigerants.

KP-E pressure switches comply with the requirements for explosive atmosphere 2014/34/EU, acc. to ATEX, zone 2.

Only apparatus designed, constructed and released by Danfoss must be used for application concerned. Danfoss can accept no responsibility in case of alterations made on the switches or the use of them against the Danfoss instructions. Original Danfoss spare parts approved for use in explosive atmosphere can only be used.

The application covers systems that must be located within the EU or EFTA and comply with the existing EU legislation, such as Pressure Equipment Directive (PED) 2014/68/EU, the directive concerning potential explosive atmosphere (ATEX) 2014/34/EU, and other related EU standards. The system where KPE is mounted must always comply with local directives, legislation or any other regulation applying in the area of installation. The Danfoss products comply with the requirements of ATEX directive, but Danfoss takes no responsibility for the classification of explosive zone.

Installation

Installation and maintenance

Only authorized persons, who are certified in installing and maintaining the systems may do the installation, maintenance and change of the switch.

In the event of strong pulsation in the system, bellows must be protected against fatigue failure by use of damping coil.

The cycle frequency of the KP-E switch must be kept as low as possible. The vibration level must be kept as low as possible.

Any overload of the KP-E switch must be prevented. Overloaded or damaged apparatus must be exchanged.

Certificates, declarations and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

When you click on the link you will be directed to the latest version of the 'Declaration of Conformity'. Products developed and sold before this date of issue conform to the directives/standards in force at the time of their sale.

Approval type	Title	Certification body	Approval topic
EU Declaration	Danfoss EU 060-9654.AJ	Danfoss	Explosive, EU RoHS, PED, Pressure, ATEX
CCC Declaration	Danfoss CCC 2024010305641303	CCC - China Compulsory Certification	CCC
Electrical Safety Certificate	EAC KZ 7100841.01.01.01391	EAC - Eurasian Customs Union	EMC
Pressure Safety Certificate	TÜV 0879-PESR-B(P)-21484-7-DE	TÜV NORD - Technischer Überwachungsverein	PED, Pressure
CCC Declaration	Danfoss CCC 2020970305003384	Danfoss	
Pressure Safety Certificate	TÜV 01 202 969/B-22-0003_01	TÜV Rheinland - Technischer Überwachungsverein	PED, Pressure
Explosive Safety Certificate	UL-US-2443922-0	UL - Underwriters Laboratories inc.	Explosive
Functional Safety Certificate	Certificate UL-CA-2549403-0	UL - Underwriters Laboratories inc.	UL-CSA
Quality Assurance Certificate	TÜV 0045 202 9120 Z 00544 25 D 000 00	TÜV NORD - Technischer Überwachungsverein	PED, Pressure
Export Control Declaration	Pressure switches & Thermostats	Danfoss	
Manufacturer's Declaration	Danfoss MD 060-9638.AA	Danfoss	China RoHS
UA Declaration	Danfoss UA 2023-01-10 Regulators PL01 PL04	Danfoss	PED, Pressure
UA Declaration	Danfoss UA 2024-07-25 cooling sensors	Danfoss	LVD, EMC
Pressure Safety Certificate	LLC CDC EURO-TYSK UA.TR.089.1015.05-22	LLC CDC EURO TYSK - Ukraine	Pressure
UK Declaration	Danfoss UK 060-9688.AC	Danfoss	UK RoHS, Pressure, ATEX

Contact details

Online support

Danfoss offers a wide range of support along with our products, including digital information, software, mobile apps and expert guidance. See the possibilities below.



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