

Data Sheet

Pressure switch and Thermostat Type **KP** and **KPI**

For industrial applications



The KP and KPI pressure switches and thermostats are used for control, monitoring and alarm systems in a wide variety of industry applications.

KP pressure switches are mainly used for gaseous fluid whereas KPI pressure switches are more for liquid and gaseous fluid. The products are available in IP30 enclosure as well as IP55 enclosure.

The KP pressure range include special designed pressure switches and limiters for steam boilers and other heating applications.

For water pump control and protection (dry run) the dual pressure switch KP44 is suitable and secure improved life time of the water pump.

Features

Features

- Wide setting range
- Shock and impact resistant
- Snap action electrical contacts minimize chatter, bounce, and wear, and ensure long term electrical and mechanical reliability
- Small dimensions - space saving and easy to install in panels
- Electrical connection from front of the unit makes rack mounting easier and also saves space
- Suitable for alternating current and direct current
- Single pressure switches and thermostats are fitted with a single pole double throw contact system (SPDT)
- Can be used for both liquids and gases (KPI)
- Manual trip function enables electrical connections verification without any tools or pressure changes in the application
- Versions with automatic and manual reset available
- For demineralized water, there are special KP models with wetted parts made of stainless steel (AISI 316L)

Product specification

Technical Data

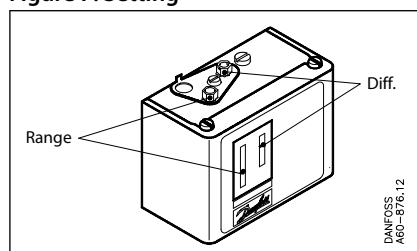
Single pressure switch

Table 1: Single pressure switch

Description		KP 35, KP 36	KPI 35, KPI 36	KPI 38	KP 34, KP 35, KP 36, KP 37 boiler version
Ambient temperature [°C]		-40 – 65 °C (for max. 2 hours up to 80 °C)			
Media temperature [°C]		-40 – 100 °C			
Fluid		Gaseous media	Gaseous media and liquids		Steam, air, gaseous media & liquids
Parts in contact with fluid	Bellows	Phosphor bronze or Stainless steel	Phosphor bronze		Stainless steel
	Pressure connector	Free-cutting steel (nickel plated) or Stainless steel	Brass	Free-cutting steel (nickel plated)	
Contact system		<p>SPDT</p> <p>Line ~ 16A 1 2 4 M</p> <p>DANFOSS 60-1031</p> <p>Single-pole double throw (SPDT)</p>			
Contact load, Silver		Alternating current: AC-1: 16 A, 400 V AC-3: 16 A, 400 V AC-15: 10 A, 400 V Direct current: DC-13: 12 W, 220 V	Alternating current: AC-1: 10 A, 440 V AC-3: 6 A, 440 V AC-15: 4 A, 440 V Direct current: DC-13: 12 W, 220 V	Alternating current: AC-1 : 16 A, 400 V AC-3 : 16 A, 400 V AC-15 : 10 A, 400 V Direct current: DC-13: 12 W, 220 V	
Contact load, Gold plated contact set		See Table 6			
Enclosure, IP30 grade		Unit must be mounted on a flat surface / a flat fitting and all unused holes covered			
Enclosure, IP44 grade		Mounted as IP30 plus fitting of top cover, code no. 060-109766			
Enclosure, IP55 grade		Unit mounted in a special IP55 enclosure, code no. 060-033066 or 060-062866			
Cable entry		Rubber cable gland entry for 6 – 14 mm diameter cables			
Mounted on back plate / wall bracket		Vibration proof in the range 0 – 1000 Hz, 4 g [1g = 9.81 m/s ²]			
Mounted on angle bracket		Not recommended in areas where vibrations occur			

Table 2: Contact system and application

Switch type – single pole double throw	Switch action	Application
<p>SPDT</p> <p>Line ~ 16A 1 2 4 M</p> <p>DANFOSS 60-1031</p>	Terminal 1 – 4 close high and open low Terminal 1 – 2 can be used as low pressure alarm	Low pressure cut-out
SPDT	Terminal 1 – 2 open high and close low Terminal 1 – 4 can be used as high pressure alarm	High pressure cut-out

Figure 7: 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.

Pressure switch and Thermostat, Type KP and KPI

- Set the cut-in pressure on the “CUT-IN” scale (range scale).
- Set the differential on the “DIFF” scale.

The cut-out pressure must be above absolute vacuum ($p_e = -1$ bar).

For high pressure switches the restart pressure is equal to cut-out pressure minus differential.

Pressure switches with manual reset

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

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

i NOTE:

For low pressure switches the restart pressure is equal to cut-out pressure plus differential value.

Dual pressure switch

Table 3: Dual pressure switch

Temperature	Range
Ambient temperature [°C]	-40 – 65 °C (for max. 2 hours up to 80 °C)
Media temperature [°C]	Max. 100 °C
Fluid	Liquids
Parts in contact with fluid	Bellows Phosphor bronze, CuSn6 Pressure connector Free-cutting steel (nickel plated)
Contact system	
Contact load, Silver	Alternating current: AC-1: 16 A, 400 V AC-3: 16 A, 400 V AC-15: 10 A, 400 V Direct current: DC-13: 12 W, 220 V
IP level	IP22
Cable entry	Rubber cable gland entry for 6 – 14 mm diameter cables
Mounted on backplate or wall bracket	Vibration-proof in the range 0 – 1000 Hz, 4 g [$1g = 9.81 \text{ m/s}^2$]
Mounting on angle bracket	Not recommended for areas where vibration occurs

Safety cut-out setting

The righthand bellows will automatically cut-out the pump at the safety cut-out setpoint. Automatic start-up, if any, will take place when the pressure has reached the level of 1 bar above the setpoint. Manual cut-in is made by lifting the impulse lever and releasing it again when the pressure has increased by min. 1 bar. The safety cut-out setpoint is normally determined by the static pressure (the water column). However, in order to avoid disturbing signal interaction, care should be taken to ensure that the safety cut-out setting is at least 1.5 bar lower than the control pressure cut-in setting. See table with pressure setting examples below

Table 4: Pressure settings

Required tap water pressure	≥ 2.3 bar	≥ 4.0 bar	≥ 5.0 bar	≥ 8.0 bar
Control pressure cut-out setting	3.0 bar	5.0 bar	8.0 bar	12 bar
Differential	0.7 bar	1.0 bar	3.0 bar	4.0 bar
Control pressure cut-in setting	2.3 bar	4.0 bar	5.0 bar	8.0 bar
Max. safety cut-out setting	0.8 bar	2.5 bar	3.5 bar	6.0 ⁽¹⁾ bar

⁽¹⁾ 6.0 bar is the normal max. setpoint

Control pressure settings

Control pressure cut-out setpoint is set on the lefthand pressure setting scale. The differential is set between 0.7 and 4 bar. The control pressure cut-in setting will be the cut-out control pressure less the differential.

Setting

Thermostats with automatic reset

Set the upper limit temperature on the range scale. Then set the differential on the DIFF scale. The temperature set on the range scale is also the temperature at which contact changeover re-occurs on rising temperature. The contacts changeover when the temperature has fallen to a value lower than that set on the DIFF scale.

If at lower settings the plant will not start/stop, the reason might be that the differential has been set too high.

Thermostats with minimum reset

Set the temperature on the range scale. The differential setting is fixed.

Min. reset units will restart after the temperature at the thermostat sensor has risen by a value greater than that of the fixed differential.

Thermostats with maximum reset

Set the stop temperature on the range scale. The differential setting is fixed.

Max. reset units will restart after the temperature at the thermostat sensor has fallen by a value greater than that of the fixed differential.

Dimensions [mm] and weights [kg]

Single pressure switch, type KP and KPI

Figure 9: KP 35, 36, KPI 35, 36, 38, Net weight 0.3 kg

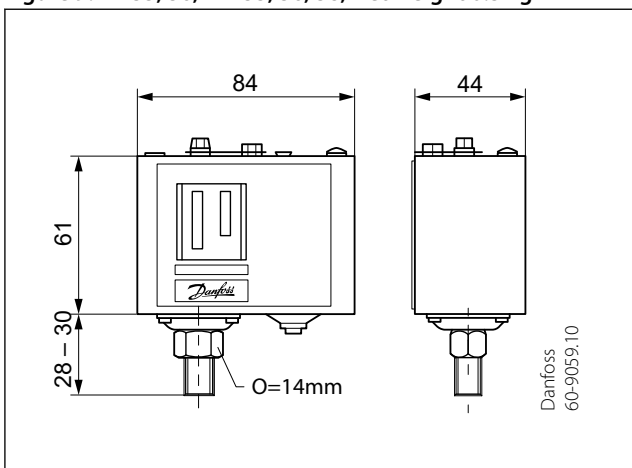


Figure 10: IP55 enclosure

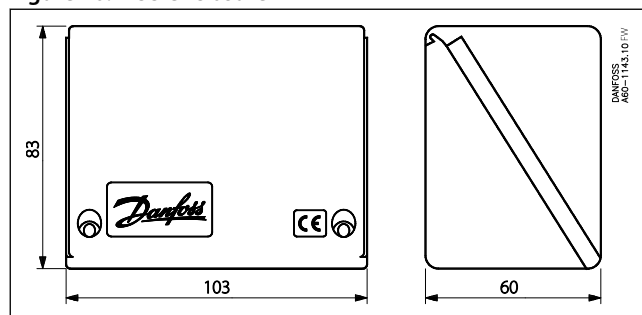


Figure 11: Wall bracket

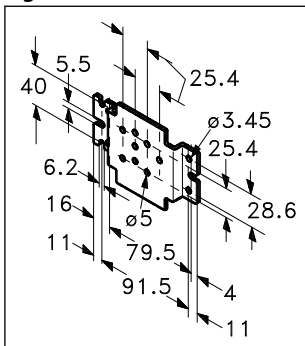


Figure 12: Angle bracket

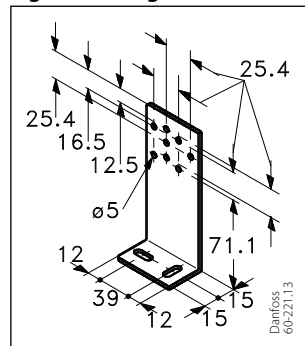
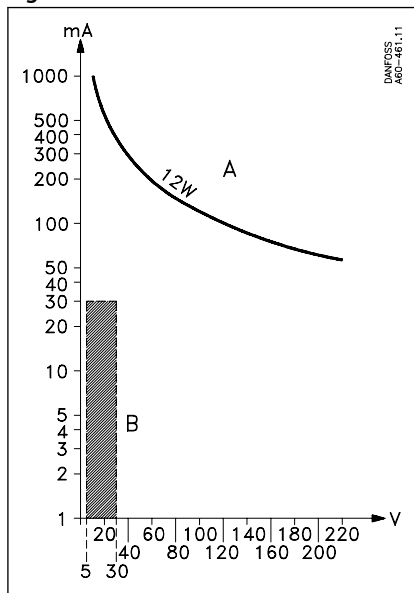


Figure 22: Contact load



A	Gives the maximum load
B	Acceptable load for the gold plating of the contact (DC-13)

Terminology

Range setting / Set point

The pressure range within which the unit will give a signal (contact changeover).

Differential

The difference between contact changeover on rising and falling pressure. The differential is a condition for stable automatic plant operation.

Manual reset

A unit with manual reset can only be restored to operational mode by activation of the external reset button. Min. reset units will restart after the pressure has risen by a value greater than that of the fixed differential. Max. reset units will restart after the pressure has fallen by a value greater than that of the fixed differential.

Automatic reset

Units with automatic reset restart automatically after stop.

Permissible operating pressure

The highest permissible constant pressure or pressure variation the unit can be exposed to.

Maximum test pressure

The maximum pressure applied in strength or leakage tests on heating system or components thereof.

Maximum working pressure

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

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 control remains very accurate and completely independent of the magnitude of the current load.

Current ratings:

Pressure switch and Thermostat, Type KP and KPI

AC – 1	The alternating current rating, in amperes, of the non-inductive, slightly inductive loads or resistive furnaces
AC – 3	The alternating current rating, in amperes, of the squirrel-cage motors: starting, plugging, inching
AC – 15	The alternating current rating, in amperes, of electromagnetic loads (>72VA)
DC – 13	The direct current rating, in amperes, of electromagnets

Ordering

Pressure switch, type KP and KPI

Table 7: Pressure switch, types KP 35 and KP 36

Type	Setting range P _e	Differential	Permissible operating pressure P _e	Max. test pressure	Pressure connection	Contact material	Code no.
	[bar]	[bar]	[bar]	[bar]			
KP 35	-0.2 – 7.5	0.7 – 4.0	17	22	G ¼ A	silver	060-113366 060-113391 ⁽¹⁾
	-0.2 – 7.5	0.7 – 4.0	17	22	G ¼ A	gold-plated	060-504766
	-0.2 – 7.5	0.7 – 4.0	17	22	G ¼ A	silver	060-538666 ⁽²⁾
	-0.2 – 7.5	0.7 – 4.0	17	22	G ¼ A	silver	060-450366 ⁽³⁾
KP 36	2.0– 14.0	0.7 – 4.0	17	22	G ¼ A	silver	060-110866 060-110891
	2.0– 14.0	0.7 – 4.0	17	22	G ¼ A	gold	060-113766
	2.0– 14.0	0.7 – 4.0	17	22	G ¼ A	silver	060-450166 ⁽³⁾
	2.0– 14.0	0.7 – 4.0	17	22	G ¼ A	silver	060-538766 ⁽²⁾
	4.0 – 12.0	0.5 – 1.6	17	22	G ¼ A	silver	060-122166
	4.0 – 12.0	0.5 – 1.6	17	22	G ¼ A	gold	060-114466

⁽¹⁾ Available only in Asia market

⁽²⁾ IP55 transparent enclosure

⁽³⁾ Stainless steel version, IP55 non-transparent enclosure

Table 8: Pressure switch, types KPI 35 – KPI 38

Type	Setting range P _e	Differential	Permissible operating pressure P _e	Max. test pressure	Pressure connection	Contact material	Code no.
	[bar]	[bar]	[bar]	[bar]			
KPI 35	-0.2 – 8.0	0.4 – 1.5	18	18	G ¼ A	silver	060-121766
	-0.2 – 8.0	0.4 – 1.5	18	18	G ¼ A	gold-plated	060-316466
	-0.2 – 8.0	0.5 – 2.0	18	18	G ¼ A	silver	060-121966
	-0.2 – 8.0	0.4 – 1.5	18	18	G ¼ A	silver	060-315766 ⁽⁴⁾
KPI 36	4.0– 12.0	0.5 – 1.6	18	18	G ¼ A	silver	060-118966
	4.0– 12.0	0.5 – 1.6	18	18	G ¼ A	gold-plated	060-113866
	2.0 – 12.0	0.5 – 1.6	18	18	G ¼ A	silver	060-316966
	2.0 – 12.0	0.5 – 1.6	18	18	G ¼ A	silver	060-319366 ⁽⁵⁾
KPI 38	8.0 – 28.0	1.8 – 6.0	30	30	G ¼ A	silver	060-508166
	8.0 – 28.0	1.8 – 6.0	30	30	G ¼ A	silver	060-541866

⁽⁴⁾ IP55 transparent enclosure

⁽⁵⁾ IP55 non-transparent enclosure

Table 9: Pressure switch, types KP 34 – KP 37, boiler version

Type	Setting range p _e	Differential	Reset	Pressure connection	Max. test pressure	Contact material	Code no.
	[bar]	[bar]		[bar]	[bar]		
KP 34	0.1 – 1.0	0.1 – 0.4	Automatic	G ½ A	4.0	silver	060-216466
	0.1 – 1.0	0.2	Manual	G ½ A	4.0	silver	060-216366
KP 35	0.4 – 3.4	0.4 – 2.2	Automatic	G ½ A	10	silver	060-216666
	0.4 – 3.4	0.5	Manual	G ½ A	10	silver	060-216566
KP 36	1.0 – 10.0	0.7 – 4.0	Automatic	G ½ A	17	silver	060-215966
	1.0 – 10.0	0.7	Manual	G ½ A	17	silver	060-216066
KP 37	4.0 – 20.0	1.8 – 3.1	Automatic	G ½ A	28	silver	060-216166
	4.0 – 20.0	3.0	Manual	G ½ A	28	silver	060-216266

Pressure switch and Thermostat, Type KP and KPI

Table 10: Pressure switch, type KP 44

Pressure range		Differential		Permissible operating pressure p_e [bar]	Max. test pressure [bar]	Pressure connection	Contact material	Code no.
Control [bar]	Safety [bar]	Control [bar]	Safety [bar]					
2.0 – 12.0	0.5 – 6.0	0.7 – 4.0	1.0	Left side: 17 Right side: 17	Left side: 25 Right side: 19	2 × G ¼ A	Silver	060-001366

Thermostat, type KP

Table 11: Thermostat, types KP 75 – KP 81

Type	Setting range [°C]	Differential [°C]	Max. sensor temperature [°C]	Capillary tube length [m]	Contact material	Code no.
KP 75	0 – 40	3 – 10	80	Room sensor	silver	060L121266
KP 75	0 – 40	3 – 10	80	Room sensor	gold-plated	060L117166
KP 78	30 – 90	5 – 15	150	2	silver	060L118466
KP 79	50 – 100	5 – 15	150	2	silver	060L112666
KP 81	80 – 150	7 – 20	200	2	silver	060L112566
KP 81	80 – 150	7 – 20	200	3	silver	060L118366
KP 81	80 – 150	7 – 20	200	5	silver	060L117066
KP 81 (max. reset)	80 – 150	8 (max. reset)	200	2	silver	060L115566

Accessories for KP pressure switches

Table 12: KP pressure switches

Part	Symbol	Description	Code no
Brackets with mounting screws and washers		Wall bracket for KP	060-105566
		Angle bracket for KP	060-105666
Screwed cable entry		PG 13.5 with special nut For 6 – 14 mm diameter cables	060-105966
Sealing screw		For sealing the setting on KP	060-105766
Top cover		If a bracket is mounted on the backplate of the housing, the KP thermostats will have an IP44 grade of enclosure. The cover protects the setting spindles	060-109766
Protective cap		Protective cap for KP pressure switches and thermostats. To protect the unit against rain and humidity. Grade of enclosure: IP44 Material: Polyethylene Max. ambient temperature: 65 °C Min. ambient temperature: -40 °C	060-003166
IP55 nontransparent enclosure		If the unit risk being exposed to heavy water influence a better grade of enclosure can be achieved when mounting product in a special IP55 enclosure	060-033066
IP55 transparent enclosure		If the unit risk being exposed to heavy water influence a better grade of enclosure can be achieved when mounting product in a special IP55 enclosure	060-062866

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.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

Table 15: Certificates, declaration and approvals

Document name	Document type	Document topic	Approval authority
BK_W_0862_01_2018	Food and Health - Performance Certificate		PZH
RU Д-ДК.ГА02.В.03367	EAC Declaration	EMC	EAC
RU C-ДК.БЛ08.В.00063_18	Electrical - Safety Certificate	EMC/LVE	EAC
ELE-086320XG-003	Marine - Safety Certificate		RINA
UA.10146.D.00075-19	UA Declaration	EMCD/LVD	LLC CDC EURO TYSK

- CE-marked in accordance with LVD 2014/35/EU: EN 60947-1, EN 60947-4-1, EN 60947-5-1
- Underwriters Laboratories Inc., UL
- China Compulsory Certificate, CCC (excluding boiler versions)

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