**Data sheet**

# Pressure switches and thermostats, types KP and KPI

**Contents**

## ISO 9001 quality approval

Danfoss A/S is certificated by BSI in accordance with international standard ISO 9001. This means that Danfoss fulfils the international standard in respect of product development, design, production and sale. BSI exercises continuous inspection to ensure that Danfoss observes the requirements of the standard and that Danfoss' own quality assurance system is maintained at the required level.

## Features

KP/KPI
illustrated is KPI 35
with top cover

- Wide regulating range
- Can be used for pumps and compressors
- Small dimensions.
  Space-saving – easy to install in panels
- Shock and impact resistant
- Ultra-short bounce times.
  Limits wear to an absolute minimum and increases reliability
- Electrical connection from front of unit. Makes rack mounting easier and also saves space
- Suitable for both alternating current and direct current
- Cable entry for 6-14 mm diameter cables
- Screwed cable entry makes rewiring easy.
  Standard screwed cable entry
  Pg 13.5 and Pg 16

## Description

Danfoss KP/KPI pressure switches are used for regulating, monitoring and alarm systems in industry.
KP pressure switches are recommended for gaseous media (also water, but only when mounted directly on the pipe - do not use capillary tube mounting).

KPI pressure switches are suitable for plant in connection with liquid and gaseous media.
The pressure switches are fitted with a single-pole switch changeover (SPDT). The position of the switch depends on the setting of the pressure control and the pressure in the connector.

## Definitions

*Range setting*
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.

*Automatic reset*
Units with automatic reset restart automatically after stop.
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

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

## Ordering

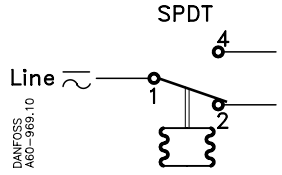
Pressure switches type **KP 35 and 36**

| Setting range $p_e$ [bar] | Differential [bar] | Permissible operating pressure $p_e$ [bar] | Max. test pressure [bar] | Pressure connection | Contact material | **Code no.** | Type |
|---|---|---|---|---|---|---|---|
| −0.2 → 7.5 | 0.7 → 4 | 17 | 22 | G ¼ A | Ag | **060-113366** | KP 35 |
| | | | | | Au | **060-504766** | |
| 2 → 14 | 0.7 → 4 | 17 | 22 | G ¼ A | Ag | **060-110866** | KP 36 |
| | | | | | Au | **060-113766** | |
| 4 → 12 | 0.5 → 1.6 | 17 | 22 | G ¼ A | Ag | **060-122166** | KP 36 |
| | | | | | Au | **060-114466** | |

Pressure switches **type KPI 35 - 38**

| Setting range $p_e$ [bar] | Differential [bar] | Permissible operating pressure $p_e$ [bar] | Max. test pressure [bar] | Pressure connection | Contact material | **Code no.** | Type |
|---|---|---|---|---|---|---|---|
| −0.2 → 8 | 0.4 → 1.5 | 18 | 18 | G ¼ A | Ag | **060-121766** | KPI 35 |
| | | | | | Au | **060-316466** | |
| −0.2 → 8 | 0.5 → 2 | 18 | 18 | G ¼ A | Ag | **060-121966** | KPI 35 |
| 4 → 12 | 0.5 → 1.6 | 18 | 18 | G ¼ A | Ag | **060-118966** | KPI 36 |
| | | | | | Au | **060-113866** | |
| 2 → 12 | 0.5 → 1.6 | 18 | 18 | G ¼ A | Ag | **060-316966** | KPI 36 |
| 8 → 28 | 1.8 → 6 | 30 | 30 | G ¼ A | Ag | **060-508166** | KPI 38 |

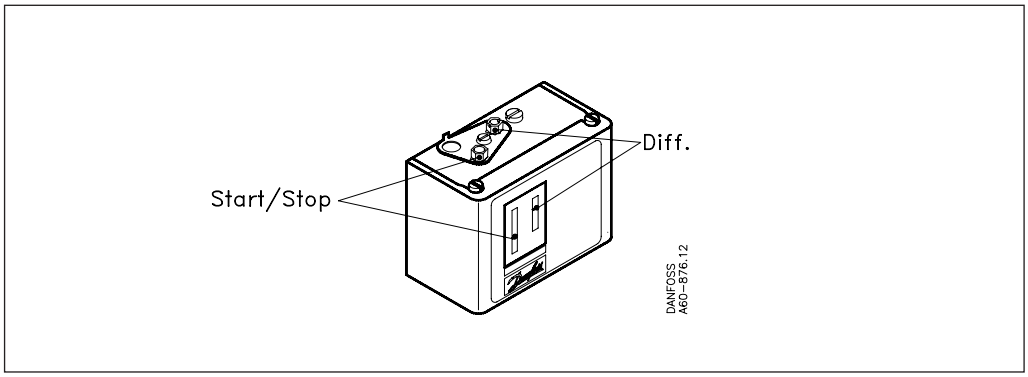
## Technical data

| Description | | KP 35, 36 | KPI 35, 36 | KPI 38 |
|---|---|---|---|---|
| Ambient temperature°C | | −40 °C - +65 °C (for short periods up to +80 °C) | | |
| Media temperature °C | | −40 °C - +100 °C | | |
| Media | | Gaseous media (also water, but only when mounted directly on the pipe - do not use capillary tube mounting). | Gaseous media and liquids | |
| Parts in contact with medium | Bellows | Tinbronze W.no. 2.1020 to DIN 17662 | Tinbronze W.no. 2.1020 to DIN 17662 | |
| | Pressure connector | Free-cutting steel (nickel plated) W. no. 1.0737 to EN 10277-3 | Brass W. no. 2.0401 to DIN 17660 | Free-cutting steel (nickel plated) W. no. 1.0737 to EN 10277-3 |
| Contact system | | Single-pole changeover switch (SPDT)   | | |
| Contact load, Ag contact set<br><br><br><br>Contact material AgCdO | | **Alternting current:**<br>AC-1: 16 A, 400 V<br>AC-3: 16 A, 400 V<br>AC-15: 10 A, 400 V<br>**Direct current:**<br>DC-13 12 W, 220 V | **Alternating current:**<br>AC-1: 10 A, 440 V<br>AC-3: 6 A, 440 V<br>AC-15: 4 A, 440 V<br>**Direct current:**<br>DC-13 12 W, 220 V | |
| Contact load, Au contact set | | See information page 4 | | |
| Enclosure, IP 33 grade | | Unit must be mounted on a flat surface/ a flat fitting and all unused holes covered | | |
| Enclosure, IP 44 grade | | Mounted as IP 33 plus fitting of top cover, code no. **060-109766** | | |
| Cable connection | | Entry for 6-14 mm diameter cables | | |
| Mounted on back plate/ wall bracket | | Vibration proof in the range 0 to 1000 Hz, 4 g ( 1 g = 9.81 m/s$^2$) | | |
| Mounted on angle bracket | | Not recommended in areas where vibrations occur | | |
| Approvals | | EN 60 947-4,5<br>RINA, Registro Italiano Navale<br>RMRS, Maritime Reg. of Shipping, Russia<br>UL approved version are available<br>CCC, China Compulsory Certificate | EN 60 947-4,5 | |

**Setting**

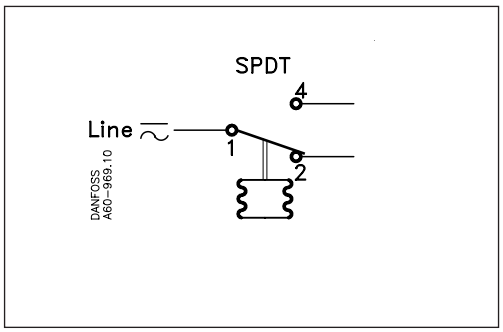
KP/KPI pressure switches with automatic reset:
Set the upper limit pressure on the range scale

Then set the lower limit pressure on the DIFF scale (the upper limit minus the differential).



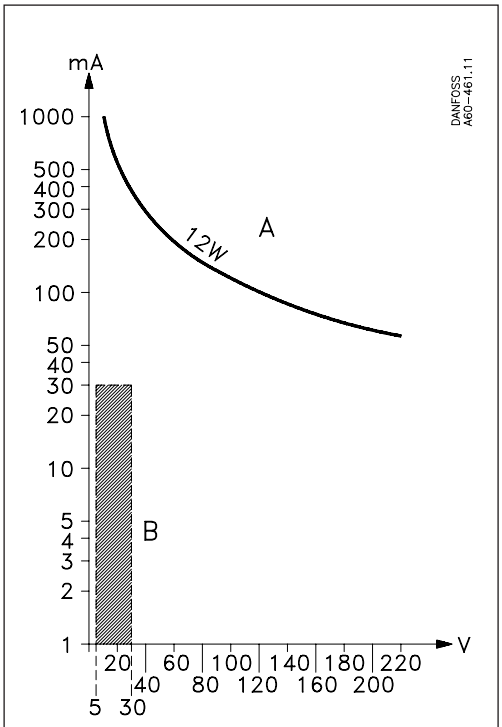

**Gold contacts**

Contact system
Single-pole changeover switch (SPDT) Contact material: Gold-plated silver




Contact load (when Au surface is burnt away)
Alternating current:
Ohmic load: AC-1: 10 A, 440 V
Inductive load: AC-3: 6 A, 440 V
AC-15: 4 A, 440 V

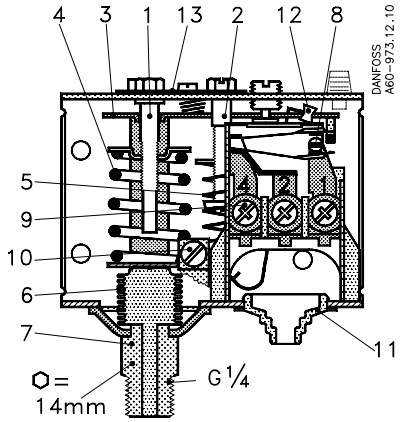
Direct current: DC-13 12 W, 220 V,



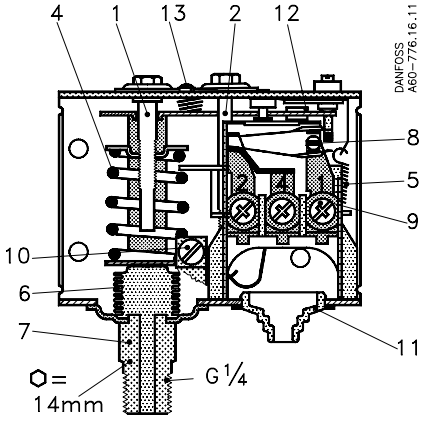

Curve A gives the maximum load.
Hatched area B: Acceptable load for the gold plating of the contact.

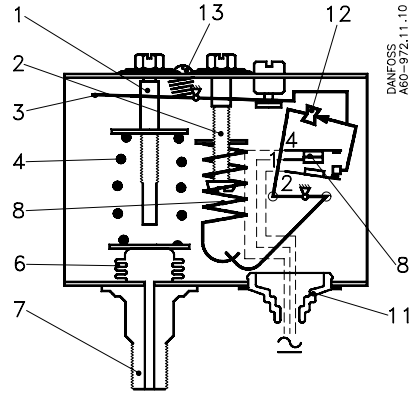
## Design and function

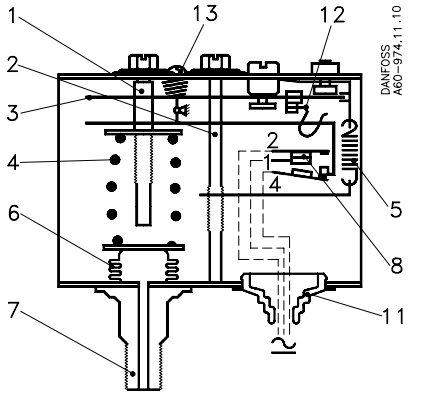
Drawing showing principle of **KP** pressure switches




Drawing showing principle of **KPI** pressure switches




1. Setting spindle
2. Differential setting spindle
3. Main arm
4. Main spring
5. Differential spring
6. Bellows
7. Connector
8. Contact system
9. Connection terminals
10. Earth terminal
11. Cable entry
12. Omega spring (KPI)
12. Tumbler (KP)
13. Locking screw (KPI)
13. Locking plate (KP)

## KP features

The contact system in KP pressure switches has a snap function. This means that the bellows is active only when the cut-in or cut-out value is reached.
The bellows is connected to the pressure of the controlled plant via the connector (7).

The design of KP pressure switches gives the following advantages:

- High contact load
- Ultra-short bounce times
- Vibration-proof in the range 0-1000 Hz, 4 g (1 g = 9.81 m/s2)
- Long operating life
- High pulsation protection
- Small dimensions – Easy to mount in panels

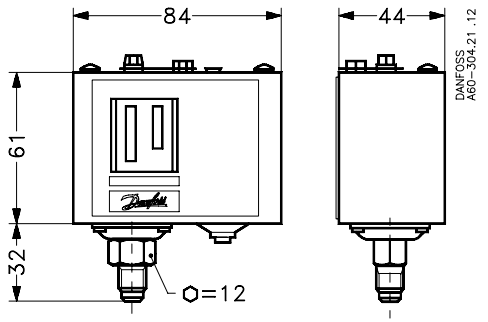
## KPI features

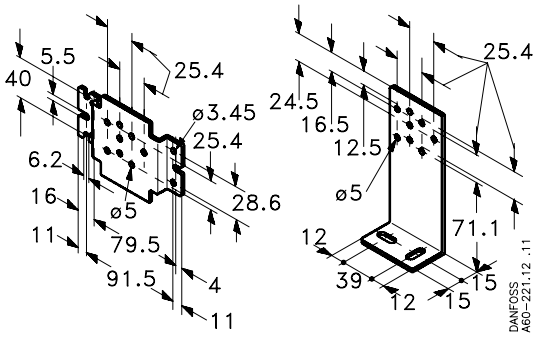
Danfoss KPI pressure switches are designed so that the bellows moves in the same proportion as the pressure change.
To ensure a snap function on contact change-over, an omega spring is located between bellows and contact system.

The design of KPI pressure switches gives the following advantages:

- High contact load
- Ultra-short bounce times
- Vibration-proof in the range 0-1000 Hz, 4 g (1 g = 9.81 m/s2)
- Long operating life
- Can be used for both liquids and gases
- Small dimensions – Easy to mount in panels

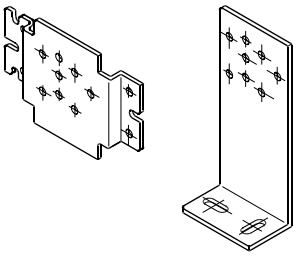
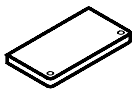
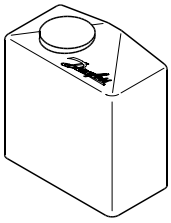
**Dimensions and weights**




Pressure switches KP 35, KP 36,
KPI 35, KPI 36 and KPI 38:
Weight approx. 0.3 kg

**Accessories for KP/ KPI pressure switches**

| Part | Symbol | Description | Total | **Code no.** |
|---|---|---|---|---|
| Brackets with mounting screws and washers |  | Wall bracket | 10 | **060-105566** |
| | | Angle bracket | 10 | **060-105666** |
| Screwed cable entry |  | Screwed cable entry<br>Pg 13.5 with special nut<br>for 6-14 mm cables<br>A standard Pg 16 screwed cable entry can be used for 8-16 mm cables | 5 | **060-105966** |
| Sealing screw |  | For sealing the setting on KP | 20 | **060-105766** |
| Top cover |  | If a bracket is mounted on the bracketplate of the housing, the KP/KPI pressure switch will have an IP 44 grade of enclosure.<br>The cover covers the setting spindles | 10 | **060-109766** |
| Protective cap |  | Protective cap for KP/KPI pressure switches.<br>To protect the unit against rain and humidity.<br>Grade of enclosure: IP 44<br>Material: Polyethylene<br>Max. ambient temperature: 65°C<br>Min. ambient temperature: –40°C | 7 | **060-003166** |

## Features


KP 44

- Wide regulating range
- Can be used for pumps and compressors
- Small dimensions.
  Space-saving – easy to install in panels
- Ultra-short bounce times.
  Limits wear to an absolute minimum and increases reliability
- Electrical connection from front of unit. Makes rack mounting easier and also saves space
- Suitable for both alternating current and direct current
- Cable entry for 6-14 mm diameter cables
- Screwed cable entry makes rewiring easy.
  Standard screwed cable entry
  Pg 13.5 and Pg 16
- Efficient protection of water pumps in case of water supply fails.

## Description

Danfoss dual pressure switch KP 44 is designed for use as a pump guard to control and protect supply water pumps. The KP 44 pump guard combines the function of a pressure switch and a flow monitoring device.

The lefthand pressure bellows switches the pump pressure. The righthand bellows cuts out the pump if the pump suction pressure is too low. In this way the pump is protected from running dry and consequent bearing damage.

## Definitions

*Range setting*
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.

*Automatic reset*
Units with automatic reset restart automatically after stop.
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

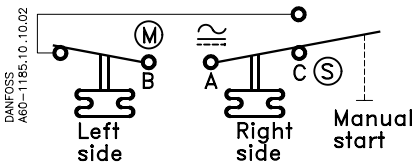
*Permissible operating pressure*
The highest permissible constant pressure or pressure variation the unit can be exposed to.

## Ordering

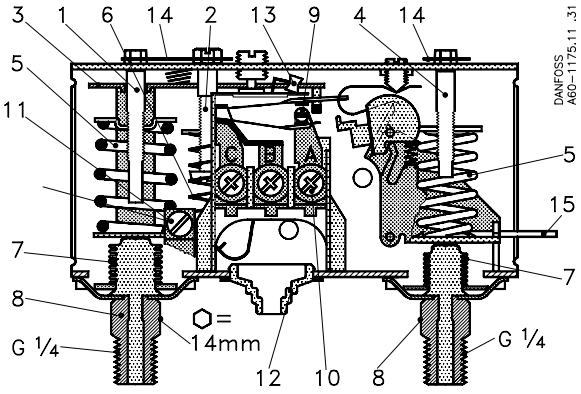
Pressure switch type KP 44, IP 22

| 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 → 12 | 0.5 → 6 | 0.7 → 4.0 | 1.0 | LP/HP: 17 | 22 | 2 × G ¼ A | Ag | **060-001366** |

**Technical data**

| | | |
|---|---|---|
| Ambient temperature °C | | –40°C to +65°C (for short periods up to +80°C) |
| Media temperature °C | | Max. + 100°C |
| Media | | Fresh water |
| Parts in contact with media | Bellows | Tinbronze W.no. 2.1020 to DIN 17662 |
| | Pressure connector | Free-cutting steel (nickel plated) W. no. 1.0737 to EN 10277-3 |
|  | | |
| Contact material AgCdO | | **Alternating current:**<br>AC-1: 16 A, 400 V<br>AC-3: 16 A, 400 V<br>AC 15: 10 A 400 V<br><br>**Direct current:**<br>DC-13: 12 W, 220 V |
| Approvals | | EN 60 947-4.-5 |
| Cable connection | | Entry for 6-14 mm diameter cables |
| Mounted on backplate or wall bracket | | Vibration-proof in the range 0-1000 Hz, 4g (1g = 9.81m/s$^2$) |
| Mounting on angle bracket | | Not recommended for areas where vibration occurs |

## Design and function



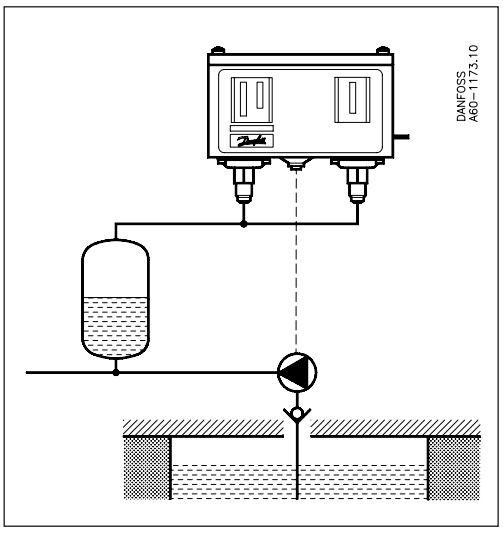

1. Lefthand pressure setting spindle
2. Differential setting spindle
3. Main arm
4. Righthand pressure setting spindle
5. Main spring
6. Differential spring
7. Bellows
8. Pressure connections
9. Switch
10. Terminal
11. Earth terminal
12. Cable entry
13. Tumbler
14. Locking plate
15. Impulse lever

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

***Water supply from reservoir or well***

If water is running short in the well or reservoir, the pump will no longer be able to increase the pressure to the cut-out value. Consequently the pump will keep running - perhaps without water. However, the KP 44 pump guard will stop the pump as soon as the righthand bellows pressure drops below the safety cut-out setting.

The pump can be started again by lifting the impulse lever. The pump will continue to operate when the impulse lever is released, provided that the righthand bellows pressure is higher than the safety cut-out setting plus a fixed differential of 1 bar. If this is not the case, the pump will cut-out again indicating insufficient water supply.

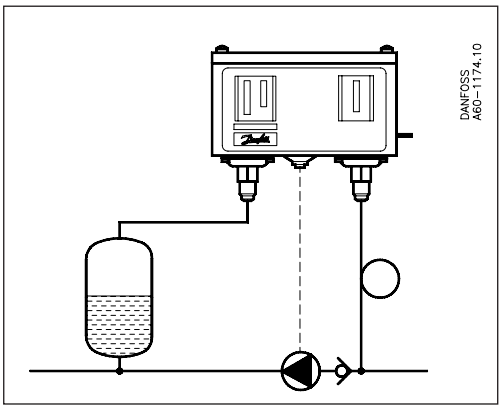



In a hydrophore system where water is pumped from a well or an open tank, both bellows are connected to a pressure outlet on the air side in the pump pressure line, if possible.

***Pressurized water supply direct to pump***

When water supply fails on the inlet side, the pump will no longer be able to boost the pressure to the cut-out value. Consequently the pump will keep running - perhaps without water. However, the KP 44 pump guard will stop the pump as soon as the pressure in the pump suction line drops below the safety cut-out setting. The pump will automatically start again when the pump suction pressure has reached the level of 1 bar above the safety cut-out setting.

Automatic start-up will only take place if the righthand bellows is connected to the pump suction line. Air pockets should be avoided to prevent the pump from starting up on air pressure rise, without the presence of water.




In a booster system receiving pressurized water the righthand bellows is connected

- to the low pressure side of the pump for automatic start-up.
- to the high pressure side of the pump for manual start-up.

The lefthand bellows is always connected to the high pressure side of the pump.

## Pressure settings

*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.

| 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* bar |

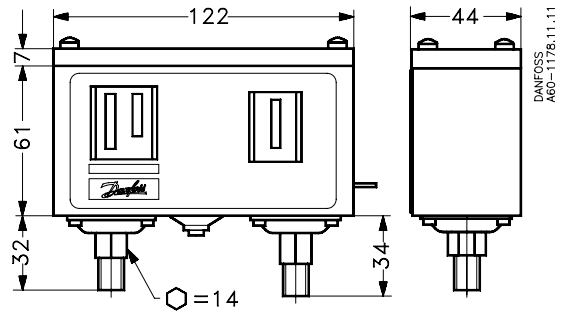
* 6.0 bar is the normal max. setpoint

*Control pressure settings*
Control pressure cut-out setpoint is set on the lefthand pressure setting scale.

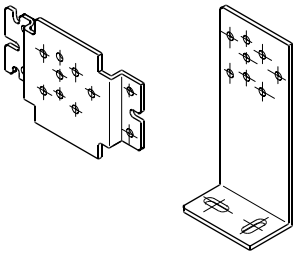
The differential is set between 0.7 and 4 bar. The control pressure cut-in setting will be the cut-out control pressure less the differential.

## Dimensions and weight

Weight approx. 0.5 kg




## Accessories for KP 44 pressure switches

| Part | Symbol | Description | Total | **Code no.** |
|---|---|---|---|---|
| Brackets with mounting screws and washers |  | Wall bracket | 10 | **060-105566** |
| | | Angle bracket | 10 | **060-105666** |
| Screwed cable entry |  | Screwed cable entry<br>Pg 13.5 with special nut<br>for 6-14 mm cables<br>A standard Pg 16 screwed cable entry can be used for 8-16 mm cables | 5 | **060-105966** |
| Sealing screw |  | For sealing the setting on KP | 20 | **060-105766** |

## Features

- Wide regulating range
- Small dimensions
  Space-saving - easy to install in panels
- Ultra-short bounce time.
  Limits wear to an absolute minimum and increases reliability.
- Electrical connection at front of unit.
  Makes rack mounting easier and also saves space
- Suitable for both alternating current and direct current
- Cable entry for 6-14 mm diameter cables
- Screwed cable entry makes rewiring easy
- Standard screwed cable entry Pg 13.5 and Pg 16

## Description

Danfoss KP thermostats are used for regulating, monitoring and alarm systems in industry.
KP thermostats are temperature-operated electric circuit breakers. The thermostats are fitted with a single-pole 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 about 2 kW.

## Definitions

*Differential*
The difference between cut-in and cut-out temperature. The differential is a condition for stable automatic plant operation.

*Mechanical differential (intrinsic differential)*
The differential set on the differential spindle of the unit.

*Working differential (thermal differential)*
The differential on which the plant operates. The working differential is the sum of the mechanical differential and the differential arising from the time constant.

*Reset*
1. *Manual reset.*
   Resets only when the reset button is pressed. Min. reset units will restart after the temperature at the thermostat sensor has risen by a value greater than that of the fixed differential. Max. reset units will restart after the temperature at the thermostat sensor has fallen by a value greater than that of the fixed differential

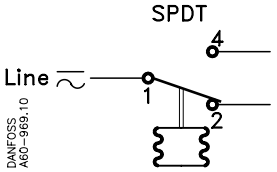
2. *Automatic reset.*
   Units with automatic reset restart automatically after stop.

## Ordering

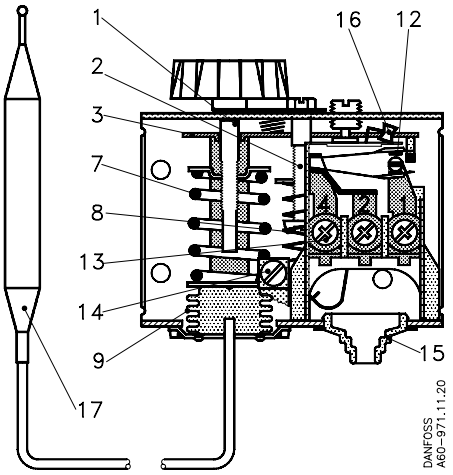
**Thermostats type KP 75 - KP 81**

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

## Technical data

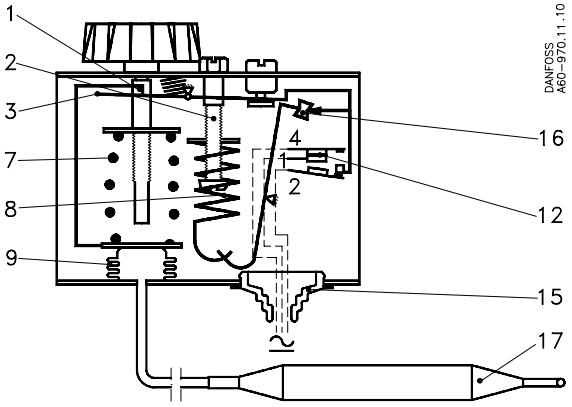
| | |
|---|---|
| Ambient temperature °C | –40 °C - +65 °C (for short periods up to +80 °C) |
| Sensor material | Tinned copper Cu/Sn5 |
| Contact system |  <br>Single-pole changeover switch (SPDT) |
| Contact load, Ag contact set<br><br><br><br>Contact material AgCdO | **Alternating current:**<br>AC-1: 16 A, 400 V<br>AC-3: 16 A, 400 V<br>AC-15: 10 A, 400 V<br><br>**Direct current:**<br>DC-13: 12 W, 220 V |
| Contact load, Au contact set | See Information page 14 |
| Enclosure, IP 33 grade | Unit must be mounted on a flat surface / a flat fitting and all unused holes covered |
| Enclosure, IP 44 grade | Mounted as IP 33 olus fitting of top cover, code no. **060-109766** |
| Approvals | EN 60 947-4. -5<br>RINA, Registro Italiano Navale<br>RMRS, Maritime Reg. of Shipping, Russia<br>Bureau Veritas<br>Germanischer Lloyd, Germany<br>DNV, Det Norske Veritas, Norway<br>UL approved version are available<br>CCC, China Compulsory Certificate |
| Cable connection | Entry for 6-14 mm diameter cable |
| Mounted on backplate or wall bracket | Vibration-proof in the range 0-1000 Hz, 4 g (1 g = 9.81 m/s$^2$) |
| Mounted on angle bracket | Not recommended for areas where vibration occurs |

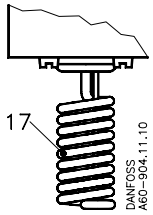
## Design and function




1. Temperature setting spindle
2. Differential setting spindle
3. Main arm
7. Main spring
8. Differential spring
9. Bellows
12. Contact system
13. Connection terminals
14. Earth terminal
15. Cable entry
16. Tumbler
17. Sensor

KP 78, KP 79, KP 81




KP 75 room sensor

Drawing showing principle of KP thermostats

The contact system in KP thermostats has a snap function. This means that the bellows is active only when the cut-in or cut-out value is reached.

The design of KP thermostats gives the following advantages:

- High contact load
- Ultra-short bounce times.
  Limits wear to an absolute minimum and increases reliability.
- Vibration-proof in the range 0-1000 Hz, 4 g (1 g = 9.81 m/s2)
- Long operating life

## Setting

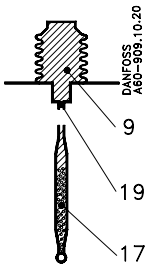
*Thermostats with automatic reset*
Set the upper limit temperature on the range scale. Then set the differential on the DIFF scale.
The temperature set on the range scale is also the temperature at which contact changeover re-occurs on rising temperature.
The contacts changeover when the temperature 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

## Charges

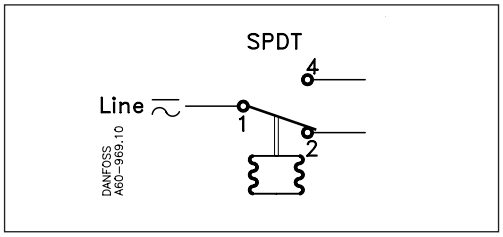
*Absorption charge*
The charge consists partly of a superheated gas and partly of a solid substance with a large absorption surface.
The solid substance is concentrated in the sensor (17), and consequently it is always the sensor that comprises the temperature-regulating part of the thermostatic element.
The sensor can be placed both warmer or colder than the thermostat housing and capillary tube. However, placing it in an ambient temperature higher or lower than +20 °C can affect the accuracy of the scale.




9. Bellows
19. Capillary tube
17. Sensor

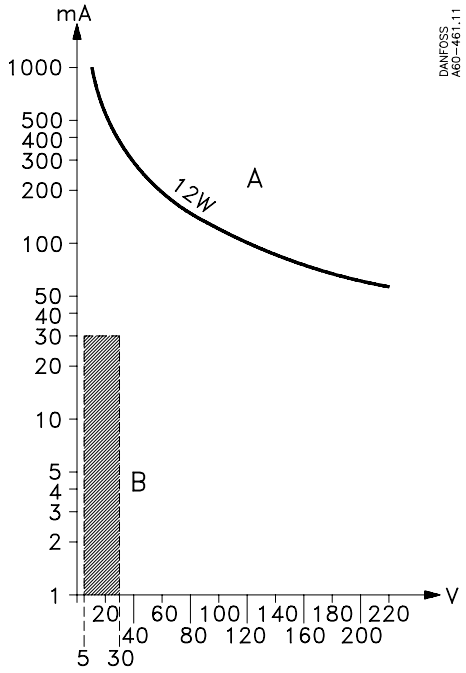
## Gold contacts

*Contact system*
Single-pole changeover switch (SPDT)
Contact material: Gold-plated silver



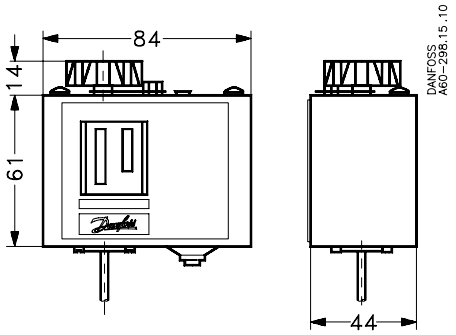

*Contact load* (when Au surface is burnt away)
Alternating current:

| | | |
|---|---|---|
| Ohmic load: | AC-1: | 10 A, 440 V |
| Inductive load: | AC-3: | 6 A, 440 V |
| | AC-15: | 4 A, 440 V |
| Direct current: | DC-13: 12 W, 220 V | |

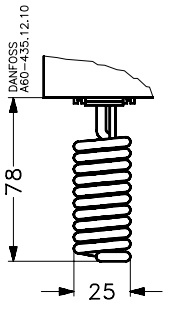



Curve A gives the maximum load.
Hatched area B: Acceptable load for the gold plating of the contact.

**Dimensions and weight**

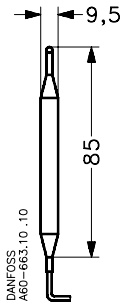



Thermostats KP 75, KP 78, KP 79, KP 81
Weight approx. 0.4 kg

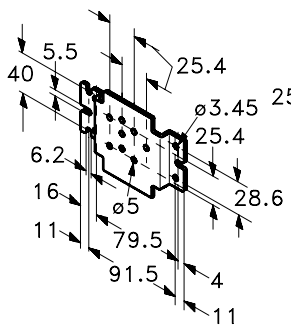



KP 62

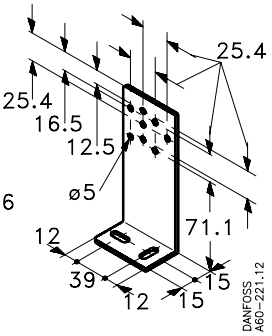
KP 75
Sensor: Tinned copper Cu/Sn 5




KP 78, 79, 81
Sensor: Tinned copper Cu/Sn 5

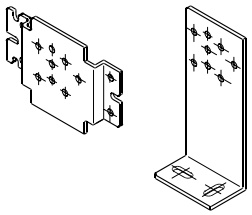
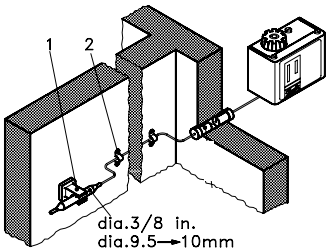
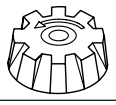
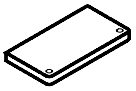
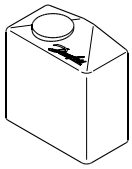
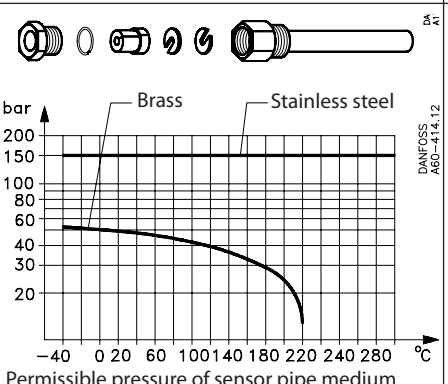
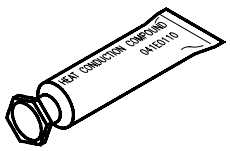



Wall bracket




Angle bracket

**Accessories for KP thermostats**

| Part | Symbol | Description | Total | Code no. |
|---|---|---|---|---|
| Brackets with mounting screws and washers |  | Wall bracket for KP | 10 | **060-105566** |
| | | Angle bracket for KP | 10 | **060-105666** |
| Capillary tube gland |  | Oil-resistant rubber gasket for max. 110°C and 90 bar | 5 | **060-422066** |
| Sensor holder |  | Sensor holder for wall mounting with four capillary tube clips and 9-off 12 mm pins | 20 | **017-420166** |
| Knob |  | | 20 | **060-106366** |
| Screwed cable entry |  | PG 13.5 with special nut<br>For 6-14 mm diameter cables<br>A standard Pg 16 cable entry can be used for 8-16 mm diameter cables | 5 | **060-105966** |
| Sealing screw |  | For sealing the setting on KP | 20 | **060-105766** |
| Top cover |  | If a bracket is mounted on the backplate of the housing, the KP thermostat will have an IP 44 grade of enclosure.<br>The cover protects the setting spindles. | 10 | **060-109766** |
| Protective cap |  | Protective cap for KP thermostats.<br>To protect the unit against rain and humidity.<br>Grade of enclosure: IP 44<br>Material: Polyethylene<br>Max. ambient temperature: 65°C<br>Min. ambient temperature: −40°C | 7 | **060-003166** |
| Sensor pocket |  <br>Permissible pressure of sensor pipe medium | For all KP thermostats with cylindrical remote sensor.<br>Sensor pocket, gasket and union for screwing into G½ connectors welded onto tues, containers, etc.<br><br>Int. diameter 9.6 mm, insert depth 112 mm (brass). Ext. diameter 11 mm<br><br>Int. diameter 9.6 mm, insert depth 112 mm (st 18/8). Ext. diameter 11 mm<br><br>Int. diameter 9.6 mm, insert depth 465 mm (brass). Ext. diameter 11 mm<br><br>Media temperature for sensor : 250 °C<br>This temperature can be increased by applying a different gasket material | <br><br>1<br><br>1<br><br>1 | <br><br>**017-437066**<br><br>**017-436966**<br><br>**017-421666** |
| Heat-conductive aluminium paste |  <br>Tube | For KP and RT thermostats with sensor mounted in a sensor pocket.<br>Temperature range: −20 to 150°C (short-lived + 220°C)<br><br>Tube with 5 g aluminium paste | 1 | **041E0114** |

**IP 33/44 enclosure**

IP 33 grade of enclosure is obtained by mounting the unit on a flat surface or a flat fitting and then covering all unused holes.
IP 44 grade of enclosure is obtained by mounting the unit as for IP 33 grade of enclosure and then fitting a top cover, code no. **060-109766.**
Alternatively the unit can be mounted in a poly-ethylene protective cap, type no. **060-003166.**

**IP testing**

An IP grade of enclosure certification is obtained when the product has been submitted to an IP test.
The IP classification contains two digits, the first IP digit denoting the degree of enclosure against foreign bodies, the second digit denoting the degree of watertightness.
The corresponding tests are as follows:

| IP 1st digit | **Foreign body test** | IP 2nd digit | **Watertightness test** [1]) |
|---|---|---|---|
| 0 | No test | 0 | No test |
| 1 | A ball of ∅50 mm cannot enter | 1 | Vertically falling drops, dripping water |
| 2 | A ball of ∅12.5 mm and a test probe of ∅12 mm, L = 80 mm, cannot be inserted | 2 | Vertically (±15°) falling drops |
| 3 | A rod of ∅2.5 mm cannot enter | 3 | Water sprays ±60° from vertical |
| 4 | A wire of ∅1 mm cannot enter | 4 | Water sprays from all directions |
| 5 | As 4 + Dust in amounts that might cause damage cannot enter | 5 | Water jets from all directions, 12 l/mm |
| 6 | As 4 + Dust cannot enter | 6 | Water jets from all directins, 100 l/mm |
| | | 7 | Immersion in 1 m water |
| | | 8 | Subject to agreement |

[1]) After all these tests, water in amounts that might cause damage must not have entered the enclosure and not have collected in electrically conductive parts or cable entries.