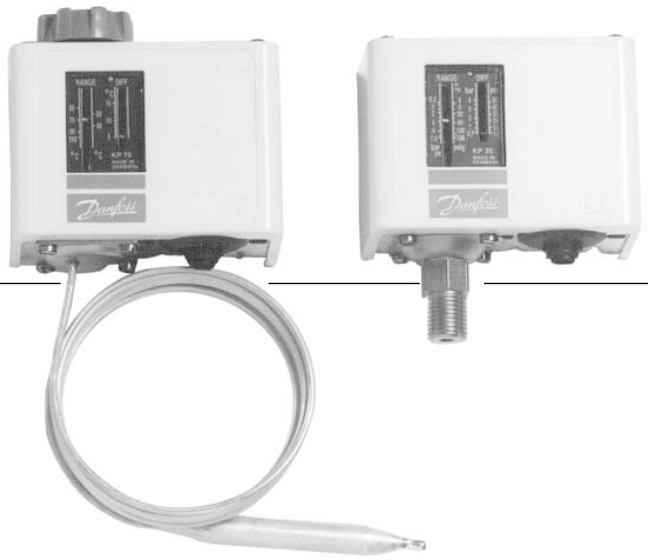
Data sheet



Pressure controls and thermostats types KPI and KP

June 2000

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Introduction

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.

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

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

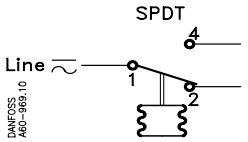
2. *Automatic reset.*
   Units with automatic reset restart automatically after stop.

Ordering

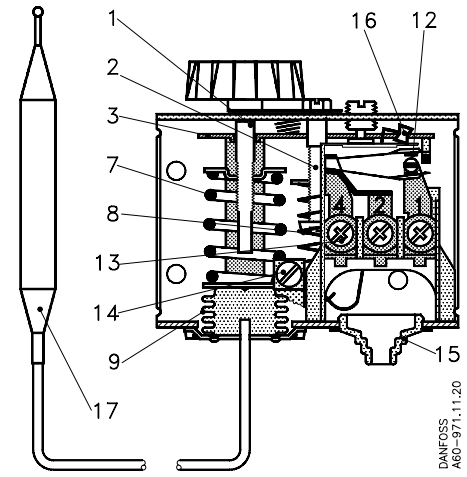
Thermostats **type KP 75 - KP 81**

Setting range p_e [°C]	Differential [°C]	Max. sensor temperature [°C]	Capillary tube length m	Contact Material	**Code no.**	Type
0 → 40	3 → 10	80	Room sensor	Ag	**060L1212**	KP 75
				Au	**060L1171**	
30 → 90	5 → 15	150	2	Ag	**060L1184**	KP 78
				Au	**060L1213**	
50 → 100	5 → 15	150	2	Ag	**060L1126**	KP 79
				Au	**060L1214**	
50 → 100	5 → 15	150	5	Ag	**060L1169**	KP 79
				Au	**060L1220**	
80 → 150	7 → 20	200	2	Ag	**060L1125**	KP 81
				Au	**060L1215**	
80 → 150	7 → 20	200	3	Ag	**060L1183**	KP 81
				Au	**060L1216**	
80 → 150	7 → 20	200	5	Ag	**060L1170**	KP 81
				Au	**060L1217**	
80 → 150	8 (Max. reset)	200	2	Ag	**060L1155**	KP 81 (max. reset)
				Au	**060L1218**	

Technical data

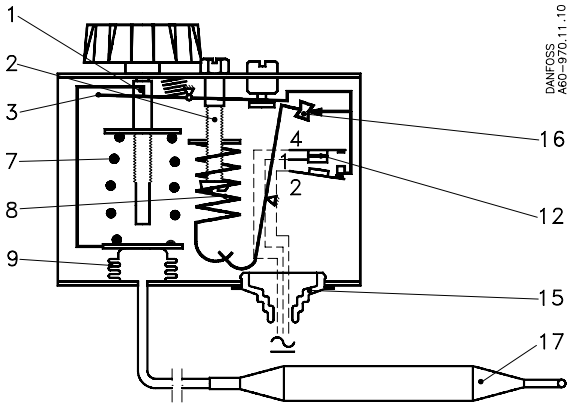
Ambient temperature °C	–40 °C - +65 °C (for short periods up to +80 °C)
Sensor material	Tinned copper Cu/Sn5
Contact system	 Single-pole changeover switch (SPDT
Contact load, Ag contact set Contact material AgCdO	**Alternating current** AC-1: 16 A,400 V AC-3: 16 A, 400 V AC-15: 10 A, 400 V **Direct current:** DC-13: 12 W, 220V
Contact load, Au contact set	See information page 16
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. **060-1097**
Approvals	EN 60 947-4,-5 RINA, Regristro Italiano Navale MRS, Maritime Reg. of Shipping, Russia Bureau Veritas Germanischer Lloyd, Germany DNV, Det norske Veritas, Norway Polski Rejestr Statkow, Poland UL approved version are available
Cable connection	Entry for 6-14 mm diameter cables
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

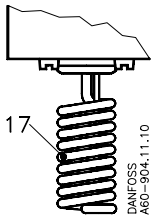


KP 78, KP 79, KP 81

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



Drawing showing principle of KP thermostats



KP 75 room sensor

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/s^2)
- Long operating life

Setting

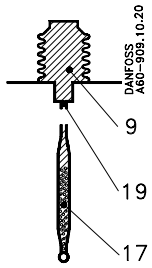
Thermostats with automatic reset
Set the upper limit temperature on the range scale. Then set the differential on the DIFF scale.
The temperature set on the range scale is also the temperature at which contact changeover re-occurs on rising temperature.
The contacts changeover when the temperature has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

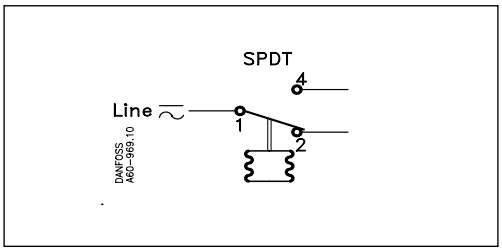
Absorption charge
The charge consists partly of a superheated gas and partly of a solid substance with a large absorption surface.
The solid substance is concentrated in the sensor (17), and consequently it is always the sensor that comprises the temperature-regulating part of the thermostatic element.
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

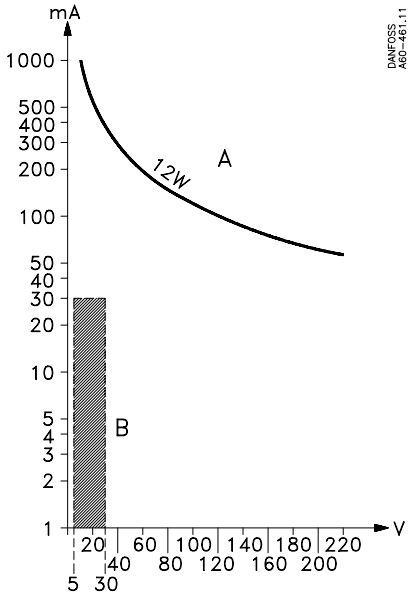
Gold contacts

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



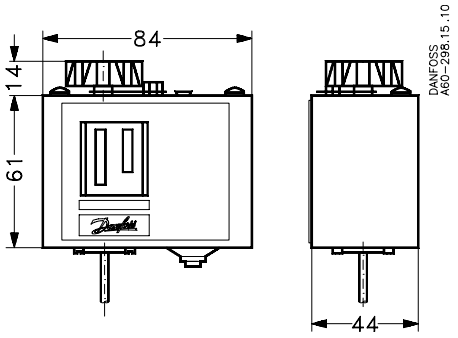
Contact load
Alternating current:

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

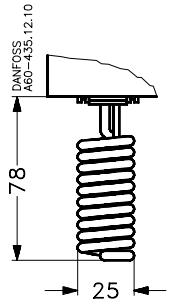


Curve A gives the maximum load.
Hatched area B: Acceptable load for the gold plating of the contact.

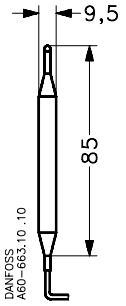
Dimensions and weight



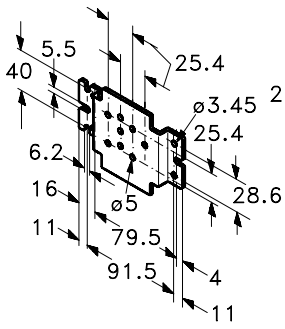
Thermostats KP 75, KP 78, KP 79, KP 81
Weight approx. 0.4 kg



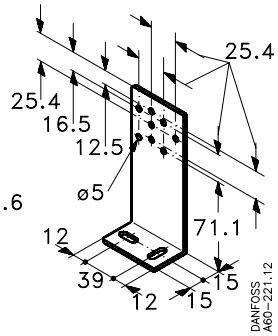
KP 75
Sensor: Tinned copper Cu/Sn 5



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

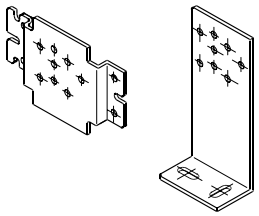
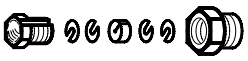
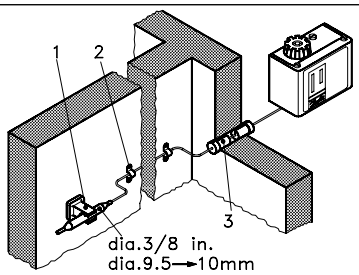
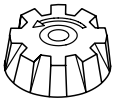
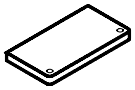
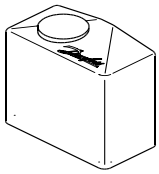
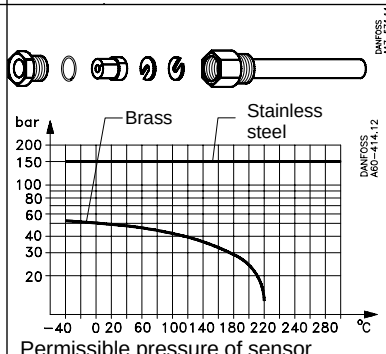
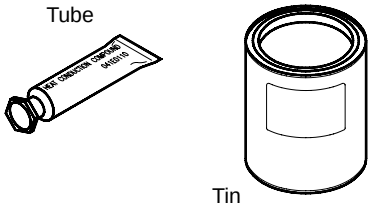


Wall bracket



Angle bracket

Accessories for KP thermostats

Part	Symbol	Description	Total	Code no.
Brackets with mounting screws and washers		Wall bracket for KP	10	**060-1055**
		Angle bracket for KP	10	**060-1056**
		4-off screws M4×5 + 4-off washers	1	**060-1054**
Capillary tube gland		Oil-resistant rubber gasket for max. 110 °C and 90 bar	5	**017-4220**
Sensor holder		For thermostats with ∅9.5 mm sensors	1	**017-4157**
		Rubber plug for wall entry ∅13x20 mm	1 set	**017-5392**
		Sensor holder for wall mounting with four capillary tub clips and 9-off 12 mm pins	20	**017-4201**
Knob			20	**060-1063**
Screwed cable entry		Pg 13.5 with special nut. For 6-14 mm diameter cables. A standard Pg 16 cable entry can be used for 8 -16 mm diameter cables.	5	**060-1059**
Sealing screw		For sealing the setting on KP	20	**060-1057**
Top cover		If a bracket is mounted on the backplate of the housing, the KP thermostats will have an IP 44 grade of enclosure. The cover covers the setting spindles.	10	**060-1097**
Protective cap		Protective cap for KP thermostats. To protect the unit against rain and humidity. Grade of enclosure: IP 44 Material: Polyethylene Max. ambient temperature: 65 °C Min. ambient temperature: –40 °C	7	**060-0031**
Sensor pocket	 Permissible pressure of sensor pipe medium	For all KP thermostats with cylindrical remote sensor. Sensor pocket, gasket and union for screwing into G ½ connectors welded onto tubes, containers, etc.		
		Int. diameter 9.6 mm, insert depth 112 mm (brass). Ext. diameter 11 mm	1	**017-4370**
		Int. diameter 9.6 mm, insert depth 112 mm (st. 18/8). Ext. diameter 11 mm	1	**017-4369**
		Int. diameter 9.6 mm, insert depth 465 mm (brass). Ext. diameter 11 mm	1	**017-4216**
		Media temperature for sensor: 250 °C This temperature can be increased by applying a different gasket material		
Heat-conductive aluminium paste		For KP and RT thermostats with sensor mounted in a sensor pocket. Temperature range: –20 - +150 °C (short-lived +220 °C)		
		Tube with 5 g aluminium paste	1	**041E0110**
		Tin with 750 g aluminium paste	1	**041E0111**

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. **060-1097.**
Alternatively the unit can be mounted in a polyethylene protective cap, type no. **060-0031.**

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/min
6	As 4 + Dust cannot enter	6	Water jets from all directions, 100 l/min
		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.

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