



Thermostat

KP standard thermostat

Description

The KP Thermostats are single-pole, doublethrow (SPDT) temperature-operated electric switches.

They can be connected directly to a single-phase AC motor of up to approx. 2 kW or installed in the control circuit of DC motors and large AC motors.

The KP Thermostats are used for regulation, but can also be seen in safety monitoring systems.

They are available with vapour charge or with adsorption charge. With vapour charge the differential is very small. The KP Thermostats with adsorption charge are widely used to give frost protection.

Features & benefits

- Wide regulating range
- Can be used for deep freeze, refrigeration and air conditioning plant
- Welded bellows elements mean increased reliability
- Small dimensions. Easy to install in refrigerated counters or cold rooms
- Ultra-short bounce times. This gives long operating life, reduces wear to a minimum and increases reliability
- Standard versions with change-over switch. Possible to obtain opposite contact function or to connect a signal
- Electrical connection at the front of the unit
 - Facilitates rack mountingSaves space
- Suitable for alternating and direct current
- Cable entry of soft thermoplastic for cables from 6 to 14 mm diameter
- Extensive and wide range

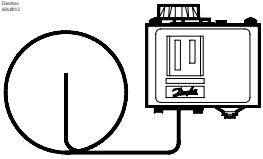
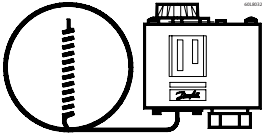
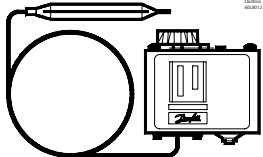
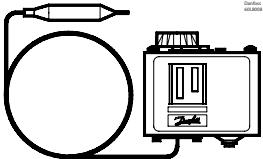
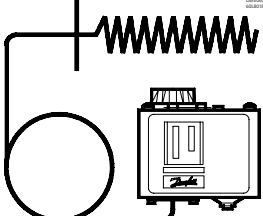
Ordering

Product code numbers

Charge type	Type	Temperature range [°C] [min]	Temperature range [°C] [max]	Diff. @ Min. range setting [°C] [min]	Diff. @ Min. range setting [°C] [max]	Diff. @ Max. range setting [°C] [min]	Diff. @ Max. range setting [°C] [max]	Reset function	Max. sensor temperature [°C]	Capillary tube length [mm]	Code number
Vapour	KP61	-30	15	5.5	23.0	1.5	7.0	Auto	120	2000	060L110066
Vapour	KP61	-30	15	5.5	23.0	1.5	7.0	Auto	120	5000	060L110166
Vapour	KP61	-30	13	4.5	23.0	1.2	7.0	Auto	120	2000	060L110266
Vapour	KP61	-30	15	5.5	23.0	1.5	7.0	Auto	120	2000	060L110366
Vapour	KP61	-30	15					Manual Min	120	5000	060L110466
Vapour	KP61	-30	15					Manual Min	120	2000	060L110566
Vapour	KP62	-30	15	6.0	23.0	1.5	7.0	Auto	120		060L110666
Vapour	KP63	-50	10	10.0	70.0	2.7	8.0	Auto	120	2000	060L110766
Vapour	KP63	-50	10	10.0	70.0	2.7	8.0	Auto	120	2000	060L110866
Adsorption	KP62	-30	15	5.0	20.0	2.0	8.0	Auto	80		060L111066
Vapour	KP68	-5	35	4.5	25.0	1.8	7.0	Auto	120		060L111166
Vapour	KP69	-5	35	4.5	25.0	1.8	7.0	Auto	120	2000	060L111266
Adsorption	KP71	-5	20	3.0	10.0	2.2	9.0	Auto	80	2000	060L111366
Adsorption	KP71	-5	20					Manual Min	80	2000	060L111566
Adsorption	KP73	-25	15	12.0	70.0	8.0	25.0	Auto	80	2000	060L111766
Adsorption	KP73	-25	15	4.0	10.0	3.5	9.0	Auto	80	2000	060L111866
Adsorption	KP75	0	35	3.5	16.0	2.5	12.0	Auto	110	2000	060L112066
Adsorption	KP77	20	60	3.5	10.0	3.5	10.0	Auto	130	2000	060L112166
Adsorption	KP77	20	60	3.5	10.0	3.5	10.0	Auto	130	3000	060L112266
Adsorption	KP81	80	150	6.0	20.0	7.0	23.0	Auto	200	2000	060L112566
Vapour	KP61	-30	15	5.5	23.0	1.5	7.0	Auto	120	2000	060L112866
Adsorption	KP75	0	35	3.5	16.0	2.5	12.0	Auto	110	2000	060L113766
Adsorption	KP73	-25	15					Manual Min	80	2000	060L113866
Adsorption	KP73	-20	15	3.3	8.0	2.0	13.0	Auto	55	3000	060L114066
Adsorption	KP73	-25	15	3.5	20.0	3.2	18.0	Auto	80	2000	060L114366
Adsorption	KP81	80	150					Manual Max	200	2000	060L115566
Adsorption	KP77	20	60	3.5	10.0	3.5	10.0	Auto	130	5000	060L116866

- **Vapour:** Bulb must always be placed colder than the thermostat housing and capillary tube. The thermostat will then regulate independent of ambient temperature.
- **Adsorption:** Bulb can be placed warmer or colder than thermostat housing and capillary tube, but variations from 20 °C ambient temperature will influence the scale accuracy.
- **060L110366, 060L112866, 060L111066, 060L111866 :** With manual switch, not isolating switch.
- **060L112866, 060L111066:** Panel mounting model with top plate.

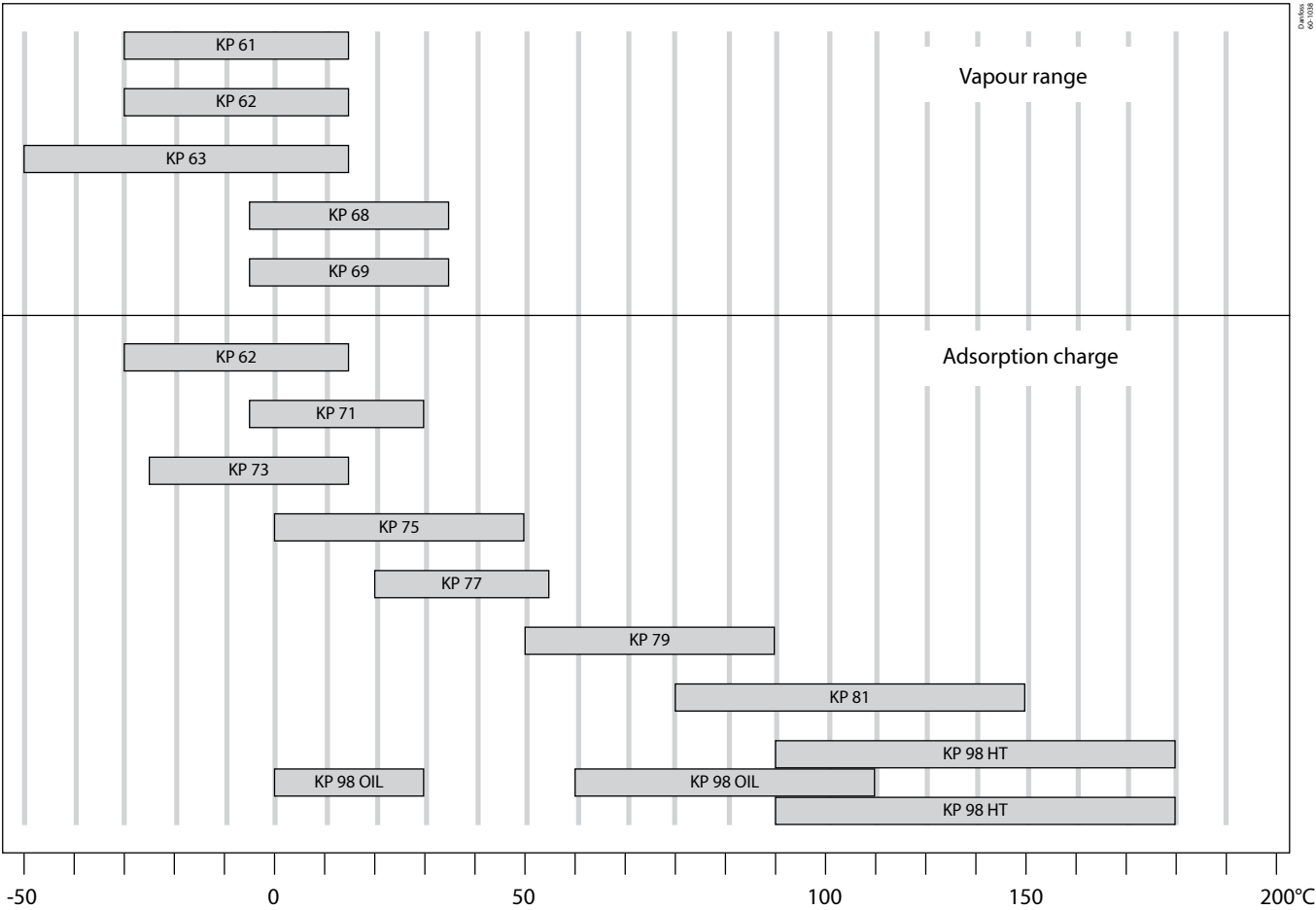
Table: Thermostat bulb types

	Bulb types	Description
A		Straight capillary tube
B		ø9.5 × 70 mm remote air coil
C		C1: ø40 × 30 mm air coil C2: ø25 × 67 mm air coil (integral with thermostat)
D		D1: ø10 × 85 mm double contact remote bulb D2: ø16 × 170 mm double contact remote bulb NOTE: Cannot be used in sensor (bulb) pocket
E		E1: ø6.4 × 95 mm remote bulb E2: ø9.5 × 115 mm remote bulb E3: ø9.5 × 85 mm remote bulb
F		ø25 × 125 mm remote duct coil



Overview

Product portfolio



Functions

Settings

Thermostats with automatic reset

Set the upper activating temperature on the range scale.

Set the differential on the "DIFF" scale. The temperature setting on the range scale will then correspond to the temperature at which the refrigeration compressor will be started on rising temperature. The compressor will be stopped when the temperature has fallen in relation to the differential setting.

Note that the differential depends on the range setting. Therefore, the differential scale must only be used as guideline.

If with low stop temperature settings, the compressor will not stop, check whether the differential is set at too high a value!

Thermostats with minimum reset

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

The compressor can be restarted by pressing the "Reset button" after the temperature on the thermostat sensor has risen by a value equal to the fixed differential setting.

Thermostats with maximum reset

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

The compressor can be restarted by pressing the "Reset button" after the temperature on the thermostat sensor has fallen to a value equal to the fixed differential setting.

Product details

General data

Table: Technical data

Features		Description
Ambient temperature		-40 – 65 °C (80 °C for max. 2 hours)
Switch		Single-pole, double-throw (SPDT) changeover switch
Contact load	Alternating current	AC1 = 16 A, 400 V AC3 = 16 A, 400 V
	Direct current	DC13: 12 W, 220 V control current
Wire dimensions	solid / stranded	0.75 – 2.5 mm ²
	flexible, without ferrules	0.7 – 2.5 mm ²
	flexible, with ferrules	0.5 – 1.5 mm ²
Tightening torque		Max. 2 Nm
Rated impulse voltage		4 kV
Pollution degree		3
Short circuit protection, fuse		16 A
Insulation		400 V
Enclosure		IP30 / IP44



Cable connection

Cable entry for cables 6 – 14 mm dia. A Pg 13.5 screwed cable entry can be used for 6 – 14 mm dia. cables. With 8 – 16 mm cables a standard Pg 16 screwed cable entry can be used.

Enclosure IP30 to EN 60529 / IEC 529

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

Table: Contact systems

KP temperature control	KP 98
Line ~ 16A 1 2 4 5 M SPDT 16A 60-910.1.10	~ 16A A B C M SOIL WHT Q 60-984.1.2

Terminology

Differential

The differential is the difference between the make and break temperatures. A differential is necessary for satisfactory automatic operation of the plant.

Mechanical differential (intrinsic differential)

The mechanical differential is the differential set by the differential spindle.

Operating differential (thermal differential)

The operating differential is the differential the plant operates on. Operating differential is the sum of the mechanical differential and the differential produced by the time constant.

Reset

1. Manual reset:

Units with manual reset can only be restarted after the reset button has been activated. On min. reset units the set value is equal to the cut-out value for falling temperature. On max. reset units the set value is equal to the cut-out value for rising temperature.

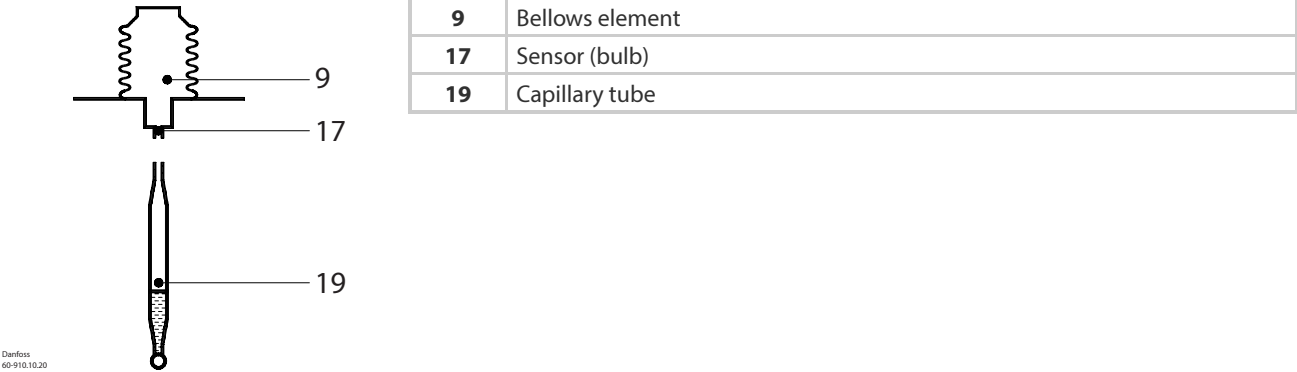
2. Automatic reset:

These units are automatically reset after operational stop.

Charges

1. Vapour charge

Figure: Vapour charge



Here the interdependence between the pressure and temperature of saturated vapour is utilized, i.e. the element is charged with saturated vapour plus a small amount of liquid.

The charge is pressure-limited; a further increase in pressure after evaporation of all the liquid in the sensor (17) will only result in a small pressure increase in the element.

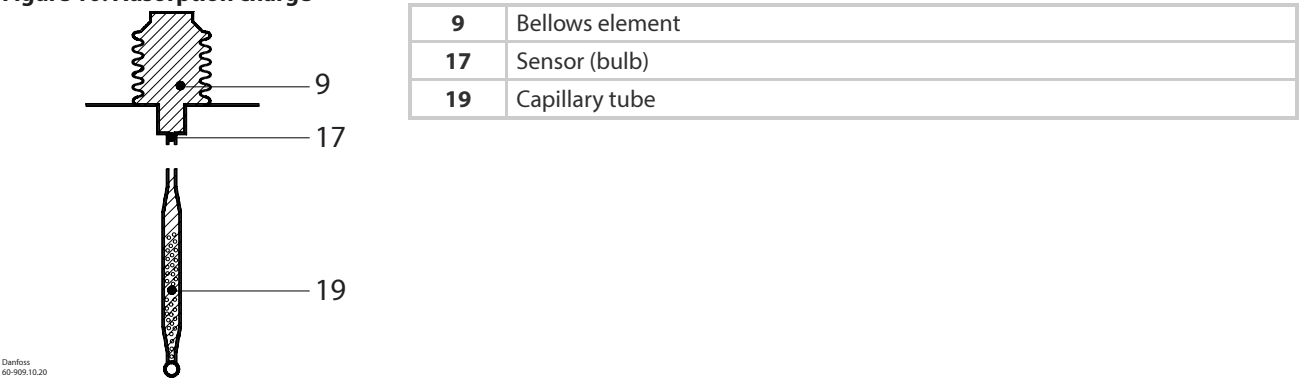
This principle can be utilized in thermostats for low temperature, etc. where evaporation must be able to take place from the free liquid surface in the sensor (within the operating range of the thermostat), and where at the same time, the bellows must be protected against deformation when kept at normal ambient temperatures. Since the pressure in the element depends on the temperature at the free liquid surface, the thermostat must always be placed so that the sensor is colder than the rest of the thermostatic element.

The evaporated liquid will recondense at the coldest point, i.e. the sensor. Thus, as intended, the sensor becomes the temperature-controlling part of the system.

NOTE:
When the sensor is coldest, the ambient temperature has no effect on regulating accuracy.

2. Adsorption charge

Figure 10: Adsorption charge

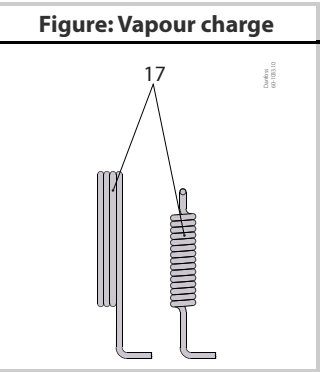
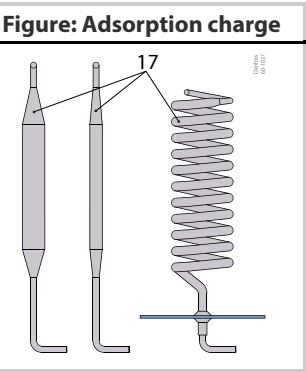
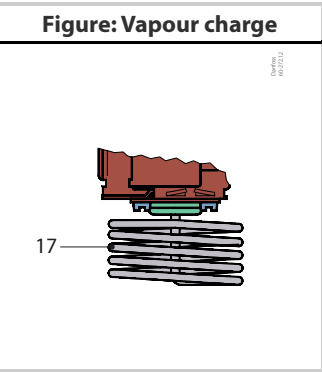
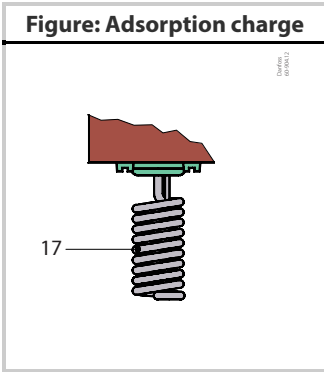
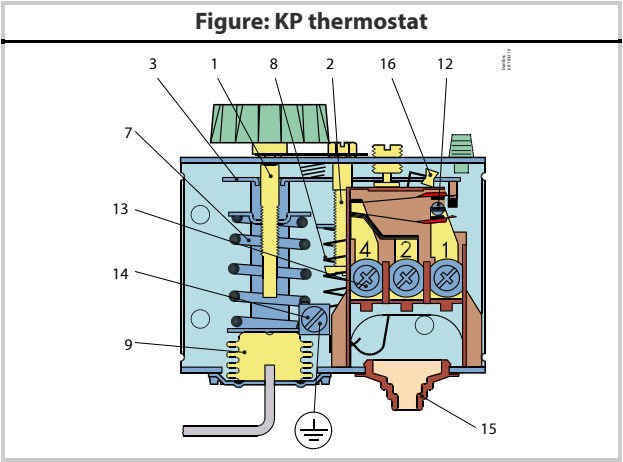
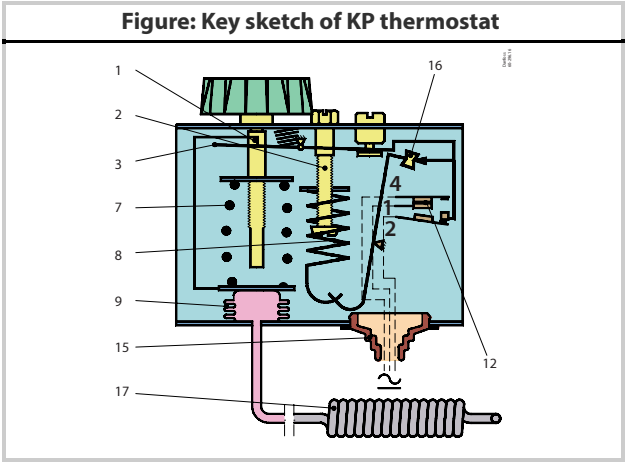


In this case the charge consists partly of a superheated gas and partly of a solid having a large adsorption surface.

The solid is concentrated in the sensor (17) and it is therefore always the sensor that is the temperature-controlling part of the thermostatic element.

The sensor can be placed warmer or colder than thermostat housing and capillary tube, but variations from 20 °C ambient temperature will influence the scale accuracy.

Design



1	Temperature setting spindle
2	Differential setting spindle
3	Main arm
7	Main spring
8	Differential spring
9	Bellows

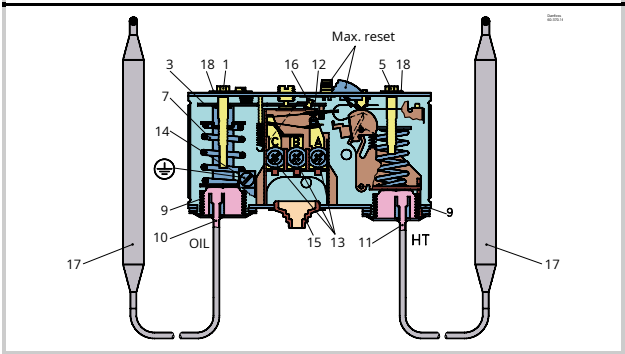
12	Switch
13	Terminals
14	Earth terminal
15	Cable entry
16	Tumbler
17	Sensor

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

The design of the KP thermostats affords the following advantages:

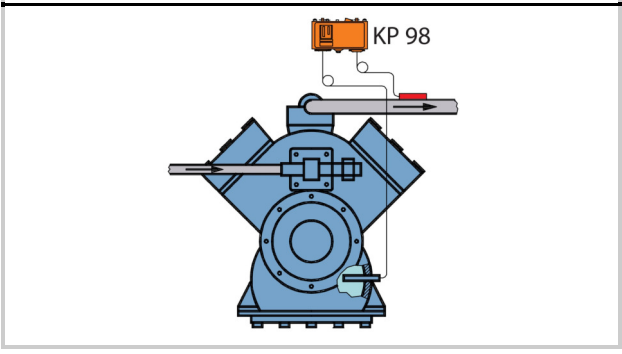
- High contact load
- Ultra-short bounce time
- Vibration resistance up to 4 g
- In the range 0 – 1000 Hz
- Long mechanical and electrical life

Figure: KP thermostat, dual type



1	Temperature setting spindle, OIL
3	Main arm
5	Temperature setting spindle, HT
7	Main spring
9	Bellows
10	Capillary tube, OIL
11	Capillary tube, HT

Figure: KP 98



12	Switch
13	Terminals
14	Earth terminal
15	Cable entry
16	Tumbler
17	Sensor (bulb)
18	Locking plate

Dual thermostat KP 98 is used to provide protection against excessively high discharge gas temperature and to ensure a suitable oil temperature in the compressor

To avoid the temperature of the hot gas exceeding the maximum permissible value during extreme operating conditions (low evaporating pressure, high condensing pressure, high suction vapour superheat) a KP 98 thermostat can be used on the high temperature side (HT). If the temperature of the hot gas becomes too high the refrigerant will break down and the compressor discharge valve will become damaged.

The risk is greatest in refrigeration systems that operate on a high compression ratio (e.g. in systems with NH3 or R22) and in applications with hot gas bypass.

This unit has two separate thermostat functions. The HT sensor that controls the discharge gas temperature is fitted on the discharge tube immediately after the compressor

For larger compressors, the sensor can be built into the discharge line.

The OIL sensor that controls the oil temperature is located in the compressor oil sump.

Dimensions

Figure: KP 61 – 81

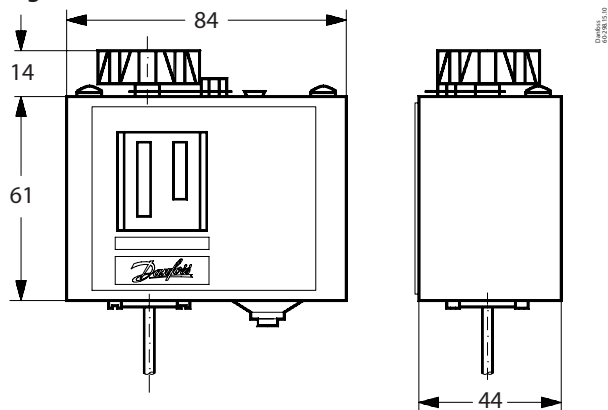


Figure: Mounting holes (back of KP)

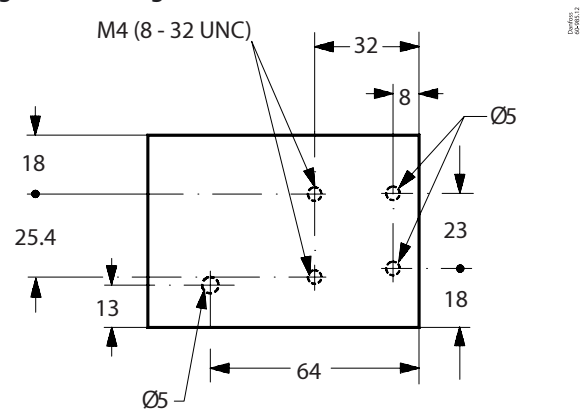


Figure: KP 98

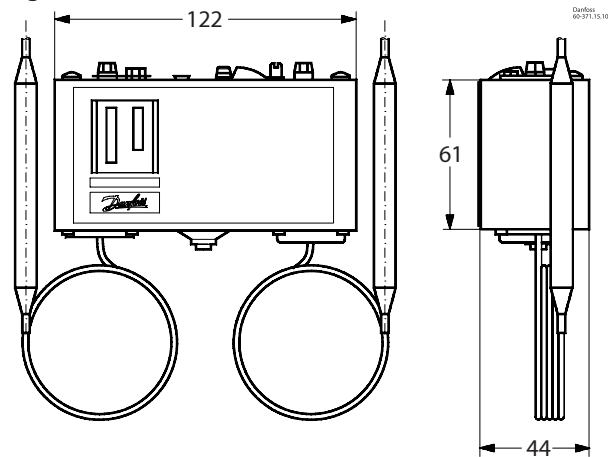


Figure: Mounting holes (back of KP)

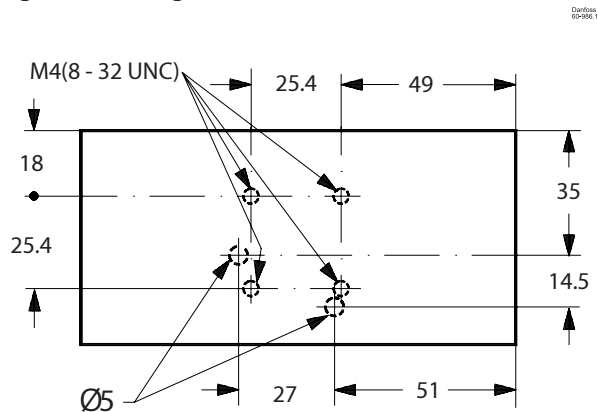


Figure: Wall bracket

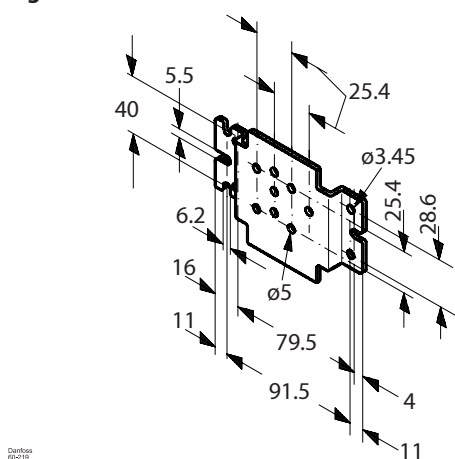


Figure: Angle bracket

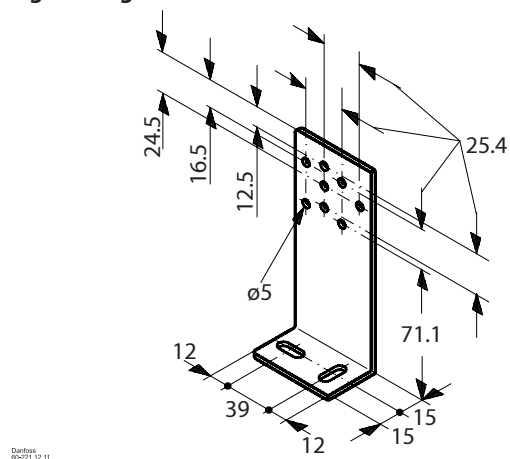
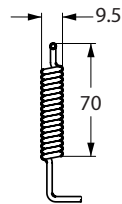


Figure: Thermostat sensor types A, B and C

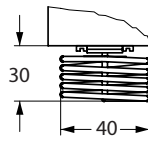
Danfoss
KP 609.12.12



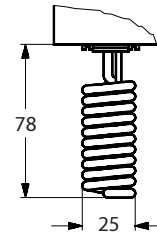
A
KP 61, KP 63,
KP 69



B
KP 61, KP 63



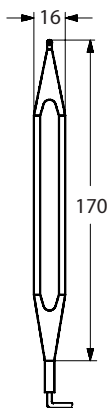
C1
KP 62, KP 68,



C2
KP 62

Figure: Thermostat sensor types D, E and F

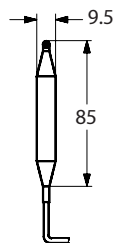
Danfoss
KP 609.13.11



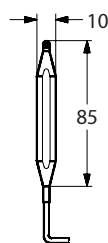
D2
KP 73



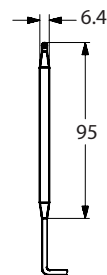
E2
KP 71



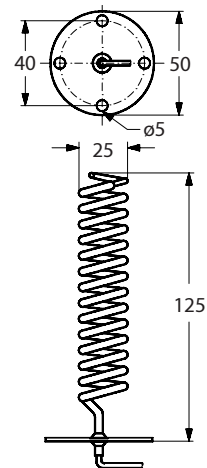
E3
KP 77, KP 73,
KP 75, KP 77,
KP 98



D1
KP 73,
KP 79,
KP 81



E1
KP 73



F
KP 75

Net weight

- KP 61 - 81: approx. 0.4 kg
- KP 98: approx. 0.6 kg

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.

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CCC Declaration	Danfoss CCC 2020970305003385	Danfoss	CCC
Mechanical Safety Certificate	UL MH27572	UL - Underwriters Laboratories inc.	
Electrical Safety Certificate	UL E31024	UL - Underwriters Laboratories inc.	
Electrical Safety Certificate	EAC KZ 7100841.01.01.01391	EAC - Eurasian Customs Union	EMC
UA Declaration	Danfoss UA 2023-01-10 Regulators PL01 PL04	Danfoss	PED, Pressure
Pressure Safety Certificate	LLC CDC EURO-TYSK UA.TR.089.1015.05-22	LLC CDC EURO TYSK - Ukraine	Pressure
Marine Certificate	BV 02281-K0 BV	BV - Bureau Veritas	Marine
Marine Certificate	DNV TAA000026F Rev.01	DNV	
UA Declaration	Danfoss UA 2024-07-25 cooling sensors	Danfoss	EMC, LVD
CCC Declaration	Danfoss CCC 2024010305641303	CCC - China Compulsory Certification	CCC
EU Declaration	Danfoss EU 060-9650AF	Danfoss	EU RoHS, LVD
Export Control Declaration	Pressure switches & Thermostats	Danfoss	
Electrical Safety Certificate	Certificate UL-US-L31024-13- 30303891-3	UL - Underwriters Laboratories inc.	UL-CSA
Marine Certificate	RINA ELE290225XG	RINA - Registro Italiano Navale	
Manufacturer's Declaration	Danfoss MD 060-9638.AB	Danfoss	China RoHS
EU Declaration	EU DOC PL01 Packaging	Danfoss	Packaging
Marine Certificate	LR26437874TA	LR - Lloyd's Register	Marine

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