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Pressure controls and thermostats  
Type KPS

**Pressure controls and thermostats, type KPS**

**Survey**

*Type KPS pressure controls*

1. Standard pressure controls

-1 0 10 20 30 40 50 60 bar								Range P <sub>e</sub> bar	Type	Further information page
[Bar chart showing range 0-2.5]								0 - 2.5	KPS 31	3
[Bar chart showing range 0-3.5]								0 - 3.5	KPS 33	3
[Bar chart showing range 0-8]								0 - 8	KPS 35	3
[Bar chart showing range 6-18]								6 - 18	KPS 37	3
[Bar chart showing range 10-35]								10 - 35	KPS 39	3

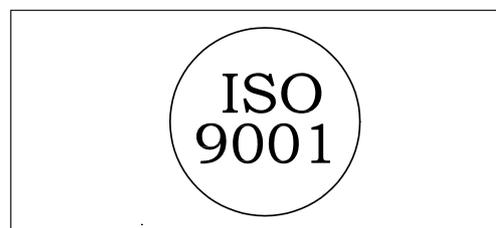
2. Type KPS pressure controls for high pressure and strongly pulsating media

-1 0 10 20 30 40 50 60 bar								Range P <sub>e</sub> bar	Type	Further information page
[Bar chart showing range 1-10]								1 - 10	KPS 43	3
[Bar chart showing range 4-40]								4 - 40	KPS 45	3
[Bar chart showing range 6-60]								6 - 60	KPS 47	3

Thermostats

-50 0 50 100 150 200 250 °C							Range °C	Type	Further information page
[Bar chart showing range -10 to +30]							-10 - +30	KPS 76	8
[Bar chart showing range 20 to 60]							20 - 60	KPS 77	8
[Bar chart showing range 50 to 100]							50 - 100	KPS 79	8
[Bar chart showing range 70 to 120]							70 - 120	KPS 80	8
[Bar chart showing range 60 to 150]							60 - 150	KPS 81	8
[Bar chart showing range 100 to 200]							100 - 200	KPS 83	8

**ISO 9001 quality approval**



Danfoss A/S is certified 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.

## Pressure controls and thermostats, type KPS

### Introduction

KPS units are pressure-controlled switches. The position of the contacts depends on the pressure in the inlet connection and the set scale value. In this series, special attention has been given to meeting important demands for:

- a high level of enclosure,
- robust and compact construction,
- resistance to shock and vibration.

The KPS series covers most outdoor as well as indoor application requirements. KPS pressure controls are suitable for use in alarm and regulation systems in factories, diesel plant, compressors, power stations and on board ship.

### Technical data and ordering

When ordering, please state type and code number



KPS 31, 33



KPS 35, 37, 39



KPS 43, 45, 47

#### 1. Pressure controls

Setting range $p_s$ [bar]	Adjustable/ fixed differential [bar]	Permissible operating pressure $P_B$ [bar]	Max. test pressure [bar]	Pressure connection	Code no.	Type
0 → 2.5	0.1	6	6	G 1/4	060-3110	KPS 31
0 → 2.5	0.1	6	6	G 3/8 A	060-3109	KPS 31
0 → 3.5	0.2	10	10	G 1/4	060-3104	KPS 33
0 → 3.5	0.2	10	10	G 3/8 A	060-3103	KPS 33
0 → 8	0.4 - 1.5	12	12	G 1/4	060-3105	KPS 35
0 → 8	0.4 - 1.5	12	12	G 3/8 A	060-3100	KPS 35
0 → 8	0.4	12	12	G 1/4	060-3108	KPS 35
6 → 18	0.85 - 2.5	22	27	G 1/4	060-3106	KPS 37
6 → 18	0.85 - 2.5	22	27	G 3/8 A	060-3101	KPS 37
10 → 35	2.0 - 6	45	53	G 1/4	060-3107	KPS 39
10 → 35	2.0 - 6	45	53	G 3/8 A	060-3102	KPS 39

#### 2. Pressure controls for high pressure and strongly pulsating media

Setting range $p_s$ [bar]	Adjustable diff. (see also figs. 1, 2 and 3) [bar]	Permissible overpressure [bar]	Max. test pressure [bar]	Min. bursting pressure [bar]	Pressure connection	Code no.	Type
1 → 10	0.7 - 2.8	120	180	240	G 1/4	060-3120	KPS 43
4 → 40	2.2 - 11	120	180	240	G 1/4	060-3121	KPS 45
6 → 60	3.5 - 17	120	180	240	G 1/4	060-3122	KPS 47

#### Terminology

##### Range setting

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

##### Differential

The difference between make pressure and break pressure (see also fig. 8, page 7).

##### Permissible overpressure

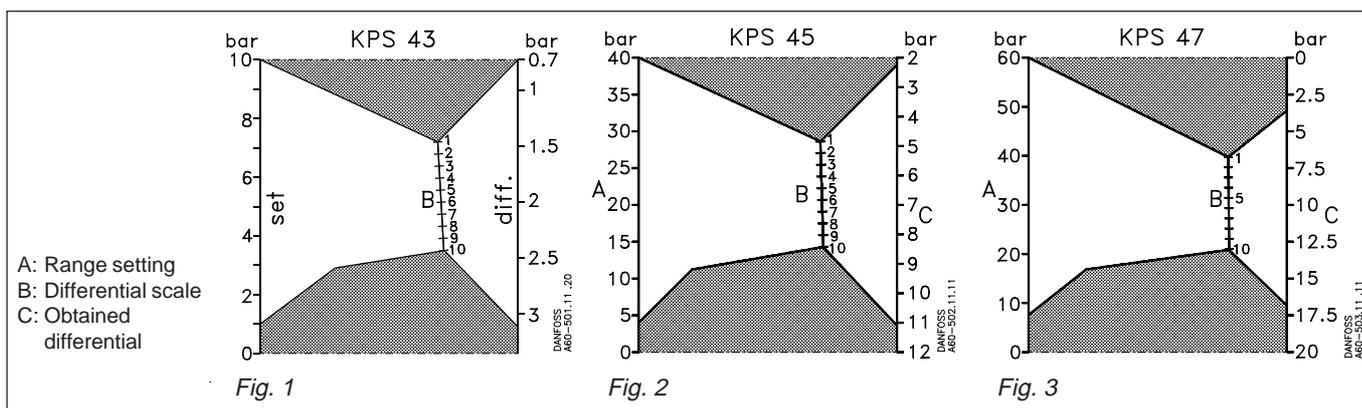
The highest permanent or recurring pressure the unit can be loaded with.

##### Max. test pressure

The highest pressure the unit may be subjected to when, for example, testing the system for leakage. Therefore, this pressure must not occur as a recurring system pressure.

##### Min. bursting pressure

The pressure which the pressure-sensitive element will withstand without leaking.



## Pressure controls and thermostats, type KPS

### Switch

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

### Contact load

1. Alternating current:
- Ohmic: 10 A, 440 V, AC-1
  - Inductive: 6 A, 440 V, AC-3  
4 A, 440 V, AC-15
  - Starting current max. 50 A (locked rotor)
2. Direct current: 12 W, 220 V, DC-13  
See curve, fig. 4

### Ambient temperature

KPS 31 - 39: -40 to +70 °C  
KPS 43 - 47: -25 to +70 °C

### Temperature of medium

KPS 31 - 39: -40 to +100 °C  
KPS 43 - 47: -25 to +100 °C  
For water and seawater, max. 80°C.

### Vibration resistance

Vibration-stable in the range 2-30 Hz, amplitude 1.1 mm og 30-300 Hz, 4 G.

### Enclosure

IP 67 to IEC 529 an DIN 40050.  
The pressure control housing is enamelled pressure die cast aluminium (GD-AISI 12). The cover is fastened by four screws which are anchored to prevent loss. The enclosure can be sealed with wire.

### Cable entry

Pg 13.5 for cable diameters from 5 to 14 mm.

### Identification

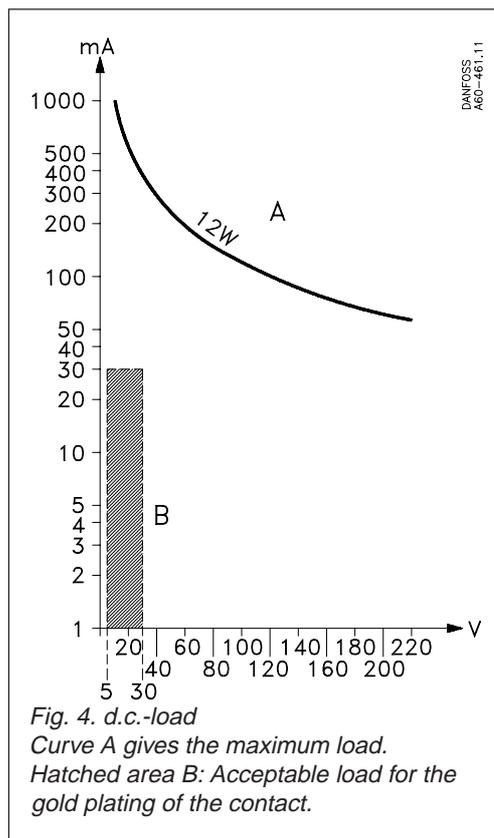
The type designation and code no. of the unit is stamped in the side of the housing.

### Scale accuracy

KPS 31: ±0.2 bar	KPS 39: ±3.0 bar
KPS 33: ±0.3 bar	KPS 43: ±1.0 bar
KPS 35: ±0.5 bar	KPS 45: ±4.0 bar
KPS 37: ±1.0 bar	KPS 47: ±6.0 bar

### Mean value of snap point variation after 400 000 operations

KPS 31: ±0.1 bar	KPS 39: ±0.7 bar
KPS 33: ±0.2 bar	KPS 43: ±0.2 bar
KPS 35: ±0.3 bar	KPS 45: ±1.0 bar
KPS 37: ±0.4 bar	KPS 47: ±1.5 bar



### Materials in contact with the medium

KPS 31, 33	Bellows capsule: Bellows: Pressure connection:	Deep-drawn plate, Stainless steel, Steel C20,	material no. 1.0524 (DIN 1624) material no. 1.4306 (DIN 17440). material no. 1.0420 (DIN 1652)
KPS 35, 37,39	Bellows: Pressure connection:	Stainless steel, Brass,	material no. 1.4306 (DIN 17440) W.No. 2.0401 (DIN 17660)
KPS 43, 45, 47	Diaphragm capsule: Diaphragm:	Nickel-plated brass, Nitrile-Butadien rubber	DIN 50 968 Cu/Ni 5 (DIN 1756)

### Approvals

EN 60 947-4-1  
EN 60 947-5-1

U Underwriters Laboratories Inc., USA

### Ship approvals

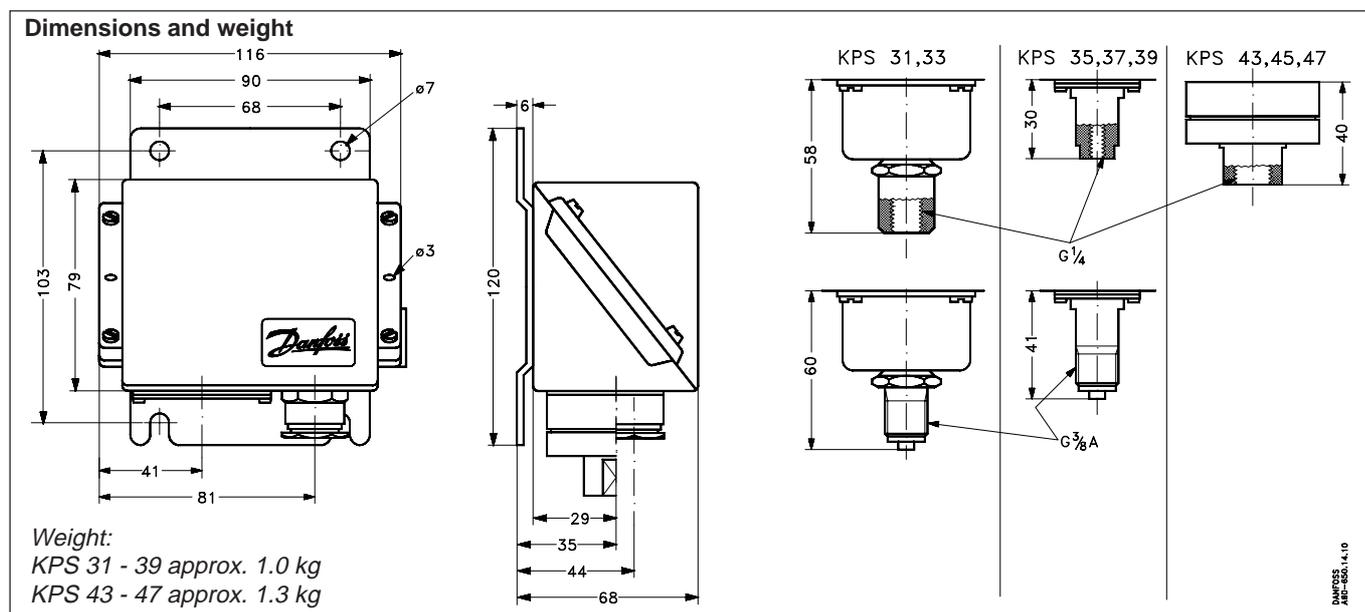
Det norske Veritas, Norway  
American Bureau of Shipping  
Lloyds Register of Shipping, UK  
F Germanischer Lloyd, Federal Republic of Germany (FRG)  
Bureau Veritas, France  
Includes thermostats with fixed sensor and pressure controls with armoured capillary tube.

P Registro Italiano Navale, Italy  
Polski Rejestr Statków, Poland  
MRS, Maritime Register of Shipping, Russia  
Nippon Kaiji Kyokai, Japan

## Pressure controls and thermostats, type KPS

### Accessories

Part		Description	Code no.
Connector with nipple		G $\frac{3}{8}$ connector, nipple and washer (10 mm o.d. x 6.5 mm i.d.), for brazing	017-4368
Connector with nipple		G $\frac{3}{8}$ connector, nipple and washer (10 mm o.d. x 6.5 mm i.d.) for welding	017-4229
Reducer		G $\frac{3}{8}$ x $\frac{7}{16}$ - 20 UNF ( $\frac{1}{4}$ flare) reduction with washer	017-4205
Adaptor		G $\frac{3}{8}$ x $\frac{1}{8}$ - 27 NPT with washer	060-3334
Nipple		R $\frac{3}{8}$ o.d x $\frac{7}{16}$ - 20 UNF ( $\frac{1}{4}$ flare)	060-3240
Nipple		G $\frac{3}{8}$ A - $\frac{1}{4}$ NPT with washer	060-3335
Adaptor		G $\frac{3}{8}$ x $\frac{1}{4}$ - 18 NPT with washer	060-3336
Nipple		G $\frac{1}{4}$ A x G $\frac{3}{8}$ A	060-3332
		G $\frac{1}{4}$ A x o.d. M10 x 1 with washer	060-3338
Damping coil		Damping coil with $\frac{1}{4}$ flare connectors and 1 m copper capillary tube. Damping coils used for applications with $\frac{3}{8}$ RG connector requires the use of reducer, type no. <b>993N3551</b> . For informations about capillary tube lengths, please contact Danfoss	060-0071
Damping coil		Damping coil with G $\frac{3}{8}$ connectors and 1.5 m copper capillary tube	060-1047
Armoured damping coil		Damping coil with G $\frac{3}{8}$ connectors and 1 m armoured copper capillary tube. Standard washers included.	060-3333



**Installation**

*Installation*

KPS pressure controls are fitted with a 3 mm steel mounting plate. The units should not be allowed to hang from the pressure connection.

*Pressure connection*

When fitting or removing pressure lines, the spanner flats on the pressure connection should be used to apply counter-torque.

*Steam plant*

To protect the pressure element from excessive heat, the insertion of a water-filled loop is recommended. The loop can, for example, be made of 10 mm copper tube as shown in fig. 5.

*Setting*

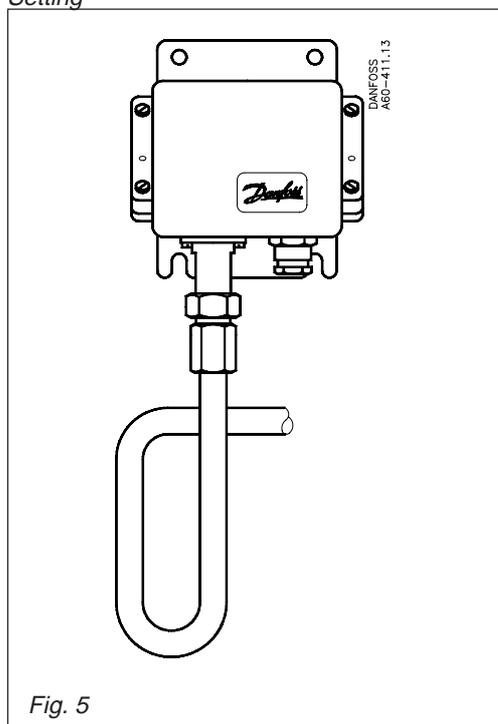


Fig. 5

*Water systems*

Water in the pressure element is not harmful, but if frost is likely to occur a water-filled pressure element may burst. To prevent this happening, the pressure control can be allowed to operate on an air cushion.

*Media-resistance*

See table of materials in contact with the medium, page 4. If seawater is involved, types KPS 43, 45, 47 are recommended.

*Pulsations*

If the pressure medium is superimposed with severe pulsations, which occur in automatic sprinkler systems (fire protection), fuel systems for diesel motors (priming lines), and hydraulic systems (e.g. propeller systems), etc., types KPS 43,45,47 are recommended. The maximum permissible pulsation level for these types is 120 bar.

When the pressure control cover is removed, and the locking screw (5) is loosened, the range can be set with the spindle (1) while at the same time the scale (2) is being read. In units having an adjustable differential, the spindle (3) must be used to make the adjustment. The differential obtained can be read direct on the scale (4) or, with types KPS 43, 45, 47, can be determined by reading the scale value and using the nomograms in figs. 1, 2, 3 (page 3). The working line for determining the differential must not intersect the shaded areas in the nomograms.

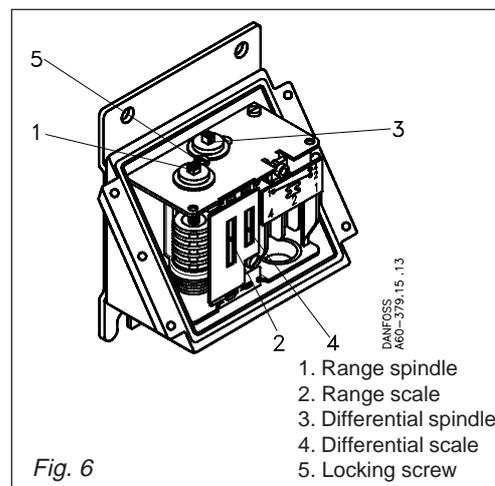


Fig. 6

*Selection of differential*

To ensure that the plant functions properly, a suitable differential pressure is necessary. Too small a differential will give rise to short running periods with a risk of hunting. Too high a differential will result in large pressure oscillations.

*Electrical connection*

KPS pressure controls are fitted with a Pg 13.5 screwed cable entry that is suitable for cable diameters from 5 to 14 mm. GL approval is however conditional on the use of a special ship's cable entry. Contact function is shown in fig. 7.

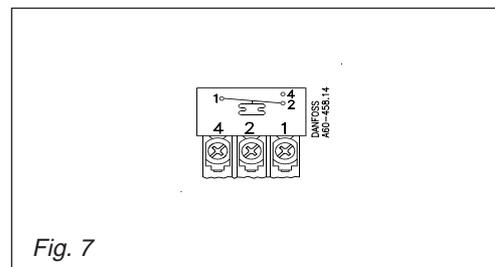


Fig. 7

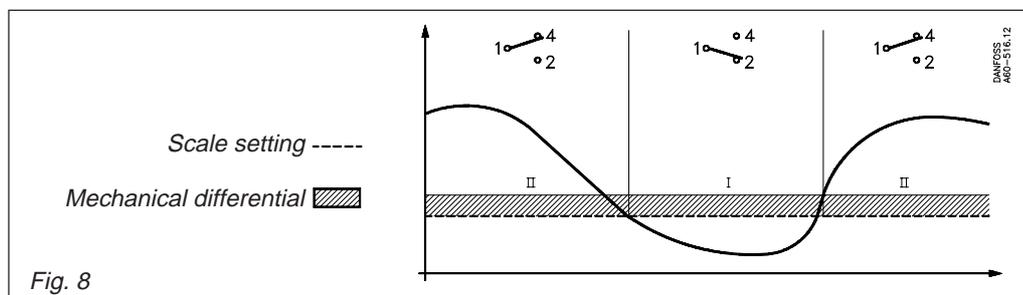
## Pressure controls and thermostats, type KPS

### Function

#### 1. KPS 31

Contacts 1-2 make and contacts 1-4 break when the pressure falls under the set range value. The contacts changeover to their initial position when the pressure again rises to the set range value plus the differential (see fig. 8).

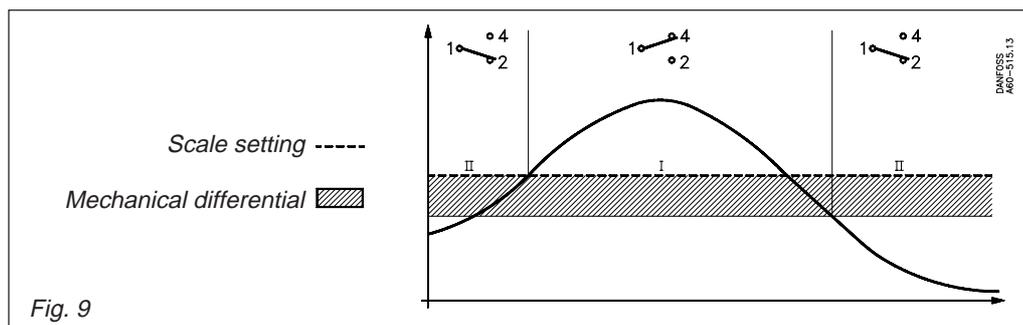
- I. Alarm for falling pressure given at the set range value.
- II. Alarm for rising pressure given at the set range value plus the differential.



#### 2. All other KPS pressure controls

Contacts 1-4 make and contacts 1-2 break when the pressure rises above the set range value. The contacts changeover to their initial position when the pressure again falls to the range value minus the differential (see fig. 9).

- I. Alarm for rising pressure given at the set range value.
- II. Alarm for falling pressure given at the set range value minus the differential.



#### Example 1

An alarm must be given when the lubricating oil pressure in a motor fails below 0.8 bar. The alarm is in the form of a lamp.

Choose a KPS 31 (range 0 to 2.5 bar).

The minimum permissible lubricating oil pressure of 0.8 bar must be set on the range spindle. The differential is fixed at 0.1 bar, i.e. the alarm will not cut out before the pressure rises to 0.9 bar. The lamp must be connected to terminals 1 and 2 in the pressure control.

#### Example 2

An alarm must be given by a bell when the pressure in a boiler rises to 10 bar. The normal operating pressure is 9 bar.

Choose a KPS 36 (range from 6 to 18 bar).

The range value of the pressure control must be set at 10 bar, the differential at 1 bar. The bell must be connected to terminals 1 and 4.

#### Example 3

The pressure in a start air reservoir must be regulated with a compressor controlled by a KPS pressure control so that it lies between 30 and 36 bar.

Choose a KPS 45 (range 4 to 40 bar).

The range value must be set at 36 bar.

The differential of 6 bar must be set in accordance with the nomogram, fig. 10, at approx. 2 on the differential scale.

The required start function is obtained by connection to terminals 1 and 2 in the pressure control.

