

Pressure controls,
type KP, with enclosure IP 33, IP 44 or IP 54

Introduction



KP pressure controls are used as protection against too low a suction pressure or too high a discharge pressure on compressors in refrigeration and air conditioning plant. KP pressure controls are also used for starting and stopping refrigeration compressors and fans for air-cooled condensers.

KP pressure controls are fitted with a single pole double throw (SPDT) changeover switch. The position of the switch is determined by the pressure control setting and the pressure at the connector. KP pressure controls can be supplied with enclosures IP 33, IP 44 and IP 54.

Features

- *Ultra-short bounce times*
Reduces wear to a minimum and increases reliability.
- *Manual control*
Testing the electrical contact function can be performed without the use of tools.
- *Vibration and shock resistant*
- *Compact design*
- *Laser welded bellows*

Approvals

- Ⓓ DEMKO, Denmark
- Ⓔ NEMKO, Norway
- Ⓕ FIMKO, Finland
- Ⓔ SEV, Switzerland
- Ⓔ Germanischer Lloyd, Germany
- Ⓓ DIN 32733, Germany
(KP 7W, 7B, 7S; KP 7B, 7 ABS; KP 17W, 17B)
- Ⓓ Polski Rejestr Statków, Poland
- DnV, Det norske Veritas, Norway
- RINA, Registro Italiano Navale, Italy
- BV, France
- LR, England
- MRS, Maritime Register of Shipping, Russia
- EZU, Czech Republic
- CE marked according to EN 60947-4, -5

Versions with UL and CSA approvals can be supplied to special order.

Materials in contact
with the medium

Unit type	Material
KP 1, 2, 5, 7, 15 and 17	Tinbronze, no. 2.1020 acc. to DIN 17662 Free cutting steel, no. 1.0737 / 1.0718 acc. to DIN 1651
KP 1A, 5A, 7A and 15A only	Stainless steel 18/8, no. 1.0737 / 1.0718 acc. to DIN 17440 Free cutting steel, no. 1.0719 acc. to DIN 1651 Steel, no. 1.0330 acc. to DIN 1624 Aluminium, no. 3.0255 acc. to DIN 1712

Technical data

Ambient temperature
 -40 → +65°C (+80°C for max. 2 hours).

DIN-approved units:
 -25 → +65°C (+80°C for max. 2 hours).

Max. working pressure
 LP: PB = 17 bar
 HP: PB = 32 bar

Max. test pressure
 LP: p' = 20 bar
 HP: p' = 35 bar

Contact load
 Alternating current:
 AC1: 16 A, 400 V
 AC3: 16 A, 400 V
 AC15: 10 A, 400 V
 Max. starting current (L.R.): 112 A, 400 V

Direct current:
 DC13: 12 W, 220 V control current

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

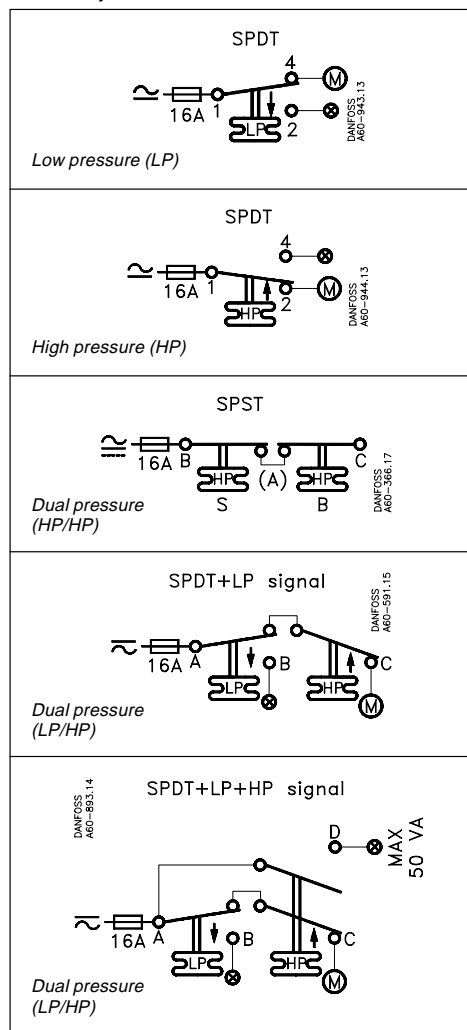
Enclosure
 IP 33 to EN 60529 / IEC 529
 Enclosure IP 33 is obtained when the units without top cover are mounted on a flat surface or bracket. The bracket must be fixed to the unit so that all unused holes are covered.

IP 44 to EN 60529 / IEC 529
 Enclosure IP 44 is obtained when the units with top cover are mounted on a flat surface or bracket. The bracket must be fixed to the unit so that all unused holes are covered.

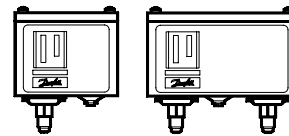
KP pressure controls with auto reset are supplied with top cover. For KP pressure controls with manual reset, the top cover must be separately ordered.

IP 54 to EN 60529 / IEC 529
 IP 54 is obtained when the KP pressure controls are mounted in an IP 54 enclosure, (code no. **60-0330** for single pressure controls and code no. **60-0350** for dual pressure controls).
 IP 54 enclosure has to be ordered separately.

Contact systems



Pressure controls, type KP, with enclosure IP 33, IP 44 or IP 54



Ordering

Pressure	Type	Low pressure (LP)		High pressure (HP)		Reset		Contact system	Code no.			
		Regulating range bar	Differential Δp bar	Regulating range bar	Differential Δp bar	Low pressure LP	High pressure HP		1/4 in. 6 mm flare	1/4 in. ODF solder	6 mm ODF solder	6 mm cutting ring

For fluorinated refrigerants

Low	KP 1	-0.2 → 7.5	0.7 → 4.0			Aut.		SPDT	60-1101	60-1112	60-1110	60-5051
Low	KP 1	-0.2 → 7.5	0.7 → 4.0			Aut.			60-1141 ¹⁾			
Low	KP 1	-0.9 → 7.0	Fixed 0.7			Man.			60-1103	60-1111	60-1109	60-5052
Low	KP 2	-0.2 → 5.0	0.4 → 1.5			Aut.			60-1120	60-1124	60-1123	
High	KP 5			8 → 32	1.8 → 6.0		Aut.		60-1171	60-1179	60-1177	60-5053
High	KP 5			8 → 32	1.8 → 6.0		Aut.		60-1142 ¹⁾			
High	KP 5			8 → 32	Fixed 3		Man.		60-1173	60-1180	60-1178	60-5054
Dual	KP 15	-0.2 → 7.5	0.7 → 4.0	8 → 32	Fixed 4	Aut.	Aut.	SPDT + LP signal	60-1241	60-1254	60-1249	60-5055
Dual	KP 15	-0.2 → 7.5	0.7 → 4.0	8 → 32	Fixed 4	Aut.	Aut.		60-1119 ¹⁾			
Dual	KP 15	-0.2 → 7.5	0.7 → 4.0	8 → 32	Fixed 4	Aut.	Man.		60-1243	60-1255	60-1250	60-5056
Dual	KP 15	-0.2 → 7.5	0.7 → 4.0	8 → 32	Fixed 4	Aut.	Man.		60-1148 ^{1) 3)}			
Dual	KP 15	-0.9 → 7.0	Fixed 0.7	8 → 32	Fixed 4	Man.	Man.		60-1245			
Dual	KP 15	-0.9 → 7.0	Fixed 0.7	8 → 32	Fixed 4	Conv. ²⁾	Conv. ²⁾		60-1261	60-1263	60-1262	
Dual	KP 15	-0.2 → 7.5	0.7 → 4.0	8 → 32	Fixed 4	Aut.	Aut.		60-1265	60-1299	60-1297	
Dual	KP 15	-0.2 → 7.5	0.7 → 4.0	8 → 32	Fixed 4	Aut.	Man.	SPDT + LP and HP signal	60-1264	60-1284	60-1298	60-5057
Dual	KP 15	-0.2 → 7.5	0.7 → 4.0	8 → 32	Fixed 4	Conv. ²⁾	Conv. ²⁾		60-1154	60-0010		
Dual	KP 15	-0.9 → 7.0	Fixed 0.7	8 → 32	Fixed 4	Conv. ²⁾	Conv. ²⁾		60-1220			

Pressure	Type	Low pressure (LP)		High pressure (HP)		Reset	Contact system	Code no.			
		Regulating range bar	Differential Δp bar	Regulating range bar	Differential Δp bar			M10 × 0.75		6 mm cutting ring	
						LP / HP		IP 44	IP 54	IP 44	IP 54

For fluorinated refrigerants and R 717 (NH₃)

Low	KP 1A	-0.2 → 7.5	0.7 → 4.0			Aut. / -	SPDT	60-1162	60-5200	60-5005	60-5201	60-1160 ⁴⁾
Low	KP 1A	-0.2 → 7.5	0.7 → 4.0			Aut. / -						60-1146 ^{1) 4)}
Low	KP 1A	-0.9 → 7.0	Fixed 0.7			Man. / -		60-1163 ³⁾	60-5202	60-5004 ³⁾	60-5203	60-1161 ³⁾
Low	KP 2A	-0.2 → 5.0	0.4 → 1.5			Aut. / -		60-5015	60-5204	60-5006	60-5205	
High	KP 5A			8 → 32	1.8 → 6.0	- / Aut.		60-1232	60-5206	60-5008	60-5207	60-1230 ⁴⁾
High	KP 5A			8 → 32	1.8 → 6.0	- / Aut.						60-1147 ^{1) 4)}
High	KP 5A			8 → 32	Fixed 3	- / Man.		60-1153 ³⁾	60-5208	60-5007 ³⁾	60-5209	60-1231 ³⁾
Dual	KP 15A	-0.2 → 7.5	0.7 → 4.0	8 → 32	Fixed 4	Aut. / Aut.	SPDT + LP & HP signal	60-1295	60-5210	60-5012	60-5211	60-1293 ⁴⁾
Dual	KP 15A	-0.2 → 7.5	0.7 → 4.0	8 → 32	Fixed 4	Aut. / Man.		60-1296 ³⁾	60-5212	60-5010 ³⁾	60-5213	60-1294 ³⁾
Dual	KP 15A	-0.9 → 7.0	Fixed 0.7	8 → 32	Fixed 4	Man. / Man.	SPDT LP signal	60-1292 ³⁾	60-5214	60-5011 ³⁾	60-5215	60-1287 ³⁾
Dual	KP 15A	-0.9 → 7.0	Fixed 0.7	8 → 32	Fixed 4	Conv. / Conv. ²⁾		60-5016 ³⁾	60-5216	60-5009 ³⁾	60-5217	60-1283 ³⁾

¹⁾ Pressure controls with gold-plated contacts

²⁾ Conv.: optional automatic or manual reset

³⁾ Enclosure IP 33

⁴⁾ Enclosure IP 44

Accessories for KP pressure controls with M10 × 0.75 connections:

Weld connections: M10 × 0.75 nut and Ø6 × 150 mm seamless steel pipe, code no. **60-0057**

Steel cap. tube: 1 m with 2 × M10 × 0.75 nuts, code no. **60-0078**

Steel cap. tube: 1 m with 1 × M10 × 0.75 and G 3/8 nut, code no. **60-0082**

Adaptor: 1/4 to 1/8 NPT int. thread, code no. **60-0141**

IP 54 enclosure for single pressure controls, code no. **60-0330**

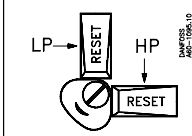
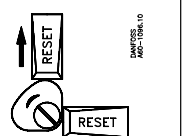
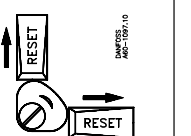
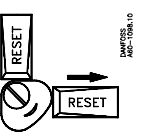
IP 54 enclosure for dual pressure controls, code no. **60-0350**

For other accessories: see "Spare parts and accessories", RK.0X.G2.02.

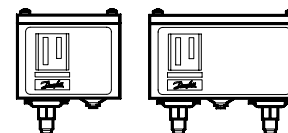
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Ordering (continued)

Pressure control setting with convertible reset

				
Low press.	Manual reset ¹⁾	Automatic reset	Automatic reset	Manual reset
High press.	Manual reset ¹⁾	Manual reset	Automatic reset	Automatic reset

¹⁾ Factory setting



Pressure controls with DIN 32733 approval ¹⁾

Pressure	Type ²⁾	Low pressure (LP)		High pressure (HP)		Reset LP / HP	Contact system	DIN approvals	Code no.		
		Regulating range bar	Differential Δp bar	Regulating range bar	Differential Δp bar				1/4 in. 6 mm flare	M10 × 0.75	6 mm ODF solder

Anvendes til fluorerede kølemidler

Low	KP 1W	-0.2 → 7.5	0.7 → 4.0			Aut. / -	SPDT	DWFK 4B06895	60-5101 ⁴⁾		60-5110 ⁴⁾
Low	KP 1W	-0.5 → 3.0	Fixed 0.7			Aut. / -	SPDT	DWFK 4B06895	60-1113 ⁴⁾		60-1117 ⁴⁾
Low	KP 1B	-0.9 → 7.0	Fixed 0.7			Man. / -	SPDT	DBFK 4B06995	60-5103 ³⁾		60-5109 ³⁾
Low	KP 2W	-0.2 → 5.0	0.2 → 1.5			Aut. / -	SPDT	DWFK 4B07095	60-5120 ⁴⁾		60-5123 ⁴⁾
High	KP 7W			8 → 32	4 → 10	- / Aut.	SPDT	DWK 4B00194	60-1190 ⁴⁾		60-1203 ⁴⁾
High	KP 7W			8 → 32	4 → 10	- / Aut.	SPDT	DWK 4B00194	60-5021 ⁴⁾ ⁶⁾		60-1203 ⁴⁾
High	KP 7B			8 → 32	Fixed 4	- / Man.	SPDT	DBK 4B00394	60-1191 ³⁾		
High	KP 7B			8 → 32	Fixed 4	- / Man.	SPDT	DBK 4B00394	60-5022 ³⁾ ⁶⁾		
High	KP 7S			8 → 32	Fixed 4	- / Man.	SPDT	DBK 4B00394	60-1192 ³⁾		60-1213 ³⁾
High	KP 7S			8 → 32	Fixed 4	- / Man.	SPDT	DBK 4B00394	60-5023 ³⁾ ⁶⁾		
Dual	KP 7BS			8 → 32	Fixed 4	Man. / Man.	SPST	DBK 4B00294	60-1200 ³⁾		60-1214 ³⁾
Dual	KP 17W	-0.2 → 7.5	0.7 → 4	8 → 32	Fixed 4	Aut. / Aut.	SPDT + LP and HP signal	DWK 4B00594	60-1275 ⁴⁾		60-1276 ⁴⁾
Dual	KP 17W	-0.2 → 7.5	0.7 → 4	8 → 32	Fixed 4	Aut. / Aut.	SPDT	DWK 4B00594	60-1267 ⁴⁾		60-1272 ⁴⁾
Dual	KP 17B	-0.2 → 7.5	0.7 → 4	8 → 32	Fixed 4	Aut. / Man.	SPDT	DBK 4B00494	60-1268 ³⁾		60-1274 ³⁾

Pressure controls with DIN 32733 approval ¹⁾

Pressure	Type	Low pressure (LP)		High pressure (HP)		Reset LP / HP	Contact system	DIN approvals	Code no.			
		Regulat. range bar	Different. Δp bar	Regulat. range bar	Different. Δp bar				M10 × 0.75		6 mm cutting ring	
									IP 44	IP 54	IP 44	IP 54

For ammonia

Low	KP 1AW	0.2 → 7	0.7 → 4			Aut. / -	SPDT	DWFK 4B06895	60-5127 ⁵⁾	60-5218 ⁵⁾		
Low	KP 1AB	0.9 → 7	Fixed 0.7			Man. / -	SPDT	DBFK 4B06995	60-5128 ⁵⁾	60-5219 ⁵⁾		
High	KP 7AS			8 → 32	Fixed 4	- / Man.	SPDT	DBK 4B00294	60-1155		60-5014	
High	KP 7ABS			8 → 32	Fixed 4	- / Man.	SPST	DBK 4B00294	60-5017 ³⁾	60-5221	60-5013 ³⁾	60-5220

¹⁾ Meets the requirements in VBG 20 dealing with safety equipment and excess pressures.

²⁾ W = Wächter (pressostat), B = Begrenzer (pressure control with ext. reset), S = Sicherheitsdruckbegrenzer (pressure control with int. reset).

A bellows rupture in inner bellows will cause the refrigeration plant compressor to stop.

A rupture of the outer bellows will cause the stop pressure to fall approx. 3 bar under the set value.

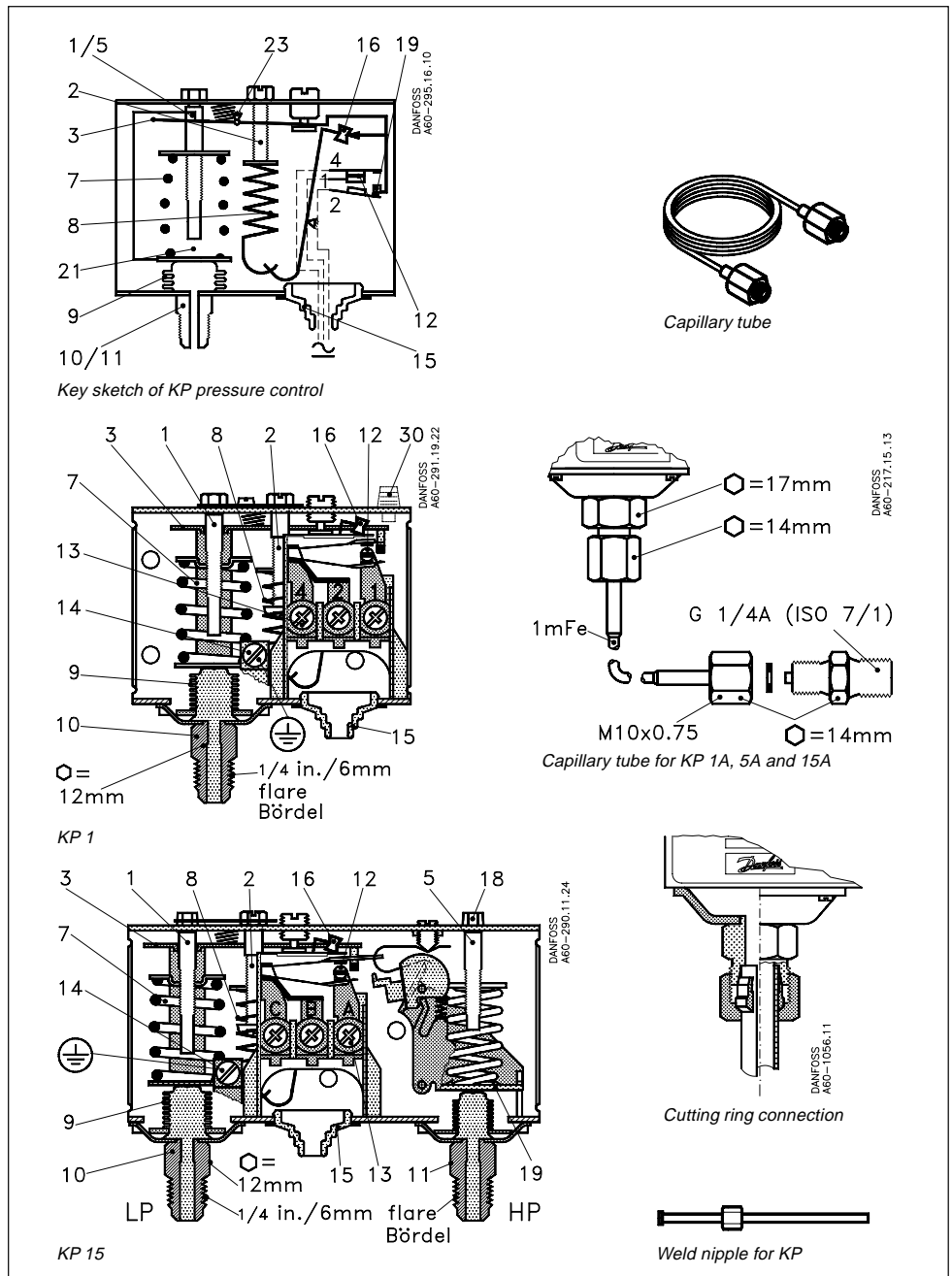
³⁾ Enclosure IP 33.

⁴⁾ Enclosure IP 44.

⁵⁾ With Ø6 × 150 mm weld connection.

⁶⁾ KP with goldplated contacts.

Design



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

The bellows becomes connected to the low or high pressure side of the plant through connection (10) or (11).

The design of the KP affords the following advantages:

- high contact load
- ultra-short bounce time
- high resistance to pulsation
- vibration resistance up to 4 g in the range 0-1000 Hz
- long mechanical and electrical life

Design

(continued)

The KP with letters W, B or S have been tested and approved by TÜV (Technischer Überwachungs Verein, Federal Republic of Germany) in accordance with DIN 32733.

W = Wächter (pressure control)

B = Begrenzer

(pressure control with external reset)

S = Sicherheitsdruckbegrenzer

(pressure control with internal reset).

KP 7 and KP 17 have a double bellows, an outer bellows and a regulating bellows. When pressure in the plant exceeds the set value, the KP will automatically stop the plant. The double bellows system prevents loss of system charge in the event of bellows rupture.

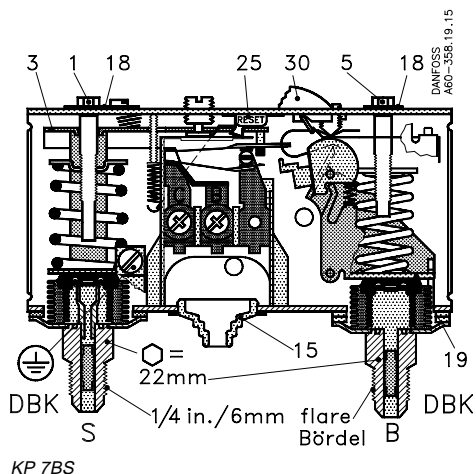
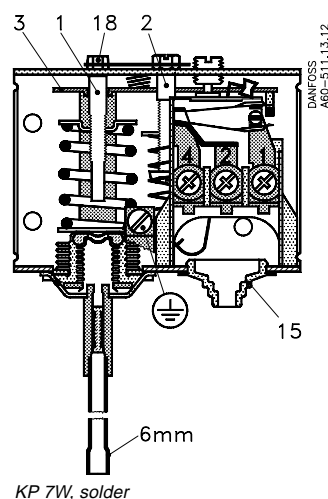
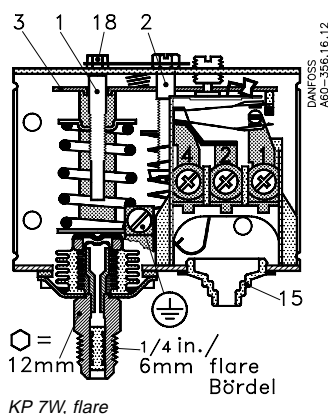
A rupture in the outer bellows will cause the cut-out pressure of the unit to fall to about 3 bar under the set value, and thus provides a fail-safe function.

Versions with designation W or AW cut in again automatically when the pressure has fallen to the set value minus the differential.

Versions with designation B or AB can be cut in manually with the external reset button when the pressure in KP 1 has raised 0.7 bar above set value and in KP 7 has fallen 4 bar under the set value.

Versions with designation S or AS can be cut in manually with the internal reset arm when the pressure has fallen 4 bar under the set value.

All KP pressure controls, including those which are DIN-approved, operate independently of changes in the ambient temperature around the control housing. Therefore the set cut-out pressure and differential are held constant provided the permissible ambient temperatures are not exceeded.



- 1. Pressure setting spindle
- 2. Differential setting spindle
- 3. Main arm
- 5. Pressure setting spindle, DBK
- 15. Cable entry
- 18. Locking plate
- 19. Arm
- 25. Int. reset arm
- 30. Ext. reset button

Terminology

Reset

1. *Manual reset:*

Units with manual reset can only be reset during operation by activation of the reset button.

2. *Automatic reset:*

After operational stop, these units reset automatically.

3. *Convertible reset:*

Units with optional reset can be activated by automatic and/or manual reset.

Permissible working pressure

The permissible working pressure is determined by the pressure that can be safely allowed in the refrigerating system or any of the units within it. The permissible working pressure is designated PB (Der zulässige Betriebsüberdruck).

Test pressure

The test pressure is the pressure used in strength tests and/or leakage tests on refrigerating systems or individual parts in systems. The test pressure is designated p'.

"Snap function"

A certain contact force is maintained until irrevocable "snap" is initiated. The time during which the contact force approaches zero is thus limited to a very few milliseconds. Therefore contact bounce cannot occur as a result of, for example, slight vibrations, before the cut-out point. Contact systems with "Snap function" will change over even when micro-welds are created between the contacts during cut-in. A very high force is created during cut-out to separate the welds. This force immediately shears off all the welds. Thus the cut-out point of the unit remains very accurate and completely independent of the magnitude of the current load.

Setting

Pressure controls with automatic reset - LP:

Set the LP start pressure on the "CUT-IN" scale (range scale).

One rotation of the low pressure spindle ~ 0.7 bar.

Set the LP differential on the "DIFF" scale. One rotation of the differential spindle ~ 0.15 bar.

The LP stop pressure is the LP start pressure minus the differential.

Note:

The LP stop pressure must be above absolute vacuum ($p_e = -1$ bar)!

If with low stop pressure the refrigeration compressor will not stop, check to ensure that the differential value has not been set too high!

Pressure controls with automatic reset - HP:

Set the HP pressure on the "CUT-OUT" scale.

One rotation of the HP spindle ~ 2.3 bar.

Set the HP differential on the "DIFF" scale.

One rotation of the differential spindle ~ 0.3 bar.

The HP start pressure is the HP stop pressure minus the differential.

Start and stop pressures for both the LP and HP sides of the system should always be checked with an accurate pressure gauge.

Pressure controls with manual reset

Set the stop pressure on "CUT-OUT" scale (range scale).

Low pressure controls can be manually reset when the pressure is equal to the stop pressure plus the differential.

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

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Dimensions and weights

<p><i>Flare connection</i></p> <p>KP 1, 2, 5, 7B, 7S and 7W</p> <p>KP 15 and 17W</p>	<p><i>KP with top cover</i></p>
<p><i>M10 x 0.75 connection</i></p> <p>KP 1A, 2A og 5A</p> <p>KP 15A, 7AS and 7ABS</p>	<p><i>KP with IP 54 enclosure</i></p>
<p><i>Cutting ring connection</i></p> <p>KP 1A, 2A and 5A</p> <p>KP 15A, 7AS and 7ABS</p>	<p><i>KP with IP 54 enclosure</i></p>
<p><i>Solder connection</i></p> <p>KP 1, 2, 5, 7B, 7S and 7W</p> <p>KP 15, 17W</p>	<p><i>IP 54 enclosure</i></p> <p><i>IP 54 enclosure</i></p>
<p><i>Weld nipple</i></p>	<p><i>Weight</i></p> <p>KP 1, 2, 5 and 7: approx. 0.3 kg</p> <p>KP 15, 17 and 7BS: approx. 0.5 kg</p> <p>KP 1A and 5A: approx. 0.3 kg</p> <p>KP 15A and 7ABS: approx. 0.5 kg</p>