



Pressure switch

KPS

Suitable for use in monitoring alarm and control systems in factories, diesel plants, compressors, power stations and on board ships.

Description

The KPS series consists of a series of pressure and temperature controlled switches. In this series, special attention has been given to meeting demands for a high level of enclosure, robust and compact construction, and resistance to shock and vibration.

For KPS pressure switches the position of the contacts depends on the pressure in the inlet connection and the set scale value.

The series covers most outdoor as well as indoor application requirements and is suitable for use in monitoring alarm and control systems in factories, diesel plants, compressors, power stations and on board ships.

Features & benefits

- A high level of enclosure
- Adjustable differential
- Robust and compact construction
- Resistance to shock and vibration
- Available with all major marine approvals

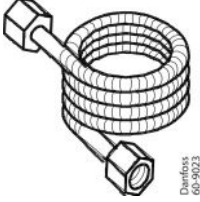
Ordering

Product code numbers

Type	Regulation range [bar] Pe [min]	Regulation range [bar] Pe [max]	Differential [bar]	Differential [bar] [min]	Differential [bar] [max]	Max. Working Pressure [bar]	Max. test pressure [bar] Pe	Pressure connection type	Pressure connection size	Code number
KPS35	0.00	8.00		0.40	1.50	12.0	12.0	G	3/8	060-310066
KPS37	6.00	18.00		0.85	2.50	22.0	27.0	G	3/8	060-310166
KPS39	10.00	35.00		2.00	6.00	45.0	53.0	G	3/8	060-310266
KPS33	0.00	3.50	0.20			10.0	10.0	G	3/8	060-310366
KPS33	0.00	3.50	0.20			10.0	10.0	G	1/4	060-310466
KPS35	0.00	8.00		0.40	1.50	12.0	12.0	G	1/4	060-310566
KPS37	6.00	18.00		0.85	2.50	22.0	27.0	G	1/4	060-310666
KPS39	10.00	35.00		2.00	6.00	45.0	53.0	G	1/4	060-310766
KPS35	0.00	8.00	0.40			12.0	12.0	G	1/4	060-310866
KPS31	0.00	2.50	0.10			6.0	6.0	G	3/8	060-310966
KPS31	0.00	2.50	0.10			6.0	6.0	G	1/4	060-311066
KPS33	0.00	3.50	0.20			10.0	10.0	G	3/8	060-311766
KPS43	1.00	10.00		0.70	2.80	120.0	180.0	G	1/4	060-312066
KPS45	4.00	40.00		2.20	11.00	120.0	180.0	G	1/4	060-312166
KPS47	6.00	60.00		3.50	17.00	120.0	180.0	G	1/4	060-312266
KPS33	0.00	3.50	0.20			10.0	10.0	G	3/8	060-314366
KPS35	0.00	8.00		0.40	1.50	12.0	12.0	G	3/8	060-314466
KPS31	0.00	2.50	0.10			6.0	6.0	G	1/4	060-315666
KPS39	10.00	35.00		2.00	6.00	45.0	53.0	G	3/8	060-319266
KPS31	0.00	2.50	0.10			6.0	6.0	G	1/4	060-410066
KPS35	0.00	8.00		0.40	1.50	12.0	12.0	G	3/8	060-410266
KPS39	10.00	35.00		2.00	6.00	45.0	53.0	G	1/4	060-410466
KPS43	1.00	10.00		0.70	2.80	120.0	180.0	G	1/4	060-410566
KPS45	4.00	40.00		2.20	11.00	120.0	180.0	G	1/4	060-410666
KPS35	0.00	8.00		0.40	1.50	12.0	12.0	G	1/4	060-411166
KPS43	1.00	10.00	2.00			120.0	180.0	G	1/4	060-411366
KPS45	4.00	40.00	5.00			120.0	180.0	G	1/4	060-411466
KPS39	10.00	35.00		2.00	6.00	45.0	53.0	G	3/8	060-419266

Accessories code numbers

Table: Accessories

Part	Figure	Description	Code number
Connector with nipple		G 3/8 connector, nipple and washer (10 mm o.d. x 6.5 mm i.d.) for brazing	017-436866
Connector with nipple		G 3/8 connector, nipple and washer (10 mm o.d. x 6.5 mm i.d.) for welding	017-422966
Reducer		G 3/8 x 7/16 - 20 UNF (1/4 flare) reduction with washer	017-420566
Adapter		G 3/8 x 1/8 - 27 NPT with washer	060-333466
Nipple		G 3/8 o.d x 7/16 - 20 UNF (1/4 flare)	060-324066
Nipple		G 3/8 A - 1/4 NPT with washer	060-333566
Adapter		G 3/8 x 1/4 - 18 NPT with washer	060-333666
Nipple		G 1/4 A x G 3/8 A	060-333266
		G 1/4 A x o.d. M10 x 1 with washer	060-333866
Damping coil		Damping coil with 1/4 flare connectors and 1 m copper capillary tube. Damp-ing coils used for applications with 3/8 RG connector requires the use of reducer. For information about capillary tube lengths, please contact Danfoss.	060-017166
Damping coil		Damping coil with G 3/8 connectors and 1.5 m copper capillary tube	060-104766
Armored damping coil		Damping coil with G 3/8 connectors and 1 m armored copper capillary tube. Standard washers included.	060-333366



Overview

Product portfolio

Figure: Standard pressure switches

[bar]									Range P _e [bar]	Type
-1	0	10	20	30	40	50	60			
									0 – 2.5	KPS 31
									0 – 3.5	KPS 33
									0 – 8	KPS 35
									6 – 18	KPS 37
									10 – 35	KPS 39

Figure: Pressure switches for high pressure and strongly pulsating media

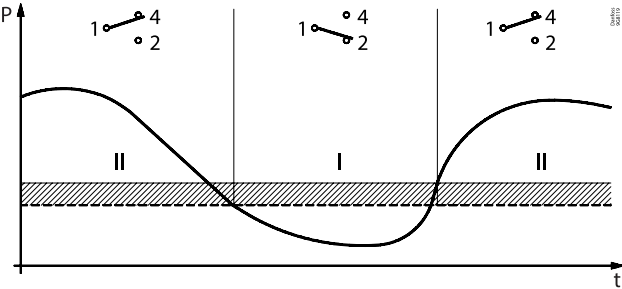
[bar]									Range P _e [bar]	Type
-1	0	10	20	30	40	50	60			
									1 – 10	KPS 43
									4 – 40	KPS 45
									6 – 60	KPS 47

Functions

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.

Figure: KPS 31

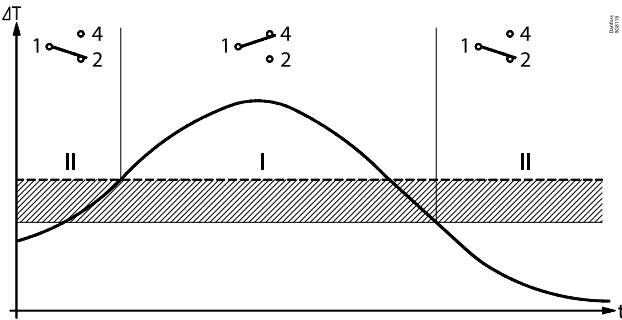


I	Alarm for falling pressure given at the set range value
II	Alarm for rising pressure given at the set range value plus the differential.
---	Scale setting
	Differential

All other KPS pressure switches

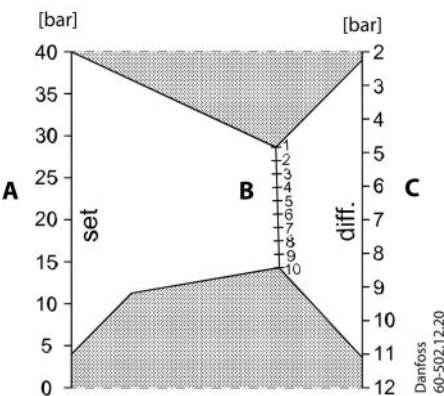
Contacts 1-4 make and contacts 1-2 break when the pressure rises above the set range value. The contacts changeover to their initial position when the pressure again falls to the range value minus the differential.

Figure: KPS pressure switches



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
---	Scale setting
	Differential

Figure: KPS 45



Example 1

An alarm must be given when the lubricating oil pressure in an engine fall below 0.8 bar. The alarm is in the form of a lamp. Choose a KPS 31 (range 0 – 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 switch.

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 37 (range 6 – 18 bar). The range value of the pressure switch must be set at 10 bars, 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 switch so that it lies between 30 and 36 bar. Choose a KPS 45 (range 4 – 40 bar). The range value must be set at 36 bar. The differential of 6 bar must be set in accordance with the nomogram, , at approx. 2 on the differential scale. The required start function is obtained by connection to terminals 1 and 2 in the pressure switch.

Product details

General data

Table: Technical Data

Switch	Single pole changeover (SPDT)	Contact material: Gold-plated silver contact	
Contact load (when Au surface is burnt away)	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)	
	Direct current	12 W, 220 V, DC-13, see <i>curve in Figure: Direct current (DC) load</i>	
Ambient temperature	KPS 31 – 39	-40 – 70 °C	
	KPS 43 – 47	-25 – 70 °C	
Temperature of medium ⁽¹⁾	KPS 31 – 39	-40 – 100 °C	
	KPS 43 – 47	-25 – 100 °C	
Vibration resistance	Vibration-stable in the range 2 – 30 Hz, amplitude 1.1 mm og 30 – 300 Hz, 4 g.		
Enclosure	IP67 (including IPX6) according to EN 60529. The pressure switch housing is enamelled pressure die cast aluminium (GD-ALSi 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 – 14 mm.		
Identification	The type designation and code no. of the unit is stamped in the side of the housing.		

⁽¹⁾ For water and seawater, max. 80 °C.

Table: Scale accuracy and settings drift

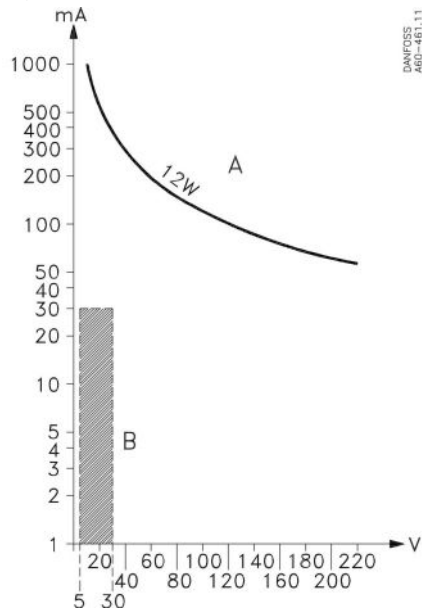
Types	Scale accuracy	Mean value of snap point variation after 400 000 operations
	[bar]	[bar]
KPS 31	±0.2	±0.1
KPS 33	±0.3	±0.2
KPS 35	±0.5	±0.3
KPS 37	±1.0	±0.4
KPS 39	±3.0	±0.7
KPS 43	±1.0	±0.2
KPS 45	±4.0	±1.0
KPS 47	±6.0	±1.5



Table: Materials in contact with the medium

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

Figure: Direct current (DC) load



A	Gives the maximum load
B	Acceptable load for the gold plating of the contact

Terminology

Range setting

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

Differential

The difference between make pressure and brake pressure

Permissible overpressure

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

Max. test pressure

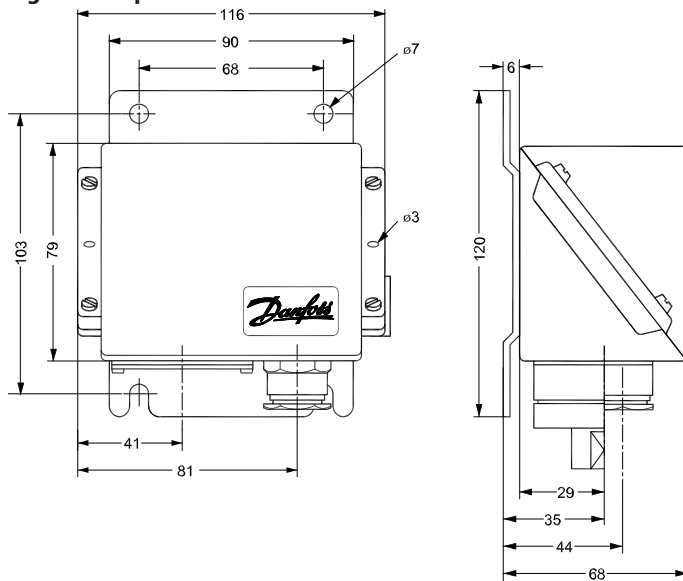
The highest pressure the unit may be subjected to when, for example, testing the system for leakage. Therefore, this pressure must not occur as a recurring system pressure.

Min. bursting pressure

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

Dimensions

Figure: KPS pressure switch



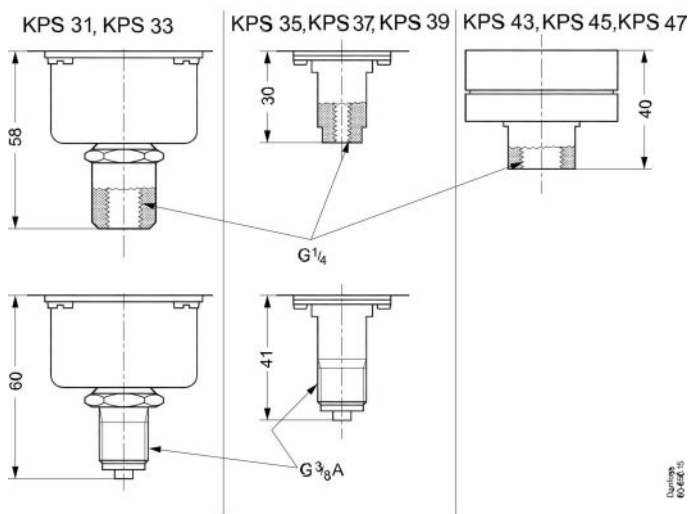
NOTE:

Net weight:

KPS 31 – 39 approx. 1.0 kg

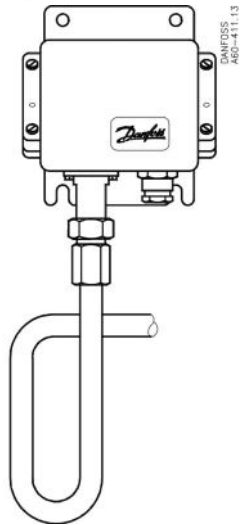
KPS 43 – 47 approx. 1.3 kg

Figure: KPS pressure connectors



Installation

Figure: KPS with water-filled loop



Installation

KPS pressure switches 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.

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.

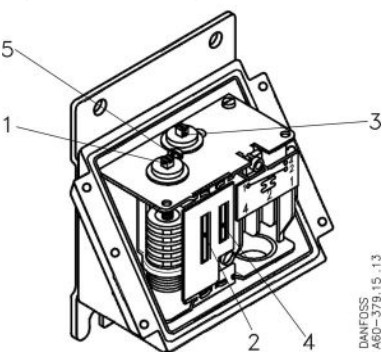
Media-resistance

See *Table: Materials in contact with the medium*. If seawater is involved, types KPS 43, KPS 45, KPS 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, KPS 45, KPS 47 are recommended. The maximum permissible pulsation level for these types is 120 bar.

Figure: KPS setting



1	Range spindle
2	Range scale
3	Differential spindle
4	Differential scale
5	Locking screw

Setting

When the pressure switch 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, KPS 45, KPS 47, can be determined by reading the scale value and using the nomograms in figs. The working line for determining the differential must not intersect the shaded areas in the nomograms.



Figure: KPS 43

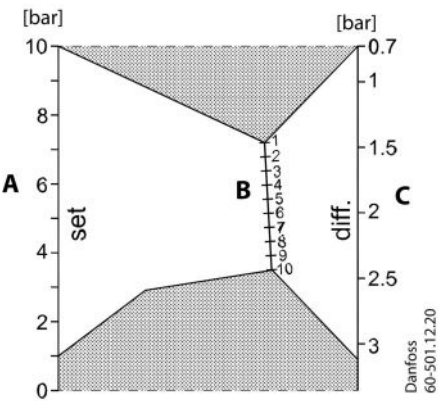


Figure: KPS 45

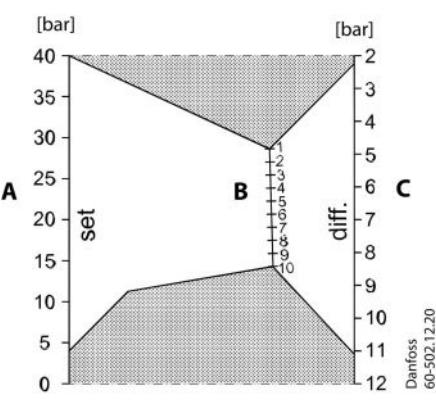
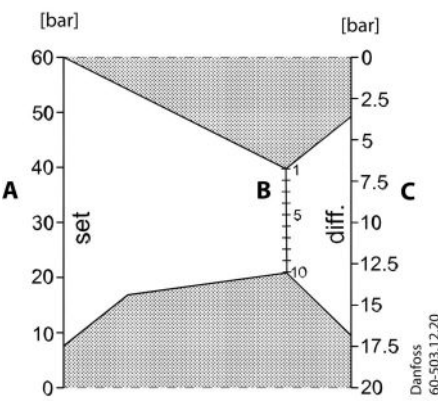


Figure: KPS 47



A	Range setting
B	Differential scale
C	Obtained differential

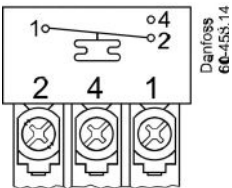
Selection of differential

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 switches are fitted with a Pg 13.5 screwed cable entry that is suitable for cable diameters from 5 – 14 mm. Contact function is shown in *Figure: Contact function*.

Figure: Contact function



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.

Approval type	Title	Issuer	Approval topic
Electrical Safety Certificate	UL E73170	UL - Underwriters Laboratories inc.	
Manufacturer's Declaration	Danfoss MD 060-9639.AB	Danfoss	China RoHS
CCC Declaration	Danfoss CCC 2020970305003454	Danfoss	
Marine Certificate	BV 04958-H0 BV	BV - Bureau Veritas	Marine
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 Safety Certificate	LLC CDC EURO-TYSK UA.TR.089.1015.05-22	LLC CDC EURO TYSK - Ukraine	Pressure
Marine Certificate	CCS GB23PTB00006_01	CCS - China Classification Society	Marine
Marine Certificate	DNV TAA000026C Rev.01	DNV	Marine
Marine Certificate	KR HMB 17529-AE003	KR - Korean Register of Shipping	Marine
Marine Certificate	NKK TA24044M	ClassNK - The Japanese Marine Association	
UA Declaration	Danfoss UA 2024-07-25 cooling sensors	Danfoss	EMC
CCC Declaration	Danfoss CCC 2024010305641305	Danfoss	CCC
EU Declaration	Danfoss EU 060-9680.AC	Danfoss	LVD
Marine Certificate	BV 04266 IO BV	BV - Bureau Veritas	
Marine Certificate	ABS 25-0336468-PDA	ABS - American Bureau of Shipping	
Export Control Declaration	Pressure switches & Thermostats	Danfoss	
Marine Certificate	RINA ELE282125XG	RINA - Registro Italiano Navale	

Contact details

Online support

Danfoss offers a wide range of support along with our products, including digital information, software, mobile apps and expert guidance. See the possibilities below.



The Danfoss Design center

Discover the Design Center, our advanced digital platform that streamlines product selection. With integrated tools and enhanced type pages, it's simpler than ever to access product information and documentation, and to select the right products. Check the availability of Danfoss products at partner locations and enjoy seamless transitions from selection to purchase with our basket-to-basket functionality. Whether you're buying from our distributors or directly from the Product Store, the Design Center simplifies your experience. Learn more at: designcenter.danfoss.com.



The Danfoss product store

The Danfoss Product Store is a one-stop shop available 24/7 for our customers, no matter where you are in the world or what area of industry you work in. Browse our catalog, check product details and documentation, view your prices and product availability, and quickly finalize your purchase. Start browsing at: store.danfoss.com.



Danfoss Partner Portal/Product Data tool

Designed to support you with easy access to product data extracts, essential resources, tools, and information. The Partner Portal provides a centralized hub for product documentation, training materials, marketing assets, and technical support, ensuring you have everything you need to succeed and grow your business with Danfoss. The Partner Portal is available 24/7 at: partner.danfoss.com and is ready to support your business.



Find technical documentation

Find technical documentation you need to get your project up running. Get direct access to our official collection of data sheets, certificates and declarations, manuals and guides, 3D models and drawings, case stories, brochures, and much more. Start searching now at: documentation.danfoss.com.



Danfoss Learning

Danfoss Learning is a free online learning platform. It features courses and materials specifically designed to help engineers, installers, service technicians, and wholesalers better understand the products, applications industry topics, and trends that will help you do your job better. Find your local Danfoss website here: learning.danfoss.com.



Get local information and support

Local Danfoss websites are the main sources for help and information about our company and products. Find product availability, get the latest regional news, or connect with a nearby expert - all in your own language. Find your local Danfoss website here: danfoss.com.

Danfoss A/S

Climate Solutions . danfoss.com . +45 7488 2222

Any information, including, but not limited to information on selection of product, its application or use, product design, weight, dimensions, capacity or any other technical data in product manuals, catalogues description, advertisements, etc. and whether made available in writing, orally, electronically, online or via download, shall be considered informative, and is only binding if and to the extent, explicit reference is made in a quotation or order confirmation. Danfoss cannot accept any responsibility for possible errors in catalogues, brochures, videos and other material. Danfoss reserves the right to alter its products without notice. This also applies to products ordered but not delivered provided that such alterations can be made without changes to form, fit or function of the products. All trademarks in this material are property of Danfoss A/S or Danfoss group companies. Danfoss and the Danfoss logo are trademarks of Danfoss A/S. All rights reserved.
