

A single-source supplier with total engineered solutions and a trusted partner with long experience and expertise in precision cooling applications. Danfoss has what it takes to help you design, build and install the system that will keep your customers satisfied.

EXPERIENCE

- 80 years of recognised experience in the HVAC/R field



INNOVATION

- Wide range of hi-tech, electronic "smart" components
- Continuous development of new products and solutions from world-class R&D



COMPREHENSIVE

- Total package – total energy efficient designs
- The support of dedicated Field System Engineers (FSEs) with testing, product selection, installation and training



ENGINEERING
TOMORROW



A world leader in climate and energy technology

The Danfoss Group operates globally with the primary aims of making modern living possible for our stakeholders and being a leader in refrigeration, heating, power electronics, and mobile hydraulics.

We employ 24,000 people, 6,000 of whom work in Denmark at 11 different locations.

We produce approximately 250,000 components each day at our 76 factories in 25 countries.

We promise leadership in our businesses through reliability, excellence, and innovation – driving true customer satisfaction and solutions within climate and energy.

Extensive experience in all key HVAC/R segments

Danfoss plays a leading role in research, development and production in a wide spectrum of industries, and has been a key player in the HVAC/R field for more than 75 years. Our Refrigeration & Air Conditioning Division designs, produces and markets a comprehensive range of automated solutions and compressors for a wide variety of HVAC/R segments, including

- Commercial Air Conditioning
- Residential Air Conditioning
- Heat Pumps
- Commercial Refrigeration
- Household, Light Commercial and Mobile Refrigeration
- Wholesalers & Installers
- Industrial Refrigeration
- Food Retail

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Enhance your **cooling systems' efficiency** with **complete solutions** from your **trusted partner**.

One
supplier fulfilling all your
Close Control A/C needs

Reduce the number of suppliers and thus reduce the cost of management without jeopardizing your systems quality.

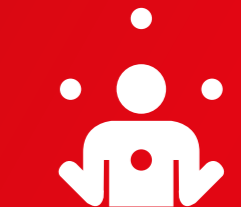
Danfoss is the single-source supplier who provides complete solutions to satisfy customers' needs for mission critical operations. As the reputable expert in the A/C field, Danfoss understands the challenges faced in the purchasing/procurement departments.

Danfoss, as your reputable and experienced partner, understands your business challenges and responds to the needs for the successful running of mission critical operations.



EASE

- 1 contact point
- Dedicated customer service
- Long term relationship thinking
- Easy product selection process



FLEXIBILITY

- Global organization which responds to your local needs



RELIABILITY

- Reliable, highest quality products - tested through and through
- Dependable and solid business partner



AVAILABILITY

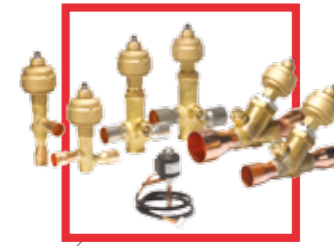
- Our global platform guarantees both availability and reliability which helps you to reduce inventory and freight costs

The most extensive range of Close Control A/C components:



Thermostatic Expansion Valves

Regulate the injection of refrigerant liquid into evaporators. Injection is controlled by the refrigerant superheat. The range comprises a variety of valves designed for specific applications.



Electronic Expansion Valves

The ETS series comprises a complete range of electrically operated expansion valves for precise liquid injection into evaporators. For the highest precision and reliability, it is recommended to use the Danfoss Superheat Controllers range.



Filter driers

Our range of both hermetic and exchangeable core filter driers protects your air conditioning system from moisture, acids and dirt.



Solenoid valves

Direct or servo-operated valves for liquid, suction and hot gas lines with fluorinated refrigerants. Delivered as a parts program, so you can design your valves according to your requirements.



Pressure switches

Small, light and robust, these disc-type pressure control units manage high or low pressure safety cuts and/or fan cycling. Available with automatic or manual reset in a wide variety of pressure settings.



Other components

Shut-off valves, ball valves, check valves, oil separators, refrigerant distributors and line heat exchangers. A wide range of proven technology for every need.



Controllers

Wide range of controllers for close control air-conditioning applications, all of which are based on a global, open and flexible system and can be programmed using standard communication protocols.



Compressors

Danfoss Performer[®] SM and SY compressors provide you world-class efficiency ensuring lower running cost and reliable operation. Newly developed 2nd generation VZH inverter compressors gains you advanced precise cooling temperature of $\pm 0.3^{\circ}\text{C}$ and reduces end-user energy bill by over 30%.

R410A - Component selection

Technical Data

Cooling capacity	Variable speed compressor	Expansion device		Controller	Filter drier	Ball valve	Check valve	Sight glass	Solenoid valve
		Thermostatic expansion valve	Electronic expansion valve						
35.0 kW	VZH088-BG	TGEL 10	ETS 6 -40+ ETS 6 coil	MCX 08M*	DCL 165s	GBC 22s	NRVH 19	SGP 22s N	EVRH 10
50.0 kW	VZH117-BG	TGEL 20	ETS 12.5	MCX 08M*	DCL 415s	GBC 22s	NRVH 19	SGP 22s N	EVRH 15
90.0 kW	VZH170-BG	TGEL 40	ETS 25	MCX 08M*	DCL 759s	GBC 28s	NRVH 22	SGP RI SGP RN	EVRH 20

* + superheat controller EXD316

R22/R407C - Component selection

Technical Data

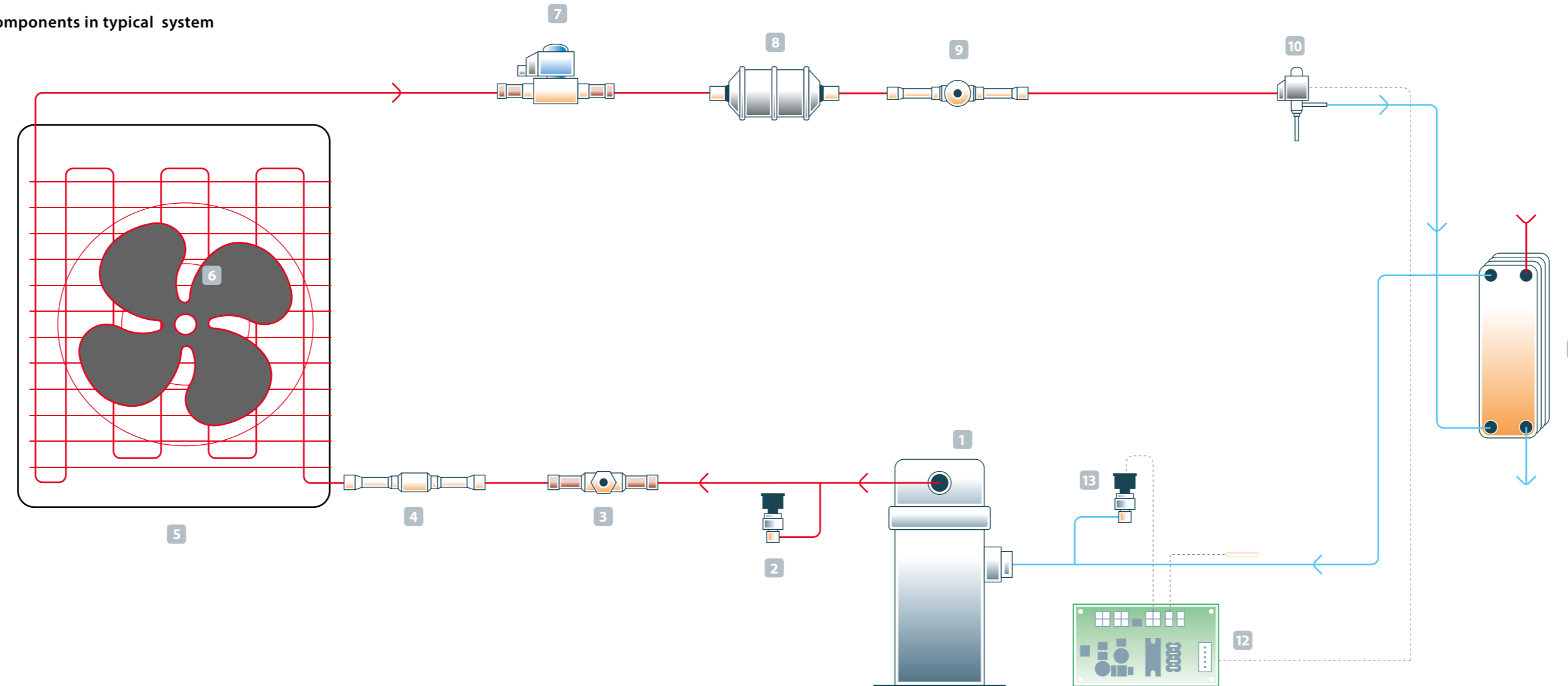
Cooling capacity	Fixed speed compressor	Expansion device		Controller	Filter drier	Ball valve	Check valve	Sight glass	Solenoid valve
		Thermostatic expansion valve	Electronic expansion valve						
36.0 kW	SM 147	TGEX 10	ETS 6 -40+ ETS 6 coil	MCX 08M*	DCL 167s	GBC 22s	NRV 19	SGN 22s	EVR 10
45.5 kW	SY 185	TGEX 20	ETS 12.5	MCX 08M*	DCL 167s	GBC 22s	NRV 19	SGN 22s	EVR 15

* + superheat controller EXD316

Application Diagram:

Close Control Air-Conditioning components in typical system

- 1 Compressors
- 2 Pressure switch
- 3 Ball valve
- 4 Check valve
- 5 Condenser
- 6 Fan
- 7 Solenoid valve
- 8 Filter drier
- 9 Sight glass
- 10 Expansion device
- 11 Evaporator
- 12 Controller
- 13 Pressure sensor



ETS 6 Electronic Expansion Valve:

Maximum working pressure	47 bar (682 psig)
Compatible refrigerants	HCF, HCFC (R22, R134a, R404A, R407C, R410A)
Refrigerant oil	All mineral oils and ester oils (to lubricate ETS 6 valve)
Ambient temperature	-30°C to 60°C (-22°F to 140°F)
Fluid temperature	-30°C to 70°C (-22°F to 158°F)
Durability	Tested for 60 million total pulses supplied to partially open valve, which is comparable to 150,000 cycles if the valve is operated between 100 to 300 pulses when open. Tested for 30,000 full-stroke cycles, including 20-pulse overdrive at each closing.
Ambient humidity	95% RH or less
Modulation	Permanent magnet type, direct operating stepper motor
Electrical connection	JST XHP-6 and JST XHP-5
Excitation speed	Min. 30 pps (pulses per second) to max. 90 pps; 31.3 pps recommended
Operating range	0 to 480 pulses, no holding power required
Full motion transit time	Examples: 16 sec @ 30 pps, 6 sec @ 80 pps
Installation position	With coil on the upper side and the valve/coil assembly within $\pm 15^{\circ}$ of the vertical axis
Max. coil winding temperature	115°C (239°F)