ENGINEERING
TOMORROW

Danfoss

CO_2 Controls Catalog

A full line of field-tested **CO_2 controls**, stocked for your convenience

7000+

CO_2 systems built with Danfoss products

www.danfoss.us/aftermarket

ENGINEERING
TOMORROW

Why choose Danfoss for CO_2?

Danfoss has pioneered CO_2 technologies for both transcritical and subcritical systems for more than ten years and has gained valuable experience from thousands of installations across six continents. We offer the widest range of field tested CO_2 controls available today.

Want to learn more about CO_2?

Danfoss offers a series of CO_2 modules in our free, online education platform. The course catalog includes a full range from refrigeration basics, to component function, to other new refrigerants. For more information, visit **learning.danfoss.com**

Curious about the future of refrigerants?

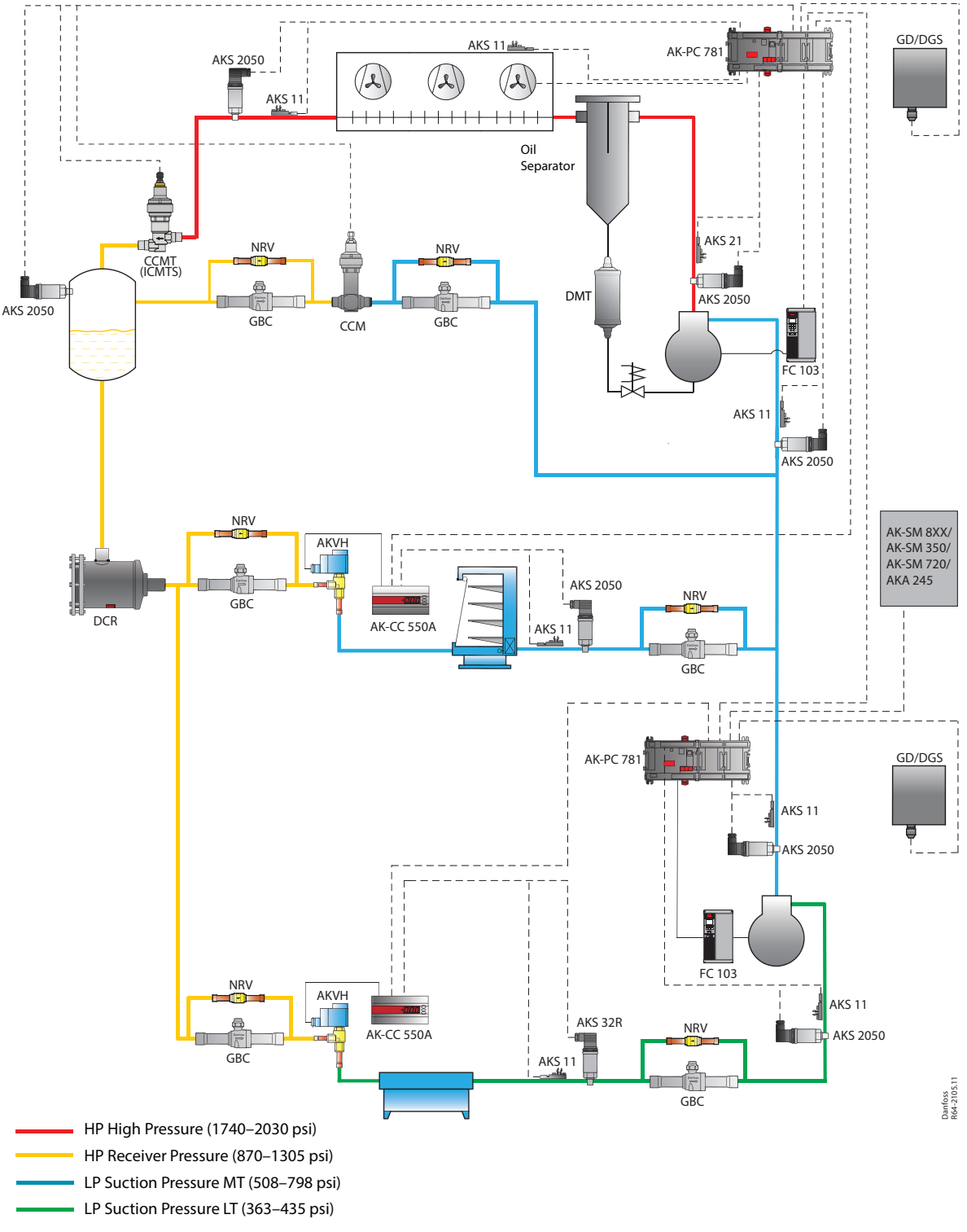
Our refrigerants website offers an abundance of information about refrigerants, energy efficiency, sustainability, and the future. Visit **refrigerants.danfoss.com**.

Danfoss offers a wide range of products for CO_2. Products included in this catalog are those used in typical installations. If you need a product not included in this catalog, please contact us to discuss other options.

For more information on other Danfoss products visit
choose.danfoss.com

CO_2 Transcritical Booster System

CO_2 transcritical booster systems enable high efficiency heat reclaim and are one of the best systems for cold to mild climates. Energy consumption is about the same or better than R-404A systems and the design is relatively simple. A typical CO_2 transcritical booster system is divided in to three pressure sections: the high pressure section, the intermediate pressure section, and the low pressure section. Controls for a transcritical system can be divided into four groups: gas cooler controls, receiver controls, injection controls and compressor capacity controls.



Food retail cascade HC/HFC- CO_2 System

CO_2 cascade systems are highly efficient in hot climates, use a relatively small amount of refrigerant, experience a low temperature change in the heat exchanger, and can use HC, HFC, or ammonia as the high side refrigerant. Cascade system controls can be divided into five groups: condenser capacity control, compressor capacity control, cascade injection control, MT evaporator CO_2 flow control, and LT evaporator injection control.

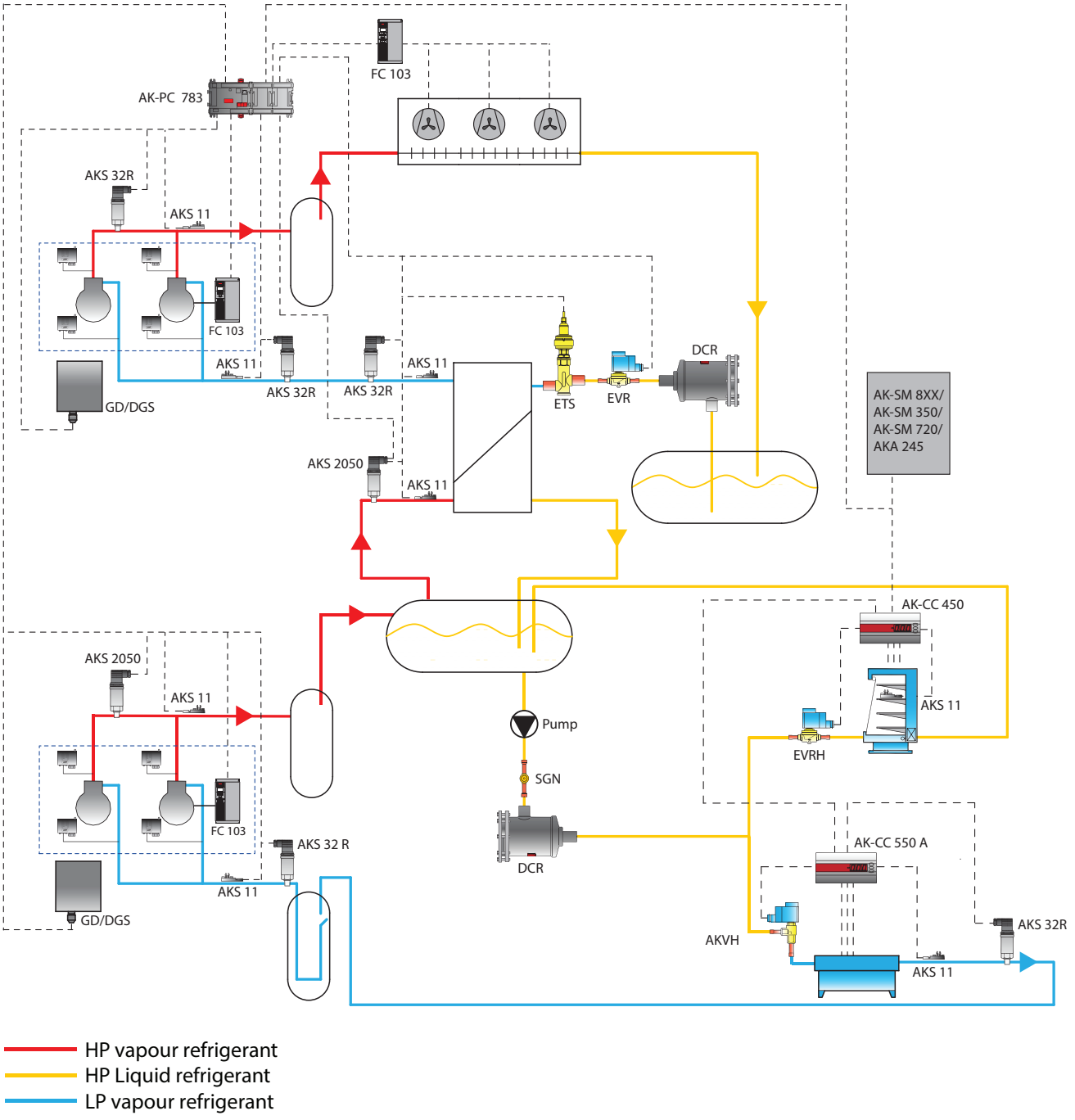


Table of Contents

High Pressure Ball Valves, type GBC

GBC H ball valves have been designed and tested to meet the high pressure requirements of CO_2. These manually operated shut-off valves are suitable for bi-directional flow and can be used in liquid, suction and hot gas lines. Features include: ball status indicator on spindle top, laser welded construction, burst-proof spindle design, holes for panel mounting, and sealing materials developed specifically for CO_2.

GBC H Ball Valves

Danfoss Type	Danfoss Code No.	Inlet Type	Inlet Size (in.)	Outlet Type	Outlet Size (in).	Cv Value (gpm)	MWP (psi)
GBC 6s H	009G7415	solder, ODF	1/4	solder, ODF	1/4	1.09	1305
GBC 10s H	009G7416	solder, ODF	3/8	solder, ODF	3/8	3.52	1305
GBC 12s H	009G7417	solder, ODF	1/2	solder, ODF	1/2	8.05	1305
GBC 16s H	009G7418	solder, ODF	5/8	solder, ODF	5/8	11.11	1305
GBC 18s H	009G7419	solder, ODF	3/4	solder, ODF	3/4	17.88	1305
GBC 22s H	009G7420	solder, ODF	7/8	solder, ODF	7/8	24.64	1305

Filter Driers, type DCR, and Cores, type DM

DCR filter driers with replaceable solid cores are used in liquid and/or suction lines in refrigeration and air conditioning systems. The shells featured below have been designed for high pressure refrigerants. DM cores contain 100% molecular sieve. They provide high moisture adsorption and protect against system impurities.

DCR Filter Driers

Danfoss Type	Danfoss Code No.	Connection (in.)	Connection Type	Weight	Max. Pressure (psig)	Temperature Range (°F)	Drying Capacity (TR) for CO_2		Liquid Capacity (TR) for CO_2
							20°F	75°F	
DCR 0489	023U7453	1	butt weld/solder, ODF	10 lbs, 6 oz.	667	–40° to 160°	165.1	151.9	27.2
DCR 0969	023U7459	1	butt weld/solder, ODF	13 lbs, 12 oz.	667	–40° to 160°	330.3	303.6	31.7
DCR 09617	023U7464	2 1/8	butt weld/solder, ODF	14 lbs, 9 oz.	667	–40° to 160°	330.3	303.6	57.0

DCR Cores & Gaskets

Danfoss Type	Danfoss Code No.	Material
48-DM Core DCR	023U1391	100% molecular sieve
48-DM Solid Core I/P=8	023U1392	100% molecular sieve
DCR Gasket for core shell	023U0058	various

Pressure Switches, type KP

KP pressure switches protect against excessively low suction or excessively high discharge pressure and are typically used for starting and stopping compressors and condenser fans. Features include: a single-pole double-throw (SPDT) switch; ultra-short bounce time, which reduces wear to a minimum and increases reliability; a manual trip function (an electrical contact function that can be tested without the need for tools); a fail-safe double bellows element that is fully-welded; vibration and shock resistance; compact design; and high electrical and mechanical reliability.

KP Pressure Switches

Danfoss Type	Danfoss Code No.	Pressure Connection Type	Weight (oz.)	Reset Function	Regulation Range (psig)	Range (°F)	Differential (psi)	Max. Working Pressure (psig)
KP 6W	060-519066	Flare – ¼, male	11	Auto	116 – 610	–15° to 150°	58 – 145	675
KP 6B	060-519166	Flare – ¼, male	10	Man.	116 – 610	–15° to 150°	58	675

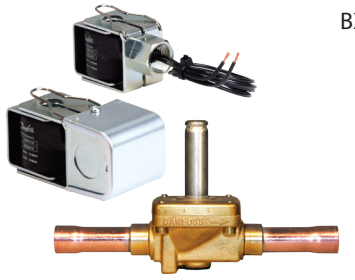
Check Valves, type NRV

NRV check valves can be used in liquid, suction, and hot gas lines in refrigeration and air conditioning applications. They ensure that refrigerant flows in the correct direction. A built-in damping piston makes the valve suitable for installation in lines where pulsation can occur, such as in the discharge line from the compressor. The NRV 10s H is specifically designed with a high maximum working pressure to permit use in CO_2 applications.

NRV Pressure Check Valves

Danfoss Type	Danfoss Code No.	Inlet Type	Inlet Size (in.)	Outlet Type	Outlet Size (in.)	Cv Value (gpm)	MWP (psi)
NRV 10s H	020-4000	solder, ODF	⅜	solder, ODF	⅜	1040	1305

Solenoid Valves, type EVR/EVRH, and Standard Coils, type BX/BJ



EVR and EVRH solenoid valves are direct or servo operated for liquid, suction and hot gas lines. They are available in both normally closed (NC) and normally open (NO) versions and feature interchangeable AC and DC coils. In standard applications standard BX/BJ coils are suitable to apply to EVR and EVRH valves; however, in applications with significant pressure differentials high MOPD BX/BJ coils are recommended. These can be found on page 10.

EVR Valves

Danfoss Type	Danfoss Code No.	Inlet Type	Inlet Size (in.)	Outlet Type	Outlet Size (in.)	Cv Value (gpm)	Weight w/o Coil (oz.)
EVR 2 (NC)	032F7100	solder, ODF	¼	solder, ODF	¼	0.18	6
EVR 3 (NC)	032F7105	solder, ODF	¼	solder, ODF	¼	0.31	6
EVR 3 (NC)	032F1157	solder, ODF	⅜	solder, ODF	⅜	0.31	6
EVR 4 (NC)	032F7110	solder, ODF	⅜	solder, ODF	⅜	0.70	6 ½
EVR 4 (NC)	032F7111	solder, ODF	½	solder, ODF	½	0.70	6
EVR 6 (NC)	032F7115	solder, ODF	⅜	solder, ODF	⅜	0.92	6 ½
EVR 6 (NC)	032F1162	solder, ODF	½	solder, ODF	½	0.92	6 ½
EVR 6 (NC)	032F7117	solder, ODF	⅝	solder, ODF	⅝	0.92	7
EVR 8 (NC)	032F7121	solder, ODF	½	solder, ODF	½	1.30	11 ½
EVR 8 (NC)	032F7122	solder, ODF	⅝	solder, ODF	⅝	1.30	8 ½
EVR 6 (NO)	032F1164	solder, ODF	⅜	solder, ODF	⅜	0.92	8

EVRH Valves

Danfoss Type	Danfoss Code No.	Inlet Type	Inlet Size (in.)	Outlet Type	Outlet Size (in.)	Cv Value (gpm)	Weight w/o Coil (oz.)
EVRH 10 (NC)	032G1077	solder, ODF	½	solder, ODF	½	2.20	13 ½
EVRH 15 (NC)	032G1078	solder, ODF	⅝	solder, ODF	⅝	3.01	22 ½
EVRH 20 (NC)	032G1079	solder, ODF	⅞	solder, ODF	⅞	5.80	46

Standard BX/BJ Coils

Danfoss Type	Danfoss Code No.	Voltage (V)	Frequency (Hz)	Power Consumption (W)	Coil Connection	Wire Length (in.)	Weight (oz.)
BX024CS	018F4102	24	50/60	14	½ in. conduit hub	18	11 ½
BX024CS	018F4103	24	50/60	14	½ in. conduit hub	71	11 ½
BX024CS	018F4104	24	50/60	14	½ in. conduit hub	98	11 ½
BX120CS	018F4112	110	50/60	16	½ in. conduit hub	18	11 ½
BX120CS	018F4113	110	50/60	16	½ in. conduit hub	36	11 ½
BX120CS	018F4114	110	50/60	16	½ in. conduit hub	71	11 ½
BX120CS	018F4115	110	50/60	16	½ in. conduit hub	98	11 ½
BX240CS	018F4122	230	50/60	17	½ in. conduit hub	18	11 ½
BX240CS	018F4123	230	50/60	17	½ in. conduit hub	98	11 ½
BJ024CS	018F4100	24	50/60	14	junction box	7	13 ½
BJ120CS	018F4110	110	50/60	16	junction box	7	13 ½
BJ240CS	018F4120	230	50/60	17	junction box	7	13 ½

CO_2 Leak Detector, type DGS

Utilizing either Semi-Conductor (SC) or Infrared (IR) technologies, DGS leak detectors give a rapid response when detecting a wide range of different refrigerants, including CO_2. The DGS sensors can be used in stand-alone or integrated systems where continuous real-time, automatic monitoring is required. The DGS complies with environmental regulations and Health & Safety requirements on new or existing systems.

Type DGS

Danfoss Type	Danfoss Code No.	Refrigerant	Temperature Range (°F)	Supply Voltage (V)	Alarm Set Point (ppm)
DGS CO2 Low Temp	080Z2996	CO_2 (R744)	–40° to 120°	12 – 24	5000
DGS CO2 Standard Temp	080Z2995	CO_2 (R744)	–4° to 120°	12 – 24	5000

Flash Gas Bypass Valve, type CCM

The CCM is an electrically operated valve designed specifically for operation in CO_2 systems and is capable of functioning both as an expansion valve and as a gas bypass valve with back-pressure regulation in subcritical applications. Additional features include: precise positioning for optimal control of intermediate pressure in transcritical CO_2 systems or liquid injection in heat exchangers, combined stainless steel butt weld and solder connections for installation in copper piped systems and a standard M12 connector for simple and flexible connection to the motor driver.

CCM Valves

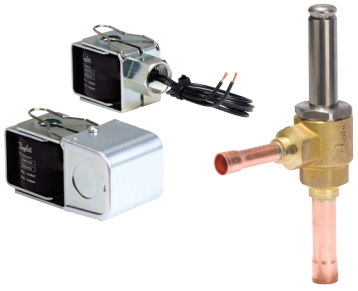
Danfoss Type	Danfoss Code No.	Connection Standard	Solder Connection Size (in.)	Weld Connection Size (in.)	Cv Value (gpm)	MWP (psig)
CCM 10	027H7188	EN10220	5/8	1/2	0.81	1305
CCM 20	027H7187	EN10220	7/8	3/4	2.14	1305
CCM 30	027H7186	EN10220	1 1/8	1	3.22	1305
CCM 40	027H7185	EN10220	1 1/8	1	5.55	1305

CCM Spare Parts and Accessories

Danfoss Type	Danfoss Code No.
Actuator CCM CO2 valve	027H7184
Wire 4 x 0.5 8000 w/M12 female	034G2323
AST-G driver manual box	034G0013

Electronic Expansion Valves, type AKVH, and High MOPD Coils, type BX/BJ

The AKVH is a pulse modulating electrically operated expansion valve designed for CO_2 refrigeration applications. It features a replaceable coil, wide range of coils for both DC and AC, quiet operation, energy efficient operation and long valve life, and the ability to operate as both an expansion and solenoid valve. AKVH valves should be paired with high MOPD BX/BJ coils.



AKVH Valves

Danfoss Type	Danfoss Code No.	Inlet Type	Inlet Size (in.)	Outlet Type	Outlet Size (in.)	Rated Capacity (TR)	Orifice Kit	MWP (psi)
AKVH 10-1	068F4079	solder, ODF	⅜	solder, ODF	½	0.37	Kit 0 – 3	1305
AKVH 10-2	068F4080	solder, ODF	⅜	solder, ODF	½	0.60	Kit 0 – 3	1305
AKVH 10-3	068F4081	solder, ODF	⅜	solder, ODF	½	0.97	Kit 0 – 3	1305
AKVH 10-4	068F4082	solder, ODF	⅜	solder, ODF	½	1.51	Kit 4 – 6	1305
AKVH 10-5	068F4083	solder, ODF	⅜	solder, ODF	½	2.36	Kit 4 – 6	1305
AKVH 10-6	068F4084	solder, ODF	⅜	solder, ODF	½	3.75	Kit 4 – 6	1305

High MOPD BX/BJ Coils

Danfoss Type	Danfoss Code No.	Voltage (V)	Frequency (Hz)	Power Consumption (W)	Coil Connection	Wire Length (in.)	Weight (oz.)
BJ120BS	018F4130	120	60	16	junction box	7	11 ½
BJ208BS	018F4132	208	60	16	junction box	7	11 ½
BJ240BS	018F4134	240	60	16	junction box	7	11 ½
BX120BS	018F4131	120	60	16	½ in. conduit hub	98	11 ½
BX208BS	018F4133	208	60	16	½ in. conduit hub	98	11 ½
BX240BS	018F4135	240	60	16	½ in. conduit hub	98	11 ½

AKVH Orifices

Danfoss Type	Danfoss Code No.
Orifice Kit #0-#3	068F5283
Orifice Kit #4-#6	068F5284

Small Capacity Gas Cooler Expansion Valve, type CCMT

The CCMT is an electronically operated valve designed specifically for CO_2 systems and can function either as an expansion valve, a pressure regulator for the gas cooler, or a gas bypass valve with back-pressure regulation in transcritical applications. Additional features include: compatibility with PAG, POE and PVE oils; combined butt weld and solder connections; and a light weight and compact design.

CCMT Valves

Danfoss Type	Danfoss Code No.	Temperature Range (°F)	Connection Standard	Solder Connection Size (in.)	Weld Connection Size (in.)	Cv Value (gpm)	Diff. Range (psi)
CCMT 2	027H7200	–40° to 40°	EN10220	5/8	1/2	0.19	1305
CCMT 4	027H7201	–40° to 40°	EN10220	5/8	1/2	0.52	1305
CCMT 8	027H7202	–40° to 40°	EN10220	5/8	1/2	0.92	1305
CCMT 16	027H7231	–40° to 40°	EN10220	1 1/8	1	1.85	1305
CCMT 24	027H7232	–40° to 40°	EN10220	1 1/8	1	2.77	1305
CCMT 30	027H7233	–40° to 40°	EN10220	1 1/8	1	3.70	1305
CCMT 42	027H7234	–40° to 40°	EN10220	1 1/8	1	5.32	1305

CCMT Spare Parts and Accessories

Danfoss Type	Danfoss Code No.
Cable with M12 connector	034G2323
EKD 316–converter box	084B8040
EKA–164A Display	084B8563
AKA 211–Cable filter	084B2238
AST-G Manual driver box	034G0013

Large Capacity Gas Cooler Expansion Valve, type ICMTS

The ICMTS is a direct operated motorized valve designed to regulate the flow of transcritical gas or subcritical liquid from the gas cooler in a transcritical CO_2 system. The ICMTS is driven by actuator type ICAD 600A-TS.

ICMTS Valves

Danfoss Type	Danfoss Code No.	Connection Standard	Inlet Type	Inlet Size (in.)	Outlet Type	Outlet Size (in.)	Cv Value (gpm)
ICMTS 20-A33	027H1084	EN 10220	butt weld	1	butt weld	1	0.23
ICMTS 20-A	027H1085	EN 10220	butt weld	1	butt weld	1	0.69
ICMTS 20-B	027H1086	EN 10220	butt weld	1	butt weld	1	2.78
ICMTS 20-C	027H1087	EN 10220	butt weld	1	butt weld	1	5.32

ICAD 600TS Actuator

Danfoss Type	Danfoss Code No.	Cable Length	Supply Voltage DC (V)	Supply Voltage Load (A)	Analog Input Voltage Options (V) DC	Analog Input Current Options (mA)	Analog Output Options (mA)	Dig. Output/ext. Supply Voltage DC (V)
ICAD 600A-TS	027H9078	4 ft. 11 in.	24	1.2	0 - 10 / 2 - 10	0 - 20 / 4 - 20	0 - 20 / 4 - 20	5 - 24
ICAD 600A-TS	027H9123	—	24	1.2	0 - 10 / 2 - 10	0 - 20 / 4 - 20	0 - 20 / 4 - 20	5 - 24

ICMT Spare Parts and Accessories

Danfoss Type	Danfoss Code No.
Multi-function tool	027H0181
ICMT/S 20-A33 top part w/cone & orifice	027H1088
ICMT/S 20-A top part w/cone & orifice	027H1080
ICMT/S 20-B66 top part w/cone & orifice	027H1094
ICMT/S 20-B top part w/cone & orifice	027H1081
ICMT/S 20-C top part w/cone & orifice	027H1082

Electronic Controllers, type AK

The AK series of controllers are stand-alone refrigeration system controls. The AK-PC 700 series of controllers offers rack-level control for various designs including standard HFC systems, transcritical CO_2 systems, and cascade designs. The AK-CC 550A is a single evaporator electronic expansion valve controller. The AK-SM 800 series is Danfoss' newest system manager and features "case to cloud" connectivity for enterprise level data sharing.

AK-PC Controllers

Danfoss Type	Danfoss Code No.	Function	Supply Voltage (V)	Communication Types	No. of Compressors (max.)
AK-PC 781	080Z0186	medium-large transcritical (single suction)	24	LON RS485	8
AK-PC 781 A	080Z0191	medium-large transcritical (single suction)	24	LON RS485	10
AK-PC 783	080Z0196	cascade system (dual suction)	24	LON RS485	4 × 4
AK-PC 772	080Z0200	small transcritical (dual-suction)	24	LON RS485	3 × 2

AK-CC Controllers

Danfoss Type	Danfoss Code No.	Supply Voltage (V)	Communication Types
AK-CC 550A	084B8036	115	LON RS485, Modbus
AK-CC 550A	084B8030	230	LON RS485, Modbus

AK-SM Controllers

Danfoss Type	Danfoss Code No.	Function	Frequency (HZ)	Communication Types
AK-SM 850	080Z4001	refrigeration	50/60	LON RS485, Modbus
AK-SM 880	080Z4008	refrigeration & HVAC	50/60	LON RS485, Modbus
AK-SM 880	080Z4009	refrigeration & HVAC	50/60	LON TP78, Modbus

Electronic Controllers, type EKC

The EKC 326A controller, when paired with an ICMTS valve, can be used in transcritical and CO_2 systems to regulate gas cooler (condenser) pressure and ensure that the system achieves optimal efficiency.

EKC Controllers

Danfoss Type	Danfoss Code No.	Function	Supply Voltage (V)	Communication Types	No. of Compressors (max.)
EKC 326A	084B7252	gas cooler for CO_2	24	EKA 174	8

Temperature Transducers, type AKS

AKS 2050 ratiometric pressure transmitters convert measured pressure to a linear output and are designed specifically for CO_2 pressure ranges.

AKS Temperature Transducers

Danfoss Type	Danfoss Code No.	Operating Range (psi)	Allowable Working Pressure PB (psi)	Compensated Temperature Range (°F)	Pressure Connection Type
AKS 2050	060G6342	–14.5 to 855	1450	–22° to 104°	¼ – 18 NPT
AKS 2050	060G6344	–14.5 to 2305	3625	32° to 176°	¼ – 18 NPT

AKS Spare Parts and Accessories

Danfoss Type	Danfoss Code No.
Mating plug with 15 ft cable	060G1034

Temperature Sensors, type AKS

AKS PT1000 temperature sensors utilize a platinum element to ensure optimal accuracy.

AKS Temperature Sensors

Danfoss Type	Danfoss Code No.	Purpose	Maximum Ambient Temperature (°F)	Measurable Range (°F)	Cable Temperature Range (°F)	Cable Type
AKS 11	084N0029	superheat measurement	212°	–58° to 212°	–40° to 212°	PVC
AKS 21	084N2003	multipurpose	356°	–94° to 356°	–60° to 392°	silicon

ENGINEERING
TOMORROW

80 years

The industry's widest expertise at your disposal. We've been looking ahead since 1933.

USCO.PK.000.A1.02