

## The ecosystem around the electric expansion valves

Benefit from an entire Danfoss ecosystem of controllers, drivers, sensors and programming tools to reduce complexity and total costs of ownership, and maximize your systems energy efficiency.



### MCX programmable controller

- Helps maintain precise temperature settings
- Extended programming library
- Modular design from standalone to more complex systems
- Built-in CANbus, RS485 Modbus and various communication protocols

### EKE superheat controller

- Helps OEMs develop more efficient chillers, rooftops, heat pumps, CRAC units, cold rooms and food retail equipment faster to reduce development and operational costs
- Best-in-class adaptive superheat control for ultimate system accuracy and efficiency
- Increased system protection with fail safe operation

### EKE 2U backup power module

- Designed to enhance system reliability, EKE 2U supplies power to stepper motor controllers to close valves in case of power loss. This prevents liquid migration to the compressor during power shortage
- Main features: fast charging, applicable to many controllers and valves, galvanic isolation, high protection

### EKF stepper motor valve driver

- Cost-competitive, robust, versatile and easy to configure stepper motor driver
- Appropriate for electric expansion valves and superheat management
- Suitable for Turbocor oil-free staging valves, for hot gas bypass, and liquid or vapor injection
- Available for 1 or 2 valves and compatible with all models on the market

### DST P110 pressure sensor

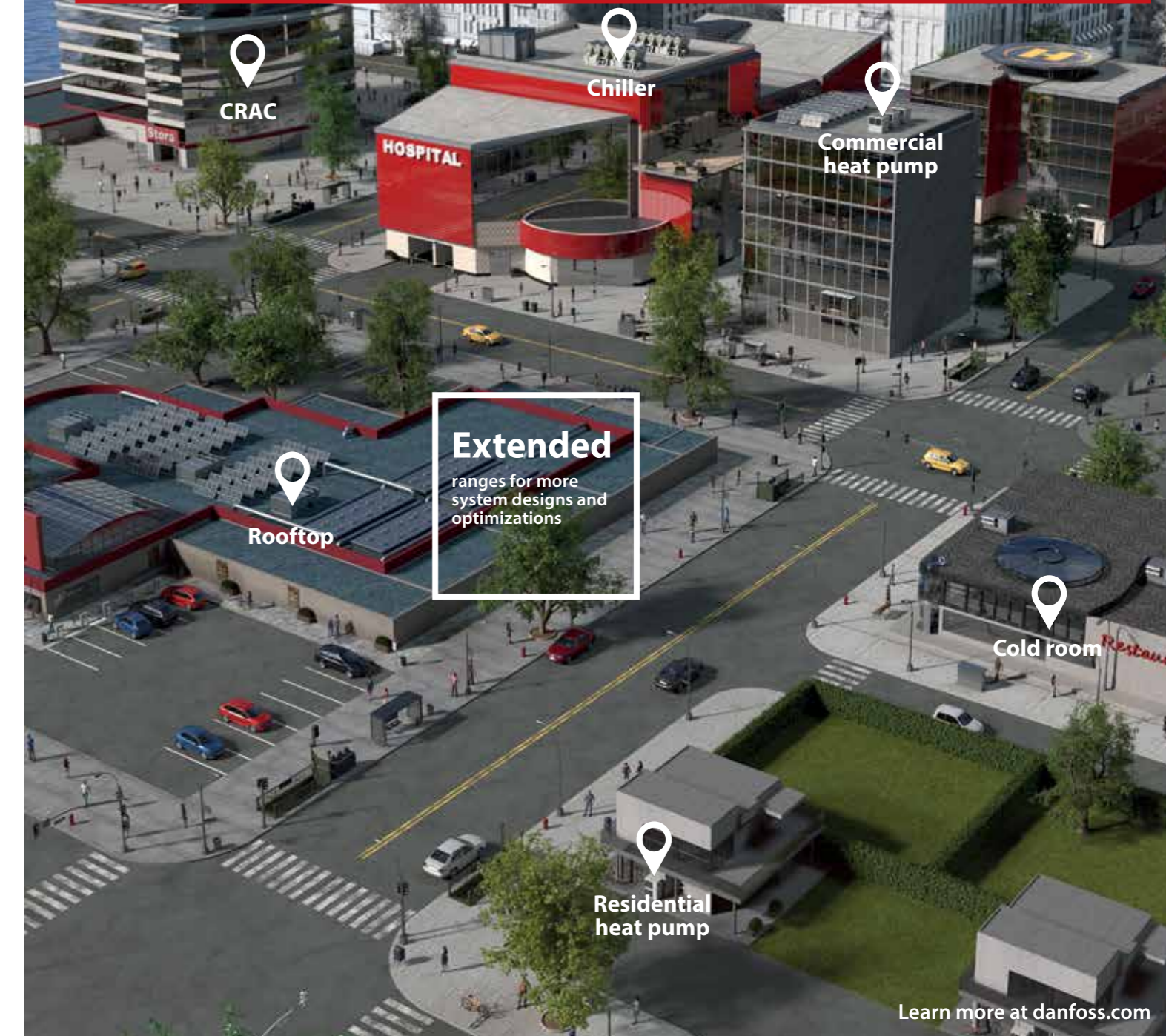
- Highly precise, providing +/- 1% Total Error Band accuracy across the application-focused temperature range
- Custom calibration profiles can be adapted to suit application-specific requirements, supporting a more efficient superheat control

### PT1000 temperature sensor

- Temperature range from -50°C to 100°C
- Color coded cables for easy installation

## Ultimate system efficiency and reliability

Precise flow control of your system with Danfoss wide electric expansion valve programs—in every HVAC-R application.



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 descriptions, 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 product. 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.



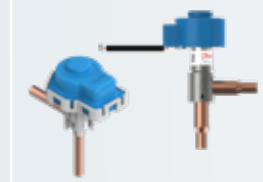
Choose the optimum solution

		Electric Expansion Valves (modulated regulation)							Electric Expansion Valves (pulsating regulation)		Electric Expansion Valves (modulating regulation) designed for R744 (CO <sub>2</sub> )			
		ETS M		ETS 6	ETS C	ETS L		ETS P	AKV	AKV-P	CCM	CCMT	CCMT light	ICMTS
Type		<ul style="list-style-type: none"> <li>Low flow noise and operation noise</li> <li>Optimized valve flow characteristics</li> <li>Accurate valve control, also at low opening degrees</li> <li>Bi-flow, with high performance in both flow directions</li> </ul>		<ul style="list-style-type: none"> <li>Easy to install</li> <li>Works with all common refrigerants</li> <li>Compact and lightweight</li> </ul>	<ul style="list-style-type: none"> <li>Precise control of liquid injection</li> <li>Fast opening/closing time</li> <li>Solenoid tight shut-off</li> <li>Fully hermetic laser welded design</li> <li>Compact, lightweight and in-line design</li> <li>Oil-free and ATEX approved</li> </ul>	<ul style="list-style-type: none"> <li>Precise positioning for optimal control of liquid injection</li> <li>High quality manufacturing standard</li> <li>Fine capacity regulation settings</li> <li>High reliability and precision</li> <li>Compatible with oil-free and high temperature applications</li> </ul>		<ul style="list-style-type: none"> <li>Compatible with oil free applications</li> <li>Precise positioning for optimal control of liquid injection</li> </ul>	<ul style="list-style-type: none"> <li>Supplied as parts programme with valve, coil and orifice</li> <li>No need of adjustment</li> <li>Allow a wide regulation range</li> </ul>	<ul style="list-style-type: none"> <li>Ideal for high pressure transcritical systems (CCMT &amp; ICMTS) or subcritical systems (CCM &amp; CCMT)</li> <li>Maintain optimal gas cooler pressure by controlled throttling of the gas from the gas cooler into the intermediate receiver (or evaporator)</li> <li>Achieve optimal intermediate receiver pressure and higher system efficiency by controlled by-pass of the gas from the receiver into the compressor suction line</li> </ul>				
Main applications	Chiller	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
	Heat pump	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
	Close control/CRAC	Yes	Yes	Yes	Yes									
	Transport Refrigeration	Yes		Yes										
	Air Drier	Yes		Yes	Yes	Yes	Yes							
	Food Retail								Yes	Yes	Yes	Yes	Yes	Yes
	Cold Room	Yes		Yes	Yes	Yes	Yes		Yes					
	Industrial Applications							Yes	Yes		Yes	Yes	Yes	Yes
Technical specifications	Subtypes	ETS 5M13 • ETS 5M17 • ETS 5M20 • ETS 5M24	ETS 8M40 • ETS 8M45 • ETS 8M55 • ETS 8M65	ETS 6 - 10 • ETS 6 - 14 ETS 6 - 18 • ETS 6 - 25 ETS 6 - 32 • ETS 6 - 40	ETS 12C • ETS 24C • ETS 25C • ETS 50C • ETS 100C	ETS 175L • ETS 250L	ETS 400L	ETS 500P • ETS 800P	AKV 15 • AKV 20	AKV 10P0 • AKV 10P8	CCM10 • CCM20 • CCM30 CCM 50 • CCM 40	CCMT 2 • CCMT 4 • CCMT 8	CCMT 3L, 5L, 8L, 10L	ICMTS 20 A33 • ICMTS 20A • ICMTS 20 B66 • ICMTS 20B • ICMTS 20C
	Capacity (in main applications)	8.9 - 20.6 kW (R410A) 2.5 - 5.8 TR (R410A)	62.8 - 114.2 kW (R410A) 12 - 40 TR (R410A)	2.7 - 40.2 kW (R407C) 0.77 - 11.4 TR (R407C)	91 - 635 kW (R410A) 26 - 183 TR (R410A)	650 - 1081 kW (R134a) 190 - 307 TR (R134a)	1394 - 1930 kW (R134a) 402 - 550TR (R134a)	1652 - 2245 kW (R134a) 471 - 640 TR (R134a)	0.6 - 530 kW (R404A) 0.17 - 151 TR (R404A)	0.4 - 33 kW 0.1 - 9.4 TR	10 - 3200 kW <sup>2)</sup> 2.8 - 910 TR <sup>2)</sup>	10 - 130 kW <sup>1)</sup> 2.8 - 37 TR <sup>1)</sup>	10 - 130 kW <sup>1)</sup> 2.8 - 37 TR <sup>1)</sup>	10 - 675 kW <sup>1)</sup> 2.8 - 192 TR <sup>1)</sup>
	Primary refrigerants	R410A • R32 • R454B • R404A • R134a • R448A • R449A • R290	R410A • R32 • R454B • R404A • R448A • R449A • R290	R410A • R22 • R407C • R404A • R134a	R410A • R32 • R454B • R290 • R134a	R134a • R513A • R515B • R1234ze	R134a • R513A • R515B • R1234ze	R134a • R513A • R515B • R1234ze	R407C • R134a • R404A • R410a	R744	HFC • R744	HFC • R744	R744	HFC • R717 • R744
	Connections	ODM/ODF Solder [mm]	ODM Solder [mm]	ODF Solder [mm]	ODF Solder [in.] / [mm]	ODF Solder [in.] / [mm]	ODF Solder [in.] / [mm]	ODF Solder [in.] / [mm]	ODF Solder [in.] / [mm]	ODF Solder [in.] / [mm]	ODF Solder / Butt weld [in.]	ODF Solder / Butt weld [in.]	ODF Solder / Butt weld [in.] / Bi-metal	Butt weld [mm]
	Principles	Unipolar stepper motor (480 steps, 1 - 2 excitation)	Unipolar stepper motor (500 steps, 1 - 2 excitation)	Unipolar Stepper motor (480 steps, 1 - 2 excitation)	Bipolar stepper motor (600 steps)	Bipolar stepper motor (3810 steps)	Bipolar stepper motor (3810 steps)	Bipolar stepper motor (3810 steps)	Servo, Pulse-width modulation	Direct, servo, pulse-width modulation	Electronic stepper motor (3530 steps)	Electronic stepper motor (1100 steps)	Electronic stepper motor (210 steps)	Electronic stepper motor (250 steps)
	Max. OPD	35 bar	32 bar (A->B), 39 bar (B->A)	35 bar	40 bar	26 bar	26 bar	25 bar	18 - 22 bar	18-35 bar	50 bar	90 bar	90 bar	90 bar
	Max. working pressure (PS)	45.5 bar	49 bar	47 bar	50 bar	37 bar	37 bar	37 bar	28 - 46 bar	90 bar	90 bar	140 bar	140 bar / 2030 psig Steel connections 130 bar / 1885 psig Bi-metal connections 120 bar / 1740 psig Bi-metal connections for UL approval 140 bar	140 bar
	Media temperature	-30 - 70 °C	-30 - 70 °C	-30 - 70 °C	-40 - 70 °C	-40 - 70 °C	-40 - 70 °C	-40 - 65 °C	-50 - 60 °C	-60 - 60 °C	-40 - 40 °C	-40 - 60 °C	-20 - 55 °C / -4 - 131 °F on inlet -40 - 55 °C / -40 - 131 °F on outlet	-60 - 120 °C
	Flow characteristics	Linear	Linear / S-curve	Linear	Linear	Linear / S-curve	Linear / S-curve	S-curve	ON-OFF	ON-OFF				
	Approvals	UL • CE • PED • CQC	UL • CE • PED • CQC	UL • CE • PED • CQC	UL • CE • PED • CQC • ATEX	UL • CE • PED • CNR	UL • CE • PED • CNR	CE • PED	UL • DEMKO • SETI • SEV • LVD • PED	UL • PED	UL • PED	UL • PED	CE • cURus • EAC	UL • PED
IP rating	66	67	66	67	67	67	67	Depends on coil type*	Depends on coil type*	67	67	68	67	
Materials	Valve body	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Brass	Brass	Brass	Brass	Brass	Stainless Steel	Stainless Steel	Stainless Steel	Steel
	Accessories													
ETS 6	Danfoss controllers/drivers	EIM 336 • EKE 1x • EKF	EKF	EIM 336 • EKE 1x • EKF MCX	EIM 365 • EKE 1x • EKF MCX	EIM 365 • EKE 1x • EKF MCX	EIM 365 • EKE 1x • EKF MCX	EKE 1x • EKF MCX	AK-CC	AK-CC	EKC 326 • AK-PC 781 • AK-CC 750 • XM 208C	EKC 326 • AK-PC 781 • AK-CC 750 • XM 208C	EKE 1P • EKE 2U • AK-PC 572 • AK-PC 7xx • AK-XM 208C <sup>1)</sup>	EKC 326 • AK-PC 781
	Cables	0.7 m • 1 m • 1.5 m • 2.7 m	2 m • 3 m • 6 m	0.7 m • 1.5 m • 3 m	Optional 2m - 12m	Optional 2m - 12m	Optional 2m - 12m	Optional 2m - 12m	Depends on coil type*	Depends on coil type*	0.3 m	0.3 m	0.3 m	2 x 1.5 m

Extended ranges, models, and capabilities

meeting wider design requirements from small to large systems, and boosting energy efficiency. Qualified for the main refrigerants in the market, including low and medium-density HFC and HFO blends, A2L options, and natural R290 and CO<sub>2</sub> refrigerants.

ETS 5M  
ETS 8M



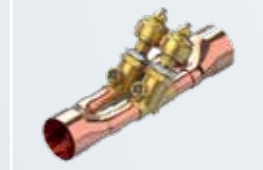
ETS Colibri



ETS L series



ETS P Manifold



AKV



AKV-P



CCMT



CCMT light



ICMTS



\* For additional information visit store.danfoss.com | <sup>1)</sup> CO<sub>2</sub> Gascooler throttle | <sup>2)</sup> CO<sub>2</sub> Gas by-pass