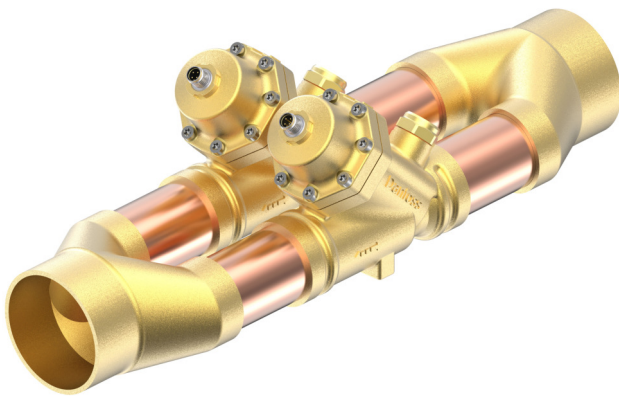


Data Sheet

Electric expansion valve **ETS P Manifold**



ETS 800P and ETS 1000P are extensions to the current electric expansion valves ETS program and include two ETS 400L and ETS 500L in parallel, respectively. They can be used for precise liquid injection in evaporators for air conditioning and refrigeration applications with high-capacity.

The valve piston and positioning design is fully balanced, providing a bi-flow feature and tight shut-off function in both flow directions.

The valve design uses a bi-polar drive, providing very precise flow regulation.

ETS 800P and ETS 1000P are compatible with electronic control solutions from Danfoss and other manufacturers.

Features

- Wide range for all common refrigerants.
- Rated capacity for R134a:
ETS 800P: 586 TR / 2043 kW
ETS 1000P: 992 TR/3459 kW
- Maximum working pressure: 37 bar / 537 psig.
- Compatible with oil-free applications.
- Precise positioning for optimal control of liquid injection.
- Balanced design.
- Built-in sight glass with moisture indicator.
- Can be operated with flow in both directions and are solenoid tight.
- Low power consumption.
- Danfoss controller, Danfoss EKE series, EKF series and MCX can be used to drive ETS 800P and ETS 1000P.
- For manual operation and service of ETS valves, an AST-G service driver is available.
- high temp capability

Product specification

Technical data

Table 1: Technical data

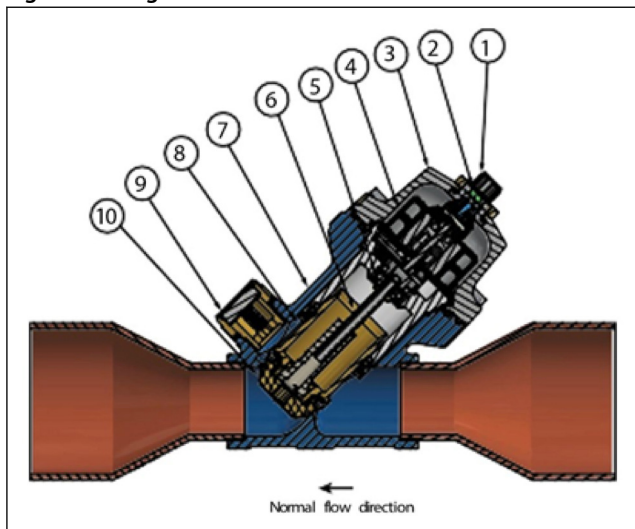
Compatible refrigerants	R1234ze(E), R134a, R22, R404A, R407A, R407C, R407F, R407H, R410A, R417A, R422A, R422B, R422D, R438A, R442A, R448A, R449A, R449B, R450A, R452A, R463A, R507A, R513A, R513B, R515A, R515B
Refrigerant oil	POE, PVE
Flow direction	Bi-Flow
Comply with P.E.D.	PED Category I
Max. opening pressure differential (MOPD) normal flow	26 bar (377 psig)
Max. opening pressure differential (MOPD) reverse flow	10 bar (145 psig)
Max. working pressure (PS/MWP)	37 bar (537 psig)
Inlet fluid temperature	-40 to 95 °C (-40 - 203 °F)
Ambient temperature	-40 °C – 70 °C (-40 °F – 158 °F)
Ambient relative humidity	Max 95% RH
Storage temperature range (°C)	~-30 °C to 70 °C
Motor enclosure	IP67
Stepper motor type	Bi-polar - permanent magnet
Excitation methods	Full step, Half step and micro stepping
Phase resistance @ 25 °C	52.4 Ω ±10%
Phase inductance	70 mH ±- 20%
Phase current	Chopper drive: 283mA peak
Nominal voltage	Constant voltage drive: 12 V dc -4% – 15%
Holding current	Not needed
Max. duty cycle	100% possible, requiring refrigerant flow through valve. (max. 50% for oil-free and high temperature version)
Travel time	<20 sec @ 200 PPS (for ETS 800P) <25 sec @ 200 PPS (for ETS 1000P)
Total steps	For each ETS 400L 3810 -0/+400 Full steps, for each ETS 500L: 4999 Full steps
Minimum stable control opening degree	10% of opening degree
Valve configuration	Inline, Straight-way
Reference position	Overdriving against the full close position
Electrical connection	M12 A-code 4 pin
Compatible Danfoss controllers	EKE 100 and EKF2A

Table 2: Installation

Installation data	Value
Installation orientation	Vertical +90°
EX-factory delivery position	90% open position

Design

Figure 1: Design



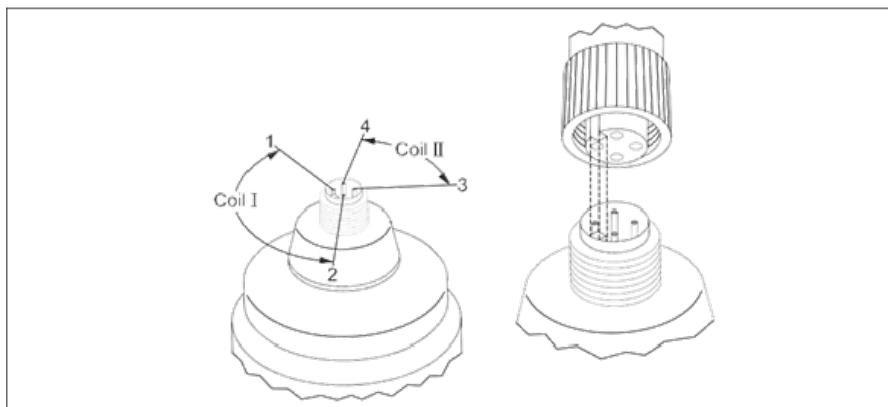
Pos.no.	ETS800P – 1000P
1	M12 connector
2	Glass seal
3	Cover
4	Stepper motor
5	Bearing
6	Spindle
7	Valve housing
8	Piston
9	Sightglass
10	Cone

Sight glass and indicator

ETS 800P and ETS 1000P are equipped with a sight glass with moisture indicator. The physical position of the piston in the valve can be checked through the sight glass.

Insufficient sub-cooling can produce flash gas, which is visible through the sight glass. The moisture indicator in the sight glass changes color to indicate whether the refrigerant is dry or wet.

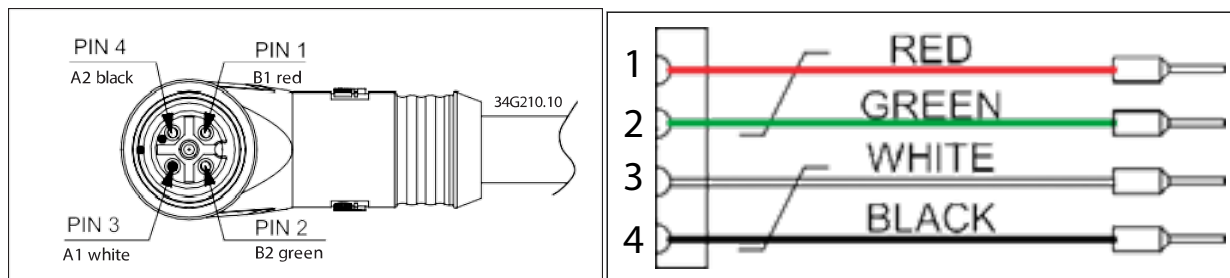
Electrical wiring



NOTE:

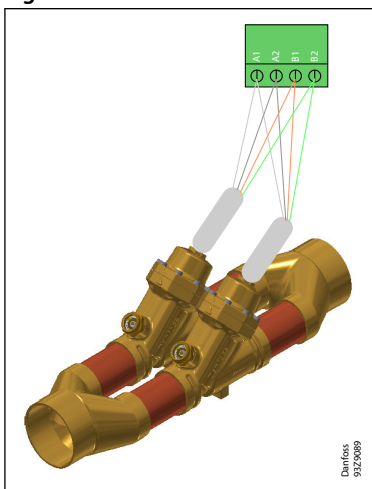
Electrical check of stepper motor and wiring: Coil I = 52.4 ohm, coil II = 52.4 ohm

Connections



The dual ETS 400L on ETS 800P and dual ETS 500L on ETS 1000P will open/close simultaneously. Thus, they should be connected to one common EKE 100 series controller and EKF 2A Stepper valve driver.

Figure 2: Connections



To make one controller drive dual ETS 400L / ETS 500L, follow the next additional steps to set the controller correctly prior to commissioning :

1. Go to "Valve selection" in "Valve configuration".
2. Select "ETS 400L" (for ETS 800P) or "ETS 500L" (for ETS 1000P)
3. Change valve type to "User-defined valve".
4. Change valve drive current to 566 mA. (Single ETS 400L / ETS 500L requires 283 mA peak current. ETS 800P / ETS 1000P require 2 times the current as the single valve.)
5. Done.

For details, please refer to ETS Large setting Koolprog.

Stepper motor switch sequence

Table 3: Stepper motor switch sequence

		Coil I		Coil II		
		1	2	3	4	
↓Opening↓	1	+12V	GRD	+12V	GRD	↑Closing↑
	2	GRD	+12V	+12V	GRD	
	3	GRD	+12V	GRD	+12V	
	4	+12V	GRD	GRD	+12V	

If the controller driving the ETS 800P and ETS 1000P valve is from another manufacturer than Danfoss or a custom design, the following points must be considered in order to overcome potential step loss.

- a. To ensure total valve closure, the controller should have a function to overdrive the valve in the closing direction. It is recommended to overdrive 5% of the full step range at appropriate intervals. Overdrive should not be performed in open direction of the valve.

Electric expansion valve, ETS P Manifold

b. The amount of lost steps may increase as a function of the amount of changes of the opening degree. Such designed controller should be able to compensate for the lost steps after a defined number of changes in the opening degree.

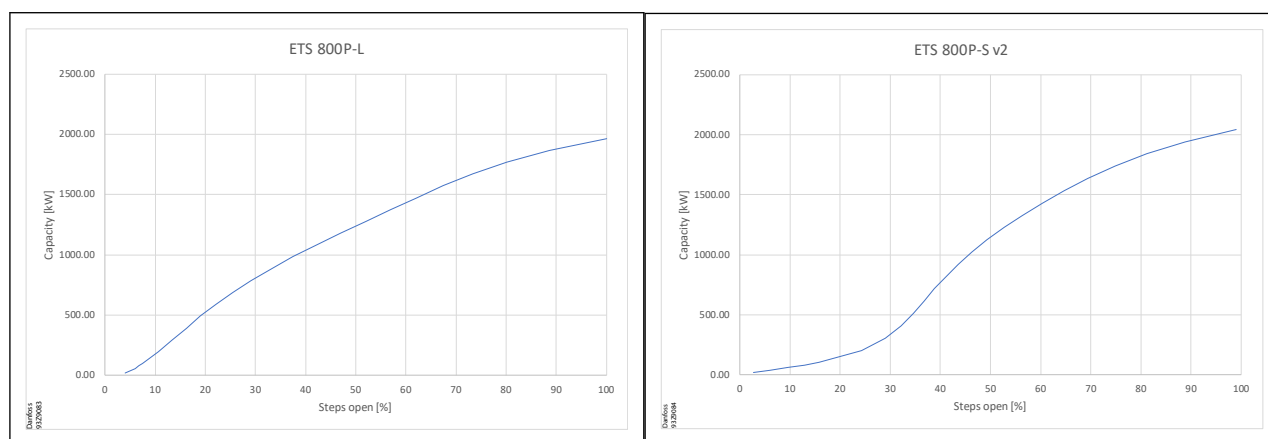
⚠ WARNING:

At power failure, the ETS 800P, ETS 1000P valve will remain in the opening position it has at the time of power failure, unless a safety device in the form of a battery backup is installed.

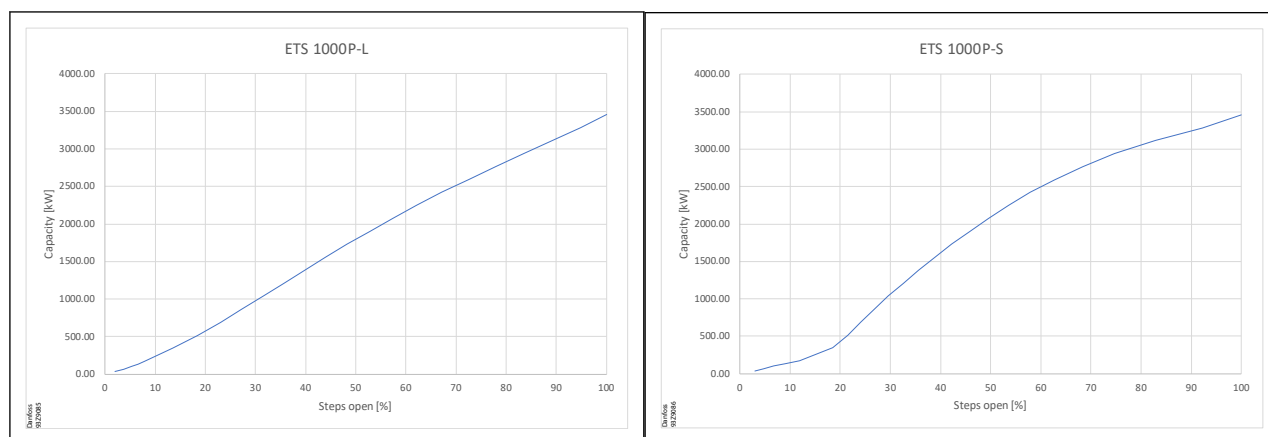
Capacity

Normalflow direction :

ETS 800P



ETS 1000P



Capacity based on: R134a

Te=5 °C / 41 °F

Tc=32 °C / 89.6 °F

TI=28 °C / 82.4 °F

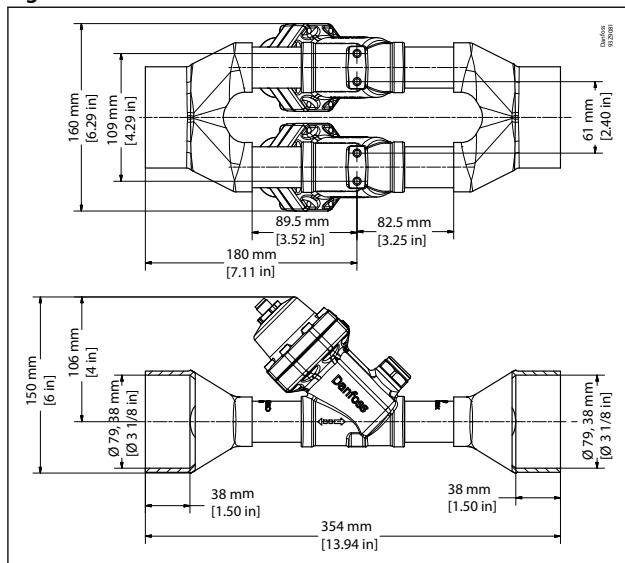
ⓘ NOTE:

For easy and precise selection of valve, use Danfoss' CoolSelector2® software.

You can download it from coolselector.danfoss.com.

Dimensions and weights

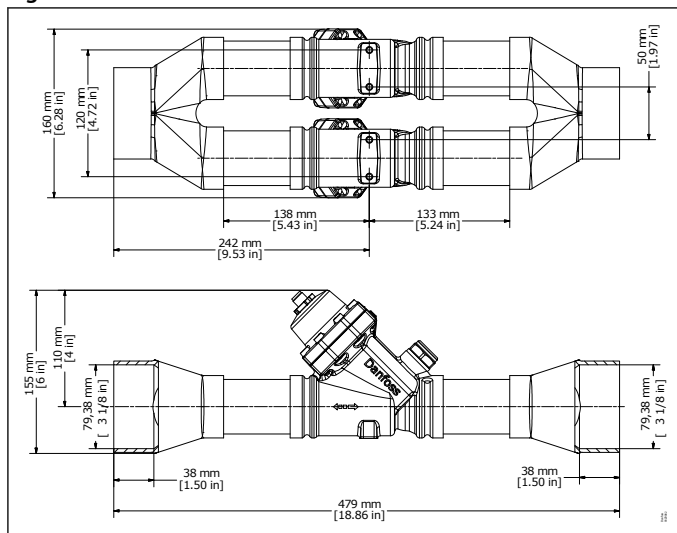
Figure 3: ETS 800P



NOTE:

1. Weight : 7.4 Kg

Figure 4: ETS 1000P



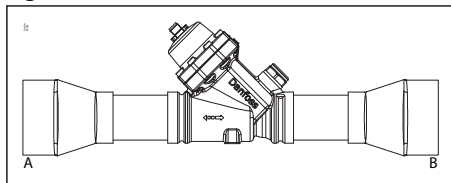
NOTE:

1. Weight : 10.05 Kg

Ordering

ETS 800P / ETS 1000P

Figure 5: ETS 800P / ETS 1000P



Type	Rated capacity ⁽¹⁾						Connection	
	R134a		R513A		R1234ze		ODF × ODF (A × B)	Code no.
	[kW]	[TR]	[kW]	[TR]	[kW]	[TR]	[in.]	Single pack
ETS 800P-L	1965	566	1685	487	1543	451	3 1/8 × 3 1/8	034Z1023
ETS 800P-S	2043	588	1753	506	1604	468	3 1/8 × 3 1/8	034Z1024
ETS 1000P-L	3458	991	2976	853	2700	783	3 1/8 × 3 1/8	034Z1025
ETS 1000P-S	3458	991	2976	853	2700	783	3 1/8 × 3 1/8	034Z1026

⁽¹⁾ Therated capacity is based on:

Evaporatingtemperature t_e : 5 °C / 40 °F

Liquid temperature t_l : 28 °C / 82 °F

Condensingtemperature t_c : 32 °C / 90 °F

Full stroke opening in normal flow direction

EKE 100 series controllers

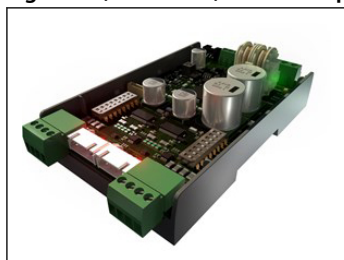
Figure 6: EKE 100 series controllers



Table 4: EKE 100 series controllers

Description	IP	Display	CodeNo.
Superheat controller EKE 100 1V	00	No	080G5050
Superheat controller EKE 100 1V	20	No	080G5051
Superheat controller EKE 100 1V	20	Yes	080G5052
Superheat controller EKE 100 2V	00	No	080G5055
Superheat controller EKE 100 2V	20	No	080G5056
Superheat controller EKE 100 2V	20	Yes	080G5057

Figure 7: (080G5035) EKF 2A Stepper valve driver



NOTE:

The controller will be supplied separately.

M12 angle cable

The M12 angle female connector is intended for use with a standard M12 male connector, which is available on stepper motor valves.

This cable is designed to offer high flexibility, small outer diameters, and tensile strength. The angle-way M12 cable consists of paired, twisted wires, which decreases mutual influence between signals transmitted along the cable and reduces the influence of external sources of interference.

The cables provide a higher degree of protection against lost steps compared to other cables.

NOTE:

The cable will be supplied separately.

Specification

Table 5: Specification

Jacket	PVC - black
Cable outer sheath	Oil - resistant
Water proof rating	IP 67
Operating temperature range	-40 – +80 °C
Wire type	Twisted pair, cross section 20 AWG / 0.5 mm ²
Cable outer diameter	7.0 mm
Minimum bending radius	10 x cable diameter
Cable combustibility / test	Flame retardant / VW-1 / CSA FT - 1
M12 standard	EN 61076-2-101
Reference standard	UL style 2464 and DIN VDE 0812
LVD directive	2014/35/EU

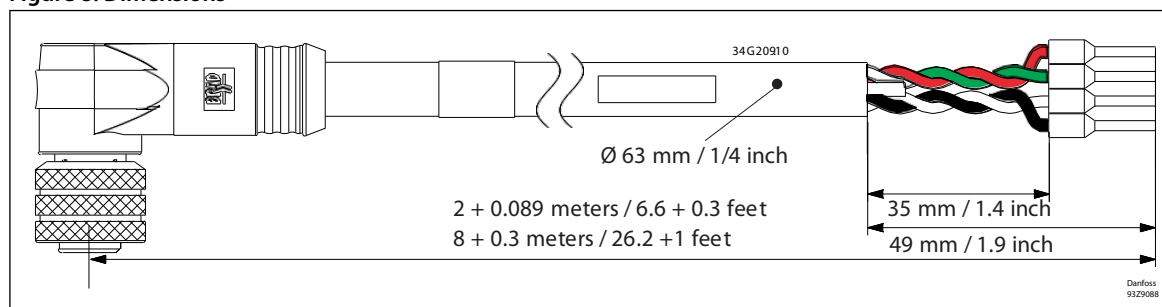
Ordering

Table 6: Ordering

Cable	Cable length (L)	Insulation	Packing format	Code no.
PVC - black	2 + 0.089 m / 6.6 + 0.3 ft	SR-PVC	Single pack	034G7073
	8 + 0.3 m / 26.2 + 1 ft	SR-PVC	Single pack	034G7074

Dimensions

Figure 8: Dimensions



Related products

Table 7: Related products

Superheat controller	Temperature sensor	Pressure transducer	M12 cable	Backup power module	Service driver
					
EKE 100	PT 1000 AKS is a High precision temp. sensor AKS 11 (preferred), AKS 12, AKS 21 ACCPBT PT1000 NTC sensors EKS 221 (NTC-10 Kohm) MBT 153 ACCPBT NTC Temp probe (IP 67 /68)	DST / AKS Pressure Transducer Available with ratiometric and 4 – 20 mA. NSK Ratiometric pressure probe XSK Pressure probe 4 – 20 mA	M12 Angle cable to connect Danfoss stepper motor valve and EKE controller	EKE 2U energy storage device for emergency valve shutdown during power outage.	AST-G

All Danfoss products fulfill the REACH requirements. One of the REACH obligations is to inform customers about the presence of substances out of the candidate list. Please note:

- A moist indicator in the sight glass contains a paper which is infused with Cobalt Dichloride (CAS no: 7646-79-9) in a concentration above 0.1% w/w.
- Avoid skin contact with the paper - Do not inhale the dust from the paper - The paper must be disposed of as hazardous waste.

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.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

Approvals

Table 8: Approvals

		
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NOTE:

UL approval available Sep.2024

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

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The Danfoss Product Store is your one-stop shop for everything product related—no matter where you are in the world or what area of the cooling industry you work in. Get quick access to essential information like product specs, code numbers, technical documentation, certifications, accessories, and more.

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Get access to the Danfoss spare parts and service kit catalog right from your smartphone. The app contains a wide range of components for air conditioning and refrigeration applications, such as valves, strainers, pressure switches, and sensors.

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Coolselector2®



For easy and precise selection of valve, use Danfoss' CoolSelector2® software. You can find the ETS valves on the group, "Electronic expansion valves".

you can download it from coolselector.danfoss.com.

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