

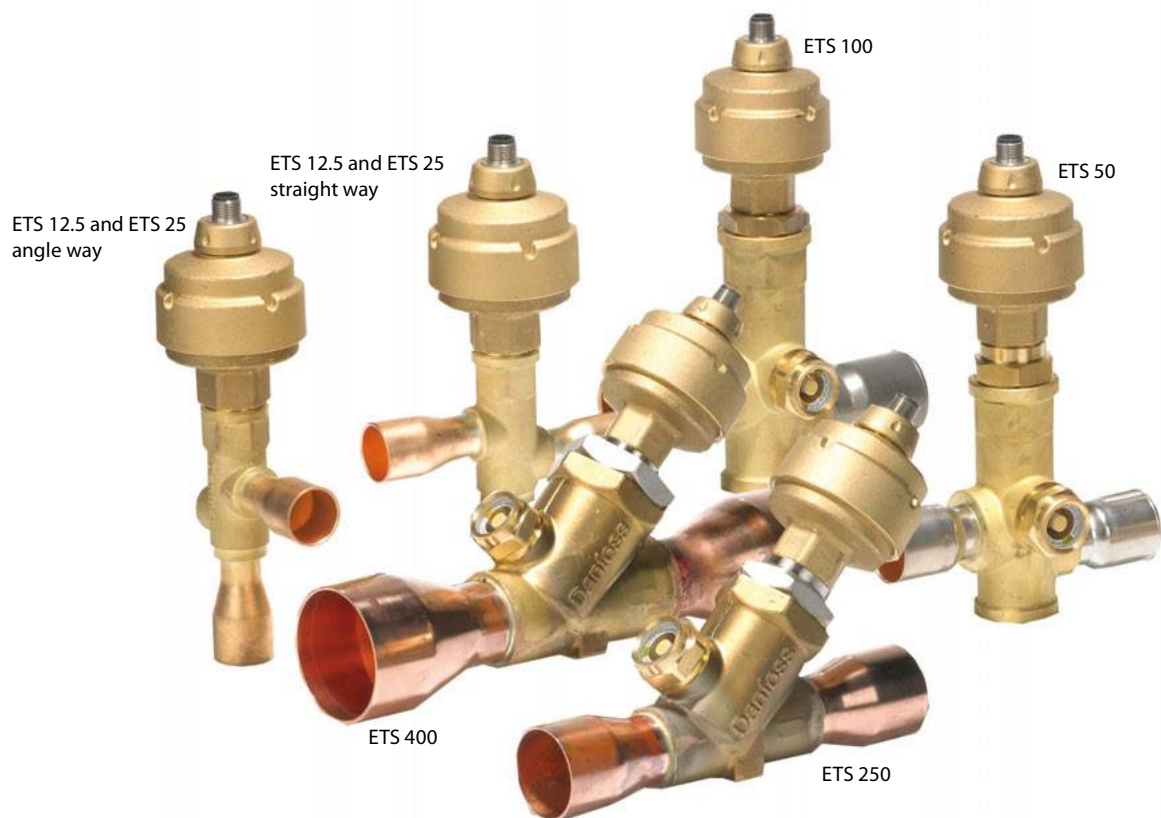


ETS 12.5 - 400 – Electronic expansion valves

ETS is a series of electrically operated expansion valves for precise liquid injection in evaporators for air conditioning and refrigeration applications.

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

The ETS needs a current or voltage driver as partner to be operated.



Applications	Advantages	Facts
• Heat pumps • Refrigeration • Air conditioning • Chillers	• Precise positioning for optimal control of liquid injection. • Balanced design (ETS 12.5 to 400) providing bi-flow operation as well as solenoid tight shut-off function in both flow directions. • Lower energy consumption • ETS 50 & ETS 100 feature improved process and productivity due to waterless brazing i.e soldering without wet cloth for cooling. • ETS 50 to 400 are all designed with built-in sight glass with moisture indicator. • Internal and external corrosion resistant design	• ETS valves are compatible with wide range of all common refrigerants, HFC, HCFC. • ETS 12.5, ETS25, ETS 50, ETS100 provides working pressure of 45.5 bar (660 psig) and ETS 250, ETS 400 provides 34 bar (493 psig). • EKC316A, 312 and EKD316 are examples of Danfoss controllers with drivers matching the ETS needs. • Equipped with M12 connector for cable connection (cable and connector assemblies as accessories) • For manual operation and service of ETS valves an AST-g service driver is available.

Technical data

Technical data

Compatible refrigerants	HFC, HCFC (e.g. R410A, R407C, R404A, R134a, R22)
Refrigerant oil	All mineral oils and ester oils
Comply with P.E.D.	Yes
MOPD	33 bar (478.6 psig)
Max. working pressure (PS/MWP)	ETS 12.5/ETS 25/ETS 50/ETS 100: 45.5 bar (660 psig) ETS 250/ETS 400: 34 bar (493 psig)
Refrigerant temperature range	–40°C to 65°C (–40°F to 149°F)
Ambient temperature	–40°C to 60°C (–40°F to 140°F)
Material of Construction	ETS 50, 100: Body and AST enclosure in brass, connections in bi-metal (stainless steel/copper) ETS 12.5, 250, 400: Body and AST enclosure in brass, connections in copper

Electrical data

Motor enclosure	IP67
Stepper motor type	Bi-polar - permanent magnet
Step mode	2 phase full step
Phase resistance	52 Ω ± 10%
Phase inductance	85 mH
Holding current	Depends on application. Full current allowed (100% duty cycle)
Step angle	7.5° (motor), 0.9° (lead screw), Gearing ratio 8.5:1. (38/13) ² :1
Nominal voltage	(Constant voltage drive) 12 V dc -4% +15%, 150 steps/sec.
Phase current	(Using chopper drive) 100 mA RMS -4% +15%,
Max. total power	Voltage / current drive: 5.5 / 1.3 W (UL: NEC class 2)
Step rate	150 steps/sec. (constant voltage drive) 0-300 steps/sec. 300 recommended (chopper current drive)
Total steps	ETS 12.5, 25, 50: 2625 [+160 / -0] steps ETS 100: 3530 [+160 / -0] steps ETS 250 and 400: 3810 [+160 / -0] steps
Full travel time	ETS 12.5, 25, 50: 17 / 8.5 sec. (voltage / current) ETS 100: 23 / 11.5 sec. (voltage / current) ETS 250 and 400: 25.4 / 12.7 sec. (voltage / current)
Lifting height	ETS 12.5, 25, 50: 13 mm (0.5 in.) ETS 100: 16 mm (0.6 in.) ETS 250-400: 17.2 mm (0.7 in.)
Reference position	Overdriving against the full close position
Electrical connection	M12 connector

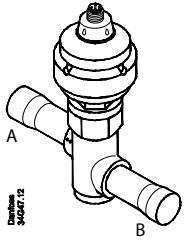


NOTE:

Full life time of ETS can only be ensured if oil is present in the system. In oil-free systems, life time of the ETS cannot be guaranteed.

Ordering

ETS 12.5, 25 Valve incl. actuator

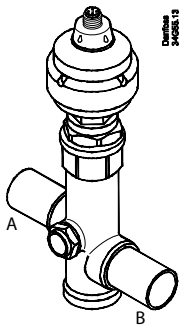


Type	Rated capacity ¹⁾									
	R410A		R407C		R22		R134a		R404A	
	kW	TR	kW	TR	kW	TR	kW	TR	kW	TR
ETS 12.5	70	20	63	18	57	16	45	13	43	12
ETS 25	144	41	129	37	117	34	93	27	88	25

Connection			
ODF × ODF (A × B)		Code no.	
in.	mm	Straight way Single Pack	Angle way Single Pack
1/2 × 1/2	-	034G4209	034G4213
-	12 × 12	034G4208	034G4212
5/8 × 5/8	16 × 16	034G4210	034G4214
7/8 × 7/8	22 × 22	034G4211	034G4215
1/2 × 1/2	-	034G4201	034G4205
-	12 × 12	034G4200	034G4204
5/8 × 5/8	16 × 16	034G4202	034G4206
7/8 × 7/8	22 × 22	034G4203	034G4207

ETS 12.5 and ETS 25 do not feature sight glass

ETS 50, 100 Valve incl. actuator

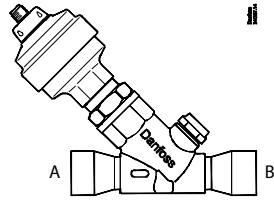


Type	Rated capacity ¹⁾									
	R410A		R407C		R22		R134a		R404A	
	kW	TR	kW	TR	kW	TR	kW	TR	kW	TR
ETS 50	262.3	75.7	240.5	69.1	215	62	170	48.9	161.4	46.3
ETS 100	488.4	140.9	447.8	128.7	400.4	115.4	316.5	91.2	300.5	86.6

Connection		
ODF × ODF (A × B)		Code no.
in.	mm	Single pack
7/8 × 7/8	22 × 22	034G1708
7/8 × 1 1/8	22 × 28	034G1705
1 1/8 × 1 1/8	28 × 28	034G1706
1 1/8 × 1 3/8	28 × 35	034G1704
1 1/8 × 1 1/8	28 × 28	034G0507
1 1/8 × 1 3/8	28 × 35	034G0501
1 3/8 × 1 3/8	35 × 35	034G0508
1 5/8 × 1 5/8	-	034G0505

ETS 50 and ETS 100 have integrated sight glass

ETS 250, 400 Valve incl. actuator



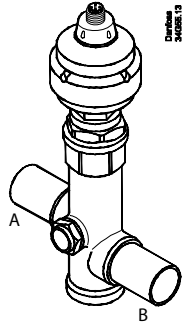
Type	Rated capacity ¹⁾									
	R410A		R407C		R22		R134a		R404A	
	kW	TR	kW	TR	kW	TR	kW	TR	kW	TR
ETS 250	-	-	1212	349	1106	319	874	252	828	239
ETS 400	-	-	1933	556	1764	509	1394	402	1320	381

Connection		
ODF × ODF (A × B)		Code no.
in.	mm	Single pack
1 1/8 × 1 1/8	28 × 28	034G2600
1 3/8 × 1 3/8	35 × 35	034G2601
1 5/8 × 1 5/8	-	034G2602
1 5/8 × 1 5/8	-	034G3500
2 1/8 × 2 1/8	54 × 54	034G3501

¹⁾ The Rated capacity is based on:
 Evaporating temperature t_e: 5°C (40°F)
 Liquid temperature t_l: 28°C (82°F)
 Condensing temperature t_c: 32°C (90°F)
 Full stroke opening in normal flow direction

ETS 250 and ETS 400 have integrated sight glass

ETS for CO₂ Applications



Type	Connection	
	ODF × ODF (A × B) in.	Code no. Single pack
ETS 12.5	7/8 × 7/8 in	034G4220
ETS 25	7/8 × 7/8 in	034G4219
ETS 50	1 1/8 × 1 1/8 in	034G1714
ETS 100	1 1/8 × 1 1/8 in	034G0515

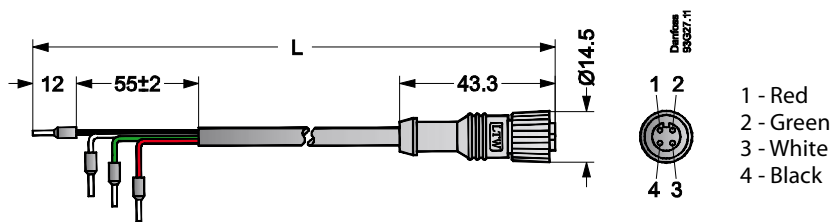
ETS 50 and ETS 100 have integrated sight glass

ETS for CO₂ can be used for expansion as well as gas bypass.

ETS for CO₂ Applications (MWP 45.5 bar / 660 psig).

Accessories

M12 Female Connector Cable



Cable quality	Temperature range	Cable length (L)		Design	Code no.	
					Single pack	Industrial pack (20 pcs)
Jacket: PVC	-50 / +80°C	2 m	6.6 ft	M12 actuator connector to 4 flying wires for driver connection	034G2201	034G2330
		8 m	26.2 ft		034G2200	034G2323
Jacket: CPE	-40 / +80°C	2 m	6.6 ft		034G2202	034G2331

Cable Specification	Jacket	Colour	UV resistant	Insulation	Connection	Outer diameter	M12 connector	Special
PVC cables	Half Matt PVC	Black	Yes	SR-PVC	4 wires (0.33 mm² (22 AWG))	5.0 mm	PU (polyurethane)	UL VW-1
CPE cables	CPE	Gray	Yes	EPR	4 wires (0.5mm² (20 AWG))	6.3 mm	PU (polyurethane)	Resistant to gear oil, diesel oil, ethylene glycol, propylene glycol

 **Note:**
CPE cables are recommended for outdoor application.