

Data Sheet

Solenoid valve
Type **EVRP 10**

EVRP 10 is used as a capacity regulator to adapt compressor capacity to the actual evaporator load



Danfoss has developed a pulsating solenoid valve, EVRP 10, for use in applications where an extremely accurate regulation of media temperature is required.

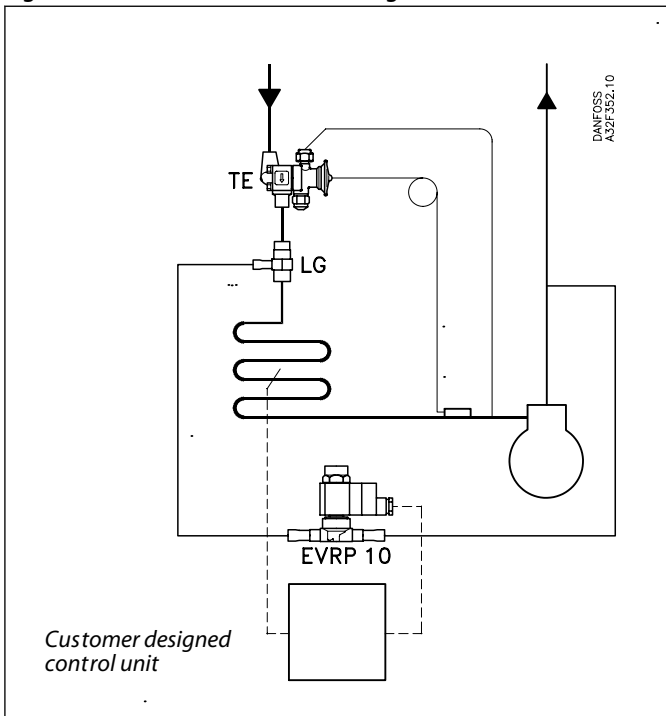
Pulse solenoid valve EVRP 10 is used as a capacity regulator to adapt compressor capacity to the actual evaporator load.

EVRP 10 must be installed in a bypass between the high and low pressure sides of the refrigeration system.

It is specially designed for hot gas injection between evaporator and expansion valve.

Functions

Figure 1: Functions for customer designed control unit



Applications

- Container refrigeration systems
- Ice cream production
- Air conditioning plant
- Wide range

Product specification

Technical data

Table 1: Separate valve body for EVRP 10

Features	Description
Refrigerants	R134a, R404A, R410A, R290
K_v value	1.5 m ³ /h
Min. opening differential pressure	0.05 bar
Max. opening differential pressure	21 bar
Max. working pressure, PB	42 bar
Media temperature	-60 – 120 °C
Mounting condition	Armature vertically upwards ±30°
Max. operating cycles	10 per minute
Life in no. of operating cycles	Min. 5 x 10 ⁶

⚠ WARNING:

Safety notes for flammable refrigerants (R290):

- This product is validated in accordance to ATEX, EN 378, ISO 5149, ASHRAE 15, IEC 60335-2-x or equivalent standards.
- Ignition risk is evaluated in accordance to ISO 5149 and IEC 60335.
- See safety note below.

⚠ WARNING:

Safety notes:

- The product can be applied on systems with R290 as the working fluid.
- For countries where safety standards are not an indispensable part of the safety system Danfoss recommend the installer to get a third party approval of the system containing flammable refrigerant.
- Note, please follow specific selection criteria stated in the datasheet for these particular refrigerants.
- The valve must only be used in closed circuit refrigeration system, where no oxygen is present acc. EN 378, ISO 5149 ASHRAE 15 or IEC 60335-2-x or equivalent standards.

Table 2: Coils for EVRP 10

Feature	Description
Enclosure	IP00

Hot gas replacement capacity

Capacities are given for 100% opening of EVRP and are composed of the EVRP hot gas capacity + the extra capacity yielded by the thermostatic expansion valve to maintain constant superheat across the evaporator.

Table 3: R134a

Type	K_v [m ³ /h]	Evaporation temp. °C	Hot gas capacity Q _h [kW]				
			Hot gas temp. $t_h = t_c + 25$ K. Subcooling $\Delta t_{sub} = 4$ K. Superheat = 0 K Condensing temperature t_c [°C]				
			20	30	40	50	60
EVRP 10	1.50	10	12.16	16.53	19.94	23.33	26.50
		0	12.96	16.00	19.18	22.34	25.24
		-10	12.52	15.40	18.39	21.32	23.93
		-20	12.06	14.79	17.58	20.27	22.58
		-30	11.60	14.16	16.76	19.20	21.21

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Table 4: R404a

Type	Kv [m ³ /h]	Evaporation temp. °C	Hot gas capacity Qh [kW] Hot gas temp. $t_h = t_c + 25$ K. Subcooling $\Delta t_{sub} = 4$ K. Superheat = 0 K Condensing temperature t_c [°C]				
			20	30	40	50	60
EVRP 10	1.50	10	18.79	24.54	28.08	30.63	31.56
		0	20.37	23.86	26.93	29.17	29.71
		-10	19.71	22.90	25.69	27.59	27.70
		-20	18.92	21.87	24.37	25.91	25.58
		-30	18.11	20.81	23.00	24.16	23.37

Table 5: R410a

Type	Kv [m ³ /h]	Evaporation temp. °C	Hot gas capacity Qh [kW] Hot gas temp. $t_h = t_c + 25$ K. Subcooling $\Delta t_{sub} = 4$ K. Superheat = 0 K Condensing temperature t_c [°C]				
			20	30	40	50	60
EVRP 10	1.50	10	28.54	38.47	45.43	51.56	56.09
		0	31.75	38.26	44.70	50.63	54.91
		-10	31.36	37.55	43.79	49.47	53.43
		-20	30.73	36.73	42.73	48.11	51.71
		-30	30.03	35.81	41.54	46.58	49.77

Table 6: R290

Type	Kv [m ³ /h]	Evaporation temp. °C	Hot gas capacity Qh [kW] Hot gas temp. $t_h = t_c + 25$ K. Subcooling $\Delta t_{sub} = 4$ K. Superheat = 0 K Condensing temperature t_c [°C]				
			20	30	40	50	60
EVRP 10	1.50	10	21.46	28.85	33.86	38.19	41.84
		0	23.69	28.25	32.59	36.61	39.87
		-10	23.07	27.22	31.29	34.97	37.84
		-20	22.25	26.16	29.95	33.29	35.75
		-30	21.41	25.09	28.58	31.57	33.63

The evaporator load is given by the actual application and the limits set when sizing the system. The compressor capacity can be found from data supplied. The difference between compressor capacity and evaporator output at any given time is the required hotgas replacement capacity.

Example:

The temperature of refrigerated items in an R134a container refrigeration system must be precisely 8 °C.

According to the specification, the compressor capacity at an evaporating temperature of 0 °C and a condensing temperature of 40 °C is 70 kW. The evaporator output needed to maintain the temperature of the items in the container at 8 °C is calculated as 58 kW.

To obtain balance in the refrigeration system, $70 - 58 = 12$ kW must be applied to the low-pressure side via EVRP 10.

At an evaporating temperature of 0 °C and a condensing temperature of 40 °C, EVRP gives 20.5 kW at 100% opening (see capacity table above).

The 12 kW therefore corresponds to a degree of opening of EVRP 10 to: $12 \times 100/20.5 = 59\%$

If changes occur in the ambient temperature of the required evaporator output, etc. the degree of opening of EVRP 10 is constantly changed via the control unit to maintain the temperature of refrigerated items within the range 8 °C \pm 0.25 °C.

Dimensions and weight

Figure 2: Separate valve body for EVRP 10

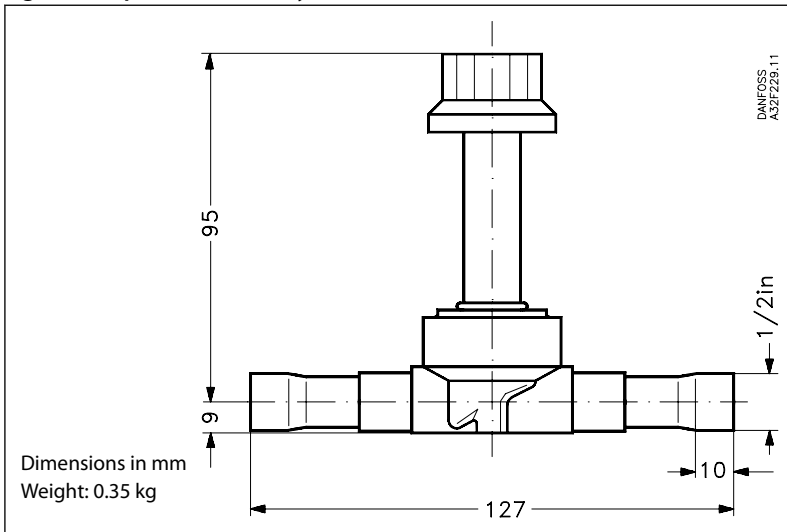
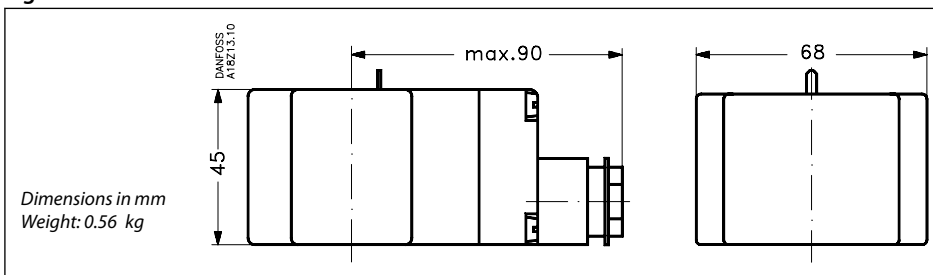


Figure 3: Coils for EVRP 10



Ordering

Figure 4: Ordering separate valve body for EVRP 10

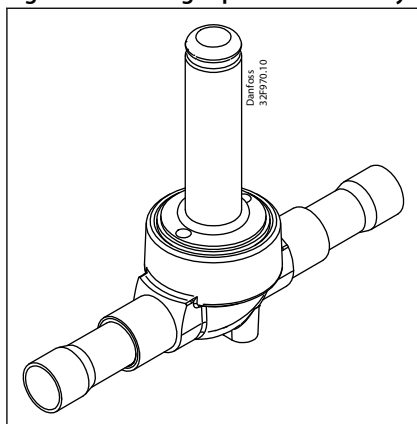


Table 7: Separate valve body for EVRP 10

Type	Connection	Code no.
EVRP 10	½ in. solder ODF	032F3298

Figure 5: Ordering coils for EVRP 10

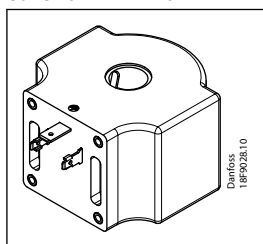


Table 8: Coils for EVRP 10

Type	Ambient [°C]	Supply voltage [V]	Voltage variation	Frequency [Hz]	Power consumption [W]	Screws	Colour	Code no.
BN024C	-40T80	24	±10%	50	6.5	18/8 stainless steel	Blue	018Z6826
		24	±10%	60	6			
BN024D	-40T50	24	±10%	DC	14	Zn-chromated	Blue	018Z6964

⚠ WARNING:

Safety notes for flammable refrigerants (R290):

1. The products (coil with terminal box equals IP67 enclosure) are validated in accordance to ISO 5149, IEC 60335 (ref. IEC/EN 60079-15). Ignition risk is evaluated in accordance to ISO 5149 and IEC 60335 (ref. IEC/EN 60079-15). See safety note below.
2. Please make sure that there is no spark, arc during the application, especially the connection of coils.
3. Follow the instruction to mount the coil correctly and apply the O-ring for sealing, to prevent the moisture penetrate inside the coils.
4. Always install a fuse ahead of the coil to avoid short circuit (fuse size should be around 2 times of rated current, and time lag: medium);
5. The coil used in an area of not more than pollution degree 2.

⚠ WARNING:

Safety notes:

Solenoid valve, Type EVRP 10

1. The product (coil with terminal box equals IP67 enclosure) can be applied on systems with R290 as the working fluid.
2. For countries where safety standards are not an indispensable part of the safety system Danfoss recommend the installer to get a third party approval of the system containing flammable refrigerant.
3. Note, please follow specific selection criteria stated in the datasheet for these particular refrigerants.
4. Note that the product (only refer to IP65/67 coils) has NOT been verified ATEX or IECEx or IEC 60079 series zone 2 compliant. This product is only validated for systems in compliance with ISO5149, IEC 60335 (ref. IEC/EN 60079-15). It is the responsibility of the user to verify such compliance. Improper use can cause explosion, fire, leakage potentially causing death, personal injury, or damage to property.

Table 9: Accessories

Description	Code no.
Service / mounting kit	032F9570

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.

Table 10: Certificates, declarations and approvals

Document name	Document type	Document topic	Approval authority
089.D.00188-17	UA Declaration	PED	LLC CDC EURO TYSK
033F1035.AJ	Manufacturers Declaration	PED	Danfoss
033F0230.00	Manufacturers Declaration		Danfoss
033F0687.AE	Manufacturers Declaration	RoHS	Danfoss

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