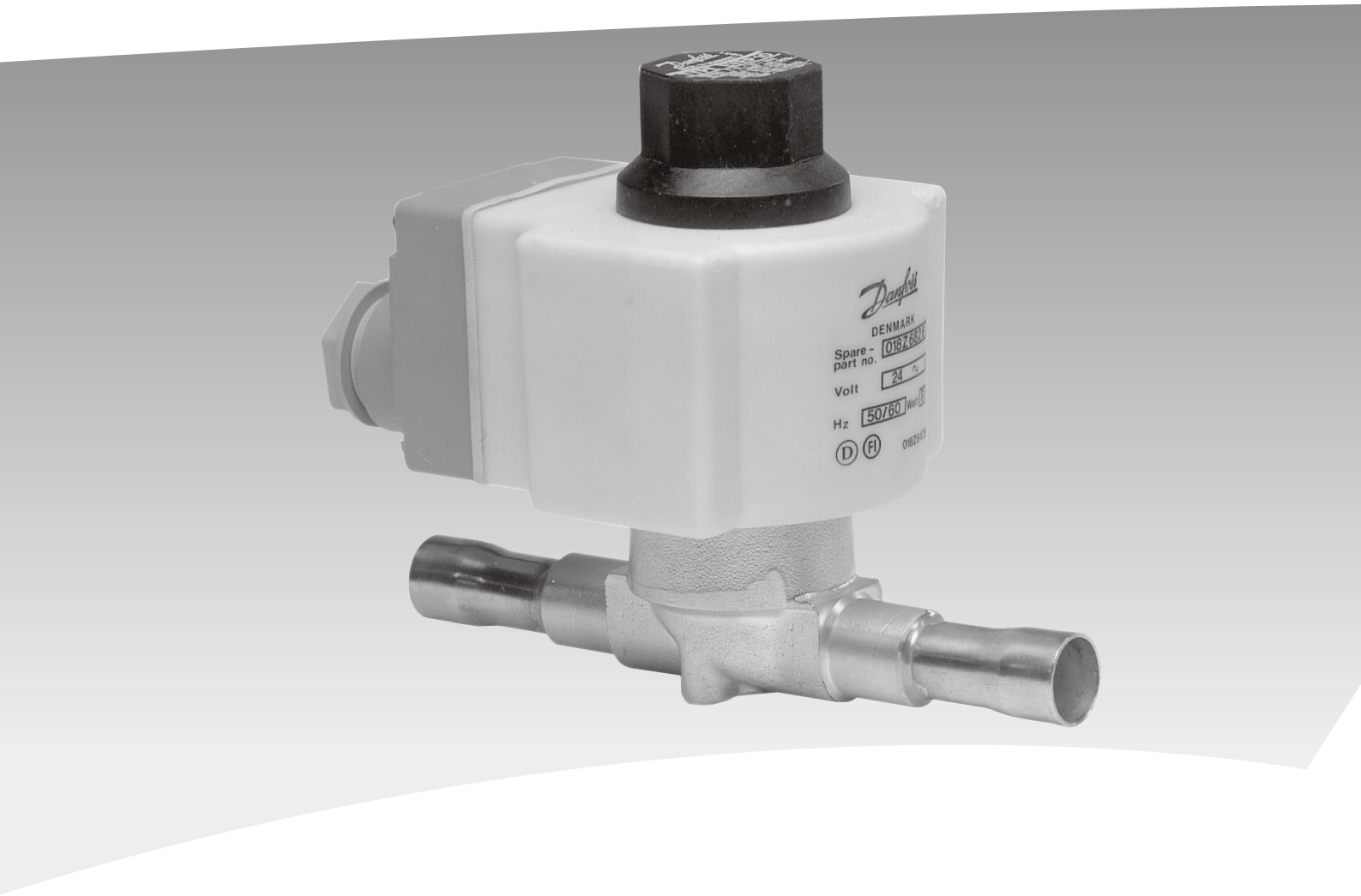


Capacity regulation with pulse solenoid valve EVRP 10

REFRIGERATION AND
AIR CONDITIONING

Technical leaflet

Technical leaflet **Capacity regulation with pulse solenoid valve EVRP 10**

Introduction

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.

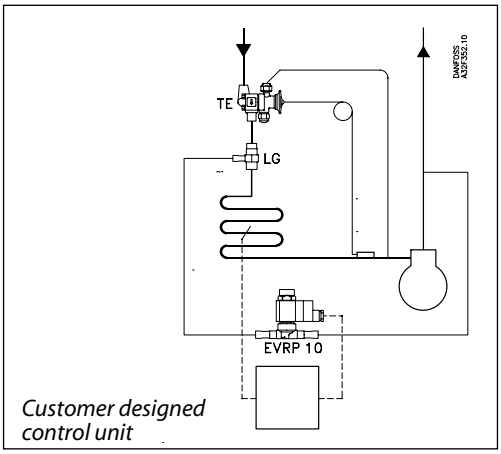
Application

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

Function

Capacity regulation is controlled by a signal from a temperature sensor located in the cooled medium, for instance air. The signal is converted by a control unit into a pulse modulated signal for the EVRP pulse solenoid valve.

This form of regulation is very stable. Variations in the temperature of refrigerated items can be held within ±0.25°C.



Ordering

Separate valve body

Type	Connection	**Code no.**
EVRP 10	½ in. solder ODF	**32F3298**

Coils for EVRP 10

Voltage	Frequency	Connection	Power consumption	**Code no.**
24 V a.c.	50/60 Hz	Terminal box	8 W	**18Z6826**
20±4 V d.c.		Terminal box	14 W	**18Z6875**
24±4 V d.c.		Terminal box	14 W	**18Z6964**

Technical data

Valve body

Refrigerants	R 12, R 22, R 134a, R 502
k_V value	1.5 m³/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. 5×10^6

Coils

Type	18Z6826	18Z6875	18Z6964
Rated supply voltage	24 V a.c. –10/+25%	20±4 V d.c.	24±4 V d.c.
Rated power consumption	8 W	14 W	14 W
Ambient temperature	–40 - +80°C	–40 - +50°C	–40 - +50°C
Enclosure	IP 67	IP 67	IP 67
Screws	18/8 stainless steel	18/8 stainless steel	Zn-chromated
Coil colour	White	Blue	Black

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.

Evaporating temperature t_e °C	Hot gas replacement capacity Q kW at condensing temperature t_c °C				
	+20	+30	+40	+50	+60
+10	10.1	13.7	16.7	19.9	23.2
0	11.0	13.7	16.8	20.0	23.5
-10	11.1	13.8	16.9	20.2	23.7
-20	11.2	14.0	17.1	20.5	24.0
-30	11.3	14.1	17.3	20.8	24.4
+10	18.4	25.2	30.6	36.5	42.6
0	20.5	25.5	31.1	37.1	43.5
-10	20.8	25.9	31.6	37.9	44.5
-20	21.1	26.3	32.2	38.7	45.6
-30	21.4	26.8	32.9	39.6	46.8
+10	12.2	16.5	20.3	24.5	28.7
0	13.0	16.6	20.5	24.6	28.9
-10	13.1	16.7	20.6	24.9	29.2
-20	13.2	16.8	20.8	25.2	29.6
-30	13.4	17.0	21.1	25.5	30.2
+10	16.1	21.4	25.0	28.6	31.8
0	17.9	21.6	25.2	28.9	32.1
-10	18.1	21.7	25.5	29.2	32.6
-20	18.2	21.9	25.8	29.6	33.1
-30	18.4	22.2	26.2	30.1	33.7

R 12 R 22 R 134a R 502

Subcooling = 4 K. Superheat = 0 K.

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 R 22 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.

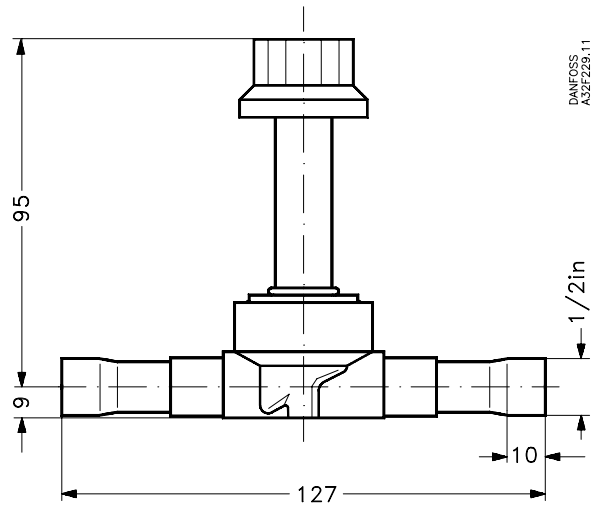
At an evaporating temperature of 0°C and a condensing temperature of 40°C, EVRP gives 31.1 kW at 100% opening (see capacity table above).
The 12 kW therefore corresponds to a degree of opening of EVRP 10 to:

$$\frac{12 \times 100}{31.1} = 39\%$$

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 ±0.25°C.

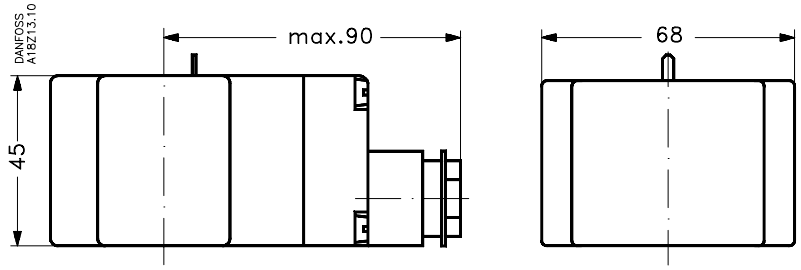
Dimensions and weight

Separate valve body for EVRP 10



Dimensions in mm
Weight: 0,35 kg

Coils for EVRP 10



Dimensions in mm
Weight: 0.56 kg