CTCY-EN – CRCY-P9 / 11-2014

Check valves

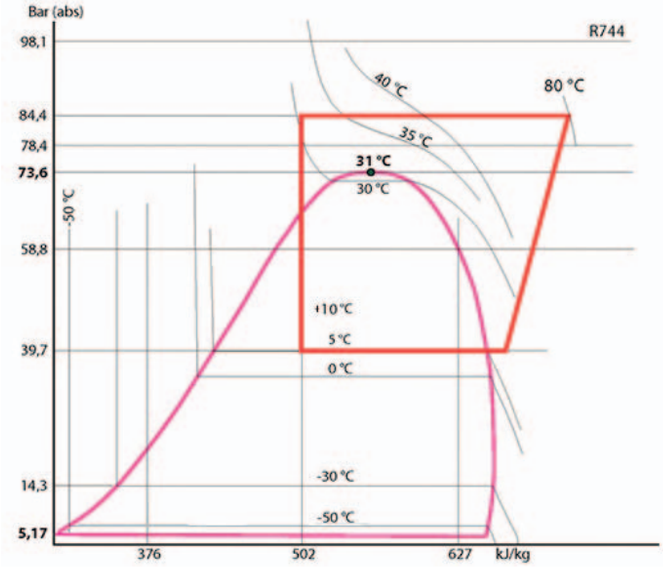
→ CRCY-P9 / 90 bar (1305 psig)

■ Applications

90 bar

CO2 SUBCRITICAL AND TRANSCRITICAL

- The check valves ensure a one-way direction of the refrigerant flow, in refrigerating and air conditioning installations, running with high working pressures.
- They can be mounted on the liquid, suction, discharge or hot gases defrost line, to prevent unwanted return of refrigerant.



■ Functional features

- Products are compatible with HFC and CO_2, as well as with their associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 97/23/EC.
- Product classification in CE categories is performed using the PED 97/23/EC table, corresponding to a nominal diameter-based selection.
- The copper-plated brass body of the valves ensures perfect resistance to corrosion.
- An arrow indicating the refrigerant flow direction is engraved on the brass body of the valve.
- 7 models with connections to braze (from 1/4” to 5/8” and from 6 to 16 mm).

■ CARLY advantages

- Maximum working pressure : up to 90 bar with CO_2 in subcritical and transcritical compression systems.
- The check valves can be installed in all positions.
- They are equipped with an internal pulse absorber piston, with PTFE gasket.
- Pressure drops are negligible.
- Perfect air tightness ensured by a TIG brass weld of the body.
- Thanks to their reduced weight, the check valves CRCY-P9 requires no specific fixing.

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■ Warning

Before selecting or installing any component, please refer to the chapter 0 - **WARNING**.

■ General assembly precautions

The installation of a component in a refrigeration system by a skilled professional, requires some precautions:

- Some are specific to each component, and in this case, they are specified in the **RECOMMENDATIONS SPECIFIC** part defined hereafter ;
- Other are general to all CARLY components, they are presented in the chapter 115 of CARLY technical catalogue – **GENERAL ASSEMBLY PRECAUTIONS**.

■ Recommendations specific to the check valves CRCY-P9

- The check valves are to be mounted in any position on the suction, discharge and liquid lines of the installation.
- The fluid flow direction is indicated by an arrow engraved on the brass body of the valve. It must imperatively be respected.
- In order to avoid any phenomenon of internal beat, never over-size a check valve compared to the diameter of piping concerned.
- Always cool the valve body when brazing the copper sleeves with a damp cloth, or by using the calories discharger CARLYCOOL (refer to chapter 95). Indeed, excessive overheating of the valve may damage the internal PTFE gasket and make it inoperative.

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■ Special precautions for components used with CO_2 in sub. and transcritical systems

- The maximal working pressure and the power variations of the installation must be taken into account as of its design, in order to select all the components consequently.
- The pressure of the circuit during the stop phases must also be taken into account, because it can be very high, due to the pressure equalization according to the ambient temperature; several solutions exist to limit and control this pressure when the installation is stopped.
  - Design of the installation allowing to resist to this pressure.
  - Implementation of a « buffer » volume of storage or expansion (receiver).
  - Installation of a secondary circuit with valve or solenoid valve, allowing the fluid transfer to the coldest point, or the less high in pressure of the installation.
  - Implementation of a small separate refrigeration unit, to maintain the liquid temperature at a pressure lower than the maximal working pressure ; it is so far the most effective technical solution, but with a major drawback, which is the power failure (safety unit to be considered, or backup power supply).
- The hot gas defrost, frequently used with CO_2 for low temperatures applications, generates also high pressures (to take in consideration)
- The implementation on the liquid line of a filter drier **DCY-P14,** or a filter drier shell **BCY-P14** equipped with drying cores **CCY 48 HP** or **PLATINIUM 48,** is highly recommended. Serious problems can occur in the presence of moisture, such as expansion valve blocking and formation of dry ice and even carbonic acid. To avoid this, it is imperative to limit the circuit openings in order to avoid air introduction, causing the condensation in the pipes, and to proceed to a high evacuation of the installation, before any commissioning or restarting.
- For an operation with CO_2 at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO_2 and the main metallic materials commonly used in refrigeration systems (steel, copper, brass...)
- On the other hand, there is a real compatibility issue between CO_2 and polymers. For example, swelling phenomena and internal explosion of the seal are possible. Carly check valves CRCY-P9 do not have polymer gaskets.

■ Selection table CRCY-P9

CARLY references	Connections To solder ODF		Δ P (1) bar	kv (2) m³/h
	inch	mm		
CRCY-P9 2 S	1/4		0,06	0,69
CRCY-P9 2 MMS		6	0,06	0,69
CRCY-P9 3 S	3/8		0,06	1,75
CRCY-P9 3 MMS		10	0,06	1,75
CRCY-P9 4 S	1/2		0,05	3,27
CRCY-P9 4 MMS		12	0,05	3,27
CRCY-P9 5 S/MMS	5/8	16	0,05	3,64

(1) i.e. the minimum pressure difference for which the check valve remains fully open.

(2) i.e. the flow rate in m³/hr for a pressure drop in the check valve of 1 bar (refrigerant used: water with per volume ratio = 1.000 kg/m³).

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■ Technical features

CARLY references	Connections To solder ODF inch	CARLY references	Connections To solder ODF mm	Dimensions mm	
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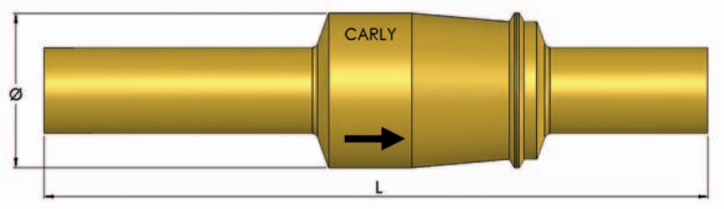
CRCY-P9 2 S	1/4	CRCY-P9 2 MMS	6	18	95
CRCY-P9 3 S	3/8	CRCY-P9 3 MMS	10	18	95
CRCY-P9 4 S	1/2	CRCY-P9 4 MMS	12	27	116,5
CRCY-P9 5 S/MMS	5/8	CRCY-P9 5 S/MMS	16	27	116,5



CARLY references		Nominal diameter	Maximal working pressure	Working pressure (1)	Maximal working temperature	Minimal working temperature	Working temperature (1)	CE Category (2)
		DN mm	PS bar	PS BT bar	TS maxi °C	TS mini °C	TS BT °C	
CRCY-P9 2 S	CRCY-P9 2 MMS	6	90	15	140	-40	-30	Art3§3
CRCY-P9 3 S	CRCY-P9 3 MMS	10	90	15	140	-40	-30	Art3§3
CRCY-P9 4 S	CRCY-P9 4 MMS	12	90	15	140	-40	-30	Art3§3
CRCY-P9 5 S/MMS		16	90	15	140	-40	-30	Art3§3

(1) The working pressure is limited to the PS BT value when working temperature is lower than or equal to TS BT value.

(2) Classification by diameter, according to PED 97/23/EC (refer to chapter 0 to CARLY technical catalogue).

■ Weights and packaging

CARLY references	Unit weight kg		Packaging number of pieces
	With packaging	Without packaging	
CRCY-P9 2 S	0,06	0,05	1
CRCY-P9 3 S	0,06	0,05	1
CRCY-P9 4 S	0,16	0,15	1
CRCY-P9 5 S/MMS	0,21	0,20	1