

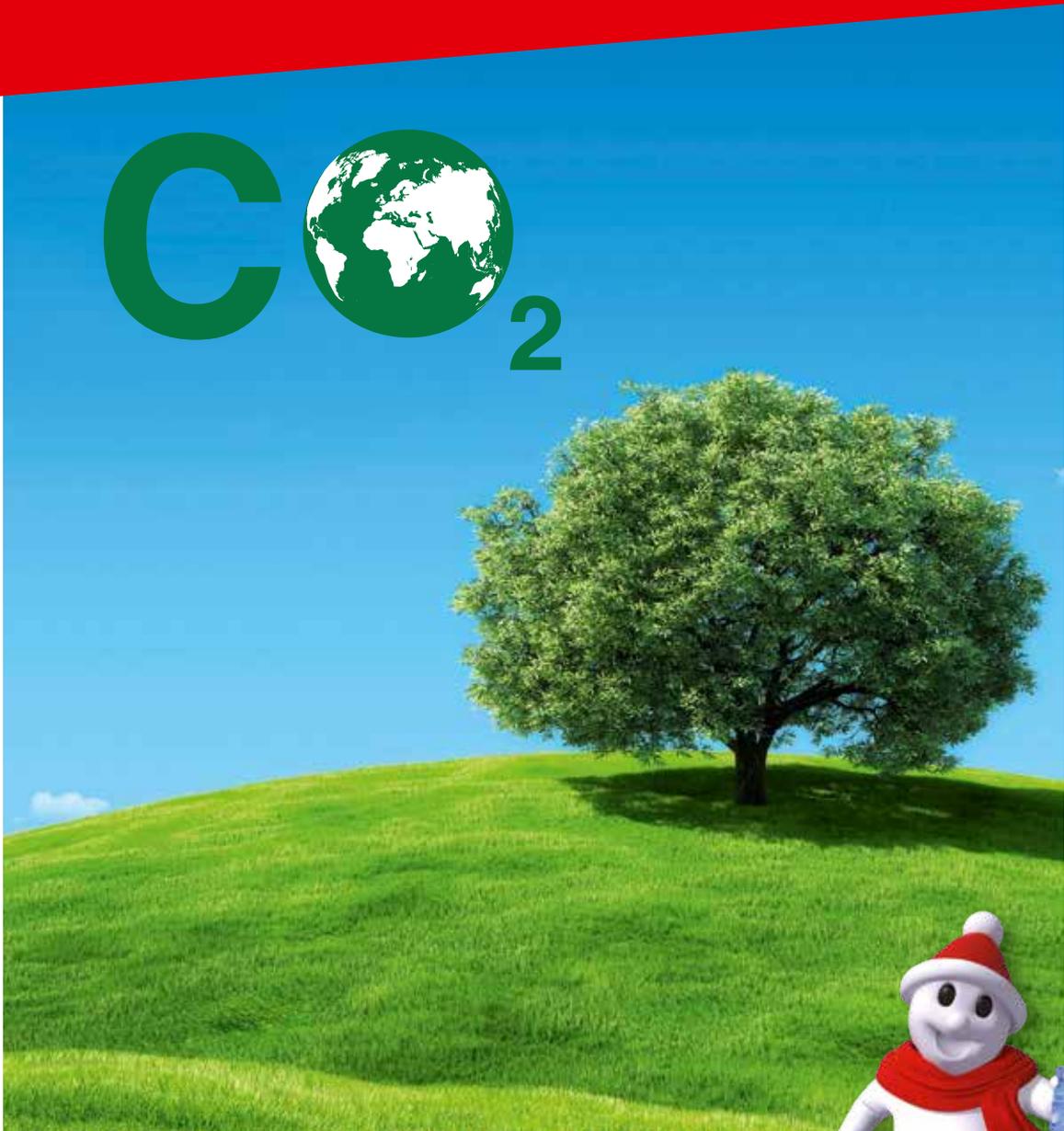


# Carly

REFRIGERATION COMPONENTS SOLUTIONS

ACT FOR CO<sub>2</sub>, THINK CARLY!

CO<sub>2</sub>



This catalogue is specific for CO<sub>2</sub> (complete catalogue in our website [www.carly-sa.com](http://www.carly-sa.com))





# Carly

**REFRIGERATION COMPONENTS SOLUTIONS**

**FOR CO<sub>2</sub> - R744**

**Updated:  
09/2018**

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CARLY equipment can only be installed by a Trade-approved technician

CARLY RCS - Share capital of 2.429.000 € - R.C.S. LYON 824 627 699 00013

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# Editorial

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## **CO<sub>2</sub>, an old story and brand new CARLY components.**

CO<sub>2</sub> has been used as a refrigerant for more than 120 years, and is now a crucial part of many different applications from commercial and industrial refrigeration to air conditioning, certain kinds of heat pump and - most recently - mobile applications.

At such a low cost, with such a limited effect on the environment (GWP = 1 and no effect on the ozone layer (ODP = 0), zero toxicity and complete non-flammability, this is often the go-to technical solution for professionals.

What's more, the F-Gas regulation (N°517/2017) brought in on the 01/01/2015 encourages the use of "natural" refrigerants such as CO<sub>2</sub>.

This relatively recent change in direction for the profession is a real challenge, and the CARLY RCS Company is up to it. Working in close collaboration with the leaders in the market, CARLY RCS is constantly developing new ranges of refrigeration line components which are adapted for use with CO<sub>2</sub>. They also produce a huge number of custom components, meeting the increasing needs of users for component solutions adapted to their specific expectations rather than off-the-shelf systems.

The main feature of these new "CO<sub>2</sub>" components is their capacity to work under higher operating pressures than those used with traditional refrigerants: 46, 64, 90, 140 bars, or even higher...

Whether the CO<sub>2</sub> system is running in a sub-critical or trans-critical cycle, CARLY RCS can provide component solutions for a vast range of refrigeration components: single-block dehydrator filters, replaceable-cartridge filter driers, impurity filters, silent backflows and oil filters. Suction accumulators and liquid tanks can be custom-designed and created.

Receivers to their flexibility, their factory located in the heart of Europe and their particularly agile industrial organisation, CARLY RCS is the ideal partner for all of your CO<sub>2</sub> developments.

**Act for CO<sub>2</sub>, Think CARLY !**



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## Refrigeration Components Solutions

### “MADE IN FRANCE, EUROPE”

All our production facilities are located in Lissieu, near Lyons. Total manufacturing process control allows us to ensure perfect traceability and optimum quality level.

Confronted with the growing opacity of the goods specific origins, CARLY RCS commits itself to offer its customers “Made in France” refrigerating components.

The location of our production unit, at the heart of Europe, offers an actual proximity thus ensuring customised, responsive service.

### THE EXPERIENCE

Created in 1923, CARLY RCS designs, manufactures and markets a wide range of very high quality components for the refrigerating and air conditioning markets.

For many years, our partnerships with the most prestigious manufacturers, our agreements and exchanges with the best specialised distributors, our ongoing relationships with well-known professional refrigerating installers have helped us increase our experience in order to better serve the profession.

### THE TECHNICAL SPECIALIST OF REFRIGERATING CIRCUIT COMPONENTS

CARLY RCS focuses its efforts in a very specific business area to which it is truly dedicated: refrigerating circuit components.

Research & Development, Production and Marketing investments are therefore targeted towards the line components activity.

This strong specialization has allowed CARLY RCS to become an international reference and to offer its users one of the market's most comprehensive product lines.

Our technical teams are expert to deal with such different subjects as filtration, decontamination, noise annoyance, oil return management, maintenance of refrigeration systems.

### AN INDEPENDENT, INTERNATIONAL AND CUSTOMER ORIENTED COMPANY

As an international and independent company focusing on its customers, CARLY RCS is a family owned company, which gives it a great adaptation capacity and a high reactivity on a more and more demanding market. Therefore, the company's management ensures that its teams focus on developing new solutions aimed at reacting to the evolution of a constantly changing environment. The company is certified ISO-9001 for quality and ISO-14001 for the environment.

With more than 60 % of its annual turn-over made on the international market, CARLY's RCS activities follow a path of ongoing growth that enables the company to offer the actors of the refrigerating industry more and more efficient products and services.



ISO 9001:2015  
ISO 14001:2015  
Système de  
management

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ID 9105077923





## Warning

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- The use of CARLY RCS products requires that the buyer performs a prior technical validation more specifically as regards the following:
  - The design of the refrigerating circuit into which the product is integrated ;
  - Oils and refrigerants used ;
  - The installation operating conditions ;
  - The parameters of the installation : charge of the installation, pipes diameters, working pressures and temperatures...
- Indeed, the installation designers' responsibility is:
  - To make sure that all operating equipment items are fitted for their intended use and are compatible with each other ;
  - To ensure that temperature and pressure requirements of the installation are respected, in conformity with the technical features of the product, adding if necessary a safety valve (the integrator must provide a mean for the recovery of exhaust fumes, in conformity with the regulations in force) ;
  - To take the necessary measures in order to avoid liquid hammer ;
  - To ensure that the system works in an almost-static position.

For specific requirements (pressure, temperature), contact CARLY RCS technical service.

- A complete evaluation of the risks must be performed during phases of design, assembling, and installation of the machine.
- As a component manufacturer, CARLY RCS is not liable for coming up with general scope recommendations, and this applies to all types of installations.  
Nevertheless, CARLY RCS technical department is at the disposal of the buyer in order to answer their questions and guide them in their choices. But CARLY RCS advices, especially about product selection (selection and technical details tables), are not liable and have no contractual aspect. Indeed, the quantity and the diversity of parameters in an installation and its working conditions are mostly unknown for CARLY RCS, and do not allow a complete study that would enable to make detailed and specific answers.
- Each CARLY RCS component should be carefully selected, in order to meet the requirements of the installation as specifically as possible. In order to do so, see the selection tables established for each family of CARLY RCS components. The recommendations in these tables have been established for regular installations, without any specific requirements. For all other specific cases, it is imperative that you get in touch with CARLY RCS's technical services, or your distributor's technical services.
- CARLY RCS components are designed for use with CFCs, HCFCs, HFCs and CO<sub>2</sub> as well as with their associated oils and additives; these are non hazardous refrigerants from group 2 of the Pressure Equipment Directive 2014/68/EU. CARLY RCS components are not compatible with corrosive, toxic or inflammable substances (according to safety classification and information on refrigerants – Cf EN378-1 Appendix E). CARLY RCS denies all responsibilities for damages subsequent to the use of said refrigerants. It is mandatory to use appropriated refrigerants (fluid or gas), in conformity with the indication on the label of the product.

For the use of CARLY RCS components with refrigerants of group I, type hydrocarbons – Propane R290, Butane R600, Isobutane R600a, Propylene R1270, please contact CARLY RCS technical service.

- CARLY RCS recommends reading its general sales terms and especially the clauses concerning the warranty (report to chapter 117 of CARLY RCS technical catalogue). These general sales terms govern the commercial relationships between CARLY RCS and its customers. They are also detailed on the order confirmations, delivery notes and commercial invoices. They are available as well on request at CARLY RCS company (info@carly-sa.com). Sending an order to CARLY RCS implies the acceptance of its general sales terms without restriction, above any other general purchase conditions.
- CARLY RCS components are designed only for thermodynamic installations (refrigeration, air conditioning, heat pumps...).
- CARLY RCS products are in conformity with the European Pressure Equipment Directive (PED 2014/68/EU). The products dedicated to be installed on a machine in the meaning of the machine directive 2006/42/CE and coming within category I as maximum (article 13, appendix II) are excluded of the scope of PED 2014/68/EU (article 1§2).
- CARLY RCS components are designed in order to be integrated into fix installations. For an integration into mobile installations (EN 378-2), it is the responsibility of the designer and/or manufacturer of the application to make sure of the right fitting of CARLY RCS components into their application, making qualification tests of the components fitting into their application.



## Warning

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- The label on the products with the CE marking, must remain visible and must not be covered nor damaged.
- A close attention must be paid to intervention areas in order to get a safe and secured working area available.
- Only a skilled personal (EN 13313) trained and initiated to interventions on refrigeration installations and pressure equipment, and with the qualifications required by the regulation of the country of use, is authorized to install CARLY RCS components (See General Assembling Precautions / Specific Procedures of the Technical Catalogue).
- Pressure equipments present some danger. During their handling, it is mandatory to take the necessary safety measures and to wear the individual protections according to the regulation in force.
- Plan a periodical control as often as necessary and in conformity with the regulation in force, of the installation air tightness and of the state of the refrigerant and the oil (moisture, acidity, dirt...) in order not to trouble the efficiency of the installation.
- In the frame of preventive maintenance, check regularly the general aspect and the state of the product, and replace it if necessary.
- It is mandatory to keep the instructions, during all the lifetime of the product.
- CARLY RCS disclaims all responsibility regarding the possible errors and omissions present in the technical catalogues and brochures, or any other document distributed by CARLY RCS.

CARLY RCS keeps the right to modify its manufacturing without prior notice, which is valid for products already upon order, subject that these modifications do not modify the features defined with the customer.



# European Pressure Equipment Directive 2014/68/EU

## PED

The European Pressure Equipment Directive 2014/68/EU (called PED) aims at harmonizing the national clauses, specific to each member state, in order to enable free flow of equipment under pressure within the European Union.

The essential safety requirements under this directive only apply to risks linked to pressure.

The European Pressure Equipment Directive 2014/68/EU applies to the design, the manufacturing, the conformity assessment of equipment and sets intended to contain refrigerants, gasses or liquids under pressure, which maximum working pressure is higher than 0.5 bar.

Equipment for which the European Pressure Equipment Directive 2014/68/EU (article 4) applies can be the following:

- Receivers non subject to the action of flame or external heat intake;
- Piping;
- Safety accessories;
- Accessories under pressure;
- Sets (equipment under pressure assembled by a manufacturer and making up a functional unit).

### → APPLICATION TO CARLY PRODUCTS

CARLY products can be containers, piping or accessories under pressure.

## ■ Definitions - CE category

Equipments under pressure are classified in several CE categories according to their "pressure" risk. The risk category is determined in function of:

- The volume of the device;
- The kind of refrigerant / gas used;
- The maximal admissible pressure (PS).

There are 4 categories of CE risk: Categories I, II, III and IV (PED 2014/68/EU, article 13, appendix II)

Category I, II, III and IV equipment items are subject to the essential requirements such as defined in the appendix I of the directive.

The equipments that cannot be classified into one of the 4 categories are excluded from the scope of application of the Directive requirements (article 4§3). So they do not have CE marking.

### Nota:

The products dedicated to be installed on a machine in the meaning of the machine directive 2006/42/CE and coming within category I as maximum (article 13, appendix II) are excluded of the scope of PED 2014/68/EU (article 1§2).

## ■ Definitions - Technical features

- **Pressure:** Pressure with reference to atmospheric pressure (pression relative).
- **Maximum working pressure (PS):** Maximum pressure for which the equipment was designed.
- **Maximal admissible pressure in low temperature (PS BT)\*:** Maximal admissible pressure in "low temperature" for which the equipment has been designed.
- **Test pressure (PT):** hydraulic test pressure of containers\*\*.
- **Working temperatures (TS mini / maxi):** Minimal and maximal temperatures for which the equipment is designed.
- **Working temperatures (TS BT)\*:** Minimal admissible working temperature for which the equipment is designed, with a pressure limit.



# European Pressure Equipment Directive 2014/68/EU

## PED

### ■ Definitions - Technical features

- **Volume (V):** Internal volume for each container including the volume of the connections up to the first connection, not including the volume of permanent internal elements.
- **Nominal size (DN):** Numerical designation common to all the elements of a piping system other than the elements referenced by their outside diameter or by their thread size.
- **Nature of refrigerant contained:** Liquid or gas, hazardous or non-hazardous.

The technical features of each product (PS/PS BT, V/DN, TS mini/maxi, TSBT, PT) are indicated in the “Technical features” table in each chapter of the technical documentation.

For each product, a description sheet can be obtained from CARLY technical services on request; it certifies each product features.

#### → APPLICATION TO CARLY PRODUCTS

The refrigerants chosen by CARLY RCS are Group 2 gases, Refrigerants classified as non hazardous according to PED 2014/68/EU (article 13).

To use CARLY components with fluids of the hydrocarbon group 1 – Propane R290, Butane R600, Isobutane R600a, Propylene R1270 – with HFOs and transcritical CO<sub>2</sub> and for a RANKINE organic cycle application, contact CARLY technical department.

#### \* **Pressure Limit for Low Temperatures :**

- *If the PS BT and TS BT values are defined, then for a working temperature between the min. TS and TS BT values, the product's maximum working pressure is limited to the PS BT value.*
- *The PS BT and TS BT values for each Product are indicated in the “Technical features» table in each chapter of the Technical Documentation.*

\*\* **Hydraulic test by sampling for products of CAT.I / for each unit for products of CAT.II and over.**

### ■ Evaluation of product conformity

In order to be able to market products with “CE” marking, products of category I, II & III are submitted to a conformity evaluation procedure (cf appendix III) in function of the category of the equipment.

#### Conformity evaluation procedures for CARLY products of:

- Cat I: Module A;
- Cat II: Module D1;
- Cat III: Module B1 + D.

### ■ CE marking

CE marking is printed on each product and shows the following information:

- CE marking\*;
- Manufacturer's name and address;
- Year of manufacture;
- Product reference;
- Manufacturing batch identification;
- The product technical features (PS, V/DN, max. TS, min. TS, PT);
- Refrigerant families to be used.

\* For CE category II, III and IV products, the notified organisation identification number is printed next to the CE marking - For CARLY, this number is N° 0036 (TÜV SÜD Industrie Service GmbH).

No CE marking is printed on article 4§3 products as they are excluded from the Pressure Equipment Directive.



# European Pressure Equipment Directive 2014/68/EU

## PED

### ■ EU declaration of conformity

The UE conformity statement is printed by the manufacturer and certifies that the product concerned matches the requirements of the European Pressure Equipment Directive 2014/68/EU in terms of design, manufacturing and conformity assessment (final test).

#### → APPLICATION TO CARLY PRODUCTS

##### CE CATEGORY I PRODUCTS

The EU conformity statement is not linked to manufacturing batch but to product design.

The original is kept by CARLY RCS.

A copy can be obtained from CARLY technical services on request or for « catalogue » products it is possible to download it from our website [www.carly-sa.com](http://www.carly-sa.com).

##### CE CATEGORY II PRODUCTS

A EU conformity statement is printed for each manufacturing batch.

The original is kept by CARLY RCS; a copy is enclosed in each product's packing.

##### CE CATEGORY III PRODUCTS

A EU conformity statement is printed for each manufacturing batch.

The original is kept by CARLY RCS; a copy is enclosed in each product's packing.

##### ARTICLE 4§3 PRODUCTS (WITHOUT CE CATEGORY)

The conformity declaration is not linked to the manufacturing lot. The original is kept by CARLY RCS. A copy is available upon request at CARLY technical service, or for "catalogue" products, it is possible to download it from our website: [www.carly-sa.com](http://www.carly-sa.com).

### ■ CE Instruction Notice

The CE Instruction Notice should catch the reader's attention on the dangers linked to erroneous use and contain all information dealing with the assembly, commissioning, operation and maintenance of the product concerned.

It also indicates the product features (CE Category retained, PS, V/DN, max. TS, min. TS,...), and also the main recommendations for mounting / assembling the products.

#### → APPLICATION TO CARLY PRODUCTS

##### CE CATEGORY I PRODUCTS

For each product, a CE instruction notice can be obtained from CARLY technical services on request.

##### CE CATEGORY II PRODUCTS

A CE instruction notice is enclosed in each product packing.

##### CE CATEGORY III PRODUCTS

A CE instruction notice is enclosed in each product packing.





## Anti-acid filter driers

### → DCY-P6 / 64 bar (928 psig)

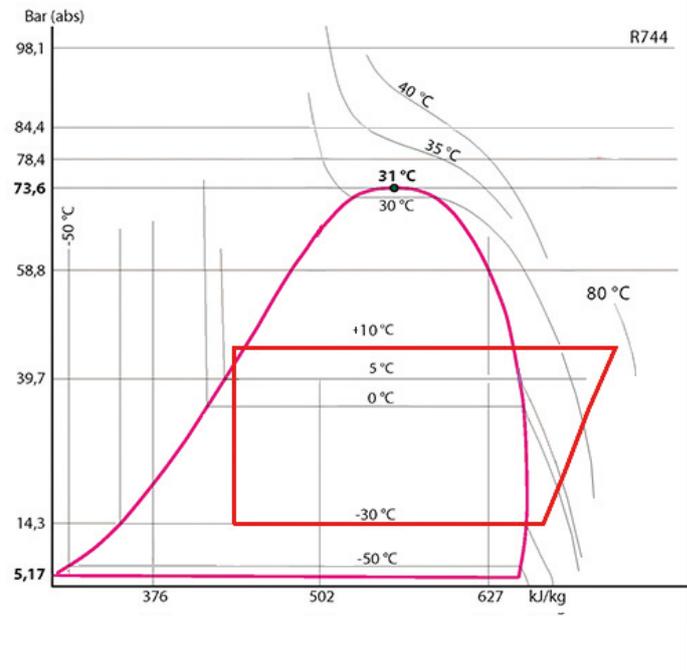
#### ■ Applications

- Filtering and drying of refrigerants and acid neutralization for liquid lines of refrigerating and air conditioning installations, running with high working pressures.



**64 bar**

**CO<sub>2</sub> SUBCRITICAL**



#### ■ Functional features

- Products are compatible with HFC and CO<sub>2</sub>, as well as with their associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU.
- Product classification in CE categories is done with the PED 2014/68/EU table, corresponding to a volume-based selection.
- Hermetically sealed outer steel enclosure with paint to ensure a high resistance to corrosion.
- Filtering at outlet preventing propagation within the circuit of particles bigger than 25 microns, with a very low pressure drop.
- No desorption, even at a high temperature.
- Several types of connections are possible on standard products:
  - To be screwed type SAE
  - To be brazed for tubes in inches (S)
  - To be brazed for tubes in millimeters (MMS)



#### Possible customization on demand:

- Specific connections (O-RING, ORFS, ...)
- Stainless steel casings and unions (resistance to corrosion and at low temperatures).

#### ■ CARLY advantages

- Maximal working pressure: up to 64 bar with CO<sub>2</sub> in subcritical compression systems.
- Great drying and acid neutralization capacity at all temperatures, thanks to a rigorous selection and a judicious mix of the chemical agents present in the filter driers (activated alumina in order to neutralise the acids and molecular sieves to adsorb moisture); the volume of free-grains drying agents used in a CARLY filter drier is greater than that present in an equivalent model with a solid core.
- Initial drying capacity guaranteed by a 200 °C oven drying and airtight sealing.
- Drying ensured for the subcritical CO<sub>2</sub> applications at low temperatures.
- A dispenser located at the inlet ensures optimal distribution and permanent treatment of the whole refrigerant, inside the filter drier.
- The copper-plated steel connections facilitate the brazing and allow using brazing alloys with a low silver percentage.

CYCO<sub>2</sub>-EN – 1.1-3 / 09-2018

# Anti-acid filter driers

## → DCY-P6 / 64 bar (928 psig)

### ■ Warning

Before selecting or installing any component, please refer to the chapter 0 of CARLY technical catalogue - **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,
- Other are general to all CARLY

and in this case, they are specified in the **RECOMMENDATIONS SPECIFIC** part defined hereafter ;

components, they are presented in the chapter 115 of CARLY technical catalogue – **GENERAL ASSEMBLY PRECAUTIONS**.

### ■ Recommendations specific to DCY-P6 filter driers

- Filter driers are to be mounted on the liquid line between the receiver and the expansion element.
- The refrigerant flow direction is indicated by an "IN" mark in the inlet shell of the filter drier and by an arrow on the filter drier tag. It must be necessarily respected.
- We recommend the vertical mounting of the filter drier with a top-down fluid flow direction in order to favour its filling when in operation and a rapid flow of the fluid when the installation is shut down.
- We recommend the use of a brasing at 10 % silver minimum for the brasing of the copper coated silver unions.
- Be careful to properly select the solenoid valves located downstream of the filter driers; their over-sizing could cause liquid hammer phenomena hindering the filter driers' mechanical behaviour; protection of regulation elements located upstream of the evaporator should be performed with FILTRY-P9 (90 bar) dirt filters (refer to chapter 11 of CARLY technical catalogue); these liquid hammer phenomena can originate from other sources, in longpiping installations.
- Never install the filter driers in an area of the circuit that can be isolated.
- Never trap the refrigerant in its liquid state (between a check valve and a solenoid valve, for instance).
- The filter driers must be changed :
  - after each intervention on the installation requiring the opening of the circuit
  - when the liquid indicator indicates an abnormal humidity content
  - when the pressure loss measured in the dewatering filter is too high
  - at least once a year as a measure of precaution
- A filter drier saturated in humidity no longer retains the water molecules which circulate then in the circuit ; these molecules in contact with other materials and with the POE oils which are very hydrophilic are liable to form acids which can be fatal for the installation ; therefore, it is very important to use filter driers containing activated alumina in order to neutralise as rapidly as possible the acids present in the circuit and not filter driers with only 100 % of a molecular screen.
- Filter drier efficiency and refrigerant moisture content should be checked using liquid sight glasses.
- Make sure that the piping can support without deformation the weight of the filter drier ; otherwise, plan the attachment of the filter drier with a clamp on a stable part of the installation.



# Anti-acid filter driers

## → DCY-P6 / 64 bar (928 psig)

### ■ Special precautions for components used with CO<sub>2</sub> in subcritical 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<sub>2</sub> for low temperatures applications, generates also high pressures (to take in consideration)
- The implementation on the liquid line of a filter drier **DCY-P6** 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<sub>2</sub> at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO<sub>2</sub> 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<sub>2</sub> and polymers. For example, swelling phenomena and internal explosion of the seal are possible. Carly **filter drier DCY-P6** do not have polymer gaskets directly in contact with CO<sub>2</sub>.



## Anti-acid filter driers

### → DCY-P6 / 64 bar (928 psig)

#### ■ Selection table

| CARLY references | Connections          |                       | CARLY references | Connections<br>To solder ODF<br>mm | Refrigerating capacity<br>kW <sup>(1)</sup> | Dehydratable refrigerant capacity<br>kg of refrigerant <sup>(2)</sup> |
|------------------|----------------------|-----------------------|------------------|------------------------------------|---|---|
|                  | To screw SAE<br>inch | To solder ODF<br>inch |                  |                                    | R744 <sup>(3)</sup>                         | R744<br>24 °C   |
| DCY-P6 053       | 3/8                  |                       |                  |                                    | 25,8  | 5,8   |
| DCY-P6 053 S     |                      | 3/8                   | DCY-P6 053 MMS   | 10                                 | 25,8  | 5,8   |
| DCY-P6 164       | 1/2                  |                       |                  |                                    | 46,5  | 24,3  |
| DCY-P6 164 S     |                      | 1/2                   | DCY-P6 164 MMS   | 12                                 | 46,5  | 24,3  |
| DCY-P6 305       | 5/8                  |                       |                  |                                    | 78,4  | 42,5  |
| DCY-P6 305 S/MMS |                      | 5/8                   |                  | 16                                 | 78,4  | 42,5  |

<sup>(1)</sup> Refrigerating capacities according to Standard ARI 710-86 for  $T_o = -15\text{ °C}$ ,  $T_k = 30\text{ °C}$  and  $\Delta p = 0.07\text{ bar}$ .  
If different conditions, refer to correction factors in chapter 112 of CARLY technical catalogue.

<sup>(2)</sup> Dehydratable refrigerant capacity according to Standard ARI 710-86.

<sup>(3)</sup> Refrigerating capacities  $Q_n$  for  $T_k = -10\text{ °C}$  and  $T_o = -40\text{ °C}$

If different conditions, refer to correction factors in chapter 112 of CARLY technical catalogue.

Nota: the diameter of connections must not be inferior to the diameter of the main pipe.



# Anti-acid filter driers

## → DCY-P6 / 64 bar (928 psig)

### ■ Example of selection of a DCY-P6 anti-acid filter drier

The sizing of a product implies that the buyer takes into account the conditions under which the product is going to be used (temperature - pressure - refrigerant - oil - external environment). The values proposed in the CARLY catalogue selection tables match specific test conditions.

In order to define a correct sizing, we suggest that you convert your operating data into data that match the CARLY selection tables.

• Installation operating with CO<sub>2</sub> under the following conditions<sup>(1)</sup> :

- To = - 40 °C
- Tk = - 10 °C
- Q<sub>0</sub> = 78 kW
- 42 kg of refrigerant at 24 °C

• Which DCY-P6 anti-acid filter drier to choose?

### DCY-P6 selection

• DCY-P6 type selection and reading of selection table on page 1.12

- CO<sub>2</sub>
- 42 kg refrigerant at 24 °C
- Q<sub>0</sub> = 78 kW

Filter drier volume selection depends on the installation total refrigerant capacity. For a quantity of 42 kg of CO<sub>2</sub>, selection should be done from the DCY-P6 300 product line. See dehydratable refrigerant capacity column.

Selection of the connection, hence of the filter drier, is performed by carrying the Q<sub>0</sub> refrigerating capacity and the refrigerant over to the refrigerating capacity column.

**Result: DCY-P6 305 S/MMS** (connections to solder) **or DCY-P6 305** (connections to screw)

If the Q<sub>0</sub> value is between two CARLY filter drier types in the selection table, it is recommended to select the filter drier with the greater capacity.

| CARLY references | Connections             |                          | CARLY references | Connections<br>To solder<br>ODF<br>mm | Refrigerating capacity<br>kW <sup>(1)</sup> | Dehydratable refrigerant capacity<br>kg of refrigerant <sup>(2)</sup> |
|------------------|-------------------------|--------------------------|------------------|---------------------------------------|---|---|
|                  | To screw<br>SAE<br>inch | To solder<br>ODF<br>inch |                  |                                       | R744  | R744<br>24 °C   |
| DCY-P6 164       | 1/2                     |                          |                  |                                       | 46,5  | 24,3  |
| DCY-P6 164 S     |                         | 1/2                      | DCY-P6 164 MMS   | 12                                    | 46,5  | 24,3  |
| DCY-P6 305       | 5/8                     |                          |                  |                                       | 78,4  | 42,5  |
| DCY-P6 305 S/MMS |                         | 5/8                      | DCY-P6 305 S/MMS | 16                                    | 78,4  | 42,5  |

<sup>(1)</sup> Chapter "Abbreviations and units" (refer to chapter 113 of CARLY technical catalogue).

<sup>(2)</sup> Dehydratable refrigerant capacity according to Standard ARI 710-86.



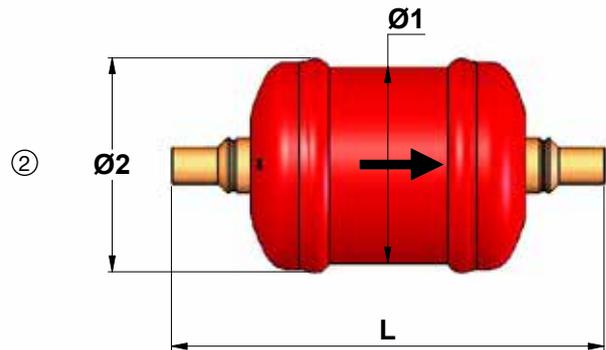
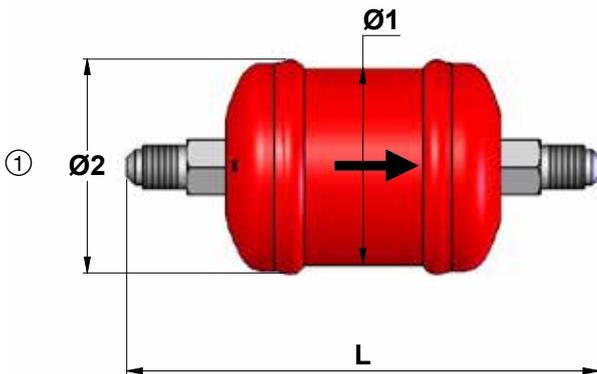
## Anti-acid filter driers

### → DCY-P6 / 64 bar (928 psig)

#### ■ Technical features

| CARLY references | Connections types <sup>(1)</sup> | Drawing Nb | Filtering surface<br>cm <sup>2</sup> | Volume of desiccation products<br>cm <sup>3</sup> | Dimensions |          |         |
|------------------|----------------------------------|------------|--------------------------------------|---|------------|----------|---------|
|                  |                                  |            |                                      |   | Ø1<br>mm   | Ø2<br>mm | L<br>mm |
| DCY-P6 053       | 1                                | 1          | 52                                   | 82  | 50         | 55       | 126     |
| DCY-P6 053 S     | DCY-P6 053 MMS                   | 2          | 52                                   | 82  | 50         | 55       | 110     |
| DCY-P6 164       | 1                                | 1          | 102                                  | 322   | 70         | 76       | 182     |
| DCY-P6 164 S     | DCY-P6 164 MMS                   | 2          | 102                                  | 322   | 70         | 76       | 162     |
| DCY-P6 305       | 1                                | 1          | 102                                  | 582   | 70         | 76       | 262     |
| DCY-P6 305 S/MMS | 2                                | 2          | 102                                  | 582   | 70         | 76       | 242     |

<sup>(1)</sup> Chapter "Connection features and drawings" (refer to chapter 114 of CARLY technical catalogue).



| CARLY references | Volume<br>V<br>L | Maximal working pressure<br>PS<br>bar | Working pressure <sup>(1)</sup> |             | Maximal working temperature<br>TS maxi<br>°C | Minimal working temperature<br>TS mini<br>°C | Working temperature <sup>(1)</sup> |        | CE Category <sup>(2)</sup> |
|------------------|------------------|---------------------------------------|---------------------------------|-------------|--|--|------------------------------------|--------|----------------------------|
|                  |                  |                                       | PS BT<br>bar                    | TS BT<br>°C |  |  | TS BT<br>°C                        |        |                            |
| DCY-P6 053       | 0,12             | 64                                    | 15                              | 100         | -40  | -30  | Art4§3                             |        |                            |
| DCY-P6 053 S     | DCY-P6 053 MMS   | 0,12                                  | 64                              | 15          | 100  | -40  | -30                                | Art4§3 |                            |
| DCY-P6 164       | 0,42             | 64                                    | 15                              | 100         | -40  | -30  | Art4§3                             |        |                            |
| DCY-P6 164 S     | DCY-P6 164 MMS   | 0,42                                  | 64                              | 15          | 100  | -40  | -30                                | Art4§3 |                            |
| DCY-P6 305       | 0,68             | 64                                    | 15                              | 100         | -40  | -30  | Art4§3                             |        |                            |
| DCY-P6 305 S/MMS | 0,68             | 64                                    | 15                              | 100         | -40  | -30  | Art4§3                             |        |                            |

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

<sup>(2)</sup> Classification by volume, according to PED 2014/68/EU (refer to Chapter 0 of CARLY technical catalogue).



# Anti-acid filter driers

## → DCY-P6 / 64 bar (928 psig)

### ■ Weights and packaging

| CARLY references   | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|--------------------|-------------------|----------------------|-------------------------------|
|                    | With<br>packaging | Without<br>packaging |                               |
| DCY-P6 053         | 0,33              | 0,30                 | 1                             |
| DCY-P6 053 S & MMS | 0,33              | 0,30                 | 1                             |
| DCY-P6 164         | 1,04              | 1,00                 | 1                             |
| DCY-P6 164 S& MMS  | 1,04              | 1,00                 | 1                             |
| DCY-P6 305         | 1,57              | 1,50                 | 1                             |
| DCY-P6 305 S/MMS   | 1,57              | 1,50                 | 1                             |





## Anti-acid filter driers

### → DCY-P14 / 140 bar (2030 psig)

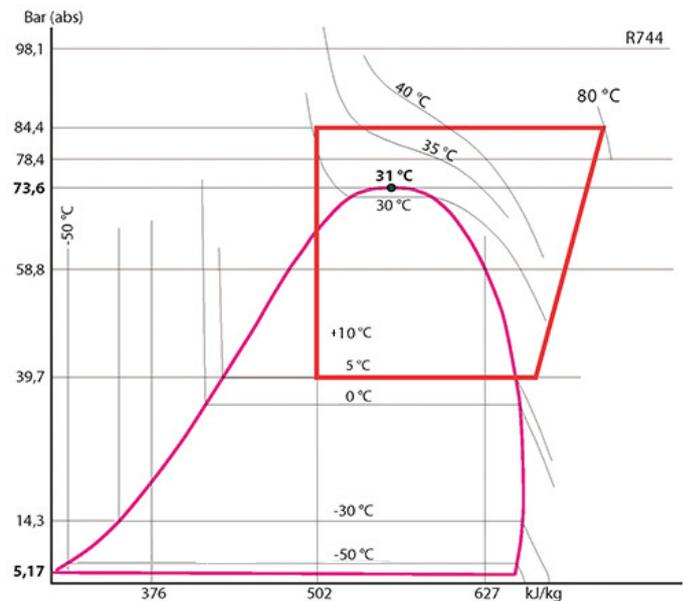
#### ■ Applications

- Filtering and drying of refrigerants and acid neutralization for liquid lines of refrigerating and air conditioning installations, running with high working pressures with CO<sub>2</sub> in transcritical compression systems.



**140 bar**

**CO<sub>2</sub> TRANSCRITICAL**



#### ■ Functional features

- Products are compatible with CO<sub>2</sub>, as well as with its associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU.
- Product classification in CE categories is done with the PED 2014/68/EU table, corresponding to a volume-based selection.
- Hermetically sealed outer steel enclosure with paint to ensure a high resistance to corrosion.
- Filtering at outlet preventing propagation within the circuit of particles bigger than 25 microns, with a very low pressure drop.
- No desorption, even at a high temperature.
- Several types of connections are possible on standard products:
  - To be brazed or welded for tubes in inches (S)
  - To be brazed or welded for tubes in millimeters (MMS)



#### Possible customization on demand:

- Stainless steel casings and unions (resistance to corrosion and at low temperatures).

#### ■ CARLY advantages

- Maximal working pressure: up to 140 bar with CO<sub>2</sub> in transcritical compression systems.
- Great drying and acid neutralization capacity at all temperatures, thanks to a rigorous selection and a judicious mix of the chemical agents present in the filter driers (activated alumina in order to neutralise the acids and molecular sieves to adsorb moisture); the volume of free-grains drying agents used in a CARLY filter drier is greater than that present in an equivalent model with a solid core.
- Initial drying capacity guaranteed by a 200 °C oven drying and airtight sealing.
- A dispenser located at the inlet ensures optimal distribution and permanent treatment of the whole refrigerant, inside the filter drier.



# Anti-acid filter driers

## → DCY-P14 / 140 bar (2030 psig)

### ■ Warning

Before selecting or installing any component, please refer to the chapter 0 of CARLY technical catalogue - **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,
- Other are general to all CARLY

and in this case, they are specified in the **RECOMMENDATIONS SPECIFIC** part defined hereafter ;

components, they are presented in the chapter 115 of CARLY technical catalogue – **GENERAL ASSEMBLY PRECAUTIONS**.

### ■ Recommendations specific to DCY-P14 filter driers

- Filter driers are to be mounted on the liquid line between the receiver and the expansion element.
- The refrigerant flow direction is indicated by an "IN" mark in the inlet shell of the filter drier and by an arrow on the filter drier tag. It must be necessarily respected.
- We recommend the vertical mounting of the filter drier with a top-down fluid flow direction in order to favour its filling when in operation and a rapid flow of the fluid when the installation is shut down.
- We recommend the use of a brasing at 38 % silver minimum for the brasing of the copper coated steel connections.
- Be careful to properly select the solenoid valves located downstream of the filter driers; their over-sizing could cause liquid hammer phenomena hindering the filter driers' mechanical behaviour FILTRY-P9 (90 bar); these liquid hammer phenomena can originate from other sources, in longpiping installations.
- Never install the filter driers in an area of the circuit that can be isolated.
- Never trap the refrigerant in its liquid state (between a check valve and a solenoid valve, for instance).
- The filter driers must be changed :
  - after each intervention on the installation requiring the opening of the circuit
  - when the liquid indicator indicates an abnormal humidity content
  - when the pressure loss measured in the dewatering filter is too high
  - at least once a year as a measure of precaution
- A filter drier saturated in humidity no longer retains the water molecules which circulate then in the circuit ; these molecules in contact with other materials and with the POE oils which are very hydrophilic are liable to form acids which can be fatal for the installation ; therefore, it is very important to use filter driers containing activated alumina in order to neutralise as rapidly as possible the acids present in the circuit and not filter driers with only 100 % of a molecular screen.
- Filter drier efficiency and refrigerant moisture content should be checked using liquid sight glasses.
- Make sure that the piping can support without deformation the weight of the filter drier ; otherwise, plan the attachment of the filter drier with a clamp on a stable part of the installation.



## Anti-acid filter driers

### → DCY-P14 / 140 bar (2030 psig)

#### ■ Special precautions for components used with CO<sub>2</sub> in subcritical 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 implementation on the liquid line of a filter drier **DCY-P14** 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<sub>2</sub> at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO<sub>2</sub> 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<sub>2</sub> and polymers. For example, swelling phenomena and internal explosion of the seal are possible. Carly filter drier DCY-P14 do not have polymer gaskets directly in contact with CO<sub>2</sub>.



## Anti-acid filter driers

### → DCY-P14 / 140 bar (2030 psig)

#### ■ Selection table

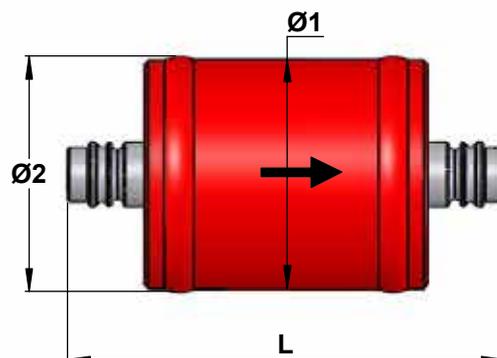
| CARLY references  | Connections   |    | CARLY references  | Connections   |       | Dehydratable refrigerant capacity |  |
|-------------------|---------------|----|-------------------|---------------|-------|-----------------------------------|--|
|                   | To solder ODF |    |                   | To solder ODF |       | kg of refrigerant                 |  |
|                   | inch          | mm |                   | R744          | 24 °C |                                   |  |
| DCY-P14 052 S/MMS | 1/4           | 6  | DCY-P14 052 S/MMS | 6             | 5,8   |                                   |  |
| DCY-P14 053 S/MMS | 3/8           | 10 | DCY-P14 053 S/MMS | 10            | 5,8   |                                   |  |
| DCY-P14 163 S/MMS | 3/8           | 10 | DCY-P14 163 S/MMS | 10            | 24,3  |                                   |  |
| DCY-P14 164 S/MMS | 1/2           | 12 | DCY-P14 164 S/MMS | 12            | 24,3  |                                   |  |
| DCY-P14 165 S/MMS | 5/8           | 16 | DCY-P14 165 S/MMS | 16            | 24,3  |                                   |  |
| DCY-P14 304 S/MMS | 1/2           | 12 | DCY-P14 304 S/MMS | 12            | 42,5  |                                   |  |
| DCY-P14 305 S/MMS | 5/8           | 16 | DCY-P14 305 S/MMS | 16            | 42,5  |                                   |  |
| DCY-P14 415 S/MMS | 5/8           | 16 | DCY-P14 415 S/MMS | 16            | 69,2  |                                   |  |

Nota: the diameter of connections must not be inferior to the diameter of the main pipe.

#### ■ Technical features

| CARLY references  | Connections types <sup>(1)</sup> | Filtering surface<br>cm <sup>2</sup> | Volume of desiccation products<br>cm <sup>3</sup> | Dimensions |    |     |
|-------------------|----------------------------------|--------------------------------------|---|------------|----|-----|
|                   |                                  |                                      |   | Ø1         | Ø2 | L   |
|                   |                                  |                                      |   | mm         | mm | mm  |
| DCY-P14 052 S/MMS | 4                                | 65                                   | 61  | 60         | 64 | 114 |
| DCY-P14 053 S/MMS | 4                                | 65                                   | 61  | 60         | 64 | 114 |
| DCY-P14 163 S/MMS | 4                                | 100                                  | 195   | 73         | 77 | 160 |
| DCY-P14 164 S/MMS | 4                                | 100                                  | 195   | 73         | 77 | 176 |
| DCY-P14 165 S/MMS | 5                                | 100                                  | 195   | 73         | 77 | 176 |
| DCY-P14 304 S/MMS | 4                                | 100                                  | 431   | 73         | 77 | 252 |
| DCY-P14 305 S/MMS | 5                                | 100                                  | 431   | 73         | 77 | 252 |
| DCY-P14 415 S/MMS | 5                                | 150                                  | 700   | 89         | 92 | 260 |

<sup>(1)</sup> Chapter "Connection features and drawings" (refer to chapter 114 of CARLY technical catalogue).





# Anti-acid filter driers

## → DCY-P14 / 140 bar (2030 psig)

### ■ Technical features

| CARLY references  | Volume | Maximal working pressure | Working pressure <sup>(1)</sup> | Maximal working temperature | Minimal working temperature | Working temperature <sup>(1)</sup> | CE Category <sup>(2)</sup> |
|-------------------|--------|--------------------------|---------------------------------|-----------------------------|-----------------------------|------------------------------------|----------------------------|
|                   | V<br>L | PS<br>bar                | PS BT<br>bar                    | TS maxi<br>°C               | TS mini<br>°C               | TS BT<br>°C                        |                            |
| DCY-P14 052 S/MMS | 0,10   | 140                      | 15                              | 100                         | -40                         | -30                                | Art4§3                     |
| DCY-P14 053 S/MMS | 0,10   | 140                      | 15                              | 100                         | -40                         | -30                                | Art4§3                     |
| DCY-P14 163 S/MMS | 0,27   | 140                      | 15                              | 100                         | -40                         | -30                                | Art4§3                     |
| DCY-P14 164 S/MMS | 0,27   | 140                      | 15                              | 100                         | -40                         | -30                                | Art4§3                     |
| DCY-P14 165 S/MMS | 0,27   | 140                      | 15                              | 100                         | -40                         | -30                                | Art4§3                     |
| DCY-P14 304 S/MMS | 0,51   | 140                      | 15                              | 100                         | -40                         | -30                                | Art4§3                     |
| DCY-P14 305 S/MMS | 0,51   | 140                      | 15                              | 100                         | -40                         | -30                                | Art4§3                     |
| DCY-P14 415 S/MMS | 0,84   | 140                      | 15                              | 100                         | -40                         | -30                                | Art4§3                     |

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

<sup>(2)</sup> Classification by volume, according to PED 2014/68/EU (refer to Chapter 0 of CARLY technical catalogue).

### ■ Weights and packaging

| CARLY references  | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|-------------------|-------------------|----------------------|-------------------------------|
|                   | With<br>packaging | Without<br>packaging |                               |
| DCY-P14 052 S/MMS | 1,09              | 0,96                 | 1                             |
| DCY-P14 053 S/MMS | 1,09              | 0,96                 | 1                             |
| DCY-P14 163 S/MMS | 2,23              | 2,10                 | 1                             |
| DCY-P14 164 S/MMS | 2,23              | 2,10                 | 1                             |
| DCY-P14 165 S/MMS | 2,23              | 2,10                 | 1                             |
| DCY-P14 304 S/MMS | 3,03              | 2,90                 | 1                             |
| DCY-P14 305 S/MMS | 3,03              | 2,90                 | 1                             |
| DCY-P14 415 S/MMS | 4,49              | 4,36                 | 1                             |





## Replaceable core filter drier shells (liquid line)

### → BCY-HP (46 bar)

#### ■ Applications

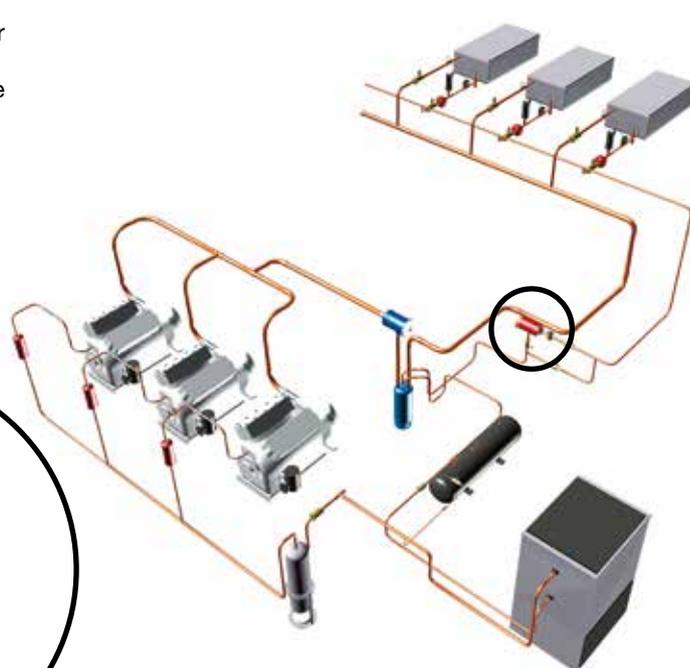
- Refrigerant filtering and drying and acid neutralization for refrigerating and air conditioning installation liquid lines.
- Replaceable core filter drier shells allow the replacement of the filter drier's active parts only.

| Shell reference  | Core reference (size) |
|------------------|-----------------------|
| BCY-HP           | CCY 48 / PLATINIUM 48 |
| BCY-P6 / BCY-P14 | PLATINIUM 48 / CCY 48 |



Customized product in stainless steel

Standard product



#### ■ Functional features

- Products are compatible with CFCs, HCFCs, HFCs, CO<sub>2</sub>, as well as with their associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU. To use CARLY components with fluids of the hydrocarbon group 1 – Propane R290, Butane R600, Isobutane R600a, Propylene R1270 – with HFOs and transcritical CO<sub>2</sub> and for a RANKINE organic cycle application, contact CARLY technical department.
- Product classification in CE categories is performed using the PED 2014/68/EU table, corresponding to a volume-based selection.
- Filtering at outlet preventing the propagation within the circuit of particles bigger than 150 microns, with a very low pressure drop.
- 1/4" NPT taper tapping and its plug on end plate, allowing the installation of a pressure tap or a feeding valve.
- End plate perfectly tight thanks to its circular rim and its gasket compatible with all CFCs, HCFCs, HFCs and CO<sub>2</sub>s.

#### ■ Possible customization on demand:

- Stainless steel casings and connections (corrosion resistance and for use at very low temperature).
- PS 46 bar for BCY-HP 3 and 4 cores.

#### ■ CARLY advantages

- Maximum working pressure : up to 46 bars for the BCY-HP 1 and 2 cartridges for use with R 410 A and CO<sub>2</sub>.
- Individual core holders treated against corrosion by zinc coating, with a reduced course for easy core replacement; therefore, replacement time is extremely reduced, limiting the time the drying cores and the inner part of the circuit are exposed to the atmosphere.
- Hermetically sealed external body made of steel to which an impregnation varnish and paint are applied to ensure a high resistance to corrosion ; this varnish ensures the internal anti-corrosion protection of the shell when it is opened for the initial set-up or during the replacement of the drying cores.
- Core holder design ensures automatic and immediate centring of the filter drier shells.
- No flow area restriction outside the filter drier shells thanks to an appropriate filtering system.

CYCO<sub>2</sub>-EN – 2.1-7 / 09-2018

# Replaceable core filter drier shells (liquid line)

## → BCY-HP (46 bar) (corresponding cores: CCY 48 and PLATINIUM 48)

### ■ 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

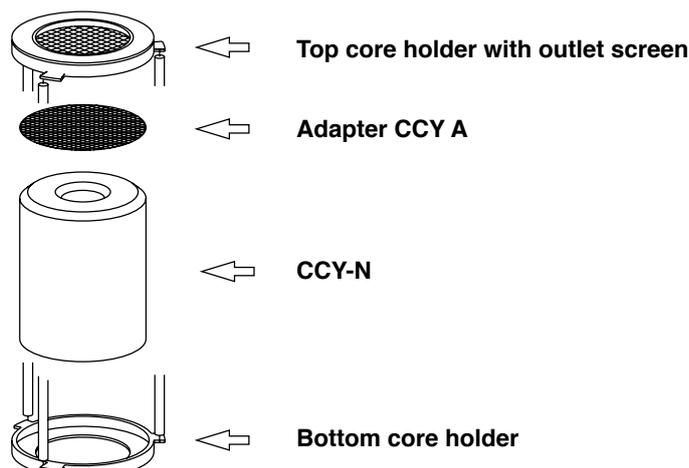
**RECOMMENDATIONS SPECIFIC** part defined hereafter ;

- Other are general to all CARLY components, they are presented in the chapter 115 – **GENERAL ASSEMBLY PRECAUTIONS**.

- The recommendations relating to the CARLY components for the subcritical CO<sub>2</sub> applications are also developed in chapter 115 – **GENERAL ASSEMBLY PRECAUTIONS**.

### ■ Specific recommendations to replaceable core filter drier shells BCY-HP

- Filter drier shells are to be mounted on the liquid line between the receiver and the expansion element.
- The refrigerant flow direction, indicated by an arrow on the filter drier shells' tags, should be complied with.
- Assembly can be performed in any position, but not vertically with the outlet connection oriented downwards.
- During filter drier shells assembly, provide for sufficient course to allow core replacement (refer to sizes L2 in the technical features table).
- The connection to the installation, by soldering or welding, of the filter shell, must be done only after removing the closing flange, its gasket and the internal core holders.
- We recommend to clean and to protect the connections of the filter drier shell with appropriate products in order to ensure a good resistance to corrosion of the affected areas.
- Be careful to properly select the solenoid valves located downstream of the filter drier shells; their oversizing could cause liquid hammer phenomena hindering the filter drier shells' proper mechanical behaviour; protection of the regulation elements upstream of the evaporator should be performed with FILTRY dirt filters (refer to chapter 11); these liquid hammer phenomena can originate from other sources, in long-piping installations.
- Never install filter drier shells in an area of the circuit that can be isolated.
- Never trap refrigerant in its liquid state (between a check valve and a solenoid valve, for instance).
- The filter drier shells' efficiency and the refrigerant's moisture content should be checked using VCYL or VCYLS liquid sight glasses (refer to chapter 9 or 10).
- Make sure that the piping can support without deformation the weight of the filter drier shell ; otherwise, provide for a clamp of the filter drier shell with a clamp on a stable part of the installation.
- In order to avoid risk of frost and condensation on the suction filter shells mounted on a cold pipe, it is recommended to insulate them thermally.



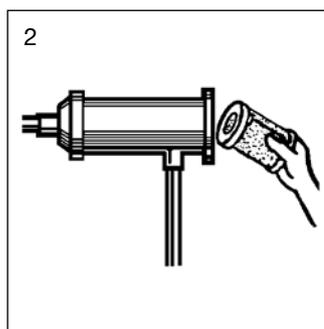
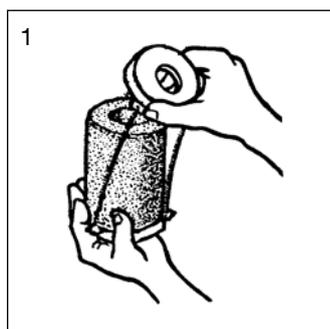


# Replaceable core filter drier shells (liquid line)

## → **BCY-HP (46 bar)** (corresponding cores: CCY 48 and PLATINIUM 48)

### ■ Core replacement procedure

- 1 • Isolate the **BCY-HP** filter drier shell.
- 2 • Purge the installation up to atmospheric pressure (shell should be empty of refrigerants)
- 3 • Remove the end plate.
- 4 • Remove the bottom core holder.
- 5 • Remove the used core.
- 6 • Clean and replace if necessary, the **CCY A 42** adapter and the outlet screen.
- 7 • Check and replace if necessary, the outlet gasket of top core holder.
- 8 • Replace systematically the end plate gasket.
- 9 • Remove the **CCY 42** core from its sealed can.
- 10 • Reassemble in order: the outlet screen (1), the **CCY A 42** adapter (2), the outlet gasket (3), the top core holder (4), the **CCY 42** core, the bottom core holder and its compression spring (5) (sketch below)
- 11 • Reinstall the closing flange making sure that the compression spring is correctly positioned and gradually and uniformly tighten the closing screws (refer to chapter 115 – **GENERAL MOUNTING PRECAUTIONS** – Criss-cross tightening).  
Maximum bolt tightening torque: 30 N.m.
- 12 • Make sure that the end plate's 1/4" NPT taper tapping has been properly plugged in and sealed.
- 13 • Make vacuum in the installation and check air-tightness of the whole set before putting back under pressure.



⚠ The standard gasket of the CCY (neoprene) is not compatible with CO<sub>2</sub>. Use the reference CY 1555200.

CYCO<sub>2</sub>-EN – 2.1-7 / 09-2018

# Replaceable core filter drier shells (liquid line)

## → BCY-HP (46 bar) (corresponding cores: CCY 48 and PLATINIUM 48)

### ■ Weights and packaging

| CARLY references  | Connections   | CARLY references  | Connections   | Refrigerating capacity | Number of cores |
|-------------------|---------------|-------------------|---------------|------------------------|-----------------|
|                   | To solder ODF |                   | To solder ODF | kW <sup>(1)</sup>      |                 |
|                   | inch          |                   | mm            | R744 <sup>(2)</sup>    |                 |
| BCY-HP 485 S/MMS  | 5/8           | BCY-HP 485 S/MMS  | 16            | 106,0                  | 1               |
| BCY-HP 487 S/MMS  | 7/8           | BCY-HP 487 S/MMS  | 22            | 171,0                  | 1               |
| BCY-HP 489 S      | 1 1/8         | BCY-HP 489 MMS    | 28            | 232,0                  | 1               |
| BCY-HP 4811 S/MMS | 1 3/8         | BCY-HP 4811 S/MMS | 35            | 277,0                  | 1               |
| BCY-HP 4813 S     | 1 5/8         | BCY-HP 4813 MMS   | 42            | 336,0                  | 1               |
| BCY-HP 4817 S/MMS | 2 1/8         | BCY-HP 4817 S/MMS | 54            | 392,0                  | 1               |
| BCY-HP 967 S/MMS  | 7/8           | BCY-HP 967 S/MMS  | 22            | 176,0                  | 2               |
| BCY-HP 969 S      | 1 1/8         | BCY-HP 969 MMS    | 28            | 264,0                  | 2               |
| BCY-HP 9611 S/MMS | 1 3/8         | BCY-HP 9611 S/MMS | 35            | 375,0                  | 2               |
| BCY-HP 9613 S     | 1 5/8         | BCY-HP 9613 MMS   | 42            | 460,0                  | 2               |
| BCY-HP 9617 S/MMS | 2 1/8         | BCY-HP 9617 S/MMS | 54            | 464,0                  | 2               |

<sup>(1)</sup> Refrigerating capacities according to Standard ARI 710-86 for  $T_o = -15\text{ °C}$ ,  $T_k = 30\text{ °C}$  and  $\Delta p = 0.07\text{ bar}$ .  
If different conditions, refer to correction factors in chapter 112.

<sup>(2)</sup> Refrigerating capacities  $Q_n$  for  $T_k = -10\text{ °C}$  and  $T_o = -40\text{ °C}$ .  
If different conditions, refer to correction factors in chapter 112.

Nota: the diameter of connections must not be inferior to the diameter of the main pipe.



# Replaceable core filter drier shells (liquid line)

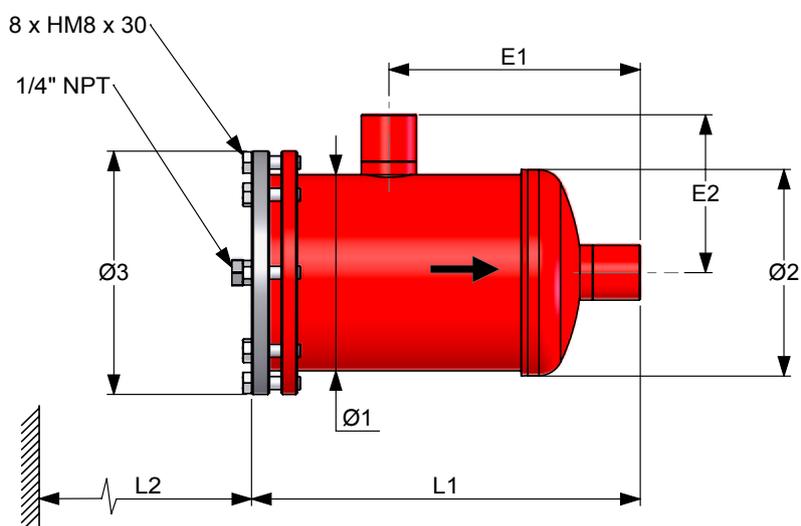
## → BCY-HP (46 bar) (corresponding cores: CCY 48 and PLATINIUM 48)

### ■ Technical features

| CARLY references  | Connection types <sup>(1)</sup> | Filtering surface<br>cm <sup>2</sup> | Dimensions<br>mm |                   |     |     |     |     |     |     |
|-------------------|---------------------------------|--------------------------------------|------------------|-------------------|-----|-----|-----|-----|-----|-----|
|                   |                                 |                                      | Ø1               | Ø2 <sup>(2)</sup> | Ø3  | L1  | L2  | E1  | E2  |     |
| BCY-HP 485 S/MMS  | 2                               | 420                                  | 121              | 128               | 150 | 223 | 210 | 139 | 83  |     |
| BCY-HP 487 S/MMS  | 2                               | 420                                  | 121              | 128               | 150 | 233 | 210 | 149 | 93  |     |
| BCY-HP 489 S      | BCY-HP 489 MMS                  | 3                                    | 420              | 121               | 128 | 150 | 238 | 210 | 154 | 98  |
| BCY-HP 4811 S/MMS |                                 | 3                                    | 420              | 121               | 128 | 150 | 247 | 210 | 163 | 108 |
| BCY-HP 4813 S     | BCY-HP 4813 MMS                 | 3                                    | 420              | 121               | 128 | 150 | 247 | 210 | 163 | 108 |
| BCY-HP 4817 S/MMS |                                 | 3                                    | 420              | 121               | 128 | 150 | 260 | 210 | 176 | 124 |
| BCY-HP 967 S/MMS  |                                 | 2                                    | 840              | 121               | 128 | 150 | 373 | 210 | 289 | 93  |
| BCY-HP 969 S      | BCY-HP 969 MMS                  | 3                                    | 840              | 121               | 128 | 150 | 378 | 210 | 294 | 98  |
| BCY-HP 9611 S/MMS |                                 | 3                                    | 840              | 121               | 128 | 150 | 387 | 210 | 303 | 108 |
| BCY-HP 9613 S     | BCY-HP 9613 MMS                 | 3                                    | 840              | 121               | 128 | 150 | 387 | 210 | 303 | 108 |
| BCY-HP 9617 S/MMS |                                 | 3                                    | 840              | 121               | 128 | 150 | 400 | 210 | 316 | 124 |

<sup>(1)</sup> Chapter «Connection features and drawings» (refer to chapter 114).

<sup>(2)</sup> Including weld.





## Replaceable core filter drier shells (liquid line)

### → BCY-HP (46 bar) (corresponding cores: CCY 48 and PLATINIUM 48)

#### ■ Technical features

| CARLY references  | Volume          | Maximal working pressure | Working pressure <sup>(1)</sup> | Maximal working temperature | Minimal working temperature | Working temperature <sup>(1)</sup> | CE Category <sup>(2)</sup> |     |
|-------------------|-----------------|--------------------------|---------------------------------|-----------------------------|-----------------------------|------------------------------------|----------------------------|-----|
|                   |                 |                          |                                 |                             |                             |                                    |                            | V L |
| BCY-HP 485 S/MMS  | 1,90            | 46                       | 15                              | 120                         | -40                         | -30                                | I                          |     |
| BCY-HP 487 S/MMS  | 1,90            | 46                       | 15                              | 120                         | -40                         | -30                                | I                          |     |
| BCY-HP 489 S      | BCY-HP 489 MMS  | 1,90                     | 46                              | 15                          | 120                         | -40                                | -30                        | I   |
| BCY-HP 4811 S/MMS |                 | 1,90                     | 46                              | 15                          | 120                         | -40                                | -30                        | I   |
| BCY-HP 4813 S     | BCY-HP 4813 MMS | 1,90                     | 46                              | 15                          | 120                         | -40                                | -30                        | I   |
| BCY-HP 4817 S/MMS |                 | 2,00                     | 46                              | 15                          | 120                         | -40                                | -30                        | I   |
| BCY-HP 967 S/MMS  |                 | 3,30                     | 46                              | 15                          | 120                         | -40                                | -30                        | I   |
| BCY-HP 969 S      | BCY-HP 969 MMS  | 3,30                     | 46                              | 15                          | 120                         | -40                                | -30                        | I   |
| BCY-HP 9611 S/MMS |                 | 3,30                     | 46                              | 15                          | 120                         | -40                                | -30                        | I   |
| BCY-HP 9613 S     | BCY-HP 9613 MMS | 3,30                     | 46                              | 15                          | 120                         | -40                                | -30                        | I   |
| BCY-HP 9617 S/MMS |                 | 3,40                     | 46                              | 15                          | 120                         | -40                                | -30                        | I   |

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

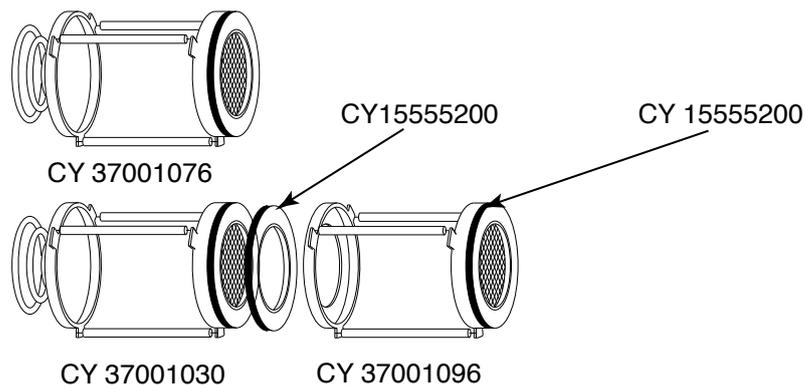
<sup>(2)</sup> Classification by volume, according to PED 2014/68/EU (refer to chapter 0).

#### ■ Spare parts

| Shells         | CARLY References for core holders | Quantity and type of gaskets for use |                                 |
|----------------|-----------------------------------|--------------------------------------|---------------------------------|
|                |                                   | Core holders gasket <sup>(1)</sup>   | End plate gasket <sup>(2)</sup> |
| BCY-HP 1 core  | CY 37001076                       | 1 gasket CY 15555200                 | 1 gasket CY 15555601            |
| BCY-HP 2 cores | CY 37001030 + CY 37001096         | 2 gaskets CY 15555200                |                                 |

<sup>(1)</sup> Gasket delivered with core holders

<sup>(2)</sup> Gasket delivered with cores CCY 48 N, CCY 48 HP and PLATINIUM 48



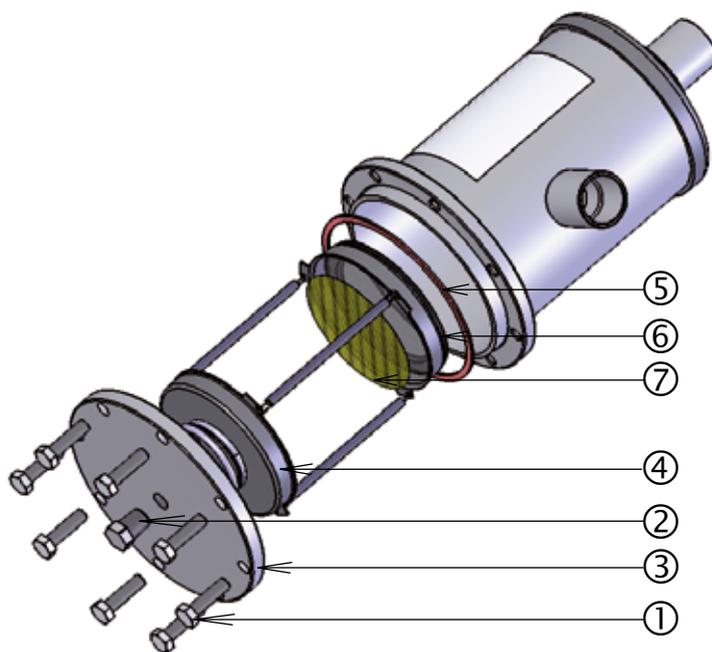


## Replaceable core filter drier shells (liquid line)

### → BCY-HP (46 bar) (corresponding cores: CCY 48 and PLATINIUM 48)

#### ■ Spare parts

| CARLY references | Part N°   | Désignation   | Quantity |
|------------------|-----------|---|----------|
| CY 19900411      | 1         | Set of 8 fastening screws for end plate   | 1        |
| CY 10810010      | 2         | 1/4" NPT phosphate plug for end plate   | 1        |
| CY 33301200      | 2 + 3 + 5 | 1/4" NPT plug + end plate + gasket  | 1        |
| CY 37001030      | 4         | Core holder (2 cores)   | 1        |
| CY 37001076      | 4         | Core holder (1 core)  | 1        |
| CY 37001096      | 4         | Core holder (2 cores)   | 1        |
| CY 15555601      | 5         | End plate gasket (red)  | 1        |
| CY 15555200      | 6         | Adhesive gasket for core holders:: CY 37001030, CY 37001040, CY 37001080, CY 37001076 and CY 37001096                 | 1        |
| CCY A 48         | 7         | Adapter for end core holder   | 1        |
| CY 15555000      |           | Bag of gaskets for shell end plates : CARLY and for most manufacturers (gaskets: 122 x 114 x 1.6 and 114 x 103 x 1.6) | 1        |



#### ■ Weights and packaging

| CARLY references    | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|---------------------|-------------------|----------------------|-------------------------------|
|                     | With<br>packaging | Without<br>packaging |                               |
| BCY-HP 485 S/MMS    | 4,45              | 4,20                 | 1                             |
| BCY-HP 487 S/MMS    | 4,55              | 4,30                 | 1                             |
| BCY-HP 489 S & MMS  | 4,65              | 4,40                 | 1                             |
| BCY-HP 4811 S/MMS   | 4,70              | 4,45                 | 1                             |
| BCY-HP 4813 S & MMS | 4,80              | 4,55                 | 1                             |
| BCY-HP 4817 S/MMS   | 5,05              | 4,80                 | 1                             |

| CARLY references    | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|---------------------|-------------------|----------------------|-------------------------------|
|                     | With<br>packaging | Without<br>packaging |                               |
| BCY-HP 967 S/MMS    | 5,90              | 5,60                 | 1                             |
| BCY-HP 969 S & MMS  | 5,95              | 5,65                 | 1                             |
| BCY-HP 9611 S/MMS   | 6,15              | 5,85                 | 1                             |
| BCY-HP 9613 S & MMS | 6,25              | 5,95                 | 1                             |
| BCY-HP 9617 S/MMS   | 6,40              | 6,10                 | 1                             |





## Replaceable core filter drier shells (liquid line)

### → BCY-P6 / PS 64 bar (928 psig)

#### ■ Applications

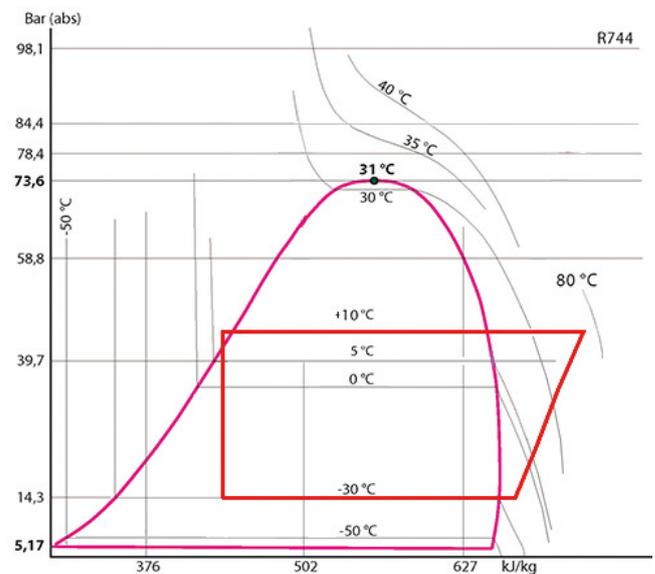
- Refrigerant filtering and drying and acid neutralization for refrigerating and air conditioning installation liquid lines, running in high working pressures.
- Replaceable core filter drier shells allow the replacement of the filter drier's active parts only.

| Shell reference  | Core reference (size) |
|------------------|-----------------------|
| BCY-HP           | CCY 48 / PLATINIUM 48 |
| BCY-P6 / BCY-P14 | PLATINIUM 48 / CCY 48 |



**64 bar**

**CO<sub>2</sub> SUBCRITICAL**



#### ■ Functional features

- Products are compatible with HFC and CO<sub>2</sub>, as well as with their associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU.
- Product classification in CE categories is performed using the PED 2014/68/EU table, corresponding to a volume-based selection.
- Filtering at outlet preventing the propagation within the circuit of particles bigger than 150 microns, with a very low pressure drop.
- 1/4" NPT taper tapping and its plug on end plate, allowing the installation of a pressure tap or a feeding valve.
- End plate perfectly tight thanks to its circular rim and its gasket compatible with all HFC and CO<sub>2</sub>.



#### Possible customization on demand :

- PS 64 bar for BCY-P6 of 3 and 4 cores.

#### ■ CARLY advantages

- Maximum working pressure : up to 64 bar for the BCY-P6 of 1 and 2 cores, with CO<sub>2</sub> in subcritical compression systems.
- Individual core holders treated against corrosion by zinc coating, with a reduced course for easy core replacement; therefore, replacement time is extremely reduced, limiting the time the drying cores and the inner part of the circuit are exposed to the atmosphere.
- Hermetically sealed external body made of steel to which an impregnation varnish and paint are applied to ensure a high resistance to corrosion ; this varnish ensures the internal anti-corrosion protection of the shell when it is opened for the initial set-up or during the replacement of the drying cores.
- Core holder design ensures automatic and immediate centring of the filter drier shells.
- No flow area restriction outside the filter drier shells thanks to an appropriate filtering system.

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# Replaceable core filter drier shells (liquid line)

## → BCY-P6 / PS 64 bar (928 psig)

### ■ Warning

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

### ■ General assembly precautions

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

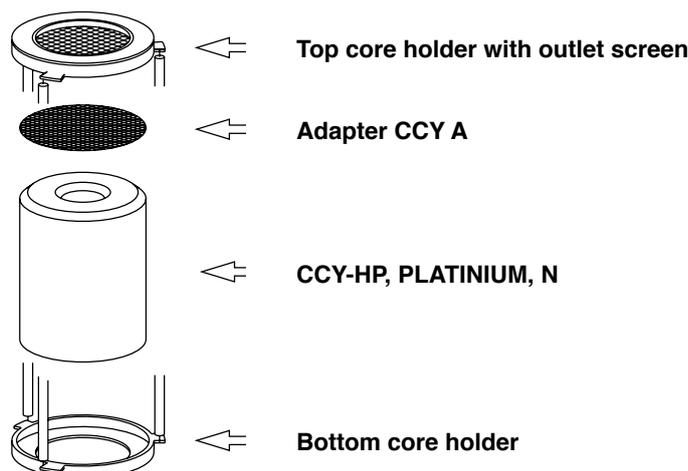
- Some are specific to each component,
- Other are general to all CARLY components,

and in this case, they are specified in the **RECOMMENDATIONS SPECIFIC** part defined hereafter ;

they are presented in the chapter 115 – **GENERAL ASSEMBLY PRECAUTIONS**.

### ■ Specific recommendations to replaceable core filter drier shells BCY-P6

- Filter drier shells are to be mounted on the liquid line between the receiver and the expansion element.
- The refrigerant flow direction, indicated by an arrow on the filter drier shells' tags, should be complied with.
- Assembly can be performed in any position, but not vertically with the outlet connection oriented downwards.
- During filter drier shells assembly, provide for sufficient course to allow core replacement (refer to sizes L2 in the technical features table).
- The connection to the installation, by soldering or welding, of the filter shell, must be done only after removing the closing flange, its gasket and the internal core holders.
- The blue gasket of the closing flange must be lubricated before its installation, with refrigerating oil compatible with the oil of the installation.
- We recommend to clean and to protect the connections of the filter drier shell with appropriate products in order to ensure a good resistance to corrosion of the affected areas.
- Be careful to properly select the solenoid valves located downstream of the filter drier shells; their oversizing could cause liquid hammer phenomena hindering the filter drier shells' proper mechanical behaviour; protection of the regulation elements upstream of the evaporator should be performed with FILTRY dirt filters (refer to chapter 11 of CARLY technical catalogue); these liquid hammer phenomena can originate from other sources, in long-piping installations.
- Never install filter drier shells in an area of the circuit that can be isolated.
- Never trap refrigerant in its liquid state (between a check valve and a solenoid valve, for instance).
- The filter drier shells' efficiency and the refrigerant's moisture content should be checked using liquid sight glasses.
- Make sure that the piping can support without deformation the weight of the filter drier shell ; otherwise, provide for a clamp of the filter drier shell with a clamp on a stable part of the installation.
- In case of replacement of removable elements of filter drier shells BCY-P6 (flange, screw, gasket), it is mandatory to use only identical components, suggested by CARLY in the list of spare parts at the end of this chapter.





# Replaceable core filter drier shells (liquid line)

## → BCY-P6 / PS 64 bar (928 psig)

### ■ Special precautions for components used with CO<sub>2</sub> in subcritical 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<sub>2</sub> for low temperatures applications, generates also high pressures (to take in consideration)
- The implementation on the liquid line of a filter drier shell **BCY-P6** 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<sub>2</sub> at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO<sub>2</sub> 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<sub>2</sub> and polymers. For example, swelling phenomena and internal explosion of the seal are possible. Carly filter drier shells BCY-P6 do not have polymer gaskets directly in contact with CO<sub>2</sub>.

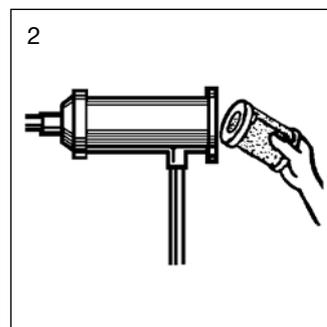
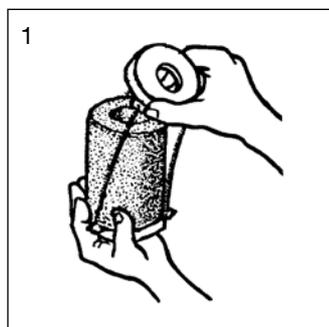


# Replaceable core filter drier shells (liquid line)

## → BCY-P6 / PS 64 bar (928 psig)

### ■ Core replacement procedure (CCY 48, PLATINIUM 48)

- 1 • Isolate the **BCY-P6** filter drier shell.
- 2 • Purge the installation up to atmospheric pressure (shell should be empty of refrigerants)
- 3 • Remove the end plate.
- 4 • Remove the core holders one after the other.
- 5 • Remove the used cores.
- 6 • Clean very carefully the core holders, the adapter (**CCY A 48**) and the inner part of the shell case.
- 7 • Replace systematically the blue gasket on the end plate, and lubricate it before its installation with refrigerating oil compatible with the oil of the installation. **Attention** : this gasket is specific for this type of shell and it is not included with CCY 48 HP and PLATINIUM 48 cores; it will have to be supplied separately, its reference is indicated in the spare parts list, in the end of this chapter; check the core holder and core end gaskets.
- 8 • Remove the core from its can and put it on the core holder, separating by traction the two flanges that hold the core holder (sketch 1)
- 9 • Repeat the operation for each core holder.
- 10 • Quickly install the core holders with their core in the shell, complying with their mounting order: the first one holds the filter elements and the last one is the one equipped with the compression spring (sketch 2)
- 11 • Reinstall the closing flange making sure that the compression spring is correctly positioned and gradually and uniformly tighten the closing screws (refer to chapter 115 of CARLY technical catalogue – **GENERAL MOUNTING PRECAUTIONS** – Criss-cross tightening). Maximum bolt tightening torque: 30 N.m.
- 12 • Make sure that the end plate's 1/4" NPT taper tapping has been properly plugged in and sealed
- 13 • Make vacuum in the installation and check air-tightness of the whole set before putting back under pressure.



**⚠** The standard gasket of the CCY (neoprene) is not compatible with CO<sub>2</sub>. Use the reference CY 15555200.



# Replaceable core filter drier shells (liquid line)

## → BCY-P6 / PS 64 bar (928 psig)

### ■ Selection table

| CARLY references  | Connections   | CARLY references  | Connections   | Refrigerating capacity |  | Number of cores |
|-------------------|---------------|-------------------|---------------|------------------------|--|-----------------|
|                   | To solder ODF |                   | To solder ODF | kW <sup>(1)</sup>      |  |                 |
|                   | inch          |                   | mm            | R744 <sup>(2)</sup>    |  |                 |
| BCY-P6 485 S/MMS  | 5/8           | BCY-P6 485 S/MMS  | 16            | 106,0                  |  | 1               |
| BCY-P6 487 S/MMS  | 7/8           | BCY-P6 487 S/MMS  | 22            | 171,0                  |  | 1               |
| BCY-P6 489 S/MMS  | 1 1/8         | BCY-P6 489 S/MMS  | 28            | 232,0                  |  | 1               |
| BCY-P6 4811 S/MMS | 1 3/8         | BCY-P6 4811 S/MMS | 35            | 277,0                  |  | 1               |
| BCY-P6 4813 S     | 1 5/8         | BCY-P6 4813 MMS   | 42            | 336,0                  |  | 1               |
| BCY-P6 4817 S/MMS | 2 1/8         | BCY-P6 4817 S/MMS | 54            | 392,0                  |  | 1               |
| BCY-P6 967 S/MMS  | 7/8           | BCY-P6 967 S/MMS  | 22            | 176,0                  |  | 2               |
| BCY-P6 969 S/MMS  | 1 1/8         | BCY-P6 969 S/MMS  | 28            | 264,0                  |  | 2               |
| BCY-P6 9611 S/MMS | 1 3/8         | BCY-P6 9611 S/MMS | 35            | 375,0                  |  | 2               |
| BCY-P6 9613 S     | 1 5/8         | BCY-P6 9613 MMS   | 42            | 460,0                  |  | 2               |
| BCY-P6 9617 S/MMS | 2 1/8         | BCY-P6 9617 S/MMS | 54            | 464,0                  |  | 2               |

<sup>(1)</sup> Refrigerating capacities according to Standard ARI 710-86 for  $T_o = -15\text{ °C}$ ,  $T_k = 30\text{ °C}$  and  $\Delta p = 0.07\text{ bar}$ .  
If different conditions, refer to correction factors in chapter 112 of CARLY technical catalogue.

<sup>(2)</sup> Refrigerating capacities  $Q_n$  for  $T_k = -10\text{ °C}$  and  $T_o = -40\text{ °C}$   
If different conditions, refer to correction factors in chapter 112 of CARLY technical catalogue.

Nota: the diameter of connections must not be inferior to the diameter of the main pipe.

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# Replaceable core filter drier shells (liquid line)

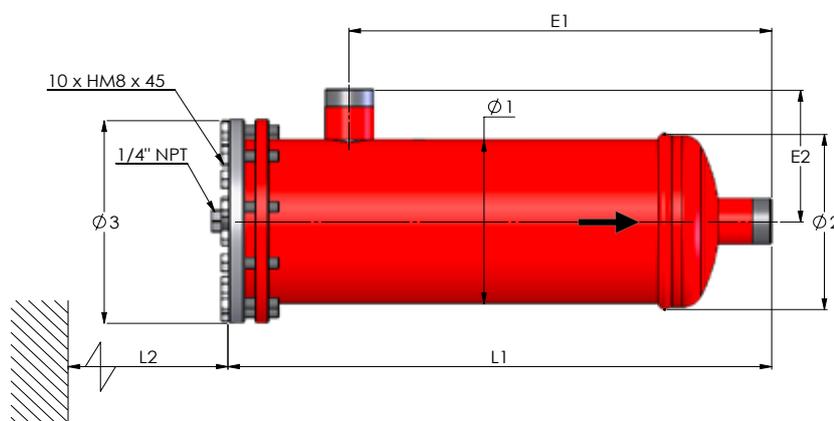
## → BCY-P6 / PS 64 bar (928 psig)

### ■ Technical features

| CARLY references                 | Connection types <sup>(1)</sup> | Filtering surface<br>cm <sup>2</sup> | Dimensions<br>mm |                   |     |     |     |       |       | Weight<br>kg |
|----------------------------------|---------------------------------|--------------------------------------|------------------|-------------------|-----|-----|-----|-------|-------|--------------|
|                                  |                                 |                                      | Ø1               | Ø2 <sup>(2)</sup> | Ø3  | L1  | L2  | E1    | E2    |              |
| BCY-P6 485 S/MMS                 | 1                               | 420                                  | 121              | 128               | 150 | 230 | 210 | 141,5 | 82,5  | 5,0          |
| BCY-P6 487 S/MMS                 | 1                               | 420                                  | 121              | 128               | 150 | 240 | 210 | 151,0 | 92,5  | 5,1          |
| BCY-P6 489 S/MMS                 | 1                               | 420                                  | 121              | 128               | 150 | 245 | 210 | 156,0 | 97,5  | 5,2          |
| BCY-P6 4811 S/MMS                | 1                               | 420                                  | 121              | 128               | 150 | 254 | 210 | 151,5 | 108,0 | 5,3          |
| BCY-P6 4813 S    BCY-P6 4813 MMS | 1                               | 420                                  | 121              | 128               | 150 | 254 | 210 | 151,0 | 107,0 | 5,4          |
| BCY-P6 4817 S/MMS                | 1                               | 420                                  | 121              | 128               | 150 | 267 | 210 | 164,5 | 124,0 | 5,6          |
| BCY-P6 967 S/MMS                 | 1                               | 840                                  | 121              | 128               | 150 | 380 | 210 | 291,0 | 92,5  | 6,4          |
| BCY-P6 969 S/MMS                 | 1                               | 840                                  | 121              | 128               | 150 | 385 | 210 | 296,0 | 97,5  | 6,5          |
| BCY-P6 9611 S/MMS                | 1                               | 840                                  | 121              | 128               | 150 | 394 | 210 | 292,0 | 108,0 | 6,7          |
| BCY-P6 9613 S    BCY-P6 9613 MMS | 1                               | 840                                  | 121              | 128               | 150 | 394 | 210 | 291,0 | 107,0 | 6,8          |
| BCY-P6 9617 S/MMS                | 1                               | 420                                  | 121              | 128               | 150 | 407 | 210 | 304,5 | 124,0 | 6,9          |

<sup>(1)</sup> Chapter «Connection features and drawings» (refer to chapter 114 of CARLY technical catalogue).

<sup>(2)</sup> Including weld.



| CARLY references                 | Volume<br>V<br>L | Maximal working pressure<br>PS<br>bar | Working pressure <sup>(1)</sup><br>PS BT<br>bar | Maximal working temperature<br>TS maxi<br>°C | Minimal working temperature<br>TS mini<br>°C | Working temperature <sup>(1)</sup><br>TS BT<br>°C | CE Category <sup>(2)</sup> |
|----------------------------------|------------------|---------------------------------------|---|--|--|---|----------------------------|
|                                  |                  |                                       |   |  |  |   |                            |
| BCY-P6 487 S/MMS                 | 1,90             | 64                                    | 15  | 120  | -40  | -30   | I                          |
| BCY-P6 489 S/MMS                 | 1,90             | 64                                    | 15  | 120  | -40  | -30   | I                          |
| BCY-P6 4811 S/MMS                | 1,90             | 64                                    | 15  | 120  | -40  | -30   | I                          |
| BCY-P6 4813 S    BCY-P6 4813 MMS | 1,90             | 64                                    | 15  | 120  | -40  | -30   | I                          |
| BCY-P6 4817 S/MMS                | 2,00             | 64                                    | 15  | 120  | -40  | -30   | I                          |
| BCY-P6 967 S/MMS                 | 3,30             | 64                                    | 15  | 120  | -40  | -30   | II                         |
| BCY-P6 969 S/MMS                 | 3,30             | 64                                    | 15  | 120  | -40  | -30   | II                         |
| BCY-P6 9611 S/MMS                | 3,30             | 64                                    | 15  | 120  | -40  | -30   | II                         |
| BCY-P6 9613 S    BCY-P6 9613 MMS | 3,30             | 64                                    | 15  | 120  | -40  | -30   | II                         |
| BCY-P6 9617 S/MMS                | 3,40             | 64                                    | 15  | 120  | -40  | -30   | II                         |

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

<sup>(2)</sup> Classification by volume, according to PED 97/23/EC (refer to chapter 0 of CARLY technical catalogue).



# Replaceable core filter drier shells (liquid line)

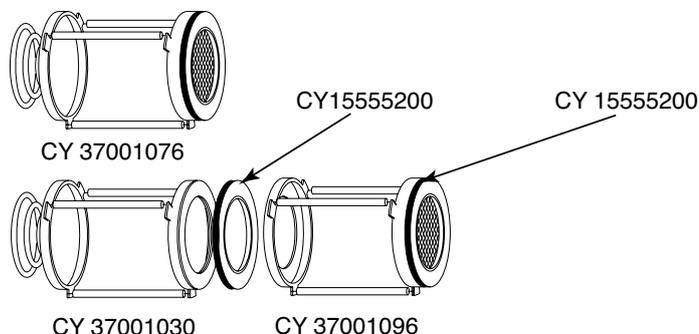
## → BCY-P6 / PS 64 bar (928 psig)

### ■ Spare parts

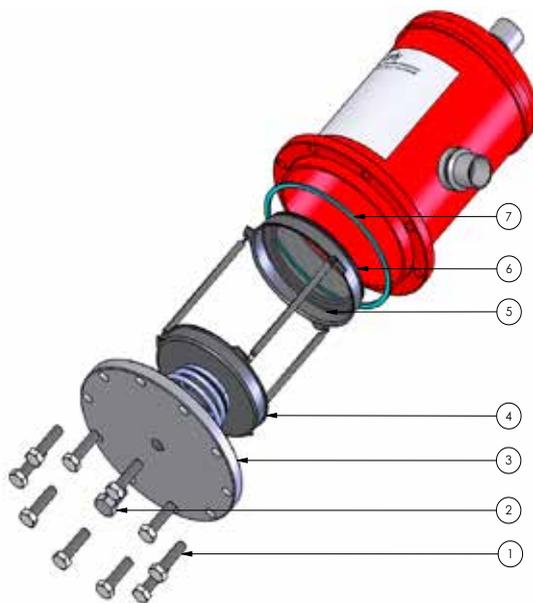
| Shells         | CARLY References for core holders | Quantity and type of gaskets for use |                                 |
|----------------|-----------------------------------|--------------------------------------|---------------------------------|
|                |                                   | Core holders gasket <sup>(1)</sup>   | End plate gasket <sup>(2)</sup> |
| BCY-P6 1 core  | CY 37001076                       | 1 gasket CY 1555200                  | 1 gasket CY 1555303             |
| BCY-P6 2 cores | CY 37001030 + CY 37001096         | 2 gaskets CY 1555200                 |                                 |

<sup>(1)</sup> Gasket delivered with core holders

<sup>(2)</sup> Gasket not delivered with cores CCY 48 N, CCY 48 HP and PLATINIUM 48



| CARLY references | Part N°   | Désignation   | Quantity |
|------------------|-----------|---|----------|
| CY 19900440      | 1         | Set of 10 fastening screws for end plate  | 1        |
| CY 10810010      | 2         | 1/4" NPT phosphate plug for end plate   | 1        |
| CY 33301203      | 2 + 3 + 7 | 1/4" NPT plug + end plate + gasket  | 1        |
| CY 37001030      | 4         | Core holder ( 2 cores )   | 1        |
| CY 37001076      | 4         | Core holder ( 1 core )  | 1        |
| CY 37001096      | 4         | Core holder ( 2 cores )   | 1        |
| CCY A 48         | 5         | Adapter for end core holder   | 1        |
| CY 1555200       | 6         | Adhesive gasket for core holders : CY 37001030, CY 37001040, CY 37001080, CY 37001076 and CY 37001096 | 1        |
| CY 1555303       | 7         | End plate gasket (blue)   | 1        |





# Replaceable core filter drier shells (liquid line)

## → BCY-P6 / PS 64 bar (928 psig)

### ■ Weights and packaging

| CARLY references    | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|---------------------|-------------------|----------------------|-------------------------------|
|                     | With<br>packaging | Without<br>packaging |                               |
| BCY-P6 485 S/MMS    | 5,22              | 4,97                 | 1                             |
| BCY-P6 487 S/MMS    | 5,32              | 5,07                 | 1                             |
| BCY-P6 489 S/MMS    | 5,42              | 5,17                 | 1                             |
| BCY-P6 4811 S/MMS   | 5,47              | 5,22                 | 1                             |
| BCY-P6 4813 S & MMS | 5,57              | 5,32                 | 1                             |
| BCY-P6 4817 S/MMS   | 5,82              | 5,57                 | 1                             |

| CARLY references    | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|---------------------|-------------------|----------------------|-------------------------------|
|                     | With<br>packaging | Without<br>packaging |                               |
| BCY-P6 967 S/MMS    | 6,67              | 6,37                 | 1                             |
| BCY-P6 969 S/MMS    | 6,72              | 6,42                 | 1                             |
| BCY-P6 9611 S/MMS   | 6,92              | 6,62                 | 1                             |
| BCY-P6 9613 S & MMS | 7,02              | 6,72                 | 1                             |
| BCY-P6 9617 S/MMS   | 7,17              | 6,87                 | 1                             |



## Replaceable core filter drier shells (liquid line)

### → BCY-P14 / PS 140 bar (2030 psig)

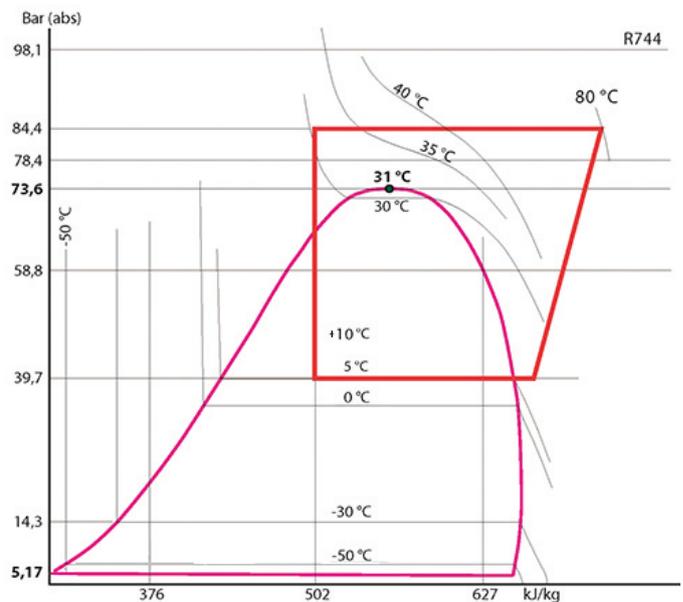
#### ■ Applications

- Refrigerant filtering and drying and acid neutralization for refrigerating and air conditioning installation liquid lines, running in high working pressures with CO<sub>2</sub> in transcritical compression systems.
- Replaceable core filter drier shells allow the replacement of the filter drier's active parts only.

**140 bar**

**CO<sub>2</sub> TRANSCRITICAL**

| Shell reference  | Core reference (size) |
|------------------|-----------------------|
| BCY-HP           | CCY 48 / PLATINIUM 48 |
| BCY-P6 / BCY-P14 | PLATINIUM 48 / CCY 48 |



#### ■ Functional features

- Products are compatible with CO<sub>2</sub>, as well as with their associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU.
- Product classification in CE categories is performed using the PED 2014/68/EU table, corresponding to a volume-based selection.
- Filtering at outlet preventing the propagation within the circuit of particles bigger than 150 microns, with a very low pressure drop.
- 1/4" NPT taper tapping and its plug on end plate, allowing the installation of a pressure tap or a feeding valve.
- End plate perfectly tight thanks to its circular rim and its O-ring gasket perfectly adapted to CO<sub>2</sub> and to the phenomenon of explosive decompression that is possible with this refrigerant.



#### Possible customization on demand :

- Stainless steel casings and connections (corrosion resistance and for use at very low temperatures).
- PS 140 bar for BCY-P14 of 3 and 4 cores.

#### ■ CARLY advantages

- Maximum working pressure : up to 140 bar for the BCY-P14 of 1 and 2 cores, with CO<sub>2</sub> in transcritical compression systems.
- Individual core holders treated against corrosion by zinc coating, with a reduced course for easy core replacement; therefore, replacement time is extremely reduced, limiting the time the drying cores and the inner part of the circuit are exposed to the atmosphere.
- Hermetically sealed external body made of steel to which an impregnation varnish and paint are applied to ensure a high resistance to corrosion ; this varnish ensures the internal anti-corrosion protection of the shell when it is opened for the initial set-up or during the replacement of the drying cores.
- Core holder design ensures automatic and immediate centring of the filter drier shells.
- No flow area restriction outside the filter drier shells thanks to an appropriate filtering system.
- Shell body of large dimensions in order to ensure a good spread of the refrigerant.

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# Replaceable core filter drier shells (liquid line)

## → BCY-P14 / PS 140 bar (2030 psig)

### ■ Warning

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

### ■ General assembly precautions

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

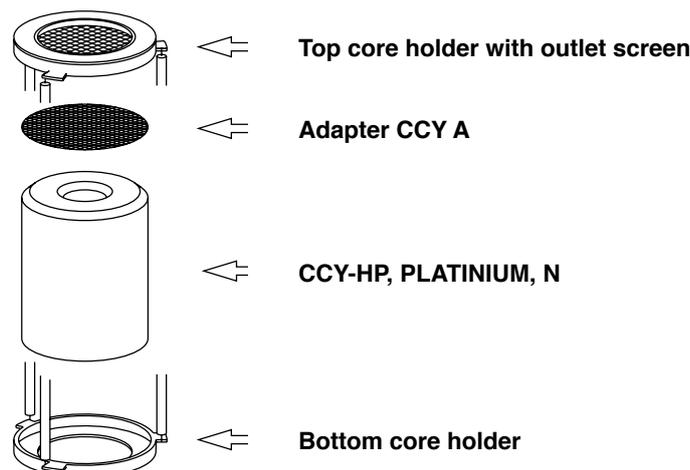
- Some are specific to each component,
- Other are general to all CARLY components,

and in this case, they are specified in the **RECOMMENDATIONS SPECIFIC** part defined hereafter ;

they are presented in the chapter 115 of CARLY technical catalogue – **GENERAL ASSEMBLY PRECAUTIONS**.

### ■ Specific recommendations to replaceable core filter drier shells BCY-P14

- Filter drier shells are to be mounted on the liquid line between the receiver and the expansion element.
- The refrigerant flow direction, indicated by an arrow on the filter drier shells' tags, should be complied with.
- Assembly can be performed in any position, but not vertically with the outlet connection oriented downwards.
- During filter drier shells assembly, provide for sufficient course to allow core replacement (refer to sizes L2 in the technical features table).
- The connection to the installation, by soldering or welding, of the filter shell, must be done only after removing the closing flange, its gasket and the internal core holders.
- The O-ring gasket of the closing flange must be lubricated before its installation, with refrigerating oil compatible with the oil of the installation.
- We recommend to clean and to protect the connections of the filter drier shell with appropriate products in order to ensure a good resistance to corrosion of the affected areas.
- Be careful to properly select the solenoid valves located downstream of the filter drier shells; their oversizing could cause liquid hammer phenomena hindering the filter drier shells' proper mechanical behaviour; these liquid hammer phenomena can originate from other sources, in long-piping installations.
- Never install filter drier shells in an area of the circuit that can be isolated.
- Never trap refrigerant in its liquid state (between a check valve and a solenoid valve, for instance).
- The filter drier shells' efficiency and the refrigerant's moisture content should be checked using liquid sight glasses.
- Make sure that the piping can support without deformation the weight of the filter drier shell ; otherwise, provide for a clamp of the filter drier shell with a clamp on a stable part of the installation.
- In case of replacement of removable elements of filter drier shells BCY-P14 (flange, screw, gasket), it is mandatory to use only identical components, suggested by CARLY in the list of spare parts at the end of this chapter.
- In order to avoid risk of frost and condensation on the suction filter shells mounted on a cold pipe, it is recommended to insulate them thermally.





# Replaceable core filter drier shells (liquid line)

## → BCY-P14 / PS 140 bar (2030 psig)

### ■ Special precautions for components used with CO<sub>2</sub> in subcritical 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 implementation on the liquid line of 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<sub>2</sub> at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO<sub>2</sub> 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<sub>2</sub> and polymers. For example, swelling phenomena and internal explosion of the seal are possible. Carly filter drier shells BCY-P14 do not have polymer gaskets directly in contact with CO<sub>2</sub>.



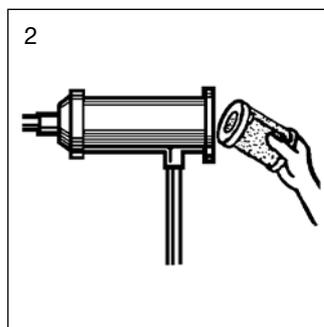
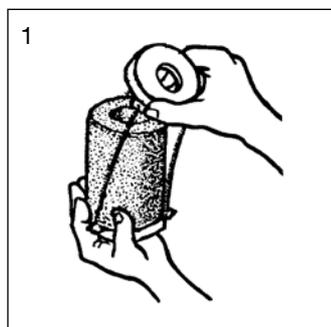
# Replaceable core filter drier shells (liquid line)

## → BCY-P14 / PS 140 bar (2030 psig)

### ■ Core replacement procedure

- 1 • Isolate the **BCY-P14** filter drier shell.
- 2 • Purge the installation up to atmospheric pressure (shell should be empty of refrigerants)
- 3 • Remove the end plate.
- 4 • Remove the core holders one after the other.
- 5 • Remove the used cores.
- 6 • Clean very carefully the core holders, the adapter (**CCY A 48**) and the inner part of the shell case.
- 7 • Replace systematically the O-ring gasket on the end plate, and lubricate it before its installation with refrigerating oil compatible with the oil of the installation.
 

**⚠ Warning: this gasket is specific for this type of shell and it is not included with CCY 48 HP N, F or I and PLATINIUM 48 cores; it will have to be supplied separately, its reference is indicated in the spare parts list, in the end of this chapter; check the core holder and core end gaskets.**
- 8 • Remove the core from its can and put it on the core holder, separating by traction the two flanges that hold the core holder (sketch 1)
- 9 • Repeat the operation for each core holder.
- 10 • Quickly install the core holders with their core in the shell, complying with their mounting order: the first one holds the filter elements and the last one is the one equipped with the compression spring (sketch 2)
- 11 • Reinstall the closing flange making sure that the compression spring is correctly positioned and gradually and uniformly tighten the closing screws (refer to chapter 115 of CARLY technical catalogue – **GENERAL MOUNTING PRECAUTIONS** – Criss-cross tightening). Maximum bolt tightening torque: 100 N.m.
- 12 • Make sure that the end plate's 1/4" NPT taper tapping present on the clamp of the filter shell has been properly plugged in and sealed.
- 13 • Make vacuum in the installation and check air-tightness of the whole set before putting back under pressure.



**⚠** The standard gasket of the CCY (neoprene) is not compatible with CO<sub>2</sub>. Use the reference CY 1555200.



# Replaceable core filter drier shells (liquid line)

## → BCY-P14 / PS 140 bar (2030 psig)

### ■ Selection table

| CARLY references          | Connections   | CARLY references        | Connections   | Dehydratable refrigerant capacity | Number of cores |
|---------------------------|---------------|-------------------------|---------------|-----------------------------------|-----------------|
|                           | To solder ODF |                         | To solder ODF | kg of refrigerant                 |                 |
|                           | inch          |                         | mm            | R744 CO <sub>2</sub>              |                 |
|                           |               |                         |               | 24 °C                             |                 |
| <b>BCY-P14 485 S/MMS</b>  | 5/8           |                         | 16            | 34                                | 1               |
| <b>BCY-P14 487 S/MMS</b>  | 7/8           |                         | 22            | 34                                | 1               |
| <b>BCY-P14 489 S</b>      | 1 1/8         | <b>BCY-P14 489 MMS</b>  | 28            | 34                                | 1               |
| <b>BCY-P14 4811 S/MMS</b> | 1 3/8         |                         | 35            | 34                                | 1               |
| <b>BCY-P14 4813 S</b>     | 1 5/8         | <b>BCY-P14 4813 MMS</b> | 42            | 34                                | 1               |
| <b>BCY-P14 967 S/MMS</b>  | 7/8           |                         | 22            | 68                                | 2               |
| <b>BCY-P14 969 S</b>      | 1 1/8         | <b>BCY-P14 969 MMS</b>  | 28            | 68                                | 2               |
| <b>BCY-P14 9611 S/MMS</b> | 1 3/8         |                         | 35            | 68                                | 2               |
| <b>BCY-P14 9613 S</b>     | 1 5/8         | <b>BCY-P14 9613 MMS</b> | 42            | 68                                | 2               |
| <b>BCY-P14 9617 S/MMS</b> | 2 1/8         |                         | 54            | 68                                | 2               |

*Nota: the diameter of connections must not be inferior to the diameter of the main pipe.*

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# Replaceable core filter drier shells (liquid line)

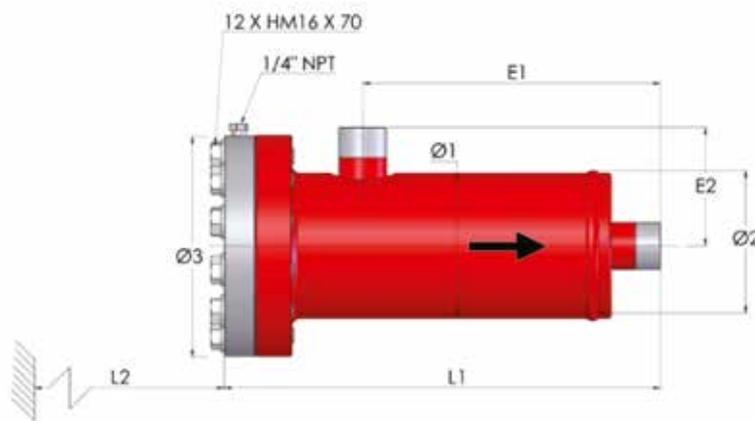
## → BCY-P14 / PS 140 bar (2030 psig)

### ■ Technical features

| CARLY references   | Connection types <sup>(1)</sup> | Filtering surface<br>cm <sup>2</sup> | Dimensions<br>mm |                   |     |     |     |     |     |     |
|--------------------|---------------------------------|--------------------------------------|------------------|-------------------|-----|-----|-----|-----|-----|-----|
|                    |                                 |                                      | Ø1               | Ø2 <sup>(2)</sup> | Ø3  | L1  | L2  | E1  | E2  |     |
| BCY-P14 485 S/MMS  | 5                               | 420                                  | 141              | 146               | 215 | 263 | 210 | 129 | 98  |     |
| BCY-P14 487 S/MMS  | 5                               | 420                                  | 141              | 146               | 215 | 277 | 210 | 143 | 115 |     |
| BCY-P14 489 S      | BCY-P14 489 MMS                 | 6                                    | 420              | 141               | 146 | 215 | 286 | 210 | 153 | 131 |
| BCY-P14 4811 S/MMS |                                 | 5                                    | 420              | 141               | 146 | 215 | 288 | 210 | 155 | 128 |
| BCY-P14 4813 S     | BCY-P14 4813 MMS                | 6                                    | 420              | 141               | 146 | 215 | 304 | 210 | 171 | 144 |
| BCY-P14 967 S/MMS  |                                 | 5                                    | 840              | 141               | 146 | 215 | 417 | 210 | 283 | 115 |
| BCY-P14 969 S      | BCY-P14 969 MMS                 | 6                                    | 840              | 141               | 146 | 215 | 426 | 210 | 292 | 131 |
| BCY-P14 9611 S/MMS |                                 | 5                                    | 840              | 141               | 146 | 215 | 428 | 210 | 295 | 128 |
| BCY-P14 9613 S     | BCY-P14 9613 MMS                | 6                                    | 840              | 141               | 146 | 215 | 444 | 210 | 311 | 144 |
| BCY-P14 9617 S/MMS |                                 | 6                                    | 840              | 141               | 146 | 215 | 444 | 210 | 285 | 155 |

<sup>(1)</sup> Chapter «Connection features and drawings» (refer to chapter 114 to CARLY technical catalogue).

<sup>(2)</sup> Including weld.



| CARLY references   | Volume<br>V<br>L | Maximal working pressure<br>PS<br>bar | Working pressure <sup>(1)</sup><br>PS BT<br>bar | Maximal working temperature<br>TS maxi<br>°C | Minimal working temperature<br>TS mini<br>°C | Working temperature <sup>(1)</sup><br>TS BT<br>°C | CE Category <sup>(2)</sup> |    |
|--------------------|------------------|---------------------------------------|---|--|--|---|----------------------------|----|
|                    |                  |                                       |   |  |  |   |                            |    |
| BCY-P14 485 S/MMS  | 2,20             | 140                                   | 15 *  | 100  | -40  | -30 *   | II                         |    |
| BCY-P14 487 S/MMS  | 2,20             | 140                                   | 15 *  | 100  | -40  | -30 *   | II                         |    |
| BCY-P14 489 S      | BCY-P14 489 MMS  | 2,20                                  | 140   | 15 *   | 100  | -40   | -30 *                      | II |
| BCY-P14 4811 S/MMS |                  | 2,20                                  | 140   | 15 *   | 100  | -40   | -30 *                      | II |
| BCY-P14 4813 S     | BCY-P14 4813 MMS | 2,20                                  | 140   | 15 *   | 100  | -40   | -30 *                      | II |
| BCY-P14 967 S/MMS  |                  | 3,80                                  | 140   | 15 *   | 100  | -40   | -30 *                      | II |
| BCY-P14 969 S      | BCY-P14 969 MMS  | 3,80                                  | 140   | 15 *   | 100  | -40   | -30 *                      | II |
| BCY-P14 9611 S/MMS |                  | 3,80                                  | 140   | 15 *   | 100  | -40   | -30 *                      | II |
| BCY-P14 9613 S     | BCY-P14 9613 MMS | 3,80                                  | 140   | 15 *   | 100  | -40   | -30 *                      | II |
| BCY-P14 9617 S/MMS |                  | 3,80                                  | 140   | 15 *   | 100  | -40   | -30 *                      | II |

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

<sup>(2)</sup> Classification by volume, according to PED 2014/68/EU (refer to chapter 0 to CARLY technical catalogue).

\* In option, possibility of maximum pressure on the full range of temperatures.



# Replaceable core filter drier shells (liquid line)

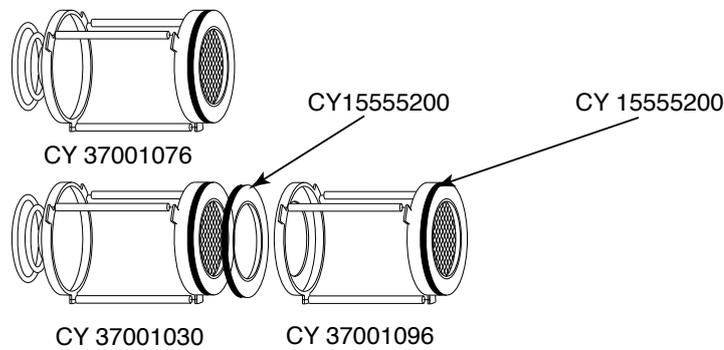
## → BCY-P14 / PS 140 bar (2030 psig)

### ■ Spare parts

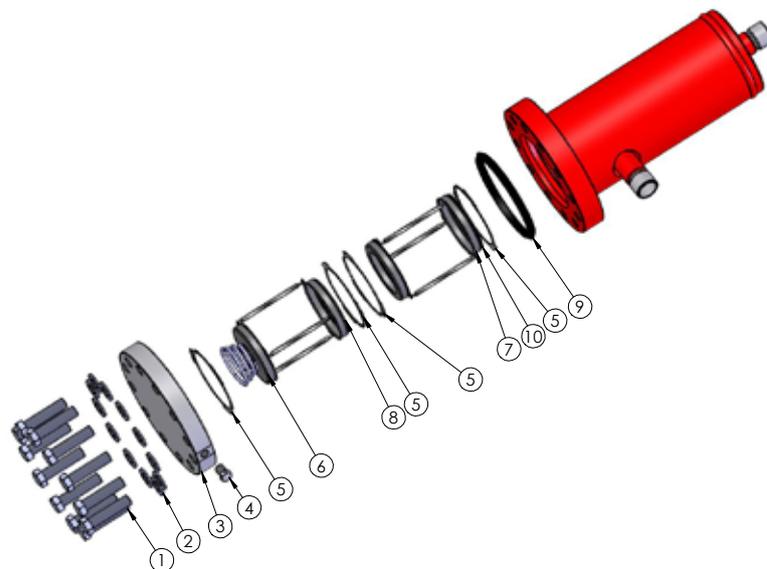
| Shells          | CARLY References for core holders | Quantity and type of gaskets for use |                                 |
|-----------------|-----------------------------------|--------------------------------------|---------------------------------|
|                 |                                   | Core holders gasket <sup>(1)</sup>   | End toric gasket <sup>(2)</sup> |
| BCY-P14 1 core  | CY 37001076                       | 1 gasket CY 1555200                  | 1 gasket CY 15552360            |
| BCY-P14 2 cores | CY 37001030 + CY 37001096         | 2 gaskets CY 1555200                 |                                 |

<sup>(1)</sup> Gasket delivered with core holders

<sup>(2)</sup> Gasket not delivered with cores CCY 48 N, CCY 48 HP, PLATINIUM 48, CCY 48 F, CCY 48 I.



| CARLY references | Part N° | Designation                                  | Quantity |
|------------------|---------|--|----------|
| CY 19900700      | 1+2     | Set of 12 fastening screws for end plate     | 1        |
| CY 33301204      | 3+4+9   | End plate + gasket + 1/4" NPT phosphate plug | 1        |
| CY 37001076      | 6       | Core holder (1 core)                         | 1        |
| CY 37001030      | 6       | Core holder (2 cores) Inlet                  | 1        |
| CY 37001096      | 6       | Core holder (2 cores) Outlet                 | 1        |
| CY 11010900      | 5       | Adapter for core holder                      | 1        |
| CCY A 48         | 7       | Adapter for end core holder                  | 1        |
| CY 1555200       | 8-10    | Adhesive gasket for core holders             | 1        |
| CY 15552360      | 9       | End torique gasket                           | 1        |
| CY 10810010      | 4       | 1/4" NPT phosphate plug                      | 1        |





## Replaceable core filter drier shells (liquid line)

### → BCY-P14 / PS 140 bar (2030 psig)

#### ■ Weights and packaging

| CARLY<br>references  | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|----------------------|-------------------|----------------------|-------------------------------|
|                      | With<br>packaging | Without<br>packaging |                               |
| BCY-P14 485 S/MMS    | 23,70             | 22,50                | 1                             |
| BCY-P14 487 S/MMS    | 23,70             | 22,50                | 1                             |
| BCY-P14 489 S & MMS  | 23,70             | 22,50                | 1                             |
| BCY-P14 4811 S/MMS   | 23,70             | 22,50                | 1                             |
| BCY-P14 4813 S & MMS | 23,70             | 22,50                | 1                             |
| BCY-P14 967 S/MMS    | 27,90             | 26,50                | 1                             |
| BCY-P14 969 S & MMS  | 27,90             | 26,50                | 1                             |
| BCY-P14 9611 S/MMS   | 27,90             | 26,50                | 1                             |
| BCY-P14 9613 S & MMS | 27,90             | 26,50                | 1                             |
| BCY-P14 9617 S/MMS   | 27,90             | 26,50                | 1                             |



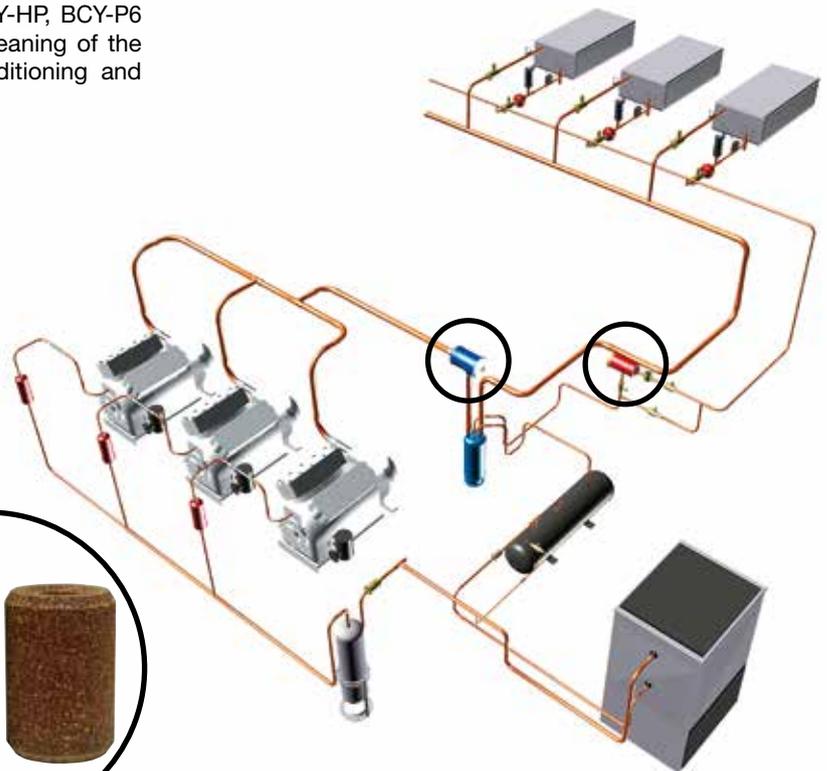
## Drying, filtering and cleaning cores

### → CCY / PLATINIUM

#### ■ Applications

- Interchangeable elements for the filter shells (BCY-HP, BCY-P6 and BCY-P14) ensuring the filtration, drying, or cleaning of the refrigerants and refrigerating oils of the air conditioning and refrigeration installations.

| Shell reference  | Core reference (size) |
|------------------|-----------------------|
| BCY-HP           | CCY 48 / PLATINIUM 48 |
| BCY-P6 / BCY-P14 | PLATINIUM 48 / CCY 48 |



#### ■ Functional features

- Products are compatible with CFCs, HCFCs, HFCs, CO<sub>2</sub>, as well as with their associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU. To use CARLY components with fluids of the hydrocarbon group 1 – Propane R290, Butane R600, Isobutane R600a, Propylene R1270 – with HFOs and transcritical CO<sub>2</sub> and for a RANKINE organic cycle application, contact CARLY technical department.
- The cartridges CCY HP, N, PLATINIUM:
  - can be used with all the filter shells that can be found on the market.
  - are supplied with a complete set of flange gaskets corresponding to most of the filter shells that can be found on the market. Important : This gaskets set do not contain the one for BCY-P14 flanges which is specific.
  - are designed and manufactured to trap with a low pressure drop the humidity and impurities conveyed by the refrigerant and resist against vibrations and the circuit's pressure cyclings.
- The cleaning and drying cores CCY HP and N have a high acid adsorption power.
- The filtering cartridge CCY 48 HU can be used for all types of refrigerating oils with or without additives.

#### ■ CARLY advantages

- The cores CCY HP, N, PLATINIUM are oven-dried in order to be perfectly dehydrated before being packed in an easy-to-open sealed box. These cores have high humidity adsorption capacities at high and low condensation temperatures.
- The CCY I and F cores are efficient whichever the refrigerant flow direction.
- Efficient solutions for refrigerating circuit decontamination thanks to a complete range of cores.
- Presence of a date sticker to be filled in after the maintenance operations (core change).



# Drying, filtering and cleaning cores

## → CCY / PLATINIUM

### ■ 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 – **GENERAL ASSEMBLY PRECAUTIONS**.

- The recommendations relating to the CARLY components for the subcritical CO<sub>2</sub> applications are also developed in chapter 115 – **GENERAL ASSEMBLY PRECAUTIONS**.

### ■ Specific recommendations for drying, filtering and cleaning cores CCY HP, N, F, I, HU and PLATINIUM

- Refer to assembly precautions for replaceable core filter drier shells and recommendations for liquid line: BCY-HP, BCY-P6, BCY-P14.
- Remove cores from their sealed can at the very last moment before putting them in the shells.
- The cartridges CCY 48 HP, 48 N and PLATINIUM must be positioned in various cartridge holders with their funnel shape at the larger end (see chapter “ technical features of cores “ , Ø 4 on drawing N°2) on the box outlet union side.
- It is imperative to use CCY A adapters with chemical cores (CCY N, CCY HP

and PLATINIUM) in the suction filter shells. Do not forget to remove them before installing CCY F and CCY I cores.

- Important : The CCY cores must be changed very regularly and particularly the CCY HP and PLATINIUM cartridges must be absolutely replaced :
  - after each intervention on the installation requiring the opening of the circuit
  - when the liquid indicator (VCYL or VCYLS) indicates an abnormal humidity content
  - when the pressure loss measured in the filter drier shell is too great

→ at least once a year as a measure of precaution.

- It is important to regularly monitor the refrigerant's moisture content and condition using sight glasses with CARLY VCYL or VCYLS moisture indicator (refer to chapter 9 or 10).
- For use of various CCY core types in the pollution control and circuit cleaning process after compressor burnout, closely follow the recommendations given to chapter 7.



# Drying, filtering and cleaning cores

## → CCY / PLATINIUM

### ■ Functional features

| CARLY References                         | To be used with |                   | Use                  |                            |             | Filtration<br>microns | Composition                           | Features  |
|--|-----------------|-------------------|----------------------|----------------------------|-------------|-----------------------|---------------------------------------|---|
|  | BCY-HP          | BCY-P6<br>BCY-P14 | On suction line      | On liquid line             | On oil line |                       |                                       |   |
| <b>Felt cores</b>                        |                 |                   |                      |                            |             |                       |                                       |   |
| CCY 48 F                                 |                 | X                 | Temporary a few days |                            |             | 10                    | Felt                                  | For CFC, HCFC, HFC, CO <sub>2</sub><br>Reinforced filtration  |
| <b>Stainless steel cores</b>             |                 |                   |                      |                            |             |                       |                                       |   |
| CCY 48 I                                 |                 | X                 | Permanent            |                            |             | 140                   | Stainless steel mesh cloth and screen | For CFC, HCFC, HFC, CO <sub>2</sub><br>Filtering  |
| <b>High efficiency drying cores</b>      |                 |                   |                      |                            |             |                       |                                       |   |
| CCY 48 HP                                | X               | X                 | Temporary a few days | Permanent until saturation |             | 50                    | Chemical agents                       | For CFC, HCFC, HFC, CO <sub>2</sub><br>Reinforced drying<br>acid neutralization   |
| <b>Very high efficiency drying cores</b> |                 |                   |                      |                            |             |                       |                                       |   |
| PLATINIUM 48                             | X               | X                 | Temporary a few days | Permanent until saturation |             | 50                    | Chemical agents                       | For CFC, HCFC, HFC, CO <sub>2</sub><br>Optimum drying   |
| <b>Cleaning cores</b>                    |                 |                   |                      |                            |             |                       |                                       |   |
| CCY 48 N                                 | X               | X                 | Temporary a few days | Temporary a few days       |             | 50                    | Chemical agents                       | For CFC, HCFC, HFC, CO <sub>2</sub><br>Burnout decontamination,<br>reinforced drying,<br>reinforced acid neutralization,<br>wax and resin binding |



# Drying, filtering and cleaning cores

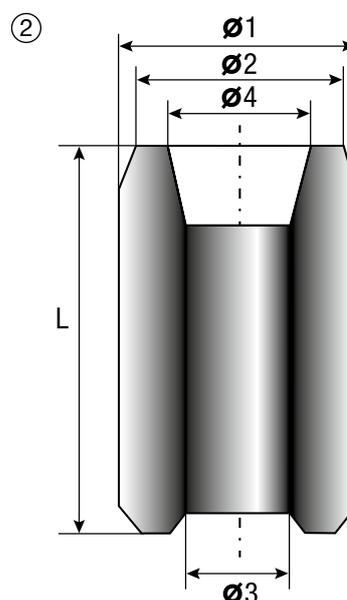
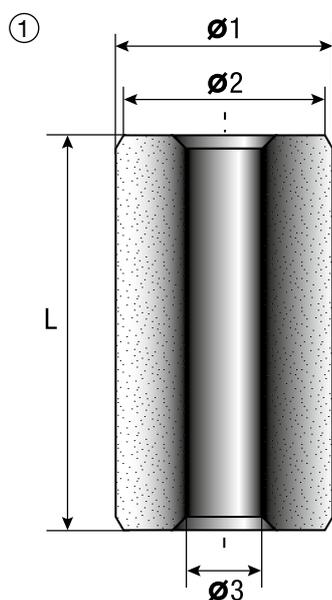
## → CCY HP / PLATINIUM / CCY N

### ■ Selection table of drying and cleaning cores

| CARLY References | Filtering surface<br>cm <sup>2</sup> | Volume of desiccation products<br>cm <sup>3</sup> | Dehydratable refrigerant capacity<br>kg of refrigerant <sup>(1)</sup> |  |
|------------------|--------------------------------------|---|---|--|
|                  |                                      |   | R744  |  |
|                  |                                      |   | 24 °C   |  |
| CCY 48 HP        | 420                                  | 704   | 34  |  |
| PLATINIUM 48     | 420                                  | 704   | 44  |  |
| CCY 48 N         | 420                                  | 704   | 34  |  |

### ■ Technical features of drying and cleaning cores

| CARLY References | Drawing Nb | Dimensions mm |    |    |    |     |
|------------------|------------|---------------|----|----|----|-----|
|                  |            | Ø1            | Ø2 | Ø3 | Ø4 | L   |
| CCY 48 HP        | 2          | 94            | 82 | 45 | 60 | 139 |
| PLATINIUM 48     | 2          | 94            | 82 | 45 | 60 | 139 |
| CCY 48 N         | 2          | 94            | 82 | 45 | 60 | 139 |



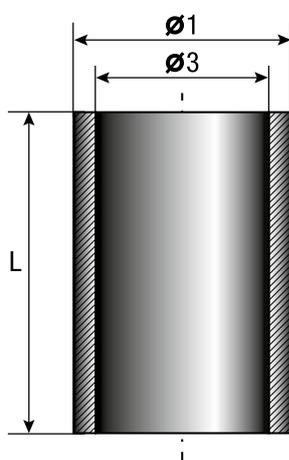


# Drying, filtering and cleaning cores

## → CCY F / CCY I / CCY HU

### ■ Selection table and technical features of filtering cores

| CARLY References | Surface de filtration cm <sup>2</sup> | Dimensions mm |    |    |     | Maximal working temperature TS maxi C° | Minimal working temperature TS mini C° |
|------------------|---------------------------------------|---------------|----|----|-----|--|--|
|                  |                                       | Ø1            | Ø2 | Ø3 | L   |  |  |
| CCY 48 F         | 420                                   | 93            | /  | 75 | 140 | 100                                    | -40                                    |
| CCY 48 I         | 420                                   | 93            | /  | /  | 140 | /                                      | /                                      |



### ■ Spare parts

| CARLY References | Description  | Types   | Quantity |
|------------------|--|---------|----------|
| CY 1555601       | Gasket for end plate and for flange of oil separator (red) | BCY-HP  | 1        |
| CY 1555303       | Gasket for flange of oil separators (blue)                 | BCY-P6  | 1        |
| CY 15552360      | End torique gasket   | BCY-P14 | 1        |



# Drying, filtering and cleaning cores

## → CCY / PLATINIUM

### ■ Weights and packaging

| CARLY<br>references | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|---------------------|-------------------|----------------------|-------------------------------|
|                     | With<br>packaging | Without<br>packaging |                               |
| CCY 48 HP           | 0,90              | 0,79                 | 15                            |
| PLATINIUM 48        | 0,90              | 0,79                 | 15                            |
| CCY 48 N            | 0,81              | 0,70                 | 15                            |
| CCY 48 F            | 0,26              | 0,15                 | 15                            |
| CCY 48 I            | 0,21              | 0,10                 | 15                            |

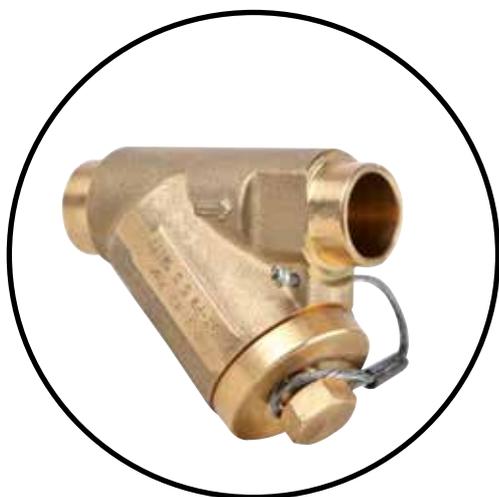


## Dirt filters

### → FILTRY-P9 / 90 bar (1305 psig) (permanent use)

#### ■ Applications

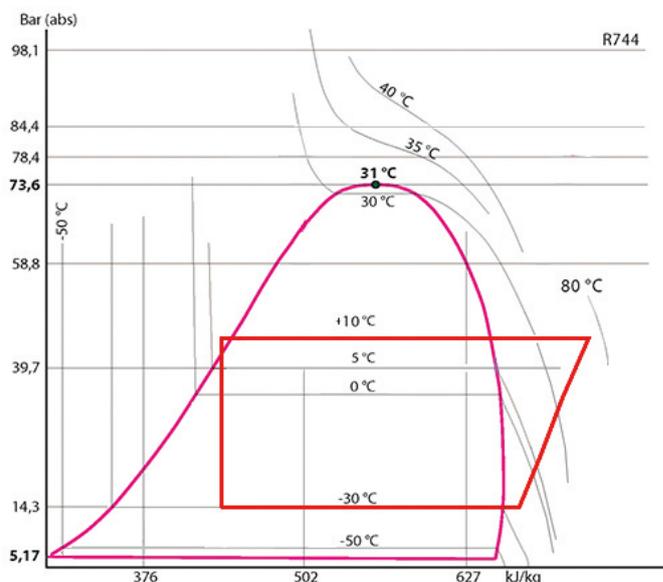
- Permanent refrigerant filtering, regulation and expansion element protection in refrigerating and air conditioning installations.
- These filters are particularly suited for commercial refrigerating applications and installations with important liquid line lengths.



**90 bar**



**SUBCRITICAL AND TRANSCRITICAL**



#### ■ Functional features

- Products are compatible with HFCs, CO<sub>2</sub>, as well as with their associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU.
- Product classification in CE categories is performed using the PED 2014/68/EU table, corresponding to a nominal diameter-based selection.
- Product is ergonomic for quick maintenance interventions.
- Body made of die-cast brass with brazed connection.
- Filtration preventing propagation within the circuit of particles bigger than 50 microns with a filtration area of 16 cm<sup>2</sup>.

#### ■ CARLY advantages

- Maximal working pressure: up to 90 bar with CO<sub>2</sub> in subcritical and transcritical compression systems.
- The stainless steel filtrating sleeve can be removed for cleaning, without removing the filter case and without de-brazing the connections, thus allowing important time savings during maintenance operations.
- Plug can be handled with a flat spanner and fitted with a safety metallic cable.
- Fastening plug in brass, can be handled with a spanner.
- Compact product for ease of assembly in reduced footprint.

CYCO<sub>2</sub>-EN – 4.1-3 / 09-2018

## Dirt filters

### → FILTRY-P9 / 90 bar (1305 psig) *(permanent use)*

#### ■ Warning

Before selecting or installing any component, please refer to the chapter 0 of CARLY technical catalogue - **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 dirt filters FILTRY-P9

- FILTRY-P9 dirt filters are to be mounted on the liquid line between the receiver and the expansion element.
- The refrigerant flow direction is indicated by an arrow on filter case. It must be complied with.
- The FILTRY-P9 dirt filters have to be mounted horizontally, the part with the strainer oriented downwards.
- It is mandatory to remove the filtrating sleeve and the O-ring before assembling filter by brazing.
- After brazing, when the base temperature is sufficiently low, put the O-ring back into its

recess and screw back the plug complying with a six-side key with the recommended tightening torque of 15 N.m.

- After each removal of the plug, imperatively replace the PTFE O-ring; it is preferable to position, in a first step, the filtrating sleeve in the filter case and in a second step, to screw the plug.
- Be careful to properly select the solenoid valves located downstream of the filters; their oversizing could cause liquid hammer phenomena hindering the filters' proper mechanical behaviour; these liquid hammer phenomena can originate

from other sources, in long-piping installations.

- Never install filters in an area of the circuit that can be isolated.
- Never trap refrigerant in its liquid state (between a check valve and a solenoid valve, for instance).
- It is mandatory to change or to clean the filtrating sleeves with a solvent when the pressure drop measured in the FILTRY-P9 filter is too important. CARLY recommends this operation at least once a year as prevention.



## Dirt filters

### → **FILTRY-P9 / 90 bar (1305 psig)** *(permanent use)*

#### ■ **Special precautions for components used with CO<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO<sub>2</sub> 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<sub>2</sub> and polymers. For example, swelling phenomena and internal explosion of the seal are possible. Carly dirt filters FILTRY-P9 do not have polymer gaskets.

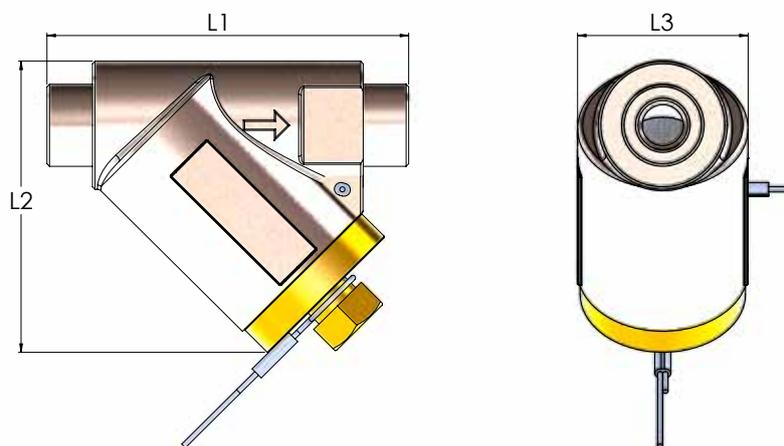


## Dirt filters

### → FILTRY-P9 / 90 bar (1305 psig) (permanent use)

#### ■ Technical features

| CARLY references  | Connections to solder ODF inch | CARLY references  | Connections to solder ODF mm | Filtering surface cm <sup>2</sup> | Filtering μm | Dimensions mm |    |    |
|-------------------|--------------------------------|-------------------|------------------------------|-----------------------------------|--------------|---------------|----|----|
|                   |                                |                   |                              |                                   |              | L1            | L2 | L3 |
| FILTRY-P9 2 S     | 1/4                            | FILTRY-P9 2 MMS   | 6                            | 16                                | 50           | 70            | 58 | 33 |
| FILTRY-P9 3 S     | 3/8                            | FILTRY-P9 3 MMS   | 10                           | 16                                | 50           | 70            | 58 | 33 |
| FILTRY-P9 4 S     | 1/2                            | FILTRY-P9 4 MMS   | 12                           | 16                                | 50           | 70            | 58 | 33 |
| FILTRY-P9 5 S/MMS | 5/8                            | FILTRY-P9 5 S/MMS | 16                           | 16                                | 50           | 70            | 58 | 33 |



| CARLY references  | Nominal diameter | CARLY references  | Nominal diameter | Maximal working pressure | Working pressure (1) | Maximal working temperature | Minimal working temperature | Working temperature (1) | CE Category (2) |
|-------------------|------------------|-------------------|------------------|--------------------------|----------------------|-----------------------------|-----------------------------|-------------------------|-----------------|
|                   | DN inch          |                   | DN mm            |                          |                      |                             |                             |                         |                 |
| FILTRY-P9 2 S     | 1/4              | FILTRY-P9 2 MMS   | 6                | 90                       | 15                   | 100                         | -40                         | -30                     | Art4§3          |
| FILTRY-P9 3 S     | 3/8              | FILTRY-P9 3 MMS   | 10               | 90                       | 15                   | 100                         | -40                         | -30                     | Art4§3          |
| FILTRY-P9 4 S     | 1/2              | FILTRY-P9 4 MMS   | 12               | 90                       | 15                   | 100                         | -40                         | -30                     | Art4§3          |
| FILTRY-P9 5 S/MMS | 5/8              | FILTRY-P9 5 S/MMS | 16               | 90                       | 15                   | 100                         | -40                         | -30                     | Art4§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 2014/68/EU (refer to chapter 0 to CARLY technical catalogue).

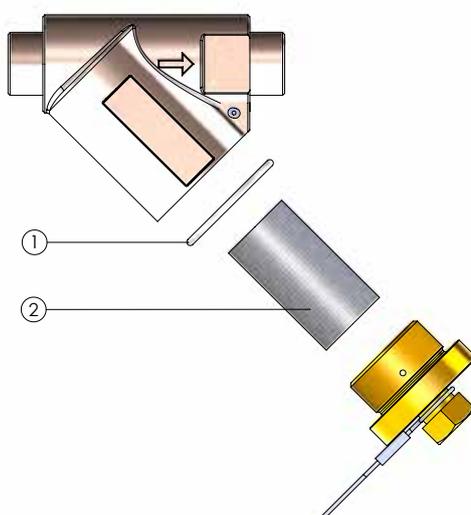


## Dirt filters

### → **FILTRY-P9 / 90 bar (1305 psig)** *(permanent use)*

#### ■ Spare parts

| CARLY references | Part N° | Description                  | Quantity |
|------------------|---------|------------------------------|----------|
| CY 15552205      | 1       | O-ring gasket                | 1        |
| CY 11610050      | 2       | 50 microns filtrating sleeve | 1        |



#### ■ Weights and packaging

| CARLY references  | Unit weight kg |                   | Packaging number of pieces |
|-------------------|----------------|-------------------|----------------------------|
|                   | With packaging | Without packaging |                            |
| FILTRY-P9 2 S     | 0,31           | 0,30              | 1                          |
| FILTRY-P9 3 S     | 0,31           | 0,30              | 1                          |
| FILTRY-P9 4 S     | 0,31           | 0,30              | 1                          |
| FILTRY-P9 5 S/MMS | 0,31           | 0,30              | 1                          |





## Dirt filters

### → FCY-P6 / 64 bar (928 psig) (permanent use)

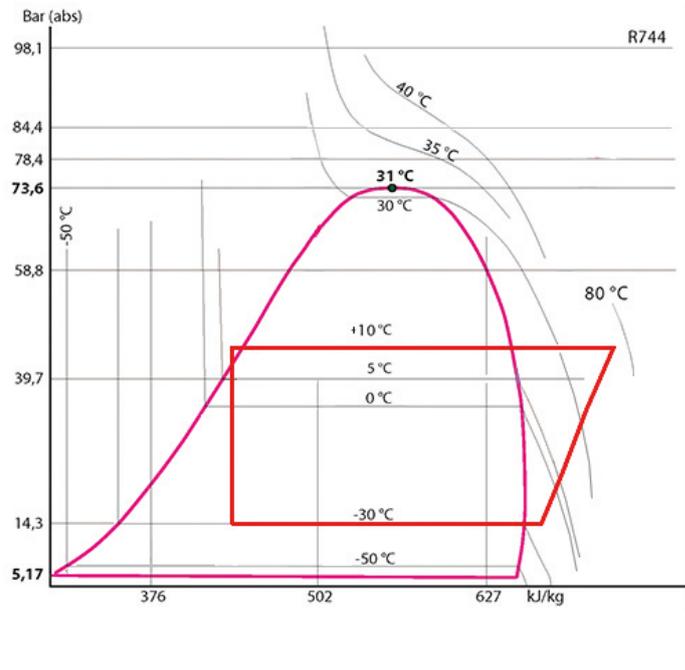
#### ■ Applications

- Permanent refrigerant filtering, regulation and expansion element protection in refrigerating and air conditioning installations, running with high working pressures.



**64 bar**

**CO<sub>2</sub> SUBCRITICAL**



#### ■ Functional features

- Products are compatible with HFC, CO<sub>2</sub>, as well as with their associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU.
- Product classification in CE categories is performed using the PED 2014/68/EU table, corresponding to a volume-based selection
- External steel body hermetically sealed with paint to ensure a high resistance to corrosion
- Filtering at outlet preventing propagation within the circuit of particles bigger than 25 microns, with a very low pressure drop.
- One type of connection is on standard products: to be screwed type SAE



#### Possible customization on demand:

- Specific connections (O-RING, ORFS, ...)
- To be brazed for tubes in inches (S)
- To be brazed for tubes in millimeters (MMS)

#### ■ CARLY advantages

- Maximal working pressure: up to 64 bar with CO<sub>2</sub> in subcritical compression systems.
- Compact products for ease of assembly in reduced footing.
- Internal retention system with minimum pressure drop, preventing the release of trapped contaminating agents.
- Very large filtering area that limits pressure drop.

CYCO<sub>2</sub>-EN – 5.1-3 / 09-2018

## Dirt filters

### → FCY-P6 / 64 bar (928 psig) *(permanent use)*

#### ■ Warning

Before selecting or installing any component, please refer to the chapter 0 of CARLY technical catalogue - **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 FCY-P6 dirt filters

- FCY-P6 dirt filters are to be mounted on the liquid line between the receiver and the expansion element.
- Never use these dirt filters on the oil line; in such a case, use HCYF-P6 oil filters (refer to chapter 45 of CARLY technical catalogue).
- The refrigerant flow direction is indicated by an "IN" mark in the inlet shell of the filter drier and by an arrow on the filter tag. It must be necessarily respected.
- We recommend the vertical mounting of the dewatering filter with a top-down fluid flow direction in order to favour its filling when in operation and a rapid flow of the fluid when the installation is shut down.
- Be careful to properly select the solenoid valves located downstream of the filters; their oversizing could cause liquid hammer phenomena hindering the filters' proper mechanical behaviour; these liquid hammer phenomena can originate from other sources, in long-piping installations; in case of doubt, it is preferable to use FILTRY-P9 dirt filters. (refer to chapter 11 of CARLY technical catalogue).
- Never install the filters in an area of the circuit that can be isolated.
- Never trap refrigerant in its liquid state (between a check valve and a solenoid valve, for instance).
- It is mandatory to change the dirt filters when the pressure drop measured in filter is too important. CARLY recommends this operation at least once a year as prevention.
- Make sure that the piping can support without deformation the weight of the dirt filter ; otherwise, provide for the attachment of the dirt filter with a clamp on a stable part of the installation.



## Dirt filters

### → FCY-P6 / 64 bar (928 psig) *(permanent use)*

#### ■ Special precautions for components used with CO<sub>2</sub> in subcritical 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<sub>2</sub> for low temperatures applications, generates also high pressures (to take in consideration)
- The implementation on the liquid line of a filter drier **DCY-P6** 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<sub>2</sub> at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO<sub>2</sub> 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<sub>2</sub> and polymers. For example, swelling phenomena and internal explosion of the seal are possible. Carly **dirt filters FCY-P6** do not have polymer gaskets directly in contact with CO<sub>2</sub>.

CYCO<sub>2</sub>-EN – 5.1-3 / 09-2018

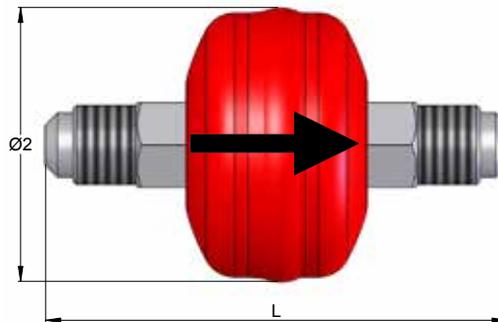
# Dirt filters

## → FCY-P6 / 64 bar (928 psig) (permanent use)

### ■ Technical features

| CARLY references | Connections <sup>(1)</sup> |                          | Connections types <sup>(1)</sup> | Filtering surface<br>cm <sup>2</sup> | Dimensions mm |    |
|------------------|----------------------------|--------------------------|----------------------------------|--------------------------------------|---------------|----|
|                  | To screw<br>SAE<br>inch    | To solder<br>ODF<br>inch |                                  |                                      | Ø2            | L  |
| FCY-P6 502       | 1/4"                       |                          | 1                                | 20                                   | 55            | 86 |
| FCY-P6 503       | 3/8"                       |                          | 1                                | 20                                   | 55            | 92 |

<sup>(1)</sup> Chapter «Connection features and drawings» (refer to chapter 114 of CARLY technical catalogue).



| CARLY references | Volume<br>V<br>L | Maximal working pressure | Working pressure <sup>(1)</sup> | Maximal working temperature | Minimal working temperature | Working temperature <sup>(1)</sup> | CE Category <sup>(2)</sup> |
|------------------|------------------|--------------------------|---------------------------------|-----------------------------|-----------------------------|------------------------------------|----------------------------|
|                  |                  | PS<br>bar                | PS BT<br>bar                    | TS maxi<br>°C               | TS mini<br>°C               | TS BT<br>°C                        |                            |
| FCY-P6 502       | 0,06             | 64                       | 15                              | 100                         | -40                         | -30                                | Art4§3                     |
| FCY-P6 503       | 0,06             | 64                       | 15                              | 100                         | -40                         | -30                                | Art4§3                     |

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

<sup>(2)</sup> Classification by volume, according to PED 2014/68/EU (refer to chapter 0 of CARLY technical catalogue).

### ■ Weights and packaging

| CARLY references | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|------------------|-------------------|----------------------|-------------------------------|
|                  | With<br>packaging | Without<br>packaging |                               |
| FCY-P6 502       | 0,28              | 0,25                 | 1                             |
| FCY-P6 503       | 0,28              | 0,25                 | 1                             |



## Discharge line mufflers

### → SCY-P6 / 64 bar (928 psig)

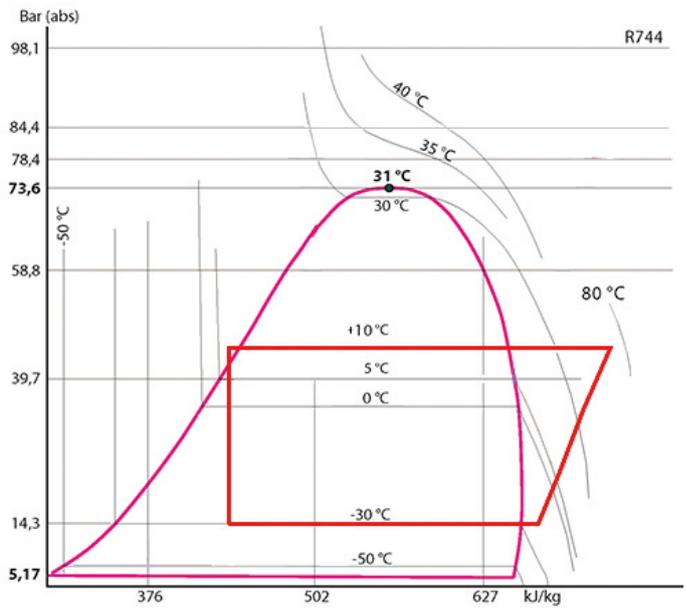
#### ■ Applications

- Reduction of noise caused by gas pulses in the discharge lines of refrigerating and air conditioning installations, running with high working pressures.
- Those pulses generally come from reciprocating compressors or screw compressors. The mufflers have no effect on the mechanical vibrations transmitted to the pipes by the compressors.



**64 bar**

**CO<sub>2</sub> SUBCRITICAL**



#### ■ Functional features

- Products are compatible with HFC, CO<sub>2</sub> as well as with their associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU.
- Product classification in CE categories is performed using the PED 2014/68/EU table, corresponding to a volume-based selection.
- Hermetically sealed outer steel enclosure with paint to ensure a high resistance to corrosion.
- Several types of connections are possible on standard products:
  - To be brazed for tubes in inches (S)
  - To be brazed for tubes in millimeters (MMS).

#### ■ Possible customization on demand :

- Specific connections (SAE, O-RING, ORFS, ...).
- Stainless steel casings and connections (resistance to corrosion and at low temperature).

#### ■ CARLY advantages

- Maximal working pressure: up to 64 bar with CO<sub>2</sub> in subcritical compression systems.
- Design allows coverage of a wide range of frequencies.
- Discharge line muffler mounting is possible in vertical and horizontal positions. There is no oil trap whichever the position. The refrigerant can flow in both directions.
- Excellent distribution of the refrigerant in its gaseous phase, with minimum pressure drop.
- The copper-plated steel connections up to a diameter of 3/4" - 18 mm facilitate the brazing and allow using brazing alloys with a low silver percentage.

CYCO<sub>2</sub>-EN – 11.1-3 / 09-2018

## Discharge line mufflers

### → SCY-P6 / 64 bar (928 psig)

#### ■ Warning

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

#### ■ General assembly precautions

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

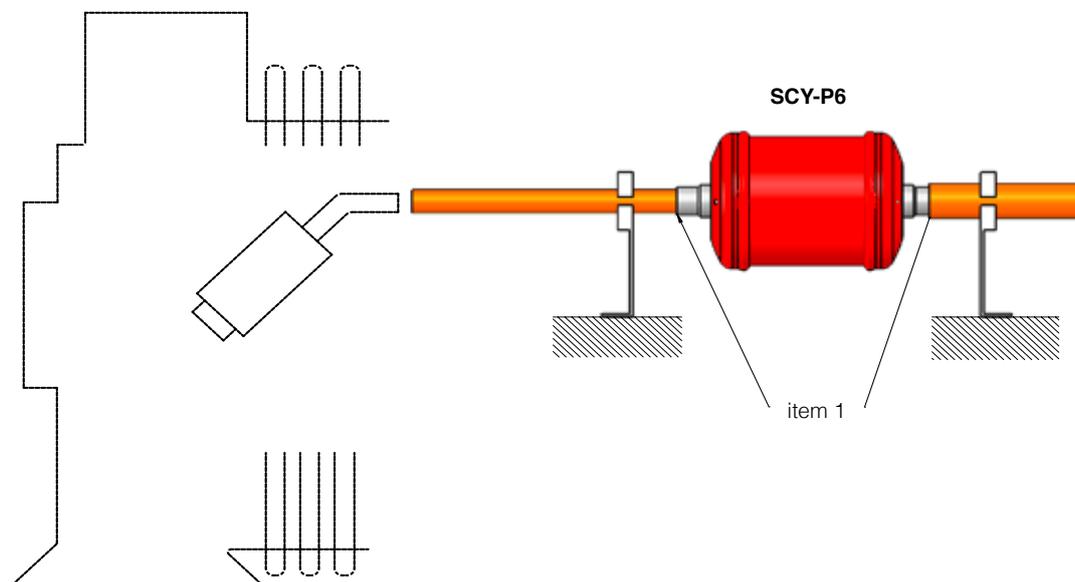
- Some are specific to each component,
- Other are general to all CARLY components,

and in this case, they are specified in the **RECOMMENDATIONS SPECIFIC** part defined hereafter ;

they are presented in the chapter 115 of CARLY technical catalogue – **GENERAL ASSEMBLY PRECAUTIONS**.

#### ■ Recommendations specific to SCY-P6 mufflers

- The discharge line mufflers are to be mounted on the discharge gas line between the compressor and the condenser; the muffler's connections diameter must correspond to the discharges pipes diameter.
- The optimum muffler position will be determined according to your installation's features, by getting in touch with your distributor or with CARLY's technical services.
- It is recommended to perform an inner connection at the intake point, and an outer connection at the muffler outlet point (refer to drawing below item 1).
- In case of vertical assembling, it is recommended not to place the muffler just over the compressor.
- Provide for efficient clamping before the intake and after the outlet of the mufflers (refer to drawing below).





# Discharge line mufflers

## → SCY-P6 / 64 bar (928 psig)

### ■ Special precautions for components used with CO<sub>2</sub> in subcritical 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<sub>2</sub> for low temperatures applications, generates also high pressures (to take in consideration)
- The implementation on the liquid line of a filter drier **DCY-P6**, or a filter drier shell **BCY-P6** 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 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<sub>2</sub> at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO<sub>2</sub> 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<sub>2</sub> and polymers. For example, swelling phenomena and internal explosion of the seal are possible. Carly mufflers SCY-P6 do not have polymer gaskets directly in contact with CO<sub>2</sub>.

CYCO<sub>2</sub>-EN – 11.1-3 / 09-2018

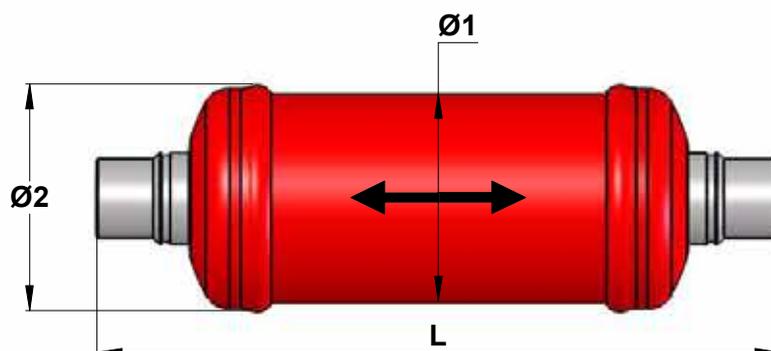
## Discharge line mufflers

### → SCY-P6 / 64 bar (928 psig)

#### ■ Technical features

| CARLY references | Connections <sup>(1)</sup> |                  | Dimensions mm |    |    |     |
|------------------|----------------------------|------------------|---------------|----|----|-----|
|                  | To solder ODF              | CARLY references | To solder ODF | Ø1 | Ø2 | L   |
|                  | pouce                      |                  | mm            |    |    |     |
| SCY-P6 30 S      | 3/8                        | SCY-P6 30 MMS    | 10            | 50 | 55 | 159 |
| SCY-P6 40 S      | 1/2                        | SCY-P6 40 MMS    | 12            | 50 | 55 | 159 |
| SCY-P6 50 S/MMS  | 5/8                        |                  | 16            | 50 | 55 | 163 |
| SCY-P6 60 S      | 3/4                        | SCY-P6 60 MMS    | 18            | 89 | 96 | 171 |
| SCY-P6 70 S/MMS  | 7/8                        |                  | 22            | 89 | 96 | 185 |

<sup>(1)</sup> Chapter «Connection features and drawings» (refer to chapter 114 of CARLY technical catalogue).



| CARLY references |               | Volume | Maximal working pressure | Working pressure <sup>(1)</sup> | Maximal working temperature | Minimal working temperature | Working temperature <sup>(1)</sup> | CE Category <sup>(2)</sup> |
|------------------|---------------|--------|--------------------------|---------------------------------|-----------------------------|-----------------------------|------------------------------------|----------------------------|
|                  |               | V<br>L | PS<br>bar                | PS BT<br>bar                    | TS maxi<br>°C               | TS mini<br>°C               | TS BT<br>°C                        |                            |
| SCY-P6 30 S      | SCY-P6 30 MMS | 0,19   | 64                       | 15                              | 120                         | -40                         | -30                                | Art4§3                     |
| SCY-P6 40 S      | SCY-P6 40 MMS | 0,19   | 64                       | 15                              | 120                         | -40                         | -30                                | Art4§3                     |
| SCY-P6 50 S/MMS  |               | 0,19   | 64                       | 15                              | 120                         | -40                         | -30                                | Art4§3                     |
| SCY-P6 60 S      | SCY-P6 60 MMS | 0,56   | 64                       | 15                              | 120                         | -40                         | -30                                | Art4§3                     |
| SCY-P6 70 S/MMS  |               | 0,57   | 64                       | 15                              | 120                         | -40                         | -30                                | Art4§3                     |

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

<sup>(2)</sup> Classification by volume, according to PED 2014/68/EU (refer to chapter 0 of CARLY technical catalogue).



# Discharge line mufflers

## → SCY-P6 / 64 bar (928 psig)

### ■ Weights and packaging

| CARLY<br>references | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|---------------------|-------------------|----------------------|-------------------------------|
|                     | With<br>packaging | Without<br>packaging |                               |
| SCY-P6 30 S & MMS   | 0,41              | 0,38                 | 1                             |
| SCY-P6 40 S & MMS   | 0,41              | 0,38                 | 1                             |
| SCY-P6 50 S/MMS     | 0,41              | 0,38                 | 1                             |
| SCY-P6 60 S & MMS   | 1,32              | 1,27                 | 1                             |
| SCY-P6 70 S/MMS     | 1,32              | 1,27                 | 1                             |





## Discharge line mufflers

### → SCY-P14 / 140 bar (2030 psig)

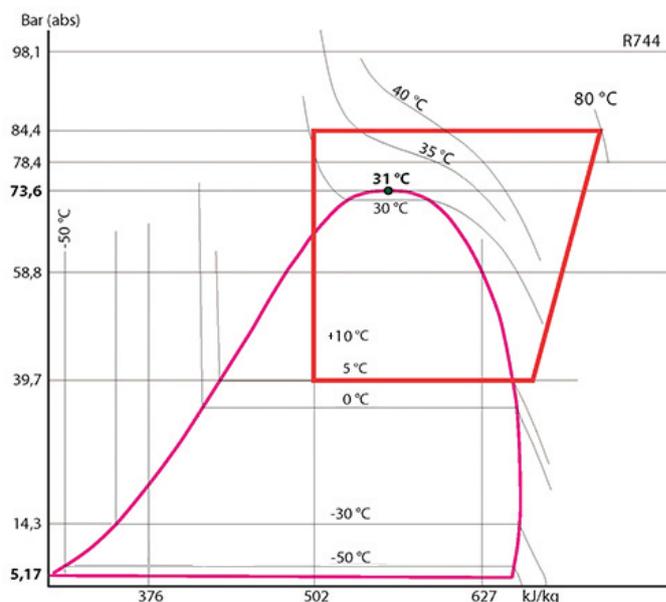
#### ■ Applications

- Reduction of noise caused by gas pulses in the discharge lines of refrigerating and air conditioning installations, running with high working pressures, with CO<sub>2</sub> in transcritical compression systems.
- Those pulses generally come from reciprocating compressors or screw compressors. The mufflers have no effect on the mechanical vibrations transmitted to the pipes by the compressors.



**140 bar**

**CO<sub>2</sub> TRANSCRITICAL**



#### ■ Functional features

- Products are compatible with CO<sub>2</sub> as well as with its associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU.
- Product classification in CE categories is performed using the PED 2014/68/EU table, corresponding to a volume-based selection.
- Hermetically sealed outer steel enclosure with paint to ensure a high resistance to corrosion.
- Connections on standard products: to solder ODF.

#### Possible customization on demand :

- Stainless steel casings and connections (resistance to corrosion and at low temperature)

#### ■ CARLY advantages

- Maximal working pressure: up to 140 bar with CO<sub>2</sub> in transcritical compression systems.
- Design allows coverage of a wide range of frequencies.
- Discharge line muffler mounting is possible in vertical and horizontal positions. There is no oil trap whichever the position. The refrigerant can flow in both directions.
- Excellent distribution of the refrigerant in its gaseous phase, with minimum pressure drop.

CYCO<sub>2</sub>-EN – 11.7-3 / 09-2018

## Discharge line mufflers

### → SCY-P14 / 140 bar (2030 psig)

#### ■ Warning

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

#### ■ General assembly precautions

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

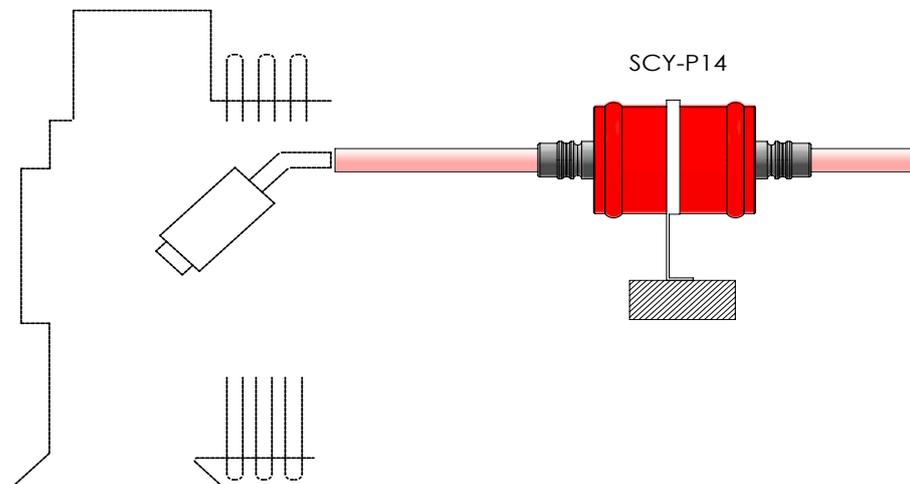
- Some are specific to each component,
- Other are general to all CARLY components,

and in this case, they are specified in the **RECOMMENDATIONS SPECIFIC** part defined hereafter ;

they are presented in the chapter 115 of CARLY technical catalogue – **GENERAL ASSEMBLY PRECAUTIONS**.

#### ■ Recommendations specific to SCY-P14 mufflers

- The discharge line mufflers are to be mounted on the discharge gas line between the compressor and the condenser; the muffler's connections diameter must correspond to the discharges pipes diameter.
- The optimum muffler position will be determined according to your installation's features, by getting in touch with your distributor or with CARLY's technical services.
- Provide for an efficient clamping directly on the muffler (refer to drawing below).
- In case of vertical assembling, it is recommended not to place the muffler just over the compressor.
- Provide for efficient clamping directly on the muffler (refer to drawing below).





# Discharge line mufflers

## → SCY-P14 / 140 bar (2030 psig)

### ■ Special precautions for components used with CO<sub>2</sub> in subcritical 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<sub>2</sub> 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<sub>2</sub> at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO<sub>2</sub> 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<sub>2</sub> and polymers. For example, swelling phenomena and internal explosion of the seal are possible. Carly mufflers SCY-P14 do not have polymer gaskets directly in contact with CO<sub>2</sub>.



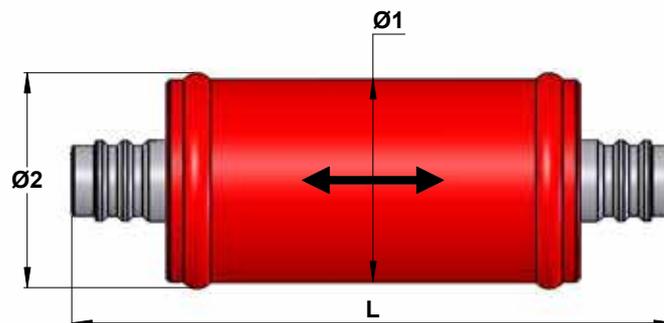
## Discharge line mufflers

### → SCY-P14 / 140 bar (2030 psig)

#### ■ Technical features

| CARLY references  | Connections to solder ODF inch | CARLY references | Connections to solder ODF mm | Connections types <sup>(1)</sup> | Dimensions mm |     |     |
|-------------------|--------------------------------|------------------|------------------------------|----------------------------------|---------------|-----|-----|
|                   |                                |                  |                              |                                  | Ø1            | Ø2  | L   |
| SCY-P14 30 S/MMS  | 3/8                            |                  | 10                           | 4                                | 60            | 64  | 162 |
| SCY-P14 40 S/MMS  | 1/2                            |                  | 12                           | 4                                | 60            | 64  | 178 |
| SCY-P14 50 S/MMS  | 5/8                            |                  | 16                           | 5                                | 60            | 64  | 178 |
| SCY-P14 60 S      | 3/4                            | SCY-P14 60 MMS   | 18                           | 5                                | 89            | 92  | 206 |
| SCY-P14 70 S/MMS  | 7/8                            |                  | 22                           | 5                                | 89            | 92  | 206 |
| SCY-P14 90 S      | 1 1/8                          | SCY-P14 90 MMS   | 28                           | 6                                | 114           | 118 | 314 |
| SCY-P14 110 S/MMS | 1 3/8                          |                  | 35                           | 5                                | 114           | 118 | 318 |
| SCY-P14 130 S     | 1 5/8                          |                  | -                            | 6                                | 141           | 146 | 485 |

<sup>(1)</sup> Chapter «Connection features and drawings» (refer to chapter 114 of CARLY technical catalogue).



| CARLY references  | Volume         | Maximal working pressure | Working pressure <sup>(1)</sup> | Maximal working temperature | Minimal working temperature | Working temperature <sup>(1)</sup> | CE Category <sup>(2)</sup> |
|-------------------|----------------|--------------------------|---------------------------------|-----------------------------|-----------------------------|------------------------------------|----------------------------|
|                   |                |                          |                                 |                             |                             |                                    |                            |
| SCY-P14 30 S/MMS  | 0,20           | 140                      | 15                              | 140                         | -40                         | -30                                | Art4§3                     |
| SCY-P14 40 S/MMS  | 0,20           | 140                      | 15                              | 140                         | -40                         | -30                                | Art4§3                     |
| SCY-P14 50 S/MMS  | 0,20           | 140                      | 15                              | 140                         | -40                         | -30                                | Art4§3                     |
| SCY-P14 60 S      | SCY-P14 60 MMS | 0,41                     | 140                             | 15                          | 140                         | -40                                | Art4§3                     |
| SCY-P14 70 S/MMS  | 0,41           | 140                      | 15                              | 140                         | -40                         | -30                                | Art4§3                     |
| SCY-P14 90 S      | SCY-P14 90 MMS | 1,30                     | 140                             | 15                          | 140                         | -40                                | Cat I                      |
| SCY-P14 110 S/MMS | 1,30           | 140                      | 15                              | 140                         | -40                         | -30                                | Cat I                      |
| SCY-P14 130 S     | 3,70           | 140                      | 15                              | 140                         | -40                         | -30                                | Cat II                     |

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

<sup>(2)</sup> Classification by volume, according to PED 2014/68/EU (refer to chapter 0 of CARLY technical catalogue).



# Discharge line mufflers

## → SCY-P14 / 140 bar (2030 psig)

### ■ Weights and packaging

| CARLY<br>references | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|---------------------|-------------------|----------------------|-------------------------------|
|                     | With<br>packaging | Without<br>packaging |                               |
| SCY-P14 30 S/MMS    | 1,33              | 1,20                 | 1                             |
| SCY-P14 40 S/MMS    | 1,33              | 1,20                 | 1                             |
| SCY-P14 50 S/MMS    | 1,33              | 1,20                 | 1                             |
| SCY-P14 60 S & MMS  | 3,13              | 3,00                 | 1                             |
| SCY-P14 70 S/MMS    | 3,13              | 3,00                 | 1                             |
| SCY-P14 90 S & MMS  | 7,13              | 7,00                 | 1                             |
| SCY-P14 110 S/MMS   | 7,58              | 7,45                 | 1                             |
| SCY-P14 130 S       | 16,47             | 16,13                | 1                             |





## Oil filters

### → HCYF-P6 / 64 bar (928 psig)

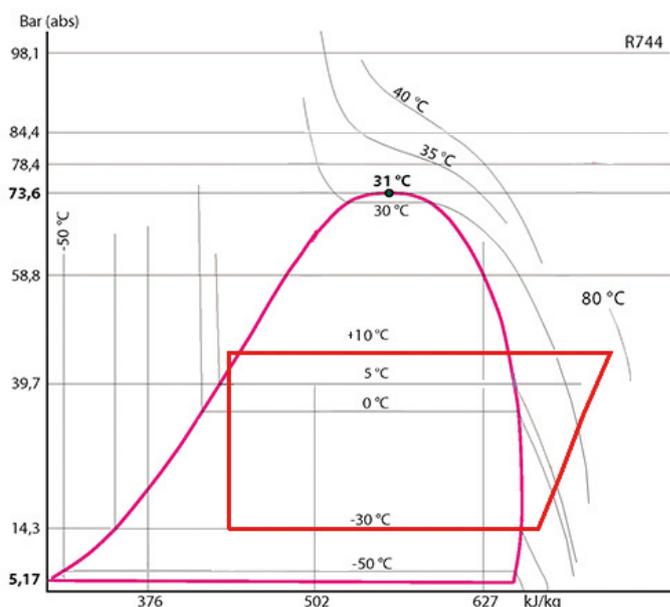
#### ■ Applications

- Oil filtering on the oil return line to the compressor sumps of refrigerating and air conditioning installations, running in high working pressures.
- These filters are required for the good operation of oil level regulators and compressors. It protect them from any contaminants that could damage them (metallic chips, filings, oxides, sludge, etc...).



**64 bar**

**CO<sub>2</sub> SUBCRITICAL**



#### ■ Functional features

- Products are compatible with HFC, CO<sub>2</sub>, as well as with their associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU.
- Product classification in CE categories is performed using the PED 2014/68/EU table, corresponding to a volume-based selection.
- Hermetically sealed outer steel enclosure with paint to ensure a high resistance to corrosion.
- Filtrating core made of stainless steel mesh cloth.
- Filtering efficient at 5 microns.
- Several types of connections are possible on standard products:
  - To be screwed type SAE
  - To be brazed for tubes in inches (S)
  - To be brazed for tubes in millimetres (MMS).



#### Possible customization on demand :

- Specific connections (O-RING, ORFS,...).
- Stainless steel casings and unions (resistance to corrosion and at low temperatures).
- Lower filtration threshold.
- Filtering surface of the core, more or less important according to the specificities of the machine.

#### ■ CARLY advantages

- Maximum working pressure: up to 64 bar with CO<sub>2</sub> in subcritical compression systems.
- Very large filtering surface areas for very low pressure drop.
- Presence of a permanent magnet located at the inlet of the filter, ensuring the immediate "trapping" of all steel particles.
- Very large range of filters: 6 different models.
- Connections to solder are made of copper-plated steel and allow to use brazing alloys with a low silver percentage; their resistance to pressure is much higher than the full copper connections.



# Oil filters

## → HCYF-P6 / 64 bar (928 psig)

### ■ Warning

Before selecting or installing any component, please refer to the chapter 0 of CARLY technical catalogue - **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,
- Other are general to all CARLY components,

and in this case, they are specified in the **RECOMMENDATIONS SPECIFIC** part defined hereafter ;

they are presented in the chapter 115 of CARLY technical catalogue – **GENERAL ASSEMBLY PRECAUTIONS**.

### ■ Recommendations specific to the oil filters HCYF-P6

- The oil filters are to be mounted on the oil return line, between the oil separator and the oil level regulator, as close as possible to the latter.
- The direction of oil flow, indicated by an arrow on the filter tag and by an “IN” sticker next to the inlet connection, must imperatively be respected.
- The degree of clogging of the filters must be regularly checked, ensuring that the oil return is correct in the crankcases of compressors; oil filters must be imperatively replaced at the first sign of clogging.
- It is highly recommended to install downstream oil filter an oil sight glass in order to visually check the presence and the condition of the oil.
- HCYF-P6 oil filter only ensures mechanical filtering of solid contaminants.
- Make sure that the piping can support without deformation the weight of the oil filter; otherwise, plan the attachment of the oil filter with a clamp on a stable part of the installation.



# Oil filters

## → HCYF-P6 / 64 bar (928 psig)

### ■ Special precautions for components used with CO<sub>2</sub> in subcritical 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<sub>2</sub> for low temperatures applications, generates also high pressures (to take in consideration)
- The implementation on the liquid line of a filter drier **DCY-P6**, or a filter drier shell **BCY-P6** 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<sub>2</sub> at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO<sub>2</sub> 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<sub>2</sub> and polymers. For example, swelling phenomena and internal explosion of the seal are possible. Carly oil filters HCYF-P6 do not have polymer gaskets directly in contact with CO<sub>2</sub>.

CYCO<sub>2</sub>-EN – 21.1-3 / 09-2018

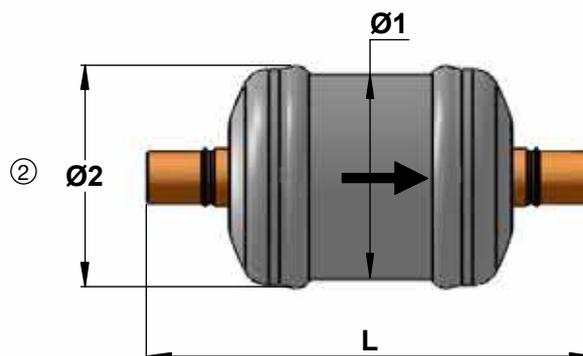
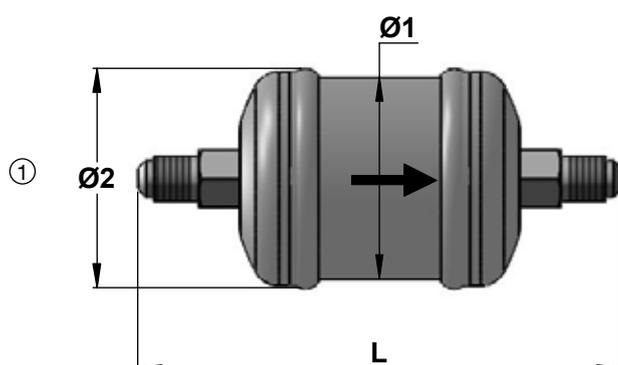
## Oil filters

### → HCYF-P6 / 64 bar (928 psig)

#### ■ Technical features

| CARLY references | Connections To screw<br>SAE<br>inch | Connections To solder<br>ODF<br>inch | CARLY references | Connections To solder<br>ODF<br>mm | Connections types<br>(1) | Drawing Nb | Filtering surface<br>cm <sup>2</sup> | Dimensions<br>mm |    |     |
|------------------|-------------------------------------|--------------------------------------|------------------|------------------------------------|--------------------------|------------|--------------------------------------|------------------|----|-----|
|                  |                                     |                                      |                  |                                    |                          |            |                                      | Ø1               | Ø2 | L   |
| HCYF-P6 52       | 1/4                                 |                                      |                  |                                    | 1                        | 1          | 70                                   | 50               | 55 | 119 |
| HCYF-P6 53       | 3/8                                 |                                      |                  |                                    | 1                        | 1          | 70                                   | 50               | 55 | 125 |
| HCYF-P6 53 S     |                                     | 3/8                                  | HCYF-P6 53 MMS   | 10                                 | 2                        | 2          | 70                                   | 50               | 55 | 112 |
| HCYF-P6 83       | 3/8                                 |                                      |                  |                                    | 1                        | 1          | 121                                  | 89               | 96 | 142 |
| HCYF-P6 84       | 1/2                                 |                                      |                  |                                    | 1                        | 1          | 121                                  | 89               | 96 | 146 |

(1) Chapter "Connection features and drawings" (refer to chapter 114 of CARLY technical catalogue).



| CARLY references | Volume<br>V<br>L | Maximal working pressure<br>PS<br>bar | Working pressure<br>(1) |             | Maximal working temperature<br>TS maxi<br>°C | Minimal working temperature<br>TS mini<br>°C | Working temperature<br>(1) |        | CE Category<br>(2) |
|------------------|------------------|---------------------------------------|-------------------------|-------------|--|--|----------------------------|--------|--------------------|
|                  |                  |                                       | PS BT<br>bar            | TS BT<br>°C |  |  |                            |        |                    |
| HCYF-P6 52       | 0,15             | 64                                    | 15                      | 120         | -40  | -30  | Art4§3                     |        |                    |
| HCYF-P6 53       | 0,15             | 64                                    | 15                      | 120         | -40  | -30  | Art4§3                     |        |                    |
| HCYF-P6 53 S     | HCYF-P6 53 MMS   | 0,15                                  | 64                      | 15          | 120  | -40  | -30                        | Art4§3 |                    |
| HCYF-P6 83       | 0,50             | 64                                    | 15                      | 120         | -40  | -30  | Art4§3                     |        |                    |
| HCYF-P6 84       | 0,50             | 64                                    | 15                      | 120         | -40  | -30  | Art4§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 volume, according to PED 2014/68/EU (refer to chapter 0 of CARLY technical catalogue).



# Oil filters

## → HCYF-P6 / 64 bar (928 psig)

### ■ Weights and packaging

| CARLY references   | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|--------------------|-------------------|----------------------|-------------------------------|
|                    | With<br>packaging | Without<br>packaging |                               |
| HCYF-P6 52         | 0,31              | 0,28                 | 1                             |
| HCYF-P6 53         | 0,31              | 0,28                 | 1                             |
| HCYF-P6 53 S & MMS | 0,31              | 0,28                 | 1                             |
| HCYF-P6 83         | 0,78              | 0,75                 | 1                             |
| HCYF-P6 84         | 0,83              | 0,80                 | 1                             |





## Oil filters

### → HCYF-P14 / 140 bar (2030 psig)

#### ■ Applications

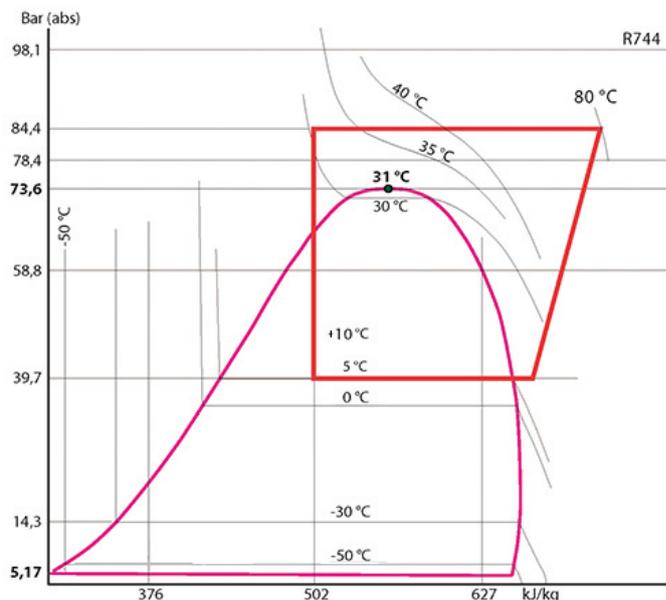
- Oil filtering on the oil return line to the compressor sumps of refrigerating and air conditioning installations, running with high working pressures, with CO<sub>2</sub> in transcritical compression systems.
- These filters are required for the good operation of oil level regulators and compressors. They protect them from any contaminants that could damage them (metallic chips, filings, oxides, sludge, etc...).



**140 bar**



TRANSCRITICAL



#### ■ Functional features

- Products are compatible with CO<sub>2</sub>, as well as with its associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU.
- Product classification in CE categories is performed using the PED 2014/68/EU table, corresponding to a volume-based selection.
- Hermetically sealed outer steel enclosure with paint to ensure a high resistance to corrosion.
- Filtrating core made of stainless steel mesh cloth.
- Filtering efficient at 5 microns.
- Connections on standard products: screwed type SAE and ODF to solder.



#### Possible customization on demand :

- Specific connections (O-RING, ORFS,...).
- Stainless steel casings and unions (resistance to corrosion and at low temperatures).
- Lower filtration threshold.
- Filtering surface of the core, more or less important according to the specificities of the machine.

#### ■ CARLY advantages

- Maximum working pressure: up to 140 bar with CO<sub>2</sub> in transcritical compression systems.
- Very large filtering surface areas for very low pressure drop.
- Automatic bypass of the internal filter when it is too dirty and when the pressure drop generated exceeds 3 bar; this particularity ensures the continuity of compressor lubrication, even if filter maintenance is late.



# Oil filters

## → HCYF-P14 / 140 bar (2030 psig)

### ■ Warning

Before selecting or installing any component, please refer to the chapter 0 of CARLY technical catalogue - **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,
- Other are general to all CARLY components,

and in this case, they are specified in the **RECOMMENDATIONS SPECIFIC** part defined hereafter ;

they are presented in the chapter 115 of CARLY technical catalogue – **GENERAL ASSEMBLY PRECAUTIONS**.

### ■ Recommendations specific to the oil filters HCYF-P14

- The oil filters are to be mounted on the oil return line, between the oil separator and the oil level regulator, as close as possible to the latter.
- The direction of oil flow, indicated by an arrow on the filter tag and by an “IN” sticker next to the inlet connection, must imperatively be respected.
- The degree of clogging of the filters must be regularly checked, ensuring that the oil return is correct in the crankcases of compressors; oil filters must be imperatively replaced at the first sign of clogging.
- It is highly recommended to install downstream oil filter an oil sight glass in order to visually check the presence and the condition of the oil.
- HCYF-P14 oil filter only ensures mechanical filtering of solid contaminants.
- Make sure that the piping can support without deformation the weight of the oil filter; otherwise, plan the attachment of the oil filter with a clamp on a stable part of the installation.



# Oil filters

## → HCYF-P14 / 140 bar (2030 psig)

### ■ Special precautions for components used with CO<sub>2</sub> in subcritical 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 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<sub>2</sub> at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO<sub>2</sub> 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<sub>2</sub> and polymers. For example, swelling phenomena and internal explosion of the seal are possible. Carly oil filters HCYF-P14 do not have polymer gaskets directly in contact with CO<sub>2</sub>.



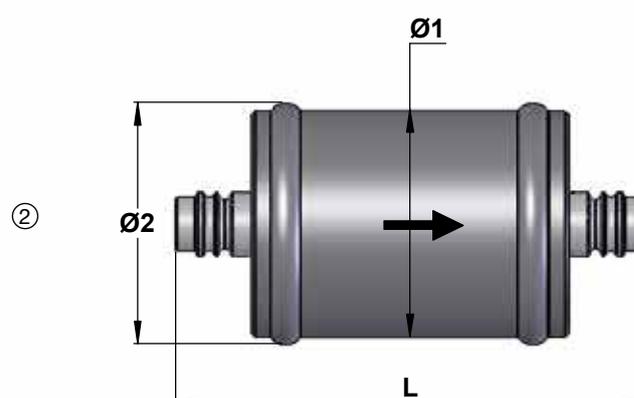
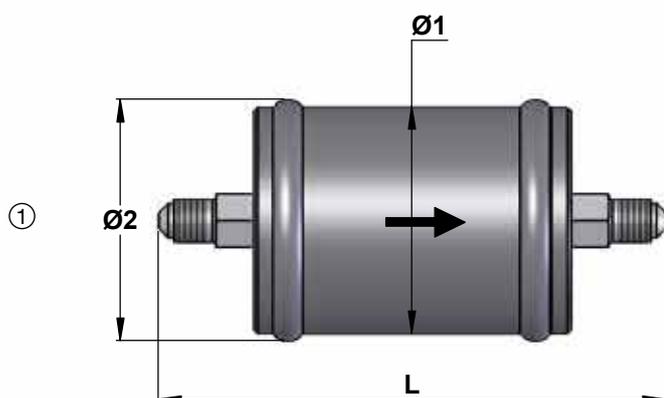
## Oil filters

### → HCYF-P14 / 140 bar (2030 psig)

#### ■ Technical features

| CARLY references  | Connections To screw<br>SAE<br>inch | Connections To solder<br>ODF<br>inch | Connections To solder<br>ODF<br>mm | Connections types<br>(1) | Drawing Nb | Filtering surface<br>cm <sup>2</sup> | Dimensions<br>mm |    |     |
|-------------------|-------------------------------------|--------------------------------------|------------------------------------|--------------------------|------------|--------------------------------------|------------------|----|-----|
|                   |                                     |                                      |                                    |                          |            |                                      | Ø1               | Ø2 | L   |
| HCYF-P14 52       | 1/4                                 |                                      |                                    | 1                        | 1          | 70                                   | 60               | 64 | 134 |
| HCYF-P14 52 S/MMS |                                     | 1/4                                  | 6                                  | 4                        | 2          | 70                                   | 60               | 64 | 124 |
| HCYF-P14 53       | 3/8                                 |                                      |                                    | 1                        | 1          | 70                                   | 60               | 64 | 150 |
| HCYF-P14 53 S/MMS |                                     | 3/8                                  | 10                                 | 4                        | 2          | 70                                   | 60               | 64 | 124 |

(1) Chapter "Connection features and drawings" (refer to chapter 114 of CARLY technical catalogue).



| CARLY references  | Volume<br>V<br>L | Maximal working pressure<br>PS<br>bar | Working pressure<br>(1) |             | Maximal working temperature<br>TS maxi<br>°C | Minimal working temperature<br>TS mini<br>°C | Working temperature<br>(1) |  | CE Category<br>(2) |
|-------------------|------------------|---------------------------------------|-------------------------|-------------|--|--|----------------------------|--|--------------------|
|                   |                  |                                       | PS BT<br>bar            | TS BT<br>°C |  |  |                            |  |                    |
| HCYF-P14 52       | 0,11             | 140                                   | 15                      | 120         | -40  | -30  | Art4§3                     |  |                    |
| HCYF-P14 52 S/MMS | 0,11             | 140                                   | 15                      | 120         | -40  | -30  | Art4§3                     |  |                    |
| HCYF-P14 53       | 0,11             | 140                                   | 15                      | 120         | -40  | -30  | Art4§3                     |  |                    |
| HCYF-P14 53 S/MMS | 0,11             | 140                                   | 15                      | 120         | -40  | -30  | Art4§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 volume, according to PED 2014/68/EU (refer to chapter 0 of CARLY technical catalogue).



# Oil filters

## → HCYF-P14 / 140 bar (2030 psig)

### ■ Weights and packaging

| CARLY references  | Unit weight<br>kg |                      | Packaging<br>number of pieces |
|-------------------|-------------------|----------------------|-------------------------------|
|                   | With<br>packaging | Without<br>packaging |                               |
| HCYF-P14 52       | 1,20              | 1,07                 | 1                             |
| HCYF-P14 52 S/MMS | 1,20              | 1,07                 | 1                             |
| HCYF-P14 53       | 1,20              | 1,07                 | 1                             |
| HCYF-P14 53 S/MMS | 1,20              | 1,07                 | 1                             |





## Check valves

### → CRCY-P9 / 90 bar (1305 psig)

#### ■ Applications

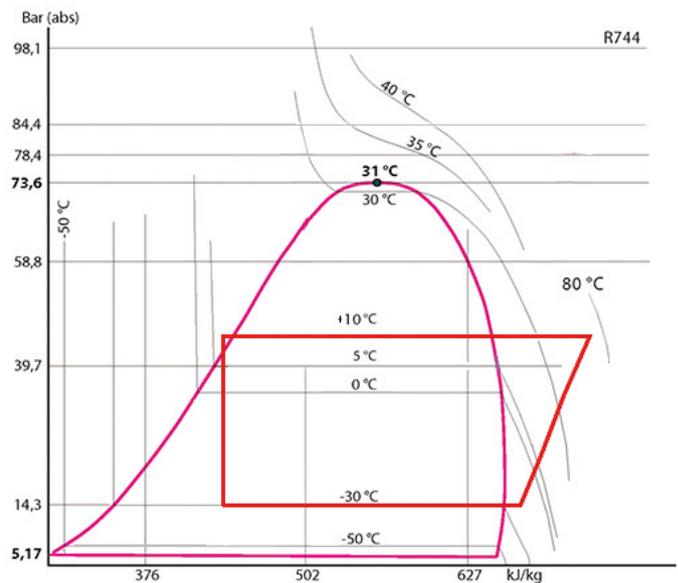
- The check valves ensure a one-way direction of the refrigerant flow, in refrigerating and air conditioning installations, running with high working pressures.
- They can be mounted on the liquid, suction, discharge or hot gases defrost line, to prevent unwanted return of refrigerant.



**90 bar**



**SUBCRITICAL AND  
TRANSCRITICAL**



#### ■ Functional features

- Products are compatible with HFC and CO<sub>2</sub>, as well as with their associated oils and additives. Products are designed for use of non-hazardous refrigerants from group 2 of PED 2014/68/EU.
- Product classification in CE categories is performed using the PED 2014/68/EU table, corresponding to a nominal diameter-based selection.
- The 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.
- 4 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<sub>2</sub> 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.



# Check valves

## → CRCY-P9 / 90 bar (1305 psig)

### ■ Warning

Before selecting or installing any component, please refer to the chapter 0 of CARLY technical catalogue - **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,
- Other are general to all CARLY components, they are presented in the chapter 115 of CARLY technical catalogue – **GENERAL ASSEMBLY PRECAUTIONS**.

and in this case, they are specified in the **RECOMMENDATIONS SPECIFIC** part defined hereafter ;

- Other are general to all CARLY

### ■ 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 of CARLY technical catalogue). Indeed, excessive overheating of the valve may damage the internal PTFE gasket and make it inoperative.



# Check valves

## → CRCY-P9 / 90 bar (1305 psig)

### ■ Special precautions for components used with CO<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO<sub>2</sub> 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<sub>2</sub> 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 inch | CARLY references | Connections To solder ODF mm | Δ P <sup>(1)</sup> bar | kv <sup>(2)</sup> m <sup>3</sup> /h |
|------------------|--------------------------------|------------------|------------------------------|------------------------|-------------------------------------|
| CRCY-P9 2 S      | 1/4                            | CRCY-P9 2 MMS    | 6                            | 0,06                   | 0,69                                |
| CRCY-P9 3 S      | 3/8                            | CRCY-P9 3 MMS    | 10                           | 0,06                   | 1,75                                |
| CRCY-P9 4 S      | 1/2                            | CRCY-P9 4 MMS    | 12                           | 0,05                   | 3,27                                |
| CRCY-P9 5 S/MMS  | 5/8                            | CRCY-P9 5 S/MMS  | 16                           | 0,05                   | 3,64                                |

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

<sup>(2)</sup> i.e. the flow rate in m<sup>3</sup>/hr for a pressure drop in the check valve of 1 bar (refrigerant used: water with per volume ratio = 1.000 kg/m<sup>3</sup>).

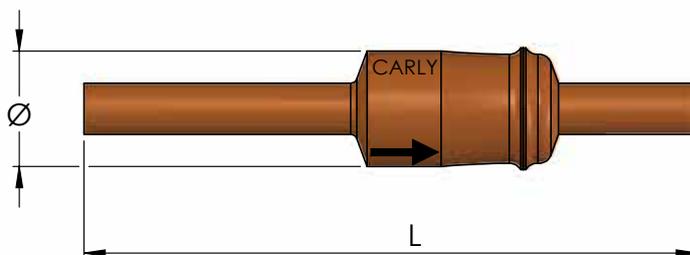


## Check valves

### → CRCY-P9 / 90 bar (1305 psig)

#### ■ Technical features

| CARLY references | Connections To solder ODF<br>inch | CARLY references | Connections To solder ODF<br>mm | Dimensions mm |     |
|------------------|-----------------------------------|------------------|---------------------------------|---------------|-----|
|                  |                                   |                  |                                 | Ø             | L   |
| 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            | 117 |
| CRCY-P9 5 S/MMS  | 5/8                               | CRCY-P9 5 S/MMS  | 16                              | 27            | 117 |



| CARLY references | Nominal diameter | CARLY references | Nominal diameter | Maximal working pressure | Working pressure <sup>(1)</sup> | Maximal working temperature | Minimal working temperature | Working temperature <sup>(1)</sup> | CE Category <sup>(2)</sup> |
|------------------|------------------|------------------|------------------|--------------------------|---------------------------------|-----------------------------|-----------------------------|------------------------------------|----------------------------|
|                  | DN inch          |                  | DN mm            |                          |                                 |                             |                             |                                    |                            |
| CRCY-P9 2 S      | 1/4              | CRCY-P9 2 MMS    | 6                | 90                       | 15                              | 140                         | -40                         | -30                                | Art4§3                     |
| CRCY-P9 3 S      | 3/8              | CRCY-P9 3 MMS    | 10               | 90                       | 15                              | 140                         | -40                         | -30                                | Art4§3                     |
| CRCY-P9 4 S      | 1/2              | CRCY-P9 4 MMS    | 12               | 90                       | 15                              | 140                         | -40                         | -30                                | Art4§3                     |
| CRCY-P9 5 S/MMS  | 5/8              | CRCY-P9 5 S/MMS  | 16               | 90                       | 15                              | 140                         | -40                         | -30                                | Art4§3                     |

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

<sup>(2)</sup> Classification by diameter, according to PED 2014/68/EU (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 & MMS | 0,07           | 0,06              | 1                          |
| CRCY-P9 3 S & MMS | 0,07           | 0,06              | 1                          |
| CRCY-P9 4 S & MMS | 0,16           | 0,15              | 1                          |
| CRCY-P9 5 S/MMS   | 0,21           | 0,20              | 1                          |



## Acidity tests for refrigerant oils

### → TESTOIL-3P-CO<sub>2</sub>



The oil acidity content is an important parameter to check because it determines the refrigerating installation's good operating condition.

On a system running with CO<sub>2</sub>, two internal chemical phenomenon may alter the oil quality and cause formation of acids, and muds detrimental to the installation :

- Refrigerant decomposition, if the installation is not well maintained (presence of water in high concentration, superior to solubility threshold)
- Lubricant decomposition, either POE or PAO, due to the modification of some parameters (humidity level, acidity, dissolved metals, viscosity...).

These acids then generate metallic salts and oxides (iron or copper) that could block the oil filter or lead to the copper plating of metallic parts in motion. These degradation phenomena are dangerous for the installation, because they lead to seizing of oil pumps and to severe damage due to lubrication defect.

### ■ Applications

- TESTOIL-3P-CO<sub>2</sub> ensure monitoring of the polyolester POE, polyalkyleneglycol PAG, polyalphaolefin PAO... oils acidity in CO<sub>2</sub> - R744 installations.
- Intended for professional use.

### ■ Functional features

- TESTOIL-3P-CO<sub>2</sub> is solvent-based flammable chemical solution, coming from natural products (does not contains benzene, or xylene, or toluene).
- Compounds of biodegradable substances.
- Non-toxic for humans : do not contain carcinogenic, mutagenic, toxic to the reproduction compounds.
- Level of VOC (Volatil Organic Compounds): 98 % - 16.9 grams / product.

### ■ CARLY advantages

- TESTOIL-3P-CO<sub>2</sub> is specially designed for oils used in CO<sub>2</sub> installations (POE, PAG, PAO...).
- Ready for use product, usable on site.
- The measurement process is simple, quick and efficient.
- Does not contain carcinogenic, mutagenic, toxic to the reproduction compounds.



# Acidity tests for refrigerant oils

## → TESTOIL-3P-CO<sub>2</sub>

### ■ Directions for use

- TESTOIL-3P-CO<sub>2</sub> bottle should be opened only for immediate use.
- Pour an oil sample in the bottle.
- Shake and let it rest for 10 seconds until colour stabilisation.
- Observe the test solution colour:
  - Purple: test is satisfactory, oil acidity is correct;
  - Yellow: oil acidity is high, oil should be replaced.

### ■ Precautions for use

#### Precautions of use - see the Safety Data Sheet

- Highly flammable liquid and vapour.
- Causes serious eye irritation.
- May cause drowsiness or dizziness.
- Wear eye protection, protective gloves.
- Avoid breathing vapours.
- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Keep container tightly closed.
- IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

- Store in a well-ventilated place. Keep cool.
- The test solution colour changes with highly additive oils but this does not mean that they are faulty: it is therefore very important to inquire about the additive contents of the oil used, for a correct interpretation of the result obtained when the acidity test is performed using TESTOIL-3P-CO<sub>2</sub>.
- To ensure reliable measurement, shorten the handling time between the oil sampling from the compressor and the opening of the TESTOIL-3P-CO<sub>2</sub> bottle.
- Do not swallow.
- The product is solvent-based and should be kept in a cool and dry place.

- Do not expose the product to sun-light.
- Do not use TESTOIL-3P-CO<sub>2</sub> in a circuit containing a tracer (the tracer distorts the test's interpretation).

#### Storage conditions

- Keep the product at temperatures between + 5°C and + 30°C, in a dry and cool place, and protect from sunlight.

#### Waste treatment

- Used products must be disposed of in accordance with current regulations for hazardous industrial waste.
- Do not dispose into drains or the environment.

### ■ Technical features

| CARLY references           | Acid test for oils                                | Packaging         |
|----------------------------|---|-------------------|
| TESTOIL-3P-CO <sub>2</sub> | polyol-ester, polyalkyleneglycol, polyalphaolefin | 1 bottle of 30 ml |

### ■ Weights and packaging

| CARLY references           | Unit weight kg | Packaging unit |
|----------------------------|----------------|----------------|
| TESTOIL-3P-CO <sub>2</sub> | 0,07           | 18             |



# Weights and packaging

## → DCY-P6

| CARLY references   | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|--------------------|-------------------|-------------------|-------------------------------|
|                    | With packaging    | Without packaging |                               |
| DCY-P6 053         | 0,33              | 0,30              | 1                             |
| DCY-P6 053 S & MMS | 0,33              | 0,30              | 1                             |
| DCY-P6 164         | 1,04              | 1,00              | 1                             |
| DCY-P6 164 S& MMS  | 1,04              | 1,00              | 1                             |
| DCY-P6 305         | 1,57              | 1,50              | 1                             |
| DCY-P6 305 S/MMS   | 1,57              | 1,50              | 1                             |

## → DCY-P14

| CARLY references  | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|-------------------|-------------------|-------------------|-------------------------------|
|                   | With packaging    | Without packaging |                               |
| DCY-P14 052 S/MMS | 1,09              | 0,96              | 1                             |
| DCY-P14 053 S/MMS | 1,09              | 0,96              | 1                             |
| DCY-P14 163 S/MMS | 2,23              | 2,10              | 1                             |
| DCY-P14 164 S/MMS | 2,23              | 2,10              | 1                             |
| DCY-P14 165 S/MMS | 2,23              | 2,10              | 1                             |
| DCY-P14 304 S/MMS | 3,03              | 2,90              | 1                             |
| DCY-P14 305 S/MMS | 3,03              | 2,90              | 1                             |
| DCY-P14 415 S/MMS | 4,49              | 4,36              | 1                             |

## → BCY-HP

| CARLY references    | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|---------------------|-------------------|-------------------|-------------------------------|
|                     | With packaging    | Without packaging |                               |
| BCY-HP 485 S/MMS    | 4,45              | 4,20              | 1                             |
| BCY-HP 487 S/MMS    | 4,55              | 4,30              | 1                             |
| BCY-HP 489 S & MMS  | 4,65              | 4,40              | 1                             |
| BCY-HP 4811 S/MMS   | 4,70              | 4,45              | 1                             |
| BCY-HP 4813 S & MMS | 4,80              | 4,55              | 1                             |
| BCY-HP 4817 S/MMS   | 5,05              | 4,80              | 1                             |

| CARLY references    | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|---------------------|-------------------|-------------------|-------------------------------|
|                     | With packaging    | Without packaging |                               |
| BCY-HP 967 S/MMS    | 5,90              | 5,60              | 1                             |
| BCY-HP 969 S & MMS  | 5,95              | 5,65              | 1                             |
| BCY-HP 9611 S/MMS   | 6,15              | 5,85              | 1                             |
| BCY-HP 9613 S & MMS | 6,25              | 5,95              | 1                             |
| BCY-HP 9617 S/MMS   | 6,40              | 6,10              | 1                             |

## → BCY-P6

| CARLY references    | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|---------------------|-------------------|-------------------|-------------------------------|
|                     | With packaging    | Without packaging |                               |
| BCY-P6 485 S/MMS    | 5,22              | 4,97              | 1                             |
| BCY-P6 487 S/MMS    | 5,32              | 5,07              | 1                             |
| BCY-P6 489 S/MMS    | 5,42              | 5,17              | 1                             |
| BCY-P6 4811 S/MMS   | 5,47              | 5,22              | 1                             |
| BCY-P6 4813 S & MMS | 5,57              | 5,32              | 1                             |
| BCY-P6 4817 S/MMS   | 5,82              | 5,57              | 1                             |

| CARLY references    | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|---------------------|-------------------|-------------------|-------------------------------|
|                     | With packaging    | Without packaging |                               |
| BCY-P6 967 S/MMS    | 6,67              | 6,37              | 1                             |
| BCY-P6 969 S/MMS    | 6,72              | 6,42              | 1                             |
| BCY-P6 9611 S/MMS   | 6,92              | 6,62              | 1                             |
| BCY-P6 9613 S & MMS | 7,02              | 6,72              | 1                             |
| BCY-P6 9617 S/MMS   | 7,17              | 6,87              | 1                             |



## Weights and packaging

### → BCY-P14

| CARLY references     | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|----------------------|-------------------|-------------------|-------------------------------|
|                      | With packaging    | Without packaging |                               |
| BCY-P14 485 S/MMS    | 23,70             | 22,50             | 1                             |
| BCY-P14 487 S/MMS    | 23,70             | 22,50             | 1                             |
| BCY-P14 489 S & MMS  | 23,70             | 22,50             | 1                             |
| BCY-P14 4811 S/MMS   | 23,70             | 22,50             | 1                             |
| BCY-P14 4813 S & MMS | 23,70             | 22,50             | 1                             |
| BCY-P14 967 S/MMS    | 27,90             | 26,50             | 1                             |
| BCY-P14 969 S & MMS  | 27,90             | 26,50             | 1                             |
| BCY-P14 9611 S/MMS   | 27,90             | 26,50             | 1                             |
| BCY-P14 9613 S & MMS | 27,90             | 26,50             | 1                             |
| BCY-P14 9617 S/MMS   | 27,90             | 26,50             | 1                             |

### → CCY / PLATINIUM

| CARLY references | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|------------------|-------------------|-------------------|-------------------------------|
|                  | With packaging    | Without packaging |                               |
| CCY 48 HP        | 0,90              | 0,79              | 15                            |
| PLATINIUM 48     | 0,90              | 0,79              | 15                            |
| CCY 48 N         | 0,81              | 0,70              | 15                            |
| CCY 48 F         | 0,26              | 0,15              | 15                            |
| CCY 48 I         | 0,21              | 0,10              | 15                            |

### → FILTRY-P9

| CARLY references  | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|-------------------|-------------------|-------------------|-------------------------------|
|                   | With packaging    | Without packaging |                               |
| FILTRY-P9 2 S     | 0,31              | 0,30              | 1                             |
| FILTRY-P9 3 S     | 0,31              | 0,30              | 1                             |
| FILTRY-P9 4 S     | 0,31              | 0,30              | 1                             |
| FILTRY-P9 5 S/MMS | 0,31              | 0,30              | 1                             |

### → FCY-P6

| CARLY references | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|------------------|-------------------|-------------------|-------------------------------|
|                  | With packaging    | Without packaging |                               |
| FCY-P6 502       | 0,28              | 0,25              | 1                             |
| FCY-P6 503       | 0,28              | 0,25              | 1                             |

### → SCY-P6

| CARLY references  | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|-------------------|-------------------|-------------------|-------------------------------|
|                   | With packaging    | Without packaging |                               |
| SCY-P6 30 S & MMS | 0,41              | 0,38              | 1                             |
| SCY-P6 40 S & MMS | 0,41              | 0,38              | 1                             |
| SCY-P6 50 S/MMS   | 0,41              | 0,38              | 1                             |
| SCY-P6 60 S & MMS | 1,32              | 1,27              | 1                             |
| SCY-P6 70 S/MMS   | 1,32              | 1,27              | 1                             |

### → SCY-P14

| CARLY references   | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|--------------------|-------------------|-------------------|-------------------------------|
|                    | With packaging    | Without packaging |                               |
| SCY-P14 30 S/MMS   | 1,33              | 1,20              | 1                             |
| SCY-P14 40 S/MMS   | 1,33              | 1,20              | 1                             |
| SCY-P14 50 S/MMS   | 1,33              | 1,20              | 1                             |
| SCY-P14 60 S & MMS | 3,13              | 3,00              | 1                             |
| SCY-P14 70 S/MMS   | 3,13              | 3,00              | 1                             |
| SCY-P14 90 S & MMS | 7,13              | 7,00              | 1                             |
| SCY-P14 110 S/MMS  | 7,13              | 7,00              | 1                             |
| SCY-P14 130 S/MMS  | 16,47             | 16,13             | 1                             |



## Weights and packaging

### → HCYF-P6

| CARLY references   | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|--------------------|-------------------|-------------------|-------------------------------|
|                    | With packaging    | Without packaging |                               |
| HCYF-P6 52         | 0,31              | 0,28              | 1                             |
| HCYF-P6 53         | 0,31              | 0,28              | 1                             |
| HCYF-P6 53 S & MMS | 0,31              | 0,28              | 1                             |
| HCYF-P6 83         | 0,78              | 0,75              | 1                             |
| HCYF-P6 84         | 0,83              | 0,80              | 1                             |

### → HCYF-P14

| CARLY references  | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|-------------------|-------------------|-------------------|-------------------------------|
|                   | With packaging    | Without packaging |                               |
| HCYF-P14 52       | 1,20              | 1,07              | 1                             |
| HCYF-P14 52 S/MMS | 1,20              | 1,07              | 1                             |
| HCYF-P14 53       | 1,20              | 1,07              | 1                             |
| HCYF-P14 53 S/MMS | 1,20              | 1,07              | 1                             |

### → CRCY-P9

| CARLY references  | Unit weight<br>kg |                   | Packaging<br>number of pieces |
|-------------------|-------------------|-------------------|-------------------------------|
|                   | With packaging    | Without packaging |                               |
| CRCY-P9 2 S & MMS | 0,07              | 0,06              | 1                             |
| CRCY-P9 3 S & MMS | 0,07              | 0,06              | 1                             |
| CRCY-P9 4 S & MMS | 0,16              | 0,15              | 1                             |
| CRCY-P9 5 S/MMS   | 0,21              | 0,20              | 1                             |

### → TESTOIL-3P-CO<sub>2</sub>

| CARLY references           | Unit weight<br>kg | Packaging<br>number of pieces |
|----------------------------|-------------------|-------------------------------|
| TESTOIL-3P-CO <sub>2</sub> | 0,071             | 18                            |





## Spare parts (classification by reference)

### → CY

| CARLY references | Description  | Types of products         |
|------------------|--|---------------------------|
| CCY A 48         | Adapter for end core holders   | BCY-HP / BCY-P6 / BCY-P14 |
| CY 10810010      | 1/4" NPT phosphate plug for end plate  | BCY-HP / BCY-P6 / BCY-P14 |
| CY 11010900      | Adapter for core holders   | BCY-P14                   |
| CY 11610050      | 150 microns filtrating sleeve  | FILTRY-P9                 |
| CY 15552205      | O-ring gasket  | FILTRY -P9                |
| CY 15552360      | End torique gasket   | BCY-P14                   |
| CY 15553000      | Gasket for 48 model core ends  | CCY : HP / N / PLATINIUM  |
| CY 15555000      | Bag of gaskets for shell end plates: CARLY and for most manufacturers of the market (gaskets: 122 x 114 x 1,6 and 114 x 103 x 1,6) | BCY-HP                    |
| CY 15555200      | Adhesive gasket for core holders   | BCY-HP / BCY-P6 / BCY-P14 |
| CY 15555303      | Gasket for flange of oil separators (blue)   | BCY-P6                    |
| CY 15555601      | Gasket for end plate and for flange of oil separator (red)   | BCY-HP                    |
| CY 19900411      | Set of 8 fastening screws for flange   | BCY-HP                    |
| CY 19900440      | Set of 810 fastening screws for flange   | BCY-P6                    |
| CY 19900700      | Set of 12 fastening screws for end plate   | BCY-P14                   |
| CY 33301200      | Flange with gasket and 1/4" NPT plug   | BCY-HP                    |
| CY 33301203      | End plate + gasket + 1/4" NPT phosphate plug   | BCY-P6                    |
| CY 33301204      | End plate + gasket + 1/4" NPT phosphate plug   | BCY-P14                   |
| CY 37001030      | C core holder  | BCY-HP / BCY-P6 / BCY-P14 |
| CY 37001076      | A1 core holder   | BCY-HP / BCY-P6 / BCY-P14 |
| CY 37001096      | G1 core holder   | BCY-HP / BCY-P6 / BCY-P14 |





## Correction factors for refrigerating capacities

### → LIQUID LINE / SUCTION LINE (CO<sub>2</sub> - R744)

The refrigerating capacities values of CARLY products selection tables for the suction and liquid line have been established with:

- Following rate conditions<sup>(1)</sup>:
  - T<sub>0</sub> = -40 °C
  - T<sub>k</sub> = -10 °C
  - Flow rate corresponding to the pressure drop caused by the filter of 0.21 bar.
- For different rate conditions, a correction factor must be used that will depend on the refrigerant and on the evaporation and condensation temperatures.  
In order to bring the installation's capacity (Q<sub>ox</sub>) to this reference conditions, apply the following formula:

$$Q_{ox} \times fct = Q_{0REF}$$

- This capacity correction allows rigorous selection of the product to be installed on the refrigerating installation, by referring to the selection tables present in each product-related chapter.

### ■ Example

• Installation operating with R744 under the following rate conditions:

- T<sub>0</sub> = -45 °C
- T<sub>k</sub> = 0 °C
- Q<sub>ox</sub> = 100 kW

• How to convert the refrigerating installation's capacity to the reference conditions?

- Lecture du facteur de correction page 112.10

- T<sub>0</sub> = -45 °C
  - T<sub>k</sub> = 0 °C
  - R744 Refrigerant
- } → fct = 1.11

- Application of the formula

$$Q_{ox} \times fct = Q_{0REF}$$

- 100 x 1.11 = 111 kW

The installation's capacity under the reference conditions is therefore 111 kW.

<sup>(1)</sup> Chapter «Abbreviations and units» (refer to chapter 113).



# Correction factors for refrigerating capacities

➔ LIQUID LINE / SUCTION LINE (CO<sub>2</sub> - R744)

## ■ R744

| Condensing temperature<br>T <sub>k</sub> °C | Evaporating temperature T <sub>0</sub> °C |      |      |      |      |      |      |      |      |      |      |      |
|---|---|------|------|------|------|------|------|------|------|------|------|------|
|   | 5   | 0    | -5   | -10  | -15  | -20  | -25  | -30  | -35  | -40  | -45  | -50  |
| 30  | 2,11                                      | 2,05 | 2,01 | 1,98 | 1,96 | 1,96 | 1,95 | 1,96 | 1,97 | 1,98 | 2,00 | 2,02 |
| 25  | 1,69                                      | 1,66 | 1,63 | 1,61 | 1,60 | 1,60 | 1,59 | 1,60 | 1,60 | 1,61 | 1,62 | 1,64 |
| 20  | 1,51                                      | 1,48 | 1,46 | 1,44 | 1,43 | 1,43 | 1,43 | 1,43 | 1,43 | 1,44 | 1,45 | 1,46 |
| 15  | 1,38                                      | 1,36 | 1,34 | 1,33 | 1,32 | 1,31 | 1,31 | 1,31 | 1,32 | 1,32 | 1,33 | 1,34 |
| 10  | 1,28                                      | 1,26 | 1,25 | 1,24 | 1,23 | 1,23 | 1,22 | 1,23 | 1,23 | 1,23 | 1,24 | 1,25 |
| 5   |   | 1,19 | 1,17 | 1,16 | 1,16 | 1,15 | 1,15 | 1,15 | 1,16 | 1,16 | 1,17 | 1,18 |
| 0   |   |      | 1,11 | 1,10 | 1,10 | 1,09 | 1,09 | 1,09 | 1,10 | 1,10 | 1,11 | 1,11 |
| -5  |   |      |      | 1,05 | 1,04 | 1,04 | 1,04 | 1,04 | 1,04 | 1,05 | 1,05 | 1,06 |
| -10   |   |      |      |      | 1,00 | 0,99 | 0,99 | 0,99 | 1,00 | 1,00 | 1,00 | 1,01 |
| -15   |   |      |      |      |      | 0,95 | 0,95 | 0,95 | 0,96 | 0,96 | 0,96 | 0,97 |
| -20   |   |      |      |      |      |      | 0,92 | 0,92 | 0,92 | 0,92 | 0,93 | 0,93 |
| -25   |   |      |      |      |      |      |      | 0,88 | 0,88 | 0,89 | 0,89 | 0,90 |
| -30   |   |      |      |      |      |      |      |      | 0,85 | 0,86 | 0,86 | 0,86 |
| -35   |   |      |      |      |      |      |      |      |      | 0,83 | 0,83 | 0,84 |
| -40   |   |      |      |      |      |      |      |      |      |      | 0,81 | 0,81 |



## Abbreviations and units

### → ABBREVIATIONS

|                       |   |
|-----------------------|---|
| <b>ARI</b>            | Air conditioning and Refrigeration Institut.  |
| <b>BSP</b>            | British Standard Pipe, defines the cylindrical «gas» threading, «Whitworth» profile.  |
| <b>NPT</b>            | National Pipe Taper, defines the taper threading with which air-tightness is ensured metal on metal, and the link by NPT and NPTF taper threads.                                      |
| <b>ODF</b>            | Outside Diameter Female.  |
| <b>ODM</b>            | Outside Diameter Male.  |
| <b>SAE</b>            | Society of Automotive Engineers, deals with flare connections.  |
| <b>UNF</b>            | Unified pipe thread, defines the threading of a part in compliance with the international refrigerating industry Standard (STANDARD DIN 8904) and is equivalent to the SAE threading. |
| <b>PTFE</b>           | Polytetrafluoroethylene.  |
| <b>T<sub>o</sub></b>  | Evaporation temperature.  |
| <b>T<sub>k</sub></b>  | Condensation temperature.   |
| <b>Q<sub>o</sub></b>  | Refrigerating capacity.   |
| <b>ΔP</b>             | Pressure drop or pressure differential.   |
| <b>F<sub>ct</sub></b> | Correction factor.  |
| <b>Q<sub>k</sub></b>  | Condensation capacity.  |
| <b>ΔT<sub>1</sub></b> | Condensation temperature - water inlet temperature.   |
| <b>TL<sub>1</sub></b> | Water inlet temperature.  |

### ■ Refrigerants

|                            |  |
|----------------------------|--|
| <b>HFC</b>                 | Hydrofluorocarbon  |
| <b>HCFC</b>                | Hydrochlorofluorocarbon  |
| <b>CFC</b>                 | Chlorofluorocarbon   |
| <b>HFO</b>                 | Tetrafluoropropen  |
| <b>HC</b>                  | Hydrocarbons   |
| <b>R1..., R2..., R3...</b> | Pure refrigerants  |
| <b>R4... : 4</b>           | Zeotropic refrigerant (e.g. R404A: «A» defines the mixture)  |
| <b>R5... : 5</b>           | Azeotropic refrigerant (e.g. R507)   |
| <b>R6... : 6</b>           | Hydrocarbon (e.g. R600)  |
| <b>R7... : 7</b>           | Inorganic refrigerant (e.g. R717: 17 = molar mass of NH <sub>3</sub> refrigerant)<br>(e.g. R744: 44 = molar mass of refrigerant) |

### ■ Oils

**Mineral oils:** Paraffinic or naphtenic oils, used with CFCs, HCFCs, NH<sub>3</sub>, HC, HFO, HFC

**Semi-synthetic oils:** Mixture of mineral and synthetic oils, used with CFCs, HCFCs, NH<sub>3</sub>

**Synthetic oils:**

|            |   |
|------------|---|
| <b>AB</b>  | Alkylbenzenes, used with CFCs, HCFCs, NH <sub>3</sub>     |
| <b>PAO</b> | Polyalphaolefines, used with CFCs, HCFCs, NH <sub>3</sub> |
| <b>PAG</b> | Polyalkyleneglycols, used with R134a and NH <sub>3</sub>  |
| <b>POE</b> | Polyolesters, used with HFCs                              |
| <b>PVE</b> | Polyvinylether, used with HFCs                            |
| <b>TAN</b> | Total Acid Number (mg of potash/g of oil)                 |



# Abbreviations and units

## → UNITS

### ■ Lengths

| Units A    | Units SI | Adjustment factor $F_{ct}$ |
|------------|----------|----------------------------|
| Inch (in.) | m        | 0.254                      |
| Foot (ft)  | m        | 0.3048                     |
| Yard (yd)  | m        | 0.9144                     |

$$Unit_{SI} = Unit_A \times F_{ct}$$

$$Unit_A = Unit_{SI} / F_{ct}$$

### ■ Volumes

| Units A            | Units SI       | Adjustment factor $F_{ct}$ |
|--------------------|----------------|----------------------------|
| Cubic inch (cu.in) | m <sup>3</sup> | 16.387.10 <sup>-6</sup>    |
| Cubic foot (cu.ft) | m <sup>3</sup> | 0.02832                    |
| US-Gallon          | m <sup>3</sup> | 0.003785                   |
| Imperial-Gallon    | m <sup>3</sup> | 0.004546                   |

$$Unit_{SI} = Unit_A \times F_{ct}$$

$$Unit_A = Unit_{SI} / F_{ct}$$

### ■ Masses

| Units A    | Units SI | Adjustment factor $F_{ct}$ |
|------------|----------|----------------------------|
| lb (pound) | kg       | 0.4536                     |
| short ton  | kg       | 907.2                      |
| long ton   | kg       | 1016                       |

$$Unit_{SI} = Unit_A \times F_{ct}$$

$$Unit_A = Unit_{SI} / F_{ct}$$

### ■ Mass concentration

**ppm** Part per million in mass, i.e. 1 milligram of water per kilogram of refrigerant.



# Abbreviations and units

## → UNITS

### ■ Pressures

| Units A            | Units SI | Adjustment factor $F_{ct}$ |
|--------------------|----------|----------------------------|
| bar                | Pa       | 100 000                    |
| kg/cm <sup>2</sup> | Pa       | 98 070                     |
| lb/sq.ft           | Pa       | 47.9                       |
| lb/sq.in           | Pa       | 6 895                      |
| atm                | Pa       | 101 325                    |
| Torr               | Pa       | 133.33                     |
| hPa                | Pa       | 100                        |
| Mpa                | Pa       | 1 000 000                  |

$Unit_{SI} = Unit_A \times F_{ct}$   
 $Unit_A = Unit_{SI} / F_{ct}$

- The pressures announced in the technical documentation are expressed in relative values with the atmospheric pressure as reference value.
- Example:  
A maximum working pressure of 42 bar is that read on a manometer whose 0 graduation corresponds to the atmospheric pressure.

### ■ Temperatures

|                               |  |
|-------------------------------|--|
| <b>SI Units:</b>              | Kelvin (K) or degree Celsius (°C)<br>0 °C = 273 K  |
| <b>Fahrenheit Degree (°F)</b> | 0 °C = 32 °F<br>Conversion of °C in °F: $t_{oF} = 9/5 t_{oC} + 32$<br>Conversion of °F in °C: $t_{oC} = 5/9 (t_{oF} - 32)$ |



# Abbreviations and units

## → UNITS

### ■ Energetics

| Units A  | Units SI | Adjustment factor $F_{ct}$ |
|--|----------|----------------------------|
| kcal/h   | W        | 1.163                      |
| Btu/p.hr   | W        | 0.293                      |
| Br.u.r (British theoretical unit of refrigeration) | W        | 5615                       |
| Br.ton (British commercial ton of refrigeration)   | W        | 3888                       |
| ton (Standard commercial ton of refrigeration)     | W        | 3513                       |
| PS (cheval vapeur)                                 | W        | 735.5                      |
| h.p (horse power)                                  | W        | 745.7                      |
| m.kg/s   | W        | 9.804                      |

$$Unit_{SI} = Unit_A \times F_{ct}$$

$$Unit_A = Unit_{SI} / F_{ct}$$

### ■ Flow rates

#### Kv coefficient of a valve

$$Kv = \frac{Qv}{\sqrt{\Delta P}}$$

with

Qv: Liquid volume flow rate (m<sup>3</sup>/hr)

$\Delta P$ : Pressure drop (bar)

Kv represents the volume flow rate of water running through the device for a pressure drop of 1 bar.

### ■ Electrical power

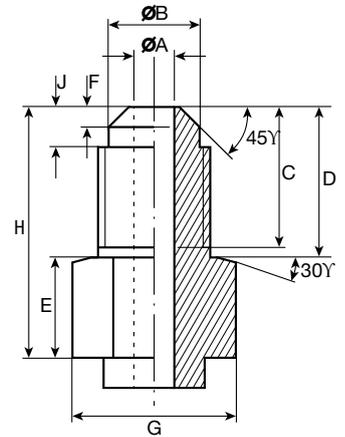
|           |                     |
|-----------|---------------------|
| <b>VA</b> | Volt Ampere         |
| <b>V</b>  | Volt                |
| <b>Ac</b> | Alternating current |
| <b>Hz</b> | Hertz               |
| <b>A</b>  | Ampere              |
| <b>W</b>  | Watt                |



# Drawings and connection features

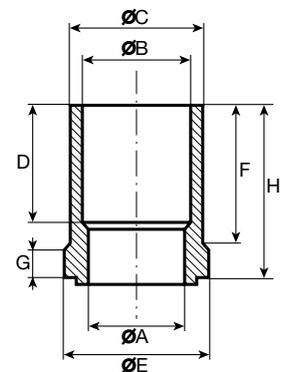
## → TYPE 1 CONNECTIONS

| Connections to screw<br>inch | CARLY size | Number of threads<br>inch | Dimensions mm |    |    |    |    |     |    |    |   |
|------------------------------|------------|---------------------------|---------------|----|----|----|----|-----|----|----|---|
|                              |            |                           | ØA            | ØB | C  | D  | E  | F   | G  | H  | J |
| 1/4 SAE                      | 2          | 7/16 - 20                 | 4             | 9  | 13 | 15 | 10 | 2,0 | 14 | 25 | 4 |
| 3/8 SAE                      | 3          | 5/8 - 18                  | 7             | 13 | 17 | 18 | 10 | 2,5 | 17 | 28 | 5 |
| 1/2 SAE                      | 4          | 3/4 - 16                  | 10            | 16 | 19 | 20 | 10 | 2,5 | 22 | 30 | 5 |
| 5/8 SAE                      | 5          | 7/8 - 14                  | 13            | 18 | 22 | 23 | 9  | 2,3 | 24 | 32 | 5 |



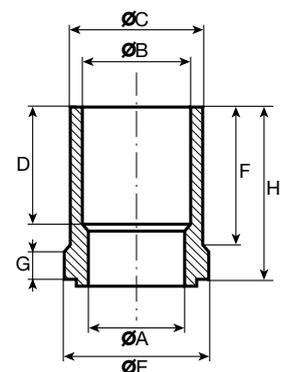
## → TYPE 2 CONNECTIONS (in inches)

| Connections to solder ODF<br>inch | CARLY size | Dimensions mm |       |       |    |    |    |   |    |
|-----------------------------------|------------|---------------|-------|-------|----|----|----|---|----|
|                                   |            | ØA            | ØB    | ØC    | D  | E  | F  | G | H  |
| 1/4                               | 2          | 4,3           | 6,40  | 9,40  | 6  | 14 | 12 | 5 | 20 |
| 3/8                               | 3          | 8,0           | 9,60  | 12,60 | 9  | 14 | 12 | 6 | 20 |
| 1/2                               | 4          | 10,0          | 12,80 | 15,80 | 10 | 22 | 13 | 5 | 20 |
| 5/8                               | 5          | 14,0          | 16,10 | 18,95 | 16 | 22 | 13 | 7 | 22 |
| 3/4                               | 6          | 17,0          | 19,15 | 22,10 | 17 | 27 | 15 | 8 | 25 |
| 7/8                               | 7          | 20,0          | 22,30 | 25,30 | 19 | 34 | 21 | 7 | 32 |
| 1                                 |            | 24,0          | 25,50 | 28,50 | 24 | 34 | 26 | 8 | 37 |



## → TYPE 2 CONNECTIONS (in mm)

| Connections to solder ODF<br>mm | CARLY size | Dimensions mm |      |       |    |    |    |   |    |
|---------------------------------|------------|---------------|------|-------|----|----|----|---|----|
|                                 |            | ØA            | ØB   | ØC    | D  | E  | F  | G | H  |
| 6                               | 2          | 4,3           | 6,1  | 9,40  | 6  | 14 | 12 | 5 | 20 |
| 10                              | 3          | 8,0           | 10,1 | 12,60 | 9  | 14 | 12 | 6 | 20 |
| 12                              | 4          | 10,0          | 12,1 | 15,80 | 10 | 22 | 13 | 5 | 20 |
| 16                              | 5          | 14,0          | 16,1 | 18,95 | 16 | 22 | 13 | 7 | 22 |
| 18                              | 6          | 17,0          | 18,1 | 22,10 | 17 | 27 | 15 | 8 | 25 |
| 22                              | 7          | 20,0          | 22,1 | 25,30 | 19 | 34 | 21 | 7 | 32 |

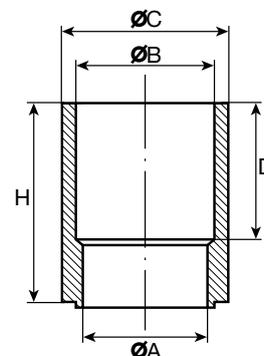




# Drawings and connection features

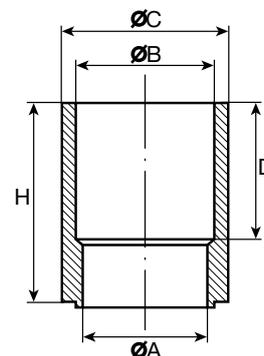
## → TYPE 3 CONNECTIONS *(in inches)*

| Connections to solder ODF<br>inch | CARLY size | Dimensions mm |       |       |    |     |
|-----------------------------------|------------|---------------|-------|-------|----|-----|
|                                   |            | ØA            | ØB    | ØC    | D  | H   |
| 1 1/8                             | 9          | 26,0          | 28,7  | 34,0  | 24 | 37  |
| 1 3/8                             | 11         | 32,0          | 35,0  | 40,0  | 30 | 47  |
| 1 5/8                             | 13         | 38,0          | 41,4  | 45,0  | 30 | 47  |
| 2 1/8                             | 17         | 52,3          | 54,1  | 60,3  | 35 | 62  |
| 2 5/8                             | 21         | 66,1          | 66,8  | 76,1  | 38 | 74  |
| 3 1/8                             | 25         | 76,3          | 79,5  | 88,8  | 45 | 85  |
| 3 5/8                             | 29         | 89,0          | 92,2  | 101,6 | 55 | 92  |
| 4 1/8                             | 33         | 101,7         | 104,9 | 114,3 | 55 | 100 |
| 5 1/8                             |            | 127,1         | 130,3 | 139,7 | 55 | 100 |



## → TYPE 3 CONNECTIONS *(in mm)*

| Connections to solder ODF<br>mm | CARLY size | Dimensions mm |       |       |    |     |
|---------------------------------|------------|---------------|-------|-------|----|-----|
|                                 |            | ØA            | ØB    | ØC    | D  | H   |
| 28                              | 9          | 26,0          | 28,1  | 34,0  | 24 | 37  |
| 35                              | 11         | 32,0          | 35,1  | 40,0  | 30 | 47  |
| 42                              | 13         | 38,4          | 42,1  | 48,3  | 30 | 47  |
| 54                              | 17         | 52,0          | 54,1  | 60,3  | 35 | 62  |
| 67                              | 21         | 66,0          | 67,1  | 76,1  | 38 | 74  |
| 80                              | 25         | 79,0          | 80,1  | 88,8  | 45 | 85  |
| 88.9                            | 29         | 90,0          | 89,0  | 101,6 | 55 | 92  |
| 108                             | 33         | 102,0         | 108,1 | 114,3 | 55 | 100 |
| 130                             |            | 127,1         | 130,1 | 139,7 | 55 | 100 |

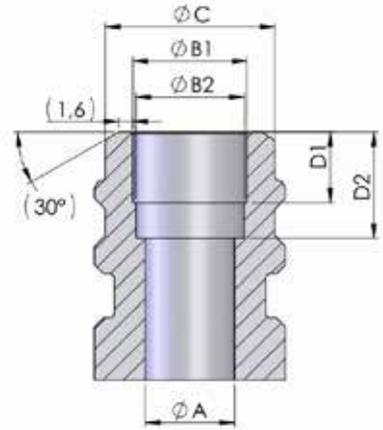




# Drawings and connection features

## → TYPE 4 CONNECTIONS *(in inches and in mm)*

| Connections to solder ODF |    | CARLY size | Dimensions mm |      |      |      |    |    |
|---------------------------|----|------------|---------------|------|------|------|----|----|
| inch                      | mm |            | ØA            | ØB1  | ØB2  | ØC   | D1 | D2 |
| 1/4                       | 6  | 2          | 5,5           | 6,4  | 6,1  | 11,0 | 6  | 10 |
| 3/8                       | 10 | 3          | 8,0           | 10,1 | 9,6  | 14,2 | 6  | 10 |
| 1/2                       | 12 | 4          | 10,0          | 12,8 | 12,1 | 19,0 | 8  | 12 |



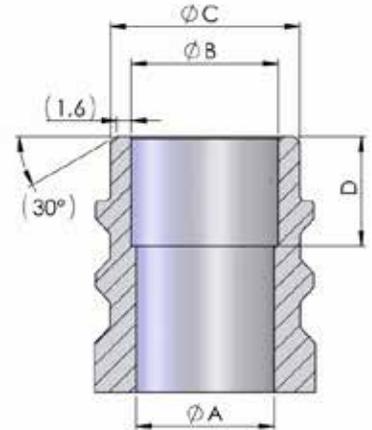
Preparation of the connection ends for:

- Butt-welding according EN 10253
- Brazing according EN 1254

Carbon steel connections - Group 1 or 11 according EN 15608

## → TYPE 5 CONNECTIONS *(in inches and in mm)*

| Connections to solder ODF |    | CARLY size | Dimensions mm |      |      |    |
|---------------------------|----|------------|---------------|------|------|----|
| inch                      | mm |            | ØA            | ØB   | ØC   | D  |
| 5/8                       | 16 | 5          | 15,0          | 16,1 | 20,6 | 12 |
| 3/4                       | -  | 6          | 17,0          | 19,2 | 28,0 | 16 |
| 7/8                       | 22 | 7          | 20,0          | 22,3 | 28,0 | 18 |
| 1 3/8                     | 35 | 11         | 32,4          | 35,1 | 44,0 | 30 |



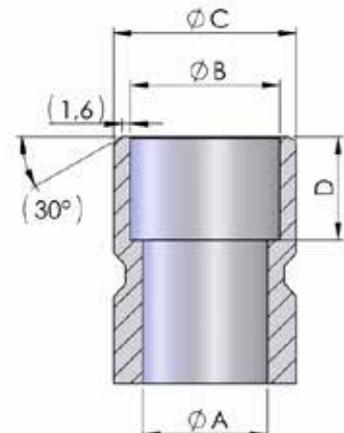
Preparation of the connection ends for:

- Butt-welding according EN 10253
- Brazing according EN 1254

Carbon steel connections - Group 1 or 11 according EN 15608

## → TYPE 6 CONNECTIONS *(in inches and in mm)*

| Connections to solder ODF |    | CARLY size | Dimensions mm |      |      |    |
|---------------------------|----|------------|---------------|------|------|----|
| inch                      | mm |            | ØA            | ØB   | ØC   | D  |
| 1 1/8                     | 28 | 9          | 24,0          | 28,7 | 35,0 | 20 |
|                           |    | 9          | 24,0          | 28,1 | 35,0 | 20 |
| 1 5/8                     | 54 | 13         | 32,0          | 41,4 | 47,9 | 30 |
| 2 1/8                     |    | 17         | 51,0          | 54,2 | 64,5 | 35 |



Preparation of the connection ends for:

- Butt-welding according EN 10253
- Brazing according EN 1254

Carbon steel connections - Group 1 or 11 according EN 15608





## General assembly precautions

### → USE OF CARLY COMPONENTS

- CARLY components are designed for use with CFCs, HCFCs, HFCs and CO<sub>2</sub> as well as with their associated oils and additives; these are non hazardous refrigerants from group 2 of the Pressure Equipment Directive 2014/68/EU. For the use of CARLY components with refrigerants of group I, type hydrocarbons – Propane R290, Butane R600, Isobutane R600a, Propylene R1270, please contact CARLY technical service.
- The label on the products with the CE marking, must remain visible and must not be covered nor damaged.
- Refrigerants used are particularly expansible depending on the temperatures they bear. Consequently, they can produce very important pressure variations, which are function of these temperatures and the areas on which these pressures apply. In consideration of the law of mechanics and fluid thermodynamics, and in order to avoid any phenomenon linked to hydrostatic forces, some precautions are mandatory; for instance, one must ensure that none part of the circuit, and especially none component at any time might be full of liquid without the protection of a device such as a safety valve in order to protect from an overpressure that would exceed the maximum working pressure admissible in this part of the installation. This recommendation especially applies to installations using the technology of sub cooling of the refrigerant. Not respecting this rule may have serious material and corporal consequences.
- Pressure equipments present some danger. During their handling, it is mandatory to take the necessary safety measures and to wear the individual protections according to the regulation in force.
- Only a skilled personal (EN 13313) trained and initiated to interventions on refrigeration installations and pressure equipment, and with the qualifications required by the regulation of the country of use, is authorized to install CARLY components.
- Respect admissible pressures and temperatures, indicated on the label or marked on the products.
- Take all the necessary measures in order to avoid liquid hammer phenomenon, especially at the starting-up of the installation.
- It is important to check regularly the pressure drop due to components, and to replace them as soon as they produce a level of pressure drop that could trouble the right working of the installation.

### → COMPONENT INSTALLATION

- Check that the component and its packaging actually bear the references corresponding to the model selected.
- A close attention must be paid to the preparation and the realization of the assembling, that is to say:
  - Ensure that the tubes are cut in right angle, and that the ends have a perfectly circular shape, without oval ;
  - Eliminate burrs and unevenness due to pipe cut; to be made rather by a pipe cutter than with a saw ;
  - Pipe bending has to be made in a way that avoids modifying the shape of the ends.
- The components and the piping used must be totally clean, dry and sealed at ends, before their use; to that purpose, check that the components' blanking plugs are always properly in place and remove them at the last moment only, just before installing them on the circuit.
- The pipe network of the installation must be as short and compact as possible and must not create oil traps in the lower parts of the network ; suction pipes have to be designed taking into account the oil return to the compressor.
- In order to prevent internal condensation phenomena, the components must be at a temperature higher or equal to the ambient temperature, before being installed.
- Most components have a precise way of mounting that has to be respected, taking into account the direction of the refrigerant flow inside indicated by the word "IN" marked on the inlet end of the component or an arrow printed on the label.
- Ensure that the component is installed at the right place of the installation and mounted in the right direction (horizontal or vertical).
- Components must not support any additional stresses from the pipes or the supports of any type.

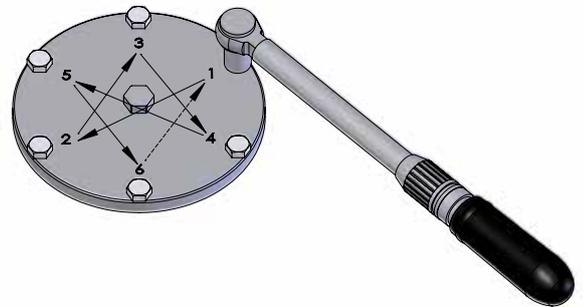


# General assembly precautions

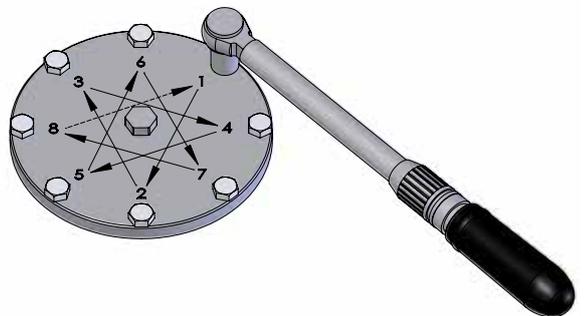
## → COMPONENT INSTALLATION

- When installing components with replaceable elements, or accessible for cleaning, such as: BDCY, BCY, BCT-HP, ACY, BBCY, BACY, HCYBF, TURBOIL-F, provide necessary space for their assembly and disassembly. This dimension is specified in the technical characteristics table of the component.
- **Procedure of tightening crossways for flanges of demountable products**
  - After positioning the gasket in the groove of the flange, put the flange back on the component, position all the screws and tighten them by hand until contact.
  - First tightening pass: must imperatively be done crossways and with a relatively low value (see sketch and values hereafter), in order to properly position the gasket.
  - Second tightening pass: must be able to correct de tightening inhomogeneities; the order of tightening the screws staying the same.
  - From the third to the last tightening pass: it must achieve the desired nominal effort; i.e. the specified torque. The screws tightening must always be done in the same order as previously. To give the gasket the time to creep, it is recommended to wait few minutes before doing the last pass.
  - For components with flanges with 10 holes, six tightening passes are recommended in order to achieve the recommended tightening torque.
  - If dispersions exist between the screws, it is recommended to carry out other passes, until obtaining the correct torque on all the screws.
  - The values of torque tightening and the order for the cross tightening of the screws are as follow:

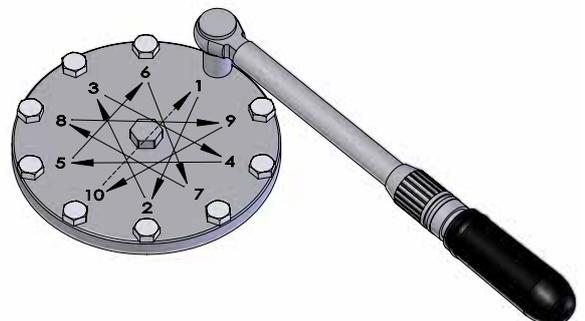
| Tightening for screws M8 CL 10-9 - Flange 6 holes<br>BDCY - TURBOIL-F 2505 S/MMS --> 3011 S/MMS |                               |
|---|-------------------------------|
| Stage 1   | Tightening the screws by hand |
| Stage 2   | Tightening torque : 5 Nm      |
| Stage 3   | Tightening torque : 10 Nm     |
| Stage 4   | Tightening torque : 20 Nm     |
| Stage 5   | Tightening torque : 30 Nm     |



| Tightening for screws M8 CL 10-9 - Flange 8 holes<br>ACY - BCY - TURBOIL-F 15017 S/MMS --> 30025 S-MMS |                               |
|--|-------------------------------|
| Stage 1  | Tightening the screws by hand |
| Stage 2  | Tightening torque : 5 Nm      |
| Stage 3  | Tightening torque : 10 Nm     |
| Stage 4  | Tightening torque : 20 Nm     |
| Stage 5  | Tightening torque : 30 Nm     |



| Tightening for screws M10 CL 10-9 - Flange 10 holes<br>BACY - BBCY - TURBOIL-F 7011 S/MMS --> 9017 S/MMS |                               |
|--|-------------------------------|
| Stage 1  | Tightening the screws by hand |
| Stage 2  | Tightening torque : 5 Nm      |
| Stage 3  | Tightening torque : 10 Nm     |
| Stage 4  | Tightening torque : 20 Nm     |
| Stage 5  | Tightening torque : 35 Nm     |
| Stage 6  | Tightening torque : 45 Nm     |
| Stage 7  | Tightening torque : 55 Nm     |

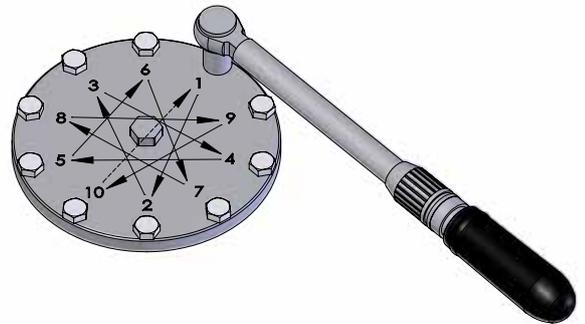




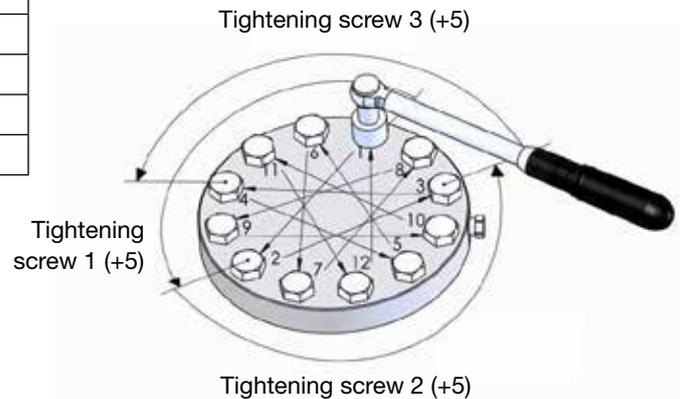
## General assembly precautions

### → COMPONENT INSTALLATION

| Tightening for screws M8 CL 10-9 - Flange 10 holes<br>BCY-P6 |                               |
|--|-------------------------------|
| Stage 1  | Tightening the screws by hand |
| Stage 2  | Tightening torque : 5 Nm      |
| Stage 3  | Tightening torque : 10 Nm     |
| Stage 4  | Tightening torque : 20 Nm     |
| Etape 5  | Tightening torque : 30 Nm     |



| Tightening for screws M 16 CL 8-8 - Flange 12 holes<br>BCY-P14 |                               |
|--|-------------------------------|
| Step 1   | Tightening the screws by hand |
| Step 2   | Tightening torque : 25 Nm     |
| Step 3   | Tightening torque : 50 Nm     |
| Step 4   | Tightening torque : 100 Nm    |



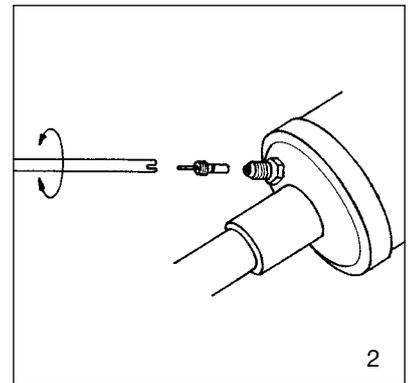
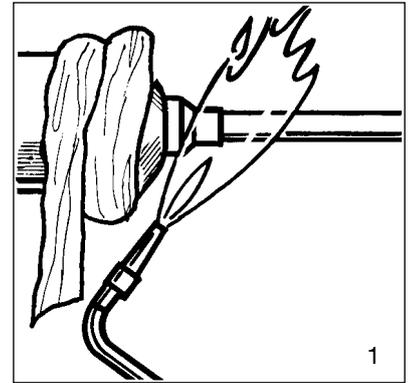
- Before any intervention, ensure among other things that :
  - The electric part of the installation is confined ;
  - The components to be installed are available, in order not to open the circuit by anticipation ;
  - The components are at ambient temperatures in order to avoid burns. If necessary, wear the appropriate protections ;
  - The installation is empty of refrigerant / gas. Vacuum (-1 Bar) can be made in the products during maintenance operations. During an operation of maintenance, the refrigerant / gas of the installation has to be recovered and recycled in conformity with the regulation in force;
  - The components are protected from bumps in order to avoid damages to the paint and the anticorrosion protection ;
  - The components are protected from seismic and fire risks.
- After each installation or replacement of a component, always check that :
  - The air tightness of this component and its assembling on the circuit, according to the regulation in force ;
  - There is no vibration in the pipe.
- Perform all recommended operations according to the art and to the intervention to perform: circuit rinsing, draining, air tightening, depressurization, refrigerant load...
- The persons responsible for commissioning of CARLY components must ensure that these components will never be exposed to vibration stresses that could cause resonance. Such situation would definitely cause breakage that would be harmful for the installation.  
This monitoring must apply most particularly to "on-board" installations.



# General assembly precautions

## → ASSEMBLING COMPONENTS WITH SOLDER CONNECTIONS

- Never braze nor solder on an installation charged with non-confined refrigerant (preferably, the refrigerant has to be stored in the liquid receiver).
- Rigorously clean the internal and external fitting surfaces.
- Ensure that the intake material selected matches the materials and refrigerants used.
- The component's body must imperatively be cooled during brazing: with a humid cloth (**sketch No. 1**), or with **CARLYCOOL** calories discharger (refer to chapter 95) in order not to exceed the maximum working conditions of the product.
- Seals and removable internal elements of CARLY flanged products (**BDCY, BCY, BCY-HP, ACY, BBCY, BACY, FILTRY, VCYLS, VCYR**) must absolutely be removed, before the operation of brazing, and reinstalled only after the heated areas have been cooled to the ambient temperature again.
- Some CARLY components contain "Schrader" type access valves. In the case of brazed components, be careful to remove the internal mechanism of these valves before brazing, in order to preserve the built-in gasket (**sketch No. 2**).
- For the brazing of connections, use a wide flame welding torch; this one has to be adjusted in order to ensure a quick and uniform heating of the connections and be oriented only towards them, avoiding any overheating; an excessive heating of the component paint may produce toxic fumes and trigger serious injuries: the brazing of components has to be performed only in perfectly ventilated areas.
- **ATTENTION:** products of brazing and stripper flows may produce some toxic fumes; read carefully the instructions of the different suppliers and follow their safety rules. It is important to plan an efficient suction at the level of the flame, with an appropriate outlet.
- The intake metal has to melt at the contact of the heated part, and not at the contact of the flame; on a copper tube, it is important to always move the flame in order to avoid any overheating of the tube; the dark red color is an indicator of the limit temperature not to excess; above this temperature, the copper pipe might suffer irreversible damages; in case of parts with different conductivities or weights, a soft pre heating has to be performed on the part with the highest thermal inertia.
- During brazing, use an inert protection gas inside the component (nitrogen for instance) in order to prevent the formation of oxide particles that are going to contaminate the circuit; the protection gas flow must preferably follow the direction of the product flow, in order to avoid damages to sensitive internal elements (**DCYs'** felt-glass filtrating medium, for instance).
- Check the air tightness (with the leak detector **CARLYLOC**) in order to check there is no leak in the different assembling parts and to be in conformity with the regulations in force.
- Eliminate by brushing the residues of brazing fluxes and the possible dirt present outside the heated surfaces.
- A visual check of the brazing made will be the first mandatory control to make, in order to realize the external state of the brazing; it enables to remark the defaults arising on the area (porosity, bad filling, irregular shape of the brazing cord, link defaults).
- After cleaning, protect the heated areas of steel connectors, by the application of paint or other anticorrosion protection products/devices such as **CARLYCOAT**, or cold galvanization, for instance.
- Always close the ends of used components after replacement, in order to avoid the possible release of refrigerants and oils. The elimination of these components must follow the regulations in force.

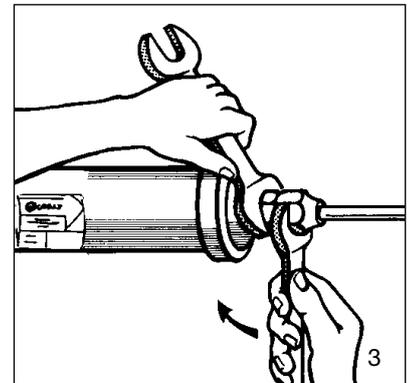




## General assembly precautions

### → ASSEMBLING COMPONENTS WITH SCREW CONNECTIONS

- Never unscrew the components in an installation full of non confined refrigerant (preferably, store the refrigerant in the liquid receiver).
- Systematically check the dudgeon condition on the copper piping, in order to ensure good air tightness of the assembly; if copper gaskets are used, check their good positioning and replace them after each product removal.
- In order to ensure a better confinement of the installations including components with connections to screw on dudgeons, CARLY highly recommends to replace the dudgeon device by the installation of connection sets, type **KRCY**. See photo and chapter 71 of the technical catalogue.
- Tightening of Flare connections should imperatively be performed with two wrenches, positioned on the six faces of the connections, in order to prevent piping twisting (**sketch No. 3**).
- Comply with the tightening torque recommended in the “**Specific recommendations**” chapter for each component concerned.
- Check the air tightness (with the leak detector **CARLYLOC**) in order to check there is no leak in the different assembling parts and to be in conformity with the regulations in force.
- Always close the ends of used components after replacement, in order to avoid the possible release of refrigerants and oils. The elimination of these components must follow the regulations in force.



### → PERIODICAL INTERVENTIONS

- Plan a periodical control as often as necessary and in conformity with the regulation in force, of the installation air tightness and of the state of the refrigerant and the oil (moisture, acidity, dirt...) in order not to trouble the efficiency of the installation.
- Make a visual check of the external area of all components on the circuit, in order to detect:
  - Bumps ;
  - Points of corrosion ;
  - Traces of refrigerant leak ;
  - Seepage of oil ;
  - Traces of moisture or ice in service ;
  - Vibration of the pipes connected to components ;
  - Damages to component supports.

Correct the defaults found.

- Monitor the pressure losses of dehydrating, acid neutralizing and filtering components generally located on the liquid, suction and oil lines. Their contaminant neutralization capacities are by definition limited in time. The saturation and obstruction time depends on the contaminant types and amounts and depends of course on the capacity of the component selected.
- After each opening of the circuit, the **DCY**, or **DDCY**, filter drier or the **CCY 42/48/100 HP** and **PLATINIUM 48/100** drying cores have to be replaced in order to keep the circuit dry enough.
- Replace systematically synthetic air-tightness gaskets after each intervention that requires the dismantling or the opening of flanged products.
- During any intervention, the opening of the refrigeration circuit must be as short as possible; if it were not the case, close the system as hermetically as possible, and charge it with a slight overpressure of dry nitrogen, in order to avoid the introduction of moisture.
- During maintenance operations, the refrigerants of the installation have to be recovered and recycled according to the regulation in force.



# General assembly precautions

## ➔ SPECIAL PRECAUTIONS FOR COMPONENTS USED IN CO<sub>2</sub> SUBCRITICAL APPLICATIONS

- 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<sub>2</sub> for low temperatures applications, generates also high pressures (to take in consideration)
- The implementation on the liquid line of a filter drier **DCY / DCY-P6 / DCY-P14** or of a drier shell **BCY-HP / BCY-P6 / BCY-P14** equipped with drying cores **CCY HP** or **PLATINIUM**, is highly recommended. Serious problems can occur in the presence of moisture, such as expansion valve blocking and formation of dry ice 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<sub>2</sub> at low temperature, provide thermal insulation on the components which can be covered by frost.
- There is no incompatibility between CO<sub>2</sub> 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<sub>2</sub> and polymers. For example, swelling phenomena and internal explosion of the seal are possible. Carly components do not have polymer gaskets directly in contact with CO<sub>2</sub>.



# General sales terms

## ■ Updated in September 2018

### • ARTICLE 1 - SCOPE OF APPLICATION

The present terms and conditions of sale (hereafter CGV) govern the rights and obligations of CARLY REFRIGERATION COMPONENTS SOLUTIONS (hereafter designated as «CARLY RCS») and its customer, an entity acting in the capacity of an informed professional (hereafter designated as «Customer»), having ordered products from CARLY RCS (hereafter designated as «Products»).

In that the products present particular technical specificities, a document called «NOTICE», mentioned in article 10 of the present document, is provided to the Customer before placing any order. This document is available from CARLY RCS upon simple request. It may also be found in the CARLY RCS technical documentation, as well as on the Internet site [www.carly-sa.com](http://www.carly-sa.com).

The Customer acknowledges that it has become familiar with the present CGV and the «NOTICE» before placing its order, which it approves and accepts in all their provisions.

Any order from the Customer placed with CARLY RCS is deemed as its adherence without restriction or reservation to the present CGV and to the «NOTICE», which prevail over its eventual terms and conditions of purchase and over any other document to the contrary.

### • ARTICLE 2 - ESTABLISHMENT OF THE CONTRACT

Any order placed by the Customer is subject to acceptance by CARLY RCS.

The order is considered as firm and definitive from the time of receipt by the Customer of written order confirmation from CARLY RCS, which confirms that said order has been definitively recorded. This confirmation is deemed as the date of establishment of the sales contract and acceptance of the CGV and the NOTICE.

No order confirmed by CARLY RCS may be cancelled by the customer unless this has been approved in writing by CARLY RCS and provided that the Customer fully indemnifies CARLY RCS for any charge or loss borne by it due to this cancellation.

### • ARTICLE 3 - PRICE

The prices of the products sold are those applicable on the order date. They are expressed in Euro and calculated before taxes, free of packaging costs. The final price indicated on the invoice is set according to the specific terms of the order, after applying possible reductions, and after entering the French VAT, as needed, as well as carriage costs on the order date. Any carriage cost shall be negotiated upon the order, as well as any express shipping cost. A sale price scale is available on request.

CARLY RCS reserves the right to change its rates at any time. However, CARLY RCS agrees to charge order products at the prices indicated on the order.

Clients based outside metropolitan France should inquire about import duties and taxes that may apply, and shall be responsible for declaring and paying such duties and taxes.

### • ARTICLE 4 - DELIVERY

Delivery may be made in two ways:

- the Customer takes delivery of the goods ordered in our workshops on the agreed date,
- the delivery is done by a transport company chosen by CARLY RCS. In this case, the timeframes will depend on this company and shall be stated to the Customer, upon request, at the time of order placement.

In any event, the week of shipment indicated at the time of order confirmation is only provided for informational purposes and is under no circumstances guaranteed by CARLY RCS.

As a result, no delay in delivery of the Products authorizes the Customer to refuse receipt, cancel the order, delay the payment date for these Products, or request damages from CARLY RCS.

### • ARTICLE 5 - RISKS INCURRED

All our merchandise, even that delivered carriage free, is sold as accepted in our warehouses. In any event, the transport risk is borne in totality by the Customer, which has responsibility for verifying the apparent condition of the Products delivered and, in case of damage or loss, for stating all reservations in writing on the waybill and to exercising all recourse against the transporters, which are solely responsible.

CARLY RCS is within its rights to refuse a shipment of Products in case of force majeure or in case of refusal of payment by the Customer for a previous order.

### • ARTICLE 6 - CONFORMITY TO THE ORDER

No claim will be acknowledged by CARLY RCS unless it is made within a period of FORTY-EIGHT (48) hours following receipt of the Products, by fax or e-mail and by registered letter, and confirmed on the waybill. Beyond this timeframe, the Products of CARLY RCS shall be deemed as conforming in quantity and quality to the order.

No Product return will be able to take place without written approval from CARLY RCS, which implies no acceptance by CARLY RCS of the grounds alleged by the Customer to support the return of the Products.

In case of a delivery that does not conform to the order, the guarantee from CARLY RCS is limited to the supply of replacement Products, to the exclusion of all damages.

### • ARTICLE 7 - CLAUSE OF RESERVATION OF OWNERSHIP

Ownership of the Products sold shall only be transferred to the Customer after payment of the entire price billed and the VAT. In the event of a collections procedure against the Customer, CARLY RCS reserves the right to reclaim the Products sold and for which payment has not been received. For the duration of the period of reservation of ownership, the risks related to the Products are the responsibility of the Customer once they have been accepted by the transporter or the Customer.

### • ARTICLE 8 - BILLING AND PAYMENT

The minimum order amount is EUR 350 before taxes.

Payments will have to be sent to the Service Comptable (Accounting Department) of CARLY RCS - ZI de Braille - 69380 LISSIEU - FRANCE.

Unless otherwise indicated in writing and agreed by the parties, all invoices are payable in cash before shipment.

The absence of total or partial payment for the Products by the due date results, rightfully and without prior notice, in:

- 1) the application of a late penalty equal to three times the legal rate of interest, being specified that this rate is equal to the interest rate applied by the Central European Bank to its most recent refinancing operation, increased by 10 percentage points, calculated on the amount including tax remaining due, from the payment due date to the date that it is paid in full,
- 2) immediate forfeiture of the term of payment for amounts remaining due to CARLY RCS by the Customer and not yet come due. The eventual discounts and rebates that are separate from the invoices are only due to the Customer to the extent that his payments are up-to-date. Furthermore, any prior payment incidents suspend orders in progress.
- 3) Application of a statutory lump-sum indemnification of € 40 for coverage of collection costs, and full indemnification of costs actually incurred by the company above that amount.

### • ARTICLE 9 - CONFIDENTIALITY

Studies, drawings, schematics and documents given or sent by CARLY RCS shall remain its property. They shall not be disclosed to any third party for any reason, or performed without its written authorisation, under penalty of damages.

### • ARTICLE 10 - CHARACTERISTICS OF THE PRODUCTS - NOTICE

To adapt to any legal or regulatory requirement, French or European, as well as for reasons related to safety and technical progress, CARLY RCS reserves the right to modify the characteristics and design of its Products at any time, as well as of those mentioned in an order. The Customer who has placed an order shall be notified about the abovementioned modifications in writing; his absence of opposition, sent by fax or e-mail and by registered letter, is deemed as acceptance of these modifications.

The specificities of these Products require technical validation by the Customer, which is an informed professional. As a result:

- 1) a document entitled «NOTICE» is attached to any Product description, regardless of the medium, which details said specificities as well as the precautions to be taken by the Customer before any order;
- 2) only the Product effectively sold enters into the contractual scope, to the exclusion of all catalogues or other documentation describing the Products. In that these commercial documents only offer an initial presentation of the Products, in no way do they engage the liability of CARLY RCS, even if they contain errors.

### • ARTICLE 11 - GUARANTEE

**11.1** The Products of CARLY RCS are guaranteed for ONE (1) year starting from the date of shipment. This guarantee is strictly limited to providing a Product to replace the defective Product. This guarantee shall not be taken into account:

- 1) if the material is not used under the conditions as stated in the document called «NOTICE», in the written instructions and in the various technical documents of CARLY RCS,
- 2) if the Customer has not validated the Products beforehand in conformity with the provisions of the NOTICE,
- 3) for deterioration resulting from the addition of equipment and accessories which are not included among the Products of CARLY RCS,
- 4) if the Customer modified the equipment without having informed CARLY RCS and provided an explicit plan followed by a written agreement from CARLY RCS. The guarantee clause will not be able to be invoked in case of negligence, accidental damage or normal wear and tear, as well as in case of non-respect of our recommendations.

**11.2** Under this guarantee, CARLY RCS accepts to provide the Product which replaces the defective Product after an assessment if its responsibility is demonstrated; the scrapped parts shall be the property of CARLY RCS. For countries outside of the European Union, CARLY RCS reserves the right to return the equipment by boat, and takes responsibility for the freight to the port which best suits the Customer. The cost of land transport from the port to the domicile of the Customer shall be its responsibility.

**11.3** In case of default observed during the period of guarantee, it is the responsibility of the Customer to notify CARLY RCS within a period of TWENTY-FOUR (24) hours (otherwise the guarantee will not be able to be applied), and to return the equipment under similar conditions to those of the first shipment, carriage and insurance paid. Proof of said defect is always incumbent upon the Customer. The charges for assembly and disassembly may not be claimed from CARLY RCS. Any returned equipment will obligatorily have to be accompanied by a file which includes the invoice, the conditions of use and the defect observed.

**11.4** Our distributors benefit from the manufacturer's guarantee to the limits stated in their own terms and conditions of sale.

### • ARTICLE 12 - SECONDARY DAMAGES / LIABILITY

**12.1** CARLY RCS is not responsible for expenses incurred by the Customer at the time of intervention on the Products such as, notably, labour charges, movement, loss of liquid refrigerant, transport, etc. At any rate and even in the event the Product guarantee specified in article 11 applies, CARLY RCS' liability shall not be involved other than for damages caused to people and property, excluding any trading loss, loss of stored equipment or other losses. The liability of CARLY RCS is strictly limited, all causes combined, to the supply of the replacement Product; said replacement not suspending the initial guarantee and not under any circumstances prolonging its duration. CARLY RCS is only bound towards its Customer, an informed professional, by an obligation of means, not of results. The Customer agrees to render the contractual limits of liability defined in the present CGV as enforceable against its insurers, its own Customer and their insurers.

**12.2** The Products bought in continuation of the use of the selection assistance software available on CARLY RCS website or CD, benefit from the guarantee aimed under article 11. Nevertheless, the use of the data and the results provided by the software is done under the full, whole and exclusive responsibility of the buyer. It is for the Customer to verify the relevance and accuracy of results and data suggested by the software compared to the installation and the desired use. In particular, company CARLY RCS cannot be held responsible for the consequences (whatever they are) of using the software or of an error of choice in the software use.

### • ARTICLE 13 - RETURN OF PRODUCT

Any return must be approved beforehand in writing by CARLY RCS. Any Product whose return has been accepted will be sent to CARLY RCS under similar conditions to those of the initial shipment, carriage and insurance paid by the Customer. No return may call into question the various payment due dates, even in case of return with involvement of the guarantee, with any payment default being deemed as termination of said guarantee. If equipment is taken back, a reduction of a minimum of THIRTY (30) % shall be taken from the initial purchase price, subject to the returned material being in perfect condition, excluding repackaging charges. The possibility of the return of merchandise does not involve specially manufactured items (not in the catalogue).

### • ARTICLE 14 - ASSIGNMENT OF JURISDICTION / CORRESPONDENCE

The present CGV are drafted in the French language, which is the only applicable version in case of a dispute. They are subject to French law.

Any dispute relative to the interpretation, execution or termination of the contract of sale established between the Customer and CARLY RCS is subject to French law. The invalidity of one of the present provisions shall not result in the invalidity of the other provisions. In the absence of an amicable agreement, the dispute shall be brought before the Commerce Court of LYON.

All correspondence must be sent to the company headquarters of CARLY RCS:

- By postal mail to: CARLY RCS - ZI de Braille - 69380 LISSIEU - FRANCE.
- By fax to: +33 (0)4.78.47.36.98
- By email to: [info@carly-sa.com](mailto:info@carly-sa.com).



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