

USER'S QUICK GUIDE

CPQ – VALVES



In the main CPQ page the user has now also the possibility to choose the sizing tool regarding the valves. This tool replaces the old ExV Lab tool.

The main new features that differentiates the CPQ from the ExV Lab are:

- Possibility to compare the same valve in multiple working points.
- Visualize the whole product code, with info on product features.
- Filter the valve list according to the user's needs.

The CPQ environment works with projects, so the user has to create a new one with all the inputs, such as project name, customer, application, of the case.

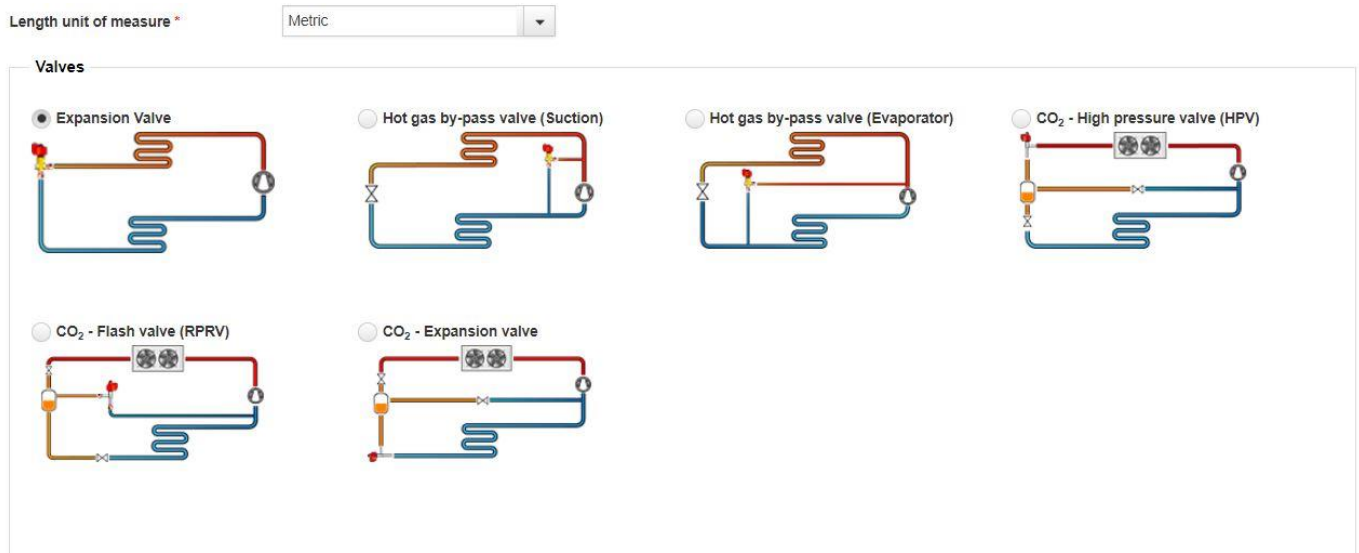
At this stage, the final output of the tool is to provide the user with the whole product code according to the chosen inputs and filter. Pricing and direct order through Carel's system are not active yet.

The new tool is also automatically filtering the valves that exceed maximum operating pressure ratings as well as maximum pressure differentials. The refrigerant compatibility is also taken care of. It is therefore due to be noted that some valves may not be displayed with certain inputs.

We highly suggest to read the technical leaflets available on our website to have a full account of the specifications and limitations.

Beginning

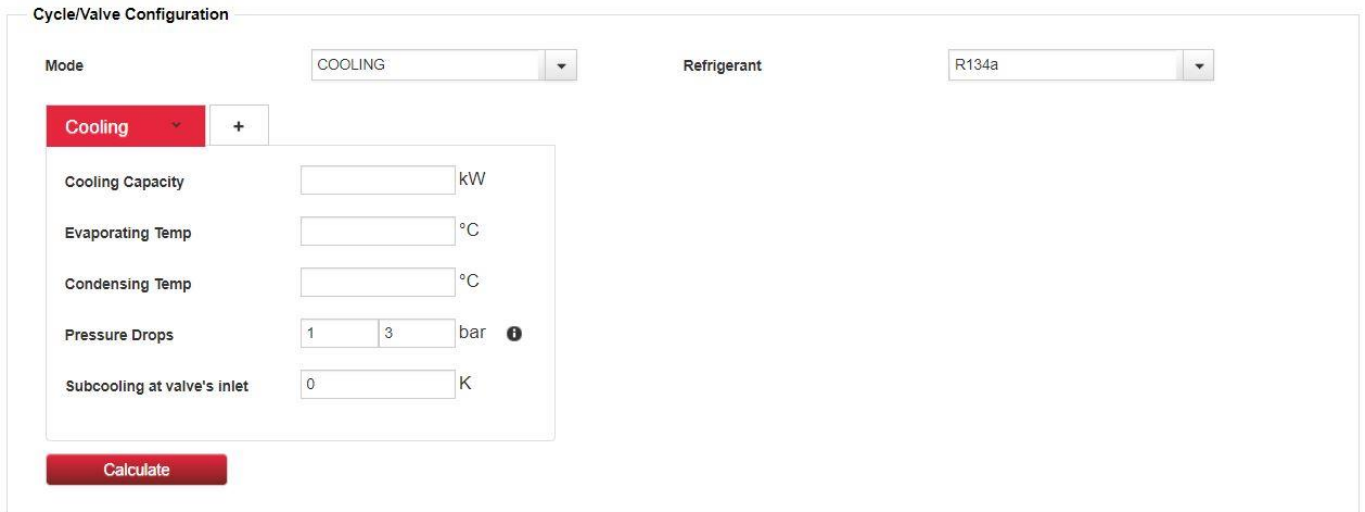
After having created a new project, in the “Design” tab the user can actually start the sizing of the valve accordingly to its use. In the top part of the page the user is asked to choose the unit measure (Metric or Imperial) and the type of valve, based on its use.



The circuit image related to each valve is an illustrative example, and together with the name, it is meant for the user to better understand the type of usage of the valve. Each section has its own input.

Expansion valve

When “Expansion valve” is selected the following blank scheme is shown.

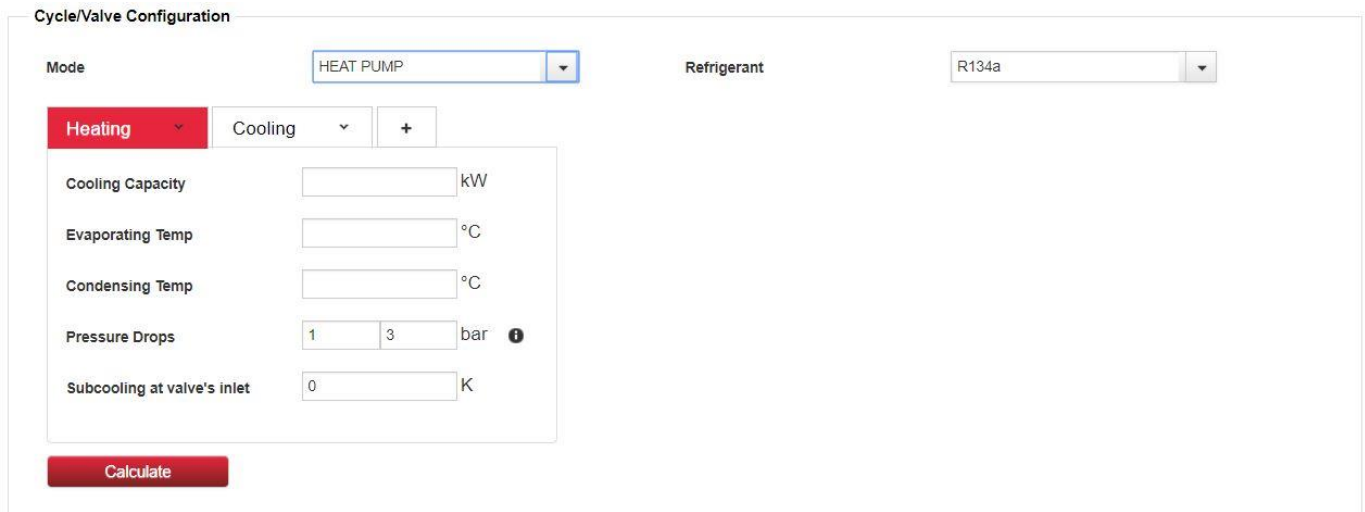


The screenshot shows the 'Cycle/Valve Configuration' window. At the top, 'Mode' is set to 'COOLING' and 'Refrigerant' is 'R134a'. Below this, a red tab labeled 'Cooling' is selected, with a '+' button next to it. The main configuration area contains the following fields:

- Cooling Capacity: [] kW
- Evaporating Temp: [] °C
- Condensing Temp: [] °C
- Pressure Drops: 1 [] 3 [] bar ⓘ
- Subcooling at valve's inlet: 0 [] K

A red 'Calculate' button is located at the bottom left of the configuration area.

The “Mode” window is just an aid for the user, if “Cooling” is selected, a working point named so is shown, while if “Heat Pump” is selected, the following scheme is displayed.



The screenshot shows the 'Cycle/Valve Configuration' window. At the top, 'Mode' is set to 'HEAT PUMP' and 'Refrigerant' is 'R134a'. Below this, a red tab labeled 'Heating' is selected, with a 'Cooling' tab and a '+' button next to it. The main configuration area contains the following fields:

- Cooling Capacity: [] kW
- Evaporating Temp: [] °C
- Condensing Temp: [] °C
- Pressure Drops: 1 [] 3 [] bar ⓘ
- Subcooling at valve's inlet: 0 [] K

A red 'Calculate' button is located at the bottom left of the configuration area.

The two opened tabs help the user to size the valve according to both the working points.

The user is free to rename, add, and erase more working points if it is needed. The following example show three working points, named “Minimum”, “Maximum”, “Middle”. More can be added.

Cycle/Valve Configuration

Mode: COOLING Refrigerant: R134a

< Minimum Maximum Middle >

Cooling Capacity: [] kW

Evaporating Temp: [] °C

Condensing Temp: [] °C

Pressure Drops: 1 [] 3 [] bar ⓘ

Subcooling at valve's inlet: 0 [] K

Calculate

Default values are set in the pressure drops inputs and in the subcooling input. A pop-up window can help referring to which side of the circuit the pressure drop are related to.

Cycle/Valve Configuration

Mode: COOLING Refrigerant: R134a

< Minimum Maximum Middle >

Cooling Capacity: [] kW

Evaporating Temp: [] °C

Condensing Temp: [] °C

Pressure Drops: HP Side LP Side bar ⓘ

Subcooling at valve's inlet: 0 [] K

Calculate

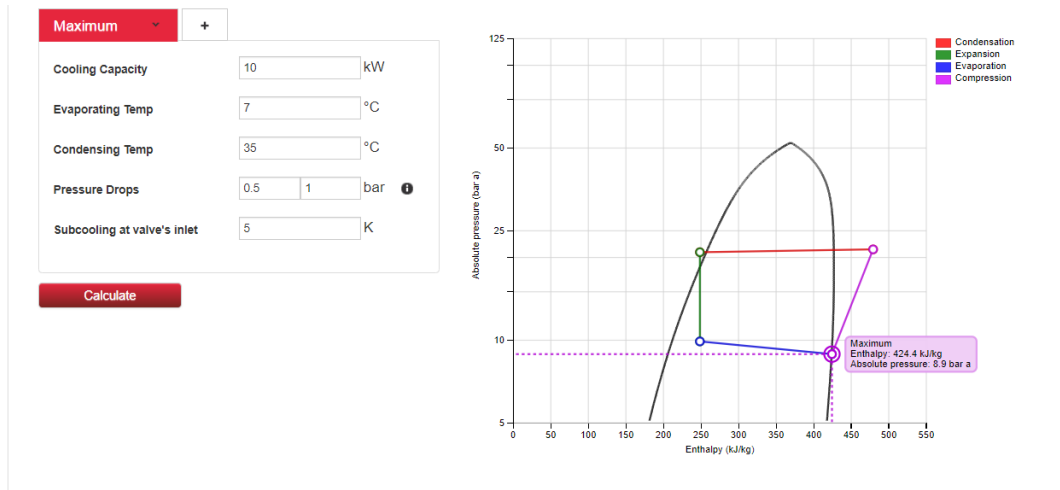
LP = "Distributor + Evaporator + Suction"

HP = "Discharge + Condenser + Liquid"

These features shown up to here are common for all valves selections.

After having chosen the thermodynamic condition of the cycle, press the “Calculate” button. Two parts appear :

- The thermodynamic cycle on the pressure – enthalpy diagram.
- The valve list with all the main features and the possibility to filter.



Suggested Valves

Reset filters

Total Valves: 167

| Code | Description | Sight Glass | Stator Included | Max Temp. (°C) | Fitting | Working point (%) | Quantity | Capacity |
|------------|--|-------------|-----------------|----------------|----------------|-------------------|----------|----------------------|
| E2V18CS100 | ELECTRONIC EXPANSION VALVE E2V18-C 13-13 S. STEEL HIGH PRESSURE | w/o SG | YES | 70 | Ø13-Ø13 mm ODF | 87 | 0 | View |
| E2V18CWAC0 | ELECTRONIC EXPANSION VALVE E2V18-C 3/8" - 3/8" ODF HIGH PRESSURE W/O STATOR | w/o SG | YES | 70 | 3/8"-3/8" ODF | 87 | 0 | View |
| E2V18CWAC1 | ELECTRONIC EXPANSION VALVE E2V18-C 3/8" - 3/8" ODF HIGH PRESSURE W/O STATOR 10 PCS | w/o SG | YES | 70 | 3/8"-3/8" ODF | 87 | 0 | View |
| E2V18CS001 | ELECTRONIC EXP VALVE E2V18C 10-10 STEEL HIGH PRESSURE 10PCS | w/o SG | YES | 70 | Ø10-Ø10 mm | 87 | 0 | View |

The valve’s list may be long or not appearing at all, according to the user’s inputs. Using the filtering options the user can shrink the list if it is too long.

Suggested Valves

Reset filters

Total Valves: 1

| Code | Description | Sight Glass | Stator Included | Max Temp. (°C) | Fitting | Working point (%) | Quantity | Capacity |
|------------|---|-------------|-----------------|----------------|------------|-------------------|----------|----------------------|
| E2V18CS001 | ELECTRONIC EXP VALVE E2V18C 10-10 STEEL HIGH PRESSURE 10PCS | w/o SG | YES | 70 | Ø10-Ø10 mm | 87 | 0 | View |

Motor Type

UNIPOLAR

BIPOLAR

Body

HERMETIC

DEMOUNTABLE

Fitting Unit

SAE SI

Fitting Material

BRASS

COPPER

BRASS/COPPER

STAINLESS STEEL

Package

ONE PACK

MULTIPACK (10PCS)

Certification

CE UL

With more multiple point configured, the user is able to appreciate more cycles on the thermodynamic chart and, for each valve, both the working points.

Maximum ▼ **Minimum** ▼ +

Cooling Capacity kW

Evaporating Temp °C

Condensing Temp °C

Pressure Drops bar ⓘ

Subcooling at valve's inlet K

Calculate

Suggested Valves

Total Valves: 144

Reset filters

Motor Type

UNIPOLAR

BIPOLAR

| Code | Description | Sight Glass | Stator Included | Max Temp. (°C) | Fitting | Working point (%) | Quantity | Capacity |
|------------|---|-------------|-----------------|----------------|-----------------|-------------------|---|-------------|
| E2V18CS100 | ELECTRONIC EXPANSION VALVE E2V18-C 13-13 S.STEEL HIGH PRESSURE | w/o SG | YES | 70 | Ø13-Ø13 mm ODF | 79 - 87 | 0 <input type="text"/> <input type="text"/> | View |
| E2V18CWAC0 | ELECTRONIC EXPANSION VALVE E2V18-C 3/8" - 3/8" ODF HIGH PRESSURE W/O STATOR | w/o SG | YES | 70 | 3/8" - 3/8" ODF | 79 - 87 | 0 <input type="text"/> <input type="text"/> | View |

Moreover, the working point/s can be visualized on the equal-percentage flow characteristic, which is typical of Carel’s valves. The user has to click on the “View” button on the “Capacity” column of the valve’s list.

Suggested Valves

Reset filters

Motor Type

UNIPOLAR

BIPOLAR

Body

HERMETIC

DEMOUNTABLE

Fitting Unit

SAE SI

Fitting Material

BRASS

COPPER

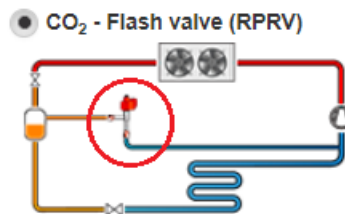
BRASS/COPPER

Capacity Diagram

| Working point (%) | Quantity | Capacity |
|-------------------|---|-------------|
| 79 - 87 | 0 <input type="text"/> <input type="text"/> | View |
| 79 - 87 | 0 <input type="text"/> <input type="text"/> | View |
| 79 - 87 | 0 <input type="text"/> <input type="text"/> | View |
| 79 - 87 | 0 <input type="text"/> <input type="text"/> | View |
| 79 - 87 | 0 <input type="text"/> <input type="text"/> | View |
| 79 - 87 | 0 <input type="text"/> <input type="text"/> | View |
| 79 - 87 | 0 <input type="text"/> <input type="text"/> | View |
| 79 - 87 | 0 <input type="text"/> <input type="text"/> | View |
| 58 - 66 | 0 <input type="text"/> <input type="text"/> | View |
| 58 - 66 | 0 <input type="text"/> <input type="text"/> | View |

With the other types of valves the sizing procedure is the same, the inputs change according to the application.

Exception made for the “Expansion valve” selection, in the other circuits more valves are shown. The user is sizing the valve represented by the Carel’s valve image. The following example highlights that the user is sizing the flash gas valve (RPRV) on a CO₂ circuit, and not the HPV valve neither the expansion valve.



Subcritical - Transcritical

A note has to be made for the CO₂ High Pressure Valve (HPV) and CO₂ Expansion Valve selections.

In order to meet user’s demands, for these two valves selections the user can switch to a transcritical or subcritical expansion. The user has to select the “Mode” and then insert proper inputs according to the expansion mode and inputs requirements.

Limits regarding the transcritical input are shown in the pop-up windows next to the input windows.

The next image shows the transcritical inputs for the CO₂ High Pressure Valve (HPV) selection.

Cycle/Valve Configuration

Config_1 +

Mode: Transcritical

Mass Flow: kg/s

Gas Cooler Outlet Pressure: barg **Pressure range : 74 - 140 bara**

Gas Cooler Outlet Temp: °C

Receiver Pressure: barg

Calculate

The next image instead, shows the subcritical inputs for the CO₂ High Pressure Valve (HPV) selection.

Cycle/Valve Configuration

Config_1 +

Mode: Subcritical

Mass Flow: kg/s

Condensing Temp: °C

Subcooling at valve's inlet: 0 K

Receiver Pressure: barg

Calculate