SANHUA Selection Software

Valid for version 00.5x BETA

SANHUA

CHILLING IDEAS WORLWIDE

CONTENTS

1. INSTALLATION

Open the archive file (.zip) called “Sanhua Selection Software rev.xx” using the software “winzip”or similar. Select the path where to extract all the software files. Automatically the software will create a new folder with the same name of the archive file, so called “Sanhua Selection Software rev.xx”.

2. WELCOME WINDOW

Start the selection tool, opening the file called “Sanhua Selection Software.exe” present in the folder where the software is stocked. Immediately on the screen will appear the following initial window (Fig. 1). The “welcome window” shows in the lower right corner the Software Version and Database Version of the selection tool actually used.
Click the “START” button present in central lower side of the “welcome window” to move in the product type selection window where it is possible to select the requested product family.

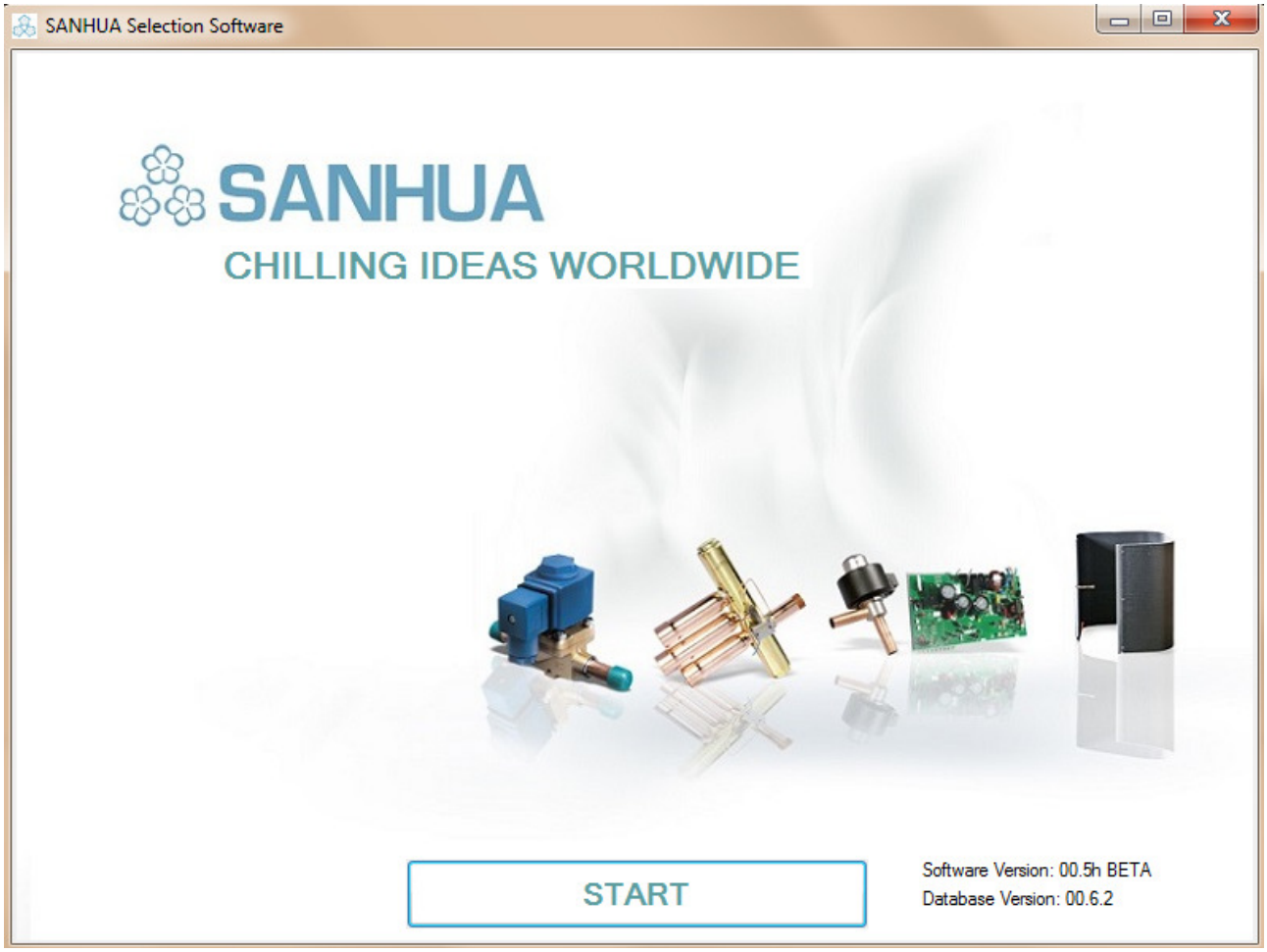


Fig.1 – Welcome Window

3. PRODUCT TYPE SELECTION WINDOW

The “Product Selection Window” (Fig.2) presents on the upper side a tool strip bar with a series of commands containing general information and some tools, useful to set correctly all the selection software parameters. All the commands will be described in details in the next paragraphs of this chapter.

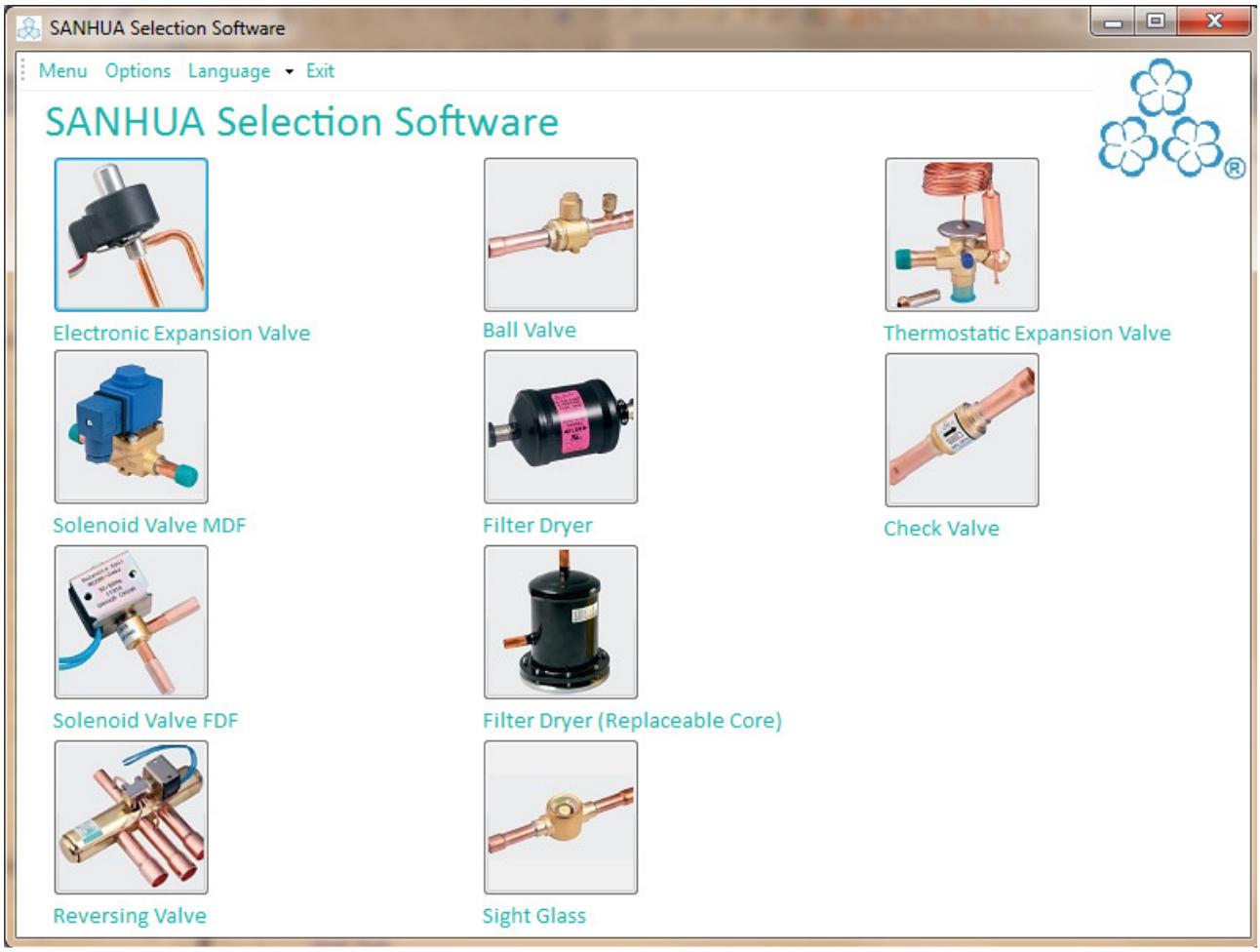


Fig.2 – Product Selection Window

3.1 Commands on the Tool Strip Bar: Menu

Clicking on the “Menu” button present in the tool strip bar will appear a new window with general information about Sanhua responsibilities related to the correct use of the Selection Software. To close the information window, click the “Return button” present on the lower right corner and described by a green arrow.

3.2 Commands on the Tool Strip Bar: Options

Clicking on the "Options" button present in the tool strip bar will appear a new window called "Settings" (fig.3). This windows permits to the user to select and to save all the preferences (customized settings); the procedure to register the new settings is the following one:

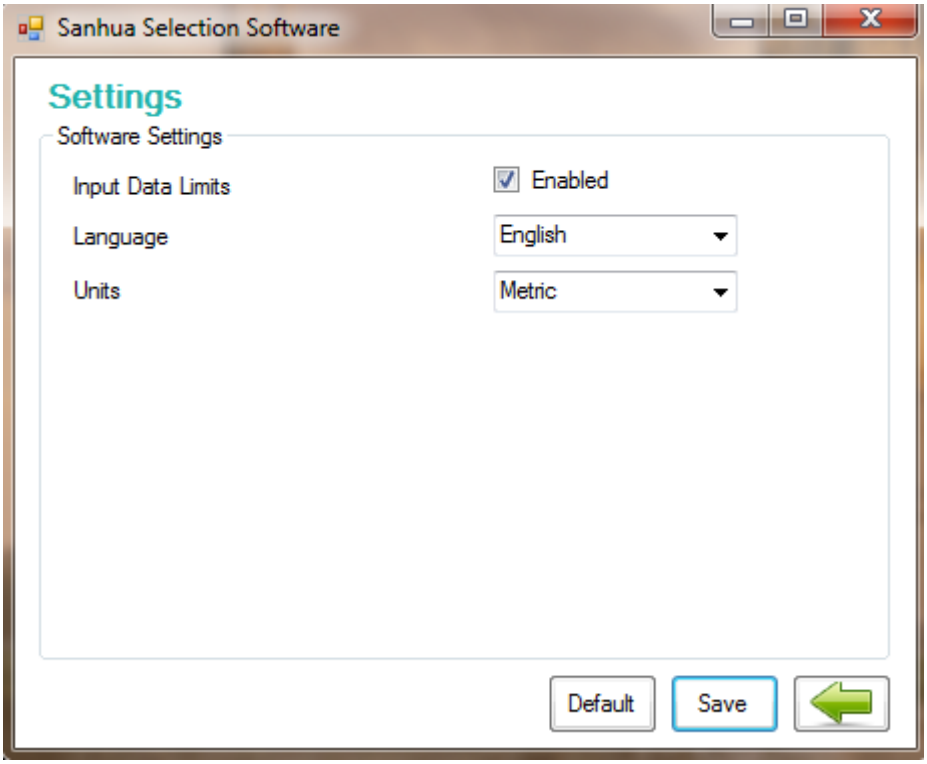


Fig.3 – Settings Window

a. Set the "Input Data Limits":
   Flag checked = Control limits on the input data box ENABLED
   Flag not checked = Control limits on the input data box DISABLED*

   ** Disabling the input limits control can be risky because the products performances calculation outside the official limits can produce not reliable results. This activity must be done under the supervision of Sanhua technicians.*

b. Set the "Language":
   Choose the preferred language: when the software will be restarted all the text will be shown in the selected language. Changing the language in the "Setting Window" the text language will not change immediately: to do this activity it is necessary to use the button "Languages" present in the tool strip bar (see paragraph 3.3)

c. Set the "Units":
   Choose the preferred units system (Metric or US units)*.

   ** In the "BETA" version of the software it is possible to select only Metric units*

In order to confirm the new settings click on the button “Save”. The new settings will be registered in the database, and they will be loaded when the software will be restarted.
It is possible to restore the default setting clicking the “Default” button: the default settings are:

a. Input Data Limits: ENABLED
b. Language: English
c. Units: Metric

It is not necessary to click on “Save” button to register the default settings.

3.3 Commands on the Tool Strip Bar: Languages

Clicking on the “Languages” button present in the tool strip bar will appear a drop-down menu where it is possible to change the language used in the present moment by the software. The available languages are:

a. English (English)
b. German (Deutsch)
c. French (Français)
d. Italian (Italiano)
e. Spanish (Español)
f. Chinese (中國的)
g. Russian (русский)
h. Japanese (日本の)
i. Korean (한국의)

3.4 Commands on the Tool Strip Bar: Exit

Clicking on the “Exit” button present in the tool strip bar it is possible to exit the software.

3.5 Product Selection

To choose the product type that the user wants to select, click on the picture button that represents the requested family of products. Actually the selection software permits to choose between the following product types:

a. Electronic Expansion Valves
b. Solenoid Valves – MDF Series
c. Solenoid Valves – FDF Series
d. Four Ways Reversing Valves
e. Ball Valves
f. Filter Dryer (Unidirectional and Bi-Flow)
g. Filter Dryer (with Replaceable Core)
h. Sight Glasses
i. Thermostatic Expansion Valves
j. Check Valves

4. CALCULATION WINDOW

4.1 Electronic Expansion Valves

After pressing the “Electronic Expansion Valve” button present on the “Product Selection Window”, will appear the “EEV Calculation Window” (Fig.4)

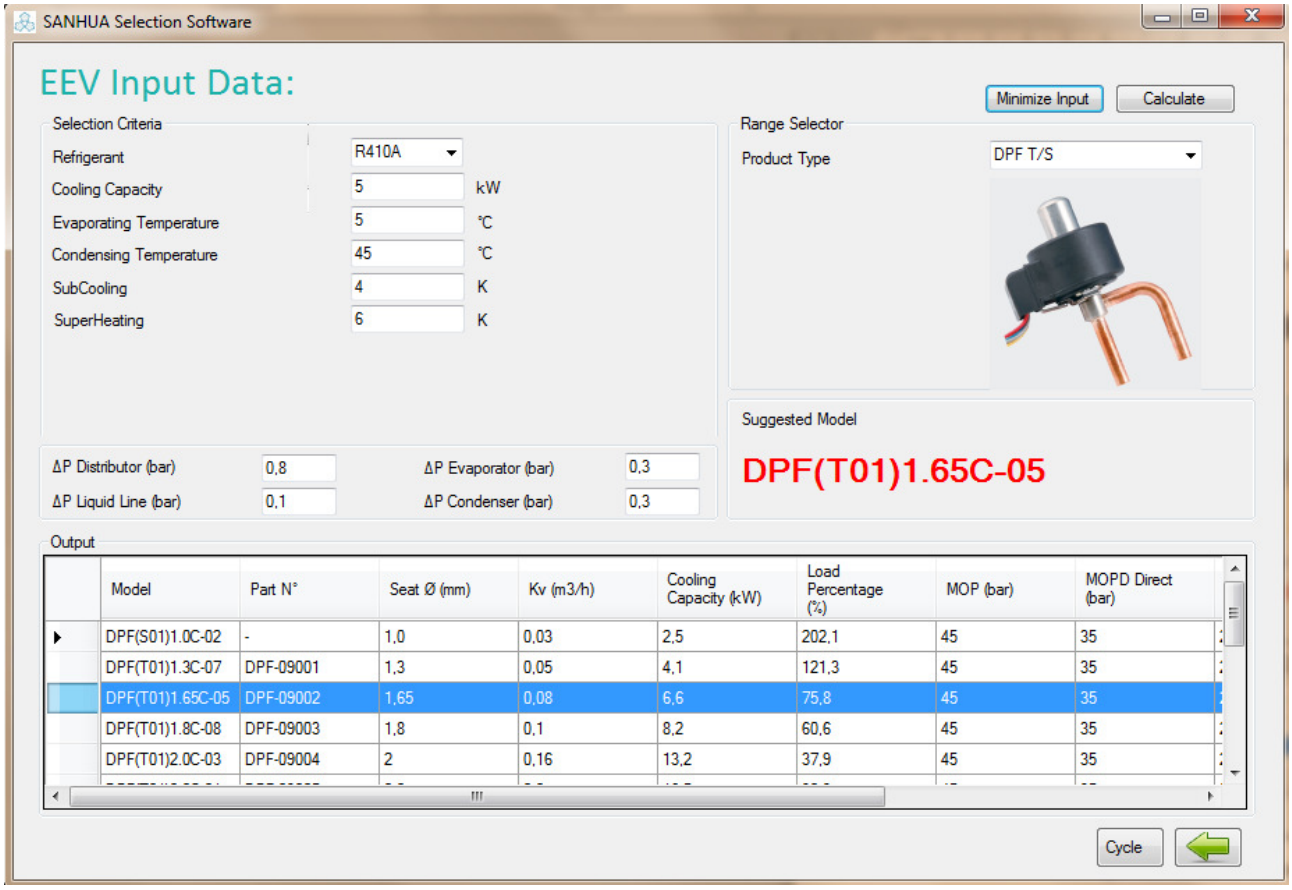


Fig.4 – EEV Calculation Window

As default the software shows only the input boxes present in the “Selection Criteria” area. The basic requested input data are:

a. Refrigerant Type
b. Requested Cooling Capacity
c. Evaporating Temperature
d. Condensing Temperature
e. Super-Heating
f. Sub-Cooling

Pushing the “Expand Input” button present on the upper right corner of the window, it is possible to expand the input mask, adding four additional input box. The further variables are:

g. Pressure drop in the distribution line (ΔP Distributor)
h. Pressure drop in the liquid line (ΔP Liquid Line)
i. Pressure drop in the Evaporator (ΔP Evaporator)
j. Pressure drop in the Condenser (ΔP Condenser)

The software can make the EEV selection also if the additional input values are hidden; in this case for the four mentioned variables, will be used the default values shown in Fig.4.
After the definition of all the requested input variables, push the "Calculate" button present on the upper right corner of the window. In the Output table the tool will show the performances of all the Electronic Expansion Valves (DPF series) available in the standard Sanhua range. The Output table is formed by the following columns:

1. Model: Described the Name of the product
2. Part Number: Described the order Code or Part Number of the product
3. Seat Ø: Described the seat diameter of the valve
4. Kv (m3/h): Described the Flux Coefficient of the valve (m3/h)
5. Cooling Capacity: Described the Max. Cooling Capacity under the set conditions
6. Load Percentage: Described the load percentage of the valve*
7. MOP: Described the Max. Operative Pressure
8. MOPD Direct: Described the Max. Operating Pressure Difference in direct way
9. MOPD Reverse: Described the Max. Operating Pressure Difference in reverse way
10. Coil Model: Described the Name of the coil associated to the EEV
11. Coil Part Number: Described the order Code or Part Number of the coil

* the Load Percentage (%) is calculated as: (Requested Capacity / Nominal Capacity)*100

The software suggests the EEV model according to the requested cooling capacity admitting a tolerance on load percentage equal to 5%. This means that the software suggests a valve size until a load percentage of 105%. The suggested model is highlighted with a blue line on the output table and it is also reported in red bold text on a specific output area.
It is possible to see the refrigerant cycle data pushing the button "Cycle" (see paragraph 5)
To return on the Product Selection Window (Fig.2) push the green arrow button.

4.2 Solenoid Valves – MDF Series

After pressing the “Solenoid Valve MDF” button present on the “Product Selection Window”, will appear the “MDF Calculation Window” (Fig.5)

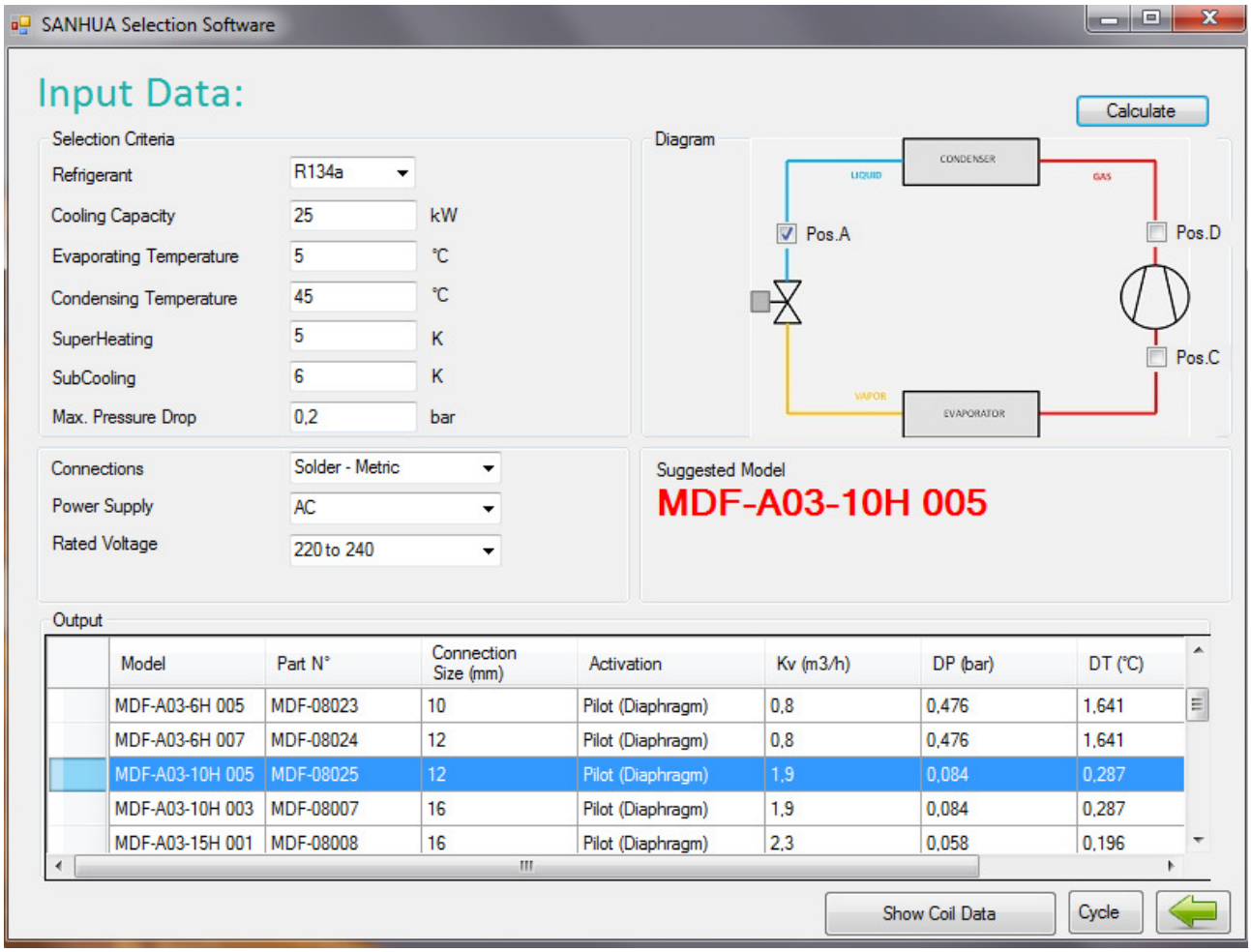


Fig.5 – MDF Calculation Window

The input boxes present in the “Selection Criteria” area permit to introduce the following basic requested input data:

a. Refrigerant Type
b. Requested Cooling Capacity
c. Evaporating Temperature
d. Condensing Temperature
e. Super-Heating
f. Sub-Cooling
g. Max. Pressure Drop admitted for the solenoid valve

It is also necessary to define the installation position of the solenoid valve in the cooling cycle selecting one of the three flags present on the diagram. The installation position can be chosen from the following locations: Liquid line, Suction line, Discharge line.

In order to define correctly the valve and electrical coil model it is necessary to select one of the proposed options for each of the following valve characteristics:

h. Connections: Type of connections for the valve body
i. Power Supply: Electrical power supply for the coil (AC or DC)
j. Rated Voltage: Rated Voltage for the coil (in Volt)

After the definition of all the requested input variables, push the "Calculate" button present on the upper right corner of the window. In the Output table the tool will show the performances of all the Solenoid Valves (MDF series) filtered according to the set characteristics. The Output table is formed by the following columns:

1. Model: Described the Name of the product
2. Part Number: Described the order Code or Part Number of the product
3. Connection Size: Described the connections size diameter of the valve body
4. Activation: Described the activation system used in the valve body
5. Kv (m3/h): Described the Flux Coefficient of the valve (m3/h)
6. Pressure Drop (ΔP): Described the Pressure drop (in bar) under the set conditions
7. Pressure Drop (ΔT): Described the Temperature drop (in °C) under the set conditions*
8. PED Category: Described the PED Category of the valve

* this value depends by the registered pressure drop (bar)

The software suggests the solenoid valve model according to the requested cooling capacity and the maximum accepted pressure drop. It admits a tolerance on pressure drop equal to 20%. This means that the software suggests a valve size until the calculated pressure drop is equal to 120% of the max. pressure drop set on the input box. The suggested model is highlighted with a blue line on the output table and it is also reported in red bold text on a specific output area.
It is possible to see the refrigerant cycle data pushing the button "Cycle" (see paragraph 5).
After the output visualization the software shows near the "Cycle" button, another button called "Show Coil Data". Clicking it, the output table shows the technical data of the electrical coil to be used with the selected solenoid valve. The coil output data are:

a. Coil Model: Described the Coil name
b. Coil Part Number: Described the Coil part number
c. Rated Voltage: Described the Rated Voltage for the coil (in Volt)
d. Power Supply: Described the power supply for the coil (AC or DC)
e. Absorbed Power – 50Hz: Described the absorbed power: AC coil with 50Hz
f. Absorbed Power – 60Hz: Described the absorbed power: AC coil with 60Hz
g. Absorbed Power – DC: Described the absorbed power: DC coil

The suggested coil model is highlighted with a blue line on the output table and it is also reported in red bold text on a specific output area below the Valve suggested model.
To return on the Valve body output window push the "Hide Coil Data" button.
To return on the Product Selection Window (Fig.2) push the green arrow button.

4.3 Solenoid Valves – FDF Series

After pressing the "Solenoid Valve FDF" button present on the "Product Selection Window", will appear the "FDF Calculation Window" (Fig.6)

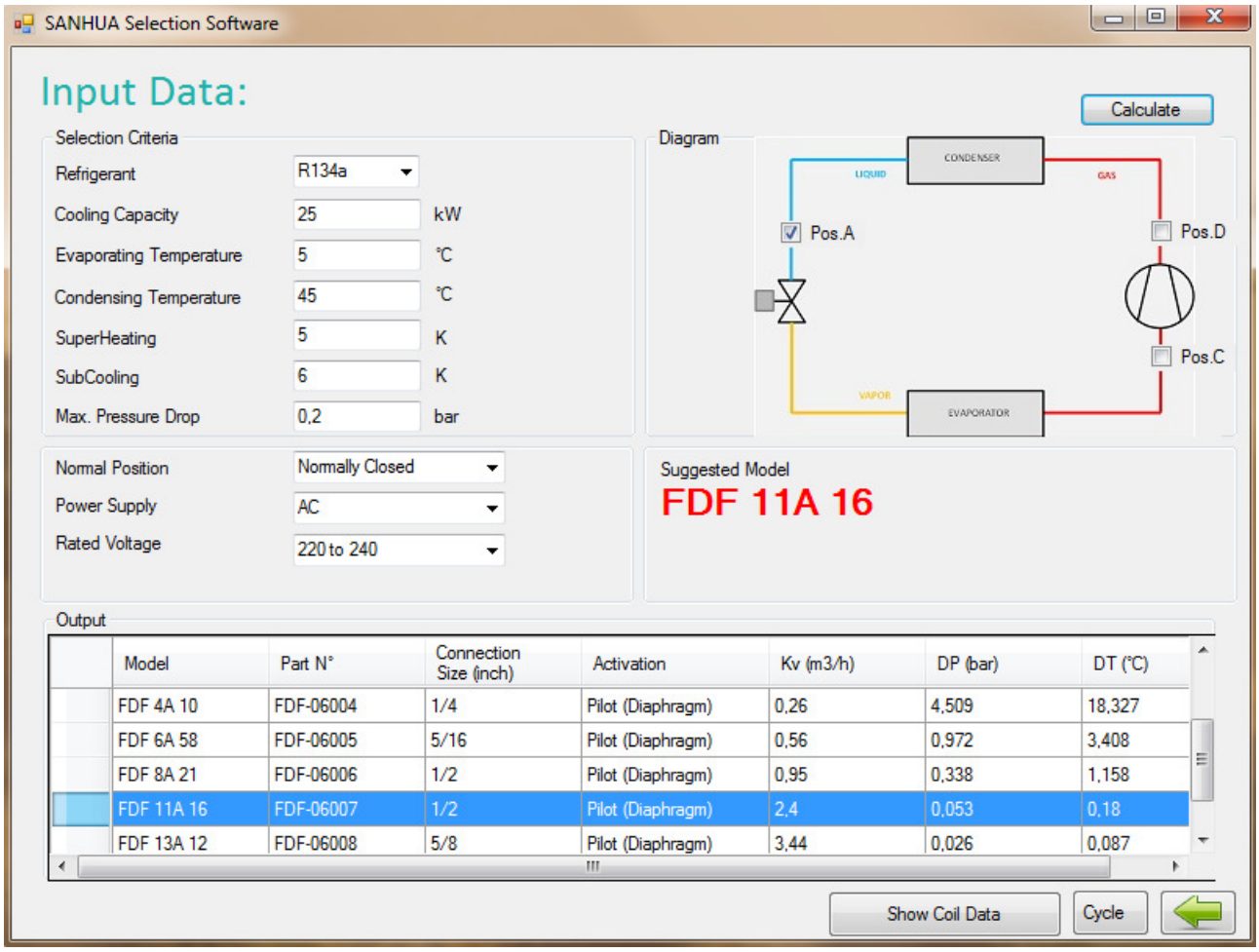


Fig.6 – FDF Calculation Window

The input boxes present in the "Selection Criteria" area permit to introduce the following basic requested input data:

a. Refrigerant Type
b. Requested Cooling Capacity
c. Evaporating Temperature
d. Condensing Temperature
e. Super-Heating
f. Sub-Cooling
g. Max. Pressure Drop admitted for the solenoid valve

It is also necessary to define the installation position of the solenoid valve in the cooling cycle selecting one of the three flags present on the diagram. The installation position can be chosen from the following locations: Liquid line, Suction line, Discharge line.

In order to define correctly the valve and electrical coil model it is necessary to select one of the proposed options for each of the following valve characteristics:

h. Normal Position: Steam position with not-energized coil (NC or NO)
i. Power Supply: Electrical power supply for the coil (AC)
j. Rated Voltage: Rated Voltage for the coil (in Volt)

After the definition of all the requested input variables, push the “Calculate” button present on the upper right corner of the window. In the Output table the tool will show the performances of all the Solenoid Valves (FDF series) filtered according to the set characteristics. The Output table is formed by the following columns:

1. Model: Described the Name of the product
2. Part Number: Described the order Code or Part Number of the product
3. Connection Size: Described the connections size diameter of the valve body
4. Activation: Described the activation system used in the valve body
5. Kv (m3/h): Described the Flux Coefficient of the valve (m3/h)
6. Pressure Drop (ΔP): Described the Pressure drop (in bar) under the set conditions
7. Pressure Drop (ΔT): Described the Temperature drop (in °C) under the set conditions*

* this value depends by the registered pressure drop (bar)

The software suggests the solenoid valve model according to the requested cooling capacity and the maximum accepted pressure drop. It admits a tolerance on pressure drop equal to 20%. This means that the software suggests a valve size until the calculated pressure drop is equal to 120% of the max. pressure drop set on the input box. The suggested model is highlighted with a blue line on the output table and it is also reported in red bold text on a specific output area.
It is possible to see the refrigerant cycle data pushing the button “Cycle” (see paragraph 5).
After the output visualization the software shows near the “Cycle” button, another button called “Show Coil Data”. Clicking it, the output table shows the technical data of the electrical coil to be used with the selected solenoid valve. The coil output data are:

a. Coil Model: Described the Coil name
b. Coil Part Number: Described the Coil part number
c. Rated Voltage: Described the Rated Voltage for the coil (in Volt)
d. Power Supply: Described the power supply for the coil (AC or DC)
e. Absorbed Power – 50Hz: Described the absorbed power: AC coil with 50Hz
f. Absorbed Power – 60Hz: Described the absorbed power: AC coil with 60Hz

The suggested coil model is highlighted with a blue line on the output table and it is also reported in red bold text on a specific output area below the Valve suggested model.
To return on the Valve body output window push the “Hide Coil Data” button.
To return on the Product Selection Window (Fig.2) push the green arrow button.

4.4 Four Ways Reversing Valves

After pressing the “Reversing Valve” button present on the “Product Selection Window”, will appear the “Four Ways Reversing Valve Calculation Window” (Fig.7)

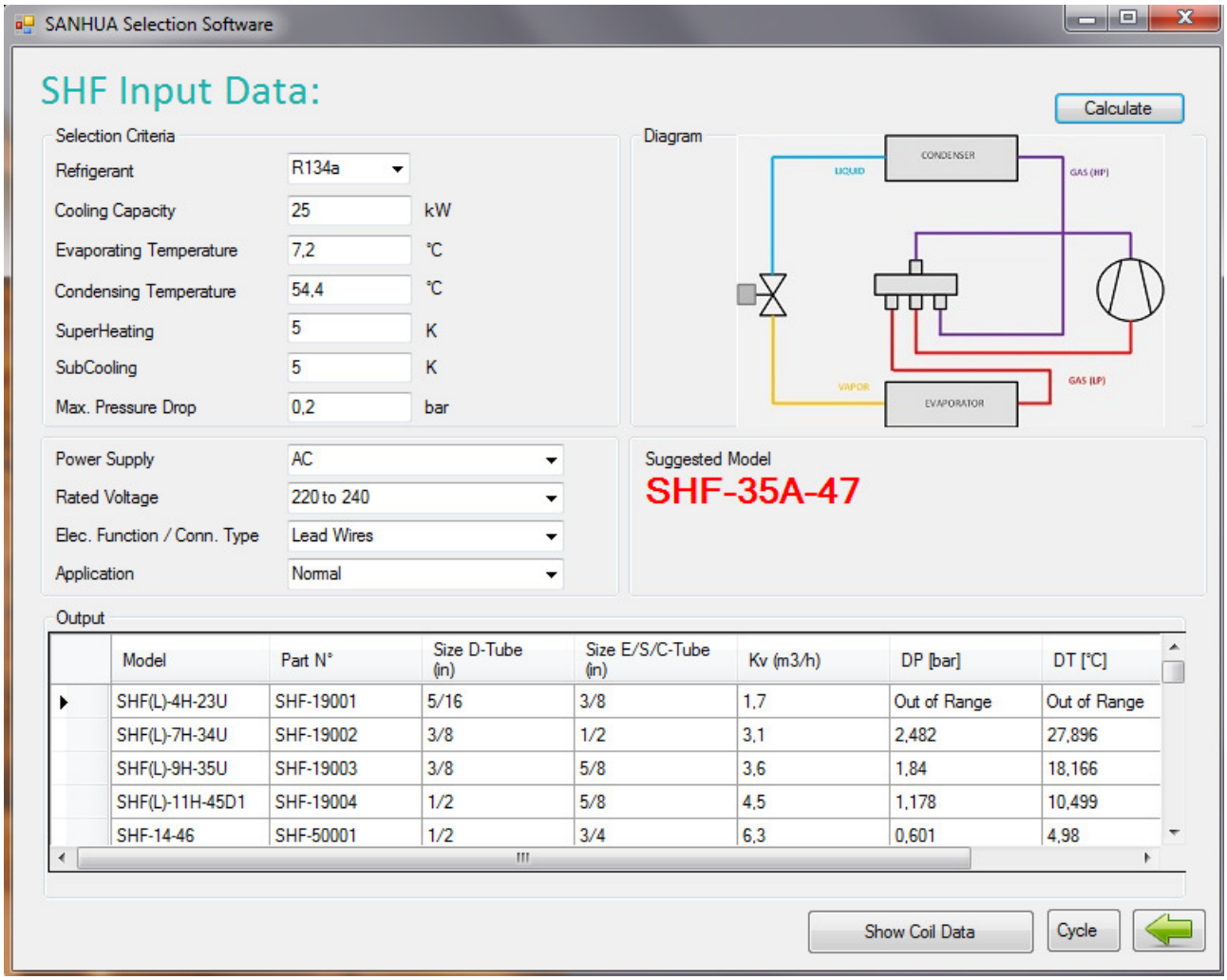


Fig.7 – Four Way Reversing Valve Calculation Window

The input boxes present in the “Selection Criteria” area permit to introduce the following basic requested input data:

a. Refrigerant Type
b. Requested Cooling Capacity
c. Evaporating Temperature
d. Condensing Temperature
e. Super-Heating
f. Sub-Cooling
g. Max. Pressure Drop admitted for the reversing valve (suction line)

In order to define correctly the valve and electrical coil model it is necessary to select one of the proposed options for each of the following valve characteristics:

h. Power Supply: Electrical power supply for the coil (AC)
i. Rated Voltage: Rated Voltage for the coil (in Volt)
j. Electrical Function: Type of electrical coil (Solenoid coil or Bi-stable coil)
Connection Type: Type of electrical connection (Lead Wires or with Faston)
k. Application: Standard or Heat Pump version

After the definition of all the requested input variables, push the “Calculate” button present on the upper right corner of the window. In the Output table the tool will show the performances of all the Reversing Valves (SHF series) filtered according to the set characteristics. The Output table is formed by the following columns:

1. Model: Described the Name of the product
2. Part Number: Described the order Code or Part Number of the product
3. Connection Size (D): Described the size diameter of the tube “D”
4. Connection Size (E/S/C): Described the size diameter of the tubes “E”,”S”,”C”
5. Kv (m3/h): Described the Flux Coefficient of the valve (m3/h)
6. Pressure Drop (ΔP): Described the Pressure drop (in bar) under the set conditions
7. Pressure Drop (ΔT): Described the Temp. drop (in °C) under the set conditions*
8. PED Category: Described the PED Category of the valve

* this value depends by the registered pressure drop (bar)

The software suggests the reversing valve model according to the requested cooling capacity and the maximum accepted pressure drop for the suction line. It admits a tolerance on pressure drop equal to 20%. This means that the software suggests a valve size until the calculated pressure drop is equal to 120% of the max. pressure drop set on the input box. The suggested model is highlighted with a blue line on the output table and it is also reported in red bold text on a specific output area. In the SHF range, a specific valve size (same Kv value) can have models with different connection size. The selection tool suggests the better valve size but doesn’t use the connection size criteria to identify the final part number; this activity has to be handled manually by the user according to the requested connection size.
It is possible to see the refrigerant cycle data pushing the button “Cycle” (see paragraph 5).
After the output visualization the software shows near the “Cycle” button, another button called “Show Coil Data”. Clicking it, the output table shows the technical data of the electrical coil to be used with the selected reversing valve. The coil output data are:

a. Coil Model: Described the Coil name
b. Coil Part Number: Described the Coil part number
c. Rated Voltage: Described the Rated Voltage for the coil (in Volt)
d. Power Supply: Described the power supply for the coil (AC or DC)
l. Electrical Function: Described the electrical coil type
e. Connection Type: Described the electrical connection type
f. Cable Length: Described the cable length
g. Absorbed Power – 50Hz: Described the absorbed power: AC coil with 50Hz
h. Absorbed Power – 60Hz: Described the absorbed power: AC coil with 60Hz
i. Absorbed Power – DC: Described the absorbed power: DC coil

The suggested coil model is highlighted with a blue line.
To return on the Valve body output window push the “Hide Coil Data” button.
To return on the Product Selection Window (Fig.2) push the green arrow button.

4.5 Ball Valves

After pressing the “Ball Valve” button present on the “Product Selection Window”, will appear the “Ball Valve Calculation Window” (Fig.8)

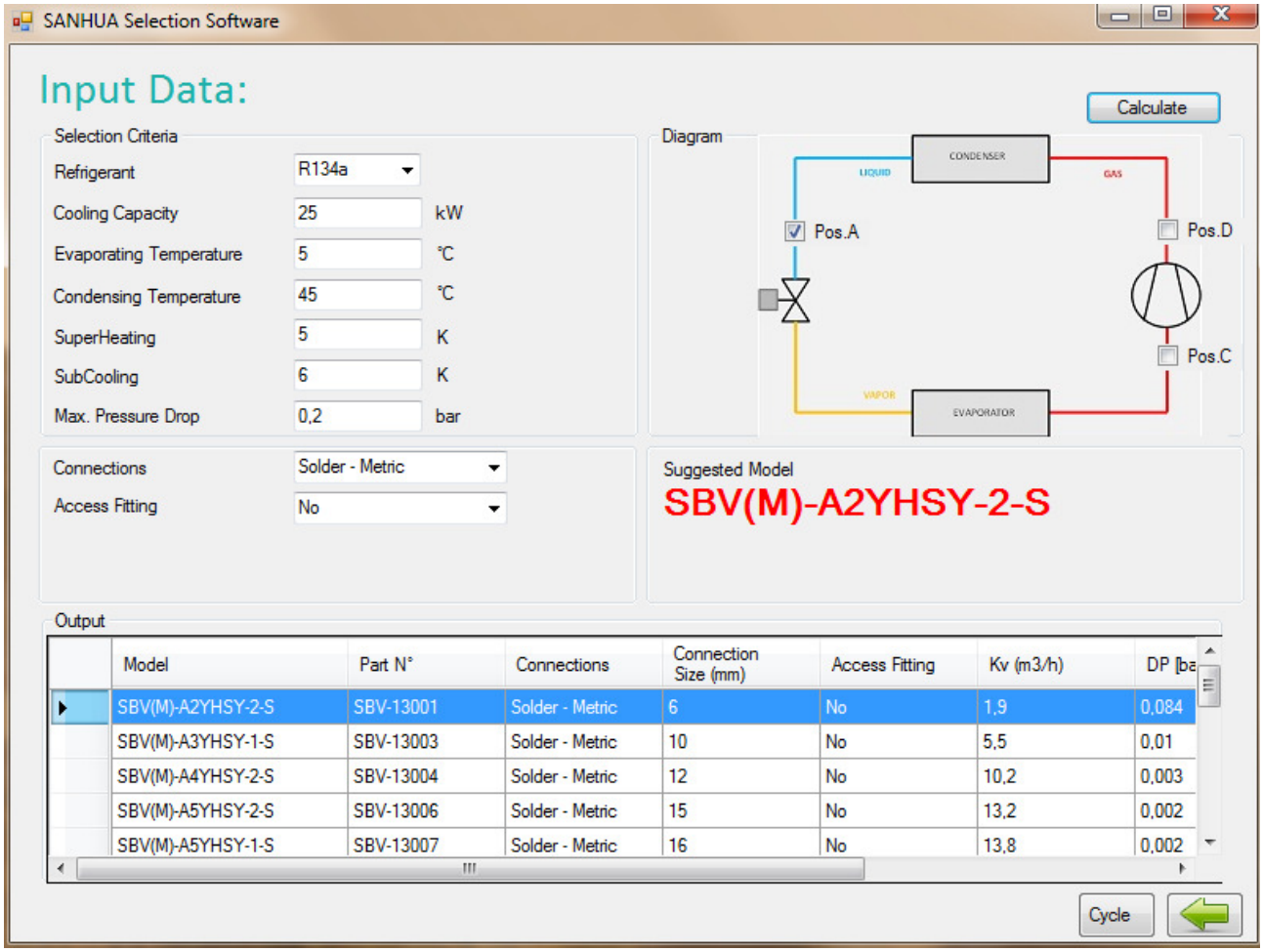


Fig.8 – Ball Valve Calculation Window

The input boxes present in the “Selection Criteria” area permit to introduce the following basic requested input data:

a. Refrigerant Type
b. Requested Cooling Capacity
c. Evaporating Temperature
d. Condensing Temperature
e. Super-Heating
f. Sub-Cooling
g. Max. Pressure Drop admitted for the valve

It is also necessary to define the installation position of the solenoid valve in the cooling cycle selecting one of the three flags present on the diagram. The installation position can be chosen from the following locations: Liquid line, Suction line, Discharge line.
In order to define correctly the valve model, it is necessary to select one of the proposed options for each of the following valve characteristics:

h. Connections: Permit to select the connection type (flare/solder)
i. Access Fitting: Indicated the presence of the access fitting (with Schrader valve)

After the definition of all the requested input variables, push the “Calculate” button present on the upper right corner of the window. In the Output table the tool will show the technical features of all the Ball Valves (SBV series) filtered according to the set characteristics. The Output table is formed by the following columns:

1. Model: Described the Name of the product
2. Part Number: Described the order Code or Part Number of the product
3. Connections: Described the connection type (flare/solder)
4. Connection Size: Described the size diameter of the connections
5. Access Fitting: Described the presence of the access fitting (Yes/No)
6. Kv (m3/h): Described the Flux Coefficient of the valve (m3/h)
7. Pressure Drop (ΔP): Described the Pressure drop (in bar) under the set conditions
8. Pressure Drop (ΔT): Described the Temp. drop (in °C) under the set conditions*
9. PED Category: Described the PED Category of the valve

* this value depends by the registered pressure drop (bar)

The software suggests the valve model according to the requested cooling capacity and the maximum accepted pressure drop for the suction line. It admits a tolerance on pressure drop equal to 20%. This means that the software suggests a valve size until the calculated pressure drop is equal to 120% of the max. pressure drop set on the input box. The suggested model is highlighted with a blue line on the output table and it is also reported in red bold text on a specific output area.
It is possible to see the refrigerant cycle data pushing the button “Cycle” (see paragraph 5).
To return on the Product Selection Window (Fig.2) push the green arrow button.

4.6 Filter Dryer (Unidirectional and Bi-Flow)

After pressing the “Filter Dryer” button present on the “Product Selection Window”, will appear the “Filter Dryer Calculation Window” (Fig.9)

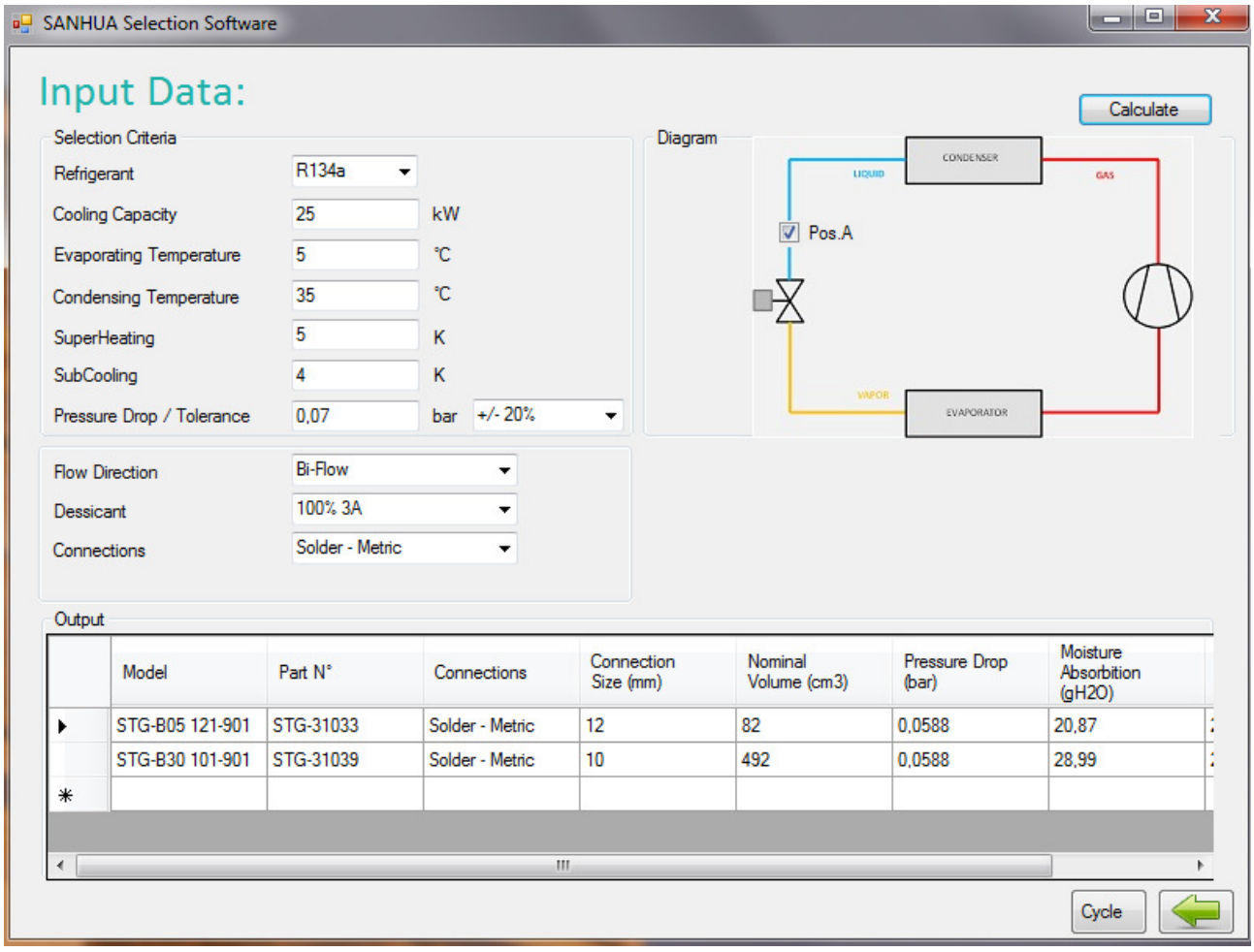


Fig.9 – Filter Dryer Calculation Window

The input boxes present in the “Selection Criteria” area permit to introduce the following basic requested input data:

a. Refrigerant Type
b. Requested Cooling Capacity
c. Evaporating Temperature
d. Condensing Temperature
e. Super-Heating
f. Sub-Cooling
g. Max. Pressure Drop admitted for the filter dryer
h. Tolerance degree on pressure drop used by the software during the filter selection

In order to define correctly the filter dryer model, it is necessary to select one of the proposed options for each of the following filter characteristics:

i. Flow Direction: Permit to choose between Unidirectional and Bi-flow filters
j. Desiccant: Permit to choose the desiccant type.
k. Connections: Type and size diameter of the filter connections

After the definition of all the requested input variables, push the “Calculate” button present on the upper right corner of the window. In the Output table the tool will show the technical features of all the Filter Dryer filtered according to the set characteristics. The Output table is formed by the following columns:

1. Model: Described the Name of the product
2. Part Number: Described the order Code or Part Number of the product
3. Connection: Described the connection type (flare/solder)
4. Connection Size: Described the size diameter of the connections
5. Nominal Volume: Described the volume of the filtering core
6. Pressure Drop (ΔP): Described the Pressure drop (in bar) under the set conditions
7. Moisture Absorption*: Described the moisture absorption under the set conditions
8. Kv (m3/h): Described the Flux Coefficient of the valve (m3/h)

* value expressed in gH_2O

The software suggests the filter dryer models according to the requested cooling capacity and the maximum accepted pressure drop for the suction line. It admits a tolerance on pressure drop customized by the user. It is possible to choose four different value of tolerance to be used for the selection: 10% (very restrictive tolerance), 20% (default value), 50% and “All Models”. When the option “All Models” is active, the software will show the technical characteristics of all the products available.

Example: Tolerance choice:
Max. Admitted Pressure Drop: 0,07 bar

- Case 1 - Tolerance: ± 10% Pressure Drop: from 0,063 bar to 0,077 bar
- Case 2 - Tolerance: ± 20% Pressure Drop: from 0,056 bar to 0,084 bar
- Case 3 - Tolerance: ± 50% Pressure Drop: from 0,035 bar to 0,105 bar
- Case 4 - Tolerance: All Models Pressure Drop: from 0 bar to + ∞ bar

It is possible to see the refrigerant cycle data pushing the button “Cycle” (see paragraph 5).
To return on the Product Selection Window (Fig.2) push the green arrow button.

4.7 Filter Dryer (with Replaceable Core)

After pressing the “Filter Dryer” button present on the “Product Selection Window”, will appear the “Filter Dryer Calculation Window” (Fig.10)

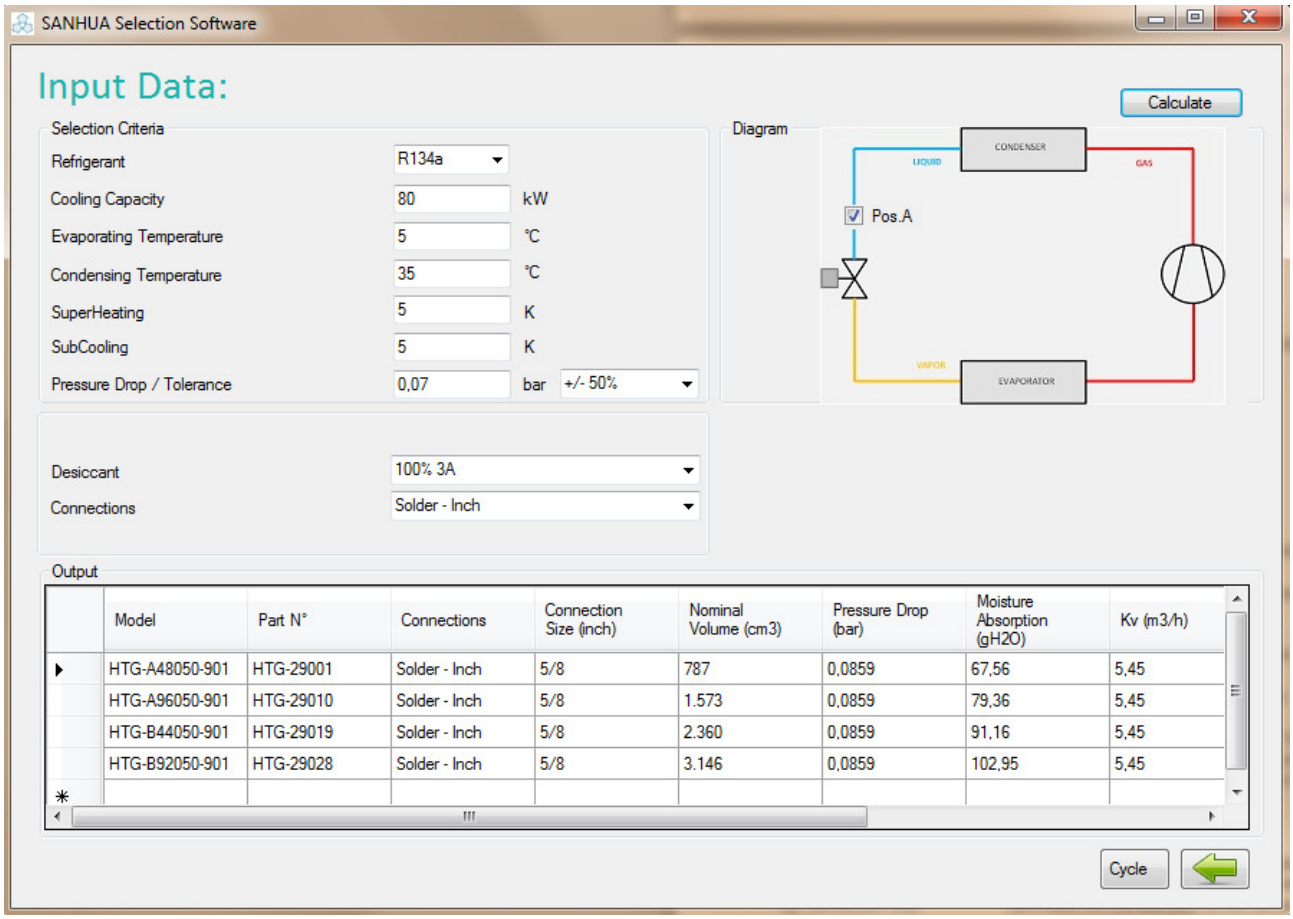


Fig.10 – Filter Dryer Calculation Window

The input boxes present in the “Selection Criteria” area permit to introduce the following basic requested input data:

a. Refrigerant Type
b. Requested Cooling Capacity
c. Evaporating Temperature
d. Condensing Temperature
e. Super-Heating
f. Sub-Cooling
g. Max. Pressure Drop admitted for the filter dryer
h. Tolerance degree on pressure drop used by the software during the filter selection

In order to define correctly the filter dryer model, it is necessary to select one of the proposed options for each of the following filter characteristics:

i. Desiccant: Permit to choose the desiccant type.
j. Connections: Type and size diameter of the filter connections

After the definition of all the requested input variables, push the “Calculate” button present on the upper right corner of the window. In the Output table the tool will show the technical features of all the Filter Dryer filtered according to the set characteristics. The Output table is formed by the following columns:

1. Model: Described the Name of the product
2. Part Number: Described the order Code or Part Number of the product
3. Connection: Described the connection type (solder: Inch/Metric)
4. Connection Size: Described the size diameter of the connections
5. Nominal Volume: Described the volume of the filtering core
6. Pressure Drop (ΔP): Described the Pressure drop (in bar) under the set conditions
7. Moisture Absorption*: Described the moisture absorption under the set conditions
8. Kv (m3/h): Described the Flux Coefficient of the valve (m3/h)
9. Number of Cores: Described the number of cores in the shell
10. Core Type: Described the Name of the core
11. Core Part Number: Described the Part Number of the core

* value expressed in gH_2O

The software suggests the filter dryer models according to the requested cooling capacity and the maximum accepted pressure drop for the suction line. It admits a tolerance on pressure drop customized by the user. It is possible to choose four different value of tolerance to be used for the selection: 10% (very restrictive tolerance), 20% (default value), 50% and “All Models”. When the option “All Models” is active, the software will show the technical characteristics of all the products available.

Example: Tolerance choice:
Max. Admitted Pressure Drop: 0,07 bar

- Case 1 - Tolerance: ± 10% Pressure Drop: from 0,063 bar to 0,077 bar
- Case 2 - Tolerance: ± 20% Pressure Drop: from 0,056 bar to 0,084 bar
- Case 3 - Tolerance: ± 50% Pressure Drop: from 0,035 bar to 0,105 bar
- Case 4 - Tolerance: All Models Pressure Drop: from 0 bar to + ∞ bar

It is possible to see the refrigerant cycle data pushing the button “Cycle” (see paragraph 5).
To return on the Product Selection Window (Fig.2) push the green arrow button.

4.8 Sight Glasses

After pressing the “Sight Glass” button present on the “Product Selection Window”, will appear the “Sight Glass Calculation Window” (Fig.11)

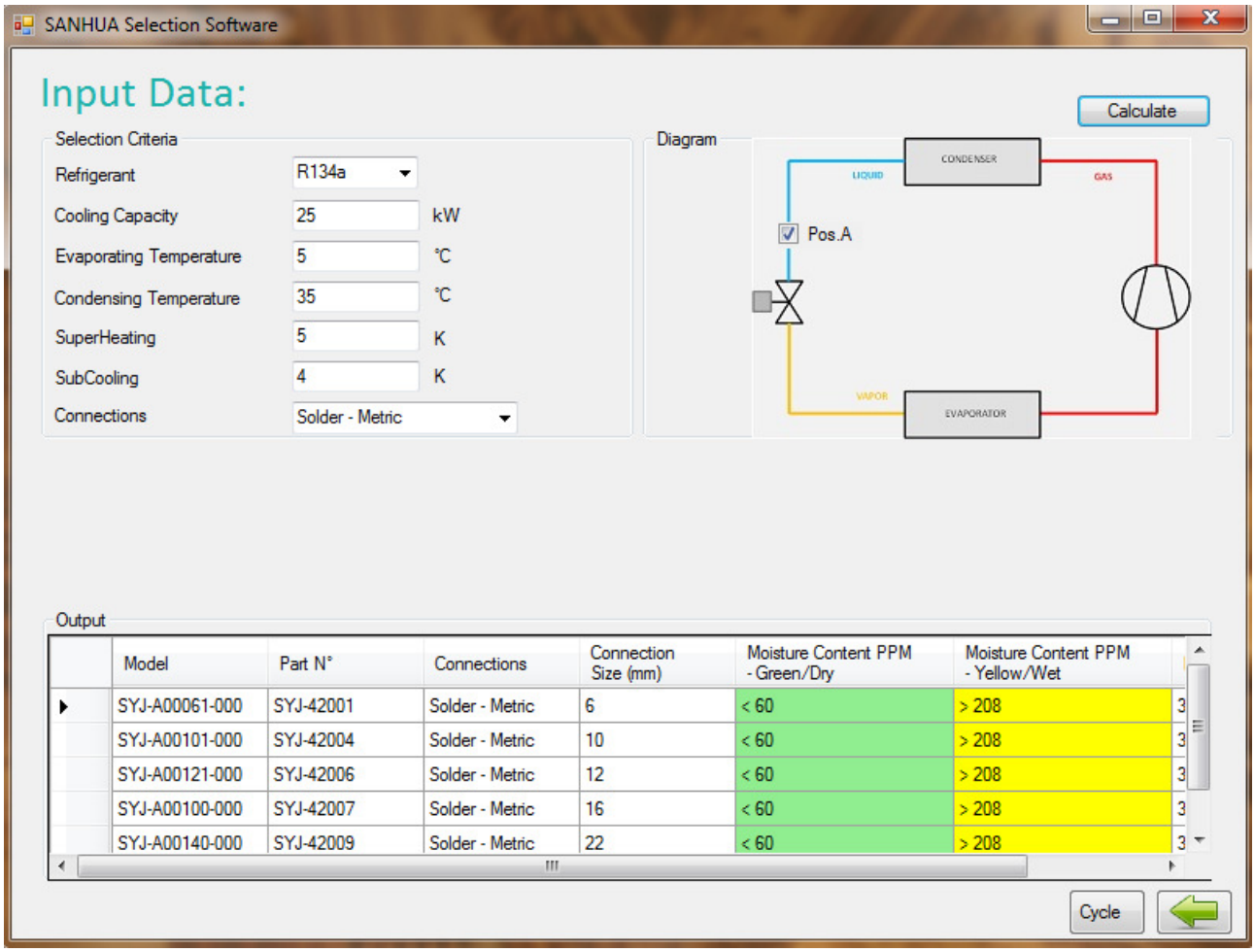


Fig.11 – Sight Glass Calculation Window

The input boxes present in the “Selection Criteria” area permit to introduce the following basic requested input data:

a. Refrigerant Type
b. Requested Cooling Capacity
c. Evaporating Temperature
d. Condensing Temperature
e. Super-Heating
f. Sub-Cooling
g. Connections: Connection type (flare/solder) of the sight glass

After the definition of all the requested input variables, push the “Calculate” button present on the upper right corner of the window. In the Output table the tool will show the technical features of all the Sight Glasses (SYJ series) filtered according to the set characteristics. The Output table is formed by the following columns:

1. Model: Described the Name of the product
2. Part Number: Described the order Code or Part Number of the product
3. Connection: Described the connection type (flare/solder)
4. Connection Size: Described the size diameter of the connections
5. Moisture Content PPM (1): Described the moisture content when the indicator is green
6. Moisture Content PPM (2): Described the moisture content when the indicator is yellow
7. PED Category: Described the PED Category of the valve

(1) the moisture indicator present under the transparent glass has a green color when the moisture in the refrigerant cycle (expressed in PPM) is below the indicated value. In this condition the refrigerant content is considered dry.
(2) the moisture indicator present under the transparent glass has a yellow color when the moisture in the refrigerant cycle (expressed in PPM) is above the indicated value. In this condition the refrigerant content is considered wet.
It is possible to see the refrigerant cycle data pushing the button “Cycle” (see paragraph 5).
To return on the Product Selection Window (Fig.2) push the green arrow button.

4.9 Check Valves

After pressing the “Check Valve” button present on the “Product Selection Window”, will appear the “Check Valve Calculation Window” (Fig.12)

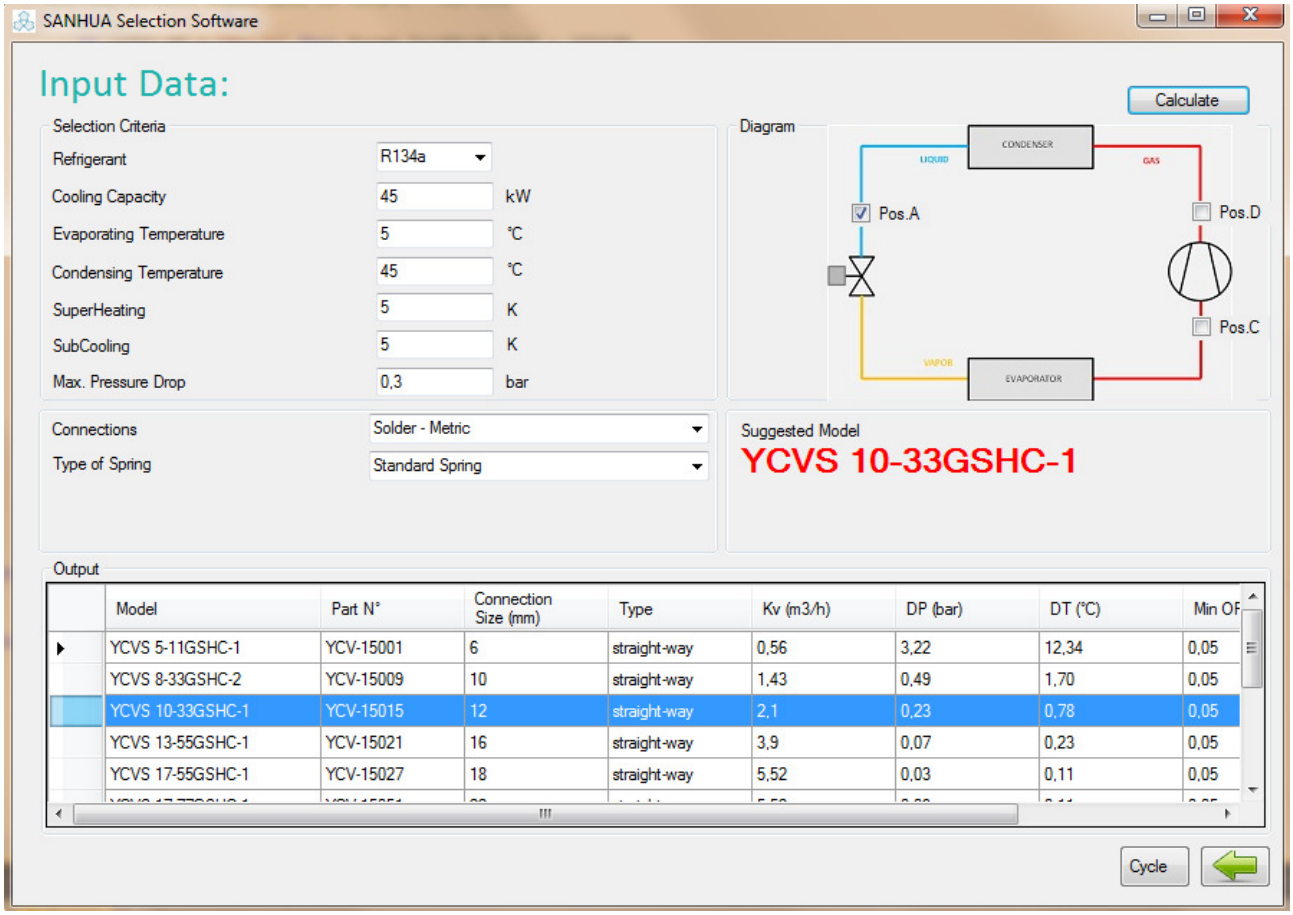


Fig.12 – Check Valve Calculation Window

The input boxes present in the “Selection Criteria” area permit to introduce the following basic requested input data:

a. Refrigerant Type
b. Requested Cooling Capacity
c. Evaporating Temperature
d. Condensing Temperature
e. Super-Heating
f. Sub-Cooling
g. Max. Pressure Drop admitted for the valve

It is also necessary to define the installation position of the solenoid valve in the cooling cycle selecting one of the three flags present on the diagram. The installation position can be chosen from the following locations: Liquid line, Suction line, Discharge line.
In order to define correctly the valve model, it is necessary to select one of the proposed options for each of the following valve characteristics:

h. Connections: Permit to select the connection type (flare/solder)
i. Type of Spring: Permit to select Standard or Reinforced spring

After the definition of all the requested input variables, push the “Calculate” button present on the upper right corner of the window. In the Output table the tool will show the technical features of all the Check Valves (YCV series) filtered according to the set characteristics. The Output table is formed by the following columns:

1. Model: Described the Name of the product
2. Part Number: Described the order Code or Part Number of the product
3. Connections: Described the connection type (flare/solder)
4. Connection Size: Described the size diameter of the connections
5. Type: Described the shape of the valve
6. Kv (m3/h): Described the Flux Coefficient of the valve (m3/h)
7. Pressure Drop (ΔP): Described the Pressure drop (in bar) under the set conditions
8. Pressure Drop (ΔT): Described the Temp. drop (in °C) under the set conditions*
9. Min. OPD: Described the Minimum Operating Pressure Difference
10. PED Category: Described the PED Category of the valve

* this value depends by the registered pressure drop (bar)

The software suggests the valve model according to the requested cooling capacity and the maximum accepted pressure drop for the suction line. It admits a tolerance on pressure drop equal to 20%. This means that the software suggests a valve size until the calculated pressure drop is equal to 120% of the max. pressure drop set on the input box. The suggested model is highlighted with a blue line on the output table and it is also reported in red bold text on a specific output area.
It is possible to see the refrigerant cycle data pushing the button “Cycle” (see paragraph 5).
To return on the Product Selection Window (Fig.2) push the green arrow button.

4.10 Thermostatic Expansion Valves

After pressing the “Thermostatic Expansion Valve” button present on the “Product Selection Window”, will appear the “Thermostatic Expansion Valve Calculation Window” (Fig.13)

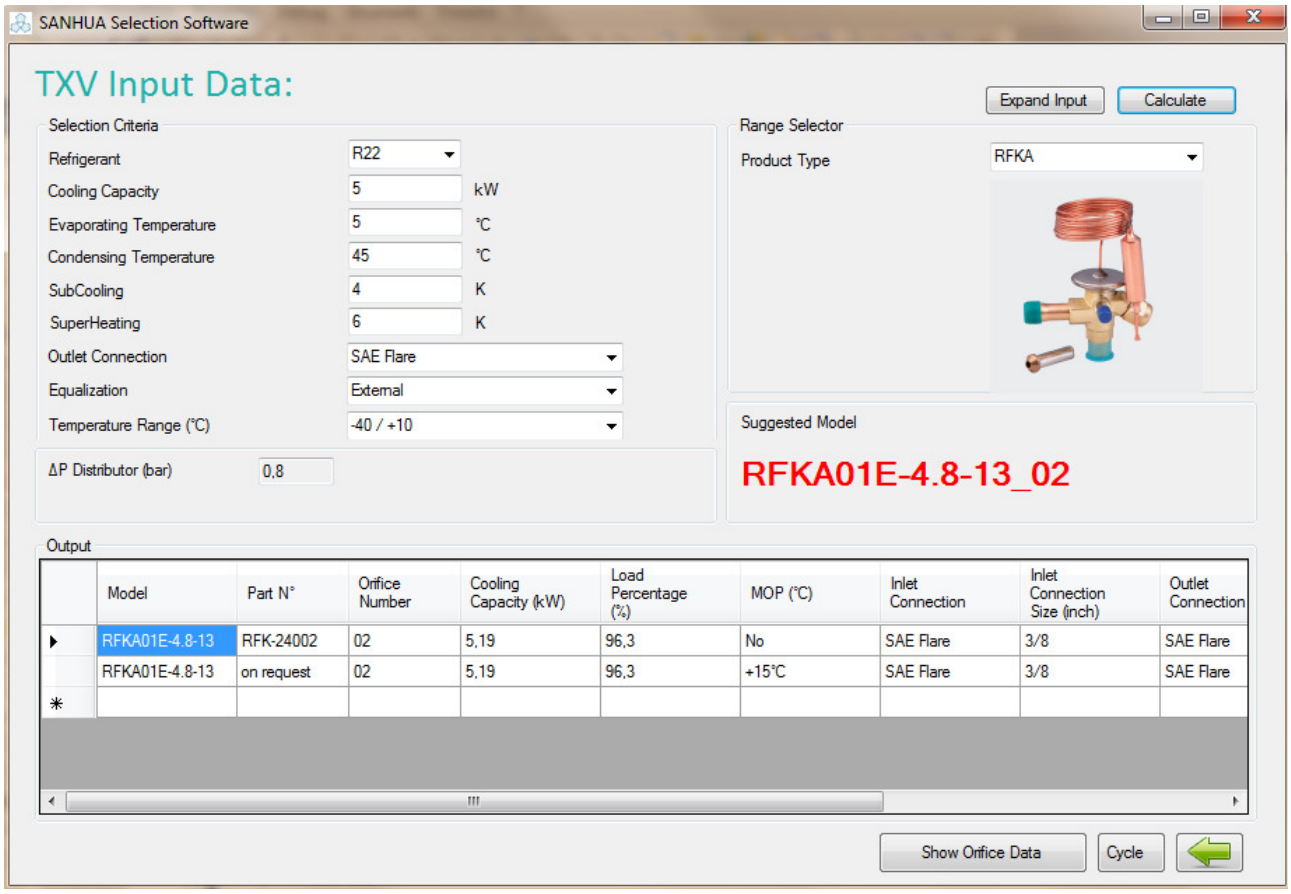


Fig.13 – Thermostatic Expansion Valve Calculation Window

The input boxes present in the “Selection Criteria” area permit to introduce the following basic requested input data:

a. Refrigerant Type
b. Requested Cooling Capacity
c. Evaporating Temperature
d. Condensing Temperature
e. Super-Heating
f. Sub-Cooling

In order to define correctly the valve model, it is necessary to select one of the proposed options for each of the following valve characteristics:

g. Outlet Connection: Permit to select the outlet connection type (flare/solder)
h. Equalization: Permit to select the type of equalization (internal/external)
i. Temperature Range: Permit to select one of the available temperature range*

* the temperature range and the presence of the MOP depends from the selected refrigerant and from the evaporating temperature value set in the previous input box.

Pushing the “Expand Input” button present on the upper right corner of the window, it is possible to expand the input mask, adding an additional input box. The further variable is:

j. Pressure drop in the distribution line (ΔP Distributor)

The software can make the TXV selection also if the additional input value is hidden; in this case for the mentioned variable, will be used the default values shown in Fig.12.
The input box present in the “Range Selector” area allows to select the Thermostatic Expansion valve range: the picture below will change accordingly . The available TXV ranges are:

- RFKA
- RFGB

4.10.1 RFKA Range

After the definition of all the requested input variables, push the “Calculate” button present on the upper right corner of the window. In the Output table the tool will show the performances of all the Thermostatic Expansion Valves (RFKA series) filtered according to the set characteristics. The Output table is formed by the following columns:

1. Model: Described the Name of the product
2. Part Number: Described the order Code or Part Number of the product
3. Orifice Number: Described the Number of the selected orifice
4. Cooling Capacity: Described the Max. Cooling Capacity under the set conditions
5. Load Percentage: Described the load percentage of the orifice*
6. MOP (°C): Described the presence of the MOP and the set temperature
7. Inlet Connection: Described the inlet connection type (flare/solder)
8. Inlet Connection Size: Described the size diameter of the inlet connections
9. Outlet Connection: Described the outlet connection type (flare/solder)
10. Outlet Connect. Size: Described the size diameter of the outlet connections
11. Equalization Connection: Described the equalization connection type (flare/solder)
12. Equalization Connect. Size: Described the size diameter of the equalization connections

* the Load Percentage (%) is calculated as: (Requested Capacity / Nominal Capacity)*100

The software suggests the Thermostatic Expansion Valves model according to the requested cooling capacity admitting a tolerance on load percentage equal to 5%. This means that the software suggests a valve size until a load percentage of 105%. The suggested model (valve body and orifice number) is reported in red bold text on a specific output area.

It is possible to see the refrigerant cycle data pushing the button “Cycle” (see paragraph 5) Pushing the button “Show Orifice Data” located on the left of the “Cycle” button it is possible to see the details related to the available orifice sizes. The output mask shows the nominal capacity

value and the load percentage for all the orifices in the selected working conditions. The visible output columns (Fig.14) are:

1. Orifice Number: Described the Number of the selected orifice
2. Nominal Capacity: Described the Max. Cooling Capacity under the set conditions
3. Load Percentage: Described the load percentage of the orifice
4. Orifice Model: Described the Name of the orifice
5. Orifice Part Number: Described the order Code or Part Number of the orifice

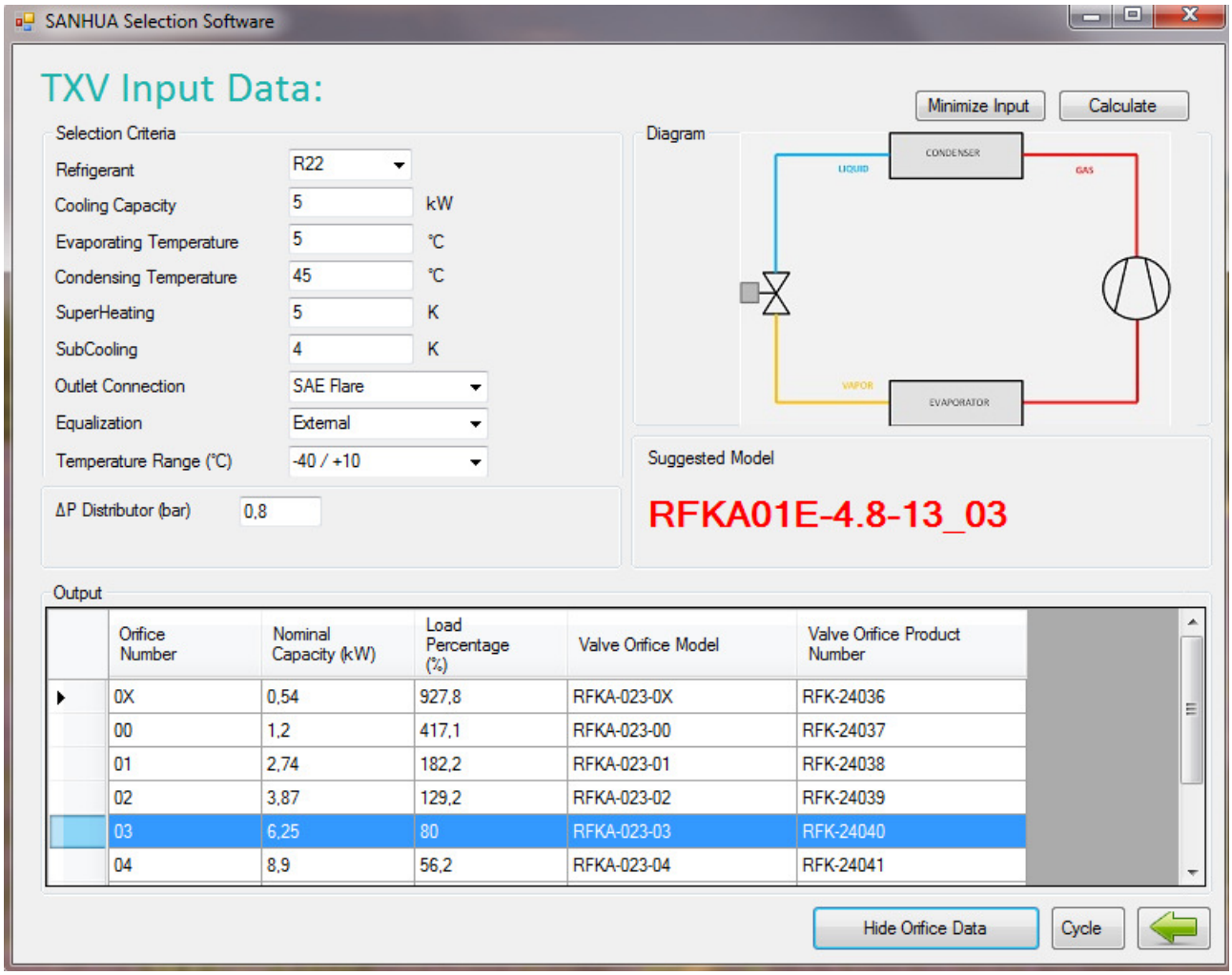


Fig.14 – RFKA Output Orifice Mask

To close the Output Orifice mask click on “Hide Orifice Data”.
To return on the Product Selection Window (Fig.2) push the green arrow button.

4.10.2 RFGB Range

After the definition of all the requested input variables, push the “Calculate” button present on the upper right corner of the window. In the Output table the tool will show the performances of all the Thermostatic Expansion Valves (RFGB series) filtered according to the set characteristics. The Output table is formed by the following columns:

1. Model: Described the Name of the product
2. Part Number: Described the order Code or Part Number of the product*
3. Size: Described the size of the valve
4. Cooling Capacity: Described the Max. Cooling Capacity under the set conditions
5. Load Percentage: Described the load percentage of the orifice**
6. MOP (°C): Described the presence of the MOP and the set temperature
7. Inlet Connection: Described the inlet connection type (flare/solder)
8. Inlet Connection Size: Described the size diameter of the inlet connections
9. Outlet Connection: Described the outlet connection type (flare/solder)
10. Outlet Connect. Size: Described the size diameter of the outlet connections
11. Equalization Connection: Described the equalization connection type (flare/solder)
12. Equalization Connect. Size: Described the size diameter of the equalization connections

* The Part Number for RFGB series is not specified: in the output data will be show “on request” due to the high customization frequency
** The Load Percentage (%) is calculated as: (Requested Capacity / Nominal Capacity)*100
*** The software doesn’t distinguish the product with straight or angle layout. Highlight this aspect during the product definition using the form present in the official RFGB datasheet: DS-RFGB-EN-R14xx

The software suggests the Thermostatic Expansion Valves model according to the requested cooling capacity admitting a tolerance on load percentage equal to 5%. This means that the software suggests a valve size until a load percentage of 105%. The suggested model is reported in red bold text on a specific output area.

It is possible to see the refrigerant cycle data pushing the button “Cycle” (see paragraph 5) Pushing the button “Show All Range” located on the left of the “Cycle” button it is possible to see an performances overview of all the RFGB range. The output mask shows the nominal capacity value and the load percentage for all the range in the selected working conditions. The visible output columns (Fig.15) are:

1. Size: Described the Number of the selected orifice
2. Nominal Capacity: Described the Max. Cooling Capacity under the set conditions
3. Load Percentage: Described the load percentage of the orifice
4. Model: Described the Name of the orifice
5. Part Number: Described the order Code or Part Number of the orifice

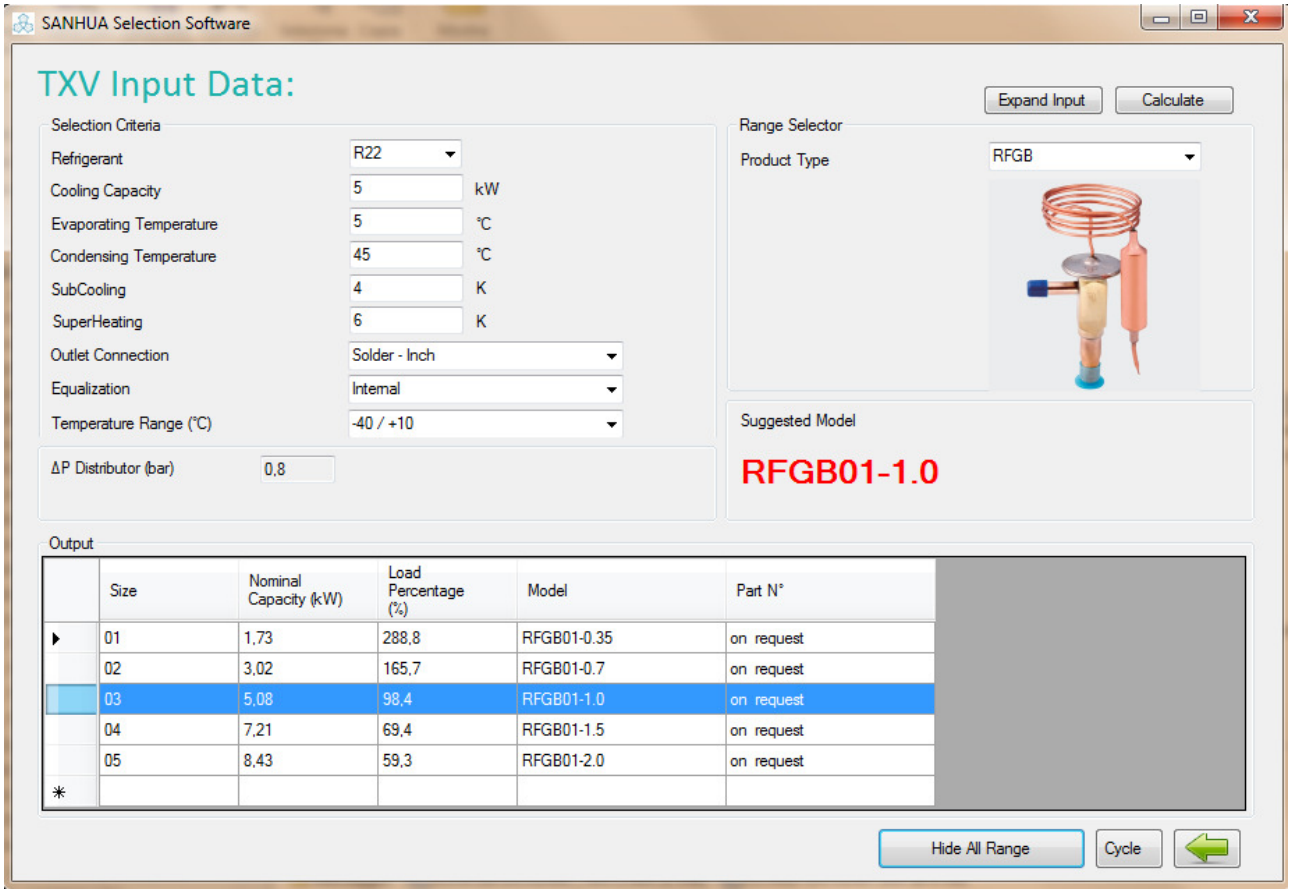
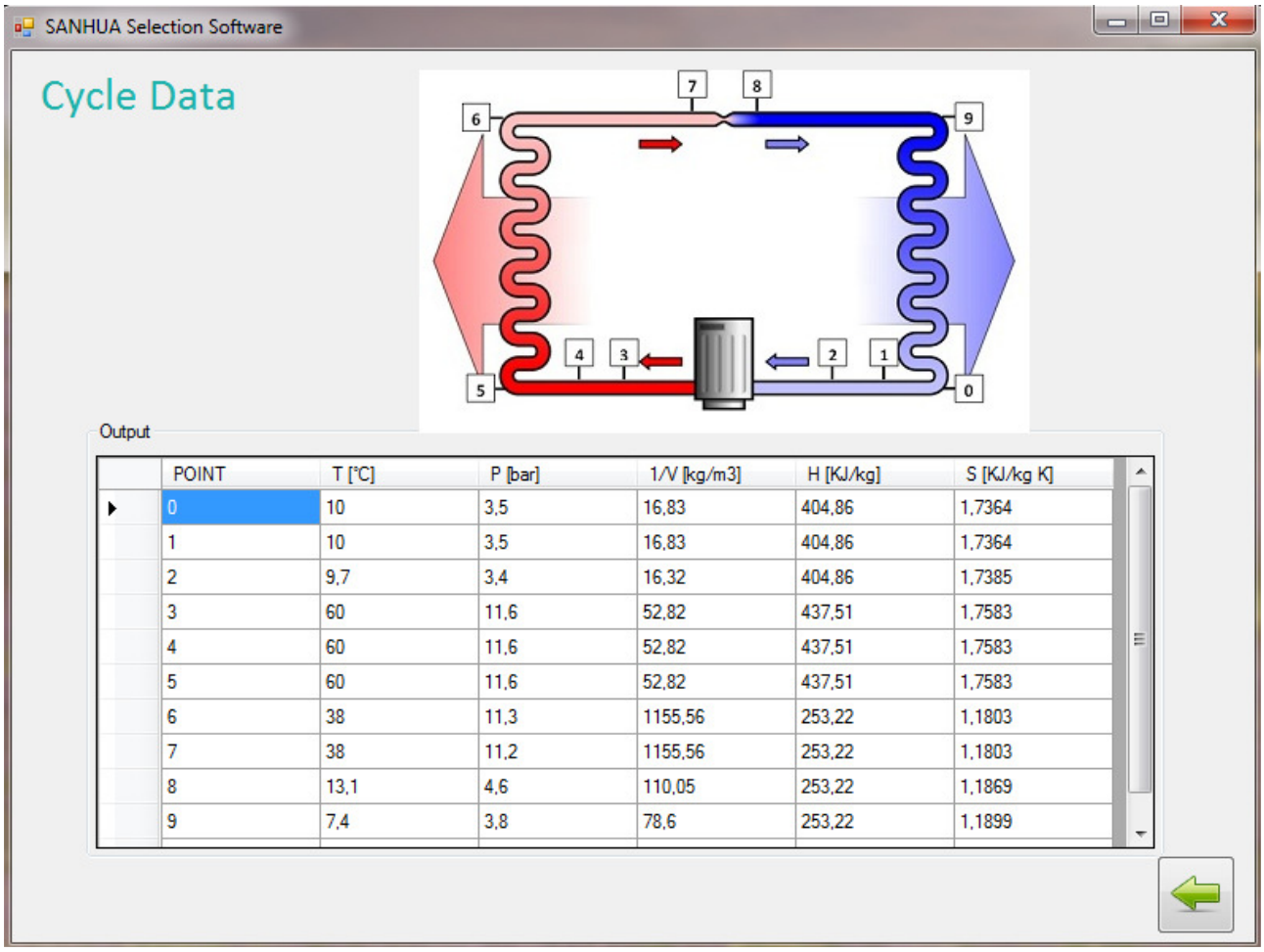


Fig.15 – RFGB Output Range Mask

To close the Output Orifice mask click on “Hide Orifice Data”.
To return on the Product Selection Window (Fig.2) push the green arrow button.

5. CYCLE DATA WINDOW

In each calculation window, after pressing the “Calculate” button, the selection tool executes the products selection and shows the results on the output mask. In the meantime on the screen appears a new button called “Cycle”.
Pushing it the software will show the “Cycle Data Window” (Fig.16)



	POINT	T [°C]	P [bar]	1/V [kg/m3]	H [KJ/kg]	S [KJ/kg K]
▶	0	10	3,5	16,83	404,86	1,7364
	1	10	3,5	16,83	404,86	1,7364
	2	9,7	3,4	16,32	404,86	1,7385
	3	60	11,6	52,82	437,51	1,7583
	4	60	11,6	52,82	437,51	1,7583
	5	60	11,6	52,82	437,51	1,7583
	6	38	11,3	1155,56	253,22	1,1803
	7	38	11,2	1155,56	253,22	1,1803
	8	13,1	4,6	110,05	253,22	1,1869
	9	7,4	3,8	78,6	253,22	1,1899

Fig.16 – Cycle Data Window

The table visible in Fig.14 permits to see the numeric values of the main thermodynamic variables for all the different points listed in refrigeration circuit. These values have been calculated according to the input data set by the user in the previous window.
The thermodynamic variables shown in the table are:

- Temperature
- Pressure (absolute)
- Specific Volume
- Enthalpy
- Entropy