Application Note

FESTO

How to use the PVA Tool

Using the Process Valve Automation tool for dimensioning and selection of the most suitable quarter turn actuator for automation of butterfly and ball valves

PVA-Tool

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1 Components/Software used

Type/Name	Version Software/Firmware	Date of manufacture
Process Valve Automation Tool (PVA Tool)	Until v0.9.6	2014

Table 1.1: Components/Software used

2 Software description

The user has to indicate only a few information about the process valve and gets as a result the four most suitable Festo quarter turn actuators for the task. All in a very visual and interactive way. Furthermore the results are arranged in ascending order according to price; the adapters can be included if required. Also a torque diagram will be displayed for a visual confirmation. In addition the tool provides a direct link to Festo catalogue pages, datasheets and the online shop.

As an extended function, this tool offers a search function for the selection of Festo ball valves. For this reason all Festo ball valves and their break away torque at nominal pressure are included. The benefit of this extra-function is that once the most suitable actuator has been identified, the user is informed about if the combination is available as a preconfigured ball valve actuator unit in Festo catalogue.

2.1 Software overview

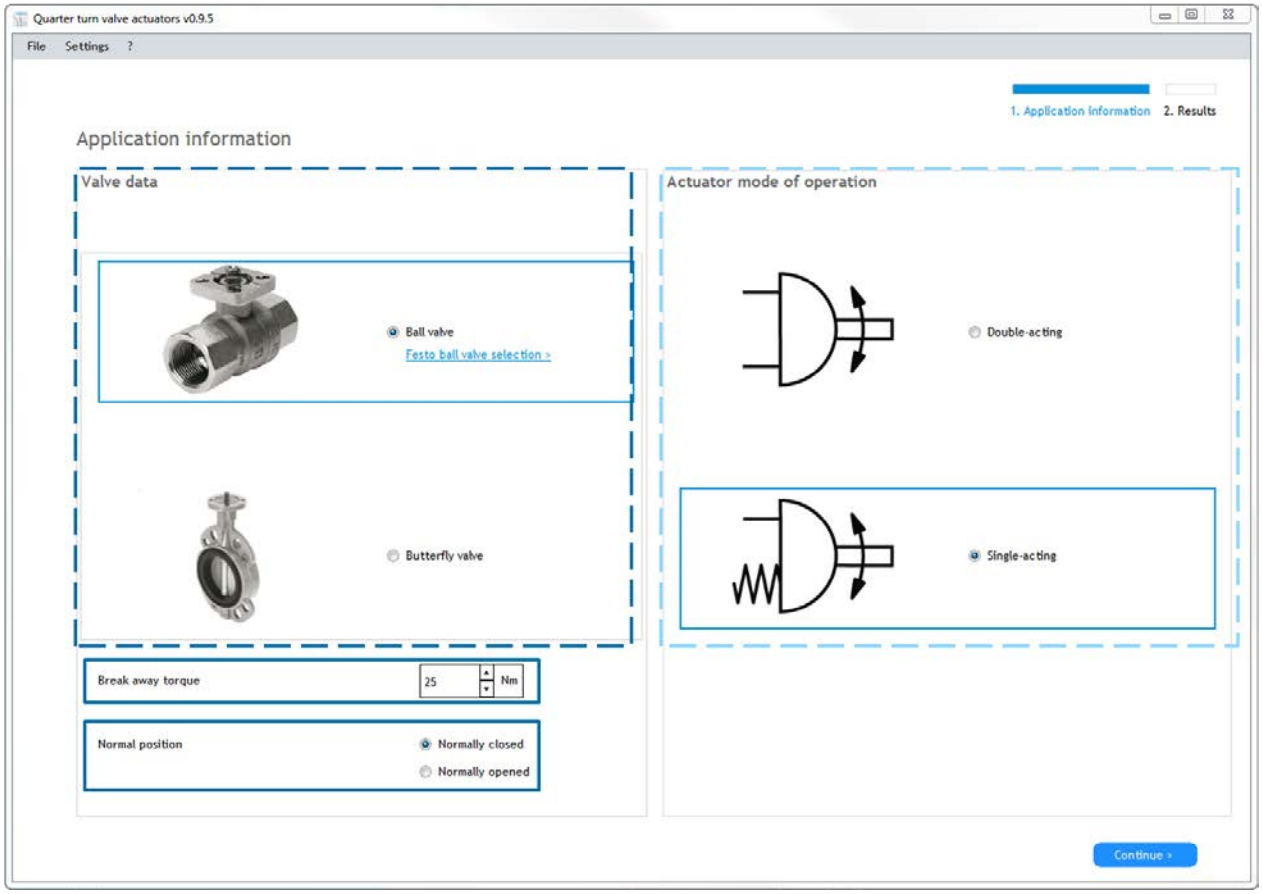

Fig. 2.1

On the first page „application information“ the general data of the application will be documented.

In the field “valve data” the user has to specify the type of valve that he wants to automate: He can choose between butterfly and ball valve. In case of ball valves, customer can also directly search for a Festo ball valve under the option “Festo ball valve selection”. The breakaway torque and dimensions of the valve will be then automatically loaded into the calculation. In case of choosing a valve from an external supplier, the breakaway torque of the valve has to be manually entered for the calculation. The normal position of the valve has to be defined in the field, too.

In the field “Actuator mode of operation” the customer can choose between double and single acting actuators.

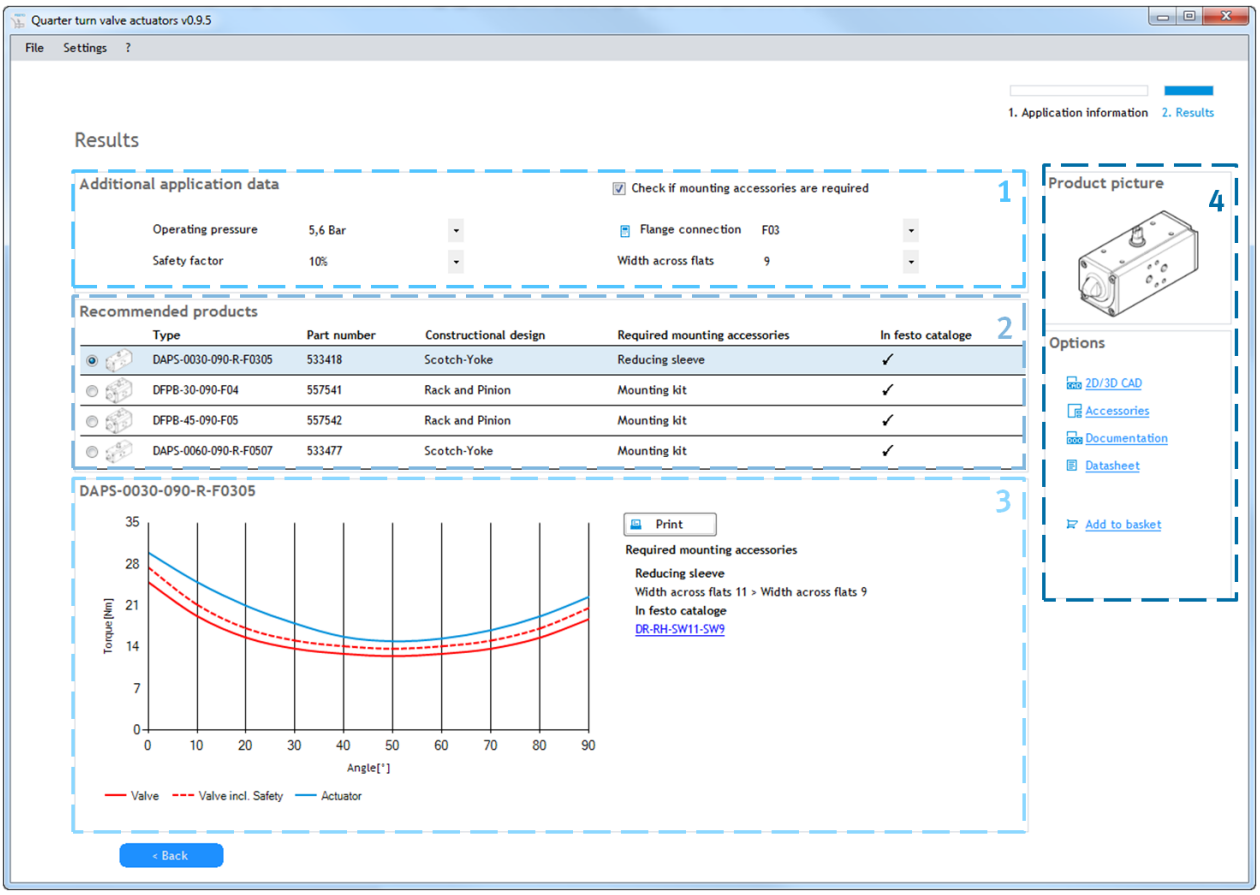

Fig. 2.2

The register „results“ is split in four parts.

In **field 1** the user can vary operation pressure and safety factor. This information has a direct influence on the results in field 2 and on the diagram in field 3. Furthermore the user can enable the function „Check if additional parts are needed”. Here the user can introduce the attributes of the valve flange to be taken into consideration in the evaluation of the most suitable actuator.

In **field 2** the user can see the four recommended products regarding his application and if additional parts are needed and if they are in the Festo catalogue or not. In the first position and per default selected, the most cost effective solution will be presented.

In **field 3**, is displayed the resistive torque of the valve, the same torque adding the safety factor and the torque of the chosen actuator in blue colour as a function of the angle of the valve.

Field 4 contains all links to the relevant data of the chosen quarter turn actuator.

3 Example 1: Finding the right quarter turn actuator

In order to find the right quarter turn actuator for a process valve it is important to be aware of the requirements of the application. For example in an application where it is necessary to safely close a process valve even in case of power and pressure failure a double acting actuator is not suitable.

If this fail safe mode is not needed a double acting actuator is better suited because it is less expensive and smaller than the single acting one.

Beside this information it is important to know the available operating pressure and to define a safety factor which depends on the viscosity of the medium.

In this example the application data is as follows:

- Ball valve DN50, Flange hole pattern F0507, Square 14 mm
- Break away torque 44 Nm
- Safety Factor 30%
- Operating pressure 6 bar
- Double-acting actuator
- Valve normally closed

3.1 Finding the cheapest quarter turn actuator

On first page the basic information of the application has to be entered. The software supports dimensioning of quarter turn actuators for ball and butterfly valves. If you use a process valve of another supplier please select the type of the valve and enter the breakaway torque. It is necessary to enter the initial position of the valve since this will affect the form of the resistive torque of the valve. Especially in case of butterfly valves.

1. Click [Ball valve] in group “valve data”.
2. Insert “44” in group “break away torque”.
3. Select [Normally closed] in group “normal position”.
4. Click [Double acting] in group “actuator mode of operation”.
5. Click [Continue].

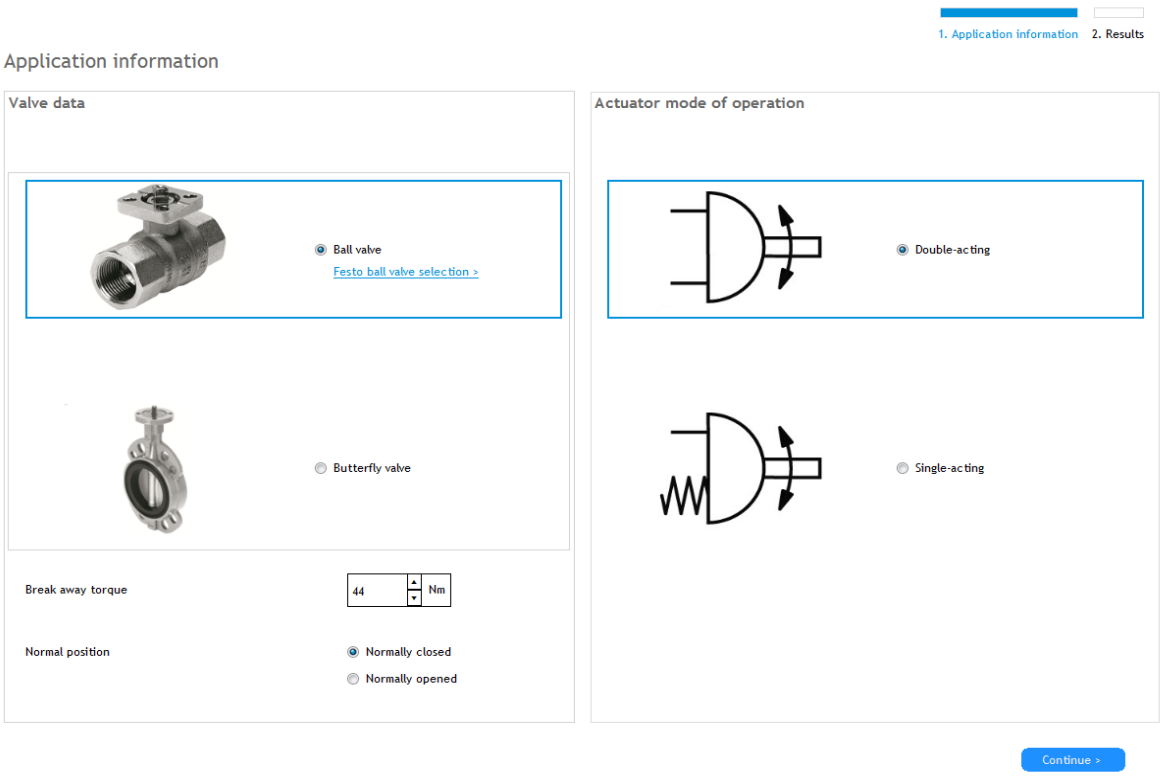

Fig. 3.1

On second page the additional application data like operating pressure and safety factor has to be entered.

6. Select [6,0 Bar] in group “Operating pressure”.
7. Select [30%] in group “Safety factor”.

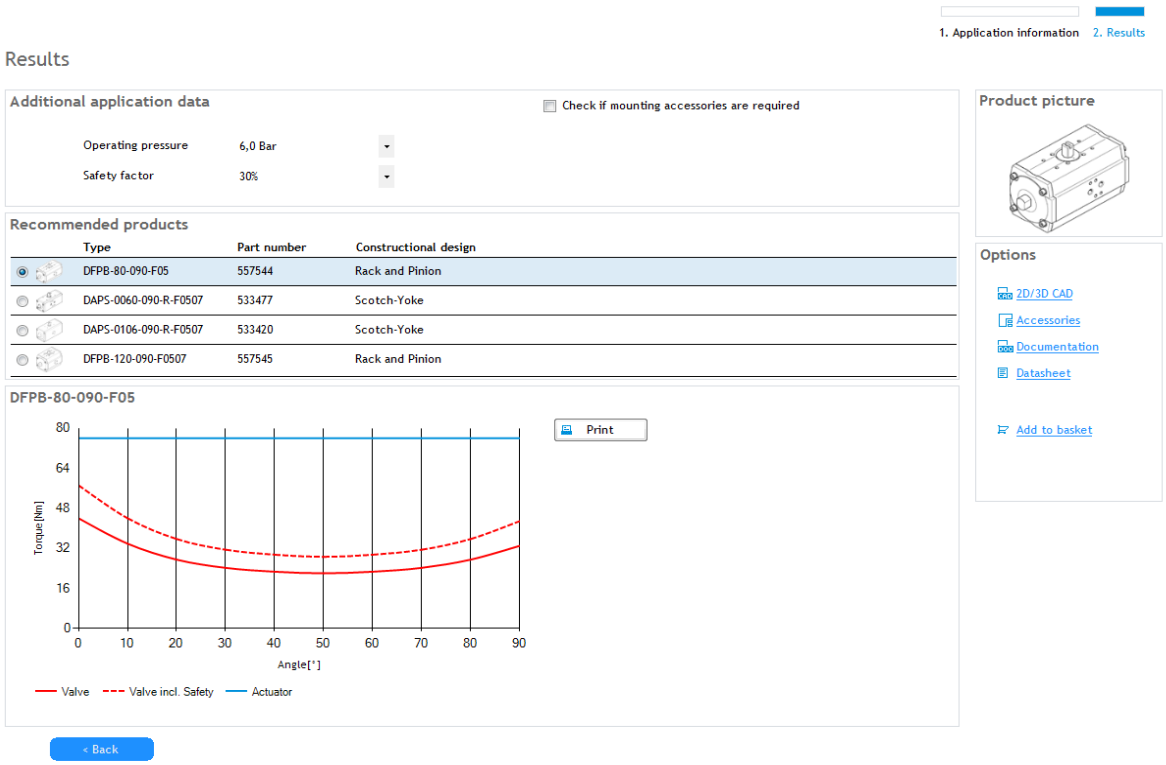

Fig. 3.2

The recommended products will be updated immediately during changing “Operating pressure” and “Safety factor”. By selecting one of the actuators the torque of the actuator will be automatically adapted (blue colour in field 3). The diagram functions as a visual inspection and shows the optimization potential. In the example above, the actuators torque is higher than the required torque of ball valve. In this case it is possible to reduce the operating pressure in order to save energy.

The results are arranged from lower to higher price: In this case the lowest price is selected.

3.2 Finding required accessories

In some cases additional accessories like bridges and reducing sleeves are needed. The software can help to identify them:

8. Enable [Check if mounting accessories are required] in field 1.
9. Select [F0507] in group “Flange connection”.
10. Select [14] in group “Width across flats”.

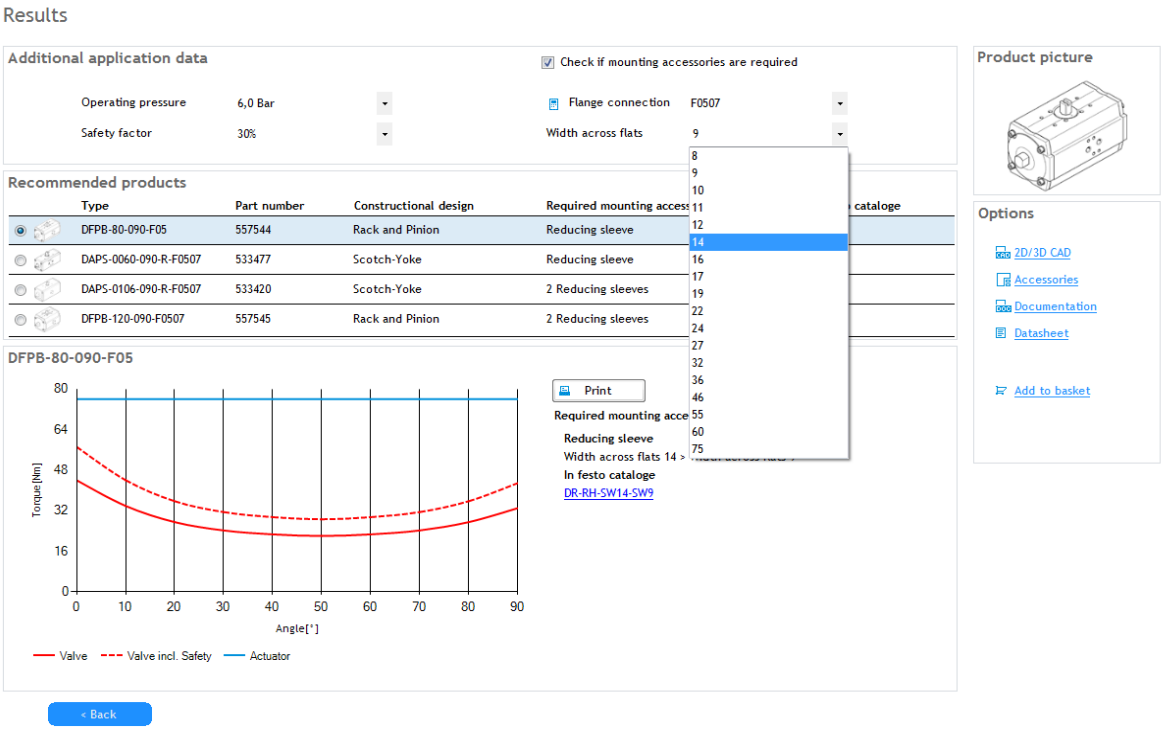

Fig. 3.3

Now the required mounting accessories and their availability in the Festo catalogue are shown in field 2. Furthermore a description of the accessories with a link to the data sheet appears in Field 3.

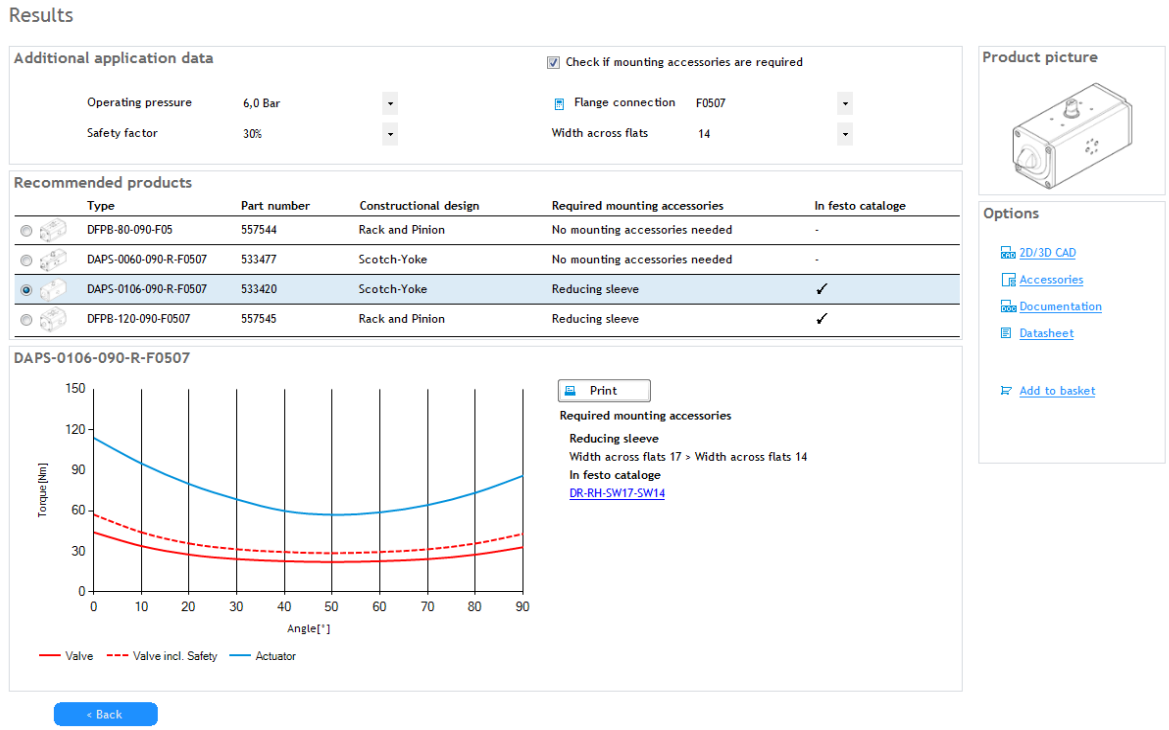

Fig. 3.4

4 Example 2: Finding Ball valve actuator units

One of the benefits of this tool is that the software detects if a combination of the selected quarter turn actuator and ball valve exists at the Festo catalogue.

Of course this units are only available with Festo ball valves. Therefore it is necessary to select a Festo ball valve first.

Fig. 4.1

4.1 Finding a Festo ball valve

Besides the configurator the software also includes a selection tool for Festo ball valves. Here all important properties of the valves are deposited.

1. Click [Festo ball valve selection] in group “valve data”.
2. Select [Stainless steel] in group “Housing material”.
3. Select [Pipe thread] in group “Process valve connection”.
4. Select [DN50] in group “Nominal size”.
5. Select [2/2-way] in group “Valve function”.

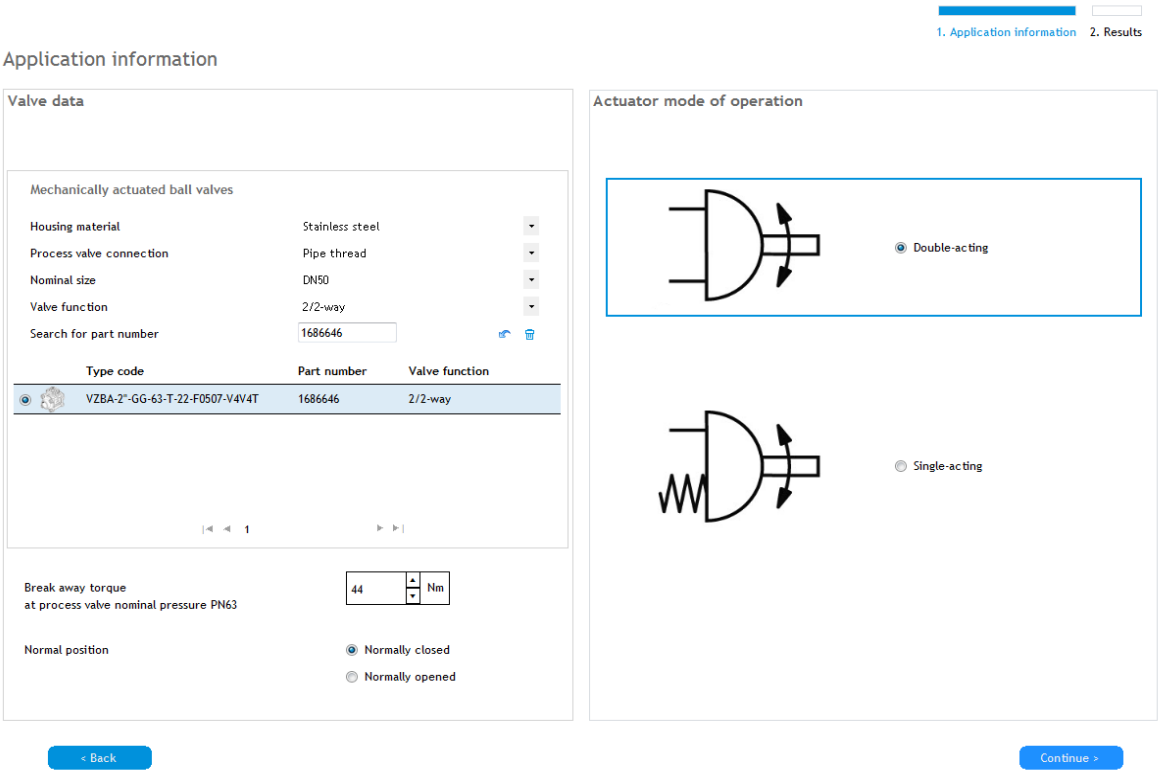

Fig. 4.2

The breakaway torque of the valve is automatically inserted and shouldn’t be changed anymore. In any of the mentioned cases it is necessary to enter the initial position of the valve (normally open or normally closed) since this will affect the form of the resistive torque of the valve. Especially in case of butterfly valves. The breakaway torque of the valve is calculated at the nominal pressure. The customer can decrease (under his responsibility) the breakaway torque if the pressure in the application is considered bellow the nominal pressure of the ball valve.

4.2 Finding a ball valve actuator unit and adding it to the basket

Ball valve actuator units by Festo are available with VZBA or VZPR ball valves and with DAPS quarter turn actuators.

6. Click [Continue].
7. Enable [Check if mounting accessories are required] in field 1.
8. Choose [DAPS-0060-...] in field 2

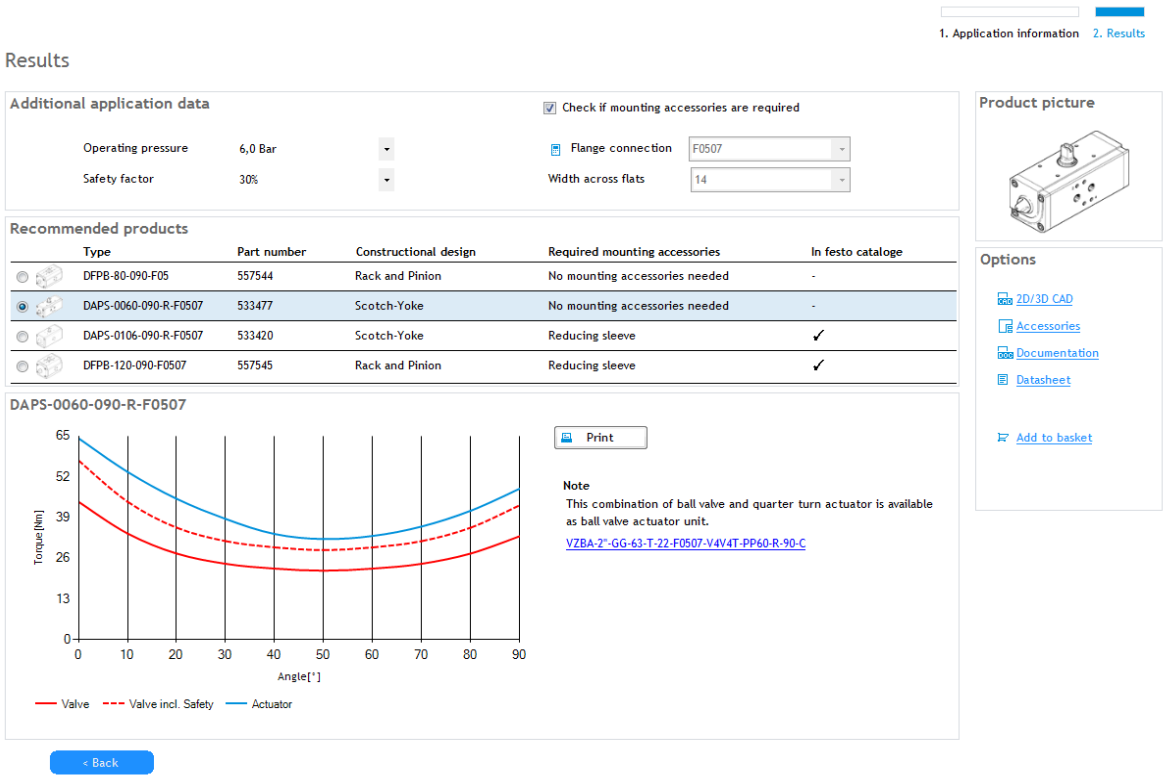

Fig. 4.3

The information about flange connection and the shaft will be automatically inserted by the software and can't be changed because the information depends on the selection of the ball valve.

If a ball valve actuator unit is available in the catalogue a note is displayed in field 3. The catalogue data can be found by clicking on the hyperlink highlighted in blue.

9. Click [Add to basket] in field 4.
10. Select [Add ball valve actuator unit to shopping basket] in the pop-up window "Ball valve unit found".
11. Click [Continue ›].
12. Insert the quantity of the required units in the pop-up window "Add to basket".
13. Click [Ok]

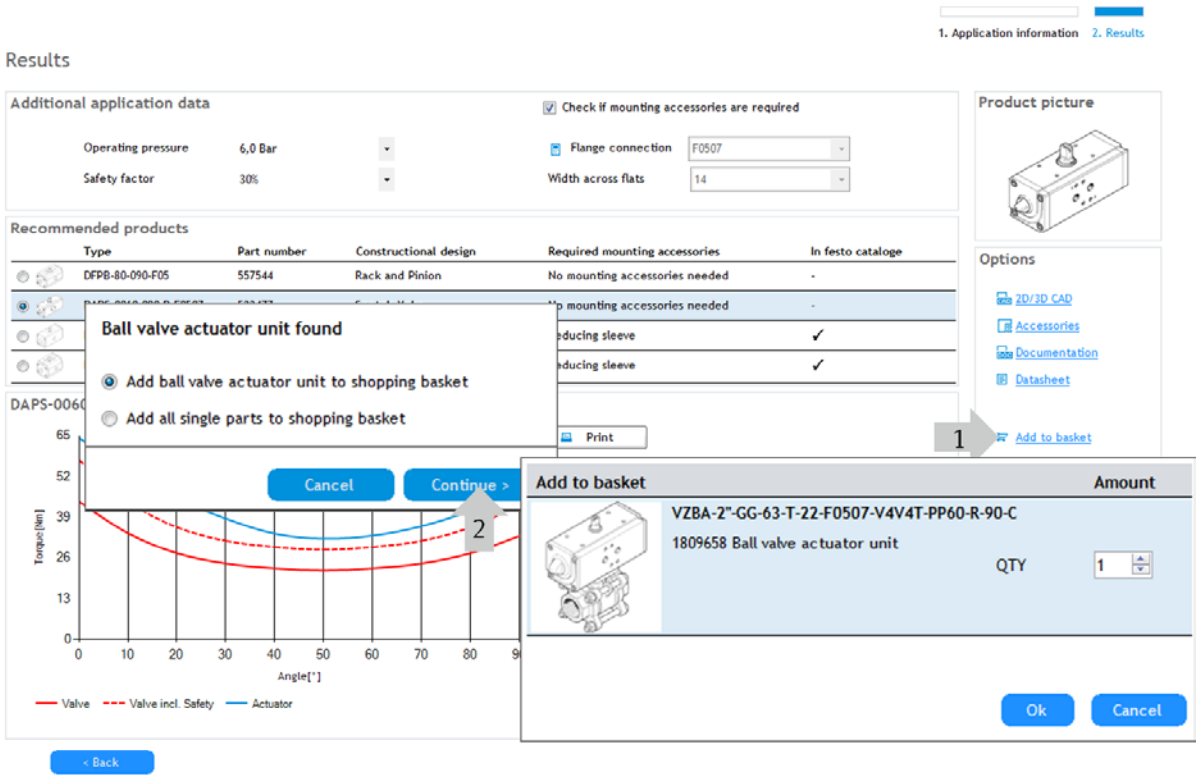

Fig. 4.4

You also have the possibility to create a pdf file with the data of the chosen quarter turn actuator and the parameters of the valve if you click on Print:

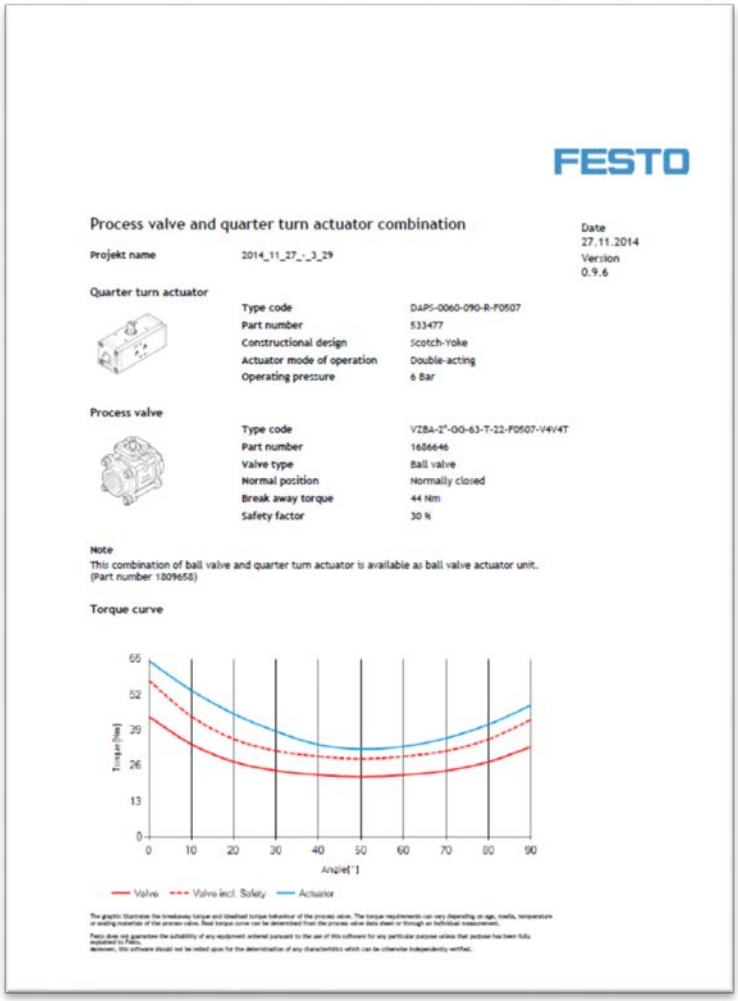

Fig. 4.5