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1 Software Description

This software is the sizing and selection tool for the ABB Thermal Mass Flowmeters Sensyflow FMT500-IG, FMT500-IG-EX, FMT400-VTS and FMT400-VTCS.

Sensyflow are thermal flowmeters for gases that operate on the thermal principle (hot-film anemometer). This measuring principle allows the direct determination of mass flow and gas temperature.

- **Sensyflow FMT500-IG and FMT500-IG-EX for:**
 - Direct measurement of mass flow and temperature - no additional pressure and temperature compensation required
 - High measuring accuracy and short response time
 - Wide measuring range up to 1:150
 - PROFIBUS® DPV1 or analog/HART signal
 - FMT500-IG and IG-EX for process applications
- **Sensyflow FMT400-VTS and FMT400-VTCS for:**
 - Direct measurement of mass flow and temperature - no additional pressure and temperature compensation required
 - High measuring accuracy and short response time
 - Wide measuring range up to 1:100
 - FMT400-VTS for process engineering
 - FMT400-VCTS for the food and beverage industry

The software offers the following features:

- Accessible on-line at <http://www70.de.abb.com/fmt/gui/index.html>
- Stand-alone CD version (no installation necessary)
- Customer/Project data recording
- Application data entry in a large variety of units
- Context-sensitive notes to assist data entry/selection
- Automatic update of the product picture during configuration
- Comparison chart of the accuracy of Sensyflow and competitor product
- Full product order code generation
- A variety of data output options – all entered/calculated data can be:
 - saved and retrieved
 - printed (from PDF file)
 - exported in Excel format
 - exported in XML format
- Links to documentation downloads (subject to internet connection)

1.1 Software requirements

- Clock frequency 1.5 GHz or higher, 1.5 GB RAM or higher
(recommended 2 GB RAM)
 - Hard drive Standard, min. 200 MB free space (plus application data)
 - Operating system Microsoft® Windows® XP® german or english
 - Microsoft® Internet-Explorer® Version 6.x or higher

Start

The software will be started directly from CD. Meeting the system requirements, no installation is necessary.

Insert CD into the disc drive.

- When autostart function is activated, the software starts automatically.
- When autostart function is deactivated, please call up the file "abb.exe" from main menu in the root directory.

In case of frequent use we recommend a copy of CD on the hard drive.

2 Introduction

When the application is launched, the 'Introduction' screen is displayed – see Fig. 2.1.

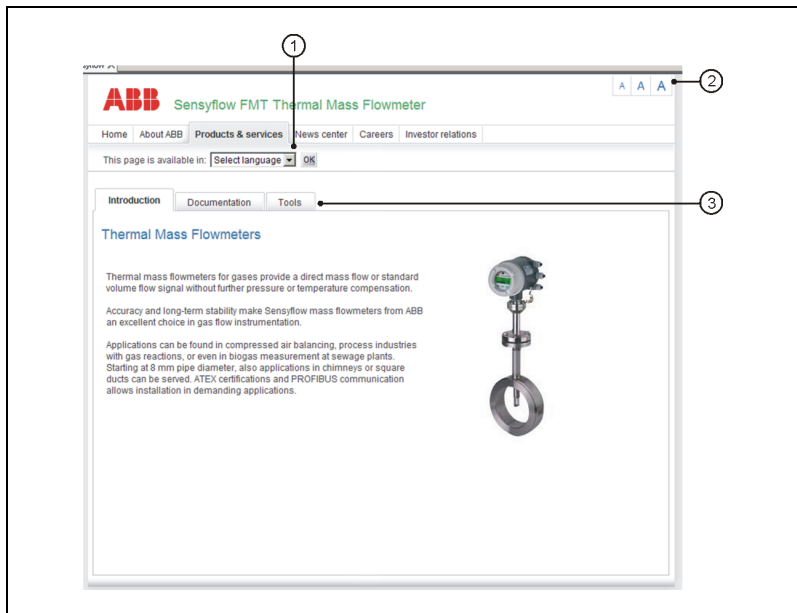


Fig. 2.1 Introduction Screen

Select the software operating language from the drop-down list ① and click **OK**.

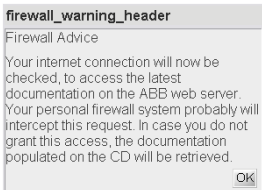
Select the required display text size by clicking on the small, medium or large font symbols ②.

Click on the tabs ③ to access the other screens.

3 Documentation

The 'Documentation' screen (see Fig. 3.1) is a pre-configured search utility that enables a user to access Sensyflow documentation.

When the Documentation tab is first clicked, a firewall warning is displayed:



Click **OK** to continue. If an internet connection is detected, access is enabled to the latest documentation from within the ABB Download Center. If an internet connection is not detected, or a personal firewall blocks access to the ABB Download Center, access is enabled to the documentation from the CD.

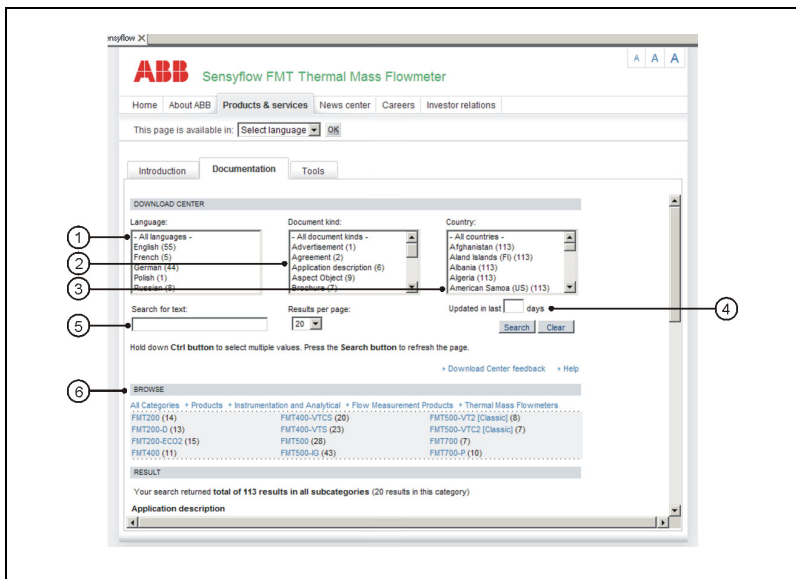


Fig. 3.1 Documentation Screen

Referring to Fig. 3.1:

- ① **Language** The language defaults to the last language selected in the Sensyflow software.
If the required language is not displayed select 'All languages' then select the language required from the list.
To display Sensyflow documents in more than one language, press and hold **Ctrl** and click on each of the required languages.
- ② **Document kind** Select the required type of Sensyflow document (manual, data sheet, etc.) from the list.
To display all Sensyflow document kinds, select 'All document kinds'.
To display multiple Sensyflow document kinds, press and hold **Ctrl** and click on each of the required documents.
- ③ **Country** To display Sensyflow documents produced in a particular country, select the country from the list.
To display Sensyflow documents produced in all countries, select 'All countries'.
To display Sensyflow documents produced in multiple countries, press and hold **Ctrl** and click on each required country.
- ④ **Updated** To display only recently updated Sensyflow documents, enter the required number of days into the 'Updated in last....days' box.
- ⑤ **Search for Text** To search for Sensyflow documents containing specific words or text string(s), enter the words or text strings in this box.

When all required filters have been set in fields ① to ⑤, click the **Search** button to display the Sensyflow documents meeting the criteria selected. To clear all search criteria click the **Clear** button.

- ⑥ **Browse** The search results appear in the Browse field at the bottom of the screen.
Documents may appear in categories/classifications in this section. Click on the category title to display the documents and/or sub-categories (these also expand when clicked).

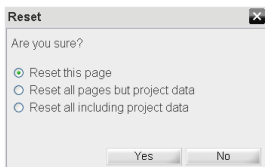
4 Tools

4.1 General

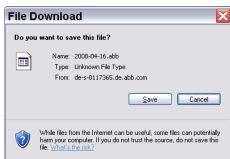
The buttons and icons that are displayed on most of the screens associated with the Tools tab are described as follows:



Resets the data on a page or on multiple pages. Select the data to reset from the 'Reset' dialog:



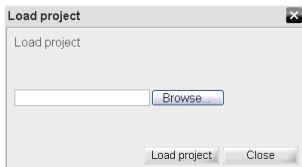
Saves all data/calculations entered so far. The 'File Download' dialog is displayed:




Click Save; a further window prompts for the required file location and name. Amend the default file name as required but *do not change the file extension* (.abb).








Loads a previously saved set of data/calculation. Browse for the file required from the 'Load a configuration' dialog:



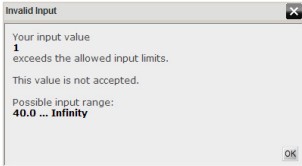
Opens the previous or next screens.

An  icon is displayed against many of the parameters in the Tools screens. Hover the mouse pointer over the icon to display a context sensitive help box to assist in entering data.

The parameters displayed on many of the screens feature drop-down lists for data selection and entry. When a selection is made, the drop-down list disappears and the  button appears against the parameter. Click the button to undo the selection and re-display the drop-down list.

Many parameters require entry of variable data. Enter the data and click the  button adjacent to the parameter or press the keyboard 'Enter' key to confirm data entry. The  button appears against the parameter, the  button is greyed-out and the entry in the parameter field can no longer be changed. Click the  button to reset the parameter.

If an invalid variable value is entered, an 'Invalid Input' error message is displayed showing the allowable input range, for example:



4.2 Fluid Data

The application's process details are entered in the 'Fluid Data' screen – Fig. 4.1.

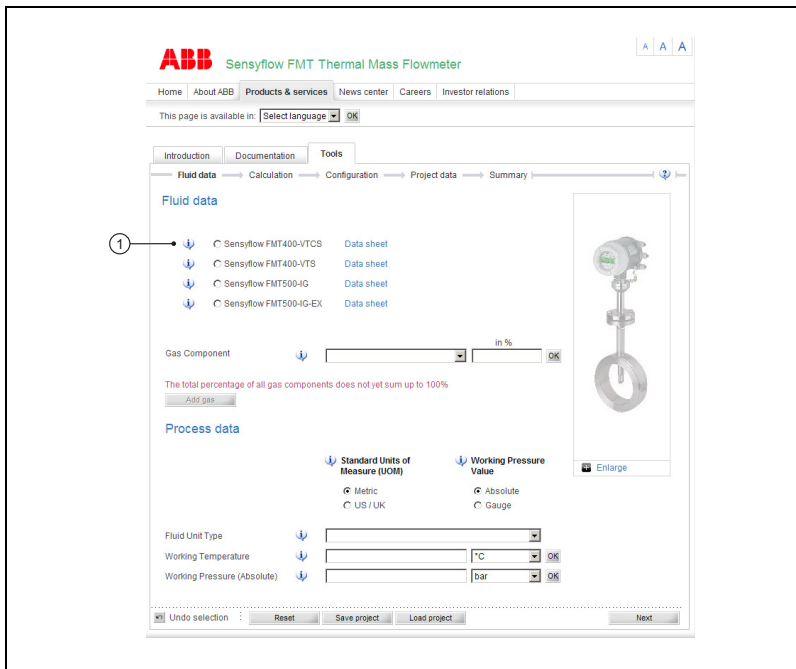


Fig. 4.1 Fluid Data Screen

Select the required Sensyflow model:

Sensyflow FMT400-VTCS: Compact thermal mass flowmeter for gas measurements in food and drink industries. The 24 V instrument supplies an analog signal directly from the sensor head.

Sensyflow FMT400-VTS: Compact thermal mass flowmeter for universal gas measurements in process applications. The 24 V instrument supplies an analog signal directly from the sensor head.

Sensyflow FMT500-IG: Intelligent thermal mass flowmeter for universal gas measurements in process applications. Compact and remote version for flexible mounting solutions. Communication and configuration via the PROFIBUS DPV1 or analog output/HART.

Sensyflow FMT500-IG-EX: Intelligent thermal mass flowmeter for universal gas measurements in hazardous area process applications. Communication and configuration via the PROFIBUS DPV1 or analog output/HART.



Select the application gas from the pull down menu and enter a value for the percentage. For pure gases enter 100 and click **OK**.

For gas mixtures, use the **Add gas** button, a new "Gas Component" line will be added.

The red message (see picture below) will not disappear until the sum of the gas components is 100 %.



Select either metric or imperial units of measurement.



Select either gauge or absolute pressure values.



Select the flow rate units required:

Mass Flow – the flow rate is specified in units of mass (for example, kg/hr, Tonnes/d)

Norm Volume Flow – the flow rate is specified in units of volume (for example, m³/h, ft³/day)



Enter the value of the normal operating temperature of the process (the temperature to be used in the flow calculation).

Select the required temperature units and click **OK**.



Enter the value of the normal operating pressure of the process (the pressure to be used in the flow calculation).

If 'Working Pressure Value' is set to 'Gauge' and a value of 5.5 bar is entered, the pressure used for calculation is 5.5 bar gauge (6.513 bar absolute).

If 'Working Pressure Value' is set to 'Absolute' and a value of 5.5 bar is entered, the pressure used for calculation is 5.5 bar absolute (4.487 bar gauge).

Select the required pressure units and click **OK**.

Gas Reference Conditions 

Note: Displayed only if 'Flow Unit Type' is set to 'Norm Volume Flow'.
Select the base conditions that the volume flow is to be referenced to.

- **0 °C / 32 °F at 1013.25 mbar / 101.325 kPa / 14.696 psi (NTP)**
Volume referenced to that occupied by a gas at normal temperature and pressure (NTP) – 0 °C and 1013.25 mbar absolute. Units may be prefixed with 'N'.
- **20 °C / 68 °F at 1013.25 mbar / 101.325 kPa / 14.696 psi (RTP)**
Volume referenced to that occupied by a gas at room temperature and pressure (RTP) – 20 °C / 68 °F and 1013.25 mbar absolute. Units are often prefixed with 'R'.
- **60 °F at 1013.25 mbar / 101.325 kPa / 14.696 psi (STP)**
Volume referenced to that occupied by a gas at standard temperature and pressure (STP) – 60 °F and 1013.25 mbar absolute. Units are often prefixed with 'S'.
- **70 °F at 1013.25 mbar / 101.325 kPa / 14.696 psi (STP)**
Volume referenced to that occupied by a gas at standard temperature and pressure (STP) – 70 °F and 1013.25 mbar absolute. Units are often prefixed with 'S'.
- **15 °C / 59 °F at 1013.25 mbar / 101.325 kPa / 14.696 psi (STP)**
Volume referenced to that occupied by a gas at standard temperature and pressure (STP) – 15°C and 1013.25 mbar absolute. Units are often prefixed with 'S'.

Note: Check the actual reference conditions of the application as there are several sets of STP reference conditions in use, worldwide.

Click the  button or click  Calculation  to advance to the 'Calculation' screen.

4.3 Calculation

In the next step, the 'Calculation' screen is displayed – Fig. 4.2.

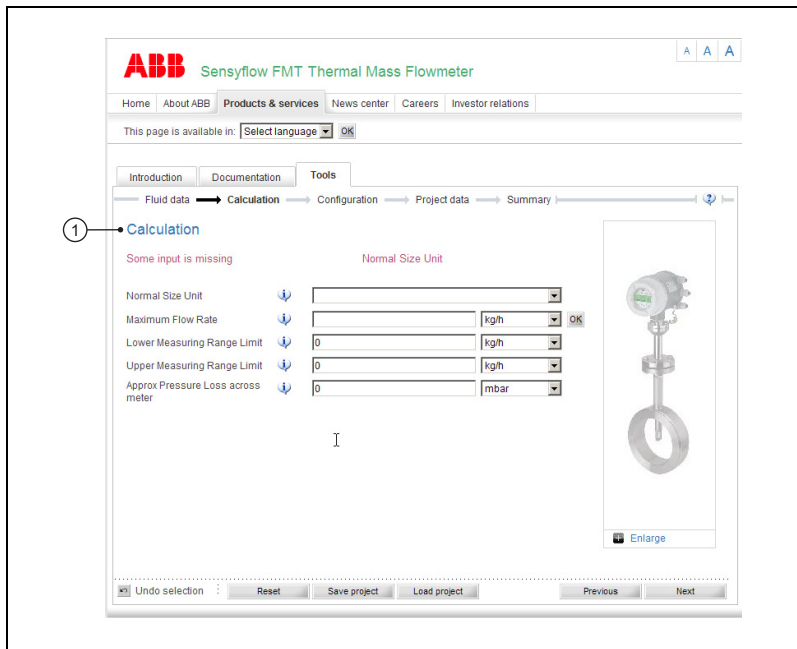
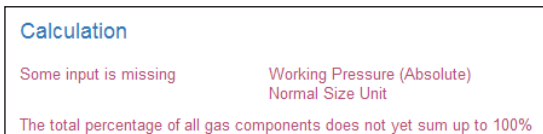


Fig. 4.2 Calculation Screen

Referring to Fig. 4.2:

If data required for the calculation is missing or inconsistent, the affected parameters are displayed in red:



Click the button or click Fluid data to return to the 'Fluid Data' screen and enter the missing data or correct the inconsistency.

Note: The screen starts always with the message ①. The message will disappear as soon as you select the normal size unit.

First select the unit of the pipe size:

You can choose from several units:

ANSI, DIN, inch and mm.

Note: You can choose whether you enter a given pipe diameter to get the maximum possible flow rate or enter the maximum flow rate, which might occur, to get the maximum pipe diameter needed.

Select the nominal pipe size from pulldown menu (DIN, ANSI) or enter the value of the pipe size (mm, inch) and click . If your application size is not listed, contact ABB.

After selection of the pipe size the Sizing Tool will automatically calculate and output the other values:

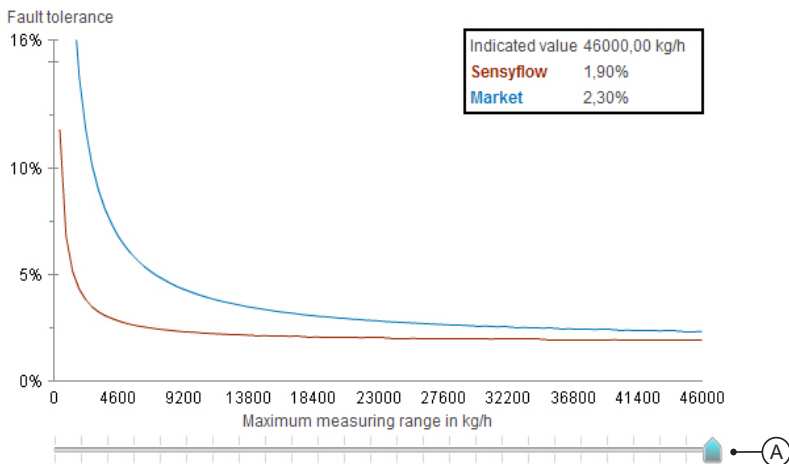
Maximum flow rate, lower measuring range limit, upper measuring range limit and approx. pressure loss across the meter.

Enter the value of the maximum flow rate, select the required flow rate and click .

After selection of the maximum flow rate the Sizing Tool will automatically calculate and output the other values:

Pipe size, lower measuring range limit, upper measuring range limit and approx. pressure loss across the meter.

As information for the customer a graphical comparison of the fault tolerance over the measuring range of the Sensyflow and the market standard is displayed. Use the slider below the graph to adjust a flow rate value and to display the calculated accuracy at the indicated value.



Click the button or click Fluid data to return to the 'Fluid Data' screen

or

Click the button or click Configuration to advance to the 'Configuration' screen.

4.4 Configuration

The full ordering code for the Sensyflow is created in the 'Configuration' screen – Fig. 4.3.

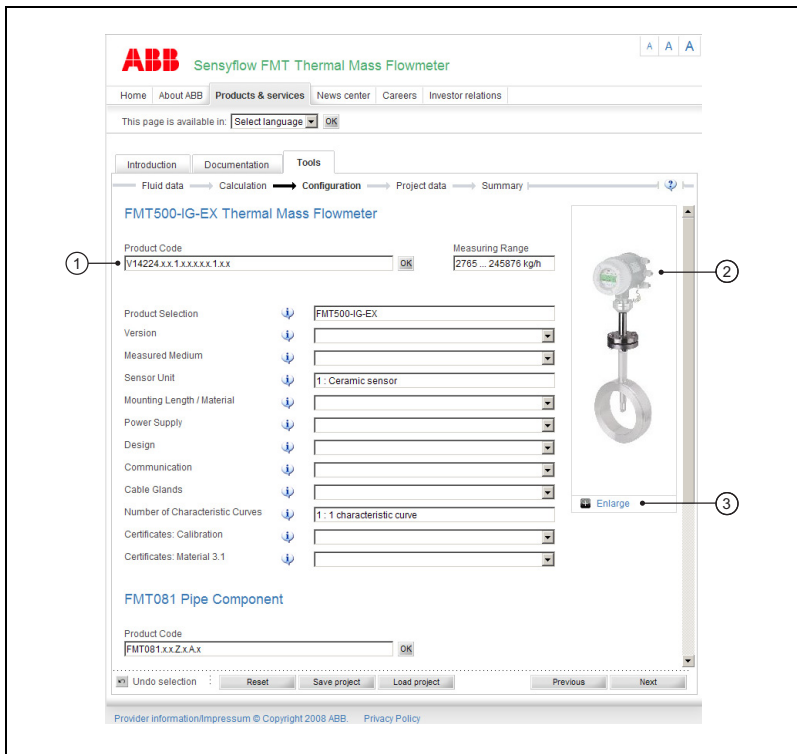



Fig. 4.3 Configuration Screen

If an application has already been sized, the relevant data is used to pre-select certain options automatically. For example, choices made earlier for Mass/Volume flow, temperature, pipe size, etc. are reflected in pre-selection of certain coded options.

As further selections are made, the ordering code is constructed at ①. Additionally, the grey product image at ② builds as selections are made until a full color, general representation of the specified product is displayed. Click on ③ to view an enlarged picture of the product in a new window.

Note. The product image is available on all the Tools tab screens.


Note. With certain options selected, other options become unavailable. Unavailable options are highlighted in red.

Product Selection  FMT500-IG-EX

The Sensyflow model chosen under 'Fluid Data' is displayed. If you want to select another model, return to 'Fluid Data'.

Version 


Select the required Sensyflow model, e.g.

Version 

- 3 : ATEX version for Zone 2 / 22, -20 ... 150 °C (-4 ... 302 °F)
- 4 : ATEX version for Zone 1 / 21, -20 ... 150 °C (-4 ... 302 °F)
- 5 : ATEX version for Zone 0 / 21, -20 ... 80 °C (-4 ... 176 °F)

Measured Medium 

Select the measured medium, e.g.

Measured Medium 


- A: Gases and gas mixtures with 23.5 Vol% O2 max.
- B : Oxygen / gas mixtures > 23.5 Vol% O2, oil and grease
- C : DVGW Certificate for natural gas (max. 150 °C [302 °F)
- D : H2, He (max. 8 bar [116 psij], always with process gas

Sensor Unit  1: Ceramic sensor

Displays the sensor unit.

Mounting Length / Material  1: 263 mm (10.4 in.) / AISI 316Ti SST (1.4571) (DN 25 ...)

Displays the meter size selected by the software based on the 'Pipe Size' selected in the 'Fluid Data' screen – see Fig. 4.1.

Click the  button to change the selection if required and select the nominal pipe size. If the required pipe size is not listed, contact ABB.

Power Supply 


Select the power supply.

Design 

Select the design (remote, compact, only available for Sensyflow IG and IG-EX).

Communication 

Select the communication.

Cable Glands 

Select the cable connection.

Number of Characteristic Curves  1: 1 characteristic curve

As standard, Sensyflow comes with 1 characteristic curve.

Note: Up to 4 characteristic curves for different gases or pipe diameters can be stored in a Sensyflow IG. With this Sizing Tool only 1 characteristic curve is possible. For more curves, please calculate separately and contact ABB for more information.

Certificates: Calibration 

As standard, Sensyflow comes with a factory calibration certificate.

For DKD calibration and certificate choose '1: DKD certificate of calibration with air'.

If the required calibration is not listed, contact ABB.

Certificates: Material 3.1 

As standard, material certificates are not supplied with Sensyflow.

For material certificates to 3.1 select '1: Material certificate acc. to EN 10204 3.1'.

If the required certificate is not listed, contact ABB.

After selection of the Thermal Mass Flowmeter, the compatible pipe component can be selected. This selection is not mandatory, but optional. The relevant data from the Thermal Mass Flowmeter is used to pre-select certain options automatically.

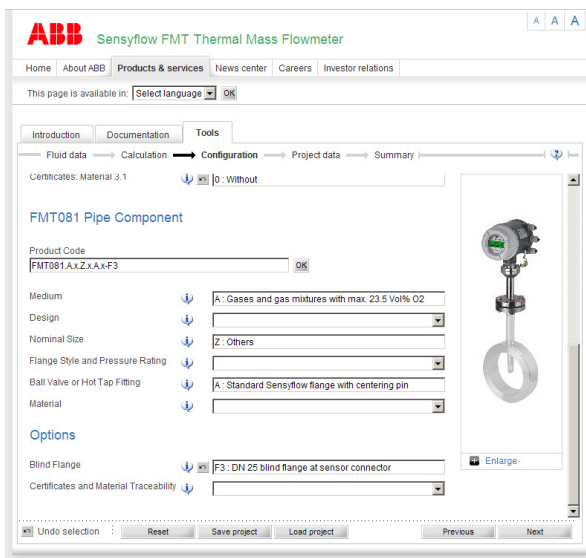



ABB Sensyflow FMT Thermal Mass Flowmeter

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This page is available in: OK


Introduction Documentation **Tools**


Fluid data Calculation **Configuration** Project data Summary


Certificates: Material 3.1 


FMT081 Pipe Component


Product Code OK


Medium 

Design 


Nominal Size 


Flange Style and Pressure Rating 


Ball Valve or Hot Tap Fitting 


Material 

Options

Blind Flange 

Certificates and Material Traceability 




Medium 

Displays the measured medium selected in the 'Measured Medium' of the Thermal Mass Flowmeter in the section above.

Design 


Choose the design of the pipe component.

Displays the nominal pipe size selected by the software based on the 'Pipe Size' selected in 'Fluid Data' screen - see Fig. 4.1.

Choose the flange style and pressure rating.
If the required value is not listed, contact ABB.

Choose the process connection.

Choose the material of the pipe component.

Choose optional blind flange if required.

Choose optional certificate if required.

Click the button or click  Calculation  to return to the 'Calculation' screen

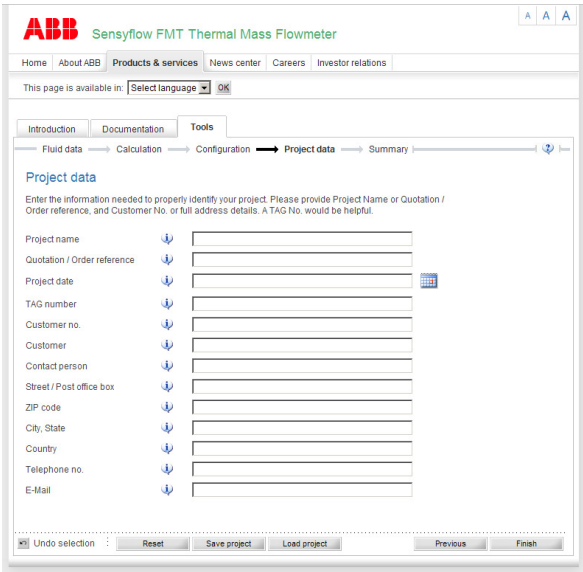
or

Click the button or click  Project data  to advance to the 'Project data' screen.

4.5 Project Data

Completion of the fields in the 'Project Data' screen (Fig. 4.4) is optional but enables the user to cross-reference the calculation to data on a client, project, quote or order reference.

The information is stored in all associated saved files, can be exported in all the export formats and included in all printed summaries if required.



The screenshot displays the 'Project Data' screen within the Sensyflow FMT Thermal Mass Flowmeter software. The interface includes a top navigation bar with 'Home', 'About ABB', 'Products & services', 'News center', 'Careers', and 'Investor relations'. Below this is a language selection dropdown set to 'Select language' with an 'OK' button. The main navigation area shows 'Introduction', 'Documentation', and 'Tools' tabs, with a breadcrumb trail: 'Fluid data' → 'Calculation' → 'Configuration' → 'Project data' → 'Summary'. The 'Project data' section contains a heading and a note: 'Enter the information needed to properly identify your project. Please provide Project Name or Quotation / Order reference, and Customer No. or full address details. A TAG No. would be helpful.' The form consists of the following fields: Project name, Quotation / Order reference, Project date, TAG number, Customer no., Customer, Contact person, Street / Post office box, ZIP code, City, State, Country, Telephone no., and E-Mail. Each field has a dropdown arrow icon to its left. At the bottom, there is a toolbar with buttons for 'Undo selection', 'Reset', 'Save project', 'Load project', 'Previous', and 'Finish'.

Fig. 4.4 Project Data Screen

Click the **Previous** button or click **Configuration** to return to the 'Configuration' screen

or

Click the **Finish** button or click **Summary** to advance to the 'Summary' screen.

4.6 Summary

The 'Summary' screen displays the collated Fluid Data, Calculation, Configuration and Project Data information – see Fig. 4.5.

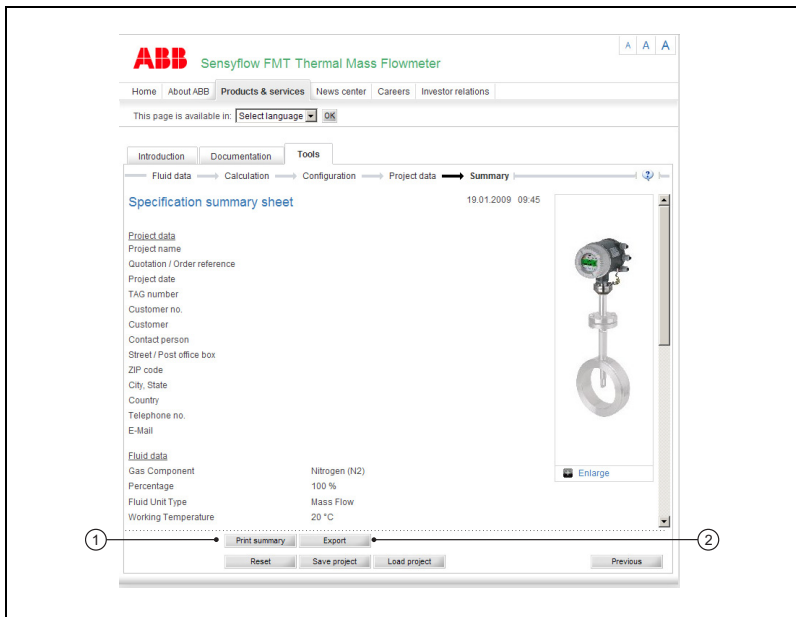


Fig. 4.5 Summary Screen

Click the **Print summary** button ① to export the information as a pdf file that can be saved, opened or printed.

Click the **Export** button ② to export the information as an excel file. The data is formatted as a Microsoft® Excel spreadsheet that can be saved, opened or printed.

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