User's Manual

FlowNavigator™ R2.03

FSA120
Flow Configuration Software

IM 01C25R51-01E

YOKOGAWA
Yokogawa Electric Corporation

IM 01C25R51-01E
12th Edition

FSA120
Flow Configuration Software

IM 01C25R51-01E 12th Edition

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Revision Information

1. Introduction

This User's Manual gives instructions on FSA120 Flow Configuration Software "FlowNavigator".

The following table lists the User's Manuals of FlowNavigator.

Table 1.1a FlowNavigator User's Manual List

Title	Contents	Media	IM No.
FSA120 Flow Configuration Software	Operation manual for FlowNavigator	PDF File	IM 01C25R51-01E
FSA120 Flow Configuration Software Getting Started	General information about installation and precautions	Paper	IM 01C25R51-10E

The FlowNavigator software is used to set up the EJX Multivariable Transmitter and digitalYEWFLO Vortex Flowmeter. It is indispensable for users to read, understand, and follow the instructions on all the following user's manuals before starting the operation.

Table 1.1b EJX Multivariable Transmitter User's Manual List

Title	Contents	IM No.
EJX910A and EJX930A Multivariable Transmitters	Installation, wiring, and maintenance	IM 01C25R01-01E
EJX910A and EJX930A Multivariable Transmitter HART Communication Type	Operation manual for HART communication type	IM 01C25R02-01E
EJX910A and EJX930A Fieldbus Communication Type	Operation manual for FOUNDATION fieldbus communication	IM 01C25R03-01E

Table 1.1c digitalYEWFLO Vortex Flowmeter User's Manual List

Title	Contents	IM No.
digitalYEWFLO Series Vortex Flowmeter	Installation, wiring, and maintenance	IM 01F06A00-01E
digitalYEWFLO Series Vortex Flowmeter FOUNDATION Fieldbus Communication Type	Operation manual for FOUNDATION fieldbus communication	IM 01F06F00-01E

When using FieldMate to launch FlowNavigator, refer to the FieldMate User's Manuals that are listed in the following table.

Table 1.1d FieldMate User's Manual List

Title	Contents	Media	IM No.
FieldMate Versatile Device Management Wizard	Operation manual for FieldMate	PDF File	IM 01R01A01-01E
FieldMate Operational Precaution	Precautions	Paper	IM 01R01A01-91E
FieldMate Versatile Device Management Wizard Getting Started	Quick start procedure for FieldMate	Paper	IM 01R01A04-01E

When using PRM to launch FlowNavigator, refer to the PRM User's Manuals that are listed in the following table.

Table 1.1e PRM User's Manual List

Title	Contents	Media	IM No.
Plant Resource Manager Reference	Operation manual for PRM	PDF File	IM 33Y05Q10-11E
Plant Resource Manager Installation	Installation manual for PRM	PDF File	IM 33Y05Q12-11E

In this manual, the following abbreviations are often used:

- AR Block stands for Arithmetic Function Block.
- HART protocol revision 5 and 7 are described as HART 5 and HART 7 respectively.

1.1 About This Manual

- This manual should be delivered to the end user.
- The information contained in this manual is subject to change without prior notice.
- The information contained in this manual, in whole or part, shall not be transcribed or copied without YOKOGAWA's written permission.
- In no case does this manual guarantee the merchantability of the transmitter or the software or its adaptability to a specific client needs.
- If any question arises or errors are found, or if any information is missing from this manual, please inform the nearest Yokogawa sales office.
- Changes to specifications, structure, and components used may not lead to the revision of this manual unless such changes affect the function and performance of the products.
- The operation of the FlowNavigator described in this manual is the operation for the use with FieldMate Basic. For the detailed installation and operation of FieldMate and additional functions available on FieldMate Advance, please refer to the FieldMate User's manual.
- The following safety symbols are used in this manual:



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



IMPORTANT

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.



NOTE

Draws attention to information essential for understanding the operation and features.

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Operation

Temperature: 0 to 40 °C
Humidity: 20 to 80 % (No dew condensation)

Storage

Temperature: -10 to 50 °C
Humidity: 20 to 80 % (No dew condensation)

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License Agreement on Flow Configuration Software (“FlowNavigator”) for EJX Multivariable Transmitter and digitalYEWFLO Vortex Flowmeter.

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2. General

2.1 Components

The FSA120 package includes the following components:

- FlowNavigator Disc: FlowNavigator Program and Resource
- Paper Document: FlowNavigator Getting Started User's Manual IM 01C25R51-10E
- License Number Sheet: FlowNavigator License Number Sheet
- USB FieldMate Modem (Option)

The following figure shows the components that are included in the FSA120 package.

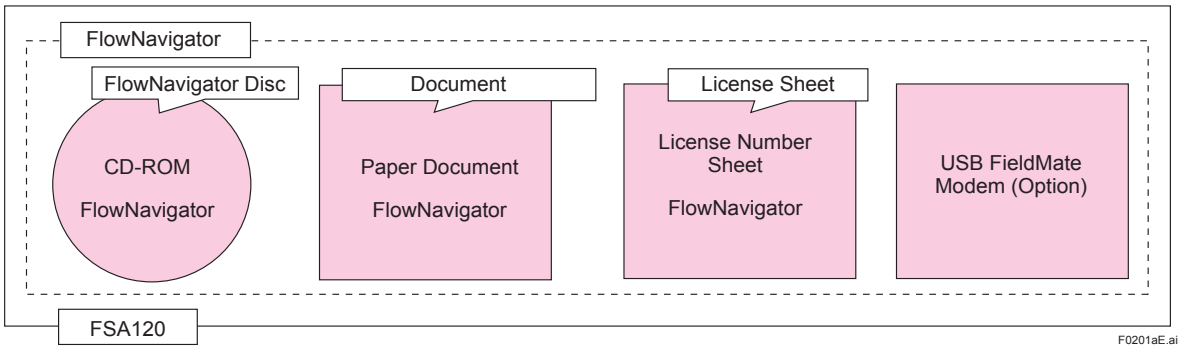


Figure 2.1a Components of FSA120

NOTE

- This package does not include the installers of either FieldMate or PRM.
- The End User License Agreement is available during FlowNavigator installation. For more information, refer to section 4.2.4.

2.1.1 FieldMate Users

User can separately purchase FieldMate, which YOKOGAWA is providing as excellent Versatile field device management and configuration software tool, and use this bundle to launch Flow-Navigator.

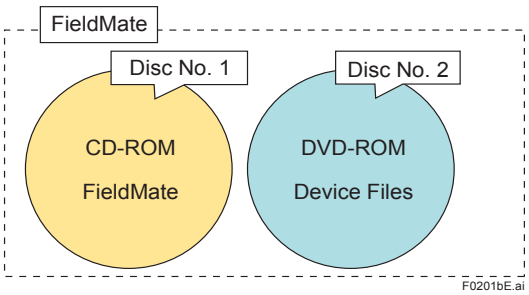


Figure 2.1b Components of FieldMate

- Disc No. 1 contains FieldMate R3.04.20 or later.
- Disc No. 2 contains Device Files R3.09.30 or later. This contains the DTM software installer and the device description files.

IMPORTANT

When using FlowNavigator R2.03.00, in case DeviceFiles is R3.09.20, download and install DeviceFiles R3.09.23.
In case DeviceFiles is R3.09.30 or later, this procedure is not required.
[How to confirm if Device Files R3.09.30 is applied]

- Confirm by DVD-ROM label
- Execute FieldMate on the PC which DeviceFiles is installed and confirm by “Help” → “About FieldMate” → “Revision information” → “DeviceFiles”

EJX910 FDT2.0 HART DTM and EJX910 FDT2.0 HART 7 DTM which are included in the DeviceFiles are updated to the DTM corresponds to FlowNavigator R2.03.00.
To obtain DeviceFiles R3.09.23, refer to “2.1.3 Information provision web site”
To confirm DeviceFiles R3.09.23 is applied, Click “Control Panel → Programs → Programs and Features” and Confirm “Yokogawa Device DTM Library 8.9” is shown.

2.1.2 PRM Users

User can execute FlowNavigator on PRM, which YOKOGAWA is providing as excellent on line asset management software tool for field devices and systems.

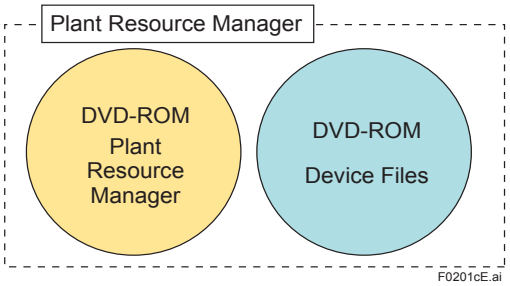


Figure 2.1c Components of PRM

The PRM package includes the installer of PRM R4.06.00 or later, the Device Files R3.09.30 or later, and the DTM that is required to launch FlowNavigator.

2.1.3 Information Provision Web Site

For FieldMate, FlowNavigator and PRM users, the users' web site is in operation as follows;

https://partner.yokogawa.com/global/fieldmate/

Entering your FSA120 license number allows you to access the information menu for "FlowNavigator and Device Files."

2.2 Getting Started

1) Before starting any operation, please carefully read the instructions in the user's manual of FlowNavigator and obtain necessary knowledge about installation and operation of the software.

   The instruction manual "FSA120 Flow Configuration Software" (IM 01C25R51-01E) can be downloaded by entering the above document number in the webpage search screen below.
   https://www.yokogawa.com/library/

   To read the file in PDF format, Adobe Reader is required. If Adobe Reader is not installed on your computer, you must download and install Adobe Reader from the following website:

   https://www.adobe.com/

2) FlowNavigator is a software that uses FDT technology. To use this software, a frame application is required.

3) FlowNavigator works with the following FDT frame applications:

   - FieldMate R3.04.20 or later
   - PRM R4.06.00 or later

2.3 Installation Flow

The following procedure discusses the flow of standard installation of FlowNavigator. As the procedures may differ according to conditions, please find details in each designated manual and follow the instructions as necessary.

Step 1 **Install an FDT Frame application**

FDT frame applications that are required for FlowNavigator can be provided by the following:

- FieldMate R3.04.20 or later
- PRM R4.06.00 or later

Step 2 **Install communication device software (for FOUNDATION fieldbus communication)**

Step 3 **Install Device File**

Make sure to install the correct DTM that can launch FlowNavigator. Both the FieldMate and PRM packages include the Device Files disc that contains the correct DTM. For more information on the DTM that is required for FlowNavigator, refer to section 4.5.2.1.

Step 4 **Install FlowNavigator by using the FSA120 package**

Step 5 **Start the FDT Frame application**

Step 6 **Start device DTM**

Step 7 **Start FlowNavigator**

Step 8 **Enter a license number for FlowNavigator**



NOTE

For the detailed instructions on the FlowNavigator installation, please refer to the following:
- Section 4.2 of this user's manual

For the installation instructions of the FDT frame applications, please refer to their respective User's Manuals:
- FieldMate: User's manual IM 01R01A01-01E "FieldMate Versatile Device Management Wizard"
- PRM: User's Manual IM 33Y05Q12-11E "Plant Resource Manager Installation"

2.4 Outline of FlowNavigator

FSA120 (FlowNavigator) offers various functions to help users to easily configure the mass flow parameters of devices.

FSA120 includes the following programs:

- EJXMVTool: for EJX Multivariable Transmitter
- DYFMVTool: for digitalYEWFLO Vortex Flowmeter

FSA120 has the following features:

- Easy flow parameter configuration by dialog windows
- Configuration of the fluid physical properties*

  *: DIPPR, Steam tables IAPWS-IF97, Natural gas standard AGA8/ISO12213
- Configuration of the primary device**

  **: Orifice, Nozzle, Venturi, FIX
- Various flow calculation modes

  EJXMVTool: Auto Compensation Mode / Basic Mode
  DYFMVTool: Detail Compensation Mode / Steam Mode / Simple Mode
- HART and FOUNDATION fieldbus H1 are supported.

FSA120 provides the following advantages to devices:

- Highly-responsive flow measurement and saving cost by built-in flow computer inside device
- Highly-accurate mass flow rate output compensated by process temperature or pressure value by using the fluid physical properties database
- Easy mass flow configuration by FDT standard conforming software

  FieldMate: Yokogawa's frame application which conforms to FDT standard
  FDT (Field Device Tool): defines the system environment in which the DTM runs.
  DTM (Device Type Manager): the application which defines the graphical user interface(GUI) specific to the device.

FlowNavigator consists of two Programs (EJXMVTool and DYFMVTool) and Resource for both programs.

- To perform the flow configuration of EJX Multivariable Transmitter, use EJXMVTool, which works on the EJX910 HART/FOUNDATION fieldbus DTM.

  EJXMVTool consists of the Flow Configuration Wizard, a dialog editor for flow configuration, and Obtain Flow Coefficient, a display for confirming the flow configuration.

- To perform the flow configuration of digitalYEWFLO Vortex Flowmeter, use DYFMVTool, which works on DYF(SoftDL) FOUNDATION fieldbus DTM.

  DYFMVTool consists of the Flow Configuration Wizard, a dialog editor for flow configuration.

The following chart shows a configuration consisting of a notebook PC, communication device and EJX Multivariable Transmitters and digitalYEWFLO Vortex Flowmeter.

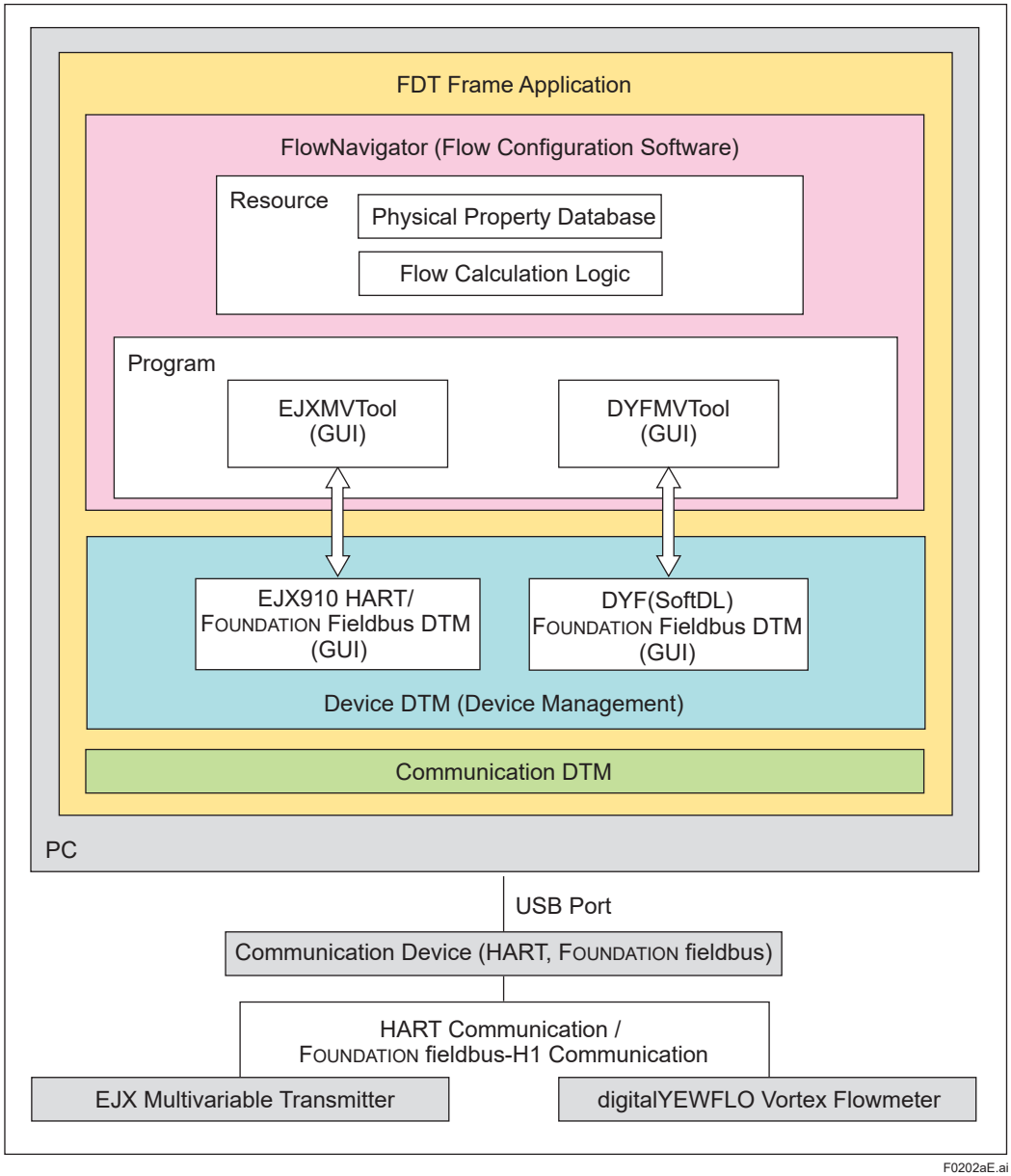


Figure 2.2a Functional diagram

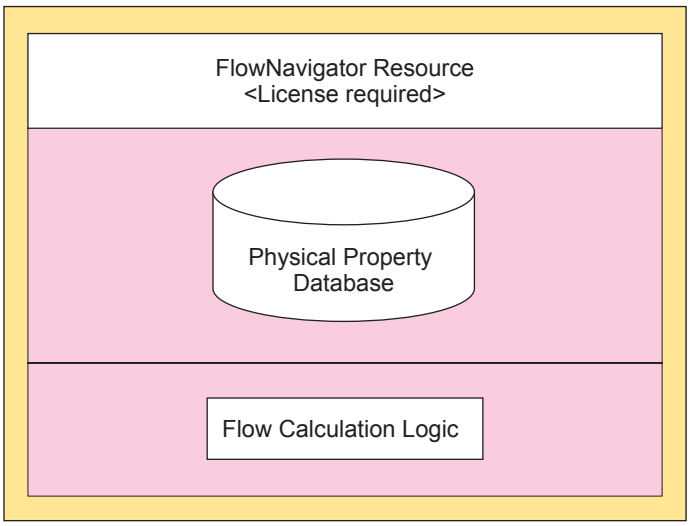


Figure 2.2b FlowNavigator Resource

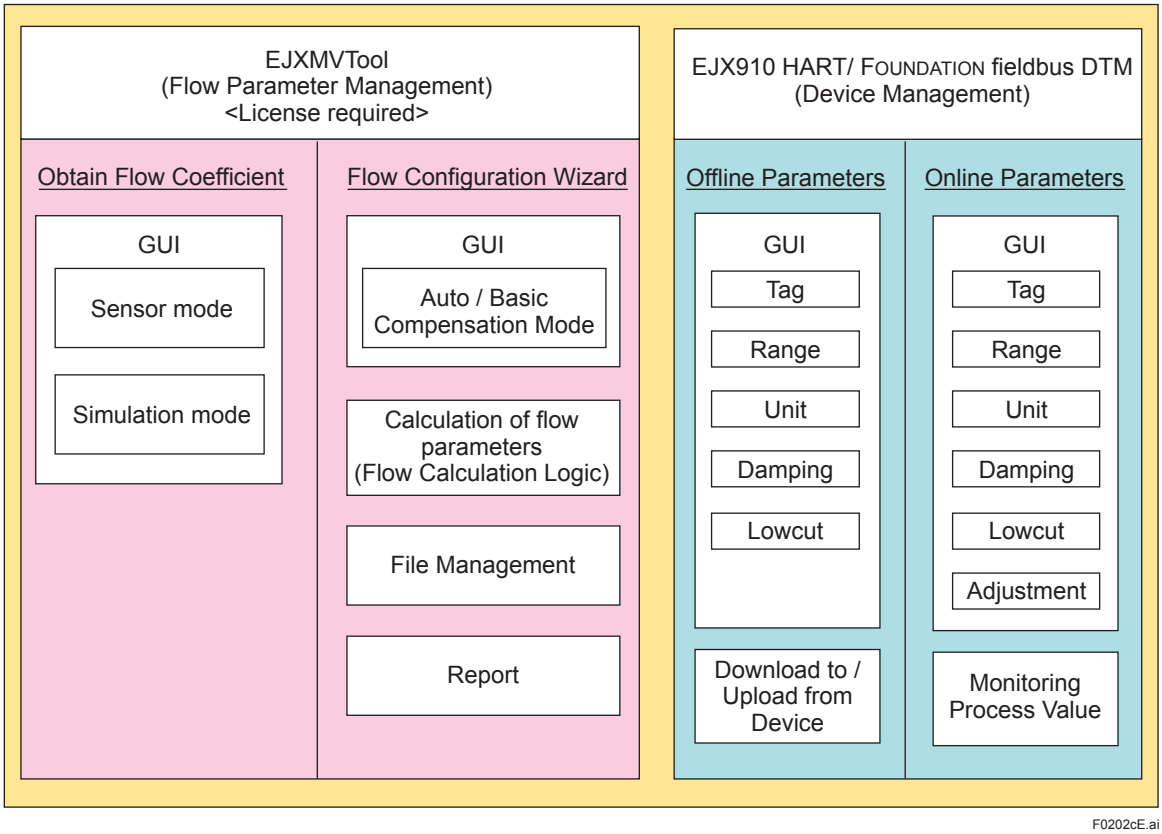


Figure 2.2c FlowNavigator Program and Device DTM (EJX Multivariable Transmitter)

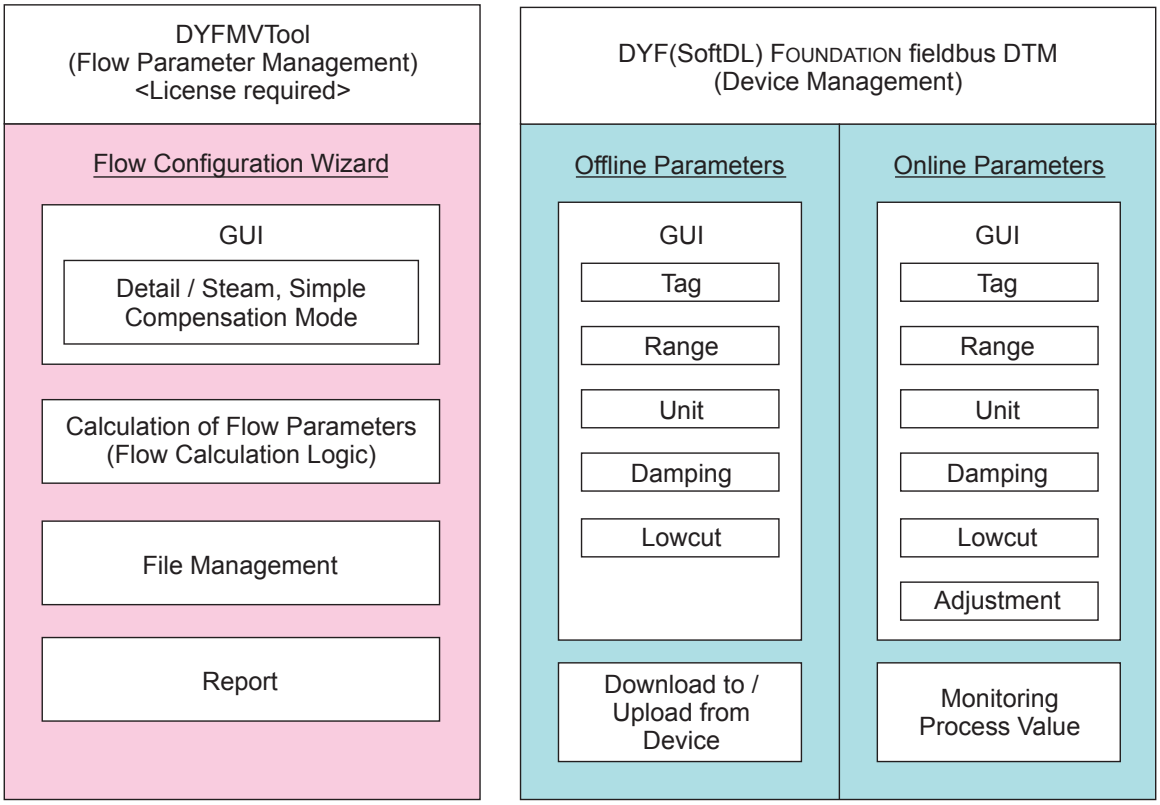


Figure 2.2d FlowNavigator Program and Device DTM (digitalYEWFLO Vortex Flowmeter)

The EJXMVTool flow configuration wizard has different functions in each version.
Refer to Table 2.1 to 2.4 for the difference in the function of each version.

Table 2.1 Flow Configuration Wizard version

		The difference of functions									
Icon	Name	Supported Primary Device	User defined material of Primary device / Pipe material	Fluid Type Setup	Supported File Format	Download User Flow Parameters to the device	Menu	Communication Protocol	Model	Device Revision	DTM Information
FCW R1	Flow Configuration Wizard (R1)	Orifice, Nozzle, Venturi, Fix	Not available	Fluid Type Setup	*.XMV	Not available	Flow Configuration Wizard	FOUNDATION fieldbus	EJX910	2	EJX910 FF DTM
								HART	EJX910	2	EJX910 FDT2.0 HART DTM
							Flow Configuration Wizard (R1)	HART	EJX910_ EXP	10	EJX910 FDT2.0 HART7 DTM
FCW R2	Flow Configuration Wizard (R2)	Orifice, Nozzle, Venturi, Multiport Averaging Pitot, Cone meters, User Defined Mode	Available	Flow Configuration Mode and Fluid type selection	*.XMV, *.XMV2	Not available	Flow Configuration Wizard (R2)	HART	EJX910_ EXP	11	EJX910 FDT2.0 HART7 DTM
FCW R3	Flow Configuration Wizard (R3)	Orifice, Nozzle, Venturi, Multiport Averaging Pitot, Cone meters, User Defined Mode	Available	Flow Configuration Mode and Fluid type selection	*.XMV, *.XMV2	Available	Flow Configuration Wizard (R3)	HART	EJX910_ EXP	12	EJX910 FDT2.0 HART7 DTM

Note: Basic Mode supports XMV file format only. XMV2 file format is not supported.

Table 2.2 Compatibility with FCW R1/R2

Flow Parameter File	FCW R2, FCW R3	FCW R1
XMV2 File	○	×
XMV File	Import Export ⟷ R1 Function*	○

*: For more details, refer to tables 2.3 and 2.4.

Table 2.3 Primary device with FCW R1/R2

Icon	Primary Device	Supported File Format
FCW R1, FCW R2, FCW R3	Orifice	XMV, XMV2
	Nozzle	XMV, XMV2
	Venturi	XMV, XMV2
FCW R2, FCW R3	Multiport Averaging Pitot	XMV2
	Cone meters	XMV2
FCW R1, FCW R2, FCW R3	User Defined Mode (Orifice, Nozzle and Venturi)	XMV, XMV2
FCW R2, FCW R3	User Defined Mode (Multiport Averaging Pitot	XMV2
	User Defined Mode (Cone meters)	XMV2

Table 2.4 Primary device/Pipe material with FCW R1/R2

Icon	Primary device/Pipe material	Supported File Format
FCW R1, FCW R2, FCW R3	304 Stainless Steel	XMV, XMV2
	316 Stainless Steel	XMV, XMV2
	Carbon Steel	XMV, XMV2
	Hastelloy C	XMV, XMV2
	Monel	XMV, XMV2
FCW R2, FCW R3	User defined material	XMV2

2.5 FlowNavigator Programs

You can execute the Device DTM in FDT frame applications such as FieldMate and PRM. In FieldMate, the Device DTM is hosted in the FDT environment, DTMWorks.

- When executing only the Device DTM, user is not required to enter the FlowNavigator license.
- Before you can start FlowNavigator, you must first perform Resource and License checks. Please refer to section 4.6 and 4.7 for more information.

Table 2.5 Function of FlowNavigator Resource

Resource			Function	Contents	Install location	Startup method	License
FlowNavigator	Resource	Physical property database	Physical property database	Physical property database used for flow parameter calculation	32-bit: <DTM InstDrive>:\Program Files\Yokogawa\DTM\DTMev\Advance-dUI\FlowNavigator\R2.01.00 64-bit: <DTM InstDrive>:\Program Files (x86)\Yokogawa\DTM\DTMev\Advance-dUI\FlowNavigator\R2.01.00	–	Required
		Flow Calculation Logic	Flow Calculation Logic	Calculation of Flow Parameters	32-bit: <DTM InstDrive>:\Program Files\Yokogawa\DTM\DTMev\Advance-dUI\FlowNavigator\R2.01.00 64-bit: <DTM InstDrive>:\Program Files (x86)\Yokogawa\DTM\DTMev\Advance-dUI\FlowNavigator\R2.01.00	–	–

Table 2.6 Function of EJXMVTool (for HART communication) and EJX910 HART DTM

Program			Function	Contents	Install location	Startup method	License
Device DTM	EJX910 HART DTM (Dev Rev 1, 2, 10, 11, 12)		Device Management	• Online Parameter • Offline Parameter • Download to or Upload from the device	32-bit: <DTM InstDrive>:\Program Files\Common Files\FDT\Yokogawa\DeviceDtm 64-bit: <DTM InstDrive>:\Program Files (x86)\Common Files\FDT\Yokogawa\DeviceDtm	Execute from FDT frame	Not required
Flow Navigator	Program -EJXMVTool-	Flow Configuration Wizard	Flow Parameter Management -Flow Configuration-	• Configuration of flow parameters for EJX Multivariable Transmitter - Auto Compensation Mode - Basic Mode • File management • Report function	32-bit: <DTM InstDrive>:\Program Files\Yokogawa\DTM\DTMev\AdvancedUI\FlowNavigator\R2.01.00 64-bit: <DTM InstDrive>:\Program Files (x86)\Yokogawa\DTM\DTMev\AdvancedUI\FlowNavigator\R2.01.00	Execute from EJX910 FDT2.0 HART/ HART7 DTM	Required
		Obtain Flow Coefficient	Flow Parameter Management -Confirming Flow Configuration-	• Flow coefficient retrieval			

Table 2.7 Function of EJXMVTool (for FOUNDATION fieldbus communication) and EJX910 FOUNDATION fieldbus DTM

Program			Function	Contents	Install location	Startup method	License
Device DTM	EJX910 FOUNDATION fieldbus DTM (Dev Rev 1, 2)		Device Management	• Online Parameter • Offline Parameter • Download to or Upload from the device	32-bit: <DTM InstDrive>: Program Files\ Yokogawa\DTM\ DTMev 64-bit: <DTM InstDrive>:Program Files (x86)\ Yokogawa\DTM\ DTMev **some of the DLLs that describe contracts for FlowNavigator are installed under <DeviceDtm Path>\ AdvancedUI\FF\ FlowNavigator\ R2.01.00	Execute from FDT frame	Not required
Flow Navigator	Program -EJXMVTool-	Flow Configuration Wizard	Flow Parameter Management -Flow Configuration-	• Configuration of flow parameters for EJX Multivariable Transmitter - Auto Compensation Mode - Basic Mode • File management • Report function	32-bit: <DTM Inst-Drive>: \Program Files\ Yokogawa\DTM\ DTMev\Advance-dUI\FlowNavigator\ R2.01.00 64-bit: <DTM Inst-Drive>: \Program Files (x86)\Yokogawa\ DTM\DTMev\Ad-vancedUI\FlowNavi-gator\R2.01.00	Execute from EJX910 FOUNDATION fieldbus DTM	Required
		Obtain Flow Coefficient	Flow Parameter Management -Confirming Flow Configuration-	• Flow coefficient retrieval			

Table 2.8 Function of DYFMVTool (for FOUNDATION fieldbus communication) and DYF(SoftDL) FOUNDATION fieldbus DTM

Program			Function	Contents	Install location	Startup method	License
Device DTM	DYF(SoftDL) FOUNDATION fieldbus DTM (Dev Rev 3)		Device Management	• Online Parameter • Offline Parameter • Download to or Upload from the device	32-bit: <DTM Inst-Drive>: Program Files\Yokogawa\DTM\DTMev 64-bit: <DTM Inst-Drive>: Program Files (x86)\Yokogawa\DTM\DTMev	Execute from FDT frame	Not required
Flow Navigator	Program -DYFMVTool-	Flow Configuration Wizard	Flow Parameter Management -Flow Configuration-	• Configuration of flow parameters for DYF Vortex Flowmeter - Detail Compensation Mode - Steam, Simple Compensation Mode • File management • Report function	32-bit: <DTM Inst-Drive>: \Program Files\Yokogawa\DTM\DTMev\AdvancedUI\FlowNavigator\R2.01.00 64-bit: <DTM Inst-Drive>: \Program Files (x86)\Yokogawa\DTM\DTMev\AdvancedUI\Flow-Navigator\R2.01.00	Execute from DYF (SoftDL) FOUNDATION fieldbus DTM	Required

3. Functional Specification

3.1 Operation Environment

Make sure that the following software are installed on your computer:

FDT frame application that conforms to the FDT Interface Specification

- FDT 1.2 (for FOUNDATION fieldbus communication)
- FDT 1.2 or 2.0 (for HART communication)

Function Block Scheduling and Connection Tool (for DYFMVTool)

e.g. NI-FBUS Configurator 16.0 or later for Windows 10

Communication DTM

- Communication DTM for HART and FOUNDATION fieldbus are included in FieldMate and PRM

Device Files*

- EJX910 HART DTM
- EJX910 FOUNDATION fieldbus DTM
- DYF(SoftDL) FOUNDATION fieldbus DTM

*The Device Files are included in Yokogawa Device DTM Library



NOTE

For the detailed instructions of FlowNavigator installation, refer to section 4.2.

For more information on the device DTM that is required for FlowNavigator, refer to section 4.5.2.1.

For more information on the requirements on operation environment, please refer to the User's Manual of the FDT frame application:

- FieldMate: User's manual IM 01R01A01-01E "FieldMate Versatile Device Management Wizard"
- PRM: User's Manual IM 33Y05Q12-11E "Plant Resource Manager Installation"

3.2 Field Communication

The following Field Communication requirements are needed for the devices to run:

1) **HART communication**

Recommended HART modem:

USB FieldMate Modem: BRAIN/HART (Optional code: /B, Yokogawa Parts Number: F9197UF)

VIATOR Bluetooth Interface: Model 010041 (MACTek) *

2) **FOUNDATION fieldbus communication**

Recommended:

National Instruments, USB-8486

* : Microsoft supplied Bluetooth stack is used.

3.3 Supported Device Models

FlowNavigator supports the following devices and their corresponding models:

- **EJX Multivariable Transmitter**

  EJX910A/EJX930A Dev Rev 1, 2, 10, 11 (HART protocol, Device Type 0054 for Rev 1 and 2, Device Type 3754 for Rev 10, 11 and 12)

  EJX910A/EJX930A Dev Rev 1, 2 (FOUNDATION fieldbus protocol, Device Type 000E)

- **digitalYEWFLO Vortex Flowmeter**

  DY-F/DYA-F Dev Rev 3 or later (FOUNDATION fieldbus protocol, Device Type 0009)

3.4 Function Detail

3.4.1 Device Management

Device Management function is supported by EJX910 HART/FOUNDATION fieldbus and DYF(SoftDL) FOUNDATION fieldbus DTM.

(1) Online Parameter

The Device General Parameters of the device can be edited directly in online status. (Process value monitoring, Tag, Range, Unit, Damping, Lowcut, Indicator display)

(2) Offline Parameter

The Device General Parameters of the device can be edited and stored in offline database. (Tag, Range, Unit, Damping, Lowcut, Indicator display)

(3) Downloads to or uploads from the device

The Device Flow Parameters and Device General Parameters stored in offline database are downloaded to the device.
The parameters of the device is uploaded from the device and stored in offline database.

Device General Parameters:

HART or FOUNDATION fieldbus parameters of the device, which can be modified by using Device DTM. e.g. range, damping, etc.

User Flow Parameters:

The parameters that users input on EJXMVTool and DYFMVTool for flow configuration. These parameters are used to only generate Device Flow Parameters.

- EJXMVTool
  In case of Flow Configuration Wizard (R1) or (R2), user flow parameters are not downloaded into the device. In case of Flow Configuration Wizard (R3) or later, user flow parameters are downloaded into the device. Refer to IM 01C25R02-01 for details of user flow parameters.
- DYFMVTool
  User flow parameters are not downloaded into the device.

Device Flow Parameters:

The parameters that EJXMVTool and DYFMVTool calculate and generate by using the User Flow Parameters, and are downloaded to the device.

3.4.2 Flow Parameter Management (Flow Configuration Wizard)

(1) EJXMVTool

(a) Auto Compensation Mode

Configuration of the fluid physical properties and primary device for the EJX Multivariable Transmitter can be performed using a dialog window. Refer to Section 7.1.

(b) Basic Mode

Flow operation and density compensation are performed conventionally, with the flow factors being input manually. Refer to Section 7.2.

(c) File management

Parameters are imported and exported using the following file:

- xmv file: import / export User Flow Parameters and Device Flow Parameters
  Refer to 6.3.

(d) Report function

Export User Flow Parameters and Device General Parameters in CSV and TSV file formats. Refer to 6.3.

(2) DYFMVTool

(a) Detail (Gas / Liquid) Compensation Mode

Configuration of the fluid physical properties for the digitalYEWFLO Vortex Flowmeter can be performed using a dialog window. Refer to Section 8.1.

(b) Steam Compensation Mode

Flow operation and density compensation are performed, with the flow factors inside digitalYEWFLO Vortex Flowmeter. Refer to Section 8.2.

(c) Simple (Gas / Liquid) Compensation Mode

Flow operation and density compensation are performed conventionally, with the flow factors being input manually. Refer to Section 8.2.

(d) File management

Parameters are imported and exported using the following file:

- vmv file: import / export User Flow Parameters and Device Flow Parameters
  Refer to 6.3.

(e) Report function

Export User Flow Parameters and Device General Parameters in CSV and TSV file formats. Refer to 6.3.

3.4.3 Flow Parameter Management (Obtain Flow Coefficient)

This function is supported by EJXMVTool only and cannot be found in DYFMVTool.

(a) Flow coefficient retrieval

The flow coefficient can be obtained from the device (input selection: sensor data or simulated data).

3.4.4 Primary Device

This function is supported by EJXMVTool Auto Compensation Mode.

Table 3.1.1 Supported primary devices FCW R1

Type	Primary Device
Orifice	Orifice Corner Taps [ISO5167-1 1991]
	Orifice Corner Taps [ISO5167-2 2003]
	Orifice Corner Taps [ASME MFC-3M 1989]
	Orifice Flange Taps ([SO5167-1 1991]
	Orifice Flange Taps [ISO5167-2 2003]
	Orifice D and D/2 Taps [ASME MFC-3M 1989]
	Orifice Flange Taps [AGA N0.3 1992]
	Orifice D and D/2 Taps [ISO5167-1 1991]
	Orifice D and D/2 Taps [ISO5167-2 2003]
	Orifice D and D/2 Taps [ASME MFC-3M 1989]
Nozzle	ISA1932 nozzle [ISO5167-1 1991/ ISO5167-3 2003]
	Long radius nozzle [ISO5167-1 1991/ ISO5167-3 2003]
	ASME FLOW NOZZLES [ASME MFC-3M 1989] with high beta ratio
	ASME FLOW NOZZLES [ASME MFC-3M 1989] with low beta ratio
	ASME FLOW NOZZLES [ASME MFC-3M 1989] with throat tap flow nozzle
Venturi	Venturi nozzle [ISO5167-1 1991/ ISO5167-3 2003]
	Classical Venturi tube ‘as cast’ convergent section [ISO5167-1 1991/ ISO5167-4 2003]
	ASME Venturi Tubes With a rough Cast or Fabricated Convergent [ASME MFC-3M 1989]
	Classical Venturi tube with a machined convergent section [ISO5167-1 1991/ ISO5167-4 2003]
	ASME Venturi Tubes With a machined convergent section [ASME MFC-3M 1989]
	Classical Venturi tube with a rough-welded sheet-iron convergent section [ISO5167-1 1991/ ISO5167-4 2003]
Fix	Fixed mode

Table 3.1.2 Supported primary devices FCW R2 , FCW R3

Type	Primary Device
Orifice	Orifice Corner Taps [ISO5167-1 1991]
	Orifice Corner Taps [ISO5167-2 2003]
	Orifice Corner Taps [ASME MFC-3M 1989]
	Orifice Flange Taps ([SO5167-1 1991]
	Orifice Flange Taps [ISO5167-2 2003]
	Orifice D and D/2 Taps [ASME MFC-3M 1989]
	Orifice Flange Taps [AGA N0.3 1992]
	Orifice D and D/2 Taps [ISO5167-1 1991]
	Orifice D and D/2 Taps [ISO5167-2 2003]
	Orifice D and D/2 Taps [ASME MFC-3M 1989]
Nozzle	ISA1932 nozzle [ISO5167-1 1991/ ISO5167-3 2003]
	Long radius nozzle [ISO5167-1 1991/ ISO5167-3 2003]
	ASME FLOW NOZZLES [ASME MFC-3M 1989] with high beta ratio
	ASME FLOW NOZZLES [ASME MFC-3M 1989] with low beta ratio
	ASME FLOW NOZZLES [ASME MFC-3M 1989] with throat tap flow nozzle
Venturi	Venturi nozzle [ISO5167-1 1991/ ISO5167-3 2003]
	Classical Venturi tube 'as cast' convergent section [ISO5167-1 1991/ ISO5167-4 2003]
	ASME Venturi Tubes With a rough Cast or Fabricated Convergent [ASME MFC-3M 1989]
	Classical Venturi tube with a machined convergent section [ISO5167-1 1991/ ISO5167-4 2003]
	ASME Venturi Tubes With a machined convergent section [ASME MFC-3M 1989]
	Classical Venturi tube with a rough-welded sheet-iron convergent section [ISO5167-1 1991/ ISO5167-4 2003]
Multiport Averaging Pitot	Verabar
	Calibrated Verabar
	Accelabar
	Calibrated Accelabar
Cone meters	V-Cone
	Wafer-Cone
	Cone meters [ISO 5167-5]
	Calibrated Cone meters [ISO 5167-5]
User Defined Mode (Orifice, Nozzle and Venturi)	The name of a primary device is defined by user
User Defined Mode (Multiport Averaging Pitot)	The name of a primary device is defined by user
User Defined Mode (Cone meters)	The name of a primary device is defined by user

3.4.5 Density Compensation

This function is supported by EJXMVTool Auto Compensation Mode and DYFMVTool Detail (Gas/Liquid) Compensation Mode.

(1) Density compensation using physical properties database

Table 3.2 Supported physical properties database

Fluid name
Acetic Acid (*)
Acetone
Acetonitrile
Acetylene
Acrylonitrile
Air
Allyl Alcohol
Ammonia
Argon
Benzaldehyde
Benzene
Benzoic Acid (*)
Benz Alcohol
Biphenyl
Bromine
Carbon Dioxide
Carbon Monoxide
Carbon Tetrachloride
Chlorine
Chlorodifluoromethane
Chloroprene
Chlorotrifluoroethylene
Cycloheptane
Cyclohexane
Cyclopentane
Cyclopentene
Cyclopropane
Dichlorodifluoromethane
Divinyl Ether
Ethane
Ethanol
Ethylamine
Ethylbenzene
Ethylene
Ethylene Glycol
Ethylene Oxide
Fluorene
Furan
Helium-4
Hydrazine
Hydrogen
Hydrogen Chloride
Hydrogen Cyanide
Hydrogen Peroxide
Hydrogen Sulfide
Isobutane
Isobutene
Isobutylbenzene
Isopentane

Fluid name
Isoprene
Isopropanol
m-chloronitrobenzene
m-dichlorobenzene
Methane
Methanol
Methyl Acrylate
Methyl Ethyl Ketone
Methyl Vinyl ether
Monochlorobenzene
n-Butane
n-Butanol
n-Butyraldehyde
n-Butyronitrile
n-Decane
n-Dodecane
n-Heptadecane
n-Heptane
n-Hexane
n-nonane
n-Octane
n-Pentane
Neon
Neopentane
Nitric Acid (*)
Nitric Oxide
Nitrobenzene
Nitroethane
Nitrogen
Nitromethane
Nitrous Oxide
Oxygen
Pentafluoroethane
Phenol
Phosphoric Acid (*)
Propadiene
Propane
Propylene
Pyrene
Styrene
Sulfur Dioxide
Toluene
Trichloroethylene
Trichlorofluoromethane
Vinyl Acetate
Vinyl Chloride
Vinyl Cyclohexene
Water
1-Butene

Fluid name
1-Decene
1-Decanal
1-Decanol
1-Dodecene
1-Dodecanol
1-Heptanol
1-Heptene
1-Hexene
1-Hexadecanol
1-Octanol
1-Octene
1-Nonanal
1-Nonanol
1-Pentadecanol
1-Pentanol
1-Pentene
1-Undecanol
1,1,2,2-Tetrafluoroethane
1,1,2-Trichloroethane
1,2,4-Trichlorobenzene
1,2-Butadiene
1,3-Butadiene
1,3,5-Trichlorobenzene
1,4-Dioxane
1,4-Hexadiene
2-Methyl-1-Pentene
2,2-Dimethylbutane

*: Only for liquid.

Source:

DIPPR Project No.801 Database 2003 Edition
This Physical Property Database from American Institute of Chemical Engineers (AIChE)



NOTE

The DIPPR recommends an air temperature no higher than –25°C and cannot guarantee results if this temperature limit is exceeded.

(2) Density compensation using standard steam tables (For EJXMVTool)

IAPWS-IF97 Water and Steam (1997)

IAPWS-IF97: IAPWS Industrial Formulation 1997

IAPWS: The International Association for the Properties of Water and Steam

(3) Density compensation using standard.

Natural gas:

AGA8

Compressibility Factors of Natural Gas and Other Related Hydrocarbon Gases

American Gas Association (AGA)

Transmission Measurement Committee Report No.8 Second Edition, November 1992

Detail Characterization Method
Gross Characterization Method 1
Gross Characterization Method 2

ISO 12213:1997 First edition 1997-12-01

Part 2: molar-composition analysis
Part 3: physical properties

(4) Custom fluid density and viscosity compensation

Numerical value user input for physical properties (density, viscosity, etc.)

4. Preparation

4.1 PC

To ensure that FlowNavigator functions properly, your PC must meet the requirements that are stated in section 3.1.

4.2 Installation Procedure

4.2.1 Online Manual

The instruction manual “FSA120 Flow Configuration Software” (IM 01C25R51-01E) can be downloaded by entering the above document number in the webpage search screen below.
https://www.yokogawa.com/library/

If Adobe Reader is not installed on your PC, download and install it from the following website:

https://www.adobe.com/

4.2.2 Installation of the FDT frame application

Refer to the User’s Manual of the FDT frame application for information on their respective installation procedures.

4.2.3 Installation of Device Files

Before installing FlowNavigator, make sure that the following software are installed on your computer.

- Communication DTM (HART and FOUNDATION fieldbus)
- Device DTM for EJX910 and DYF (SoftDL)



NOTE

Make sure to install the correct DTM that can launch FlowNavigator. Both the FieldMate and PRM packages include the Device Files disc that contains the correct DTM. For more information on the DTM that is required for FlowNavigator, refer to section 4.5.2.1.

4.2.4 Installation of FlowNavigator

This section explains the recommended installation procedure of FlowNavigator.

IMPORTANT

Before installing FlowNavigator, please make sure that the correct DTM library version is installed on your computer. This setup requires Yokogawa Device DTM Library 8.9 or later.
For information on how to confirm the DTM library version, refer to section 4.2.6.

Follow these steps to install FlowNavigator:

Step 1 Log on to Windows

Log on to Windows as an Administrator or a user with administrative rights.

Step 2 Insert the "FlowNavigator CD-ROM"

Insert the "FlowNavigator CD-ROM" into the CD-ROM drive. AutoRun starts and the setup wizard appears.

IMPORTANT

If AutoRun does not start after inserting the CD-ROM, double-click the following file.
<FlowNavigator CD-ROM>:\FlowNavigatorResources.exe

NOTE

On Windows 10 due to user account control, the "AutoPlay" or "User Account Control" window may be displayed, and confirmation operation is required.

Step 3 Install FlowNavigator by using the setup wizard

1. Click [I accept the terms in the License Agreement], and then click [Install].

   You can print the End User License Agreement by clicking [Print].

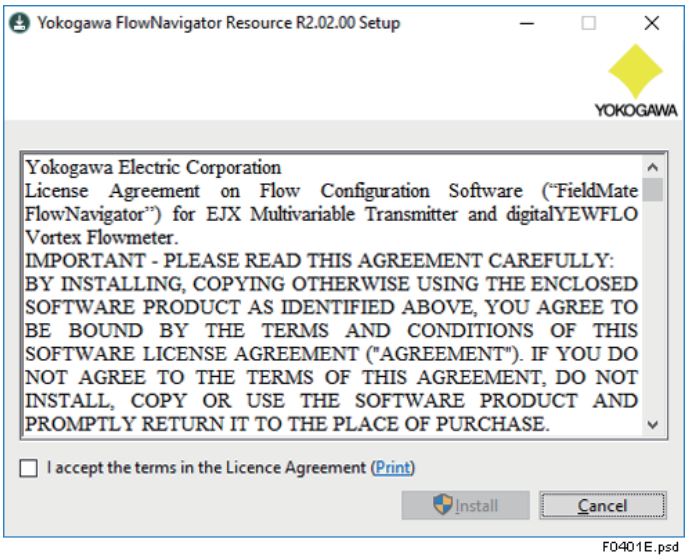


Figure 4.1 End User License Agreement screen

2. Wait for the installation to complete.

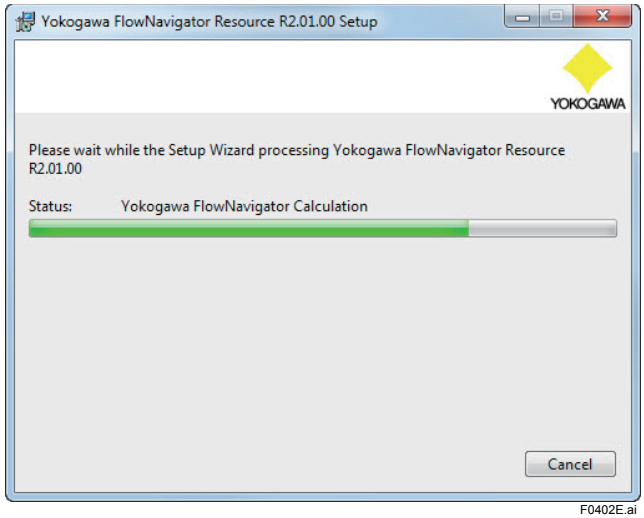


Figure 4.2 Installation Progress screen

3. Once the installation is completed, click [Finish].

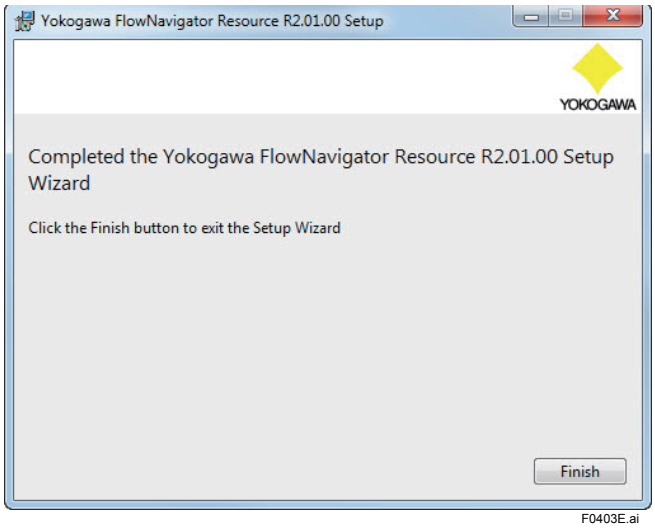


Figure 4.3 Setup Completion screen

4.2.5 Coexistence of FlowNavigator R1 and R2 versions

FlowNavigator R2 can coexist with FlowNavigator R1 versions. When FlowNavigator R2 is installed, any existing R1 versions are not uninstalled from the computer.

If FlowNavigator R1 is uninstalled while FlowNavigator R2 exists on your computer, the following behaviours can happen:

- EJX910 and DYF(SoftDL) FOUNDATION fieldbus DTMs that correspond to FlowNavigator R1 may not launch FlowNavigator R1 functions.
- By using FlowNavigator R2, you can load only the configuration files (xmv/vmv) that are saved in FlowNavigator R1. But you cannot load dns files that are saved in DTM corresponding to FlowNavigator R1. Hence, data migration is necessary.

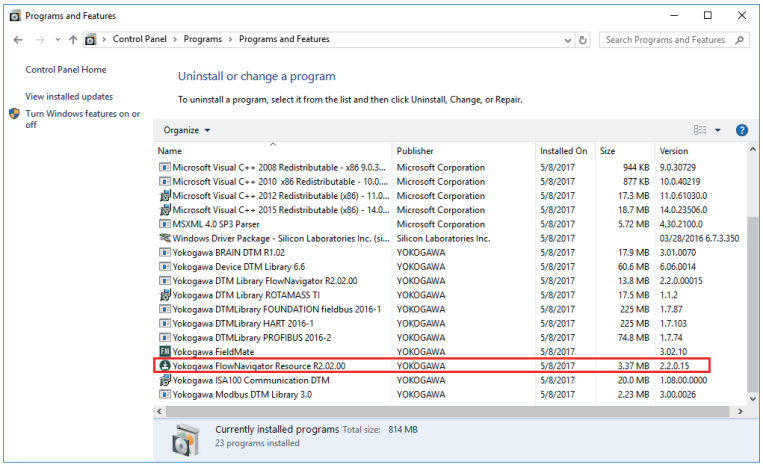
NOTE

For more information on how to perform data migration, refer to Appendix A-2.

4.2.6 How to confirm version numbers

- **FlowNavigator Resource**

  The version number of the FlowNavigator Resource is displayed on the “Programs and Features” screen of Windows Control Panel.



F0404E.psd

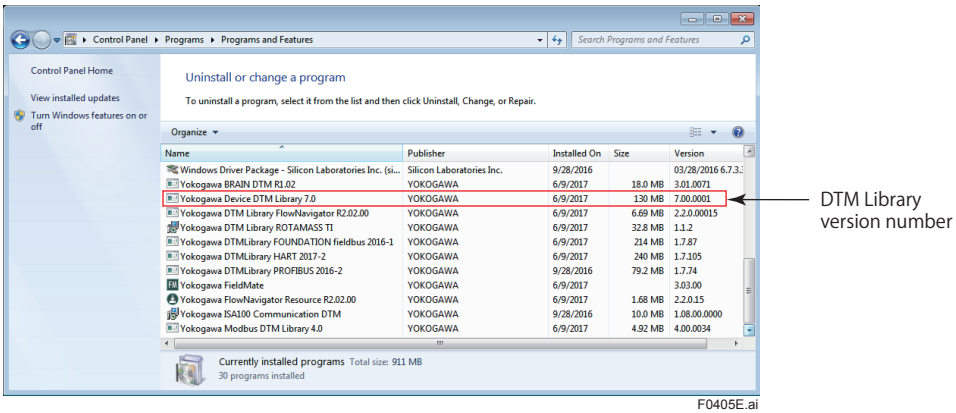
Figure 4.4 Version number of Yokogawa FlowNavigator Resource

- **FlowNavigator Program: EJXMVTool, DYFMVTool**

  To view the version number of EJXMVTool and DYFMVTool, place the mouse pointer over the About icon in the FlowNavigator Program. For more information on the About icon, refer to section 6.3.6

- **Yokogawa Device DTM Library**

  The version number of the Yokogawa DTM Library is displayed on the “Programs and Features” screen of Windows Control Panel.



F0405E.ai

Figure 4.5 Version number of DTM Library

- **Device DTM: EJX910 HART/FOUNDATION fieldbus DTM, DYF(SoftDL) FOUNDATION fieldbus DTM**

  For information on the version of Device DTM, refer to section 4.5.2.2 or 6.2.5.

4.3 Initial Setting (HART Communication)

NOTE

Regarding start up procedure of the device, refer to the following:

- EJX Multivariable Transmitter: User's Manual IM01C25R01-01E "EJX910A and EJX930A Multivariable Transmitters"
  User's Manual IM 01C25R02-01E "EJX910A and EJX930A Multivariable Transmitter HART Communication"

Regarding the initial setting in HART communication such as communication device installation, COM port, wiring, and communication settings, refer to the following:

- User's manual IM 01R01A01-01E "FieldMate Versatile Device Management Wizard"

4.4 Initial Setting (FOUNDATION fieldbus Communication)

NOTE

Regarding start up procedure of the device, refer to the following:

- EJX Multivariable Transmitter: User's Manual IM01C25R01-01E "EJX910A and EJX930A Multivariable Transmitters"
- digitalYEWFLO Vortex Flowmeter: Appendix B-1 of this user's manual

Regarding the initial setting in FOUNDATION fieldbus communication such as communication device installation and wiring, refer to the following:

- User's Manual IM 01R01A01-01E "FieldMate Versatile Device Management Wizard"

Regarding the Communication Settings (NI-FBUS Card) in FOUNDATION fieldbus, refer to the following:

- Appendix D-2 of this user's manual

4.5 Start FDT frame application

This section describes the operation of DTMs in an FDT frame application. The procedures in this section are described by using FieldMate as the sample FDT frame application and the EJX910 FDT2.0 HART7 DTM as the sample DTM.

4.5.1 Update DTM Setup

After new DTM is installed, follow any of these steps to confirm that the designated DTM is correctly installed:

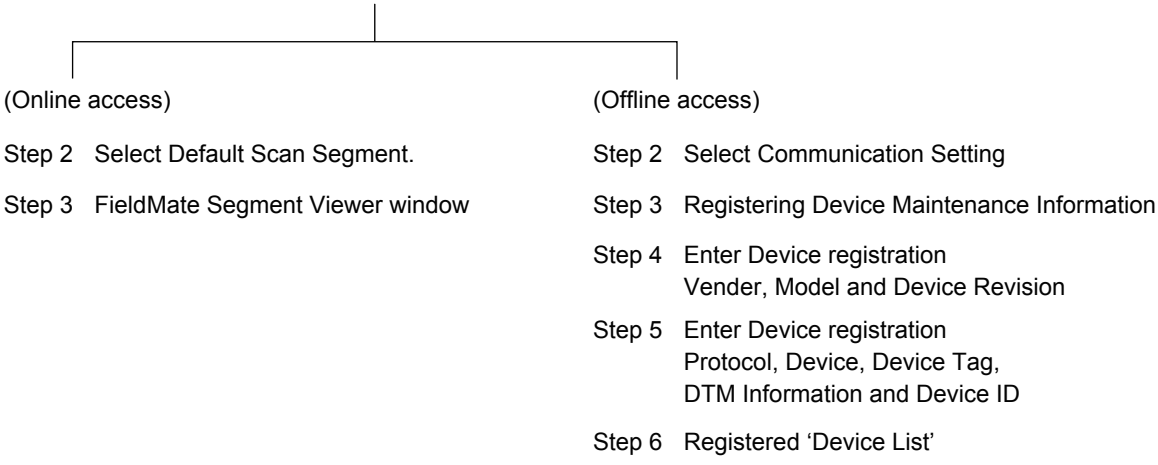
- For Windows 10 or 11,
  Click Windows start button and then click [DTM Setup] under [DTM Setup] in the application list list.

4.5.2 Start FieldMate

Follow these steps to start FieldMate:

Flow

Step 1 Access the Start menu to start FieldMate (Online/Offline access)



Step 1 Access the Start menu to start FieldMate.

- For Windows 10 or Windows 11, click Windows start button, then click [FieldMate] from [YOKOGAWA FieldMate] in the application list.

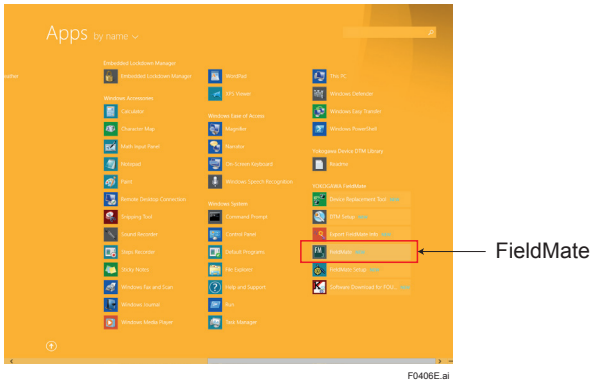
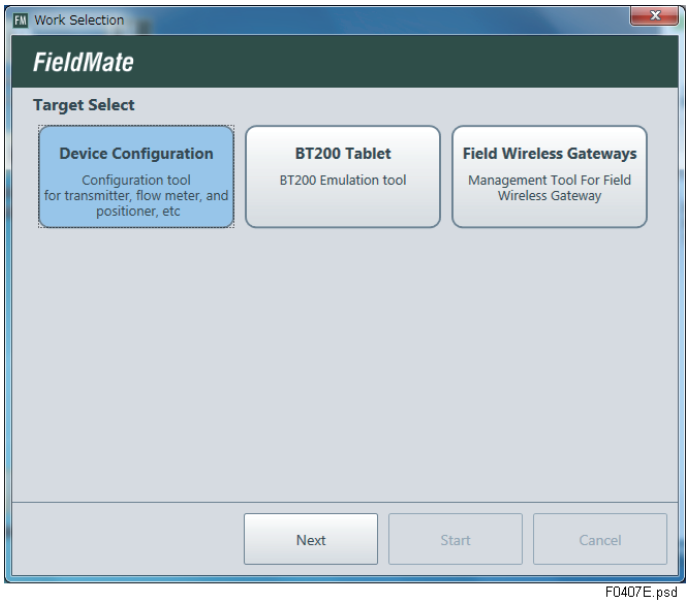


Figure 4.6b Start FieldMate (Windows 8.1)

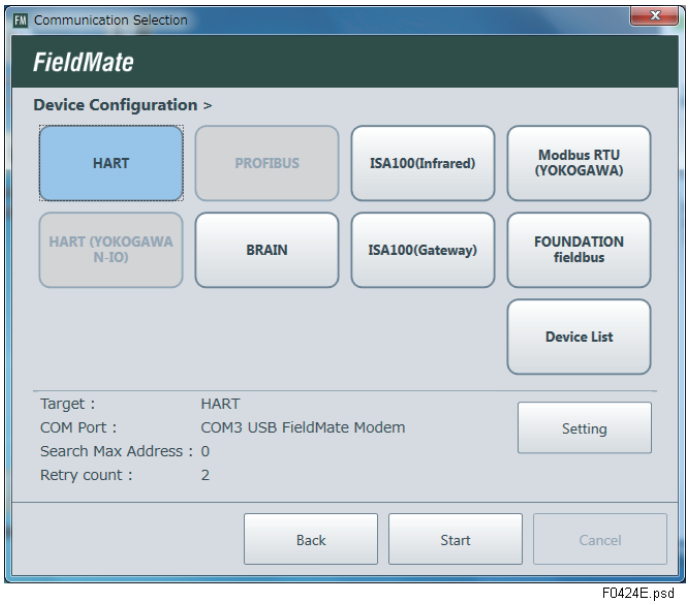
[Online access]

Step 2 Select Default Scan Segment.

In the Work Selection screen, select [Device Configuration] and press [NEXT]. In the Communication Selection screen, specify whether to automatically scan HART devices/ Foundation Fieldbus H1 devices after startup. Select [HART] or [FOUNDATION fieldbus] and then click [Start].



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F0424E.psd

Figure 4.7 Select HART/FOUNDATION fieldbus

NOTE

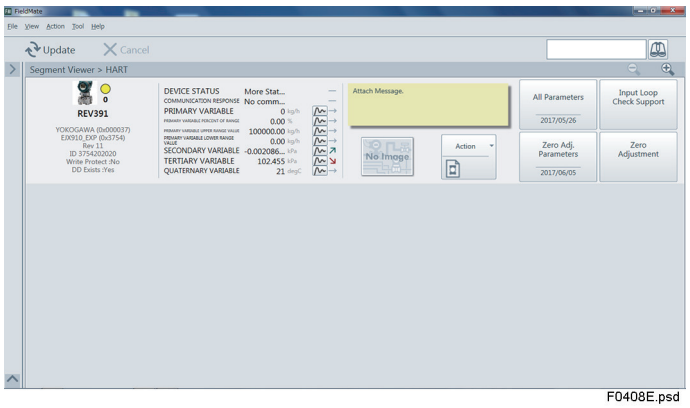
The software for the communication device starts automatically when [FOUNDATION fieldbus] is selected at [FieldMate]. Refer to Appendix D-3 for how to start the software.

Step 3 FieldMate Segment Viewer window

Open Segment Viewer on FieldMate.

A device icon appears on the window if connection to FieldMate is established successfully.

If a connected device icon does not appear, a message appears informing that no device is found. Check if the initial setting for communication is done correctly. For more information on how to check the initial setting, refer to section 4.3 for HART and 4.4 for FOUNDATION fieldbus.



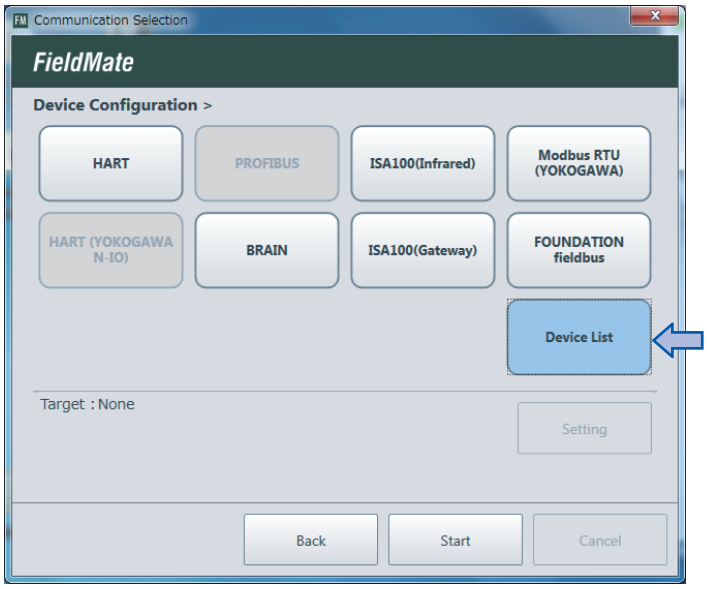
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Figure 4.8 Segment Viewer

[Offline access]

Step 2 Select Communication Setting

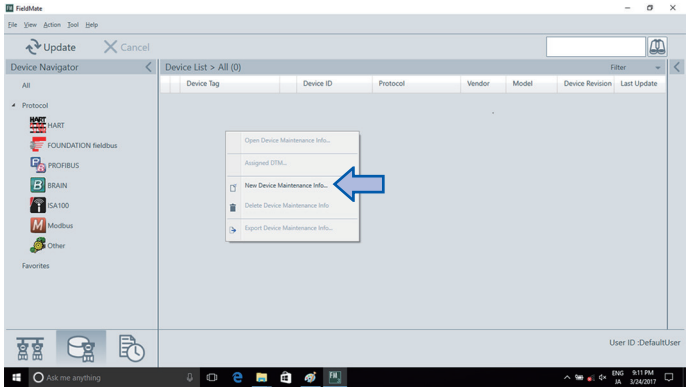
Select [Device List] in Communication Selection screen and press [Start].



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Step 3 Registering Device Maintenance Information

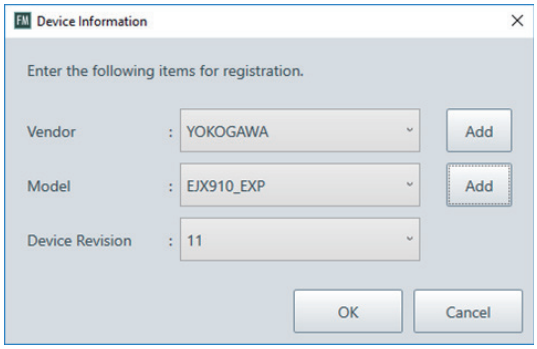
Right click in “Device List” window and select the ‘New Device Maintenance Info…”



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Step 4 Enter Device registration

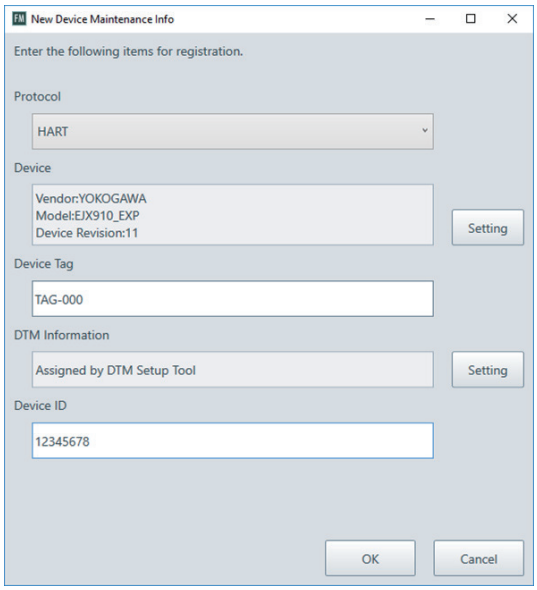
Select the Device Information (Vender, Model and Device Revision). Refer to Table 2.1.



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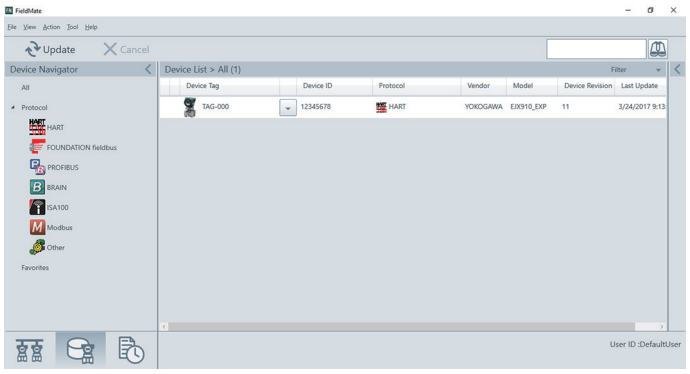
Step 5 Enter Device registration

Input 'Protocol', 'Device', 'Device Tag', 'DTM Information' and 'Device ID'.
Press 'OK' Button.



F0422E.ai

Step 6 Registered 'Device List'



F0423E.ai

4.5.2.1 Supported Device DTMs for FlowNavigator

The following tables show the Device DTMs on which FlowNavigator works.

Table 4.1 Device DTM Name (EJX910 HART DTM)

EJX Multivariable Transmitter				Device DTM
Model Name	HART Protocol Revision	Device Type	Device Revision	Name
EJX910	5	EJX910 (0x0054)	1	EJX910 FDT2.0 HART DTM *1
		EJX910 (0x0054)	2	
EJX910_EXP	7	EJX910 (0x3754)	10	EJX910 FDT2.0 HART7 DTM *2
		EJX910 (0x3754)	11	
		EJX910 (0x3754)	12	

*1: For EJX910A/EJX930A HART5 model, use this DTM.
*2: For EJX910A/EJX930A HART7 model, use this DTM.

Table 4.2 Device DTM Name (EJX910 FOUNDATION fieldbus DTM)

EJX Multivariable Transmitter			Device DTM
Model Name	Device Type	Device Revision	Name
EJX910	EJX910 (0x000E)	1	EJX910 FF DTM
	EJX910 (0x000E)	2	EJX910 FF DTM

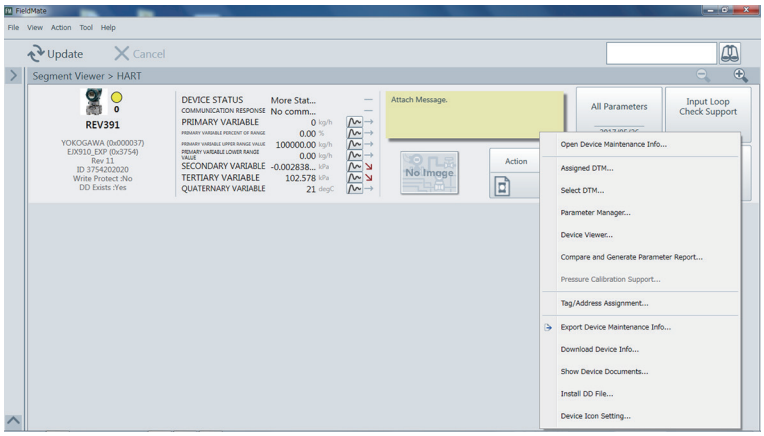
Table 4.3 Device DTM Name (DYF(SoftDL) FOUNDATION fieldbus DTM)

digitalYEWFLO Vortex Flowmeter			Device DTM
Model Name	Device Type	Device Revision	Name
DYF (Software Download)	DYF (Software Download) (0x0009)	3	DYF(SoftDL) FF DTM

4.5.2.2 How to confirm version of Device DTMs

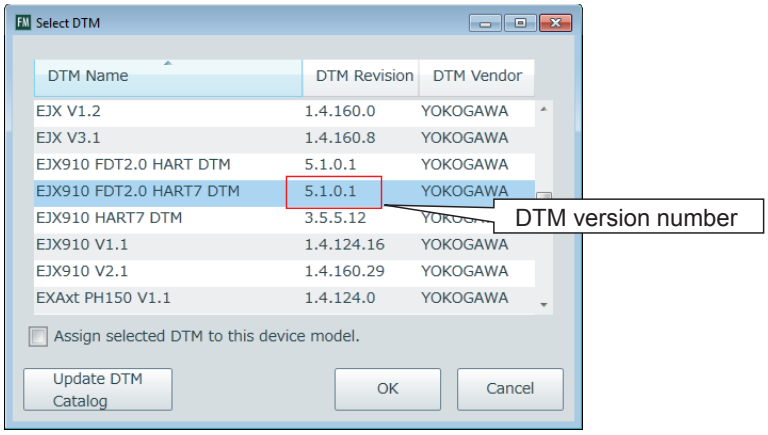
Follow these steps to confirm the version of the Device DTM:

1. Click [Action] → [Select DTM] to select the target device.
2. Confirm version number.



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Figure 4.9 Confirm Version of Device DTM



F0410E.ai

Figure 4.10 Version Number of Device DTM

NOTE

You can also confirm the version of Device DTM by using the Properties menu. For more information on the Properties menu, refer to section 6.2.5.

4.5.3 Start Device DTM

1. Select the icon of the target device.

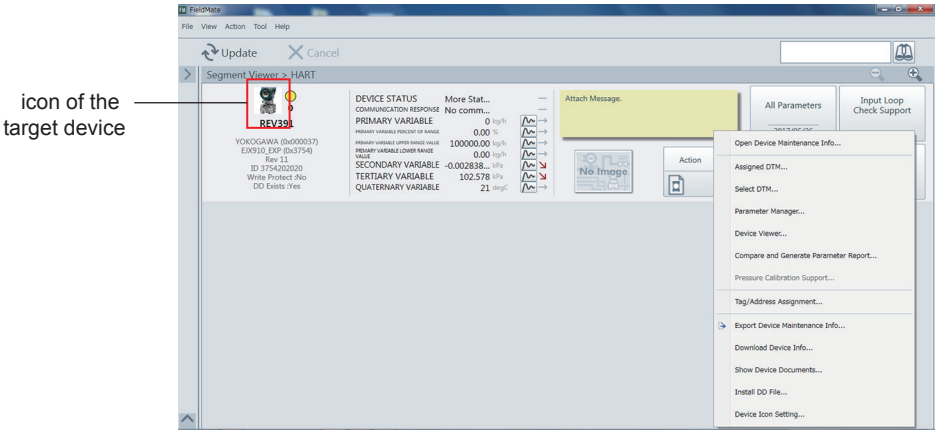


Figure 4.11 Start DTM Works

2. Click [Action] → [Assigned DTM]. To know the device DTM on which FlowNavigator works, refer to section 4.5.2.1.
   A message appears asking you which data to load.

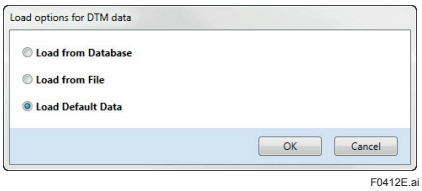


Figure 4.12 Load options for DTM data

3. Select the data you want to load. The Online Parameter window appears, which may take a few minutes to load.

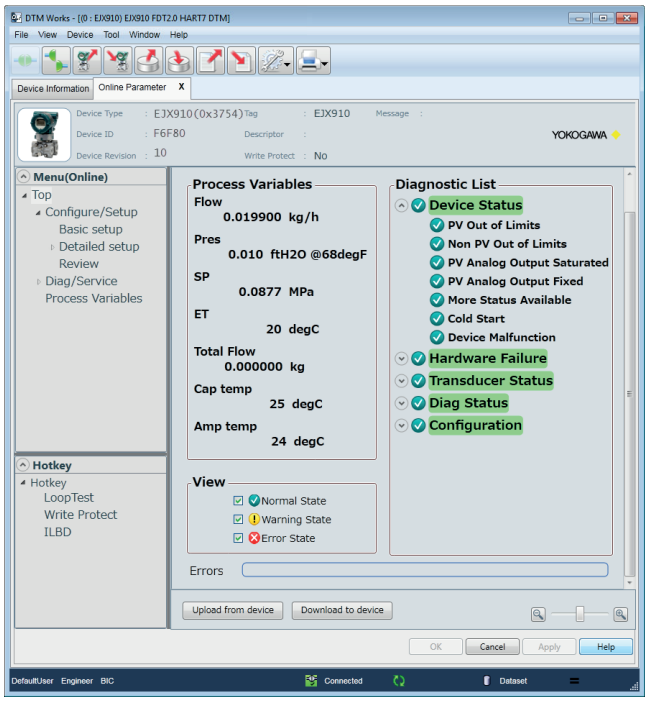


Figure 4.13 Online Parameter window

4.5.4 Save DTM Information

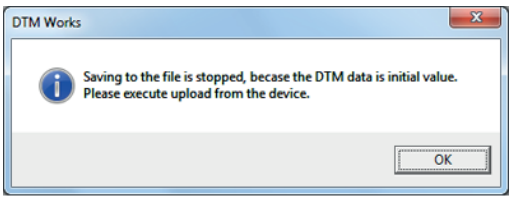
If “Save to file” is performed, a device parameter snapshot is saved to an external .dns file, which includes the following parameters:

- User Flow Parameters
- Device Flow Parameters
- Device General Parameters

Follow these steps to save DTM information:

1. In the DTM Works window, click [File] → [Save to file].

   The following message appears when [Save to file] is clicked without [Upload from Device].



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Figure 4.14 Confirmation Message in saving .dns file

2. Click [OK].
3. Save the .dns file on the computer.



NOTE

- The .dns file is not compatible among different communication.
- The .dns files that are saved in FlowNavigator R1.05 and earlier cannot be imported to FlowNavigator R2.01. Refer to Appendix A-2 for more details on how to migrate the .dns files.
- For more details about the .dns file, refer to section 6.1.1 and section 9.1.

4.6 FlowNavigator Resource Check

You can check the FlowNavigator Resource in any of the following ways:

- Check if FlowNavigator Resource is installed on your computer. Refer to section 4.2.6 for the details.

  If FlowNavigator Resource is not installed on your computer, an error message appears whenever you launch FlowNavigator.

- Validate the version of the FlowNavigator Resource.

  If Resource is installed on your computer, it is checked whether it is compatible with the installed FlowNavigator. If it is not compatible, a message appears, asking the user to install the minimum required version of Resource. This message appears whenever you launch FlowNavigator.

4.7 FlowNavigator License Check

User must enter a valid license when launching FlowNavigator for the first time.

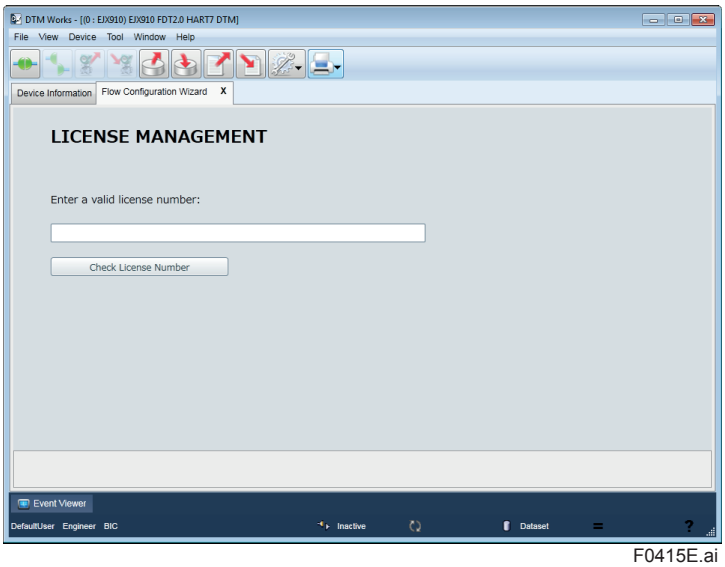
IMPORTANT

Before performing a license check, make sure that you have a valid FlowNavigator Resource installed on your computer.

Follow these steps to enter the license of FlowNavigator:

1. Start DTM Works. The Offline or Online Parameter screen appears.
2. Close the Online or Offline Parameter screen by clicking [X] on the tab.
3. From the main menu, select [Device] → [Additional Functions].
4. Select either [Flow Configuration Wizard] or [Obtain Flow Coefficient].

   The License Management Screen appears.



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Figure 4.15 FlowNavigator License Management screen

5. In the box, enter the license number of the FlowNavigator software.
6. Click [Check License Number].

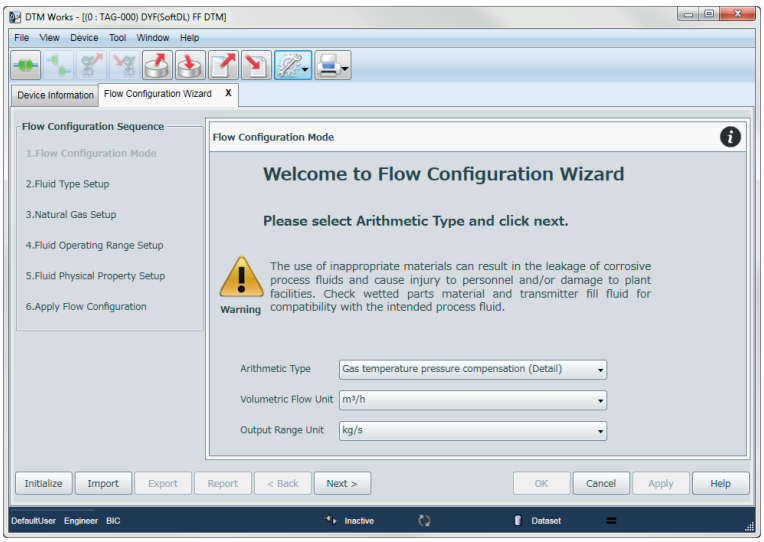
   If the license number is invalid, an error message appears, prompting you to enter a license key again.

   If the license number is valid, the following screen appears.



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Figure 4.16a Initial Screen of FlowNavigator (EJX910 HART)



F0416bE.ai

Figure 4.16b Initial Screen of FlowNavigator (DYF(SoftDL) FOUNDATION fieldbus)

NOTE

- When FlowNavigator Resource is uninstalled from your computer, the license is automatically deactivated. If Resource is installed again, user must enter the license key again to launch FlowNavigator.
- The license number can be found in the license number sheet, which is included in the FSA120 package. Refer to section 2.1 for more details.

FlowNavigator: Flow Configuration Software

Software License Number

Model and Suffix Codes: FSA120-□□□□□□
Serial Number: □□□□□□□□□□
Software License Number: □□□□□□-□□□□□□□-□□□□□□□-□□□□□

IMPORTANT **Please keep this sheet with the FlowNavigator CD-ROM.**

Thank you for purchasing ***FieldMate FlowNavigator***. The software license number for the included CD-ROM is printed above. This number is used to **ACTIVATE FlowNavigator programs after the installation is completed** and to identify your software package by Yokogawa Electric Corporation. Please keep this sheet with the CD-ROM.

To use this software, you must first enter the software license number. For the information on how to enter the license number, please see the instruction manual [IM01C25R51-01E].

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Figure 4.17 Software License Form

5. Operational Flowchart

5.1 Configuration Procedure (EJXMVTool)

The following list shows examples of configuration procedures using Auto Compensation Mode:

(A) New Configuration (example for using FieldMate project file)

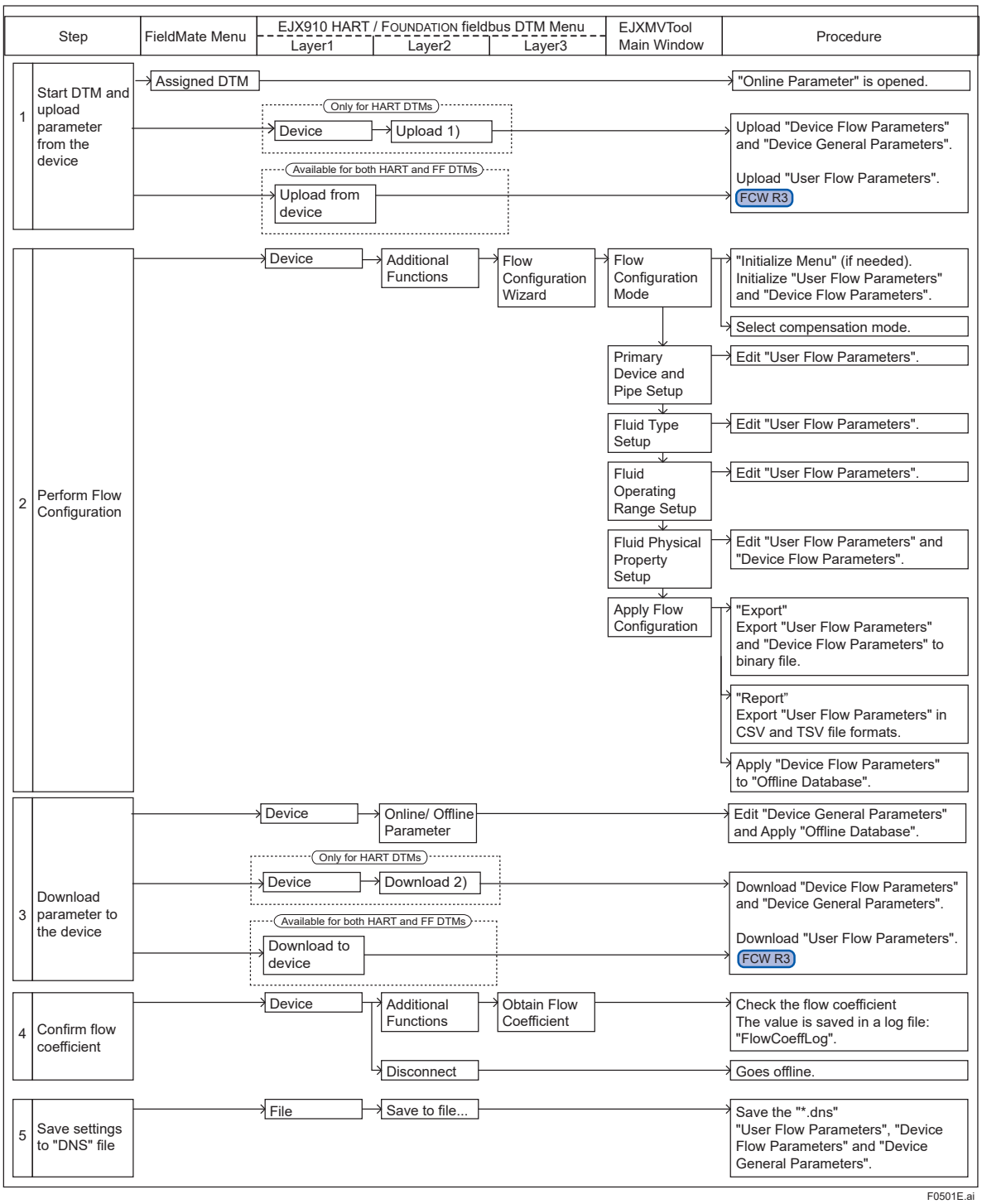
(B) Configure with existing Configuration File (dns file)

(C) Configure with existing Configuration File (example for using XMV file)

(D) Configure with existing Configuration File (import: XMV file,export:dns file)

(E) Create Flow Configuration File with Offline

(A) New Configuration (Example of using Auto Compensation Mode)



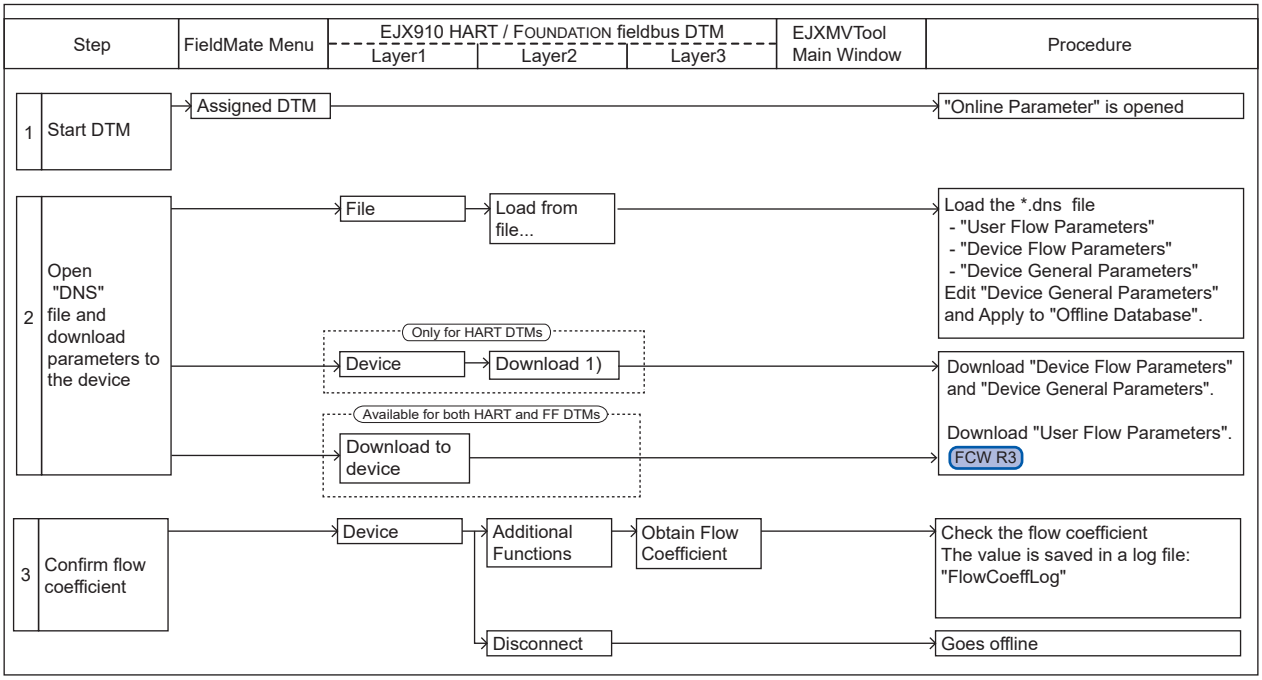
F0501E.ai

*1)
- Before starting any operation, execute 'Upload from device', so that the "Device General Parameters" in the offline database are synchronized with the device.
- There are different ways to upload data from device, depending on which communication protocol you are using:
  - In EJX910 HART DTMs, you can click [Device] → [Upload] or click the [Upload from device] button to execute 'Upload from device'. Then click the double arrow icon, and click [Apply]. Close the Offline Parameter screen.
  - In EJX910 FOUNDATION fieldbus DTMs, you can only click the [Upload from device] button. Then close the Offline Parameter or Online Parameter screen.

  Refer to section 6.2.3 for more information.

*2)
- Executing 'Download to device' will write both "Device Flow Parameters" and "Device General Parameters" into the device. In case of Flow Configuration Wizard (R3) or later, user flow parameters are also downloaded into the device. Before executing 'Download to device', execute 'Upload from device', so as to make "Device General Parameters" in the offline database synchronized with the device.
- In EJX910 HART DTMs, you can click [Device] → [Download] or click the [Download to device] button to execute 'Download to device'. However, in EJX910 FOUNDATION fieldbus DTMs, you can only click the [Download to device] button. Refer to section 6.2.3 for more information.

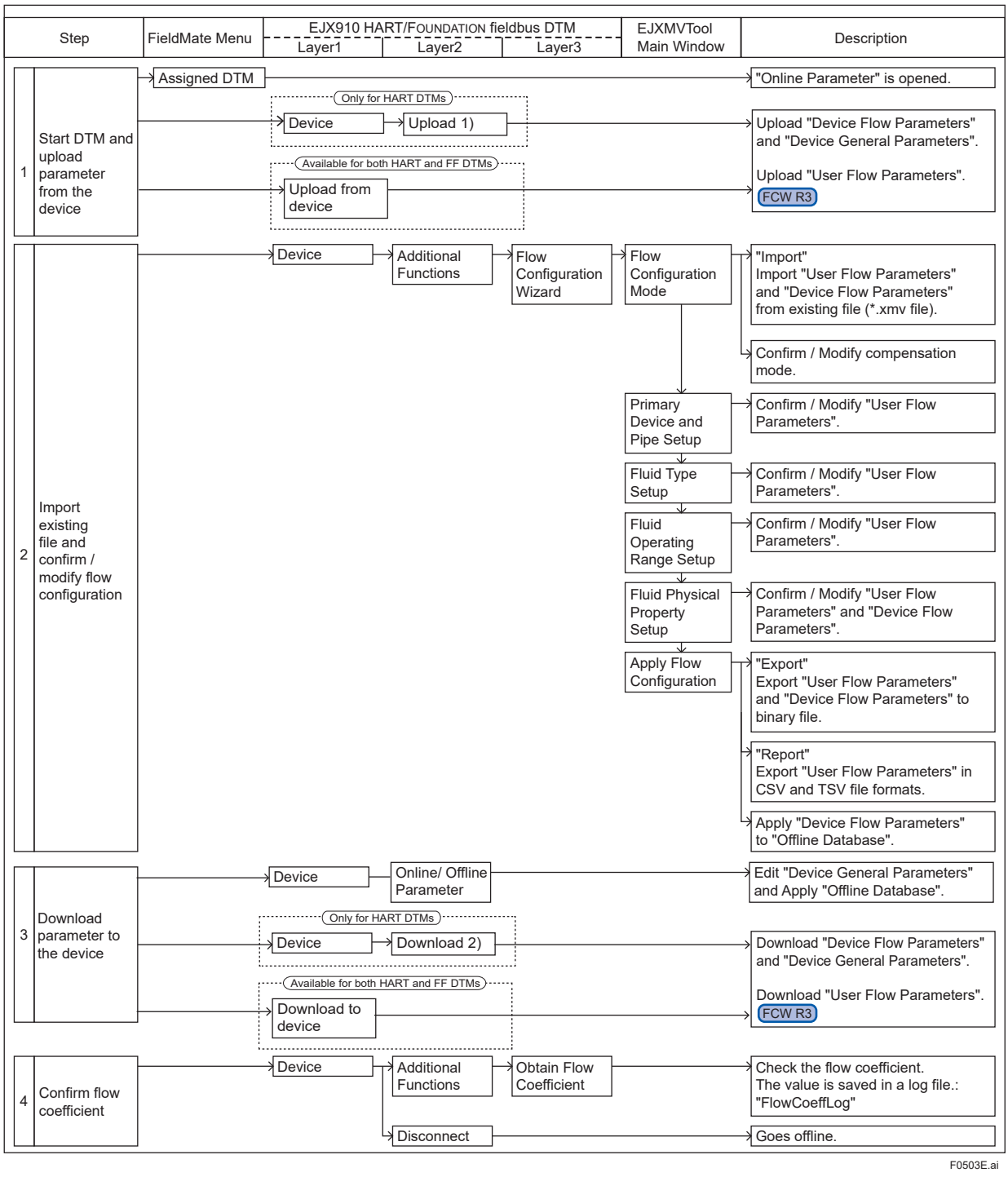
(B) Configure with existing configuration file (dns file)



F0502E.ai

*1)
- Executing 'Download to device' will write both "Device Flow Parameters" and "Device General Parameters" into the device. In case of Flow Configuration Wizard (R3) or later, user flow parameters are also downloaded into the device. Before executing 'Download to device', execute 'Upload from device', so as to make "Device General Parameters" in the offline database synchronized with the device.
- In EJX910 HART DTMs, you can click [Device] → [Download] or click the [Download to device] button to execute 'Download to device'. However, in EJX910 FOUNDATION fieldbus DTMs, you can only click the [Download to device] button. Refer to section 6.2.3 for more information.

(C) Configure with existing Configuration File (XMV file)



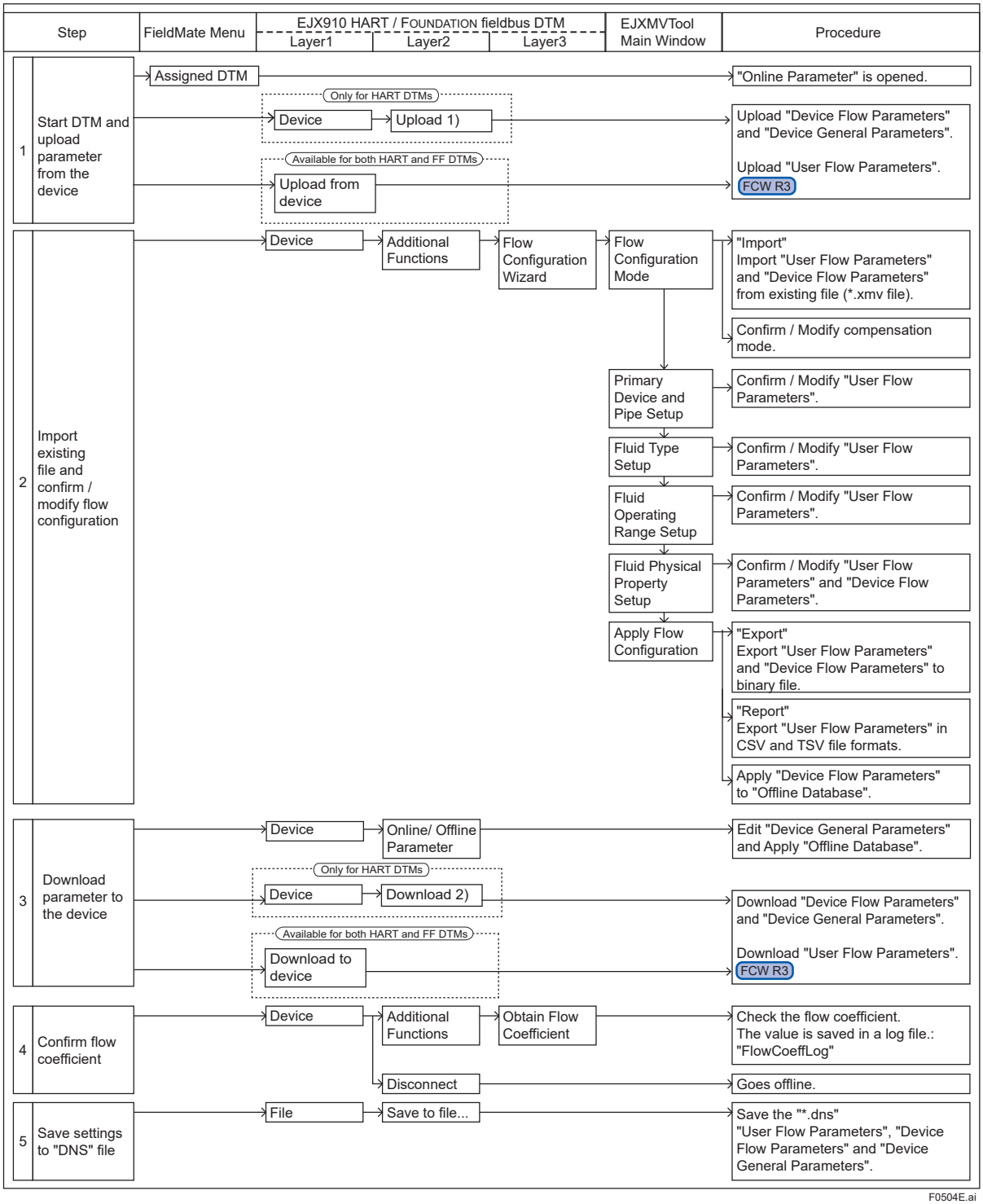
F0503E.ai

*1)
- Before starting any operation, execute 'Upload from device', so that the "Device General Parameters" in the offline database are synchronized with the device.
- There are different ways to upload data from device, depending on which communication protocol you are using:
  - In EJX910 HART DTMs, you can click [Device] → [Upload] or click the [Upload from device] button to execute 'Upload from device'. Then click the double arrow icon, and click [Apply]. Close the Offline Parameter screen.
  - In EJX910 FOUNDATION fieldbus DTMs, you can only click the [Upload from device] button. Then close the Offline Parameter or Online Parameter screen.

  Refer to section 6.2.3 for more information.

*2)
- Executing 'Download to device' will write both "Device Flow Parameters" and "Device General Parameters" into the device. In case of Flow Configuration Wizard (R3) or later, user flow parameters are also downloaded into the device. Before executing 'Download to device', execute 'Upload from device', so as to make "Device General Parameters" in the offline database synchronized with the device.
- In EJX910 HART DTMs, you can click [Device] → [Download] or click the [Download to device] button to execute 'Download to device'. However, in EJX910 FOUNDATION fieldbus DTMs, you can only click the [Download to device] button. Refer to section 6.2.3 for more information.

(D) Configure with existing Configuration File (import: XMV, export: dns file)



F0504E.ai

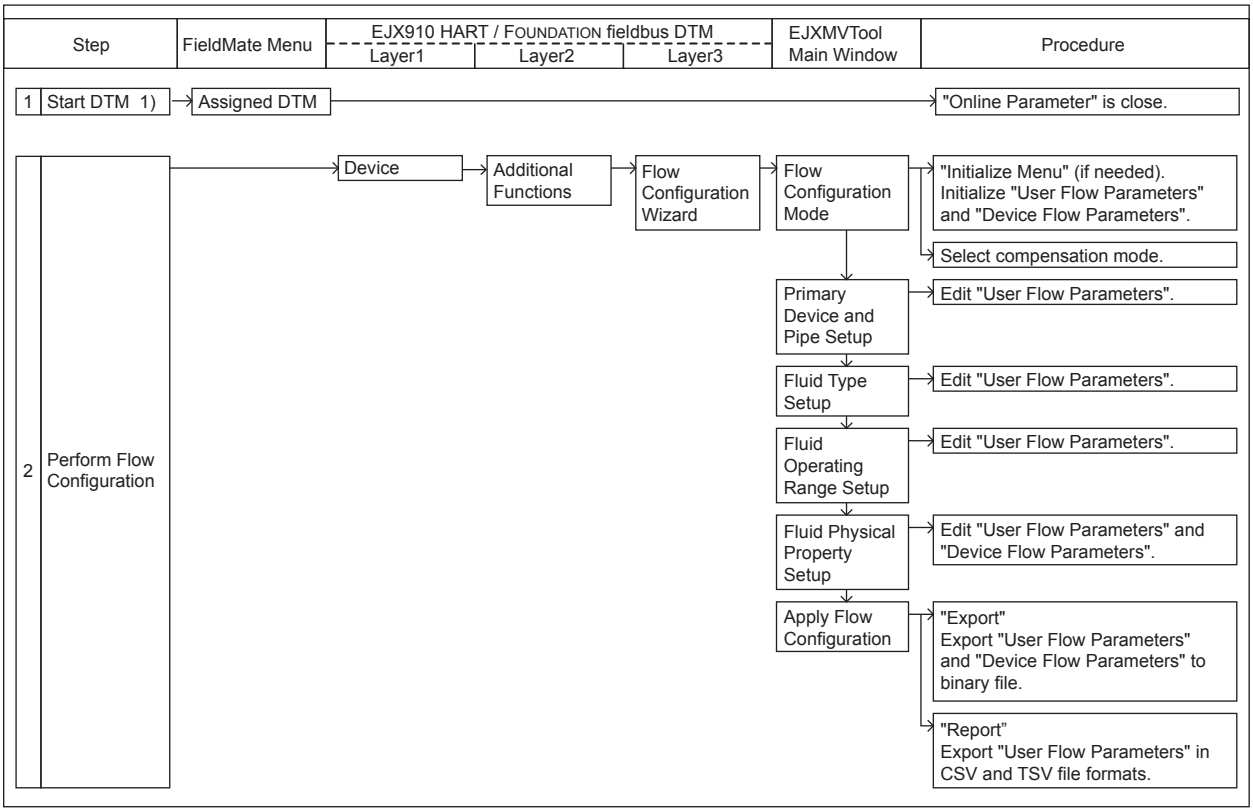
*1)
- Before starting operation, execute 'Upload from device', so that the "Device General Parameters" in the offline database are synchronized with the device.
- There are different ways to upload data from device, depending on which communication protocol you are using:
  - In EJX910 HART DTMs, you can click [Device] → [Upload] or click the [Upload from device] button to execute 'Upload from device'. Then click the double arrow icon, and click [Apply]. Close the Offline Parameter screen.
  - In EJX910 FOUNDATION fieldbus DTMs, you can only click the [Upload from device] button. Then close the Offline Parameter or Online Parameter screen.

  Refer to section 6.2.3 for more information.

*2)
- Executing 'Download to device' will write both "Device Flow Parameters" and "Device General Parameters" into the device. In case of Flow Configuration Wizard (R3) or later, user flow parameters are also downloaded into the device. Before executing 'Download to device', execute 'Upload from device', so as to make "Device General Parameters" in the offline database synchronized with the device.
- In EJX910 HART DTMs, you can click [Device] → [Download] or click the [Download to device] button to execute 'Download to device'. However, in EJX910 FOUNDATION fieldbus DTMs, you can only click the [Download to device] button. Refer to section 6.2.3 for more information.

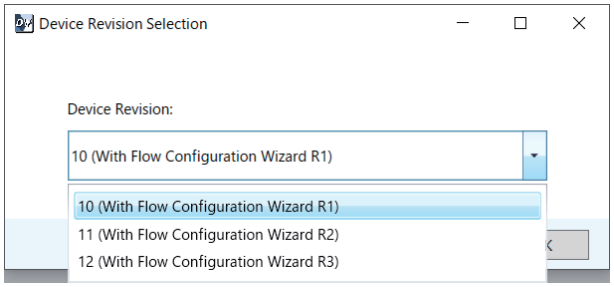
(E) Cretate Flow Configuration File with Offline

Start up DTM from the Device Navigator window and create a Flow Configuration File.



F0510E.ai

*1) Multiport Averaging Pitot and Cone meters are supported only with Flow Configuration Wizard (R2) and Flow Configuration Wizard (R3).
Select “11 (With Flow Configuration Wizard R2)” or “12 (With Flow Configuration Wizard R3)” when starting DTM.



F0511E.ai

5.2 Configuration Procedure (DYFMVTool)

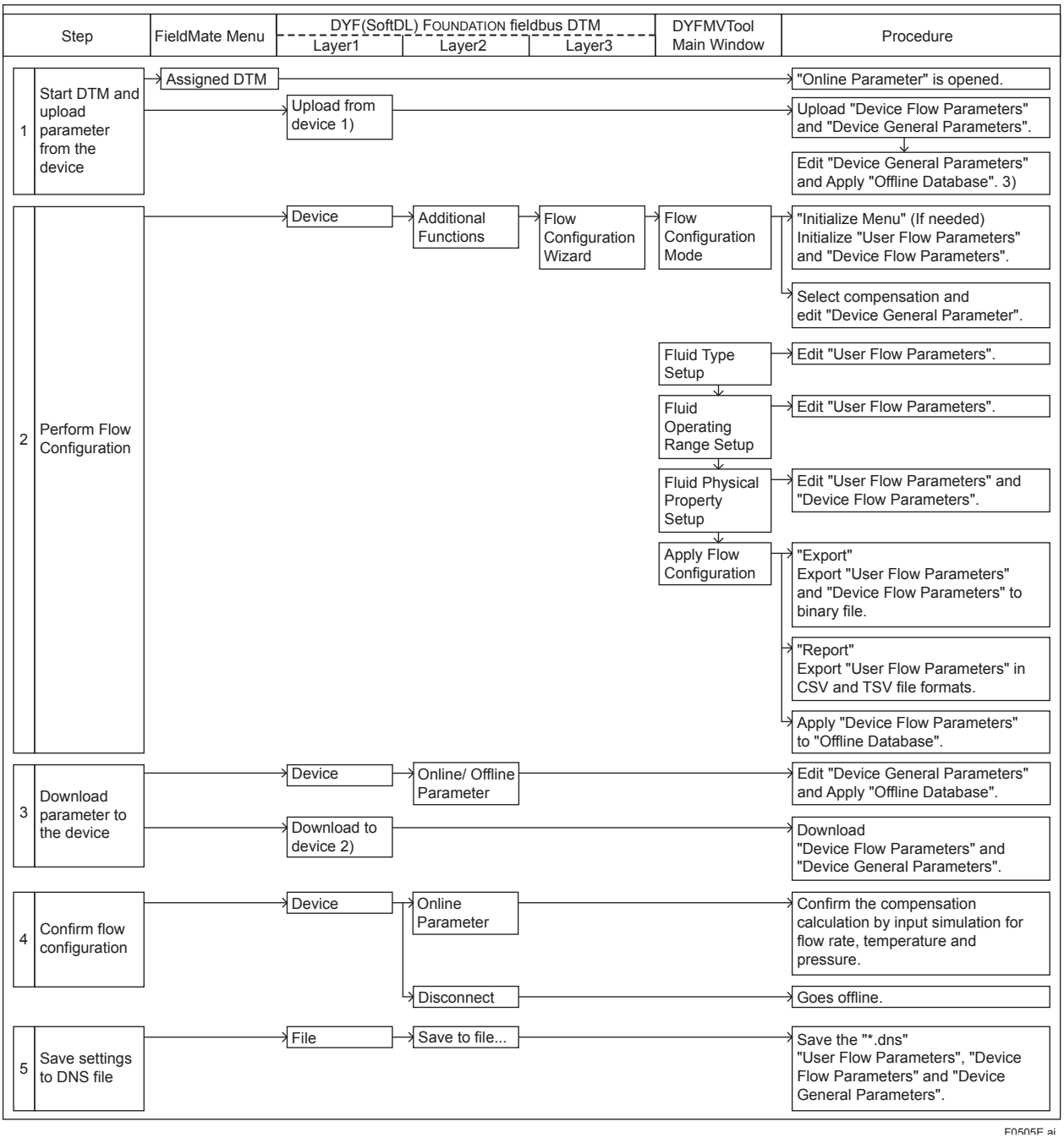
The following list shows examples of configuration procedures using Flow Configuration Wizard:

(A) New Configuration (example for using FieldMate project file)

(B) Configure with existing Configuration File (dns file)

(C) Configure with existing Configuration File (VMV file)

(A) New Configuration



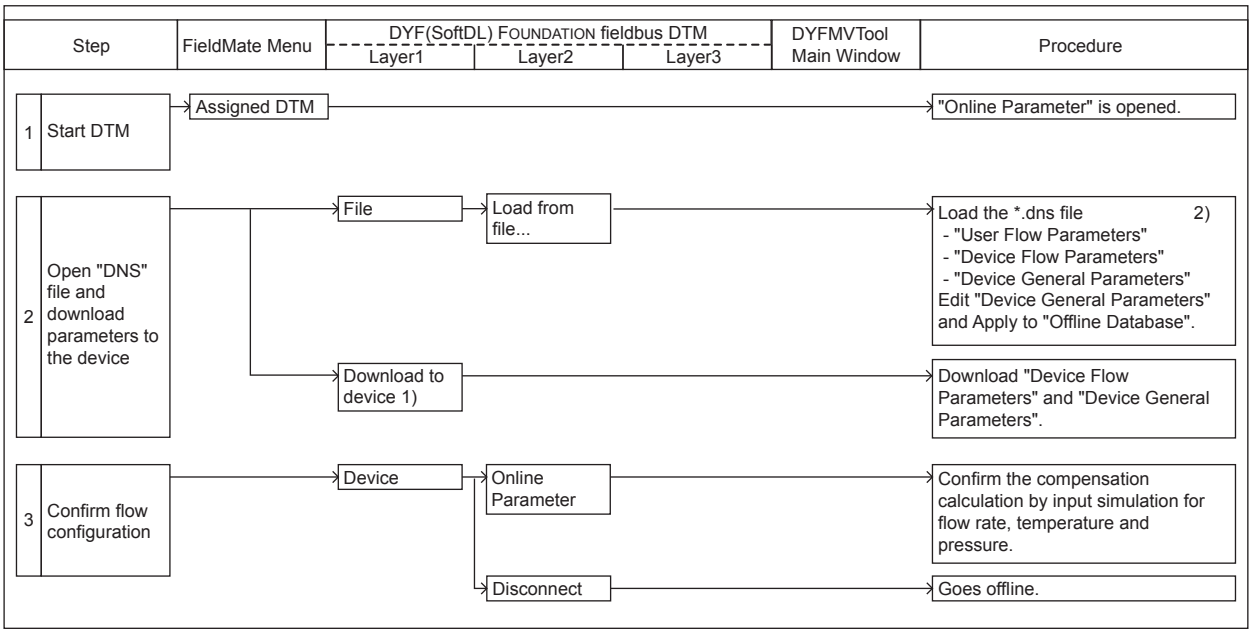
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*1) • Before starting operation, execute 'Upload from device' so that "Device General Parameters" of the flowmeter in the offline database are synchronized with the device. Upload data from the device does not include "User Flow Parameters".
*: User Flow Parameters consist of fluid information and operating condition.
• After uploading, make sure to close the Offline Parameter or Online Parameter screen before launching FlowNavigator.

*2) Executing 'Download to device' will write both "Device Flow Parameters" and "Device General Parameters" into the device. Before executing 'Download to device', execute 'Upload from device', so as to make "Device General Parameters" of the flowmeter in the offline database synchronized with the device.
Download data to the device does not include "User Flow Parameters".

*3) Temperature unit and pressure unit in AR Block are not configured in Flow Configuration Wizard Detail Compensation Mode. These parameters must be set manually in AR Block offline parameter.

(B) Configuration with existing configuration file (dns file)

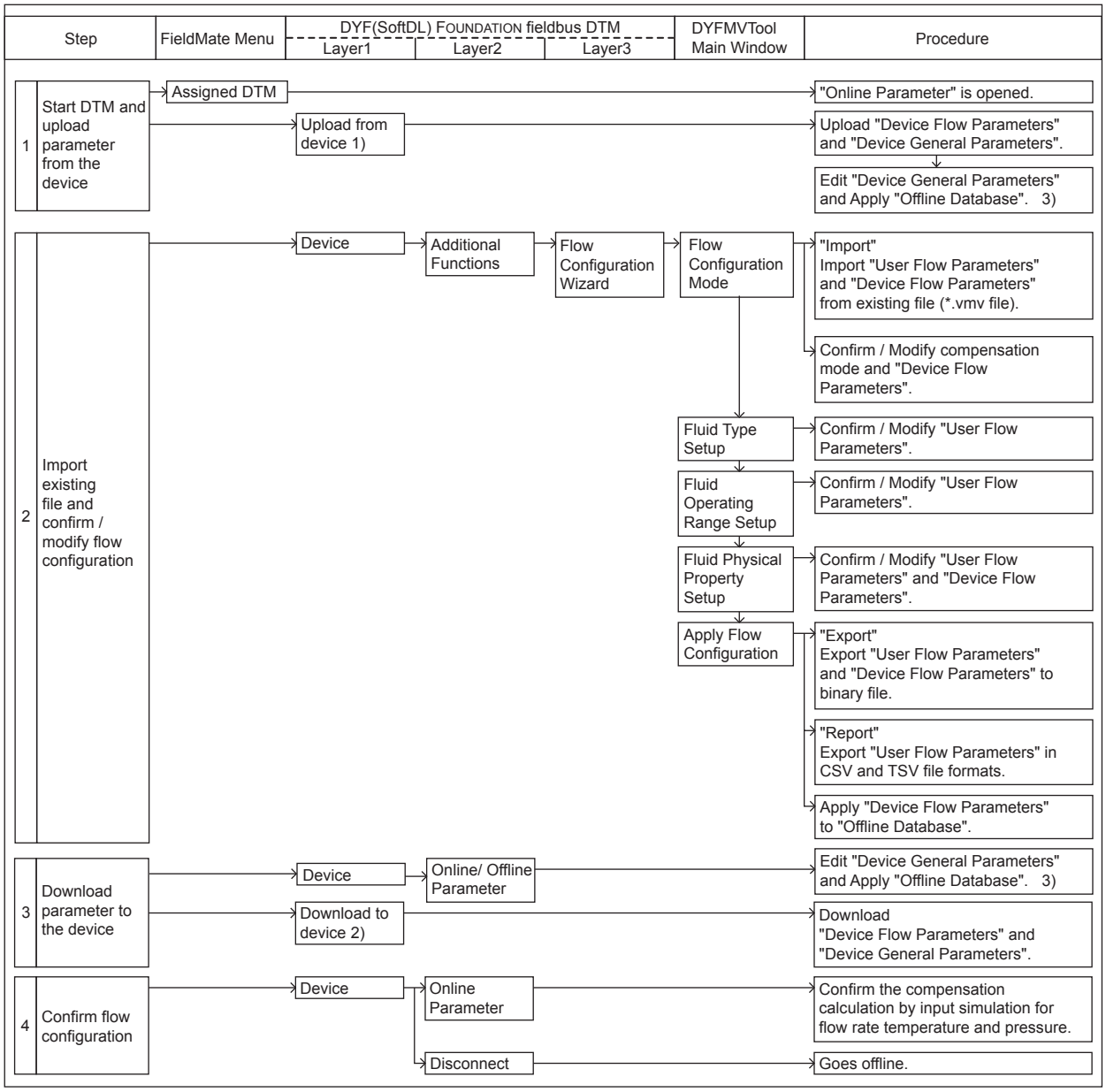


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*1) Executing 'Download to device' will write both "Device Flow Parameters" and "Device General Parameters" into the device. Before executing 'Download to device', execute 'Upload from device', so as to make General Parameters of the device in the offline database synchronized with the device. Download data to the device does not include "User Flow Parameters".
*: User Flow Parameters consist of fluid information and operating condition.

*2) Temperature unit and pressure unit in AR Block are not configured in Flow Configuration Wizard Detail Compensation Mode. These parameters must be set manually in AR Block offline parameter.

(C) Configuration with existing configuration File (VMV file)



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*1) • Before starting operation, execute ‘Upload from device’, so that “Device General Parameters” of the flowmeter in the offline database are synchronized with the device. Upload data from the device does not include “User Flow Parameters”.
*: “User Flow Parameters” consist of fluid information and operating condition.
• After uploading, make sure to close the Offline Parameter or Online Parameter screen before launching FlowNavigator.

*2) Executing ‘Download to device’ will write both “Device Flow Parameters” and “Device General Parameters” into the device. Before executing ‘Download to device’, execute ‘Upload from device’, so as to make “Device General Parameters” of the device in the offline database synchronized with the device. Download data to the device does not include “User Flow Parameters”.

*3) Temperature unit and pressure unit in AR Block are not configured in Flow Configuration Wizard Detail Compensation Mode. These parameters must be set manually in AR Block offline parameter.

5.3 Flow Parameters Upload/ Download Procedure

This section explains the basic procedure of uploading and downloading the flow parameters to a device.

Refer to Figure 5.2 for a summary of the procedure.

Step 1 Upload from Device

Follow these steps to save the setting parameters (“Device Flow Parameters” and “Device General Parameters”) in the device to the offline database on your PC:

- **HART**

1. In FTD2 HART DTMs, you can upload data from a device in any of the following ways:
   - Click [Device] → [Upload].
   - Click the Upload icon.
   - Click the [Upload from device] button.
2. Click the double arrow icon. The data from the device are copied.
3. Click [Apply]. The data in the device are saved to the offline database on your PC.
4. Close the Offline Parameter screen.

- **FOUNDATION fieldbus**

1. In FDT1.2 FOUNDATION fieldbus DTMs, you can upload data from a device only by clicking the [Upload from device] button. After clicking, the data in the device are saved to the offline database on your PC.
2. Close the Online Parameter or Offline Parameter screen.



IMPORTANT

- Make sure to close the Offline Parameter or Online Parameter screen because DTM does not allow some functions accessing the dataset. After you close the Offline Parameter or Online Parameter screen, the uploaded data are stored in the dataset.
- For more information on the upload function, refer to section 6.2.3.

Step 2 Flow Configuration

Perform Flow configuration in accordance with the guidance in the Flow Configuration Wizard. “Device Flow Parameters” are output of the Flow Configuration Wizard.

Save “Device Flow Parameters” as XMV file (EJXMVTool) or VMV file (DYFMVTool) in the last screen, and then click the [Apply] button.

“Device Flow Parameters” are then stored to the offline database on your PC.



NOTE

Clicking [Apply] does not download the flow parameters to the device.

Step 3 Download to Device

Perform “Download to Device”. The “Device Flow Parameters” will then be downloaded together with the “Device General Parameters” to the device.

NOTE

In FDT2 HART DTMs, you can perform ‘Download to device’ in any of the following ways:
- Click [Device] → [Download].
- Click the Download icon.
- Click the [Download to device] button.

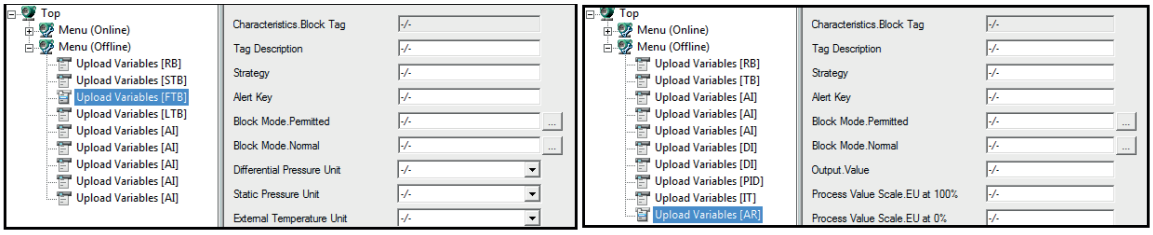
However, in FDT1.2 FOUNDATION fieldbus DTMs, you can perform ‘Download to device’ only by clicking the [Download to device] button.

For more information on how to download data to a device, refer to section 6.2.3.

IMPORTANT

For FOUNDATION fieldbus, the following block must be selected from the “Download Blocks” menu in the Offline Parameter screen to download the “Device Flow Parameters” that are set by Flow Configuration Wizard:

- In EJX910 FOUNDATION fieldbus DTM, select FTB block.
- In DYF(SoftDL) FOUNDATION fieldbus DTM, select AR block.



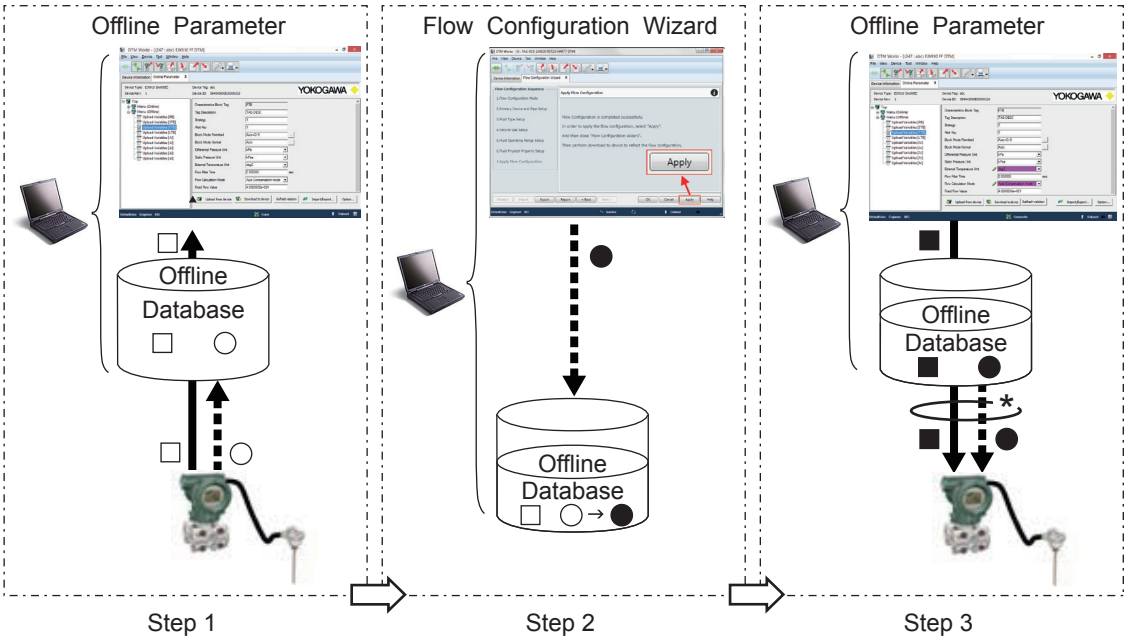
“Download Blocks” menu
(EJX910 FOUNDATION fieldbus DTM)

“Download Blocks” menu
(DYF(SoftDL) FOUNDATION fieldbus DTM)

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Figure 5.1 “Download Blocks” menu in the Offline Parameter

The following figure shows a summary of the procedure of downloading parameters to a device.



*: Confirm the selection on the “Download blocks” menu in the Offline Parameter (refer to Figure 5.1)

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Figure 5.2 Procedure to Download the Parameters to the Device

6. Operation of FlowNavigator Program

6.1 Outline of FlowNavigator Program

FlowNavigator can be accessed from [Device] →[Additional Functions] → [Flow Configuration Wizard] or [Obtain Flow Coefficient].

The following figure shows the menu items in FlowNavigator except for those specific to Device DTM.

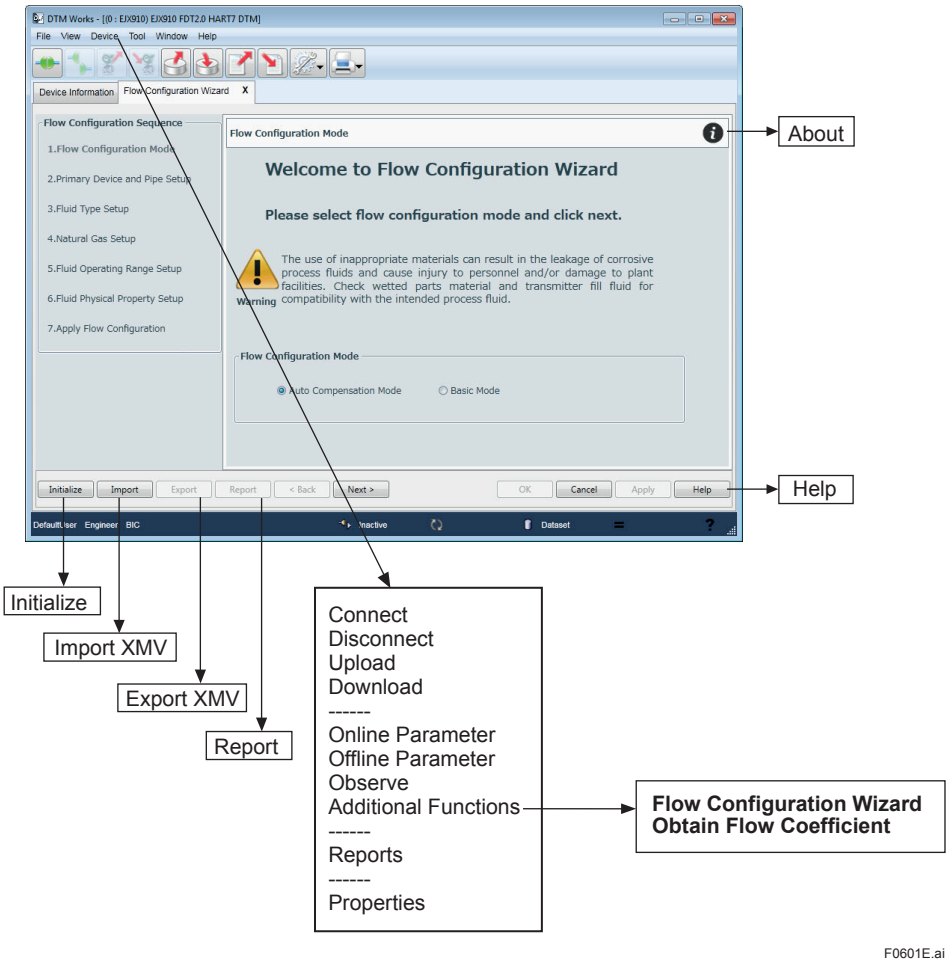


Figure 6.1 Menu structure of EJXMVTool HART

NOTE

- In HART DTM, Offline Parameter window and FlowNavigator can not be activated at the same time.
  In FOUNDATION Fieldbus DTM, Offline and Online Parameter window can not be activated at the same time.
  Before launching FlowNavigator, make sure to close the Offline Parameter screen in HART DTMs and the Offline or Online Parameter screen in FOUNDATION fieldbus DTMs.
- The Additional Functions menu may display other menu items other than the FlowNavigator functions.
- The menu items that are displayed on screen may slightly differ according to communication protocol.
- Obtain Flow Coefficient is available only when Device DTM is online.
- Obtain Flow Coefficient is available only in EJX910 HART and FOUNDATION fieldbus.

The following table describes the options that are available in Device menu.

Table 6.1 Device menu

Device menu		Functions		Reference	Program
Connect		Device Management	Connect a device	• Section 6.2	• EJX910 HART/FOUNDATION fieldbus DTM • DYF(SoftDL)FOUNDATION fieldbus DTM
Disconnect			Disconnect a device		
Upload			Upload data from a device		
Download			Store data to a device		
Online Parameter			Opens the online parameters view		
Offline Parameter			Opens the offline parameters view		
Observe			Opens Observe View		• EJX910 HART DTM
Additional Functions	Flow Configuration Wizard	Flow Parameter Management -Flow Configuration-	Calculate flow configuration data of a device	• Section 6.3 • Chapter 7 • Chapter 8	• EJXMVTool • DYFMVTool
	Obtain Flow Coefficient	Flow Parameter Management -Confirming Flow Configuration-	Obtain Flow coefficient from a device	• Chapter 7	• EJXMVTool
Reports	Online Parameter	Device Management	Print the Online Parameter	• Section 6.2	• EJX910 HART DTM
	Offline Parameter		Print the Offline Parameter		
	Current Menu		Print the Online or Offline parameters, depending on which menu is currently selected		• EJX910 and DYF(SoftDL) FOUNDATION fieldbus DTM
Properties			Show property information		• EJX910 HART/FOUNDATION fieldbus DTM • DYF(SoftDL) FOUNDATION fieldbus DTM

The following table describes the buttons available in the Flow Configuration Wizard screen.

Table 6.2 Flow Configuration Wizard buttons

Button	Functions		Reference	Program
Initialize	Flow Parameter Management -Flow Configuration-	Initialization (This is needed only if configuration is done previously)	• Section 6.3 • Chapter 7 • Chapter 8	• EJXMVTool • DYFMVTool
Import		Flow configuration file management • XMV file format in EJXMVTool • VMV file format in DYFMVTool		
Export		Flow configuration file management • XMV file format in EJXMVTool • VMV file format in DYFMVTool		
Report		Flow configuration report in CSV or TSV file format		
Help		FlowNavigator Instruction Manual		
About		Version information		

The following table describes the buttons available in the Obtain Flow Coefficient screen.

Table 6.3 Obtain Flow Coefficient buttons

Button	Functions		Reference	Program
Execute	Flow Parameter Management -Confirming Flow Configuration-	Execute function	• Section 7.3	• EJXMVTool
Clear		Clear user input data		
Cancel		Cancel		
Help		FlowNavigator Instruction Manual		
About		Version information		

6.1.1 Data Flow Diagrams

(1) EJXMVTool

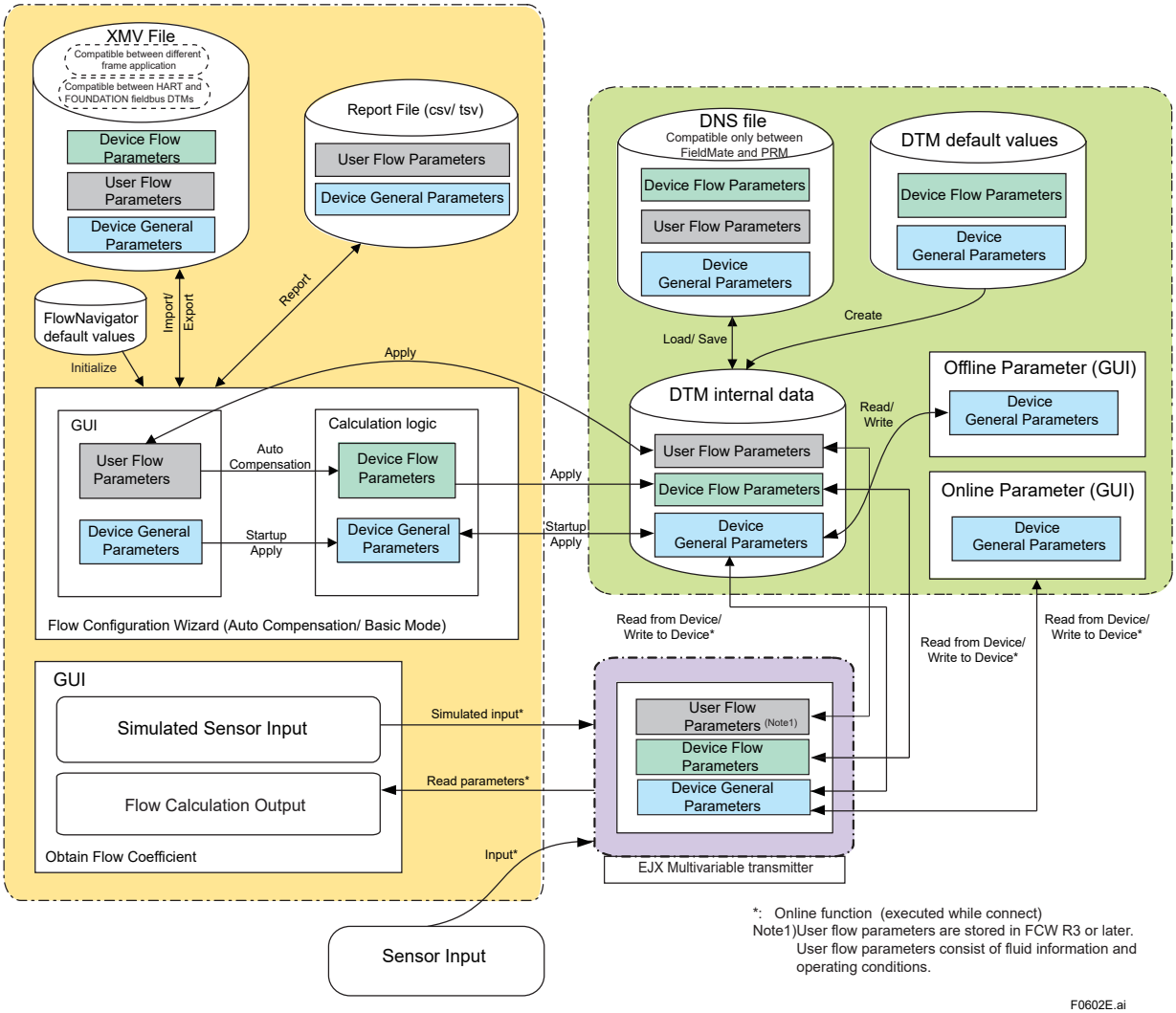


Figure 6.2 Data flow diagram of EJXMVTool

(2) DYFMVTool

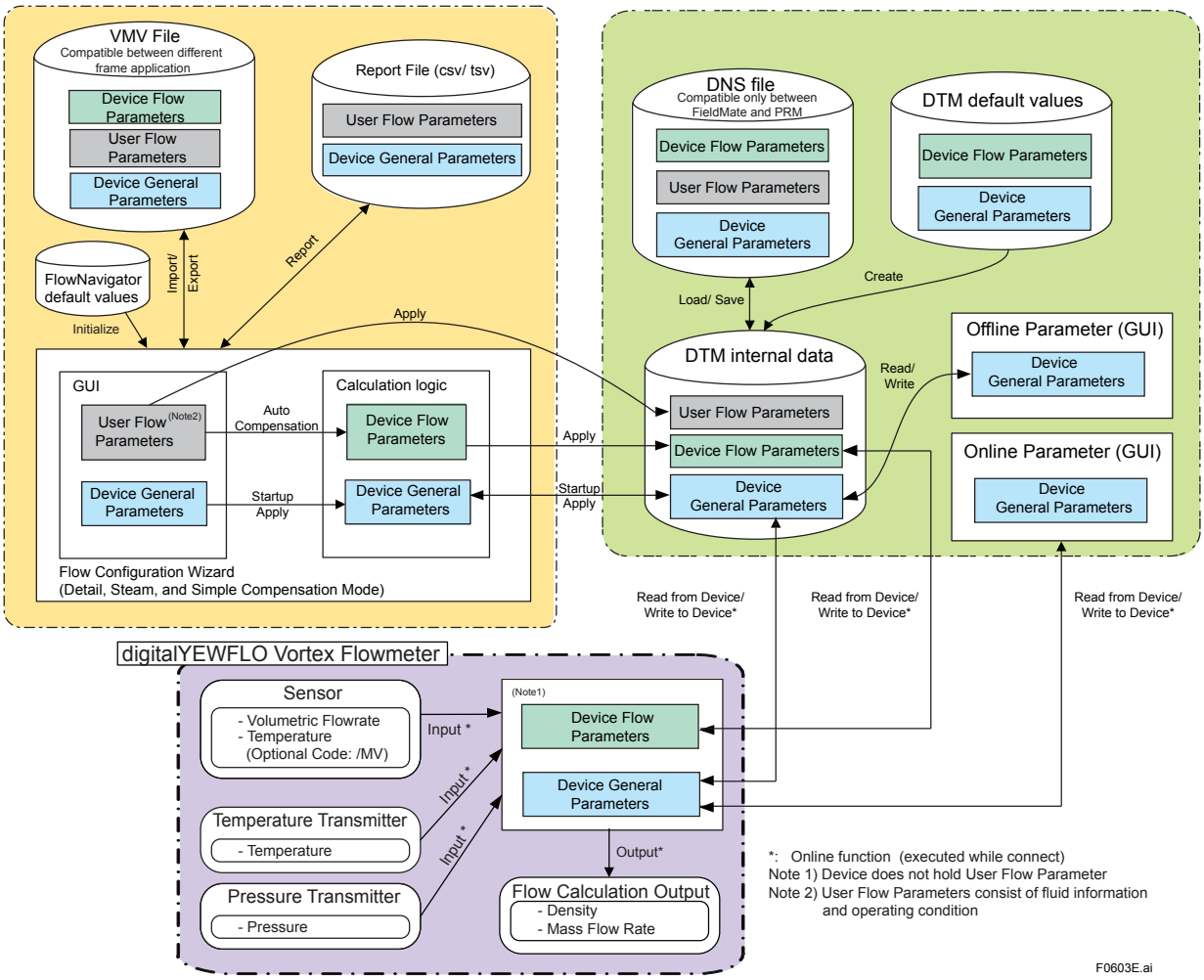


Figure 6.3 Data Flow Diagram of DYFMVTool

6.1.2 Flow Calculation of Device and FlowNavigator

(1) EJX Multivariable Transmitter

Refer to the instruction manual “EJX910A and EJX930A Multivariable Transmitters”

(IM 01C25R01-01E)

(2) digitalYEWFLO Vortex Flowmeter

The following descriptions give an overview of the calculation modes.

• Detail (Gas / Liquid) Compensation Mode

- Gas temperature pressure compensation (Detail)

  The mass flow rate of the gas is calculated based on the process temperature and pressure by referring to the physical property database of FlowNavigator Resource.
  The temperature value is the output of digitalYEWFLO Built-in Temperature Sensor (Optional Code /MV) or Temperature Transmitter. The pressure value is the output of Pressure Transmitter.

- Liquid temperature compensation (Detail)

  The mass flow rate of the liquid is calculated based on the process temperature by referring to the physical property database of FlowNavigator Resource. The temperature value is the output of digitalYEWFLO Built-in Temperature Sensor (Optional Code: /MV) or Temperature Transmitter.

• Steam Compensation Mode

- Saturated steam (Temperature)

  The mass flow rate of the saturated steam is calculated based on the process temperature by referring to the saturated steam table (a process temperature) in the device. The process temperature value is the output of digitalYEWFLO Built-in Temperature Sensor (Optional Code: /MV) or Temperature Transmitter.

- Saturated steam (Pressure)

  The mass flow rate of the saturated steam is calculated based on the process pressure by referring to the saturated steam table (a process pressure) in the device. The process pressure value is the output of Pressure Transmitter.

- Superheat steam

  The mass flow rate of the superheated steam calculated based on the process temperature and pressure by referring to the superheated steam table in the device. The process temperature value is the output of digitalYEWFLO Built-in Temperature Sensor (Optional Code: /MV) or Temperature Transmitter, and the process pressure value is the output of Pressure Transmitter.

• Simple (Gas / Liquid) Compensation Mode

- Gas temperature pressure compensation

  The mass flow rate of the gas is calculated based on the process temperature and pressure by using the density correction value input by users in FlowNavigator. The temperature value is the output of digitalYEWFLO Built-in Temperature Sensor (Optional Code: /MV) or Temperature Transmitter. The pressure value is the output of Pressure Transmitter.

- Liquid temperature compensation

  The mass flow rate of the liquid is calculated based on the process temperature by using the density correction value input by users in FlowNavigator. The temperature value is the output of digitalYEWFLO Built-in Temperature Sensor (Optional Code: / MV) or Temperature Transmitter.

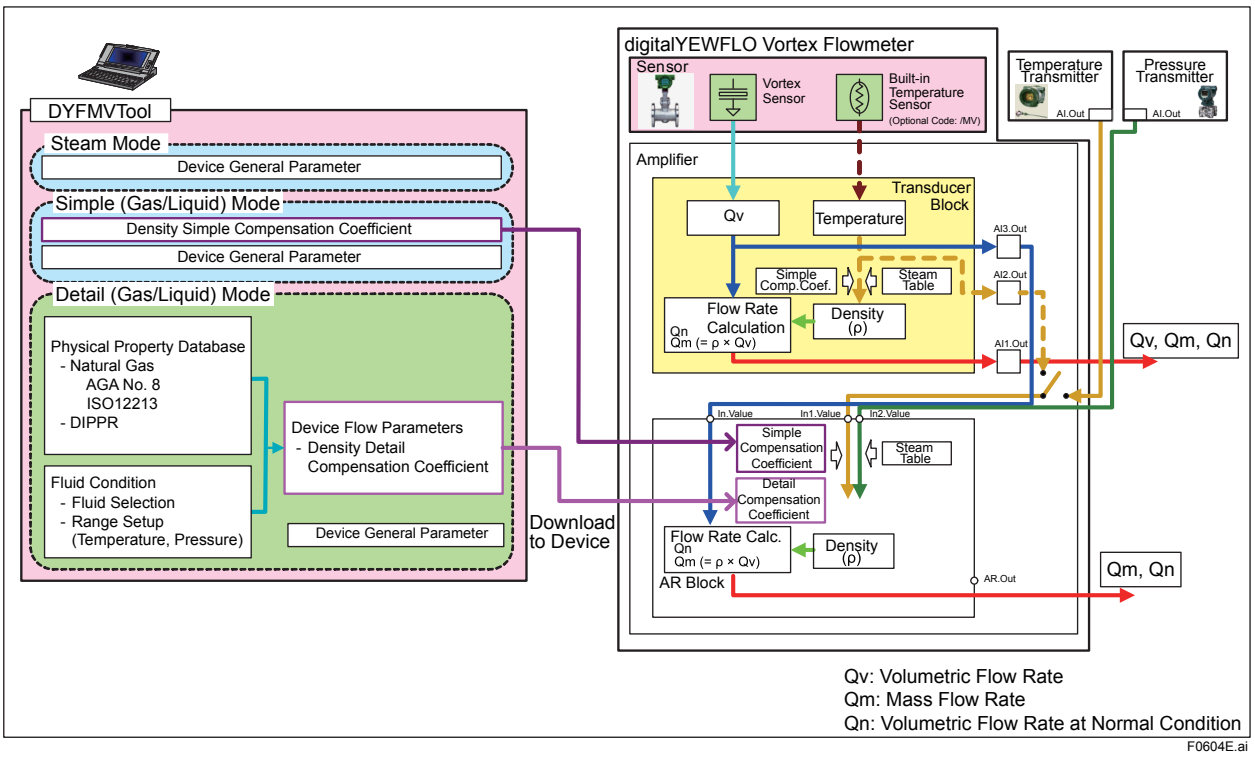
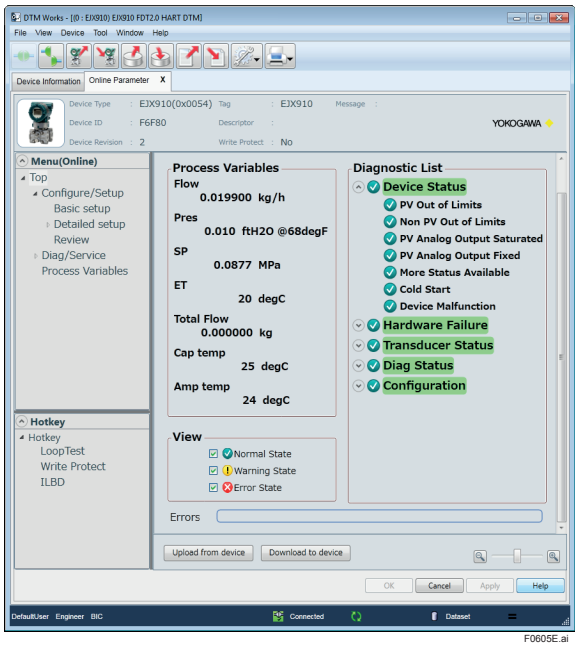


Figure 6.4 digitalYEWFLO Vortex Flowmeter and FlowNavigator Block Diagram

6.2 Device Management

Device management is a function of Device DTM. This section describes this function by using EJX910 FDT2.0 HART DTM as the sample DTM.



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Figure 6.5 Device Management screen (Online Parameter)

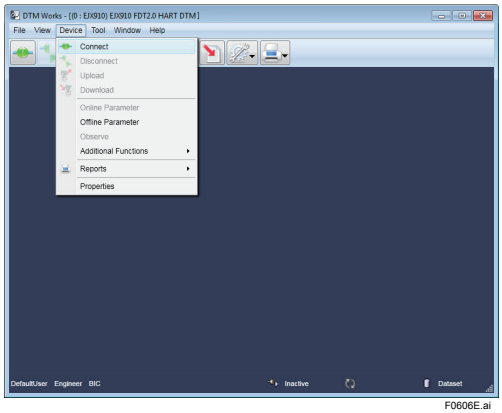
NOTE

Please refer to Device DTM Help for more information on the Device DTM. Also refer to the User's Manual of the FDT frame application for more information.

6.2.1 Connect / Disconnect

(1) How to Connect

Click [Device] → [Connect].



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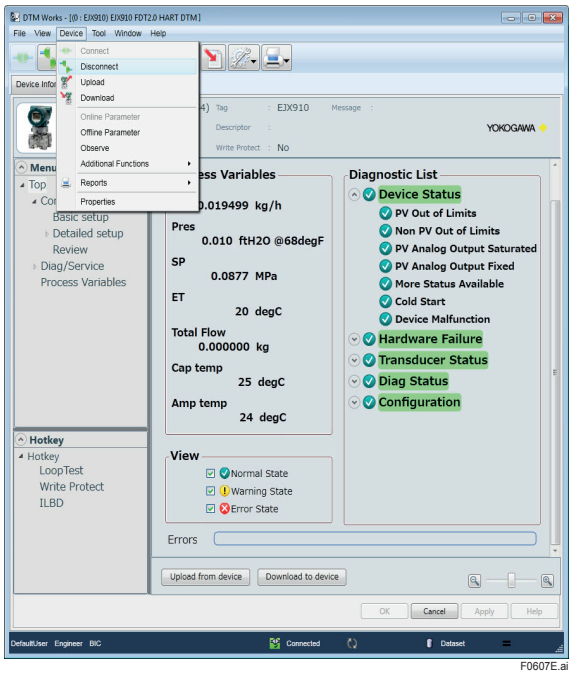
Figure 6.6 How to Connect

NOTE

'Connect' menu is active only while the device is disconnected.

(2) How to Disconnect

Click [Device] → [Disconnect].



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Figure 6.7 How to Disconnect

NOTE

'Disconnect' menu is active only while the device is connected.

6.2.2 Online / Offline Parameter

- Online Parameter:

  The online parameters of the device can be edited directly in online status.

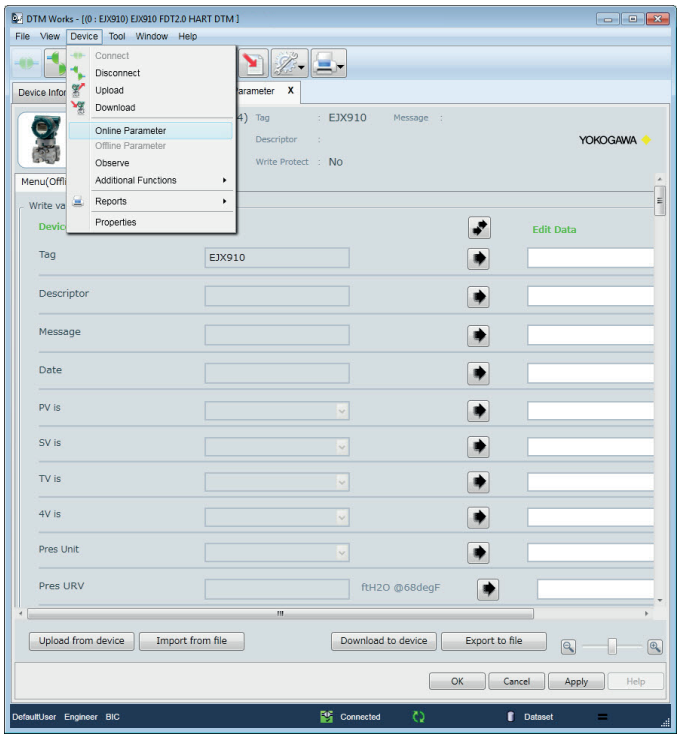
- Offline Parameter :

  The offline parameters of the device can be edited and stored in offline database.

Parameters that are saved in offline database of your PC can be downloaded to the device by using the “Download to Device” function. While, parameters in the device can be uploaded to the offline database of your PC by using the “Upload from Device” function. Refer to section 6.2.3 for more information.

(1) Online Parameter

Click [Device] → [Online Parameter].



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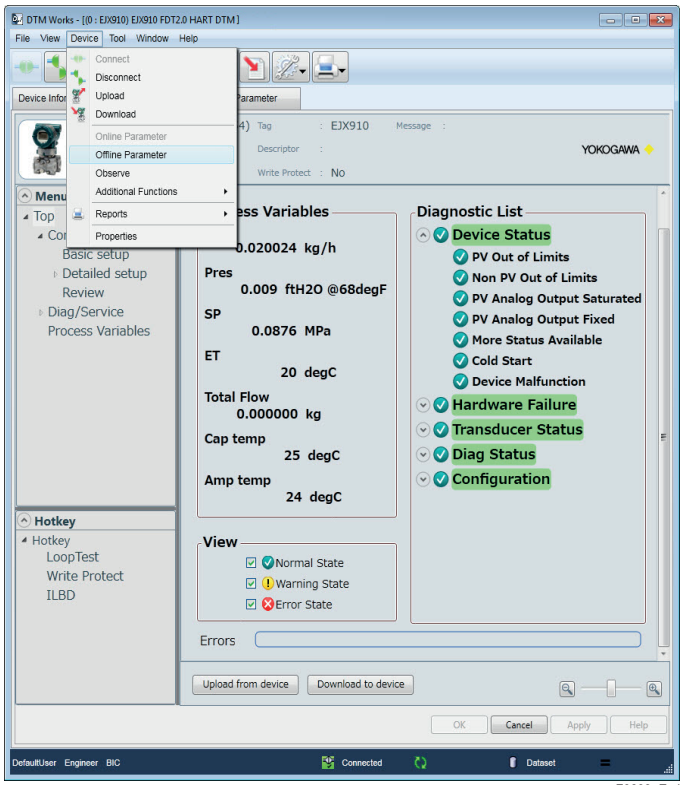
Figure 6.8 Go to Online Parameter

NOTE

‘Online Parameter’ menu is active only while the device is connected.

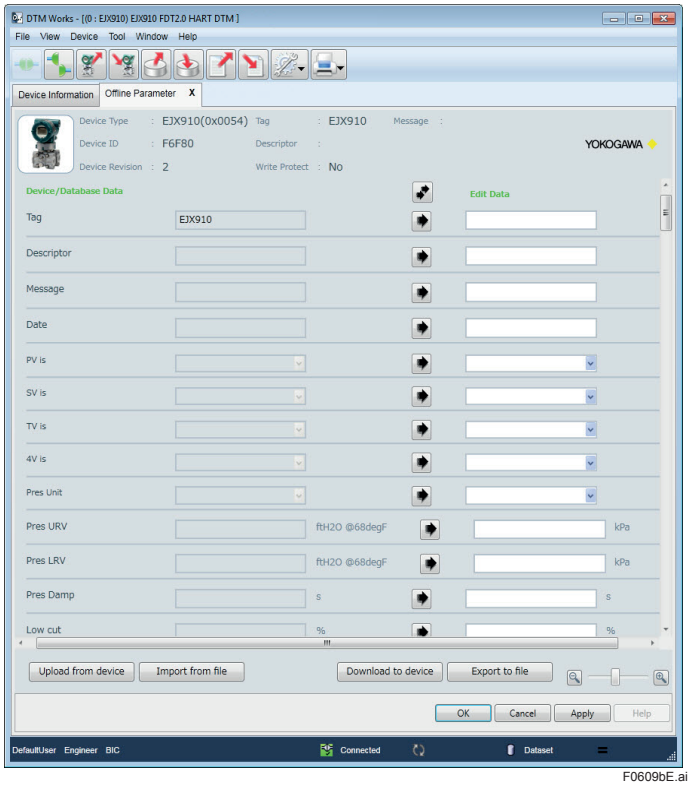
(2) Offline Parameter

Click [Device] → [Offline Parameter].



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Figure 6.9a Go to Offline Parameter



F0609bE.ai

Figure 6.9b Offline Parameter screen

6.2.3 Upload from Device / Download to Device

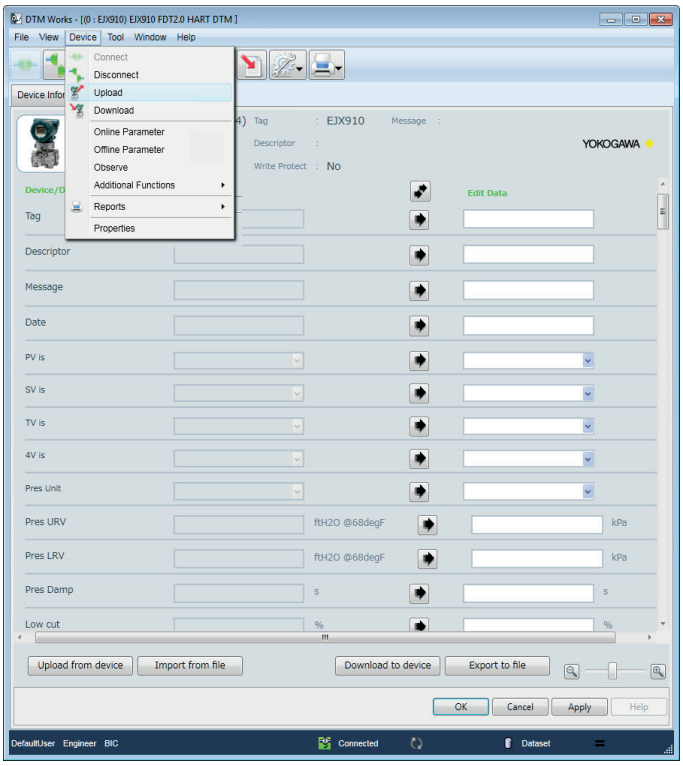
(1) How to upload from a device

Before starting any operation in FlowNavigator, it is important to upload first the data from device and synchronize these data with the offline database of your PC. This section explains the different ways to upload and synchronize data in HART and FOUNDATION fieldbus DTMs.

The uploaded data includes Device General Parameters and Device Flow Parameters. It does not include User Flow Parameters.

- **HART DTM**

1. Click [Device] → [Offline Parameter].
2. Click [Device] → [Upload].



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Figure 6.10a Upload from Device (HART)

3. Click the double arrow icon . The data from the device are copied.
4. Click [Apply]. The data in the device are saved to the offline database on your PC.
5. Close the Offline Parameter screen.



IMPORTANT

- You can also click the Upload icon  from the toolbar or click the [Upload from device] button from the lower-left corner of the screen or to execute 'Upload from device'.
- Make sure to close the Offline Parameter screen because DTM does not allow some functions accessing the dataset. After you close the Offline Parameter or Online Parameter screen, the uploaded data are stored in the dataset.

- **FOUNDATION fieldbus DTM**

1. Click [Device] and then select either [Online Parameter] or [Offline Parameter].
2. From the tree view on the left pane, select the function block that you want to upload.
3. Click [Upload from device].

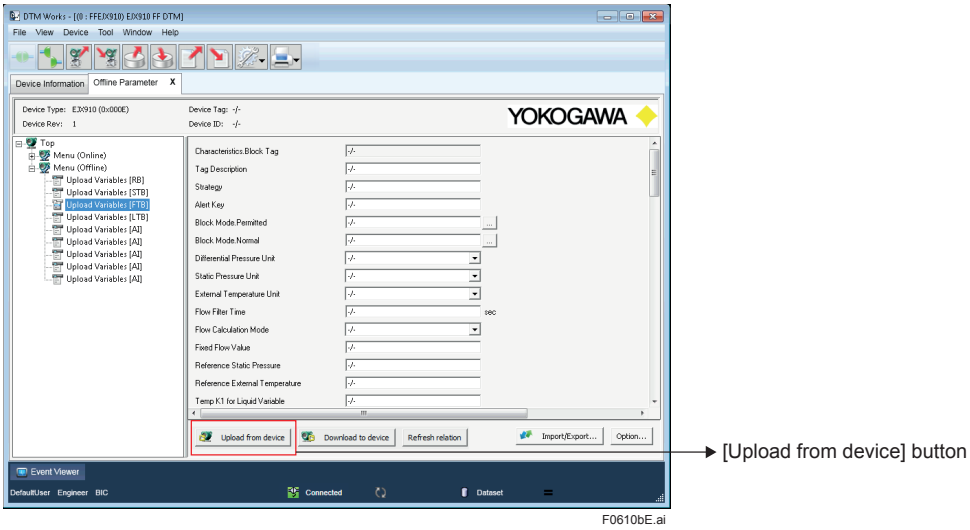


Figure 6.10b Upload from Device (EJX910 FOUNDATION fieldbus)

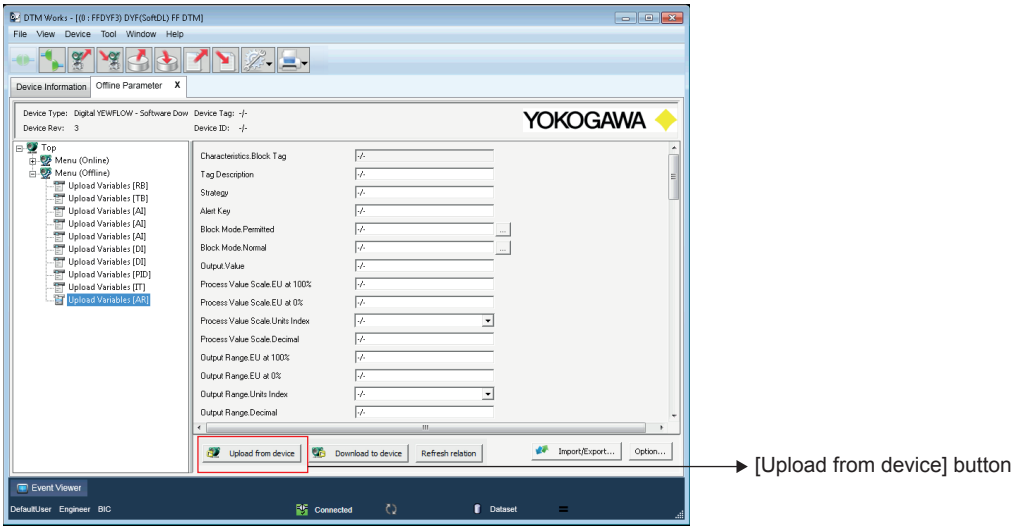


Figure 6.10c Upload from Device (DYF(SoftDL) FOUNDATION fieldbus)

4. Close the Online Parameter or Offline Parameter screen.

IMPORTANT

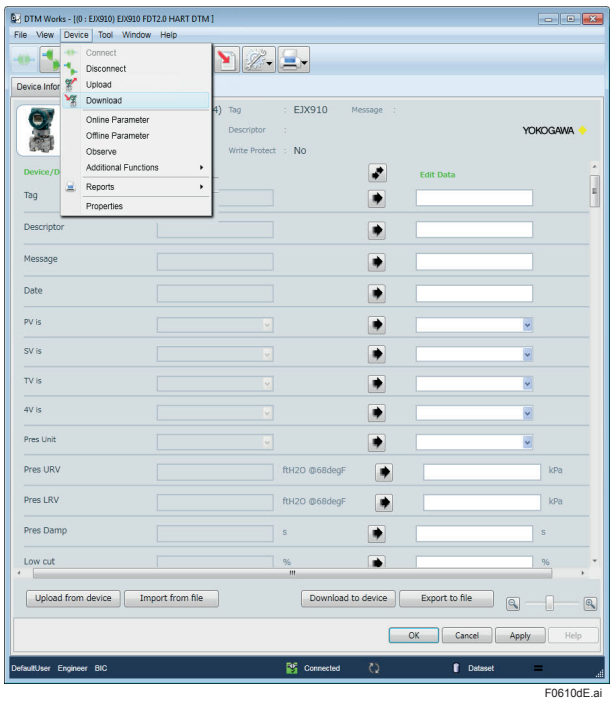
- The following block must be selected to upload the “Device Flow Parameters”:
  - In EJX910 FOUNDATION fieldbus DTM, select FTB block.
  - In DYF(SoftDL) FOUNDATION fieldbus DTM, select AR block.
- Do not use the Device menu or the Upload icon to execute ‘Upload from Device’ because these are not supported in FDT1.2 FOUNDATION fieldbus DTMs.
- Make sure to close the Offline Parameter or Online Parameter screen because DTM does not allow some functions accessing the dataset. After you close the Offline Parameter or Online Parameter screen, the uploaded data are stored in the dataset.

(2) How to download to a device

After performing any operation in FlowNavigator, you can download the Device Flow Parameters and Device General Parameters to the device. This section explains the different ways to download data in HART and FOUNDATION fieldbus DTMs.

- **HART DTM**

1. Click [Device] → [Offline Parameter].
2. Click [Device] → [Download].



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Figure 6.10d Download to Device (HART)

IMPORTANT

You can also click the Download icon  from the toolbar or click the [Download to device] button from the lower-right corner of the screen to execute 'Download to device'.

- **FOUNDATION fieldbus DTM**

1. Click [Device] and then select [Online Parameter] or [Offline Parameter].
2. From the tree view on the left pane, select the function block that you want to download.
3. Click [Download to device].

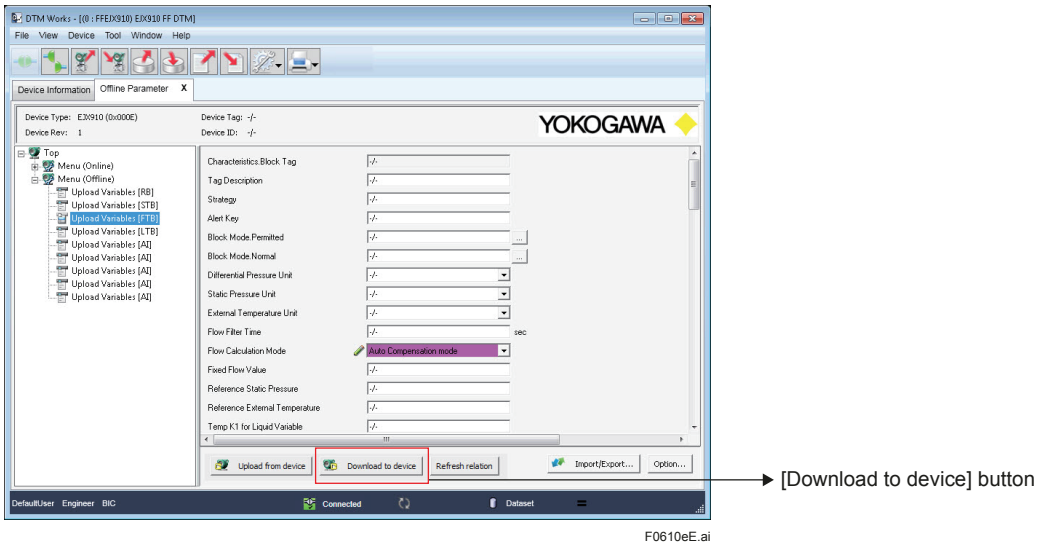


Figure 6.10e Download to Device (EJX910 FOUNDATION fieldbus)

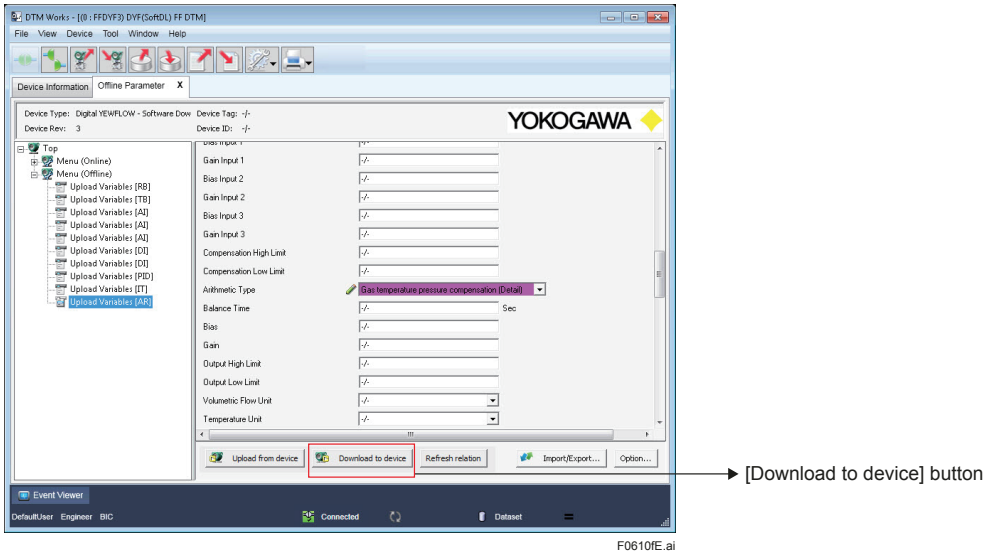


Figure 6.10f Download to Device (DFY(SoftDL) FOUNDATION fieldbus)

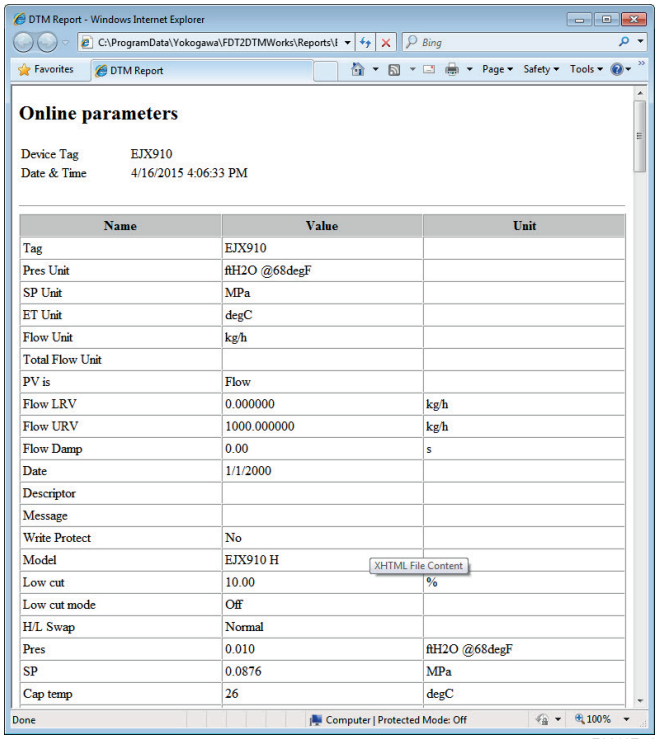
IMPORTANT

- The following block must be selected to download the “Device Flow Parameters” set by Flow Configuration Wizard:
  - In EJX910 FOUNDATION fieldbus DTM, select FTB block.
  - In DYF(SoftDL) FOUNDATION fieldbus DTM, select AR block.
- Do not use the Device menu or the Download icon to execute ‘Download to Device’ because these are not supported in FDT1.2 FOUNDATION fieldbus DTMs.

6.2.4 Reports

Parameters can be printed by using the Reports function.

1. Click [Device] → [Reports].
2. Select [Online Parameter] or [Offline Parameter]. The Report appears in a web page, which may take a few minutes to load.



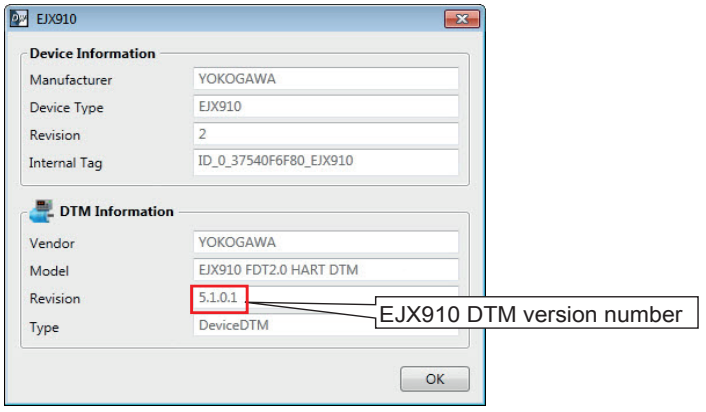
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Figure 6.11 Reports (Online Parameter)

6.2.5 Properties

The Device DTM version number can be shown by using the Properties menu.

Click [Device] → [Properties].



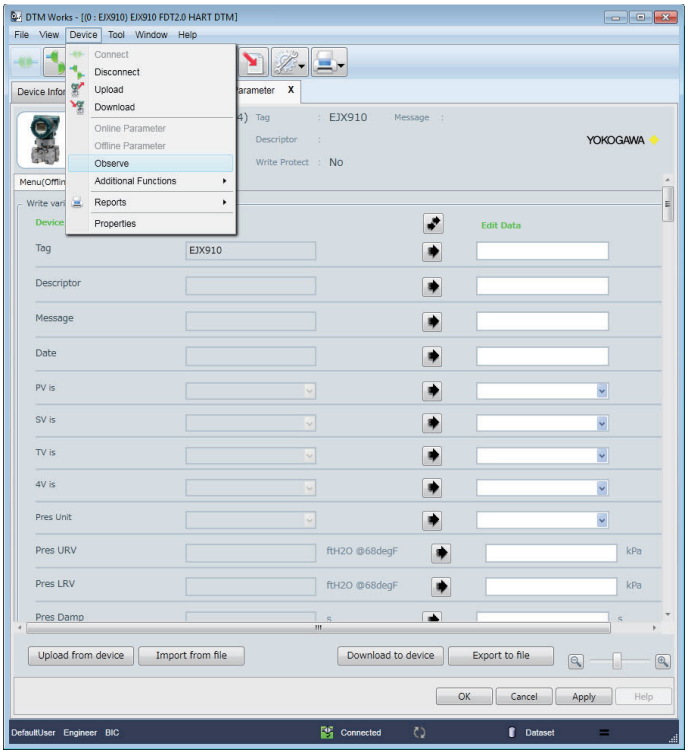
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Figure 6.12 Properties

6.2.6 Observe

Process variables related parameters can be shown by using the Observe menu.

Click [Device] → [Observe].



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Figure 6.13 Observe (HART)

NOTE

The Observe menu is not available in FOUNDATION fieldbus DTMs.

6.3 Flow Parameters Management

This section describes the management of flow parameters by using EJXMVTool as the Flow-Navigator Program and EJX910 FDT2.0 HART7 DTM as the sample DTM.

Flow Parameters Management consists of Flow Configuration Wizard and Obtain Flow Coefficient. In the Flow Configuration Wizard, you can manage flow parameters by using the following buttons:

- Initialize
- Import
- Export
- Report
- Help

The following figure shows the initial screen of the Flow Configuration Wizard by using the EJXMVTool.

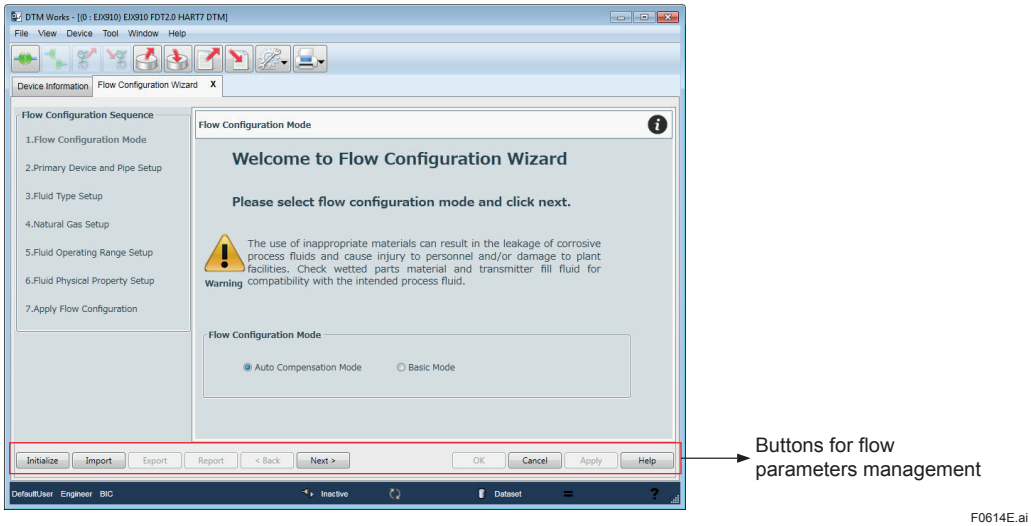


Figure 6.14 Initial Screen of Flow Configuration Wizard (EJXMVTool)

NOTE

Some FDT frame applications may set different buttons for OK, Cancel, Apply, and Help actions; where OK performs the Apply and Close actions, while Cancel performs only the Close action.

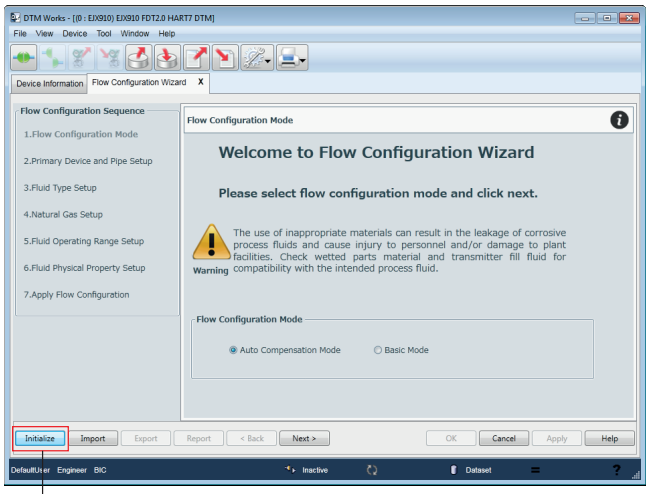
WARNING

The use of inappropriate materials can result in the leakage of corrosive process fluids and cause injury to personnel and/or damage to plant facilities. Check wetted parts materials and transmitter fill fluid for compatibility with the intended process fluid.

6.3.1 Initialize

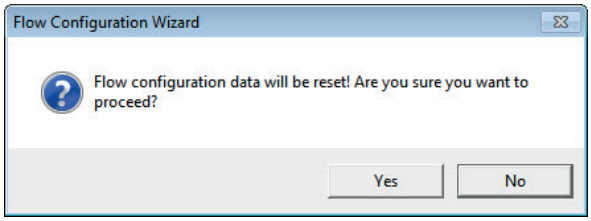
The Initialize button is available only in the Flow Configuration Mode screen.

Click [Initialize] to set the flow parameters to default values.



F0615aE.ai

Figure 6.15a Initializing



F0615bE.ai

Figure 6.15b Initializing Message

6.3.2 Import

The Import button is available only in the Flow Configuration Mode screen.

You can import the following types of configuration file, depending on the device that is used.

- **XMV file**

  This file format includes the “User Flow Parameters” and “Device Flow Parameters” for EJX Multivariable Transmitter.

- **VMV file**

  This file format includes the “User Flow Parameters” and “Device Flow Parameters” for digitalYEWFLO Vortex Flowmeter.

NOTE

Data in XMV2 file formats are only available for Flow Configuration Wizard (R2) and Flow Configuration Wizard (R3)
For more information on the configuration file, refer to section 9.1.

Follow these steps to import a file:

1. Click [Import]. A file selection dialog box appears.

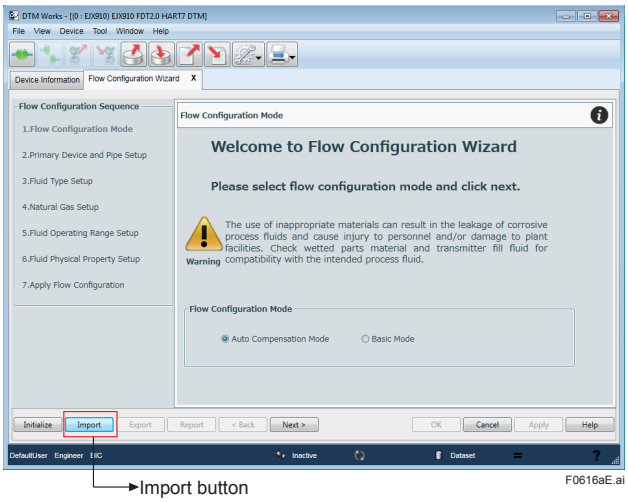
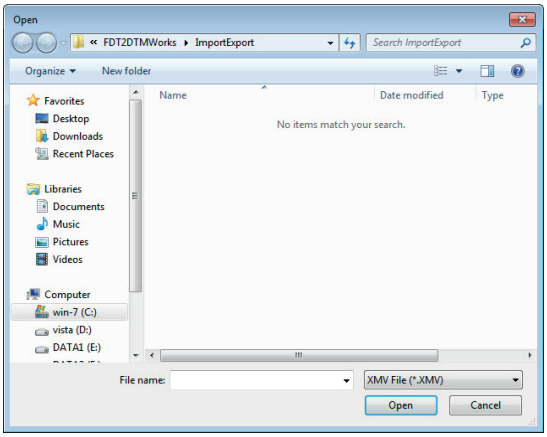


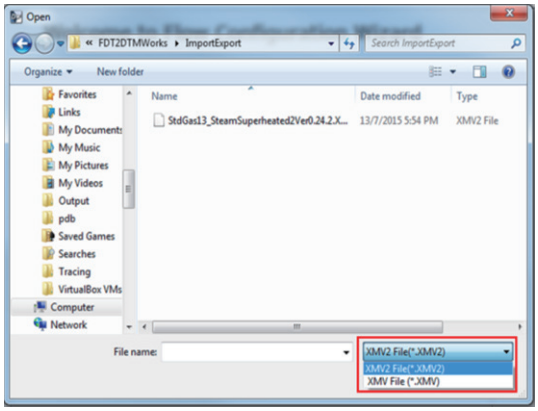
Figure 6.16a Importing a File

2. Navigate to the XMV file (for EJXMVTool) or the VMV file (for DYFMVTool) that you want to import, and then click [Open].



F0616bE.ai

Figure 6.16b Opening a File FCW R1



F0621E.ai

Figure 6.16c Opening a File FCW R2 FCW R3

6.3.3 Export

The Export button is available only in the Apply Flow Configuration screen.

You can export “Device General Parameters”, “User Flow Parameters”, and “Device Flow Parameters”.

NOTE

Data in XMV2 file formats are only available for Flow Configuration Wizard (R2) and Flow Configuration Wizard (R3).
For more information on the configuration files, refer to section 9.1.

Follow these steps to export a file:

1. Click [Export]. A file selection dialog box appears.

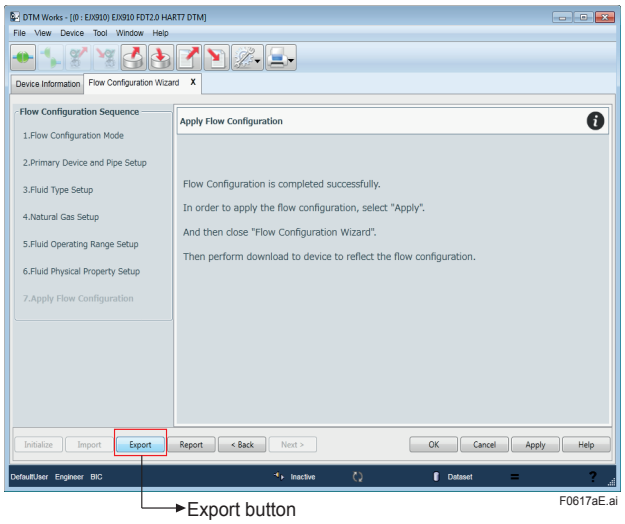
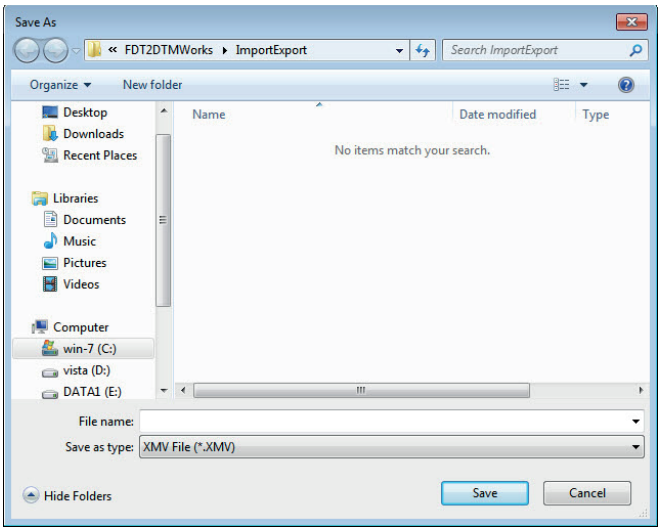


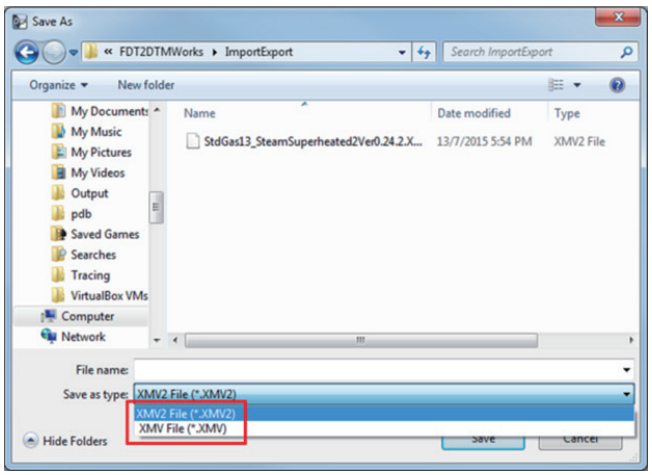
Figure 6.17a Exporting a File

2. Navigate to the folder where you want to save the XMV file (for EJXMVTool) or the VMV file (for DYFMVTool), and then click [Save]. Flow Configuration Wizard (R2) and Flow Configuration Wizard (R3) can save an XMV or XMV2 file.



F0617bE.ai

Figure 6.17b Saving a File FCW R1



F0622E.ai

Figure 6.17c Saving a File FCW R2 FCW R3

6.3.4 Report

The Report button is available only in the Apply Flow Configuration screen.

You can create reports of “User Flow Parameters” and “Device General Parameters” in CSV or TSV file format.

Follow these steps to create a report:

1. Click [Report]. A fie selection dialog box appears.

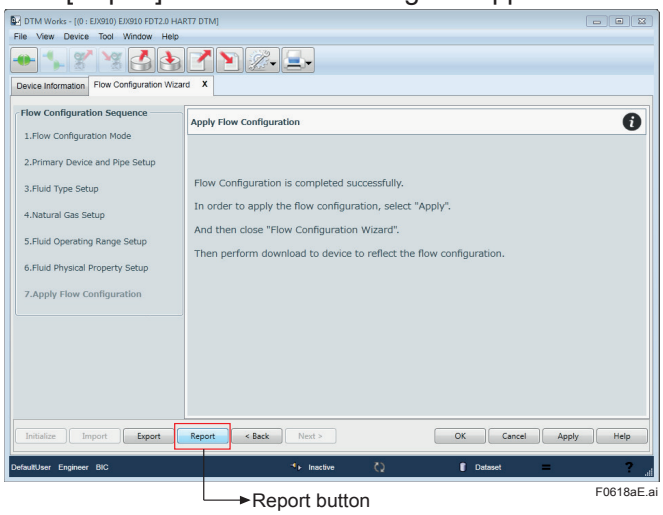


Figure 6.18a Report

2. Navigate to the folder where you want to save the file.
3. From the Save as type drop-down list, select either CSV or TSV, and then click [Save].

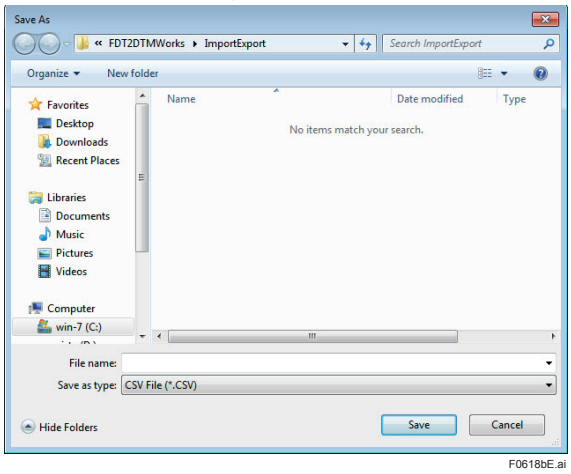


Figure 6.18b Save Report

NOTE

The user name on the report may be shown as “unknown” in frame applications that do not support user authorization function.

6.3.5 Help

The Help button is always available in all Flow Configuration Mode.

Click [Help] to access the Help information. A website opens where you can find the instruction manual.

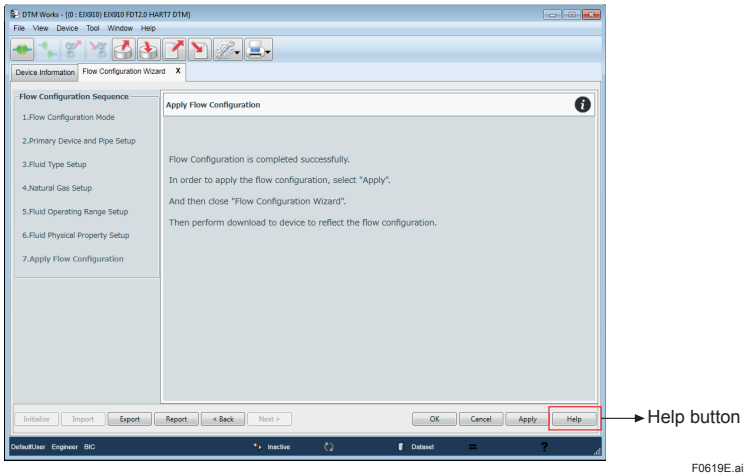


Figure 6.19 Help

NOTE

- Make sure to have internet connection so that you can access the EJXMVTool/ DYFMVTool online help.

6.3.6 About

The About icon is always available in all Flow Configuration Wizard and Obtain Flow Coefficient screens.

Place the mouse pointer over the About icon to display the About FlowNavigator information.

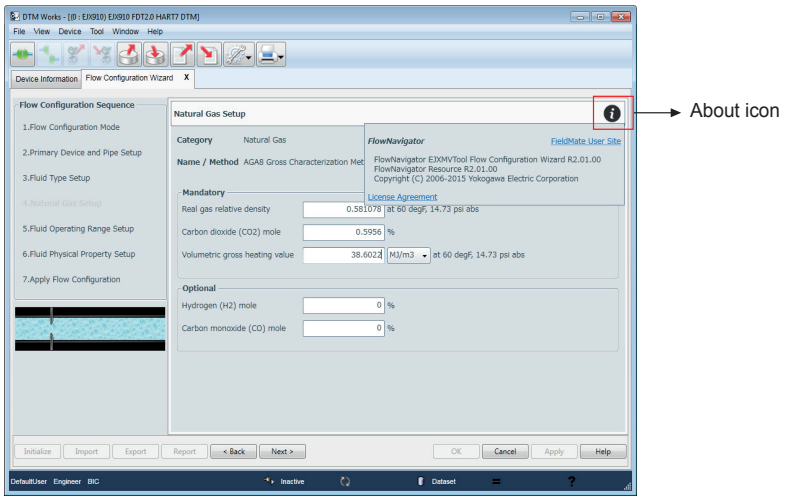


Figure 6.20 About

NOTE

When you click [License Agreement], a window appears showing the End User License Agreement.

7. Operation of EJXMVTool

EJXMVTool has two modes:

- Auto Compensation Mode

  This mode enables you to configure the fluid physical properties and primary device for the EJX Multivariable Transmitter by using a dialog window.

- Basic Mode

  This mode enables you to perform flow operation and density compensation conventionally, with the flow factors being entered manually.

NOTE

- The flow unit is not automatically converted in basic mode.
- The flow range is set to LRV=0 and URV=100 when the Flow Configuration Mode is changed to Basic Mode or Auto Compensation Mode.

IMPORTANT

- Before starting any operation, make sure to upload first the data from device and synchronize these data with the offline database of your PC. There are different ways to upload and synchronize data in HART and FF DTMs. Refer to sections 5.3 and 6.2.3 for the complete steps.
- The uploaded data from Flow Configuration Wizard (R1) or Flow Configuration Wizard (R2) includes Device General Parameters and Device Flow Parameters. It does not include User Flow Parameters. Uploaded data from Flow Configuration Wizard (R3) includes Device General Parameters, Device Flow Parameters and User Flow Parameters.

7.1 Flow Configuration Wizard (Auto Compensation Mode)

The Flow Configuration Wizard and the Flow Configuration Wizard (R1) correspond to the Orifice, Venturi and nozzles.
The Flow Configuration Wizard (R2) and (R3) are enhanced versions.

In addition to the Orifice, Venturi and Nozzle, it also supports a porous Multiport Averaging Pitot and a Cone meters.
It corresponds to the custom input of the thermal expansion coefficient of the primary device and piping.

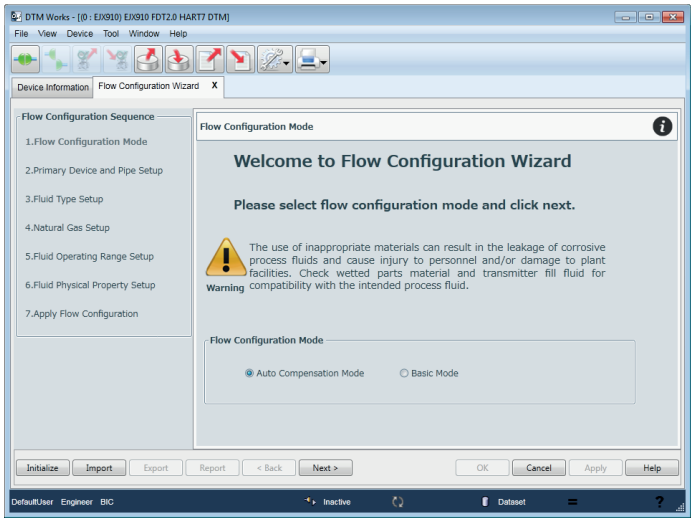
Table 7.1 Flow Configuration Wizard Revision

Icon	Menu	Protocl	Model	Device Revision	DTM Information
FCW R1	Flow Configuration Wizard	HART	EJX910	2	EJX910 FDT2.0 HART DTM
	Flow Configuration Wizard(R1)		EJX910_EXP	10	EJX910 FDT2.0 HART7 DTM
	Flow Configuration Wizard	FOUNDATION fieldbus	EJX910	2	EJX910 FF DTM
FCW R2	Flow Configuration Wizard(R2)	HART	EJX910_EXP	11	EJX910 FDT2.0 HART7 DTM
FCW R3	Flow Confi guration Wizard(R3)	HART	EJX910_EXP	12	EJX910 FDT2.0 HART7 DTM

7.1.1 Flow Configuration Mode

7.1.1.1 Flow Configuration Wizard/Flow Configuration Wizard (R1)

The following figure shows the initial screen of the Flow Configuration Wizard (Auto Compensation Mode).



F0701E.ai

Figure 7.1a Flow Configuration Wizard R1 (Auto Compensation Mode)

7.1.1.2 Flow Configuration Wizard (R2)/(R3)

The following shows the screen for Flow Configuration Wizard (Auto Compensation Mode)



F0727E.ai

Figure 7.1b Flow Configuration Wizard R2 (Auto Compensation Mode)

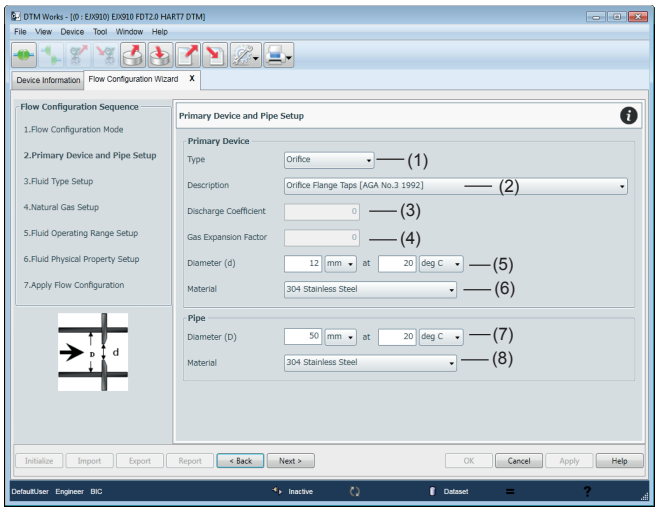
(1) Flow Configuration Mode

(2) Fluid Type

Select whether the fluid is “gas or steam” or “liquid”

7.1.2 Primary Device and Pipe Setup

7.1.2.1 Flow Configuration Wizard/Flow Configuration Wizard (R1)



F0702E.ai

Figure 7.2a Primary Device and Pipe Setup Screen

(1) Primary Device Type

You can select from the following device types:

Type
Orifice
Nozzle
Venturi
Fix

(2) Primary Device Description

The following table lists the primary devices that you can use.

Table 7.2 Primary Device

Type	Primary Device
Orifice	Orifice Corner Taps [ISO5167-1 1991]
	Orifice Corner Taps [ISO5167-2 2003]
	Orifice Corner Taps [ASME MFC-3M 1989]
	Orifice Flange Taps [ISO5167-1 1991]
	Orifice Flange Taps [ISO5167-2 2003]
	Orifice Flange Taps [ASME MFC-3M 1989]
	Orifice Flange Taps [AGA No.3 1992]
	Orifice D and D/2 Taps [ISO5167-1 1991]
	Orifice D and D/2 Taps [ISO5167-2 2003]
	Orifice D and D/2 Taps [ASME MFC-3M 1989]
Nozzle	ISA1932 nozzle [ISO5167-1 1991/ ISO5167-3 2003]
	Long radius nozzle [ISO5167-1 1991/ ISO5167-3 2003]
	ASME FLOW NOZZLES [ASME MFC-3M 1989] with high beta ratio
	ASME FLOW NOZZLES [ASME MFC-3M 1989] with low beta ratio
	ASME FLOW NOZZLES [ASME MFC-3M 1989] with throat tap flow nozzle
Venturi	Venturi nozzle [ISO5167-1 1991/ ISO5167-3 2003]
	Classical Venturi tube 'as cast' convergent section [ISO5167-1 1991/ ISO5167-4 2003]
	ASME Venturi Tubes with a rough Cast or Fabricated Convergent [ASME MFC-3M 1989]
	Classical Venturi tube with a machined convergent section [ISO5167-1 1991/ ISO5167-4 2003]
	ASME Venturi Tubes with a machined convergent section [ASME MFC-3M 1989]
	Classical Venturi tube with a rough-welded sheet-iron convergent section [ISO5167-1 1991/ ISO5167-4 2003]
Fix	Fixed mode *1

*1: Sets the discharge coefficient and gas expansion factor to a fixed value

(3) Discharge Coefficient of the Primary Device

This parameter is active only when 'Fix' is selected for [Type].
Input the Discharge Coefficient manually when 'Fix' is selected.

(4) Primary Device Gas Expansion Factor

This parameter is active only when 'Fix' is selected for [Type].
Input the Gas Expansion Factory manually when 'Fix' is selected.

(5) Primary Device Sizing

Set the following values and select a unit.

- Diameter of Differential Producer:
  unit: mm (default), in
- Measuring temperature: 20 (default)
  unit: degC (default), degF, K

(6) Primary Device Material

Thermal expansion of the primary device is automatically calculated according to the material.
The following table lists the primary device materials that you can select.*
(*) The thermal expansion factor of material implemented in FlowNavigator conforms to ASME MFC-3M.

Table 7.3 Primary device material

Material	Remarks
304 Stainless Steel	Default
316 Stainless Steel	-
Carbon Steel	-
Hastelloy C	-
Monel	-

(7) Pipe Sizing

Set the pipe size and select a unit.

- Pipe inside Diameter:
  unit: mm (default), in
- Measuring temperature: 20 (default)
  unit: degC (default), degF, K

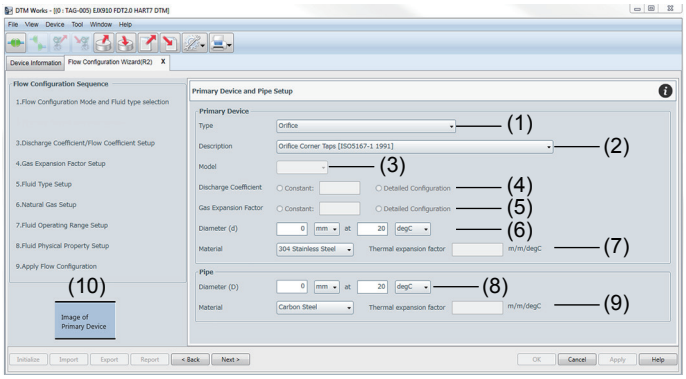
(8) Pipe material

Thermal expansion of pipe is automatically calculated according to the material.
The following table lists the pipe material types that you can select.*
(*) The thermal expansion factor of material implemented in FlowNavigator conforms to ASME MFC-3M.

Table 7.4 Pipe material

Pipe Material	Remarks
304 Stainless Steel	-
316 Stainless Steel	-
Carbon Steel	Default
Hastelloy C	-
Monel	-

7.1.2.2 Flow Configuration Wizard (R2)/(R3)

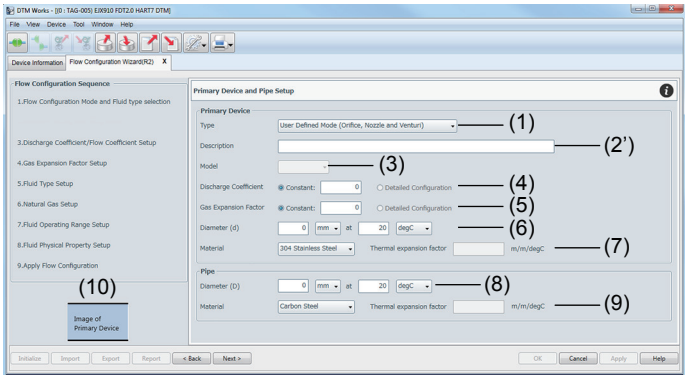


F0723E.ai

Figure 7.2b Primary Device and Pipe Setup (1)

NOTE

Figure 7.2b is displayed when 'User Defined Mode' is NOT selected in [Type].



F0724E.ai

Figure 7.2c Primary Device and Pipe Setup (2)

NOTE

Figure 7.2c is displayed when one of the 'User Defined Mode' type is selected in [Type].

(1) Primary Device Type

The device type is selectable from the followings:

Type
Orifice
Nozzle
Venturi
Multiport Averaging Pitot
Cone meters
User Defined Mode (Orifice, Nozzle and Venturi)
User Defined Mode (Multiport Averaging Pitot
User Defined Mode (Cone meters)

(2) Primary device description

The following table lists the primary devices that you can use.

Table7.5 Primary Device

Type	Primary Device
Orifice	Orifice Corner Taps [ISO5167-1 1991]
	Orifice Corner Taps [ISO5167-2 2003]
	Orifice Corner Taps [ASME MFC-3M 1989]
	Orifice Flange Taps ([SO5167-1 1991]
	Orifice Flange Taps [ISO5167-2 2003]
	Orifice Flange Taps [ASME MFC-3M 1989]
	Orifice Flange Taps [AGA N0.3 1992]
	Orifice D and D/2 Taps [ISO5167-1 1991]
	Orifice D and D/2 Taps [ISO5167-2 2003]
	Orifice D and D/2 Taps [ASME MFC-3M 1989]
Nozzle	ISA1932 nozzle [ISO5167-1 1991/ ISO5167-3 2003]
	Long radius nozzle [ISO5167-1 1991/ ISO5167-3 2003]
	ASME FLOW NOZZLES [ASME MFC-3M 1989] with high beta ratio
	ASME FLOW NOZZLES [ASME MFC-3M 1989] with low beta ratio
	ASME FLOW NOZZLES [ASME MFC-3M 1989] with throat ap flow nozzle
Venturi	Venturi nozzle [ISO5167-1 1991/ ISO5167-3 2003]
	Classical Venturi tube 'as cast' convergent section [ISO5167-1 1991 / ISO5167-4 2003]
	ASME Venturi Tubes With a rough Cast or Fabricated Convergent [ASME MFC-3M 1989]
	Classical Venturi tube with a machined convergent section [ISO5167-1 1991/ ISO5167-4 2003]
	ASME Venturi Tubes With a machined convergent section [ASME MFC-3M 1989]
	Classical Venturi tube with a rough-welded sheet-iron convergent section [ISO5167-1 1991/ ISO5167-4 2003]
Multiport Averaging Pitot	Verabar
	Calibrated Verabar
	Accelabar
	Calibrated Accelabar
Cone meters	V-Cone
	Wafer-Cone
	Cone meters [ISO 5167-5]
	Calibrated Cone meters [ISO 5167-5]
User Defined Mode (Orifice, Nozzle and Venturi)	The name of a primary device is defined by user. (*)
User Defined Mode (Multiport Averaging Pitot)	The name of a primary device is defined by user. (*)
User Defined Mode (Cone meters)	The name of a primary device is defined by user.(*)

(*) Primary device Name

When one of the following primary device is selected, pull down labelled description disappears and, alternatively, text box appears in which use can name the device.

- User Defined Mode (Orifice, Nozzle and Venturi)
- User Defined Mode (Multiport Averaging Pitot)
- User Defined Mode (Cone meters)

(3) Model

This parameter is activated only when 'Multiport Averaging Pitot' is selected for [Type] but when 'User Defined Mode' is selected in [Description], it is not activated.
Selectable model types are shown as follows.

Table 7.6 Model Type

Description	Model
Accelabar Calibrated Accelabar	1 inch
	2 inches
	3 inches
	4 inches
	6 inches
	8 inches
	10 inches
	12 inches
Verabar Calibrated Verabar	05 Sensor
	10 Sensor
	15 Sensor
	20 Sensor

(4) Flow Coefficient / Discharge Coefficient Configuration

When selecting 'Detailed Configuration', refer also to 7.1.2.2.1.

■ Label

This parameter is named differently, discharge coefficient or flow coefficient, in accordance with primary devices. Therefore, the label of the component must be switched according to primary device type as shown in the following table.

Table 7.7 Flow/Discharge coefficient

Primary Device Type	Label
Orifice	Discharge Coefficient
Venturi	Discharge Coefficient
Nozzle	Discharge Coefficient
Multiport Averaging Pitot	Flow Coefficient
Cone meters	Discharge Coefficient
User Defined Mode (Orifice, Nozzle and Venturi)	Discharge Coefficient
User Defined Mode (Multiport Averaging Pitot)	Flow Coefficient
User Defined Mode (Cone meters)	Discharge Coefficient

■ Methods for computing the coefficient

Available method depends on primary device as shown in the table below:

Table 7.8 Computing Method

Primary device		Radio button	
		Constant	Detailed Configuration
Orifice	Existing devices	X	X
Venturi	Existing devices	X	X
Nozzle	Existing devices	X	X
Multiport Averaging Pitot	Verabar	X	X
	Calibrated Verabar	Available	X
	Accelabar	X	X
	Calibrated Accelabar	Available	X
Cone meters	V-Cone	Available	Available
	Wafer-Cone	Available	Available
	Cone meters [ISO 5167-5]	X	X
	Calibrated Cone meters [ISO 5167-5]	Available	Available
User Defined Mode (Orifice, Nozzle and Venturi)	The name of a primary device is defined by user. (*)	Available	X
User Defined Mode (Multiport Averaging Pitot)	The name of a primary device is defined by user. (*)	Available	Available
User Defined Mode (Cone meters)	The name of a primary device is defined by user. (*)	Available	Available

X denotes “Unavailable”

(*) Primary device name

When one of the following primary device is selected, pull down labelled description disappears and, alternatively, text box appears in which use can name the device.

- User Defined Mode (Orifice, Nozzle and Venturi)
- User Defined Mode (Multiport Averaging Pitot)
- User Defined Mode (Cone meters)

For configuring the coefficient, three methods are available which are:

- Default: Value designated catalogue or standard is set
- Constant Cd / K: user can define the coefficient as constant value
- Coefficient vs. Reynolds number curve: The coefficient is compensated with curve of Coefficient vs. Reynolds number.

When the ratio button “Constant” is selected, the coefficient is configured with Constant Cd / K and, similarly, Coefficient vs. Reynolds number curve is available when “Detailed Configuration” is selected.
The table below shows the available method for each primary device.

Table 7.9 Available Method by Device

Primary device		Available method		
		Default	Constant Cd / K	Coefficient vs. Reynols number
Orifice	Existing devices	Available	X	X
Venturi	Existing devices	Available	X	X
Nozzle	Existing devices	Available	X	X
Multiport Averaging Pitot	Verabar	Available	X	X
	Calibrated Verabar	X	Available	X
	Accelabar	Available	X	X
	Calibrated Accelabar	X	Available	X
Cone meters	V-Cone	X	Available	Available
	Wafer-Cone	X	Available	Available
	Cone meters [ISO 5167-5]	Available	X	X
	Calibrated Cone meters [ISO 5167-5]	Available	Available	Available
User Defined Mode (Orifice, Nozzle and Venturi)	The name of a primary device is defined by user .(*)	X	Available	X
User Defined Mode (Multiport Averaging Pitot)	The name of a primary device is defined by user.(*)	X	Available	Available
User Defined Mode (Cone meters)	The name of a primary device is defined by user.(*)	X	Available	Available

*X denotes “Not Available”.
(*) Primary device Name
When one of the following primary device is selected, pull down labelled description disappears and, alternatively, text box appears in which use can name the device.
- User Defined Mode (Orifice, Nozzle and Venturi)
- User Defined Mode (Multiport Averaging Pitot)
- User Defined Mode (Cone meters)

(5) Gas Expansion Factor Configuration

Similarly, Gas expansion factor can be configured with the same interface of flow coefficients / discharge coefficient configuration. When liquid is selected as fluid type on the first page, this method is entirely unavailable for all primary device.

For gas and steam, available method depends on primary device as shown in the table below:

Table 7.10 Computing Method

Primary device		Ratio button	
		Constant	Detailed Configuration
Orifice	Existing devices	X	X
Venturi	Existing devices	X	X
Nozzle	Existing devices	X	X
Multiport Averaging Pitot	Verabar	X	X
	Calibrated Verabar	X	X
	Accelabar	X	X
	Calibrated Accelabar	X	X
Cone meters	V-Cone	X	X
	Wafer-Cone	X	X
	Cone meters [ISO 5167-5]	X	X
	Calibrated Cone meters [ISO 5167-5]	X	X
User Defined Mode (Orifice, Nozzle and Venturi)	The name of a primary device is defined by user.(*)	Available	X
User Defined Mode (Multiport Averaging Pitot)	The name of a primary device is defined by user.(*)	Available	Available
User Defined Mode (Cone meters)	The name of a primary device is defined by user.(*)	Available	Available

X denotes “Unavailable”
(*) Primary device name
When one of the following primary device is selected, pull down labelled description disappears and, alternatively, text box appears in which use can name the device.
- User Defined Mode (Orifice, Nozzle and Venturi)
- User Defined Mode (Multiport Averaging Pitot)
- User Defined Mode (Cone meters)

For configuring gas expansion factor, three methods are available which are:

- Default: Value designated catalogue or standard is set
- Constant: User can define the coefficient as constant value
- Detailed Setup: The value is strictly compensated depending on flowing condition

When the ratio button “Constant” is selected, the coefficient is configured with Constant and, similarly, “Detailed Setup” is available when “Detailed Configuration” is selected.
The table below shows the available method for each primary device:

Table 7.11 Available Method by Primary Device

Primary device		Available method		
		Default	Constant	Detailed Setup
Orifice	Existing devices	Available	X	X
Venturi	Existing devices	Available	X	X
Nozzle	Existing devices	Available	X	X
Multiport Averaging Pitot	Verabar	Available	X	X
	Calibrated Verabar	Available	X	X
	Accelabar	Available	X	X
	Calibrated Accelabar	Available	X	X
Cone meters	V-Cone	Available	X	X
	Wafer-Cone	Available	X	X
	Cone meters [ISO 5167-5]	Available	X	X
	Calibrated Cone meters [ISO 5167-5]	Available	X	X
User Defined Mode (Orifice, Nozzle and Venturi)	The name of a primary device is defined by user on. (*)	X	Available	X
User Defined Mode (Multiport Averaging Pitot)	The name of a primary device is defined by user on. (*)	X	Available	Available
User Defined Mode (Cone meters)	The name of a primary device is defined by user on. (*)	X	Available	Available

*X denotes “Not available”.
(*) Primary device name
When one of the following primary device is selected, pull down labelled description disappears and, alternatively, text box appears in which use can name the device.
- User Defined Mode (Orifice, Nozzle and Venturi)
- User Defined Mode (Multiport Averaging Pitot)
- User Defined Mode (Cone meters)

(6) Primary Device Sizing

Set the following values and select a unit.

Diameter of Differential Producer

unit: mm (default), in

Measuring temperature: 20 (default)

unit: degC (default), degF, K

When the following is selected, the parameters are not activated and default values are not shown:

- Verabar (Multiport Averaging Pitot)
- Calibrated Verabar (Multiport Averaging Pitot)
- Accelabar (Multiport Averaging Pitot)
- Calibrated Accelabar (Multiport Averaging Pitot)
- User Defined Mode (Multiport Averaging Pitot)

(7) Primary Device Material

The primary device material is selectable from followings.
Thermal expansion of the primary device is automatically calculated according to the material. When 'User defined material' is selected, textbox labelled 'Thermal expansion factor' is activated and user can define coefficient of thermal expansion. Because the value typically takes very small value, validation should be done to check if the coefficient can cause underflow or overflow when it is downloaded to the transmitter. The unit for Thermal Expansion Factor will be based on the selected temperature in (6) Primary Device Sizing as displayed in Table 7.12 'Thermal Expansion Factor Unit.'

Table 7.12 Thermal Expansion Factor Unit

Temperature	Thermal Expansion Factor Unit
degC	m/m/degC
degF	m/m/degF
K (Kelvin)	m/m/degC

Table 7.13 Primary Device Material

Material	Remarks
304 Stainless Steel	Default
316 Stainless Steel	Default when Multiport Averaging Pitot or User Defined Mode (Multiport Averaging Pitot) is selected in (1)
Carbon Steel	
Hastelloy C	
Monel	
User defined material	

When the following is selected, the parameters are not activated and default values are not shown:

- Verabar (Multiport Averaging Pitot)
- Calibrated Verabar (Multiport Averaging Pitot)
- Accelabar (Multiport Averaging Pitot)
- Calibrated Accelabar (Multiport Averaging Pitot)
- User Defined Mode (Multiport Averaging Pitot)

(8) Pipe Sizing

Set the following values and select a unit.

Pipe inside Diameter

unit: mm (default), in

Measuring temperature: 20 (default)
70 (default when 'Accelabar' or 'Calibrated Accelabar' is selected in (2))

unit: degC (default)
degF (default when 'Accelabar' or 'Calibrated Accelabar' is selected in (2))
K

When 'Accelabar' or 'Calibrated Accelabar' is selected in [Description], the parameters are not activated and default values are not shown.

(9) Pipe Material

The pipe material selected from followings.
Thermal expansion of pipe is automatically calculated according to the material. When 'User defined material' is selected, textbox labelled 'Thermal expansion factor' is activated and user can define the coefficient of thermal expansion. Because the value typically takes very small value, validation should be done to check if the coefficient value can cause underflow or overflow when it is downloaded to the transmitter. The unit for Thermal Expansion Factor will be based on the selected temperature in (8) Pipe Sizing as displayed in Table 7.14.

Table 7.14 Thermal Expansion Factor Unit

Temperature	Thermal Expansion Factor Unit
degC	m/m/degC
degF	m/m/degF
K (Kelvin)	m/m/degC

Table 7.15 Pipe Material

Material	Remarks
304 Stainless Steel	
316 Stainless Steel	Default when Multiport Averaging Pitot or User Defined Mode (Multiport Averaging Pitot) is selected in (1)
Carbon Steel	Default
Hastelloy C	
Monel	
User defined material	

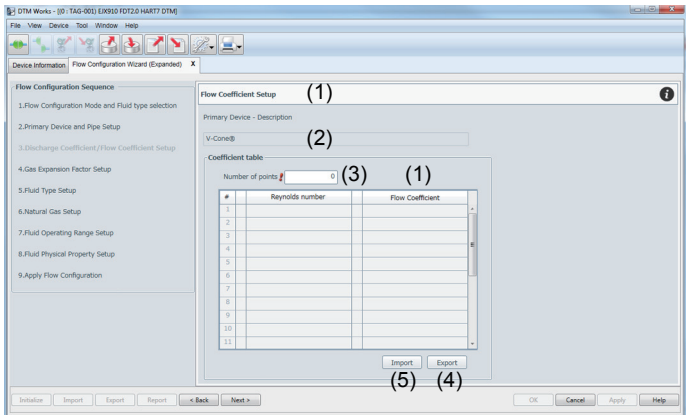
When 'Accelabar' or 'Calibrated Accelabar' is selected in [Description], the parameters are not activated and default values are not shown.

(10) Drawing

Drawing is shown up in accordance with primary device

7.1.2.2.1 Detail Setup for Discharge Coefficient / Flow Coefficient

When 'Detailed Configuration' is selected at 7.1.2.2 (4) on Primary Device and Pipe Setup, this configuration is opened.



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Figure 7.2d Flow Coefficient Setup

(1) Flow Coefficient / Discharge Coefficient

The name of parameter is called discharge coefficient or flow coefficient depending on primary devices. Therefore, the name to display is switched according to primary device type as shown in 7.1.2.2 (4). In the same way, the right column of the table is renamed flow coefficient or discharge coefficient in accordance with the primary device.

(2) Primary Device Name

This field shows the name of selected primary device in the text box and deactivate it. A table below shows the string to display in the text box. Strings do not have to be created for other primary devices which are not shown on the table because the configuration is unavailable for them.

Table 7.16 Primary Device

Primary devices	Descriptions	Strings
Multiport Averaging Pitot	User defined mode	(*)
Cone meters	V-Cone	V-Cone
	Wafer-Cone	Wafer-Cone
	Calibrated Cone meters [ISO 5167-5]	Calibrated Cone meters
	User defined mode	(*)

(*) For user defined mode, the name of the primary device inputted in "Primary Device Name" on "Primary Device and Pipe Setup" is shown.

(3) Define Flow Coefficient / Discharge Coefficient as Function of Reynolds Number

Text box labelled "Number of plots" defines the rows of the table and valid value for the parameter ranges from 2 to 20. The table defines Reynolds Number vs. Coefficient curve and user can define the table up to the same number of rows as he/she defined in "Number of points" text box. Rows which exceed the number of plots are deactivated. For instance, when the number of plot is 10, rows of the table numbered 11 to 20 are greyed out. Only values of the active cells are saved or loaded during Import/Export.

In addition, the table and the number of plots are saved or loaded by clicking Import/Export.

NOTE

When user clicks the 'Next' button, the values of the non-active cells will be set to 0 and those values will be saved as well.

(4) Export Plot Data as csv file

The plots are saved as csv file. Following validation rules should be applied to the table before exporting:

- The number of plots is a natural number between 2 ≤ n ≤ 20(n denotes the number of plots)
- The same number of rows as the number of the plots are filled.
- Invalid inputs such as characters or strings are not written in the table
- There are no vacant plot between the first and end plot
- Values exported will be in ascending order.

(5) Import Plot Data

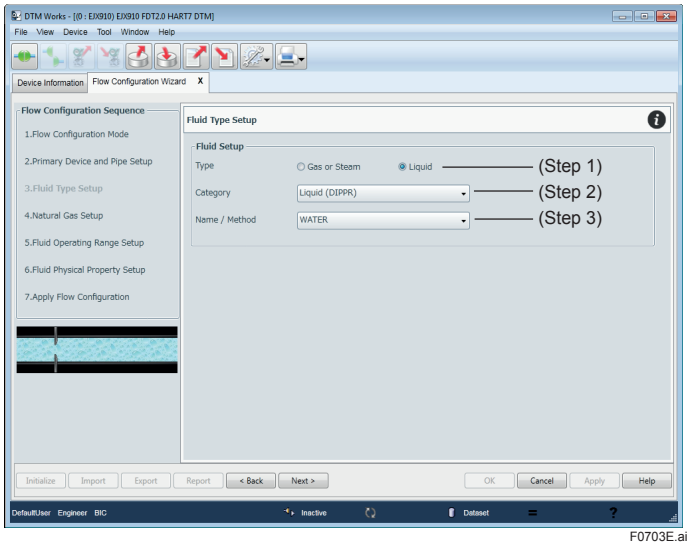
User can make the table data by importing plot data. In importing the file, validation must also be done to reject invalid inputs which may cause error. The validation should check at least:

- The number of plots is a natural number between 2 ≤ n ≤ 20(n denotes the number of plots.)
- The same number of rows as the number of the plots is saved in the file.
- Invalid inputs such as characters or strings are not included in the file
- The file format is the same one which is produced when the table is exported.
- There are no vacant plot between the first and end plot
- Values imported will be in ascending order.

If importing file is invalid, error massage is shown and importing is stopped .

7.1.3 Fluid Type Setup

Auto compensation mode supports physical property database of fluid.



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Figure 7.3 Fluid Type Setup screen

Table 7.17 Fluid setup

Type	Category	Name/Method
Gas or Steam	Gas (DIPPR)	*Refer to the DIPPR database (Table 7.18)*
	Natural gas	AGA8 Detail Characterization Method
		AGA8 Gross Characterization Method 1
		AGA8 Gross Characterization Method 2
		ISO12213 molar-composition analysis
		ISO12213 physical properties
	Gas (custom data table)	*Based on user's numerical input*
	Steam	Superheated and Saturated Steam
		Saturated Steam
Liquid	Liquid (DIPPR)	*Refer to the DIPPR database (Table 7.18)*
	Liquid (custom data table)	*Based on user's numerical input*

Follow these steps to configure the Fluid Type Setup:

Step 1

Select the type of fluid from the following options:

- Gas or Steam (Default)
  If you select this, go to Step 2.
- Liquid
  If you select this, go to Step 3.

For Flow Configuration Wizard(R2) and Flow Configuration Wizard(R3), leave out this step because user already selected Fluid Type on the first page (Flow Configuration Mode).

Step 2

When “Gas or Steam” is selected for [Type], select the Category from the following options:

- Natural Gas - this is the default type
- Steam
- Gas (DIPPR)
- Gas (custom data table)

(a) When “Natural Gas” is selected for [Category], select the Name/Method from the following options:
- AGA8 Detail Characterization Method (Default)
- AGA8 Gross Characterization Method 1
- AGA8 Gross Characterization Method 2
- ISO12213 molar-composition analysis
- ISO12213 physical properties

(b) When “Steam” is selected for [Category], select the Name/Method from the following options:
- Superheated and Saturated steam
- Saturated steam

(c) When “Gas (DIPPR)” is selected for [Category], select the Name/Method from the materials shown in Table 7.18.

Table 7.18 Physical property database

Fluid name	Fluid name	Fluid name
Acetic Acid (*)	Hydrogen Cyanide	Propadiene
Acetone	Hydrogen Peroxide	Propane
Acetonitrile	Hydrogen Sulfide	Propylene
Acetylene	Isobutane	Pyrene
Acrylonitrile	Isobutene	Styrene
Air	Isobutylbenzene	Sulfur Dioxide
Allyl Alcohol	Isopentane	Toluene
Ammonia	Isoprene	Trichloroethylene
Argon	Isopropanol	Trichlorofluoromethane
Benzaldehyde	m-chloronitrobenzene	Vinyl Acetate
Benzene	m-dichlorobenzene	Vinyl Chloride
Benzoic Acid (*)	Methane	Vinyl Cyclohexene
Benz Alcohol	Methanol	Water
Biphenyl	Methyl Acrylate	1-Butene
Bromine	Methyl Ethyl Ketone	1-Decene
Carbon Dioxide	Methyl Vinyl ether	1-Decanal
Carbon Monoxide	Monochlorobenzene	1-Decanol
Carbon Tetrachloride	n-Butane	1-Dodecene
Chlorine	n-Butanol	1-Dodecanol
Chlorodifluoromethane	n-Butyraldehyde	1-Heptanol
Chloroprene	n-Butyronitrile	1-Heptene
Chlorotrifluoroethylene	n-Decane	1-Hexene
Cycloheptane	n-Dodecane	1-Hexadecanol
Cyclohexane	n-Heptadecane	1-Octanol
Cyclopentane	n-Heptane	1-Octene
Cyclopentene	n-Hexane	1-Nonanal
Cyclopropane	n-nonane	1-Nonanol
Dichlorodifluoromethane	n-Octane	1-Pentadecanol
Divinyl Ether	n-Pentane	1-Pentanol
Ethane	Neon	1-Pentene
Ethanol	Neopentane	1-Undecanol
Ethylamine	Nitric Acid (*)	1,1,2,2-Tetrafluoroethane
Ethylbenzene	Nitric Oxide	1,1,2-Trichloroethane
Ethylene	Nitrobenzene	1,2,4-Trichlorobenzene
Ethylene Glycol	Nitroethane	1,2-Butadiene
Ethylene Oxide	Nitrogen	1,3-Butadiene
Fluorene	Nitromethane	1,3,5-Trichlorobenzene
Furan	Nitrous Oxide	1,4-Dioxane
Helium-4	Oxygen	1,4-Hexadiene
Hydrazine	Pentafluoroethane	2-Methyl-1-Pentene
Hydrogen	Phenol	2,2-Dimethylbutane
Hydrogen Chloride	Phosphoric Acid (*)	

*: Only for liquid.

(d) When “Gas (Custom Data Table)” is selected for [Category], set the custom Name/Method in the blank box. You can type up to 100 characters.

Step 3

When “Liquid” is selected for [Type], select the Category from the following:

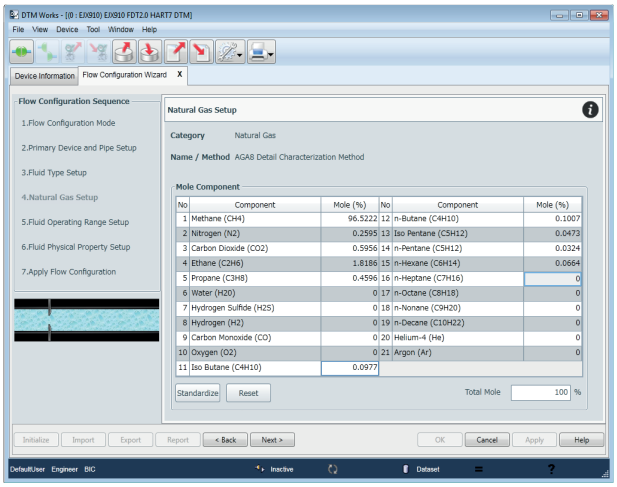
- Liquid (DIPPR)
- Liquid (custom data table)

(a) When Liquid (DIPPR) is selected for [Category], select the Name/Method from the materials shown in Table 7.18.

(b) When Liquid (custom data table) is selected for [Category], set the Name/Method in the blank box. You can type up to 100 characters.

7.1.4 Natural Gas Setup

(1) AGA8 Detail Characterization Method



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Figure 7.4 Natural Gas Setup Screen (1)

- In the Mole (%) column, enter the mole percentage of each component.

  Each mole percentage needs to be within the valid range as shown in Table 7.19.
  The Total Mole box displays the total mole percentage, which must be 100%.

- If the total mole percent does not equal to 100%, you can click [Standardize] to standardize the mole component value.

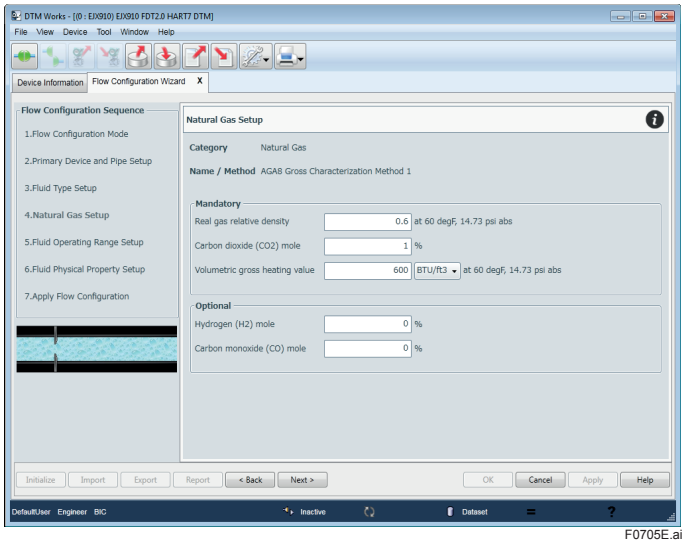
- If you want to reset the mole component value, click [Reset].

Table 7.19 AGA 8 Mole Valid Range

#	Component	Mole Valid Range (Expanded Range)
1	CH4 Methane mole percent	0–100 %
2	N2 Nitrogen mole percent	0–100 %
3	CO2 Carbon Dioxide mole percent	0–100 %
4	C2H6 Ethane mole percent	0–100 %
5	C3H8 Propane mole percent	0–12 %
6	H2O Water mole percent	0–Dew Point % *3
7	H2S Hydrogen Sulfide mole percent	0–100 %
8	H2 Hydrogen mole percent	0–100 %
9	CO Carbon Monoxide mole percent	0–3.0 %
10	O2 Oxygen mole percent	0–21 %
11	C4H10 i-Butane mole percent	0–6 % *1
12	C4H10 n-Butane mole percent	0–6 % *1
13	C5H12 i-Pentane mole percent	0–4 % *2
14	C5H12 n-Pentane mole percent	0–4 % *2
15	C6H14 n-Hexane mole percent	0–Dew Point % *3
16	C7H16 n-Heptane mole percent	0–Dew Point % *3
17	C8H18 n-Octane mole percent	0–Dew Point % *3
18	C9H20 n-Nonane mole percent	0–Dew Point % *3
19	C10H22 n-Decane mole percent	0–Dew Point % *3
20	He Helium mole percent	0–3.0 %
21	Ar Argon	1–1.0 %

*1: ISOBUTANE (C4H10) and n-BUTANE (C4H10)'s sum cannot exceed 6%.
*2: ISOPENTANE (C5H12) and n-Pentane (C5H12)'s sum cannot exceed 4%.
*3: Upper limit Dew Point is not checked by the tool.

(2) AGA8 Gross Characterization Method 1



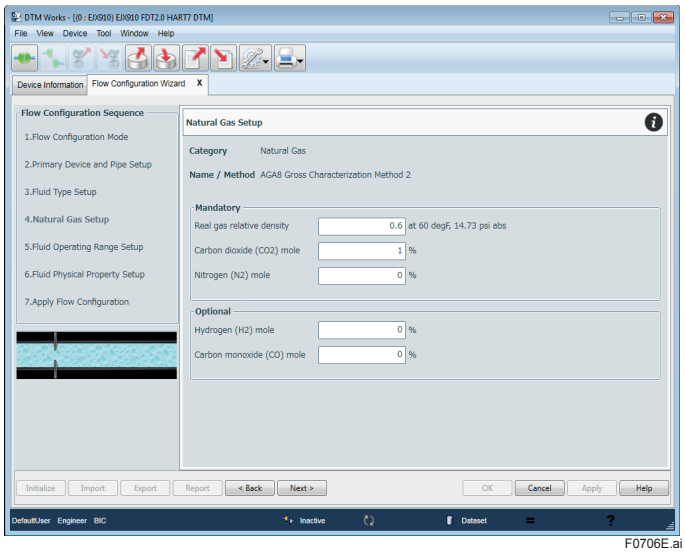
F0705E.ai

Figure 7.5 Natural Gas Setup Screen (2)

Table 7.20 Input & Valid Range (Expanded Range)

Contents		Expanded Range	Remarks
Mandatory	Real Gas Relative Density	0.554–0.87	at 14.73 psi abs 60 °F (at 101.56 kPa abs and 15.56 °C)
	Carbon Dioxide (CO2) mole	0–30%	-
	Volumetric Gross Heating Value	17.76–42.87 MJ/m3 (477–1150 BTU/ft3)	at 14.73 psi abs 60 °F (at 101.56 kPa abs and 15.56 °C)
Optional	Hydrogen (H2) mole	0–10%	-
	Carbon Monoxide (CO) mole	0–3%	-

(3) AGA8 Gross Characterization Method 2



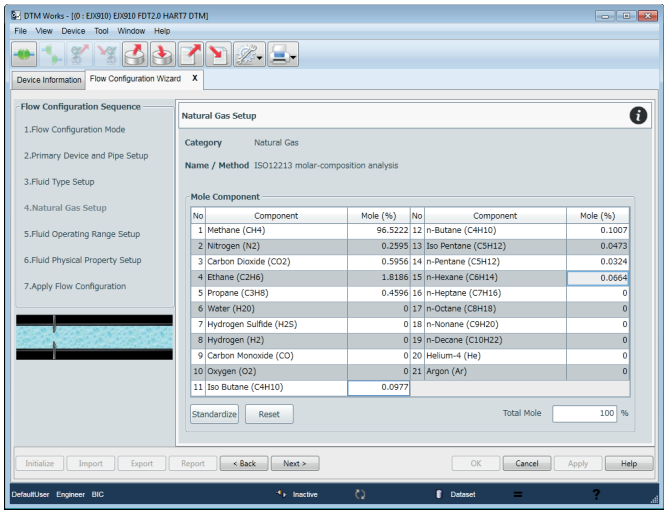
F0706E.ai

Figure 7.6 Natural Gas Setup Screen (3)

Table 7.21 Input & Valid Range (Expanded Range)

Contents		Expanded Range	Remarks
Mandatory	Relative Density	0.554–0.87	at 14.73 psi abs 60 °F (at 101.56 kPa abs and 15.56 °C)
	Carbon Dioxide (CO2) mole	0–30%	-
	Nitrogen (N2) mole	0–50%	-
Optional	Hydrogen (H2) mole	0–10%	-
	Carbon Monoxide (CO) mole	0–3%	-

(4) ISO12213 molar-composition analysis



F0707E.ai

Figure 7.7 Natural Gas Setup Screen (4)

- In the Mole (%) column, enter the mole percentage of each component.

  Each mole percentage needs to be within the valid range as shown in Table 7.22.
  The Total Mole box displays the total mole percentage, which must be 100%.

- If the total mole percent does not equal to 100%, you can click [Standardize] to standardize the mole component value.

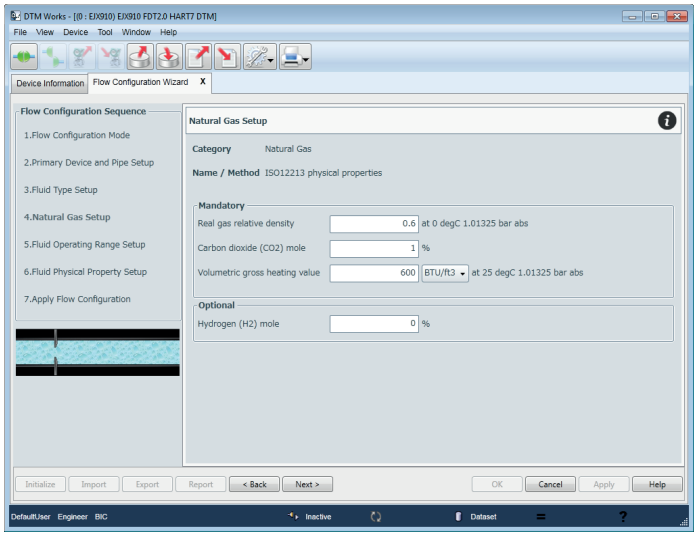
- If you want to reset the mole component value, click [Reset].

Table 7.22 ISO12213 Mole Valid Range

#	Component	Mole Valid Range (Expanded Range)
1	CH4 Methane mole percent	50–100 %
2	N2 Nitrogen mole percent	0–50 %
3	CO2 Carbon Dioxide mole percent	0–30 %
4	C2H6 Ethane mole percent	0–20 %
5	C3H8 Propane mole percent	0–5 %
6	H2O Water mole percent	0–0.015 %
7	H2S Hydrogen Sulfide mole percent	0–0.02 %
8	H2 Hydrogen mole percent	0–10 %
9	CO Carbon Monoxide mole percent	0–3 %
10	O2 Oxygen mole percent	0–0.02 %
11	C4H10 i-Butane mole percent	0–1.5 % *1
12	C4H10 n-Butane mole percent	0–1.5 % *1
13	C5H12 i-Pentane mole percent	0–0.5 % *2
14	C5H12 n-Pentane mole percent	0–0.5 % *2
15	C6H14 n-Hexane mole percent	0–0.1 %
16	C7H16 n-Heptane mole percent	0–0.05 %
17	C8H18 n-Octane mole percent	0–0.05 %
18	C9H20 n-Nonane mole percent	0–0.05 %
19	C10H22 n-Decane mole percent	0–0.05 %
20	He Helium mole percent	0–0.5 %
21	Ar Argon	0–0.02 %

*1: ISOBUTANE (C4H10) and n-BUTANE (C4H10) 's sum cannot exceed 1.5%.
*2: ISOPENTANE (C5H12) and n-Pentane (C5H12) 's sum cannot exceed 0.5%.

(5) ISO12213 physical properties



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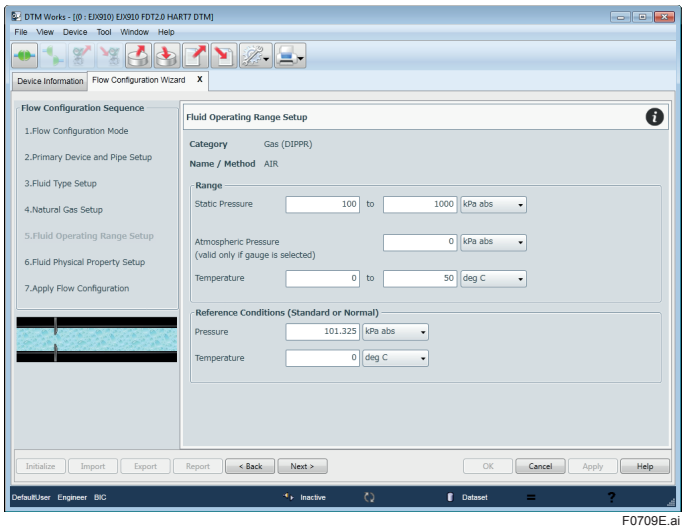
Figure 7.8 Natural Gas Setup Screen (5)

Table 7.23 Input & Valid Range (Expanded Range)

Contents		Expanded Range	Remarks
Mandatory	Relative Density	0.55–0.9	at 0°C, 1.01325 bar abs
	Carbon Dioxide (CO2) mole	0–30%	-
	Volumetric Gross Heating Value	20–48 MJ/m3	at 25°C, 1.01325 bar abs
Optional	Hydrogen (H2) mole	0–10%	-

7.1.5 Fluid Operating Range Setup

(1) Gas or Steam (excluding Category: Saturated steam)



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Figure 7.9 Fluid Operating Range Setup Screen (1)

In the Range section, enter the operating ranges and then select unit.

You can select unit from the following options:

- Pressure: kPa abs, bar abs, psi abs, kPa gauge, bar gauge, psi gauge
- Atmospheric Pressure: psi abs, bar abs, kPa abs
- Temperature: degC, degF, K

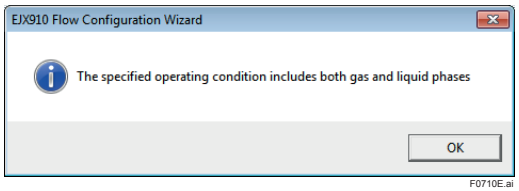
In the Reference Condition section, enter the ranges of reference condition and then select unit.

You can select unit from the following options:

- Pressure unit: kPa abs, bar abs, psi abs
- Temperature unit: degC, degF, K

NOTE

- After clicking the [Next] button, if the following message appears “The specified operating condition includes both gas and liquid phases”, it means that the operating condition is near the acceptable limits for liquid and gas.



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Figure 7.10 Warning message

- Please confirm the density value on the following page (Fluid Physical Property Setup page) and continue configuration.
- If the temperature and pressure range input on the “Fluid Operating Range Setup” is too wide, there is a probability that the calculation error of density is big.
- These ranges are used only for the density and viscosity calculation.
- The ranges of Transmitter are not changed.

(2) Gas or Steam (Category: Saturated steam)

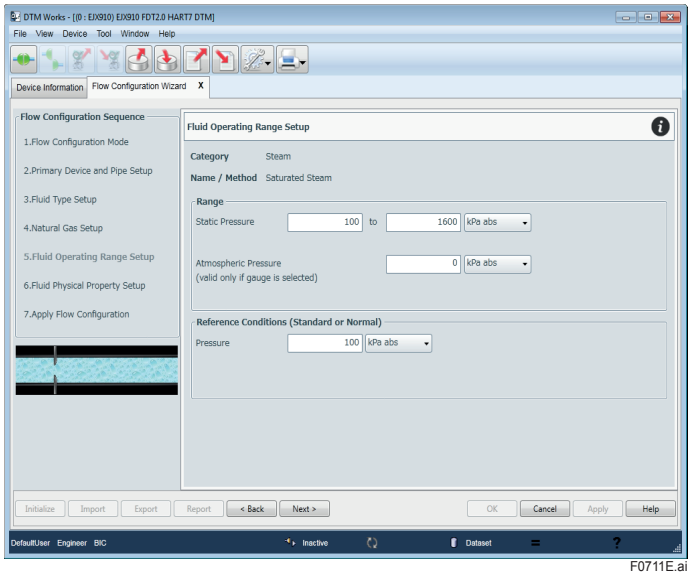


Figure 7.11 Fluid Operating Range Setup Screen (2)

In the Range section, enter the operating ranges and then select unit.

You can select a unit from the following options:

- Pressure: kPa abs, bar abs, psi abs, kPa gauge, bar gauge, psi gauge
- Atmospheric Pressure: psi abs, bar abs, kPa abs

In the Reference Conditions section, enter the reference condition and select unit.

You can select a unit from the following options:

- Pressure: kPa abs, bar abs, psi abs

NOTE

- After clicking the [Next] button, if the following message appears “The specified operating condition includes both gas and liquid phases”, it means that the operating condition is near the acceptable limits for liquid and gas.

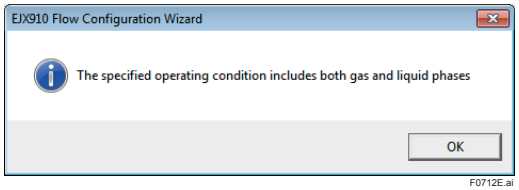
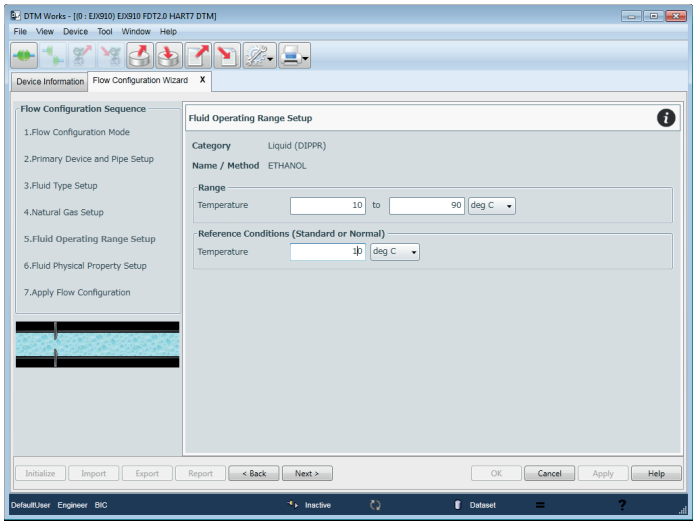


Figure 7.12 Warning message

- Please confirm the density value on the following page (fluid physical property setup page) and continue configuration.
- If the pressure range input on the “Fluid Operating Range Setup” is too wide, there is a probability that the calculation error of density is big.
- These ranges are used only for the density and viscosity calculation.
- The ranges of Transmitter are not changed.

(3) Liquid



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Figure 7.13 Fluid Operating Range Setup Screen (3)

In the Range section, ener the operating range and then select unit.

You can select a unit from the following options:

- Temperature: degC, degF or K

In the Reference Condition section, ener the reference condition and then select unit.

You can select a unit from the following options:

- Temperature: degC, degF or K

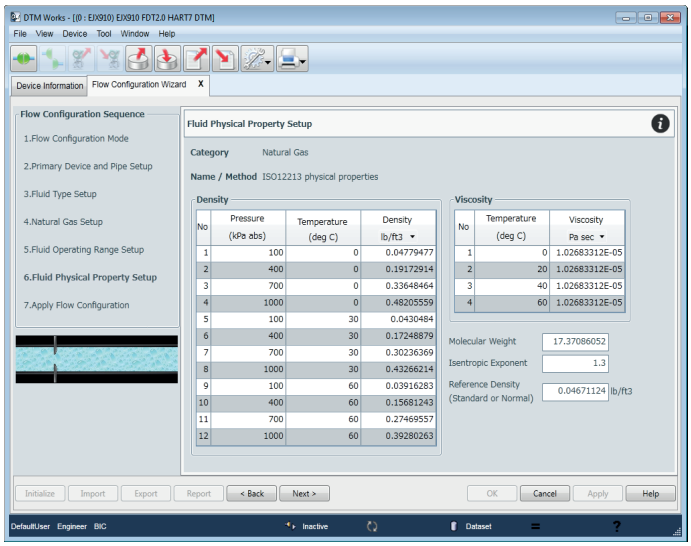


NOTE

- Please confirm the density value on the following page (Fluid Physical Property Setup page) and continue configuration.
- If the temperature range input on the “Fluid Operating Range Setup” is too wide, there is a probability that the calculation error of density is big.
- This range are used only for the density and viscosity calculation.
- The ranges of Transmitter are not changed.

7.1.6 Fluid Physical Property Setup

(1) Gas or Steam



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Figure 7.14a Fluid Physical Property Setup Screen (1)

Confirm the values of density, viscosity, molecular weight, and isentropic exponent.

You can select units from the following options:

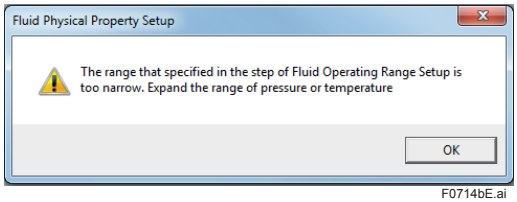
- Density: kg/m3 (Default), lb/ft3
- Viscosity: Pa s, lb/ft s

NOTE

- When you change the unit of Density from the Density drop-down list, the unit and value in the Reference Density box are also changed automatically.
- The density and viscosity value can be customized.
- The Isentropic exponent value can be customized.
- The molecular weight value can be customized.
- The value is shown after entering return key.

NOTE

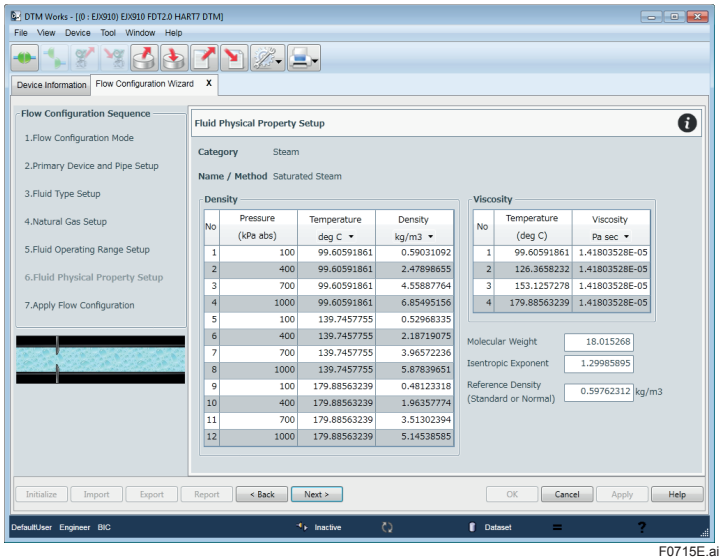
After clicking [Next], if the following message appears, it means that the temperature and pressure range input on the Fluid Operating Range Setup is narrow. Please specify another value, preferably a wider range, and then try again.



F0714bE.ai

Figure 7.14b Information message for setting range

(2) Saturated Steam



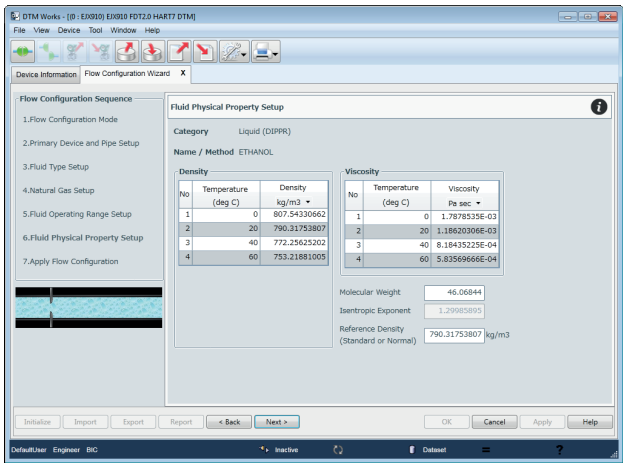
F0715E.ai

Figure 7.15 Fluid Physical Property Setup Screen (2)

You can change the temperature unit only when the selected Name/Method is Saturated Steam. When you change the temperature unit, the following happens:

- The temperature values in Density data are updated.
- The temperature unit and values in Viscosity data are updated.

(3) Liquid



F0716E.ai

Figure 7.16 Fluid Physical Property Setup Screen (3)

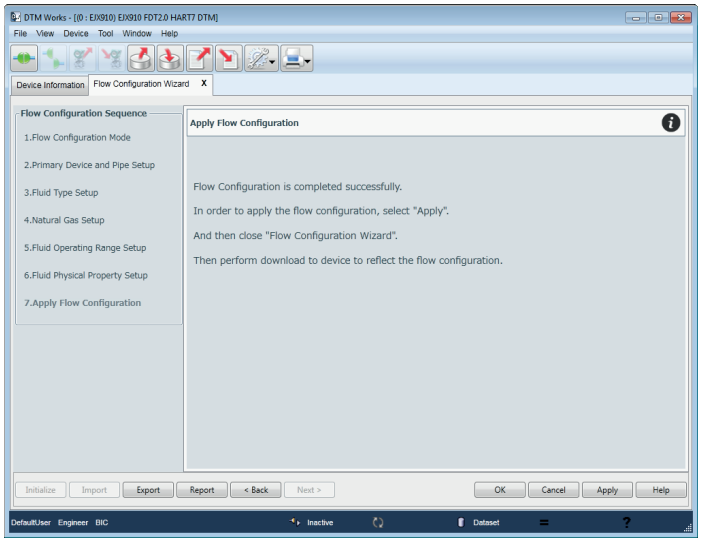
Confirm the values of density, viscosity and molecular weight.
You can select units from the following options:

- Density: kg/m3 (Default), lb/ft3
- Viscosity: Pa s, lb/ft s

NOTE

- When you change the unit of Density from the Density drop-down list, the unit in the Reference Density box are also changed automatically.
- The density and viscosity value can be customized.
- The molecular weight value can be customized.
- The value is shown when entering return key.

7.1.7 Apply Flow Configuration



F0717E.ai

Figure 7.17 Apply Flow Configuration

1. Select [Apply] to apply the flow configuration.
2. Select [OK].
3. From Device DTM, perform ‘Download to device’. Refer to section 6.2.3 for the steps.

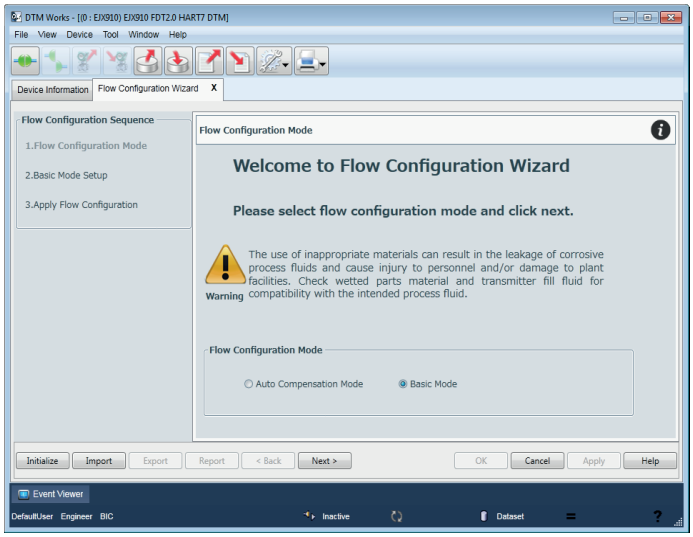
NOTE

For more information on ‘Download to device’, please refer to Chapter 5 and section 6.1.1.

7.2 Flow Configuration Wizard (Basic Mode)

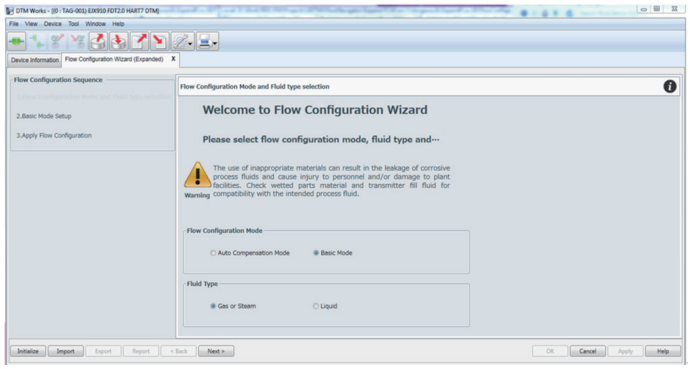
7.2.1 Flow Configuration Mode

The following figure shows the initial screen of the Flow Configuration Wizard (Basic Mode).



F0718E.ai

Figure 7.18a Flow Configuration Mode (Basic mode) FCW R1

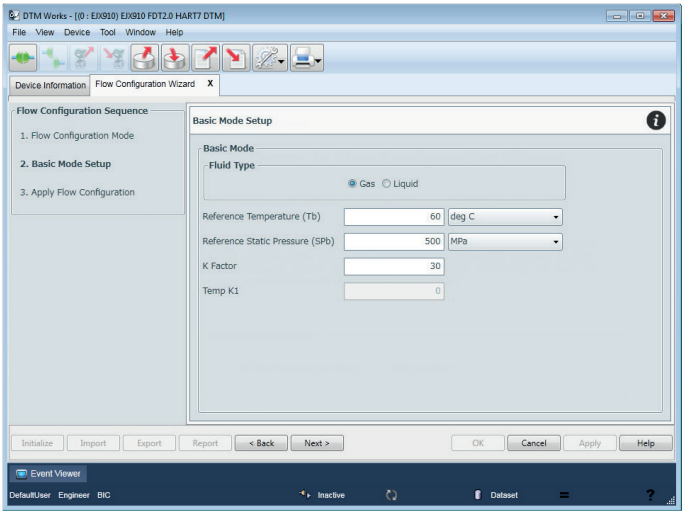


F0726E.ai

Figure 7.18b Flow Configuration Mode (Basic mode) FCW R2 FCW R3

7.2.2 Basic Mode Setup

(1) Gas



F0719E.ai

Figure 7.19 Basic Mode Setup Screen

- Input Reference Temperature (Tb), Reference Static Pressure (SPb), and Kfactor.



NOTE

The static pressure value is according to the transmitter's abs and gauge selection (A/G select). But same unit character is used for both absolute and gauge.

The procedure for setting the BASIC Mode is as follows. For details on how to calculate the Kfactor, refer to the EJX910A and EJX930A Multivariable Transmitters User's Manual (IM 01C25R01-01E).

Table 7.24 Flow Operational Expression

Fluid type	Flow unit Category *3	Kfactor *2	Flow Equation
Liquid	Mass Flow	$Kfactor = \pi/4 \times Nc \times C/\sqrt{1-\beta^4} \times \varepsilon \times d^2 \times \sqrt{2 \times \rho b}$	$Qm \text{ or } Qv \text{ or } Qv_norm = \underline{Kfactor} \times \sqrt{\Delta P \times (1+\underline{Temp\ K1} \times (T-\underline{Tb}))}$ *1
	Normal·Standard Volume Flow	$Kfactor = \pi/4 \times Nc \times C/\sqrt{1-\beta^4} \times \varepsilon \times d^2 \times \sqrt{2 \times \rho b} / \rho norm$	
	Volume Flow	$Kfactor = \pi/4 \times Nc \times C/\sqrt{1-\beta^4} \times \varepsilon \times d^2 \times \sqrt{2 / \rho b}$	
Gas	Mass Flow	$Kfactor = \pi/4 \times Nc \times C/\sqrt{1-\beta^4} \times \varepsilon \times d^2 \times \sqrt{2 \times \rho b \times 1/K}$	$Qm \text{ or } Qv_norm = \underline{Kfactor} \times \sqrt{\Delta P \times \underline{Tb}/T \times SP/\underline{SPb}}$ *1
	Normal·Standard Volume Flow	$Kfactor = \pi/4 \times Nc \times C/\sqrt{1-\beta^4} \times \varepsilon \times d^2 \times \sqrt{2 \times \rho b \times 1/K} / \rho norm$	
	Volume Flow	$Kfactor = \pi/4 \times Nc \times C/\sqrt{1-\beta^4} \times \varepsilon \times d^2 \times \sqrt{2/(\rho b \times 1/K)}$	$Qv = \underline{Kfactor} \times \sqrt{\Delta P \times T/\underline{Tb} \times \underline{SPb}/SP}$ *1

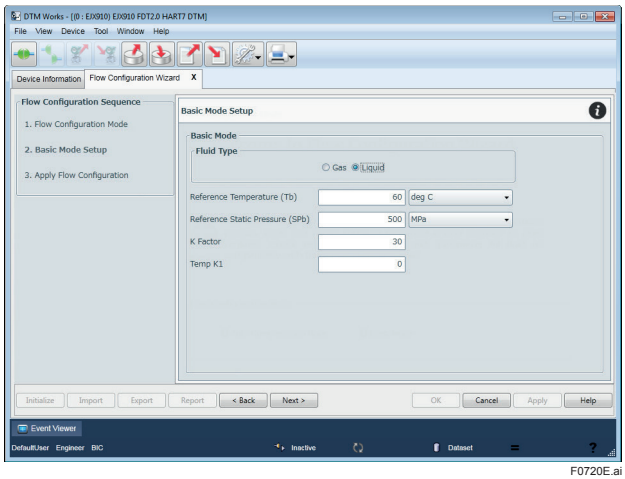
T0701E.ai

*1: ═══ mark indicate User Input
*2: Kfactor must be calculated according to the Flow unit category
*3: Reter to table 7.5, 7.6, 7.7

Table 7.25 Symbol

#	Symbol	Description
1	Qm	Mass Flow
2	Qv	Volume Flow
3	Qv_norm	Normal·Standard Volume Flow
4	Nc	Unit convert factor
5	Kfactor	Basic flow Calculation factor
6	C	Discharge Coefficient
7	ε	Expansion Factor
8	β	Diameter Ratio
9	d	Diameter of orifice
10	Δp	Differential Pressure (Transmitter Setting unit)
11	ρb	Base Density on Tb, SPb Condition
12	ρnorm	Density on Normal, Standard condition
13	Tb	Reference temperature unit: K
14	T	Temperature unit: K
15	SPb	Reference static pressure unit: kPa abs
16	SP	Static Pressure unit: kPa abs
17	Temp K1	The density rate of change per temperature 1degC of a density base value (value which set 100% to 1) For volume flow: set 0.
18	K	Compressibility factor

(2) Liquid



F0720E.ai

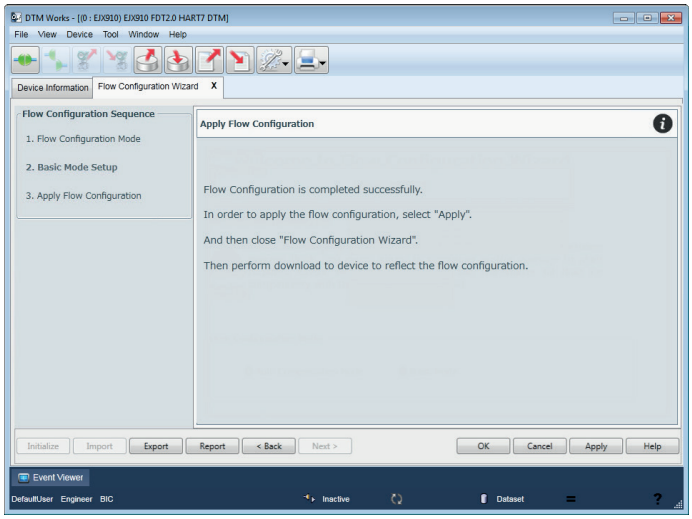
Figure 7.20 Basic Mode Setup for Liquid

- Input Reference Temperature (Tb), Kfactor, Temp K1
- Input Reference static pressure to 0. (This factor is used for gas)

NOTE

Refer to EJX910A and EJX930A Multivariable Transmitters User's Manual IM 01C25R01-01E for the calculation of these flow factors.

7.2.3 Apply Flow Configuration



F0721E.ai

Figure 7.21 Apply Flow Configuration Screen

1. Select [Apply] to apply the flow configuration.
2. Select [OK].
3. From Device DTM, perform ‘Download to device’. Refer to section 6.2.3 for the steps.

NOTE

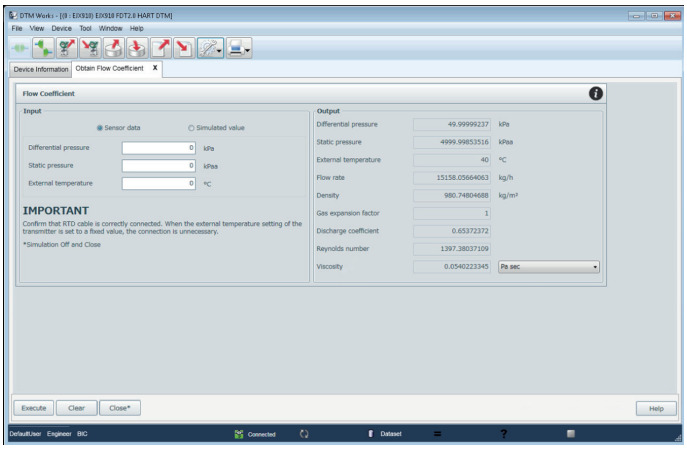
For more information on ‘Download to device’, please refer to Chapter 5 and section 6.1.1.

7.3 Obtain Flow Coefficient

The Obtain Flow Coefficient function is available only when DTM is online.

Select [Device] → [Additional Functions] → [Obtain Flow Coefficient] from the main menu to access the Obtain Flow Coefficient screen.

The following figure shows the Obtain Flow Coefficient screen.



F0722E.ai

Figure 7.22 Obtain Flow Coefficient

The flow coefficient can be obtained from the transmitter (input selection: sensor data or simulated data).

Execute flow simulation for confirmation of configured flow parameters. Input differential pressure, static pressure (absolute) and temperature value and confirm that desired flow is obtained.

When the simulation is executed, it is necessary to connect RTD or mock resistance (about 100Ω) to the transmitter.

Once you select “Simulated value” and press the [Execute] button, the transmitter is transferred to simulation mode. The transmitter will remain in the simulation mode for approximately 10 minutes and automatically return to normal mode. (Regarding the simulation duration time, refer to User’s Manual IM 01C25R02-01E “EJX910A and EJX930A Multivariable Transmitter HART Communication Type” and IM 01C25R03-01E “EJX910A and EJX930A Fieldbus Communication Type”)

Press [Close*] button if you wish to finish the simulation mode immediately.

IMPORTANT

Confirm that RTD cable is correctly connected. When the external temperature setting of the transmitter is set to a fixed value, the connection is unnecessary.

CAUTION

While executing Obtain Flow Coefficient on the FOUNDATION fieldbus DTM, do not write the parameters of the EJX Multivariable Transmitter from other parameter setting tools.

NOTE

- This menu is active only when the transmitter is connected.
- In Basic mode density output data is always 0.

NOTE

If one of following alarm occurs, all the output data is held to the value before alarm occurs.
AL-01(CAP.ERR)
AL-02(AMP.ERR)
AL-03(ET.ERR)
For detail alarm information, refer to User's Manual IM 01C25R03-01E "EJX910A and EJX930A Fieldbus Communication Type".

To get input from the Transmitter, you must select "Sensor data".

- EJXMVTool Help

  Click the [Help] button. The EJXMVTool online help opens.

- EJXMVTool About

  Place the mouse pointer over the [About] icon . The EJXMVTool About information is displayed.

8. Operation of DYFMVTool

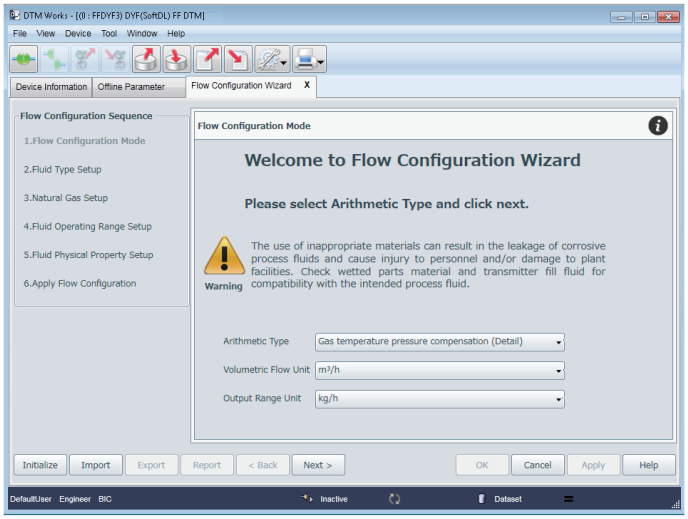
IMPORTANT

- Before starting any operation, make sure to upload first the data from device and synchronize these data with the offline database of your PC. For more information on how to upload and synchronize data in FF DTMs, refer to sections 5.3 and 6.2.3 for the complete steps.
- The uploaded data includes Device General Parameters and Device Flow Parameters. It does not include User Flow Parameters.

8.1 Flow Configuration Wizard (Detail Compensation Mode)

8.1.1 Flow Configuration Mode

The following figure shows the initial screen for Flow Configuration Wizard (Detail Compensation Mode).



F0801E.ai

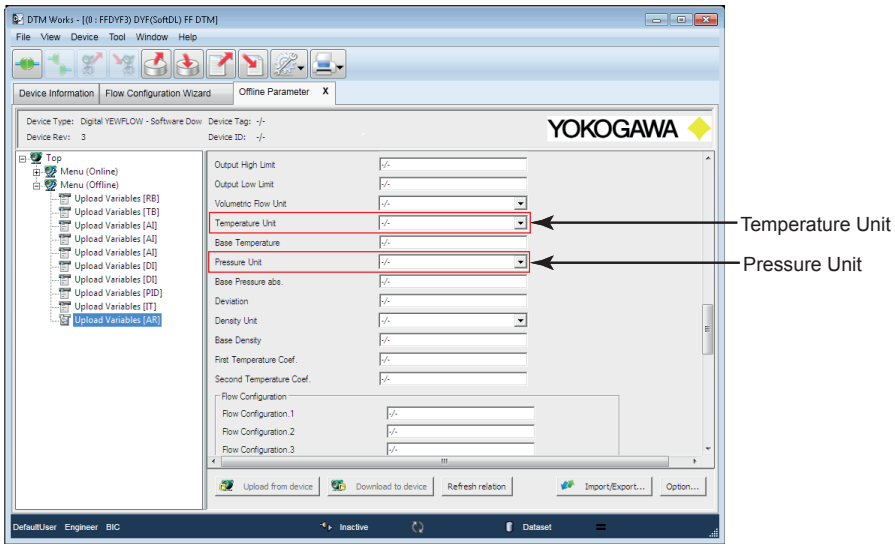
Figure 8.1 Flow Configuration Wizard (Detail Compensation Mode)

Follow these steps in the Flow Configuration Mode screen:

1. For the Arithmetic Type, select calculation type in AR Block:
   - Detail (Gas / Liquid) Compensation Mode
     - Gas temperature pressure compensation (Detail)
     - Liquid temperature compensation (Detail)
2. For the Volumetric Flow Unit, select Flow rate unit for AR Block input.
3. For the Output Range Unit, select Flow rate unit for AR Block output.
4. Click [Next].

IMPORTANT

Temperature Unit and Pressure Unit are to be set in Offline Parameter for Detail Compensation Mode.
Set units according to input temperature and pressure unit.

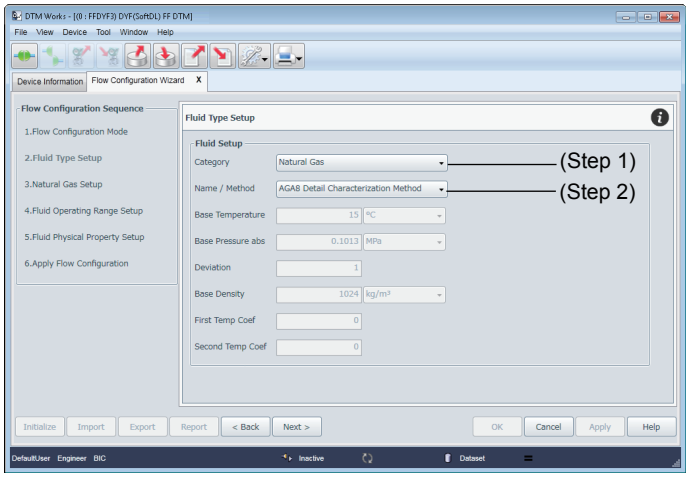


F0802E.ai

Figure 8.2 Offline – Arithmetic after Flow Configuration Wizard is executed.

Temperature Unit and Pressure Unit in AR Block are not configured by Flow Configuration Wizard Detail Compensation Mode.
Set manually using Offline Parameter.

8.1.2 Fluid Type Setup



F0803E.ai

Figure 8.3 Fluid Type Setup Screen

Table 8.1 Fluid type setup

Type	Category	Name/Method
Gas	Natural gas	AGA8 Detail Characterization Method
		AGA8 Gross Characterization Method 1
		AGA8 Gross Characterization Method 2
		ISO12213 molar-composition analysis
		ISO12213 physical properties
	Gas (DIPPR)	*Refer to the DIPPR database (Table 8.2)*
	Gas (custom data table)	*Based on user's numerical input*
Liquid	Liquid (DIPPR)	*Refer to the DIPPR database (Table 8.2)*
	Liquid (custom data table)	*Based on user's numerical input*

(1) In case of Gas temperature pressure compensation

Step 1

Select the Category from the following options:

- Natural Gas
- Gas (DIPPR)
- Gas (custom data table)

Step 2-1

When “Natural Gas” is selected from “Category”, select the “Name/Method” from the following options:

- AGA8 Detail Characterization Method
- AGA8 Gross Characterization Method 1
- AGA8 Gross Characterization Method 2
- ISO12213 molar-composition analysis
- ISO12213 physical properties

Step 2-2

When “Gas (DIPPR)” is selected from “Category”, select the “Name/Method” from the materials shown in Table 8.2.

Step 2-3

When “Gas (custom data table)” is selected from “Category”, set the custom Fluid Name/Method in the blank box. You can type up to 100 characters.

(2) In case of Liquid temperature compensation

Step 1

Select the “Category” from the following options:

- Liquid (DIPPR)
- Liquid (custom data table)

Step 2-1

When “Liquid (DIPPR)” is selected from “Category”, select the “Name/Method” from the materials shown in Table 8.2.

Step 2-2

When “Liquid(custom data table)” is selected from “Category”, set the custom Fluid Name/Method in the blank box. You can type up to 100 characters.

Table 8.2 Physical property database

Fluid name
Acetic Acid (*)
Acetone
Acetonitrile
Acetylene
Acrylonitrile
Air
Allyl Alcohol
Ammonia
Argon
Benzaldehyde
Benzene
Benzoic Acid (*)
Benz Alcohol
Biphenyl
Bromine
Carbon Dioxide
Carbon Monoxide
Carbon Tetrachloride
Chlorine
Chlorodifluoromethane
Chloroprene
Chlorotrifluoroethylene
Cycloheptane
Cyclohexane
Cyclopentane
Cyclopentene
Cyclopropane
Dichlorodifluoromethane
Divinyl Ether
Ethane
Ethanol
Ethylamine
Ethylbenzene
Ethylene
Ethylene Glycol
Ethylene Oxide
Fluorene
Furan
Helium-4
Hydrazine
Hydrogen
Hydrogen Chloride
Hydrogen Cyanide
Hydrogen Peroxide
Hydrogen Sulfide

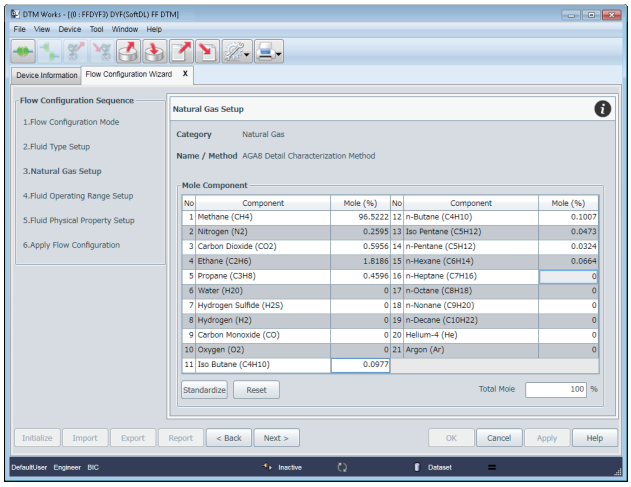
Fluid name
Isobutane
Isobutene
Isobutylbenzene
Isopentane
Isoprene
Isopropanol
m-chloronitrobenzene
m-dichlorobenzene
Methane
Methanol
Methyl Acrylate
Methyl Ethyl Ketone
Methyl Vinyl ether
Monochlorobenzene
n-Butane
n-Butanol
n-Butyraldehyde
n-Butyronitrile
n-Decane
n-Dodecane
n-Heptadecane
n-Heptane
n-Hexane
n-nonane
n-Octane
n-Pentane
Neon
Neopentane
Nitric Acid (*)
Nitric Oxide
Nitrobenzene
Nitroethane
Nitrogen
Nitromethane
Nitrous Oxide
Oxygen
Pentafluoroethane
Phenol
Phosphoric Acid (*)
Propadiene
Propane
Propylene
Pyrene
Styrene
Sulfur Dioxide

Fluid name
Toluene
Trichloroethylene
Trichlorofluoromethane
Vinyl Acetate
Vinyl Chloride
Vinyl Cyclohexene
Water
1-Butene
1-Decene
1-Decanal
1-Decanol
1-Dodecene
1-Dodecanol
1-Heptanol
1-Heptene
1-Hexene
1-Hexadecanol
1-Octanol
1-Octene
1-Nonanal
1-Nonanol
1-Pentadecanol
1-Pentanol
1-Pentene
1-Undecanol
1,1,2,2-Tetrafluoroethane
1,1,2-Trichloroethane
1,2,4-Trichlorobenzene
1,2-Butadiene
1,3-Butadiene
1,3,5-Trichlorobenzene
1,4-Dioxane
1,4-Hexadiene
2-Methyl-1-Pentene
2,2-Dimethylbutane

*: Only for liquid.

8.1.3 Natural Gas Setup

(1) AGA8 Detail Characterization Method



F0804E.ai

Figure 8.4 Natural Gas Setup screen (1)

- In the Mole (%) column, enter the mole percentage of each component.

  Each mole percentage needs to be within the valid range as shown in Table 8.3.
  The Total Mole box displays the total mole percentage, which must be 100%.

- If the total mole percentage does not equal to 100%, you can click [Standardize] to standardize the mole component value.

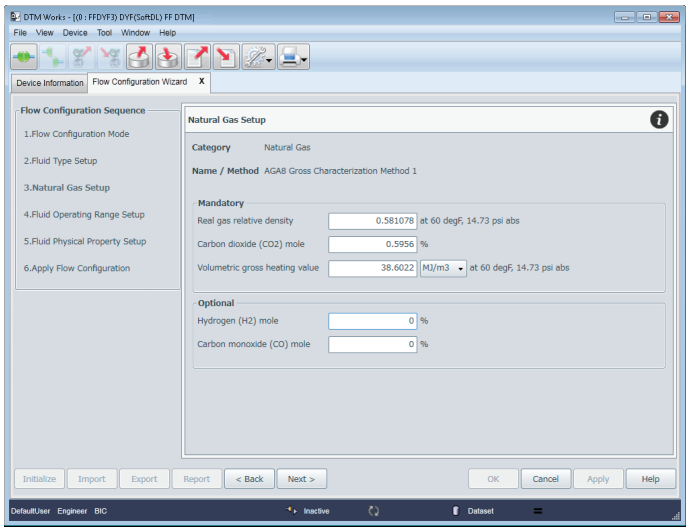
- If you want to reset the component value, click [Reset].

Table 8.3 AGA 8 Mole Valid Range

#	Component	Mole Valid Range (Expanded Range)
1	CH4 Methane mole percent	0–100 %
2	N2 Nitrogen mole percent	0–100 %
3	CO2 Carbon Dioxide mole percent	0–100 %
4	C2H6 Ethane mole percent	0–100 %
5	C3H8 Propane mole percent	0–12 %
6	H2O Water mole percent	0–Dew Point %*3
7	H2S Hydrogen Sulfide mole percent	0–100 %
8	H2 Hydrogen mole percent	0–100 %
9	CO Carbon Monoxide mole percent	0–3.0 %
10	O2 Oxygen mole percent	0–21 %
11	C4H10 i-Butane mole percent	0–6 %*1
12	C4H10 n-Butane mole percent	0–6 %*1
13	C5H12 i-Pentane mole percent	0–4 %*2
14	C5H12 n-Pentane mole percent	0–4 %*2
15	C6H14 n-Hexane mole percent	0–Dew Point %*3
16	C7H16 n-Heptane mole percent	1–Dew Point %*3
17	C8H18 n-Octane mole percent	2–Dew Point %*3
18	C9H20 n-Nonane mole percent	3–Dew Point %*3
19	C10H22 n-Decane mole percent	4–Dew Point %*3
20	He Helium mole percent	0–3.0 %
21	Ar Argon	1–1.0 %

*1: ISOBUTANE (C4H10) and n-BUTANE (C4H10)'s sum cannot exceed 6 %.
*2: ISOPENTANE (C5H12) and n-Pentane (C5H12)'s sum cannot exceed 4 %.
*3: Upper limit Dew Point is not checked by the tool.

(2) AGA8 Gross Characterization Method 1



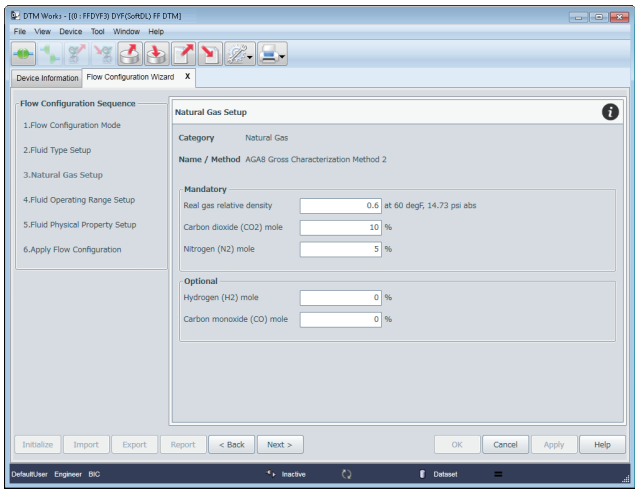
F0805E.ai

Figure 8.5 Natural Gas Setup screen (2)

Table 8.4 Input & Valid Range (Expanded Range)

Contents		Expanded Range	Remarks
Mandatory	Real Gas Relative Density	0.554–0.87	at 14.73 psi abs 60 °F (at 101.56 kPa abs and 15.56 °C)
	Carbon Dioxide (CO2) mole	0–30 %	
	Volumetric Gross Heating Value	17.76–42.87 MJ/m3 (477–1150 BTU/ft3)	at 14.73 psi abs 60 °F (at 101.56 kPa abs and 15.56 °C)
Optional	Hydrogen (H2) mole	0–10 %	
	Carbon Monoxide (CO) mole	0–3 %	

(3) AGA8 Gross Characterization Method 2



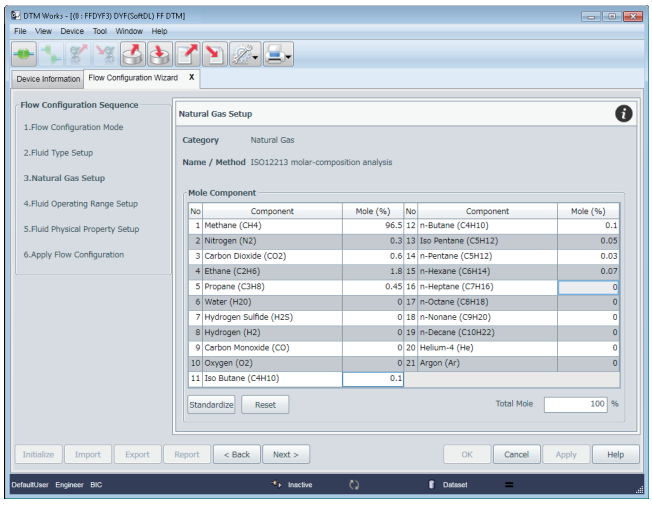
F0806E.ai

Figure 8.6 Natural Gas Setup screen (3)

Table 8.5 Input & Valid Range (Expanded Range)

Contents		Expanded Range	Remarks
Mandatory	Relative Density	0.554–0.87	at 14.73 psi abs 60 °F (at 101.56 kPa abs and 15.56 °C)
	Carbon Dioxide (CO2) mole	0–30 %	
	Nitrogen (N2) mole	0–50 %	
Optional	Hydrogen (H2) mole	0–10 %	
	Carbon Monoxide (CO) mole	0–3 %	

(4) ISO12213 molar-composition analysis



F0807E.ai

Figure 8.7 Natural Gas Setup screen (4)

- In the Mole (%) column, enter the mole percentage of each component.

  Each mole percentage needs to be within the valid range as shown in Table 8.6.
  The Total Mole box displays the total mole percentage, which must be 100%.

- If the total mole percentage does not equal to 100%, you can click [Standardize] to standardize the mole component value.

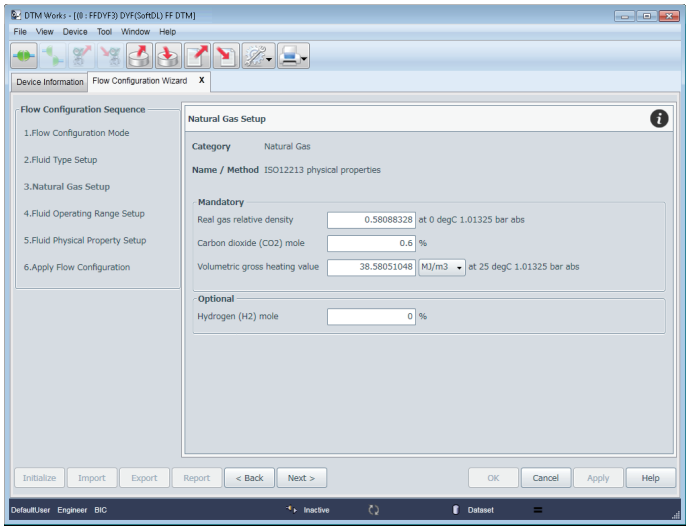
- If you want to reset the mole component value, click [Reset].

Table 8.6 ISO12213 Mole Valid Range

#	Component	Mole Valid Range (Expanded Range)
1	CH4 Methane mole percent	50–100 %
2	N2 Nitrogen mole percent	0–50 %
3	CO2 Carbon Dioxide mole percent	0–30 %
4	C2H6 Ethane mole percent	0–20 %
5	C3H8 Propane mole percent	0–5 %
6	H2O Water mole percent	0–0.015 %
7	H2S Hydrogen Sulfide mole percent	0–0.02 %
8	H2 Hydrogen mole percent	0–10 %
9	CO Carbon Monoxide mole percent	0–3 %
10	O2 Oxygen mole percent	0–0.02 %
11	C4H10 i-Butane mole percent	0–1.5 %*1
12	C4H10 n-Butane mole percent	0–1.5 %*1
13	C5H12 i-Pentane mole percent	0–0.5 %*2
14	C5H12 n-Pentane mole percent	0–0.5 %*2
15	C6H14 n-Hexane mole percent	0–0.1 %
16	C7H16 n-Heptane mole percent	0–0.05 %
17	C8H18 n-Octane mole percent	0–0.05 %
18	C9H20 n-Nonane mole percent	0–0.05 %
19	C10H22 n-Decane mole percent	0–0.05 %
20	He Helium mole percent	0–0.5 %
21	Ar Argon	0–0.02 %

*1: ISOBUTANE (C4H10) and n-BUTANE (C4H10)'s sum cannot exceed 6 %.
*2: ISOPENTANE (C5H12) and n-Pentane (C5H12)'s sum cannot exceed 4 %.

(5) ISO12213 physical properties



F0808E.ai

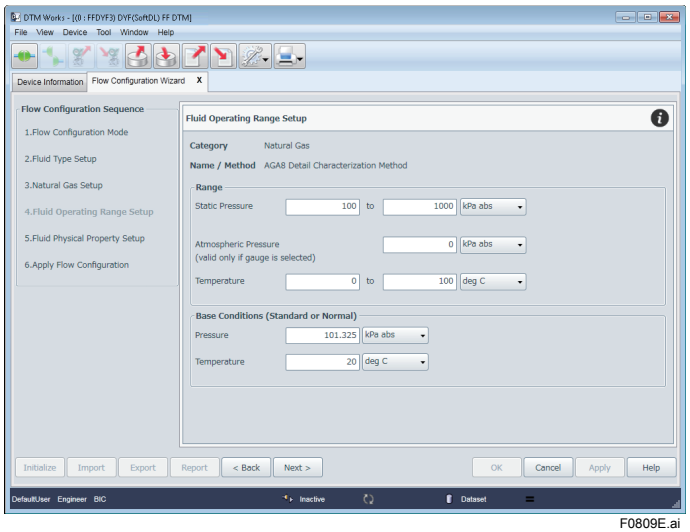
Figure 8.8 Natural Gas Setup screen (5)

Table 8.7 Input & Valid Range (Expanded Range)

Contents		Expanded Range	Remarks
Mandatory	Relative Density	0.55–0.9	at 0°C, 1.01325 bar abs
	CARBON DIOXIDE (CO2) mole	0–30 %	
	Volumetric Gross Heating Value	20–48 MJ/m3	at 25°C, 1.01325 bar abs
Optional	HYDROGEN (H2) mole	0–10 %	

8.1.4 Fluid Operating Range Setup

(1) Gas



F0809E.ai

Figure 8.9 Fluid Operating Range Setup screen (1)

In the Range section, enter the operating ranges and then select units.

You can select unit from the following options:

- Pressure: kPa abs, bar abs, psi abs, kPa gauge, bar gauge, psi gauge
- Atmospheric Pressure: kPa abs, bar abs, psi abs
- Temperature: degC, degF, K

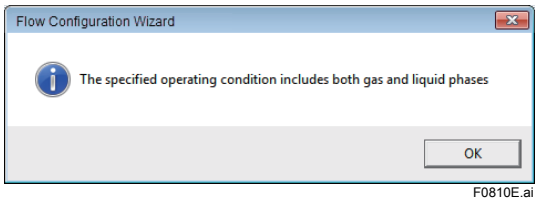
In the Base Condition section, enter the base condition values and then select unit.

You can select unit from the following options:

- Pressure unit: kPa abs, bar abs, psi abs
- Temperature unit: degC, degF, K

NOTE

- After clicking the [Next] button, if the following message appears “The specified operating condition includes both gas and liquid phases” , it means that the operating condition is near the acceptable limits for liquid and gas.

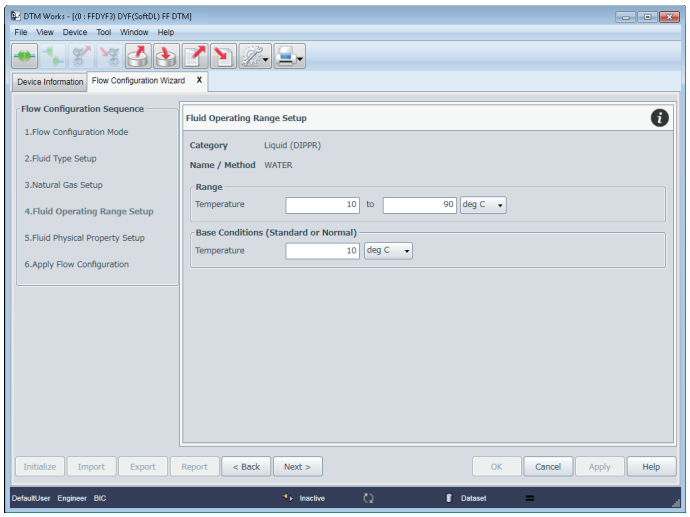


F0810E.ai

Figure 8.10 Warning message

- Please confirm the density value on the following page (Fluid Physical Property Setup page) and continue configuration.
- If the temperature and pressure range input on the “Fluid Operating Range Setup” is too wide, there is a probability that the calculation error of density is big.
- These ranges are used only for the density and viscosity calculation.
- The ranges of Flowmeter are not changed.

(2) Liquid



F0811E.ai

Figure 8.11 Fluid Operating Range Setup screen (2)

In the Range section, enter the operating range and then select unit.

You can select unit from the following options:

- Temperature: degC, degF or K

In the Base Condition section, enter the value of base condition and then select unit.

You can select unit from the following options:

- Temperature: degC, degF or K

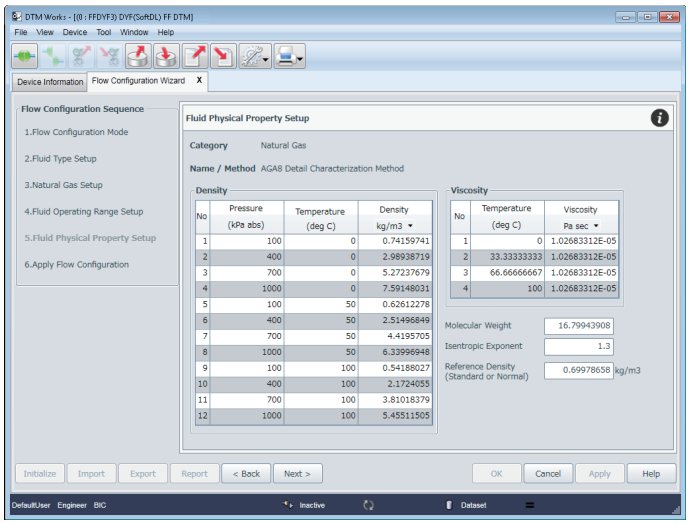


NOTE

- Please confirm the density value on the following page (Fluid Physical Property Setup page) and continue configuration.
- If the temperature range input on the “Fluid Operating Range Setup” is too wide, there is a probability that the calculation error of density is big.
- This range are used only for the density and viscosity calculation.
- The ranges of Flowmeter are not changed.

8.1.5 Fluid Physical Property Setup

(1) Gas



F0812E.ai

Figure 8.12 Fluid Physical Property Setup Screen (1)

Confirm the values of density, viscosity, molecular weight, and isentropic exponent.

You can select unit from the following options:

- Density: kg/m3 (Default), lb/ft3
- Viscosity: Pa s, lb/ft s



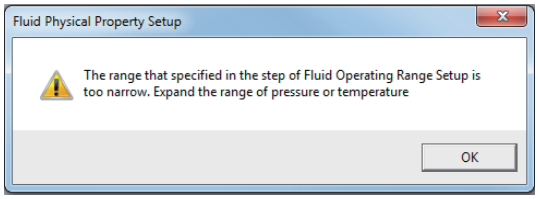
NOTE

- If you change the unit of Density from the Density drop-down list, the unit and value in the Reference Density box are also updated automatically.
- The density and viscosity value can be customized.
- The isentropic exponent value can be customized.
- The molecular weight value can be customized.
- The value is shown after entering return key.



NOTE

If the temperature and pressure range input on the “Fluid Operating Range Setup” is narrow, the following error message is displayed:
“The range that specified in the step of Fluid Operating Range Setup is too narrow. Expand the range of pressure or temperature”

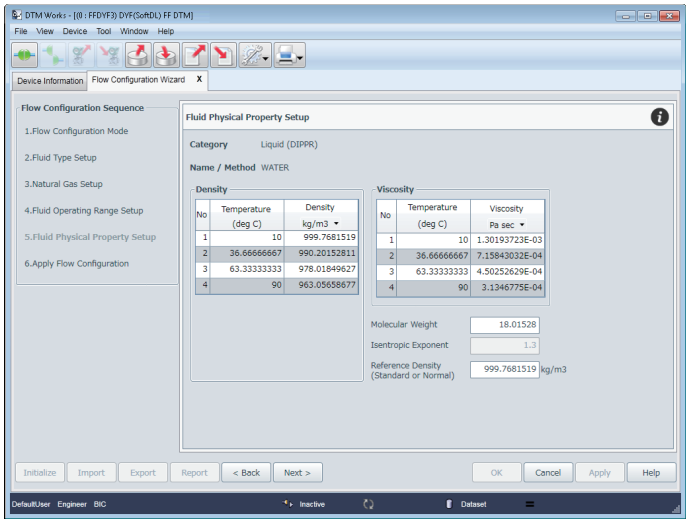


F0813E.ai

Figure 8.13 Information message for setting range

You must specify another value that is of wider range and try again.

(2) Liquid



F0814E.ai

Figure 8.14 Fluid Physical Property Setup Screen (2)

Confirm the values of density, viscosity, and molecular weight.
You can select units from the following options:

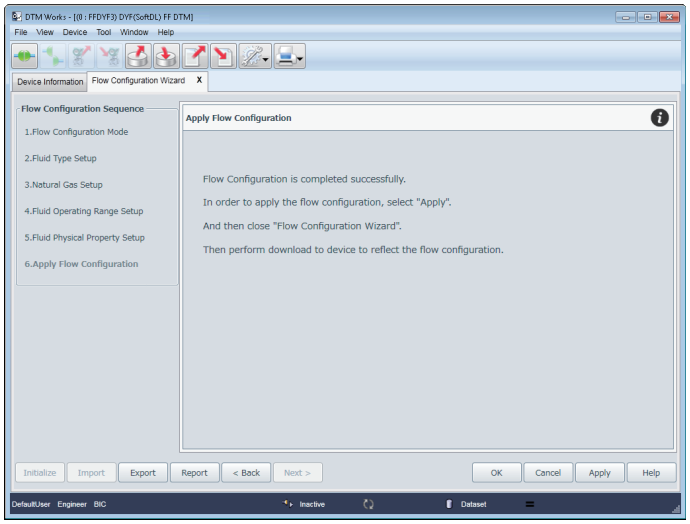
- Density: kg/m3 (Default), lb/ft3
- Viscosity: Pa s, lb/ft s



NOTE

- If you change the unit of Density from the Density drop-down list, the unit in the Reference Density box are also updated automatically.
- The density and viscosity value can be customized.
- The molecular weight value can be customized.
- The value is shown when entering return key.

8.1.6 Apply Flow Configuration



F0815E.ai

Figure 8.15 Apply Flow Configuration Screen

1. Select [Apply] to apply the flow configuration.
2. Select [OK].
2. From Device DTM, perform 'Download to device'. Refer to section 6.2.3 for the steps.

For more information on 'Download to device', please refer to Chapter 5 and section 6.1.1.

NOTE

The following table shows the "Device General Parameters" applied to "Offline Database".

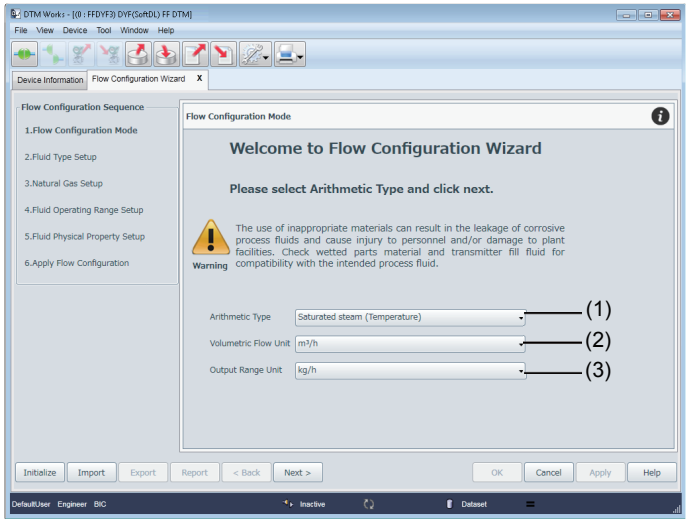
Table 8.8 "Device General Parameters" applied to "Offline Database"

	Detail Compensation Mode	
	Gas temperature pressure compensation (Detail)	**Liquid temperature compensation (Detail)**
Arithmetic Type	Applied	Applied
Bias	Applied (Always "0")	Applied (Always "0")
Gain	Applied (Always "1")	Applied (Always "1")
Bias Input 1	Applied (Always "0")	Applied (Always "0")
Gain Input 1	Applied (Always "1")	Applied (Always "1")
Bias Input 2	Applied (Always "0")	Applied (Always "0")
Gain Input 2	Applied (Always "1")	Applied (Always "1")
Output Range.Unit Index	Applied	Applied
Volumetric Flow Unit	Applied	Applied
Temperature Unit	— *1	— *1
Base Temperature	—	—
Pressure Unit	— *1	—
Base Pressure abs	—	—
Density Unit	Applied	Applied
Base Density	Applied	Applied
Deviation	—	—
First Temperature Coef.	—	—
Second Temperature Coef.	—	—

Applied : Target parameter is applied by DYFMVTool
*1: Temperature Unit and Pressure Unit in AR Block are not configured by Flow Configuration Wizard Detail Compensation Mode.
Set manually using Offline Parameter. Refer to section 8.1.1.

8.2 Flow Configuration Wizard (Steam, Simple Compensation Mode)

8.2.1 Flow Configuration Mode



F0816E.ai

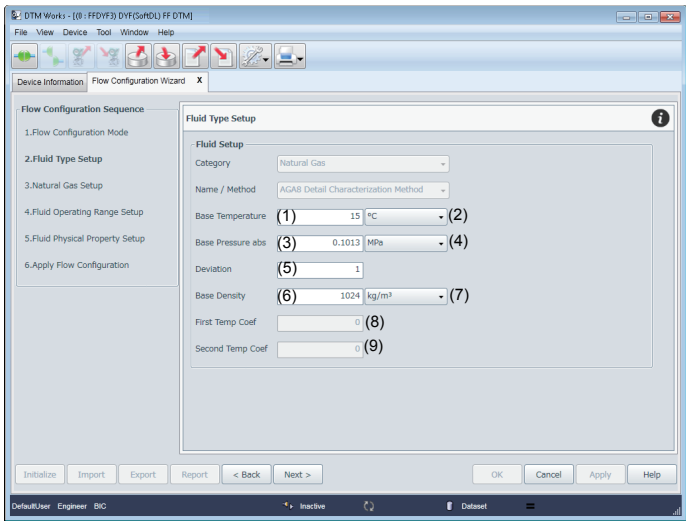
Figure 8.16 Flow Configuration Mode screen

Follow these steps in the Flow Configuration Mode screen:

1. For the Arithmetic Type, select calculation type in AR Block:
   - Steam Compensation Mode
     - Saturated steam (Temperature)
     - Saturated steam (Pressure)
     - Superheat steam
   - Simple Gas/Liquid Compensation Mode
     - Gas temperature pressure compensation
     - Liquid temperature compensation
2. For the Volumetric Flow Unit, select the Flow rate unit in AR Block input.
3. For the Output Range Unit, select the Flow rate unit in AR Block output.
4. Click [Next].

8.2.2 Fluid Type Setup

Set parameters (1) to (9) according to Arithmetic Type.



F0817E.ai

Figure 8.17 Fluid Type Setup Screen

(1), (2) Base Temperature

Set the standard temperature and select temperature unit.

(3), (4) Base Pressure abs

Set the standard abs pressure and select pressure unit.

(5) Deviation

Set the gas deviation factor.

(6), (7) Base Density

Set the standard density and select density unit.

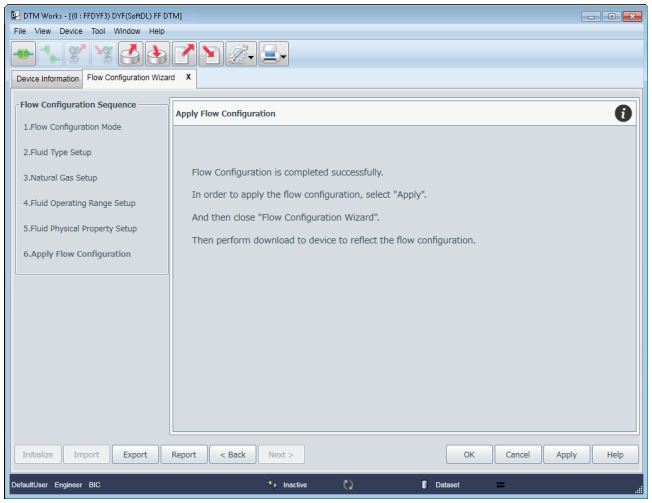
(8) First Temp. Coef.

Set first temperature factor for density compensation equation in liquid

(9) Second Temp. Coef.

Set second temperature factor for density compensation equation in liquid

8.2.3 Apply Flow Configuration



F0818E.ai

Figure 8.18 Apply Flow Configuration Screen

1. Click [Apply] to apply the flow configuration.
2. Click [OK].
3. From Device DTM, perform download to device. Refer to section 6.2.3 for the steps.

For more information about download to device, please refer to Chapter 5 and section 6.1.1.

NOTE

The following table shows the “Device General Parameters” which is applied to “Offline Database”.

Table 8.9 “Device General Parameters” applied to “Offline Database”

	Simple Compensation Mode				
	Saturated steam (Temperature)	**Saturated steam (Pressure)**	**Superheat steam**	**Gas temperature pressure compensation**	**Liquid temperature compensation**
Arithmetic Type	Applied	Applied	Applied	Applied	Applied
Bias	Applied (Always "0")	Applied (Always "0")	Applied (Always "0")	Applied (Always "0")	Applied (Always "0")
Gain	Applied (Always "1")	Applied (Always "1")	Applied (Always "1")	Applied (Always "1")	Applied (Always "1")
Bias Input 1	Applied (Always "0")	Applied (Always "0")	Applied (Always "0")	Applied (Always "0")	Applied (Always "0")
Gain Input 1	Applied (Always "1")	Applied (Always "1")	Applied (Always "1")	Applied (Always "1")	Applied (Always "1")
Bias Input 2	Applied (Always "0")	Applied (Always "0")	Applied (Always "0")	Applied (Always "0")	Applied (Always "0")
Gain Input 2	Applied (Always "1")	Applied (Always "1")	Applied (Always "1")	Applied (Always "1")	Applied (Always "1")
Output Range.Unit Index	Applied	Applied	Applied	Applied	Applied
Volumetric Flow Unit	Applied	Applied	Applied	Applied	Applied
Temperature Unit	Applied	—	Applied	Applied	Applied
Base Temperature	—	—	—	Applied	Applied
Pressure Unit	—	Applied	—	Applied	—
Base Pressure abs	—	—	—	Applied	—
Density Unit	Applied	Applied	Applied	Applied *1	Applied
Base Density	—	—	—	Applied *1	Applied
Deviation	—	—	—	Applied	—
First Temperature Coef.	—	—	—	—	Applied
Second Temperature Coef.	—	—	—	—	Applied

Applied: Target parameter is applied by DYFMVTool
*1: Not applied when output unit is Normal or Standard

8.3 How to Confirm Flow Configuration

After performing flow configuration for the device by using "Flow Configuration Wizard" and "Download to Device", execute the following procedures to confirm the configuration.

NOTE

Regarding start up procedure of digitalYEWFLO and DYFMVTool, refer to Appendix B-1.

IMPORTANT

Use function block scheduling and connection tool for DYFMVTool. After using this setting tool, finish the program before starting FlowNavigator.

The procedures differ depending on whether AR Block is used standalone or connected with other devices.

- Case1: AR Block is standalone. Refer to section 8.3.1
- Case2: AR Block is connected with other devices. Refer to section 8.3.2

Figure 8.19 shows the parameters for confirming the flow configuration.

Regarding Flow Calculation of digitalYEWFLO and DYFMVTool, refer to section 6.1.2 and the document "digitalYEWFLO Series Vortex Flowmeter FOUNDATION Fieldbus Communication Type" (IM 01F06F00-01E).

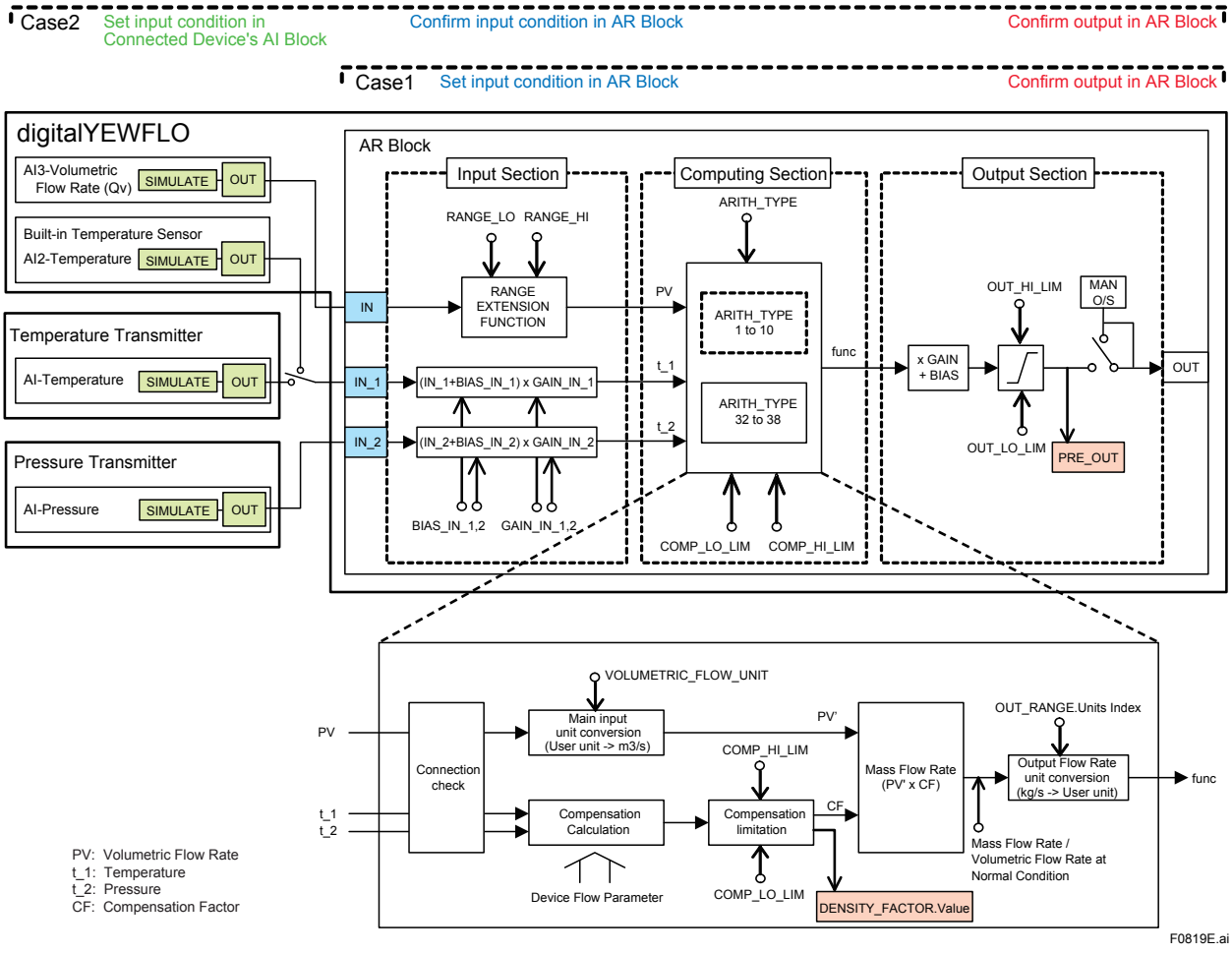


Figure 8.19 Parameters for flow configuration confirmation

8.3.1 Case1: Arithmetic Function Block is Standalone

The following procedures explain how to confirm flow configuration in case the AR block is standalone.

Step 1 Set function block scheduling information

Set the function block scheduling information to activate digitalYEWFLO AR Block.
Regarding function block scheduling, refer to Appendix B-2.

Step 2 Open Online Parameter in Device DTM

Start Device DTM to display the Online Parameter screen.
([Device] → [Online Parameter])

IMPORTANT

Turn on the alarm output of AR Block at TB: ALARM_PERFORM:
Default setting for the alarm output of AR Block is off.
[Menu(Online)] → [Diagnostics] → [(TB Block Tag)] → [Device Diagnostics] → [Diagnostics/Alerts]

Step 3 Set input conditions in AR Block

Set value to following input parameters (Refer to Figure 8.19 and Table 8.10):
"Input.Value", "Input1.Value" and "Input2.Value"
([Menu (Online)] → [Process Variables] → [(AR Block Tag)] → [Process Variables] → [Dynamic Variables])

Table 8.10 Input conditions in AR Block

Input	Device	Function Block	Parameter	
			Value	Unit
Volumetric Flow Rate	digitalYEWFLO	AR Block (Input Section) IN	Input.Value (Relative Index: 14) <Effective Mode: Auto/MAN/OOS>	Volumetric Flow Unit (Relative Index: 37)
Temperature		AR Block (Input Section) IN_1	Input 1.Value (Relative Index: 16) <Effective Mode: Auto/MAN/OOS>	Temperature Unit (Relative Index: 38)
Pressure		AR Block (Input Section) IN_2	Input 2.Value (Relative Index: 17) <Effective Mode: Auto/MAN/OOS>	Pressure Unit (Relative Index: 40)

IMPORTANT

Confirm the settings in "Volumetric Flow Unit", "Temperature Unit", and "Pressure Unit".
Regarding "Temperature Unit", "Pressure Unit", refer to section 8.1.1.
([Menu (Online)] → [Device Configuration] → [(AR Block Tag)] → [Device Configuration] → [Density Factor Parameters])

IMPORTANT

Before entering the input parameters, set the Function Block Mode in AR Block by referring to Table 8.10.

IMPORTANT

Before inputting values, set "Good_NonCascade::NonSpecific:NotLimited" status in the following parameters:
“Input.Status”, “Input1.Status” and “Input2.Status”
([Menu (Online)] → [Process Variables] → [(AR Block Tag)] → [Process Variables] → [Dynamic Variables])
*: To show "Good_NonCascade::NonSpecific:NotLimited", open the pull-down menu of each Status parameter and press the [G] key.

Step 4 Confirm output in AR Block

Confirm the value of the following output parameters (Refer to Figure 8.19 and Table 8.11):

“Density Factor.Value” and ”Pre Output.Value”.
([Menu (Online)] → [Process Variables] → [(AR Block Tag)] → [Process Variables] → [Dynamic Variables])

Table 8.11 Output in AR Block

Output	Device	Function Block	Parameter	
			Value	Unit
Density	digitalYEWFLO	AR Block (Computing Section) DENSITY_FACTOR	Density Factor.Value (Relative Index: 48) <Effective Mode: Auto/MAN/OOS>	Density Factor Unit (Relative Index: 49)
Mass Flow Rate		AR Block (Output Section) PRE_OUT	Pre Output.Value (Relative Index: 9) <Effective Mode: Auto/MAN/OOS>	Output Range.Units Index (Relative Index: 11)

IMPORTANT

Make sure that no alarming status of AR Block is shown in Device Status, and then confirm the value of output parameters. Refer to Appendix B-3 for alarm.
([Additional Functions] → [Device Status] → [Diagnostic List])

IMPORTANT

Make sure "Good_NonCascade::NonSpecific:NotLimited" status of the following parameters before confirming the values:
“Density Factor.Status” and “Pre Output.Status”
([Menu(Online] → [Process Variables] → [(AR Block Tag)] → [Process Variables] → [Dynamic Variables])

NOTE

Confirm the settings in "Density Factor Unit" and "Output Range.Unit Index".
([Menu(Online)] → [Device Configuration] → [(AR Block Tag)] → [Device Configuration] → [Density Factor Parameters])
([Menu(Online] → [Device Configuration] → [(AR Block Tag)] → [Device Configuration] → [Output Parameters])

8.3.2 Case2: AR Block is Connected with Other Devices

The procedures below are for confirming flow configuration when AR Block is connected with other devices.

Step 1 Set function block scheduling information

Set the function block scheduling information to activate digitalYEWFLO AR Block and the connected function block. Regarding function block scheduling, refer to Appendix B-2.

Step 2 Set function block connection information

Connect the function block output to digitalYEWFLO AR Block input. Regarding function block connection, refer to Appendix B-2.

Step 3 Open Online Parameter in Device DTM

Start Device DTM to display the Online Parameter screen.
([Device] → [Online Parameter])



IMPORTANT

Turn on the alarm output of AR Block at TB: ALARM_PERFORM:
Default setting for the alarm output of AR Block is off.
[Menu(Online)] → [Diagnostics] → [(TB Block Tag)] → [Device Diagnostics] → [Diagnostics/ Alerts]



IMPORTANT

Confirm the settings in "Volumetric Flow Unit", "Temperature Unit" and "Pressure Unit".
Regarding "Temperature Unit", "Pressure Unit", refer to section 8.1.1.
([Menu (Online)] → [Device Configuration] → [(AR Block Tag)] → [Device Configuration] → [Density Factor Parameters])

Step 4 Set input conditions in Connected Device's AI Block

Set the value in the following input parameters (Refer to Figure 8.19 and Table 8.12):
Input the values of volumetric flow rate, temperature, and pressure in Manual mode or Simulation mode of Connected Device's AI Block.

Table 8.12 Input conditions in Connected Device's AI Block

Input	Device	Function Block	Parameter	
			Value	Unit
Volumetric Flow Rate	digitalYEWFLO	AI3 Block OUT or AI3 Block SIMULATE	Output.Value (Relative Index: 8) <Effective Mode: Auto> or Simulate.Simulate Value (Relative Index: 9) <Effective Mode: Auto/MAN>	Output Scale.Units Index (Relative Index: 11)
Temperature	digitalYEWFLO (In case Using built-in temperature output)	AI2 Block OUT or AI2 Block SIMULATE	Output.Value (Relative Index: 8) <Effective Mode: MAN> or Simulate.Simulate Value (Relative Index: 9) <Effective Mode: Auto/MAN>	Output Scale.Units Index (Relative Index: 11)
	Temperature Transmitter (In case Using external temperature output)	AI Block OUT or AI Block SIMULATE	Output.Value (Relative Index: 8) <Effective Mode: MAN> or Simulate.Simulate Value (Relative Index: 9) <Effective Mode: Auto/MAN>	Output Scale.Units Index (Relative Index: 11)
Pressure	Pressure Transmitter	AI Block OUT or AI Block SIMULATE	Output.Value (Relative Index: 8) <Effective Mode: MAN> or Simulate.Simulate Value (Relative Index: 9) <Effective Mode: Auto/MAN>	Output Scale.Units Index (Relative Index: 11)



IMPORTANT

Before write parameter, set the Function Block Mode in AI Block according to Table 8.12

Step 5 Confirm input conditions in AR Block

Confirm that the following parameters are the same values input in <Step 4>.
“Input.Value”, “Input1.Value” and “Input2.Value”
([Menu (Online)] → [Process Variables] → [(AR Block Tag)] → [Process Variables] → [Dynamic Variables])
Refer to Table 8.10.

IMPORTANT

Set "Good" status in the following parameters before inputting values:
“Input.Status”, “Input1.Status” and “Input2.Status”
([Menu(Online)] → [Process Variables] → [(AR Block Tag)] → [Process Variables] → [Dynamic Variables])

IMPORTANT

In DYF(SoftDL) FOUNDATION fieldbus DTM, "Input.Value", "Input1.Value" and "Input2.Value" are defined as non-volatile parameters.
In Device DTM, the update time for non-volatile parameters on the Online Parameter screen is set to 300 seconds as default. Set the value of "Refreshtime for STATICs" to about 30 seconds because longer time is needed to display parameters in the default configuration.
(Device DTM menu: [Device] → [Additional functions] → [Communication])

Step 6 Confirm output in AR Block

Refer to section 8.3.1 <Step 4>

9. File Format

9.1 Configuration File

(1) FlowNavigator file

Table 9.1a Configuration File Information FCW R1

Category	File Name	Location	Flow Configuration Wizard		Description
			Import Menu	Export Menu	
Flow Parameter File	*.xmv	Desk Top (short cut) \ [UserName] \ Documents (Default)	○	○	This file consist of following parameter: - User Flow Parameters - Device Flow Parameters EJXMVTool driven on the different frame application can access the file. Compatible between both protocol, HART and FOUNDATION fieldbus.
	*.vmv		○	○	This file consist of following parameter: - User Flow Parameters - Device Flow Parameters DYFMVTool driven on the different frame application can access the file.

Table 9.1b Configuration File Information FCW R2 FCW R3

Category	File Name	Location	Flow Configuration Wizard		Description
			Import Menu	Export Menu	
Flow Parameter File	*.xmv	Desk Top (short cut) \ [UserName] \ Documents (Default)	○	○	This file consist of following parameter: - User Flow Parameters - Device Flow Parameters EJXMVTool driven on the different frame application can access the file. Compatible between both protocol, HART and FOUNDATION fieldbus.
	*.xmv2		○	○	Data in XMV2 file formats are only available for Flow Configuration Wizard(R2) Applicable for Auto Compensation Mode only. Basic Mode is not applicable.

Table 9.1c Supported File Format(XMV/XMV2)

Primary device (Only use for Auto Compensation Mode)

Primary Device	Supported File Format
Orifice	XMV, XMV2
Nozzle	XMV, XMV2
Venturi	XMV, XMV2
Multiport Averaging Pitot	XMV2
Cone meters	XMV2
User Defined Mode (Orifice, Nozzle and Venturi)	XMV, XMV2
User Defined Mode (Multiport Averaging Pitot)	XMV2
User Defined Mode (Cone meters)	XMV2

Primary device/Pipe material (Only use for Auto Compensation Mode)

Primary Device/Pipe Material	Supported File Format
304 Stainless Steel	XMV, XMV2
316 Stainless Steel	XMV, XMV2
Carbon Steel	XMV, XMV2
Hastelloy C	XMV, XMV2
Monel	XMV, XMV2
User defined material	XMV2

(2) Frame Application project file (.dns file for FieldMate)

In the project file, project information specific to each frame application is saved in addition to the Device DTM and FlowNavigator parameters shown in below. Only that frame application can use the file.

- User Flow Parameters
- Device Flow Parameters
- Device General Parameters



NOTE

For more information on the dns file, refer to sections 3.4.1, 4.5.4, and 6.1.1.

9.2 Other Files

The following table describes the other files that are created by FlowNavigator R2.01 or later.

Table 9.2 Other files

Category	File Name	Location	Flow Configuration Wizard		Automatically Created	Description
			Import Menu	Export Menu		
Report File	*.csv	<ProgramData>\ Yokogawa\DTMs\FlowNavigator\ Reports *2	—	○	—	User Flow Parameters and Device General Parameters in CSV file format.
Report File	*.tsv	<ProgramData>\ Yokogawa\DTMs\FlowNavigator\ Reports *2				User Flow Parameters and Device General Parameters in TSV file format.
Obtain Flow Coefficient Log File	EJXMVTool HART: FlowCoeff.log (FlowCoeff1.log (Backup)) *1	<ProgramData>\ Yokogawa\DTMs\FlowNavigator\ Logs\	—	—	○	Data log of ObtainFlowCoeff. Process Value (DP, SP, ET) Flow Coefficient (Flow, Density, Viscosity, Gas Expansion Factor, Discharge Coefficient, Reynolds No.)
	EJXMVTool FOUNDATION fieldbus: FlowCoeffFF.log (FlowCoeffFF1.log (Backup)) *1					
Physical Property Error Log File	EJXMVTool HART: EJXMVTool.log (EJXMVTool1.log (Backup)) *1	<ProgramData>\ Yokogawa\DTMs\FlowNavigator\ Logs\	—	—	○	Physical property Error Log File
	EJXMVTool FOUNDATION fieldbus: EJXMVToolFF.log (EJXMVToolFF1.log (Backup)) *1					
	DYFMVTool FOUNDATION fieldbus: DYFMVToolFF.log (DYFMVToolFF1. log (Backup)) *1					

<SystemDrive>: the drive where the Operating System is installed.
<ProgramData>: a folder under the <SystemDrive> (e.g. C:\ProgramData)
*1: The maximum size of the log file is 1 Mbyte per file.
If it exceeds its maximum size, it will be copied to a backup file.
*2: This is the default location that FlowNavigator will show for user to save the report files. However, user can select another location.



NOTE

The format and contents of these files are the same with the files in the existing FlowNavigator in FDT 1.2 DTMs.

10. Other Information

10.1 Error Message

The error message is shown in both pop up message and error log file (EJXMVTool.log/DYFMV-Tool.log).

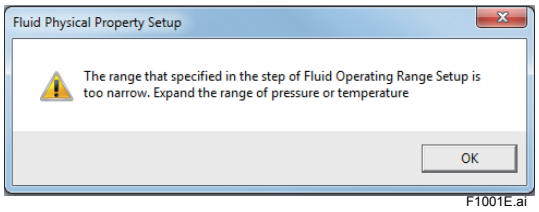


Figure 10.1 Error message example

In case of Physical Property error, code and sub code is shown in error log file (EJXMVTool.log/DYFMVTool.log).

Table 10.1 Error message

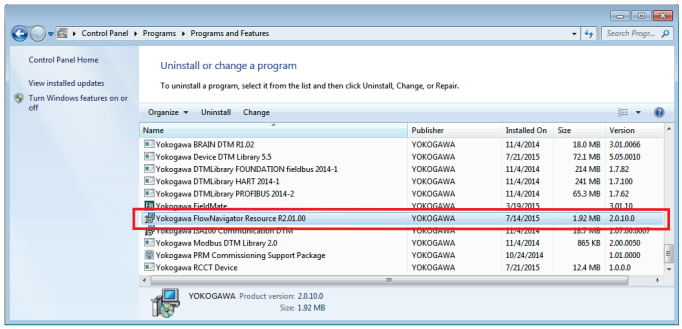
Code	Sub code	Information Message	Explanation	Recovery
600	8	[Display] The range that is specified in the step of Fluid Operating Range Setup is too narrow. Expand the range of Pressure or Temperature. [Log file] Physical Calc lib Error - ERR_RANK	Rank deficient	The temperature or pressure range, which was set by the user at the Fluid Operating Range Setup is too narrow. Try another range value.

Appendix A. FlowNavigator Uninstallation and Data Migration

A-1 Uninstallation of FlowNavigator

To uninstall FlowNavigator R2.01 or earlier, follow these steps:

1. Go to the “Programs and Features” screen of the Windows Control Panel.
2. Select [Yokogawa FlowNavigator Resource <Release>].



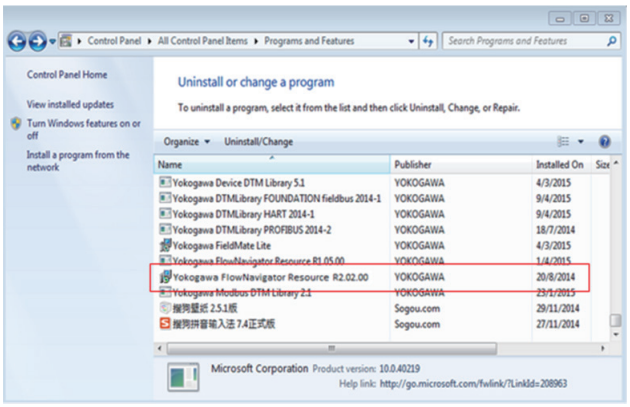
FA0101E.ai

Figure A1.1 Uninstall FlowNavigator Resource

3. Click [Uninstall/Change].
   A window appears to guide you through the uninstallation process.

To uninstall FlowNavigator R2.02, follow these steps:

1. Go to the “Programs and Features” screen of the Windows Control Panel.
2. Select [Yokogawa FlowNavigator Resource <Release>].



FA0102E.ai

Figure A1.2 Uninstall FlowNavigator Resource

3. Click [Uninstall/Change].
   A window appears to guide you through the uninstallation process.”

NOTE

During uninstallation, the program folders of EJXMVTool and DYFMVTool are deleted.
When FlowNavigator R2.01 or later is uninstalled, any existing FlowNavigator versions such as R1.05 or earlier are not uninstalled from the computer. License registry will also be removed.

A-2 Data Migration

Old data formats of xmv and vmv files from FlowNavigator R1.05 are compatible with the FlowNavigator R2.01 or later. However, the dns files that are saved in FlowNavigator R1.05 and earlier cannot be loaded to FlowNavigator R2.01 or later.

Follow these steps to migrate data from FlowNavigator R1.05 to R2.01 or later:

In FlowNavigator R1, follow these steps:

1. Load the .dns file that you want to migrate to FlowNavigator R2.01 or later.
2. Run FlowNavigator R1.
3. Export the xmv or vmv file.
4. Click [Apply].
5. Perform a “Download to Device”.

In FlowNavigator R2, follow these steps:

6. Perform an “Upload from Device”.
7. Run FlowNavigator R2 and then import the xmv or vmv file.
8. Click [Apply].
9. Perform a “Download to Device”.
10. Perform a “Save to file”. Save the imported data to a new dns file.

The following figure shows the steps that are involved when performing data migration.

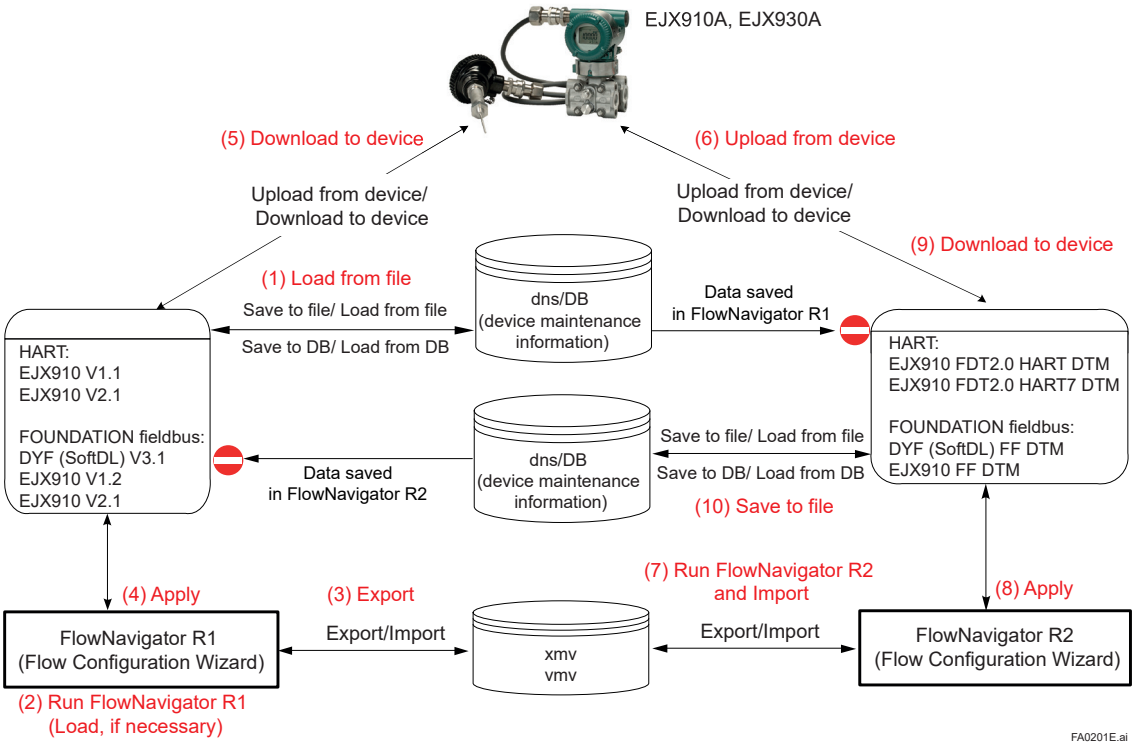


Figure A2.1 Data Migration

NOTE

For more information on data flow management, refer to section 6.1.1.

Appendix B. Device Information

B-1 Start up Procedure of Device and FlowNavigator

(1) digitalYEWFLO and DYFMVTool

The flow chart below shows the start-up procedure of digitalYEWFLO and DYFMVTool.

Set digitalYEWFLO FOUNDATION fieldbus according to the chart and then proceed to "DYFMVTool -Flow Configuration-" and "DYFMVTool -Confirm Flow Configuration-".

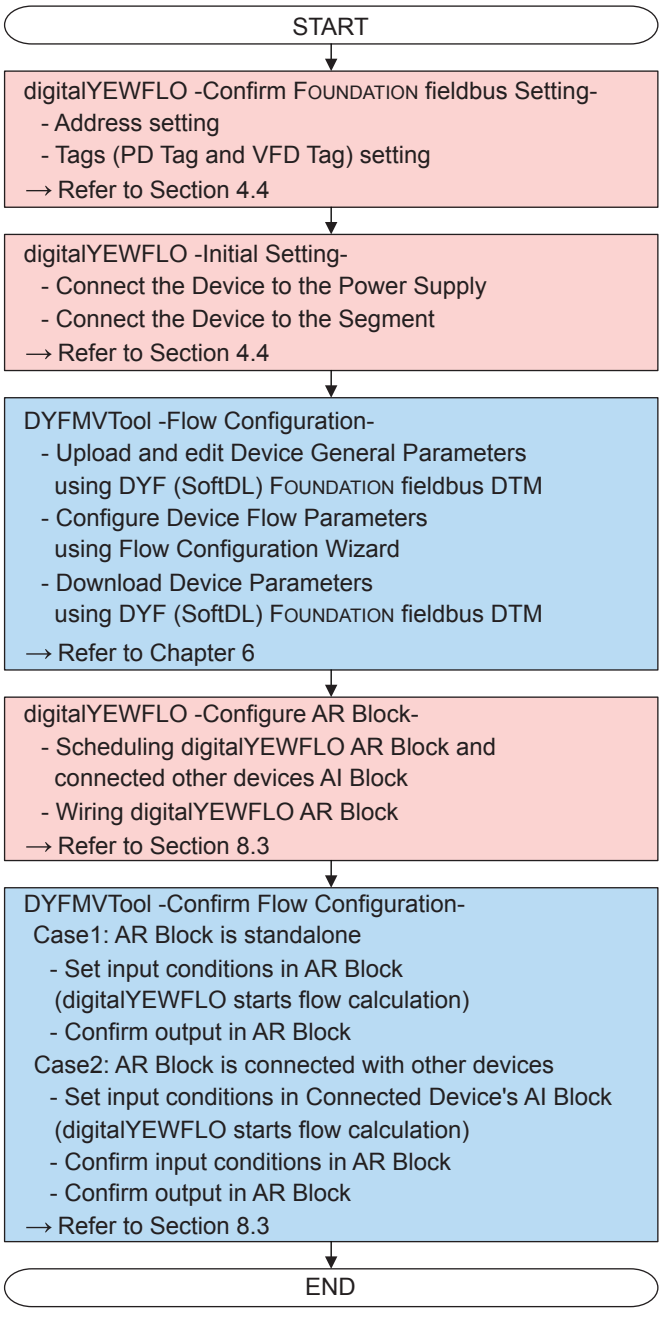


Figure B1.1 Start up Procedure of digitalYEWFLO and DYFMVTool

B-2 How to Configure digitalYEWFLO AR Block

This section explains how to set the function block scheduling and connection information with the following device as an example.

In this example, NI-FBUS Configurator 3.1 is used as a setting tool.

Table B2.1 Object device (Case 1: AR Block is standalone)

	Value	Device	Function Block	Input to AR Block	Output from AR Block	Factory setting of scheduling information
(1)	Mass Flow Rate	digitalYEWFLO	AR Block	—	○	—

Table B2.2 Object device (Case 2: AR Block is connected with other devices)

	Value	Device	Function Block	Input to AR Block	Output from AR Block	Factory setting of scheduling information
(1)	Volumetric Flow Rate (Qv)	digitalYEWFLO	AI3 Block	—	○	—
(2)	Temperature	Temperature Transmitter (Yokogawa YTA320)	AI1 Block	—	○	○
(3)	Pressure	Pressure Transmitter (Yokogawa EJX510A)	AI1 Block	—	○	○
(4)	Mass Flow Rate	digitalYEWFLO	AR Block	—	○	—

Step 1 Confirm the installation status of the device DD.

To set the device by using NI-FBUS Configurator, the device DD must be successfully installed in the following folder.

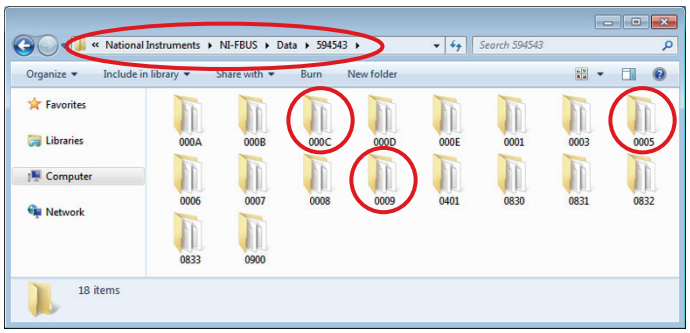
“<WinInstDrive>:\Program Files\National Instruments\NI-FBUS\Data\594543”

(<WinInstDrive>: Windows installed drive)
(The folder name “594543” indicates that the manufacturer is Yokogawa Electric Corporation.)

The DD files are saved for each model in the folder. Confirm that the latest DD files (FileName: AABB.ffo, AABB.sym*) are installed for each device.

(*: AA = “Device Revision”, BB = “DD Revision”, For example: 0301.ffo and 0301.sym)

- digitalYEWFLO: Folder name “0009”
- YTA320: Folder name “0005”
- EJX910A: Folder name “000C”



FB0201E.ai

Figure B2.1 Confirmation of DD installation

NOTE

To obtain an appropriate DD file, download and install from FieldComm Group website.
https://www.fieldcommgroup.org/registered-products

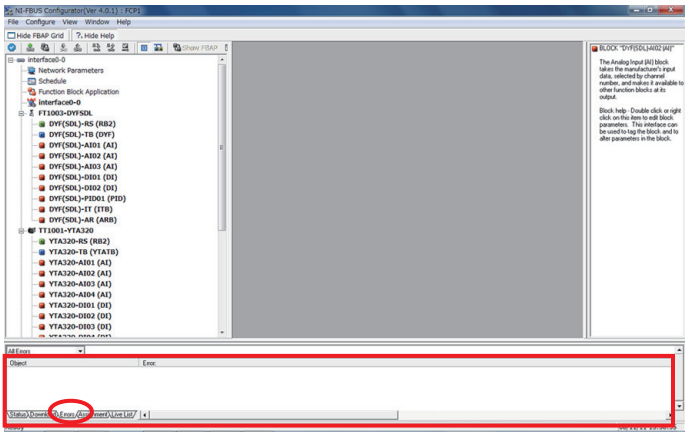
Step 2 Start NI-FBUS Configurator

Start NI-FBUS Configurator.

[All programs] → [National Instruments] → [NI-FBUS] → [NI-FBUS Configurator]

Wait for a while to load device information.

After loading the information, click the Error tab and confirm there is no error information.



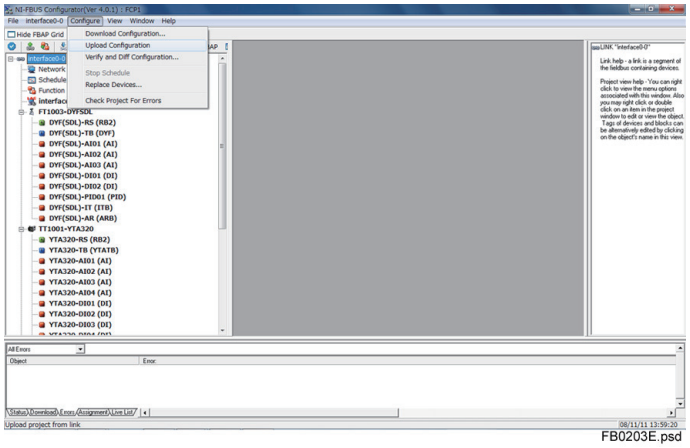
FB0202E.ai

Figure B2.2 After starting NI-FBUS Configurator

Step 3 Upload function block scheduling and connection information

Follow the procedures below to load the function block scheduling and connection information from the segment where the device exists. The setting information appears on the "Function Block Application" screen after loading.

<Menu: [Configure] → [Upload Configuration]>



FB0203E.psd

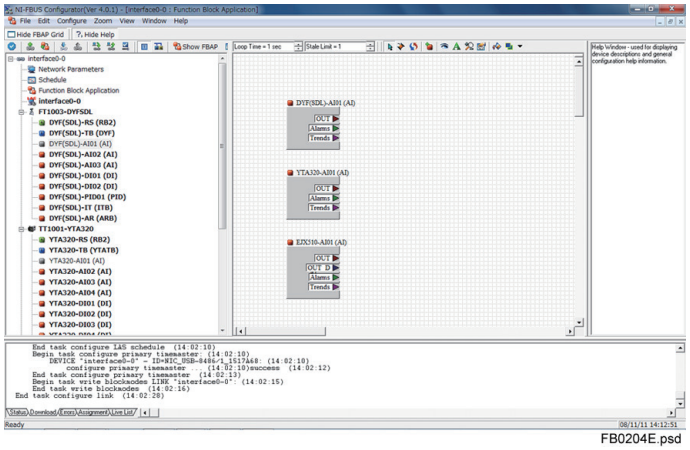
Figure B2.3 Before “Upload Configuration”

CAUTION

"Upload Configuration" must be executed before setting the function block scheduling and connection information.
Without up-loading, the setting information in the device is overwritten.

NOTE

When any block has scheduling information set at shipment, it appears on the “Function Block Application” screen. Refer to Table B2.1, B2.2.



FB0204E.psd

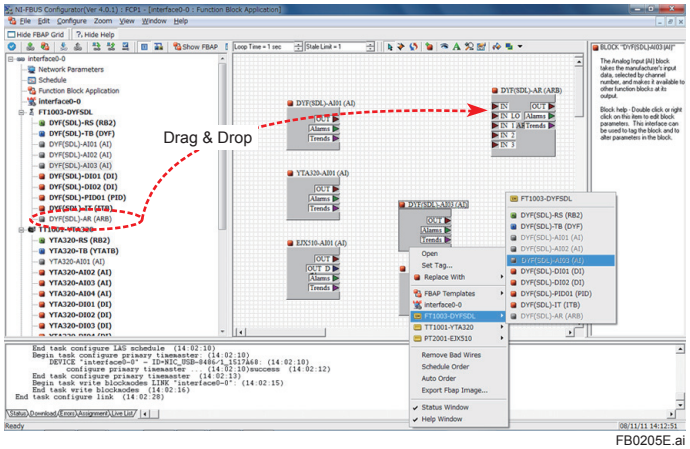
Figure B2.4 After “Upload Configuration”

Step 4 Set function block scheduling information

Arrange any function block shown in Table B2.1 or Table B2.2 on the "Function Block Application" screen.

IMPORTANT

In “Case 2: AR Block is connected with other devices”, arrange digitalYEWFLO AR Block at the end.
Otherwise, digitalYEWFLO will not carry out the flow calculation correctly.

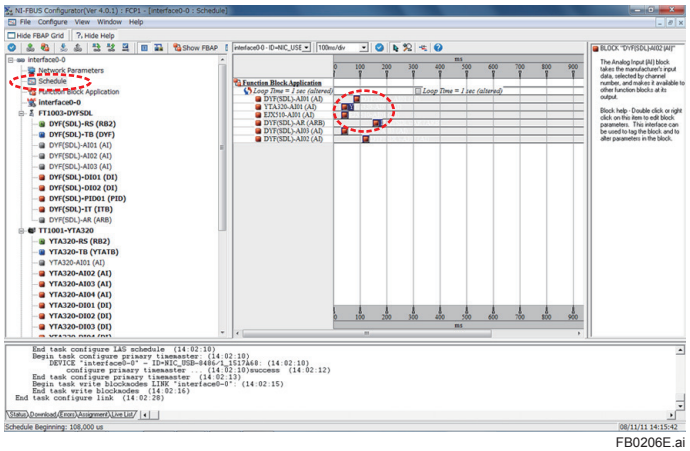


FB0205E.ai

Figure B2.5 How to configure the function block scheduling

Double-click "Schedule" at the left of the screen to confirm the execution sequence of arranged function blocks.

The figure below describes the sequence in “Case 2: AR Block is connected with other devices”.



FB0206E.ai

Figure B2.6 After double clicking “Schedule”

Proceed to < Step 6 > if there is no need to set the function block connection.

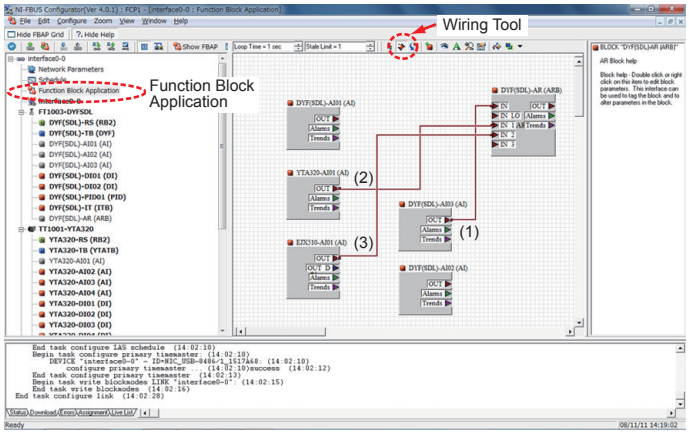
Step 5 Set function block connection information

Double-click "Function Block Application" on the left of the screen to display "Function Block Application".

Click "Wiring Tool" on the menu bar to connect the blocks as shown in Table B2.3.

Table B2.3 Function blocks for wiring

	Value	Device	Function Block		Device	Function Block
(1)	Volumetric Flow Rate (Qv)	digitalYEWFLO	AI3 Block OUT	➔	digitalYEWFLO	AR Block IN
(2)	Temperature	Temperature Transmitter (Yokogawa YTA320)	AI1 Block OUT	➔	digitalYEWFLO	AR Block IN_1
(3)	Pressure	Pressure Transmitter (Yokogawa EJX510A)	AI1 Block OUT	➔	digitalYEWFLO	AR Block IN_2



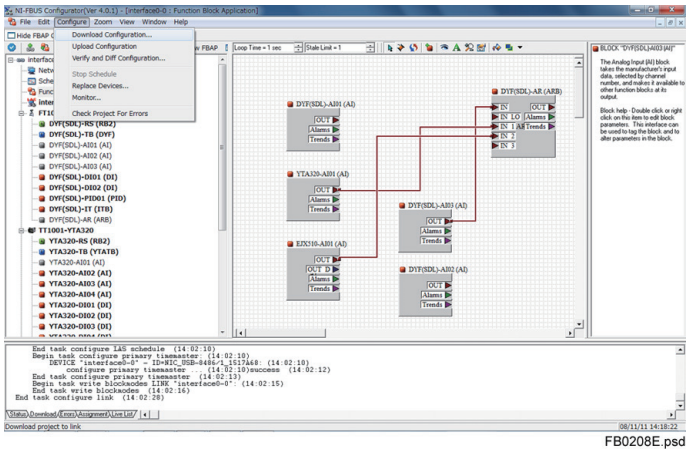
FB0207E.ai

Figure B2.7 How to configure the function block connection

Step 6 Download function block scheduling and connection information

Write the function block scheduling and connection information in the segment where the device exists after completing the setting.

<Menu: [Configure] → [Download Configuration]>

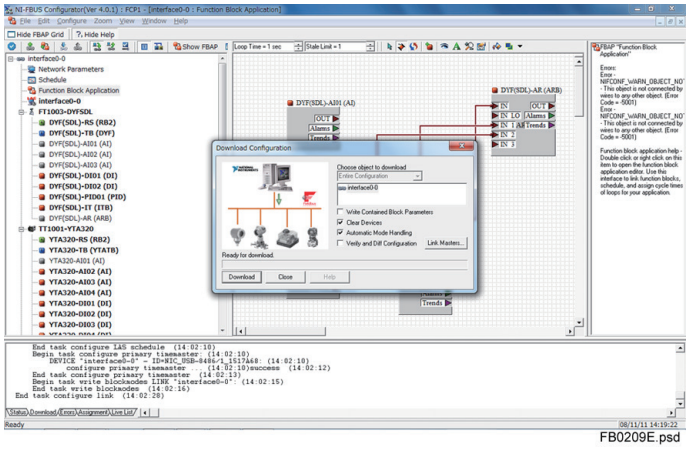


FB0208E.psd

Figure B2.8 Before "Download Configuration"

Click "Download Configuration" to show the "Download Configuration" pop-up window.

Then set options ("Clear Devices" and "Automatic Mode Handling" are recommended) and click "Download".

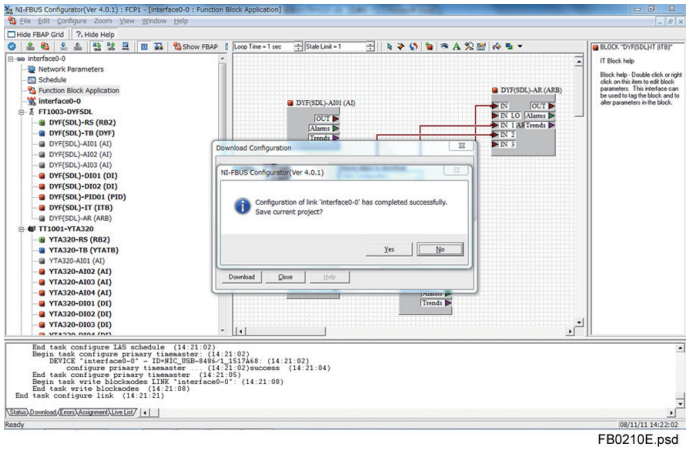


FB0209E.psd

Figure B2.9 “Download Configuration” pop up window

After this, the function block scheduling and connection information is written in the segment where the device exists.

After writing, a message window appears to ask whether to save the project setup information. Save it if necessary.



FB0210E.psd

Figure B2.10 Message for saving the current project

B-3 How to Check digitalYEWFLO AR Block Alarm

Confirm AR Block functions correctly by following the procedures below.

Step 1 Open Online Parameter in Device DTM

Start Device DTM to display the Online Parameter screen.

([Device] → [Online Parameter])

IMPORTANT

Turn on the alarm output of AR Block at TB: ALARM_PERFORM:
Default setting for the alarm output of AR Block is off.
[Menu(Online)] → [Diagnostics] → [(TB Block Tag)] → [Device Diagnostics] → [Diagnostics/Alerts]

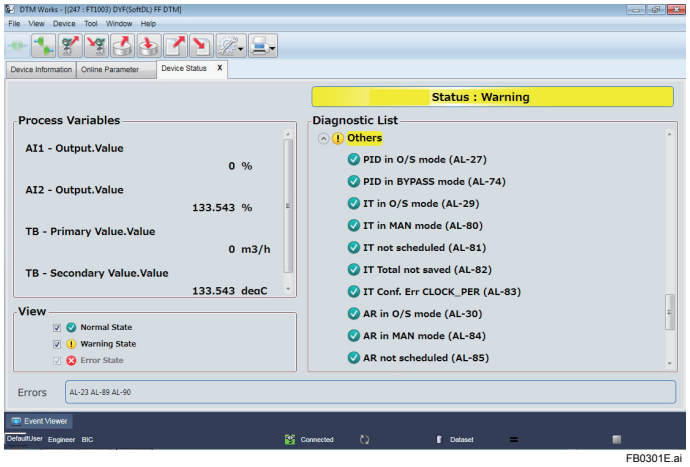
Step 2 Open the Device Status screen

Display the alarm of AR Block in Diagnostic List of the Device Status screen.

([Device] → [Additional Functions] → [Device Status])

NOTE

The alarm information on AR Block appears under “Others” of Diagnostic List.



FB0301E.ai

Figure B3.1 Device Status screen

Step 3 Check the alarm in AR Block

Confirm that the following alarms are not displayed in Diagnostic List of the Device Status screen.

If any alarm is displayed for AR Block, take the appropriate measure by referring to the table below.

Table B3.1 Alarm list of AR Block for flow configuration

Alarm No.	Alarm Label	Counter Measure
AL-85	AR Not Scheduled	Make a schedule of AR Block
AL-86	AR Range Conf. Err	Change the value as AR Range High (AR.RANGE_HI) is larger than AR Range Low (AR.RANGE_LO)
AL-87	AR Temp. IN Over Range	This case is out of specification. Refer to IM01F06F00-01E or Check the engineering setting or AR Temperature Unit (AR.AR_TEMPERATURE_UNIT)
AL-88	AR Press IN Over Range	This case is out of specification. Refer to IM01F06F00-01E or Check the engineering setting or AR Pressure Unit (AR.AR_PRESSURE_UNIT) and AR Bias Input2 (AR.BIAS_IN_2)
AL-89	AR Flow IN NotConnected	Connect the volumetric flow data into AR Input (AR.IN)
AL-90	AR Temp. IN NotConnected	Connect the temperature data into AR Input1 (AR.IN_1)
AL-91	AR Press IN NotConnected	Connect the pressure data into AR Input2 (AR.IN_2)
AL-92	AR Comp. Coef. Conf. Err	Execute “Flow Configuration Wizard” again and download to the device.
AL-93	AR Output Unit Conf. Err	Refer to IM 01F06F00-01E or Check the AR Output Range.Units Index (AR.OUT_RANGE.Unit Index) and AR Arithmetic Type (AR.ARITH_TYPE)



NOTE

As for device alarms other than AR Block, refer to Instruction Manual "digitalYEWFLO Series Vortex Flowmeter FOUNDATION Fieldbus Communication Type" (IM 01F06F00-01E).

Appendix C. HART Communication Device Information

C-1 Installing Software for Communication Device

The USB FieldMate modem driver is installed automatically.

Check that “Silicon Laboratories CP210x USB to UART Bridge (Driver Removal) or Windows Driver Package Silicon Laboratories (silabenm) Ports (10/18/2013 6.6.1.0)” is installed using Add or Remove Programs (Windows XP) or Programs and Features (Windows Vista) in the Control Panel.

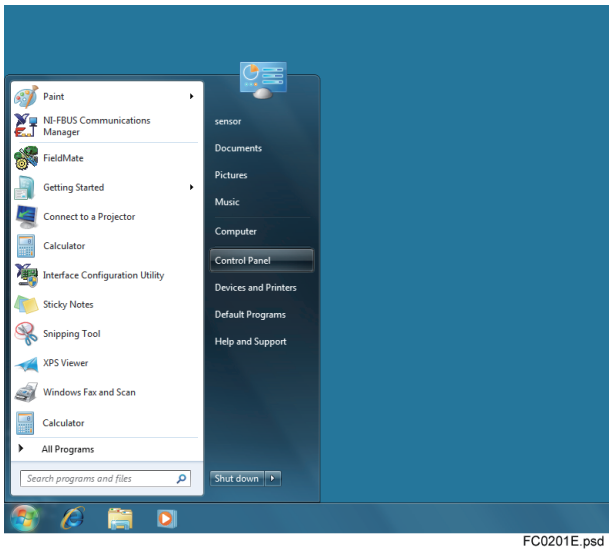
If the installation is not performed correctly, double-click the following file.

“<FieldMate CD-ROM>:\USB_Modem_Driver\FMModemInstaller.exe”

C-2 How to Confirm COM Port

Find out which COM port the modem will be connected to.

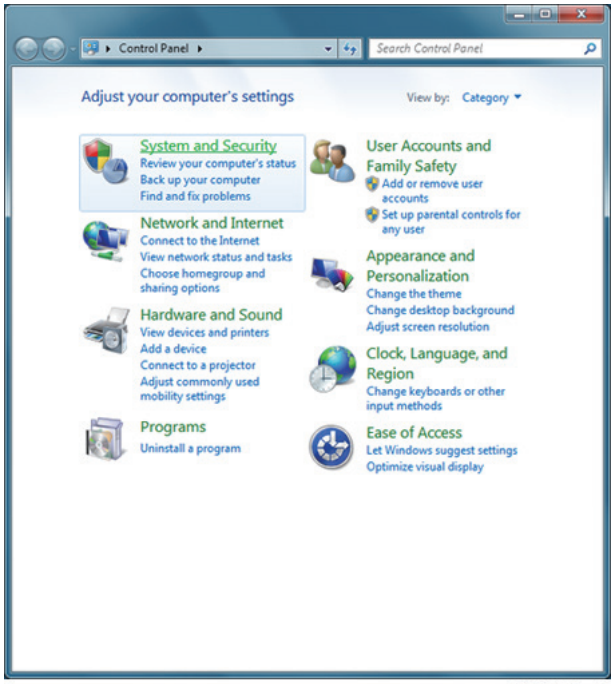
Click [Control Panel]



FC0201E.psd

Figure C2.1 Start Menu

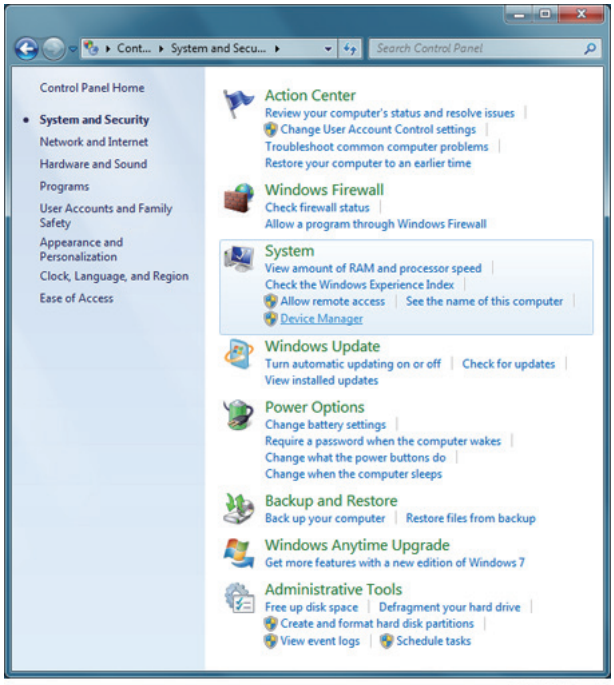
Click [System and Security]



FC0202aE.psd

Figure C2.2a Control Panel

Click [System] → [Device Manager]



FC0202bE.psd

Figure C2.2b System and Security

Click [Ports (COM & LPT)] to find out the port number of “Silicon Laboratories CP210x USB to UART Bridge (Driver Removal) or Windows Driver Package Silicon Laboratories (silabenm) Ports (10/18/2013 6.6.1.0)”.

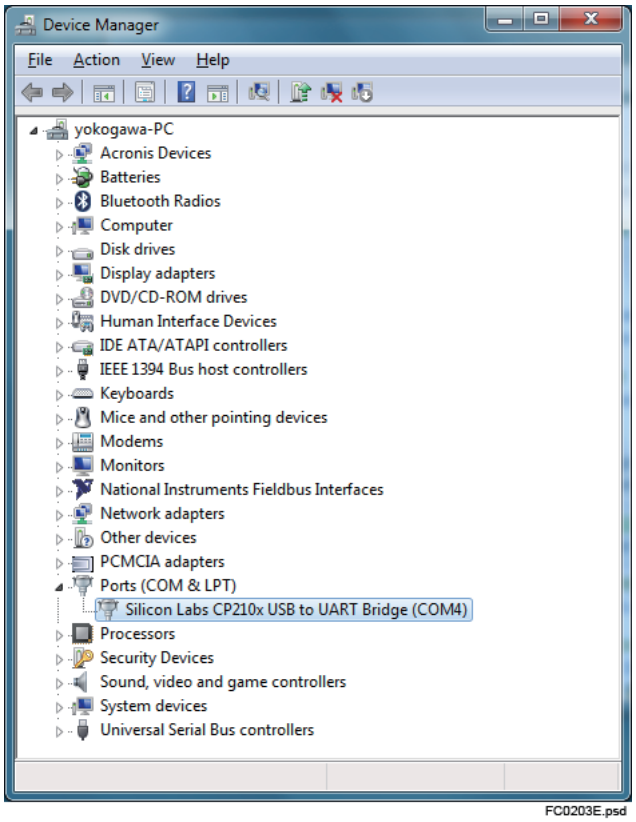


Figure C2.3 COM port number

Appendix D. FOUNDATION fieldbus Communication Device Information

D-1 Installing Software for Communication Device

D-1-1 NI-FBUS Interface

Install software according to following procedure.

Step 1 **Install the NI-FBUS Communications Manager**

Step 2 **Restart PC**

D-2 Setting Software for Communication Device

D-2-1 NI-FBUS Interface

Define the port of NI-FBUS card as follows using “Interface Configuration Utility”.

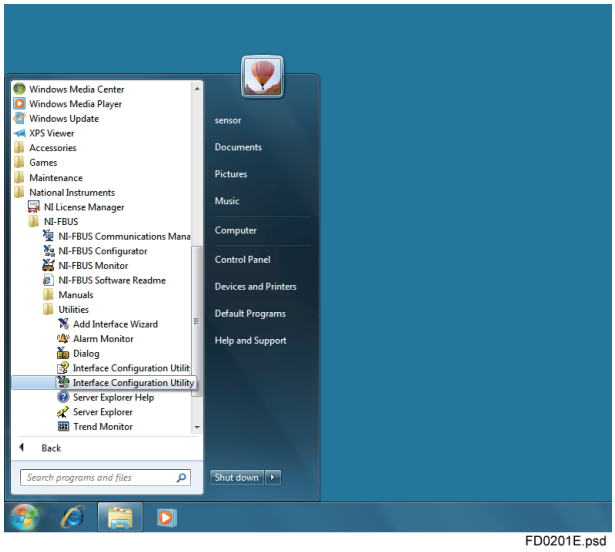
IMPORTANT

Start the program as an Administrator or user with an Administrative authority.

(1) Activate the program

On PC, click the following order and activate the program

Click start button → [National Instruments] → [NI-FBUS] → [Utilities] → [Interface Configuration Utility].



FD0201E.psd

Figure D2.1 Starting NI-FBUS Utility

(2) Select the port

On the screen shown up, select “Port0" and press “Edit”.

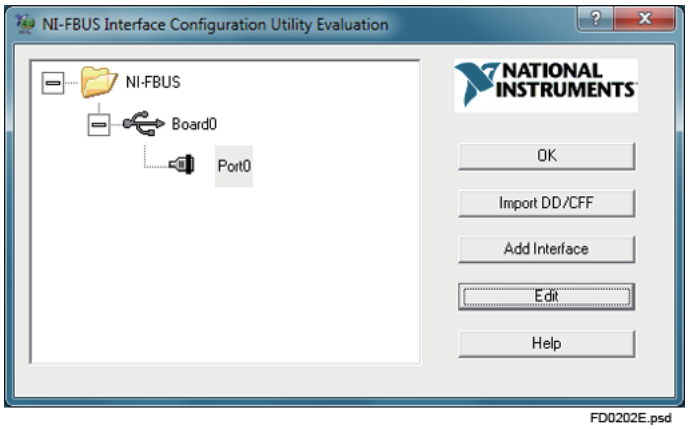


Figure D2.2 NI-FBUS Interface Config Screen

(3) Setting

After that, on the screen shown up, select the items indicated as below.



Figure D2.3 NI-FBUS H1 Port Properties

Device Address: Select [Visitor]

Device Type: Select [Link Master Device]

Usage: Select [NI-FBUS]

CAUTION

When connect the NI-FBUS card to the Fieldbus segment when other Link Master may exist, be sure to set the above beforehand.
If not, setting may cause disturbance of control.

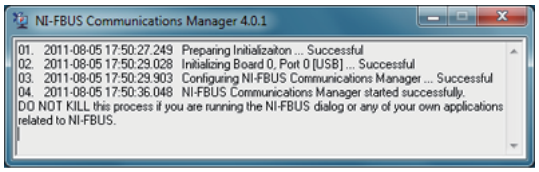
D-3 Starting Software for Communication Device

D-3-1 NI-FBUS Interface

Please Start the NI-FBUS Communications Manager as follows.

Click start button → [National Instruments] → [NI-FBUS] →

[NI-FBUS Communications Manager].



FD0301E.psd

Figure D3.1 Starting NI-FBUS Communication Manager

Revision Information

- Title : FSA120
  Flow Configuration Software
- Manual No. : IM 01C25R51-01E

Edition	Date	Page	Revised Item
1st	Sep. 2006	—	New publication
2nd	Jan. 2007	—	Full-fledged revision due to the release of HART DTM and change of the product architecture.
3rd	Aug. 2007	5-1 to 5-4 6-6 6-13 6-19 6-23 6-27 and 6-28	5. Correct the note number for 'Download to device'. 6.1.2 Add Note regarding updating on Offline parameters screen in EJX910 FF DTM. 6.2.2 Add Note for xmv file made in FSA120 R.102.00 or before. 6.3.3 Correct the method name for steam. 6.3.4 Correct the mole valid range. 6.3.5 Delete the gauge pressure unit from the reference pressure unit.
4th	Feb. 2008	— 3-1 to 3-4 6-6 6-7 to 6-9 7-2	Replace screens due to the release of FieldMate R1.03. 3. Change the operating environment and components. 6.1.2 Delete Note regarding updating on Online parameters screen in EJX910 FF DTM. 6.1.3 Add the procedure in FF parameters downloading. 7.2 Change the location where the OFC log file for FF is saved to.
5th	Dec. 2008	—	Change the operating environment of software and hardware due the release of FieldMate R2.
6th	June 2010	—	Full-fledged revision because of adding the DYFMVTool program for digitalYEWFLO Vortex Flowmeter and change of the product name to "FieldMate FlowNavigator".
7th	Sep. 2011	—	Correspond to Windows 7 and HART protocol revision 7.
8th	Aug. 2012	2-1, 3-3 3-2 D-2, D-3 —	Add the USB FieldMate Modem as option Revise the Software Operating Environment Change the Setting Correct errors
9th	Oct. 2014	— 2-1 3-1 3-2 4-1 4-3 C-1, C-3	Correspond to FieldMate R3. (Replace Figures 4.27, 4.28, 4.29, 4.31c, 4.31d, 4.31e, 4.32a, 4.32b and 6.12) 2.1 Delete "Basic or Advance". 3.1.1 Replace Windows Vista by Windows 8.1. 3.1.2 Replace Windows Vista by Windows 8.1. Revise the revision of Fieldbus related software. 4.1.1 Delete Windows Vista. 4.2.3 Modify procedures. C-1, C-2 Modify driver name.
10th	Nov. 2015	— 2-1 2-3, 4-1 3-1 4-1 4-6 7-1, 8-1 A-1	Correspond to FlowNavigator R2.01 • FieldMate is no longer bundled with FSA120 package Added PRM as FDT frame application • Instruction Manual can be downloaded from web • Operation Environment and Supported Devices are revised • FlowNavigator installation is revised FlowNavigator uninstallation is moved to Appendix A • Information about Initial Setting is referred to other user's manuals • EJXMVTool and DYFMVTool information and screenshots are updated • Appendix A: FSA120 Uninstallation is replaced with Appendix A: FlowNavigator Uninstallation and Data Migration/ Backup

Edition	Date	Page	Revised Item
11th	Jan. 2018	—	Correspond to FlowNavigator R2.02.
		2-2 to 2-5	2.1.1, 2.1.2, 2.2 and 2.3 Update the software version of related software. Add 2.1.3.
		2-9	Add description and note for Table 2.1.
		3-5	Add Table 3.1.2.
		4-2	4.2.4 Update the version. Update the figure 4.1.
		4-4	4.2.6 Update the figure 4.4.
		5-1 and 5-6	5.1 Add (E).
		6-1	6.1 Revise NOTE.
		6-19 to 6-22	6.3.2 and 6.3.3 Revise NOTE. Add figure 6.16c and 6.17c.
		—	Chapter 7. Add information for R2.02.
		9-1 to 9-2	9.1 Add Table 9.1b and 9.1c.
		A-1	A-1 Add information for R2.02.
12th	Oct. 2022	—	Correspond to FlowNavigator R2.03
		2-2, 2-3, 2-4	2.1.1, 2.1.2, 2.2, 2.3 Update supported software versions.
		2-8, 2-9	Add FCW R3 information in table 2.1, 2.2, 2.3 and 2.4.
		2-11	Fix the install information in table 2.6
		3-1, 3-2	3.1, 3.2, 3.3 Update functional specification.
		3-5	Add FCW R3 information in Table 3.1.2.
		4-1	Fix the online manual URL.
		4-6	4.5.1 Add target OS information.
		4-7	Remove the figure 4.6a.
		4-12	4.5.2.1 Add information of device revision 12 device in table 4.1.
		5-2 to 5-6	Add information of upload or download user flow parameters to (A), (B), (C), (D) setting flow charts.
		6-3	Update the figure 6.2 of data flow chart.
		6-22, 6-23	Add FCW R3 information to figure 6.16c and 6.17c.
		7-1	Add FCW R3 information to table 7.1.
		7-2, 7-6	7.1.1.2, 7.1.2.2 Add FCW R3 information
		7-35	7.3 Add “IMPORTANT” information of external temperature input and simulation.
		—	Remove ® and ™ marks.