General Specifications

FlowNavigator® R2.02

FSA120
Flow Configuration Software

GS 01C25R51-01EN

1. Features

The FSA120 (FlowNavigator) is the software package which offers various functions to help users to easily configure the mass flow parameters of device.

The FSA120 includes following two programs:

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

FSA120 employs FDT/DTM technology and works on the FieldMate and PRM.

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, Multiport Averaging Pitot, Cone meters, user define mode
- Various flow calculation modes
  EJXMVTool: Auto Compensation Mode / Basic Mode
  DYFMVTool: Detail Compensation Mode / Steam Compensation Mode / Simple Compensation Mode
- HART and FOUNDATION fieldbus H1 are supported.

FSA120 provides following advantages to device:

- 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: Versatile field device management and configuration software tool which conforms to FDT standard.
PRM (Plant Resource Manager): On line asset management software tool for field devices and systems 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.
Remarks: For FSA120 R1.04 or later, the product name has been changed to “FieldMate FlowNavigator” from “EJXMVTool”.

2. Functional Details

Device Management

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

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

Download/upload
Downloading the flow and general parameters to the device. Uploading the data from the device to PC.

Flow Configuration Wizard

In this mode, the procedures which are required for flow configuration can be performed interactively.

(1) Auto Compensation Mode (EJXMVTool), Detail (Gas / Liquid) Compensation Mode (DYFMVTool)
Procedures to configure flow calculation by setting up a primary device and fluid physical properties in a step-by-step in dialog window.

(2) Basic Mode (EJXMVTool), Simple (Gas / Liquid) Compensation Mode (DYFMVTool), Steam Compensation Mode (DYFMVTool)
Flow operation and density compensation are performed as follows.

- With the flow factors being input manually (Basic Mode/ Simple (Gas / Liquid) Compensation Mode)
- With the flow factors inside digitalYEWFLO Vortex Flowmeter (Steam Compensation Mode)

(3) Import/export file
Import and export the user flow parameters.

(4) Report
The list of user flow parameters is exported in CSV file format.

Obtain Flow coefficient (for EJXMVTool)

The flow coefficient can be obtained from the device.
Input selection: sensor data actually measured or simulated data input by user.

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Specification of Auto Compensation Mode (EJXMVTool) and Detail Compensation Mode (DYFMVTool)

Supported primary device (for EJXMVTool)

The 27 devices or User define mode as specified in Table 1.

User Defined Mode:

Set a constant value or coefficient vs. Reynolds number to Discharge coefficient Set detail value to Gas expansion factor.

Density compensation

Following (1) and (2) methods are supported for density compensation. For unsupported fluid, data entries to configure custom physical properties are also available as shown in (3).

(1) Density compensated by physical properties

Database:

As specified in Table 2

Source:

American Institute of Chemical Engineers (AIChE®) DIPPR® Project No.801 Database: 2003 Edition

(2) Density compensated 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

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) Custom fluid density and viscosity compensation:

Numerical value can be input to configure physical properties (density, viscosity, etc.)

3. Operation Environment

The quality and operability of the FlowNavigator are certified for use with FieldMate and PRM only.

Make sure that the following software is installed on your computer.

FDT frame application that conforms to the FDT Interface Specification

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

* FDT2.0 frames support both FDT1.2 and FDT2.0.

Communication DTM

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

Function Block Scheduling and Connection Tool (for DYFMVTool) e.g. NI-FBUS Configurator*

- 4.1.1 or later for Windows 7 / 5.0 or later for Windows 8.1

* Version 14.0 or later cannot be used.

Device Files*

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

* The Device Files include Yokogawa Device DTM Library

4. Model and Suffix Codes

R2.02

Model	Suffix Codes	Descriptions
FSA120	. . . . .	Flow Configuration Software*
License	**-S**	Single PC License**
—	**1**	Always 1
—	**1**	Always 1
—	**0**	Always 0
Optional code	**/B**	USB FieldMate Modem attached

*: For FSA120 R1.03 or before, “EJX-MV configuration DTM” was used.

**: Single user on a single PC

The specification covers the obsolete option code /Y.

Models to be connected

- EJX Multivariable Transmitter
  EJX910A/EJX930A
  Protocol: HART, FOUNDATION fieldbus
- digitalYEWFLO Vortex Flowmeter
  DY-F/DYA-F
  Protocol: FOUNDATION fieldbus
  Device Type: 9, Device revision: 3 or later

Recommended Communications interface

HART:
Yokogawa USB FieldMate modem
(Parts number: F9197UF)
VIATOR® Bluetooth® Interface
(Model 010041 (MACTek®)) *

FOUNDATION fieldbus:
Softing
FFusb **
National Instruments
PCMCIA-FBUS Series 2
NI USB-8486

* : Microsoft supplied Bluetooth stack is used.
**: The package is provided complete with FieldMate driver from Softing.

Components

FSA120 includes the following items:

<FlowNavigator>
- CD-ROM: FlowNavigator
- License number sheet for FlowNavigator
- Getting started for FlowNavigator

<Modem> (Option)
- USB FieldMate modem: BRAIN/HART, with cables
  For the details, refer to GS 01R01A01-01E.

*: Compatibility
Compatibility between FieldMate, PRM and Device Files is indicated at the following URL.
https://voc.yokogawa.co.jp/PMK/

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<RELATED INSTRUMENTS AND SOFTWARE>
EJX910A Multivariable Transmitter:
GS 01C25R01-01EN
EJX930A Multivariable Transmitter:
GS 01C25R04-01EN
digitalYEWFLO Series Vortex Flowmeter:
GS 01F06A00-01EN
digitalYEWFLO Series Vortex Flowmeter FOUNDATION Fieldbus Communication Type:
GS 01F06F01-01EN
FieldMate: GS 01R01A01-01E
PRM: GS 33Y05Q10-32E

Table 1. Supported primary Devices

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]
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)	Set a constant value to Discharge coefficient. Set constant value to Gas expansion factor.
User Defined Mode (Multiport Averaging Pitot)	Set a constant value or coefficient vs. Reynolds number to Discharge coefficient. Set detail value to Gas expansion factor.
User Defined Mode (Cone meters)	Set a constant value or coefficient vs. Reynolds number to Discharge coefficient. Set detail value to Gas expansion factor.

Table 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
Chlorodiuoromethane
Chloroprene
Chlorotriuoroethylene
Cycloheptane
Cyclohexane
Cyclopentane
Cyclopentene
Cyclopropane
Dichlorodiuoromethane
Divinyl Ether
Ethane
Ethanol
Ethylamine
Ethylbenzene
Ethylene
Ethylene Glycol
Ethylene Oxide
Fluorene
Furan
Helium-4
Hydrazine
Hydrogen
Hydrogen Chloride
Hydrogen Cyanide
Hydrogen Peroxide
Hydrogen Sulde

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
Pentauoroethane
Phenol
Phosphoric Acid (*)
Propadiene
Propane
Propylene
Pyrene
Styrene
Sulfur Dioxide

Fluid name
Toluene
Trichloroethylene
Trichlorouoromethane
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-Tetrauoroethane
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.