User's Manual

FieldMate R3.01

FieldMate
NE 107 Field Diagnostics

IM 01R01A15-01EN

YOKOGAWA
Yokogawa Electric Corporation

IM 01R01A15-01EN
3rd Edition

CONTENTS

Revision Information

A Introduction

Thank you for purchasing FieldMate Versatile Device Management Wizard.
This document:

- **outlines how to operate the field diagnostic function of FieldMate (Field Diagnostics)**
- **describes the displays and menus of Field Diagnostics**

In addition to the following documents, thoroughly read the documents of field devices to be connected before starting the operation.

Title	IM No.
FieldMate Versatile Device Management Wizard	IM 01R01A01-01E
FieldMate Operational Precaution R3.01	IM 01R01A01-91E
FieldMate Versatile Device Management Wizard Getting Started	IM 01R01A04-01E
FieldMate NE 107 Field Diagnostics	IM 01R01A15-01EN

Note

- The contents of this manual are subject to change without prior notice to reflect improvements in the performance and functions of the software. Screenshots illustrated in this manual may slightly differ from what actually appears on your screen.
- Every effort has been made to ensure the accuracy of this manual. However, if you have any question or find any error, please contact your nearest Yokogawa representative.
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- Yokogawa Electric Corporation assumes no responsibility to any party for any losses or damage, directly or indirectly, caused by using the software.
- The content of this manual covers FieldMate R3.01 or later and Device Files R3.06 or later.
- The license number will not be reissued. Please keep your license number sheet in a safe place.

A-1 Symbols Used in this Manual

The symbols used in this manual have the following meanings.

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 also alerts unsafe practices.

IMPORTANT

Indicates handling of the hardware or software which may cause damage or lead to a system failure.

NOTE

Draws attention to essential information for understanding the operation and functions of the product.

A-2 Trademarks

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A-3 Terms and Conditions of the Software License

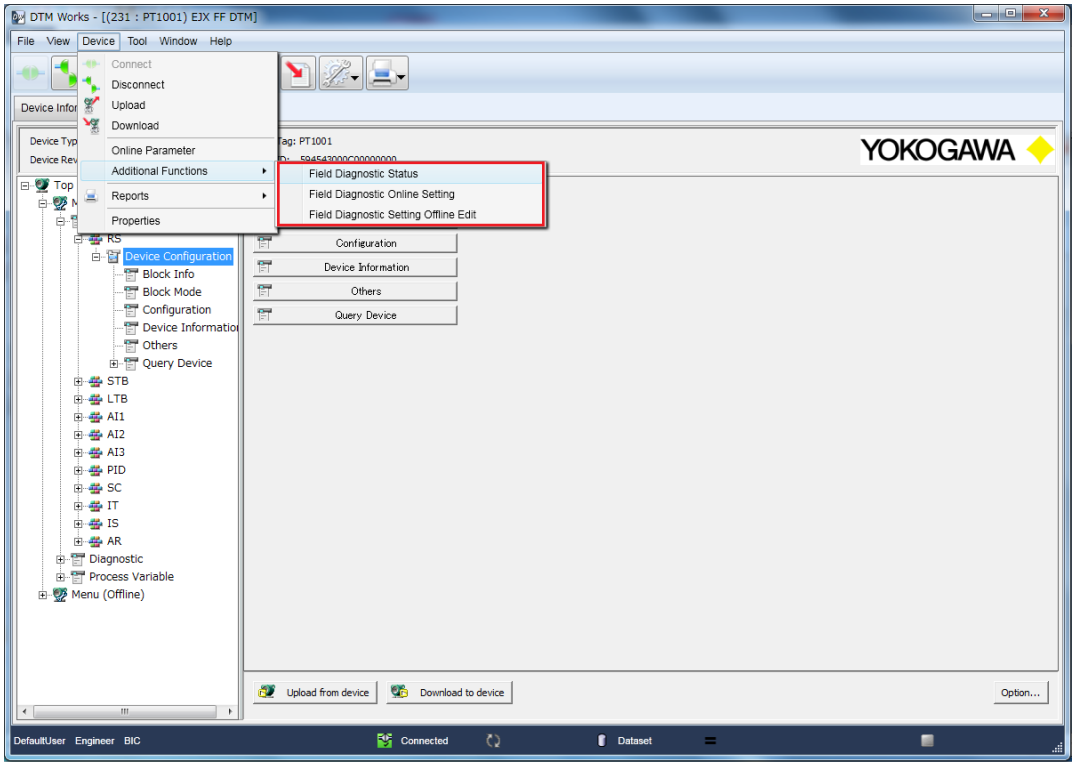
See Section A-2 “Terms and Conditions of the Software License” in FieldMate Versatile Device Management Wizard (IM 01R01A01-01E).

A-4 Starting Up Field Diagnostics from FieldMate

Follow the procedures below to start up Field Diagnostics from FieldMate.

1. Start up DTM Works for a connected device. For details, see Section E-3-2 “DTM Works” in FieldMate Versatile Device Management Wizard (IM 01R01A01-01E).
2. Select “Device” → “Additional Functions” in the toolbar menu.
3. Select a function of Field Diagnostics.
   - Field Diagnostic Status:
     Starts up the Field Diagnostic Status Display.
   - Field Diagnostic Online Setting:
     Starts up the Field Diagnostic Online Setting Display.
   - Field Diagnostic Setting Offline Edit:
     Starts up the Field Diagnostic Setting Offline Edit Display.

Figure A-4-1 Menu for Field Diagnostics in DTM Works



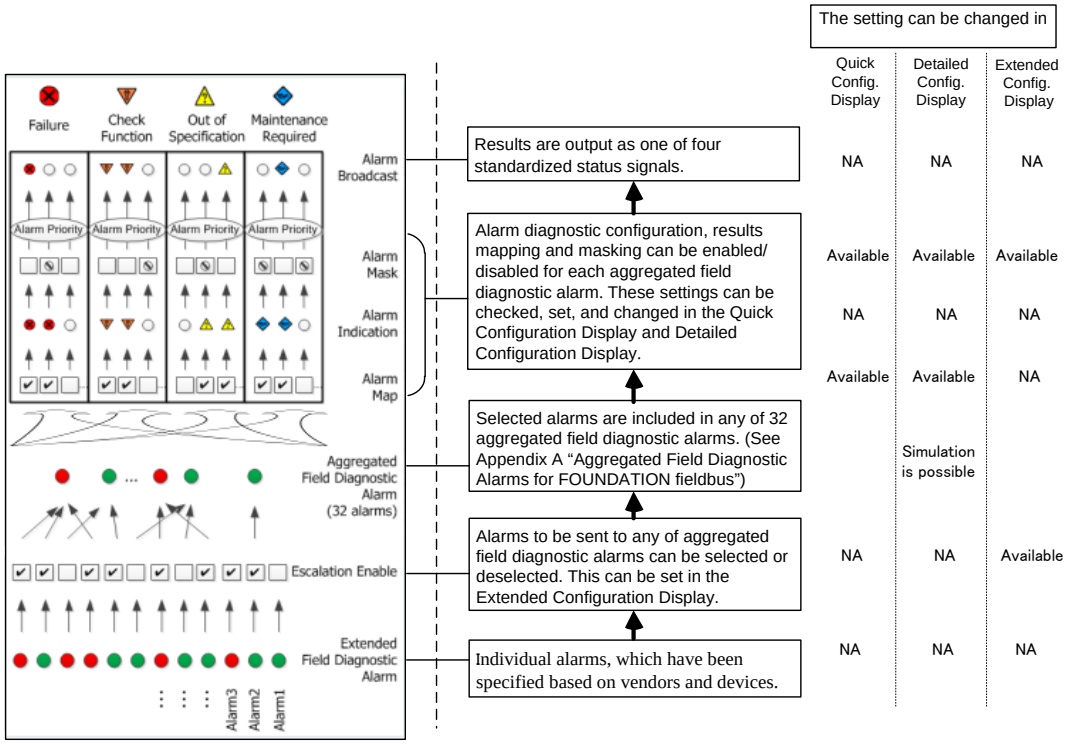
B Field Diagnostics on FOUNDATION Fieldbus Devices

B-1 Outline

B-1-1 Field Diagnostics (NE 107) on FOUNDATION Fieldbus Devices

NAMUR NE 107 is a standard for self-diagnosing field devices. It yields reliable results, categorizes alarms into four standardized statuses and outputs corresponding signals, allows users to configure diagnostics, and provides detailed information for experts.
To perform and confirm the settings of transmitters in accordance with NE 107 more easily, FieldMate incorporates a field diagnostics function, Field Diagnostics.
Figure B-1-1 shows the flow of alarm information and corresponding displays which are specified as field diagnostics (NE 107) on FOUNDATION Fieldbus devices.

Figure B-1-1 Flow of alarm information and corresponding displays



B-2 Operation

B-2-1 Field Diagnostic Status Display

Start up the Field Diagnostic Status function from the FieldMate menu as follows.

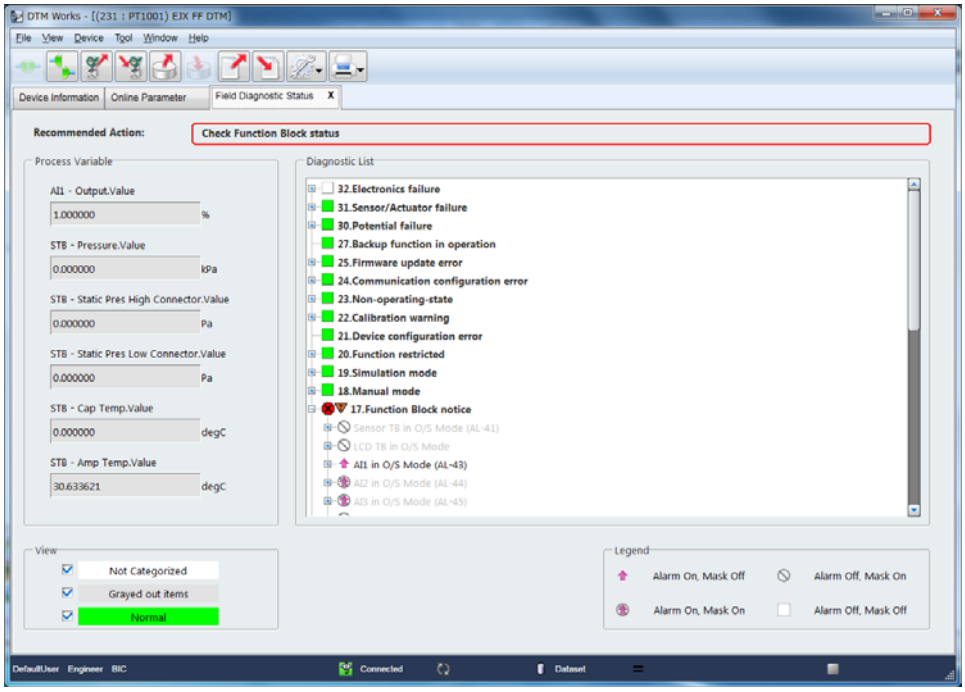
1. Select Field Diagnostic Status in the menu of Additional Functions (see Figure A-4-1). The Field Diagnostic Status Display appears.
2. Check “Not Categorized,” “Grayed out items,” or “Normal” in the View area to select alarms to be displayed in the Diagnostic List area. The selected alarms are all assigned to any of the 32 aggregated field diagnostic alarms. The first layer displays aggregated field diagnostic alarms and the second layer displays extended field diagnostic alarms, which are related to the aggregated field diagnostic alarms in the first layer. The extended field diagnostic alarms can be shown or hidden according to the setting of respective alarms or masking.

   Not Categorized: Among the alarms in the first layer, alarms which are set to “Not Categorized” are displayed or hidden (aggregated field diagnostic alarms which are set to “Not Assigned” in the Quick Configuration Display).

   Grayed out items: Among the alarms in the second layer, alarms which are masked are displayed or hidden (grayed out alarms with “Escalation Enable” being OFF in the Extended Configuration Display).

   Normal: Among the alarms in the first layer, alarms which are set to “Normal” are displayed or hidden. When there are no alarms occurring, “No Alarms” is displayed in the Diagnostic List area.

Figure B-2-1 Field Diagnostic Status Display



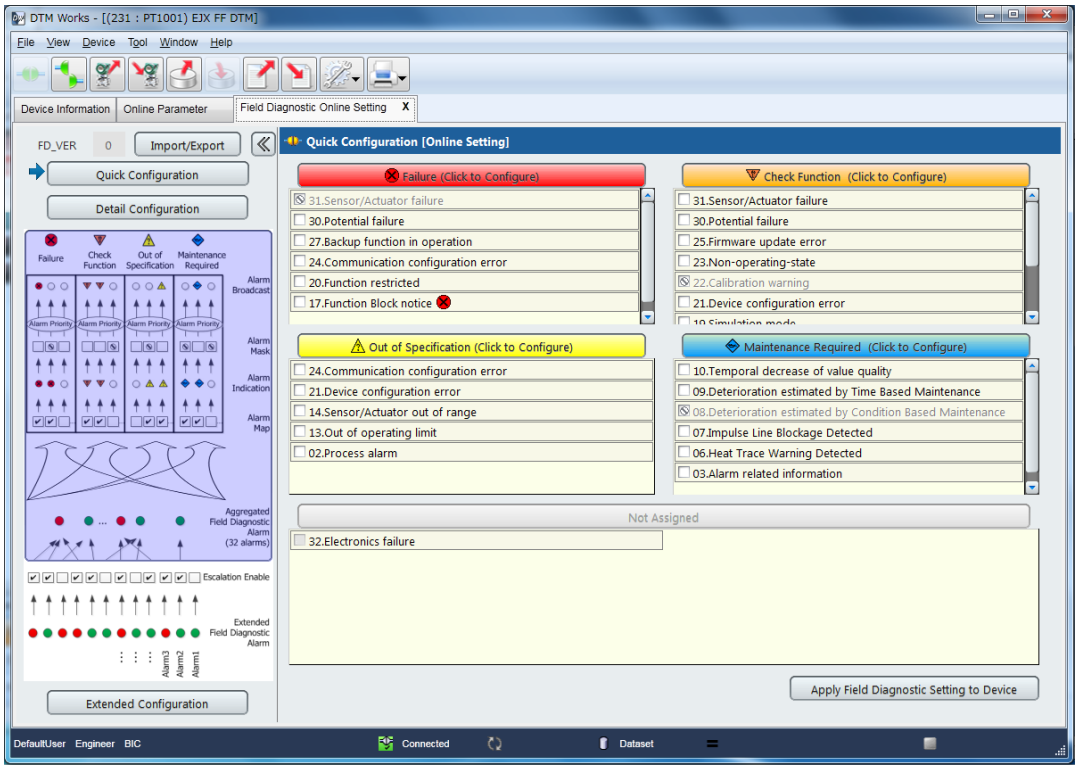
B-2-2 Field Diagnostic Online Setting Display

Start up the Field Diagnostic Online Setting function from the menu of FieldMate. Select Field Diagnostic Online Setting in the menu of Additional Functions (See Figure A-4-1). The Field Diagnostic Online Setting Display appears. Follow the procedure below.

■ Quick Configuration

1. Click the Quick Configuration button. The Quick Configuration [Online Setting] Display appears.
2. Follow the procedure below to categorize or recategorize each alarm into any of the four statuses.
   - Drag & drop: Any alarm can be moved among five alarm statuses including “Not Assigned” (e.g. from “Failure” to “Check Function”).
   - Mask ON/OFF: Check or clear the box to turn masking on or off.
   - Right-click menu: “Copy,” “Paste,” “Remove,” “Mask On,” or “Mask Off” can be set.
   - Colored title: Click any of the colored titles to show the Alarm Map and Alarm Mask setting display.

Figure B-2-2 Quick Configuration Display



■ Detail Configuration

1. Click the Detail Configuration button. The Detail Configuration Display appears.
2. For each setting (Alarm Map, Alarm Indication, Alarm Mask, and Alarm Broadcast) of the aggregated field diagnostic alarms, set the alarm status (Failure, Check Function, Out of Specification, Maintenance Required).
   - The background of alarms with the setting changed becomes magenta. Click the “Apply Field Diagnostic Setting to Device” button at the bottom right to fix the change. The background returns to the original color.

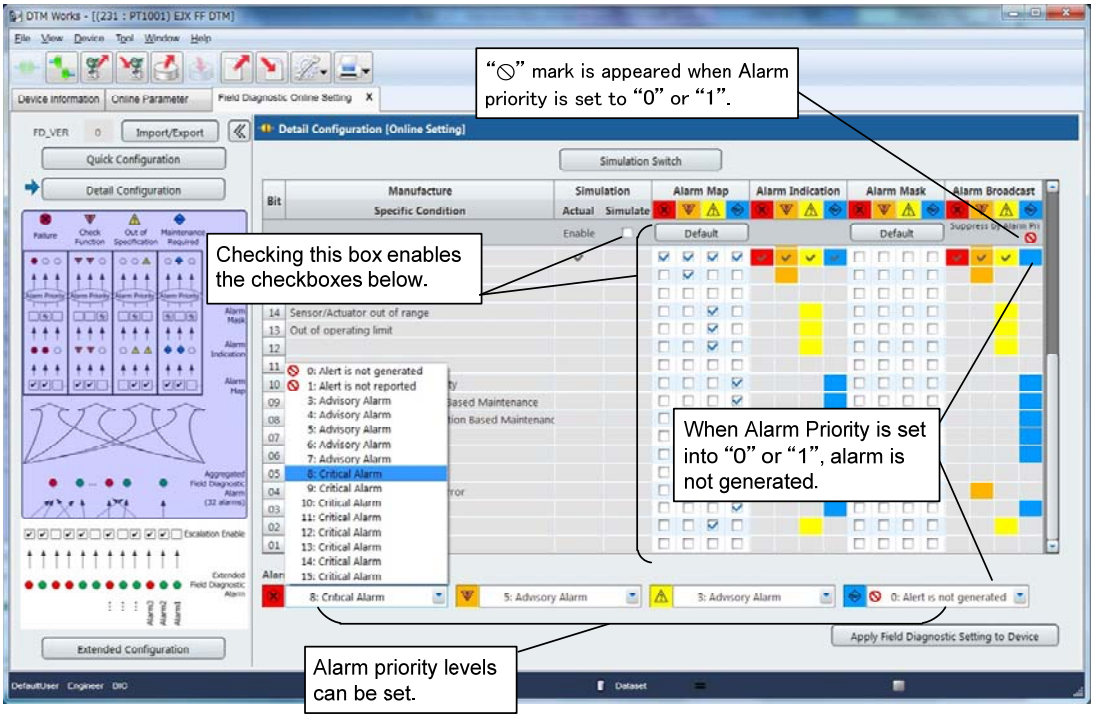
- When testing alarm processing with the Simulation function

1. Click the Simulation Switch button.
2. Enter the parameter for disabling simulation in the SIM_ENABLE_MSG (REMOTE LOOP TEST SWITCH for EJX and EJA-E), and then click the OK button.
3. Checking the box below Simulate displays checkboxes corresponding to each of the aggregated field diagnostic alarms.
   - The background of alarms with the setting changed becomes magenta. Click the “Apply Field Diagnostic Setting to Device” button at the bottom right to fix the change. The background returns to the original color.

- When configuring Alarm Priority functions

1. Alarm priority can be set for each alarm status (range: 0 to 15).
   When Alarm Priority of alarm status is set to “0” or “1”, alarms are not broadcasted and Alarm Broadcast display will be changed to inapplicable status. (“⃠” mark will be displayed under the Alarm Broadcast title)

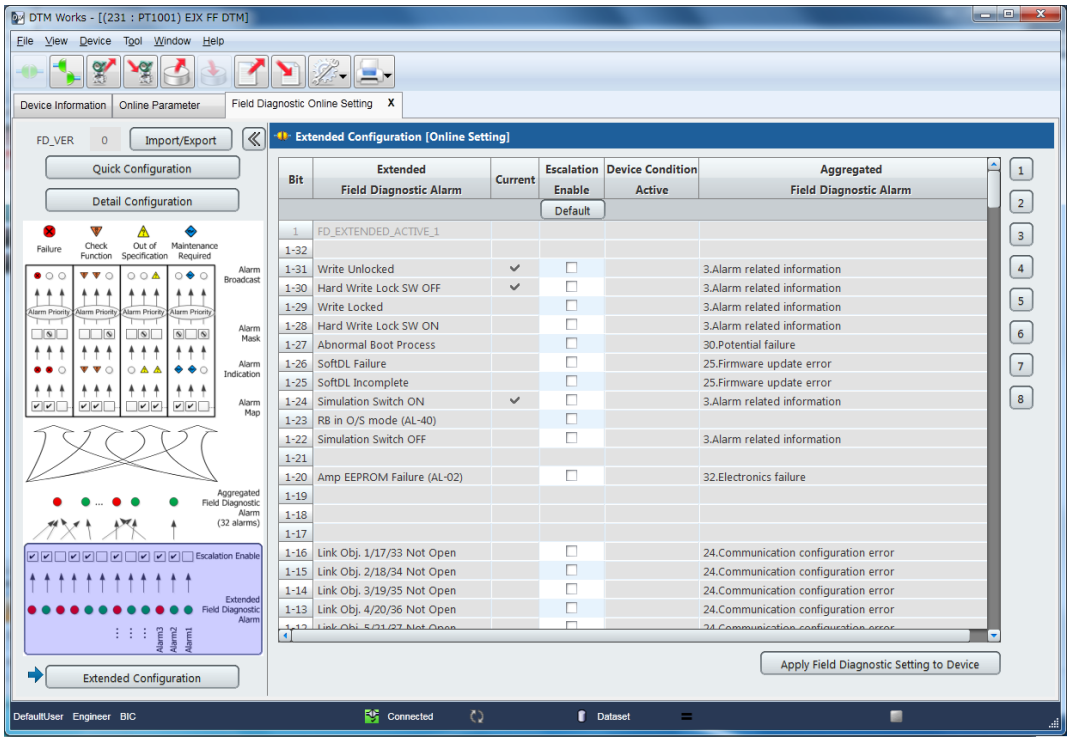
Figure B-2-3 Detail Configuration Display



■ Extended Configuration

1. Click the Extended Configuration button at the bottom left. The Extended Configuration Display appears.
2. Check the box in the Escalation Enable column for extended field diagnostic alarms to be sent to any of the aggregated field diagnostic alarms.
   - The background of alarms with the setting changed becomes magenta. Click the “Apply Field Diagnostic Setting to Device” button at the bottom right to fix the change. The background returns to the original color.

Figure B-2-4 Extended Configuration Display



B-2-3 Field Diagnostic Offline Edit Display

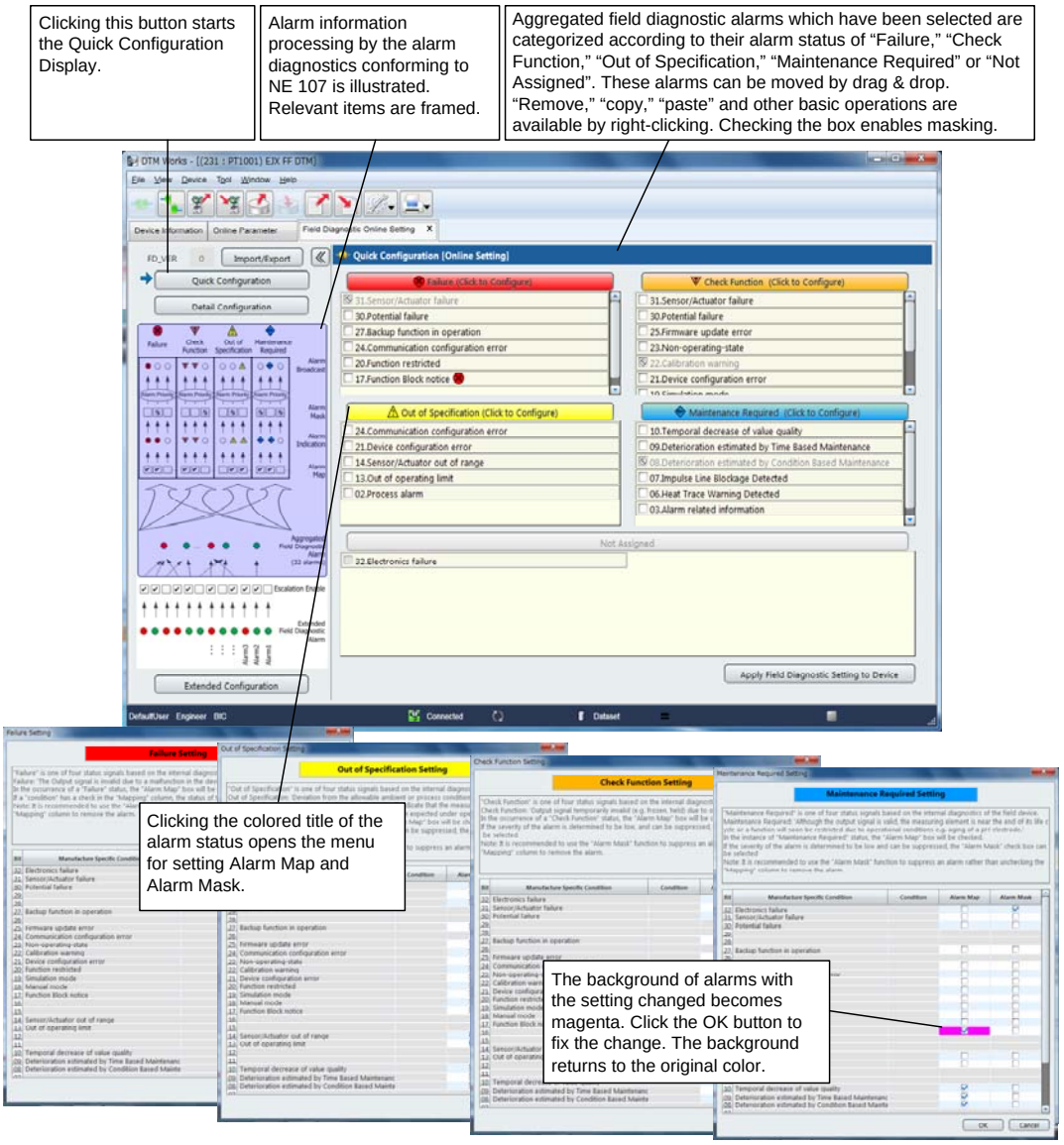
The operation of Field Diagnostic Offline Edit is the same as Field Diagnostic Online Setting. See Section “B-2-2 Field Diagnostic Online Setting Display”.

B-3 Examples of the Display and Menu

B-3-1 Quick Configuration Display

The Quick Configuration Display and its menu are shown below.

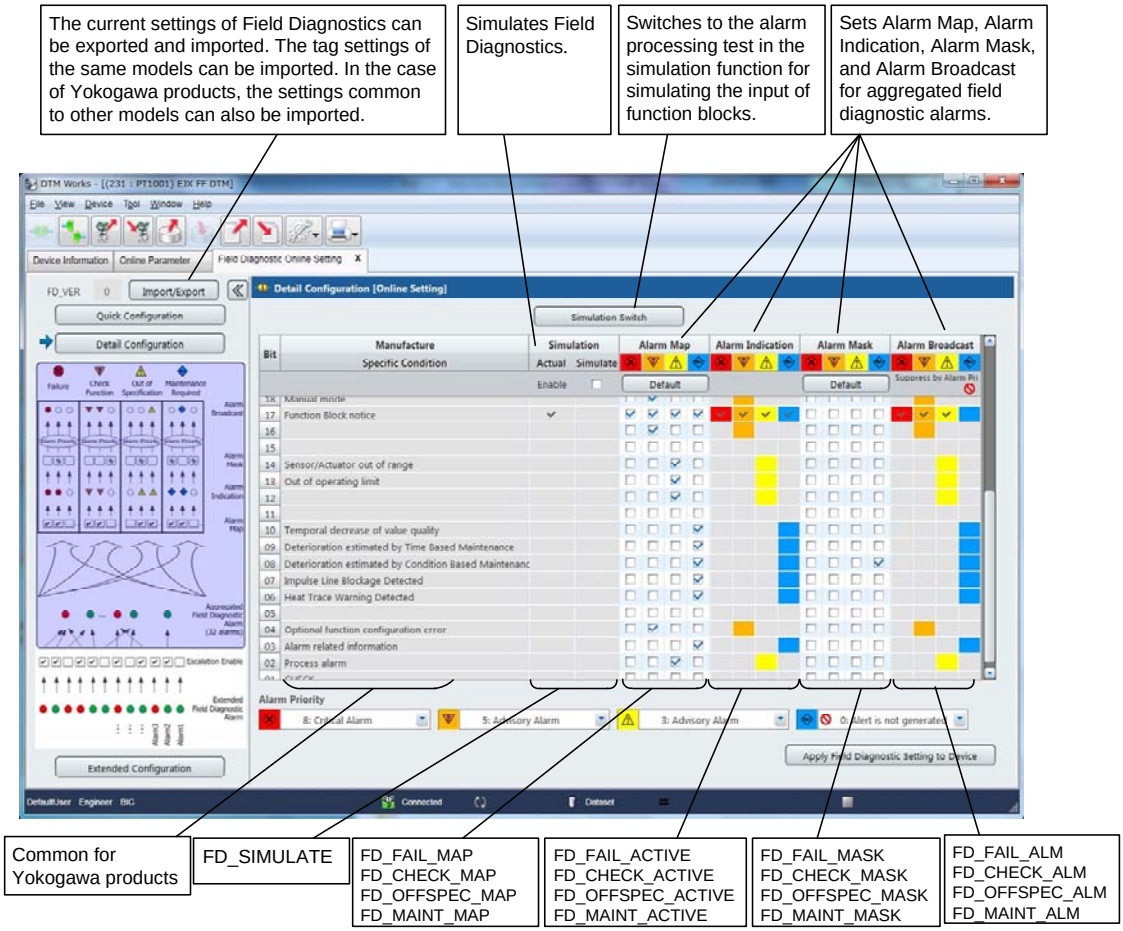
Figure B-3-1 Quick Configuration [Online Setting] Display



B-3-2 Detail Configuration Display

The Detail Configuration Display and its menu are shown below.

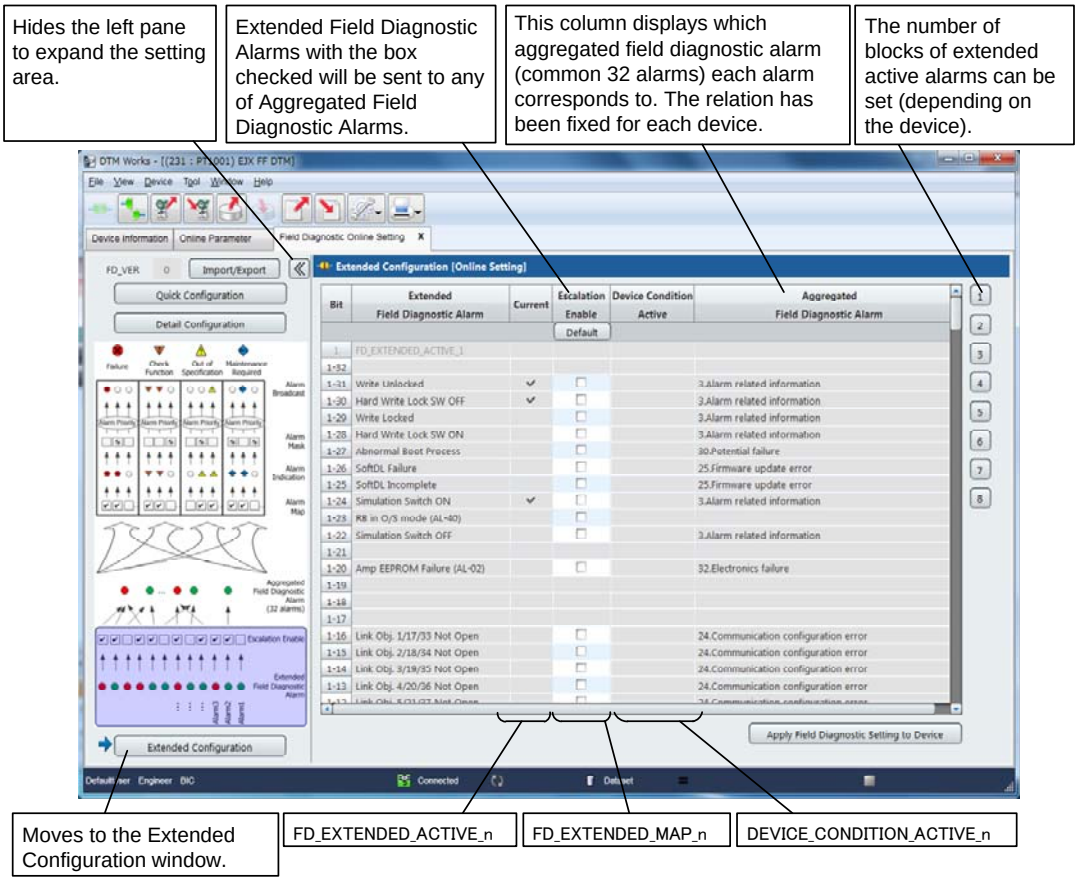
Figure B-3-2 Detail Configuration [Online Setting] Display



B-3-3 Extended Configuration Display

The Extended Configuration Display and its menu are shown below.

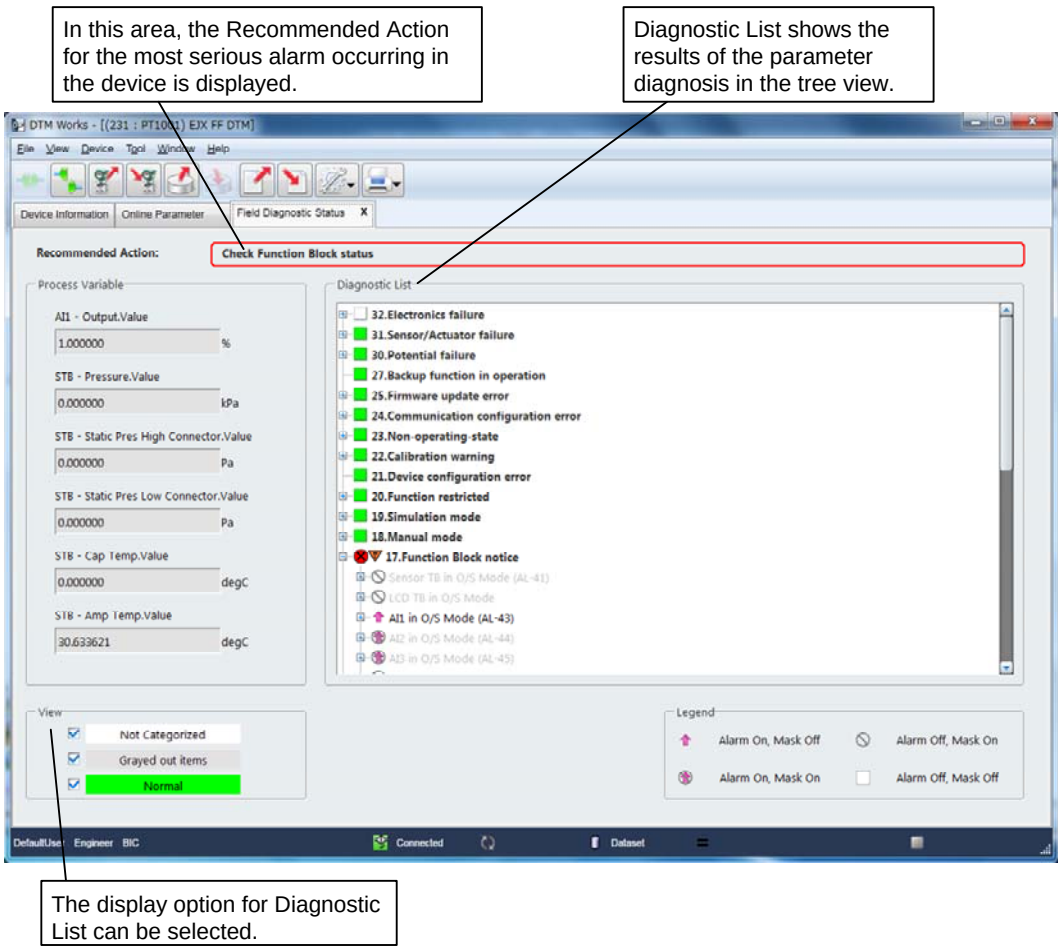
Figure B-3-3 Extended Configuration [Online Setting] Display



B-3-4 Status Display

The Status Display and its menu are shown below.

Figure B-3-4 Field Diagnostic Status Display



C Field Diagnostics on PROFIBUS Devices

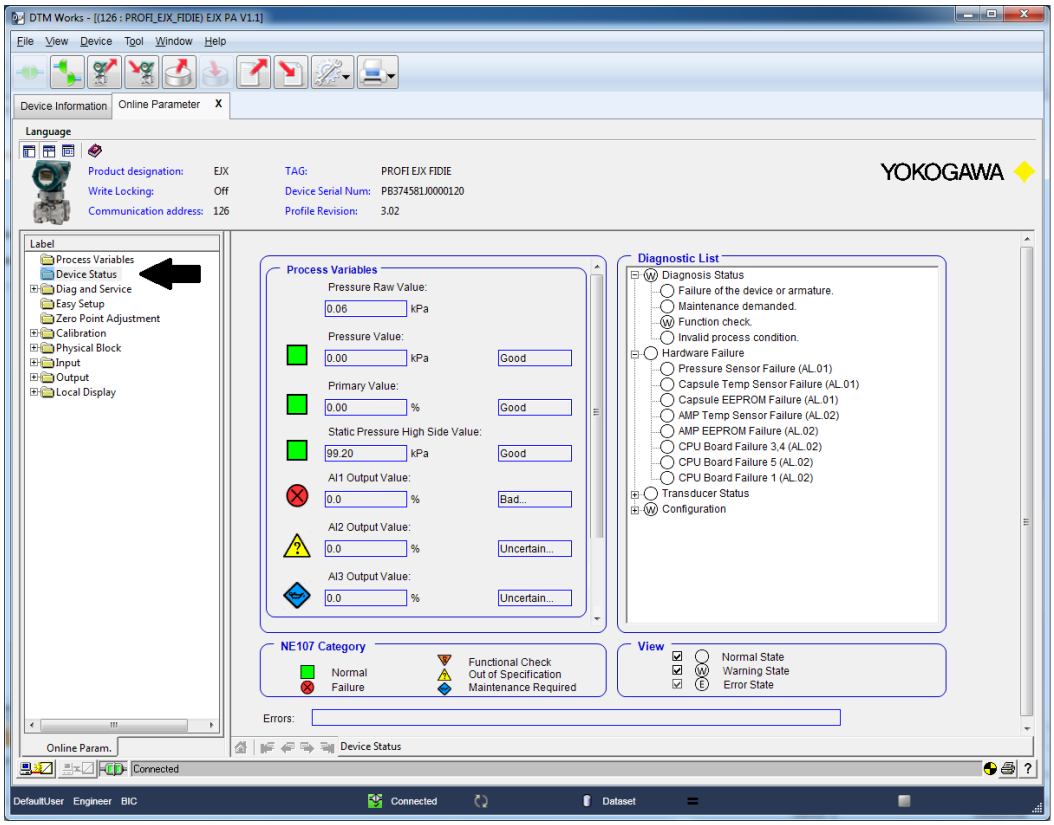
C-1 Outline

The NE 107 alarms have been categorized in the PROFIBUS protocol, which means that these categories cannot be changed. Therefore, Alarm Mapping and Masking cannot be set for PROFIBUS devices and only the results are displayed (the Device Status Display only). Follow the instructions of next section to operate the Device Status Display.

■ Starting Up Field Diagnostics (NE 107) for PROFIBUS Devices

There are two ways to open the Device Status Display: from the toolbar menu (see Section A-4 “Starting Up Field Diagnostics from FieldMate”), and from the Device Status menu in the navigation area (see Figure C-1-1).

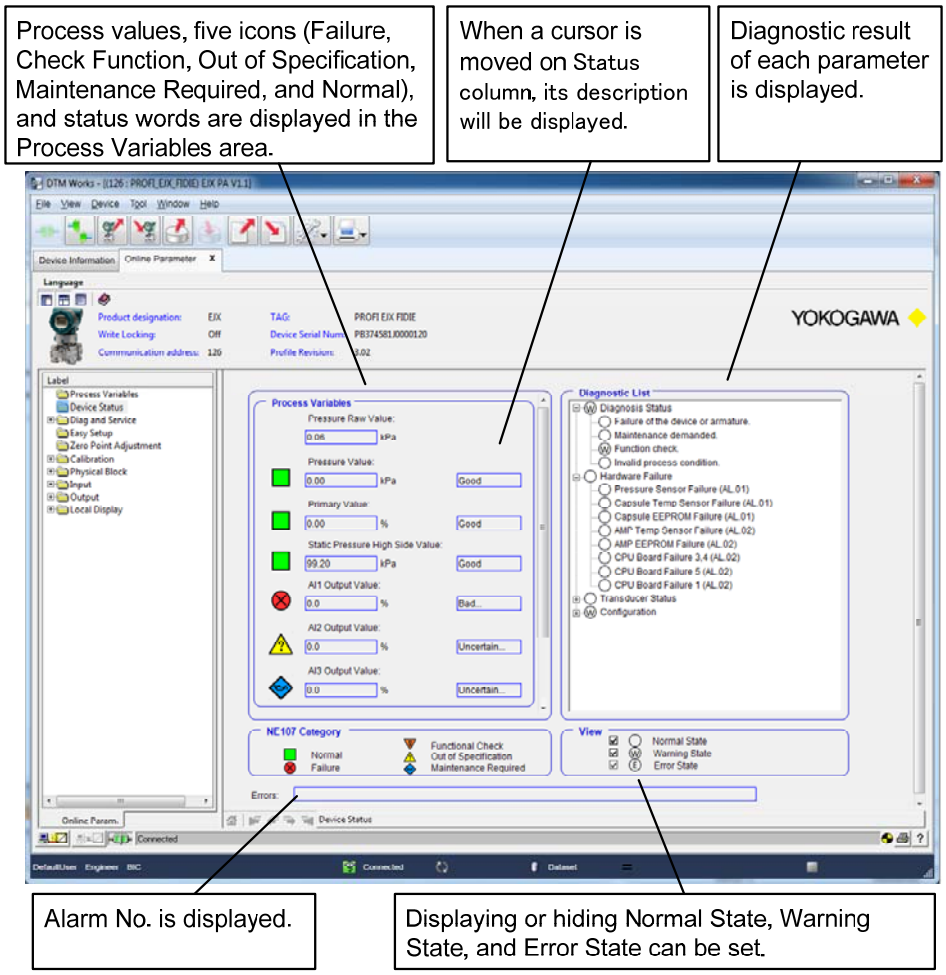
Figure C-1-1 Start-up menu in the Field Diagnostics Navigation area



C-2 Examples of the Display and Menu

The Device Status Display and its menu for Field Diagnostics on PROFIBUS devices are shown below.

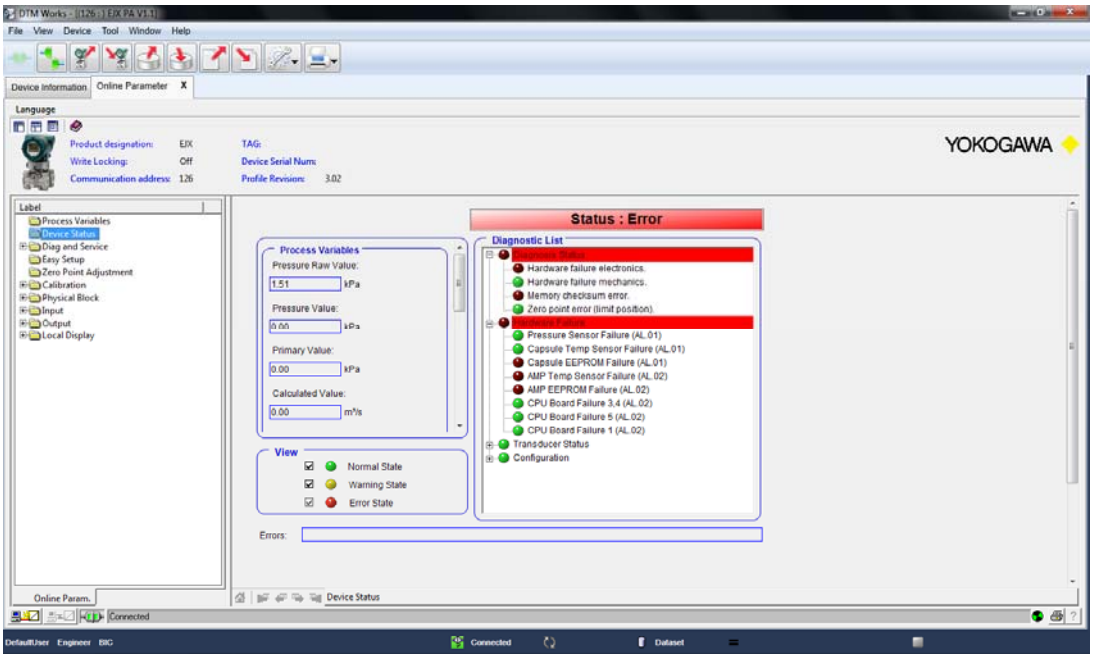
Figure C-2-1 Device Status Display of Field Diagnostics (NE 107 Condensed Status Type)



NOTE

In the PROFIBUS DTM that does not conform to NE 107, or even in the PROFIBUS DTM conforming to NE 107 when the parameter “COND_STATUS_DIAG” is “0” (Classic status type), the Status Display like “Figure C-2-2“ will be appeared.

Figure C-2-2 Device Status Display of Field Diagnostics (Classic Status Type)



D Field Diagnostics on HART Devices

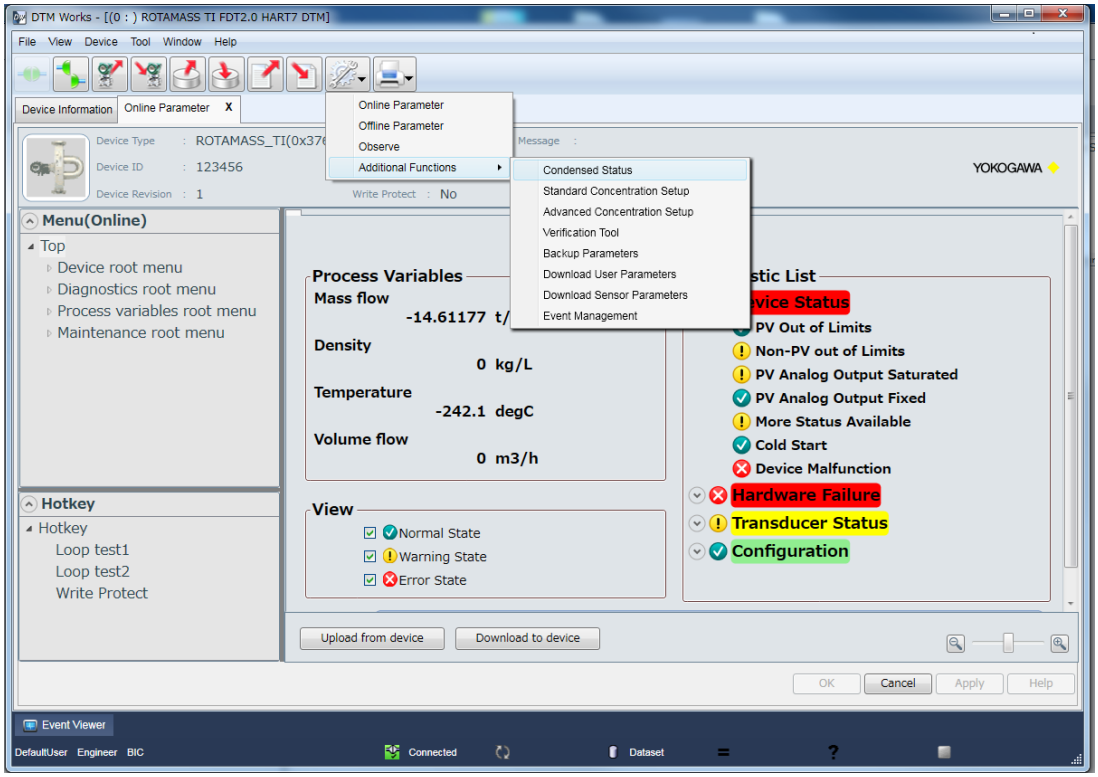
D-1 Field Diagnostics (NE107) on HART Devices

HART 7 specification supports four Condensed Device Status Indicators (Failure, Function Check, Out of Specification, Maintenance Required) based on NAMUR NE107 diagnostics.
FieldMate has a Field Diagnostic (NE107) function which supports five alarm statuses (four “Condensed Device Status” and one “information (no effect)”). Field Diagnostic (NE107) function provides easy configuration of mapping the five kinds of alarm status.

■ Starting Field Diagnostics (NE107) on HART Devices

You can launch Field Diagnostics (NE107) on HART Devices from the toolbar menu. (see Section A-4 “Starting Field Diagnostics from FieldMate”)
Condensed Status: Launch the Observe and Configuration of Field Diagnostics (NE107)

Figure D-1-1 Toolbar menu of Field Diagnostics (NE107)



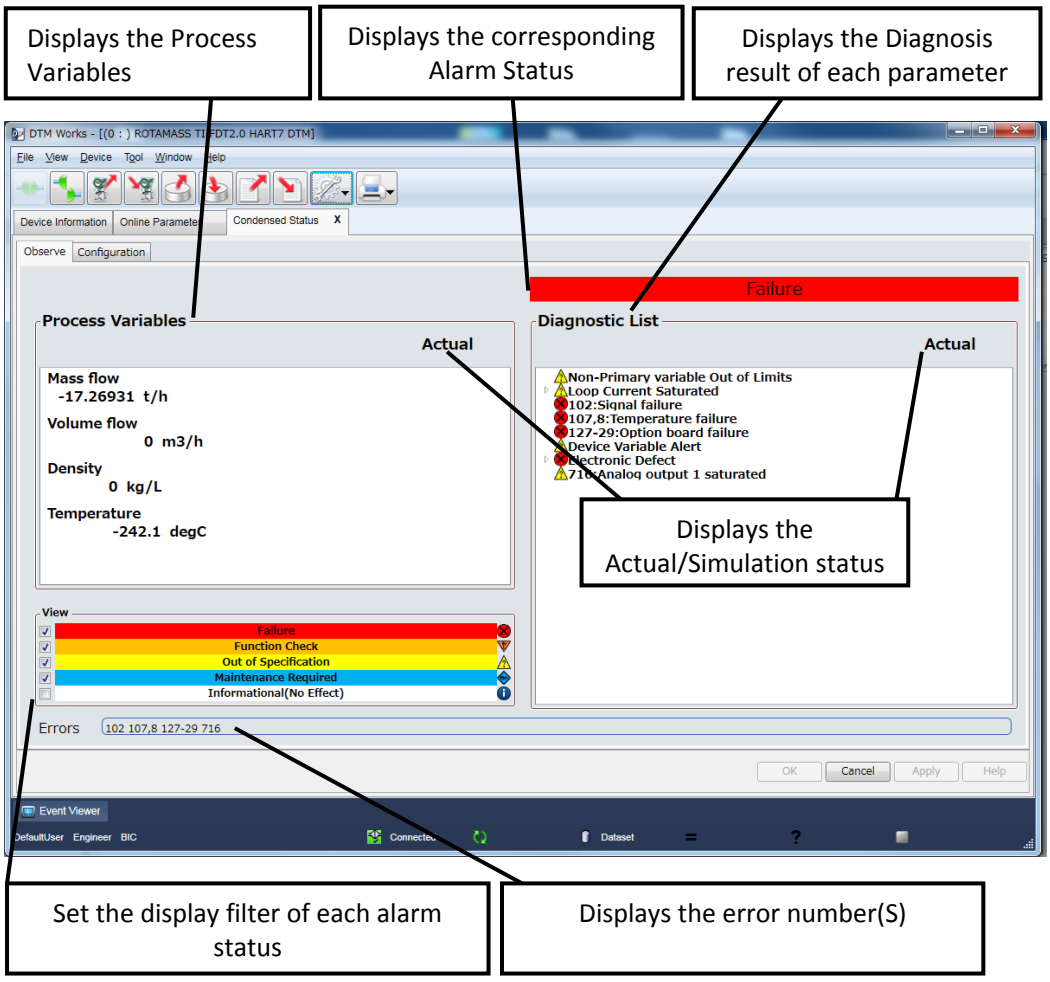
D-2 Example of the Display and Menu

The Observe page and Configuration page are shown below.

D-2-1 Observe page

Observe page can be displayed by clicking the Observe tab.

Figure D-2-1 Example of Observe display of Field Diagnostics (NE107) on HART Devices



D-2-2 Configuration page

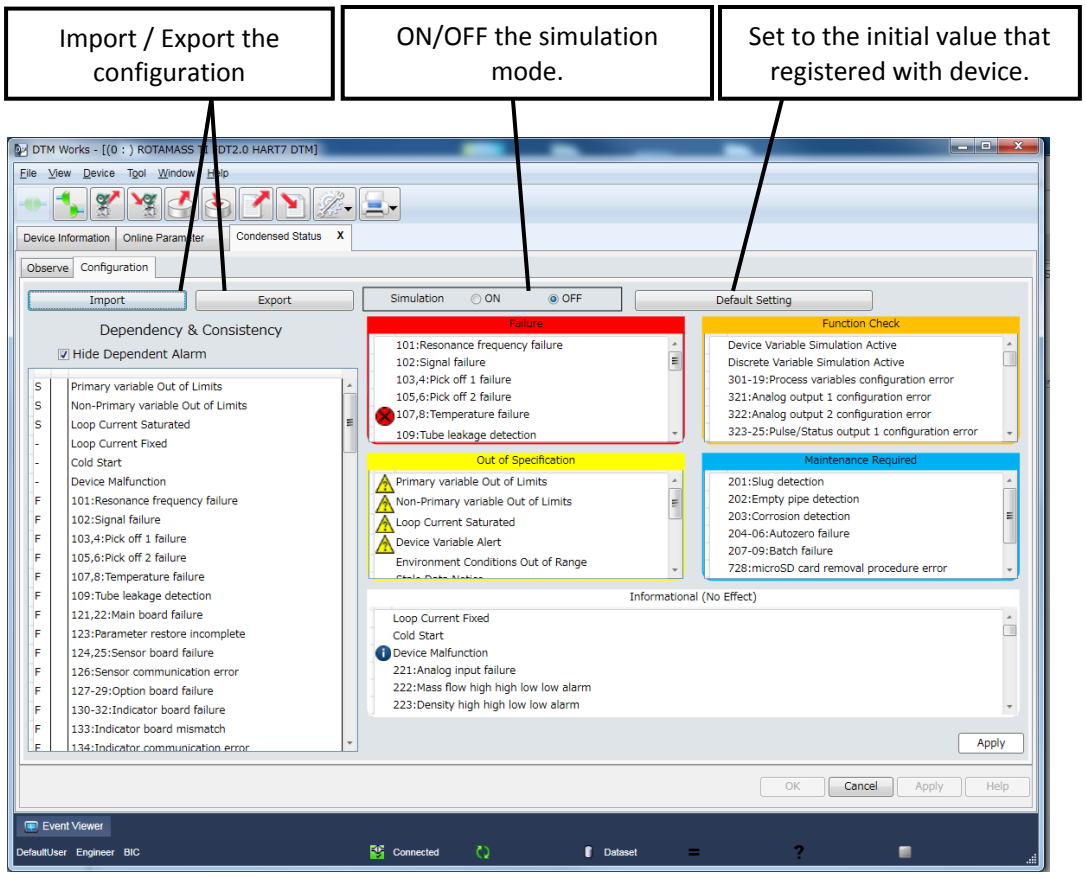
Configuration page can be displayed by clicking the Configuration tab.

- Import/Export
  Import the configuration from a file. Export the configuration to a file.
- Simulation
  You can run simulations using the alarm status.
  1. Select [ON] in Simulation area.
  2. Check boxes appear next to the Field Diagnostic Alarm items.
  3. Check the checkbox of Field Diagnostic Alarm item, and alarm outputs are simulated.

  Import/Export/Default Setting/Apply buttons are disabled when the simulation mode is [ON].

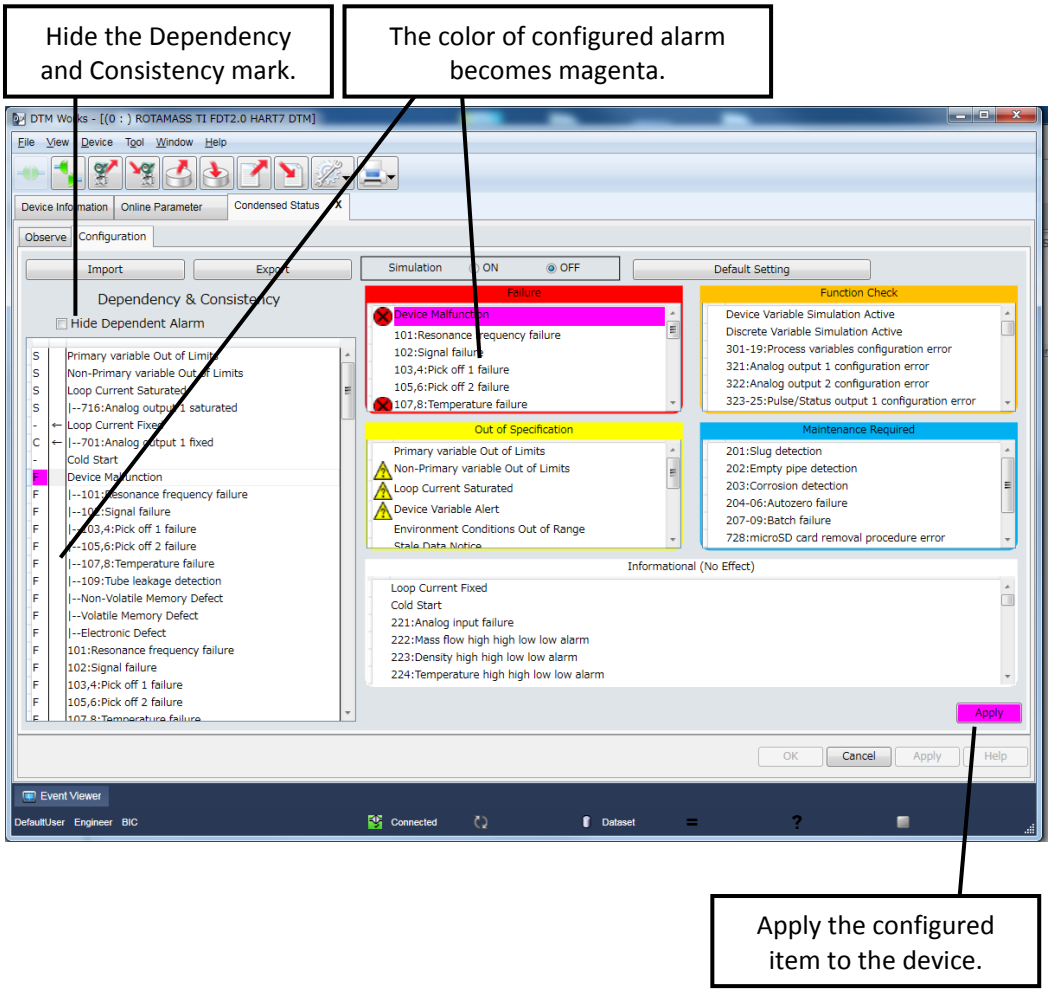
  You must set the simulation mode to [OFF] after simulation.
- Default Setting
  - Restore to the initial value that is registered with the device.

Figure D-2-2 Example of Configuration page of Field Diagnostics (NE107) on HART Devices



- Dependency & Consistency
  Display the dependency and consistency of alarms and configure the mapping of alarm status.
  - Hide Dependent Alarm
    Hide the alarm dependency mark (|--) and the inconsistent mark (←).
    Initial status is [Hide].
  - Device alarms can be mapped to any of the five alarm statuses “Failure”, “Function Check”, “Out of Specification”, ”Maintenance Required”, “Informational (No Effect)” with drag & drop.
  - The background color of the configured device alarm becomes magenta. The configured item is applied after clicking [Apply] button, and then the background color of device alarm becomes default.

Figure D-2-3 Example of Configuration window of Field Diagnostics (NE107) on HART Devices



Appendix A Aggregated Field Diagnostic Alarms for FOUNDATION Fieldbus

Table Appendix A-1 describes all of the 32 Aggregated Field Diagnostic Alarms used for Yokogawa products.

Table Appendix A-1 Aggregated Field Diagnostic Alarms (32-bit)

Alarm bit	Initial alarm category	Label	Description
31	F	Electronics failure	An electric/electronic failure such as amplifier breakdown may have occurred.
30	F	Sensor/Actuator failure	A sensor/actuator failure may have occurred.
29	F	Potential failure	A device failure may have occurred, or abnormal settings, dirt, poor contact of wiring and connectors, or poor board installation may have occurred.
28	F	(Device specific failure alarm)	Device-specific failure
27	F	(Device specific failure alarm)	Device-specific failure
26	F	Backup function in operation	A breakdown has occurred in at least one system of redundant sensors. The backup sensor is operating normally.
25	-	(Reserved)	(Reserved)
24	C	Firmware update error	A firmware update error has occurred. The operation is being covered by the existing firmware.
23	C	Communication configuration error	Communication setting is improper.
22	C	Non-operating-state	Non-routine operations such as initialization, calibration, testing, or maintenance are in progress.
21	C	Calibration warning	The device is running with existing settings or abnormal calibration values because the calibration was performed during an alarm condition.
20	C	Device configuration error	The settings of sensors or actuators are improper.
19	C	Function restricted	The device is running partially.
18	C	Simulation mode	The device is running in the simulation mode.
17	C	Manual mode	The device is running in the manual mode.
16	C	Function Block notice	A function block is in the “O/S” or “Unscheduled” state.
15	C	(Device specific function check	Device-specific function check alarm
14	-	(Reserved)	(Reserved)
13	S	Sensor/Actuator out of range	The measured value of the sensor or the operating point of the actuator is out of range.
12	S	Out of operating limit	The environment or operating condition is out of the specification.
11	S	(Device specific out of specification alarm)	Device-specific out-of-spec alarm
10	-	(Reserved)	(Reserved)
9	M	Temporal decrease of value quality	Although the accuracy satisfies the specification, the measured values are temporarily unreliable due to degradation.
8	M	Deterioration estimated by Time Based Maintenance	The operation time or the number of operations has exceeded the limit.
7	M	Deterioration estimated by Condition Based Maintenance	The internal algorithm has detected an abnormality.
6	M	(Device specific maintenance request alarm)	Device-specific “maintenance request” alarm
5	M	(Device specific maintenance request alarm)	Device-specific “maintenance request” alarm
4	-	(Reserved)	(Reserved)
3	C	Optional function configuration error	A setting of sub-functions is abnormal although it will not affect the main measuring functions. Masking this alarm does not affect the operation of the main functions.
2	-	Alarm related information	Supplementary information is displayed.
1	-	Process alarm	A process alarm has occurred. This alarm may be caused by an abnormality of devices or peripheral devices.
0	-	CHECK	CHECK

Appendix B NE 107 Parameters for FOUNDATION fieldbus

The added NAMUR NE 107 parameters for FOUNDATION fieldbus devices and item names used in this software are shown below.

Table Appendix B-2

Parameters (NE 107)	Details	Item Name
FD_FAIL_ALM FD_CHECK_ALM FD_MAINT_ALM FD_OFFSPEC_ALM	Indicate alarms which should notify Host	Alarm Broadcast
FD_FAIL_MASK FD_CHECK_MASK FD_MAINT_MASK FD_OFFSPEC_MASK	Set alarms which should notify Host	Alarm Mask
FD_FAIL_ACTIVE FD_CHECK_ACTIVE FD_MAINT_ACTIVE FD_OFFSPEC_ACTIVE	Indicate aggregated devices alarms	Alarm Indication
FD_FAIL_MAP FD_CHECK_MAP FD_MAINT_MAP FD_OFFSPEC_MAP	Set NE 107 classification of aggregated devices alarms	Alarm Map
FD_FAIL_PRI FD_CHECK_PRI FD_MAINT_PRI FD_OFFSPEC_PRI	Set priority whether should notify Host	Alarm Priority
FD_EXTENDED_ACTIVE_n	Indicate all device alarms related to NE 107	Detailed Field Diagnostics Alert
FD_EXTENDED_MAP_n	Set NE 107 classification of all device alarms related to NE 107	Escalation Enable
FD_RECOMMEN_ACT	Indicates an alarm and action which the user should do	Recommended Action
FD_SIMULATE	Enable/Disable simulation of NE 107	Simulation
FD_VER	Version information of this specification	FD_VER

Revision Information

- Title : FieldMate NE 107 Field Diagnostics

- Manual No. : IM 01R01A15-01EN

Revision No.	Revised Date	Major Changes
1st Edition	May 2013	Newly published (R2.06.00)
2nd Edition	Nov 2013	Specification change of Alarm Priority settings on Detailed Configuration window and Status window of PROFIBUS
3rd Edition	July 2016	Add D Field Diagnostics on HART Devices