User's Manual

Vortex Flowmeter VY Series Verification Tool

IM 01F07A04-01EN

YOKOGAWA
Yokogawa Electric Corporation

IM 01F07A04-01EN
1st Edition

Vortex Flowmeter VY Series
Verification Tool

IM 01F07A04-01EN 1st Edition

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Product Precautions

- This manual should be provided to the end user.
- Before using this tool, read this manual thoroughly to fully understand its contents.
- The contents of this manual are subject to change without prior notice. Also, the content of actual displays may differ slightly from the displays given in this manual.
- All rights are reserved. No part of this manual may be reproduced in any form without Yokogawa Electric Corporation's written permission.
- Yokogawa Electric Corporation makes no warranty of any kind with regard to this manual, including, but not limited to, implied warranties of merchantability and fitness of this tool for a particular purpose.
- If any question arises or errors are found, or if any information is missing from this manual, inform the nearest Yokogawa Electric Corporation sales office.
- Yokogawa Electric Corporation assumes no responsibilities for this product except as stated in the warranty.
- Note that this manual may not be revised for any changes in specifications, construction changes or operating part changes that are not considered to affect function or performance.
- If the customer or any third party is harmed by the use of this product, Yokogawa Electric Corporation assumes no responsibility for any such harm owing to any defects in the product which were not predictable, or for any indirect damages.
- This manual describes the operation of the Vortex Flowmeter VY Series Verification Tool which operates on FieldMate. For details about installation, operation and functions of FieldMate, refer to the FieldMate User's Manual in Table 1.
- The content of this manual corresponds to operation and functions of FieldMate R3.04.20 or later and Device Files R3.09.21 or later. For details on how to confirm the revision No., refer to the FieldMate manual, and for details on possible changes in its operation and functions in the newly released version, refer to the latest version of the FieldMate manual.

Safety and Modification Precautions

- The following general safety precautions must be observed during all phases of operation, service and repair of this product. Failure to comply with these preventive measures or with specific WARNINGS given elsewhere in this manual violates the safety standards of intended use of the product. Yokogawa Electric Corporation assumes no liability for the customer's failure to comply with these preventive measures and actions. If this product is used in a manner not specified in this manual, the protection provided by this product may be impaired.
- Yokogawa Electric Corporation will not be liable for malfunctions or damage resulting from any modification made to this product by the customer.

Introduction

This Manual

This manual provides instructions on the usage and operation of Vortex Flowmeter VY Series (simply referred to as “VY” from here on) for the “FSA130 Magnetic Flowmeter/Vortex Flowmeter Verification Tool”.
The FSA130 Verification Tool is a software tool for checking the health of the ADMAG TI (Total Insight) Series AXG/AXW Magnetic Flowmeter HART Communication Type and VY HART Communication Type. The functions of the tool are incorporated in the DTM file of the respective product and operate on FieldMate "Versatile Device Management Wizard." Depending on the check items, the CA500 "Multi-Function Process Calibrator" is sometimes used.

Composition of This Manual

This manual comprises the following chapters.

Chapter Title	Description
1. Outline	This chapter presents an outline of the functions of the Vortex Flowmeter VY Series Verification Tool and a system configuration.
2. Before Executing Verification	This chapter explains basic operation and other information about the verification tool.
3. How To Check and Test Devices	This chapter explains how to check and test devices in the standard and enhanced VF modes.
4. Managing Check and Test Result (report) Files	This chapter explains storage and reading of verification results.
5. Error Messages and Countermeasures	This chapter explains messages, causes and countermeasures for errors that might occur during execution of verification.
6. Operations In the Remote Maintenance Tool	This chapter explains how to check and test devices in the remote maintenance tool.
Appendix 1 Software License Agreement	This appendix presents the License Agreement that the user must consent to in order to use the software.
Appendix 2 Contents of the Package	This appendix presents the contents of the verification tool package.

Related Manuals

Thoroughly read the documents listed below to ensure a full understanding of related products before using this tool. Manuals for corresponding devices can be downloaded from the following websites.
Website address:
https://www.yokogawa.com/library/
https://tmi.yokogawa.com/library/

Table 1. Related Documents

Product	Document title	Document No.
Vortex Flowmeter VY Series	Vortex Flowmeter VY Series Read Me First	IM 01F07A21-01Z1
	Vortex Flowmeter VY Series Installation Manual	IM 01F07A01-01EN
	Vortex Flowmeter VY Series Maintenance Manual	IM 01F07A01-02EN
	Vortex Flowmeter VY HART Communication Type	IM 01F07A02-01EN
	Vortex Flowmeter VY Series	GS 01F07A00-01EN
FieldMate	FieldMate Versatile Device Management Wizard	IM 01R01A01-01
	FieldMate Operational Precaution (Japanese-English Version)	IM 01R01A01-91E
	FieldMate Wizard Getting Started (Japanese-English Version)	IM 01R01A04-01E
	FieldMate Versatile Device Management Wizard General Specifications	GS 01R01A01-01
Verification Tool	Vortex Flowmeter VY Series Verification Tool	IM 01F07A04-01EN
	FSA130 ADMAG TI Verification Tool General Specifications	GS 01E21A04-01EN
CA500	CA500, CA550 Multi-function Process Calibrator User's Manual	IM CA500-01EN

Annotations Used In This Manual

The following annotations are used in this manual.

Example of Used Annotation	Explanation
<Screen name>	Screen names are enclosed by angle brackets "<" and ">".
[In-screen UI items]	Names of menus, fields, buttons and other in-screen items are enclosed by square brackets "[" and "]".
WARNING	A WARNING sign denotes a hazard. It calls attention to procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in serious injury or death of personnel. This document presents precautions for avoiding such hazards should such a situation arise.
IMPORTANT	An IMPORTANT sign denotes that attention is required to avoid damage to the instrument or system failure.
NOTE	A NOTE sign denotes information necessary for an essential understanding of operation and features.

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1. Outline

1.1 Outline of Functions

The Verification Tool checks the health of the VY by testing multiple items to make sure that the device (VY) is operating normally. The Verification Tool has two modes, Standard Verification (Standard VF) and Enhanced Verification (Enhanced VF). The normalcy of a device in a standalone confirmation or with other instruments connected to the device can be checked. Verification result data can also be stored on a database and printed out or output as a PDF file.

1.1.1 Checking the operation state of device targeted for verification

This tool can be used on VY's that support HART communication protocol and whose health can be checked in either of the standard VF or enhanced VF modes.

- **Standard VF**

  This mode executes items (Circuit, Device Status, Display) that are verified by operating the parameters of the device (VY) in combination with DTM Frame and the item (Physical Appearance) that is verified manually by the user. Other external measuring devices are not required.

- **Enhanced VF**

  This mode executes items that verify I/O by using the CA500 or other external measuring device by operating the parameters of the device (VY) in combination with DTM Frame.

1.1.2 Outputting check results (report)

- **Generating/editing check results (report)**

  The result of performed verification (check/test) is reflected in the specified format to generate report data. A comment, creation date and other information are appended to the generated report data to finally become a report file.

- **Printing check results (report)**

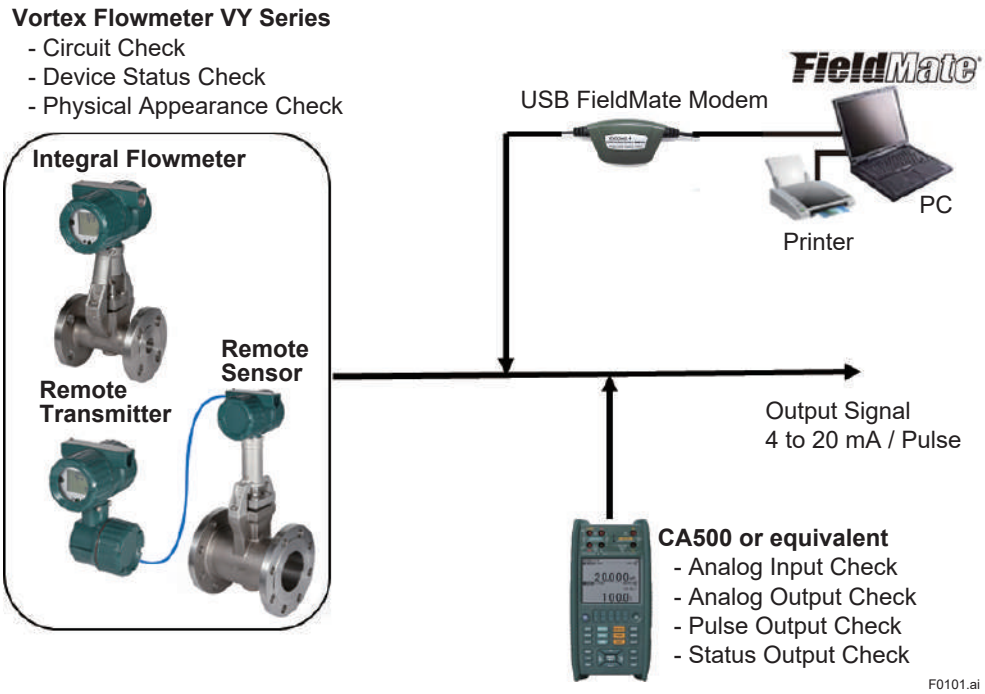
  Report files that are created are printed or output as PDF files.
  Two paper sizes are supported: A4 and Letter. With other paper sizes, report data may not fit on a single page. The default paper size is A4.

1.1.3 Managing check result (report) files

After executing verification, check result (report) files can be stored on a database or external storage. Check result (report) files stored on a database or external storage can also be read to and used on the tool. Files are read at two different timings, when the DTM is started up and after DTM is started up.
Changes to verification result data can also be disabled (locked).

1.2 System Configuration

1.2.1 Device connection configuration



- Vortex Flowmeter VY Series
- PC (pre-installed with the following software)

- FieldMate Versatile Device Management Wizard R3.04.20 or later, Device Files R3.09.21 or later
  - Printer (for printing verification reports)
  - USB FieldMate Modem
  - CA500 Multi-Function Process Calibrator or equivalent(*)

    (Only when enhanced VF is performed)

    *: CA500 can be replaced by a general purpose instrument which has equivalent functions to measure analog values and pulse count and also to output analog signals.

1.2.2 Operating environment and conditions

This tool runs on FieldMate (R3.04.20 or later) and Device Files (R3.09.21 or later).

1.3 Verification items

1.3.1 Test items in standard VF mode

Item		Explanation	Remarks
Circuit		Checks the normalcy of each circuit	-
	Sensor Circuit	Checks the sensor circuit	
	Signal Processing Circuit	Checks the signal processing circuit	
	Calculation Circuit	Checks the calculation circuit	
Device Status		Checks the normalcy of each device status	
	Alarm Check	Checks the latest alarm status and details	
	Alarm History Check	Checks the past alarm status and details	
Physical Appearance		Checks for abnormalities on target devices (sensor or transmitter) and connected cables based on their appearance	-
	Sensor	Checks the result of the sensor appearance test	
	Transmitter	Checks the result of the transmitter appearance test	
Display		Checks the normalcy of display functions when the target device is equipped with an LCD display	Testing is possible on devices with a display
	Display	Checks the LCD display	

1.3.2 Test items in enhanced VF mode

Item	Explanation	Remarks
Analog Output	Checks and tests analog output	-
Pulse Output	Checks and tests pulse output	Testing is possible when pulse output is used (status output cannot be tested)
Status Output	Checks and tests status output	Testing is possible when status output is used (pulse output cannot be tested)
Analog Input	Checks and tests analog input	Testing is possible on devices with an analog input function

2. Before Executing Verification

2.1 Preparing To Use The Verification Tool

WARNING

- Before starting up this tool, set the control loop to the manual mode on the host system.
- When "unexpected issue(*1) occurs while verification functions are being executed, refer to Section 2.2.1 and Chapter 5.
- Set the automatic sleep function of the computer to "off".

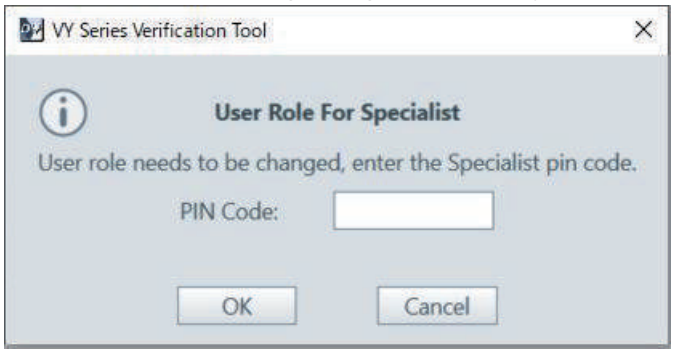
*1: "Unexpected issue" means disconnection between the VY and PC due to the following reasons:
- Physical disconnection of the communication line between the VY and PC
- Forced shutdown of PC
- Unexpected power off of the VY

2.1.1 Installing the tool

For details about installation of FieldMate and connection of the device to FieldMate, refer to the FieldMate User's Manual. At this time, check that the DTM files for HART communication with the VY are installed. If your FieldMate package does not include these DTM files, download them from the following website.
https://www.yokogawa.com/library/documents-downloads/software/yokogawa-dtm-hart/

2.1.2 Setting user rights

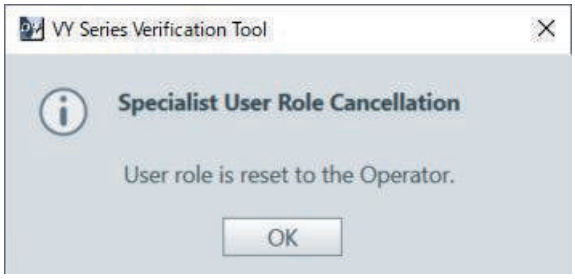
The VY has an operation rights (user role) function for limiting writing to parameters. Before performing verification, set the operation rights of the device to "specialist".
If an attempt is made to start up the verification tool with the operation rights set to other than "specialist", the following dialog box is displayed and verification is terminated.



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If this happens, enter the PIN code for "specialist" that has been set by the user to the "PIN Code:" entry field, and click [OK] to resume startup. Clicking [Cancel] exits the verification tool.

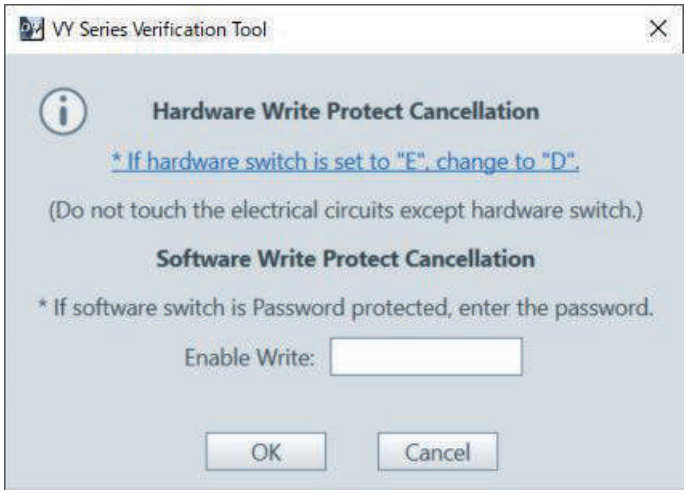
If operation rights have been changed when the verification tool has been started up, the following dialog is displayed when the verification tool exit. Click [OK] to return the operation rights to “operator”.



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2.1.3 Disabling the write protect setting

Before performing verification, set the hardware write protection function switch of the device OFF if it is set to ON. Follow the procedure given in the Vortex Flowmeter VY Series Installation Manual. If an attempt is made to perform verification with the hardware write protection function switch still ON, the following dialog box is displayed and the startup is terminated. To resume verification, set the switch OFF, and click [OK] in the screen below.
Also, if the software write protection function is enabled, the following dialog box is displayed and the startup is terminated. In this case, enter the password for disabling the protection in the Password field in the figure below, which has been set by customer, and click [OK].
It is not necessary to disable the software write protection function in advance. By entering the password at the time the following dialog box is displayed, the protection is automatically enabled again within 10 minutes of verification ending.



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2.2 Basic Operating Procedures

2.2.1 Starting up and exiting the tool

How to start up the tool

This tool is incorporated into the DTM files that operate on FieldMate. It can be started up by the following two ways on FieldMate:

- From Segment Viewer
- From Device Navigator

If the device is not connected to a PC where FieldMate is operating, verification cannot be performed. However, when this tool has been started up from Device Navigator, it is possible to read and check the results of verification performed in the past.

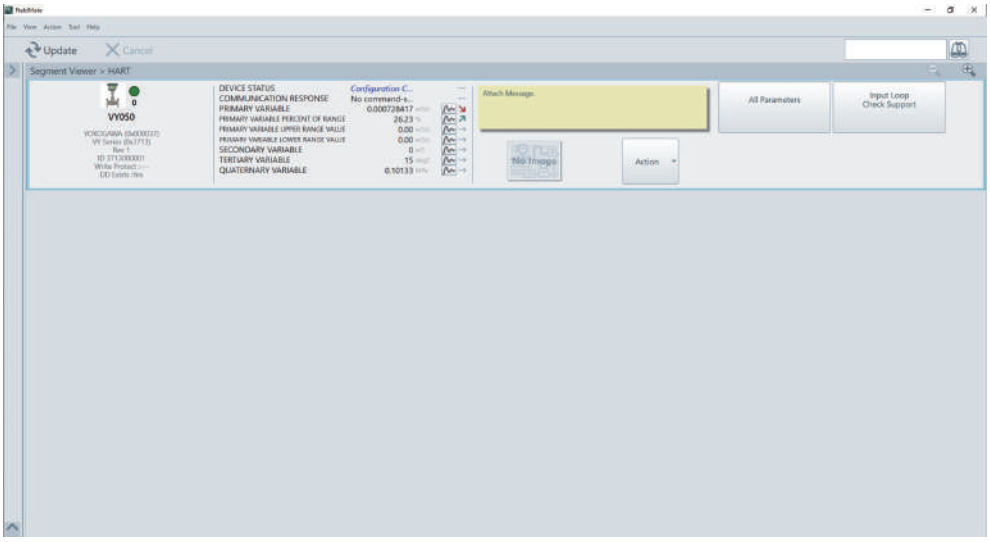
NOTE

- To operate this tool in the online mode, start up from Segment Viewer.
- To perform standard VF, start up from Segment Viewer.
- Starting up from Segment Viewer is possible only when the device is connected.
  Device Navigator can be used to read past data even if the device is not connected.
- The screens and explanations given in this manual are for when the English version of FieldMate is used.
- When operating multiple tools, communication may conflict and settings may not be possible.

Operating Procedure

Starting up from Segment Viewer

1 Start up FieldMate, and select the <Segment Viewer> screen



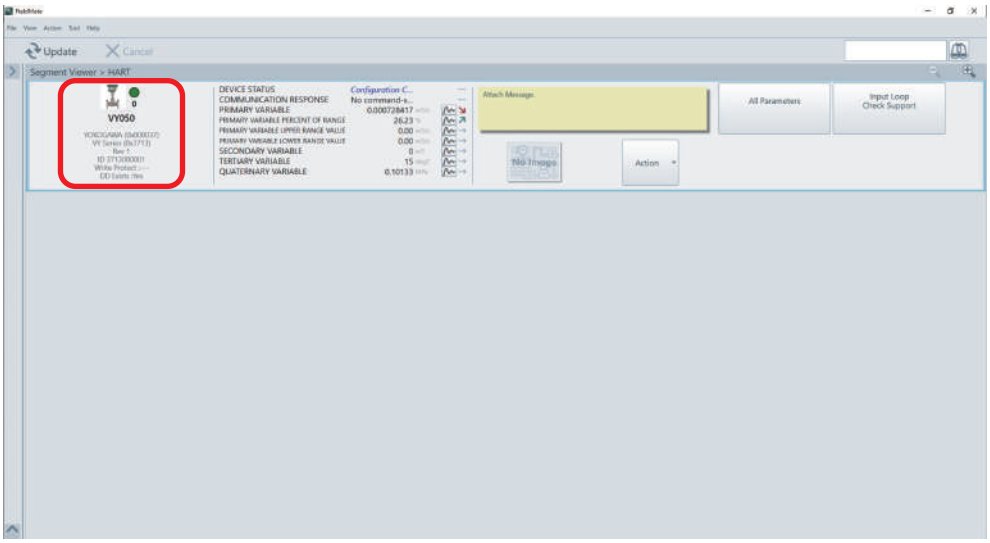
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2 Start up DTM

There are 4 kinds of the way to start up the DTM.

Starting up DTM by the device icon

Double click the device icon if the default DTM is specified. Please refer to the following guide about the assignment of the default DTM.

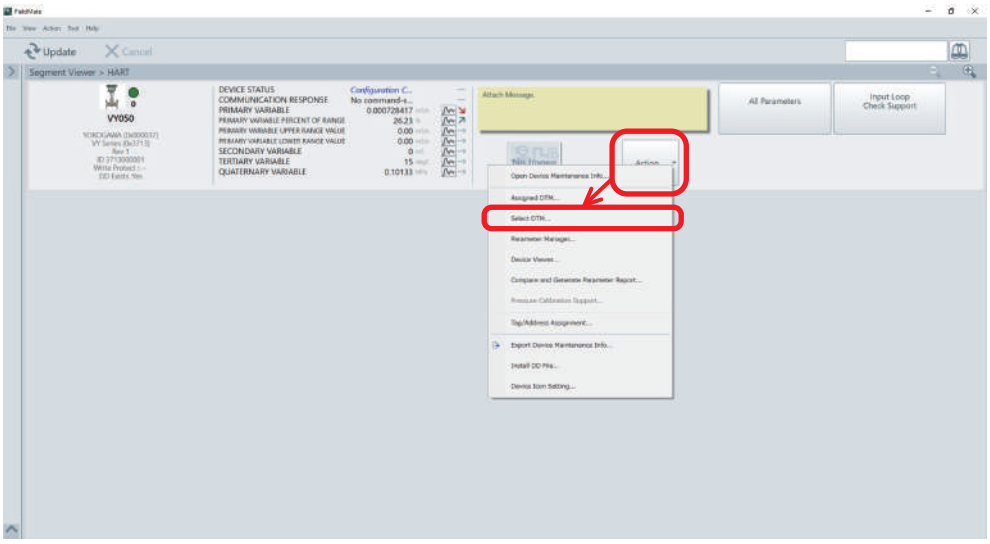


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Proceed to Step 4.

Starting up DTM by the action button

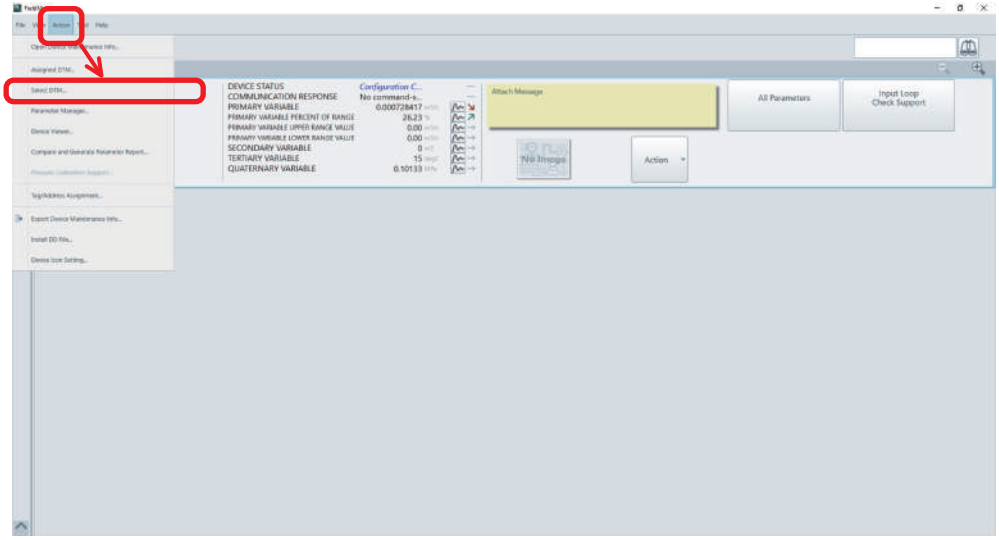
Click the [Action] button, and select [Select DTM…]



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Starting up DTM by the action menu

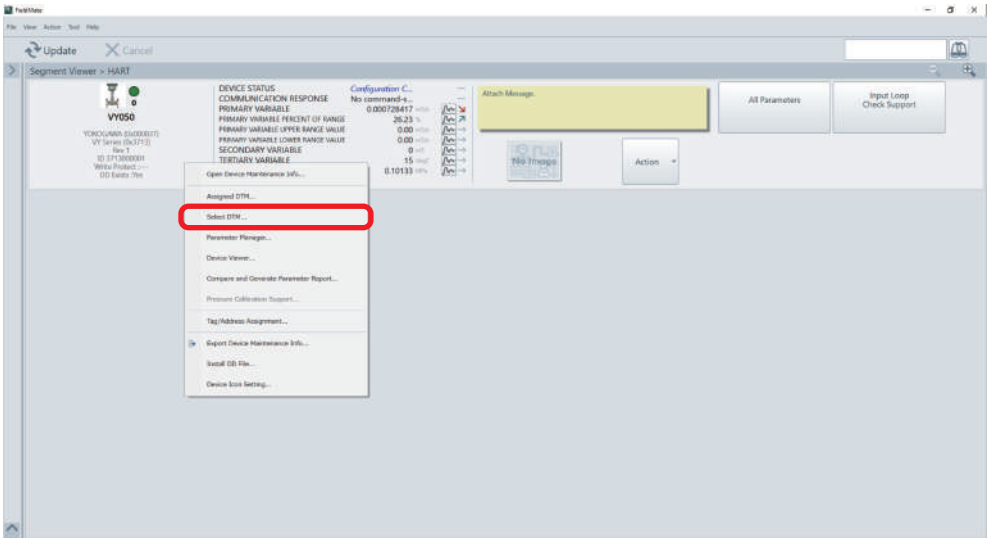
Click the [Action] menu, and select [Select DTM…]



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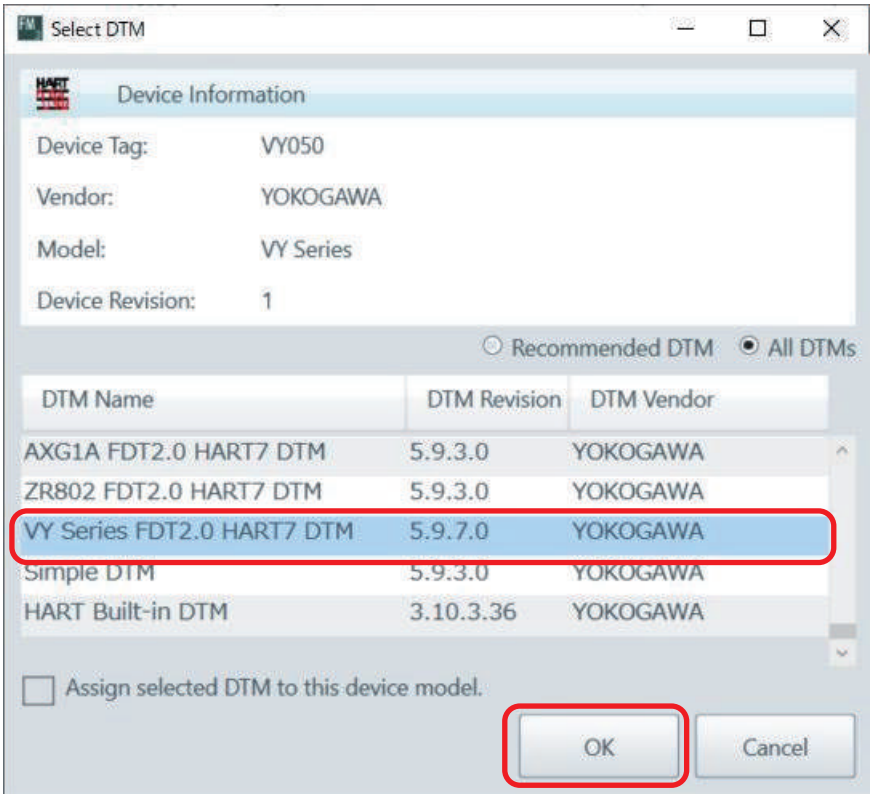
Starting up DTM by right-clicking

Right-click on the <Segment Viewer> screen, and select [Select DTM…]



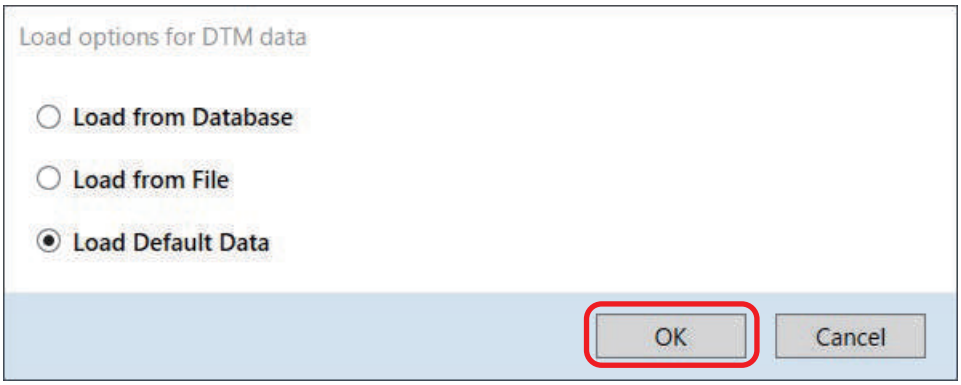
F0208.ai

3 Select the target DTM shown in the <Select DTM> screen, and click [OK].



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4 Select the data to load, and click [OK].



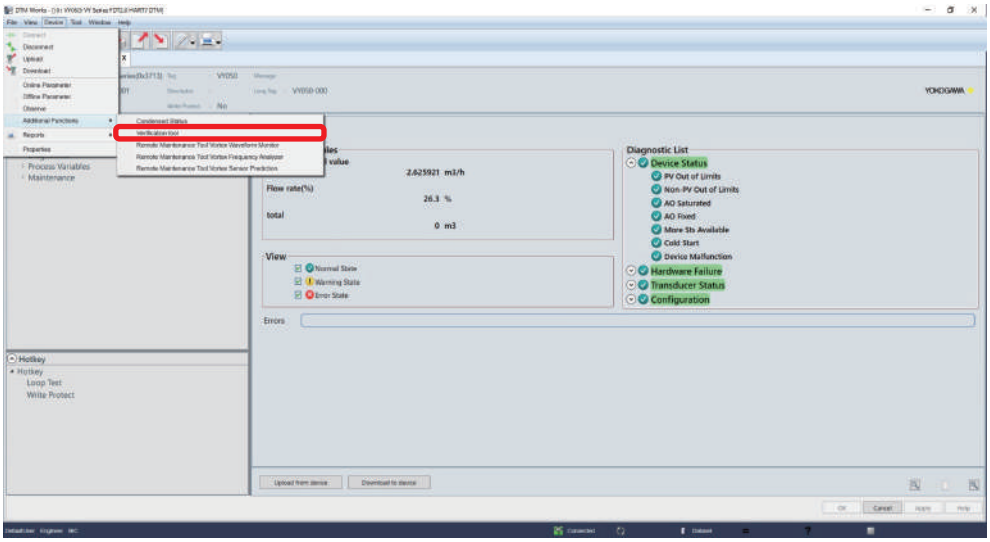
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Display Item	Explanation
Load from Database	Loads data stored on the database
Load from File	Loads data stored in dns format file
Load Default Data	Loads data from a connected device

For details in dns format files, refer to the FieldMate User's Manual.

When performing a new verification, select "Load Default Data".

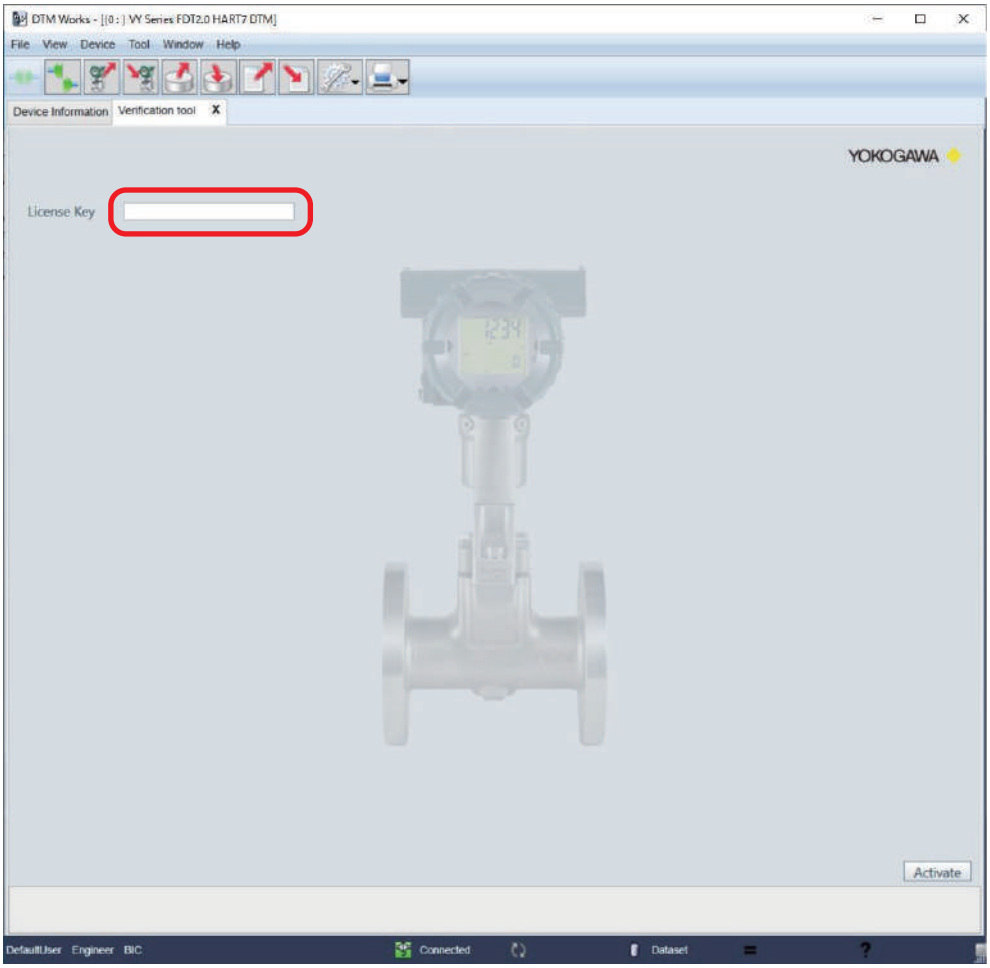
5 Select [Device], [Additional Functions] and then [Verification tool] in this order from the tool bar in the <DTM> screen.



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6 Enter the license key in the "License key" field, and click [Activate].

This screen is displayed only when the verification tool is started up for the first time after it has been installed.



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Display Item	Explanation
License key	Enter the license key for the software using 23 characters excluding a hyphen "-"

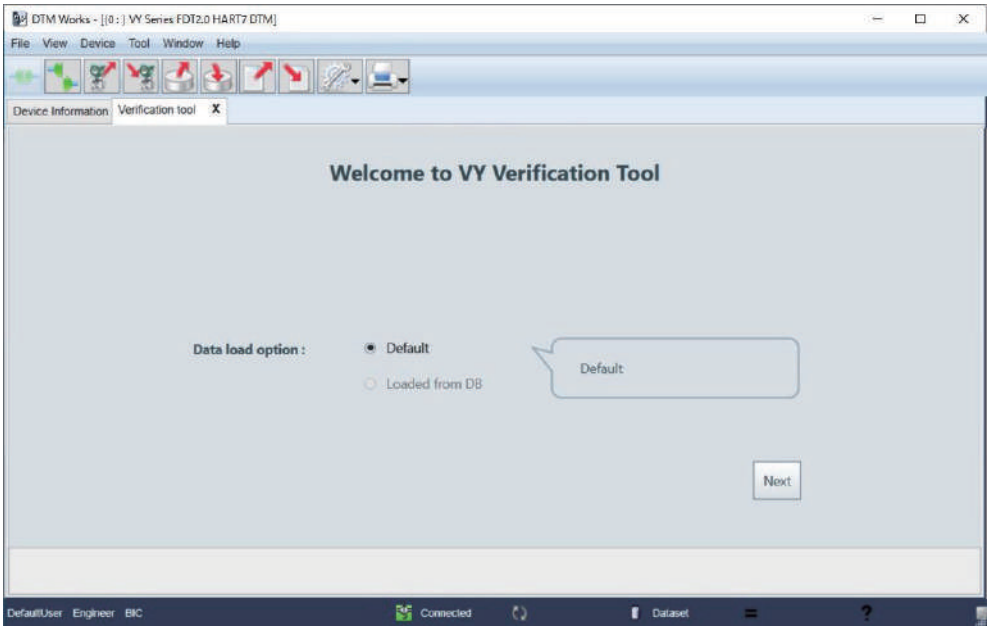
The License Agreement is displayed.

7 Check the content of the License Agreement, and click [OK].



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The Verification Tool startup screen is displayed.



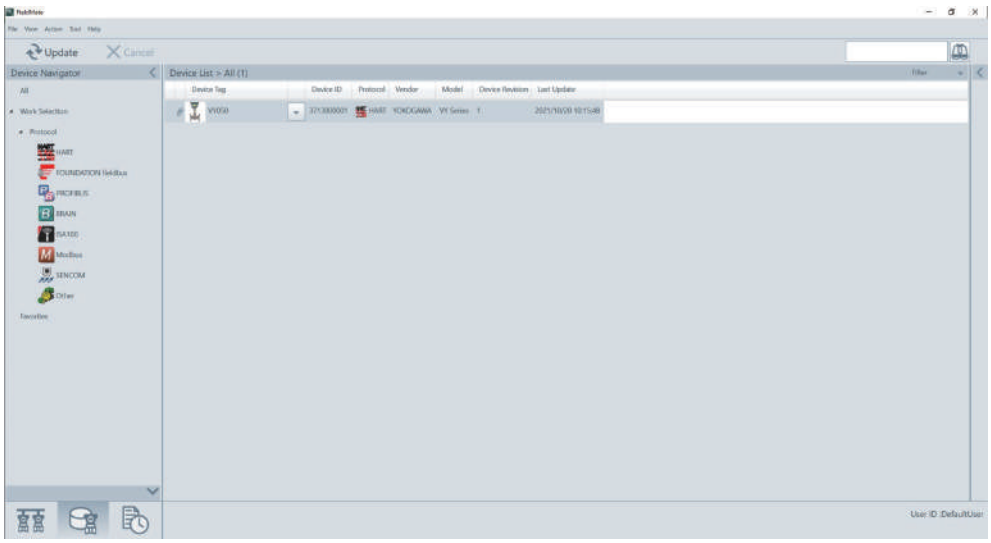
F0214.ai

Select the data to load, and click [Next]. The verification test items screen is displayed.

Display Item	Explanation
Default	Perform new verification
Loaded From DB	Read the data saved in the database and perform verification

Starting up from Device Navigator

1 Start up FieldMate, and select the <Device Navigator> screen

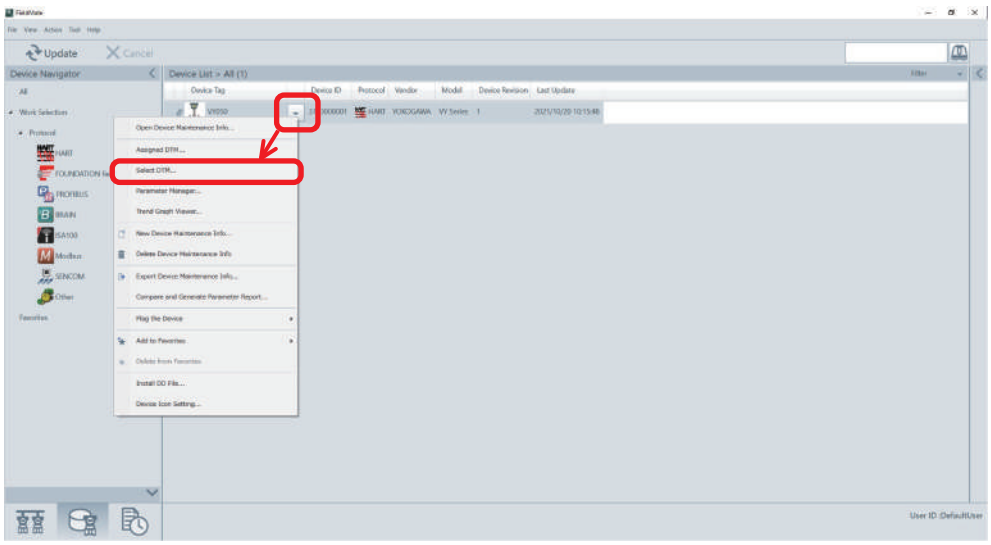


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2 Start up DTM

Starting up DTM from the device list

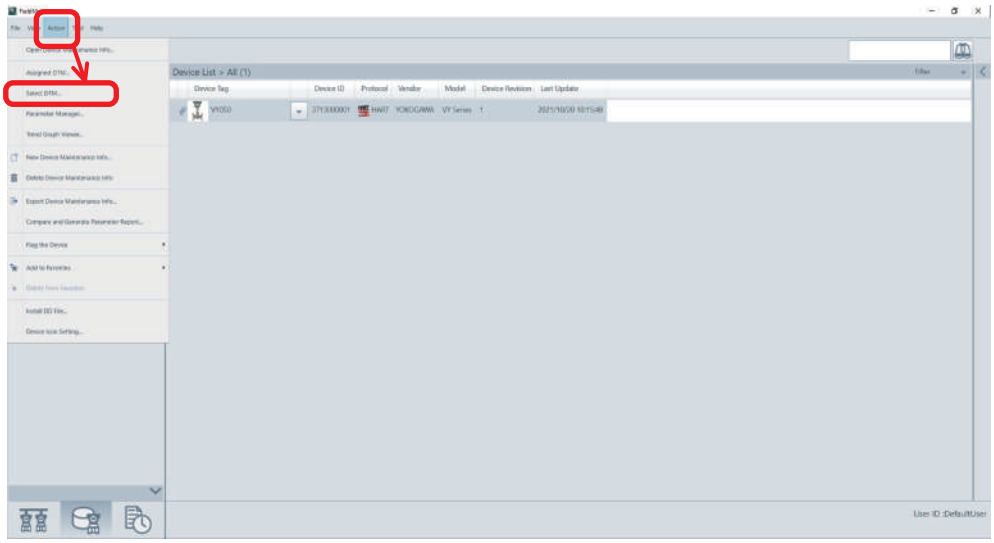
Click the pulldown menu icon of the device list, and select [Select DTM…]



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Starting up DTM by the action menu

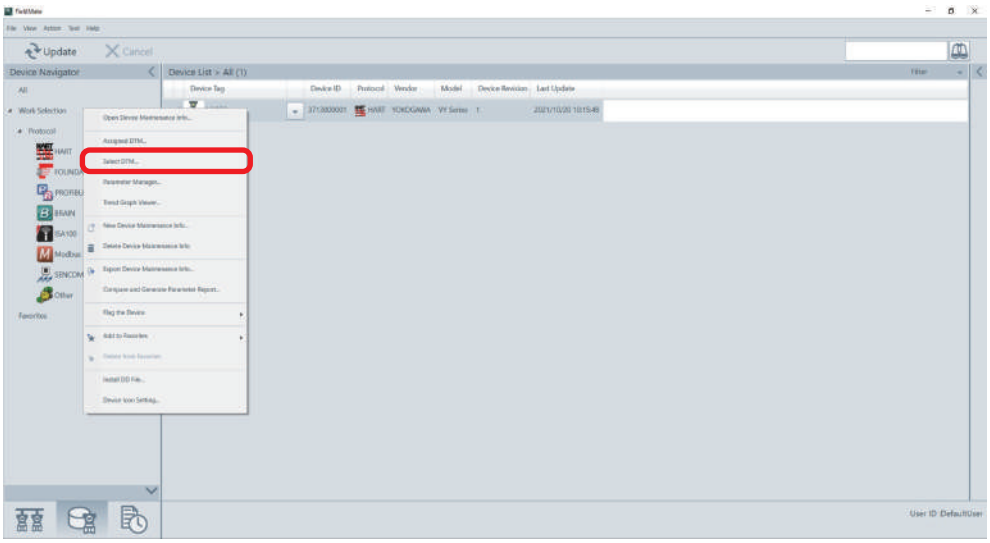
Click the [Action] menu, and select [Select DTM…]



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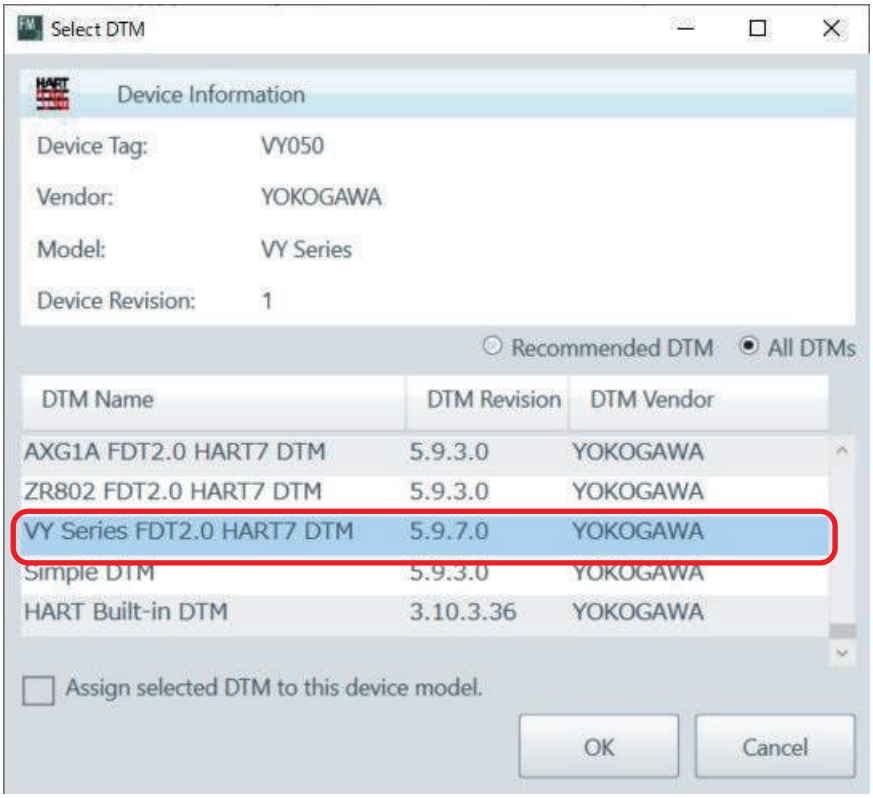
Starting up DTM by right-clicking

Right-click on the device list, and select [Select DTM…]



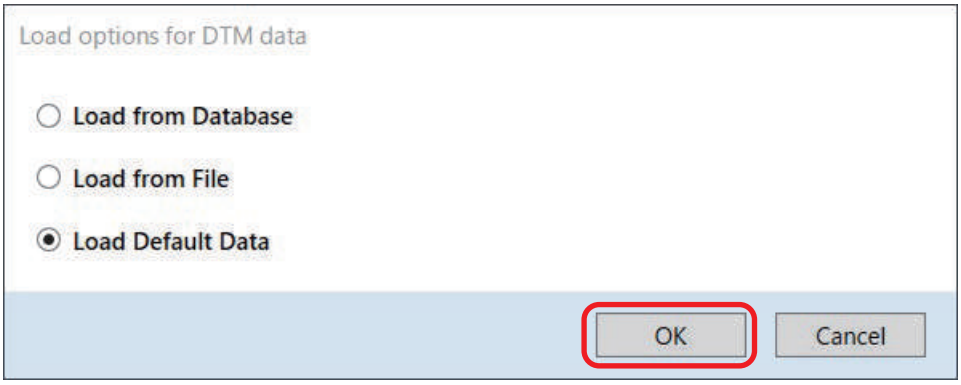
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3 Select the target DTM shown in the <Select DTM> screen, and click [OK].



F0222.ai

4 Select the data to load, and click [OK].



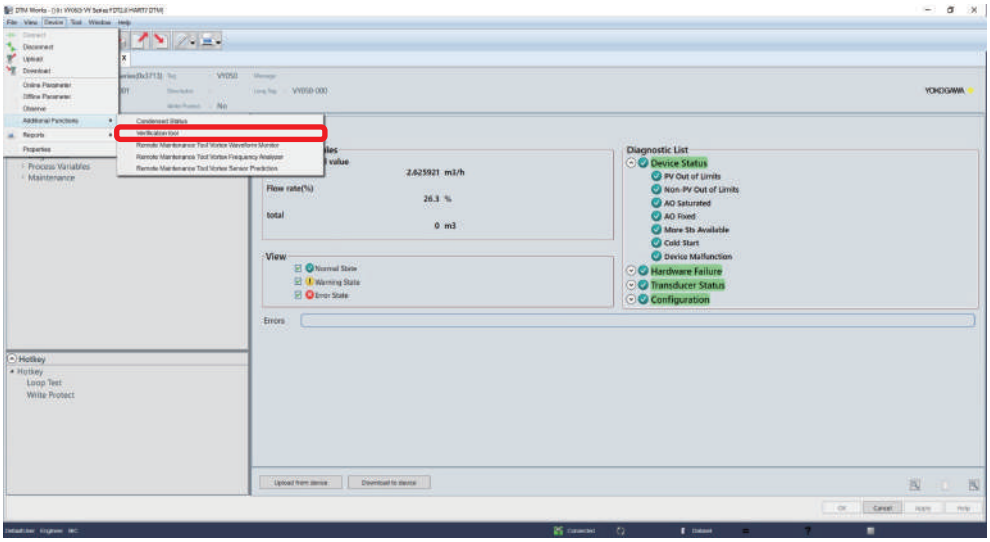
F0223.ai

Display Item	Explanation
Load from Database	Loads data stored on the database
Load from File	Loads data stored in dns format file
Load Default Data	Loads data from a connected device

For details in dns format files, refer to the FieldMate User's Manual.

When performing a new verification, select "Load Default Data".

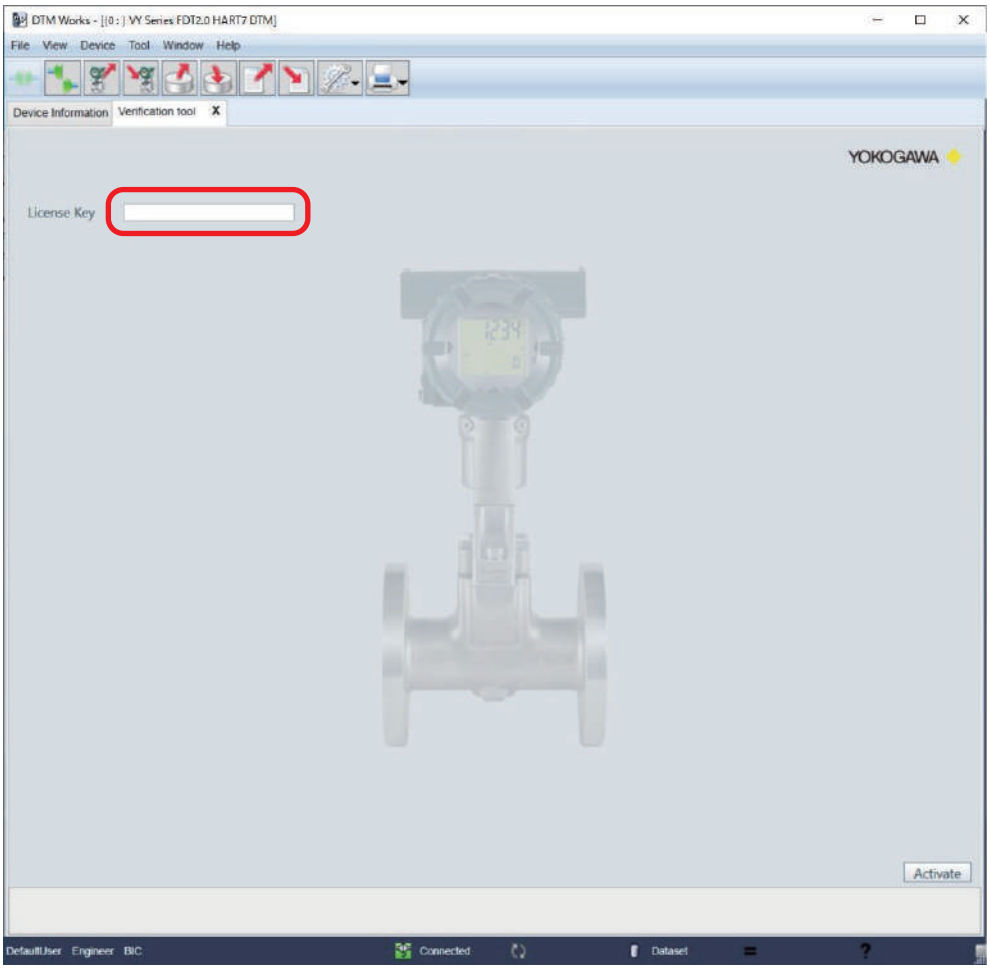
5 **Select [Device], [Additional Functions] and then [Verification tool] in this order from the tool bar in the <DTM> screen.**



F0224.ai

6 Enter the license key in the "License key" field, and click [Activate].

This screen is displayed only when the verification tool is started up for the first time after it has been installed.



F0225.ai

Display Item	Explanation
License key	Enter the license key for the software using 23 characters excluding a hyphen "-"

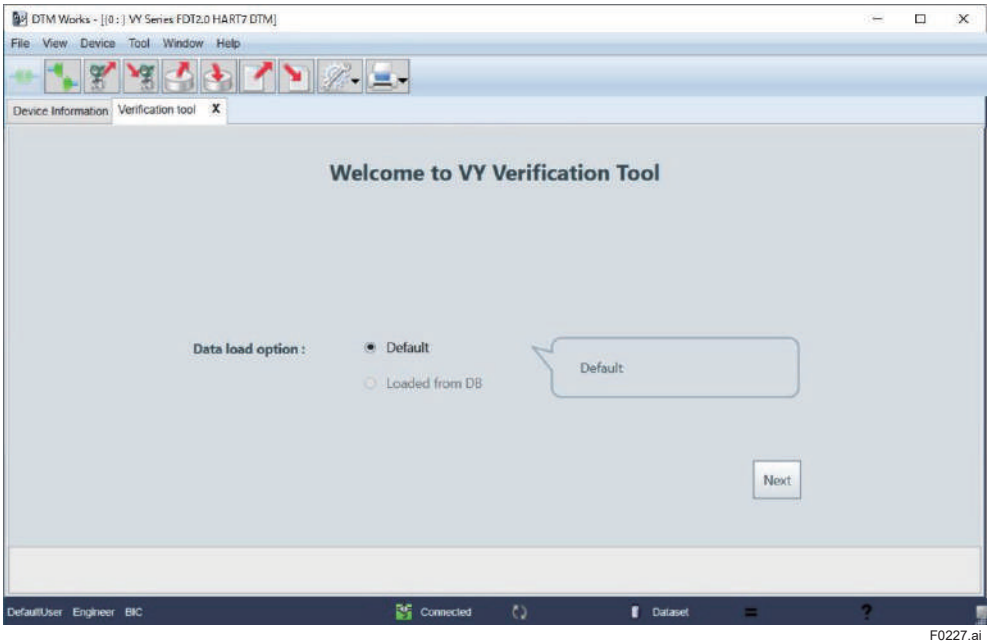
The License Agreement is displayed.

7 Check the content of the License Agreement, and click [OK].



F0226.ai

The Verification Tool startup screen is displayed.



F0227.ai

Select the data to load, and click [Next]. The verification test items screen is displayed.

Display Item	Explanation
Default	Perform new verification
Loaded From DB	Read the data saved in the database and perform verification

How to exit the tool

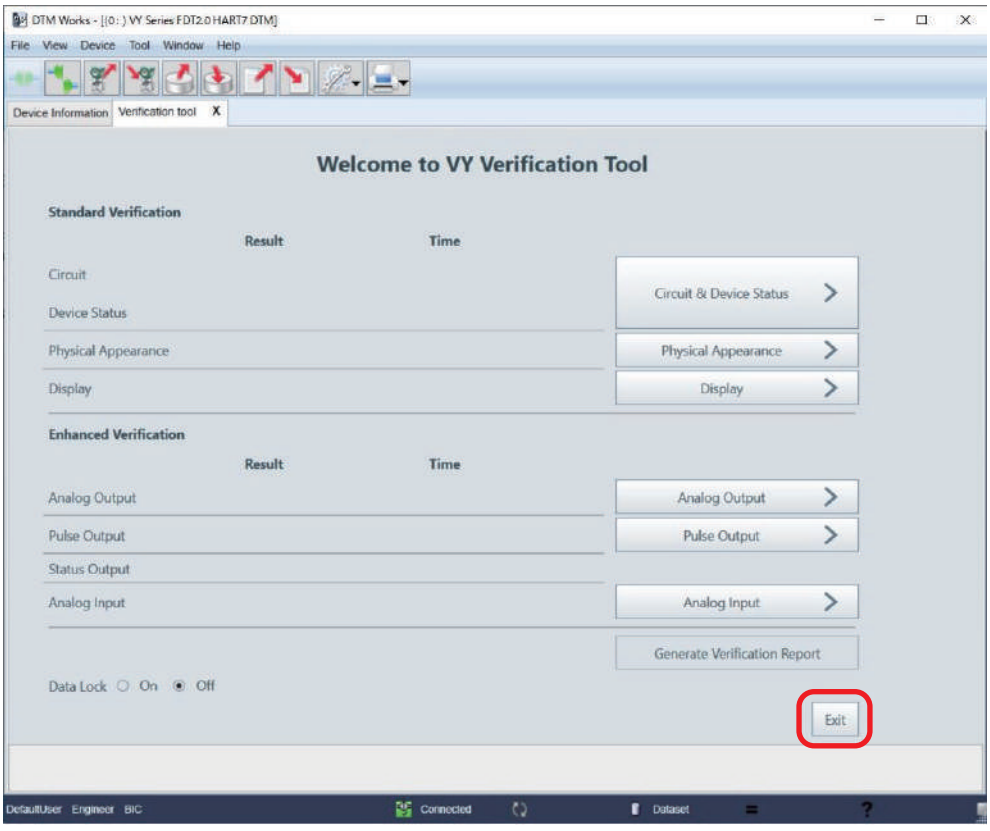
IMPORTANT

Make sure to keep the power for the VY ON for at least ten minutes after finishing verification. If the power is turned OFF immediately, parameters may be changed to different values from the ones before verification was performed.
Also, when the software write protection function was disabled according to the procedure in 2.1.3, write protection will automatically become enabled within ten minutes of verification ending. When the hardware write protection function switch was set to OFF, set it ON again after ten minutes or more of verification ending.

NOTE

Before exiting this tool, store the verification result data.
For details about how to store data, refer to Section 4.1.

1 **Click [EXIT].**



F0215.ai

Countermeasures at an abnormal end

If this tool ends abnormally, make sure that the target device and FieldMate are connected correctly, and restart this tool. If there are parameters that have been changed during execution of verification and have not been restored to their original values, the original settings are returned to automatically when the tool is restarted.

2.2.2 Remote Maintenance Tool

■ Remote Maintenance Tool functions

The Remote Maintenance Tool of the Vortex Flowmeter VY Series runs in combination with DTM Frame. It is used, for example, for monitoring and analyzing the acquisition status of the vortex signal, and for the predictive diagnosis of sensors.
For details on screens that are used and operating procedures, refer to the respective item in "6. Operations In the Remote Maintenance Tool."
The Remote Maintenance Tool comprises three tools.

Tool name	Explanation	Refer to
Vortex Waveform Monitor	Acquires the waveform data of the vortex signal at the user-specified timing or when a vortex sensor-related alarm occurs, and displays that data on screen. Noise ratio and TLA can be changed so that changes in waveform data can be checked.	6.1
Vortex Frequency Analyzer	Acquires the signal strength data of each frequency band of the vortex signal at the user-specified timing or when a vortex sensor-related alarm occurs, and displays that data on screen. Noise ratio and Signal level can be changed to check changes in signal strength data.	6.2
Vortex Sensor Prediction	Periodically acquires vortex signal data and displays this on screen. Predictive diagnosis is performed regarding the possibility and the timing of vortex sensor-related alarms occurring in the future based on long-term changes in this vortex signal data.	6.3

NOTE

- Do not turn the device OFF during execution of the Remote Maintenance Tool and for at least ten minutes of verification ending. If the power is turned OFF immediately, waveform data may not be stored correctly.
- Use Vortex Sensor Prediction with fluid flowing.

IMPORTANT

- The Remote Maintenance Tool must be executed with the vortex flowmeter installed on the piping.
- The Remote Maintenance Tool might not operate normally if it is executed while a system alarm has occurred.
- If communication changes to an offline state due to disconnection of the cable during execution of the Remote Maintenance Tool, re-connect FieldMate to the device.

How to start up the tool

1 Start up the operation screen

Starting up the <Vortex Waveform Monitor> screen

(1) Click [Device]→[Additional Functions]→[Remote Maintenance Tool:Vortex Waveform Monitor].

Starting up the <Vortex Frequency Analyzer> screen

(1) Click [Device]→[Additional Functions]→[Remote Maintenance Tool:Vortex Frequency Analyzer].

Starting up the <Vortex Sensor Prediction> screen

(1) Click [Device]→[Additional Functions]→[Remote Maintenance Tool:Vortex Sensor Prediction].

How to exit the tool

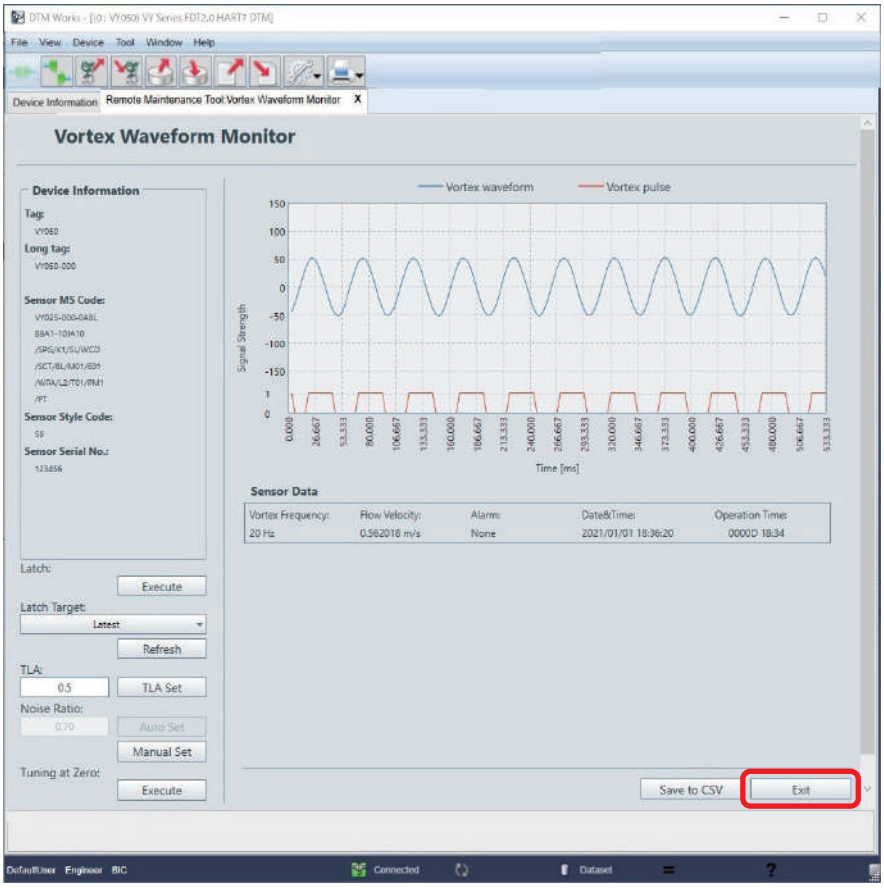
1 Exit the operation screen

NOTE

The Write Protect status and User Role rights return to their status before the tool was started up.

Exiting the <Vortex Waveform Monitor> screen

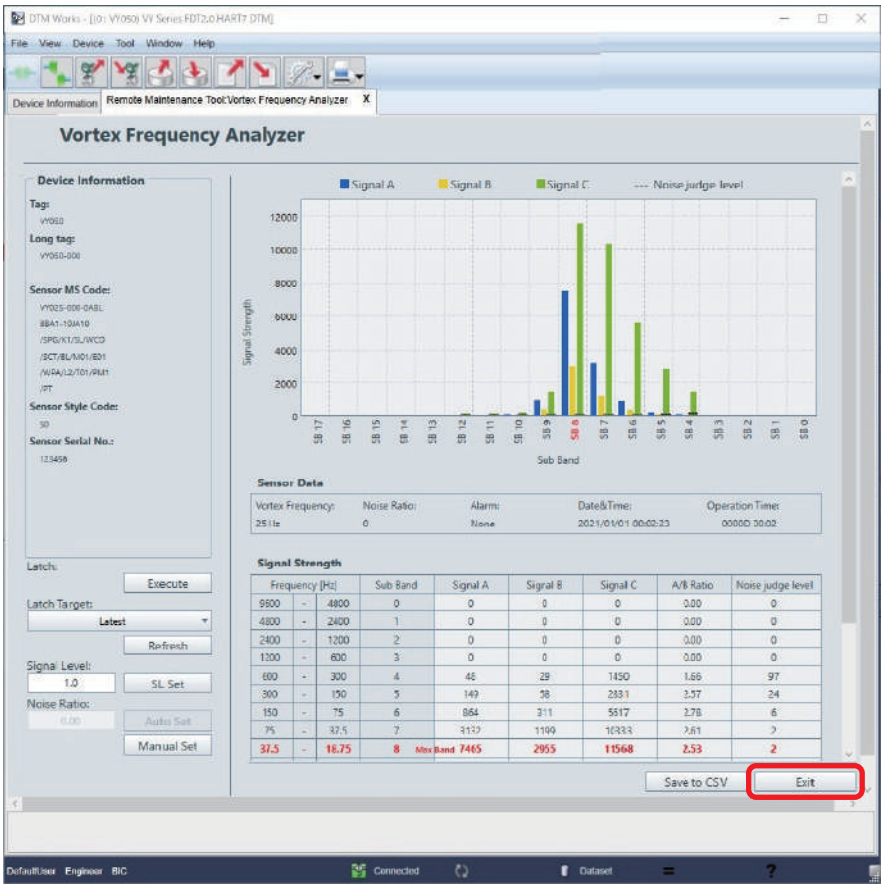
Click [EXIT].



F0234.ai

Exiting the <Vortex Frequency Analyzer> screen

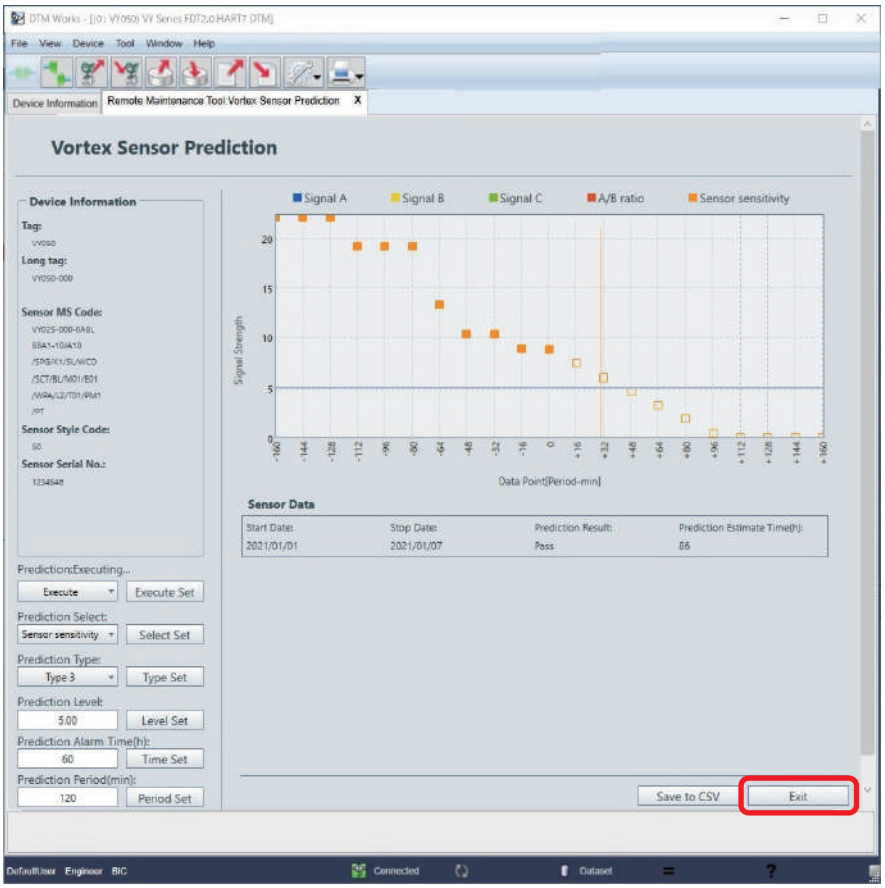
Click [EXIT].



F0235.ai

Exiting the <Vortex Sensor Prediction> screen

Click [EXIT].



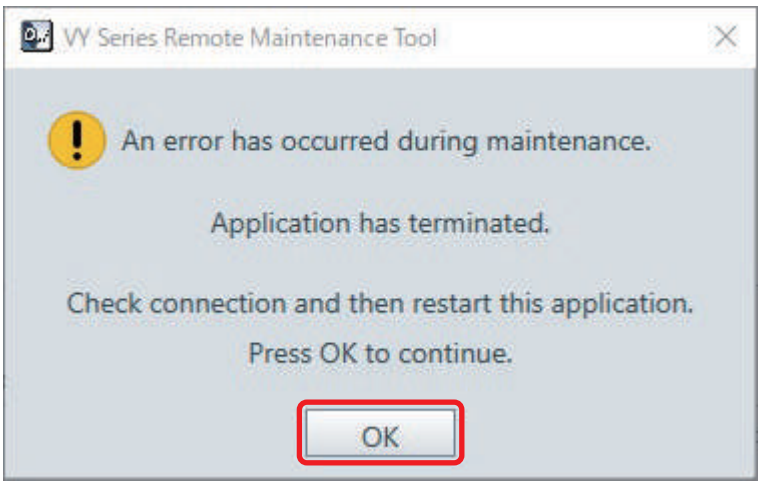
F0236.ai

Countermeasures at an abnormal end

If this tool ends abnormally, make sure that the target device and FieldMate are connected correctly, and restart this tool by the following procedure.

1 **If communication is no longer possible due to an abnormality occurring on the device, click [OK] in the dialog box that is displayed.**

The tool ends.



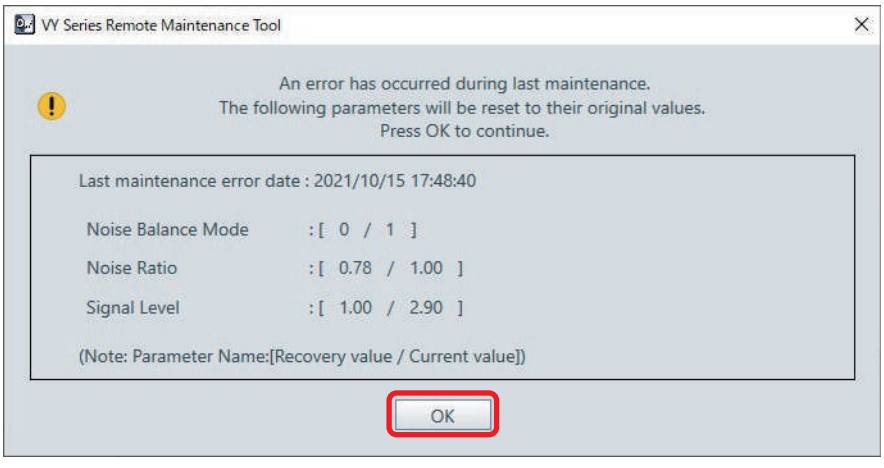
F0237.ai

When the tool is restarted manually, a dialog box prompting recovery of parameters is displayed.

2 **Click [OK].**

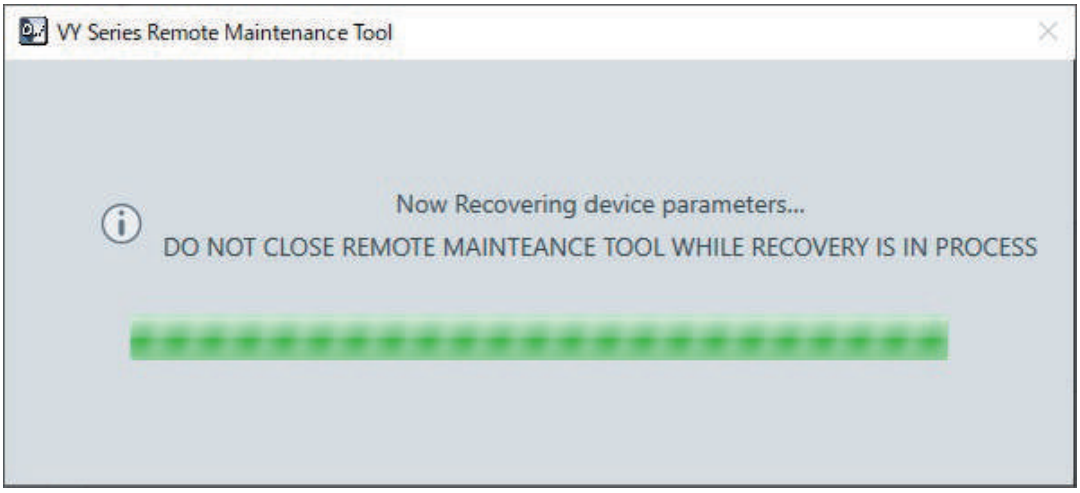
The following parameters that have been changed are recovered.

- Noise balance mode
- Noise ratio
- TLA
- Signal level



F0238.ai

During parameter recovery, the following dialog box is displayed.



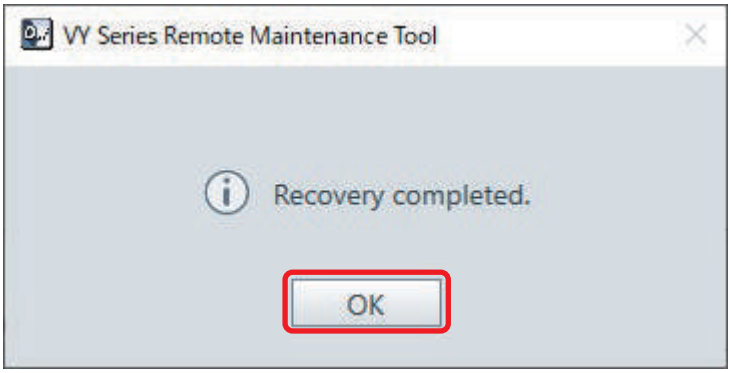
F0239.ai

After parameter recovery is completed, the following dialog box is displayed.

3 **Click [OK].**

The tool starts up.

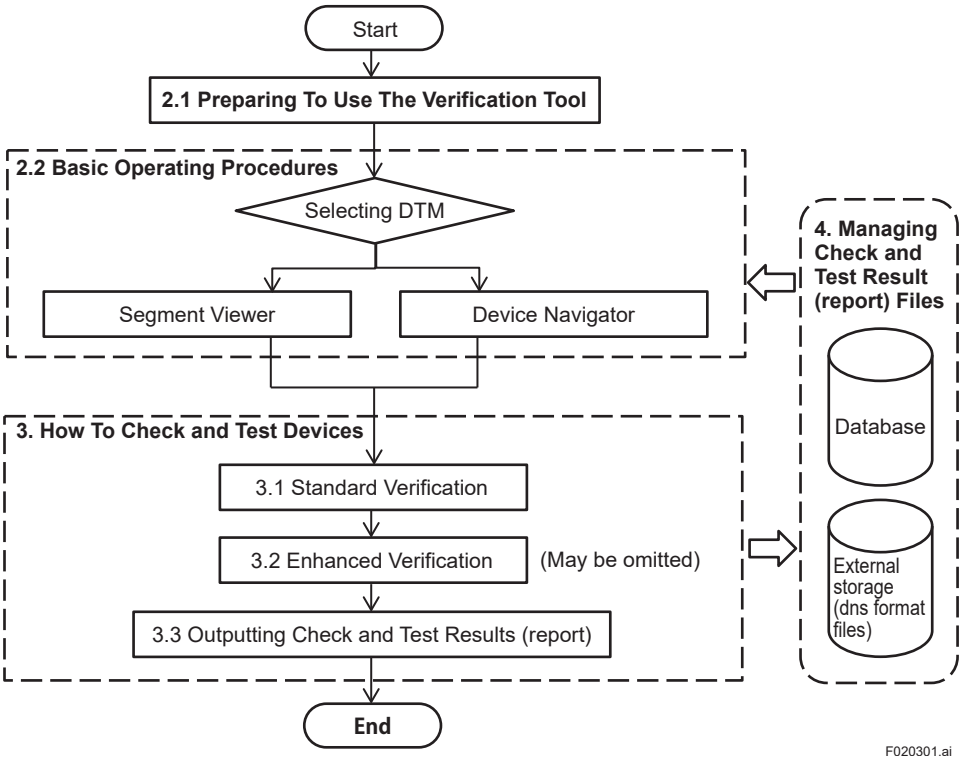
Parameters return to their status at the time when the tool was previously started up.



F0240.ai

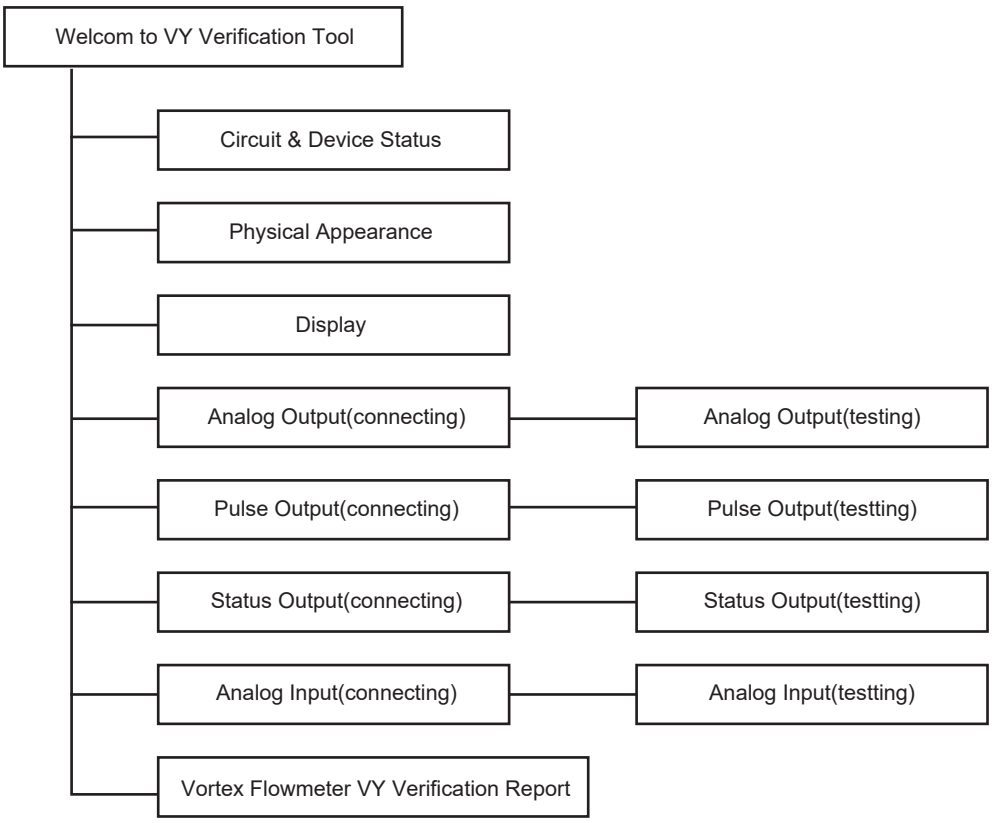
2.3 Verification Operations

2.3.1 Flow of operation



2.3.2 Operation screen

Menu hierarchy

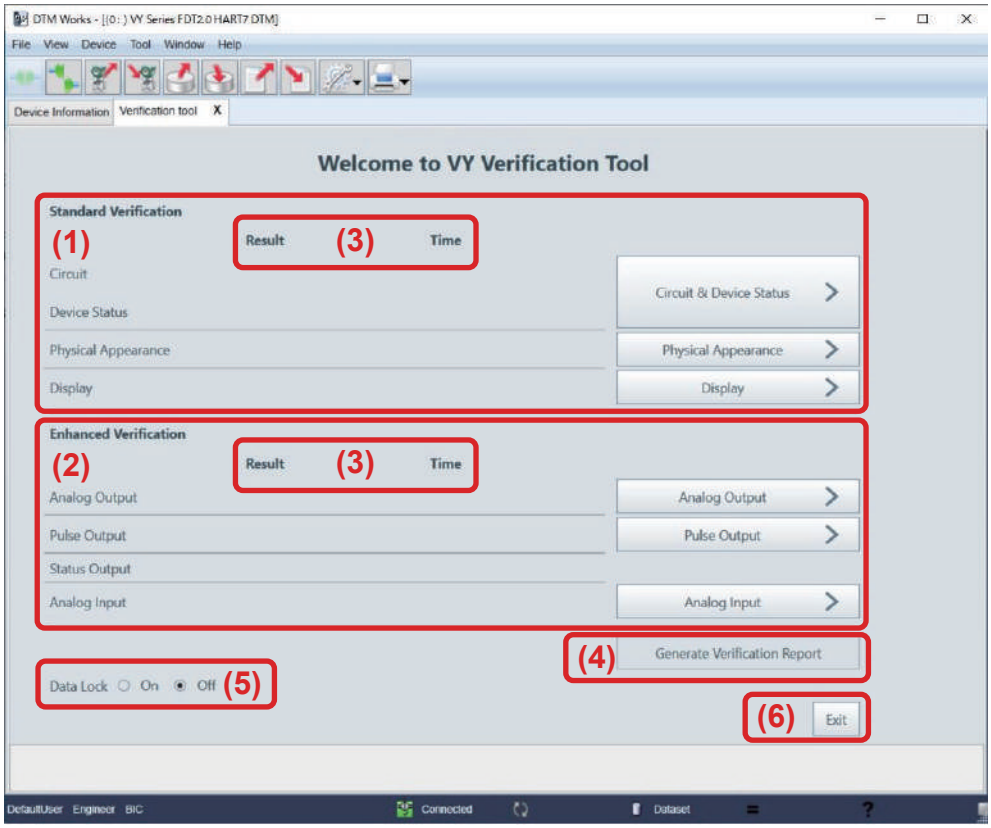


Functions of each screen

Screen name	Explanation
Welcome to VY Verification Tool	This is the top screen of the Verification Tool.
Circuit & Device Status	Performs verification.
Physical Appearance	Performs the appearance test.
Display	Performs the display test. The test is possible on devices with a display.
Analog Output(connecting)	Performs the analog output test connected to an external measuring device.
Analog Output(testing)	
Pulse Output(connecting)	Performs the pulse output test connected to an external measuring device. Whether or not the test is possible depends on the function assigned to the DO terminal. The test is possible when Pulse/Status output mode is set to Scaled pulse, Unscaled pulse or Frequency output.
Pulse Output(testing)	
Status Output(connecting)	Performs the status output test connected to an external measuring device. Whether or not the test is possible depends on the function assigned to the DO terminal. The test is possible when Pulse/Status output mode is set to alarm switch or limit switch.
Status Output(testing)	
Analog Input(connecting)	Performs the analog input test connected to an external measuring device. The test is possible on devices with an analog input function.
Analog Input(testing)	
Vortex Flowmeter VY Verification Report	Outputs test results (report). Output is possible only when Circuit & Device Status is completed.

3. How To Check and Test Devices

■ Screen used and configuration of screen



F0363.ai

No.	Display Item		Explanation
(1)	Standard Verification		Verification that is possible on individual devices
		[Circuit & Device Status]	Performs testing of each circuit and device status
		[Physical Appearance]	Performs the appearance test
		[Display]	Performs the display test
(2)	Enhanced Verification		Verification that is possible on devices in combination with external devices
		[Analog Output]	Performs the analog output test
		[Pulse Output]	Performs testing of pulse output and status output Which test to perform depends on the function assigned to the DO terminal • DO mode = off → Pulse Output button/Status Output button both Off • DO mode = pulse/frequency output → Pulse Output button only On • DO mode = alarm/limit switch → Status Output button only On
		[Status Output]	
		[Analog Input]	Performs the analog input test
(3)	Result		Displays the judgment result for each item.
	Time		Displays the test time for each item.
(4)	[Generate Verification Report]		Outputs test results as a report Output is possible only when at least Standard VF is completed.
(5)	Data lock		When "On" is selected, buttons other than [Generate Verification Report] are inactive
(6)	[Exit]		Exits the tool

3.1 Performing Standard VF

3.1.1 Checking/testing circuits and alarm status

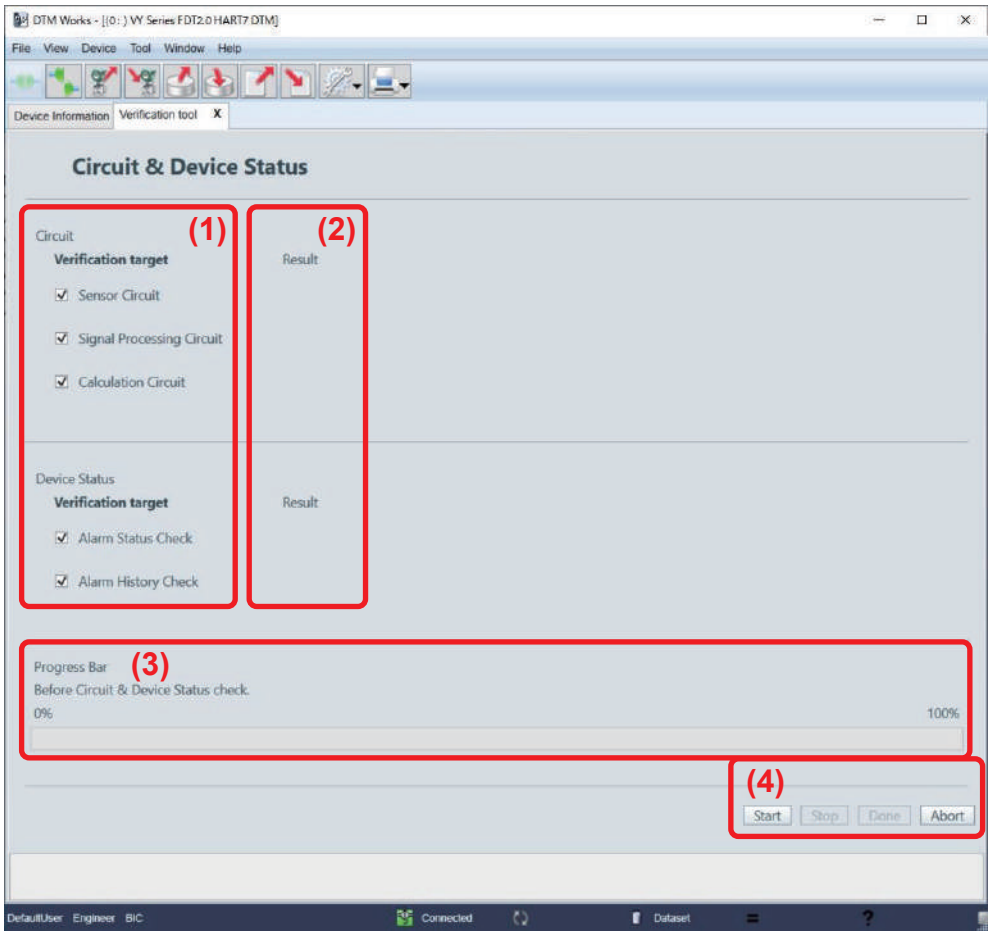
■ Outline of function

The normalcy of each circuit and alarm output states for the target device are checked.
This check is performed by using the verification functions built into the target device.

NOTE

For output of check and test results (report), this test must already have been performed.

■ Screen used and configuration of screen



F0301.ai

No.	Display Item		Explanation
(1)	Circuit		Checks the normalcy of each circuit
		Sensor Circuit	Checks the sensor circuit
		Signal Processing Circuit	Checks the signal processing circuit
		Calculation Circuit	Checks the calculation circuit
	Device Status		Checks the normalcy of each device status
		Alarm Check	Checks the latest alarm status and details
		Alarm History Check	Checks past alarm status and details
(2)	Result		Displays the judgment result for each item.
(3)	Progress Bar		The progress of verification is displayed
(4)	[Start]		Starts verification
	[Stop]		Stops verification When verification is resumed, verification is executed from the beginning.
	[Done]		The display returns to the <Welcome to VY Verification Tool> screen. When verification is completed, the results are reflected in the <Welcome to VY Verification Tool> screen.
	[Abort]		The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen

■ Operating Procedure

NOTE

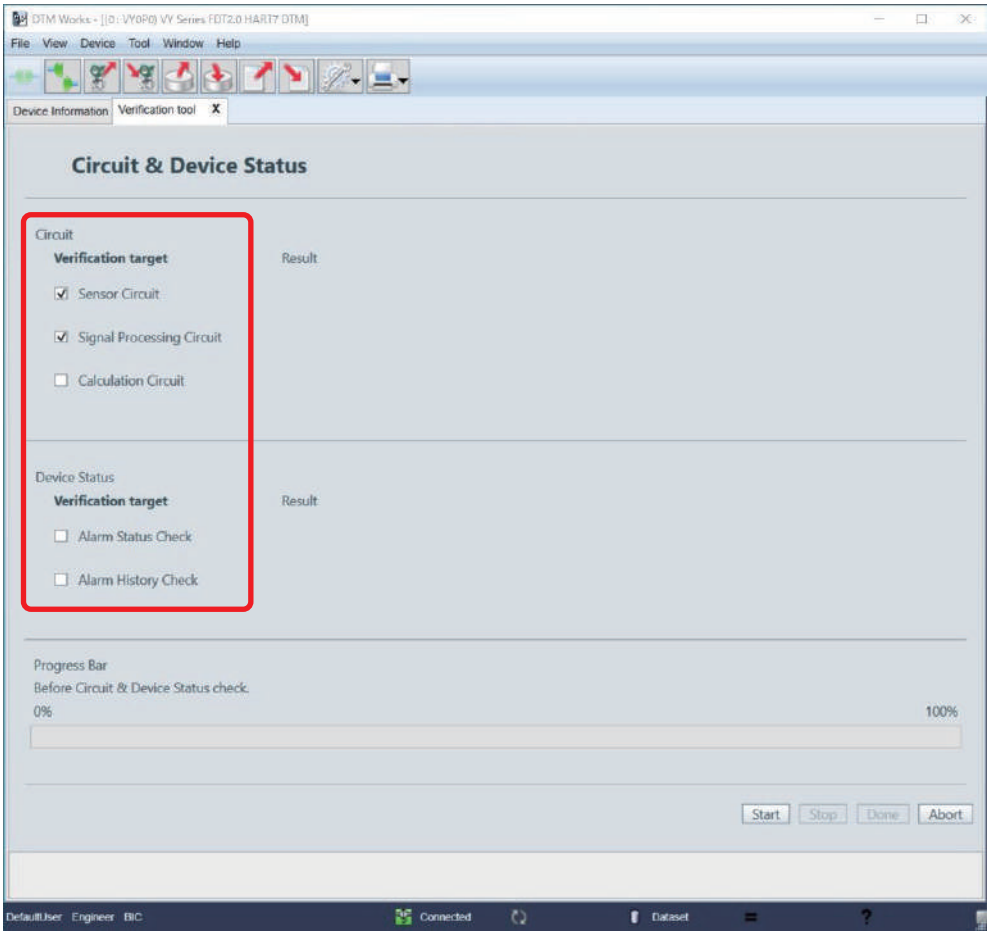
Before starting operation, make sure that [Data Lock] is [Off]. Operation is not possible if the [On] checkbox is selected at [Data Lock].

1 Start up the operation screen

Click [Circuit & Device Status] in the <Welcome to VY Verification Tool> screen to display the <Circuit & Device Status> screen.

2 Specify target items for verification

Click the checkbox of items to be verified



F0302.ai

Display Item		Explanation
Circuit		
	Sensor Circuit	Checks the normalcy of the sensor circuit
	Signal Processing Circuit	Checks the normalcy of the signal processing circuit
	Calculation Circuit	Checks the normalcy of the calculation circuit
Device Status		
	Alarm Check	Checks the latest alarm status and details
	Alarm History Check	Checks past alarm status and details

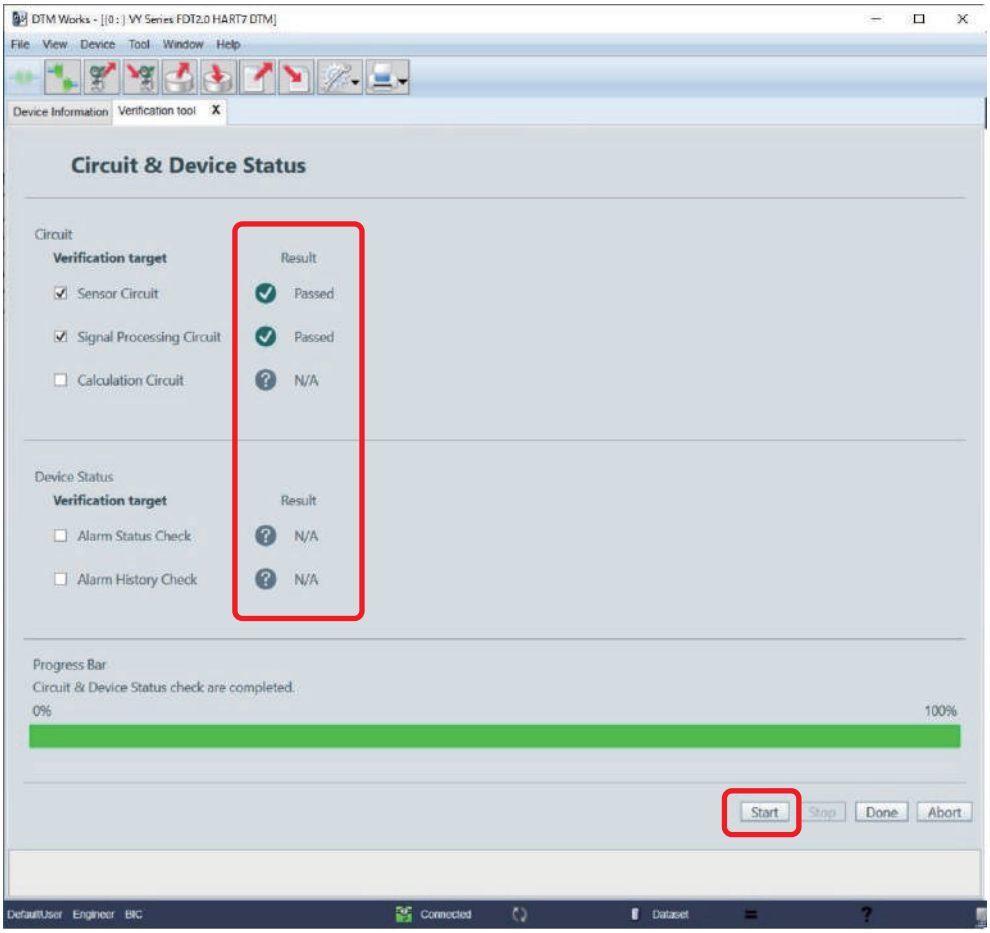
3 Click [Start] to execute verification

Verification is executed on the selected check items, and the judgment result is displayed at [Result].

During execution, progress of verification is displayed at [Progress Bar].

NOTE

To stop the verification, click [Stop].



F0303.ai

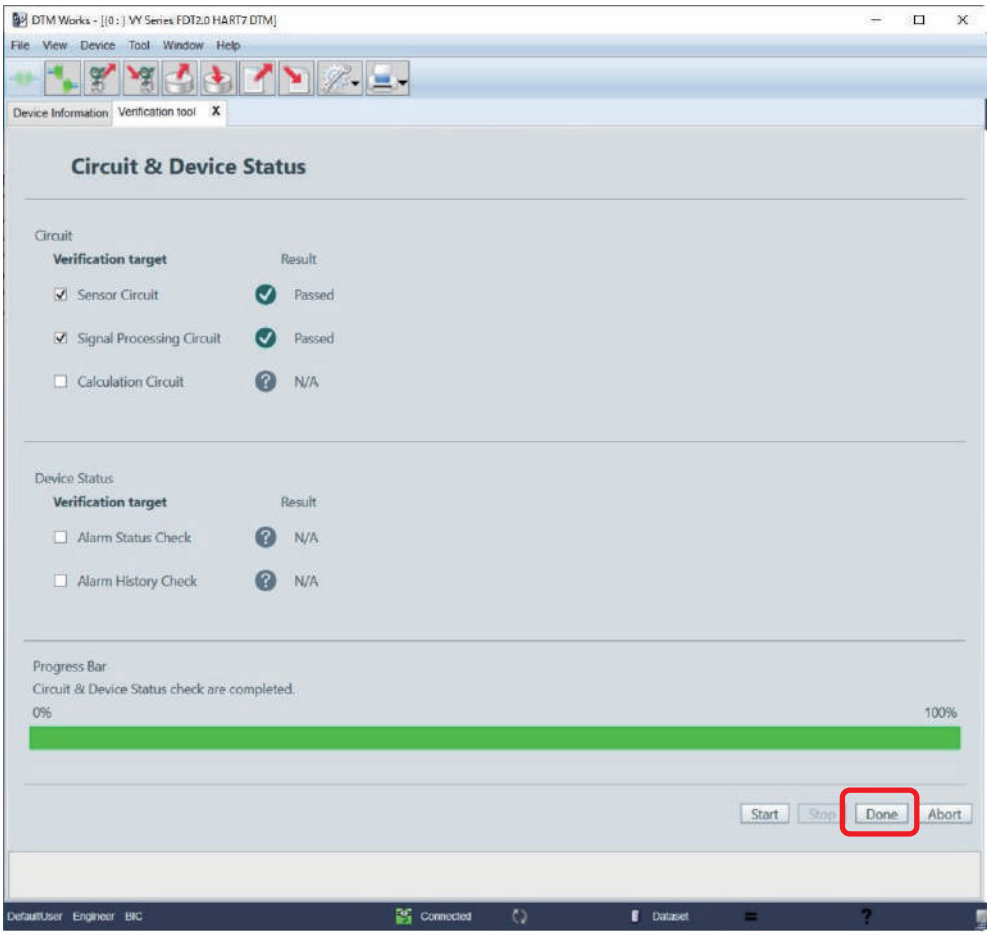
Display Item	Explanation
Passed	This is displayed when measured values are within the range of the judgment threshold as a result of verification.
Failed	This is displayed when measured values are outside the range of the judgment threshold as a result of verification.
N/A	Items not targeted for verification (verification not yet performed)

4 Click [Done] to apply the result of verification

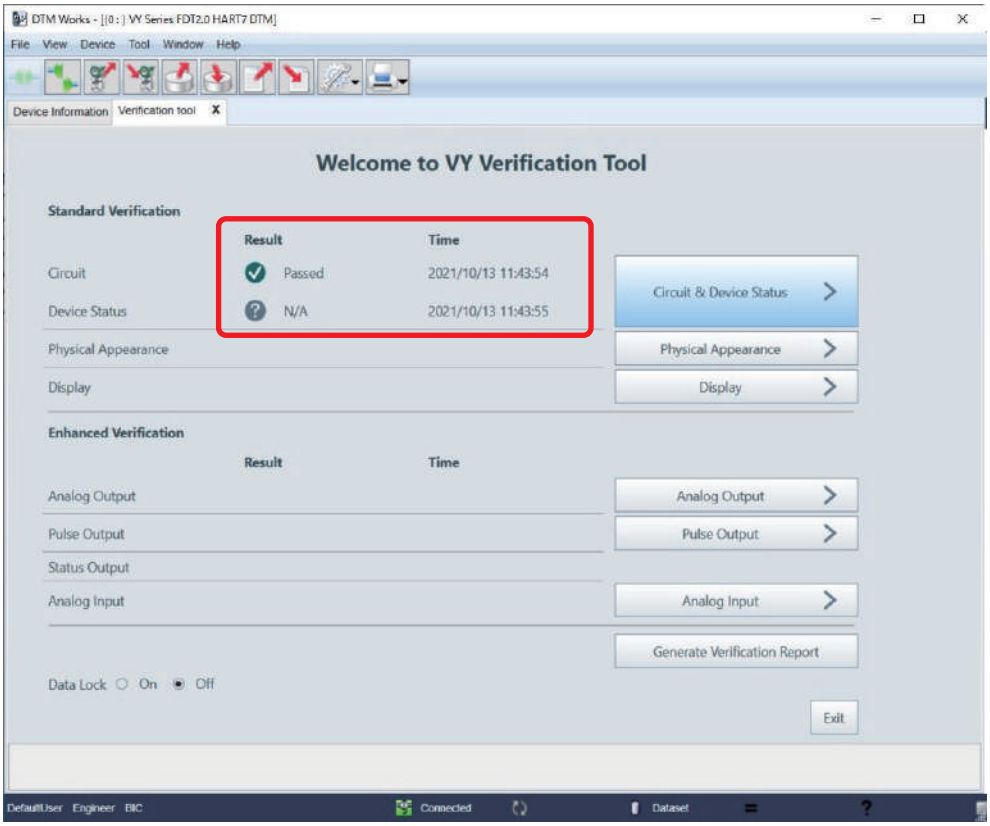
The judgment results are applied, and are reflected and displayed in the <Welcome to VY Verification Tool> screen.

To cancel and discard the execution results, click [Abort], and then click [OK] in the confirmation dialog box.

The execution results up till then are canceled and discarded, and the screen returns to the <Welcome to VY Verification Tool> screen.



F0304.ai


DTM Works - [(0 :) VY Series FDT2.0 HART7 DTM]
File View Device Tool Window Help
Device Information
Verification tool
Welcome to VY Verification Tool
Standard Verification
Result
Time
Circuit
Passed
2021/10/13 11:43:54
Device Status
N/A
2021/10/13 11:43:55
Physical Appearance
Display
Circuit & Device Status
Physical Appearance
Display
Enhanced Verification
Result
Time
Analog Output
Pulse Output
Status Output
Analog Input
Analog Output
Pulse Output
Analog Input
Generate Verification Report
Data Lock On Off
Exit
DefaultUser Engineer BIC
Connected
Dataset

F0305.ai

3.1.2 Check/testing appearance

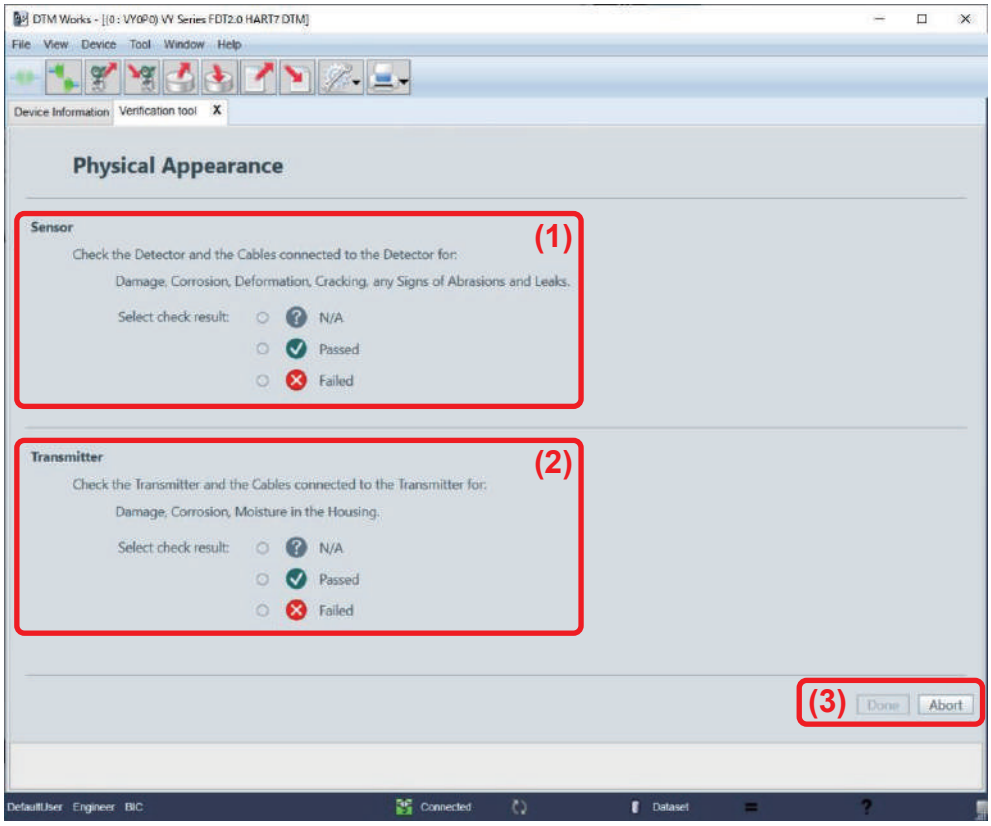
Outline of function

Check for abnormalities on target devices (sensor or Transmitter) and connected cables based on their appearance.
The user performs this check manually (visually), and reflects and applies the judgment results on the tool.

NOTE

For the integrated type, check the indicator and the sensor separately.

Screen used and configuration of screen



F0306.ai

No.	Display Item		Explanation
(1)	Sensor		Select the result of the sensor appearance test
		Passed	Select when it is judged that there is no abnormality as a result of the visual check
		Failed	Select when it is judged that there is an abnormality as a result of the visual check
		N/A	Select in the case of items not targeted for the visual check (visual check not yet performed)
(2)	Transmitter		Checks the result of the transmitter appearance test
		Passed	Select when it is judged that there is no abnormality as a result of the visual check
		Failed	Select when it is judged that there is an abnormality as a result of the visual check

		N/A	Select in the case of items not targeted for the visual check (visual check not yet performed)
(3)	[Done]		The display returns to the <Welcome to VY Verification Tool> screen. When testing is completed, the results are reflected in the <Welcome to VY Verification Tool> screen.
	[Abort]		The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen

Operating Procedure

NOTE

Before starting operation, make sure that [Data Lock] is [Off]. Operation is not possible if [On] is checked at [Data Lock].

1 Start up the operation screen

Click [Physical Appearance] in the <Welcome to VY Verification Tool> screen to display the <Physical Appearance> screen.

2 Visually check the sensor and connected cable.

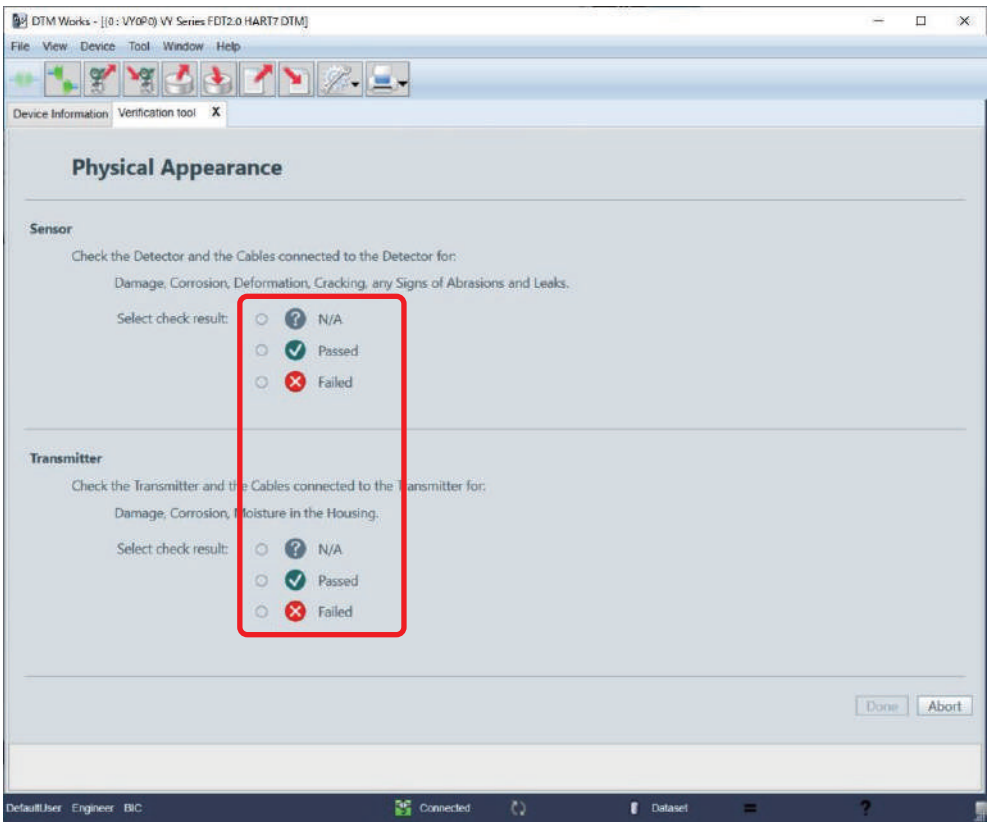
Damage, corrosion, deformation, cracking, and abrasion, and signs of leakage on the sensor and connected cable are checked.

3 Visually check the transmitter and connected cable.

Damage and corrosion, and the humidity condition on the transmitter and connected cable are checked.

4 Reflect the results of the visual checks

Select the check result for the sensor and transmitter (including connection cable).


DTM Works - [(0 : VY0P0) VY Series FDT2.0 HART7 DTM]
File View Device Tool Window Help
Device Information
Verification tool
Physical Appearance
Sensor
Check the Detector and the Cables connected to the Detector for:
Damage, Corrosion, Deformation, Cracking, any Signs of Abrasions and Leaks.
Select check result:
N/A
Passed
Failed
Transmitter
Check the Transmitter and the Cables connected to the Transmitter for:
Damage, Corrosion, Moisture in the Housing.
Select check result:
N/A
Passed
Failed
Done
Abort
DefaultUser Engineer BIC
Connected
Dataset
F0307.ai

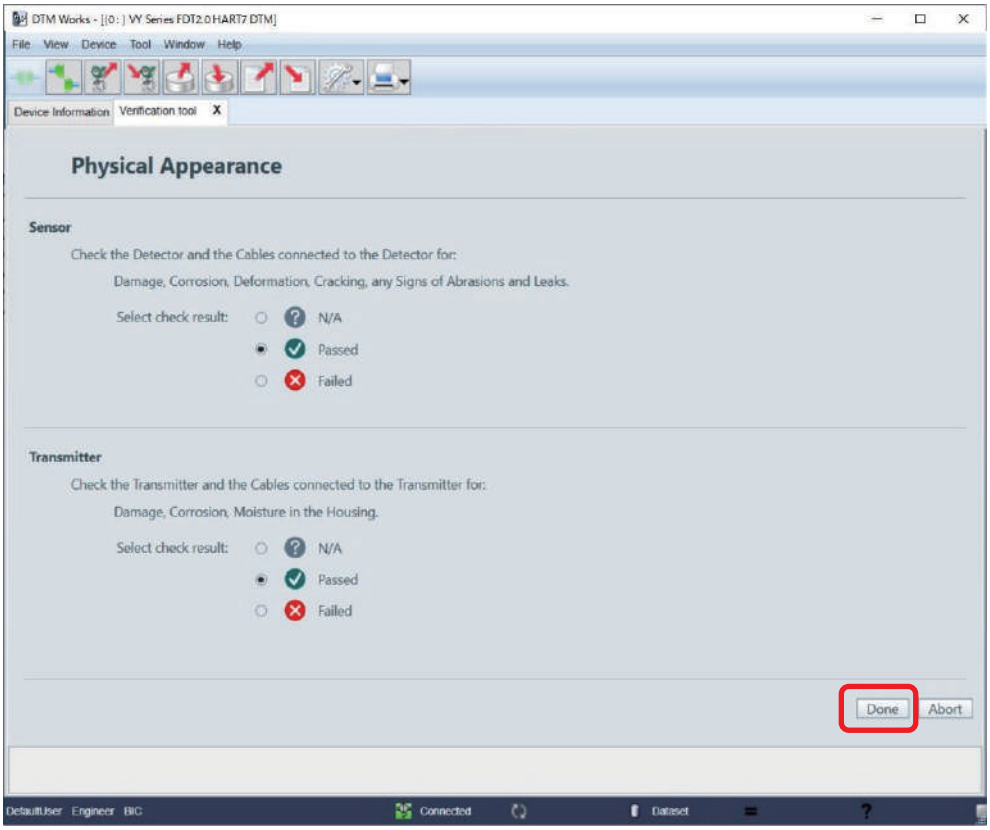
Display Item	Explanation
Passed	Select when it is judged that there is no abnormality as a result of the visual check
Failed	Select when it is judged that there is an abnormality as a result of the visual check
N/A	Items not targeted for the visual check (visual check not yet performed)

5 Click [Done] to apply the results of the visual checks

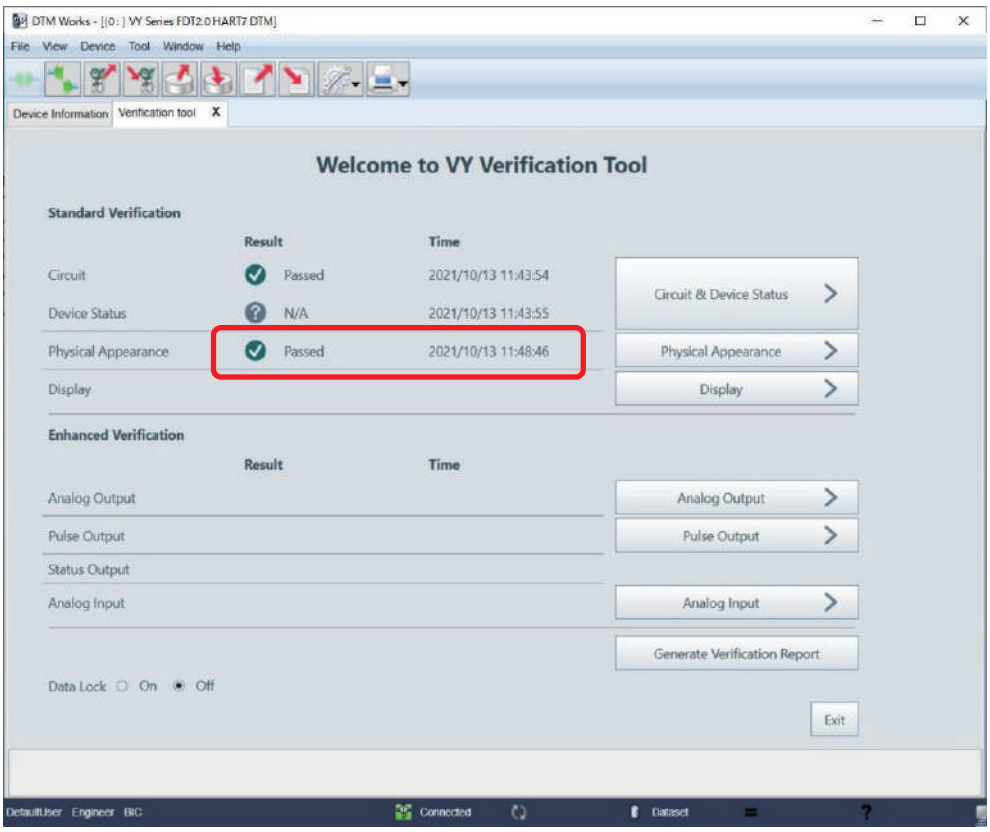
The judgment results are applied, and are reflected and displayed in the <Welcome to VY Verification Tool> screen.

To cancel and discard the execution results, click [Abort], and then click [OK] in the confirmation dialog box.

The execution results up till then are canceled and discarded, and the screen returns to the <Welcome to VY Verification Tool> screen.



F0308.ai


DTM Works - [(0:) VY Series FDT2.0 HART7 DTM]
File View Device Tool Window Help
Device Information
Verification tool
Welcome to VY Verification Tool
Standard Verification
Result
Time
Circuit
Passed
2021/10/13 11:43:54
Device Status
N/A
2021/10/13 11:43:55
Physical Appearance
Passed
2021/10/13 11:48:46
Display
Circuit & Device Status
Physical Appearance
Display
Enhanced Verification
Result
Time
Analog Output
Pulse Output
Status Output
Analog Input
Analog Output
Pulse Output
Analog Input
Generate Verification Report
Data Lock On Off
Exit
DefaultUser Engineer BIC
Connected
Dataset

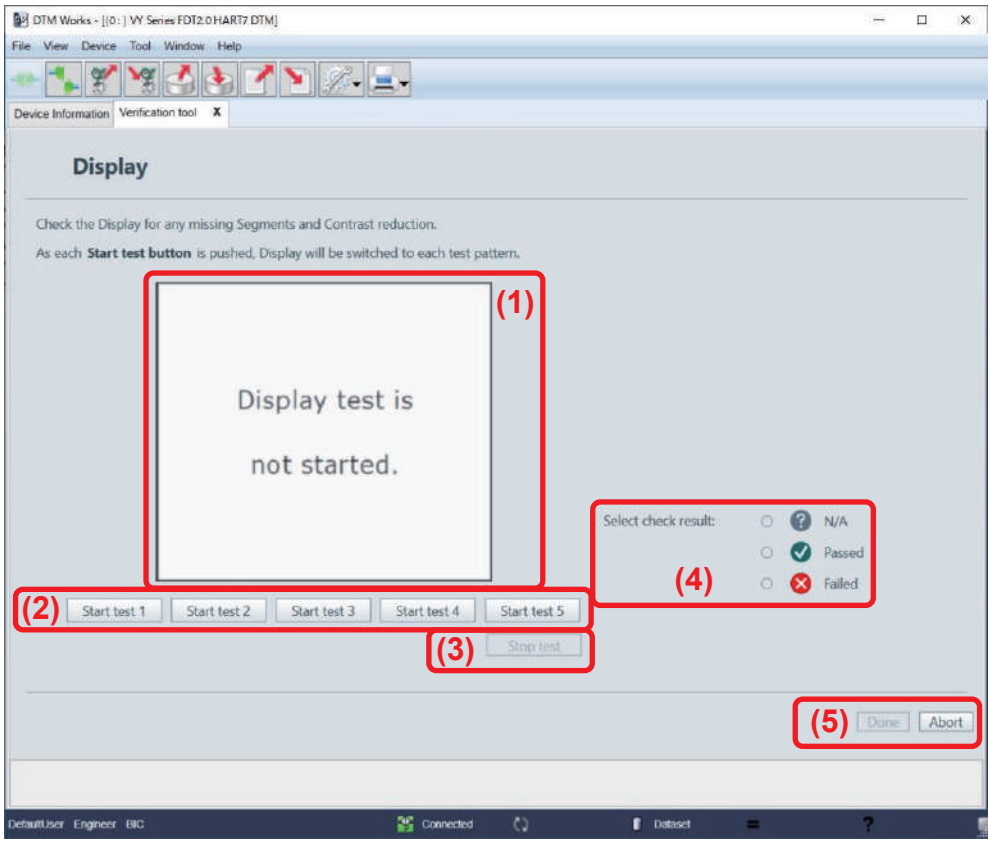
F0309.ai

3.1.3 Checking/testing the display

Outline of function

Checks the normalcy of display functions when the target device is equipped with an LCD display. This check is performed by using the Display test function built into the target device.

Screen used and configuration of screen



F0310.ai

No.	Display Item		Explanation
(1)	Display screen		This displays an image of the display screen while the Display test is being executed
(2)	Display test start buttons		These start the Display test
		[Start Test 1]	All LCDs on the target device are indicated
		[Start Test 2]	Only LCD segments are indicated
		[Start Test 3]	Only the LCD unit display is indicated
		[Start Test 4]	Only the LCD icon is indicated
		[Start Test 5]	All LCDs on the target device are out
(3)	Display test stop button		This stops the Display test
		[Stop test]	
(4)	Select check result		Select the result of the display test
		Passed	Select when it is judged that there is no abnormality as a result of the test
		Failed	Select when it is judged that there is an abnormality as a result of the test
		N/A	Select in the case of items not targeted for the test (visual check not yet performed)
(5)	[Done]		The display returns to the <Welcome to VY Verification Tool> screen. When testing is completed, the results are reflected in the <Welcome to VY Verification Tool> screen.

	[Abort]	The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen

Operating Procedure

NOTE

Before starting operation, make sure that [Data Lock] is [Off]. Operation is not possible if the [On] checkbox is selected at [Data Lock].

1 **Start up the operation screen**

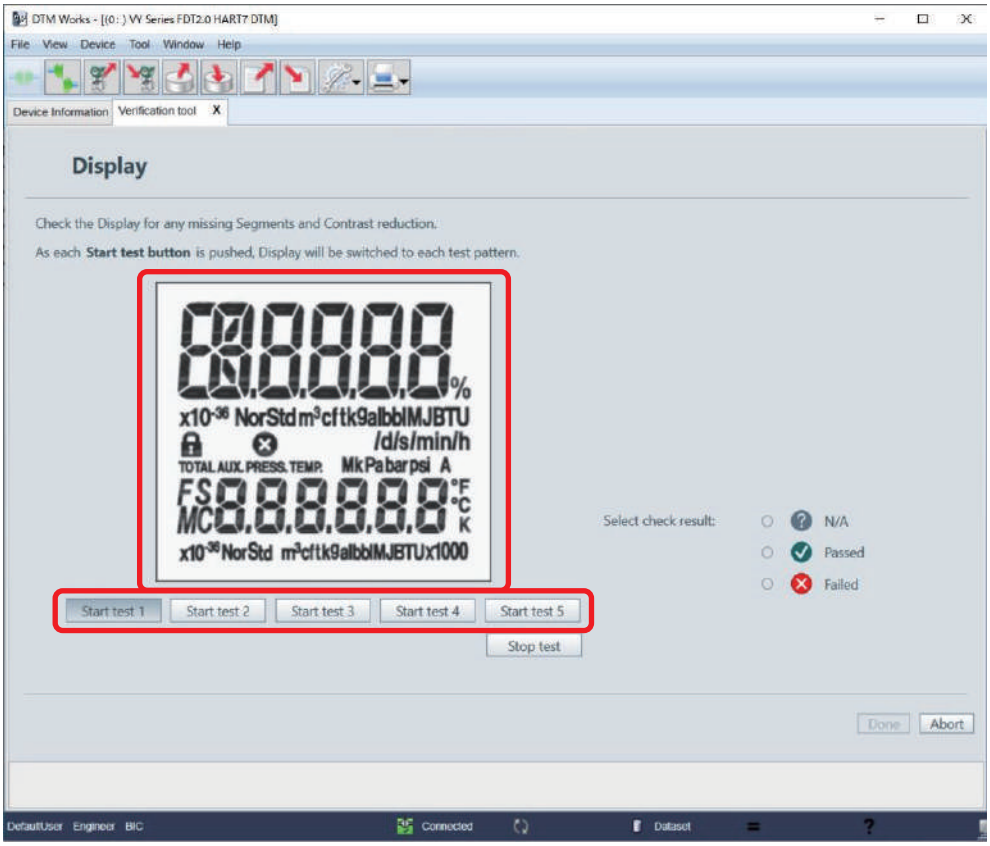
Click [Display] in the <Welcome to VY Verification Tool> screen to display the <Display> screen.

2 **Test the LCD display functions of the target device**

Click [Start Test 1] to [Start Test 5] to perform the five types of display test. Check if the display is displayed in accordance with the screen image according to each button.

NOTE

To stop the test, click [Stop Test]. The execution results are canceled and discarded, and the initial state is returned to.

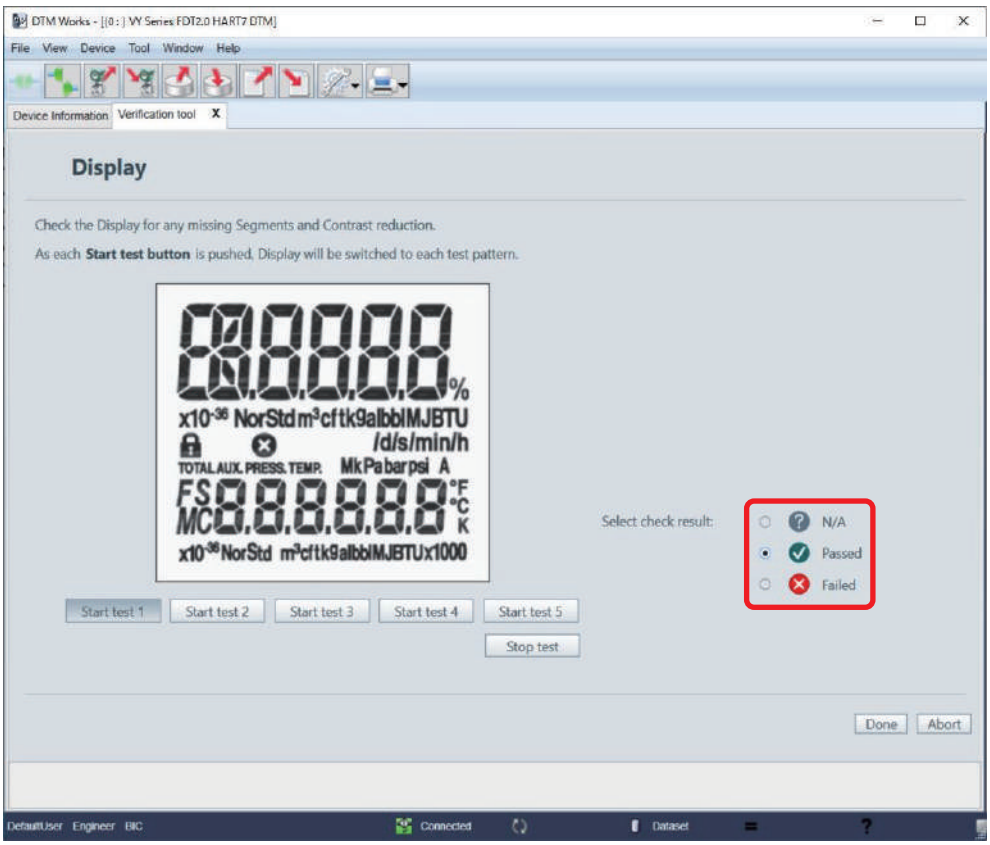


F0311.ai

Display Item	Explanation
[Start Test 1]	All LCDs on the target device are indicated to check normalcy
[Start Test 2]	Only LCD segments are indicated to check normalcy
[Start Test 3]	Only the LCD unit display is indicated to check normalcy
[Start Test 4]	Only the LCD icon is indicated to check normalcy
[Start Test 5]	All LCDs on the target device are out to check normalcy

3 Reflect the results of the test

Select the check result for the LCD display functions of the target device.



F0312.ai

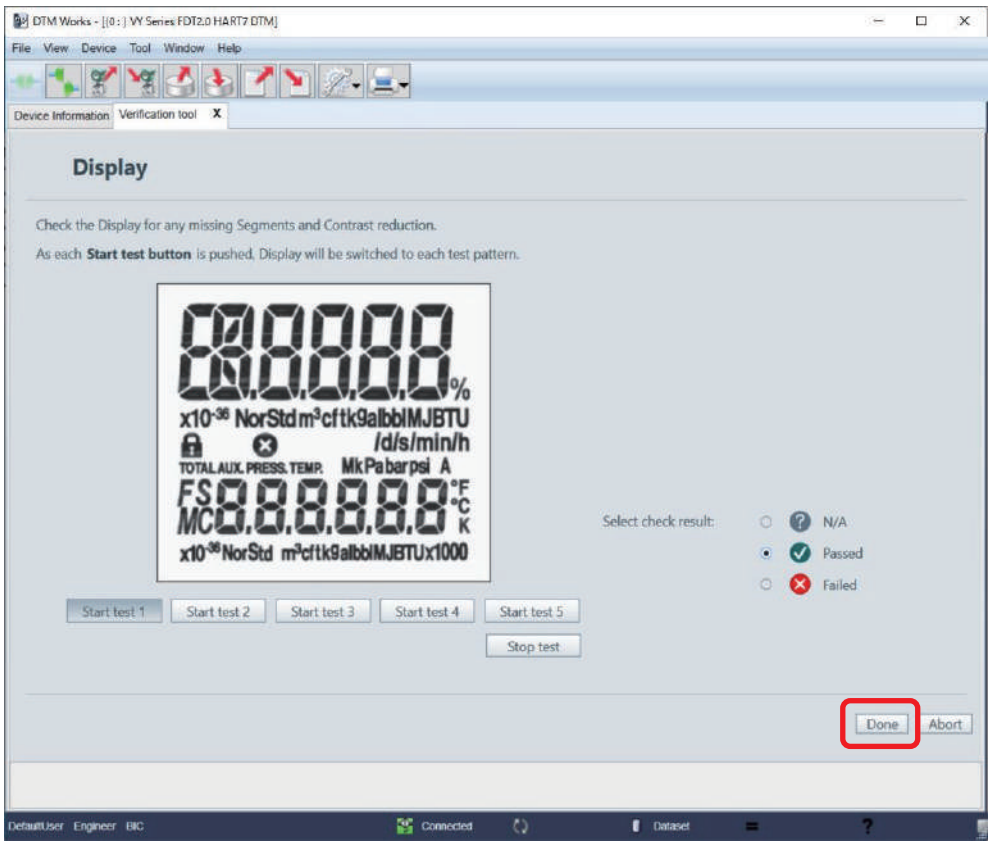
Display Item	Explanation
Passed	Select when it is judged that there is no abnormality as a result of the test
Failed	Select when it is judged that there is an abnormality as a result of the test
N/A	Items not targeted for the test (visual check not yet performed)

4 Click [Done] to apply the results of the test

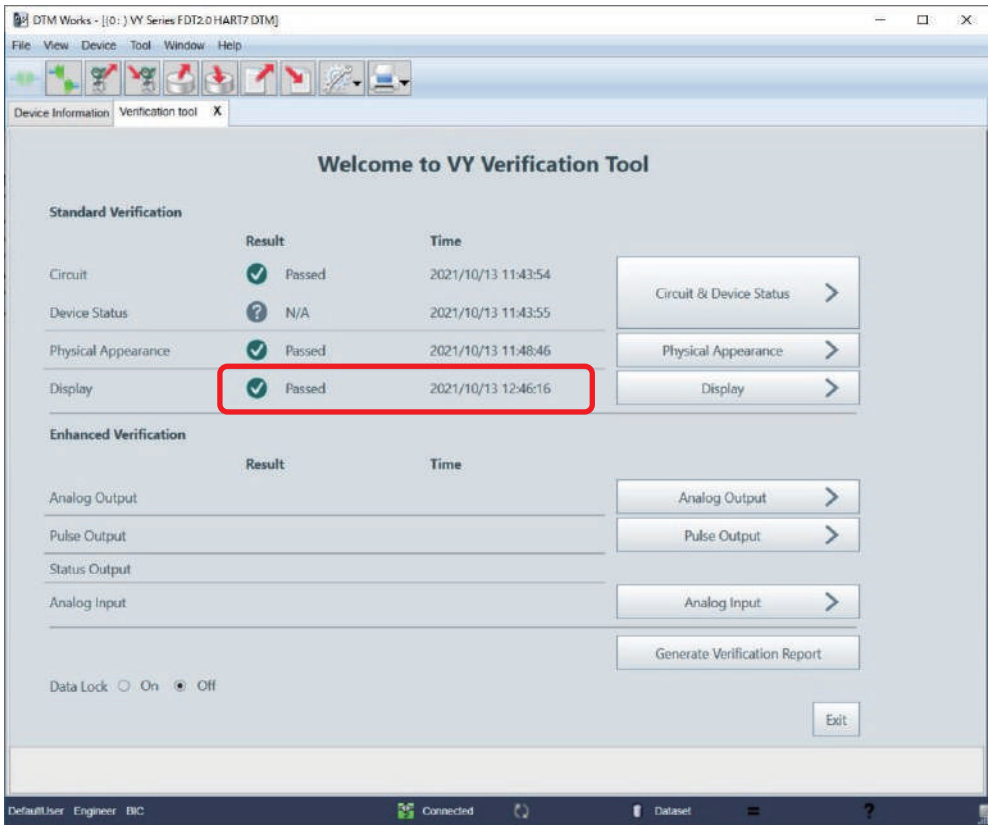
The judgment results are applied, and are reflected and displayed in the <Welcome to VY Verification Tool> screen.

To cancel and discard the execution results, click [Abort], and then click [OK] in the confirmation dialog box.

The execution results up till then are canceled and discarded, and the screen returns to the <Welcome to VY Verification Tool> screen.



F0313.ai



F0314.ai

3.2 Performing Enhanced VF

3.2.1 Checking/testing analog output using an ammeter

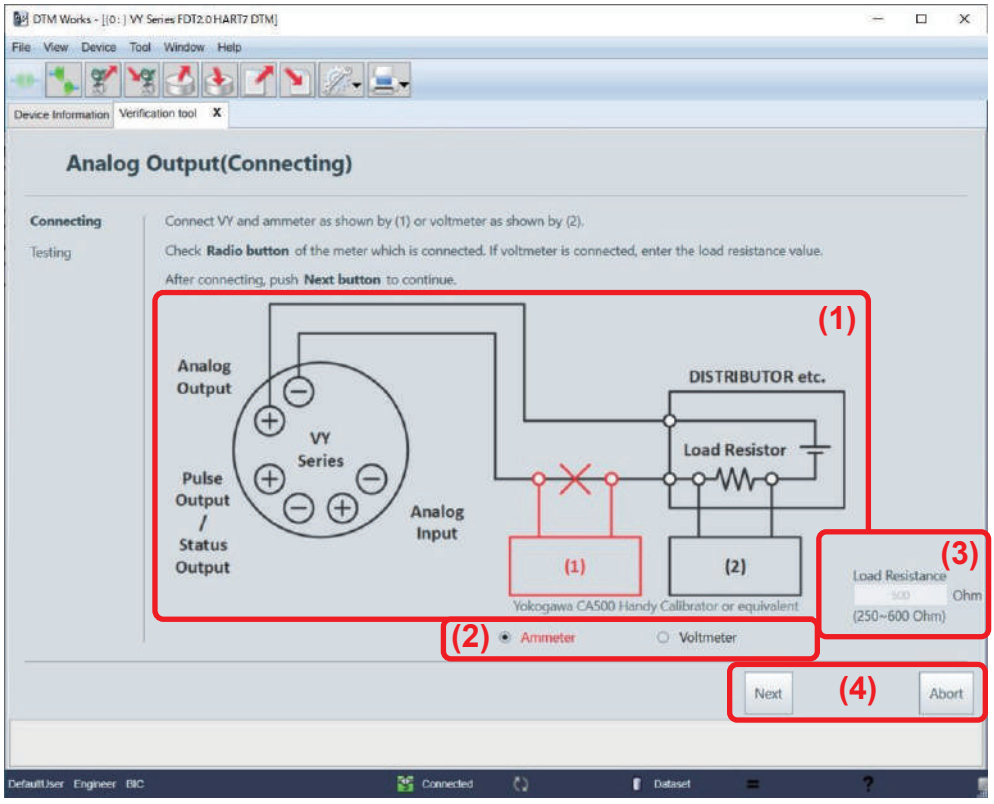
Outline of function

An external measuring device (ammeter) is connected to the target device to check normalcy of analog output.

NOTE

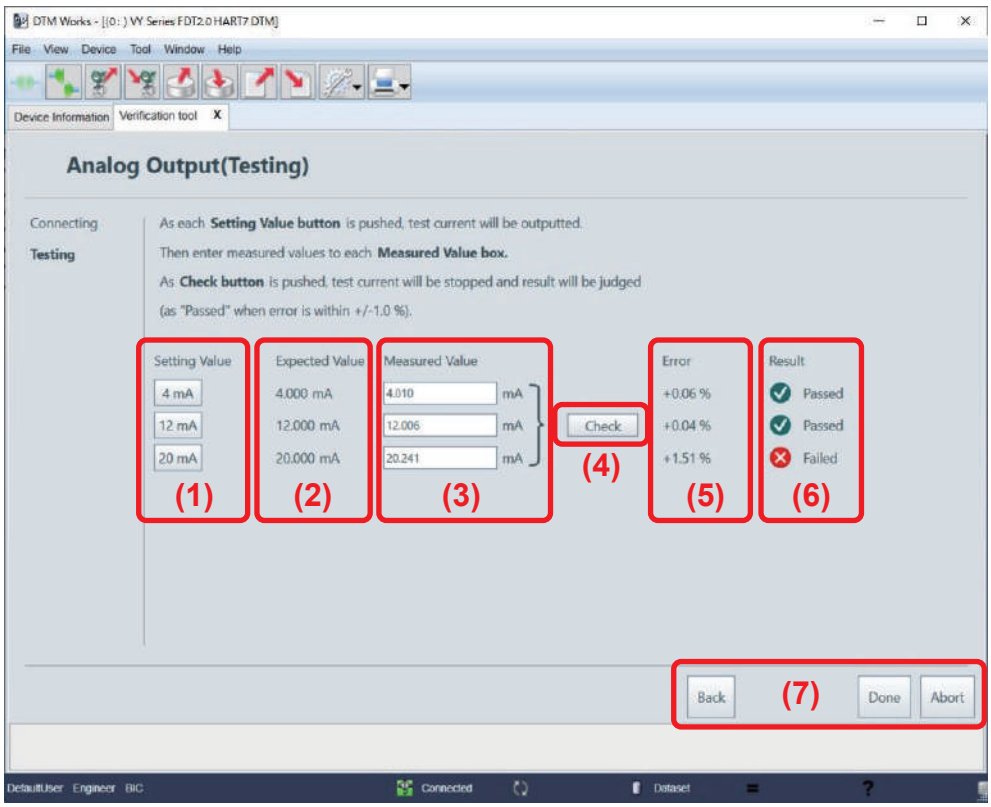
Before performing this test, prepare an external measuring device such as the CA500 Handy Calibrator.

Screen used and configuration of screen



F0315.ai

No.	Display Item		Explanation
(1)	Connection diagram		Shows the connection diagram between the device and the external measuring device
(2)	Measuring device selection		Select the device for testing analog output
		Ammeter	Testing is performed by using an ammeter.
		Voltmeter	Testing is performed by using a voltmeter. See Section 3.2.2
(3)	Load Resistance		A load resistance value need not be entered when Ammeter is selected
(4)	[Next]		Moves the screen to the next page
	[Abort]		The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen



F0316.ai

No.	Display Item	Explanation
(1)	Setting Value	Executes analog test output
	[4mA]	A test current of 4 mA is output from the target device.
	[12mA]	A test current of 12 mA is output from the target device.
	[20mA]	A test current of 20 mA is output from the target device.
(2)	Expected Value	"Expected Value" is displayed as the expected value. When an ammeter is used, the value is the analog test output value and is displayed in mA units.
(3)	Measured Value	Enter the measured value (mA) obtained by measurement using an ammeter
(4)	[Check]	Ends analog test output and performs judgment
(5)	Error	Displays the error between the expected value and the measured value
(6)	Result	Displays the judgment result of analog test output Passed: Error within range of judgment threshold Failed: Error outside range of judgment threshold N/A: Items not targeted for verification (verification not yet performed)
(7)	[Back]	Moves the screen to the previous page
	[Done]	The display returns to the <Welcome to VY Verification Tool> screen. When testing is completed, the results are reflected in the <Welcome to VY Verification Tool> screen.
	[Abort]	The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen

Operating Procedure

NOTE

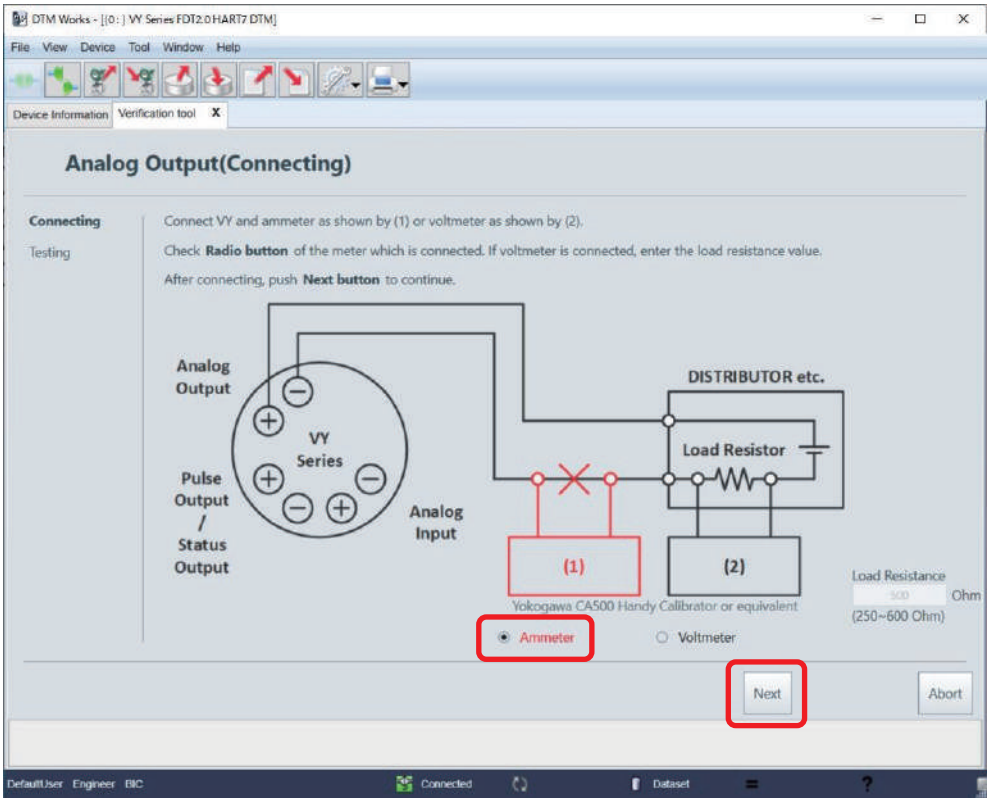
Before starting operation, make sure that [Data Lock] is [Off]. Operation is not possible if the [On] checkbox is selected at [Data Lock].

1 Start up the operation screen

Click [Analog Output] in the <Welcome to VY Verification Tool> screen to display the <Analog Output(connecting)> screen.

2 Set the connection type with the external measuring device

Select the [Ammeter].



F0317.ai

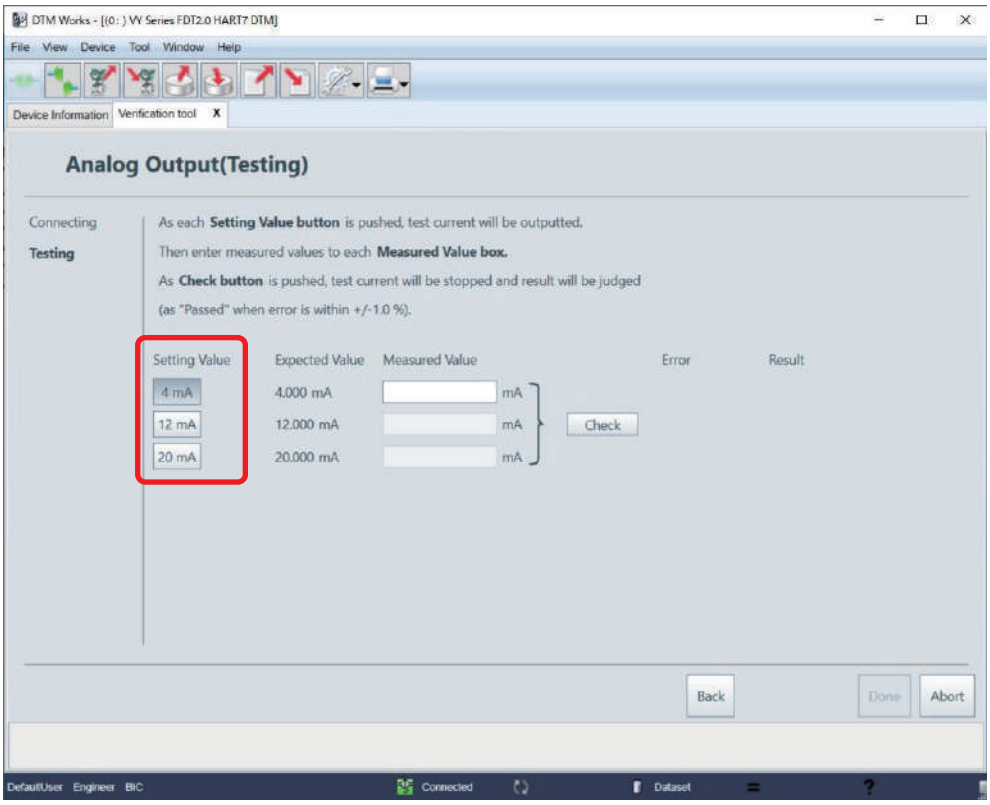
3 Connect the external measuring device

Open the transmitter case cover, and connect the external measuring device by referring to the <Analog Output(connecting)> screen.

After connection is completed, click [Next].

4 Test the analog output from the target device

Click [4mA] to [20mA] to output the test current, and measure the analog output value of the target device.

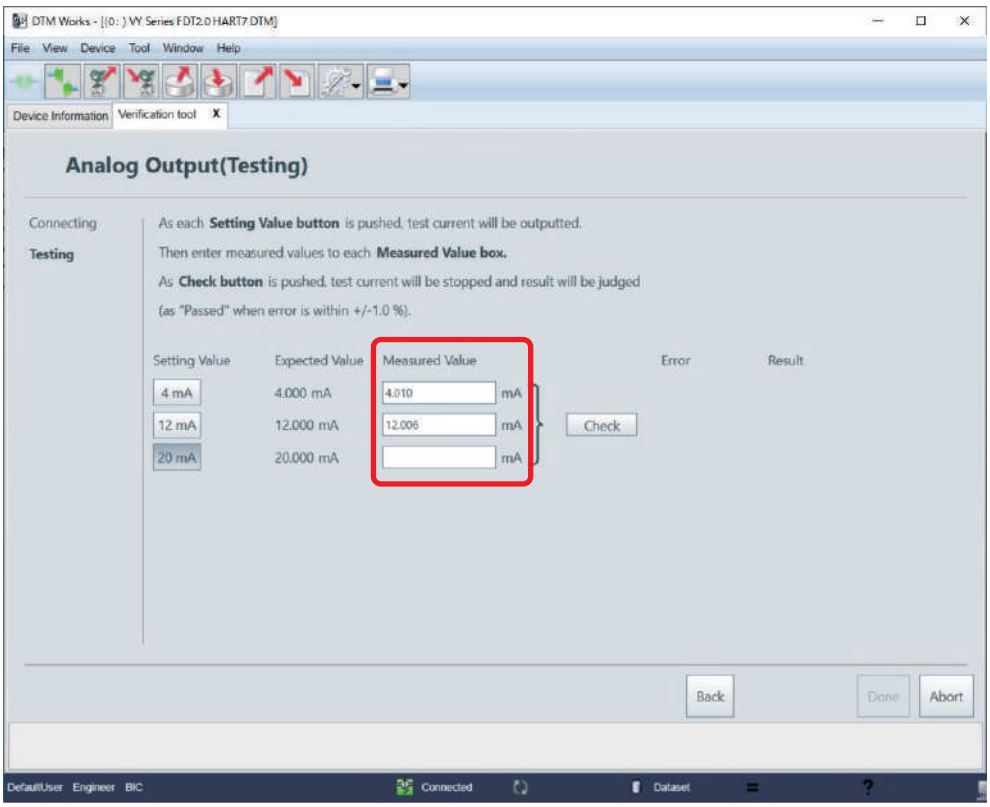


F0318.ai

Display Item	Explanation
[4mA]	A test current of 4 mA is output from the target device.
[12mA]	A test current of 12 mA is output from the target device.
[20mA]	A test current of 20 mA is output from the target device.

5 Enter the analog output value from the target device

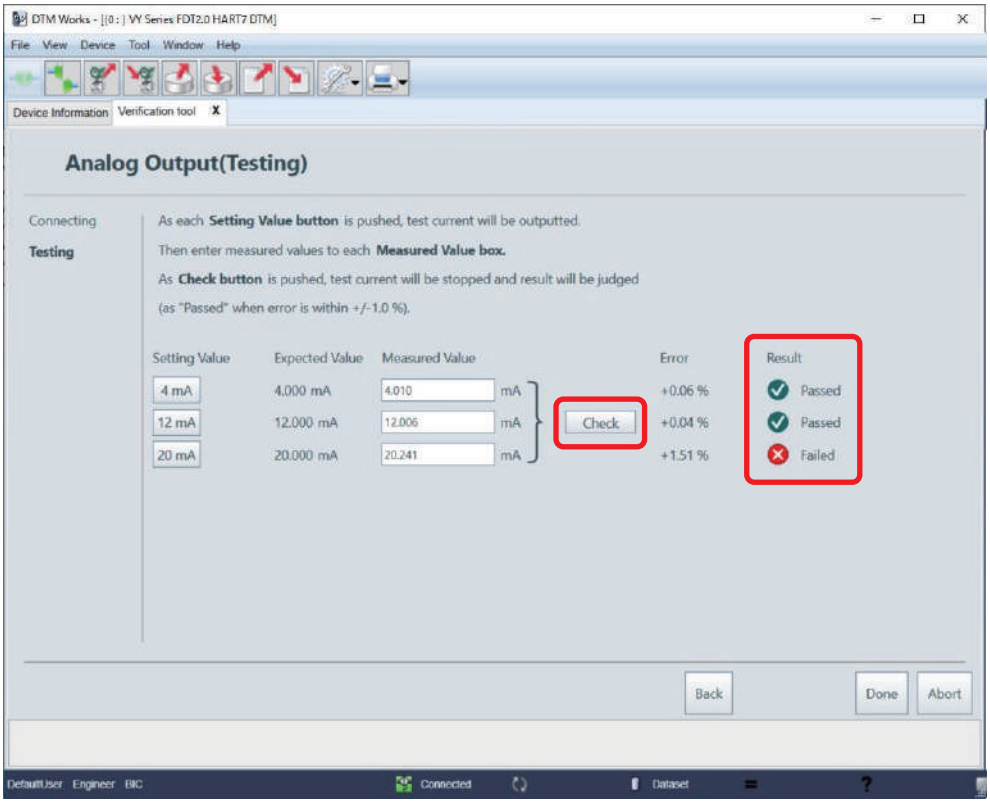
Read the measurement result of the external measuring device for each test analog value (4mA to 20mA), and enter the analog values to [Measured Value].



F0319.ai

6 Click [Check] to execute verification

Verification is executed on each measurement result (values entered at [Measured Value]), and the judgment result is displayed at [Result].



F0320.ai

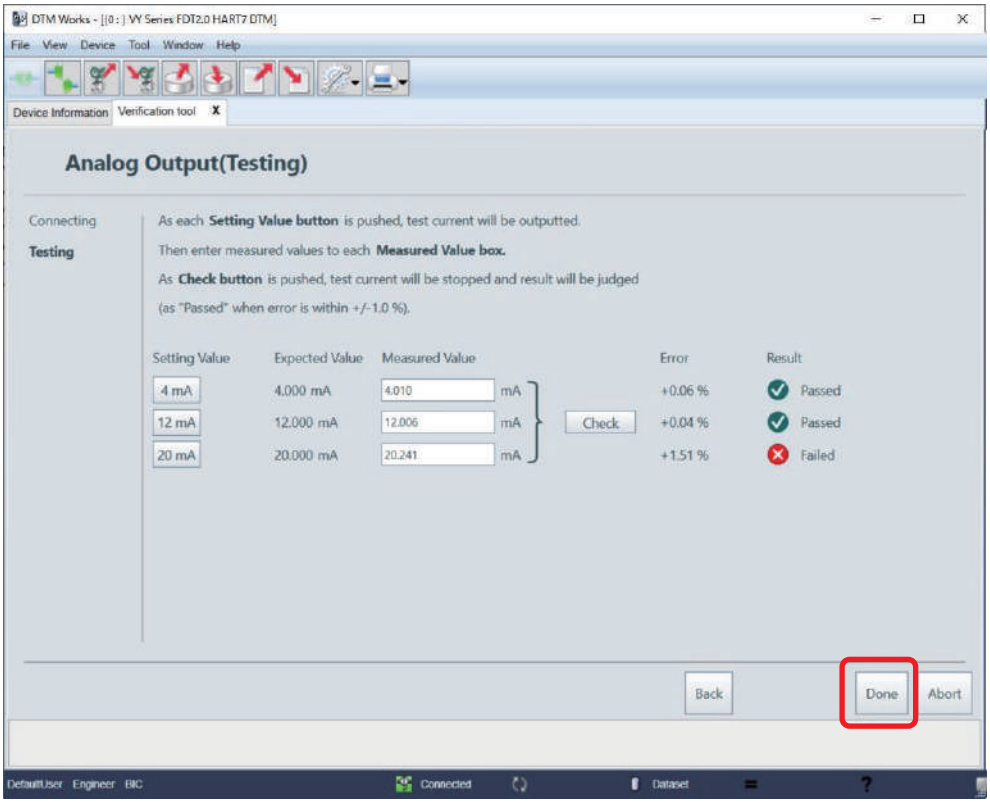
Display Item	Explanation
Passed	This is displayed when error is within the range of the judgment threshold as a result of verification.
Failed	This is displayed when error is outside the range of the judgment threshold as a result of verification.
N/A	Items not targeted for verification (verification not yet performed)

7 Click [Done] to apply the result of verification

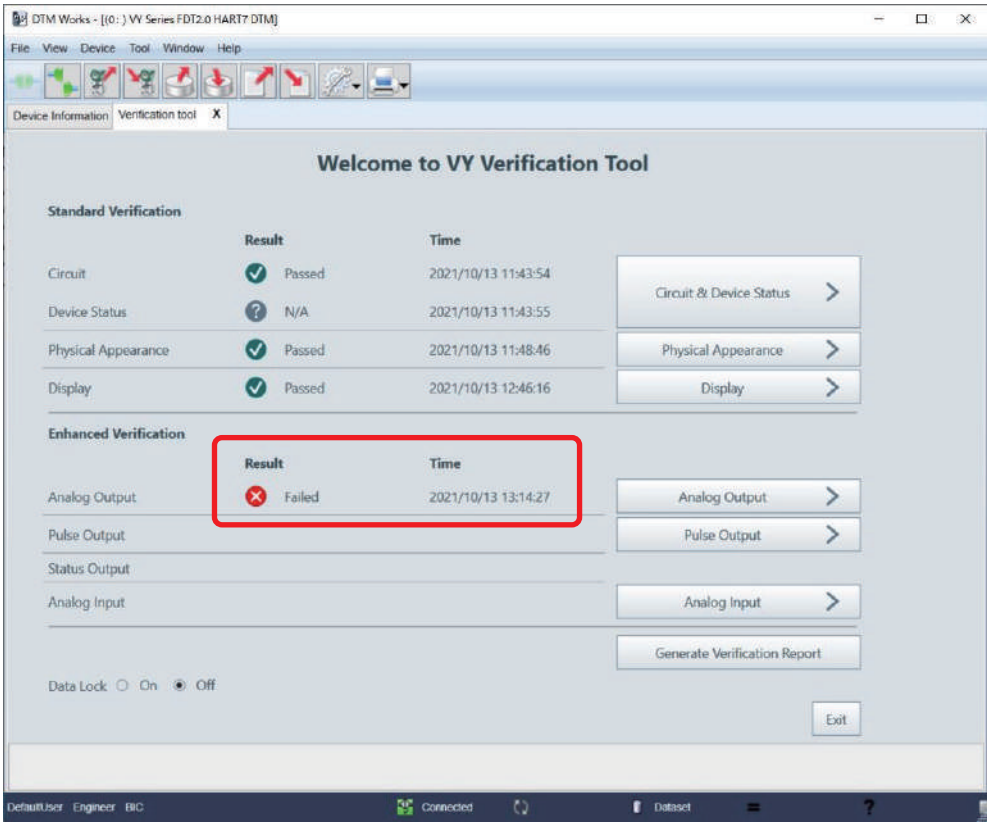
The judgment results are applied, and are reflected and displayed in the <Welcome to VY Verification Tool> screen.

To cancel and discard the execution results, click [Abort], and then click [OK] in the confirmation dialog box.

The execution results up till then are canceled and discarded, and the screen returns to the <Welcome to VY Verification Tool> screen.



F0321.ai


DTM Works - [(0:) VY Series FDT2.0 HART7 DTM]
File View Device Tool Window Help
Device Information
Verification tool
Welcome to VY Verification Tool
Standard Verification
Result
Time
Circuit
Passed
2021/10/13 11:43:54
Device Status
N/A
2021/10/13 11:43:55
Physical Appearance
Passed
2021/10/13 11:48:46
Display
Passed
2021/10/13 12:46:16
Circuit & Device Status
Physical Appearance
Display
Enhanced Verification
Result
Time
Analog Output
Failed
2021/10/13 13:14:27
Pulse Output
Status Output
Analog Input
Analog Output
Pulse Output
Analog Input
Generate Verification Report
Data Lock On Off
Exit
DefaultUser Engineer BIC
Connected
Dataset

F0322.ai

3.2.2 Checking/testing analog output using a voltmeter

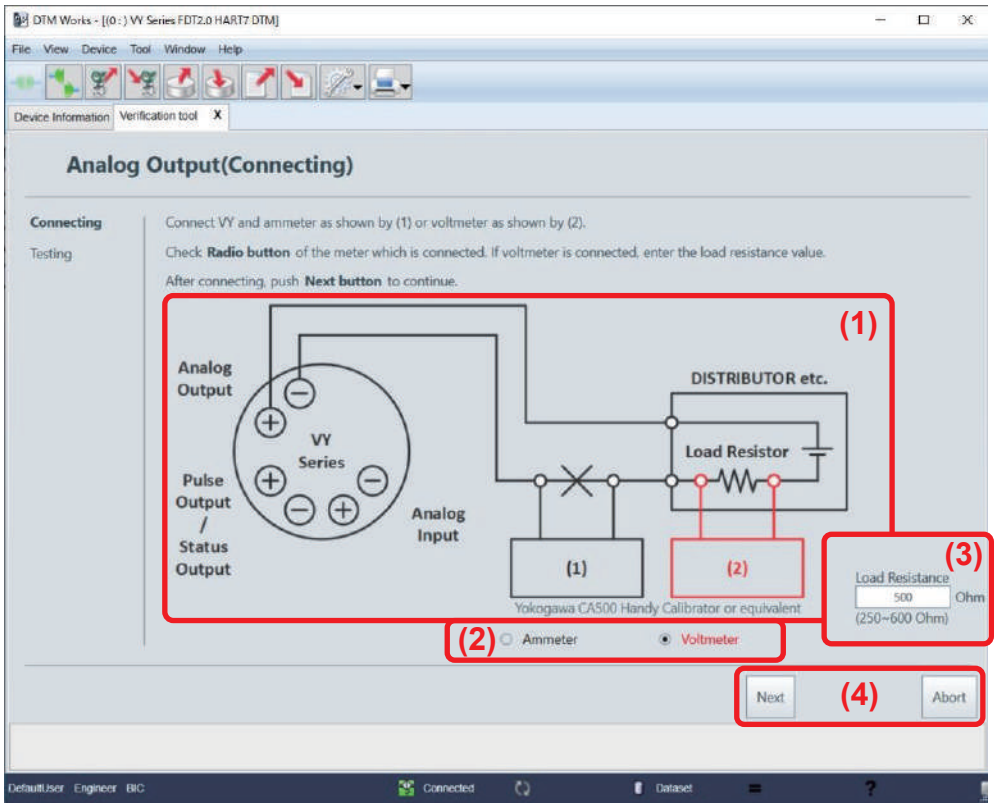
Outline of function

An external measuring device (voltmeter) is connected to the target device to check normalcy of analog output.

NOTE

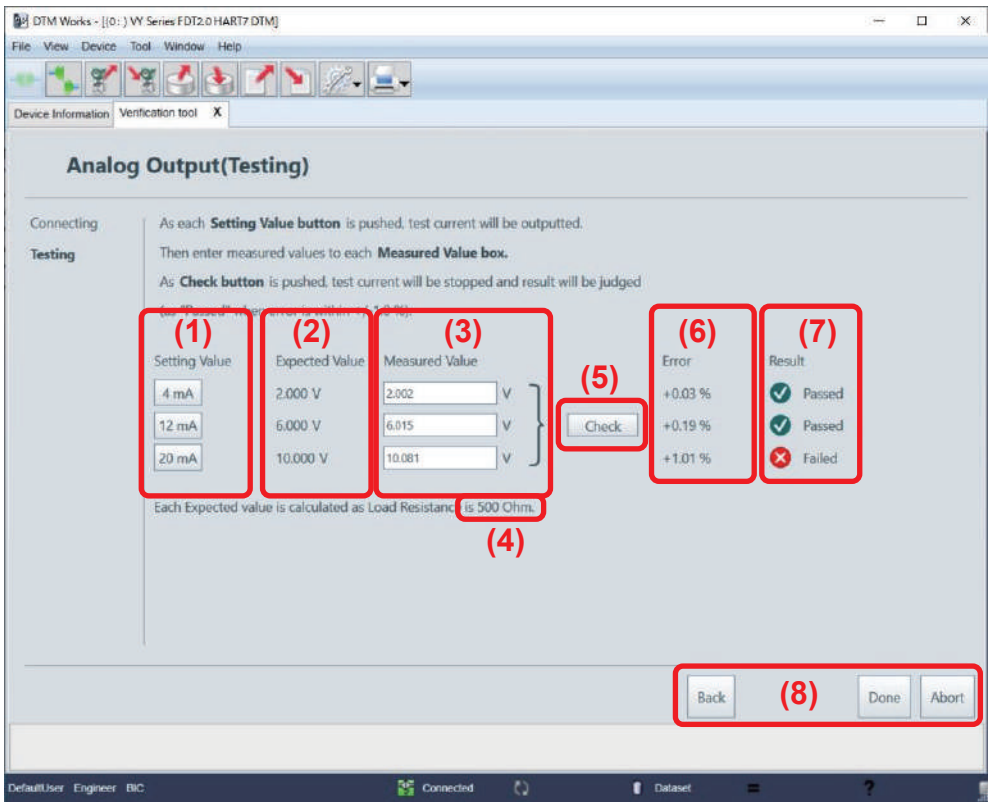
Before performing this test, prepare an external measuring device such as the CA500 Handy Calibrator.

Screen used and configuration of screen



F0323.ai

No.	Display Item		Explanation
(1)	Connection diagram		Shows the connection diagram between the device and the external measuring device
(2)	Measuring device selection		Select the device for testing analog output
		Ammeter	Testing is performed by using a voltmeter. See Section 3.2.1
		Voltmeter	Testing is performed by using a voltmeter
(3)	Load Resistance		Enter a load resistance value (250 to 600 Ohm) when Voltmeter is selected
(4)	[Next]		Moves the screen to the next page
	[Abort]		The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen



F0324.ai

No.	Display Item	Explanation
(1)	Setting Value	Executes analog test output
	[4mA]	A test current of 4 mA is output from the target device.
	[12mA]	A test current of 12 mA is output from the target device.
	[20mA]	A test current of 20 mA is output from the target device.
(2)	Expected Value	"Expected Value" is displayed as the expected value. This is the product of the analog test output value and load resistance value and is displayed in V units.
(3)	Measured Value	Enter the measured value (V) obtained by measurement using a voltmeter
(4)	Load resistance display	The load resistance value entered in the following page is displayed
(5)	[Check]	Ends analog test output and performs judgment
(6)	Error	Displays the error between the expected value and the measured value
(7)	Result	Displays the judgment result of analog test output Passed: Error within range of judgment threshold Failed: Error outside range of judgment threshold N/A: Items not targeted for verification (verification not yet performed)
(8)	[Back]	Moves the screen to the previous page
	[Done]	The display returns to the <Welcome to VY Verification Tool> screen. When testing is completed, the results are reflected in the <Welcome to VY Verification Tool> screen.
	[Abort]	The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen

Operating Procedure

NOTE

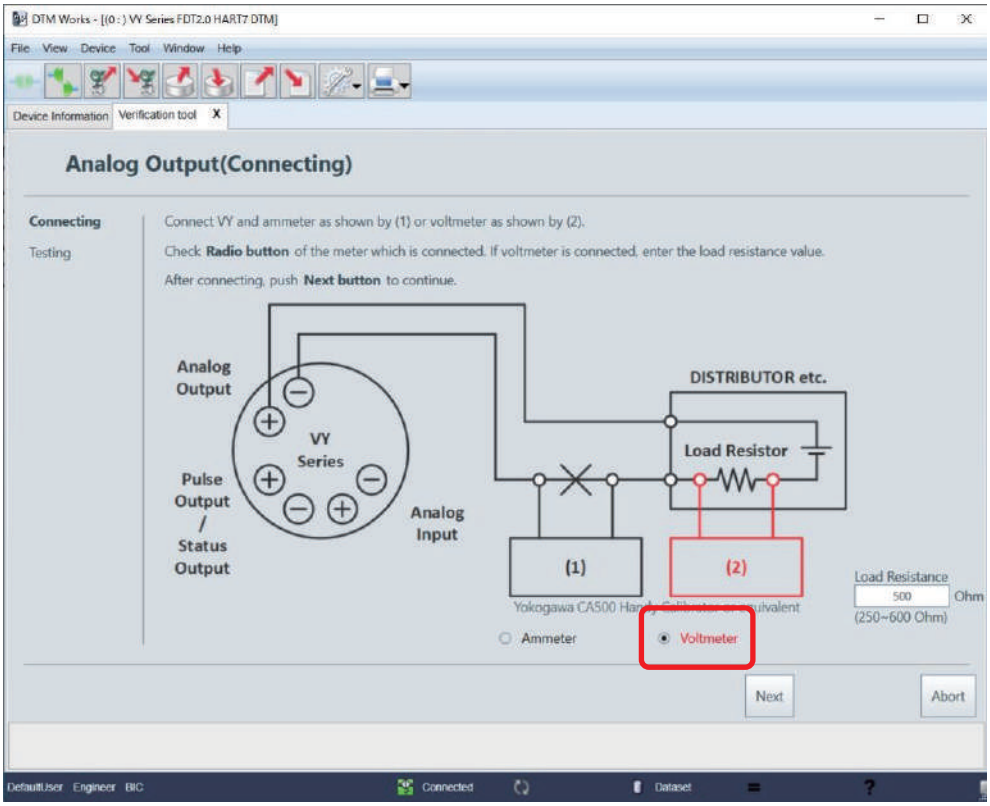
Before starting operation, make sure that [Data Lock] is [Off]. Operation is not possible if the [On] checkbox is selected at [Data Lock].

1 Start up the operation screen

Click [Analog Output] in the <Welcome to VY Verification Tool> screen to display the <Analog Output(connecting)> screen.

2 Set the connection type with the external measuring device

Select the [Voltmeter].

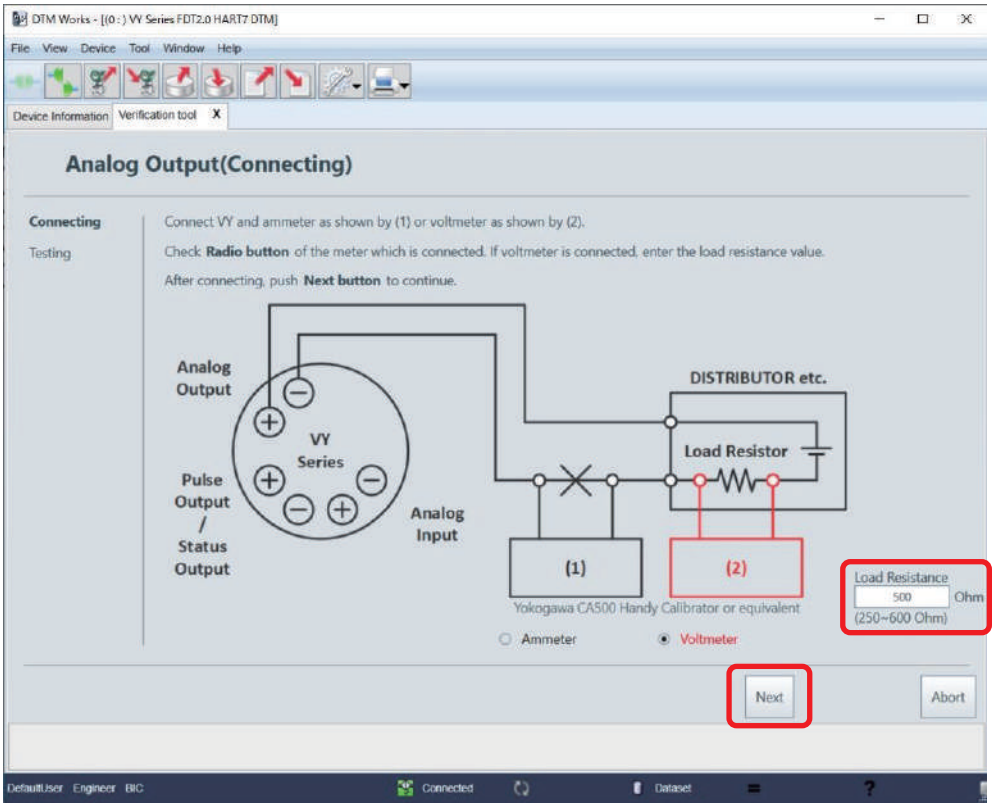


F0325.ai

3 Set the connection conditions with the external measuring device

Enter the load resistance value (250 to 600 Ohm) at [Load Resistance].

The value obtained by multiplying the analog test output value with this load resistance value becomes the "Expected Value" (standard value of judgment).



F0326.ai

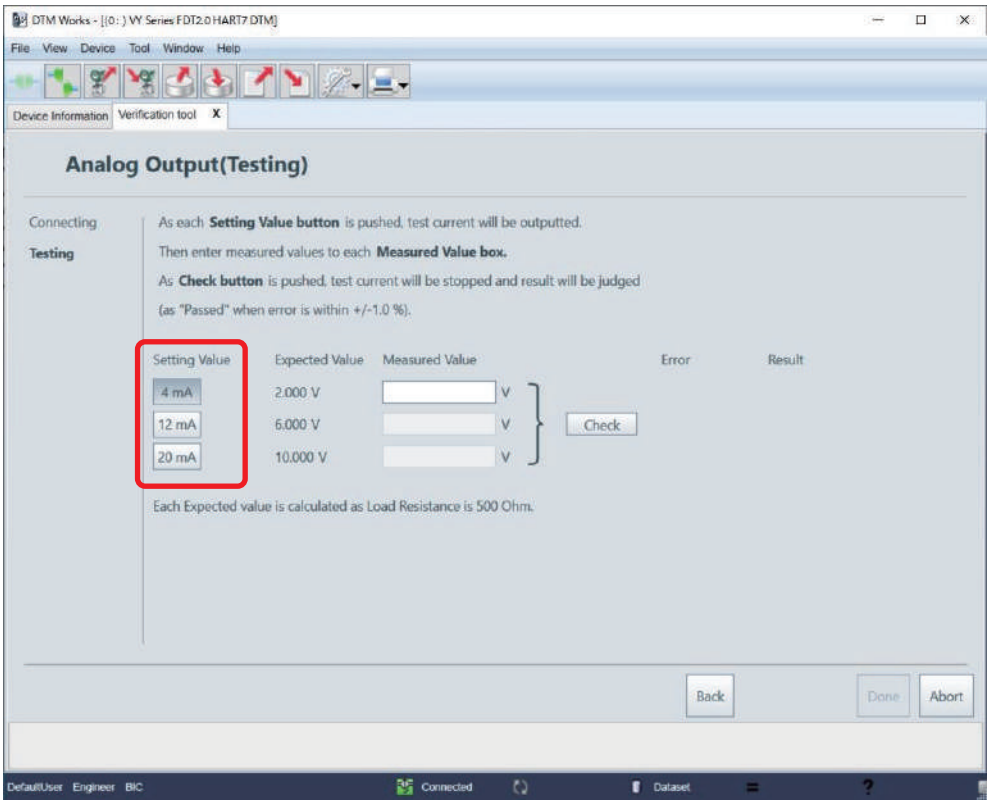
4 Connect the external measuring device

Open the transmitter case cover, and connect the external measuring device by referring to the <Analog Output(connecting)> screen.

After connection is completed, click [Next].

5 Test the analog output from the target device

Click [4mA] to [20mA] to output the test current, and measure the analog output value of the target device.

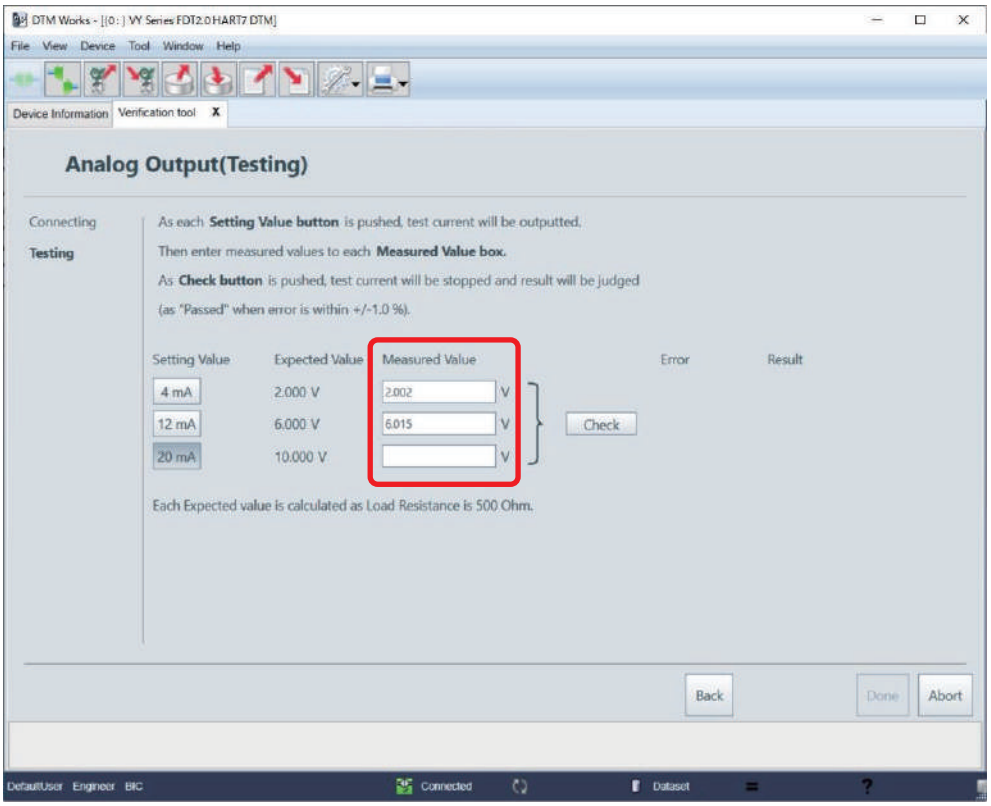


F0327.ai

Display Item	Explanation
[4mA]	A test current of 4 mA is output from the target device.
[12mA]	A test current of 12 mA is output from the target device.
[20mA]	A test current of 20 mA is output from the target device.

6 Enter the analog output value from the target device

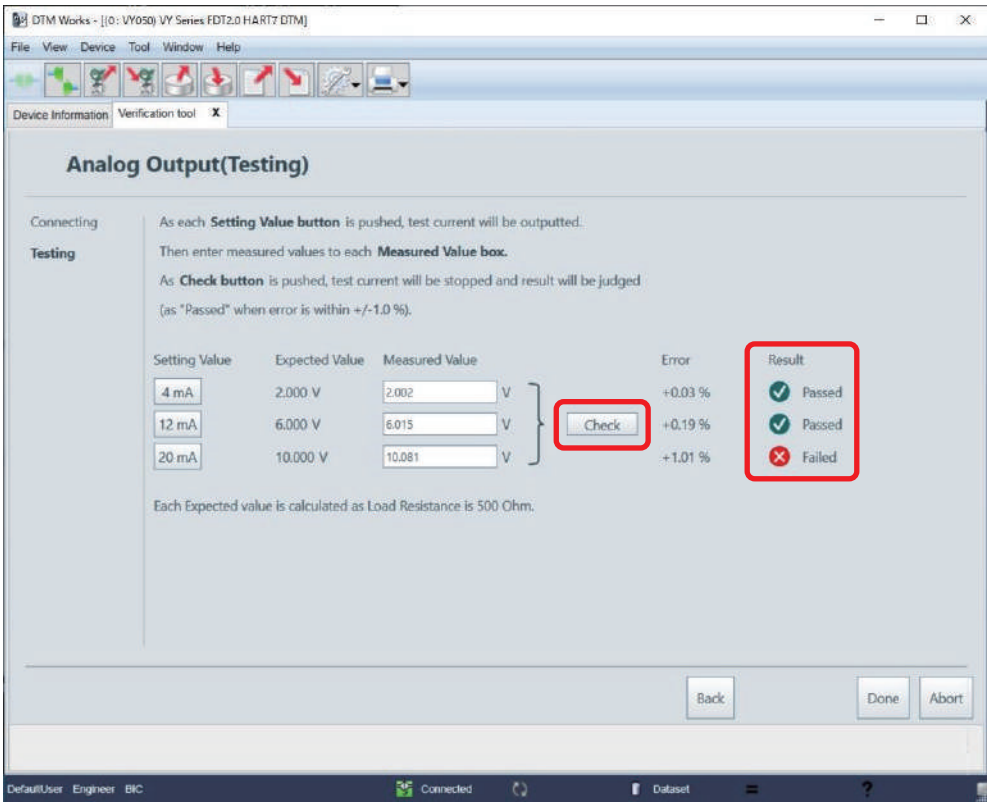
Read the measurement result of the external measuring device for each test analog value (4mA to 20mA), and enter the voltage values to [Measured Value].



F0328.ai

7 Click [Check] to execute verification

Verification is executed on each measurement result (values entered at [Measured Value]), and the judgment result is displayed at [Result].



F0329.ai

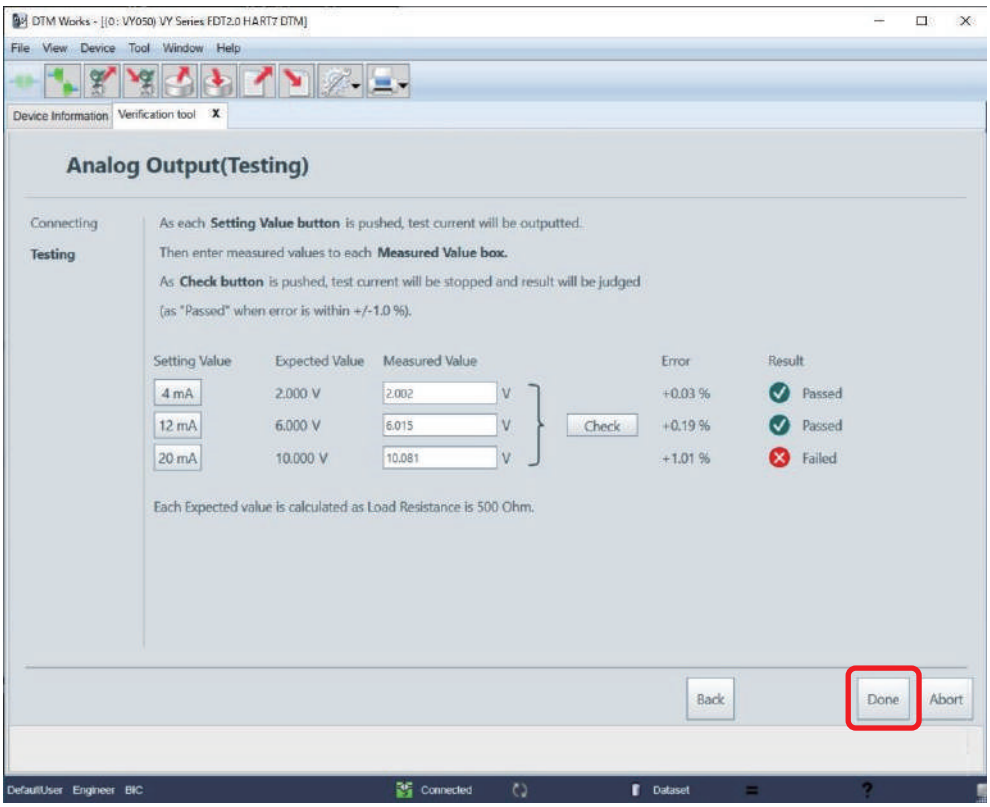
Display Item	Explanation
Passed	This is displayed when error is within the range of the judgment threshold as a result of verification.
Failed	This is displayed when error is outside the range of the judgment threshold as a result of verification.
N/A	Items not targeted for verification (verification not yet performed)

8 Click [Done] to apply the result of verification

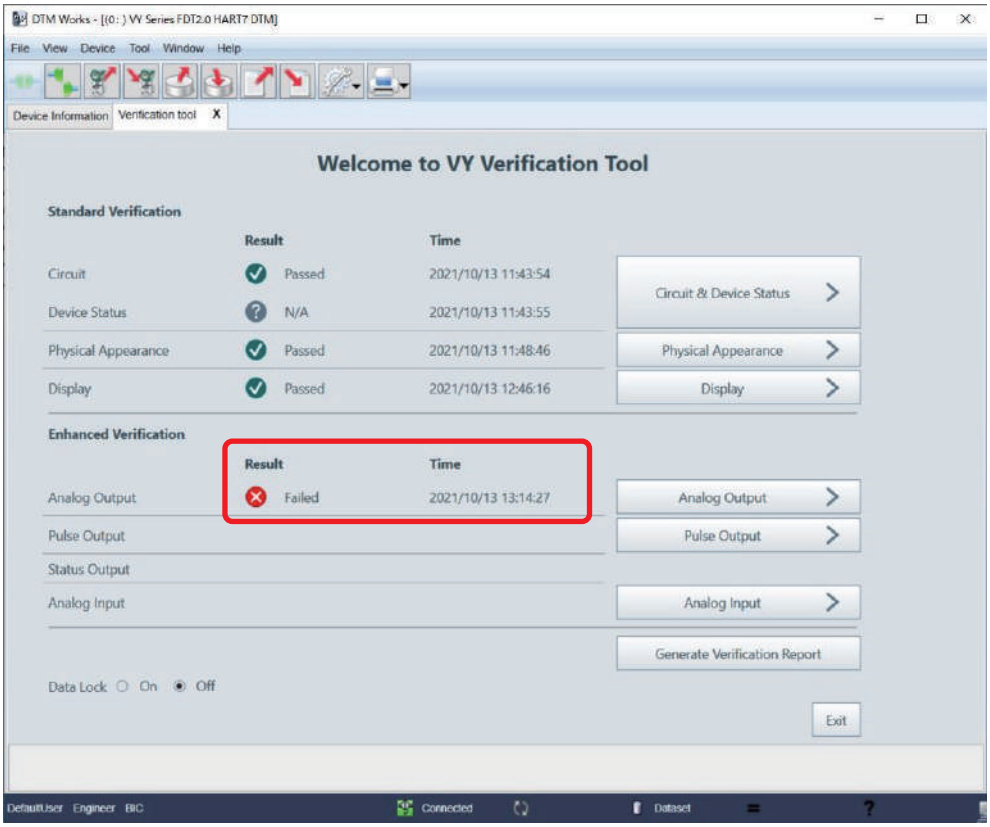
The judgment results are applied, and are reflected and displayed in the <Welcome to VY Verification Tool> screen.

To cancel and discard the execution results, click [Abort], and then click [OK] in the confirmation dialog box.

The execution results up till then are canceled and discarded, and the screen returns to the <Welcome to VY Verification Tool> screen.



F0330.ai



F0331.ai

3.2.3 Checks and tests pulse output

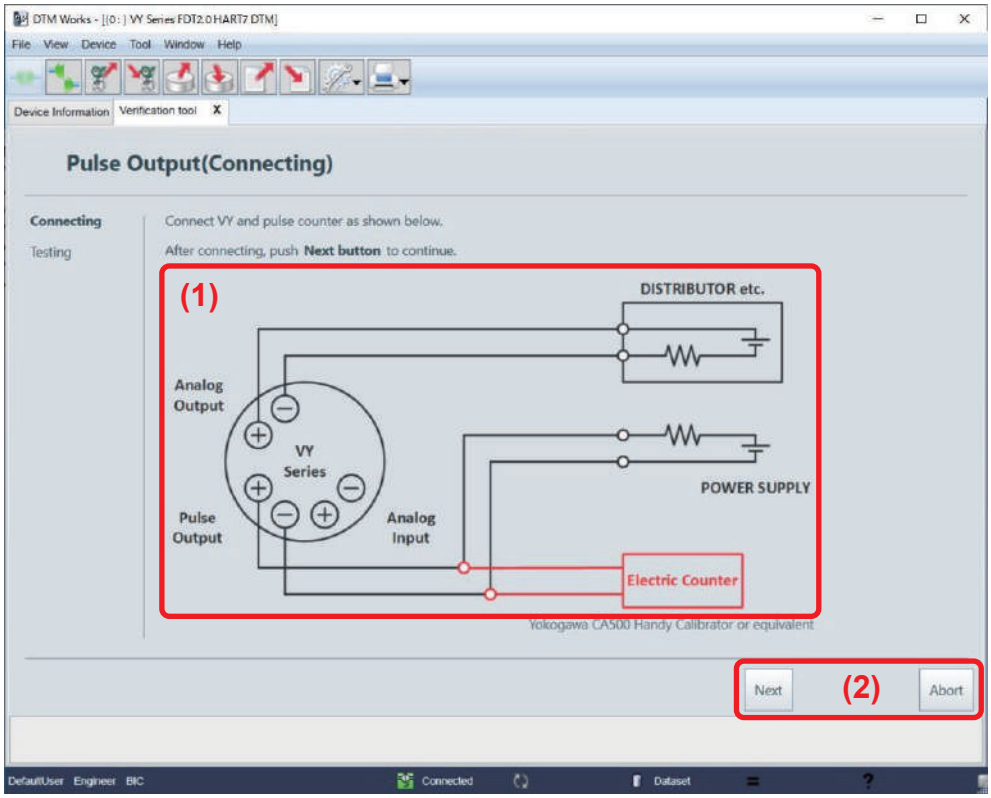
Outline of function

An external measuring device (pulse counter) is connected to the target device to check normalcy of pulse output.

NOTE

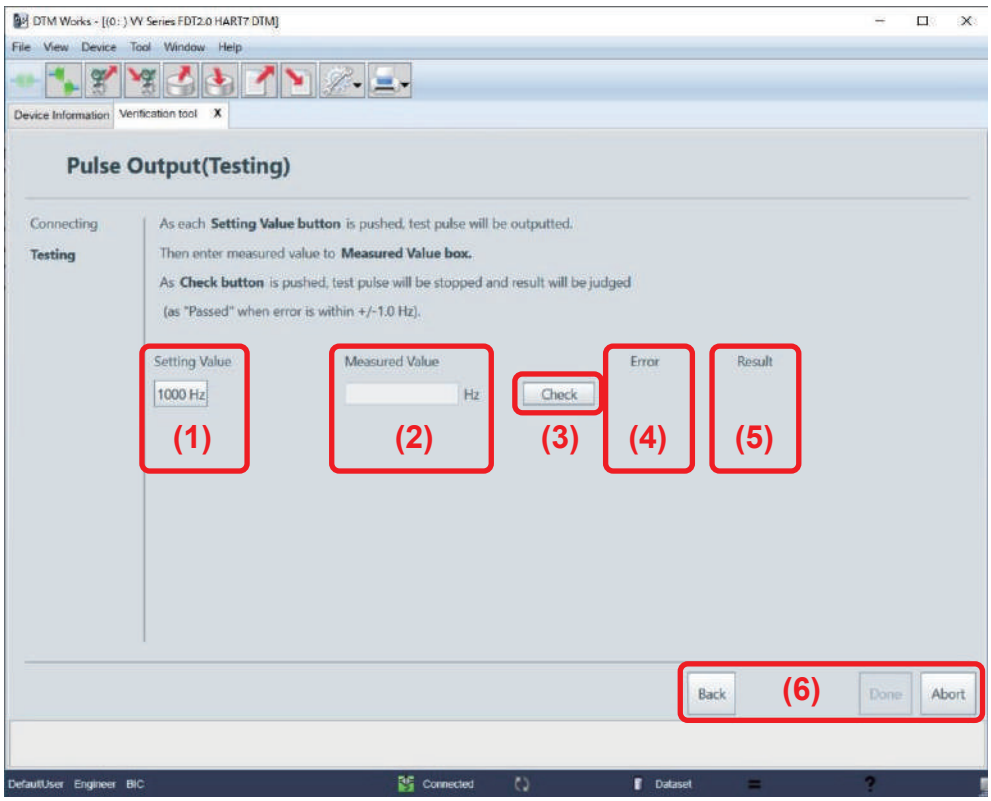
- Before performing this test, prepare an external measuring device such as the CA500 Handy Calibrator.
- As this function is selected exclusively from Status Output, the execute button is hidden (i.e. execution is disabled) when Status Output is selected.

Screen used and configuration of screen



F0332.ai

No.	Display Item	Explanation
(1)	Connection diagram	Shows the connection diagram between the device and external measuring device (pulse counter)
(2)	[Next]	Moves the screen to the next page
	[Abort]	The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen



F0333.ai

No.	Display Item	Explanation
(1)	Setting Value	Executes pulse test output
	[1000Hz]	A test pulse of 1000 Hz is output from the target device.
(2)	Measured Value	Enter the measured value (Hz) obtained by measurement using a pulse counter
(3)	[Check]	Ends pulse test output and performs judgment
(4)	Error	Displays the error between the expected value and the measured value
(5)	Result	Displays the judgment result of pulse test output Passed: Error within range of judgment threshold Failed: Error outside range of judgment threshold N/A: Items not targeted for verification (verification not yet performed)
(6)	[Back]	Moves the screen to the previous page
	[Done]	The display returns to the <Welcome to VY Verification Tool> screen. When testing is completed, the results are reflected in the <Welcome to VY Verification Tool> screen.
	[Abort]	The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen

Operating Procedure

NOTE

Before starting operation, make sure that [Data Lock] is [Off]. Operation is not possible if the [On] checkbox is selected at [Data Lock].

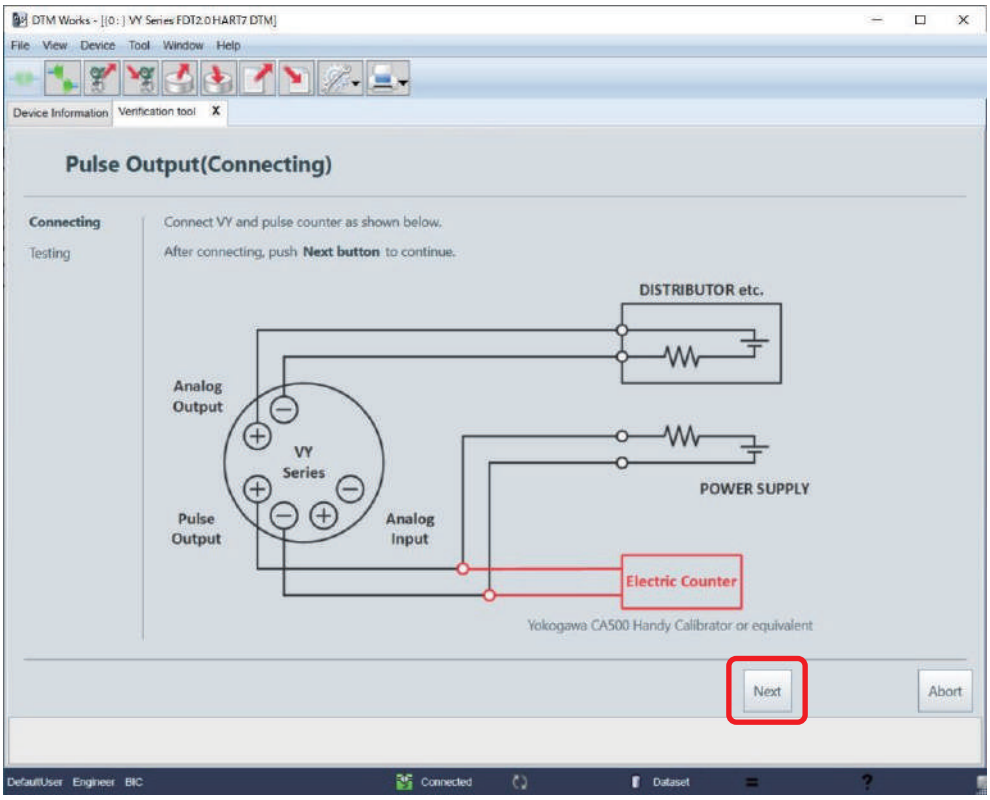
1 Start up the operation screen

Click [Pulse Output] in the <Welcome to VY Verification Tool> screen to display the <Pulse Output(connecting)> screen.

2 Connect the external measuring device

Open the transmitter case cover, and connect the external measuring device by referring to the <Pulse Output(connecting)> screen.

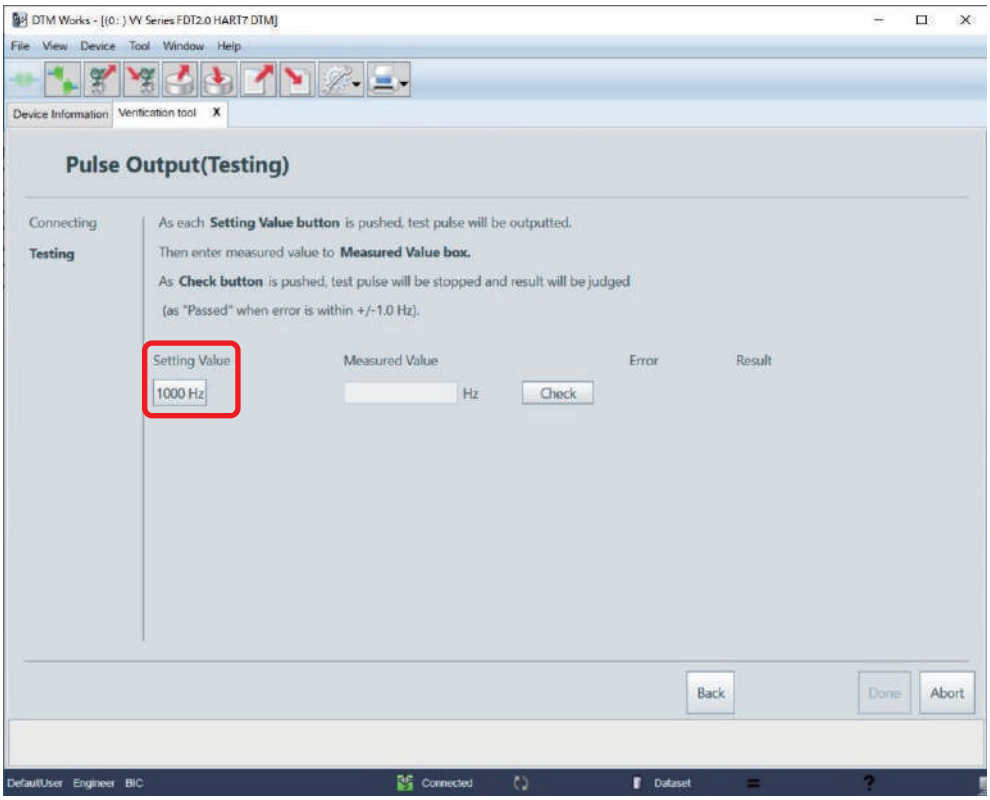
After connection is completed, click [Next].



F0334.ai

3 Test the pulse output from the target device

Click [1000Hz] in the <Pulse Output(testing)> screen to output the test pulse, and measure the pulse output value of the target device.

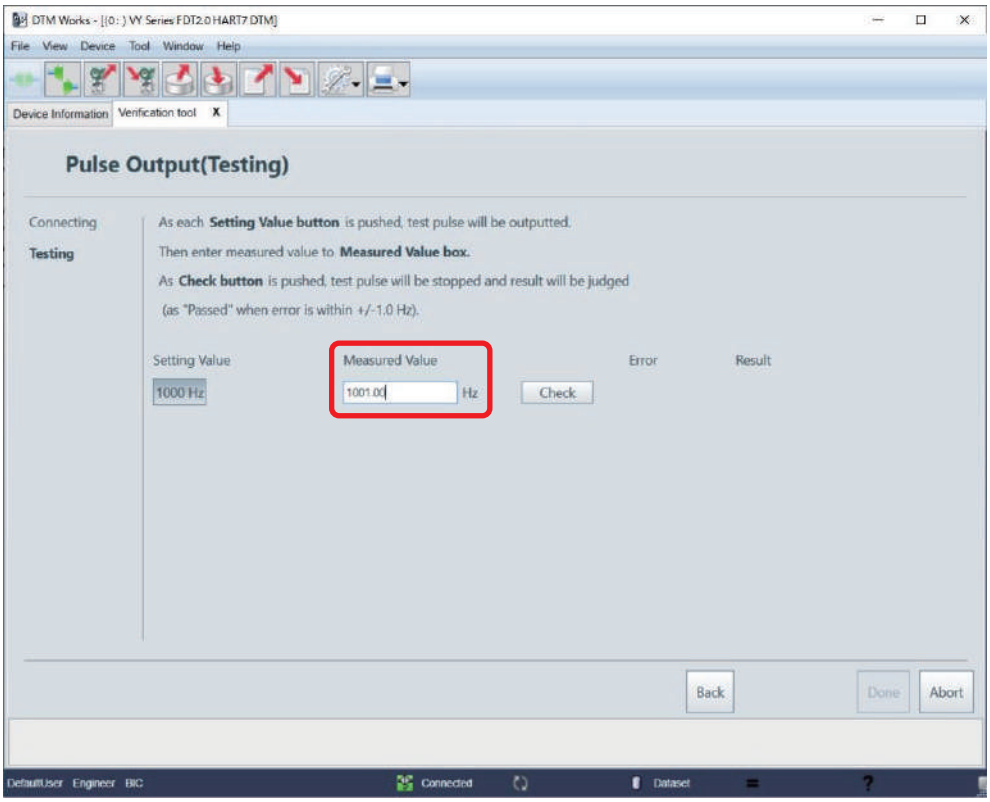


F0335.ai

Display Item	Explanation
[1000Hz]	A test pulse of 1000 Hz is output from the target device.

4 Enter the pulse output value from the target device

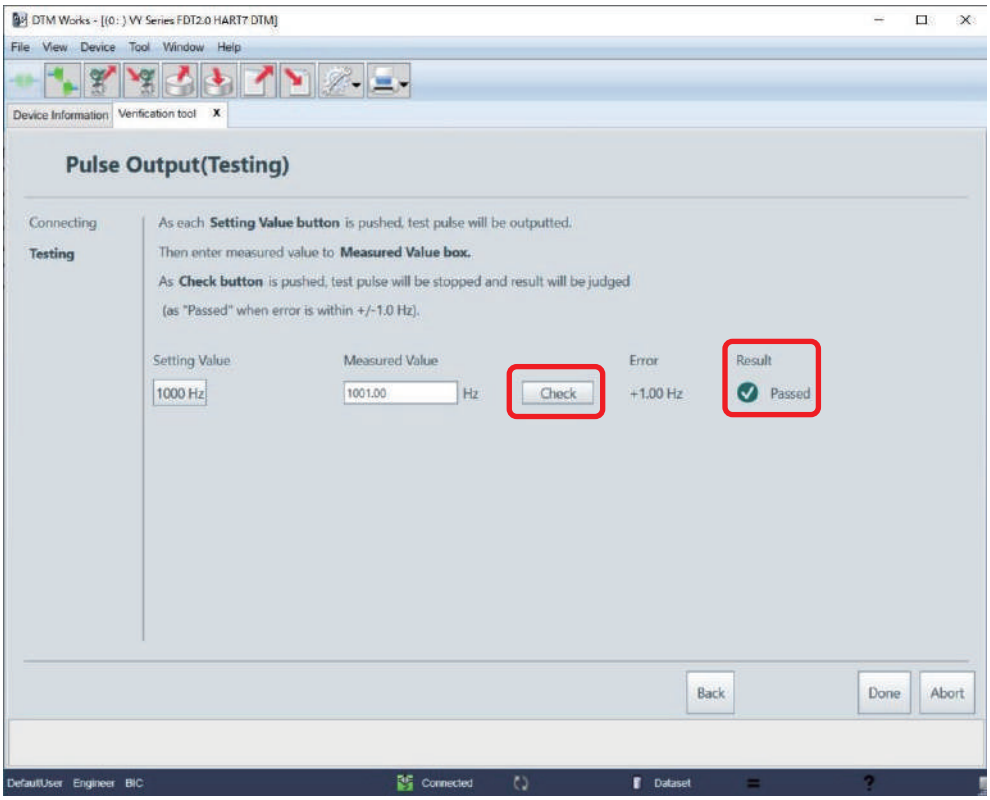
Read the measurement result of the external measuring device for the test pulse value (1000Hz), and enter the voltage values to [Measured Value].



F0336.ai

5 Click [Check] to execute verification

Verification is executed on the measurement result (values entered at [Measured Value]), and the judgment result is displayed at [Result].



F0337.ai

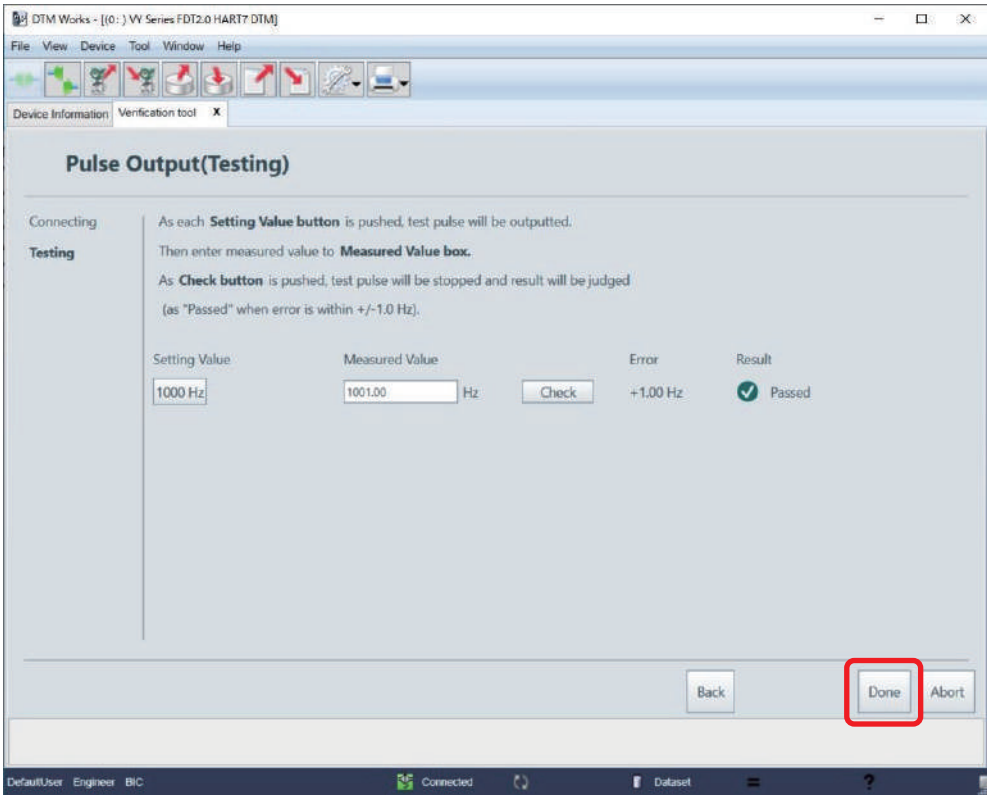
Display Item	Explanation
Passed	This is displayed when error is within the range of the judgment threshold as a result of verification.
Failed	This is displayed when error is outside the range of the judgment threshold as a result of verification.
N/A	Items not targeted for verification (verification not yet performed)

6 Click [Done] to apply the result of verification

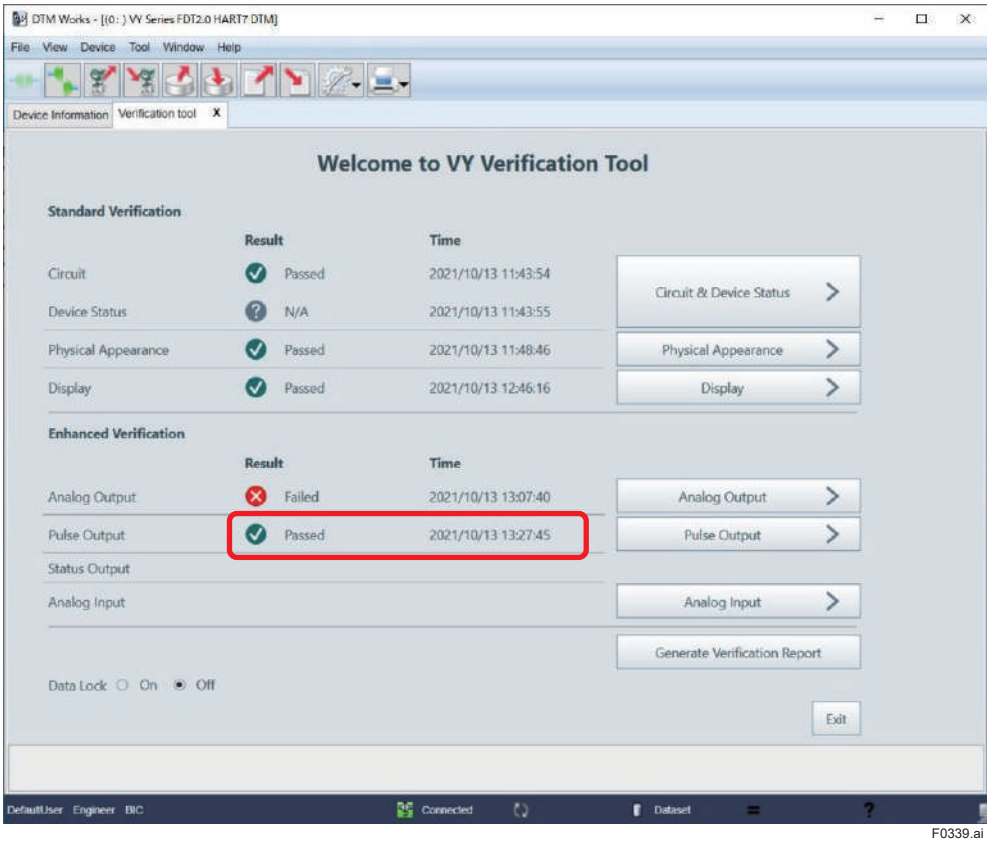
The judgment results are applied, and are reflected and displayed in the <Welcome to VY Verification Tool> screen.

To cancel and discard the execution results, click [Abort], and then click [OK] in the confirmation dialog box.

The execution results up till then are canceled and discarded, and the screen returns to the <Welcome to VY Verification Tool> screen.



F0338.ai



F0339.ai

3.2.4 Checks and tests status output

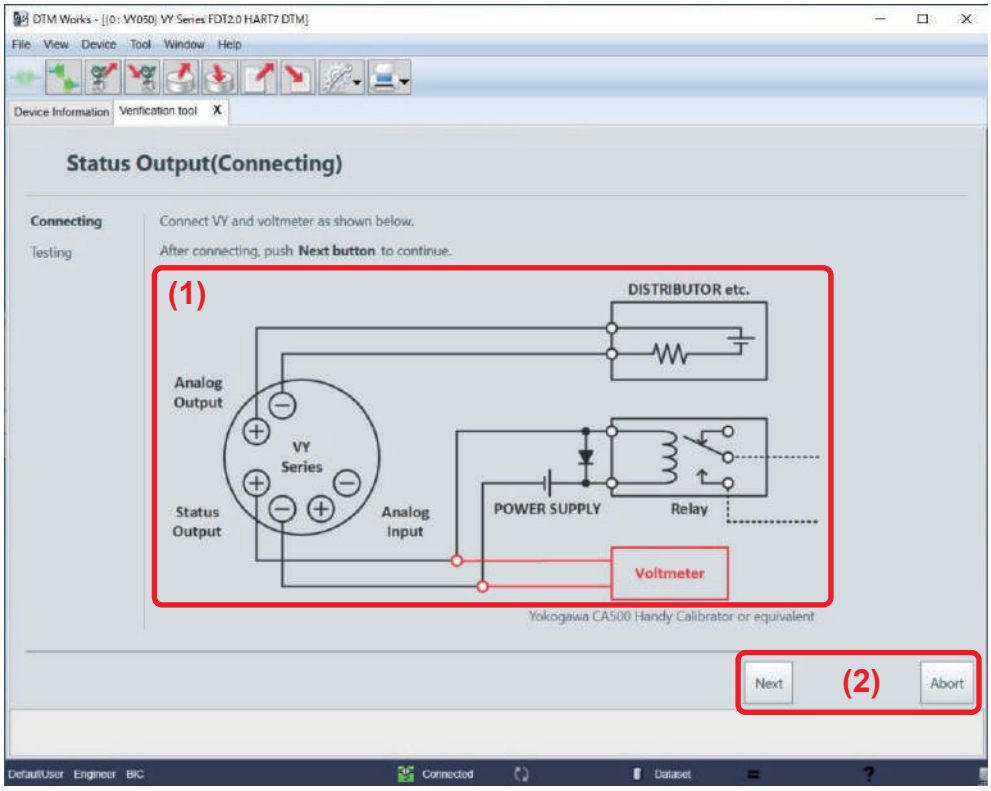
Outline of function

An external measuring device (voltmeter) is connected to the target device to check normalcy of status output.

NOTE

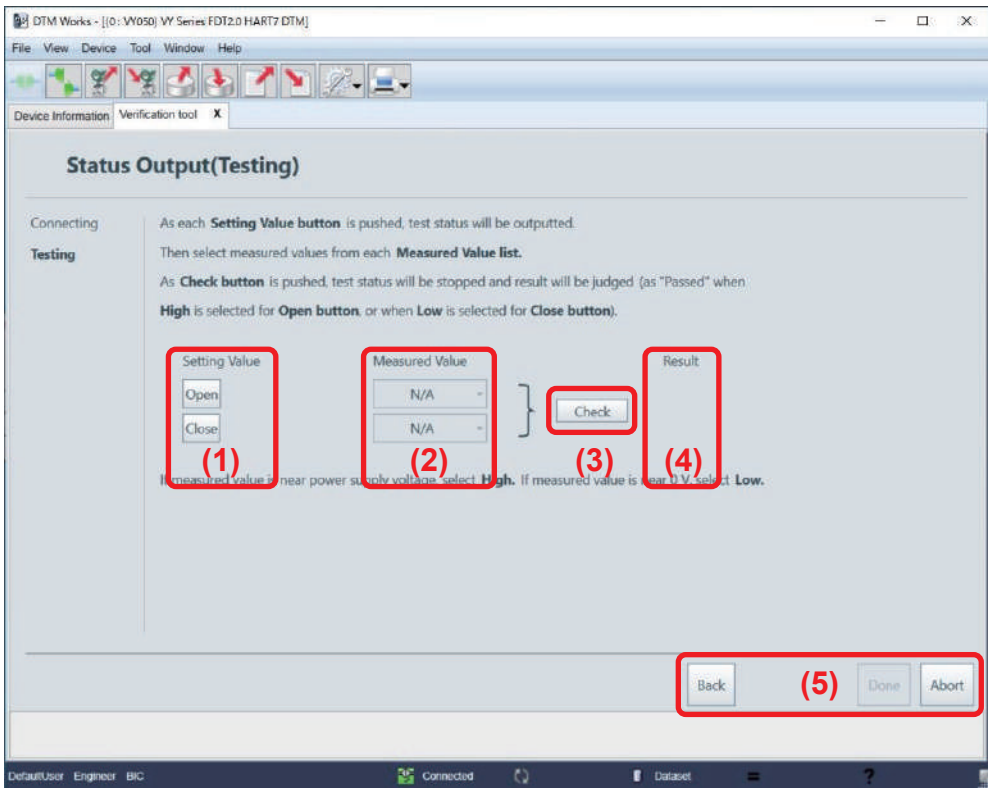
- Before performing this test, prepare an external measuring device such as the CA500 Handy Calibrator.
- As this function is selected exclusively from Pulse Output, the execute button is hidden (i.e. execution is disabled) when Pulse Output is selected.

Screen used and configuration of screen



F0340.ai

No.	Display Item	Explanation
(1)	Connection diagram	Shows the connection diagram between the device and external measuring device (voltmeter)
(2)	[Next]	Moves the screen to the next page
	[Abort]	The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen



F0341.ai

No.	Display Item	Explanation
(1)	Setting Value	Executes status test output
	[Open]	A test voltage of approximately the power supply voltage value (voltage value of Power Supply) is output from the target device.
	[Close]	A test voltage of approximately 0 V is output from the target device.
(2)	Measured Value	Select the measured value of the external measuring device for each test voltage value (Open/Close) High: Measured value is approximately the power supply voltage value (voltage value of Power Supply) Low: Measured value is approximately 0 V N/A: Measured value is the default value
(3)	[Check]	Stops status test output and performs judgment
(4)	Result	Displays the judgment result of status test output Passed: The measured value is the same as the judgment value Failed: The measured value differs from the judgment value N/A: Items not targeted for verification (verification not yet performed)
(5)	[Back]	Moves the screen to the previous page
	[Done]	The display returns to the <Welcome to VY Verification Tool> screen. When testing is completed, the results are reflected in the <Welcome to VY Verification Tool> screen.
	[Abort]	The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen

Operating Procedure

NOTE

Before starting operation, make sure that [Data Lock] is [Off]. Operation is not possible if the [On] checkbox is selected at [Data Lock].

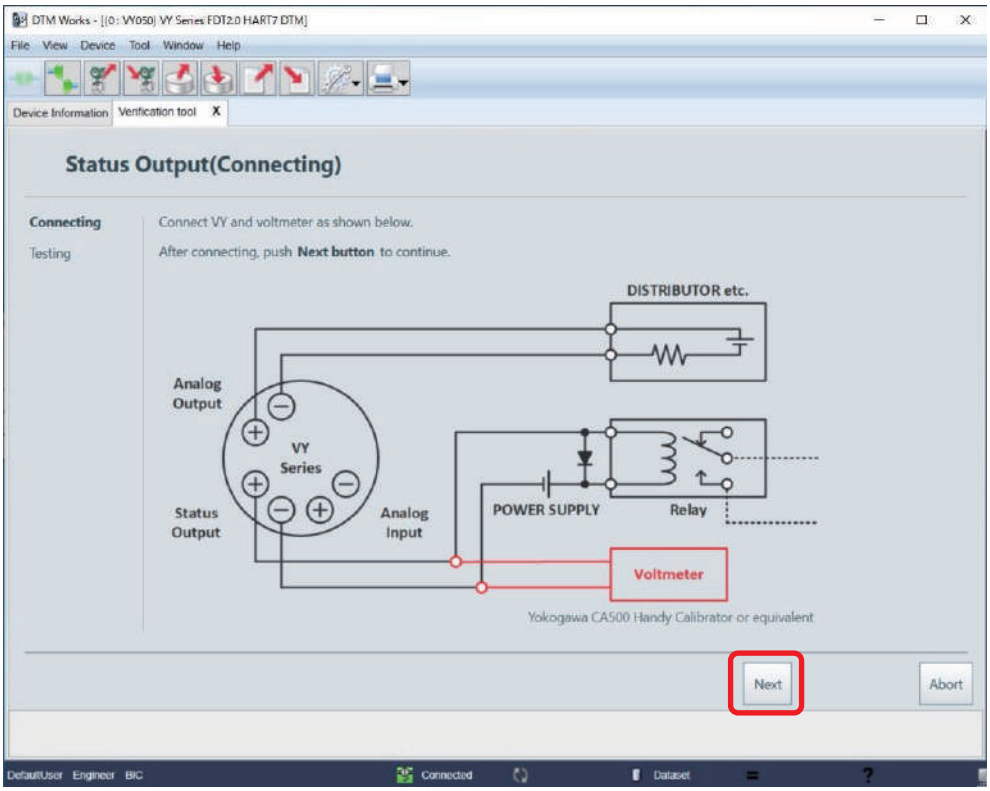
1 Start up the operation screen

Click [Status Output] in the <Welcome to VY Verification Tool> screen to display the <Status Output(connecting)> screen.

2 Connect the external measuring device

Open the transmitter case cover, and connect the external measuring device by referring to the <Status Output(connecting)> screen.

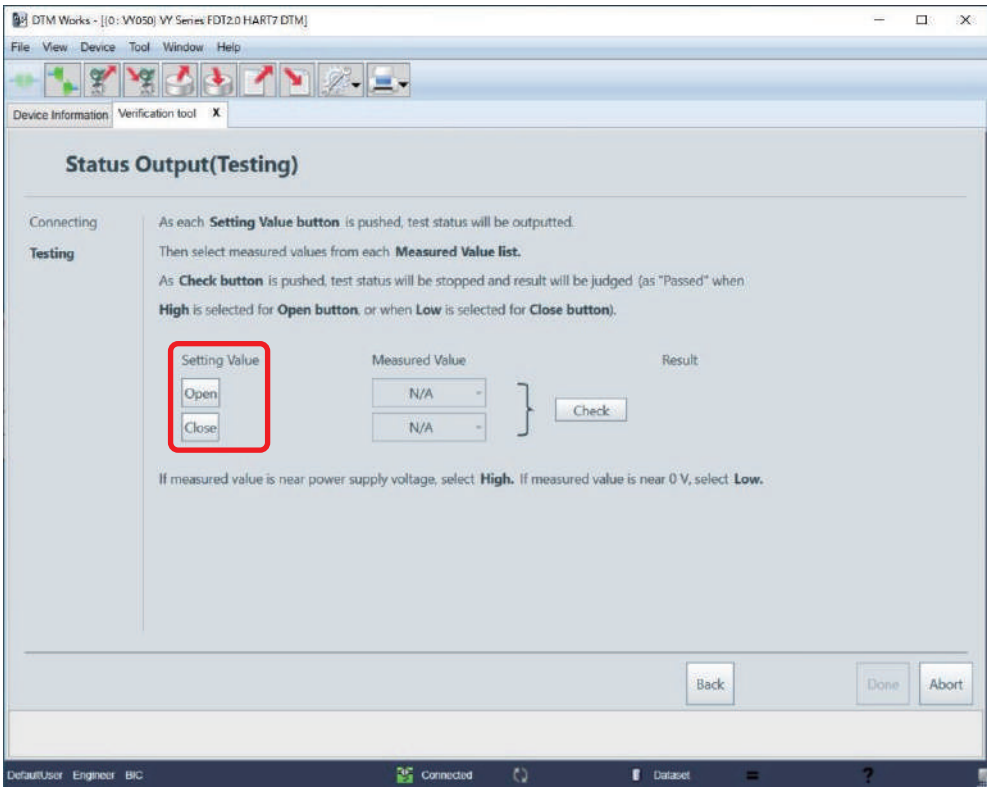
After connection is completed, click [Next].



F0342.ai

3 Test the status output from the target device

Click [Open] or [Close] in the <Status Output(testing)> screen to output the test voltage, and measure the status output value of the target device.

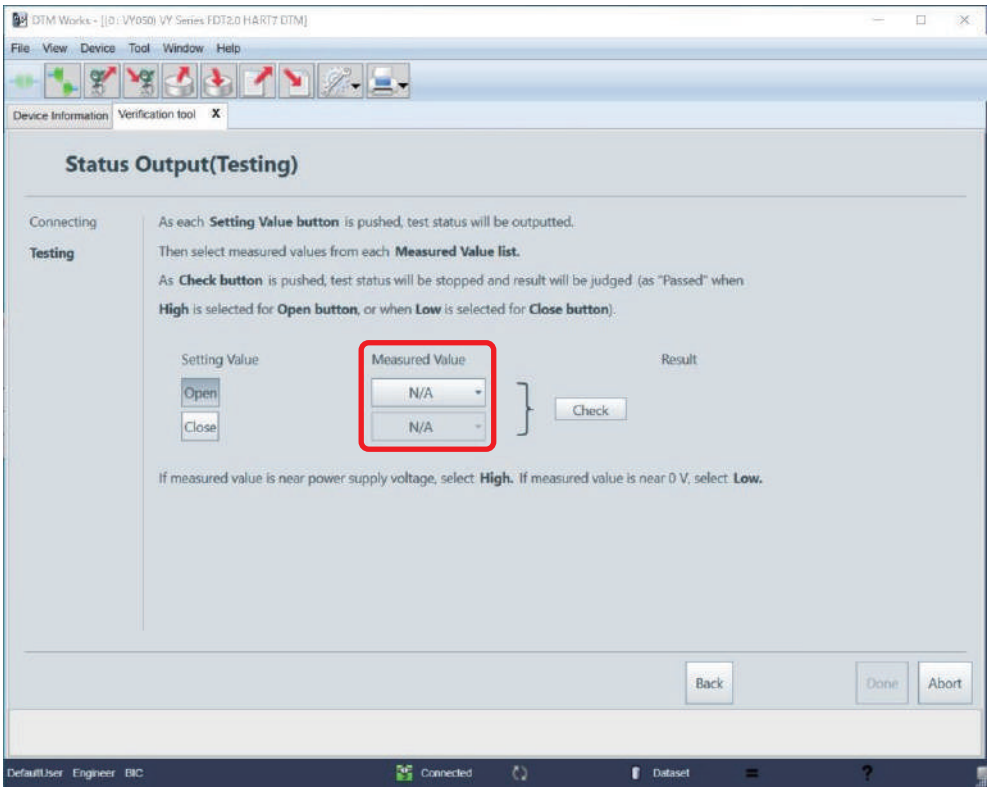


F0343.ai

Display Item	Explanation
[Open]	A test voltage of approximately the power supply voltage value (voltage value of Power Supply) is output from the target device.
[Close]	A test voltage of approximately 0 V is output from the target device.

4 Select the status output value from the target device

Read the measurement result of the external measuring device for each test voltage value (Open/Close), and select the status output values from [Measured Value].

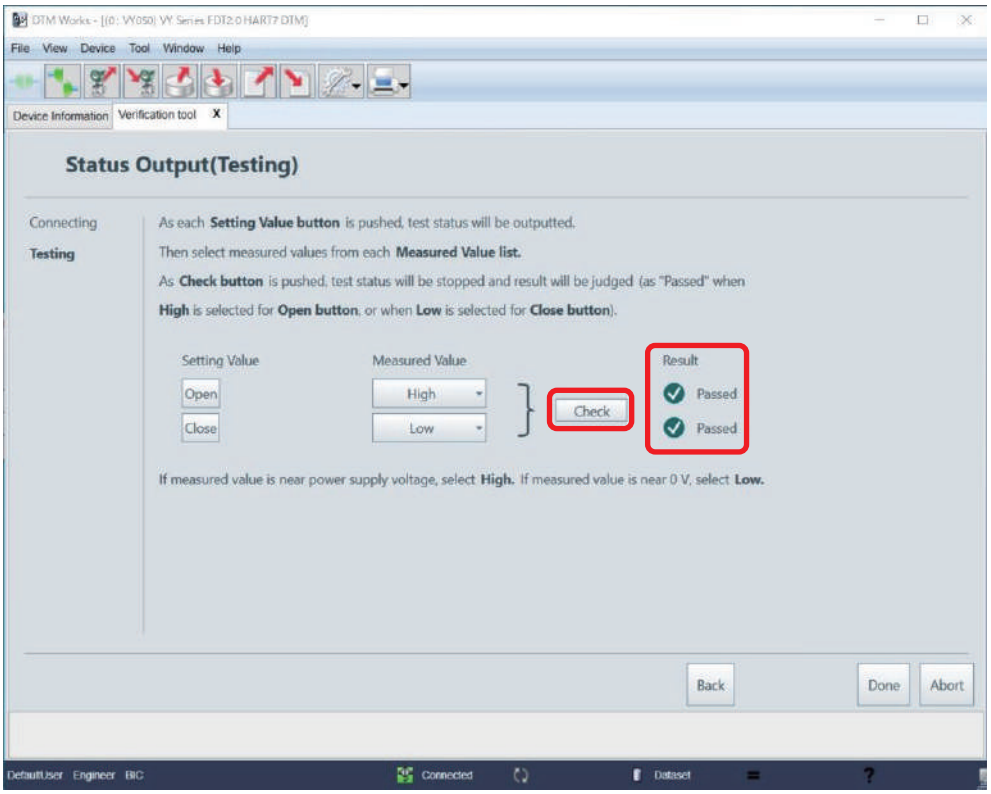


F0344.ai

Display Item	Explanation
High	Select this when the measured value is approximately the power supply voltage value (voltage value of Power Supply)
Low	Select this when the measured value is approximately 0 V
N/A	Select this when the measured value is the default value

5 Click [Check] to execute verification

Verification is executed on the measurement result (option at [Measured Value]), and the judgment result is displayed at [Result].



F0345.ai

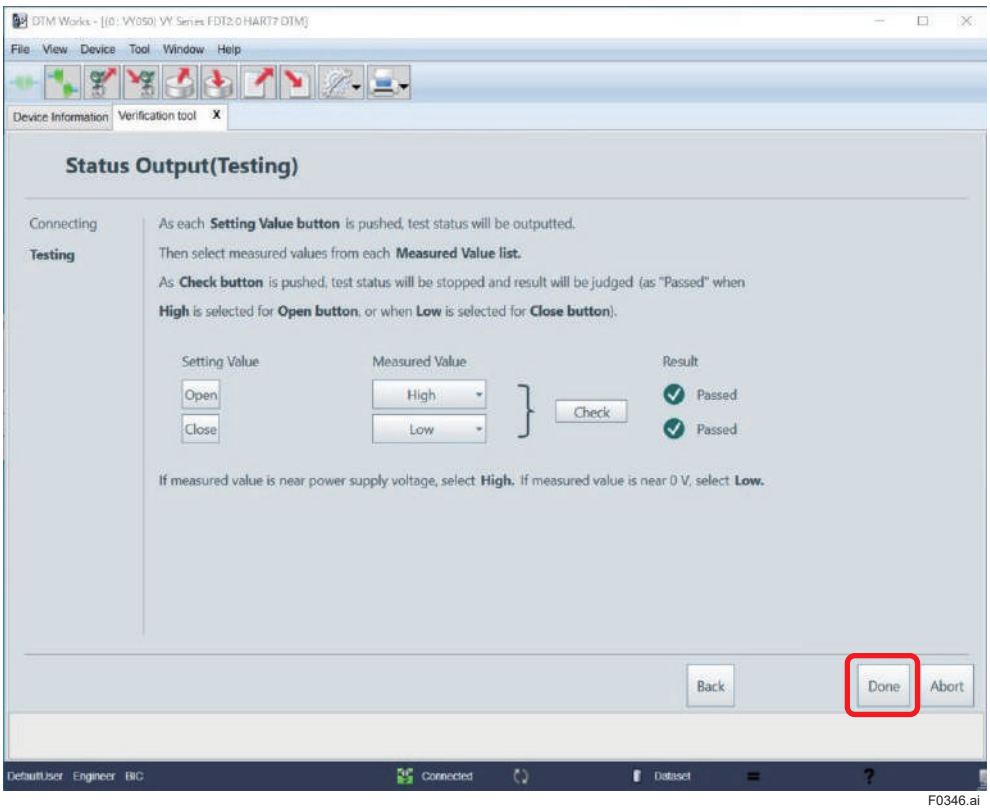
Display Item	Explanation
Passed	This is displayed when measured values are the same as the judgment value as a result of verification.
Failed	This is displayed when measured values differ from the judgment value as a result of verification.
N/A	Items not targeted for verification (verification not yet performed)

6 Click [Done] to apply the result of verification

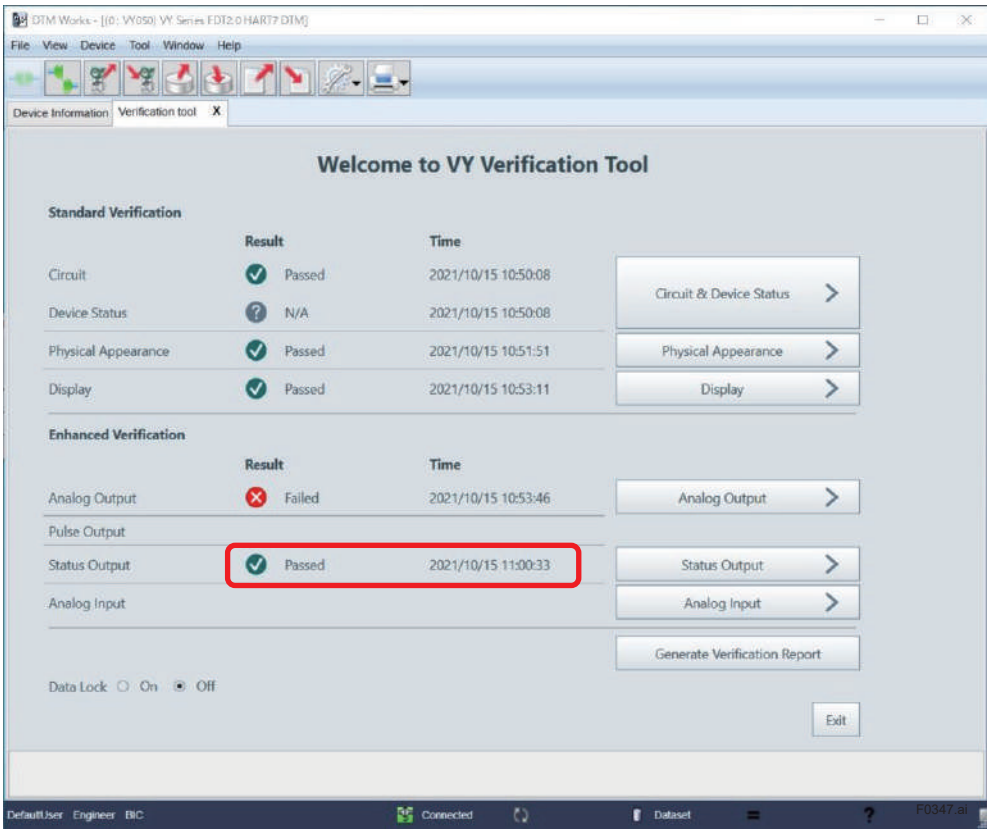
The judgment results are applied, and are reflected and displayed in the <Welcome to VY Verification Tool> screen.

To cancel and discard the execution results, click [Abort], and then click [OK] in the confirmation dialog box.

The execution results up till then are canceled and discarded, and the screen returns to the <Welcome to VY Verification Tool> screen.



F0346.ai



F0347.ai

3.2.5 Checks and tests analog input

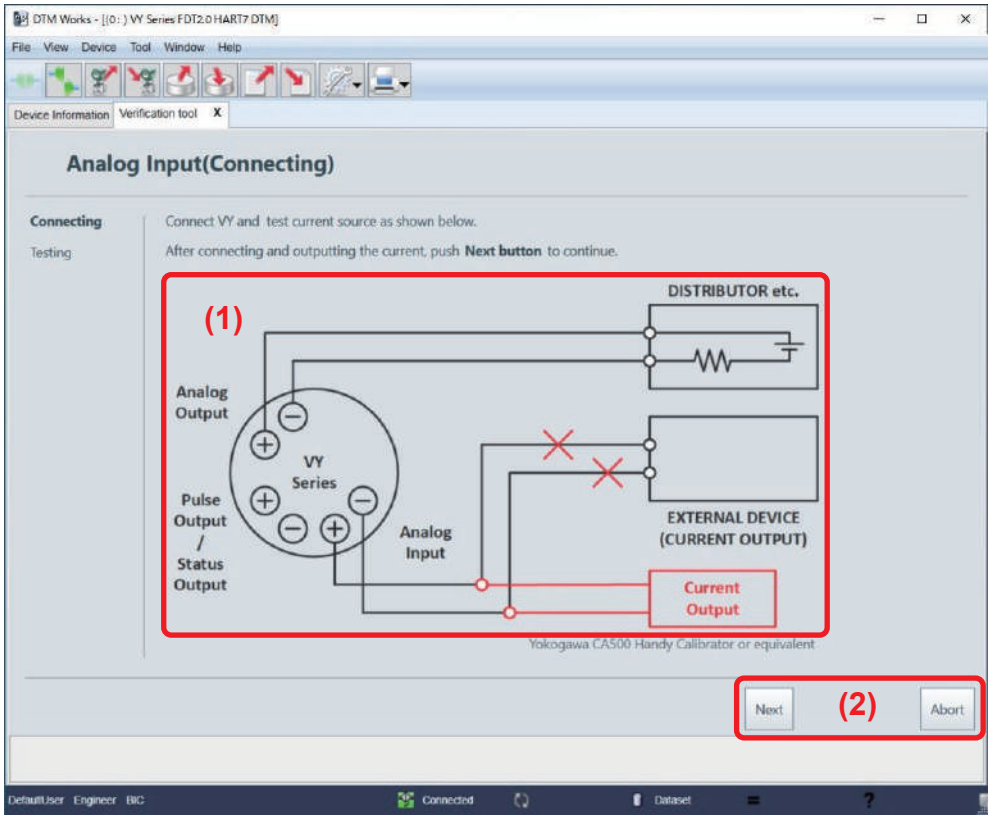
Outline of function

An external signal source (current generator) is connected to the target device to check normalcy at analog input.

NOTE

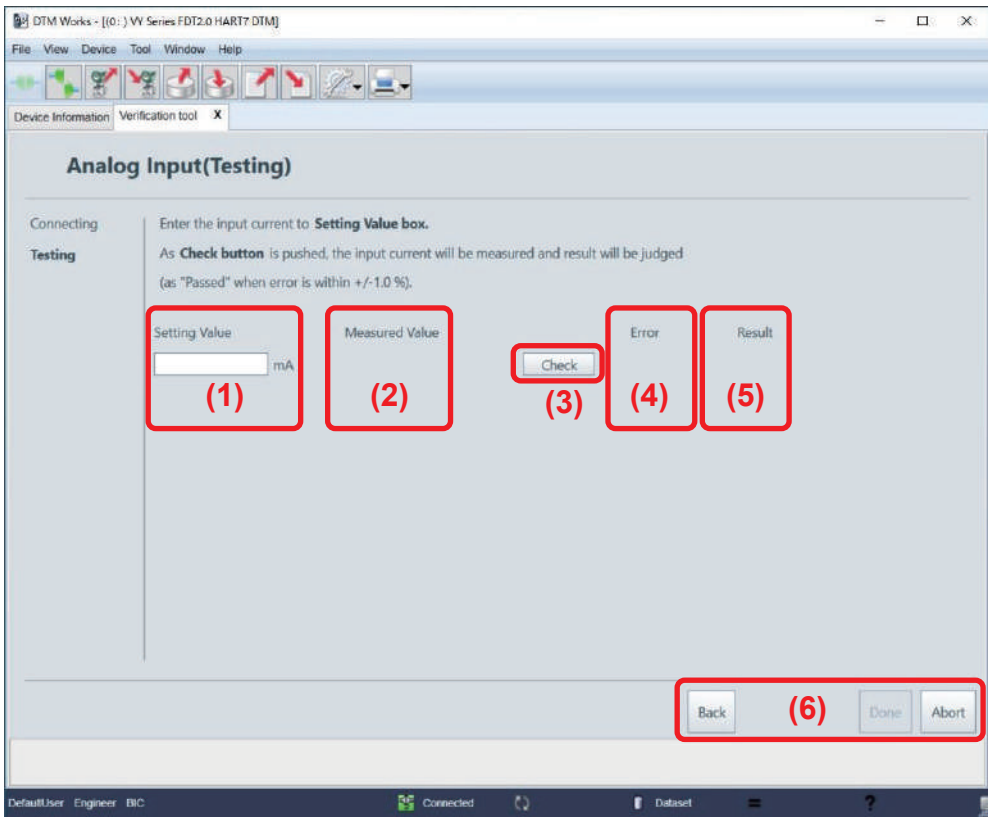
- Before performing this test, prepare an external signal source such as the CA500 Handy Calibrator.
- The execute button is displayed (i.e. execution is enabled) only when there is analog input for the target device.

Screen used and configuration of screen



F0348.ai

No.	Display Item	Explanation
(1)	Connection diagram	Shows the connection diagram between the device and external signal source
(2)	[Next]	Moves the screen to the next page
	[Abort]	The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen



F0349.ai

No.	Display Item	Explanation
(1)	Setting Value	Enter the output value mA of the current source from the external measuring device to input to the target device
(2)	Measured Value	Displays the measured value obtained by the device measuring the output value (input value to device) of the current source
(3)	[Check]	Judges the measured value
(4)	Error	Displays the error of the measured value with the output value (input value to device) of the current source
(5)	Result	Displays the measurement result Passed: Error within range of judgment threshold Failed: Error outside range of judgment threshold N/A: Items not targeted for verification (verification not yet performed)
(6)	[Back]	Moves the screen to the previous page
	[Done]	The display returns to the <Welcome to VY Verification Tool> screen. When testing is completed, the results are reflected in the <Welcome to VY Verification Tool> screen.
	[Abort]	The display returns to the <Welcome to VY Verification Tool> screen. Results are not reflected in this screen

Operating Procedure

NOTE

Before starting operation, make sure that [Data Lock] is [Off]. Operation is not possible if the [On] checkbox is selected at [Data Lock].

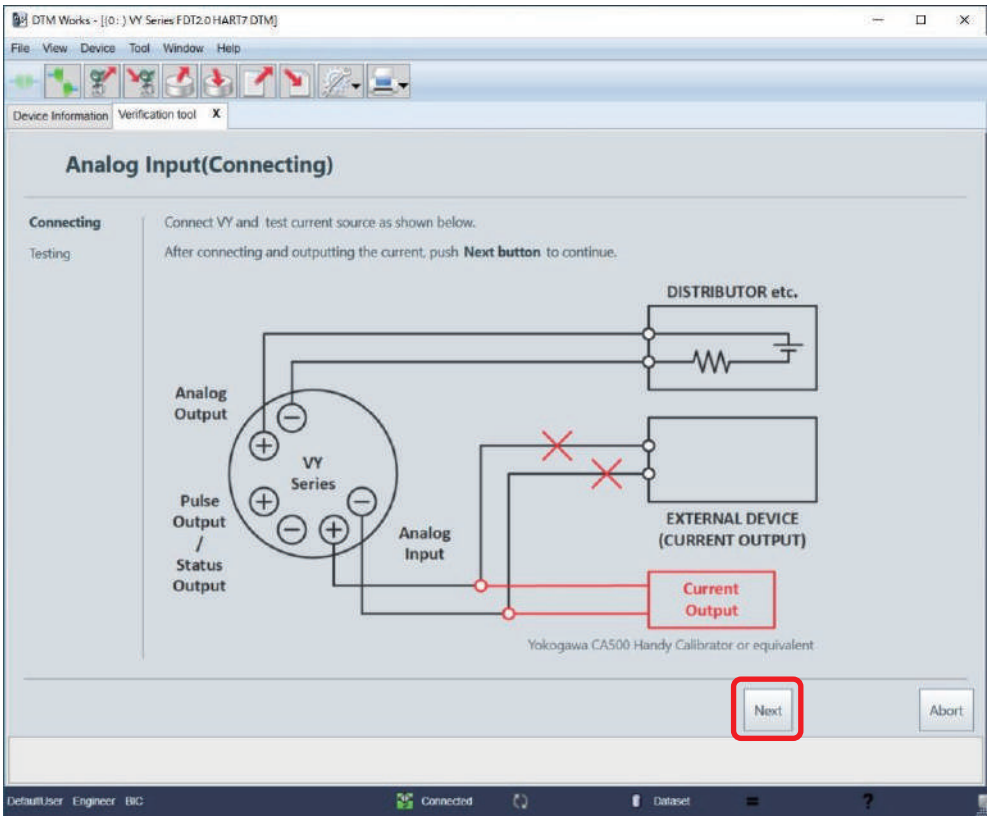
1 Start up the operation screen

Click [Analog Input] in the <Welcome to VY Verification Tool> screen to display the <Analog Input(connecting)> screen.

2 Connect the external signal source

Open the transmitter case cover, and connect the external signal source by referring to the <Analog Input(connecting)> screen.

After connection is completed, click [Next].



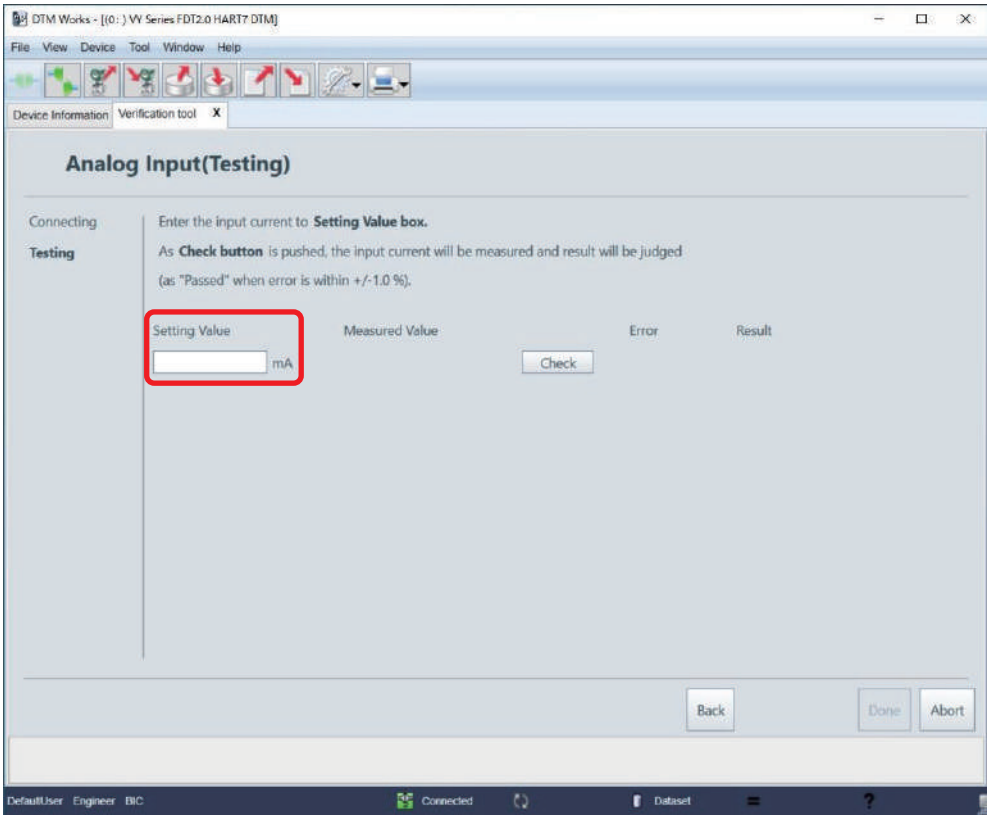
F0350.ai

3 Enter the test current to the target device

Enter the desired current from the external signal source to the target device, and set that value at [Setting Value] in the <Analog Input(testing)> screen.

NOTE

Enter the setting value down to two digits past the decimal point.

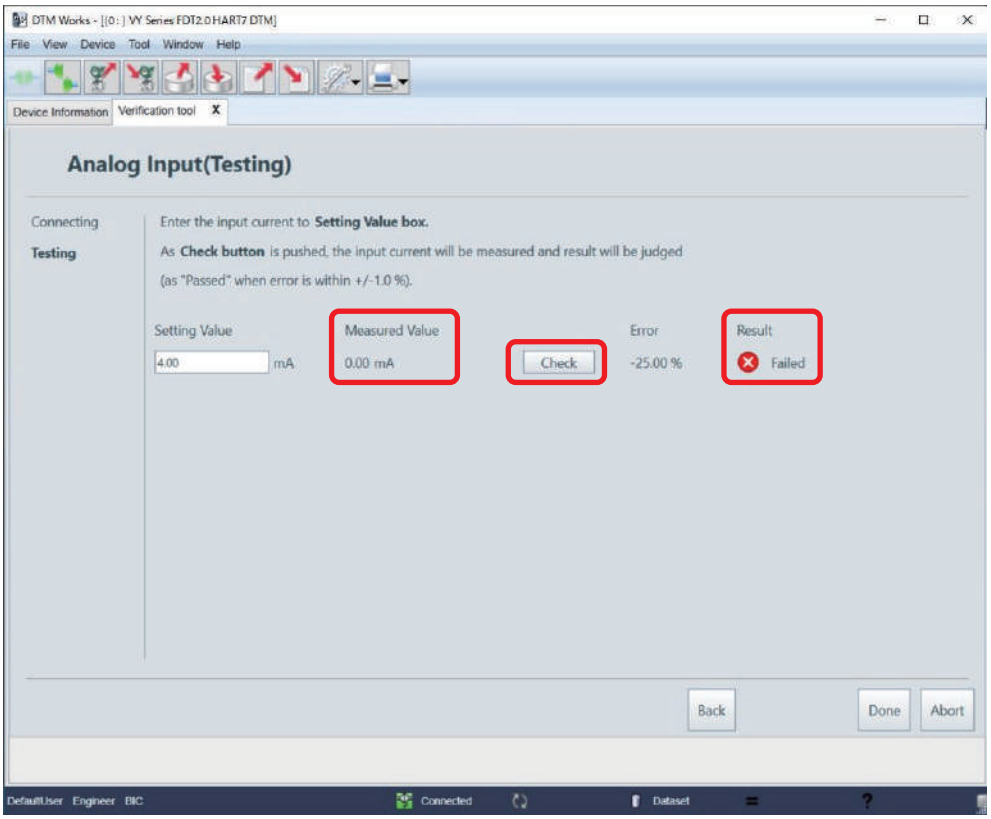


F0351.ai

4 Click [Check] to execute verification

The input current is acquired three times, and the average value is calculated and displayed at [Measured Value].

Verification is executed on the measurement result (average value of input current), and the judgment result is displayed at [Result].



F0352.ai

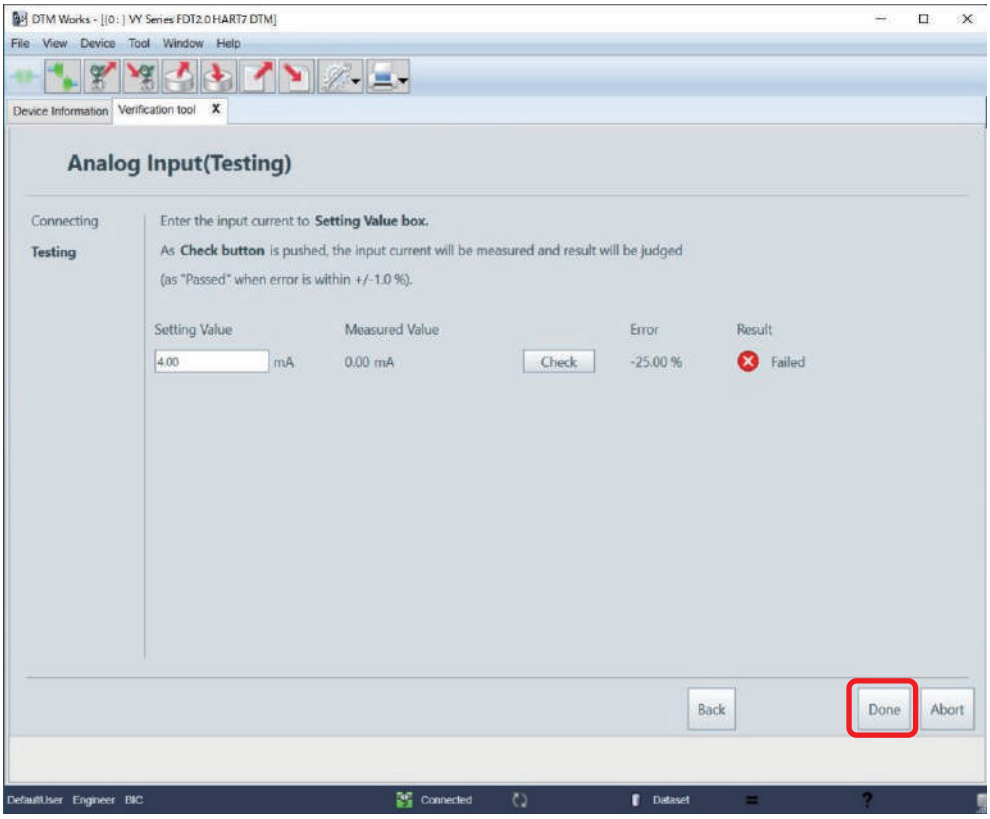
Display Item	Explanation
Passed	This is displayed when error is within the range of the judgment threshold as a result of verification.
Failed	This is displayed when error is outside the range of the judgment threshold as a result of verification.
N/A	Items not targeted for verification (verification not yet performed)

5 Click [Done] to apply the result of verification

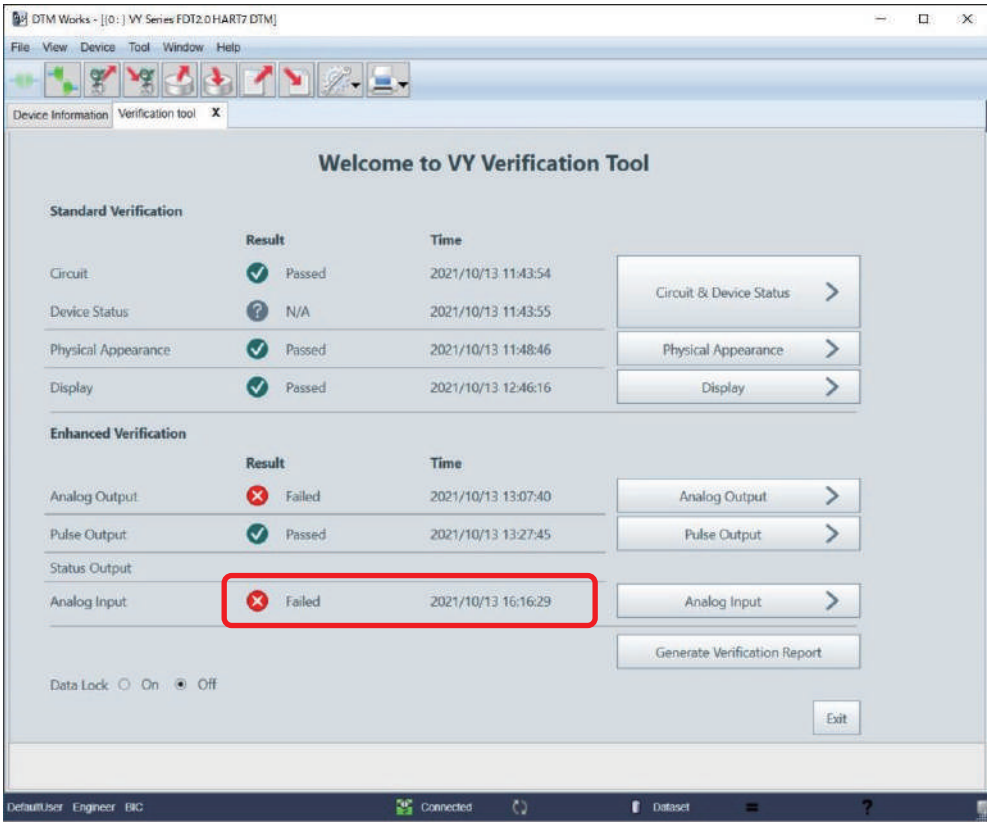
The judgment results are applied, and are reflected and displayed in the <Welcome to VY Verification Tool> screen.

To cancel and discard the execution results, click [Abort], and then click [OK] in the confirmation dialog box.

The execution results up till then are canceled and discarded, and the screen returns to the <Welcome to VY Verification Tool> screen.



F0353.ai



F0354.ai

3.3 Outputting Check and Test Results (report)

3.3.1 Generating Check and Test Results (report)

■ Outline of function

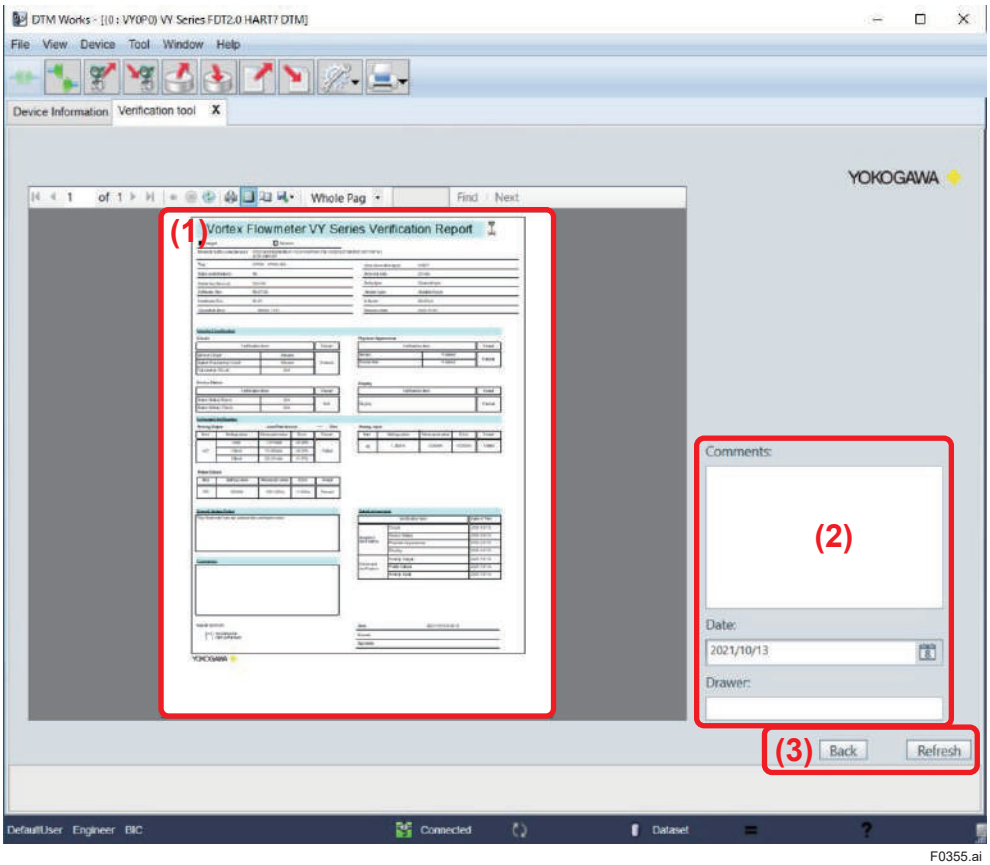
The result of performing verification (check/test) is saved in the specified format to generate report data.

NOTE

When generating check and test results (report), "Checking/testing circuits and alarm status" must already have been performed. For this reason, when "Checking/testing circuits and alarm status" has not yet been performed, [Generate Verification Report] is inactive.

Furthermore, when "Checking/testing circuits and alarm status" has been performed, check and test results (report) can be generated even if other verification items have not yet been performed.

■ Screen used and configuration of screen



F0355.ai

No.	Display Item	Explanation
(1)	Check and test results (report)	Displays the check and test results (report)
(2)	Entry area	Enter the information to reflect in the report For details, refer to "3.3.2 Editing and issuing check and test results (report)"

(3)	[Back]	The display returns to the <Welcome to VY Verification Tool> screen. The content of the entry area is not reflected
	[Refresh]	Reflects and updates comments, implementation date and executor

■ Operating Procedure

1 Check that "Checking/testing circuits and alarm status" and the required verification have finished being completed

Check that all required test items have completed and that [Generate Verification Report] is active.

2 Click [Generate Verification Report] in the <Welcome to VY Verification Tool> screen to generate check and test results (report).

The screen changes, and the results of already performed verifications are reflected and displayed at [Vortex Flowmeter VY Verification Report].

Also, overall judgment results are displayed at [Overall Status].

Display Item	Explanation
Device Information	The information of the VY to be tested is displayed
Standard Verification	When standard VF has been performed, each of the results of performing verification are reflected • Items that have not been performed and judgment (result) are empty fields
Enhanced Verification	When enhanced VF has been performed, each of the results of performing verification are reflected • Items that have not been performed and judgment (result) are empty fields • Items that have no functions or that cannot be exclusively selected (cannot be judged) and judgment are indicated by "----"
Overall Status	Each of the verification results are comprehensively judged, and the overall result is displayed as "Passed", empty field or "Failed". Passed: When all of the judgment results of standard VF are within the normal range and there is no Failed judgment in enhanced VF • Displayed comment This flowmeter was verified to be functioning within the original factory calibration. Empty field: When there are items that have not been performed in standard VF • Displayed comment One of the following is displayed depending on the execution status: Display was not verified. Physical Appearance was not verified. Physical Appearance and Display were not verified. Failed: When there is one or more Failed judgment in one of the items • Displayed comment This flowmeter has not passed this verification test.
Detail of test date	The date (year/month/day) that each verification was performed is displayed
Comments	The information entered in the [Comments:] field is reflected. For details, refer to "3.3.2 Editing and issuing check and test results (report)"
Date	The information entered in the [Date:] field is reflected. For details, refer to "3.3.2 Editing and issuing check and test results (report)"
Drawer	The information entered in the [Drawer:] field is reflected. For details, refer to "3.3.2 Editing and issuing check and test results (report)"

NOTE

There is no [Signature:] field on screen as it is assumed that the signature will be entered by an actual handwritten signature.

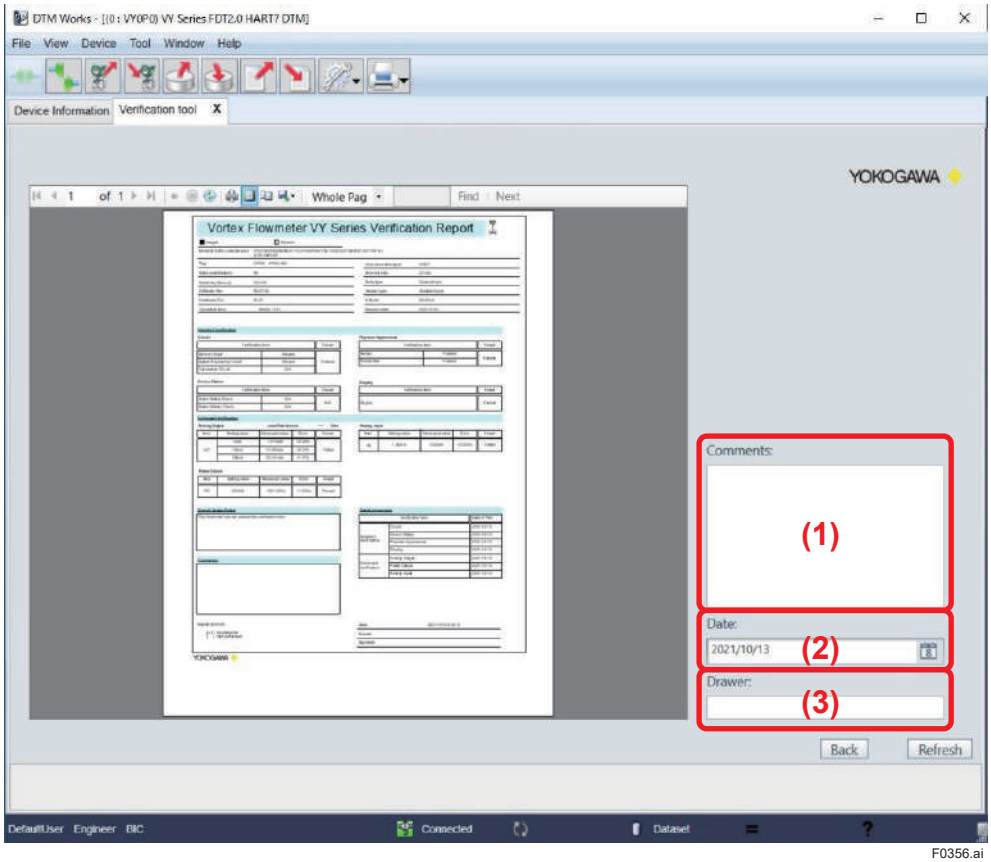
Next, proceed to "3.3.2 Editing and issuing check and test results (report)," and add and edit generation dates, as required to complete the report.

3.3.2 Editing and issuing check and test results (report)

Outline of function

A comment, creation date and other information are appended to the generated report data to finally become a report file.

Screen used and configuration of screen



F0356.ai

No.	Display Item	Explanation
(1)	Comments	Enter comments in the generated report. Enter comments up to eight lines and up to 256 characters long when entering a string of characters.
(2)	Date	Enter the generation date of the report. Dates can be entered directly or by clicking [8] to the right of the entry field to open a calendar and selecting the date from here. Clicking [Refresh] adds the time (hours/minutes/seconds) which is reflected in the [Date:] field.
(3)	Drawer	Enter the author of the report.

<Explanation of Buttons>



F0358.ai

Button	Button Name	Explanation
	First Page	Moves the screen to the first page
	Previous Page	Moves the screen to the previous page
1 of 1	Current Page of Total Pages	Displays the current page and total number of pages
	Next Page	Moves the screen to the next page
	Last Page	Moves the screen to the last page
	Refresh	Updates the report
	Print	Prints the report
	Print Layout	Specifies whether to display a preview of the report or to display the page as it will be printed
	Page Setup	Specifies the page setup
	Export	Exports the report as a PDF file
Whole Pag	Zoom	Specifies the enlarge/reduce factor for displaying the report
Find	Find	Searches for a specified text string in the report
Next	Find Next	Moves to find the next text string found in the report

■ Operating Procedure

1 Enter the information required for issuing the report

Enter comments, generation date and author, as required.

Display Item	Explanation
Comments	Enter comments in the generated report. Enter comments up to eight lines and up to 256 characters long when entering a string of characters.
Date	Enter the generation date of the report. Dates can be entered directly or by clicking [8] to the right of the entry field to open a calendar and selecting the date from here. Clicking [Refresh] adds the time (hours/minutes/seconds) which is reflected in the [Date:] field.
Drawer	Enter the author of the report.

2 Click [Refresh] to refresh the check and test results (report)

The entered comments, generation date and author are reflected in [Vortex Flowmeter VY Verification Report].

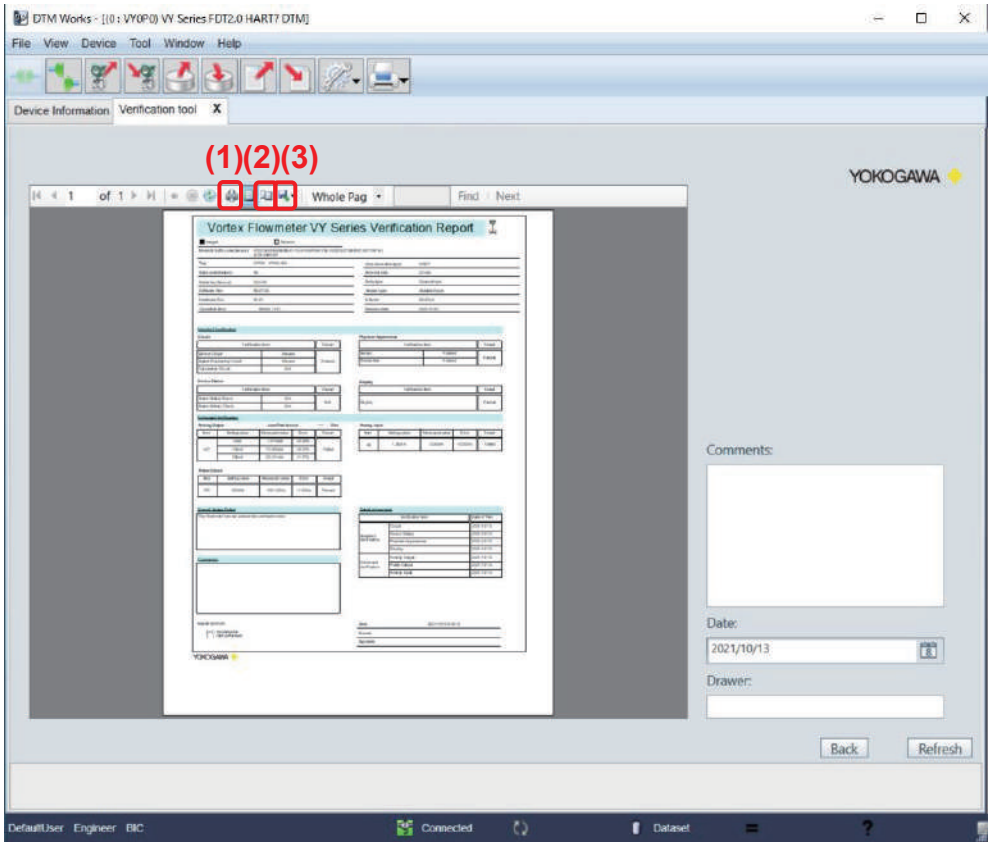
Next, proceed to "3.3.3 Outputting Check and Test Results (report)," and print the generated report file or output it as a PDF file, as required.

3.3.3 Outputting Check and Test Results (report)

Outline of function

Report files that are created are printed or output as PDF files.

Screen used and configuration of screen



F0357.ai

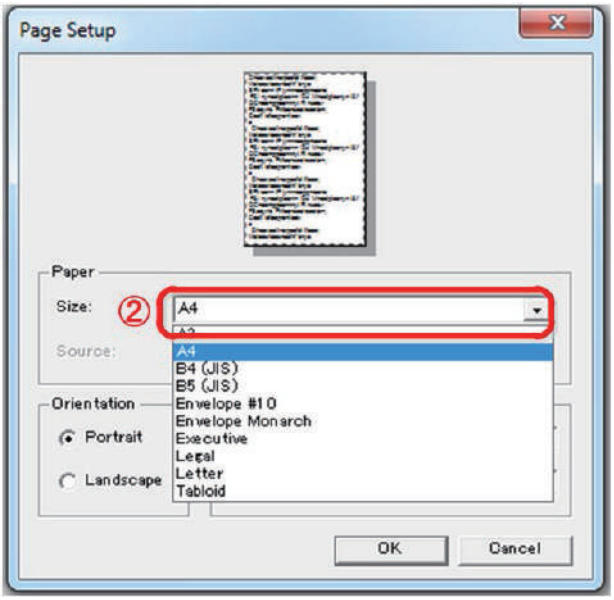
No.	Item		Explanation
(1)		Print	Prints the report
(2)		Page Setup	Specifies the page setup
(3)		Export	Exports the report as a PDF file

Operating Procedure

Print the report file

1 **Click [ ] to select the paper size**

The <Page Setup> dialog box is displayed. Select the paper size to print the report file on.



F0359.ai

NOTE

- Two paper sizes are supported: A4 and Letter. With other paper sizes, report data may not fit on a single page.
- Do not change the page orientation and margins. If these are changed, report data may not fit on a single page.

2 **Click [ ].**

The <Print>dialog box is displayed.

3 **Set the printing conditions, and click [Print].**

The report is output to the selected printer.

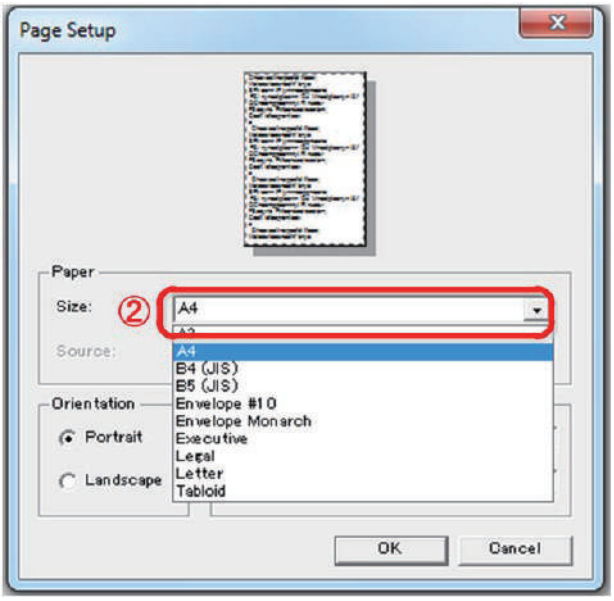
To cancel printing, click the [Cancel] button.

The settings up till then are canceled and discarded, and the screen returns to the <Vortex Flowmeter VY Verification Report> screen.

Outputting the report file as a PDF file

1 Click [ ] to select the paper size

The <Page Setup> dialog box is displayed. Select the size of the PDF file to output the report file to.



F0361.ai

NOTE

- Two output sizes are supported: A4 and Letter. With other paper sizes, report data may not fit on a single page.
- Do not change the page orientation and margins. If these are changed, report data may not fit on a single page.

2 Click [ ].

The <Save As>dialog box is displayed.

3 Set the save conditions, and click [Save].

The report file is saved as a PDF file with the name specified at the selected save directory.
To cancel output, click the [Cancel] button.
The settings up till then are canceled and discarded, and the screen returns to the <Vortex Flowmeter VY Verification Report> screen.

3.3.4 Re-generating Check and Test Results (report)

Outline of function

A "check and test results (report)" is re-generated for the results of verification performed in the past by using the file loading and save function. This function can be performed even for DTM files in an offline state.
For details, refer to "4.2 Loading Files" and "4.1 Storing Files."

Operating Procedure

For details about the operating procedure, refer to "4.2 Loading Files" and "4.1 Storing Files."

4. Managing Check and Test Result (report) Files

4.1 Storing Files

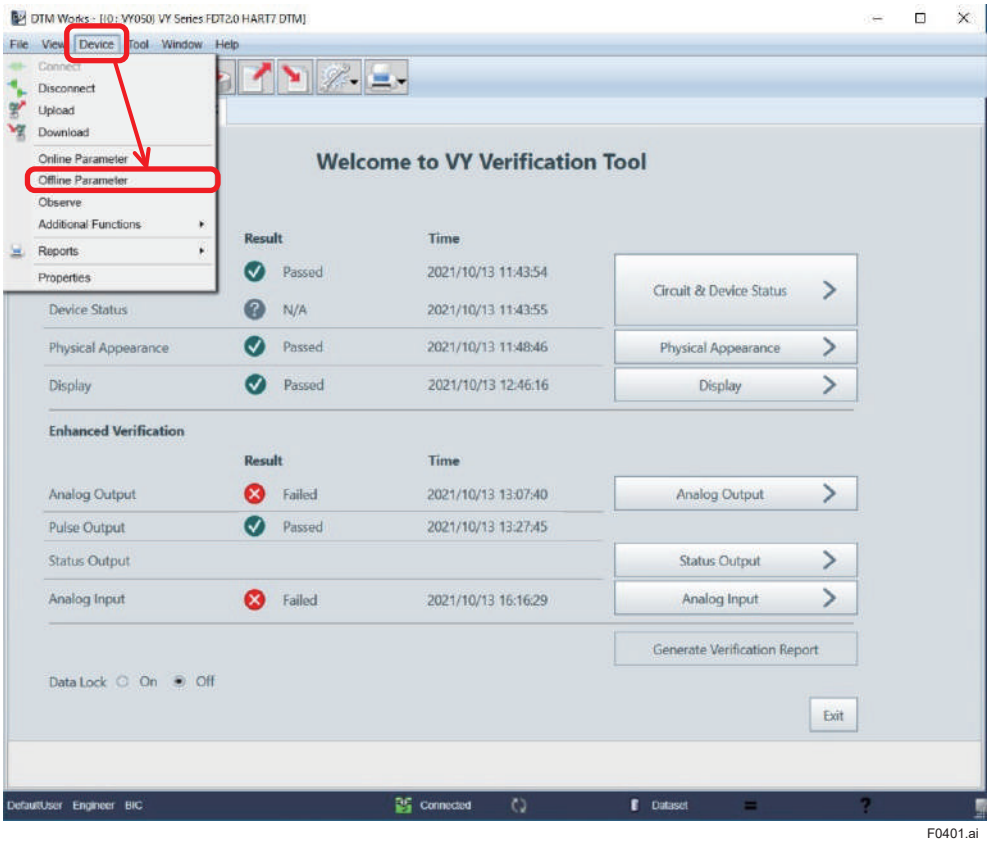
4.1.1 Storing files to the database

■ Outline of Functions

Check/test results (report) that are generated after execution of verification are stored on the DTM internal database.

■ Operating Procedure

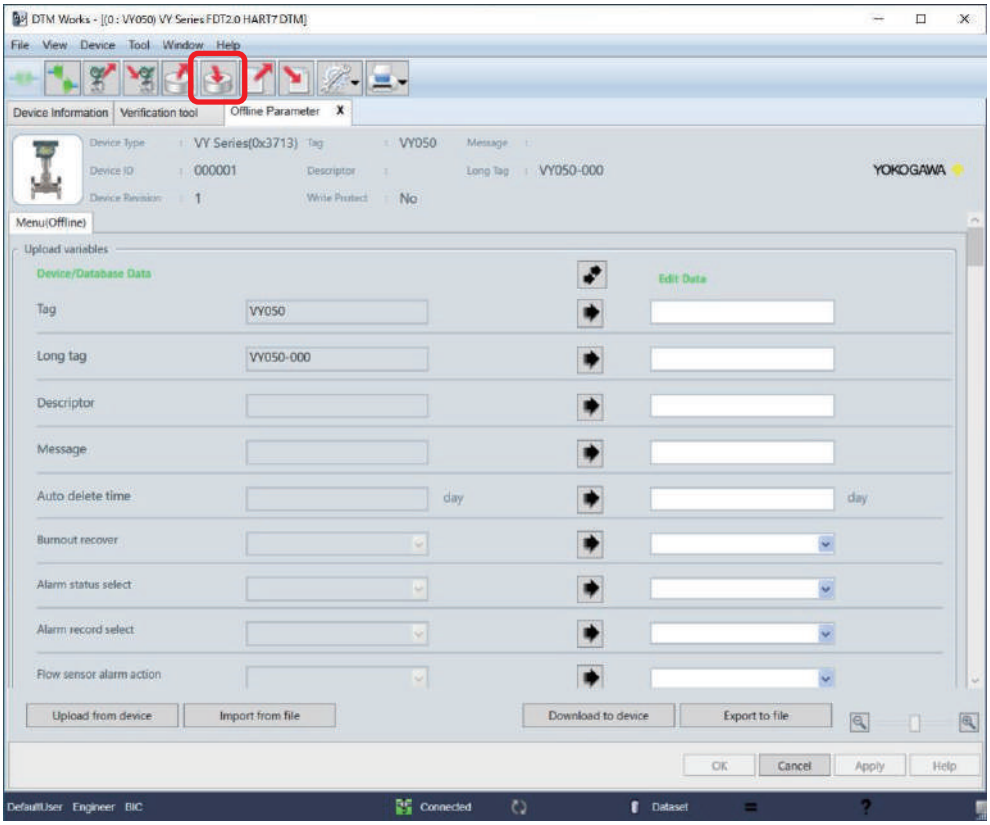
1 **In the top page of this tool, click the [Device] menu, and select [Offline Parameter].**



F0401.ai

The [Offline Parameter] panel is displayed.

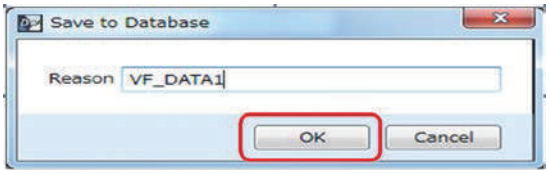
2 Click [ ] to store the check results to the database.



F0403.ai

The <Store to Database> dialog box is displayed.

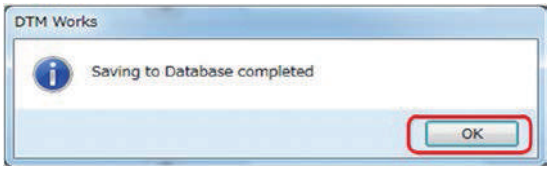
3 Enter the registration name at [Reason], and click [OK].



F0404.ai

The <DTM Works> dialog box is displayed.

4 Click [OK] to complete storage.



F0405.ai

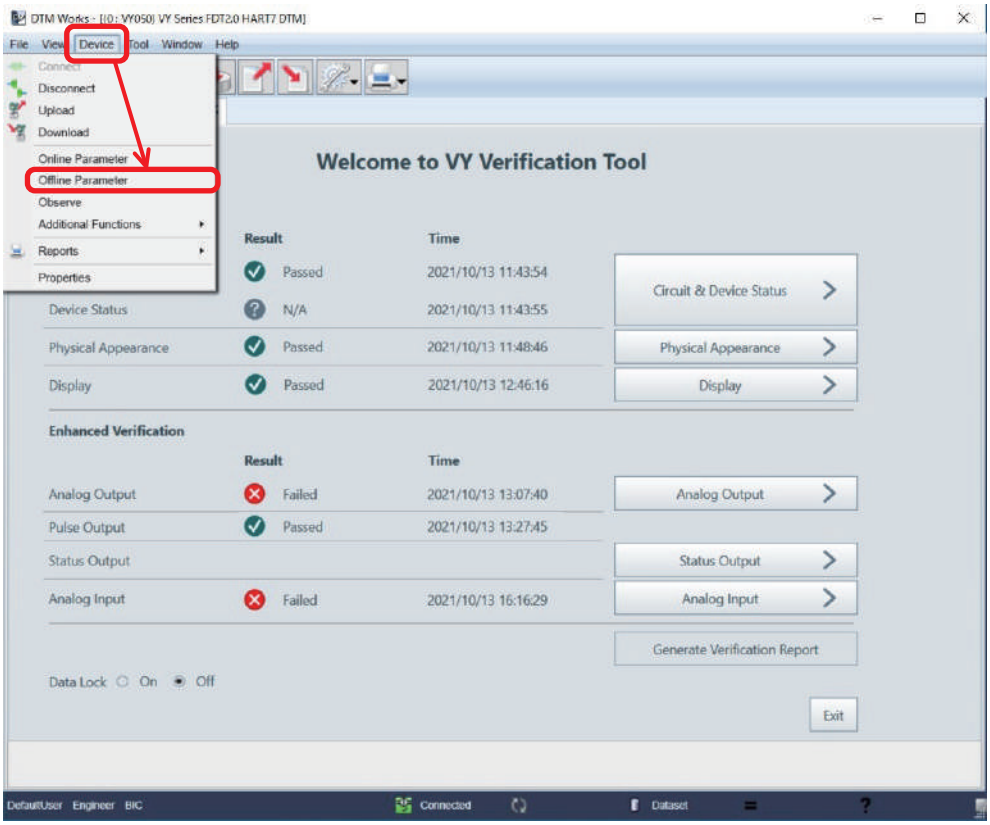
4.1.2 Storing to external storage

Outline of Functions

Check/test results (report) that are generated after execution of verification are stored to external storage as dns format files.

Operating Procedure

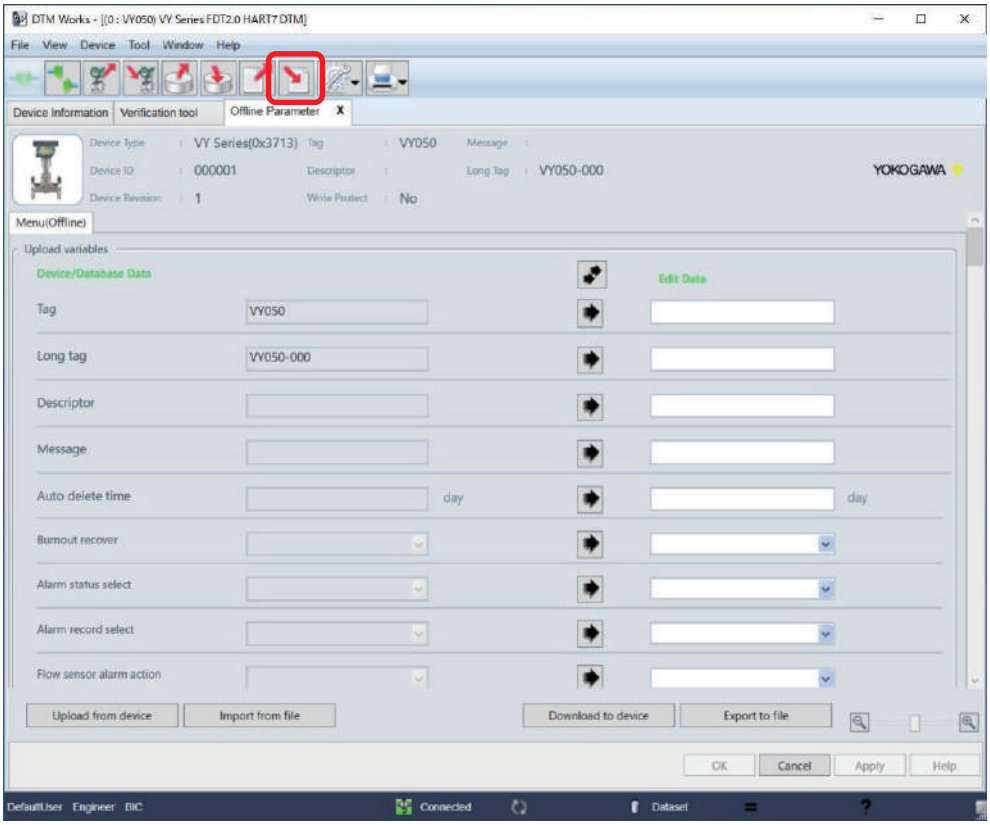
1 **In the top page of this tool, click the [Device] menu, and select [Offline Parameter].**



F0401.ai

The [Offline Parameter] panel is displayed.

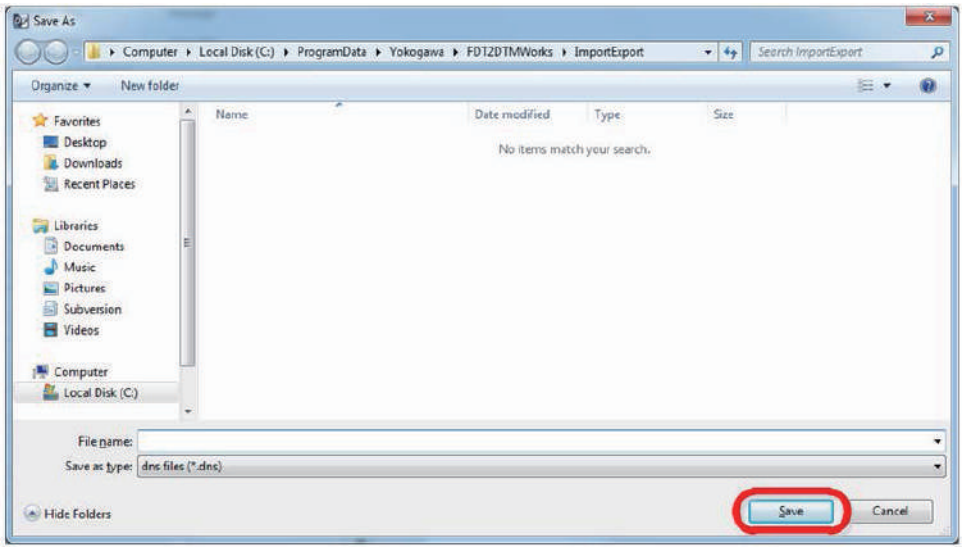
2 Click [ ] to store the check results to file.



F0406.ai

The <Save As> dialog box is displayed.

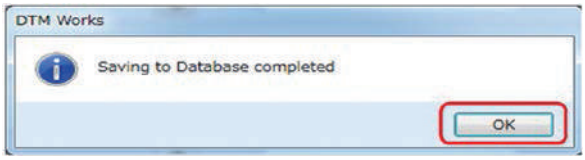
3 Enter the file name, and click [Save].



F0407.ai

The <DTM Works> dialog box is displayed.

4 **Click [OK] to complete storage.**



F0408.ai

4.2 Loading Files

4.2.1 Loading files from the database (at DTM startup)

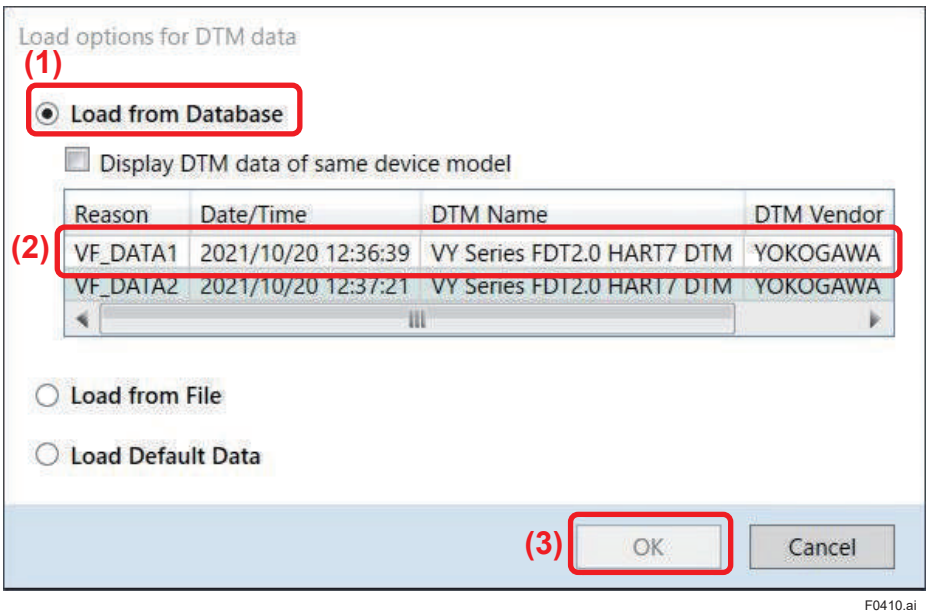
■ Outline of Functions

The check/test results (report) that are stored to the DTM internal database are loaded when the DTM is started up.

■ Operating Procedure

1 **Select the data to load**

Select "Load from Database", select the target data from the list that is displayed, and click [OK].

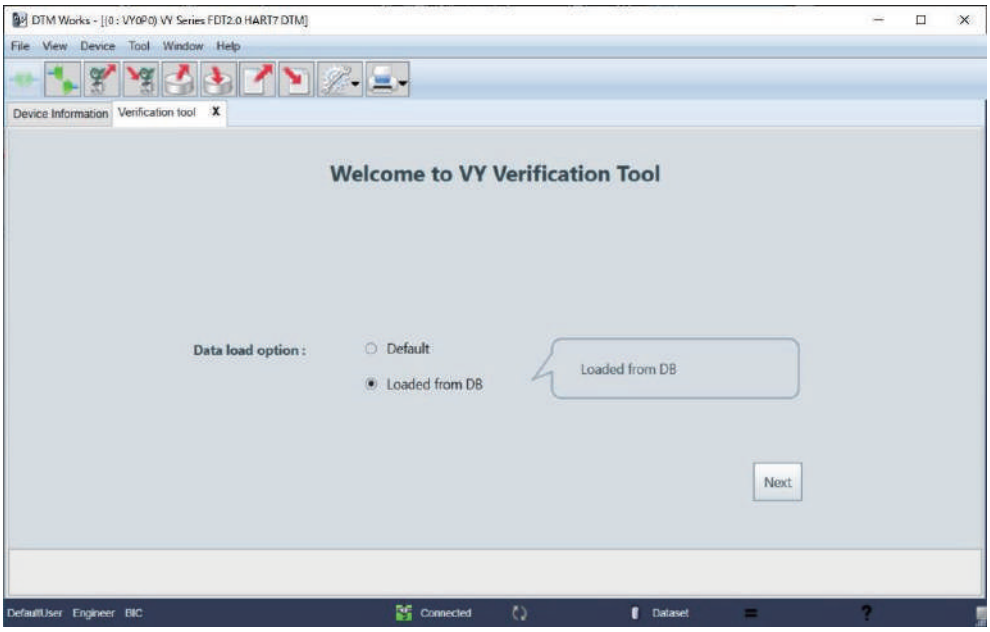


F0410.ai

The data of the selected file is loaded and the DTM starts up.

2 Select the data load option

In the <Welcome to VY Verification Tool> startup screen, select [Loaded from DB], and click [Next].



F0409.ai

The selected data is loaded, and the verification tool starts up.

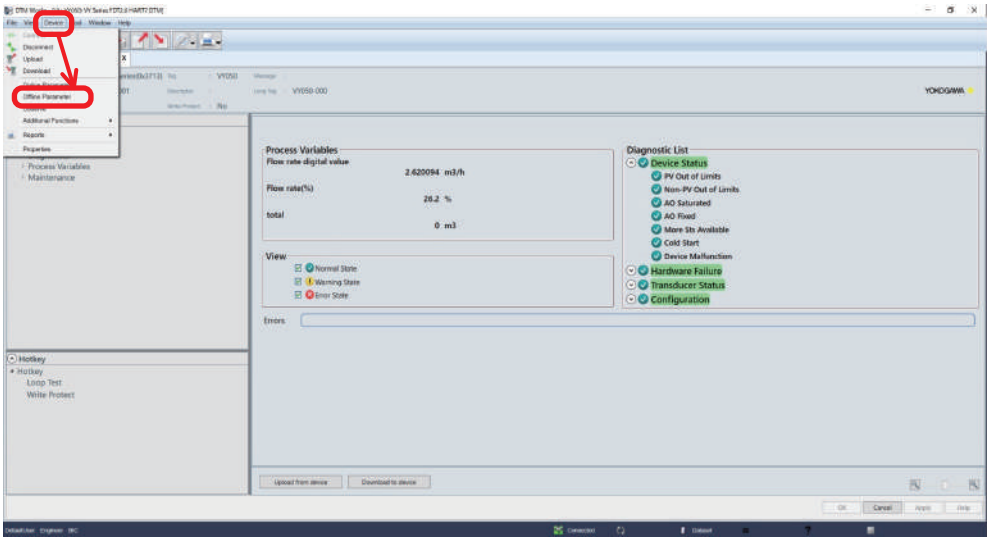
4.2.2 Loading files from the database and external storage (at DTM startup)

■ Outline of Functions

The check/test results (report) that are stored to the DTM internal database and external storage are loaded at any timing after the tool is started up.

■ Operating Procedure

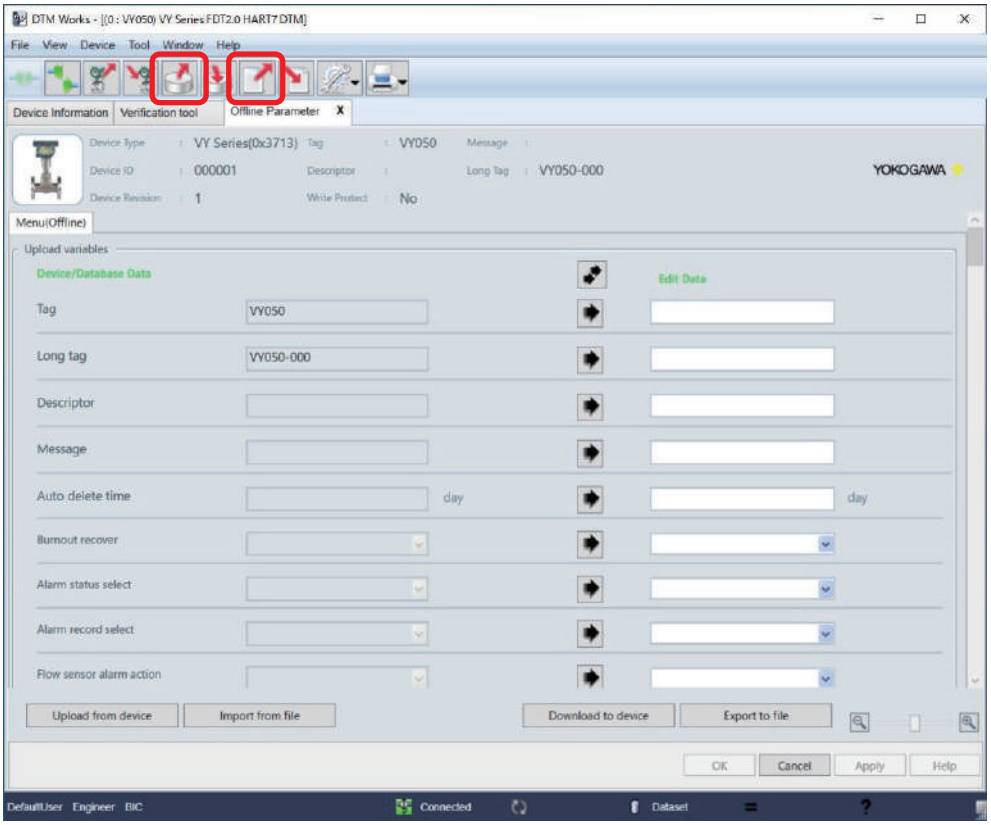
1 **In the top page of the DTM, click the [Device] menu, and select [Offline Parameter].**



F0411.ai

The [Offline Parameter] panel is displayed.

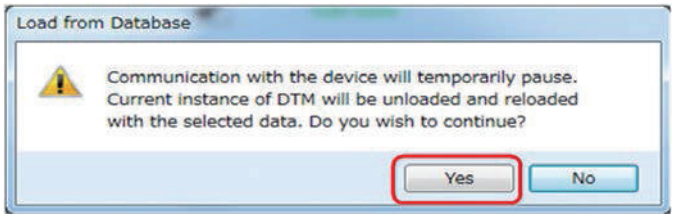
2 **Click [ ] to load the check results from the database or click [ ] to load the check results from external storage.**



F0412.ai

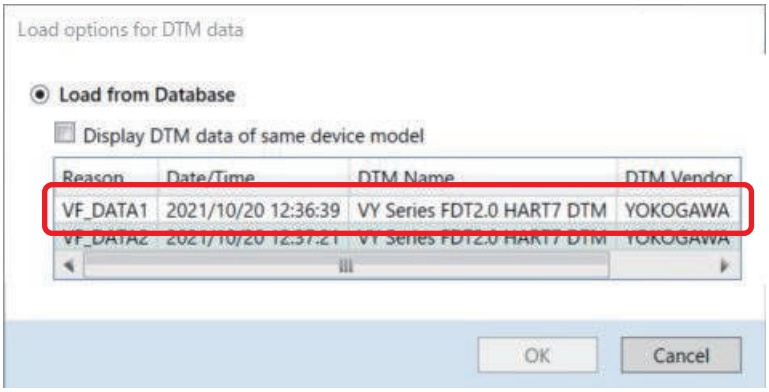
The <Load from Database> or <Load from external storage> dialog box is displayed.

3 **Click [Yes].**



F0413.ai

4 **Select the data to load, and click [OK].**



F0414.ai

NOTE

When data is loaded after the DTM is started up, exit this tool once and then restart it to activate that data after it has been loaded.
To exit this tool, click [x] on the [Verification tool] tab. For details on the restart procedure, refer to Section 2.2.

4.3 Locking Data

4.3.1 Locking verification results

■ Outline of Functions

Changes to result data after verification is executed can also be disabled (locked). Locking disables all buttons except [Generate Verification Report] and prevents result data from being changed.

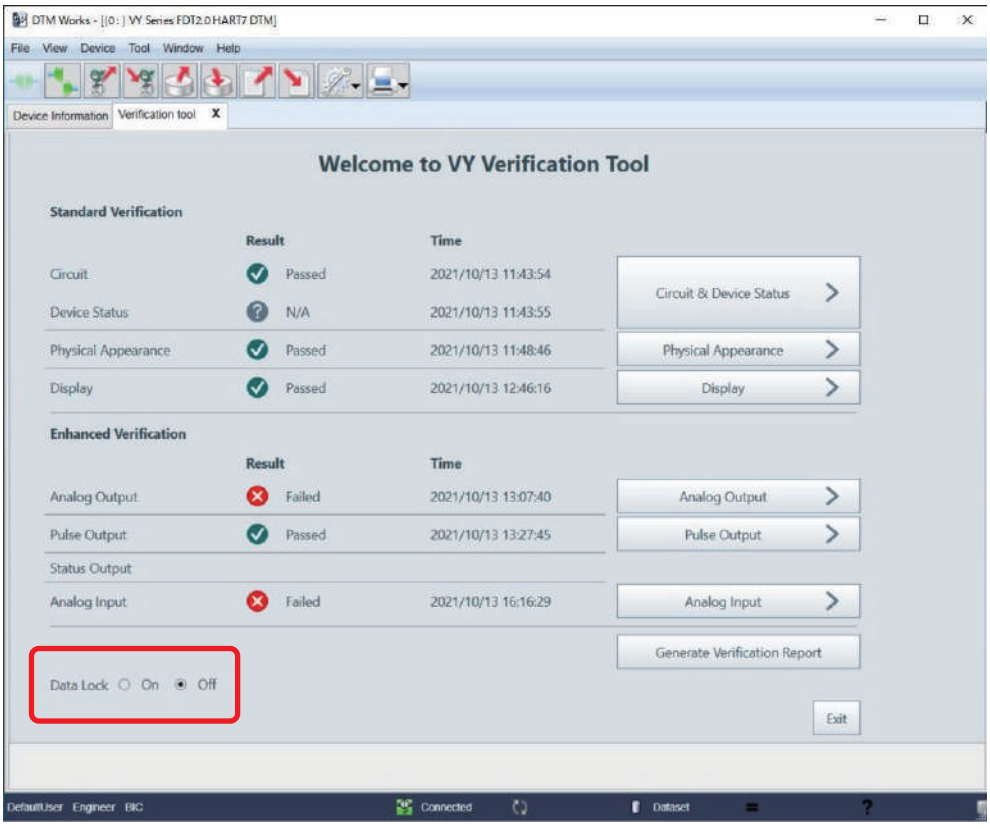
■ Operating Procedure

1 **Check that the required verification has ended**

In the <Welcome to VY Verification Tool> screen, check that verification of all required test items has ended.

2 **Select data lock**

In the <Welcome to VY Verification Tool> screen, select the [On] radio button at [Data Lock].

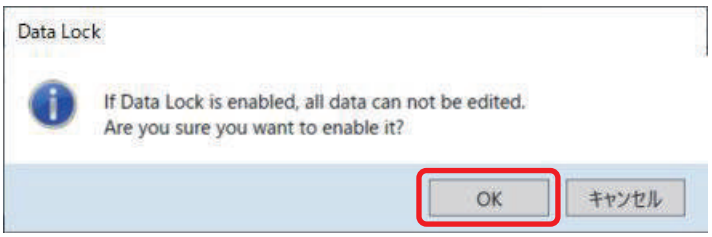


F0415.ai

The execution confirmation dialog box is displayed.

3 Execute data lock

The confirmation dialog box is displayed. Click [OK].



F0416.ai

This locks the data, and buttons other than [Generate Verification Report] can no longer be clicked.

4.3.2 Check the data lock status

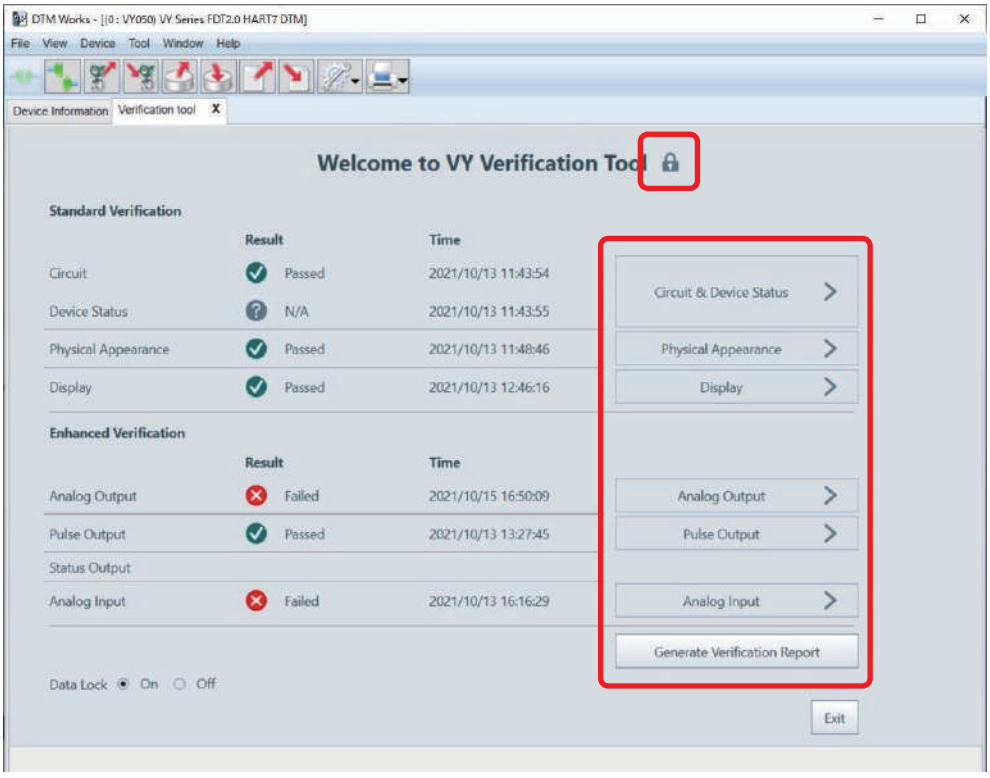
■ Outline of Functions

When verification result data is locked, the data lock icon is displayed in the <Welcome to VY Verification Tool> screen to indicate that the data lock is active. At the same time, buttons other than [Generate Verification Report] are inactivate and verification can no longer be performed.

■ Operating Procedure

1 Check that the data lock is active

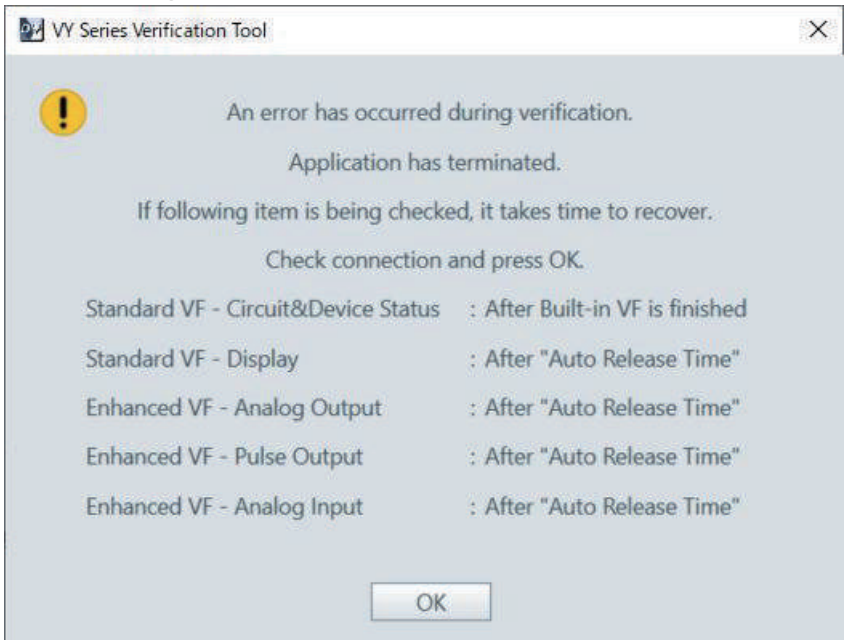
Check that the key icon is displayed in the <Welcome to VY Verification Tool> screen and that buttons other than [Generate Verification Report] are inactivate.



5. Error Messages and Countermeasure

This chapter shows messages, causes and countermeasures for errors that might occur and be output during execution of verification.

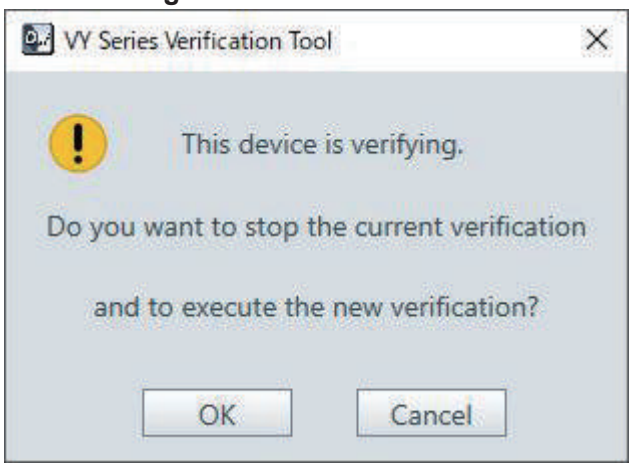
Error message 1:



F0501.ai

Details of message	An error has occurred during verification. Application has terminated. If following item is being checked, it takes time to recover. Check connection and press OK. Standard VF-Circuit&Device Status:After Built-in VF is finished Standard VF-Display:After "Auto Release Time" Enhanced VF-Analog Output:After "Auto Release Time" Enhanced VF-Pulse Output:After "Auto Release Time" Enhanced VF-Status Output:After "Auto Release Time"
Cause of error	A communication error occurred during execution of the respective verification item
Countermeasure when output	Click [OK] in the message dialog box. At this time, the display returns to the <Welcome to VY Verification Tool> screen. Check the communication connection, and re-execute the test item that was terminated

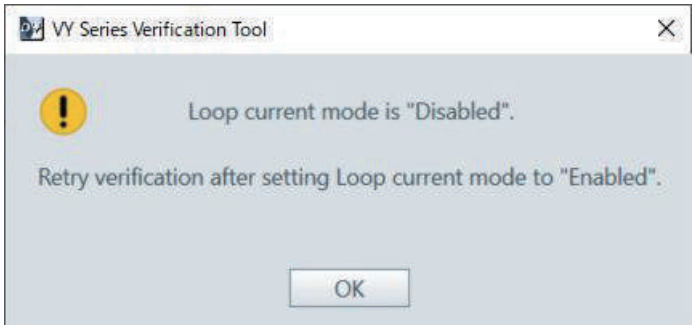
Error message 2:



F0502.ai

Details of message	This device is verifying. Do you want to stop the current verification and to execute the new verification?
Cause of error	An attempt was made to further execute verification even though device internal verification was in progress
Countermeasure when output	When "OK" in the message screen is clicked, the currently executing verification is terminated and verification is re-executed at the new settings. When "Cancel" is clicked, the display returns to the <Circuit & Device Status> execution screen.

Error message 3:



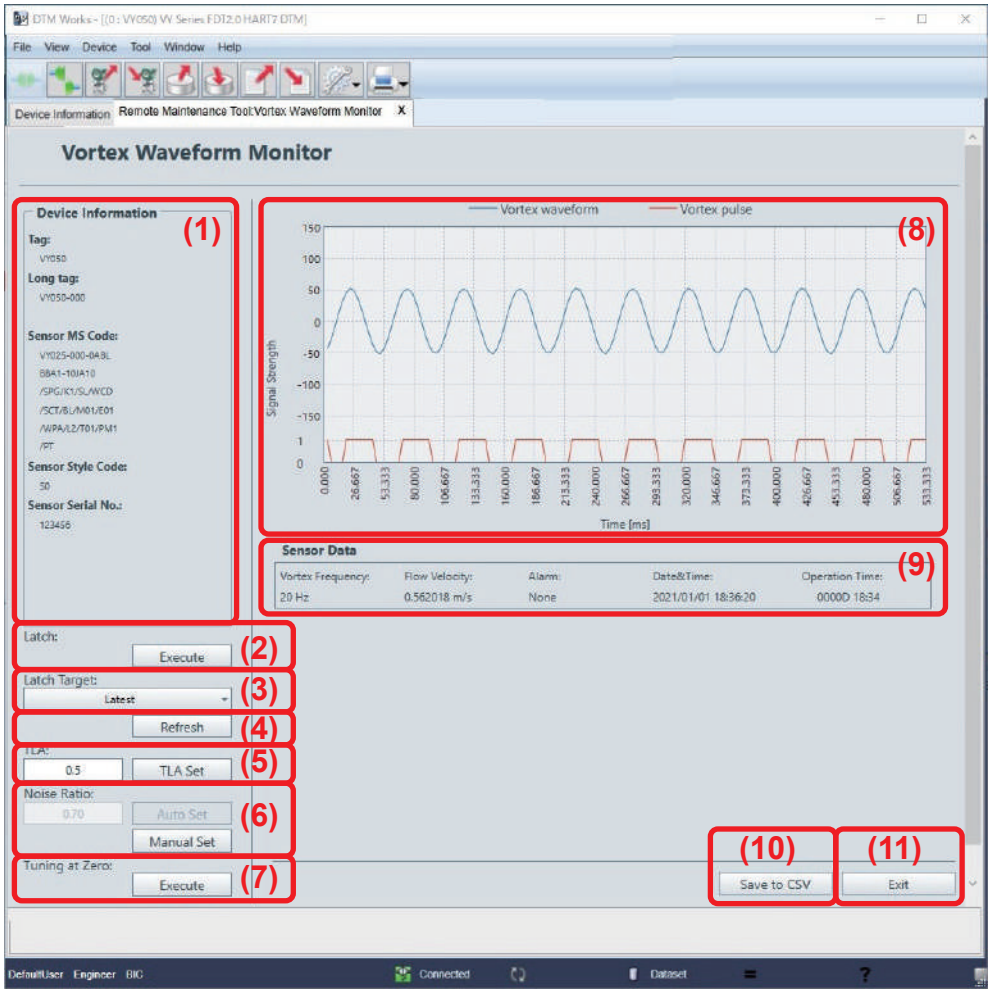
F0503.ai

Details of message	Loop current mode is “Disabled”. Retry verification after setting Loop current mode to “Enabled”.
Cause of error	The communication parameter [Loop current mode] was set to [Disabled] when verification of analog output was started.
Countermeasure when output	Set communication parameter [Loop current mode] to [Enabled], and re-start verification of analog output.

6. Operations In the Remote Maintenance Tool

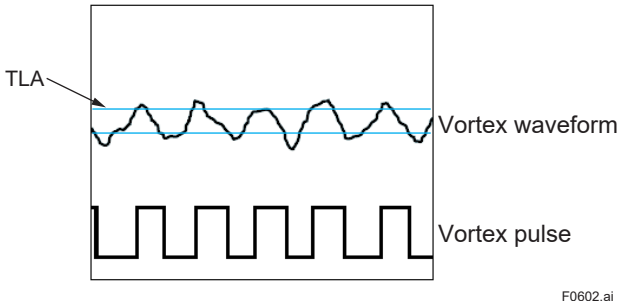
6.1 Execution of Vortex Waveform Monitor

■ Screen used and configuration of screen



F0601.ai

No.	Display Item	Explanation
(1)	Device Information	Device information display area Displays the device information of the connected VY vortex flowmeter **NOTE** In the case of an integral sensor, Transmitter MS code, Transmitter style code, and Transmitter serial no. are blank.
	Tag	Device tag
	Long tag	Device long tag
	Sensor MS code	Sensor MS code
	Sensor style code	Sensor style code
	Sensor serial no.	Sensor serial No.
	Transmitter MS code	Transmitter MS code
	Transmitter style code	Transmitter style code

		Transmitter serial no.	Transmitter serial No.
(2)	Latch		The waveform data and vortex pulse waveform for the current number of vortex signals are acquired from the VY vortex flowmeter
		[Execute]	
(3)	Latch Target		Type of data to display on screen
		Not selected	Not selected (screen data is deleted)
		Latest data	Data at time when latest (2) was performed
		Sensor alarm record 1 to 5	Data when vortex sensor related alarm occurred (1: Newest value to 5: Oldest value)
(4)	[Refresh]		Displays the vortex signal waveform and vortex pulse waveform selected at (3) as a graph
(5)	TLA		Threshold for converting the vortex signal waveform to vortex pulse waveform Set TLA when the vortex pulse waveform is not being output even though the vortex signal waveform is being output 
		[TLA Set]	Sets the value entered in the box
(6)	Noise Ratio		Noise ratio value
		[Auto Set]	The optimum Noise Ratio value is automatically set. The Noise Ratio value cannot be changed
		[Manual Set]	Sets the value entered in the box
(7)	[Execute]		Executes Tuning at Zero
(8)	Graph display area		Area where vortex signal waveform data and vortex pulse waveform are displayed • Vortex waveform: Waveform data of vortex signal before application of TLA • Vortex pulse: Vortex pulse waveform obtained by application of TLA on the vortex waveform (vortex signal waveform)
(9)	Sensor Data		Displays the data selected at (3)
		Vortex Frequency	Frequency of vortex signal
		Flow Velocity	Flow velocity
		Alarm	Alarm state No alarm: No vortex sensor-related alarm occurred Fluctuating: Data when fluctuation occurred Transient noise: Data when transient noise occurred High vibration: Data when high vibration occurred Critical vibration: Data when critical vibration occurred Flow sensor error: Data when a flow sensor error occurred Clogging: Data when clogging occurred Degradation: Data when degradation occurred
		Date & Time	Date and time
		Operation Time	Operation time
(10)	[Save to CSV]		Saves acquired data in csv format
(11)	[Exit]		Exits the tool

6.1.1 Acquiring/displaying latest waveform data

■ Outline of function

Waveform data at the user-specified timing is acquired and displayed on screen.

■ Operating Procedure

1 **Start up the operation screen**

Referring to "2.2.2 Remote Maintenance Tool," display the <Vortex Waveform Monitor> screen.

2 **Click [Execute] at [Latch].**

The waveform data is acquired and then displayed.

6.1.2 Acquiring/displaying waveform data when a specific alarm occurred

■ Outline of function

Waveform data when a specified alarm occurred that is stored in the VY is acquired and displayed on screen.

Alarms targeted by this function are as follows. Alarms during data acquisition are displayed at the Alarm section of the Sensor Data area.

Indicated value	Description
Fluctuating	Data when fluctuation occurred
Transient noise	Data when transient noise occurred
High vibration	Data when high vibration occurred
Critical vibration	Data when critical vibration occurred
Flow sensor error	Data when a flow sensor error occurred
Clogging	Data when clogging occurred
Degradation	Data when degradation occurred

Operating Procedure

1 Start up the operation screen

Referring to "2.2.2 Remote Maintenance Tool," display the <Vortex Waveform Monitor> screen.

2 Select one of [Sensor alarm record 1] to [Sensor alarm record 5] at [Latch Target].

Select the data when a vortex sensor-related alarm occurred (Sensor alarm record 1: Newest value to Sensor alarm record 5: Oldest value).

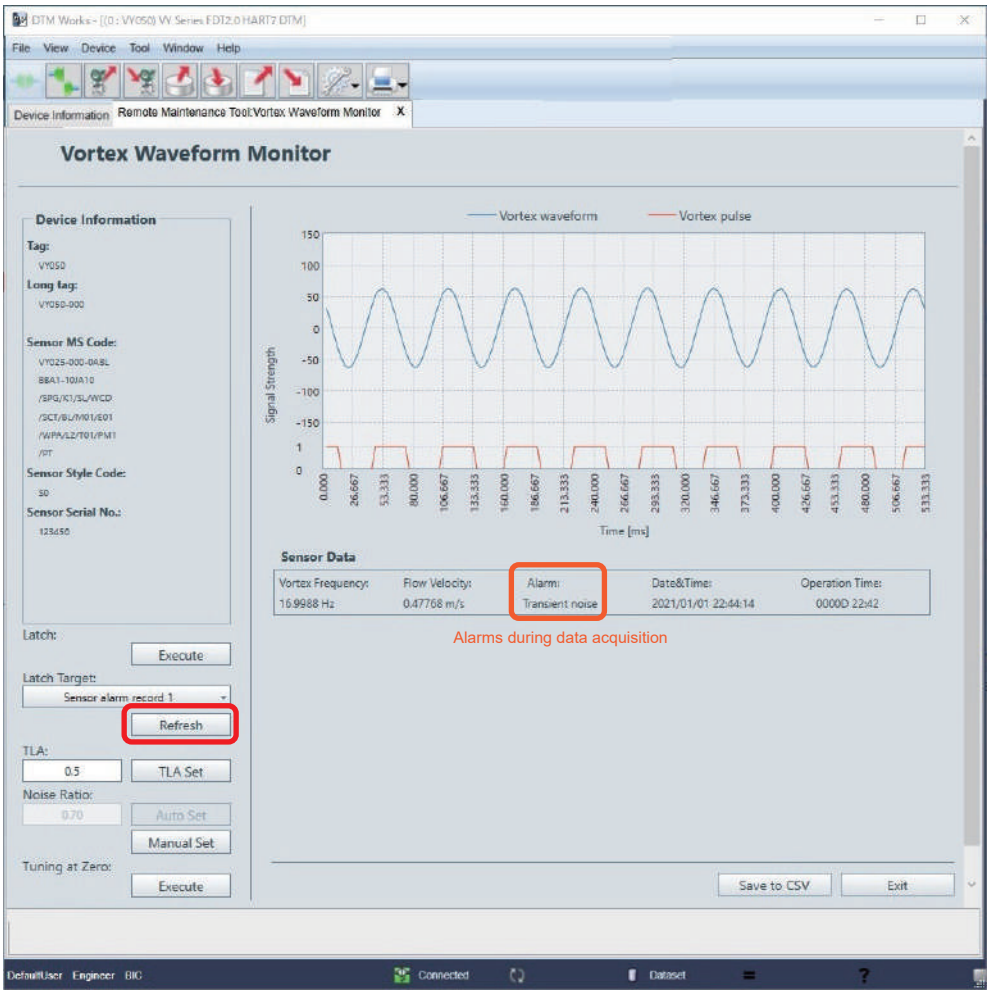
Example: When the alarm occurs sequentially from Fluctuating to Transient noise internally on the VY

When [Sensor alarm record 1] is specified, the data when a Transient noise alarm occurred is acquired.

When [Sensor alarm record 2] is specified, the data when a Fluctuating alarm occurred is acquired.

3 Click [Refresh].

The acquired waveform data is displayed.



F0604.ai

6.1.3 Acquiring/displaying waveform data after re-adjusting Noise Ratio

■ Outline of function

When no indication is output even though liquid is flowing, TLA and the Noise balance mode are set to Manual, the noise ratio is re-adjusted, and changes in waveform data are displayed on screen.

NOTE

Once Noise Ratio has been changed, it does not automatically return to the original value.

NOTE

The trigger level (TLA) has already been set to the optimum value. Accordingly, there is no need to set this during regular measurement. However, the trigger level needs to be adjusted in the following cases:

- To perform measurement at a flow rate lower than the default flow rate
- When there is considerable vibration on the piping line, and the flow rate is zero even after manually adjusting noise balance, or when output indicates a value higher than the actual value during a low flow rate

Note, however, that the measurable lower limit flow velocity increases when the adjustment value has been set higher than the optimum value (default value).

■ Operating Procedure

1 **Start up the operation screen**

Referring to "2.2.2 Remote Maintenance Tool," display the <Vortex Waveform Monitor> screen.

2 **Enter the value of TLA after re-adjustment to [TLA], and click [TLA Set].**

The TLA of the VY vortex flowmeter is updated.

3 **Click [Manual Set] at [Noise Ratio], enter the Noise Ratio value, and click [Manual Set] again.**

NOTE

When Noise Ratio is set to Auto Set, the Noise Ratio value cannot be changed.

4 **Click [Execute] at [Latch]**

The waveform data is acquired by the VY vortex flowmeter and then displayed.

6.1.4 Acquiring/displaying waveform data after executing Tuning at Zero

■ Outline of function

When indication is output even though liquid is flowing, Tuning at Zero is executed and waveform data is acquired and displayed on screen.

NOTE

The trigger level (TLA) has already been set to the optimum value. Accordingly, there is no need to set this during regular measurement. However, the trigger level needs to be adjusted in the following cases:

- To perform measurement at a flow rate lower than the default flow rate
- When there is considerable vibration on the piping line, and the flow rate is zero even after manually adjusting noise balance, or when output indicates a value higher than the actual value during a low flow rate

Note, however, that the measurable lower limit flow velocity increases when the adjustment value has been set higher than the optimum value (default value).

■ Operating Procedure

1 **Start up the operation screen**

Referring to "2.2.2 Remote Maintenance Tool," display the <Vortex Waveform Monitor> screen.

2 **Click [Execute] at [Tuning at Zero].**

Tuning is executed. During execution, [Execute] flashes, and turns blue when tuning ends.

3 **When Tuning at Zero ends normally, check that the values of [TLA] and [Noise Ratio] are updated.**

4 **Click [Execute] at [Latch].**

The waveform data is acquired by the VY vortex flowmeter and then displayed.

NOTE

The [TLA] and [Noise ratio] values are not updated when Tuning at zero fails.

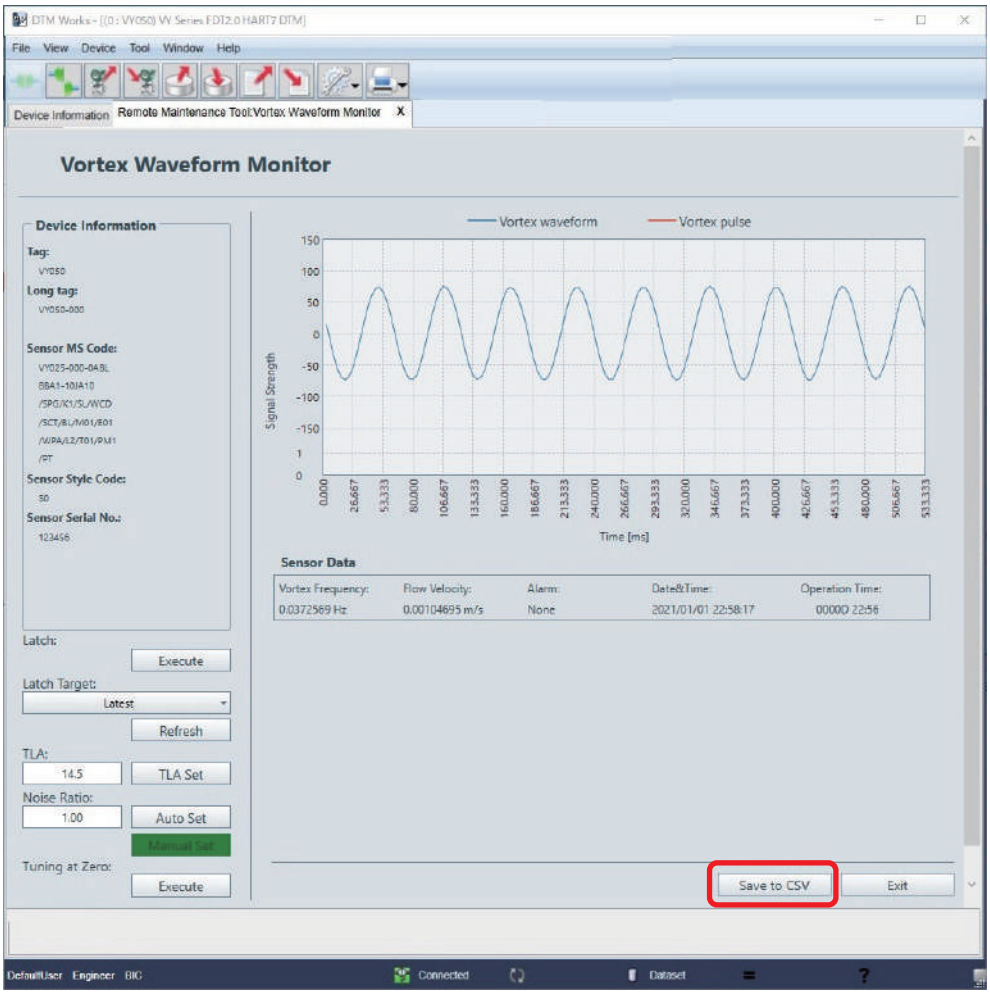
6.1.5 Saving acquired waveform data

Outline of function

The acquired waveform data is saved.

Operating Procedure

1 **Click [Save to CSV] and save the data to the desired directory.**



F0607.ai

The following data is saved.

- Device Information
- Latch switch/alarm/date/time/operation time/vortex frequency/velocity
- Latch sampling frequency
- Vortex waveform/Vortex pulse

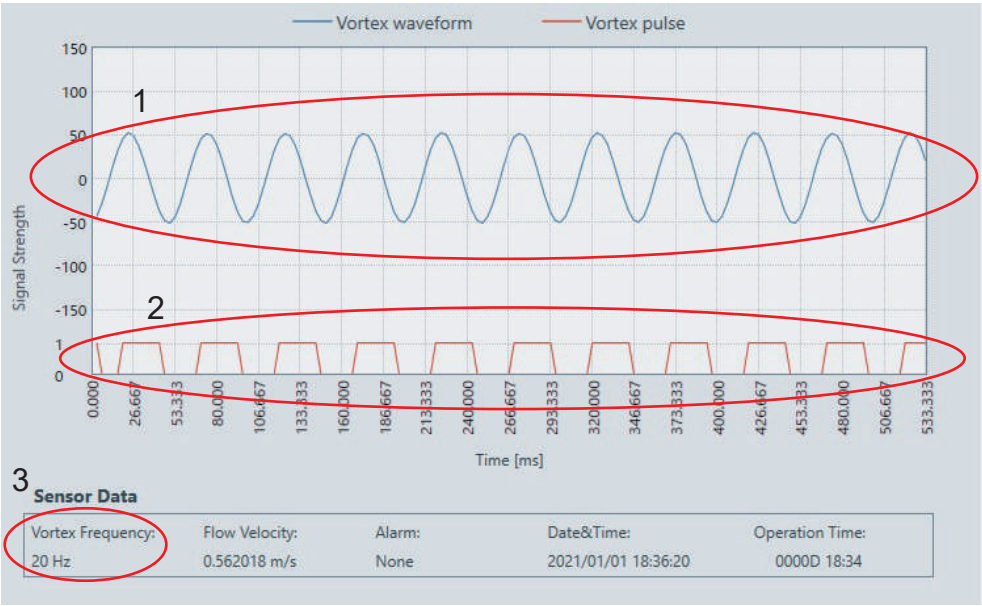
6.1.6 Guidelines for healthy device measurement

The following signs are seen when there is no vibration on the piping and the device is operating healthily:

- The frequencies of Vortex waveform (1) and Vortex Frequency (3) are matching.
- The frequencies of Vortex waveform (1) and Vortex pulse (2) are matching.

NOTE

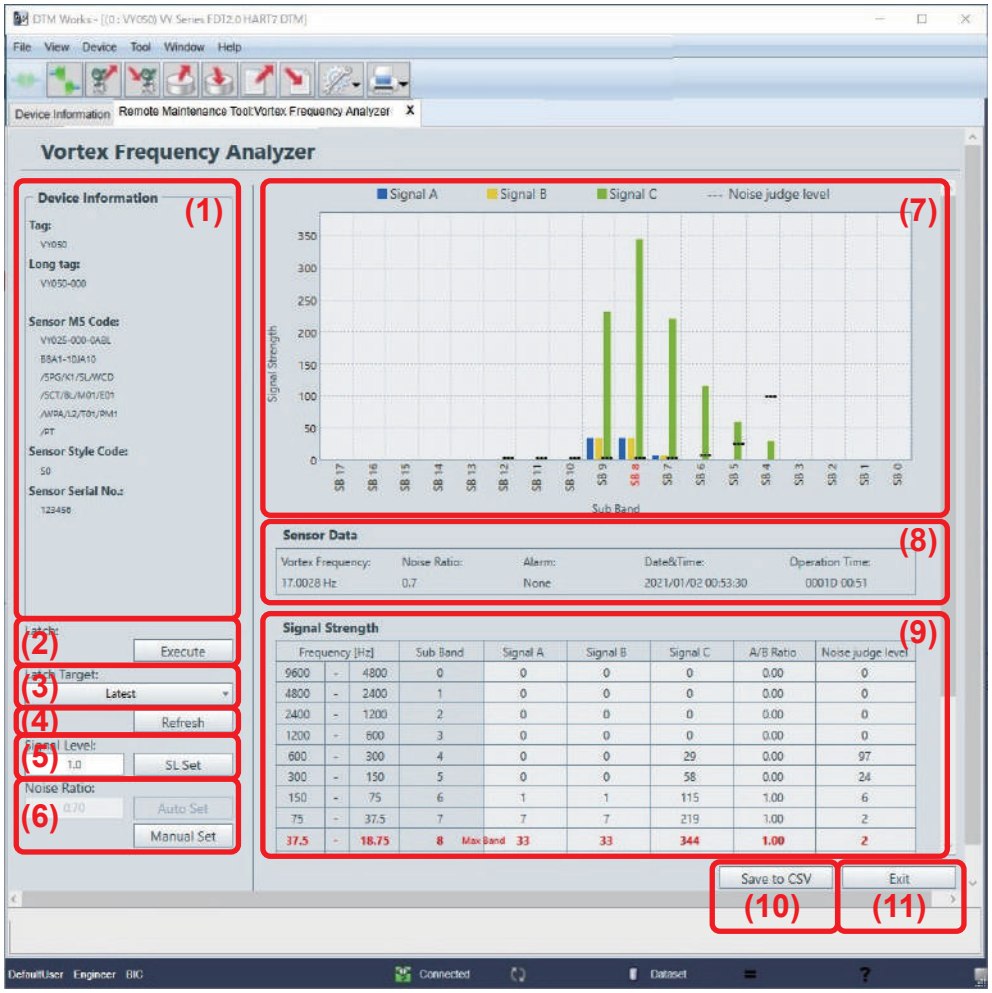
If the health of measurement cannot be confirmed and output is unstable even though the device is healthy, contact your nearest Yokogawa service center and notify them of the acquired waveform data and signal strength data (refer to section 6.2).



F0621.ai

6.2 Executing Vortex Frequency Analyzer

■ Screen used and configuration of screen



F0609.ai

No.	Display Item		Explanation
(1)	Device Information		Device information display area Displays the device information of the connected VY vortex flowmeter **NOTE** In the case of an integral sensor, Transmitter MS code, Transmitter style code, and Transmitter serial no. are blank.
		Tag	Device tag
		Long tag	Device long tag
		Sensor MS code	Sensor MS code
		Sensor style code	Sensor style code
		Sensor serial no.	Sensor serial No.
		Transmitter MS code	Transmitter MS code
		Transmitter style code	Transmitter style code
		Transmitter serial no.	Transmitter serial No.
(2)	Latch		The signal strength data is acquired from the VY vortex flowmeter
		[Execute]	
(3)	Latch Target		Type of data to display on screen
		Not selected	Not selected (screen data is deleted)

		Latest data	Data at time when latest (2) was performed
		Sensor alarm record 1 to 5	Data when vortex sensor-related alarm occurred (1: Newest value to 5: Oldest value)
(4)	[Refresh]		Displays the signal strength data selected at (3) as a graph
(5)	Signal Level		Signal Level value
		[SL Set]	Sets the value entered in the box
(6)	Noise Ratio		Noise ratio value
		[Auto Set]	The optimum Noise Ratio value is automatically set. The Noise Ratio value cannot be changed
		[Manual Set]	Sets the value entered in the box
(7)	Graph display area		Area where signal strength data is displayed
(8)	Sensor Data		Displays the data acquired at (2)
		Vortex Frequency	Frequency of vortex signal
		Noise Ratio	Noise Ratio
		Alarm	Alarm state No alarm: No vortex sensor-related alarm occurred Fluctuating: Data when fluctuation occurred Transient noise: Data when transient noise occurred High vibration: Data when high vibration occurred Critical vibration: Data when critical vibration occurred Flow sensor error: Data when a flow sensor error occurred Clogging: Data when clogging occurred
		Date & Time	Date and time
		Operation Time	Operation time
(9)	Signal Strength		Displays signal strength data as numerical values
(10)	[Save to CSV]		Saves acquired data in csv format
(11)	[Exit]		Exits the tool

6.2.1 Acquiring/displaying latest signal strength data

■ Outline of function

The signal strength data (Signals A, B and C) of each frequency band of the vortex signal at the user-specified timing is displayed.

■ Operating Procedure

1 **Start up the operation screen**

Referring to "2.2.2 Remote Maintenance Tool," display the <Vortex Frequency Analyzer> screen.

2 **Click [Execute] at [Latch].**

The signal strength data of each frequency band of the vortex signal is acquired, and the acquired signal strength data is displayed.

6.2.2 Acquiring/displaying signal strength data when a specific alarm occurred

■ Outline of function

Signal strength data when a specified alarm occurred that is stored in the VY is acquired and displayed on screen.
Alarms targeted by this function are as follows. Alarms during data acquisition are displayed at the Alarm section of the Sensor Data area.

Indicated value	Description
Fluctuating	Data when fluctuation occurred
Transient noise	Data when transient noise occurred
High vibration	Data when high vibration occurred
Critical vibration	Data when critical vibration occurred
Flow sensor error	Data when a flow sensor error occurred
Clogging	Data when clogging occurred
Degradation	Data when degradation occurred

Operating Procedure

1 Start up the operation screen

Referring to "2.2.2 Remote Maintenance Tool," display the <Vortex Frequency Analyzer> screen.

2 Select one of [Sensor alarm record 1] to [Sensor alarm record 5] at [Latch Target].

Select the data when a vortex sensor-related alarm occurred (Sensor alarm record 1: Newest value to Sensor alarm record 5: Oldest value).

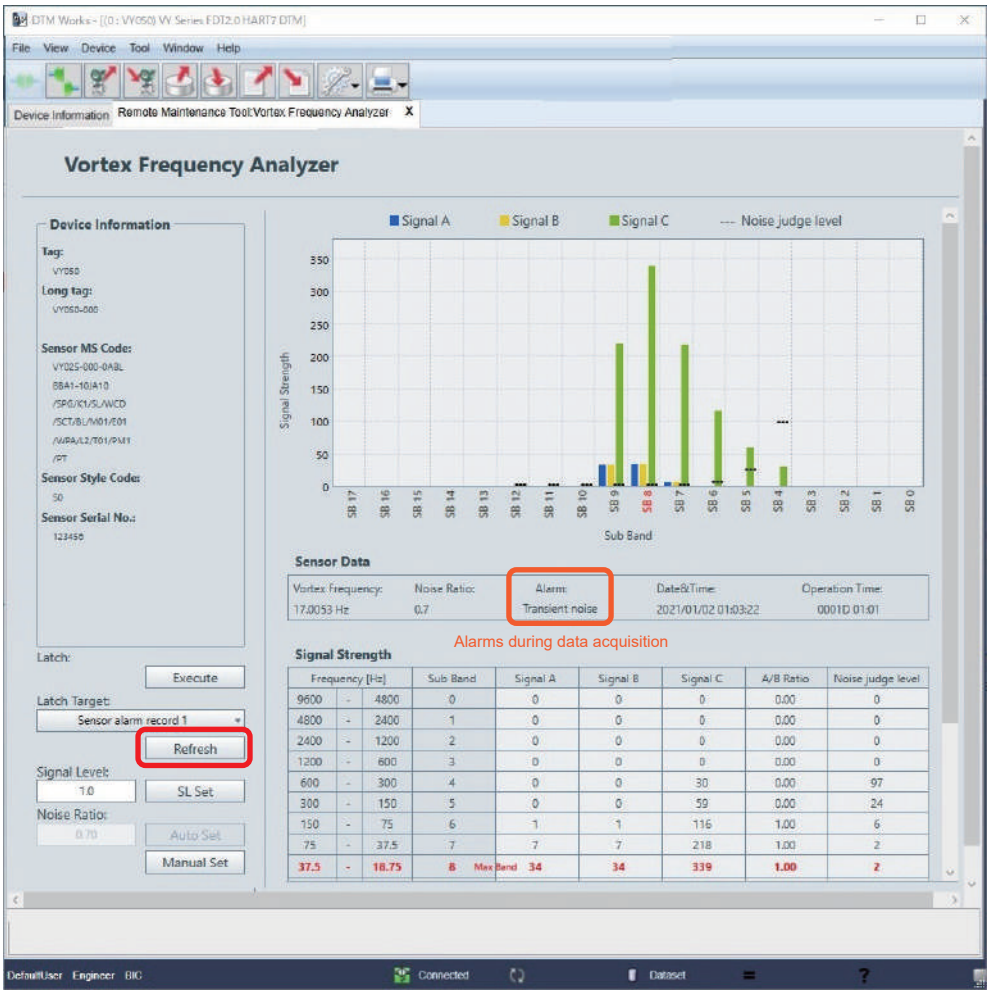
Example: When the alarm occurs sequentially from Fluctuating to Transient noise internally on the VY

When [Sensor alarm record 1] is specified, the data when a Transient noise alarm occurred is acquired.

When [Sensor alarm record 2] is specified, the data when a Fluctuating alarm occurred is acquired.

3 Click [Refresh].

The acquired signal strength data is displayed.



F0611.ai

6.2.3 Changing Signal Level/Noise Ratio

Outline of function

Signal Level and Noise Ratio are changed to check changes in signal strength.

Signal level is the parameter for suppressing vibration noise, etc. when the flow rate is 0.
When the flow rate is 0, noise can be suppressed by adjusting the value during output.

Noise ratio is the parameter for adjusting the strength of Signal C. Noise can be removed by adjusting Noise ratio.
The size of Signal is calculated as follows: Signal C = Signal A - Noise ratio * Signal B.

NOTE

Once Signal Level or Noise Ratio has been changed, it does not automatically return to the original value.

Operating Procedure

1 **Start up the operation screen**

Referring to "2.2.2 Remote Maintenance Tool," display the <Vortex Frequency Analyzer> screen.

2 **Enter the [Signal Level] value, click [SL Set], and click [Manual Set] again.**

3 **Click [Manual Set] at [Noise Ratio], and enter the Noise Ratio value.**

NOTE

When Noise Ratio is set to Auto Set, the Noise Ratio value cannot be changed.

4 **Click [Execute] at [Latch].**

The signal strength data is acquired by the VY vortex flowmeter and then displayed.

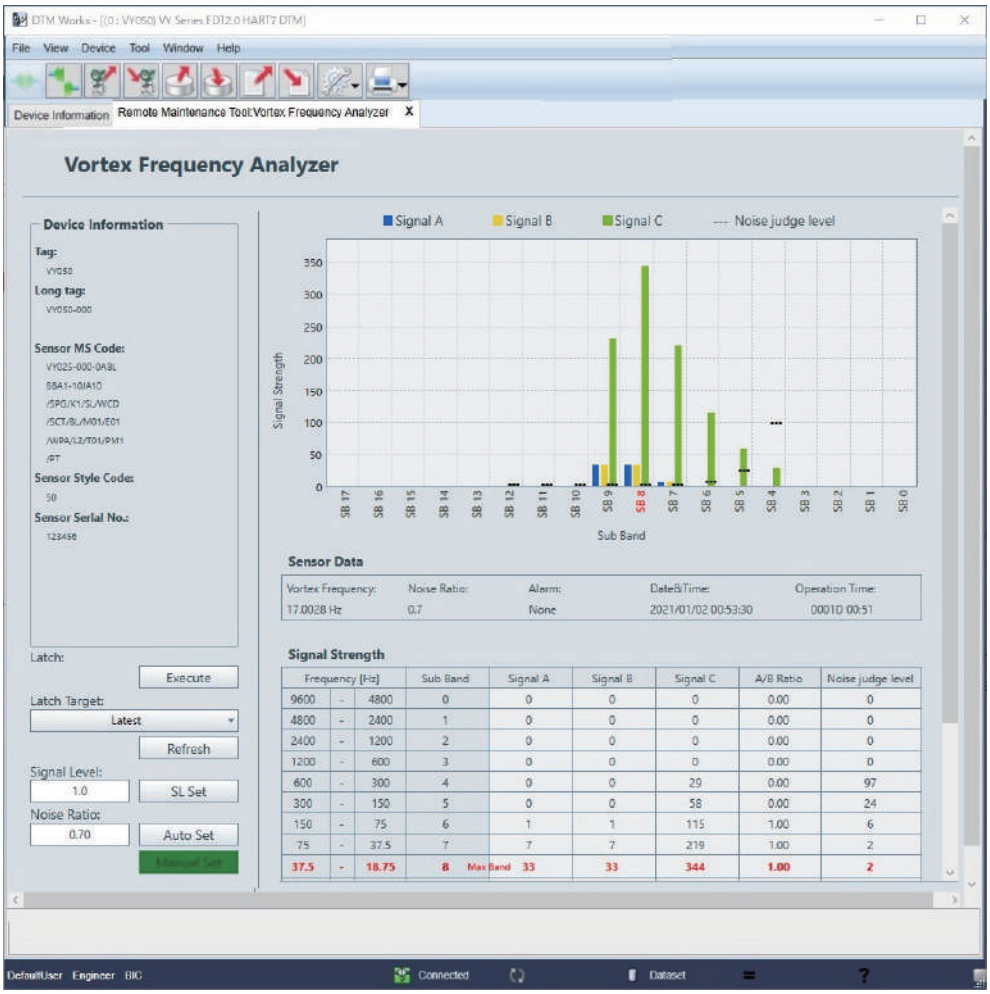
6.2.4 Saving acquired signal strength data

■ Outline of function

Signal strength data displayed on screen is saved to a csv format file.

■ Operating Procedure

1 **Click [Save to CSV] and save the data to the desired directory.**



F0613.ai

The following data is saved.

- Device Information
- Latch switch/alarm/date/time/operation time/vortex frequency/velocity
- Latch sampling frequency
- Vortex waveform/Vortex pulse

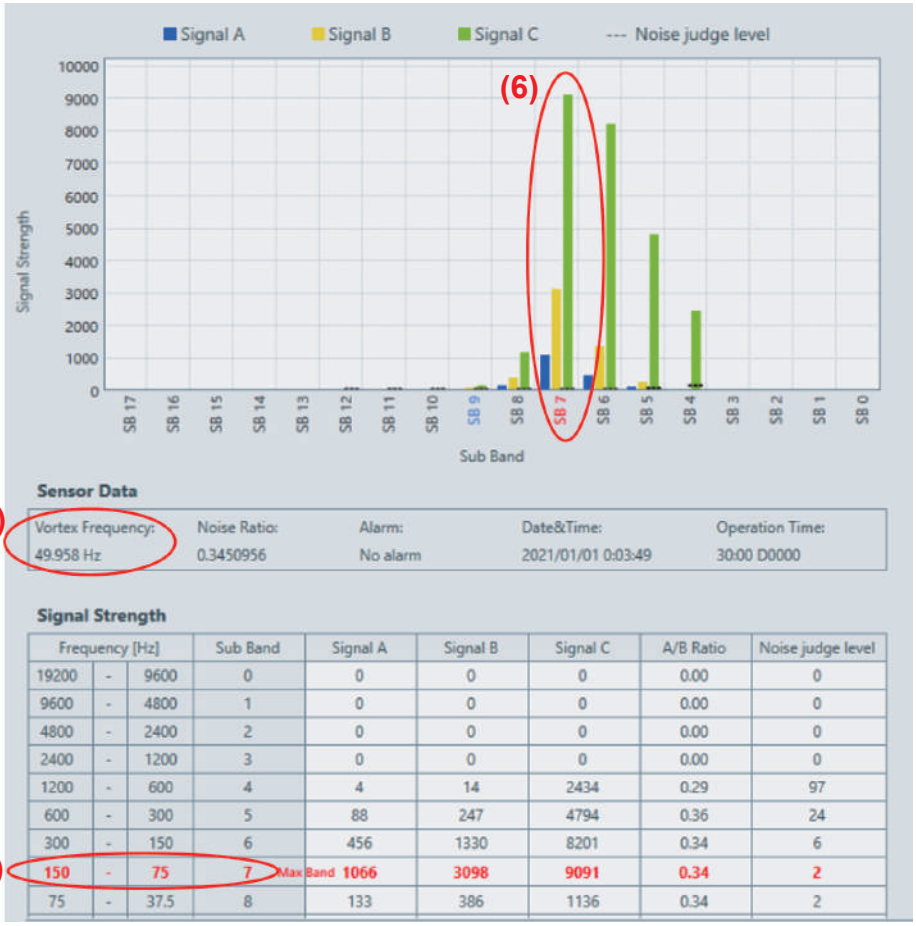
6.2.5 Quidelines for healthy device measurement

The following signs are seen when there is no vibration on the piping and the device is operating healthily:

- Vortex Frequency (4) falls within the range of Frequency (5) of the Max Band.
- Signal C (6) of the Max Band becomes greater than that of other bands.

NOTE

If the health of measurement cannot be confirmed and output is unstable even though the device is healthy, contact your nearest Yokogawa service center and notify them of the acquired waveform data and signal strength data (refer to section 6.1).

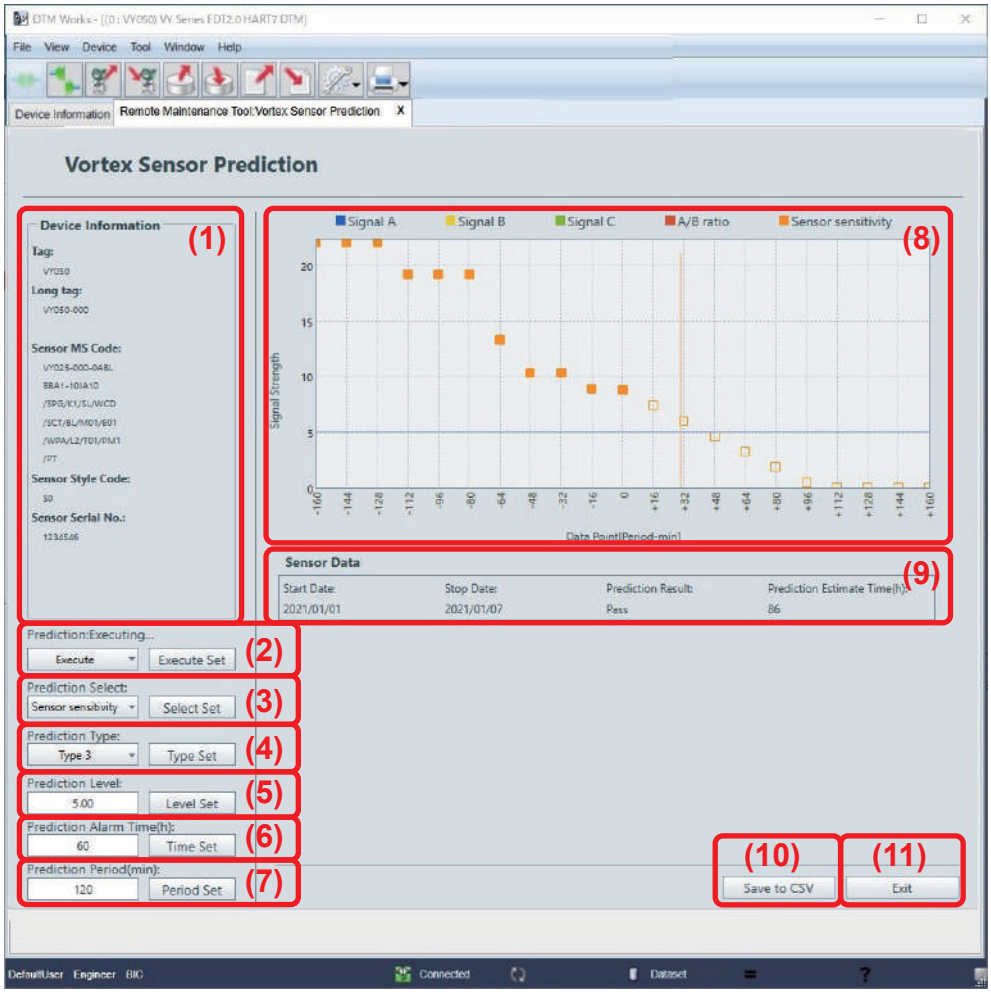


Frequency [Hz]			Sub Band	Signal A	Signal B	Signal C	A/B Ratio	Noise judge level
19200	-	9600	0	0	0	0	0.00	0
9600	-	4800	1	0	0	0	0.00	0
4800	-	2400	2	0	0	0	0.00	0
2400	-	1200	3	0	0	0	0.00	0
1200	-	600	4	4	14	2434	0.29	97
600	-	300	5	88	247	4794	0.36	24
300	-	150	6	456	1330	8201	0.34	6
150	-	75	7	1066	3098	9091	0.34	2
75	-	37.5	8	133	386	1136	0.34	2

F0622.ai

6.3 Executing Vortex Sensor Prediction

■ Screen used and configuration of screen



F0616.ai

No.	Display Item		Explanation
(1)	Device Information		Device information display area Displays the device information of the connected VY vortex flowmeter **NOTE** In the case of an integral sensor, Transmitter MS code, Transmitter style code, and Transmitter serial no. are blank.
		Tag	Device tag
		Long tag	Device long tag
		Sensor MS code	Sensor MS code
		Sensor style code	Sensor style code
		Sensor serial no.	Sensor serial No.
		Transmitter MS code	Transmitter MS code
		Transmitter style code	Transmitter style code
		Transmitter serial no.	Transmitter serial No.
(2)	Prediction		Sets acquisition of data for predictive diagnosis and start/stop of predictive diagnosis. To execute selected setting items, click the [Execute Set] button.
		[Execute]	Acquires data for predictive diagnosis and starts predictive diagnosis
		[Not Execute]	Acquires data for predictive diagnosis and stops predictive diagnosis

(3)	Prediction Select		Type of data targeted in predictive diagnosis
		Not selected	Not selected (screen data is deleted)
		A/B Ratio	Displays the A/B ratio and performs predictive diagnosis
		Sensor sensitivity	Displays the vortex sensor sensitivity and performs predictive diagnosis
		Signal A	Displays the strength of signal A in the Max Band (frequency band in which Signal C is greatest), and performs predictive diagnosis
		Signal B	Displays the strength of signal B in the Max Band (frequency band in which Signal C is greatest), and performs predictive diagnosis
		Signal C	Displays the strength of signal C in the Max Band (frequency band in which Signal C is greatest), and performs predictive diagnosis
		[Select Set]	Performs diagnosis with the selected data
(4)	Prediction Type		Type of predictive diagnosis of data
		Type 1	Performs predictive diagnosis using predictive diagnosis type 1
		Type 2	Performs predictive diagnosis using predictive diagnosis type 2
		Type 3	Performs predictive diagnosis using predictive diagnosis type 3
		[Type Set]	Acquires the results of the selected predictive diagnosis
(5)	Prediction Level		Threshold for judging alarm occurrence in predictive diagnosis
		[Level Set]	Sets the value entered in the box
(6)	Prediction Alarm Time (h)		Standard value of alarm occurrence judgment time. An alarm is generated when the arrival time to the Prediction Level is smaller than the preset Alarm Time Unit of setting value: Hour
		[Time Set]	Sets the value entered in the box
(7)	Prediction Period (min)		Acquisition period of vortex signal related data Unit of setting value: Minute To acquire data once every 30 days, set "43200". At this setting, predictive diagnosis is judged 30 days from data acquisition
		[Period Set]	Sets the value entered in the box
(8)	Graph display area		Area where vortex signal related data is displayed. The graph is displayed according to the following display format. • The vertical axis is scaled according to the values of the vortex signal related data (w/o unit) • Measurement data is displayed in the left half and prediction data is displayed in the right half of the horizontal access starting from the center of the graph data field **NOTE** To delete the graph display, select "Not Selected" at Prediction select and click [Select Set].
(9)	Sensor Data		Displays the result of predictive diagnosis
		Start Date	Start date of predictive diagnosis The date when the initial Execute is set is displayed
		Stop Date	Stop date of predictive diagnosis The value is updated each time that Not Execute is set
		Prediction Result	The result of predictive diagnosis Passed: The prediction value did not reach the Prediction Level within the time preset for the alarm time Failed: The prediction value not reached the Prediction Level within the time preset for the alarm time NA: When predictive diagnosis is stopped (Not Execute)
		Prediction Estimate Time	The estimated time until the prediction value arrives at Prediction Level
(10)	[Save to CSV]		Saves acquired data in csv format
(11)	[Exit]		Exits the tool

6.3.1 Predictive Diagnosis of Vortex Sensor

Outline of function

Vortex Sensor Prediction periodically acquires vortex signal data and displays this on screen. Predictive diagnosis is performed regarding the possibility and the timing of vortex sensor-related alarms occurring in the future based on long-term changes in this vortex signal data.

Operating Procedure

1 **Start up the operation screen**

Referring to "2.2.2 Remote Maintenance Tool," display the <Vortex Sensor Prediction> screen.

2 **Select the type of data targeted in predictive diagnosis at [Prediction Select], and click [Select Set]**

3 **Select the type of predictive diagnosis at [Prediction Type], and click [Type Set]**

4 **Enter the threshold for judging alarm occurrence in predictive diagnosis at [Prediction Level], and click [Level Set]**

5 **Enter the standard value of alarm occurrence judgment time at [Prediction Alarm Time], and click [Time Set]**

6 **Enter the acquisition period of vortex signal related data at [Prediction Period (min)], and click [Period Set]**

7 **Select the Execute at [Prediction], click [Execute Set]**

Start acquisition of measurement data for predictive diagnosis.

"Prediction: Executing..." is displayed.

The measurement data and prediction data are displayed in the graph display area.

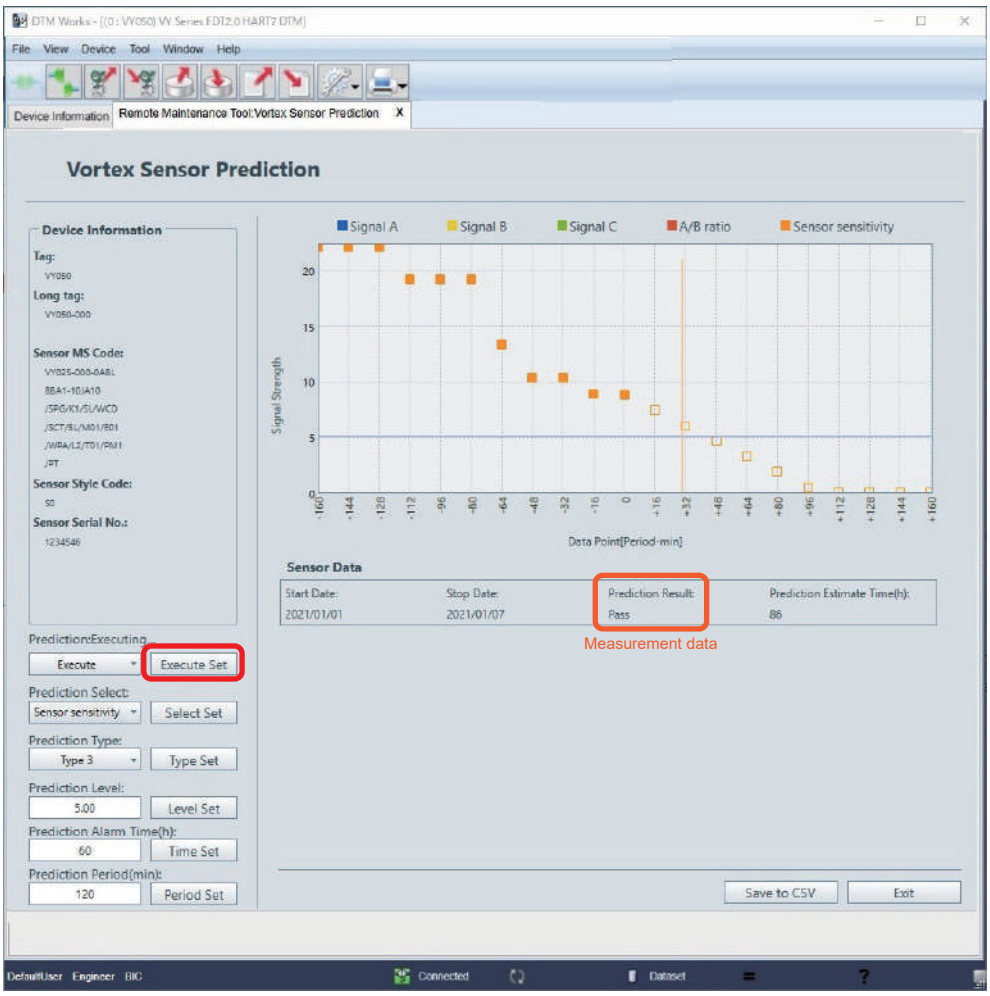
The result of predictive diagnosis is displayed at [Sensor Data].

During execution of predictive diagnosis, the data in the graph display area and the result of predictive diagnosis at Sensor Data are automatically updated as the device continues data acquisition and predictive diagnosis at the period set at Prediction Period.

Also, the type of data targeted in predictive diagnosis and type of predictive diagnosis can be changed even during execution of predictive diagnosis.

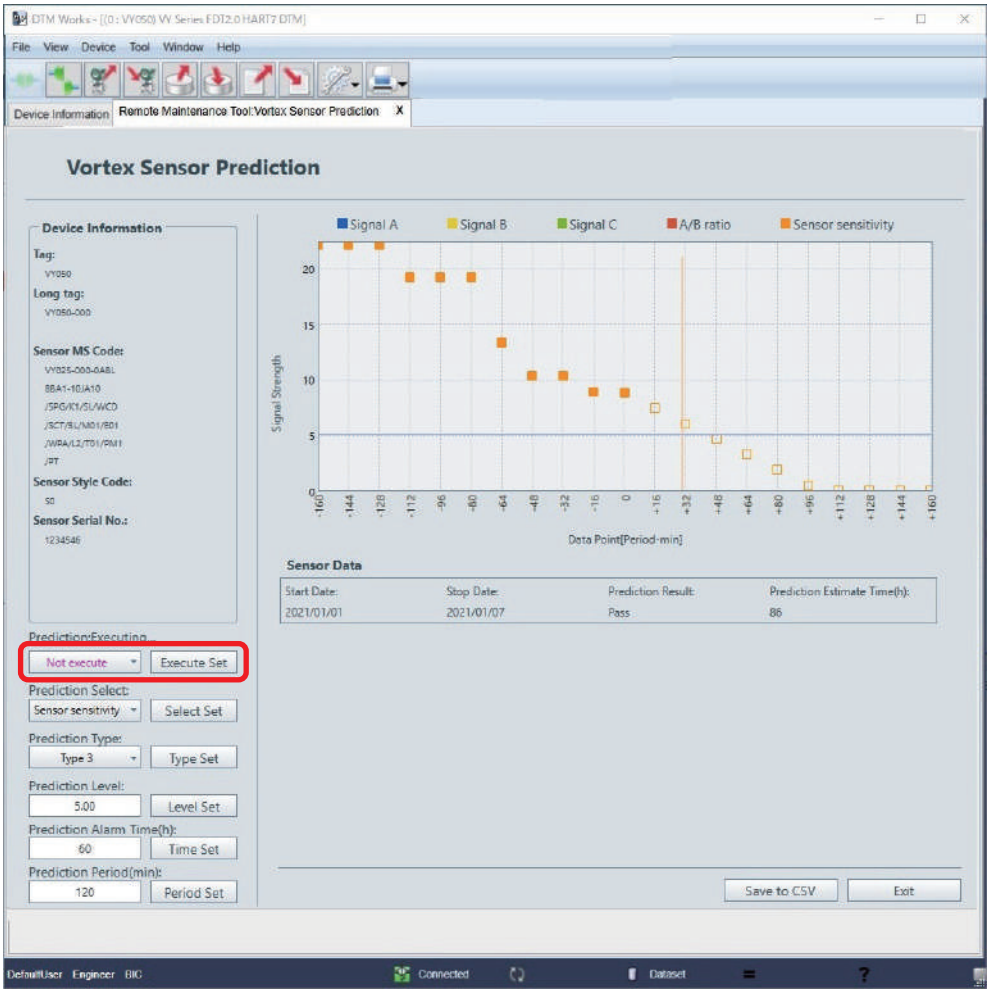
Change these settings by following the procedures at Steps 2 and 3.

After changing these settings, the graph display area and Sensor Data values are automatically updated according to the new settings.


DTM Works - [(0 : VY050) VV Series FDT2.0 HART7 DTM]
File View Device Tool Window Help
Device Information
Remote Maintenance Tool:Vortex Sensor Prediction
Vortex Sensor Prediction
Device Information
Tag:
VY050
Long tag:
VY050-000
Sensor MS Code:
VY025-000-0ABL
BBA1-10JA10
/SPG/K1/SI/WCD
/SCT/SI/M01/BD1
/WRA/L2/T01/PM1
/PT
Sensor Style Code:
S0
Sensor Serial No.:
1234546
Signal A
Signal B
Signal C
A/B ratio
Sensor sensitivity
Signal Strength
Data Point[Period-min]
Sensor Data
Start Date:
2021/01/01
Stop Date:
2021/01/07
Prediction Result:
Pass
Prediction Estimate Time(h):
86
Measurement data
Prediction:Executing
Execute
Execute Set
Prediction Select:
Sensor sensitivity
Select Set
Prediction Type:
Type 3
Type Set
Prediction Level:
5.00
Level Set
Prediction Alarm Time(h):
60
Time Set
Prediction Period(min):
120
Period Set
Save to CSV
Exit
DefaultUser Engineer BIC
Connected
Dataset

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8 **To stop predictive analysis, select [Not Execute] at [Prediction], and click the [Execute Set] button.**



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6.3.2 Saving used trend data

■ Outline of function

Signal trend data displayed on screen is saved to a csv format file.

NOTE

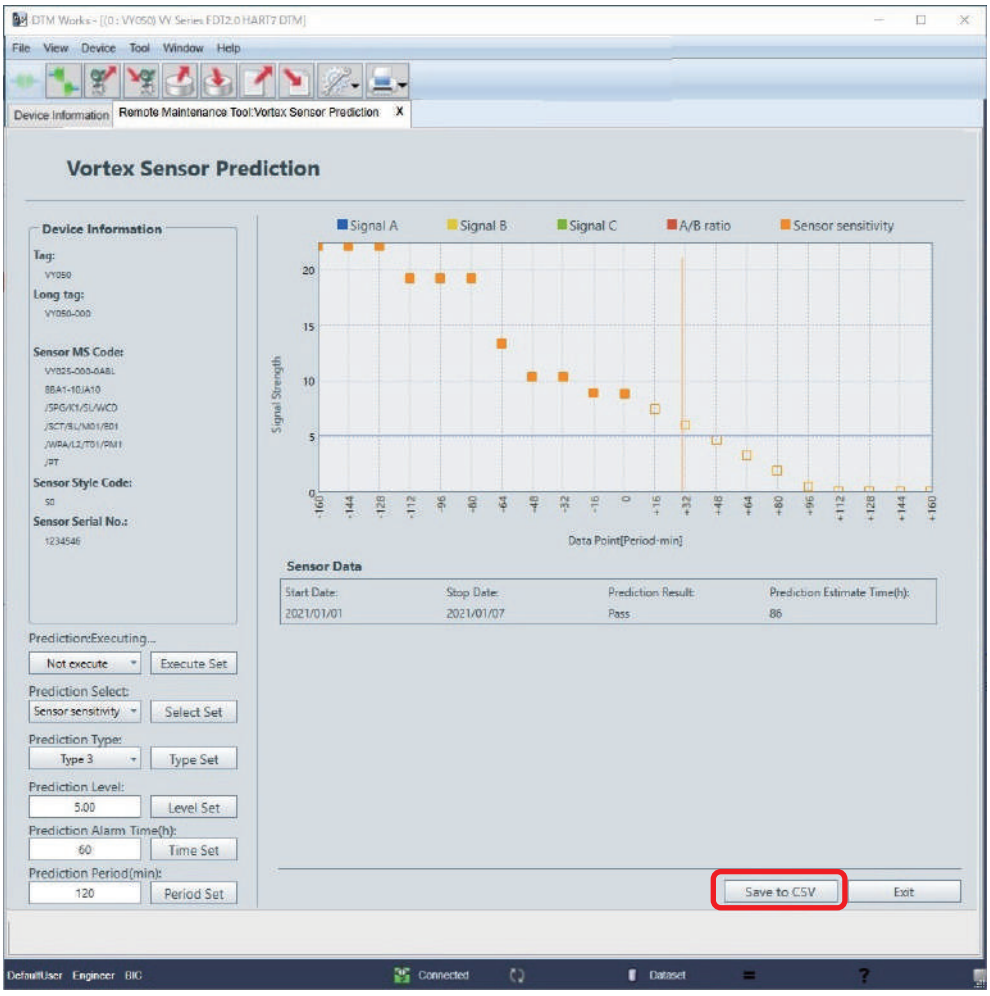
Before using this function, stop predictive diagnosis.

Operating Procedure

1 Start up the operation screen

Referring to "2.2.2 Remote Maintenance Tool," display the <Vortex Sensor Prediction> screen.

2 Click [Save to CSV] and save the data to the desired directory.



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The following data is saved.

- Device Information
- Select/Type/Level/Alarm Time/Period/
- Number of data points, sensor sensitivity, signal strength

Appendix 1 Software License Agreement

The following presents the License Agreement that the user must consent to in order to use the software. This License Agreement is displayed when the verification tool is started up for the first time after it has been installed. An abridged Japanese translation follows the English below.

IMPORTANT - PLEASE READ THIS AGREEMENT CAREFULLY:

BY INSTALLING OR OTHERWISE USING THIS SOFTWARE PRODUCT FSA130 ELECTROMAGNETIC FLOWMETER / VORTEX FLOWMETER VERIFICATION TOOL, YOU AGREE TO BE BOUND BY THE TERMS AND CONDITIONS OF THIS SOFTWARE LICENSE AGREEMENT (“AGREEMENT”).

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- In other cases: the operating environment conditions defined on the readme file of “Yokogawa Device DTM Library” which is contained in the Licensed Software when Licensee download it from Website.

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Appendix 2 Contents of the Package

Checking the Contents of the Package

Open the package of FSA130 Magnetic Flowmeter/Vortex Flowmeter Verification Tool License Key" and check the following before use. If some items are missing, or there is a problem with the appearance, inform the nearest Yokogawa Electric Corporation sales office.

Contents of the package:

- License Sheet
- USB FieldMate Modem (when optional code B is selected)

Note: For details on the USB FieldMate Modem, refer to the FieldMate manual.

The format of the License Sheet is as follows. The "Software License Number" is the license key for activating this tool. For details about how to enter the license key, refer to Section 4.1.

FSA130 Electromagnetic Flowmeter / Vortex Flowmeter Verification Tool

Software License Number

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

IMPORTANT: Please keep this sheet.
Thank you for purchasing ***FSA130 Electromagnetic Flowmeter / Vortex Flowmeter Verification Tool***. The software license number is printed above. This number is used to **ACTIVATE FSA130 Electromagnetic Flowmeter / Vortex Flowmeter Verification Tool programs** and to identify your software package by Yokogawa Electric Corporation.

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- Manual No. : IM 01F07A04-01EN

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