Setup Guide

IM/WM/VM   Issue 1

Software Tools

VeriMaster

ABB

The Company

We are an established world force in the design and manufacture of instrumentation for industrial process control, flow measurement, gas and liquid analysis and environmental applications.

As a part of ABB, a world leader in process automation technology, we offer customers application expertise, service and support worldwide.

We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support.

The quality, accuracy and performance of the Company's products result from over 100 years experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

The UKAS Calibration Laboratory No. 0255 is just one of the ten flow calibration plants operated by the Company and is indicative of our dedication to quality and accuracy.

EN ISO 9001:2000

Cert. No. Q 05907

EN 29001 (ISO 9001)

Lenno, Italy –
Cert. No. 9/90A

Stonehouse, U.K.

Health and Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

1. The relevant sections of these instructions must be read carefully before proceeding.
2. Warning labels on containers and packages must be observed.
3. Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given.
4. Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.
5. Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry. Normal safe handling procedures must be used.
6. When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual or any relevant hazard data sheets (where applicable) may be obtained from the Company address on the back cover, together with servicing and spares information.

Contents

1 Introduction

VeriMaster is a PC software application that produces documented records (reports) of the self-checking diagnostics and validation routines built into an ABB WaterMaster flowmeter to provide in situ verification.

The software enables diagnostic and validation data on the transmitter to be downloaded and saved as an electronic file (in .jpg format) or printed as a certificate to provide a hard copy verification report that has either a passed or failed status.

Live flow measurement and internal volume totalization are unaffected by the VeriMaster test sequence or operation – flowmeter operation continues normally (only the current output and pulse outputs are affected if these are tested).

VeriMaster is supplied complete with Service Port Splitter software that enables communication between the transmitter and a PC (USB port) via an infrared adaptor – see section 1.3.1, page 3.

1.1 Compatibility

The VeriMaster/Service Port Splitter software is compatible with the following:

- ■ a PC running Windows XP or Vista – all editions
- ■ an ABB WaterMaster flowmeter running application firmware V01.01.01 or later

1.2 Required Equipment and ABB Part Numbers

The following equipment is required to use VeriMaster software:

- ■ PC with USB port and printer
- ■ ABB infrared adaptor
- ■ resistor (100R resistor recommended, minimum 50R, maximum 750R), 0.05 % tolerance or better
- ■ digital volt meter (DVM). 4 $\frac{1}{2}$ digit, accuracy better than 0.05 % on voltage range or digital multimeter (DMM), accuracy better than 0.05 % on current range

Item	ABB Part Number
VeriMaster software	WAJC2532
Service Port Splitter software (COM port communication)	WAJC2510
ABB infrared adaptor	WEBC2500

Table 1.1 ABB Part Numbers for VeriMaster and Associated Items

1.3 Installation and Configuration

1.3.1 Attaching the Infrared Adaptor to the Transmitter

Note.

- Ensure the glass screen and the suction pads are clean and dry before attaching the Infrared Adaptor to the transmitter.

- Avoid siting the WaterMaster/Infrared Adaptor in direct sunlight as this can interfere with normal operation.

Referring to Fig. 1.1:

1. Carefully align the two infrared ports on the inside face of the adaptor (A) with the two infrared sensor channels on the transmitter glass display.

2. Secure the Infrared Adaptor to the transmitter glass area using the suction pads.

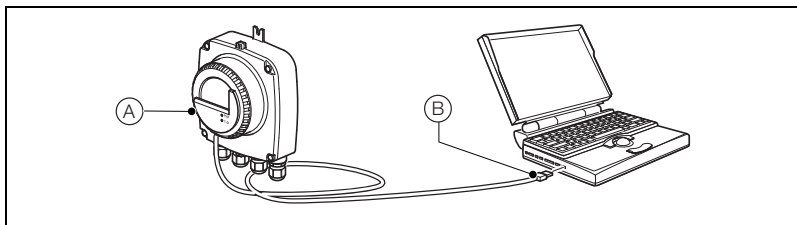3. Connect the USB cable (B) to the USB port on the PC.

Fig. 1.1 Infrared Adaptor Installation

1.3.2 Pre-installation Requirements

The VeriMaster software option needs to be configured in the sensor by ABB. If the VeriMaster option has not been ordered, the following warning is displayed and VeriMaster does not launch:

Caution. Time and date readings generated by the VeriMaster software are taken from the connected PC (not from the transmitter). Before installing VeriMaster software, ensure the PC time and date are set correctly.

1.3.3 Installing VeriMaster

Note. When installing onto Vista, login as a normal user (non-administrator). Vista then requests an administrator password at the appropriate stage.

To install VeriMaster:

1. Uninstall any previous version of the ABB Service Port Splitter software from the PC.
2. Insert the VeriMaster CD into the PC's CD drive.
3. Follow the on-screen instructions to install VeriMaster and Service Port Splitter software.
4. When installation is complete, remove the CD from the PC.
5. Proceed to section 1.3.4 to register and enable VeriMaster.

1.3.4 Registering VeriMaster
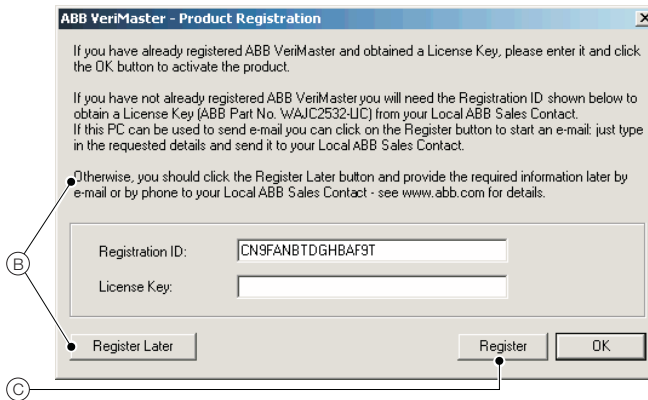
To register VeriMaster:

1. Install VeriMaster as described in section 1.3.3.

2. Launch VeriMaster.

    The 'ABB VeriMaster – License Information' dialog is displayed:
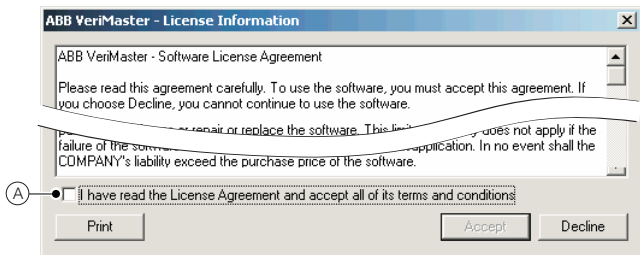
3. To accept the terms of the license, select the checkbox (A) at the bottom of the dialog and click 'Accept'.
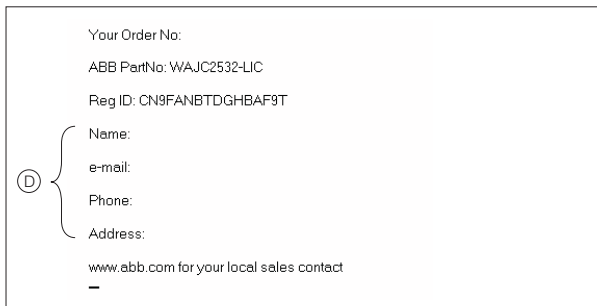
    The 'ABB VeriMaster – Product Registration' dialog is displayed:

    VeriMaster can be registered via email (proceed to step 4), or telephone.

    To register by telephone, follow the instructions on the 'ABB VeriMaster – Product Registration' dialog (B) and call your Local ABB Sales Contact with the required information.

4. To register by email, click 'Register' Ⓒ.

    Your default mail application is launched.

5. Add your name, email address, telephone number and full postal address Ⓓ to the email:

Your Order No:

ABB PartNo: WAJC2532-LIC

Reg ID: CN9FANBTDGHBAF9T

Ⓓ
Name:

e-mail:

Phone:

Address:

www.abb.com for your local sales contact

6. Send the email to the email address of your Local ABB Sales Contact (this can be obtained from the ABB website at www.abb.com).

    ABB will register the product and return a machine-specific license key.

7. At the 'ABB VeriMaster – Product Registration' dialog, type the license key into the 'License Key:' field and click 'OK' to register VeriMaster.

8. Proceed to Section 1.3.5 to launch VeriMaster for the first time and test the installation.

1.3.5 Testing VeriMaster

Note.

COM Port Configuration **–** during start-up, VeriMaster determines which physical COM port to use automatically, therefore, COM port configuration is not necessary.

To test the software after installation:

1. Launch the VeriMaster software by selecting 'Start/Programs/ABB/VeriMaster/ABB VeriMaster' (if the software was installed to the default directory) or navigate to the desktop shortcut and double-click the VeriMaster icon.

2. During start-up, VeriMaster determines which COM port to use, attempts to communicate with the transmitter and displays the 'Main Menu' – see section 2.1, page 8.

1.3.6 Troubleshooting

If VeriMaster cannot communicate with the transmitter:

1. Check the VeriMaster software has been registered and unlocked – see section 1.3.4, page 5.

2. Check the infrared adaptor is connected at the PC's USB port and that Windows has recognized the new device.

3. Check the infrared adaptor is attached firmly at the WaterMaster screen and that infrared detectors are aligned precisely – see section 1.3.1, page 3.

4. Check the transmitter is VeriMaster enabled – see section 1.3.2, page 4.

2 VeriMaster Dialogs

2.1 Main Menu

The 'Main Menu' dialog is displayed once the software has been launched and has attempted to communicate with the transmitter.

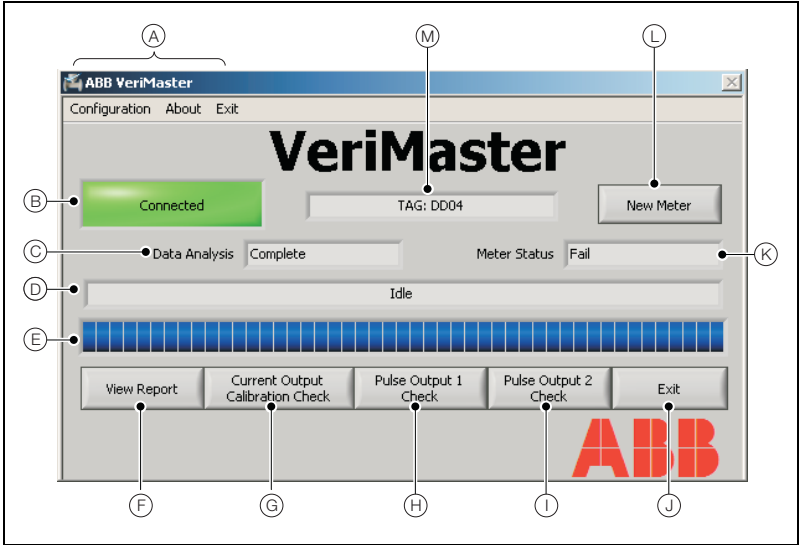All other VeriMaster dialogs are displayed or reached via the 'Main Menu' – see Fig. 2.1.

Fig. 2.1 Main Menu

Item	Description
(A)	Menu bar – displayed once the software is available and is communicating with the transmitter: ■ 'Configuration' – opens the 'Configuration' dialog (see section 2.2, page 11). ■ 'About' – displays VeriMaster part number, software version and ABB contact details. ■ 'Exit' – exits VeriMaster and ends communication with the transmitter.
(B)	Connection Status – displays one of: ■ 'Connected' – when VeriMaster has established communication with the transmitter the button is green. ■ 'Not Connected' – if VeriMaster fails to communicate with a transmitter, or loses connection, the button is red and a report cannot be generated until connection is re-established.
(C)	Data Analysis field – displays the status of the current data analysis: ■ 'Complete' – analysis is complete for the current transmitter. ■ 'Waiting on Data' – displayed if data analysis is incomplete (a full report cannot be generated).
(D)	Status field – shows the current upload status of VeriMaster software: ■ 'Idle' – no software operations currently in progress. ■ 'Updating information from WaterMaster' – displayed while diagnostic and validation data is uploaded.
(E)	Progress bar – a visual display of relative progress while the software is performing an operation. **Note**. While status field (D) reads 'Idle', the status bar is filled with a continuous blue bar ▮▮▮▮▮.
(F)	'View Report' – generates a validation report. Clicking 'View Report' opens the 'Customer Information' dialog (used to add customer information to the report – see section 2.4, page 13) before proceeding to the report. Prompts are also displayed in the following conditions: ■ If the 'Current Output Calibration Check' and/or 'Pulse Output Check' (1 and 2) have not been completed, a continue/cancel prompt is displayed. ■ If the 'Customer Information' dialog is not completed, a continue/cancel prompt is displayed; this does not affect the 'Passed/Fail' status of a report – see section 2.4, page 13.

Table 2.1 Main Menu Overview

Item	Description
(G)	'Current Output Calibration Check' – performs a current output calibration check.
(H)	'Pulse Output 1 Calibration Check' – performs a pulse output 1 calibration check.
(I)	'Pulse Output 2 Calibration Check' – performs a pulse output 2 calibration check.
(J)	'Exit' – exits VeriMaster and ends communication with the transmitter.
(K)	'Meter Status' – displays the status of the flowmeter: ■ 'Pass' – the flowmeter has passed its internal continuous verification and is working within ±1 % of original factory calibration. ■ 'Marginal' – the flowmeter has detected internal measurement changes that may affect the measurement accuracy – see section 4.1, page 28. ■ 'Fail' – the flowmeter has failed its internal continuous verification (a statement is displayed on the report beneath the 'Overall Meter: Fail' notification).
(L)	'New Meter' – clears all information relative to the current transmitter from (PC) memory to allow connection of a new flowmeter. **Note**. This button is also a reset – if connection with the transmitter is lost (status is 'Not Connected'), the status changes to 'Connect'.
(M)	Meter ID Field – the transmitter is polled continuously to verify continuous communication. If connected, this field displays the 'Sensor Tag' or, if no tag is available, the 'SAP/ERP No' serial number is shown. **Note**. The 'Sensor Tag' can be edited on the WaterMaster – refer to IM/WMP for details.

Table 2.1 Main Menu Overview (Continued)

2.2 Configuration

The 'Configuration' dialog (see Fig. 2.2) is used to specify or select a default directory for saved reports and to run the 'Communication Wizard'.
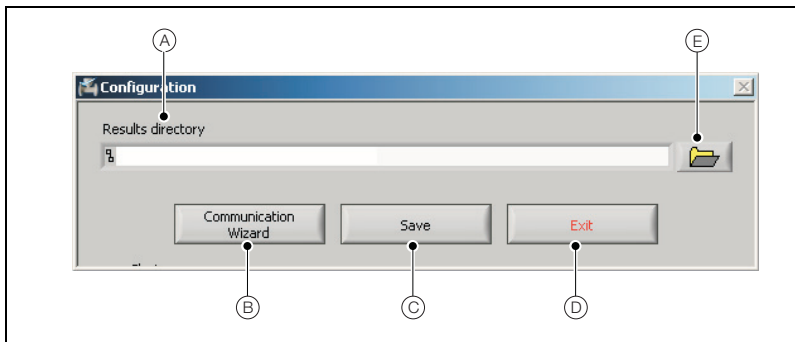

Fig. 2.2 'Configuration' Dialog

Item	Description
(A)	'Results Directory' – the default directory path that reports are saved to – see section 3.2, page 20.
	The default path is the current user's desktop. A different path can be entered manually or selected via the folder icon (E).
(B)	'Communication Wizard' – runs a communication wizard to detect and automatically setup which COM port on the PC is used for communication (via HART protocol) – see section 3.3, page 21.
(C)	'Save' – saves any changes to the 'Results Directory' path and establishes the new path as the default.
(D)	'Exit' – exits the 'Results Directory' and returns to the 'Main Menu'.
(E)	📁 Icon – opens the Windows 'Open' dialog, allowing a directory to be specified for saved reports – see section 3.2, page 20:

Table 2.2 'Configuration' Dialog Overview

2.3 Communication Wizard

The 'Communication Wizard' dialog (see Fig. 2.3) is displayed automatically while the software is establishing a connection with the transmitter – see section 3.3, page 21.

The 'Communication Wizard' is launched when VeriMaster is started up or, subsequently, by selecting 'Configuration' from the 'Main Menu'.
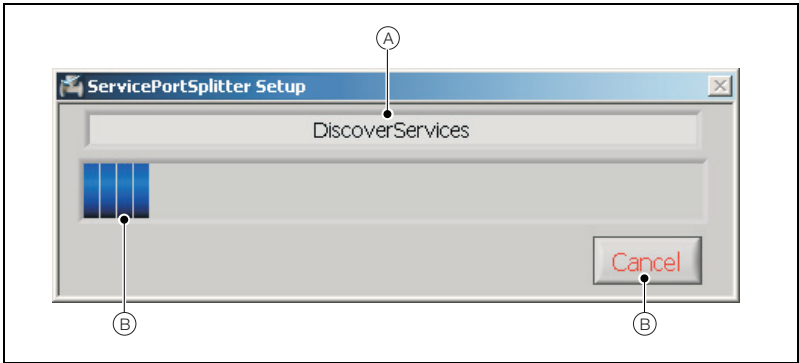

Fig. 2.3 'Communication Wizard' Dialog

Item	Description
(A)	Status field – the status of the operation during the stages required to establish communication.
	When communication has been established successfully, the 'Communication Wizard' dialog closes automatically, the 'Configuration' dialog is displayed and the 'Save' button is highlighted by a green box – see section 3.3, page 21.
(B)	Status bar – provides a visual indication of the relative progress of the current operation.
(C)	'Cancel' – cancels the current operation and returns to the 'Configuration' dialog.

Table 2.3 'Communication Wizard' Dialog Overview

2.4 Customer Information

The 'Customer Information' dialog (see Fig. 2.4) enables customer-specific information to be added to the generated report. This dialog is displayed by clicking 'View Report' on the 'Main Menu'.

Note. Information added to 'Customer Information' fields is retained in memory until 'New Meter' is selected at the 'Main Menu'. The comments are then discarded and new comments must be entered if required.
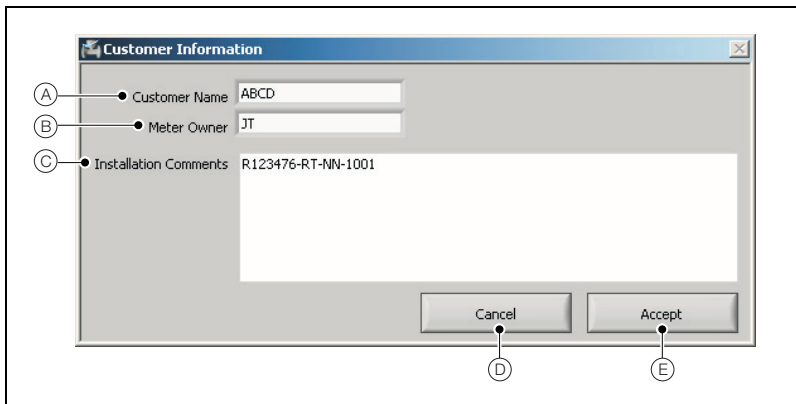

Fig. 2.4 'Customer Information' Dialog

Item	Description
(A)	'Customer Name' – a free-text field used to enter a name (25 characters max.).
(B)	'Meter Owner' – a free-text field used to enter the ID of the owner.
(C)	'Installation Comments' – a free-text field used to enter any installation comments.
(D)	'Cancel' – cancels the 'View Report' operation and returns to the 'Main Menu'.
(E)	'Accept' – verifies that text in the 'Customer Name' and 'Installation Comments' fields does not exceed character limits and generates the report – see section 3.1, page 16. If the 'Customer Name' and 'Installation Comments' fields have too much or no text, a prompt is displayed. If character limits are exceeded, only the number of characters permitted are displayed on the report.

Table 2.4 'Customer Information' Dialog Overview

2.5 Current Output

The 'Current Output' dialog (see Fig. 2.5) is used to test and verify the current output generated by the transmitter – see section 3.4, page 23.
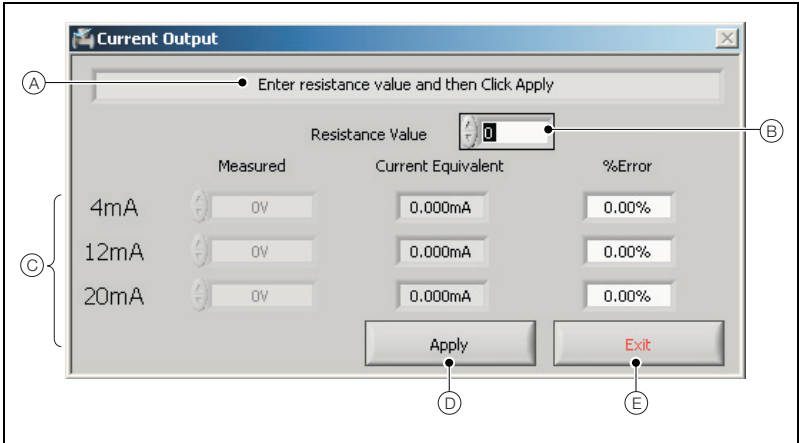

Fig. 2.5 'Current Output' Dialog

Item	Description
(A)	Status bar – a context-sensitive read-only guide to the required step at each stage of the test.
(B)	'Resistance Value' – a free-text field used to enter the resistance value for calculating the current equivalent (100R recommended – min. 50R, max. 750R).
(C)	'4mA/12mA/20mA' text fields – used to enter the measured voltage and display current equivalents and error(s) against expected values for each current: ■ 'Measured' (Voltage) – used to enter the voltage reading. ■ 'Current Equivalent' – populated automatically when 'Apply' is clicked after entering the measured voltage. ■ '%Error' – populated automatically – displays the % difference between the calculated and expected current.
(D)	'Apply' – saves values entered at the 'Resistance Value' and 'Measured' (Voltage) fields.
(E)	'Exit' – exits the dialog and returns to the 'Main Menu'.

Table 2.5 'Current Output' Dialog Overview

2.6 Pulse Output

The 'Pulse Output' dialog (see Fig. 2.6) is used to test and verify the pulse frequency generated by the transmitter – see section 3.5, page 25.
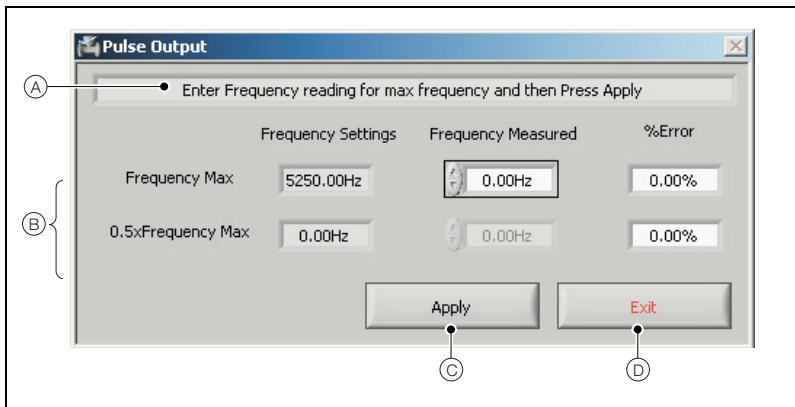

Fig. 2.6 'Pulse Output' Dialog

Item	Description
(A)	Status bar – a context-sensitive read-only guide to the required step at each stage of the test.
(B)	'Frequency Max/0.5xFrequency Max' text fields – used to display frequency settings, enter the measured frequency and display any error(s) against expected values for each frequency: ■ 'Frequency Settings' – displays the transmitter's setting for the pulse output – populated when 'Apply' is clicked after entering the frequency reading. ■ 'Frequency Measured' – used to enter the pulse frequency reading. ■ '%Error' – populated automatically, the % difference between the calculated and expected frequency.
(C)	'Apply' – applies values entered in the 'Frequency Measured' fields.
(D)	'Exit' – exits the dialog and returns to the 'Main Menu'.

Table 2.6 'Pulse Output' Dialog Overview
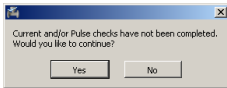
3 Using VeriMaster

3.1 Generating a Report

Reports can be saved and/or printed to produce a 'snapshot' of the transmitter's current diagnostic/validation information.

3.1.1 Viewing a Report

To generate and view a report:

1. At the 'Main Menu', click 'View Report' [View Report] .

    > **Note.** If the current and pulse output checks have not been completed, a prompt is displayed.

    Click 'Yes to proceed or 'No' to return to the 'Main Menu'.

    The 'Customer Information' dialog is displayed with the fields empty:
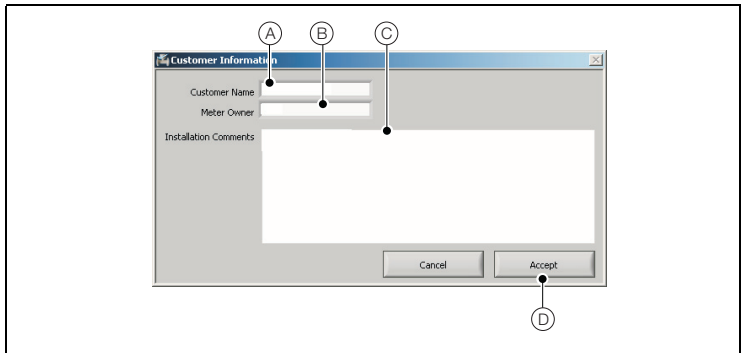
    Fig. 3.1 'Customer Information' Dialog

2. In the 'Customer Name' field (A) type a customer name.

3. In the 'Meter Owner' field (B) type an identification for the owner of the transmitter.

4. In the 'Installation Comments' field (C) type any comments required.

    > **Note.** If the fields in steps 2 and/or 4 are populated with too many characters, a prompt is displayed to proceed or return to the 'Customer Information' dialog to edit the field(s).
    >
    > If the report is generated and fields contain too many characters, the information on the report is truncated to the maximum characters permitted per field.

5.   Click 'Accept' (D).

A formatted report is generated:

Fig. 3.2 Example Report

3.1.2 Saving a Report

> **Note.** Report details are specific to the flowmeter data uploaded during the current session and are time and date stamped. Report contents are unique at each save and cannot be edited.

To save a report:

1. View the report – see section 3.1.1, page 16.

2. At the 'Report' menu, click 'Save' Save .

    The 'Enter Report Title' dialog is displayed with the default result directory (A) open:
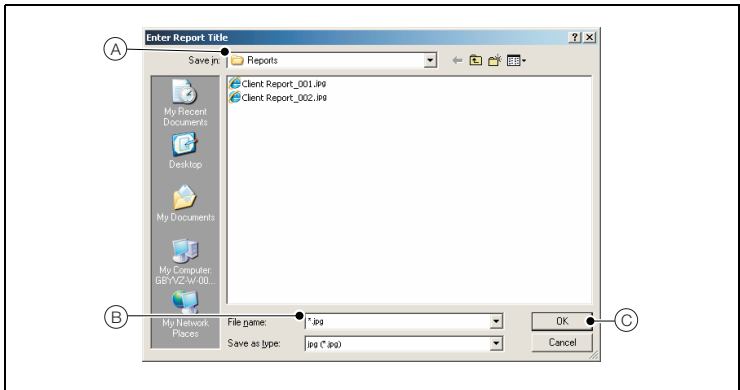
Fig. 3.3 'Enter Report Title' Dialog

3. In the 'File Name' field, type a name for the file (B) and click 'OK' (C).

    The report is saved to the directory as a .jpg file, the 'Enter Report Title' dialog is closed and the 'Report' dialog is displayed.

4. To close the 'Report' dialog, click 'Exit' Exit .

    A prompt is displayed asking if the alarm history should be cleared:
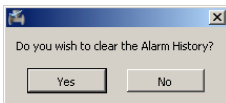
5. Click 'Yes' to clear (or 'No' to retain) the alarm history and return to the 'Main Menu'.

> **Note.** The 'Alarm History' is used by VeriMaster to determine the marginal status. If a fault had occurred since VeriMaster was last run, but is now cleared, it indicates a marginal status. Clearing the 'Alarm History' clears the marginal status for future verification reports.

3.1.3 Printing a New Report

> **Note.** Reports can be printed as PDF files if the Adobe PDF Writer driver is available and selected.

To print a new report:

1. Generate the report – see section 3.1.1, page 16.

2. At the 'Report' menu, click 'Print' [Print].

   The 'Select Printer' dialog is displayed:
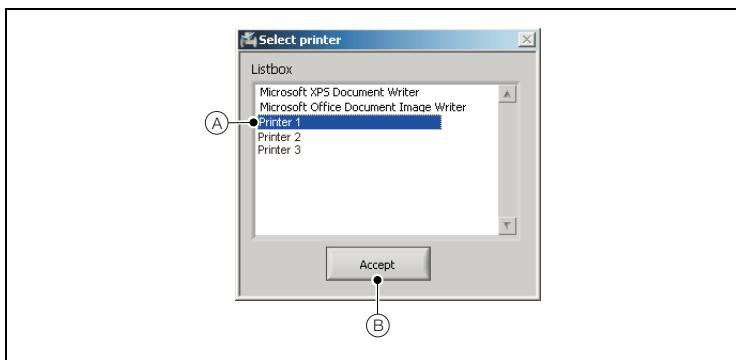

Fig. 3.4 'Select Printer' Dialog

3. Select the printer required (A).

4. Click 'Accept' (B) to print the report.

3.1.4 Printing a Saved Report

To print a saved report:

1. From the default directory location, select the report to be printed – see Section 3.2, page 20.

2. Open the report using a .jpg file viewer.

3. Use the local application's print command to print the report.

3.2 Changing the Default Results Directory

When VeriMaster is installed, the default results directory is set to the user's desktop.

The directory can be changed by specifying a different path in the 'Results Directory' field.

To change the default results directory path:

1. At the 'Main Menu', select 'Configuration' Configuration .

   The 'Configuration' dialog is displayed.
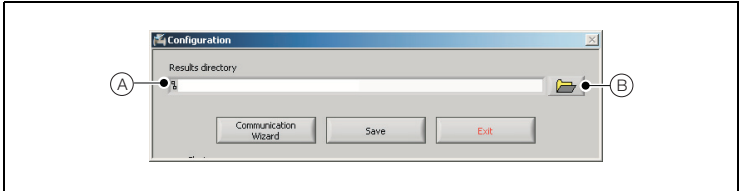
Fig. 3.5 'Results Directory' Field

2. The existing default directory path is displayed in 'Results Directory' field Ⓐ.

3. Click the folder icon Ⓑ.

   The (Windows) 'Open' dialog is displayed.

4. At the (Windows) 'Open' dialog, navigate to and select the required folder.

5. Click 'Current Folder'.

   The 'Configuration' dialog is displayed and the 'Save' button Ⓒ is highlighted green.
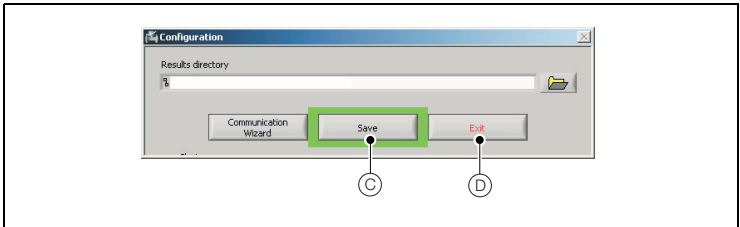
Fig. 3.6 'Configuration' Dialog Buttons

6. To save the default result directory, click 'Save' Ⓒ.

   The new path is retained as the new default directory location for saved reports.

   Note. To discard the new default directory, click 'Exit' Ⓓ without saving. The new settings are discarded and the 'Main Menu' is displayed.

7. Click 'Exit' Ⓓ to exit the dialog.

   The 'Main Menu' is displayed.

3.3 Running the Communication Wizard

Note. The 'Communication Wizard' runs automatically when VeriMaster is first launched. If connection to the transmitter is lost subsequently, it can be re-established by re-running the wizard manually.

To run the 'Communication Wizard' manually:

1.   At the 'Main Menu', select 'Configuration [Configuration] .

      The 'Configuration' dialog is displayed:
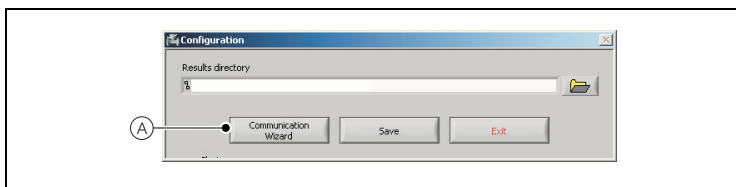
Fig. 3.7 'Configuration' Dialog

2.   At the 'Configuration' dialog, click 'Communication Wizard' (A).

      The 'ServicePortSplitter Setup' dialog is displayed while VeriMaster communicates with the infrared adaptor and transmitter.
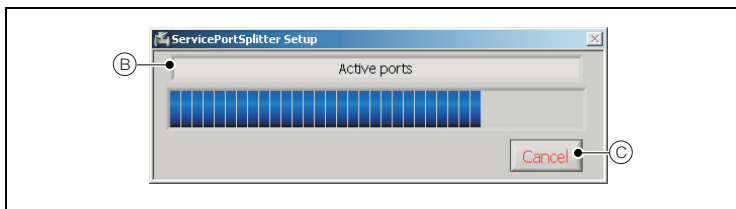
Fig. 3.8 'ServicePortSplitter Setup' Dialog

The connection progress is displayed in the status field (B).

Note. The wizard can be stopped at any time by clicking 'Cancel' (C).

3. If the new connection details are established successfully, the 'Configuration' dialog is displayed and the 'Save' button (D) is highlighted by a green box.
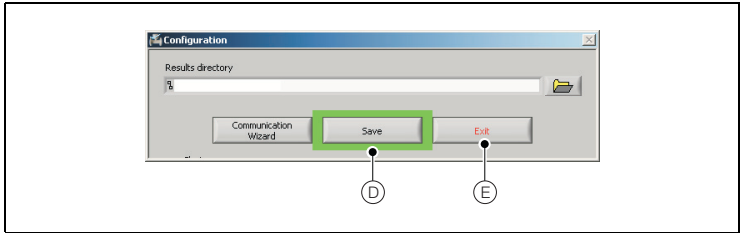
Fig. 3.9 Saving the New Communication Details

4. Click 'Save' (D) to save the new communication details.

> **Note.** To discard the new communication details, click 'Exit' (E) without saving. The new settings are discarded and the 'Main Menu' is displayed.

5. Click 'Exit' (E) to return to the 'Main Menu'.

3.4 Checking the Current Output Calibration

Caution. This test must only be performed by suitably qualified instrumentation personnel.

Note.

■ VeriMaster must show a status of 'Connected' to enable the current output to be verified.

■ For analog output measurement:

– resistor (100R resistor recommended, minimum 50R, maximum 750R), 0.05 % tolerance or better

– digital volt meter (DVM), $4^1/_2$ digit, accuracy better than 0.05 % on voltage range or digital multimeter (DMM), accuracy better than 0.05 % on current range

To check the current output calibration:

1. Refer to IM/WM to access the transmitter's current outputs.

2. Referring to Fig. 3.10:

   a. Disconnect the customer's current output wiring.

   b. Connect a precision resistor (tolerance better than 0.05 %) (A) across current output terminals 31 (IC+) and 32 (IC–).

      Recommended value 100R (minimum 50R, maximum 750R).

      Note. The resistor can be connected in series with the customer's receiving equipment, providing the total loop resistance does not exceed 750R.

   c. Measure the voltage (B) across the resistor (refer to page 2 for minimum meter specification).
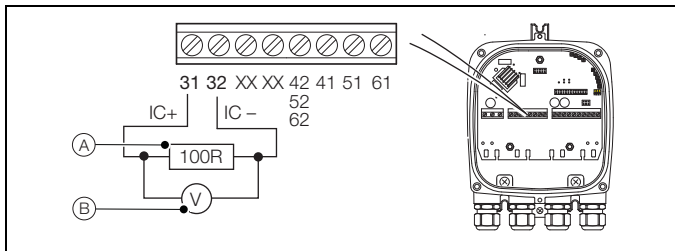

Fig. 3.10 Current Output Calibration Check

3. At the 'Main Menu', click 'Current Output Calibration Check' [Current Output Calibration Check] .

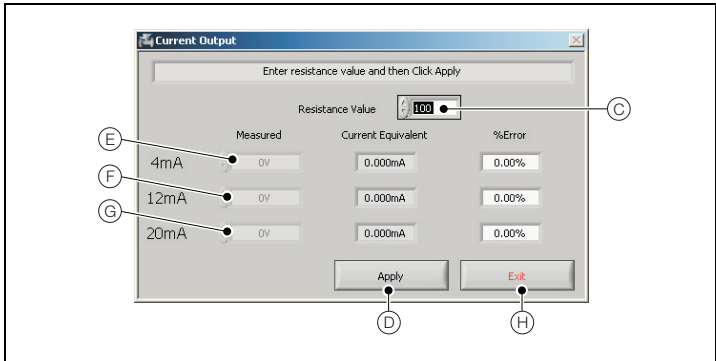   The 'Current Output' dialog is displayed.

Fig. 3.11 Current Output Dialog

4. In the 'Resistance Value' field (C), type the value of resistor (A) (from Fig. 3.10, page 23).

5. Click 'Apply' (D).

 The '4mA Measured' field E is enabled.

6. In the '4mA Measured' field (E), type the voltage (B) measured at step 2.

7. Click 'Apply' (D).

 The '4mA Current Equivalent' field displays a mA current equivalent and the '%Error' field displays any difference between the calculated current and the expected value.

8. In the '12mA Measured' field (F), type the voltage (B) measured at step 2.

 The '12mA Measured' field is enabled.

9. Click 'Apply' (D).

 The '12mA Current Equivalent' field displays a mA current equivalent and the '%Error' field displays the status of the reading.

10. In the '20mA Measured' field (G), type the voltage (B) measured at step 2.

 The '20mA Measured' field is enabled.

11. Click 'Apply' (D).

 The '20mA Current Equivalent' field displays a mA current equivalent and the '%Error' field displays the status of the reading.

12. Click 'Exit' (H).

 The readings are saved and the 'Main Menu' is displayed.

Note. If the current output calibration is exited before it is completed, a prompt is displayed to confirm exit or continue with the calibration.

3.5 Checking the Pulse Output Calibration

Caution. This test should only be carried out by suitably qualified instrumentation personnel.

Note.

■ VeriMaster must show a status of 'Connected' to enable the pulse outputs to be checked.

■ The pulse output operates only if an external circuit is connected (the contacts are open collector). If an external circuit is connected, connect the frequency counter (built into a DMM or similar) across the open collector output terminals on the transmitter.

   If the frequency meter does not have this capability, use one of the following two options:

   – leave the plant load connected to the WaterMaster, as it will have a pull-up to some voltage
      OR

   – using a voltage source and a resistor (250 R to 2K2) provide a pull-up for the open collector output to drive.

■ Depending on the capability of the external frequency counter used, measurement of low frequencies may not be accurate enough. If such equipment is used, it is recommended that the WaterMaster 'Pulse Limit Frequency' is increased to at least 1000 Hz to enable an accurate result to be obtained from the external counter.

To check the pulse output 1 calibration:

1. Refer to IM/WM to access the transmitter pulse outputs.

2. Referring to Fig. 3.12 – connect a frequency counter across pulse output 1 (A).

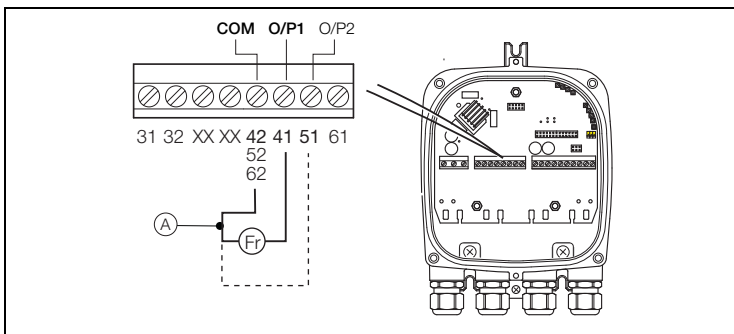3. Note the frequency measured.

Fig. 3.12 Connecting a Frequency Counter to Pulse Output 1

4.   At the 'Main Menu', click 'Pulse Output 1 Check' [Pulse Output 1 Check] .

The 'Pulse Output' dialog is displayed.

Fig. 3.13 Pulse Output Dialog

5.   Referring to Fig. 3.13 – in the 'Frequency Measured' field (B) (associated with 'Frequency Max'), type the measured frequency (A) (from step 3) for pulse output 1.

6.   Click 'Apply' (C). The '%Error' field displays any difference between the pulse output and the expected value.

7.   In the 'Frequency Measured' field (D) (associated with '0.5xFrequency Max'), type the measured frequency (A) (from step 3) for pulse output 1.

8.   Click 'Apply' (C). The '%Error' field displays any difference between the pulse output and the expected value.

9.   Click 'Exit' (E).

The readings are saved and the 'Main Menu' is displayed.

> **Note.** If the pulse output check is exited before it is completed, a prompt is displayed to confirm exit or continue with the calibration.

To check the pulse output 2 calibration, proceed to step 9.

10. Referring to Fig. 3.14 – connect a frequency counter across pulse output 2 (F).

11. Note the frequency measured.

Fig. 3.14 Connecting a Frequency Counter to Pulse Output 2

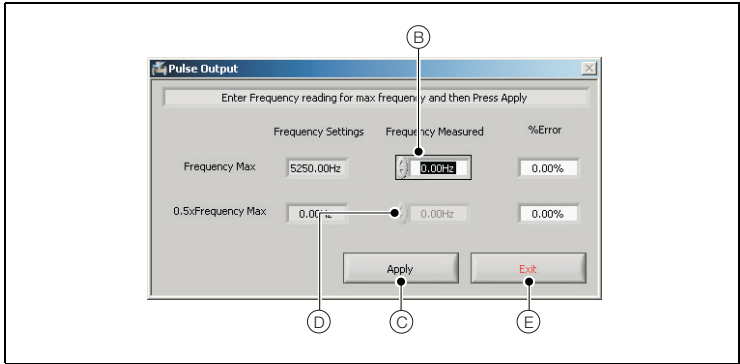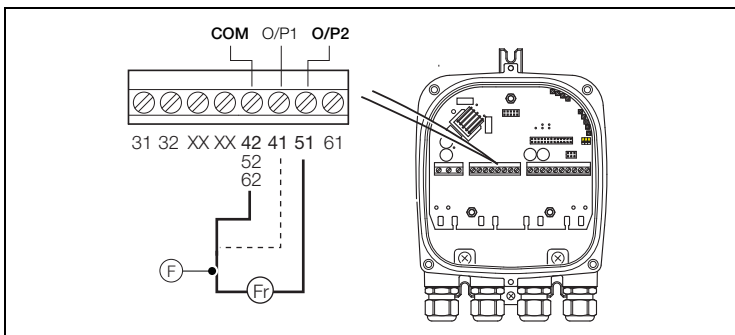12. At the 'Main Menu', click 'Pulse Output 2 Check' | Pulse Output 2 Check | .

The 'Pulse Output' dialog is displayed.

13. Referring to Fig. 3.13 – in the 'Frequency Measured' field (B) (associated with 'Frequency Max'), type the measured frequency (F) (from step 11) for pulse output 2.

14. Click 'Apply' (C). The '%Error' field displays any difference between the pulse output and the expected value.

15. In the 'Frequency Measured' field (D) (associated with '0.5xFrequency Max'), type the measured frequency (F) (from step 11) for pulse output 2.

16. Click 'Apply' (C). The '%Error' field displays any difference between the pulse output and the expected value.

17. Click 'Exit' (E).

The readings are saved and the 'Main Menu' is displayed.

Note. If the pulse output check is exited before it is completed, a prompt is displayed to confirm exit or continue with the calibration.

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4 Reports

4.1 Summary of Results

The 'Summary of Results' area shows the status of the device at the last configuration upload. Each group within the summary contains fail and marginal alarm conditions.

If the status for a condition is set to 'Fail' or 'Warning' and there is more than one condition in the group that affects the status, only the first condition is reported. To indicate if more than one condition affects the status of a group, a '+' is appended to the text in the report (for example, *Fail – Coil Open Circuit +*).

To produce a summary, each of the alarms in each alarm group is checked and, if a 'Fail' is not detected, the alarm history is checked. If a previous occurrence is detected in the history log the occurrence is indicated as a 'Warning' on the summary. If an item fails, it is indicated as a 'Fail' on the summary.
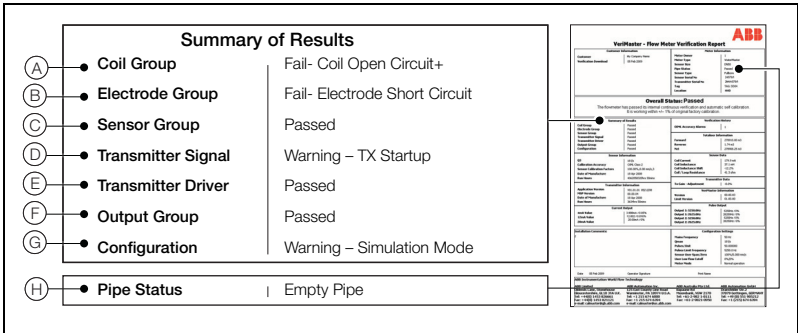

Fig. 4.1 Summary of Results

Note. NAMUR codes are shown in Table 4.1 in brackets next to applicable alarms. Refer to IM/WMP for code details and diagnostic text displayed at the WaterMaster transmitter.

Group	Fail with Alarm Message	Marginal Warning
(A)	Sensor Accuracy (VeriMaster defined) Coil Open Circuit (F238.025) Coil Short Circuit (F236.026) Loop Resistance (F234.027)	–
(B)	Electrode Open Circuit (S147.021) Electrode Short Circuit (S146.022) Electrode Voltage (S105.030) Electrode Voltage (VeriMaster defined)	–
(C)	Sensor Comms (M090.013) Installation (F247.024) Installation – Mixed System (F248.035) Installation – No Sensor (F252.016) Sensor Not Calibrated (S110.034) Installation – Bonding? (F230.029)	–
(D)	TX Accuracy (VeriMaster defined) TX Hardware (refer to Table 4.2 for conditions that generate this alarm)	TX Startup (S148.032)
(E)	Coil Current Tolerance (VeriMaster defined)	–
(F)	Current Output (VeriMaster defined) Pulse Output (VeriMaster defined)	–
(G)	–	Totaliser Incorrect Resolution/Units (M080.011) Simulation Mode (refer to Table 4.3 for conditions that generate this alarm) HART Address Non Zero (_044.014)
(H)	–	Empty Pipe (S150.018)

Table 4.1 Summary of Results – Fail and Marginal Warnings

NAMUR Code	Diagnostic Message at WaterMaster
C186.010	Tx. simulator/calibrator mode.
F220.017	Tx. measurement suspended. Contact service.
F232.028	Transmitter hardware fault. Contact service.
F250.015	Tx. memory fault detected. Contact service.
F253.036	Tx. code memory fault. Contact service.
F254.037	Tx. data memory fault. Contact service.
M094.033	Current output hardware fault. Contact service.

Table 4.2 Diagnostics that Generate the VeriMaster 'TX Hardware' Alarm

NAMUR Code	Diagnostic Message at WaterMaster
C168.001	Logic simulation selected on O/P1.
C174.002	Pulse simulation selected on O/P1.
C164.003	Logic simulation selected on O/P2.
C172.004	Pulse simulation selected on O/P2.
C160.005	Logic simulation selected on O/P3.
C182.009	Simulation mode on.
C158.038	HART frequency simulation active.
C190.039	Alarm simulation active.
C178.000	Simulated/fixed current output. HART address >0? Simulation mode?

Table 4.3 Diagnostics that Generate the VeriMaster 'Simulation Mode' Alarm

4.2 Overall Result

The overall result calculated by VeriMaster is one of the following types:

- ■ 'Pass' – the flowmeter has passed its internal continuous verification and is working within ±1 % of original factory calibration (the alarm status and alarm history do not contain any alarms and the output checks have been made and are within acceptable limits).

- ■ 'Marginal' – the flowmeter has detected internal measurement changes that may affect the measurement accuracy. The current status does not contain any alarms but the alarm history does – see section 4.1, page 28.

  > **Note.** The alarm history must be cleared before a 'Pass' status can be achieved – see Section 4.3 below.

- ■ 'Fail' – the flowmeter has failed its internal continuous verification because:
    - – at least one of the items in the 'Summary of Results' has failed
    - – one or both of the output checks have unacceptable error levels
    - – calibration checks have not been made

4.3 Clear Alarm History

If the result of the test has been saved or printed, the alarm history can be cleared when the Report window is exited. The prompt: 'Do you wish to clear the Alarm History?' is displayed when 'Exit' is selected, enabling the alarm history to retained or discarded.

Notes

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