Rosemount™ 975 Flame Detectors

Modbus® Manager Manual

ROSEMOUNT™

EMERSON™

> ## ⚠ WARNING
>
> **Physical access**
>
> Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.
>
> Physical security is an important part of any security program and fundamental in protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

Legal notice

The device described in this document is the property of Emerson.

No part of the hardware, software, or documentation may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, without prior written permission from Emerson.

While great efforts have been made to ensure the accuracy and clarity of this document, Emerson assumes no liability resulting from any omissions in this document or from misuse of the information obtained herein. The information in this document has been carefully checked and is believed to be entirely reliable with all of the necessary information included. Emerson reserves the right to make changes to any products described herein to improve reliability, function, or design and reserves the right to revise this document and make changes from time to time in content hereof with no obligation to notify any persons of revisions or changes. Emerson does not assume any liability arising out of the application or any use of any product or circuit described herein; neither does it convey license under its patent rights or the rights of others.

Warranty

1. <u>Limited Warranty</u>: Subject to the limitations contained in *Section 2 (Limitation of Remedy and Liability)* herein, Seller warrants that (a) the licensed firmware embodied in the Goods will execute the programming instructions provided by Seller; (b) that the Goods manufactured by Seller will be free from defects in materials or workmanship under normal use and care; and (c) Services will be performed by trained personnel using proper equipment and instrumentation for the particular Service provided. The foregoing warranties will apply until the expiration of the applicable warranty period.

    Sensors and detectors are warranted against defective parts and workmanship for 60 months from the date of purchase.

    Products purchased by Seller from a third party for resale to Buyer (Resale Products) shall carry only the warranty extended by the original manufacturer. Buyer agrees that Seller has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products. If Buyer discovers any warranty defects and notifies Seller thereof in writing during the applicable warranty period, Seller shall, at its option, (i) correct any errors that are found by Seller in the firmware or Services; (ii) repair or replace free on board (FOB) point of manufacture that portion of the Goods found by Seller to be defective; or (iii) refund the purchase price of the defective portion of the Goods/Services. All replacements or repairs necessitated by inadequate maintenance; normal wear and usage; unsuitable power sources or environmental conditions; accident; misuse; improper installation; modification; repair; use of unauthorized replacement parts; storage or handling; or any other cause not the fault of Seller, are not covered by this limited warranty, and shall be replaced or repaired at Buyer's sole expense, and Seller shall not be obligated to pay any costs or charges incurred by Buyer or any other party except as may be agreed upon in writing in advance by Seller. All costs of dismantling, re-installation, freight, and the time and expenses of Seller's personnel and representatives for site travel and diagnosis under this limited warranty clause shall be borne by Buyer unless accepted in writing by Seller. Goods repaired and parts replaced by Seller during the warranty period shall be in warranty for the remainder of the original warranty period or 90 days, whichever is longer. This limited warranty is the only warranty made by Seller and can be amended only in a writing signed by an authorized representative of Seller. The limited warranty herein ceases to be effective if Buyer fails to operate and use the Goods sold hereunder in a safe and reasonable manner and in accordance with any written instructions from the manufacturers.

    The warranties and remedies set forth above are exclusive. There are no representations or warranties of any kind, expressed or implied, as to merchantability, fitness for particular purpose, or any other matter with respect to any of the Goods or Services.

2. <u>Limitation of Remedy and Liability</u>: Seller shall not be liable for damages caused by delay in performance. The remedies of Buyer set forth in the agreement are exclusive. In no event, regardless of the form of the claim

or cause of action (whether based in contract infringement, negligence, strict liability, other tort, or otherwise), shall Seller's liability to Buyer and/or Buyer's customers exceed the price to Buyer of the specific Goods manufactured or Services provided by Seller giving rise to the claim or cause of action. Buyer agrees that in no event shall Seller's liability to Buyer and/or Buyer's customers extend to include incidental, consequential, or punitive damages. The term "consequential damages" shall include, but not be limited to, loss of anticipated profits, revenue, or use and costs incurred including without limitation for capital, fuel and power, and claims of Buyer's customers.

Abbreviations and acronyms

Abbreviation or acronym	Definition
ATEX	Atmospheric explosives
AWG	American wire gauge
BIT	Built-in test
EMC	Electromagnetic compatibility
EOL	End of line
FOV	Field of view
HART®	Highway addressable remote transducer - communication protocol
IAD	Immune at any distance
IECEx	International Electrotechnical Commission Explosion
IPA	Isopropyl alcohol
IR	Infrared
JP5	Type of jet fuel
Latching	Refers to relays remaining in the ON state even after the ON condition has been removed.
LED	Light emitting diode
LPG	Liquified petroleum gas
mA	Milliamps (0.001 amps)
Modbus®	Master-slave messaging structure
N/A	Not applicable
NFPA	National Fire Protection Association
NPT	National pipe thread
RS-485	Communication protocol allowing bi-directional communication
PN	Part number
SIL	Safety integrity level
UNC	Unified coarse thread
Vac	Volts alternating current
Vdc	Volts direct current

Contents

1 Introduction

1.1 Product overview

Modbus® Manager is customized software based on the Modbus protocol over RS-485, used to configure the device to suit the customer needs, perform firmware upgrades, and provide troubleshooting information and functionality.

This Manual describes the Modbus Manager and provides instructions on how to install, operate, and maintain the software.

Note
The Modbus Manager software is for use with Rosemount 975 models only.

1.2 Minimum requirements

The minimum requirements for operating Modbus® Manager are as follows:

- Pentium® 3GHz

- Microsoft® Windows® XP, 7, 8, or 10

- 2 GB RAM

- 10 GB hard disk free space

- Isolated RS-485 interface card to be defined as COM or an RS-485 converter to connect to a standard `COM` port
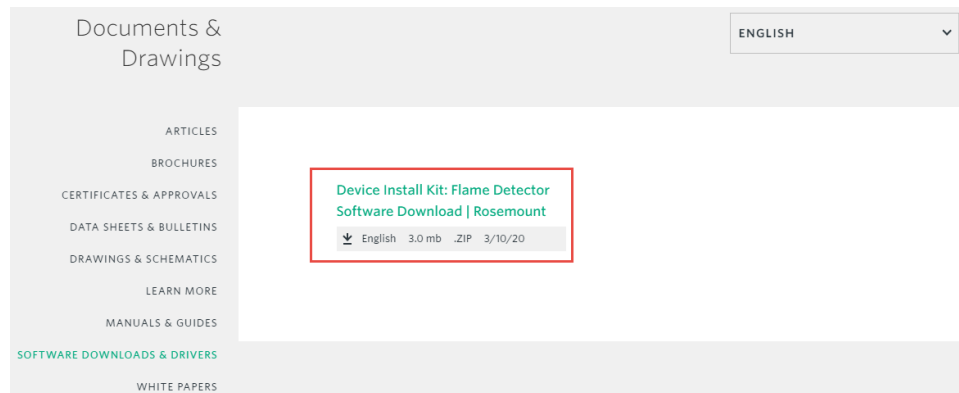
2   Initial setup

2.1   Download software

To download the Modbus® Manager, follow these steps:

Procedure

1. Go to Emerson.com/Rosemount.
2. Using the site navigation, go to the relevant product page.
3. Scroll down to *Documents and Drawings*.
4. Click **SOFTWARE DOWNLOADS & DRIVERS**.
5. Download the relevant file.

2.2   Run software

Once the software file has been downloaded to your computer, create a shortcut in a convenient location.

To run the software, double click on the executable file.

2.3   Connect the computer to the device

Prerequisites

Connect the computer to the device using the RS-485 harness cable before performing any configuration or diagnostic operations on the device.

Procedure

1. Connect one end of the USB cable to one of the computer's USB ports.
2. Connect the other end of the USB cable to the USB serial (RS-485) adapter.
3. Connect the serial port of the adapter to the harness cable.

2.4 Connect the device to the harness cable

Procedure

1. Connect one side of the cable to detector Terminal 13 for RS-485 (+).
2. Connect the other side of the cable to detector Terminal 14 for RS-485 (-).
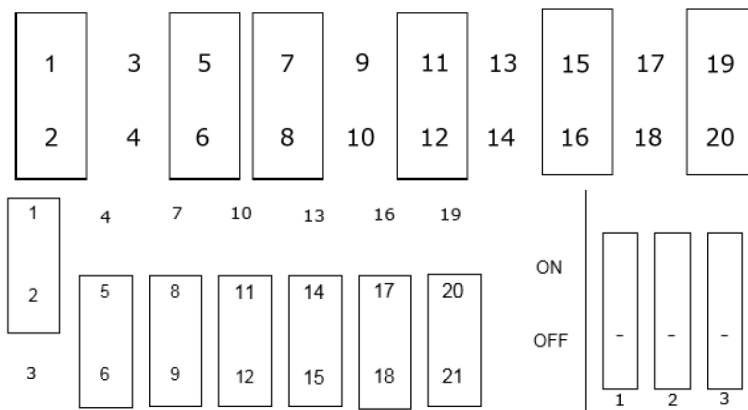
2.5 Set up the USB adapter

NOTICE

Check that the D-connector adapter wiring is similar to the wiring shown. If it is not, adjust the cable wiring to fit the desired adapter.

⚠ CAUTION

Procedure

1. If required, unscrew the cover of the USB adapter.
2. Set up jumpers using one of the following options.

3. Close the USB adapter cover.
4. Connect the cable.

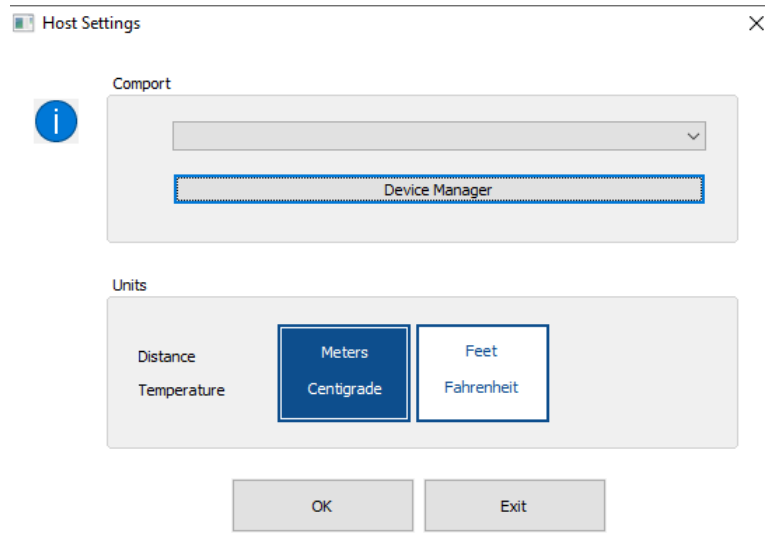## 2.6 Establish the COM port

Prerequisites

When first connecting the harness, you will be prompted to select a `COM` port.

Procedure

1. Open Modbus® Manager.

2. Select **Device Manager**.
3. Select **Ports**.

4. Note to which `COM` the `USB Serial Port` is connected.

   This will vary between computers.

5. From the *Comport* drop-down list, select the relevant COM port.
6. Click **OK**.

2.7　　Connect device

Procedure

1. Connect the RS-485 to the terminals according to the following table:

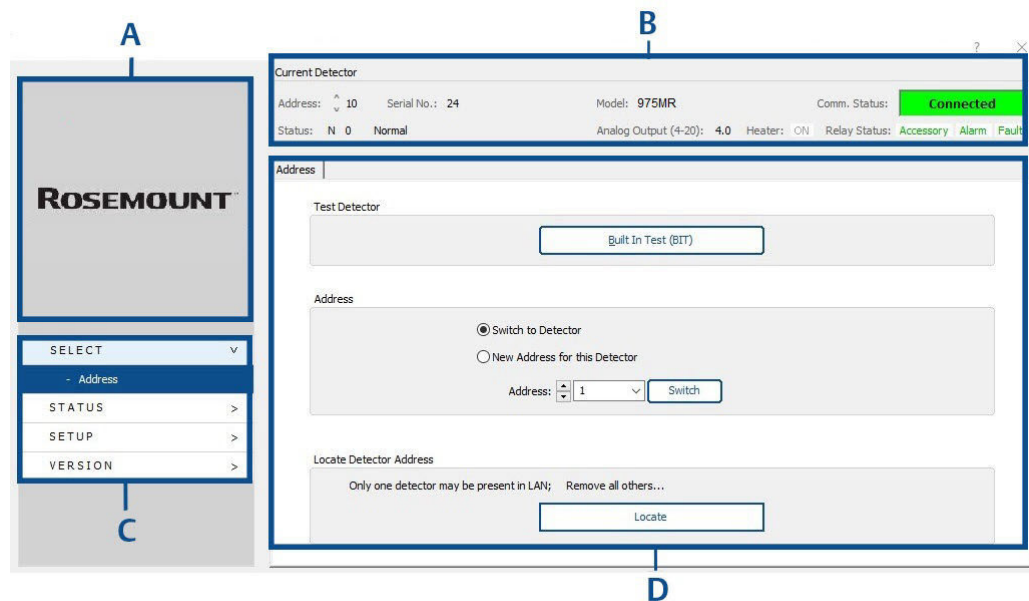| Function	Wire color	Terminal
RS-485 (+)	Red	13
RS-485 (-)	Black	14

2. Connect the device to power.

3 Operation

## 3.1 Screen overview

Main screen

The left bar and top bar display on every screen. The left bar displays the brand name and navigation controls; the top bar displays device information.

A. Device brand
B. Top bar (device information)
C. Left bar (navigation controls)
D. Various controls and actions

Top bar

The top bar contains information about the connected detector and appears on every screen.
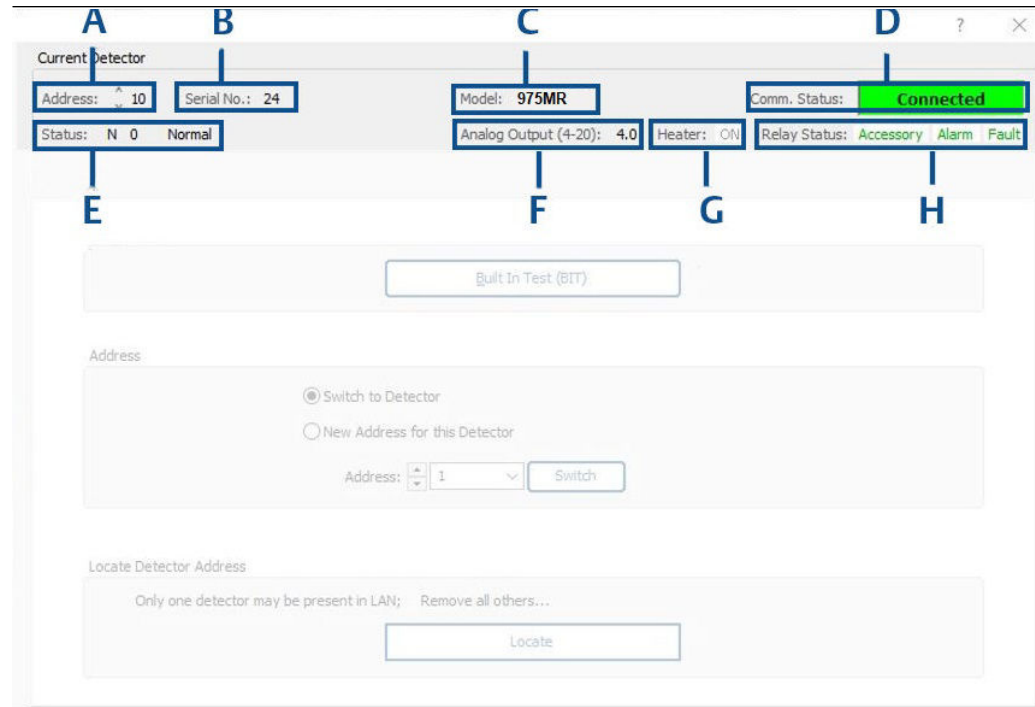
A. Current Detector Address
B. Detector Serial Number
C. Full detector Model code
D. Communication Status
E. Detector Status
F. Analog Output signal
G. Heater status
H. Relay Status (green indicates de-energized state for Alarm and Accessory, energized for Fault; red indicates energized state for Alarm and Accessory, de-energized for Fault).

Left bar

The left navigation bar contains expandable menus. Click the menu link or expand it and click one of the menu items to open a new page in the software.
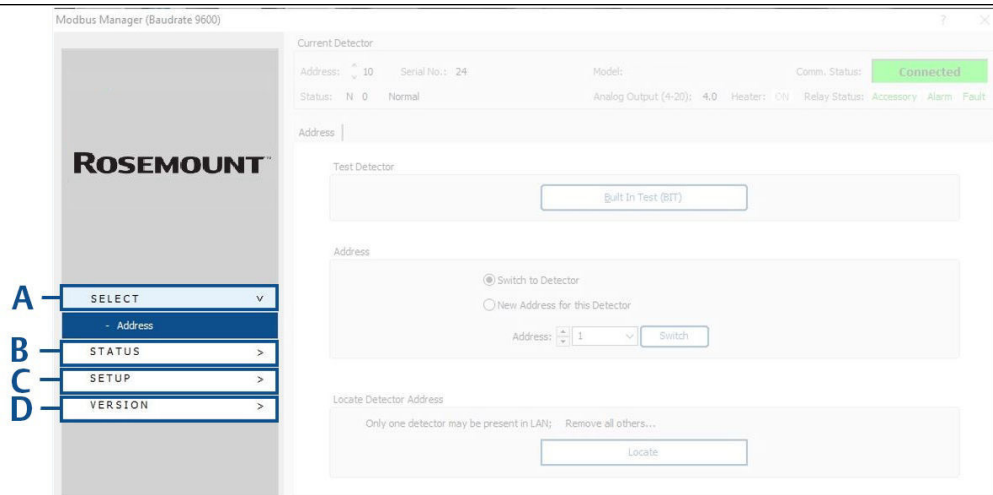
A. *Device information*
B. *Device STATUS*
C. *Device SETUP*
D. *Device and software VERSION*

3.2 Perform manual built-in test (BIT)

Procedure

In the **Test Detector** pane, click the **Built-In Test (BIT)** button.

Note
Performing BIT sets field of view (FOV). If the detector is not mounted in its final position, you will need to perform BIT again.

3.3 Assign address to device

Procedure

1. In the **Address** pane, select the **New Address for this Detector** radio button.
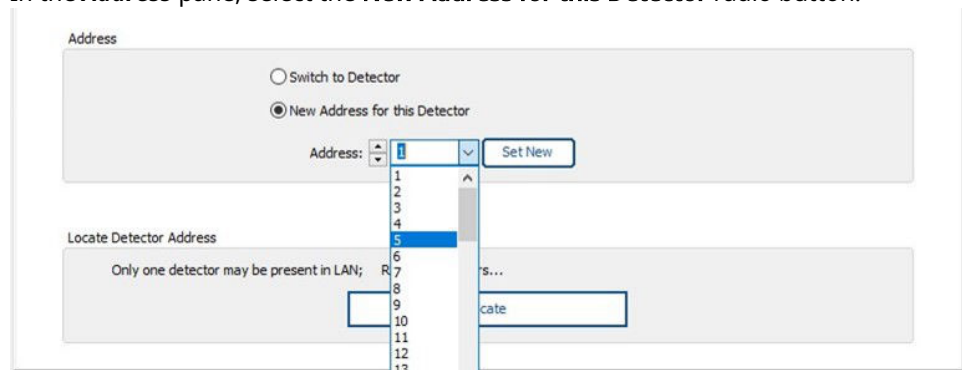
2. Use the *Address* drop-down list to select the required address or enter the address in the drop-down text box.

3. Click the **Set New** button.

3.4   Switch device address

Procedure

1. In the *Address* pane, if more than one detector is in the network and its address is known, select the **Switch to Detector** radio button.

2. Use the *Address* drop-down list to select the required address.

3. Click the **Switch** button.

Note
The detector address set by the factory is 1.

3.5 Locating the detector address

If the detector address is not shown in the top bar or it is not communicating, you can locate its address by clicking the **Locate** button in the *Locate Detector Address* pane.

Once communication is established, the current detector address is shown in the top bar.

Note

To use the **Locate** function, make sure that only one detector is present in the RS-485 local area network (LAN).

3.6　Status tab

This tab displays the device status for the currently selected detector.
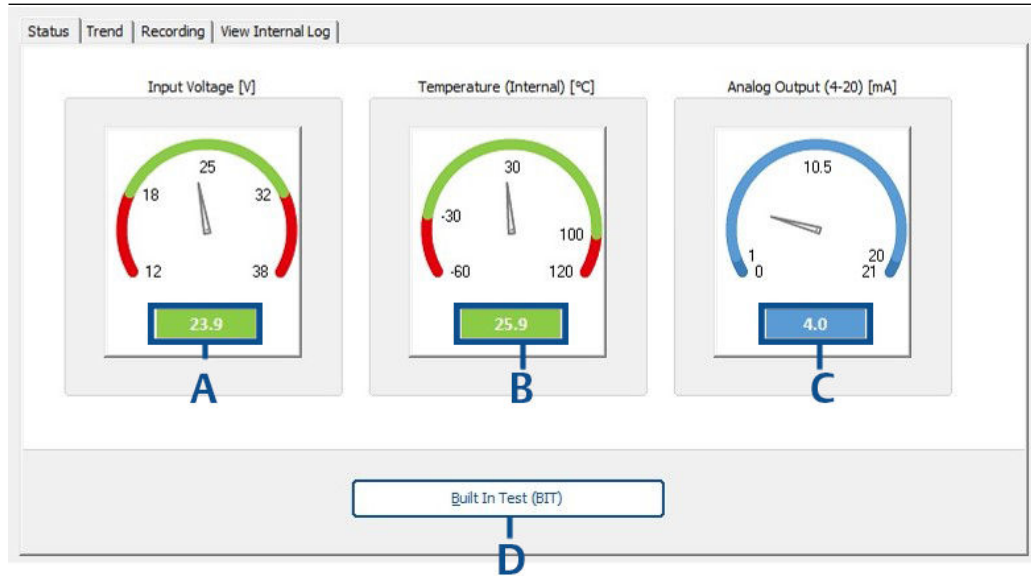
A.　Shows current Input Voltage (in volts)
B.　Shows current internal temperature (in degrees C or F according to setup)
C.　Shows current 4-20 Analog Output (in mA)
D.　Activates manual Built-In Test (BIT)

3.7   Trend tab

This tab shows the input voltage, internal temperature, and analog output live trends according to the selected time frame.
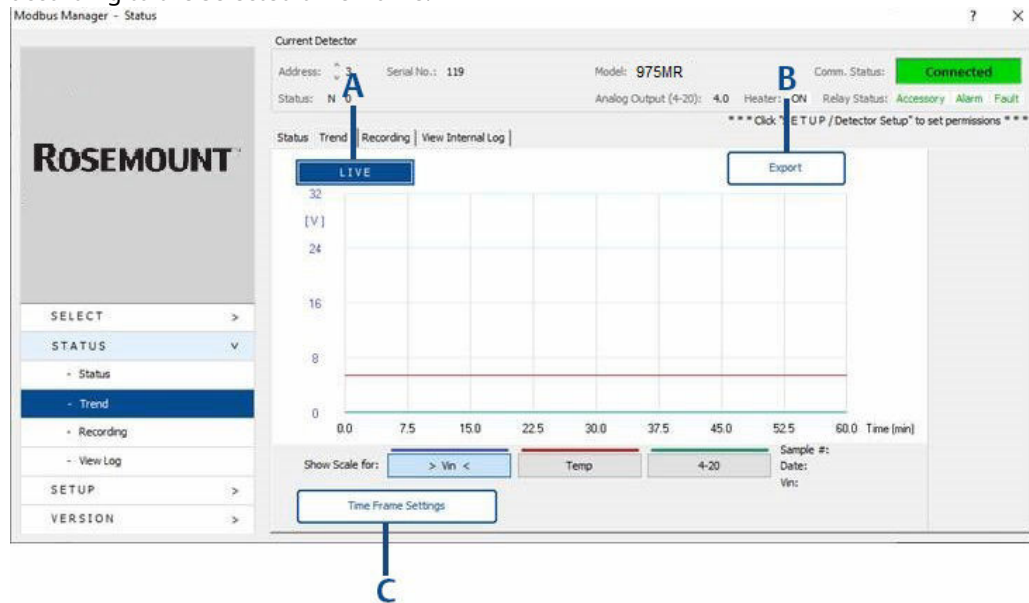
A. *Displays all recorded data according to time frame settings*
B. *Exports all data as .txt file*
C. *Opens* **Time Frame Settings** *dialog*

To adjust time frame settings, select the desired **Duration** and **Sampling Rate** and click **Reset**.
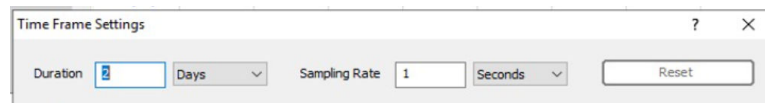
3.8 Recording tab

In this tab, you can record data and export it to a *.txt* or *.xls* file.

3.8.1 Record data

Procedure

1. Select the required recording mode.
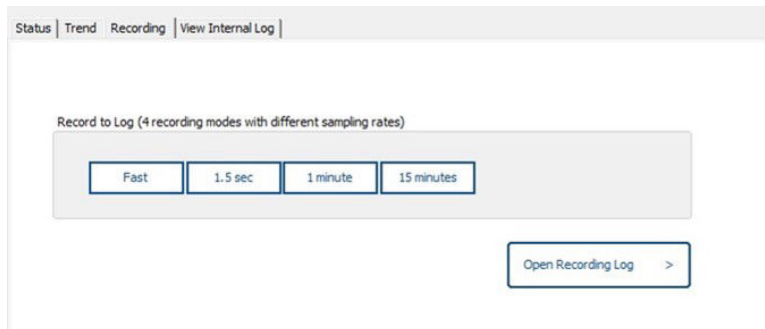
Note
The **Fast** mode provides recording at the best possible polling rate, around three records per second.

2. Enter a comment and click **Insert**.
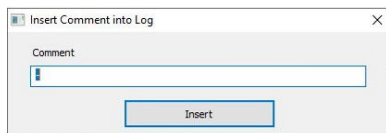
3. To end the recording, click **Stop**.
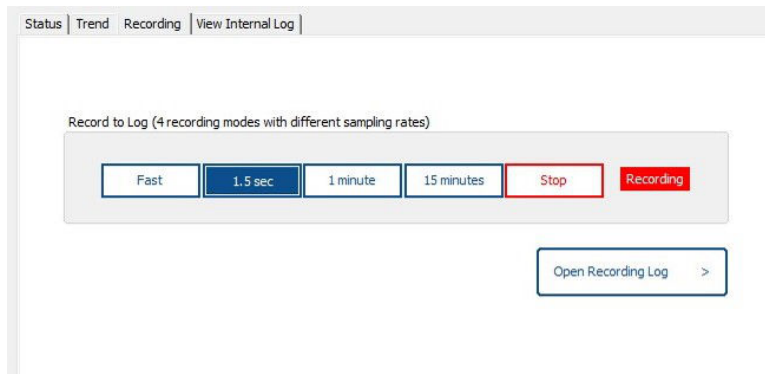
4. (Optional) Once recording has ended, click **Open Recording Log**.

Note
The file location is in the Modbus® directory installed on the computer in a file entitled *Recordings*. Rosemount 975 MR and HR file names start with *QuadIRlog_YMDHMS* (Year, Month, Date, Hour, Minute, Second). Rosemount 975 UF and UR file names are prefaced with ***UVIRlog_YMDHMS*** (Year, Month, Date, Hour, Minute, Second).

The time stamp is according to Greenwich Mean Time (GMT).

3.8.2 View internal log

In the log, you can view the 12 most recent records without scrolling.

Procedure

To adjust the number of records shown, change the number in the **Get** field and then press the **Get** button.

A. *Displays records according to selection in the **records up to current position** field*
B. *Scrolls up by page*
C. *Scrolls down by page*
D. *Scrolls up by line*
E. *Re-read by line*
F. *Select which records will be displayed when clicking **Get** button*
G. *Opens selected number of most recent records in .txt format*

3.9 Detector setup tab

3.9.1 Detector configurable settings

You can configure the following detector parameters:

Sensitivity　　　　Sets the detector's sensitivity (in meters/feet). A higher number indicates greater sensitivity. See relevant product manual for more information.

Heater mode	Demister settings for clearing condensation from the lens. Choose from `On`, `Off`, or `Auto`.
	Default: `Auto`
Alarm delay	The delay (in seconds) between detection of a signal and activation of the alarm. Choose from:
	• `0`
	• `3`
	• `5`
	• `10`
	• `15`
	• `20`
	• `30`
	• `A` (anti-flare)
	Default: `A`
Heater power	Choose from high or low power.
	Default: `High power`
Heater on temperature	Temperature at which the demister is activated, if the heat mode is set to `Auto`.
	Default: `5 °C`
Enable alarm latch	When selected, the alarm remains on even when the signal abates.
	Default: `Not enabled`

3.9.2 Built-in test (BIT) settings

You can configure the following BIT settings:

Enable Automatic BIT	When selected, the BIT runs automatically according to the settings.
	Default: `Enabled`
Fault count	Number of sequential BIT faults before BIT fault indication.
	Default: `3`
Interval (in minutes)	Duration between BIT cycles (maximum 60).
	Default: `15`
Activate alarm on successful manual BIT	Activates an alarm when a manual BIT is successfully completed.
	Default: `Not enabled`
Activate accessory relay on successful manual BIT	Activates the accessory relay when a manual BIT is successfully completed.
	Default: `Not enabled`
Post manual BIT indication duration (in seconds)	Enables the user to configure the alarm duration (maximum 60) after successful manual BIT.

Default: 3

3.9.3 Accessory relay options

You can configure the following options:

Activate accessory relay on warning	When the detector's status is warning, the accessory relay is activated.
	Default: `Not enabled`
Accessory relay as end of line (EOL)	When selected, the accessory relay is activated.
	Default: `Not enabled`
Accessory relay as field of view (FOV)	When selected, the accessory relay is activated where FOV fault is detected.
	Default: Not enabled
Field of view (FOV) integrity	When enabled, will generate a notification if the detector's FOV has changed by at least 15 degrees on the Y axis.
	Default: `Not enabled`
	15 – 90 degrees: notification after 120 minutes
	Above 90 degrees: notification after 20 minutes

Note
The FOV integrity is monitored through all outputs:

- Device status (Modbus® and HART® protocols)

- Stepped 4-20mA: assign specific values (such as 3, 4, or 5mA) to indicate the change

- Accessory relay: select the accessory relay activation for FOV integrity change

Important
Enable the FOV integrity after the detector is installed and its positioning is finalized.

3.9.4 Detection options

To determine the detection type, use the following parameters:

Fast	According to model specifications, found in data sheet
Explosion	According to model specifications, found in data sheet
IR only	Single channel selection
UV only	Single channel selection
UV/IR	Double channel selection

3.9.5 Lock option

Modbus® Manager offers password protection for various maintenance and administrative actions.

Not locked	No password required to change detector settings or perform BIT
Locked	Password required to change detector settings; opens dialog box for setting passwords
Change passwords	To change the password, the previous password must be entered. If you do not have the previous password, contact the manufacturer to receive a time-limited password to reset the password. Once received, use the **Enable Password reset** button in the **Version → Service** menu.

When the "locked" option is selected, access to selected actions is controlled. There are two independent permission types that allow access to the actions listed in Table 3-1 once the detector is locked by passwords. When selecting the "locked" option, a dialog box opens to enter the maintenance and admin passwords. Both passwords must be entered by authorized personnel to complete the password setting process. Once completed, only share the relevant password in accordance with internal policy.

Table 3-1: Permission Types

Action	Permissions	
	Maintenance	**Admin**
Reset detector	Yes	Yes
Change password	Authorized personnel only	
Manual BIT	Yes	No
Detector setup	No	Yes
Firmware update	No	Yes
Fix 4-20 scale values	No	Yes
Parameter upload	No	Yes

Important
Once locked, the actions can be activated only when entering the correct password. The manufacturer will provide a time-limited password on authorized demand within five business days.

3.9.6   4-20 settings

Clicking the **4-20 Settings** button opens a window showing current 4-20 settings. These settings can be customized in accordance with the allowed nominal values.

Fault	0 or 1 mA (if 0 is selected there will be no HART® communication) Default: 1 mA
BIT fault	Fixed value, cannot be changed
FOV warning	3 – 5 mA (must be ≤ the normal value)[1] Default: 4 mA
Normal	4 or 5 mA (must be ≥ the FOV value) Default: 4 mA
Pre-alarm warning	13 – 16 mA (must be lower than alarm value) Default: 16 mA

(1) Available with Spectrex 40/40D models only.

Alarm	15 – 20 mA (must be higher than warning)
	Default: 20 mA
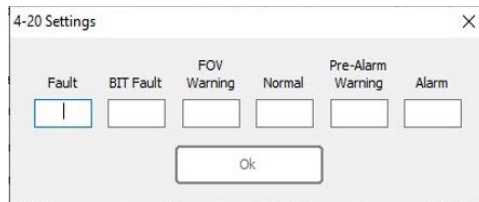
Once values are entered, click the **OK** button to update the setup.

Note
The setup is only saved upon closing the *4-20 Settings* dialog and subsequent application of setup dialog.

3.9.7   Modbus® Manager settings

The *Modbus Manager Settings* screen is used to change COM port and the units throughout the software.

Comport

Use this section to change the COM port as described in Establish the COM port.

Units

Use this section to change the units (i.e. metric or feet and Fahrenheit) in which all measurements are displayed.
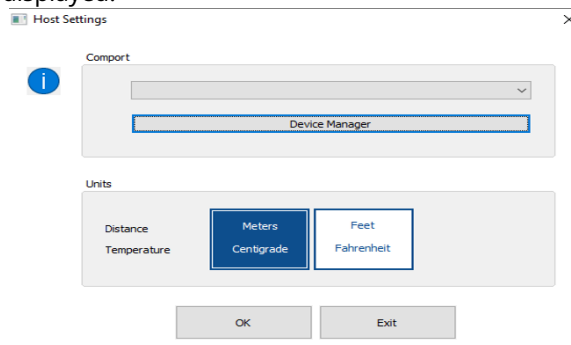
Note
The application automatically restarts when the COM port or the unit system is changed.

4 Maintenance

4.1 Miscellaneous functions

This screen provides access to various maintenance functions.

Figure 4-1: Miscellaneous tab
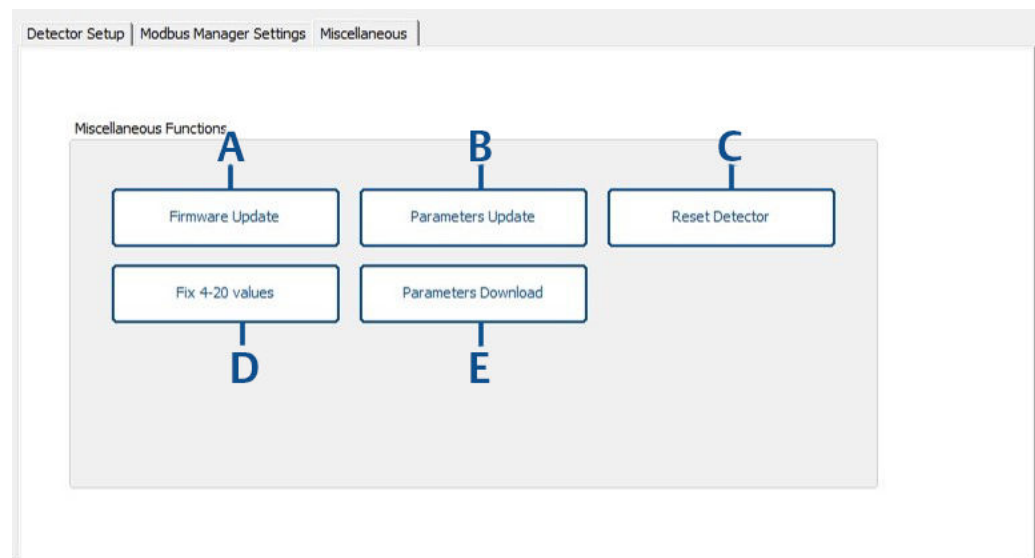
A. Perform firmware update with provided file
B. Upload parameters file
C. Detector reset
D. Fix 4-20 values
E. Download parameters file

4.2 Update firmware

Prerequisites

Firmware update file will be provided.

Procedure

1. Save file to your computer.
2. Switch to the required baud rate.
3. Click the **Firmware update** button.
4. Follow on-screen instructions to complete the process.

4.3 Parameter update

There is an optional feature to upload device parameters file with extension ".upm".

Where required, this file will be provided by the manufacturer.

4.4   Set fixed current 4-20 values

4-20mA is factory calibrated with controlled and certified equipment; there is no need for additional calibration. This process allows fixing of multimeter values to 4mA and 20mA fixed values.

For different equipment used at the customer site over ±0.05mA, the 4-20mA output can be fixed to match the reading indicated on the customer's multimeter. The reading can be adjusted within ±0.05mA.

Procedure

1. Select the **4 mA** radio button

2. Click **Set fixed current**.

3. Enter multimeter reading.

4. Click the **Apply** button.

5. Repeat steps Step 3 and Step 4 until you enter value within 4mA ±0.05.

   Important
   It is essential to enter the final value and click **Apply**. If this process remains incomplete for five minutes, the detector will restart.

6. Select the **20 mA** radio button.

7. Click **Set fixed current**.

8. Enter multimeter reading.

9. Click the **Apply** button.

10. Repeat steps Step 8 and Step 9 until you enter value within 20mA ±0.5.

    Important
    It is essential to enter the final value and click **Apply**. If this process remains incomplete for five minutes, the detector will restart.

11. Click the **Burn** button to save the changes.

4.5   Parameter download

There is an optional feature to download device parameter files incorporated into one folder located in the Modbus® Manager directory. This folder is saved to the subfolder with the detector serial number included in the title.

Where required, this file will be provided by the manufacturer.

4.6   Version information

Detector information and the software version can be viewed on this screen.
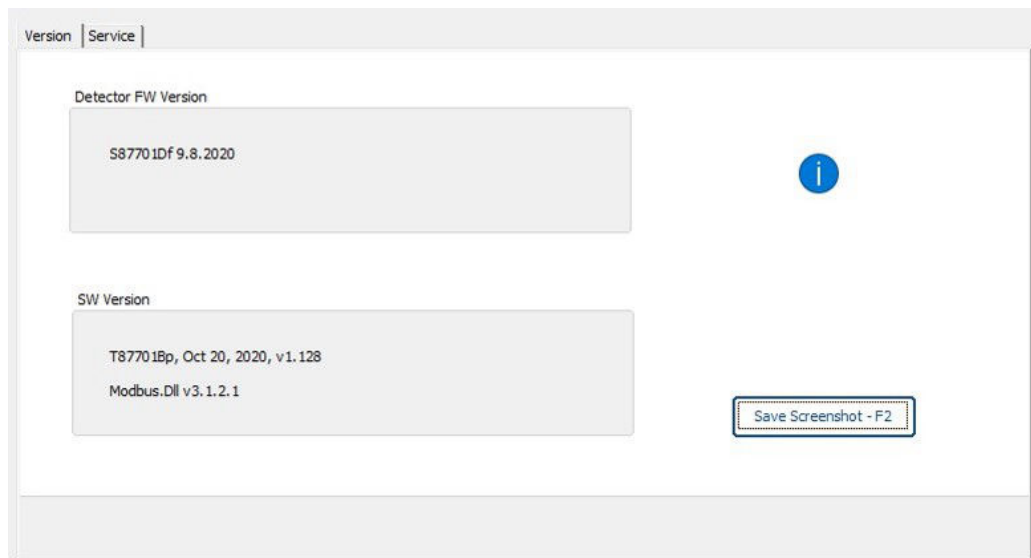
4.7   Service functions

This screen provides access to various service functions.
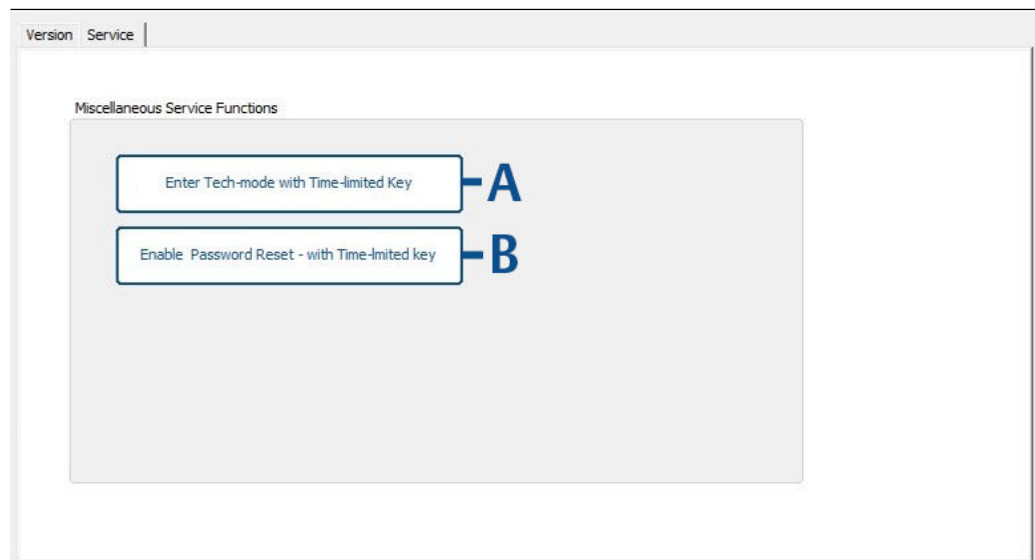
A. Enter time-limited password received from the manufacturer to enter tech-mode.
B. Enter time-limited password received from the manufacturer to reset password.

Note
If the application is closed after entering the password, a new password is required to re-enter tech mode or reset password.

A   Reference data

A.1   Ordering information, specifications, dimensional drawings, and installation drawings

To view current Rosemount 975 Series ordering information, specifications, and dimensional drawings, follow these steps:

Procedure

1. Go to Emerson.com/en-us/catalog/flame-detectors.
2. Select the appropriate product.
3. Scroll down to **Documents and Drawings**.
4. Select **DATA SHEETS & BULLETINS**.
5. Select the appropriate Product Data Sheet.

A.2   Product certifications

To view current Rosemount 975 Series product certifications, see Rosemount 975 Series Flame Detectors Certification Information.

A.3   Status codes

Rosemount 975 MR and HR Models

Status	Description	4-20 mA output	Analog output	Fault relay	LED indicator	Test rate
S90	Start up	1 mA	0 V	Open	4 Hz blinking orange	Every start-up
S91	Parameter restoration	1 mA	0 V	Open	4 Hz blinking orange	After parameters burning
S92	Restore from wrong voltage	1 mA	0 V	Open	4 Hz blinking orange	After wrong voltage
V81	Wrong 5 VOLT[1]	1 mA	0 V	Open	4 Hz blinking orange	Every 30msec
V82	Wrong 9 VOLT[1]	1 mA	0 V	Open	4 Hz blinking orange	Every 30msec
V83	Wrong vin[2]	1 mA	0 V	Open	4 Hz blinking orange	Every 30msec

Status	Description	4-20 mA output	Analog output	Fault relay	LED indicator	Test rate
P71	Program memory CRC failure	1 mA	0 V	Open	4 Hz blinking orange	At start-up
P72	Faulty parameters	1 mA	0 V	Open	4 Hz blinking orange	At start-up or upon setup/ parameters burning
P74	RAM CRC failure	1 mA	0 V	Open	4 Hz blinking orange	Every 30msec
P75	None of the parameters exist	1 mA	0 V	Open	4 Hz blinking orange	At start-up
P76	RAM parameters CRC failure	1 mA	0 V	Open	4 Hz blinking orange	Every hour
F31	Sensor 4.5μ circuit failure – no signal	1 mA	0 V	Open	4 Hz blinking orange	Auto/manual BIT
F32	Sensor 5μ circuit failure – no signal	1 mA	0 V	Open	4 Hz blinking orange	Auto/manual BIT
F33	Sensor 4μ, or 2.4μ for Hydrogen circuit failure – no signal	1 mA	0 V	Open	4 Hz blinking orange	Auto/manual BIT
F34	Sensor 4.4μ, or 3μ for Hydrogen circuit failure – no signal	1 mA	0 V	Open	4 Hz blinking orange	Auto/manual BIT
F38	Wrong AFE offset	1 mA	0 V	Open	4 Hz blinking orange	Every 30msec
F46	IR signal Amp stuck at one failure	1 mA	0 V	Open	4 Hz blinking orange	Every BIT
F47	Failure SPI COM with AFE	1 mA	0 V	Open	4 Hz blinking orange	Every 30msec
F48	AFE stuck at 1	1 mA	0 V	Open	4 Hz blinking orange	Every 30msec
F51	Sensor 4.5 noise	1 mA	0 V	Open	4 Hz blinking orange	Every 30msec
F52	Sensor 5 noise	1 mA	0 V	Open	4 Hz blinking orange	Every 30msec
F53	Sensor 4μ, or 2.4μ for Hydrogen noise	1 mA	0 V	Open	4 Hz blinking orange	Every 30msec

Status	Description	4-20 mA output	Analog output	Fault relay	LED indicator	Test rate
F54	Sensor 4.4µ, or 2.4µ for Hydrogen noise	1 mA	0 V	Open	4 Hz blinking orange	Every 30msec
F55	Sensor 4.5 and 5 short circuit	1 mA	0 V	Open	4 Hz blinking orange	Every BIT
F56	Sensor 4.5 and 4 short circuit	1 mA	0 V	Open	4 Hz blinking orange	Every BIT
F57	Sensor 4 and 5 short circuit	1 mA	0 V	Open	4 Hz blinking orange	Every BIT
F58	Sensor 4.4 and 4.55 short circuit	1 mA	0 V	Open	4 Hz blinking orange	Every BIT
F59	Sensor 4.4 and 4 short circuit	1 mA	0 V	Open	4 Hz blinking orange	Every BIT
F60	Sensor 4.5 and 5 short circuit	1 mA	0 V	Open	4 Hz blinking orange	Every BIT
N0	Normal	4 mA	2 V	Close	1Hz blinking green	Every 30msec
N1	Constant external BIT	4 mA	2 V	Close	4 Hz blinking orange	Every 30msec
N2	Wrong ambient temperature	4 mA	2 V	Close	4 Hz blinking orange	Every 30msec
N3	4-20mA circuit failure	0 mA	2 V	Close	4 Hz blinking orange	Every 30msec
N4	Fault relay failure	4 mA	2 V	Open	4 Hz blinking orange	Every 30msec
N5	Accessory relay failure	4 mA	2 V	Open	4 Hz blinking orange	Every 30msec
N6	Alarm relay failure	4 mA	2 V	Open	4 Hz blinking orange	Every 30msec
N7	Heater failure	4 mA	2 V	Close	4 Hz blinking orange	Every 30msec
N8	BIT failure	2mA	0 V	Open	4 Hz blinking orange	Every BIT
N9	Damaged BIT lamp	2mA	0 V	Open	4 Hz blinking orange	Every BIT

Status	Description	4-20 mA output	Analog output	Fault relay	LED indicator	Test rate
N11	FOV failure	4 mA	2 V	Close	1 Hz blinking green	Every 30msec
N12	Missed ADC reading	4 mA	2 V	Close	1 Hz blinking green	Every 30msec
N13	Analog output failure	4 mA	0 V	Close	4 Hz blinking orange	Every 30msec
N18	FOV warning	4 mA	2 V	Close	1 Hz blinking green	Every 30msec
B0	Automatic BIT	4 mA	2 V	Close	1 Hz blinking green	Every BIT
M0	Manual BIT	4 mA	2 V	Close	1 Hz blinking green[3]	Every BIT
E0	End of BIT	4 mA	2 V	Close	1 Hz blinking green[3]	Every BIT
G0	Pre-alarm	4 mA	2 V	Close	1 Hz blinking green	Every 30msec
T0	Alarm delay	16 mA	2 V	Close	2 Hz blinking red	Every 30msec
W0	Warning	16 mA	2 V	Close	2 Hz blinking red	Every 30msec
A0	Alarm	20 mA	5 V	Close	Constant red	Every 30msec
L0	Latch	20 mA	5 V	Close	Constant red	Every 30msec
Z0	Post-alarm: Benzene	4 mA	2 V	Close	1 Hz blinking green	Every 30msec
J0	Anti-flare	[4]	2 V	Close	1 Hz blinking green	Every 30msec
X0	Explosion	20 mA	5 V	Close	Constant red	Every 0.23msec

(1)   *The detector turns to V81, V82 after two minutes.*
(2)   *The detector turns to V83 after 50 seconds.*
(3)   *Unless in Setup table define constant red.*
(4)   *4 mA if from state "N", 16mA if from state "T".*

Rosemount 975 UF and UR Models

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
S90	Start up	1 mA	0 V	Open	4 Hz blinking orange	Every start-up
S91	Parameter restoration	1 mA	0 V	Open	4 Hz blinking orange	After burning a new parameter
S92	Restore from wrong voltage	1 mA	0 V	Open	4 Hz blinking orange	After wrong voltage
V81	Wrong 5 VOLT[1]	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
V82	Wrong 9 VOLT[1]	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
V83	Wrong vin[2]	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
P71	Program memory CRC failure	1 mA	0 V	Open	4 Hz blinking orange	At start-up
P72	Faulty parameters	1 mA	0 V	Open	4 Hz blinking orange	At start-up or upon setup/ parameters burning
P74	RAM CRC failure	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
P75	None of the parameters exist	1 mA	0 V	Open	4 Hz blinking orange	At start-up
P76	RAM parameters CRC failure	1 mA	0 V	Open	4 Hz blinking orange	Every hour
F38	Wrong AFE offset	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
F41	Constant UV	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
F42	Noisy UV	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
F43	UV high voltage failure	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
F44	IR sensor failure – no signal	1 mA	0 V	Open	4 Hz blinking orange	Auto/manual BIT

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
F45	IR circuit shortcut failure	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
F46	IR signal Amp stuck at one failure	1 mA	0 V	Open	4 Hz blinking orange	Auto/manual BIT
F47	Constant IR signal	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
F48	UV pulse stuck at 1	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
F49	Digi pot failure	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
F51	UV tube broken/ constant UV pulse	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
F52	AFE (Analog Front End) failure	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
F53	Bad SPI COM	1 mA	0 V	Open	4 Hz blinking orange	Every 30 msec
N0	Normal	4 mA	2 V	Close	1Hz blinking green	Every 30 msec
N1	Constant external BIT	4 mA	2 V	Close	4 Hz blinking orange	Every 30 msec
N2	Wrong ambient temperature	4 mA	2 V	Close	4 Hz blinking orange	Every 30 msec
N3	4-20mA circuit failure	0 mA	2 V	Close	4 Hz blinking orange	Every 30 msec
N4	Fault relay failure	4 mA	2 V	Open	4 Hz blinking orange	Every 30 msec
N5	Accessory relay failure	4 mA	2 V	Open	4 Hz blinking orange	Every 30 msec
N6	Alarm relay failure	4 mA	2 V	Open	4 Hz blinking orange	Every 30 msec
N7	Heater failure	4 mA	2 V	Close	4 Hz blinking orange	Every 30 msec
N8	IR or UV BIT failure	2mA	0 V	Open	4 Hz blinking orange	Every BIT

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
N9	Lamp BIT failure	2mA	0 V	Open	4 Hz blinking orange	Every BIT
N10	UV LED failure	3mA	0 V	Open	4 Hz blinking orange	Every BIT
N11	FOV failure	4 mA	2 V	Close	4 Hz blinking green	Every 30 msec
N12	Missed ADC reading	4 mA	2 V	Close	1Hz blinking green	Every 30 msec
N13	Analog output failure	4 mA	0 V	Close	4 Hz blinking orange	Every 30 msec
N18	FOV warning	4 mA	2 V	Close	1 Hz blinking green	Every 30 msec
I0	IR level	8mA	2 V	Close	1 Hz blinking green	Every 30 msec
U0	UV level	12mA	2 V	Close	1 Hz blinking green	Every 30 msec
B0	IR/UV automatic BIT	4 mA	2 V	Close	1 Hz blinking green	Every IR BIT
M0	IR/UV manual BIT	4 mA	2 V	Close	1 Hz blinking green[3]	Every IR BIT
E0	IR/UV end of BIT	4 mA	2 V	Close	1 Hz blinking green[3]	Every IR BIT
G0	Temperature gradient	4 mA	2 V	Close	1 Hz blinking green	Every 30 msec
T0	Alarm delay	16mA	2 V	Close	2 Hz blinking red	Every 30msec
W0	Warning	16mA	2 V	Close	2 Hz blinking red	Every 30 msec
A0	Alarm	20mA	5 V	Close	Constant red	Every 30 msec
L0	Latch	20mA	5 V	Close	Constant red	Every 30 msec
Z0	Benzene	4 mA	2 V	Close	1 Hz blinking green	Every 30 msec
J0	Anti-flare	[4]	2 V	Close	1 Hz blinking green	Every 30 msec

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
X0	Explosion	20mA	5 V	Close	Constant red	Every 0.23 msec

B Configurable options

B.1 Rosemount 975 options

This section contains values for configurable options. Asterisks (*) indicate default values unless otherwise noted.

Option	Model			
	975MR	**975HR**	**975UF**	**975UR**
Detection sensitivity	• 3 m • 15 m • 30 m* • 45 m • 65 m • 90 m		• 3 m • 15 m • 28 m*	
Alarm delay (in seconds)	• 0 • A (Anti-flare)* • 3 • 5 • 10 • 15 • 20 • 30			
Alarm latching	• Yes • No*			
Heated optics	• Constantly on • Constantly off • Auto on: 32 °F (0 °C) • Auto on: 41 °F (5 °C)* • Auto on: 50 °F (10 °C) • Auto on: 59 °F (15 °C) • Auto on: 68 °F (20 °C) • Auto on: 77 °F (25 °C) • Auto on: 86 °F (30 °C)			
Heated power	• Low • High*			
Alarm relay on successful manual BIT	• Yes • No*			

Option	Model			
	975MR	**975HR**	**975UF**	**975UR**
Accessory relay on successful manual BIT	• Yes • No*			
Post manual BIT indication duration (in seconds)	3–60 Default value: 3			
Enable automatic BIT	• Yes* • No			
Fault count	0–10 Default value: 3			
Bit interval (in minutes)	1–60 Default value: 15			
Detection options	• Standard* • Fast • Explosion		• Standard* • Fast • Explosion • IR only • UV only • UV/IR*	
Accessory relay options	• Disabled* • Accessory relay on warning • Accessory relay as EOL • Accessory relay as FOV • FOV integrity			
Lock option	• Not locked* • Locked			
4-20mA settings				
Fault	• 0 • 1*			
BIT fault	2*			
Normal	• 4* • 5			
Warning	• 16* • Custom			
Alarm	• 20* • Custom			
FOV	• 3 • 4* • 5			

ROSEMOUNT™

EMERSON.