

Spectrex™ SharpEye™ 40/40C and D Series Flame Detectors

Modbus® Manager Manual



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Abbreviations and acronyms

Abbreviation or acronym	Definition
ATEX	Atmospheric explosives

Abbreviation or acronym	Definition
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
RS485	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

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1 Introduction

1.1 Product overview

Modbus[®] Manager is a customized software based on Modbus protocol over RS485, used to configure the device to suit the customer needs, perform firmware upgrades and provide troubleshooting information and functionality.

This guide 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 Spectrex SharpEye[™] 40/40C and 40/40D 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
- 2GB RAM
- 10GB 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

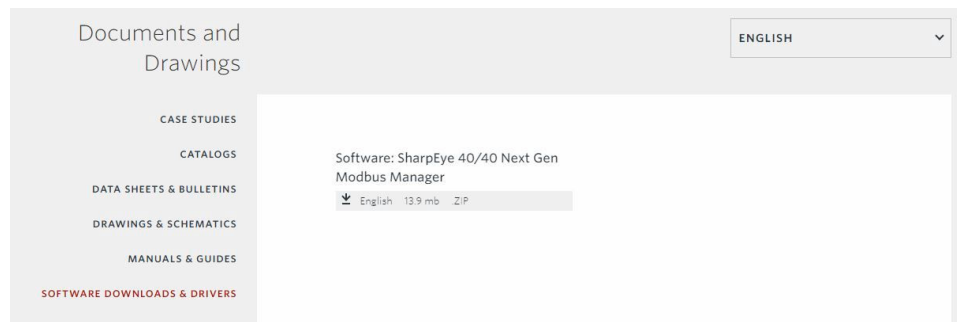
2 Initial setup

2.1 Download software

To download the Modbus[®] Manager, follow these steps:

Procedure

1. Go to [Spectrex.net](https://www.spectrex.net).
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 Running the 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 computer to the device

Prerequisites

The computer must first be connected to the device using the RS485 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 device to 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 (-).

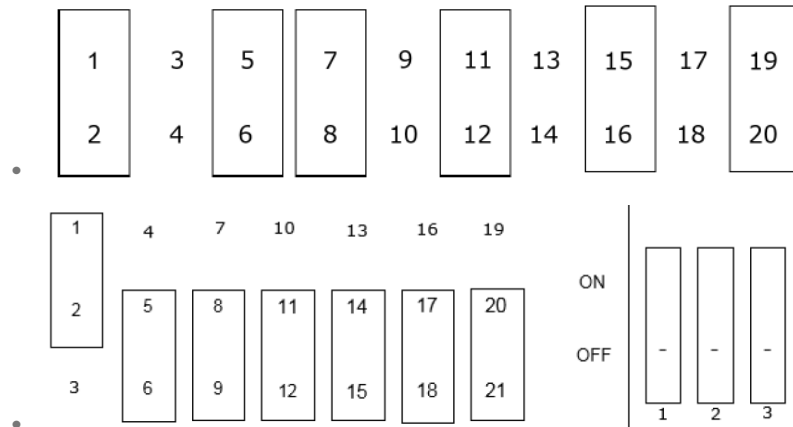
2.5 Set up USB adapter

⚠ CAUTION

Check that the D-connector adapter wiring is similar to the wiring shown (if not, adjust the cable wiring to fit the desired adapter).

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.

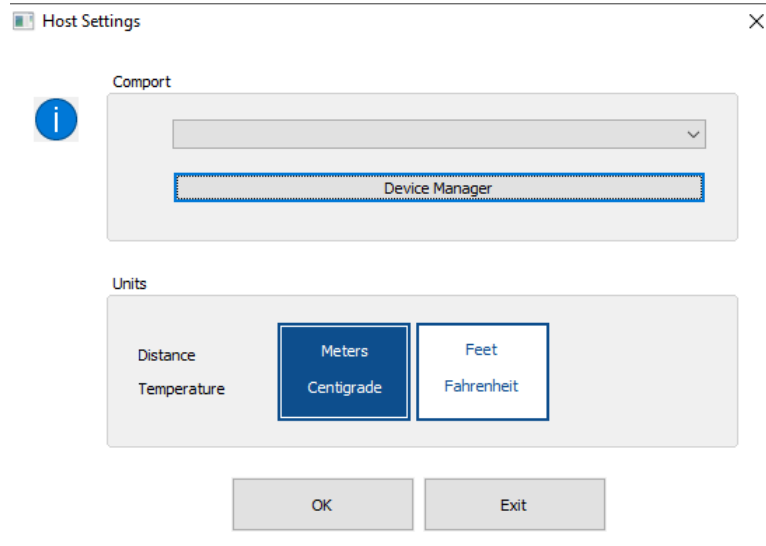
2.6 Establish the COM port

Prerequisites

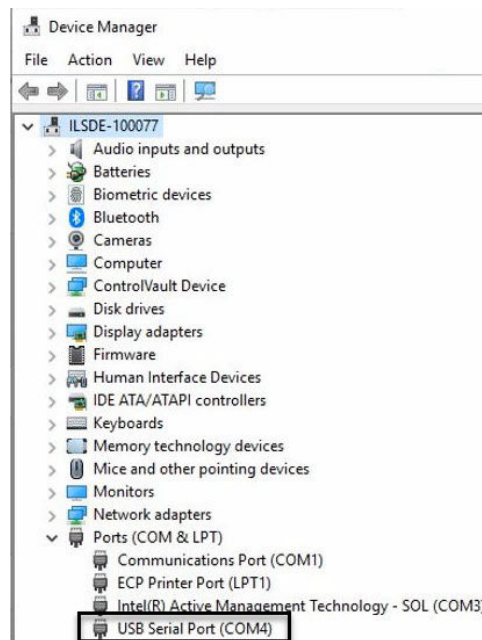
When first connecting the harness, you will be prompted to select a COM port.

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 among computers).
5. From the **Comport** dropdown, select the relevant COM port.
6. Click the **OK** button.

2.7 Connecting the device

The device must be connected to power and the RS485 should be connected to the terminals according to the following table:

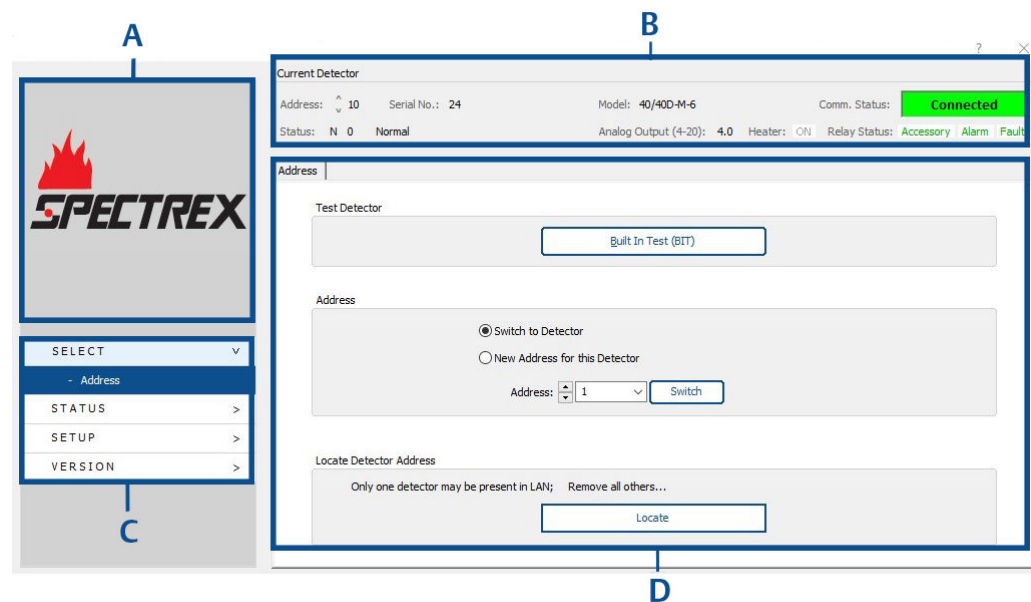
Function	Wire color	Terminal
RS485 (+)	Red	13
RS485 (-)	Black	14

3 Operation

3.1 Screen overview

Main screen

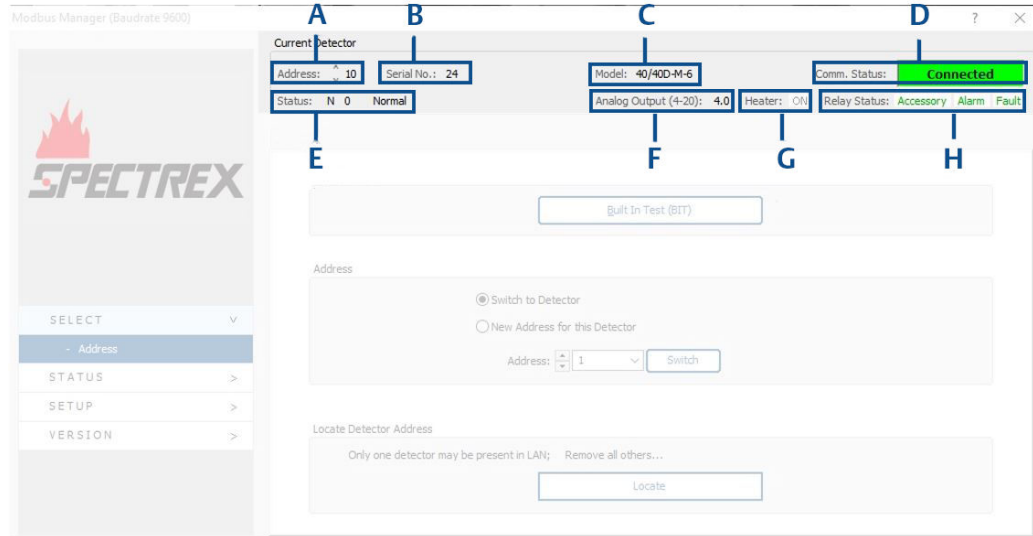
The left menu and top bar display on every screen. The left menu displays the brand name and navigation controls; the top bar displays device information.



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

Top bar

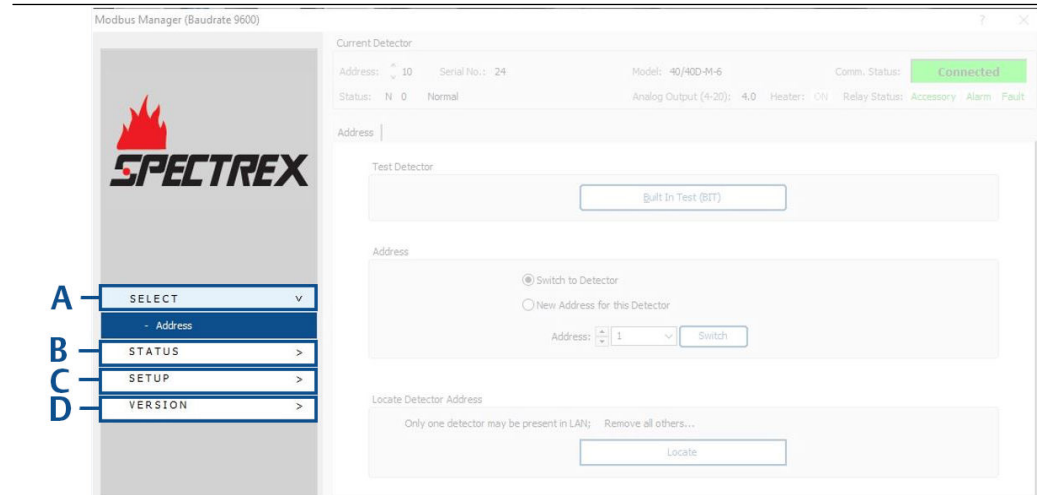
The top bar contains information about the connected detector and appears on every screen.



- 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 ACC, energized for fault; red indicates energized state for alarm and ACC, de-energized for fault).

Left menu

The left menu contains navigation information and the main sections are viewed on each page. Subitems of the selected item are visible.



- A. Device information
- B. Device status
- C. Device setup
- D. Device and software version

3.2 Perform manual BIT

Procedure

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

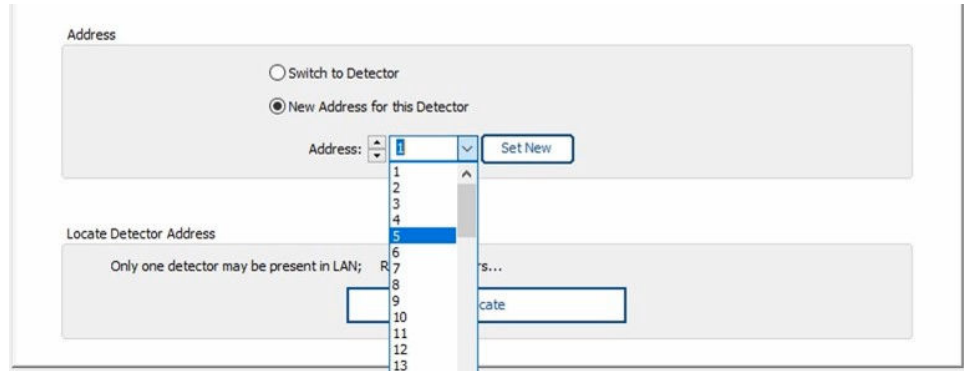
Note

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

3.3 Assign address to device

Procedure

1. In the **Address** pane, select the **New Address for the Detector** radio button.



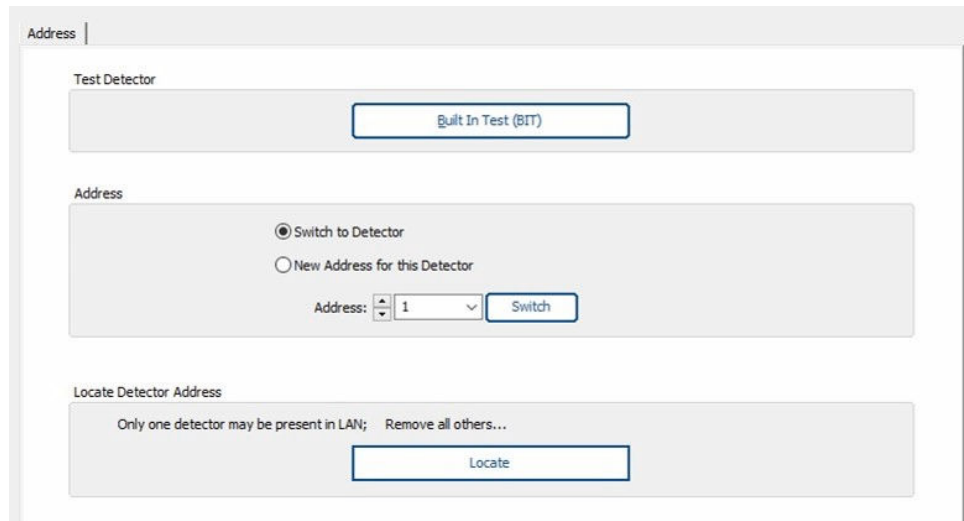
The screenshot shows the 'Address' pane with two radio buttons: 'Switch to Detector' (unselected) and 'New Address for this Detector' (selected). Below the radio buttons is an 'Address:' dropdown menu with a list of addresses from 1 to 13. The 'Set New' button is to the right of the dropdown. Below the dropdown is a 'Locate Detector Address' section with a warning message 'Only one detector may be present in LAN;' and a 'Locate' button.

2. Use the **Address** dropdown to select the required address or enter the address in the dropdown 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.



The screenshot shows the 'Address' pane with two radio buttons: 'Switch to Detector' (selected) and 'New Address for this Detector' (unselected). Below the radio buttons is an 'Address:' dropdown menu with the value '1' selected. The 'Switch' button is to the right of the dropdown. Below the dropdown is a 'Locate Detector Address' section with a warning message 'Only one detector may be present in LAN; Remove all others...' and a 'Locate' button.

2. Use the **Address** dropdown to select the required address.
3. Click the **Switch** button.

Note

The detector address set by the factory is '1'. When locating the detector address, only one detector should be connected.

Note

Alternatively, the up and down arrows can be used to switch the address without clicking the **Switch** button.

3.5 Locating the detector address

If the detector address is not shown in the top menu or is not communicating, its address can be located by clicking the **Locate** button within the *Locate Detector Address* pane.

The screenshot shows a software interface with a tab labeled 'Address'. Below the tab are three distinct sections. The top section, 'Test Detector', contains a button labeled 'Built In Test (BIT)'. The middle section, 'Address', features two radio buttons: 'Switch to Detector' (which is selected) and 'New Address for this Detector'. Below the radio buttons is a dropdown menu for 'Address' with the value '1' and a 'Switch' button. The bottom section, 'Locate Detector Address', displays the text 'Only one detector may be present in LAN; Remove all others...' and a 'Locate' button.

Once communication is established, the current detector address will be shown in the top menu.

Note

The *Locate* function requires that just a single detector be present in the RS485 LAN.

3.6 Status tab

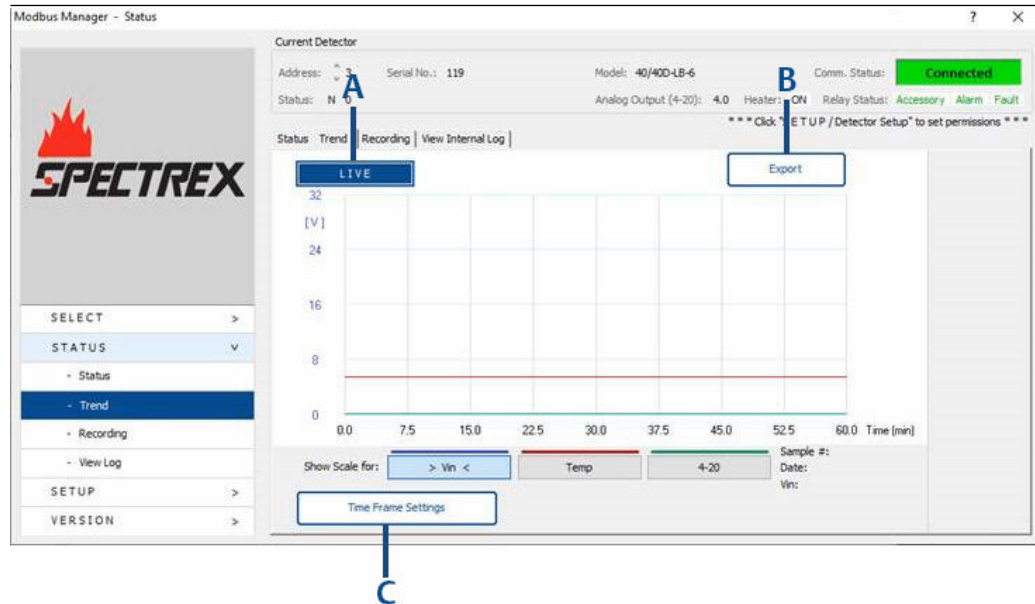
This tab displays the device status for the currently selected detector.



- 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 BIT

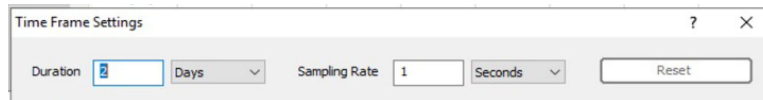
3.7 Trend screen

This screen shows the input voltage, internal temperature, and analog output live trends according to the selected timeframe.



- A. Displays all recorded data according to timeframe settings
- B. Exports all data as ".txt" file
- C. Opens timeframe settings

The timeframe settings can be adjusted by selecting the required values and clicking the **Reset** button.



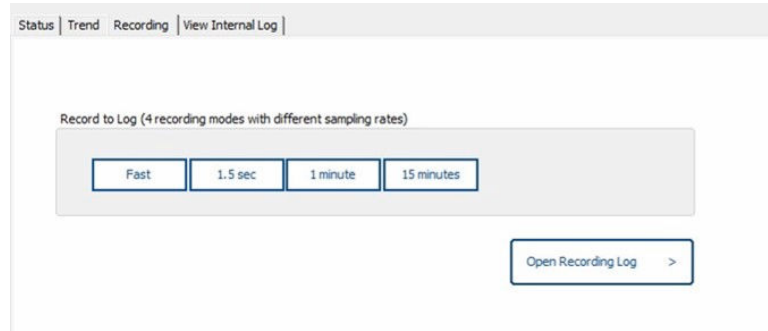
3.8 Recording screen

This screen allows data from detector currently connected to be recorded and exported into a ".txt" or ".xls" file.

3.8.1 Record data

Procedure

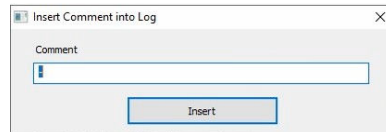
1. Select the required recording mode.



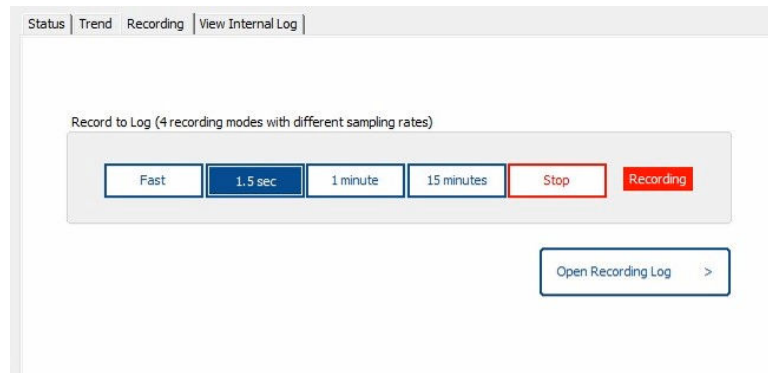
Note

The **Fast** mode provides recording at the best possible polling rate – around three records per second.

2. Enter a comment and click the **Insert** button.



3. To end the recording, click the **Stop** button.



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”. SharpEye 40/40-I and M file names are **QuadIRlog_YMDHMS** (Year, Month, Date, Hours, Minute, Second). SharpEye 40/40-LB and L4B file names are prefaced with **UVIRlog_YMDHMS** (Year, Month, Date, Hours, Minute, Second).

The time stamp is according to GMT.

3.8.2 View internal log

The log displays the 12 most recent records without scrolling.

Procedure

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

The screenshot shows the 'Current Detector' interface. At the top, it displays device information: Address: 1, Serial No.: 24, Model: 40/40D-M-6, and Comm. Status: Connected. Below this is a table with columns: #, Record, Operating Time, Voltage, 4-20, Status, Temp [°C], sum45, and sum5. The table contains 12 records. Below the table are several control buttons: 'Get', 'Page Up', 'Page Down', 'Line Up', 'Line Down', and 'Open Last'. A dropdown menu next to the 'Get' button is set to '12 records up to current position'. A 'Detector Operating Time' field shows '9 days, 14:39:58'. Blue labels A through G are overlaid on the image to identify key UI elements.

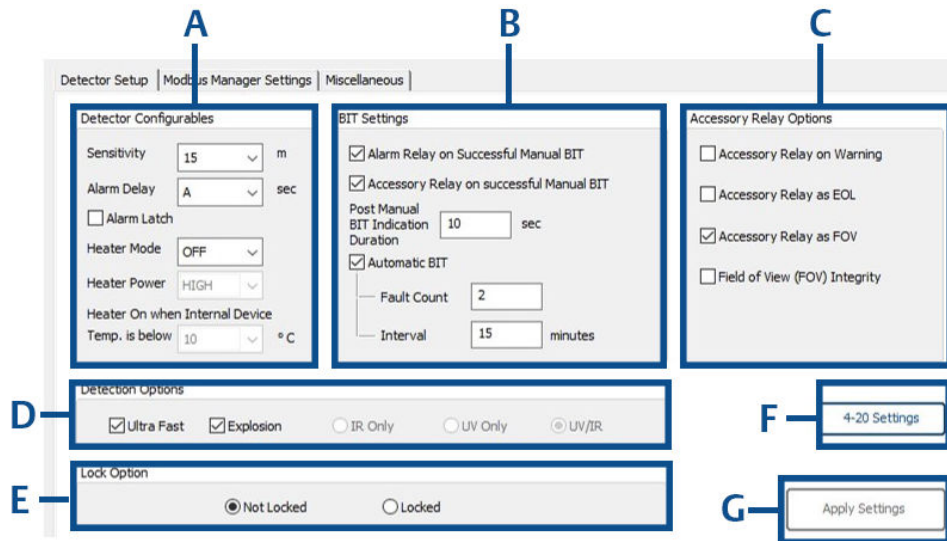
- A. Displays records according to selection in the **records up to current position** field
- B. Scrolls up by page
- C. Scrolls down by page
- D. Scrolls up by line
- E. Re-read by line
- F. Select which records will be displayed when clicking **Get** button
- G. Opens selected number of most recent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

3.9 Detector setup tab

The detector is setup using the **Detector Setup** screen, in which configurable options, BIT settings, Accessory Relay Options, Detection Options, Lock Option, and 4-20 Settings can be changed.

Note

4-20mA settings – for fault mode, the default indication is 1mA, but may be changed to 0mA. A 4-20mA mode of 0mA is incompatible with HART® communication.



- A. Detector configurable settings
- B. BIT settings
- C. Accessory relay options
- D. Detection options
- E. Lock option
- F. 4-20 settings
- G. Click to save any changes made, becomes clickable once any setting has been changed

Note

Any unavailable options will be grayed out depending on specific detector model connected.

3.9.1 Detector configurable settings

These detector parameters may be configured.

- 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**, **20**, **30**, or **A** (anti-flare).
Default: A
- Heater power** Choose from high or low power (Spectrex 40/40D models only).
Default: High power

Heater on temperature	Temperature at which the demister is activated, if the heat mode is set to <i>Auto</i> . Default: 5 °C
Enable alarm latch	When selected, the alarm remains on even when the signal abates. Default: Not enabled

3.9.2 BIT settings

These BIT settings may be configured.

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

These options may be changed as described.

Activate accessory relay on warning	When the detector's status is warning, the accessory relay is activated. Default: Not enabled
Accessory relay as EOL	When selected, the accessory relay is activated. Default: Not enabled
Accessory relay as FOV	When selected, the accessory relay is activated where FOV fault is detected. ⁽¹⁾ 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. ⁽¹⁾ 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 (i.e. 3, 4, or 5mA) to indicate the change
- Accessory relay—select the accessory relay activation for FOV integrity change

Important

The FOV integrity should be enabled after the detector is installed and its positioning is finalized.

3.9.4 Detection options

The type of detection can be determined using this section with the following parameters.⁽²⁾

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

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

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

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

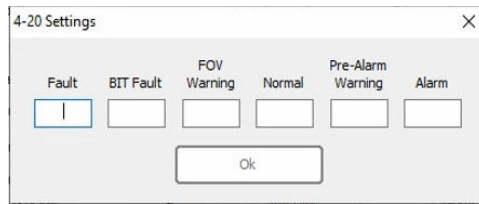
Once locked, the actions can be activated only when entering the correct password. The manufacturer will provide a time-limited password on authorized demand within five business days.

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 1mA (if 0 is selected there will be no HART® communication)
Default: 1mA
- BIT fault** Fixed value, cannot be changed
- FOV warning** 3 – 5mA (must be ≤ the normal value)⁽³⁾

	Default: 4mA
Normal	4 or 5mA (must be \geq the FOV value) Default: 4mA
Pre-alarm warning	13 – 16mA (must be lower than alarm value) Default: 16mA
Alarm	15 – 20mA (must be higher than warning) Default: 20mA



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

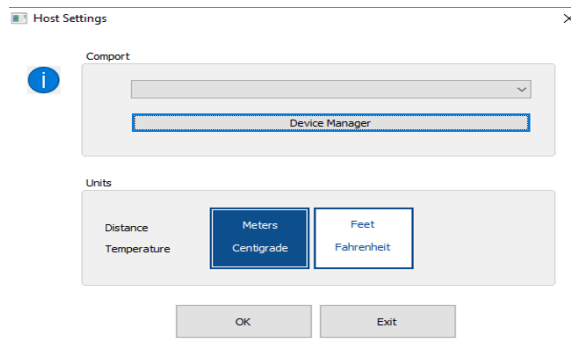
The **Modbus Manager Settings** screen is used to change COM port and the units throughout the software.

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 imperial) in which all measurements are displayed.



Note

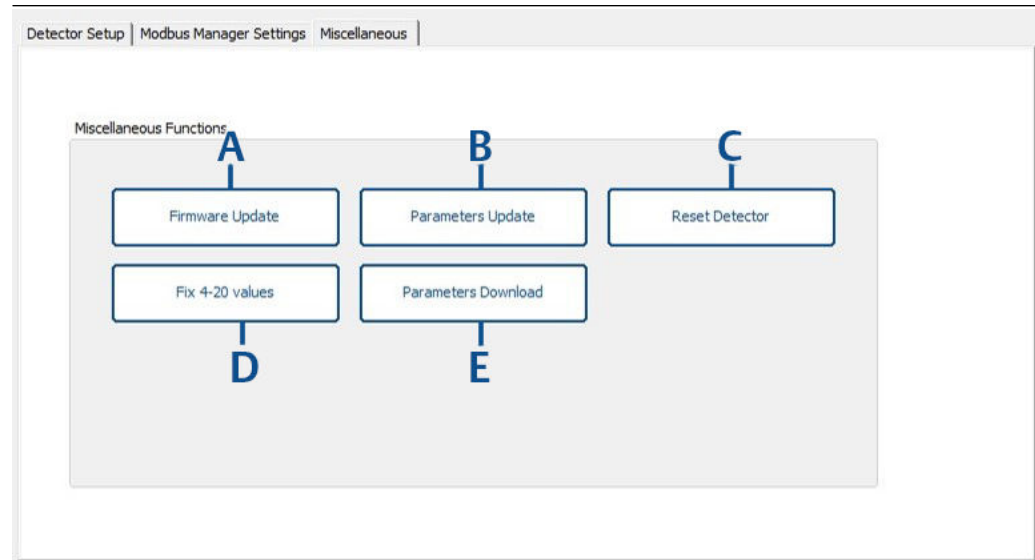
The application automatically restarts when the COM port is changed.

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

4 Maintenance

4.1 Miscellaneous functions

This screen provides access to various maintenance functions.



- 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 $\pm 0.05\text{mA}$, the 4-20mA output can be fixed to match the reading indicated on the customer's multimeter. The reading can be adjusted within $\pm 0.05\text{mA}$.

4-20 Scale Calibration

1. 4 mA 2. 20 mA Set Fixed Current

Multimeter Reading (mA): Apply

Burn

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 $4\text{mA} \pm 0.05$.

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 $20\text{mA} \pm 0.5$.

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.

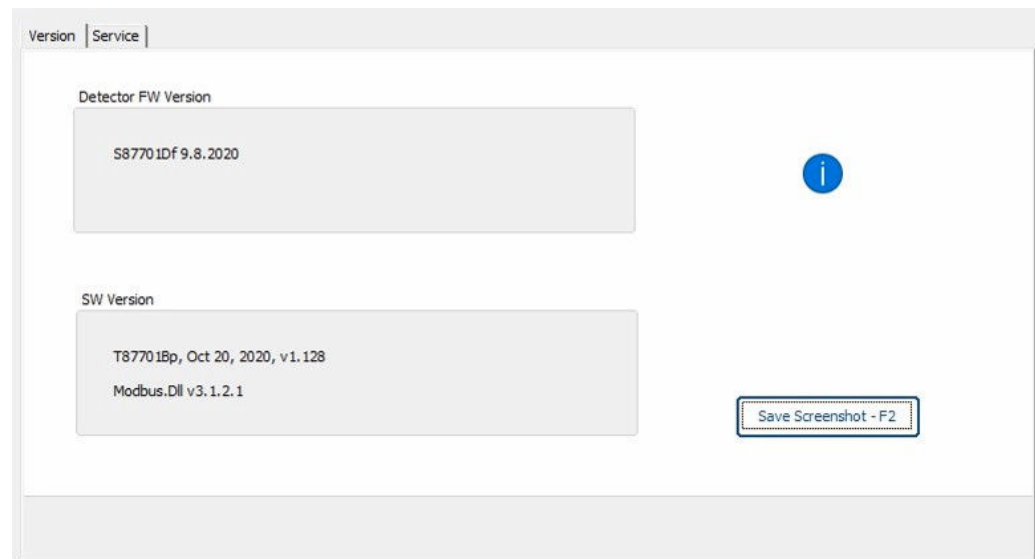
4.5 Parameter download

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.

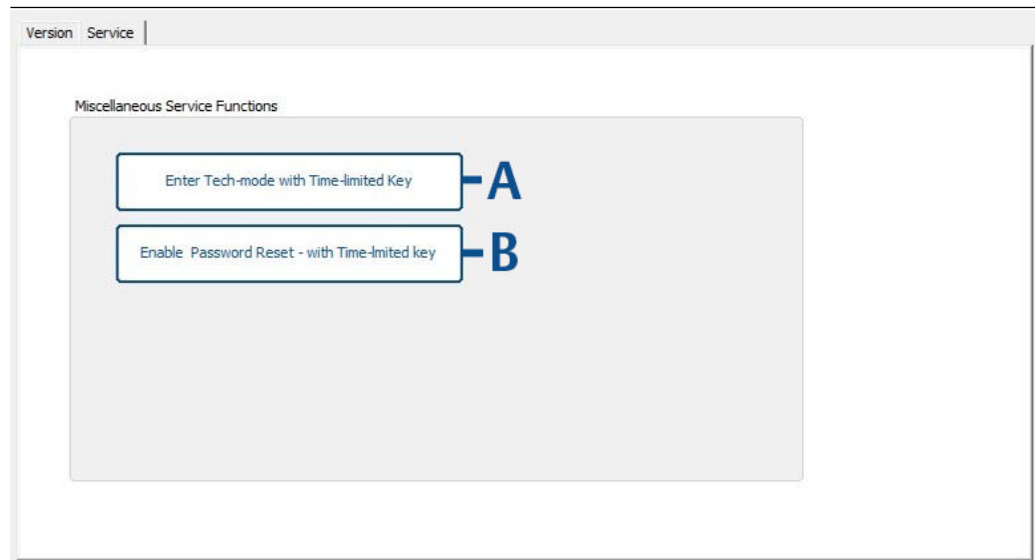
4.6 Version information

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, and dimensional drawings

To view current SharpEye 40/40 Series ordering information, specifications, and dimensional drawings, follow these steps:

Procedure

1. Go to Spectrex.net/en-us/flame-gas-detectors-flame-detectors-40-40-series.
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 and installation drawings

To view current SharpEye 40/40 Series product certifications and installation drawings, follow these steps:

Procedure

1. Go to Spectrex.net/en-us/flame-gas-detectors-flame-detectors-40-40-series.
2. Select the appropriate product.
3. Scroll down to *Documents and Drawings*.
4. Select CERTIFICATES & APPROVALS.
5. Select the appropriate document.

A.3 Status codes

SharpEye 40/40 C-I, C-M, D-I, and D-M Models

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
S90	Start up	1mA	0v	Open	4Hz blinking orange	Every start-up
S91	Parameter restoration	1mA	0v	Open	4Hz blinking orange	After parameters burning

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
S92	Restore from wrong voltage	1mA	0v	Open	4Hz blinking orange	After wrong voltage
V81	Wrong 5 VOLT ⁽¹⁾	1mA	0v	Open	4Hz blinking orange	Every 30msec
V82	Wrong 9 VOLT ⁽¹⁾	1mA	0v	Open	4Hz blinking orange	Every 30msec
V83	Wrong vin ⁽²⁾	1mA	0v	Open	4Hz blinking orange	Every 30msec
P71	Program memory CRC failure	1mA	0v	Open	4Hz blinking orange	At start-up
P72	Faulty parameters	1mA	0v	Open	4Hz blinking orange	At start-up or upon setup/ parameters burning
P74	RAM CRC failure	1mA	0v	Open	4Hz blinking orange	Every 30msec
P75	None of the parameters exist	1mA	0v	Open	4Hz blinking orange	At start-up
P76	RAM parameters CRC failure	1mA	0v	Open	4Hz blinking orange	Every hour
F31	Sensor 4.5 μ circuit failure – no signal	1mA	0v	Open	4Hz blinking orange	Auto/manual BIT
F32	Sensor 5 μ circuit failure – no signal	1mA	0v	Open	4Hz blinking orange	Auto/manual BIT
F33	Sensor 4 μ , or 2.4 μ for Hydrogen circuit failure – no signal	1mA	0v	Open	4Hz blinking orange	Auto/manual BIT
F34	Sensor 4.4 μ , or 3 μ for Hydrogen circuit failure – no signal	1mA	0v	Open	4Hz blinking orange	Auto/manual BIT
F38	Wrong AFE offset	1mA	0v	Open	4Hz blinking orange	Every 30msec

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
F46	IR signal Amp stuck at one failure	1mA	0v	Open	4Hz blinking orange	Every BIT
F47	Failure SPI COM with AFE	1mA	0v	Open	4Hz blinking orange	Every 30msec
F48	AFE stuck at 1	1mA	0v	Open	4Hz blinking orange	Every 30msec
F51	Sensor 4.5 noise	1mA	0v	Open	4Hz blinking orange	Every 30msec
F52	Sensor 5 noise	1mA	0v	Open	4Hz blinking orange	Every 30msec
F53	Sensor 4 μ , or 2.4 μ for Hydrogen noise	1mA	0v	Open	4Hz blinking orange	Every 30msec
F54	Sensor 4.4 μ , or 2.4 μ for Hydrogen noise	1mA	0v	Open	4Hz blinking orange	Every 30msec
F55	Sensor 4.5 and 5 short circuit	1mA	0v	Open	4Hz blinking orange	Every BIT
F56	Sensor 4.5 and 4 short circuit	1mA	0v	Open	4Hz blinking orange	Every BIT
F57	Sensor 4 and 5 short circuit	1mA	0v	Open	4Hz blinking orange	Every BIT
F58	Sensor 4.4 and 4.55 short circuit	1mA	0v	Open	4Hz blinking orange	Every BIT
F59	Sensor 4.4 and 4 short circuit	1mA	0v	Open	4Hz blinking orange	Every BIT
F60	Sensor 4.5 and 5 short circuit	1mA	0v	Open	4Hz blinking orange	Every BIT
N0	Normal	4mA	2v	Close	1Hz blinking green	Every 30msec
N1	Constant external BIT	4mA	2v	Close	4Hz blinking orange	Every 30msec

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
N2	Wrong ambient temperature	4mA	2v	Close	4Hz blinking orange	Every 30msec
N3	4-20mA circuit failure	0 mA	2v	Close	4Hz blinking orange	Every 30msec
N4	Fault relay failure	4mA	2v	Open	4Hz blinking orange	Every 30msec
N5	Accessory relay failure	4mA	2v	Open	4Hz blinking orange	Every 30msec
N6	Alarm relay failure	4mA	2v	Open	4Hz blinking orange	Every 30msec
N7	Heater failure	4mA	2v	Close	4Hz blinking orange	Every 30msec
N8	BIT failure	2mA	0v	Open	4Hz blinking orange	Every BIT
N9	Damaged BIT lamp	2mA	0v	Open	4Hz blinking orange	Every BIT
N11	FOV failure	4mA	2v	Close	1Hz blinking green	Every 30msec
N12	Missed ADC reading	4mA	2v	Close	1Hz blinking green	Every 30msec
N13	Analog output failure	4mA	0v	Close	4Hz blinking orange	Every 30msec
N18	FOV warning	4mA	2v	Close	1Hz blinking green	Every 30msec
B0	Automatic BIT	4mA	2v	Close	1Hz blinking green	Every BIT
M0	Manual BIT	4mA	2v	Close	1Hz blinking green ⁽³⁾	Every BIT
E0	End of BIT	4mA	2v	Close	1Hz blinking green ⁽³⁾	Every BIT

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
G0	Pre-alarm	4mA	2v	Close	1Hz blinking green	Every 30msec
T0	Alarm delay	16mA	2v	Close	2Hz blinking red	Every 30msec
W0	Warning	16mA	2v	Close	2Hz blinking red	Every 30msec
A0	Alarm	20mA	5v	Close	Constant red	Every 30msec
L0	Latch	20mA	5v	Close	Constant red	Every 30msec
Z0	Post-alarm: Benzene	4mA	2v	Close	1Hz blinking green	Every 30msec
J0	Anti-flare	(4)	2v	Close	1Hz blinking green	Every 30msec
X0	Explosion	20mA	5v	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) 4mA if from state "N", 16mA if from state "T".

SharpEye 40/40 -C-LB, C-L4B, D-LB, and D-L4B Models

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
S90	Start up	1mA	0v	Open	4Hz blinking orange	Every start-up
S91	Parameter restoration	1mA	0v	Open	4Hz blinking orange	After burning a new parameter
S92	Restore from wrong voltage	1mA	0v	Open	4Hz blinking orange	After wrong voltage
V81	Wrong 5 VOLT ⁽¹⁾	1mA	0v	Open	4Hz blinking orange	Every 30msec
V82	Wrong 9 VOLT ⁽¹⁾	1mA	0v	Open	4Hz blinking orange	Every 30msec

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
V83	Wrong vin ⁽²⁾	1mA	0v	Open	4Hz blinking orange	Every 30msec
P71	Program memory CRC failure	1mA	0v	Open	4Hz blinking orange	At start-up
P72	Faulty parameters	1mA	0v	Open	4Hz blinking orange	At start-up or upon setup/ parameters burning
P74	RAM CRC failure	1mA	0v	Open	4Hz blinking orange	Every 30msec
P75	None of the parameters exist	1mA	0v	Open	4Hz blinking orange	At start-up
P76	RAM parameters CRC failure	1mA	0v	Open	4Hz blinking orange	Every hour
F38	Wrong AFE offset	1mA	0v	Open	4Hz blinking orange	Every 30msec
F41	Constant UV	1mA	0v	Open	4Hz blinking orange	Every 30msec
F42	Noisy UV	1mA	0v	Open	4Hz blinking orange	Every 30msec
F43	UV high voltage failure	1mA	0v	Open	4Hz blinking orange	Every 30msec
F44	IR sensor failure – no signal	1mA	0v	Open	4Hz blinking orange	Auto/manual BIT
F45	IR circuit shortcut failure	1mA	0v	Open	4Hz blinking orange	Every 30msec
F46	IR signal Amp stuck at one failure	1mA	0v	Open	4Hz blinking orange	Auto/manual BIT
F47	Constant IR signal	1mA	0v	Open	4Hz blinking orange	Every 30msec

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
F48	UV pulse stuck at 1	1mA	0v	Open	4Hz blinking orange	Every 30msec
F49	Digi pot failure	1mA	0v	Open	4Hz blinking orange	Every 30msec
F51	UV tube broken/ constant UV pulse	1mA	0v	Open	4Hz blinking orange	Every 30msec
F52	AFE (Analog Front End) failure	1mA	0v	Open	4Hz blinking orange	Every 30msec
F53	Bad SPI COM	1mA	0v	Open	4Hz blinking orange	Every 30msec
N0	Normal	4mA	2v	Close	1Hz blinking green	Every 30msec
N1	Constant external BIT	4mA	2v	Close	4Hz blinking orange	Every 30msec
N2	Wrong ambient temperature	4mA	2v	Close	4Hz blinking orange	Every 30msec
N3	4-20mA circuit failure	0 mA	2v	Close	4Hz blinking orange	Every 30msec
N4	Fault relay failure	4mA	2v	Open	4Hz blinking orange	Every 30msec
N5	Accessory relay failure	4mA	2v	Open	4Hz blinking orange	Every 30msec
N6	Alarm relay failure	4mA	2v	Open	4Hz blinking orange	Every 30msec
N7	Heater failure	4mA	2v	Close	4Hz blinking orange	Every 30msec
N8	IR or UV BIT failure	2mA	0v	Open	4Hz blinking orange	Every BIT
N9	Lamp BIT failure	2mA	0v	Open	4Hz blinking orange	Every BIT

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

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
J0	Anti-flare	(4)	2v	Close	1Hz blinking green	Every 30msec
X0	Explosion	20mA	5v	Close	Constant red	Every 0.23msec

B Configurable options

B.1 SharpEye 40/40C options

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

Option	SharpEye model			
	40/40C-I	40/40C-M	40/40C-LB	40/40C-L4B
Detection sensitivity	<ul style="list-style-type: none"> • 3m • 15m • 30m* • 45m • 65m 		<ul style="list-style-type: none"> • 3m • 15m* 	<ul style="list-style-type: none"> • 3m • 15m • 28m*
Alarm delay (in seconds)	<ul style="list-style-type: none"> • 0 • A (Anti-flare)* • 3 • 5 • 10 • 15 • 20 • 30 			
Alarm latching	<ul style="list-style-type: none"> • Yes • No* 			
Heated optics	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Low • High* 			

Option	SharpEye model			
	40/40C-I	40/40C-M	40/40C-LB	40/40C-L4B
Alarm relay on successful manual BIT	<ul style="list-style-type: none"> • Yes • No* 			
Accessory relay on successful manual BIT	<ul style="list-style-type: none"> • Yes • No* 			
Post manual BIT indication duration (in seconds)	3–60 Default value: 3			
Enable automatic BIT	<ul style="list-style-type: none"> • Yes* • No 			
Fault count	0–10 Default value: 3			
Bit interval (in minutes)	1–60 Default value: 15			
Accessory relay options	<ul style="list-style-type: none"> • Disabled* • Accessory relay on warning • Accessory relay as EOL 			
Lock option	<ul style="list-style-type: none"> • Not locked* • Locked 			
4-20mA settings				
Fault	<ul style="list-style-type: none"> • 0 • 1* 			
BIT fault	2*			
Normal	<ul style="list-style-type: none"> • 4* • 5 			
Warning	<ul style="list-style-type: none"> • 16* • Custom 			
Alarm	<ul style="list-style-type: none"> • 20* • Custom 			

B.2 SharpEye 40/40D options

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

Option	SharpEye model			
	40/40D-I	40/40D-M	40/40D-LB	40/40D-L4B
Detection sensitivity	<ul style="list-style-type: none"> • 3m • 15m • 30m* • 45m • 65m • 90m 		<ul style="list-style-type: none"> • 3m • 15m • 28m* 	
Alarm delay (in seconds)	<ul style="list-style-type: none"> • 0 • A (Anti-flare)* • 3 • 5 • 10 • 15 • 20 • 30 			
Alarm latching	<ul style="list-style-type: none"> • Yes • No* 			
Heated optics	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Low • High* 			
Alarm relay on successful manual BIT	<ul style="list-style-type: none"> • Yes • No* 			

Option	SharpEye model			
	40/40D-I	40/40D-M	40/40D-LB	40/40D-L4B
Accessory relay on successful manual BIT	<ul style="list-style-type: none"> • Yes • No* 			
Post manual BIT indication duration (in seconds)	3–60 Default value: 3			
Enable automatic BIT	<ul style="list-style-type: none"> • Yes* • No 			
Fault count	0–10 Default value: 3			
Bit interval (in minutes)	1–60 Default value: 15			
Detection options	<ul style="list-style-type: none"> • Standard* • Fast • Explosion 		<ul style="list-style-type: none"> • Standard* • Fast • Explosion • IR only • UV only • UV/IR* 	
Accessory relay options	<ul style="list-style-type: none"> • Disabled* • Accessory relay on warning • Accessory relay as EOL • Accessory relay as FOV • FOV integrity 			
Lock option	<ul style="list-style-type: none"> • Not locked* • Locked 			
4-20mA settings				
Fault	<ul style="list-style-type: none"> • 0 • 1* 			
BIT fault	2*			
Normal	<ul style="list-style-type: none"> • 4* • 5 			
Warning	<ul style="list-style-type: none"> • 16* • Custom 			
Alarm	<ul style="list-style-type: none"> • 20* • Custom 			

Option	SharpEye model			
	40/40D-I	40/40D-M	40/40D-LB	40/40D-L4B
FOV	<ul style="list-style-type: none">• 3• 4*• 5			

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