Addendum

HART® Communication with the
X9800 IR Flame Detector

Table of Contents

DET-TRONICS

AUTOMATIC Oi

HART Communication with the X9800 IR Flame Detector

HART
COMMUNICATION PROTOCOL

Digital communication with the X9800 allows the operator to monitor the status of the detector, determine factory settings, adjust field settings, and initiate field tests. This addendum provides guidance for establishing HART communication, and describes the HART menu structure when using the X9800 with a HART Handheld Communicator, a PC, or other process interface device that supports Device Description Language (DD).

NOTE
A minimum level of understanding with regard to the operation and navigation of the HART Communicator is required. Refer to the instruction manual supplied with the HART Communicator for basic operating instructions.

INTERCONNECTING THE HART COMMUNICATOR WITH THE DETECTOR

Point-to-Point Mode

The HART Communicator can connect to the X9800 at any wiring termination point in the analog output signal loop. Connect the HART communicator in parallel with the X9800 analog signal or load resistor. The HART connections are non-polarized.

IMPORTANT WIRING NOTE
The HART Communicator does not measure loop current directly, but instead reads a voltage signal across a resistance (250 ohms) in the loop. The recommended connection point is across the input impedance of the signal receiver (PLC), which is a nominal 250 ohms. See Figures 1 to 4. If testing/programming on a bench, a 250 ohm load resistor must be used. See Figure 5.

Switch on the HART Communicator. If a device is found, the HART Communicator displays the Main menu. If no device is found, check the connections and verify the presence of a minimum of 250 ohms load resistance in series in the loop.

Figure 1—X9800 Detector Wired for Non-Isolated 0 to 20 mA Current Output (Sourcing)

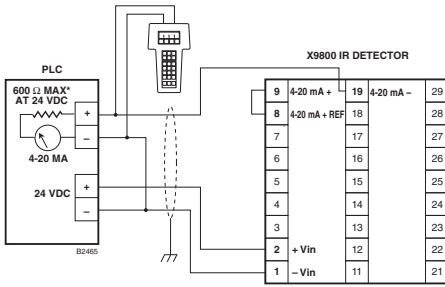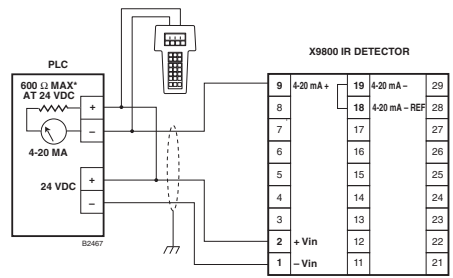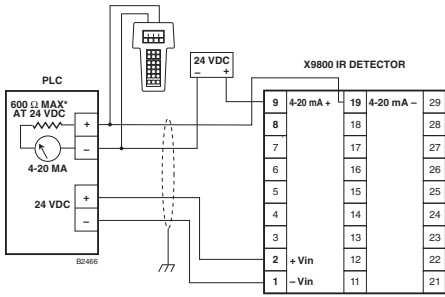Figure 3—X9800 Detector Wired for Non-Isolated 0 to 20 mA Current Output (Sinking)

Figure 2—X9800 Detector Wired for Isolated 0 to 20 mA Current Output (Sourcing)
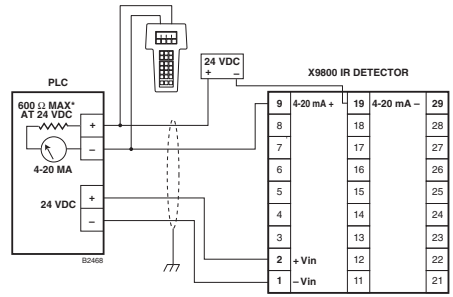
Figure 4—X9800 Detector Wired for Isolated 0 to 20 mA Current Output (Sinking)

*Nominal input impedance of PLC = 250 ohms.
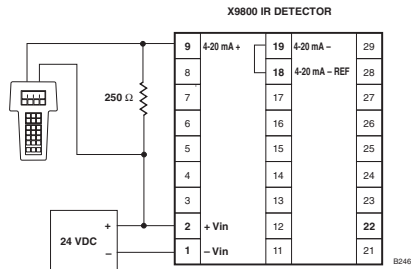Maximum loop impedance including input impedance of PLC = 600 ohms.

Figure 5—Wiring the X9800 for Benchtop Testing/Programming Using HART Protocol

Multidrop Mode

Optical flame detectors are life safety devices and require the 0–20 mA loop for transmitting important detector status data. They should not be used in conjunction with multidrop mode. If multidrop mode is a requirement, the alarm and fault relay contacts must be connected directly to the safety system or fire panel for signalling purposes.

NOTE
This addendum covers HART wiring only. Refer to the device instruction manual for NFPA-72 compliant releasing wiring diagrams.

HART DEVICE DESCRIPTION LANGUAGE

The HART protocol incorporates a concept called the Device Description Language (DD) that enables all suppliers of HART instruments to define and document their products in a single consistent format. This format is readable by handheld communicators, PCs and other process interface devices that support DD. DD enables full interoperability of devices, regardless of manufacturer, allowing full functionality from any HART device.

In the event that your Communicator does not establish communications with the X9800, ensure that the appropriate DDs for the X9800 have been programmed into your Communicator. To review the DDs programmed into your HART Communicator:

1. From the Main menu, access the Offline menu.

2. From the Offline menu, select New Configuration to access the list of device descriptions programmed into the HART Communicator.

3. Select Det-Tronics and review the list of models to determine if the X9800 DDs are installed in your Communicator.

If the X9800 DDs have not been programmed into the Memory Module, you must use the generic interface built into your HART Communicator.

The HART Communication Foundation manages a library of Manufacturer Device Descriptions, which are distributed to programming sites for inclusion in master devices. A complete listing of the HCF DD Library is available for download in manufacturer and device type sequence at en.hartcomm.org.

DETECTOR WIRING

Refer to the X9800 instruction manual (form number 95-8554) for complete instructions regarding detector installation and wiring.

NOTE
X9800 detectors with HART do not support RS-485 communication.

NOTE
Power consumption specifications for the HART model are different than the standard model.

Power Consumption Specifications of X9800 Detector with HART Communication

Without heater:	2.1 watts at 24 Vdc nominal; 3.7 watts at 24 Vdc in alarm. 2.2 watts at 30 Vdc nominal; 4.2 watts at 30 Vdc in alarm.
Heater only:	8 watts maximum.
Total power:	16.5 watts at 30 Vdc with EOL resistor installed and heater on maximum.

EOL resistor must be ceramic, wirewound type, rated 5 watts minimum, with actual power dissipation not to exceed 2.5 watts.

HIB Hdwr Flt

When a HART field communicator is first connected to the detector, a "HIB Hdwr Flt" message may be displayed. If this message is displayed, set the Real Time Clock (RTC) using the HART field communicator as detailed in the Real Time Clock section of this manual. See Marketing Bulletin 78-1026 for further information.

HART MENU STRUCTURE

X9800 Root Menu
1) Fire (Yes/No)
2) Fault (Yes/No)
3) Device Info Menu
4) Command Menu
5) Device Setup Menu

Device Info Menu
1) General Info Menu
2) HART Info Menu
3) Status Info Menu
4) Detector Settings
5) History Menu

General Info Menu
1) Manufacturer
2) Model
3) Serial Number
4) Part Number
5) Manufacture Date
6) Snsr Firmware
7) HART Firmware
8) Real Time Clock
9) Write protect (Y/N)

HART Info Menu
1) Universal rev
2) Field dev rev
3) Final asmbly num
4) Tag
5) Long tag
6) Date
7) Descriptor
8) Message
9) Num req preams
10) HART PV Menu
11) Condensed Status

HART PV Menu
1) PV Unit
2) PV
3) PV Sensor Unit
4) PV USL
5) PV LSL
6) PV Minimum Span
7) PV Damp
8) PV AO
9) PV AO Alarm type
10) PV % Range
11) PV Xfer Function
12) PV Range Unit
13) PV URV
14) PV LRV
15) PV PV Snsr S/N

Condensed Status
1) Xmtr Addstatus 0
2) Xmtr Addstatus 1
3) Xmtr Addstatus 2
4) Xmtr Addstatus 3
5) Operating Mode

Status Info Menu
1) Warm Up (Y/N)
2) Fire (Y/N)
3) IR Alarm (Y/N)
4) TDSA Alarm (Y/N)
5) Quick Alarm (Y/N)
6) IR Pre Alarm (Y/N)
7) Auto IR Oi Fault (Y/N)
8) Manual Oi at Start
9) Sensor Hdwr. Fault (Y/N)
10) HIB Hardware Fault (Y/N)
11) Internal Com. Flt (Y/N)
12) Incompatible Fault (Y/N)
13) Voltage Fault (Y/N)
14) Hardware Menu
15) Oi Menu

Hardware Menu
1) Temperature
2) Temp Range Fault
3) Voltage
4) Voltage Fault
5) Manual Oi at start

Oi Menu
1) Consecutive IR Oi Fails
2) Oi Calibrate Active
3) IR Oi Cal Fault
4) Manual Oi Active
5) Manual IR Oi Fault

Command Menu
1) Start Passive Oi
2) Start Active Oi
3) Clear Oi Fault
4) Reset Latches
5) Master Reset
6) Clear Data Log
7) HART Command Menu

HART Command Menu
1) Self test
2) Master Reset
3) Loop test

Detector Settings
1) IR Mode
2) IR Sensitivity
3) Auto Oi Enabled
4) Fire Relay (NL/L)
5) Fault Relay (NL/L)
6) Aux Relay (NL/L)
7) Heater Disabled
8) Aux Function
9) Aux IR Function
10) Aux Relay (NE/NDE)

History Menu
1) Alarm Log
2) Fault Log
3) General Log

Configuration Menu
1) Consecutive IR Oi Fails
2) Time Delay

Calibration Menu
1) Loop test
2) D/A trim
3) Calibrate Oi

Write Protect
1) Set Password
2) Set Write Protect
3) Write protect (Y/N)

Device Setup Menu
1) Configuration Menu
2) Calibration Menu
3) Write Protect
4) HART Setup
5) Real Time Clock

HART Setup
1) Poll addr
2) Final asmbly num
3) Tag
4) Long tag
5) Date
6) Descriptor
7) Message

Real Time Clock
1) RTC Seconds
2) RTC Minutes
3) RTC Hours
4) RTC Date
5) RTC Month
6) RTC Year

X9800 ROOT MENU

When HART communication is established, the first menu displayed is the X9800 Root menu:

```
X9800 Root Menu
1)  Fire  (Yes/No)
2)  Fault  (Yes/No)
3)  Device Info Menu
4)  Command Menu
5)  Device Setup Menu
```

1) Fire (Yes/No)   Indicates "Y" if the device is in a fire alarm status — analog output is at 20 mA, fire alarm relay is actuated, and LED is red.

2) Fault (Yes/No)   Indicates "Y" if a fault condition exists. Go to "Device Info" and select "Status Info" to determine the nature of the fault.

3) Device Info Menu   Provides access to manufacturer and HART information, current device status, factory settings, and history logs.

4) Command Menu   This menu allows the operator to initiate a manual o¡ test and to perform various reset/clear functions.

5) Device Setup Menu This menu allows various setup, configuration, and calibration functions.

DEVICE INFO MENU

This menu allows access to a variety of "read-only" information.

```
X9800 Root Menu              Device Info Menu
1)  Fire  (Yes/No)           1)  General Info Menu
2)  Fault  (Yes/No)          2)  HART Info Menu
3)  Device Info Menu    →    3)  Status Info Menu
4)  Command Menu             4)  Detector Settings
5)  Device Setup Menu        5)  History Menu
```

1) General Info Menu Factory information.

2) HART Info Menu   HART Specific Variables.

3) Status Info Menu   Current operating status and/or diagnostic information.

4) Detector Settings   Factory settings relating to relay operation, detector sensitivity, and response.

5) History Menu   Display log files: Alarm, Fault, General.

GENERAL INFO MENU

```
┌─────────────────────────┐     ┌─────────────────────────┐     ┌─────────────────────────┐
│ X9800 Root Menu         │     │ Device Info Menu        │     │ General Info Menu       │
│ 1) Fire  (Yes/No)       │     │ 1) General Info Menu    │     │ 1) Manufacturer         │
│ 2) Fault (Yes/No)       │ ──▶ │ 2) HART Info Menu       │ ──▶ │ 2) Model                │
│ 3) Device Info Menu     │     │ 3) Status Info Menu     │     │ 3) Serial Number        │
│ 4) Command Menu         │     │ 4) Detector Settings    │     │ 4) Part Number          │
│ 5) Device Setup Menu    │     │ 5) History Menu         │     │ 5) Manufacture Date     │
└─────────────────────────┘     └─────────────────────────┘     │ 6) Snsr Firmware        │
                                                                │ 7) HART Firmware        │
                                                                │ 8) Real Time Clock      │
                                                                │ 9) Write protect  (Y/N) │
                                                                └─────────────────────────┘
```
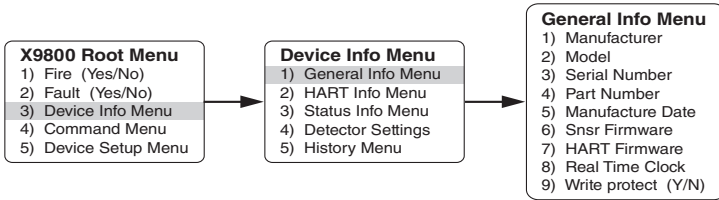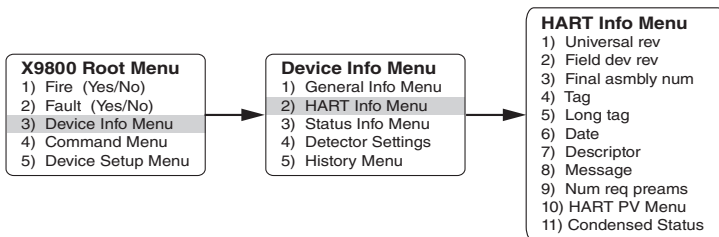
1) Manufacturer   Det-Tronics.

2) Model   X9800.

3) Serial Number   Serial number of device.

4) Part Number   Manufacturer's part number for this device.

5) Manufacture Date   Date of manufacture shown as XX/XX/XX (month/day/year).

6) Snsr Firmware   Firmware revision level of sensor module.

7) HART Firmware   Firmware revision level of HART Interface Board (HIB).

8) Real Time Clock   Current time and date settings of real time clock.

9) Write protect (Y/N) This indicates whether variables can be written to the device or whether commands that cause actions to be performed in the device can or cannot occur.

HART INFO MENU

X9800 Root Menu	Device Info Menu	HART Info Menu
1) Fire (Yes/No)	1) General Info Menu	1) Universal rev
2) Fault (Yes/No)	2) HART Info Menu	2) Field dev rev
3) Device Info Menu	3) Status Info Menu	3) Final asmbly num
4) Command Menu	4) Detector Settings	4) Tag
5) Device Setup Menu	5) History Menu	5) Long tag
		6) Date
		7) Descriptor
		8) Message
		9) Num req preams
		10) HART PV Menu
		11) Condensed Status

1) Universal rev   HART universal revision.

2) Field dev rev   HART field device revision.

3) Final asmbly num   A number that is used for identification purposes and is associated with the overall field device.

4) Tag   Text that is associated with the field device installation. This text can be used by the operator in any way. Max of eight character input.

5) Long tag   Text that is associated with the field device installation. This text can be used by the operator in any way. Max of 32 character input.

6) Date   Any date chosen by the operator to be used for any purpose. XX/XX/XXXX (month/day/year).

7) Descriptor   Text associated with the field device that can be used by the operator in any way.

8) Message   Text associated with the field device that can be used by the operator in any way.

9) Num req preams   HART specific synchronization messages.

10) HART PV Menu   Display HART specific primary variable (PV) items.

11) Condensed Status   Device status condensed for HART handheld display.

HART PV MENU

	X9800 Root Menu	Device Info Menu	HART Info Menu	HART PV Menu

```
X9800 Root Menu          Device Info Menu        HART Info Menu          HART PV Menu
1) Fire  (Yes/No)        1) General Info Menu     1) Universal rev        1) PV Unit
2) Fault (Yes/No)        2) HART Info Menu        2) Field dev rev        2) PV
3) Device Info Menu      3) Status Info Menu      3) Final asmbly num     3) PV Sensor Unit
4) Command Menu          4) Detector Settings     4) Tag                  4) PV USL
5) Device Setup Menu     5) History Menu          5) Long tag             5) PV LSL
                                                  6) Date                 6) PV Minimum Span
                                                  7) Descriptor           7) PV Damp
                                                  8) Message              8) PV AO
                                                  9) Num req preams       9) PV AO Alarm type
                                                  10) HART PV Menu        10) PV % Range
                                                  11) Condensed Status    11) PV Xfer Function
                                                                          12) PV Range Unit
                                                                          13) PV URV
                                                                          14) PV LRV
                                                                          15) PV PV Snsr S/N
```

1) PV Unit   Not implemented for X9800.

2) PV   Not implemented for X9800.

3) PV Sensor Unit   Not implemented for X9800.

4) PV USL   Not implemented for X9800.

5) PV LSL   Not implemented for X9800.

6) PV Minimum Span   Not implemented for X9800.

7) PV Damp   Not implemented for X9800.

8) PV AO   Analog Output. The value that tracks the Digital Value representation, under normal operating modes.

9) PV AO Alarm type   Not implemented for X9800.

10) PV % Range   Percent of Range. The variable that tracks the Digital Value representation with respect to the range defined by the Lower Range Value and Upper Range Value, for normal operating modes. The units of this variable are always in percent.

11) PV Xfer Function Not implemented for X9800.

12) PV Range Unit   Not implemented for X9800.

13) PV URV   Not implemented for X9800.

14) PV LRV   Not implemented for X9800.

15) PV PV Snsr S/N   Not implemented for X9800.

CONDENSED STATUS

```
                                                            HART Info Menu
                                                            1)  Universal rev
  X9800 Root Menu          Device Info Menu                 2)  Fld dev rev               Condensed Status
  1) Fire  (Yes/No)        1)  General Info Menu            3)  Final asmbly num          1)  Xmtr Addstatus 0
  2) Fault  (Yes/No)       2)  HART Info Menu               4)  Tag                       2)  Xmtr Addstatus 1
  3) Device Info Menu      3)  Status Info Menu             5)  Long tag                  3)  Xmtr Addstatus 2
  4) Command Menu          4)  Detector Settings            6)  Date                      4)  Xmtr Addstatus 3
  5) Device Setup Menu     5)  History Menu                 7)  Descriptor                5)  Operating Mode
                                                            8)  Message
                                                            9)  Num req preams
                                                            10) HART PV Menu
                                                            11) Condensed Status
```

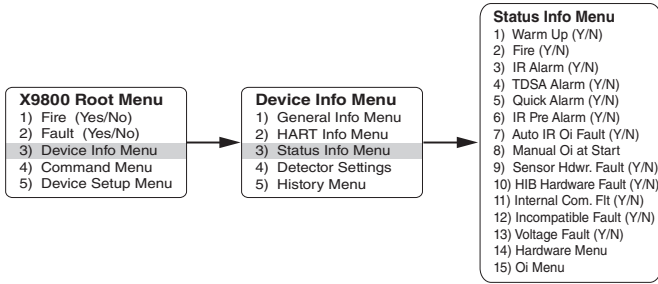**1) Xmtr Addstatus 0**   Fire Alarm
                           IR Alarm
                           TDSA Alarm
                           Quick Alarm
                           o¡ Cal Alarm
                           Manual o¡ Active
                           Warm-up

2) Xmtr Addstatus 1   IR Pre Alarm

3) Xmtr Addstatus 2   Fault
                           Manual IR o¡ Fault
                           Auto IR o¡ Fault
                           IR o¡ Cal Fault
                           Temperature Out of Range

4) Xmtr Addstatus 3   Voltage Out of Range Fault
                           Manual o¡ at Start
                           Hardware Fault
                           HART Fault
                           Modbus Communication Fault
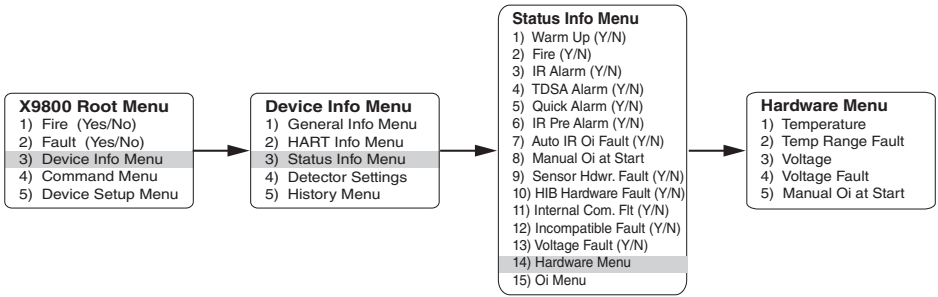   Incompatible Version

5) Operating mode   Fault
                           Fire Alarm

STATUS INFO MENU

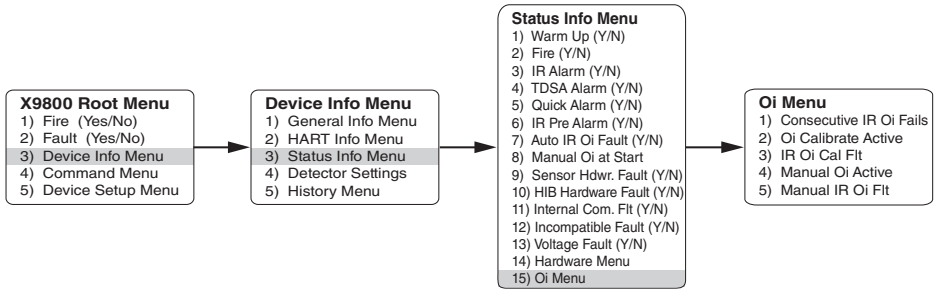This menu (read-only) shows extensive status information about the detector.

X9800 Root Menu	Device Info Menu	Status Info Menu
1) Fire (Yes/No)	1) General Info Menu	1) Warm Up (Y/N)
2) Fault (Yes/No)	2) HART Info Menu	2) Fire (Y/N)
3) Device Info Menu	3) Status Info Menu	3) IR Alarm (Y/N)
4) Command Menu	4) Detector Settings	4) TDSA Alarm (Y/N)
5) Device Setup Menu	5) History Menu	5) Quick Alarm (Y/N)
		6) IR Pre Alarm (Y/N)
		7) Auto IR Oi Fault (Y/N)
		8) Manual Oi at Start
		9) Sensor Hdwr. Fault (Y/N)
		10) HIB Hardware Fault (Y/N)
		11) Internal Com. Flt (Y/N)
		12) Incompatible Fault (Y/N)
		13) Voltage Fault (Y/N)
		14) Hardware Menu
		15) Oi Menu

1) Warm Up (Y/N) — Device is in the power-up time delay (warm-up) mode.

2) Fire (Y/N) — Indicates "Y" if the device is in a fire alarm status — analog output is at 20 mA, fire alarm relay is actuated, and LED is red.

3) IR Alarm (Y/N) — Indicates "Y" if the IR detector is signaling an alarm.

4) TDSA Alarm (Y/N) — Indicates "Y" if the IR detector is signaling a TDSA alarm.

5) Quick Alarm (Y/N) — Indicates "Y" if the IR detector is signaling a quick alarm.

6) IR Pre Alarm (Y/N) — Indicates "Y" if the IR detector is in a pre-alarm state. .

7) Auto IR oi Flt (Y/N) — Automatic IR oi Fault. Check viewing window and oi reflector plate for cleanliness.

8) Manual oi at Start (Y/N) — Manual oi at start. On power-up a manual oi was started. Check the external input wiring.

9) Sensor Hdwr. Flt (Y/N) — Sensor hardware fault.

10) HIB Hardware Flt (Y/N) — HART Interface Board hardware fault.

11) Internal Com. Flt (Y/N) — Internal communication fault.

12) Incompatible Flt (Y/N) — Sensor module firmware version is not compatible with HART Interface Board.

13) Voltage Fault (Y/N) — Detector operating voltage is out of tolerance.

14) Hardware Menu — Refer to sub-menu.

15) oi Menu — Refer to sub-menu.

HARDWARE MENU

X9800 Root Menu 1) Fire (Yes/No) 2) Fault (Yes/No) 3) Device Info Menu 4) Command Menu 5) Device Setup Menu	**Device Info Menu** 1) General Info Menu 2) HART Info Menu 3) Status Info Menu 4) Detector Settings 5) History Menu	**Status Info Menu** 1) Warm Up (Y/N) 2) Fire (Y/N) 3) IR Alarm (Y/N) 4) TDSA Alarm (Y/N) 5) Quick Alarm (Y/N) 6) IR Pre Alarm (Y/N) 7) Auto IR Oi Fault (Y/N) 8) Manual Oi at Start 9) Sensor Hdwr. Fault (Y/N) 10) HIB Hardware Fault (Y/N) 11) Internal Com. Flt (Y/N) 12) Incompatible Fault (Y/N) 13) Voltage Fault (Y/N) 14) Hardware Menu 15) Oi Menu

Hardware Menu
1) Temperature
2) Temp Range Fault
3) Voltage
4) Voltage Fault
5) Manual Oi at Start

1) Temperature   Actual integral temperature of detector.

2) Temp Range Fault   Detector integral temperature out of range — Operating range: –40°F to +167°F (–40°C to +75°C).

3) Voltage   Actual detector supply voltage must be 18 to 30 Vdc.

4) Voltage Fault   Supply voltage is out of range. Operating voltage must be 18 to 30 Vdc.

5) Manual oị at Start   Manual oị at start. On power-up a manual oị was started. Check the external input wiring.

O¡ MENU

```
┌─────────────────────────┐        ┌─────────────────────────┐        ┌──────────────────────────────┐        ┌─────────────────────────┐
│ X9800 Root Menu         │        │ Device Info Menu        │        │ Status Info Menu             │        │ Oi Menu                 │
│ 1) Fire  (Yes/No)       │   ──▶  │ 1) General Info Menu    │   ──▶  │ 1)  Warm Up (Y/N)            │   ──▶  │ 1) Consecutive IR Oi Fails│
│ 2) Fault  (Yes/No)      │        │ 2) HART Info Menu       │        │ 2)  Fire (Y/N)               │        │ 2) Oi Calibrate Active  │
│ 3) Device Info Menu     │        │ 3) Status Info Menu     │        │ 3)  IR Alarm (Y/N)           │        │ 3) IR Oi Cal Flt        │
│ 4) Command Menu         │        │ 4) Detector Settings    │        │ 4)  TDSA Alarm (Y/N)         │        │ 4) Manual Oi Active     │
│ 5) Device Setup Menu    │        │ 5) History Menu         │        │ 5)  Quick Alarm (Y/N)        │        │ 5) Manual IR Oi Flt     │
└─────────────────────────┘        └─────────────────────────┘        │ 6)  IR Pre Alarm (Y/N)       │        └─────────────────────────┘
                                                                      │ 7)  Auto IR Oi Fault (Y/N)   │
                                                                      │ 8)  Manual Oi at Start       │
                                                                      │ 9)  Sensor Hdwr. Fault (Y/N) │
                                                                      │ 10) HIB Hardware Fault (Y/N) │
                                                                      │ 11) Internal Com. Flt (Y/N)  │
                                                                      │ 12) Incompatible Fault (Y/N) │
                                                                      │ 13) Voltage Fault (Y/N)      │
                                                                      │ 14) Hardware Menu            │
                                                                      │ 15) Oi Menu                  │
                                                                      └──────────────────────────────┘
```

1) Consecutive IR o¡ Fails Allowable number of consecutive IR o¡ failures to produce a fault. Factory set to three (minutes). This is the time between fault occurrence and annunciation

2) o¡ Calibrate Active o¡ calibration is in progress.

3) IR o¡ Cal Flt IR o¡ calibration has detected a fault condition.

4) Manual o¡ Active A manual o¡ test is in progress.

5) Manual IR o¡ Flt Manual IR o¡ fault. Check IR viewing window and o¡ reflector plate cleanliness.

DETECTOR SETTINGS

This menu shows factory settings relating to relay operation, detector sensitivity, and response.
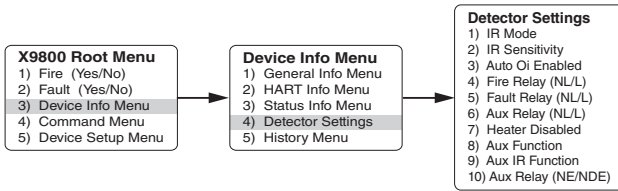
1) IR Mode   IR Mode: TDSA and Quick or TDSA only.

2) IR Sensitivity   Detector IR sensitivity setting: Low, Medium, High, or Very High.

3) Auto oi Enabled   Auto oi enabled. If (Y) an oi test will be conducted periodically without manual input.

4) Fire Relay (NL/L) Fire Relay: Latching (L) or Non-Latching (NL).

5) Fault Relay (NL/L) Fault Relay: Latching (L) or Non-Latching (NL).

6) Aux Relay (NL/L)   Aux Relay: Latching (L) or Non-Latching (NL).

7) Heater Disabled   Heater disabled. If (Y) the optics heater is not enabled to prevent condensation and icing.

8) Aux Function   Aux function: Pre Alarm or IR Alarm.

9) Aux IR Function   Aux IR function: TDSA and Quick or TDSA only.

10) Aux Relay (NE/NDE) Aux Relay: Normally Energized (NE) or Normally De-Energized (NDE)

HISTORY MENU

This menu provides historical information about the detector. Up to 32 events in each of the three categories will be kept in non-volatile memory. When the log is full, the oldest event will be overwritten. The most recent event will be displayed first.
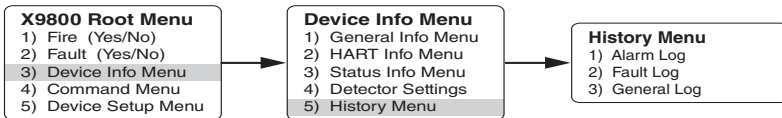
1) Alarm Log   Scroll through 32 Alarm Logs with time, date, and temperature stamp.

2) Fault Log   Scroll through 32 Fault Logs with time, date, and temperature stamp.

3) General Log   Scroll through 32 General Logs with time, date, and temperature stamp.

COMMAND MENU

The Command Menu allows the operator to initiate a manual o¡ test and also to perform various reset/clear functions.

```
X9800 Root Menu          Command Menu
1) Fire  (Yes/No)        1) Start Passive Oi
2) Fault  (Yes/No)       2) Start Active Oi
3) Device Info Menu      3) Clear Oi Fault
4) Command Menu          4) Reset Latches
5) Device Setup Menu     5) Master Reset
                         6) Clear Data Log
                         7) HART Command Menu
```
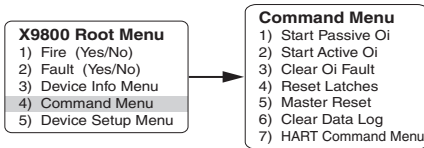
1) Start Passive o¡   A passive o¡ test command checks the cleanliness of the detector's optical surfaces. This calibrated o¡ test confirms the ability of the detector to respond correctly to an IR signal. Fire and fault relays as well as 0–20 mA current loop output are unaffected by this test. A red LED signals a successful test, and an amber LED signals a failed test. The general log will indicate either "Man o¡ Pass" or "Man o¡ Flt."

2) Start Active o¡

<div align="center">

⚠️ *CAUTION*

</div>

An active o¡ *test generates an actual Fire Alarm Output. All fire response equipment must be bypassed/disabled prior to testing to prevent unwanted output actuation.*

An active o¡ test performs an o¡ test with all detector outputs fully operational. Fire and fault relays as well as the 0–20 mA loop are "live."

If the test is successful: Fire relay = Alarm
                                     Fault relay = no fault
                                     Current output is 20 mA
                                     LED turns red
                                     General log indicates "Man o¡ Pass"
                                     Alarm log indicates "Fire Alarm"

If the test is unsuccessful: Fire relay = No Alarm
                                     Fault relay = Fault
                                     Current output is 2 mA
                                     LED turns yellow
                                     Fault log indicates "Man o¡ Flt"

3) Clear o¡ **Fault**   If the cause of the fault has not been corrected, subsequent o¡ faults will occur.

4) Reset Latches   Latching relays are reset and LED turns green.

5) Master Reset   This function re-initializes the microprocessor, resets the operating software, and initiates a hardware reset for both the sensor and the HART interface. Latched relays are reset.
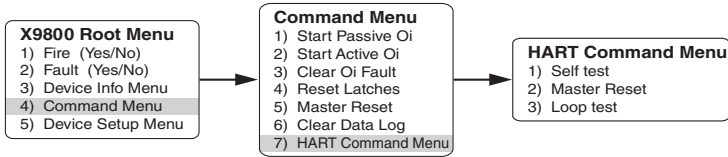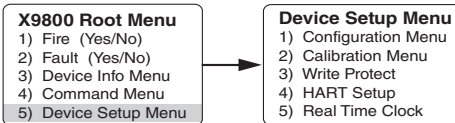
6) Clear Data Log   This function resets the HART data log history. To view the logs, go to "Device Info Menu" and select "History Menu."

7) HART Command Menu   This menu performs various diagnostic and/or service functions.

HART COMMAND MENU

The HART Command Menu allows the operator to perform diagnostic and service functions as follows:

```
X9800 Root Menu          Command Menu              HART Command Menu
1) Fire  (Yes/No)         1) Start Passive Oi       1) Self test
2) Fault  (Yes/No)        2) Start Active Oi        2) Master Reset
3) Device Info Menu       3) Clear Oi Fault         3) Loop test
4) Command Menu           4) Reset Latches
5) Device Setup Menu      5) Master Reset
                          6) Clear Data Log
                          7) HART Command Menu
```

1) Self test   Internal tests are performed and any detected problems are reported in "Status Info." If successful, indication will be "No Device Info on Self Test."

2) Master Reset   This function re-initializes the microprocessor, resets the operating software, and initiates a hardware reset for both the sensor and the HART interface. Latched relays are reset.

3) Loop test   This test allows the operator to manually set the analog signal output at 1, 2, 3, or between 4 and 20 mA in increments of 2 (4, 6, 8, etc.). When the loop test is completed, ensure that the current loop is returned to automatic operation.

DEVICE SETUP MENU

This menu allows various setup, configuration, and calibration functions. When Write Protect is off, these menus allow the operator to reconfigure or write new variables to the device.

```
X9800 Root Menu          Device Setup Menu
1) Fire  (Yes/No)         1) Configuration Menu
2) Fault  (Yes/No)        2) Calibration Menu
3) Device Info Menu       3) Write Protect
4) Command Menu           4) HART Setup
5) Device Setup Menu      5) Real Time Clock
```

1) Configuration Menu

2) Calibration Menu

3) Write Protect

4) HART Setup

5) Real Time Clock

Refer to the appropriate sub-menus for details.

CONFIGURATION MENU
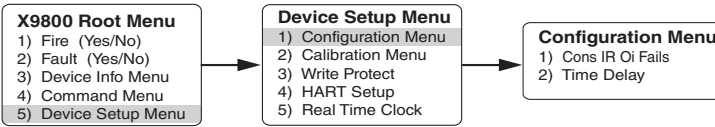
X9800 Root Menu		Device Setup Menu		Configuration Menu
1) Fire (Yes/No)		1) Configuration Menu		1) Cons IR Oi Fails
2) Fault (Yes/No)	→	2) Calibration Menu	→	2) Time Delay
3) Device Info Menu		3) Write Protect		
4) Command Menu		4) HART Setup		
5) Device Setup Menu		5) Real Time Clock		

1) Cons IR o¡ Fails   Allowable number of consecutive IR o¡ failures to produce a fault. Factory set to three (minutes). This is the time between fault occurrence and annunciation.

2) Time Delay   Time Delay before alarm is indicated (0 to 15 seconds). Factory default is zero seconds.
Important: In addition to lengthening the time period between the outbreak of a fire and the fire alarm, a time delay can also affect sensitivity. Consult the factory for guidance before setting a time delay over five seconds.
Note: FM Approval covers the detector's performance with zero time delay only.

CALIBRATION MENU

X9800 Root Menu		Device Setup Menu		Calibration Menu
1) Fire (Yes/No)		1) Configuration Menu		1) Loop test
2) Fault (Yes/No)	→	2) Calibration Menu	→	2) D/A trim
3) Device Info Menu		3) Write Protect		3) Calibrate Oi
4) Command Menu		4) HART Setup		
5) Device Setup Menu		5) Real Time Clock		
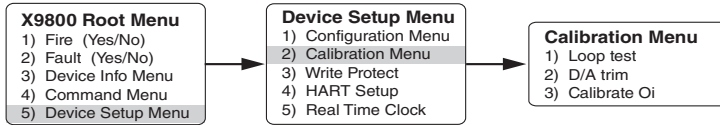
1) Loop test   This test allows the operator to manually set the analog signal output at 1, 2, 3, or between 4 and 20 mA in increments of 2 (4, 6, 8, etc.). When the loop test is completed, ensure that the current loop is returned to automatic operation.

2) D/A trim   This function allows adjustment of the 0–20 mA span factor.

NOTE
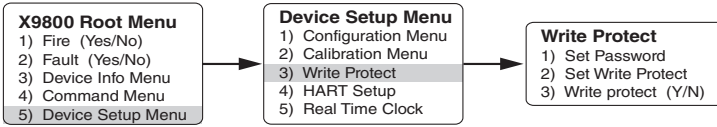*Trim in increments of 0.1 mA resolution only.*

3) Calibrate o¡   This procedure calibrates the o¡ test signal for the IR sensor.

1. Bypass/disable all Alarm outputs connected to the detector.

2. Thoroughly clean the sensor and o¡ reflector for the IR sensor. Check the o¡ source openings for contaminants and clean as needed.

3. Cover the detector with the provided cover.

4. Initiate o¡ Calibration. The detector performs the calibration automatically and notifies the operator upon completion. The procedure takes approximately two minutes.

5. Upon completion of o¡ calibration, remove the cover and return all alarm outputs to service.

WRITE PROTECT

This function enables the operator to enable/disable password and write protection capability, as well as to enter or change a password. The device is provided from the factory with Write Protect off. With Write Protect on, the use of a password is required to enable writing to the device.

```
┌─────────────────────────┐      ┌─────────────────────────┐
│ X9800 Root Menu         │      │ Device Setup Menu       │      ┌─────────────────────────┐
│ 1) Fire  (Yes/No)       │      │ 1) Configuration Menu   │      │ Write Protect           │
│ 2) Fault  (Yes/No)      │ ───► │ 2) Calibration Menu     │ ───► │ 1) Set Password         │
│ 3) Device Info Menu     │      │ 3) Write Protect        │      │ 2) Set Write Protect    │
│ 4) Command Menu         │      │ 4) HART Setup           │      │ 3) Write protect  (Y/N) │
│ 5) Device Setup Menu    │      │ 5) Real Time Clock      │      └─────────────────────────┘
└─────────────────────────┘      └─────────────────────────┘
```

1) Set Password The password is used to validate the command to enable or disable writes in the device. (The factory default password is: 1*******. Once the password has been changed, the default password is no longer valid.)

To change the password:
1. Select "Set Password" and enter the password. Hit "Send."
2. If enabled, disable Write Protect. Hit "Send."
3. Select "Set Password" and enter a new password. Do not hit "Send" yet.
4. From within the "Set Write Protect" menu, select "Change Password." Hit "Send."

⚠️ *CAUTION*

Always record the new password. If the password is forgotten, the device must be returned to the factory for re-programming.
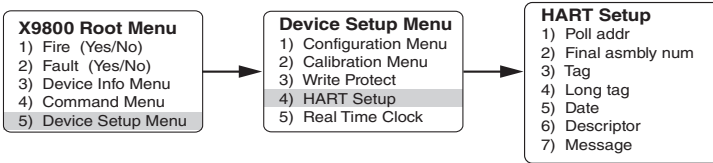
2) Set Write Protect With Write Protect enabled, variables cannot be written to the device and commands that cause actions to be performed in the device cannot occur.

3) Write protect (Y/N) This indicates whether or not Write Protect is enabled.

HART SETUP

This menu allows editing of the following functions:

1) Poll addr Address used by the host device to identify a field device. Note that if it is set to an address other than "0," the Detector will output 1 mA.

2) Final asmbly num A number that is used for identification purposes and is associated with the overall field device.

3) Tag Text that is associated with the field device installation. This text can be used by the operator in any way. Max of eight character input.

4) Long tag Text that is associated with the field device installation. This text can be used by the operator in any way. Max of 32 character input.

5) Date Any date chosen by the operator to be used for any purpose. XX/XX/XXXX (month/day/year).

6) Descriptor Text associated with the field device that can be used by the operator in any way.

7) Message Text associated with the field device that can be used by the operator in any way.

REAL TIME CLOCK

To set the real time clock, enter the current time and date information into the appropriate fields.
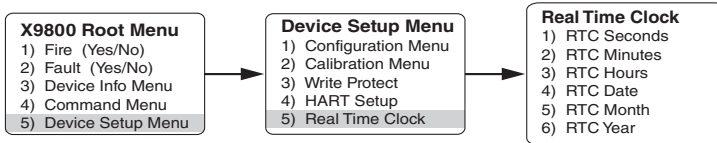
1) RTC Seconds 0 to 59

2) RTC Minutes 0 to 59

3) RTC Hours 0 to 23

4) RTC Date 1 to 31

5) RTC Month 1 to 12

6) RTC Year 0 to 99

‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖
95-8637

FlexSonic® Acoustic
Leak Detector

X3301 Multispectrum
IR Flame Detector

PointWatch Eclipse® IR
Combustible Gas Detector

FlexVu® Universal Display
with GT3000 Toxic Gas Detector

Eagle Quantum Premier®
Safety System

DET-TRONICS

Carrier

Corporate Office
6901 West 110th Street
Minneapolis, MN 55438 USA
www.det-tronics.com

Phone: +1 952.941.6665
Toll-free: +1 800.765.3473
Fax: 952.829.8750
det-tronics@carrier.com