Reference Manual
00809-0300-4036, Rev AA
October 2021

HART® Communication

Rosemount™ 936 Open Path Gas Detector

ROSEMOUNT™

EMERSON™

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1 Introduction

Using digital communication with the Rosemount Rosemount 936 Open Path Detector, the operator can monitor the status of the detector, determine factory settings, and initiate field tests.

This document provides guidance for establishing HART® communication and describes the HART menu structure when using the detector with a HART Hand-held Communicator, personal computer (PC), or other process interface device that supports device description language (DDL).

2 Connectingto the HART® Communicator

The host connects to the detector via the two-wire 4-20 mA current loop or via the intrinsically safe (IS) port. Refer to the *Rosemount Rosemount 936 Reference Manual* for connection details.

These outputs from the detector represent the analog output channel. They correspond to the primary variable (PV) and support HART communication.

2.1 Connect HART® Communicator to wiring terminals

The operator can connect the HART Communicator to the detector at any wiring termination point in the analog output signal loop.

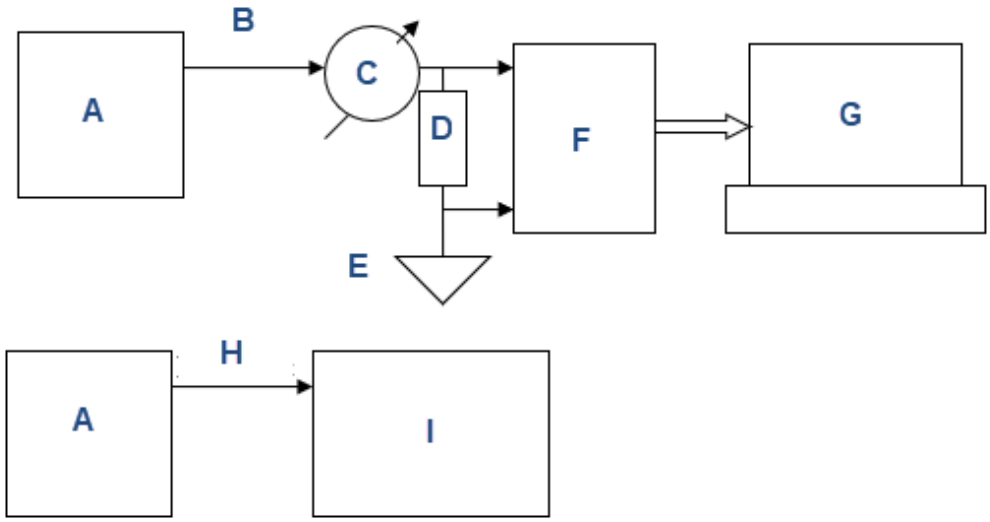
Procedure

Connect the HART Communicator in parallel with the 500 Ohm load resistor.

The HART connections are non-polarized.

2.2 Connect HART® Communicator to intrinsically safe (IS) port

Figure 2-1: HART Connection Block Diagram



A. *Rosemount Rosemount 936 Gas Detector*
B. *4-20 mA out*
C. *4-20 mA current*
D. *Load resistor, defined in HART standard as 250-600 ohm*
E. *Ground*
F. *HART modem*
G. *Personal computer (PC) with appropriate software*
H. *Intrinsically safe (IS) output*
I. *HART Communicator*

Procedure

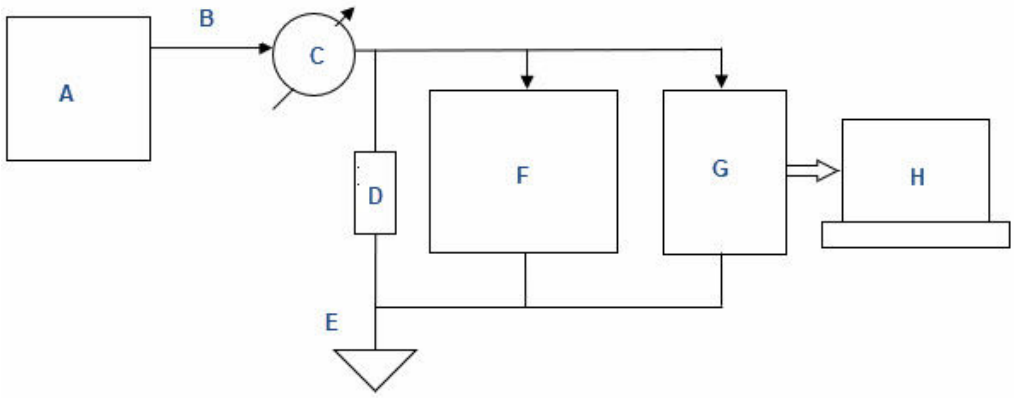
1. To use the IS port, connect the HART Communicator to the detector using the appropriate communication cable, as described in the *Rosemount Rosemount 936 Reference Manual*.
2. Switch on the HART Communicator.

If the HART Communicator finds the detector, it displays the ***Main Menu***.

Postrequisites

If the HART Communicator doesn't find the detector, check the connections and verify the presence of a 500 ohms load resistance in series to the loop.

2.3 Connecting two HART® Communicators (primary and secondary master)



A. Rosemount Rosemount 936 Gas Detector
B. 4-20 out
C. 4-20 mA current
D. Load resistor, defined in HART standard as 250-600 ohm
E. Ground
F. HART Communicator
G. HART modem
H. Personal computer (PC) with appropriate software

2.4 Multidrop mode

Optical gas detectors are safety devices and require the 4-20 mA loop for transmitting important detector status data. Do not use optical gas detectors in conjunction with multidrop mode. If multidrop mode is required, no gas reading will be available via the 4-20 mA loop.

3 HART® device description language (DDL)

The HART protocol incorporates a concept called the DDL that enables all suppliers of HART instruments to define and document their products in a single, consistent format. This format can be read by hand-held communicators, personal computers (PCs), and other process interface devices, regardless of manufacturer, allowing full functionality from any HART device.

Note
For full compliance with the gas detector and the HART host application, install a HART Communication Foundation device description (HCF DD) on your machine.
You can download a complete listing of the HCF DD library in the manufacturer and device type sequence on the HCF home page.

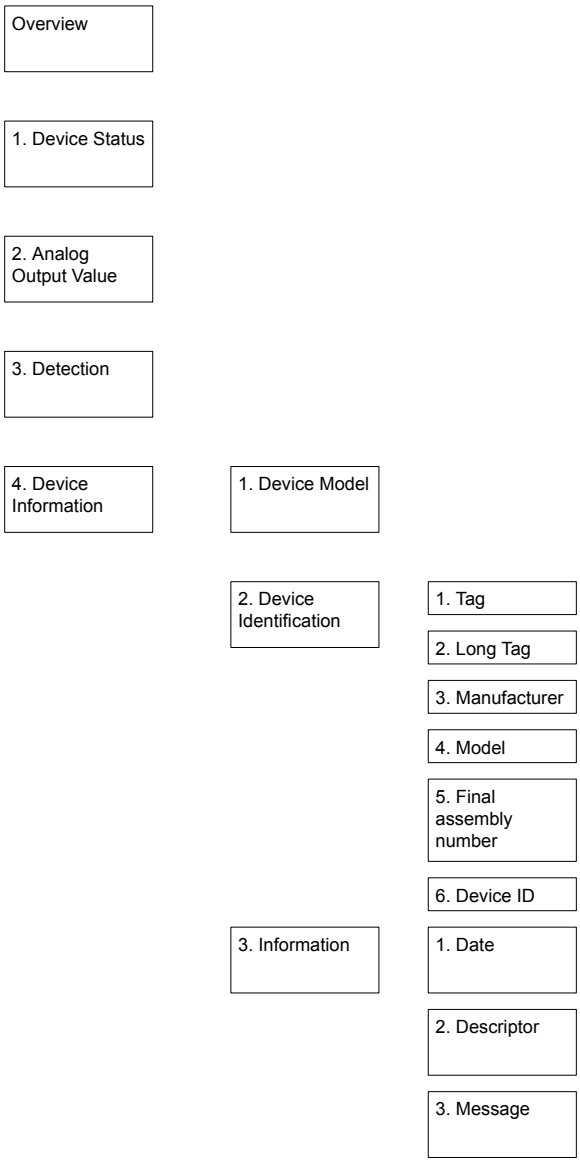
The Rosemount Rosemount 936 device description allows you to present the HART menu in a graphical mode. However, this option is not supported by all host manufacturers. For more information about using the graphical mode, please refer to HART host literature.

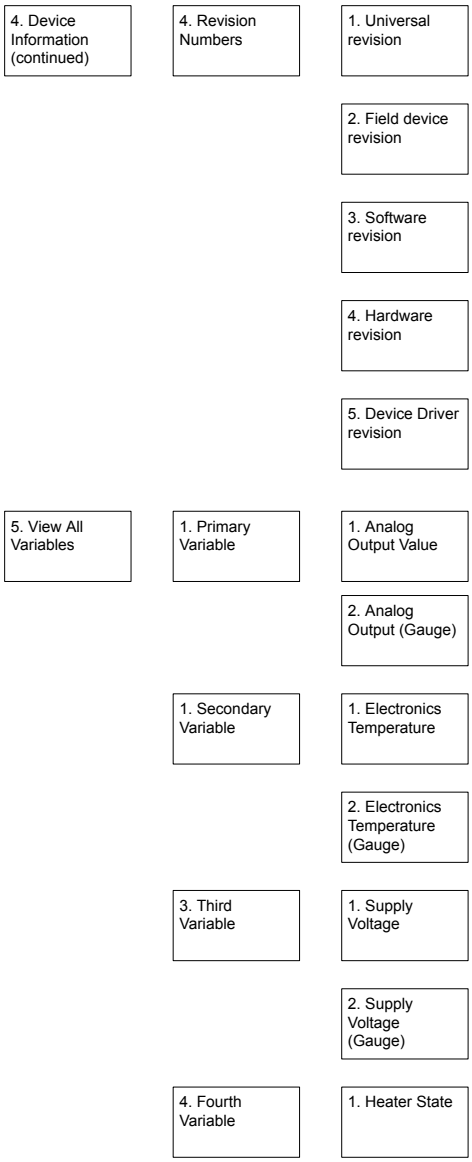
4 HART® menu structure

4.1 Overview menu

When you first establish HART® communication, the first menu displayed is the ***Overview*** menu.

Figure 4-1: Overview Menu Structure




4. Device Information (continued)
4. Revision Numbers
1. Universal revision
2. Field device revision
3. Software revision
4. Hardware revision
5. Device Driver revision
5. View All Variables
1. Primary Variable
1. Analog Output Value
2. Analog Output (Gauge)
1. Secondary Variable
1. Electronics Temperature
2. Electronics Temperature (Gauge)
3. Third Variable
1. Supply Voltage
2. Supply Voltage (Gauge)
4. Fourth Variable
1. Heater State

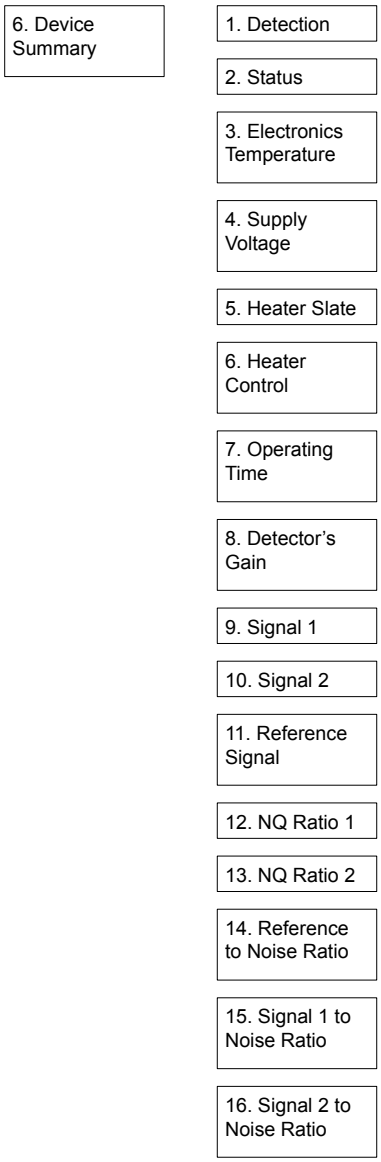


Table 4-1: Overview Menu Options

Number	Option	Description	Field type
1	Device Status	Indicates a field device condition.	Method
2	Analog Output Value	The actual analog output of the fire detection channel.	Read
3	Detection	Gas reading in PPM*M.	Read
4	Device Information	Device information.	Menu
5	View all Variables	Device variables.	Menu
6	Device Summary	Device summary.	Menu

4.1.1 Device Information menu

Table 4-2: Device Information Options

Number	Option	Description	Field type
1	Device Model	Rosemount 936	Read
2	Device Identification	Device identification	Menu
3	Information	Information	Menu
4	Revision Numbers	Revision numbers	Menu

Device Identification menu

Table 4-3: Device Identification Menu Options

Number	Option	Description	Type
1	Tag	Text that is associated with the field device installation (8 characters). The operator can modify and use this text in any way.	Read
2	Long Tag	Text that is associated with the field device installation (32 characters). The operator can modify and use this text in any way.	Read
3	Manufacturer	Rosemount	Read
4	Model	Rosemount 936	Read
5	Final assembly number	A number that is used for identification purposes and is associated with the overall field device. Example: 1	Read
6	Device id	Device unique identification number. Example: 1	Read

Information menu

Table 4-4: Information Menu Options

Number	Option	Description	Field type
1	Date	Any date chosen by the operator to be used for any purpose.	Read
2	Descriptor	Text associated with the field device that can be used by the operator in any way.	Read
3	Message	Text associated with the field device that can be used by the operator in any way.	Read

Revision Numbers menu

Table 4-5: Revision Numbers Menu Options

Number	Option	Description	Field type
1	Universal rev	HART® protocol revision. Example: 7	Read
2	Fld dev rev	Field device revision. Example: 1	Read
3	Software rev	Field device software revision. Example: 1	Read
4	Hardware rev	Field device hardware revision. Example: 1	Read
5	Device Driver Revision	Device driver revision. Example: 01	Method

4.1.2 View All Variables menu

Table 4-6: View All Variables Menu Options

Number	Option	Description	Field type
1	Primary Variable	Primary variable	Menu
2	Secondary Variable	Secondary variable	Menu
3	Third Variable	Third variable	Menu
4	Fourth Variable	Fourth variable	Menu

Primary Variables menu

Table 4-7: Primary Variable Menu Options

Number	Option	Description	Field type
1	Analog Output Value	The actual analog output of the fire detection channel.	Read
2	Analog Output	The actual analog output of the fire detection channel.	Gauge

Secondary Variables menu

Table 4-8: Secondary Variables Menu Options

Number	Option	Description	Field type
1	Electronics Temperature	Electronics temperature of the detector in degrees C.	Read
2	Electronics Temperature	Electronics temperature of the detector in degrees C.	Gauge

Third Variables menu

Table 4-9: Third Variables Menu Options

Number	Option	Description	Field type
1	Supply Voltage	Input voltage of the detector.	Read
2	Supply Voltage	Input voltage of the detector.	Gauge

Fourth Variables menu

Table 4-10: Fourth Variables Menu Options

Number	Option	Description	Field type
1	Heater State	Indicates the current state of the heater (ON or OFF).	Read

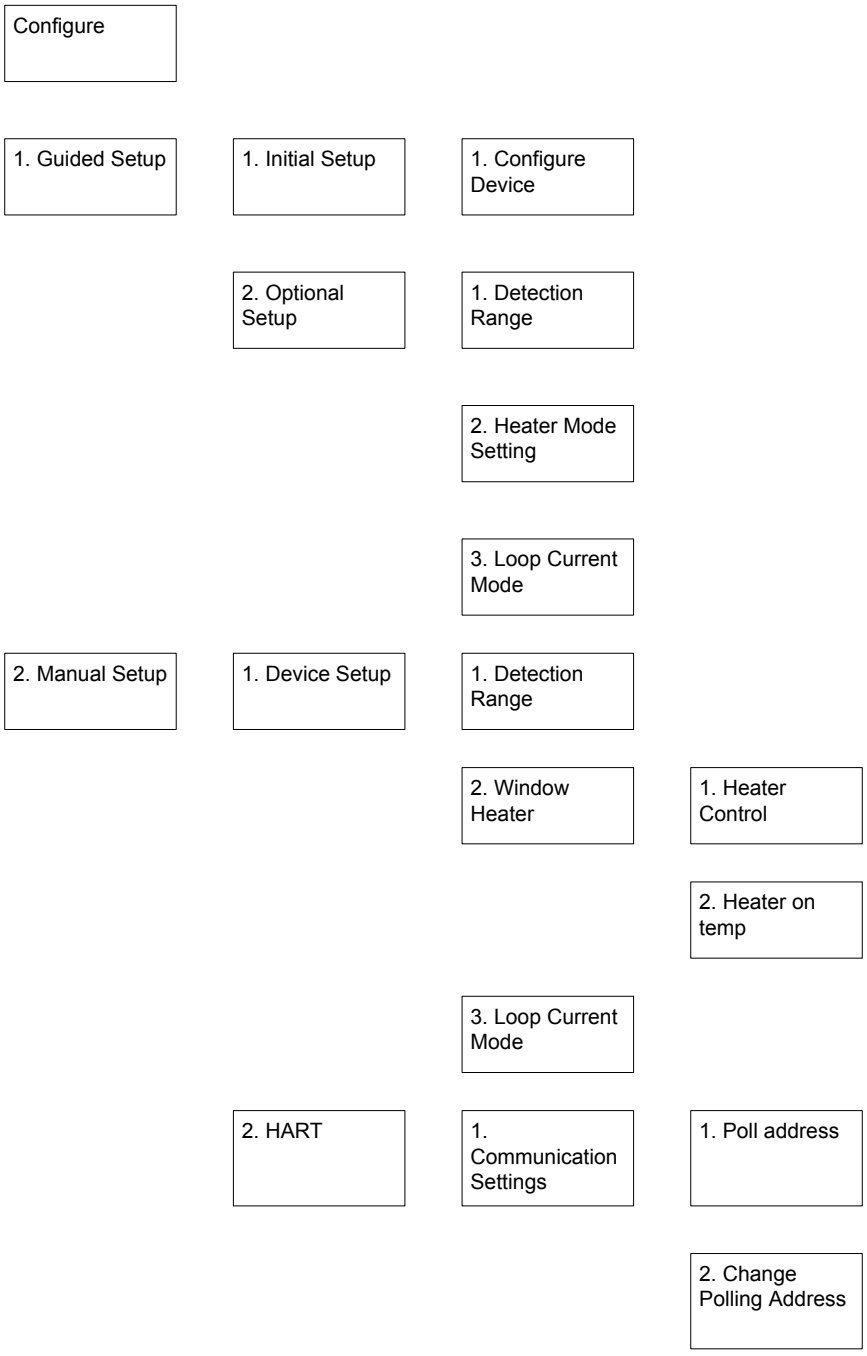
4.1.3 Device Summary menu

Table 4-11: Device Summary Menu Options

Number	Option	Description	Field type
1	Detection	Gas reading in PPM.m.	Read
2	Status	Indicates a field device condition.	Read
3	Electronics Temperature	Electronics temperature of the detector in degrees C.	Read
4	Supply Voltage	Input voltage of the detector.	Read
5	Heater State	Indicates the current state of the heater (ON or OFF).	Read
6	Heater Control	Indicates if the heater control is manual or automatic.	Read
7	Operating Time	Displays the detector's total operating time from last power up.	Read
8	Detector's Gain	The current amplifying level of the detector.	Read
9	Signal 1	Signal reading.	Read
10	Signal 2	Signal reading.	Read
11	Reference Signal	Reference Signal reading.	Read
12	NQ Ratio 1	Normalized ratio.	Read
13	NQ Ratio 2	Normalized ratio.	Read
14	Reference to Noise Ratio	Calculation of the signal to noise ratio (SNR) on Reference signal. The detector must be at SNR test mode.	Read
15	Signal 1 to Noise Ratio	Calculation of the SNR on signal 1. The detector must be at SNR test mode.	Read
16	Signal 2 to Noise Ratio	Calculation of the SNR on signal 2. The detector must be at SNR test mode.	Read

4.2 Configure menu

Figure 4-2: Configure Menu Structure



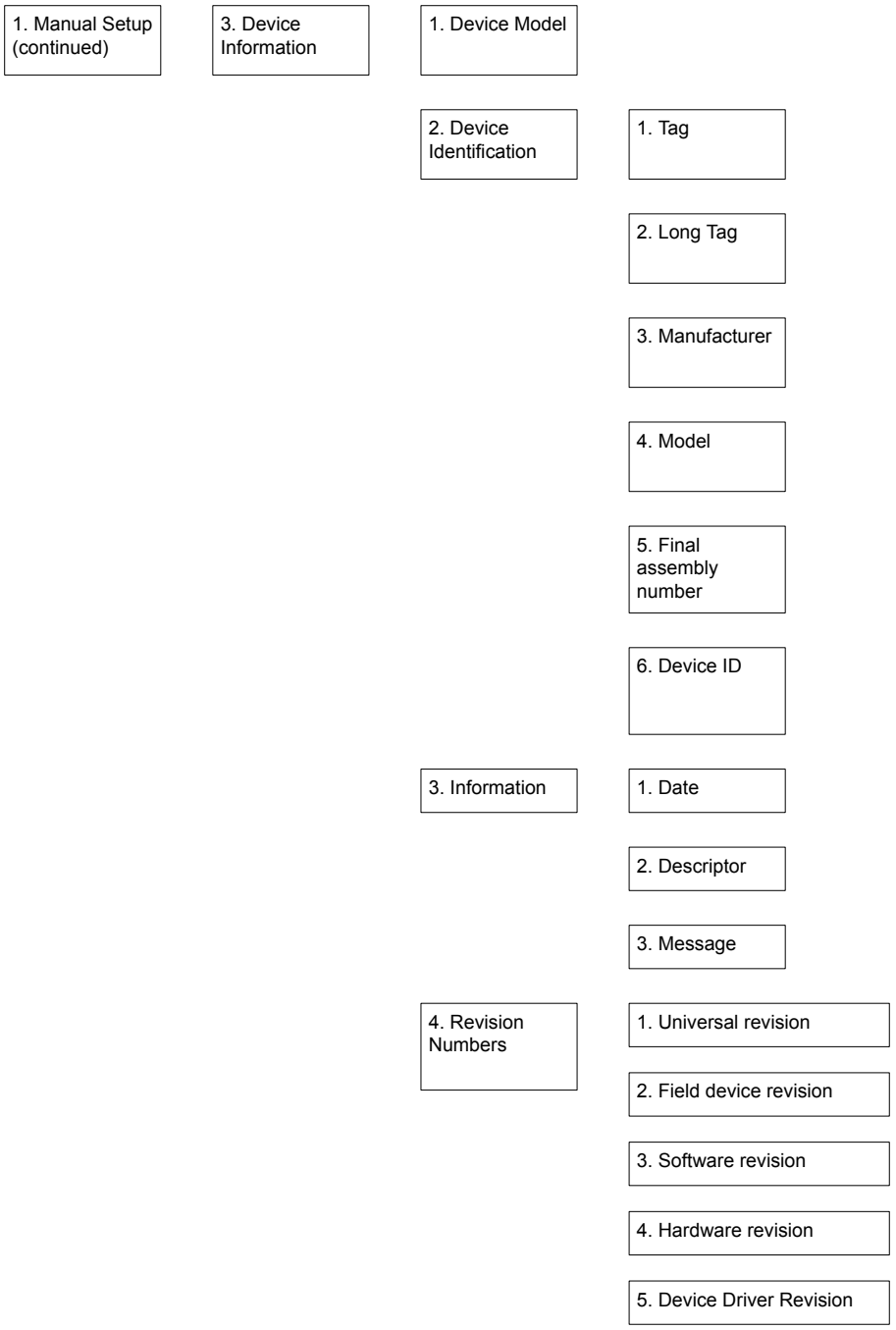


Table 4-12: Configure Menu Options

Number	Option	Description	Field type
1	Guided Setup	Guided setup	Menu
2	Manual Setup	Manual setup	Menu

4.2.1 Guided Setupmenu

Table 4-13: Guided Setup Menu Options

Number	Option	Description	Field type
1	Initial Setup	Detector's initial setup	Menu
2	Optional Setup	Detector's optional setup	Menu

Initial Setup menu

Table 4-14: Initial Setup Menu Options

Number	Option	Description	Field type
1	Configure Device	Configure device information, window heater, and gas type.	Method

Optional Setup menu

Table 4-15: Optional Setup Menu Options

Number	Option	Description	Field type
1	Detection Range	Set up detection range.	Method
2	Heater Mode Settings	Set up heater mode.	Method
3	Loop Current Mode	Set up loop current mode.	Method

4.2.2 Manual Setup menu

Table 4-16: Manual Setup Menu Options

Number	Option	Description	Field type
1	Device Setup	Manually set up gas type and window heater.	Menu
2	HART	Set up HART® communication settings.	Menu
3	Device Information	Configure device information.	Menu

Device Setup menu

Table 4-17: Device Setup Menu Options

Number	Option	Description	Field type
1	Detection Range	Set up detection range.	Read/Write
2	Window Heater	Configure window heater.	Menu
3	Loop Current Mode	Configure loop current mode.	Read/Write

Window Heater menu

Table 4-18: Window Heater Menu Options

Number	Option	Description	Field type
1	Heater State	Indicates the current state of the heater (ON or OFF).	Read/Write
2	Heater Control	Indicates if the heater control is manual or automatic.	Read/Write

HART menu

Table 4-19: HART Menu Options

Number	Option	Description	Field type
1	Communication Settings	HART® communication settings	Menu

Communication Settings menu

Table 4-20: Communication Settings Menu Options

Number	Option	Description	Field type
1	Poll addr	Address used by the host to identify a field device.	Read
2	Change Polling Address	Change detector's HART® polling address.	Method

Device Information menu

Table 4-21: Device Information Options

Number	Option	Description	Field type
1	Device Model	Rosemount 936	Read
2	Device Identification	Device identification	Menu
3	Information	Information	Menu
4	Revision Numbers	Revision numbers	Menu

Device Identification menu

Table 4-22: Device Identification Menu Options

Number	Option	Description	Type
1	Tag	Text that is associated with the field device installation (8 characters). The operator can modify and use this text in any way.	Read/Write
2	Long Tag	Text that is associated with the field device installation (32 characters). The operator can modify and use this text in any way.	Read/Write
3	Manufacturer	Rosemount	Read
4	Model	Rosemount 936	Read
5	Final assembly number	A number that is used for identification purposes and is associated with the overall field device. Example: 1	Read/Write
6	Device id	Device unique identification number. Example: 1	Read

Information menu

Table 4-23: Information Menu Options

Number	Option	Description	Field type
1	Date	Any date chosen by the operator to be used for any purpose.	Read/Write
2	Descriptor	Text associated with the field device that can be used by the operator in any way.	Read/Write
3	Message	Text associated with the field device that can be used by the operator in any way.	Read/Write

Revision Numbers menu

Table 4-24: Revision Numbers Menu Options

Number	Option	Description	Field type
1	Universal rev	HART® protocol revision. Example: 7	Read
2	Fld dev rev	Field device revision. Example: 1	Read
3	Software rev	Field device software revision. Example: 1	Read
4	Hardware rev	Field device hardware revision. Example: 1	Read
5	Device Driver Revision	Device driver revision. Example: 01	Method

4.3 Service Tools menu

Figure 4-3: Service Tools Menu Structure

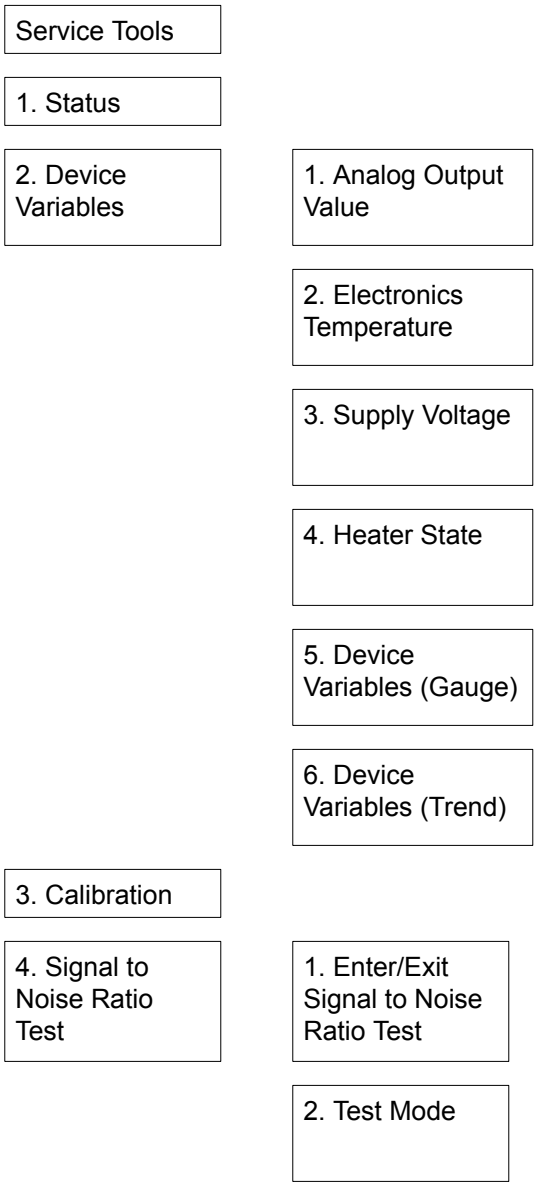


Table 4-25: Service Tools Menu Options

Number	Option	Description	Field type
1	Status	Detector status	Method
2	Device Variables	Device variables	Menu
3	Calibration	Calibration	Method
4	SNR Test	Signal to noise ratio test mode	Menu

4.3.1 Device Variables menu

Table 4-26: Device Variables Menu Options

Number	Option	Description	Field type
1	Analog Output Value	Primary variable: analog output value	Read
2	Electronics Temperature	Secondary variable: electronics temperature	Read
3	Supply Voltage	Tertiary variable: supply voltage	Read
4	Heater State	Quaternary variable: heater state	Read
5	Device Variables	Primary, secondary, and tertiary variables	Gauge
6	Device Variables	Primary, secondary, and tertiary variables	Trend

4.3.2 Signal to Noise Ratio (SNR) Test menu

Table 4-27: SNR Test Menu Options

Number	Option	Description	Field type
1	Enter/Exit SNR Test	Enter or exit SNR test mode.	Method
2	Test Mode	Indicates if the detector is currently at SNR test mode. The detector is not operational in SNR test mode.	Read

4.4 Device status

Status	Category	Description	Recommended action
0x01	Failed	Internal electrical fault	Send for repair.
0x02	Good	Performing optical alignment	Perform optical alignment and proceed to next step of stand by.
0x04	Good	Standby mode	Proceed to zero calibration.
0x08	Good	Performing calibration	Wait for calibration to complete.
0x10	Failed	Obscuration mode	Check optical alignment and source.
0x20	Maintenance	Block	Check optical alignment and source.
0x40	Good	Gas reading: Warning level	N/A
0x80	Good	Gas reading: Alarm level	N/A

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