SensAlarm® PLUS

HART Communications Board

(Highway Addressable Remote Transducer)

User Manual

Document No. 360-0128-01
(Revision F)

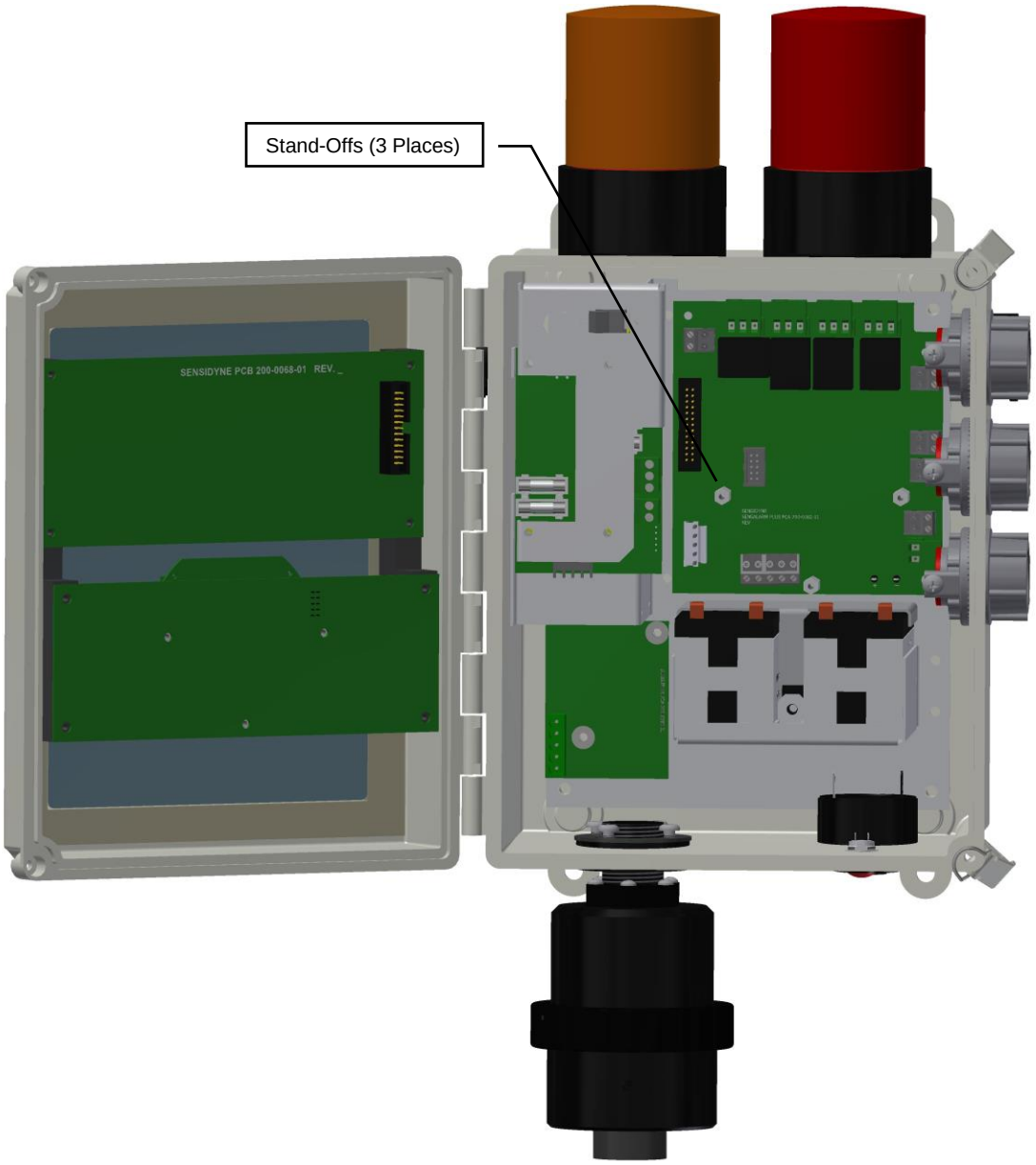
SENSIDYNE®

Sensidyne, LP.
1000 112th Circle N, Suite 100
St. Petersburg, Florida 33716 USA
800-451-9444 • +1 727-530-3602 • +1 727-539-0550 [fax]
web: www.sensidyne.com • **e-mail:** info@sensidyne.com

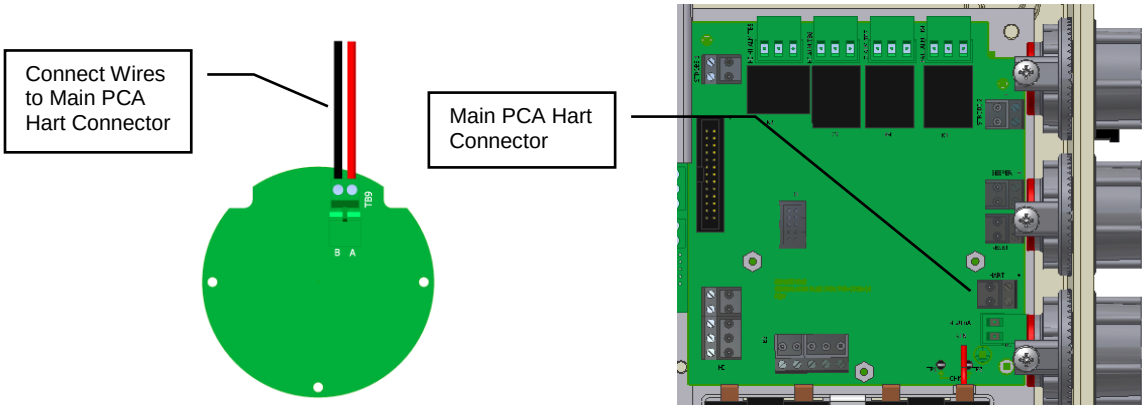
• Field Installation Kit

If you have ordered the field install kit p/n 821-0302-02, you will need to install the HART Card into your SensAlarm Plus Monitor as follows (If not skip to **Set Up**):

1. Disconnect Power - Open cover.
2. Remove screws from Main PCA.
3. Install (3) Hex Stand-offs on Main PCA.

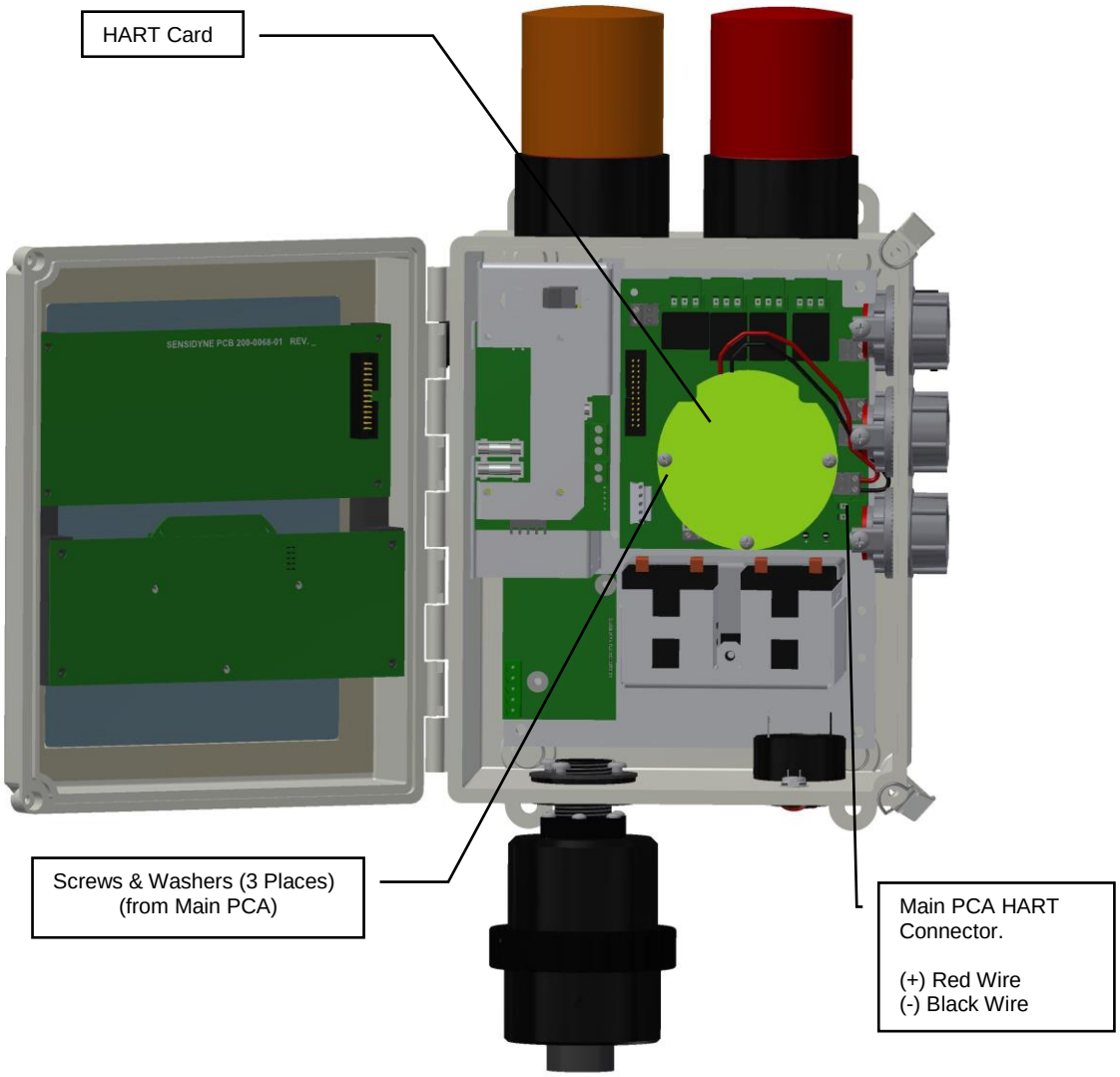


4. Remove HART Connector from Main PCA. Attach wires from **TB9** on Hart PCA
   (Red Wire from TB9 on Hart Plug to Main PCA (+) Hart Connector Pin)
   (Black Wire from TB9 on Hart Plug to Main PCA (-) Hart Connector Pin)



5. Place the HART Card on the Hex Stand-offs and gently couple the Electrical Plug into the jack on the Main Printed Circuit Board Assembly.

6. Re-Install the (3) Screws and Lock-Washers into the Hex Stand-offs.

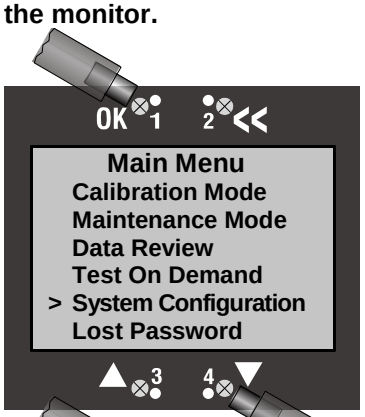


• Refer to SensAlarm Plus User Manual (P/N: 360-0126-01)

The following section is reprinted from the SensAlarm Plus User Manual. A properly installed HART Communication Board will indicate Hart Comm at step 5.2.5.5. If "Modbus Comm." Or "No Comm Installed" appears, an improper Board has been installed in the monitor.

5.2 Main Menu

As shown on the example display to the right, the top level (main) menu allows the selection of several submenus, documented below. Selecting **OK** brings up the submenus.



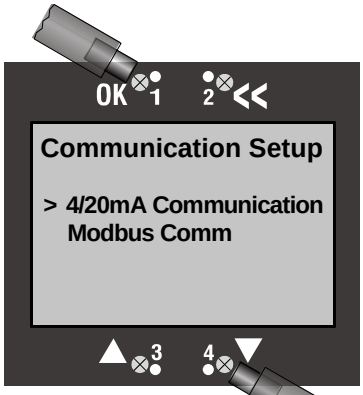
5.2.5 System Configuration

The System Configuration menu provides a large number of functions for configuring the operation of the unit. These include conducting a self test, alarm and relay setup, adjusting the 4 mA & 20 mA outputs, setting the date and time, communications setup, adjusting TOD cell functions, setting combustible sensor parameters, and setting a password.

5.2.5.5 Communication Setup

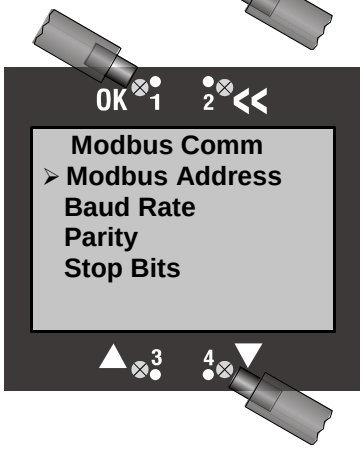
This menu provides adjustment for both standard and optional installed communications methods. Options installed will be displayed. Possible options are

Hart Comm
Modbus Comm



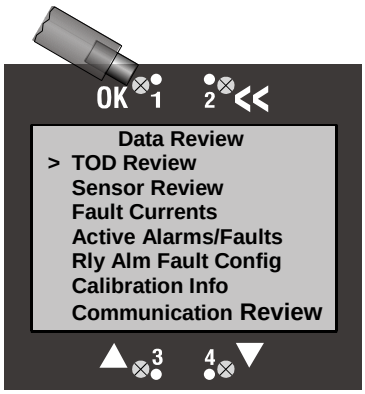
(If no Communications Option is installed Display will read)

No Comm Installed



5.2.3 Data Review

Data review allows the examination of data stored by the unit. Data reviews are available for the Test-On-Demand gas generating cell, the installed sensor, Fault Currents, Active Alarms/Faults, Rly Alm Fault Config., Calibration Info, and Communication Review.



5.2.3.7 Communication Review

The Communication Review screen displays the present setting Of the 4/20mA Current Loop (SensAlert sensor ID or None). Depending on which Communications Option is installed (None, HART, or Modbus) the display will vary.

5.1 Menu Map

5.5. Communication Setup

5.5.1. 4-20ma Communications

5.5.1.1. None

5.5.1.2. SensAlert Sensor ID

5.5.2. **Hart Comm or Modbus or No Comm Installed**

5.5.2.1. Hart Comm

5.5.2.1.1. – No User Adjustments Through this Interface Use Current Loop

5.5.2.2. Modbus Comm

5.5.2.2.1. Modbus Address

5.5.2.2.2. Baud Rate

5.5.2.2.3. Parity

5.5.2.2.4. Stop bits

5.5.2.3. No Comm Installed

5.5.2.3.1. -No Communications Board Installed

Implemented HART Commands

Variable	Value
PV (Primary Variable)	Gas Concentration
SV (Secondary Variable)	Not Used
TV (Tertiary Variable)	Not Used
QV (Quaternary Variable)	Not Used

This section provides information about the implementation of the HART Protocol on the Sensidyne SensAlert Plus Detector.

The basis of Sensidyne's implementation of the HART protocol is HART Revision 7.5 with 20 device specific commands. These commands will allow the HART host software to change alarm levels, enable/disable alarms, etc.

The following HART Commands have been implemented in the SensAlert Plus device. Hart commands are divided as follows: Universal Commands (UC), Common Practice Commands (CPC), and Device Specific Commands (DSC).

Universal Commands

#	Command	Description
1	Command 0	Read Unique Identifier
2	Command 1	Read Primary Variable
3	Command 2	Read Loop Current And Percent Of Range
4	Command 3	Read Dynamic Variables And Loop Current
5	Command 6	Write Polling Address
6	Command 7	Read Loop Configuration
7	Command 8	Read Dynamic Variable Classifications
8	Command 9	Read Device Variables with Status
9	Command 11	Read Unique Identifier Associated With Tag
10	Command 12	Read Message
11	Command 13	Read Tag, Descriptor, Date
12	Command 14	Read Primary Variable Transducer Information
13	Command 15	Read Device Information
14	Command 16	Read Final Assembly Number
15	Command 17	Write Message
16	Command 18	Write Tag, Descriptor, Date
17	Command 19	Write Final Assembly Number
18	Command 20	Read Long Tag
19	Command 21	Read Unique Identifier Associated With Long Tag
20	Command 22	Write Long Tag
21	Command 38	Reset Configuration Changed Flag
22	Command 48	Read Additional Device Status

Common Practice Commands

#	Command	Description
1	Command 33	Read Device Variables
2	Command 41	Perform Self-Test
3	Command 42	Perform Device Reset
4	Command 72	Squawk (**Wink functionality**)
5	Command 79	Write Device Variable

Device Specific Commands

Command	Description	Request data Bytes			Response data Bytes			Command-Specific Response Codes		
		Byte	Format	Description	Byte	Format	Description	Code	Class	Description
Command 128	Read Sensor Type	None			0 - 1	Unsigned-16	Sensor Type	0 1 - 5 6 7 - 127	Success Error	No Command-Specific Errors Undefined Device Specific Command Error Undefined
Command 129	Read Calibration Information	None			0 1 - 4 5 - 8 9 - 11 12 - 15	Unsigned-8 Float Float Date Time	Gas Concentration Unit Code Calibration Pre- Exposure Calibration Gas Concentration Date of Last Calibration Time of Last Calibration	0 1 - 5 6 7 - 127	Success Error	No Command-Specific Errors Undefined Device Specific Command Error Undefined
Command 130	Read TOD Information	None			0 1 - 4 5 - 7 8 - 11	Unsigned-8 Float Date Time	Gas Concentration Unit Code TOD Peak Value Date of Last TOD Time of Last TOD	0 1 - 5 6 7 - 127	Success Error	No Command-Specific Errors Undefined Device Specific Command Error Undefined
Command 131	Read S/W Versions	None			0 - 3 4 - 7 8 - 11 12 - 15	Float Float Float Float	Display S/W Version Comm S/W Version Head Unit S/W Version Sensor S/W Version	0 1 - 5 6 7 - 127	Success Error	No Command-Specific Errors Undefined Device Specific Command Error Undefined
Command 132	Read Maximum Gas Concentration, Date and Time	None			0 1 - 4 5 - 7 8 - 11	Unsigned-8 Float Date Time	Gas Concentration Unit Code Maximum Gas Concentration Date of Maximum Gas Concentration Time of Maximum Gas Concentration	0 1 - 5 6 7 - 127	Success Error	No Command-Specific Errors Undefined Device Specific Command Error Undefined
Command 133	Read Minimum Sensor Temperature, Date and Time	None			0 1 - 4 5 - 7 8 - 11	Unsigned-8 Float Date Time	Sensor Temperature Unit Code Minimum Sensor Temperature Date of Minimum Sensor Temperature Time of Minimum Sensor Temperature	0 1 - 5 6 7 - 127	Success Error	No Command-Specific Errors Undefined Device Specific Command Error Undefined
Command 134	Read Maximum Sensor Temperature, Date and Time	None			0 1 - 4 5 - 7 8 - 11	Unsigned-8 Float Date Time	Sensor Temperature Unit Code Maximum Sensor Temperature Date of Maximum Sensor Temperature Time of Maximum Sensor Temperature	0 1 - 5 6 7 - 127	Success Error	No Command-Specific Errors Undefined Device Specific Command Error Undefined
Command 135	Start Zeroing	None			None			0 1 - 5 6 7 - 127	Success Error	No Command-Specific Errors Undefined Device Specific Command Error Undefined

Command	Description	Request data Bytes			Response data Bytes			Command-Specific Response Codes		
		Byte	Format	Description	Byte	Format	Description	Code	Class	Description
Command 136	Write Calibration Gas Concentration	0	Unsigned-8	Gas Concentration Unit Code	0	Unsigned-8	Gas Concentration Unit Code	0	Success	No Command-Specific Errors
		1 - 4	Float	Calibration Gas	1 - 4	Float	Calibration Gas Concentration	1 - 4		Undefined
								5	Error	Too Few Data Bytes Received
								6	Error	Device Specific Command Error
								16	Error	Access Restricted
								7 - 127		Undefined
Command 137	Start/stop Calibration	0	Enumerated	Start/Stop Calibration	0	Enumerated	Start/Stop Calibration	0	Success	No Command-Specific Errors
								1 - 4		Undefined
								5	Error	Too Few Data Bytes Received
								6	Error	Device Specific Command Error
								7 - 15		Undefined
								16	Error	Access Restricted
								17 - 127		Undefined
Command 138	Read Alarm Settings	0	Unsigned-8	Alarm Number[1]	0	Unsigned-8	Alarm Number[1]	0	Success	No Command-Specific Errors
					1 - 4	Float	Alarm Setpoint	1		Undefined
								2	Error	Invalid Selection
								7 - 5		Undefined
								6	Error	Device Specific Command Error
								7 - 127		Undefined
Command 139	Write Alarm Settings	0	Unsigned-8	Alarm Number[1]	0	Unsigned-8	Alarm Number[1]	0	Success	No Command-Specific Errors
		1 - 4	Float	Alarm Setpoint	1 - 4	Float	Alarm Setpoint	1		Undefined
								2	Error	Invalid Selection
								3	Error	Passed Parameter Too Large
								4	Error	Passed Parameter Too Small
								5	Error	Too Few Data Bytes Received
								6	Error	Device Specific Command Error
								7 - 15		Undefined
								16	Error	Access Restricted
								17 - 127		Undefined
Command 140	Alarm Control	0	Enumerated	Alarm Control Code[2]	0	Enumerated	Alarm Control Code[2]	0	Success	No Command-Specific Errors
		1	Unsigned-8	Alarm Number[1]	1	Unsigned-8	Alarm Number[1]	1		Undefined
								2	Error	Invalid Selection
								3 - 4		Undefined
								5	Error	Too Few Data Bytes Received
								6	Error	Device Specific Command Error
								7 - 15		Undefined
								16	Error	Access Restricted
								17 - 127		Undefined

[1] See Alarm Number Table

[2] See Alarm Control Code Table

Command	Description	Request data Bytes			Response data Bytes			Command-Specific Response Codes		
		Byte	Format	Description	Byte	Format	Description	Code	Class	Description
Command 141	Fault Control	0	Enumerated	Fault Control Code[1]	0	Enumerated	Fault Control Code[1]	0	Success	No Command-Specific Errors
		1	Unsigned-8	Fault Number[2]	1	Unsigned-8	Fault Number[2]	1		Undefined
								2	Error	Invalid Selection
								3 - 4		Undefined
								5	Error	Too Few Data Bytes Received
								6	Error	Device Specific Command Error
								7 - 15		Undefined
								16	Error	Access Restricted
								17 - 127		Undefined
Command 142	Read Relay Settings	0	Unsigned-8	Relay Number[3]	0	Unsigned-8	Relay Number[3]	0	Success	No Command-Specific Errors
					1	Enumerated	Relay Status[4]	1		Undefined
					2	Enumerated	Relay Type[5]	2	Error	Invalid Selection
								7 - 5		Undefined
								6	Error	Device Specific Command Error
								7 - 127		Undefined
Command 143	Write Relay Settings	0	Unsigned-8	Relay Number[3]	0	Unsigned-8	Relay Number[3]	0	Success	No Command-Specific Errors
		1	Enumerated	Relay Status[4]	1	Enumerated	Relay Status[4]	1		Undefined
		2	Enumerated	Relay Type[5]	2	Enumerated	Relay Type[5]	2	Error	Invalid Selection
								3	Error	Passed Parameter Too Large
								4	Error	Passed Parameter Too Small
								5	Error	Too Few Data Bytes Received
								6	Error	Device Specific Command Error
								7 - 15		Undefined
								16	Error	Access Restricted
								17 - 127		Undefined
Command 144	Maintenance Mode Control	0	Enumerated	Maintenance Mode[6]	0	Enumerated	Maintenance Mode[6]	0	Success	No Command-Specific Errors
								1 - 4		Undefined
								5	Error	Too Few Data Bytes Received
								6	Error	Device Specific Command Error
								7 - 127		Undefined

[1] See Fault Control Code Table
[2] See Fault Number Table
[3] See Relay Number Table
[4] See Relay Status Table
[5] See Relay Type Table
[6] See Maintenance Mode Table

Command	Description	Request data Bytes			Response data Bytes			Command-Specific Response Codes		
		Byte	Format	Description	Byte	Format	Description	Code	Class	Description
Command 145	Start TOD	None			None			0	Success	No Command-Specific Errors
								1 - 5		Undefined
								6	Error	Device Specific Command Error
								7 - 127		Undefined
Command 146	Relay Latching	0	Enumerated	Relay Number[1]	0	Enumerated	Relay Number[1]	0	Success	No Command-Specific Errors
								1		Undefined
								2	Error	Invalid Selection
								3 - 4		Undefined
								5	Error	Too Few Data Bytes Received
								6	Error	Device Specific Command Error
								7 - 15		Undefined
								16	Error	Access Restricted
								17 - 127		Undefined
Command 147	Relay Latch Clear	None			None			0	Success	No Command-Specific Errors
								2 - 5		Undefined
								6	Error	Device Specific Command Error
								7 - 127		Undefined

[1] See Relay Number Table

Alarm Number

#	Alarm Number Code	Description
1	1	Alarm 1
2	2	Alarm 2
3	3	Alarm 3
4	4	TWA Alarm

Alarm Control Code

#	Alarm Control Code	Description
1	0	Disable
2	1	Enable

Fault Number

#	Fault Number Code	Description
1	1	Head Fail
2	2	Missing Sensor
3	3	Sensor Fail
4	4	Sensor End of Life
5	5	Output Current Track
6	6	Calibration Mode
7	7	Maintenance Mode
8	8	TOD Fail
9	9	TOD End of Life

Relay Number

#	Relay Number Code	Description
1	1	Relay 1
2	2	Relay 2
3	3	Relay 3
4	4	Relay 4

Relay Status

#	Relay Status Code	Description
1	0	Latched
2	1	Non-Latched

Relay Type

#	Relay Type Code	Description
1	0	Energized
2	1	De-energized

Fault Control Code

#	Fault Control Code	Description
1	0	Disable
2	1	Enable

Maintenance Mode Code

#	Maintenance Mode Code	Description
1	0	Disable
2	1	Enable

For further information about the HART protocol contact the HART Communication Foundation at www.hartcomm.org

HART Communication Foundation
9390 Research Blvd., Suite I-350
Austin TX 78759
Tel: 512-794-0369
Fax: 512-794-3904

Sensidyne, LP.
1000 112th Circle N, Suite 100
St. Petersburg, Florida 33716 USA
800-451-9444 • +1 727-530-3602 • +1 727-539-0550 [fax]
web: www.sensidyne.com • e-mail: info@sensidyne.com