HART® Field Device Specification

Meridian wiredHART

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1. INTRODUCTION

1.1 Scope

The Scott Safety Meridian 3/4-wire gas transmitter with WiredHART, Rev 1.0, complies with HART Protocol Revision 7.5. This document specifies all the device specific features and documents HART Protocol implementation details (e.g., the Engineering Unit Codes supported). The functionality of this Field Device is described sufficiently to allow its proper application in a process and its complete support in HART capable Host Applications.

1.2 Purpose

This specification is designed to compliment other documentation (e.g., the Meridian User Guide, 087-0049) by providing a complete, unambiguous description of this Field Device from a HART Communication perspective

1.3 Who should use this document?

The specification is designed to be a technical reference for HART capable Host Application Developers, System Integrators and knowledgeable End Users. It also provides functional specifications (e.g., commands, enumerations and performance requirements) used during Field Device development, maintenance and testing. This document assumes the reader is familiar with HART Protocol requirements and terminology.

1.4 Abbreviations and definitions

CPU	Central Processing Unit (of microprocessor)
EEPROM	Electrically-Erasable Read-Only Memory
ROM	Read-Only Memory

1.5 References

HART Smart Communications Protocol Specification. HCF_SPEC-12. Available from the HCF.

Meridian Universal Gas Detector User Manual, 087-0049. Available from the Scott Safety.

Meridian Universal Gas Detector Communication Guide, 087-0050. Available from Scott Safety.

2. DEVICE IDENTIFICATION

Manufacturer Name:	Scott Safety	**Model Name(s):**	Meridian
Manufacture ID Code:	6069 (Hex)	**Device Type Code:**	E1D4 (Hex)
HART Protocol Revision	7.5	**Device Revision:**	1
Number of Device Variables	None		
Physical Layers Supported	FSK		
Physical Device Category	Transmitter, Non-DC-isolated Bus Device		

3. PRODUCT OVERVIEW

The Meridian Gas Transmitter (3/4-wire) is a fixed-point device designed to provide continuous monitoring of combustible (LEL), toxic, and volatile organic chemicals. The device receives inputs from up to three (3) Meridian detector bodies that accept the Meridian sensors. Product Interfaces

4. PRODUCT INTERFACES

4.1 Process Interface

4.1.1 Sensor Input Channels

The detector body accepts all of the Meridian sensors. Refer to the User Guide for connection details. Operating ranges correspond to the capabilities of each sensor type.

4.2 Host Interface

4.2.1 Analog Output 1: Gas Concentration

The two-wire, 4-to-20mA current loop is connected on two terminals marked "LP1+" and "LP1-" of TB2 of the Meridian Relay/Terminal PCBA. Refer to the User Manual for connection details. This is the HART communications current loop of the transmitter, representing gas concentration, linearized and scaled according to the configured range of the sensor. This output corresponds to the Primary Variable. A linear over-range is provided. Device inhibit can be indicated by down-scale or up-scale current. The current is user selectable. Current values are shown in the table below.

	Values (percent of full scale)	Values (mA
Linear over-range	0 – 110	4 to 21.6
Device Fault		3.2
Device Inhibit		3.8 to 24
Multi-Drop current		4

4.3 Local Interfaces, Jumpers and Switches

4.3.1 Local Controls and Displays

Meridian has an onboard LCD screen that displays gas concentration as well as the devices configuration menu screens. The device is operated using a magnet to activate switches to navigate and make selections in the menus. Sensor calibration can also be performed.

4.3.2 Internal Jumpers and Switches

Two (2) jumpers on J3 of the Meridian power supply PCBA must be in the HART position.

Switch, SW1, of the Meridian power supply PCBA must be in the NON position.

Refer to the Communication Guide for further information.

5. DEVICE VARIABLES

This Field Device does not expose any Device Variables.

6. DYNAMIC VARIABLES

Two Dynamic Variables are implemented.

	Meaning	Units
PV	Sensor 1 Gas Concentration	%, %LEL, PPM, or PPB
SV	Sensor 2 Gas Concentration	%, %LEL, PPM, or PPB
TV	Sensor 3 Gas Concentration	%, %LEL, PPM, or PPB

7. STATUS INFORMATION

7.1 Device Status

Bit 2: Loop Current Saturated. Set when the current is below 3.2mA or above 21.6mA
Bit 3: Loop Current Fixed. Set when the loop current mode is disabled.

Bit 4: More Status Available. Set when a fault is detected. More status information is available via Command 48.
Bit 5: Cold Start. Set after a power cycle or Device Reset has occurred.
Bit 6: Configuration Changed. Set when a HART command modifies the transmitter configuration and reset by HART Command 38.
Bit 7: Device Malfunction. Set when the transmitter detects a fault.

7.2 Extended Device Status

Bit 1: Device Variable Alert. This bit is set when the transmitter is in fault.

7.3 Additional Device Status (Command #48)

Byte 8: Non-volatile memory defect
Byte 10: Analog Channels 1, 2, & 3 saturated.
Byte 13: Analog Channels 1, 2, & 3 fixed mode.

8. UNIVERSAL COMMANDS

Command #3 returns loop current and PV, SV, and TV.

Command #8 returns 90 for PV, SV and TV.

Command #9 responds to host commands having up to and including 3 device variable codes. Device variable 0 is the PV. Device variable 1 is the SV. Device variable 2 is the TV.

Command #14 returns sensor serial number as 0.

9. COMMON-PRACTICE COMMANDS

9.1 Supported Commands

40	Enter/Exit Fixed Current Mode
42	Perform Master Reset
45	Trim DAC Zero
46	Trim DAC Gain
48	Read Additional Device Status
54	Read Device Variable Information

9.2 Burst Mode

This Field Device does not support Burst Mode.

9.3 Catch Device Variable

This Field Device does not support Catch Device Variable.

10. DEVICE-SPECIFIC COMMANDS

The following device-specific commands are implemented:

203	Read Transmitter Information
204	Read Transmitter Alarm Parameters
205	Set Transmitter Alarm Parameters
206	Read Transmitter Date & Time
207	Set Transmitter Date & Time
208	Read Transmitter Editor Parameters
209	Set Transmitter Editor Parameters
210	Read Sensor Information General
211	Read Sensor Information Detailed
212	Read Sensor Information Dates
213	Read Sensor Information Live
214	Backup/Restore Transmitter Parameters
220	Read Sensor Setup General
221	Set Sensor Setup General
222	Read Sensor Setup Calibration
223	Set Sensor Setup Calibration
224	Read Sensor Setup Alarms
225	Set Sensor Setup Alarms
226	Read Sensor Names
227	Set Sensor Names
228	Read Sensor Calibration Information
229	Zero & Span Sensors
230	Set System Inhibit
231	Alarm Acknowledge
232	Read Sensor Offline Parameters
233	Set Sensor Offline
234	Read Loop Trim Parameters
235	Set Loop Trim Parameters

10.1 Command #203: Read Transmitter Information

Read the transmitters basic information.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-15	String	TX Name
16-29	String	TX Serial Number
30-37	String	TX Model Number
38-41	String	TX Code Version
42-44	HART date	Current Date
45-48	HART time	Current Time

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.2 Command #204: Read Transmitter Alarm Parameters

Read the transmitter alarm parameters.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	U8	Alarm logic 1
1-2	U16	Alarm off time delay 1
3	U8	Alarm logic 2
4-5	U16	Alarm off time delay 2
6	U8	Alarm logic 3
7-8	U16	Alarm off time delay 3

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.3 Command #205: Set Transmitter Alarm Parameters

Write the transmitter alarm parameters.

Request Data Bytes

Byte	Format	Description
0	U8	Alarm logic 1
1-2	U16	Alarm off time delay 1
3	U8	Alarm logic 2
4-5	U16	Alarm off time delay 2
6	U8	Alarm logic 3
7-8	U16	Alarm off time delay 3

Response Data Bytes

Byte	Format	Description
0	U8	Alarm 1 logic
1-2	U16	Alarm 1 off time delay
3	U8	Alarm 2 logic
4-5	U16	Alarm 2 off time delay
6	U8	Alarm 3 logic
7-8	U16	Alarm 3 off time delay

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too few data bytes

10.4 Command #206: Read Transmitter Date & Time

Read the transmitters current date and time.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-2	HART date	Current date
3-6	HART time	Current time

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.5 Command #207: Set Transmitter Date & Time

Write the transmitters date and time.

Request Data Bytes

Byte	Format	Description
0-2	HART date	Date
3-6	HART time	Time

Response Data Bytes

Byte	Format	Description
0-2	HART date	Current date
3-6	HART time	Current time

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too few data bytes

10.6 Command #208: Read Transmitter Editor Parameters

Read the transmitter name, latitude and longitude.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-15	String	Transmitter name
16-25	String	Transmitter latitude
26-35	String	Transmitter longitude

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.7 Command #209: Set Transmitter Editor Parameters

Write the transmitter name, latitude and longitude.

Request Data Bytes

Byte	Format	Description
0-15	String	Transmitter name
16-25	String	Transmitter latitude
26-35	String	Transmitter longitude

Response Data Bytes

Byte	Format	Description
0-15	String	Transmitter name
16-25	String	Transmitter latitude
26-35	String	Transmitter longitude

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too few data bytes

10.8 Command #210: Read Sensor Information General

Read sensor general information.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-13	String	Sensor 1 serial number
14	U8	Gas type 1
15	U8	Gas units 1
16-23	String	Sensor 1 model number
24-37	String	Sensor 2 serial number
38	U8	Gas type 2
39	U8	Gas units 2
40-47	String	Sensor 2 model number
48-61	String	Sensor 3 serial number
62	U8	Gas type 3
63	U8	Gas units 3
64-71	String	Sensor 3 model number

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.9 Command #211: Read Sensor Information Detailed

Read sensor detailed information.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-3	Float	Current Cal Factor 1
4-7	Float	Current Cal Temperature 1
8-9	U16	Zero Offset 1
10	U8	Sensor Life 1
11	U8	Cal Required 1
12-15	Float	Current Cal Factor 2
16-19	Float	Current Cal Temperature 2
20-21	U16	Zero Offset 2
22	U8	Sensor Life 2
23	U8	Cal Required 2
24-27	Float	Current Cal Factor 3
28-31	Float	Current Cal Temperature 3
32-33	U16	Zero Offset 3
34	U8	Sensor Life 3
35	U8	Cal Required 3

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.10 Command #212: Read Sensor Information Dates

Read sensor calibration dates.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-2	HART date	Mfg Cal date 1
3-5	HART date	Install Cal Date 1
6-8	HART date	Prior Cal Date 1
9-11	HART date	Current Cal Date 1
12-14	HART date	Mfg Cal date 2
15-17	HART date	Install Cal Date 2
18-20	HART date	Prior Cal Date 2
21-23	HART date	Current Cal Date 2
24-26	HART date	Mfg Cal date 3
27-29	HART date	Install Cal Date 3
30-32	HART date	Prior Cal Date 3
33-35	HART date	Current Cal Date 3

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.11 Command #213: Read Sensor Information Live

Read sensor live information.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-3	Float	Gas Concentration 1
4-5	U16	Voltage 1
6-9	Float	Temperature 1
10-11	U16	Gas A-D 1
12-15	Float	Gas Concentration 2
16-17	U16	Voltage 2
18-21	Float	Temperature 2
22-23	U16	Gas A-D 2
24-27	Float	Gas Concentration 3
28-29	U16	Voltage 3
30-33	Float	Temperature 3
34-35	U16	Gas A-D 3

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.12 Command #214: Backup / Restore Transmitter Parameters

Backup and restore transmitter parameters.

Request Data Bytes

Byte	Format	Description
0	U8	Backup (0) or Restore (1)

Response Data Bytes

Byte	Format	Description
None		

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes

10.13 Command #220: Read Sensor Setup General

Read sensor general setup parameters.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	U8	Gas Range Index 1
1-4	Float	Deadband 1
5-6	U16	Sensor Warmup Time 1
7	U8	Display Negative 1
8	U8	Gas Type 1
9	U8	Gas Units 1
10	U8	Gas Range Index 2
11-14	Float	Deadband 2
15-16	U16	Sensor Warmup Time 2
17	U8	Display Negative 2
18	U8	Gas Type 2
19	U8	Gas Units 2
20	U8	Gas Range Index 3
21-24	Float	Deadband 3
25-26	U16	Sensor Warmup Time 3
27	U8	Display Negative 3
28	U8	Gas Type 3
29	U8	Gas Units 3

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.14 Command #221: Set Sensor Setup General

Set sensor general setup parameters.

Request Data Bytes

Byte	Format	Description
0	U8	Gas Range Index 1
1-4	Float	Deadband 1
5-6	U16	Sensor Warmup Time 1
7	U8	Display Negative 1
8	U8	Gas Type 1
9	U8	Gas Units 1
10	U8	Gas Range Index 2
11-14	Float	Deadband 2
15-16	U16	Sensor Warmup Time 2
17	U8	Display Negative 2
18	U8	Gas Type 2
19	U8	Gas Units 2
20	U8	Gas Range Index 3
21-24	Float	Deadband 3
25-26	U16	Sensor Warmup Time 3
27	U8	Display Negative 3
28	U8	Gas Type 3
29	U8	Gas Units 3

Response Data Bytes

Byte	Format	Description
0	U8	Gas Range Index 1
1-4	Float	Deadband 1
5-6	U16	Sensor Warmup Time 1
7	U8	Display Negative 1
8	U8	Gas Type 1
9	U8	Gas Units 1
10	U8	Gas Range Index 2

11-14	Float	Deadband 2
15-16	U16	Sensor Warmup Time 2
17	U8	Display Negative 2
18	U8	Gas Type 2
19	U8	Gas Units 2
20	U8	Gas Range Index 3
21-24	Float	Deadband 3
25-26	U16	Sensor Warmup Time 3
27	U8	Display Negative 3
28	U8	Gas Type 3
29	U8	Gas Units 3

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes

10.15 Command #222: Read Sensor Setup Calibration

Read sensor calibration parameters.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-3	Float	Calibration Gas Concentration 1
4-5	U16	Calibration Period 1
6-7	U16	Inhibit Timer 1
8-9	U16	Purge Timer 1
10	U8	Gas Range Index 1
11-14	Float	Calibration Gas Concentration 2
15-16	U16	Calibration Period 2
17-18	U16	Inhibit Timer 2
19-20	U16	Purge Timer 2
21	U8	Gas Range Index 2
22-25	Float	Calibration Gas Concentration 3
26-27	U16	Calibration Period 3
28-29	U16	Inhibit Timer 3
30-31	U16	Purge Timer 3
32	U8	Gas Range Index 3

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.16 Command #223: Set Sensor Setup Calibration

Set sensor calibration parameters.

Request Data Bytes

Byte	Format	Description
0-3	Float	Calibration Gas Concentration 1
4-5	U16	Calibration Period 1
6-7	U16	Inhibit Timer 1
8-9	U16	Purge Timer 1
10	U8	Gas Range Index 1
11-14	Float	Calibration Gas Concentration 2
15-16	U16	Calibration Period 2
17-18	U16	Inhibit Timer 2
19-20	U16	Purge Timer 2
21	U8	Gas Range Index 2
22-25	Float	Calibration Gas Concentration 3
26-27	U16	Calibration Period 3
28-29	U16	Inhibit Timer 3
30-31	U16	Purge Timer 3
32	U8	Gas Range Index 3

Response Data Bytes

Byte	Format	Description
0-3	Float	Calibration Gas Concentration 1
4-5	U16	Calibration Period 1
6-7	U16	Inhibit Timer 1
8-9	U16	Purge Timer 1
10	U8	Gas Range Index 1
11-14	Float	Calibration Gas Concentration 2
15-16	U16	Calibration Period 2
17-18	U16	Inhibit Timer 2
19-20	U16	Purge Timer 2
21	U8	Gas Range Index 2

22-25	Float	Calibration Gas Concentration 3
26-27	U16	Calibration Period 3
28-29	U16	Inhibit Timer 3
30-31	U16	Purge Timer 3
32	U8	Gas Range Index 3

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes

10.17 Command #224: Read Sensor Setup Alarms

Read sensor alarms set and reset parameters.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-3	Float	Alarm 1 Set Point 1
4-7	Float	Alarm 1 Reset Point 1
8-11	Float	Alarm 2 Set Point 1
12-15	Float	Alarm 2 Reset Point 1
16-19	Float	Alarm 3 Set Point 1
20-23	Float	Alarm 3 Reset Point 1
24-27	Float	Alarm 1 Set Point 2
28-31	Float	Alarm 1 Reset Point 2
32-35	Float	Alarm 2 Set Point 2
36-39	Float	Alarm 2 Reset Point 2
40-43	Float	Alarm 3 Set Point 2
44-47	Float	Alarm 3 Reset Point 2
48-51	Float	Alarm 1 Set Point 3
52-55	Float	Alarm 1 Reset Point 3
56-59	Float	Alarm 2 Set Point 3
60-63	Float	Alarm 2 Reset Point 3
64-67	Float	Alarm 3 Set Point 3
68-71	Float	Alarm 3 Reset Point 3

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.18 Command #225: Set Sensor Setup Alarms

Set sensor alarms set and reset parameters.

Request Data Bytes

Byte	Format	Description
0-3	Float	Alarm 1 Set Point 1
4-7	Float	Alarm 1 Reset Point 1
8-11	Float	Alarm 2 Set Point 1
12-15	Float	Alarm 2 Reset Point 1
16-19	Float	Alarm 3 Set Point 1
20-23	Float	Alarm 3 Reset Point 1
24-27	Float	Alarm 1 Set Point 2
28-31	Float	Alarm 1 Reset Point 2
32-35	Float	Alarm 2 Set Point 2
36-39	Float	Alarm 2 Reset Point 2
40-43	Float	Alarm 3 Set Point 2
44-47	Float	Alarm 3 Reset Point 2
48-51	Float	Alarm 1 Set Point 3
52-55	Float	Alarm 1 Reset Point 3
56-59	Float	Alarm 2 Set Point 3
60-63	Float	Alarm 2 Reset Point 3
64-67	Float	Alarm 3 Set Point 3
68-71	Float	Alarm 3 Reset Point 3

Response Data Bytes

Byte	Format	Description
0-3	Float	Alarm 1 Set Point 1
4-7	Float	Alarm 1 Reset Point 1
8-11	Float	Alarm 2 Set Point 1
12-15	Float	Alarm 2 Reset Point 1
16-19	Float	Alarm 3 Set Point 1
20-23	Float	Alarm 3 Reset Point 1
24-27	Float	Alarm 1 Set Point 2

28-31	Float	Alarm 1 Reset Point 2
32-35	Float	Alarm 2 Set Point 2
36-39	Float	Alarm 2 Reset Point 2
40-43	Float	Alarm 3 Set Point 2
44-47	Float	Alarm 3 Reset Point 2
48-51	Float	Alarm 1 Set Point 3
52-55	Float	Alarm 1 Reset Point 3
56-59	Float	Alarm 2 Set Point 3
60-63	Float	Alarm 2 Reset Point 3
64-67	Float	Alarm 3 Set Point 3
68-71	Float	Alarm 3 Reset Point 3

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes

10.19 Command #226: Read Sensor Names

Read sensor name fields.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0-15	String	Sensor 1 Name
16-23	String	Sensor 1 Gas Name Line 1
24-31	String	Sensor 1 Gas Name Line 2
32-47	String	Sensor 2 Name
48-55	String	Sensor 2 Gas Name Line 1
56-63	String	Sensor 2 Gas Name Line 2
64-79	String	Sensor 3 Name
80-87	String	Sensor 3 Gas Name Line 1
88-95	String	Sensor 3 Gas Name Line 2

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.20 Command #227: Set Sensor Names

Set sensor name fields.

Request Data Bytes

Byte	Format	Description
0-15	String	Sensor 1 Name
16-23	String	Sensor 1 Gas Name Line 1
24-31	String	Sensor 1 Gas Name Line 2
32-47	String	Sensor 2 Name
48-55	String	Sensor 2 Gas Name Line 1
56-63	String	Sensor 2 Gas Name Line 2
64-79	String	Sensor 3 Name
80-87	String	Sensor 3 Gas Name Line 1
88-95	String	Sensor 3 Gas Name Line 2

Response Data Bytes

Byte	Format	Description
0-15	String	Sensor 1 Name
16-23	String	Sensor 1 Gas Name Line 1
24-31	String	Sensor 1 Gas Name Line 2
32-47	String	Sensor 2 Name
48-55	String	Sensor 2 Gas Name Line 1
56-63	String	Sensor 2 Gas Name Line 2
64-79	String	Sensor 3 Name
80-87	String	Sensor 3 Gas Name Line 1
88-95	String	Sensor 3 Gas Name Line 2

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes

10.21 Command #228: Read Sensor Information Calibration

Read sensor calibration information.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	U8	Sensor 1 Life
1-4	Float	Current Calibration Factor 1
5	U8	Sensor 1 Zero
6	U8	Sensor 1 Span
7	U8	Sensor 2 Life
8-11	Float	Current Calibration Factor 2
12	U8	Sensor 2 Zero
13	U8	Sensor 2 Span
14	U8	Sensor 3 Life
15-18	Float	Current Calibration Factor 3
19	U8	Sensor 3 Zero
20	U8	Sensor 3 Span

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.22 Command #229: Zero and Span Sensors

Zero and span (calibrate) sensors.

Request Data Bytes

Byte	Format	Description
0	U8	Sensor 1 zero (T/F)
1	U8	Sensor 1span (T/F)
2	U8	Sensor 2 zero (T/F)
3	U8	Sensor 2span (T/F)
4	U8	Sensor 3 zero (T/F)
5	U8	Sensor 4span (T/F)

Response Data Bytes

Byte	Format	Description
0	U8	Sensor 1 Life
1-4	Float	Current Calibration Factor 1
5	U8	Sensor 1 Zero
6	U8	Sensor 1 Span
7	U8	Sensor 2 Life
8-11	Float	Current Calibration Factor 2
12	U8	Sensor 2 Zero
13	U8	Sensor 2 Span
14	U8	Sensor 3 Life
15-18	Float	Current Calibration Factor 3
19	U8	Sensor 3 Zero
20	U8	Sensor 3 Span

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes

10.23 Command #230: Set System Inhibit

Put the transmitter into System Inhibit.

Request Data Bytes

Byte	Format	Description
0	U8	Enable Inhibit (1) or Disable Inhibit (0)

Response Data Bytes

Byte	Format	Description
None		

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes

10.24 Command #231: Alarm Acknowledge

Alarm acknowledge.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
None		

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.25 Command #230: Read Sensor Offline Settings

Read sensor online/offline status.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Bits	bit 3: Sensor 1 - (1) online (0) offline bit 4: Sensor 2 - (1) online (0) offline bit 5: Sensor 3 - (1) online (0) offline

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.26 Command #231: Set Sensor Offline

Set sensor offline.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	Bits	bit 3: Sensor 1 - (0)set sensor offline bit 4: Sensor 2 - (0)set sensor offline bit 5: Sensor 3 - (0)set sensor offline

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes

10.27 Command #234: Read Loop Trim Parameters

Read sensor online/offline status.

Request Data Bytes

Byte	Format	Description
None		

Response Data Bytes

Byte	Format	Description
0	S8	Current Loop 1: 4mA offset
1	S8	Current Loop 1: 20mA offset
2	S8	Current Loop 2: 4mA offset
3	S8	Current Loop 2: 20mA offset
4	S8	Current Loop 3: 4mA offset
5	S8	Current Loop 4: 20mA offset

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

10.28 Command #235: Set Loop Trim Parameters

Read sensor online/offline status.

Request Data Bytes

Byte	Format	Description
0	S8	Current Loop 1: 4mA offset
1	S8	Current Loop 1: 20mA offset
2	S8	Current Loop 2: 4mA offset
3	S8	Current Loop 2: 20mA offset
4	S8	Current Loop 3: 4mA offset
5	S8	Current Loop 4: 20mA offset

Response Data Bytes

Byte	Format	Description
0	S8	Current Loop 1: 4mA offset
1	S8	Current Loop 1: 20mA offset
2	S8	Current Loop 2: 4mA offset
3	S8	Current Loop 2: 20mA offset
4	S8	Current Loop 3: 4mA offset
5	S8	Current Loop 4: 20mA offset

Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
5	Error	Too Few Data Bytes

11. PERFORMANCE

11.1 Sampling Rates

The PV, SV and TV are updated every 2 seconds.

11.2 Power-Up

On power up the transmitter will go through an initialization sequence which takes approximately 15 seconds. During this time the device will not respond to HART commands and the analog output will be set to the Inhibit level. The analog output will stay in Inhibit level until sensor 1 has completed its warm-up time or if a fault occurs. If a fault occurs the output will switch to the fault level. If no fault occurs the analog output will switch to active signaling mode.

11.3 Reset

Command 42 ("Device Reset") causes the device to reset its microprocessor. The resulting restart is identical to the normal power up sequence.

11.4 Self-Test

Command 41 is not supported in the HART interface.

Self-test is executed during the device initialization at power up and following Command 42 ("Device Reset"). The self-test includes:

- Microprocessor
- Oscillator drift
- Transmitter input voltage
- Sensor communications
- RAM
- Program ROM
- Configuration storage EEPROM

During device initialization at power-up or reset, the analog output is set to Inhibit level and the device will not respond to HART commands.

Continuous self-testing is also part of the normal device operation. The same checks are made, but have no impact on HART communications.

11.5 Command Response Times

Minimum	20ms
Typical	50ms
Maximum	100mS

11.6 Busy and Delayed-Response

The transmitter may respond with "busy" status if a further command is received while self-test is underway.

Delayed-response is not used.

11.7 Long Messages

The largest data field used is in the response to Command 226: 98 bytes including the two status bytes.

11.8 Non-Volatile Memory

EEPROM is used to hold the device's configuration parameters. New data is written to this memory immediately on execution of a write command.

11.9 Modes

Fixed current mode is implemented, using Command 40. This mode is cleared by power loss or reset.

11.10 Write Protection

Not implemented.

11.11 Damping

No additional damping is provided beyond the sampling of the sensor.

ANNEX A. CAPABILITY CHECKLIST

Manufacturer, model and revision	Scott Safety, Meridian Rev1.0
Device type	Transmitter
HART revision	7.5
Device Description available	Yes
Number of sensors	Up to 3
Number and type of host side signals	1: 4 - 20mA analog
Number of Device Variables	0
Number of Dynamic Variables	3
Mappable Dynamic Variables	No
Number of common-practice commands	17
Number of device-specific commands	2
Bits of additional device status	8
Alternative operating modes	No
Burst mode	No
Write-protection	No

ANNEX B. DEFAULT CONFIGURATION

Parameter	Default value
Lower Range Value	0
Upper Range Value	Sensor specific
Number of response preambles	5

ANNEX C. REVISION HISTORY

A1. Rev 1.0 Initial release