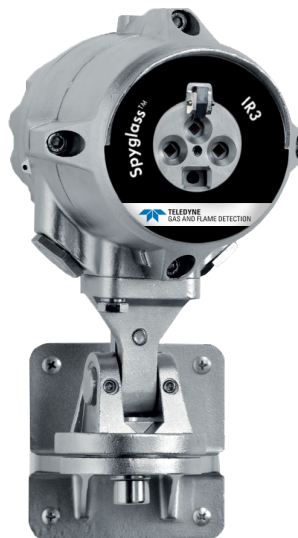




TELEDYNE
GAS AND FLAME DETECTION
Everywhereyoulook™

Guide

SPYGLASS HART COMMUNICATION



User manuals in other languages are available on Website
<https://teledynegasandflamedetection.com>



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All of the information that is provided in this document is accurate to the best of our knowledge.

As a result of continuous research and development, the specifications of this product may be changed without prior notice.

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Spyglass SG50-F

HART Communication
GUIDE

1 Introduction

1.1 General description

HART (Highway Addressable Remote Transducer) establishes a digital data communication over 4-20mA Current Loop cables. The HART protocol uses FSK modulation signals superimposed at a low level on top of the 4-20mA current.

The HART implementation on the FlameSpec IR3/UV-IR Flame Detector allows the Control Unit to monitor the status of the detector, set User Configuration and initiate field diagnostics.

The HART protocol implemented in this FlameSpec detector corresponds to HART rev. 7.0.

It supports HART Universal commands including Common Practice and Device Specific Commands.

This document provides guidance for establishing HART communication and describe the HART menu structure when using the FlameSpec with a HART Handheld Communicator or PC-Host HART application.

1.2 Product Overview

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.

This HART user manual refers to the FlameSpec family of flame detectors of the following models:

FLS-IR3-HD

FLS-IR3-H2-HD

FLS-UV-IR-HD

FLS-UV-IR-F-HD

FLS-IR3

FLS-IR3-H2

FLS-UV-IR

FLS-UV-IR-F

2 4-20mA Current Loop Wiring

The FGD FlameSpec detector's 4-20mA current output can act as both a source or a sink transmitter and can be 3-wire or 4-wire connected.

Please refer to the specific detector User's Manual for detailed wiring.

The following drawing, Figure 1, shows how to wire the detector to act as a current source isolated transmitter using external 250Ω resistor for HART handheld monitoring:

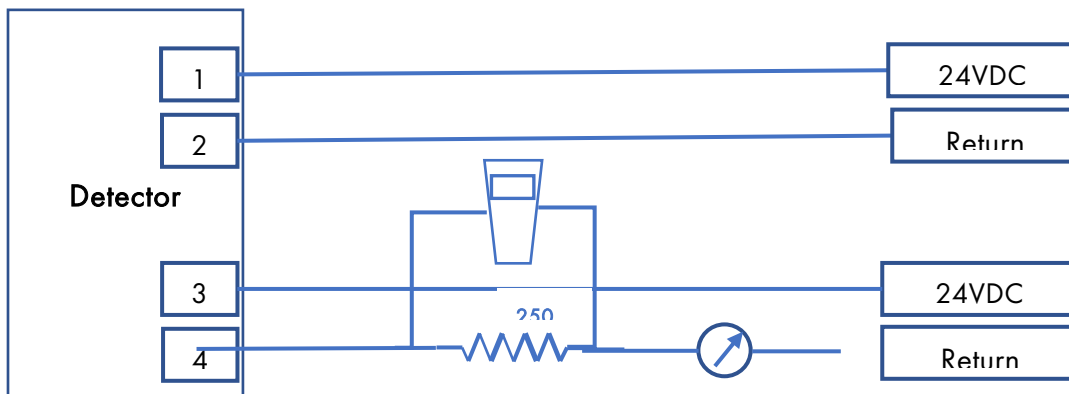


Figure 1 – Connecting Handheld device using 250Ω resistor

Another option, as show in figure 2, is to connect the FlameSpec Detector to PLC HART interface with internal resistor of 250 Ohm.

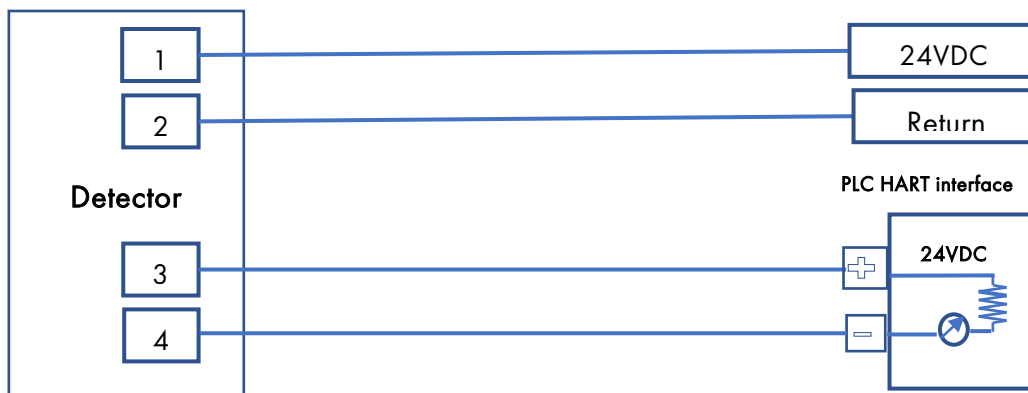


Figure 2 – Connecting the detector to PLC with internal 250Ω resistor

3 Multidrop connection

In addition to Point-To-Point connection, the HART protocol also supports Multidrop mode. In multidrop operation mode each device exchanges data with the control device only via the HART protocol. The analog current signal is used to energize the 4-20 wires by providing a steady current of 4mA.

4 HART Device description language (DLL)

The HART protocol incorporates a concept called the Device Description Language (DDL) 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, regardless of manufacturer, allowing full functionality from any HART device.

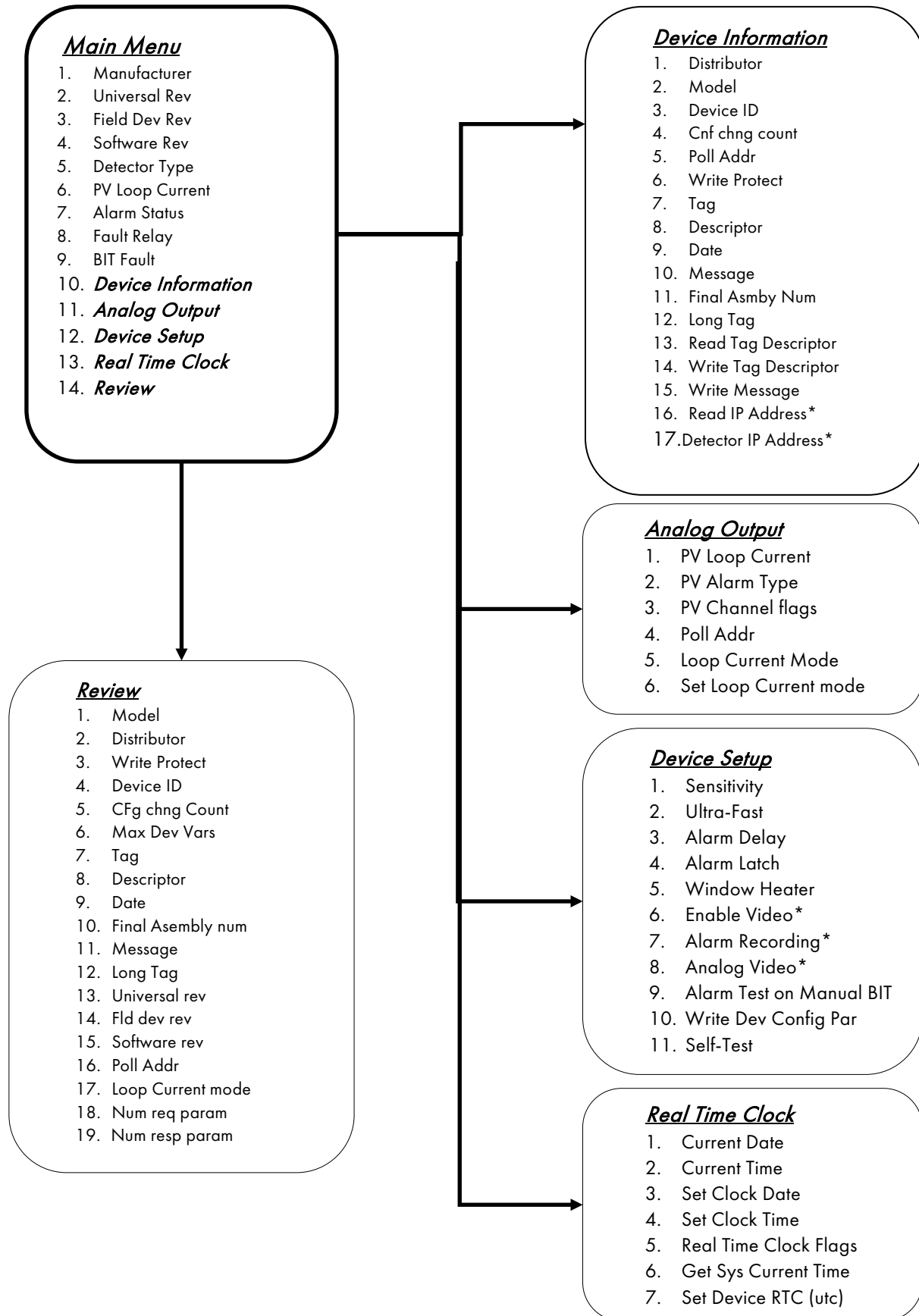
4.1 Hart Device description File (DD)

Any HART master communicator device can communicate with the FlameSpec detectors with the default DD file to operate basic HART 7.0 Universal commands and to do basic HART configuration.

To allow access to the HART Configuration option of the detector and to observe the Fire Alarm status and Fault status the HART master should be loaded with appropriate Device Descriptor (DD) according to the detector type.

To obtain the DD file please contact your local FGD support team.

5 HART Menu Structure



5.1 HART ROOT MENU

When HART communication is established, the first menu displayed is the FlameSpec Root Menu.

1	Manufacturer	Manufacturer ID assigned by HART Foundation: FGD Code is 0x6126	Read
2	Universal Rev	HART protocol Major Revision: 7	Read
3	Field Dev Rev	Field Device Revision: indicates the revision level: 1	Read
4	Software Rev	Indicates detector firmware internal revision	Read
5	Detector Type	HART registered FGD FlameSpec Detector Type: See Annex B	Read
6	PV Loop Current	Indicates the actual analog 4-20mA current of the detector output	Read
7	Alarm Status	Indicates the Alarm level: none, Early Alarm or Alarm	Read
8	Fault Relay	Indicate detector Fault State: Fault State or Normal	Read
9	BIT Fault	Indicated Self-Built-In-Test Status result: Fault or none	Read
10	Device Information	Showing Field Device detailed information	Sub menu
11	Analog Output	Controlling Analog Output	Sub menu
12	Device Setup	Setting User Config	Sub menu
13	Real Time Clock	Setting Real Time Clock Sub Menu	Sub menu
14	Review	Displaying review of all HART universal variables	Sub menu

5.2 DEVICE INFORMATION SUB MENU

1	Distributor	FGD – Fire & Gas Detection Tech.		Read
2	Model	FGD Device Type See Annex A		Read
3	Dev ID	Device unique identification number.		Read
4	Config. Changed Counter	The number of Device Configuration changes from the factory configurations.		Read
5	Poll Addr	Address used by the host to identify a field device.	0-64	Rd/Wr
6	Write Protect	Indicates Write Protect Mode: Currently None		Read
7	TAG	Text field (16 chars) can be associated with the field device installation and can be modified and used by the operator in any way.		Rd/Wr
8	Descriptor	Text associated with the field device that can be used by the operator in any way.		Rd/Wr
9	Date	The operator can define any date	MM/DD/YYYY	Rd/Wr
10	Message	Text associated with the field device that can be used by the operator in any way		Rd/Wr
11	Final Asmby Num	A number that is used for identification purposes, and is associated with the overall field device.		Rd/Wr
12	Long Tag	Text field (32 chars) that is associated with the field device installation. HART command 21 associated with Long Tag for unique device identification.		Rd/Wr
13	Read Tag, Descriptor and date	Read back those fields from detector's non-volatile memory	Button	
14	Write Tag, Descriptor and date	Write those fields into the non-volatile detector memory.	Button	
15	Write Message	Write the message into the detector non-volatile memory	Button	
16	Read IP Address	Refreshing Detector IP Address. (HD models only)	Button	
17	Detector IP Address	The latest known IP address of the detector, to refresh the address click on the "Read IP Address" button (HD models only)		Read

5.3 ANALOG OUTPUT

1	PV Loop Current	Indicates the actual analog 4-20mA current of the detector output		Read
2	PV Alarm type			Read
3	PV Channel flags	If set indicate input analog channel.		Read
4	Poll addr	Device Polling Address.	0-64	Rd/Wr
5	Loop Current Mode	Disable the Loop Current Mode for Multidrop Mode	Enable, Disable	Rd/Wr
6	Set Loop Current Mode	Send the Polling address and the Loop Current Mode fields to the detector.	Button	

5.4 DEVICE SETUP

1	Sensitivity	Sensitivity of detection	Low, Medium, High, Extreme	Multi Op Input
2	Ultra-Fast	Allows detection of fireballs and explosions within 5 or 40 milliseconds (depending on model type)	Enable, Disable	Multi Op Input
3	Alarm Delay	Delay alarm output on fire detection In second	0, 5, 10, 20, 30	Multi Op Input
4	Alarm Latch	On fire detection Latch alarm outputs	Yes, No	Multi Op Input
5	Window Heater	Activate the Window Heater automatically depending on temperature	Enable, Disable	Multi Op Input
6	Enable Video	Provide video output and record flame alarm events (HD models only)	Enable, Disable	Multi Op Input
7	Alarm Recording	Duration of post alarm recording event in minutes (HD models only)	1, 2, 3	Multi Op Input
8	Analog Video	Composite Analog Video output (HD models only)	Disable, NTSC, PAL	Multi Op Input

9	Alarm Test on Manual BIT	Activate Test Alarm outputs after successful manual BIT	Enable, Disable	Multi Op Input
10	Write Device Config Param	Update device internal configuration parameters	Button	
11	Self-Test	Initiate built-in-test in the detector	Button	

5.5 REAL TIME CLOCK SETTING

This menu used to set and control internal Real-Time Clock:

1	Current Date	Displaying Detector RTC current Date		Read
2	Current Time	Displaying Detector RTC current Time		Read
3	Set Clock Date	Setting new Date for the RTC.	MM/DD/YYYY	Rd/Wr
4	Set Clock Time	Setting new Time for the RTC.	UTC time	Rd/Wr
5	Real Time Clock Flags	Displaying RTC Fags		Read
6	Get System Current Time	Get Current Time and Date from the System	Button	
7	Set Device RTC	Address used by the host to identify a field device.	Button	

5.6 HART VARIABLES REVIEW

1	Model	FGD FlameSpec Detector Model	Read
2	Distributor	Private Label code for Distributor	Read
3	Write protect	Field Device Write Protect mode	
4	Dev ID	Unique Device ID	Read
5	Cfg chng count	Configuration Change Counter	Read
6	Max dev vars	Maximum number of Internal Device Variables	Read
7	Tag	HART Protocol Tag field content	Read

8	Descriptor	HART Protocol Descriptor field content	Read
9	Date	HART Protocol Date field content	Read
10	Final asmbly num	HART Protocol Final Assembly Number Field content	Read
11	Message	HART Protocol Message field content	Read
12	Long Tag	HART Protocol Long Tag field content	Read
13	Universal Rev	HART Protocol Field Device revision.	Read
14	Fld dev Rev	HART Protocol Field Device hardware revision.	Read
15	Software Rev	HART Protocol Field Device software revision.	Read
16	Poll Addr	HART slave device polling address	Read
17	Loop Current Mode	Actual Loop Current Mode	Read
18	Num Req Preams	Min. number of Preambles required to be sent with the message response	Read
19	Num Resp Preams	Min. number of Preambles required for request message	Read

ANNEX A: FGD FlameSpec Detectors Type Code

Code	Detector Type
0xE46F	FLS-IR3-HD, FLS-IR3-H2-HD
0x4E70	FLS-IR3, FLS-IR3-H2
0x4E71	FLS-UV-IR-HD, FLS-UV-IR-F-HD
0x4E72	FLS-UV-IR, FLS-UV-IR-F

ANNEX B: FGD FlameSpec Detectors Models Type Code

Code	Detector Type
10	FLS-IR3-HD
14	FLS-IR3-H2-HD
12	FLS-IR3
15	FLS-IR3-H2
13	FLS-UV-IR-HD
17	FLS-UV-IR-F-HD
11	FLS-UV-IR
16	FLS-UV-IR-F



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