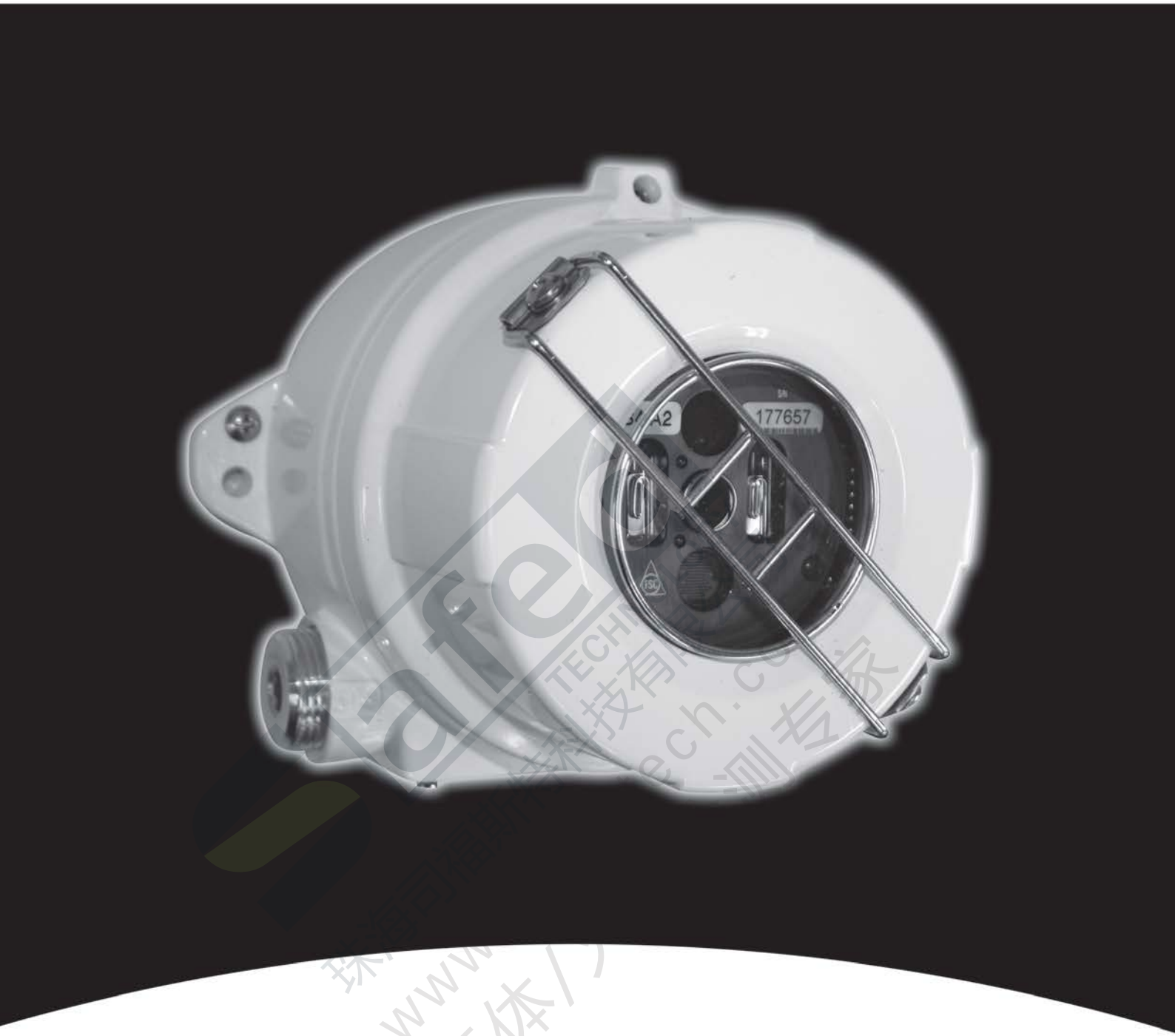
User Guide

Honeywell



SS4-A HART

▪ Revision History			
Author	**Revision**	**Date**	**Comments**
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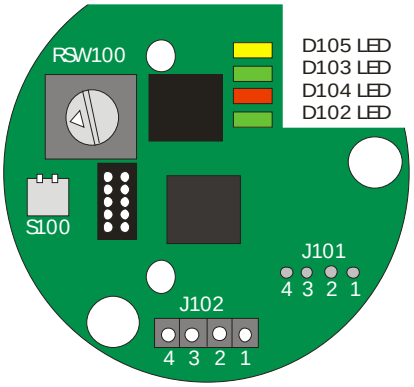
1 Introduction



The Fire Sentry FSCHCOM-SS4 module is a piggy-back device that allows SS4-series flame detectors to communicate with a HART Network Master. The HART module may be considered to be a protocol converter. The flame detector itself communicates to external devices with the FireBus-I proprietary protocol. This HART module obtains alarm and fault status using FireBus-I, and then upon receiving a HART command will respond to the HART master by returning the necessary information. Communication with the master requires that the request that matches the short address (assigned by the rotary switch) or long address (a combination of device type and serial number).

Pin #2 and Pin #3 of J102 of this module are used for HART communication. Current-loop 4-20 ma is sourced from Pin #2 when switches at S100 are ON, and ground is the current-return point. See below for connection details.

2 4-20 ma of SS4

This FSCHCOM-SS4 is providing 4-20ma analog value as well as HART protocol simultaneously. In single drop configuration (I=One master to One Device) the analog 4-20ma provide the following information.

0 ma : PCB fault, Voltage fault, temperature fault, relay fault.

2 ma : Optical Self Test fail & Lid Off fault.

4 ma : Normal.

20 ma : Alarm.

3 Supported HART Commands

The SS4-A HART module supports the commands enumerated below.

3.1 Command 0

Use command 0 to read Unique Identifier.

Response to command 0:

Manufacturer ID: Hex 6042 String FSCHCOM

Product ID: Hex E180

Polling address is assigned by rotary switch RSW100 (0 , 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F).

Placing RSW100 to position 1,2,3.. to F, you are putting the devices in hardware address mode. Hardware address will over-ride software address.

Placing RSW100 to position 0, you are putting the devices in software addressing mode.

You can use command 6 to write polling address to the FSCHCOM module. Once software polling address is written into the FSCHCOM, the address is saved into flash memory until over written by next command 6.

Byte	Format	Description
0	Unsigned 8	Must be Decimal 254 (Hex FE)
1 to 2	Code	Device Type Hex E1 80
3	Unsigned 8	Minimum number of preambles byte from master= 5
4	Unsigned 8	HART Major Revision = 7
5	Unsigned 8	Device Revision Level = 0
6	Unsigned 8	Software Revision = 1
7	Unsigned 8	Bit 7,6,5,4,3 Hard ware revision = 0x10 Bit 2,1,0 physical signal code 0x01
8	Unsigned 8	Flag = 0. N/A
9 to 11	Unsigned 24	Device ID unique from manufacturer
12	Unsigned 8	Minimum number of preambles byte to master = 5
13	Unsigned 8	Maximum number of device variable = 4
14 to 15	Unsigned 16	Configuration Change Counter = 0. No user configurtion

16	Unsigned 8	Device status
17 to 18	Unsigned 16	Manufacturer ID code = Hex 60 42

3.2 Command 1

Use command 1 to read the Primary Variable.

Response to command 1:

Alarm and Device status is save into the Primary Variable (Unit in ma), where :

.

Byte	Format	Description
0	Code	Unit code in ma
1 to 4	Float	0 ma : PCB fault, Voltage fault, temperature fault, relay fault. 2 ma : Optical Self Test fail & Lid Off fault. 4 ma : Normal. 20 ma : Alarm

3.3 Command 2

Use command 2 to read Loop current (ignore percent range).

Response to command 2:

The loop current always matches the current that can be measured by milli-ammeter in series with the device. This includes the loop current under alarm conditions. SS4 flame sensors does not have percent value, therefore please ignore the percent output of this response.

Byte	Format	Description
0 to 3	Float	Loop Current in milli-ampere 0 ma : PCB fault, Voltage fault, temperature fault, relay fault. 2 ma : Optical Self Test fail & Lid Off fault. 4 ma : Normal. 20 ma : Alarm
4 to 7	Float	% reading. 0ma = 0%

		2ma = 10% 4ma = 20% 20ma = 100%

3.4 Command 3

Use command 3 to read dynamic variable and loop current.

Response to command 3:

Byte	Format	Description
0 to 3	**Float**	**Primary Variable Loop current (Unit in milli-ampere)** 0 ma : PCB fault, Voltage fault, temperature fault, relay fault. 2 ma : Optical Self Test fail & Lid Off fault. 4 ma : Normal. 20 ma : Alarm
4	**Code**	**Unit code for ma . Variable 1**
5 to 8	**Float**	**Variable 1. Voltage Fault** 4 ma : Normal 20ma :Voltage Fault (either too low or too high)
9	**Code**	**Unit code for ma. Variable 2**
10 to 13	**Float**	**Variable 2. Temperature Fault** 4 ma : Normal 20ma : Temperature too high.
14	**Code**	**Unit code for ma. Variable 3**
15 to 18	**Float**	**Variable 3. Self test and lid off** 4 ma :Normal 20ma :Self Test Fail (window dirty) and/or Lid is off.
19	**Code**	**Unit code for ma. Variable 4**
20 to 23	**Float**	**Variable 4. Communication between FSCHCOM module and the SS4 flame detector.** 4 ma : Normal. 20ma : Temperature too high.

3.5 Command 6

Use command 6 to write the polling address and loop current mode to the field device.

Every HART device must have a polling address.

Response to command 6:

Byte	Format	Description
0	Unsigned 8	Polling address
1	Code	0 = loop current off, 1 loop current on. Loop current of this FSCHCOM is enable/disable by hardware dip switches S1. Regardless of the S1 position this byte is always 0. Please make sure you have set the S1 accordingly.

Once command 6 is received by the SS4HCOM module, the assigned polling address (decimal 0 to 15, Hex 0 to 0x0f), the SS4HCOM will save the newly assigned short address to flash memory, and use the newly assigned short address until power off.

Upon power on the SS4HCOM module will first read the rotary switch RSW1. If the RSW1 is in position 0, the SS4HCOM will read back the saved short address. If the RSW1 is in position other than 0 (I,e. 1,2,3,4,5…A,B,C,D,E,F), the position number will be used as short address.

3.6 Command 7

Use command 7 to read the polling address and loop current mode.

Response to command 7:

Byte	Format	Description
0	Unsigned 8	Polling address
1	Code	0 = loop current off, 1 loop current on. Loop current of this FSCHCOM is enable/disable by hardware dip switches S1. Regardless of the S1 position this byte is always 0. Please make sure you have set the S1 accordingly.

3.7 Command 8

Use command 8 to read Dynamic Variable Classification.

This command is not application flame sensors, however the FSCHCOM will reply as following:

Response to command 8:

Byte	Format	Description
0	Code	0 for undefined code
1	Code	0 for undefined code
2	Code	0 for undefined code
3	Code	0 for undefined code

3.8 Command 12

Use command 12 to read the message contained within the FSCHCOM module.

Response to command 12:

Byte	Format	Description
0 to 23	Packed ASCII	Alpha numeric message

3.9 Command 13

Use command 13 to read Tag, Descriptor, Date of release.

Response to command 13:

Byte	Format	Description
0 to 5	Packed string	TAG
6 to 15	Packed string	Description
18-20	Date	Date of firmware release

3.10 Command 14

Use command 14 to Primary variable transducer information.

Response to command 14:

Byte	Format	Description
0 to 2	Unsigned 24	Transducer Serial Number
3	Code	0 for undefined 39 (Hex 27) for milli ampere
4 to 7	Float	Upper limit is 20 ma Hex (41 A0 00 00)
8 to 11	Float	Lower Limit is 0 ma Hex (00 00 00 00)
12 to 15	float	SPAN Low Limit is Hex (00 00 00 00)

3.11 Command 15

This command is not applicable for Flame Sensors. However this FSCHCOM will still respond to this command with all zero.

Response to command 15:

Byte	Format	Description
0	Code	Code 0 = High priority
1	Code	Code 0 = Undefined
2	Code	Code 0 = Undefined
3 to 6	Float	Upper range value 20 ma
7 to 10	Float	Lower range value 0 ma
11 to 14	Float	Damping Factor 0 = Not Applicable
15	Code	Code 0 = Undefined
16	Code	Code 0 = Undefined
17	code	Code 0 = Undefined

3.12 Command 16

Use this command to read Final Assembly Number.

This command is not applicable for Flame Sensors. However this FSCHCOM will still respond to this command with all zero.

Response to command 16:

Byte	**Format**	**Description**
0 to 2	**Unsigned 24**	**00 00 00 = Not applicable**

3.13 Command 20

Use this command to read long tag.

Response to command 20:

Byte	**Format**	**Description**
0 to 31	**string**	Long Tag = " FSHCOM MODULE SS4."

3.14 Command 50

This command is not applicable for Flame Sensors. However this FSCHCOM will still respond to this command with all zero.

Response to command 50:

Byte	Format	Description
0	Unsigned 8	Code 0 = undefined
1	Unsigned 8	Code 0 = undefined
2	Unsigned 8	Code 0 = undefined
3	Unsigned 8	Code 0 = undefined

4 LED Indication

Four LEDs are provided on the HART module for status indication, as follows:

D105 Yellow LED indicates fault or normal. Yellow on = Fault, Off=Normal.

D102 Green LED. Solid Green = Hart is polled and response.

Off = not active.

D103 Green LED. Blinking Green = Heart Beat of the SS4 communication.

Solid Green or OFF = Waiting for SS4 to respond.

D104 Red LED. Solid Red = Alarm. Off = No Alarm.

5 HART Module Address

Polling address is assigned by rotary switch RSW1 (0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F).

Placing RSW1 to position 1,2,3.. to F, you are putting the devices in hardware address mode. Hardware address will override software address.

Placing RSW1 to position 0, you are putting the devices in software addressing mode. You can use command 6 to write polling address to the FSCHCOM module. Once software polling address is written into the FSCHCOM, the address is saved into flash memory until overwritten by next command

6 HART Module Mounting

If you have ordered Hart Module Option along with your SS4 , the HART module is most likely already installed on the SS4 module.

If you have ordered HART module separately, remember to secure the HART module to your SS4 module with two screws.

7 HART Module Connections

Follow the steps below to connect a single HART module to a HART Master.

1. Turn off power to the detector.
2. Connect HART signaling line to J102 pins #2 and #3.
3. If you need current-source signaling in addition to HART, turn on both S100 switches by pressing them down (toward the circuit board).
4. Connect the positive terminal of your current load to J102 pin #2 (this is the pin next to the ground pin).
5. Connect the return terminal of the current loop to J102 pin #1 (this is the ground pin). Ensure that nominal loop resistance is approximately 250 ohms.
6. Turn on 24 volt DC power to the detector.

In the event you need to configure a multi-drop HART network, contact the factory for further guidance.

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