

## Technical Note

### FS20X, FS24X Modbus Communications Interface

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The Model FS20X and FS24X Detector can communicate fire and fault status via the Modbus RTU computer communications protocol. More information on Modbus can be found at <http://modbus.org/>. Up to 32 Modbus devices can be individually addressed on the same network.

#### Basic Requirements

1. SW3 must be in position 2.
2. The Modbus address is set on SW1 positions 4 through 10 to values from 1 to 127.
3. The communication parameters:
  - a. 9600 baud
  - b. 8 data bits
  - c. even parity
  - d. 1 stop bit
4. The only command supported is 'Read Holding Registers' (0x03). Thus it is not possible to write anything to the FSX flame detector.
5. The FSX contains only one Modbus holding register, register 40001. On the wire this is transmitted as address 0x0000.

#### Rear View Switch and Pin Assignments



FS24X Detector Module  
(Rear View)

J1 Pin	Function
1	DC Return and Modbus common
2	Modbus D1, EIA RS-485 B <sup>1</sup>
3	Modbus D0, EIA RS-485 A <sup>1</sup>
4	+24 Vdc
5	4-20 Source
6	4-20 Sink

<sup>1</sup> See (4) under Notes and Limitations

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Modbus Address	Leave OFF			Switch SW1 Positions						
	1	2	3	4 MSB	5	6	7	8	9	10 LSB
127	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
126	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	OFF
125	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	ON
124	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	OFF
004	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
003	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
002	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
001	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON

### Data Definitions

The contents of Modbus Holding Register 40001 will be as listed in the table below.

Bit	Meaning
0 (lsb)	Flame Alarm
1	Internal PCB Fault
2	Voltage Fault
3	Heartbeat (alternates)
4	High-Temp Fault
5	Self-Test Fault
6	Relay Coil Fault
7	Lid-Off Fault
8	always 0
9	always 0
10	always 0
11	always 0
12	always 0
13	always 0
14	always 0
15 (msb)	always 0

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## **Notes and Limitation**

1. The FSX Detector Module can process a Modbus Master's command every 500 milliseconds. Commands should not be sent more frequently than this.
2. The FS24X does not return Modbus exception codes if an unsupported command is received. It is simply silent.
3. The FS24X returns response packets faster than some other Modbus devices. This requires that the master's transceiver for the half-duplex RS-485 physical layer must transition from transmit to receive immediately after the last bit is transmitted.
4. The symbols 'A' and 'B' are assigned differently than shown above on some products, including some Honeywell products. It may be necessary to flip the RS-485 wires to establish communications.
5. PC testing of the FS24X Modbus interface can be performed with an RS-485 transceiver such as the B&B Electronics model USOPTL4 and software. Suitable software includes such as Witte Software Modbus Poll and WinTECH Software Design ModScan32.
6. RS-485 is a 3 wire network. A common or ground connection must be made between J1 pin 1 and the other transceivers on the network.

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