MBUV-100D, MBUVS-100D
MBIR-100D, MBFR-100D
DIN RAIL MOUNT
FLAMEWORX™ MODULES

◇ FM ◇
APPROVED

CSA ®

Year 2000 Compliant in accordance with BSI document DISC PD2000-I:1998

DESCRIPTION

Fireye offers a complete line of dual channel, DIN rail mount flame switch modules to provide accurate, reliable flame on/flame off indication. The user can select from four (4) different type of flame scanners (ultra-violet, infra-red, ultra-violet self check, and flame rectification) to meet a wide range of flame scanning applications. Each module provides two (2) independent flame switches. Each flame switch has its own SPDT flame relay (Refer to Jumpers JP4 and JP5).

A series of LED's on the FlameWorx module provide indication of system status (power on), flame relay status, and fault indication. Three (3) separate front panel test jacks are provided to measure the flame signal strength (4-20 mA) of each flame relay. Access to the 4-20 mA signal is also available via the wiring terminal (Refer to Jumpers JP4 and JP5). Flame Failure Response Time (FFRT) is selectable between 1, 2, 3, or 4 seconds (selected via dipswitch).

Fireye FlameWorx modules can be used in a number of flame detection applications. In addition, the modules also incorporate LonWorks* communications, which allow the use of Fireye programming modules (e.g. multi-burner module) which provide safe start check, purge timing, safety lockout, etc. which further expands on the functionality of the flame switches. LonWorks communications use an RS485 twisted pair wire as the communications network.

Note: *When the FlameWorx modules are used without the Fireye programming modules, some additional means must be furnished to provide those functions required in flame safeguard control systems (e.g. safety interlocks, purge timing, etc.).*

Note: FlameWorx modules are shipped from the factory with the FFRT set for 1 second. Refer to page 6 for warning on burn-in.

Note: *See Bulletin MBR-1001 for Rack Mount modules.*

* LonWorks® is a registered trademark of Echelon Corporation.

ORDERING INFORMATION

PART NUMBER	DESCRIPTION
MBUV-100D	Ultra-violet FlameWorx module, dual channel - DIN rail mount.
MBIR-100D	Infra-red FlameWorx module, dual channel - DIN rail mount.
MBUVS-100D	Ultra-violet self-check FlameWorx module, dual channel - DIN rail mount.
MBFR-100D	Flame rectification FlameWorx module, dual channel - DIN rail mount.
Note: Wiring base for flame switch modules must be ordered separately.	
Power Supplies	
MBLPS-100D	Power supply (120 VAC input power) for flame switch modules - DIN rail mount.
MBHPS-100D	Power supply (120 VAC input power) for flame rods, UV and UV Self check flame scanners- DIN rail mount.
MBLPS-200D	Power supply (230 VAC input power) for flame switch modules - DIN rail mount.
MBHPS-200D	Power supply (230 VAC input power) for flame rods, UV and UV Self check flame scanners- DIN rail mount.
Note: Wiring base for power supplies must be ordered separately.	
Wiring Bases	
60-2537	Wiring base with sixteen (16) straight style screw terminals (22-14 AWG, 0.5 - 1.5 mm^2) for all DIN rail mount flame switch modules.
60-2538	Wiring base with twelve (12) straight style screw terminals (22-14 AWG, 0.5 - 1.5 mm^2) for all DIN rail mount power supplies.
Mounting Rails	
60-2539-12	DIN style mounting rail - 12 inches. Will mount up to 4 modules.
60-2539-24	DIN style mounting rail - 24 inches. Will mount up to 8 modules.
60-2539-36	DIN style mounting rail - 36 inches. Will mount up to 12 modules.
Flame Scanners	
UV1A3	Ultra-violet scanner for use with MBUV modules. 1/2" NPT mount. 3' flex conduit.
UV1A6	Ultra-violet scanner for use with MBUV modules. 1/2" NPT mount. 6' flex conduit.
UV2	Ultra-violet scanner for use with MBUV modules. 3/8" NPT mount. 3' flex conduit.
UV8A	Ultra-violet scanner for use with MBUV modules. 1/2" NPT mount. 90 head, 6' cable, no conduit.
45UV3-1050	Ultra-violet scanner for use with MBUV modules. 3/4" NPT mount, w/ 4-314-1 UV tube.
45UV5-1007	Self-checking ultra-violet scanner for use with MBUVS modules. 1″ BSP mount (230 VAC).
45UV5-1008	Self-checking ultra-violet scanner for use with MBUVS modules. 1" BSP mount (120 VAC).
45UV5-1009	Self-checking ultra-violet scanner for use with MBUVS modules. 1" NPT mount (120 VAC).
48PT2-1003	Infra-red scanner for use with MBIR modules. 1/2" NPT mount, straight head, 8' cable.
48PT2-1007	Infra-red scanner for use with MBIR modules. 1/2" NPT mount, straight head, 4' cable.
48PT2-9003	Infra-red scanner for use with MBIR modules. 1/2" NPT mount, 90° head, 8' cable.
48PT2-9007	Infra-red scanner for use with MBIR modules. 1/2" NPT mount, 90° head, 4' cable.
48PT2-9007W	Infra-red scanner for use with MBIR modules. 1/2" NPT mount, 90° head, 4' cable, water repellant.
45CM1-1000	Photocell (with filter) for use with MBFR modules. 1/2" NPT mount.
45CM1-1000Y	Photocell (without filter) for use with MBFR modules. 1/2" NPT mount.
69ND1-1000K4	Flame rod for use with MBFR modules. 1/2" NPT mount, 12" length.
69ND1-1000K6	Flame rod for use with MBFR modules. 1/2" NPT mount, 18" length.
69ND1-1000K8	Flame rod for use with MBFR modules. 1/2" NPT mount, 24" length.

PRODUCT SPECIFICATIONS

FLAMEWORX MODULES

Supply Voltage:	24 VAC +10 / -15%, 50 / 60 Hz @ 100 mA. 24 VDC +10 / -15%, @ 100 mA.
Power Consumption:	2.4 VA (100 mA)

Flame Relay Contacts: (1 Form C SPDT for each flame switch, 2 per module.)

	5 amps (resistive load) @ 250 VAC
	3 amps (resistive load) @ 24 VDC
	250 VA (maximum connected load) each 40 mA (minimum connected load current).
Contact Material:	Silver cadmium oxide
Flame Signal Output:	4-20 mA (current source). Max connected load: 750 ohms.

POWER SUPPLIES

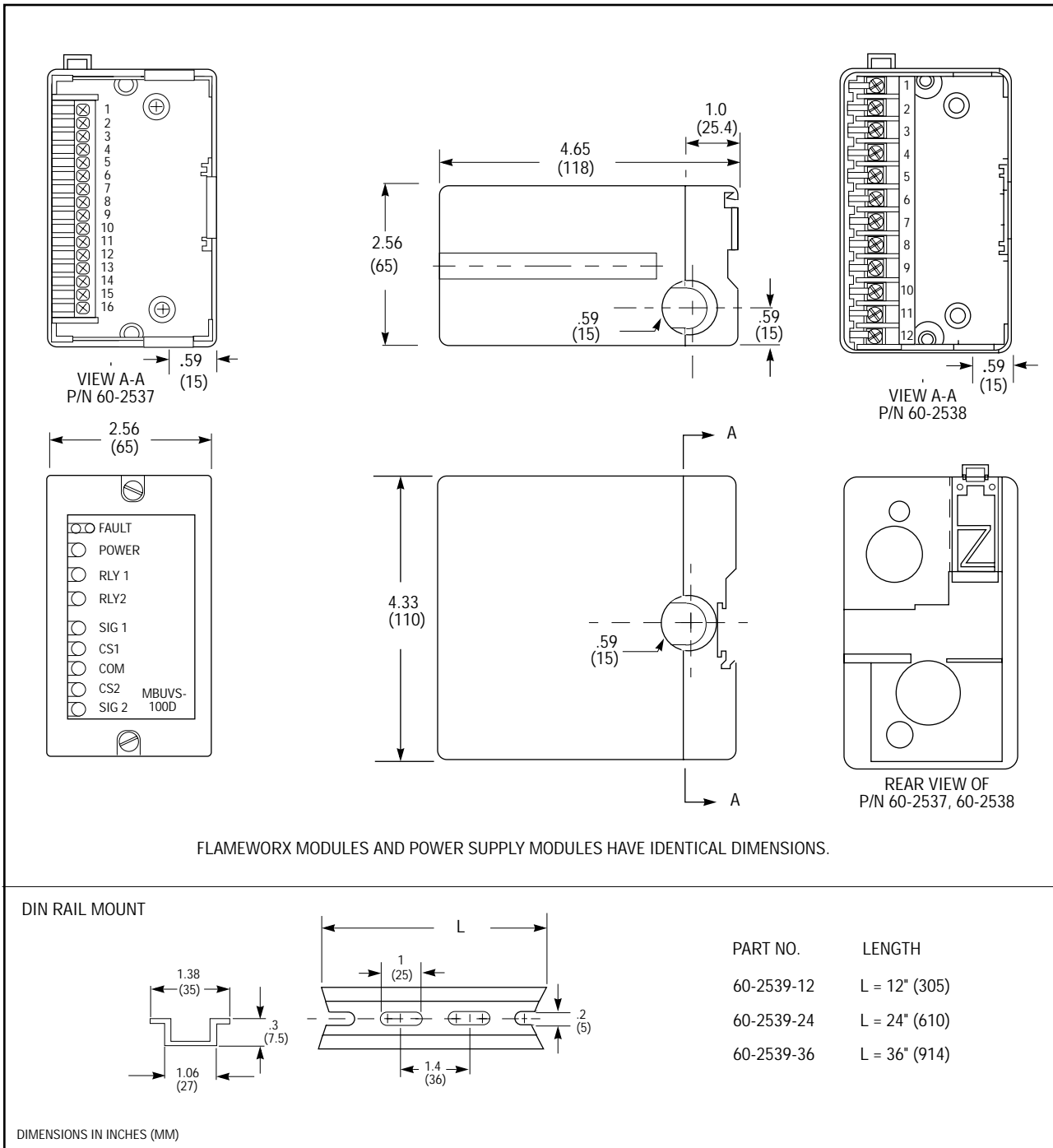|		
Input Supply Voltage:	**MBLPS-100D:**	120 VAC +10 / -15%. 50/60 Hz.
	MBHPS-100D:	120 VAC +10 / -15%. 50/60 Hz.
	MBLPS-200D:	230 VAC +10 / -15%. 50/60 Hz.
	MBHPS-200D:	230 VAC +10 / -15%. 50/60 Hz.

Maximum current output:

MBLPS-100D, -200D:	1.4A @ 24 VDC (Will power up to 10 FlameWorx modules)
MBHPS-100D, -200D:	25mA @ 600 VAC (Will power up to 20 flame scanners - UV and/or flame rod).

FLAMEWORX MODULES and POWER SUPPLIES

Operating Temperature:	-40° F to 140° F (-40° C to 60° C)
Storage Temperature:	-40° F to 176° F (-40° C to 80° C)
Humidity:	85% RH (max), non-condensing.
Agency Approvals:	Factory Mutual (FM) Canadian Standards Association (CSA)

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Year 2000 Compliant in accordance with BSI document DISC PD2000-I:1998
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FIGURE 1.   **DIMENSIONS OF DIN MOUNTING RAILS, WIRING BASES, AND FLAME SWITCH MODULES SHOWN IN INCHES (MM).**

VIEW A-A
P/N 60-2537

1.0
(25.4)

4.65
(118)

2.56
(65)

.59
(15)

.59
(15)

VIEW A-A
P/N 60-2538

2.56
(65)

FAULT
POWER
RLY 1
RLY2
SIG 1
CS1
COM
CS2
SIG 2

MBUVS-100D

A

4.33
(110)

.59
(15)

A

REAR VIEW OF
P/N 60-2537, 60-2538

FLAMEWORX MODULES AND POWER SUPPLY MODULES HAVE IDENTICAL DIMENSIONS.

DIN RAIL MOUNT

L

1
(25)

1.38
(35)

.3
(7.5)

.2
(5)

1.06
(27)

1.4
(36)

PART NO.	LENGTH
60-2539-12	L = 12" (305)
60-2539-24	L = 24" (610)
60-2539-36	L = 36" (914)

DIMENSIONS IN INCHES (MM)

FRONT FACEPLATE

The front faceplate of the FlameWorx modules provides LED indicator lights and flame signal test jack points for current status and failure mode analysis, and two communication push-buttons for LonWorks communications.

FIGURE 2.
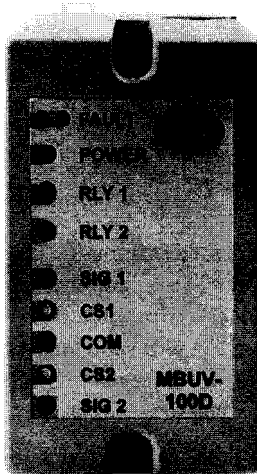
TEST JACK POINTS

SIG1, SIG2 and COM: These three (3) test jack points provide access via the front faceplate to measure flame signal strength for each flame relay. The output signal is a current source 4-20 mA signal. Maximum connected load not to exceed 750 ohms. SIG1 referenced to COM provides the flame signal for Channel #1, and SIG 2 referenced to COM provides the flame signal for Channel #2.

Minimum acceptable flame signal	6 mA.
Average flame signal	8-20 mA.

LED STATUS INDICATORS

POWER: The green LED will blink when power (24 VAC/VDC) is applied to the FlameWorx module (terminal 13 and 14 - Refer to Wiring Diagram).

RLY 1 and RLY 2: These two (2) green LED's will light when the scanner detects flame for the appropriate flame switch.

LED FAULT INDICATORS

FAULT: These two (2) red LED's will light and/or blink in the manner described below to indicate the following fault conditions:

| Fault Condition	Corrective Action
○ ✺ CPU failure.	Replace FlameWorx module.
✺ ○ Communication failure.	Check communication wiring Check communication master. Press CS1 and CS2 communication push-buttons. Set dipswitch #6 to On position (for stand alone module).
○ ● Shutter check failure on Channel 1.	Check shutter operation on scanner. Check UV tube on scanner.
● ○ Shutter check failure on Channel 2.	Check shutter operation on scanner. Check UV tube on scanner.

○ LED is Off   ● LED is On.   ✺ LED is blinking.

COMMUNICATION PUSHBUTTONS:

CS1 and CS2: These two (2) push-buttons are associated with LonWorks communications. After all wiring connections between the FlameWorx module and designated master device (e.g. Fireye MB Module, host PC, etc.) are complete, press **each** push-button **one time** to establish the communication link between the FlameWorx module and the designated master. These push-buttons do not need to be pressed a second time unless the address of the master device or the master device itself is changed. A "Fault" indicator LED will light momentarily when each CS1 push-button is pressed. Also refer to dipswitches #1 through #5 (Communication Address) and dipswitch #6 (stand alone or network mode).

DIPSWITCHES (1-8)

Eight (8) dipswitches located on the printed circuit board (see Figure 3) are used to set the communication address of the FlameWorx module (switches 1 through 5), stand alone operation or connection to a communication network (dipswitch #6) and the Flame Failure Response Time (FFRT) for the flame switches (switches 7 and 8). **All 8 switches are shipped in the OFF position.**
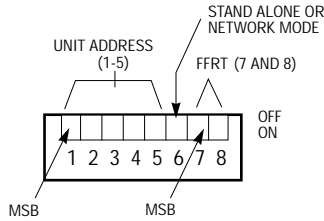
Dipswitches 1 through 5 — Communications address

Dipswitches 1 through 5 are used to configure the communication address (address 00 through 31) for each flame switch module when used on the LonWorks communication network (e.g., communicating with the Fireye MB module). Dipswitch #1 is the Most Significant Bit (MSB). Dipswitch #5 is the Least Significant Bit (LSB). Setting dipswitches 1 through 5 in the OFF position will set address 00. Also refer to Communication Pushbuttons CS1 and CS2

DIPSWITCHES

#1	#2	#3	#4	#5	ADDRESS
Off	Off	Off	Off	Off	00
Off	Off	Off	Off	On	01
Off	Off	Off	On	Off	02
		:			
On	On	On	On	On	31

Dipswitch #6 — Stand Alone or Network Communications

Dipswitch #6 sets the FlameWorx module in either Stand Alone or Network mode. When set for the stand alone mode, the FlameWorx module **will not** attempt to communicate on a communications network. The settings for dipswitches #1 through 5 are inhibited when set for stand alone mode. When the FlameWorx modules are used in a communication network (e.g. Fireye MB Module), dipswitch #6 **must be** set in the Network mode to enable communications. Also refer to Communication Pushbuttons CS1 and CS2.

Dipswitch 6
Off   Stand alone mode.
On   Network mode.

⚠ **WARNING: If the FlameWorx modules are used in a stand-alone application (e.g. LonWorks communications ARE NOT being used), dipswitch 6 MUST BE SET IN THE OFF POSITION or the FlameWorx will shut down on communication failure**

Dipswitches 7 & 8 - Selectable Flame Failure Response Time (FFRT)

Dipswitches 7 and 8 are used to select the FFRT time for both flame switches. Available selections are 1, 2, 3, or 4 seconds.

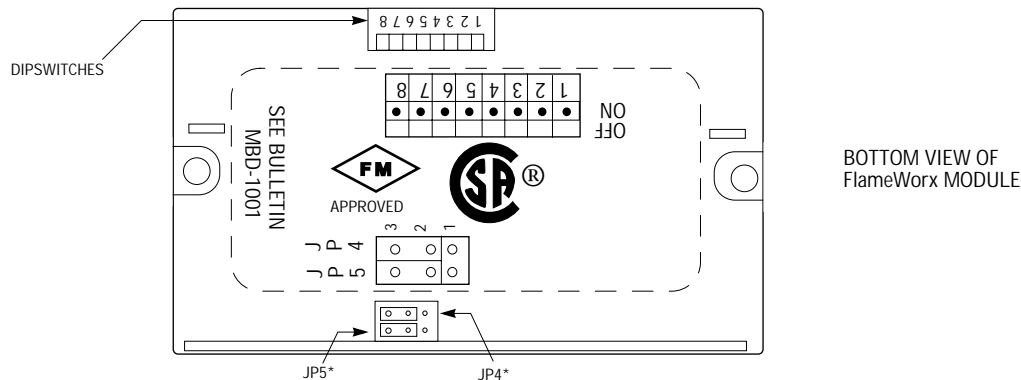| Switch 7	Switch 8	FFRT
Off	Off	1 sec
Off	On	2 sec
On	Off	3 sec
On	On	4 sec

⚠ **WARNING: After eight (8) hours of continuous power being applied to the FlameWorx module, FFRT timings CANNOT BE CHANGED.**

⚠️ **WARNING: Dipswitches 7 and 8 are shipped from the factory in the OFF position. FFRT = 1 sec.**

FIGURE 3.　　　LOCATION OF DIPSWITCHES AND JUMPERS

BOTTOM VIEW OF FlameWorx MODULE

* JUMPERS SHOWN PROVIDING NC FLAME RELAY CONTACT (POSITION 2-3).

JUMPERS JP4 AND JP5

Two jumpers on the FlameWorx module select the function associated with terminal 9 (Flame Channel #1) and terminal 10 (Flame Channel #2) of the FlameWorx module (refer to Wiring Diagrams). The two selections (for each terminal) are:

— Normally closed contact for the appropriate flame relay

— 4-20 mA output signal proportional to the flame signal strength for each flame switch

Normally closed contact: Each flame switch provided with the FlameWorx module has a SPDT flame relay. The normally open contact (NO) and associated common of each flame relay are provided on terminals 7 and 8 (for Channel #1) and terminals 12 and 11 (for Channel #2). With jumper JP4 placed over pins 2 and 3, the FlameWorx module will also provide a normally closed flame relay contact (terminal 9) for Channel #1. With jumper JP5 placed over pins 2 and 3, the FlameWorx module will provide a normally closed flame relay contact (terminal 10 for Channel #2. **The jumpers are shipped from the factory jumpering pins 2 and 3 (providing NC flame relay contact).** Small needle-nose pliers are required to move jumpers JP4 and JP5. Refer to Wiring Diagram.

4-20 mA Output Signal: The FlameWorx module provides a 4-20mA output signal (proportional to flame signal strength) for each flame switch via test jack points located on the face plate of the module. **In addition to these analog outputs via the test jacks**, jumpers JP4 and JP5 will provide an additional 4-20 mA flame signal via terminals on the connector of the FlameWorx module (to allow an easier means of wiring to a remote meter). Use terminal 14 (Input power common) as the common return for either/both 4-20 mA output signals. With jumper JP4 placed over pins 1 and 2, the FlameWorx module will also provide a 4-20 mA output signal (terminal 9) for channel #1. With jumper JP5 placed over pins 1 and 2, the FlameWorx module will provide a 4-20 mA output signal (terminal 10) for channel #2. **The jumpers are shipped from the factory jumpering pins 2 and 3 (providing NC flame relay contact).** Small needle-nose pliers are required to move jumpers JP4 and JP5. Refer to Wiring Diagram.

SPECIFICATIONS OF DIN RAIL WIRING BASES AND MOUNTING RAILS

DIN Mounting Rails: The DIN mounting rails are available in three lengths; 12, 24, and 36 inches for the installation of the DIN rail mount flame switch modules (MBUV-100D, MBIR-100D, MBFR-100D, and MBUVS-100D) and the power supplies (MBHPS-100D, -200D and MBLPS-100D, -200D).

DIN Rail Wiring Bases: Fireye offers two (2) wiring bases for use with the flame switch modules and power supplies.

Wiring Base P/N	For use with
60-2537	MBUV-100D, MBUVS-100D, MBIR-100D, and MBFR-100D
60-2538	MBHPS-100D, -200D and MBLPS-100D, -200D.

The 60-2537 wiring base for the flame switch modules provides a sixteen (16) screw connector terminal strip that will accept 22 to 14 AWG (0.5 - 1.5 mm^2) wire.

The 60-2538 wiring base for the low and high style power supplies provide a twelve (12) screw connector terminal strip that will accept 22 to 14 AWG (0.5 - 1.5 mm^2) wire.

INSTALLATION OF DIN RAIL MOUNT FLAME SWITCH MODULES AND POWER SUPPLIES

The wiring bases for the flame switch module (60-2537) and high and low voltage power supplies (60-2538) mount onto the DIN mounting rails (60-2539-12, -24, -36). The flame switch module and/or power supplies are then screwed onto their respective wiring base.

To mount the wiring base onto the DIN mounting rail

1. Position the bottom edge of the DIN mounting rail into the slot on the bottom of the wiring base (60-2537 or 60-2538).
2. Insert a small screw driver into the slot of the white plastic retainer on the top rear section of the wiring base.
3. Lift up the white plastic retainer and press the upper half of the wiring base against the DIN mounting rail until it snaps into place.

To mount the flame switch module or power supply onto the wiring base.

1. Align the flame switch module with its wiring base and insert the edge of the flame switch module into the connector on the wiring base.
2. Using a medium slotted screw driver with a 4-inch shaft (minimum), tighten down the two retaining screws on the flame switch module.

To remove the wiring base from the DIN mounting rail.

1. Insert a small screwdriver into the slot of the white plastic retainer on the top rear section of the wiring base.
2. Lift up the white plastic retainer and pull the flame switch module/wiring base forward.
3. Slide the bottom of the wiring base off of the DIN mounting rail.

Connections for MBHPS-100D, -200D Power Supply

TERMINAL	FUNCTION
1, 7	Power for UV scanners (UV1A, 45UV5). Connect to terminals 1 and 2 of MBUV-100D and MBUVS-100D.
2, 4	Power for flame rods and photocells. Connect to terminals 1 and 2 of MBFR-100D.
10	Incoming line power - L1 (120 VAC for MBHPS-100D, 230 VAC for MBHPS-200D).
11	Incoming line power common - L2.
12	Earth Ground.

Connections for MBLPS-100D, -200D Power Supply

3, 4	24 VDC Power for FlameWorx modules. Connect to terminal 13 of FlameWorx modules.
5, 6	24 VDC common for FlameWorx modules. Connect to terminal 14 of FlameWorx modules.
10	Incoming line power - L1 (120 VAC for MBLPS-100D, 230 VAC for MBLPS-200D).
11	Incoming line power common - L2.
12	Earth Ground.

WIRING DIAGRAM

The wiring base for the DIN rail mount flame modules (60-2537) provides 16 terminals for wiring the FlameWorx modules.

FIGURE 4.   **Internal/External Wiring Connections**

EXTERNAL CONNECTIONS

1 Power for flame rod and UV scanner(s) (from MBHPS-100D, -200D power supply)
2 Power for flame rod and UV scanner (s) (from MBHPS-100D, -200D power supply)
3 Scanner input (flame signal) - Flame Switch (Channel #1)
4 Scanner input (flame signal) - Flame Switch (Channel #1)
5 Scanner input (flame signal)- Flame Switch (Channel #2)
6 Scanner input (flame signal)- Flame Switch (Channel #2)
7 Flame relay normally open (NO) contact - Flame Switch (Channel #1)
8 Flame relay common - Flame Switch (Channel #1)
9 Flame relay normally closed (NC) contact or 4-20 mA output
   - Flame Switch (Channel #1)
10 Flame relay normally closed (NC) contact or 4-20 mA output
   - Flame Switch (Channel #2)
11 Flame relay common - Flame Switch (Channel #2)
12 Flame relay normally open (NO) contact - Flame Switch (Channel #2)
13 Input power (24 VAC / 24 VDC)
14 Input power common
15 LonWorks Communications (Data A)
16 LonWorks Communications (Data B)

INTERNAL CONNECTIONS

4-20MA JP4

4-20MA JP5

Jumpers JP4 and JP5 are shipped from the factory in positions 2-3, providing the flame relay normally closed (NC) contact.

USE TERMINAL 14 (INPUT POWER COMMON) AS THE COMMON RETURN FOR EITHER /BOTH 4-20 mA OUTPUT SIGNALS. JUMPER(S) JP4/JP5 ARE SET IN POSITION 1-2.
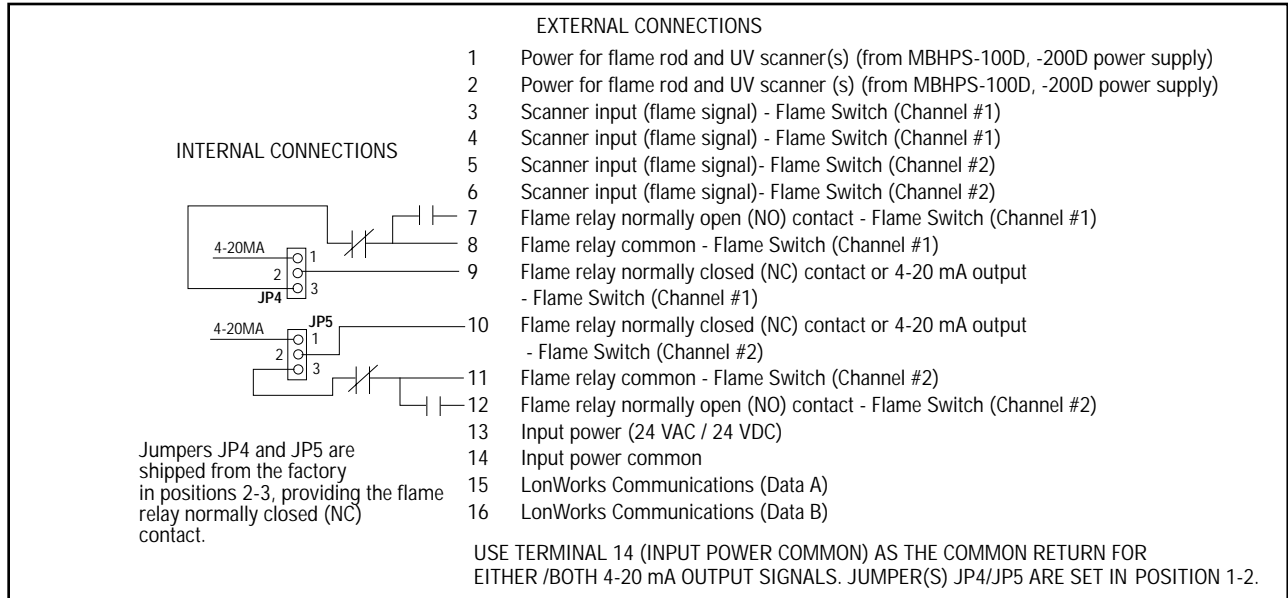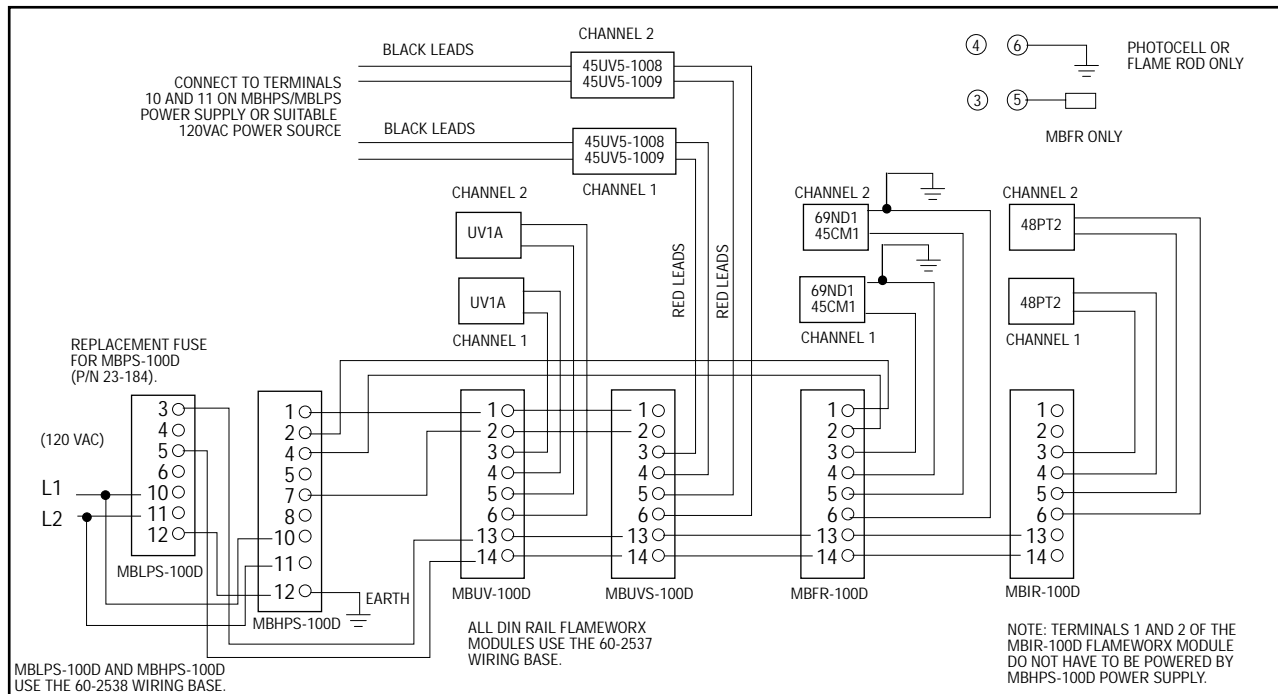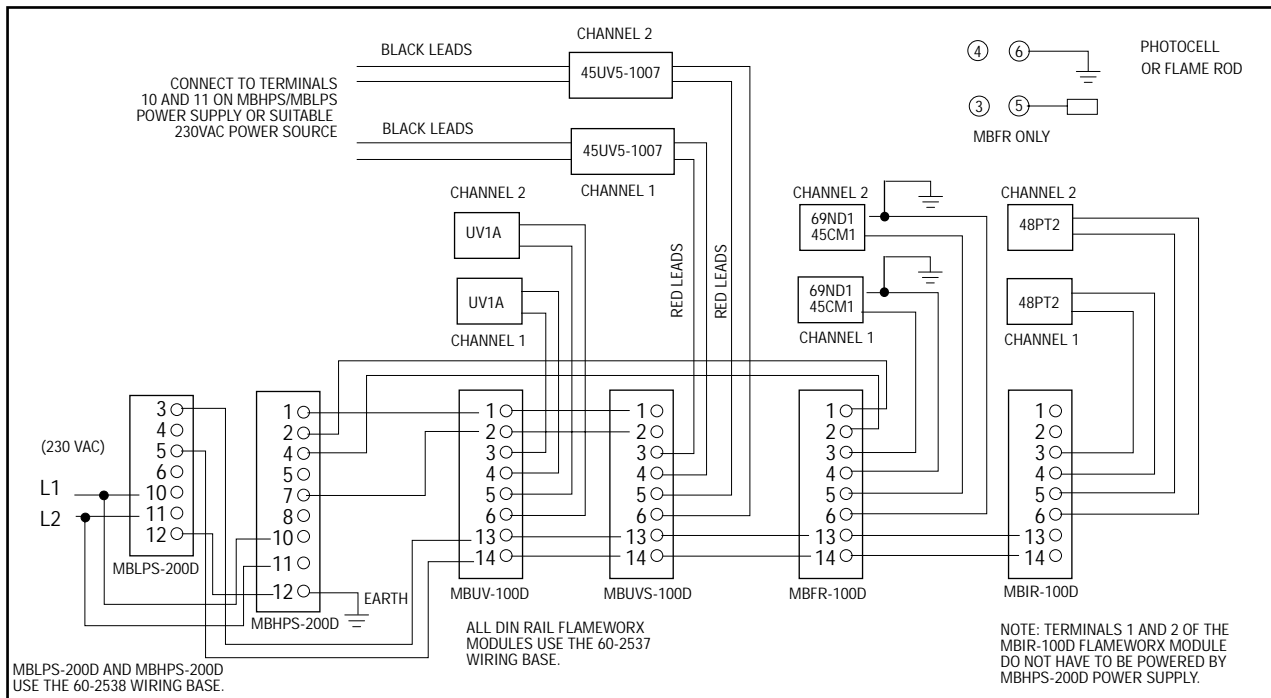
FIGURE 5.   **Scanner wiring diagram for MBHPS-100D and MBLPS-100D power supply and MBUV-100D, MBUVS-100D, MBFR-100D, and MBIR-100D FlameWorx modules and their associated scanners.**

FIGURE 6. Scanner wiring diagram for MBHPS-200D and MBLPS-200D power supplies and MBUV-100D, MBUVS-100D, MBFR-100D, and MBIR-100D FlameWorx modules and their associated scanners.

NOTICE

When Fireye products are combined with equipment manufactured by others and/or integrated into systems designed or manufactured by others, the Fireye warranty, as stated in its General Terms and Conditions of Sale, pertains only to the Fireye products and not to any other equipment or to the combined system or its overall performance.

WARRANTIES

FIREYE guarantees for *one year from the date of installation or 18 months from date of manufacture* of its products to replace, or, at its option, to repair any product or part thereof (except lamps, electronic tubes and photocells) which is found defective in material or workmanship or which otherwise fails to conform to the description of the product on the face of its sales order. **THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES AND FIREYE MAKES NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED.** Except as specifically stated in these general terms and conditions of sale, remedies with respect to any product or part number manufactured or sold by Fireye shall be limited exclusively to the right to replacement or repair as above provided. In no event shall Fireye be liable for consequential or special damages of any nature that may arise in connection with such product or part.