

# MODEL 6010 DUAL CHANNEL SMOKE/FIRE DETECTION MODULE

## DESCRIPTION

The SST Model 6010 Two Channel Smoke/Fire Detection Module provides two independent detection input channels for the VulcanGuard Detection and Control System. Each input circuit is designed for a two wire "Class B" circuit, and can supply the operating voltage required to power Ionization and Photoelectric Smoke Detectors, while at the same time receiving alarm signals from these devices. Each alarm input module may also receive signals from any device that initiates a contact closure upon alarm, such as fixed temperature or rate of rise Heat Detectors and Manual Alarm Stations. The operation of each of the two channels on the Model 6010 Smoke/Fire Detection Input Module is independent and identical. The field wiring connected to the inputs is continuously supervised for open circuit, short circuit or ground fault conditions, and will signal a fault when one of these is detected. The module requires one mounting space in a VulcanGuard mounting rack.

## LOGIC DIAGRAM

Figure 6010-1 shows, in simplified form, the internal logic in the Smoke/Fire module, and indicates the terminal number assigned with each.

This logic diagram, and all the other logic diagrams in this manual, may be photocopied and used as "paste ups" for help in designing your VulcanGuard system. Disk copies of these diagrams, suitable for use in computer aided drafting programs, are also available from Safety Systems Technology at a nominal charge.

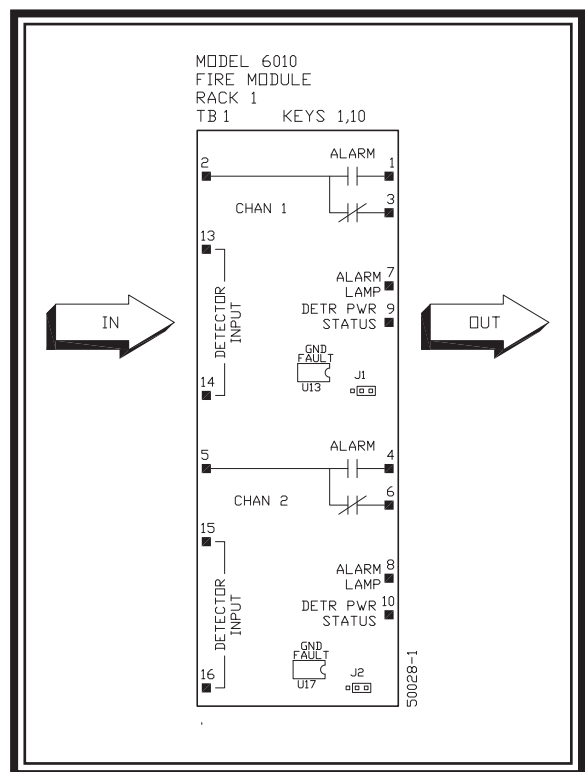


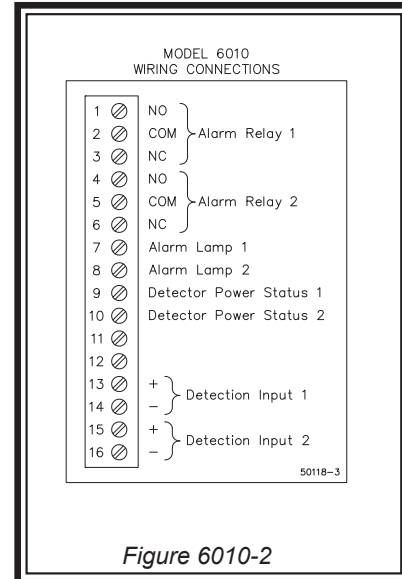
Figure 6010-1 Logic Diagram

## INPUT/OUTPUT CONNECTIONS

Figure 6010-2 shows the physical arrangement of the 16 terminals associated with the Smoke/Fire Detection Module. Each of the available signals is described below.

### Alarm Relay Outputs - terminals 1 through 6

These are VulcanGuard Standard Relay Outputs that operate when an alarm is detected in the appropriate zone (1 or 2). The normally open (NO) and normally closed (NC) contacts will be in that state with no alarm detected. The relay will transfer when an alarm condition occurs, and will latch until the zone is reset by pushing the reset pushbutton on the module or the main system reset pushbutton. These outputs will not be activated if the isolate switch on the Model 6010 Module is in the Isolated position.



### Alarm Lamp Outputs - terminals 7 and 8

These are Standard Alarm Lamp Outputs activated by the Alarm state of the appropriate zone. They exactly follow the state of the front panel alarm lamps, i.e. flash on initial detection of an alarm, steady when acknowledged, and switched off by reset. These outputs are activated by Lamp Test, and are not inhibited by Isolate.

### Detector Power Status Outputs - terminals 9 and 10

These are Standard Logic Outputs activated by the detector power control circuits in the Model 6010 Module. Because the detection input wires to the module also supply operating power to the connected smoke detectors, a short circuit on those wires would cause excessive current draw from the system. Therefore, in case of a short circuit condition on the detection input lines, the detector power supply feed from the module is shut down. The Detector Power Status Output is energized whenever power is being supplied to the detectors, and will be deenergized when power is shut down.

If any self powered detecting devices with latching alarms are connected to the module (for instance a Safety Systems Model F100 IR Flame Detector), it will be necessary to reset the alarms in these devices after activation. Since the module power status output is momentarily interrupted whenever the module is reset, it can be used as a means to reset the electronics in the remote detectors. To do this, you would typically use the power status output to control a relay, with the relay contact arranged to either interrupt the power to the controller, or to activate the reset input on the controller.

### Alarm Solid State Outputs - terminals 11 and 12

These are Standard Logic Outputs activated by the Alarm state of the appropriate zone. They operate simultaneously with the alarm relay outputs.

Detection Inputs - terminals 13 through 16

These are special dual purpose inputs which connect to the field detection devices in each zone, and have the ability to detect when these devices are in alarm, while at the same time providing DC operating power for the electronics in the devices. During normal operation, there is a DC voltage of approximately plus 11 volts between one terminal and ground, and minus 11 volts between the other terminal and ground. This results in a potential of 22 volts between the two field conductors, which is used as operating power for any two wire smoke detectors installed in the zone. This module continuously measures the DC current being drawn from this 22 volt source, and uses this current to determine the operating status of the field devices as follows:

- 0 to 3 mA ••••• Open circuit fault
- 3 to 13 mA ••••• Normal (non alarm) operating conditions
- 13 to 40 mA ••••• Alarm
- More than 40 ••••• Short circuit fault

Although this is a supervised input, it is not the Standard Supervised Input described in section 5000. However, the field wiring as shown in Figure 5000-1 is applicable for any contact type field devices connected to the Model 6010 Smoke/Fire Module. During normal operation, the only load seen by the 22 volt source will be the 3.3 Kohm end of line resistor. This results in a current draw of approximately 6.6 mA, which will be interpreted as normal operation. (There

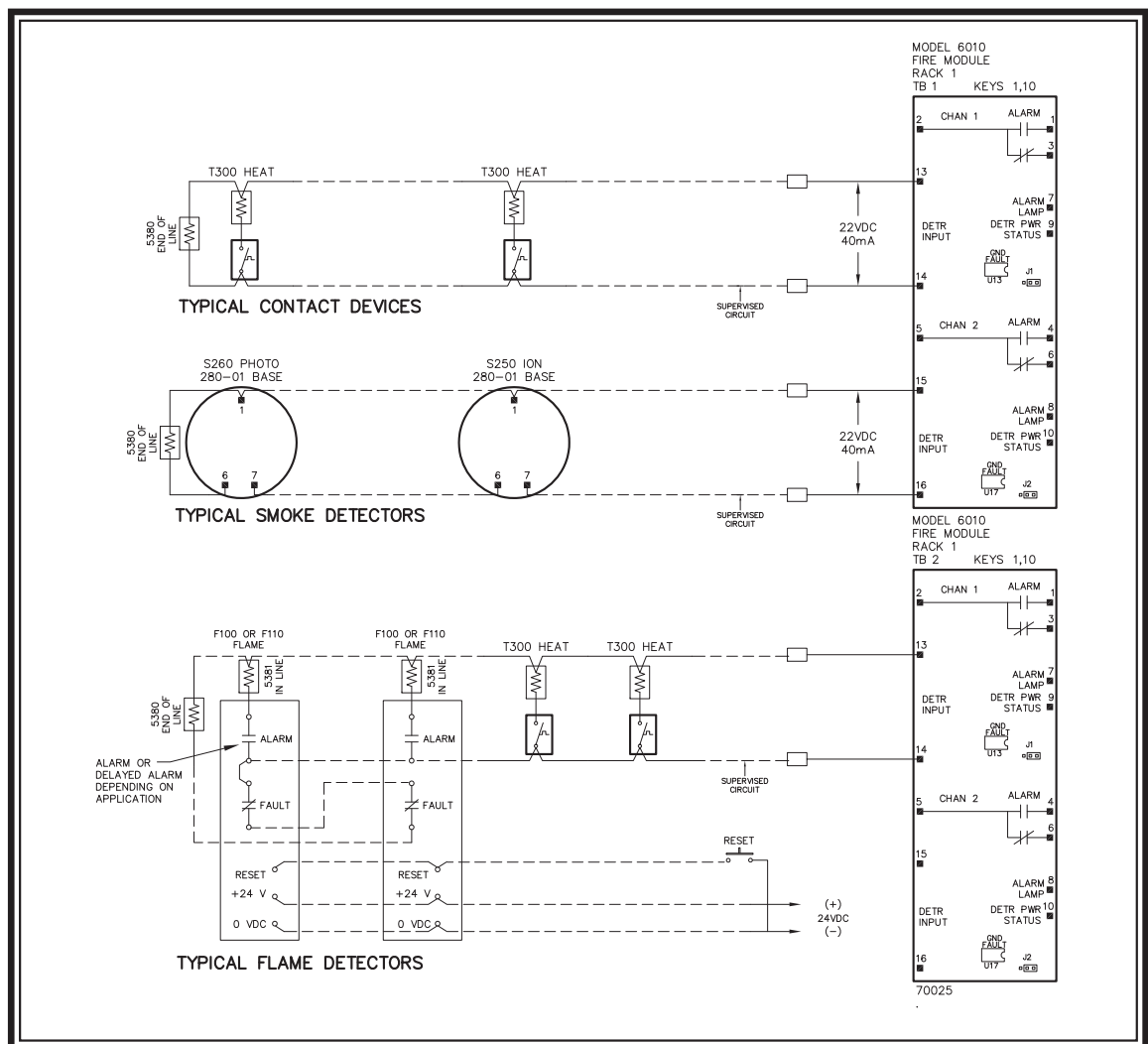


Figure 6010-3 Typical Input Wiring to Model 6010 Module

is also a few additional microamps of current drawn as operating power for any connected smoke detectors, but this is insignificant.) When the contact device is actuated, the 1000 ohm in line resistor will produce an alarm current of about 29 mA. Smoke detectors may be used on the same circuit, but they are connected directly to the two wire loop, without the 1000 ohm in line resistor. Should the smoke detector go into alarm, its internal circuitry is arranged to draw approximately 30 mA of current from the module. This will generate an alarm condition in the module.

The end of line resistor provides open circuit supervision of the detection circuit. Should any field wire become disconnected, current will not flow through this resistor, resulting in a module fault due to an open circuit. Likewise, a short circuit across the field wires will cause more than 40 mA to be drawn, resulting in a fault condition.

Figure 6010-1 shows, in simplified form, the internal logic in the Smoke/Fire module, and indicates the terminal number assigned with each.

**!** Because of this short circuit supervision, it is imperative that any contact type field devices be installed with an in-line resistor to properly report an alarm.

The detection inputs are also continuously monitored for any ground faults. Any connection between either of the field wires and ground which results in a current difference of more than 0.2 mA being drawn from the positive and negative supplies will cause the module to report a fault, and the power supply to this input will be shut down.

### Typical Wiring Diagram

The typical wiring diagram in the Reference Information section of this manual shows the approved connections for the Model 6010 Module. All installations should be made in conformance with this drawing. Note that when wired this way, there is no field wire that can break without interrupting the supervisory current through the end of line resistor. Additional input connection methods are also shown in Figure 6010-3.

**!** When using smoke detectors, be sure that only approved detectors as listed on the wiring diagram are use. Also be sure that the limitations when using relay equipped detectors are not violated.

Figure 6010-4 shows an *incorrect wiring method*. When connected as shown here, there are some branches of the supervised input circuit where a wire break can occur without interrupting the current through the end of line resistor. This wiring method is unsafe.

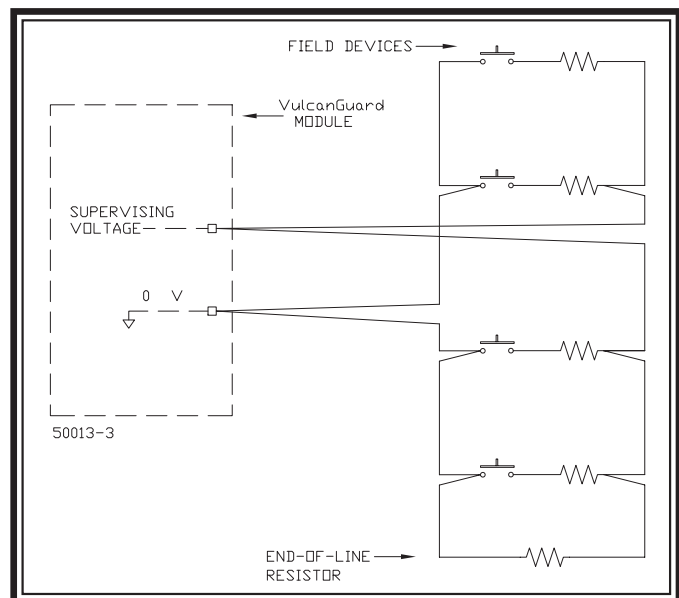


Figure 6010-4 Incorrect Wiring Method for Supervision

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## MODULE SETUP INSTRUCTIONS

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All VulcanGuard modules are completely tested and calibrated at the factory before shipment. The following adjustments may be necessary before installing the module to match the characteristics of the module to the system in which it is to be used.

### Module keying

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Before installing each Model 6010 Module into the wired slot in the mounting rack, be sure that the snap in covers have been installed at keying locations 1 and 10 of the rack keying strip. See “Module Keying Instructions” in the mounting rack section of this manual for complete details.

**!** Installation of the keying system is very important. A module can be permanently damaged if it is plugged into a slot which is wired for a different type of module.

Modules may be inserted into or unplugged from the rack at any time, even with the power on. This will not damage the modules nor generate any false alarms, but will of course generate a fault alarm.

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## OPERATING INSTRUCTIONS

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### General

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Each Model 6010 Smoke/Fire Module includes two independent channels, each offering similar facilities. The module supplies the operating voltage to a zone of fire detectors, and monitors the detectors for an alarm and the wiring to the detectors for a fault condition.

Alarms and faults are indicated as follows:

- When an alarm or fault indication is first detected, the relevant indicator lamp flashes. Most systems are wired so that an audible alarm also sounds at the same time. If the Alarm Acknowledge button is depressed, any flashing indication becomes steady, and this action will silence the audible alarm on most systems.

When the cause of an alarm or fault is removed, the indication generally operates as follows:

- If the indication is flashing, it remains flashing until it is acknowledged or the zone is reset, when it will extinguish.
- If the indication is steady, it will extinguish immediately. Some faults and alarms are latched so that they can only be cleared by resetting the channel.

### Power lamps (green and yellow)

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The two lamps at the top of the panel indicate the status of the power supply to the module. A green lamp indicates that both of the dual 24V power feeds are within specification. If the yellow lamp is on or flashing, an out of tolerance power condition or power failure is indicated. If the indication is on one zone only, it is probable that a fuse is blown. The power systems of each zone are independent, and failure of one will not affect the other zone. When a power fault is detected, the main channel fault lamp on the module will also be illuminated.

### Alarm lamp (red)

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This lamp will normally be off. When a fire alarm is detected, this lamp will flash, and the appropriate system outputs will be activated if the zone is not in the Isolate state. This alarm will latch in the module until the reset pushbutton on the module, or the main system reset pushbutton is depressed.

### Alarm Test Pushbutton

This pushbutton will simulate an alarm for testing purposes. This switch will not operate unless the associated Isolate switch has been operated.

### Isolate Lamp (yellow or blue)

This lamp indicates that the Isolate switch is in the Isolate (up) position.

### Isolate Pushbutton Switch

This switch is recessed behind the panel and requires a small screwdriver to operate it. The switch is used in conjunction with the Alarm Test pushbutton for routine testing of the Module. To activate, insert a small screw driver through the small hole in the front panel and momentarily push the switch. A phillips head screwdriver works best for this action. When the isolate function is active the following actions occur.

- the normal alarm outputs from the zone are inhibited, preventing inadvertent operation of extinguisher and alarm systems.
- The yellow or blue Isolate lamp is illuminated.
- A pulse is transmitted on the Isolate Pulse bus and the Isolate Loop is open-circuited
- the existing alarm status (off, flashing or steady) is memorized, and will be restored when the isolate switch is returned to normal.
- the yellow Isolate lamp starts to flash.
- the alarm test button is enabled. When depressed, it will actuate the alarm pulse and alarm lamp module outputs, and the alarm LED on the module. It will not activate the alarm relay output. An alarm condition from the field wiring will do the same thing (alarm pulse, lamp, LED, but no relay).

To cancel the isolate function, insert screw driver and again push the switch. When the isolate switch is returned to its normal position, an internal channel reset is generated so that any test alarm condition within the zone is cleared, thus preventing unwanted alarm outputs. The following actions also occur:

- the Isolate lamp will extinguish if it was steady
- the test alarm condition is cleared.
- the alarm status prior to the Isolate switch being operated is restored
- the Test button is inhibited.

### Fault Lamp (yellow)

Below the Isolate switch is the yellow Fault lamp. This will flash if any of the following occurs:

- the field wiring is measured as open or short circuit
- there is ground fault leakage from either side of the field wiring (if the ground fault detection option is installed).

The Fault state is always latched, and will require a reset, either from the system reset pushbutton or from the front panel pushbutton to restore normal operation.

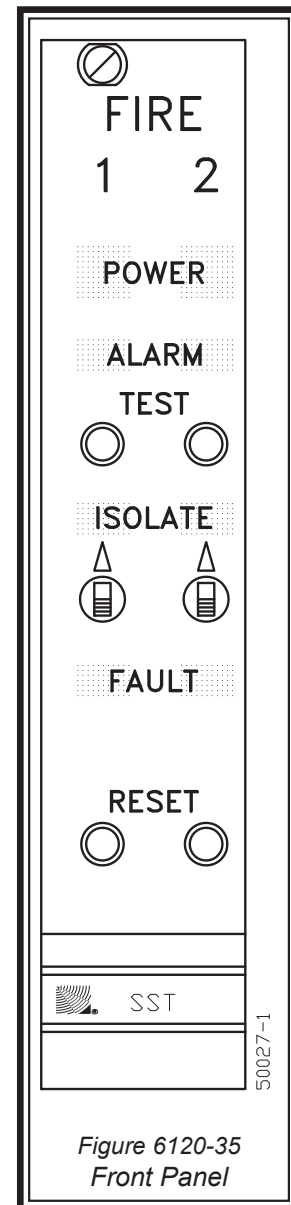


Figure 6120-35  
Front Panel

## Reset Pushbutton

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At the bottom of the panel is the Reset pushbutton. When operated this will perform the following actions:

- alarms and faults are cleared
- a lamp test is carried out: all lamps on the channel should illuminate
- The detection line power is interrupted to reset any field detectors that have latching alarms.

The same action (except for lamp test) occurs whenever the main system reset pushbutton is depressed.

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# MODEL 6120 SYSTEM FACILITIES LOGIC MODULE

## DESCRIPTION

The SST Model 6120 System Facilities Logic Module provides control capabilities common to all modules in a VulcanGuard System. The most common facilities are Alarm Acknowledge, System Reset and Lamp Test. In many VulcanGuard systems, these capabilities are provided by dedicated pushbuttons located elsewhere on the system enclosure. The Model 6120 System Module is used when it is desired to provide these facilities within the VulcanGuard module mounting rack. In multiple rack systems, one module may be used to control the entire system, or separate System Modules may be provided for each rack.

The fourth switch on the module front panel is a two position key operated switch, which may be used for any desired function. Some typical uses for this switch are:

- As an ABORT switch, to inhibit the inputs on a Model 6230 Extinguishant Release Control Module
- As a DRILL switch, to start system Fire Drills
- As a MAIN/RESERVE switch to activate reserve extinguishant releasing systems

The Model 6120 System Facilities Module also provides fault monitoring for the VulcanGuard system. When any other module in the rack identifies a fault condition, and audible signal buzzer in the System Module will sound, along with an LED fault indication. There is also a System Alarm output from this module, which will be activated when any module in the rack detects an alarm condition. This may be used to activate a system alarm bell, horn or strobe.

## LOGIC DIAGRAM

Figure 6120-1 shows, in simplified form, the internal logic in the System Facilities module, and indicates the terminal number assigned with each.

This logic diagram, and all the other logic diagrams in this manual, may be photocopied and used as “paste ups” for making wiring schematics for your VulcanGuard system. Disk copies of these diagrams, suitable for use in computer aided drafting programs, are also available from Safety Systems Technology at a nominal charge.

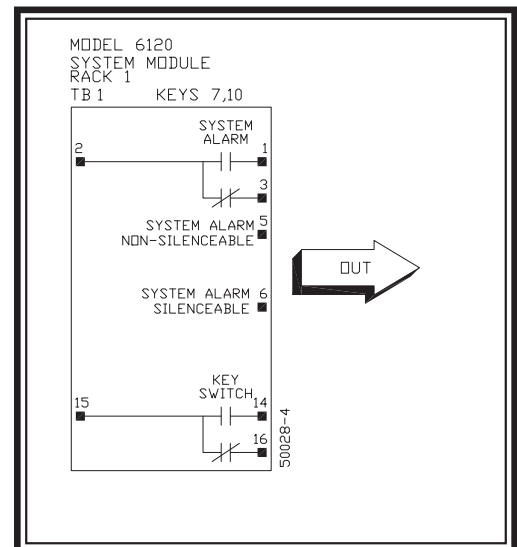


Figure 6120-1 Logic Diagram

## INPUT/OUTPUT CONNECTIONS

The Acknowledge, Reset, Lamp Test and Fault Buzzer capabilities of the System Module are active as soon as you plug in the module. All connections for these functions are automatically connected via the backplane. The physical arrangement of the 16 terminals on the rack back plane are shown in Figure 6120-2. Each of the available signals is described below.

### System Alarm Relay Outputs – terminals 1 through 3

These are VulcanGuard Standard Relay Outputs that operate when any alarm is detected on any other module in the VulcanGuard module mounting rack(s). The normally open (NO) and normally closed (NC) contacts will be in that state with no alarm detected. The relay will transfer when an alarm condition occurs, and will latch into that condition until the System Reset button is pushed.

### System Alarm Output (Non-Silencable) – terminal 5

This is a Standard Logic Output that is activated the same time as the alarm relay, that is, when an alarm is detected in any other module in the VulcanGuard mounting rack(s). This output is not deactivated when the Acknowledge/Silence pushbutton is depressed. The output will remain activated until the Reset button on the System Module is depressed. This output may be used to activate visual alarm devices (strobe lights, beacons, etc.).

### System Alarm Output (Silencable) – terminal 6

This is a Standard Logic Output that is activated the same time as the alarm relay, that is, when an alarm is detected in any other module in the VulcanGuard mounting rack(s). This output remains activated until the Acknowledge/Silence or the Reset pushbutton on the System Module is depressed. This output may be used to activate audible alarm devices (bells, horns, etc.), by connecting to the input of a Model 6241 Supervised Alarm (Mon Out) Module.

### Keyswitch Contact Outputs– terminal 14 through 16

These are “dry” contacts which operate when the key operated switch on the front of the module is turned. The normally open (NO) and normally closed (NC) contacts will be in that state when the switch is in the counter clockwise locked position. The contacts will transfer when the switch is turned clockwise. Note that the key is removable only when the switch is in the CCW locked position.

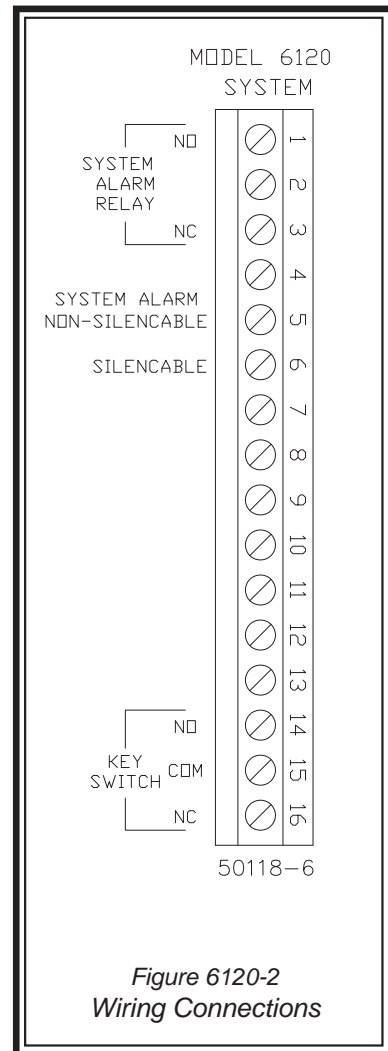


Figure 6120-2  
Wiring Connections

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## MODULE SETUP INSTRUCTIONS

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All VulcanGuard modules are completely tested at the factory before shipment. The following adjustments may be necessary before installing the module to match the characteristics of the module to the system.

### Buzzer Activation

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The “DIP” switch on the module printed circuit board determines the function of the buzzer on the module. If all switches are OFF or OPEN, the buzzer will never operate. When switch 1 is ON or CLOSED, the buzzer will sound when any system fault occurs. When switch 2 is ON or CLOSED, the buzzer will sound when any system ISO (isolate) switch is operated. Close both switches if you want the buzzer to operate on either condition. The buzzer will be silenced whenever the ACKNOWLEDGE pushbutton is depressed.

Underwriters Laboratories regulations require a fault buzzer for all VulcanGuard systems. Switch 1 must always be left ON or CLOSED for these systems.

### Module Keying

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Before installing the Model 6120 System Module into the wired slot in the mounting rack, be sure that the snap in covers have been installed at keying locations 7 and 10 of the rack keying strip. See “Module Keying Instructions” in section 5300 of this manual for complete details.

Installation of the keying system is very important. A module can be permanently damaged if it is plugged into a slot which is wired for a different type of module.

Modules may be inserted into or unplugged from the rack at any time, even with power on, without any damage to the module, and without generating any false alarms.

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## OPERATING INSTRUCTIONS

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### General

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The Model 6120 System Facilities Logic Module is designed to provide the common functions that are not assigned to any particular input or output module. During normal operation, only the green Power LED will be lit. When an alarm or fault condition is detected, the relevant indicator lamp flashes, until the ACKNOWLEDGE pushbutton is depressed. The following controls and indicators are provided on the module.

### Power lamps (green and yellow)

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The two lamps at the top of the panel indicate the status of the power supply to the module. A green lamp indicates that both of the dual 24 volt power supply feeds are within specification. If the yellow lamp is flashing or on, a fault in the power circuits is indicated.

### System Alarm Lamp (red)

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When any new alarm is detected by any other module in the VulcanGuard system, this lamp will flash simultaneously with the alarm lamp on the initiating module. At the same time, the system alarm output of the System Module will be activated. In many cases, this will be connected to appropriate audible and/or visual alarm indicating appliances (bells, horns, strobe lights, etc.). The lamp will continue to blink and the alarm devices will continue to sound until the

ACKNOWLEDGE/ALARM SILENCE pushbutton on the front of the module is depressed. Depressing this button silences the alarm devices, extinguishes the alarm lamp on the System Module, and causes the blinking lamp on the module(s) that initiated the alarm to change from blinking to steady on. The system alarm lamp on the System Module will repeat this same sequence every time a new or subsequent alarm is detected.

### System Fault Lamp (yellow)

When any new fault is detected by any other module in the VulcanGuard system, this lamp will flash simultaneously with the fault lamp on the initiating module. At the same time, the system fault buzzer in the System Module may be activated, if the module dip switch has been set to activate this buzzer. The lamp will continue to blink and the buzzer will continue to sound until the ACKNOWLEDGE/ALARM SILENCE pushbutton on the front of the module is depressed. Depressing this button silences the buzzer, extinguishes the fault lamp on the System Module, and causes the blinking lamp on the module(s) that initiated the fault to change from blinking to steady on. The system fault lamp and buzzer on the System Module will repeat this same sequence every time a new or subsequent fault is detected.

### System Isolated Lamp (blue)

When the ISO switch on any other module in the VulcanGuard system is activated, this lamp will flash simultaneously with the ISOL lamp on the initiating module. At the same time, the system fault buzzer in the System Module may be activated, if the module dip switch has been set to activate this buzzer. The lamp will continue to blink and the buzzer will continue to sound until the ACKNOWLEDGE/ALARM SILENCE pushbutton on the front of the module is depressed. Depressing this button silences the buzzer, extinguishes the lamp on the System Module, and causes the blinking lamp on the initiating module(s) to change from blinking to steady on. The system isolated lamp and buzzer on the System Module will repeat this same sequence every time a new or subsequent isolate switch is activated.

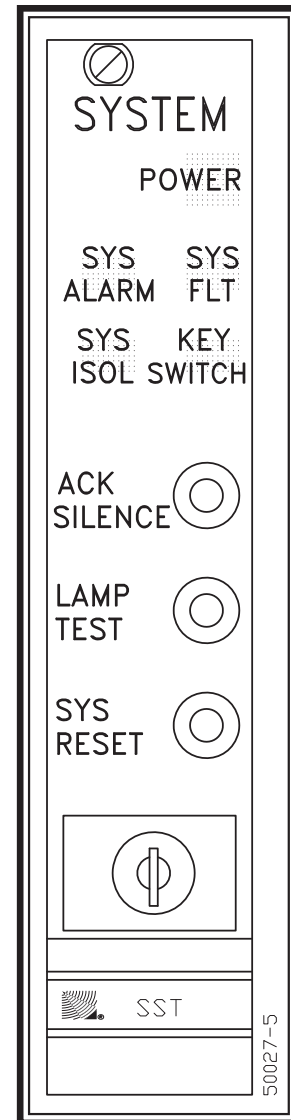


Figure 6120-3  
Front Panel

### Keyswitch Lamp (blue)

This lamp is on whenever the key switch on the front of the module is in the “off normal” position. The lamp extinguishes when the key switch is returned to the normal (counter clockwise) position.

### Acknowledge/Alarm Silence Pushbutton

Depress this switch to acknowledge any new alarm or fault condition in the associated VulcanGuard system. This button will always acknowledge any alarm/fault in the entire module mounting rack where the System Module is located. Depending on system design, alarm/faults in adjacent racks may also be acknowledged. Depressing this button also extinguishes the system alarm and system fault lamps on the System Module, and silences the fault buzzer. In many systems, this button is also set up to silence the system alarm audible devices.

### Lamp Test Pushbutton

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Depressing this button causes all lamps on all associated modules to be illuminated. In systems with more than one Model 6120 System Modules, use this button to determine exactly which modules are controlled by each System Module.

### System Reset Pushbutton

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Depressing this button performs the same reset functions as if the individual reset buttons on each module was depressed. All latched alarms in the various modules will be reset to their normal state. All fault conditions and timers will also be reset.

### Key operated switch

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This switch may be wired to perform various functions. The system designer specifies the exact function by describing on the drawings and module nameplate. The keyswitch is normally in the counter clockwise position, and the key may be removed in this position. The key is held captive in the lock when the key switch is turned.

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# MODEL 6230 EXTINGUISHANT RELEASE CONTROL MODULE

## DESCRIPTION

The SST Model 6230 Extinguishant Release Control Module is used to initiate the release of extinguishing or inerting agent in a protected hazard area. The module is available in several versions, all identical in operation, but with front panel markings indicating the type of extinguishing agent being used. The CO<sub>2</sub> modules are typically used to energize an electric solenoid which opens the valve on storage cylinders or tanks. The DELUGE module is typically used to energize a small "pilot valve" which subsequently opens a large deluge valve to release water or foam spray into the protected area. For other types of releasing service, the module is available with suitable markings applied.

Each Model 6230 Extinguishant Release Control Module mounts in one plug-in space in the VulcanGuard System Rack Assembly. The module may be inserted into or removed from the rack with power applied without triggering the release of extinguishing agent.

## LOGIC DIAGRAM

Figure 6230-1 shows, in simplified form, the internal logic in the Extinguisher Control module, and indicates the terminal number assigned with each.

This logic diagram, and all the other logic diagrams in this manual, may be photocopied and used as "paste ups" for making wiring schematics for your VulcanGuard system. Disk copies of these diagrams, suitable for use in computer aided drafting programs, are also available from Safety Systems Technology at a nominal charge.

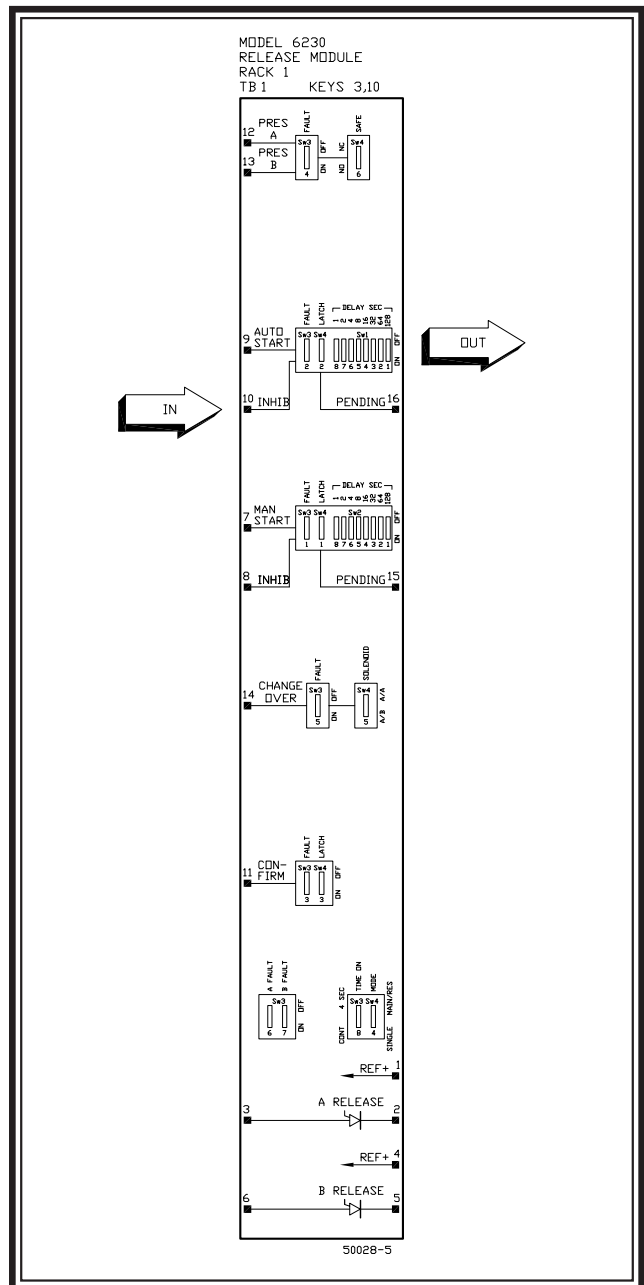


Figure 6230-1 Logic Diagram

## INPUT/OUTPUT CONNECTIONS

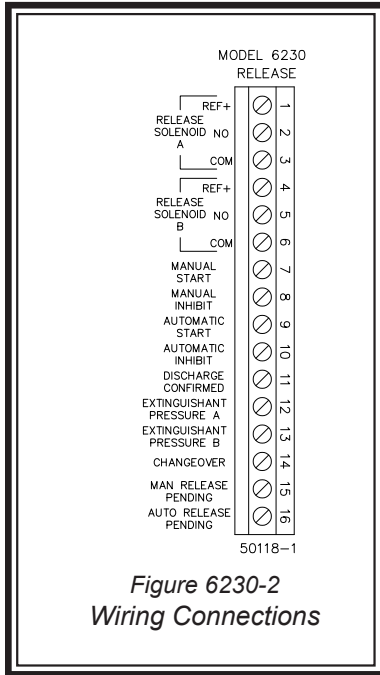


Figure 6230-2  
Wiring Connections

The physical arrangement of the 16 terminals on the rack back plane are shown in Figure 6230-2. Each of the available signals is described below.

### Release Solenoid Outputs – terminals 1 through 6

Two separate release solenoid outputs are provided on the module.

These are Standard Supervised Outputs which drive the two release solenoids. Each output will signal a Fault if an open or short circuit is detected with the output inactive, or open circuit with the output active. After the pre-release time delay has elapsed, the Release Control Module will apply 24 VDC actuating voltage to the releasing devices via these supervised output circuits. Since most release solenoids latch open when energized, this actuating voltage is usually set to be on for only 4 seconds, to prevent excessive current drain when the system is operating from stand-by batteries. If the releasing solenoid requires continuous energization, these outputs may be set to energize the solenoids continuously.

There are two possible modes of operation. If there is only one source of extinguishing agent to be controlled by the module, the DIP switches will be set so that a release signal (either manual or automatic) will **activate both Release Solenoid Outputs**. Output A is connected to the normal releasing solenoid. If a second, redundant releasing solenoid is available, output B would be connected to it for added reliability.

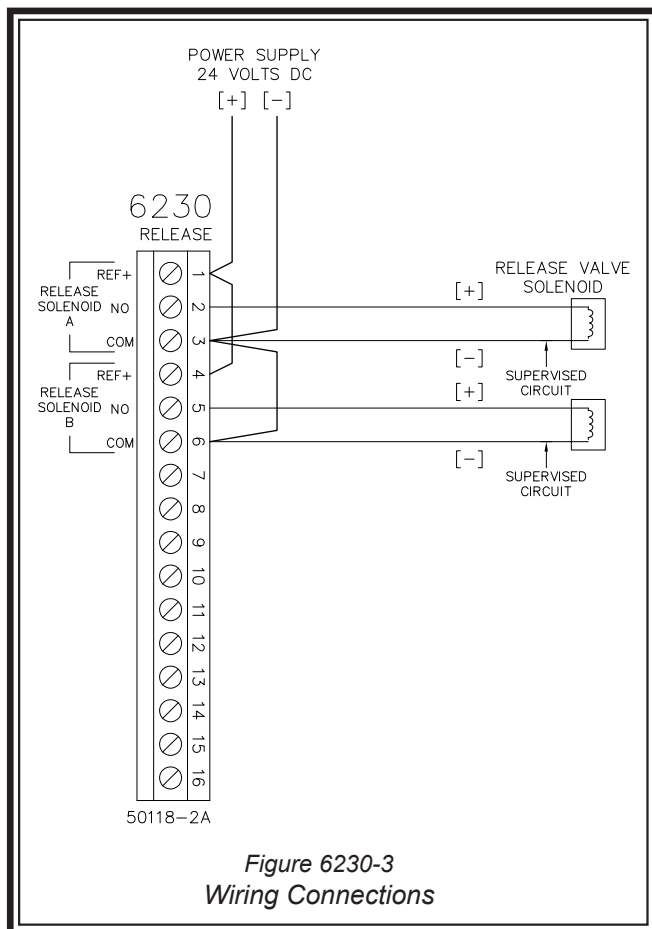


Figure 6230-3  
Wiring Connections

If there are separate **Main and Reserve** sources of extinguishing agent, the two outputs may be set so that Output A will release a main extinguishing system, and Output B releases the reserve system. In this case, the output activated by the manual and automatic inputs will be controlled by the position of the switch connected to the module's Changeover Input.

Note that the time delay between activation of the release start input and the output of voltage to the release solenoids is separately adjustable for the automatic and manual inputs.

**CAUTION:** These outputs are protected against transients with a reverse biased diode. This protects the module from damage under most conditions. However, if the connected output device is highly inductive (such as a deluge solenoid), we recommend a suitable diode, varistor, or surge protector be installed across the solenoid terminals as close to the solenoid as possible.

**Overcurrent protection** for these circuits is not provided by the fuses in the module. All wiring to these terminals must be capable of carrying the maximum available current from the system power supplies. If this is not possible, the installer must supply suitable fuses or circuit breakers between the power supply and these circuits.



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### Manual Release Start Input – terminal 7

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This is a Standard Supervised Input, but its fault detection may be disabled by means of a DIP switch on the circuit board. In this condition the input will respond as a Standard Logic Input, except that the input current will be up to 15 mA instead of 1.1 mA for a Standard Input. This input is normally connected, via supervised field wires, to Manual Release Stations, which start extinguishant release when operated by personnel in the protected area. When this input is activated, and if the Manual Inhibit input is not activated, the Manual Release Pending output will be energized immediately and the manual pre-release timer will start. At the end of the timer period (0 to 4.25 minutes) the appropriate release solenoid will be energized.

*NOTE 1: If devices (Manual Stations) are connected to this input, a system alarm pulse is not generated when the device goes into alarm if there is any time delay set. The system alarm pulse occurs at the end of the time delay.*

If the start input is set for non-latching, and the input is deactivated prior to the end of the time delay, the release will not occur. Reactivating the the input requires the full time delay to occur before release.

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### Manual Inhibit Input – terminal 8

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This is a Standard Logic Input which, when activated, prevents the Manual channel from operating either of the two solenoid outputs. When this input is energized, a pulse will be transmitted on the module rack back plane, and the Isolate Loop will be opened. The inhibit input will deactivate the solenoid output, even after the time delay has elapsed and the solenoid has been energized.

If the pre-release timer is operating when the inhibit input is activated, the timer is immediately reset, and any subsequent enabling of the channel will result in the solenoid output being energized only after the full delay time.

*Supervision is not required* on this input, since any open circuit fault would not inhibit the release of extinguishing agent.

■ The Manual Inhibit input is provided for the unusual case where it is necessary to inhibit all extinguishant release. It should not be used in most instances, as it is usually preferred to ■ keep manual releasing stations active at all times.

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### Automatic Release Start Input – terminal 9

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The “auto start” input is intended for automatic devices which initiate a request for extinguishant without human intervention. Devices with normally open alarm contacts, such as thermal heat detectors, IR or UV Flame Detectors, or similar devices are usually considered reliable enough to connect directly to this circuit. In this application, the related field wiring is fully supervised for open circuit or short circuit faults. When using field detectors that are more prone to “false alarms”, such as smoke detectors, the auto input may be fed from other cross-zoned or voting modules in the VulcanGuard system.

This input is not suitable for smoke detectors or heat detectors with active electronics. This input does not provide the required voltage to operate the electronics in these devices. Connect those devices to the input of a Model 6010 Smoke/Fire Module.

This is a Standard Supervised Input, but its fault detection may be disabled by means of a DIP switch on the circuit board. In this condition the input will respond as a Standard Logic Input, except that the input current will be up to 15 mA instead of 1.1 mA for a Standard Input. When this input is activated, and if the Automatic Inhibit input is not activated, the Auto Release

Pending output will be energized and the auto channel will start to time for a preset period (the time may be adjusted by means of a DIP switch on the circuit board for up to 4 minutes). At the end of the timer period the appropriate release solenoid will be energized.

*NOTE: If devices (Flame Detectors) are connected to this input, a system alarm pulse is not generated when the device goes into alarm if there is any time delay set. The system alarm pulse occurs at the end of the time delay.*

### **Automatic Inhibit – terminal 10**

---

This a Standard Logic Input which, when energized, prevents the Automatic channel from operating either of the two solenoid outputs. When this input is energized, Isolate is signalled on the back plane. This inhibit input is normally controlled by external bypass, abort, or isolate switches. Operation of these switches, prior to the occurrence of an alarm, prevents actual release of extinguishing agent.

The inhibit input may also be momentarily energized during the pre-release time delay; this will reset the pre-release timer and any subsequent enabling of the channel will result in the solenoid output being energized only after the full delay time.

*Supervision is not required* on this input, since any open circuit fault would not inhibit the release of extinguishing agent.

### **Discharge Confirmed Input – terminal 11**

---

The **Discharge Confirmed** input is operated by a pressure switch located in the discharge piping, downstream from the discharge valve. Pressure at this point indicates that the valve has opened and extinguishant is being released. This is a standard supervised input, but its fault detection may be disabled by means of a DIP switch on the circuit board. In this condition the input will respond as a Standard Logic Input, except that the input current will be up to 15 mA instead of 1.1 mA for a Standard Input. When energized, it will cause a front panel lamp to flash, and will generate an Alarm Pulse on the back plane. The connection can be arranged to be latching (for a momentary action field switch) or non-latching (for a latching field switch) by setting a DIP switch on the circuit board. If set to Latching mode, the front panel lamp will not extinguish until the reset button is depressed. If non-latching, the lamp will extinguish when the alarm has been acknowledged and the field switch restored to normal position.

### **Extinguishant Pressure Inputs – terminals 12 and 13**

---

Two **Extinguishant Pressure** inputs are provided which can be fed from pressure switches in the cylinders or supply piping. An open switch indicates that pressure is present, ready for extinguishant release when requested. A closed switch indicates a leak or failure in the system. (The open/closed indications from the pressure switches can be interchanged by setting a DIP switch on the module.)

Each of these is a Standard Supervised Input, but its fault detection may be disabled by means of a DIP switch on the circuit board. In this condition the input will respond as a Standard Logic Input, except that the input current will be up to 15 mA instead of 1.1 mA for a Standard Input. If either input changes to the “extinguishant not ready” condition, it will cause a front panel lamp to flash, will transmit a fault pulse on the back plane, and will open the fault loop.

## Changeover Input – terminal 14

It was noted above that two independent release solenoid output circuits are provided on the extinguisher control module. If the two outputs are to connect to two separate extinguishing systems in a Main/Reserve configuration, an external **Changeover** switch may be connected to this input on the module. Operation of this switch determines whether **Output A** or **Output B** will be energized to release the **Main** or the **Reserve** extinguishing system.

NOTE: For Main/Reserve Systems, the changeover input must be activated by setting SW4/4 on the module to OFF or OPEN, and the desired mode of solenoid operation must be set on SW4/5. This is covered fully under *Module Setup Instructions*.

This is a Supervised Input, but its fault detection may be disabled by means of a DIP switch on the circuit board. In this condition the input will respond as a Standard Logic Input, except that the input current will be up to 15 mA instead of 1.1 mA for a Standard Input.

## Release Pending Outputs – terminals 15 and 16

When the manual or automatic release start input has been energized, but not inhibited, the corresponding release pending output will be energized. These outputs are energized immediately, and are not affected by the release timers. They may be used to control appropriate alarm signals or equipment shutdowns. These outputs are Standard Logic Outputs.

## MODULE SETUP INSTRUCTIONS

The setup actions detailed here are necessary to match the characteristics of the Module to the field components and the mode of operation required. These settings are made only once. There are no adjustments needing periodic checking or readjustment. The settings are all summarized on the standard wiring diagram and in Figure 6230-4. We suggest that you document the required settings for each Extinguisher Control Module on your wiring diagram by marking the position of each DIP switch with an **x**.

### Pre-release Time Delay

The two DIP switches SW1 and SW2 set the length of the pre-release time delay, that is, the time delay between actuation of the module release start input and the activation of the release solenoid. The release time delay, in seconds, associated with each switch section is as follows:

Switch Number on SW1 or SW2	1	2	3	4	5	6	7	8
Time Delay in Seconds	128	64	32	16	8	4	2	1

The total pre-release time will be the sum of the switches that are set to the ON or CLOSED position. Set SW1 for the desired time delay for the Automatic Release Start circuit. Set SW2 for the desired time delay for the Manual Release Start circuit.

Operation of an Abort switch connected to the inhibit input of the module stops this timer and will delay the release of extinguishing agent as long as the switch is activated. UL requires that the agent be released within 10 seconds after the switch is released. Therefore, this timer must not be programmed for more than 10 seconds if an abort switch is used.

Example: If a release time of 30 seconds is required, this is made up of 16 + 8 + 4 + 2. So switches 4, 5, 6 and 7 should be ON, all others OFF.

**Fault Detection (Supervision)**

Switch SW3 (switches 1 through 7) control whether open- and short-circuit detection is ON or OFF for the appropriate circuit. When ON, we refer to the circuit as “supervised”.

Circuits must always be configured with supervision ON if they are connected through field wiring to remotely located devices. If the inputs are being fed from other system modules, or from switches located in the control room, supervision is not required.

Refer to Fig 6230-4 for the function assigned to each switch. For each circuit that is to be supervised, set the appropriate switch on SW3 to ON or CLOSED. For each circuit that is not being used, set the appropriate switch on SW3 to OFF or OPEN.

**Solenoid Energize Time**

Switch SW3, switch no. 8 controls the time that the release solenoid(s) will be energized. If this switch is ON, the release solenoid(s) are continuously energized from the time the release timer expires to the time when the Model 6230 is reset. If this switch is OFF, the solenoid(s) are energized for 4 seconds only.

**Latching/Non-Latching Operation**

**Manual Start Latch - SW4/1**

When this switch is OFF or OPEN, the Manual pre-release timer and release system runs only while the Manual Start input on the Extinguisher Control Module is energized. When the input becomes deenergized, the timer will be reset and the solenoid output, if it is on, is turned off.

When this switch is ON or CLOSED, the Manual Start input will latch on when energized, the pre-discharge timer and release system will operate, and this state will remain until the Module is reset.

**Auto Start Latch - SW4/2**

This performs the same function for the Auto timer and release system as the Manual Latch for the Manual system.

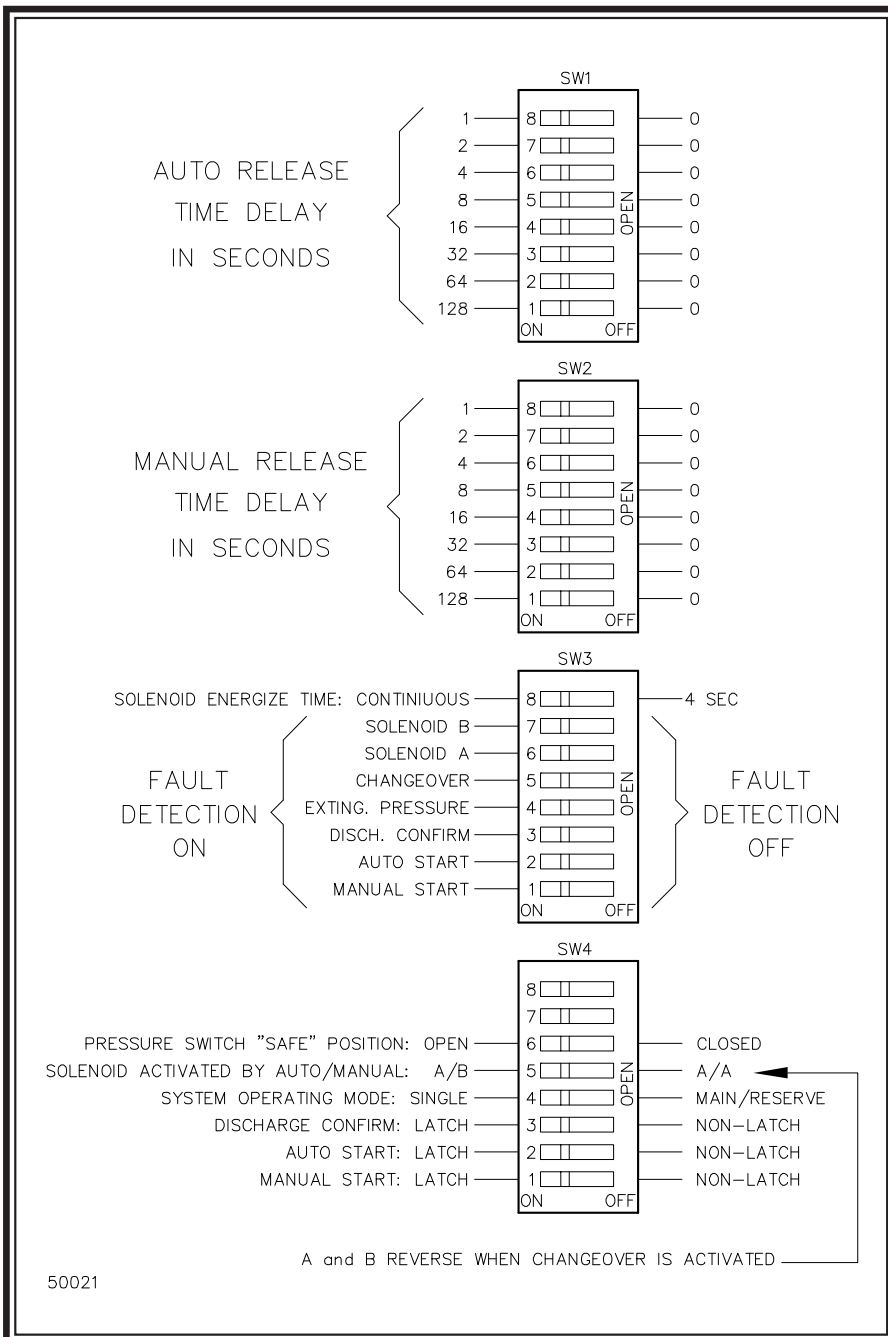


Figure 6230-4 Programming Switch Settings

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### Discharge Confirmed Latch - SW4/3

This switch should be ON or CLOSED if the Discharge Confirmed pressure switch is a momentary type; OFF or OPEN if the pressure switch is itself latched. If this switch is ON, the Confirm indication on the module front panel will remain until the Module is reset.

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### Main/Reserve or Single Extinguishing System Operating Modes

If the module controls two sets of extinguishing storage tanks or systems, set the operating mode switches as specified below under Main/Reserve. If there is no standby reserve supply of extinguishant, use the Single System setup.

#### Single Extinguishing System

For this mode, set SW4/4 to ON or CLOSED. In this mode, both Solenoid outputs are energized for release. This permits the use of a single solenoid connected to Output A, with an optional redundant releasing solenoids or valves connected to Output B. If Solenoid B output is not being used, then set SW3/7 to OFF to suppress fault detection on that circuit. When this switch is ON, the Extinguishant Pressure Switch B and the Changeover Inputs are not operational. Also, the setting of DIP switch SW4/5 has no effect.

#### Main/Reserve Extinguishing System

For this mode of operation, set SW4/4 to OFF or OPEN. Connect the Main releasing valve or solenoid to Output A on the module, and the Reserve solenoid to output B. There are two “sub-modes” of operation for Main/Reserve systems, depending on how you set DIP switch SW4/5. This switch setting determines which of the two release outputs are energized as listed below.

With Switch SW4/5 OPEN or OFF:

- Automatic Start Input activates the main output A
- Manual Start Input activates the main output A
- Changeover causes manual or automatic to activate reserve output B

With Switch SW4/5 CLOSED or ON:

- Automatic Start Input activates the main output A
- Manual Start Input activates the reserve output B
- Changeover causes manual or automatic to activate the opposite output from those listed above

---

### Extinguishant Pressure Switch Safe Condition

Two inputs are provided on the module to monitor the supply pressure in the Main and Reserve extinguishing systems. Low pressure here would indicate a leak in a storage cylinder, or failure of a pump.

When switch SW4/6 is ON, the Pressure Switches A and B are expected to be open in the safe or normal condition: closure of a switch will signal the appropriate Fault.

When switch SW4/6 is OFF, the Pressure switches are expected to be closed in the safe or normal condition: opening a switch will signal the appropriate Fault.

## Module keying

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Before installing each Model 6230 Module into the wired slot in the mounting rack, be sure that the snap in covers have been installed at keying locations 3 and 10 of the rack keying strip. See “Module Keying Instructions” in the mounting rack section of this manual for complete details.

Installation of the keying system is very important. A module can be permanently damaged if it is plugged into a slot which is wired for a different type of module.

Modules may be inserted into or unplugged from the rack at any time, even with the power on. This will not damage the modules nor generate any false alarms, but will of course generate a fault alarm.

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## OPERATING INSTRUCTIONS

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### General

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The Model 6230 Extinguisher Control Module controls the release of extinguishing agent in a protected hazard area. The module continuously checks the integrity of the system wiring connected to it, and indicates a Fault when there is a failure in the wiring. The module initiates release of the agent by energizing an electric solenoid which opens a valve on the storage cylinders or tanks.

The Model 6230 has two independent release input channels (automatic and manual) which may be controlled independently. When one of the input channels is activated, it will be indicated on the module front panel immediately. Then after a pre-discharge time delay which has been programmed into the module, the extinguishing system will be activated. There are two separate release outputs. In some systems, these will both activate the same extinguishing system. Or if two sources of extinguishant are available (a main and a reserve), one output is connected to each system and a switch is provided to control which system will be activated.

Alarms and faults are indicated as follows:

- When an alarm or fault indication is first detected, the relevant indicator lamp will be illuminated. The red manual alarm and automatic alarm indicators light steady; the other LED's flash when initially activated. Most systems are wired so that an audible alarm sounds at the same time. If the alarm acknowledge button is depressed, any flashing indication becomes steady, and this action will silence the audible alarm on most systems.

When the cause of an alarm or fault is removed, the indication generally operates as follows:

- If the indication is flashing, it remains flashing until it is acknowledged or the module is reset, when it will extinguish.
- If the indication is steady, it will extinguish immediately.
- Some faults and alarms are latched so that they can only be cleared by resetting the module.

### Power lamps (green and yellow)

---

The two lamps at the top of the front panel indicate the status of the power supplies. A green lamp indicates that both of the dual 24V power feeds are within specification. If the yellow lamp is on or flashing, an out-of-tolerance power condition or power failure is indicated. Probable cause is a blown fuse in the module.

### Pressure lamps (Blue)

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When the left hand lamp, marked “A”, is lit, there is low supply pressure in the main extinguishing system. This probably indicates a leak in the storage tanks. If the installation includes a standby “reserve” extinguishing system, the center “B” lamp in the row performs the same function for

this system. The right hand “FLT” lamp lights when there is an open or short circuit in the wiring to either the A or B pressure switches used to monitor the supply pressure. When the FLT lamp is on, either the A or B lamp will also be on to indicate which of the two circuits are reporting a fault.

### Release lamps (red, blue and yellow)

The release lamps show the status of the two release inputs to the module. The upper row of lamps are for the “automatic” release input. This input is activated by field sensors and detectors that operate automatically, such as smoke, flame or heat detectors. The lower row of lamps are for the “manual” release input, which is activated by manually operated alarm stations in the protected area. The function of the lamps is the same for both inputs.

When the red lamp lights, it indicates that the input has been activated. Once the input is has been activated, a timer starts to run, at the end of which time the appropriate extinguisher system is released.

The blue “INH” inhibit lamp indicates that the channel is inhibited, due to the operation of an external inhibit, abort or lockout switch. This will prevent release of extinguishant, and if energized after an input has been initiated, will stop and hold the timer for that channel.

The yellow “FLT” lamp indicates that there is an open or short circuit fault on that input.

### Changeover lamps (green and yellow)

This facility is used only when the module is connected to selectively release either a Main or Reserve extinguishing system. When the green “A” lamp is lit, any request for extinguishant will release the Main system. If the main system has already been released or is not working, the changeover switch should be operated, causing the “A” lamp will go out and the “B” lamp to light. The “B” indicates that the reserve system is now available for release.

NOTE: Changeover occurs only when the manual and automatic start inputs are not activated. Input must be restored to normal (for latching inputs, reset button must be pushed) for changeover to occur.

The yellow “FLT” lamp indicates if there is an open or short circuit fault on the wiring to the changeover switch.

### Solenoid lamps (red and yellow)

There are two separate solenoid outputs on the module, which are used to activate solenoid operated valves in the extinguishing system. The red lamp marked “A” will light whenever actuating voltage is applied to the **Main** releasing system. The red “B” light indicates voltage to a second releasing solenoid. If there is a reserve extinguishing system, this B output would activate that system. If there isn’t a reserve system, the B output can be used to operate a second solenoid on the main system for redundancy. The “FLT” lamps indicate an open or short circuit fault on the relevant solenoid circuit.

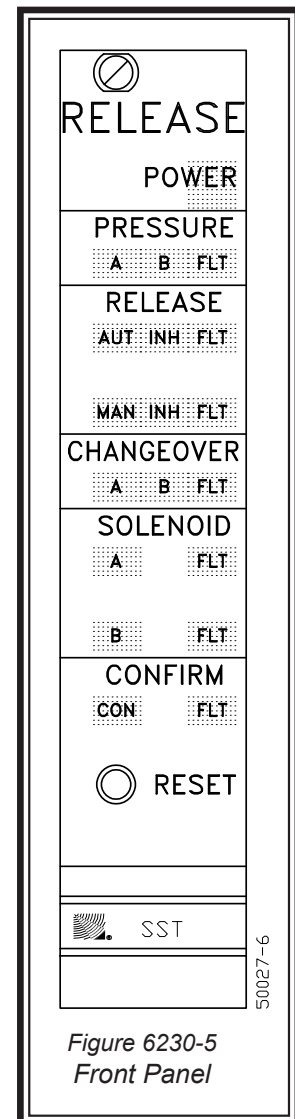


Figure 6230-5  
Front Panel

### **Confirm lamps (red and yellow)**

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When the pressure switch in the extinguisher manifold is activated by the flow of extinguishant, the red "CON" lamp will flash, and a system Alarm will be activated. This lamp can be acknowledged in the normal way.

### **Reset pushbutton**

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At the bottom of the panel is the Reset pushbutton. When operated all alarms and faults are cleared, the pre-discharge timers are reset, and all lamps on the module are tested.



# MODEL 6241 SUPERVISED ALARM (MON OUT) MODULE

## DESCRIPTION

The SST Model 6241 Supervised Alarm Output Module controls external alarm devices, such as bells, horns, rotating beacons, strobe lights, etc. on four independent channels. It may also be used to control other devices, such as shutdown relays, door closers, damper motors, or for elevator recall circuits.

The field wiring is supervised for open circuits (10 K Ohms or more) or short circuits by passing the supervisory current through the end of line (EOL) resistor connected across the field wires at the last field device. Polarizing diodes inside the field devices prevent the supervisory current from flowing through the device's actuating coil or electronics. Thus the Model 6241 Module supervises the field wiring and not the physical state of the field devices. If the required "polarized" alarm appliances are not available, any field device can be converted to a polarized field device by simply connecting a diode in series with its coil. This diode will prevent the device from being activated when the Model 6241 Module applies the reversed voltage to its output channels for supervision of the field wiring. The number of field devices connected to each output channel is virtually unlimited, as long as the maximum current rating is not exceeded. The Model 6241 input circuits are normally actuated by outputs from other modules in the VulcanGuard system.

Each Model 6241 Module mounts on one plug in space in the VulcanGuard Rack Assembly.

## LOGIC DIAGRAM

Figure 6241-1 shows, in simplified form, the internal logic in the Model 6241 Supervised Alarm Output Module, and indicates the terminal number assigned with each.

**!** This logic diagram, and all the other logic diagrams in this manual, may be photocopied and used as "paste ups" for making wiring schematics for your VulcanGuard system. Disk copies of these diagrams, suitable for use in computer aided drafting programs, are also available from Safety Systems Technology at a nominal charge.

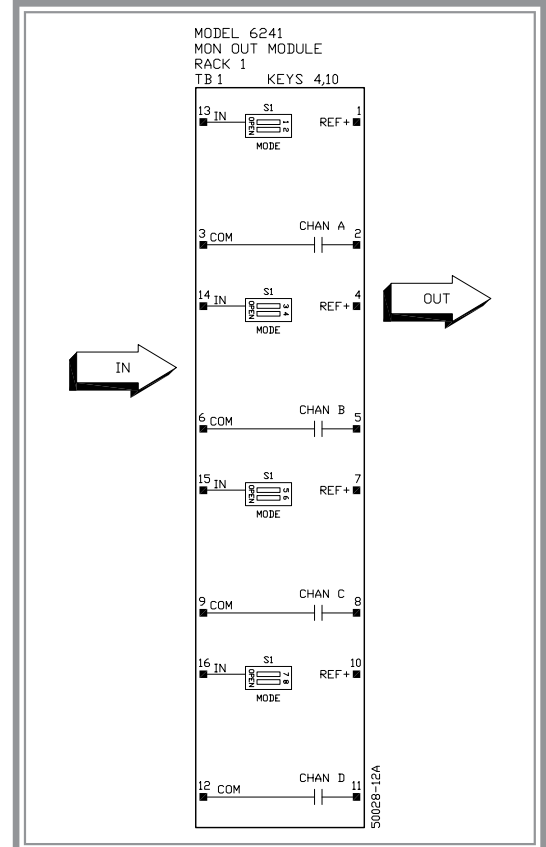


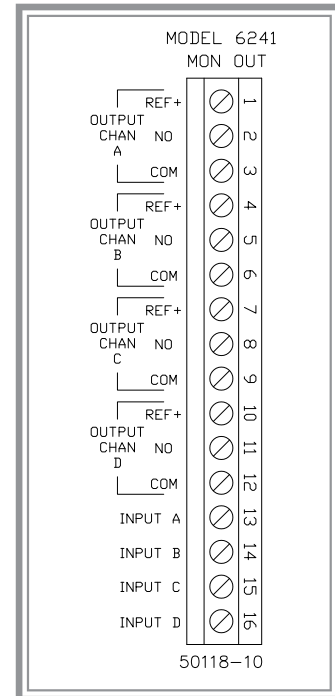
Figure 6241-1 Logic Diagram

## INPUT/OUTPUT CONNECTIONS

The physical arrangement of the 16 terminals on the rack back plane are shown in Figure 6241-2. Each of the available signals is described below.

### Monitored Outputs — terminals 1 through 12

There are three screw terminals on the back of the rack associated with each polarized supervised output (REF, NO, COM) which are activated when the corresponding input is activated. All outputs are activated through relay contacts and are rated to switch 24 volts DC at 2 Amps. The positive terminals of the external alarm devices and the positive end of the power supply used to feed them must be connected to the terminal REF. Note that this is a voltage reference input terminal. This is not a source of 24 volts DC for the field devices. The negative terminals of the external alarm devices must be connected to the terminal NO (“normally open”). When the channel output is activated, the Model 6241 Module will electrically connect the terminals NO and COM. The negative side of the external power supply must be connected to the COM terminals of the Alarm Module channels being used.



*Figure 6241-2  
Wiring Connections*

Alarm Indicating Appliances that contain a switching contact (typical for bells and some horns) produce very large transients during operation, caused by the inductive “kick” of the collapsing magnetic field in the coil. These transients may damage the supervision circuit in the Alarm Module unless they are suppressed. Use either a reverse biased diode, a varistor, or other suitable suppressor across the input terminals of each such alarm device. These suppressors must be installed at the bell or horn, not at the VulcanGuard system rack and must be connected directly to the coil terminals of the bell or horn, not across the polarizing diode!

Overcurrent protection for the alarm outputs is recommended to prevent damage to the module in case of a short circuit on the wires going to the alarm appliances. The installer should supply suitable fuses or circuit breakers between the power supply and the output circuits to limit the output current to 2.0 amps maximum on each of the four outputs.

Each output will signal a fault if an open or short circuit is detected with the output inactive, or open circuit with the output active. Additionally, the failure of internal and external fuses due to short circuits is detected when the output is active. On initial detection of the fault the following actions occur:

- The Fault lamp starts to flash
- The Fault Pulse line is activated for 100 to 150 milliseconds
- The Fault Loop is open circuited.

### Inputs — terminals 13 through 16

These are Standard Logic Inputs which drive the outputs directly. Each input has two sections of a DIP switch on the circuit board associated with it. The DIP switch setting determines whether the input is latched or not latched and which signals will activate or reset the corresponding channel.

### Typical Wiring Diagram

The wiring diagram in this manual shows the approved connections for the Model 6241 Module. All installations should be made in conformance with this drawing.

## MODULE SETUP INSTRUCTIONS

The module must be configured to match the mode of operation required. These settings are made only once. We suggest that you document the required settings for each Alarm Output Module on photocopies of figure 6241-1 and file these for future reference.

### Channel Operating Mode Selection

Each of the four output channels may be individually set to operate in any one of four operation modes. The available modes are:

- **NON LATCHED MODE:** In this mode the output is solely determined by the current state of its corresponding input terminal. An active input (low voltage) will activate its corresponding output. With the input inactive or open (+24VDC) the corresponding output will be deactivated.
- **LATCH MODE 1:** In this mode a short activation (100ms or more) of the input terminal will activate the corresponding output and hold it activated. A RESET pulse on the VulcanGuard backplane or powering down the VulcanGuard rack will deactivate the output.
- **LATCH MODE 2:** This mode is identical to LATCH MODE 1, but the output is additionally deactivated when an ACKNOWLEDGE pulse is detected on the VulcanGuard backplane. If the ACKNOWLEDGE pulse is detected and the input terminal is still activated, the output will not reactivate. The output will only reactivate when the input terminal goes to the inactive state and is then activated. A typical application of this mode is to connect the alarm output of a Model 5020 Gas Module to a channel input of the Model 6241 Module. A gas alarm will then activate the announcing devices connected to the channel outputs. Acknowledging the alarm will deactivate the annunciators, even if the gas alarm is still present. Only after the gas alarm goes away, or the system is reset, will the channel of the Model 6241 Module be ready to announce a new alarm.
- **LATCH MODE 3:** In this mode the channel will additionally be activated by any ALARM pulse detected on the VulcanGuard backplane. A RESET pulse on the VulcanGuard backplane or powering down the VulcanGuard rack will deactivate the output.

The eight section OUTPUT LATCHING switch SW2 on the module sets the operating mode for the four channels. Positions 1 and 2 correspond to channel A, positions 3 and 4 to Channel B, etc. The operating mode of each channel can be selected as listed below.

<u>pos 1</u>	<u>pos 2</u>	<u>operating mode</u>
CLOSED	CLOSED	channel A NON LATCHED
OPEN	CLOSED	channel A LATCH MODE 1
CLOSED	OPEN	channel A LATCH MODE 2
OPEN	OPEN	channel A LATCH MODE 3
<u>pos 3</u>	<u>pos 4</u>	<u>operating mode</u>
CLOSED	CLOSED	channel B NON LATCHED
OPEN	CLOSED	channel B LATCH MODE 1
CLOSED	OPEN	channel B LATCH MODE 2
OPEN	OPEN	channel B LATCH MODE 3
<u>pos 5</u>	<u>pos 6</u>	<u>operating mode</u>
CLOSED	CLOSED	channel C NON LATCHED
OPEN	CLOSED	channel C LATCH MODE 1
CLOSED	OPEN	channel C LATCH MODE 2
OPEN	OPEN	channel C LATCH MODE 3

pos 7	pos 8	operating mode
CLOSED	CLOSED	channel D NON LATCHED
OPEN	CLOSED	channel D LATCH MODE 1
CLOSED	OPEN	channel D LATCH MODE 2
OPEN	OPEN	channel D LATCH MODE 3

In all latch modes the outputs will be activated when the input terminals are in the active state after a reset or power up.

### Channels in Use Selection

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The four section CHANNEL ACTIVATION switch SW3 on the module specifies which channels are being used. When set to ON or OPEN position on the switch, the respective channel is activated. An End-of-Line resistor is required on each activated channel. When set to OFF or CLOSED, the respective channel is not operational, and no End-of-Line resistor is required on that channel.

### Module Keying

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Before installing each Model 6241 Alarm Module into the wired slot in the mounting rack, be sure that the snap in covers have been installed at keying locations 4 and 10 of the rack keying strip. See "Module Keying Instructions" in section 5300 for complete details.

- !** Installation of the keying system is important. A module can be permanently damaged if it is plugged into a slot which is wired for another type of module. Modules may be inserted into or unplugged from the rack at any time, even with the power on. This will not damage the modules nor generate any false alarms, but will, of course, generate a fault alarm.

## OPERATING INSTRUCTIONS

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### General

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The red alarm lights on the module front panel are illuminated whenever the connected alarm device is activated. The fault lights work slightly different. When a fault condition is first detected, the corresponding yellow indicator lamp flashes. Most systems are wired so that an audible alarm sounds at the same time. The fault lamp will continue to flash, even if the fault condition is cleared, until an ACKNOWLEDGE or RESET pulse is detected on the VulcanGuard backplane. In most systems this is achieved by pressing the acknowledge or reset pushbutton on the Model 6120 System Facilities Module. If the acknowledge pushbutton is depressed, any flashing indication becomes steady, and this action will silence the audible alarm on most systems.

### Power lamps (green and yellow)

---

These two lamps at the top of the panel indicate the status of the power supplies. A green lamp indicates that both of the dual 24 volt power feeds are within specification. If the yellow lamp is on or flashing, an out of tolerance power condition or power failure is indicated.

### Channel lamps (red)

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There are 4 red lamps, corresponding to channels A, B, C and D, marked "ON". Each indicates that the alarm indicating device connected to that channel is energized. This lamp is either on or off; it does not flash.

### Channel lamps (green)

There are 4 green lamps, marked A, B, C and D. Green indicates that the channel is activated and operating. If not illuminated, that channel is not in service. These lamps are either on or off; they do not flash.

### Channel lamps (yellow)

The yellow lamp, marked “FLT”, will flash if there is an open or short circuit fault in the output wiring between the module and the field device. Each inactive channel is supervised (sampled) every 8 seconds. A singular short flash (1/10 second) of the yellow lamp indicates that a fault was detected in the sample that was just taken. An official fault (i.e. continued flashing of the FLT lamp, interruption of the fault loop) will be announced only if short or open circuit conditions are detected at three consecutive samples. This filtering is performed to eliminate false alarms due to noise or transients on the field wiring. Consequently a continuous open or short circuit condition will be announced after 24 seconds. Frequent occurrence of short flashes (more than 1 per minute per channel) indicates that the end of line resistor is out of tolerance, there is a wiring problem, a module malfunction or that the field wiring is subjected to noise or transients. In this case the wiring and the module should be checked at the next scheduled maintenance. Open circuit conditions of active channels will be detected immediately.

### Module fault lamp (yellow)

This lamp will flash when the module detects an internal fault, such as processor failure. A module with its internal fault lamp flashing or on should be replaced immediately.

### Reset Pushbutton

At the bottom of the panel is the Reset pushbutton. When operated, all alarms and faults are cleared and all lamps on the module are tested.

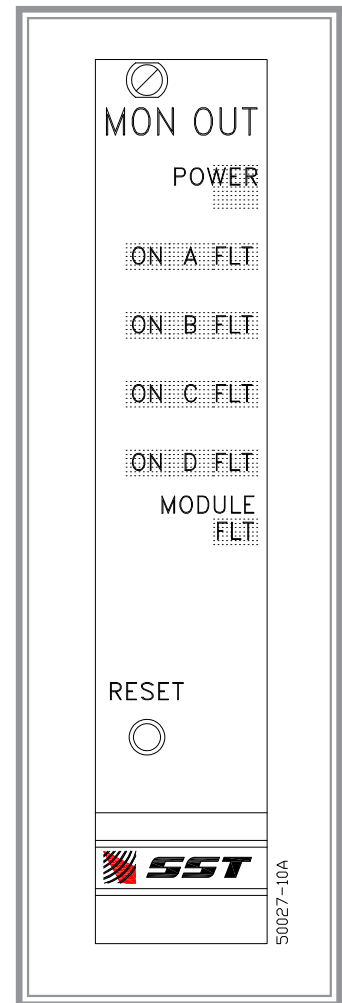


Figure 6241-3  
Front Panel

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