

MODEL 5241 SUPERVISED ALARM (MON OUT) MODULE

DESCRIPTION

The SST Model 5241 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 5241 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 5241 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 5241 input circuits are normally actuated by outputs from other modules in the NOVA-5000 system.

Each Model 5241 Module mounts on one plug-in space in the NOVA-5000 Rack Assembly.

Differences between Models 5241 and 5240

The Model 5241 Alarm Module is "pin compatible" with the Model 5240; that is, all input and output connections to the terminals on the back of the NOVA-5000 System Rack are identical. The Model 5241 may be used to replace a Model 5240, and provides additional functionality. Some revisions of the field wiring will be required when upgrading. See Table 5241-1 for a comparison of the two modules.

As opposed to the Model 5240 Supervised Alarm Output Module, the SST Model 5241 Supervised Alarm Output Module requires field devices of the "polarized" type, since polarity reversal of actuating voltage is used for supervision of the field wiring.

Table 5241-1 Model 5241 and Model 5240 Comparison		
PARAMETER	MODEL 5240	MODEL 5241
field device type	non-polarized	polarized
number of field devices per channel	2	any number, up to 2 amps load
EOL resistor	None	3.3 k-Ohms
latched operation	Not provided	3 modes
reset switch on module	none	provided

LOGIC DIAGRAM

Figure 5241-1 shows, in simplified form, the internal logic in the Model 5241 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 NOVA-5000 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.

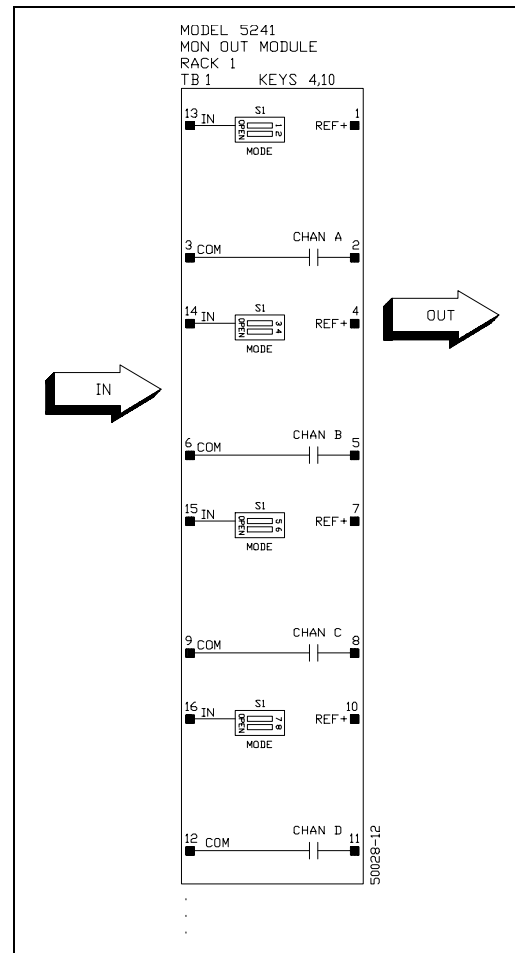


Figure 5241-1 Logic Diagram

INPUT/OUTPUT CONNECTIONS

The physical arrangement of the 16 terminals on the rack back plane are shown in Figure 5241-2. 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 5241 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.

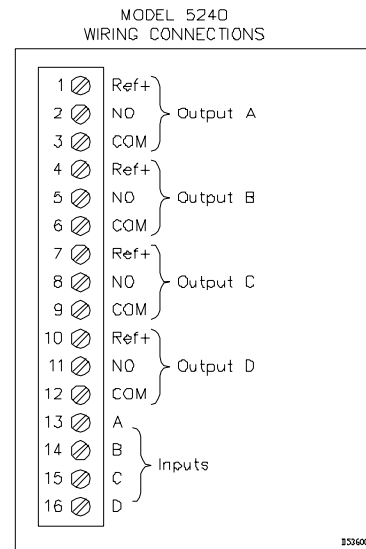


Figure 5241-2

! **VERY IMPORTANT: The same power supply must be used to feed all four channels of one Model 5241 Module. If different power supplies are to be used to feed different circuits, they must be connected to different Model 5241 Modules.**

! Connecting the positive terminal of the power supply to the REF terminal indicates that the channel is in use, i.e. the Model 5241 Module will supervise the line connected to terminals REF and NO for short and open circuit conditions. A channel with the REF terminal unconnected will not be supervised. Always connect channel A first, then any of the three remaining channels. **A module with channels B, C, or D, but not A, connected will not work properly.**

! 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 NOVA-5000 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 provided by self-resetting solid state fuses in the module, rated at 4 Amps. These fuses are of the slow-action type and are designed to protect the module itself, not the power supply, the field wiring or the field devices. All wiring to the output terminals must be capable of carrying the maximum available current from the system power supplies. The installer must supply suitable fuses or circuit breakers between the power supply and the output circuits.

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 fold-out wiring diagram in the Reference Information section of this manual shows the approved connections for the Model 5241 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 5241-1 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 NOVA-5000 backplane or powering down the NOVA-5000 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 NOVA-5000 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 5241 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 5241 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 NOVA-5000 backplane. A RESET pulse on the NOVA-5000 backplane or powering down the NOVA-5000 rack will deactivate the output.

The eight section Dual Inline Package (DIP) switch S1 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

pos 3	pos 4	operating mode
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

pos 5	pos 6	operating mode
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.

Module Keying

Before installing each Model 5241 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

General

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 NOVA-5000 backplane. In most systems this is achieved by pressing the acknowledge or reset pushbutton on the Model 5120 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)

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 (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.

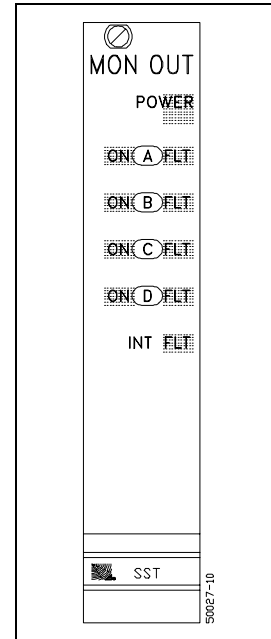


Figure 5241-4 Front Panel

Internal 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.

