M500S Supervised Control Module

Specifications
Normal Operating Voltage: 15 to 32 VDC
External Supply Voltage (between Terminals T3 and T4)
  Maximum: 80 Volts (RMS or DC)
Temperature Range: 32˚F to 120˚F (0˚C to 49˚C)
Humidity: 10% to 93% Non-condensing
Dimensions: 4 1/2” H × 4” W × 1/4” D (Mounts to a 4” square by 2 1/8” deep box.)
Accessories: SMB500 Electrical Box; CB500 Barrier

Before Installing
This information is included as a quick reference installation guide. Refer to the control panel installation manual for detailed system information. If the modules will be installed in an existing operational system, inform the operator and local authority that the system will be temporarily out of service.

1. Disconnect power to the control panel before installing the modules.

NOTICE: This manual should be left with the owner/user of this equipment.

General Description
M500S Supervised Control Modules are intended for use in intelligent, two-wire systems, where the individual address of each module is selected using the built-in rotary decade switches. This module is used to switch an external power supply, which can be a DC power supply or an audio amplifier (up to 80 VRMS), to notification appliances. It also supervises the wiring to the connected loads and reports their status to the panel as NORMAL, OPEN, or SHORT CIRCUIT. The M500S has two pairs of output termination points available for fault-tolerant wiring and a panel-controlled LED indicator. This module can be used to replace an M500C module that has been configured for supervised wiring operation.

Compatibility Requirements
To ensure proper operation, these modules shall be connected to listed compatible system control panels only.

Mounting
The M500S mounts directly to 4” square electrical boxes (see Figure 2A). The box must have a minimum depth of 2 1/8” . Surface mounted electrical boxes (SMB500) are available from System Sensor.

Wiring
NOTE: All wiring must conform to applicable local codes, ordinances, and regulations. When using control modules in nonpower limited applications, the System Sensor CB500 Module Barrier must be used to meet UL requirements for the separation of power-limited and nonpower-limited terminals and wiring. The barrier must be inserted into a 4” × 4” × 2 1/8” junction box, and the control module must be placed into the barrier and attached to the junction box (Figure 2A). The power-limited wiring must be placed into the isolated quadrant of the module barrier (Figure 2B).

1. Install module wiring in accordance with the job drawings and appropriate wiring diagrams.
2. Set the address on the module per job drawings.
3. Secure module to electrical box (supplied by installer), as shown in Figure 2A.
Figure 3. Typical indicating circuit configuration, NFPA Style Y:

- Connect modules to listed compatible control panels only.
- All wiring shown is supervised and power limited.
- Communication line 32 VDC max. twisted pair is recommended.
- From panel or previous device.
- 24 VDC branch circuit. Do not loop wire on terminals 3 & 4 break wire run to provide supervision of connections.
- 24 VDC power supply: isolated, regulated, power limited per NFPA 70.
- Listed for fire protection with battery backup.

Figure 4. Typical fault tolerant indicating circuit configuration, NFPA Style Z:

- All wiring shown is supervised and power limited.
- Communication line 32 VDC max. twisted pair is recommended.
- From panel or previous device.
- 24 VDC branch circuit. Do not loop wire on terminals 3 & 4 break wire run to provide supervision of connections.
- 24 VDC power supply: isolated, regulated, power limited per NFPA 70.
- Listed for fire protection with battery backup.
**Figure 5. Typical wiring for speaker supervision and switching, NFPA Style Y:**

- All wiring shown is supervised.
- Connect modules to listed compatible control panels only.
- Wires must be supervised per NFPA.
- Speakers must be listed for fire protection. Refer to the relay contact rating table for maximum load.
- 32 VDC MAX twisted pair is recommended.
- Audio branch circuit.
- Do not loop wire around terminals 3 and 4. Break wire to ensure supervision of connections.
- Audio circuit wiring must be twisted pair as a minimum.
- When a 70.7V audio amplifier is used, terminals 1 and 2 are power limited, while terminals 3-9 are nonpower limited. In this case the CB500 barrier is required. Otherwise, all terminal wiring is power limited. The CB500 includes a label indicating which terminals are nonpower limited. This label must be placed over the power-limited terminal information on the nameplate label, present on the module housing.
- Audio circuit wiring must be twisted pair as a minimum.
- All wiring shown is supervised.
- Connect modules to listed compatible control panels only.
- Wires must be supervised per NFPA.
- Speakers must be listed for fire protection. Refer to the relay contact rating table for maximum load.
- 32 VDC MAX twisted pair is recommended.
- Audio branch circuit.
- Do not loop wire around terminals 3 and 4. Break wire to ensure supervision of connections.
- Audio circuit wiring must be twisted pair as a minimum.
- When a 70.7V audio amplifier is used, terminals 1 and 2 are power limited, while terminals 3-9 are nonpower limited. In this case the CB500 barrier is required. Otherwise, all terminal wiring is power limited. The CB500 includes a label indicating which terminals are nonpower limited. This label must be placed over the power-limited terminal information on the nameplate label, present on the module housing.

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**Figure 6. Typical fault tolerant wiring for speaker supervision and switching, NFPA Style Z:**

- All wiring shown is supervised.
- Connect modules to listed compatible control panels only.
- Wires must be supervised per NFPA.
- Speakers must be listed for fire protection. Refer to the relay contact rating table for maximum load.
- 32 VDC MAX twisted pair is recommended.
- Audio branch circuit.
- Do not loop wire around terminals 3 and 4. Break wire to ensure supervision of connections.
- Audio circuit wiring must be twisted pair as a minimum.
- When a 70.7V audio amplifier is used, terminals 1 and 2 are power limited, while terminals 3-9 are nonpower limited. In this case the CB500 barrier is required. Otherwise, all terminal wiring is power limited. The CB500 includes a label indicating which terminals are nonpower limited. This label must be placed over the power-limited terminal information on the nameplate label, present on the module housing.

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**Diagram Notes:**

- Audio amplifier 70.7 Vrms MAX.
- 47K EOL resistor is internal at terminals 8 & 9.
- By-pass capacitors: 100 µF nonpolarized, <10 µF polarized.
Relay Contact Ratings:

<table>
<thead>
<tr>
<th>CURRENT RATING</th>
<th>MAXIMUM VOLTAGE</th>
<th>LOAD DESCRIPTION</th>
<th>APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>*3 A</td>
<td>30 VDC</td>
<td>Resistive</td>
<td>Non-coded</td>
</tr>
<tr>
<td>2 A</td>
<td>30 VDC</td>
<td>Resistive</td>
<td>Coded</td>
</tr>
<tr>
<td>.9 A</td>
<td>110 VDC</td>
<td>Resistive</td>
<td>Non-coded</td>
</tr>
<tr>
<td>.9 A</td>
<td>125 VDC</td>
<td>Resistive</td>
<td>Non-coded</td>
</tr>
<tr>
<td>.5 A</td>
<td>30 VDC</td>
<td>Inductive (L/R = 5ms)</td>
<td>Coded</td>
</tr>
<tr>
<td>1 A</td>
<td>30 VDC</td>
<td>Inductive (L/R = 2ms)</td>
<td>Coded</td>
</tr>
<tr>
<td>.3 A</td>
<td>125 VAC</td>
<td>Inductive (PF = .35)</td>
<td>Non-coded</td>
</tr>
<tr>
<td>1.5 A</td>
<td>25 VAC</td>
<td>Inductive (PF = .35)</td>
<td>Non-coded</td>
</tr>
<tr>
<td>.7 A</td>
<td>70.7 VAC</td>
<td>Inductive (PF = .35)</td>
<td>Non-coded</td>
</tr>
<tr>
<td>2 A</td>
<td>25 VAC</td>
<td>Inductive (PF = .35)</td>
<td>Non-coded</td>
</tr>
</tbody>
</table>

*For Class A wiring systems, the current rating is 2 A @ 30 VDC, non-coded.

**WARNING**

All relay switch contacts are shipped in the standby state (open) state, but may have transferred to the activated (closed) state during shipping. To ensure that the switch contacts are in their correct state, modules must be made to communicate with the panel before connecting circuits controlled by the module.