Electromagnetic Locks

Installation Instructions

Cover Screws (4)

Cover

Mounting Bracket

Outside Mounting Bracket Screws** (4)

Inside Mounting Bracket Screws** (2)

Magnet Assembly

Armature Plate

Armature Holder Screws (2)

Armature Holder

Sex Nut

Magnet Screws (2)

Armature Bolt*

Conical Washer

Star Locking Washer

Flat Washer

* Two armature bolts may be included in the package, but only one is used. There may be one left over after proper installation.

** Screws for both reinforced metal and sheet metal are included. Some screws will be left over after proper installation. See individual steps for screw identification.
**Features**

**Delayed Egress**
Unlocking is delayed 15 seconds while an alarm sounds.

**Automatic Voltage Selection**
Magnet immediately detects 12VDC or 24VDC when power is connected.

**Fire Unlock**
Input from fire system that will unlock the magnet immediately.

**Auxiliary Inputs**
Allows use of an auxiliary switch such as an exit device or push button.

**Alarm Output**
Activates external alarm, when in alarm state.

*Indicators*
- LED Status and Audible Alarm
- Magnetic Bond Sensor (MBS)
  - Detects proper bond between magnet and armature. It can be monitored remotely and locally with an LED.
- Door Position Switch (DPS)
  - Indicates whether door is open or closed. This feature is used in conjunction with the MBS.
- Relock Time Delay
  - Relock time can be changed. Range is 1 - 30 seconds.
- Door Prop Timer
  - Allows adjustment of the amount of time a door can be propped open before alarm sounds. Range is 0 - 150 seconds.
  - Plus Version Only

**Models**

- **M490DE (Single Lock Basic)**
  - Delayed Egress, Automatic Voltage Selection
- **M490DEP (Single Lock Plus)**
  - Basic features + Magnetic Bond Sensor (MBS), Door Position Switch (DPS), Relock Time Delay, Door Prop Timer, and Indicators
- **M490DE-2 (Double Lock Basic)**
  - Double lock with same features as the Basic single lock
- **M490DEP-2 (Double Lock Plus)**
  - Double lock with same features as the Plus single lock

**Notes:**
- BOCA is a Plus only lock option.
- If BOCA option model is provided, see page 12 for operational description.

**UL Requirements**

- Units shall not impair operation of panic hardware mounted on door.
- Units shall not impair intended operation of an emergency exit.
- Not to be used without UL approved latching hardware.
- Units/Models are intended to be connected to UL Listed Equipment, not intended for Burglar or Fire Alarm Initiating or Indicating Devices.
- Ambient Conditions - “For Indoor Use Only”.
- Wiring methods shall be in accordance with the National Electrical Code, ANSI/NFPA 70.
- **This device complies with part 15 of FCC rules.**
  Operation is subject to following two conditions:
  1. This device may not cause harmful interference.
  2. This device must accept any interference received, including any interference that may cause undesired operation. Changes or modifications not expressly approved by party responsible for compliance could void user’s authority to operate equipment.

**Electrical Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>M490DE</th>
<th>M490DE-2</th>
<th>M490DEP</th>
<th>M490DEP-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Current @ 12VDC Input</td>
<td>.75ADC</td>
<td>1.25ADC</td>
<td>.75ADC</td>
<td>1.25ADC</td>
</tr>
<tr>
<td>Input Current @ 24VDC Input</td>
<td>.45ADC</td>
<td>.76ADC</td>
<td>.45ADC</td>
<td>.76ADC</td>
</tr>
<tr>
<td>Holding Force Per Door Leaf</td>
<td>1500 lbs.</td>
<td>1500 lbs.</td>
<td>1500 lbs.</td>
<td>1500 lbs.</td>
</tr>
<tr>
<td>Size</td>
<td>3” x 12 1/2”</td>
<td>3” x 25 1/16”</td>
<td>3” x 12 1/2”</td>
<td>3” x 25 1/16”</td>
</tr>
</tbody>
</table>

**Wire Gauge and Length Specifications**

<table>
<thead>
<tr>
<th>Wire Gauge</th>
<th>12VDC</th>
<th>24VDC</th>
<th>12VDC</th>
<th>24VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>1000 feet</td>
<td>4000 feet</td>
<td>500 feet</td>
<td>2000 feet</td>
</tr>
<tr>
<td>18</td>
<td>400 feet</td>
<td>1600 feet</td>
<td>200 feet</td>
<td>800 feet</td>
</tr>
</tbody>
</table>

**Warnings and Cautions**

- **WARNING**
  - Warnings indicate potentially hazardous conditions, which if not avoided or corrected, may cause death or serious injury.

- **CAUTION**
  - Cautions indicate potentially hazardous conditions, which if not avoided or corrected, may cause minor or moderate injury. Cautions may also warn against unsafe practices.

**Pre-Installation Considerations**

- Use ONLY the hardware provided for mounting this product (NOTE: Non-standard Door thickness may require different sex nut hardware - see specific instructions for required hardware).
- Follow the installation procedure as described in this manual.
- Check door thickness. If the door is not 1¾” thick, a different sex nut will be required. Contact customer service at 1-877-671-7011.
- Check door header. A minimum 2¼” thick, flat surface is needed to securely mount all screws for the magnet. If you do not have the required surface, you will need filler plates and/or angle brackets to properly mount the magnet. Contact customer service at 1-877-671-7011.

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![Image][1]

Door: 1¾” Thick

Header: At least 2¼” thick, flat

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*Plus Version Only*
1. Prepare for installation.

1a. Determine proper magnet orientation.

**Single Door**

- Magnet should be placed opposite of door hinges.

**Double Door**

Locks should be installed with wiring covers in the middle, so the magnet in one of the locks must be reoriented.
1b Reorient magnet and board (if necessary).

- a. Remove screws, wiring cover and end blocks.
- b. Remove board.
- c. Rotate magnet, end blocks and wiring cover as shown, then reassemble.
- d. Rotate board 180°, then reassemble.

1c Place template and mark holes.
- a. Place template on top corner, opposite of hinges.
- b. Mark holes and prepare them per template.
2. Attach armature to door.

2a. Install armature holder.

警告

CAUTION

Armature holder screws must be flush to inside of armature holder.

2b. Install armature plate as shown for door type (M420/M450 shown).

警告

Armature bolt must be tightened to at least 120 in.-lbs. for all doors except composite wood doors. For composite wood doors, tighten only to tight and flush. 120 in.-lbs. may damage composite wood doors.

DO NOT back off bolt after tightening! Backing off the bolt after tightening will loosen the thread-locking patch, which may allow the bolt to loosen over time.

The included sex nut is for 1¼" (45 mm) doors ONLY. For other door thicknesses, please contact customer service, 1-877-671-7011. Using the incorrect sex nut for your door thickness will lead to improper function and possible injury.

警告

Sex nut must extend all the way through hollow metal door for proper installation. Improper Sex nut or installation may lead to malfunction and injury. Extended lengths available from customer service, 1-877-671-7011.
3 Install mounting bracket into frame.

3a Attach mounting bracket temporarily.
Install two middle screws into slots and partially tighten.

3b Slide magnet onto bracket.

3c Align magnet to armature.
  a. Close door.
  b. Press magnet to fully engage with armature.
  c. Mark bracket location.

3d Verify that DE plunger aligns with screw head on armature.
Verify DE plunger switch is activated when door is closed. Re-adjust position of mounting bracket to achieve proper switch activation if necessary.

3e Fully attach bracket.
  a. Remove magnet from bracket.
  b. Check bracket alignment with marks.
  c. Fully tighten two screws in slotted marks.
  d. Drill four (4) remaining holes.
  e. Fully tighten all screws.

CAUTION
All four screws MUST be installed for proper operation and safety!
If you do not have enough room to securely fasten all screws, you will need filler plates and/or angle brackets to properly mount the magnet.
Failure to properly install the screws may lead to injury or property damage.
Contact customer service at 1-877-671-7011.
4 Install lock

4a Install magnet and secure with screws.

5 Connect wiring to board (basic model).

5a Connect plug and wires to board.

5b Set SW2 dip switches.

NOTE: Dip switch panel may be upside-down, depending on installation. Look for the “OFF” label and compare to the images below for correct dip switch positions.

### Table: Feature Switch Setting Description

<table>
<thead>
<tr>
<th>Feature</th>
<th>Switch</th>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuisance Delay</td>
<td></td>
<td></td>
<td>Nuisance delay is the amount of time the door must be pushed or aux input must be pressed before triggering the Delayed Egress Cycle. Programmable to 0-3 seconds.</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1 second</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>On</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>On</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>On</td>
<td></td>
</tr>
<tr>
<td>Nuisance Alert</td>
<td>3</td>
<td>Off=Disabled</td>
<td>Causes horn to sound during nuisance delay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On=Enabled</td>
<td></td>
</tr>
<tr>
<td>Auto Relock</td>
<td>4</td>
<td>Off=Disabled</td>
<td>When enabled, lock will energize upon regaining power or after a fire alarm condition clears.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On=Enabled</td>
<td></td>
</tr>
<tr>
<td>Anti-Tailgate (Plus Model Only)</td>
<td>5</td>
<td>Off=Disabled</td>
<td>Door will relock as soon as it closes – even if the relock time delay has not ended.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On=Enabled</td>
<td></td>
</tr>
<tr>
<td>Door Propped/Forced (Plus Model Only)</td>
<td>6</td>
<td>Off=Disabled</td>
<td>Enables door propped and door forced alarms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On=Enabled</td>
<td></td>
</tr>
<tr>
<td>Unlock Alert</td>
<td>7</td>
<td>Off=Disabled</td>
<td>Horn sounds whenever door is unlocked and power is still applied to the door</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On=Enabled</td>
<td></td>
</tr>
<tr>
<td>DEL Enabled</td>
<td>8</td>
<td>Off=Disabled</td>
<td>Enables or disables the DEL plunger switch. Aux Input will always function even if DEL plunger switch is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On=Enabled</td>
<td></td>
</tr>
</tbody>
</table>
5c Install cover using spanner wrench and security screws.

6 Connect wiring to board (plus model).

6a Connect plugs to board.

6b Connect wires to board.

- **Power Input**: 12/24V DC
  - UL 294 Listed, power limited, Class 2, power supply must be used

- **Fire Alarm Input**: Apply a normally closed dry contact or a jumper if not connected to fire alarm.

- **Reset Input**: Dry contact closure resets lock in alarm condition.

- **Release Input**: Dry contact closure will release lock for the time delay period.

- **Auxiliary Input**: Apply a normally closed dry contact or a jumper if not using. Opening dry contact places lock into delayed egress countdown.

- **DPS Output (Optional)**: Contacts change state when door is closed.
  - 12V @ 200mA resistive
  - 24V @ 100mA resistive

- **Alarm Output (Optional)**: Contacts change state during an alarm condition.
  - 30V @ 1A resistive

- **MBS Output (Optional)**: Contacts change state when magnet is properly bonded to its armature. Poor bond can be caused by low voltage, misalignment, or damaged mating surfaces.
  - 30V @ 1A resistive

<table>
<thead>
<tr>
<th>PWR</th>
<th>FIRE</th>
<th>RST</th>
<th>RLS</th>
<th>AUX</th>
<th>NO</th>
<th>C</th>
<th>NC</th>
<th>C</th>
<th>NO</th>
<th>C</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td>NO</td>
<td>C</td>
<td>NC</td>
<td>C</td>
<td>NO</td>
<td>C</td>
<td>NC</td>
</tr>
</tbody>
</table>

For wire gauge and length specifications, see “Wire Gauge and Length Specifications” on page 2.

6c (Optional) To use one access control for both Reset and Release, wire as shown.

Dry contact closure
From any access control system
Will release lock in locked condition
or reset lock in alarm condition
Set SW2 dip switches.

**NOTE:** Dip switch panel may be upside-down, depending on installation. Look for the “OFF” label and compare to the images below for correct dip switch positions.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Switch</th>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuisance Delay</td>
<td>0</td>
<td>Off</td>
<td>1 second Nuisance delay is the amount of time the door must be pushed or</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>On</td>
<td>aux input must be pressed before triggering the Delayed Egress Cycle.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Off</td>
<td>Programmable to 0-3 seconds.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Off</td>
<td>Causes horn to sound during nuisance delay</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Off</td>
<td>When enabled, lock will energize upon regaining power or after a fire</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>On</td>
<td>alarm condition clears.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Off</td>
<td>Door will relock as soon as it closes – even if the relock time delay</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>On</td>
<td>has not ended.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Off</td>
<td>Enables door propped and door forced alarms</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>On</td>
<td>Enables or disables the DEL plunger switch. Aux Input will always</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>Off</td>
<td>function even if DEL plunger switch is disabled.</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>On</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>Off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>On</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>On</td>
<td></td>
</tr>
</tbody>
</table>

6e Set relock time - SW4.

Relock time is the amount of time the lock is de-energized after a valid release. If auto relock is enabled, it also controls the amount of time the lock is unlocked before it automatically relocks after a power-on or fire alarm reset. Programmable 0-30 seconds in 2 second increments.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Delay in Seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>A</td>
<td>10</td>
</tr>
<tr>
<td>B</td>
<td>11</td>
</tr>
<tr>
<td>C</td>
<td>12</td>
</tr>
<tr>
<td>D</td>
<td>13</td>
</tr>
<tr>
<td>E</td>
<td>14</td>
</tr>
<tr>
<td>F</td>
<td>15</td>
</tr>
</tbody>
</table>

6f Set door prop time - SW3.

The amount of time the door must be propped open (after normal release time delay has ended) before triggering the alarm. The alarm will clear as soon as the door closes again. Programmable 0-150 seconds in 10 second increments.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Delay in Seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td>7</td>
<td>70</td>
</tr>
<tr>
<td>8</td>
<td>80</td>
</tr>
<tr>
<td>9</td>
<td>90</td>
</tr>
<tr>
<td>A</td>
<td>100</td>
</tr>
<tr>
<td>B</td>
<td>110</td>
</tr>
<tr>
<td>C</td>
<td>120</td>
</tr>
<tr>
<td>D</td>
<td>130</td>
</tr>
<tr>
<td>E</td>
<td>140</td>
</tr>
<tr>
<td>F</td>
<td>150</td>
</tr>
</tbody>
</table>
6g Install cover.

7 If double door, install second lock (M490DE-2 or M490DEP-2).

7a Install second lock.
   a. Reorient as needed as shown in step 1b.
   b. Install lock as shown in steps 2-4.

7b Install communication cable.
   a. Route cable (supplied) through frame.
   b. Connect cable to each lock.
7c Connect wiring to second lock.

Master Lock (Basic or Plus)

*DPS Wiring in Parallel (Plus Models Only)

-辅输入
-NC

*DPS Output

-12V@200mA
-24V@100mA resistive

Both doors closed.

If either or both doors open, contacts will change

7d Install covers.

Note: Some warming of the device under routine operation is normal.
## Indicator Table

<table>
<thead>
<tr>
<th>Condition</th>
<th>LED Indicator</th>
<th>Audible</th>
<th>Alarm Relay State</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Features</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lock Secure</td>
<td>Off</td>
<td>Off</td>
<td>Open</td>
</tr>
<tr>
<td>Authorized Release Input</td>
<td>Steady Green</td>
<td>Off</td>
<td>Open</td>
</tr>
<tr>
<td>During Nuisance Delay</td>
<td>Steady Red</td>
<td>Off (Default)</td>
<td>Open</td>
</tr>
<tr>
<td>During Fire Alarm</td>
<td>Steady Green</td>
<td>Off</td>
<td>Closed</td>
</tr>
<tr>
<td>During Delayed Egress</td>
<td>Flashing Red</td>
<td>Beeping</td>
<td>Closed</td>
</tr>
<tr>
<td>After Delayed Egress</td>
<td>Steady Green</td>
<td>Steady Tone</td>
<td>Closed</td>
</tr>
<tr>
<td><strong>Switch Selectable Features</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SW2-7 &quot;ON&quot; = Unlock Alert whenever lock is unlocked</td>
<td>Steady Green</td>
<td>Steady Tone</td>
<td>Open</td>
</tr>
<tr>
<td>SW2-3 &quot;ON&quot; = Horn will sound during nuisance alert</td>
<td>Steady Red</td>
<td>Steady Tone</td>
<td>Open</td>
</tr>
<tr>
<td><strong>Optional Switch Selectable Features - Plus Model Required</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door Propped Open Alarm</td>
<td>Flashing Green</td>
<td>Beeping</td>
<td>Closed</td>
</tr>
<tr>
<td>Door Forced Open Alarm</td>
<td>Flashing Red</td>
<td>Steady Tone</td>
<td>Closed</td>
</tr>
<tr>
<td>Door Forced Open Alarm followed by Delayed Egress Input</td>
<td>Steady Green + Flashing Red</td>
<td>Steady Tone</td>
<td>Closed</td>
</tr>
</tbody>
</table>

## Troubleshooting

<table>
<thead>
<tr>
<th>Condition</th>
<th>LED Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lock has power but won't lock. LED (on lock) is Green.</td>
<td>Fire alarm not connected or open connection. SW4-7 not ON (set switch, remove and re-apply power).</td>
</tr>
<tr>
<td>Won't go into delayed egress.</td>
<td>Check dipswitch settings</td>
</tr>
<tr>
<td></td>
<td>Armature washers not installed properly</td>
</tr>
<tr>
<td></td>
<td>Magnet not properly aligned with armature.</td>
</tr>
<tr>
<td>Goes into delayed egress upon powerup.</td>
<td>Armature washers not installed properly</td>
</tr>
<tr>
<td></td>
<td>Improper gap between magnet and armature.</td>
</tr>
<tr>
<td>Lock can be pushed open with minimal resistance.</td>
<td>Magnet/Armature/washers not installed properly</td>
</tr>
<tr>
<td>Lock &quot;hums&quot; or vibrates noisily when energized.</td>
<td>Magnet/Armature/washers not installed properly</td>
</tr>
<tr>
<td>LED(s) flash once quickly.</td>
<td>Relock delay set to 0 sec.</td>
</tr>
<tr>
<td></td>
<td>Keypad not initialized</td>
</tr>
<tr>
<td>MBS doesn't change state when locked.</td>
<td>Low voltage. Mechanical misalignment. Debris between lock and armature. Armature/magnet not installed properly</td>
</tr>
<tr>
<td>DPS option not working properly.</td>
<td>Armature holder not aligned with DPS switch.</td>
</tr>
<tr>
<td></td>
<td>Switch not plugged into correct jack</td>
</tr>
</tbody>
</table>

## BOCA Operational Description

1. **BOCA Option is Applicable in United States Jurisdictions Only**
   a. Lock the door and start the release process by pushing on the actuating bar (or door if no actuating bar provided) for at least 1 second. The door will release within 15 seconds.
   b. The door will not relock until the door has been opened, and returned to the closed position for not less than 30 seconds. Any reopening of the door during this time will restart the 30 second relocking cycle.
   c. A 30 second release time delay may be provided with code official approval.