

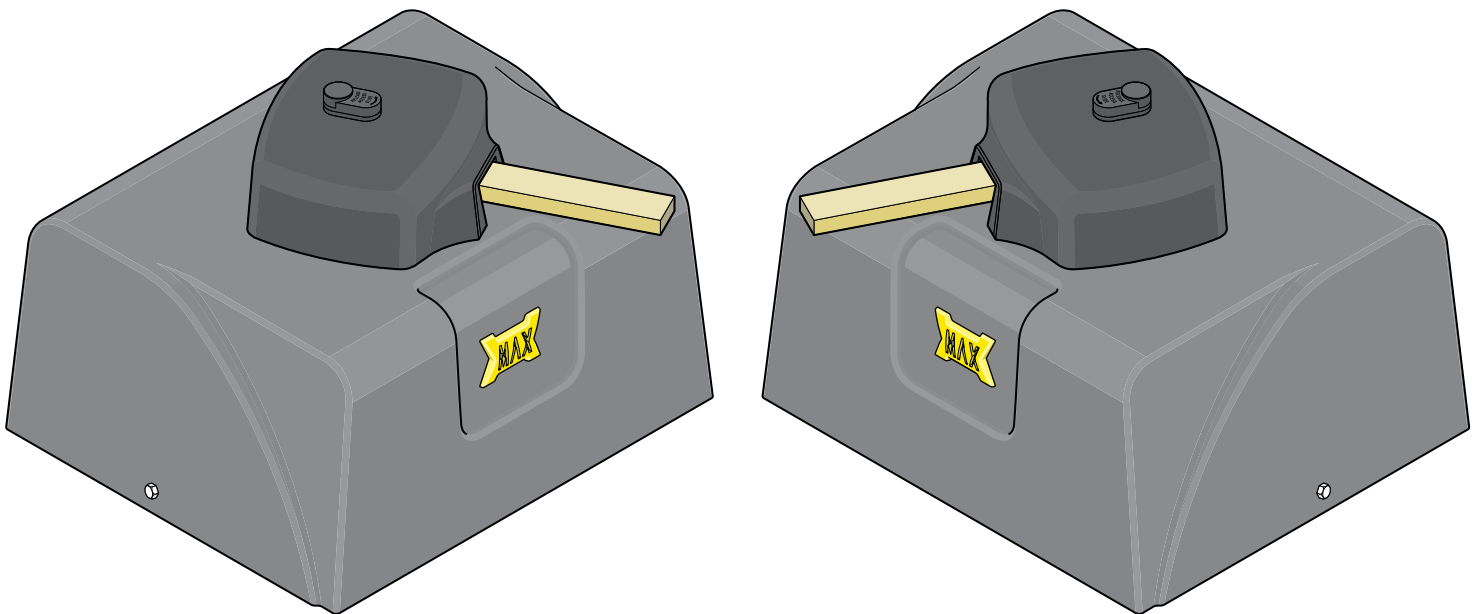


[www.max.us.com](http://www.max.us.com)

**SAFETY SENSORS REQUIRED FOR UL 325 2016**

CONFORMS TO UL STD 325  
UL CLASS - I, II, III, IV

CERTIFIED TO CAN/CSA STD  
C22.2 NO. 247



## High Traffic Commercial Brushless DC Low Profile Swing Gate Operators

Made in USA



**MAX PHANTOM**  
**2000 / FAST**  
Single or Bi-Parting Gates      Bi-Parting Gates ONLY

# Installation and Owners Manual



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# MAX PHANTOM SPECIFICATIONS

**UL 325 Class of Operation** - Class I, II, III, IV

**Gate Type** - Vehicular Swing Gate

**Max Gate Weight / Length:**

- **MAX Phantom 2000** - 2000lbs @ 15 ft or 1500 lbs @ 20 ft
- **MAX Phantom FAST** - 1600lbs @ 12 ft gate per operator

**NOTE:** The MAX Phantom FAST is **ONLY** available for installation on bi-parting gates (dual operators).  
A single gate operator **CANNOT** be used.

**90° Opening Time:**

- **MAX Phantom 2000** - 16 selectable speeds from approximately 11.5 sec to 20 sec depending on the weight and length of the gate.
- **MAX Phantom FAST** - 16 selectable speeds from approximately 6 sec to 14 sec depending on the weight and length of the dual gates.

**Cycles per Hour AC Input Power** - Continuous

**Battery Back-Up Cycles** (Batteries fully charged):

- BC-7 Battery Module-7 Amp/Hr Batteries, approximately 450 cycles
- BC-36 Phantom Battery Module-36 Amp/Hr Batteries, approximately 2000 cycles

**NOTE:** The number of gate cycles using **ONLY** battery back-up power will vary depending on the weight of the gate, the gate length, the operating condition of the gate hardware, temperature and the amount of charge the batteries have at the beginning of the battery power only operation.

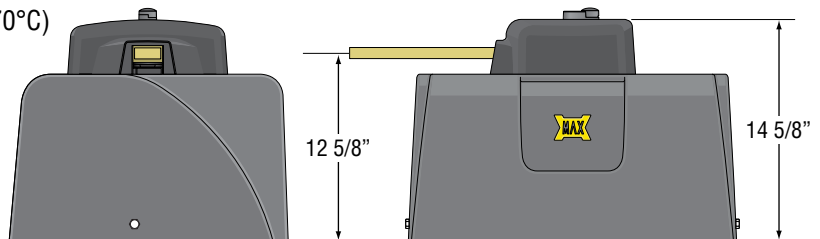
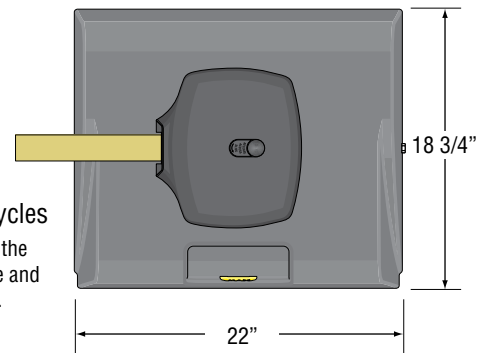
**Input AC Power** - Switchable: 115VAC or 230VAC single phase

**Motor** - 24VDC Brushless (equivalent to 1 HP AC motor)

**Operating Temperature:** -4°F to 158°F (-20°C to 70°C)

**Entrapment Protection:**

- UL 325 Type A Inherent (ERD sensor)
- Inputs for **NORMALLY CLOSED (N.C.)**  
UL 325 Type B1 (photo cell)  
and Type B2 (sensing edge)



## IMPORTANT SAFETY INFORMATION

**WARNING** – To reduce the risk of injury or death:

1. READ AND FOLLOW ALL INSTRUCTIONS.
2. Never let children operate or play with gate controls. Keep the remote control away from children.
3. Always keep people and objects away from the gate. NO ONE SHOULD CROSS THE PATH OF THE MOVING GATE.
4. Test the gate operator monthly. The gate **MUST** reverse on contact with a rigid object or stop when an object activates the non-contact sensors. After adjusting the force or the limit of travel, retest the gate operator. Failure to adjust and retest the gate operator properly can increase the risk of injury or death.
5. Use the emergency release only when the gate is not moving.
6. KEEP GATES PROPERLY MAINTAINED. Read the owner's manual. Have a qualified service person make repairs to gate hardware.
7. The entrance is for vehicles only. Pedestrians must use separate entrance.
8. SAVE THESE INSTRUCTIONS

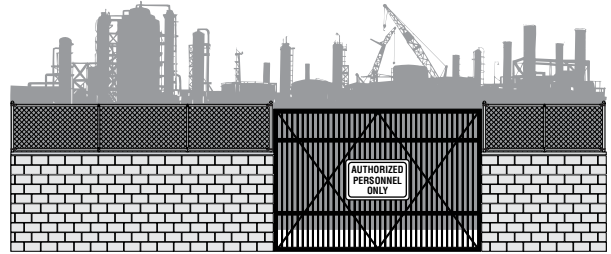


# UL 325 MODEL CLASSIFICATIONS



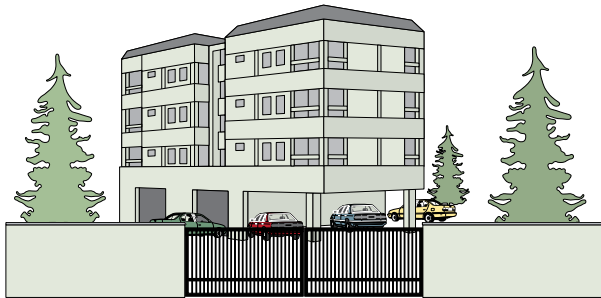
**CLASS I**

**Residential Vehicular Gate Operator** - A vehicular gate operator (opener or system) intended for use in a home of one to four single family dwellings, or a garage or parking area associated therewith.



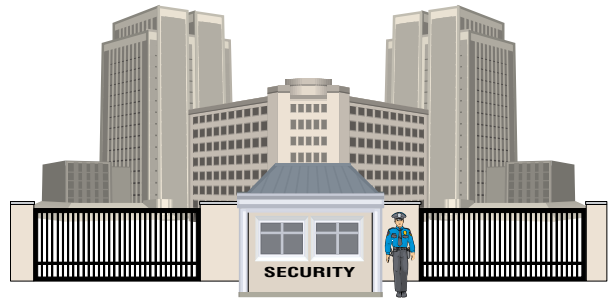
**CLASS III**

**Industrial/Limited Access Vehicular Gate Operator** - A vehicular gate operator (opener or system) intended for uses in an industrial location, loading dock area or other location not intended to service the general public.



**CLASS II**

**Commercial/General Access Vehicular Gate Operator** - A vehicular gate operator (opener or system) intended for use in a commercial location or building such as a multi-family housing unit (five or more single family units) hotel, garages, retail store or other building servicing the general public.



**CLASS IV**

**Restricted Access Vehicular Gate Operator** - A vehicular gate operator (opener or system) intended for use in a guarded industrial location or buildings such as airport security area or other restricted access locations not servicing the general public, in which unauthorized access is prevented via supervision by security personnel.

## UL 325 REQUIRED ENTRAPMENT PROTECTION

This vehicular gate operator must be installed with at least two independent entrapment protection means as specified in the table and definitions below.

The same type of device shall not be used for both entrapment protection means. Use of a single device to cover both the opening and closing directions is in accordance with the requirement, however, a single device is not required to cover both directions. This operator has been provided with type A entrapment protection. The installer is required to install additional entrapment protection devices in each entrapment area.

Gate Type	Class I & II	Class III & IV
Swing Gate	A, B1*, B2*, C, D	A, B1*, B2*, C, D, E
Slide Gate	A, B1*, B2*, D	A, B1*, B2*, D, E

**A** - Inherent entrapment protection system.

**B1** - Provision for connection of a non-contact sensor (photoelectric sensor or the equivalent).

**B2** - Provision for connection of a contact sensor (edge device or the equivalent).

\* B1 and B2 means of entrapment protection must be MONITORED.

**C** - Inherent adjustable clutch or pressure relief device.

**D** - Provision for connection of an actuating device requiring continuous pressure to maintain opening or closing motion of the gate.

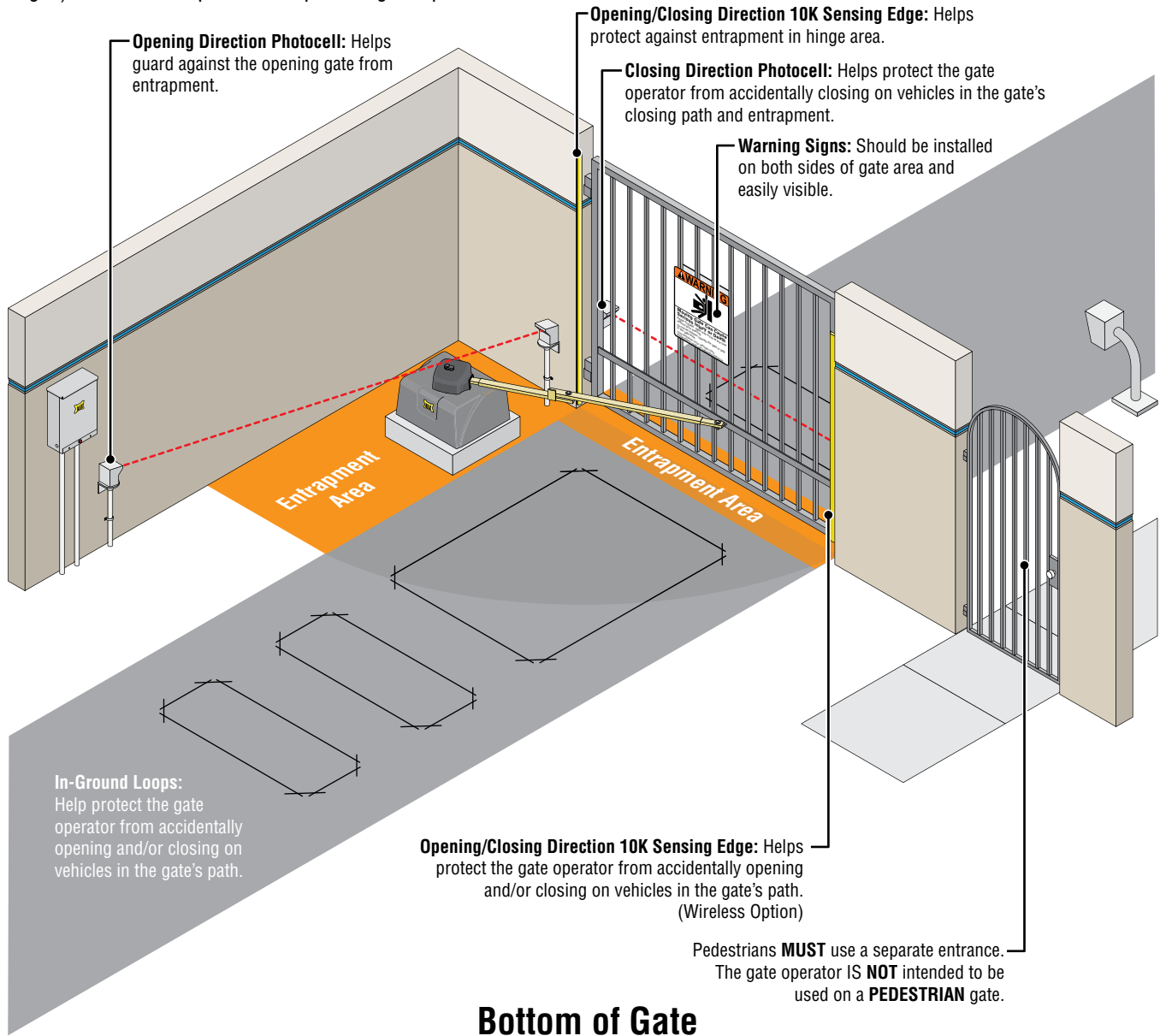
**E** - An audio alarm.

# UL 325 COMPLIANT INSTALLATION REQUIREMENTS

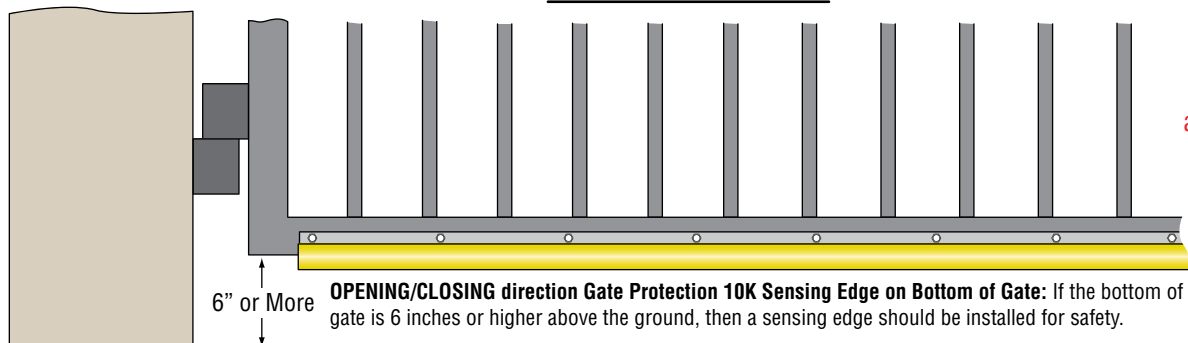
- A** Install the gate operator only when:
- 1** The operator is appropriate for the construction of the gate and the usage Class of the gate,
  - 2** All openings of a horizontal slide gate are guarded or screened from the bottom of the gate to a minimum of 6 feet (1.83 m) above the ground to prevent a 2-1/4 inch (57.2 mm) diameter sphere from passing through the openings anywhere in the gate, and in that portion of the adjacent fence that the gate covers in the open position,
  - 3** All exposed pinch points are eliminated or guarded, and
  - 4** Guarding is supplied for exposed rollers.
- B** The operator is intended for installation only on gates used for vehicles. Pedestrians must be supplied with a separate access opening. The pedestrian access opening shall be designed to promote pedestrian usage. Locate the gate such that persons will not come in contact with the vehicular gate during the entire path of travel of the vehicular gate.
- C** The gate must be installed in a location so that enough clearance is supplied between the gate and adjacent structures when opening and closing to reduce the risk of entrapment. Swinging gates shall not open into public access areas.
- D** The gate must be properly installed and work freely in both directions prior to the installation of the gate operator. Do not over-tighten the operator clutch or pressure relief valve to compensate for a damaged gate.
- E** For gate operators utilizing Type D protection:
- 1** The gate operator controls must be placed so that the user has full view of the gate area when the gate is moving,
  - 2** A gate operator shall additionally be provided with a placard that is marked in letters at least 1/4-in (6.4-mm) high with the word **“WARNING”** and the following statement or the equivalent: **“Moving Gate Has Potential of Inflicting Injury or Death - Do Not Start Gate Unless Path is Clear”**.
  - 3** An automatic closing device (such as a timer, loop sensor, or similar device) shall not be employed, and
  - 4** No other activation device shall be connected.
- F** Controls intended for user activation must be located at least six feet (6') away from any moving part of the gate and where the user is prevented from reaching over, under, around or through the gate to operate the controls. Outdoor or easily accessible controls shall have a security feature to prevent unauthorized use.
- G** The Stop and/or Reset button must be located in the line-of-sight of the gate. Activation of the reset control shall not cause the operator to start.
- H** A minimum of two (2) WARNING SIGNS shall be installed, one on each side of the gate where easily visible.
- I** For gate operators utilizing a non-contact sensor:
- 1** See instructions on the placement of non-contact sensors for each Type of application,
  - 2** Care shall be exercised to reduce the risk of nuisance tripping, such as when a vehicle, trips the sensor while the gate is still moving, and
  - 3** One or more non-contact sensors shall be located where the risk of entrapment or obstruction exists, such as the perimeter reachable by a moving gate or barrier.
- J** For a gate operator utilizing a contact sensor:
- 1** One or more contact sensors shall be located where the risk of entrapment or obstruction exists, such as at the leading edge, trailing edge, and post mounted both inside and outside of a vehicular horizontal slide gate.
  - 2** One or more contact sensors shall be located at the bottom edge of a vehicular vertical lift gate.
  - 3** One or more contact sensors shall be located at the pinch point of a vehicular vertical pivot gate.
  - 4** A hardwired contact sensor shall be located and its wiring arranged so that the communication between the sensor and the gate operator is not subjected to mechanical damage.
  - 5** A wireless device such as one that transmits radio frequency (RF) signals to the gate operator for entrapment protection functions shall be located where the transmission of the signals are not obstructed or impeded by building structures natural landscaping or similar obstruction. A wireless device shall function under the intended end-use conditions.
  - 6** One or more contact sensors shall be located on the inside and outside leading edge of a swing gate. Additionally, if the bottom edge of a swing gate is greater than 6 inches (152 mm) above the ground at any point in its arc of travel, one or more contact sensors shall be located on the bottom edge.
  - 7** One or more contact sensors shall be located at the bottom edge of a vertical barrier (arm).

# INTENDED USE OF SWING GATE OPERATOR

The operator is intended for use on a **VEHICULAR** slide gate ONLY. It is intended to be used **WITH** appropriate entrapment protection safety devices and in-ground vehicle loop detection system. This operator has a inherent entrapment protection system and requires additional external monitored entrapment protection devices (Non-contact Photocells or contact sensing edges) for each entrapment area prior to gate operation.



## Bottom of Gate



**NOTE: sensors **MUST** be **MONITORED** and **NORMALLY CLOSED (N.C.)****

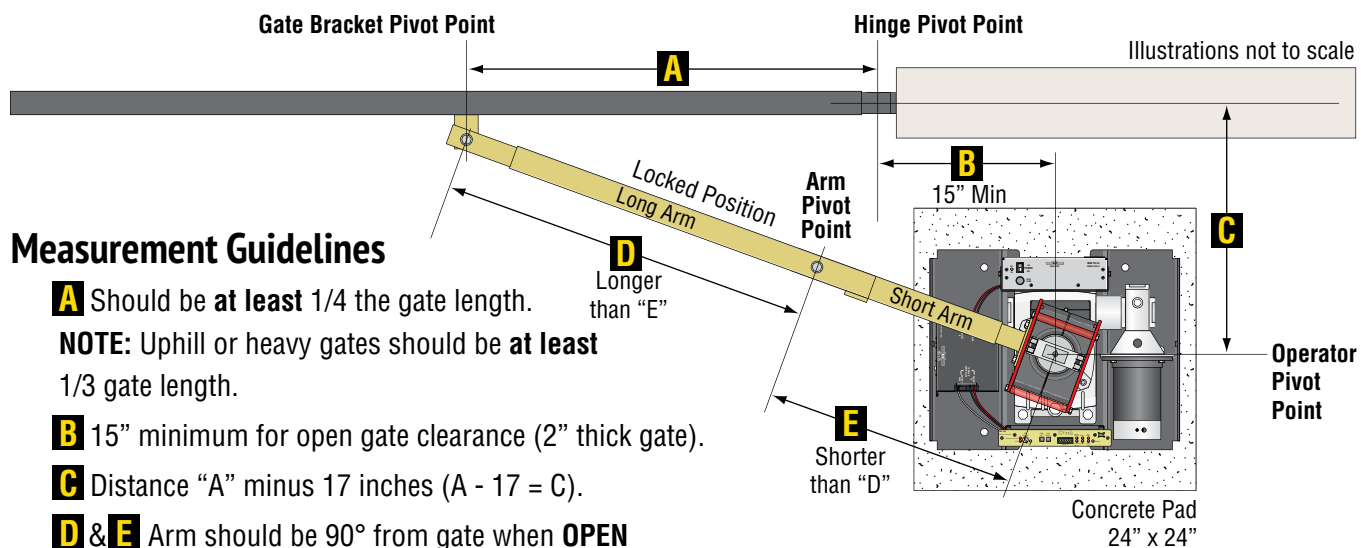
# INSTALLATION

Read and understand this entire manual before installation. Check with the local building department prior to installing this gate operator to comply with local building code requirements. The gate must be installed in a location so that enough clearance is supplied between the gate and adjacent structures when opening and closing to reduce the risk of entrapment. Swinging gates should not open into public access areas.

## GATE OPERATOR POSITION

The gate must be properly installed and work freely in both directions prior to installation of the gate operator.

### Closed Position



### Measurement Guidelines

**A** Should be **at least** 1/4 the gate length.

**NOTE:** Uphill or heavy gates should be **at least** 1/3 gate length.

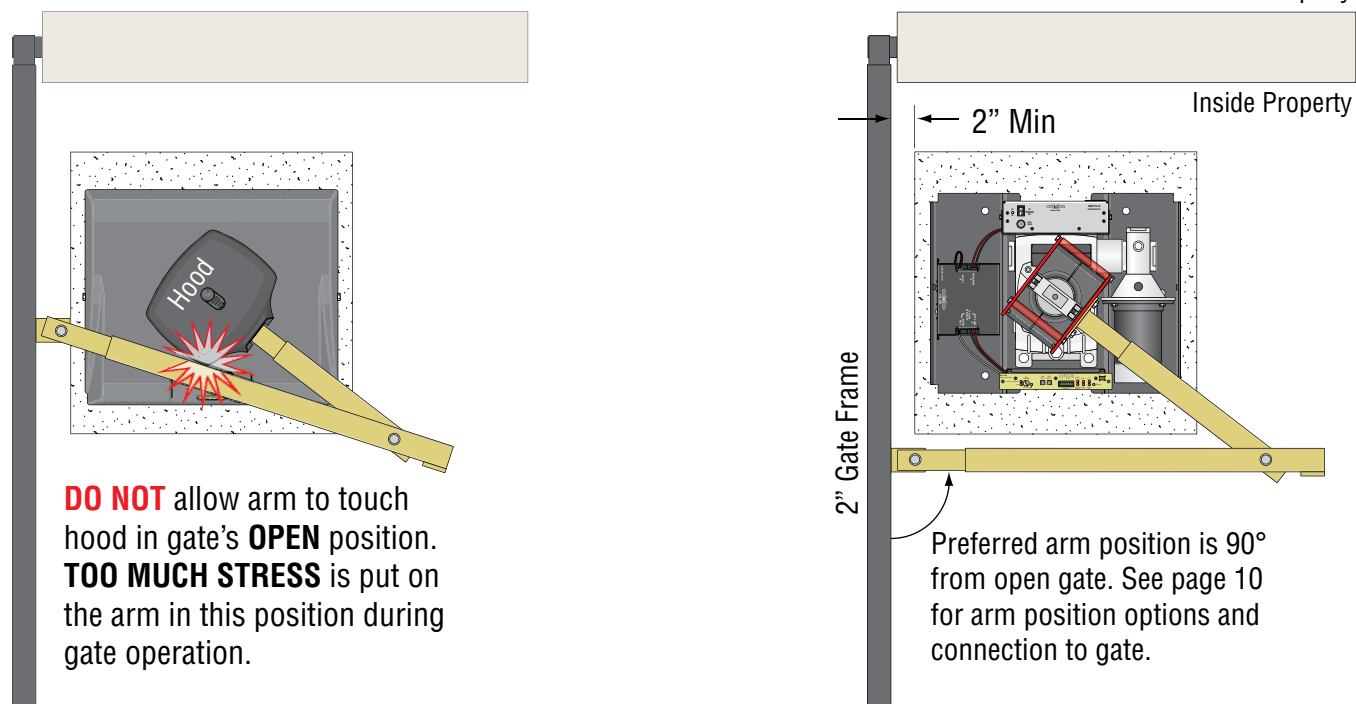
**B** 15" minimum for open gate clearance (2" thick gate).

**C** Distance "A" minus 17 inches ( $A - 17 = C$ ).

**D & E** Arm should be 90° from gate when **OPEN** and in the straight "locked" position when **CLOSED**.

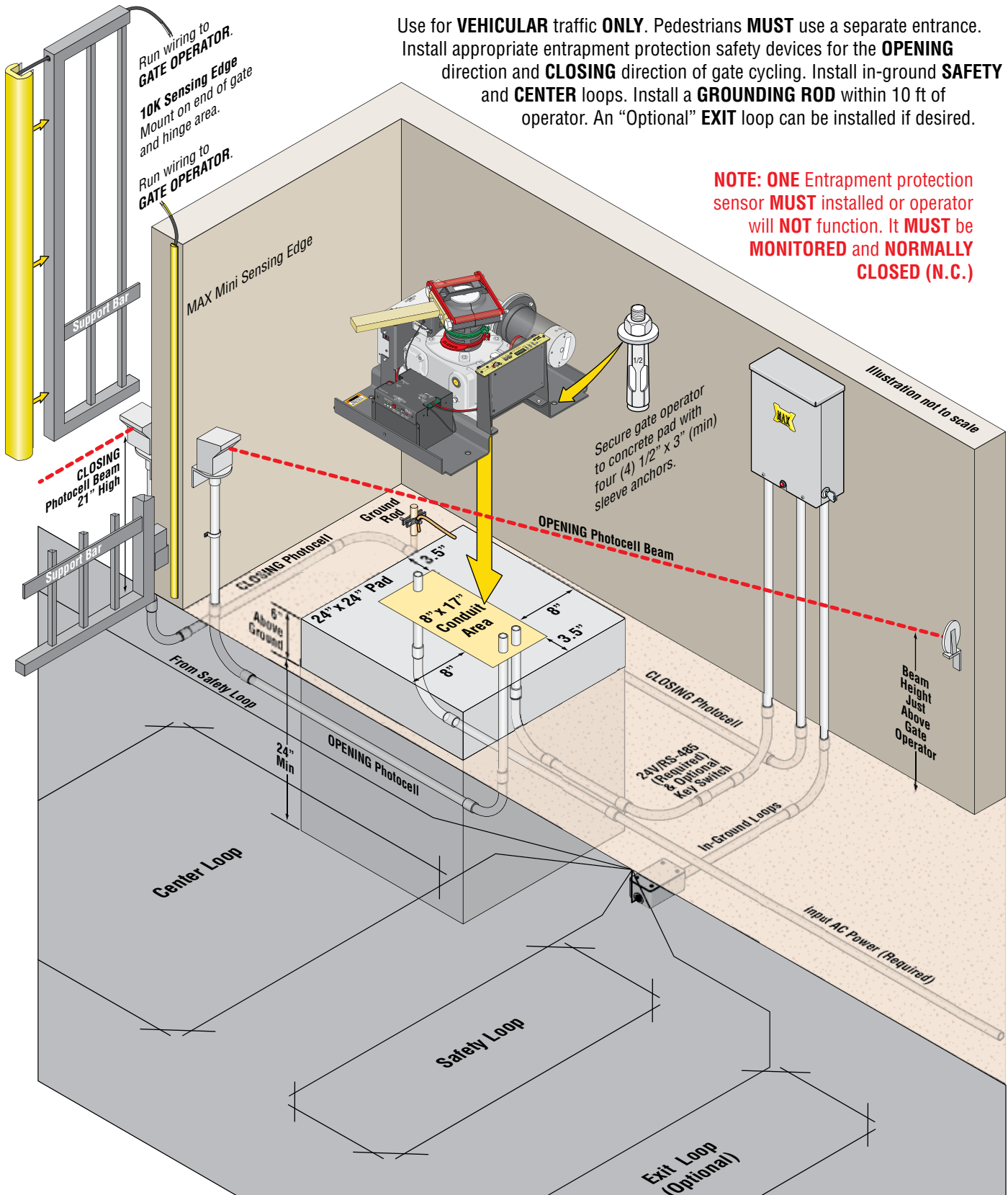
**Maximum arm length is 71 inches.**

### Open Position



# INSTALLATION

## RECOMMENDED GATE OPERATOR LAYOUT



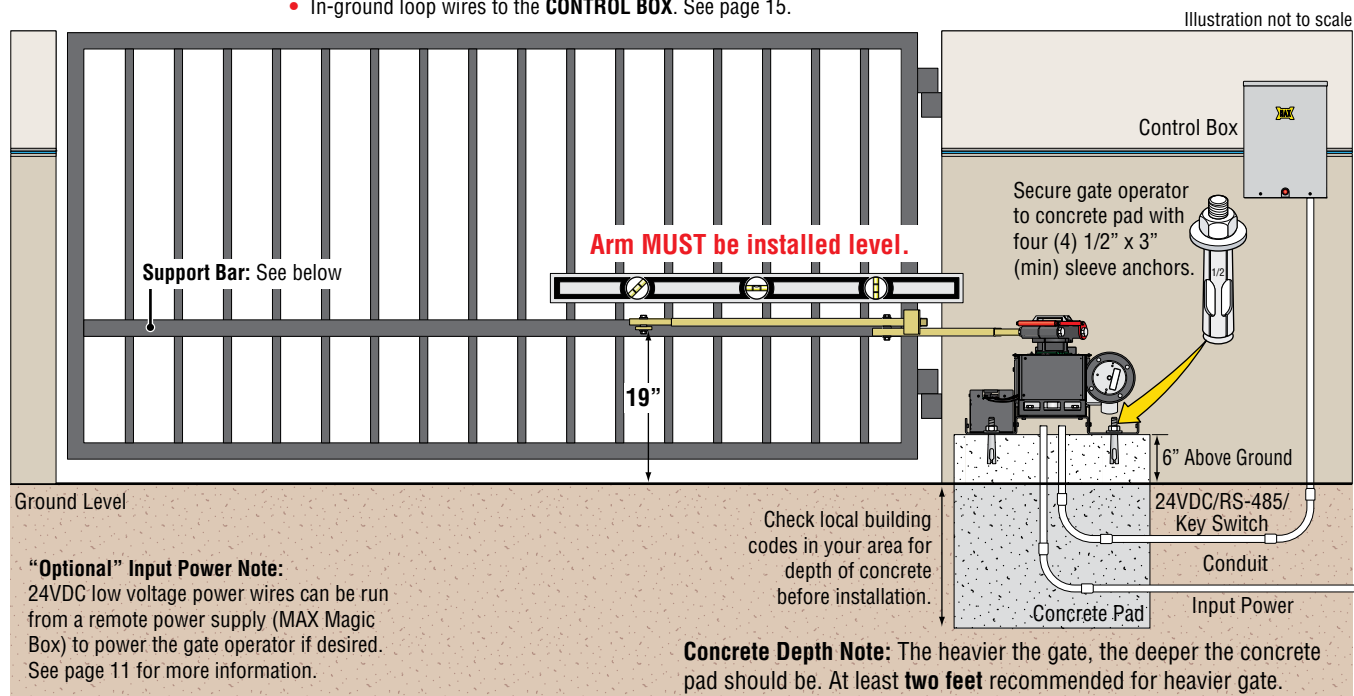
# INSTALLATION

## LAYOUT AND ARM HEIGHT

The gate must be properly installed and work freely in both directions prior to the installation of the gate operator. See “Gate Operator Position” on page 6 for operator position and “Arm Connection to Gate” on page 10.

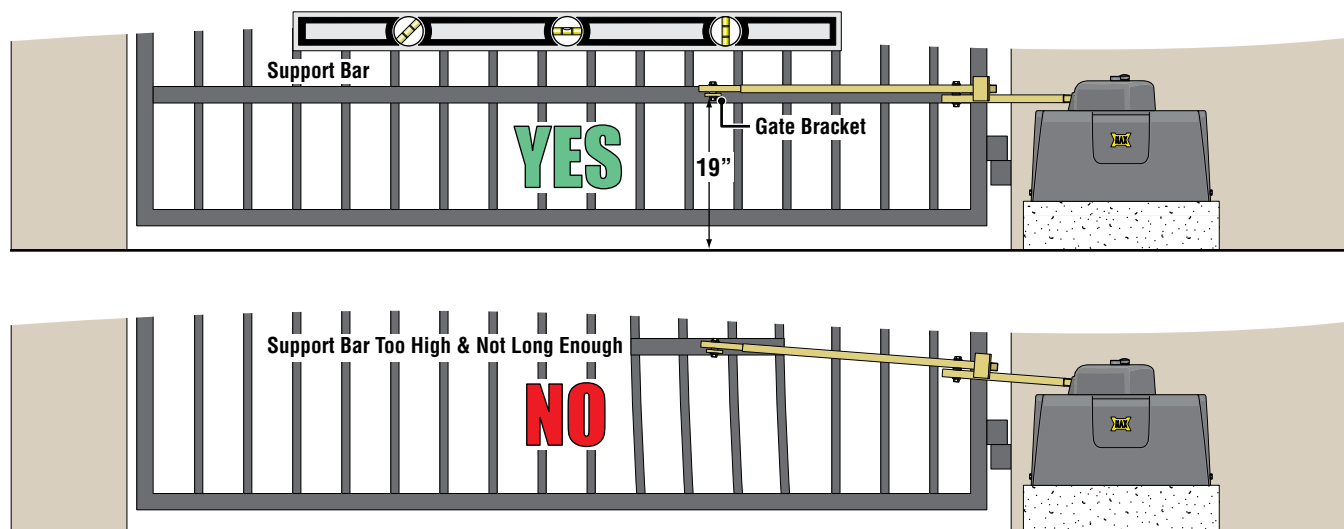
### Conduit Guidelines and Suggestions (See page 7)

- **REQUIRED** - AC input power wire to the **GATE OPERATOR**.
- **REQUIRED** - 24VDC/RS-485/Optional Key Switch wires from **CONTROL BOX** to **GATE OPERATOR**.
- **REQUIRED** - Entrapment protection (photocell and/or sensing edge) to the **GATE OPERATOR**. See page 14.
- Normally Open photocells to the **CONTROL BOX**. See page 14.
- In-ground loop wires to the **CONTROL BOX**. See page 15.



### Support Bar

A support bar should be installed at the gate bracket height across the **ENTIRE** gate to keep the gate pickets from bending.



# INSTALLATION

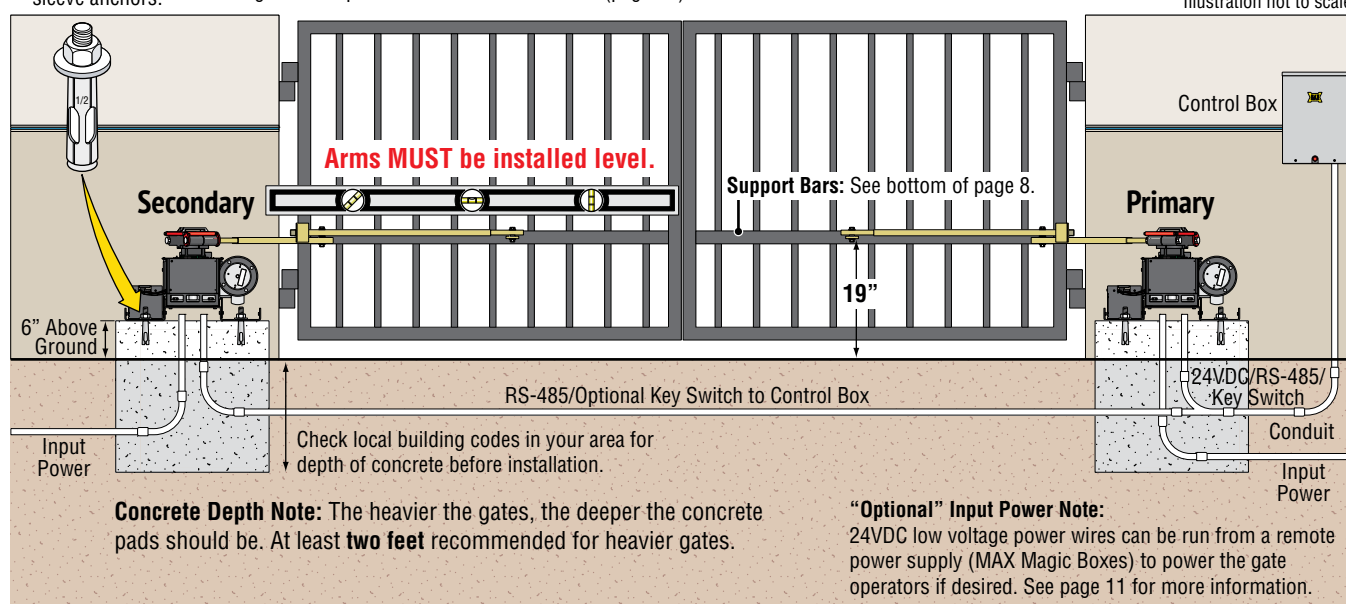
## DUAL GATE OPERATORS

The gates must be properly installed and work freely in both directions prior to the installation of the dual gate operators. See "Gate Operator Position" on page 6 for operator positions.

### Conduit Guidelines and Suggestions

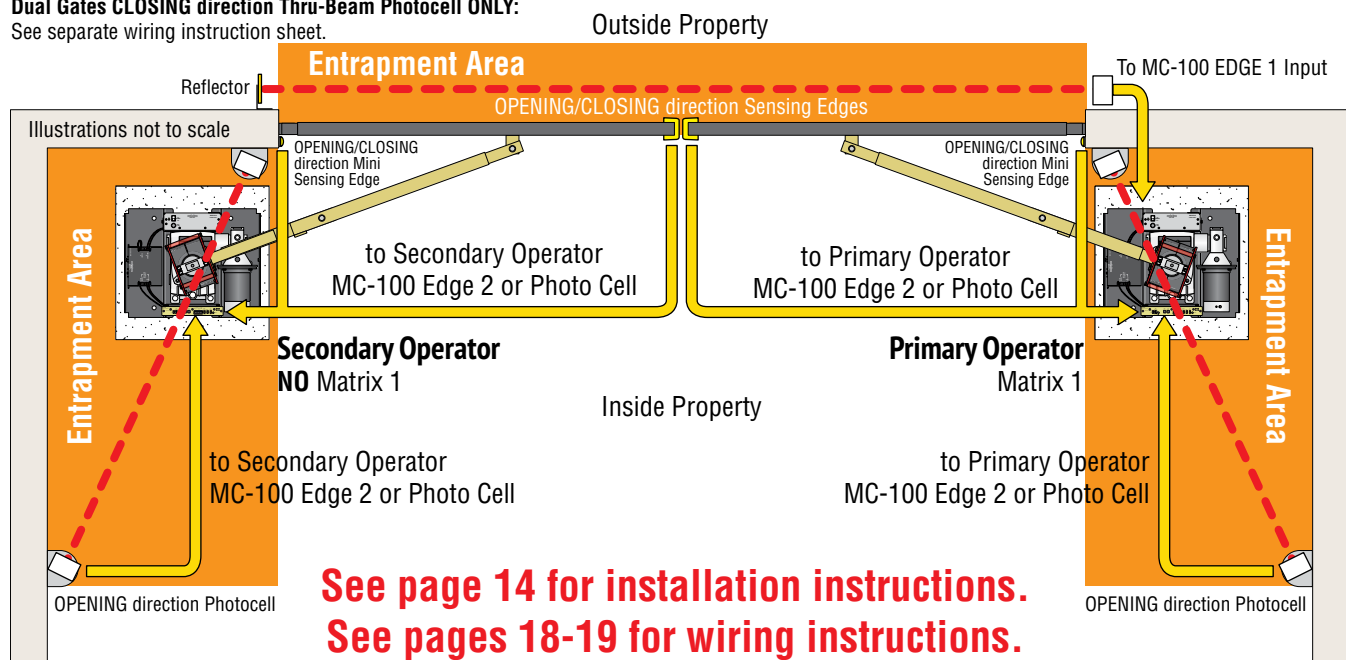
Secure EACH gate operator to concrete pad with four (4) 1/2" x 3" (min) sleeve anchors.

- **REQUIRED** - AC input power wire to **EACH** gate operator.
- **REQUIRED** - 24VDC/RS-485/Optional Key Switch wires from **PRIMARY** operator to the **CONTROL BOX**.
- **REQUIRED** - RS-485/Optional Key Switch wires from **SECONDARY** operator to the **CONTROL BOX**.
- **REQUIRED** - Entrapment protection (photocell and/or sensing edge) to **EACH** Corresponding **GATE OPERATOR**. (see below & page 14)
- Normally open photocell to the **CONTROL BOX**. (page 14)
- In-ground loop wires to the **CONTROL BOX**. (page 15)



### Each entrapment protection sensor MUST be connected to corresponding gate operator.

Dual Gates **CLOSING** direction Thru-Beam Photocell ONLY:  
See separate wiring instruction sheet.



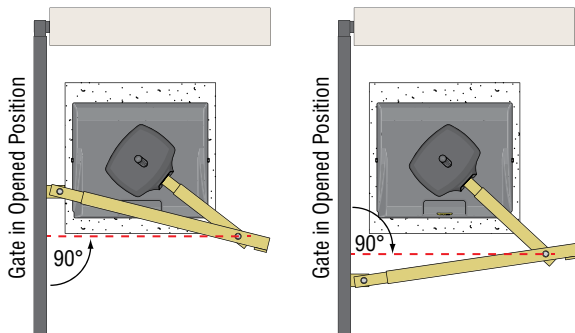


# INSTALLATION

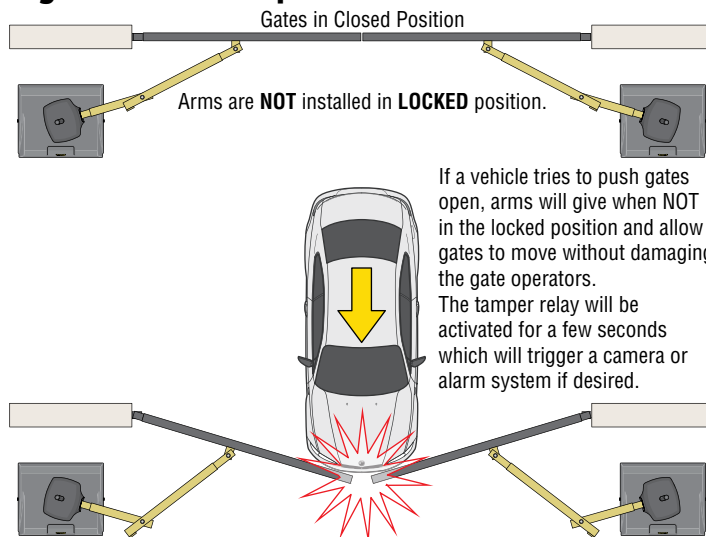
## ARM POSITION OPTIONS

### Retro-Fit Arm Option

When replacing an existing gate operator, the arm may not be able to conform to the preferred arm position (90° from gate in open position). The positions illustrated below can be acceptable as long as the gate operator cycles smoothly and there is **NO** gate hesitation when gate starts cycling in either direction.

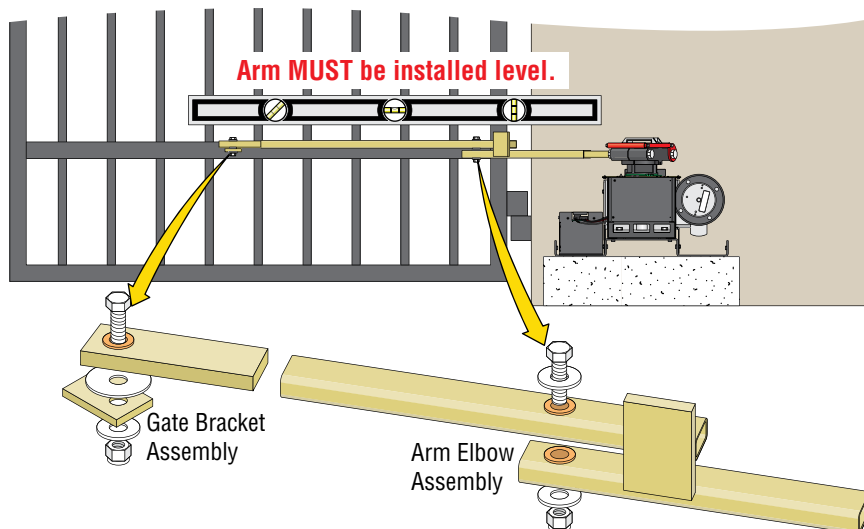
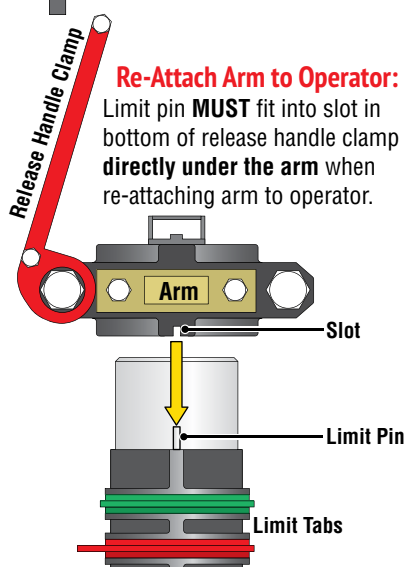
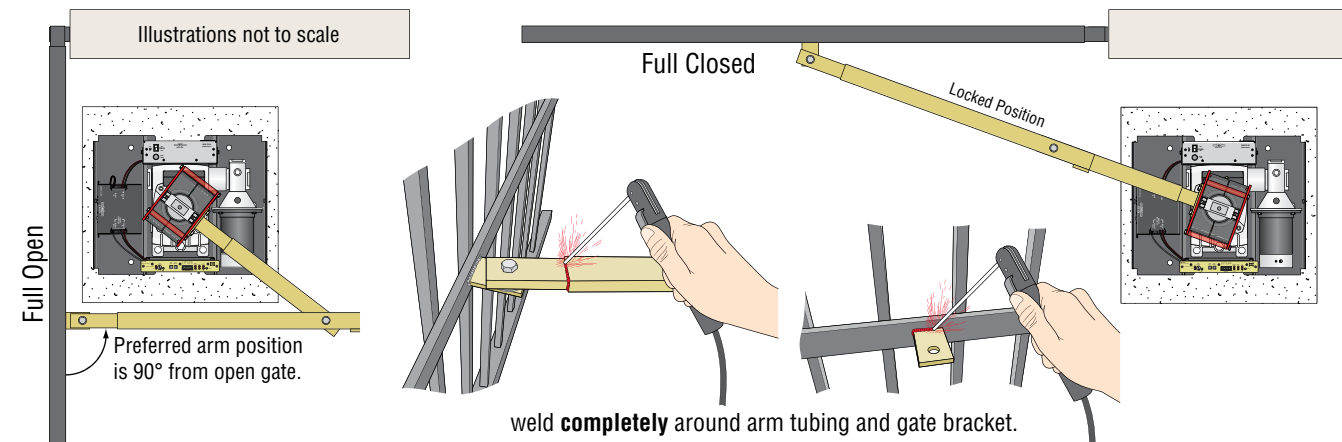


### High Traffic Arm Option



## ARM CONNECTION TO GATE

After you're satisfied testing the arm in the **FULL OPEN** and **FULL CLOSED** positions, weld gate bracket and arm.





# INSTALLATION

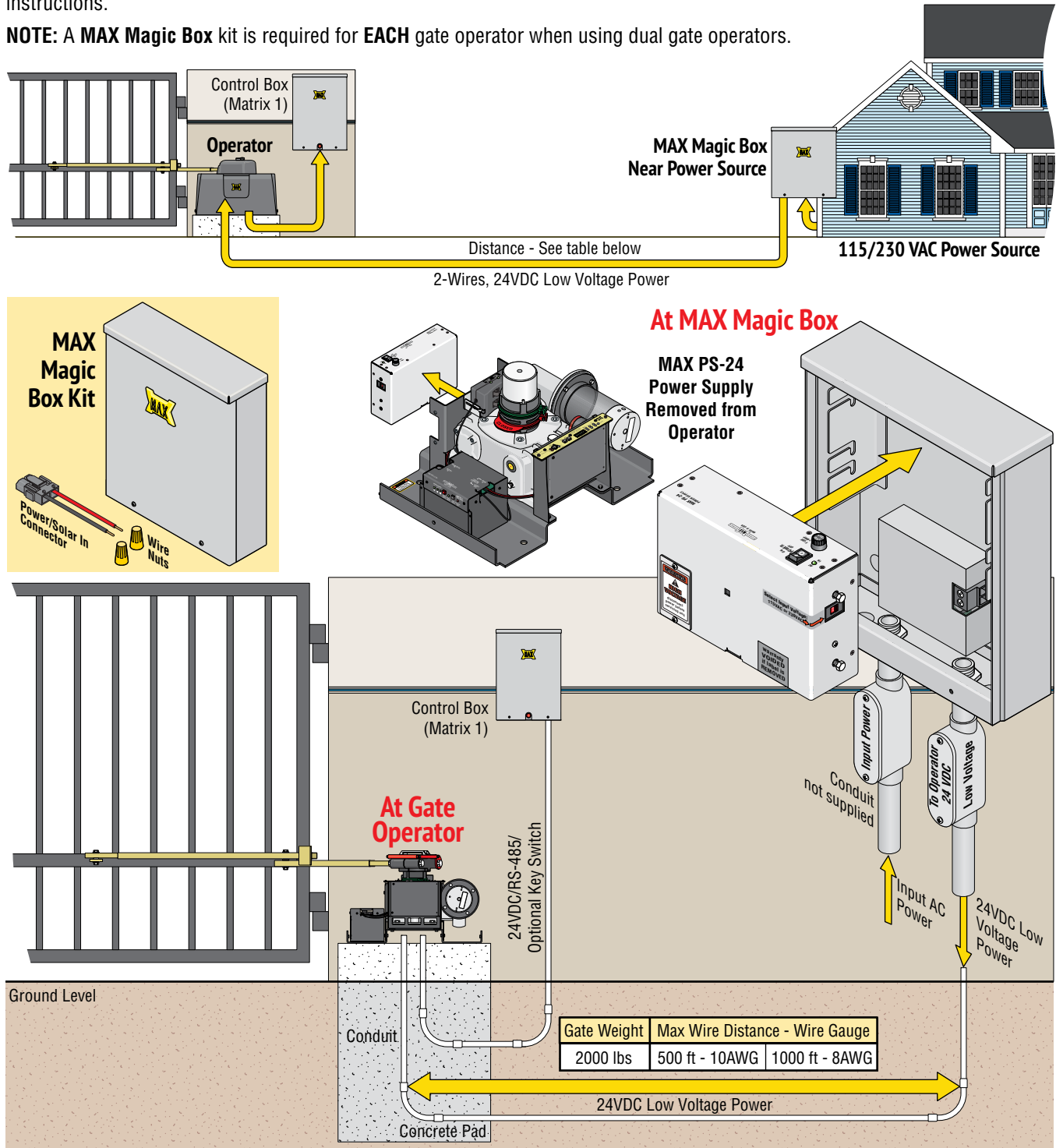
## OPTIONAL REMOTE POWER SUPPLY KIT - MAX MAGIC BOX

A remote power supply is for installations where it is too costly or difficult to trench a 115/230 VAC power line to the operator but instead run a low voltage power line to the operator. A **MAX Magic Box Kit** (sold separately) is required to remotely install the **MAX PS-24 power supply**.

Install the **MAX Magic Box** near the 115 VAC or 230 VAC input AC power source, up to 1000 ft away from gate operator.

Remove **MAX PS-24 power supply** from gate operator and place in **MAX Magic Box**. See page 21 for **MAX Magic Box** wiring instructions.

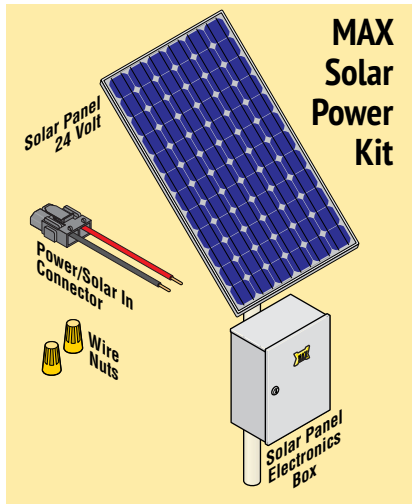
**NOTE:** A **MAX Magic Box** kit is required for **EACH** gate operator when using dual gate operators.



# INSTALLATION

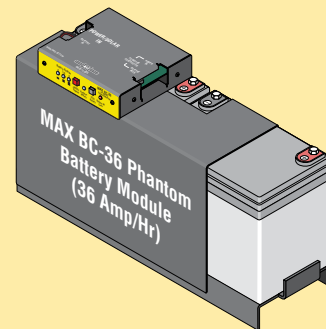
## SOLAR - OPTIONAL

Refer to Solar application guide.

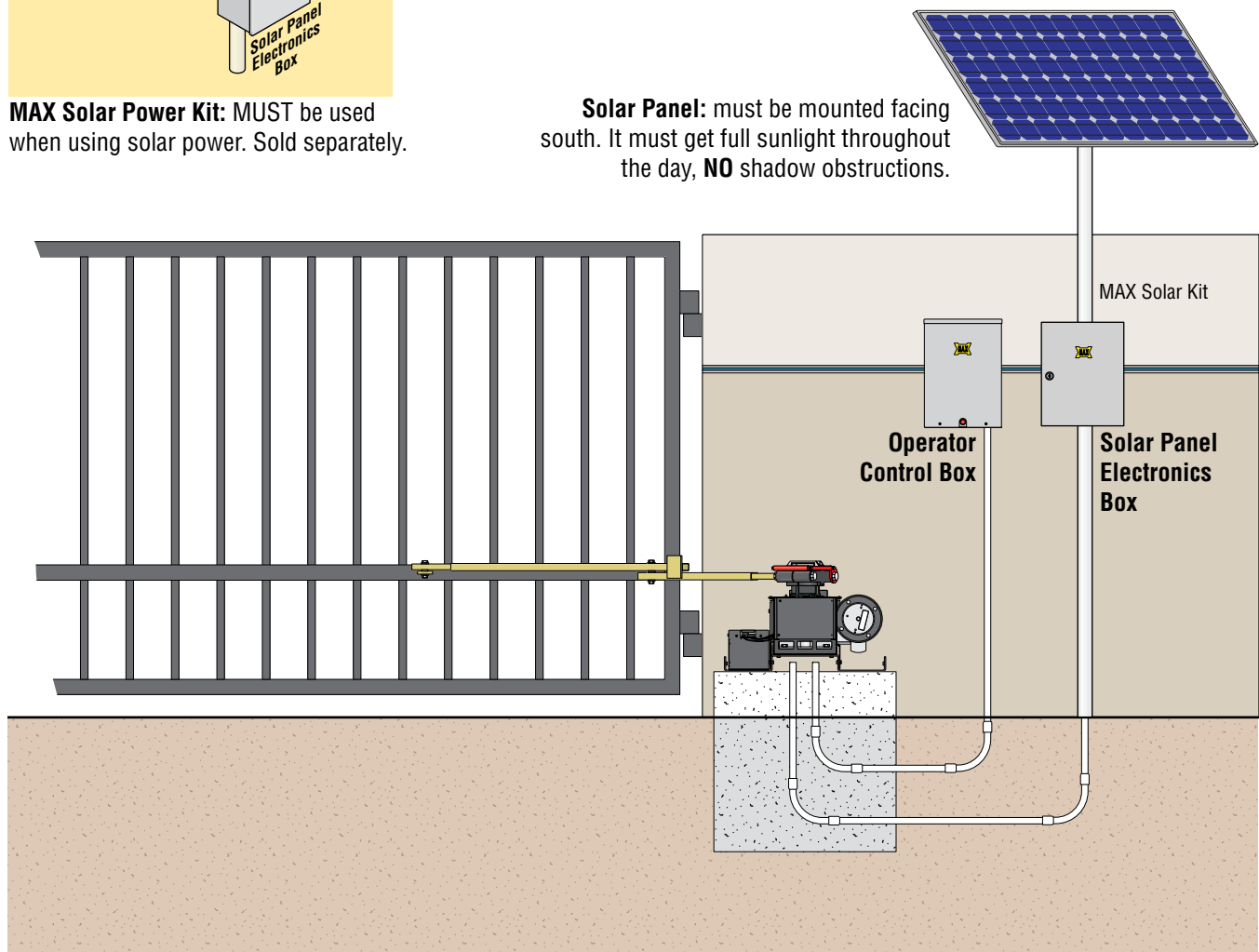


**MAX Solar Power Kit:** MUST be used when using solar power. Sold separately.

## OPTIONAL MAX BC-36 Phantom Battery Module



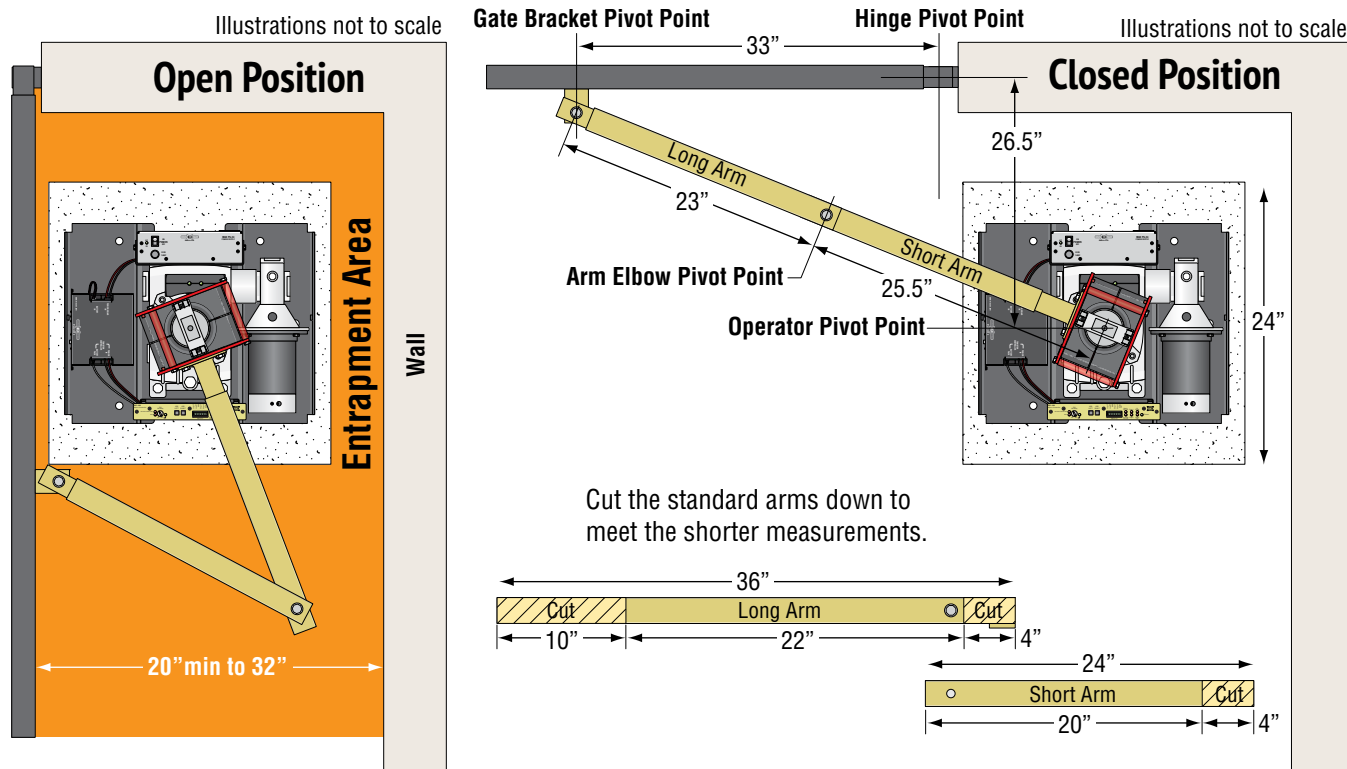
This OPTIONAL module replaces the MAX BC-7 Battery Module in the operator. It can be used when the operator is in a high traffic cycling area (Approximately 2000 cycles using only battery power). Sold separately.



# INSTALLATION

## COMPACT INSTALLATION ONLY

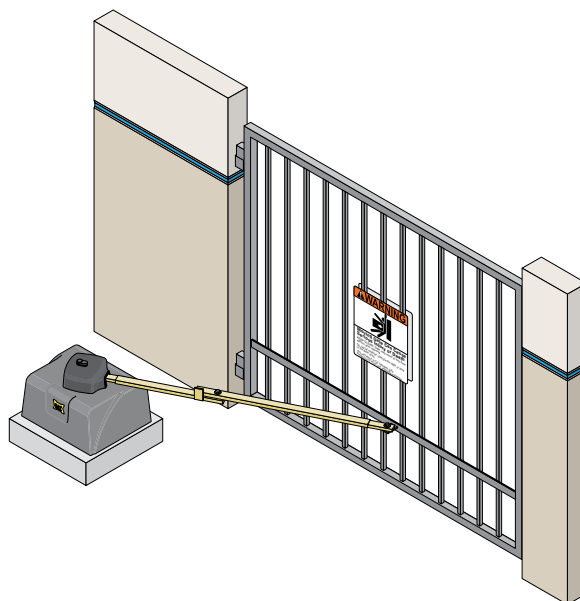
Use compact installation arm measurements when area between the **OPEN gate** and wall is 20" min to 32".  
**DO NOT** use these arm measurements for a standard installation. (For standard installation, see page 6)



It is necessary to protect against the entrapment that could occur with this type of installation.  
 (See entrapment protection on page 13)

## INSTALL WARNING SIGNS

A minimum of two (2) WARNING SIGNS shall be installed, one on each side of the gate where easily visible.



## ENTRAPMENT PROTECTION

**ONE** entrapment protection sensor **MUST** be installed and connected to “Edge 1 CLOSING direction” on MC-100 motor controller or operator will **NOT** function. Entrapment protection sensors **MUST** be **MONITORED** and **NORMALLY CLOSED (N.C.)**.

**IMPORTANT:** Sensing edges **MUST** be Monitored 10K Normally Closed Type and a GEM-104 module **MUST** be installed.

**CLOSING** direction photocell to  
MC-100 EDGE 1 input, Monitored.  
Normally CLOSED (N.C.)

**Entrapment Area**

Beam: 5" or LESS from CLOSED gate.

Wireless Module

**WIRELESS NOTE:** Refer to the instruction sheet that comes with the wireless module for wiring and mounting instructions when using wireless option.

Max 10K Mini Sensing Edge (N.C.)

Conduit

**End of Gate Options**

**OPENING/CLOSING**  
Two Sided 10K Sensing Edge to Edge 2 or Photo Cell input  
MC-100 Edge 2 or Photo Cell input

**CLOSING ONLY**  
One Sided 10K Sensing Edge  
MC-100 Edge 1 input

**Hinge Area**

The hinge area may need protection against entrapment. MAX 10K mini sensing edge works well in this area. (OPEN/CLOSE direction, MC-100 Edge 2 or Photo Cell input)

**Bottom of Gate**

**Dual Gate Operators NOTE:** Run **EACH** entrapment protection sensor to each corresponding **GATE OPERATOR'S MC-100 motor controller**. See page 9.

**Entrapment Area**

**IMPORTANT:** Photocells **MUST** be in alignment or fault will occur.

Normally CLOSED (N.C.)

Normally OPENING direction Photocell

**IMPORTANT:** Photocells **MUST** be Monitored Normally Closed Type.

## Side View

[illegible]

# INSTALLATION

## IN-GROUND LOOPS

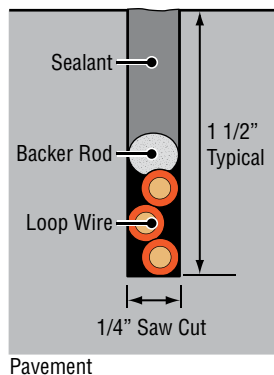
Install in-ground loops to help protect vehicles from a moving gate. See pages 27 & 31 for wiring instructions.

Outside Property

Illustration not to scale

Inside Property

### Side View of Saw Cut



### Safety Loops

Are placed on each side of the gate to prevent the gate from closing on a vehicle in its path. They will stop or reverse the cycling of the gate while a vehicle is in or near the gate's pathway.

### Center Loop

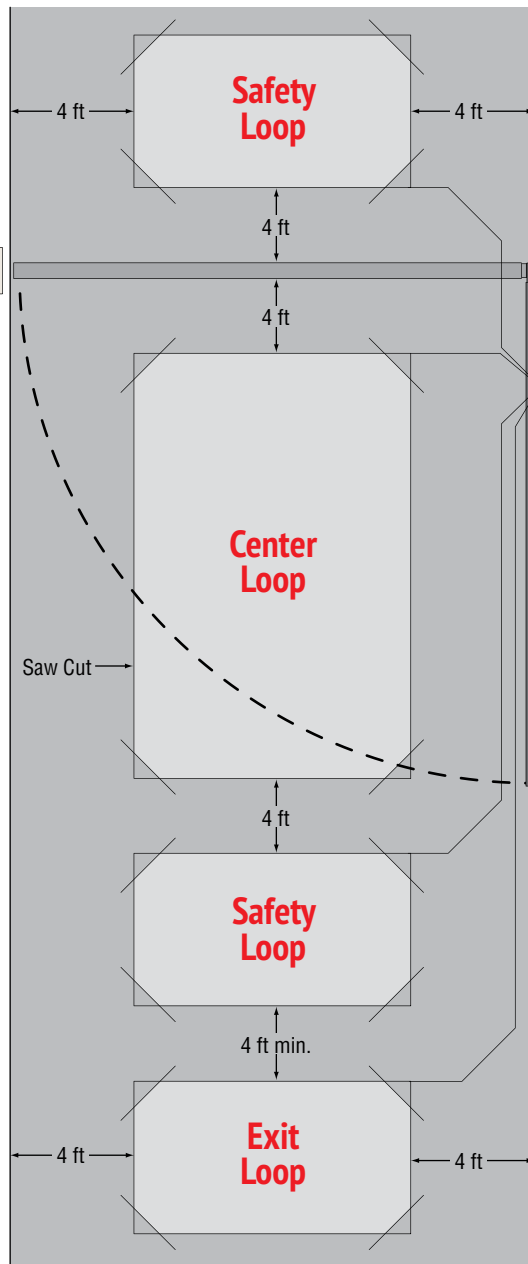
Will **ONLY HOLD** the gate in the **Full Open Position** when a vehicle is on the center loop. However, it **WILL NOT stop or reverse** the gate once it starts to close.

### Exit Loop

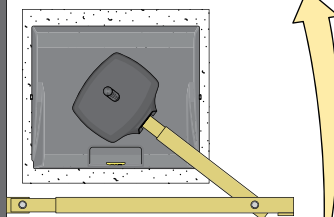
Automatically opens the gate for exiting vehicles without having to use a radio transmitter (remote control). The exit loop can be placed a minimum of 4 feet away from the safety loop or far enough away from the gate so it has opened by the time the vehicle approaches it.

Refer to loop manufacturer's instructions to determine specific loop dimensions.

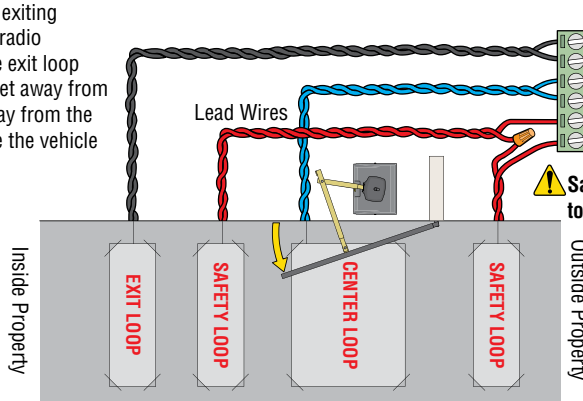
**It is recommended that a licenced installer perform this work.**



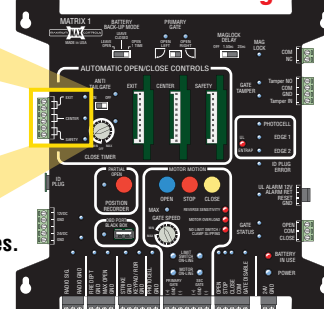
Control Box  
Run in-ground loops conduit to **CONTROL BOX**.



Loop lead wires are twisted 6 twists per foot minimum inside conduit.



### Matrix 1 Wiring



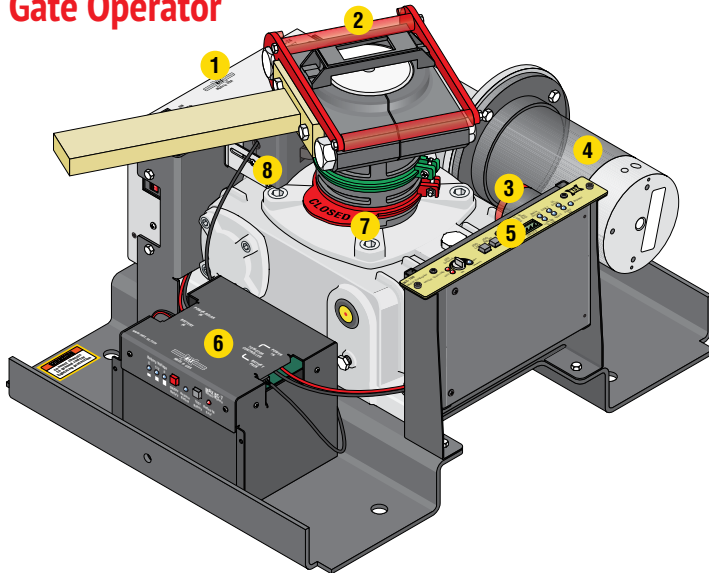
**Safety loops need to be wired in series.**

# WIRING OPERATOR

Check with local building department prior to installing any permanent wiring on this gate operator. Make sure all wiring complies with local code requirements.

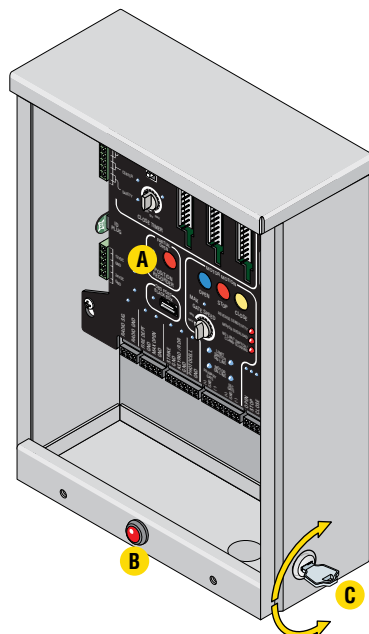
## GATE OPERATOR SYSTEM OVERVIEW

### Gate Operator



- 1 MAX PS-24 Power Supply:** AC power management for the AC input power to the gate operator. See pages 20, 21 & 25.
- 2 Release Handle Clamp:** Manually move the gate when handle is raised. See page 37.
- 3 Audible Alarm:** Sounds when there is a problem with cycling the gate. Push the alarm reset button on the control box to shut off alarm (see below). Alarm can sound every time operator is cycled using ONLY battery back-up power when turned ON, See page 34.
- 4 24VDC Brushless Motor (6 million cycles)**
- 5 MAX MC-100 Motor Controller:** Manages UL entrapment protection devices and operator motor reversing ERD sensitivity adjustment. See pages 17, 18, 19, 23, 24 & 27.
- 6 MAX BC-7 Battery Module:** Battery Back-Up and DC power management for the gate operator. See page 17.
- 7 Limit Tabs:** Adjusts the OPEN and CLOSE gate positions. See page 36.
- 8 Limit Switch Box:** Contains the limit switches. Gate operator will **NOT** function when limit switch box is not connected. See page 36.

### Control Box



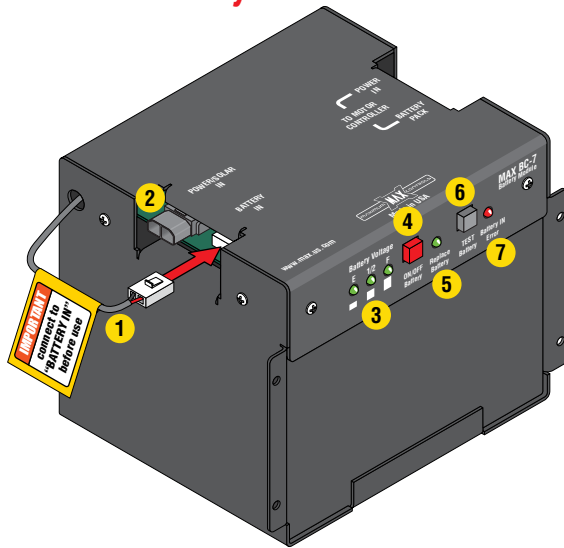
- A Matrix 1:** Manages control panel operations. Manages inputs/outputs, loops and reports problems with gate operator. See Matrix 1 Section starting on page 24.
- B Alarm Reset Button:** Push to shut off alarm and/or reset Matrix 1. See pages 27, 34 & 40.
- C Optional Electronic Gate Open/Close Key Switch:** Electronically move the gate open or closed by turning removable key in the key switch if connected to operator(s). See pages 24 & 42.



# WIRING OPERATOR

## GATE OPERATOR SYSTEM OVERVIEW CONTINUED

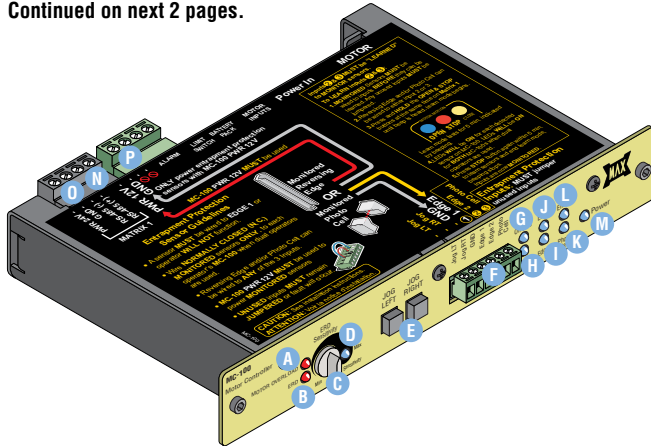
### MAX BC-7 Battery Module



- 1 BATTERY Plug:** **MUST** be plugged into **BATTERY IN** port **Before** use.
- 2 POWER/SOLAR IN Port:** MAX PS-24 Power Supply connection.
- 3 Battery Voltage LEDs:** Show amount of battery power available. LEDs are always ON when using AC power. Test battery button must be pressed to show battery power when using battery power **ONLY**.
- 4 ON/OFF Battery Button:**  
**IMPORTANT:** Battery power **automatically** turns **ON** when MAX PS-24 Power Supply **AC POWER Switch** is turned **ON**.  
**To turn OFF ALL POWER to operator:**
  1. Turn OFF **AC POWER Switch** on MAX PS-24 Power Supply. Battery power **remains ON**.
  2. **WAIT** for 15 seconds.
  3. **Press and HOLD** (approx. 5 seconds) the **RED ON/OFF BATTERY** button until MAX BC-7 LEDs turn **ON**, then release button. LEDs will turn **OFF**.
- 5 Replace Battery LED:** Replace battery when lit.
- 6 TEST Battery Button:** Press to show amount of battery power available when using battery power **ONLY** (Battery voltage LEDs will light respectively).
- 7 Battery IN Error LED:** Lights when there is a battery connection problem. Make sure battery plug #1 is plugged into BATTERY IN port or there is no damaged or loose wires.

### MAX MC-100 Motor Controller

Continued on next 2 pages.



- G Matrix On Line LED:** Gate operator is successfully communicating with Matrix 1 when lit.
- H Limit SW On Line LED:** Limit Switch Sensors are successfully communicating with MC-100 Motor Controller when lit.
- I Edge 1 LED:** Edge 1 sensor has been activated when lit.
- J Edge 2 LED:** Edge 2 sensor has been activated when lit. LED will light up during "LEARNING" mode when sensor is connected, see page 19.
- K Photocell LED:** Photocell sensor has been activated when lit. LED will light up during "LEARNING" mode when sensor is connected, see next page.
- L UL Entrap LED:** Edge1/Edge2/Photocell inputs have been activated when lit.
- M Power LED:** Low voltage power is connected when lit.
- N RS-485 Input:** Factory wired for **Primary** operator.  
Wire to Matrix 1 "SEC GATE" for **Secondary** operator **ONLY**.
- O 24V Power Input:** 24V Power for Matrix 1 and wireless receiver for edge.
- P 12V Entrapment Protection Sensor Power Out:** 12V Power that **ALL** Entrapment protection sensors **MUST** use **PWR 12V** power.

**DUAL GATE OPERATORS NOTE:** Connect **EACH** photocell/sensing edge to the **corresponding** gate operator. See page 9.

- A MOTOR OVERLOAD LED:** Excessive current being drawn by motor when lit.
- B ERD LED:** ERD sensor has been activated when lit.
- C ERD Sensitivity Knob:** 16 selectable sensitivity settings of ERD sensor.
- D ERD Sensitivity LED:** MAX sensitivity reached when lit.
- E Jog LEFT/RIGHT Buttons:**  
Push and **HOLD** buttons accordingly to move the gate (release the button to stop gate). **WARNING:** Avoid moving gate while using Jog buttons.
- F INPUTS:**

**Jog LT/RT inputs:** Can connect to an External Open/Close Key switch. Connect a single key switch to control dual gate operators, See page 24.  
**GND input:** Low Voltage Common connection.

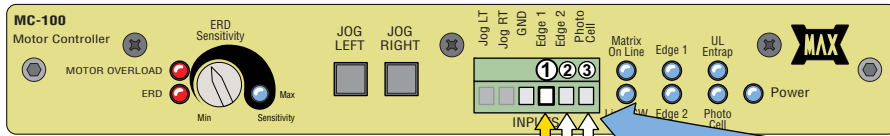
#### Entrapment Protection Sensor Inputs

**Edge 1-MONITORED CLOSING direction ONLY input:** Connects to a **NORMALLY CLOSED (N.C.)** Sensing Edge or Photocell.  
**Closing direction activation:** gate will reverse to full open position and reset close timer.  
**Opening direction activation:** gate will NOT be monitored during opening cycle.

**Edge 2-LEARNED MONITORED OPENING/CLOSING direction input:**  
Connects to a **NORMALLY CLOSED (N.C.)** Sensing Edge or Photocell. Input **MUST** be "**LEARNED**" before it can **MONITOR** a connected sensor (see page 19).  
**Closing direction activation:** gate will **REVERSE** to full open position but will **NOT** reset close timer. Another command is required for gate to resume operation.  
**Opening direction activation:** gate will **REVERSE** 2 inches and **STOP**. Another command is required for gate to resume operation.

**Photo Cell-LEARNED MONITORED OPENING/CLOSING direction input:**  
Connects to a **NORMALLY CLOSED (N.C.)** Sensing Edge or Photocell. Input **MUST** be "**LEARNED**" before it can **MONITOR** a connected sensor (see page 19).  
**Closing direction activation:** gate will **STOP**. Another command is required for gate to resume operation.  
**Opening direction activation:** gate will **STOP**. Another command is required for gate to resume operation.

# WIRING OPERATOR



**EDGE 1: MONITORED CLOSE ONLY**

Edge 2: LEARNED MONITORED OPEN/CLOSE

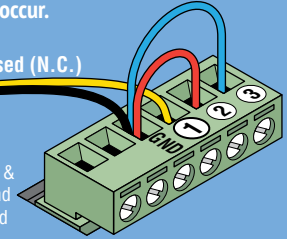
Photo Cell: LEARNED MONITORED OPEN/CLOSE

Jumper UNUSED Entrapment Protection Inputs or a fault will occur.

Normally Closed (N.C.)

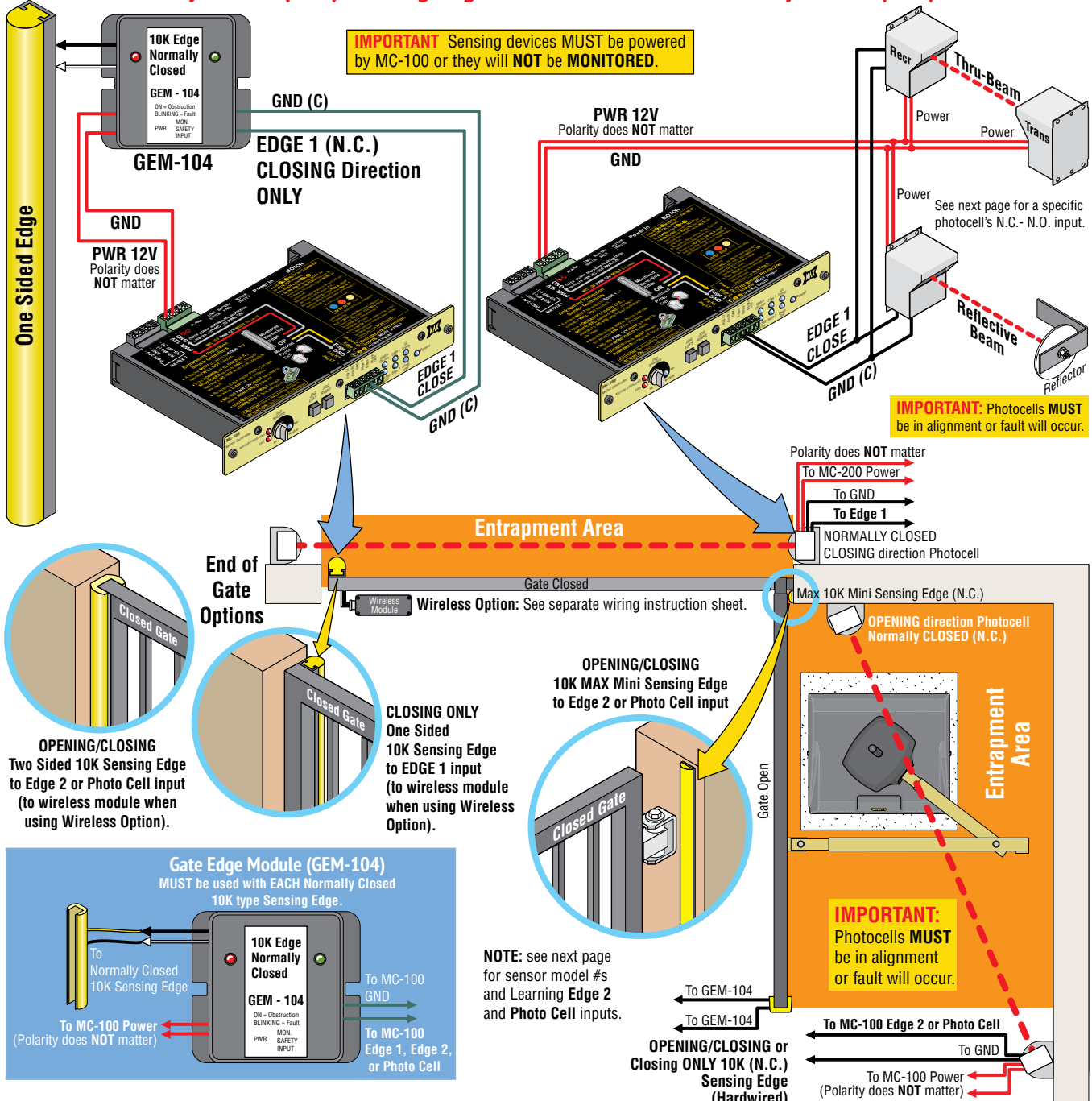
Sensor Wire

Example: Inputs 2 & 3 are NOT used and MUST be jumpered to GND.



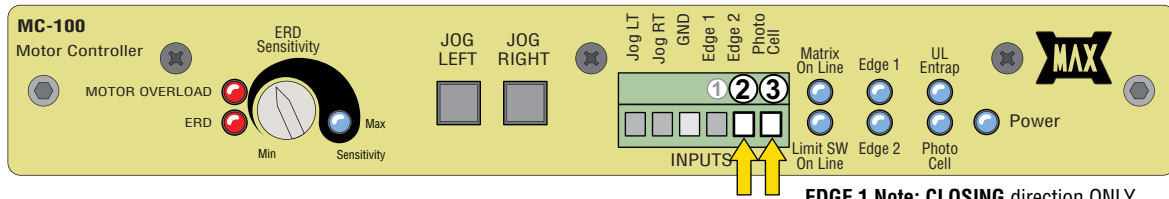
## Typical Wiring For:

a 10K Normally Closed (N.C.) Sensing Edge .....AND/OR .....a Normally Closed (N.C.) Photo Cell





# WIRING OPERATOR



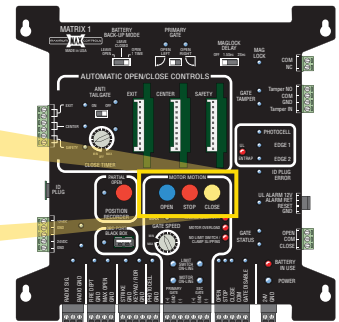
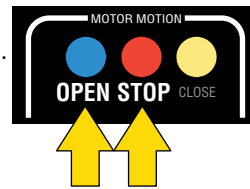
EDGE 1 Note: CLOSING direction ONLY.

**Inputs ② & ③ MUST be "LEARNED" to MONITOR OPENING/CLOSING direction sensors.**

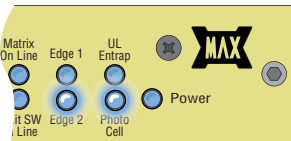
**To LEARN inputs ② & ③:**

1. **MONITORED** Sensors **MUST** be wired **BEFORE** they can be learned. Any unused inputs **MUST** be jumpered. See previous page.
2. A Sensing Edge or Photo Cell can be wired to either input 2 or 3.

3. Press and **HOLD** the **STOP** button & then the **OPEN** button together on Matrix 1 until beep is heard, learn mode begins. **NOTE: DO NOT** press the **OPEN** button before the **STOP** button or learn mode will **NOT** function.



4. LEDs **WILL** be **ON** for each detected sensor on MC-100. LEDs **WILL** be **ON** for **BOTH** MC-100s when dual operators are used. If an LED is not on and it should be, wiring to sensor is bad, photocells are out of alignment, photocells are wired wrong - N.C. or N.O. depending on which photocells are used (see below) or sensor is bad etc. and must be corrected. When all LEDs are **ON** that should be **ON**, proceed to next step.

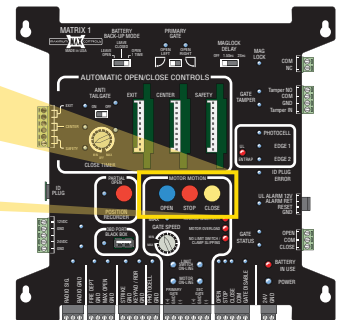
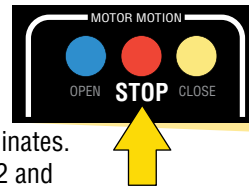


Example shows that sensors are **DETECTED** on inputs **Edge 2** and **Photo Cell**.

5. Press **STOP** button again within 5 min. to learn sensors and end learn mode, beeping stops.

Wired Inputs are now **MONITORED**.

If **STOP** button is not pressed within 5 min. learn mode terminates. If no sensors are detected then factory default setting (Edge 2 and Photo Cell are NOT Monitored) is restored.



## UL 325 2016 Compliant **MONITORED** Normally Closed Entrapment Protection Devices:

Normally Closed Definition: When Power is off, relay contacts are OPEN. When Power is on, relay contacts are CLOSED.

### Photo Cells:

**Model RG** Miller Edge Reflecti-GUARD Reflective-Beam Type (Normally Closed)

**Model PG** Miller Edge Prime-GUARD Thru-Beam Type with battery operated transmitter (Normally Closed)

**Model EMX-IRB-MON** EMX Thru-Beam Type (Normally Closed)

**Model EMX-IRB-RET** EMX Reflective-Beam Type (**MUST be wired to Normally Open**)

**Model E3K-R10K4-NR** OMRON Photo Electric Sensor Reflective-Beam Type (**MUST be wired to Normally Open**) will work with 12V

**Model 60-2728-1** Allen Bradley Reflective-Beam Type (**MUST be wired to Normally Open**)

### Direct-wired 10K Sensing Edge:

**Model 10K Sensing Edge with GEM-104 Module** Miller Edge (Normally Closed)

**MAX 10K Mini Edge** Maximum Controls (Normally Closed) Requires a Miller Edge GEM-104 module

**MAX 10K Edge 1** Maximum Controls (Normally Closed) Requires a Miller Edge GEM-104 module

### Sensing Edge Wireless Transmitter/Receiver:

**Model MGL-K20** Miller Edge Monitored Gate Link Transmitter and Receiver

# WIRING OPERATOR

## INPUT AC POWER

Wire input AC power wire to the **MAX PS-24 power supply** as shown.  
Choose either **115V** or **230V** setting on input AC power selector switch.

**NOTE:** AC power wire is required for **EACH** gate operator when using dual gate operators.

**CAUTION:** MAKE SURE CIRCUIT BREAKER IS OFF BEFORE WIRING

## Input AC Power Options

Single Phase 115VAC Only

**115VAC**



115 OR 230VAC Power Wire

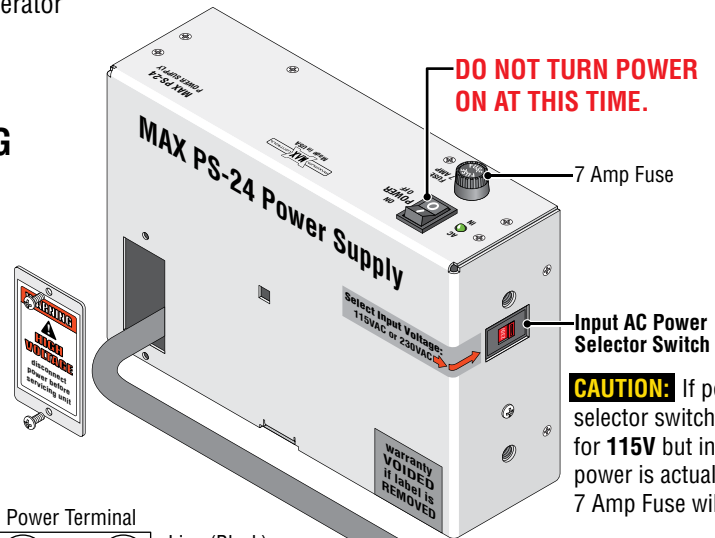


Single Phase 230VAC Only

**230VAC**



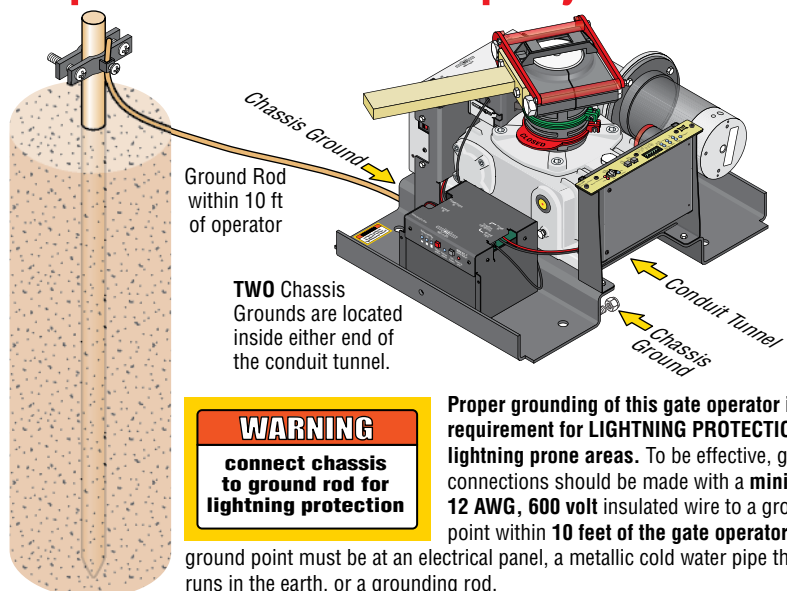
**IMPORTANT NOTE:** Make sure there are **NO** exposed bare wires at the power terminal connection.



**CAUTION:** If power selector switch is set for **115V** but input power is actually **230 V**, 7 Amp Fuse will blow.

## Operator MUST be Properly GROUNDING

**NOTE:** Consult city codes for AC line wiring.  
Beware of existing underground services.



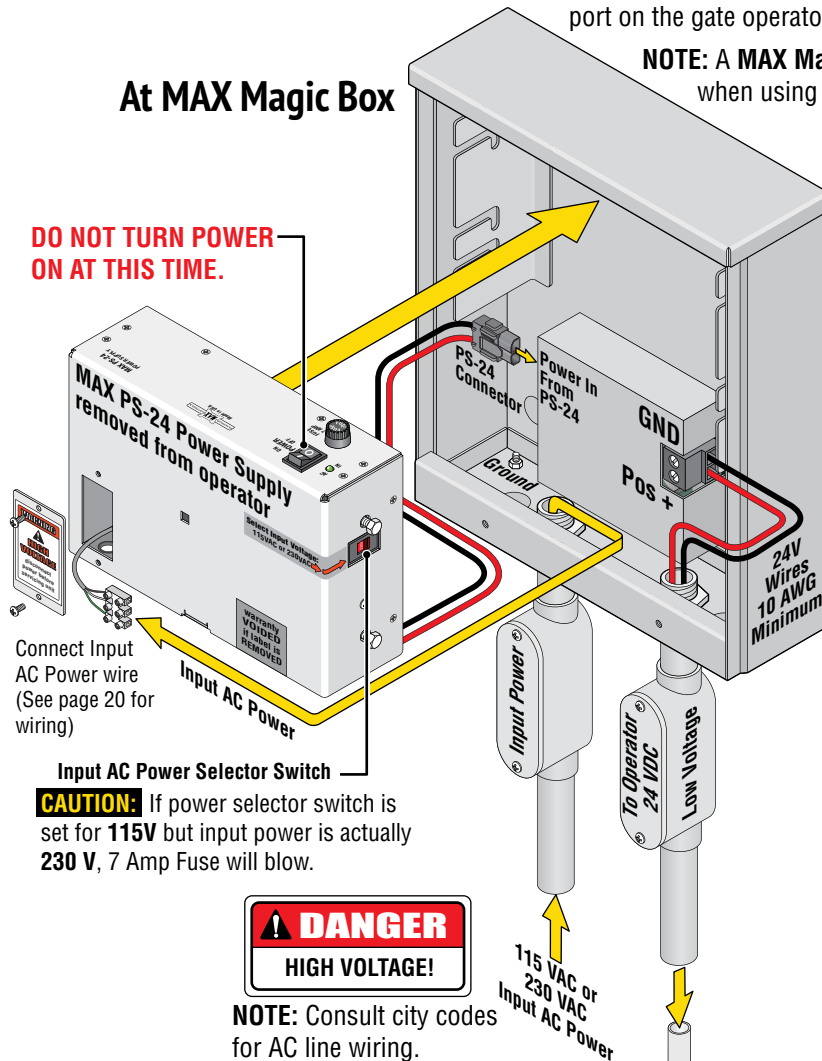
# WIRING OPERATOR

## OPTIONAL REMOTE POWER SUPPLY KIT - MAX MAGIC BOX

A **MAX Magic Box Kit** (sold separately) is required to remotely install the **MAX PS-24 Power Supply** from the gate operator. Remove **MAX PS-24 power supply** from gate operator and install in **MAX Magic Box**, plug in power supply to PS-24 connector. Wire input AC power to the **MAX PS-24 Power Supply** (See page 20 for wiring). Choose either **115V** or **230V** setting on input AC power selector switch. Run 24V low voltage wires (not included) from the **MAX Magic Box** connection and wire to **POWER/SOLAR IN** connector (Polarity Matters!). Plug connector into **POWER/SOLAR IN** port on the gate operator's **MAX BC-7 battery module**.

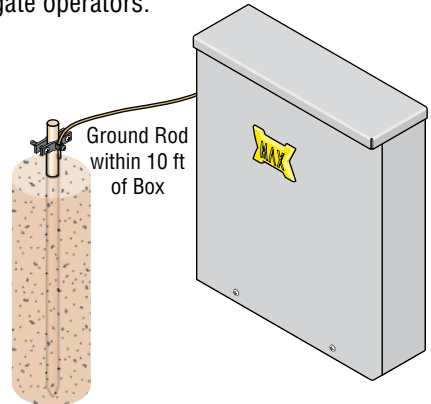
**NOTE:** A **MAX Magic Box** kit is required for **EACH** gate operator when using dual gate operators.

### At MAX Magic Box



**CAUTION:** MAKE SURE CIRCUIT BREAKER IS OFF BEFORE WIRING

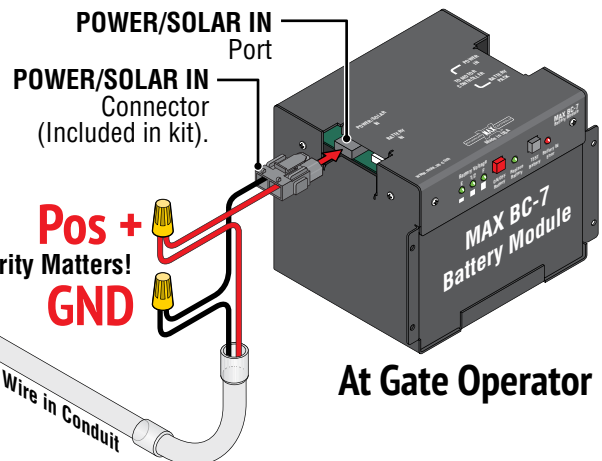
**IMPORTANT NOTE:** Maximum Control's remote power supply technology does **NOT** utilize the battery power from the **MAX BC-7 Battery Module** during **NORMAL** gate operation. Battery power is reserved for back-up power **ONLY** when an **AC power failure occurs**. As a result, battery life is **NOT** shortened. This low voltage system can **CONTINUOUSLY** cycle the gate during **NORMAL** gate operation, perfect for high traffic gate applications.



### MAX Magic Box MUST be Properly GROUND

**IMPORTANT:** MAX Magic Box and Gate Operator **MUST EACH** be Properly **GROUND**. Proper grounding is a requirement for **LIGHTNING PROTECTION** in lightning prone areas. To be effective, ground connections should be made with a **minimum 12 AWG, 600 volt** insulated wire to a ground point within **10 feet** of the **MAX Magic Box** and gate operator. The ground point must be at an electrical panel, a metallic cold water pipe that runs in the earth, or a grounding rod.

**NOTE:** Beware of existing underground services.

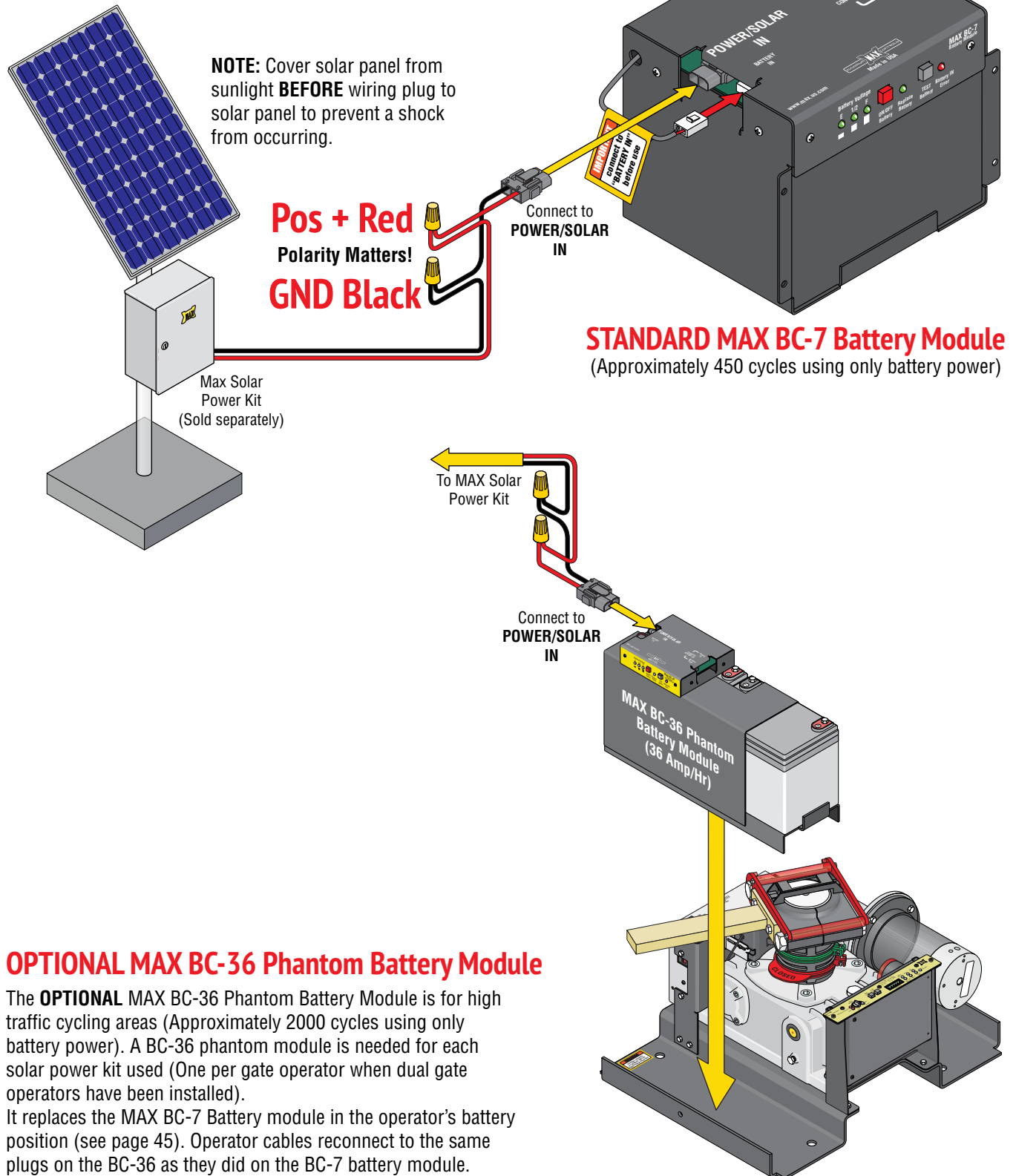


### At Gate Operator

# WIRING OPERATOR

## SOLAR POWER CONNECTION - OPTIONAL

Refer to Solar application guide.



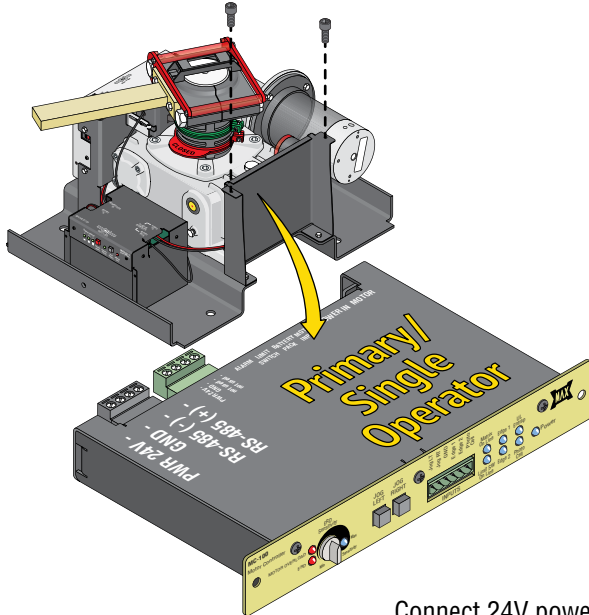
## OPTIONAL MAX BC-36 Phantom Battery Module

The **OPTIONAL** MAX BC-36 Phantom Battery Module is for high traffic cycling areas (Approximately 2000 cycles using only battery power). A BC-36 phantom module is needed for each solar power kit used (One per gate operator when dual gate operators have been installed). It replaces the MAX BC-7 Battery module in the operator's battery position (see page 45). Operator cables reconnect to the same plugs on the BC-36 as they did on the BC-7 battery module.

# WIRING OPERATOR

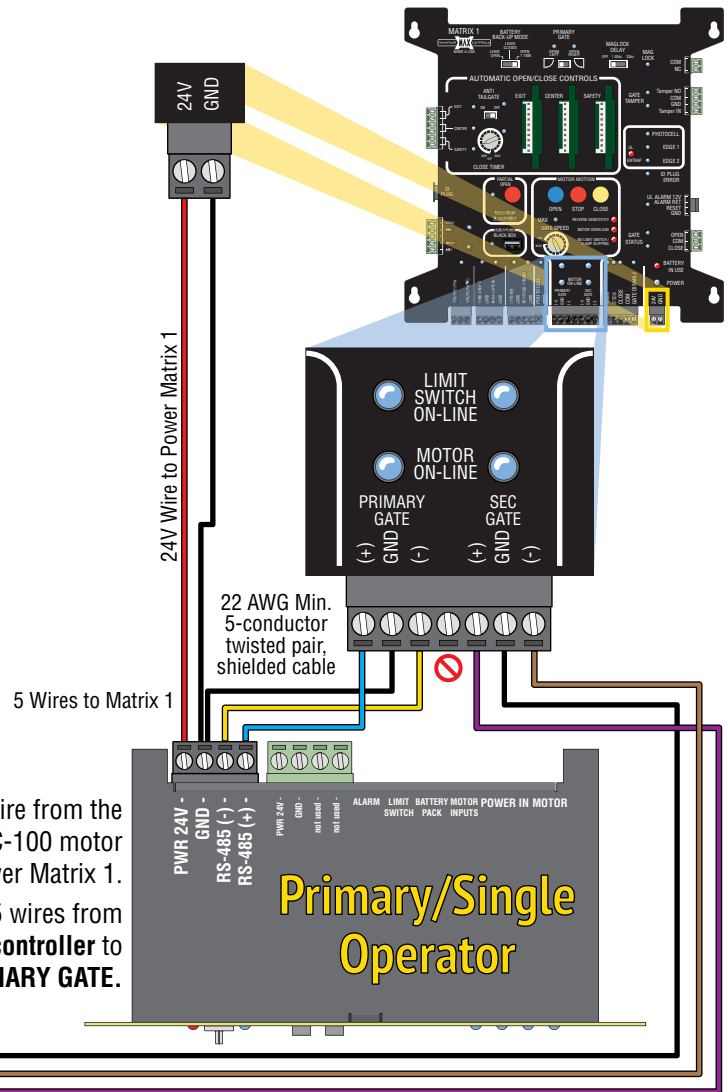
## OPERATORS TO MATRIX 1

Unscrew **MAX MC-100 motor controller** from operator to gain access to RS-485 connector. Schematics on page 40 of manual shows where all plugs are located to re-install **MAX MC-100 motor controller**.



Connect 24V power wire from the **Primary/Single** MAX MC-100 motor controller to power Matrix 1.

Connect (3) three RS-485 wires from the **MAX MC-100 motor controller** to the **Matrix 1 - PRIMARY GATE**.



22 AWG Min. 3-conductor twisted pair, shielded cable  
 NO 24V to Matrix 1

3 Wires to Matrix 1

## Secondary Operator Bi-Parting Gates

Connect (3) three RS-485 wires from the **SECONDARY operator's MAX MC-100 motor controller** to the **Matrix 1 - SEC GATE**. **DO NOT** connect PWR 24V.





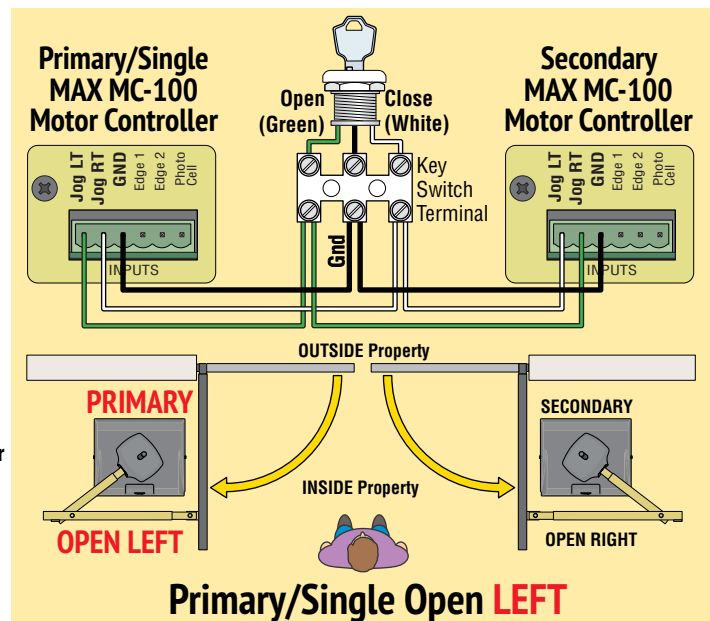
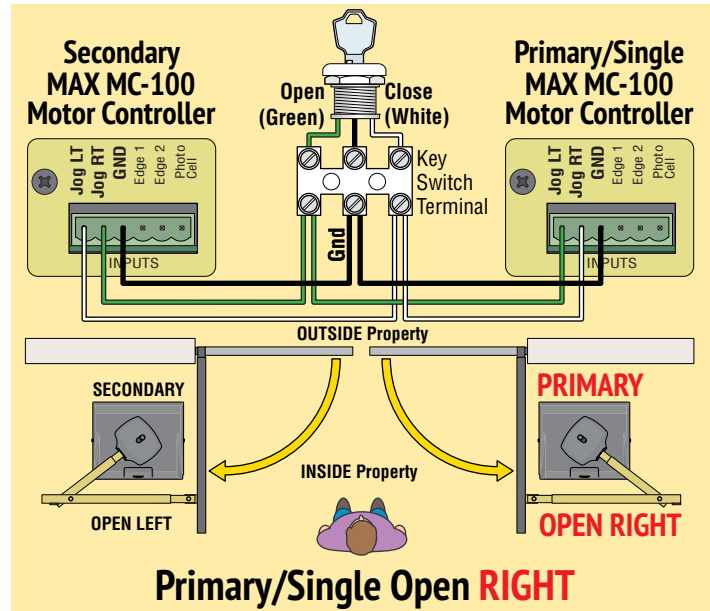
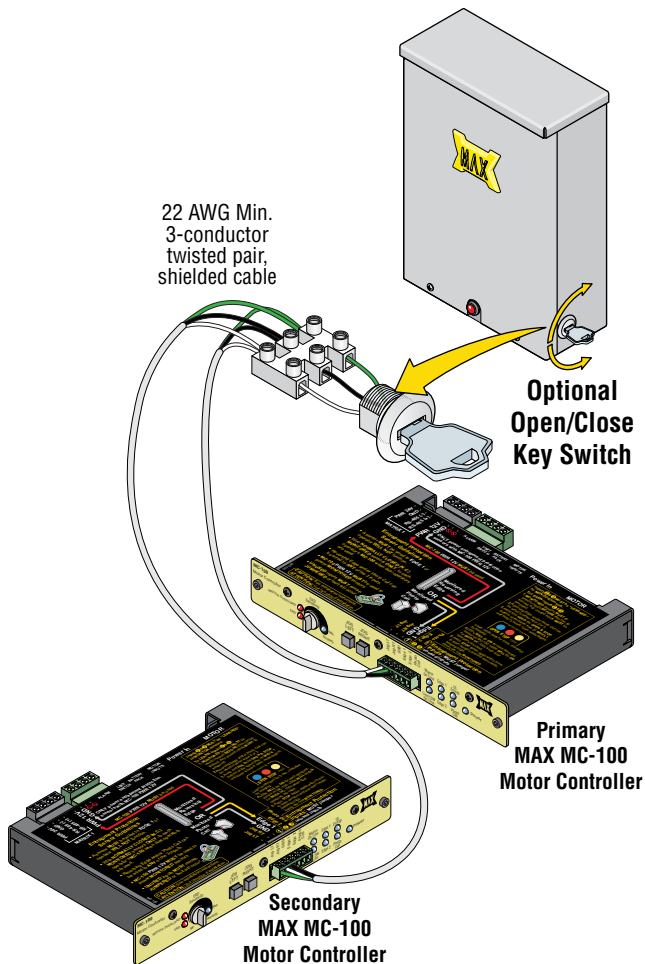
# WIRING OPERATOR

## OPTIONAL KEY SWITCH TO OPERATOR(S)

The Optional **Key Switch** is **independent** of the Matrix 1 and allows the gate to be **electronically moved** open or closed by turning the removable key in either direction if you choose to connect the key switch.

Connect (3) three wires from the **Key Switch** at the Control Box to the **MAX MC-100 Motor Controller**.

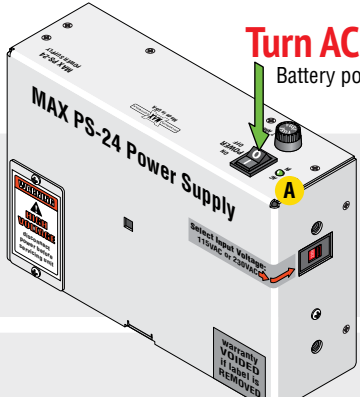
**NOTE:** Each operator is specifically wired to the Optional Key Switch when installing dual gate operators if you choose to connect the key switch. (see illustrations).



# WIRING OPERATOR

## TURN ON/OFF OPERATOR POWER

Operator should have **Input AC power wired** to PS-24, **24V** & **RS-485** wired between Matrix 1 and MC-100 and “Optional” **Key Switch** wired to MC-100. **TURN POWER ON.** Certain LEDs should normally turn ON accordingly:

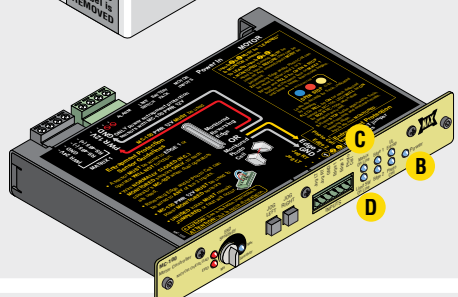


**1**

Turn AC Power Switch ON

Battery power automatically turns ON.

DO NOT CYCLE GATE OPERATOR AT THIS TIME



**2**

**MAX PS-24 Power Supply**

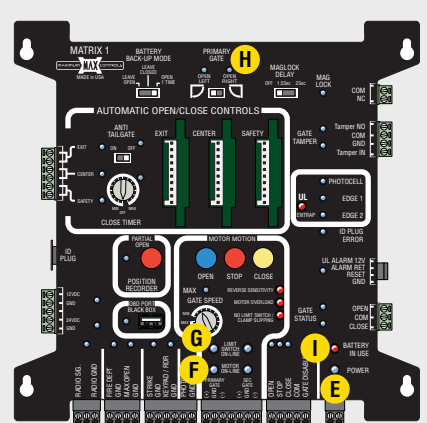
**A AC IN LED:**  
**Normal** - Turns ON.  
**Error** - Not ON. Check AC power.  
 7 Amp Fuse blown. Replace fuse.  
 Input AC selector switch **MUST** be set to **CORRECT** input AC power.

**MAX MC-100 Motor Controller**

**B POWER LED:**  
**Normal** - Turns ON.  
**Error** - Not ON. Check **POWER IN** plug on back of MC-100.

**C Matrix On-Line LED:**  
**Normal** - Turns ON.  
**Error** - Not ON. Check **RS-485** wiring to Matrix 1.

**D Limit SW On-Line LED:**  
**Normal** - Turns ON.  
**Error** - Not ON. Check **LIMIT SWITCH** plug.



**3**

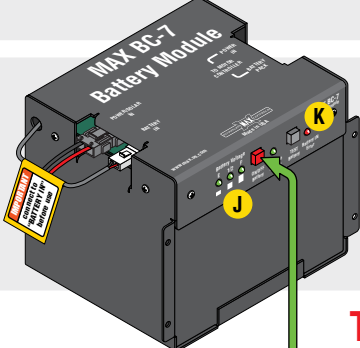
**Matrix 1**

**E POWER LED:**  
**Normal** - Turns ON.  
**Error** - Not ON. Check **24V** wiring from MC-100 **Primary/Single**.

**F Motor On-Line PRIMARY LED:**  
**Normal** - Turns ON.  
**Error** - Not ON. Check **RS-485** wiring to **Primary/Single** MC-100.

**G Limit SW On-Line PRIMARY LED:**  
**Normal** - Turns ON.

**H PRIMARY GATE OPEN RIGHT OPEN LEFT LED:**  
**Normal** - Turns ON either LED according to switch setting.  
**Error** - Not ON. Check **LIMIT SWITCH** plug on back of MC-100.



**4**

**MAX BC-7 Battery Module**

**J BATTERY VOLTAGE LEDs:**  
**Normal** - 3 LEDs turn ON - Fully charged batteries.  
**Batteries need charging** - LEDs will turn on in sequence until batteries are fully charged. Batteries are **NOT** necessary when AC power is available.

**K BATTERY IN ERROR LED:**  
**Normal** - Not ON.  
**Error** - Turns ON. Battery not plugged in to **BATTERY IN** port.

### To turn OFF ALL POWER:

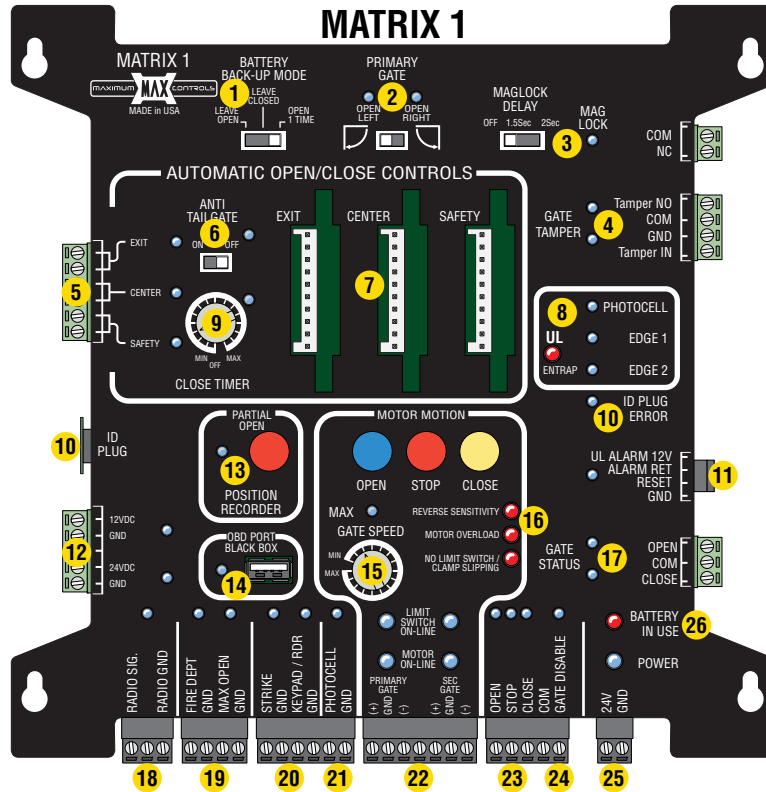
1. Turn OFF **AC POWER** Switch on MAX PS-24 Power Supply. Battery power **remains ON**.
2. **WAIT** for 15 seconds.
3. Press and **HOLD** (approx. 5 seconds) the **RED ON/OFF BATTERY** button until MAX BC-7 LEDs turn **ON**, then release button. LEDs will turn **OFF**.

25

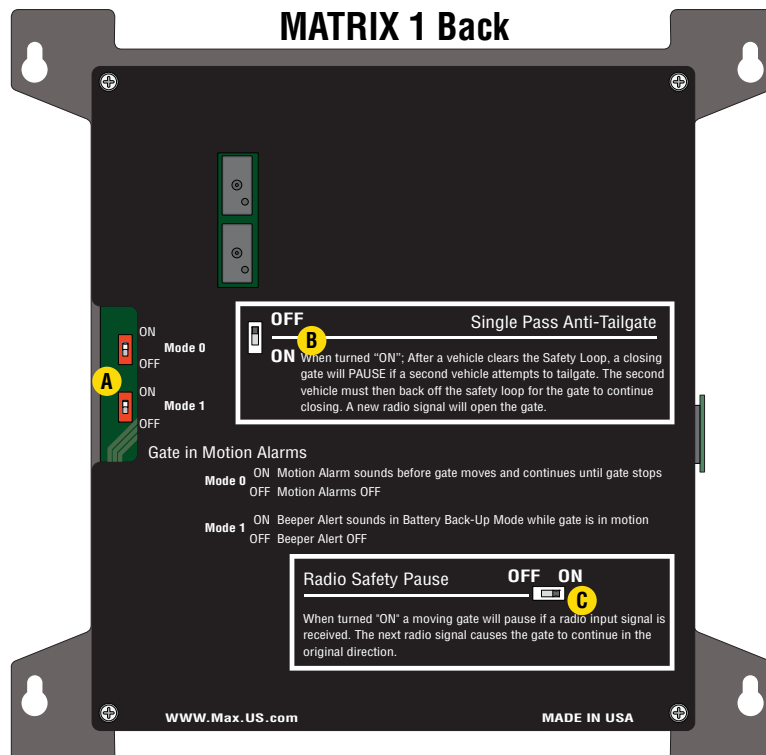
# MATRIX 1

## MATRIX 1 OVERVIEW

- 1 Battery Back-Up Mode - Page 28
- 2 Primary Gate - Page 28
- 3 Maglock - Page 31
- 4 Gate Tamper - Page 32
- 5 In-Ground Loop Connection - Page 31
- 6 Anti Tailgate - Page 29
- 7 Loop Detectors - Page 31
- 8 UL Entrapment LEDs - Page 32
- 9 Close Timer - Page 28
- 10 ID Plug & ID Plug Error LED - Page 32
- 11 UL Alarm/Alarm Reset Button - Page 34
- 12 Radio Power - Page 30
- 13 Partial Open - Page 33
- 14 OBD Port Black Box - Page 30
- 15 Selectable Gate Speed Control - Page 28
- 16 ERD & Motor Overload LEDs - Page 35
- 17 Gate Status - Page 34
- 18 Radio Relay - Page 30
- 19 Emergency Vehicle/Max Open Inputs - Page 32
- 20 Normal Opening Devices - Page 27
- 21 Close direction Photocell (N.O.) - Page 34
- 22 Operators Communication LEDs - Page 23 & 35
- 23 OPEN/STOP/CLOSE Connection - Page 34
- 24 Gate Disable - Page 33
- 25 Matrix 1 Power - Page 23 & 35
- 26 Battery in Use - Page 35



## MATRIX 1 Back

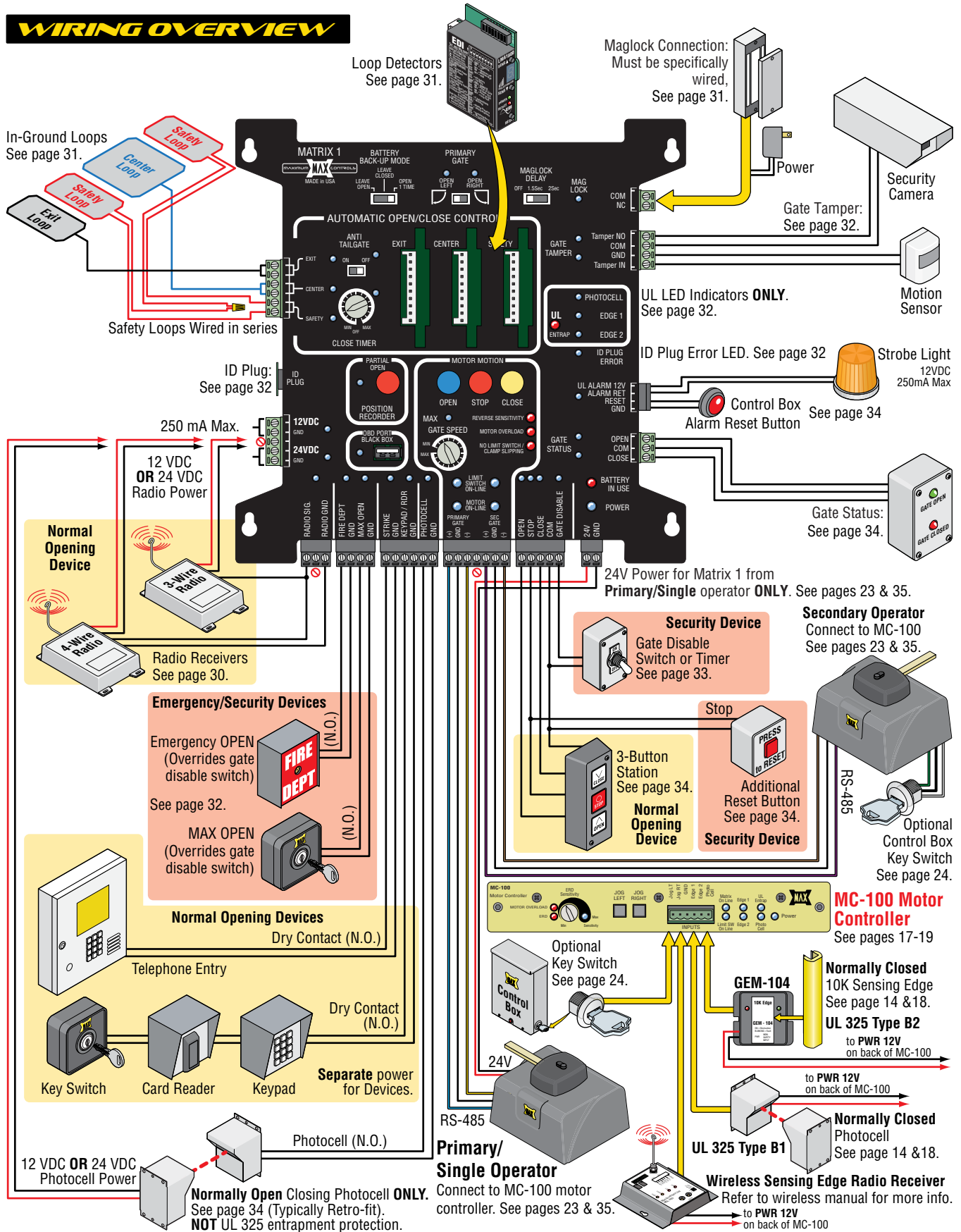


- A Gate in Motion Alarms - Page 30
- B Single Pass Anti-Tailgate - Page 29
- C Radio Safety Pause - Page 30



# MATRIX 1

## WIRING OVERVIEW

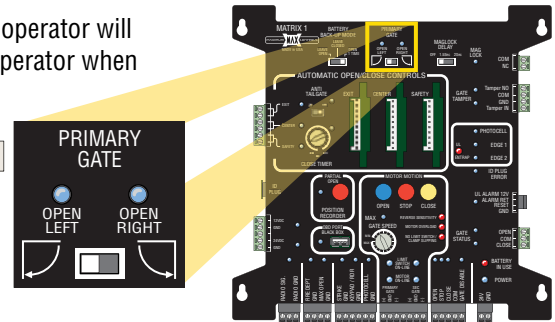
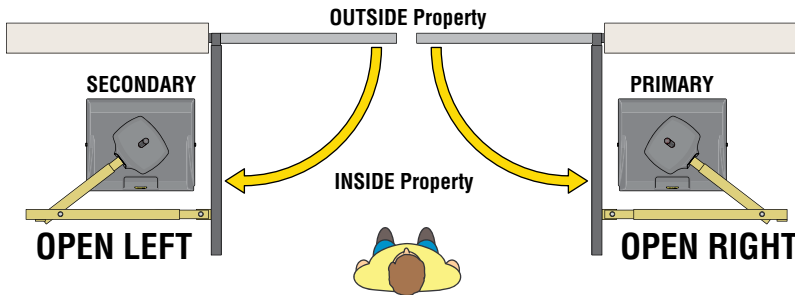


MATRIX 1

# MATRIX 1

## PRIMARY GATE - OPEN LEFT / OPEN RIGHT

Set the **Primary**/single gate operator with **Primary Gate** setting. Secondary operator will automatically be set to the opposite opening direction as the primary gate operator when using dual gates.



## GATE CLOSE TIMER

The **Close Timer** has 16 selectable settings for automatic gate close time.

**Knob at OFF position:** close timer OFF.

**1st click clockwise - Knob at MIN position:** 1/2 sec...

2nd click clockwise: 1 sec...

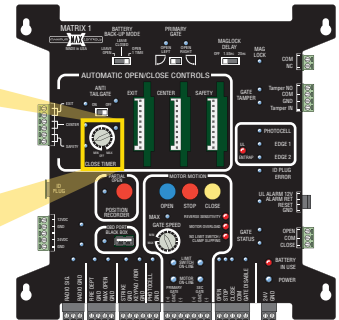
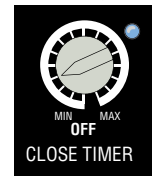
3rd click: 4 sec...

4th click: 8 sec...

5th click: 12 sec (4 sec increments for each successive click up to 60 sec **MAX**)

**NOTE:** 1/2 sec **MIN** position is recommended for **High Traffic** areas.

LED turns ON for  
MAX setting ONLY



## SELECTABLE GATE SPEED CONTROL

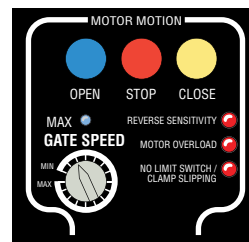
The **Gate Speed** knob has 16 selectable settings to choose from.

**MAX Phantom 2000** speed varies approx. 11.5 sec to 20 sec.

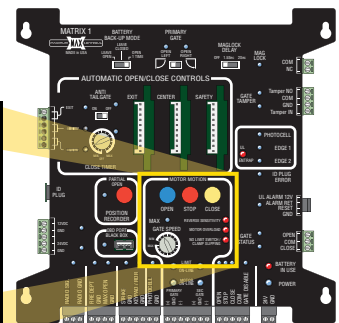
**MAX Phantom FAST** speed of dual gates varies approx. 6 sec to 14 sec.

The speed will vary depending on the weight and length of the specific gate(s). Make sure gate speed is appropriate for the size and length of the gate(s).

**NOTE:** The **Auto Gate Sync** feature provides synchronous opening and closing between bi-parting gates (dual gate operators).



LED turns ON for  
MAX setting ONLY



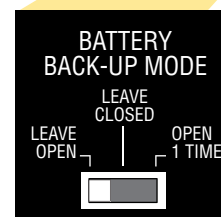
## BATTERY BACK-UP MODE

The **Battery Back-Up Mode** setting will determine how the gate operator will function during an AC power failure. Gate operator with a full battery charge should cycle a 2000 lbs gate (battery power ONLY) approximately 450 times.

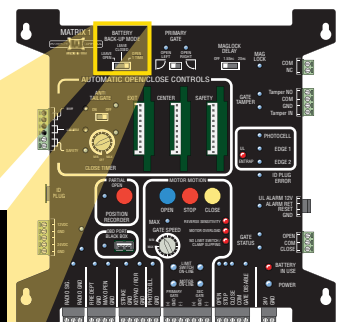
**LEAVE OPEN** - The gate operator will continue to cycle the gate normally until the battery power can no longer cycle the gate. When this happens, the gate operator will open the gate and leave it in the **OPEN** position until power is restored.

**LEAVE CLOSED** - The gate operator will continue to cycle the gate normally until the battery power can no longer cycle the gate. When this happens, the gate will close if not already in the **CLOSE** position, where it will remain until power is restored. Enough battery power is retained for a **LIMITED** time to operate emergency vehicle entry (Using opening devices connected to **FIRE DEPT** and/or **MAX OPEN** inputs to **FULLY** open gate).

**OPEN 1 TIME** - The gate operator will **automatically OPEN** gate once and leave it in the **OPEN** position until power is restored.



FIRE DEPT/MAX OPEN Inputs

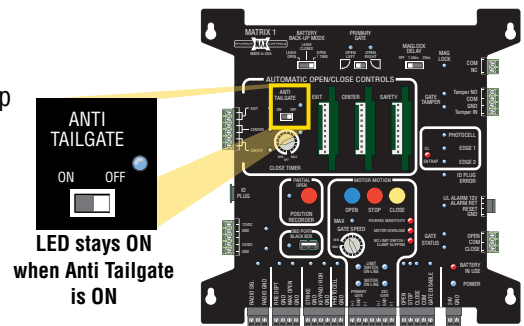


# MATRIX 1

## ANTI TAILGATE

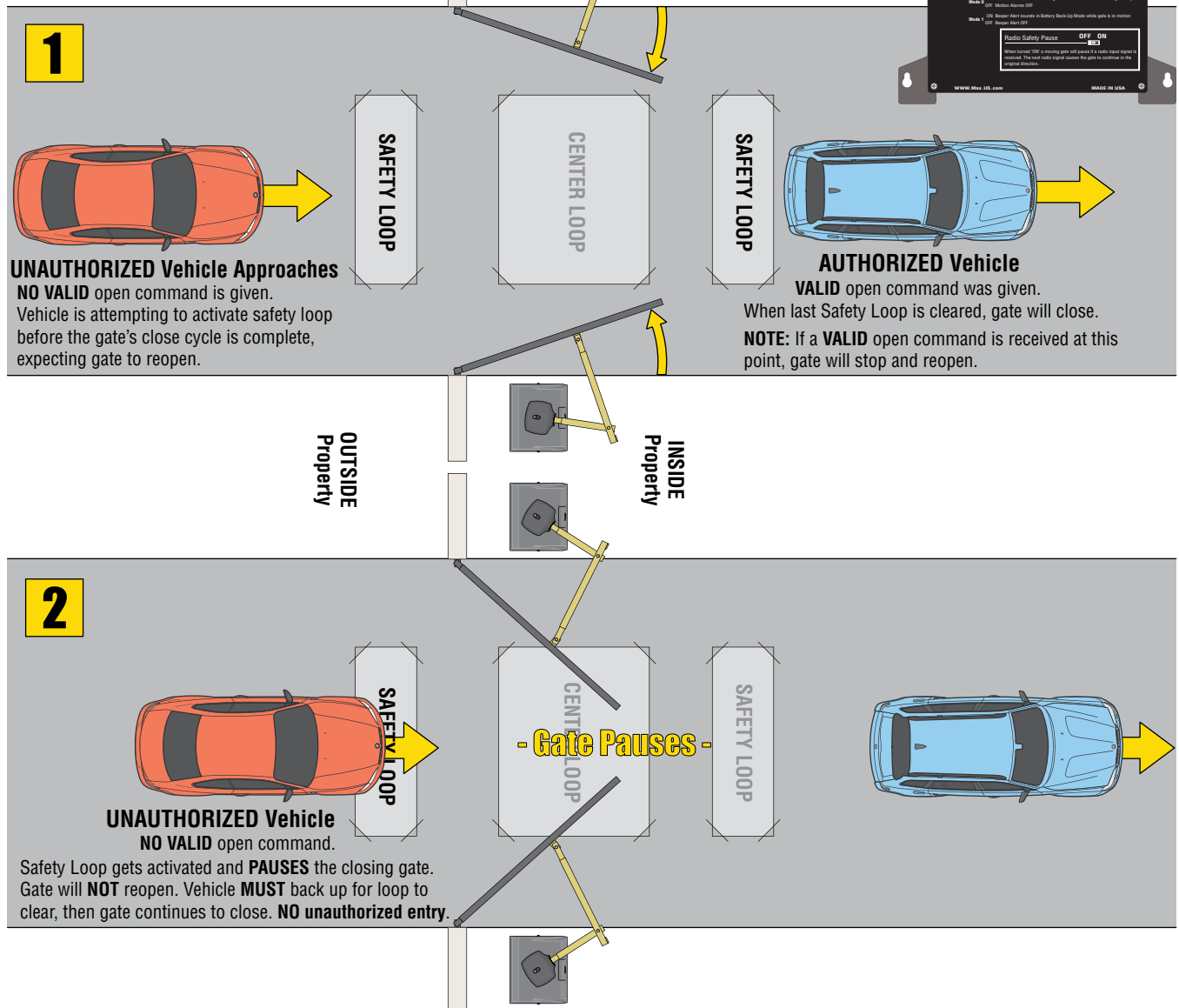
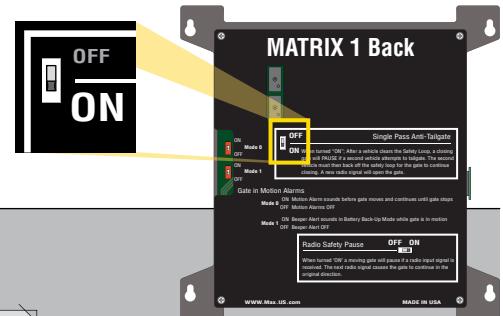
**Turned OFF** - Close timer will close the gate. If an in-ground **safety** or **exit** loop gets activated during the close cycle, gate will **REVERSE** to the open position.

**Turned ON** - (In-ground loops required) Gate will close after **all the in-ground loops have been cleared** no matter how long the close timer is set for. If an in-ground safety loop gets activated during the close cycle, gate will **REVERSE** to the open position.



## SINGLE PASS ANTI-TAILGATE

**Turned ON** - (In-ground loops required) Gate will close after all the in-ground loops have been cleared no matter how long the close timer is set for. When an in-ground safety loop gets activated during the close cycle, gate will **PAUSE** and **NOT** reopen. When loop is cleared, gate will continue to close **preventing UNAUTHORIZED entry**.



# MATRIX 1

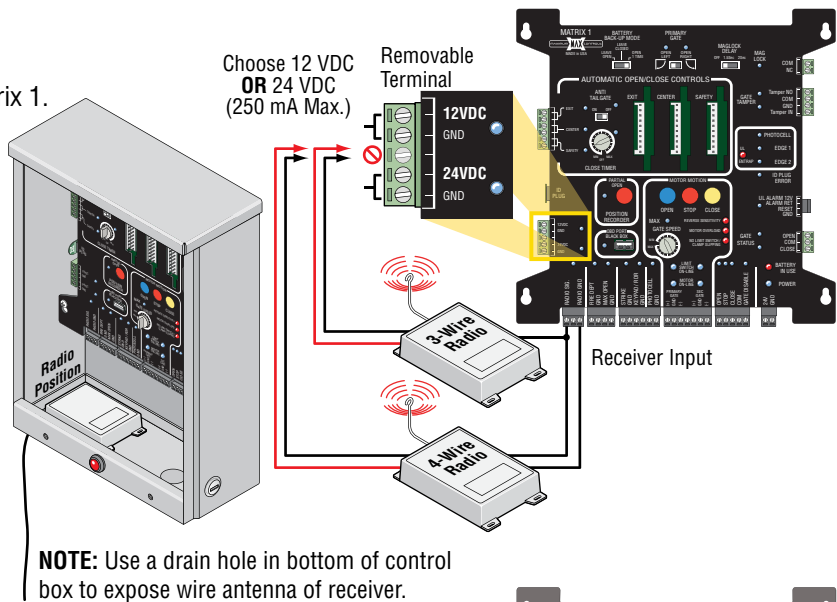
## RADIO RECEIVER

Connect a 3-wire or 4-wire radio receiver to Matrix 1. Choose 12V or 24V, 250 ma max. power.

**CLOSE TIMER ON** - Each time the remote button is pressed **during the Close Timer countdown** (gate is open) causes the timer to reset and begin again. When close timer countdown is complete, gate will close.

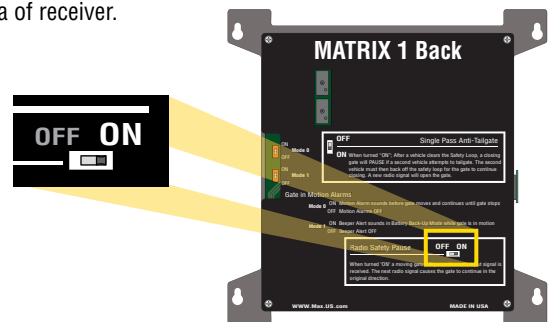
**CLOSE TIMER OFF** - Sequence when pressing remote button:

- Press **One Time** - gate **OPENS** . . .
- Press **Again** - gate **STOPS** . . .
- Press **Again** - gate **CLOSES** . . .
- Press **Again** - gate **STOPS** . . .
- Sequence repeats when button is pressed again.



## RADIO SAFETY PAUSE

**Turned ON** - The radio transmitter (remote control) can **PAUSE** a **MOVING** gate by pressing the remote button. Pressing the remote button again will cause the gate to **CONTINUE** in the **SAME direction**. This process can be repeated as many times as desired.

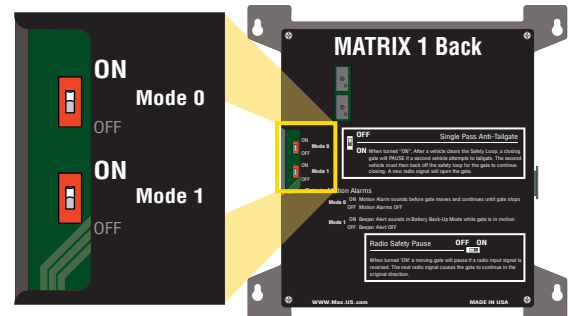


## GATE IN MOTION ALARMS

**MODE 0 - Turned ON** - Alarm will sound **BEFORE** and **DURING** gate cycle to alert surrounding area.

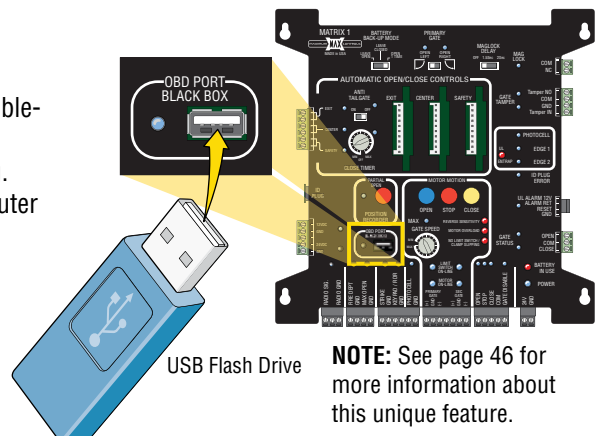
**NOTE:** A strobe light can be connected to **UL ALARM** connection that will flash **ON** and **OFF** when the alarm is sounding. See page 34.

**MODE 1 - Turned ON** - Alarm will beep when using **ONLY** battery power **DURING** gate cycling. This brings to attention that only battery power is being used and **NOT** normal AC power.



## OBD PORT BLACK BOX

On Board Diagnostics (OBD) port will download a simple .txt file to troubleshoot gate operator errors and to view normal transaction logs. Plug a USB flash drive into port. LED will flash while file is downloading. When LED stops flashing, remove flash drive and plug it into any computer with an available USB port and simple text reader software (typical). The operator's event history is stored as a simple .txt file. Contained in the file is a log of the most recent **1000 events**. Quickly identify and diagnose a complex or intermittent problem. The file can even be e-mailed to the factory for on site diagnosis if necessary. The files will be stored as an ongoing **event history** of the transactions that occur at the gate operator.



# MATRIX 1

## MAGLOCK

Maglock **MUST** be connected as shown.

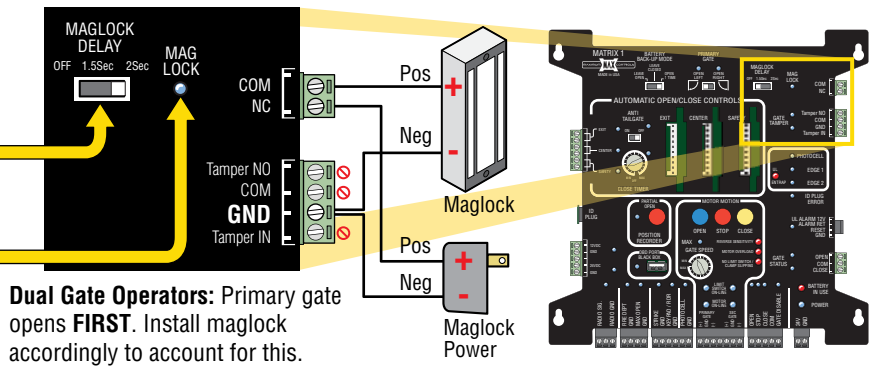
**MAGLOCK DELAY:** You **MUST** select a time delay when using a maglock.

Maglock power disengages 1.5 sec or 2 sec **before** gate starts opening.

**MAGLOCK LED (Monitors Maglock):**

**ON** - Locked **OFF** - Unlocked

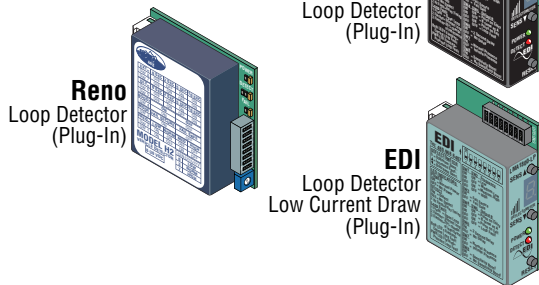
**Flashing** - Problem with Maglock



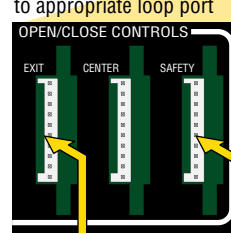
## LOOP DETECTORS

Matrix 1 will accept third party loop detectors in the 3 ports. Each loop detector has a corresponding in-ground loop that must be connected for the loop system to operate (see below). Power down Matrix 1 **BEFORE** connecting loop detectors. Refer to your chosen loop detector's instruction sheet for specific information about loop detector.

### Plug-In Loop Detectors



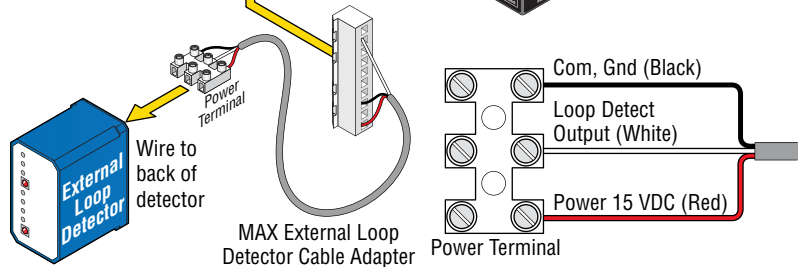
Connect desired loop detector to appropriate loop port



Plug-In Loop Detector

### External Loop Detectors

Third party external loop detectors can be used if desired with the **MAX External Loop Detector Cable Adapter**. (1) One is included with the operator but more can be purchased if needed.

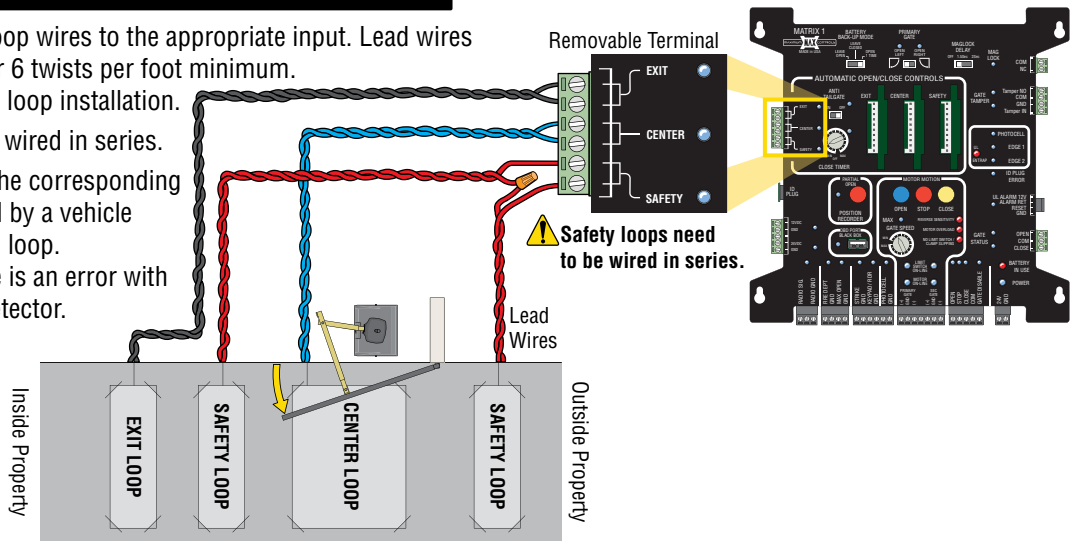


## IN-GROUND LOOP CONNECTION

Connect each in-ground loop wires to the appropriate input. Lead wires should be twisted together 6 twists per foot minimum. See page 15 for in-ground loop installation.

Safety loop wires must be wired in series.

Each LED will light when the corresponding loop detector get activated by a vehicle passing over its in-ground loop. LEDs will flash when there is an error with the corresponding loop detector.



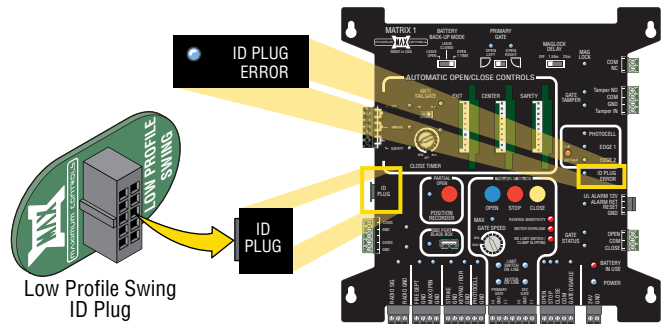


# MATRIX 1

## ID PLUG

AN **ID Plug** comes standard on Matrix 1. It identifies the type of gate operator and **MUST** be plugged in or the Matrix 1 **WILL NOT** function.

**ID PLUG ERROR LED:** Will light when ID PLUG is missing.

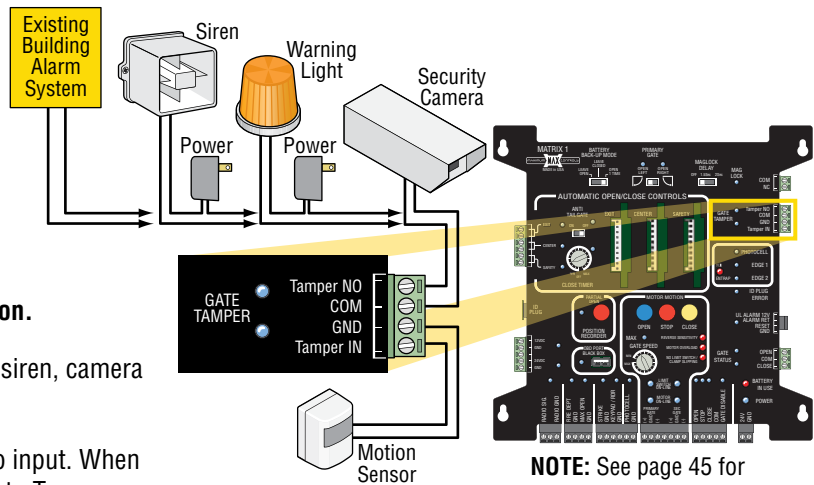


## GATE TAMPER

The **GATE TAMPER** can be used for various functions such as turning a warning light, siren or camera on when the gate is tampered with (Vandalized Gate). The gate operator defines a "Vandalized Gate" as **UNAUTHORIZED** movement of the gate. This can occur if the red release handle clamp is lifted and gate is manually moved from the **closed position** or the gate is forced open from the **closed position without authorization**.

**TAMPER NO/Com Relay:** Connect a warning light, siren, camera or an existing alarm system to relay.

**TAMPER IN/GND Input:** Connect a sensor device to input. When Tamper In/GND gets triggered, device that is wired to Tamper relay (NO/Com) will activate.



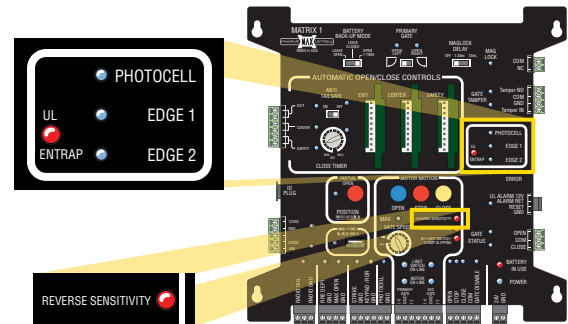
**NOTE:** See page 45 for more information about this unique feature.

## UL ENTRAPMENT LEDS

**UL ENTRAPMENT LEDS** will indicate when a **OPENING DIRECTION** Photocell and/or Sensing Edge(s) have been activated. If alarm gets triggered, press reset button on control box to turn alarm off.

**NOTE:** **UL safety approved devices** are wired to the MC-100 motor controllers **ONLY**. DO NOT wire them to the Matrix 1.

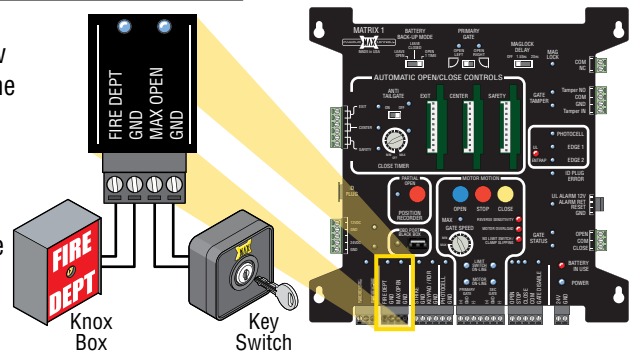
**REVERSE SENSITIVITY LED:** Will light when the gate encounters an obstruction triggering the ERD sensor.



## EMERGENCY VEHICLE/MAX OPEN INPUTS

**FIRE DEPT Input:** Should be connected to a knox box device to allow the proper authorities to gain emergency access when necessary. The input will override the **GATE DISABLE** input and allow **EMERGENCY** personnel **FULL 24/7** access. Gate fully opens.

**MAX OPEN Input:** Can be connected to a key switch and used as an **ADDITIONAL** input from the FIRE DEPT input. The input will override the **GATE DISABLE** input and allow **SECURITY** personnel **FULL 24/7** access. Gate fully opens.





# MATRIX 1

## GATE DISABLE

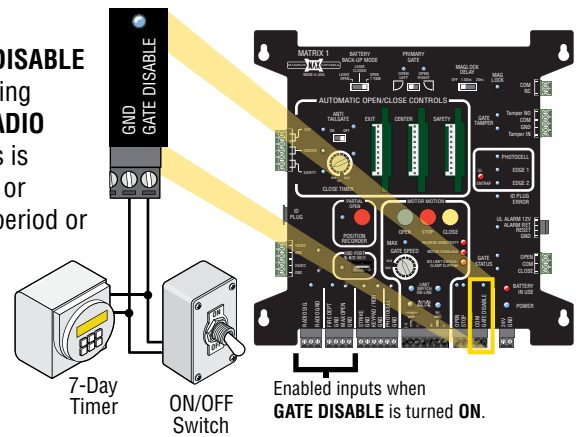
An ON/OFF switch or 7-Day timer devices can be connected to the **GATE DISABLE** input. When these devices are turned ON, they will **DISABLE** normal opening devices such as keypad, exit loop etc. The **FIRE DEPT/ MAX OPEN** and **RADIO** inputs will remain enabled when **GATE DISABLE** has been turned ON. This is useful when the gated area needs to be secured from ALL but emergency or authorized vehicle entry. Some examples are: Residential home vacation period or during closed hours of a business when no one can monitor the property.

**When GATE DISABLE is turned ON:** The operator will beep for **3 minutes BEFORE arming itself**. This allows time to turn ON **GATE DISABLE** and leave the property before it is armed.

**When FIRE DEPT/MAX OPEN gets activated:** Gate opens and **GATE TAMPER** relay will activate immediately.

**When RADIO Input gets activated:** Gate opens and **GATE TAMPER** relay will activate **after 3 min**. This allows time to turn OFF **GATE DISABLE** or disarm an existing building alarm system if connected.

**IMPORTANT:** It is **NOT** recommended activating the **GATE DISABLE device** while persons are present inside the property.



**NOTE:** See page 46 for more information about this unique feature.

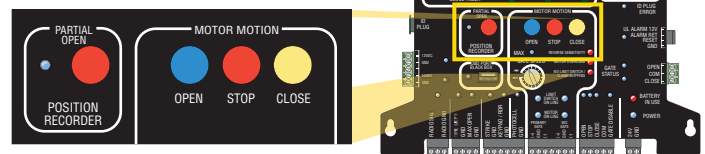
## PARTIAL OPEN

A gate can be set to partially open by recording the **PARTIAL OPEN** gate cycle. LED will stay lit when **PARTIAL OPEN** is ON.

**IMPORTANT:** Limit switches **MUST** be learned **BEFORE** Partial Open can be recorded.

To **RECORD** PARTIAL OPEN:

1. With gate in **CLOSED** position, press and release **PARTIAL OPEN** button to START recording. Blue LED starts flashing.
2. Press 3-button station **OPEN** button to start gate's open cycle.
3. Press 3-button station **STOP** button when gate is in desired partial open position (Beyond center loop).
4. Press **PARTIAL OPEN** button AGAIN to STOP recording. Blue LED stops flashing, open position has been recorded. LED remains **ON**.

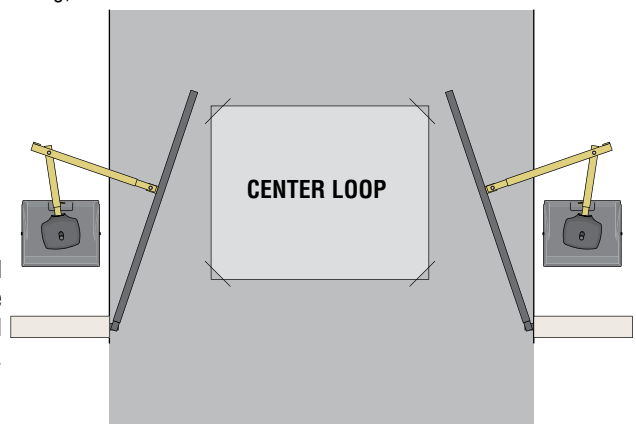


To **ERASE** PARTIAL OPEN recording:

Press and **HOLD PARTIAL OPEN** button for 5 sec. LED turns **OFF**.

**NOTE:** The **FIRE DEPT** and/or **MAX OPEN** connected devices will always **FULLY** open gates even when the partial open is being used.

**CAUTION:** Gates partial **OPEN** position **MUST** be outside the Center Loop when in-ground loops have been installed.



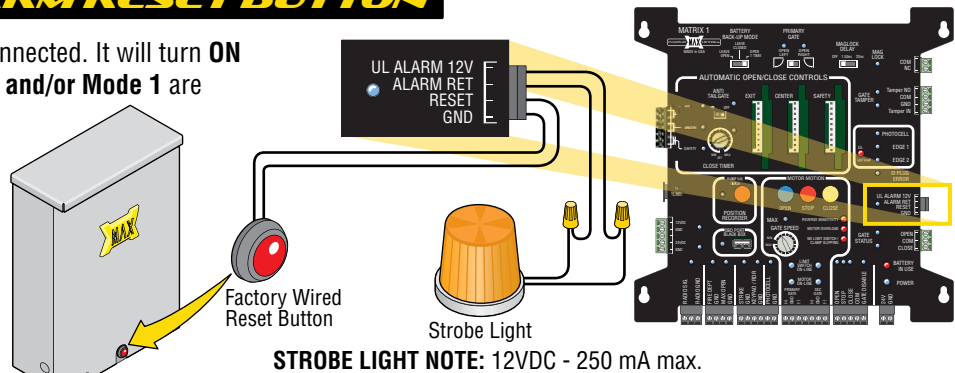
# MATRIX 1

## UL ALARM / ALARM RESET BUTTON

A **UL ALARM** (strobe light) can be connected. It will turn **ON** when the **GATE IN MOTION - Mode 0 and/or Mode 1** are turned **ON** (see page 30).

Press **RESET BUTTON** to turn **OFF** activated strobe light.

Press **RESET BUTTON** to turn **OFF** an activated alarm.



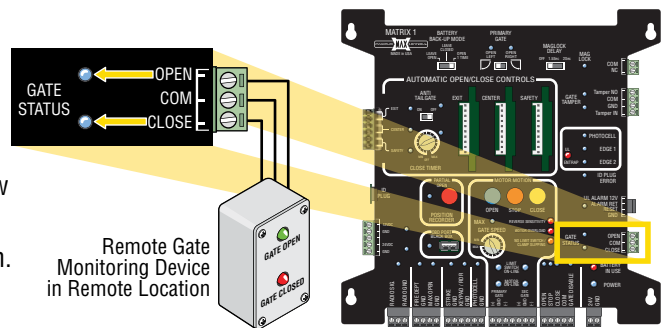
## GATE STATUS MONITORING

**GATE STATUS** LEDs will turn **ON** when gate is in the **OPEN** or **CLOSED** position.

Connect a gate monitoring device to **GATE STATUS** relays to show if gate is in the **OPEN** or **CLOSED** position.

**OPEN/COM Relay:** Activates when gate gets to the **OPEN** position.

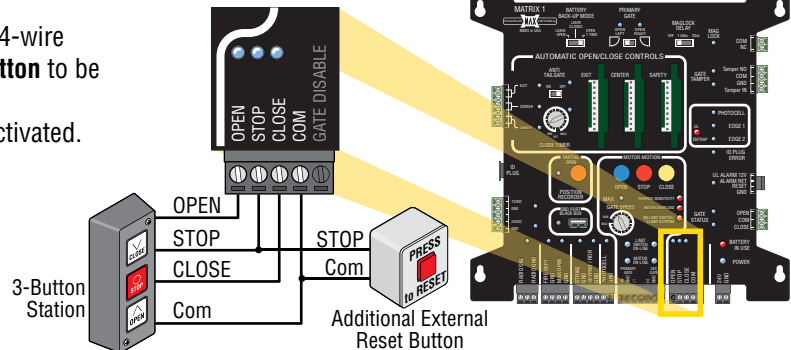
**CLOSE/COM Relay:** Activates when gate gets to the **CLOSED** position.



## OPEN / STOP / CLOSE CONNECTION

The **OPEN/STOP/CLOSE** inputs will allow a standard 4-wire **3-Button Station** or an additional **External RESET Button** to be connected.

Corresponding LEDs will light when each button is activated.

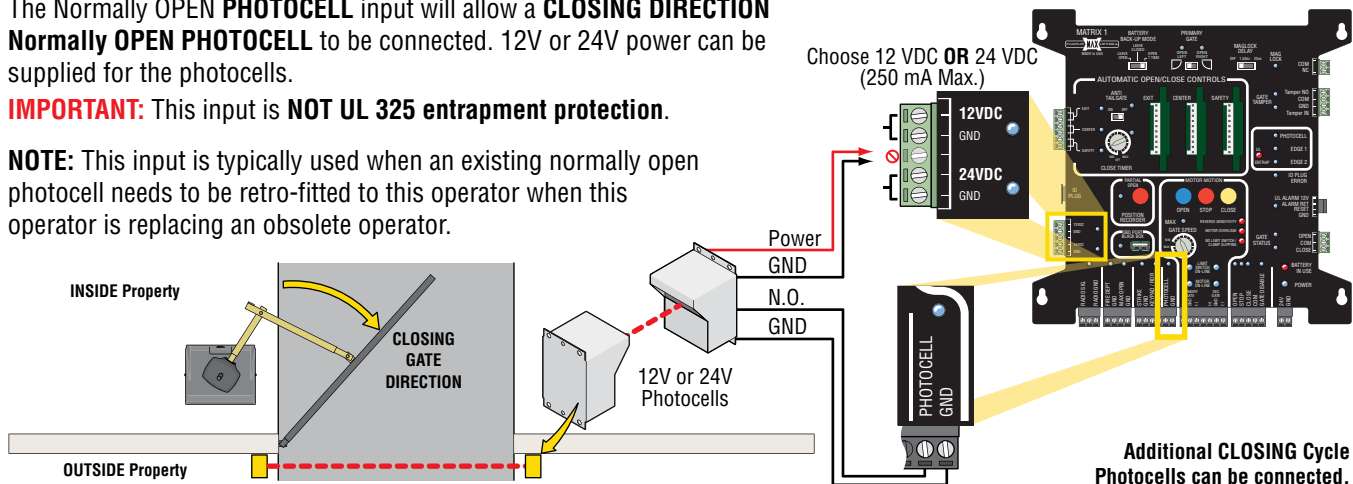


## CLOSING PHOTOCELL CONNECTION

The Normally **OPEN PHOTOCELL** input will allow a **CLOSING DIRECTION Normally OPEN PHOTOCELL** to be connected. 12V or 24V power can be supplied for the photocells.

**IMPORTANT:** This input is **NOT UL 325 entrapment protection**.

**NOTE:** This input is typically used when an existing normally open photocell needs to be retro-fitted to this operator when this operator is replacing an obsolete operator.



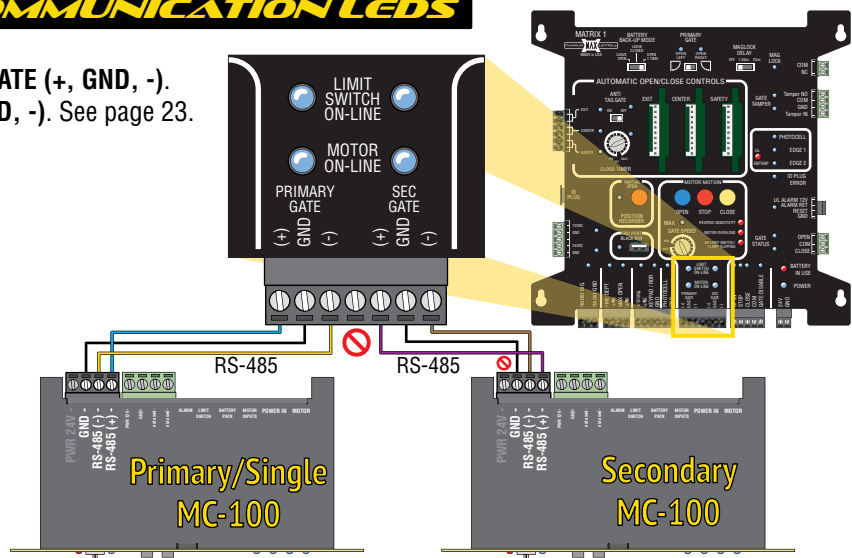
# MATRIX 1

## GATE OPERATORS COMMUNICATION LEDS

**PRIMARY/SINGLE** operator to the **PRIMARY GATE (+, GND, -)**.  
**SECONDARY** operator to the **SEC GATE (+, GND, -)**. See page 23.

**LIMIT SWITCH ON-LINE LEDs:** will light for each gate operator's **limit switch** that the **Matrix 1** is successfully communicating with.

**MOTOR ON-LINE LEDs:** will light for each gate operator's **MC-100 Motor Controller** that the **Matrix 1** is successfully communicating with.

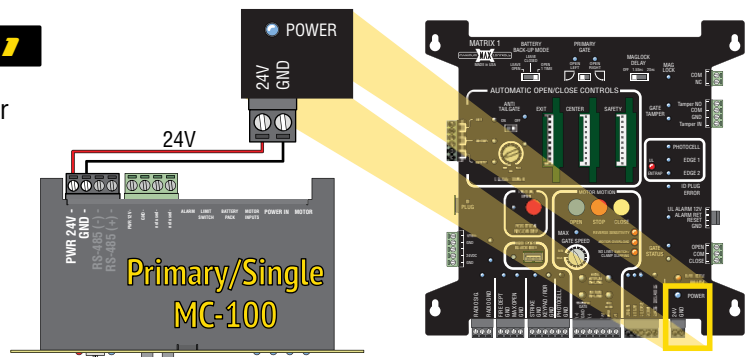


## 24V POWER FOR MATRIX 1

Connect **24VDC POWER** from **PRIMARY/SINGLE** operator **ONLY**. See page 23.

**POWER LED:** Will light when 24V low voltage power is connected.

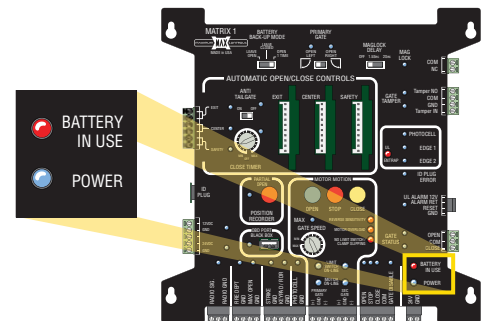
**NOTE: DO NOT** power any external devices using this connection. This power is reserved for Matrix 1 **ONLY**.



## BATTERY IN USE LED

**BATTERY IN USE LED** will light when operator is using **ONLY** battery back-up power. The **GATE IN MOTION Alarm** can be set up to sound alarm when operator is using **ONLY** battery power **DURING** gate cycling. This brings to attention that only battery power is being used and **NOT** normal AC power. See page 30.

**LED Flashing NOTE:** **BATTERY IN USE** and **POWER** LEDs flash together when the battery is not plugged into the BATTERY IN port of the MAX BC-7 Battery Module. Make sure battery plug is correctly installed and there is no damaged or loose wires.



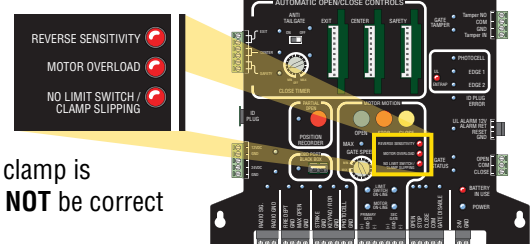
## MOTOR MOTION LEDS

**REVERSE SENSITIVITY LED:** Will light when the gate encounters an obstruction triggering the ERD sensor.

**MOTOR OVERLOAD LED:** Will light when excessive current is being drawn by motor caused by damaged gate hardware or gate is too heavy.

**NO LIMIT SWITCH/CLAMP SLIPPING LED:** Will light when either limit switch does **NOT** activate from it's learned positions.

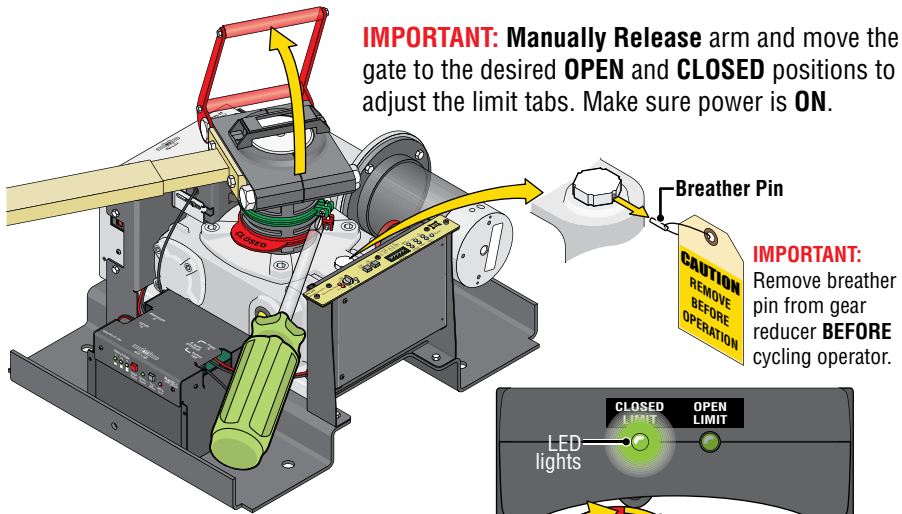
**NO LIMIT SWITCH/CLAMP SLIPPING LED:** Will light when the release handle clamp is slipping on the output shaft. The learned gate **OPEN** and **CLOSE** positions will **NOT** be correct when the limit tabs keep changing position.



# ADJUSTMENTS

## OPEN AND CLOSE LIMITS

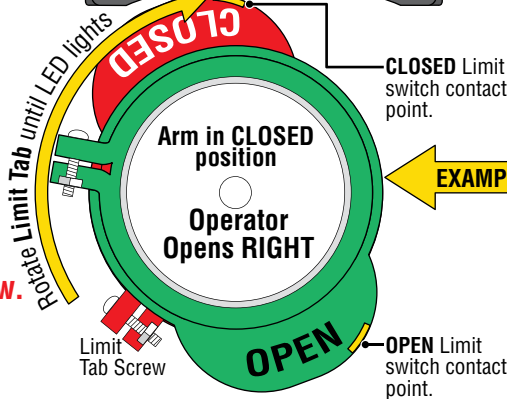
The limit tabs need to be set **BEFORE** the gate can be cycled or **DAMAGE** could occur.



## ADJUST LIMITS:

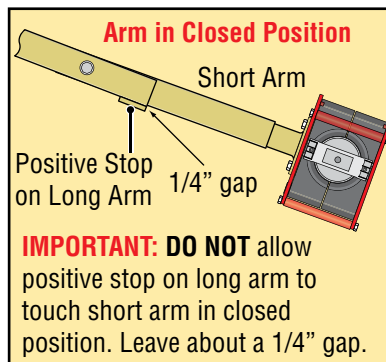
### Manually Release Arm

1. Move gate to **OPEN** position.
2. Loosen open limit tab screw.
3. Rotate open limit tab until open LED lights.
4. **TIGHTEN open limit tab screw.**
5. Move gate to **CLOSED** position.
6. Loosen closed limit tab screw.
7. Rotate closed limit tab until closed LED lights.
8. **TIGHTEN closed limit tab screw.**

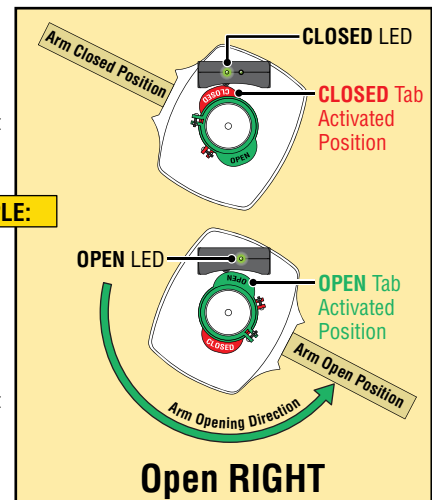
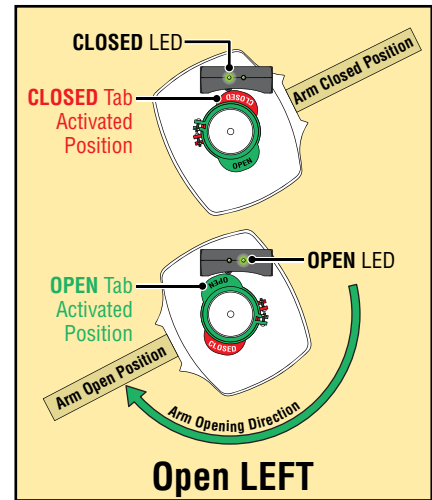


## CAUTION

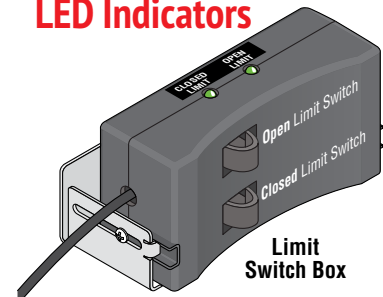
Make sure **OPEN/CLOSE** limit rings are tightened after adjustment or slippage could occur.



Approximate **OPEN** and **CLOSED** limit tab positions.



## LED Indicators

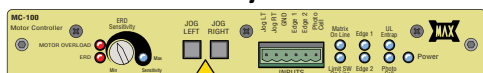


**IMPORTANT:** LEDs **MUST** light up when gate reaches **OPEN** and **CLOSE** positions or operator **WILL NOT** learn gate positions. If gate positions are not learned, gate cycling speed will **remain** slow during normal operation.

**IMPORTANT:** Manually Secure Arm (see page 37)

Cycle the gate **OPEN** and **CLOSED** after the limit tabs have been set **AND** the arm is **SECURE**. Operator will cycle slowly to **LEARN** the **open** and **closed** gate positions. After the operator learns the gate positions, it will cycle at the **GATE SPEED** selected for normal operation.

### "Fine Tune" Limits Adjustment



Push and **HOLD** the **JOG LEFT** or **JOG RIGHT** buttons accordingly on the **MAX MC-100** motor controller to move the gate (release the button to stop gate). This allows gate to be moved back and forth without leaving the operator to "fine tune" the open and close gate positions if desired.

**WARNING:** Avoid the moving arm while "Fine Tune" adjusting.

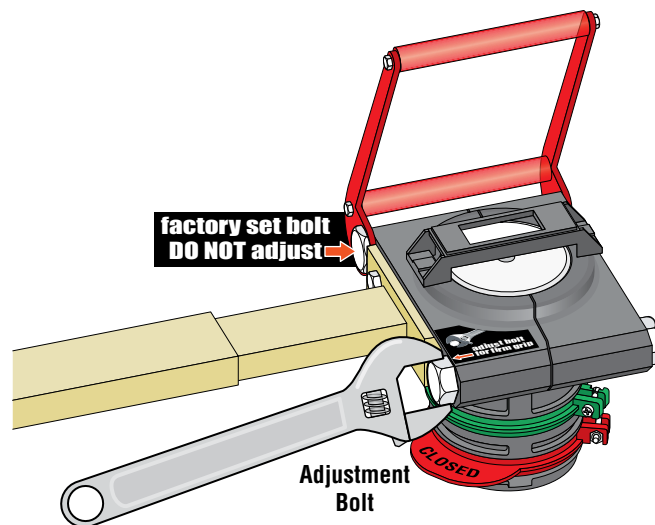
# ADJUSTMENTS

## RELEASE HANDLE CLAMP

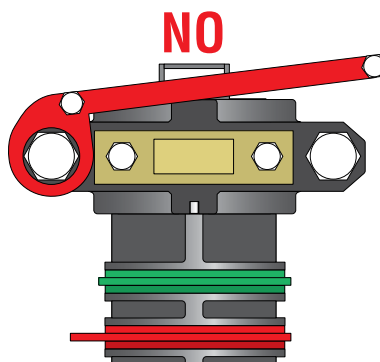
### Adjustment:

Tighten the Adjustment bolt until desired result is achieved. The release handle clamp has been factory adjusted and **SHOULD NOT** need any adjustment.

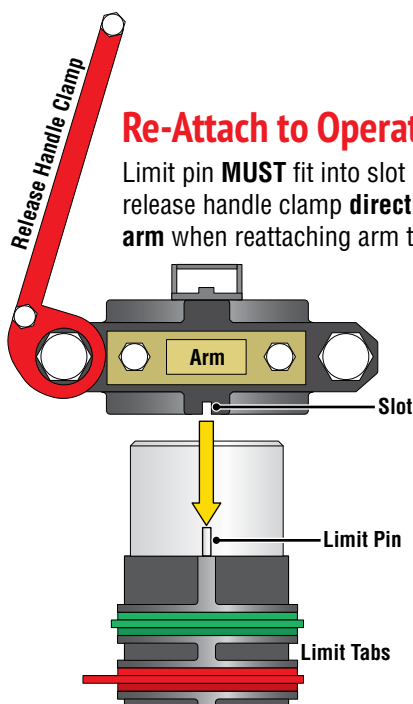
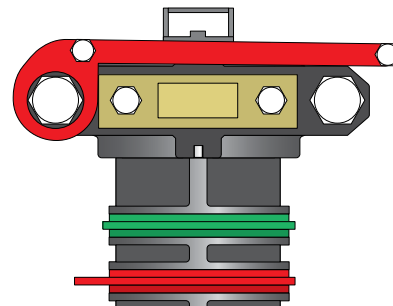
**IMPORTANT:** The red handle **MUST BE FIRMLY** secure in the **HORIZONTAL** position.



**IMPORTANT:** The arm **MUST NOT** slip when the gate is cycling or the gate **OPEN** and **CLOSE** limit positions will **NOT** be **LEARNED**. Gate speed will remain slow if gate positions are **NOT** learned.

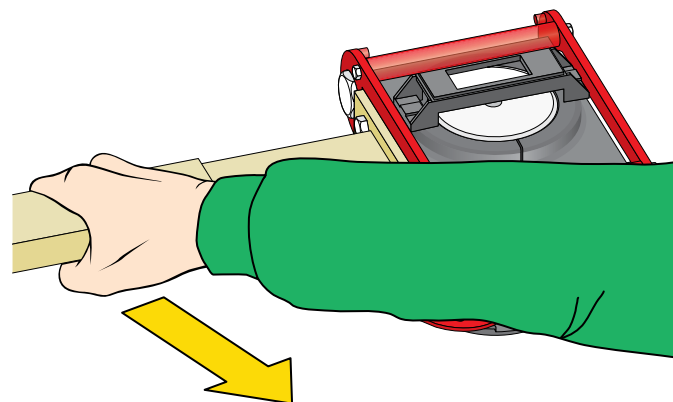


Release Handle Clamp **MUST** be **HORIZONTAL** when **FIRMLY** secured.



### Re-Attach to Operator:

Limit pin **MUST** fit into slot in bottom of release handle clamp **directly under the arm** when reattaching arm to operator.



**After Release Handle Clamp is in the SECURE HORIZONTAL position:**

Pull the arm. **NO** slippage should occur. If it does, readjust.

**NOTE:** When limit tabs are already set and the release handle is put back in the secure position but the gate is **NOT** in the full open or close position, the operator will **automatically** re-align the gate's open and close tabs. **No readjustment is necessary.**



# ADJUSTMENTS

## REVERSE SENSOR (ERD)

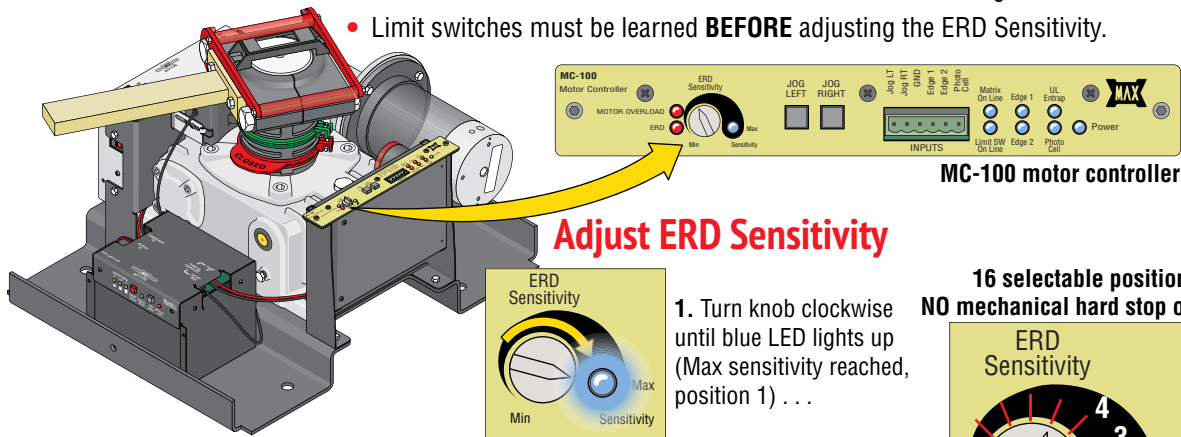
The Phantom 2000 is equipped with an **ERD Sensor - Electronic Reversing Device** (Type A) that functions as entrapment protection according to UL 325 standards. **The gate will reverse direction after encountering an obstruction in either the OPEN or CLOSE gate cycle.**

When the gate encounters an obstruction during the **CLOSE** cycle, it will reverse to the open position and **PAUSE** the gate. An input command (press remote button or exit loop) is needed **BEFORE** the gate will reset and close again.

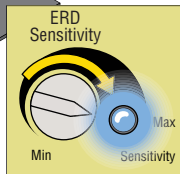
When the gate encounters an obstruction during the **OPEN** cycle, it will reverse approximately 6 inches and **PAUSE** the gate. An input command (press remote button or exit loop) is needed **BEFORE** the gate will reset and open again.

For the **ERD Sensitivity** to function correctly:

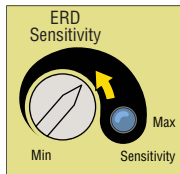
- **THE RELEASE HANDLE CLAMP MUST NOT SLIP** when the gate encounters an obstruction.
- Limit switches must be learned **BEFORE** adjusting the ERD Sensitivity.



### Adjust ERD Sensitivity

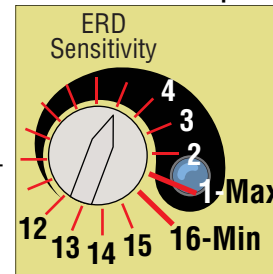


1. Turn knob clockwise until blue LED lights up (Max sensitivity reached, position 1) . . .



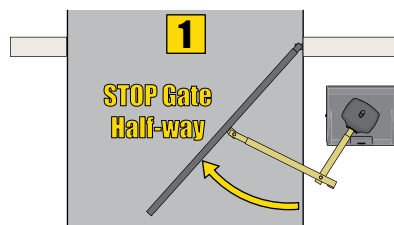
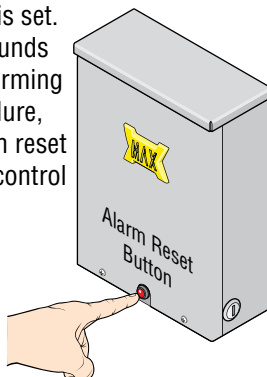
2. Turn knob counter-clockwise to reduce sensitivity during testing as needed (LED will turn OFF at any position but 1).

16 selectable positions  
NO mechanical hard stop on knob

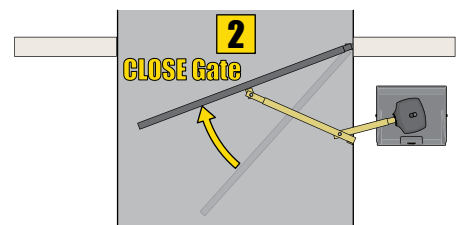


### Test ERD Sensitivity

Allow the gate to strike an immobile object while **OPENING** and **CLOSING**. The gate **MUST** reverse direction after striking the object. If it does not, increase the **ERD Sensitivity**. Repeat this process until the correct sensitivity is set. If alarm sounds while performing this procedure, press alarm reset button on control box.



Position gate half-way open and **STOP** gate. This gate position will put the most amount of resistance on the ERD sensor when gate cycles.



**CLOSE** gate. If ERD sensor triggers, reduce sensitivity. If sensor does **NOT** trigger, sensitivity is set correctly.

### "Min" ERD Position 16 Setting

When solid gates are installed in:

- Unusually high wind areas
- Uphill opening gate
- Heavy gate

ERD sensor can be set to **Min** (position 16) to keep the gate cycling normally in such extreme conditions.

**CAUTION:** Minimum sensitivity setting (position 16) results in gate exerting **MAXIMUM force** before reversing direction.

**IMPORTANT:** When satisfied with ERD adjustment, cycle the gate 3 or 4 times to make sure that the ERD sensor does not **falsely trigger** during normal gate operation. Readjust if this happens.



# MAINTENANCE

## **QUALIFIED GATE OPERATOR TECHNICIAN**

Maintenance and repair of the gate operator must be preformed by a qualified professional gate operator technician.

The following services need to be periodically performed:

- Check and adjust the gate operator's force, speed, and sensitivity.
- Make sure all power (AC/DC) connections are corrosion free.
- Check all batteries for proper voltage.
- Check the incoming line voltage and confirm it is within 10% of its rating (115 or 230 volts).
- Verify battery backup functionality by turning off the power source (115 VAC and 230 VAC). Restore power after testing.
- Cycle gate system and lubricate with heavy-duty, high-performance lubricant where needed.
- Test all contact and non-contact sensors, in-ground vehicle loop detectors, keypad, telephone entry system or any other access control devices that are used to control the gate operator.
- Test the manual release feature.

MAKE SURE END USER/HOME OWNER KNOWS HOW TO PROPERLY REMOVE GATE OPERATOR FROM SERVICE AND WHO TO CONTACT FOR PROFESSIONAL ASSISTANCE.

Date Installed: \_\_\_\_\_

Installer/Company Name: \_\_\_\_\_

\_\_\_\_\_

Phone Number: \_\_\_\_\_

Operator

Serial Number: \_\_\_\_\_

## **END USER / HOMEOWNER**

Any repairs and modifications must be preformed by a qualified professional gate operator technician. If the gate or gate operator ever malfunctions, end user/home owner needs to immediately remove the gate operator from service (manually position gate (see manual release) in a desired prolonged position and turn ALL power OFF to the gate operator). End user/home owner must call a qualified professional gate operator technician for any repairs and modifications.

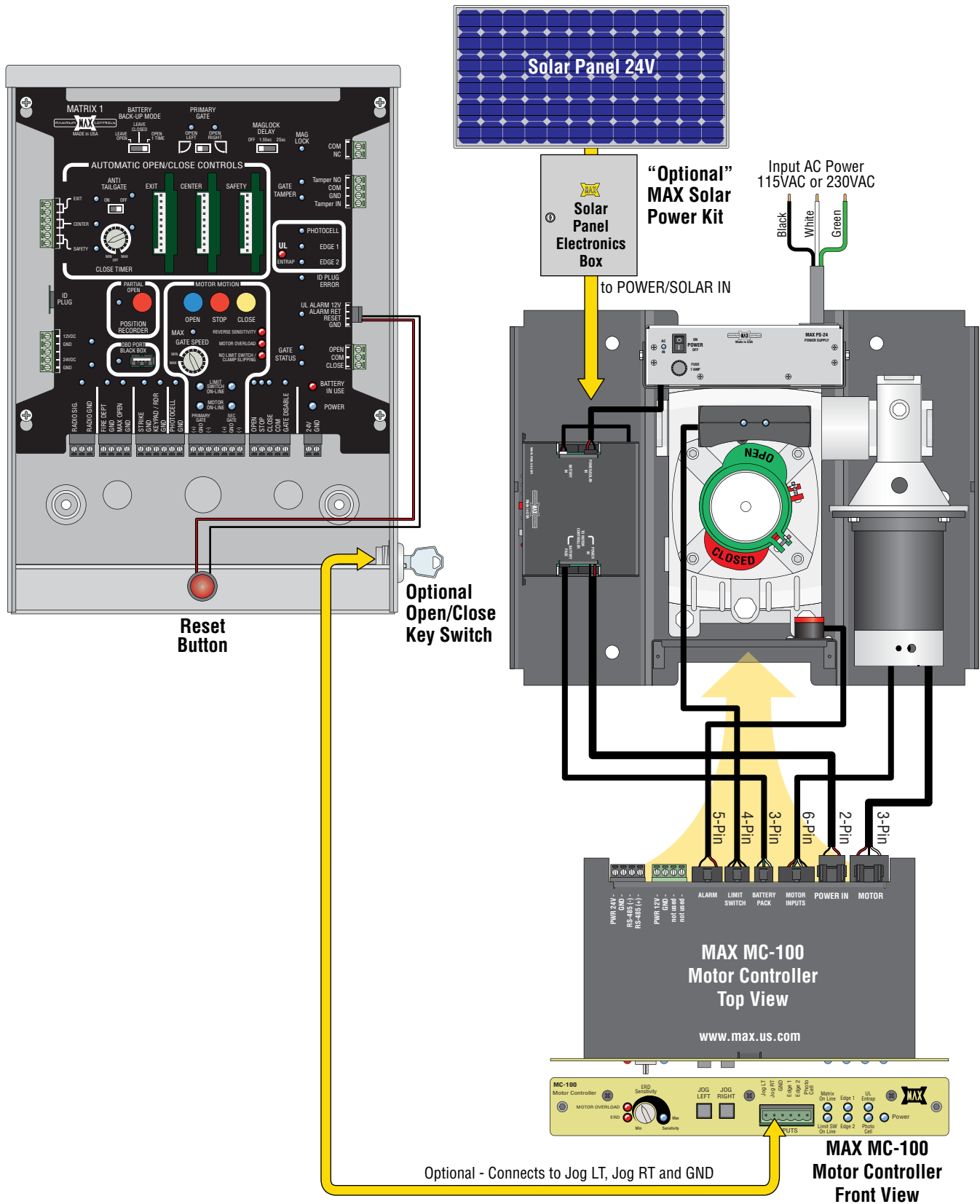
The gate operator is virtually maintenance free to an end user/home owner, minimal maintenance is recommended to ensure reliable operation.

End user/home owner:

- Scheduled maintenance should be performed approximately every six months by a qualified professional gate operator technician, or when unusual noises are heard from the gate hinges and/or gate operator arm.
- DO NOT remove the operator cover to perform any normal maintenance.
- Lubricate gate hinges and gate operator arm periodically with heavy-duty, high-performance lubricant and clean up all excess lubricant.
- Make sure there are no vehicles or pedestrians in the path of the gate while performing maintenance.
- Make sure the person performing maintenance is the only person in control of all control devices in order to avoid possible involuntary activation of the gate operator. Gate operator MUST be removed from service while maintenance is performed.
- Keep any water from landscape watering hoses or sprinkler systems away from the gate and gate operator area.
- Keep the area around the gate and gate operator as clean as possible.
- Keep any debris away from the gate's swinging path.
- Test periodically (use caution) all safety sensors, in-ground vehicle loop detectors, keypad, telephone entry system or any other access control devices that are used to control the gate operator. Make sure everything is working properly.
- Solar panel must be cleaned periodically if solar power is being used.

# MAINTENANCE

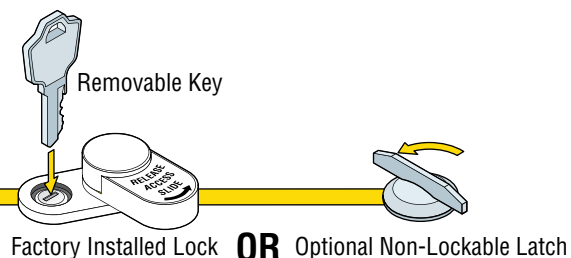
## PHANTOM 2000 WIRING SCHEMATIC



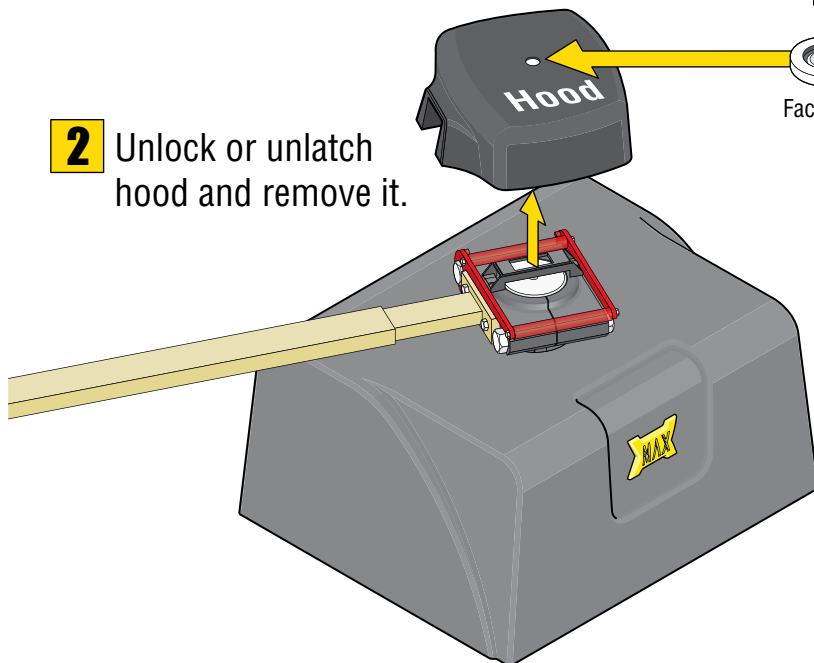
# MAINTENANCE

## MANUAL GATE RELEASE

- 1** Make sure **ALL** power is **OFF** to operator.

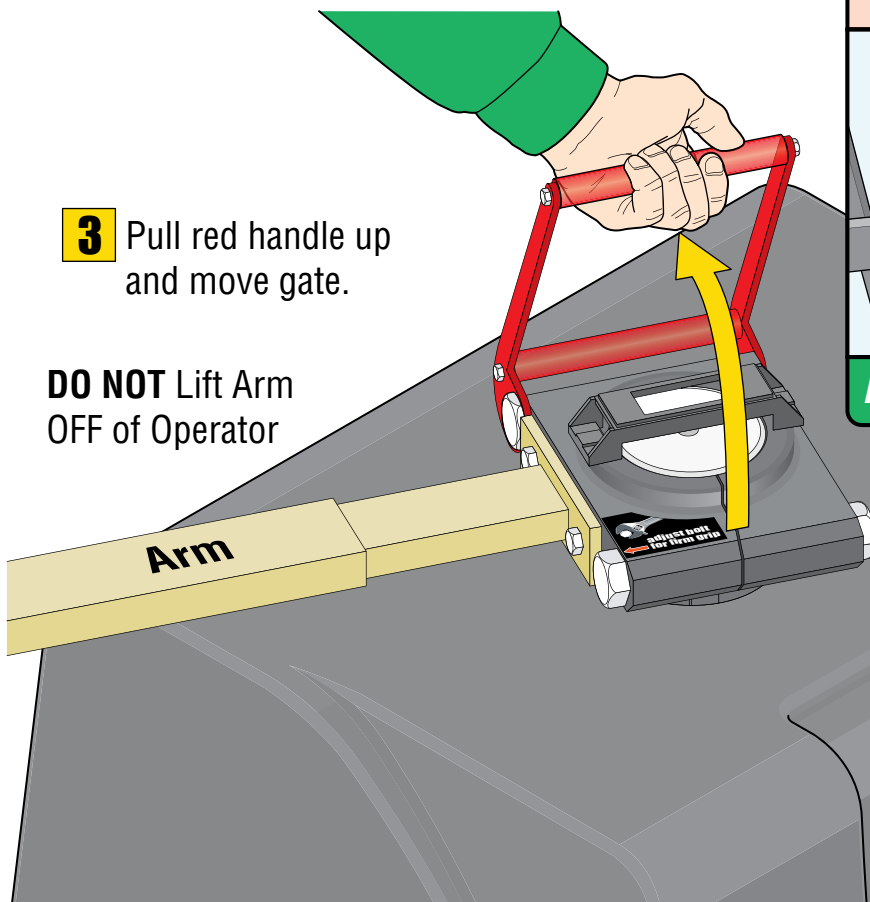


- 2** Unlock or unlatch hood and remove it.

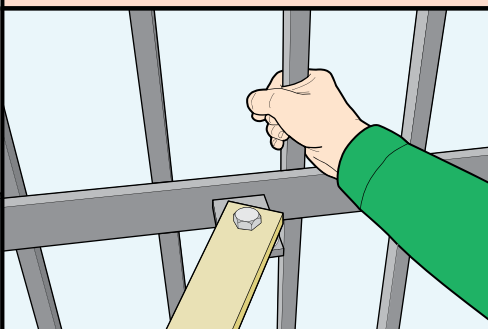
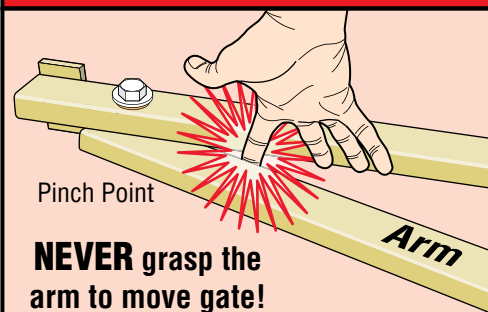


- 3** Pull red handle up and move gate.

**DO NOT** Lift Arm  
OFF of Operator



## WARNING



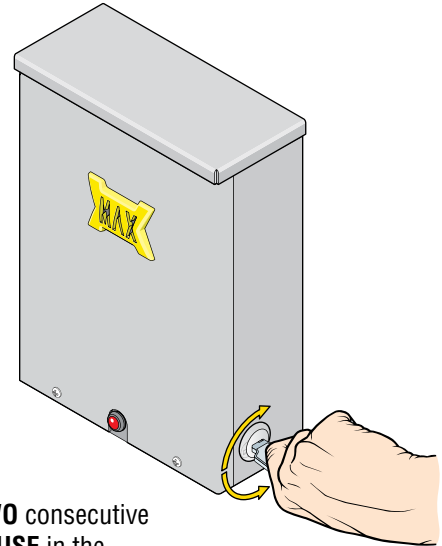
# MAINTENANCE

## ELECTRONIC GATE OPEN / CLOSE

The **OPTIONAL** key switch can open or close the gate electronically if the switch has been wired to the gate operator.

Insert key on control box, turn and **HOLD** (in either direction) to **MOVE** gate.

**CAUTION:** Keep pedestrians and vehicles clear of the gate while it is moving.



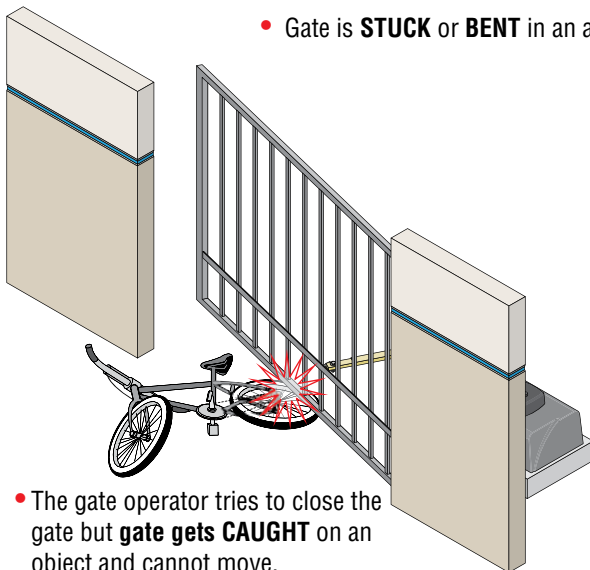
## AUDIBLE ALARM

**If the Alarm Sounds During Normal Gate Operation:** When the gate encounters **TWO** consecutive obstructions before completing a gate cycle, the alarm will sound and the gate will **PAUSE** in the position where the second obstruction occurred. **CHECK THE GATE AREA FOR ANY PROBLEMS BEFORE** pressing the alarm reset button on the control box to shut off the alarm and reset the gate. **NOTE:** Alarm will automatically shut-off after five minutes but **will not allow** gate to operate until the **alarm reset button** is pressed.

### Some reasons why the alarm sounds:

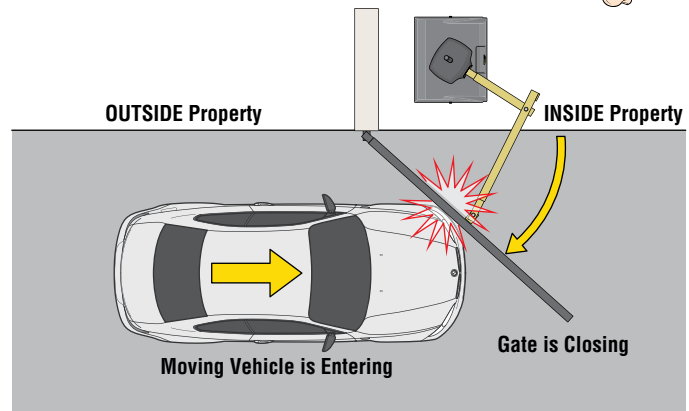
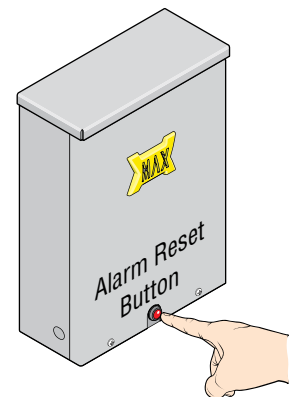


- **HINGES** are **TOO TIGHT** or **BROKEN**, gate **CANNOT** move freely.
- Gate is **STUCK** or **BENT** in an awkward position.



- The gate operator tries to close the gate but **gate gets CAUGHT** on an object and cannot move.

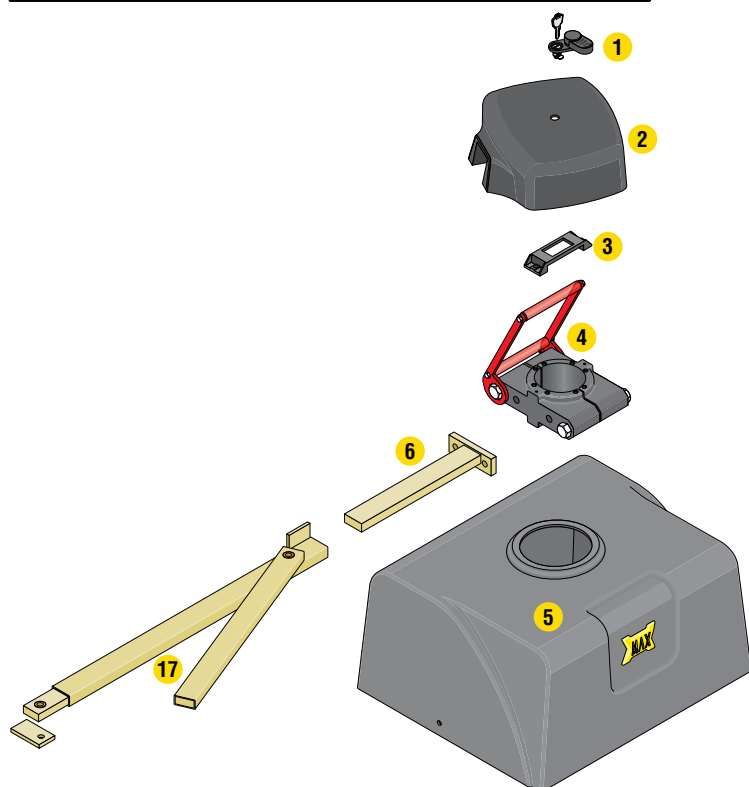
- A **FOREIGN OBJECT** is on the gate frame while the gate is moving.
- The gate is **TOO HEAVY**.



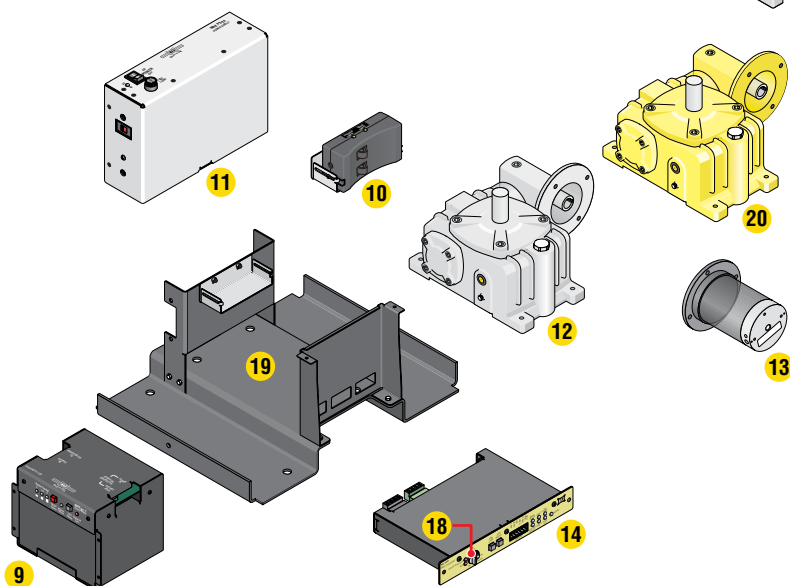
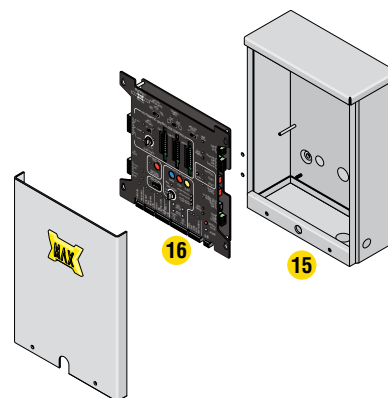
- The moving gate gets **PUSHED** by a moving **VEHICLE**.

# MAINTENANCE

## REPLACEMENT PARTS LIST



Item	Description
1	Camlock Assembly with cover and key
2	Plastic Hood
3	Hood Latch Bracket
4	Output Clamp Assembly
5	Operator cover with nameplate
6	Swing arm T-Bar
7	Output collar and rings
8	Output Shaft
9	7Ah Battery Module
10	Limit Switch Assembly
11	Power Supply Assembly
12	Double Gear Box Gray (2000)
13	DC Brushless Motor
14	MC-100 Motor Controller Assembly
15	External Control Box Cabinet
16	Matrix 1 Control Board Assembly
17	Swing Arm Assembly
18	Rotary Knob Actuator
19	Chassis
20	Double Gear Box Yellow (FAST)



# PHANTOM 2000 WARRANTY

Maximum Controls LLC (“Manufacture”) warrants the original purchaser of this product, for the purpose to which this product is originally installed, that the product is free from defect in materials and/or workmanship for a period of 8 years for the Brushless DC Motor and cover, 5 years for everything else with the exception of the batteries which are limited to a 1 year warranty. The performance of this product is dependent on compliance to the instructions, maintenance, operation, and testing clearly outlined in the user manual. Failure to comply completely with those instructions will void this warranty in its entirety. This warranty does not cover damage to the product caused by vandalism, water damage, direct hit lightning strike, or installation errors. This warranty does not include any labor charges that might be needed to troubleshoot, replace, or repair a problem.

If, during the limited warranty period, one of the components exhibits a defect in material and/or workmanship, please call 949-699-0220 before dismantling the product. Shipping instructions and an RMA (Return Material Authorization) Number will be issued by the factory service center when contacted. Do not send any product in for service without an RMA number. Shipping charges to and from the factory service center for warranty repairs are the responsibility of the customer. Repair or replacement of any warranty items is made at the sole discretion of the Manufacturer.

ALL IMPLIED WARRANTIES FOR THE PRODUCT, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY AND SUITABILITY FOR A PARTICULAR PURPOSE, ARE LIMITED TO 8 YEARS FOR THE BRUSHLESS MOTOR DC AND COVER, 5 YEARS FOR EVERYTHING ELSE WITH THE EXCEPTION OF THE BATTERIES WHICH ARE 1 YEAR. NO IMPLIED WARRANTIES WILL EXTEND BEYOND THE WARRANTIES LISTED ABOVE. Some states do not allow limitations on how long an implied warranty last so this limitation might not apply to you.

This Limited warranty does not cover any problems with or relating to, the gate, the gate hardware, including but not limited to hinges, rollers, brackets, entry devices etc. Any service call that determines the cause of a problem to be external to the product could result in a fee. Under no circumstances shall the manufacture be liable for consequential, incidental or special damages arising in connection with the use, or inability to use, this product. Under no circumstances will the Manufacture’s liability for breach of warranty, breach of contract, negligence or strict liability exceed the cost of the product covered other liability in connection with the sale of this product.

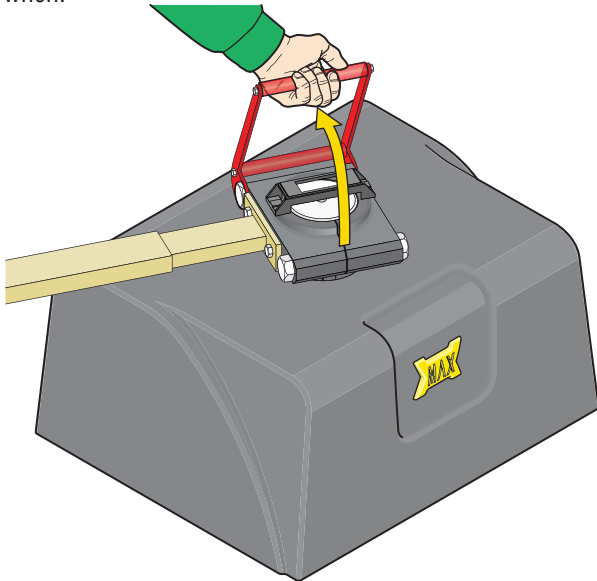


## PHANTOM OPTIONS / UNIQUE FEATURES

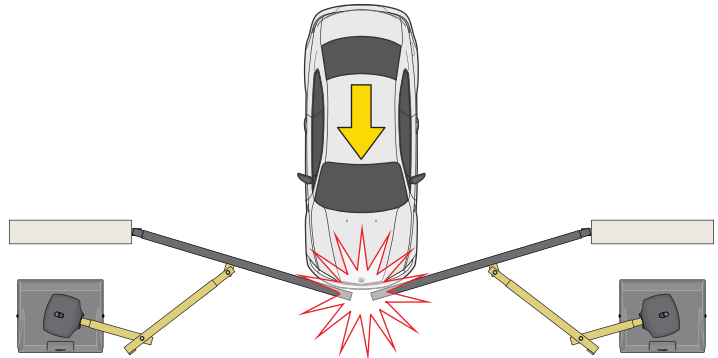
**“Like NO other Gate Operator in the World”**

### **GATE TAMPER FEATURE**

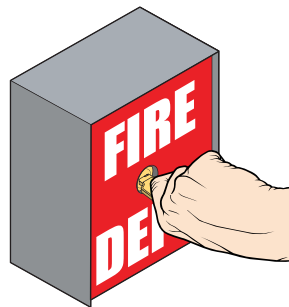
The **GATE TAMPER** feature will activate the relay when a number of security circumstances occur, making illegal entry almost impossible when the gate operator is connected to a existing building/home alarm system. The **GATE TAMPER** relay will activate when:



The red release handle clamp is lifted and the gate is pushed open from the **closed position without authorization**.

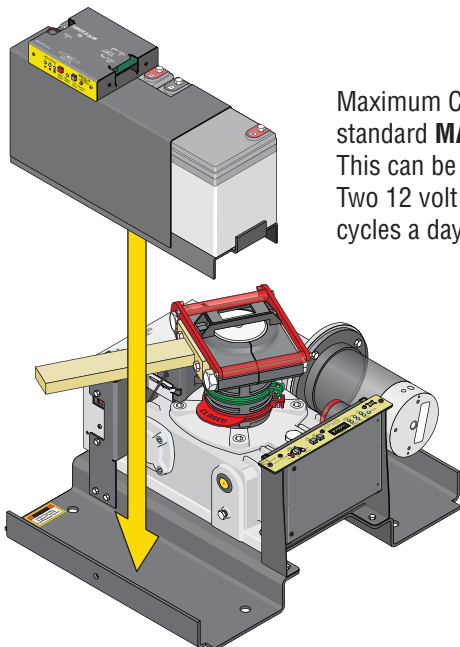


The gate is **PHYSICALLY** moved from the **closed position** with **EXTREME** force.



The FIRE switch is turned **ONLY** if the **GATE DISABLE** has been turned ON.

### **MAX BC-36 PHANTOM BATTERY MODULE - OPTIONAL**



Maximum Controls offers a **MAX BC-36 Phantom Battery Module** that replaces the standard **MAX BC-7 Battery Module** when more battery power **ONLY** will be used. This can be used with the **OPTIONAL** MAX solar power kit for the gate operator. Two 12 volt 36 Amp/Hr batteries supply plenty of power to operate up to 2000 gate cycles a day using only battery power. (your performance might vary)

# PHANTOM OPTIONS / UNIQUE FEATURES

**“Like NO other Gate Operator in the World”**

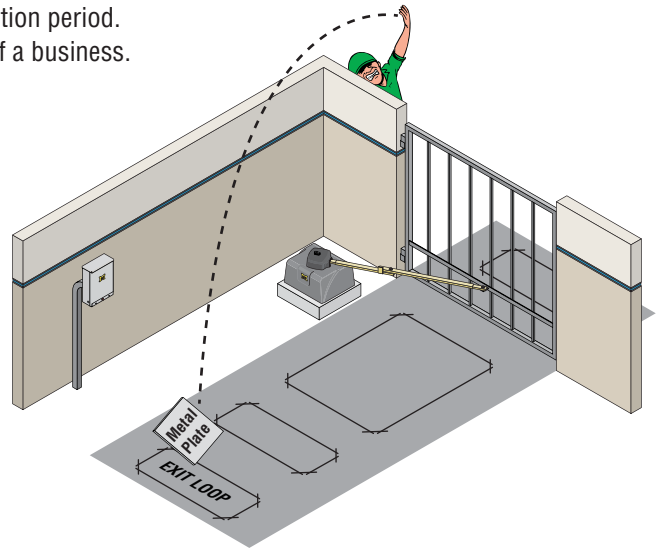
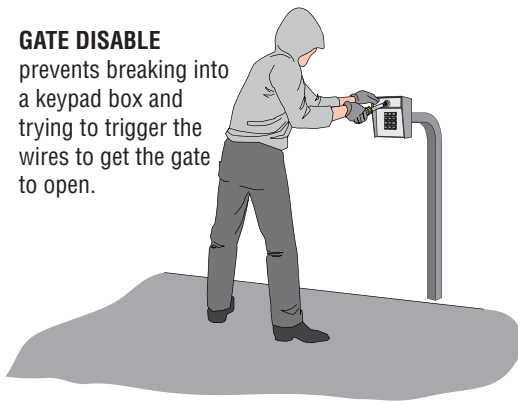
## GATE DISABLE FEATURE

This unique **GATE DISABLE** feature is useful when the gated area needs to be secured from **ALL** but emergency and/or authorized vehicle entry. Some examples are:

- Residential home vacation period.
- During closed hours of a business.

The **GATE DISABLE** feature will allow the FIRE DEPT/MAX and RADIO inputs to operate but nothing else. It helps with some major security problems that can occur when no one is available to monitor the property.

**GATE DISABLE** prevents breaking into a keypad box and trying to trigger the wires to get the gate to open.



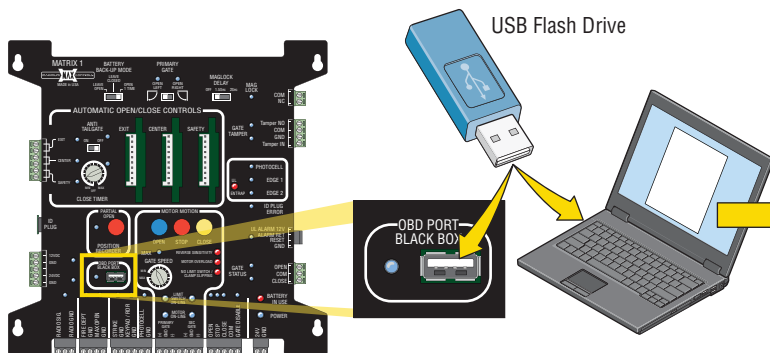
**GATE DISABLE** prevents trying to trigger the exit loop to get the gate to open.

**IMPORTANT:** It is **NOT** recommended activating **GATE DISABLE** while persons are present inside the property.

## EVENT HISTORY DOWNLOAD

This unique **EVENT HISTORY** feature has an On Board Diagnostics (OBD) port to download a simple .txt file to troubleshoot gate operator errors and to view normal transaction logs. This file will log intermittent problems with the gate operator that can be difficult to solve. This file can even be e-mailed to the factory from out in the field at the job site for additional technical support if necessary.

The event history can store up to 1000 transactions.



## Event History Text Document Sample

Event type clarification:

**INFO:** informational message only

**WARNING:** unusual event but doesn't cause system malfunction

**ERROR:** abnormal event, could cause system malfunction

**ENTRAP:** entrapment detection event

Event Report:

Fri 07/11/2014 10:59:41	INFO : Cycle Counter
Fri 07/11/2014 10:59:41	<b>ENTRAP : SEC_MC: First ERD Detected</b>
Fri 07/11/2014 10:59:37	INFO : Radio Input Deactivated
Fri 07/11/2014 10:59:36	INFO : Radio Input Activated
Fri 07/11/2014 10:58:54	INFO : PRI_MC: Fully Open Position Learned
Fri 07/11/2014 10:58:53	INFO : SEC_MC: Fully Open Position Learned
Fri 07/11/2014 10:57:40	INFO : PRI_CIO: Communication Established
Fri 07/11/2014 10:57:38	<b>ENTRAP : PRI_MC: Photo Cell Deactivated</b>
Fri 07/11/2014 10:57:34	<b>ENTRAP : PRI_MC: Photo Cell Activated</b>
Fri 07/11/2014 10:57:21	INFO : Radio Input Deactivated
Fri 07/11/2014 10:57:21	INFO : Radio Input Activated
Fri 07/11/2014 10:56:46	<b>WARNING: PRI_MC: Tamper Reported</b>
Fri 07/11/2014 10:56:36	INFO : SEC_MC: Fully Open Position Unknown
Fri 07/11/2014 10:56:36	INFO : PRI_MC: Fully Open Position Unknown
Fri 07/11/2014 10:56:36	<b>WARNING: PRI_MC: Tamper Reported</b>
Fri 07/11/2014 10:56:33	ENTRAP : PRI_MC: Photo Cell Deactivated
Fri 07/11/2014 10:56:33	ENTRAP : PRI_MC: Photo Cell Activated
Fri 07/11/2014 10:56:33	ENTRAP : PRI_MC: Photo Cell Deactivated
Fri 07/11/2014 10:56:33	ENTRAP : PRI_MC: Photo Cell Activated







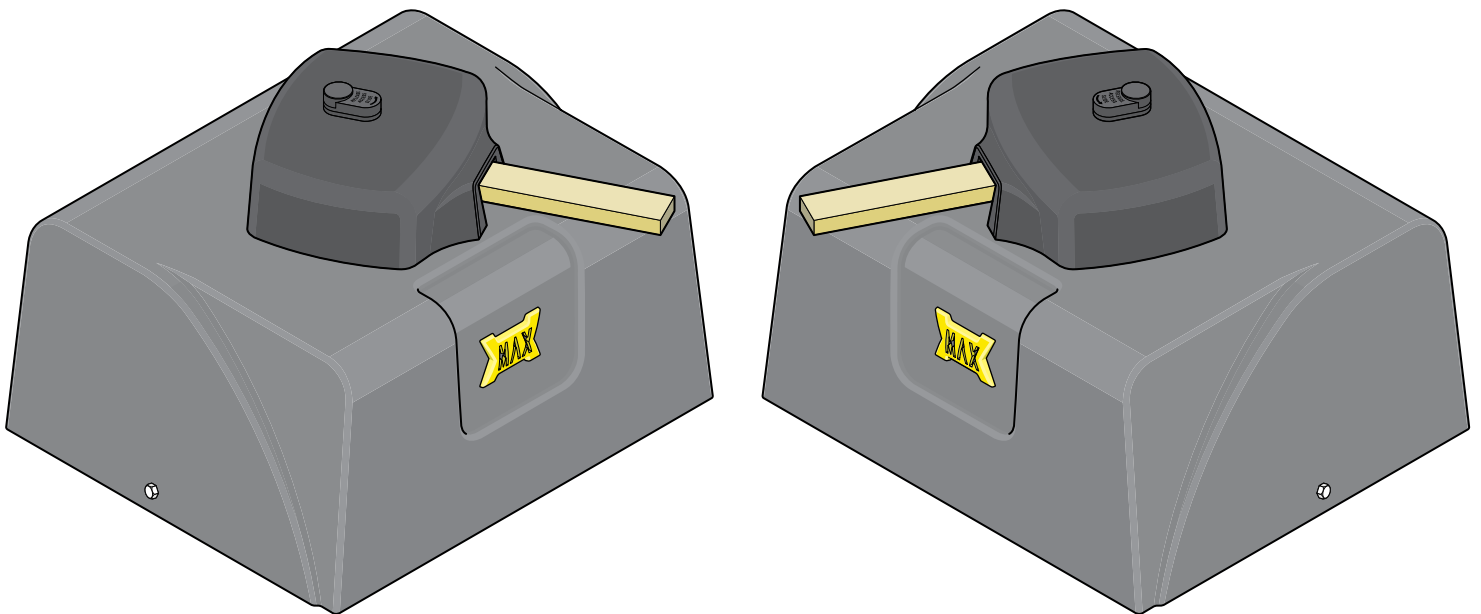


[www.max.us.com](http://www.max.us.com)

**SAFETY SENSORS REQUIRED**

**CONFORMS TO UL STD 325  
UL CLASS - I, II, III, IV**

**CERTIFIED TO CAN/CSA STD  
C22.2 NO. 247**



## **High Traffic Commercial Brushless DC Low Profile Swing Gate Operators**

**Made in USA**



Maximum Controls LLC.  
27211 Burbank  
Foothill Ranch, Ca 92610  
Tel: (949) 699-0220