

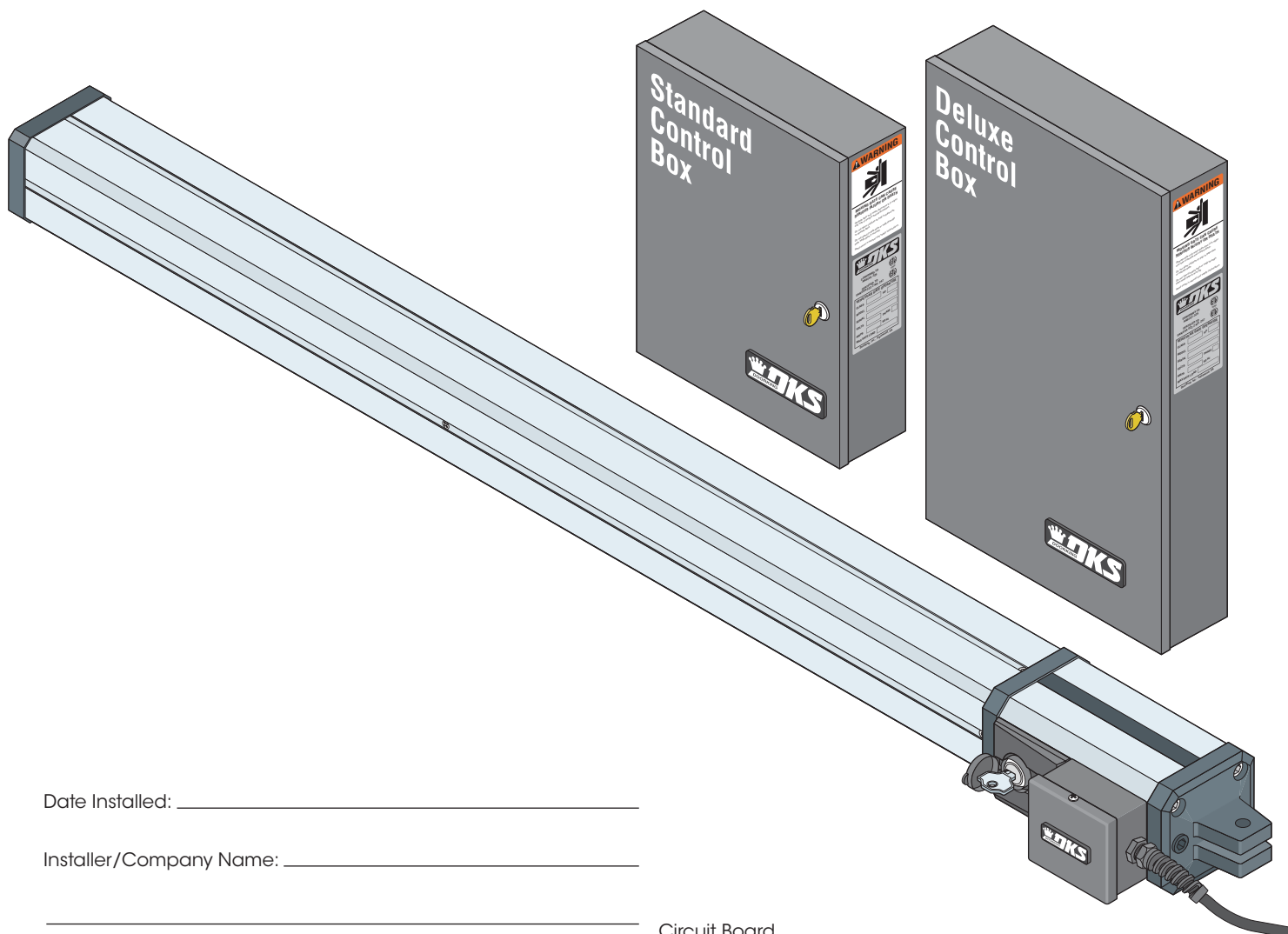
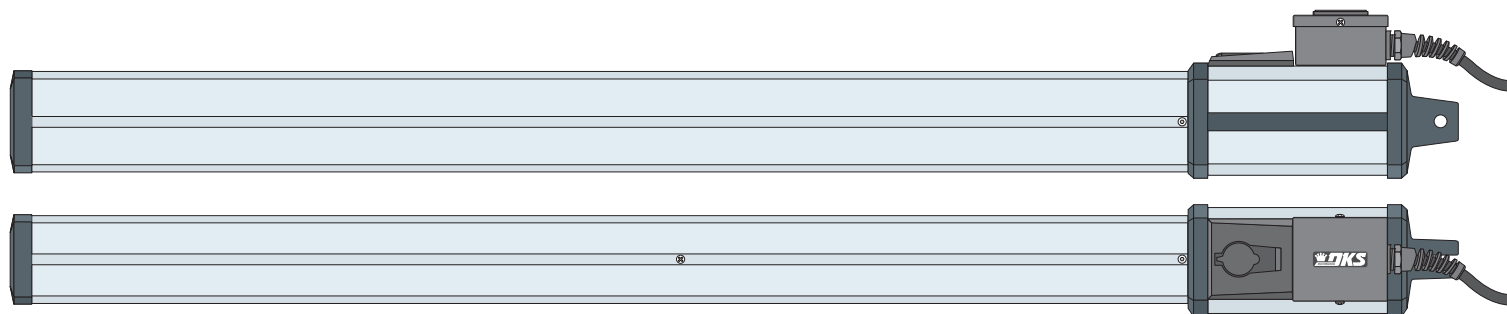
# Installation/Owner's Manual

# 6002

## Vehicular Swing Gate Operator

Use this manual for circuit board 4302-010 Revision A or higher.

6002-065-Q-7-10



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

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

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

Circuit Board  
Serial Number  
and Revision Letter: \_\_\_\_\_

**Leave Manual with Owner**

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UL 325 Compliant

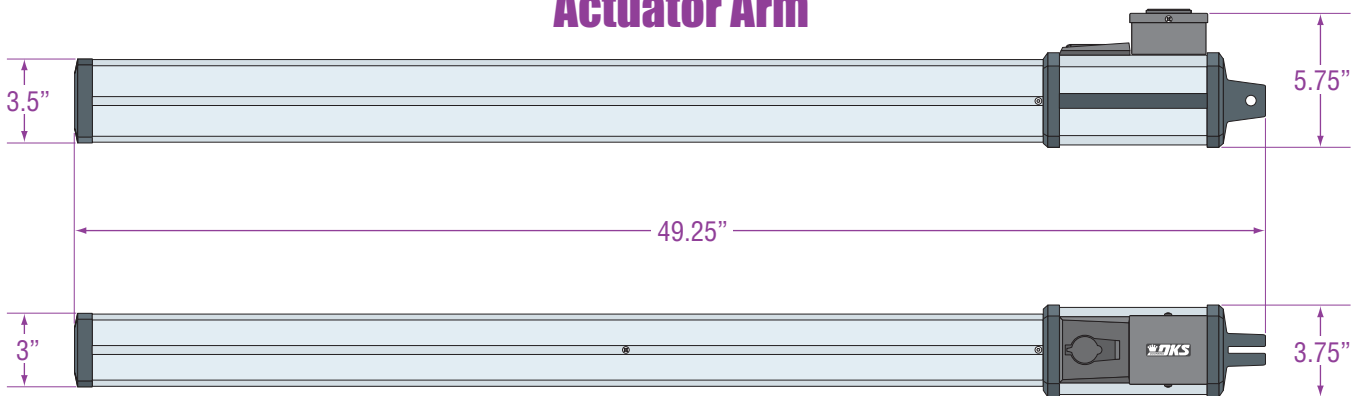




# 6002 SPECIFICATIONS

<b>Class of Operation</b>	Model 6002 - UL325 Class I
<b>Type of Gate</b>	Vehicular Swing Gates Only
<b>Motor RPM</b>	1400
<b>Maximum Thrust</b>	300 daN
<b>Voltage / Phase</b>	115 VAC Single Phase Input Power – 24 VDC Operating Power
<b>Current</b>	3 Amps
<b>Max Gate Weight</b>	500 Lbs.
<b>Max Gate Length</b>	14 Feet
<b>Useful Rod Stroke</b>	14 inches
<b>Cycles Per Hour</b>	10 Per Hour with AC connected
<b>Speed</b>	90° in approximately 15 seconds
<b>Entrapment Protection</b>	<b>Primary</b> - Inherent entrapment sensing system (Type A) <b>Secondary</b> - Provision for connection of a non-contact sensor (Type B1)

## Actuator Arm



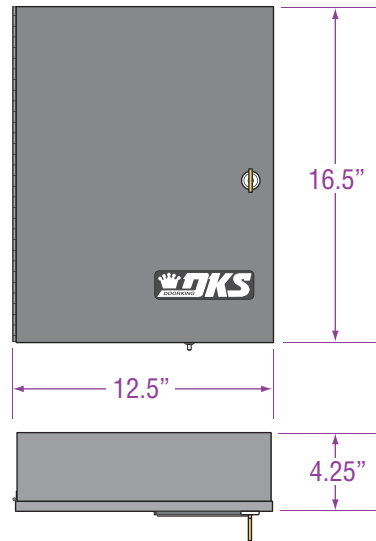
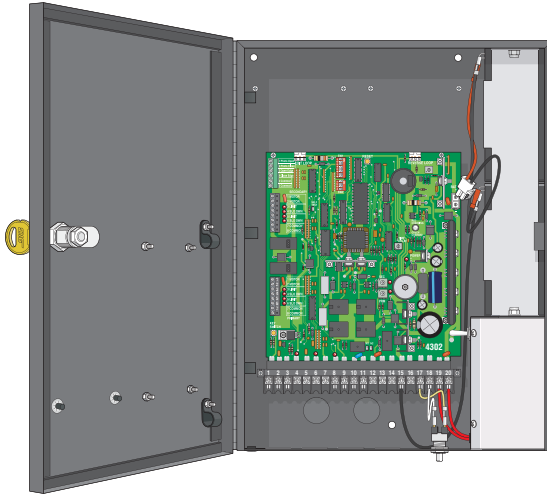
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# CONTROL BOXES SPECIFICATIONS

<b>Class of Operation</b>	Models 6002, 6003, 6004 and 6400 - UL325 Class I
<b>Type of Gate</b>	Residential Vehicular Swing Gates Only
<b>Voltage / Phase</b>	115 VAC 60 Hz Single Phase Input Power – 24 VDC Operating Power
<b>Back-Up Power</b>	24 VDC battery power during power outages.
<b>Circuit Board Model</b>	4302-010

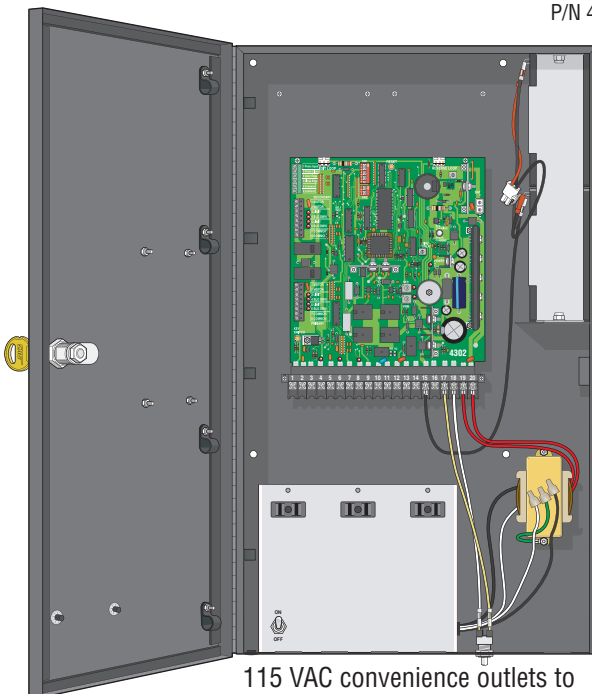
## Standard Control Box

P/N 4302-111

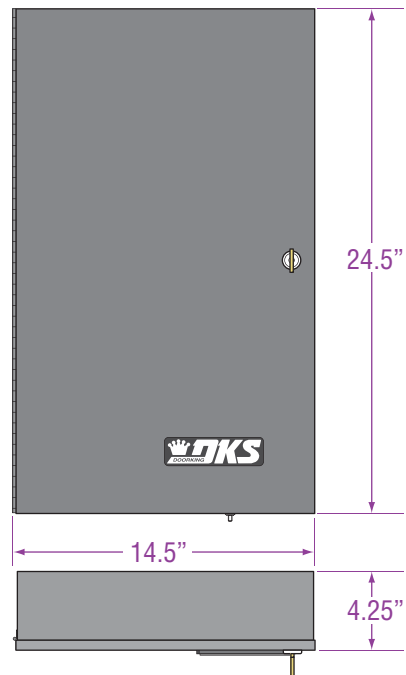


## Deluxe Control Box

P/N 4302-112



115 VAC convenience outlets to power auxiliary power transformers.



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# ASTM F2200 Standard for Gate Construction

Vehicular gates should be constructed and installed in accordance with ASTM F2200; Standard Specification for Automated Vehicular Gate Construction. For a copy of this standard, contact ASTM directly at 610-832-9585; [service@astm.org](mailto:service@astm.org); or [www.astm.org](http://www.astm.org).

## Important Safety Instructions

### **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 gate. **NO ONE SHOULD CROSS THE PATH OF THE MOVING GATE.**
4. Test the operator monthly. The gate MUST reverse on contact with a rigid object or stop or reverse 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!**

## Instructions regarding intended installation:

- Install the gate operator only if:
  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 4 feet (1.22 m) above the ground to prevent a 2 ¼ 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.
  4. Guarding is supplied for exposed rollers.
- 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.
- 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.
- 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, pressure relief valve or reduce reversing sensitivity to compensate for a damaged gate.
- 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 warning placard shall be placed adjacent to the controls.
  3. An automatic closing device (such as a timer, loop sensor, or similar device) shall not be employed.
  4. No other activation device shall be connected.
- Controls intended for user activation must be located at least ten feet (10') 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 should have a security feature to prevent unauthorized use.
- 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.
- A minimum of two (2) WARNING SIGNS shall be installed, one on each side of the gate where easily visible.
- For gate operators utilizing a non-contact sensor:
  1. See the 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 in the opening direction.
  3. One or more non-contact sensors shall be located where the risk of entrapment or obstruction exist, such as the perimeter reachable by a moving gate or barrier.

- For gate operators utilizing contact sensors:
  1. One or more contact sensors shall be located where the risk of entrapment or obstruction exist, 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 contact sensor 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 obstructions. A wireless contact sensor shall function under the intended end-use conditions.
  6. One or more contact sensors shall be located at the bottom edge of a vertical barrier (arm).

## Important Notices

Vehicular gate operator products provide convenience and security. However, gate operators must use high levels of force to move gates and most people underestimate the power of these systems and do not realize the potential hazards associated with an incorrectly designed or installed system. These hazards may include:

- Pinch points
- Entrapment areas
- Reach through hazards
- Absence of entrapment protection devices
- Improperly located access controls
- Absence of vehicle protection devices
- Absence of controlled pedestrian access

In addition to these potential hazards, automated vehicular gate systems must be installed in accordance with the UL 325 Safety Standard and the ASTM F2200 Construction Standard. Most lay persons are unaware of, or are not familiar with, these standards. If an automated vehicular gate system is not properly designed, installed, used and maintained, serious injuries or death can result. Be sure that the installer has instructed you on the proper operation of the gate and gate operator system.

Be sure that the installer has trained you about the basic functions of the required reversing systems associated with your gate operating system and how to test them. These include reversing loops, inherent reversing system, electric edges, photoelectric cells, or other external devices.

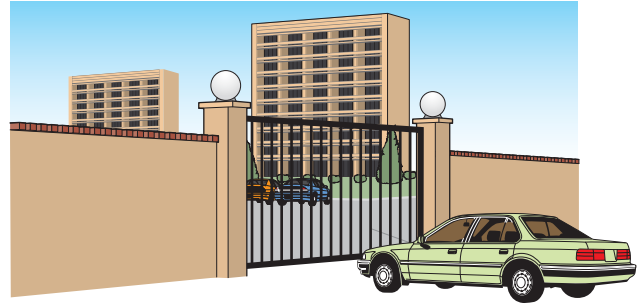
- This Owner's Manual is your property. Keep it in a safe place for future reference.
- Be sure that all access control devices are installed a minimum distance of 10 feet away from the gate and gate operator, or in such a way that a person cannot touch the gate or gate operator while using the device. If access control devices are installed in violation of these restrictions, immediately remove the gate operator from service and contact your installing dealer.
- Loops and loop detectors, photo-cells or other equivalent devices must be installed to prevent the gate from closing on vehicular traffic.
- The speed limit for vehicular traffic through the gate area is 5 MPH. Install speed bumps and signs to keep vehicular traffic from speeding through the gate area. Failure to adhere to posted speed limits can result in damage to the gate, gate operator, and to the vehicle.
- Be sure that all persons who will use the gate system are familiar with the proper use of the gate and gate operator and are familiar with the possible hazards associated with the gate system.
- Be sure that warning signs are permanently installed on both sides of the gate in an area where they are fully visible to traffic.
- It is your responsibility to periodically check all entrapment protection devices. If any of these devices are observed to function improperly, remove the operator from service immediately and contact your installing or servicing dealer.
- Follow the recommended maintenance schedule.
- Do not allow children to play in the area of the operator or to play with any gate-operating device.
- To remove the gate operator from service, operate the gate to the full open position and then shut off power to the operator at the service panel.

# UL 325 Entrapment Protection



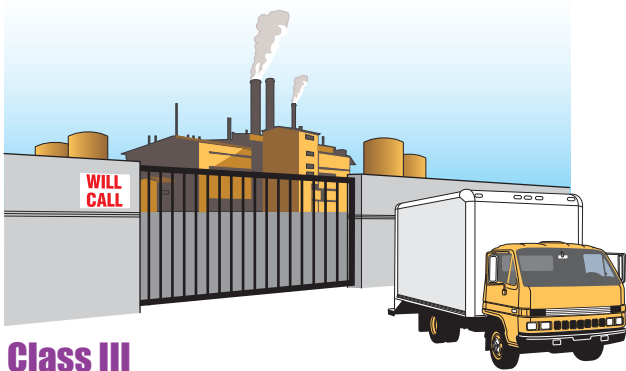
## Class I

A vehicular gate operator (or system) intended for use in a home of one-to four single family dwelling, or a garage or parking area associated therewith.



## Class II

A vehicular gate operator (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 III

A vehicular gate operator (or system) intended for use in an industrial location or building such as a factory or loading dock area or other locations not intended to service the general public.



## Class IV

A vehicular gate operator (or system) intended for use in a guarded industrial location or building such as an airport security area or other restricted access locations not servicing the general public, in which unauthorized access is prevented via supervision by security personnel.

**This table illustrates the entrapment protection requirements for each of the four UL 325 classes.**

UL 325 Classifications	Horizontal Slide, Vertical Lift, Vertical Pivot		Swing and Vertical Barrier (arm)	
	Primary Protection	Secondary Protection	Primary Protection	Secondary Protection
<b>Class I and II</b>	<b>A</b>	B1, B2 or D	<b>A or C</b>	A, B1, B2, C or D
<b>Class III</b>	<b>A, B1 or B2</b>	A, B1, B2, D or E	<b>A, B1, B2 or C</b>	A, B1, B2, C or D
<b>Class IV</b>	<b>A, B1, B2 or D</b>	A, B1, B2, D or E	<b>A, B1, B2, C or D</b>	A, B1, B2, C, D or E

- A** - Inherent entrapment protection system.
- B1** - Provision for connection of, or supplied with, a non-contact sensor (photoelectric sensor or the equivalent). When used as the PRIMARY device, must be monitored.
- B2** - Provision for connection of, or supplied with, a contact sensor (edge device or the equivalent). When used as the PRIMARY device, must be monitored.
- C** - Inherent adjustable clutch or pressure relief device.
- D** - Provision for connection of, or supplied with, an actuating device requiring continuous pressure to maintain opening or closing motion of the gate.
- E** - An inherent audio alarm.



# Glossary

**GATE** - A moving barrier such as a swinging, sliding, raising, lowering, or the like, barrier, that is a stand-alone passage barrier or is that portion of a wall or fence system that controls entrance and/or egress by persons or vehicles and completes the perimeter of a defined area.

**RESIDENTIAL VEHICULAR GATE OPERATOR – CLASS I** - A vehicular gate operator (or system) intended for use in a home of one-to four single family dwelling, or garage or parking area associated therewith.

**COMMERCIAL / GENERAL ACCESS VEHICULAR GATE OPERATOR - CLASS II** - A vehicular gate operator (or system) intended for use in a commercial location or building such as a multi-family housing unit (five or more single family units), hotels, garages, retail store, or other building servicing the general public.

**INDUSTRIAL / LIMITED ACCESS VEHICULAR GATE OPERATOR - CLASS III** - A vehicular gate operator (or system) intended for use in an industrial location or building such as a factory or loading dock area or other locations not intended to service the general public.

**RESTRICTED ACCESS VEHICULAR GATE OPERATOR - CLASS IV** - A vehicular gate operator (or system) intended for use in a guarded industrial location or building such as an airport security area or other restricted access locations not servicing the general public, in which unauthorized access is prevented via supervision by security personnel.

**VEHICULAR BARRIER (ARM) OPERATOR (OR SYSTEM)** - An operator (or system) that controls a cantilever type device (or system), consisting of a mechanical arm or barrier that moves in a vertical arc, intended for vehicular traffic flow at entrances or exits to areas such as parking garages, lots or toll areas.

**VEHICULAR HORIZONTAL SLIDE-GATE OPERATOR (OR SYSTEM)** - A vehicular gate operator (or system) that controls a gate which slides in a horizontal direction that is intended for use for vehicular entrance and exit to a drive, parking lot, or the like.

**VEHICULAR SWING-GATE OPERATOR (OR SYSTEM)** - A vehicular gate operator (or system) that controls a gate which moves in an arc in a horizontal plane that is intended for use for vehicular entrance and exit to a drive, parking lot, or the like.

**SYSTEM** - In the context of these requirements, a system refers to a group of interacting devices intended to perform a common function.

**WIRED CONTROL** - A control implemented in a form of fixed physical interconnections between the control, the associated devices, and an operator to perform predetermined functions in response to input signals.

**WIRELESS CONTROL** - A control implemented in means other than fixed physical interconnections (such as radio waves or infrared beams) between the control, the associated devices, and an operator to perform predetermined functions in response to input signals.

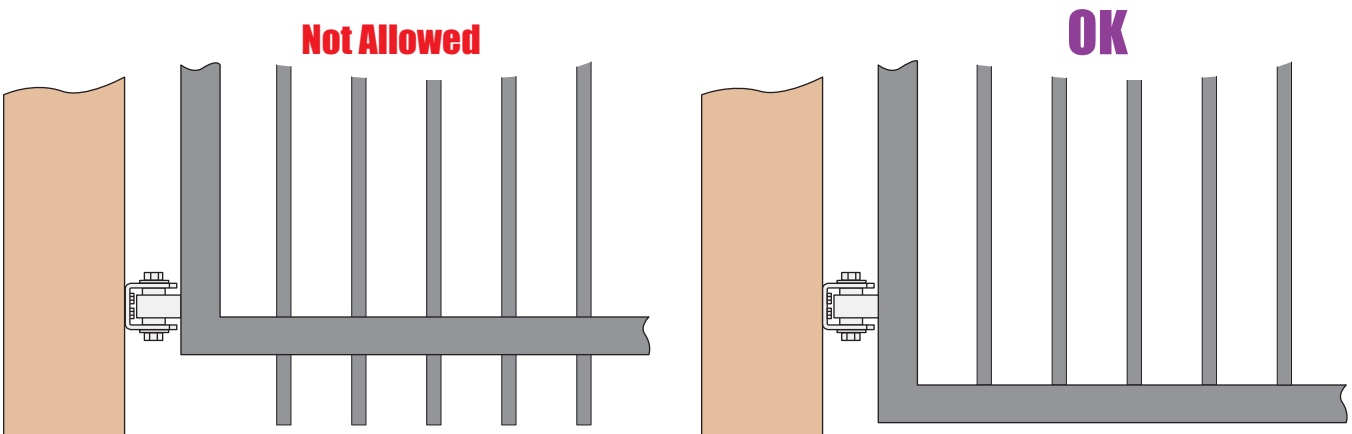
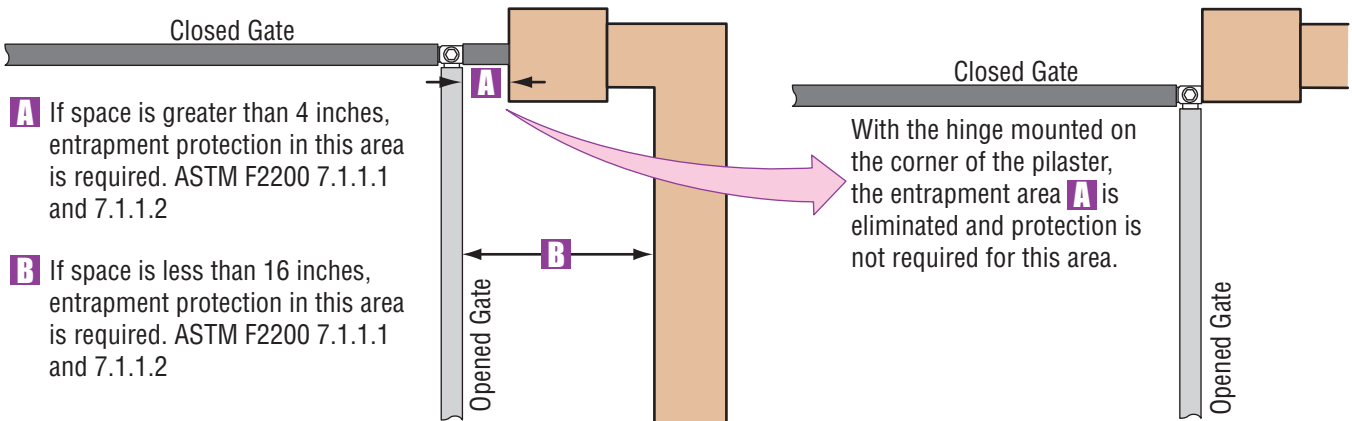
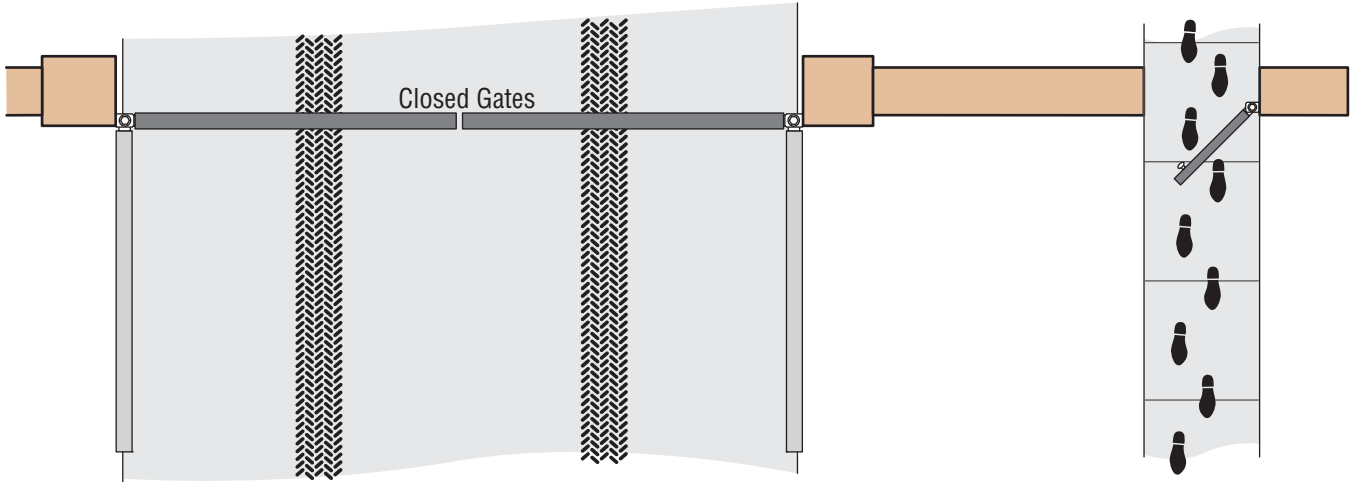
**INHERENT ENTRAPMENT PROTECTION SYSTEM** - A system, examples being a motor current or speed sensing system, which provides protection against entrapment upon sensing an object and is incorporated as a permanent and integral part of the operator.

**EXTERNAL ENTRAPMENT PROTECTION DEVICE** - A device, examples being an edge sensor, a photoelectric sensor, or similar entrapment protection device, which provides protection against entrapment when activated and is not incorporated as a permanent part of an operator.

**ENTRAPMENT** - The condition when an object is caught or held in a position that increases the risk of injury.

# Swing Gate Requirements

**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. (ref. UL325 56.8.4.b)



Gates shall have smooth bottom edges, with vertical bottom edged protrusions not exceeding 0.50 inches. ASTM F2200 4.3

# Swing Gate Protection

## Reverse Loop

Minimizes the potential of the gate closing when a vehicle is present. Number and placement of loops is dependent on the application.

## Non-contact Sensor

Minimizes the potential of the gate closing on vehicular or other traffic that loops cannot sense.

## Shadow Loop

Provides a hold open command to the operator(s) only if the gate(s) are at the full open position.

## Warning Signs

Permanently mounted and easily visible from either side of the gate.



## Reverse Loop

Minimizes the potential of the gate closing when a vehicle is present. Number and placement of loops is dependent on the application.

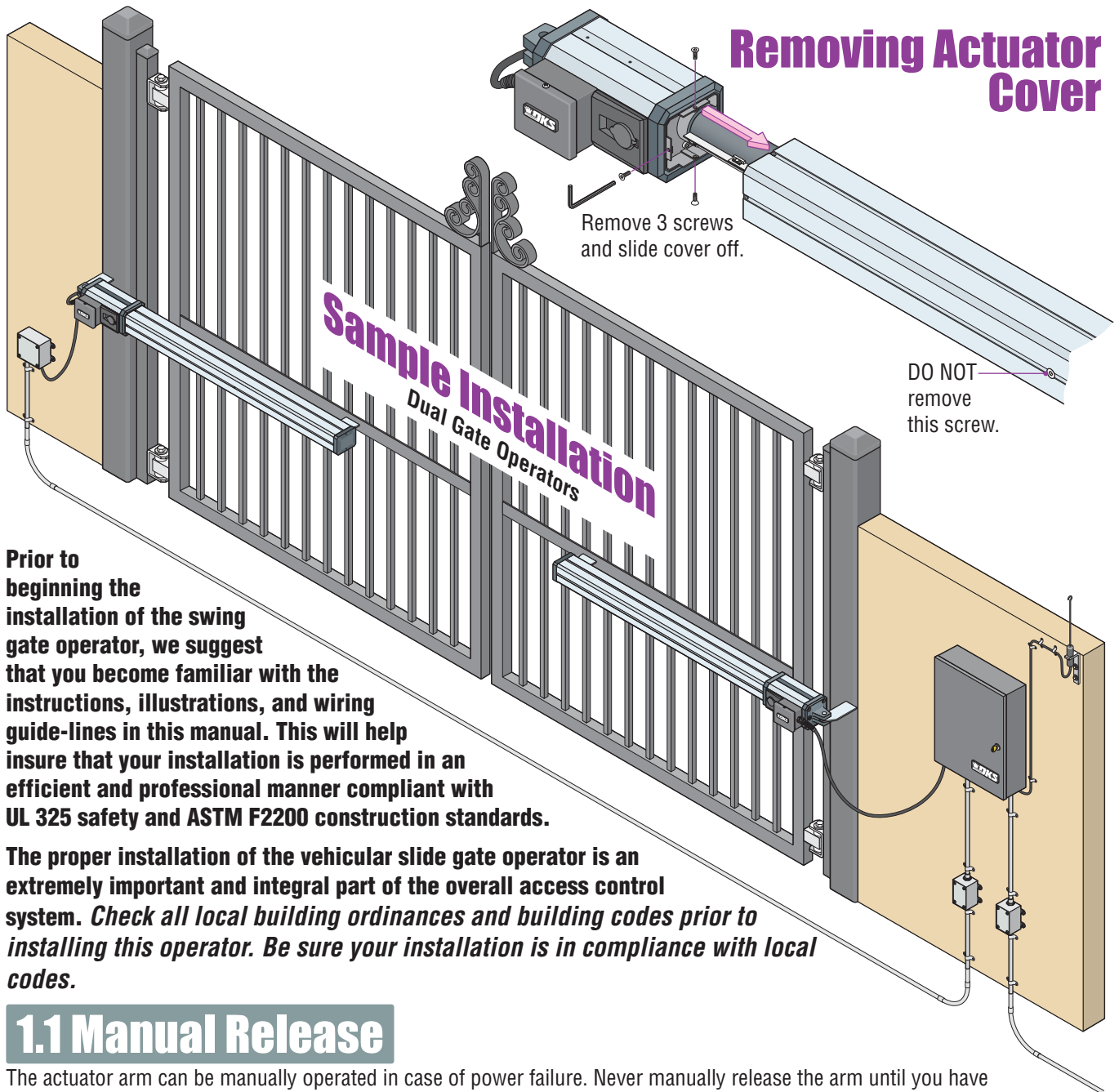
## Automatic Exit Loop

(Optional) will provide an open command to the gate operator(s) when a vehicle is exiting the property.

## Separate Pedestrian Walkway

Located so pedestrians cannot come in contact with the vehicular gate.

# SECTION 1 - INSTALLATION



## Removing Actuator Cover

Remove 3 screws and slide cover off.

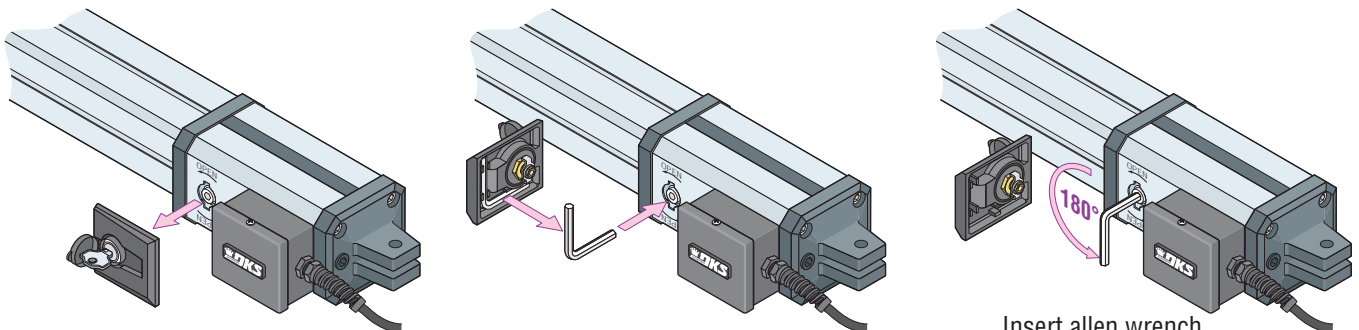
DO NOT remove this screw.

Prior to beginning the installation of the swing gate operator, we suggest that you become familiar with the instructions, illustrations, and wiring guide-lines in this manual. This will help insure that your installation is performed in an efficient and professional manner compliant with UL 325 safety and ASTM F2200 construction standards.

The proper installation of the vehicular slide gate operator is an extremely important and integral part of the overall access control system. Check all local building ordinances and building codes prior to installing this operator. Be sure your installation is in compliance with local codes.

## 1.1 Manual Release

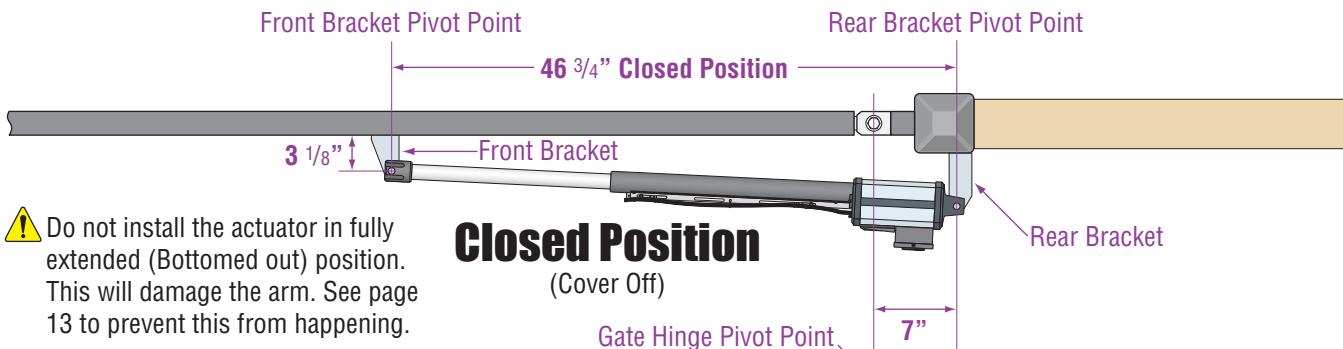
The actuator arm can be manually operated in case of power failure. Never manually release the arm until you have verified that ALL power has been shut-off to it (Including batteries).



Use key to unlock and remove the cover. Remove allen wrench from inside of cover.

Insert allen wrench and turn 180° to release the arm.

# 1.2 "Opening to the Inside" Installation

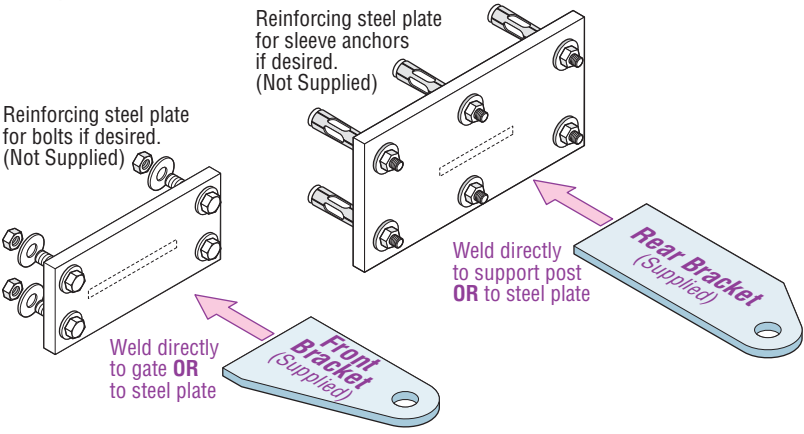


**⚠** Do not install the actuator in fully extended (Bottomed out) position. This will damage the arm. See page 13 to prevent this from happening.

**Closed Position**  
(Cover Off)

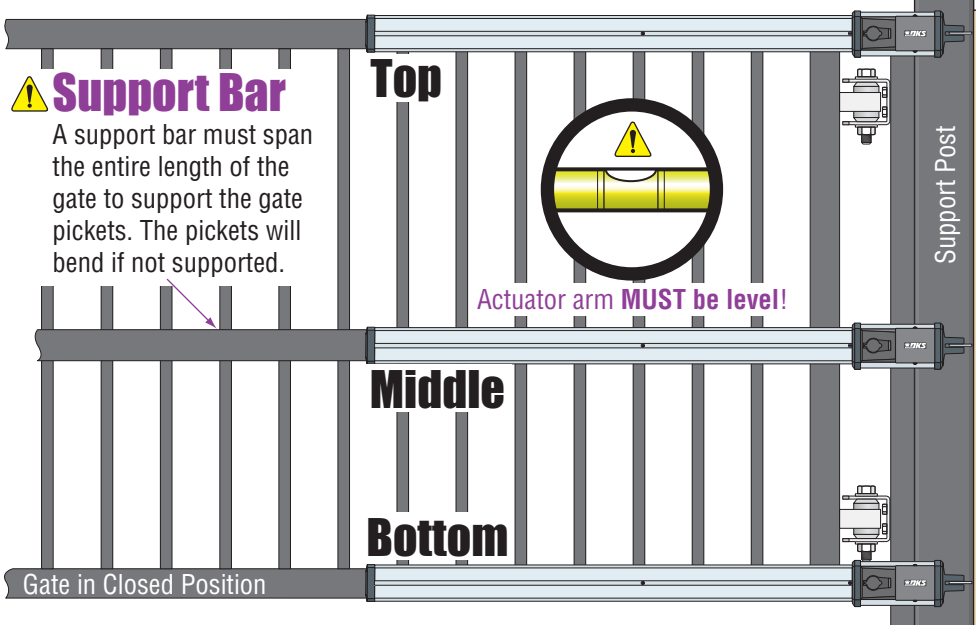
## Mounting Brackets to Surfaces

Weld front and rear brackets **directly** to gate and metal support post if desired.  
If mounting brackets with bolts to the gate and wall, weld reinforcing steel plates to the brackets.



**Open Position**  
(Cover On)

Note: The brackets must be perpendicular (Plumb) to the gate and wall/post and horizontally level. Weld completely around brackets.



**⚠ Support Bar**  
A support bar must span the entire length of the gate to support the gate pickets. The pickets will bend if not supported.

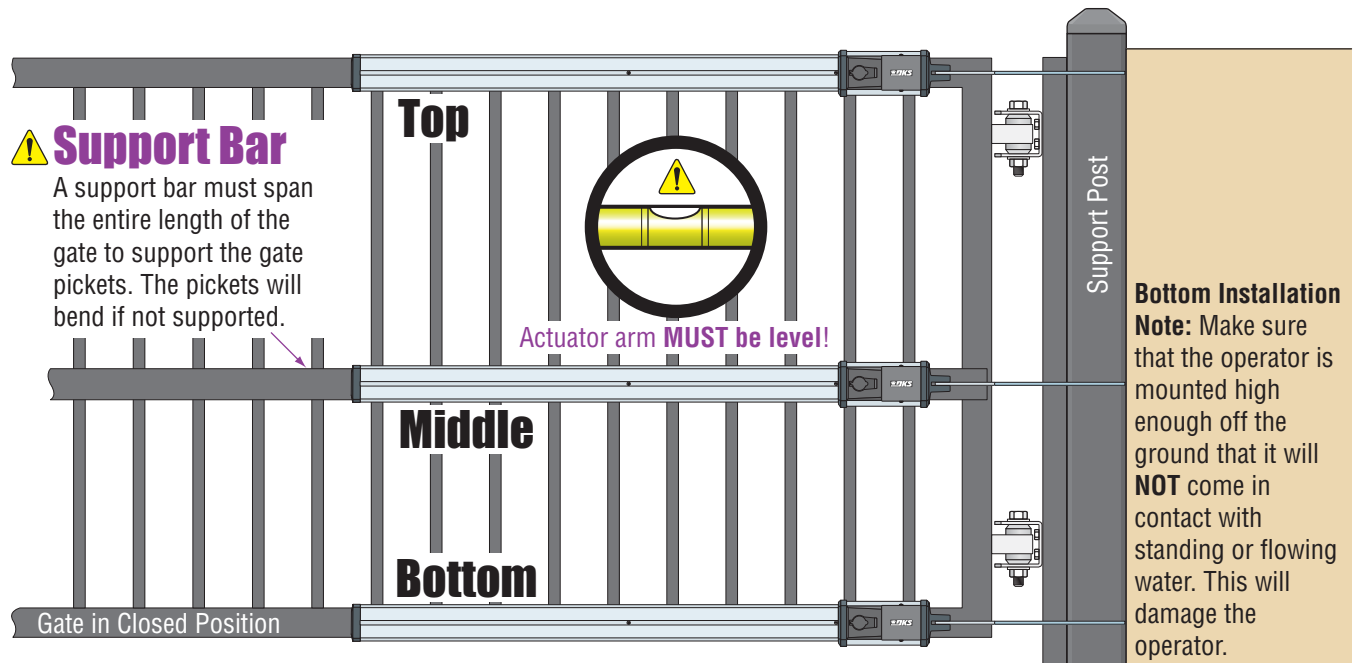
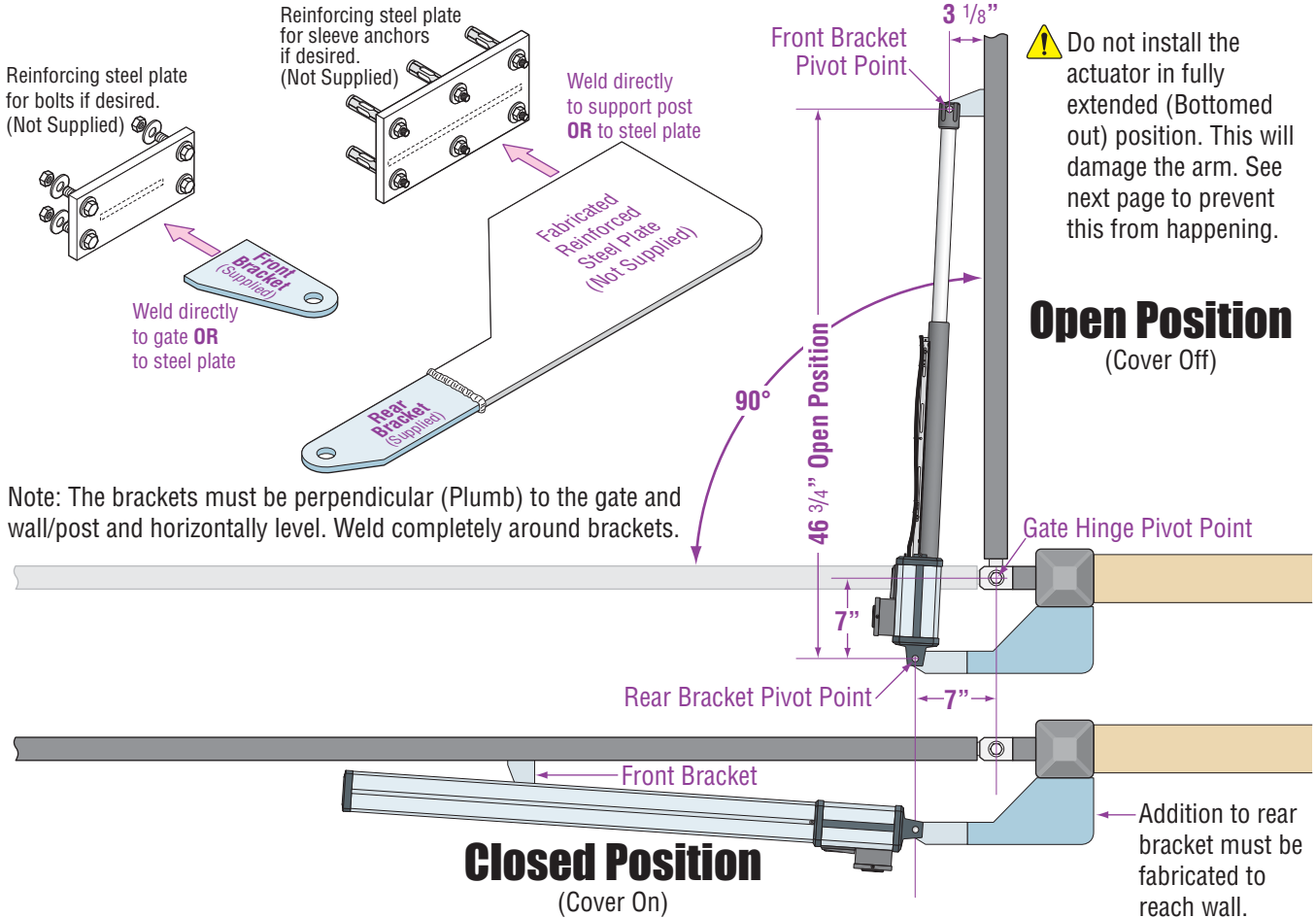
**Bottom Installation Note:**  
Make sure that the operator is mounted high enough off the ground that it will **NOT** come in contact with standing or flowing water. This will damage the operator.

# 1.3 "Opening to the Outside" Installation

## Mounting Brackets to Surfaces

Weld front bracket and fabricated rear bracket **directly** to gate and metal support post if desired.

If mounting brackets with bolts to the gate and wall, weld reinforcing steel plates to the brackets.



## 1.4 Mounting Actuator Arm

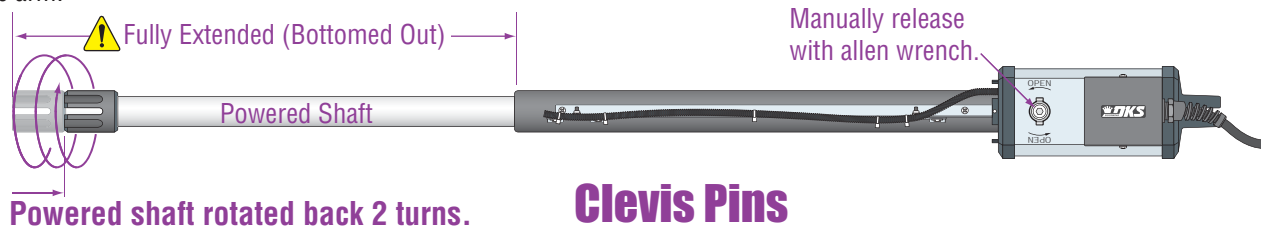
**Gate must be in good working condition before the actuator arm can be installed.** Determine what direction the actuator arm will open the gate “Opening to the Inside” or “Opening to the Outside” (See previous two pages).

### Gate Support Bar

A support bar that spans the entire length of the gate must be installed to keep the pickets from bending. **Do not mount the front bracket directly to gate pickets!**

### Prevent Powered Shaft from Bottoming Out

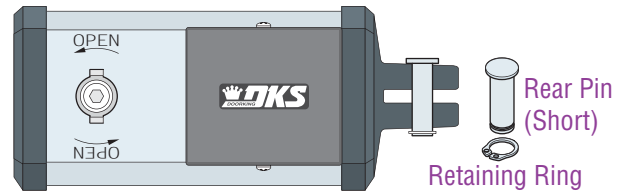
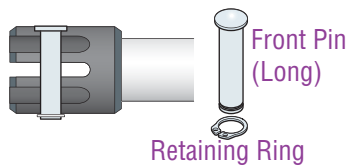
It is very important that the powered shaft is not fully extended when installed on the gate (bottoming out). This will damage the arm. To prevent this, manually release the arm and fully extend the powered shaft. Rotate it back two full turns before installing the arm.



Powered shaft rotated back 2 turns.

### Clevis Pins

Note: Front clevis pin **MUST** fit into countersunk hole to allow retaining ring to be installed.

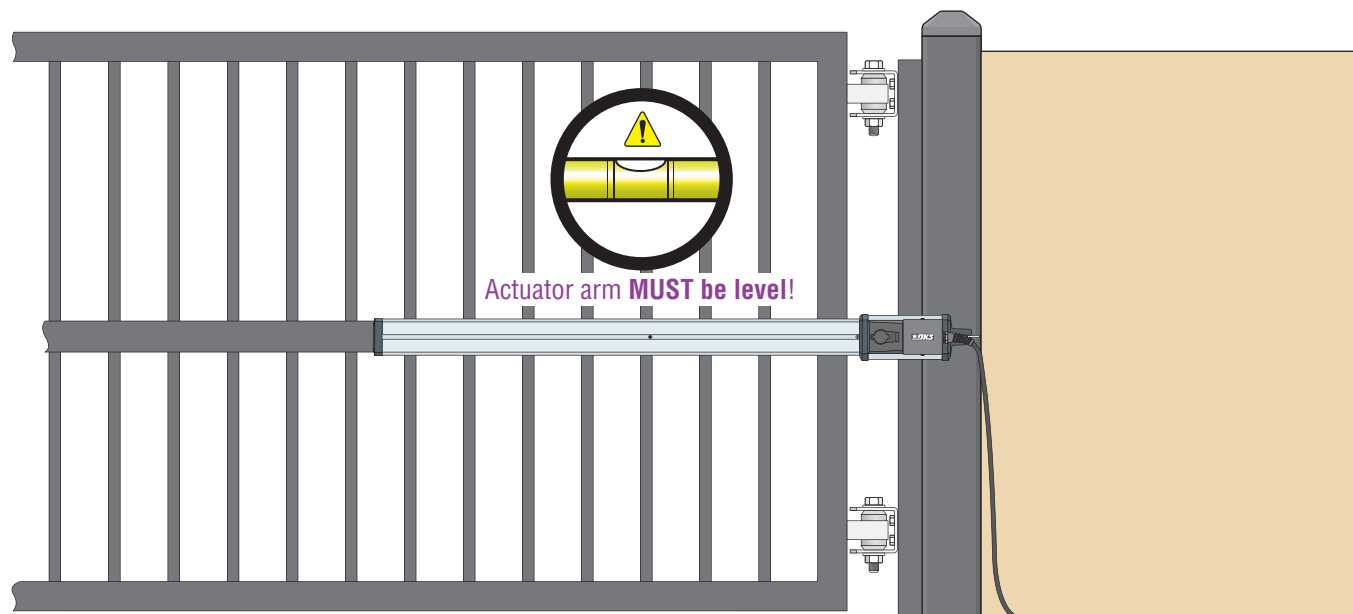


### Bracket Fabrication

The brackets need to be fabricated before the arm can be installed. Brackets will vary in size depending on the opening direction of the gate and the thickness of the wall the actuator arm will attach to. They can be attached to the wall and gate by welding and/or mechanically, depending on the type wall and gate. **The brackets must be perpendicular to the wall and/or gate and horizontally level. Make sure the brackets will be VERY secure when fastened to the wall and gate.**

### Welding Brackets to Surfaces

If brackets are going to be welded to the gate and/or wall, **only tack weld the brackets with the arm attached. Protect the arm from welding sparks during tack welding. Remove arm before completely welding around the brackets. Make sure the brackets are level when tack welding them!** The arm will not operate properly if not level.

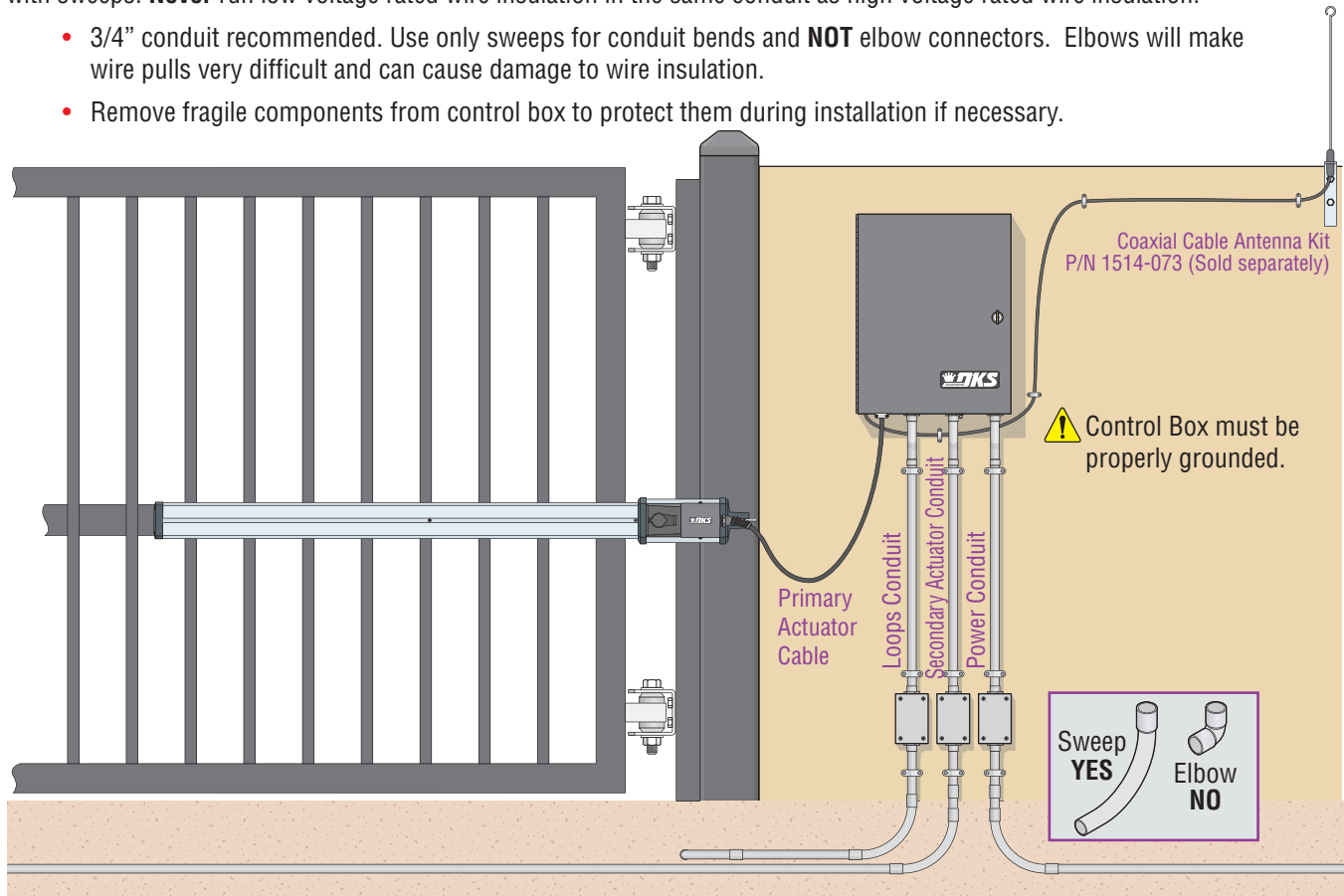


## 1.5 Mounting Control Box with Conduit

Permanent wiring must be installed to the operator as required by local electrical codes. It is recommended that a licensed electrical contractor perform this work. Check local building codes prior to installing any permanent wiring to ensure all wiring and connections comply with local electrical code requirements.

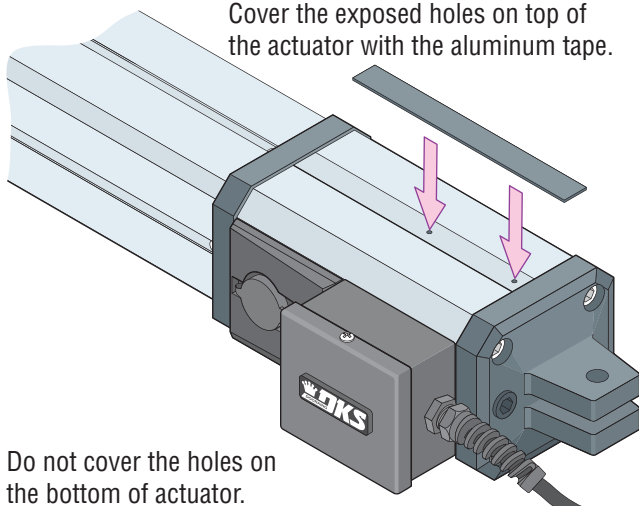
Position the control box on the wall, **close enough to the operator so the primary operator cable can be easily routed inside the box.** Make sure that the control box is mounted high enough off the ground that it will **NOT** come in contact with standing or flowing water. **This will damage the internal components.** Secure the control box to the wall with appropriate hardware (not included). Control box has predrilled mounting holes. All power and control wires should be routed to control box in conduits with sweeps. **Never** run low voltage rated wire insulation in the same conduit as high voltage rated wire insulation.

- 3/4" conduit recommended. Use only sweeps for conduit bends and **NOT** elbow connectors. Elbows will make wire pulls very difficult and can cause damage to wire insulation.
- Remove fragile components from control box to protect them during installation if necessary.



## Cover Holes on Top

Cover the exposed holes on top of the actuator with the aluminum tape.

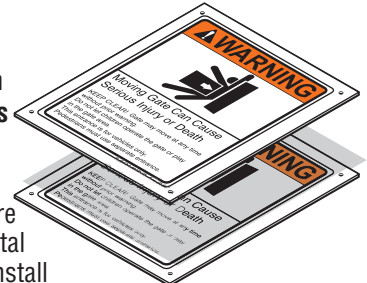


Do not cover the holes on the bottom of actuator.

## Install Warning Signs

This DoorKing Swing Gate Operator is shipped with two warning signs. The purpose of the warning sign is to alert uninformed persons, and to remind persons familiar with the gate system, that a possible hazard exists so that appropriate action can be taken to avoid the hazard or to reduce exposure to the hazard. See page 9 for suggested mounting positions of signs.

- Permanently install the supplied warning signs in locations so that the signs are visible by persons on both sides of the gate.
- Use appropriate hardware such as wood or sheet metal screws (not supplied) to install the warning signs.





# SECTION 2 - WIRING

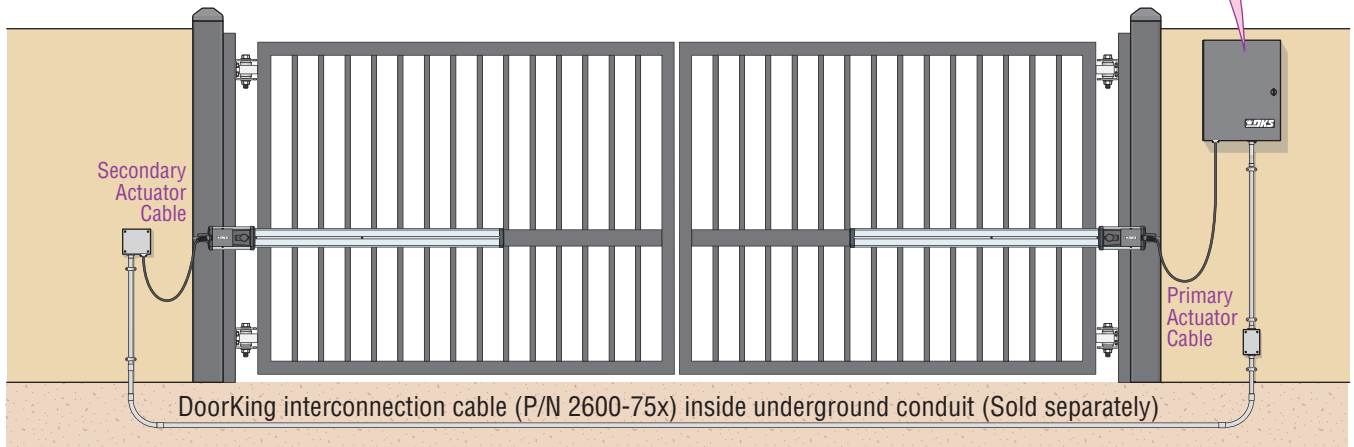
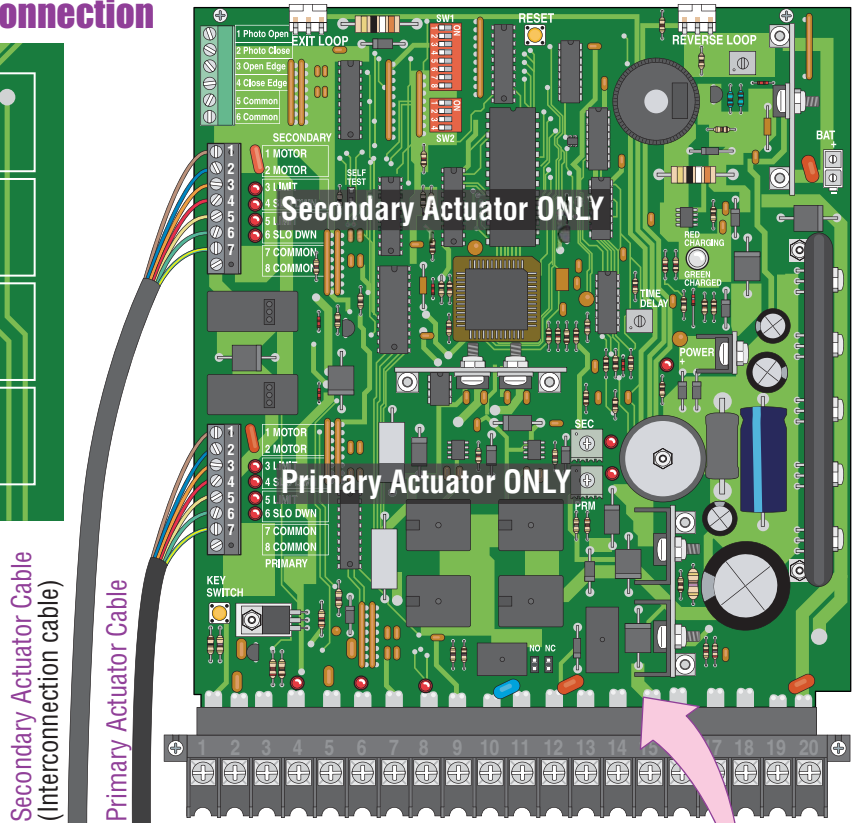
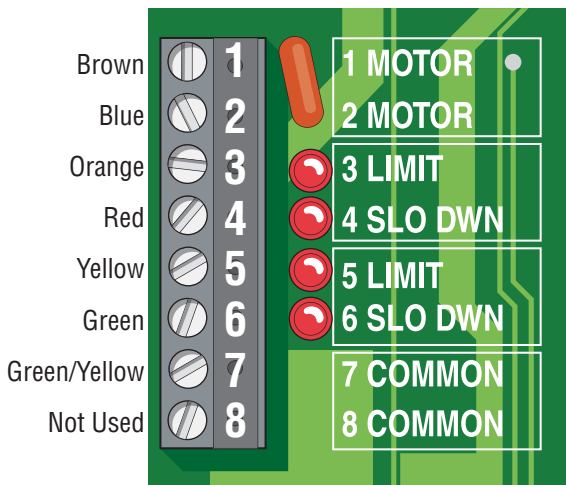
Before attempting to connect any wiring to the control box, be sure that the circuit breaker in the electrical panel is in the OFF position. Permanent wiring must be installed to the control box as required by local electrical codes. It is recommended that a licensed electrical contractor perform this work.

Since building codes vary from city to city, we highly recommend that you check with your local building department prior to installing any permanent wiring to be sure that all wiring to the control box (both high and low voltage) complies with local code requirements.

**THIS GATE OPERATOR MUST BE PROPERLY GROUNDED!!**

## 2.1 Wiring Actuator Arm(s)

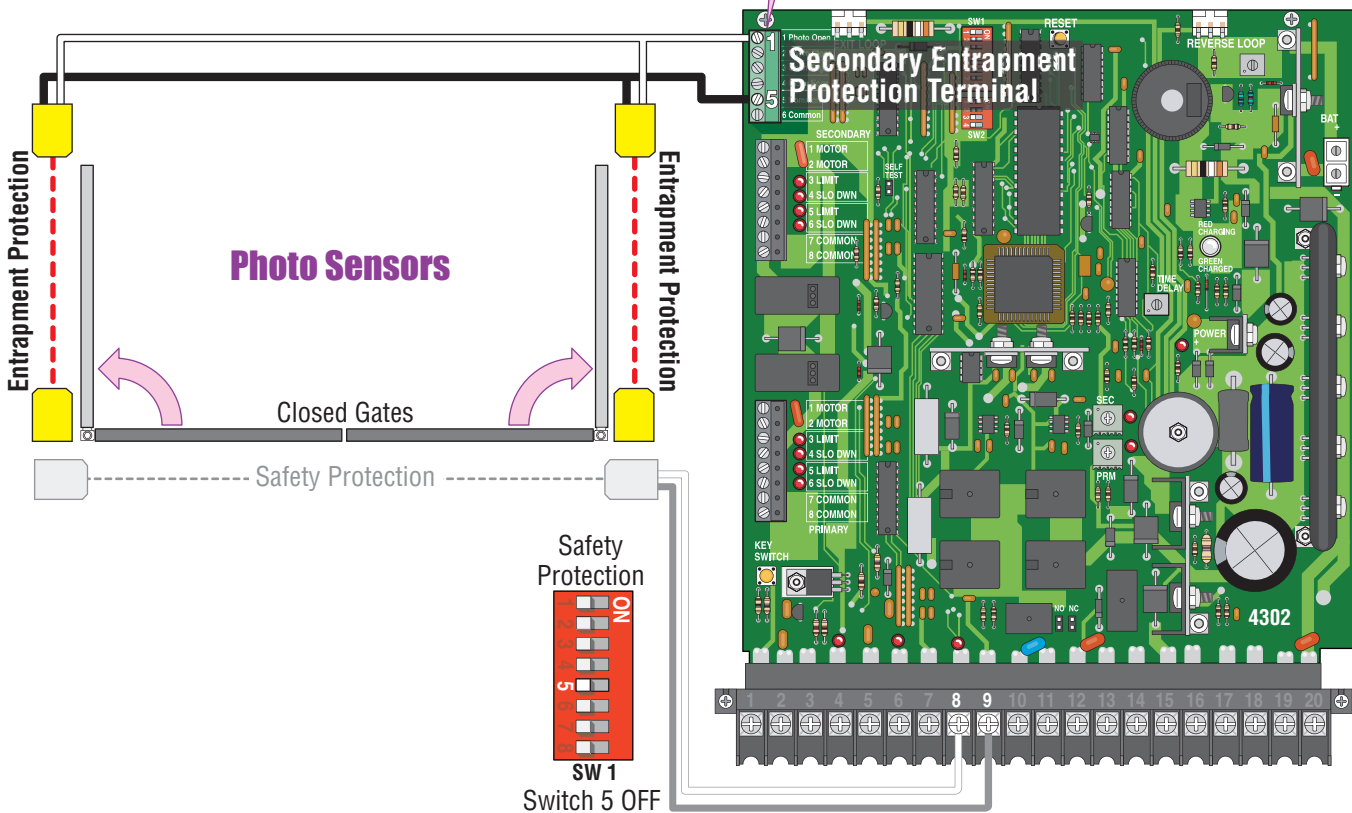
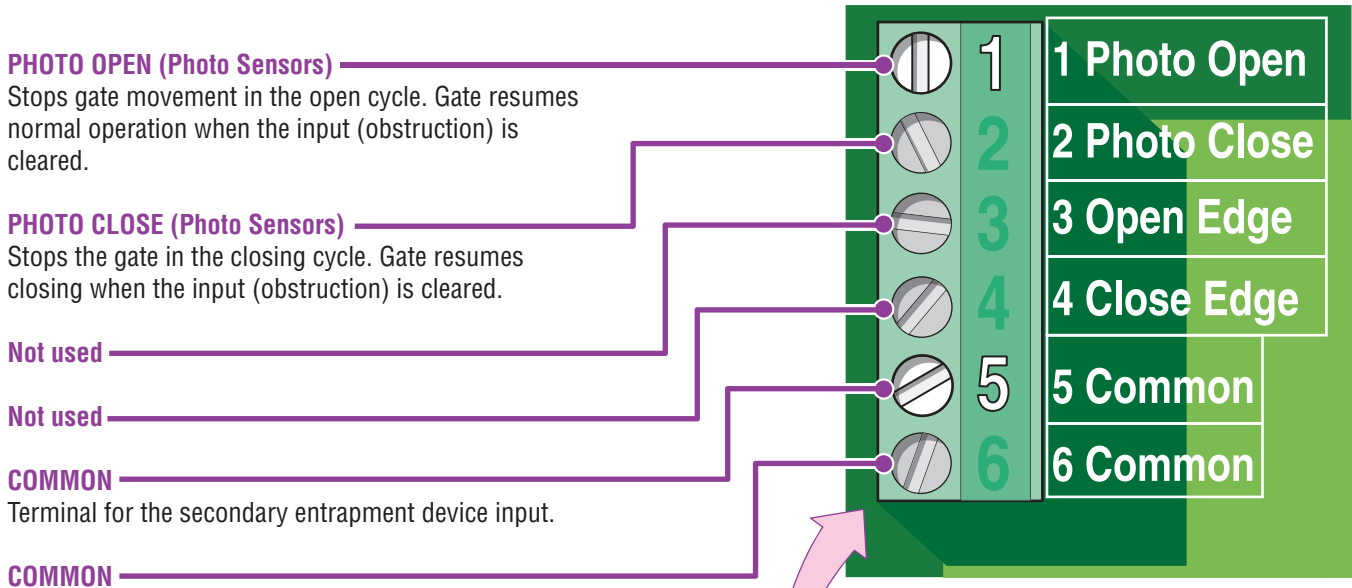
### Primary or Secondary Cable Connection



## 2.2 Secondary Entrapment Protection Wiring

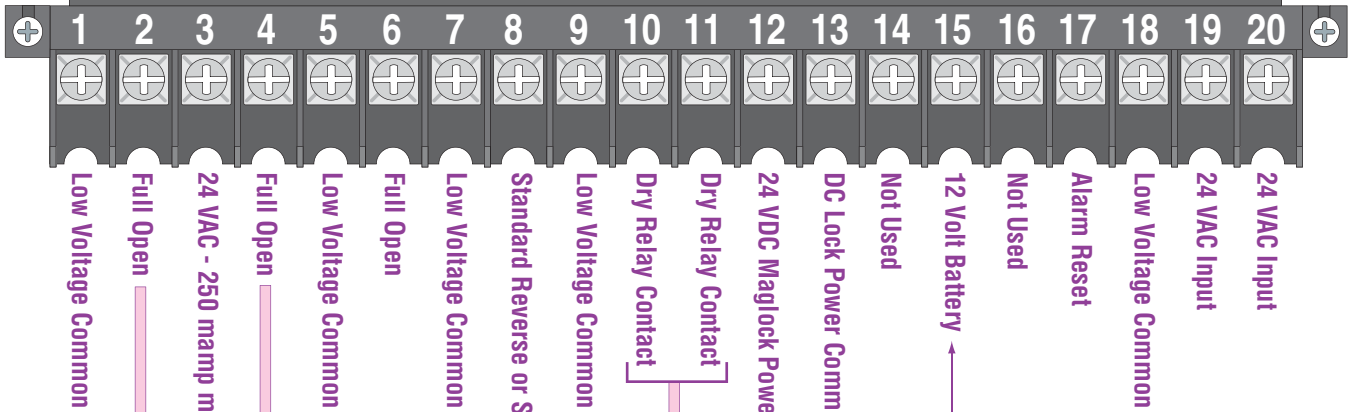
In addition to the inherent entrapment sensing system, this operator has provisions for the connection of a non-contact (type B1) secondary entrapment protection device. This is required by UL 325 standards. DoorKing highly recommends installing loops and loop detectors to enhance this secondary entrapment protection.

Entrapment protection devices are required to reduce the risk of injury. Install sensors where the risk of entrapment or obstruction exists while gate is moving.



# 2.3 Main Terminal Description

For specific wiring information, see next page.



**15** DC power is not present on the board until first initial cycle of gate.

**2**

- When gate is closed, input will open gate.
- When gate is open and auto close timer SW 1, switch 4 is turned ON, input will re-set and hold timer.
- When gate is open and auto close timer SW 1, switch 4 is turned OFF, input will close gate.
- When gate is closing, input will reverse gate.

SW 1

**12**

Maglock: SW 2, Switch 3 ON, 1 sec. delay at start.

SW 2

**10**  
**11**

Operation of the relay is dependent on the setting of SW 2, switches 1 and 2. Relay contact can be set for Normally Open (NO) or Normally Closed (NC) operation. **Contact rating is 1 amp maximum at 24 Volts.**

- SW 2, Switch 1 OFF, Switch 2 OFF: Relay activates when gate is OPEN.
- SW 2, Switch 1 OFF, Switch 2 ON: Relay activates when gate is OPEN, OPENING or CLOSING.
- SW 2, Switch 1 ON, Switch 2 OFF: Relay activates when gate is OPEN or OPENING.
- SW 2, Switch 1 ON, Switch 2 ON: Relay activates when gate is OPENING or CLOSING.

SW 2

**8**

- When gate is closed, this input has no affect on the gate operator.
- When gate is open and auto close timer SW 1, switch 4 is turned ON, input will re-set and hold timer.
- When gate is open and auto close timer SW 1, switch 4 is turned OFF, input will prevent gate from closing.
- When gate is closing, input will reverse gate if SW 1, switch 5 is OFF.
- When gate is closing, input has no affect on the gate operator if SW 1, switch 5 is ON (Set for shadow input).

SW 1

SW 1

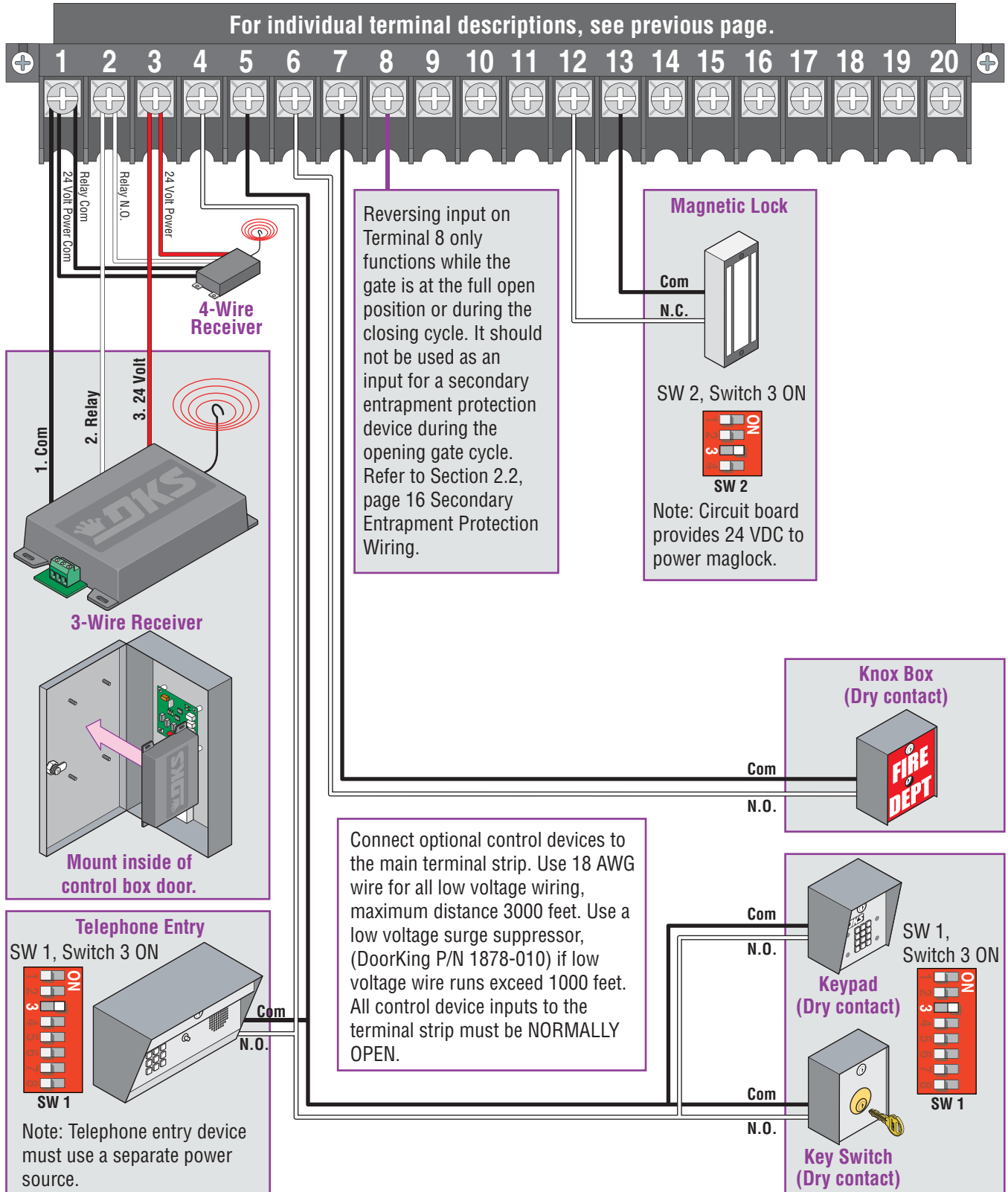
**4**

- SW 1, switch 3 is ON, terminal #4 functions as a normal **FULL** open input (Normal Setting).
- SW 1, switch 3 is OFF, terminal #4 becomes the output from a plug-in loop detector installed in the **EXIT loop port** of the circuit board.

SW 1

# 2.4 Main Terminal Wiring

Controls must be far enough from the gate so that the user is prevented from coming in contact with the gate while operating the controls. Outdoor or easily accessible controls should have a security feature to prevent unauthorized use. When installing electrical equipment make certain all wiring complies with local code requirements. Do not power any control devices from the circuit board other than low voltage devices.

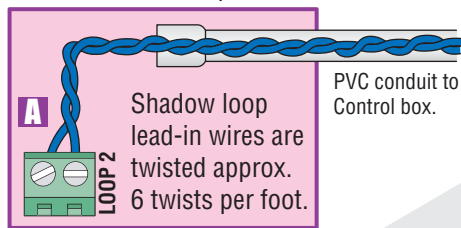


## 2.5 Loop Detector Wiring

To help protect the operator from accidentally closing on vehicles in the gate's path, DoorKing highly recommends that loops and loop detectors be installed. Loops are laid underneath, cut into asphalt or concrete driveways or buried beneath gravel and earth driveways. A loop detection system will sense a vehicle like a metal detector and send a signal to the gate operator preventing the gate from automatically opening or closing on a vehicle when it is in the gate's path. DoorKing recommends that a licensed installer perform this work.

**Shadow Loop** The shadow loop is placed inside the gate's swinging path to prevent the gate from closing on a vehicle in this area. **It is only active when the gate is in the full open position.** Vehicles in the shadow area will activate it. It will not allow the gate to close unless this area is clear. After a closing cycle begins, the shadow loop **will not** reverse the gate. Reverse loops work in conjunction with the shadow loop and both should be used.

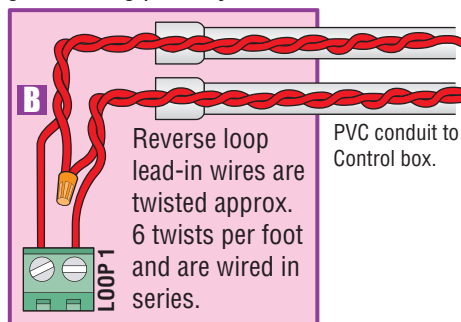
DoorKing offers a free "Loop and Loop-Detectors Information Manual" PDF located at DoorKing's web site for more information.  
[www.dkaccess.com](http://www.dkaccess.com)



PVC conduit to Control box.

### Reverse Loops

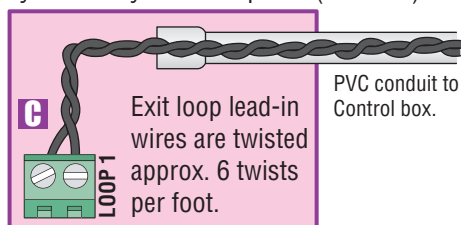
Reverse loops are placed just outside the gate's swinging path to prevent the gate from closing on a vehicle in these areas. They will reverse the cycling of the gate while a vehicle is in or near the gate's swing pathway.



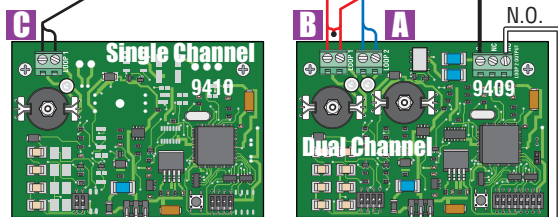
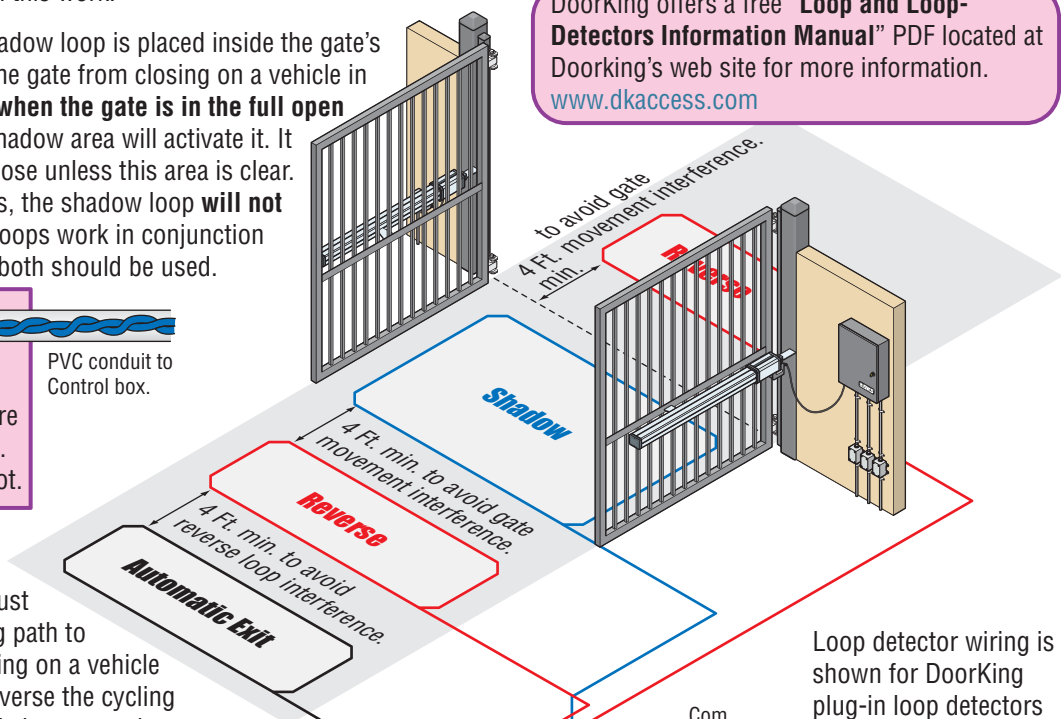
PVC conduit to Control box.

### Automatic Exit Loop

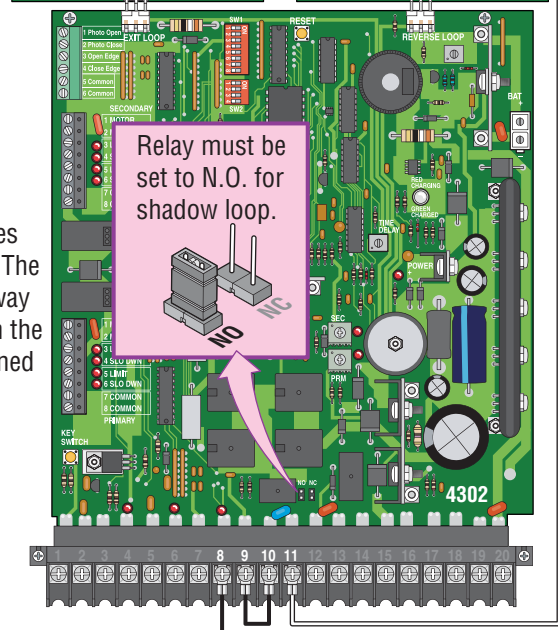
Automatically opens the gate for exiting vehicles without having to use a transmitter or keypad. The exit loop can be placed a minimum of 4 feet away from the reverse loop or far enough away from the gate so the gate has started or completely opened by the time you drive up to it (Free exit).



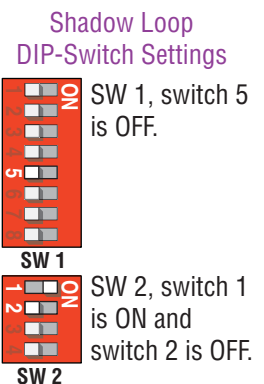
PVC conduit to Control box.



Loop detector wiring is shown for DoorKing plug-in loop detectors P/N 9409-010 and P/N 9410-010 only. If other loop detectors are used, refer to the installation instructions supplied with those detectors for wiring and separate power instructions.

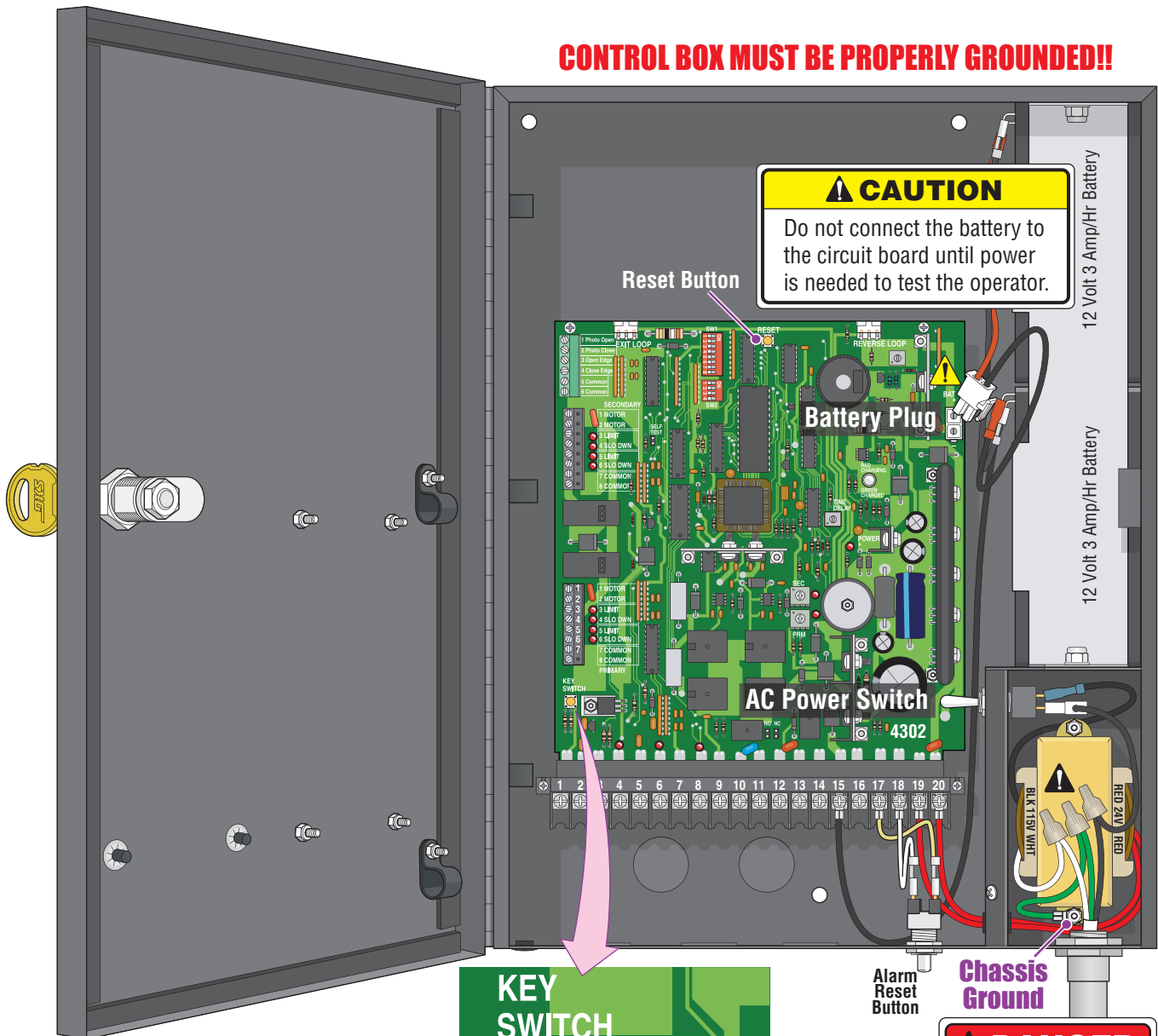


Shadow Loop Output



## 2.6 High Voltage Wiring and Battery Connection

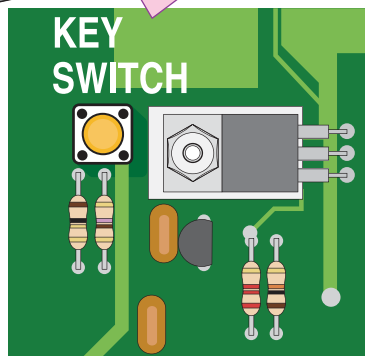
**CONTROL BOX MUST BE PROPERLY GROUNDED!!**



### To Cycle Operator:

After power has been connected, activate the operator by pressing the key switch button.

**DO NOT** cycle operator before limit sensors and DIP-switches have been adjusted, damage could occur to gate and operator (See pages 22 and 23).



**Important Power Note:** To turn-off **ALL** power to the operator, the AC power switch must be turned off **AND** the battery plug must be disconnected from the circuit board.

It is recommended that a surge suppressor be installed on the high voltage power lines.

Alarm  
Reset  
Button

Chassis  
Ground



Conduit

Input Power Wire

Connect 115 VAC input power wires:  
**Black** to transformer's black (Hot).  
**White** to transformer's white (Neutral).  
**Green** to chassis ground.

### Input Power Wire Table

Wire Size	Distance
14 AWG	Up to 200 ft
12 AWG	Greater than 200 ft

# SECTION 3 - ADJUSTMENTS

The switch settings and adjustments in this section should be made after your installation and wiring to the operator(s) is complete. **Whenever any programming or switch setting on the control board are changed, press the reset switch for new settings to take effect.**

## 3.1 4302 Circuit Board Description and Adjustments

### DIP-Switches

Set DIP-switches on the circuit board to the desired setting. See switch-setting charts on next 2 pages.

SW 1

SW 2

### Loop Detector 9410 Single Channel

Exit Loop Port

### Loop Detector 9409 Dual Channel

Reverse Loop Port

### Reset Switch

RESET

Press reset switch to activate changed control board settings.

### Self Test

Self Test Mode

Self test mode is for bench checks only. The operator will continually cycle the gate.

Normal Mode

The jumper must be set at normal mode to function.

Secondary Operator ONLY

Primary Operator ONLY

### Auto Close Timer

- Auto close timer (when turned on) SW 1, switch 4.

SW 1

Adjust from 1 second (full counter clockwise) to approximately 23 seconds (full clockwise).

TIME DELAY  
1 23

### Key Switch

KEY SWITCH

Cycles the operator when pressed.

### Dry Relay Contact

Dry relay contacts (terminals 10-11) can be set for Normally Open (NO) or Normally Closed (NC) operation by placing the relay shorting bar on the N.O. or N.C. pins respectively.

### Reverse Sensors

Adjust reversing sensitivity for: PRIMARY (single) and SECONDARY (dual) operators. See 3.4 on page 24.

## 3.2 DIP-Switch Description and Functions

Whenever any programming or switch setting on the control board is changed, press the reset switch for new settings to take effect.

SW 1 (Top 8 Switches)			
Switch	Function	Setting	Description
1	Opening Direction of Primary Operator		
2	Opening Direction of Secondary Operator		Same opening directions as illustrated above for the primary operator. Switch 2 will be the SAME setting as the primary operator switch 1. SW1, switch 7 MUST also be ON.
3	Exit Loop Port Output	OFF	Terminal 4 is output from plug-in exit loop detector installed in EXIT loop port.
	Open Input	ON (normal)	Terminal 4 is normal open command.
4	Auto-Close Timer	OFF	Auto-close timer is OFF. Manual input required to close gate.
		ON	Auto-close timer is ON. Adjustable from 1-23 seconds.
5	Reverse	OFF (normal)	Terminal 8 is a standard Reverse input.
	Shadow	ON	Terminal 8 is a Shadow reverse input.
6	Overlapping Gates	OFF	Both operators start at the same time.
		ON	Secondary operator starts 1-2 seconds before primary operator.
7	Single	OFF	Switch must be OFF for single operator.
	Dual	ON	Switch must be ON when (dual) operators are used.
8	Spare	OFF	Leave in the OFF position.

**SW 1-Switch 1** Motor direction switch - **Must** OPEN the primary gate upon initial AC power up and open command. If the open command begins to close the primary gate, turn AC power off and reverse this switch.

**SW 1-Switch 2** Motor direction switch - **Must** OPEN the secondary gate upon initial AC power up and open command. If the open command begins to close the secondary gate, turn AC power off and reverse this switch.

**SW 1-Switch 3** Determines if the output of the loop detector (DoorKing plug-in loop detectors only) installed into the **EXIT loop port** will be sent directly to the microprocessor to open the gate (Normal), or if the output is directed to Terminal 4 where it can then be connected to other input terminals.

**SW 1-Switch 4** Turns the auto close timer on or off. Maximum time that the close timer can be set for is approximately 23 seconds.

**SW 1-Switch 5** This switch sets the input at Terminal 8 to act as a normal reverse input or to act as a shadow input. A shadow input will only hold the gate operator in the open position once it is in the full open position. A shadow input will not reverse the direction of the gate actuator once it begins its close cycle.

**SW 1-Switch 6** Turns the gate overlap feature on or off. When turned ON, the Secondary operator begins its cycle 1-2 seconds prior to the Primary operator, allowing the Primary gate to reach its full closed position 1-2 seconds before the Secondary gate. This feature is useful when a magnetic lock is used to secure the gates.

**SW 1-Switch 7** Sets up the circuit board for single or dual (Primary / Secondary) gate operation.

**SW 1-Switch 8** Spare switch. Leave in the OFF position.



## 3.2 Continued

SW 2 (Bottom 4 Switches)			
Switch	Function	Setting	Description
1 and 2	Relay Operation	1-OFF 2-OFF	Relay activates when gate is fully open.
		1-OFF 2-ON	Relay activates when gate is not closed.
		1-ON 2-OFF	Relay activates when gate is opening and open.
		1-ON 2-ON	Relay activates when gate is opening and closing.
3	Maglock	ON	1 second delay to disengage maglock.
	DK Deadbolt Lock	OFF	4-5 seconds delay to retract dead-bolt.
4	Spare	OFF	Leave in the OFF position.

**SW 2-Switch 1 and 2** These work in conjunction with each other and determine when the relay on the board will be activated. This relay can be used as a switch for various functions such as illuminating a warning light when the gate is moving, or turning on a green light when the gate is full open. This relay is not available for these uses if it is being used for the shadow loop function.

**SW 2-Switch 3** Used for a maglock or a DK deadbolt lock.

**SW 2-Switch 4** Spare switch. Leave in OFF position.

## 3.3 Limit Sensor Adjustments

The limit sensors on the actuator can be adjusted to control the travel of the gate and to precisely set the full open and full closed position of the gate. This feature is especially useful in applications where the gate opens partially, such as on a curved driveway.

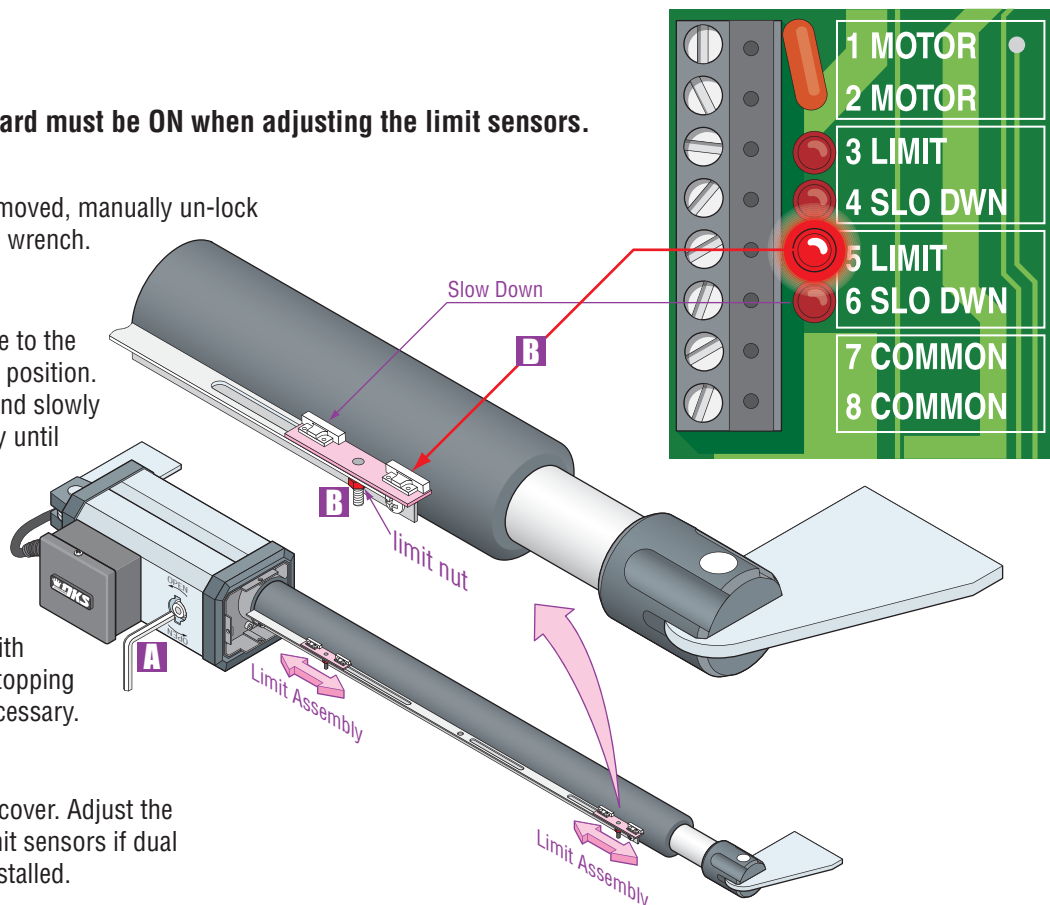
**Power to the circuit board must be ON when adjusting the limit sensors.**

**A** With actuator cover removed, manually un-lock actuator arm with allen wrench.

**B** Manually move the gate to the desired open or closed position. Loosen the limit nuts and slowly slide the limit assembly until the **LIMIT LED** on the circuit board lights up.

**C** Tighten the limit nuts, re-lock actuator arm with key and test the gate stopping positions. Repeat if necessary.

**D** Re-install the actuator cover. Adjust the Secondary actuator limit sensors if dual actuators have been installed.



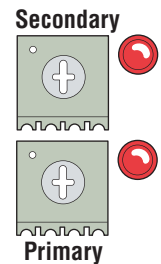
## 3.4 Inherent Entrapment Sensing Adjustment

This vehicular gate operator is equipped with an inherent adjustable reversing sensor (Type A) that is used as the primary entrapment sensing system according to the UL 325 standards. The gate will reverse direction upon encountering an obstruction in either the **opening or closing gate cycle**. For the reverse system to function correctly, the gate must be properly installed and work freely in both directions. A good set of roller bearing hinges is essential for proper swing gate operation.

The ideal adjustment will allow the operator to move the gate through its entire travel cycle without reversing, but will reverse upon contact with an obstruction with no more than 40 Lbs of force. This force can be measured with a gate scale, DoorKing P/N 2600-225.

The amount of force required for the gate to reverse direction depends on the reverse sensitivity potentiometer.

**CAUTION: Keep pedestrians and vehicles clear of the gate while adjusting sensor!**



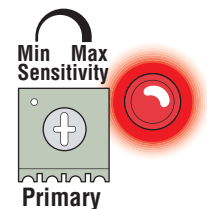
### Adjust the operators reversing sensitivity:

While operator has AC power:

- 1 Press the Key Switch button to cycle the gate open.

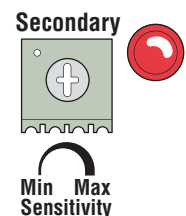


- 2 While gate is opening, slowly rotate **Primary** reverse sensor clockwise until the **reverse LED lights up** and the gate reverses direction. Rotate reverse sensor back counter-clockwise approximately 1/8 turn.



- 3 Cycle the gate a few times to be sure that it cycles completely.

Note: Secondary operator must be individually adjusted if dual operators have been installed. Use the **Secondary** reverse sensor.



### Test the operators reversing sensitivity:

Place an immobile object along the gate path, allowing the gate to strike it while in the **open** or **close** cycle. The gate must reverse direction after striking the object. If it does not, increase the reverse sensitivity (step **2**) and repeat this test until the correct sensitivity has been set for the open and close directions.

## 3.5 Shutdown Conditions

Under various entrapment conditions the operator will assume either a **SOFT** or **HARD (alarm)** shutdown. To determine what type of reset action is required, you will need to understand how the different entrapment conditions affect the gate operator.

### Soft Shutdown

---

This occurs in various situations where the inherent or secondary entrapment protection devices have been activated. In a soft shutdown condition, the operator **will not** respond to any input that was present when the entrapment protection device sensed or encountered an obstruction. If the gate stops at the open position, the operator **will not** respond to the automatic close timer and a “manual input” is required to close the gate.

- **Example 1** - A time clock keys the gate open in the morning and an entrapment protection device senses an obstruction prior to the gate reaching the full open position. If the entrapment is sensed by the inherent system, the gate will reverse and run back to the closed position. The time clock input is still present, but the gate will not re-open.

**Note:** In some systems, the time clock input comes from the telephone entry system relay. This same relay may also provide open commands for a card reader, MicroPLUS transmitters and the visitor telephone entry. If so, these devices will also be disabled in a soft shutdown condition.

- **Example 2** - If the gate is closing and an entrapment protection device is activated, the gate will either stop or reverse and run back to the open position, depending upon if the secondary or inherent device was activated. The automatic close timer will not close the gate.
- **Example 3** - If a moving vehicle runs over a loop while the gate is cycling open and hits the opening gate, the operator's inherent entrapment protection is activated. The gate will reverse direction and run back to the closed position. A soft shutdown condition **does not occur** and the loop provides an immediate reset of the operator. Once the loop area is clear and another open command is given, the gate will cycle open.

### Resetting a Soft Shutdown

In some conditions, a soft shutdown will reset as soon as the entrapment condition clears. For example, if a non-contact sensor (photo sensor) is sensing an obstruction, the operator will stop the gate and assume a soft shutdown condition. When the photo sensor clears (Obstruction is no longer there), the operator will return to normal operation.

When the operator is in a soft shutdown, activation of any “intended input” will reset the operator. An “intended input” includes any command input device, any standard safety input device and any loop input. Activating any of these inputs will reset the gate. At that point the gate will return to normal operation. If the gate is open, the automatic close timer will then time out and close the gate.

Continued on next page.

## 3.5 Shutdown Conditions Continued

### Hard Shutdown (Alarm Activated)

A hard shutdown condition occurs when: (1.) The inherent entrapment protection system (Type A) gets activated TWO consecutive times before the gate completes the open or close cycle. (2.) The reversing edge (Type B2) gets activated and reverses but before the gate completes the reverse cycle the inherent entrapment protection system (Type A) gets activated.

- **Example of a Hard Shutdown** - The gate is closing and the inherent entrapment protection system senses an obstruction and causes the gate to reverse direction. As the gate begins to run in the open direction, a second obstruction is sensed prior to the gate reaching the full open position. Once the second obstruction has been sensed, the operator will stop, **the audio alarm will sound and all standard inputs are shut down** (including open commands, safety commands, loop inputs, etc.).
  - **To silence the alarm**, press the reset button or after 5 minutes, the audio alarm will shut off but will “chirp” every 5 seconds. This indicates that the operator is in a hard shutdown condition (The reset button must be pressed to reset the operator and stop the alarm “chirping”).

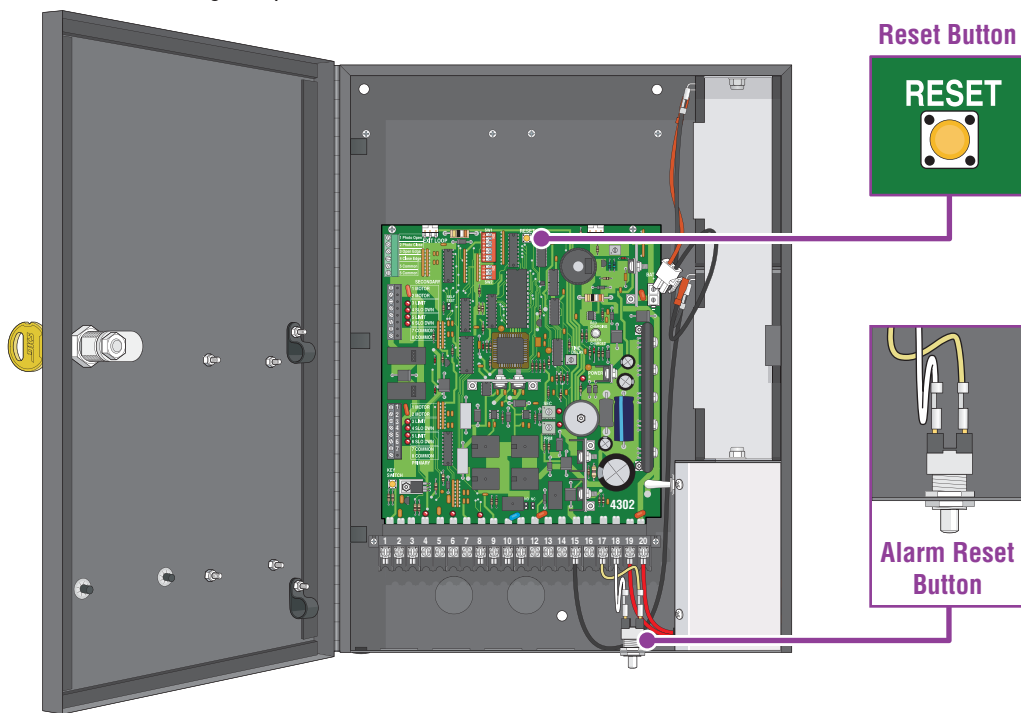
### Resetting a Hard Shutdown

The operator is in a hard shutdown condition when the audio alarm is sounding OR “chirping” every 5 seconds.

- Before resetting a hard shutdown, determine why the shutdown occurred. Inspect the gate for any obstructions along its path that could have activated the inherent entrapment sensing system. Inspect the gate and gate hardware.

**The audio alarm will sound for five minutes, or until the operator’s reset button is pushed. After (5) five minutes the alarm will “chirp every 5 sec.” and the hard shutdown condition will remain in affect until the reset button is pushed.**

**Note:** DoorKing operators have a built-in alarm reset push buttons on the circuit board and on the bottom of the control box for quick access. Activating either one of these buttons will return the gate operator to normal operation, but will not activate the gate operator.



Once the gate has been reset, an open or close command is needed to start the gate operator. Most activating commands will cause the gate operator to cycle to the open position. This includes activation of a key switch or open command and activation of the automatic exit loop (If used). Activation of a close command will run the gate to the closed position.

# SECTION 4 - MAINTENANCE AND TROUBLESHOOTING

Inspection and service of this gate operator by a qualified technician should be performed anytime a malfunction is observed or suspected. High cycle usage may require more frequent service checks.

## 4.1 Maintenance

When servicing the gate operator, always check any secondary (external) reversing devices (loops, photo sensors, etc.) for proper operation. If external reversing devices cannot be made operable, do not place this operator in service until the malfunction can be identified and corrected.

**Always check the inherent reversing system when performing any maintenance. If the inherent reversing system cannot be made operable, remove this operator from service until the cause of the malfunction is identified and corrected. Keeping this operator in service when the inherent reversing system is malfunctioning creates a hazard for persons which can result in serious injury or death should they become entrapped in the gate.**

When servicing the gate operator, be sure that the 24 VAC input power and batteries are disconnected.

Operator Component	Maintenance	Monthly Interval		
		3	6	12
<b>Alarm</b>	Activate the primary (inherent) reverse system by blocking the gate with a solid object. When the gate reverses, block the gate in the opposite direction prior to the limit being reached. The entrapment alarm should activate. Press the reset button to silence the alarm.	✓		
<b>Batteries</b>	Check the batteries for any leakage or loose connections. Batteries should be replaced every two years.	✓		
<b>Fire Dept.</b>	Check emergency vehicle access device for proper operation.	✓		
<b>Gate</b>	Inspect for damage. Check gate hinges for wear and grease if necessary.		✓	
<b>Primary Reverse System</b>	Check that the gate reverses on contact with an object in both the opening and closing cycles. Adjust the reversing sensor if necessary.	✓		
<b>Loop(s)</b>	Check vehicular reverse and shadow loops for proper operation.	✓		
<b>Release</b>	Check manual release for proper operation.	✓		
<b>Secondary Reverse Device</b>	Check secondary (external) reverse device(s) stop or reverse the gate when activated.	✓		
<b>Complete System</b>	Complete check of gate and gate operating system.			✓

## 4.2 Diagnostics Check

Have the following diagnostic tools available: VOM meter with minimum voltage memory or min-max range to check voltage and continuity. Meg-ohm meter capable of checking up to 500 megohms of resistance to properly check ground loop integrity. A malfunction can be isolated to one of the following:

- Gate Operator
- Loop System
- Keying Devices.

**Disconnect all external inputs to the circuit board.**

1. Check the input indicator LED's. They should only come ON when a keying device (card reader, push button, etc.) is activated. If any of the input LED's are ON continuously, this will cause the gate operator to hold open. Disconnect the keying devices one at a time until the LED goes OFF (see troubleshooting guide).
2. If the operator stops or holds open, check external secondary entrapment protection devices for any shorts or malfunction.
3. A malfunction in a loop or loop detector can cause the gate operator to hold open, or not detect a vehicle when it is present over the loop. Pull the loop detector circuit boards from the loop ports on the operator circuit board. If the malfunction persists, the problem is not with the loop system. For more information refer to the loop detector instruction sheet and the DoorKing Loop and Loop Detector Information Manual. Continued on next page.

## 4.2 Diagnostics Check Continued

4. Check that there are no shorted or open control wires from the keying devices to the gate operator. If a keying device fails to open the gate, momentarily jumper across terminals 1 and 2 on the control board. If the gate operator starts, this indicates that a problem exist with the keying device and not with the gate operator.

5. Check the supply voltage and batteries. A voltage drop on the supply line (usually caused by using too small supply voltage wires) will cause the operator to malfunction. Batteries should be fully charged for proper operation, replace batteries every two years on average.

## 4.3 Troubleshooting

Symptom	Possible Solution(s)
Operator(s) will not run. Power LED is OFF.	<ul style="list-style-type: none"> <li>• Check that AC power to the operator is turned ON.</li> <li>• Check battery power.</li> <li>• Check for 24 VAC at terminals 19 and 20. If voltage measures OK, check the terminal strip or replace the circuit board.</li> </ul>
Operator(s) will not run. Power LED is ON.	<ul style="list-style-type: none"> <li>• Momentarily jumper terminal 1 to terminal 2. If the input LED does not come ON, check the terminal strip or replace the circuit board. If LED does come ON, proceed to next steps.</li> <li>• Check the fuses.</li> <li>• <b>Check Motor(s):</b> Remove the circuit board. With two 14 AWG insulated jumper wires, momentarily jumper the battery terminals to the motor terminals (1, 2) of the Primary operator connector. The operator should run. Swap the two wires at the terminal strip. The operator should run in the opposite direction. Repeat these steps using the Secondary operator connector.</li> <li>• If the operator(s) run in both directions in the step above, replace the control board. If the operator(s) do not run, or run in only one direction, problem can be a bad operator, wire connections from the control board to the operator(s) or a bad control board.</li> </ul>
Gate opens a short distance, then stops and reverses.	<ul style="list-style-type: none"> <li>• Check the reversing sensitivity.</li> <li>• Check the secondary safety devices.</li> <li>• Disconnect the gate from the gate operator and check that the gate swings freely without any binding.</li> <li>• Continue troubleshooting or replace the circuit board.</li> </ul>
Gate opens but will not close.	<ul style="list-style-type: none"> <li>• Check the input LEDs. Any ON will hold the gate open and indicates a problem with a keying device.</li> <li>• Check the secondary safety devices. Any activated will hold the gate open and indicates a problem with the safety device.</li> <li>• Check the loop detectors. Any activated can hold the gate open and indicates a problem with the loop detector or ground loop.</li> <li>• Operator may be in a “soft shutdown.” Activate any keying device to determine if operator returns to normal operation.</li> <li>• If automatic close is desired, be sure SW 1, switch 4 is ON.</li> </ul>
Gate closes but will not open.	<ul style="list-style-type: none"> <li>• Operator may be in a “soft shutdown.” Check input LEDs. If any are ON, momentarily disconnect, then re-connect the wire going to the respective terminal. Operator should open.</li> <li>• Check to be sure that the operator is running in the proper direction. Turn power OFF, and then back ON. Activate a keying device. Operator should run in the open direction. If operator runs in the close direction, turn power OFF and change direction switch SW 1, switches 1 and/or 2. Go to above section if operator now opens but will not close.</li> <li>• Be sure that the respective LED on the control board lights when the keying device connected to the respective terminal is activated. If LED does not light, momentarily place a jumper wire from terminal 1 to the input terminal being checked. If LED lights and gate opens, problem is with the keying device. If LED does not light, replace control board.</li> <li>• Check motor as described above “Operator(s) will not run. Power LED is ON”.</li> </ul>

## 4.3 Troubleshooting Continued

Symptom	Possible Solution(s)
Gate starts to close, then reverses to open.	<ul style="list-style-type: none"> <li>• Disconnect the gate from the operator and check that the gate operates freely without any binding.</li> <li>• Check the loop detector LED's and input LED's. Any that flash ON will cause the gate to reverse.</li> <li>• If a shadow loop is used, check for proper wiring. A mis-wired shadow loop detector will cause the gate to reverse.</li> <li>• Continue troubleshooting or replace the circuit board.</li> </ul>
Gate closes and opens continuously.	<ul style="list-style-type: none"> <li>• Check for any input or loop detector LED's that are ON.</li> <li>• Check that the operator is running in the proper direction (see "gate closes but will not open").</li> <li>• Check the SELF TEST jumper, see page 21.</li> </ul>
Alarm sounds for 5 minutes and then beeps once every 5 seconds. Operator will not run.	<ul style="list-style-type: none"> <li>• Operator is in a "hard shutdown" condition. Reset switch must be activated to return operator to normal operation, see Hard Shutdown Section 3.5, page 26.</li> </ul>

## 4.4 Accessory Items

The following accessory items are available for the model 6002 swing gate operator.

**Photo Sensor** - Non-contact sensors (photo-cells) sensors for use as a secondary entrapment protection device.

EMX Industries, Inc. Model IRB-325

MMTC, Inc. Model E3K-R10K4-NR

**Loop Detector** - Detectors plug directly into ports on circuit board simplifying wiring.

P/N 9410-010 - Single channel detector

P/N 9409-010 - Two-channel detector

**Magnetic Lock** - Magnetic Gate Lock Kit provides an excellent means to secure swing gates and is a fail-safe device allowing emergency vehicle access upon power outage.

P/N 1216-080 and P/N 1216-081

**Interconnect Cable** - Interconnect wire cable contains all the necessary wires to interconnect primary / secondary operators.

Cable length 30 feet. P/N 2600-755 Cable length 40 feet. P/N 2600-756 Cable length 50 feet. P/N 2600-757

**Time Clock** - 7 day and 365 day time clocks can be used to automatically open gate at pre-set time and days. Compact clock fits inside the control box.

P/N 2600-791 - 7 day clock

P/N 2600-795 - 365 day clock

**Hinges** - Heavy-duty ball bearing hinges provide easy swing gate operation.

P/N 1200-009 (Flange), P/N 1200-019, P/N 1200-039. Two (2) required.

**Surge Devices** - High and low voltage surge suppressors help prevent circuit board failure caused by lightning strikes and power surges.

P/N 1876-010 - High Voltage

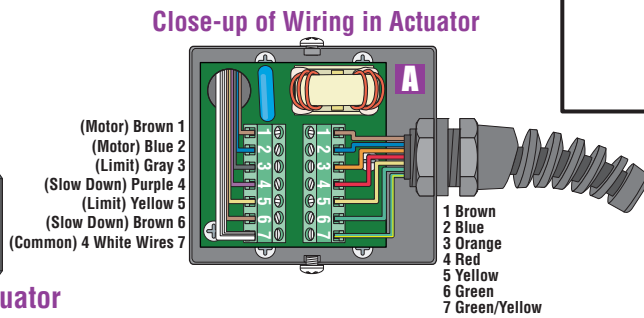
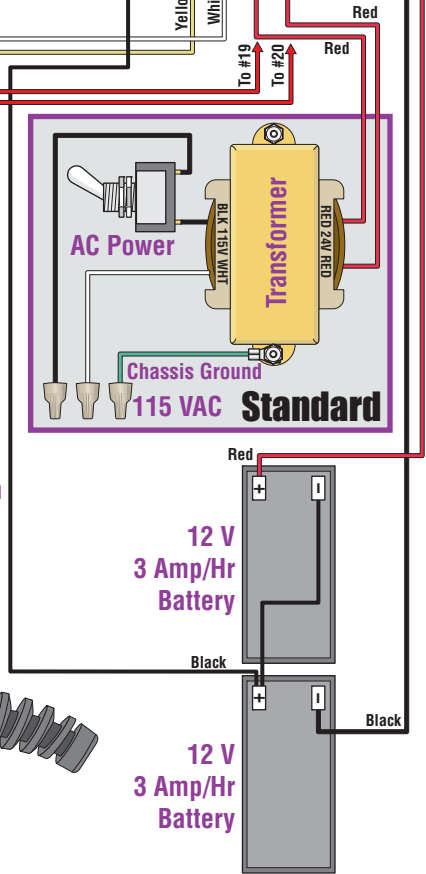
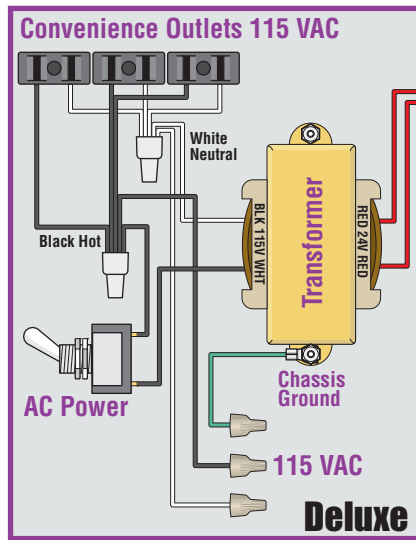
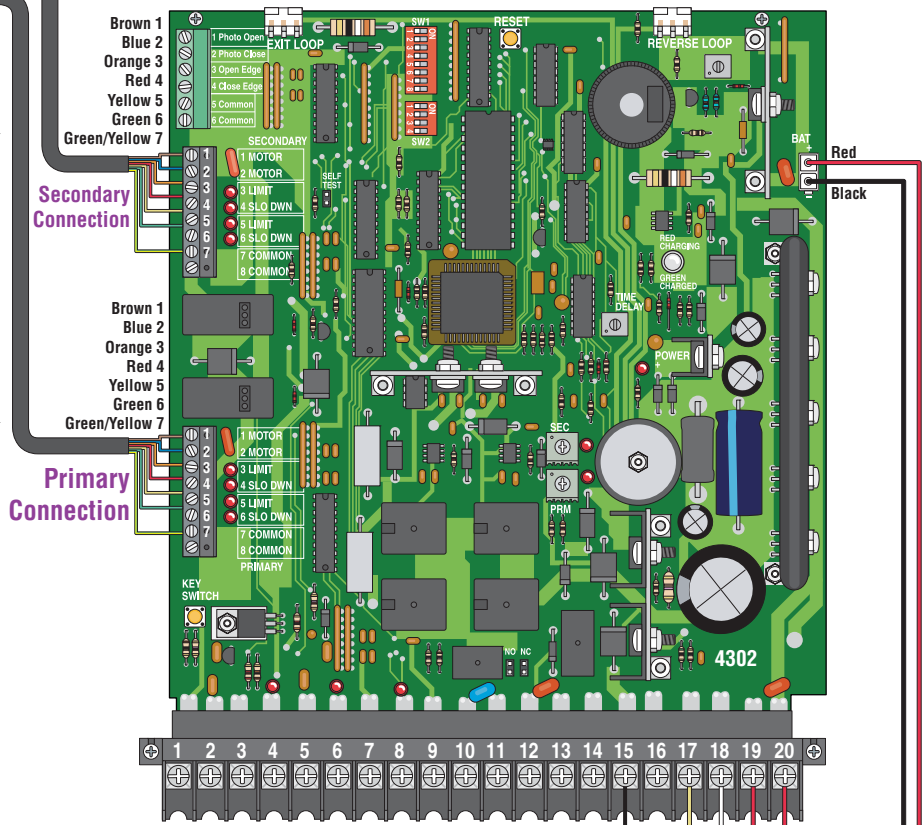
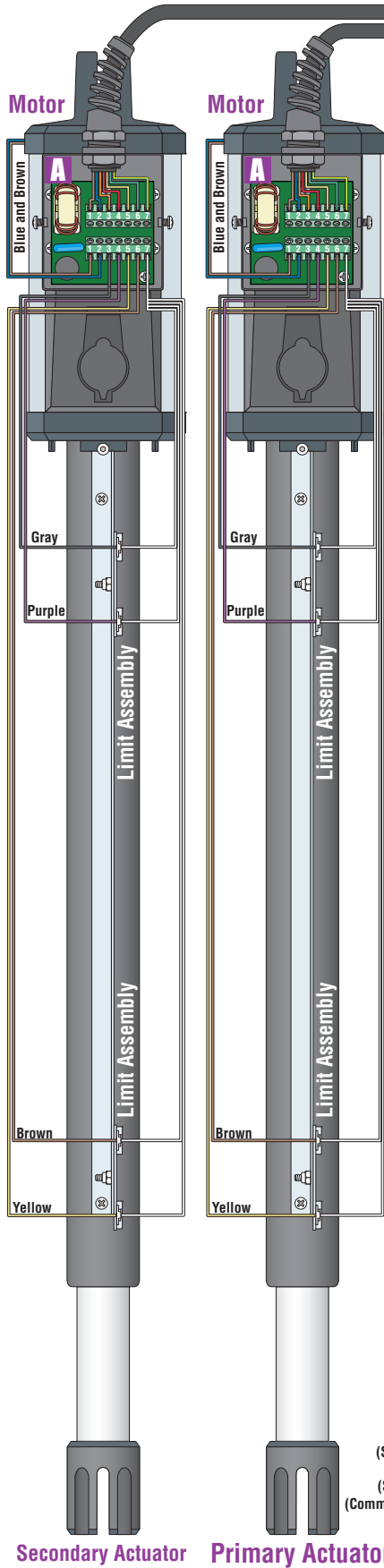
P/N 1878-010 - Low Voltage

**Gate Scale** - Use to test torque required to move gate. P/N 2600-225

**Speed Bumps** - Prefabricated six-foot speed bump reduces traffic speed through gate system. P/N 1610-150

**Batteries** - 12 Volt 3 Amp Hour. P/N 1801-009. Two (2) required.

# 6002 with Standard or Deluxe Control Box Schematics









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