Installation/Owner's Manual

1603

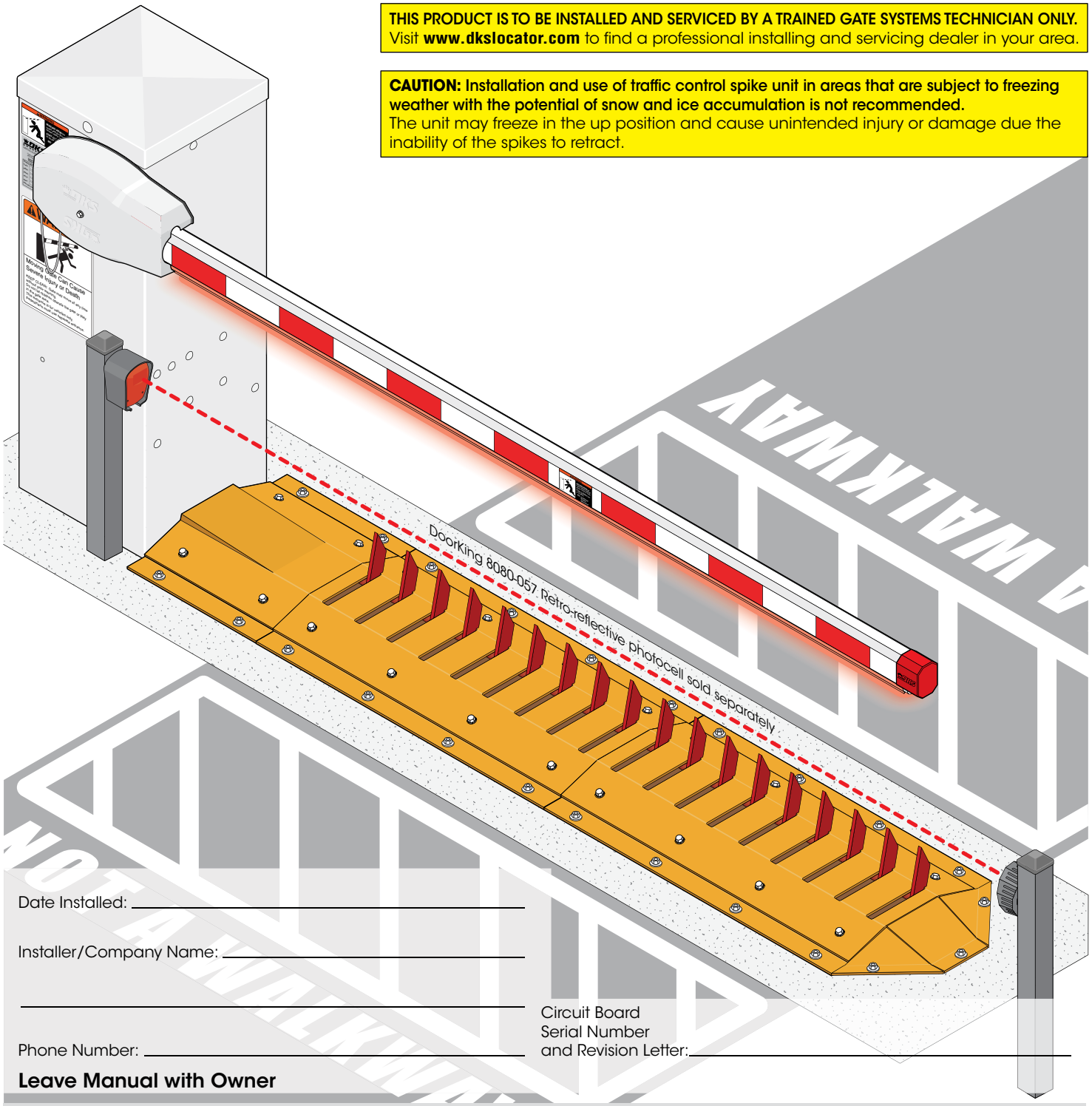
Barrier Gate Operator with Auto Spike System

Use this manual for circuit board 1601-010 Revision AK or higher.

1603-065-WJ-11-26

THIS PRODUCT IS TO BE INSTALLED AND SERVICED BY A TRAINED GATE SYSTEMS TECHNICIAN ONLY.
Visit **www.dkslocator.com** to find a professional installing and servicing dealer in your area.

CAUTION: Installation and use of traffic control spike unit in areas that are subject to freezing weather with the potential of snow and ice accumulation is not recommended.
The unit may freeze in the up position and cause unintended injury or damage due the inability of the spikes to retract.



Date Installed: _____

Installer/Company Name: _____

_____

Phone Number: _____

Circuit Board
Serial Number
and Revision Letter: _____

Leave Manual with Owner

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Intertek 9900288 Listed to ANSI/CAN/UL 325

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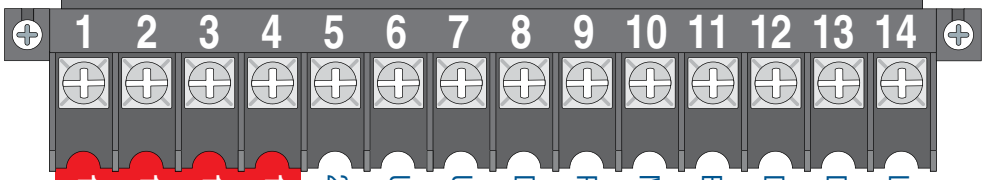
DKS DOORKING®

QUICK GUIDE: Terminal Descriptions



Relay Contacts

Input LEDs: The LED that is above the terminal wiring input will light when that terminal input gets activated.



See page 16 for terminal wiring.

115 VAC Neutral
115 VAC Power
115 VAC Motor
115 VAC Motor

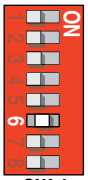
DANGER
HIGH VOLTAGE!

24 VAC - 250 mA max — 5

Exceeding 250 mA of power from this terminal may cause the circuit board transformer to **overheat**, causing intermittent **problems**.

UP Input — 6

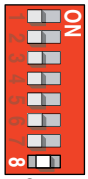
Function is dependent on the setting of programming SW 1, switch 6.
When switch 6 is **OFF**, this input will cause the operator to rotate the arm to the up position. If the arm is in the down cycle, this input will reverse the arm to the up position. If this terminal has a constant input, the arm will remain in the up position regardless of any down input or timer command to rotate down.
When switch 6 is **ON**, this input will cause the operator to rotate the arm to the up position when it is down, and will cause the operator to rotate the arm to the down position when it is up. If the auto timer is turned ON (Not recommended if switch 6 is ON), this input will override the timer and rotate the arm to the down position. If the arm is in the down cycle, this input will reverse the arm to the up position.



SW 1

UP INPUT or UP LOOP Output — 7

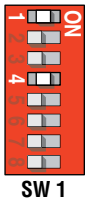
Function is dependent on the setting of programming SW 1, switch 8.
When switch 8 is **ON**, the function of this input is identical to terminal 6.
When switch 8 is **OFF**, this terminal becomes the logic output of the up loop detector.



SW 1

DOWN/REVERSE Input — 8

Function is dependent on the setting of programming SW 1, switches 1 and 4.
With switch 1 **OFF** and switch 4 **ON**, activation and then deactivation of this input will rotate the arm to the down position, provided that the deactivation of the input happens while the arm is in the full up position. This input will override the auto timer if it is turned **ON**. If the arm is in the down position, traveling in the down cycle, or traveling in the up cycle, activation and deactivation of this input has no effect on the arm.
With switches 1 and 4 are **ON**, activation and then deactivation of this input will rotate the arm to the down position after it reaches the full up position regardless of when the deactivation of the input occurred.
When switch 4 is **OFF**, this input is identical to the reverse input, terminal 9.



SW 1

REVERSE Input — 9

When the arm is in the down position, activation of this input has no effect.
When the arm is in the up position, activation of this input will prevent the arm from rotating to the down position. If the arm is in the down cycle, activation of this input will reverse the arm to the up position.

MOMENTARY UP Input — 10

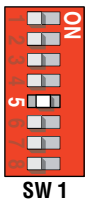
This input is used when sequencing the 1603 with a slide or swing gate operator in **PAMS** applications. Activation of this input will rotate the arm to the up position one time, and activates the enable up input.

ENABLE UP Input — 11

This input is used when sequencing the 1603 with a slide or swing gate operator in **PAMS** applications. This input is only active after a MOMENTARY UP input is received. Activation of this input will rotate the arm to the up position or reverse an arm in the down cycle to the up position.

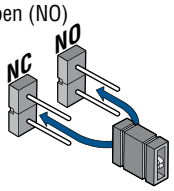
Dry Relay Contact — 12
Dry Relay Contact — 13

Function is dependent on the setting of programming SW 1, switch 5.
When switch 5 is **OFF**, activation of the down loop will activate the relay.
When switch 5 is **ON**, activation of the UP loop will activate the relay.



SW 1

Relay contacts can be set for Normally Open (NO) or Normally Closed (NC) operation. Contact rating is **24V AC or DC @ 1 amp max.**



Low Voltage Common

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1603 SPECIFICATIONS

Use this manual for the Model 1603 operators with circuit board 1601-010 Rev AK or higher ONLY.

1603 Cabinet

Class of Operation
Model 1603 - UL 325 Class II, III, IV – ETL Listed

Type of Gate
Single Traffic Lane Vehicular Barrier Gate Only

Arm Types
Octagon/Round – Straight or Folding (NO Break-Away)

Max Arm Length
Up to 14 Ft

Max Spike Length
9 Ft. (Three 3-ft spike sections)

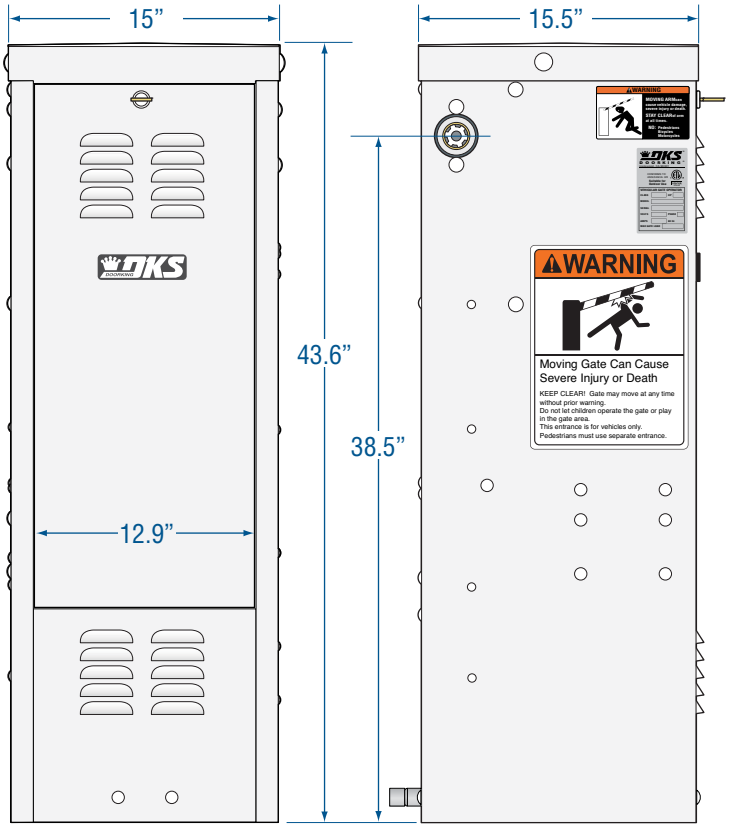
Gate Cycles
High Cycle

Speed
90° in approximately 2.5 seconds

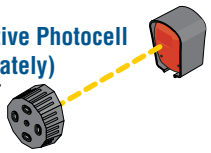
Pedestrian Protection
Inherent entrapment sensing system (Type A)
Provision for connection of a non-contact sensor (Type B1) and/or contact sensor (Type B2)

Model #	Convenience Open	Manual Release	Horsepower - Volts	Amp
1603-380	No	Yes	1/2 HP - 115 VAC	5.7
1603-381	Yes	Yes	1/2 HP - 115 VAC	5.7
1603-580	Lane Barrier Operator **ONLY** see **1601-065.PDF** and **1620-065.PDF manuals**			

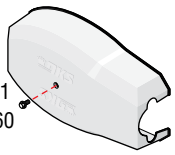
Note: 208/230/460/575 VAC input voltage can be connected to the operator by installing an "Optional" High Voltage Kit (P/N 2600-266).



DKS Reflective Photocell (Sold Separately)
P/N 8080-057

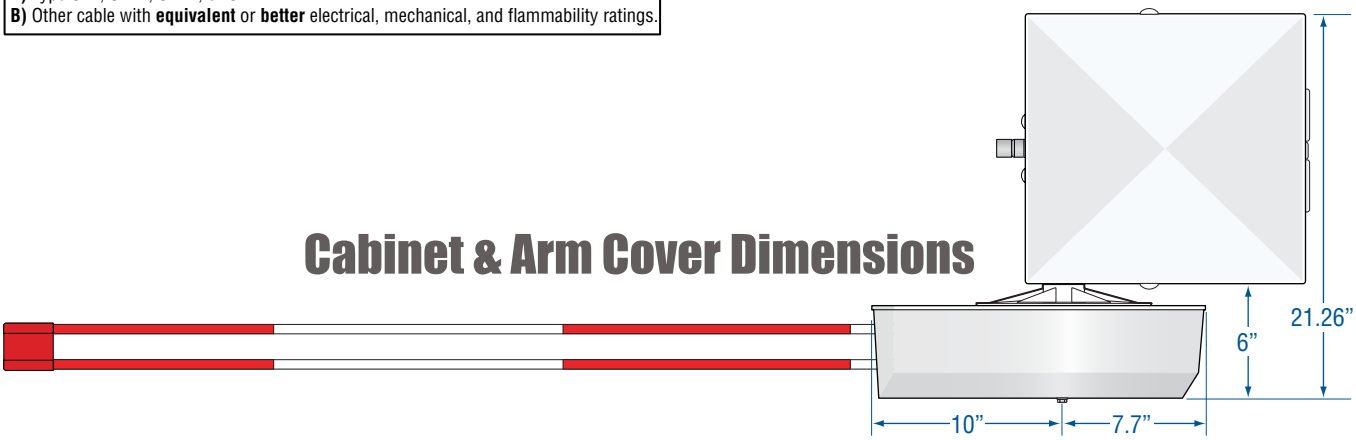


Plastic Arm Cover P/N 1601-281
with Securing Bolt P/N 2615-260
(Included with All models)



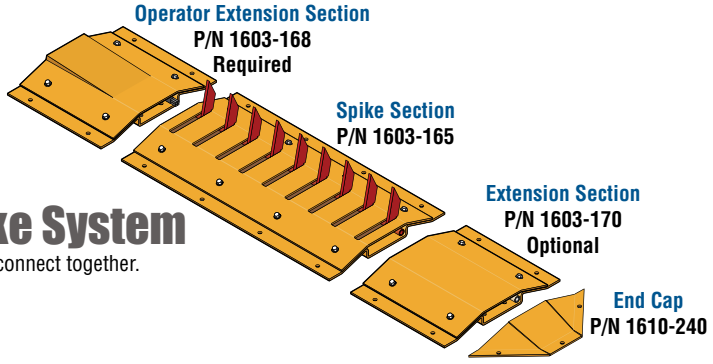
Type of wiring to be used on ALL external devices:
A) Type **CL2**, **CL2P**, **CL2R**, or **CL2X**.
B) Other cable with **equivalent** or **better** electrical, mechanical, and flammability ratings.

Cabinet & Arm Cover Dimensions



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1603 BARRIER ARM and SPIKE OPTIONS



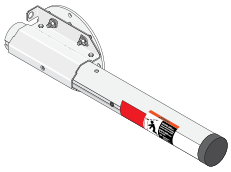
1603 Auto Spike System

Up to 3 spike sections can connect together.

Drawings not to scale

1603 Arms - Round / Octagon

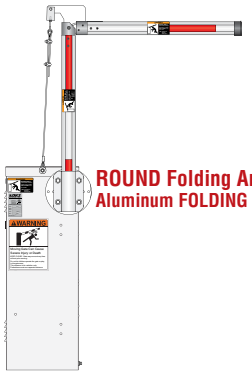
The 1603 CANNOT use a Break-Away Arm



ROUND Arm (No LEDs)

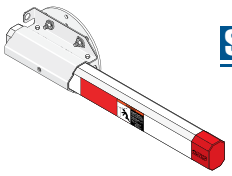
Choose { 14 Ft 1-Piece Aluminum Arm Only P/N 1601-516
14 Ft 2-Piece Aluminum Arm Only P/N 1601-524

Arm Hardware Kit (Required) P/N 1601-242



ROUND Folding Arm (No LEDs)

Aluminum FOLDING Arm Kit (With Arm) P/N 1601-610



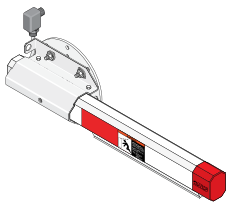
STANDARD Bracket OCTAGON Arm OPTIONS

OCTAGON Arm (No reversing edge or LEDs)

Choose { 14 Ft 1-Piece Octagon Arm Only P/N 1601-555
14 Ft 2-Piece Octagon Arm Only P/N 1601-567

Arm Hardware Kit (Required) P/N 1601-242
Rubber Bumper P/N 8080-089

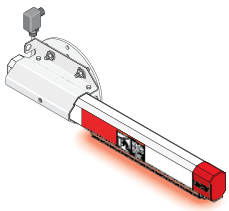
Contact Sensor Note: A reverse edge is **NOT** to be used as a replacement, or in lieu of, in-ground loops or non-contact sensor (photocell) that protect vehicles passing underneath the barrier arm. A **moving** vehicle coming in contact with a downward moving barrier arm **WILL** result in **damage to the vehicle** and the barrier arm/reversing edge if **NOT** using in-ground loops or non-contact sensor (Photocell).



OCTAGON Reversing Edge Arm (No LEDs)

Choose { 14 Ft 1-Piece Octagon Arm Only P/N 1601-555
14 Ft 2-Piece Octagon Arm Only P/N 1601-567

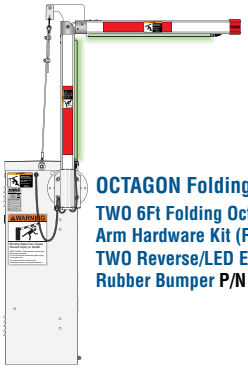
Octagon Arm Hardware Kit (Required) P/N 8080-235
Reverse Edge (Required) different lengths available
Reverse Edge 5 Ft P/N 8080-605
Reverse Edge 6 Ft P/N 8080-606
Reverse Edge 9 Ft P/N 8080-609
Reverse Edge 12 Ft P/N 8080-612



OCTAGON Reversing Edge/Red-Green LED Arm

Choose { 14 Ft 1-Piece Octagon Arm Only P/N 1601-555
14 Ft 2-Piece Octagon Arm Only P/N 1601-567

Octagon Arm Hardware Kit (Required) P/N 8080-235
Reverse/LED Edge (Required) different lengths available
Reverse/LED Edge 5 Ft P/N 8080-905
Reverse/LED Edge 6 Ft P/N 8080-906
Reverse/LED Edge 9 Ft P/N 8080-909
Reverse/LED Edge 12 Ft P/N 8080-912



OCTAGON Folding Arm

TWO 6Ft Folding Octagon Arms Only P/N 1601-812
Arm Hardware Kit (Required) P/N 1601-242
TWO Reverse/LED Edges P/N 8080-922
Rubber Bumper P/N 8080-089

OCTAGON Retrofit Kit for 1603 Operator in the Field:

Replace an existing 1603 **ROUND** aluminum arm to an **OCTAGON** arm

OCTAGON Arm Retro Kit P/N 1601-532

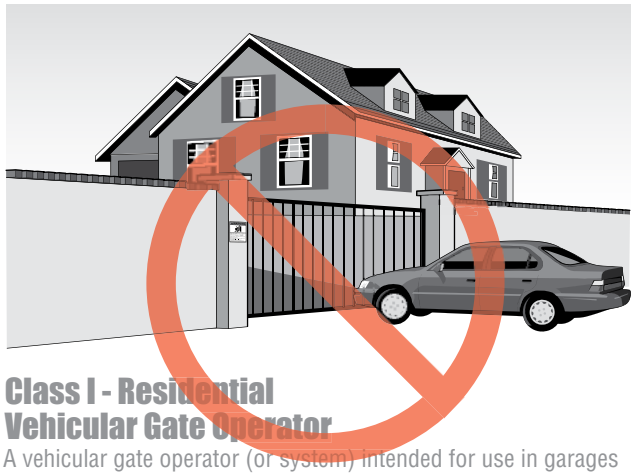
(A standard octagon arm with Reverse Edge + Red/Green LEDs)

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SECTION 1 - IMPORTANT SAFETY INFORMATION

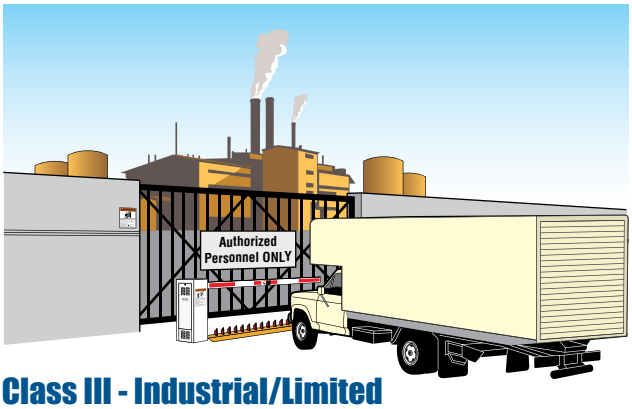
1.1 UL 325 Entrapment Protection for Vertical Barrier Arm

UL 325 Classifications



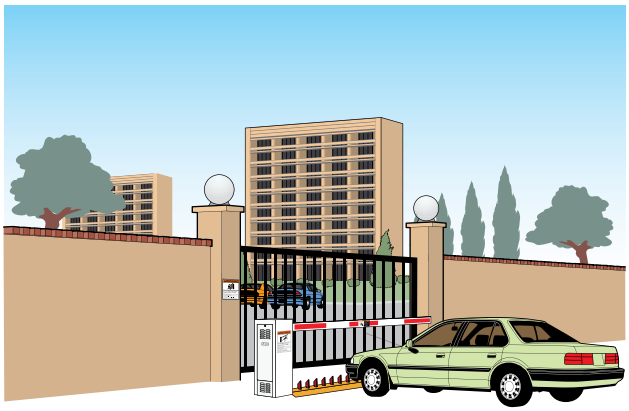
Class I - Residential Vehicular Gate Operator

A vehicular gate operator (or system) intended for use in garages or parking areas associated with a residence of one-to four single families. This does **NOT** apply to a vertical barrier arm.



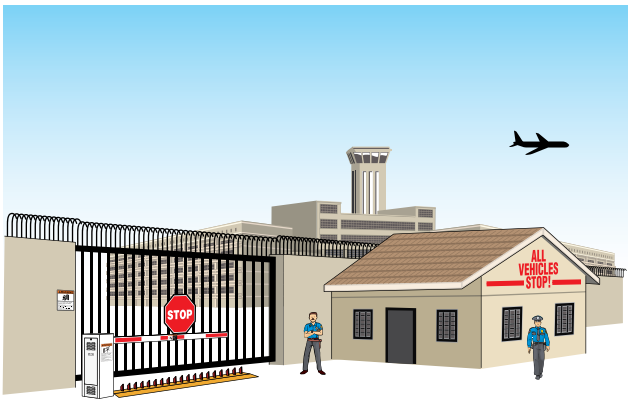
Class III - Industrial/Limited Access Vehicular Gate Operator

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 accessible by or intended to service the general public.



Class II - Commercial/General Access Vehicular Gate Operator

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 buildings accessible by or servicing the general public.



Class IV - Restricted Access Vehicular Gate Operator

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.

Gate Operator Category	Horizontal Slide, Vertical Lift, Vertical Pivot, Horizontal Bifold	Swing, Vertical Barrier (Arm)
Entrapment Protection Types	A, B1*, B2* or D	A, B1*, B2*, C or D

Type A - Inherent entrapment protection system.

Type B1 - Non-contact sensor (photoelectric sensor or the equivalent).

Type B2 - Contact sensor (edge device or equivalent).

Type C - Inherent force limiting, inherent adjustable clutch or inherent pressure relief device.

Type D - Actuating device requiring constant pressure to maintain opening or closing motion of the gate.

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

Vertical Barrier Note: Barrier gate operators (arm) that is not intended to move toward a rigid object **closer than 16 inches** (406 mm) are **NOT** required to be provided with a means of entrapment protection.

1.2 Important Safety Instructions

English	French
IMPORTANT SAFETY INSTRUCTIONS WARNING – To reduce the risk of severe injury or death:	**AVERTISSEMENT DE CONSIGNES DE SÉCURITÉ IMPORTANTES** – Pour réduire le risques de blessures graves ou mortelles :
1. READ AND FOLLOW ALL INSTRUCTIONS.	**1.** LIRE ET SUIVRE TOUTES LES INSTRUCTIONS.
2. Never let children operate or play with gate controls. Keep the remote control away from children.	**2.** Ne jamais laisser les enfants faire fonctionner la porte ou jouer avec les commandes de la barrière. Garder la télécommande hors de la portée des enfants.
3. Always keep people and objects away from the gate. NO ONE SHOULD CROSS THE PATH OF THE MOVING GATE.	**3.** Toujours garder les personnes et les objets loin de la barrière. PERSONNE NE DEVRAIT FRANCHIR LA BARRIÈRE EN MOUVEMENT.
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.	**4.** Vérifier l'ouvre-barrière une fois par mois. La barrière DOIT inverser son mouvement au contact d'un objet rigide, lorsque celui-ci active les capteurs sans contact. Après avoir réglé la force ou la limite du déplacement, vérifier de nouveau l'ouvre-barrière. Si l'ouvre-barrière est mal réglé ou n'est pas vérifié de manière appropriée, le risque de ou de blessures graves ou mortelles est accru.
5. Use the manual release only when the gate is not moving.	**5.** Utiliser le dispositif de dégagement manuel uniquement si la barrière est immobilisée.
6. KEEP GATES PROPERLY MAINTAINED. Read the user's manual. Have a qualified service person make repairs to gate hardware.	**6.** ASSURER L'ENTRETIEN ADÉQUAT DE LA BARRIÈRE. Lire le guide d'utilisation. Demander à un professionnel qualifié de réparer la quincaillerie de la barrière .
7. The entrance is for vehicles only. Pedestrians must use separate entrance.	**7.** L'entrée est réservée aux véhicules . Les piétons doivent avoir une entrée distincte.
8. SAVE THESE INSTRUCTIONS.	**8.** CONSERVER CES INSTRUCTIONS.

1.3 Instructions regarding intended UL 325 installation:

English	French
a) Install the gate operator only when:	**a)** Installer l'ouvre-barrière uniquement si :
1) The operator is appropriate for the construction of the gate and the usage Class of the gate,	**1)** L'ouvre-barrière convient à la construction et la classe d'utilisation de la barrière.
2) All openings of a horizontal slide gate are guarded or screened from the bottom of the gate to a minimum of 1.83 m (6 ft) above the ground to prevent a 57.2 mm (2-1/4 inch) 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,	**2)** Toutes les ouvertures de la barrière coulissante horizontale sont protégées ou grillagées du bas de la barrière jusqu'à au moins 1,83 m (6 pi) du sol si bien qu'une sphère de 57,2 mm (2 1/4 po) de diamètre ne peut passer par aucune ouverture dans la barrière ou dans la portion de la clôture adjacente que la barrière couvre en position ouverte.
3) All areas of the moving vertical pivot gate panel from the bottom of the gate to the top of the gate or a minimum of 1.83 m (72 in) above grade, whichever is less, that pass by a fixed stationary object, and in the area of the adjacent fence that the gate covers during the travel of the gate, shall be designed, guarded or screened to prevent a 57 mm (2-1/4 in) diameter sphere from passing through such areas.	**3)** Toutes les zones du panneau d'une barrière à pivot verticale du bas jusqu'au haut de la barrière ou jusqu'à au moins 1,83 m (72 po) au-dessus du sol (la hauteur la plus basse prévalant) qui passe par un objet immobile et dans la portion de la clôture adjacente que la barrière couvre pendant sa course sont conçues, protégées ou grillagées si bien qu'une sphère de 57 mm (2 1/4 po) de diamètre ne peut passer par de telles zones.
4) All exposed pinch points are eliminated or guarded, and	**4)** Tous les points de pincement sont éliminés ou protégés .
5) Guarding is supplied for exposed rollers.	**5)** Des protections sont fournies pour les galets exposés.
6) The operator instructions shall list the maximum number of open and close entrapment protection devices capable of being connected to the operator.	**6)** Les instructions de l'ouvre-barrière doivent indiquer le nombre maximal de dispositifs de protection contre le coincement à l'ouverture ou à la fermeture.

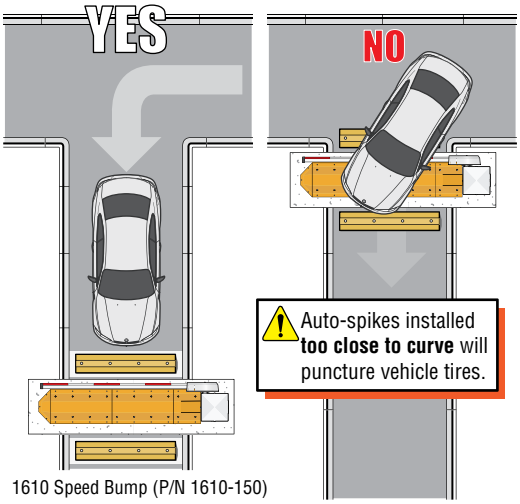
1.3 Instructions regarding intended installation cont:

English	French
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.	**b)** L'ouvre-barrière doit être installé uniquement sur des barrières utilisées pour les véhicules. Les piétons doivent avoir une entrée distincte. Celle-ci doit être conçue pour inciter les piétons à l'utiliser. L'accès doit se trouver dans un endroit où les piétons n'entreront pas en contact avec une barrière pour véhicules en mouvement pendant le déplacement de la barrière.
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.	**c)** Pour réduire le risque de coincement lors de l'ouverture et de la fermeture, la barrière doit être installée dans un endroit où elle est suffisamment éloignée des structures avoisinantes . Les barrières basculantes ne doivent pas s'ouvrir dans des endroits accessibles au public.
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 an improperly installed, improperly functioning, or damaged gate.	**d)** S'assurer que la barrière est bien installée et fonctionne librement dans les deux directions avant d'entreprendre l'installation de l'ouvre-barrière. Ne pas trop serrer l'embrayage de l'ouvre-barrière ou la soupape de décharge de l'ouvre-barrière pour compenser une barrière mal installée, qui ne fonctionne pas correctement ou qui est endommagée.
e) For a gate operator utilizing Type D entrapment protection:	**e)** Pour un ouvre-barrière utilisant une protection contre le coincement de type D:
1) The gate operator controls must be placed so that the user has full view of the gate area when the gate is moving,	**1)** les commandes de l'ouvre-barrière doivent être placées de sorte que l'utilisateur voit l'ensemble de la zone de la barrière lorsque cette dernière est en mouvement.
2) The placard shall be placed adjacent to the controls,	**2)** La plaque exigée doit être placée à côté des commandes.
3) An automatic closing device (such as a timer, loop sensor, or similar device) shall not be employed, and	**3)** Ne pas utiliser de dispositif de fermeture automatique (comme une minuterie, une boucle de détection ou un dispositif similaire).
4) No other activation device shall be connected.	**4)** Ne brancher aucun autre dispositif d'activation.
f) Permanently mounted controls intended for user activation must be located at least 1.83 m (6 ft) 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. **Exception:** Emergency access controls only accessible by authorized personnel (e.g. fire, police, EMS) may be placed at any location in the line-of-sight of the gate.	**f)** Les commandes permanentes destinées à l'activation par l'utilisateur doivent être situées à au moins 1,83 m (6 pi) des pièces mobiles de la barrière et à un endroit que l'utilisateur ne peut atteindre pour actionner les commandes par -dessus ou sous la barrière, ou à côté ou au travers de la barrière. **Exception:** Les commandes d'accès d'urgence accessibles au personnel autorisé seulement (p. ex. pompiers, policiers, ambulanciers) peuvent être placées n'importe où, du moment qu'elles sont en vue de la barrière.
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.	**g)** Le bouton d'arrêt, ou de réinitialisation doit être situé en vue de la barrière. L'activation de la commande de réinitialisation ne doit pas entraîner l'activation de l'ouvre-barrière.
h) A minimum of two (2) WARNING SIGNS shall be installed, in the area of the gate. Each placard is to be visible by persons located on the side of the gate on which the placard is installed.	**h)** Au moins deux (2) PANNEAUX D'AVERTISSEMENT doivent être installés dans la zone de la barrière. Toutes les plaques d'avertissement doivent être visibles des personnes situées à côté de la barrière sur laquelle les plaques sont installées.
i) For a gate operator utilizing Type B1, non-contact entrapment protection:	**i)** Pour un ouvre-barrières utilisant un capteur sans contact pour la protection contre le coincement de type B1:
1) See instructions on the placement of non-contact sensors for each Type of application,	**1)** Voir les instructions sur l'emplacement des capteurs sans contact pour chaque type d'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	**2)** Des précautions doivent être prises pour réduire les risques de déclenchement inutile, comme lorsqu'un véhicule déclenche le capteur pendant que la barrière est encore en mouvement.
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.	**3)** Au moins un capteur sans contact ou plus doit être situé où il existe un risque de coincement ou d'obstruction, comme dans l'espace que peuvent atteindre le bras et la barrière lorsqu'ils sont en mouvement.
j) For a gate operator utilizing Type B2, contact entrapment protection:	**j)** Pour un ouvre-barrière utilisant un capteurs de contact pour la protection contre le coincement de type B2:
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 postmounted both inside and outside of a vehicular horizontal slide gate.	**1)** Au moins un capteur de contact doit être situé où il existe un risque de coincement ou d'obstruction, comme sur le bord d'attaque, sur le bord de fuite et sur les poteaux montés sur l'intérieur et l'extérieur d'une barrière coulissante horizontale pour véhicules.

1.3 Instructions regarding intended installation cont:

English	French
2) One or more contact sensors shall be located at the bottom edge of a vehicular vertical lift gate.	**2)** Au moins un capteur de contact doit être situé sur le bord inférieur d'une barrière levante verticale pour véhicules.
3) One or more contact sensors shall be located at the pinch point of a vehicular vertical pivot gate.	**3)** Au moins un capteur de contact doit être situé au point de pincement d'une barrière à pivot vertical pour véhicules.
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.	**4)** Un capteur de contact doit être installé et câblé de sorte à éviter que la communication entre le capteur et l'ouvre-barrière soit gênée par des dommages mécaniques.
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.	**5)** Un dispositif sans fil, comme un appareil qui transmet des signaux de radiofréquence (RF) à l'ouvre- barrière pour prévenir le coincement, doit être situé à un endroit où la transmission des signaux ne sera pas obstruée ou gênée par des structures, des arbres ou d'autres obstacles similaires. Un dispositif sans fil doit fonctionner dans les conditions pour lesquelles il a été conçu.
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 101.6 mm (4 in) but less than 406 mm (16 inches) above the ground at any point in its arc of travel, one or more contact sensors shall be located on the bottom edge.	**6)** Au moins un capteur de contact doit être situé à l'intérieur et à l'extérieur du bord d'attaque d'une barrière battante. De plus, si le bord inférieur de la barrière battante est situé à plus de 101 ,6 mm (4 po), mais à moins de 406 mm (16 po) du sol à l'un des points de sa trajectoire, au moins un capteur de contact doit être situé sur le bord inférieur.
7) For a vertical barrier (arm) operator utilizing Type B2 contact entrapment protection, one or more contact sensors shall be located at the bottom edge of a vertical barrier (arm).	**7)** Pour un ouvre-barrière à bras levant utilisant un capteur de contact pour la protection contre le coincement de type B2, au moins un capteur de contact doit être situé sur le bord inférieur de la barrière à bras levant.
8) One or more contact sensors shall be located where the risk of entrapment or obstruction exists on a bifold gate, such as:	**8)** Au moins un capteur de contact doit être situé où il existe un risque de coincement ou d'obstruction sur une barrière pliante, comme :
i) At the inner and outer leading edge,	**i)** Au bord d'attaque intérieur et extérieur;
ii) Between the outer column panel and the inner bifold panel of an opening bifold gate,	**ii)** Entre le panneau de colonne extérieur et le panneau interne à deux volets d'une barrière pliante;
iii) Between the outer/column panel and any obstruction within 406mm (16 in) of the gate panel when it is in the fully open position,	**iii)** Entre le panneau de colonne extérieur et tout obstacle se trouvant à moins de 406 mm (16 po) du panneau de barrière lorsqu'il est en position complètement ouverte;
iv) At hinge points depending on the construction of the gate,	**iv)** Aux points de charnière selon la construction de la barrière;
v) On the bottom edge(s),if the bottom edge(s) of a bifold gate is/are greater than 152 mm (4 in) but less than 406 mm (16 in) above the ground at any point in its arc of travel.	**v)** Sur les bords inférieurs d'une barrière pliante, s'ils sont situés à plus de 152 mm (4 po), mais à moins de 406 mm (16 po) du sol à l'un des points de la trajectoire de la barrière.

1.4 IMPORTANT Safety Information for Auto-Spikes System



1610 Speed Bump (P/N 1610-150)

- **Control Vehicular Traffic:** Traffic must be slowed to a **cautious speed** prior to crossing the auto-spikes to avoid accidents and excessive wear and tear on hardware. Speed-bumps should be installed where additional speed control is desired and also serves to prolong the life of the auto-spikes (see 1610 speed bump for concrete surfaces).
- **Auto-Spikes Location Limitations:** Auto-spikes must always be installed at a 90° angle, never installed in blind spots, corners, curves, (enough straight-away must be available to allow vehicles that have just completed a turn to straighten out and approach the auto-spike system **perpendicular** to the spikes).



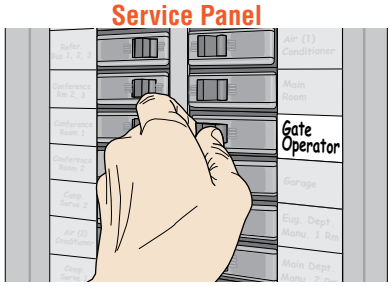
1615 Illuminated Warning Sign (P/N 1615-080)

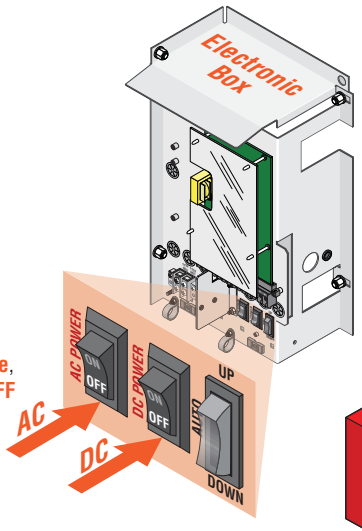
- **Auto-Spike System:** It is extremely important that the traffic spikes are **clearly marked with a warning sign** of potential hazard to vehicles and the spike area is **well illuminated**.
- **Auto-Spike System:** Automotive traffic only - **No** bicycles or motorcycles.

1.4 IMPORTANT Safety Information Continued

Shut OFF Power

Service Panel





- When **removing the barrier operator from service**, move the arm to the **full open position** and **Shut-OFF AC power** at the operator's **AC power switch** on operator's electronic box **AND** at the **service panel**. **Shut-OFF DC power switch** on operator's electronic box on **some** models.



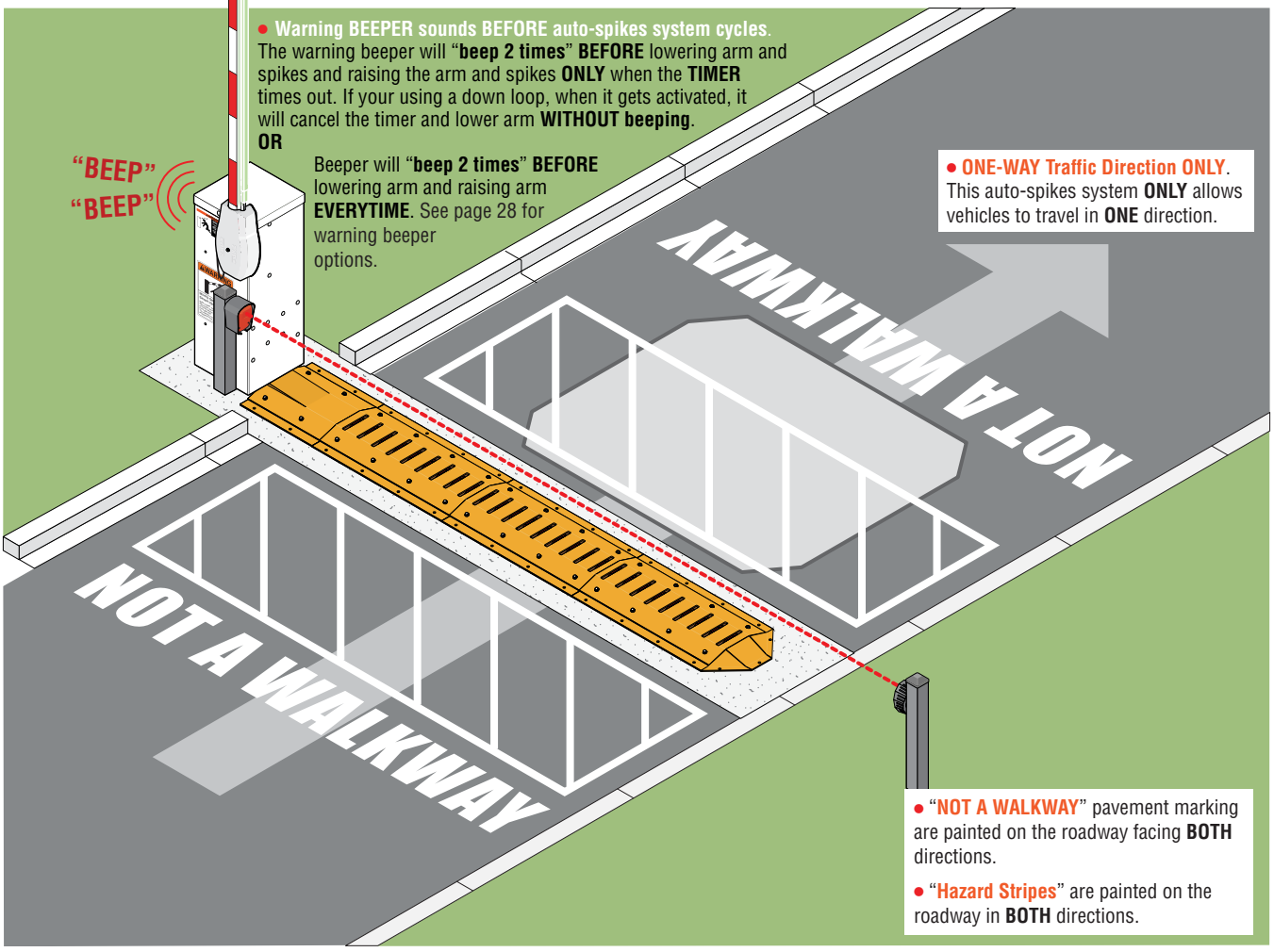
- **Speed limit through barrier area is 5 MPH**. Install speed bumps, warning signs and hazard stripes where visible in the area of the barrier gate, failure to do so may result in injury, damage to operator and vehicle.



- **Emergency Access Controls** only accessible by authorized personnel (e.g., fire, police, EMS) may be placed at any location in the **line-of-sight of the barrier gate**.



- **Access Controls** intended for user activation must be located **at least six feet (6') away from any moving part of the barrier gate** and where the user is prevented from reaching over, under or around the barrier gate to operate the controls. It's best to keep opening device in a **SECURE** area.



- **Warning BEEPER sounds BEFORE auto-spikes system cycles**. The warning beeper will "**beep 2 times**" **BEFORE** lowering arm and spikes and raising the arm and spikes **ONLY** when the **TIMER** times out. If your using a down loop, when it gets activated, it will cancel the timer and lower arm **WITHOUT beeping**.

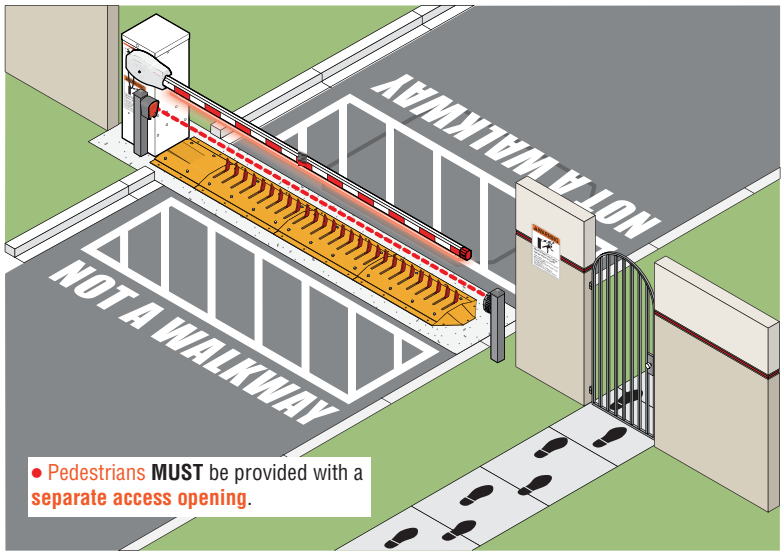
OR

Beeper will "**beep 2 times**" **BEFORE** lowering arm and raising arm **EVERYTIME**. See page 28 for warning beeper options.

- **ONE-WAY Traffic Direction ONLY**. This auto-spikes system **ONLY** allows vehicles to travel in **ONE** direction.

- "**NOT A WALKWAY**" pavement marking are painted on the roadway facing **BOTH** directions.
- "**Hazard Stripes**" are painted on the roadway in **BOTH** directions.

1.4 IMPORTANT Safety Information Continued



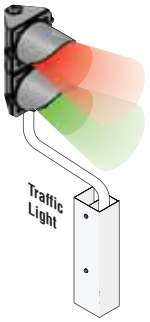
• Pedestrians **MUST** be provided with a **separate access opening**.

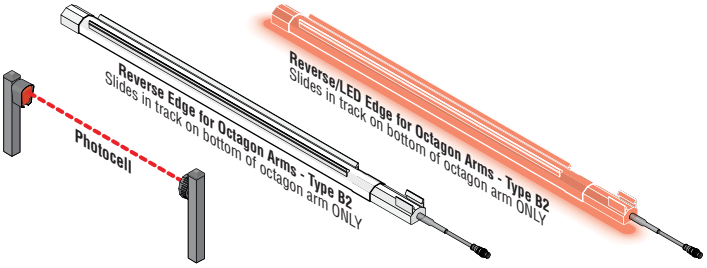




• Make sure all **WARNING SIGNS** are on operator and arm. Warning signs are to be permanently installed in the area of the gate in such a manner that at least one warning sign is visible by persons located on **each** side of the gate, for both the secure and unsecure sides of the gate.

• A **Reverse Edge** is **NOT** to be used as a replacement, or in lieu of, **in-ground loops or non-contact sensor (photocell)** that protect vehicles passing underneath the barrier arm. A moving vehicle coming in contact with a downward moving barrier arm **WILL result in damage** to the vehicle and the barrier arm/reversing edge if **NOT using in-ground loops or non-contact sensor** (Photocell).





• **IMPORTANT** Keep **ALL** debris out of spike slots and from operator cabinet vents and off of arms.

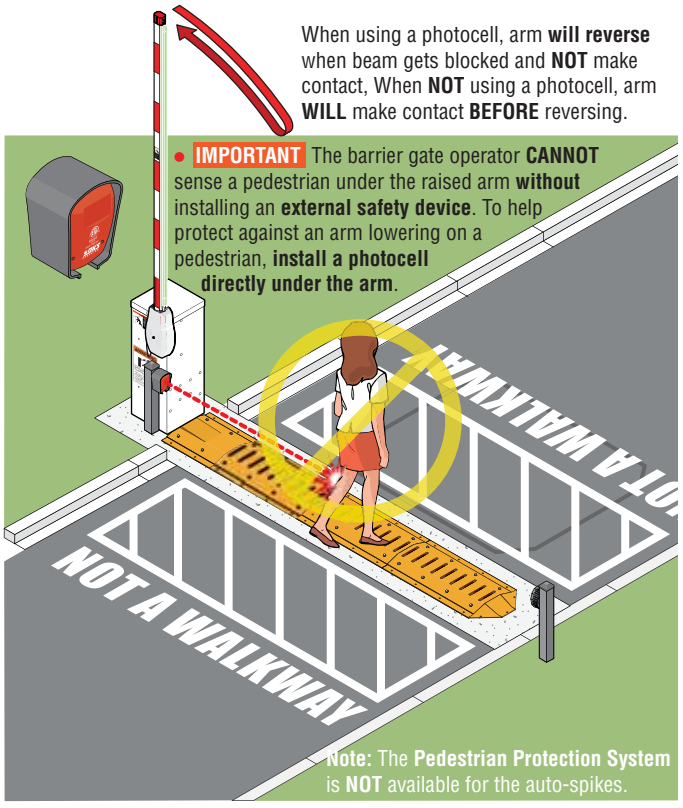
• **Auto-Spikes Barrier System Safety Devices:** They **shall** have **reverse/LED edge** on arm, **traffic light** and **photocell** installed. If any of these devices are **NOT functioning**, remove barrier system from service until repairs can be made.



• **DO NOT** Attach **ANY external sign** on the arm. A lowering sign **WILL cause damage** to a vehicle or injure a person.This scenario is **VERY DANGEROUS** and **MUST NEVER OCCUR!!**

• **IMPORTANT** Instruct employees, guard personnel or anyone working near the barrier arm operator to **NEVER** stand directly beneath a raised or moving arm!

When using a photocell, arm **will reverse** when beam gets blocked and **NOT** make contact, When **NOT** using a photocell, arm **WILL** make contact **BEFORE** reversing.



• **IMPORTANT** The barrier gate operator **CANNOT** sense a pedestrian under the raised arm **without** installing an **external safety device**. To help protect against an arm lowering on a pedestrian, **install a photocell directly under the arm**.

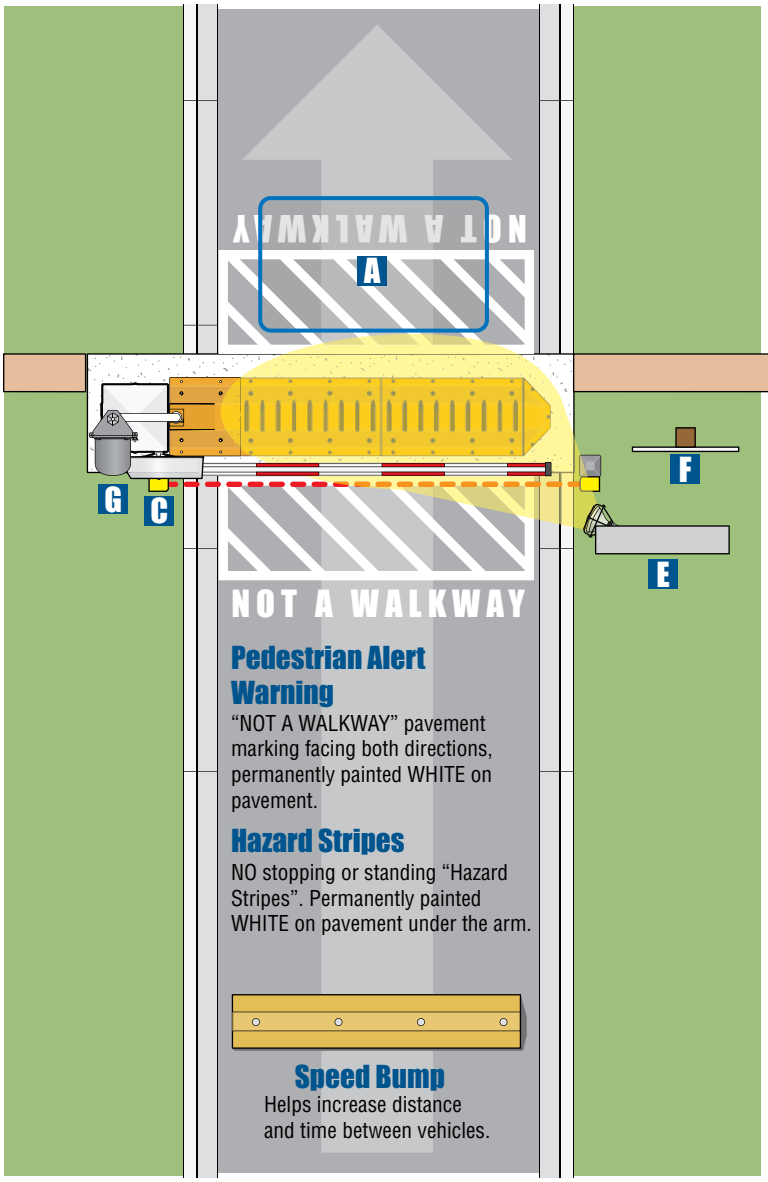
Note: The **Pedestrian Protection System** is **NOT** available for the auto-spikes.

• **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 severe injury or death**.

• **Operators and components are to be properly installed and maintained** following the recommended service schedule and testing the operator monthly. Keep all debris away from spikes, operator housing vents and off of arm. Contact your service dealer for any maintenance or repairs.

• **Vehicular barrier gate operators can produce high levels of force**, it is important that **you are aware** and eliminate **possible HAZARDS**; Pinch Points, Entrapment Areas, Overhead Power Wires, Absence of Controlled Pedestrian Access, Traffic Backup.

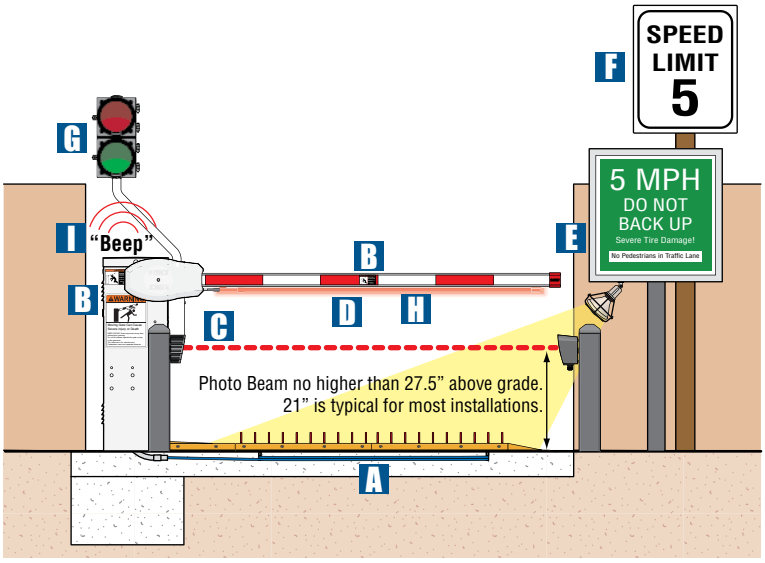
1.5 Safety and Traffic Management for Auto-Spikes System



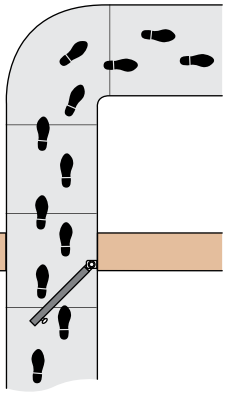
Pedestrian Alert Warning
"NOT A WALKWAY" pavement marking facing both directions, permanently painted WHITE on pavement.

Hazard Stripes
NO stopping or standing "Hazard Stripes". Permanently painted WHITE on pavement under the arm.

Speed Bump
Helps increase distance and time between vehicles.



Separate Pedestrian Walkway
Located so pedestrians **CANNOT** come in contact with the barrier arm.



A In-Ground Loop(s)
Loops minimize the potential of the arm closing when a vehicle is present. Number and placement of loop(s) is dependent on the application.

B Warning Signs
Permanently mounted on operator and arm and easily visible. Warning signs are to be **permanently installed** in the area of the gate in such a manner that at least one warning sign is visible by persons located on each side of the gate, for both the **secure** and **unsecure** sides of the gate.





C Non-Contact Sensor - Photocell
Minimizes the potential of the arm lowering on vehicular or other traffic that loops cannot sense.
Located directly under arm.

D Contact Sensor - Reverse Edge
Minimizes the potential of the arm lowering on vehicular or other traffic that loops cannot sense.

Contact Sensor Note: A reverse edge is **NOT** to be used as a replacement, or in lieu of, in-ground loops or non-contact sensor (photocell) that protect vehicles passing underneath the barrier arm. A **moving** vehicle coming in contact with a downward moving barrier arm **WILL** result in **damage to the vehicle** and the barrier arm/reversing edge if **NOT** using in-ground loops or non-contact sensor (Photocell).

E Spike Warning and Illumination
It is extremely important that traffic spikes are installed in an area that is illuminated and clearly marked with spike warning signs (DoorKing's model 1615 illuminated warning sign kits).

F Speed Limit Sign
Helps control traffic.

G Traffic Red/Green Light
Helps control traffic.

H Arm LED Lights
Helps with arm's visibility and position.

I Beep BEFORE Cycling Arm
Used to alert pedestrians that barrier arm is cycling.

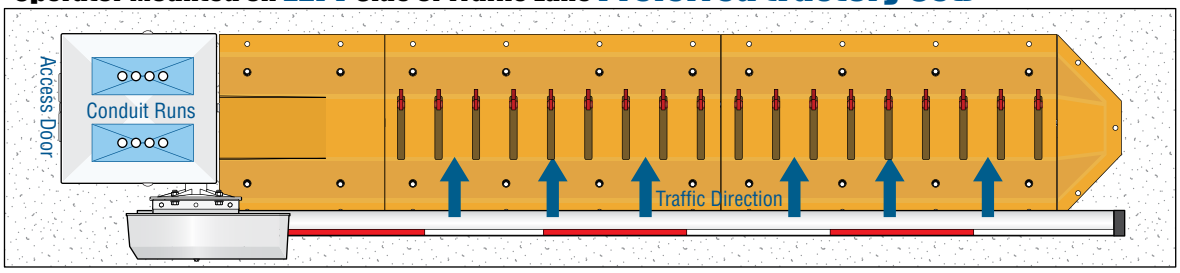
SECTION 2 - INSTALLATION

Prior to beginning the installation of the barrier 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.

The proper installation of the vehicular barrier 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.

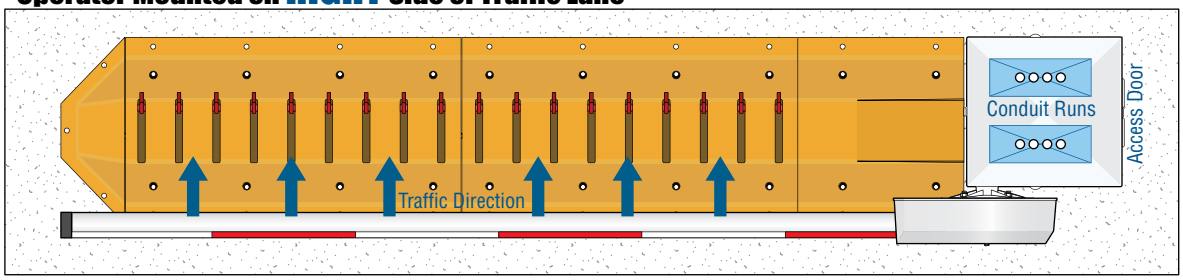
2.1 Operator Positioning and Conduit Requirements

Operator Mounted on LEFT Side of Traffic Lane Preferred (Factory Set)

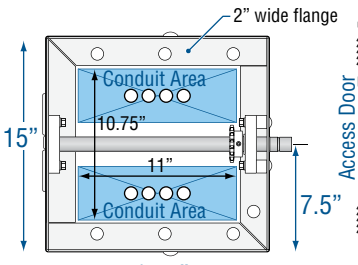


Operator Mounted on RIGHT Side of Traffic Lane

DO NOT install operator or spikes on asphalt.

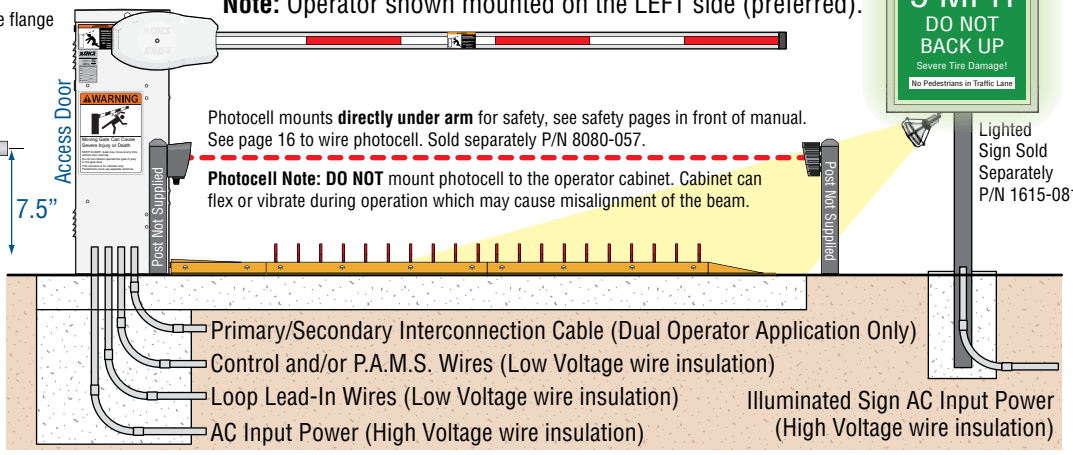


The spike's drive chain **MUST** be **reversed** so spikes rotate in correct direction when operator is on **RIGHT** side, see section 4.3.

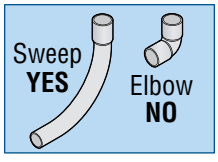


Approx. Operator Conduit Position

Note: Operator shown mounted on the LEFT side (preferred).



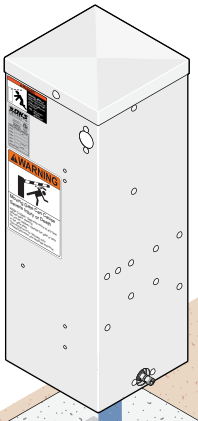
- The conduit requirements are for a typical barrier gate operator installation. **The conduit requirements for your application may vary from this depending on your specific needs.**
- Use only sweeps for conduit bends. Do not use 90° connectors as this will make wire pulls very difficult and can cause damage to wire insulation.
- We suggest that minimum 3/4-inch conduit be used.
- **Never** run low voltage rated wire insulation in the same conduit as high voltage rated wire insulation.
- Be sure that all conduits are installed in accordance with local codes.



2.2 Concrete Pad Requirements

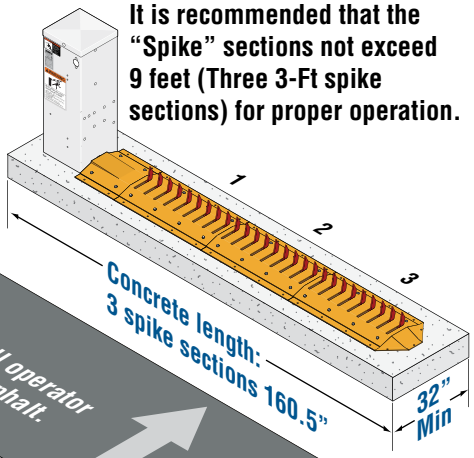
The operator and auto spike system must **ONLY** be installed on a **concrete pad** with a minimum 6 inch depth. The concrete pad must be **FLAT** and **LEVEL** (Check local building codes for restrictions). Reinforced concrete recommended.

Note: Operator shown mounted on the LEFT side of traffic lane (preferred).



Note: Operator extension section **REQUIRED** to connect to operator.

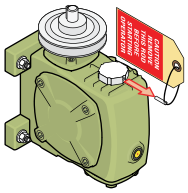
It is recommended that the "Spike" sections not exceed 9 feet (Three 3-Ft spike sections) for proper operation.

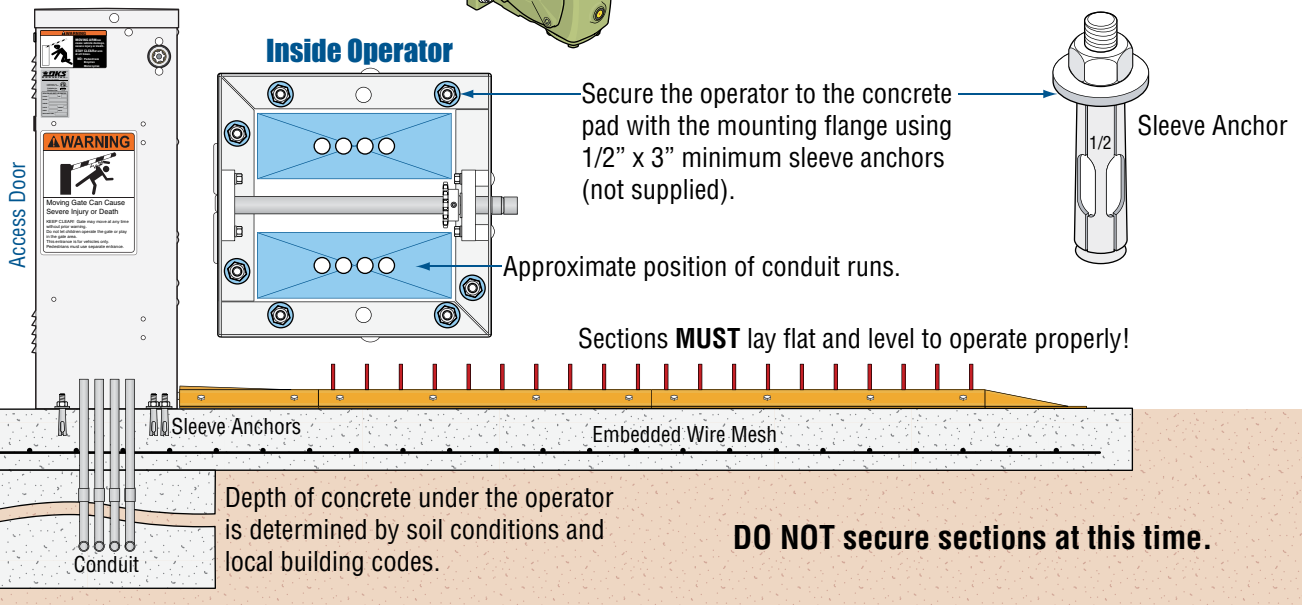


IMPORTANT: A barrier gate operator installed **WITHOUT** any external safety sensors **CANNOT** sense a person under the raised arm and can strike them while the arm is lowering. DoorKing **recommends** installing an external photo sensor directly under the arm. See safety pages in front of this manual for more information.

2.3 Mount Operator

Remove breather pin from gear reducer **AFTER** the operator has been secured in place.



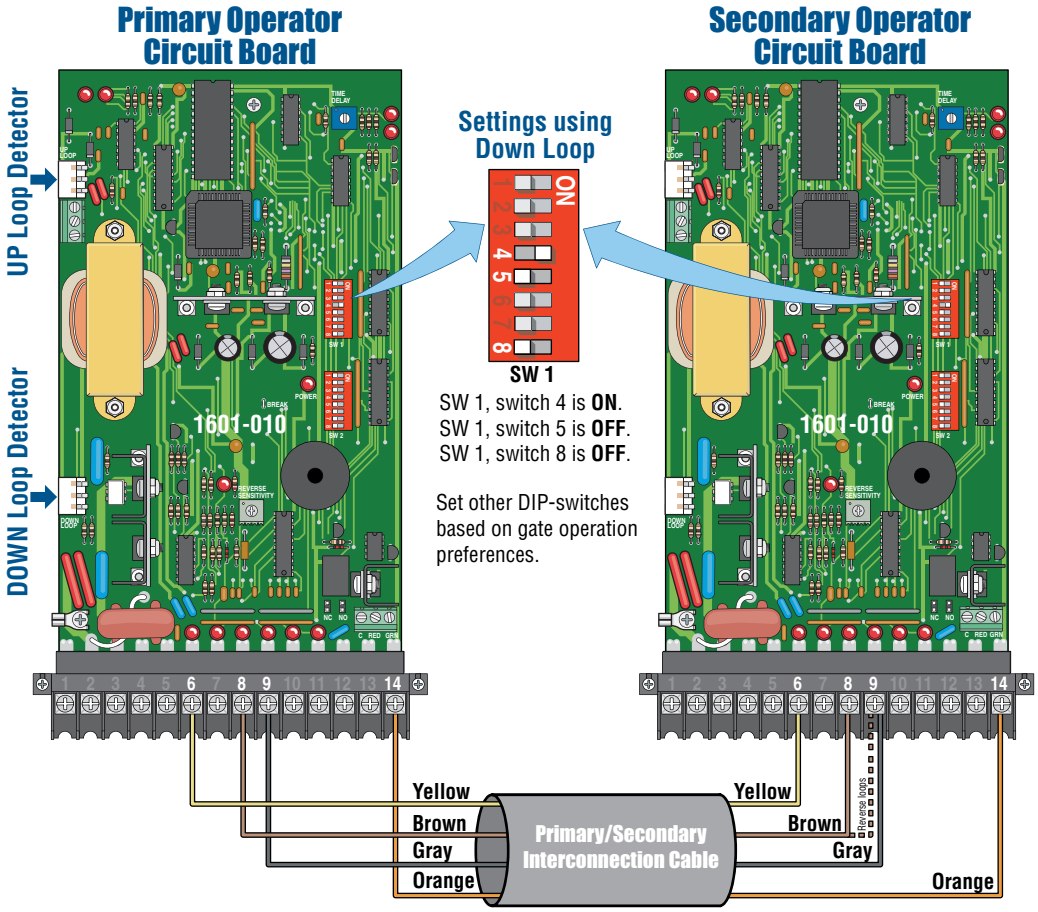


2.4 Dual Operator Installation (Primary/Secondary)

For use in areas needing **more** than **three** 3-Ft spike sections (9 ft. of spikes) in a traffic lane.
Up to **six** 3-Ft spike sections (18 ft. of spikes) can be used with dual operators.

Install dual operators the **same** as installing two single operators except for:

- There are no end cap sections used for the spikes.
- **RIGHT** side operator spike's drive chain will need to be **reversed**, see section 4.3.
- Operators need to be wired together with an interconnection cable (Sold separately).
- Each operator requires AC power.
- Both operator's DIP-switches (SW 1, SW 2) must be set the same.
- Connect all loop detectors and access control devices to the **PRIMARY** operator **ONLY**.



Sold separately from DoorKing.
4 wires used (8 - 18 AWG wires total).

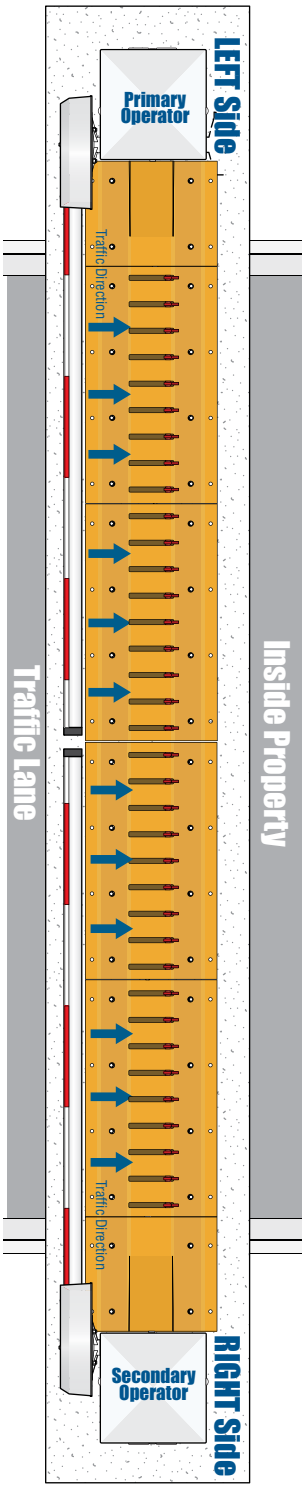
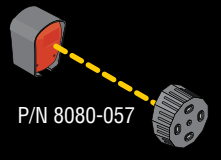


Illustration shows four 3-ft spike sections (12 ft. of spikes).
Each operator controls two 3-ft spike sections.

When using Reverse Loops:

DIP-Switch settings: SW 1, switch 4 is OFF. SW 1, switch 5 is OFF. SW 1, switch 8 is OFF. Set other DIP-switches based on gate operation preferences. See page 25 for reverse loop wiring.
Interconnection cable: The BROWN wire must be connected to **SECONDARY TERMINAL #9** along with the **GRAY wire**. All other terminal wire connections are the same as shown above.

IMPORTANT: The barrier gate operators installed **WITHOUT** any external safety sensors **CANNOT** sense a person under the raised arms and can strike them while the arms are lowering. DoorKing recommends installing an external photo sensor directly under the arm. See safety pages in front of this manual for more information.



SECTION 3 - WIRING

Before attempting to connect any wiring to the operator, be sure that the circuit breaker in the electrical panel is in the OFF position. 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.

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 operator (both high and low voltage) complies with local code requirements.

THIS GATE OPERATOR MUST BE PROPERLY GROUNDED!!

3.1 High Voltage Wire Runs

The distance shown in the chart is measured in **"Feet"** from the operator to the power source. If power wiring is greater than the maximum distance shown, it is recommended that a service feeder be installed. When large gauge wire is used, a separate junction box must be installed for the operator connection. The wire table is based on stranded copper wire. Wire run calculations are based on the NEC recommended maximum 3% voltage drop on the power line, plus an additional 10% reduction in distance to allow for other losses in the system.

This table illustrates the high voltage AC power wire size and distance limitations.

Model Type	Voltage Required	Amps Required	Wire Size / Max Distance in Feet			
			12 AWG	10 AWG	8 AWG	6 AWG
1603 1/2 HP	115	5.7	170	275	460	690

Never run low voltage rated wire insulation in the same conduit as high voltage rated wire insulation.

"Optional" Heater Installation Note: When installing a heater, refer to the **"high voltage AC power wire size and distance limitations"** table on the instruction sheet with the specific heater kits (115, 208/230, 460 VAC) for AC power wire run limitations.

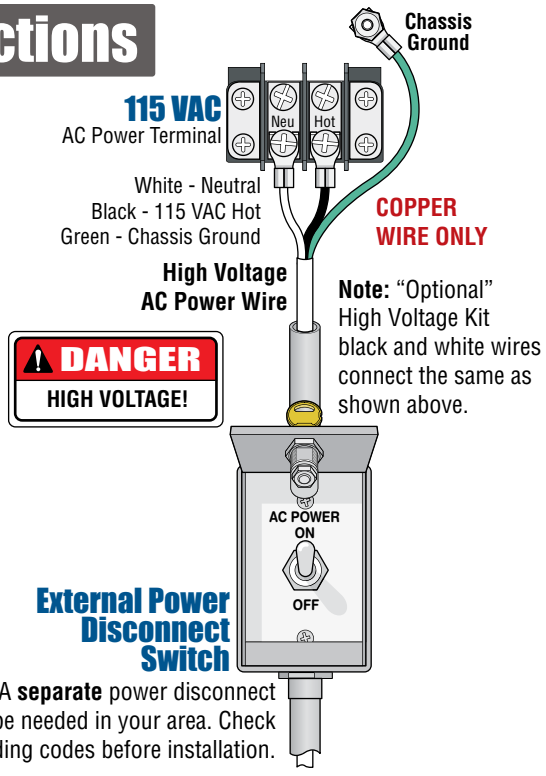
"Optional" High Voltage Kit Installation Note: When installing the high voltage kit for 208/230/460/575 VAC input power, refer to the **"high voltage AC power wire size and distance limitations"** table on the instruction sheet with the high voltage kit (P/N 2600-266) for AC power wire run limitations.

3.2 High Voltage Terminal Connections

- Route incoming high voltage power in it's **OWN** conduit.
- Be sure wiring is installed in accordance with local codes. Be sure to color code all wiring.
- It is recommended that a surge suppressor be installed on the high voltage power lines to help protect the operator and circuit board from surges and power fluctuations.
- Dual operators (Primary/Secondary) require AC power to each operator.

Keep wire clear of all moving parts.

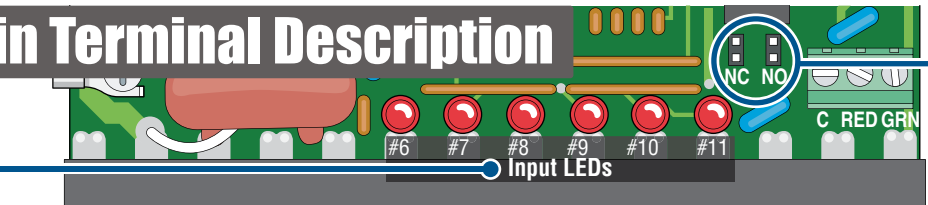
DO NOT power up and cycle the operator until the "**DIP-Switches**" have been set for the 1603 model (See pages 27 and 28).
The operator will not function properly unless the switches have been correctly set.



Note: "Optional" High Voltage Kit black and white wires connect the same as shown above.

Note: A **separate** power disconnect switch may be needed in your area. Check local building codes before installation.

3.3 Main Terminal Description



Relay Contacts

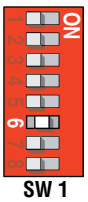
Input LEDs: The LED that is above the terminal wiring input will light when that terminal input gets activated.

5

Exceeding 250 mA of power from this terminal may cause the circuit board transformer to **overheat**, causing intermittent **problems**.

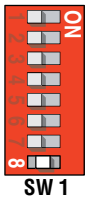
6

Function is dependent on the setting of programming SW 1, switch 6.
When switch 6 is **OFF**, this input will cause the operator to rotate the arm to the up position. If the arm is in the down cycle, this input will reverse the arm to the up position. If this terminal has a constant input, the arm will remain in the up position regardless of any down input or timer command to rotate down.
When switch 6 is **ON**, this input will cause the operator to rotate the arm to the up position when it is down, and will cause the operator to rotate the arm to the down position when it is up. If the auto timer is turned ON (Not recommended if switch 6 is ON), this input will override the timer and rotate the arm to the down position. If the arm is in the down cycle, this input will reverse the arm to the up position.



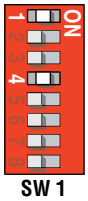
7

Function is dependent on the setting of programming SW 1, switch 8.
When switch 8 is **ON**, the function of this input is identical to terminal 6.
When switch 8 is **OFF**, this terminal becomes the logic output of the up loop detector.



8

Function is dependent on the setting of programming SW 1, switches 1 and 4.
With switch 1 **OFF** and switch 4 **ON**, activation and then deactivation of this input will rotate the arm to the down position, provided that the deactivation of the input happens while the arm is in the full up position. This input will override the auto timer if it is turned **ON**. If the arm is in the down position, traveling in the down cycle, or traveling in the up cycle, activation and deactivation of this input has no effect on the arm.
With switches 1 and 4 are **ON**, activation and then deactivation of this input will rotate the arm to the down position after it reaches the full up position regardless of when the deactivation of the input occurred.
When switch 4 is **OFF**, this input is identical to the reverse input, terminal 9.



9

When the arm is in the down position, activation of this input has no effect.
When the arm is in the up position, activation of this input will prevent the arm from rotating to the down position. If the arm is in the down cycle, activation of this input will reverse the arm to the up position.

10

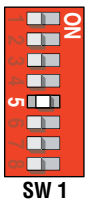
This input is used when sequencing the 1603 with a slide or swing gate operator in **PAMS** applications. Activation of this input will rotate the arm to the up position one time, and activates the enable up input.

11

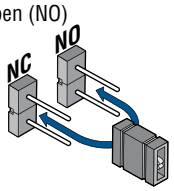
This input is used when sequencing the 1603 with a slide or swing gate operator in **PAMS** applications. This input is only active after a MOMENTARY UP input is received. Activation of this input will rotate the arm to the up position or reverse an arm in the down cycle to the up position.

12
13

Function is dependent on the setting of programming SW 1, switch 5.
When switch 5 is **OFF**, activation of the down loop will activate the relay.
When switch 5 is **ON**, activation of the UP loop will activate the relay.

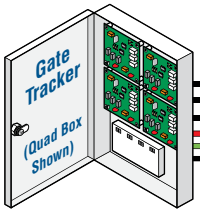


Relay contacts can be set for Normally Open (NO) or Normally Closed (NC) operation.
Contact rating is **24V AC or DC @ 1 amp max.**

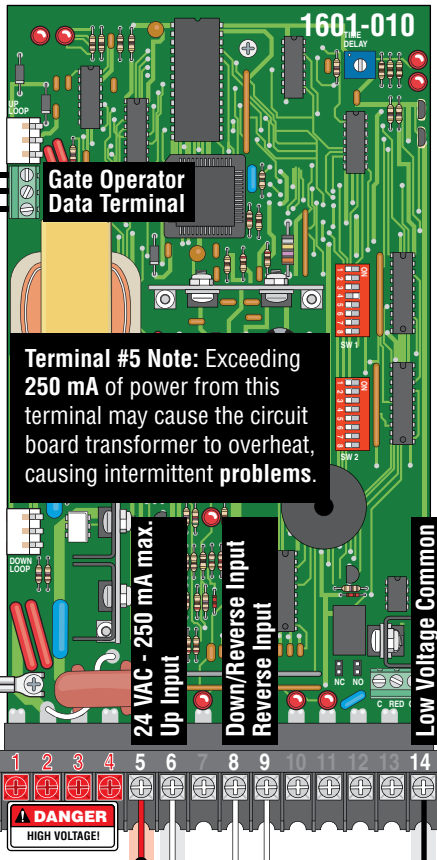


3.4 Control Wiring

DoorKing Access Control System (Model 1833, 1835, 1837 or 1838) tracker system can be connected.
This system can keep track of gate operator cycle count, shorted inputs, loop detector problems, any forced entry attempts, if the gate has struck anything during the open or close cycle, power interruptions, etc.
For more information refer to the Tracker Installation and Wiring **2358-065 PDF**.

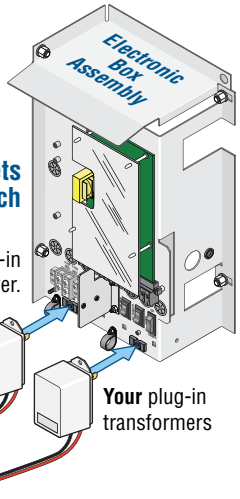


Terminal 6 required only if the expansion tracker board **will activate** the gate operator. Refer to the **2358-065 PDF** for detailed information.



Terminal #5 Note: Exceeding **250 mA** of power from this terminal may cause the circuit board transformer to overheat, causing intermittent **problems**.

Type of wiring to be used on ALL external devices:
A) Type **CL2**, **CL2P**, **CL2R**, or **CL2X**.
B) Other cable with **equivalent** or **better** electrical, mechanical, and flammability ratings.



Two 115 VAC Convenience Outlets Controlled by Operator's AC Power Switch



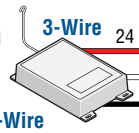
Entry System

115 VAC step-down plug-in transformer power.

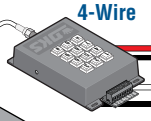
NO
Com

Your plug-in transformers

Coax Antenna Kit P/N 1514-073
Antenna mounted outside operator housing.



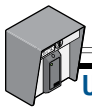
3-Wire 24 Volt Power
Relay (NO)
Com



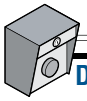
4-Wire 24 Volt Power
Relay (NO)

24V
Up Input
Com

Radio Receivers



Up-Inputs



Down-Inputs



Manual Gate Control Toggle
P/N 1200-017

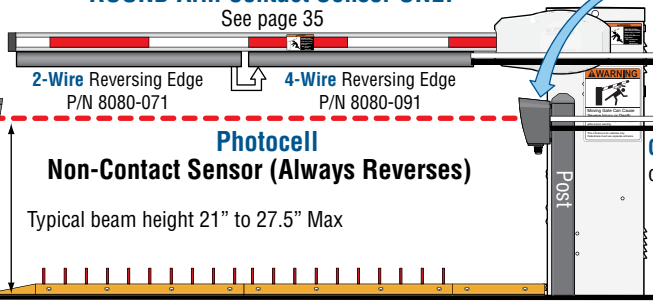
⚠WARNING
User MUST make sure gate area **IS CLEAR** before manually operating gate arm.

Up toggle position: User toggles switch up to hold gate open.
Center toggle position: Is neutral for normal operation.



24 Volt
DoorKing photocell P/N 8080-057 Included

ROUND Arm Contact Sensor ONLY
See page 35



Contact Sensors Note: Helps minimizes the potential of the round aluminum or wood arm lowering on vehicular or other traffic that loops cannot sense.

Non-Contact Sensor Note: **DO NOT** mount photocell to the operator cabinet. Cabinet can flex or vibrate during operation which may cause misalignment of the beam.

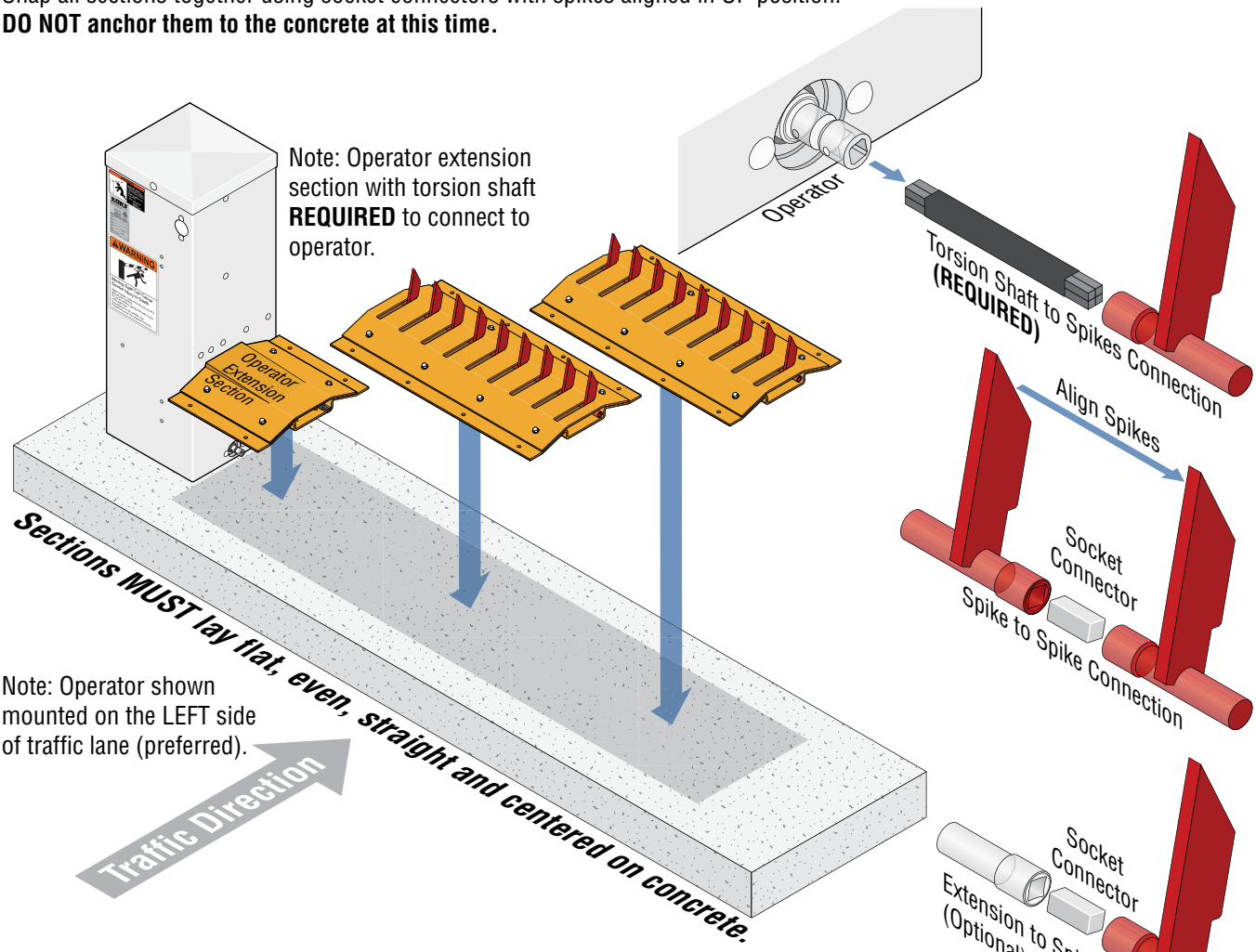
Non-Contact Sensor Connected to Reverse Input Note: Helps minimize the arm lowering on **ANYTHING** that blocks beam. Lowering arm will **ALWAYS REVERSE** when beam gets obstructed. **This setup does NOT distinguish between a vehicle and a pedestrian. It will reverse arm for EITHER when beam gets obstructed.**

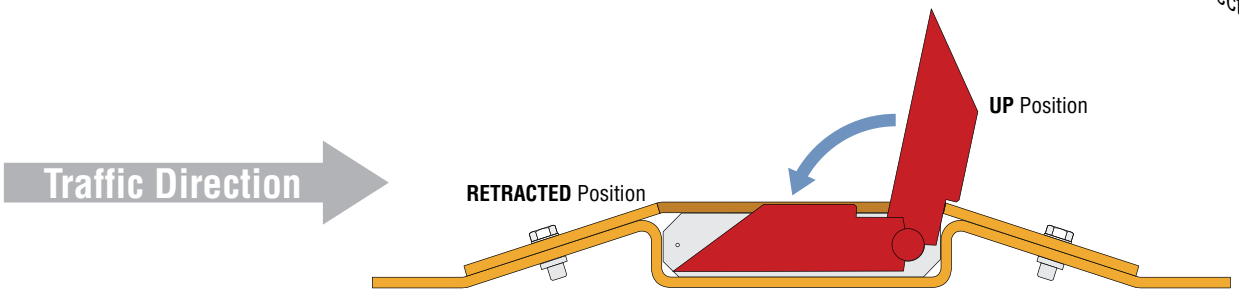
SECTION 4 - AUTO SPIKE SYSTEM INSTALLATION

The operator and auto spike system must be installed on a flat and level concrete pad with a minimum 6 inch depth (Check local building codes for restrictions). Reinforced concrete recommended. **It is recommended that the "Spike" sections not exceed 9 feet (Three 3-Ft spike sections) for proper operation.**

4.1 Connect Sections Together on Concrete Pad

Snap all sections together using socket connectors with spikes aligned in UP position.
DO NOT anchor them to the concrete at this time.



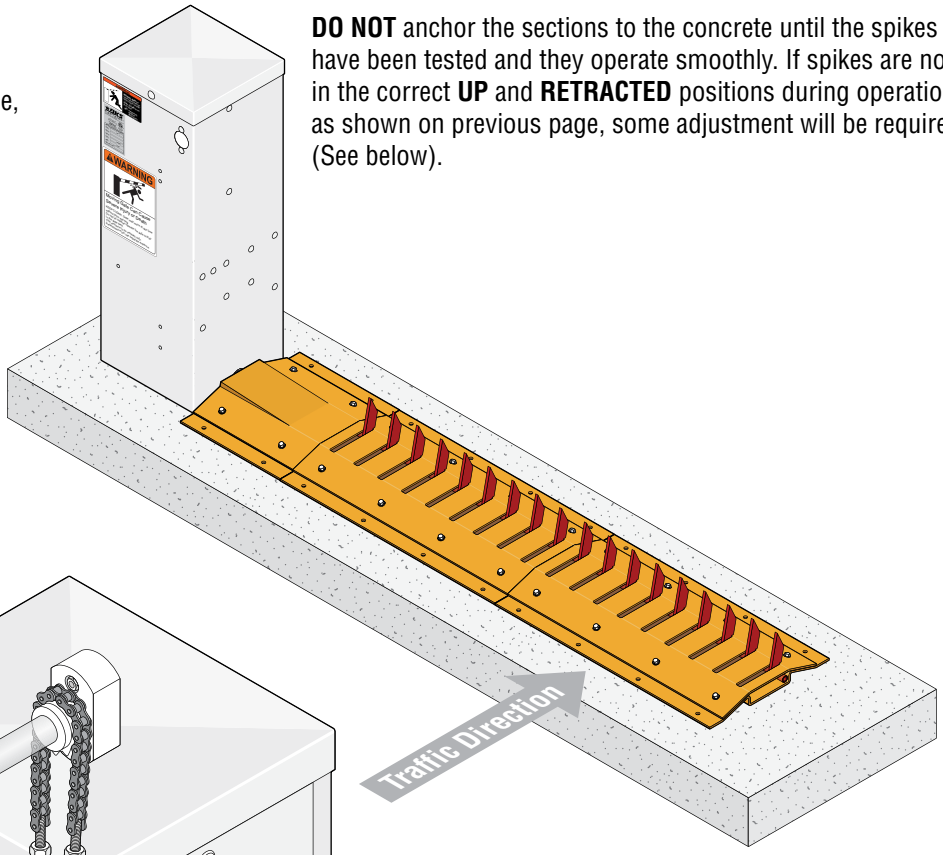


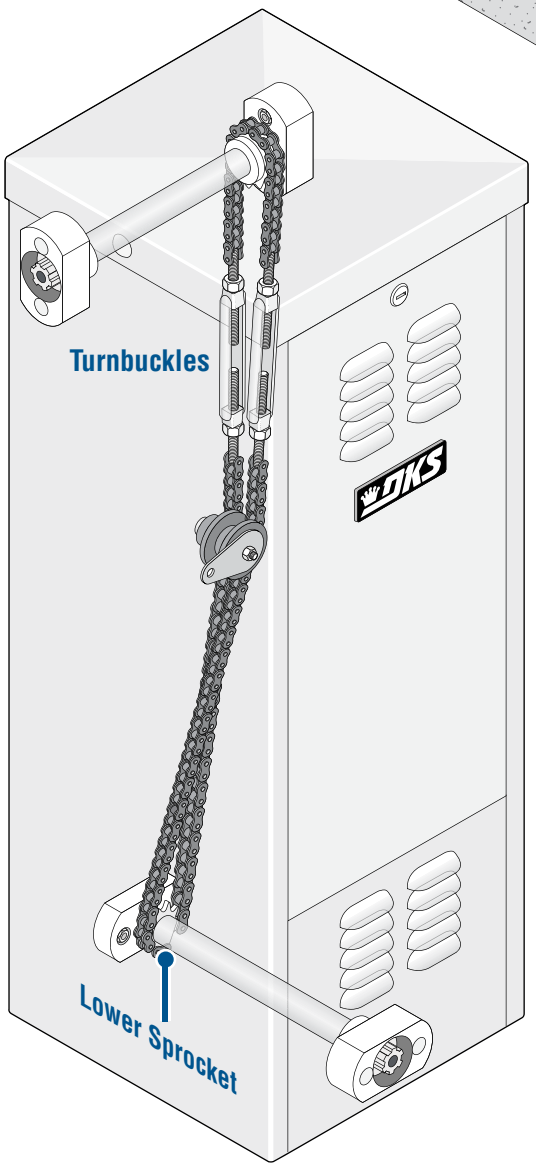
CORRECT Spike Positions
The spikes will retract towards oncoming traffic.

4.2 Test Spikes when Operator positioned on LEFT side

Note: If operator is positioned on **RIGHT** side, see next page.

DO NOT anchor the sections to the concrete until the spikes have been tested and they operate smoothly. If spikes are not in the correct **UP** and **RETRACTED** positions during operation as shown on previous page, some adjustment will be required (See below).

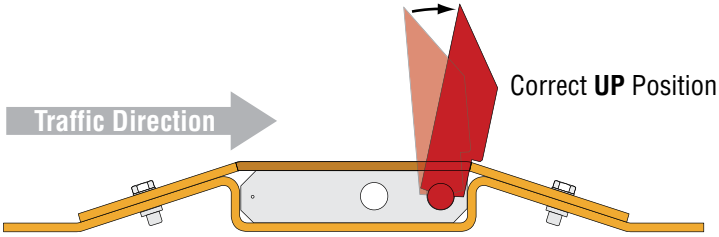




Spike Adjustment

With operator in the spikes **UP** position, loosen both turnbuckles on crossed chain inside the operator to release chain from the lower sprocket....

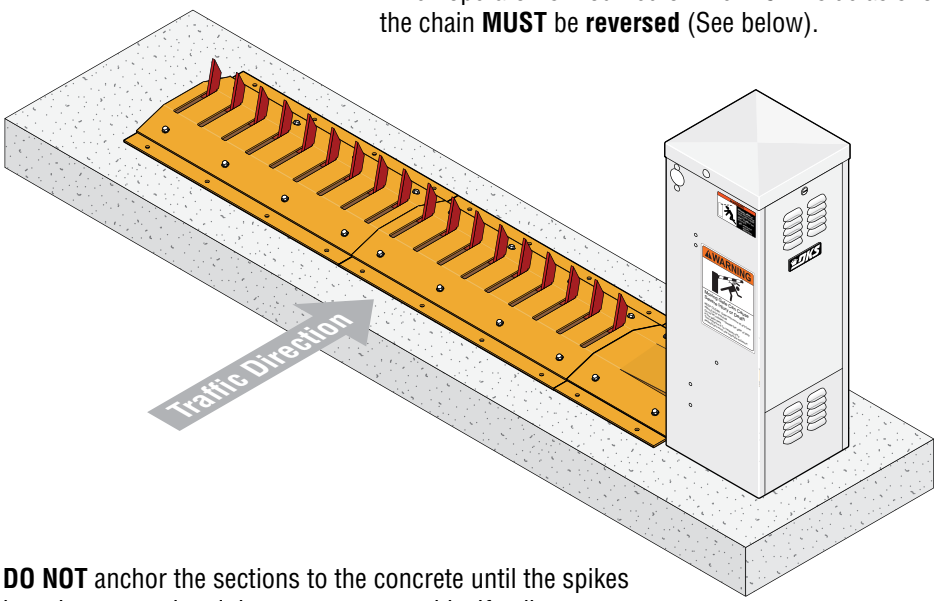
....spikes can now be adjusted to the correct UP position as shown.



....replace the chain back onto lower sprocket and tighten both turnbuckles after spikes have been adjusted to the correct position.

4.3 Test Spikes when Operator positioned on RIGHT side

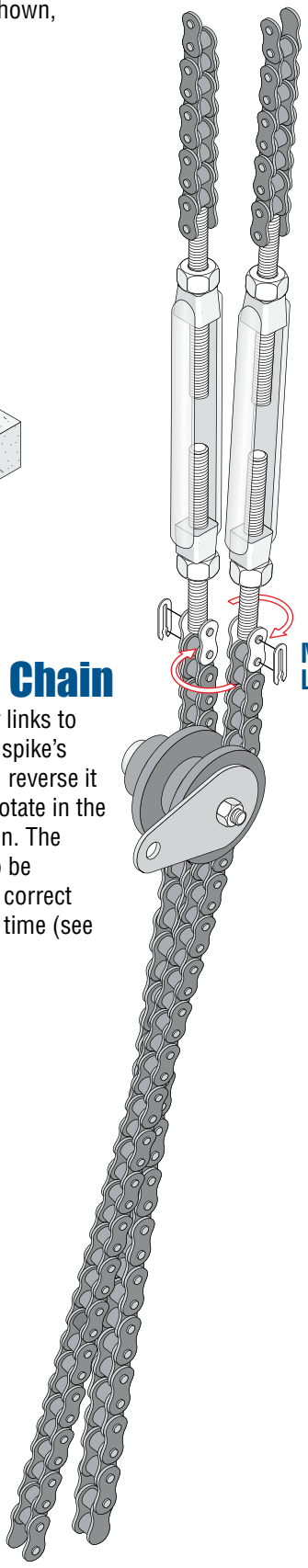
When operator is mounted on the **RIGHT** side as shown, the chain **MUST** be **reversed** (See below).



DO NOT anchor the sections to the concrete until the spikes have been tested and they operate smoothly. If spikes are not in the correct **UP** and **RETRACTED** positions during operation, some adjustment will be required (See below).

Reverse Chain

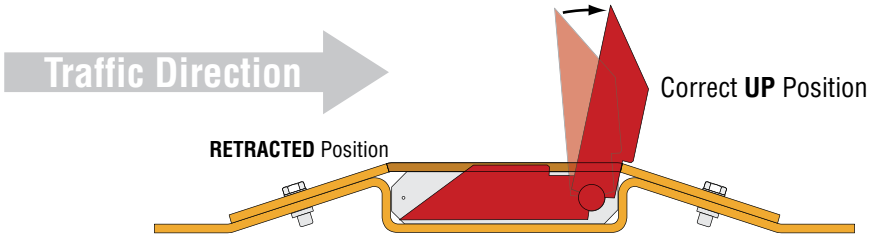
Use the master links to disconnect the spike's drive chain and reverse it so spikes will rotate in the correct direction. The spikes can also be adjusted to the correct position at this time (see below)



Spike Adjustment

Loosen both turnbuckles on un-crossed chain to release chain from the lower sprocket....

....spikes can be adjusted to the correct UP position as shown.



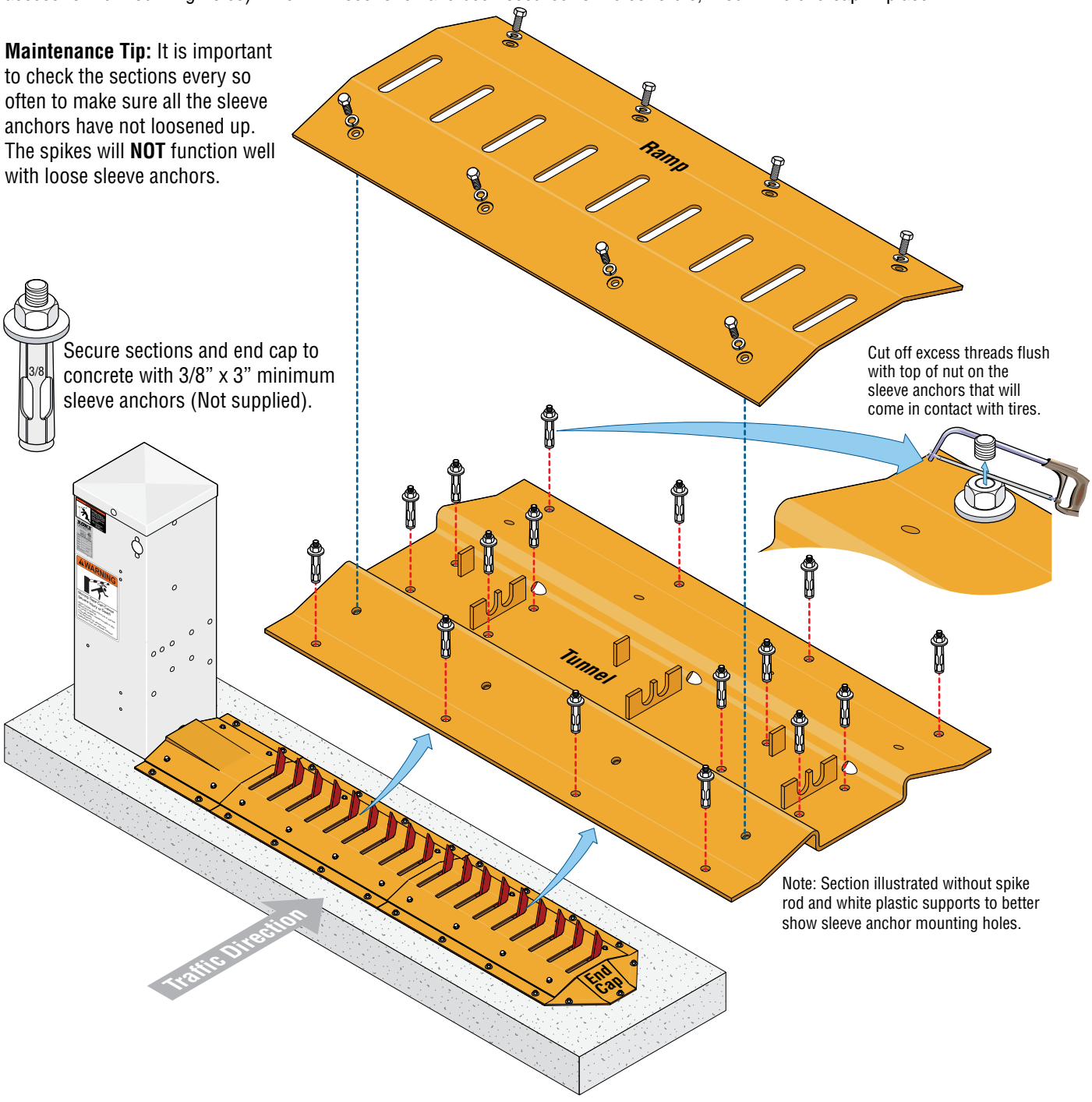
Adjust spikes as shown.

4.4 Secure EACH Section to Concrete

Extreme force is exerted on the sections every time a vehicle drives over them. It is important that they have enough anchors in them to keep them securely in place.

After you have tested the spikes and are satified with the way they perform, **without moving the sections**, secure **EACH** section in place with sleeve anchors (8 sleeve anchors are located inside the spike sections. The ramps will need to be unbolted to gain access to the mounting holes). After ALL sections have been secured to the concrete, mount the end cap in place.

Maintenance Tip: It is important to check the sections every so often to make sure all the sleeve anchors have not loosened up. The spikes will **NOT** function well with loose sleeve anchors.



Note: Section illustrated without spike rod and white plastic supports to better show sleeve anchor mounting holes.

Cleaning the Spikes

The ramps will have to be unbolted and the tunnel will need to have the debris cleaned out every so often to keep the spikes in good working condition. The sleeve anchors mounted inside the tunnel will also need to be checked for looseness and repaired when necessary.

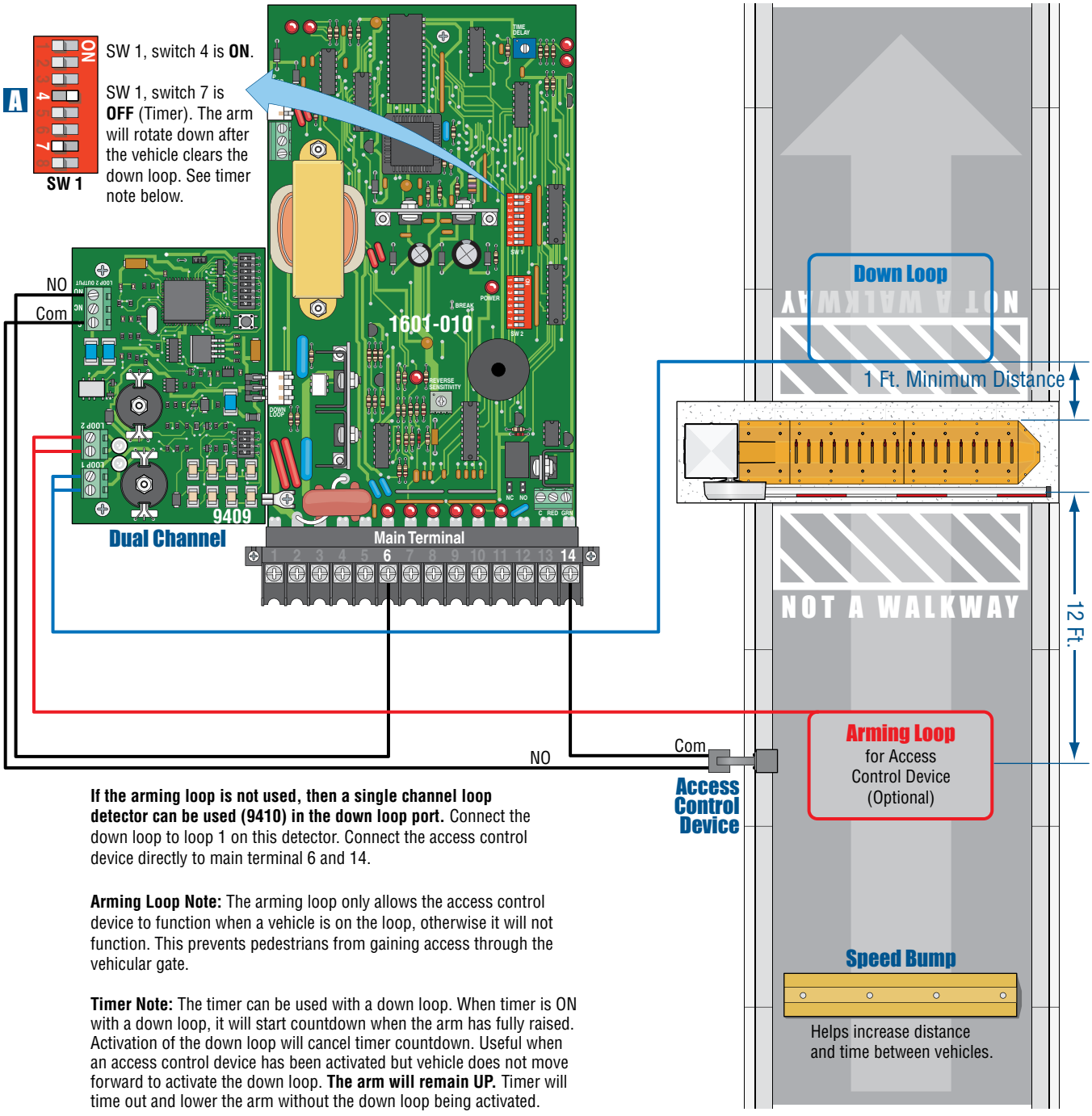
SECTION 5 - LOOP DETECTOR LANE SETUPS

Before attempting to connect any wiring to the operator, be sure that the circuit breaker in the electrical panel is in the OFF position. 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.

Loop detector wiring shown is for DoorKing model 9409 Dual Channel and 9410 Single Channel plug-In loop detectors only. If using other loop detectors refer to the separate Loop Information Manual for installation instructions, loops/preformed loops and wiring diagrams. All inputs to the main terminal are NORMALLY OPEN.

5.1 Entry Lane Only

Type of wiring to be used on ALL external devices:
A) Type **CL2**, **CL2P**, **CL2R**, or **CL2X**.
B) Other cable with **equivalent** or **better** electrical, mechanical, and flammability ratings.

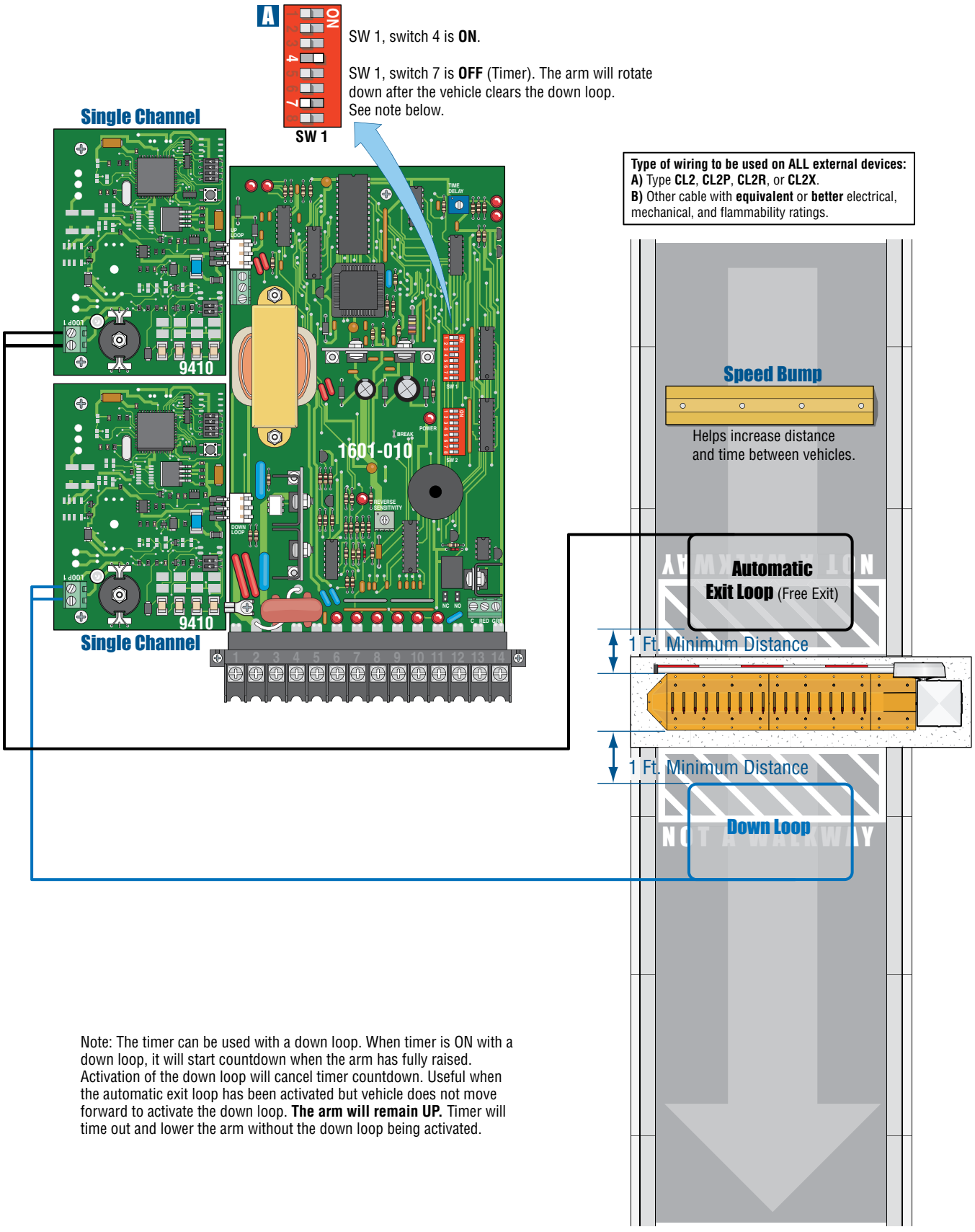


If the arming loop is not used, then a single channel loop detector can be used (9410) in the down loop port. Connect the down loop to loop 1 on this detector. Connect the access control device directly to main terminal 6 and 14.

Arming Loop Note: The arming loop only allows the access control device to function when a vehicle is on the loop, otherwise it will not function. This prevents pedestrians from gaining access through the vehicular gate.

Timer Note: The timer can be used with a down loop. When timer is ON with a down loop, it will start countdown when the arm has fully raised. Activation of the down loop will cancel timer countdown. Useful when an access control device has been activated but vehicle does not move forward to activate the down loop. **The arm will remain UP.** Timer will time out and lower the arm without the down loop being activated.

5.2 Exit Lane Only



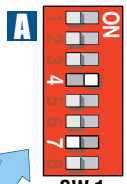
Note: The timer can be used with a down loop. When timer is ON with a down loop, it will start countdown when the arm has fully raised. Activation of the down loop will cancel timer countdown. Useful when the automatic exit loop has been activated but vehicle does not move forward to activate the down loop. **The arm will remain UP.** Timer will time out and lower the arm without the down loop being activated.

5.3 Two-Way Traffic Lane

Type of wiring to be used on ALL external devices:
A) Type **CL2**, **CL2P**, **CL2R**, or **CL2X**.
B) Other cable with **equivalent** or **better** electrical, mechanical, and flammability ratings.

When a vehicle enters, the down loop will be overridden by the automatic exit loop which will continue to hold the arm up. When the interior down loop has been cleared by the vehicle, the arm will lower.

When a vehicle exits, the automatic exit loop will raise arm and when the down loop is cleared, the arm will lower. The interior down loop is inoperative for exiting vehicles.



SW 1

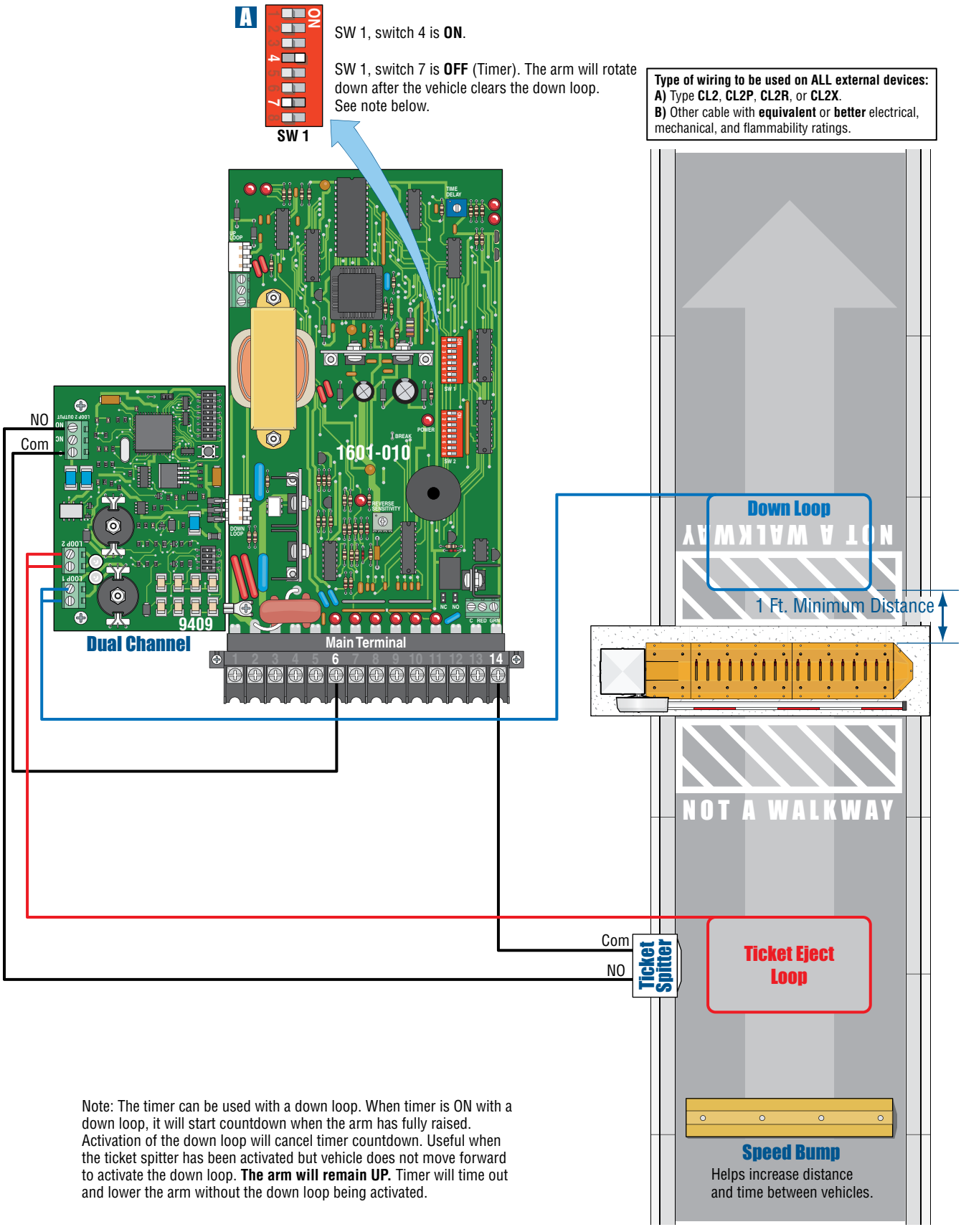
SW 1, switch 4 is **ON**.

SW 1, switch 7 is **OFF** (Timer). The arm will rotate down after the vehicle clears the down loops. See timer note below.

Arming Loop Note: The arming loop only allows the access control device to function when a vehicle is on the loop, otherwise it will not function. This prevents pedestrians from gaining access through the vehicular gate.

Timer Note: The timer can be used with down loops. When timer is ON with a down loop, it will start countdown when the arm has fully raised. Activation of the down loop will cancel timer countdown. Useful when the access control device or automatic exit loop has been activated but vehicle does not move forward to activate the down loop. **The arm will remain UP.** Timer will time out and lower the arm without the down loop being activated.

5.4 Ticket Spitter Entry Lane



Note: The timer can be used with a down loop. When timer is ON with a down loop, it will start countdown when the arm has fully raised. Activation of the down loop will cancel timer countdown. Useful when the ticket spitter has been activated but vehicle does not move forward to activate the down loop. **The arm will remain UP.** Timer will time out and lower the arm without the down loop being activated.

5.5 Operator Timer ON Entry Lane (No Down Loop)

A

SW 1, switch 4 is **OFF**.

SW 1, switch 7 is **ON** (Timer). The arm will rotate down after the timer has timed out.

SW 1

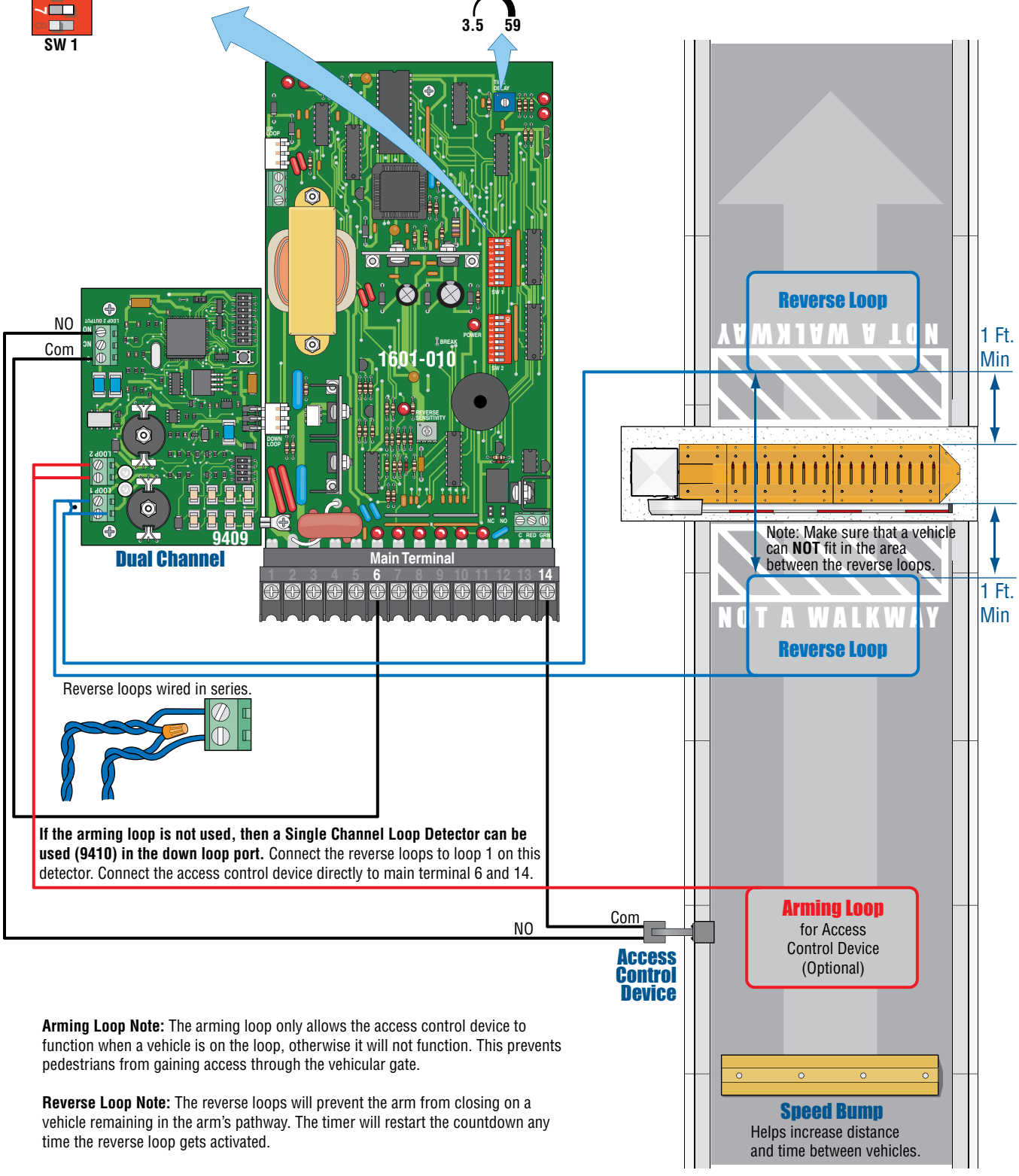
B

TIME DELAY

Adjust from 3.5 seconds (full counter clockwise) to approximately 59 seconds (full clockwise).

3.5 59

Type of wiring to be used on ALL external devices:
A) Type **CL2**, **CL2P**, **CL2R**, or **CL2X**.
B) Other cable with **equivalent** or **better** electrical, mechanical, and flammability ratings.



If the arming loop is not used, then a Single Channel Loop Detector can be used (9410) in the down loop port. Connect the reverse loops to loop 1 on this detector. Connect the access control device directly to main terminal 6 and 14.

Arming Loop Note: The arming loop only allows the access control device to function when a vehicle is on the loop, otherwise it will not function. This prevents pedestrians from gaining access through the vehicular gate.

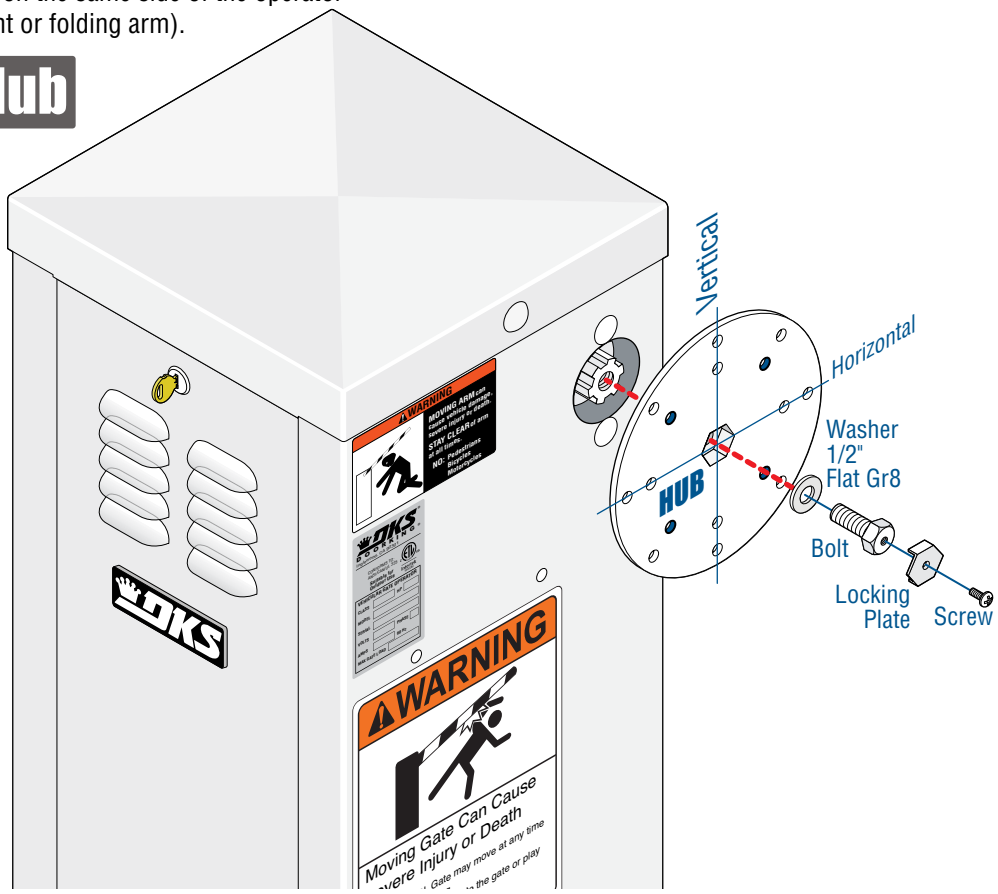
Reverse Loop Note: The reverse loops will prevent the arm from closing on a vehicle remaining in the arm's pathway. The timer will restart the countdown any time the reverse loop gets activated.

SECTION 6 - ARM INSTALLATION

The 14 ft. aluminum arm mounts on the same side of the operator as oncoming traffic (either straight or folding arm).

6.1 Mounting Hub

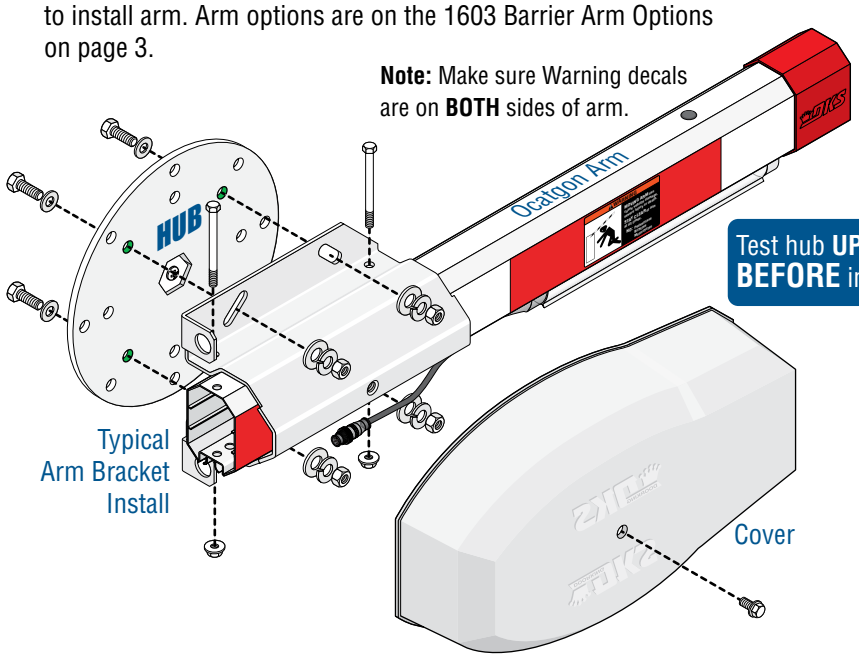
Operator in the **Down** position.



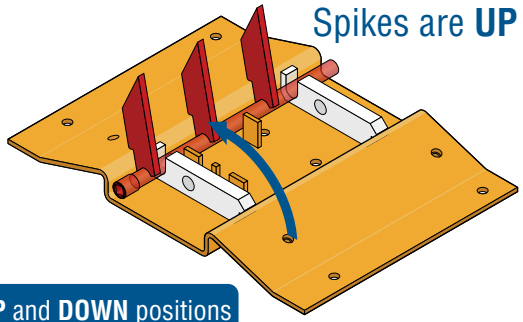
6.2 Mounting Chosen Arm

Refer to instruction sheet that comes with **YOUR CHOSEN ARM** to install arm. Arm options are on the 1603 Barrier Arm Options on page 3.

Note: Make sure Warning decals are on **BOTH** sides of arm.

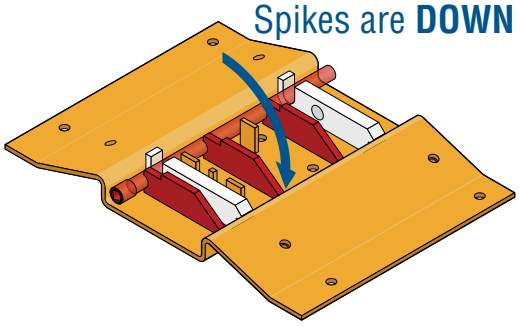


Arm is DOWN when Spikes are **UP**



Test hub **UP** and **DOWN** positions **BEFORE** installing arm.

Arm is UP when Spikes are **DOWN**



SECTION 7 - ADJUSTMENTS

The switch settings and adjustments in this chapter should be made after your installation and wiring to the operator is complete. **Whenever any of the programming switches on the circuit board are changed, power must be shut-off, and then turned back on for the new setting to take effect.**

7.1 1601 Circuit Board Description and Adjustments

Gate Tracker Activity LED

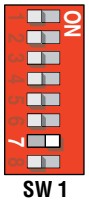
An automatic sensor system that senses entrapment of a solid object and is incorporated as a permanent and integral part of the operator.

Gate Operator Data Terminal

Operator status reporting; cycle count, shorted inputs, loop detector problems, power interruptions, etc. See page 16.

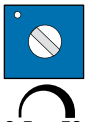
Auto Close Timer

Auto close timer (when turned on) SW 1, switch 7.



SW 1

Adjust from 3.5 seconds (full counter clockwise) to approximately 59 seconds (full clockwise).



3.5 59

How LEDs Function

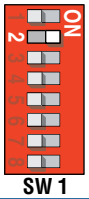
Illuminated **LEDs** Indicates that low voltage power is being applied to the circuit board.

Input LEDs should be OFF and will only illuminate when the input is activated.

Limit LEDs will only illuminate when the respective limit sensor has been activated.

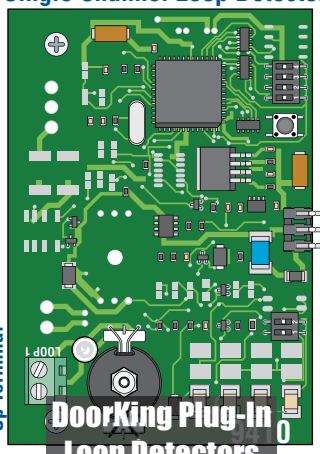
Self Test

Self test (when turned on) SW 1, switch 2.



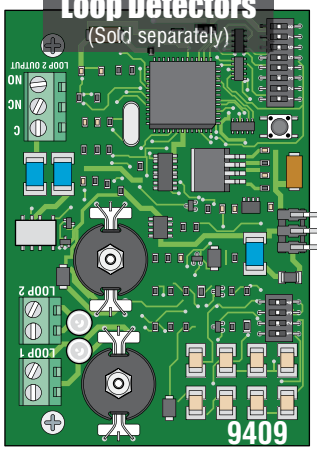
SW 1

Single Channel Loop Detector



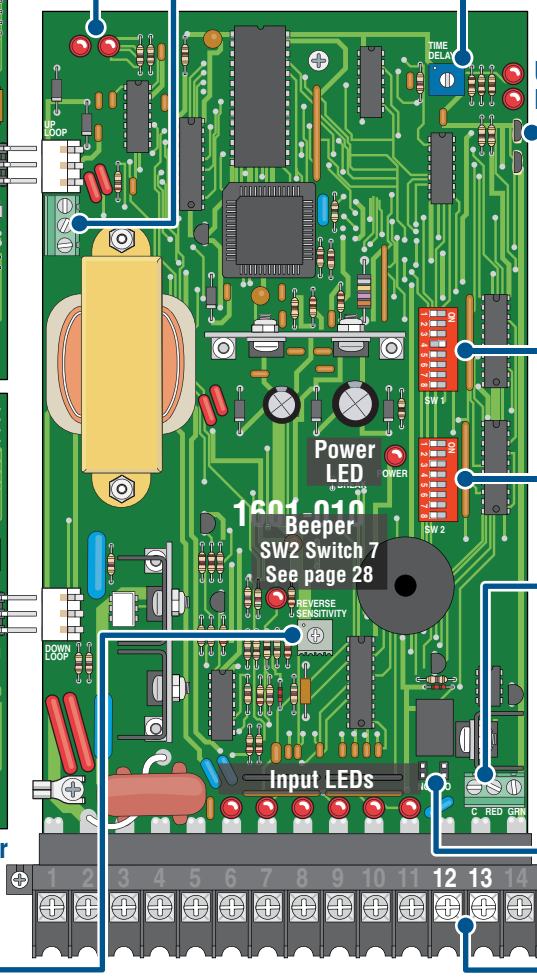
Up Terminal

DoorKing Plug-In Loop Detectors (Sold separately)



Down Terminals

Dual Channel Loop Detector

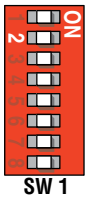


Up Limit LED
Down Limit LED

Limit Sensor
See page 31.

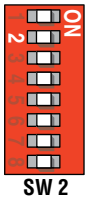
DIP-Switches

Set the DIP-switches on the circuit board to the desired setting. See switch settings information on the next 3 pages.



SW 1

Note: SW 2, switch 1 **MUST** be set for the correct model operator that has been installed.



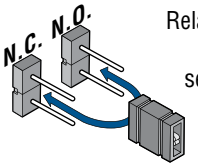
SW 2

LED Lights Terminal (C–RED–GRN)

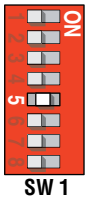
NC NO

This solid state switch is **ONLY** used to control the DoorKing 12VDC **LED Traffic Signal**; 12 VDC, 6A maximum. Refer to installation instruction sheet 1603-264 for wiring info.

Dry Relay Contact



Relay activation is dependant on setting of SW 1, switch 5.

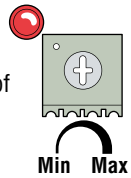


SW 1

Dry relay contacts (terminals 12-13) 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. See page 15 and next page. 24V AC or DC @ 1 amp max.

Reverse Sensor

Adjust reversing sensitivity for the DOWN direction of arm. See page 31.



Min Max

7.2 DIP-Switch SW 1 and SW 2 Settings

The two DIP-switches located on the circuit board are used to program the operator to operate in various modes and to turn on or off various operating features. Whenever a switch setting is changed, power to the operator must be turned OFF and then turned back on for the new setting to take affect. Check and review ALL switch settings prior to applying power to the operator.

SW 1 (Top 8 Switches)

Switch	Function	Setting	Description
1	Down Active when arm is full up.	OFF	Activation and then deactivation of the down loop or down / reverse input will cause the arm to rotate down ONLY if the deactivation occurred after the arm reached the FULL UP position.
	Down Active when arm is moving up or is up.	ON	Activation and then deactivation of the down loop or down / reverse input will cause the arm to rotate down AFTER reaching the FULL UP position regardless of when the deactivation occurred.
2	Self-Test	**OFF**	**Normal setting.** Self-test is turned off.
		ON	Run self-test.
3	Gear Box Travel	**OFF**	**Normal setting.** Operator uses 360° of gearbox. Extends wear life of gearbox.
		ON	Operator uses 180° of gearbox.
4	Down / Reverse Loop and Input	OFF	Down / Reverse loop and input will function as a REVERSE loop and REVERSE input.
		ON	**Normal setting.** Down / Reverse loop and input will function as a down input and cause the arm to rotate down upon deactivation of the input. See SW 1, switch 1 for additional information.
5	Relay 1 Activation	**OFF**	**Normal setting.** Relay activates when the DOWN loop detector (DoorKing plug-in detector only) senses a vehicle presence.
		ON	Relay activates when the UP loop detector (DoorKing plug-in detector only) senses a vehicle presence.
6	Up Input Function	OFF	Up Input will raise arm and/or reset the down timer. Input will not lower the arm.
		ON	Up Input will raise arm if it is down, or will lower arm if it is up.
7	Timer	OFF	Timer to lower arm is OFF.
		ON	Timer to lower arm is ON. Set from 3.5 to 59 seconds for close time delay. Timer can be used as a **secondary** closing command for a down loop. Timer countdown starts when arm has fully raised. Down loop activation will cancel timer and lower arm **OR** arm will lower when timer has timed out.
8	Up Loop Port Input	OFF	Output of the loop detector plugged into the UP loop port is switched to terminal 7 for connection to other input terminals.
		ON	**Normal setting.** Output of the loop detector plugged into the UP loop port will raise arm when activated.

SW 2 (Bottom 8 Switches)

Switch	Function	Setting	Description
1	Model 1603	OFF	Switch **must** be **OFF** for model 1603 barrier gate operator.
2	Multiple Input Memory ON/OFF Switch	**OFF**	**Normal setting.** Operator will respond to a single UP command, then require a DOWN command. **Operator will not accept multiple Up commands.** Operator will not accept the next UP command until the previous DOWN command is in progress.
		ON	Turns ON the multiple input memory option 1 or 2 (See switch 3). SW 1, switch 4 must also be on.
3	Multiple Input Memory Options (SW2, Switch 2 must be ON) (SW1, Switch 4 must be ON)	Option 1 (OFF Position)	Override a DOWN command – When the arm is in the up position for a vehicle passing through and the next vehicle's UP command is received, the operator will hold the arm up and wait for the next vehicle to clear the down loop before lowering the arm. The operator **will not count** multiple UP commands. Distance between access control device and barrier operator is a factor when using this option. Remote transmitters recommended for this option. See next page for more information.
		Option 2 (ON Position)	Override Mulitlpe DOWN commands – The operator **will count** multiple UP commands received **during** an UP command and require a matching number of DOWN commands before lowering the arm. Distance between access control device and barrier operator is a factor when using this option. Remote transmitters **NOT** recommended for this option. See page 30 for more information.
4	Stop Arm Function	**OFF**	**Normal setting.** Arm **will NOT stop** DURING the down cycle.
		ON	Stop Arm Function – Arm **will stop** DURING the down cycle if a vehicle activates the down loop. An UP command will raise the arm, or the arm will continue down AFTER the down loop is cleared.
5	Reverse Delay	OFF	Arm reversal is delayed approximately .5 seconds when a reverse input from terminal 9 is received during the down cycle. (eg. non-contact sensor beam is blocked). Limited application use.
		ON	**Normal setting.** Instant Reverse – Arm reversal is delayed approximately .1 second when a reverse input from terminal 9 is received during the down cycle. (eg. non-contact sensor beam is blocked)
6	Arm Rotation Direction	**OFF**	**Normal setting.** Leave in OFF position.
7	Warn Before Operate Beeper	OFF	Beeper will beep **2 times** before lowering arm **ONLY** when the **TIMER** times out. If using a down loop, when it gets activated, it will cancel the timer and lower arm **WITHOUT beeping**.
		ON	Beeper will beep **2 times** before lowering arm **EVERYTIME**.
8	Spare	**OFF**	**Normal setting.** Leave in OFF position.

Option 1 - Override a DOWN Command SW2, Switch 3 OFF

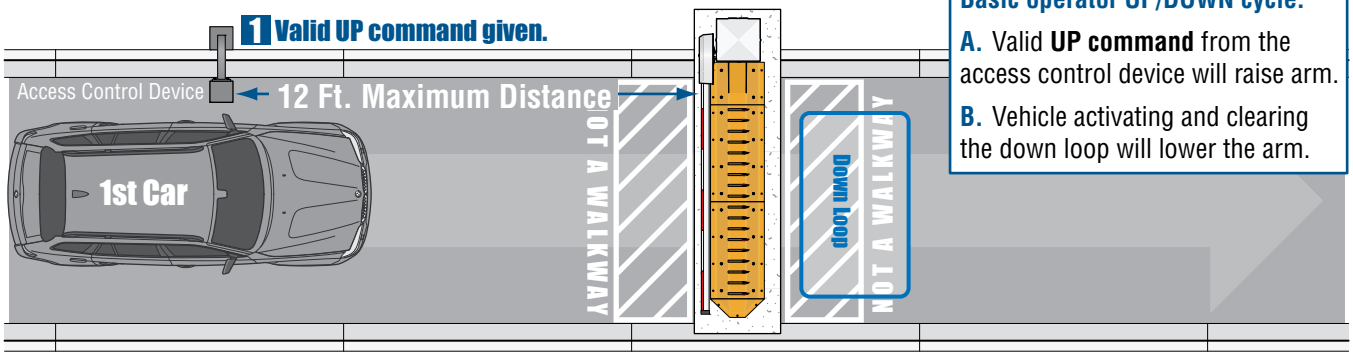
Remote transmitters are recommended for this option.

Basic operator UP/DOWN cycle:

A. Valid **UP command** from the access control device will raise arm.

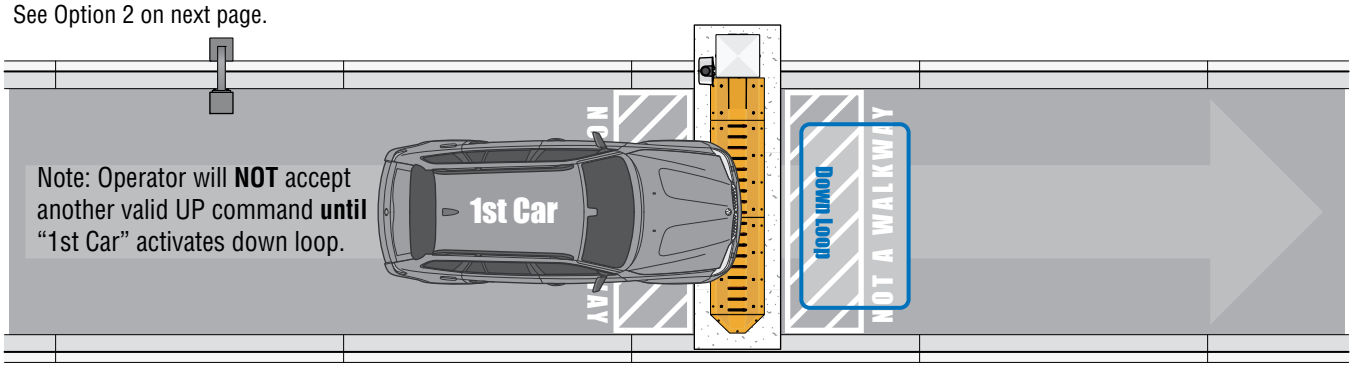
B. Vehicle activating and clearing the down loop will lower the arm.

1 Valid UP command given.

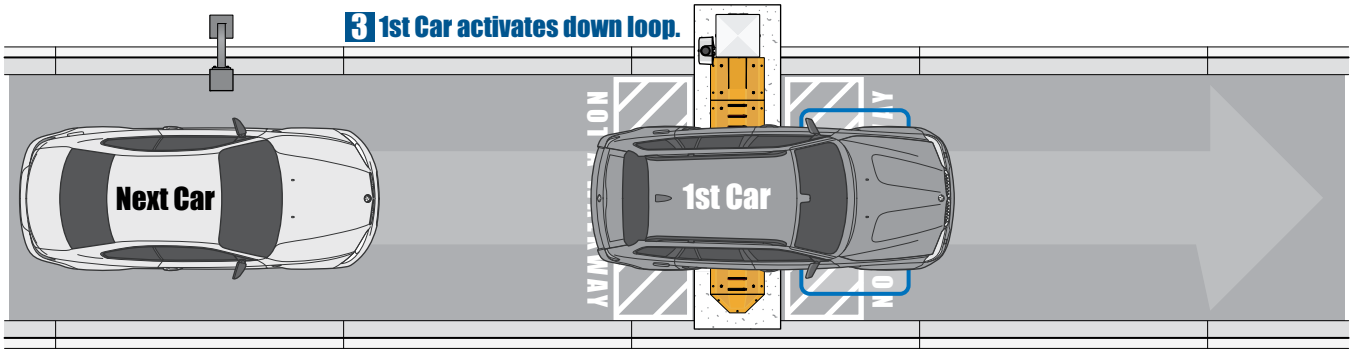


Option 1 CANNOT be used at distances OVER 12 feet. This allows multiple vehicles in this area which Option 1 **WILL NOT** keep track of. See Option 2 on next page.

2 Operator will raise arm.

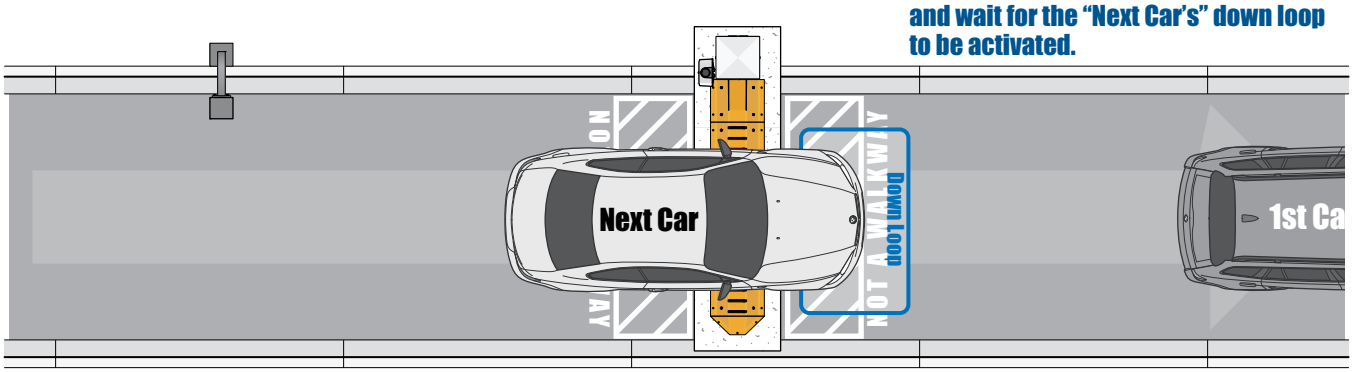


3 1st Car activates down loop.



4 While 1st Car is on down loop, the next UP command is given.

5 Operator will override "1st Car's" DOWN command. Arm will remain up and wait for the "Next Car's" down loop to be activated.



6 When "Next Car" activates then clears down loop, arm will lower.

Note:
If an UP command is given while the arm is lowering, the arm will raise.

Option 2 - Override Multiple DOWN Commands SW2, Switch 3 ON

Basic operator UP/DOWN cycle:

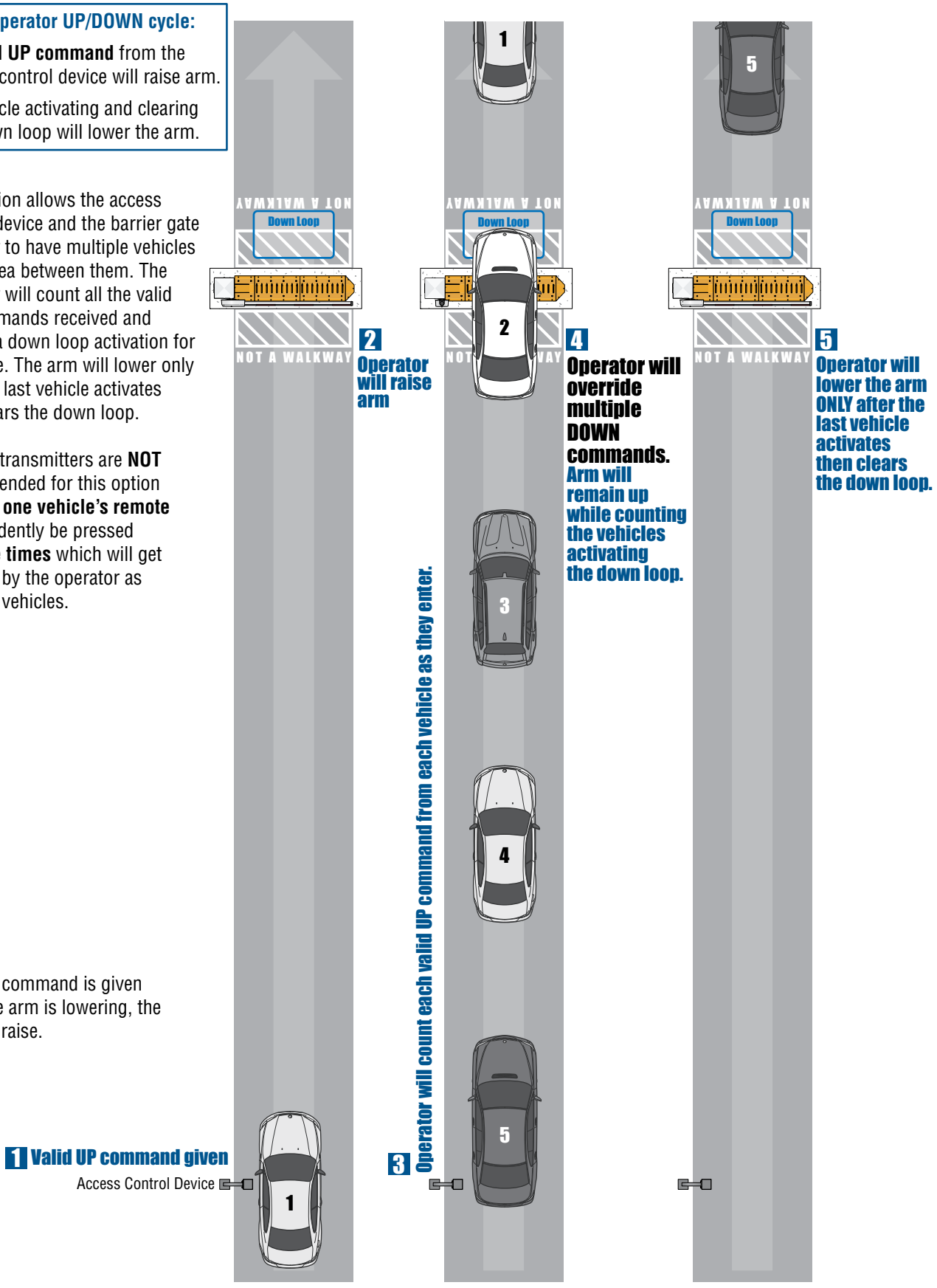
A. Valid **UP command** from the access control device will raise arm.

B. Vehicle activating and clearing the down loop will lower the arm.

This option allows the access control device and the barrier gate operator to have multiple vehicles in the area between them. The operator will count all the valid UP commands received and require a down loop activation for each one. The arm will lower only after the last vehicle activates then clears the down loop.

Remote transmitters are **NOT** recommended for this option because **one vehicle's remote** can accidently be pressed **multiple times** which will get counted by the operator as multiple vehicles.

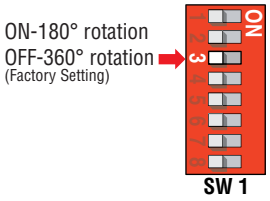
Note:
If an UP command is given while the arm is lowering, the arm will raise.

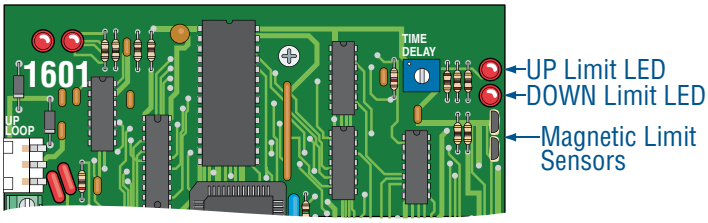


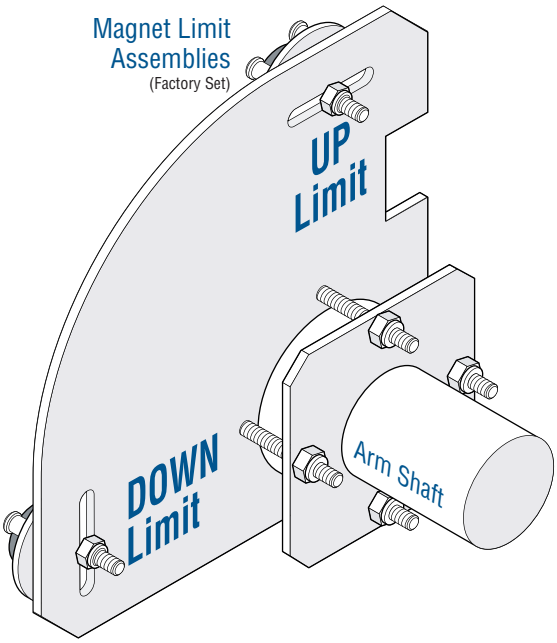
7.3 Magnetic Limit Adjustments

The operator has been **preset at the factory** to rotate 90°.
NO ADJUSTMENT is necessary for a "Normal 90° Setup".

Gear Box Rotation Note: The gear box is **factory set** (SW1, DIP-switch 3 **OFF**) to **rotate 360°** for a **Standard 90° operator ARM rotation** (less wear on gear box). The auto-spikes can **ONLY** be set-up as a **90° rotation**, **NOT** less.
It's best to leave gear box set to rotate 360° and **NOT** 180° (more wear on gear box).

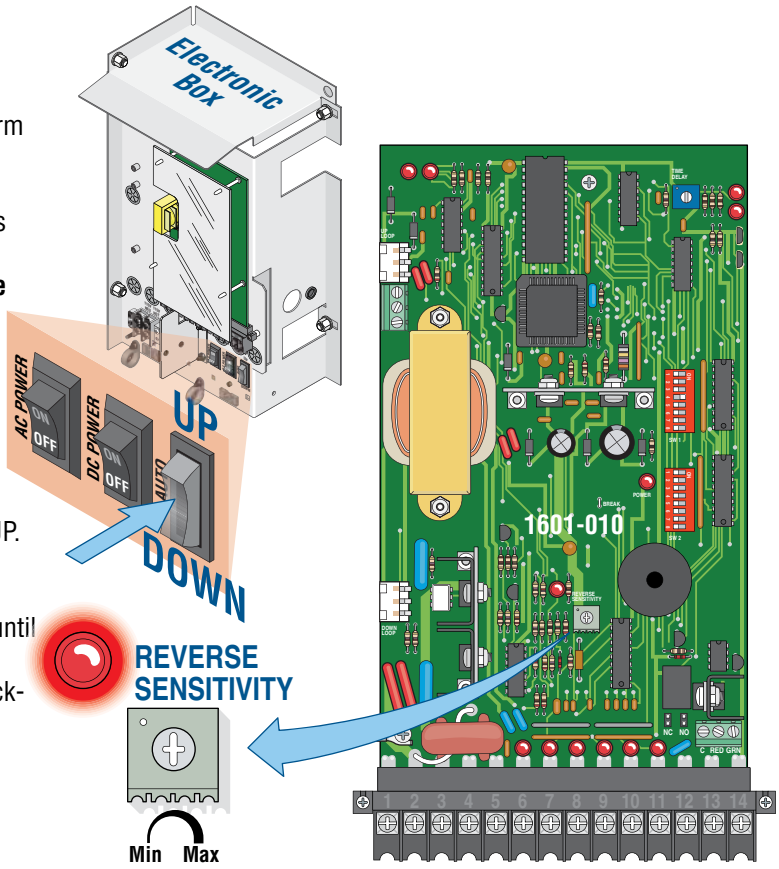






7.4 Reverse Sensor

Reverse sensitivity adjustment will cause the barrier arm to reverse direction of travel should an object be encountered during the down cycle. The amount of force required for the arm to reverse direction depends on the reverse sensitivity potentiometer.
CAUTION: Keep pedestrians and vehicles clear of the arm zone while adjusting sensor!



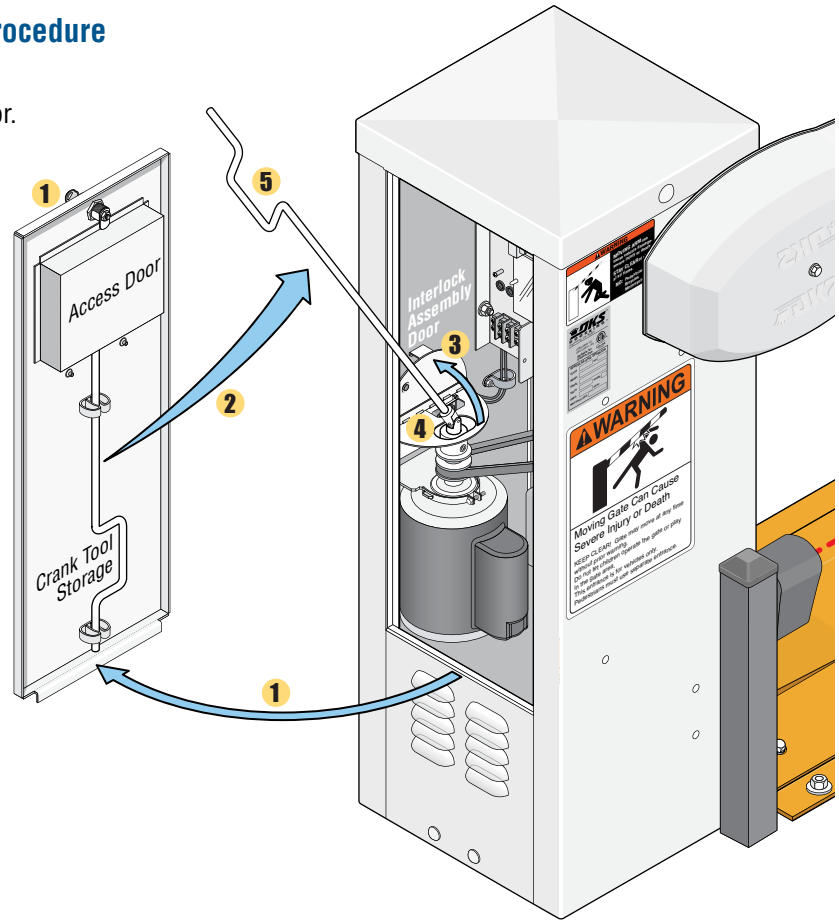
While operator has AC power:

1. Push "**AUTO**" rocker switch **UP**. Arm will rotate UP.
2. Push "**AUTO**" rocker switch **DOWN**. While arm is traveling down, rotate reverse sensor clockwise until the reverse LED lights up and the arm reverses direction. Rotate reverse sensor back counterclockwise approximately 1/8 turn.
3. Repeat the adjustment as needed to find a satisfactory setting.

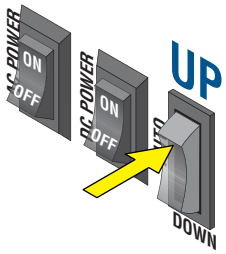
7.5 Manual Release OPTIONS

Factory Installed Manual Release Procedure

1. Unlock and remove access door.
2. Remove crank tool from inside access door.
3. Flip interlock assembly door up, power will be disabled from operator.
4. Insert crank tool into motor pulley as shown.
5. Rotate crank tool to manually move operator arm **UP** or **DOWN**.

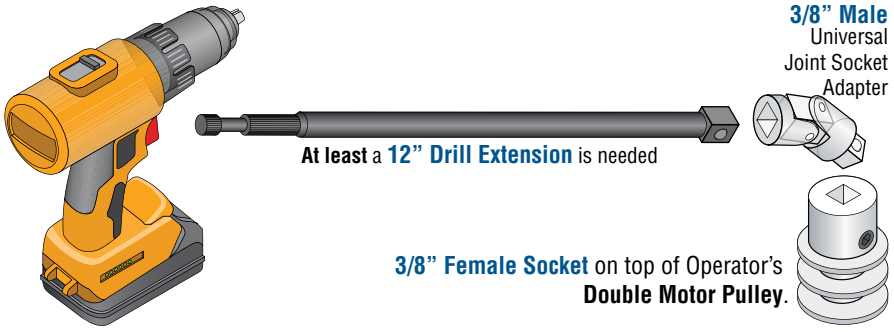


Convenience Open can **automatically raise** the arm by pressing the "**AUTO**" rocker button when operator **has DC power**.



A **Cordless Drill** can be used to manually crank the arm. **BE CAREFUL** if using a cordless drill. Take it slow, **damage could occur**. DoorKing does **NOT** recommend using a cordless drill because of damage that **could** occur.

Hardware **NOT** provided.



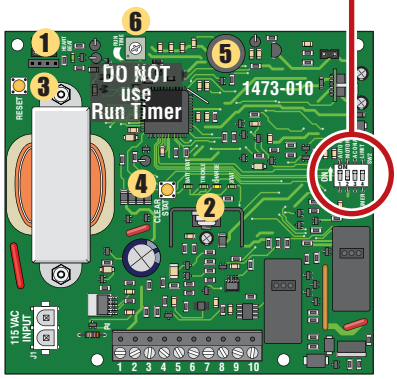
SECTION 8 - OPTIONAL CONVENIENCE OPEN SYSTEM

The optional convenience open system installed in your vehicular gate operator is designed as a convenience enhancement only. It is not designed or intended to provide continuous gate operation during a power outage. Its sole purpose is to provide a method to open the vehicular gate to allow unimpeded traffic flow when the gate and access control system is without power. If your access control system requires 100% power backup and continuous operation when primary (AC) power has failed, a power inverter / backup system, such as DoorKing's Model 1000 is required.

- The convenience open system **cannot** provide continuous gate operation during a power outage.
- **This system cycles the arm to the open position one time only after AC power failure.**
- The convenience open system requires testing on a monthly basis to insure the batteries are fully charged and that the system is operational.
- The convenience open system uses two 12-volt, 3.0 amp-hour gel-cell batteries. These batteries should be replaced every two years on average, or sooner if required.
- Batteries are affected by temperature. Cold temperatures will reduce the effectiveness of the batteries. High temperatures will result in a shortened battery life.
- Batteries are not covered under warranty.

8.1 Circuit Board Settings and Descriptions

This convenience open system consist of a control board (1473-010), motor and power supply (batteries) providing a completely redundant drive system to open the barrier arm should a power outage occur. This system is not designed to maintain continuous barrier operation; rather it provides a convenient method to open the arm **once** during adverse conditions. **If continuous barrier and access control system operation is required, refer to the DoorKing Model 1000 Inverter / Backup Power System.**



DIP-Switches

Switch	Function	Setting	Description
1	**Auto Open** Operation After Power Outage	OFF	DO NOT USE. Manual Mode.
		ON	**(Auto Mode) Apartment complexes, gated communities, etc.:** Arm will **automatically** raise to the operator's UP limit position.
2	**Motor Dir** Motor Direction	**OFF**	Set so that the arm **opens to the UP direction** upon loss of AC power.
3	**AC on ACT** Restore Power Operation	OFF	DO NOT USE. Physical Input Required.
		ON	**Auto:** a 1-second pulse is **automatically** sent to the barrier gate operator input to restore normal operation again.
4	**Timer-OFF Limit-ON** Operator Type	Timer-OFF	DO NOT USE. "Run timer" **is used** and **MUST** be adjusted.
		Limit-ON	Operator limits are used to stop arm at UP position.

1 HEART BEAT LED

Blinking: Indicates board is operating normally.

2 Battery LEDs

BATT STAT LED

2 Blinks: Replace batteries.
3 Blinks: Battery level is too low.
4 Blinks: Batteries are not connected.
5 Blinks: Bad battery.
6 Blinks: Battery charge current exceeds maximum, possible shorted cell.

TRICKLE LED

Steady Green LED: Battery is fully charged and a trickle charge is being used to maintain a full charge.

CHARGE LED

Steady Yellow LED: Battery is being bulk charged.
Blinking Yellow LED: Battery is 90% of a full charge.

STAT LED

3 Blinks: Extreme temperature, charging suspended.

3 Reset Button

Press to reset board.

4 Clear Stat Button

Press and hold the **CLEAR STAT** button for 4 secs clears the battery replacement reminder counter and resets the beeper. LEDs will also indicate battery status.

5 Beeper

A beep every 20 seconds indicates that battery replacement is needed. Press and hold the **CLEAR STAT** button to reset the battery reminder beeper and clear the counter. LEDs will also indicate battery status.

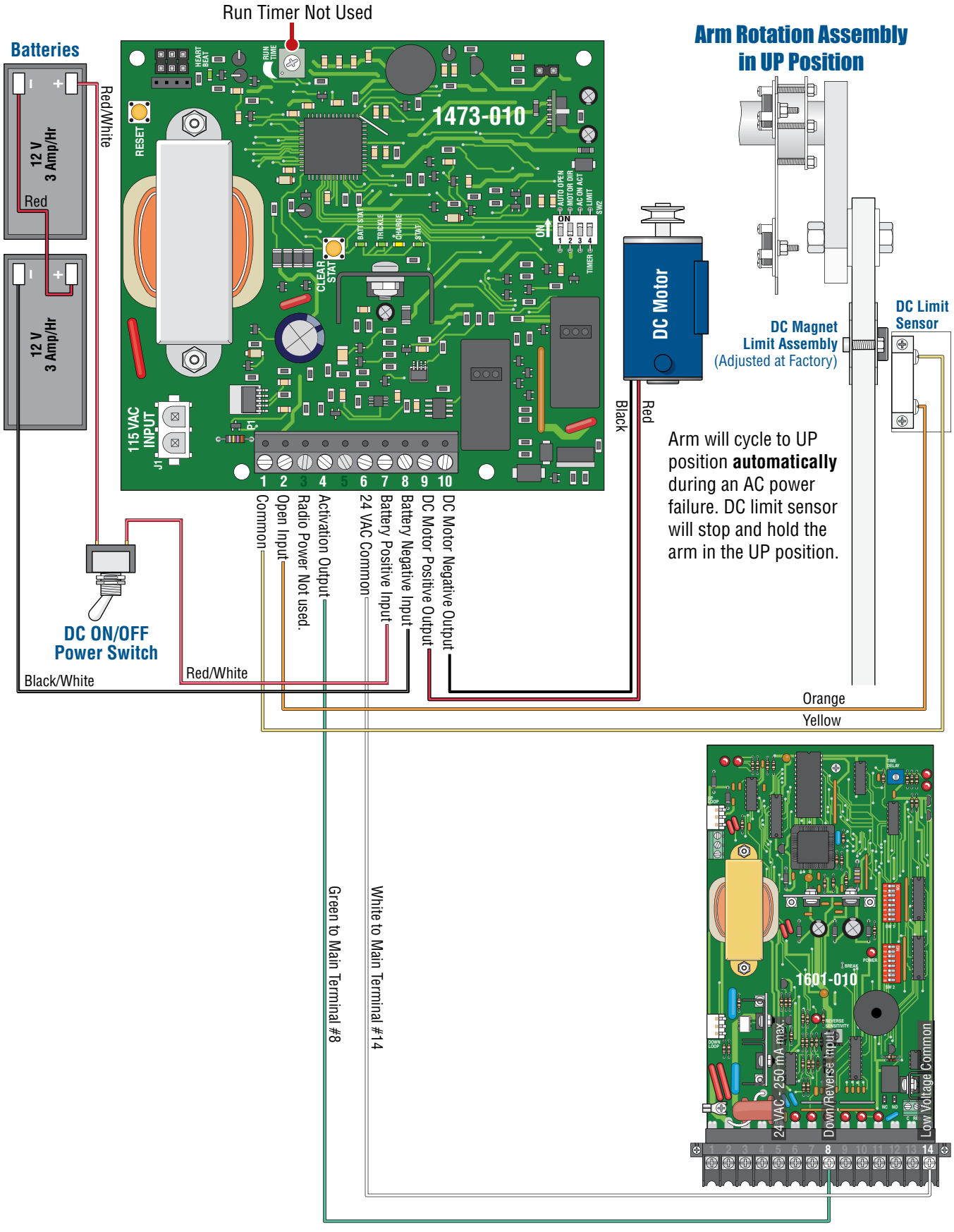
6 Run Timer

DO NOT USE.

Operating Note: Arm will cycle to UP position **automatically** (DIP-Switch 1 **ON**) during an AC power failure. Operator's DC limit sensor will stop and hold the arm in the UP position (DIP-Switch 4 **ON**). Operator will **automatically** return to normal operation once AC power has been restored (DIP-Switch 3 **ON**).

Initial Power Up Convenience Open Note: The DC power is not present on the main circuit board until the **first** initial cycle.

8.2 DC System Wire Schematic



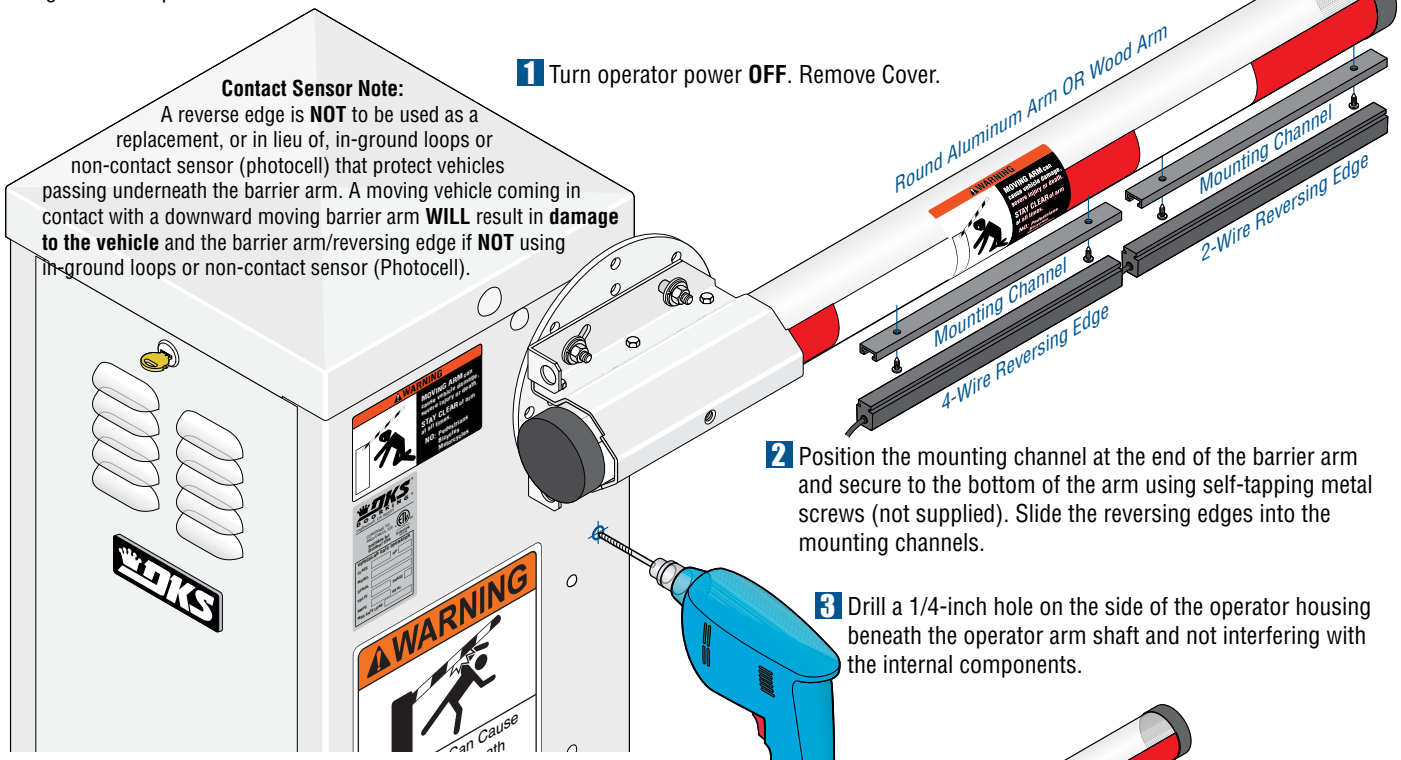
SECTION 9 - OPTIONAL ACCESSORIES INSTALLATION

9.1 Contact Sensor Installation (Reversing Edge)

In addition to the electronic reversing device (ERD) an optional electric reversing edge may be installed on **Round Aluminum** arm **ONLY** offering additional protection. P/N 8080-071 - 2-wire 6 ft. P/N 8080-091 - 4-wire 6 ft.

Contact Sensor Note:
A reverse edge is **NOT** to be used as a replacement, or in lieu of, in-ground loops or non-contact sensor (photocell) that protect vehicles passing underneath the barrier arm. A moving vehicle coming in contact with a downward moving barrier arm **WILL** result in **damage to the vehicle** and the barrier arm/reversing edge if **NOT** using in-ground loops or non-contact sensor (Photocell).

1 Turn operator power **OFF**. Remove Cover.

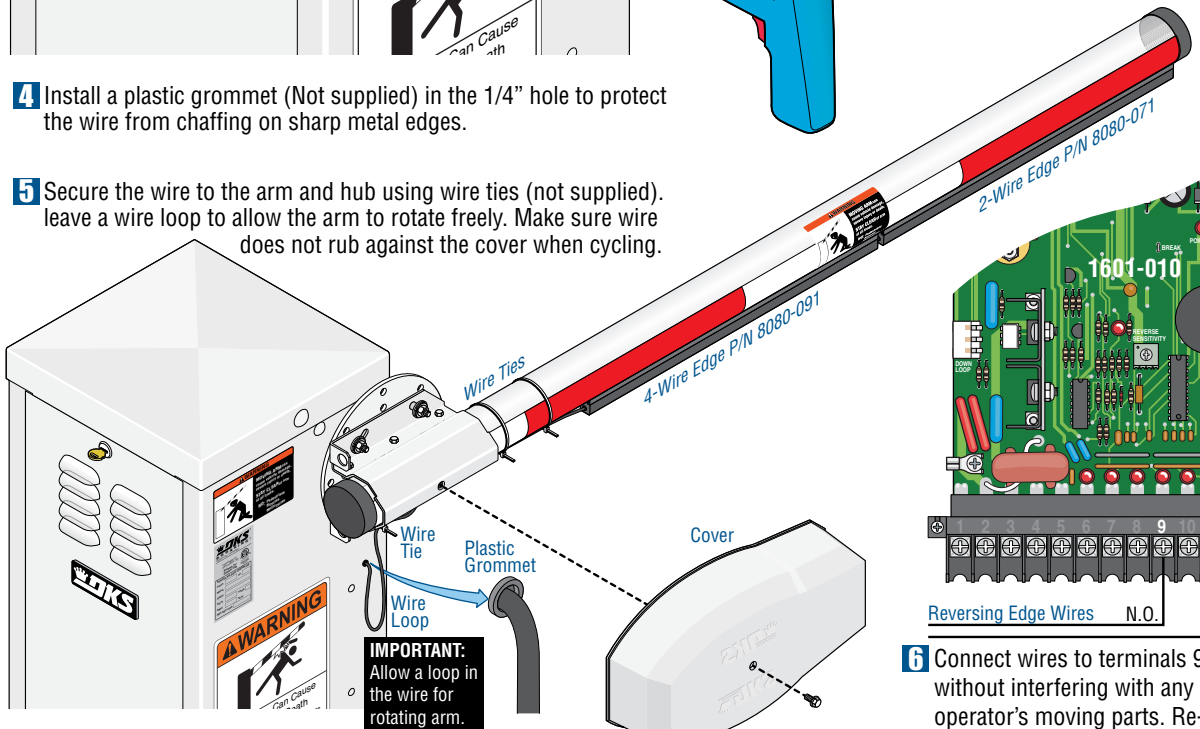


2 Position the mounting channel at the end of the barrier arm and secure to the bottom of the arm using self-tapping metal screws (not supplied). Slide the reversing edges into the mounting channels.

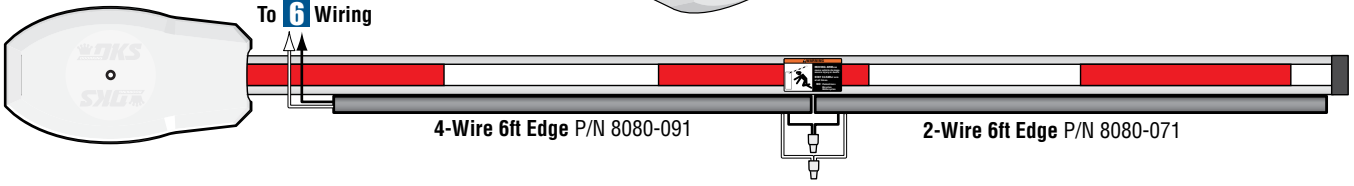
3 Drill a 1/4-inch hole on the side of the operator housing beneath the operator arm shaft and not interfering with the internal components.

4 Install a plastic grommet (Not supplied) in the 1/4" hole to protect the wire from chaffing on sharp metal edges.

5 Secure the wire to the arm and hub using wire ties (not supplied). leave a wire loop to allow the arm to rotate freely. Make sure wire does not rub against the cover when cycling.

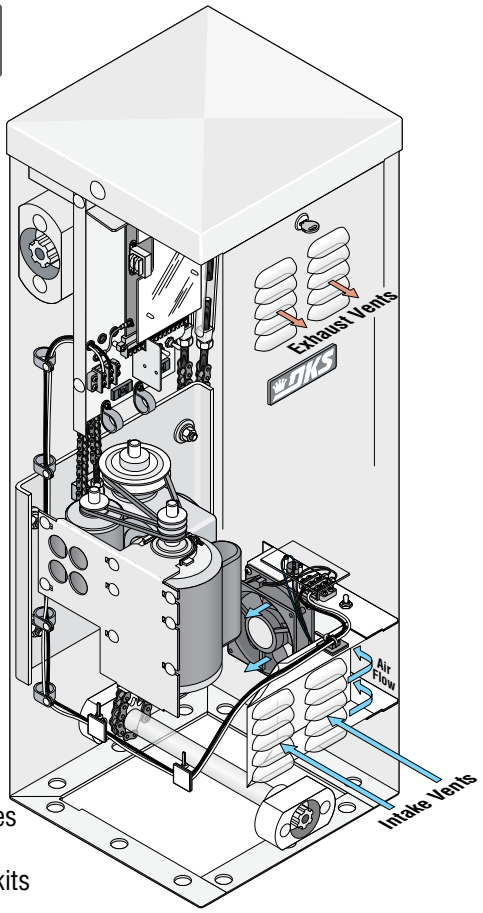


6 Connect wires to terminals 9 and 14 without interfering with any of the operator's moving parts. Re-install cover.



9.2 Additional Optional Accessories

"Optional" accessories offering additional features, available from DoorKing.



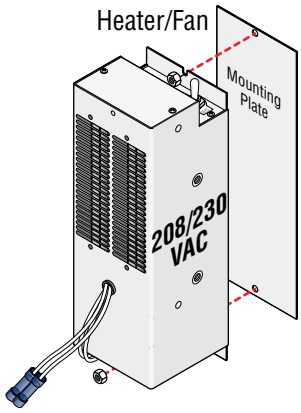
Fan Kit

This kit is designed for the 1603 barrier gate operator. It is recommended for hot humid climates to prevent heat and moisture build-up inside the housing (P/N 1601-093).
For further information about this, go to DoorKing's web site at:
www.doorking.com

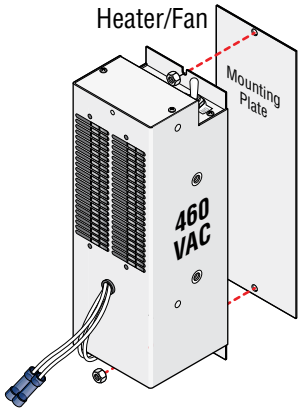
Heater Kits

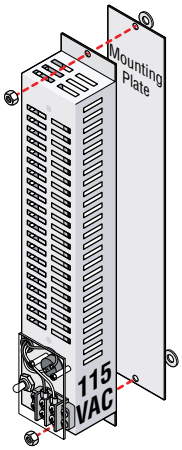
These kits are designed for the 1603 barrier gate operator. For cold weather climates where temperatures routinely drop below 10°F (-12°C). A built-in thermostat will automatically control the temperature inside operator housing. There are different kits depending on the input power wire being used to power the barrier gate operator.
For further information about these, go to DoorKing's web site at: **www.doorking.com**

P/N 1601-197 - 208/230 VAC
Heater/Fan



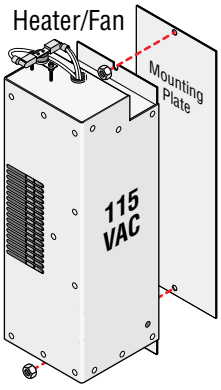
P/N 1601-198 - 460 VAC
Heater/Fan

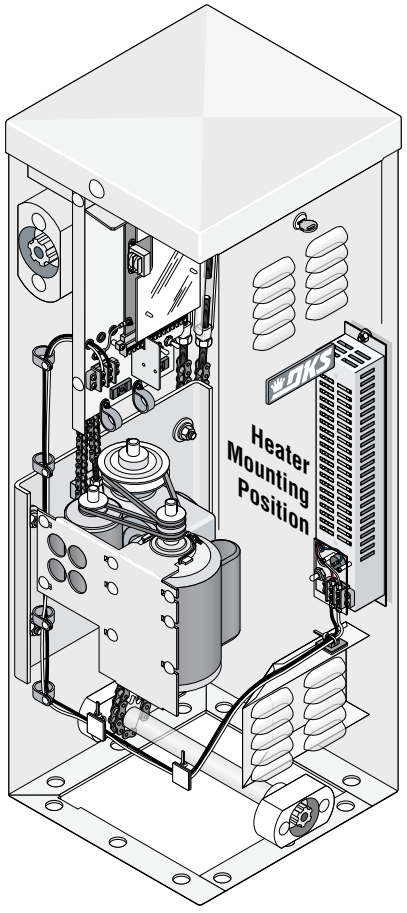




P/N 1601-092 - 115 VAC
Heater **ONLY** NO Fan

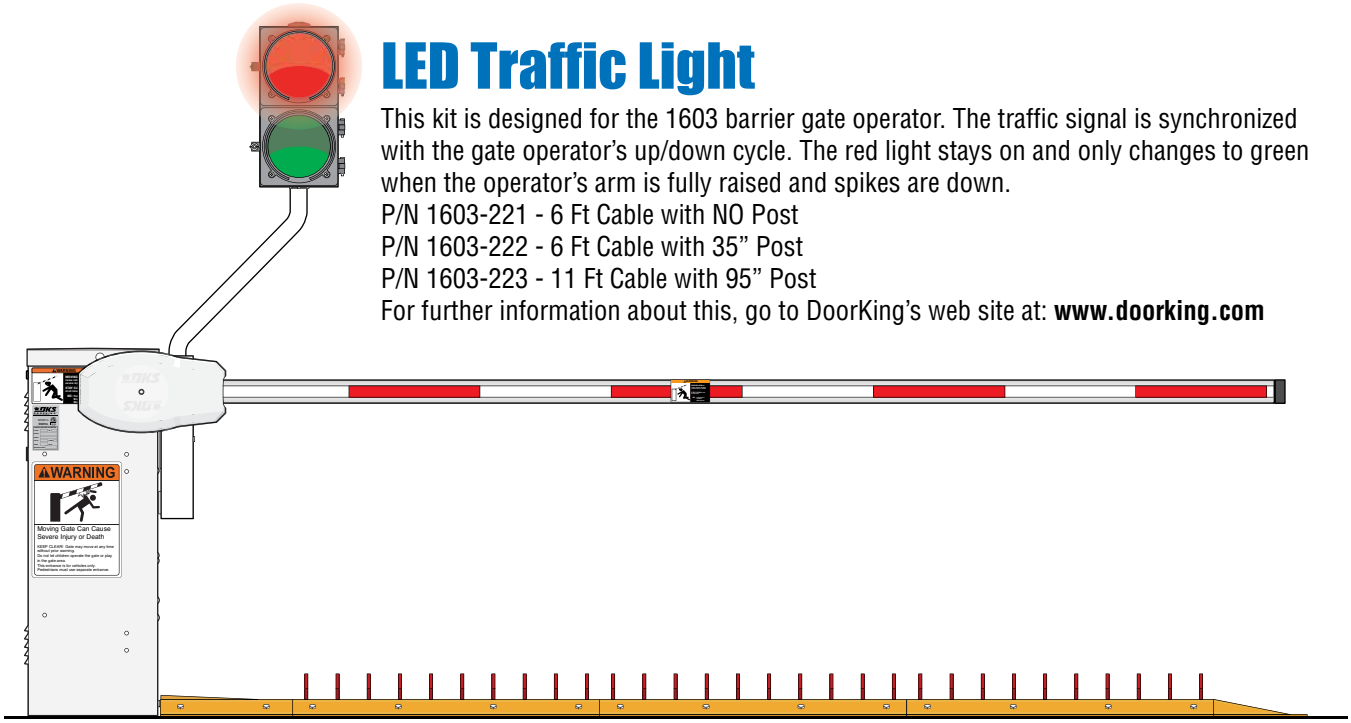
P/N 1601-154 - 115 VAC
Heater/Fan





9.2 Additional "Optional" Accessories

"Optional" accessories offering additional features, available from DoorKing.

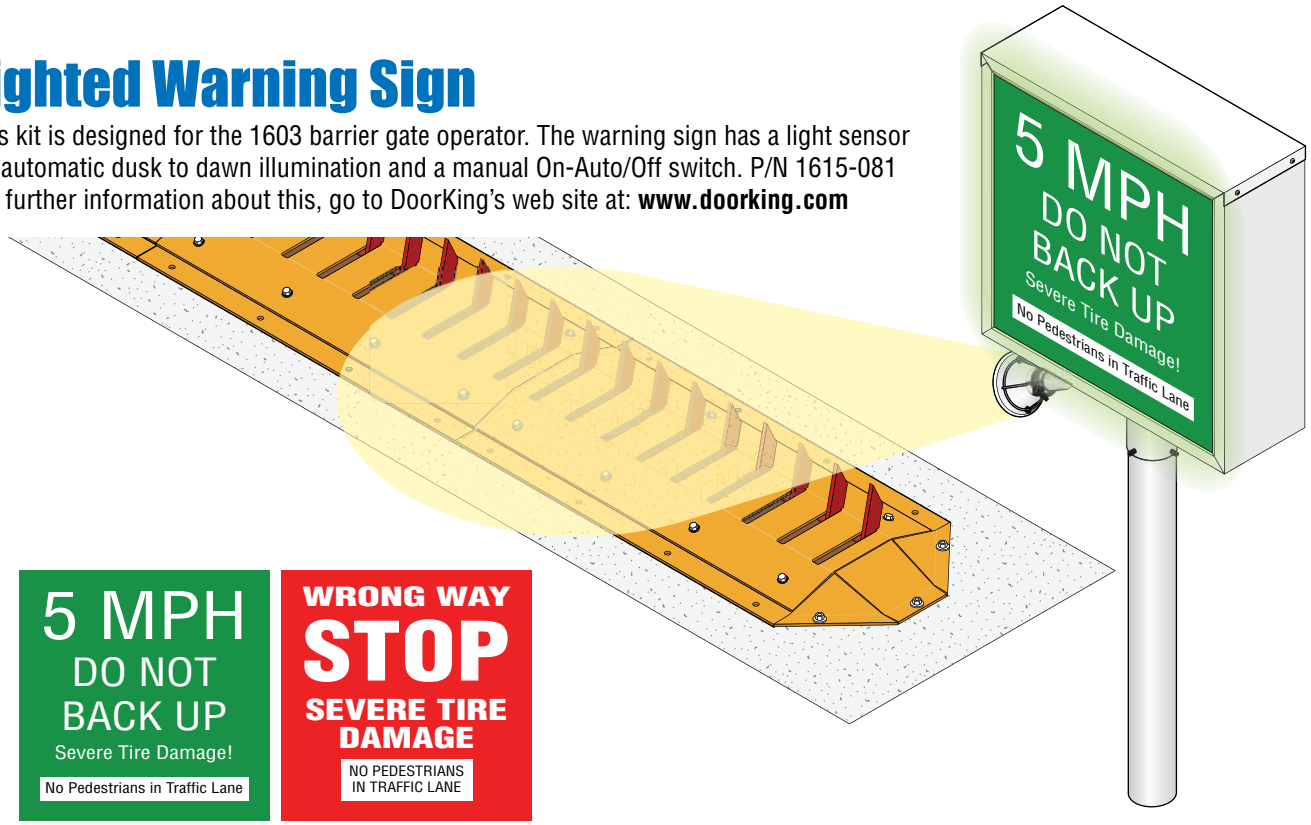


LED Traffic Light

This kit is designed for the 1603 barrier gate operator. The traffic signal is synchronized with the gate operator's up/down cycle. The red light stays on and only changes to green when the operator's arm is fully raised and spikes are down.
P/N 1603-221 - 6 Ft Cable with NO Post
P/N 1603-222 - 6 Ft Cable with 35" Post
P/N 1603-223 - 11 Ft Cable with 95" Post
For further information about this, go to DoorKing's web site at: **www.doorking.com**

Lighted Warning Sign

This kit is designed for the 1603 barrier gate operator. The warning sign has a light sensor for automatic dusk to dawn illumination and a manual On-Auto/Off switch. P/N 1615-081
For further information about this, go to DoorKing's web site at: **www.doorking.com**



Front Panel

Back Panel

SECTION 10 - 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.

10.1 Maintenance

When servicing the gate operator, always check any external reversing devices (loops, photo eyes, 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.

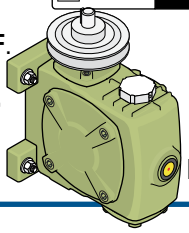
Always check the inherent reversing system when performing any maintenance. If the inherent reversing system cannot be made operable, remove this operator from service until the cause of the malfunction is identified and corrected. Keeping this operator in service when the inherent reversing system is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

If replacing arm, make sure warning decal is on both sides of arm.



When servicing this gate operator, always turn power **OFF!!**
If equipped with batteries, make sure battery power switch is **OFF**.

If gearbox requires oil, use only Mobil SHC-629 Synthetic Gear Oil. Do not completely fill gearbox with oil. Gearbox is full when oil completely covers inspection window.



Inspection Window

Operator Component	Maintenance	Monthly Interval		
		1	6	12
Arm(s)	Check for alignment, tightness and wear.		✓	✓
Auto Spike System	Check for shaft alignment, tightness of hardware and wear of spikes. Make sure all tunnel plates and ramps are securely fastened to concrete.			✓
Drive Belt(s)	Check for alignment, tightness and wear.		✓	✓
ERD Reversing System	Check that the arm reverses on contact with an object in closing cycle. Adjust the reversing sensor if necessary.	✓		✓
Batteries (On select models)	If operator is equipped with optional convenience open system, check the batteries for any leakage or loose connections. Batteries should be replaced every two years.	✓		
Convenience Open System (Not on all models)	If operator is equipped with optional DC open system, check to be sure the system opens the arm upon loss of AC power. Operator should resume normal operation when AC power has been restored.	✓	✓	✓
Fire Dept.	Check emergency vehicle access device for proper operation.	✓		✓
Gearbox	Check oil level and fill if necessary. Do not overfill.			✓
Linkages	Check internal linkages for wear. Inspect bushing for wear.		✓	✓
Loop(s)	Check all external ground loops for proper operation.	✓		✓
Pulleys	Check set screw for tightness.		✓	✓
External Reverse Device(s)	Check electric reversing edges and photo-cells for proper operation.	✓		✓
Complete System	Perform a complete system check. Include all reversing devices, loops, access system devices, Fire Dept. access devices, etc.			✓

10.2 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 terminal.

1. Use caution when checking high voltage areas: terminals 1 through 6, the motor capacitor and the motor.

2. 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 the arm up. Disconnect the keying devices one at a time until the LED goes OFF (see troubleshooting guide).

3. If the operator stops or holds open, check external entrapment protection devices for any shorts or malfunction.

4. A malfunction in a loop or loop detector can cause the gate operator to hold the arm up, 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.

5. 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 arm, momentarily jumper across terminals 6 and 14 on the control board terminal. If the gate operator starts, this indicates that a problem exist with the keying device and not with the gate operator.

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

10.3 Troubleshooting

Symptom	Possible Solution(s)
Operator will not run. Power LED is OFF.	• Check that power to the operator is turned ON. • Check for 117 VAC with a voltmeter at control board terminals 1 and 2. If voltage measures 0, check power supply to operator or check terminal strip. If voltage measures OK, replace control board.

10.3 Troubleshooting Continued

Symptom	Possible Solution(s)
Operator will not run. Power LED is ON.	• Press **RESET button on BOTTOM of motor**. • Momentarily jumper terminal 6 to terminal 14. If input LED does not come ON, check terminal strip or replace control board. If LED does come on, go to the next step. **Remove circuit board from the terminal strip and shutoff power to the operator:** 1 Momentarily jumper terminal 2 to terminal 3 (Caution – High Voltage). Momentarily turn power ON. The motor should run. Make sure power is OFF. Remove the jumper. 2 Momentarily jumper terminal 2 to terminal 4 (Caution – High Voltage). Momentarily turn power ON. The motor should run. Make sure power is OFF. Remove the jumper. • If motor does not run in either or both steps above, bad motor, motor capacitor or wiring to motor.
Arm rotates up, but will not rotate down.	• Check LEDs on terminals 6, 7 and 9. Any of these ON will hold the arm in the UP position. This indicates a shorted input. • Check the LEDs on the loop detectors. Any ON will hold the arm in the UP position. Possible loop or loop detector problem. • If auto timer is not used (SW1, switch 7 off), check to be sure SW1, switch 6 is in the ON position. This will cause terminal 6 to rotate the arm down when it is activated. • Check to be sure SW1, switch 4 is ON. This will cause terminal 8 activation, then deactivation to rotate arm down.
Down input / down loop will not rotate arm to down position.	• Check to be sure SW1, switch 4 is in the ON position. • Down input must be activated, and then deactivated to cause arm to rotate down.
Loop detector LED is on continuously.	• Activate the reset switch on the loop detector. • Decrease loop detector sensitivity. • Check loop wire for resistance to ground with meg-ohm meter. Should be 100 meg-ohms or higher. If less than 50 meg-ohms, replace loop wire. • Be sure loop lead-in wire is twisted at least 6 turns per foot. • Be sure all loop connections are soldered. • Replace loop detector.
Loop detector LED never activates.	• Increase loop detector sensitivity. • Check continuity of loop wire. Should be 0 ohms. If continuity check indicates anything other than 0 ohms, check all connections. Replace loop wire. • Move loop detector board to the other loop detector port on the control board, and then check loop operation. If loop detector still fails, replace loop board. • If loop detector operates OK in the other loop port, replace control board.
Battery back-up system will not raise arm upon power outage.	• Check that the back-up system toggle switch is in the ON position. • Check to be sure that the 1473-010 battery back-up control board switch settings are set as described in SECTION 8. • Check the batteries for proper voltage, replace if necessary. • Replace the 1473-010 Back-up control board.
Operator has intermittent functionality problems that vary.	• The main terminal #5 250 mA power has been exceeded. Check total amp draw of connected device(s).

10.4 Accessories Parts List

The following accessories are available for 1603 Auto-Spikes barrier gate operators.

Plug-In Loop Detectors - Plug directly into ports on circuit board simplifying wiring.
P/N 9410-010 - Single channel detector.
P/N 9409-010 - Two channel detector.
P/N 9411-010 - Single channel detector with aux relay. **Pedestrian Protection:** Controls arm lowering for vehicles but **NOT** for pedestrians.
P/N 9416-010 - Single channel low power draw detector
P/N 9415-010 - Dual channel low power draw detector

Loop Wire - XLPE insulation is available in 500 and 1000 foot rolls, available in Black, Blue and Red insulation.

Loop Sealant - P/N 2600-771 Asphalt P/N 2600-772 Concrete

Manual Release Kit - Installs on 1603 operators without factory installed manual release. P/N 1601-270

Meg Ohm Meter - Checks the integrity of ground loops. P/N 9401-045

Interconnect Cable - Interconnect cable contains all the necessary wires to interconnect primary / secondary operators.
Cable length: 30 ft. - P/N 2600-755 40 ft. - P/N 2600-756 50 ft. - P/N 2600-757

High Voltage Kit - Alter the input AC voltage on a 115 VAC 1601/1602 to 208, 230, 460 or 575 VAC. P/N 2600-266

Type B2 Contact Devices - Reverse Edges: Installs on the bottom of a **ROUND** / **WOOD** / **PLASTIC** arm ONLY. NOT for Octagon arm.

DoorKing
DKS 8080-250 **5 ft** 2-wire End-of-Line
DKS 8080-254 **5 ft** 4-wire In-Line
DKS 8080-260 **6 ft** 2-wire End-of-Line
DKS 8080-264 **6 ft** 4-wire In-Line



Type B1 Non-Contact Devices - Photocell - Prevents arm from lowering on vehicles or pedestrians.

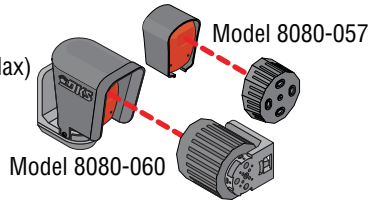
DoorKing
Model 8080-057 (Retro-reflective 35 ft Max)
Model 8080-060 with protective hood (Retro-reflective 35 ft Max)

Miller Edge
OptiGuard (Thru-Beam 100 ft Max)
TruGuard (Retro-reflective 30 ft Max)

EMX Industries
Model IRB-MON2 (Thru-Beam 115 ft Max)
Model IRB-RET2 (Retro-reflective 60 ft Max)
Model IRB-325 (Thru-Beam 65 ft Max)
Model NIR-50-325 (Retro-reflective 50 ft Max)

Omron
Model E3K-R10K4 (Retro-reflective 30 ft Max)

Seco-Larm
Model E-936-S45RRGQ (Retro-reflective 45 ft Max)
Model E-960-D90GQ (Thru-Beam 90 ft Max)



Arm and Spike OPTIONS page 3.

Manual Gate Control Toggle - Allows user to manually operate gate arm. Fits inside single-gang electrical box. P/N 1200-017

Time Clock - 7 day clock, used to automatically open gate at pre-set time, fits inside operator. P/N 2600-791 7 day clock

Surge Devices - Helps prevent circuit board failure caused by lightning strikes and power surges.
P/N 1879-080 - High Voltage P/N 1878-010 - Low Voltage

Replacement Battery - Convenience open system. P/N 1801-009 (2 required)

Speed Bump - Prefabricated 6-foot speed bump reduces traffic speed through gate system. P/N 1610-150

115 VAC 3.3 Amp Heater/NO Fan Kit - Thermostatically controlled heater for cold environment. P/N 1601-092

115 VAC 3.3 Amp Heater with Fan Assembly Kit - Thermostatically controlled heater and fan for cold and hot environments. For 115 VAC input power **ONLY**. P/N 1601-154

208/230 VAC Heater with Fan Assembly Kit - Thermostatically controlled heater and fan for cold environment.
Note: This heater kit only works when installing a High Voltage Kit with 208 or 230 VAC Input power wire on the barrier gate operator.
P/N 1601-197

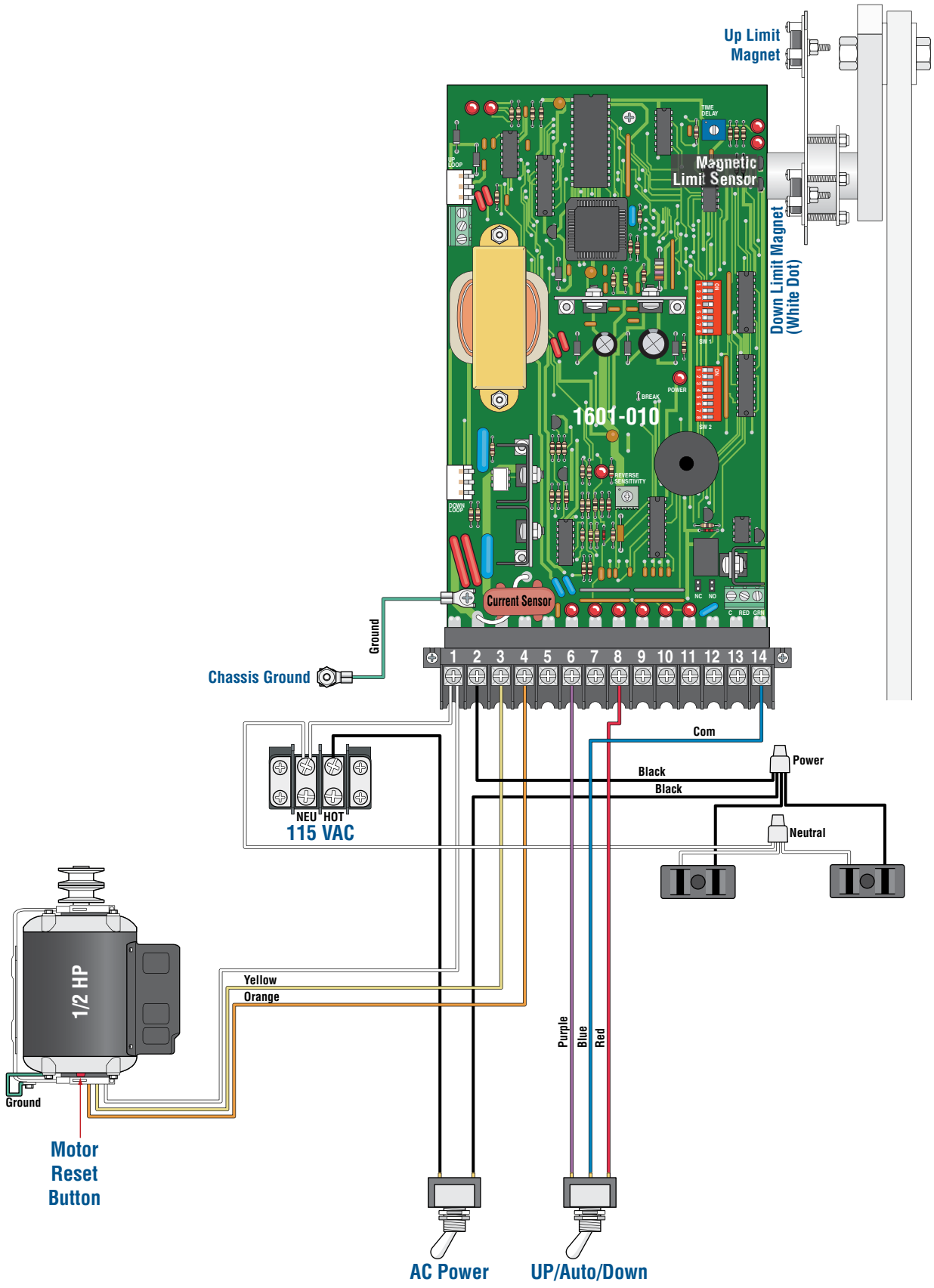
460 VAC Heater with Fan Assembly Kit - Thermostatically controlled heater and fan for cold environment.
Note: This heater kit only works when installing a High Voltage Kit with 460 VAC Input power wire on the barrier gate operator. P/N 1601-198

Fan Kit - Thermostatically controlled fan for hot humid environments. P/N 1601-093

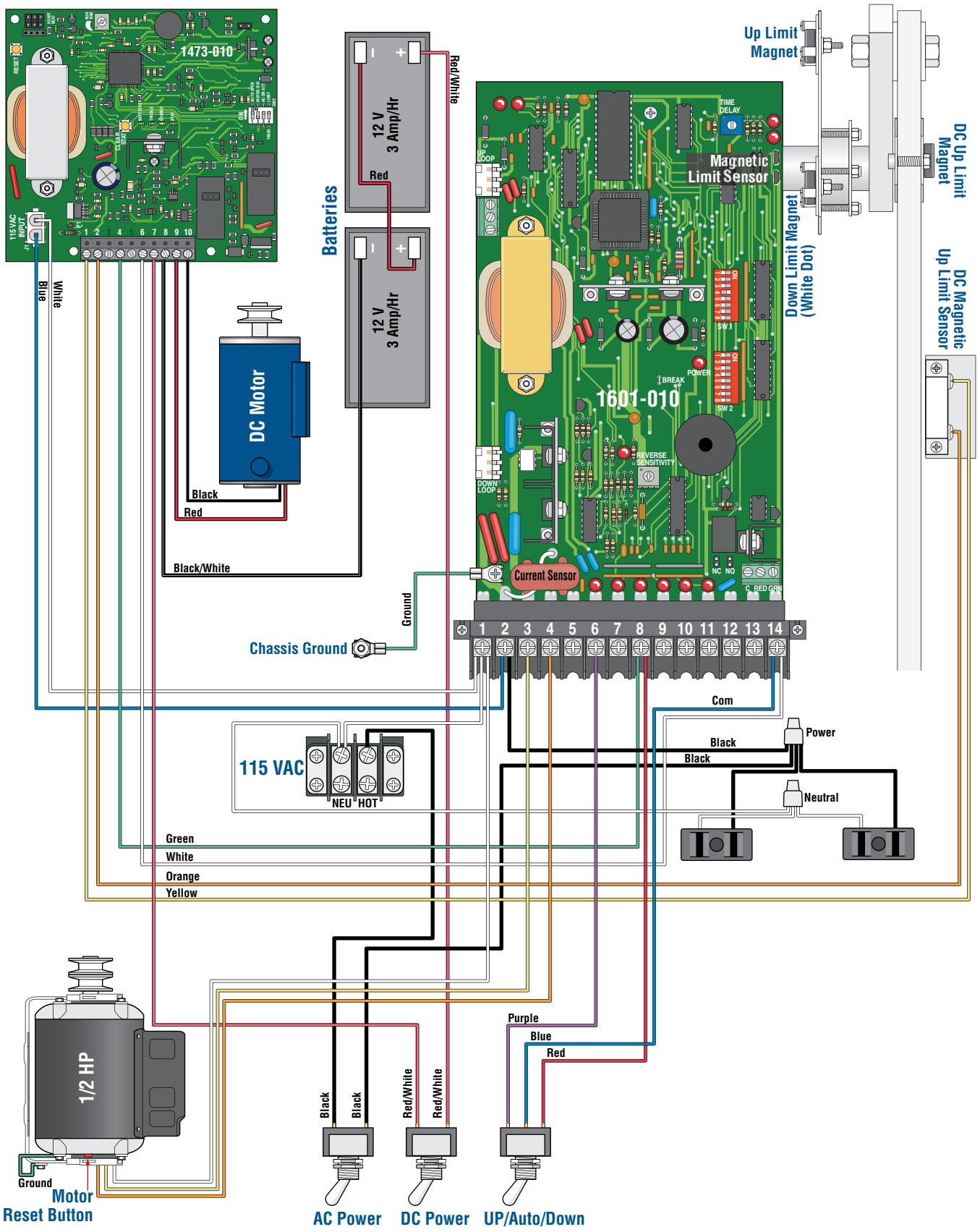
LED Traffic Light (Red, Green) - Manage the traffic flow with LED red-green lights. Support post bolts onto the 1601 or 1602 operator.
P/N 1603-221 - 6 Ft Cable with NO Post
P/N 1603-222 - 6 Ft Cable with 35" Post
P/N 1603-223 - 11 Ft Cable with 95" Post

Expansion "Tracker" board - "Tracker" board allows the barrier gate operator to report activity to a companion 1830 series access control system. P/N 2351-080 single 2358 tracker board in enclosure.

1/2 HP 115 VAC


Up Limit Magnet
Magnetic Limit Sensor
Down Limit Magnet (White Dot)
1601-010
Current Sensor
Ground
Chassis Ground
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Com
Power
Black
Black
Neutral
NEU HOT
115 VAC
1/2 HP
Yellow
Orange
Ground
Motor Reset Button
Purple
Blue
Red
AC Power
UP/Auto/Down

1/2 HP 115 VAC / Convenience Open



Installation/Owner's Manual

1603

Barrier Gate Operator with Auto Spike System

Use this manual for circuit board 1601-010 Revision AK or higher.

1603-065-W-11-26

THIS PRODUCT IS TO BE INSTALLED AND SERVICED BY A TRAINED GATE SYSTEMS TECHNICIAN ONLY.
Visit **www.dkslocator.com** to find a professional installing and servicing dealer in your area.



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