

# Installation Manual for the

# **MIGHTY MULE** **350**

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## **E-Z GATE OPENER™ UL325 SERIES**



## **⚠ WARNING! ⚠**

This equipment is similar to other gate or door equipment and meets or exceeds Underwriters Laboratory Standard 325 (UL 325). However, gate equipment has hazards associated with its use and therefore by installing this product the installer and user accept full responsibility for following and noting the installation and safety instructions. Failure to follow installation and safety instructions can result in hazards developing due to improper assembly. You agree to properly install this product and that if you fail to do so GTO, Inc. shall in no event be liable for direct, indirect, incidental, special or consequential damages or loss of profits whether based in contract tort or any other legal theory during the course of the warranty or at any time thereafter. The installer and/or user agree to assume responsibility for all liability and use of this product releasing GTO, Inc. from any and all liability. If you are not in agreement with this disclaimer or do not feel capable of properly following all installation and safety instructions you may return this product for full replacement value.

**READ ALL INSTRUCTIONS CAREFULLY AND COMPLETELY** before attempting to install and use this automatic gate opener. This gate opener produces a high level of force. Stay clear of the unit while it is operating and exercise caution at all times.

All automatic gate openers are intended for use on vehicular gates only.

*This product meets and exceeds the requirements of UL 325, the standard which regulates gate opener safety, as established and made effective March 1, 2000, by Underwriters Laboratories Inc.*



3121 Hartsfield Road • Tallahassee, Florida, USA 32303  
Telephone GTO Sales: 1-800-543-GATE (4283) or (850) 575-0176 • Fax (850) 575-8912  
or GTO Technical Service: 1-800-543-1236 or (850) 575-4144 • Fax (850) 575-8950

[www.mightymule.com](http://www.mightymule.com)

**R350INST**  
REV - 04/11/06

The Mighty Mule® Gate Opener is intended for use with vehicular swing gates. The opener can be used in Class I, Class II and Class III applications.

**VEHICULAR GATE OPENER CLASS CATEGORIES**

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

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

**Industrial/Limited Access Vehicular Gate Opener-Class III:** A vehicular gate opener (or system) intended for use in an industrial location or building such as a factory or loading dock area or other locations not intended to service the general public.

**Conversion Chart**

<i>Converting Metric Units to English Equivalents</i>			
<b>When You Know</b>	<b>Multiply By</b>	<b>To Find</b>	<b>Symbol</b>
centimeters	0.3937	inches	in. (or ")
meters	3.2808	feet	ft. (or')
kilograms	2.2046	pounds	lb. (or #)
<i>Converting English Units to Metric Equivalents</i>			
<b>When You Know</b>	<b>Multiply By</b>	<b>To Find</b>	<b>Symbol</b>
inches	2.5400	centimeters	cm
feet	0.3048	meters	m
pounds	0.4535	kilograms	kg
<i>Converting Temperature</i>			
deg. Celsius	$(^{\circ}\text{C} \times 1.8) + 32$	deg. Fahrenheit	$^{\circ}\text{F}$
deg. Fahrenheit	$(^{\circ}\text{F} - 32) \div 1.8$	deg. Celsius	$^{\circ}\text{C}$

**FOR YOUR RECORDS**

Please record the product serial number (located on the rear of opener arm), and the date and place of purchase in the spaces provided below. Refer to this information when calling GTO for service or assistance with your automatic gate opener.

**Serial Number** \_\_\_\_\_ **Date of Purchase** \_\_\_\_\_

**Place of Purchase** \_\_\_\_\_

***Remember to keep all receipts for proof of purchase.***

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**KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE**



## PLEASE READ THIS FIRST!

Thank you for purchasing a **Mighty Mule® 350 E-Z Gate Opener**—GTO's "do-it-yourself" automatic gate opener! When correctly installed and properly used, your **Mighty Mule® E-Z Gate Opener** will give you many years of reliable service. Please read the following information and watch the enclosed videotape to ensure you have the correct system for your particular needs. Furthermore, this manual and the videotape will enable you to properly install your **Mighty Mule® E-Z Gate Opener**.

The **Mighty Mule® 350 E-Z Gate Opener** is designed for installation on a **pull-to-open single leaf gate** (gates that open *into* the property). By purchasing an *accessory bracket (FM148)*, the **Mighty Mule® E-Z Gate Opener** can accommodate a **push-to-open single leaf gate** (gates that open *out* from the property). The gate must not exceed 8 feet and 550 pounds or exceed 16 feet and 150 pounds (please see *Technical Specifications* on page 10). The **Mighty Mule® E-Z Gate Opener** can be used on vinyl, aluminum, chain link, farm tube, and wrought iron gates. Use on solid (wood) gates is not recommended. Solid surface gates have a high resistance to the wind. If the wind is strong enough, the opener will obstruct and stop.

The **Mighty Mule® E-Z Gate Opener** accommodates extra transmitters, digital keypads, solar panels, push buttons, automatic gate locks, and other access control products. These optional accessories (see the enclosed *Mighty Mule® Accessory Catalog*) are available at most stores. Your store should be able to special order any accessory not in stock. If your store cannot special order accessories, please call the GTO Sales Department (800-543-GATE).

The **Mighty Mule® E-Z Gate Opener** features **adjustable obstruction sensing**. This safety feature makes the gate stop and reverse direction within 2 seconds when it comes in contact with an obstruction. **MIN** is the factory setting; meaning the gate will exert the minimum force on an obstruction before it stops and reverses direction.

The **Mighty Mule® E-Z Gate Opener** also has an **adjustable auto-close feature**. After the gate reaches the fully open position, it can be set to remain open up to 120 seconds before automatically closing. Pressing the transmitter button at any time after the gate opens fully will cause it to close immediately. **OFF** is the factory setting; meaning the gate will stay open until you press the transmitter (or keypad, etc.) again.

**PLEASE NOTE**—If your application requires any of the following:

- Slide gates;
- Heavy duty or commercial uses;
- Professional installation;

please call GTO at (800) 543-GATE [4283] or (850) 575-0176 for information about our **GTO/PRO** professional line of gate openers and accessories. Our Sales Department will be glad to give you the name and phone number of a **GTO/PRO** dealer near you.

**BEFORE YOU BEGIN TO INSTALL YOUR AUTOMATIC GATE OPENER:**  
**watch the enclosed videotape and read these instructions *carefully and completely***  
**to become familiar with all parts and installation steps. The video tape is only designed as**  
**an overview of the installation procedure. You must read the installation manual for detailed**  
**instructions on gate opener safety and proper use of the gate opener.**




# IMPORTANT SAFETY INSTRUCTIONS



Because automatic gate openers produce high levels of force, consumers need to know the potential hazards associated with improperly designed, installed, and maintained automated gate opener systems. **Keep in mind that the gate opener is just one component of the total gate operating system.** Each component must work in unison to provide the consumer with convenience, security, and safety.

This manual contains various safety precautions and warnings for the consumer. Because there are many possible applications of the gate opener, the safety precautions and warnings contained in this manual cannot be completely exhaustive in nature. They do, however, provide an overview of the safe design, installation, and use of this product. **CAREFULLY READ AND FOLLOW ALL SAFETY PRECAUTIONS, WARNINGS, AND INSTALLATION INSTRUCTIONS TO ENSURE THE SAFE SYSTEM DESIGN, INSTALLATION, AND USE OF THIS PRODUCT.**

Precautions and warnings in this manual are identified with this  warning symbol. The symbol identifies conditions that can result in damage to the opener or its components, serious injury, or death.

Because GTO automatic gate openers are *only part* of the total gate operating system, it is the responsibility of the consumer to ensure that the total system is safe for its intended use.

## To Manually Open and Close the Gate, Follow the Procedure Below:

**⚠ CAUTION:** The gate will move freely and uncontrolled when the gate opener is removed from the gate. **ONLY** disconnect the opener when the opener power switch is **OFF** and the gate is **NOT** moving.

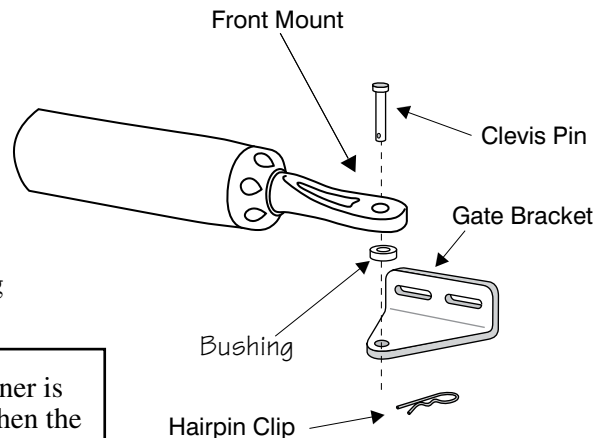
### Disconnecting the Opener

1. Turn opener power switch **OFF**.
2. Remove hairpin clip, clevis pin, and bushing from the front mounting point.
3. Remove the opener from the mount.

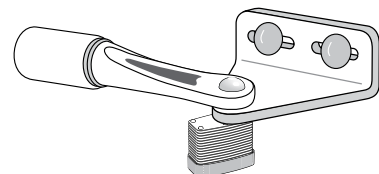
*The gate can be opened and closed manually when the opener is disconnected.*

**IMPORTANT:** NEVER allow opener arm to hang by the front mount - it will break from the arm weight.

**CAUTION:** Because the Mighty Mule gate opener is battery powered, disconnect the opener **ONLY** when the power switch on the opener is turned **OFF**. Unplugging the transformer does not turn power to the opener **OFF**.



**NOTE:** Substitute a **Pin Lock (FM133)** for the clevis pin on the front mount only of the gate opener to prevent unauthorized removal of the opener from the gate (see *Accessory Catalog*).





# IMPORTANT SAFETY INSTRUCTIONS



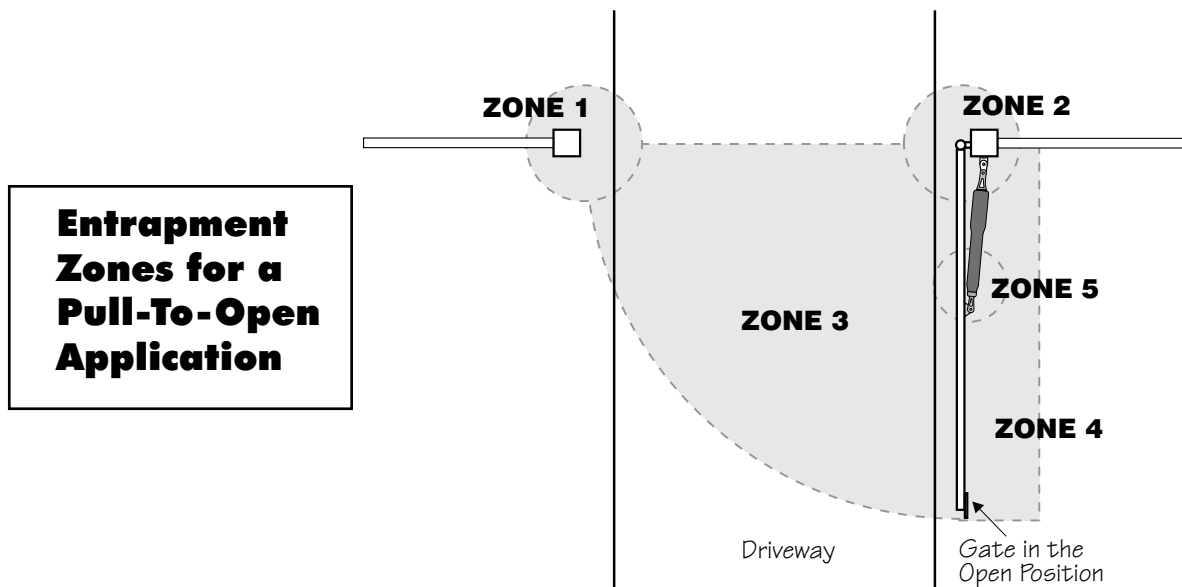
## For The Consumer

### WARNING: To reduce the risk of injury or death:

1. **READ AND FOLLOW ALL INSTRUCTIONS.** Failure to meet the requirements set forth in the instruction manual could cause severe injury and/or death, for which the manufacturer cannot be held responsible.
2. When designing a system that will be entered from a highway or main thoroughfare, make sure the system is placed far enough from the road to prevent traffic congestion.
3. The gate must be installed in a location that provides adequate clearance between it and adjacent structures when opening and closing to reduce the risk of entrapment. Swinging gates **must not** open into public access areas.
4. The gate and gate opener installation **must comply with any applicable local codes.**

#### I. Before Installation

1. Verify this opener is proper for the type and size of gate, its frequency of use and the proper class rating.
2. Make sure the gate has been properly installed and swings freely in both directions. Repair or replace all worn or damaged gate hardware prior to installation. A freely moving gate will require less force to operate and will enhance the performance of the opener and safety devices used with the system.
3. Review the operation of the system to become familiar with its safety features. Understand how to disconnect the opener for manual gate operation (*see page 1*).
4. This gate opener is intended for **vehicular gates ONLY**. A separate entrance or gate must be installed for pedestrian use (*see page 6*).
5. Always keep people and objects away from the gate and its area of travel. **NO ONE SHOULD CROSS THE PATH OF A MOVING GATE.**
6. Pay close attention to the diagram below and be aware of these areas at all times.







# IMPORTANT SAFETY INSTRUCTIONS



## III. After Installation

1. Attach the **warning signs** (*included*) to each side of the gate to alert the public of automatic gate operation. It is *your responsibility* to post warning signs on both sides of your gate. If any of these signs or warning decals become damaged, illegible or missing, replace them immediately. Contact GTO for free replacements.
2. The gate is automatic and could move at any time, posing a serious risk of entrapment. No one should be in contact with an activated gate when it is moving or stationary.
3. Do not attempt to drive into the gate area while the gate is moving; wait until the gate comes to a complete stop.
4. Do not attempt to "beat the gate" while the gate is closing. This is extremely dangerous.
5. Do not allow children or pets near your gate. **Never let children operate or play with gate controls.** Keep the remote controls away from children and unauthorized users; store controls where children and unauthorized users do not have access to them.
6. **KEEP GATES PROPERLY MAINTAINED.** Always turn power to opener OFF before performing any maintenance. Clean the push-pull tube with a soft, dry cloth and apply silicone spray to it at least once per month.
7. Service the gate and gate opener regularly. Grease hinges, spray push pull tube with high quality silicon spray.
8. To operate this equipment safely, YOU must know how to disconnect the opener for manual gate operation (*see page 1*). If you have read the instructions and still do not understand how to disconnect the opener, contact the GTO Service Department.
9. Disconnect the opener **ONLY** when the power is **TURNED OFF** and the gate is **NOT** moving.
10. Make arrangements with local fire and law enforcement for emergency access.
11. Distribute and discuss copies of the **IMPORTANT SAFETY INSTRUCTIONS** section of this manual with all persons authorized to use your gate.
12. **IMPORTANT: Save these safety instructions. Make sure everyone who is using or will be around the gate and gate opener are aware of the dangers associated with automated gates. In the event you sell the property with the gate opener or sell the gate opener, provide a copy of these safety instructions to the new owner.**

**Should you lose or misplace this manual, a copy can be obtained by downloading one from the Mighty Mule® web site ([www.mightymule.com](http://www.mightymule.com)), by contacting GTO, Inc., at 3121 Hartsfield Road, Tallahassee, Florida 32303 or by calling 1-800-543-4283 and requesting a duplicate copy. One will be provided to you free of charge.**





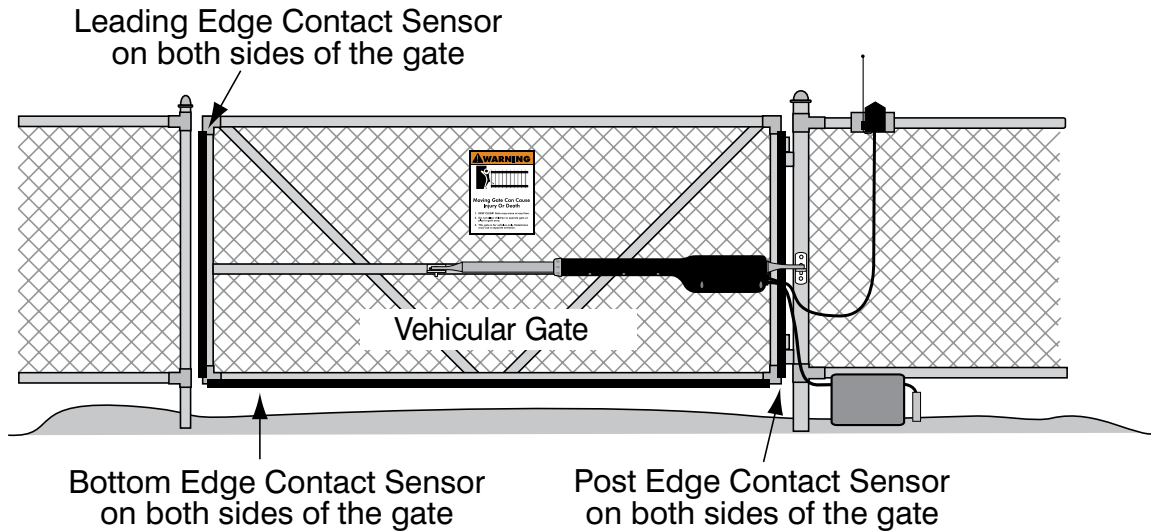
# IMPORTANT SAFETY INSTRUCTIONS



## Secondary Means of Protection Against Entrapment

As specified by Gate Opener Safety Standard, UL 325 (30A.1.1), automatic gate openers shall have an inherent entrapment sensing system, and shall have *provisions for, or be supplied with*, at least one independent secondary means to protect against entrapment. The Mighty Mule® utilizes **Type A**, an inherent (i.e., built-in) entrapment sensing system as the **primary** type of entrapment protection. Also, the Mighty Mule® has *provisions for* the connection of **Type B2** protection to be used as the **secondary** type of entrapment protection, if desired.

1. For gate openers utilizing a contact sensor (e.g., safety edge sensor– Type B2) in accordance with UL 325 (51.8.4 [i]):
  - A. One or more contact sensors shall be located at the leading edge, bottom edge, and post edge, both inside and outside of a vehicular swing gate system.
  - B. A hard wired contact sensor shall be located and its wiring arranged so that the communication between the sensor and the gate opener is not subjected to mechanical damage.
  - C. A wireless contact sensor such as one that transmits radio frequency (RF) signals to the gate opener 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 contact sensor shall function under the intended end-use conditions.



### ENTRAPMENT ALARM (UL 325; 30A.1.1A)

The Mighty Mule® E-Z Gate Opener is designed to stop and reverse within 2 seconds when the gate comes in contact with an obstruction. Additionally, these openers are equipped with an **audio entrapment alarm** which will activate if the unit obstructs *twice* while opening or closing. This alarm will sound for a period of 5 minutes, or until the opener receives an intended signal from a hardwired entry/exit source (e.g. push button control or keypad) and the gate returns to a fully open or fully closed position. Turning the power switch on the control box OFF and back ON will also deactivate the alarm. Wireless controls such as transmitters and wireless keypads will not deactivate the alarm.

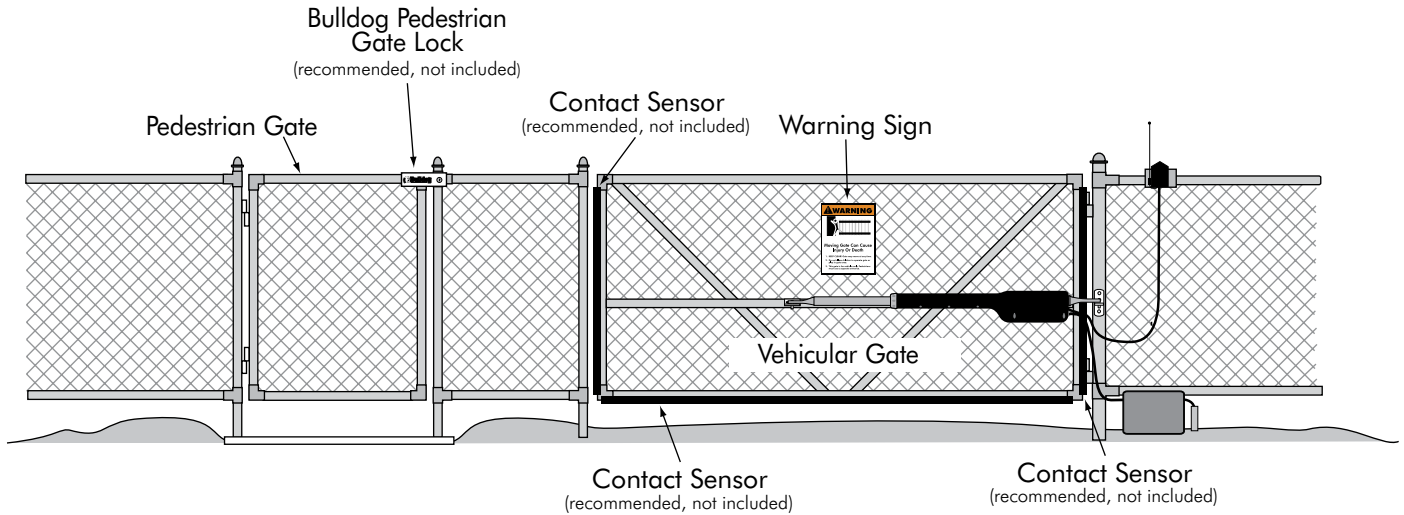


# IMPORTANT SAFETY INSTRUCTIONS



## Required Safety Precautions for Gates Install Warning Signs

**Warning signs** alert people of automatic gate operation and are **required** when installing the Mighty Mule® E-Z Gate Opener. Furthermore, a walk-through gate must be installed if pedestrian traffic is expected near the vehicular gate. We recommend using the **GTO Bulldog Pedestrian Gate Lock** (Call the GTO Sales Department) for controlled access.



## Entrapment Protection

GTO's inherent obstruction settings, even when properly adjusted, *may not be sensitive enough to prevent bodily injury in some circumstances*. For this reason, safety devices such as safety edge sensors (or photoelectric sensors), which stop and reverse gate direction upon sensing an obstruction, are suggested for enhanced protection against entrapment.

### Warning Signs

The warning signs (*at right*) must be installed on both sides of the gate (*see page 7 for details*).





# IMPORTANT SAFETY INSTRUCTIONS



**! WARNING**



**Moving Gate Can Cause Injury Or Death**

- 1. KEEP CLEAR! Gate may move at any time.**
- 2. Do not allow children to operate gate or play in gate area.**
- 3. This gate is for vehicles only. Pedestrians must use a separate entrance.**

These warning labels should be found at the locations specified below. If any of them are missing, immediately contact GTO for replacements.



*Product identification label (1)  
installed under rear mount on arm.*

*Warning signs (2 enclosed) to be installed on each side  
of the gate (3–5 feet above the bottom of the gate)*



**MIGHTY MULE 350**  
**E-Z GATE® OPENER UL325 SERIES**  
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**TO MANUALLY OPEN AND CLOSE THE GATE**

1. Turn opener power switch OFF.
2. Disconnect front or rear mount from mounting bracket.
3. Pull opener away from mounting bracket and move gate.

Disconnect opener **ONLY** when the power switch is OFF and the gate is not moving.

**! WARNING !**

**MOVING GATE!**



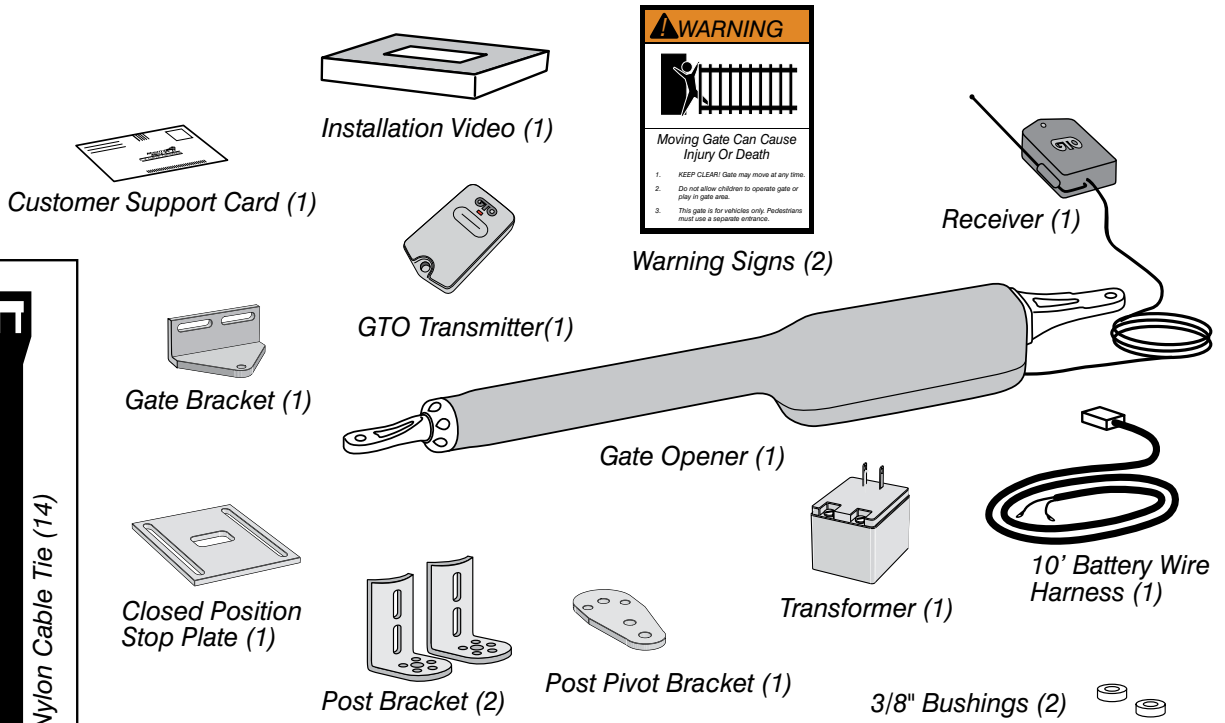
**Can Cause Injury or Death**

1. **KEEP CLEAR! Gate may move at any time.**
2. **Do not allow children to operate gate or play in gate area.**
3. **This gate is for vehicles only. Pedestrians must use separate entrance.**

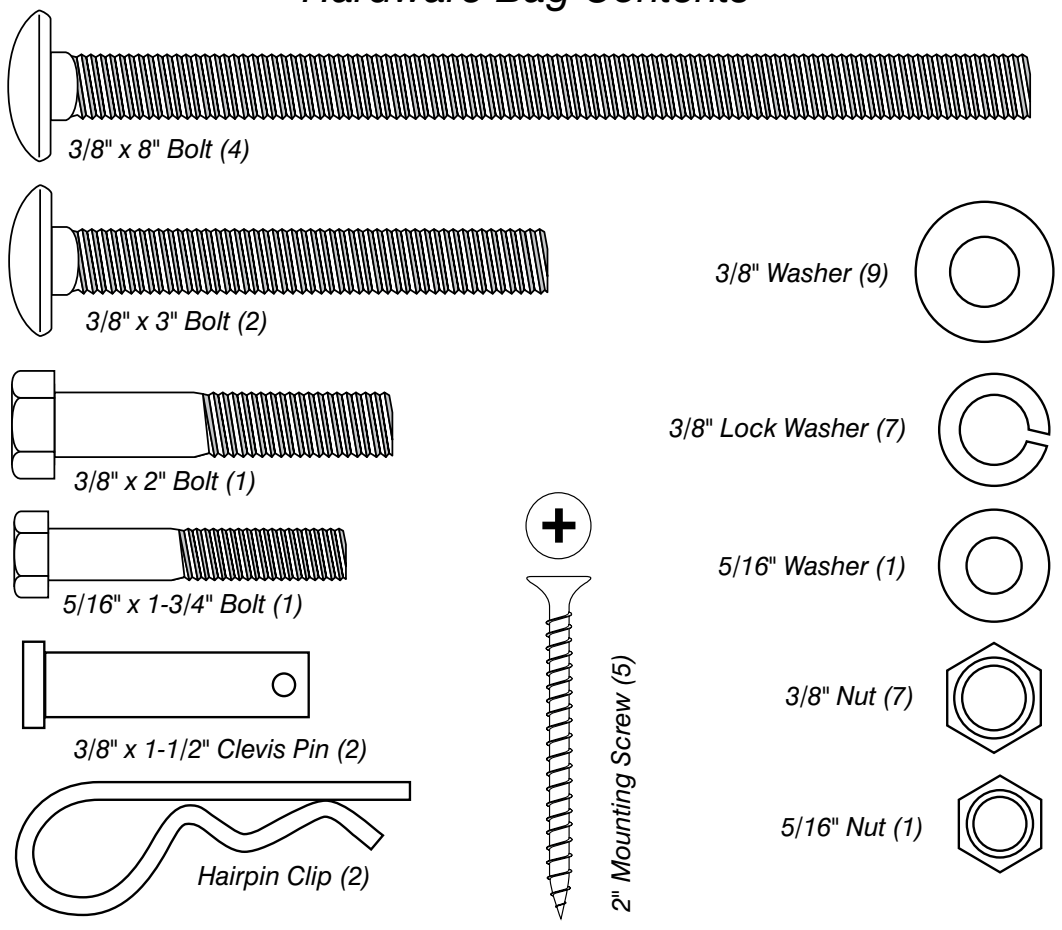
Maximum Gate: 550 lbs. (249.4 kg); 16 ft. (4.9 m) • Voltage: 12 Vdc; Frequency: 0Hz; Power: 25W • Class I, II, and III Vehicular Swing Gate Operator

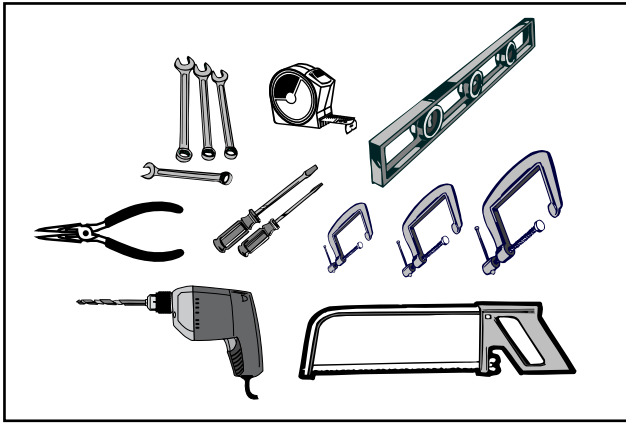
*Logo and warning labels (2) installed on each side of  
opener housing*

# Parts List - Opener and Mounting Hardware



## Hardware Bag Contents





## Tools Needed

- Power Drill
- Open End Wrenches — 3/8", 7/16", 1/2", and 9/16"
- 3/8" Drill Bit
- Hacksaw or Heavy Duty Bolt Cutters
- Small (Flat Bladed) Screwdriver
- Phillips Screwdriver/ Large
- Tape Measure
- Level
- Wire Strippers
- C-Clamps — small, medium, and large
- Center Punch
- Extra person will be helpful

## YOU MAY ALSO NEED THESE ITEMS BEFORE YOU BEGIN THE INSTALLATION

(Some of these items can be found in the *Accessory Catalog* page 37):

- **Low voltage wire** (RB509) will be needed to run from the transformer to the opener control board; length depends upon the distance between the transformer power supply and the opener arm. See **Powering the System** on page 19, and the *Accessory Catalog*.
- If your gate is more than 1000' away from AC ac power source you will need to use at least one **Mighty Mule® 5 watt Solar Panel** (FM121) to charge the 12 Volt automotive or marine type battery (not included). See the *Accessory Catalog*.
- If your fence post is made of wood and is less than 6" in diameter or 6" square, see page 12.
- If your fence post is larger than 6" in diameter you will need **threaded rods or carriage bolts longer than 8"**. See page 15.
- PVC conduit.
- If you have thin walled tube or panel gates, see **Recommended Reinforcement Examples** on page 12.
- Depending on the type of gate, **a horizontal cross member or mounting plate may be needed** to mount the front of the opener and gate bracket to the gate. See page 11, step 2; page 15, step 10.
- Surge protection for transformer.
- Some types of installations require U-Bolts.

# Technical Specifications

## MIGHTY MULE® 350 E-Z GATE OPENER

### DRIVE

- Low friction screw drive (linear actuator) rated for -5 °F to +160 °F (-28 °C to +71 °C).
- Powered by a 12 V motor with integral case hardened steel gear reducer. Motor speed reduced to 260 rpm. Generates 520 inch lb. of torque at 12 V.
- Maximum opening arc of 110°. Approximate opening time (90°): 18 seconds, depending on weight of gate.

### POWER

- The system is powered by a 12 Vdc automotive or marine battery.
- Battery charge is maintained by a 120 Vac, 18 Vac output transformer [rectified to 14.5 Vdc (40 VA) through the GTO control board] or by optional GTO Solar Panels [the panel should generate minimum of 5 W at 300 mA]. A diode on the control board prevents battery discharge.

**IMPORTANT:** Never use both transformer and solar panel - this will damage the battery and control board.

- One (1) blade-style control board fuse is rated for 15 A.

**NOTE: The transformer should not be directly connected to any battery. Do not replace fuses with higher ampere rated fuses; doing so will void your warranty and may damage your control board.**

### CONTROL

- **GTO** microprocessor-based control board is set for single leaf, pull-to-open gate installations. DIP switches can be adjusted to accommodate an optional kit for push-to-open gates (*see Accessory Catalog*).
- Control board has temperature compensated circuits.
- A circuit on the control board regulates charging. "Sleep draw" is 25 mA; "active draw" is 2 to 5 A.
- Auto-memorization of digital transmitter code.
- GTO remote-mounted RF receiver tuned to 318 MHz.
- Opener length with push-pull tube fully retracted is 37<sup>1</sup>/<sub>4</sub>", mounting point to mounting point.
- Adjustable auto-close timer (OFF to 120 s), and obstruction sensitivity.
- Power terminal block accommodates a transformer or solar panels.
- DIP switches simplify setup of gate opener.
- Accessory terminal block fully compatible with all Mighty Mule access controls.
- Control board allows connection of safety edge sensors and photoelectric sensors.
- Audio entrapment alarm sounds if unit encounters an obstruction twice while opening or closing.

### OPERATIONAL CAPACITY

- The Gate Capacity Chart shows approximate cycles, per day, you can expect from the Mighty Mule 350 Automatic Gate Opener when powered with a transformer. Actual cycles may vary slightly depending upon the type and condition of gate and installation.

<b>Mighty Mule 350 Gate Capacity /Cycle Chart</b>							
<i>Estimated number of daily cycles, based on use with a transformer and one(1) 12 Volt battery.</i>							
Number of Cycles Per Day							
Gate Weight	550 lbs.	125	115	NR	NR	NR	NR
	450 lbs.	135	125	115	NR	NR	NR
	350 lbs.	145	135	125	115	NR	NR
	250 lbs.	155	145	135	125	115	NR
	150 lbs.	165	155	145	135	125	115
	100 lbs.	175	165	155	145	135	125
	50 lbs.	185	175	165	155	145	135
		5' - 6'	8'	10'	12'	14'	16'
Gate Length							

**NOTE:** "NR" indicates this size and weight combination is not recommended for the Mighty Mule 350.

**NOTE: BALL BEARING HINGES SHOULD BE USED ON ALL GATES WEIGHING OVER 250 LB.**

To determine the number of cycles the gate opener will perform using solar panels, please see the specifications listed on page 18 or call (800) 543-1236 or (850) 575-4144 for more information.

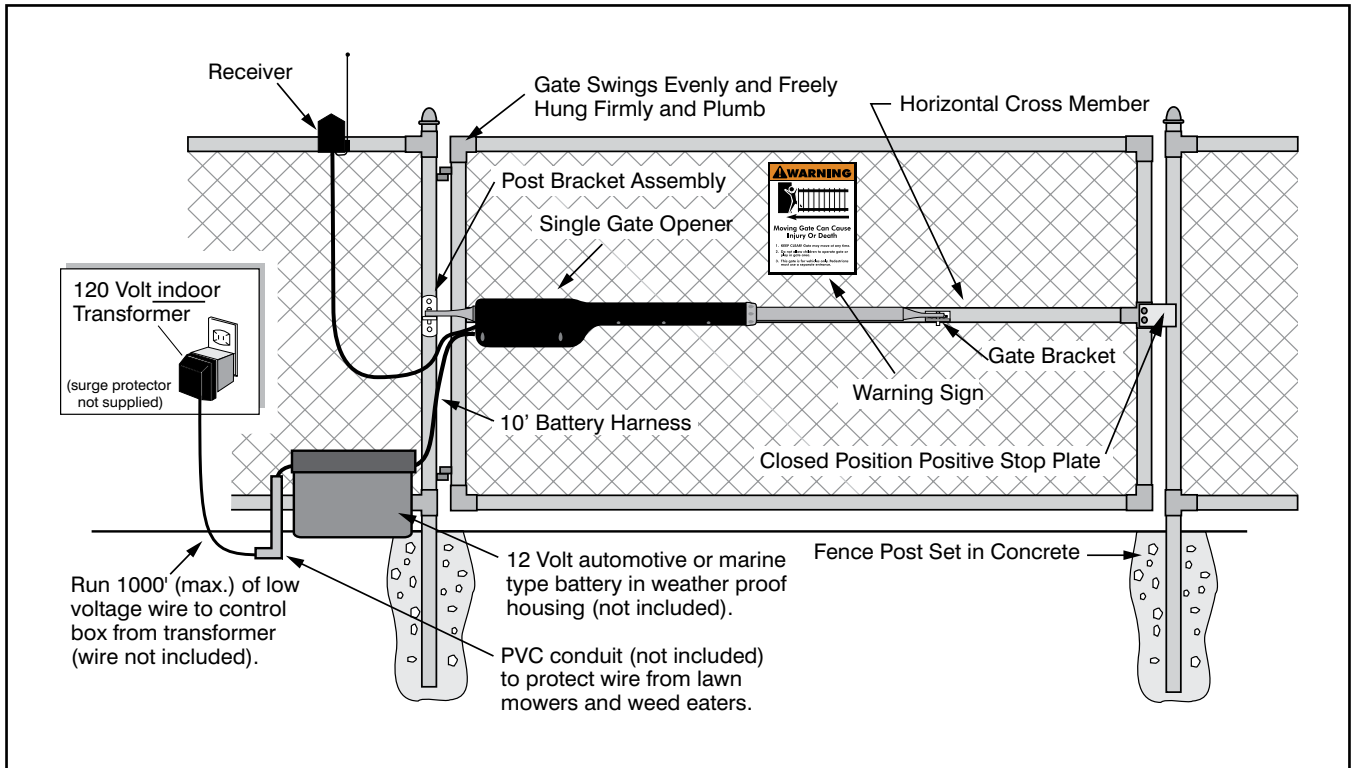
\* An operation cycle is one full opening and closing of the gate.

These specifications are subject to change without notice.

# Installation Overview

## Pull-to-Open Gates (Gate Opens into the Property)

The diagram shown below is an example of a pull-to-open installation on a chain link fence and single gate. Mounting the opener on a masonry column requires special procedures; see **Column Installation Information** on page 39 if you intend to mount the opener on a column. Furthermore, if you have a push-to-open gate, you will need to purchase a **push-to-open bracket (FM148)** (see *Accessory Catalog*) to properly configure your system. See **Push to Open Installation** on page 33 before proceeding.



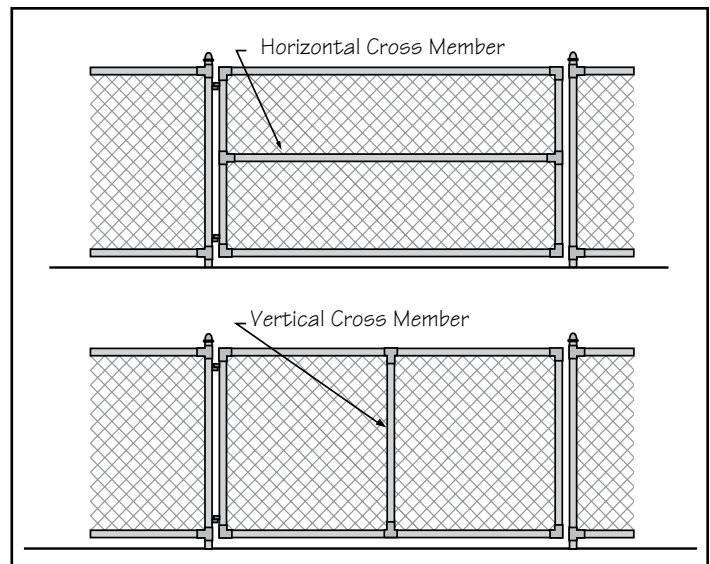
## Preparation of the Gate

### Step 1

The gate **must** be plumb, level, and swing freely on its hinges. Wheels must not be attached to the gate. The gate must move throughout its arc **without binding or dragging on the ground**. Note that gates over 250 lb. should have ball bearing hinges with grease fittings.

### Step 2

The fence post must be secured in the ground with concrete so it will minimize twist or flex when the opener is activated. We recommend you position the opener near the **centerline** of the gate to keep the gate from twisting and flexing. The addition of a **horizontal or vertical cross member** (if one is not already in place) to provide a stable area for mounting the gate bracket is also important.





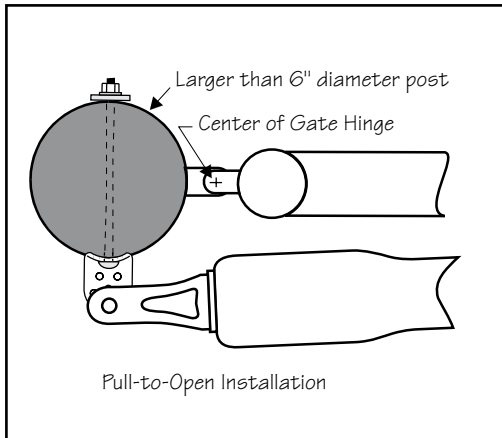
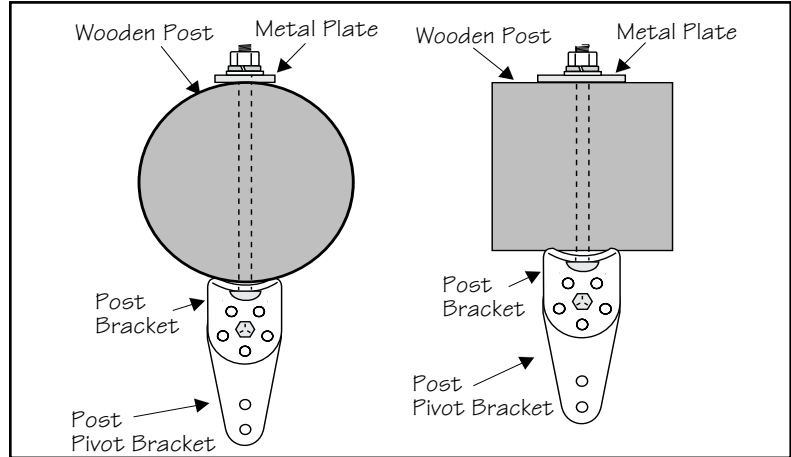
# Installation of Mounting Hardware

The position of the post bracket determines the leverage and efficiency of the opener. The post bracket position also sets the clearance between the opener and gate in the open and closed positions (minimum 2 inches for safety reasons).

The curved design of the post bracket works well for installations on round and square fence posts. Because the post bracket carries the entire thrust of the active opener, **bolts that completely penetrate the fence post must be used.**

On wooden posts, place a metal plate or washer (*not supplied*) between the nuts and the fence post to prevent the thrust of the opener from pulling the bolts and washers out of the wood.

**NOTE:** A fence post smaller than 6" in diameter or 6" square should be made of metal instead of wood so that it will remain stable while the opener is moving the gate.

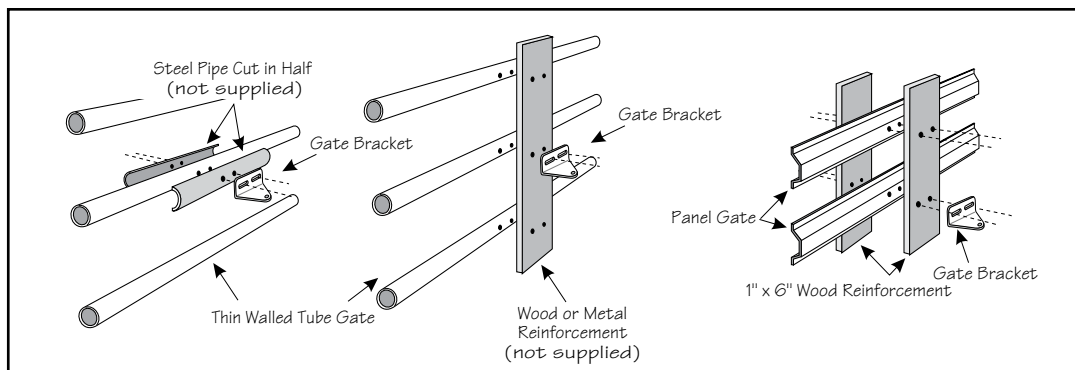


On round posts of 6" diameter or larger, the post pivot bracket may not be necessary for the installation. In this instance, the two post brackets are mounted by themselves.

## IMPORTANT:

We **strongly recommend** using steel pipe, wood or metal to reinforce thin walled tube gates or wood to reinforce panel gates as shown. These reinforcement methods will prevent damage to the opener and gate when the opener is installed.

## Recommended Reinforcement Examples

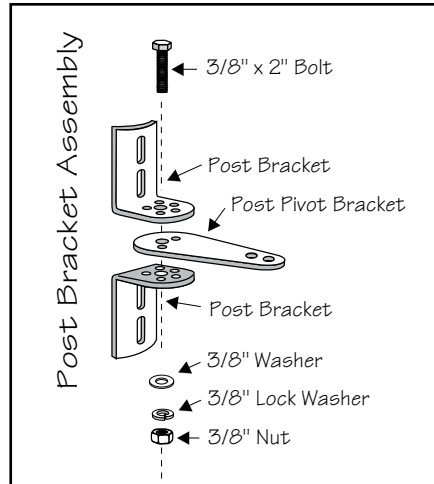




# Determining the Mounting Position of the Post Bracket Assembly and the Gate Bracket

## Step 3

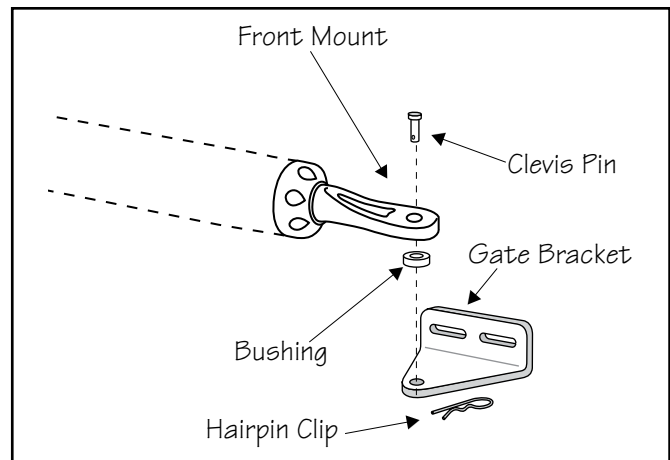
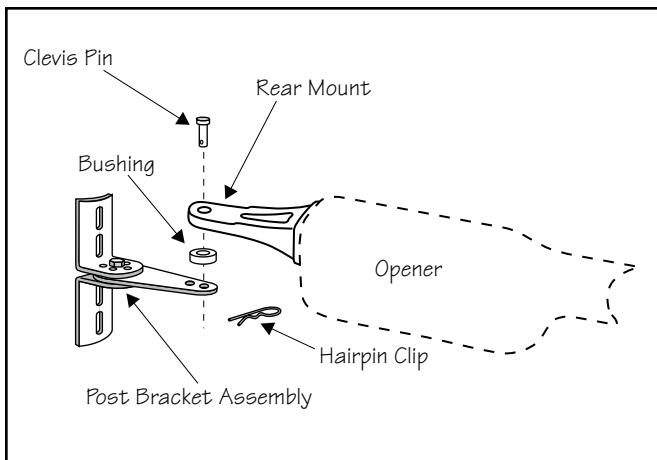
Insert the 3/8" x 2" bolt through the center hole of the post brackets and post pivot bracket as shown. Fasten a 3/8" lock washer, 3/8" washer and 3/8" nut on the end of the bolt. **DO NOT overtighten** the nut because the post pivot bracket will have to be adjusted later.



**NOTE:** The following steps are intended for **pull-to-open** gate installations. If you are mounting your opener on a push-to-open gate (e.g., a gate on a sloped driveway) you will need to purchase a **Push To Open bracket (FM148)** (see *Accessory catalog*). Also, see **Push-to-Open Installation** beginning on page 33.

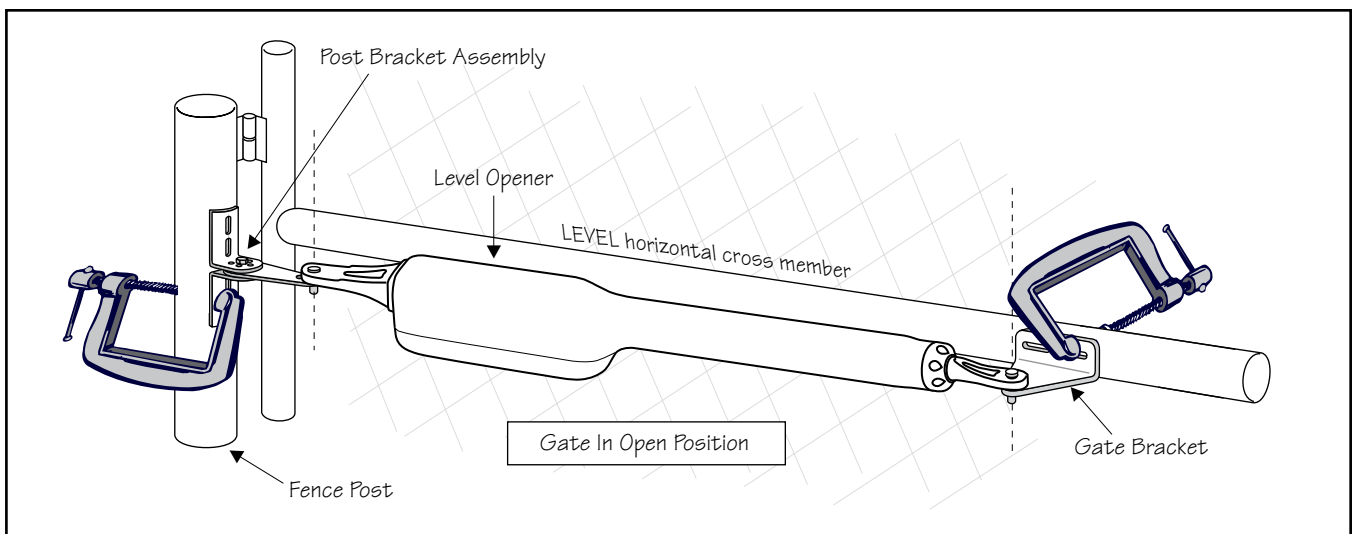
## Step 4

Attach post bracket assembly and gate bracket to the opener with the clevis pins and bushings. Secure the clevis pins with hairpin clips.



## Step 5

With the gate in the open position (up to 110° from its closed position), and the opener fully retracted, adjust the post bracket assembly and gate bracket until the opener is level. While holding the opener level, use C-clamps to **temporarily** keep the post bracket assembly and gate bracket in their respective positions on the fence post and gate.



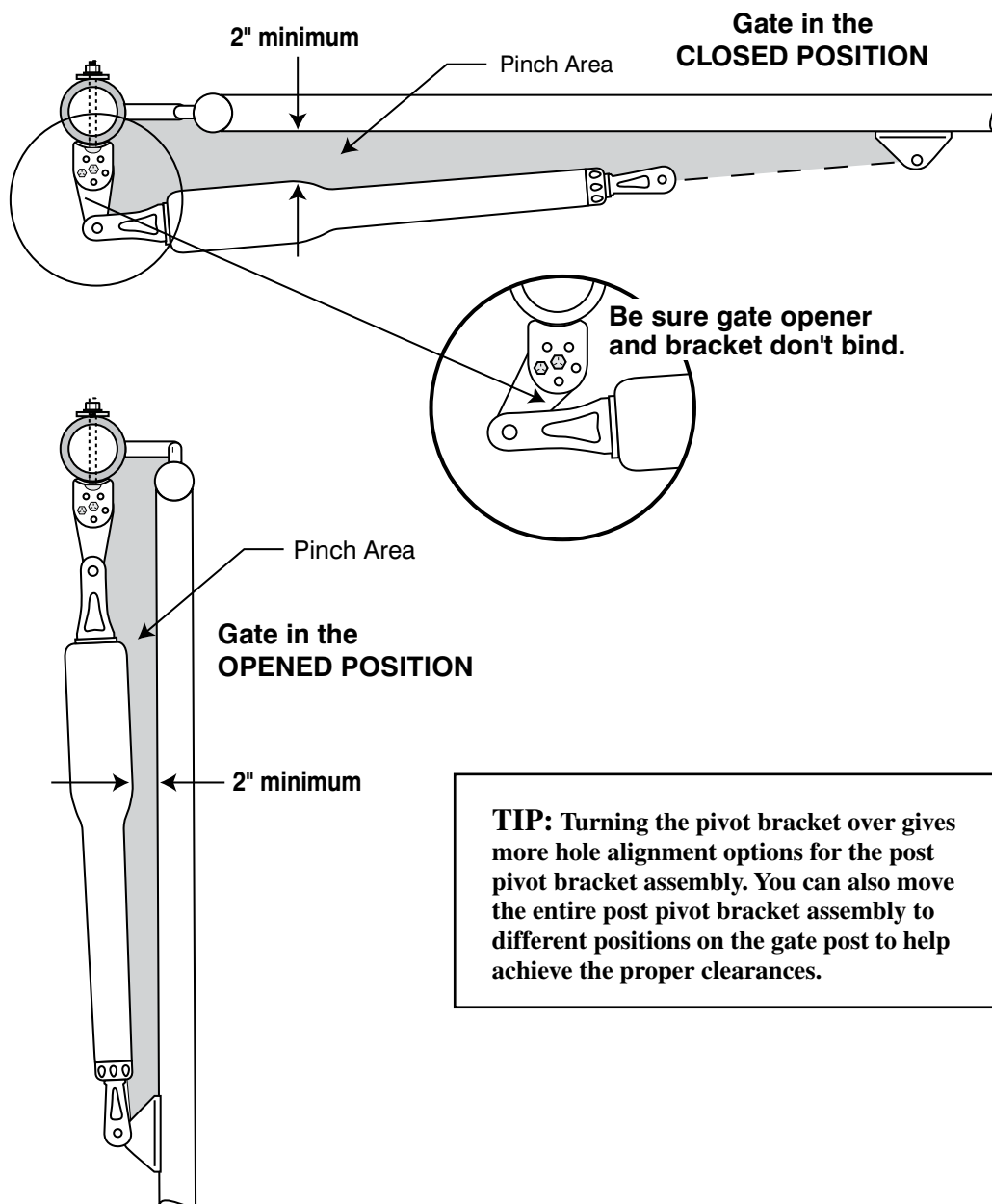
**IMPORTANT:** While determining the mounting point for the post pivot bracket assembly, be sure that the position allows for minimum 2 inches of clearance between the gate and the opener in both the open and closed positions, as shown in the diagrams below. This clearance will give the opener the most efficient leverage point for opening and closing the gate and more importantly provides the least possible pinch area.

## Step 6

When you feel that you have the best position for the post pivot bracket in the open position, insert the 5/16" x 1-3/4" bolt through the aligned holes of the post bracket and post pivot bracket to hold it in place. Remove the clevis pin from the front mount and while supporting the gate opener, swing the gate and gate opener to the closed position. With the gate and gate opener in the closed position check the clearance and be sure that the gate opener is not binding at the post pivot bracket.

If you don't have 2 inches of clearance or the gate opener is binding on the post pivot bracket, remove the 5/16" x 1-3/4" bolt and readjust the pivot bracket until you can achieve these important clearances.

With the post pivot bracket in the optimum position for clearance and freedom of movement, reattach the opener to the gate bracket in the open position and recheck the gate opener level and make sure the brackets are clamped securely.



# Installing the Post Bracket Assembly and Gate Bracket

## Step 7

Mark reference points for bolt holes on the fence post through middle of bracket slots. Marking reference points in this manner allows room for adjustment when mounting the post bracket assembly and gate bracket. After marking your reference points, remove the opener and brackets from the fence and gate.

## Step 8

Drill  $\frac{3}{8}$ " holes into fence post as marked.

## Step 9

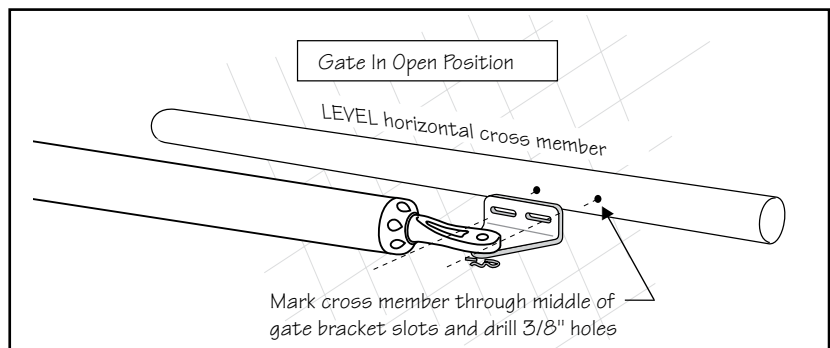
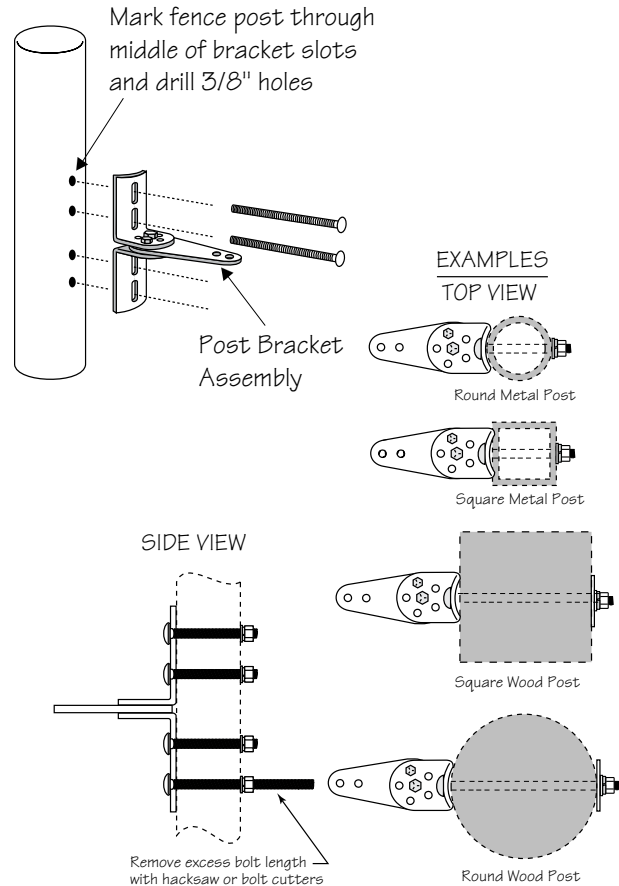
Fasten post bracket assembly to the fence post using (4)  $\frac{3}{8}$ " x 8" bolts, washers, lock washers, and nuts (*provided*). Remove excess bolt length extending beyond the tightened nuts with a hacksaw or bolt cutters.

**NOTE:** In cases where the fence post has a diameter larger than 6", **threaded rods or carriage bolts longer than 8"** (*not supplied*) must be used.

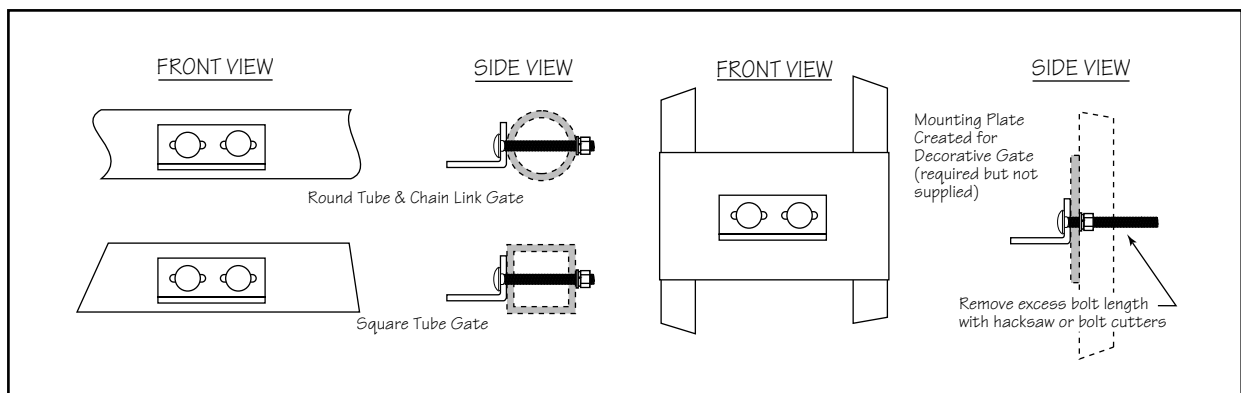
## Step 10

Mark reference points for bolt holes on the gate cross member through middle of gate bracket slots. Drill  $\frac{3}{8}$ " holes into the gate cross member as marked.

Mount gate bracket using (2)  $\frac{3}{8}$ " x 3" bolts, washers, lock washers, and nuts (*provided*). Cut off excess bolt length extending beyond the tightened nuts.



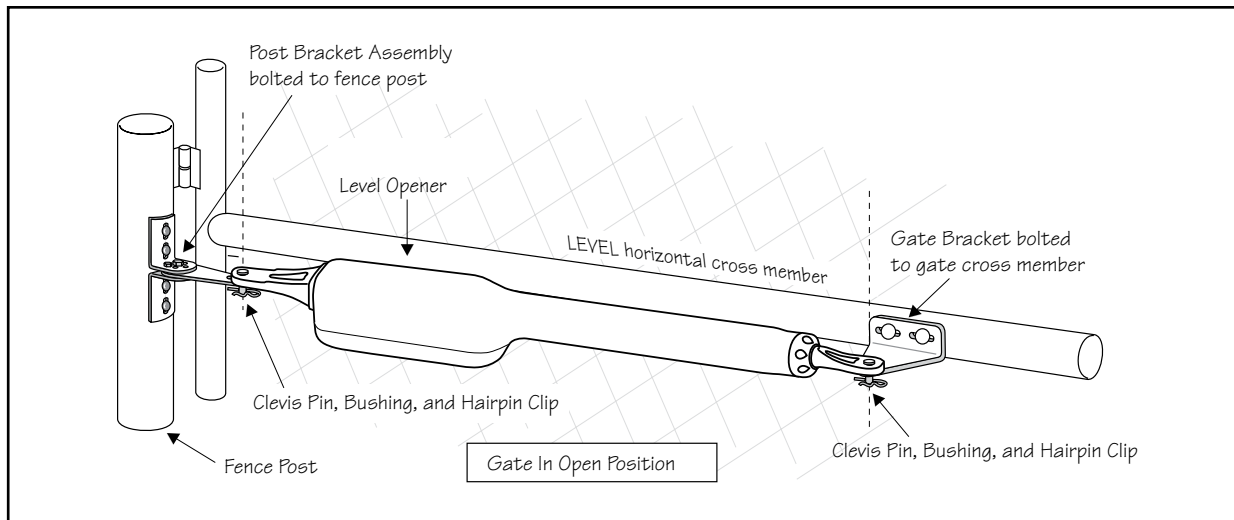
## Gate Bracket Mounting Examples



# Mounting the Opener

## Step 11

Attach the opener to the securely bolted post bracket assembly and gate bracket using clevis pins, bushings, and hairpin clips, or optional Pin Locks (see *Accessory Catalog*). Verify that the opener is level and adjust the post bracket assembly if necessary.



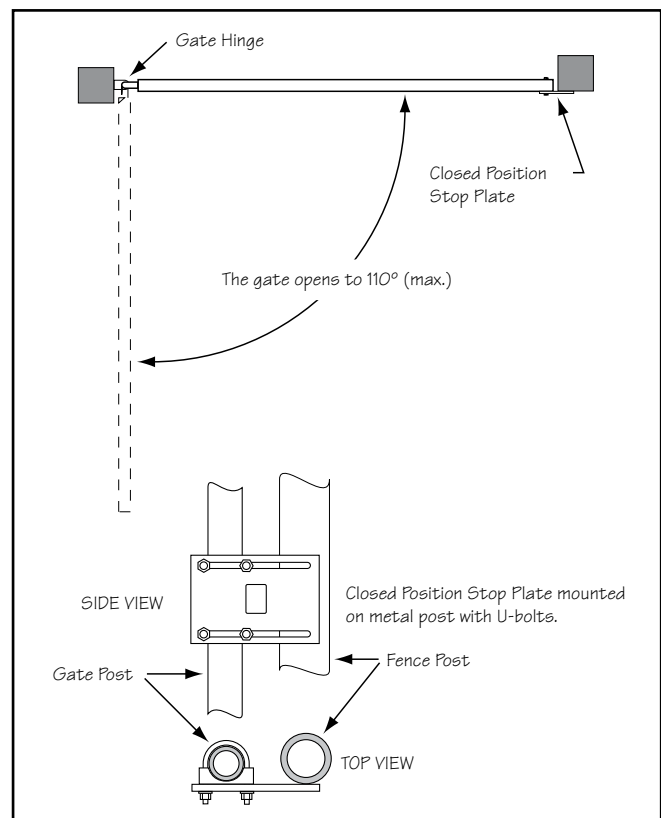
# Installation of the Closed Position Stop

The Mighty Mule® Gate Opener firmly holds the gate in the closed position using the positive stop plate. The positive stop helps stabilize the gate leaf in the closed position. To further enhance the stability and security of your gate, install the optional **Mighty Mule® Automatic Gate Lock** (see *Accessory Catalog*).

## Step 12

Remove hairpin, clevis pin, and washer from front mount and close the gate (remember to support opener). Fasten the *closed position stop plate* to the end of the gate frame on the **gate centerline**, but **do not** tighten it completely. Slide the stop plate toward the fence post until they touch (see *illustration*). Once you have moved the stop plate to the correct position, tighten its hardware completely.

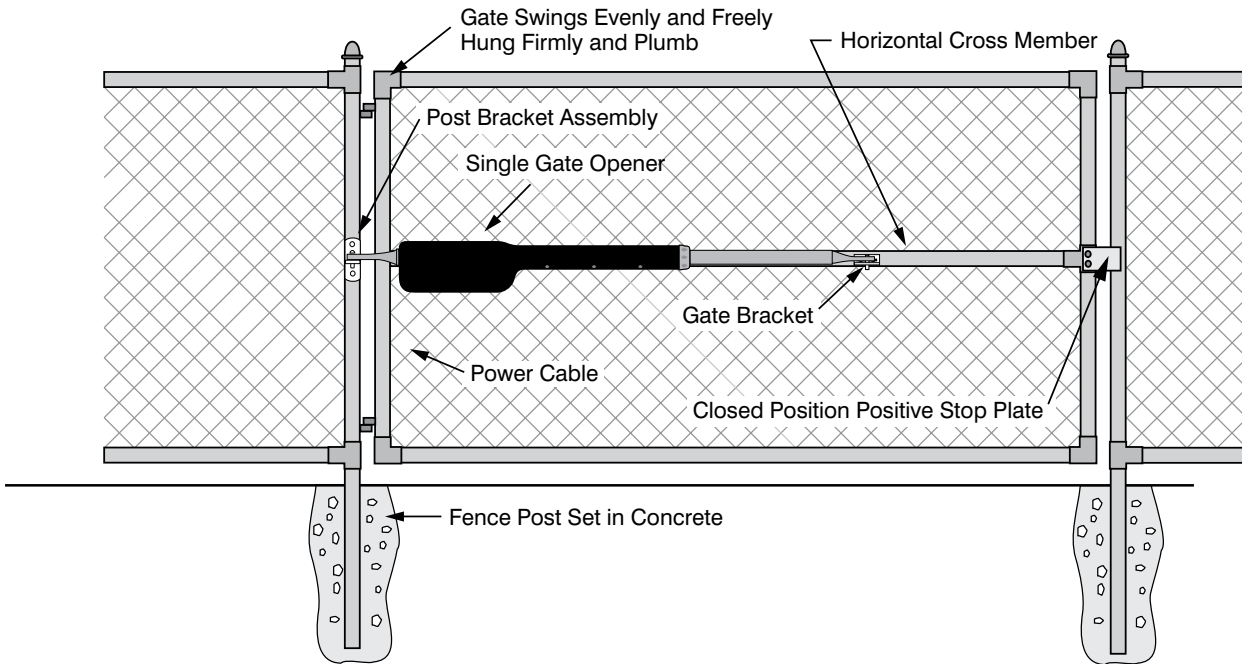
Use the appropriate hardware for your type of gate (use U-bolts if you have a tube or chain link gate; wood or lag screws for wood gates; etc.). This hardware is not provided.



**At this stage of the installation, the opener should be installed on the gate and the closed position stop should be in place.**

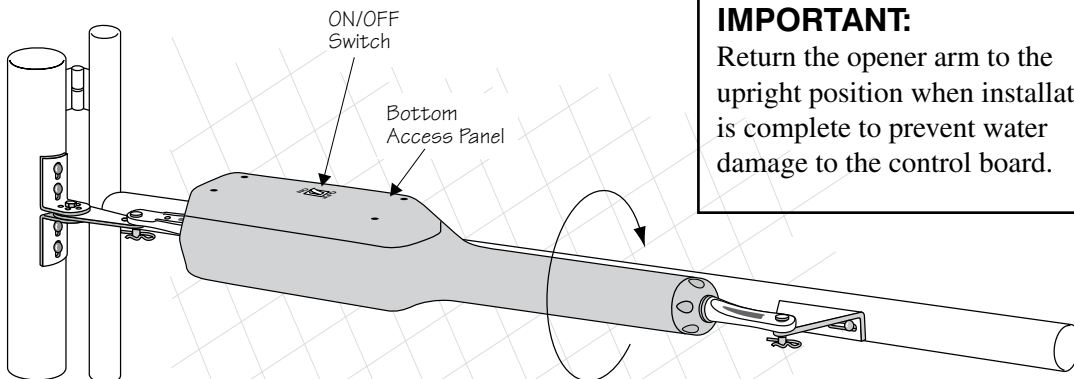
#### Check List

- The gate is plumb, level, and swings smoothly on its hinges.
- A plate or support was added for the gate bracket (if necessary).
- The opener is level and mounted on the centerline of the gate.



## Preparing to Activate the System

**In order to have easy access to the control board during the rest of the installation, remove the opener and remount it upside down.**



#### **IMPORTANT:**

Return the opener arm to the upright position when installation is complete to prevent water damage to the control board.

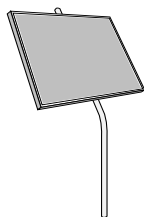
# Powering the System

## IMPORTANT:

- The Mighty Mule 350 is designed and intended for use with a 12 Volt automotive or marine type battery. The battery must be placed inside a weatherproof case and located within 6 feet of the opener arm. The 10 foot harness supplied connects the battery to the opener arm.
- The battery charge is maintained by the 18 Volt transformer included **or** by using optional solar panel(s). The transformer **or** solar panel is connected to the opener arm control board using low voltage, 16 gauge, dual conductor, multi-stranded, direct burial wire (FM509) (see page 23 and the Accessory Catalog).
- All low voltage wire used with the Mighty Mule® Gate Opener must be 16 gauge dual conductor, multi-stranded, direct burial wire (see page 20 and the Accessory Catalog). **Do not run more than 1000 feet of wire.**
- The transformer is designed and intended for indoor use. If the transformer can be plugged only into an outside electrical outlet, a weatherproof cover or housing (available at local electrical supply stores) **must** be used.
- If your gate is more than 1000 ft. from an ac power source, you will need to use at least one 5 watt Solar Panel to charge the battery (see Accessory Catalog). Refer to the **Solar Panels and Gate Activity** chart below.

**NEVER USE TRANSFORMER AND SOLAR PANEL(S) AT THE SAME TIME  
– it will damage the control board –**

## Solar Panel and Gate Activity Chart



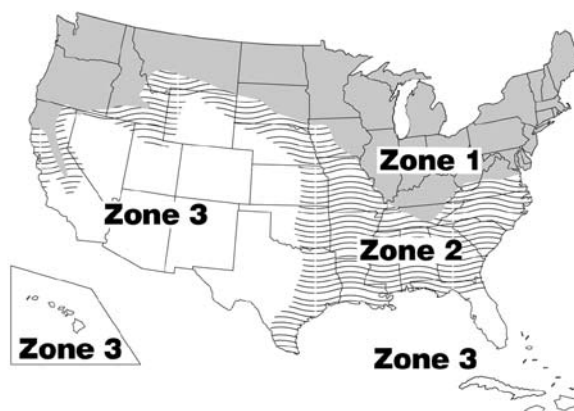
The table and map illustrate the maximum number of gate cycles to expect per day in a particular area when using from 5 to 30 watts of solar charging power. (see Accessory Catalog). The figures shown are for winter (minimum

sunlight) and do not account for the use of any accessory items.

*Accessories connected to your system will draw additional power from the battery and will require additional solar panels.*

**NOTE:** A maximum of 30 watts of solar charging power can be connected to the Mighty Mule® Gate Opener. Consult Solar Panel Installation Instructions for further information.

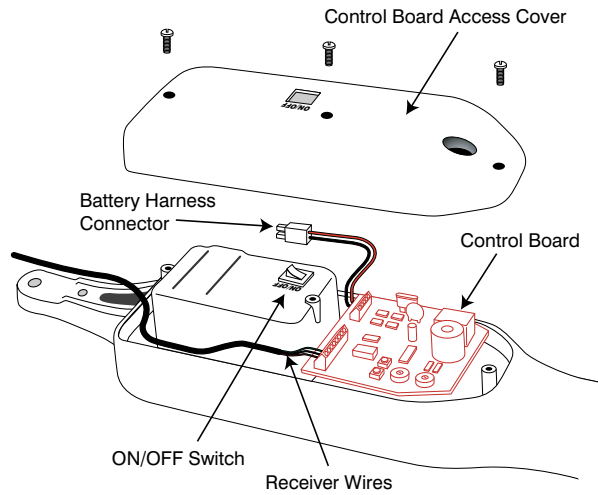
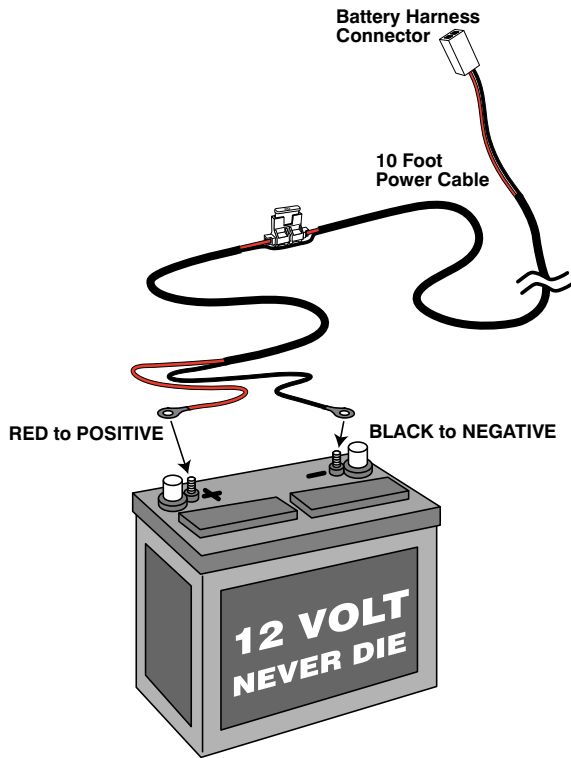
Single Gate Winter Ratings	Zone 1	Zone 2	Zone 3
12 v single gate (5 watts) solar charger	4	8	13
12 v single gate (10 watts) solar charger	8	16	26
12 v single gate (15 watts) solar charger	11	20	30
12 v single gate (20 watts) solar charger	14	28	38
12 v single gate (25 watts) solar charger	17	36	46
12 v single gate (30 watts) solar charger	20	44	54



# Connecting the Battery

## Step 1

With the opener mounted in the upside down position remove the Control Board Access Panel on the bottom of the opener arm.



## Step 2

Place the 12 Volt automotive or marine type battery and its weatherproof case within 6 feet of the fence post where the opener arm is mounted.

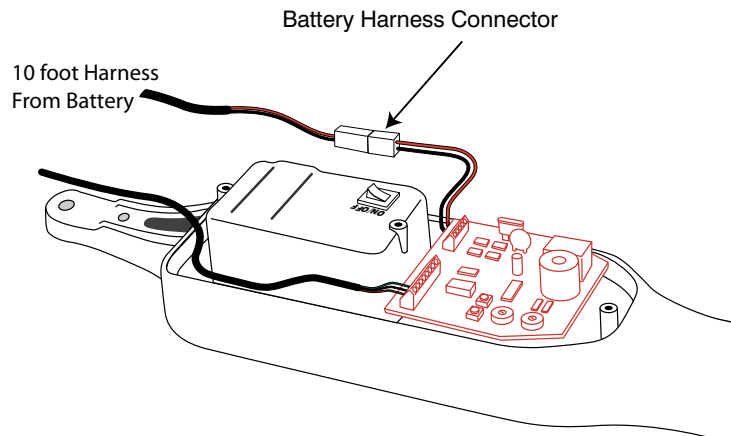
## Step 3

Attach the 10 foot battery harness wires provided, to the terminals of the battery. Take care to attach the BLACK wire to the NEGATIVE terminal and the RED wire to the POSITIVE terminal. Reverse connection will cause damage to the control board.

## Step 4

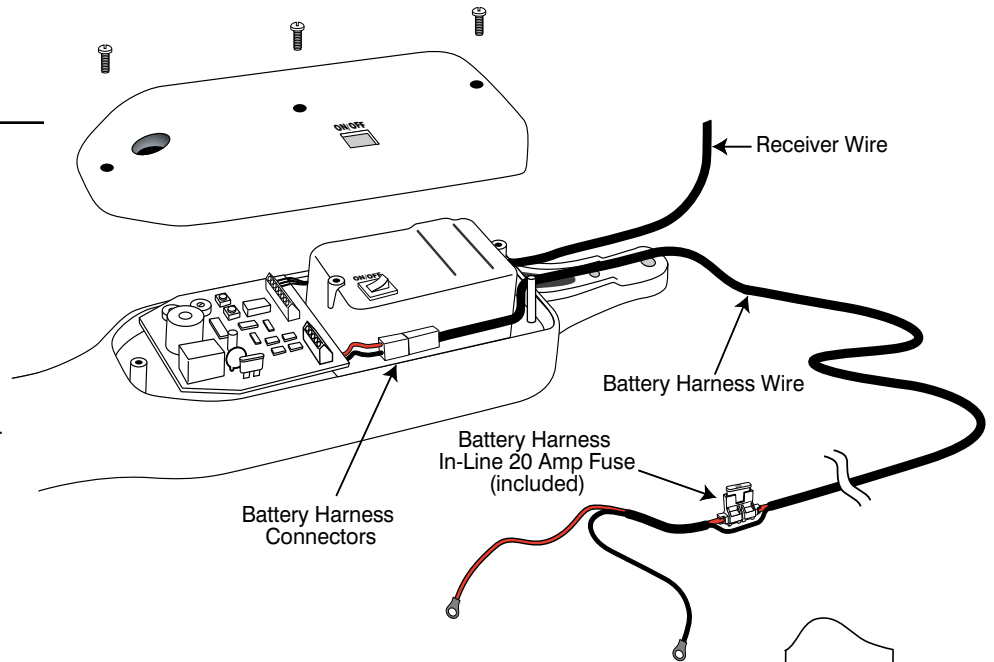
**IMPORTANT:** Make sure the power switch on the opener arm is in the OFF position.

Run the plug end of the Wire Harness wire up to the opener arm and plug it into the battery harness connector coming from the control board.



# IMPORTANT: Detailed Wire Routing Diagrams

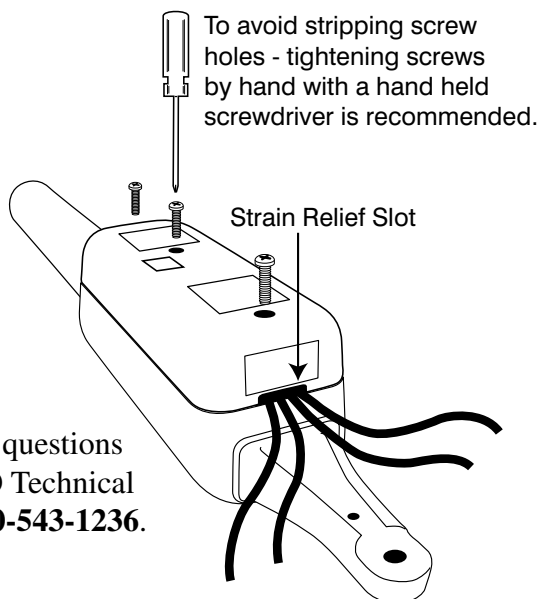
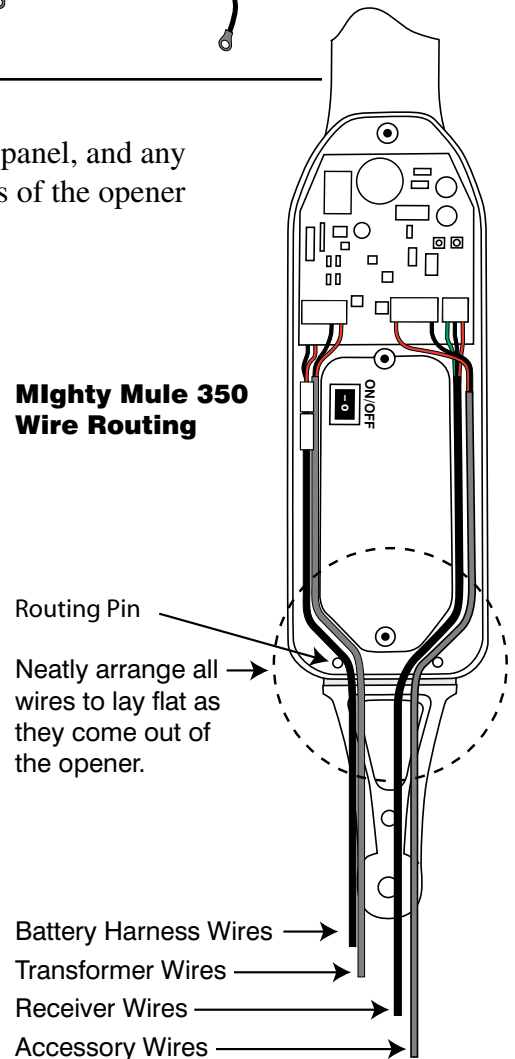
The battery harness wire has an in-line 20 Amp fuse that must be placed inside the opener when connecting the battery to the opener. The illustration to the right shows the best placement for the battery harness wire, connector and in-line fuse.



The wires from the battery harness, receiver, transformer or solar panel, and any accessories that have been installed must be routed down the sides of the opener and flatly out the strain relief slot in the back of the opener.

It is **IMPORTANT** that the wires lay flat and run inside the routing pins at the back of the opener and out the strain relief slot without being pinched when the control board access cover is replaced. See the illustrations to the right and below.

## Mighty Mule 350 Wire Routing



If you have any questions please call GTO Technical Service at **1-800-543-1236**.



# Connecting the Transformer

**IMPORTANT:** Never connect the transformer and a solar panel to the opener control board at the same time. It will damage the control board.

If you are using SOLAR PANEL(S) to charge the opener battery, skip this section and go to "Connecting Solar Panel(s)" section on page 23.

## IMPORTANT INFORMATION ABOUT LOW VOLTAGE WIRE

The only wire acceptable for use with GTO products is 16 gauge multi-stranded, low voltage, PVC sheathed wire. This particular gauge enables the transformer to provide an adequate charge through the control board to the battery at distances up to 1000 ft.

**DO NOT** use telephone wire or solid core wire. Unlike multi-stranded wire, these types of wire are inadequate for use with your gate opener system. Telephone wire and solid core wire do not deliver enough voltage for your gate opener to function and will cause the system to go into a condition known as "low voltage lockout."

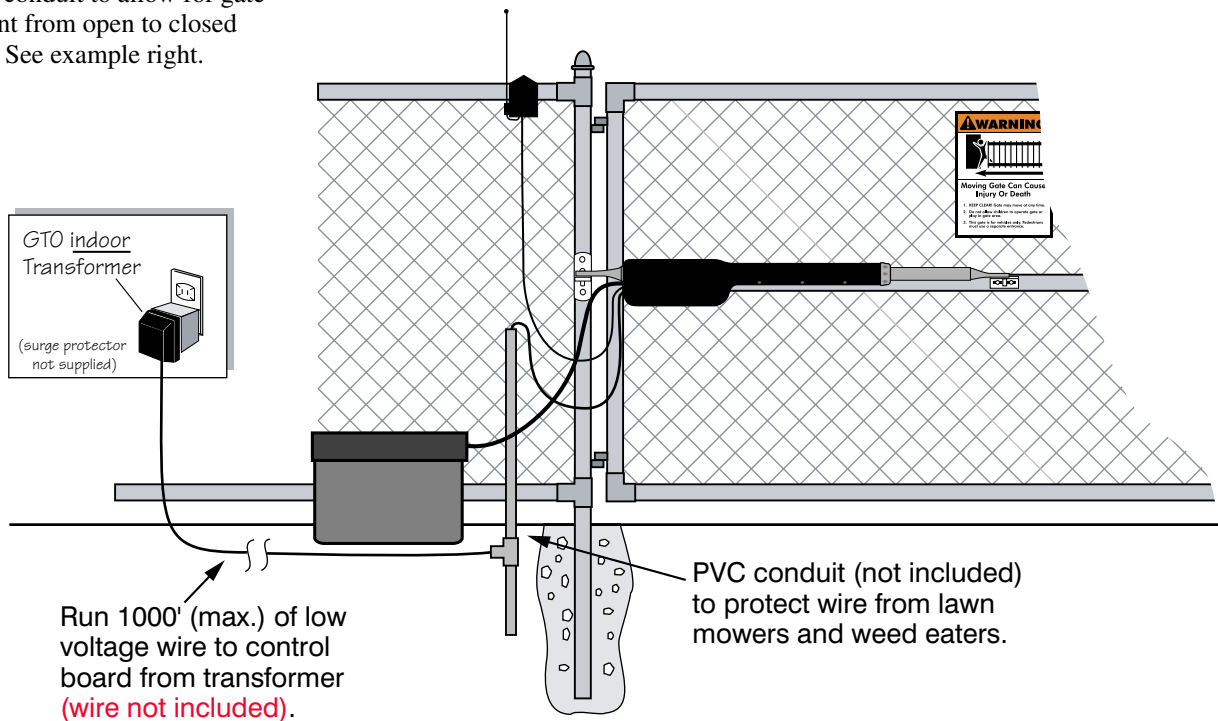
**NEVER** splice wires together. Splicing permits corrosion and seriously degrades the wire's ability to carry an adequate current.

## Step 5

Select the 120 Volt electrical outlet into which you will plug the transformer. Lay the low voltage wire in a trench following a path from the selected electrical outlet to the control box. Wires coming up from the ground should be run through PVC conduit to protect them from lawn mowers, weed eaters, and grazing animals. Be sure to bury the wire laid in the trench.

## Step 6

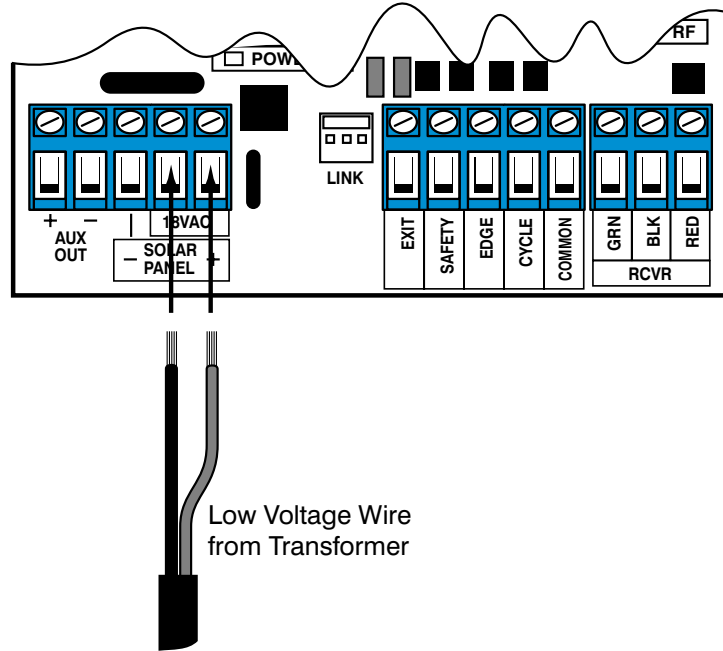
Bring enough wire up through the PVC conduit to allow for gate movement from open to closed position. See example right.



## Step 7

Strip  $\frac{3}{16}$ " off the ends of the low voltage wire and twist tightly. Insert these ends to the **18 VAC** terminal block located on the control board (see illustration at right). The wires can be inserted into either terminal regardless of color. **Be certain not to let the exposed wires touch each other!**

Tighten set screws against exposed end of wires. A dab of household petroleum jelly on each terminal will help prevent corrosion.



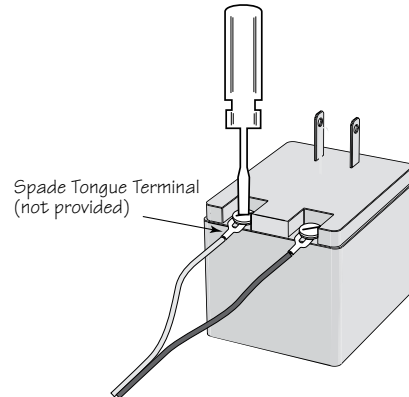
## Step 8

At the AC outlet strip  $\frac{1}{2}$ " of insulation from the ends of the low voltage wire. Attach these stripped ends to the transformer terminals.

A dab of household petroleum jelly on each terminal will help prevent corrosion.

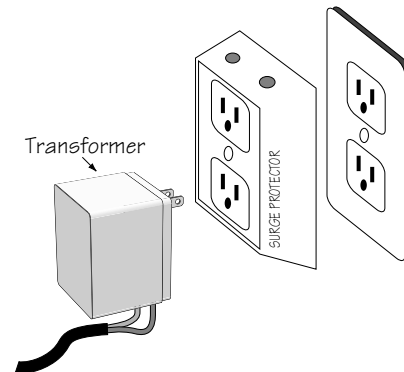
We suggest crimping a spade tongue terminal (*not provided*) to the end of each wire before attaching it to the transformer.

**Make sure the exposed wires do not touch each other!**



## Step 9

Plug the transformer into the electrical outlet. (Use of a surge protector with the transformer is **strongly** recommended.)



# Connecting Solar Panel(s)

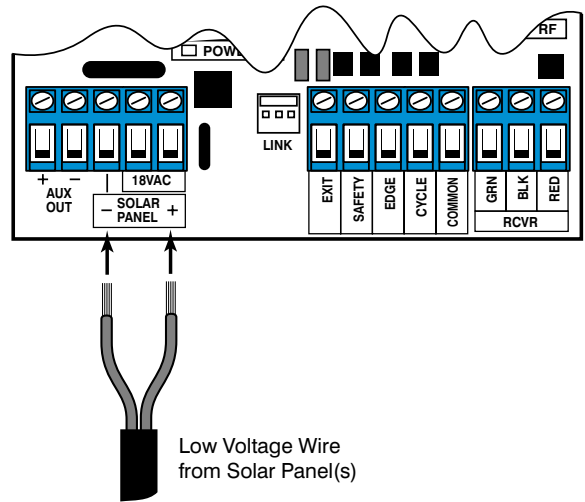
**IMPORTANT:** Never connect the transformer and a solar panel to the opener control board at the same time. It will damage the control board.

If you are using the transformer included with the Mighty Mule 350 to charge the opener battery, skip this section and go to "CONTROL BOARD SETTINGS" below.

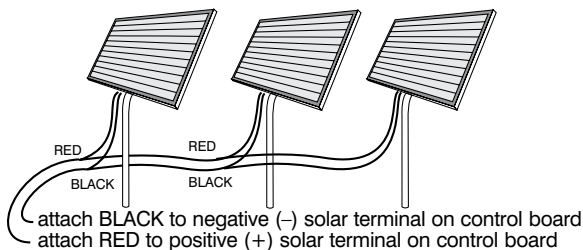
Strip 3/16" off the ends of the low voltage wire from the solar panel and twist tightly. Attach the **RED solar panel wire** to the **SOLAR terminal** marked (+) and the **BLACK solar panel wire** to the **SOLAR terminal** marked (-).

Tighten set screws against exposed end of wires. A dab of household petroleum jelly on each terminal will help prevent corrosion.

**NOTE:** For multiple panels wire the panels in parallel as shown in this diagram.



## Solar Panels connect in PARALLEL



# CONTROL BOARD SETTINGS

## DIP Switches

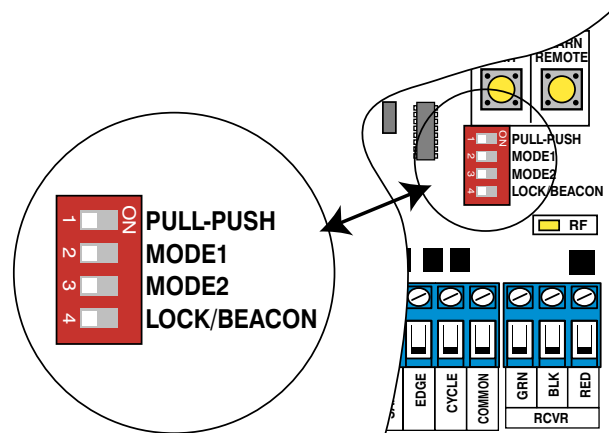
### Main DIP Switch Settings (MODES)

#### DIP Switch #1 - Push/Pull-to-Open

If your gate opens into the property the DIP Switch is set to OFF (factory). If your gate opens out from the property the DIP Switch must be set to the ON position. NOTE: if you have a Push-to-Open gate application you will need a Push-to-Open bracket (see Push-to-Open Instructions on page 33).

#### DIP Switch #4 - Lock/Beacon

This DIP selects the mode of operation of the "AUX OUT" terminal.



The OFF (factory) setting is selected when the Mighty Mule Automatic Gate Lock is used with the Mighty Mule 350. The RED wire from the lock control board is connected to the "AUX OUT +" terminal and the BLACK wire from the lock control board is connected to the "AUX OUT -" terminal. (OFF position provides a timed pulse of voltage to the accessory while the gate opener is activated.)

The ON setting is selected when a beacon or light is used with the Mighty Mule 350. One wire from the low voltage beacon or light is connected to the "AUX OUT +" terminal and the other to the "AUX OUT -" terminal. Wire colors doesn't matter for this connection. (ON position provides a continuous voltage to the accessory while the gate opener is activated.)

# Setting the Closed Position Limit

For PULL-TO-OPEN Installation

Turn the power switch on the opener arm to the ON position



Your Mighty Mule 350 has two Limit Settings

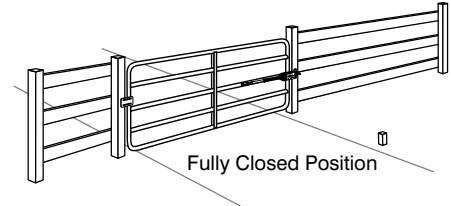
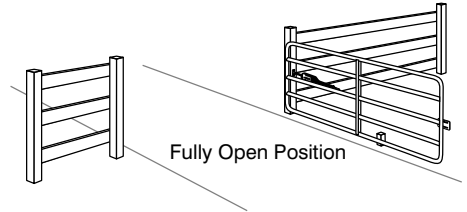
1) **OPEN Limit setting:** (Gate in the OPEN POSITION / FACTORY SET & NOT ADJUSTABLE)

The open limit setting is the fully open position.

2) **CLOSED Limit setting:**

The CLOSED Limit setting (gate in the CLOSED POSITION)

To achieve optimum closed position, you are required to complete the following FOUR STEPS:



## Step 1

While programming, be sure the gate is in the OPEN POSITION and the operator is mounted upside-down with "SET LIMIT" PROGRAM BUTTON visible on the control board.

## Step 2

Activate your opener by pressing the entry transmitter. Your gate should now be moving from the fully open position toward the closing position. Prepare to STOP gate when it reaches the desired closed position by pressing the entry transmitter again. The optimum CLOSED POSITION is when the gate closes firmly, without excess tension, against the gate post. The motor should run for one-half second after the gate closes against the gate post. This step may be repeated until desired close position is achieved. Once the desired CLOSE position has been achieved, proceed to step 3.

## Step 3

With your gate firmly closed. Program the closed limit setting by PRESSING & HOLDING the "SET LIMIT" BUTTON on the control board for 5 seconds.

## Step 4

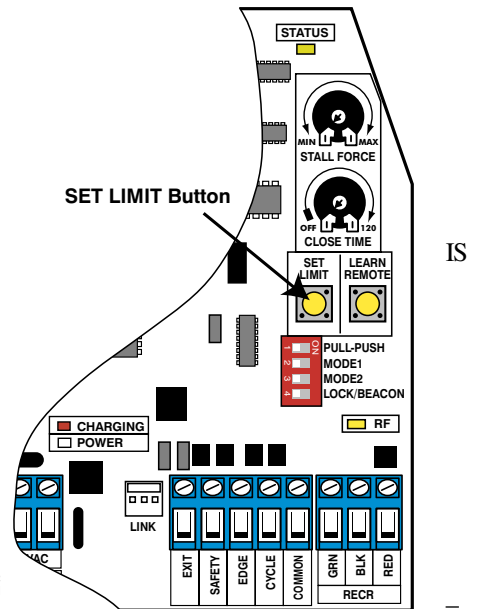
Save the setting by pressing the transmitter and allowing the gate to return to the fully open position. YOUR CLOSED POSITION LIMIT NOW PROGRAMMED.

### TESTING YOUR CLOSED LIMIT SETTING:

Press your entry transmitter and allow your gate to close. If CLOSED position is not correct or needs to be changed you will need to CLEAR your CLOSED LIMIT (see below) setting and follow steps 1 through 4 again.

### CLEARING PROGRAMMED CLOSED LIMIT SETTING:

If you make a mistake and set the limit at the wrong position press your transmitter to return the gate to its fully opened position, then press and hold the "SET LIMIT" button for 5 seconds. This will clear the memory for the closed limit position. Follow Steps 1-4 again.



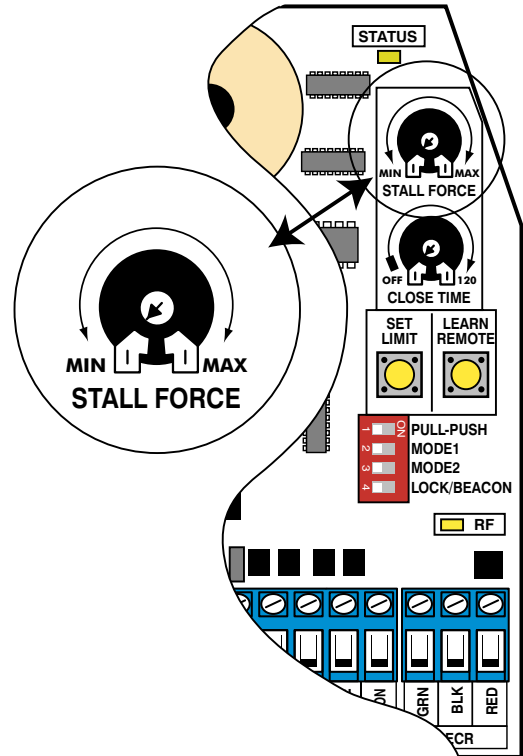
# Obstruction Sensitivity Potentiometer Setting

**IMPORTANT:** For safety reasons the obstruction setting or **Stall Force** on the Mighty Mule® control board comes from the factory set at **MIN** (minimum). In many gate installations this setting will need to be adjusted to overcome the weight and size of the gates.

The **Stall Force** potentiometer on the control board operates like a volume control on a radio. It controls the obstruction sensitivity (or the amount of force the opener will apply to an obstruction) before it automatically stops and reverses direction for approximately two (2) seconds.

Use a small slotted screwdriver to turn the arrow in the center of the potentiometer. Adjust the sensitivity from the **MINIMUM** position where the gate operates without obstructing from its own weight or the wind conditions in your area.

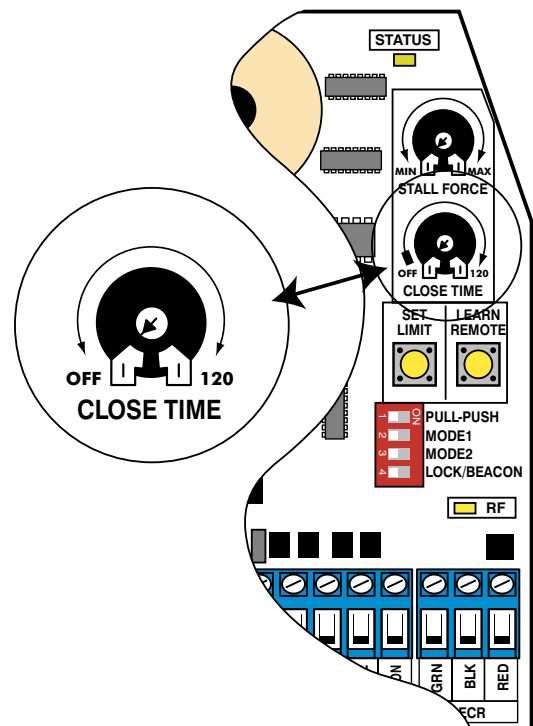
**NOTE:** You may need to increase the stall force in cold weather due to increased resistance from gate hinges.



**ALWAYS KEEP SAFETY AT THE TOP OF YOUR LIST WHEN ADJUSTING OR SERVICING YOUR AUTOMATIC GATE OPENER!**

## Setting Auto-Close Time

**CLOSE TIME** (auto close timer): Determines how long the gate will remain open before it automatically closes. The limits are **OFF** to 120 seconds. The factory setting is **OFF**.

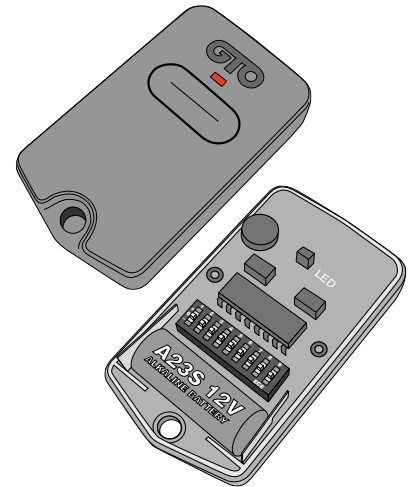


# Setting Your Personal Transmitter Code

All GTO transmitters are set to a standard code at the factory and are ready to operate your Mighty Mule® Gate Opener®. For your safety and security, however, we **strongly recommend** that you replace the factory setting with your own personal code. Follow the directions below:

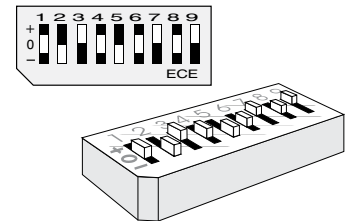
## 1. Remove the Transmitter Cover

On the back of the transmitter use a small phillips head screw driver to remove the two screws on the sides of the visor clip and separate the front cover from the transmitter. With the front cover removed, the battery and the DIP switches will be exposed. To set a new code, use a small screwdriver to move the switches.



## 2. Set the transmitter DIP Switches

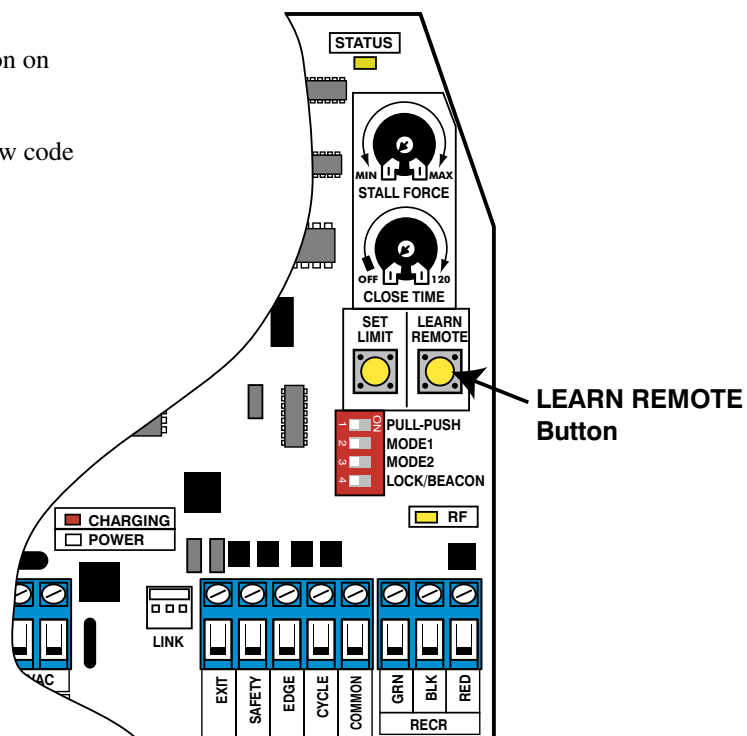
There are nine (9) transmitter DIP switches; each can be placed in three different positions (+, 0, -). **DO NOT** set all the switches in the same position, such as all +, all 0, or all -. Once the DIP switches have been set to a personal code, replace and close the access cover.



**WARNING:** No other adjustments should be made inside the transmitter.

## 3. "Teach" the New Code to Control Board Memory

- Press and hold transmitter button.
- Press and hold the **LEARN REMOTE** button on the control board until it beeps.
- Release transmitter button.
- Release **LEARN REMOTE** button. The new code is stored in control board memory.



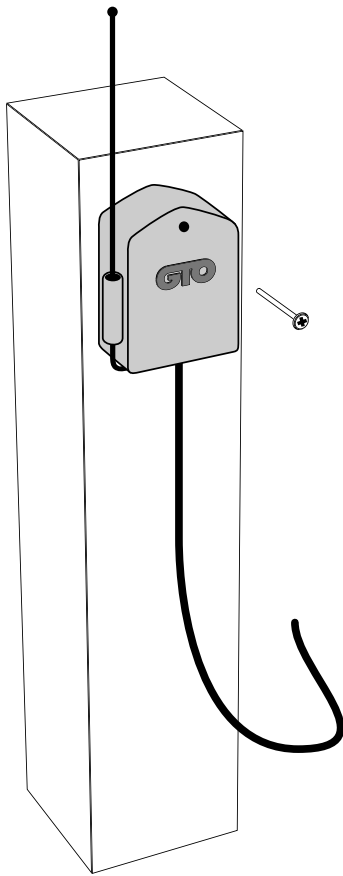
# Installing the Receiver

Use the transmitter to check the range of the receiver *before permanently mounting it*.

Consider the following when mounting the receiver:

- Standard receiver cable length is 10 feet (receivers with a longer cable are available as special order items; *call the GTO Sales Department*). NEVER splice receiver cable!
- **Run the cable through PVC conduit to protect it from damage.**
- DO NOT run cable through metal conduit because the receiver signal range will be decreased.
- DO NOT coil excess cable or store it in the control box.
- DO NOT run cable in conduit containing ac wiring.
- The receiver range can vary from 50 to 100 feet depending upon weather, topography, and external interference.

**NOTE: Do not mount upside down.**



## FCC Regulation

This device complies with FCC rules Part 15. Operation is subject to the following conditions:

1. This device may not cause harmful interference.
2. This device must accept an interference that may cause undesired operation.

Transmitter distance may vary due to circumstances beyond our control. **NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.**

# Connecting Additional Safety Devices

Although GTO strongly recommends the use of additional safety devices, we do not endorse any specific brand names. Only use products that are certified and listed to be in compliance with any applicable UL standards (Underwriters Laboratories) and national and regional safety codes.

Call GTO Sales at 1-800-543-4283 for information on compatible products for your specific application.

The Mighty Mule® 350 will ONLY accept accessory devices with normally open contact output.

## Contact Sensors (safety edges)

If not installing a contact sensor skip to next section.

**PLEASE NOTE:** Contact sensors are not *included with the Mighty Mule® 350*.

The Mighty Mule® 350 is equipped with built-in obstruction sensitivity. The opener is designed to stop and reverse the gate for 2 seconds when it comes in contact with an obstruction. However, obstruction sensitivity, although functioning properly, *may not be sensitive enough to prevent bodily injury in some circumstances*. To increase your protection against entrapment, **GTO recommends using some form of additional safety device**. When installed, contact sensors must be mounted in compliance with UL 325, Underwriters Laboratories safety standard for gate openers. Review page 5 for information about mounting requirements for safety edges ("contact sensors").

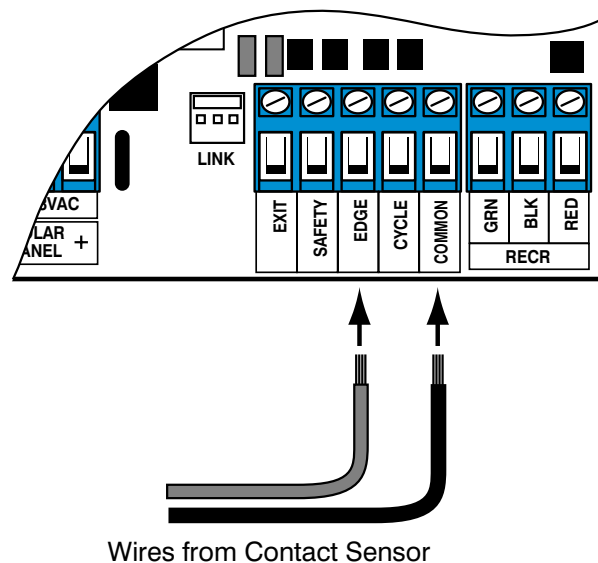
Refer to the sensor manufacturer's instructions for information about installing these devices on a vehicular gate.

**⚠ Make sure the power switch to the opener is turned off before connecting safety device wiring to the terminal blocks. Unplugging the transformer does not turn power to the opener OFF.**

### Contact Sensor Input Connection:

Connect one of the EDGE contact sensor wires to the **COMMON (COM)** terminal and the other to the **EDGE** terminal on the Mighty Mule® 350 control board.

**Activation of a contact sensor while the gate is in motion will cause the gate to stop and reverse for two (2) seconds.**





# Non-Contact Sensors (photo beams)

**If not installing a non-contact sensor skip to next section.**

**PLEASE NOTE:** Non-contact sensors are not *included with the Mighty Mule® 350.*

The Mighty Mule® 350 can also accept "Safety" input from normally open "dry-contact" output devices such as photo beams connected to the SAFETY input terminal.

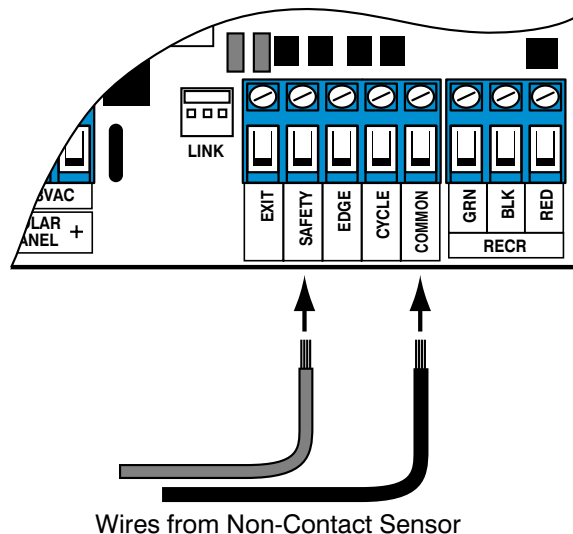
*Refer to the sensor manufacturer's instructions for information about installing these devices on a vehicular gate.*

**⚠ Make sure the power switch to the opener is turned off before connecting safety device wiring to the terminal blocks. Unplugging the transformer does not turn power to the opener OFF.**

## Non-Contact Sensor Connection:

Connect one of the non-contact sensor dry contact output wires to the **COMMON (COM)** terminal and the other to the **SAFETY** terminal on the Mighty Mule® 350 control board.

**This input is ONLY monitored when the gate is closing. Activating the non-contact sensor (obstructing the safety beam path) will cause the gate to reverse to the fully open position.**



# Exit Loop

**If not installing a shadow loop skip to next section.**

**PLEASE NOTE:** Non-contact sensors are not *included with the Mighty Mule® 350.*

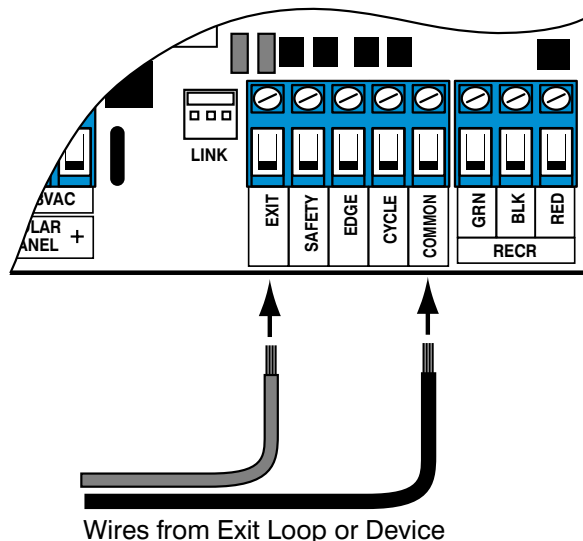
*Refer to the sensor manufacturer's instructions for information about installing these devices on a vehicular gate.*

**⚠ Make sure the power switch to the opener is turned OFF before connecting safety device wiring to the terminal blocks. Unplugging the transformer does not turn power to the opener OFF.**

## Free Exit Connection:

Connect one of the free exit wires to the **COMMON** terminal and the other to the **EXIT** terminal on the Mighty Mule® 350 control board.

A **FREE EXIT** device or loop that senses a vehicle as it approaches the gate from inside the property and automatically opens the gate to allow the vehicle to exit.



# Connecting Accessories

**If not connecting accessories skip to next section.**

The Mighty Mule® 350 can accept NORMALLY OPEN CONTACT accessories, such as; Push Button Entry Devices and Key Pads.

*Refer to the accessory manufacturer's instructions for information about installing these devices on a vehicular gate.*

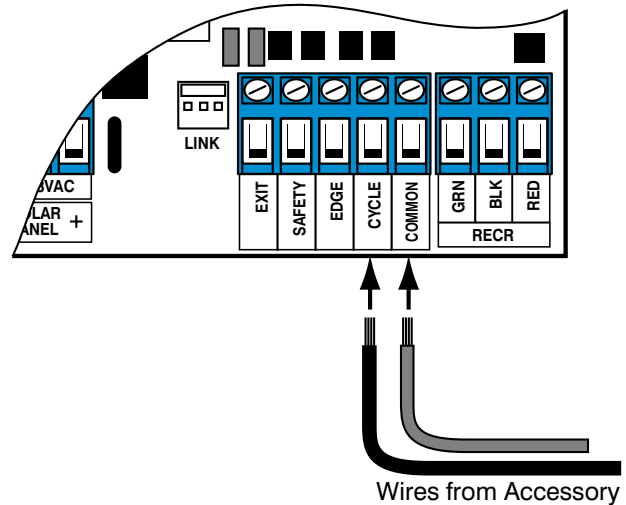
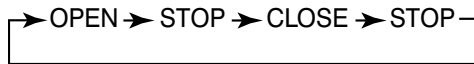


**Make sure the power to the opener is turned off before connecting safety device wiring to the terminal blocks. Unplugging the transformer does not turn power to the opener OFF.**

## Accessory Input Connection:

Connect one of the accessory wires to the **COMMON (COM)** terminal and the other to the **CYCLE** terminal on the Mighty Mule® 350 control board.

**Each activation of the accessory will cause the gate to cycle as follows:**



## Automatic Gate Lock (FM143)

The Automatic Gate Lock unlocks and locks automatically as gates open and close. Used with the Mighty Mule® system for maximum stability and security. Comes with a keyed manual release. Recommended for gates over 8 ft. long. Ideal for animal enclosures or high wind areas.

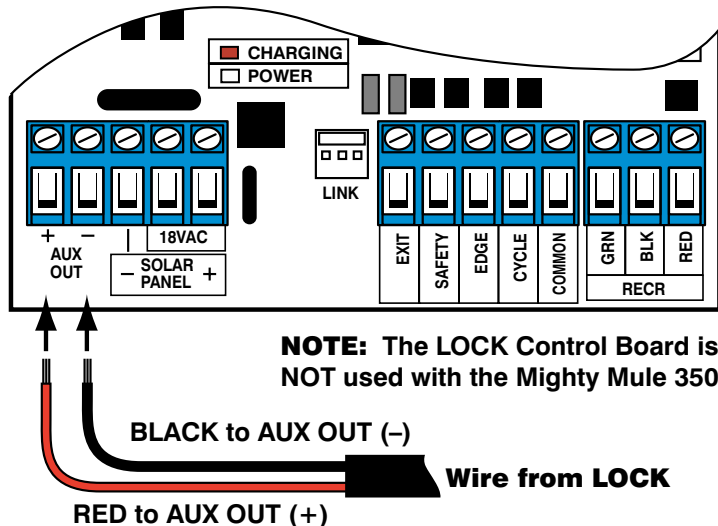
**Make sure the power switch to the opener is turned OFF before connecting gate lock wiring to the Mighty Mule 350 terminal blocks.**

The control board that comes with the Mighty Mule Automatic Gate Lock is not used when connecting the lock to the Mighty mule 350.

Connect the **RED** wire from the lock to the **AUX OUT (+)** terminal, and the **BLACK** wire from the lock to the **AUX OUT (-)** terminal on the Mighty Mule® 350 control board.

Be sure **DIP SWITCH #4** is set to the **OFF** position.

## Wiring the Automatic Gate Lock to the Mighty Mule 350



## Mighty Mule Free Entry/Exit Loop

A Free Entry/Exit Loop is a in ground wire loop that senses a vehicle as it drives over it and opens the gate. It can be placed in the driveway outside the gate to allow FREE Entry to the property and it can be placed in the driveway inside the gate to allow FREE Exit from the property.

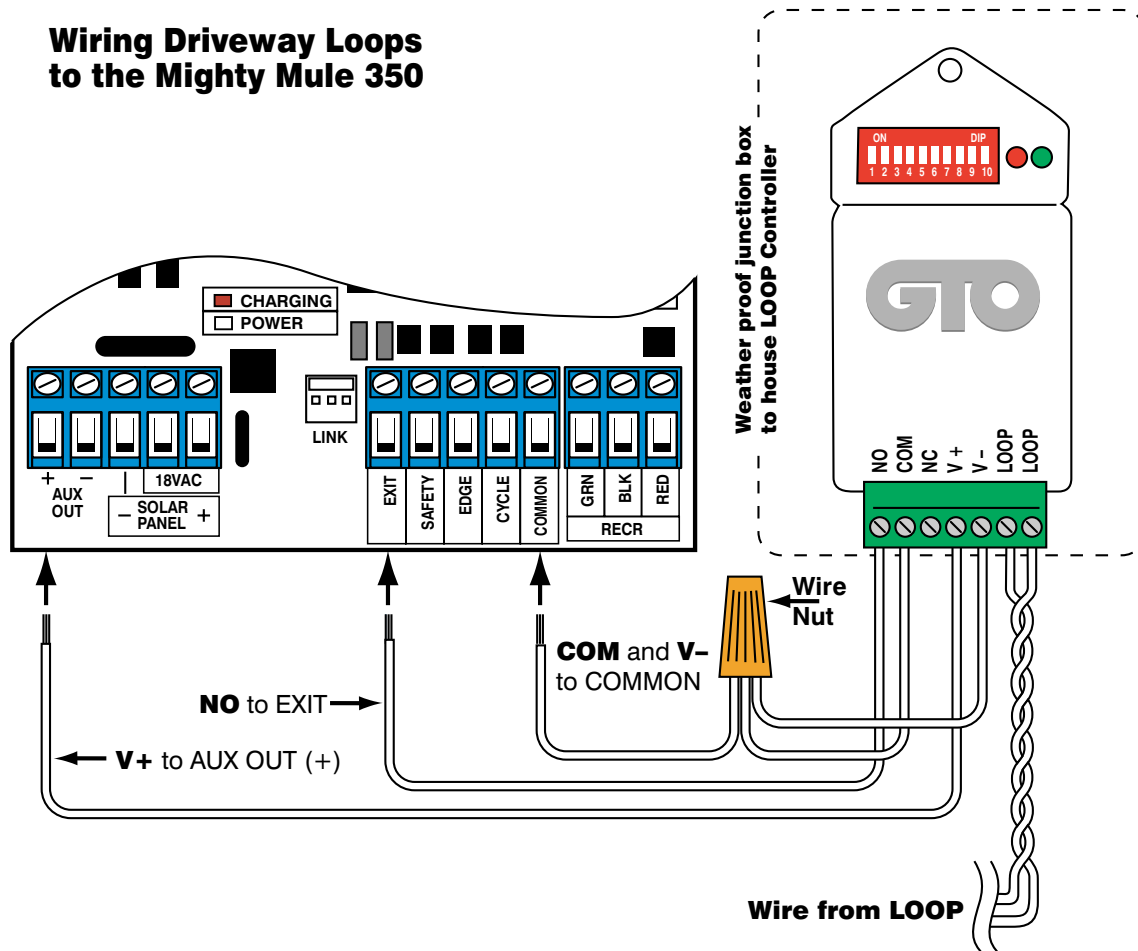
Depending on how you want your gate to function you can use just one or all types on the same gate.

**Make sure the power switch to the opener is turned OFF before connecting loop wiring to the Mighty Mule 350 terminal blocks.**

The LOOP Controller must be placed in a weather proof housing separate from the opener arm.

Use 16 gauge multi-stranded low voltage wire to connect the LOOP Controller to the Mighty Mule 350 control board.

Connect a wire from the V+ terminal on the LOOP Controller to the AUX OUT (+) terminal on the Mighty Mule® 350 control board. Connect a wire from the NO (Normally Open) terminal on the LOOP controller to the EXIT terminal on the Mighty Mule 350 control board. Connect wires from the V- and COM terminals on the LOOP controller to the COMMON terminal on the Mighty Mule 350 control board. The twisted pairs of wires from the ground loop are then connected to the LOOP terminals on the LOOP Controller. See Illustration below.



## Mighty Mule Gate Opening Sensor (FM138)

The Gate Opening Sensor is designed for residential and agricultural applications and is compatible with Mighty Mule® automatic gate openers (see Sensor Box for model compatibility). The Sensor is an electromagnetic sensor, which offers 'hands free' operation of the Mighty Mule® Gate Opener with a 12 ft. radius of detection of vehicles in motion.

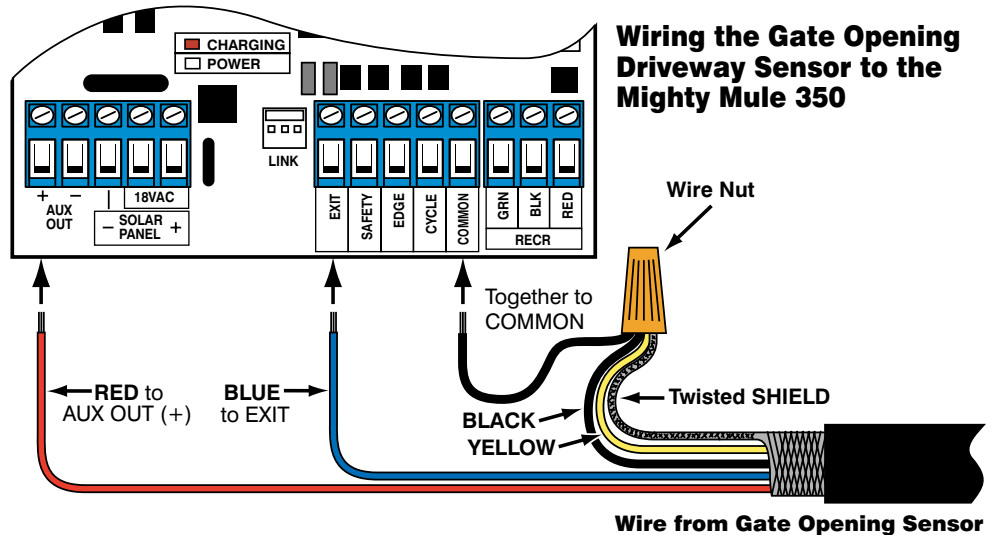
**Make sure the power switch to the opener is turned OFF before connecting sensor wiring to the Mighty Mule 350 terminal blocks.**

The wiring cable that comes with the Mighty Mule Gate Opening Sensor has four colored wires and a braided wire shield around them.

Stripback a few inches of the vinyl (black) outer cover to expose the braided SHIELD. Cut the SHIELD down one side and twist as shown in illustration.

Connect the twisted SHIELD, the YELLOW, the BLACK as well as a separate length of wire, with a WIRE NUT. The other end of the single length of wire is connected to the COMMON terminal on the Mighty Mule 350 control board.

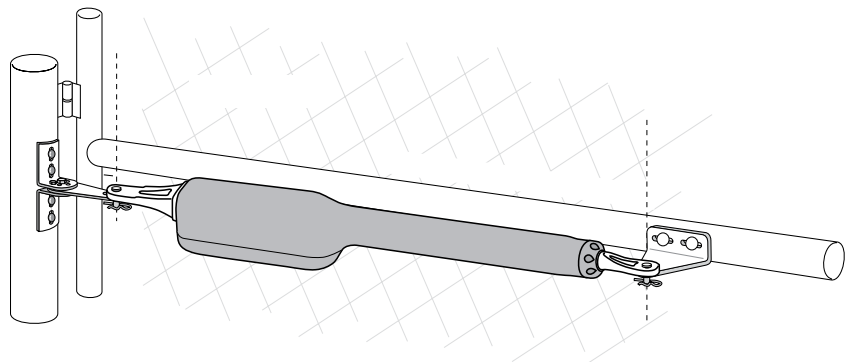
Connect the RED wire from the sensor to the AUX OUT (+) terminal, and the BLUE wire to the EXIT terminal on the Mighty Mule® 350 control board.



## FINAL STEP

### When everything has been connected to the opener...

replace the control board access cover. If you were working with the opener with the control board access facing up, remove the opener arm from both mounts and remount it in the upright position (control board cover facing down). Failure to remount opener in the upright position will allow water to enter the opener and cause damage to the opener control board.



# Push to Open Installation

## Determining The Mounting Position of The Post Bracket Assembly

**A** Swinging gates shall not open into public access areas!

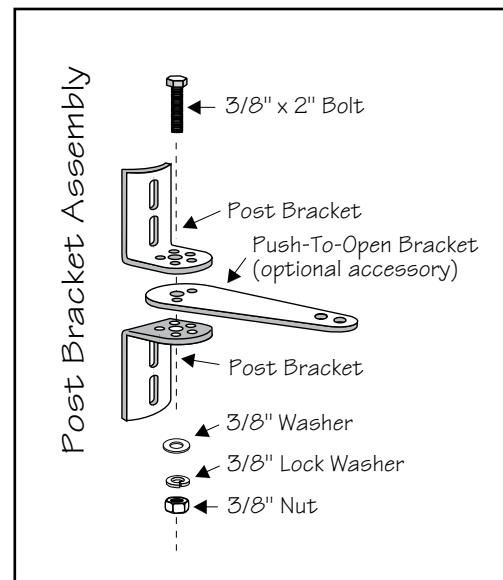
A "Push-to-Open" gate opens *out* from the property.

**A Push-to-Open Bracket is required for this type of installation** (see *Accessory Catalog*). If you have a pull-to-open gate (gate opens *into* the property), return to page 13; step 3.

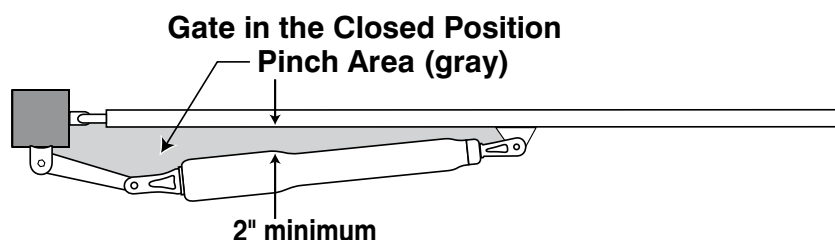
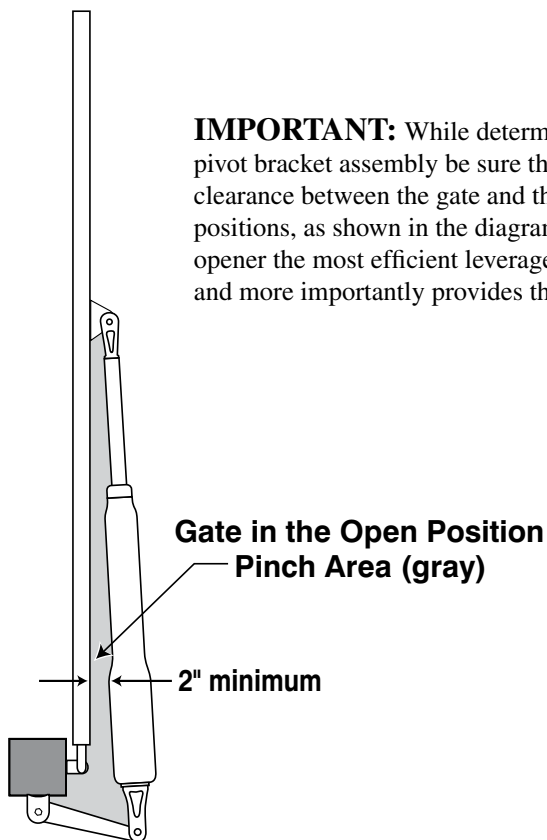
In a PUSH-TO-OPEN installation the opener is installed while the gate is in the **closed** position.

### Step 1

With the gate **closed**, adjust the post bracket assembly and the gate bracket until the opener is level. While holding the opener level, use C-clamps to temporarily keep the post bracket assembly and gate bracket in their respective positions on the fence post and gate.



**IMPORTANT:** While determining the mounting point for the post pivot bracket assembly be sure that the position allows for maximum clearance between the gate and the opener in both the open and closed positions, as shown in the diagrams below. This clearance will give the opener the most efficient leverage point for opening and closing the gate and more importantly provides the least possible pinch area.



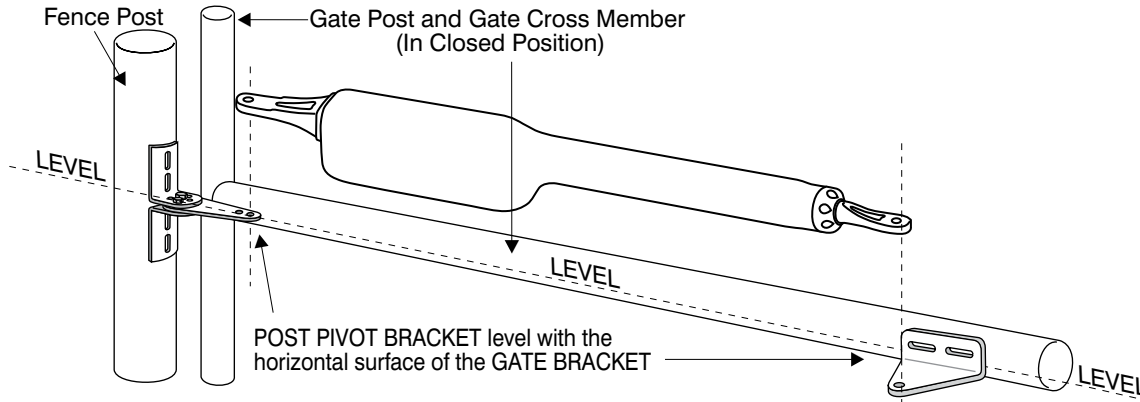
### Step 2

After verifying that you have the best position for the post pivot bracket, insert the  $\frac{5}{16}$ " x  $1 \frac{3}{4}$ " bolt through the aligned holes of the post bracket and post pivot bracket and fasten it with the  $\frac{5}{16}$ " washer and nut.

**IMPORTANT:** If you loosened the clamp on the post bracket to achieve the optimum position, tighten it in its new position and recheck the gate bracket with the gate in the open position (move the gate bracket and re-clamp it if necessary).

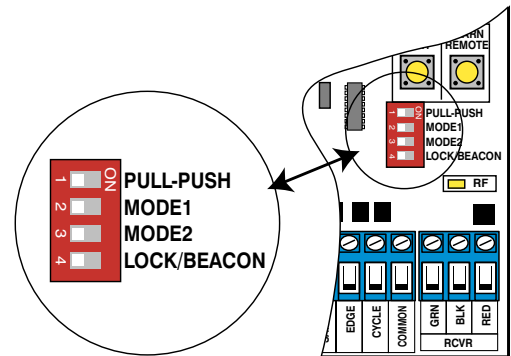
### Step 3

With the gate in the **fully closed position** and the opener retracted, swing the opener to the gate. Mark reference points for bolt holes on gate cross member through middle of gate bracket slots. The opener must be level. (Some vertical adjustment is possible by sliding the post bracket assembly up and down.) Drill  $\frac{3}{8}$ " holes into the gate cross member as marked. Fasten gate bracket to cross member using (2)  $\frac{3}{8}$ " x 3" bolts, washers, lock washers, and nuts. Attach the opener to the post bracket assembly and gate bracket using clevis pins, bushings, and hairpins clips.



### Step 4

Make sure the control box power switch is **OFF**. Use a small screwdriver to move the **Number 1** DIP switch from the factory setting (OFF / Pull-To-Open) to **ON for Push-To-Open**. Turn power switch **ON**. The control board is now configured to *push* the gate open.



## Setting the Open Position Limit

### Step 1

Confirm that the power switch is in the ON position, and the gate is in the CLOSED POSITION.

### Step 2

Activate your opener by pressing the entry transmitter button. Your gate should now be moving from the closed position toward the open position. Prepare to **STOP** gate by pressing the entry transmitter button again when the gate reaches the desired open position. This step may be repeated until desired open position is achieved. Once the desired **OPEN** position has been achieved, proceed to Step 3.

### Step 3

With the gate in the desired open position PRESS & HOLD the “SET LIMIT” button on the control board for 5 seconds.

### Step 4

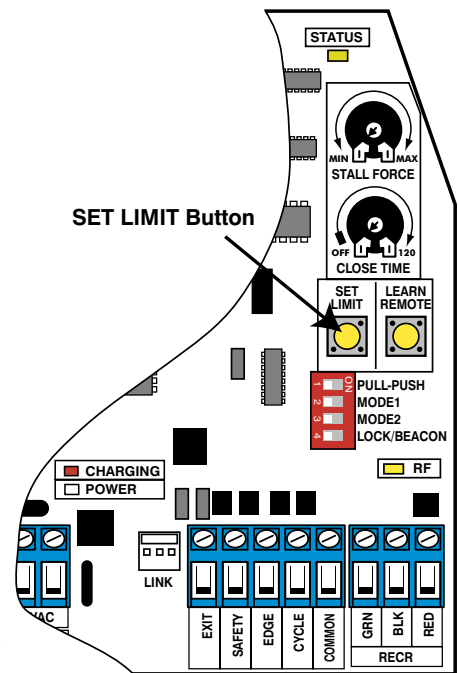
Press the transmitter button and allow the gate to return to the closed position. YOUR GATE’S OPEN POSITION LIMIT IS NOW PROGRAMMED.

#### TESTING YOUR OPEN LIMIT SETTING:

Press your entry transmitter and allow your gate to open. If the OPEN position is not correct or need to be changed, you will need to CLEAR your OPEN LIMIT settings and follow steps one (1) to four (4) again.

#### CLEARING PROGRAMMED OPEN LIMIT SETTING:

If you make a mistake and set the limit at the wrong position – press your transmitter to return the gate to the closed position, then press and hold the "SET LIMIT" button for 5 seconds. This will clear the memory for the open limit position. Follow steps one (1) to four (4) again.



# Maintenance & Troubleshooting Guide

If your gate opener does not function properly after it is installed, use this guide before calling the GTO Service Department.

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- On all gates weighing 250 lb. or more, routinely grease the ball bearing hinges at least 4 times a year; more frequently if the gates are in a coastal area.
- Clean the push-pull tube with a soft, dry cloth and apply silicone spray to it at least once a month.
- While oxidation is a normal part of weathering of equipment that is exposed to the elements, we recommend you apply silicone spray the front and rear mounts to minimize this effect.

## **Audible/Buzzer/Alarm Feedback:**

### **1. 1 beep with 2 seconds off:**

Limit switch error: Limit switch's normally open and normally close inputs both open or both shorted. The alarm will automatically shut off in 4 seconds after the problem is corrected.

### **2. 5 beeps with 2 seconds off:**

Low battery condition detected: Low battery can occur if the following condition is detected:

While in idle state and the battery voltage is below ~11.5 Volts.

While running and the battery voltage is below ~10.0 Volts.

The alarm will automatically shut off when the idle voltage is more than 12 Volt.

The unit may continue to operate even when low battery is detected.

The STATUS LED will also blink when the buzzer is beeping. See page 36 #3 and #4.

### **3. 1 beep when attempt to run the unit:**

No battery is connected.

Blown fuse

Dead cell or extremely low battery condition.

### **4. Alarm continuously beeps (remote does not operate unit AND not at either limits):**

Two consecutive obstructions have been detected without reaching the limit. Alarm will automatically shut off after 5 minutes. 'Power-cycle' the unit will also shut off the alarm.

### **5. Learn Remote:**

When a new code is learned from the remote the alarm will sound. Release the 'LEARN

REMOTE' button will turn the alarm off. See "Setting Your Personal Transmitter Code" section on page 26.

### **6. Power-Cycle:**

The alarm will beep for 1 second upon power up.

## **B) Visual/LEDs Feedback:**

### **1. RF LED (LED2):**

Blinking when there is 318 MHz signal is received. This LED is typically off when the receiver is connected and no 318 MHz signal is presented.



2. **STATUS LED (LED1):**

*While the unit is IDLE:*

**1 blink with 2 seconds off:**

Free Exit terminal is shorted to common.

**2 blink with 2 seconds off:**

Safety terminal is shorted to common.

**3 blink with 2 seconds off:**

Edge terminal is shorted to common.

**4 blink with 2 seconds off:**

Cycle terminal is shorted to common.

**LEARN LIMIT Mode:**

This LED will turn on when the 'LEARN-LIMIT' button is pressed. It will turn off after 3 seconds indicating that it has entered the learn limit mode (if not at the retracted limit) or cleared the previous learned limit (if at retracted limit). See "Setting Closed Position" section on page 24.

Whenever there is a change in state at any of the inputs this LED will blink once.

3. **POWER LED (Green):**

ON: AC power or solar power is presented.

OFF: NO AC power or solar power is presented.

4. **CHARGING LED (Red):**

Continuously ON: Fast charging mode. (~1.5 Amps charging current).

Blinking (two blinks per second): Soak charge. Enter this mode after fast charging. The battery is almost at full charge in this mode.

Slow blinking (one blink per second): Float charge. In this mode when the battery is fully charged.

## **The Gate CLOSES Then Opens Again on its Own:**

1. Check the position of the mounting brackets and readjust if necessary.
2. Check the gate for binding or hinge damage.

## **The Gate OPENS Then Closes Again on its Own:**

1. Check the position of the mounting brackets and readjust if necessary.
2. Check the gate for binding or hinge damage.

VOLTAGE RATINGS	
18 Vac Transformer _____	18.0 to 22.0 Vac
5 W Solar panel (single) _____	18.0 to 22.0 Vdc 300 mA
measure voltage at panel and control box.	
12 V Battery _____	12.0 to 13.5 Vdc 7.0 Ah
Charging circuit _____	12.0 to 14.8 Vdc
measure voltage with battery connected	

# Repair Service

If your Mighty Mule® Gate Opener is not operating properly, please follow the steps below:

1. First use the procedures found in the *Maintenance & Troubleshooting Guide* (see page 36).
2. If you are unable to solve the problem, call the **GTO Service Department** at (800) 543-1236, or (850) 575-4144. Refer to the serial number (located on the back of opener arm) and date of purchase when calling for assistance.
3. If repair or replacement of your gate opener is necessary, the Service Department will assign a **Return Goods Authorization (RGA) number** to you for all warranty repairs
4. Securely pack the component(s) authorized for return to the factory. Write the RGA number issued to you on the outside of the package in **LARGE BOLD PRINT**. Ship the package(s) freight prepaid to:  
**GTO, Inc., 3121 Hartsfield Road, Tallahassee, Florida, USA 32303.**

**NOTE: Products returned to GTO without a Return Goods Authorization (RGA) number in LARGE BOLD PRINT on the outside of the package WILL NOT be accepted. Also, items returned to GTO freight collect WILL NOT be accepted.**



The **GTO, Inc. Technical Service Department** is open  
Monday – Friday 8:00 A.M. – 5:00 P.M. (Eastern Time)

**For sales call toll free:**  
**1-800-543-GATE (4283)**  
**For technical service Call toll free:**  
**1-800-543-1236**

**Fax (850) 575-8950 • Web site: [www.mightymule.com](http://www.mightymule.com)**  
**E-Mail: [techsupport@gtoinc.com](mailto:techsupport@gtoinc.com)**

**GTO, Inc.**

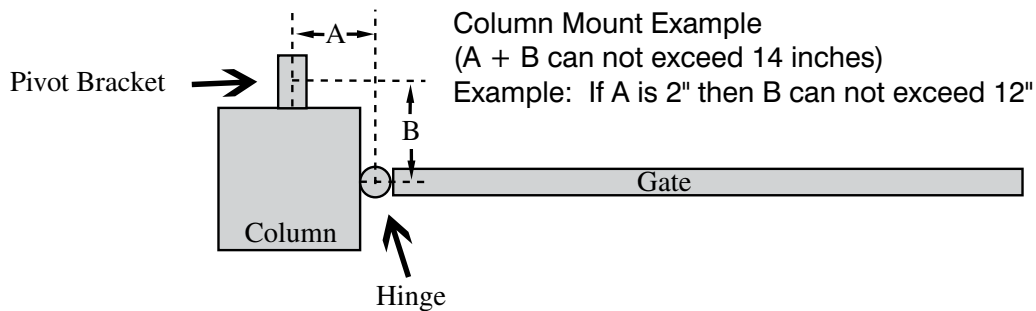
3121 Hartsfield Road • Tallahassee, Florida, USA 32303 • (850) 575-0176 • Fax (850) 575-8912 • Web site [www.mightymule.com](http://www.mightymule.com)

# Column Installation Information

**IF THIS OPENER WILL BE USED WITH GATES THAT ARE MOUNTED ON MASONRY, BRICK, OR ROCK (etc.) COLUMNS:**

**READ THE FOLLOWING CAREFULLY BEFORE PROCEEDING**

- A. The simplest solution is to install the opener in a push-to-open configuration (requires Push-To-Open Bracket, see Accessory Catalog). The minimum clearance is easier to achieve and clearance is no longer a problem, since the opener will be pushing the gate away from the column instead of pulling it toward the column. It is recommended that you place a steel plate between the opener mounting brackets and masonry surface for additional strength.
- B. If a push-to-open installation is impossible due to traffic hazards, terrain, etc., another option is to re-hang the gate. You may hang it on a post, either in the center of the column or at the back corner, or move the gate to the back corner of the columns.
- C. The most difficult solution is to cut a notch in the column to accommodate the opener and power cable. This job is **NOT** for the inexperienced!

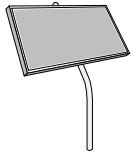


# MIGHTY MULE®

## E-Z GATE OPENERS

### ACCESSORIES

**Accessories are Available From Your Retail Store**



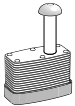
**Solar Panel (FM121) Not Compatible with Mighty Mule® 250**

The **Solar Panel** is a 5 watt solar powered battery charger for use with the **FM500 & FM502** gate opener systems. Particularly suited for remote installations, each **Solar Panel** comes with tubular steel support, mounting clips, wire connectors, and 8 ft. of low voltage wire (see Low Voltage Wire for additional wire). The **Mighty Mule®** control board has clearly labeled terminal connections for easy installation of the **Solar Panel**. Installation in some regions of the world will require multiple solar panels for adequate charging power. Dual gates require a minimum of 10 watts of solar charging power. (10 watt solar panels are available)



**Push Button (doorbell) Control (FM132)**

Unlit doorbell button for remote entry or exit control. Wires directly to the control board and uses 16 gauge multi-stranded, dual conductor low voltage wire (sold separately).



**Pin Lock (FM133)**

The **Pin Lock** substitutes for the clevis pin at the front end of the **Mighty Mule®** gate openers. Helps prevent theft of the opener from the gate, while allowing quick release of the opener.



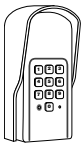
**Key Chain Mini Transmitter (FM134)**

The **Key Chain Mini Transmitter** is a miniature version of the **Mighty Mule®** entry transmitter and has the same adjustable code settings. 12 Volt battery included.



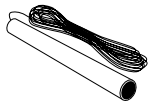
**Entry Transmitter (FM135)**

The **Mighty Mule®** entry transmitter, with adjustable code settings, is standard equipment with all **Mighty Mule®** systems. 9 Volt battery included.



**Digital Keypad (FM137)**

The specially designed digital keypad can be easily installed as a wireless or wired keypad. It can be programmed to use up to 25 different personal identification number (PIN) codes. Each code is face programmable with additional security features built in. Wired installations require 16 gauge, low voltage, multi-stranded, dual conductor, direct burial wire (sold separately). Requires 3 AA batteries (not included).



**Gate Opening Sensor (FM138) Not Compatible with Mighty Mule® 250**

The **Gate Opening Sensor** is designed for residential and agricultural applications and is compatible with most **Mighty Mule®** automatic gate opener models (see **Sensor Box** for model compatibility). The **Sensor** is an electromagnetic sensor, which offers 'hands free' operation of the **Mighty Mule®** Gate Opener with a 12 ft. radius of detection of vehicles in motion.



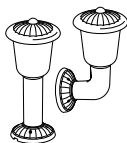
**Automatic Gate Lock Pull-to-Open (FM143) Not Compatible with Mighty Mule® 250**

A **MUST** for added security. Solenoid driven with a steel housing. Unlocks and locks automatically as gates open and close. Used with the **Mighty Mule®** system for maximum stability and security. Comes with a keyed manual release. Recommended for gates over 8 ft. long. Ideal for animal enclosures or high wind areas.



**Wireless Entry Intercom / Keypad (FM136)**

Allows owner to screen guest at the gate before allowing access to the property. Keypad also allows owner to give up to 25 programmable entry codes to family, friends or approved delivery personnel. Codes can be permanent or temporary. Can be wireless or hard wired up to 1000 feet.



**Gate Opener Light Kit with Digital Controller (FM124)**

The light kit's control board and the daylight sensor integrate the two low voltage lights with the existing gate opener, allowing the lights to come on when the driveway gate is opened and shut off after the gate closes, at night. Lights can be face mounted or mounted on top of the gate posts.

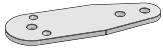
## Accessories are Available From Your Retail Store (con't)

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### Low Voltage Wire (RB509)

The 16 gauge, multi-stranded, dual conductor **Low Voltage Wire** is for connecting the AC powered transformer, or the **Solar Panel** to the control board. Also used for the connection of accessories, such as locks, keypads, push buttons and other wired control devices. This specially designed wire is UV treated, PVC coated and ready for direct burial. Available in 1000' rolls or special lengths.



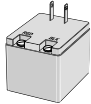
### 11" Push to Open Bracket (FM148)

Required when **Mighty Mule®** 350 gate opener(s) must push the gate open, such as on a sloping driveway or where space prevents gate(s) from opening inward (pulled open). Order two PTO brackets for conversion of a dual swing gate installation.



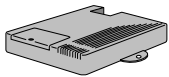
### Column Mount Lock Receiver (433IH)

For mounting the **Automatic Gate Lock** on brick columns, walls, or for other applications with limited space between gate and post.



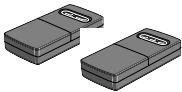
### Replacement Transformer (RB570)

Standard 18 volt AC transformer for maintaining the battery included with the **Mighty Mule®** gate opener. This is the only transformer approved for use with **all UL325 Mighty Mule®** gate opener systems.



### Garage Door Receiver (RB709)

The Garage Door Receiver allows you to use the same **Mighty Mule®** entry transmitter (see Dual and Triple Transmitters) to operate your gate opener and your garage door opener. Compatible with most garage door openers.



### Dual & Triple Button Transmitters (RB742 & RB743)

The Dual (RB742) & Triple (RB743) Button Transmitters are for remote control of multiple separate gate openers, and/or gate opener(s) and garage door opener(s) (see Garage Door Receiver). 9 Volt battery included.

**If you have a question about any special order item,  
just call 1-800-543-GATE!**

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