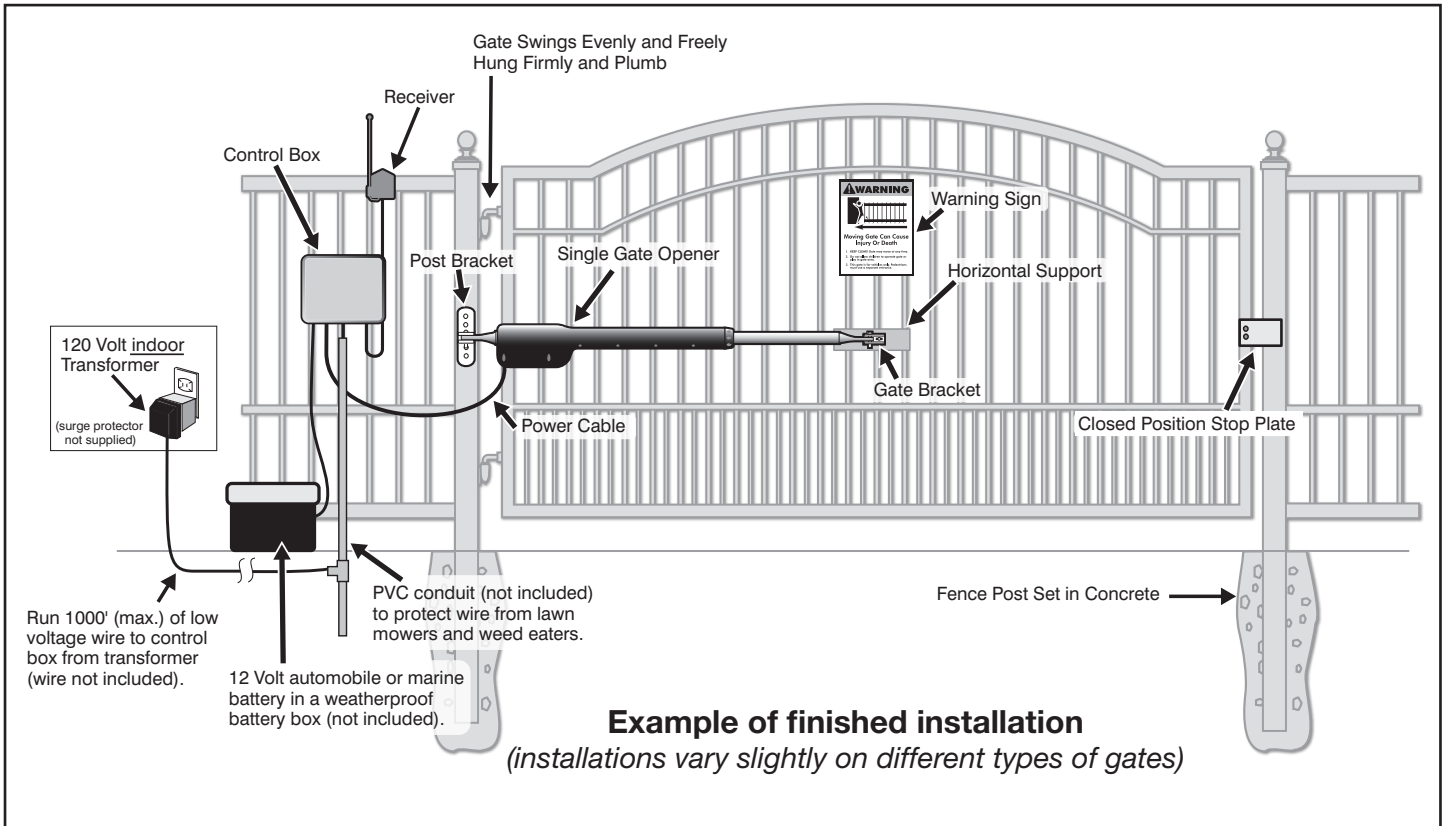




# MM660

## Installation Manual



This product meets the requirements of UL325 6th Edition, 2016, the standard for gate operator safety.

GTO Sales: 800-543-4283 • Fax 850-575-8912

GTO Technical Service 800-543-1236

For 24 hour/day, 7 day/week Technical Service visit <http://support.gtoinc.com>  
For more information on Mighty Mule's full line of Automatic Gate Operators and Access Controls visit [www.mightymule.com](http://www.mightymule.com)

Mighty Mule® is the retail brand of GTO Access Systems, LLC  
3121 Hartsfield Road • Tallahassee, FL 32303





# WARNING

This equipment meets 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 Access Systems, LLC, 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 Access Systems, LLC, 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 operator. This gate operator produces a high level of force. Stay clear of the unit while it is operating and exercise caution at all times.

**ALL AUTOMATIC GATE OPERATORS ARE INTENDED FOR USE ON VEHICULAR GATES ONLY.**

## Product Usage

The Mighty Mule Gate Operator meets all of the safety requirements of a **Class I** Residential Vehicular Gate Operator and is intended for use solely with vehicular swing gates in single-family residential applications that meet the Class I category listed in the table below.

### Vehicular Gate Operator Class Categories

**Residential Vehicular Gate Operator-Class I:**

A vehicular gate operator (or system) intended for use in garages or parking areas associated with a residence of one-to-four single families.

**Commercial/General Access Vehicular Gate Operator-Class II:**

A vehicular gate operator (or system) intended for use in a commercial location or building such as a multi-family housing unit (five or more single family units), hotel, garages, retail store, or other buildings accessible by or servicing the general public.

**Industrial/Limited Access Vehicular Gate**

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

**Restricted Access Vehicular Gate Operator-**

**Class IV:** 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.

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# Please Read This First!

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

The Mighty Mule Gate Operator is designed for installation on a pull-to-open single leaf gate (gates that open into the property). By purchasing an accessory bracket, the Mighty Mule Gate Operator can accommodate a push-to-open single leaf gate (gates that open out from the property). The gate must not exceed 18 feet in length and weigh more than 350 pounds or exceed 8 feet in length and weigh more than 850 pounds (please see Technical Specifications on page 9). The Mighty Mule Gate Operator can be used on vinyl, aluminum, chain link, farm tube, and wrought iron gates. Use on solid surface gates is not recommended. Solid surface gates have a high resistance to the wind. If the wind is strong enough, the operator will obstruct and stop.

The Mighty Mule Gate Operator accommodates extra transmitters, digital keypads, solar panels, push buttons, automatic gate locks, and other access control products. These optional accessories (see the 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 Mighty Mule Sales Department (800-543-GATE).

The Mighty Mule Gate Operator features Dual Sense Technology™. This feature makes the gate stop and reverse direction when it comes in contact with an obstruction. This is factory set to the most sensitive setting and must be adjusted during installation.

The Mighty Mule Gate Operator 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.

NOTE—If your application requires any of the following:

- Swing gates longer than 18 feet or weighing more than 850 pounds
- Slide gates
- Heavy duty or commercial uses
- Professional installation

Go to [www.gtoaccess.com](http://www.gtoaccess.com) for a dealer or retailer near you or call (800) 543-4283 for information about our Linear PRO Access professional line of gate operators and accessories. Our Sales Department will be glad to give you the name and phone number of a Linear PRO Access dealer near you.

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




# Important Safety Information

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

This manual contains various safety precautions and warnings for the installer end user. Because there are many possible applications of the gate operator, 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.**

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

**Because Mighty Mule automatic gate operators are only part of the total gate operating system, it is the responsibility of the installer and end user to ensure that the total system is safe for its intended use.**

## Manually Opening and Closing Gate

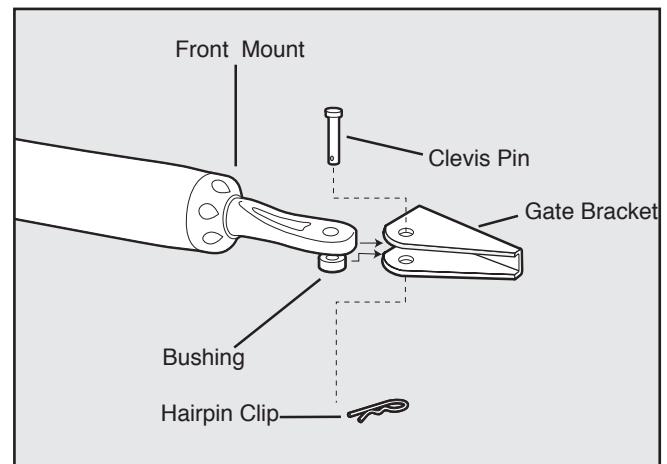
### CAUTION

The gate will move freely and uncontrolled when the gate operator is removed from the gate. **ONLY** disconnect the operator when the control box power switch is OFF and the gate is NOT moving.

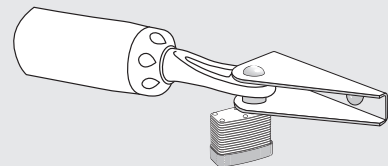
#### Disconnecting the Operator

1. Turn control box power switch OFF.
2. Remove hairpin clip, clevis pin, and bushing from either the front or rear mounting point.
3. Remove the operator from the mount.

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



**NOTE:** Substitute a **Pin Lock** for the clevis pin on the front mount of the gate operator to prevent unauthorized removal of the operator from the gate (see accessory pages in back of this book).



# Important Safety Information

## For the Installer and End User

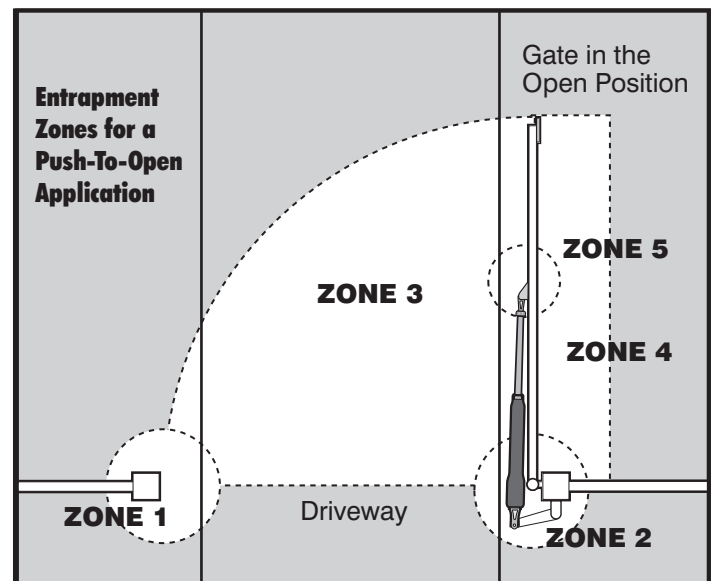
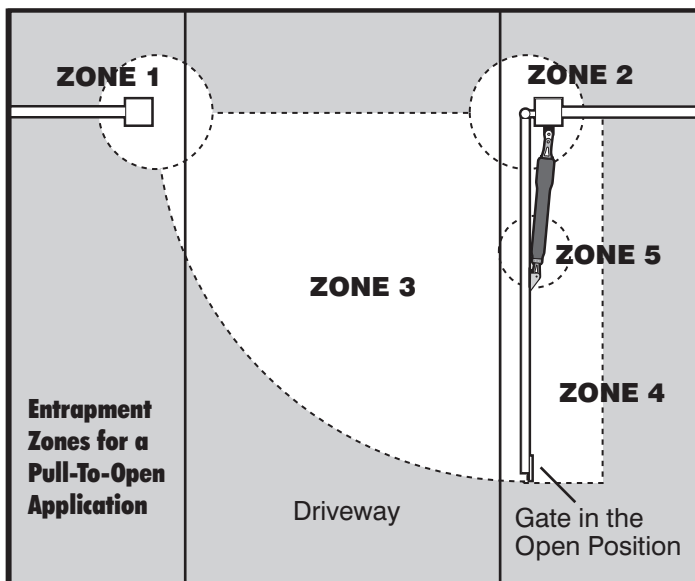
### **! WARNING**

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

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

#### **I. Before Installation**

1. Verify this operator is proper for the type and size of gate, frequency of use and class of the gate system.
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 entrapment protection devices used with the system (see page 10).
3. Review the operation of the system to become familiar with its safety features. Understand how to disconnect the operator for manual gate operation (see page 2).
4. The gate and operator installation must comply with any applicable local codes.
5. This gate operator is intended for vehicular gates only. A separate entrance or gate must be installed for pedestrian use (see page 7).
6. Always keep people and objects away from the gate and its area of travel. No one should cross the path of a moving gate.
7. Identify all of the entrapment zones for the type of installation. An entrapment zone is an area around the automatic gate system where a person or object could be caught that increase the risk of injury. Entrapment zones must be eliminated, guarded or protected.
8. When designing a system that will be entered from a highway or main thoroughfare, make sure the gate system is placed far enough from the road to prevent traffic congestion.



# Important Safety Information

## For the Installer and End User

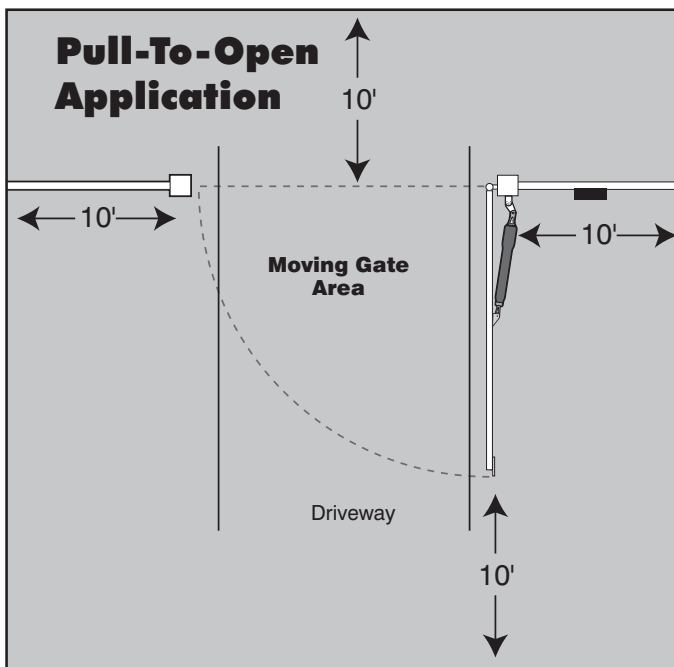
Typical Entrapment Zones are shown in the diagrams on page 3:

- Zone 1 – leading edge of the gate and the fence post.
- Zone 2 – between the gate and the gate post.
- Zone 3 – the path of the gate.
- Zone 4 – the space between the gate in the open position and any object such as a wall, fence, tree, etc.
- Zone 5 – pinch points between the operator and gate.

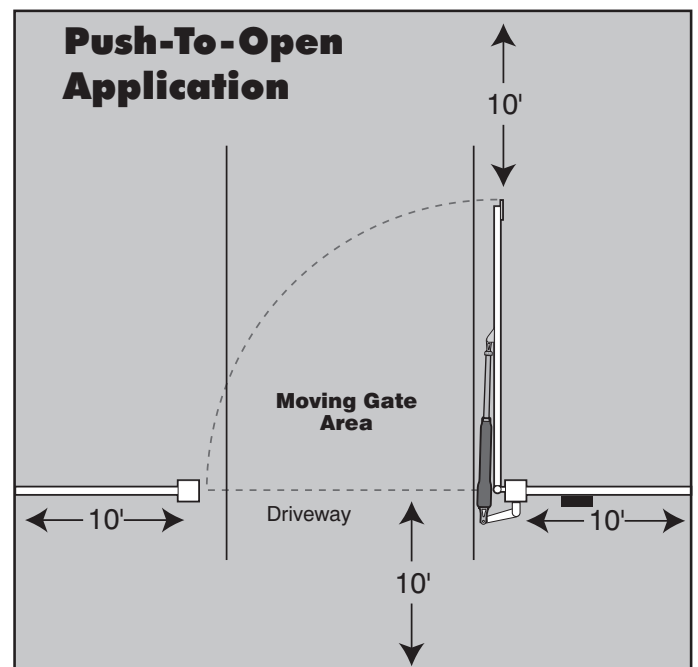
## II. During Installation

1. Install the gate operator on the inside of the property and fence line. **DO NOT** install an operator on the outside of the gate where the public has access to it.
2. Be careful with moving parts and avoid close proximity to areas where fingers or hands could be pinched.
3. Devices such as contact sensors (sensing edges) and non contact sensors (photo beams) provide additional protection against vehicle damage.
4. If push buttons or key switches are installed, they should be within sight of the gate, located at least 10 feet from any moving part of the gate (see diagram below). **Never install any control device where a user will be tempted to reach through the gate to activate the gate operator.**
5. Do not activate your gate operator unless you can see it and can determine that its area of travel is clear of people, pets, or other obstructions. Watch the gate through its entire movement.
6. Secure outdoor or easily accessed gate operator controls in order to prohibit unauthorized use of the gate.

**NEVER install any control device within gray area**



**NEVER install any control device within gray area**





# Important Safety Information

## For the Installer and End User

### 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 becomes damaged, illegible, or missing, replace them immediately. Contact GTO for free replacements.
2. The gate is automatic and could move at any time, posing serious risk of entrapment. No one should be in contact with the 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 control 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 operator OFF before performing any maintenance. See page 33 for maintenance procedures.
7. To operate this equipment safely, YOU must know how to disconnect the operator for manual gate operation (see page 2). If you have read the instructions and still do not understand how to disconnect the operator, contact the Mighty Mule Service Department.
8. Disconnect the operator **ONLY** when the power is **TURNED OFF** and the gate is **NOT** moving.
9. Make arrangements with local fire and law enforcement for emergency access.
10. Distribute and discuss copies of the **IMPORTANT SAFETY INFORMATION** section of this manual with all persons authorized to use your gate.
11. **IMPORTANT: Save these safety instructions. Make sure everyone who is using or will be around the gate and gate operator are aware of the dangers associated with automated gate systems. In the event you sell the property with the gate operator or sell the gate operator, provide a copy of these safety instructions to the new owner.**

Should you need a replacement 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, 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.



# Important Safety Information

## For the Installer and End User

Mighty Mule gate operators utilize Dual Sense Technology™ entrapment protection. Dual Sense Technology™ is built into every Mighty Mule and provides redundant methods of entrapment protection for open and close gate directions.

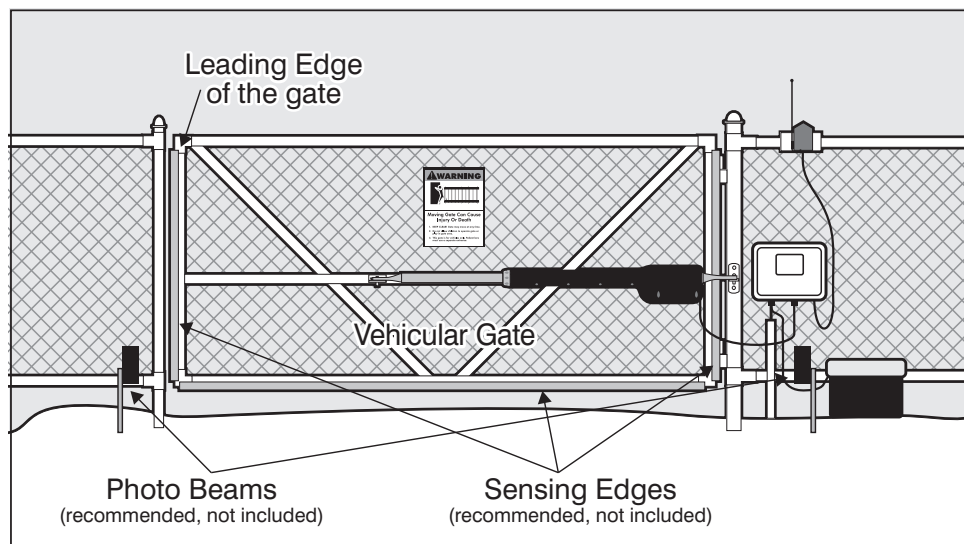
In addition to Dual Sense Technology, every Mighty Mule gate controller has provisions for the connection of additional obstruction detection devices such as sensing edges and photo beams.

These devices may be located where there is an increased risk of obstruction. Refer to the diagram below.

One or more edge sensors may be located at the leading edge, bottom edge, and post edge, both inside and outside of a vehicular swing gate system.

Wiring to sensors must be located and arranged so the wiring between the sensor and the gate operator is not subjected to mechanical damage.

A wireless sensor such as one that transmits radio frequency (RF) signals to the gate operator for obstruction protection functions shall be located where the transmission of the signals is not blocked or impeded by building structures, natural landscaping or similar objects.



## Entrapment and Obstruction Protection

Mighty Mules's Dual Sense Technology™ provides entrapment protection, even when properly adjusted. Since all installations are different, you may need to add photo beams or sensing edges to help prevent damage to vehicle or other items that could be hit by a moving gate.

## Entrapment Alarm

The Mighty Mule Automatic Gate Operator is designed to stop and reverse the gate when the gate comes in contact with an obstruction. Additionally, these operators 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 operator receives an intended signal from a hard wired 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.

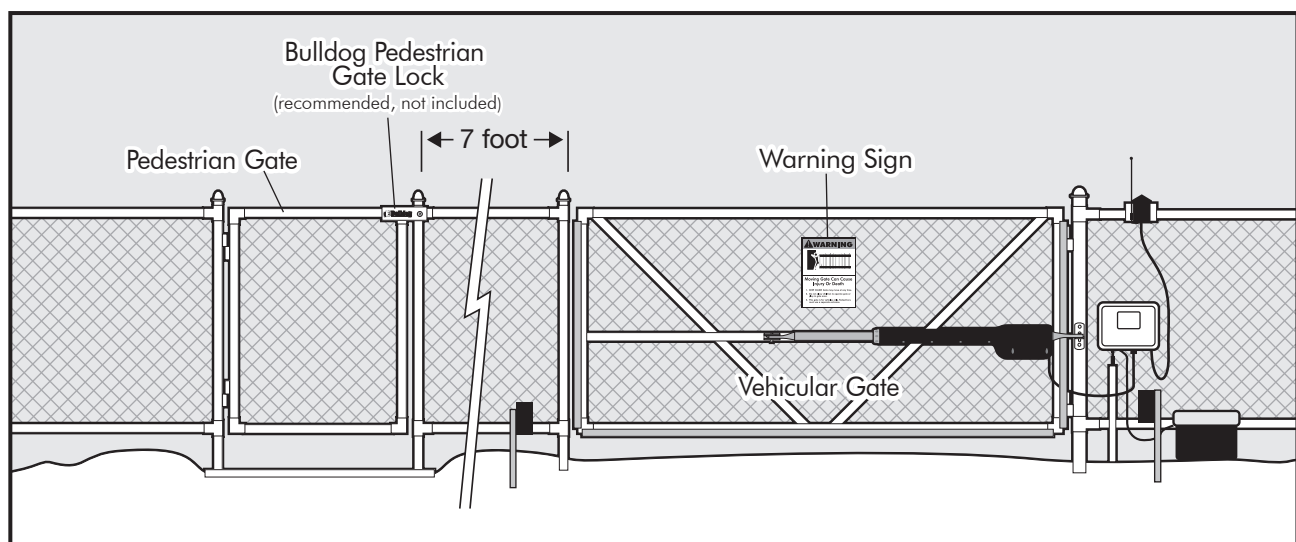
# Important Safety Information

## Installing Warning Signs and Pedestrian Gates

Warning signs alert people of automatic gate operation and are required when installing Mighty Mule Automatic Gate Operators. A minimum of two WARNING SIGNS must be installed in the area of the gate. Each sign is to be visible by persons located on the side of the gate on which the placard is installed.

The operator is intended for installation only on gates used for vehicles. Pedestrians must be supplied with a separate access. The pedestrian access 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.

We recommend using the GTO Bulldog Pedestrian Gate Lock (Call the GTO Sales Department at 800-543-4283) for controlled access.



### Warning Signs

The gate operator is provided with 2 safety warning signs. The signs **MUST** be installed on the front and back of the gate where they will be visible in the area of the gate.

Permanently secure each warning sign to the gate.

Immediately replace a damaged or missing warning sign.



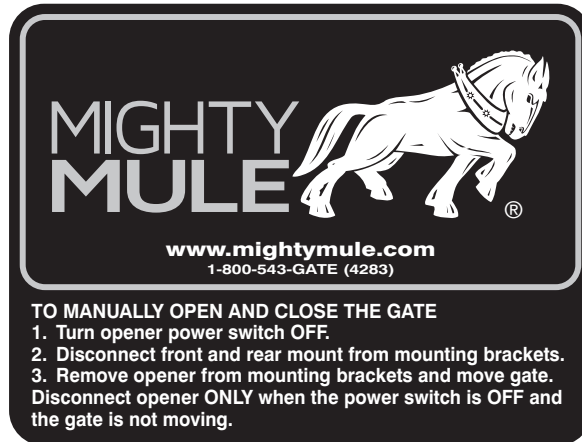
# Important Safety Information

## Required Safety Precautions for Gates

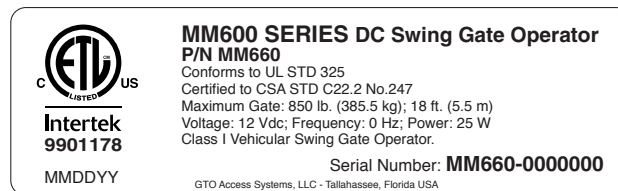
These warning labels should be found at the locations specified below. If any of them are missing, immediately contact GTO for replacements.



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



*Control Box label with Manual Open and Close instructions*



*Product identification label (1) installed on side of control box.*

# Technical Specifications

## Mighty Mule 660 Gate Opener

### DRIVE

- Low friction screw drive (linear actuator) rated for -5 °F to +160 °F (-20 °C to +71 °C). Use of heater bands on arm and control box will enhance performance in extreme cold temperatures.
- Powered by a 12 V motor with integral case hardened steel gear reducer. Motor speed reduced to 260 rpm. Generates 680 ft. lb. of torque at 12 V.
- Maximum opening arc of 110°. Approximate opening time (90°): 20 seconds, depending on weight of gate.

### POWER

- The system is powered by a 12 Vdc, 7.0 Ah, sealed, rechargeable acid battery.
- Battery charge is maintained by a 120 Vac, 18 Vac output transformer. One lade-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.**
- OPTIONAL: Battery charge is maintained by GTO Solar Panel Charger Kit (5 Watt minimum).

### CONTROL

- The Mighty Mule 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).
- 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.
- Operator length with push-pull tube fully retracted is 40-1/4” mounting point to mounting point. Max stroke 20”.
- Adjustable auto-close timer (3 to 120 s), and Dual Sense Technology Stall Force.
- Power terminal block accommodates a transformer or solar panels. **NOTE: Do not use solar panel and transformer at the same time.**
- DIP switches simplify setup of gate operator.
- Accessory terminal block fully compatible with push button controls, digital keypads, loops, etc.
- Control board allows connection of 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 could achieve prior to the battery depleting to a state where the unit will not function. This chart reflects a Mighty Mule Automatic Gate Opener when charging with a transformer. Actual cycles may vary slightly depending upon the type and condition of gate and installation.

*NOTE: “NR” indicates this size and weight combination is not recommended for the Mighty Mule 660.*

*NOTE: Ball bearing hinges should be used on all gates weighing over 250 lb.*

		<b>Mighty Mule 660 Gate Capacity /Cycle Chart</b>						
		Estimated number of daily cycles, based on use with a transformer and one(1) 12 Volt battery.						
		<b>Number of Cycles* Per Day</b>						
	<b>850 lbs.</b>	<b>135</b>	<b>125</b>	<b>NR</b>	<b>NR</b>	<b>NR</b>	<b>NR</b>	<b>NR</b>
	<b>750 lbs.</b>	<b>145</b>	<b>135</b>	<b>125</b>	<b>NR</b>	<b>NR</b>	<b>NR</b>	<b>NR</b>
	<b>650 lbs.</b>	<b>155</b>	<b>145</b>	<b>135</b>	<b>125</b>	<b>NR</b>	<b>NR</b>	<b>NR</b>
	<b>550 lbs.</b>	<b>165</b>	<b>155</b>	<b>145</b>	<b>135</b>	<b>125</b>	<b>NR</b>	<b>NR</b>
	<b>450 lbs.</b>	<b>175</b>	<b>165</b>	<b>155</b>	<b>145</b>	<b>135</b>	<b>125</b>	<b>NR</b>
	<b>350 lbs.</b>	<b>185</b>	<b>175</b>	<b>165</b>	<b>155</b>	<b>145</b>	<b>135</b>	<b>125</b>
	<b>250 lbs.</b>	<b>195</b>	<b>185</b>	<b>175</b>	<b>165</b>	<b>155</b>	<b>145</b>	<b>135</b>
	<b>150 lbs.</b>	<b>205</b>	<b>195</b>	<b>185</b>	<b>175</b>	<b>165</b>	<b>155</b>	<b>145</b>
	<b>100 lbs.</b>	<b>215</b>	<b>205</b>	<b>195</b>	<b>185</b>	<b>175</b>	<b>165</b>	<b>155</b>
	<b>50 lbs.</b>	<b>225</b>	<b>215</b>	<b>205</b>	<b>195</b>	<b>185</b>	<b>175</b>	<b>165</b>
		<b>5' - 6'</b>	<b>8'</b>	<b>10'</b>	<b>12'</b>	<b>14'</b>	<b>16'</b>	<b>18'</b>

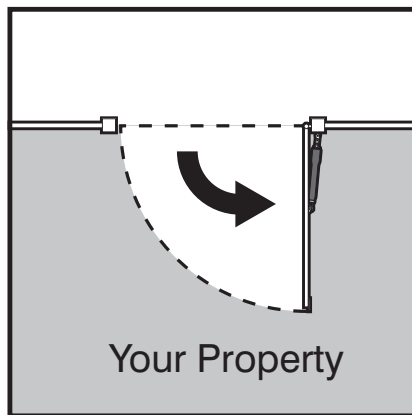
To determine the number of cycles the gate operator will perform using solar panels (see page 23).

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

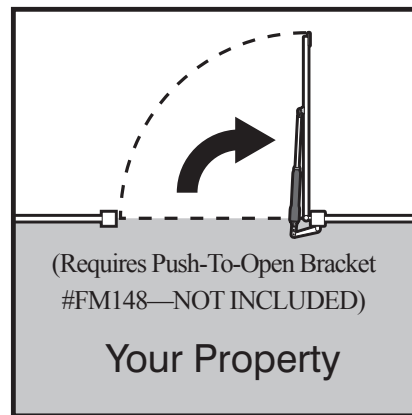
These specifications are subject to change without notice.

# Before You Begin

## Check Direction of Gate Swing



**Pull-to-Open Option**  
Instructions begin on  
page 13



**Push-to-Open Option**  
Instructions begin on  
page 16

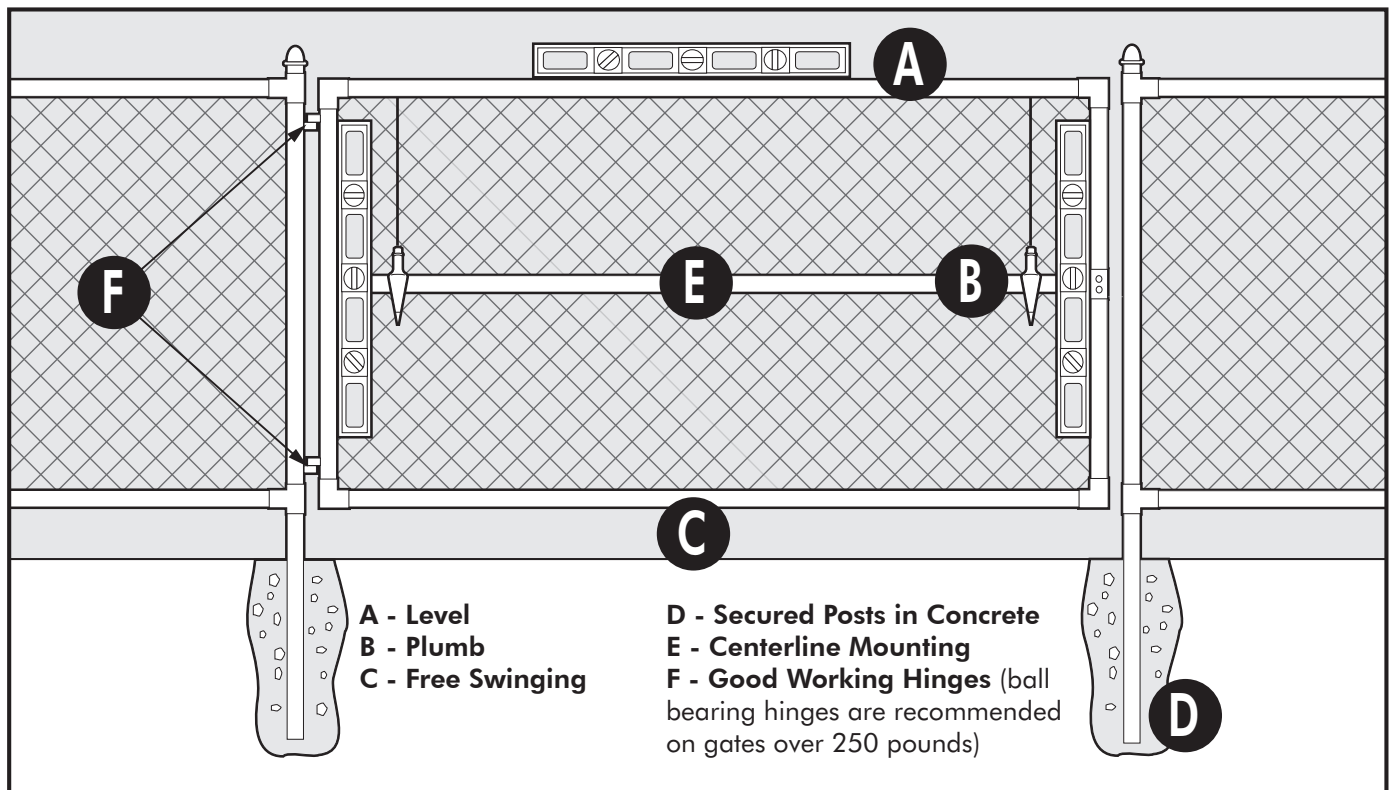
## Check Existing Gate Size and Material

• **Gate size:** Up to 18 feet or up to 850 lbs—See chart on page 9.

• **Type of gate material:** Vinyl, aluminum, chain link, farm tube, wrought iron, wood (not recommended for solid surface gates).

## IMPORTANT: Check for Proper Gate Installation

*For the Mighty Mule to work properly, gate must be plumb, level, set in concrete, swing freely and not touching the ground and have good working hinges.*

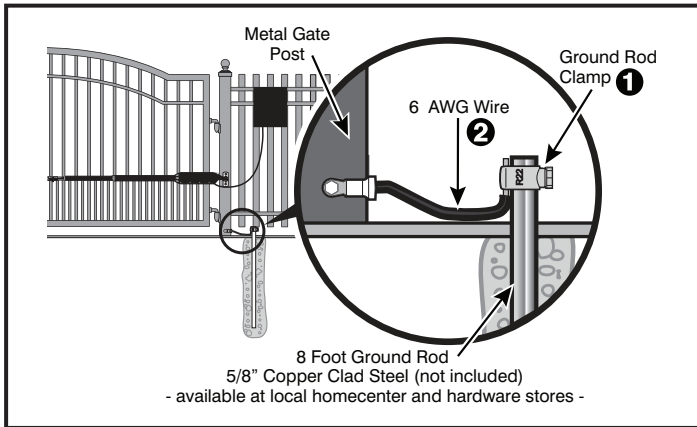


**A - Level**  
**B - Plumb**  
**C - Free Swinging**

**D - Secured Posts in Concrete**  
**E - Centerline Mounting**  
**F - Good Working Hinges** (ball bearing hinges are recommended on gates over 250 pounds)

# Before You Begin

## Gate Grounding (recommended)



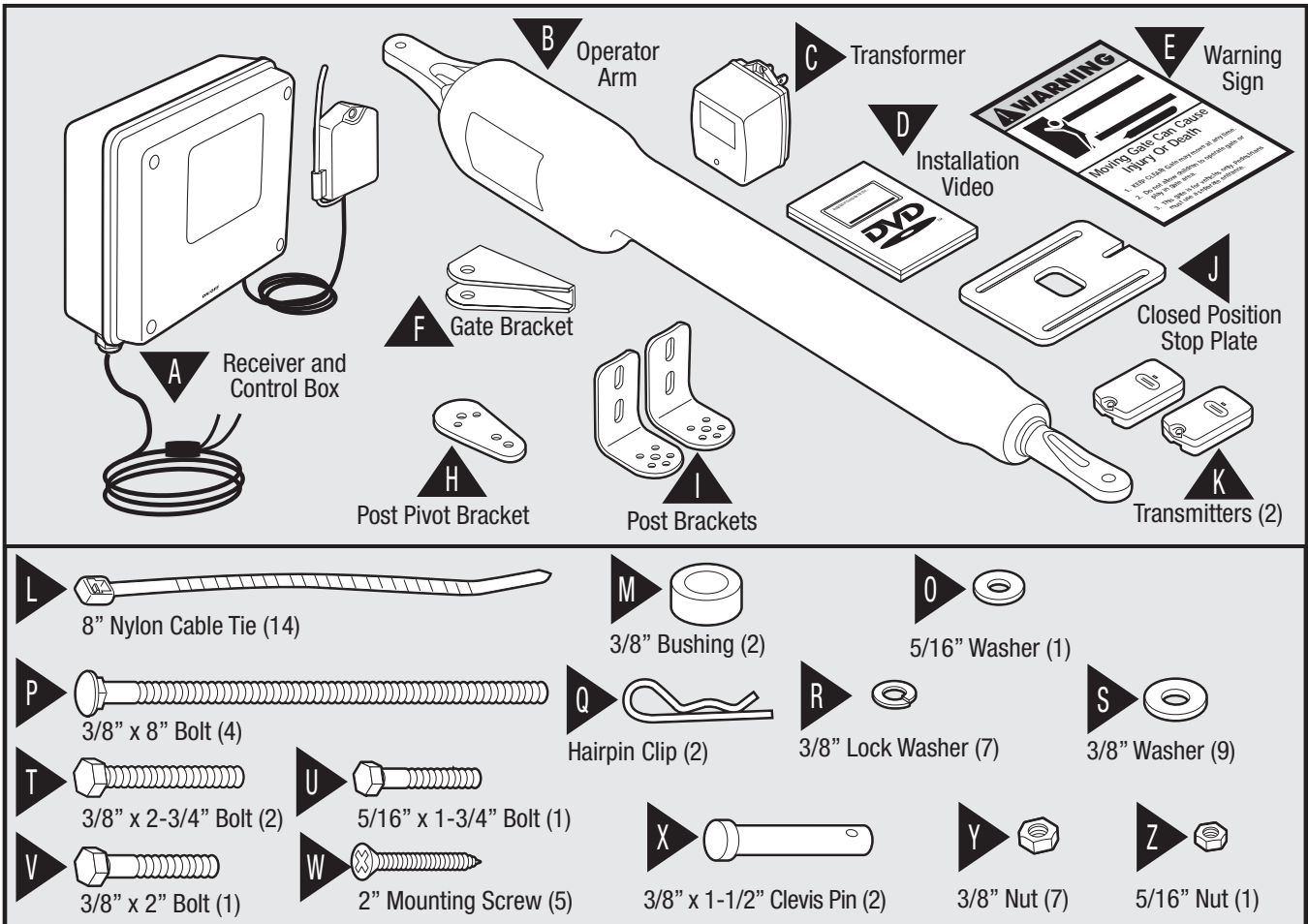
- Shorter wire (6 AWG) is better, 1 to 2 feet recommended.
- Bolt ring terminal at end of cable 4 - 6 inches above ground level.

R4196 Kit Includes:

- Ground Rod Clamp
- 6 AWG Wire (3 feet)

NOTE: No grounding system absolutely protects against lightning strikes. If installed correctly, a grounding system will help minimize damage to your gate opener.

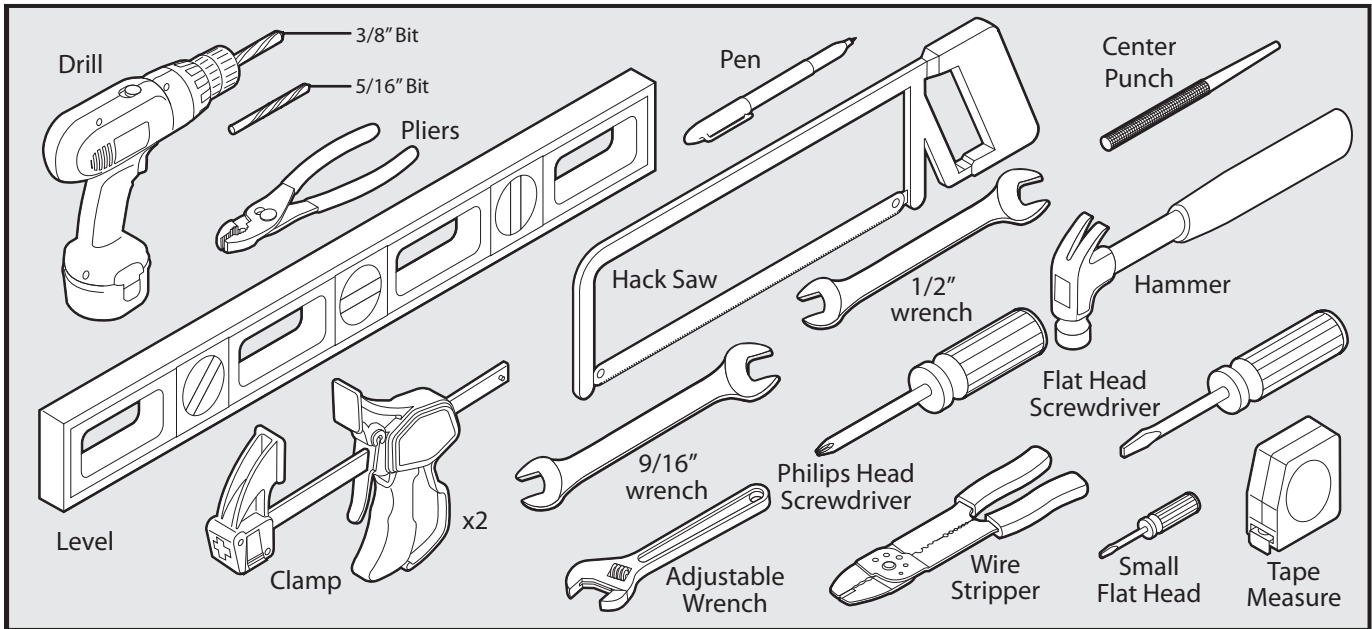
## Items Included





# Before You Begin

## Tools Needed



## Items Not Included

- 12 Volt lawn tractor or automotive battery and a weather proof case.
- Low voltage wire will be needed to run from the transformer to the control box; length depends upon the distance between the transformer power supply and the control box. See Transformer Wiring Installation on page 20, and the accessory catalog.
- PVC conduit.
- If your gate is more than 1000' away from an ac power source you will need to use at least one Mighty Mule® 5 watt solar panel to trickle charge the battery. See the accessory catalog (Do not use both transformer and solar).
- If you have thin walled tube or panel gates, see Recommended Reinforcement Examples after Step 3 of "Mounting Pull-to-Open Opener to Gate" section (page 13).
- 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 Gate Bracket Mounting Examples after Step 3 of "Mounting Pull-to-Open Opener to Gate" section.
- Surge protection for transformer.
- Some types of installations require u-bolts.
- If the gate is a push-to-open you will need to purchase a PUSH-TO-OPEN bracket, refer to page 16 in Installation Manual for more information.
- Additional washers or a metal plate may be needed for wooden post.
- Weatherproof cover for outdoor outlet and transformer.
- Strain relief bushing for wiring accessory devices to control box.
- If post the gate is hinged on is more than 6", bolts longer than 8" are needed.

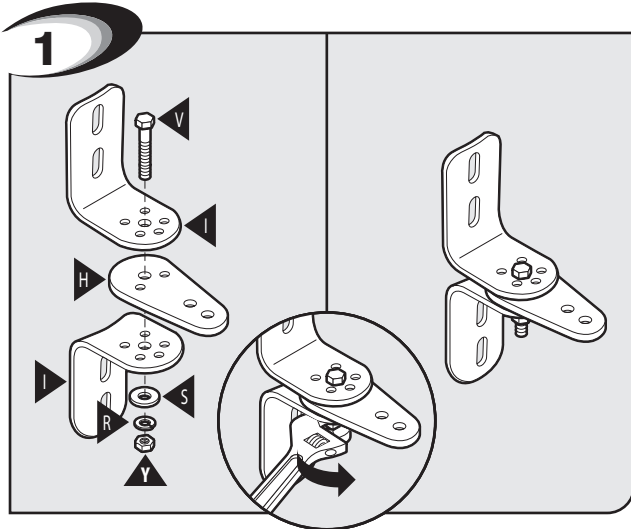




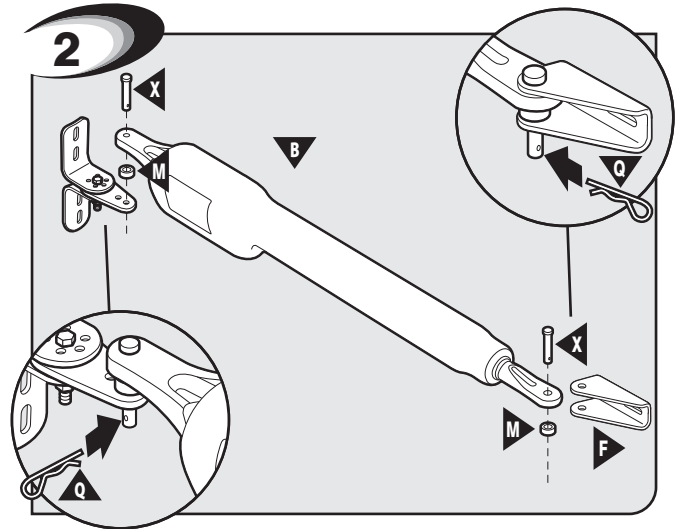
# Gate Opener Installation

## Mounting Pull-to-Open Opener to Gate

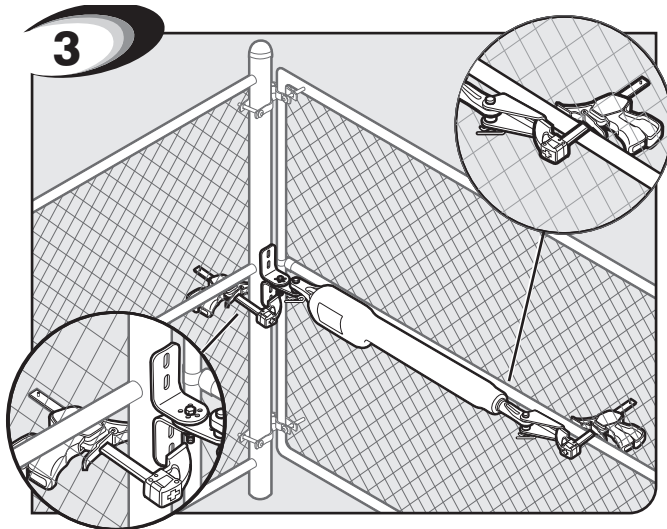
If you are installing a push-to-open gate opener - skip to page 16.



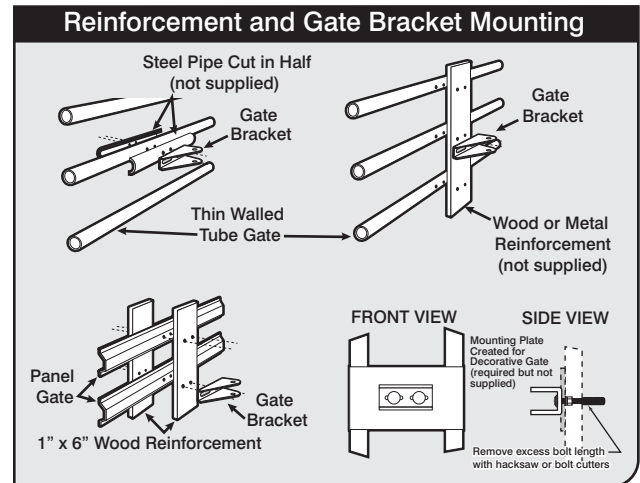
Assemble post bracket parts.



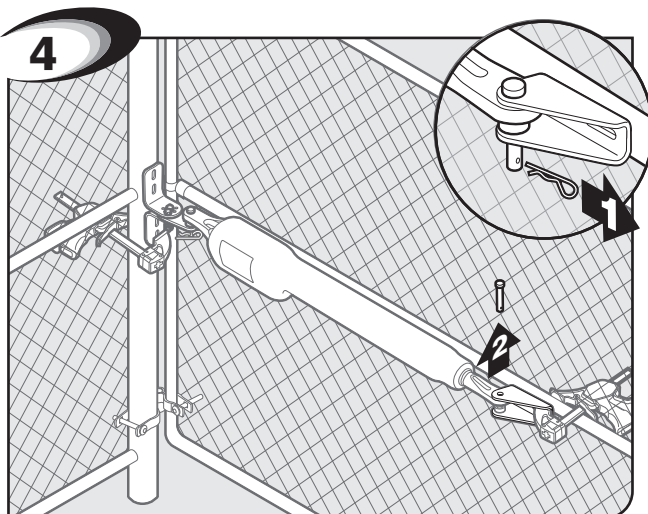
Attach opener to gate bracket and secure with required hardware.



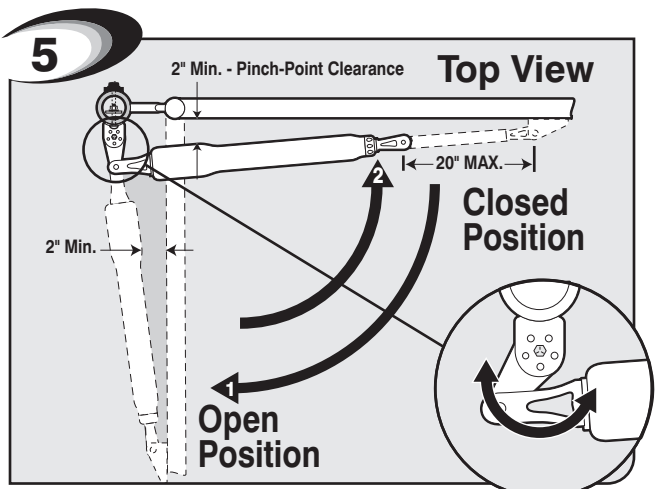
With Gate in **OPEN** position, using clamps, secure opener to gate post and center cross member of gate.



Recommended reinforcement and gate bracket mounting examples.



Remove clevis pin from the gate bracket and support loose opener.

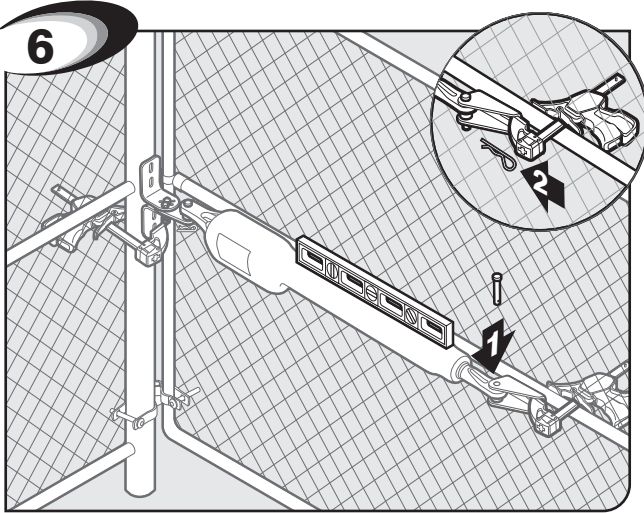


Swing gate and opener arm to the **CLOSED** position-check clearance/binding by inspecting alignment. Arm stroke should be maximum of 20°. *TIP: Turning the pivot bracket over gives more hole alignment options for the post pivot bracket assembly.*

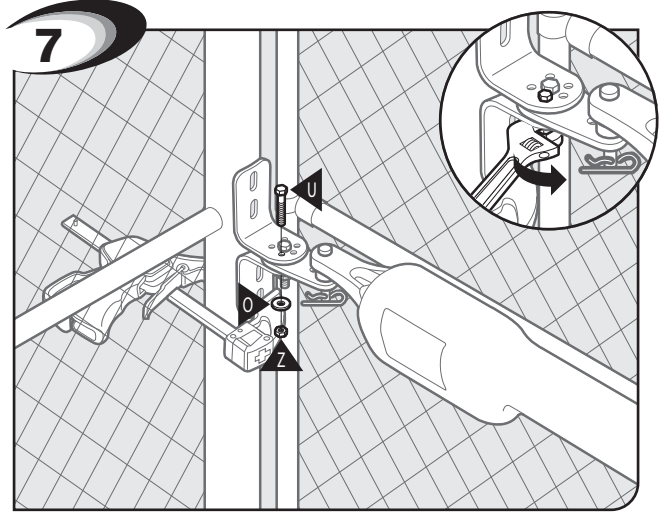


# Gate Opener Installation

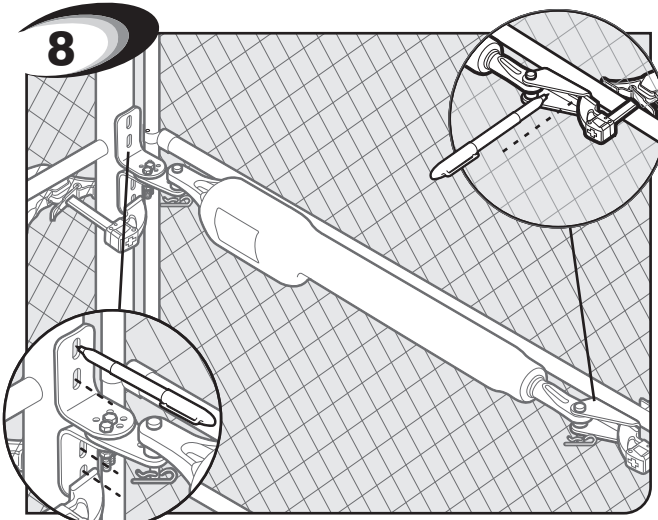
## Mounting Pull-to-Open Opener to Gate



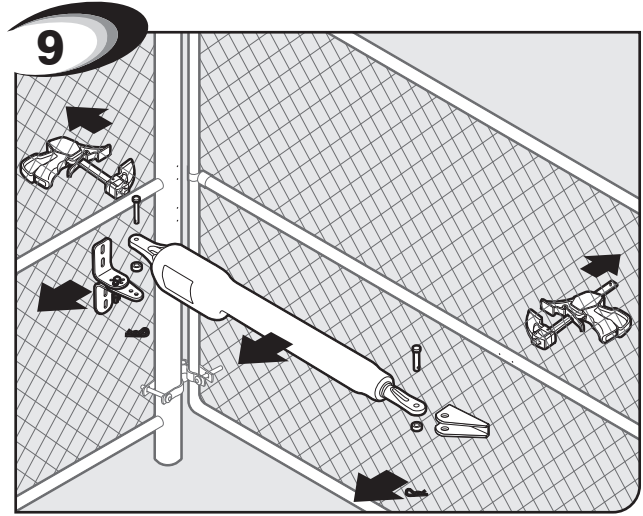
6 OPEN gate and reattach opener with clevis pin. Check for level. Clamp securely.



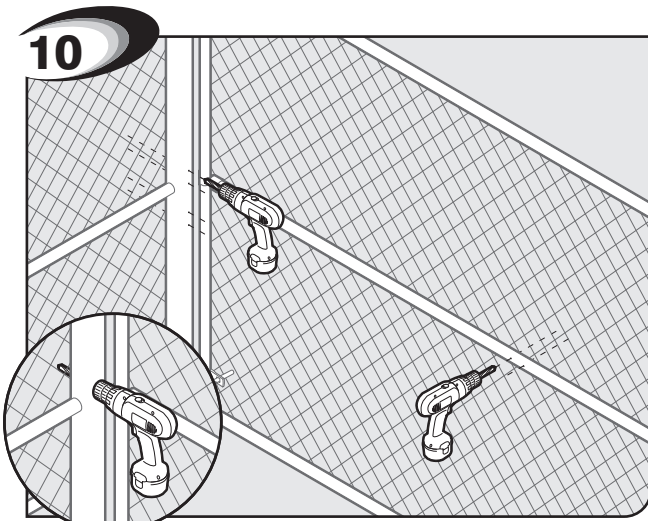
7 Secure post pivot bracket to post bracket when clearances are OK (Step 5) in both open and closed positions.



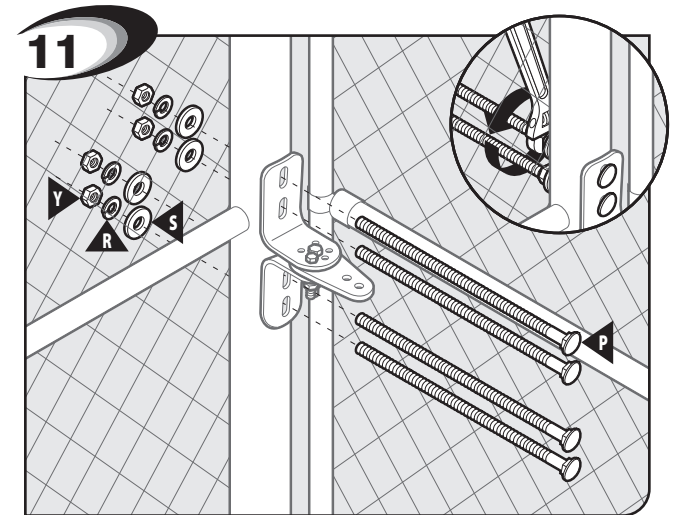
8 Mark middle of post bracket slots on fence post. Mark middle of gate bracket slots on gate cross support.



9 Remove clamps, post bracket, gate bracket, and opener. Then use a hammer and center punch to dimple hole positions for drilling.



10 Drill 3/8" holes completely through gate post and gate cross support.



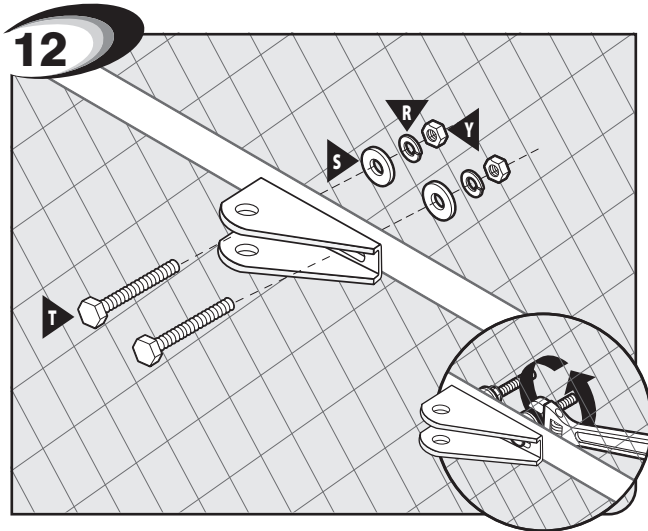
11 Attach post bracket assembly to fence post. *NOTE: Must be through bolted.*



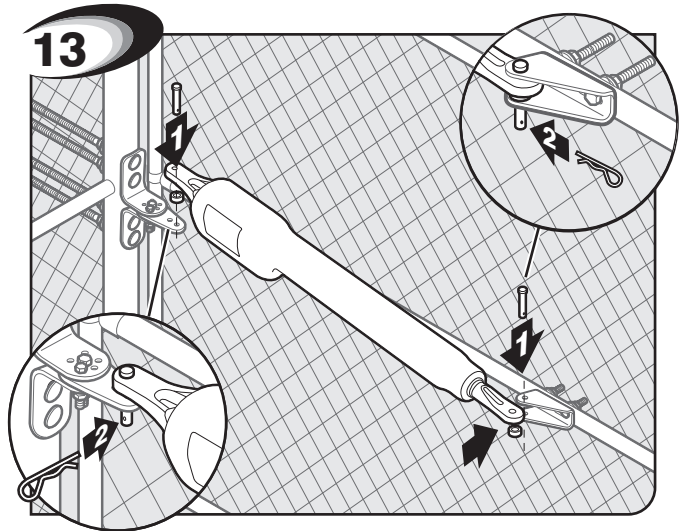


# Gate Opener Installation

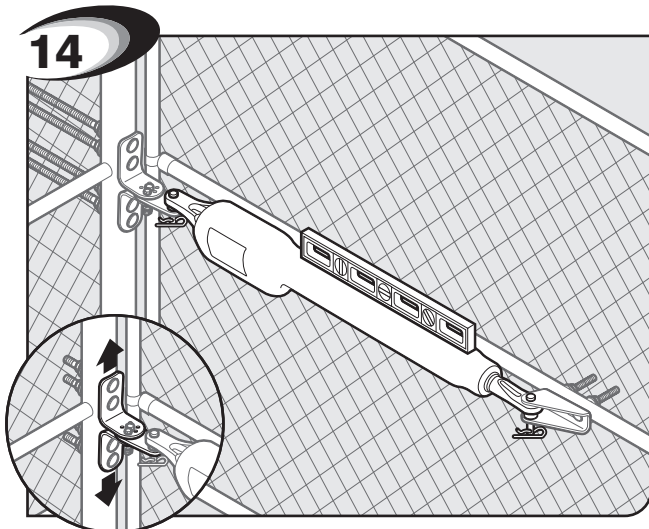
## Mounting Pull-to-Open Opener to Gate



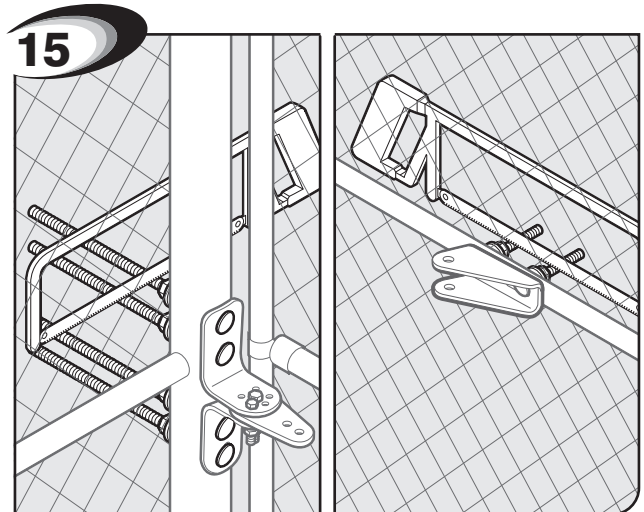
Attach gate bracket assembly to gate cross support.



Attach and secure opener assembly to brackets.

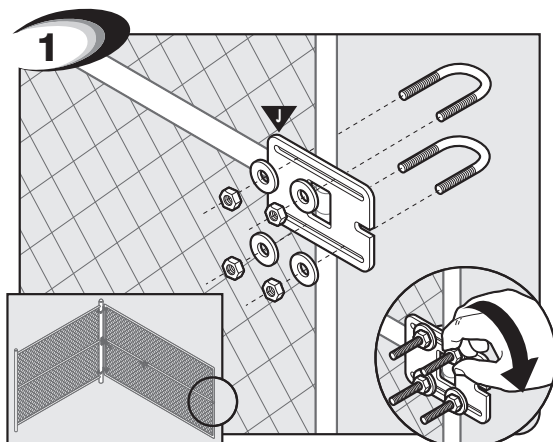


Check for level. Adjust post bracket if necessary. After the opener is level, remove the opener from the gate.

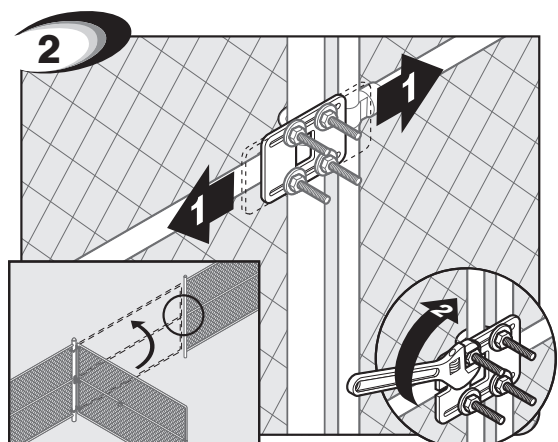


Tighten all bolts and remove excess length on post and gate bracket bolts with hacksaw.

## Closed Position Stop Plate Installation



Fully open gate. Attach gate stop with one of the following:  
• U-bolts—tube and chain link gates (Not included)  
• Wood/lag screws—flat aluminum/wood supports (Not included).



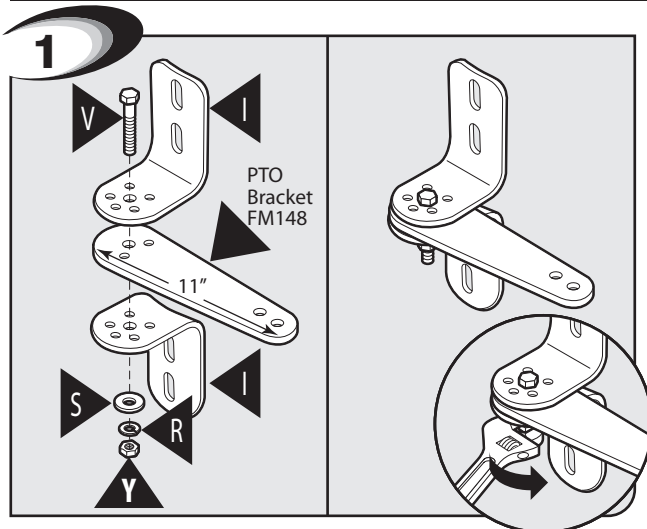
Position gate stop with gate CLOSED to fence post. Tighten fasteners. Cut off excess bolt length.  
Return the gate to the full open position and reinstall the Mighty Mule. To complete a pull-to-open installation, proceed to page 19.



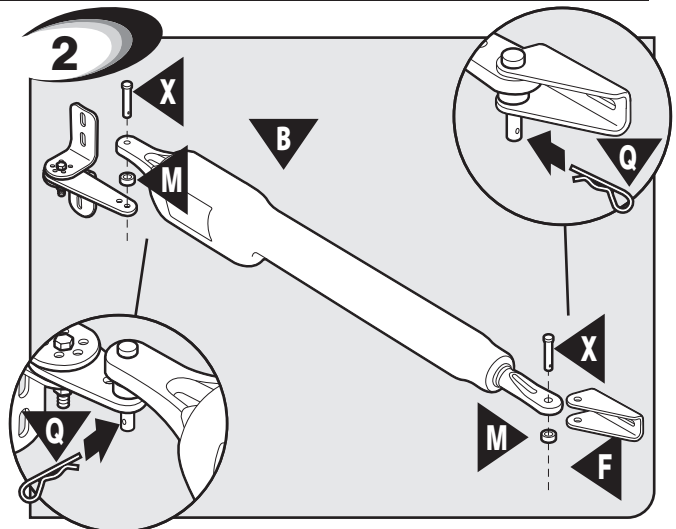
# Gate Opener Installation

## Mounting Push-to-Open Opener to Gate

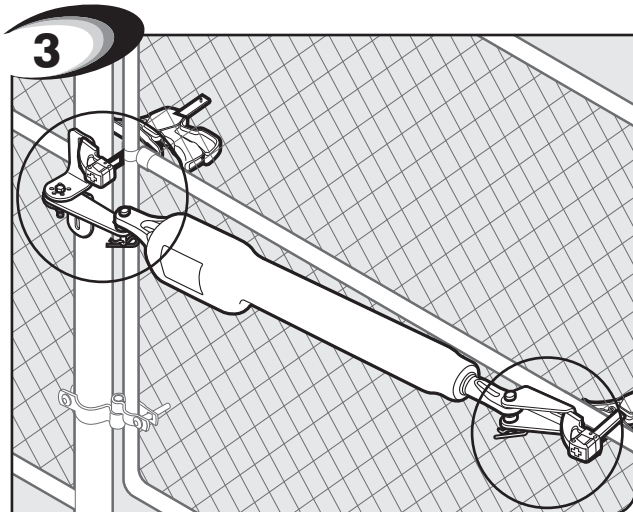
If you are installed a pull-to-open gate opener - skip to page 19.



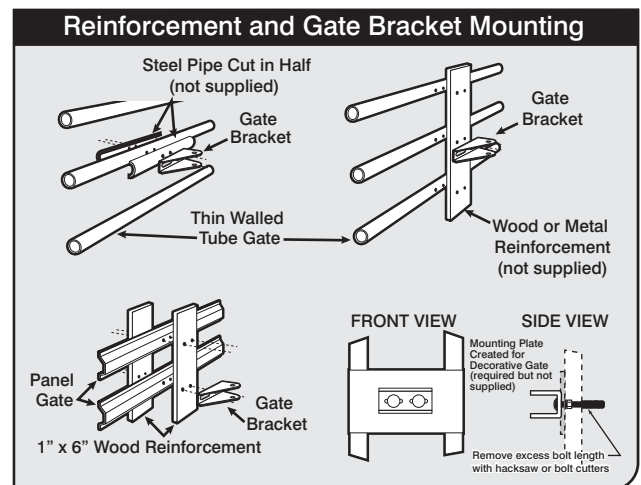
Assemble post bracket parts. **NOTE:** A Push-to-Open Bracket FM148 is required for this type of installation (not included).



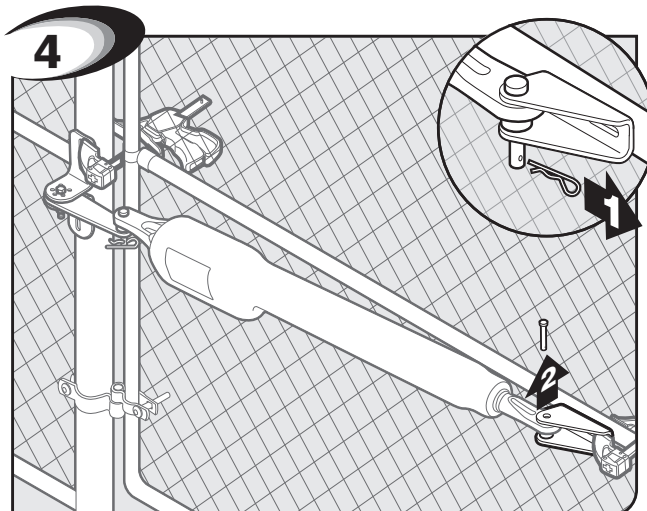
Attach opener to gate bracket and secure with hardware required.



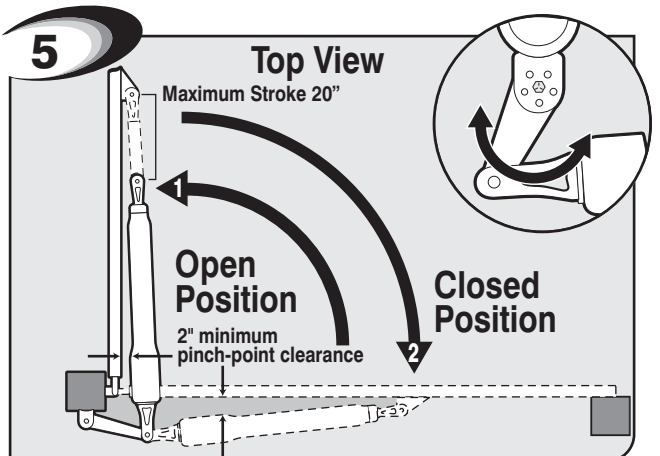
With gate in CLOSED position, using clamps, secure opener to gate post and center cross member of gate.



Recommended reinforcement and gate bracket mounting examples.



Remove clevis pin from the gate bracket and support loose opener.

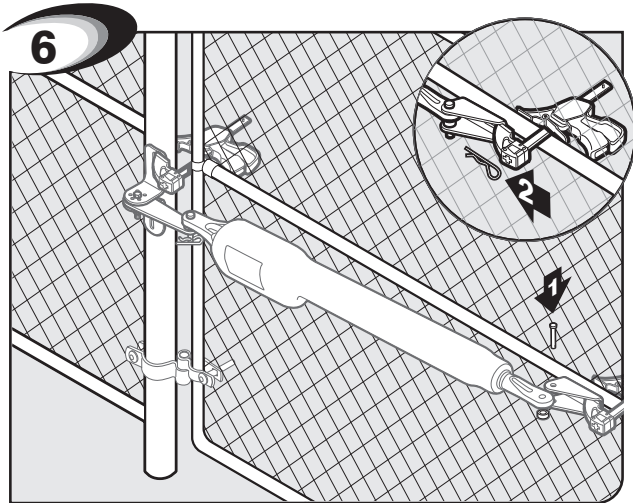


Swing gate to OPENED position. Check clearance/binding by inspecting the alignment. The Maximum stroke is 20 inches. Secure post pivot bracket to post bracket as shown in Step 7 on the next page, when clearance is OK in both open and closed positions. **TIP:** Turning the pivot bracket over gives more hole alignment options for the post pivot bracket assembly.

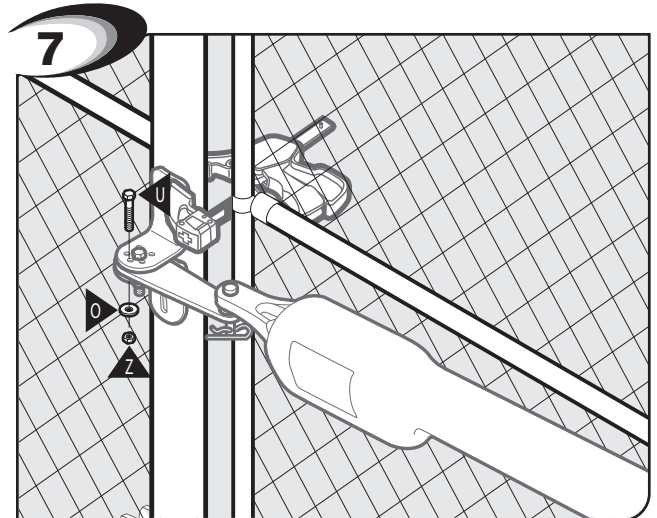


# Push-to-Open Installation

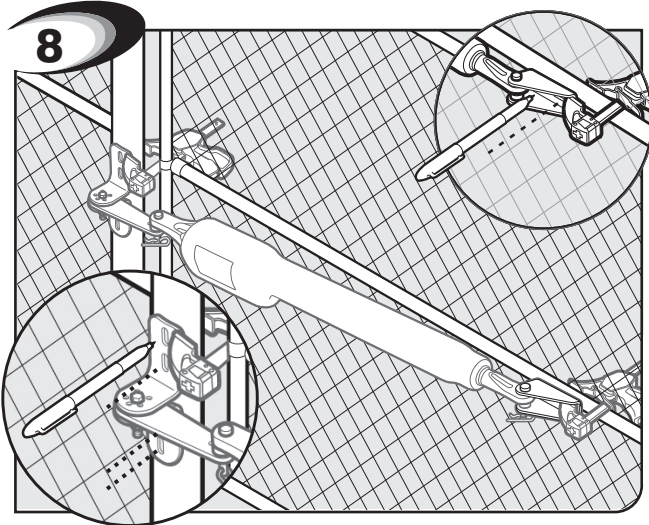
## Mounting Push-to-Open Opener to Gate



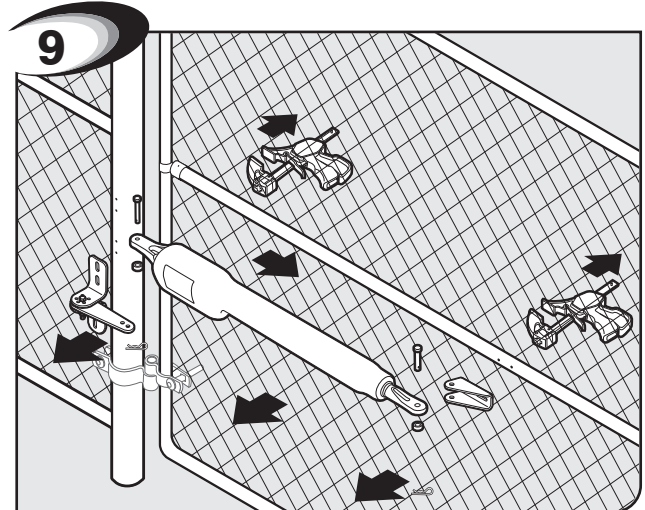
CLOSE gate and re-attach opener with clevis pin. Check for level. Clamp securely.



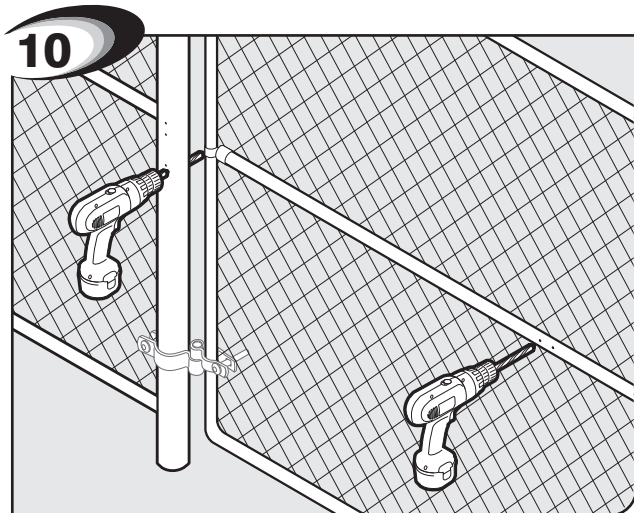
Secure post pivot bracket to post bracket when clearance is OK (Step 5) in both open and closed positions.



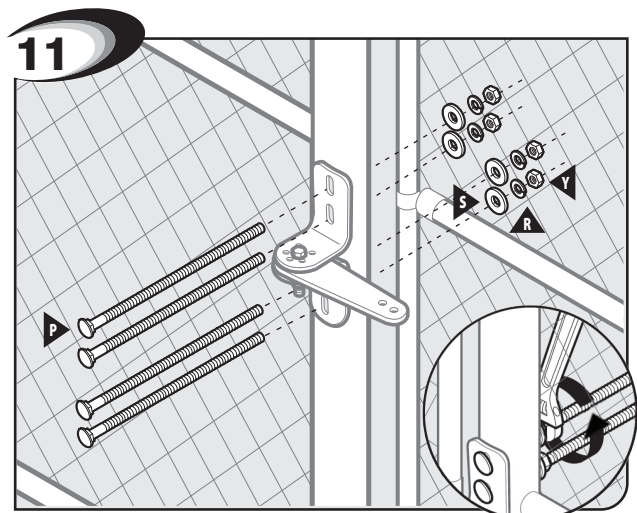
Mark middle of post bracket slots on fence post. Mark middle of gate bracket slots on gate cross support.



Remove clamps, post, gate brackets, and opener. Then use a hammer and center punch to dimple hole positions for drilling.



Drill holes completely through gate post and gate cross support.



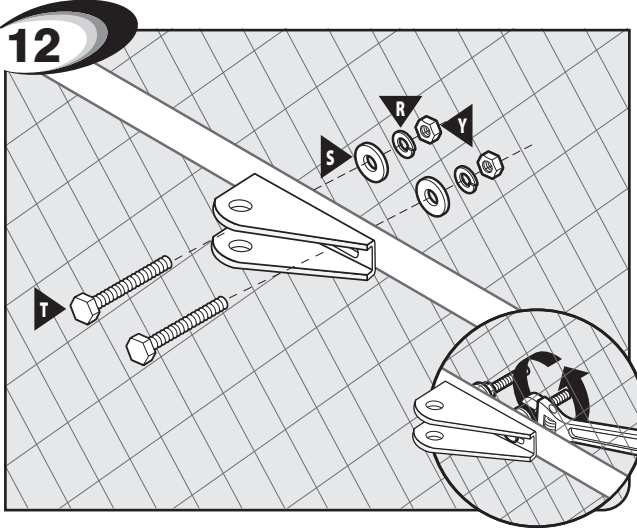
Attach post bracket assembly to fence post. **NOTE:** Must be through bolted.



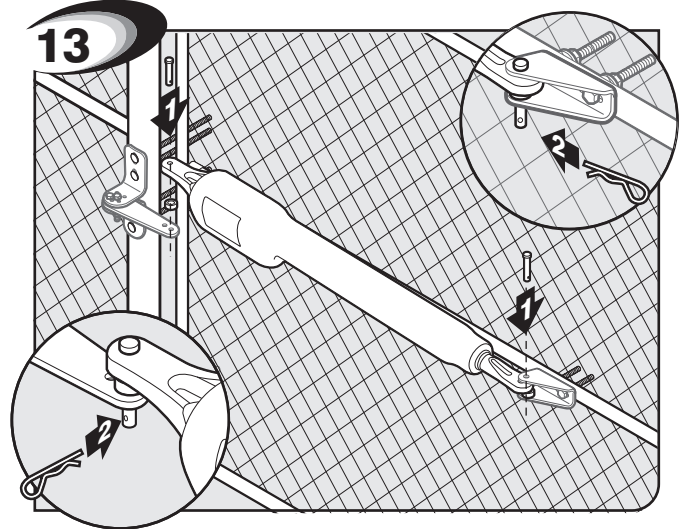


# Push-to-Open Installation

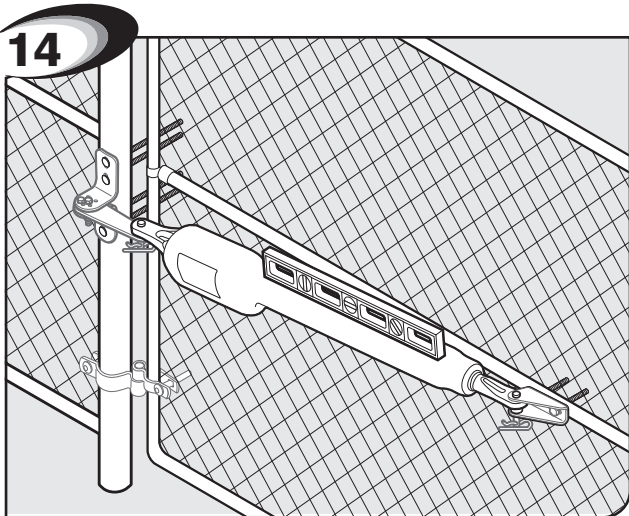
## Mounting Push-to-Open Opener to Gate



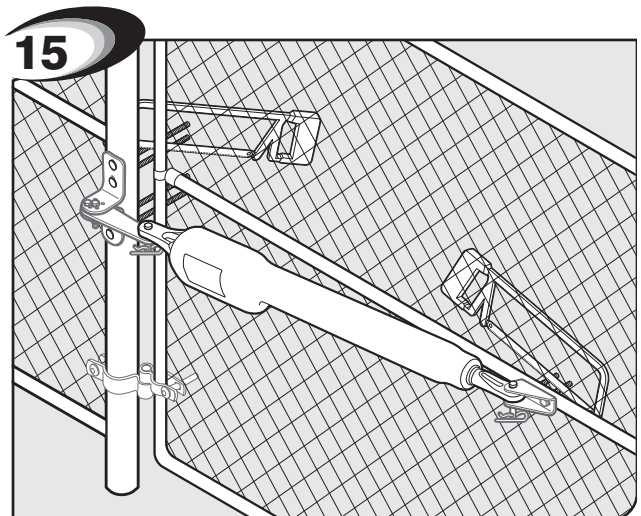
Attach gate bracket assembly to gate cross support.



Attach and secure opener assembly to brackets.

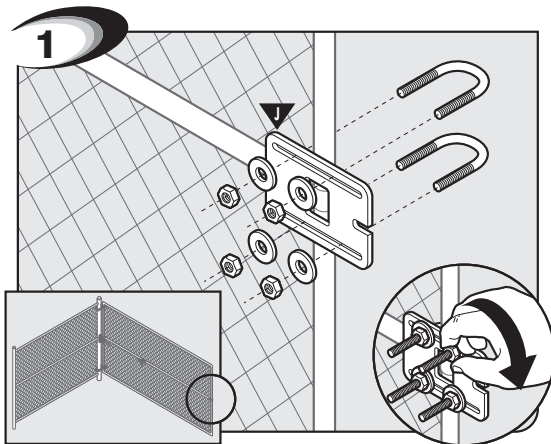


Check for level. Adjust post bracket if necessary.



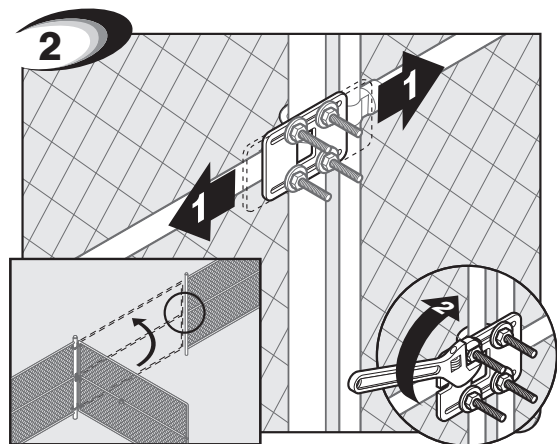
Remove bolt excess length on post and gate bracket with hacksaw. After the bolts are trimmed, remove the opener from the gate.

## Closed Position Stop Plate Installation



Fully open gate. Attach gate stop on the outside of the gate with one of the following:

- U-bolts—tube and chain link gates (Not included)
- Wood/lag screws—flat aluminum/wood supports (Not included). Do not tighten.

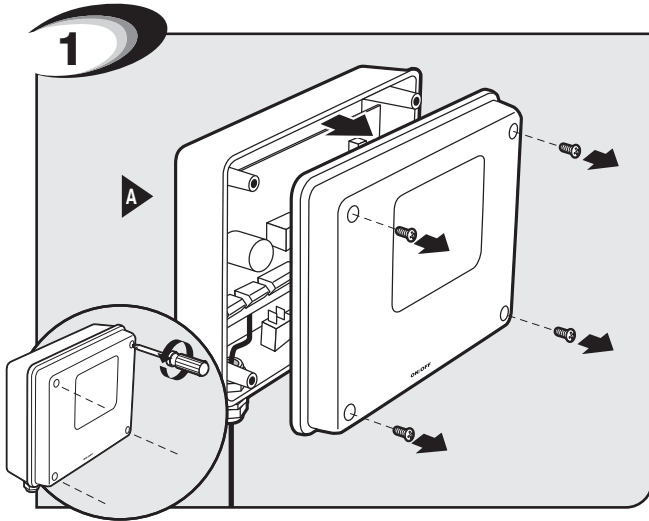


Position gate stop with gate CLOSED to fence post. Tighten fasteners. Cut off excess bolt length.

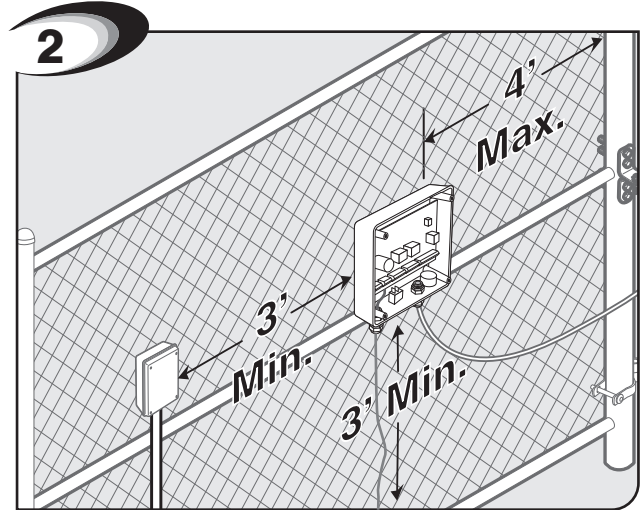
Return the gate to the full closed position and reinstall the Mighty Mule.

# Control Box Installation

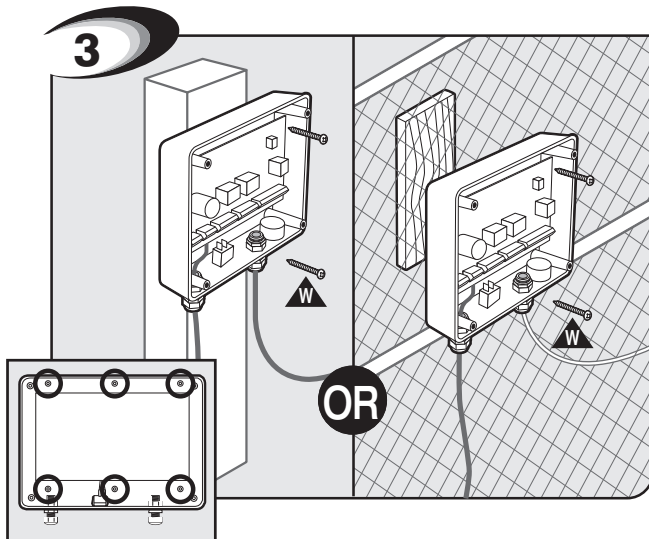
## Control Box Installation



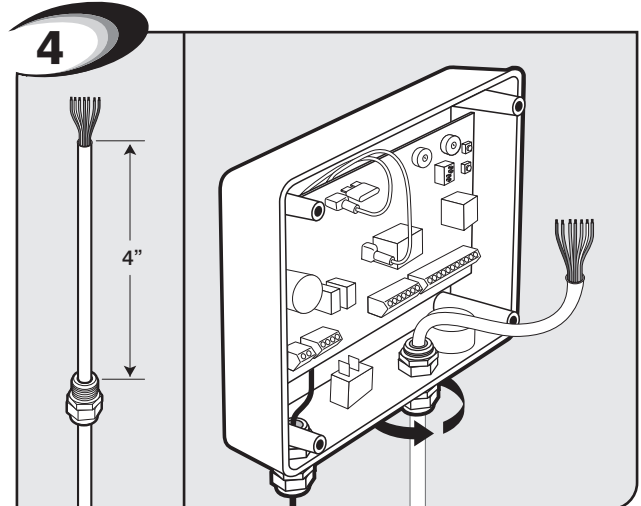
Remove control box cover.



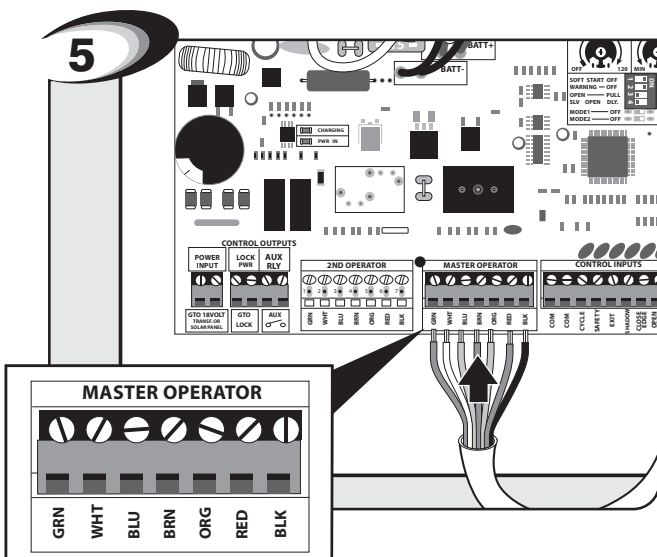
Locate control box mounting area. **IMPORTANT:** Be sure to mount box at least 3 feet from AC power and 3 feet off the ground.



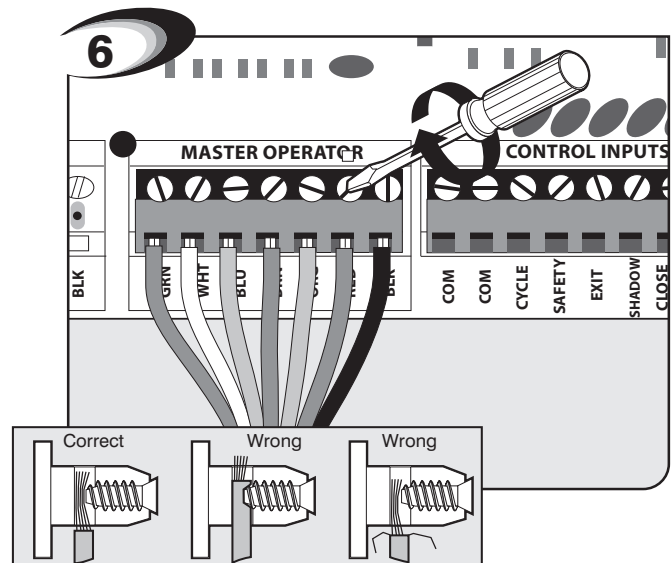
Mount control box to post or fence using screws.



Feed 4" of opener cable into box through the empty strain relief. Tighten strain relief nut to secure cable.



Insert 7 wires into corresponding color terminals.

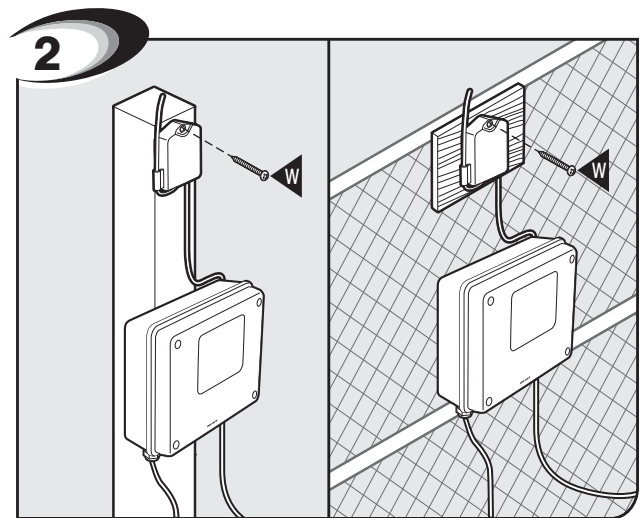
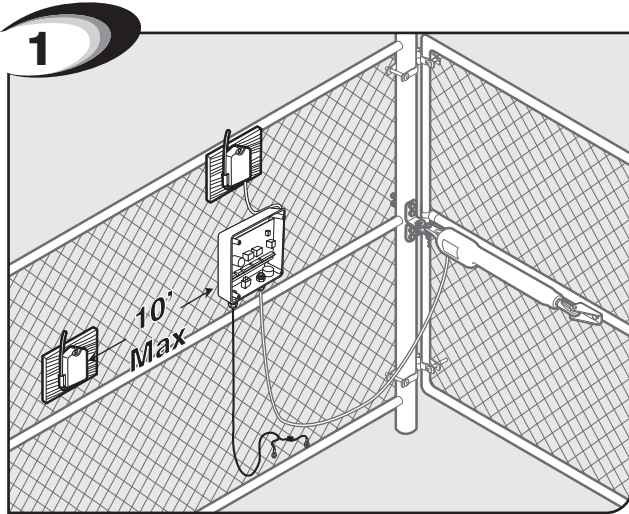


Secure wires in terminals.



# Control Box Installation

## Receiver Installation



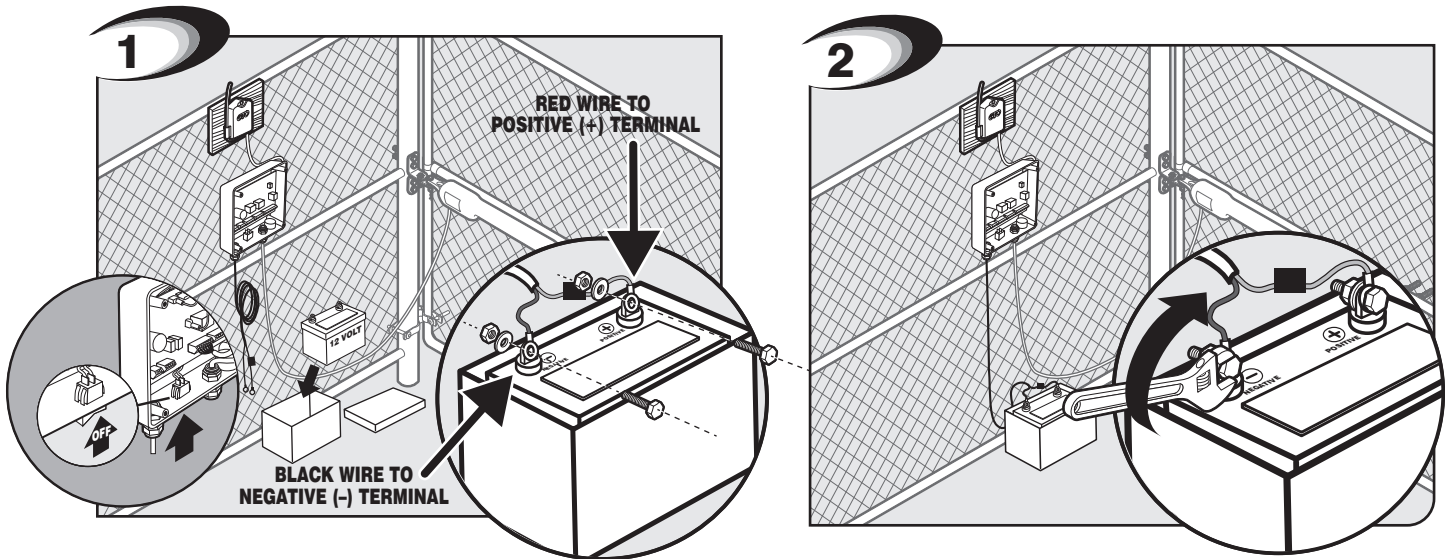
**NOTE:** Once you have completed the installation, you may need to relocate the receiver to get better reception distance.

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 Mighty Mule 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 run cable through conduit containing AC wire.
- DO NOT place receiver within 3 feet of AC power.
- DO NOT coil excess cable or store it in the control box.
- **Do not mount upside down.**
- The receiver range can vary from 50 to 100 feet depending upon weather, topography, and external interference.

# Control Box Installation

## Connecting the Battery



Turn control box power switch OFF. Place the 12 Volt Lawn Tractor or Automotive battery and weatherproof battery box (not supplied) within 6 feet of the control box. Attach the battery harness wires from the control box to the battery terminals using bolts, washers and nuts. Be sure to attach the RED wire to the POSITIVE terminal and the BLACK wire to the NEGATIVE terminal.

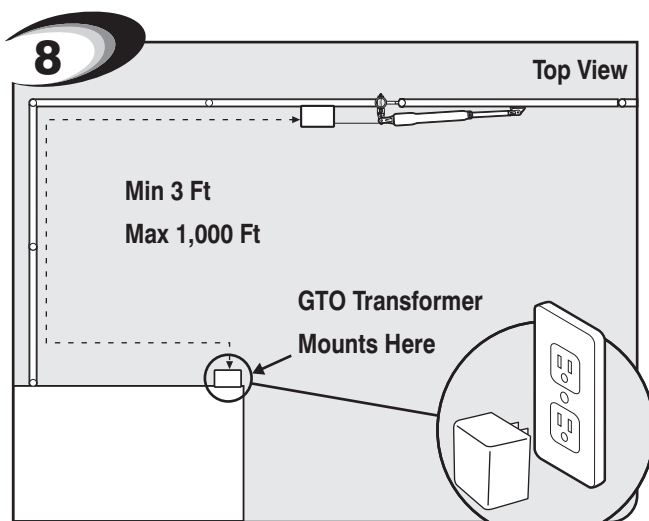
Tighten the bolts, washers, and nuts and place the cover on the weatherproof box. **IMPORTANT:** Do not connect the transformer or solar panel directly to the battery. This will cause the system to fail.

**IF USING OPTIONAL SOLAR PANEL CHARGER INSTEAD OF TRANSFORMER, GO TO PAGE 23.**  
**IMPORTANT: Do NOT connect BOTH SOLAR PANEL AND TRANSFORMER.**

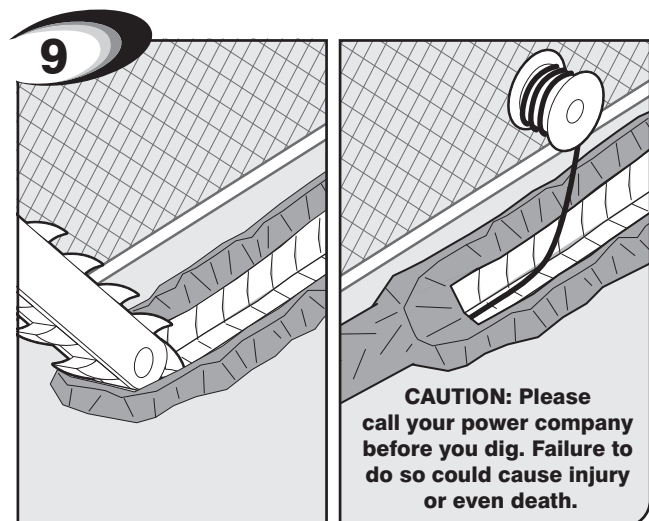
## Transformer Wiring Installation

### WARNING

Before digging contact local authorities to locate underground utilities such as electric and gas service.



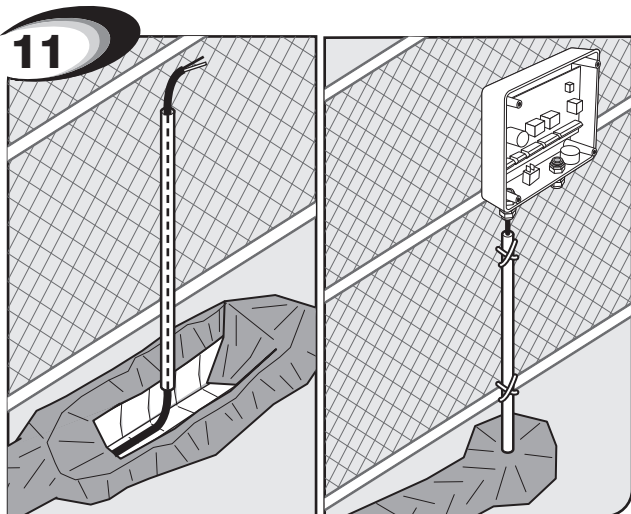
Locate power outlet and identify wire path to control box.  
*NOTE: If OUTLET is OUTSIDE use weatherproof cover:*



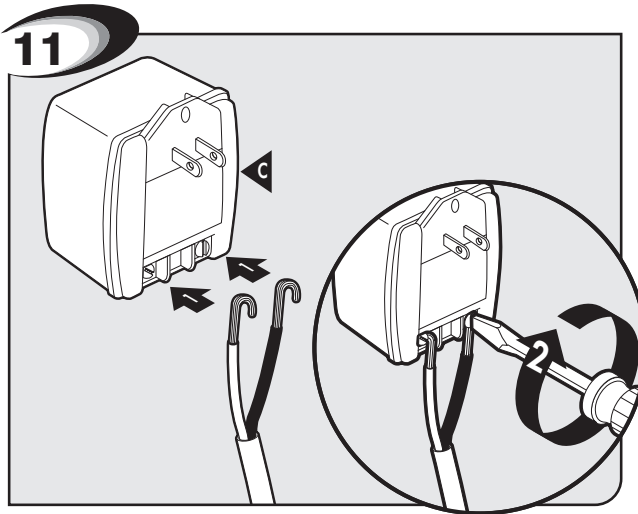
Dig trench and lay wire from AC power source to control box. Use only 16 gauge multi-stranded, low voltage, direct burial wire (RB509). *NOTE: DO NOT use telephone wire or solid core wire. NEVER splice wires together. We recommend running wire in PVC conduit.*

# Control Box Installation

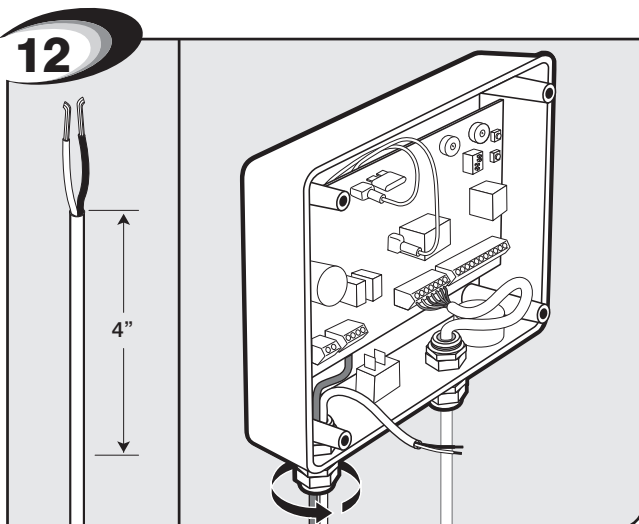
## Transformer Wiring Installation



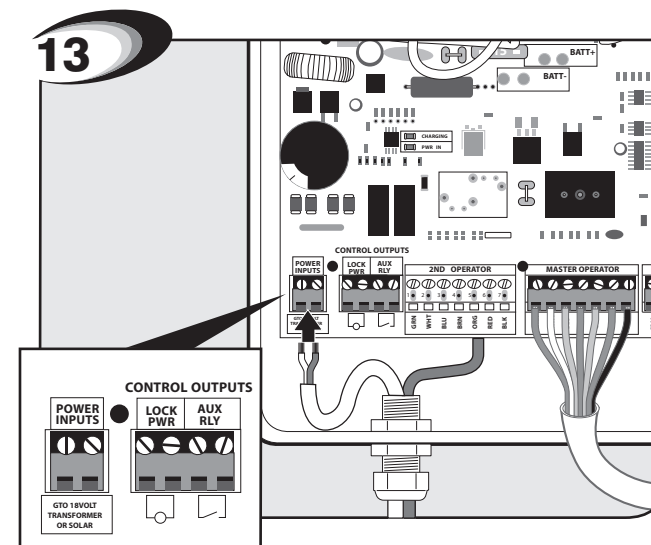
Use PVC conduit from ground up to control box.



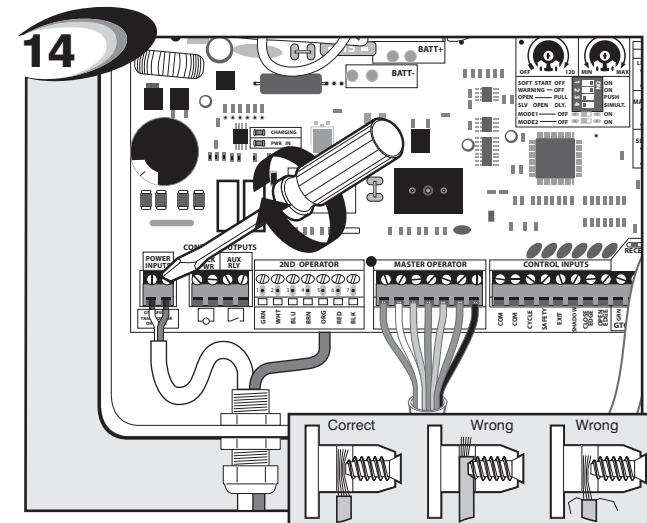
Cut excess cable/strip 1/2" off 2 wires/twist ends. Attach wires to transformer screw terminals. NOTE: The Mighty Mule power input is not polarized. The wires can be connected to either terminal.



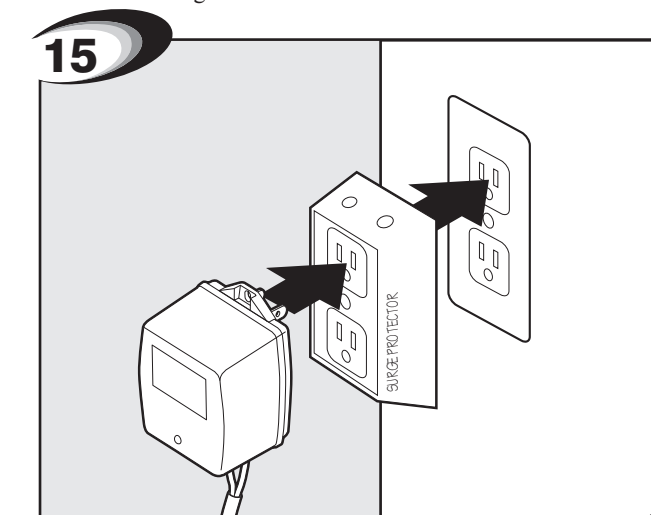
Feed 4" of low voltage wire through strain relief with the battery harness wire into box and tighten strain relief to secure wires.



Insert one wire into each 18VAC terminal. The Mighty Mule power input is not polarized. The wires can be inserted into either terminal regardless of color.



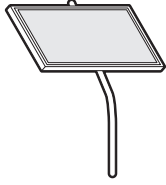
Secure with terminal screws.



Plug in transformer to power outlet. (Use of a surge protector is highly recommended. **If outdoors use weatherproof box.**)

# Solar Panel Installation

## (Optional)

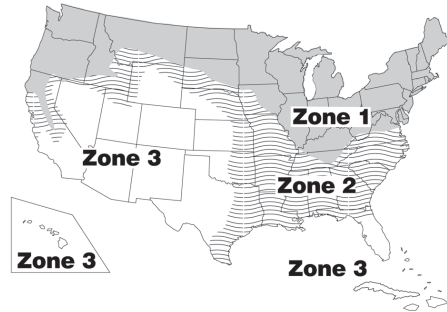


The table and map illustrate the maximum number of gate cycles to expect per day in a particular area when using from 5 to 30 watts of solar charging power, prior to the battery depleting to a state where the unit will not function (see accessory pages in back of this book). The figures shown are for 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.

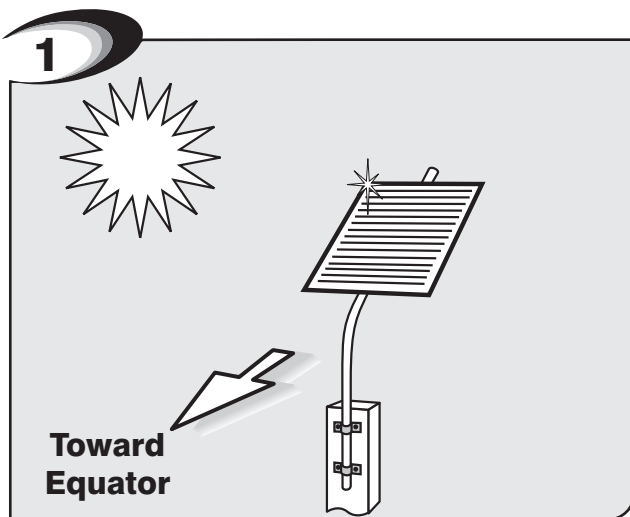
**NOTE:** A minimum of 5 watts of solar charging power is required for Mighty Mule single gate systems, with a maximum of 30 watts. A second battery 12V 7Ah, tractor, auto or deep cycle marine battery is recommended for solar and/or high traffic applications, if needed. See Solar Panel Installation Instructions for further information.

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

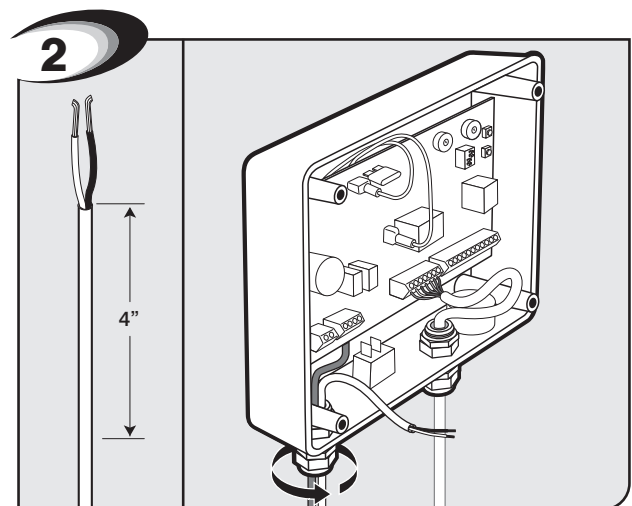


**IMPORTANT: Mount the panel using the curved pipe provided to maintain the proper angle to the sun.**

**IMPORTANT: Requires 8 hours of direct sunlight a day.**

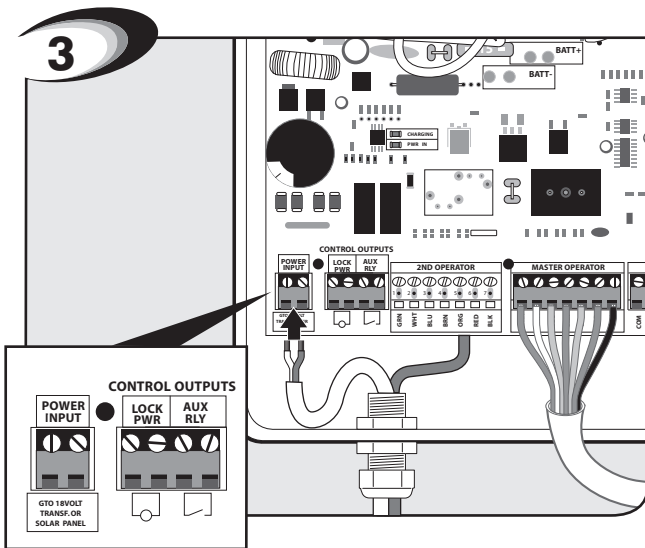


The solar panel must be positioned facing the path of the sun and in an open area away from shade. It should receive at least 8 hours of direct sunlight for a full charge.

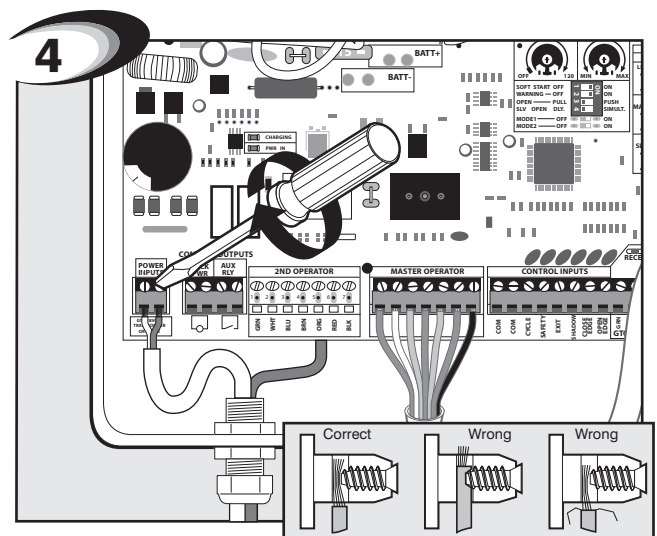


Feed 4" of low voltage wire through strain relief with the battery harness wire into box and tighten strain relief to secure wires.

# Solar Panel Installation



Insert one wire into each 18VAC terminal. The Mighty Mule power input is not polarized. The wires can be inserted into either terminal regardless of color.

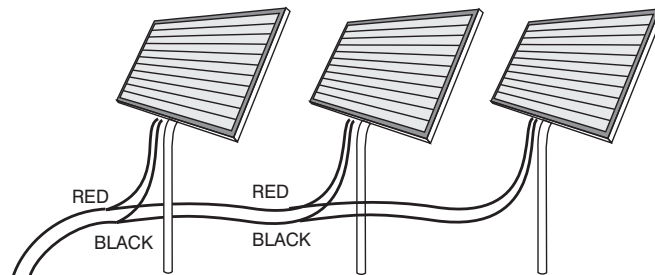


Secure with terminal screws.

## Multiple Panel Installations

**NOTE:** If using multiple panels, wire in parallel as shown in diagram to right. All connections should be weatherproofed using weatherproof splice kits available at hardware and electrical supply stores.

### Solar Panels connect in PARALLEL



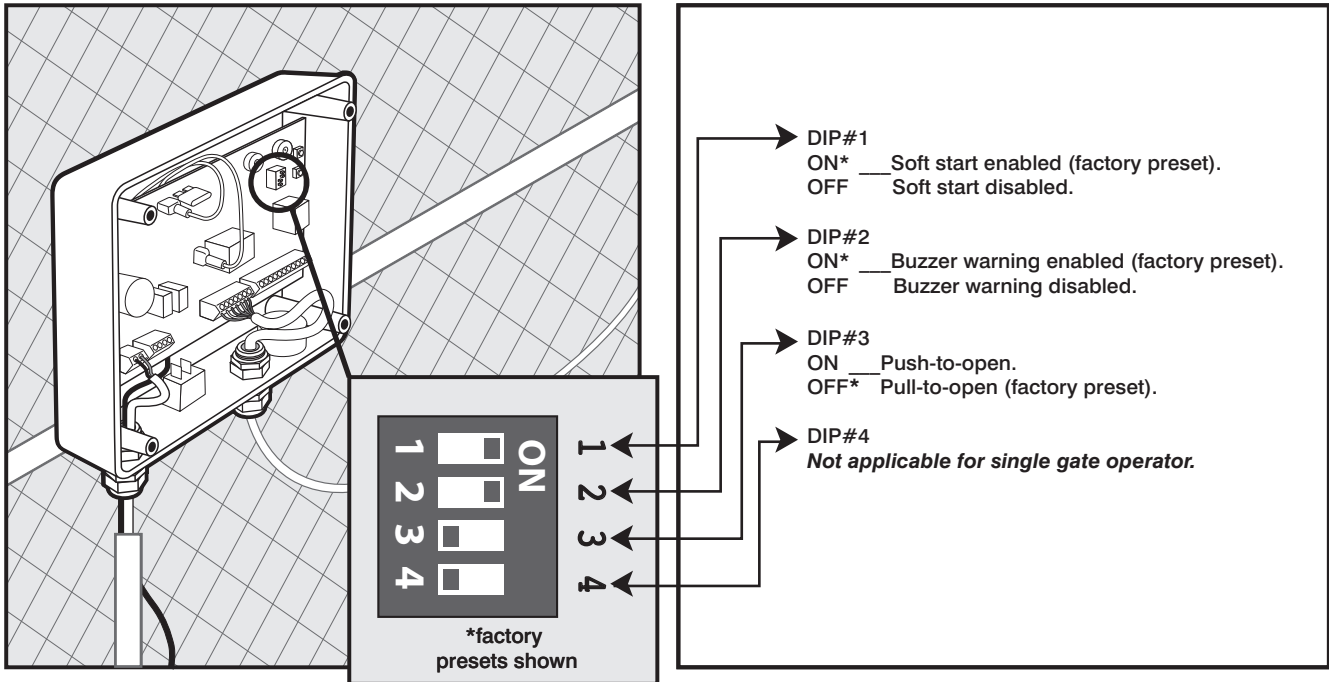
attach wires to POWER INPUT terminals marked "GTO 18VOLT TRANSF. OR SOLAR PANEL" on the control board.  
(wire color does not matter on this terminal connection)



# Control Box Settings

## DIP Switches

**IMPORTANT: Before making any changes to dip switches turn control box off!**



### DIP Switch #1 - Soft Start/Stop

The soft start/stop feature slowly starts the gate as it begins to open or close and slows the gate as it comes to the opened or closed position. This saves wear and tear on the gate and gate opener system.

### DIP Switch #2 - Warning Buzzer

The warning buzzer alerts you when the gate opener is beginning to either open or close the gate. It sounds for the first 2 seconds in each direction. It also sounds a warning when the gate obstructs two times in one cycle. Switching this to OFF only disables the open and close warning not the obstruction warning.

### DIP Switch #3 - Push/Pull-to-Open

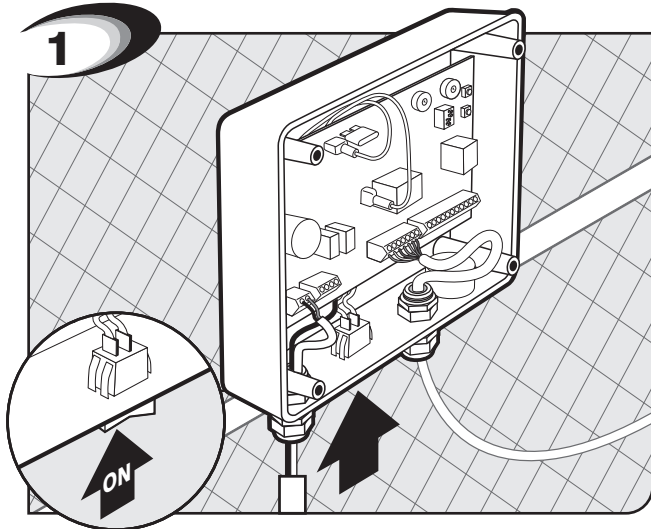
If your gate opens into the property the DIP Switch is set to the OFF position (factory setting). If your gate opens out from the property the DIP Switch must be set to the ON position. NOTE: if you have a Push-to-Open gate application you will need a Push-to-Open bracket (see Push-to-Open Instructions on page 16).

### DIP Switch #4 -

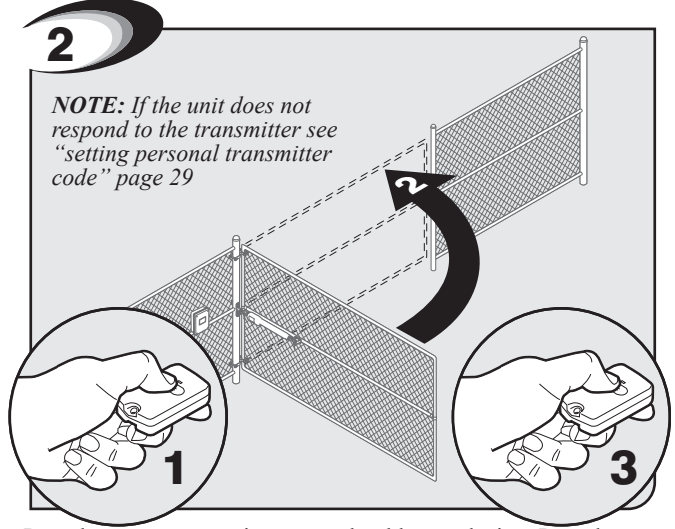
Not applicable for single gate operator.

# Control Box Settings

## Setting Pull-to-Open (Closed) Gate Limit (for push-to-open go to pg. 27)

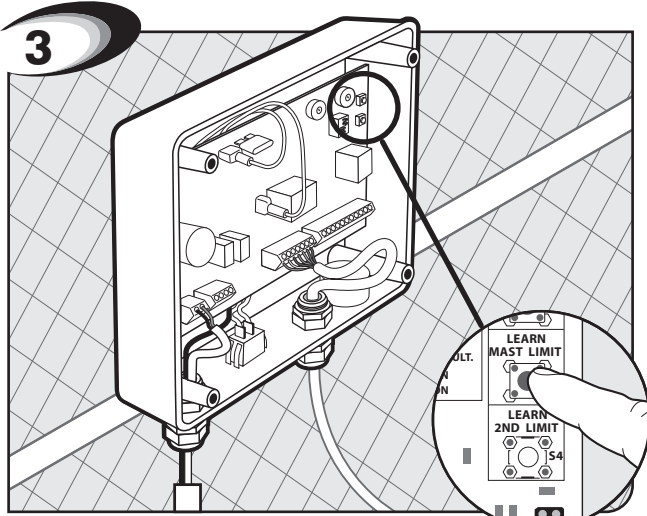


With gate in OPEN position, turn control box power ON.

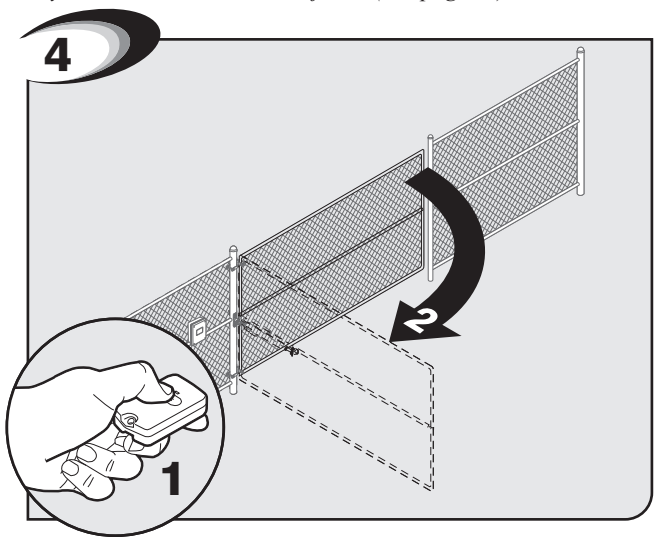


**NOTE:** If the unit does not respond to the transmitter see "setting personal transmitter code" page 29

Press button on transmitter; gate should start closing. Press button on transmitter again when gate is in desired CLOSED position.  
**NOTE:** If your gate stops and reverses before it fully closes, you may need to increase the stall force. (See page 28)

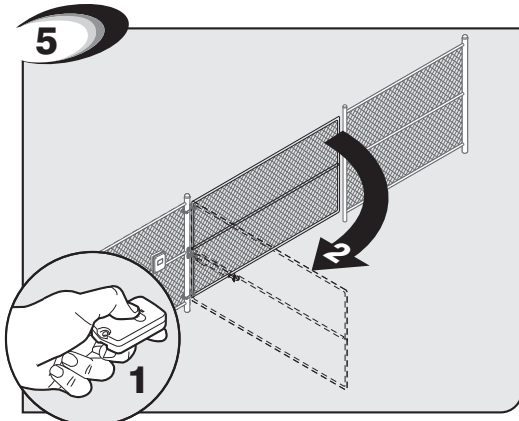


Press and hold the "LEARN MAST LIMIT" button for 5 seconds, or until the alarm sounds.

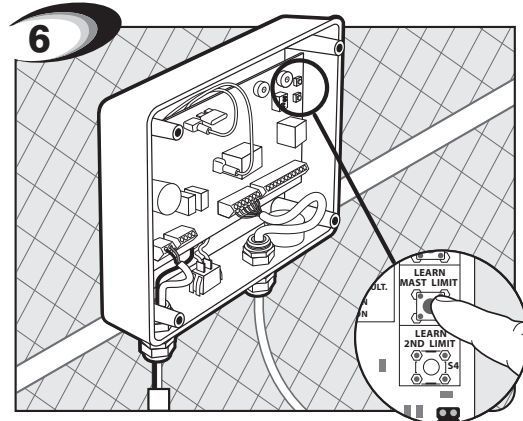


Press button on transmitter to fully open gate. Closed limit is set upon reaching fully open position. Test and, if needed, reset and start over.

## Resetting Closed Gate Limit



Press button on opener remote to open gate.

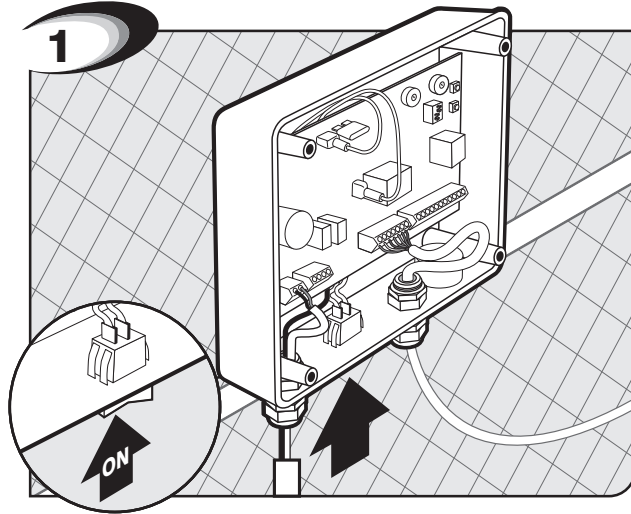


Press and hold the "LEARN MAST LIMIT" button for 10 seconds, or until the alarm sounds to clear. Go back to the setting closed limit steps on the top of this page.

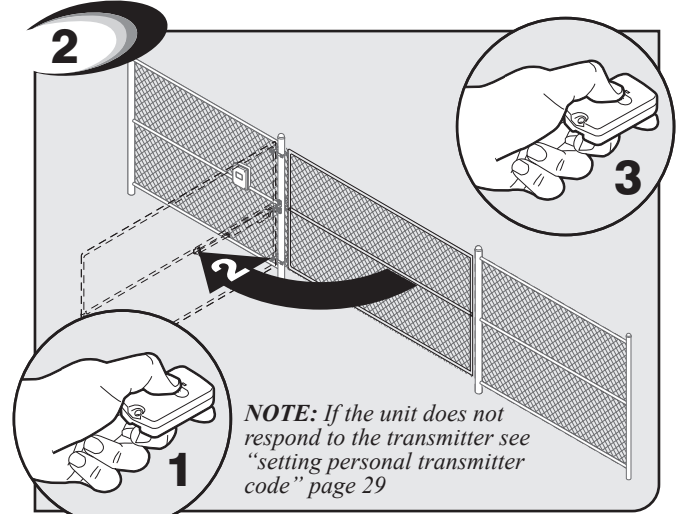


# Control Box Settings

## Setting Push-to-Open (Open) Gate Limit (for pull-to-open go to pg. 26)

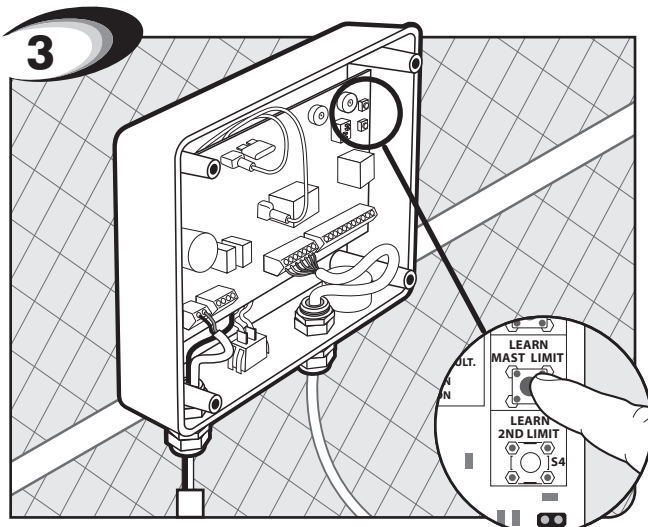


With gate in CLOSED position, turn control box power switch to ON.

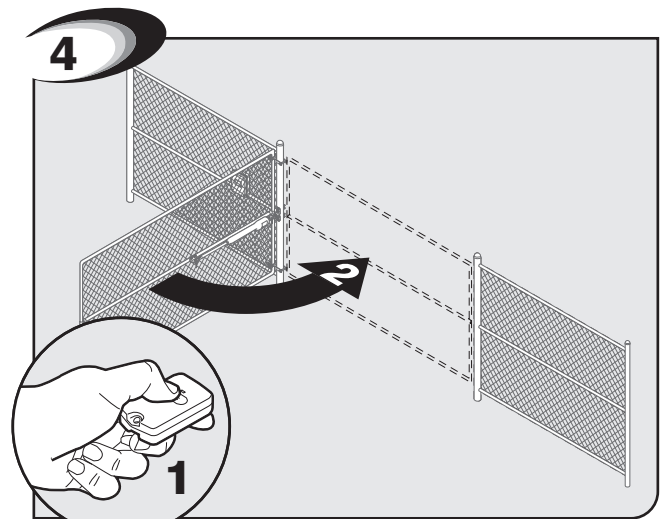


**NOTE:** If the unit does not respond to the transmitter see "setting personal transmitter code" page 29

Press button on transmitter; gate should start opening. Press button on transmitter again when gate is in desired OPEN position. **NOTE:** If your gate stops and reverses before it fully opens, you may need to increase the stall force. (See page 28)

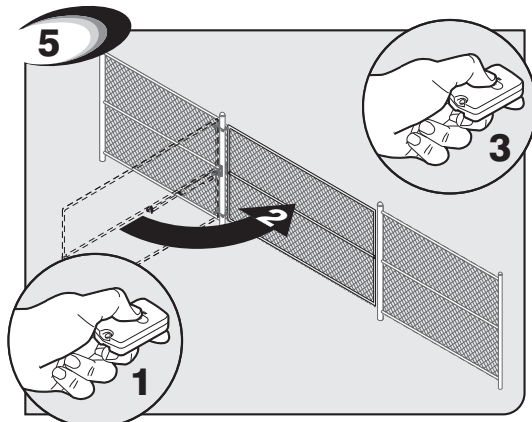


Press and hold the "LEARN MAST LIMIT" button for 5 seconds, or until the alarm sounds.

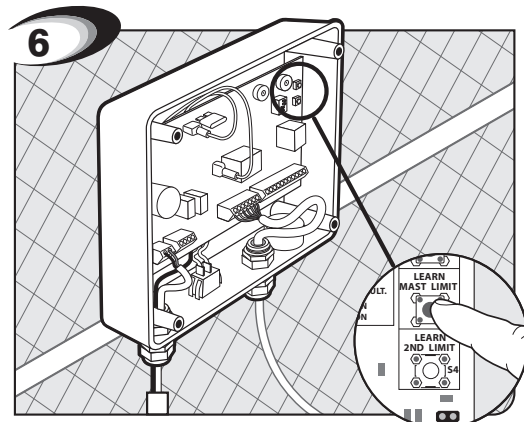


Press button on transmitter to fully close gate. Open limit is set upon reaching the fully closed position. Test and, if needed reset and start over.

## Resetting Open Gate Limit



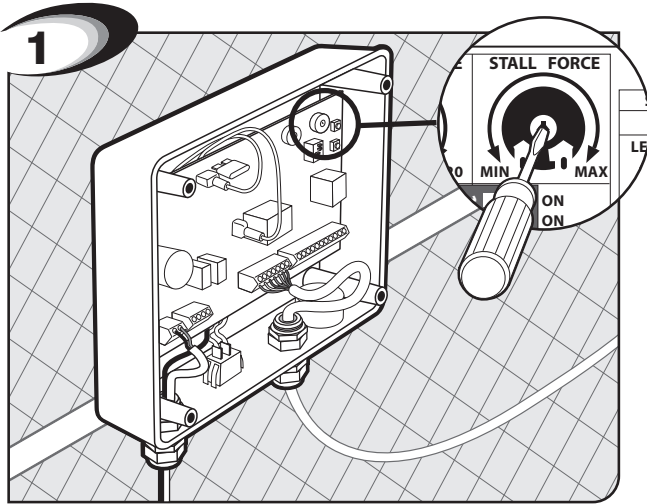
Press button on opener remote to close gate.



Hold the "LEARN MAST LIMIT" button for 10 seconds, or until the alarm sounds to clear. Go back to setting open gate limit step 1 at the top of this page.

# Control Box Settings

## Setting Dual Sense Detection



Do not use the Dual Sense Stall Force adjustment to compensate for a gate that is sticking or binding. Excessive Stall Force may cause damage to the gate operator or gate system or Injury or Death.

The Stall Force adjustment controls the amount of force the opener will apply against an obstruction before it stops and reverses direction. The adjustment on the control board operates like a volume control on a radio. It controls the amount of force the opener will apply to an obstruction before it automatically reverses direction.

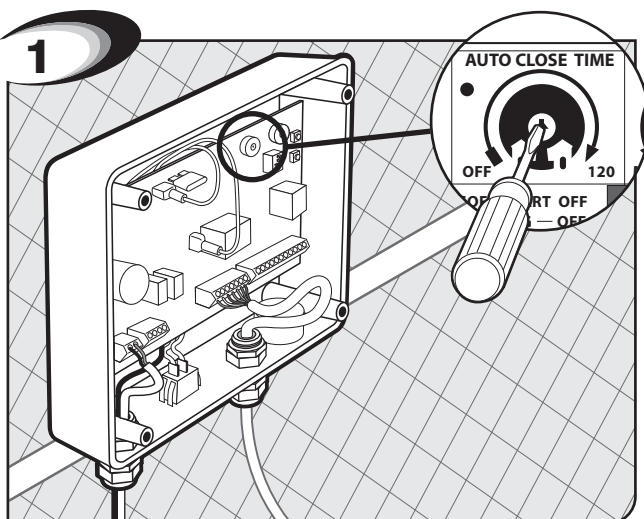
The Stall Force adjustment is located on the control board. Turn the “STALL FORCE” arrow in the center of the potentiometer with small flat head screwdriver. Adjust the sensitivity from the MINIMUM position up to the point where the gate operates without obstructing from its own weight or the wind conditions in your area.

**NOTE:** You may need to increase the stall force in cold weather due to increased resistance from gate hinges. However, the adjustment must remain as near to minimum as possible and when the weather improves decrease the setting to the appropriate position.

### CAUTION

For safety reason the Dual Sense Stall Force setting on the Mighty Mule control board comes from the factory set at MIN (minimum). This setting may need adjustment depending on the size and weight of the gate.  
**ALWAYS KEEP SAFETY AT THE TOP OF YOUR LIST WHEN ADJUSTING OR SERVICING YOUR GATE SYSTEM.**

## Setting Auto Close Timer



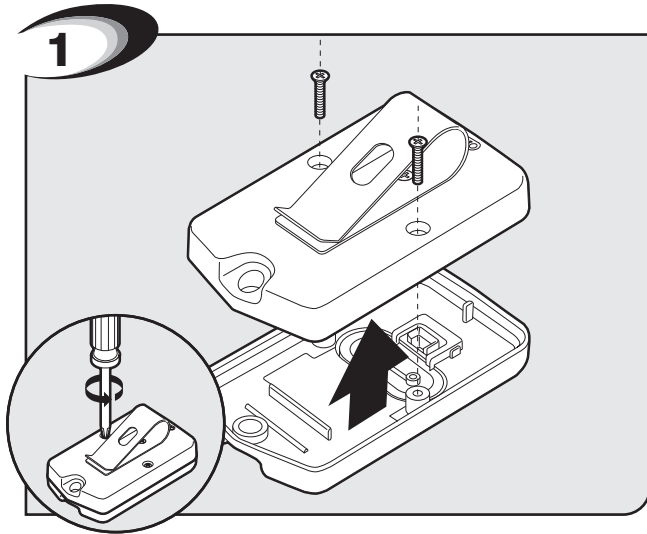
Turn the “AUTO CLOSE TIME” arrow in the center of the potentiometer with small flat head screwdriver. Turning the pot all the way counter-clockwise will turn the auto close feature off. The minimum auto close time is 3 seconds. The maximum (turn the pot all the way clockwise) auto close time is 120 seconds.

# Control Box Settings

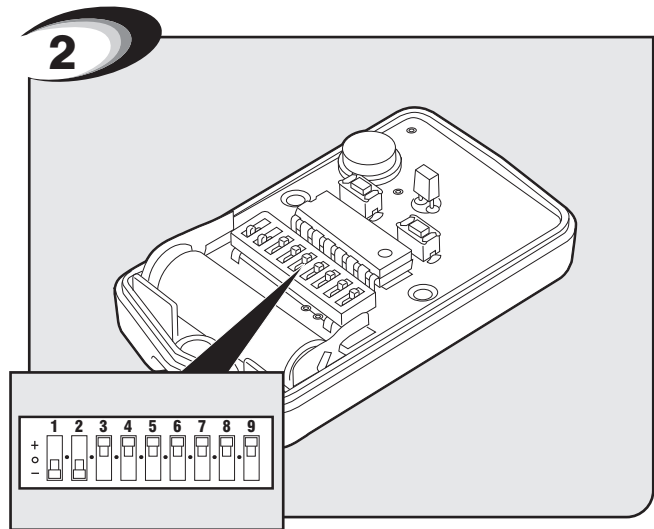
## Setting Personal Transmitter Code

All GTO transmitters are set to a standard code at the factory and are ready to operate your gate opener.

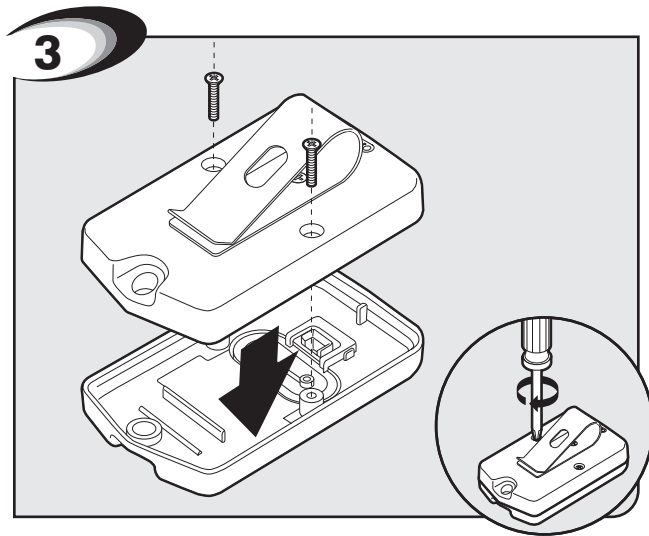
For your safety and security, however, we **strongly recommend** that you replace the factory setting with your own personal code. Follow the directions below:



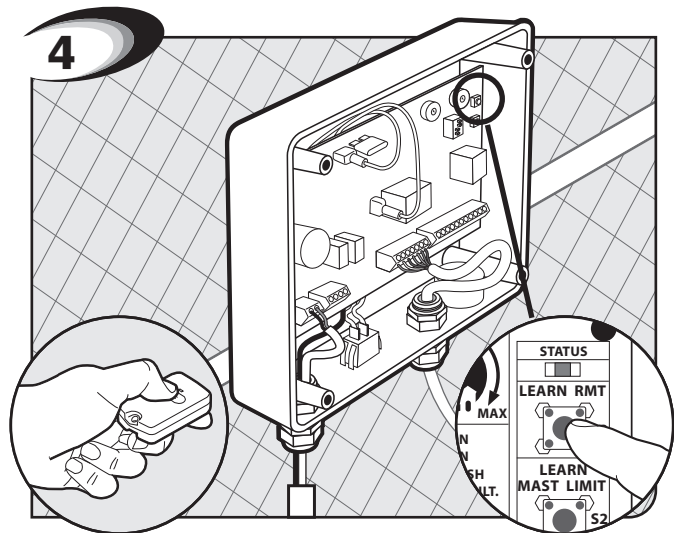
Remove back cover of the opener remote.



Flip opener remote over. Use small screwdriver to move switches to random positions. If you have more than one transmitter, now is a good time to set them all with the same code.

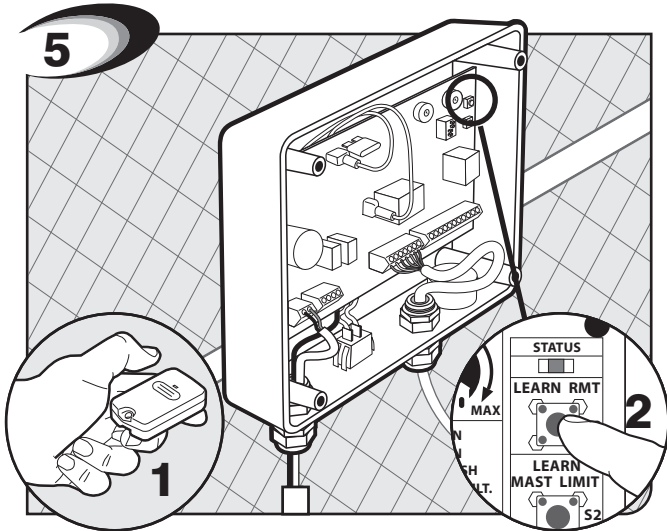


Replace and secure back cover of the opener remote.

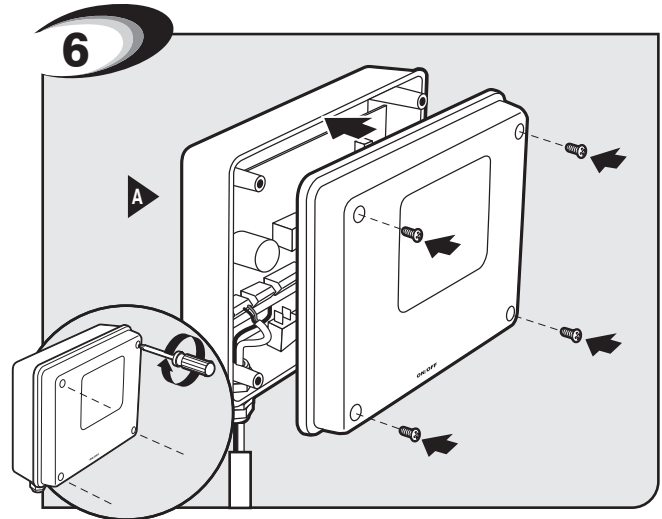


Go to control box. Press and hold the remote and "LEARN RMT" buttons simultaneously for 5 seconds or until the alarm sounds.

# Setting Personal Transmitter Code



Release the remote button, then release the “LEARN RMT” button. The new code is now programmed.



Replace control box cover.

Example									Fill In Code For Your Records								
1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
+	0	1	2	3	4	5	6	7	+	0	1	2	3	4	5	6	7
-	0	1	2	3	4	5	6	7	-	0	1	2	3	4	5	6	7

**WARNING:** Changes, modifications or adjustments not expressly approved by GTO Access Systems, LLC could void the user’s authority to operate this equipment. There Are No User Serviceable Parts.

**NOTICE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 the FCC. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

# Connecting Additional Devices

## Input Connections

Mighty Mule strongly recommends the use of additional obstruction detection devices however we do not endorse any specific brand names. Only use products that are listed to be in compliance with any applicable UL safety standards and national and regional codes.

PLEASE NOTE: Contact sensors, non-contact sensors, shadow loops, etc. are not included with the Mighty Mule. Refer to the sensor manufacturer's instructions for information about installing accessory devices.

The Mighty Mule ONLY accepts accessory devices with normally open dry contact outputs.

### **! WARNING**

Make sure the operator power switch is turned OFF before connecting ANY device wiring to the terminals of the controller. Unplugging the transformer does not turn power to the operator off.

#### NOTE:

- All control inputs are dry-contact, normally open, inputs. DO NOT apply external voltage sources to these inputs.
- All inputs are connected with respect to **COMMON** terminal.
- The status light will blink once when its corresponding input is activated.

**1 COM:** Circuit common (reference for all logic input)

- Two (2) terminals to provide extra common connection point.

**2 CYCLE:** (Typically for use with doorbell button or hardwired key pad)

- Each activation at this input will cycle the operation as follows:  
....→ OPEN → STOP → CLOSE → STOP → OPEN → ...

**3 SAFETY:** (Typically for use with photo beam device, loop detector or other non-contact sensors)

- Activation of this input while the gate is closing will cause the gate to stop and return to the opened position.
- Activation of this input while the gate is opening has no effect (gate will continue to open).
- Activation of this input while gate is idle will prevent gate from closing.

**4 EXIT:** (Typically for use with exit loop or wand)

- Activation of this input will open the gate if it's not already at the open position
- Activation of this input while at open limit will restart the auto close time (if enabled).

NOTE: if the contact (activation) is maintained it will hold the gate in the fully open position.

**5 SHADOW:** (Typically for use with loop detector device)

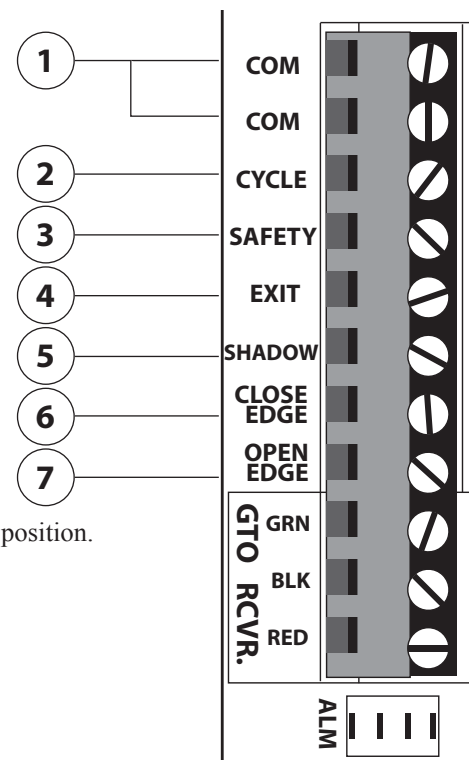
- This input is only monitored when the gate is at the fully open position. At any other position, activation of this input has no effect on gate operation.
- Activation of this input while gate at the fully open position will prevent gate from closing.

**6 CLOSE EDGE:** (Typically for use with safety edge device)

- Activation of this input while the gate is closing will cause the gate to stop and reverse direction for approximately 2 seconds.
- Activation of this input while the gate is opening has no effect (gate will continue to open).
- Activation of this input while gate is idle will prevent gate from closing.

**7 OPEN EDGE:** (Typically for use with safety edge device)

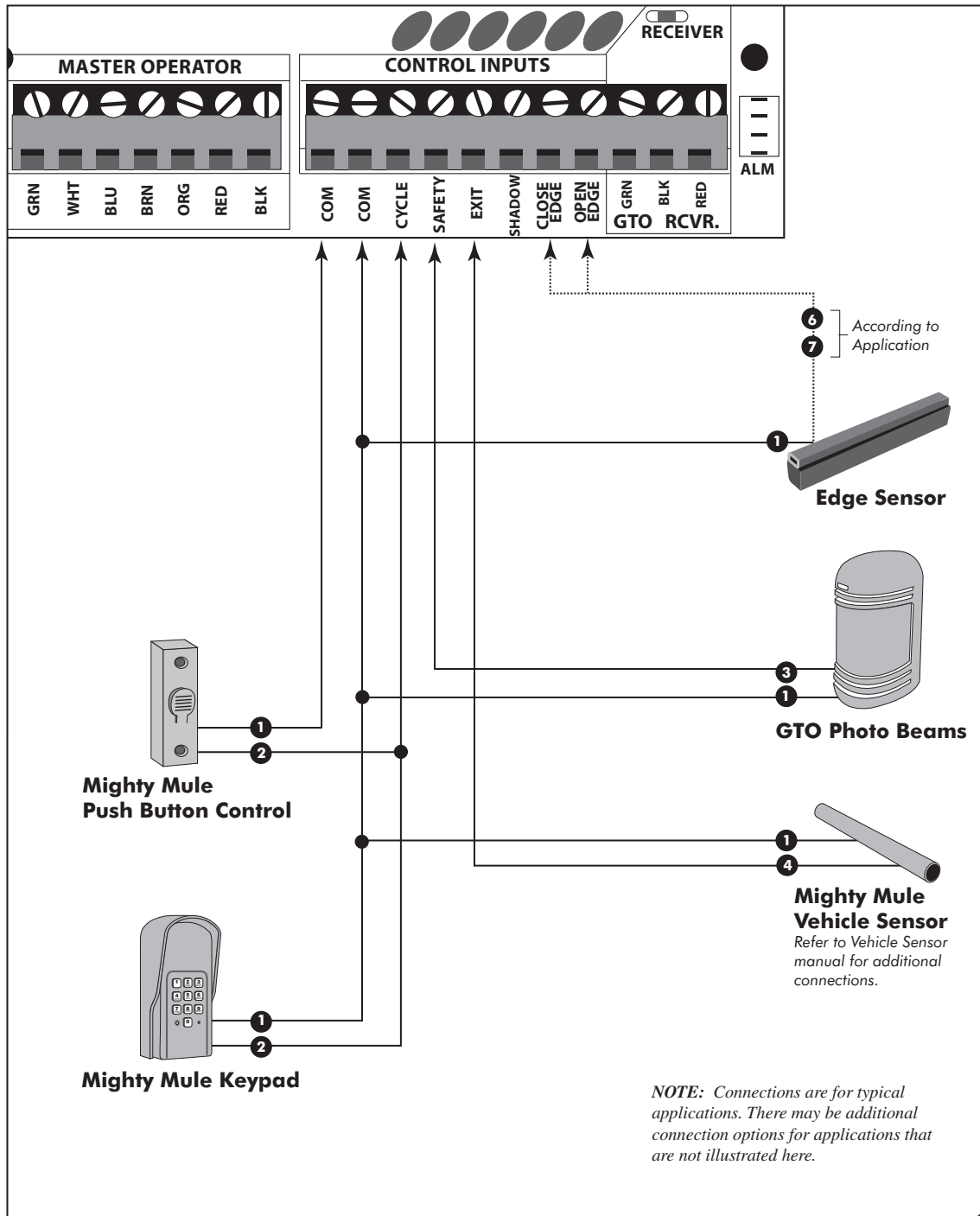
- Activation of this input while the gate is opening will cause the gate to stop and reverse direction for approximately 2 seconds.
- Activation of this input while the gate is closing has no effect (gate will continue to close).
- Activation of this input while gate is idle will prevent gate from opening.





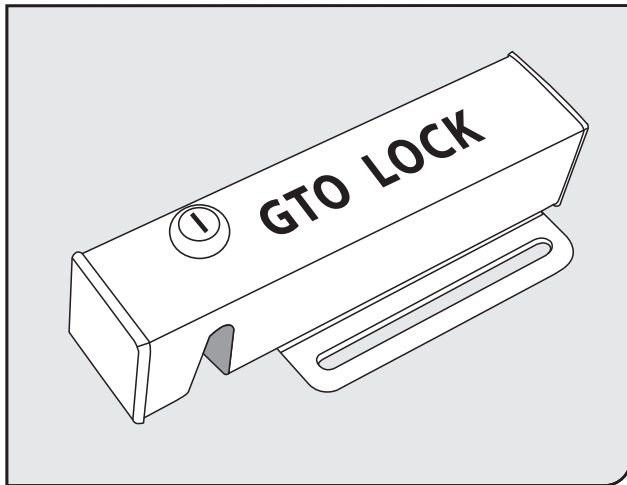
# Connecting Additional Devices

## Connecting Accessories



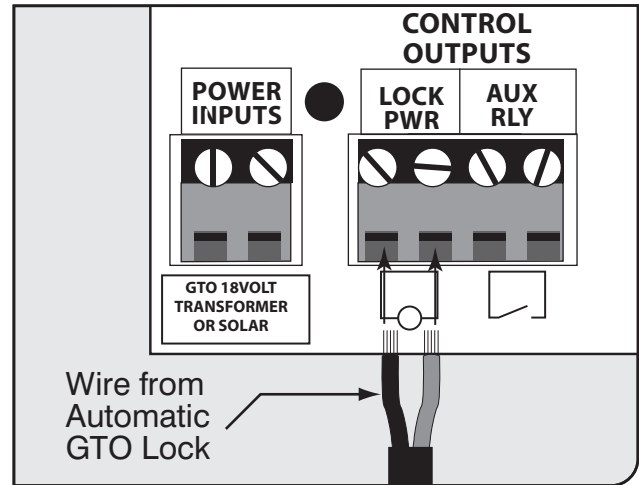
# Connecting Additional Devices

## Connecting GTO Automatic Lock



### GTO Automatic Gate Lock:

**LOCK PWR** terminals are use exclusively with the GTO Automatic Gate Lock (FM143). Connecting other devices to these terminals may cause incorrect operation and void your warranty. You do not use the lock board with this control board.



### GTO Lock Connection:

Connect the red and black leads from the lock to the GTO LOCK terminal on the control board.

## Connecting Other Auxiliary Devices (Mag Locks, Sirens, Lights. . .}

- **AUX RLY** terminals are normally open, dry-contact (no voltage) relay output.
- **AUX RLY** terminals are ON (shorted) whenever the gate is moving and OFF (opened) otherwise.
- **AUX RLY** terminals have a maximum rating of 24Vdc, 1 Amp.

# Maintenance & Troubleshooting

## Maintenance Tips

Monthly, test the obstruction and entrapment protection systems.

Monthly, service the gate operator (make sure the power switch is OFF). Clean extended operator arm with a soft, dry clean cloth. After cleaning, apply a high quality silicon spray to a soft dry cloth and wipe the push/pull tube. DO NOT directly spray the tube!

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 near a coastal area.

Monthly, turn off the power switch and disconnect the Mighty Mule and move the gate to make sure the gate is moving freely without sticking or binding. Lubricate the hinges or repair the gate as required before reattaching the Mighty Mule.

Monthly, check the gate system for potentially entrapments from new landscaping or construction. Eliminate or guard as required.

Monthly, check that the warning signs are mounted on each side of the gate and clearly visible. Replace the signs if they are missing or damaged.

Replace batteries every 2-3 years and properly recycle old batteries.



# Troubleshooting Guide

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

## VOLTAGE READINGS

18 Vac Transformer ..... 18.0 to 22.0 Vac, 2200 mA  
 5 W Solar panel (single)..... 18.0 to 22.0 Vdc, 300 mA  
*\* measure voltage at panel and control box, in full sun; this will increase by approximately 300mA for each additional solar panel.*

Two 12 V, 7 amp hour Batteries..... 12.5 to 13.5 Vdc 7.0 Ah  
*\*measure voltage at battery terminals with battery disconnected from circuit board*

Charging circuit ..... 13.3 to 14.8 Vdc  
*\*measure voltage at battery terminals with battery connected to circuit board and GREEN "POWER IN" LED is ON.*

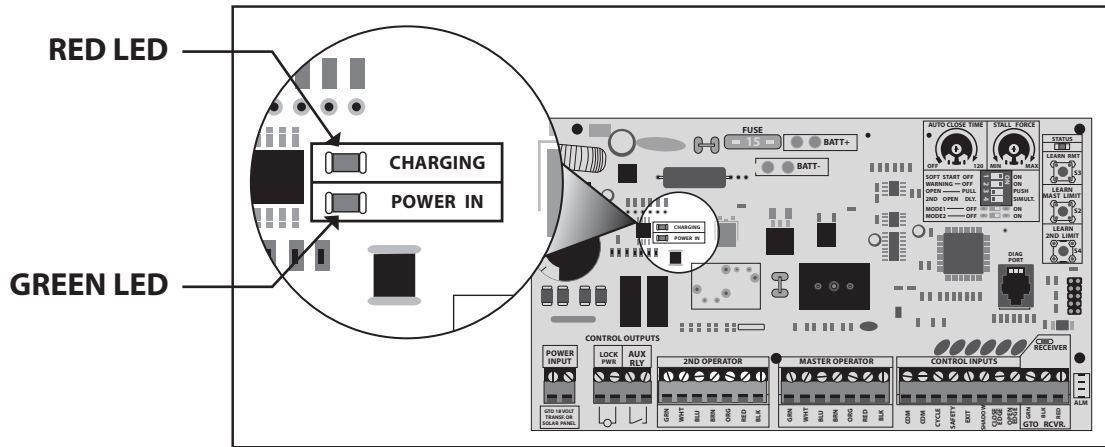
## Audible Feedback

Indication	Possible Diagnosis	Check
1 short beep upon activation	Blown Fuse Low or Bad Battery Loose Battery Connection	<ul style="list-style-type: none"> <li>• Fuse</li> <li>• Battery Under Load</li> <li>• Battery Harness Connections</li> </ul>
A series of beeps that stop and do not repeat after power-up	Circuit Board Powered Up & Ready	<ul style="list-style-type: none"> <li>• Normal Operation</li> </ul>
Continuous Uninterrupted Alarm	Circuit Board Senses an Obstruction	<ul style="list-style-type: none"> <li>• Path of Gate</li> <li>• Gate for Level and Plumb</li> <li>• Stall Force Adjustment</li> <li>• For diagnostic purposes, temporarily disconnect the external obstruction detection devices</li> <li>• Rev Counter</li> </ul>
1 beep with 10 seconds off	Low Battery Condition	<ul style="list-style-type: none"> <li>• Fuses</li> <li>• Battery Harness Connections</li> <li>• Battery Under Load</li> </ul>
1 beep then 2 beeps, then pause and repeats	Master Motor Terminals Shorted	<ul style="list-style-type: none"> <li>• Connections to Master Inputs</li> <li>• Master Arm Power Cable</li> <li>• Motor</li> <li>• Circuit Board</li> </ul>
1 beep then 3 beeps, then pause and repeats	Second Motor Terminals Shorted	<ul style="list-style-type: none"> <li>• Connections to Second Inputs</li> <li>• Second Arm Power Cable</li> <li>• Motor</li> <li>• Circuit Board</li> </ul>
1 beep with 2 seconds, then pause and repeats	Master Arm Limit Switch Error	<ul style="list-style-type: none"> <li>• Connections to Master Inputs</li> <li>• Master Arm Power Cable</li> </ul>
3 beeps with 2 seconds, then pause and repeats	Master Arm Rev Counter Error	<ul style="list-style-type: none"> <li>• Connections to Master Inputs</li> <li>• Master Arm Power Cable</li> <li>• Rev Counter</li> </ul>

# Visual Feedback

Indication	Possible Diagnosis	Check
Status (clear) 1 blink	Cycle Terminal Shorted	Disconnect the push button, keypad, intercom keypad, or any other accessory wired to this terminal. Try the remote. If the remote works, then the problem is the accessory.
Status (clear) 2 blinks	Safety Terminal Shorted	Disconnect the loop detector, photo beam, or any other accessory wired to this terminal. Try the remote. If the remote works, the problem is the accessory.
Status (clear) 3 blinks	Exit Terminal Shorted	Disconnect exit wand, loop detector, photo beam, Knox box, or any other accessory wired to this terminal. Try remote. If the remote works, the problem is the accessory.
Status (clear) 4 blinks	Shadow Terminal Shorted	Disconnect the loop detector, photo beam, or any other accessory wired to this terminal. Try remote. If the remote works, the problem is the accessory.
Status (clear) 5 blinks	Close Edge Terminal Shorted	Disconnect the edge sensor, photo beam, or any other accessory wired to this terminal. Try the remote. If the remote works, the problem is the accessory.
Status (clear) 6 blinks	Open Edge Terminal Shorted	Disconnect edge sensor, photo beam, or any other accessory wired to this terminal. Try the remote. If the remote works, the problem is the accessory.
RF (yellow) Flickers	Receiving 318 MHz RF	Normal operation when remote or wireless keypad is used.
RF (yellow) does not flash when remote is pressed	No 318 MHz RF Received	<ul style="list-style-type: none"> <li>• Battery in Remote</li> <li>• Program Remote</li> <li>• Antenna Receiver Connections</li> <li>• Antenna Receiver</li> </ul>
Power (green) ON	AC or Solar Power Present	Normal Operation
Power (green) OFF	No AC or Solar Power	<p><b>Transformer:</b></p> <ul style="list-style-type: none"> <li>• Breaker or GFI</li> <li>• Power at AC outlet.</li> <li>• Output of Transformer.</li> <li>• Voltage on wire at 18 VAC Input</li> </ul> <p><b>Solar:</b></p> <ul style="list-style-type: none"> <li>• Weather</li> <li>• Solar Panel Placement</li> <li>• Output of Solar Panel</li> <li>• Voltage on wire at Solar Input</li> </ul>
Charge (red) ON or FLASH	Unit in fast, soak or float charge	Battery voltage increasing slowly or steady at approx 13.8 -14.1. Normal condition.
Charge (red) OFF	Battery Not Being Charged	AC power Transformer Solar Panel Charging Circuit

## Battery/Power Troubleshooting



POWER IN LED	CHARGING LED	
ON	Steady ON	Battery Charging
ON	Blinking	Battery Fully Charged
ON	OFF	Test charging circuit, check battery
OFF	OFF	No AC/Solar Power, check battery
OFF	Blinking	Check battery, incoming AC transformer or solar
OFF	Steady ON	Test charging circuit and check incoming AC transformer or solar and check battery

# Repair Service

If your Gate Operator is not operating properly, please follow the steps below:

1. First use the procedures found in the Troubleshooting Guide (see page 25).
2. Use the 24/7 Troubleshooting Wizard at <http://support.gtoinc.com>.
3. 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 right side of the control box) and date of purchase when calling for assistance.
4. If repair or replacement of your gate operator is necessary, the Service Department will assign a Return Goods Authorization (RGA) number to you.
5. Securely pack the component(s) authorized for return to the factory. Include a copy of your sales receipt for the purchase of the product(s). 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, 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.**

## GTO Technical Service and Installation Assistance

8:00am–7:00pm • Monday–Friday (EST)

Toll Free Support: 800-543-1236 • Fax: 850-575-8950

24/7 Troubleshooting Wizard: <http://support.gtoinc.com>



# Conversion Chart

## *Converting Metric Units to English Equivalents*

<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 #)

## *Converting English Units to Metric Equivalents*

<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

## *Converting Temperature*

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 right hand side of the control box), 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 \_\_\_\_\_

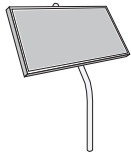
Place of Purchase \_\_\_\_\_

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



## ACCESSORIES

**Accessories are Available From Your Retail Store**



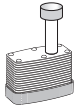
### **Solar Panel (FM121)**

The **Solar Panel** is a 5 watt solar powered battery charger for use with the **FM560 & FM502** gate operator 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 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 operator from the gate, while allowing quick release of the operator.



### **Key Chain Two Button Transmitter (FM134)**

The **Key Chain Mini Transmitter** is a two button version of the **Mighty Mule®** entry transmitter and has the same adjustable code settings. (battery is included)



### **Single Button Transmitter (FM135)**

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



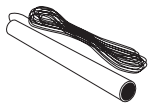
### **Digital Keypad (FM137)**

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).



### **Mounting Post (FM100) - In Ground**

This black powder coated pedestal is designed to provide convenient access to your keypad, wireless intercom, or other access control device from your vehicle. With its break down design it is easy to install and works well in most standard applications. Surface Mount Flanges (F102) and Extensions (F103) for added height are available.



### **Mighty Mule® Vehicle Sensor (FM138)**

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 Operator with a 12 ft. radius of detection of vehicles in motion.



### **Automatic Gate Lock Pull-to-Open (FM143)**

A **MUST** for added security. Solenoid driven, with a steel housing. Unlocks and locks automatically as gates open and close. Used with **Mighty Mule®** DC swing gate operating systems for maximum stability and security. Comes with a keyed manual release. Recommended for gates over 8 ft. long. Ideal for high wind areas.

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

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### 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. Up to 560 feet reception. Additional base stations available (F3101MBC).



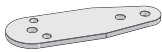
### Replacement Battery (FM150)

Standard 12 volt, 7.0 amp-hour, maintenance-free battery for the **Mighty Mule® FM560 & FM502** gate operator systems. This is the only battery approved for use with the **Mighty Mule® FM560 & FM502** gate operator systems. Life expectancy is 2-3 years.



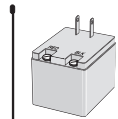
### Low Voltage Wire (RB509)

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.



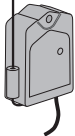
### Push to Open Bracket (FM148)

Required when **Mighty Mule® 560/502** gate operator(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.



### Replacement Transformer (RB570)

Standard 18 volt, 2200 mA, AC transformer for maintaining the battery included with the **Mighty Mule®** gate operator. This is the only transformer approved for use with **all UL325 Mighty Mule®** gate operator systems.



### Garage Door Receiver (RB709U)

The Garage Door Receiver allows you to use the same **Mighty Mule®** entry transmitter to operate your gate operator and your garage door operator. Compatible with most garage door operators.

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

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## **Gate Operator Installation Checklist**

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- 1. The gate has been checked to make sure it is level and moves freely in both directions.
- 2. Potential pinch areas have been guarded so as to be inaccessible OR have sensing edges and/or photo beam obstruction detection devices installed.
- 3. The installer has installed one or more contact or non-contact obstruction sensing devices, if required for this installation.
- 4. If pedestrian traffic is expected, a separate pedestrian gate has been installed, a minimum of seven feet from the gate systems. All pedestrian traffic must use the pedestrian gate.
- 5. Warning signs have been installed on each side of the gate in highly visible locations. These signs must remain at all times.
- 6. There are no controls installed on the gate operator, or within 10 feet of the gate.
- 7. The Dual Sense Technology™ feature has been properly adjusted and tested to make sure that the gate stops and reverses a short distance with minimal resistance applied.
- 8. Reviewed and understand all of the operational functions, obstruction sensing devices, warning beeper and reset, etc.
- 9. Review and understand the proper use of the operator's manual disconnect feature. The manual disconnect must never be used while the gate is in motion. The power switch must be turned off before using the manual disconnect and disengaging the operator.
- 10. Reviewed all safety instructions, and keep the safety instructions and owner's information sheets for reference.
- 11. Review and understand the maintenance schedule for both the gate and the gate operator.



For sales call toll free:

**1-800-543-4283**

The **Mighty Mule Sales Department** is open  
Monday – Friday 8:00 A.M. – 5:00 P.M. (Eastern Time)

For technical service Call toll free:

**1-800-543-1236**

The **Mighty Mule Technical Service Department** is open  
Monday – Friday 8:00 A.M. – 7:00 P.M. (Eastern Time)

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