

Juno



Slide Gate Operator with Mercury 310 Controller

Installation and Programming Manual

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Contact Information: Visit <https://support.hysecurity.com/hc/en-us> for installation manuals, replacement part instructions, part diagrams and more. Qualified Nice distributors are experienced and trained to assist in resolving installation problems. For the name of a qualified distributor near you, call Nice at 253-201-2918. *Before contacting your distributor or Nice Technical Support, obtain the serial number of your operator.

Warning Signs and Labels for Installations in Canada

If this operator is being installed in Canada, please contact the Nice | HySecurity Technical Support team at (253) 201-2918 for a free Juno Canada kit.

This kit includes: French Canadian manual, operator warning labels and warning signs required for compliance with ETL/CSA standards.

Panneaux et étiquettes d'avertissement pour les installations au Canada

Si cet opérateur est installé au Canada, veuillez contacter l'équipe d'assistance technique de Nice | HySecurity au (253) 201-2918 pour obtenir un kit Juno Canada gratuit.

Ce kit comprend : un manuel canadien en français, des étiquettes d'avertissement de l'opérateur et des panneaux d'avertissement requis pour la conformité aux normes ETL/CSA.

Introduction

Juno is a slide gate operator using a motor, gearbox and output sprocket to move a drive-chain attached to a sliding gate. It is programmed and controlled using the integrated Nice Mercury 310 controller. The system runs on a 12VDC battery with a built in battery charger and MPPT solar controller.

The Juno operator may be mounted on an a concrete slab (directly or with an optional 4-inch riser) or affixed to a metal base mount and installed on a 4"x4" metal post.

Full open and close gate positions are accomplished by placing a magnetic target at each end of full travel of the drive chain. The automatic gate position sensing technology allows for smooth gate slow down when traveling into full open or close limit positions.

CAUTION

Anyone who installs or assists with installation or otherwise facilitates the installation in any manner should thoroughly read and understand this manual before any attempt is made to begin the installation process.

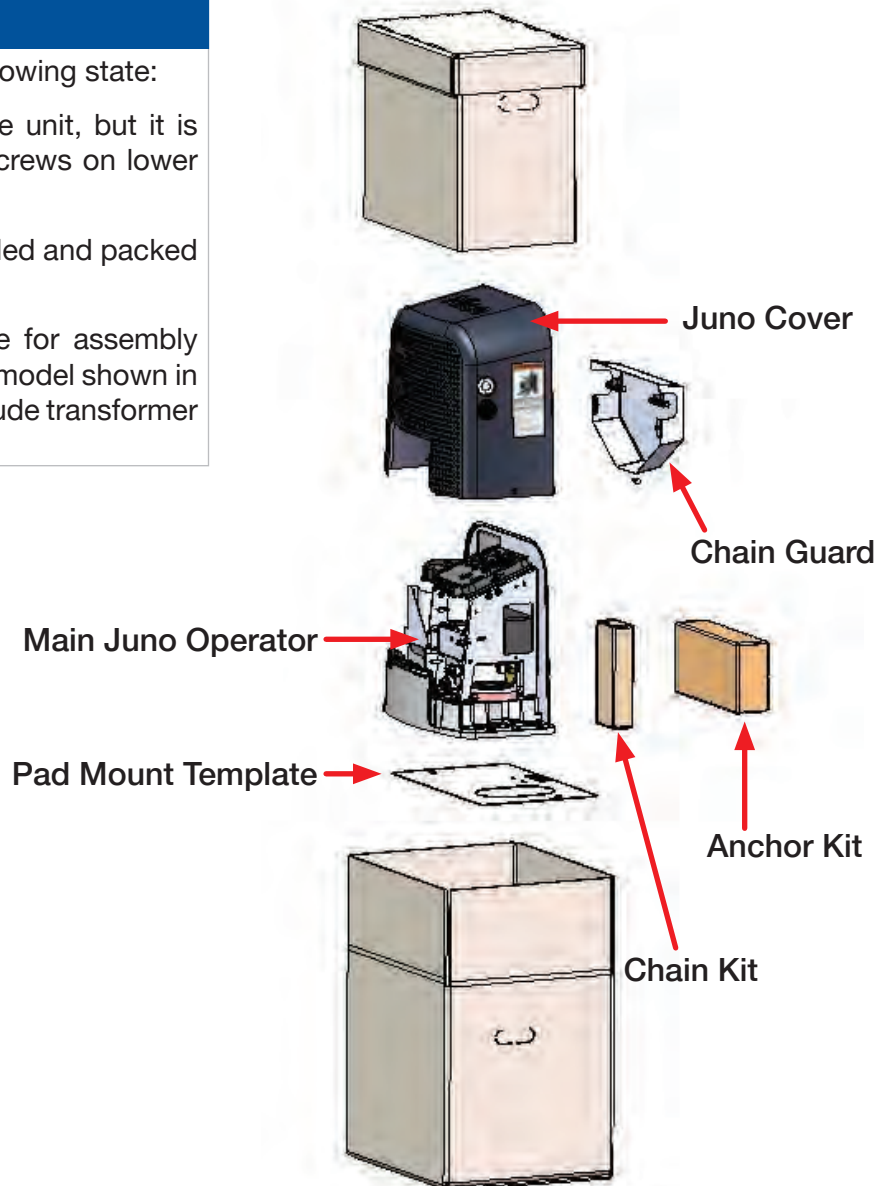
Features

NOTE

The Juno operator ships in the following state:

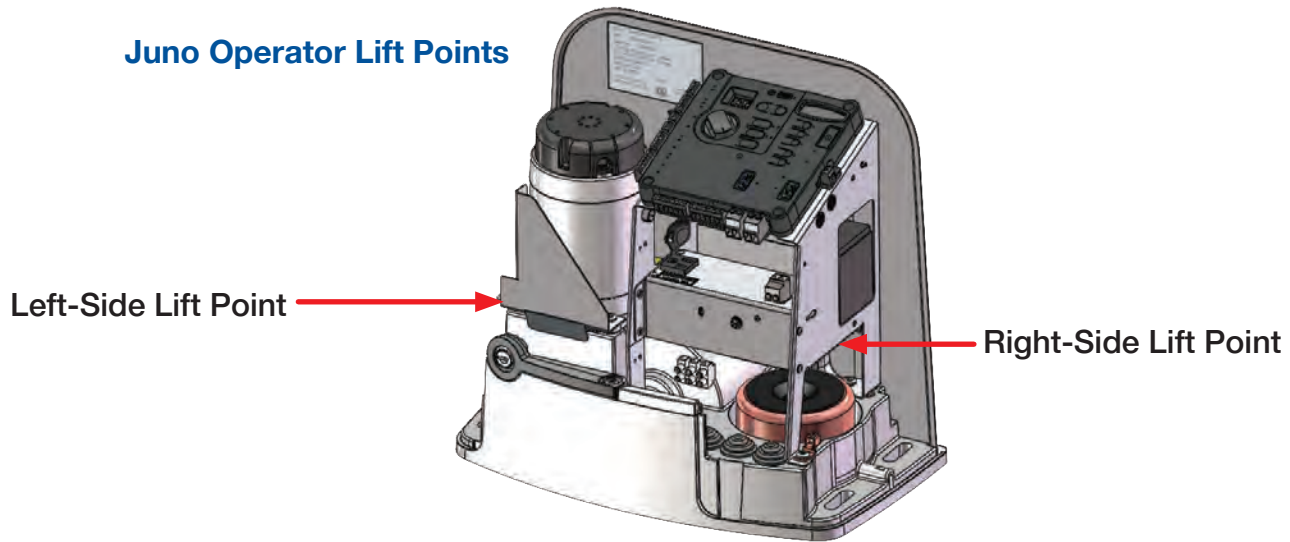
- The cover is placed over the unit, but it is not yet affixed by the two screws on lower left and right sides.
- The Chain guard is not installed and packed separately.

All necessary parts and hardware for assembly are supplied with the unit. The AC model shown in the image (right). Solar will not include transformer and AC power supply.

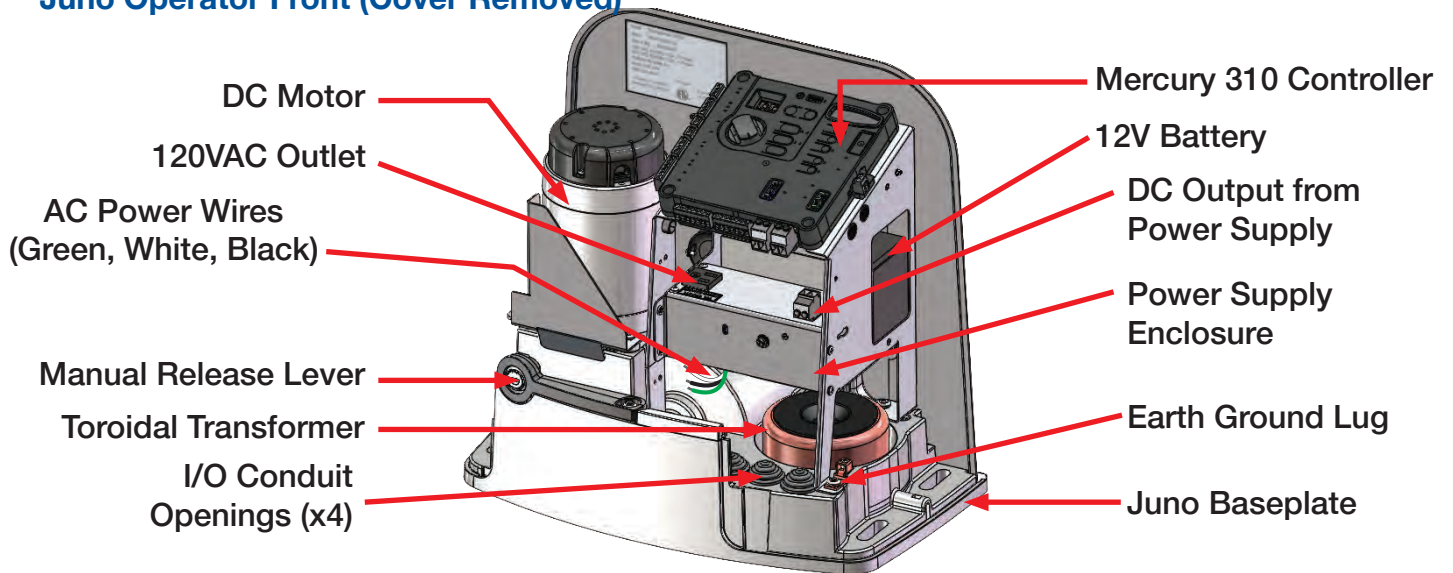


Features

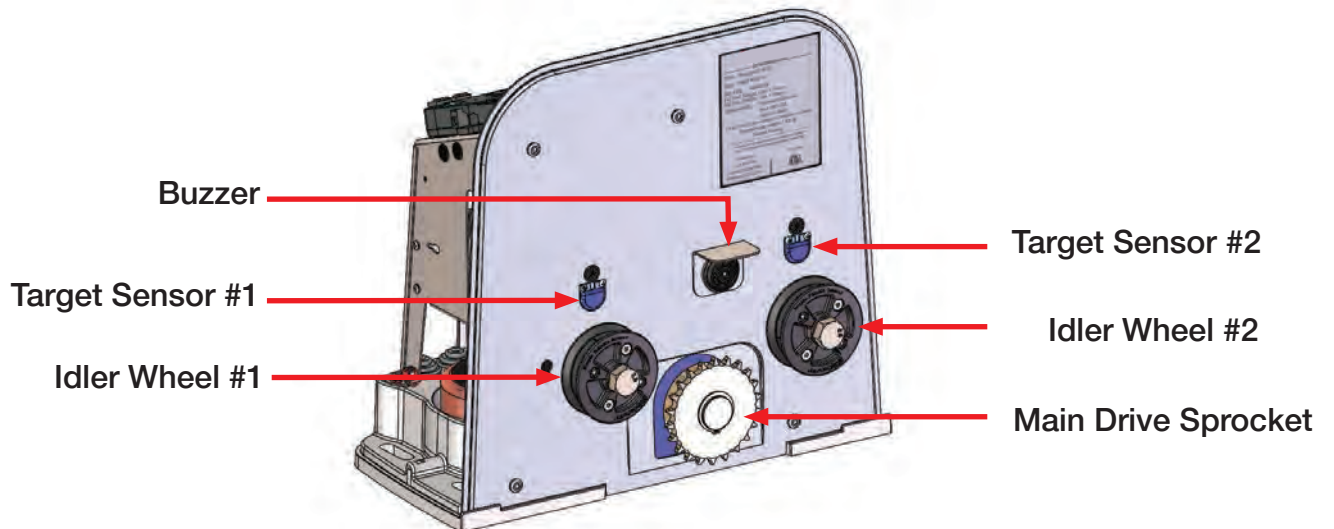
Juno Operator Lift Points



Juno Operator Front (Cover Removed)



Juno Operator Rear (Chain Cover Removed)



Important Safety Information



Hazards, associated with automatic gates, can be reduced with proper site design, installation and use. Installers, maintenance crews and owners/users must read and follow the safety requirements found in Nice product manuals.

Safety Messages

The safety messages below inform regarding potential hazards that can result in injury. Safety messages specifically address level of exposure to the operator and are preceded by one of four words: **DANGER**, **WARNING**, **CAUTION** or **NOTICE**.

DANGER

Indicates a hazardous situation which, if not avoided, **WILL** result in **DEATH** or **SERIOUS INJURY**.

CAUTION

Indicates a hazardous situation which, if not avoided, **COULD** result in **MINOR** or **MODERATE INJURY**.

WARNING



Indicates a hazardous situation which, if not avoided, **COULD** result in **DEATH** or **SERIOUS INJURY**.


NOTICE

Addresses practices not related to personal injury. Indicates damage to equipment is probable if the hazardous situation is not avoided.

Industrial Symbols

These international safety symbols may appear on the product or in its literature to alert of potential personal injury hazards. Obey all safety messages that follow these symbols to avoid possible injury or death.

Symbol	Safety Hazard
	Entrapment Zone
	Possible Pinch Point

Symbol	Safety Hazard
	Attention: Take Notice
	Danger: Keep Away



It is important that only qualified installers handle installation of Nice Gate vehicular gate operators. A “qualified” installer has one of the following:

1. A minimum of three years experience installing similar equipment.
2. Proof of attending a Nice | HySecurity Training seminar within the past three years.
3. Significant manufacturer endorsements of technical aptitude in gate operator installation and operation.

Underwriter Laboratories (UL) and the American Society for Testing and Materials (ASTM) are responsible for current safety standards and regulations regarding gate operators and automated gates. All aspects of gate installation must comply with the appropriate safety standard. For the most up-to-date ASTM F2200 Gate and Fence Standards, refer to www.astm.org. For UL 325 Safety Standard, refer to www.ul.com. Consult local government agencies for up-to-date rules and regulations as certain municipalities have established licensing, codes or regulations that regulate automated gate system design and installation.

General Safety Information

A gate operator is only a component in a gate system. The other parts of the gate system can include the gate, the external entrapment sensors, access controls and vehicle detectors. To have a gate system that provides for safety, security and reliable operation it is essential these components operate together as a system. It is the responsibility of the system designer and/or installer to ensure any safety or operational issues have been addressed.

Important Safety Information



WARNING

To reduce the risk of severe injury or death:

1. **READ AND FOLLOW ALL INSTRUCTIONS!**
2. Never let children operate or play with gate controls. Keep the remote control away from children.
3. Always keep people and objects away from gate. **NO ONE SHOULD CROSS THE PATH OF THE MOVING GATE!**
4. Test the 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 (pgs. 37-38), retest the gate operator. Failure to adjust and retest the gate operator properly can increase the risk of severe injury or death.
5. Use the manual 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. **SAVE THESE INSTRUCTIONS!**

Identifying Gate Operator Category and UL 325 Usage Class

The UL 325 standard covers gate operators. Within this safety standard, several Usage Classes are described that define different types of installations where gate operators can be applied. Some operators are restricted in their usage application. Appropriate Usage Classes are shown in the Specifications.



Class I:

Intended for use in a location of one to four single family dwellings or a parking area associated with one to four single family dwellings.



Class II:

Intended for use in a commercial location or building such as a multi-family housing units (five or more single family units) hotels, garages, retail stores or other buildings servicing general public.

NOTE

The Juno operator is rated for use **ONLY** in Class I and Class II scenarios, as shown above.

Important Safety Information



WARNING

This automatic gate operator is not designed nor is it intended for pedestrian traffic. Vehicular gate operators must by their nature be powerful to function reliably. This power can cause injury or death. Accordingly, direct all pedestrian traffic to a separate walk-through gate.

Install this gate operator only when:

- The operator is appropriate for the construction of the gate and the Usage Class of the site.
- All openings of a horizontal slide gate are guarded or screened from the bottom of the gate to a minimum of 1.83 m (6 ft) above the ground to prevent a 57.2 mm (2-1/4 in) diameter sphere from passing through the openings anywhere in the gate, and in that portion of the adjacent fence that the gate covers in the open position.
- All exposed pinch points are eliminated or guarded.
- Guarding is installed for exposed rollers.

The operator is intended for installation only on gates used for vehicles. Pedestrians must be supplied with a separate access opening. For pedestrian access in the vicinity of an automated vehicular gate, separate pedestrian access shall be provided or available. The pedestrian access shall be in a location such that a pedestrian shall not come in contact with a moving vehicular access gate during the entire path of travel of the vehicular gate. A pedestrian gate shall not be incorporated into an automated vehicular gate panel.

The gate must be installed in a location so that enough clearance is supplied between the gate and adjacent structures when opening and closing to reduce the risk of entrapment. Swinging gates shall not open into public access areas.

The gate must be properly installed and work freely in both directions prior to the installation of the gate operator. Do not over-tighten the operator clutch or pressure relief valve to compensate for an improperly installed, improperly functioning or damaged gate.

Permanently mounted controls intended for user activation must be located at least 1.83 m (6 ft) away from any moving part of the gate and where the user is prevented from reaching over, under, around or through the gate to operate the controls. **Exception:** Emergency access controls, only accessible by authorized personnel (e.g. fire, police, EMS), may be placed at any location in the line-of-sight of the gate.

The **Stop** and/or **Reset** button must be located in the line-of-sight of the gate. Activation of the reset control shall not cause the operator to start.

A minimum of two (2) WARNING SIGNS shall be installed, in the area of the gate. Each placard is to be visible by persons located on the side of the gate on which the placard is installed.

For gate operators utilizing a non-contact sensor (Photo Eye):

- See instructions on the placement of non-contact sensors for each type of application.
- Care shall be exercised to reduce the risk of nuisance tripping, such as when a vehicle trips the sensor while the gate is still moving.
- One or more non-contact sensors shall be located where the risk of entrapment or obstruction exists, such as the perimeter reachable by a moving gate or barrier.

For a gate operator utilizing a contact sensor (Edge):

- One or more contact sensors shall be located where the risk of entrapment or obstruction exists, such as at the leading edge, trailing edge, and post-mounted both inside and outside of a vehicular horizontal slide gate.
- A hardwired contact sensor shall be located and its wiring arranged so that the communication between the sensor and the gate operator is not subjected to mechanical damage.
- A wireless device that transmits radio frequency (RF) signals to the gate operator for entrapment protection functions shall be located where the transmission of the signals are not obstructed or impeded by building structures, natural landscaping or similar obstruction. A wireless device shall function under the intended end-use conditions.
- One or more contact sensors shall be located on the inside and outside leading edge of a swing gate. Additionally, if the bottom edge of a swing gate is greater than 152 mm (6 in) but less than 406 mm (16 in) above the ground at any point in its arc of travel, one or more contact sensors shall be located on the bottom edge.

Important Safety Information

Use of Vehicle Detectors

Use of vehicle detectors (loop detectors) is strongly encouraged to prevent damage to vehicles caused by gates closing on them. This is not considered to be a safety item as most vehicle detectors cannot provide protection to pedestrians. In some situations, photoelectric devices may be used as vehicle detectors, but they should be wired accordingly.

Gate Construction and Safety

Gate construction plays a very important role in ensuring the safety of any automated gate system. The standard for gate construction is ASTM F2200. Below are key areas to address in gate design for safety. For complete information consult the standard. Copies of the standard are available at: <https://www.astm.org/f2200-24.html>.

Another source of information is available from DASMA, the Door and Access System Manufacturer's Association. The Association publishes Technical Data Sheets, one of which concerns ASTM F2200. For more information, see: <https://www.dasma.com/publications/>

General Requirements for Gate Construction:

- Gates shall be constructed in accordance with the provisions given for the appropriate gate type listed. Refer to ASTM F2200 for additional gate types.
- Gates shall be designed, constructed and installed to not fall over more than 45 degrees from the vertical plane, when a gate is detached from the supporting hardware.
- Gates shall have smooth bottom edges, with vertical bottom edged protrusions not exceeding 0.50 in (12.7 mm) other than the Exceptions listed ASTM F2200.
- The minimum height for barbed wire shall not be less than 6 ft (1.83 m) above grade. The minimum height for barbed tape shall not be less than 8 ft (2.44 m) above grade.
- An existing gate latch shall be disabled when a manually operated gate is retrofitted with a powered gate operator.
- A gate latch shall not be installed on an automatically operated gate.
- Protrusions shall not be permitted on any gate. Consult ASTM F2200 for exceptions.
- Gates shall be designed, constructed and installed such that their movement shall not be initiated by gravity when an automatic operator is disconnected.
- For pedestrian access in the vicinity of an automated vehicular gate, a separate pedestrian gate shall be provided. The pedestrian gate shall be installed in a location such that a pedestrian shall not come in contact with a moving vehicular access gate. A pedestrian gate shall not be incorporated into an automated vehicular gate panel.
- Any non-automated gate that is to be automated shall be upgraded to conform to the provisions of this specification.
- This specification shall not apply to gates generally used for pedestrian access and to vehicular gates not to be automated.
- Any existing automated gate, when the operator requires replacement, shall be upgraded to conform to the provisions of this specification in effect at that time.

The following provisions shall apply to Class I, Class II, Class III, and Class IV vehicular horizontal slide gates:

All weight bearing exposed rollers 8 ft (2.44 m), or less, above grade shall be guarded or covered.

All openings shall be designed, guarded, or screened from the bottom of the gate to the top of the gate or a minimum of 72 inch (1.83 m) above grade, whichever is less, to prevent a 2-1/4 inch (57 mm) diameter sphere from passing through the openings anywhere in the gate, and in that portion of the adjacent fence that the gate covers in the open position. The gate panel shall include the entire section of the moving gate, including any back frame or counterbalance portion of the gate.

A gap, measured in the horizontal plane parallel to the roadway, between a fixed stationary object nearest the roadway (such as a gate support post) and the gate frame when the gate is in either the fully open position or the fully closed position, shall not exceed 2-1/4 inches (57 mm).

Exception: All other fixed stationary objects greater than 16 inches (406 mm) from the gate frame shall not be required to comply with this section.

Positive stops are provided to limit travel to the designed fully open and fully closed positions. These stops shall be installed at either the top of the gate, or at the bottom of the gate where such stops shall horizontally or vertically project no more than is required to perform their intended function.

All gates shall be designed with sufficient lateral stability to assure that the gate will enter a receiver guide. Consult ASTM F2200 for details on various gate panel types.

Important Safety Information

External Entrapment Protection Sensors

Most Nice gate operators are equipped with a Type A, Inherent Entrapment Sensor (IES). UL 325 Safety Standard compliance requires installation of external entrapment protection sensors, the number of which, depends on entrapment hazards that exist at each particular installation.

To comply with UL 325, the following external sensors may be used:

- Contact sensors, such as edge sensors
- Non-contact sensors, such as photo eyes

Site designer or installer can choose either photo eyes, edge sensors, or a combination of these devices.

UL 325 Safety Standard for automatic sliding gates specifically requires that edge sensors, photo eyes, or a combination of both devices be installed to protect against pedestrian entrapment in BOTH directions of gate travel and wherever entrapment hazards exist.

UL 325 Standard Definitions

- The operator shall monitor for the presence of every device at least once during each open and close cycle (32.1.8)
- It shall not be possible to make simple modifications in the field by adding, suppressing or changing, either on the operator or external entrapment protection device(s), to bypass, interfere with, or otherwise defeat the monitoring function. (32.1.10)
- Entrapment zones are now defined for each gate type (4.23, 4.24, 4.29, 4.34).

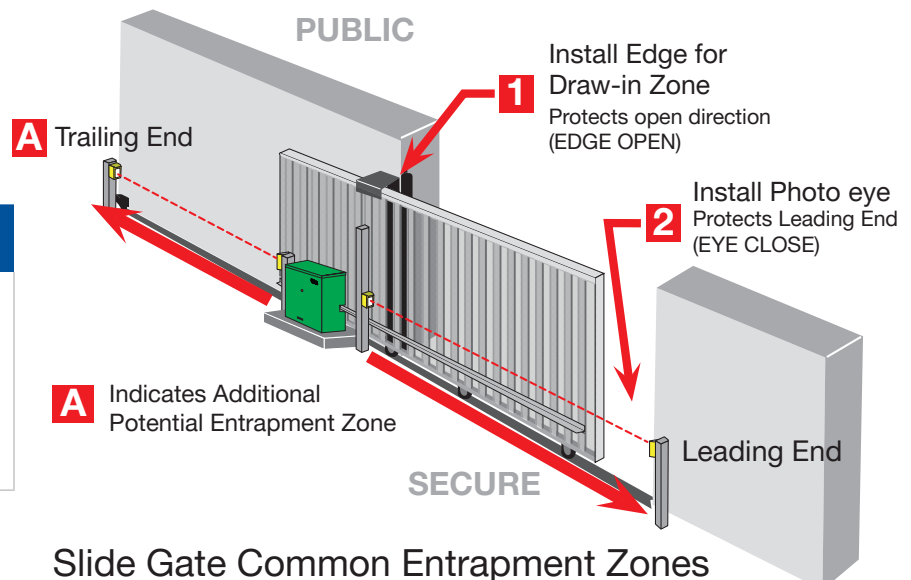
Slide Gates: To enable fully automatic operation, all SLIDE gate operators will require a minimum of TWO monitored external entrapment protection sensors (one for each direction) to protect entrapment zones in both the open and close direction of travel.

***Preferred solution for slide gates:** A photo eye for the close direction and a hard-wired edge sensor for the open direction that is mounted to the face of the leading post of the fence behind the gate. (Reach through injuries are the most common hazard associated with automatic sliding gates).*

***Preferred solution for swing gates:** A photo eye for the close direction and/or a hard-wired wrap-around edge sensor on the leading edge of the gate, which protects for both directions of gate travel.*

IMPORTANT NOTICE

Installers must assess each specific site and install sensors that protect all potential entrapment zones. For more information or to see the latest operator manuals, go to: support.hysecurity.com



Slide Gate Common Entrapment Zones

Important Safety Information

UL 325 Recommended Sensor Listing:

Edge sensors and photo eyes must be tested and labeled as “Recognized Components” or otherwise certified to UL 325 requirements in order to be deemed acceptable for use in a gate operator.

Study all Safety Instructions and consider your specific installation to determine where greatest entrapment risks exist. Locate edge sensors and/or photo sensors accordingly. Be certain that a sufficient number of sensors are used so that pedestrians are protected from entrapment in both directions of gate travel and all hazard areas are fully protected.

Nice gate operators utilizing the Mercury Controller, SmartCNX Controller, or the SmartTouch 720/725 Controller require external entrapment sensors that are BlueBus capable, or have a 10k Ohm or 4-wire pulsed monitoring output. Other Nice gate operators require external entrapment sensors that utilize Normally Closed (NC) contact means of monitoring. The operator instructions shall list the maximum number of open and close entrapment protection devices capable of being connected to the operator.

Refer to UL website at www.ul.com for most up-to-date list of gate operator safety standards (UL 325). Refer to www.astm.org for a complete list of ASTM F2200 Gate and Fence Standards.

Recommended External Entrapment Protection Sensors List



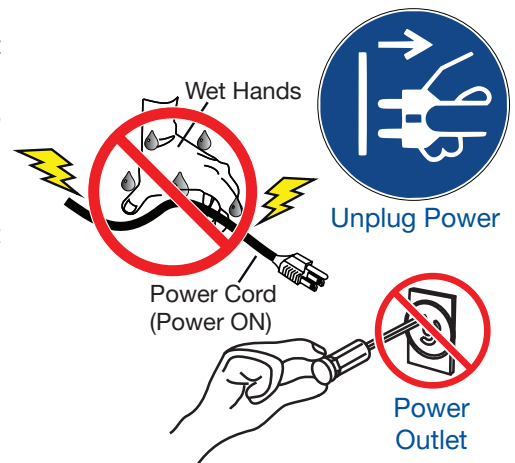
The following sensors have been tested with Nice gate operators by an independent laboratory and certified to comply with UL 325 7th Edition. Select sensors from this list for UL compliant gate automation solutions. Contact the sensor manufacturer for specific recommendations for use.

Recommended Sensors					Compatible Control Boards				
Type	Mfg. Part # or Model	Brand	Nice Hysecurity Part #	Max Range	Smart Touch	Smart DC	SmartCNX / SmartTouch 725	1050	Mercury 310
Photo Eyes (Retro-Reflective)	E3K-R10K4-NR-1	Omron	MX000999	40 ft	•	•	•		
	NIR-50-325	EMX	-	45 ft	•	•	•	•	•
	IRB-RET	EMX	-	53 ft	•	•	•	•	•
	IRB-RET2	EMX	-	53 ft	•	•	•	•	•
	E-931-S50RRGQ	Seco-Larm	-	46 ft	•	•	•		•
Photo Eyes (Thru-Beam)	Blue Bus Era Photo Eyes	Nice	EPMB/A, EPMOB/A EPLOB/A, EPMAB/A EMBORB/A	45 ft			•	•	•
	OVS-50TNR	Optex	-	33 ft	•	•			
	IRB-MON	EMX	MX3990	65 ft	•	•	•		•
	IRB-MON2	EMX	MX5792-01	65 ft	•	•	•		•
	E-960-D90GQ	Seco-Larm	-	90 ft	•	•	•		•
Edge Sensors	Sentir Series	ASO Safety	"AS1502-* AS1501-*"	-	•	•	•	•	•
	CPT Models	Miller Edge	-	-	•	•	•	•	•
Edge Sensor Converters	Hy2NC (Converts 10K to NC Monitoring)	Nice	MX4018	-	•	•			
	GEM103 (Converts 10K to Pulsed Monitoring)	Miller Edge	-	-				•	
Edge Wireless Kits	iGAZE RE Kit	Transmitter Solutions	-	-	•	•	•	•	•
	WEL-200	EMX	-	-	•	•	•	•	•
	RB-G-K10C	Miller Edge	-	-	•	•	•	•	•
Multi-Input Module	The Solution – MIM-62	Miller Edge	-	-	•	•	•		•

Important Safety Information

Electrical Safety

- Turn gate operator and all circuit breakers OFF before performing maintenance on the gate operator or making contact with output receptacles.
- Never insert any objects into output receptacles during operation. The possibility exists of electrical shock, electrocution, or death.
- Never let power wires lay in water.
- Never use damaged or worn wire when connecting equipment. Inspect for cuts in the insulation.
- Never grab or touch a live power cord or cable with wet hands. The possibility exists of electrical shock, electrocution or death.
- Always make certain that proper power has been selected for the job. See Cable Selection Chart in this manual.



Grounding Safety

- Always make sure that electrical circuits are properly grounded to a suitable earth ground (ground rod) per the National Electrical Code (NEC) and local codes. Severe injury or death by electrocution can result from operating an ungrounded operator.
- Never use gas piping as an electrical ground.



Battery Safety

Nice operators use sealed Absorbed Glass Mat (AGM) batteries and Nice highly recommends replacing used batteries with new AGM-type batteries.

CAUTION

Batteries used with Nice gate operator contain materials considered hazardous to environment. Proper battery disposal is required by federal law. Refer to *Hazardous Waste Regulations* federal guidelines.

To reduce risk of fire or injury to persons:

- Observe polarity between batteries and charging circuit.
- Never mix battery sizes, types, or brands. Charging circuit on Nice DC operators is designed for AGM-type batteries, not flooded lead acid-type or lithium batteries.
- Exercise care in handling batteries. Be aware metal found in rings, bracelets, and keys can conduct electricity, short batteries, and cause potential injury.
- Do not open or mutilate batteries. Battery cells contain corrosive materials which may cause burns and other injuries. Material within batteries is toxic.
- Always dispose of batteries properly. Do not place batteries in fire. Battery cells may explode. Follow federal guidelines for proper disposal of hazardous waste.
- Always keep battery cables in good working condition. Repair or replace all worn cables.
- Replace batteries according to instructions found in DC Battery Replacement.
- Do not charge frozen battery. Battery can explode. If frozen, warm the battery to at least 61°F (16°C).



Environmental Safety/Hazardous Materials and Proper Disposal

Decommissioning is a controlled process used to safely retire a piece of equipment that is no longer serviceable. If the equipment poses an unacceptable and unreparable safety risk due to wear or damage or is no longer cost effective to maintain (beyond life-cycle reliability) and is to be decommissioned (demolition and dismantlement), be sure to follow rules below.

- Do not pour waste oil directly onto the ground, down a drain or into any water source.

Important Safety Information

- Contact the county Department of Public Works or recycling agency in your area and arrange for proper disposal of any electrical components, waste or oil associated with this equipment.
- When the life cycle of this equipment is over, remove battery and bring to appropriate facility for lead reclamation. Use safety precautions when handling batteries that contain sulfuric acid.
- When the life cycle of this equipment is over, it is recommended that the frame and all other metal and plastic parts be sent to a recycling center.

Metal and plastic recycling involves the collection of metal and plastic from discarded products and its transformation into raw materials to use in manufacturing a new product.

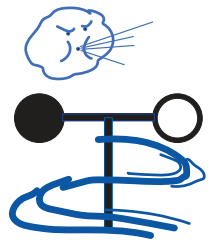
Recyclers and manufacturers alike promote the process of recycling metal and plastic. Using a metal and plastic recycling center promotes energy cost savings.



Wind Load Factors & Site Prep

Wind load is always a factor when considering the appropriate gate for a particular site. Solid gate panels produce a larger wind load than gates with slats or open decorative features. If you are installing a gate operator in a high wind area, gate design will affect the load on the gate operator because wind load acts the same as an obstruction. Good gate panel design presents a low surface area to reduce the wind load.

If gate is heavy and near weight capacity of what the gate operator can handle (see specifications), make sure it has an open design that allows wind to flow through it. A solid or semi-solid gate design under certain wind load conditions may cause damage to gate operator and is not covered by the Nice Limited Warranty.



Several factors play into calculations of wind load on a gate panel. To find out maximum wind speed in areas around the United States, search for US government wind speed maps on the internet. If you don't know how to calculate for wind load, ask a mechanical engineer or site architect for assistance prior to installing gate operator and gate panels.

When the IES trips, it sends a signal to gate operator to stop and reverse direction. This feature may be falsely triggered in excessively windy conditions because wind itself, acting over surface area of gate panel, can provide necessary force to trigger IES.



CAUTION

Do not adjust IES sensitivity to accommodate for inappropriately designed gate panels. Loss of IES sensitivity increases mechanical wear on gate hardware and gate operator. It may also pose a safety hazard. Compensating for wind loads by adjusting IES may set IES sensitivity to a level which, when encountering an obstruction, ignores obstruction and fails to reverse direction. For more information, refer to Adjusting the IES Sensitivity.

Maintenance of Gate Systems

To keep your automated gate system performing both safely and reliably it is important to ensure that the components of that system are functioning properly.

At least monthly:

- Disconnect the gate operator and manually move the gate through its range of travel. Note any squeaks from rollers or hinges or areas of binding. The gate should travel smoothly and quietly throughout its range. If it does not, contact a gate professional to correct the problem.
- Reconnect the gate operator and perform the following tests:
 - » With the gate opening, block any photo eyes and/or depress any safety edges used to protect the open direction. The gate should stop and/or reverse.
 - » With the gate closing, block any photo eyes and/or depress any safety edges used to protect the close direction. The gate should stop and/or reverse.
 - » Using a suitable obstruction in the path of the gate (a solid, immovable object), run the gate in the open direction until it contacts the obstruction. The gate should stop and/or reverse.
 - » Using a suitable obstruction in the path of the gate (a solid, immovable object), run the gate in the close direction until it contacts the obstruction. The gate should stop and/or reverse.

Important Safety Information



CAUTION

- The gate operator installation is NOT a “do-it-yourself” project. Contract a qualified gate operator installation company to install this system to ensure a safe and reliable installation.
- Property owner is responsible to ensure installer is qualified to make a safe and professional installation.
- Consult local government agencies for up-to-date rules and regulations to satisfy licensing, codes or regulations that regulate automated gate system design and installation.
- The gate being modified should be level and plumb and the gate should open and close easily and evenly.

Site Installation

Installation Overview and Planning

An installation of the Juno slide gate operator requires some planning, including the height and location of the operator, position of the chain on the gate and identification of entrapment zones, including placement of warning signs and installation of entrapment sensors.

Refer to the checklist, list of tools, install options and diagrams of gate installations on the following pages for more information.

Install Checklist

- 1. Check all materials to ensure they are suitable for use and compliant with current standards.**
- 2. Check the following to ensure gate structure is suitable for automation:**
 - Weight and dimensions of gate are within specified operating limits.
 - There are no points of friction when gate is opening or closing.
 - There is no danger of gate derailing.
 - Mechanical stops are sturdy, with no risk of deformation when gate stops with force.
 - Gate is well balanced and does not move by itself when placed in any position.
 - Operator is raised sufficiently above the ground to avoid flooding.
 - Installation area allows the motor's manual release to be operated safely and easily.
 - Mounting positions of the various devices are sufficiently secure and protected from impacts.
- 3. Prevent components from being immersed in water or other liquids.**
- 4. Keep operator away from heat sources, open flames, acid, or a potentially explosive atmosphere.**
- 5. If there is an access door in the gate, or within the range of movement of the gate, make sure that it does not obstruct normal travel. Mount a suitable interlock system if necessary.**
- 6. Only connect the control unit to a power supply line equipped with a safety grounding system.**
- 7. The power supply line must be protected by suitable magnetothermal and differential switches.**
- 8. A disconnection device must be inserted in power supply line between operator power and electrical mains per the following:**
 - Distance between contacts must be at least 3.5 mm with overvoltage category of III or equivalent system (i.e. an outlet and relative plug).
 - If the disconnection device is not mounted near the operator and automation system, it must have a locking system to prevent unintentional, unauthorised operation.

Install Tools Needed

Below is a list of tools and materials necessary for installation of the Juno operator:

- Wire cutters/strippers
- Basic hand tools (screwdrivers, wrenches, pliers, etc..)
- Drill and assorted size bits
- Hardware for mounting gate operator
- Electrical conduits, wire nuts, grommets, asphalt patch, etc. as needed

Juno Installation Options

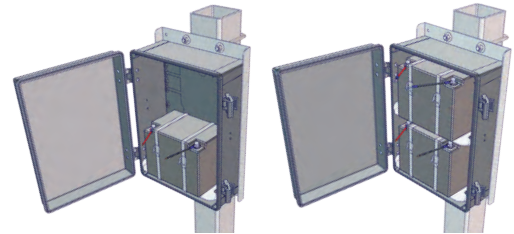
POWER OPTIONS FOR BATTERY CHARGING:

- AC electrical source
- Solar panel source

BATTERY BOX OPTIONS:

The following two backup battery box options are available:

- Enclosure for single battery (x1 AGM, 12VDC, 35Ah) [Part: MX5570-35]
- Enclosure for two batteries (x2 AGM, 12VDC, 35Ah, wired in parallel) [Part: MX5570-70]

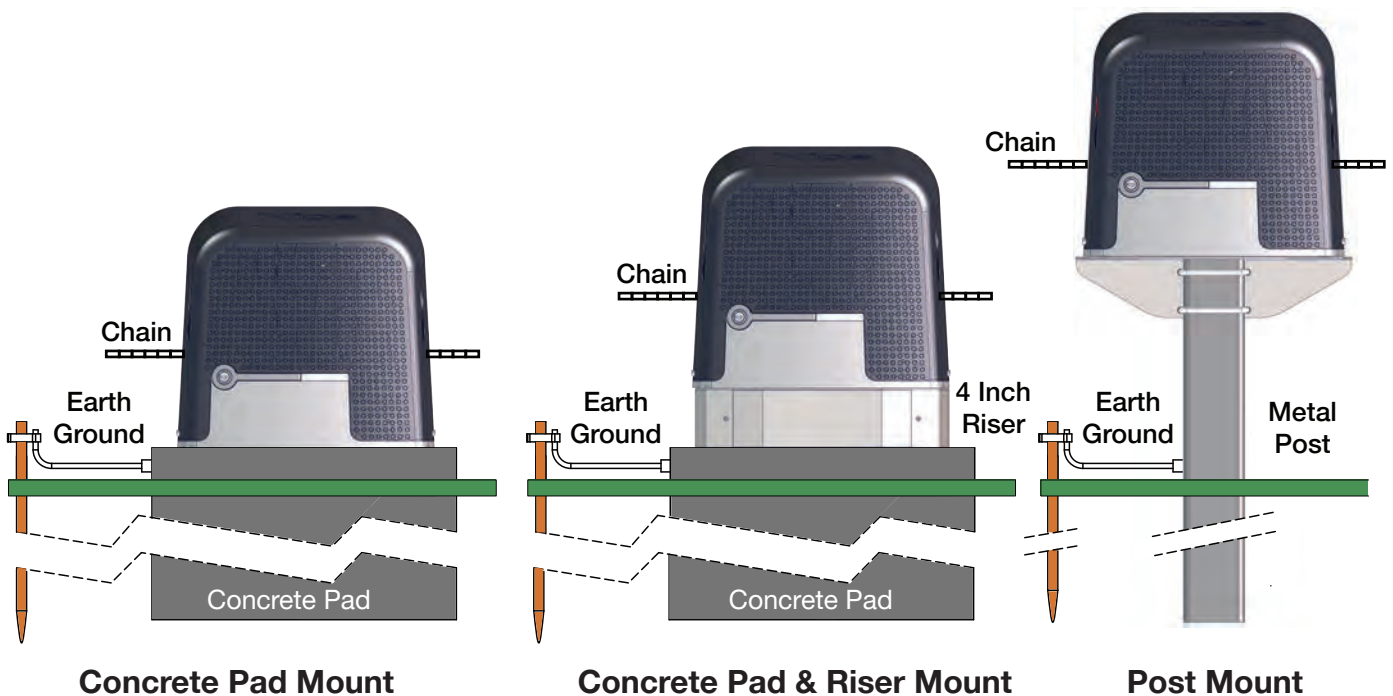


Juno Battery Box Options

OPERATOR MOUNTING OPTIONS:

Juno may be installed in one of the following three ways (See the illustration below):

- Concrete pad
- Concrete Pad with 4" Base Riser [Part: MX5583]
- Metal Post [Part: MX5710]

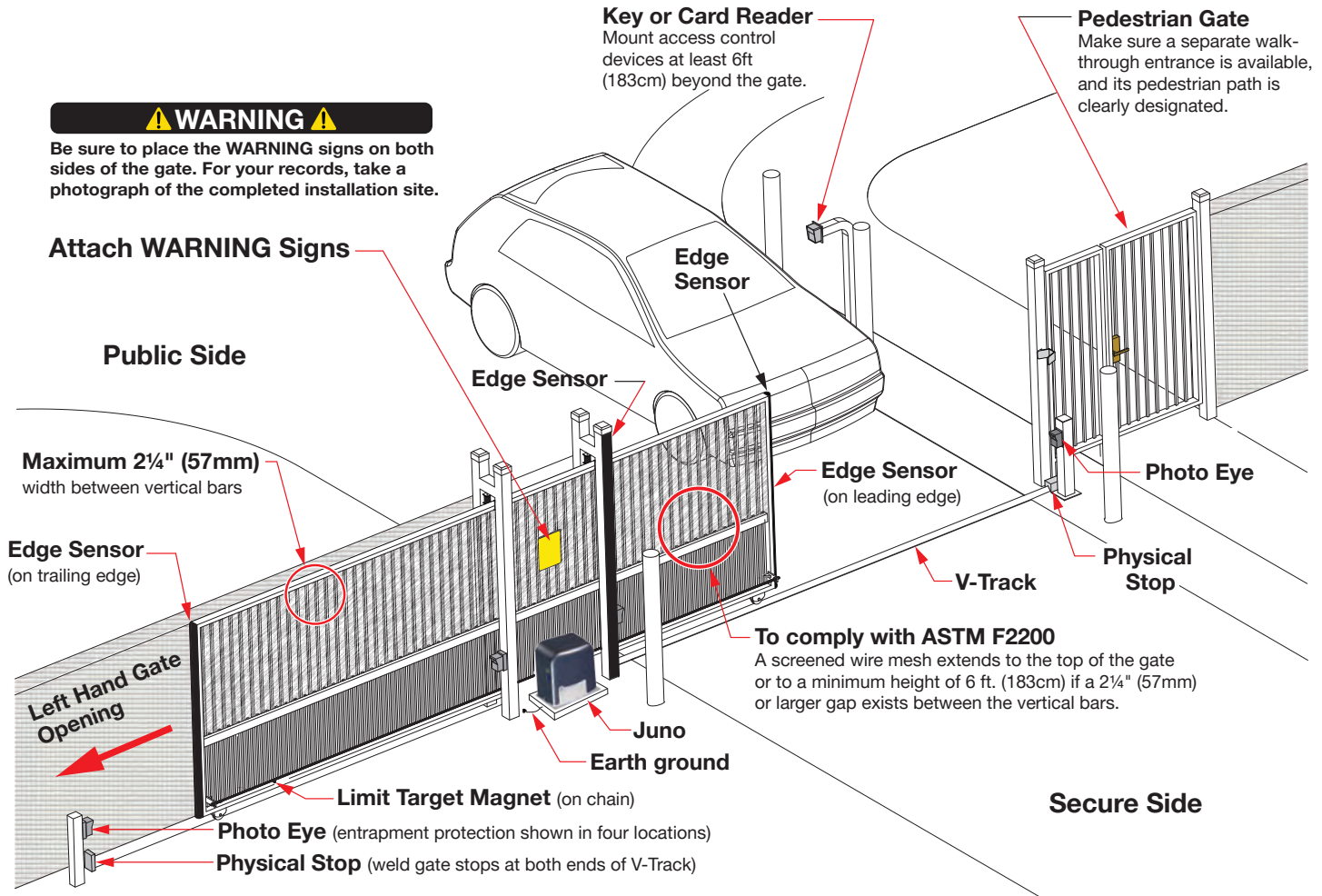


Juno Operator Installation Options

Important Installation Site Considerations

Site Overview and Planning

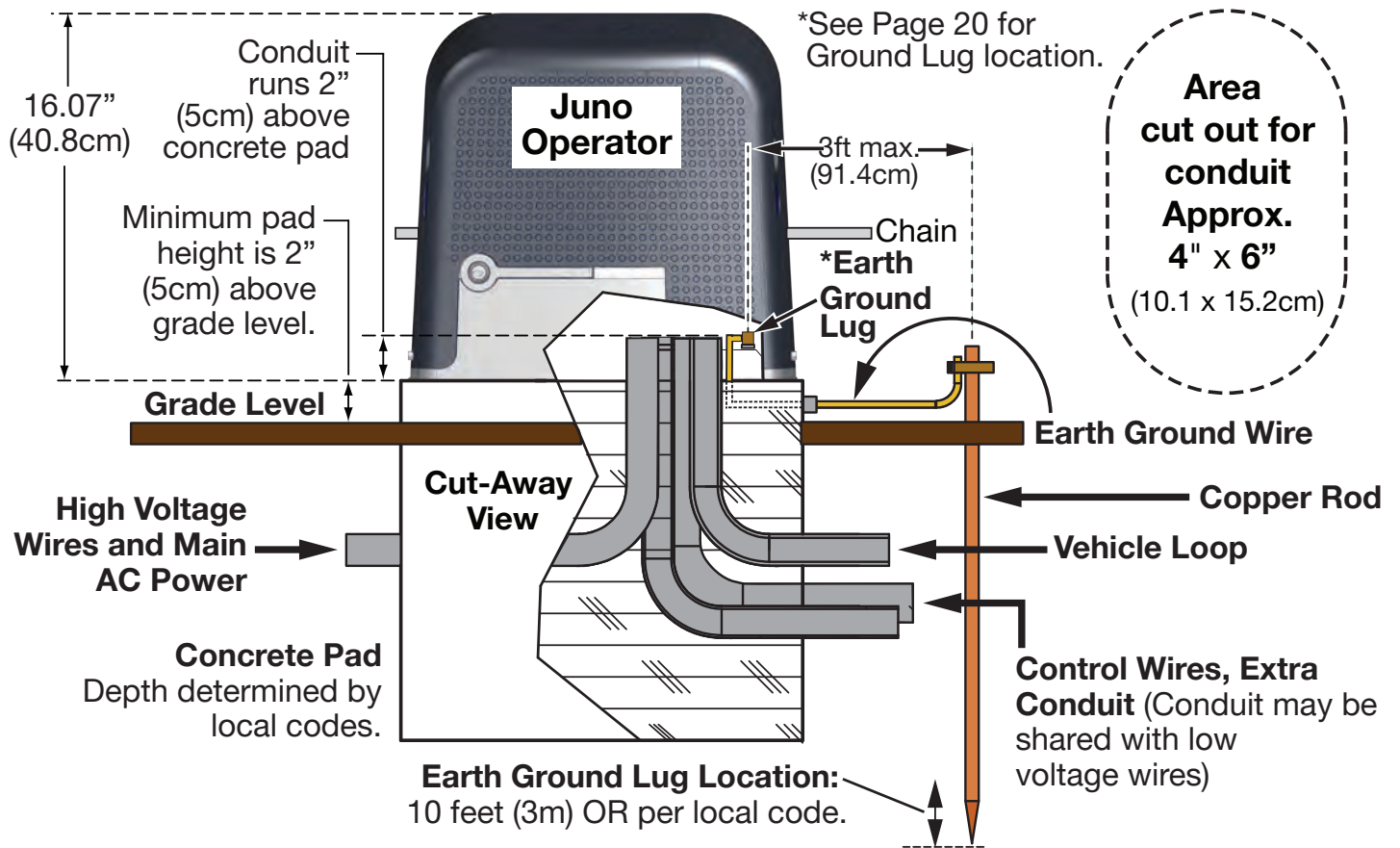
This diagram shows an example of a concrete pad mounted Juno installation with a number of important considerations to take during the planning phase.



Important Concrete Pad Considerations

If pouring a concrete pad for installation of the Juno operator, do the following:

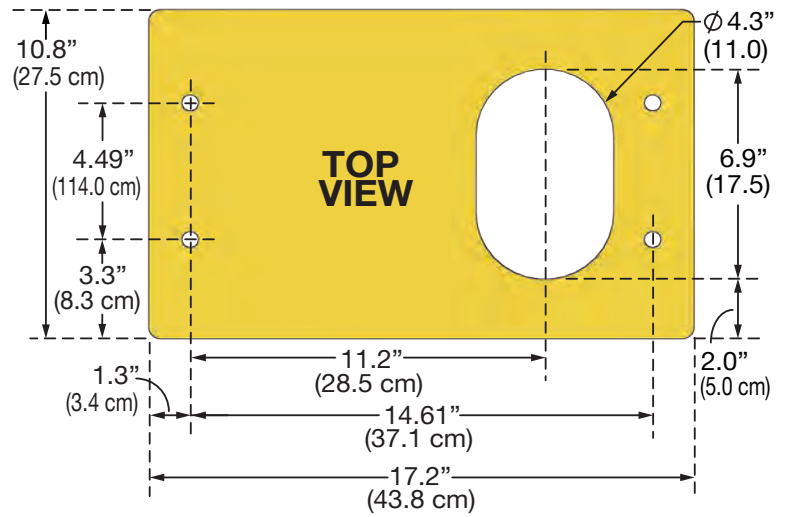
1. Follow local building codes to identify the frost line and determine the required depth of the concrete pad. Nice recommends a minimum 16-inch depth with a minimum 2-inch extension. See the diagram below that displays a typical concrete pad installation for Juno showing ground rod and conduit routing.
2. Before pouring the pad, consider all conduit placement so they fit within the confines of the cutout in the Juno baseplate. Refer to **DETAIL A** and **B** (next page) for dimensions. Run separate conduits for:
 - High voltage wiring (120VAC supply power) including equipment ground.
 - Low voltage wiring (12V accessory power), which includes:
 - a. Vehicle loop control wiring
 - b. Accessory control wiring
 - Earth ground (NEC/NFPA). The Juno ground lug location is shown in Fig 1-2, **page 20**.
3. Extend conduit height 2-inches (5cm) above the pad (4-inches [9cm] above ground level). Make sure the concrete forms are square with the gate and the pad is level. The operator footprint, with cover, is approximately an 17.2" (438cm) x 10.8" (275cm). See **DETAIL B** (next page) for general minimum pad dimensions.
4. For specific instructions to form a concrete pad for Juno, refer to **Concrete Pad Installation, page 20**.



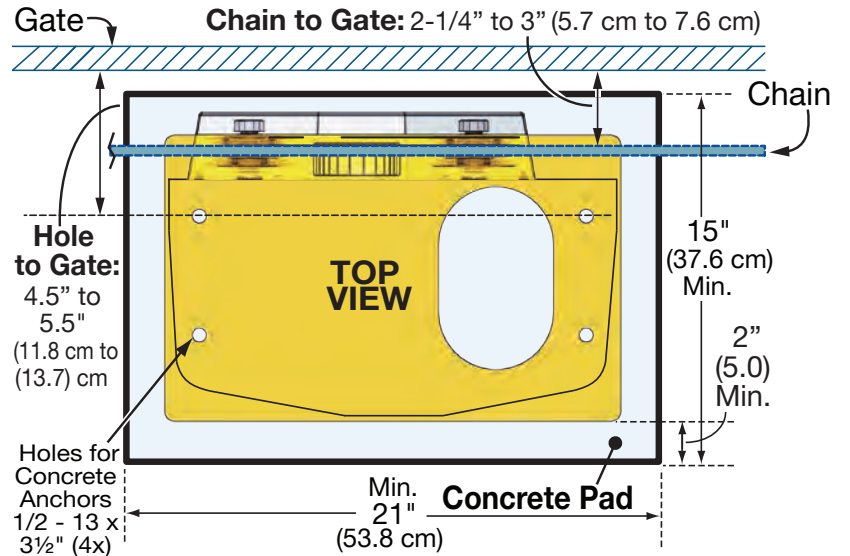
Juno Concrete Pad Considerations

Important Concrete Pad Considerations

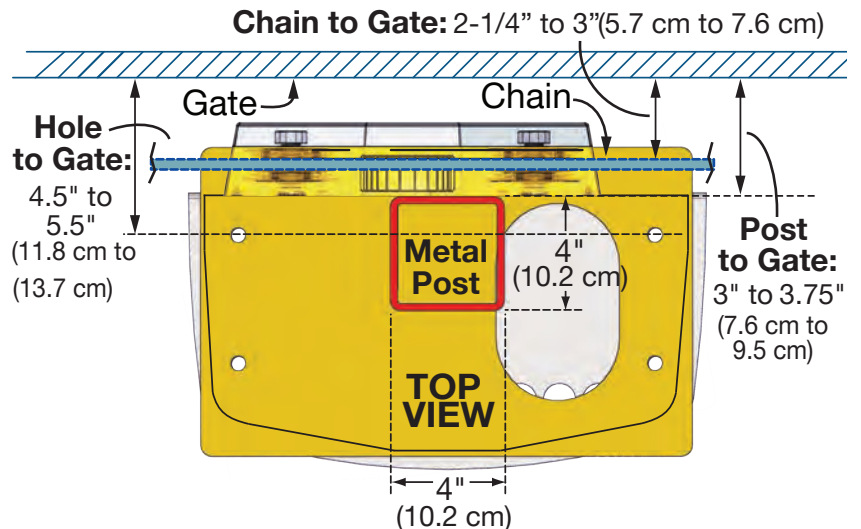
**DETAIL A
Juno Baseplate Dimensions**



**DETAIL B
Juno Pad Mount Dimensions**



**DETAIL C
Juno Post Mount Dimensions**



1. Concrete Pad Installation

To prepare a concrete pad to mount Juno upon, refer to the previous two pages and follow the instructions below:

1. Prepare the pad with dimensions suitable for placing the Juno operator on top (min. 2" edge all around).
2. Embed necessary conduits into the concrete, as illustrated in the example in FIG. 1-1. Use the Juno baseplate, DETAIL A, as a template (see previous page).

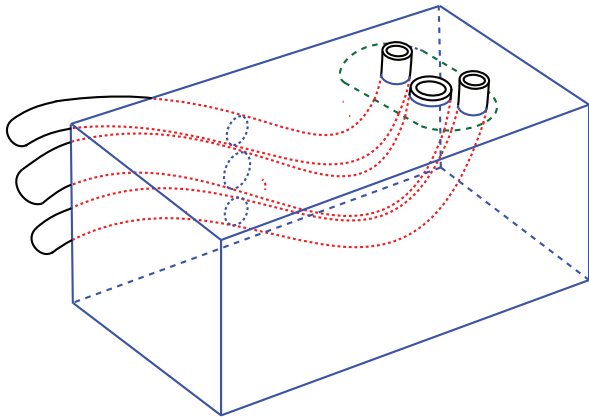
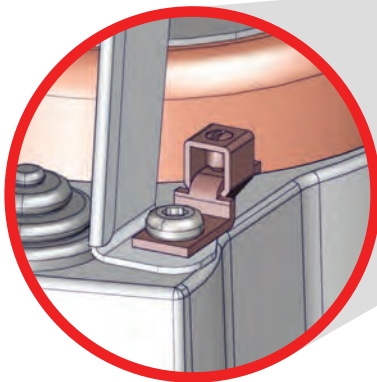


Fig-1-1: Embedded Conduits

3. Plan the grounding and arrange ground wire for connection to grounding lug (location shown in Fig 1-2, Detail D).



Detail D
Ground Lug Location

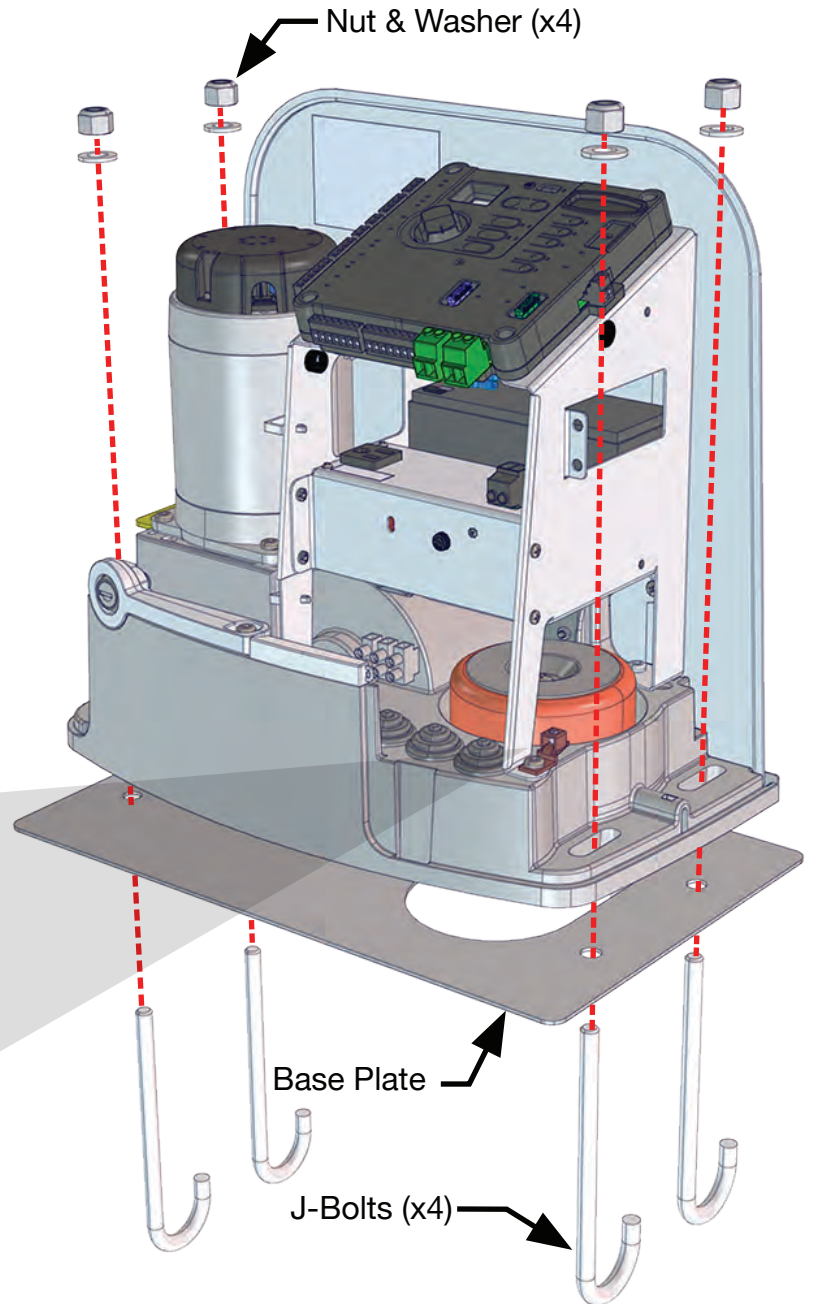


Fig-1-2: Juno Hardware Assembly

- Assess limitations in the chain path, such as gate support posts. Adjust operator's location and position as required according to the necessary dimensions in FIG. 1-3. Mark the mounting locations based on gate, operator and chain requirements. Mark the drill point at the center of slots to allow for adjustments.
- Juno may be installed to pad in one of two ways:

NOTE: Ensure chain path is parallel with the gate!

- J-Bolts:** Attach J-bolts to baseplate using hardware, then place baseplate on the pad embedding J-bolts into the concrete as shown in FIG. 1-2. Ensure that it is level and plumb, then let concrete set.

- Concrete Anchors:** Place Juno on a concrete pad as a template, mark the holes, remove Juno from pad, drill the holes for the anchors and then install Juno to the anchors.

- Attach Juno to the concrete pad with hardware, ensuring conduits are oriented properly inside the Juno operator (FIG. 1-5) and that all critical dimensions are maintained (FIG. 1-3).

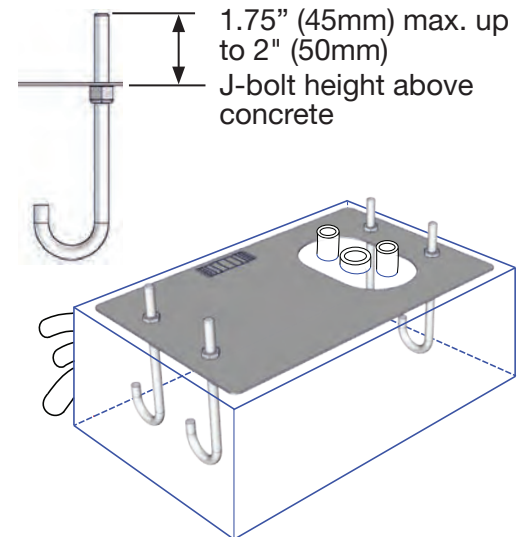


FIG. 1-4: Baseplate & J-Bolts

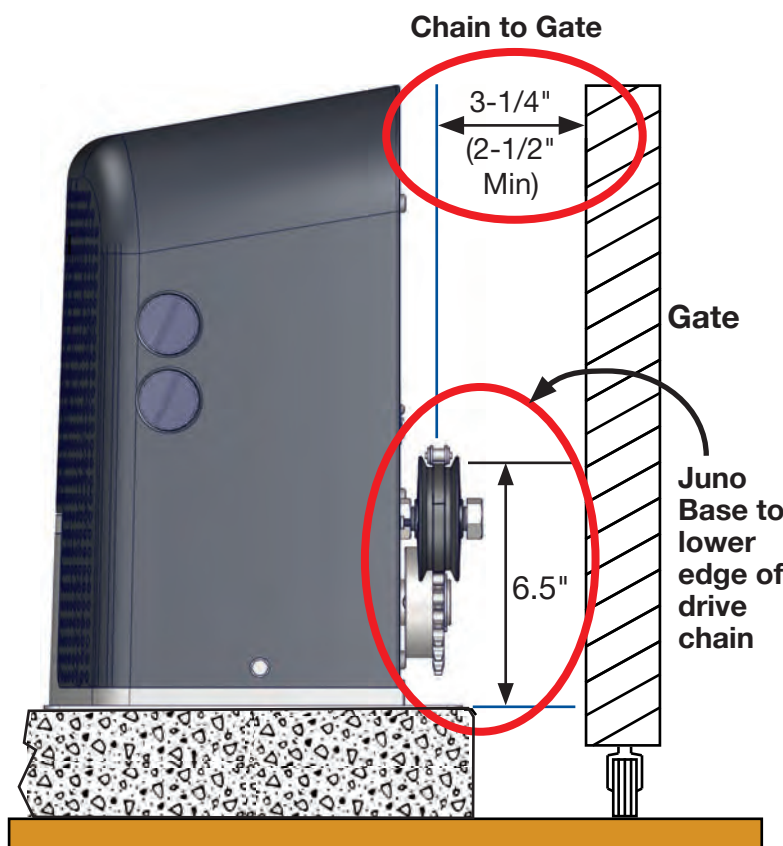


FIG. 1-3: Important Pad to Gate Dimensions

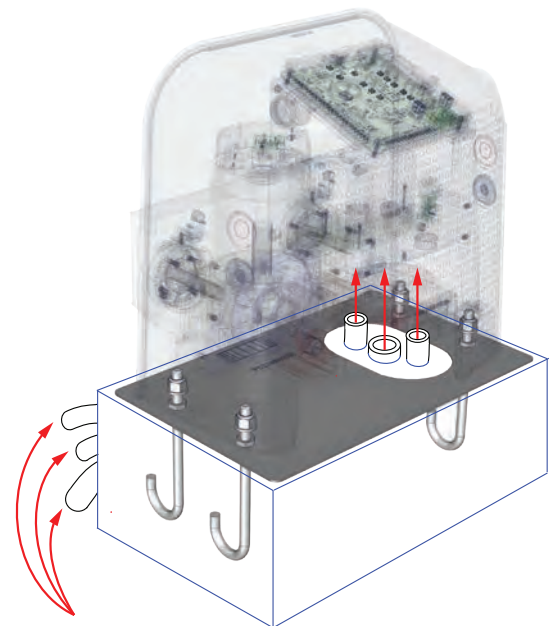


FIG. 1-5: Juno with J-Bolts

2. Post Mount Installation

To post-mount the Juno operator:

1. Cut a 4" x 4" steel metal post (P/N MX5710, sold separately) to desired height per site requirements.
2. Attach the mounting plate to a post using 3/8" u-bolts or by welding. Provided is 7/16" hardware for mounting the operator to post mount plate.
3. When installing, refer to Detail C, **page 19**, for the required Juno-to-gate dimensions.

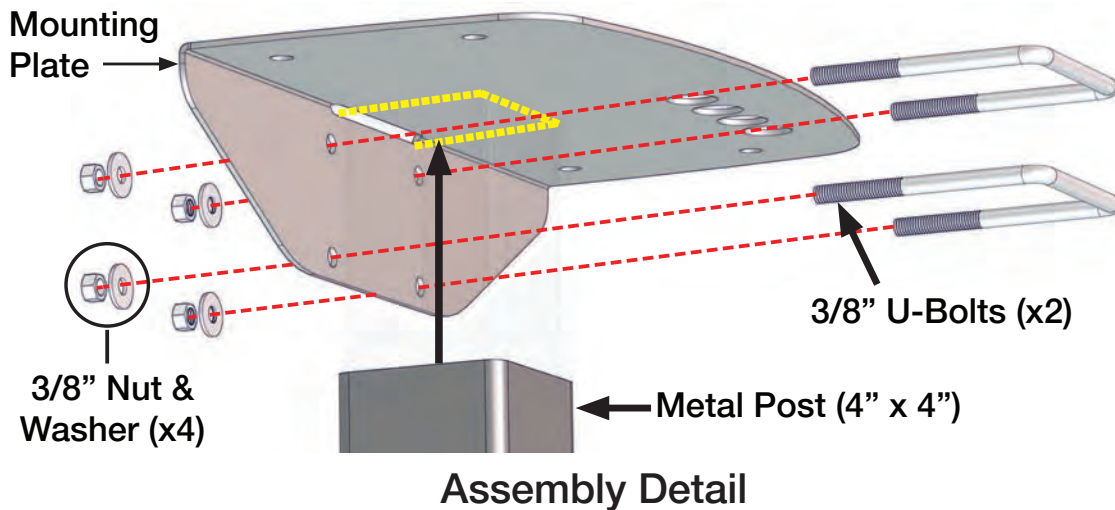


FIG. 2-1: Post-Mounting Plate and Hardware

NOTE

When installing the 4" x 4" metal post, refer to Detail C, **page 19**, for all necessary post-to-gate dimensions.

3. The 4" Riser Installation

The Juno operator may be mounted on an optional 4" riser [P/N MX5583 (sold separately)], featuring a removable front panel displayed in FIG. 3-1.

The riser may be mounted to a concrete pad (see **Concrete Pad Installation, page 20**), and the Juno operator is mounted on top. Slots are provided on the top and bottom of riser to accommodate 7/16" bolts, washers and nuts for attachments.

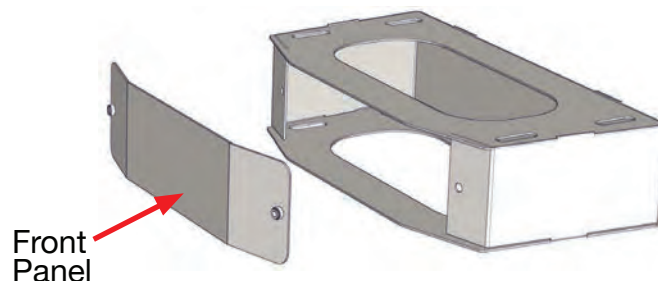
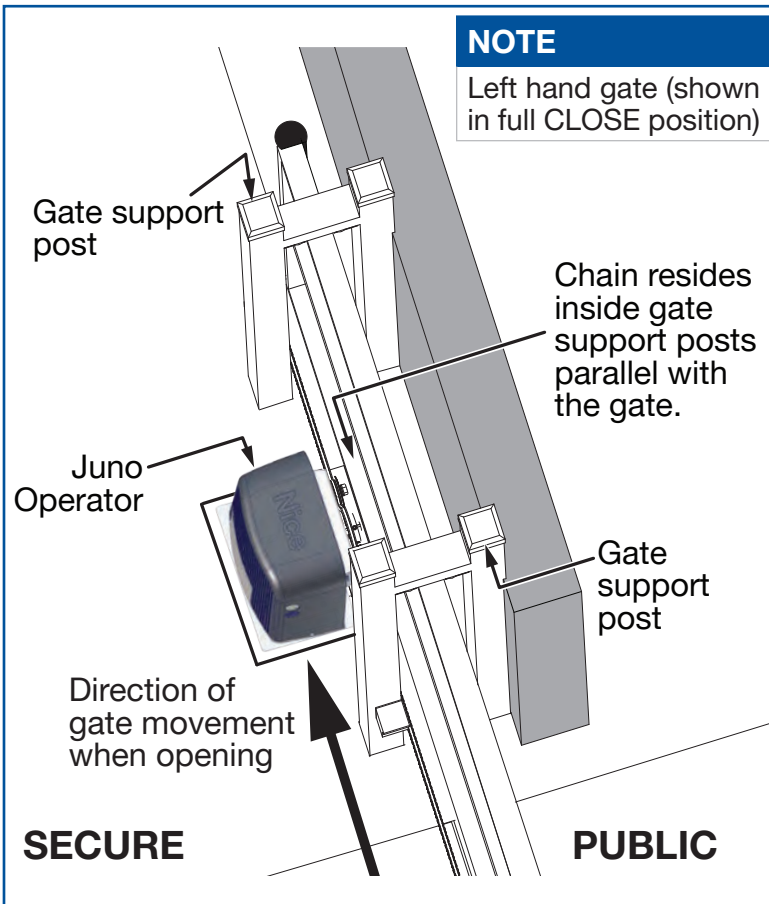
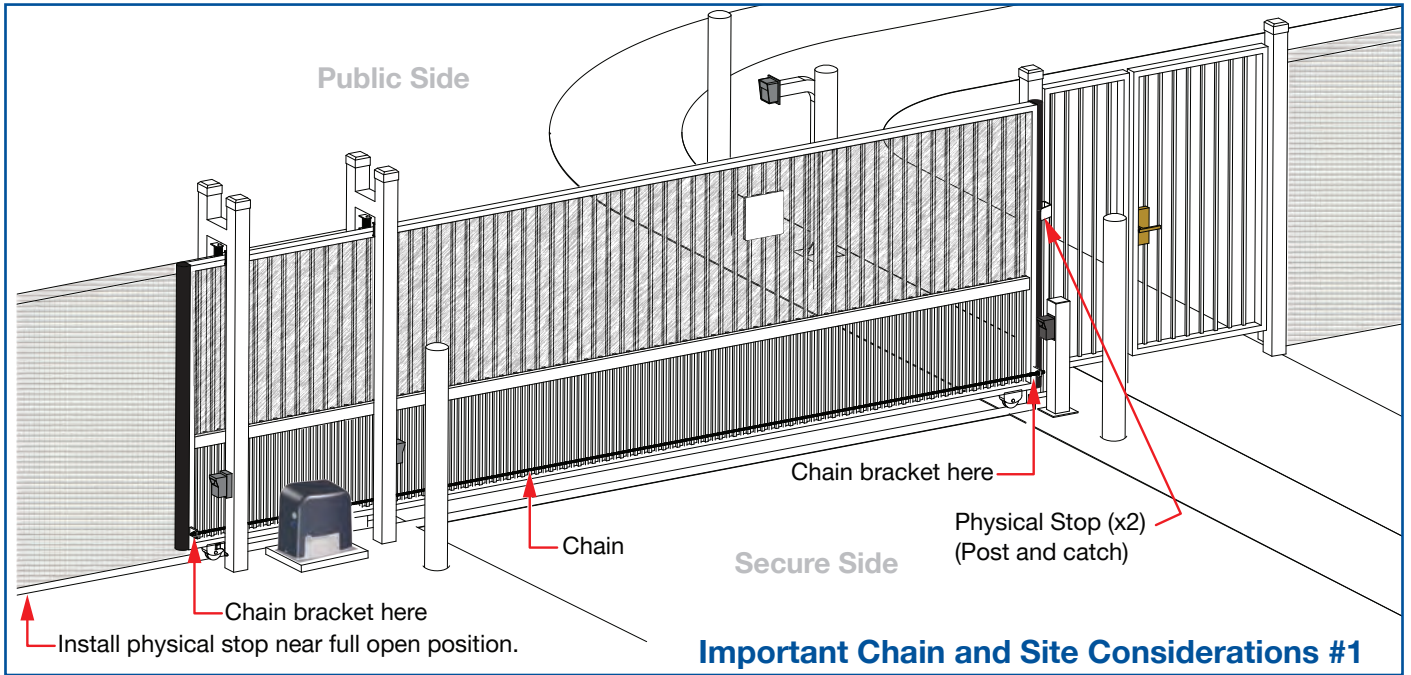


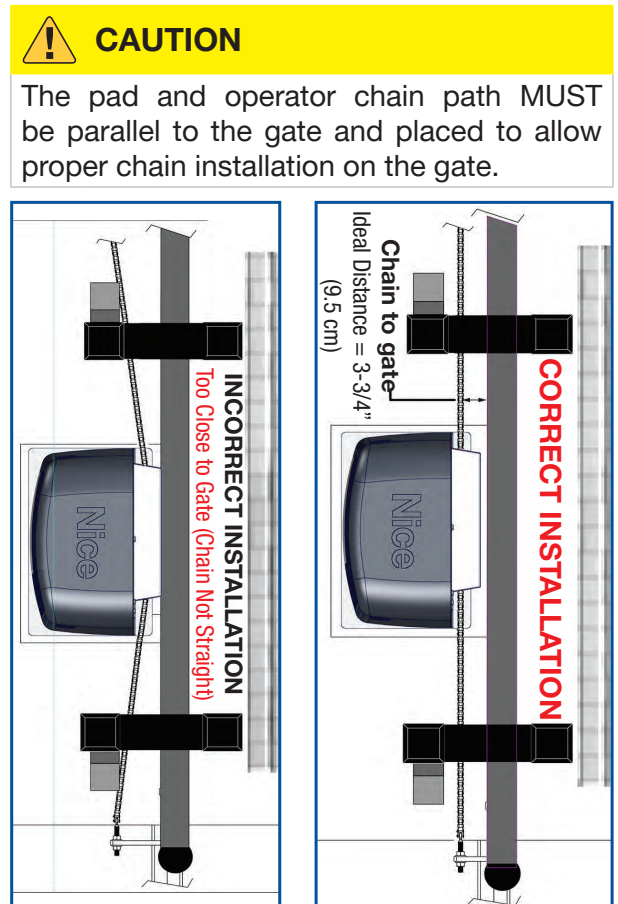
FIG. 3-1: Juno Optional 4" Riser

Important Chain Installation Considerations

Refer to the diagrams and images below for an overview of important considerations before installing the drive chain to the gate per instructions 4 and 5 on the following pages.



Important Chain and Site Considerations #2



Correct Chain Alignment

Juno Manual Release Lever Operation

Some procedures require disengaging Juno's main drive sprocket from the motor, which allows the gate to be manually opened or closed in the event of a power outage, for maintenance, or when installing the drive chain (see next page). Follow the instructions below in order to manually move the gate.

NOTE

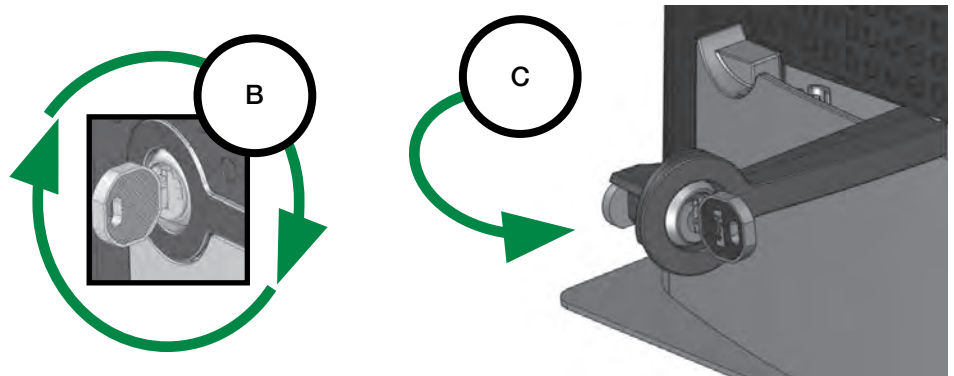
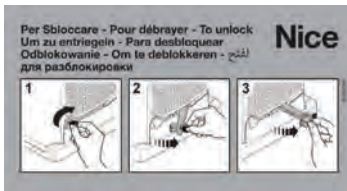
Manual release features allows for chain and magnetic target installation BEFORE connecting to AC Power.

To manually disengage the Juno motor from the main drive:

- A. Insert** key into Manual. Release Lever lock on front of unit.
- B. Turn** key clockwise to unlock.
- C. Pull** on key slightly to begin moving the lever outward, then grab entire lever and pull 90 degrees from the closed position.

When lever is pulled out, the motor is disengaged from the main drive and the gate may then be manually moved into closed and/or open positions.

The Manual Release label is included in this kit. Place the label in area visible to device operators.



Manual Release Lever Operation

4. Gate Bracket and Chain Installation

To install the chain brackets and chain assembly:

1. Use manual release lever to disengage Juno motor, **page 24**, then secure gate to prevent movement.
2. Retrieve Chain Kit (P/N MX4560, FIG. 4-1). Measure for proper chain alignment **BEFORE** installing brackets to the gate. Make sure the chain will run horizontal to the ground and parallel with the gate (FIG. 4-2).



FIG. 4-1: Chain Kit

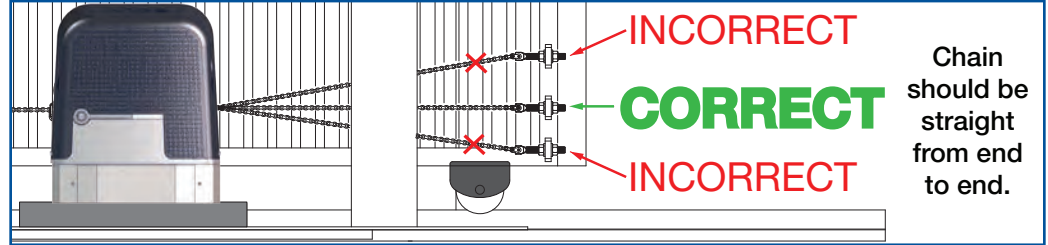


FIG. 4-2: Vertical Chain Alignment

3. Install a chain bracket at the gate leading and trailing edges (FIG. 4.3). The bracket can be welded in place to a steel gate. Alternatively, the bracket can be bolted to the gate. Use the bracket as a template and drill three 8mm (5/16") diameter holes through the gate frame. Secure with 8mm (5/16") bolts (not provided).
4. Attach the eye bolts to brackets, and then chain to eye bolts (as shown in FIG. 4-3).
5. Feed chain over the top of the Juno idler wheels and under the drive sprocket (**Detail D**), and attach to bracket assembly at opposite end of the gate. Make sure the chain is horizontal to the ground and parallel to the gate.
6. Adjust the nuts on the eye bolt to tighten the chain (minimize sag, but avoid over tightening). **Chain sag should not exceed 3 inches (76mm) from its anchor point.**

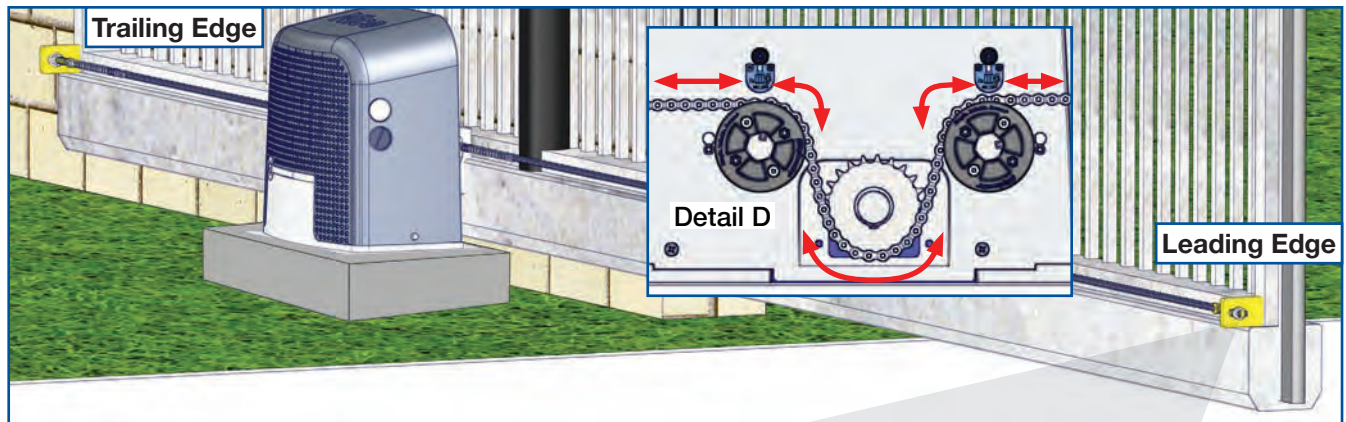


FIG. 4-3: Bracket Location and Chain/Bolt Assembly

5. Install Limit Target Magnets

To install limit target magnets:

1. Manually place the gate in either the fully open or close position (**page 25** for instructions).
2. At the target sensor closest to the gate end, mark the fixed (internal) link directly in front of the sensor.
3. Push gate 6" (or so) to give physical access to marked location on chain, then attach the limit target magnet to the fixed (internal) link, as shown in FIG. 5-2. The target sensor wiring remains the same regardless of which direction the gate opens.
4. Repeat the procedure for the other limit target magnet for the other limit. Install chain guard per FIG. 5-3.

NOTE

In FIG. 5-1, a few chain links (with magnetic targets installed) are shown located in front of each of two limit sensors to show relationship between sensor, magnet and chain.

Trailing and leading edge depend on gate opening direction. All labels are per gate installed per FIG. 5-4.

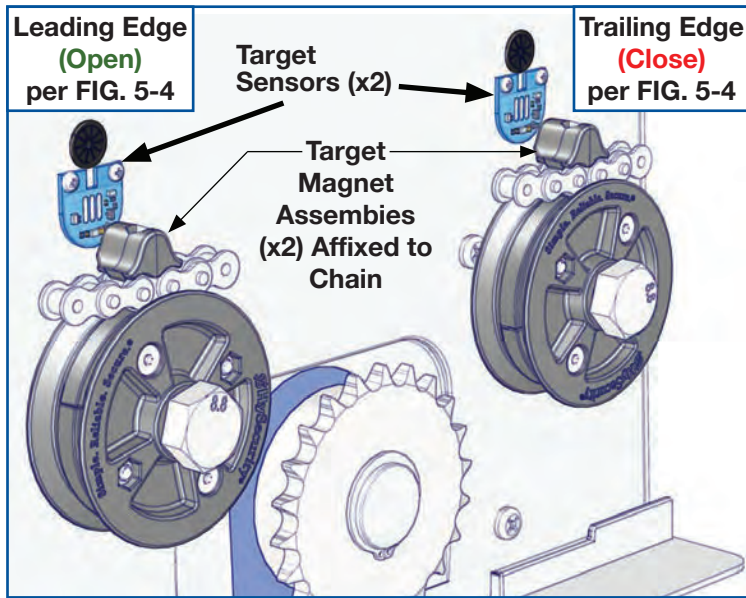


FIG. 5-1: Target Magnets and Sensors

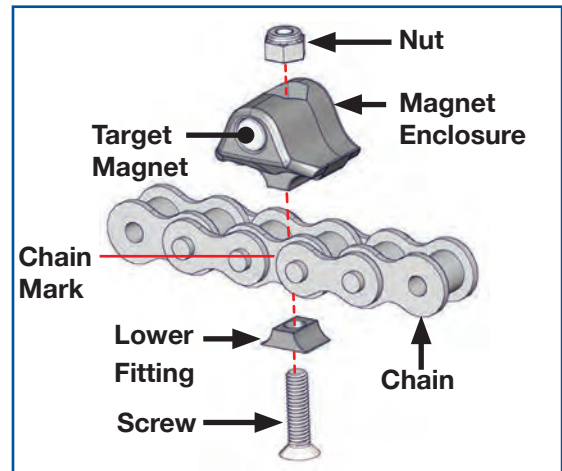


FIG. 5-2: Magnet Assembly

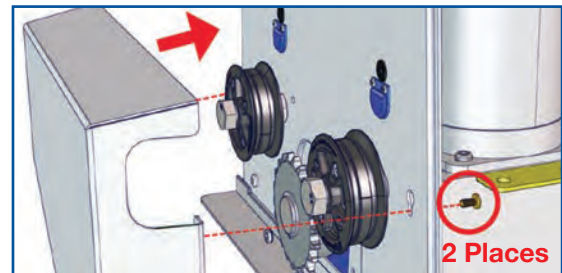


FIG. 5-3: Install Chain Guard

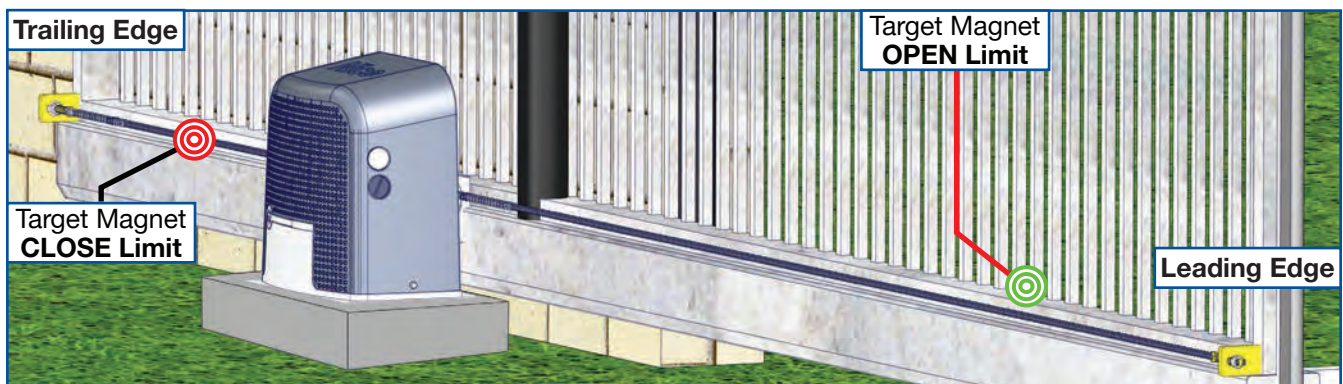


FIG. 5-4: Typical Juno Pad Mounted Installation Location

6. Juno Power Wiring

AC Power



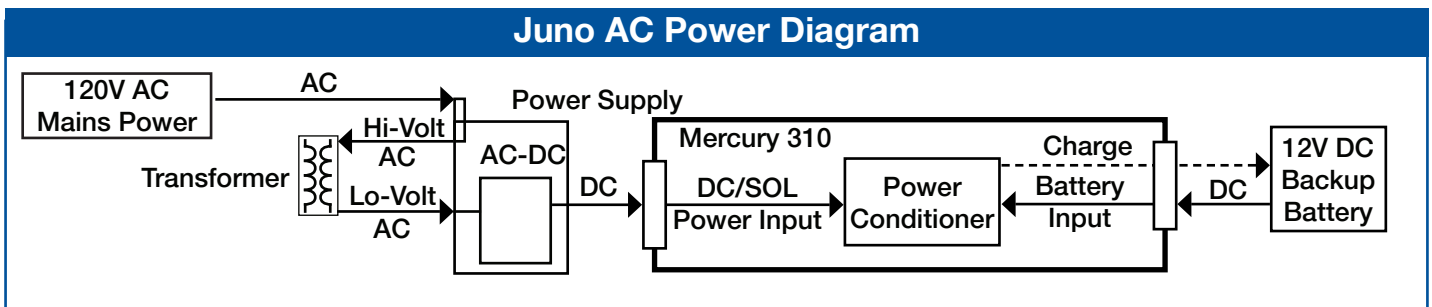
WARNING

FOLLOW ALL SAFETY WARNINGS, AS FOLLOWS, WHEN INSTALLING AC POWER:

- Juno is a 120VAC operator and cannot run on 208VAC or 230VAC and will be damaged if wired for those voltages!
- Disconnect power to gate operator by manually opening its dedicated circuit breaker and unplugging the battery connector on the Mercury control board before making any mechanical or electrical adjustments.
- Use a 20 AMP dedicated circuit breaker for each installed gate operator.
- Open the dedicated circuit breaker supplying power to gate operator before a new installation or making any modifications to an existing installation of this gate operator.
- All wiring connections must be made by a qualified individual.
- Run individual circuits in separate UL Listed conduits. Do not combine high voltage (120VAC) power wiring and low voltage (+12VDC) control wiring in the same conduits.

The Juno operator may be configured to charge the system battery using either an AC source or a solar panel. The Juno operator runs directly off the DC backup batteries, so the system will operate as long as sufficient battery power remains, even in the event of a loss of external power.

To use an AC source, AC power is wired into the Juno AC-to-DC power supply in addition to at least one 12VDC 8Ah backup battery. The basic power flow for AC electrical sources is displayed in the diagram below.



AC Voltage Wire Size

Use the table below to determine high voltage wire size requirements.

AC Voltage Wire Size Chart						
120V/AWG GAUGE	14	12	10	8	6	4
MAX RUN	180 FT (54.8m)	280 FT (85.3m)	460 FT (140m)	700 FT (213.3m)	1150 FT (350.5m)	1800 FT (548.6m)

Distance shown in chart is measured from operator to power source. If power wiring is greater than maximum distance shown, a service feeder is recommended. When large gauge wire is used, a separate junction box **must** be installed for the operator connection. The above table is based on stranded copper wire, with calculations based on 120VAC power source and with 3% voltage drop on power line & additional 10% reduction in distance to allow for other electrical losses in system.

Earth Ground

Because AC power is being run into the control box for conversion to DC, the gate operator system should be earth grounded at the operator using the copper grounding lug on the operator chassis.

- This ground connection prevents dangerous currents in the control box parts, the operator or the gate.
- Nice recommends an 10 foot copper rod driven into the ground with copper clamp and 12ga copper wire (minimum).
- Connect Earth Ground wire to the grounding lug in the lower left corner of chassis interior (right).

AC Power Wiring

1. Ensure all power sources are disconnected from Juno, and remove battery leads from Mercury 310 controller.
2. Remove Juno cover to access the power supply and cable conduits.
3. Run the AC source cable up through one of the conduit holes in the Juno base.
4. Join the AC power wires using wire connectors (example in Fig 6-1), ensuring correct AC to power supply wire color:
 - Ground to Green
 - Hot to Black
 - Neutral to White

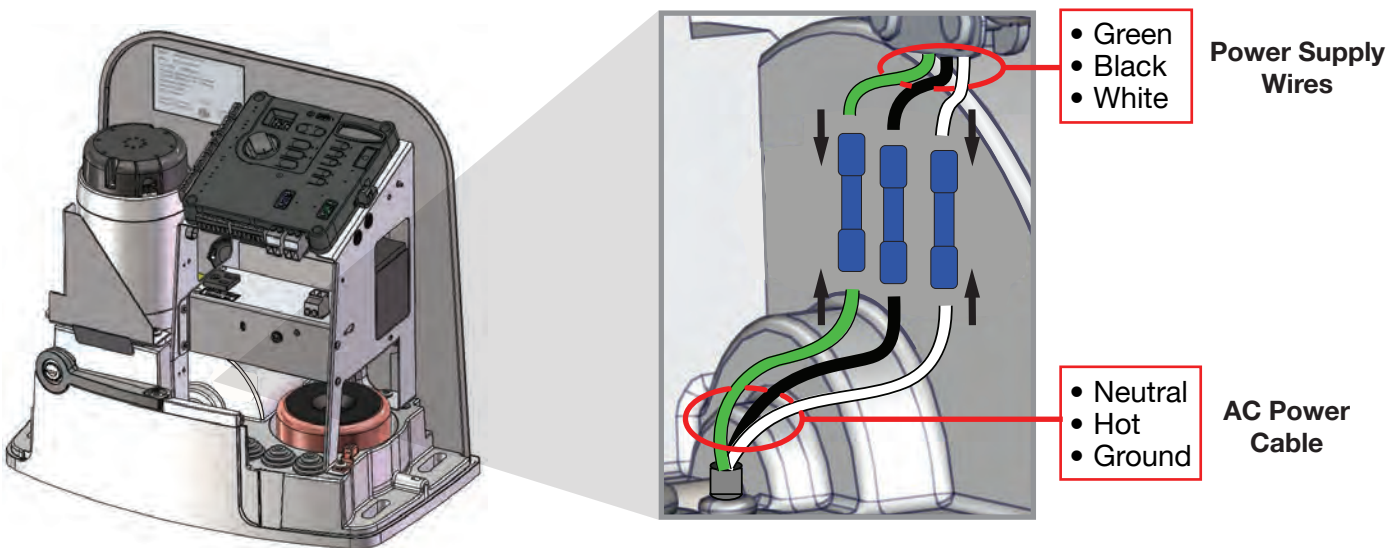


FIG. 6-1: AC Power Supply Wiring

AC WIRING TABLE	
AC POWER WIRE	POWER SUPPLY WIRE
Ground	Green
Hot	Black
Neutral	White

Solar Power

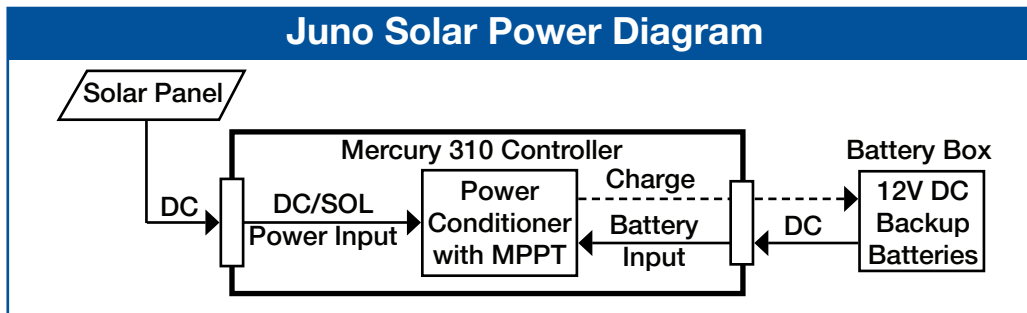


WARNING

Follow all safety warnings, as follows, when installing solar power:

- Disconnect all power to the gate operator by manually unplugging solar panel and battery leads from the Mercury controller.
- All wiring connections must be made by a qualified individual.

Juno Mercury 310 backup battery charging may be performed using a solar panel instead of an AC electrical source. The basic power flow for a solar power electrical source is displayed in the diagram below.



Solar Power Wiring

Convert a Juno 310 AC to use solar power by disconnecting the power supply wires connected to the Mercury 310 power input terminals and directly connecting wires from a 12VDC rated (17-23.5V Open Circuit Voltage) solar panel providing at least 10 Watts.

NOTE

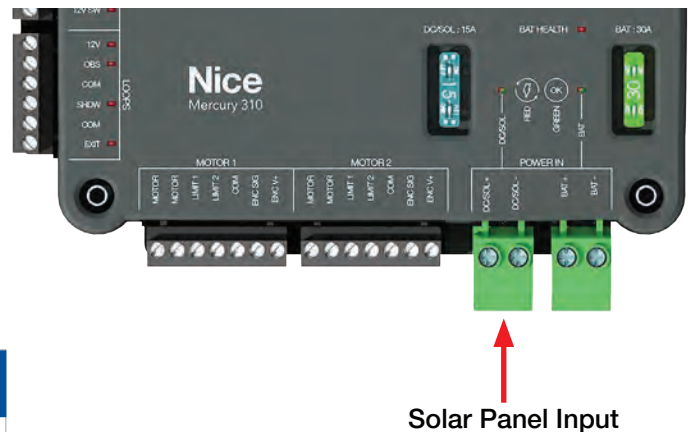
Solar panels should be connected only to the Mercury310 DC/SOL input and not directly to the battery terminals (recommended for all other controllers).

For more cycles on power loss, we highly recommend using a Nice external battery kit for 35Ah (P/N: MX5570-35) or 70Ah (P/N: MX5570-70) batteries. Recommended specifications for an external backup battery for solar use are as follows:

- **Output:** 12 Volt DC
- **Type:** sealed lead acid (AGM)
- **Features:** terminal posts on top (not sides)
- **Size/Watts:** Minimum 35AH recommended, and 70AH for higher cycle after-power-loss requirements.

NOTE

Juno 310 is available in AC and Solar models. Contact Nice for solar panel and external battery kit availability.

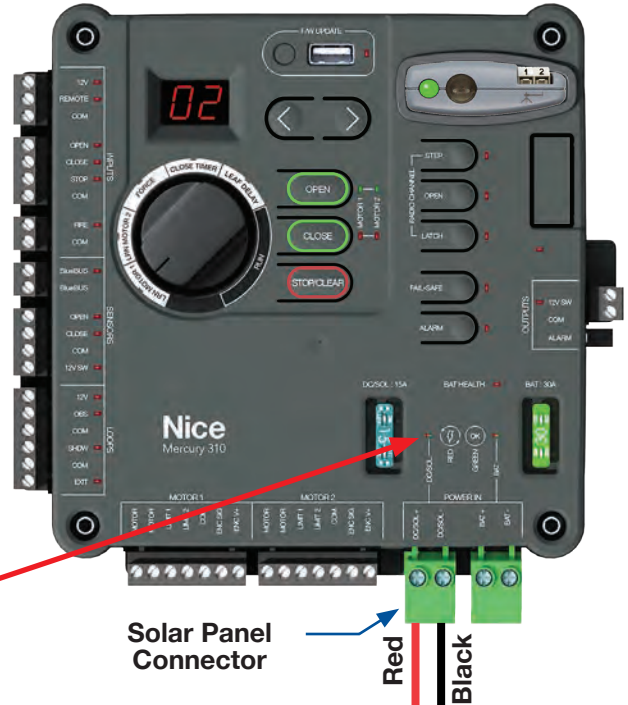


7. Solar Panel Installation

Solar Panel Installation

Install the solar panel as follows:

1. Assemble solar panel mounting bracket and panel with included hardware (instructions included).
2. Install solar panel (in bracket) on suitable surface out of shadows of surrounding buildings, walls, etc.
3. Orient panel to collect maximum sunlight energy throughout the year.
4. In the northern hemisphere, mount panels facing south at an upward angle of about 45 degrees. In the southern hemisphere, orient panel to face north. See FIG. 7-2, below.
5. Strip panel wire ends, then install into DC/SOL input (FIG. 7-1), ensuring proper negative/positive polarity.



NOTE

If solar panel is wired in reverse polarity, the red DC/SOL LED will illuminate.

FIG. 7-1: Solar Panel Connections

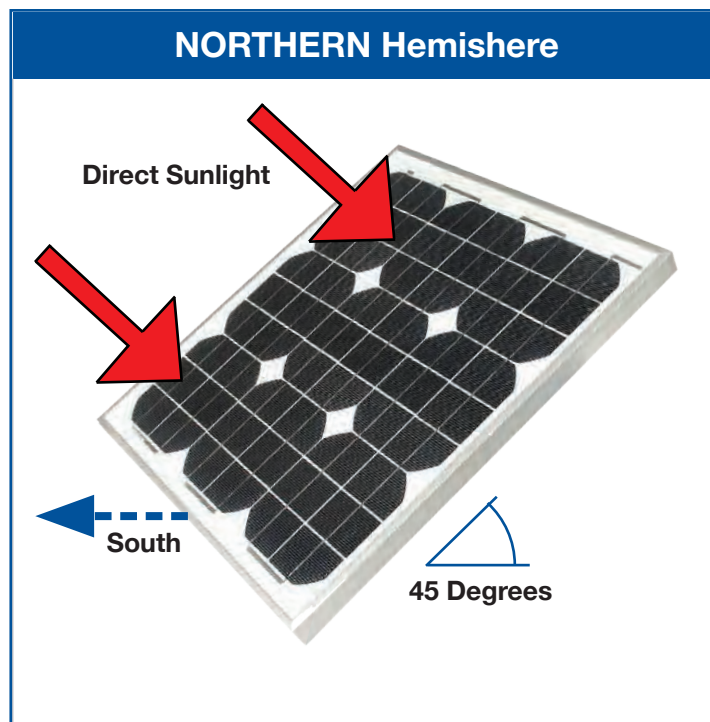


FIG. 7-2: Maximum Efficient Solar Panel Orientation

8. Backup Battery Wiring

Battery Wiring and Battery Enclosures

To continue the installation, power must first be supplied to the Mercury 310 controller. Wire the battery(s) and connect to the Mercury 310 controller as shown below:

The Juno system requires at least one suitable backup battery to run controller and motor. Location must be close enough to the operator to avoid long wire lengths, and protect batteries from inclement weather and/or environmental damage. Nice offers a properly specified battery enclosure capable of being post-mounted and housing one or two 35AH batteries (wired in parallel - see FIG. 8.2), as well as offering protection from the elements (see FIG. 8-1).

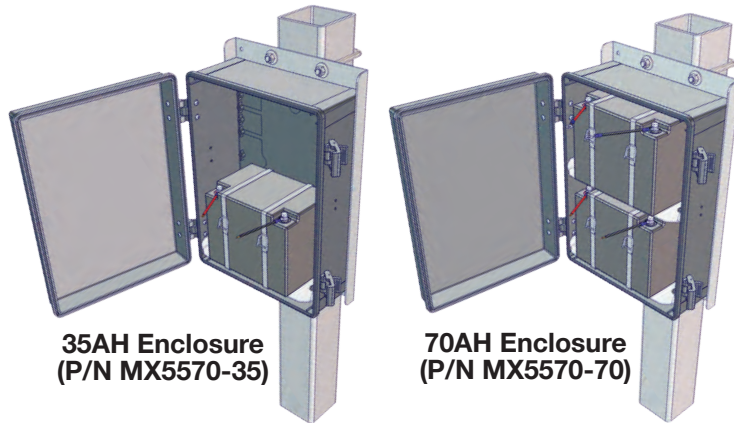


FIG. 8-1: Optional Battery Enclosures

WARNING

If a battery box is used, the factory installed 8Ah battery should be disconnected.

CAUTION

When connecting two batteries, **do NOT wire in series** (always in parallel), or it will damage the controller. See FIG. 8-2 for an example.

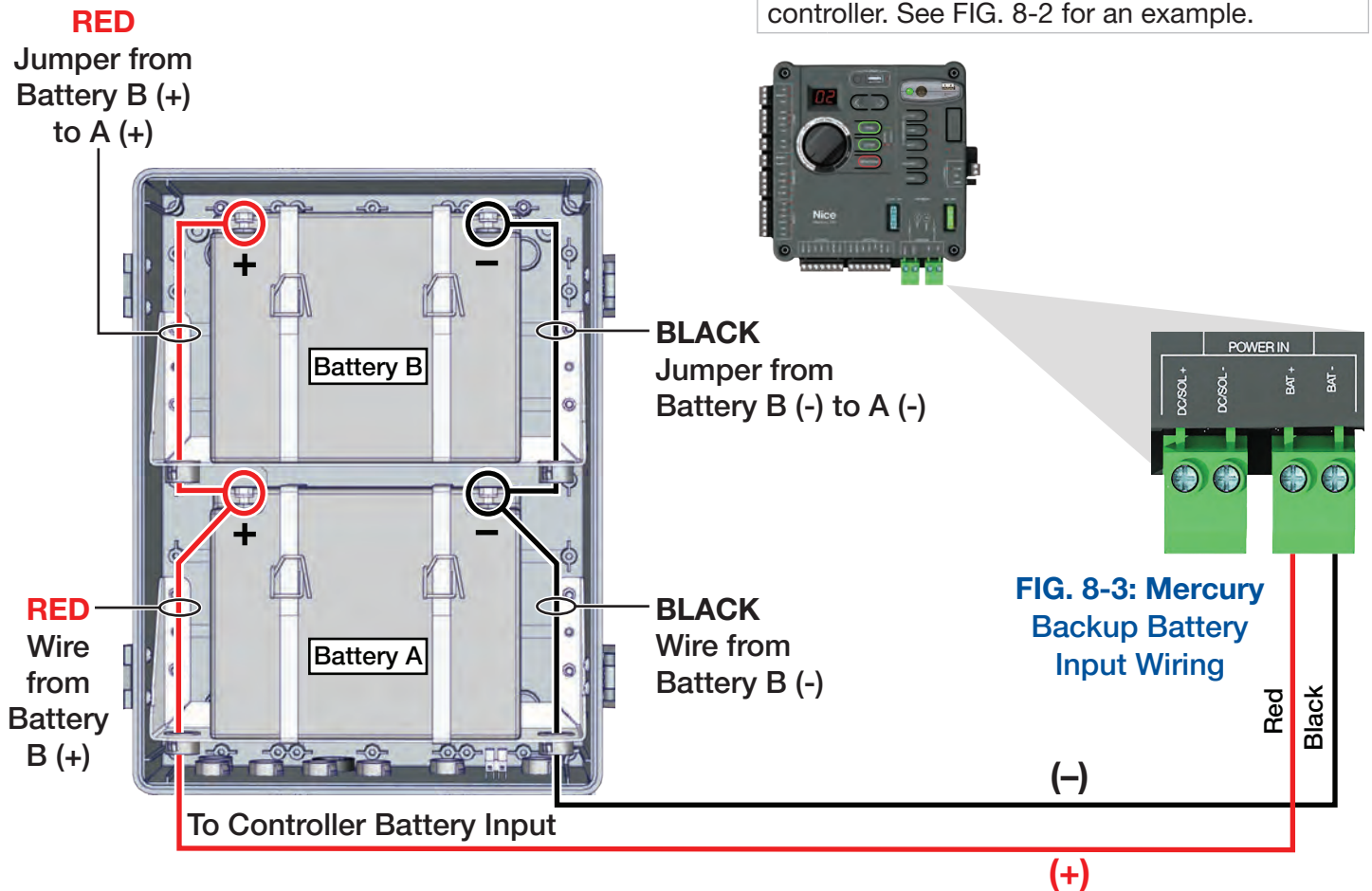


FIG. 8-2: 70AH Battery Box (Wiring Example)

9. Warning Signs

Attach Warning Signs to Gate

1. Place one warning sign (see Figure 9-1 below) on outside of gate, and place the other on the inside of gate in high visibility locations (eye level) to warn of entrapment dangers. If signs cannot be attached to gate, ensure they are visible to pedestrians and anyone operating the gate.
2. Use two cable ties per sign, or alternative means, to securely affix signs.

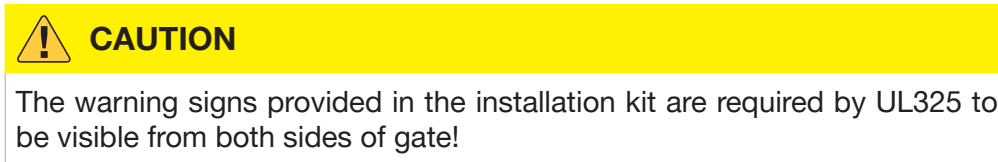


FIG. 9-1: Warning Sign

Warning Signs and Labels for Installations in Canada

If this operator is being installed in Canada, please contact the Nice | HySecurity Technical Support team at (253) 201-2918 for a free Juno Canada kit.

This kit includes: French Canadian manual, operator warning labels and warning signs required for compliance with ETL/CSA standards.

Panneaux et étiquettes d'avertissement pour les installations au Canada

Si cet opérateur est installé au Canada, veuillez contacter l'équipe d'assistance technique de Nice | HySecurity au (253) 201-2918 pour obtenir un kit Juno Canada gratuit.

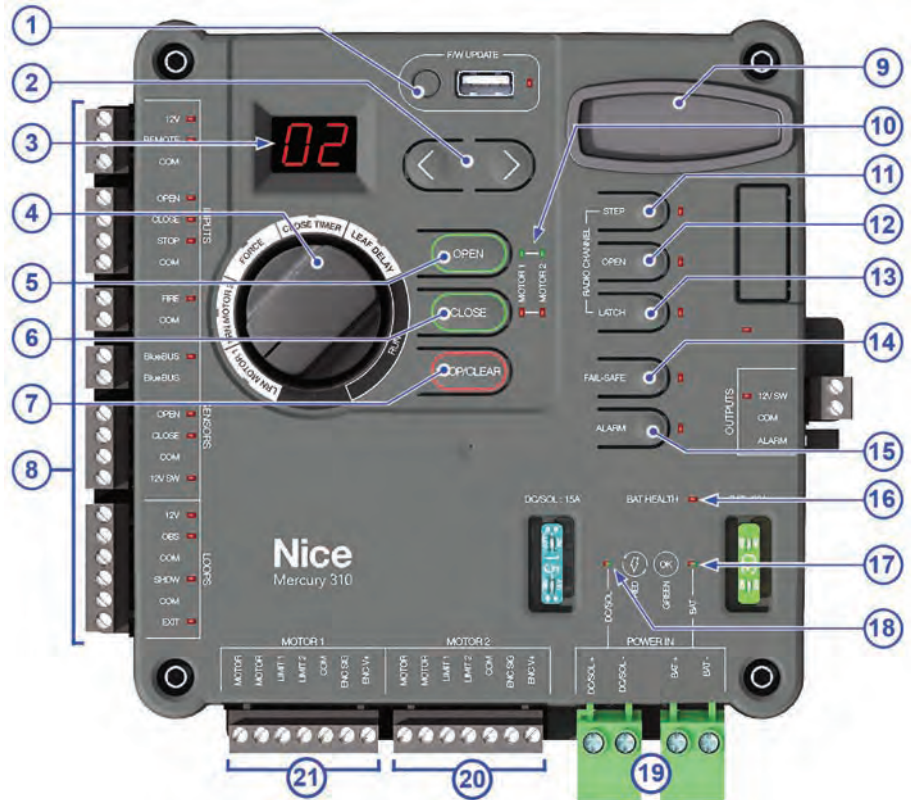
Ce kit comprend : un manuel canadien en français, des étiquettes d'avertissement de l'opérateur et des panneaux d'avertissement requis pour la conformité aux normes ETL/CSA.

10. Mercury Wiring, Programming and Settings

Mercury 310 Controls and Features

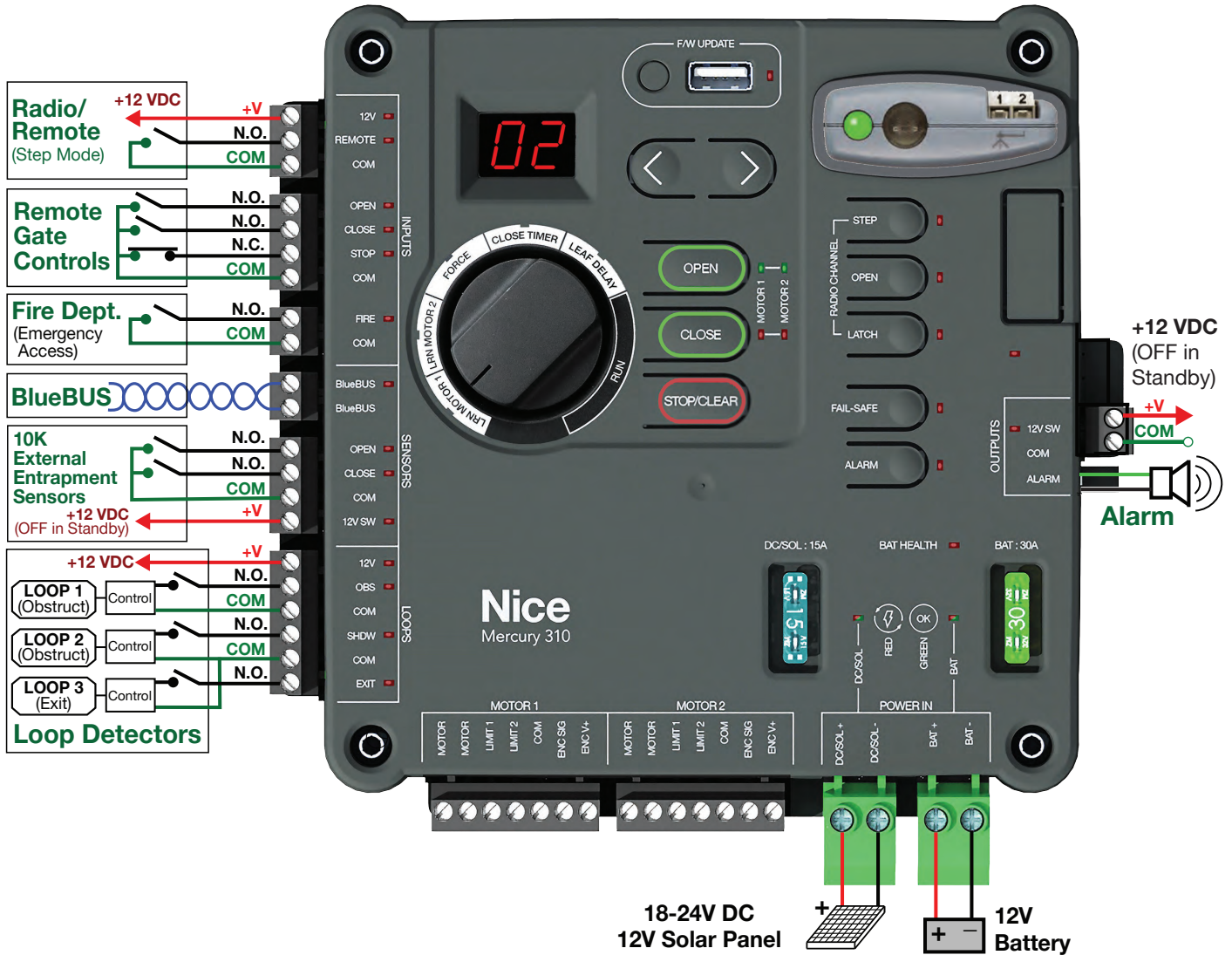
Refer to the image below for identification of controls featured on the Mercury 310 controller. For full operating and programming instructions, refer to the following pages.

1. **Firmware Update:** Button, USB Port, & LED for updating firmware.
2. **LEFT / RIGHT Arrow Buttons:** For selecting settings, changing values, and other programming functions.
3. **Display:** Two character digital LED.
4. **FUNCTION Knob:** Selects Limit Learn Motor 1 or 2, Force, Close Timer, Leaf Delay and Run Mode.
5. **OPEN Button:** Opens gate or reverses closing gate.
6. **CLOSE Button:** Closes gate or stops an opening gate.
7. **STOP/CLEAR Button:** Stops open/closing gate or clears Mercury in Entrapment Mode. If pressed and held 3 seconds, clears the sensor registry.
8. **INPUT Connections:** Used for attaching accessories and sensors.
9. **OXI RADIO Port:** Accepts the Nice OXI radio module for remote control of the gate operating system.
10. **MOTOR LIMIT LEDs:** During normal operation, green LEDs light to indicate gate (1 or 2) is at open limit, and red LEDs when at close limit. Also used during limit learning procedure.
11. **STEP Button:** Used to program a remote button to sequentially open, stop, close, etc. gate with each press.
12. **OPEN Button:** Used to program a remote button to open gate with a single press.
13. **LATCH Button:** Used to program a remote button to “latch” the gate in open or close position with each press.
14. **FAIL-SAFE Button (On/Off):** When on (red LED lit), gate moves to open limit if battery voltage fails. If currently off, a battery voltage failure results in the gate moving to the *close* limit (security priority).
15. **ALARM Button (On/Off):** When on (red LED lit), alarm sounds before and during gate movement, whether by button press or sensor.
16. **BATTERY HEALTH LED:** Lights red for healthy battery operation and flashes if no battery voltage detected.
17. **BATTERY Power Indicator LED:** Lights green when OK, red for reversed polarity, and off for no voltage.
18. **DC/SOLAR Power Indicator LED:** lights green when OK, red for reversed polarity, and off for no voltage.
19. **POWER INPUT:** Solar and battery power input connectors.
20. **Dedicated STATUS LED Connections - Factory Wired**
21. **Dedicated MOTOR Connections - Factory Wired**



Mercury 310 Inputs and Outputs

Refer to diagram below for identification of the Mercury inputs and outputs. Instructions for installing the basic required entrapment sensor is on the following pages. For installation of additional devices, see **Appendix A**, page 47.



Mercury 310 Inputs and Outputs

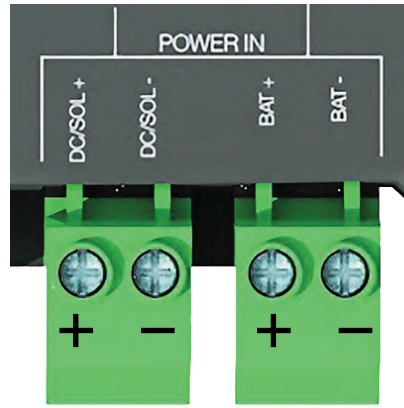
WARNING

Disconnect operator from power (DC/Solar & Battery) when installing accessories or entrapment sensor.

NOTE

Accessory wiring material should be suitable for use in a Class 2 circuit, which includes CL2, CL2P, CL2R, CL2X, or any other wiring type that has equivalent or better electrical, mechanical and temperature ratings.

Mercury 310 Power Inputs



Solar/DC Input:
Must be a 12V rated solar panel (23.5V Open Circuit Voltage) or a 18-24V high current DC power source.

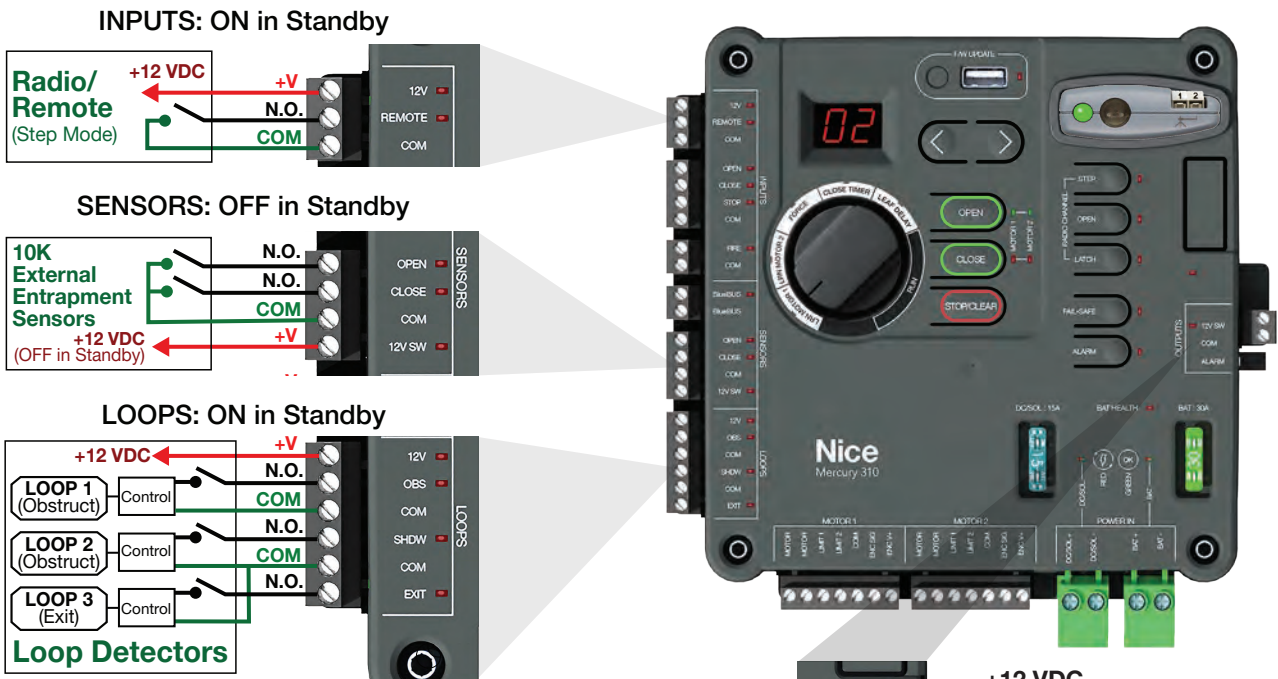
Battery Input:
Must be a 12VDC sealed lead acid (SLA) battery.

Mercury 310 Power Inputs	
INPUT	POWER TYPE
DC/SOL+	High Current DC/Solar Input (positive)
DC/SOL-	High Current DC/Solar Ground (negative)
BAT+	+12VDC Battery Input (positive)
BAT-	Battery Ground (negative)

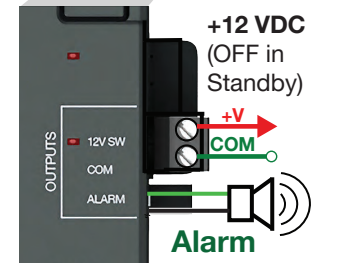
Mercury 310 Power Inputs

Mercury 310 Power Outputs

Four 12VDC power outputs are provided for powering accessories and sensors. During Standby mode, two of the outputs are switched off, while two remain powered, as shown below.



Mercury 310 Power Outputs			
LOCATION	VOLTS	AMPS	STANDBY
Inputs	12VDC	500 mA	On
Sensors			Off
Loops			On
Outputs			Off

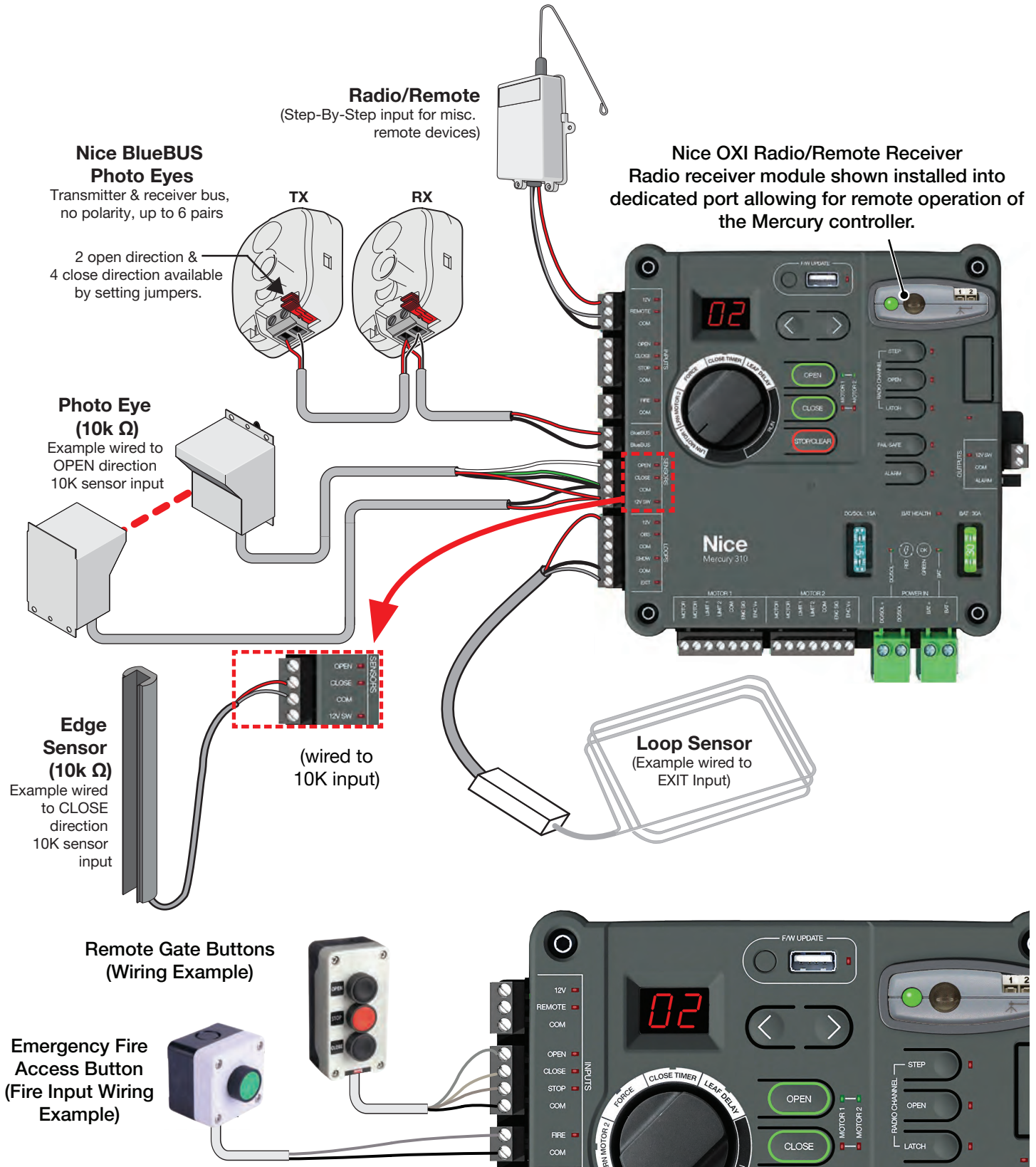


OUTPUTS: OFF in Standby

Mercury 310 Power Outputs

Installing Devices

See below for examples of accessory devices connected to the Mercury 310 controller. Instructions for installing the minimum of two external entrapment sensors (required by UL325 regulations) starts on **page 40**.



Mercury 310 Sensor and Control Input Wiring Examples

11. Limit Learn Program

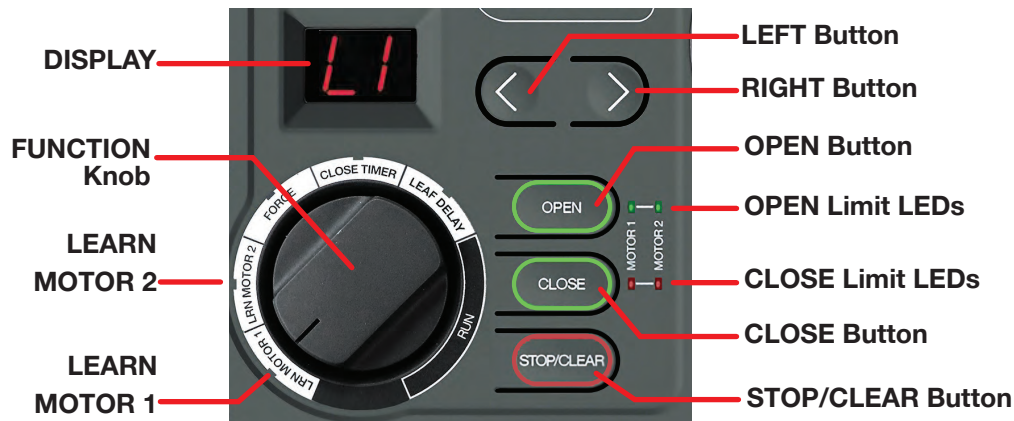
After Juno is mounted, the chain is attached to the gate, and open/close target magnets are installed. The Mercury 310 must be programmed to recognize the distance between gate limits. Before performing the Limit Learn programming procedure, perform the following checks:

Limit Learn Checklist

- ☑ Open manual release lever to disengage drive train (see **page 24**) and push gate to ensure smooth travel.
- ☑ Install a minimum of two external entrapment sensors (**page 40**) with warning signs on both sides of gate (**page 32**).
- ☑ Close manual release lever to re-engage drive train.
- ☑ Connect battery terminal to Mercury 310 controller battery inputs (shipped with battery disconnected.)

Limit Learn Programming Procedure

1. Set FUNCTION knob to LRN MOTOR 1 (**L1** flashes if unlearned or solid if already learned). See **Clearing and Re-Learning Limits**, next page, for instructions to clear previously learned limits).
2. Press and hold the LEFT or RIGHT button to “jog” the gate into position about halfway between open and close limits. (The motor starts 2 seconds after being pressed, and it will stop when the button is released).



NOTE

During gate movement at normal speed, travel percentage is shown in display.

3. Start learn procedure by pressing and holding BOTH Left and Right Buttons for one (1) second.
4. Display will show solid **LL** and gate will run at slow speed to first limit.
5. After reaching first limit, display flashes between **OP** or **CL** (Open/Close LEDs also flash).
6. Observe the current position of the gate and do only one of the following:
 - If gate is at open limit position, press the Open button.
 - If gate is at close limit position, press the Close button.
7. The gate will now automatically run to the second limit at slow speed and stop, run to the first limit at normal speed and stop and then run to the second limit at normal speed and stop.
8. When finished, the display will show either **OP** or **CL**, depending on gate position and if the correct position button was pressed in step 6.
9. With limits properly established, the user may now turn the FUNCTION knob to RUN. If limits are incorrect or need relearning, follow the instructions on next page, **Clearing and Re-Learning Limits**.

Clearing and Re-Learning Limits

To clear a motor’s programmed limits and relearn them:

1. Set the Function Knob to the motor to be cleared (i.e. **LRN MOTOR 1**). If already on desired motor, turn knob clockwise then back again.
2. **Press and hold** the STOP button for 5 seconds. **L1** flashes in the display to indicate limits are cleared and can be re-learned.
3. Follow steps 3-9 above to re-learn limits.

Standby (Low Power Mode)

After the Limit Learn programming procedure is performed, Standby is automatically enabled. The controller will also enter Standby after two minutes of no user input to the Mercury 310 controller or fifteen seconds after a gate operation. Standby, or “low power mode” is a significant power saving feature for solar applications. When the controller is in Standby mode:

- A red “heartbeat” decimal point will flash every two seconds in the lower right of the display to indicate the controller is ON, functioning normally and in Standby.
- Any active LEDs and 12V switched outputs are turned OFF.
- Pressing any button will “wake” the board for two minutes.

Standby is NOT entered: For two minutes if the Function knob is changed or any on-board buttons are pressed.

12. Setting Force (IES)

To comply with UL 325 Safety Standards, Mercury operators feature a Type A, Inherent Entrapment Sensor (IES). The IES software monitors average motor current when a gate is in motion and initiates an “Entrapment Alert and 2 second reversal” of the direction of gate travel when the current exceeds a threshold. A spike in motor current can be caused by the gate hitting a pedestrian, a collision with a vehicle, failing gate hardware, extreme wind gust or any other force applied against the moving gate. To set the IES sensitivity (Force):

1. Place the selection knob to “**FORCE**”.
2. Select values (0-5) using the Right or Left arrow buttons (Default = 2).
3. To test, apply force to the leading edge of the moving gate with an obstruction to trigger the IES. Gate will stop motion and reverse for two seconds.
4. Cycle the gate a few times to test the IES sensitivity.

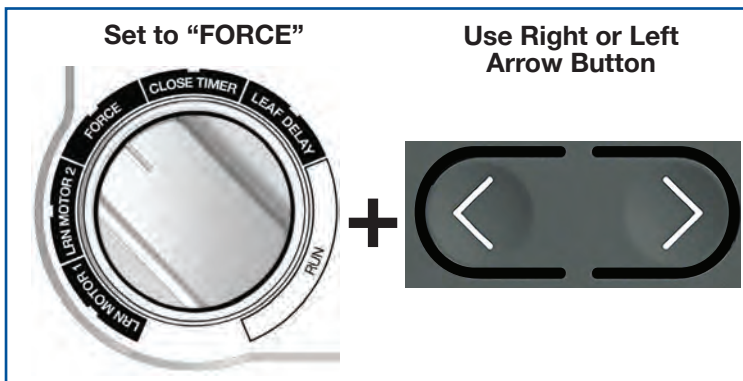


FIG. 12-1: Function Knob: FORCE

FORCE (IES)		
Values	Default	Details
0 - 5	2	Least force = 0 Most force = 5

WARNING

The close timer only operates when the selection knob is in the RUN position.

WARNING

Do not enter the path of gate travel to test IES sensitivity. Vehicular gate operators must by their nature be powerful to function reliably. This power can cause injury or death to people caught in the moving gate.

13. Setting the Close Timer

The Close Timer setting determines how long the gate will remain open (0 - 90 seconds) after hitting the open limit before automatically closing again. To set the close Timer:

1. Place the selection knob to “CLOSE TIMER”.
2. Select values (0-90) using the Right or Left arrow buttons (Default = 0).
3. Place selection knob to “RUN”.

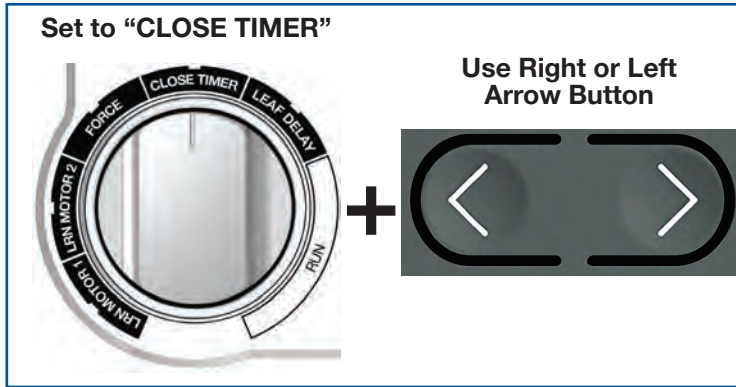


FIG. 13-1: Function Knob: Close Timer

CLOSE TIMER		
Values	Default	Details
0 - 90 (seconds)	0 (OFF)	Increments = 1 (Press/hold = 5s increments)

NOTE
Close timer does not count down after a Type A or Type C entrapment event.
The timer doesn't count down if a Contact Sensor is tripped (type B2).

14. Installing External Entrapment Sensors

The Juno operator requires at least one external entrapment device in both the open and close directions of travel to meet the minimum requirements of UL325. The Mercury 310 controller can monitor up to eight (8) total devices including four (4) close direction BlueBus eyes, two (2) open direction BlueBus eyes, one (1) close direction 10k eye or edge, and one (1) open direction 10k eye or edge.

Included standard with Juno are two sets of reflective photo eyes:

- (EPMORB/A) for external mounting
- MX5810 for internal (under cover mounting) which includes a service light.

Install BlueBus reflective photo eye pairs as follows:

1. Remove power to Mercury 310 Controller (disconnect battery wires from battery input).
2. Determine where external photo eyes will be installed per site diagram on **page 56**.
3. Determine if internal mounted photo eyes will be installed on the Left or Right hand side of the operator.

Note: Internal photo eye and service light generally mount facing the roadway. Beams pass through the lenses on the external operator cover.

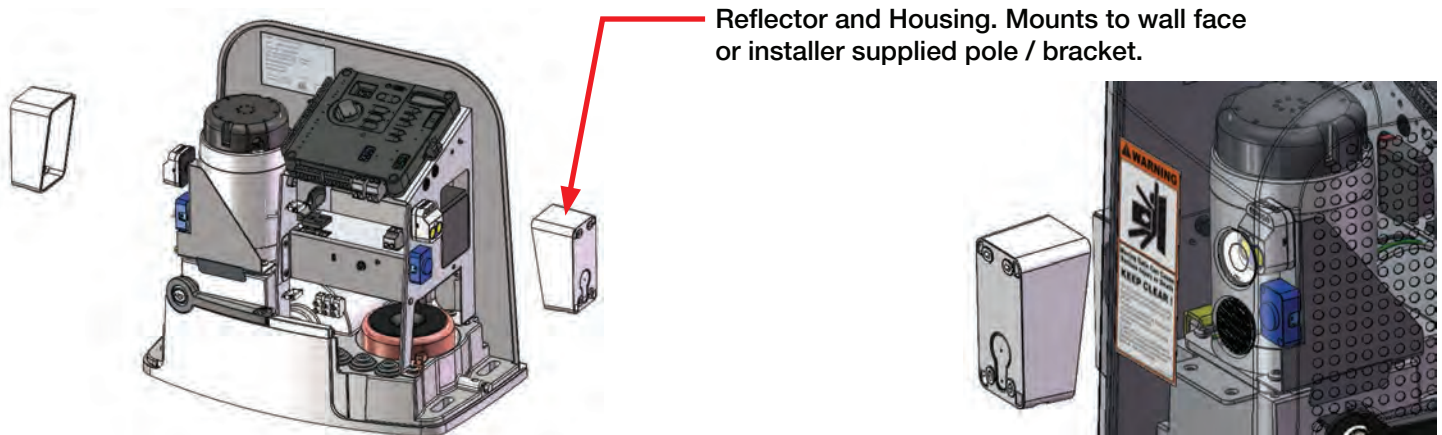
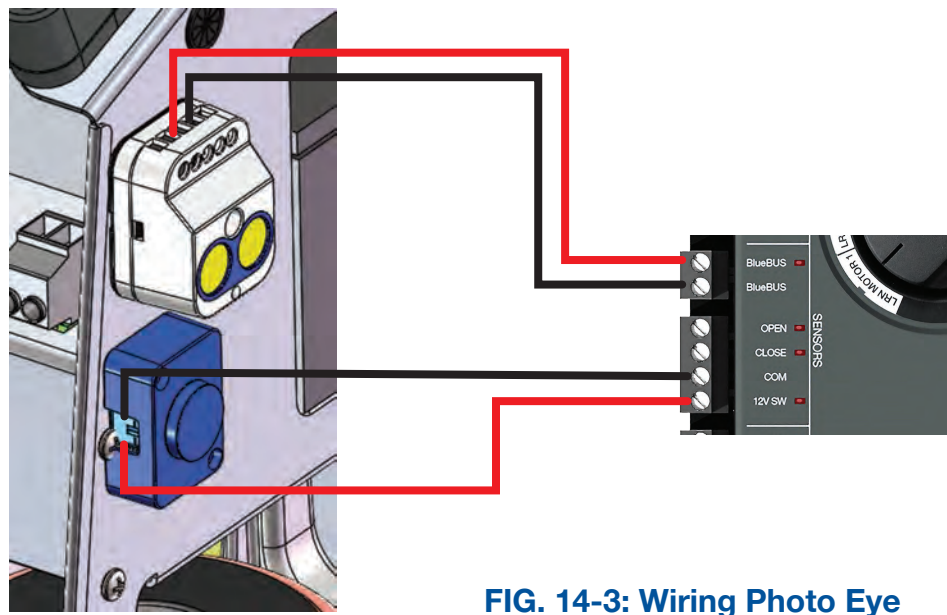
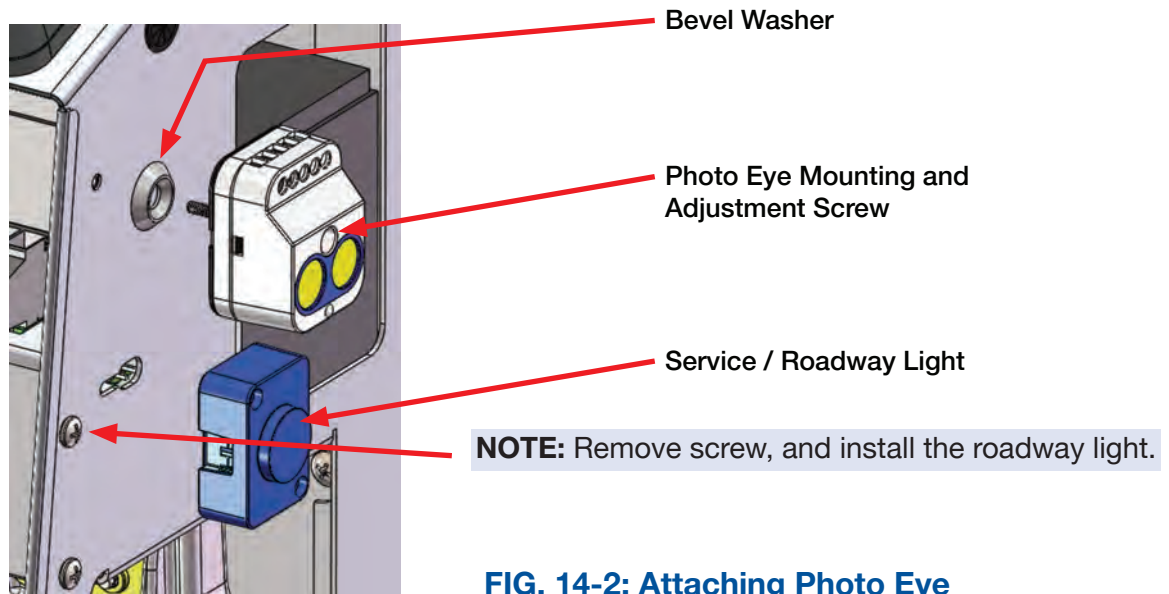


FIG. 14-1: Reflector and Housing

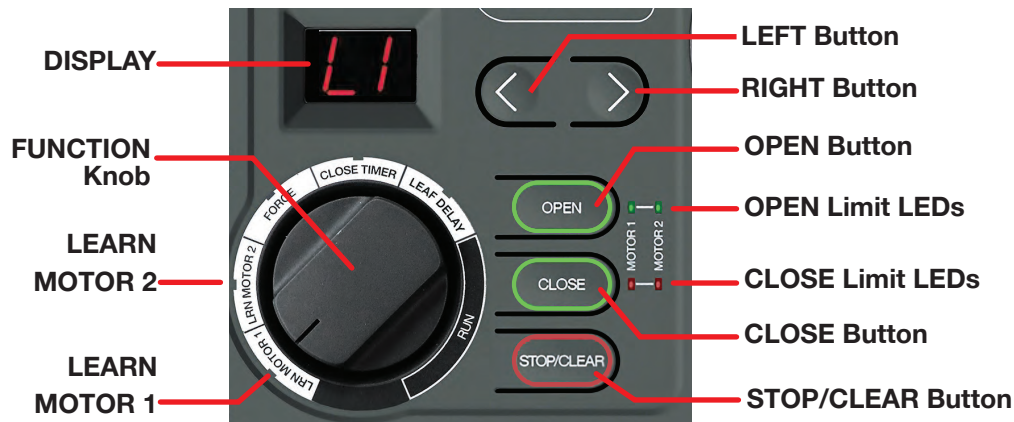
- When attaching the photo eye, include the bevel washer to allow for alignment adjustment. Housing with reflective lens mounts to a post on the opposite side of the roadway or tail end of the gate to protect from entrapment when opening.



- Run two wires from the BlueBus Photoeye to the BlueBus terminal on the Mercury Board.
- Run two wire from the service light to the COM and 12V SW terminal. Service light will activate anytime the Mercury board is active. When the Mercury board sleeps, the light will turn off.
- Re-apply power to the Mercury Board.
- At power-up, sensor inputs are scanned, and the red BlueBus LED on the controller will turn on if BlueBUS photo eyes have been detected and registered. Adjust loosen center screw and adjust photoeye position until reflection is registered. Tighten center screw to secure position.
- Test function of sensor by interrupting the infrared beam while the gate is opening or closing.

15. Adjusting Open or Close Slowdown Points

Open and close slowdown points are automatically set to default values after the learn limit program has been completed. If the default values for open and close slowdown points cause the gate to decelerate too early or too late, then the slowdown points can be adjusted.



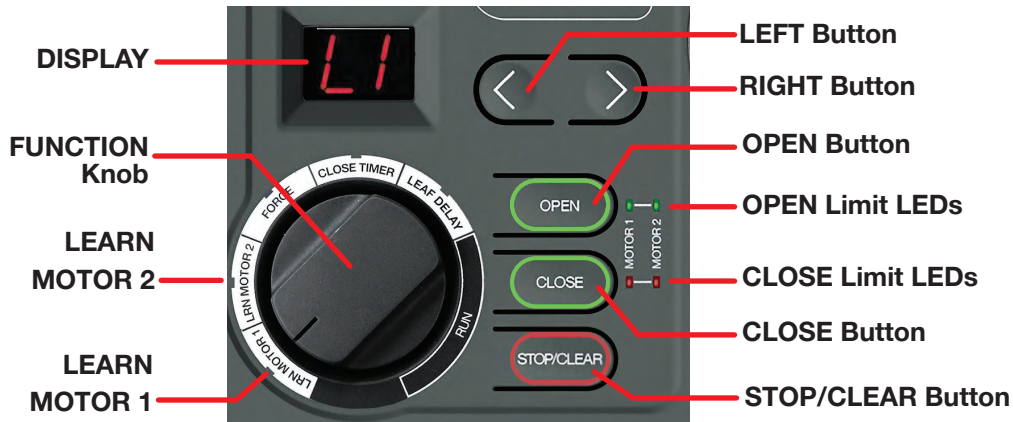
To adjust open or close slowdown points:

1. Limits must be learned prior to adjusting slowdown points.
2. Turn the UI knob to **LRN MOTOR 1** to adjust motor 1 slowdown points.
 - Ensure that "L1" or "L2" is shown on the display (adjust UI knob position if needed).
3. Press the **Open** or **Close** button to adjust the associated slowdown point.
4. The associated limit LED will flash to indicate whether the open or close slowdown point is currently being adjusted.
5. The display will show the current slowdown point.
6. Use the left or right buttons to adjust the slowdown point.
7. To save the new slowdown point, press the same **Open** or **Close** button used to adjust either the open or close slowdown point.
 - Slowdown point is not automatically saved.
 - User must press the same open or close button to save.
8. To cancel, press the **Stop** button.

NOTE: The **Stop** button causes the display to no longer display UI knob associated settings (i.e., LRN MOTOR 1, Force, Close Timer, etc.).

16. Selecting Open/Close Sensor Type

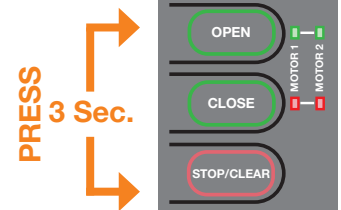
When external entrapment sensors (10K) are installed to the open/close sensor input, the default type is non-contact (photo eye).



To change the type of external entrapment sensors installed in the open and close direction:

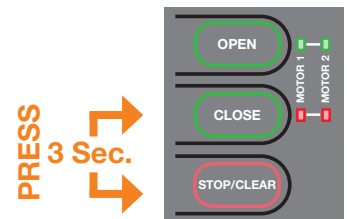
To Change OPEN Sensor Type:

- Press/hold the OPEN and STOP buttons simultaneously for **3 seconds**.
- Display shows "nc" for 5 seconds to indicate **non-contact** photocell sensor type. Release to select.
- Display shows "CO" for 5 seconds to indicate **contact** edge sensor type. Release to select.



To Change CLOSE Sensor Type:

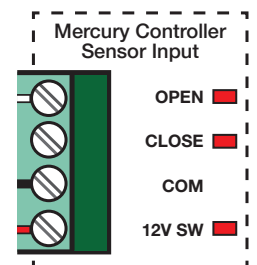
- Press/hold the CLOSE and STOP buttons simultaneously for **3 seconds**.
- Display shows "nc" for 5 seconds to indicate **non-contact** photocell sensor type. Release to select.
- Display shows "CO" for 5 seconds to indicate **contact** edge sensor type. Release to select.



Sensor LED Function

The sensor LED functions differently based on the sensor type. The table below describes the manner in which the open/close sensor LED operates for photocell and edge sensor types.

Sensor State	Sensor Type	
	Photocell (Non-Contact)	Edge (Contact)
Sensor not registered	LED Off	LED Off
Sensor registered and not active	LED On	LED Off
Sensor active	LED Flashes	LED ON
Sensor removed or missing	LED Flashes	LED Flashes



17. Installing the OXI Radio Module



WARNING

Disconnect operator from power (DC/Solar & Battery) when installing any accessory or entrapment sensors.

To install the OXI receiver, perform the following steps:

1. Ensure power to the controller is OFF.
2. Connect supplied antenna wire to terminal 1 of receiver (IMAGE 18-1, Detail A).
3. If installing the external antenna from the kit (P/N ABF/A), connect the 50Ω impedance coaxial cable directly to terminals 1 and 2, as displayed below in Detail B (lead = 1, shield = 2).

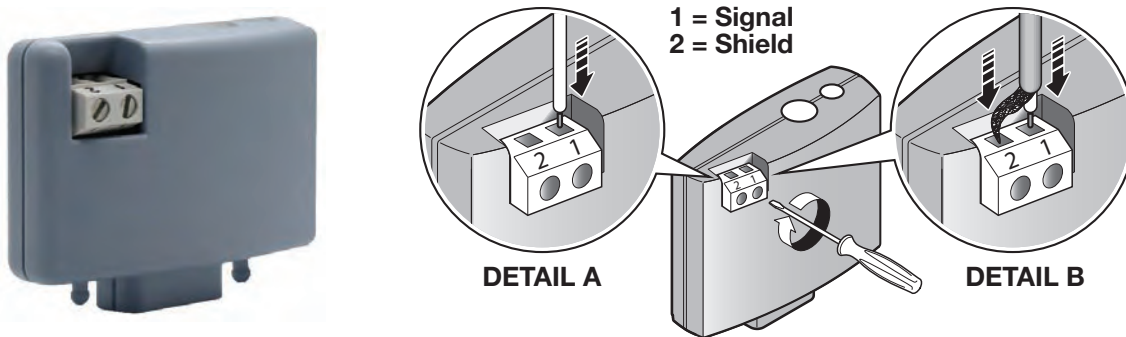


FIG. 17-1: OXI Radio Module & Antenna

4. Remove rubber cover from OXI slot and Insert OXI radio module into the slot (FIG. 18-2, Detail C).

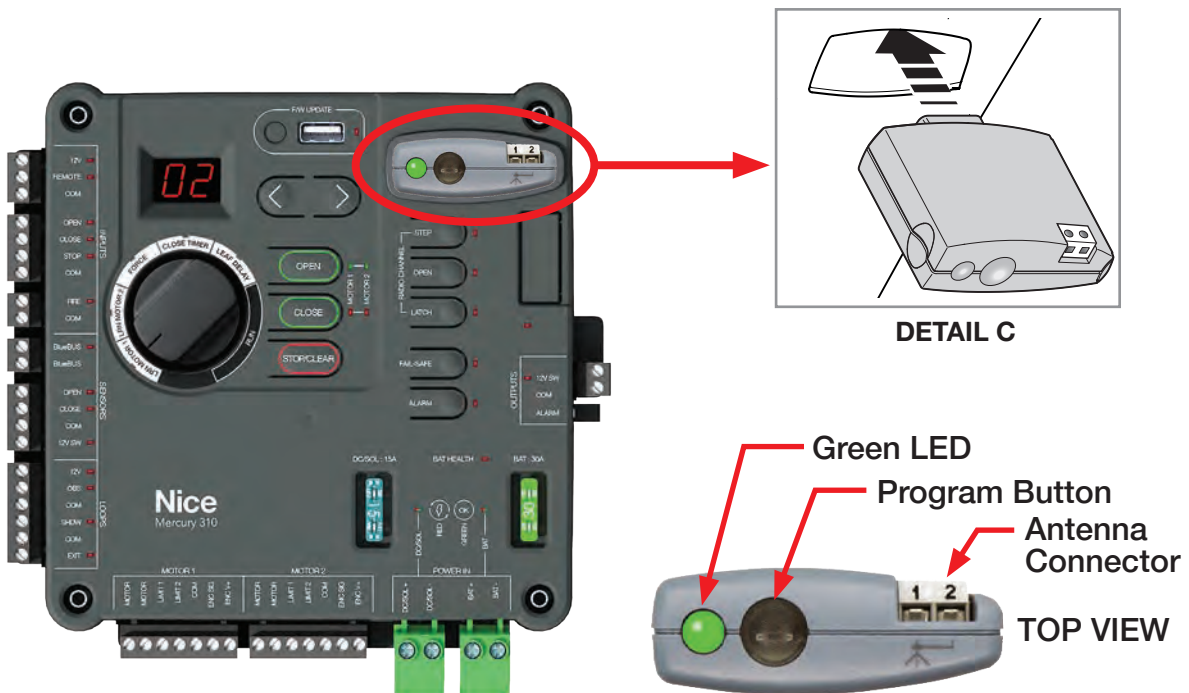


FIG. 17-2: Installing the OXI Module

OXI Radio Programming

If OXIBD/A receiver module is installed, program transmitters (remote controls) for gate operation as follows:

IMPORTANT NOTE

To avoid errors, transmitters (remote controls) must be “learned” by the OXIBD/A radio receiver **before** other radio accessories (i.e. wireless keypads). To reset in the event of an error, press and hold down **Program** button (on OXIBD/A top) and release after green LED flashes five times, then re-learn a remote before other devices.

STEP Button

Programs a remote control button to operate like a garage door opener (1st press = OPEN, 2nd press = STOP, 3rd press = CLOSE). To program:

1. Press and hold the desired button on the remote control.
2. Within 2 seconds, press and release the **STEP** button on the Mercury.

If programming is successful, **DN** (done) is displayed, the Step LED will flash twice and the alarm will chirp for successful pairing. If programming fails, error code **ER + 08** is displayed.

OPEN Button

Programs a remote control button to open the gate. To program:

1. Press and hold the desired button on the remote control.
2. Within 2 seconds, press and release the **OPEN** button on the Mercury.

If programming is successful, **DN** (done) is displayed, the Open LED will flash twice and the alarm will chirp for successful pairing. If programming fails, error code **ER + 08** is displayed.

NOTE

The Open function will only open a gate or reverse a closing gate; it will not have any effect on a gate in Entrapment Mode.

LATCH Button

Programs a remote button to “latch” a gate in a hold open or close position, until pressed a second time. To program:

1. Press and hold the desired button on the remote control.
2. Within 2 seconds, press and release the LATCH button on the Mercury.

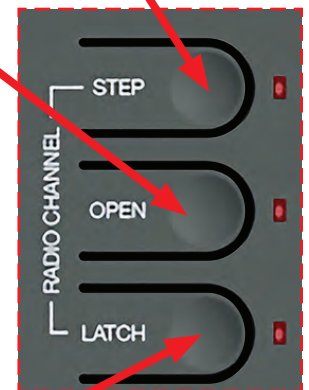
If programming is successful, **DN** (done) is displayed, the Latch LED will flash twice, and the alarm will chirp for successful pairing. If programming fails, error code **ER + 08** is displayed.

NOTE

Latch function will be ignored on a moving gate or a gate stopped in mid-travel. The audio alarm will “chirp” whenever the Latch transmitter is activated or the gate is locked and an “operate” command is received.



OXIBD/A Radio Receiver & Transmitter



Deleting Transmitters

Transmitters (remote controls) may be deleted from the programming of the OXIBD/A radio receiver using the Mercury 310 Radio Buttons as follows:

Delete ALL Transmitters:

Simultaneously press and hold down the **Step**, **Open** and **Latch** buttons for at least three (3) seconds, until **RE** (Remote Erase All) is displayed. All three LEDs will flash twice.

- If deletion is successful, **DN** (done) is shown in Mercury display.
- If deletion fails, **ER + 09** is shown in Mercury display.

Delete SINGLE Button from Transmitter:

Press and hold any one of three radio channel buttons on the Mercury 310 controller for at least three (3) seconds until **RD** (Remote Delete Button) is displayed, then press the button on the remote to be deleted.

- If deletion is successful, **DN** (done) is shown in Mercury display.
- If deletion fails, **ER + 09** is shown in Mercury display.



Mercury Radio Buttons and OXIBD/A Receiver

WARNING: Transmitter contains Coin Batteries

- **INGESTION HAZARD:** This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if ingested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH** of **CHILDREN**.
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.



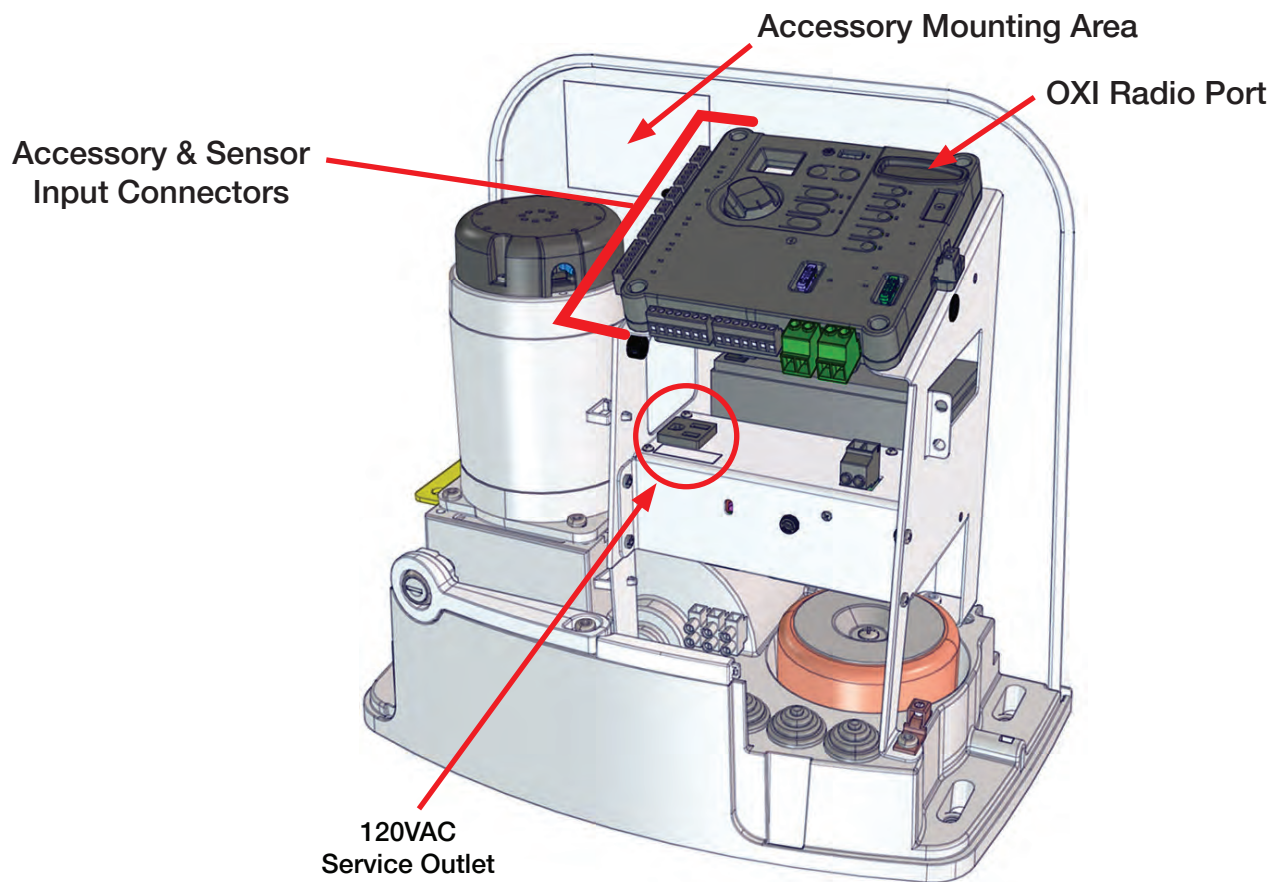
- Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children.
- Do NOT dispose of batteries in household trash or incinerate.
- Even used batteries may cause severe injury or death.
- Call a local poison control center for treatment information.
- Only use this product with CR2450 type batteries.
- The nominal battery voltage is 3Vdc.
- This product uses non-rechargeable batteries and are not to be recharged.
- Do not force discharge, recharge, disassemble, incinerate or heat above specified operational temperature. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- Ensure the batteries are installed correctly according to polarity (+ and -).
- Do not mix old and new batteries, different brands or types of batteries, such as alkaline, carbon-zinc, or rechargeable batteries.
- Remove and immediately recycle or dispose of batteries from equipment not used for an extended period of time according to local regulations.
- Always completely secure the battery compartment. If the battery compartment does not close securely, stop using the product, remove the batteries, and keep them away from children.

Appendix A - Accessory Input Wiring

- Control Inputs
- Safety Sensor Inputs
- BlueBUS Input
- 10K Ω Sensor Inputs
- Misc. Mfg. Sensor Wiring
- Loop Inputs and Installation

Accessories, such as loop detector boards, may be installed onto the rear panel of the Juno behind the motor (see image at right). Drill holes and/or use appropriate hardware to affix the accessories inside the enclosure.

The Juno power supply features a standard 120VAC 15A service power outlet (on left side of power supply) that can be used to power tools during the installation.



Accessory Locations and Features



WARNING

Disconnect the operator from power (both DC/Solar & Battery) when installing any accessory or external entrapment sensor.

Installing Required Entrapment Sensors

Install External Entrapment Sensors

The Juno operator requires at least one external entrapment device in both the open and close directions of travel to meet the minimum requirements of UL325. The Mercury 310 controller can monitor up to eight (8) total devices including four (4) close direction BlueBus eyes, two (2) open direction BlueBus eyes, one (1) close direction 10k eye or edge, and one (1) open direction 10k eye or edge. Install BlueBus photo eye pairs as follows:



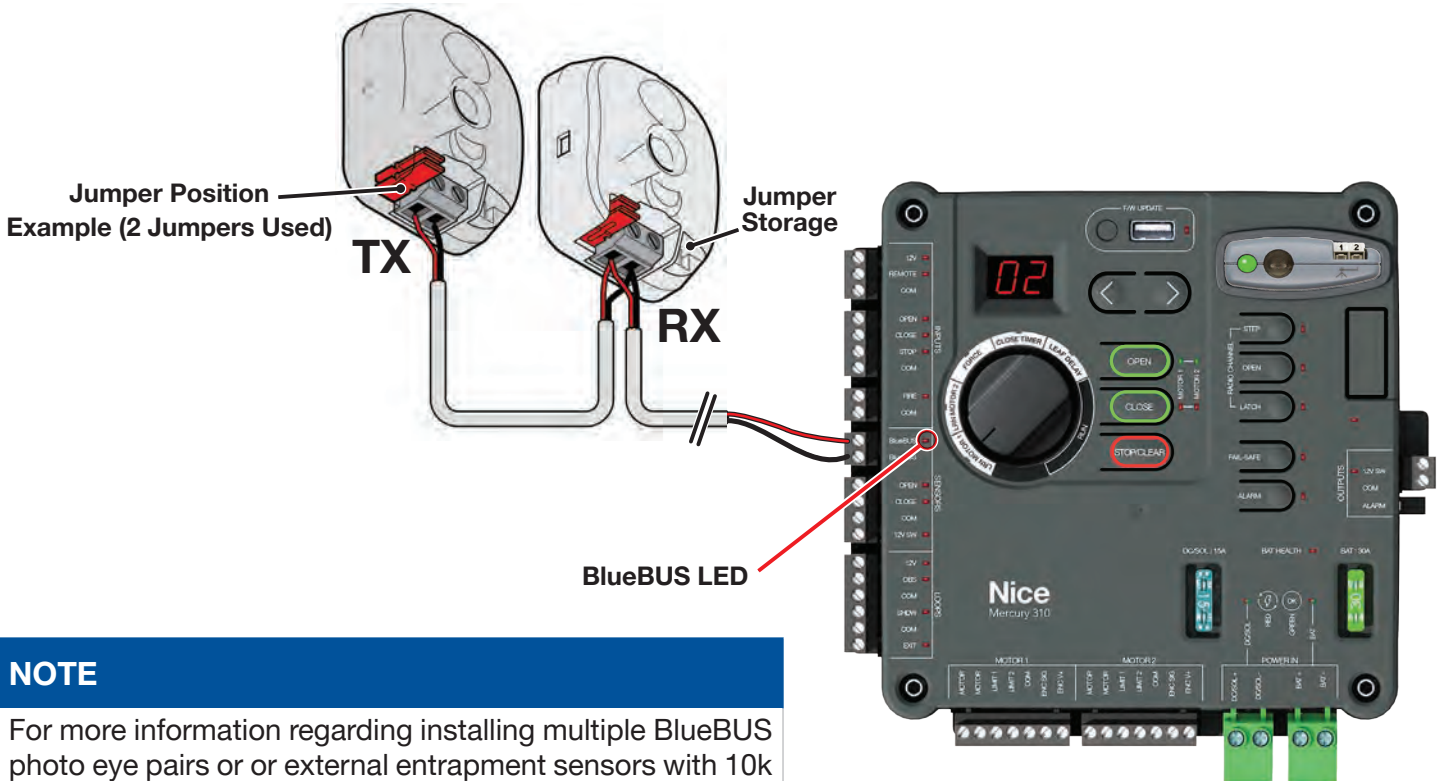
BlueBUS Photo Eyes (Rx & Tx)

1. Remove power to Mercury 310 Controller (disconnect battery wires from battery input).
2. Determine where photo eyes will be installed per site diagram on **page 55**.
3. Remove sensor covers and wire the two BlueBUS photo eyes together as shown in the **BlueBUS Photo Eye Wiring** illustration below.

NOTE

Each photo eye pair wired to the same gate operator must use a different jumper configuration for each pair (six max).

4. Set both transmitter (TX) and receiver (RX) jumpers to same setting per chosen photo eye location. See the diagram and chart on **page 54**.
5. Route sensor wire into Juno chassis and install to Mercury 310 BlueBUS input (no polarity) per FIG. 10-1.
6. Reapply power to the controller (reconnect battery).
7. At power-up, sensor inputs are scanned, and the red BlueBUS LED on the controller will turn on if BlueBUS photo eyes have been detected and registered.
8. Test function of sensor by interrupting the infrared beam while the gate is opening or closing.



NOTE

For more information regarding installing multiple BlueBUS photo eye pairs or external entrapment sensors with 10k outputs, continue reading through **Appendix A, page 47**.

BlueBUS Photo Eye Wiring

Mercury 310 Accessory Wiring

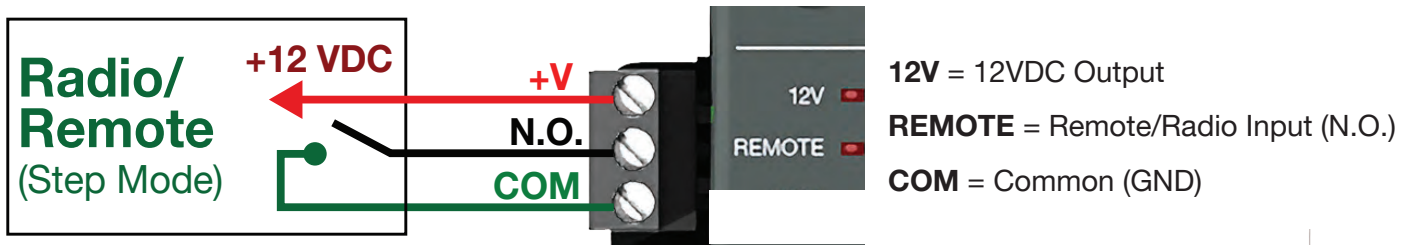
Refer to the following pages for detailed wiring information for various sensors and accessories from various manufacturers that can be used with the Juno gate system.

Control Inputs

The Control Inputs, normally used to control some Mercury 310 gate operations, are listed below and described on the following pages:

- Remote/Radio Input
- Guard station Input
- Fire Input

Remote Radio Input



This input is used to connect an auxiliary radio receiver or remote switch and is Normally Open. When it closes, the input will be active and the associated LED will turn on. The Radio/Remote input will operate in a “step” mode, like a garage door opener as follows:

- **1st activation:** Starts the gate moving in the open-direction.
- **2nd activation:** Stops gate.
- **3rd activation:** Starts gate moving in the close-direction.
- **4th activation:** Stops gate.

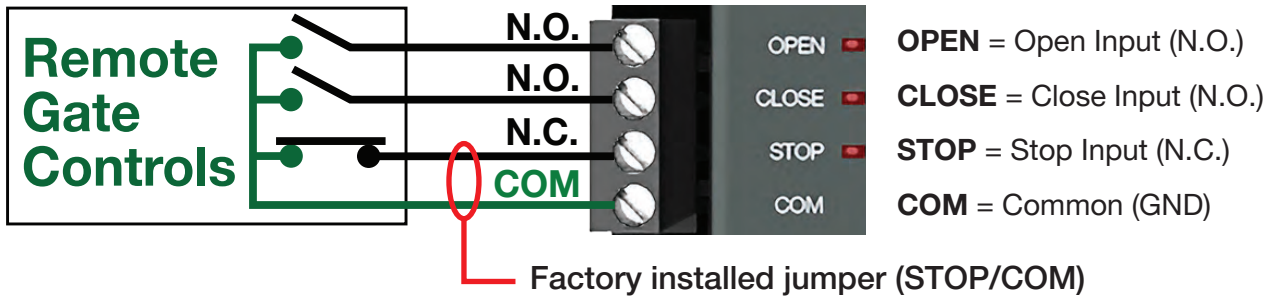


**Nice 318M
2-Ch. Radio Receiver**

NOTE

- If more than 15 seconds pass between activations, the next activation will start the gate moving in the open-direction. If the open limit is active, the gate will close on the first activation.
- The radio/remote input will be ignored if there is an active stop command, an active entrapment sensor, a BlueBus device in the commanded direction of travel or Latch mode has been activated.
- The radio/remote input will have no effect when the operator is in Hard Shutdown/Entrapment mode (Type A sensor tripped twice).

Remote Gate Control Inputs



CAUTION

These inputs are intended to be used for controls that are installed within sight of the gate.

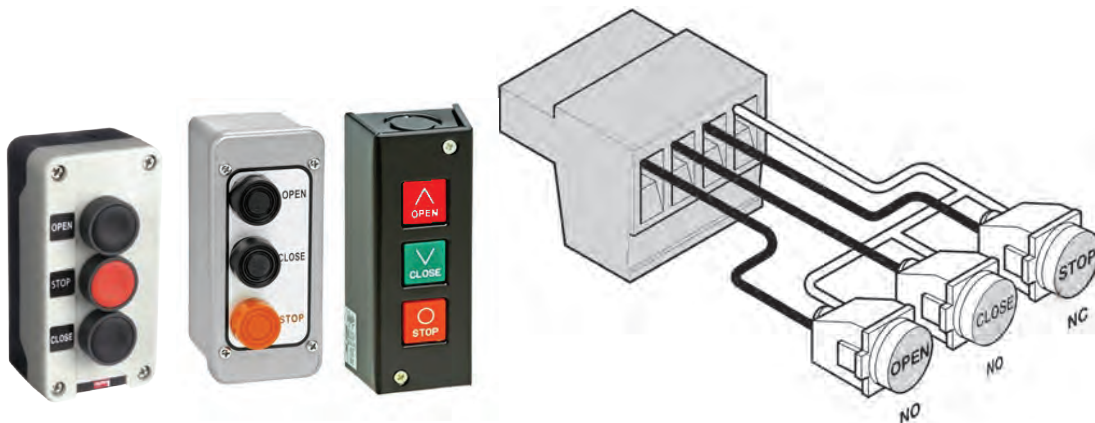
With the Remote Gate Control contact switches installed, the user can operate the gate by pushing the respective button for the command that is desired (open, close, or stop).

Gate Open and **Close** are controlled by Normally Open (NO) momentary switches and Stop is controlled by a Normally Closed (NC) momentary switch.

- **OPEN Input:** Dry contact input (normally open) for a guard station open switch. Momentarily shorting the Open input to COM opens the gate(s).
- **CLOSE Input:** Dry contact input (normally open) for a guard station close switch. Momentarily shorting the Close input to COM (GND) closes the gate(s).
- **STOP Input:** Dry contact input (normally closed) for a remote stop switch. Momentarily opening the Stop input stops the opening gate at its current position. While this input is activated, all other inputs are disabled and are not functional.

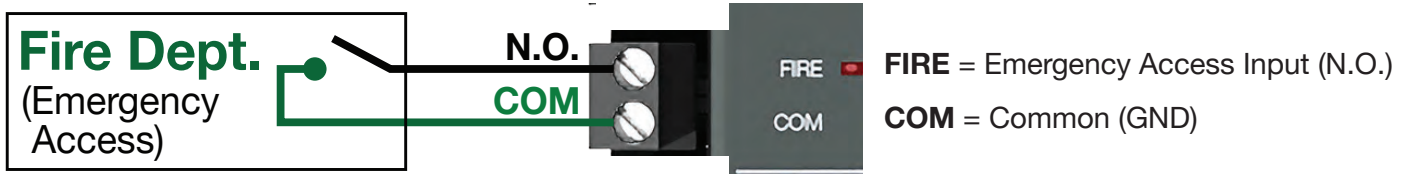
NOTE

When wiring in a **Stop** button, first remove the factory installed jumper (between Stop and COM). Reinstall a jumper if the **Stop** button is removed from the input.



Remote Gate Control Examples and Wiring

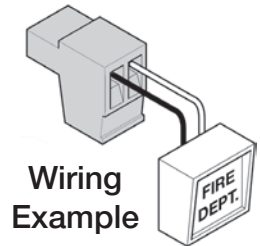
Fire Input



The fire input is meant to allow emergency personnel the ability to open the gate in an emergency situation without needing assistance. See **Emergency Gate Access**, below, for more information.

NOTE

- Auto-close is disabled when this input is activated.
- When Fire input is activated, it clears a hard shutdown
- An audible alarm will activate when fire input is active.



Emergency Gate Access Input

CAUTION

The gate system **MUST** be designed to allow access to emergency vehicles under different operating conditions. Read all of the following information. Make sure that your gate operating system is compliant with all local codes and regulations and that access for emergency vehicles is assured.

IMPORTANT INFORMATION!

During normal operation, emergency vehicles access the gate by using an emergency vehicle access device installed on your gate system. The type of device that is used in your community is dependent on local city codes. These devices may include (but are not limited to) Fire Department lock boxes, Click-to-Enter radio receivers, strobe light sensors, siren sensors, etc. Examples displayed below:



Cellular Switch



Fire Lockbox



Siren Sensor



Wireless Keypad

Examples: Emergency Access Device Examples

Ensure the gate system is equipped with a back-up power system. In the event of a primary (AC) power failure and a back-up system (DC) power failure (low charged or dead batteries for example), the system must have a release system to allow the gate to be manually operated. The release device must be accessible from either side of the gate and must be present, so emergency personnel can gain access through the gate under this condition.

Manual gate opening instructions for Juno are provided on **page 24**.

Safety Sensor Input

The Sensor Inputs, which are used to connect safety sensors, are listed below:

- BlueBUS Input
- 10K Ω Monitored Sensor Input (photo eyes, edge sensors, etc.)



CAUTION

The Mercury 310 controller has a Type A entrapment sensor built into it. At least two external entrapment sensors are required to meet the minimum requirements of UL325. However, some installations may need more than the minimum number of sensors to ensure all entrapment zones are protected.



WARNING

Disconnect the operator from power (both DC/Solar & Battery) when installing any accessory or external entrapment sensor.

Auto-Sensor Scan

When power is applied to the Mercury 310 controller, it performs a scan for connected external entrapment sensors at the sensor inputs and “Learns” the sensor by registering it in an internal sensor registry.

The Mercury 310 controller also performs a scan for connected external entrapment sensors at the BlueBus input. The display flashes **bb** until the scan is complete, and “Learns” the BlueBus sensors by registering it to the internal sensor registry.

If the sensor input is tripped at power up, the sensor input LED will flash and power must be removed from the controller and sensor wiring or alignment must be corrected before re-powering the controller and re-learning the sensors. The display will show what sensor is tripped and the associated LED will Flash.

Manual Sensor Scan / Clear

Once the controller has a stored sensor at a specific input, the power-up scan will always expect to see that sensor at the same input. The only way to remove that sensor, and clear the sensor registry, is to disconnect the sensor and perform a manual scan as follows:

- Press and hold the **STOP/CLEAR** button for five (5) seconds to relearn the connected sensors.

NOTE

Only a manual scan will uninstall learned sensors.

Sensor Activation (10K / BlueBUS)

The following section describes the behavior of the gate when the 10K and BlueBUS open and closed sensors are activated.

Activation of an open-direction or close-direction 10K or BlueBUS sensor input will stop a moving gate within two seconds, and reverse it in the opposite direction.

Sensor inputs will only be functional if a sensor is detected at power-up or during a manual learn of sensors. Appropriate sensors detected at these inputs will be treated as Type B2 external entrapment devices per UL325.

When learned, the sensor connected to the 10K input must have a 10K terminated sensor connected for monitoring purposes. These inputs are normally open. When closed, it will be active and the associated LED(s) will turn on.

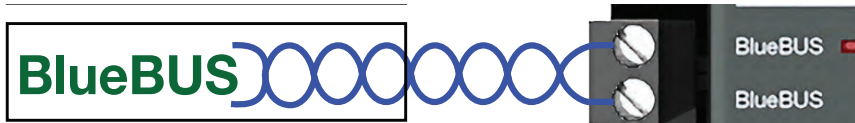
Open-direction sensor activation behavior includes:

- The associated LED will flash three times if activated and preventing gate operation.
- The reversal toward the close limit will be limited to 0.5s if any loop or open inputs are active, and the full reversal will be completed when all the inputs are clear.
- If the close-direction sensor input is activated during the reverse to close, the gate will stop and perform a 0.5s reversal toward open.
- The close timer will be disabled until a renewed run command (open, close, loop, etc.) is received.
- If the Type A inherent current sensor is tripped while the gate is reversing toward close, the operator will perform a 0.5s reversal and stop in “hard shutdown”.
- A fire open input will still attempt to open the gate even if the open-direction sensor input is activated.
- Activation of the open-direction sensor input (shorted to common or closed) will prevent the gate from opening normally unless the controller did not learn the input with a sensor.

Close-direction sensor activation behavior includes:

- The associated LED will flash three times if activated and preventing gate operation.
- If an open-direction sensor input is activated during the reverse to open, then the gate will stop and perform a 0.5s reversal toward close.
- The close timer will be disabled until a renewed run command is received.
- If the Type A inherent current sensor is tripped while the gate is reversing toward open, then the operator will perform a 0.5s reversal and stop in “hard shutdown”.
- Activation of the close-direction sensor input (shorted to common or open) will prevent the gate from closing normally unless the controller did not learn the input with a sensor.

BlueBUS Input



BlueBUS = BlueBUS Photo eye inputs

Nice BlueBUS™ photo eyes offer useful features, such as:

- Up to six (6) BlueBUS photo eye pairs may be wired together along a single two wire cable.
- Jumper settings on each photo eye pair allow two (2) open-direction addresses and four (4) close-direction addresses.
- Wiring connections are non-polarized.



Example: Nice BlueBUS Photo Eyes

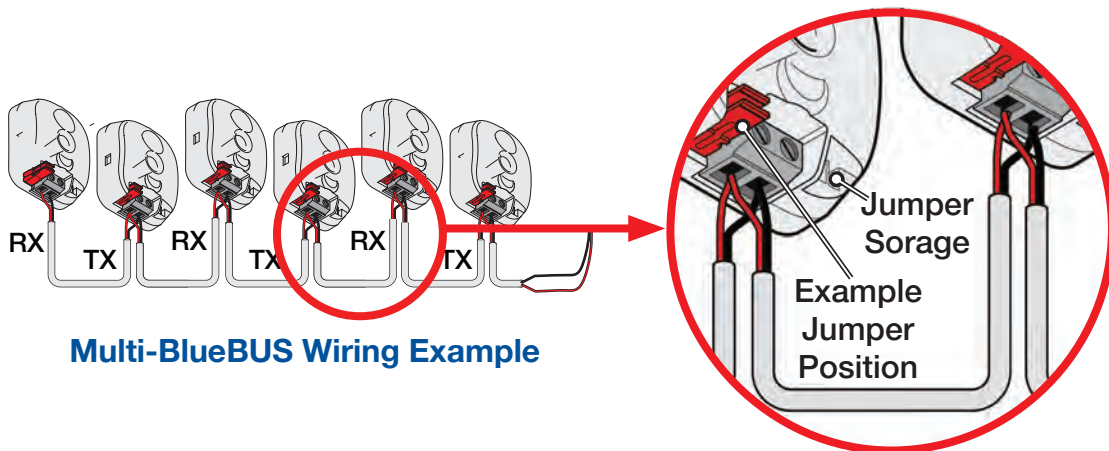
Installing BlueBUS photo eye sensors:

1. Remove power sources from controller (battery and DC/Solar inputs).
2. Install photo eye pairs in appropriate locations per the **BlueBUS Sensor Locations** (per Jumper Settings) diagrams on next page).
3. Wire BlueBUS photo eyes as shown in example below.
4. Configure photo eye jumpers per the **BlueBUS Jumper Settings** (Gate Behavior) chart on next page.

NOTE

Each photo eye pair wired to the same gate operator must use different jumper configuration for each pair (six max).

5. Route sensor wires into control box and install sensor wires to BlueBUS input (no polarity required).
6. Reapply power to the controller.
7. At power-up, sensor inputs are scanned, and the BlueBus LED on the controller will turn on if BlueBUS photo eyes have been detected and registered.
8. Test the function of each sensor by interrupting the infrared beam while the gate is opening or closing.



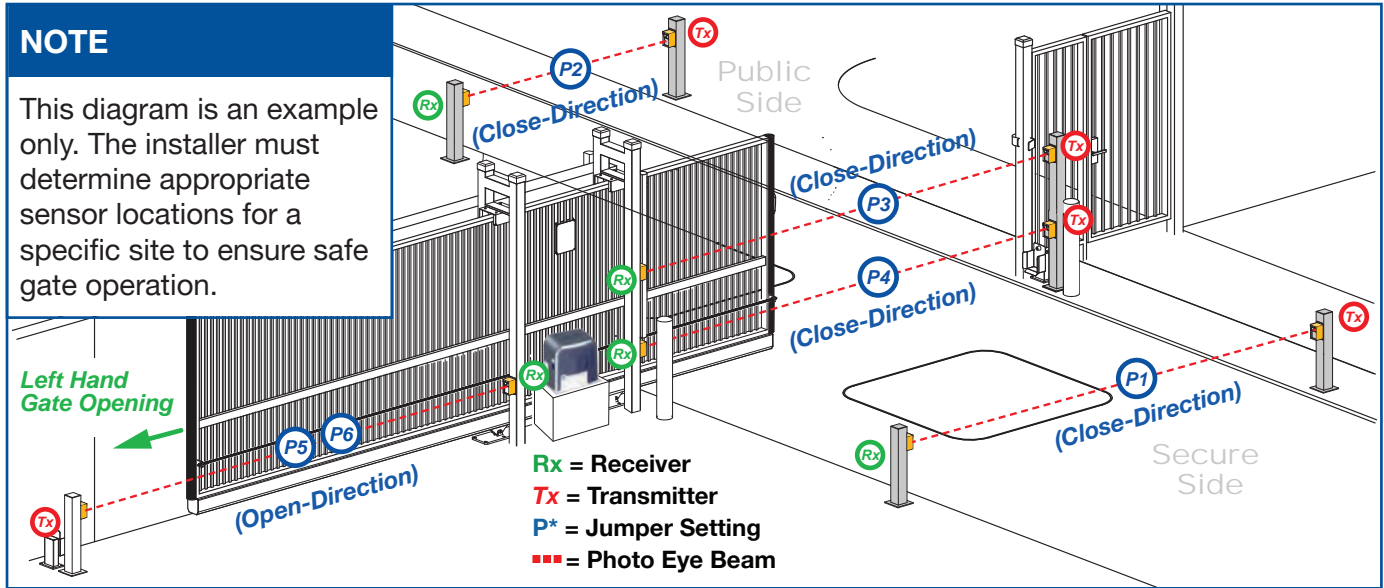
Multi-BlueBUS Wiring Example

NOTE

To remove BlueBus sensors from controller sensor registry: Unplug sensors, then perform a registry clear by pressing and holding the **Stop/Clear** button for five (5) seconds. The sensors are then relearned.

BlueBUS Slide-Gate Sensor Locations

(Example per Jumper Settings)

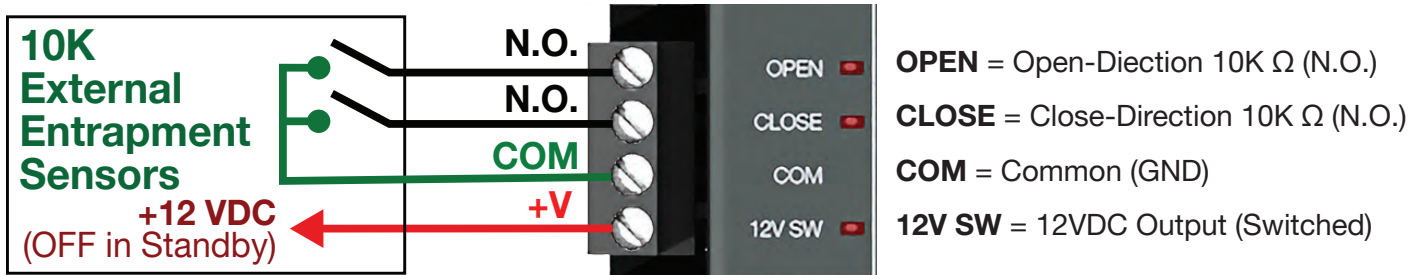


BlueBUS Jumper Settings (Gate Behavior)

Not Used	NOTE	
	Each pair of photo eyes wired to the same gate operator must use a different jumper configuration for each pair (six maximum).	
	P1	P1 - P2 (Close Direction)
	P2	<ul style="list-style-type: none"> • Holds gate open and reverses gate if closing. • Resets close timer in open position.
	P3	P3 - P4 (Close Direction)
	P4	<ul style="list-style-type: none"> • Holds gate open, stops gate if closing and reverses back open when eye is cleared. • Stops gate if opening and resumes after eye is cleared. • Resets close timer in open position.
	P5	P5 - P6 (Open Direction)
	P6	<ul style="list-style-type: none"> • Delays gate from opening until eye is cleared. • Reverses gate back closed.

NOTE
 When a BlueBus device is detected, it must always be present and not tripped before the gate will run in that direction.

10KΩ Sensor Inputs



10KΩ Sensor Installation

1. Remove power sources from controller (battery and DC/ Solar inputs).
2. Install photo eye pairs or edge sensors as appropriate (See page 11).
3. Wire sensors per manufacturer's instructions. Wiring diagrams of various compatible sensors can be found on the following pages.
4. Route sensor wires into control box and install into 10K input.
5. Reapply power to the controller.
6. At power-up, sensor inputs are scanned, and if 10K device is detected, sensors are registered and associated input red LED lights.
7. Test the function of each sensor according to manufacturers instructions.



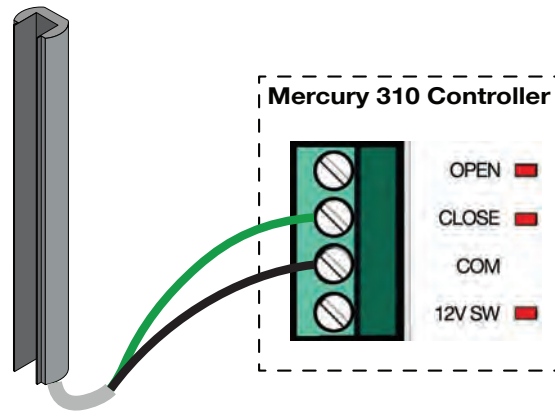
**Example 10KΩ:
EMX IRB MON Photo Eye**

NOTE

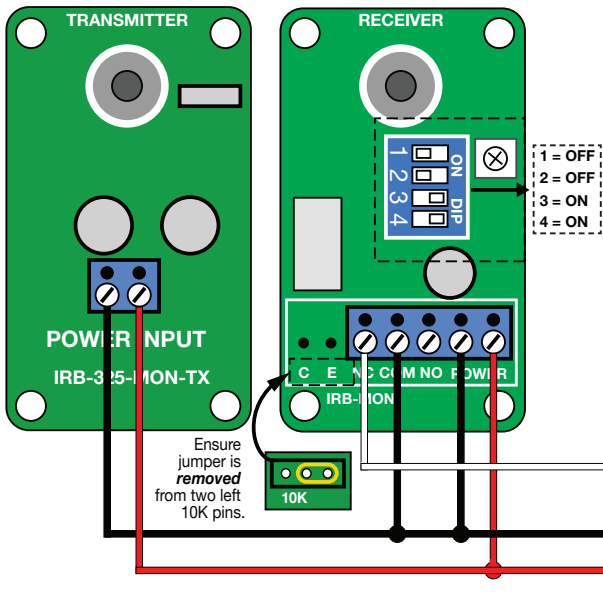
The Mercury 310 controller requires sensors with 10K terminated outputs to meet the monitoring requirements of UL325.

Generic 2-Wire Edge Sensor Wiring

Generic 2-wire edge sensors must be 10K Normally Open (N.O.) devices and may be wired to the Sensor Inputs as shown below.



EMX IRB-MON (Photo Eye) Wiring



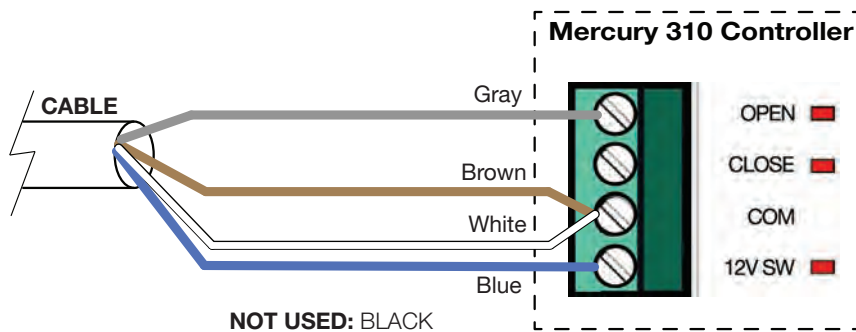
NOTE

Wiring shown is for sensor in the open-direction. For a close-direction sensor, use the Close input.

IMPORTANT

Set DIP switches as shown, or photo eye will not operate correctly.

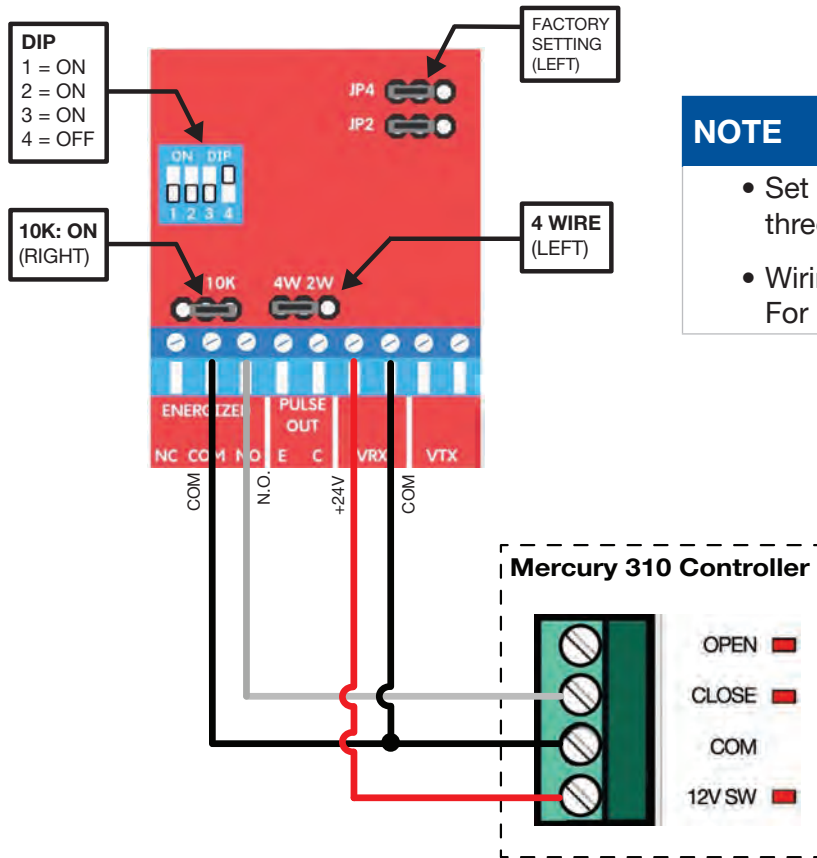
EMX NIR-50-325 (Photo Eye) Wiring



NOTE

Wiring shown is for sensor in the open-direction. For a close-direction sensor, use the Close input.

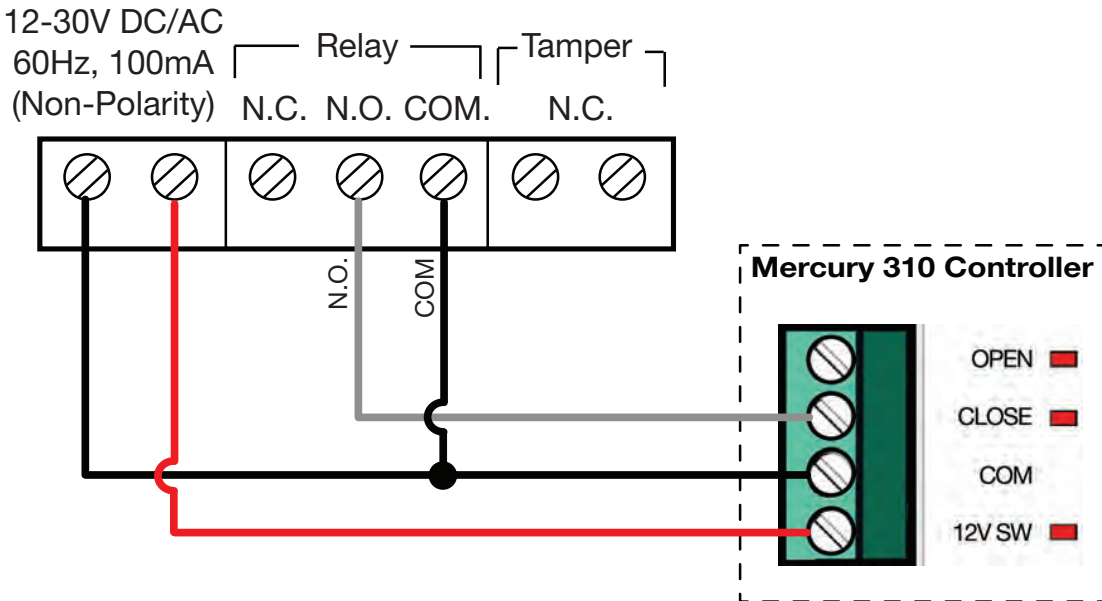
EMX IRB-RET (Photo Eye) Wiring



NOTE

- Set board as shown in diagram at left. Jumpers are three pin type and placed as indicated (left or right).
- Wiring shown is for sensor in the close-direction. For an open-direction sensor, use the Open input.

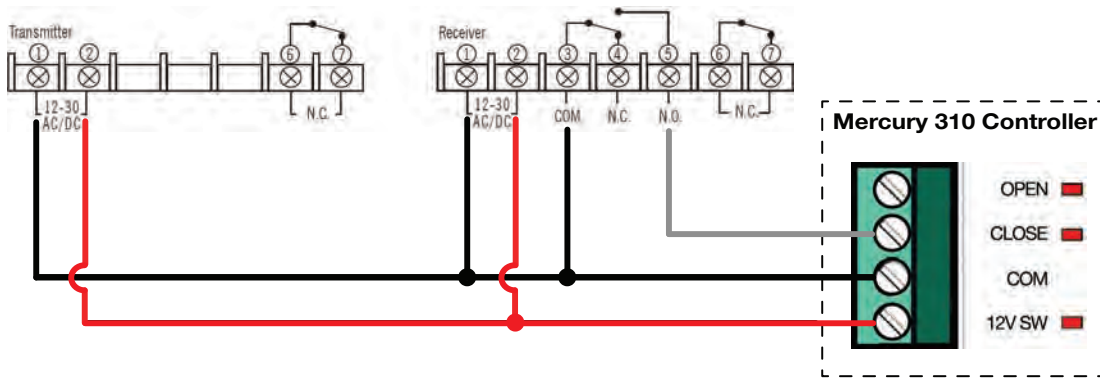
Seco-Larm Enforcer Retro-Reflective (E-931-S50RRGQ) (Photo Eye) Wiring



NOTE

Wiring displayed above is for the sensor in the close-direction. For an open-direction sensor, use the Open input.

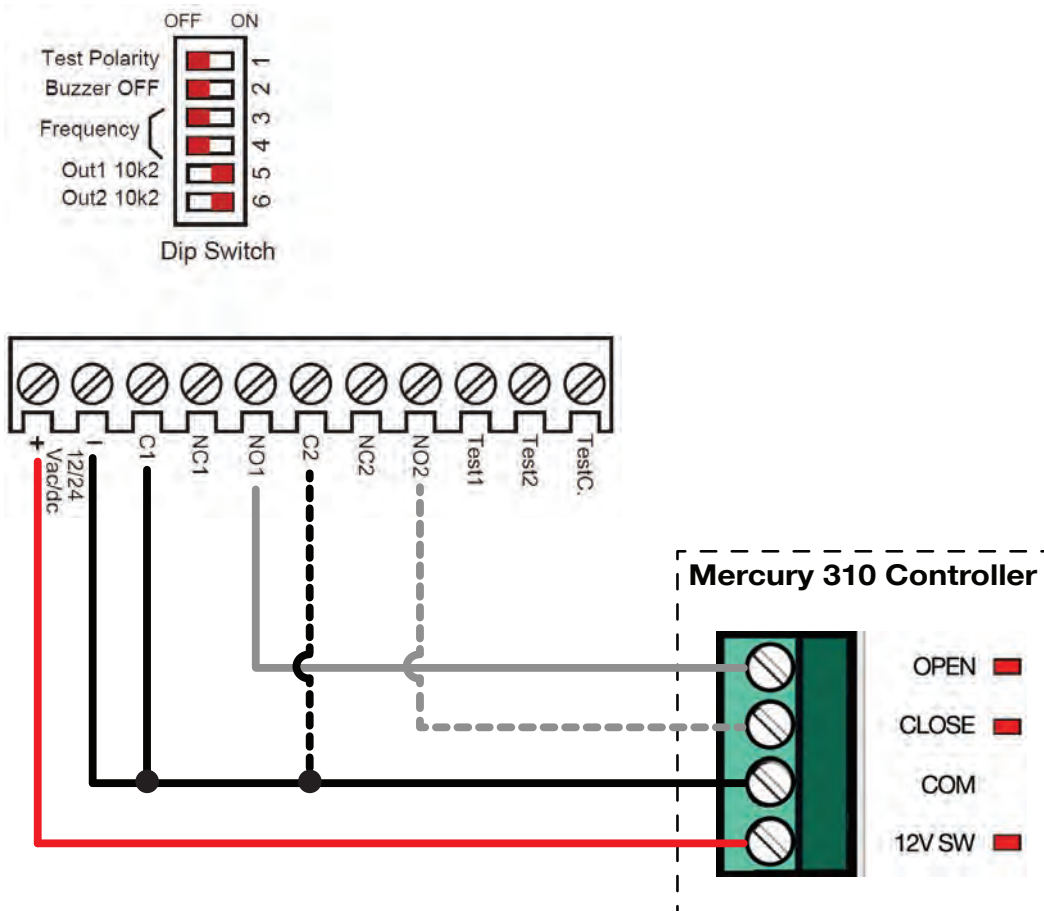
Seco-Larm Enforcer Through-Beam (E-960-D90GQ) Wiring



NOTE

Wiring shown is for sensor in the close-direction. For an open-direction sensor, use the Open input.

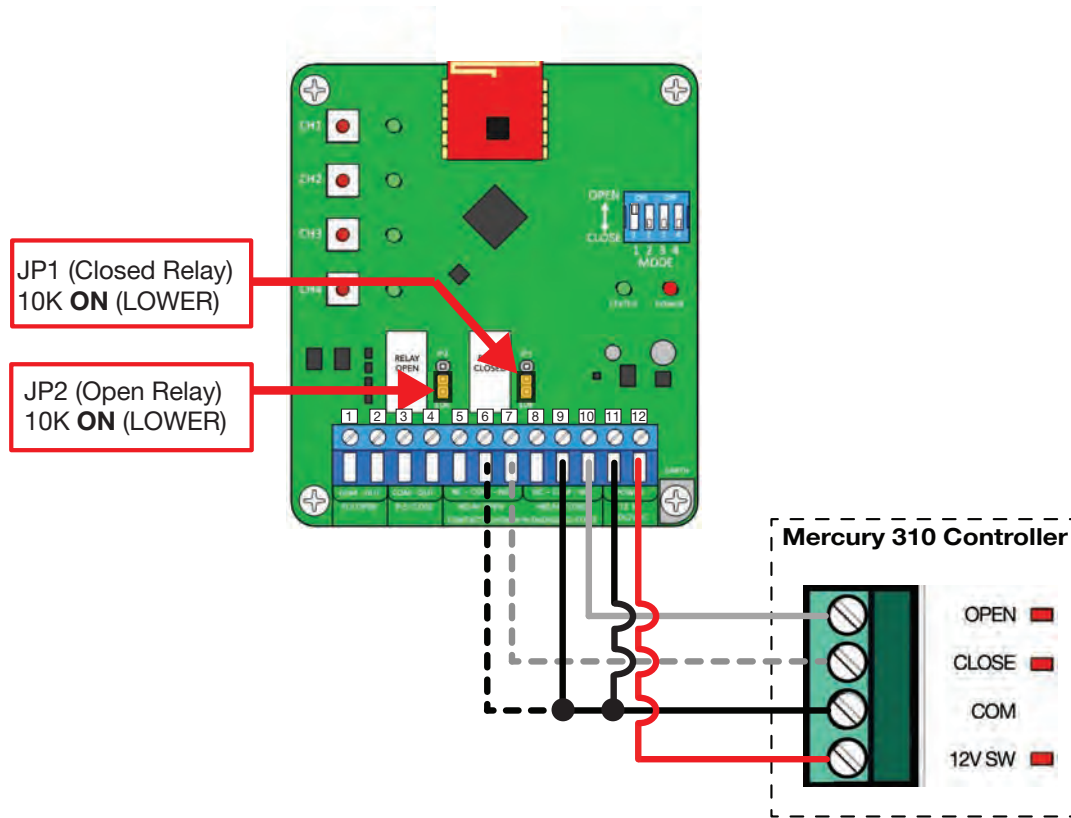
Transmitter Solutions iGaze RE Kit (Photo Eye) Wiring



NOTE

- Dashed lines indicate the secondary wiring connections if an additional sensor is wired to the inputs. See manufacturer's instructions for details.
- Wiring shown is for sensor in the open-direction. For a close-direction sensor, use the Close input. To add a close-direction sensor, wire as shown with secondary wiring (dotted lines).

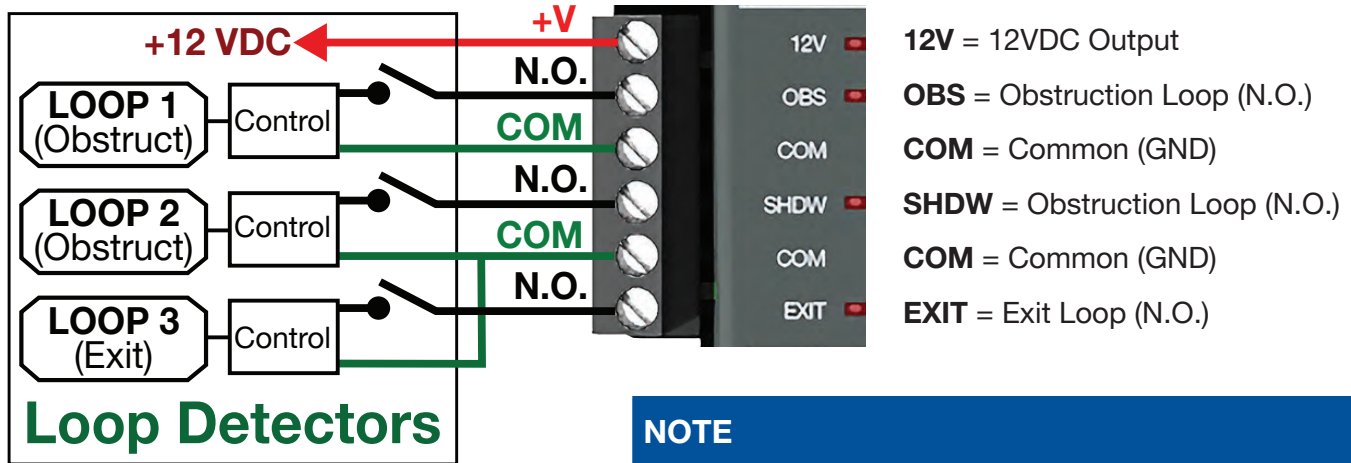
EMX WEL200 (Edge Sensor) Wiring



NOTE

- Set board as shown in red boxes per diagram. Jumpers are three pin type, and placed LOWER as indicated for 10K operation. Dashed lines indicate the secondary wiring connections if an additional sensor is wired to the input. See manufacturer's instructions for details.
- Wiring displayed is for sensor in the open-direction. For a close-direction sensor, use the Close input. To add a close-direction sensor, wire as shown with secondary wiring (dotted lines).

Loop Inputs



NOTE

LOOP 2 has front panel indication of “SHDW”, but for a slide gate operator, such as Juno, it is used as a second obstruction loop.

The Mercury 310 is capable of two types of loop response for slide gate systems:

- **Obstruction Loop:** Keeps a gate open if activated, OR if a gate is closing, reverses it to open. No effect on an opening gate.
- **Exit Loop:** If gate is closed, opens it and if gate is closing, reverse it to open.

The Obstruction Loop is intended to prevent a gate from closing onto a vehicle that is activating the sensor. Refer to Loop examples on the next page. When activated, the Obstruction Loop input:

1. Prevents an open gate from closing (suspends close timer during activation).
2. Stops a closing gate and reverses it to Open limit (suspends close timer during activation).

The associated red LED will FLASH three times if the gate is prevented from closing by the activation. The activation of this input has no effect on an opening gate or stopped gate that has received an open command.

NOTE

Activation of the obstruction loop re-enables the close timer function.

The Exit Loop input is used to open a fully closed gate for a vehicle, open a closing gate to prevent the gate from hitting a vehicle or to prevent an open gate from closing onto a vehicle. Refer to loop examples below. When activated, the Exit Loop input:

1. Starts a stopped gate moving in the open-direction.
2. Stops and reverses a closing gate toward the open-direction.
3. Prevents an open gate from closing (resets close timer and suspends it during activation).

The associated red LED will FLASH three times if the gate is prevented from operating by the activation. Activation of this input has no effect if there is an active stop command or an open-direction entrapment sensor or BlueBus device.

NOTE

The following are general instructions for installing generic vehicle loops detectors. If installing loop detectors, the manufacturer's instructions should have priority over these guidelines.

A vehicle detector passes a small current flow through the “loop” of wire, which then becomes an inductive coil. When a vehicle passes over the loop, the detector senses resultant drop in inductance and actuates detector output.

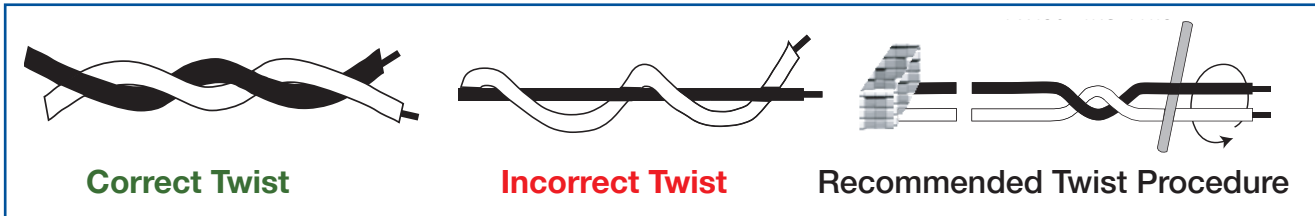
Loop Configurations: Configurations differ depending on application. In parking applications, a loop may be as small as 4 x 6 ft (122 x 183cm). In traffic applications employing one of our swing or slide gate operators, the smallest loop should not be less than 6 x 6 ft (183 x 183cm) in order to detect high bed vehicles.

- The side of the loop closest to the gate must be located at least 4 feet from the gate when gate is closed.
- The shortest side of loop should be between 6 and 8 feet (1.8m and 2.4m) in length. Longest side of loop should be between 6 and 20 feet (1.8m and 6.1m) in length. For applications that need to span a wide area, use several smaller loops. Do not connect more than 200 square feet (18.6sq. m) of loop area to a single detector.
- In applications with multiple loops, keep each loop 4 ft (122cm) to 6 ft (188cm) apart. This avoids “cross talk”. It's possible to have loops closer together by selecting different frequencies.
- For greater sensitivity and less chance of false calls caused by the motion of the gate, it's better to use multiple smaller loops, connected in a series circuit, to one detector instead of a single large loop.
- To avoid interference, keep loops at least 2-inches (5cm) above any reinforcing steel. Do not route loop wires with, or in close proximity to, any other conductors. This includes other loop leads, unless shielded lead-in cable is used. Never route high voltage circuits in PVC conduit near a loop.
- Loop and lead-in wire should be one continuous piece. Avoid splices, if possible. If a splice is necessary for any reason, “pot” the splice in epoxy or use heat shrink to ensure that the quality of the splice covering is the same as the original wire jacket.
- Use 14, 16 or 18 gauge stranded wire with a direct burial jacket. Cross linked polyethylene insulation types, such as, XLPE or XHHW, will last much longer and are less prone to damage during installation than conventional insulation types. Preformed loops can be used before road surfacing or under pavers.
- Twist loose tails of lead-in wires tightly, approximately ten times per foot (see next page).
- Follow this guide for the correct number of turns in the loop:
 - ◇ 12 to 20 sq. feet (3.7 to 6.1 sq. m) = 5 turns
 - ◇ 20 to 60 sq. feet (6.1 to 18.3 sq. m) = 4 turns
 - ◇ 60 to 240 sq. feet (18.3 to 73.1 sq. m) = 3 turns
- Slot after the sealer has set, the detector may give false calls.

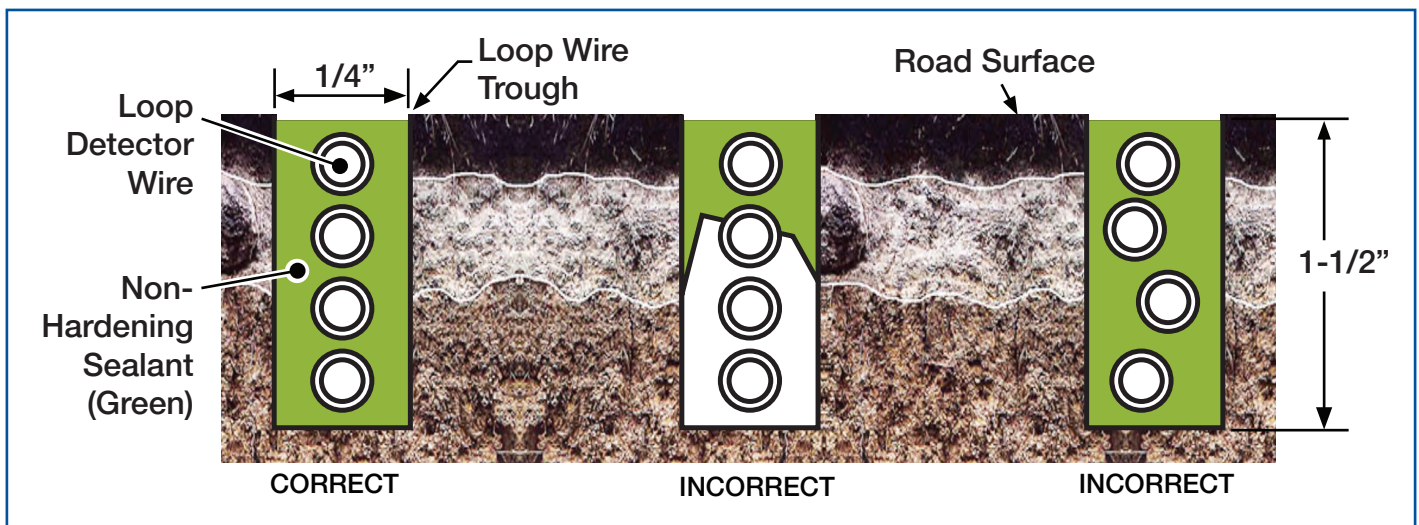
Loop Inputs

This guide is written from a design perspective, but installation workmanship practices are equally important to insure proper operation and long loop life. The best way to insure a quality installation is to employ a professional installer experienced with detector loops. A few important practices are:

- The trough (slot) in the surface of the road should be cut $\frac{1}{4}$ -inch wide x $1\frac{1}{2}$ -inch deep (6.3mm x 38.1mm).
- The corners of the cut must be at an angle or core drilled to relieve stress on the wires.
- Lead-in wires must be twisted at least ten (10) turns per foot. See diagram below.
- After the wire is installed, slot must be completely backfilled with a non-hardening sealer. If the loop wires can move in the slot after the sealer has set, the detector may give false calls. See diagram below:



Loop Wire Lead-in Twisting



Loop Wire Troughs and Sealant

Detector Logic

Nice recommends that vehicle detectors be used for free open and obstruction sensing logic only. Because of their slower speeds, closing logic is a poor choice for security gate systems. Since there are several ways that the gate may be left standing open and because there is a loss of safety, our circuit has not been designed to accommodate "detect to close" logic.

Loop Diagnostics

The following tests cannot guarantee a functioning loop, but failure of either test means that the loop is definitely suspect, even though it may still be functioning at the time.

- Test the resistance of the loop and lead-in wire. It should not exceed 4 Ω s.
- Test the resistance between the loop and earth ground with a 500V Megohm meter. It should be 100 Megohms or more. Loops may function at 100 Megohms or less but will not be reliable (e.g. when the ground is wet from rainfall). Low resistance indicates broken or moisture saturated insulation. This is common if inappropriate wire insulation has been used.

Appendix B - Controls and Indicators

Mercury Gate Controls and Indicators

Refer to **page 33** for a diagram of all Mercury 310 controls and features.

Gate Control Buttons

The OPEN, CLOSE, and STOP/CLEAR buttons are used to operate the gate from the control box. Each is described below.

OPEN Button

Press and release to open the gate.

NOTE

Pressing the **OPEN** button on a closing gate will stop, reverse direction and open the gate.

CLOSE Button

Press and release to close the gate.

NOTE

Pressing the **CLOSE** button on an opening gate will stop the gate.

STOP/CLEAR Button

- Press and release to stop the gate.
- Press and release to clear a hard shutdown/entrapment mode.
- Press and hold (3s) to clear the BlueBUS and 10K sensor registry.
- **Press and hold STOP/CLEAR with FAIL-SAFE Button for 5s seconds for a factory reset to default settings.**



NOTE

If no obstruction present, manually operate gate to verify smooth rolling. If necessary increase the Force setting to prevent false trips.



CAUTION

DO NOT reset the system without first determining what obstructed the gate or tripped a sensor to cause the shutdown, as well as whether the situation has been safely resolved.

Power Status LEDs

The power indication LEDs display the power status for the solar, DC, and battery power sources. Each is described below.

BATTERY HEALTH LED

RED LED:

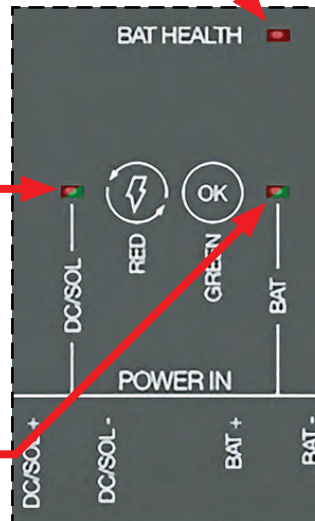
- Glows solid when battery health OK.
- Flashes when:
 - ◇ No battery connected;
 - ◇ Battery fuse is blown; or
 - ◇ Battery voltage is too low (<10.5V).

DC/SOLAR LED

- **GREEN** = ON and polarity OK.
- **RED** = Polarity reversed.
- **OFF** = No power or 15A fuse blown or other hardware failure.

BATTERY POWER LED

- **GREEN** = ON and polarity OK.
- **RED** = Polarity reversed.
- **Flashing GREEN** = Battery Voltage below 12.5V.
- **OFF** = No power or other hardware failure.



NOTE

Battery replacement should only be performed by a professional installer.

Fail-Safe and Alarm buttons

The Fail-Safe and Alarm buttons operate as described below. These should be set according to user preference.

FAIL SAFE Button (On/Off)

RED LED = ON:

Fail-Safe is enabled, and the gate will automatically move to the **open limit** if the battery voltage falls below a certain limit.

RED LED = OFF:

Fail-secure is enabled, and the gate will automatically move to the **close limit** if the battery voltage falls below a certain limit.

RED LED = FLASHING:

When FLASHING, Fail-safe or Fail-secure is currently activated.

NOTE

If site security has a priority over site access, then fail safe should be turned off (fail secure) and instructions for manually opening a gate in the event of a power failure (**page 24**) should be reviewed.

Activation of fail-safe/secure only occurs with a battery powered controller during an AC failure for a controller powered from an AC-DC power supply.

Reset of fail-safe/secure occurs automatically when these conditions are met:

- If the controller is powered from an AC-DC power supply, the fail-safe/secure will reset when AC power is restored.
- If the controller is powered from a battery, then the fail-safe/secure will reset when the battery voltage is above a certain limit for 10 minutes.

Pressing the fail-safe button while fail-safe/secure is activated will reset it. However, fail-safe/secure may be activated again if the battery voltage is still below a certain limit.



ALARM Button (On/Off)

RED LED = ON:

When set to ON, the **warn-before-operate alarm** will sound for three (3) seconds before the gate starts moving because a gate button was pressed or a sensor (such as a ground loop) is tripped. The alarm continues for two (2) seconds after gate moves, and then it turns off.



CAUTION

The alarm connected to the Mercury 310 Controller should never be disconnected. This alarm functions as the entrapment alarm and is a requirement under UL325 requirements.

NOTE

Alarm will sound during safety critical scenarios regardless of this setting.

Appendix C - Firmware Update

Firmware updates are sometimes released to upgrade the controller with new features or optimizations. These firmware updates are announced via technical bulletins and are available for downloading from the Nice website when they are released.

NOTE

Nice recommends that all controllers be updated to the latest firmware revision to ensure reliable operation.

Equipment needed:

- USB capable computer (with internet access)
- USB flash drive (formatted in FAT32)



Mercury 310 Firmware Update Features

Firmware update instructions are as follows:

1. Download and save the firmware update from <https://support.hysecurity.com/hc/en-us/categories/360003202873-Software>.
2. Copy downloaded file onto a USB drive (FAT32 format). Save/copy to root directory of USB drive (not in a folder). An empty flash drive is recommended. Nice is not responsible for any data loss.

NOTE

A USB drive being used to update the firmware should have only one file version of the Mercury 3xx series firmware in the root directory.

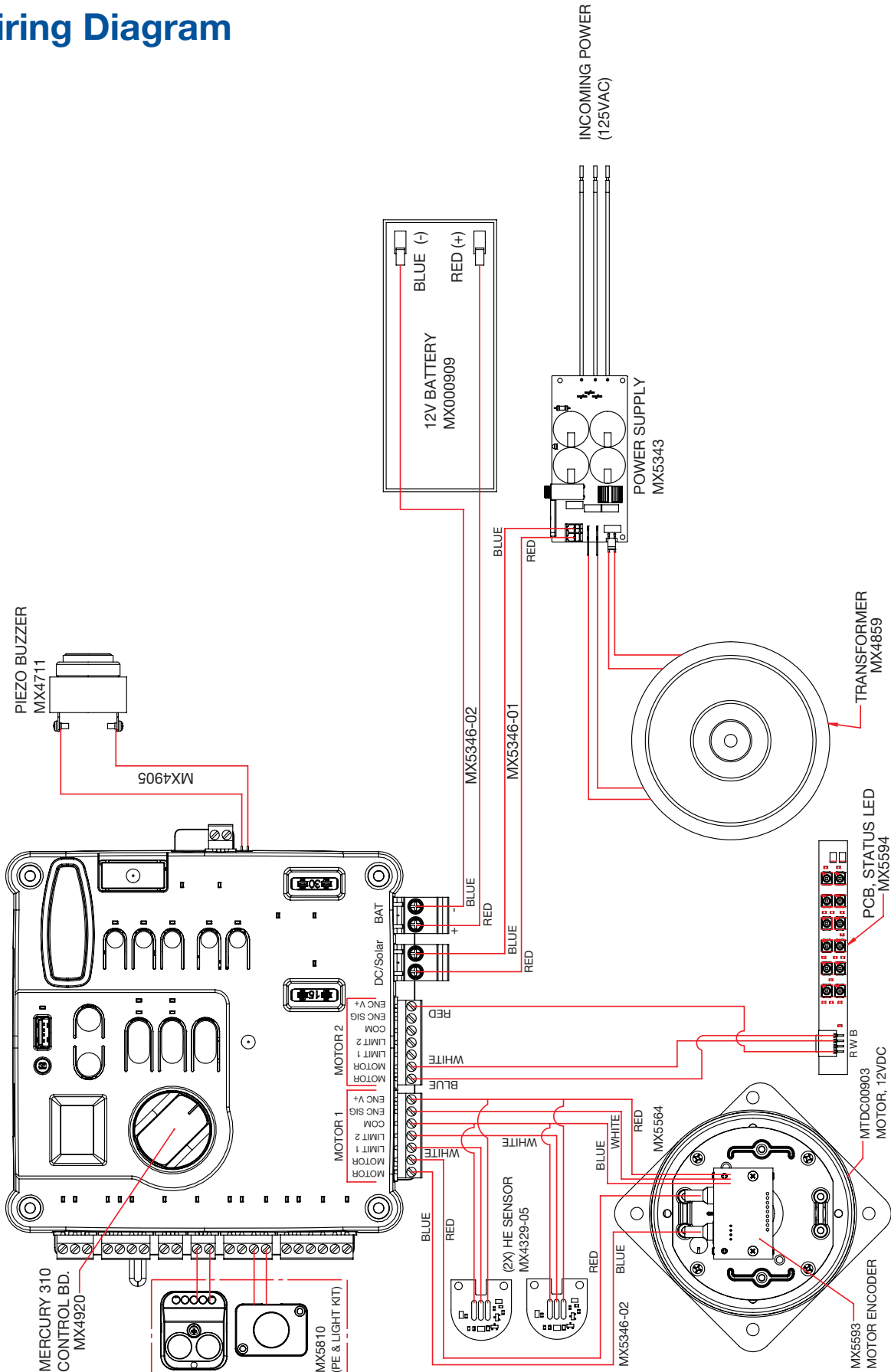
3. Press and hold the F/W Update button on the Mercury 310 controller for about 5 seconds. The display will show "**BL**" and the F/W Update LED will flash to indicate that the board is ready to be updated.
4. Plug USB drive (with update) into the F/W Update connector (see image above). When the USB is detected, firmware will automatically be updated, and the board will reset.
5. After reset, the firmware version will show in the display and debug data logging will automatically start. During the logging of debug data, the F/W Update LED will turn on when data is written to the USB drive.
6. When the display returns to normal behavior and the LED stops flashing, the update is complete. The USB drive can be safely removed when the F/W Update LED remains off.

NOTE

Depending on firmware changes, some settings may need to be reset or sensors relearned.

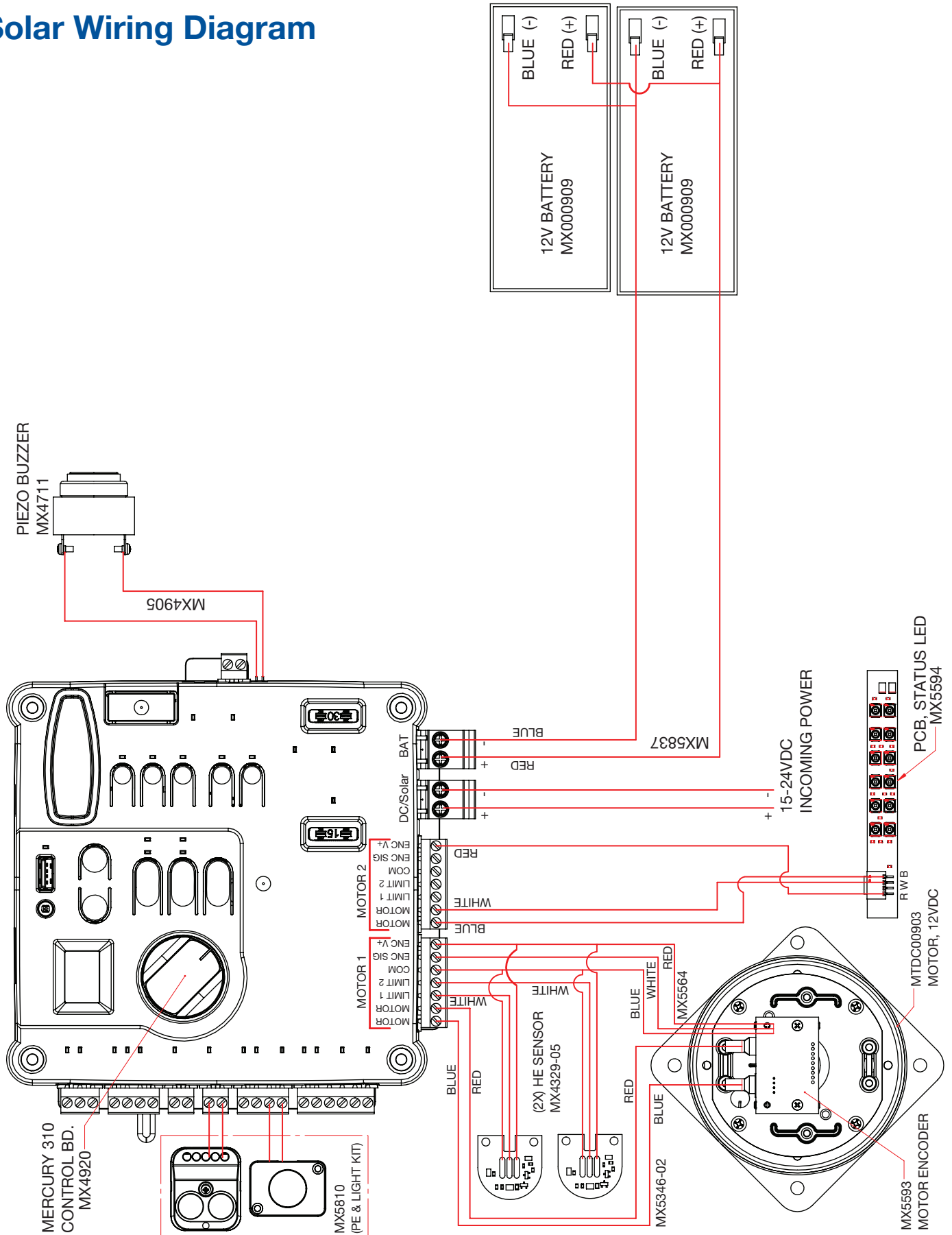
Appendix D - Wiring Diagrams

AC Wiring Diagram



Appendix D - Wiring Diagrams

Solar Wiring Diagram



Appendix E - Safety Section (French)

French Translations

The following French translations provided below are found in the Safety Section located at the beginning of the manual.

English	French
IMPORTANT SAFETY INSTRUCTIONS WARNING – To reduce the risk of severe injury or death:	AVERTISSEMENT DE CONSIGNES DE SECURITÉ IMPORTANTES- Pour reduire le risques de blessures graves ou mortelles :
1. READ AND FOLLOW ALL INSTRUCTIONS.	1. LIRE ET SUIVRE TOUTES LES INSTRUCTIONS.
2. Never let children operate or play with gate controls. Keep the remote control away from children.	2. Ne jamais laisser les enfants faire fonctionner la porte ou jouer avec les commandes de la bamriere. Garder la telecommande hors de la portee des enfants.
3. Always keep people and objects away from the gate. NO ONE SHOULD CROSS THE PATH OF THE MOVING GATE.	3. Toujours garder les personnes et les objets loin de la barriere, PERSONNE NE DEVRAIT FRANCHIR LA BARRIERE EN MOUVEMENT.
4. Test the gate operator monthly. The gate MUST reverse on contact with a rigid object or stop when an object activates the non-contact sensors. After adjusting the force or the limit of travel, retest the gate operator. Failure to adjust and retest the gate operator properly can increase the risk of injury or death.	4. Verifier l'ouvre-bamriere une fois par mois. La barriere DOIT inverser son mouvement au contact d'un objet rigide, lorsque celui-ci active les capteurs sans contact. Apres avoir regle la force ou la limite du deplacement, verifier de nouveau l'ouvre-bamriere. Si l'ouvre-bamriere est mal regle ou n'est pas verifie de maniere appropriee, le risque de ou de blessures graves ou mortelles est accru.
5. Use the manual release only when the gate is not moving.	5. Utiliser le dispositif de degagement manuel uniquement si la bamriere est immobilisee.
6. KEEP GATES PROPERLY MAINTAINED. Read the user's manual. Have a qualified service person make repairs to gate hardware.	6. ASSURER L'ENTRETIEN ADEQUAT DE LA BARRIERE. Lire le guide d'utilisation. Demander a un professionnel qualifie de reparer la quincaillerie de la barriere.
7. The entrance is for vehicles only. Pedestrians must use separate entrance.	7. L'entree est reservee aux vehicules. Les piétons doivent avoir une entree distincte.
8. SAVE THESE INSTRUCTIONS.	8. CONSERVER CES INSTRUCTIONS.

Appendix E - Safety Section (French)

English	French
<p>2.3 Install the gate operator only when:</p> <p>a. The operator is appropriate for the construction of the gate and the usage Class of the gate,</p> <p>b. All openings of a horizontal slide gate are guarded or screened from the bottom of the gate to a minimum of 1.83 m (6 ft) above the ground to prevent a 57.2 mm (2-1/4 inch) diameter sphere from passing through the openings anywhere in the gate, and in that portion of the adjacent fence that the gate covers in the open position,</p> <p>c. All exposed pinch points are eliminated or guarded, and</p> <p>d. Guarding is supplied for exposed rollers.</p>	<p>2.3 N'installez l'ouvre-barrière que si :</p> <p>a. l'ouvre-barrière est approprié pour la structure et la classe d'utilisation de la barrière;</p> <p>b. toutes les ouvertures de la barrière coulissante sont protégées ou grillagées du bas de la porte jusqu'à un minimum de 1,83 m (6 pi) du sol si bien qu'une sphère de 57,2 mm (2 1/4 po) de diamètre ne peut passer par une ouverture au niveau de la barrière et de la portion de la clôture adjacente que la barrière couvre en position ouverte;</p> <p>c. tous les points de pincement sont éliminés ou protégés;</p> <p>d. des protections sont fournies pour les galets exposés.</p>
<p>2.4 The operator is intended for installation only on gates used for vehicles. Pedestrians must be supplied with a separate access opening. The pedestrian access opening shall be designed to promote pedestrian usage. Locate the gate such that persons will not come in contact with the vehicular gate during the entire path of travel of the vehicular gate.</p>	<p>2.4 L'ouvre-barrière est destiné à n'être installé que sur des barrières utilisées pour les véhicules. Il faut fournir une autre voie d'accès aux piétons. La voie d'accès pour les piétons doit être conçue pour favoriser le passage des piétons. Placez la barrière de sorte que personne ne puisse entrer en contact avec la barrière pour les véhicules sur l'ensemble de sa trajectoire.</p>
<p>2.5 The gate must be installed in a location so that enough clearance is supplied between the gate and adjacent structures when opening and closing to reduce the risk of entrapment. Swinging gates shall not open into public access areas.</p>	<p>c) Pour réduire les risques de coincement lors de l'ouverture et de la fermeture, la barrière doit être installée dans un endroit où la barrière et les structures avoisinantes sont suffisamment éloignées l'une de l'autre. Les barrières battantes ne doivent pas ouvrir dans une zone d'accès public.</p>
<p>2.6 The gate must be properly installed and work freely in both directions prior to the installation of the gate operator. Do not over-tighten the operator clutch or pressure relief valve to compensate for a damaged gate.</p>	<p>2.6 La barrière doit être bien installée et fonctionner librement dans les deux directions avant d'entreprendre l'installation de l'ouvre-barrière. Ne serrez pas trop l'embrayage ou la soupape de surpression de l'ouvre-barrière pour compenser une barrière endommagée.</p>
<p>2.7 Controls intended for user activation must be located at least 1.83 m (6 ft) away from any moving part of the gate and where the user is prevented from reaching over, under, around or through the gate to operate the controls. Exception: Emergency access controls only accessible by authorized personnel (e.g. fire, police, EMS) may be placed at any location in the line-of-sight of the gate.</p>	<p>2.7 Les commandes destinées à l'activation par l'utilisateur doivent être situées à au moins 1,83 m (6 pi) des pièces mobiles de la barrière et à un endroit où l'utilisateur ne peut pas atteindre les commandes par le dessus, par le dessous, par les côtés et au travers de la barrière. Exception : Les commandes d'accès d'urgence accessibles au personnel autorisé seulement (p. ex. pompier, policier, SMU) peuvent être placées à tout endroit dans le champ de visibilité de la barrière.</p>

Appendix E - Safety Section (French)

English	French
<p>2.8 The Stop and/or Reset button must be located in the line of-sight of the gate. Activation of the reset control shall not cause the operator to start.</p>	<p>2.8 Le bouton d'arrêt, le bouton de réenclenchement ou ces deux boutons doivent être situés dans le champ de visibilité de la barrière. L'activation des commandes de réenclenchement ne doit pas mettre en marche l'ouvrebarrière.</p>
<p>2.9. A minimum of two (2) WARNING SIGNS shall be installed, in the area of the gate. Each placard is to be visible by persons located on the side of the gate on which the placard is installed.</p>	<p>2.9. Au moins deux panneaux de mise en garde doivent être installés dans la zone de la barrière. Chaque étiquette doit être visible des personnes situées de chaque côté de la barrière sur laquelle l'étiquette est installée.</p>
<p>2.10 For gate operators utilizing a non-contact sensor</p> <p>a. See instructions on the placement of non-contact sensors for each Type of application</p> <p>b. Care shall be exercised to reduce the risk of nuisance tripping, such as when a vehicle, trips the sensor while the gate is still moving, and</p>	<p>2.10 Pour les ouvre-barrières qui fonctionnent avec des capteurs</p> <p>a. Voir les instructions sur le positionnement des capteurs sans contact pour chaque type d'utilisation.</p> <p>b. Des précautions doivent être prises pour réduire les risques de déclenchement inutile, comme lorsqu'un véhicule déclenche le capteur alors que la barrière est encore en mouvement.</p>
<p>c. One or more non-contact sensors shall be located where the risk of entrapment or obstruction exists, such as the perimeter reachable by a moving gate or barrier.</p>	<p>c. Un capteur sans contact ou plus doit être situé où il existe un risque de coincement ou d'obstruction, comme dans l'espace que peut occuper la barrière lorsqu'elle est en mouvement.</p>
<p>2.11 For a gate operator utilizing a contact sensor</p> <p>a. One or more contact sensors shall be located where the risk of entrapment or obstruction exists, such as at the leading edge, trailing edge, and post-mounted both inside and outside of a vehicular horizontal slide gate.</p> <p>b. A hardwired contact sensor shall be located and its wiring arranged so that the communication between the sensor and the gate operator is not subjected to mechanical damage.</p>	<p>2.11 Pour les ouvre-barrières qui fonctionnent avec des capteurs</p> <p>a. Au moins un capteur de contact doit être situé où il existe un risque de coincement ou d'obstruction, comme sur le bord d'ouverture, sur le bord de fermeture et sur les poteaux montés sur l'intérieur ou l'extérieur d'une barrière coulissante pour véhicules.</p> <p>b. Un capteur de contact doit être installé et câblé de sorte à éviter que la communication entre le capteur et l'ouvrebarrière soit gênée par des dommages mécaniques.</p>
<p>c. A wireless device such as one that transmits radio frequency (RF) signals to the gate operator for entrapment protection functions shall be located where the transmission of the signals are not obstructed or impeded by building structures, natural landscaping or similar obstruction. A wireless device shall function under the intended end-use conditions.</p>	<p>c. Un dispositif sans fil, comme un appareil qui transmet des signaux de radiofréquence (RF) à l'ouvre-barrière pour prévenir le coincement, doit être situé à un endroit où la transmission des signaux ne sera pas obstruée ou gênée par des structures, des arbres ou d'autres obstacles similaires. Un dispositif sans fil doit fonctionner selon les conditions d'utilisation finale prévues.</p>
<p>d. One or more contact sensors shall be located on the inside and outside leading edge of a swing gate. Additionally, if the bottom edge of a swing gate is greater than 152 mm (6 inches) but less than 406 mm (16 inches) above the ground at any point in its arc of travel, one or more contact sensors shall be located on the bottom edge.</p>	<p>d. Au moins un capteur de contact doit être situé sur les bords d'ouverture intérieur et extérieur d'une barrière battante. De plus, si le dessous d'une barrière battante est situé à plus de 152 mm (6 po) mais à moins de 406 mm (16 po) du sol à l'un des points de sa trajectoire, au moins un capteur de contact doit être situé sur le bord inférieur.</p>

Appendix F - Solar Requirements

Calculating Solar Requirements

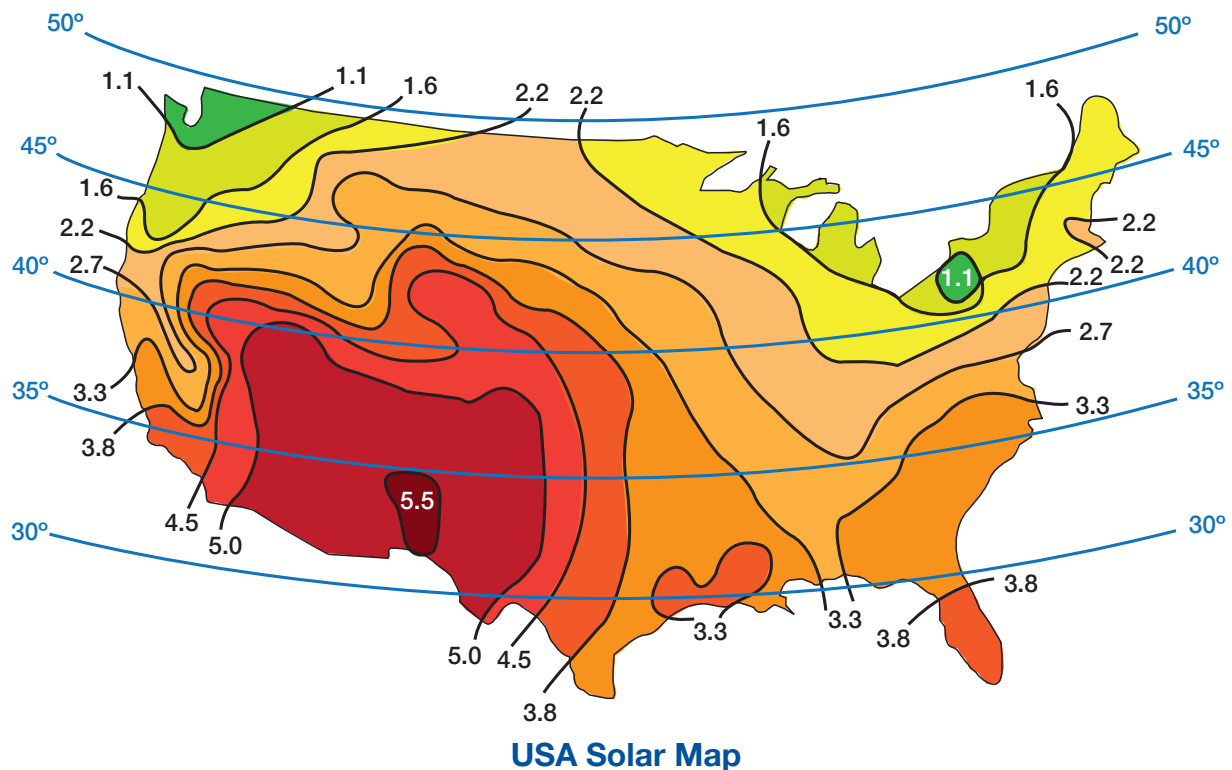
1. Estimate the gate traffic measured in open/close cycles per the table below:

Solar Panel Watt/Cycle Chart						
Daily Cycles	1-10	1-20	1-40	1-60	1-80	80+
10 Watt Solar Panel		X				
20 Watt Solar Panel			X			
30 Watt Solar Panel				X		
40 Watt Solar Panel					X	

NOTE

- Table (above) should be used as only a guide. Alternative gate operator configurations may reduce or increase the daily power usage.

1. Estimate the gate traffic measured in open/close cycles per the table below:
2. Estimate the amount of sunlight available per the Solar Map (right).
3. Use the solar wattage calculator found on the HySecurity website at <https://support.hysecurity.com/hc/en-us/articles/360057403914-Solar-Calculator> to determine battery and solar panel size needed to serve the installation in question.



Appendix G - LED Codes

Error Codes

Error codes are very useful for communicating information to your gate installer in the event of a gate error. When there is an error, the display will alternately flash **ER** and a two digit code, as displayed below in the **ER Display Code** column.

ER Display Code	Error Condition	Possible Cause
01	Learn limits started without motor 1 connected Normal gate operation - motor not detected after start	<ul style="list-style-type: none"> • Motor not connected to motor 1 connector • Wiring fault • Defective motor
02	Learn limits started without motor 2 connected Normal gate operation - motor not detected after start	<ul style="list-style-type: none"> • Motor not connected to motor 2 connector • Wiring fault • Defective motor
03	Normal gate operation - Encoder frequency below nominal	<ul style="list-style-type: none"> • Obstruction preventing gate movement • Wiring fault • Defective encoder
04	Normal gate operation - Motor current exceeds force threshold	<ul style="list-style-type: none"> • Obstruction preventing gate movement • Wiring fault • Defective motor
05	IES Type A activated twice prior to reaching a limit	<ul style="list-style-type: none"> • Obstruction preventing gate movement • Defective motor
06	Learn limits started when the motor is at limit	<ul style="list-style-type: none"> • Learn limits started when the motor is at limit • Wiring fault
07	Learn limits started and an encoder is not detected	<ul style="list-style-type: none"> • Learn limits started and an encoder not detected • Wiring fault
08	Programming OXI step, open, or latch to key FOB failed	<ul style="list-style-type: none"> • OXI not plugged in • Key FOB Button not pushed • Key FOB Button not detected by OXI receiver
09	Erasing single button or all fobs failed	<ul style="list-style-type: none"> • OXI not plugged in • Key FOB Button not pushed • Key FOB Button not detected by OXI receiver
10	OXI not connected OXI communication error with Mercury	OXI not plugged in
11	Battery voltage too low	<ul style="list-style-type: none"> • Battery voltage below 12.5V without gate cycle during battery health check • Battery voltage below 12.0V with gate cycle during battery health check
12	12V Regulator Failure	Defective component
13	Accessory power (unswitched) fuse tripped	Excessive current draw (disconnect accessory power, restart controller, reconnect)
14	Accessory power (switched) fuse tripped	Excessive current draw (disconnect accessory power, restart controller, reconnect)

Appendix G - LED Codes

Display Code	Error Condition	Possible Cause
15	Alarm fuse tripped	Excessive current draw. (disconnect alarm connector, restart controller, reconnect).
16	24V Power Supply Failure	Defective component. (Not applicable for Mercury 310)
17	Lock fuse failure	Excessive current draw. (Not applicable for Mercury 310)
18	Open & close limits active same time.	Open and close limits both active (check connections).
19	DC input voltage too high at motor start.	<ul style="list-style-type: none"> DC input voltage is greater than 25V and no battery is connected. AC/DC power supply problem.
20	Battery input voltage too high. NOTE: Error 20 available only in Mercury 310 Firmware version h7.01.	DC/SOL connector swapped with BAT connector. Verify wiring for power input connectors.
21	Required sensor(s) missing.	Missing open/close sensor required for gate start. Verify sensor installation and wiring.

Stop Codes

When a gate stops because of an input, one of the following two digit codes will show in the display to indicate which input caused the gate to stop.

Display Code	Description
<i>oE</i>	Open Entrapment: Entrapment sensor connected to Open Sensor input is active and preventing gate from opening.
<i>cE</i>	Close Entrapment: Entrapment sensor connected to the Close Sensor input is active and preventing gate from closing.
<i>bo</i>	BlueBus Open: BlueBus device in open-direction is active and preventing gate from opening.
<i>bc</i>	BlueBus Close: BlueBus device in close-direction is active and preventing gate from closing.
<i>FS</i>	Fail-Safe (or Fail-secure): BlueBus Close sensor preventing gate operation.

Sensor LED Codes

The sensor LED functions differently based on the sensor type. The table below describes the manner in which the open/close sensor LED operates for photocell and edge sensor types.

Sensor State	Sensor Type	
	Photocell (Non-Contact)	Edge (Contact)
Sensor not registered	LED Off	LED Off
Sensor registered and not active	LED On	LED Off
Sensor active	LED Flashes	LED ON
Sensor removed or missing	LED Flashes	LED Flashes



EXAMPLE:
Status LEDs for 10K Sensor Input

Appendix G - LED Codes

Loop LED Codes

Specific sensor input LED activity is displayed in the table below.

LED On	Description	Conditions
Stop Input	Stop input preventing gate operation.	Normal gate operation and stop input is active.
Obs. Loop	Obstruction loop preventing gate operation.	Close gate operation and obstruction loop active.
Shadow Loop	Shadow loop preventing gate operation.	Normal gate operation and shadow loop active.
Exit loop	Exit loop preventing gate operation.	Close gate operation and exit loop active.

Radio Programming Display Codes

When programming the OXI receiver and remote(s), the current program status is displayed (see table below).

Display Code	Description
<i>rA</i>	Remote Add: Learn a single remote button.
<i>rd</i>	Remote Delete: Remove a single button function from a remote.
<i>rE</i>	Remote Erase All: Erase all remotes from OXI radio.

NOTE

If solar panel is wired in reverse polarity, the red DC/SOL LED will illuminate.

Sensor Type Display Codes

When selecting the type of external entrapment sensor, one of the following codes will show in the display to indicate a non-contact or contact sensor type.

Display Code	Description
<i>co</i>	Contact edge sensor type
<i>nc</i>	Non-contact photocell sensor type

BlueBus Display Code

When the BlueBus input is scanning for connected external entrapment sensors, the display will show the following code to indicate a BlueBus scan.

Display Code	Description
<i>bb</i>	BlueBus scan for connected sensors is in progress

Appendix K - Troubleshooting

Procedures

Problem	Possible Solution
Gate opens a short distance, then stops and reverses.	<ul style="list-style-type: none"> • Check the 10K sensor input on the gate controller • Ensure limits are properly set • Check for obstructions • Adjust Force Settings
Gate opens but will not close.	<ul style="list-style-type: none"> • Check the input LEDs. Any lit LED indicates sensor activation, which will hold the gate open. • Check the external safety devices. Any activated safety devices will hold the gate open and may indicate a problem with the safety device. • Ensure limits are properly set. • Check the loop detectors. Any activated safety devices can hold the gate open and may indicate a problem with the loop detector or ground loop.
Battery backup system will not open gate upon AC power outage.	<ul style="list-style-type: none"> • Check batteries for proper voltage. Replace if necessary. • Check battery connections to controller.
Hard Shutdown (two back to back obstructions) LED blinking, Buzzer sounds for 5 minutes.	Clear any obstructions from the path of the gate, then Press STOP/CLEAR button on controller to clear the Hard Shutdown.
Gate opens by itself.	<ul style="list-style-type: none"> • Check accessory inputs and clear them as necessary. • Delete all key fobs from the OXI receiver and learn them in again.
Gate moves in direction opposite expected.	Perform the gate learning procedure, taking care during step 6 on page 36 .

Appendix L - Install Check & Maintenance

The table below lists maintenance procedures the gate installer should perform over time. It is the responsibility of the end user to ensure maintenance is performed by an appropriate automated gate installer professional.

Installer Maintenance Schedule			
Component	Maintenance Action	6 Months	Annually
Alarm	Activate (inherent) reverse system by blocking gate with a solid object. Gate should reverse momentarily, then stop. Restart gate and block again with solid object. Gate should reverse momentarily, stop, and go into hard shutdown with alarm.	X	X
Backup System	If operator is equipped with battery backup system, check to be sure the system opens the gate upon loss of AC power.	X	X
Battery	If operator is equipped with battery backup system, check the batteries for any leakage or loose connections. Batteries should be replaced every two years.	X	X
Fire Dept	Check emergency vehicle access device for proper operation.	X	X
Loop(s)	Check vehicular loops for proper operation.	X	X
Release	Check manual release for proper operation.	X	X
Photo Eyes	Break the beam near the transmitter, receiver and in the middle of travel to ensure the gate stops and reverses.	X	X
Mounting Hardware	Check screws and nuts.		X
Gate	Inspect for damage.		X

User Monthly Maintenance Operations	
Component	Maintenance Action
Gate	Visually inspect gate system for damage, wear and corrosion.
Gate Travel	Manually release actuators, then move the gate by hand through its range of travel. Note any squeaks from rollers or hinges or areas of binding. Gate should travel smoothly and quietly throughout range. If not, contact a gate professional. Re-engage actuator for normal operation.
Photo Eyes: Open Direction Sensors	With the gate opening, block any photo eyes and/or depress any safety edges used to protect the open direction. The gate should stop and/or reverse.
Photo Eyes: Close Direction Sensors	With the gate closing, block any photo eyes and/or depress any safety edges used to protect the close direction. The gate should stop and/or reverse.
Inherent Entrapment Systems	<ul style="list-style-type: none"> • Open direction: Using a suitable obstruction in the path of the gate (a solid, immovable object), run the gate in the open direction until it contacts the obstruction. The gate should stop and reverse. • Close direction: Using a suitable obstruction in the path of the gate (a solid, immovable object), run the gate in the close direction until it contacts the obstruction. The gate should stop and reverse.

Appendix L - Install Check & Maintenance

The installer and customer must each ensure that all of the following actions have been completed. Left box is for installer check off and the right box is for customer check off.

Installer	Customer	Checklist
<input type="checkbox"/>	<input type="checkbox"/>	The gate(s) has been checked to make sure it is level and moves freely in both directions
<input type="checkbox"/>	<input type="checkbox"/>	Potential pinch areas have been guarded so as to be inaccessible OR have contact and/or non-contact external entrapment devices installed.
<input type="checkbox"/>	<input type="checkbox"/>	If pedestrian traffic is expected, a separate pedestrian gate has been installed, a minimum of seven feet from the gate. The customer has been informed that all pedestrian traffic must use the pedestrian gate.
<input type="checkbox"/>	<input type="checkbox"/>	Warning signs have been installed on each side of the gate in highly visible locations. The customer has been informed that these signs must remain at all times.
<input type="checkbox"/>	<input type="checkbox"/>	There are no controls installed within 6 feet of the gate.
<input type="checkbox"/>	<input type="checkbox"/>	The installer has properly adjusted the obstruction sensing feature and has tested the gate to make sure that the gate stops and reverses a short distance with minimal resistance applied on a swing gate, at the end of the gate.
<input type="checkbox"/>	<input type="checkbox"/>	The installer has instructed the customer in the proper use of the gate operator and reviewed all of the operational functions, obstruction sensing devices, external entrapment sensors, warning buzzer and reset, etc.
<input type="checkbox"/>	<input type="checkbox"/>	The installer has instructed the customer in the proper way of disconnecting the operator. Manual disconnect must never be used while the gate is in motion. The power must be turned off and battery disconnected before disengaging the operator.
<input type="checkbox"/>	<input type="checkbox"/>	The installer has answered any questions the customer has regarding the operation of the gate operator and gate operator safety precautions.
<input type="checkbox"/>	<input type="checkbox"/>	The installer has explained to the customer that a regular maintenance schedule for both the gate and the gate operator is recommended.
<input type="checkbox"/>	<input type="checkbox"/>	The installer has given the key to the Juno manual release to the customer.

Appendix M - Limited Warranty

Nice Branded Products

1. Warranty.

Nice warrants that at the time of sale, each Nice-branded gate operator product that it sells will, in all material respects, conform to the then applicable specification for the product and will be free from defects in material and manufacture.

The following additional durational warranties apply to products purchased through a distributor authorized by Nice to sell Nice products (“Authorized Distributor”), depending on whether (1) the product is purchased through an Authorized Distributor and (2) whether a timely and complete product registration is submitted to Nice.

It is therefore important that you register your product with Nice, online at www.hysecurity.com/warranty, within the 60-day period described below.

1(a) Nice-branded Products Purchased Through Authorized Distributors and Properly Registered

For any gate operator product that is purchased from an Authorized Distributor (this excludes product purchased through internet resellers or any distributor not authorized by Nice to sell Nice products), if the product registration is completed by the Dealer/Installer or End User within 60 days of the date of purchase, the following warranty terms will apply. Nice warrants that the product will remain serviceable for the following periods:

- a) **Electromechanical pad-mounted Slide and Swing operators:** Two Years after the date of installation,
- b) **Electromechanical linear actuator Swing operators:** Two Years after the date of installation,
- c) **Electromechanical barrier arm operators:** Two years after the date of installation,
- d) **Nice-branded accessories:** Two years after the date of installation, provided that the Two Year warranty period in (a), (b), or (c) will not extend beyond four years from the date that the product was shipped from Nice. The preceding warranty durations do not apply to the products or components described below (e-f), which have a shorter warranty period:
- e) **Batteries:** One Year from date of shipment from Nice.
- f) Components subject to normal wear including, but not limited to, chains, belts, idler wheels, sprockets and fuses: One Year from date of installation.

1(b) Nice Products Not Purchased Through an Authorized Distributor or Not Properly Registered within 60 Days

For any product that is not purchased from an Authorized Distributor or for which the product registration was not completed by the Dealer/Installer/End User within sixty (60) days of the date of purchase, the following **One-Year Limited Warranty** will apply: Nice warrants that the product will remain serviceable for One Year from the date that the product was shipped from Nice.

1(c) Replacement Parts

Nice warrants that replacement parts (whether new or reconditioned) will remain serviceable for One Year from the date that the part was shipped from Nice or the remaining period of the Gate Operator warranty, whichever is longer.

1(d) Limitations and Exclusions Applicable to Each of the Preceding Warranties

The preceding warranties shall not apply to equipment that has been:

- (1) installed, maintained, or used improperly or contrary to instructions;
- (2) subjected to negligence, accident, vandalism, or damaged by severe weather, wind, flood, fire, terrorism or war; or (3) damaged through improper operation, maintenance, storage or abnormal or extraordinary use or abuse. Any modification made to products will void the warranty unless the modifications are approved in writing by Nice in advance of the change (this exclusion does not apply to normal installation of approved accessories and/or protective devices or sensors). It is the responsibility of the Distributor, Dealer/Installer, or End User to ensure that the software version in the product is maintained to the latest revision level.

The preceding warranties do not extend to accessories when those items carry the name plate of a manufacturer other than Nice or Nice and they are not a part of the base model. Nice disclaims all warranties for such accessory components, which carry only the original warranty, if any, of their original manufacturer. Nice hereby assigns its rights under such manufacturer warranties—to the extent that such rights are assignable—to Buyer.

Appendix M - Limited Warranty

These warranties extend to Nice Distributors, to the Dealer/Installer, and to the first End User of the product following installation. They do not extend to subsequent purchasers.

2. Limitation of Certain Implied Warranties and Exclusion of Other Warranties.

The warranties contained in Section 1 are the exclusive express warranties given by Nice and supersede any previous, contrary or additional representations, whether oral or written. Any prior or extrinsic representations or agreements are discharged or nullified. ANY IMPLIED WARRANTIES, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO PERIOD OF THE APPLICABLE EXPRESS WARRANTY FOR THE PRODUCT OR COMPONENT. NICE HEREBY DISCLAIMS AND EXCLUDES ALL OTHER WARRANTIES – INCLUDING ANY LIABILITY FOR INFRINGEMENT, AND ANY WARRANTIES OTHERWISE ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE, OR USAGE OF TRADE.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

3. Buyer's Exclusive Remedies for Any Nonconformity.

If a Nice product fails to conform to the warranties in Section 1, Buyer must notify and order replacement parts from the Distributor through which the product was purchased within a reasonable time and in no event more than thirty (30) days after the discovery of the nonconformity. Nice will investigate and, in the event of a breach, will provide, within a reasonable period of time, one of the following: (1) repair or replacement of any nonconforming products or components or (2) refund of the price upon return of the nonconforming items. Nice reserves the right to supply used or reconditioned material for all warranty claims. Nice will not be considered to be in breach of or default under this Warranty because of any failure to perform due to conditions beyond its reasonable control, including any force majeure. This warranty does not cover any incidental expenses, including fines or penalties, temporary security, labor, shipping, travel time or standby time that are incurred for inspection or replacement of any nonconforming items. As a condition of warranty coverage, warranty claims must be submitted in accordance with the procedures described on the Nice form, "RMA Procedures".

THE REMEDY SELECTED BY NICE IN ACCORDANCE WITH THIS PARAGRAPH SHALL BE THE EXCLUSIVE AND SOLE REMEDY OF BUYER FOR ANY BREACH OF WARRANTY.

4. Exclusion of Consequential and Incidental Damages.

NICE SHALL NOT BE LIABLE FOR ANY INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM NONDELIVERY OR FROM THE USE, MISUSE, OR INABILITY TO USE THE PRODUCT OR FROM DEFECTS IN THE PRODUCT OR FROM NICE'S OWN NEGLIGENCE. This exclusion applies regardless of whether such damages are sought for breach of warranty, breach of contract, negligence, or strict liability. This exclusion does not apply to claims for bodily injury or death.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you.

5. Severability.

If any provision of this warranty is found to be invalid or unenforceable, then the remainder shall have full force and effect.

6. Proprietary Rights.

Nice retains and reserves all right, title, and interest in the intellectual property rights of their products, including any accompanying proprietary software. No ownership of any intellectual property rights in the products or accompanying software is transferred to Distributor, Dealer/Installer, or End User.

7. Applicable Law.

This warranty will be interpreted, construed, and enforced in all respects in accordance with the laws of the State of Washington, without reference to its choice of law principles. The U.N. Convention on Contracts for the International Sale of Goods will not apply to this warranty.

This warranty gives you specific legal rights, and you may also have other rights which vary from State to State.

