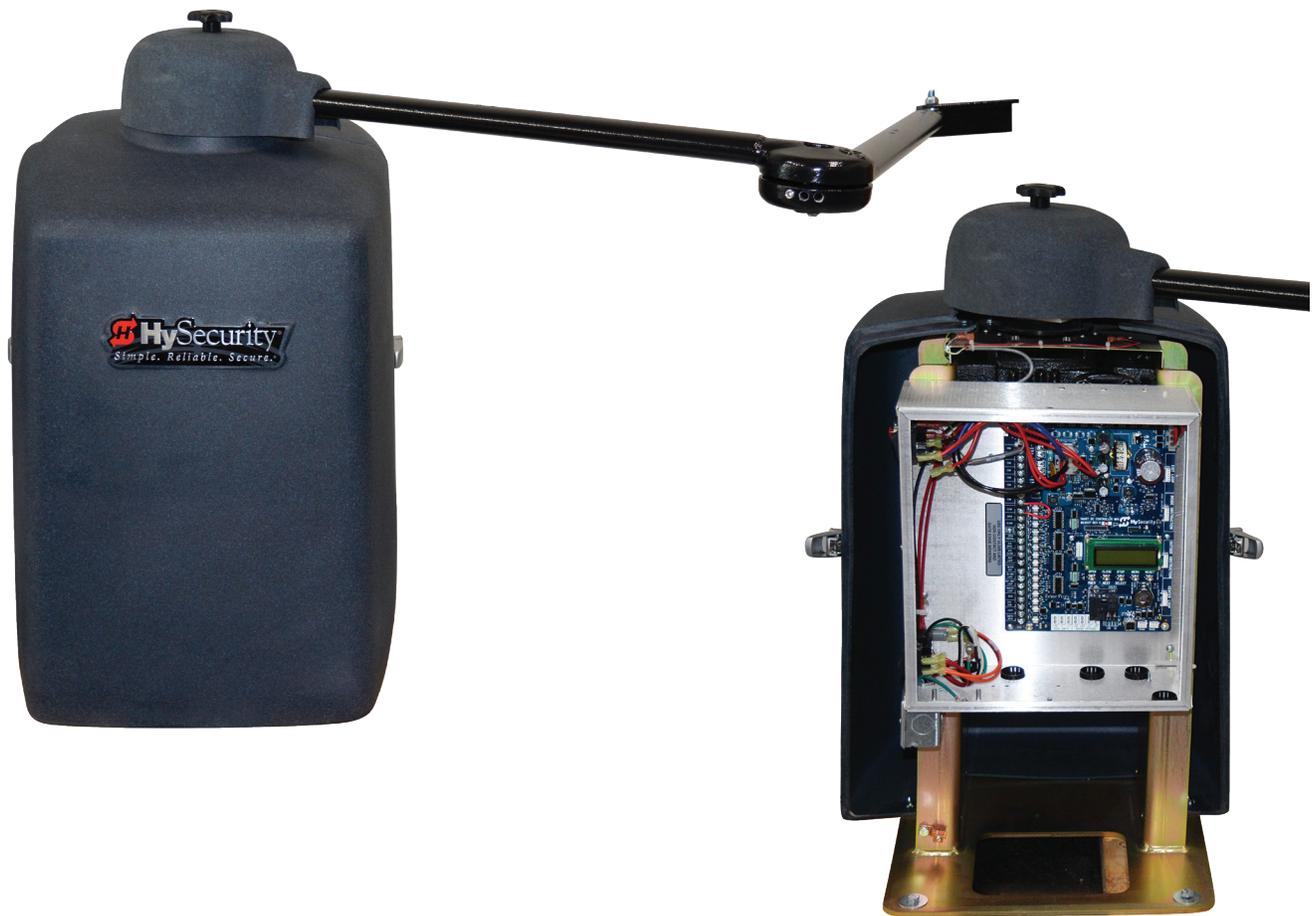


SwingSmart™ DC

DC20, DCS20

Vehicular swing gate operator with Smart DC Controller



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NOTICE

Visit <https://hysecurity.com/technical-support/> for installation manuals, replacement part instructions, part diagrams and more.

INTRODUCING SWINGSMART DC

Thank you for purchasing our premium SwingSmart DC™ 20 swing gate operator. At HySecurity® Gate, Inc., we pride ourselves on quality and a number of unparalleled user benefits:

Robust - An especially strong twin channel steel chassis and adjustable taper clutch greatly improves the ability for SwingSmart to resist damage from vehicle hits on the gate. The components on the Smart DC Controller are protected by opto-isolators which shield them from power surges and lightning strikes.

Power - A variable speed control board supplies a powerful, continuous 24V DC motor which drives a 600:1 gearbox providing variable speeds. The electronics, motor and gear box are rated to operate in very broad temperatures that range from -13°F to 158°F (-25°C to 70°C). SwingSmart DC is rated for gates up to 20 feet long and 1,300 pounds.

Finesse - A variable rate of gate acceleration and deceleration, dependent upon gate weight and length, assures very smooth handling.

Adaptable - The design incorporates a universal gate arms to assure aesthetic functionality. An articulating arm is an available option which also provides adaptability to a variety of site situations.

UPS backup and Solar ready - Two 12V, 8 amp hour (Ah) batteries will provide a fully functional gate operator (up to 300 gate cycles) when AC power is unavailable. Four user-selectable UPS modes are available. 12VDC and 24VDC are available to power access controls. The unit's design also incorporates space for optional 50Ah batteries to support solar applications or usage during extended power outages.

INTELLIGENT FEATURES: SMART DC CONTROLLER™

Automatic adjustment and synchronization of bi-parting gates - The Smart DC Controller automatically adjusts the gate speed to synchronize the left and right gates so that they reach the open and close positions at the same time. Independent leaf delay adjustment for bi-parting gates is selectable in ½ second increments.

Menus and User relays - The Smart DC Controller has a multitude of menu items that allows installer configuration of gate function and two programmable user relays. Independent adjustment for open and close gate speeds - An easy-to-use menu allows the installer to vary the open and close speed settings in a range between 10 and 15 seconds.

Intelligent Inherent Entrapment Sensor (IES) - Any impediment to gate travel is sensed by the system, stopping gate movement per UL 325 Standard of Safety. The intelligent system monitors gate power then adapts the IES to trip at an adjustable threshold above normal power.

Improved Liquid Crystal Display (LCD) - A 32-character LCD provides increased readability for programming and troubleshooting.

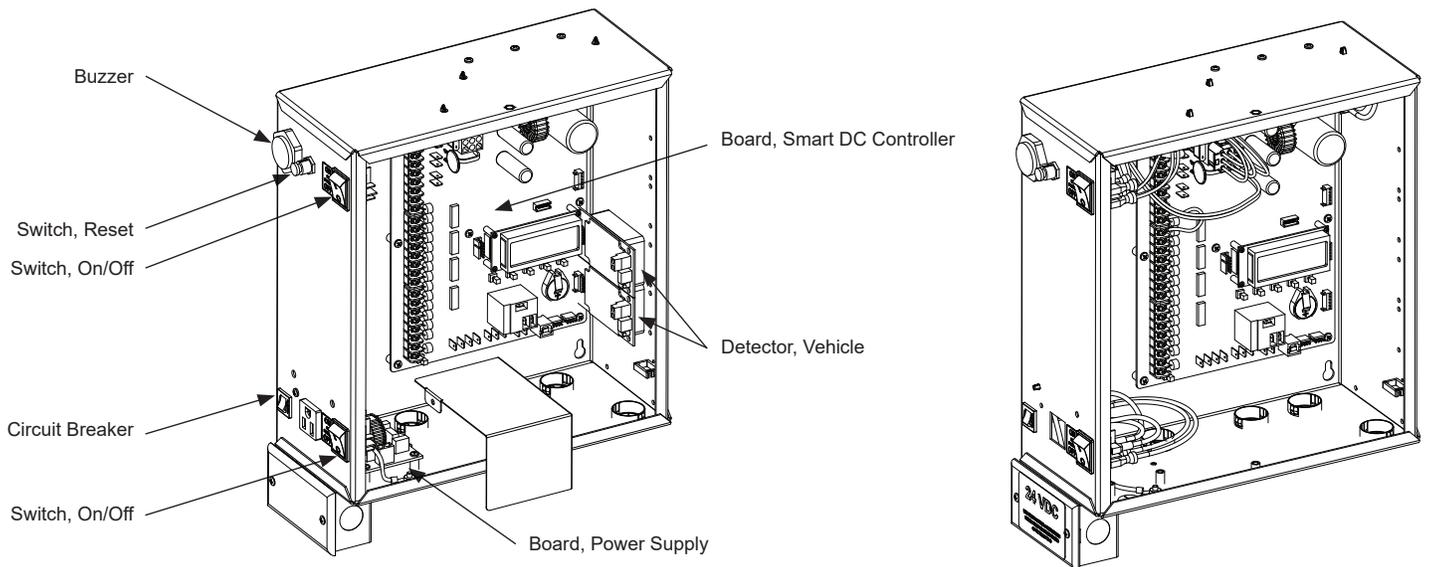
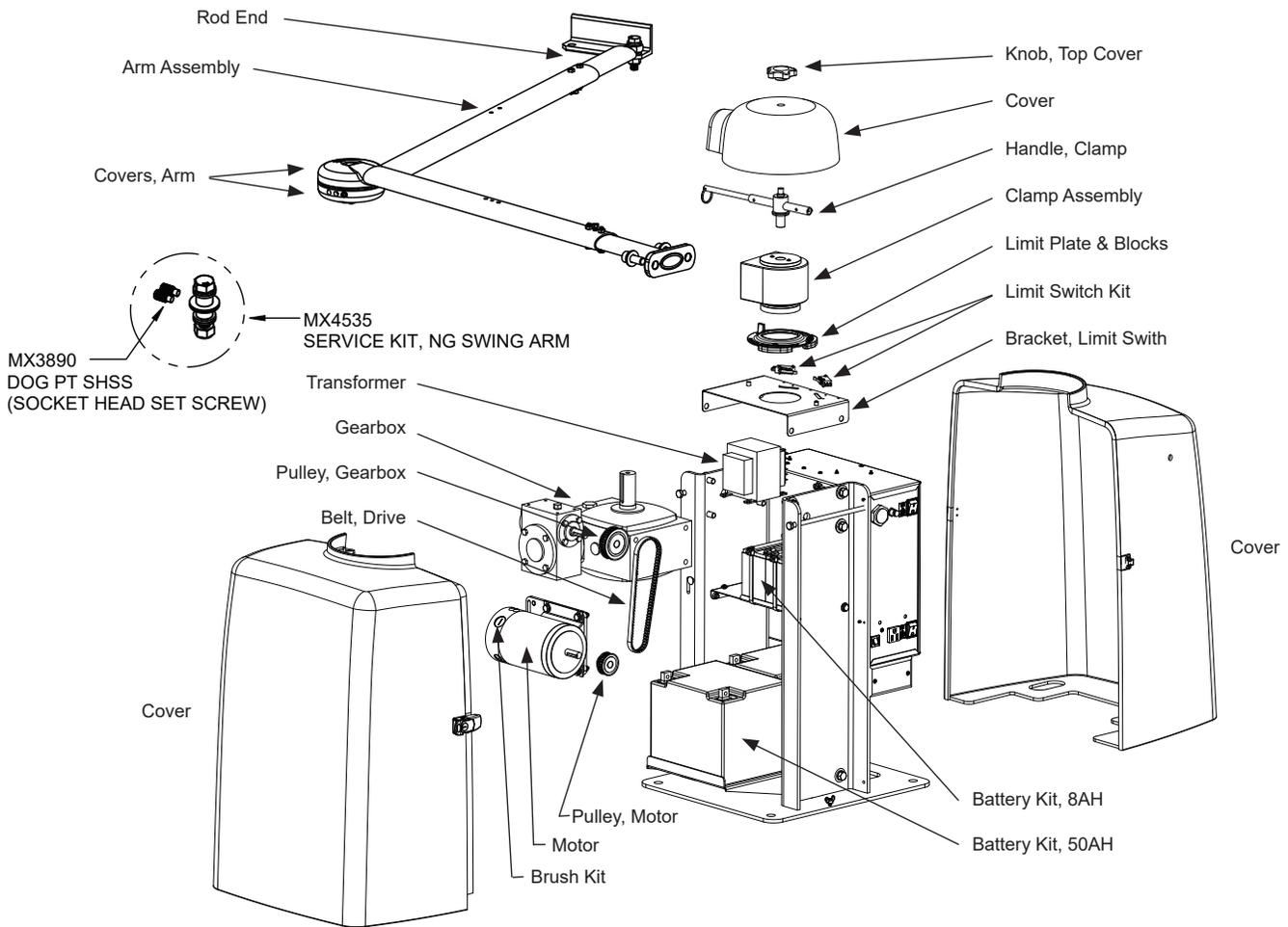
USB communications port - A direct connect provides accessibility to download system diagnostics and upload system configurations using the Smart Touch Analyze and Retrieve Tool (S.T.A.R.T.) software.

S.T.A.R.T. software and diagnostics - With S.T.A.R.T. software loaded on a laptop computer, you have an invaluable management tool for all HySecurity operators. To download this free software, visit the HySecurity website at www.hysecurity.com.

TECHNICAL SUPPORT

For technical support, call your installer or authorized HySecurity distributor. Obtain the serial number of your operator before calling. Refer to "SwingSmart HD Components" on page 7. For the name of a distributor near you, call HySecurity at 800-321-9947. For information about HySecurity training for installers, maintenance personnel and end users, refer to the company website at www.hysecurity.com or call 800-321-9947.

SWINGSMART DC COMPONENTS



INSTALLER'S CHECK LIST

INSTALLER'S CHECK LIST

The following list provides a high level overview of the tasks involved in installing the SwingSmart DC gate operator. Take a moment to review the list and check off the items as you complete the install.

- ? Site Prep - concrete pad location/dimensions, distance from gate, chain height, and mounting considerations: post or base extension, front or rear installation.
- ? Make sure gate installation complies with ASTM F2200 Standard Specification for Automated Vehicular Gate Construction. And, install the supplied WARNING signs on both sides of the gate.
- ? Check for compliance with local codes, site conditions, and NEC standards.
- ? Install operator on concrete pad using four ½ - 13 x 3.5 inch long concrete wedge anchors.
- ? Temporarily attach gate bracket and linkage arm(s).
- ? Adjust open and close limit switches through manual operation of the gate.
- ? Complete gate arm installation (weld or drill and bolt).
- ? Cut the excess off the over extension stop (angle iron) on the SwingSmart arm.
- ? Hand-tighten the taper clamp to obtain a tight clutch setting.
- ? Install the earth ground and AC wiring connections for AC power.
- ? Connect battery wire to switch.
- ? Complete Initial Setup Menu programming.
- ? Review the connections on the Smart DC Controller.
- ? Install Primary/Secondary operator connections, if the site is a bi-parting gate system.
- ? Attach accessory devices.
- ? Configure the User and Installer Menu options. Program applicable settings dependent on accessory devices installed.
- ? Set the Close Timer (in the User Menu), if necessary.
- ? Check the Smart DC Controller software version. If needed, upload the latest version from www.hysecurity.com. See "Smart Touch Analyze and Retrieve Tool" on page 94..
- ? Program changes through the Installer Menu depending on the accessory devices that you have installed.
 - Give a copy of the operator instructions to the end user. Show the end user how to:
 - Remove the operator cover. Turn the power off and on.
 - Loosen the taper clamp and manually push the gate(s) open & close.
- ? **NOTE:** Remember to re-tighten the taper clamp before turning the DC power switch back on and replacing the covers.
 - Test the red Emergency Stop Button located on the side of the control box. It can be accessed through a hole in the cover. See Figure 1 on page 16.
- ? Take photographs of the completed installation site and save it in your business files.
- ? Install external entrapment devices as needed.

SAFETY INFORMATION

SAFETY MESSAGES

The safety messages below inform you about potential hazards that can result in injury. Safety messages specifically address level of exposure to 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**.

 **WARNING**

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

 **CAUTION**

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

NOTICE

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

COMMON INDUSTRIAL SYMBOLS

These international safety symbols may appear on 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
	Attention - Take Notice
	Danger - Keep Away
	Entrapment Zone
	Possible Pinch Point

IMPORTANT SAFETY INSTRUCTIONS

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 HySecurity® product manuals.



It is important that only qualified installers handle installation of HySecurity 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 HySecurity Technical 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 safety 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.

WARNING

To reduce the risk of injury or death:

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



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



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.

Class III



Class III: Intended for use in an industrial location or building such as factories or loading docks or other locations not accessible by the general public.

Class IV



Class IV: Intended for use in guarded industrial locations or buildings such as an airport security area or other restricted access location, not servicing general public, in which access is monitored by security personnel or via closed circuitry.

VEHICULAR TRAFFIC ONLY

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 gate.
- 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 supplied for exposed rollers.

The operator is intended for installation only on gates used for vehicles. Pedestrians must be supplied with a separate access opening. The pedestrian access opening shall be designed to promote pedestrian usage. Locate the gate such that persons will not come in contact with the vehicular gate during the entire path of travel of the vehicular gate.

The gate must be installed in a location so that enough clearance is supplied between the gate and adjacent structures when opening and closing to reduce the risk of entrapment. Swinging gates 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 postmounted 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 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.
- 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.

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 vehicle detectors cannot provide protection to pedestrians. In some situations, photoelectric devices may be used as vehicle detectors, but 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/Standards/F2200.htm>

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:

<http://www.dasma.com/PDF/Publications/TechDataSheets/OperatorElectronics/TDS370.pdf>.

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 swing gates:

Gates shall be designed, constructed and installed so as not to create an entrapment area between the gate and the supporting structure or other fixed object when the gate moves toward the fully open position, subject to the following provisions.

The width of an object (such as a wall, pillar or column) covered by a swing gate when in the open position shall not exceed 4 inches (102 mm), measured from the centerline of the pivot point of the gate. Exception: For a gate that is not in compliance with this provision, the defined area shall be subject to the entrapment protection provisions of UL 325.

Except for the zone specified above the distance between a fixed object such as a wall, pillar or column, and a swing gate when in the open position shall not be less than 16 inches (406 mm). Exception: For a gate that is not in compliance with this provision, the defined area shall be subject to the entrapment protection provisions of UL 325.

SECONDARY ENTRAPMENT PROTECTION SENSORS

Most HySecurity 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. Whatever devices are used, protection in both opening and closing directions of gate travel must be provided.

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.

PHOTO EYES: One or more non-contact sensor (photo eyes) shall be located where entrapment risk or obstruction exists, such as perimeter reachable by a moving gate.

Care shall be exercised to reduce the risk of nuisance tripping, such as when a vehicle trips the sensor while the gate is moving.

SAFETY INFORMATION

EDGE SENSORS: One or more contact sensors (edge sensors) shall be located at leading edge, trailing edge, and post-mounted, both inside and outside of a sliding gate.

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 6" (152mm) but less than 16" (406mm) above the ground at any point in its arc of travel, one or more contact sensors shall be located on the bottom edge.

SENSOR SECURITY: A hard-wired contact sensor shall be located and its wiring arranged so that communication between sensor and gate is not subjected to mechanical damage.

CAUTION

A contact or non-contact sensor is also required to protect against possible entrapment if gate opens to a position less than 16 inches from any object, such as a post or wall.

SENSOR FUNCTION and COMMUNICATION: A sensor that transmits its signal to gate operator must be located so its signal is not impeded by building structures or other obstructions. All sensors must be installed so that they function as intended for end-use conditions.

UL 325 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 Important 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. Most HySecurity gate operators require external entrapment sensors that utilize Normally Closed (NC) contact means of monitoring. HySecurity gate operators utilizing the SmartCNX Controller require external entrapment sensors that have a 10k Ohm or 4-wire pulsed monitoring scheme. 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.



Use of Approved External Entrapment Protection Sensors is REQUIRED

Gate operator will not automatically cycle the gate unless an indication that the appropriate number of external entrapment protection sensors are connected and operational.

The normally closed (NC) entrapment protection sensors wired to the Controller's SENSOR inputs are monitored using HySecurity software. Prompts appear on the display requesting specific configurations based on the gate operator type.

Effective August 1st, 2018, the UL 325 Standard has changed:

- 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)

SWING GATES: To enable fully automatic operation, all SWING gate operators will require a minimum of ONE monitored external entrapment protection sensor to protect entrapment zones in either the open or close direction of travel. However, an additional monitored sensor is required if there is a risk of entrapment in both directions of gate travel.

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

For more information and latest updates, visit www.hysecurity.com/gatesafety

SAFETY INFORMATION

The following sensors have been tested with HySecurity 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.

CAUTION All external entrapment protection sensors must have NC sensor outputs and be wired to the SENSOR COM terminal for monitoring and powering purposes. Depending on software version, the sensor becomes powered when the gate operator's motor runs or is always powered when the operator is connected to AC power.

HySecurity Recommended Sensors				
	Mfg. Part #	Mfg.	Details	Hysecurity Part #
Photo Eyes (Retroreflective)	E3K-R10K4-NR	Omron	40 ft max range limit	MX000999
	NIR-50-325	EMX	45 ft max range limit	
	IRB-RET	EMX	53 ft max range limit	
	E-931-S50RRGQ	Seco-Larm	46 ft max range limit	
Photo Eyes (Thru-Beam)	IRB-MON*	EMX	65 ft max range limit	MX3990
	E-960-D90GQ	Seco-Larm	90 ft max range limit	
Edge Sensors	Sentir Series**	ASO Safety	Channel mount, high profile Channel mount, low profile Round, wraparound Square, wraparound	AS1502-0440-05 AS1502-0430-05 AS1501-0760 AS1501-0790
	CPT210-2U-#-T2	Miller Edge	10k resistor termination (replace # with length requirement in feet)	
Edge Sensor, Converters (10K to NC Contact)	Hy2NC	HySecurity	2-channel edge converter	MX4018
Edge, Wireless Kits(iGAZE RE Kit	Transmitter Solutions	50 ft line of sight max range limit	
	WEL-200 (kit with receiver and transmitter)	EMX	200 ft line of sight max range limit	
Multi-Input Module	The Solution – MIM-62	Miller Edge	6 inputs to 2 outputs	

*IRB-MON photo eyes are pre-bundled with HySecurity SwingSmart DC, SlideSmart DC and SlideDriver operators.

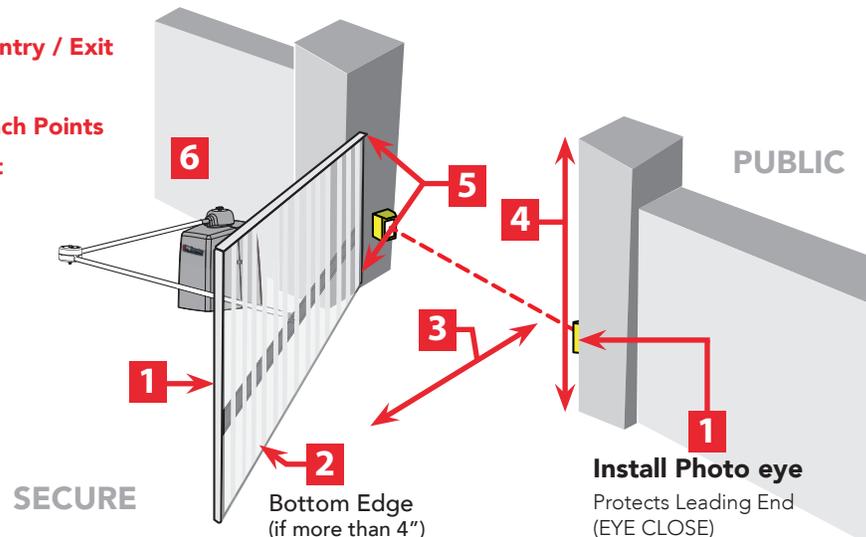
**Sentir Series ASO edge sensors are pre-bundled with HySecurity SlideSmart DC and SlideDriver operators.

Installers must assess each specific site and install sensors that protect all potential entrapment zones.

For more information visit Gate Safety at www.hysecurity.com/gatesafety or see latest operator manual at www.hysecurity.com/contact-us/technical-support/installation-manuals

Swing Gate Common Entrapment Zones

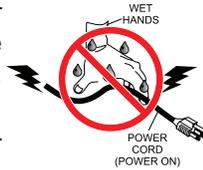
1. Leading Edge
2. Bottom Edge Entry / Exit
3. Posts
4. Post Pivot / Pinch Points
5. Arm Movement
6. Posts



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

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

CAUTION

Batteries used with HySecurity 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 HySecurity DC operators is designed for AGM-type batteries, not flooded lead acid-type 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 or oil directly onto the ground, down a drain or into any water source.
- Contact your country's 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.

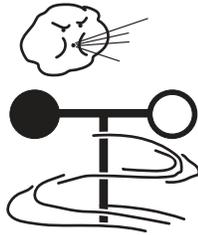
Metal and plastic recycling involves the collection of metal and plastic from discarded products and its transformation into raw materials to use in manufacturing a new product.

SAFETY INFORMATION

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 HySecurity 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 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 reverse.

EMERGENCY STOP BUTTON

An emergency stop button that is accessible from the outside of the operator is a requirement for compliance with UL325 Safety Standards. The red emergency stop button on the SwingSmart operator is located inside a hole cutout on the cover.

Pressing the emergency stop button while the gate is opening or closing disables the automatic close timer and stops gate travel. The gate travel remains stopped until the operator receives any open or close signal.

Make sure all users of the gate know where the emergency stop button is located.

A screwdriver or hex key can be used to press lightly on the switch to activate it.

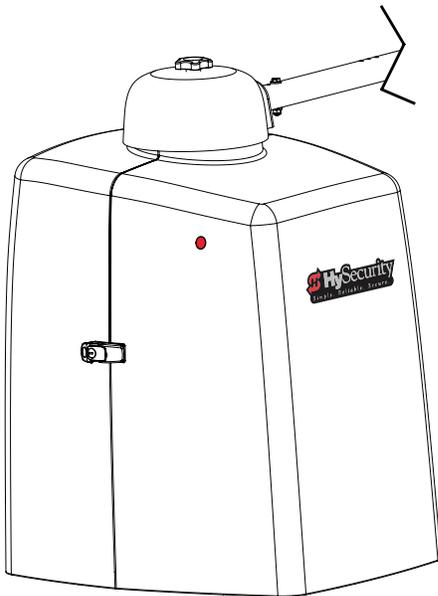


Figure 1. Emergency Stop Button

EMERGENCY RELEASE

Make sure to teach all users how to turn off electric power and how to move the gate manually. SwingSmart allows a gate to be pushed manually when the taper clamp is loosened. It is recommended that you turn off DC power which disengages the motor allowing you to easily move the gate.

When you turn DC power off, the following occurs:

- The motor disengages which keeps it from running should any relay or open/close leaf functions be set.
- The GATE NO LOAD (FAULT 4) may appear on the display.

To manually open the gate(s), take the following steps:

1. Remove the covers and turn off.
2. Extend the taper handle and loosen the clamp by turning the handle counter-clockwise. Refer to Figure 16.
3. Swing the gate(s) open or close.

To return SwingSmart to automatic operation, take the following steps:

1. Make sure the gate(s) is not moving.
2. Tighten the taper clamp until no slippage occurs when you simulate a gate strike. Refer to "Setting the Taper Clamp" on page 29.
3. Flip the DC power switch ON.
4. Clear any faults by pressing STOP or RESET.

SITE OVERVIEW AND PLANNING

Public Side

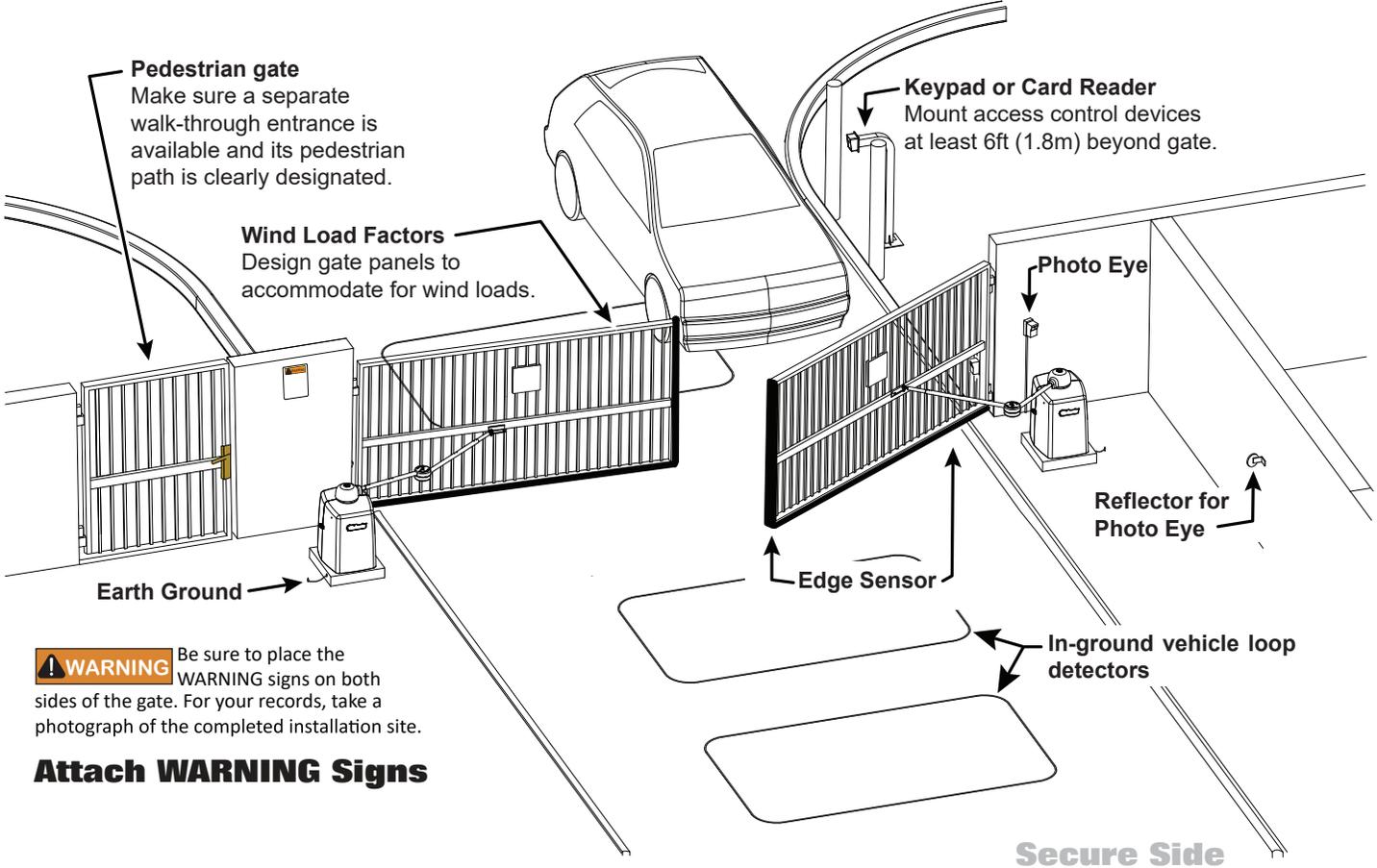


Figure 2. Site Planning and Overview

Table 1. SwingSmart Specifications		
	SwingSmartDC 20	SwingSmart DCS 20 Solar
Duty cycle:	continuous	continuous
Power:	Single Phase Switch selectable 115 volts, 3 amps, 50/60 Hertz 230 volts, 1.5 amps, 50/60 Hertz	Solar-powered 24VDC, 100 cycles/day requires two 10 WATT panels and a minimum of 5 solar hours/day.
Motor	½ hp	½ hp
DC Batteries	Two 8Ah (50Ah optional)	Two 8Ah (50Ah optional)
Gate time to open/close:	Approximately 10 to 15 seconds Variable speed, open/close separately	Approximately 10 to 15 seconds Variable speed, open/close separately
Gate weight:	1,300lbs @ 12ft leaf (590kg @ 4m leaf)	1,300lbs @ 12ft leaf (590kg @ 4m leaf)

PAD CONDITION

Pouring the Concrete

1. Follow the local building codes to identify the frost line and determine the required depth of the concrete pad. HySecurity recommends a minimum 16-inch (40.6cm) depth with a minimum 2-inch (51cm) extension above ground level. Refer to Figure 3.
2. Before pouring the pad, consider conduit placement so it fits within the confines of the cutout in the SwingSmart base plate as shown in Figure 3. Run separate conduits for:

- High voltage wiring (115/230V supply power) including equipment ground
- low voltage wiring (12V and 24V accessory power) including:
 - vehicle loop control wiring
 - primary/secondary connections
- Earth ground (NEC/NFPA)

NOTICE

SwingSmart provides a 6 x 7-inch (15.2 x 17.7cm) cutout in its chassis base for conduit. Refer to Figure 3. The design also provides a 9.6-inch (24.4cm) height between the control box and chassis base for pulling and placement of wires.

3. Extend conduit height 2-inches (51mm) above the pad (4-inches/102mm above ground level). Make sure the concrete forms are square with the gate and the pad is level. Refer to Figure 3 for minimum pad dimensions.

CAUTION

Be sure to restrict conduit to the 6 x 7-inch (15.2 x 17.7cm) cutout in the chassis base if you plan to use the extended battery backup kit. The area designed for the optional dual 50Ah batteries may be obstructed if conduit is routed elsewhere.

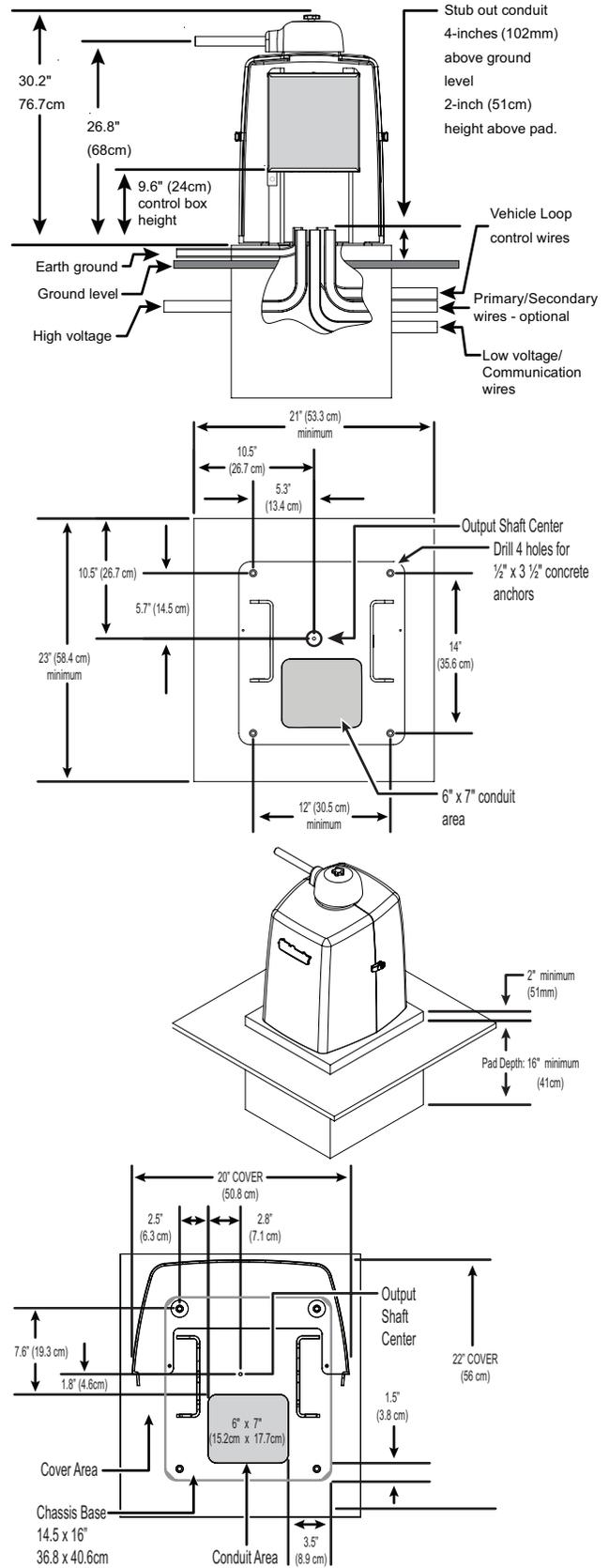


Figure 3. Pad Condition and Dimensions

USING AN EXISTING PAD

In many applications, SwingSmart may be a replacement operator for an existing gate system. Make sure the pad is level and inspect the pad for:

- Compliance with local building codes.
- Appropriate distance from the gate. Refer to Figure 3.
- Appropriate dimensions for SwingSmart installation.
- Durability.

To use an existing pad, take the following steps:

1. Remove any existing equipment from the pad.
2. Measure the pad to ensure it is sized properly for SwingSmart.
3. Mark the center shaft location.
4. Follow the steps in Mounting the Operator.

CAUTION

Consider positioning the operator so existing conduit exits through the cutout in the SwingSmart base plate. Cutting small holes in the base plate for pre-existing conduit is permissible, but not recommended because it can impair the strength of the chassis and void the Limited Warranty.

UNPACKING THE OPERATOR

Prepare the gate operator for installation. See Figure 4.

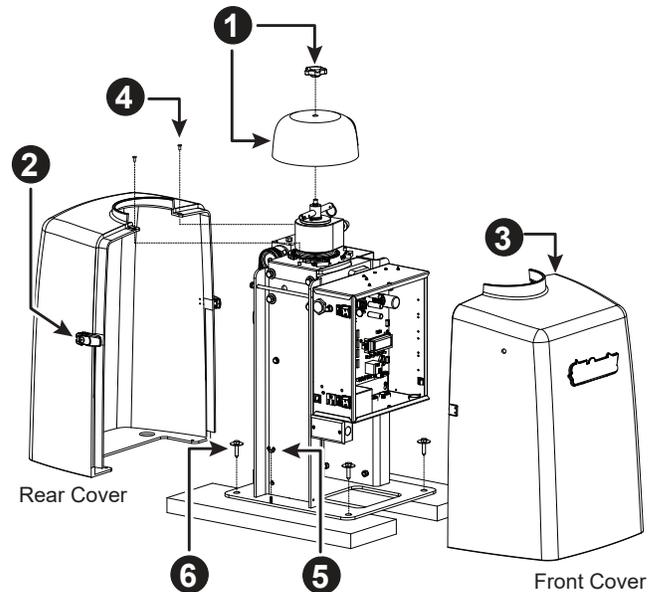


Figure 4. Unpacking the Operator

1. Remove the top cap by unscrewing the knob.
2. Unfasten the side cover latches.
3. Remove the front cover.
4. Use a Phillips-head screwdriver to remove the two screws that secure the top of the rear cover. Set the screws aside.
5. Remove the two wing nuts that secure the rear cover to the base plate and set the rear cover aside. Set the wing nuts aside.

NOTICE

Do not lose the Phillips-head screws or wing nuts as they are used to secure the rear cover when the installation is complete.

6. Remove the four lag bolts and separate the operator from the shipping boards.

MOUNTING THE OPERATOR

Install the operator, by taking the following steps:

1. Assess any limitations in the surrounding area such as curbs, walls, or bushes.
2. Before placing the operator on the pad, measure and mark the output shaft center on the concrete pad by selecting the X and Y dimensions. Refer to Figure 5.
 - a. **For short gates up to 10 feet (3m):** If $X = 10.5"$, Set Y dimension at 14, 18, or 20". (35.6, 45.7, or 50.8cm)
 - b. **For medium gates up to 13 feet (3.9m):** If $X = 12"$, Set Y dimension at 22, 24, or 28". (55.9, 61, or 71cm)
 - c. **For long gates up to 20 feet (6.1m):** If $X = 15"$, Set Y dimension at 30, 35, or 40". (76, 89, or 102cm)
3. Set the operator base on the concrete pad and use it as a template. Position the operator base so the center mark on the pad aligns with the small hole in the base plate. Mark the fastener and conduit cutouts. Remove the operator from the concrete pad and drill the holes for the concrete anchors.
4. Mount the operator with four $\frac{1}{2} \times 3\frac{1}{2}$ -inch concrete anchors as shown in Figure 5.

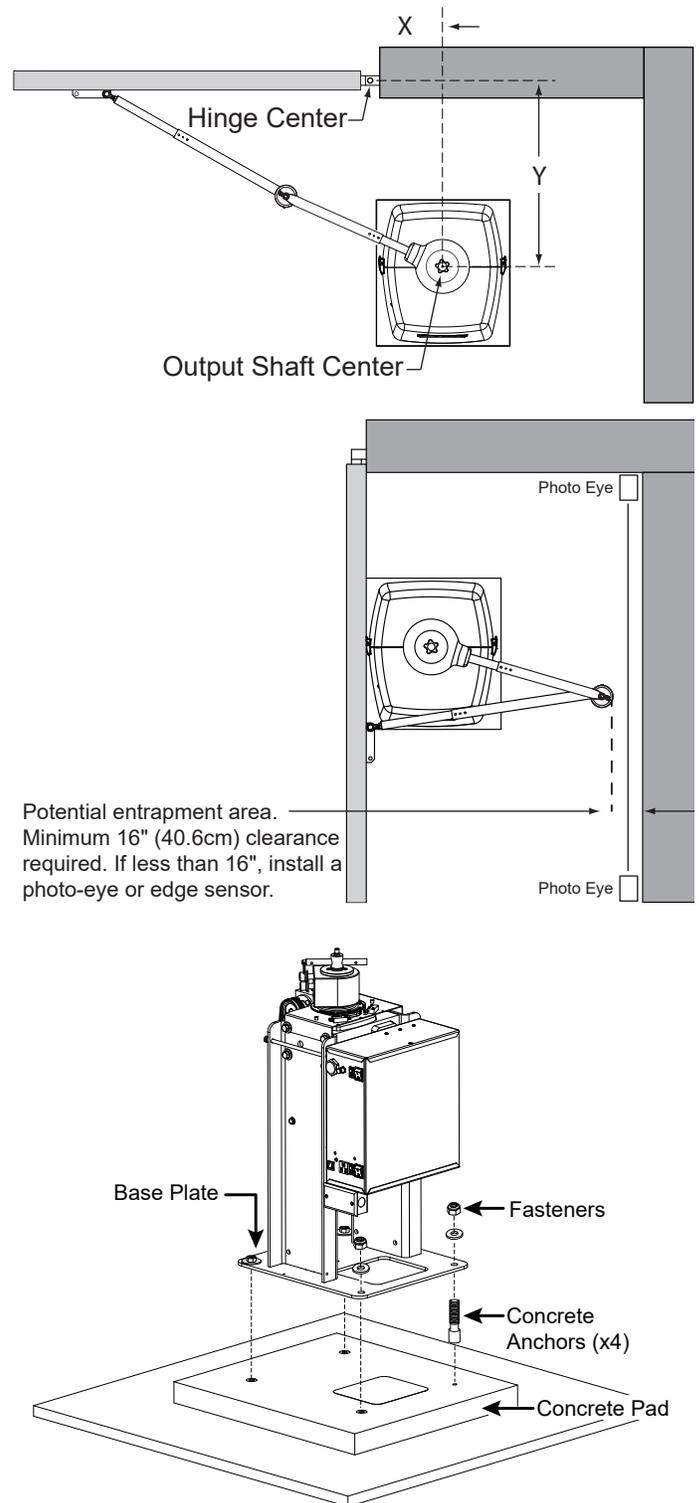


Figure 5. Mounting Operator

GATE BRACKET AND LINKAGE ARMS

Installing the Gate Bracket

1. Secure the gate to prevent movement.

CAUTION

Consider positioning the operator so existing conduit exits through the cutout in the SwingSmart base plate. Cutting small holes in the base plate for pre-existing conduit is permissible, but not recommended because it can impair the strength of the chassis and void the Limited Warranty.

2. Determine the proper position of the gate bracket. Use Figure 6 and Table 2 for reference. **Hint:** Determine if you have a short, medium, or long gate. If the X and Y dimensions in the chart are the same as your install, set the gate bracket at the Xg dimension. If your install does not fit to the chart specs, use the Custom Gate Installation formula to determine the proper gate bracket placement.
3. Measure and position the gate bracket so it is level with the arm on the operator. Clamp the gate bracket to the horizontal cross member.

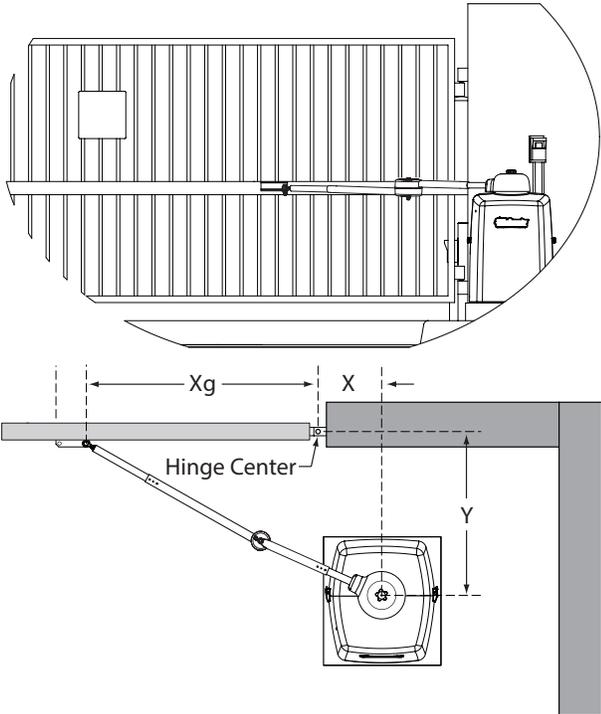


Figure 6. Installing the Gate Bracket

Table 2. Gate Bracket Installation Dimensions

Short Gate Installation: For gates up to 10 feet (3 meters)		
X	Y	Xg
10.5" (27cm)	14" (36cm)	23.5" (60cm)
	18" (46cm)	27.5" (70cm)
	20" (51cm)	29.5" (75cm)
Medium Gate Installation: For gates up to 13 feet (4 meters)		
X	Y	Xg
12" (31cm)	22" (56cm)	33" (84cm)
	24" (61cm)	35" (89cm)
	28" (71cm)	39" (99cm)
Long Gate Installation: For gates up to 20 feet (6 meters)		
X	Y	Xg
15" (38cm)	30" (76cm)	44" (112cm)
	35" (89cm)	49" (124cm)
	40" (101cm)	54" (137cm)
Custom Gate Installation:		
X	Y	Xg
-	-	$X + Y - 1$

INSTALLATION

ATTACHING THE STUB ARMS

1. Attach the swivel eye bolt to the gate bracket using the fasteners provided.
2. Remove the fasteners from the taper clamp assembly.
3. Align the stub arm and secure it to the taper clamp assembly using the fasteners removed in step 2.
4. Pull the taper handle to lengthen it. Adjust the handle so the ball detent fits into its cutout and secures the handle length. Turn the handle counterclockwise to loosen the taper clamp. Figure 7.

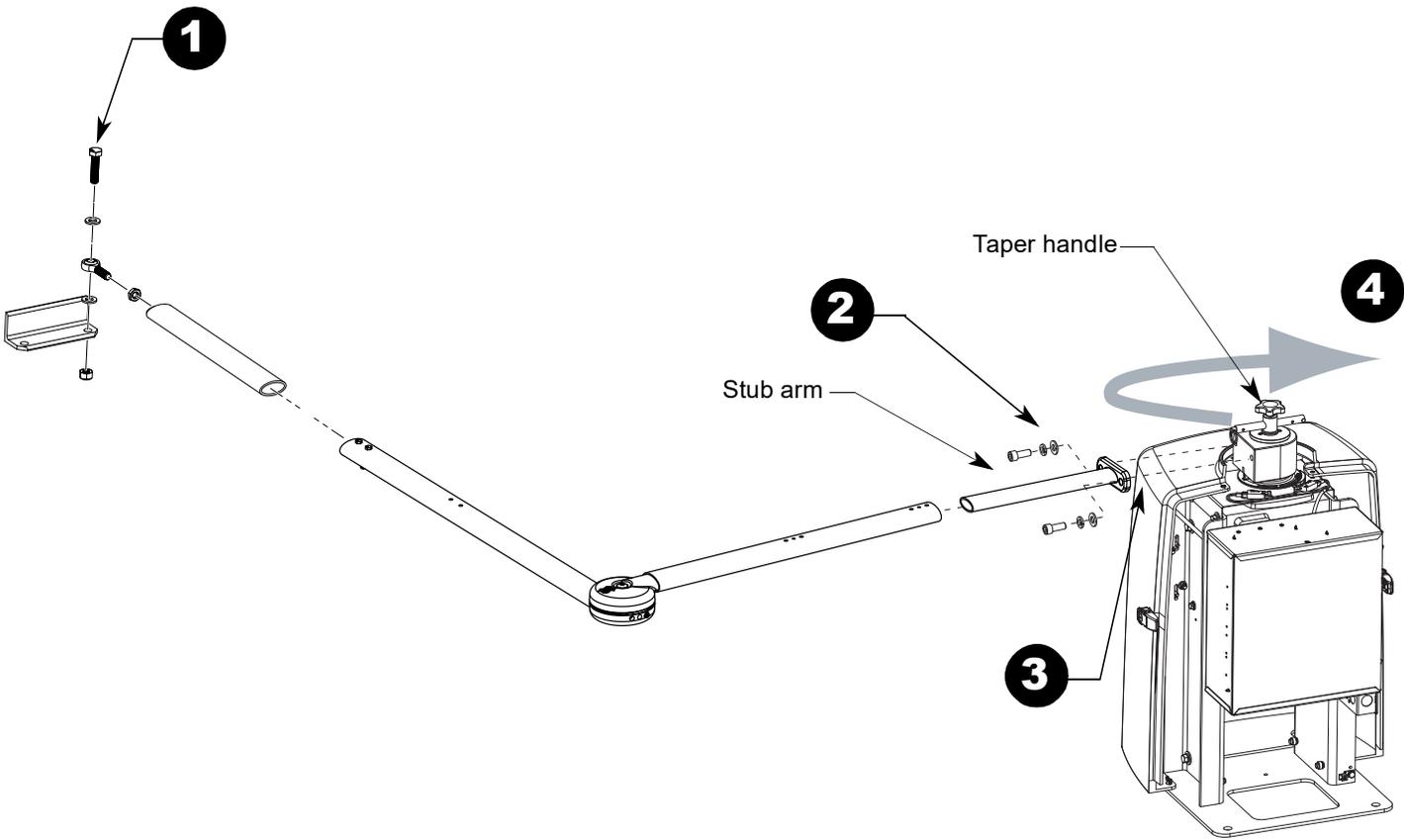
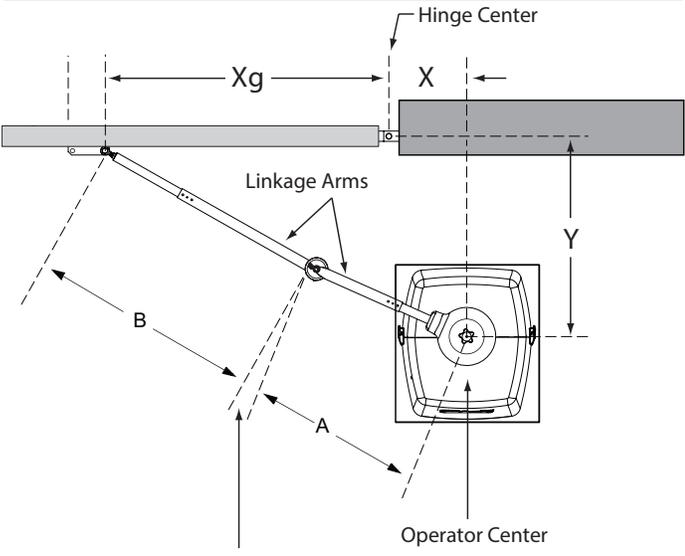


Figure 7. Attaching Stub Arms

INSTALLING THE LINKAGE ARMS

NOTICE

SwingSmart operators ship with separately packaged linkage arms. The linkage arms have a universal elbow joint and can be used on either an operator with right handing or left-handing by simply flipping the linkage arms.



A slight bend in the elbow joint can minimize damage to the operator in event of light gate strike.

NOTE: At secure sites, a straight arm lowers the chance of someone manually pushing the gate open.

NOTE: Maximum measurement for A = 38 inches (97cm)
Maximum measurement for B = 47.5 inches (121cm)

Figure 8. Installing Linkage Arms

Table 3. Gate Linkage Arms Installation Dimensions

Short Gate Installation: For gates up to 10 feet (3 meters)				
X	Y	Xg	A	B
10.5" (27cm)	14" (36cm)	23.5" (60cm)	15.5" (39cm)	21.5" (55cm)
	18" (46cm)	27.5" (70cm)	17.5" (44cm)	24.5" (62cm)
	20" (51cm)	29.5" (75cm)	19" (48cm)	26" (66cm)
Medium Gate Installation: For gates up to 13 feet (4 meters)				
X	Y	Xg	A	B
12" (31cm)	22" (56cm)	33" (84cm)	21" (53cm)	29" (74cm)
	24" (61cm)	35" (89cm)	22" (56cm)	30.5" (78cm)
	28" (71cm)	39" (99cm)	24" (61cm)	33.5" (85cm)
Long Gate Installation: For gates up to 20 feet (6 meters)				
X	Y	Xg	A	B
15" (38cm)	30" (76cm)	44" (112cm)	28" (71cm)	38.5" (98cm)
	35" (89cm)	49" (124cm)	30.5" (78cm)	42.5" (108cm)
	40" (101cm)	54" (137cm)	33.5" (85cm)	46.5" (118cm)
Custom Gate Installation:				
X	Y	Xg	A	B
-	-	$X + Y - 1$	$0.63 * Xg$	$0.87 * Xg$
Space for custom calculations:				

INSTALLATION

- Slide the linkage tubes on the appropriate stub arms and use the tapped holes for adjustment purposes. Tighten the hex-head bolts to hold the arms in place. Refer to Figure 10.
- Verify the A and B dimensions on the arm linkage tubes. For short gate applications, the linkage arms must be cut to achieve the required lengths. See Figure 8. If your operator position does not fit the chart specs, use the Custom Gate Installation formula to determine the proper length.

- To verify appropriate arm length, manually push the gate to the full open and close positions. Maximum torque is accomplished in the open position when the B-arm is approximately 90° with the gate. See Figure 9.

Table 4. Operator Placement & Gate Arm Geometry for 100° through 130° opening

	X	Y	Xg	A	B
100°	20" (51cm)	24" (61cm)	36" (91cm)	24" (61cm)	36" (91cm)
110°	26" (66cm)	24" (61cm)	39" (99cm)	28" (71cm)	40.5" (103cm)
120°	32" (81cm)	20" (51cm)	41" (104cm)	31.5" (80cm)	44" (112cm)
130°	38" (97cm)	18" (46cm)	44" (112cm)	36" (91cm)	47.5" (121cm)

NOTE: Maximum A = 38" (97cm)
NOTE: Maximum B = 47.5" (121cm)

NOTICE

The linkage tubes used for the arm can be drilled and bolted or welded together. Do the finishing work AFTER the arm and gate adjustments are complete. See "Completing Gate Arm Installation" on page 27.

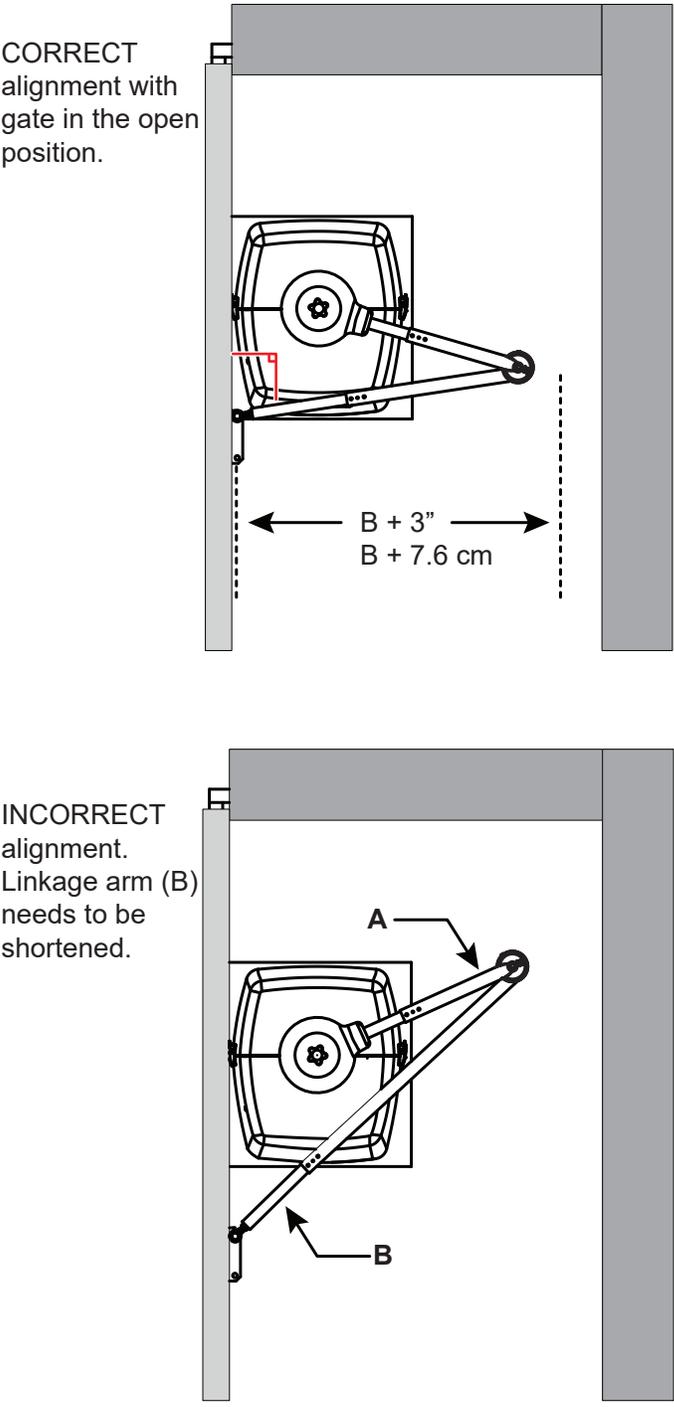
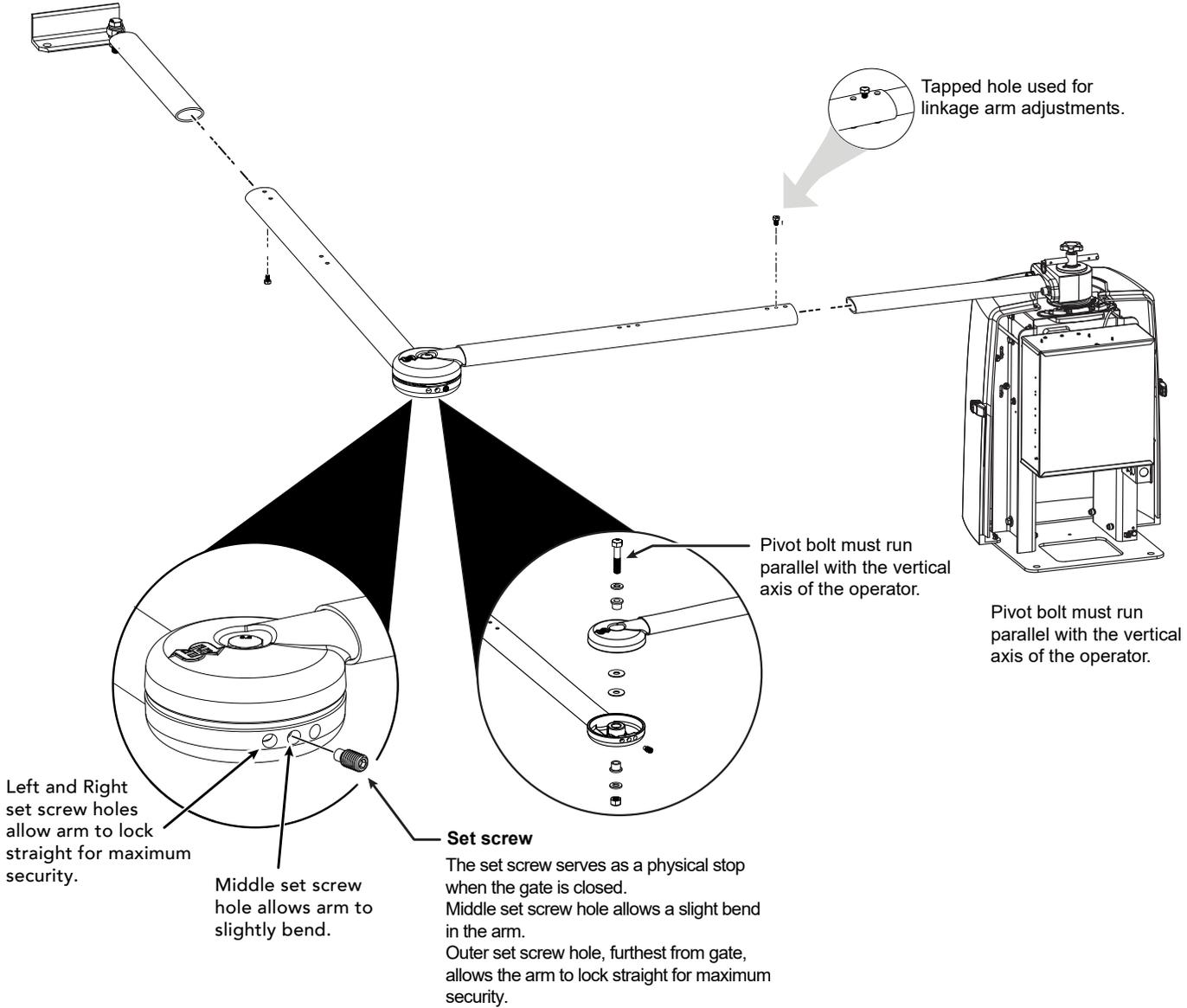


Figure 9. Correct and Incorrect Linkage Arms

4. During the open and close process:
- Verify all pivot joints rotate smoothly without binding. At the full open position, linkage arms must not scissor or bind.
 - See Figure 10 and make adjustments to arm lengths by:
 - loosening the set screws
 - telescoping the arms
 - re-tightening the set screws



Note: The elbow pivot bolt must be parallel with the vertical axis of the operator. If the pivot bolt is not vertical, binding of the arm assembly may occur during operation.

Figure 10. Linkage Arm Adjustments

ADJUSTING THE LIMIT SWITCHES

1. Determine whether the gate operator is a right-hand operator (Figure 11) or left-hand operator (Figure 12). Stand on the secure side of the gate. If the gate opens to the right, it is a right-hand operator.

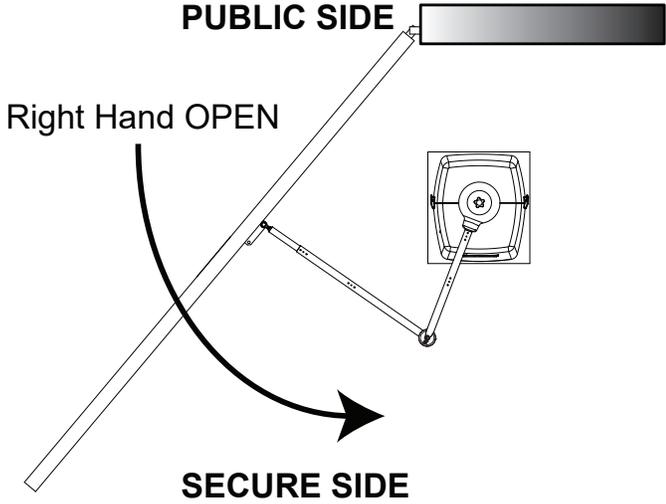


Figure 11. Right Hand Dual Gate Opening

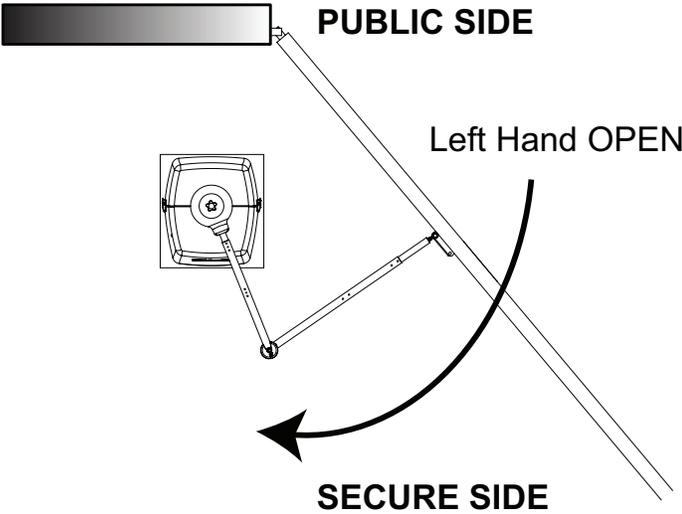


Figure 12. Left Hand Dual Gate Opening

NOTICE

For a right-hand operator, the OPEN switch is the left limit switch as shown in Figure 13. The opposite occurs in a left-hand operator; the OPEN switch becomes the right limit switch.

2. To adjust the limit cams, use a Phillips-head screwdriver and loosen the fastener that secures each limit cam to the limit plate.
3. Manually, open and close the gate. Move the limit cams so they trip the appropriate limit switch at the full OPEN and full CLOSE positions.
4. Secure the limit cams by retightening the two Phillips head screws.

A fin on the limit plate fits into the taper clamp. This feature ensures the limits always track the gate arm position even if the gate is struck and the taper clamp slips.

NOTICE

When reassembling the taper clamp, make sure the limit plate fin is seated into the slot on the taper clamp.

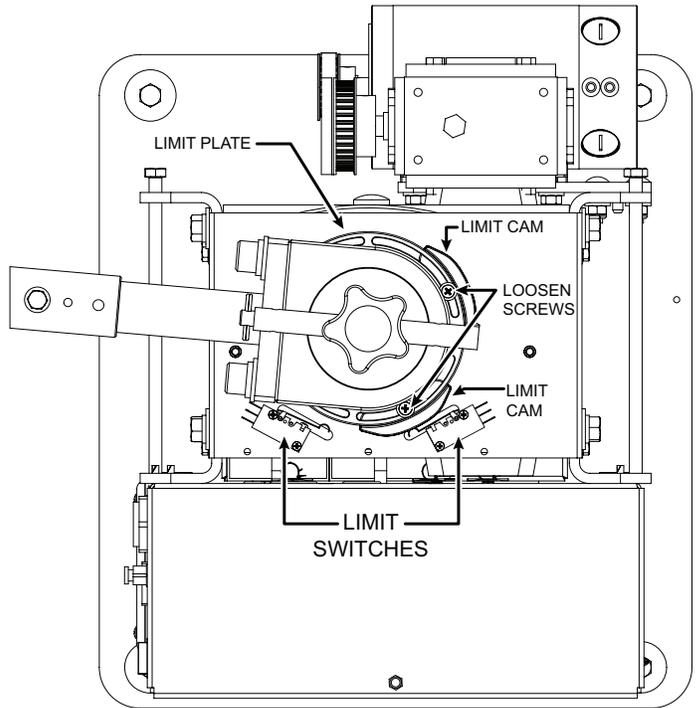


Figure 13. Limit Switches

COMPLETING GATE ARM INSTALLATION

1. To determine whether you should drill & bolt or weld the linkage arms, you should take into consideration site planning and future impact to gate arm installation. Check whether fire bans exist at your site. Fire bans do not permit outdoor welding.
 2. Paint exposed areas to prevent rusting.
- 1A: DRILL & BOLT:** If you plan to use fasteners, drill holes through the linkage arms. Refer to Figure 14.
- 1B: WELD:** If you plan to weld the linkage arms, weld a 1/8-inch fillet around the tubing joint. Only weld at sites where outdoor welding is permitted.

CAUTION

For sites where incident of gate strikes are high, HySecurity recommends setting the elbow with a slight offset at the full close position. Use the supplied set screw in middle position to prevent the arm from locking. The intent of the offset is that, upon gate strike, the elbow will bend and the taper clamp will slip, minimizing damage to the gearbox and operator. Be aware if the elbow is set straight and a gate strike does occur, the full force of the impact will be transferred through the linkage arms and into the gearbox causing possible damage to the gearbox and operator.

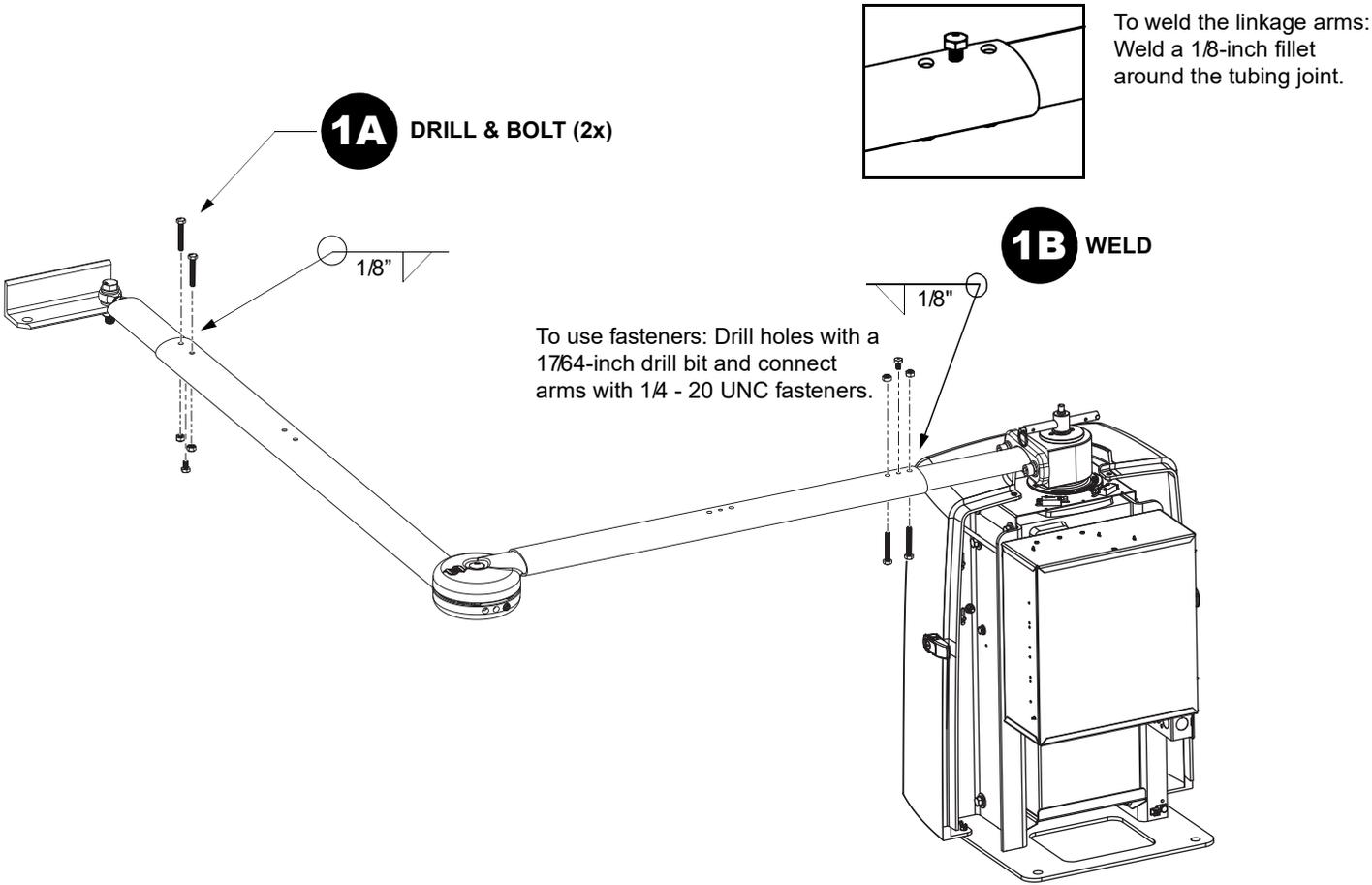


Figure 14. Completing Gate Arm Installation

ARTICULATING ARM OPTION

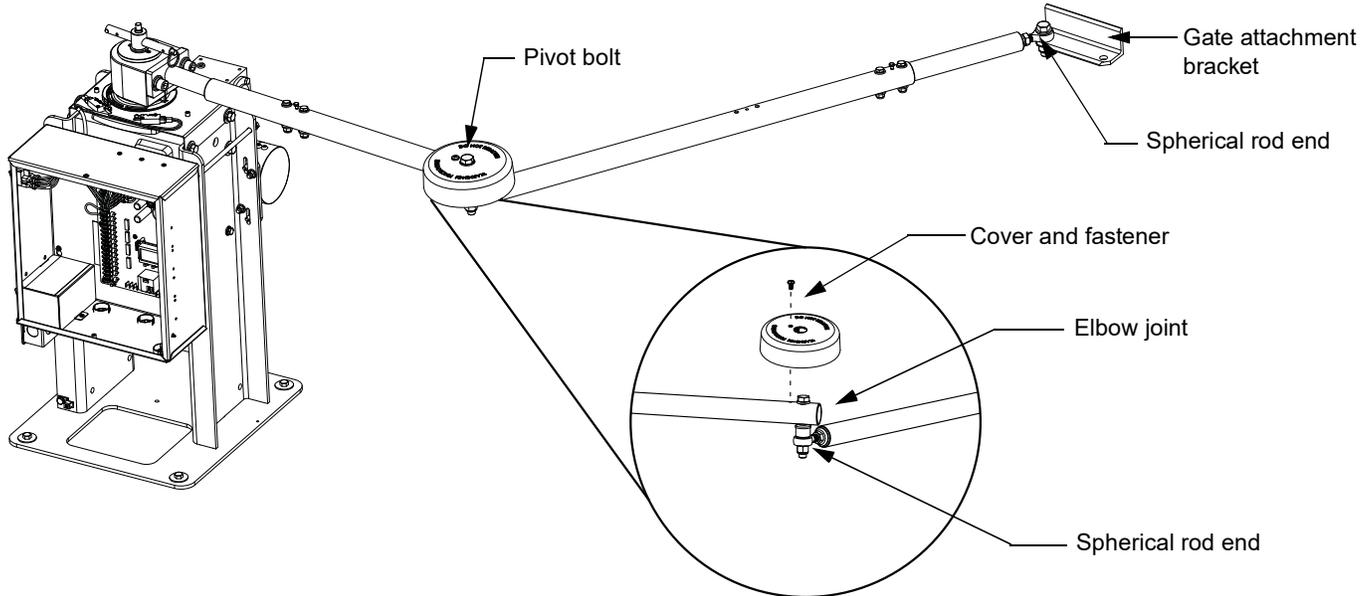


Figure 15. Articulating Arm Option

NOTICE

Articulating Arm Option is only available on the old style two cover swing arm shown here.

The articulating arm assembly uses a spherical rod end at the elbow and at the bracket mount. Situations where you might use this option include:

- The operator pad or gate is not level. The spherical rod ends on the articulating arm forgive minor discrepancies where the hardware may not be perfectly plumb.
- The gate arm is not horizontal.

By ordering the articulating arm assembly for use in these situations, the binding stress between the operator and gate hardware is reduced.

NOTICE

Although some sites necessitate fastening a gate arm to the gate at an angle, HySecurity does not recommend it. The preferred method is an installation where the gate arm remains horizontal throughout gate travel.

When installing an articulating arm assembly, be sure to take into account the following guidelines:

- A gate must be neutrally balanced. To comply with ASTM F2200 General Requirements, a gate must be designed, constructed and installed in such a way that its movement is not initiated by gravity when the gate operator is disconnected or loses power.
- The over-extension stop on the standard HySecurity gate arm does not exist on the articulating arm. To avoid hyperextension, mount the arm so a slight bend at the elbow joint is maintained in the gate closed position. This slight bend may prevent damage to the operator during a gate strike because it allows the elbow to bend properly and permits the taper clutch to slip thereby reducing the impact to the operator.
- Due to the flexibility in the elbow joint, only one pinch protection cover is used.

CAUTION

If the gate arm is mounted at a slight angle, test the operation of the gate several times. Be sure to check for clearance issues. If possible pinch points exist, make sure to adjust the gate arm and eliminate any clearance issues or pinch points.

SETTING THE TAPER CLAMP

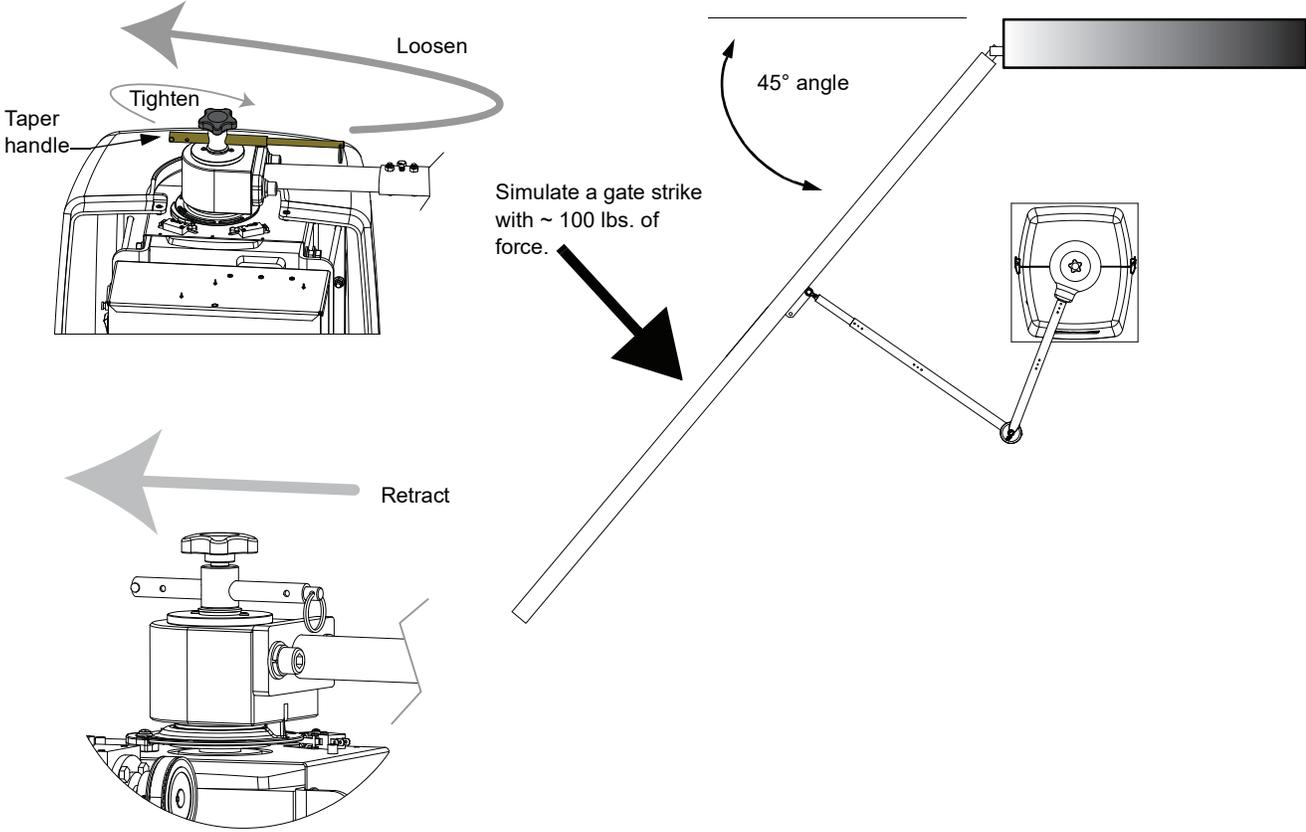


Figure 16. Setting the Taper Clamp

NOTICE

Setting the taper clamp with the gate closed impedes traffic flow. If vehicles need to pass through the gate area, delay setting the taper clamp until after the operator has been configured to run. Refer to "Configuring the Setup Menu" on page 47.

The taper clamp is made of two pieces: a cone-shaped hub fits into a taper clamp assembly. The more you turn the taper handle clockwise the harder it becomes to slip the clutch. In certain situations, such as secure military facilities, consider straightening the gate arm instead of over-tightening the taper clamp. Refer to "Locking the Gate Arm at Secure Facilities" on page 30.

1. To loosen and release the taper clamp, extend the taper handle and turn the handle counterclockwise. See Figure 16.
2. Manually, swing the gate half way between the open and closed position (approximate 45° angle).
3. To tighten the assembly, turn the taper clamp handle clockwise in 1/8-inch (3.2mm) increments. A large amount of torque is not required in order to obtain a tight clutch setting.
4. Push the gate end with approximately 100 pounds of force to simulate a gate strike. If the taper clamp slips, use the taper handle to further tighten the assembly.
5. Continue to adjust the taper clamp until no slippage occurs.
6. Retract and center the taper clamp handle.

LOCKING THE GATE ARM AT SECURE FACILITIES

The purpose in leaving the gate arm with a slight bend in it (i.e. turning the set screw to offset the over travel stop) is to lessen the transference of energy along the gate arm during gate strikes. With the gate arm bent at a slight angle, it can absorb more of the impact and possibly cause less damage to the gear box in the SwingSmartDC operator.

At facilities that require higher security, you may want to consider straightening the gate arm to “lock” it in place so pushing the gate open becomes much more difficult.

Some aspects to consider, if you want to limit opportunities to force the gate open:

- Turn ON the Force Open Alert in the User Menu by setting the menu item FA to 1. When set to 1 and the gate is forced open, a 3-second buzzer alerts the surrounding area that the gate is being forced off its closed limits. The gate operator attempts to close the gate, but if the gate does not begin to fully close within 4 seconds, the motor turns off and the buzzer continues for another 30 seconds. ALERT 1 - FORCED OPEN appears on the display. (An OPEN or CLOSE command clears the alert and resets the display.)
- Fully straighten the gate arm, so it is in a straight “locked” position. Throughout the instructions found in this manual, it states that a bend in the gate arm is critical to offset the damage that may be inflicted to the gate operator during a gate strike. If the purpose is to use excessive measures to keep the gate closed, consider fully straightening the gate arm during installation. Straightening the gate arm after installation will require loosening the set screw and moving the gate bracket or other gate hardware.
- Lock the movement of the gate using an external method, such as a locking chain.

NOTICE

Keep the taper clamp tight as explained in the procedures on the previous page. Do not overtighten the taper clamp. Overtightening the taper clamp may cause excessive wear to the clutch mechanism or damage to the taper clamp causing it to stick during normal gate operation.

INSTALLING THE EARTH GROUND

An earth ground refers to the grounding rod and accompanying equipment ground which need to be installed to safeguard against potential electrical shock and damage to personnel and equipment.

DANGER

The potential for lightning discharge exists with all gates, fences and gate operators. National Electric Code (NEC) - Article 250 requires a separate earth ground in addition to the required equipment ground.

HySecurity recommends grounding the operator with a separate earth ground rod (or a similar device in the case of crash products) to shield the operator against electromagnetism and other electrical signals that may cause, erratic operation with, or damage to, the Smart DC Controller and other electrical parts.

For earth grounding requirements in the U.S.A., refer to the National Fire Protection Association (NFPA) 780 - Standard for the Installation of Lightning Protection Systems. Highlights of the standard include:

NOTICE

Properly grounding the gate operator is critical to gate operator performance and the life of its electrical components. Use sufficient wire size during installation. If you do not ground the operator with a separate earth ground, you risk voiding the HySecurity Warranty.

Take the following steps to comply with NEC and NFPA 780 standards:

1. Install a grounding rod per local building codes. See Figure 17.
2. Attach a large earth ground wire (6AWG) from the grounding rod to the lug nut on the base of the chassis.
 - New site: Run the 6AWG wire through the concrete base and into the cutout on the chassis base.
 - Existing site: Run the 6AWG wire beneath the rear cover. Make sure the covers align and side latches lock properly.

Properly grounding the gate operator is critical to gate operator performance and the life of its electrical components. Use sufficient wire size during installation. Refer to "Wiring 115VAC Power" and "Wiring 208/230VAC Power".

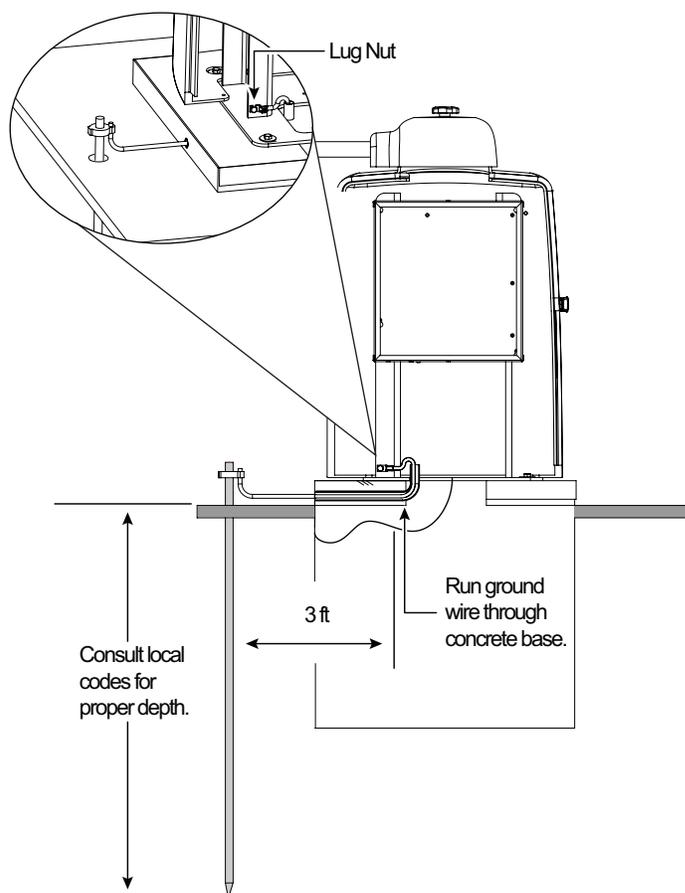


Figure 17. Installing Earth Ground

WIRING AC POWER

⚠ DANGER

Turn off AC power at the source (circuit breaker panel) before accessing the wires in the SwingSmart DC junction box. Follow facility Lock Out/Tag Out procedures. Make sure both the DC and AC power switches, on the side of the SwingSmart DC control box are in the off position.

⚠ CAUTION

Wiring of gate operators must conform to the NEC standards and comply with all local codes. If you plan to connect to 208/230VAC power, read the WARNING in the illustration below. The voltage selector switch on the AC Power board must be moved to the 230V position or damage to the operator will occur and void the Limited Warranty.

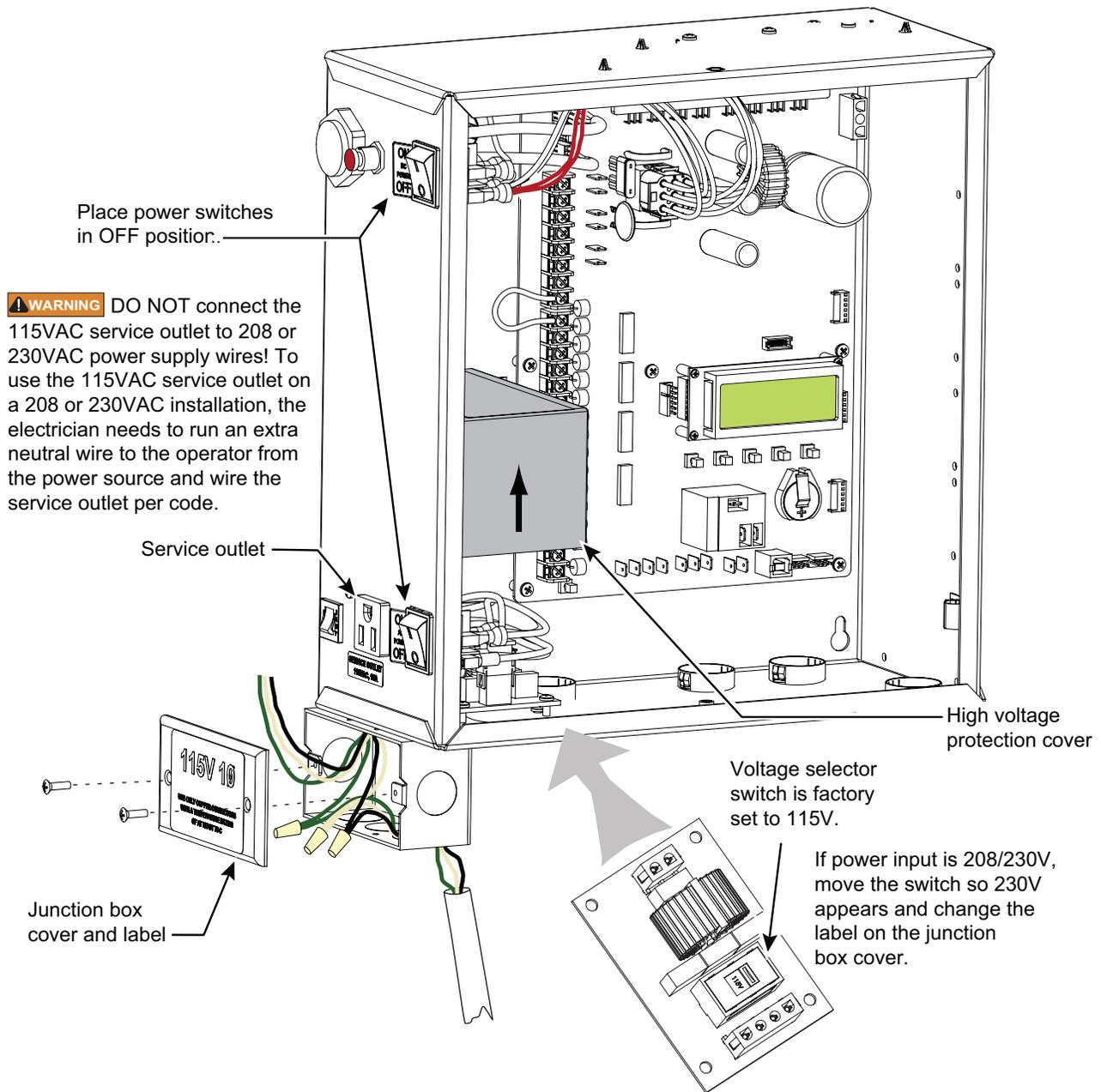


Figure 18. Wiring AC Power

Wiring 115VAC Power

For standard 115VAC power connection:

- Verify AC power supply wires and low voltage (12V & 24V accessory power wires) run through two separate conduits. The higher voltage from the AC power supply may cause interference and anomalies in SwingSmart DC operation if the high and low voltage wires are routed through the same conduit.
- Maximum gate operator current draw is 3 Amps on a dedicated 115VAC circuit (20A dedicated circuit is recommended).
- Make sure proper wiring is being used. The following table shows the maximum allowable wire run from the power source to the operator for various wire sizes.

AC Power	14 gauge wire	12 gauge wire	10 gauge wire
One operator 115V	730 ft (223 m)	1200 ft (366 m)	1900 ft (579 m)
Two operators 115V	460 ft (140 m)	750 ft (228 m)	1160 ft (354 m)

NOTICE

Table 5 assumes a dedicated circuit with an accessory power load up to 2A. Additional loads require that the wire size be increased or the distance of the run be decreased.

To connect to 115VAC power, take the following steps:

1. Make sure the AC power is turned off at its source and the DC and AC power switches on the operator are in the off position.
2. Access the input power wires and service outlet wires by removing the two Phillips-head screws that secure the high voltage junction box cover. See Figure 18.

NOTICE

The service outlet wires are solid copper and are labeled and bound together to keep them separate from the AC power switch wires.

3. Wire nut or crimp bond the power supply wires to the black and white lead wires coming from the AC power switch (no label).
4. Wire nut or crimp bond the equipment ground wire to the green ground wire in the junction box.
5. To activate the 115VAC service outlet, include the black and white outlet lead wires and the green ground wire in the connections made above.
6. Neatly organize all wire connections and replace the high voltage junction box cover. Secure it with the two Phillips-head screws.

Wiring 208/230VAC Power

For the 208/230VAC power connection:

- Verify AC power supply wires and low voltage (12V & 24V accessory power wires) run through two separate conduits as discussed in Wiring 115VAC Power.
- Maximum gate operator current draw is 1.5 Amps on a dedicated 208/230VAC circuit (20A dedicated circuit is recommended).
- Make sure proper wiring is being used. Refer to the following table:

Table 6. Wire Gauge versus Run			
AC Power	14 gauge wire	12 gauge wire	10 gauge wire
One operator 208/230V	2095 ft (639 m)	3350 ft (1021 m)	5300 ft (1615 m)
Two operators 208/230V	1465 ft (446 m)	2350 ft (716 m)	3750 ft (1143 m)

NOTICE

Table 6 assumes a dedicated circuit. Additional loads require that the wire size be increased or the distance of the run be decreased.

To connect to 208/230VAC power, take the following steps:

1. Make sure the AC power is turned off at its source and the DC and AC power switches on the operator are in the off position.
2. Remove the High Voltage Protection cover by unscrewing the two Phillips-head screws that secure it.
3. Toggle the voltage selector switch from 115V to 230V. Replace the High Voltage Protection cover and secure it.

4. Access the input power wires by removing the two Phillips head screws that secure the High Voltage Protection Cover.
5. Wire nut or crimp bond the power supply wires to the black, red, and white lead wires coming from the AC power switch (no label).
6. Wire nut or crimp bond the equipment ground wire to the green ground wire in the junction box.

! DANGER

To use the service outlet with 208/230VAC, a separate neutral wire (white) must be run from the power source. Make sure the incoming power wires are sized appropriately to support the load expected on the service outlet. Follow guidelines per the National Electrical Code Article 250.

7. Neatly organize all wire connections and secure the High Voltage Protection Cover with the two Phillips-head screws.
8. Place the 208V or 230V 1Ø label on the High Voltage Protection Cover over the 115V 1Ø label.

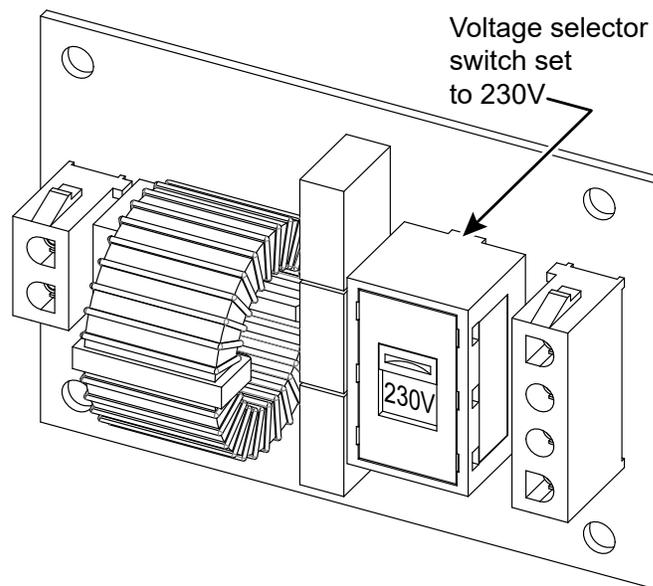


Figure 19. 230V Voltage Selector Switch

CONNECTING DC POWER

To connect the DC power:

1. Turn off the DC and AC power switches.
2. Slide the plastic cover off the control box.
3. Attach the red spade connector to the battery terminal on the DC power switch. See Figure 20.

NOTICE

For extended battery backup installation, refer to the "Installing the Extended Battery Backup Kit" on page 42 instructions.

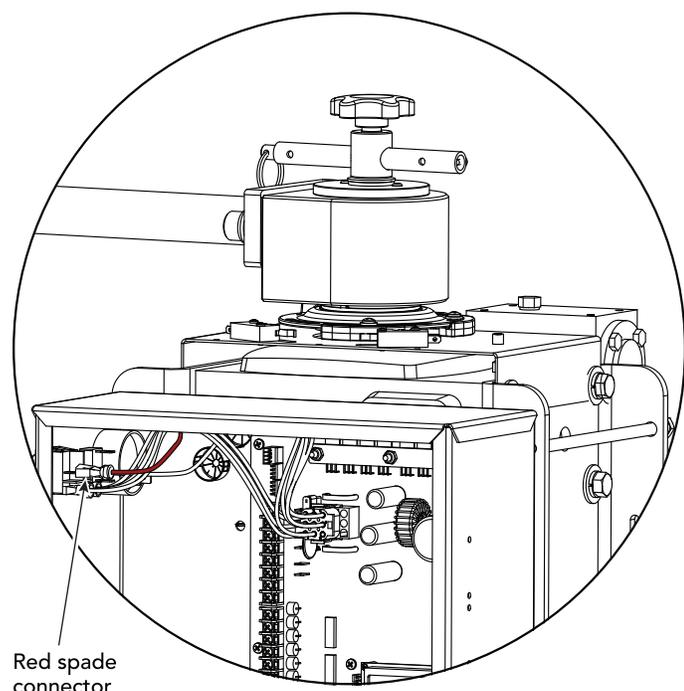


Figure 20. Connecting DC Power

USING A SOLAR POWERED OPERATOR

HySecurity offers a solar version of the SwingSmart operator: SwingSmart DCS20. The solar model has different internal wiring and includes software programmed for solar use. The Smart DC Controller has a built-in charger which allows a 24V solar panel (or two 12V panels) a direct connection to the SwingSmart operator with no additional electronic devices required.

NOTICE

Solar panels are NOT included in the purchase of the SwingSmart DCS 20 Solar operator. Also, adapting a standard SwingSmart DC operator to a solar application is not recommended. For ease of installation and proper functionality, be sure to order a SwingSmart DCS 20 for a solar-powered site.

To plan a solar-powered site, read through this entire section. Keep in mind that the SwingSmart DCS 20 operator does not have the following components:

- Transformer
- AC power supply board
- AC service outlet
- Various wiring adaptations that are standard in a SwingSmart DC 20 operator

Design Requirements & Considerations

Two standard 8Ah batteries are supplied with SwingSmart DCS 20 and nominally support up to 100 cycles per day based on the following:

- Battery storage capacity based on 5 solar hours per day.
- 20WATT solar panel system (minimum requirement).
- A gate weight of 750lbs (340kg) and gate length of 12ft (3.7m)
- Connection to two Hy5B and one multi-code radio receiver. Note that if connected properly, photo eyes are not considered in the power load because the Smart DC Controller only powers the photo eyes when the motor engages.

NOTICE

The available 50Ah battery option supports more peripheral connections because of its higher storage capacity. A higher energy storage capacity provides a higher sustained current draw. If the solar operator will be opening and closing more often at night or in low solar hour conditions, consider using the 50Ah option and two 20WATT panels (for a total capacity of 40 WATTS).

The design of the solar-powered site is important in maintaining the highest gate cycle capacity and extending the life of the batteries. The construction of a solar-powered gate and its cycle capacity is significantly affected by the following:

- Energy demand of the peripheral devices. The more energy efficient the device the less power draw occurs to the batteries.
- Solar hours at the site. "Solar hours" relate to the amount of energy delivered by the sun and absorbed by the solar panels. It is NOT the same as the number of daylight hours available at the site. See Figure 23.
- Design considerations must use calculations that are figured for the darkest months of the year (typically December/January). Higher wattage panels may be required.
- Impediments to the sun's rays reaching the solar panels. Elements such as, shade, improper alignment, or dirty panels will reduce the amount of power available.

NOTICE

Solar panels must not be shaded (not even partially) or the output power will be significantly reduced. Panels must be kept clean as small areas of sunlight blockage cause a large reduction in output power. Alignment is also critical because the rated wattage output is based on the solar panels being mounted perpendicular to the angle of the sun's rays midday on winter solstice (December 21st).

- Extreme temperatures affect battery life. Keep the batteries away from temperatures above 90°F (32°C). See "Important Considerations for DC-Powered Operators" on page 41.
- Good gate hardware and smooth, unobstructed gate travel lowers the operator's power draw and serves to extend battery life.

NOTICE

Any solar systems that are designed close to the minimum margins will stress and shorten the battery life and risk unreliable operation, especially in periods of inclement weather.

Connecting the SwingSmart DCS 20 to Solar Power Panels

1. Use 14 gauge wire or larger to connect the solar panel(s) within 100ft (30.5m) of the operator. Check NEC and local regulations if other distances apply.
2. Use one 24VDC solar panel or two 12VDC solar panels in series with a total capacity of at least 20W. Mount them according to the manufacturer's installation instructions.\
3. Make sure both DC power switches on the SwingSmart control box are in the OFF position, and then remove the two Phillips head screws that secure the 24VDC cover to the junction box.
4. Wire nut or crimp bond the solar panel wires to the black and red input wires. See Figure 21.
5. Wire nut or crimp bond the equipment ground wire to the green ground wire in the junction box.

NOTICE

For extended battery backup installation instructions, refer to Installing the Extended Battery Backup Kit.

6. Slide the plastic cover off the control box and attach the red spade connector to the battery terminal on the upper DC power switch. See Figure 21.
7. Turn both DC power switches ON and program the Smart DC Controller. See "Configuring the Setup Menu" on page 47.

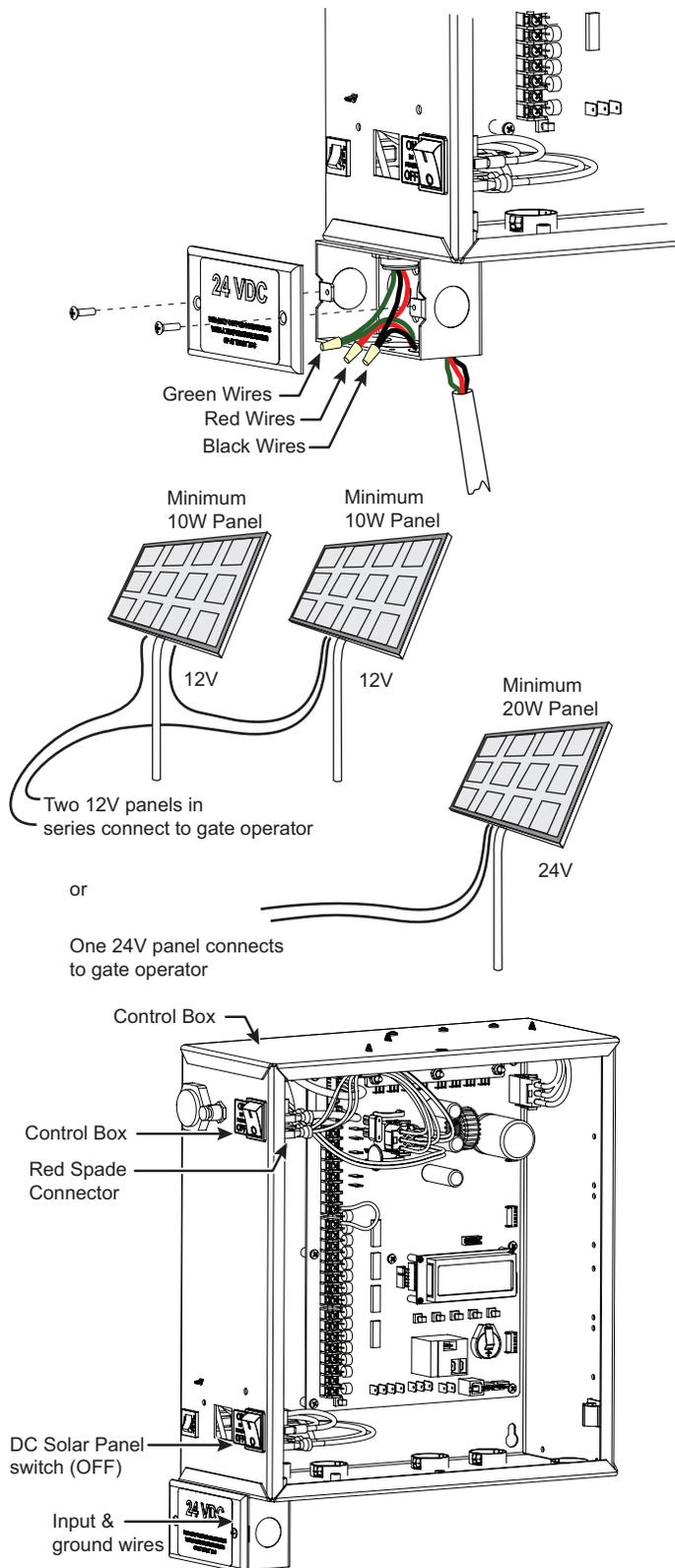


Figure 21. Solar Panels and Wiring Connections

Connecting the Peripherals to Solar Operators

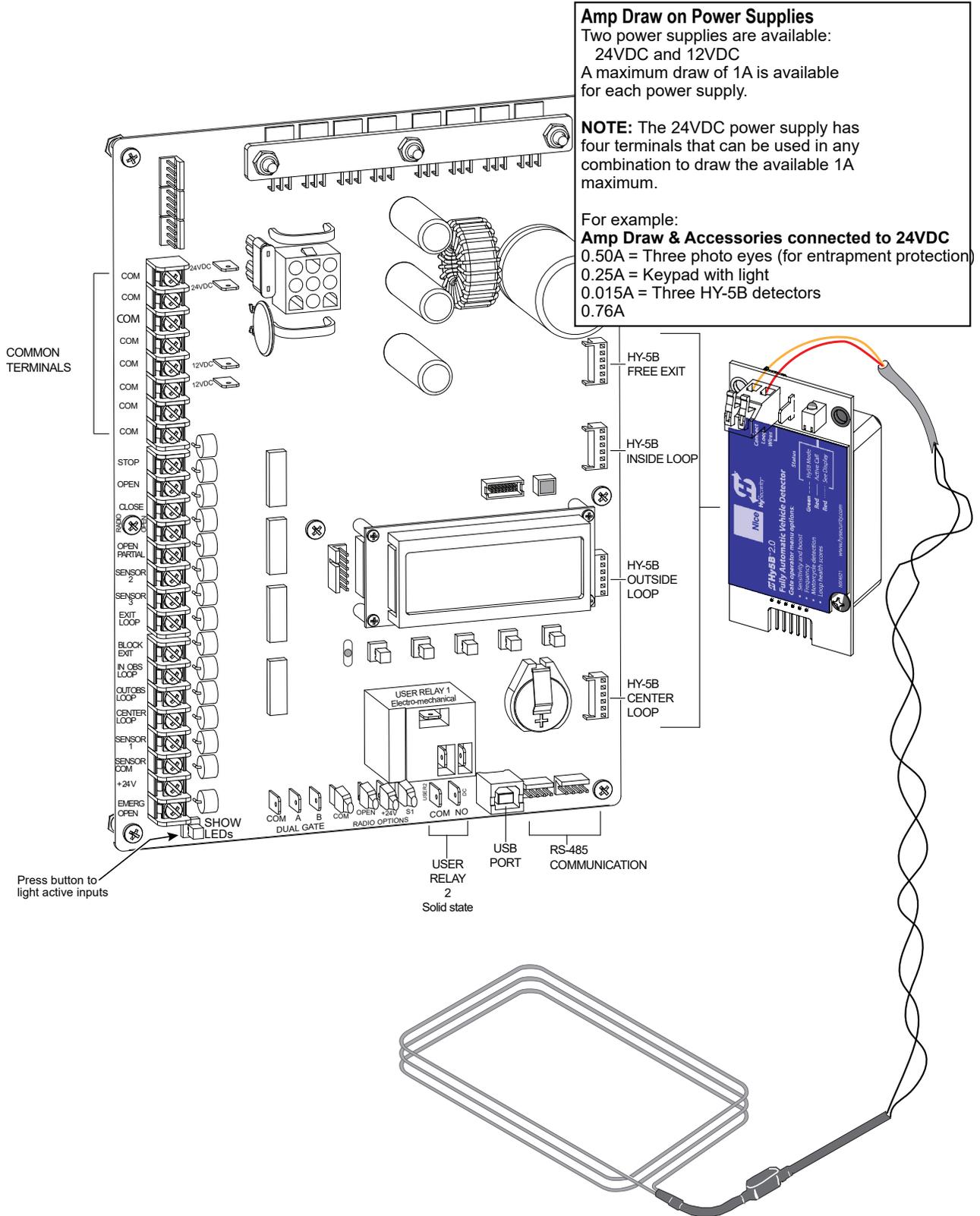


Figure 22. Connecting DC Power

To connect any peripheral devices to a solar operator, use the 24VDC or 12VDC terminals. Because a solar operator gets its energy from the sun and stores the energy produced by the solar panels in batteries that are constantly discharging, it is important to use peripheral devices that draw and consume as little power as possible.

For example, the Smart DC Controller has specific connections for photo eyes. When you attach photo eyes for entrapment protection, wire the photo eyes to the EYE COM and +24VDC. When wired to these connections, the photo eyes only draw power when the motor engages, thereby extending battery life. The same can be said for Hy5B vehicle detectors which draw a minimal 0.005A per detector; compared to box detectors which usually draw, at minimum, 0.009A. .

Understanding Gate Activity based on Solar Zones

Use the solar maps to determine the number of solar hours per day that can be reasonably expected in a particular zone. The number of solar hours per day affects the amount of gate travel powered by the SwingSmart solar operator.

NOTICE

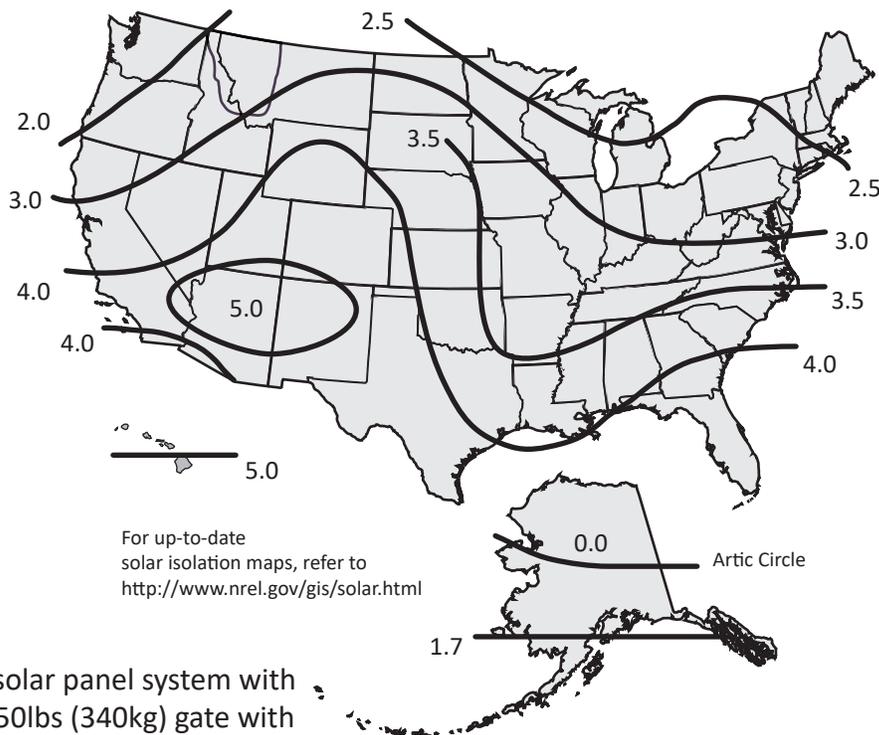
Remember, the sun is the only source of energy. If you need to increase the number of gate cycles per day, additional solar panels may be required. Also, the greater the battery capacity, the longer the operator can cycle the gate on cloudy days without the recharge provided by the solar panels. Sites requiring more cycles per day or those sites located in less sunny climates, need larger capacity batteries. HySecurity offers a 50Ah battery option which provides six times the storage capacity of the standard 8Ah batteries.

Map Legend

Four Week Average, December 7 - January 4

Solar hrs/day Cycles/day
using 8Ah batteries

5.0	100 (20W panel)
4.5	60 (20W panel)
4.0	48 (20W panel)
3.5	34 (20W panel)
3.0	20 (20W panel)
2.5	6 (20W panel)



The chart is based on a 20 Watt (24VDC) solar panel system with SwingSmart powering a 12 foot (3.6m), 750lbs (340kg) gate with the following peripherals attached:

- One low current multi-code radio receiver
- Two HY-5B vehicle detectors

The number of amps that the peripherals draw coupled with the gate travel occurring throughout the night determines the battery capacity required.

The number of amps that the peripherals draw coupled with the gate travel during the day, determines the solar panel size needed.

NOTE: HySecurity provides a 50Ah battery option for sites where high gate travel and inclement weather are an issue. For sites of this nature, consider at least 40W system. A 40W system doubles the feet of gate travel/day that is shown in the chart above.

Figure 23. Solar Legend

IMPORTANT CONSIDERATIONS FOR DC-POWERED OPERATORS

- Since the operator is intended to run on batteries, control of the load is important. Gates that move easily and do not bind will drain less energy from the battery, preserving capacity for more cycles during a power failure.
- Be certain to observe polarity when connecting the batteries or adding accessories. Reversed polarity may result in a non-functional operator or damage to a component. Red (+) is positive and black (-) is negative. If shorted, the batteries will generate a very high current. The batteries are connected in a series circuit: Join the positive (+) terminal from one battery to the negative (-) terminal of the next battery.
- Batteries have a finite life and age more quickly when exposed to temperatures above 80°F (27°C). Battery temperatures above 104°F (40°C) are damaging and significantly shorten battery life.
- As the batteries age, they will progressively lose their capacity to store energy. If the total amount of back up capacity is critical, plan to replace the batteries after two years of use especially in hot climates. Properly discard used batteries. **Refer to page 14.**

WARNING

Batteries contain sulfuric acid. Acid in your eyes, on your skin, or on your clothing can cause injury and severe burns. If batteries are dropped or damaged dispose of them properly.

- Batteries are rated to perform to capacity at certain temperatures. Variations in temperature affect performance of the batteries. An example of amp hour performance is shown in Table 7. HySecurity mounts the battery pack near the transformer to provide residual heat around the batteries which guards against amp hour loss in colder climates.

Table 7. Amp Hour - Example of Battery Performance

Temperature	Capacity
77°F (25°C)	100
32°F (0°C)	80
-22°F (-27°C)	50

- HySecurity uses a permanently sealed AGM-type battery which last much longer than wet cell batteries and needs no maintenance over its life span. Batteries are protected from over discharge by a low voltage sensing circuit. The charger circuit regulates to allow high charger output when the battery is partially discharged. The charger circuit automatically reduces the output to near zero as the batteries become fully charged.

NOTICE

The SwingSmart operator stores all User and Installer Menu settings in non-volatile memory (EEPROM). Configurations are saved if a power loss occurs and reinstated once power is restored.

INSTALLING THE EXTENDED BATTERY BACKUP KIT

HySecurity offers extended DC power back up option with two 50Ah batteries. Contact HySecurity parts department to order extended battery backup kit (P/N MX001810).

To install the extended battery backup kit:

1. Turn off the DC and AC power switches.
2. Unlock side latches to remove the SwingSmart front cover. Remove the two Phillips-head screws and the two wing nuts that secure the rear cover. Set the covers aside.
3. Cut the two black zip ties which secure the 8Ah batteries to the tray.
4. To access the 8Ah batteries and disconnect its wires, remove the two screws closest to the motor and loosen the other two screws that secure the support tray as shown in Figure 24.

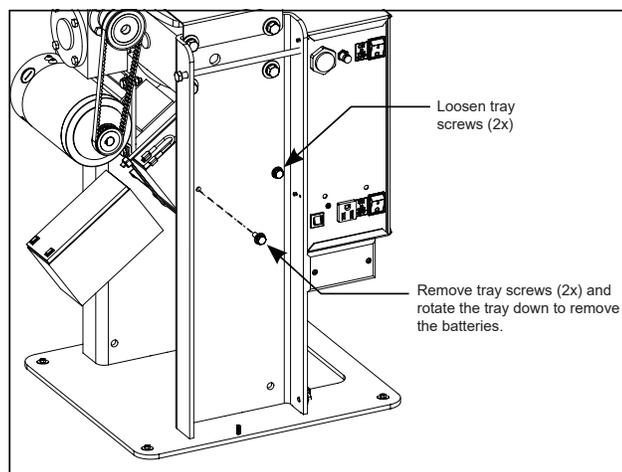
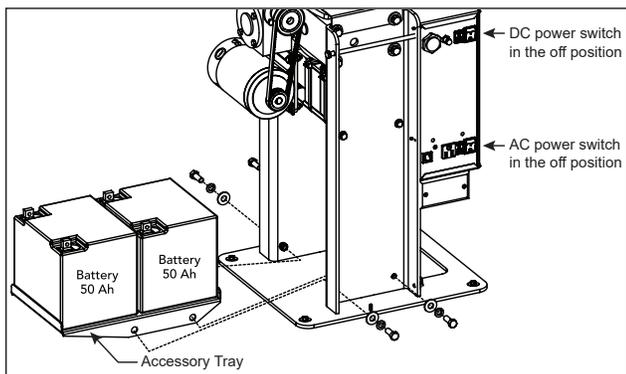


Figure 24. 50 Amp Battery Installation

5. Carefully rotate the support tray to access the battery wires. Lift the 8Ah batteries from the support tray. Disconnect the black and blue wires and set the 8Ah batteries aside.
6. Return the support tray to its original position and secure it properly.
7. Place the 50Ah battery tray between the chassis posts and secure it using the four fasteners provided in the kit. See Figure 25.

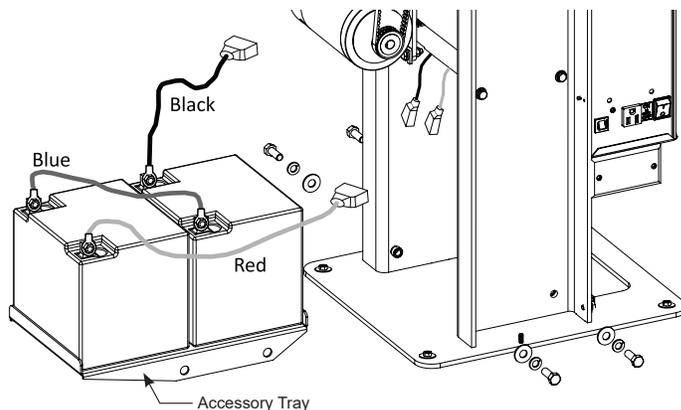


Figure 25. 50 Amp Battery Harness Installation

8. Situate the two 50Ah batteries on the tray. Attach the blue wire from the red terminal on one 50Ah battery to the black terminal on other 50Ah battery.
9. Run the 8Ah wire harness through hole in the 8Ah battery support tray.
10. Using the wires attached in the 50Ah battery kit, attach the red wire to the red positive terminal on the 50Ah battery. Connect its opposite end to the red lead exiting the support tray. Connect the black wire to the black negative terminal on the 50Ah battery. Connect its opposite end to the black lead exiting the support tray.
11. Access the Installer Menu on the Smart DC Controller.

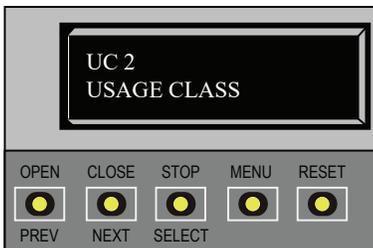
12. Change the Battery Setting (BT) in the Installer Menu to a number 1 (Extended). Follow the steps in the menu tree shown in Figure 26.



1. Start at a gate status display.



2. To access the User Menu, press the MENU button twice.



3. Access the Installer Menu, by simultaneously, pressing the OPEN and RESET buttons.



4. Use NEXT to navigate to the menu display. Change the setting using the SELECT and NEXT buttons.

Figure 26. Battery Type Selection

DISPLAY AND MENU OPTIONS

When you first apply power to the operator, it is locked in Menu mode and prompts appear on the display. The gate will not move and the controls will not function until the prompts have been answered. The prompts include:

- Usage Class setting
- Gate Handing
- Three external entrapment protection SENSOR assignments

Once you've completed the installation of the SwingSmart operator and attached the wired accessories, you're ready to program the operator. Two different approaches exist:

- Connect a laptop computer to the USB or serial (RS-232) port and upload the gate settings and set the operator menu configurations via the S.T.A.R.T. software.

NOTICE

Use a laptop computer at your place of business to conveniently download the free S.T.A.R.T. software from www.hysecurity.com before heading out into the field. A S.T.A.R.T. User Guide is also available online.

- Manually navigate through the User and Installer Menus using the buttons located on the Smart DC Controller.

If you are unsure of the usage classification, refer to page 17. It explains the different usage site classifications for UL 325.

CAUTION

Smart DC Controller can be powered when either switch is turned on. The operator is a DC-powered unit and runs on its batteries. If DC power switch is off, operator will not function (even though AC power switch is on). When the operator is connected to AC power and the unit is turned on, the charge level of the battery is being monitored and maintained. On a solar-powered operator, the AC power switch connects and disconnects the DC power from the solar panels.

Five buttons on the display keypad provide operational controls. Refer to Figure 30 for more information. To answer the initial prompts, use the Previous, Next, and Select buttons as described in the chart below:

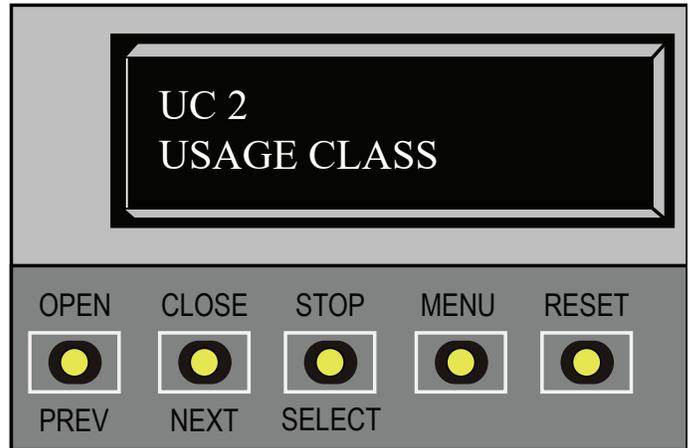


Figure 27. UC2 Usage Class

Table 8. Menu Mode Navigational Buttons
To edit the Menu
Press SELECT. Two top characters blink.
To navigate through the SELECTIONS
Press NEXT. Continue pressing NEXT to view all selections.
To choose what is on the display
Press SELECT. Blinking characters become static.
To navigate between menus
Press NEXT or PREV. Advance - press NEXT. Previous - press PREV.

DISPLAY AND MENU OPTIONS

GATE HANDING

The handing is determined by the position of the operator and which way the gate opens. See Figure 28. To determine handing, look at the gate from the secure, operator side, choose:

- R - If the operator is on your right
- L - If the operation is on your left

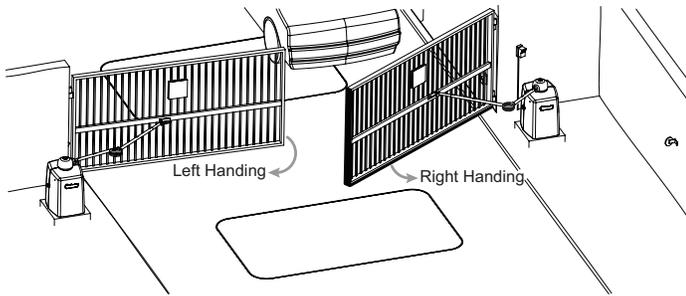


Figure 28. Gate Handing

TURNING BOTH POWER SWITCHES ON

One AC and one DC rocker power switch are located on the outside edge of the control box.

1. Turn both power switches ON. An audible beep occurs and a red light pulsates next to the OPEN button on the Smart DC Controller which indicates the system is functioning.

NOTICE

If AC power is lost, the rate of flashing slows down. Other indicator lights are described below.

2. The software version briefly appears on the LCD display and the display settles on one of the following modes:
 - Gate status - indicates the operator is in Run Mode. Refer to Run Mode.
 - Usage class - indicates that the Setup Menu, which consists of four sequential displays, needs to be programmed. Refer to Configuring the Setup Menu.
 - Error message - indicates a problem exists with the operator which needs to be resolved before the operator can function properly.

The flashing red indicator light next to the OPEN button on the Smart DC Controller is considered the heart beat of the system. It indicates that the electronics board is receiving power. When AC power is lost, the rate of flashing slows down. Another indicator light, above the display, is multi-colored and corresponds to the action that the operator is performing:

- Green - AC power and Run mode
- Yellow - Menu mode
- Red - indicates the operator has experienced an Alert, Fault, or Error.
- Not lit - AC power is lost. Pressing the SHOW LEDs button indicates which inputs, if any, are active.

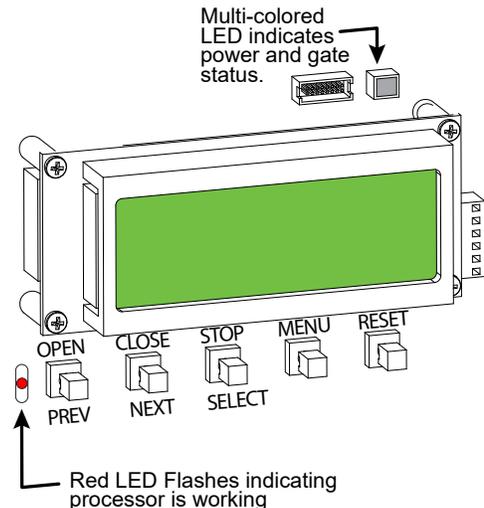


Figure 29. Heartbeat Display

DISPLAY AND MENU OPTIONS

USING THE SMART DC CONTROLLER BUTTONS IN MENU MODE

Smart DC Controller buttons let you navigate, change, or clear the information in the display menus. Refer to Figure 30.

The buttons with text above and below have two functions. Use these buttons to enter operating commands or navigate through the User and Installer Menus. The singular use of these keys is dependent on the operator mode. Three different modes exist:

- Run Mode - gate is operational awaiting commands. Refer to "Run Mode" on page 48.
- Menu Mode - motor disengages and operator commands are ignored. Data entry, menu navigation, and menu selection can be accomplished via the Controller buttons or through a START software connection using the USB port.
- Fault Mode - alerts, faults or errors appear on the display. Some errors or faults can be reset with the STOP button while more serious faults require the RESET button or cycling power. Faults indicate a need for diagnosis and resolution. Refer to "Smart DC Controller Troubleshooting" on page 115.

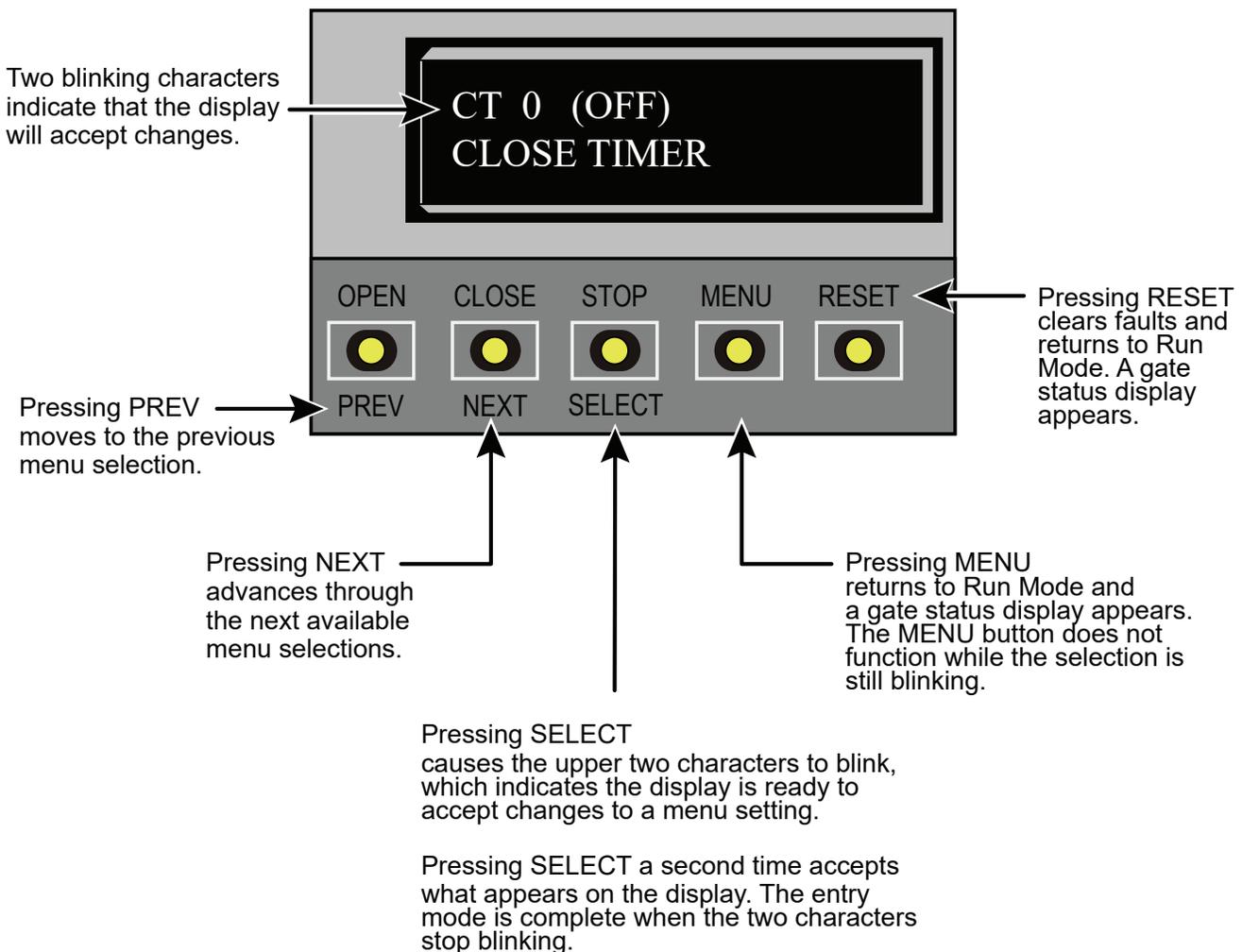


Figure 30. Function of the Smart DC Controller Buttons in Menu Mode

DISPLAY AND MENU OPTIONS

CONFIGURING THE SETUP MENU

The USAGE CLASS display appears the first time power is supplied. See Figure 31.

NOTICE

If a gate status display appears, the Setup Menu has already been configured. Refer to "Viewing Operator Status Displays" on page 48.

Seven sequential displays present information which must be configured before SwingSmart DC will function. Once the configuration is complete, the information is retained even when a power loss occurs.

NOTICE

Programming the Setup Menu is usually a one-time occurrence unless factory defaults are reinstated through the Installer Menu. Refer to "Reinstating Factory Defaults" on page 74.

To navigate within the Setup Menu, use the SELECT, NEXT, and PREV buttons. All menu options cycle, so you eventually return to the first menu option by continually pressing the NEXT or PREV key.

From the USAGE CLASS display, take the following steps:

1. Press SELECT. The two top characters blink.
2. Press NEXT. Continue to press NEXT to view all the selections.
3. When the desired selection appears, press SELECT. The blinking characters become static.
4. Press NEXT. Advance to the next menu display.
5. Continue to configure each menu display that appears.

An audible beep occurs as the gate status display appears when the initial setup is complete. The operator enters Run Mode.



Selections:

1. Garages or parking areas with residences of 1 to 4 units.
2. Commercial location or multi-family housing (hotels, garages, etc.)
3. Industrial use, not accessible by or intended to serve general public.
4. Guarded industrial location or facility, not servicing general public.



Selections:

- 0 - No Handing set. Gate will not move until handing is set.
R - Right-hand gate opening. Looking at the gate from the operator side, it opens to the right.
L - Left-hand gate opening. Looking at the gate from the operator side, it opens to the left.



Selections:

- 0 - not set
1 - Gate weight: 0 to 300lbs.
2 - Gate weight: 301 to 600lbs.
3 - Gate weight: 601 to 800lbs.
4 - Gate weight: 801 to 1300lbs.

Set Sensors 1, 2 and 3 as needed.



Selections:

- 0 - not set
1 - Gate length: 0 to 8ft.
2 - Gate length: 8 to 12ft.
3 - Gate length: 12 to 16ft.
4 - Gate length: 16 to 20ft.



NOTE: The GATE CLOSED display is an example. Any one of three gate status displays could appear depending on the gate operating mode. Refer to Run Mode.

Figure 31. Configuring the Setup Menu

DISPLAY AND MENU OPTIONS

RUN MODE

The Run Mode displays appear static when the operator is ready and waiting for a run command. When the display is flashing "GATE OPENING" or "GATE CLOSING", a command has been received and the gate is in motion. The command may come from a variety of sources: a card reader, push-button remote, or recognition of a vehicle passing over a loop detector. In all cases, the operator "runs" the motor when it receives an operational command.

NOTICE

To access the User or Installer menus, the motor cannot be engaged and the gate cannot be moving.

Three displays indicate the position or status of the gate. The keypad entry used to access the User or Installer menus, begins at one of these Run Mode displays. See Figure 32.



Figure 32. Run Mode Displays

VIEWING OPERATOR STATUS DISPLAYS

Press the MENU button once and the operator status displays appear in two second intervals. Pertinent information appears to provide a quick overview of the operator's status or configurations. See Figure 33. The type of information that may scroll across the display includes: software version, operator type (OT), gate handing (LEFT HAND or RIGHT HAND), buss voltage, and life cycle counter.



Figure 33. Example of Operator Status Displays

DISPLAY AND MENU OPTIONS

Table 9. Viewing Operator Status Displays

Display	Variables	Description
Build Year	Indicates whether the gate operator was manufactured before (pre-2016) or after UL 325 - 2016 Standard of Safety changes that require monitoring of external entrapment sensors.	All gate operators manufactured in 2016 or later will show Build Year - Post 2016 because it contains software version h5.50 or later. If you plan to upload 5.50 software (or later) into your gate operator, you will need to set the appropriate build year according to the date of manufacture.
Software Version A lower case "h" appears in front of the software version number.	Software version and revision number are hard-coded in Smart DC Controller.	Displays software version when you press RESET or cycle power. You will need software version when calling Technical Support.
Dual Gate or Sequenced Gate	PRIMARY or SECONDARY (Display only appears when operator is used in bi-parting gate systems.)	Indicates, in a dual gate setting, whether operator is set to Primary or Secondary. Setting is assigned in Installer Menu.
Operator Type (OT)	OT 12 = SwingSmart DC or DCS	Indicates and identifies the operator.
Set Handing (SH)	LEFT or RIGHT	Designates which way a gate opens viewed from operator. If it slides left, it is a left-hand gate. Gate handing is established in the initial Setup Menu.
Usage Class (UC)	1, 2, 3, or 4	Displays operator's Usage Class designation per UL 325 standards.
Bulk Charger State	Three stages of charging: ● Bulk ● Absorption ● Float	Indicates the state of charging that the AGM battery is currently handling.
Input Voltage VDC	The number varies depending on the voltage that the power board is providing.	Input voltage (DC Buss voltage) to the Smart DC is shown. Helps to determine proper power connections.
BT <0> STANDARD BATTERY	0 = 8Ah (standard factory issue) 1 = 50Ah (optional upgrade) 2 = 110Ah (option)	Confirms operator's battery type. If you use larger capacity batteries you must configure operator through Installer Menu. See BT - BATTERY TYPE.

DISPLAY AND MENU OPTIONS

Table 9. Viewing Operator Status Displays

Display	Variables	Description
D <32>.0 VDC BATTERY VOLTAGE	Number varies depending on voltage that charger is providing.	Displays actual charging voltage.
Cycle Count (CC)	One cycle equals a full open and close sequence. Partial cycles are not counted.	Displays number of cycles gate operator has incurred. Similar to an odometer, it resets to zero after 999,999 cycles.
Close Timer (CT)	The first menu item in the User Menu. See "User Menu" on page 51.	NOTE: You can also access Installer Menu from this display. See "Installer Menu" on page 59. Displays number of seconds before open gate initiates closure

USER MENU

The User Menu consists of several items which can be modified using the Smart DC Controller buttons. Refer to "Using the Smart DC Controller Buttons In Menu Mode" on page 46.

To access the User Menu, take the following steps:

1. At a gate status display, press the MENU button. The operator status displays scroll past and the CLOSE TIMER display appears.

NOTICE

To access the User Menu, the operator must be in Run Mode. The motor cannot be engaged and the gate cannot be moving.

2. Press the NEXT button to cycle through the available menu items.

Use the navigational buttons, Select, Next, and Previous to change or view the menu functions. Table 11 describes the User Menu items and supplies the factory defaults. (Factory default settings shown in bold.) In the pages that follow, a detailed view of the more commonly used menus is provided:

- Adjusting the Close Timer
- Setting the Time & Date
- Setting the AC Power Loss Gate Function
- Adjusting the Display Contrast

For information on how the menu buttons function, review "Using the Smart DC Controller Buttons In Menu Mode" on page 46.

ADJUSTING THE CLOSE TIMER

The close timer assigns how many seconds will pass before the operator initiates automatic closure of a fully opened gate after all open commands and reversing sensor inputs have ceased. Every gate operator should have the close timer set to a specific number of seconds unless a hard-wired closing device is connected to the unit such as a push button station.

To adjust the time (1 to 99 seconds) it takes before the operator initiates gate closure, take the following steps and see Figure 34:

1. At a gate status display, press the MENU button twice. This accesses the User Menu and the CLOSE TIMER display appears.
2. Use the SELECT, and then NEXT or PREV buttons to navigate and change the number on the display.

NOTICE

Keep the close timer at zero if gate personnel operate the gate or the owner plans to use a remote control.

3. To exit the User Menu, press the MENU button. The gate status appears in the display indicating you have returned to Run Mode.



Figure 34. CT 0 (OFF) Close Timer

DISPLAY AND MENU OPTIONS

SETTING THE TIME AND DATE

A feature of the Smart DC Controller is its 24-hour, 365 day clock. Make sure it is set to the appropriate time zone. An accurate time and date allows the diagnostic log to date stamp operational data which indicates when Alerts, Faults and Errors occur. The log helps in troubleshooting and can be viewed via a laptop connected to the USB or RS232 port, or on the LCD directly. For more information, refer to "Smart DC Controller Troubleshooting" on page 115.

To set or adjust the time or date, take the following steps and see Figure 35:

1. At a gate status display, press the MENU button twice. This accesses the User Menu and the CLOSE TIMER display appears.
2. Press NEXT or PREV until the SET CLOCK display appears.
3. Press SELECT. CL blinks.
4. Press NEXT or PREV to change the number to 1.
5. Press SELECT to accept the display.
6. The date and time display appears. Use the SELECT and NEXT buttons in the same manner as before to adjust the date and time.

NOTICE

A date or time field must have the blinking arrows below it before it can be changed.

7. To accept what appears on the date and time display, press SELECT.
8. To exit the User Menu, press the MENU button. A gate status appears in the display indicating you have returned to Run Mode.

NOTICE

A lithium coin battery, on the Smart DC Controller board, supports the clock so the date and time is retained even when the main power is turned off. Replace the battery every five years with a DL 2025, DL 2032 or CR 2025 or CR 2032 battery. Refer to "Clock Battery Replacement" on page 95.



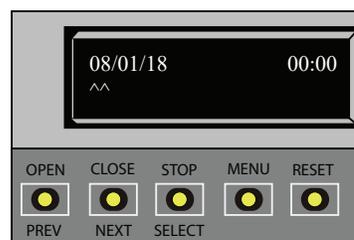
1. Start at a gate status display.



2. To access the User Menu, press the MENU button twice.



3. Press NEXT until the SET CLOCK display appears. Use the navigational buttons to select 1.



4. Change the time and date using the NEXT and SELECT buttons.

Figure 35. Setting Time and Date

DISPLAY AND MENU OPTIONS

SETTING AC POWER LOSS GATE FUNCTION

The setting in the AC LOSS display determines what action the operator performs during an AC power loss. The settings help reduce drain on the battery. You can choose between four settings depending on customer preferences.

Table 10. AC Power Loss Menu	
Menu Setting	Description
	Normal gate functions continue until system detects battery voltage drop below 21V. DEAD BATTERY appears on display and gate automatically opens. Any pushbutton CLOSE command will close gate and any OPEN command will re-open gate. If battery continues to diminish and system detects 18V or less, system initiates an automatic open cycle. Any new open or close command is ignored and LCD appears blank. System remains in this disabled state until reset or battery recovers to 24V.
	Normal gate functions continue until system detects a battery voltage drop below 21V. DEAD BATTERY appears on display and gate automatically closes. Gate can be opened by a special sequence of a STOP input followed by an OPEN push-button or directly opened with Fire Department Open command. Any push-button CLOSE command closes gate. If battery continues to diminish and system detects 18V or less, system initiates an automatic open cycle if not already on a limit. Any new open or close command is ignored and LCD appears blank. System remains in this disabled state until reset or battery recovers to 24V.
	Operator automatically opens gate five seconds after AC power loss detected. Gate remains open until AC power is restored. Any push-button CLOSE command will close gate and any open command will open gate. When battery voltage drops below 21V or less, system initiates an automatic open cycle. Gate will remain open until battery recovers to 24V.
	Operator initially does nothing after it detects AC power loss until it receives an open command. Once an open command is received, operator opens and remains in that state. Any push-button CLOSE command will close gate and any open command will open gate. When battery voltage drops below 21V or less, system initiates an automatic open cycle. Gate will remain open until battery recovers to 24V.

To designate what you want operator to do during an AC power loss, access User Menu (see "User Menu" on page 51 and Figure 36) and scroll through items until AP (AC LOSS) display appears:

1. Use SELECT and NEXT buttons to navigate and change number on display. Review "Using the Smart DC Controller Buttons In Menu Mode" on page 46.
2. To exit User Menu, press MENU button. A gate status appears in display indicating you have returned to Run Mode.

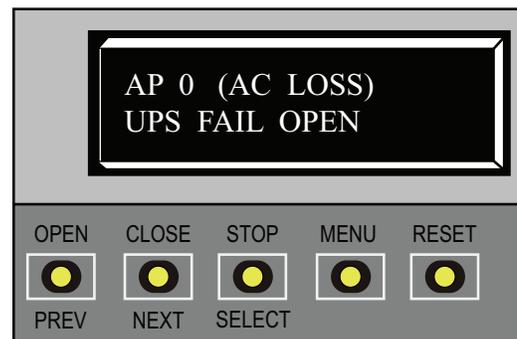


Figure 36. AC Power Loss

ADJUSTING THE DISPLAY CONTRAST

The display contrast can be adjusted from 1 to 9 to increase visibility and ease of use. It is set at the factory to level 5. The text becomes darker as you go up the scale.

NOTICE

If extremely low temperatures are expected, set the contrast to a higher number.

To adjust the contrast (1 to 9), take the following steps and see Figure 37:

1. At a gate status display, press the MENU button twice. This accesses the User Menu and the CLOSE TIMER display appears.
2. Press NEXT until the LCD CONTRAST display appears.
3. Use the SELECT and NEXT buttons to navigate and change the number on the display.
4. To exit the User Menu, press the MENU button. A gate status appears in the display indicating you have returned to Run Mode.



Figure 37. LCD Contrast

DISPLAY AND MENU OPTIONS

Table 11. Smart DC Controller - User Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
CT 0 (OFF) Close Timer	0 = Timer disabled 1 second to 99 seconds	Assign how many seconds before open gate initiates automatic closure. Keep setting at 0 if a hard-wired, push-button control device is being used. NOTE: CLOSE TIMER display does not appear when HOLD TO CLOSE is set to 1.	Not applicable (N/A)
HC 0 (OFF) Hold to Close	0 = off 1 = on	Set to 0 produces a gate closure when a momentary signal is transmitted. Set to 1 if a constant hold to close signal, such as a push button control, is being used. A setting of 1 also deactivates automatic close timer and causes its menu to disappear. You must set HC to 1 to comply with UL 325 Type D protection. Refer to Table Notes.	COM CLOSE
HO 0 (OFF) Hold to Open	0 = off 1 = on	Similar to HOLD TO CLOSE, but configures OPEN push button for a constant-hold function. 0 = Momentary open signal 1 = Constant hold open push button required. You must set HO to 1 to comply with UL 325 Type D protection. Refer to Table Notes	COM OPEN
AP 0 AC LOSS UPS FAIL OPEN	0 = UPS Fail Open 1 = UPS Fail Close 2 = Auto Open 3 = No Close Timer	Setting designates what action gate performs during an AC power loss. Refer to "Setting AC Power Loss Gate Function" on page 53.	N/A.
RO 0 (OFF) Radio Open/Close	0 = off 1 = on	Configures radio input for open only (0). If changed to setting 1 then adds capability for radio input to close gate, but only when gate is fully open.	COM RADIO OPEN

DISPLAY AND MENU OPTIONS

Table 11. Smart DC Controller - User Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
BF 2 (On 2 SEC) Warn Before Operate	0 = off 1 = on 2 = on	Controls warn-before-operate buzzer and can be configured three ways Set to 0: Buzzer is disabled. Set at 0, buzzer will still beep when alerts, faults, errors, or entrapment are detected. Set to 1: Buzzer beeps for 3 seconds before gate motion begins and continues through entire gate travel. Set to 2: Buzzer beeps for 3 seconds before gate motion begins and continues for 2 seconds of gate travel.	(N/A) WARNING: Do NOT cut wires to buzzer or unplug it as operator will not be in compliance with UL 325. Failure to comply may result in serious injury or death.
FA 0 (OFF) Forced Open Alert	0 = off 1 = on	Intended for highly secure facilities. Set to 1, the operator sounds the 3-second "warn before operate" buzzer alarm and initiates a closure if the gate is forced open and the closed limit switch disengages. The motor starts to secure the gate. If the gate does not fully close within 4s, the motor turns off and the buzzer sounds for 30 seconds. The display shows ALERT 1 - FORCED OPEN.	N/A
DA 0 (OFF) Drift Close Alert	0 = off (standard) 1 = on (detailed)	Set to 1, the operator sounds the 3-second "warn before operate" buzzer alarm and initiates an open command if the gate is forced, or drifts, off the open limit switch. The motor starts to reopen the gate. The motor runs for a maximum of 4s and, if the gate is not fully open at the end of this period, the buzzer sounds for 10s. The display shows ALERT 2 - DRIFT CLOSED.	N/A

DISPLAY AND MENU OPTIONS

Table 11. Smart DC Controller - User Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
PE 0 (OFF) Photo Eye Alignment	0 = off 1 = on	When set to 1, operator serves as an aide in photo-eye emitter/receiver alignment. Buzzer chirps once when emitter and receiver are not aligned. When emitter and receiver are aligned, buzzer chirps twice. If they go out of alignment again, buzzer will chirp once. Alignment Mode is reset with a limit input or reset input.	Sensor Common, Sensor 1, Sensor 2, Sensor 3
CL 0 Set Clock	0 = Display 1 = Set Clock	To set or adjust minute, hour, day, month or year, select 1. Once clock is set, display automatically returns to 0 setting. Significant gate events are logged and stamped with time and date. This feature is useful to read historical operation data, which can be accessed with a computer via USB or RS232 port or the LG setting in User Menu. See "Setting the Time and Date" on page 52.	(N/A)
LD 5 LCD Contrast	5 0 through 9	Under some extreme high or low temperature conditions, it may be necessary to adjust LCD contrast. Display is adjustable from 0-9 with a factory default setting of 5.	(N/A)
LG 0 VIEW EVENT LOG	0 = off 1 = on	With v5.53 (or later) software, you can set LG to 1 and view abbreviated event logs on the display. These messages are helpful for diagnostic purposes and reviewing the gate operator's event history. Over 300 events can be logged before the software begins overwriting the existing history.	(N/A)
DS 0 (OFF) DIAGNOSTIC LOGS	0 = off (standard) 1 = on (detailed)	Set this item to 1 to record all gate operator open and close events, in addition to normal alert, fault and error logs. This parameter automatically resets to the default 0 (off) after 24 hours, which is useful when experiencing intermittent problems. Set to 0, DC Controller logs pertinent gate operator events such as faults, errors, or menu manipulation.	USB or RS232 cable and laptop computer with HySecurity's free START software is required to read log file.

DISPLAY AND MENU OPTIONS

Table 11. Smart DC Controller - User Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
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Table Notes:

The following conditions apply to the indicated reference-numbered menu selections:

Table Note 1:

For gate operators using Type D entrapment protection, an automatic closing device (such as a timer, loop sensor, or similar device) shall not be employed.

Table Note 2:

WARNING: Do NOT cut the wires to the buzzer or unplug it as the operator will not be in compliance with UL 325. Failure to comply may result in serious injury or death.

DISPLAY AND MENU OPTIONS

INSTALLER MENU

The Installer Menu consists of several functions which can be modified using the Smart DC Controller buttons or configured through the use of a laptop computer and the START software available from the HySecurity website.

The Installer Menu options provide more advanced configurations for the SwingSmart operator. Access to the Installer Menu is through the User Menu. The navigational buttons are the same in both menu modes. To review how to use the navigational buttons on the Smart DC Controller, refer to "Using the Smart DC Controller Buttons In Menu Mode" on page 46.

NOTICE

To access the User or Installer Menus, the operator must be in Run Mode with a gate status showing on the display. The motor cannot be engaged and the gate cannot be moving.

To access the Installer Menu, take the following steps:

NOTICE

The menu items, Usage Class, Gate Handing, Gate Weight, and Gate Length, as well as sensor 1, 2, and 3, must be configured before the operator will function. Refer to "Configuring the Setup Menu" on page 47.

1. Start at a gate status display. To bypass the Operator Status Displays, press the MENU button twice. See Figure 38.



Figure 38. HySecurity Gate Closed

2. To access the Installer Menu simultaneously press OPEN and RESET. See Figure 39



Figure 39. Close Timer

NOTICE

The CLOSE TIMER display appears indicating you have accessed the User Menu.

3. Release the buttons and the Usage Class display appears indicating entrance to the Installer Menu. The USAGE CLASS display is the first item in the Installer Menu. See Figure 40.



Figure 40. Learn Limit

DISPLAY AND MENU OPTIONS

Table 12. Smart DC Controller - Installer Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Display Connections
OT 0 Set Operator Type	<p>0 = operator type</p> <p>12 = SwingSmart DC 20 & DCS 20 Solar</p> <p>14 = StrongArmPark DC 10 & DC14 DCS 10 Solar & DCS 14 Solar</p> <p>15 = SlideSmart DC 15 & DCS 15 Solar</p> <p>16 = SlideSmart DC 10F & DCS 10F Solar</p>	<p>Select the appropriate number for the operator. NOTE: This menu item only appears if the Smart DC Controller is being replaced.</p> <p>CAUTION: If you are replacing an SDC board, remember to transfer the operator's menu settings from the existing board to the replacement board. Refer to the installation instructions that accompany the replacement SDC board.</p>	Not applicable (N/A)
MN 0 Model Number	<p>0 = model type unknown</p> <p>1 = Model <x></p> <p>2 = Model <x></p>	Select the type of gate operator model used at the site. NOTE: This menu item only appears, if applicable, when you set the OT (operator type).	(N/A)
LL 0 (OFF) Learn Limit	<p>0 = Normal operation</p> <p>1 = Reset limits</p>	A setting of 1 places operator into its learn limits mode which allows you to reset gate's open and close positions. Only appears in SlideSmart, StrongArmPark, and WedgeSmart	(N/A)
UC 0 Usage Class	<p>0 = Gate disabled</p> <p>1 = Residential 1 to 4 units</p> <p>2 = Comm./public access</p> <p>3 = Light industria</p> <p>4 = Industrial secure</p>	Assign operator's Usage Class designation per UL 325 standards. See "Safety Information" on page 17. The installer must designate a usage class before operator will function. See "Configuring the Setup Menu" on page 47.	(N/A)
SH 0 Gate Handing	<p>0 = Gate disabled</p> <p>R = Right hand</p> <p>L = Left hand</p>	The handing determines which way the gate opens as you view it from the secure side. The installer must designate a left or right handing before the operator will function. See Programming the Initial Setup Menu.	(N/A)

DISPLAY AND MENU OPTIONS

Table 12. Smart DC Controller - Installer Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Display Connections
WT 0 Gate Weight (LB)	0 = Gate disabled 1, 2, 3, or 4 Gate weight selections appear in pounds.	Select gate's weight range in pounds. Correct gate weight allows operator to determine appropriate acceleration and deceleration rates.	(N/A)
LN 0 GATE LENGTH (FT)	0 = gate disabled 1 = 0 to 8 feet 2 = 8 to 12 feet 3 = 12 to 16 feet 4 = 16 to 20 feet	Select the gate's length in feet. The installer must designate the gate's length before the operator will function. "Configuring the Setup Menu" on page 47. Designating the correct gate length allows the operator to determine the appropriate acceleration and deceleration rates.	(N/A)
OS 5 OPEN SPEED	5 1 through 10 1 = slowest speed 10 = fastest speed	The range 1 through 10 varies the speed of the motor and the gate opening speed increases as you go up the number scale. A setting of 1 slows the gate travel to approximately 15 seconds. A setting of 10 speeds up gate travel to approximately 10 seconds. Refer to "Adjusting the Gate Speed" on page 70.	(N/A)
CS 5 CLOSE SPEED	5 1 through 10 1 = slowest speed 10 = fastest speed	The range 1 through 10 varies the speed of the motor and the gate opening speed increases as you go up the number scale. A setting of 1 slows the gate travel to approximately 15 seconds. A setting of 10 speeds up gate travel to approximately 10 seconds. Refer to "Adjusting the Gate Speed" on page 70.	(N/A)
FD 0 (OFF) Load Factory Defaults	0 = custom user settings 1 = reload factory default settings	Globally restores all menu settings back to new operator status. Select setting 1 to return operator to factory defaults. NOTE: If factory defaults are restored, the UL usage class, handing, gate weight, and any other modified menu settings will need to be reprogrammed.	(N/A)

DISPLAY AND MENU OPTIONS

Table 12. Smart DC Controller - Installer Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Display Connections
DG 0 (OFF) Dual Gate	0 = solo operator 1 = Secondary unit 2 = Primary unit 3 = Sally Port A 4 = Sally Port B	Configures gate operator as a Primary or as a Secondary in a dual-gate installation. When you assign one unit as Primary, you must configure other as Secondary through Installer Menu. This menu is also used to configure a Sally Port system by setting one operator to Sally Port A and the other to Sally Port Bw. NOTE: Use a 2-pair, twisted, shielded cable with one pair of wires used to connect A-A and B-B terminals between the two boards. The other pair will connect the Common terminals. The shield should then be grounded on one end to one of the operators.	Shielded cable to DUAL GATE input terminals. Connect Dual Gate COM (Gate 1) to Dual Gate COM (Gate 2). Pair wires: A - A, COM - COM, and B - B
SG 0 (OFF) Sequenced Gate	0 = solo operator 1 = Loop View #1 2 = Loop View #2 3 = Loop View #3 4 = Loop View #4	Establishes communication after wiring two or more gate operators as sequential gates. This SG menu item only appears if the Dual Gate menu item (DG) is set to 0 (solo operator). See note in above cell. NOTE: After selecting SG settings, consider accessing the User Menu in each gate operator to address the Close Timer (CT) setting.	Shielded cable to DUAL GATE input terminals on both operators. Pair wires: A - A, COM - COM, and B - B
CH 0 (AC) Charger Type	0 = AC powered 1 = Solar powered	Assigns charger type usually set at factory. If set to solar at factory then this menu item is hidden.	(N/A)
BT 0 (STANDARD) Battery Type	0 = standard (8Ah) 1 = extended (50Ah) 2 = maximum (110Ah)	Assign battery type used by operator. NOTE: Smaller batteries are charged with less current to avoid overheating and larger batteries are charged with more current to supply a more rapid charge.	Extended (50Ah) batteries require wire extensions. Maximum (110Ah) batteries require separate housing and wiring.

DISPLAY AND MENU OPTIONS

Table 12. Smart DC Controller - Installer Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Display Connections
FO 0 (OFF) Fire Dept Open	0 = disabled 1 = enabled	Enables Fire Department Open input. When set to 1, signal received through this input overrides all photoelectric eyes and edge sensors and opens gate. Pressing RESET button (or the OPEN push button) is required before gate can be closed.	+24V DC EMERG OPEN
SE 2 IES Sensitivity	0 = maximum sensitivity 2 = default Setting 9 = least sensitivity	Adjusts sensitivity of internal inherent entrapment sensor (IES). Available settings are 0 to 9 with 9 being least sensitive. HySecurity strongly recommends that you avoid setting IES sensitivity higher than 6. NOTE: Before changing IES sensitivity, make sure that gate rolls smoothly without obstruction. Fix any issues with gate hardware.	See Note.
SS 0 (OFF) IES STOP ONLY	0 = stop, reverse for 2s 1 = stop only	In a Usage Class 4 environment, operator can be set to stop gate and not reverse gate travel after an IES trip.	(N/A)
LC 0 (0.0 SECS) Leaf Delay Close	0 = no delay 1 through 20 in ½ second increments For example: 1 = ½ second 10 = 5 seconds 20 = 10 seconds	Only appears if gate operator is set up as a Primary or a Secondary. Available settings are 1 through 20. Each increment adds ½ second time delay following a command to close before operator begins closing. Provides up to a 10 second time delay.	DUAL GATE inputs on both operators
LO 0 (0.0 SECS) Leaf Delay Open	0 = no delay 1 through 20 in ½ second increments For example: 1 = ½ second 10 = 5 seconds 20 = 10 seconds	Only appears if gate operator is set up as a Primary or a Secondary. Available settings are 1 through 20. Each increment adds ½ second time delay following a command to open before operator activates. Provides up to a 10 second time delay.	DUAL GATE inputs on both operators

DISPLAY AND MENU OPTIONS

Table 12. Smart DC Controller - Installer Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Display Connections
RT 0 (30 SECS) MAXIMUM RUN TIMER	0 = 30 Seconds max run, 1 = 300 Seconds max run	Assigns a motor run time of 30 or 300 seconds. If the gate opening or closure takes longer than 30 seconds, you'll need to set the run timer to 1.	(N/A)
PO (OFF) Partial Open	0 = OFF 7 = 7 ft, 8 = 8ft, through 32 = 32 ft	Sets distance (from closed gate position) where gate stops if the partial open input is activated. When a number is entered in PO display, open partial input becomes operational. Only available on slide gate operators.	OPEN PARTIAL COM
EC 0 STOP ONLY Eye Close Logic	0 = Close eye stops only 1 = 2s reverse to open 2 = Full Open	Default setting is non-reversal if close photo eye is triggered while closing. A setting of 1 causes gate to reverse toward open for two seconds if triggered while closing. A setting of 2 reverses the gate to full open.	Sensor Common Sensor Input
EO 0 (STOP ONLY) EYE OPEN LOGIC	0 = Open eye stops only 1 = 2s reverse to close	Default setting is non-reversal if open photo eye is triggered while opening. A setting of 1 causes gate to reverse travel and close for two seconds if triggered while opening.	Sensor Common Sensor Input
GC 0 NO CONTACT Gate Edge Output	0 = Normally Open Edge 1 = Normally Closed	This menu item only appears when UC is set to 4. Default setting is edge sensor with Normally Closed (NC) output. Optional setting of 0 requires an (NO) output.	Sensor Common Sensor Input
GR 0 (FULL OPEN) GATE EDGE LOGIC	0 = Edge reverses full open 1 = 2s reversal only	Default setting is a full-open reversal if gate edge is triggered while closing. Optional setting of 1 causes gate to reverse for two seconds if triggered while closing.	Sensor Common Sensor Input
SR 1 REVERSE 2S IES Sensor Logic	0 = IES reverses full open 1 = 2 second reversal only	Default setting is a two-second duration reversal if inherent sensor is triggered. Optional setting of 0 will cause gate to reopen fully if triggered while closing.	(N/A)

DISPLAY AND MENU OPTIONS

Table 12. Smart DC Controller - Installer Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Display Connections
PC 1 NO CONTACT PHOTO EYE OUTPUT	0 = Normally Open PE output 1 = Normally Closed (supervised)	This menu item only appears when UC is set to 4. Default setting is photo eyes with Normally Close outputs. Optional setting 0 requires a Normally Open (NO) output. When set for NC, connection is monitored and any short circuit fault will generate a FAULT 2 alert which requires a STOP or RESET button press to re-enable gate operation.	Photo eye connections: Sensor Common Sensor Input +24V
GC 0 NO CONTACT GATE EYE OUTPUT	0 = Normally Open Edge 1 = Normally Closed	This menu item only appears when UC is set to 4. Default setting is edge sensor with Normally Closed (NC) output. Optional setting of 0 requires an (NO) output.	S e n s o r Common Sensor Input
S1 0 Sensor #1 Type	0 - disabled 1 - (NOT USED) 2 - (EYE CLOSE) 3 - (EDGE CLOSE) 4 - (EYE OPEN) 5 - (EDGE OPEN) 6 - (EDGE BOTH) 7 - (EYE BOTH)	UL 325 - 2018 sensor input setting for external entrapment protection sensor monitoring. All three sensor types must be configured to a non-zero number before the gate operator will move the gate. Edge Both is only available in Swing Gate operator types. Eye Both is only available in Slide Gate operator types.	
S2 0 Sensor #2 Type	Same as Sensor 1	Same as Sensor 1	
S3 0 Sensor #3 Type	Same as Sensor 1	Same as Sensor 1	
DT 0 FREE EXIT DISABLE FUNCTION	0 = Disable Free Exit 1 = Disable Close Timer	Configures BLOCK EXIT input to disable either Free Exit Detector function or, alternately, Close Timer function. Default setting disables free exit detector. NOTE: Free exit is disabled when gate is at its closed limit. If closed limit is not tripped, free exit continues to work normally.	BLOCK EXIT COM

DISPLAY AND MENU OPTIONS

Table 12. Smart DC Controller - Installer Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Display Connections
OR 1 REVERSE OUTSIDE OBS LOOP	0 = Pause closing only 1 = Enable reverse to open	Default is for full reversal when Outside Obstruction Loop is triggered while closing. A setting of 0 causes gate to only pause when triggered. Gate closure continues as soon as loop is clear again.	OUTSIDE OBS LOOP COM or Hy5B
IR 1 REVERSE INSIDE OBS LOOP	0 = Pause closing only 1 = Enable reversing to open	Default is for full reversal when Inside Obstruction Loop is triggered while closing. A setting of 0 causes gate to only pause when triggered. Closure begins as soon as loop is clear again.	INSIDE OBS LOOP COM or Hy5B
HD 1 HOLD OPEN CENTER LOOP HOLD	0 = Hold open only 1 = Hold close and hold open	Configures the function of the Center Loop (Shadow Loop) when triggered: Setting 1 - prevents opening and closing of the gate when the Center Loop is tripped if the gate is on either (opened or closed) limit switches. Setting 0 - prevents closing when on the open limit switch.	CENTER LOOP COM
DL 1 STANDARD Detector Logic	1 = Standard 2 = Quick closed 3 = Forced Time out 4 = Full anti-tailgate	This selection determines whether close timer begins to count down after vehicles have departed detector loops or whether close timer will count down while the loops are occupied. Gate can only close when all loop detectors are clear. Default settings causes Close Timer to start when all loops are clear. A setting of 2 causes Close Timer to start when open limit is reached. A setting of 3 forces the Close Timer to 0 when the OOLD and IOLD are tripped simultaneously. A setting of 4 stops the gate when OOLD and IOLD are tripped simultaneously and closes from that point when the loops clear.	Hy5B

DISPLAY AND MENU OPTIONS

Table 12. Smart DC Controller - Installer Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Display Connections
RL 1 0 DISABLED Relay 1 Logic	0 = default 1 to 45 available	Configures function of the user 1 output relay, which is an electromechanical relay. It has capacity to switch, both AC and DC and can be used for high voltage and/or high current loads. Connect devices directly to the top of relay: COM plus NO and NC contacts. Up to 45 optional relay functions exist. See "Figure 68. Setting the User Relay Function in the Installer Menu" on page 102.	User 1 Relay
RL 2 1 CLOSE LIMIT RELAY 2 LOGIC	0 = default 1 to 45 available	Configures function of user output relay, which is an electronic relay with capacity for switching a DC load only. The User 2 Relay is limited to 48 Volts DC and 4A maximum load. Up to 45 optional relay functions exist. See "Figure 68. Setting the User Relay Function in the Installer Menu" on page 102.	User 2 Relay
RL 3-10 0 CLOSE LIMIT Relay 3-10 Logic	0 = Disabled Up to 45	Similar to Relay 1 Logic. NOTE: The Hy8Relay™ module option can be purchased for eight additional NO relay outputs. Relay #39 set aside for Factory Use.	User 3 -10 Relay
TL 2 (45 SECS) OPEN TIME ALERT	0 = 0 seconds 1 = 15 seconds 2 = 45 seconds 3 = 75 seconds 4 = 105 seconds 5 = 135 seconds	Adjusts time delay before activating a user relay. Maximum time setting is 135 seconds. See "Figure 68. Setting the User Relay Function in the Installer Menu" on page 102. NOTE: This menu controls a user relay set to Function No. 8	User relays

DISPLAY AND MENU OPTIONS

Table 12. Smart DC Controller - Installer Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Display Connections
LT 3 (75 SECS) LOITERING ALERT	0 = 0s delay 1 = 15s 2 = 45s 3 = 75 second delay 4 = 105s 5 = 135s	This function monitors activation of Outside Obstruction Loop when the gate is closed and not running. When adjustable period of time is exceeded, User Relay No. 13 triggers and reports loitering in diagnostics log. Adjust time delay before activating user relay. Maximum time setting is 135 seconds. See "Figure 68. Setting the User Relay Function in the Installer Menu" on page 102. NOTE: This menu controls a user relay set to Function No. 13	User relays
SA 0 (OFF) SDC Address	0 = No network 1 to 99 Network "drop" address	Set system address for network communication: 0 = no network communication 1 - 99 sets individual polling addresses. Use addresses 1-4 when connecting to HyNet.	RS-485
ELD0 RUN MODE Exit Loop Set	0 = Run mode 1 = Show frequency 2 = Show call level 0-7 3 = Set Frequency	Controls Hy5A or Hy5B Free Exit detector. If an Hy5B is used, additional settings of 4-8 are available.	Hy5B
ILD 0 (RUN MODE) IN OBS LOOP SET	0 = Run mode 1 = Show frequency 2 = Show call level 0-7 3 = Set Frequency	Controls Hy5A or Hy5B Inside Obstruction Loop detector. If an Hy5B is used, additional settings of 4-8 are available.	Hy5B
OLD 0 (RUN MODE) OUT OBS LOOP SET	0 = Run mode 1 = Show frequency 2 = Show call level 0-7 3 = Set Frequency	Controls Hy5A or Hy5B Outside Obstruction Loop detector. If an Hy5B is used, additional settings of 4-8 are available.	Hy5B

DISPLAY AND MENU OPTIONS

Table 12. Smart DC Controller - Installer Menu Functions

User Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Display Connections
CLD 0 (RUN MODE) CENTER LOOP SET	0 = Run mode 1 = Show frequency 2 = Show call level 0-7 3 = Set Frequency	Controls Hy5A or Hy5B Center Loop (Shadow) detector. If an Hy5B is used, additional settings of 4-8.#22.	Hy5B

DISPLAY AND MENU OPTIONS

Adjusting the Gate Speed

The gate speed can be increased or decreased from the operator's default speed.

NOTICE

Two options, one for OPEN SPEED the other for CLOSE SPEED, appear in the Installer Menu. The steps involved in changing the open speed are shown below. The steps to set the close speed are the same, you just need to access the CLOSE SPEED option.

To adjust the gate speed, take the following steps and see Figure 41:

1. At a gate status display, press the MENU button twice. The CLOSE TIMER display appears.
2. Simultaneously, press the OPEN and RESET buttons to enter the Installer Menu. Release the buttons and the LEARN LIMITS display appears. It is the first item in the Installer Menu.
3. Press NEXT until the OPEN SPEED (or CLOSE SPEED) display appears. The factory default setting is 5. A speed setting of 1 slows the gate travel speed to open or close in approximately 15 seconds. A speed setting of 10 increases gate travel and opens or closes in approximately 10 seconds.
4. Use the SELECT and NEXT buttons to navigate and change the speed setting on the display.
5. To exit the Installer Menu, press the MENU button. The gate status appears in the display indicating you have returned to Run Mode.



1. Start at a gate status display.



2. To access the User Menu, press the MENU button twice.



3. Access the Installer Menu, by simultaneously, pressing the OPEN and RESET buttons.



4. Use NEXT to navigate to the menu display. Change the setting using the SELECT and NEXT buttons.

Figure 41. Adjusting Gate Speed

DISPLAY AND MENU OPTIONS

ENABLING FIRE DEPARTMENT OVERRIDE

Many counties and cities require a Fire Department override system for gate operators. The fire department's alert system is a separate unit that must be connected to the Smart DC Controller. FIRE DEPARTMENT OPEN option must be properly configured through Installer Menu before operator will recognize alert system.

To enable Fire Department Override, take following steps and see Figure 42 and Figure 43:

1. Connect NO contact from alert system or key switch to following Smart DC Controller terminals: EMERG OPEN and +24V.
2. Configure Installer Menu. At a gate status display, press MENU button twice. This accesses User Menu and CLOSE TIMER display appears.
3. Simultaneously, press OPEN and RESET buttons to enter Installer Menu. Release buttons and USAGE CLASS display appears. It is first item in Installer Menu.
4. Press NEXT until FIRE DEPARTMENT OPEN display appears. Factory default setting is 0.
5. Use NEXT button to change number on display to 1 and then press SELECT.
6. To exit Installer Menu, press MENU button. Gate status appears in display indicating you have returned to Run Mode.

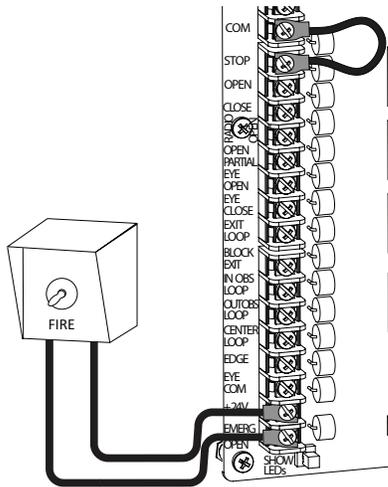


Figure 42. Fire Department Override Wiring



1. Start at a gate status display.



2. To access the User Menu, press the MENU button twice.



3. Access the Installer Menu, by simultaneously, pressing the OPEN and RESET buttons.



4. Use NEXT to navigate to the menu display. Change the setting using the SELECT and NEXT buttons.

Figure 43. Fire Department Override Commands

ADJUSTING THE IES SENSITIVITY

SwingSmart uses a primary Type-A inherent entrapment sensor (IES) per UL325 Safety Standards. A solid immovable object blocking the gate will trip the IES and cause the operator to stop and reverse (for two seconds) and enter safe mode.

The adaptive IES software monitors the average running motor current while the gate is in motion and reverses the gate when the current exceeds an automatically self-adapting threshold.

The IES display, accessed through the Installer Menu, allows you to input a number between 0 and 9. The settings (0 through 6) allow an increasingly higher threshold (amount of headroom) above the average current draw before tripping. For IES settings 7 through 9, the current limit is a fixed relatively high current value before the IES will be tripped. The factory setting is 2, which is adequate for most sites. See Figure 44 and Figure 45

⚠ CAUTION

Avoid setting the IES sensitivity to a fixed level (7 - 9 setting). The high motor current required for the IES to trip could cause severe injury or death to people caught in the moving gate.

For IES settings (0 through 6), the motor current is continually being measured and the IES threshold automatically set to trip at peak motor current plus the additional "headroom" provided by the IES setting selected.

To prevent false IES trips, the software boosts the IES current threshold for one gate cycle after an IES event, then returns to the normal sensitivity threshold.

Over time, degrading gate hardware and other site issues, such as road settling or debris on the gate rail (V-track) can occur. As the gate hardware ages and becomes stiffer, the SwingSmart motor current increases and this may create the need to use a higher IES setting level. The higher settings should only be used on a TEMPORARY basis until the gate, gate track, or hinges are repaired so the gates swing smoothly with minimum resistance.



Figure 44. IES Sensitivity

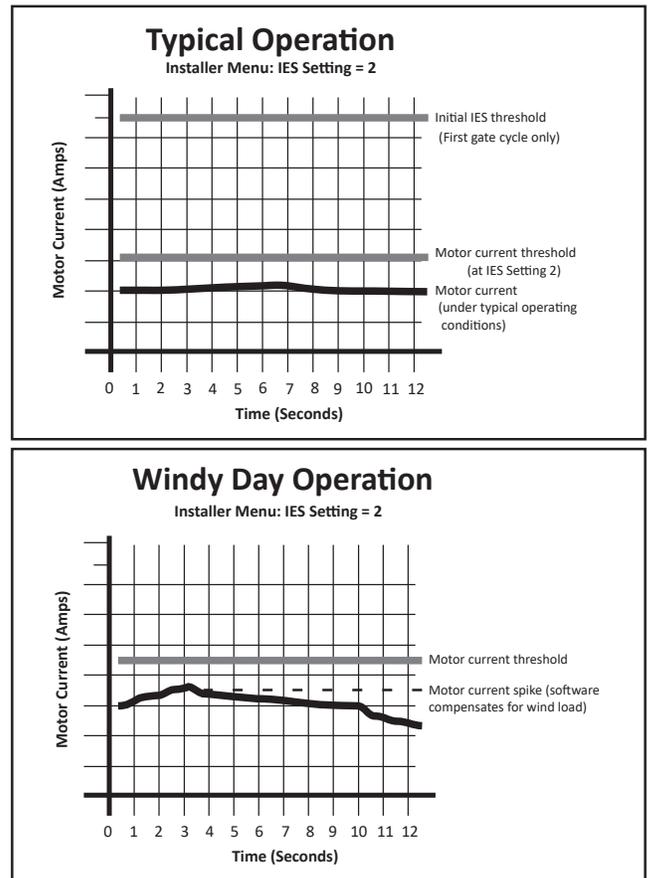


Figure 45. IES Sensitivity Chart

NOTICE

When changing the IES setting, consider the site design and vehicular gate traffic. It is recommended that you use the most sensitive setting while still allowing for reliable gate operation.

DISPLAY AND MENU OPTIONS

Examples of conditions which affect IES sensitivity include:

Gate design - For long and/or solid gates in windy environments, large variations in motor current may occur. In these types of scenarios, you may want to use a higher (less sensitive) IES setting.

Gate condition - If the gate environment is near salty sea air, rusty hinges might impede gate travel over time. Additionally, gates that are hit and bent may have very stiff areas during travel that cause a large variation in motor current. For these issues, you may want to use a higher (less sensitive) IES setting until repairs are made.

Gate maintenance - Gate hinges will deteriorate and begin to fail over time. In poorly maintained gate areas, the chance for false IES trips is higher.

To adjust the IES sensitivity, take the following steps and see Figure 46:

1. At a gate status display, press the MENU button twice. The CLOSE TIMER display appears.
2. Simultaneously, press the OPEN and RESET buttons to enter the Installer Menu. Release the buttons and the LEARN LIMITS display appears.
3. Press NEXT until the IES SENSITIVITY display appears. The factory default setting is 2.

CAUTION

Avoid setting the IES sensitivity to a fixed level (7 - 9 setting). The high motor current required for the IES to trip could cause severe injury or death to people caught in the moving gate.

4. Use the SELECT and NEXT buttons to navigate and change the number on the display.
5. To exit the Installer Menu, press the MENU button. The gate status appears in the display indicating you have returned to Run Mode.

If IES trips occur, SAFE MODE or ENTRAPMENT MODE will appear on the display. For more information about troubleshooting, refer to "Smart DC Controller - Troubleshooting" on page 116.



1. Start at a gate status display.



2. To access the User Menu, press the MENU button twice.



3. Access the Installer Menu, by simultaneously, pressing the OPEN and RESET buttons.



4. Use NEXT to navigate to the menu display. Change the setting using the SELECT and NEXT buttons.

Figure 46. Adjusting IES Sensitivity

DISPLAY AND MENU OPTIONS

REINSTATING FACTORY DEFAULTS

Thirteen menu configurations are available in the User Menu. Several other items in the Installer Menu let you customize the operator depending on the number of attached accessories and your customer's needs.

CAUTION

Reinstating factory default clears ALL menu settings stored in the operator and returns them to factory defaults. It is recommended that you save the menu settings before reinstating factory defaults. You can write the settings in a notebook or, if you have a laptop computer, you can use HySecurity's START software and download the menu settings and save them to a file to upload to the operator at a later date.

To reinstate factory defaults, take the following steps and see Figure 47:

1. At a gate status display, press the MENU button twice. This accesses the User Menu and the CLOSE TIMER display appears.
2. Simultaneously, press the OPEN and RESET buttons to enter the Installer Menu. Release the buttons and the LEARN LIMITS display appears. It is the first item in the Installer Menu.
3. Press NEXT until the FACTORY DEFAULTS display appears. Factory default setting is 0.
4. Use the SELECT and NEXT buttons to navigate and change the number on the display to 1.

NOTICE

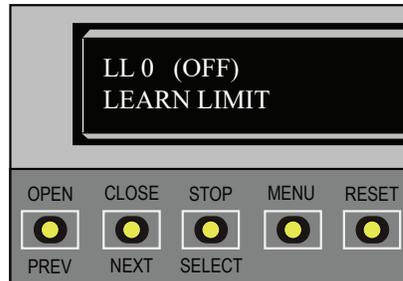
When you press SELECT to accept FD 1, the factory settings are reinstated immediately and the menu display returns to the initial Setup Menu. The gate operator will not run until the three menu parameters are entered: Usage Class, Gate Handing, Gate Weight, and Gate Length along with Sensor 1, 2, 3. Refer to "Configuring the Setup Menu" on page 47.



1. Start at a gate status display.



2. To access the User Menu, press the MENU button twice.



3. Access the Installer Menu, by simultaneously, pressing the OPEN and RESET buttons.



4. Use NEXT to navigate to the menu display. Change the setting using the SELECT and NEXT buttons.

Figure 47. Reinstating Factory Defaults

SMART DC CONTROLLER

This section provides information about the Smart DC Controller board; its inputs for peripheral connections and its monitoring capabilities. This section explains how to:

- Make connection on the Smart DC Controller
- Integrate with Security Systems
- Adapt User Relays for your Gate Site

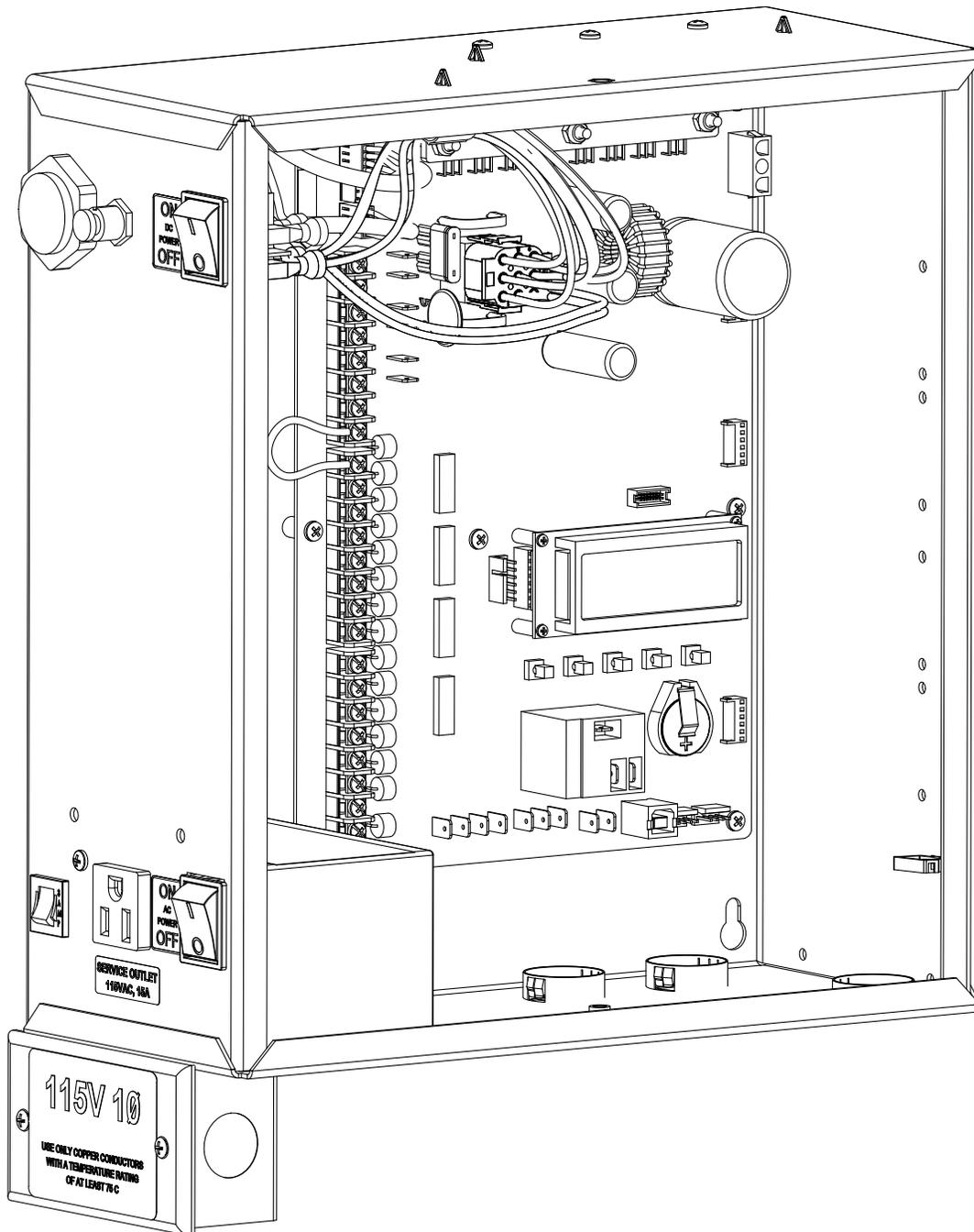


Figure 48. Smart DC Controller and Control Box

SMART DC CONTROLLER

PRELIMINARY TESTING OF INPUTS

All the control device inputs listed in Table 13 are shown as a single input. The second wire is connected to a Common Terminal Bus (COM) on the Smart DC Controller. The Fire Department Open input is an exception and requires a +24 Volt input as well as activation in the Installer Menu (item FO). For convenience a +24V terminal is located next to the EMERG OPEN terminal.

Table 13. SDC Controller Inputs

Smart DC Terminal UL 325 - 2016	Smart DC Terminal pre-2016	Wire Connections	Commonly used for...
COM	COM	All user inputs are energized when connected to common except Emergency Open.	Powering sensors and accessories
Stop	Stop *	Normally Closed (N.C.) input. Jumper to Common if not being used.	Line of sight, external stop button or 3-button station
Open	Open *	Normally Open (N.O.) input. DO NOT use for radio or remote access controls	Line of sight, external open button or 3-button station.
Close	Close	N.O. input. DO NOT use for radio or remote access controls	Line of sight, external connection for a close button or 3-button station.
Radio Open	Radio Open	N.O. input. For radio / remote open device: Access RO in the User Menu and set to 1.	Remote access controls or radio controls.
Open Partial	Open Partial	Not used in swing gate operators.	
Sensor 2	Eye Open	N.C. input. Connection for Photo Eye Open direction. Type of sensor used is programmable in Installer Menu (S2).	External Entrapment Sensor
Sensor 3	Eye Close	N.C. input. Connection for Photo Eye Close direction. Type of sensor used is programmable in Installer Menu (S3).	External Entrapment Sensor

SMART DC CONTROLLER

Table 13. SDC Controller Inputs

Smart DC Terminal UL 325 - 2016	Smart DC Terminal pre-2016	Wire Connections	Commonly used for...
Exit Loop	Exit Loop	N.O. input. Connection for free exit vehicle detector.	Free Exit Vehicle Detector
Block Exit	Block Free Exit vehicle detector or Close Timer	N.O. input.	Free Exit is only disabled if Close Limit Switch is tripped. If the gate is partially opened, the Free Exit detector will trigger the gate to open fully. The input can be converted in the Installer Menu (menu item DT) to alternately disable the Close Timer.
Inside Obstruction Loop	Inside Obstruction Vehicle Detector	N.O. input.	Inside reversing loop. Optional settings available: Installer Menu item IR.
Outside Obstruction Loop	Outside Obstruction Vehicle Detector	N.O. input.	Inside reversing loop. Optional settings available: Installer Menu item IR.
Center Loop	Center Loop (Shadow) Vehicle Detector	N.O. input.	Shadow function used for Swing gates. Optional settings available: Installer Menu item HD.
Sensor 1	Edge Sensor	Type of sensor used is programmable in Installer Menu (S1).	
Sensor COM	Eye Common - 24 Volts Common	All devices used for external entrapment protection that require monitoring must be connected to SENSOR COM.	Device common power. Connect external entrapment protection sensors to these terminals.
+24V	+24V	Convenient 24VDC power	Convenient 24VDC power for photo eyes or the Emergency Open input.

SMART DC CONTROLLER

Table 13. SDC Controller Inputs

Smart DC Terminal UL 325 - 2016	Smart DC Terminal pre-2016	Wire Connections	Commonly used for...
Emergency Open (Fire Dept. Open) **	Emergency Open (Fire Dept. Open) **	N.O. input.	The Emergency Open must be enabled via the Installer Menu (item FO). It is energized by connecting to the +24V terminal above it. The EMERG OPEN overrides photo eye & edge sensor commands.

*Do not connect an external control to STOP or OPEN inputs unless controls are located in clear view of entire gate area.

**Use RADIO OPEN input or RADIO OPTIONS spade connections for all out-of-sight controls, such as a telephone entry or radio operated controls.

***Fire Department Open control must be keyed or guarded so that it can only be used by authorized personnel.

INTEGRATING WITH SECURITY SYSTEMS

See Figure 50 and Figure 51.

HySecurity gate operators provide a 2-wire, serial interface (RS-485 connection) which allows remote access to one or more operators. With software protocols provided by HySecurity, bi-directional status updates and control commands are easily integrated with a central controller (computer or server), which becomes the primary (master) to the connected operators. Several physical operators (1 to 99) can be polled from the central master command station. Reset requests, gate control, gate status, and gate faults can be monitored and information can be retrieved from the central command station.

The RS-485 interface is also used to communicate with the HyNet Gateway, a web-enabled interface. For specific information regarding HyNet Gateway SFP 4/1, go to www.hysecurity.com.

HySecurity gate operators provide a 2-wire, serial interface (RS-485 connection) which allows remote access to one or more operators. With software protocols provided by HySecurity, bi-directional status updates and control commands are easily integrated with a central controller (computer or server), which becomes the primary (master) to the connected operators. Several physical operators (1 to 99) can be polled from the central master command station. Reset requests, gate control, gate status, and gate faults can be monitored and information can be retrieved from the central command station.

The RS-485 interface is also used to communicate with the HyNet Gateway, a web-enabled interface. For specific information regarding HyNet Gateway SFP 4/1, go to www.hysecurity.com.



Figure 50. SA Display in the Installer Menu

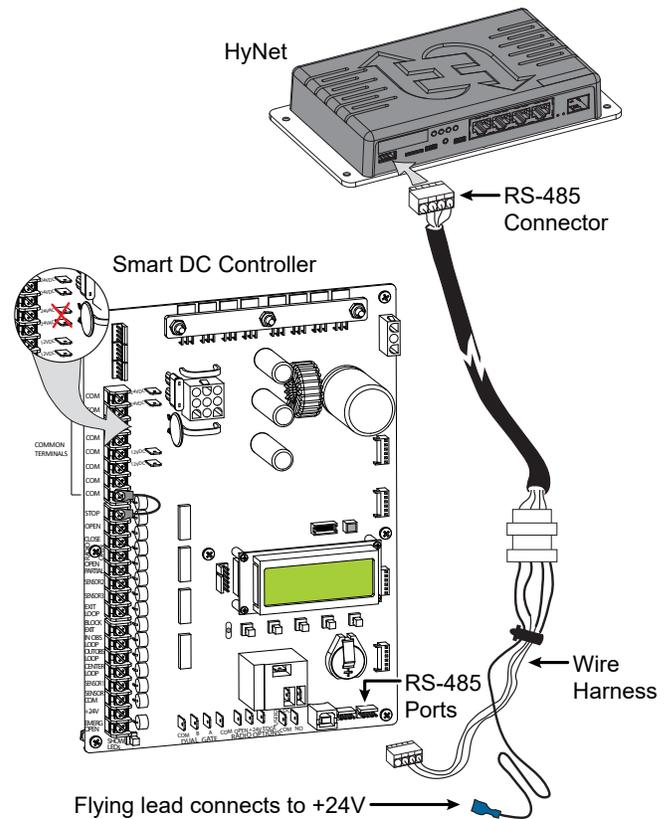


Figure 51. Smart DC Controller and HyNet

HySecurity recommends that vehicle detectors be used for free exit and obstruction sensing logic only. The exception is in parking or gate applications where detectors may also be used to close the gate. In applications employing our swing, vertical lift, or sliding gate operators, closing logic cannot be used except when the anti-tailgate logic is employed.

Vehicle detector functions (OR, IR, HD, DL) are configurable through the "Table 12. Smart DC Controller - Installer Menu Functions" on page 60.

ANTI-TAILGATE MODE CLOSING LOGIC

The Detector Logic (DL) installer menu item lets you set the anti-tailgate mode. This menu item works in conjunction with the Close Timer (CT) when the vehicle detector is triggered. If you plan to use the anti-tailgate feature, check the time delay aspect of the Close Timer (CL) setting.

The four selectable modes for DL are as follows:

Mode 1 (Default): An input from either the Free Exit, Outside Obstruction Loop, Inside Obstruction Loop, or the Center Loop will hold the gate open, reset the close timer, and ignore all close inputs. The close timer begins to count down only after all vehicle detectors are clear and no other open command is present.

Mode 2: The close timer does not wait for vehicle detectors to clear, but instead it starts counting down as soon as the open limit is reached.

Mode 3: When both inside and outside obstruction loops are simultaneously active, the gate will close immediately (unless another open command is present) once all vehicle detectors are no longer sensing active loops (i.e. vehicle loops are clear).

Mode 4: Full anti-tailgate logic includes Mode 3 functions. In addition, the gate will stop during the opening cycle when both OOLD & IOLD are tripped simultaneously. When the OOLD & IOLD loops are cleared, the gate closes immediately. The OOLD & IOLD can be individually set so that, if tripped while closing, the gate may either, pause only or reverse to reopen. The free exit detector input is ignored while the gate is closing.

NOTICE

Using any vehicle detector logic mode other than Mode 1 (default) requires that all the loops be placed with the geometry and spacing as shown in the loop layout drawings. The detector Modes 3 and 4 require use of separate inner and outer obstruction detectors. Mode 4 is not available in HydraWedge SM50 or gate operators functioning with HydraSupply XL.

TailGate Alert

User Relay 11 is available for notification devices. If a vehicle is tailgating, and a flasher or audio device is connected to User Relay 11, the relay will be triggered by the tailgating vehicle crossing the loops.

VEHICLE DETECTOR INSTALLATION HY5B

The Smart DC Controller provides a feature-rich interface to four different vehicle detector inputs.

NOTICE

Standard box type 11 pin (24 Volt DC or 24 Volt AC) vehicle detectors may be connected in the traditional manner as described in Installing Standard 11-Pin Box Type Vehicle Detectors.

HySecurity's custom Hy5B mini-detector module (Figure 52) plugs directly into the Smart DC Controller board making field installation much faster plus providing a large performance benefit. The detector communicates with the Smart DC Controller microprocessor to achieve the following benefits over common box type detectors:

- Loop frequency is automatically set and monitored by the Smart DC Controller
- Very low power draw, which is important for maximum UPS capability during a power failure and for solar applications.
- Cross-talk between multiple loops is impossible.
- Best operating frequency for each loop is automatically selected.
- Loop frequency and call strength can be reported on the Smart DC Controller display.
- Loop malfunctions are reported and stored by the Smart DC Controller.
- Most detector or loop faults that can occur are reported and presented on the Smart DC Controller display.

It is not mandatory to use two separate detectors for inner and outer obstruction detection, but the benefits in using an additional detector provide second vehicle tailgating detection, loitering alert, and selectable nonreversing options.

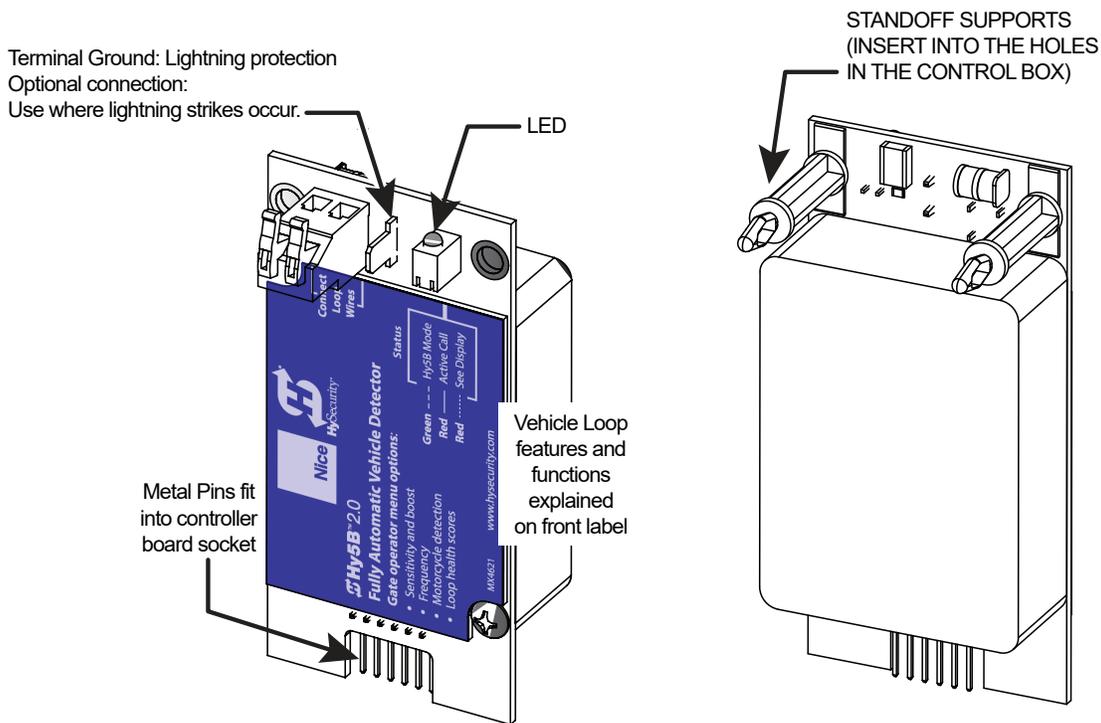


Figure 52. Hy5B Front and Rear Module

VEHICLE DETECTOR

There are four vehicle detector inputs available on the Smart DC Controller:

- Free Exit Loop Detector - This opens a fully closed gate or reopens a closing gate.
- Outside Obstruction Loop Detector (Out Obs Loop) - Reversing loop on public side
- Inside Obstruction Loop Detector (In Obs Loop) - Reversing loop on secure side
- Center Loop Detector - Not used for slide gates.

NOTICE

Standard box type 11 pin (24 Volt DC or 24 Volt AC) vehicle detectors may be connected in the traditional manner as described in "Installing Standard 11-Pin Box Type Vehicle Detectors" on page 85.

CONNECTING HY5B VEHICLE DETECTORS

Install the Hy5B Vehicle Detector modules according to the following procedure:

1. Turn off both AC and DC power switches.
2. Insert the locking end of the two white plastic standoffs into the mounting holes on the detector.
3. Plug the detector into the appropriate socket along the right edge of the Smart DC Controller board. **Be careful to align the six detector pins into the socket correctly** (the screws for tightening the terminals should face toward the board), and then snap the standoffs into the holes in the control box.
4. Route the loop wires through the holes provided in the control box and connect the loop leads to the two terminals on the Hy5B detector. Tighten the terminal screws securely.

5. Repeat Steps 1 through 3 for each Hy5B detector.
6. To enable the detectors, turn on power. The detectors will immediately tune if they are connected to loops. Make sure no cars or other metal objects are over the loops.
7. If the detector module is unplugged after it is enabled, a communications alert (ALERT 10) will be triggered; if the fault continues an error message, ERROR 3 "Detector Failed" is displayed.

NOTICE

If there is any detector fault, the gate operator functions as if the detector is triggered.

Pressing the RESET button:

- Clears any errors
 - Tunes the detectors on connected loops
 - Un-installs any detectors that have been removed
8. The Smart DC Controller automatically governs frequency selection for all Hy5B detector modules. This simplifies installation and guarantees that there is no cross-talk between multiple loops. The frequency can also be manually selected; if this is required, refer to "Table 12. Smart DC Controller - Installer Menu Functions" on page 60.
 9. Sensitivity adjustment is available for each Hy5B in the installer menu. Generally, sensitivity does not need to be increased unless the loop is large or there are multiple loops connected to one detector. The Hy5B sensitivity defaults to automatic.

NOTICE

Do not exceed more than 200 square feet (61 square meters) of loop area to one detector.

VEHICLE DETECTOR

If required, adjust the sensitivity by accessing the ELD, OOLD, IOLD, or CLD menu items in the installer menu.

- A = Automatic,
- M = Motorcycle
- 0 = Low with boost (See NOTE.)
- 1 = Normal with boost (See NOTE.)
- 2 = High with boost (See NOTE.)
- 3 = X-High with boost (See NOTE.)
- 4 = Low without boost
- 5 = Normal without boost
- 6 = High without boost
- 7 = X-High without boost

NOTICE

A boost feature is applied for settings 0 through 3. Boost increases the sensitivity during a call and is useful for maintaining continuous detection if the signal becomes weak (such as with tractor-trailer trucks). Sensitivity settings 4 through 7 are the same as 0 through 3, but without the boost feature.

10. Vehicle detector functions are configurable through the Installer Menu as described in Table 14.
11. Set the vehicle detector logic (DL).

Table 14. Vehicle Detector - Configurable Functions

Display	Meaning	Installer Menu Setting Options (Bold - Default)
OR 1	Outside Obstruction loop detector function	0 = Pause closing only 1 = Enable reverse to full open.
IR 1	Inside Obstruction loop detector function	0 = Pause closing only 1 = Enable reverse to full open.
DL 1	Vehicle detector logic	1 = Standard (Close Timer does not begin counting until all loops have cleared) 2 = Quick close (Close Timer can count to zero, even while loops are active, so the gate will close as soon as the loops are clear) 3 = Forced time out (Close Timer is forced to zero when both the OOLD & IOLD are tripped simultaneously. Additionally, all other close inputs are memorized and the gate closes immediately when all open commands and vehicle detector inputs are clear. 4 = Full Anti-tailgate (In addition to the functions of 3, the gate stops during the opening cycle when both OOLD & IOLD are tripped simultaneously.). When the OOLD and IOLD loops are cleared, the gate closes immediately.

INSTALLING STANDARD 11-PIN BOX TYPE VEHICLE DETECTORS

NOTICE

If photo eyes are used to monitor vehicle traffic instead of loop detectors, connect the photo eyes using the same steps described below.

If standard 11-pin box type vehicle detectors are to be used, perform the following procedure.

If there is sufficient space, install the sockets in the control box; if not, then install them in a separate external housing. Carefully consider your peripheral connections. Any peripheral device required for safe gate operation should be attached 24VDC in case of an AC power outage. Figure 53 is for general reference only.

NOTICE

Box detectors with relays require five times more power than Hy5A detectors. One Hy5A detector draws about 0.005A. Consider Hy5A vehicle detectors for DC and Solar powered sites.

1. Connect 24 Volt power to the detector. Connect Pin No. 1 to a 24VDC terminal and Pin No. 2 to Common.
2. Connect output Pin No. 6 to the Common Bus and output Pin No. 5 to one of the four detector terminal inputs (depending upon the detector function required) on the Smart DC Controller.
3. If multiple detectors are used, route the power wires and common wire from socket to socket (daisy chaining) rather than individually running each wire to the same location. See Figure 53. The only wires that are separate are the output wire to the Smart DC Controller and the detector loop input wires.

NOTICE

Always keep the detector loop wires well twisted at all places beyond the area of the loop. The lead in portion should be twisted to the detector to help mitigate problems associated with electrical noise getting into the loop wires. The wires should then be encapsulated in the saw cut with a flexible loop sealant. Refer to "Installing Vehicle Detectors and Loops" on page 102.

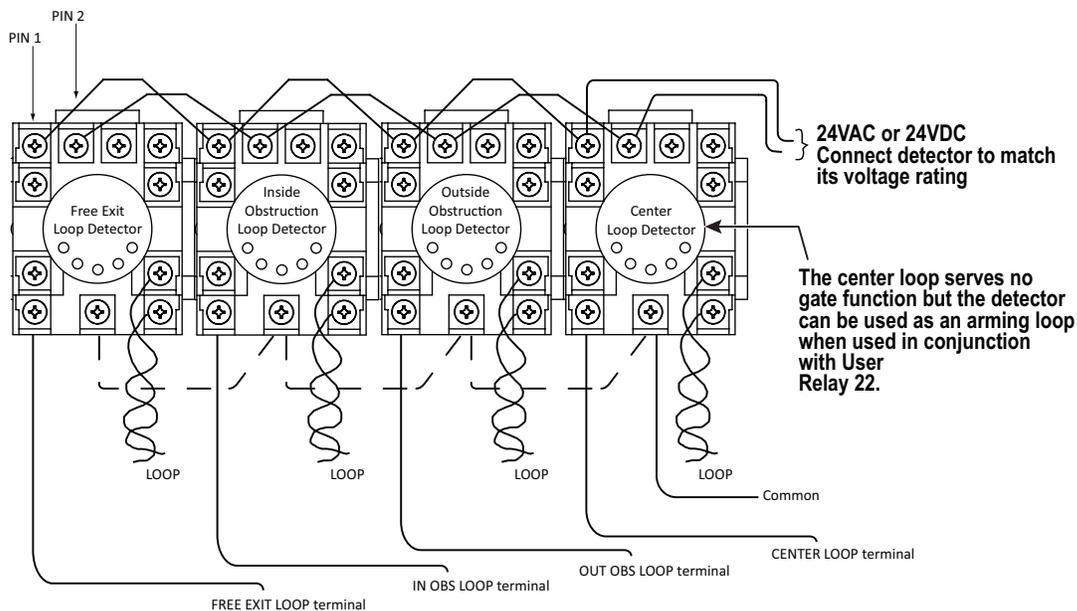


Figure 53. Standard 11-Pin Box Type Vehicle Detector

HY8RELAY MODULE OPTION

The Hy8Relay (extended relay module) provides 8 numbered mechanical relays. R3, RELAY 3 LOGIC through R10, RELAY 10 LOGIC can be accessed through the Installer Menu. Set the number for the relay based on the information found in Table 15.

Wire communication cable connections between the DUAL GATE ports, at the base of the Smart DC, and the extended-mechanical relay module. Refer to illustration "Overview of the Smart DC Controller" on page 76.

NOTICE

Several user relays are available for revenue control. These types of relays start at number 29 and go through 38. Refer to the StrongArmPark DC Programming and Operations Manual for more information.

Table 15. User-Programmable User Relays - Function Options

No.	Name	Description
1	Close limit output	Creates an interlock signal to another operator's interlock input, or simply to indicate that gate is secure or not. Relay is released when fully-closed limit switch is tripped. Relay is energized when fully-closed limit is released. (Any open command energizes relay.)
2	Close limit pulse output	Used in a sequenced system to command a second machine to close. Generates a brief pulsed output that occurs when close limit is triggered.
3	Open limit output	Indicates gate is at full-open position. Output becomes active when an open-limit is triggered and deactivates when open-limit is released or a close command is received. Use this output for a traffic light.
4	Open limit pulse output	Triggers a sequenced barrier arm gate operator to open. Generates a brief pulsed-output when open-limit is triggered. An additional pulse is also generated with any new open command even when gate is already fully-opened.
5	Warn before/during operate output	Controls an external warning device. This output is active whenever internal warn before operate buzzer is sounding but the relay output is constant on. Activation timing of this relay is controlled by setting User Menu for Warn Before Operate [bF].
6	Gate Lock output	Controls external solenoid locks or magnetic locks. In both directions of travel, this output is activated about 7/10ths of a second before operator starts moving the gate.
7	Gate forced open output	Activated if gate is forced off closed limit switch and operator is not able to restore gate to full closed position within four seconds. The buzzer resets itself in 30 seconds but relay stays active until gate receives a run command.
8	Gate open too long output	Activates when gate is open longer than the user-selected period of time. Adjustable from a 0 second to 135 seconds delay in 15-second increments. NOTE: TL - OPEN TIME ALERT adjustments can be made in Installer Menu.

VEHICLE DETECTOR

Table 15. User-Programmable User Relays - Function Options

No.	Name	Description
9	Safety Mode Alert output	Activated when system is in Safety Mode or Entrapment Mode. Safety Mode occurs upon an impact with an obstruction. Entrapment Mode means gate is stopped and occurs if inherent entrapment sensor triggers while system is in Safety Mode.
10	Entrapment Mode Alert output	Activated only when system is in Entrapment Mode.
11	Unauthorized Vehicle Entry output	Activated when a second vehicle enters from outside without a valid input from an access control device. The OOLD and IOLD loops must be capable of being triggered at the same time for this relay to ever activate. This output releases when an access control input signals open or gate reaches the close limit position.
12	Outside Obstruction Vehicle Detector output	This output is active whenever Outside Obstruction Loop Detector is tripped. Interlocks an entry device to prevent pedestrian use.
13	Loitering Alert	Indicates vehicle is loitering on Outside Obstruction Loop with the gate closed. Adjustable from a 0 second to 135 second delay in 15-second intervals. NOTE: LT - LOITERING ALERT adjustments can be made in Installer Menu
14	Gate nearing full travel output	Activated when gate is approaching full open or full closed. Relay activates three feet from where software expects limit switch to be triggered whether moving toward full open, full close, or in a reverse travel mode.
15	Gate Failure output	Activated to report occurrence of problem. Indicates the system is in an Error, Fault, Alert, or Entrapment Mode. If active, gate is disabled.
16	Motor Running output	Active when motor is running and gate is in motion.
17	AC Power Failure output	This relay is normally energized and drops with loss of AC power.
18	DC Power Failure output	Activated when battery power is very low, but output ceases when battery is dead (18 volts). Relay is triggered when battery is less than 21 volts.
19	Flasher Relay	Controls flashing lights to pulse once per second. Relay is constantly pulsing except when open limit switch is triggered. Recommended to use User Relay 2 since it is an electronic switch
20	Free Exit Loop Vehicle Detector output	Active whenever Exit Loop is tripped.
21	Inside Obstruction Vehicle Detector output	Active whenever Inside Obstruction Vehicle Detector is tripped
22	Center Loop Detector output	Active whenever Center (Shadow) loop detector is tripped.

VEHICLE DETECTOR

Table 15. User-Programmable User Relays - Function Options

No.	Name	Description
23	External Latching Gate Lock Output	Not functional in SwingSmart DC operators.
24	Gate at Partial Open Position	Not functional in SwingSmart DC operators.
25	DC Power Alert	Active when on AC power or the battery voltage is above 21V. When used with User Relay 2, this option can shed electrical loads to conserve battery energy.
26	Free Exit Loop Detector pulse	Outputs a 250ms pulse when the free exit vehicle detector is tripped.
27	Not Open (w/ AC power)	Activated when gate is not on open limit and AC power is present. Deactivated when AC power fails or gate is on open limit.
28	Flasher (w/ AC power)	Output identical to relay #19 and pulses relay 500 ms/sec when gate not on open limit and AC power is present. Deactivated when AC power fails or gate is on open limit.
29	Arm Entry Ticket Dispenser	Not functional in SwingSmart DCt operator.
30	Arm Exit Ticket Dispenser	Not functional in SwingSmart DC operator.
31	Resert Ticket Dispenser Pulse	Not functional in SwingSmart DC operator.
32	Backoff Pulse	Not functional in SwingSmart DC operator.
33	Transient In Pulse	Not functional in SwingSmart DC operator.
34	Transient Out Pulse	Not functional in SwingSmart DC operator.
35	Tenant In Pulse	Not functional in SwingSmart DC operator.
36	Tenant Out Pulse	Not functional in SwingSmart DC operator.
37	Special In Pulse	Not functional in SwingSmart DC operator.
38	Special Out Pulse	Not functional in SwingSmart DC operator.
39	Unknown In Pulse	Not functional in SwingSmart DC operator.
40	Unknown Out Pulse	Not functional in SwingSmart DC operator.
41	Test Open Pulse	Output pulses five seconds after close limit is activated. Typically used for cycle testing.
42	Break-Away Switch Output	Activates when arm break-away switch is tripped.
43	Warn Before	Combination of relays #5 and #16.
44	Partial Open Limit Pulse	Pulses for 250ms when gate, commanded with Partial Open input, reaches Partial Open Limit, or, gate is past Partial Open Limit and Partial Open input is activated.
45	Outside Obstruction/ Arming Loop Detector	Activated when OOLD/OALD detector input tripped and gate closed. Used for testing purposes.

BI-PARTING/DUAL GATE SYSTEM

Configuring two operators to be a Primary and Secondary pair is easy with the Smart DC Controller. There is no need to order a special model or any adapters. The area of the board marked Dual Gate employs a 3-wire RS-485 serial port for communication between primary and secondary operators. See Figure 54.

POWER REQUIREMENTS

When installing a dual-operator system, the following must be adhered to:

- An electrical conduit for interconnecting wires must span between the two operators. The dual gate communication wires and any low voltage control wires must be installed in a conduit that is separate from the high voltage power wires. See Table 16 and Figure 54.
- Complete the installation of both operators as separate machines and verify that their basic functions are correct as solo operators before interconnecting them.

- External control inputs, vehicle detectors and entrapment protection sensors may be connected to either gate operator without regard to preference.
- Be sure both operators are running the same software version. The software version is available on the display by pressing the RESET button on the operator. The software version appears beneath the word HYSECURITY. Keep the most current software loaded. It is available at www.hysecurity.com. Make it part of your maintenance routine to check for software upgrades on a regular basis.
- Both operators can be connected to the same 20A circuit breaker in the main panel. The wire size affects operator performance. Use the following chart as a guideline to size wire for the given distance from the power source to BOTH operators.

Table 16. Power Requirements			
AC Power	14 gauge wire	12 gauge wire	10 gauge wire
Two operators 115V	305 ft (95 meters)	500 ft (150 meters)	775 ft (240 meters)
Two operators 230V	1220 ft (370 meters)	1950 ft (590 meters)	3100 ft (940 meters)

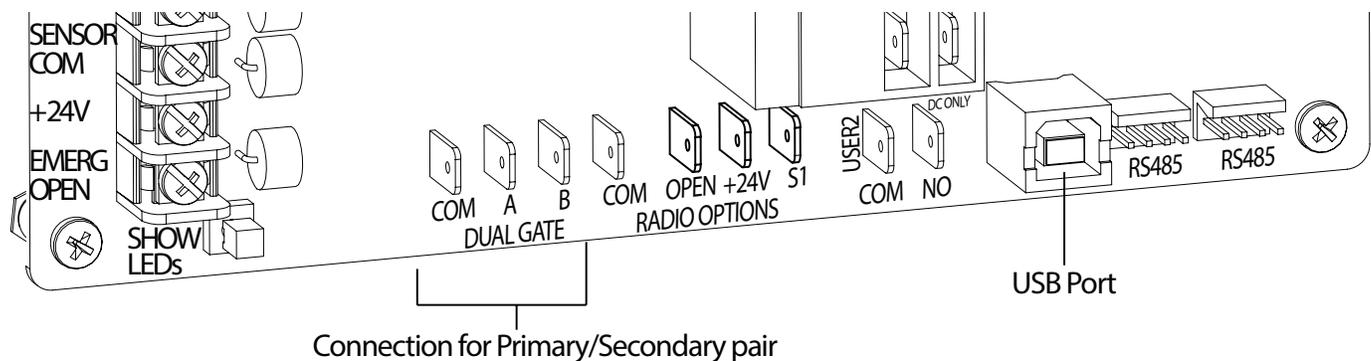


Figure 54. Primary-Secondary Pair

BI-PARTING/DUAL GATE SYSTEM

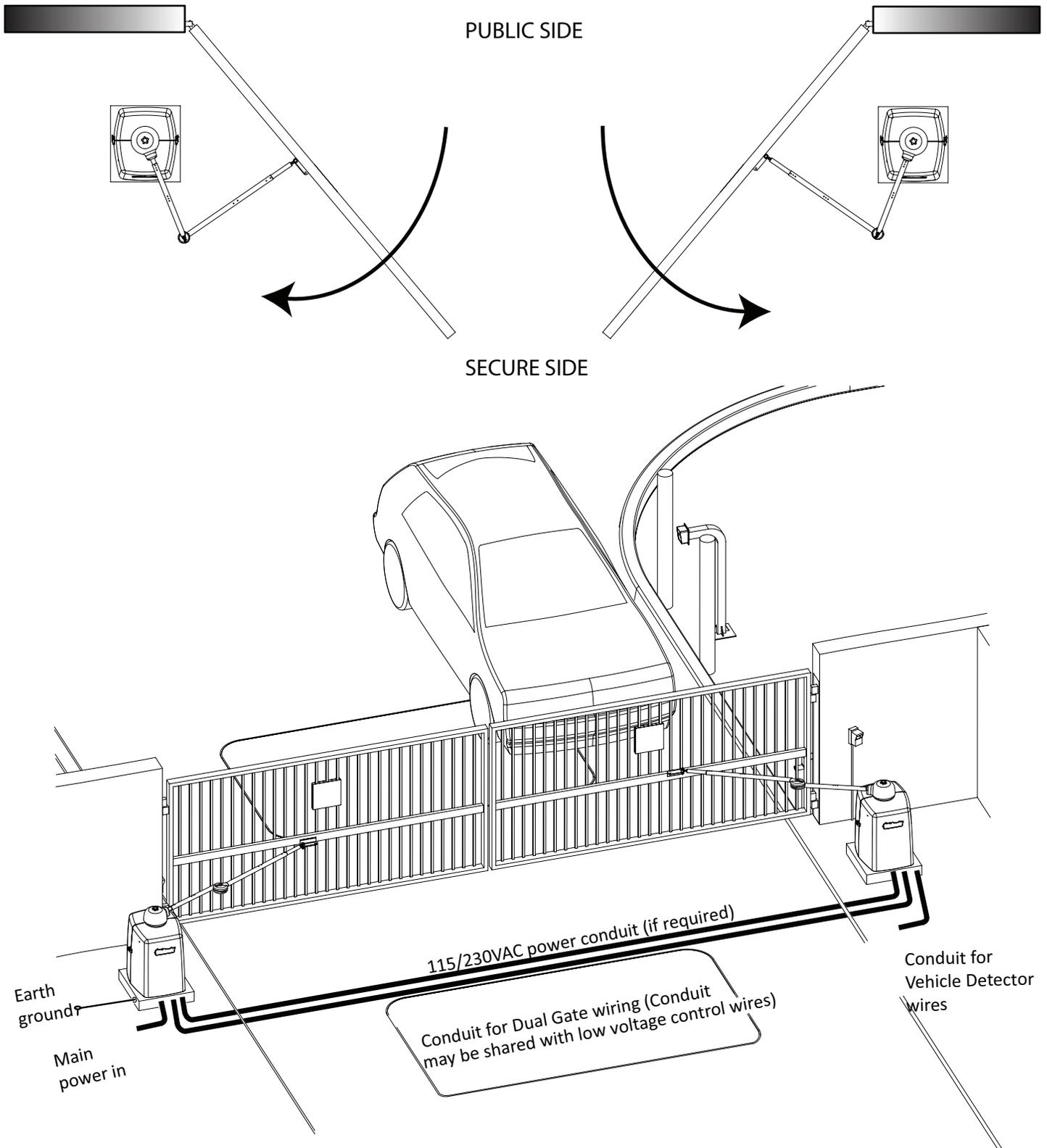


Figure 55. Bi-Parting/Dual Gate Scene Overview

BI-PARTING/DUAL GATE SYSTEM

PRIMARY AND SECONDARY WIRING CONNECTIONS

1. As shown in Figure 56, connect a two-pair, twisted, shielded communications cable to the DUAL GATE inputs in each unit. The inputs are located near the base of the Smart DC Controller. Be sure to connect the wires in pairs to the same terminal ports (A-A, B-B, and COM to COM) on both units. See Table 17.

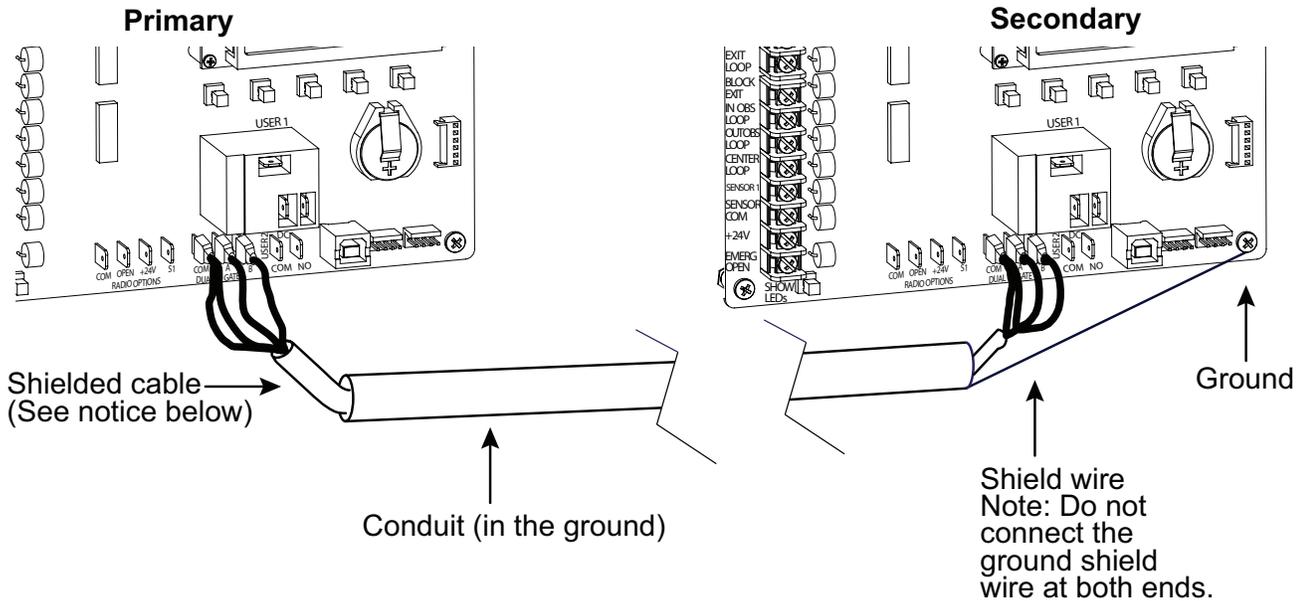
2. Attach a ring terminal to the shield wire and connect it to the Smart DC Controller's convenient ground screw. Refer to Figure 56.

NOTICE

Connect the ground shield wire to only one operator, not both.

Table 17. Primary-Secondary Wiring

Primary	Secondary
A	A
COM	COM
B	B
* Only ground to one unit. Do NOT attach the shield wire to both units.	Shield wire to Ground*



NOTICE

Use a 2-pair, twisted, shielded cable with one pair of wires used to connect A-A and B-B terminals between the two boards. The other pair will connect the Common terminals. The shield should then be grounded on one end to one of the operators.

BI-PARTING/DUAL GATE SYSTEM

Figure 56. Primary-Secondary Pair Wiring Connections

PRIMARY AND SECONDARY MENU SETUP

Determine which unit will be set up as the Primary. The other unit will be set up as the Secondary. It doesn't matter which unit is which, but you must identify the Primary and Secondary operators by taking the following steps and Figure 57:

Start by configuring the PRIMARY unit.

1. At a gate status display, press the MENU button twice. This accesses the User Menu and the CLOSE TIMER display appears.
2. Simultaneously, press the OPEN and RESET buttons to enter the Installer Menu. Release the buttons and the LEARN LIMITS display appears which is the first item in the Installer Menu.
3. Press NEXT until the DUAL GATE display appears. The factory default setting is 0.
4. Use the SELECT and NEXT buttons to navigate and change the setting to 2 PRIMARY.
5. To exit the Installer Menu, press the MENU button. A gate status appears in the display indicating you have returned to Run Mode.

NOTICE

For proper operation, you must set the other gate operator as SECONDARY.

6. Move to the other SlideSmart operator.
7. Using Smart DC Controller buttons, access DUAL GATE display through the Installer Menu.
8. Perform the same steps, 1 through 5, but address the operator as SECONDARY, setting 1.

When SlideSmart operator has been designated as the primary and the other as secondary, the dual-gate operators will be in constant communication, most often, in a peer-to-peer relationship. For example,

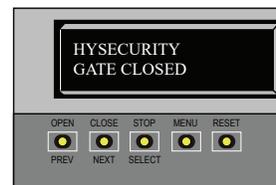
- Any control input that is attached to secondary

unit will be recognized by primary once Installer Menu is properly configured in both units.

- A diagnostics log is maintained in each unit, but both units run and store the errors codes and diagnostics pertinent to each other.
- The primary unit controls the close timer even if the timer is set in the slave unit. If a close timer is set in both units, the primary unit overrides the secondary setting.

NOTICE

If the dual-gate communication stops for whatever reason, (communication wire severed or the power switch is turned off in one unit), both operators cease to function and an ERROR 4 (Primary/Secondary Communication Error) appears in the display.



1. Start at a gate status display.



2. To access the User Menu, press the MENU button twice.



3. Access the Installer Menu, by simultaneously, pressing the OPEN and RESET buttons.



4. Use NEXT to navigate to the menu display. Change the setting using the SELECT and NEXT buttons.

BI-PARTING/DUAL GATE SYSTEM

Figure 57. Primary-Secondary Menu Setup

CONNECTING SEQUENCED GATES

Sequenced gates are slightly different than dual or interlocked gates. When two gate operators are connected as sequenced gates, a faster “Traffic Control Gate” operator (i.e. gate or crash wedge) and a slower “Security Gate” operator (slide, swing, or vertical lift gate) operate in sequence to help prevent tailgating by unauthorized vehicles. Both operators open (Security Gate first followed by the Traffic Control Gate) and allow a vehicle through, but the faster moving Traffic Control Gate closes quickly once its reset/center loop and all obstruction loops are cleared. Upon reaching its closed limit, the Traffic Control Gate signals the Security Gate to close. Note that all shared vehicle detector loops must be cleared before the Security Gate closes.

NOTICE

An emergency open or close overrides the gate sequencing and acts upon both gates simultaneously.

The Smart DC Controller (SDC) provides the sequenced gate connections and programming features, and the SDC software establishes the communication protocols when wiring the

sequenced gate operators.

CAUTION

The operators do not have to be of the same type, but both need to have the most current and up-to-date software version installed. The inherent SDC software integrates seamlessly between operators and software protocols and allows RS-485 communication for networked security systems

To connect a sequenced pair of gate operators, see Figure 58 follow the following steps:

1. The same wire connections (DUAL GATE) are used in connecting sequenced gates. Refer to Wire Diagram: Interlocked Pair of Operators using DUAL GATE Wiring on page 77. Be sure to connect the wires in pairs to the same terminal ports (A-A, B-B, COM-COM) on both operators.
2. Attach a ring terminal to the shield wire and connect it to the Smart DC Controller’s convenient ground screw.

NOTICE

Connect the ground shield wire to only one operator, not both. Use the proper gauge twisted and shielded wire.

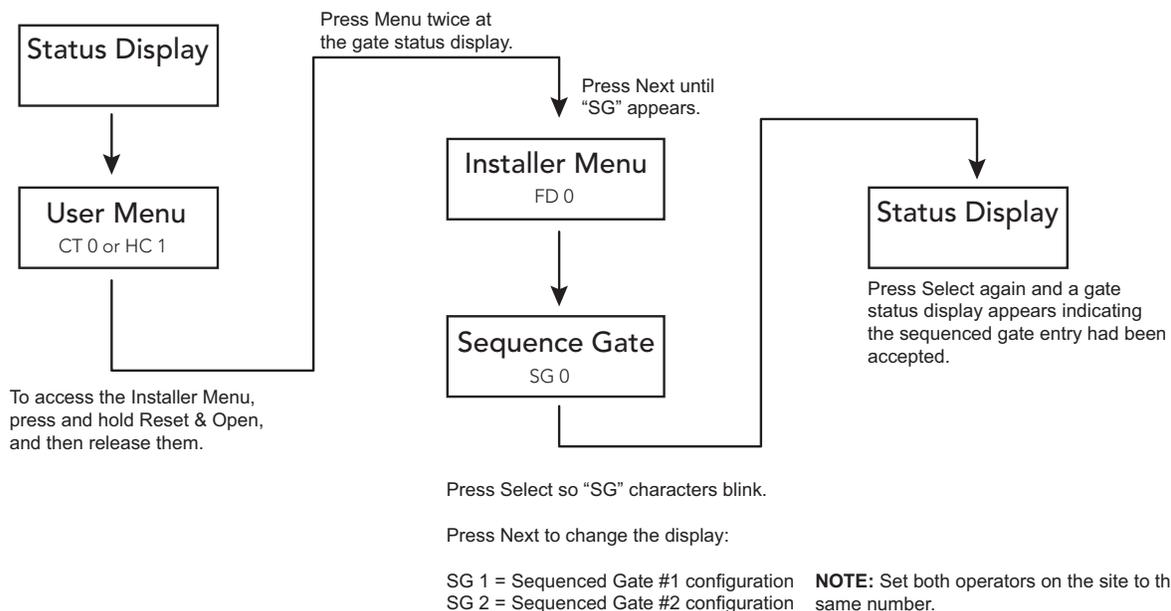


Figure 58. Sequenced Menu Setup

GENERAL MAINTENANCE

SMART TOUCH ANALYZE AND RETRIEVE TOOL

HySecurity provides Smart Touch Analyze and Retrieve Tool (START) software to help HySecurity gate operator users and installers conduct the following field service activities:

- Configure installer and user menu settings
- View the operator history (event) log
- Display monitored inputs for operator diagnostics
- Load Smart DC Controller (SDC) operator code

With START software loaded on your laptop computer, you have an invaluable management tool for all HySecurity operators. Either the USB port or the RS-232 serial port, found on the Smart DC Controller (see Figure 59), allows you to download system diagnostics and upload system configurations using the START software. The free START software is conveniently located on the www.hysecurity.com website. Instructions for downloading START are found on the website, as well.

What You Need

- Standard USB 2.0 A-B communications cable. If you are using the HySecurity RS-232 to USB adapter, be sure to install the USB driver in your laptop.
- Laptop computer with Windows PC operating system (XP, Vista, or Windows 7/8/8.1/10)
- Minimum 128MB of RAM
- Minimum 5MB of hard drive disk space
- VGA graphics card (minimum resolution of 800 x 600)

Installing START Software

Read the START User Manual, and then take the following steps to download START software:

1. Bring up your web browser and type in <http://www.hysecurity.com> in the command line.
2. Click Technical Support (left column) on the HySecurity home page.

3. Enter your user name and password. If you do not have a user name, register as an online member.
4. Click to Download: S.T.A.R.T. software for Smart Touch and Smart DC.
5. Read the End User License Agreement and, if you agree to the terms, click on, I accept (bottom of the page).
6. Click RUN. A setup window appears.

NOTICE

If the operating system on your laptop is VISTA or Windows 7, you must first disable the "User Account Control Settings," refer to the procedure in "Setting User Account Controls" on page 95 and then continue to step 9.

7. Follow the step-by-step instructions to complete the installation.
8. When the download is complete, log out of the HySecurity website. Shortcuts for the START and Smart DC Controller History Logs appear on your laptop's desktop.

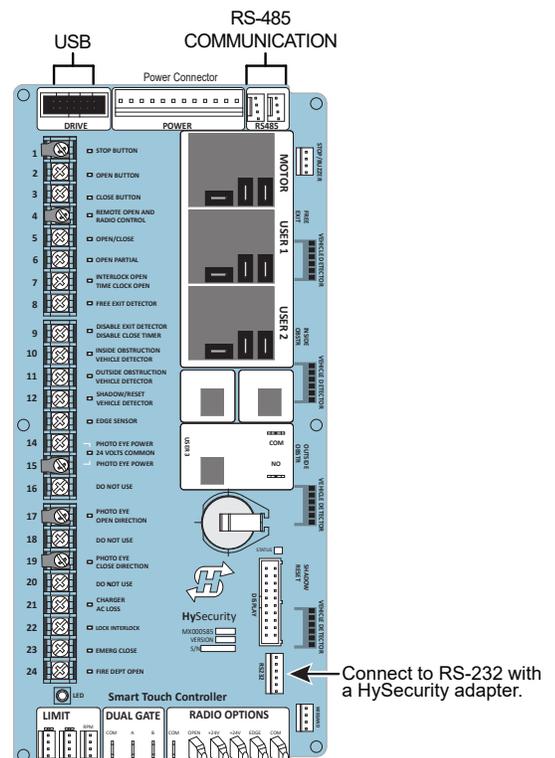


Figure 59. RS-232 and USB Connection

GENERAL MAINTENANCE

Setting User Account Controls

Because of the security settings inherent in VISTA and Windows 7, you need to disable the "user account controls" in the operating system before uploading START software onto your laptop. Take the following steps:

In Windows 7:

Go to Start Menu -> Control Panel -> User Accounts and Family Safety -> User Account -> Change User Account Control Settings "slide the slide bar to the lowest value (toward Never Notify), with description showing Never notify me -> Press Ok -> Reboot Computer.

In Vista:

Go to the Start Menu type "msconfig" and press Enter -> In System Configuration select the tools tab -> Scroll down till you find "Disable UAC" and single click it -> Press the Launch button -> Press the Apply button -> Press OK -> Reboot Computer.

SOFTWARE MAINTENANCE

SDC board software is constantly being enhanced with new features that create an easier install and improve on board diagnostic tools. Check the HySecurity website for latest version of software before heading out for field maintenance.

Use S.T.A.R.T. software to download latest software version to a PC laptop and upload it to SlideSmart gate operator in the field.

NOTICE

If site includes a bi-parting gate system, make sure software version used in Primary and Secondary operators is identical.

ELECTRICAL CONTROLS

CAUTION

Before servicing, turn OFF all power switches.

No routine maintenance is needed for the electrical system or controls. If the environment is very sandy or dusty, or has many insects, be certain to seal all holes in the electrical enclosure. Blow the dust out of the electric panel with compressed air. Use "Smart DC Controller Troubleshooting" on page 115 to assess and fix error, alert, and fault codes. If it is necessary to call a distributor for assistance, be sure to have your model and serial number ready. Other helpful information includes the name of the job, approximate date of installation, and the service record of the operator.

Clock Battery Replacement

A lithium coin battery supports the clock so the date and time is retained even when the main power is turned off. Replace the battery about every five years (or as needed) with a DL 2025, DL 2032, or CR 2025, or CR 2032 battery. See Figure 60.

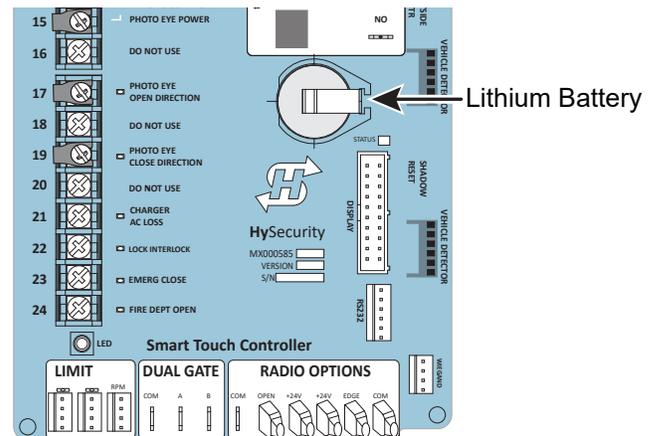


Figure 60. Clock Battery Replacement

Fuse Replacement

A 35A fuse is located next to the 24VDC power supply inputs on the SDC. It requires no maintenance, but if it were blown due to a power surge or other unusual circumstance, it must be swapped out with a new fuse. The symptoms of a blown fuse appear as a control system malfunction (i.e. all control systems may not work properly). See Figure 61.

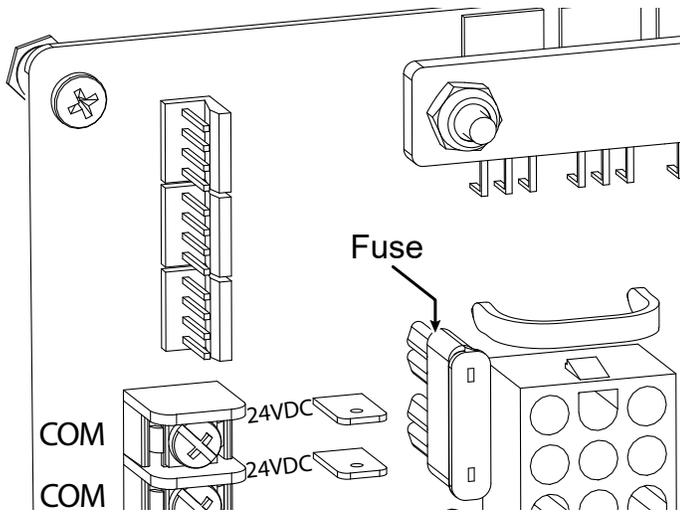


Figure 61. Fuse Replacement

MECHANICAL MAINTENANCE

The SwingSmart DC mechanical maintenance is not in depth or difficult, but should be performed on a routine basis. The operator chassis is zinc plated, but some environments may speed corrosion of this plating.

Schedule regular maintenance and look for the following:

- Sweep debris out and away from the chassis.
- Verify drive belt has proper tension. Check for drive belt wear. Fraying edges or missing teeth indicate that drive belt needs to be replaced. Refer to "Drive Belt Tension and Alignment" on page 97.
- Check for signs of rust. If any areas of rust are found, reduce spread of corrosion by treating areas with a rust inhibitor.
- Check motor. DC motors contain carbon brushes which wear over time and must be replaced. Failure to replace brushes will result in DC motor damage. Brushes should be inspected every year in high usage applications or every 100,000 cycles and replaced as needed.
- Replace worn-out batteries. Refer to "DC Battery Replacement" on page 98 and "Clock Battery Replacement" on page 95.

DRIVE BELT TENSION AND ALIGNMENT

To prolong the life of the drive belt and maintain superior performance, proper drive belt tension is important. To check the drive belt tension, see Figure 62, and take the following steps:

1. Remove the covers. Refer to the Quick Start Steps.
2. Turn off the DC and AC disconnect switches.
3. Check to make sure the pulley is aligned vertically.
4. With your finger, apply light pressure to the drive belt. If it is properly tensioned, it should move about 1/16 to 1/8-inch (16 to 32 mm).
5. To replace or re-tension the drive belt. Loosen the four motor bracket nuts and move the motor accordingly.
6. With the belt properly tensioned, retighten the motor bracket nuts.
7. Replace the drive belt cover.
8. Turn the AC and DC disconnect switches ON.
9. Replace covers.

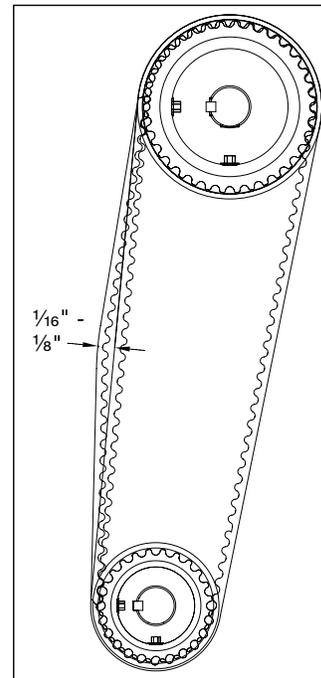
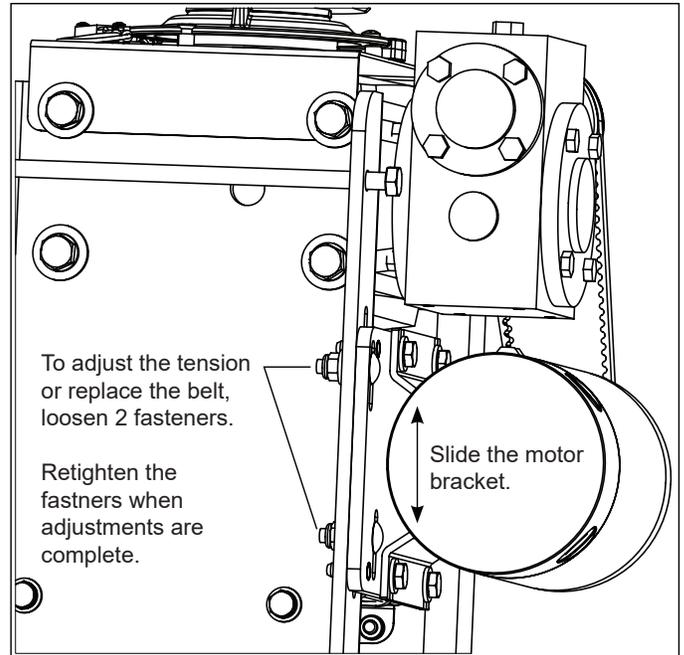


Figure 62. Drive Belt Tension and Alignment

GENERAL MAINTENANCE

DC BATTERY REPLACEMENT

HySecurity provides a one year warranty from the date of shipment for all batteries supplied with the SwingSmart DC operator.

Display indicators of a low battery include:

- LOW BATTERY or DEAD BATTERY appears on the Smart DC Controller display which may or may not be indicative of normal discharge.
- ALERT 18 CHANGE BATTERY appears on the Smart DC Controller display. The operator emits an audible chirp every minute to indicate a problem exists.
- AP (#) AC LOSS appears on the Smart DC Controller display. Gate operation is affected by AC power loss depending on customer preferences and the configuration set by the installer in the AP (#) AC LOSS User Menu. For more information, refer to Setting AC Power Loss Gate Function on page 51.

Symptoms of a low battery may include:

- Gate remains locked in the open position
- Gate remains locked in the closed position
- Gate opens five seconds after AC power loss and locks open

CAUTION

Before replacing the batteries, turn off all power switches. Use only AGM batteries as replacements (8Ah - MX002008, 50Ah - MX002013). The batteries supplied in the SwingSmart operator are state-of-the-art AGM batteries. Do NOT use flooded cell batteries as damage may occur to the unit. Wear protective clothing while working with batteries.

The two 8Ah batteries are accessible within the operator on a tray behind the control box.

To replace the batteries, see Figure 63, and take the following steps:

1. Remove the covers. If unfamiliar with removing the covers, refer to the Quick Start Steps.
2. Turn off the DC and AC power switches.
3. Cut the black wire ties holding the batteries to the shelf.
4. Disconnect the red, blue jumper, and black wires before removing the batteries.
5. Loosen the two rear screws and remove the front two screws that secure the support tray.
6. Carefully rotate the support tray to access the battery wires and disconnect the black and blue wires.
7. Remove the first battery from the support tray.
8. Slide the second battery to the right, disconnect the red and black wires and remove it from the tray.

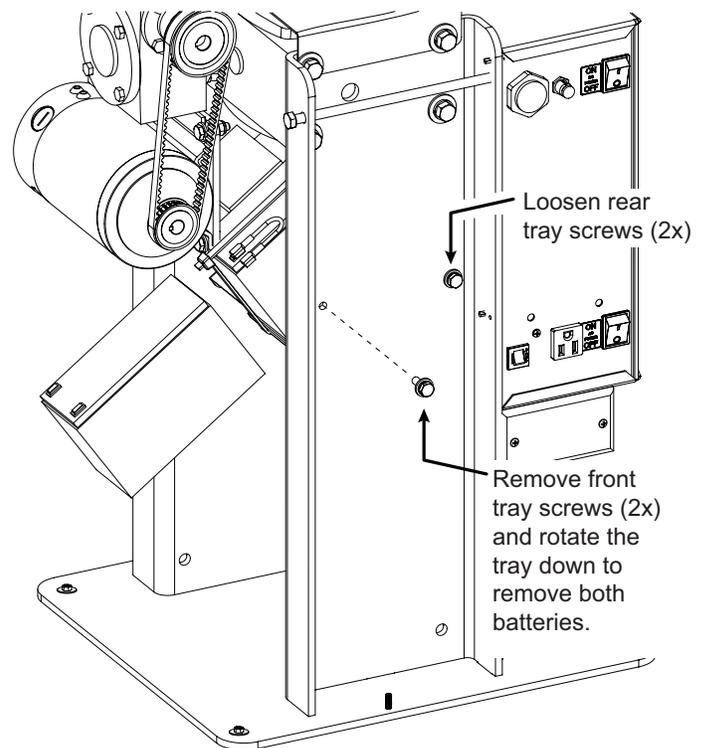
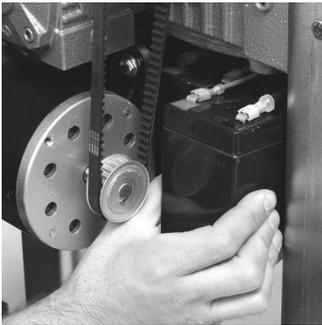


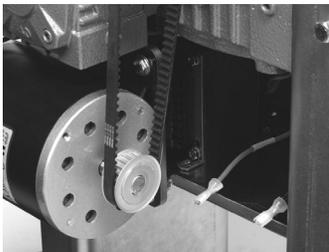
Figure 63. Drive Belt Tension and Alignment

To install the two new batteries, reverse the removal procedure. See Figure 64.

1. Connect the red wire to the red terminal on left battery and slide the battery onto the tray and move it behind the motor.
2. Connect the blue wire between the left and right batteries (black and red terminals).
3. As you slide the battery onto the tray, connect the black wire to the black terminal on the right battery.
4. Return the support tray to its original position and secure it properly.
5. Turn the AC and DC disconnect switches ON and replace the covers.



Remove batteries.



Disconnect wires.



Reconnect the wires onto the replacement batteries.

Figure 64. Drive Belt Tension and Alignment

This section of the manual provides information which may be useful when installing SwingSmart operators. It includes how to:

- Connect a Radio Receiver for Remote Open
- Install a Gate Locking Mechanism
- Install Vehicle Detectors and Loops
- Install Photoelectric Sensors
- Install Gate Edge Sensors
- Troubleshoot error codes, faults, and hardware issues
- Diagnose vehicle detector and loop faults
- Handle General Maintenance issues

CONNECTING A RADIO RECEIVER FOR REMOTE OPEN

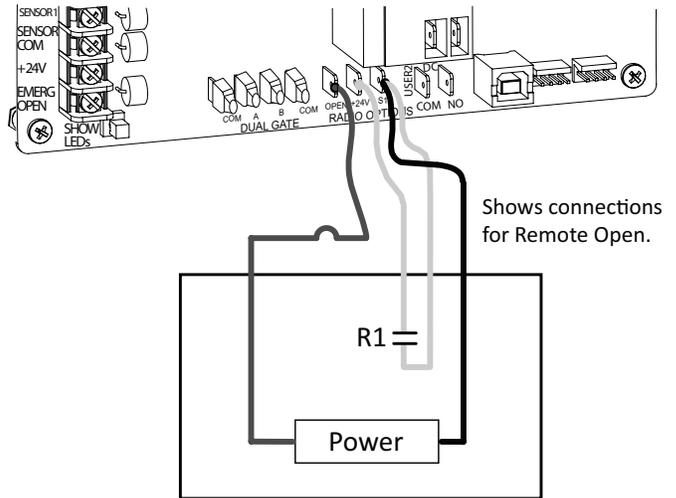
Take the following steps to mount a commercial style 24VDC radio receiver (external antenna type):

1. Install the receiver in the chassis on either side of the control box.
2. Route the wires to the area marked RADIO OPTIONS. Only three wire connections are needed because the common wire and one radio output wire are connected together. Figure 65 shows additional wires from a two channel receiver.
3. Make sure to observe polarity and crimp together the black radio common wire and one of the radio output wires using a ¼-inch spade connector.
4. Fasten the two crimped wires to the COM terminal.
5. Connect the red wire to the +24V spade and connect the other radio output contact wire to the spade marked OPEN.

NOTICE

This terminal is the same as the input terminal labeled RADIO OPEN along the left edge of the Smart DC Controller.

6. Mount an external antenna onto the top of a fixed fence post near the operator.
7. Connect the antenna into the socket on the radio receiver.
8. Set the "DIP" switches in the receiver to match the same code used in the transmitter.



Two Channel Radio Receiver

Figure 65. Radio Receiver Connections

INSTALLING A MAGLOCK OR SOLENOID LOCK

To provide additional gate security, a maglock or a solenoid lock can be used and connected to the Smart DC Controller. The Smart DC Controller releases the lock prior to initiating gate movement. Before installing the lock, be sure to:

- Determine the electrical power requirements of your lock (maglock or solenoid lock). Electronic board and peripheral connections differ between high voltage and lower voltage gate operators.
- Determine the current required. A total combined current draw of 1 amp is available from the 24VDC or 12VDC power supply. If the peripherals attached to the terminals need more than 1 amp, a separate power supply is required. Refer to "Overview of the Smart DC Controller" on page 76 and Figure 49.

Installing a Lock for 12VDC or 24VDC Systems

To install a lock for 12VDC or 24VDC systems, take the following steps:

1. Connect a wire between COM on USER 1 RELAY and a COM terminal on the Smart DC Controller board. See Figure 66.

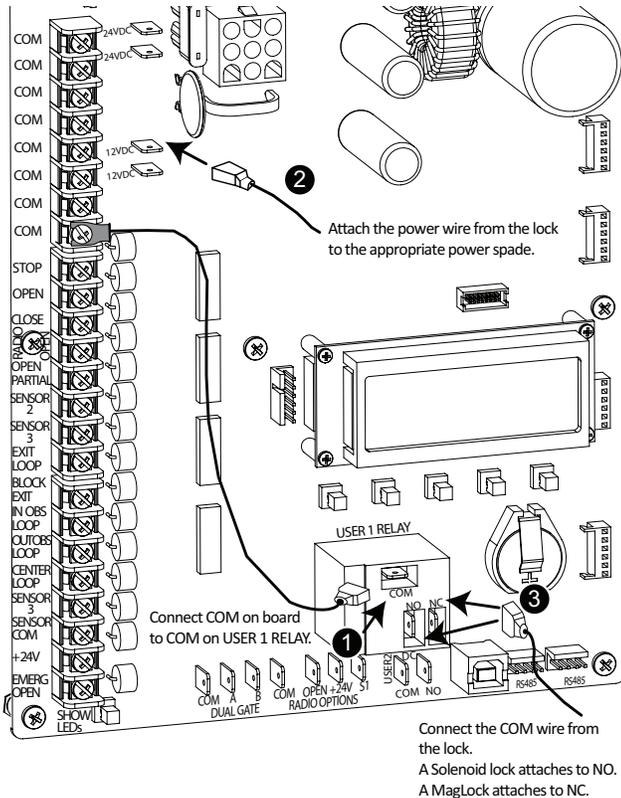


Figure 66. Lock Installation 12/24 VDC

2. Connect the power lead from the lock to the appropriate power spade (+24VDC or +12VDC)
3. Connect the common wire from the lock to NC on USER 1 RELAY if it is a maglock or NO if it is a solenoid.
4. Set the User Relay function in the Installer Menu to RL1 - 6. See Figure 68.

INSTALLING A LOCK FOR HIGH VOLTAGE SYSTEMS

To install a lock on higher voltage systems (115V or 230V), take the following steps:

1. Connect one lead of the power supply to one lead of the lock's coil. See Figure 67.

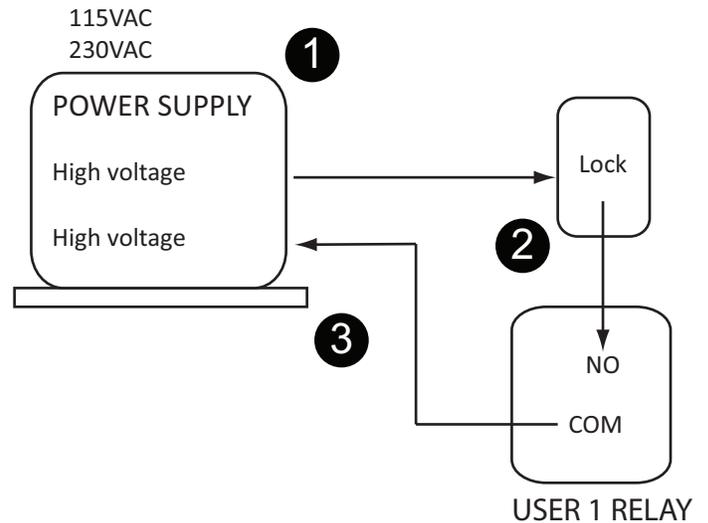


Figure 67. Lock Installation- High Voltage

2. Connect the other lead of the lock's coil to NO on USER 1 RELAY.

NOTICE

Connect to NC on USER 1 RELAY if installing a maglock.

3. Connect the COM on USER 1 RELAY to the second lead wire in the power supply (115V or 230V).
4. Set the User Relay function in the Installer Menu to RL1 - 6. See Figure 68.



1. Start at a gate status display.



2. To access the User Menu, press the MENU button twice.



3. Access the Installer Menu, by simultaneously, pressing the OPEN and RESET buttons.



4. Use NEXT to navigate to the menu display. Change the setting using the SELECT and NEXT buttons.

ACCESS CONTROLS AND VEHICLE DETECTOR LOOPS

HySecurity automatic gate operators can be triggered to open or close through a variety of devices. An individual can affect normal open and close functions by:

- Using a key card or entry/exit access transmitter device such as a push button control
- Pressing the appropriate button on the operator's keypad
- Wiring to a separate input on the SwingSmart DC Controller (SDC) board and connecting a push button control device (used for supervised access and for Emergency Close)
- Installing in-ground vehicle loops with the option to set the Close Timer (CT) in the Installer Menu.

INSTALLING VEHICLE DETECTORS AND LOOPS

A vehicle detector passes a small current flow through the "loop" 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:

Loop configurations differ depending on the application. All HySecurity gate operators can be designed for automatic use with one way traffic or bidirectional traffic. To assure closure, should the gate be left open, a closing timer can be set through the Installer Menu. It is provided as a back-up. The ideal means of automatic closure is created with vehicle detector loops. Gate closure begins when a vehicle passes through (first triggering then releasing), the two required loops.

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.

Figure 68. Setting the User Relay Function in the Installer Menu

Rules to Follow for Security Gate Applications:

Side of the loop closest to the gate must be located at least 4 ft from the line of travel.

- 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 at least 6 ft (1.8m) apart. This avoids "cross talk". It is possible to have loops closer together by selecting different frequencies. An advantage of using HySecurity model Hy5B detectors is that problematic "cross talk" is not possible.
- For greater sensitivity and less chance of false calls caused by gate motion, it is 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, including 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 only 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 Figure 69.
- Follow this guide for the correct number of turns in the loop; 12 to 20 sq. ft = 5 turns; 20 to 60 sq. ft. = 4 turns; 60 to 240 sq. ft. = 3 turns; 3.7 to 6.1sq. m = 5 turns; 6.1 to 18.3 sq. m = 4 turns; 18.3 to 73.1sq. m = 3 turns

Twist lead-in at least 10 turns per foot



Like This



Not Like This

Twist Like This



Figure 69. Wire Twist Lead-ins

Table 18. Loop Wire Turns according to the Perimeter Size of the Loop

Perimeter Size in Feet	Turns	Perimeter Size in Meters
10 to 13	5	3 to 4
14 to 26	4	4 to 8
27 to 45	3	8 to 14
46 to 100	2	14 to 30

9. 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: See Figure 70.

- The slot in the surface of the road should be cut ¼-inch wide x 1½-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.
- After the wire is installed, the slot must be completely backfilled with a non-hardening sealer. If the loop wires are able to move in the slot after the sealer has set, the detector may give false calls.

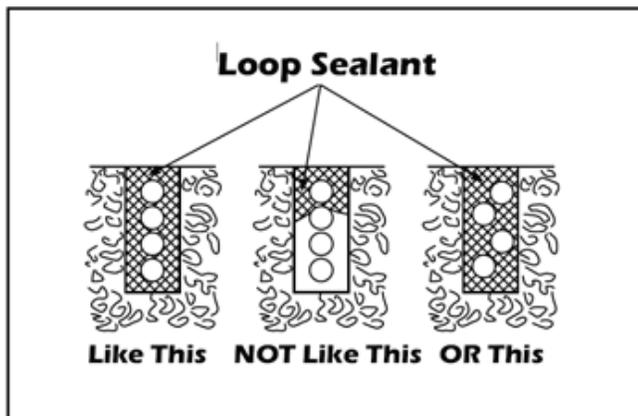


Figure 70. Loop Sealant

Detector Logic

HySecurity 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.

1. Test the resistance of the loop and lead-in wire. It should not exceed 4 Ohms.
2. 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.

VEHICLE DETECTOR AND LOOP FAULT DIAGNOSTICS

If HySecurity Hy5B vehicle detector modules are used, the Smart DC Controller has the ability to store and report detector and loop fault information for performance diagnostics.

If the Smart DC Controller senses a loop or detector problem:

- The LCD display flashes the name of the affected detector or error and the appropriate alert code.
- The buzzer chirps continuously at regular intervals until the issue is resolved.

Table 19. Hy5B Vehicle Detector Faults and Errors

Alert or Error #	LCD Description	Advisory	Resolution
ALERT 7	FREQ SHIFT FAULT	Hy5B vehicle detector - Abnormal frequency change alert.	Alert indicates an unstable loop frequency. Check loop and lead in wires for problems. Replace them, if necessary.
ALERT 8	LOOP SHORTENED	Hy5B vehicle detector - Loop is shorted.	Alert indicates that loop and lead in wires are shorting out. Check wires for problems. Replace them, if necessary.
ALERT 9	LOOP OPEN	Hy5B vehicle detector - Disconnected loop alert.	Alert indicates loop wires are loose or disconnected. Check wires for problems. Replace them, if necessary.
A L E R T 10	I2C BUS ERROR	Hy5B vehicle detector - Communications alert.	Alert indicates detector is not communicating properly with Smart DC Controller. Alert occurs if detector is unplugged or connection is unstable. If communication is not reestablished within 30 seconds, controller will reset and message changes to ERROR 3.
A L E R T 11	DETECTOR FAULT	Hy5B vehicle detector - Malfunction alert.	Display indicates Hy5B detector malfunction. Check detector for problems. Replace it, if necessary.
A L E R T 12	ON TOO LONG	Detector input triggered too long - More than five minutes.	Display indicates Hy5B detector malfunction. It alert also works for any input connected to terminal strip for standard box detectors. Check that a vehicle is not parked on loop. Also, determine if loop is stable. An unstable loop can hold detector in a triggered state.
ERROR 3	DETECTOR FAILED	Hy5B vehicle detector - Communication failed. Smart DC Controller will behave as if detector is triggered, usually holding gate fully open.	Alert indicates detector is not communicating properly with Smart DC Controller. Alert occurs if detector is unplugged or detector has failed. To replace detector, press RESET button to clear error and re-seat detector or install a new one.

Even if the loop problem self heals, historical data about detector/loop performance and a log of Alerts, Faults and Errors can be retrieved from the Smart DC Controller by downloading from the RS232 communications port or the USB port. HySecurity's free START software, a laptop computer, and a special download cable or USB cable are required to retrieve and read this data.

Loop Health:

The Hy5B monitors loop health which is comprised of loop noise, loop step changes and loop reference changes. Loop health readings accumulate throughout a 24 hour period and the accrued readings are posted to the Event Log each day at midnight. After midnight, the loop health baseline resets to its highest value of 777.

Example of an Event Log posting (Figure 71):

```
Event log:
02/09 EVENT - CLD Loop Health: noise 5, step 6, ref 7
```

Figure 71. Hy5B Event Log

Loop Presence:

Loop presence is dependent on "disturbance effect" of the entire vehicle. Presence determines how long to hold the "memory" of a stationary vehicle on a loop before it is forgotten and ignored. Set the presence of the loop:

- LONG (default) lasts about 20 hours dependent on call strength and sensitivity setting. The Hy5B tunes out the "disturbance effect" when a vehicle is stationary on a portion of the loop, but keeps the undisturbed (unaffected) portion of the loop operational.
- INFINITE never drops the call. The INFINITE setting requires a certain amount of signal strength. A "threshold" is maintained and it will hold the call forever. The loop connected to an Hy5B with this setting may become nonfunctioning.

Table 20. Setting Loop Presence		
Sub-menu Item	Display	Example Site Scenario
PR 0	(LONG)	With sensitivity set to A (AUTO) and a large sedan stationary on loop, LONG presence may hold call for many hours before vehicle's presence is tuned out. Then, stationary vehicle is ignored and unaffected portion of loop becomes operational. In contrast, with sensitivity set to M (MOTORCYCLE), default threshold only lasts about 1 hour before presence of motorcycle on loop is tuned out.
PR 1	(INFINITE)	A site where standing or parked vehicular traffic (on large area loops) is a daily or consistent basis, INFINITE presence setting is a viable option. When loop may have vehicles parked on it for more than several hours and it must hold the call, set presence to INFINITE.

NOTICE

Hy5B has ability to continue counting vehicles passing over loop even though a stationary vehicle may be on a portion of loop. Controller and Hy5B detector also exchange pertinent information, so if a power failure were to occur, controller can determine if a vehicle is on loop when power returns.

Frequency:

Knowing the exact frequency of a loop can be useful as a diagnostic tool, and verifying the stability of the loop frequency is valuable information. To view the actual loop frequency of a specific vehicle detector, go to the setting for that detector in the Installer Menu, switch the selection from 0 to 1, and press the Select button. The display will show the loop frequency. The frequency is usually between 20,000 to 80,000 Hertz.

Changing the Loop Frequency:

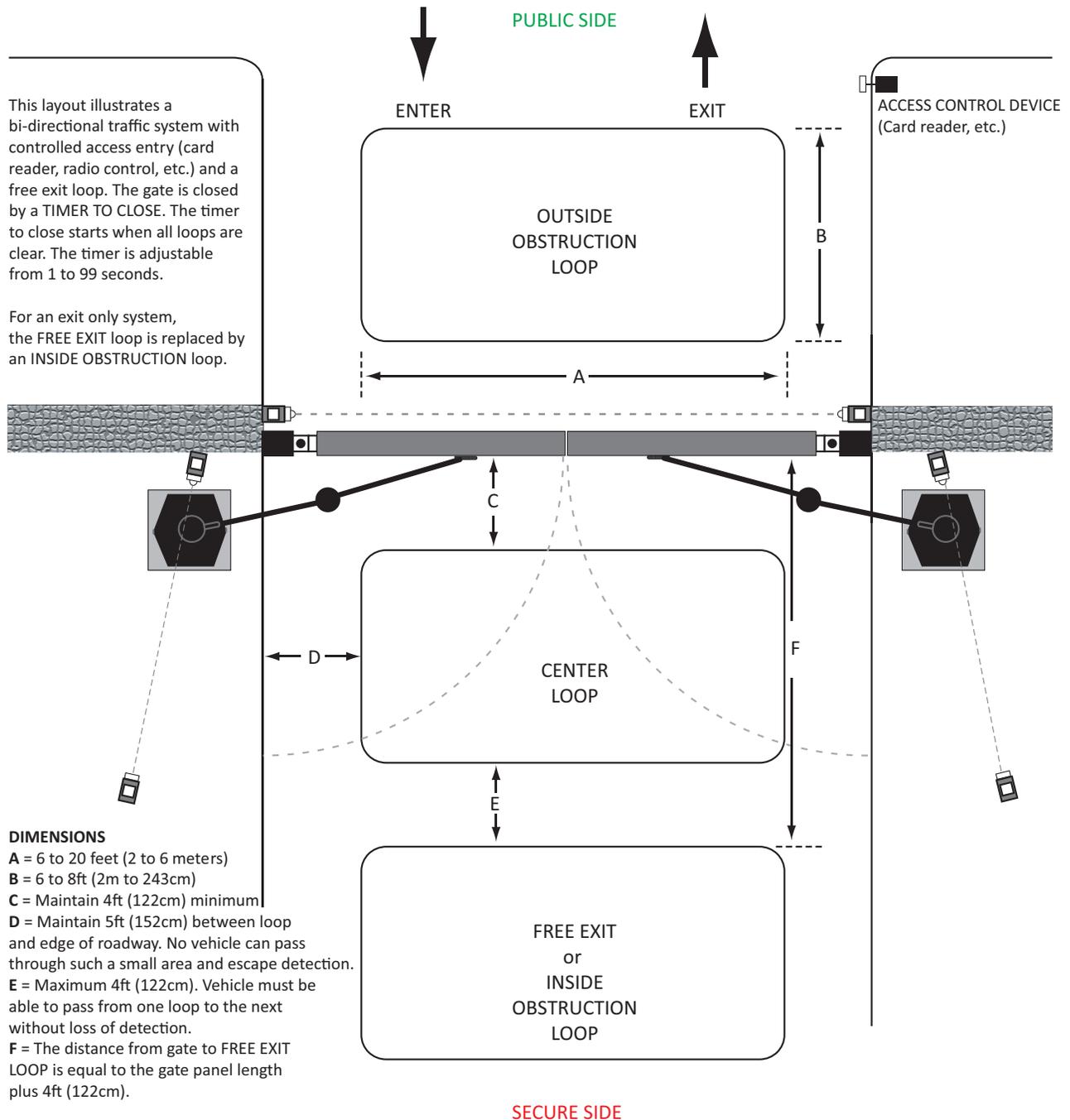
Hy5B detectors can never crosstalk. If for any reason, you want to manually change the loop frequency, change the Installer Menu option for the desired loop from 0 to 3, and then press the Select button. Each detector has a choice of four frequencies. Press the Select button when the desired frequency setting is found, and the controller will perform a reset and tune to the new frequency setting.

Call Strength Level:

Knowing the call strength of a detector is valuable because it provides information about how well the loop is actually “seeing” a specific vehicle. For example, it may be useful to check to see if the loop is easily detecting the middle of a high bed semi-truck. The strength of a detector call can be displayed in real time, on a scale of 0 to 7. As indicated in the table below, when the Installer Menu setting for a given detector is set to 2, and the Menu button is pressed, the LCD display will read Level 0 - 7 Call Level. If the call strength on the display appears as a level 4 or less, consider increasing the sensitivity level by adjusting the rotary switch on the Hy5B detector.

Table 21. Hy5B Vehicle Detector Call Level Display

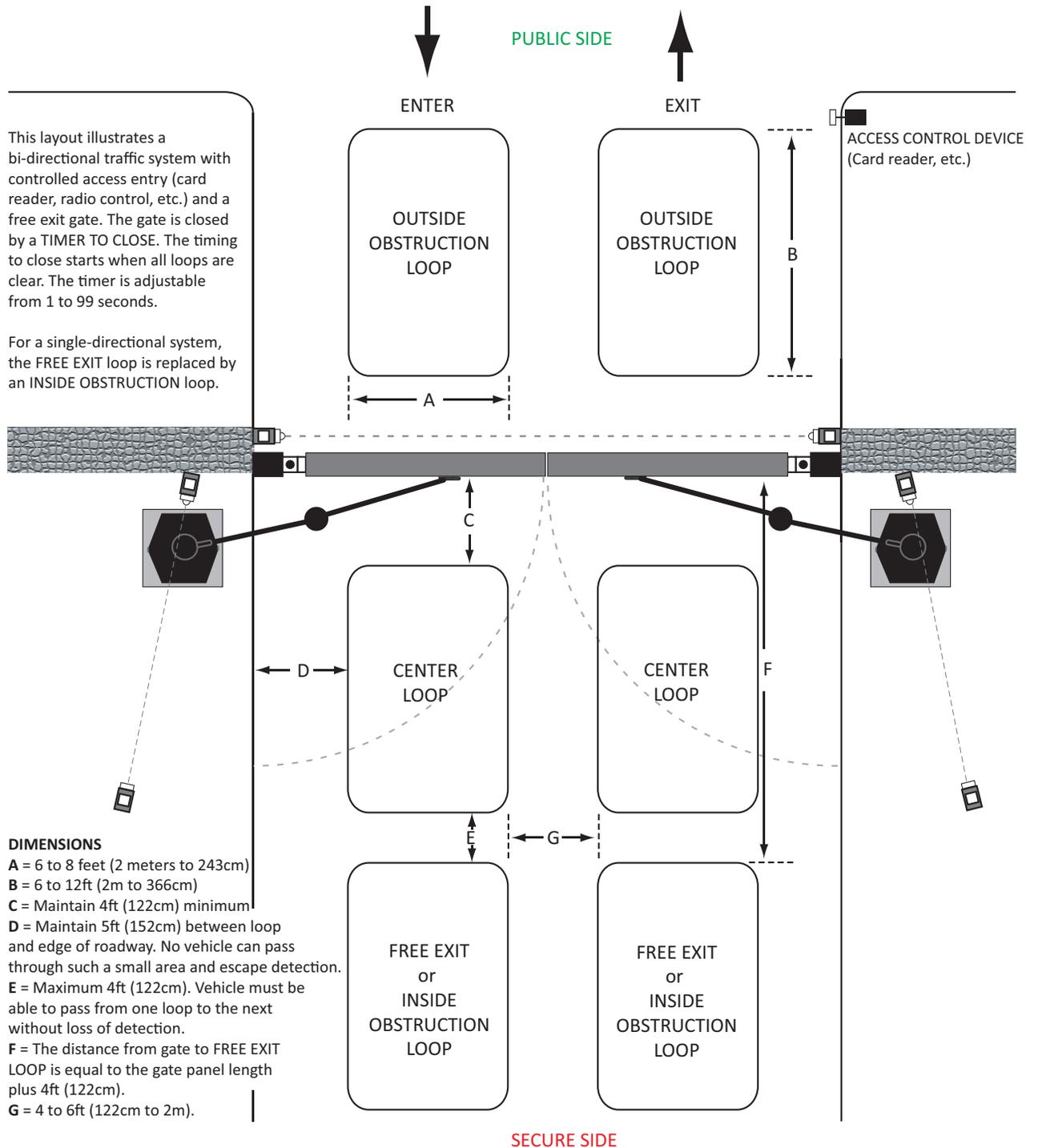
Installer Menu	LCD Description	Setting Options (Bold = Factory Settings)
ELD 0	EXIT LOOP SET	0 = Run mode
ILD 0	IN OBS LOOP SET	1 = Show frequency
OLD 0	OUT OBS LOOP SET	2 = Show call level 0-7
CLD 0	CENTER LOOP SET (Can be used as an arming loop with User Relay 22.)	3 = Set Frequency 4 = Show Sensitivity 5 = Set Sensitivity 6 = Show Inductance 7 = Show Loop Health 8 = Set Presence



Vehicle Detectors and Loop Layout for Openings less than 28 feet*

* NOTE: A minimum of three (3) detectors are required for this type of gate.

Figure 72. Vehicle Detectors and Loop Layout for Openings Less than 28 feet*



Vehicle Detectors and Loop Layout for Openings greater than 28 feet*

* NOTE: A minimum of three (3) detectors are required for this type of gate.

Figure 73. Vehicle Detectors and Loop Layout for Openings Greater than 28 feet*

MONITORED EXTERNAL ENTRAPMENT SENSORS

As of January 2016, UL325 standard requires gate operators to monitor the presence of all external entrapment sensors, including non-contact (Photo Eyes) and contact (Edge) sensors. For operators built between January 1st, 2016 and July 31st, 2018 only one external entrapment sensor is needed to allow automatic operation, but all potential entrapment zones must be protected or eliminated. After July 31st, 2018, all Slide gate operators will need a minimum of 2 external entrapment sensors (1 open direction and 1 close direction) installed before automatic operation is allowed, but all potential entrapment zones must be protected or eliminated.

HySecurity monitors all external entrapment sensors connections by looking for NC contacts connected to input terminals. Smart touch software cycles power to device and looks for a time delay from when device powers on to when the contact closes (sensor input pulled low, meaning the sensor is not blocked/tripped).

Three programmable sensor inputs are available for use and must be programmed to a non-zero number when initial configuration is performed. The three inputs are labeled Sensor 1, Sensor 2, and Sensor 3 and are configurable in the installer menu (S1, S2, or S3) for the following options:

- 1 – Not Used
- 2 – Eye Close
- 3 – Edge Close
- 4 – Eye Open
- 5 – Edge Open
- 6 – Edge Both (Swing Only)
- 7 – Eye Both (Solo Slide Only)

It is the installers responsibility to determine the number of potential entrapment zones that exist and program the Sensor inputs according to which type of external entrapment sensor will be used to protect each zone. If more than three potential entrapment zones exist, then site design may be adjusted to eliminate risks or a Miller Edge MIM-62 may be used to connect additional sensors.

Potential entrapment zones on a slide gate are shown in Figure 74. Included in the drawing are examples of potential external entrapment sensor mounting/installation locations.

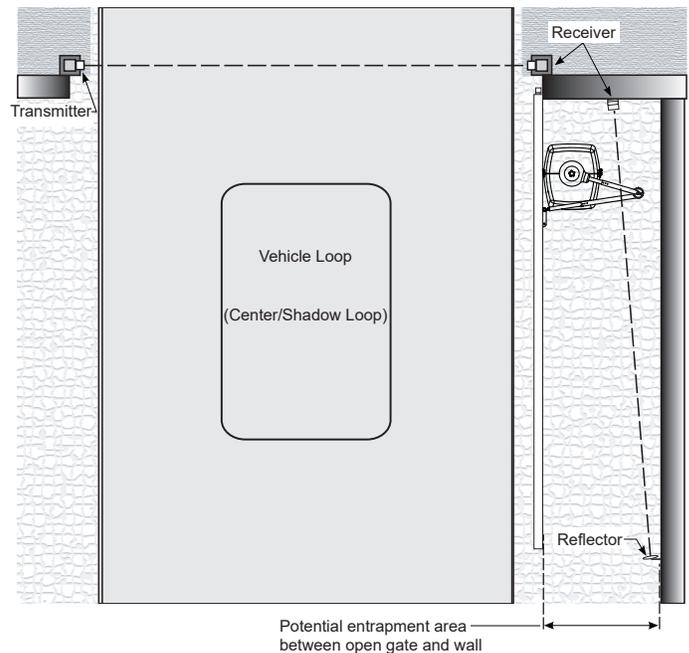


Figure 74. Site Overview

After programming the sensor inputs in the installer menu or during initial startup, the appropriate type and number of sensors will need to be connected. Figure 75 below shows the wiring and dip switch settings of an EMX-MON photo eye (typical thru-beam wiring). A retroreflective photo eye will be similar and only have wiring similar to the receiver of the thru-beam photo eye.



All external entrapment protection sensors must be NC sensor outputs and wired to the SENSOR COM terminal for monitoring and powering purposes. The sensor becomes actively powered when the gate operator's motor runs.



Connect all contact and non-contact sensors to same power source. Example, Do NOT connect photo eyes to +24VDC and gate edges to +12VDC. Incompatible electricity flow. A FAULT 2 will appear.

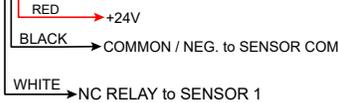


Set DIP Switches
 1 = OFF
 2 = OFF
 3 = OFF
 4 = ON

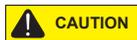
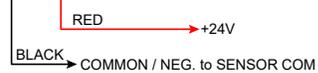
NOTE: DIP switches must be set as shown otherwise the photo eye will not operate correctly.

Jumper POWER INPUT - 24V to COM in Receiver

**EMX IRB MON
 Photo Eye
 Receiver**



**EMX IRB MON
 Photo Eye
 Transmitter**



DIP switches must be set as shown otherwise the photo eye will not operate correctly. If you receive an Alert, "ACTION BLOCKED" "Photo Eye Open" PEO or "Photo Eye Close" PEC, take steps to align the photo eye.

Figure 75. EMX-MON Photo Eye Wiring

An Edge Sensor can be either hardwired through an adapter module (Hy2NC) or a wireless transmitter/receiver combo (WEL-200 or iGAZE RE). Figure 76 below shows the wiring and dip switch settings of a WEL-200. For more information and wiring diagrams of other recommended sensors see the "HySecurity External Entrapment Sensor Wiring Guide".

EMX WEL-200 Wireless Edge Receiver

Dip Switch Settings determine which relay activates when the associated edge is tripped.

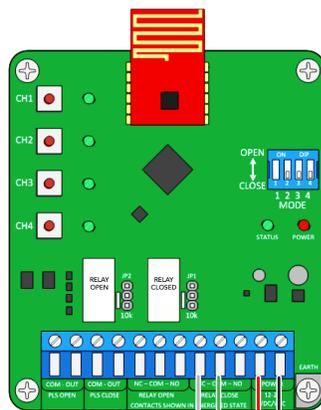


Figure 76. WEL-200 or iGAZE RE

EXTERNAL ENTRAPMENT PROTECTION

Consult a photoelectric sensor manual for wiring details. Make all electrical connections to Smart DC Controller as shown in Figure 77.

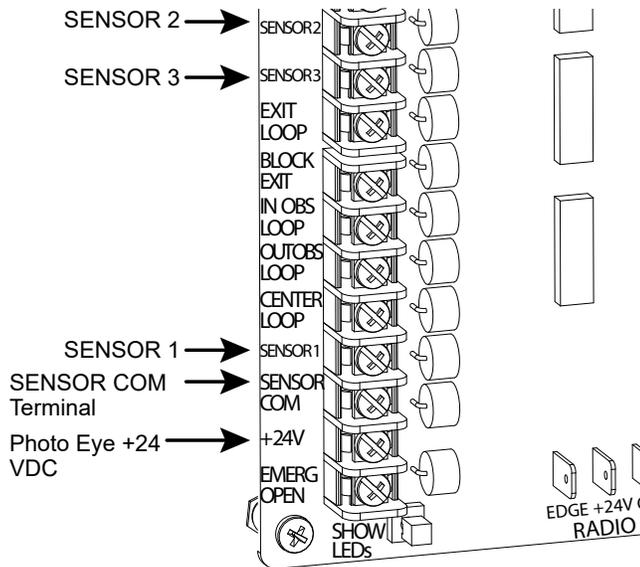


Figure 77. Entrapment Protection Only Connections

PHOTO EYE INSTALLATION TIPS

Underwriters Laboratories requires that any non-contact sensor used as an external entrapment protection device, must be tested to, and recognized by, the UL 325 Standard.

- There are two common types of photoelectric sensors, thru-beam and retro-reflective, and each has its advantages.
 - A thru-beam sensor is generally more powerful and able to function reliably with dirty optics and in poor weather.
 - A retro-reflective sensor does not require the installation and extra wiring of a separate emitter and receiver as is required in a thru-beam system, but retro-reflective eyes are generally more problematic in poor weather. Avoid using retro-reflective devices across outdoor distances greater than 24 ft (7.3m) because of performance and reliability issues.

- For pedestrian detection, mount thru-beam type photo eyes approximately 15" to 30" (4.6 to 9m) above the ground and as close to the gate as possible. A minimum of one photo eyes is required, but two is recommended, one photo eye to guard the open direction and the other for the close direction of travel, unless gate edges for entrapment protection are installed.

- Three wires to the receiver and two wires to the emitter are all that is required.
 - Depending on how the photo eyes are to be wired, +24VDC or +12VDC, power is provided via spades located just to the right of the COM terminal strip near the left side of the board.
 - The receiver and emitter common wires are connected to the SENSOR COM terminal at the bottom, left of the Smart DC Controller.
 - The photo eye NO or NC output wires connect to the Smart DC Controller at the Appropriate Sensor Input (1, 2, or 3). The appropriate sensor input must be programmed for Eye Open or Eye Close based on whether it spans the road or the "catch" area of an opening gate.
- If tripped while in motion, the standard function is to stop the gate and automatically restart again if the photo eye is clear within five seconds. An optional setting in the Installer Menu will cause a two second reversal of travel, or, if closing, can be programmed to reverse to full open.

NOTICE

Sensor Common & +24V is the recommended way to connect monitored photo eyes to Smart DC Controller.

NOTICE

If photo eyes are to be used for vehicle detection and logically function the same as a vehicle detector, connect the common wires to the COM terminals on the left side of the board and wire the NO output contact to the appropriate vehicle detector input: EXIT LOOP, IN OBS LOOP, and OUT OBS LOOP.

If the photo eye has an internal switch for setting Light Operate vs. Dark Operate, select Light Operate. If the photo eye has a relay output and has both NO and NC terminals, some experimentation may be required to determine the proper connection. This is because, in the Light Operate mode, the output relay is normally energized and releases when the beam is blocked. Some manufacturers label an output as NO, when it is actually an NC contact. If the photo eye has a solid-state output you must choose a sinking type connection.

PHOTO EYE FUNCTION:

A tripped photo eye will prevent the gate from starting in either direction if the gate is stationary. If tripped while in motion, the standard function is to stop the gate motion and then automatically restart again if the photo eye is clear within five seconds. An optional setting in the Installer Menu will cause a two second reversal of travel.

Alignment:

Most photo eyes require careful optical alignment in order to aim the emitter beam to the center of the receiver or reflector. In order to avoid false triggering, it is important to carefully align the system, especially with retroreflective photo eyes. The best way to assure true centering of the beam is with some trial testing where the emitter is shifted to move the beam left and right and up and down until the range of the invisible cone of the infrared beam is known. Photo eyes usually provide alignment aid LED's for this setup, but they can be hard to see. HySecurity has provided a unique feature that turns power on to the photo eyes and causes the buzzer to chirp when the photo eyes enter and exit alignment. See "Table 11. Smart DC Controller - User Menu Functions" on page 55 to enable this feature. Set the menu item PE - PHOTO EYE ALIGN from a 0 to a 1. The buzzer chirps once when the emitter and photo eye receiver are not aligned. When the emitter and receiver are aligned, the buzzer chirps twice. If they go out of alignment again, the buzzer will chirp once. This "alignment mode" will automatically reset to 0 the next time the Close Limit Switch is triggered or the RESET key is pressed.

Notes about retro-reflective systems:

Correct installation and alignment of a retro-reflective photo eye and its reflector is important for trouble free performance. Any system operating at a range greater than 16 feet is more prone to false triggering due to dirty optics, condensation or poor weather. If care is taken in the initial mounting and alignment of the 3-inch reflector, the chance of problems is greatly reduced.

Taking steps to protect the photo eye and the reflector from being exposed to fog and being absolutely certain the photo eye is perfectly aligned will greatly reduce any false triggering of the system. The ideal mounting of a retro-reflective photo eye is inside an enclosure.

The ideal reflector mounting suspends it inside a 12-inch long piece of 3-inch PVC conduit. Cut the opening of the PVC conduit at a 45-degree angle to act as a drip shield. Hold the reflector against the backside of the PVC conduit by attaching a 3-inch male connector. Do not cement the connector. This would prevent the reflector from being reached for future cleaning. To create a mounting base, attach a 3-inch aluminum flange (electric meter hub) to the connector. This whole package can be mounted to any flat surface.

Locate the reflector in the center of the invisible beam of infrared light to achieve the most sensitive alignment. The beam center is determined by the following test: while holding the reflector in your hand, slowly raise it until the beam is no longer returned and the photo eye trips. Mark this maximum height. Now lower your hand and determine the lower limit of the infrared beam by watching for the trip point. Mark this position as well. Repeat the same procedure for left and right at the center elevation of the beam, as determined by the previous test. Once the four limits have been determined, either mount the reflector in the center of the area outlined or realign the eye for the position of the reflector. If photo eye is realigned, be sure to perform centering test again to verify that the reflector is truly in the center.

Compatibility

The UL 325 standard requires that a gate edge sensor be laboratory tested and “recognized” under UL 325. In order to be compatible with all HySecurity operators, a gate edge sensor must be rated to function from 24 VDC source power. For a list of compatible sensors, refer to page 19.

Installation

HySecurity gates monitor normally closed (NC) sensors. Wire the NC sensors to SENSOR input terminals (SENSOR 1, SENSOR 2, or SENSOR 3) on the Smart DC Controller and set the Installer Menu item S1, S2, or S3 to the appropriate setting for the area being monitored.

When using wired edge sensors, the wired edge must be connected to an interface module with an NC output. These edge sensors have a 10k Ω resistor that connects to an interface module. The interface module (Hy2NC) provides the NC output for monitoring purposes. Refer to Figure 75 and Figure 76. For wireless edge sensors, no interface module is required. Wireless edge sensors need the wireless gate links which include a transmitter and receiver. HySecurity has created kits for all-inclusive shipment.

Gate Edge Function

If the gate is stationary, a tripped gate edge sensor will prevent the gate from starting programmed direction. If tripped while in motion, the standard function is to stop the gate movement and, if tripped while closing, automatically re-open fully. An optional setting in the Installer Menu (GR, Gate Edge Logic) will cause a 2 second reversal if triggered while closing. Refer to "Table 12. Smart DC Controller - Installer Menu Functions" on page 60 for more information.

INSTALLING GATE SENSORS ON SWING GATES

Three-sided sensors are ideal for swing gates. If gate clearance is 4 inches (10 cm) or more above the pavement, then an edge sensor must be mounted on the bottom edge. Drill holes through the edge sensor’s mounting channel and through the gate surface where each edge sensor is to be mounted. Securely fasten each edge sensor.

Edge sensors may be used with an edge transmitter and a receiver in order to transmit to the gate operator. The use of retractable cord reels or curl cords is not recommended because of durability problems with these devices in outdoor environments.

EDGE SENSOR INSTALLATION TIPS

Refer to page 21 to help plan the most appropriate placement of the edge sensors being installed.

- If edge sensors are used sliding gates, one or more contact sensors (edge sensors) must be located at the leading edge, trailing edge and post-mounted both inside and outside of the sliding gate.
 - Three-sided detectors are ideal for slide gates.
 - If the clearance of the gate is 6" (15cm) or more above the road, then an edge sensor must be mounted on the bottom edge.
 - If gate is sliding open to a wall with less than 16" (41cm) of clearance, mount an edge sensor to wall that aligns with gate in open position.
 - Always route leads from edge sensors to gate operator so that they are protected from physical damage.
 - Underwriters Laboratories requires that any contact sensor used as an external entrapment protection device, must be laboratory tested to, and recognized to the UL 325 Standard.

- To monitor edge sensors, there must be a terminating resistor in the embedded in the edge. This resistor is typically 8.2K or 10K and always has a small current draw to confirm that it is installed.
- HySecurity gate operators must see a NC contact for monitoring purposes, therefore any edge sensor with a terminating resistor will need an interfacing device to convert the resistor output into a NC contact.
 - Types of devices that will convert the resistor output to NC output include the Hy2NC and WEL-200.
 - Hy2NC enables the Edge Sensor to be hard wired to the board.
 - The WEL-200 is a wireless transmitter/receiver kit that communicates the state of the Edge Sensor wirelessly from the gate mounted transmitter to the operator mounted receiver.
- Hard-wired edge sensor adaptors (like Hy2NC) have inputs for up to two resistor terminated edges and up to two NC contact outputs.
 - HySecurity suggests the use of hard-wired edge sensor adaptors with an edge mounted to lead fence post to protect draw-in entrapment zone when the gate is running.
- Wireless transmitters are always monitoring for presence of resistor terminated edge(s) connected to it. Status of edge is then continuously communicated back to receiver which determines when to switch NC contact to NO and tell board edge is tripped or missing.
 - Receiver can only give a NC (edge not tripped) signal or a NO (edge tripped or missing) signal to control board.
 - If edge is tripped, missing, or resistor value is too low, transmitter will communicate this information to receiver which will indicate this to control board as a tripped edge (NC contact opens).
 - Additionally, if communication between transmitter and receiver is ever lost or corrupted, due to too much RF "noise" in area, then the receiver will indicate to control board that the edge is tripped, even if edge is present and functioning normally with transmitter.
- When selecting a wireless edge as one of the external entrapment sensors, be aware of the environment around it and know that RF interference from outside sources can drastically diminish range and performance of wireless device.
 - Airports, police stations, fire departments, hospitals, and other sites with a lot of radio traffic have shown to have a lot of RF noise in frequencies that most transmitter/receiver kits function.
 - Install transmitter in a way that it is in direct line of site with receiver's antenna throughout gate motion.
 - Limit distance between transmitter(s) and receiver(s) to what is specified by manufacturer, and be aware that range may be greatly diminished when operating in a noisy RF environment.

SMART DC CONTROLLER TROUBLESHOOTING

This section is available to help you troubleshoot any problems that may occur with SlideSmart operator. It provides information about Smart DC Controller display codes.

The Smart DC Controller system includes many self diagnostics. Specific messages appear on LCD and Audio Alert buzzer sounds distinctive chirps. Any alerts, faults or errors are also logged into memory and date/time stamped. For diagnostic purposes these messages can be retrieved with optional START software available from HySecurity. Refer to "Smart Touch Analyze and Retrieve Tool" on page 94.

Table 22 provides solutions to error codes, faults, and alerts that may appear on Smart DC Controller display.

Table 22. Smart DC Controller - Troubleshooting

Display Condition	Description Alert, Error or Fault	Possible Causes	Solutions
SAFE MODE	Safe Mode Alert	Occurs when either edge sensor or Inherent Entrapment Sensor (IES) has been tripped. In Safe Mode, automatic close timer is disabled, but any command will reset and/or start gate in motion. Safe Mode clears when full travel is reached or RESET button is pressed. Gate binding, wind, a faulty edge sensor, or worn motor brushes can cause a false alert.	<ol style="list-style-type: none"> 1. Remove obstruction. 2. Adjust IES sensitivity. 3. Correct gate hardware. 4. Correct faulty edge sensor. 5. Check for worn motor brushes and replace, if necessary.
ENTRAPMENT MODE	Entrapment Mode Alert	Occurs when IES is tripped when gate is already in Safe Mode. Operator will not function until it is reset, which can occur by: <ul style="list-style-type: none"> ● An Open or Stop command from a push-button control ● Pressing black button on operator side ● Pressing RESET button below display With any one of these inputs, operator will return to Safe Mode. Gate binding or wind can cause a false alert.	<ol style="list-style-type: none"> 1. Remove obstruction. 2. Adjust IES sensitivity. 3. Correct gate hardware.
NO AC POWER	No AC Input Power Advisory only.	AC power is shut off at source (breaker) or is not connected. AC power switch on operator (lower rocker switch) is turned off, or circuit breaker on the operator has tripped.	<ol style="list-style-type: none"> 1. Turn AC power switch on or connect power to operator. 2. Reset operator circuit breaker or connect power to AC switch. 3. Reset circuit breaker at electrical panel. 4. Have a licensed electrician check wiring.

Table 22. Smart DC Controller - Troubleshooting

Display Condition	Description Alert, Error or Fault	Possible Causes	Solutions
LOW 24VDC	Low 24VDC UPS Batteries Advisory only.	Occurs when battery voltage has dropped to less than 22V. At this level, batteries are 80% depleted. Normal function until 21V.	<ol style="list-style-type: none"> 1. No AC Power. See above item. 2. Wiring / Connector problem - check all connections. Clean or repair as required. 3. Check battery condition. 4. Smart DC Controller charger failure - check charger voltage and replace Smart DC Controller. 5. Transformer failure - replace transformer.
DEAD BATTERY	Extremely low UPS batteries – no automatic operation - batteries below 21V.	Occurs when battery voltage has dropped to less than 21V. At this level, batteries are 90% depleted. Gate will automatically open or close depending upon setting chosen. No additional automatic function is possible, but limited push button control is available to 18V.	Refer to corrective action above.
HYSECURITY BAD POWER	Critically low 24V supply power. This message can occur only on initial start up if power is critically low.	DC power is below 14V – no control functions will be allowed at all.	Refer to corrective action above.
No display, LED blinking	Smart DC Controller is receiving power, but battery voltage is very low.	<p>Several possible causes:</p> <ul style="list-style-type: none"> ● AC power has been shut off from the operator for too long and the batteries are drained. ● Wiring problem. ● Batteries no longer hold a charge. ● Bad Smart DC Controller. ● Bad transformer. 	Refer to corrective action above.

Table 22. Smart DC Controller - Troubleshooting

Display Condition	Description Alert, Error or Fault	Possible Causes	Solutions
HYSECURITY LOADER	Software is being loaded into Smart DC Controller.	Software is currently being loaded.	Wait for software to finish loading.
ALERT 1 FORCE OPEN	Gate forced open.	Gate has been forced open from a full close limit and is being prevented from re-closing.	Will self-clear after an open or close input.
ALERT 2 DRIFT CLOSED	Gate drifted closed.	Gate has drifted closed from a full open limit and is being prevented from re-opening.	Will self-clear after an open or close input.
ALERT 3 EXCESS DRIFT	Gate drift in transit - Advisory only	Alert appears if gate drifts three times in a five minute period.	Check track to make sure it is level.
ALERT 4 MOTOR OVERLOAD	Thermal overload alert. When alert is triggered, gate can only "fully open" until alert is cleared.	Motor drive heat sink exceeds 195°F. Alert will temporarily disable operator, but will automatically reset itself when it cools down. May also occur if the heatsink temperature is 70°F. higher than ambient temperature.	Check gate hardware, weight/length of gate. Alert automatically clears when temperature drops below threshold.
ALERT 5 BOTH LIM ACTIVE	Both limit switches are on at the same time	Possible causes: <ul style="list-style-type: none"> ● Short in wiring ● Stuck limit switch ● Debris in limit plate area (SwingSmart DC) 	<ul style="list-style-type: none"> ● Repair any wiring issues. ● Check limit switches and replace as required.

Table 22. Smart DC Controller - Troubleshooting

Display Condition	Description Alert, Error or Fault	Possible Causes	Solutions
ALERT 6 LIM NOT RELEASED	The limit did not release when the operator was commanded to move.	<ul style="list-style-type: none"> ● Broken drive belt. ● Hardware holding the arm. 	<ul style="list-style-type: none"> ● Tighten taper clamp (SwingSmart DC) ● Check/replace drive belt. ● Remove debris from limit area ● Check limit switches and replace as required ● Check limit plate ● Release any holds on the arm. ● Relearn Limits. (StrongArmPark DC and WedgeSmart DC)
ALERT 7 FREQ SHIFT FAULT	Hy5B has detected a frequency change outside normal range.	Likely causes are poor integrity of loops or metallic objects within range. This message will also indicate which detector alert applies to: Exit Loop (ELD), Inside Obstruction Loop (IOLD), Outside Obstruction Loop (OOLD), or Center Loop (CLD) - (User Relay 22).	Loop lead in wires and roadway should be checked for problems or replaced.
ALERT 8 LOOP SHORTED	Hy5B has detected a loopshorted to ground.	Caused by inadequate insulation of loop wires.	Loop lead in wires and roadway should be checked for problems or replaced.
ALERT 9 LOOP OPEN	Hy5B has detected a lack of continuity in loop wire.	Caused by broken loop wire or wire has come unplugged from detector.	Loop and lead in wires should be checked for problems or replaced.
ALERT 10 12C BUS ERROR	Smart DC Controller has detected a communication error with a Hy5B vehicle detector.	Caused by removal of Hy5B or lack of integrity of socket connection. This message will also indicate which detector alert applies to: Exit Loop (ELD), Inside Obstruction Loop (IOLD), Outside Obstruction Loop (OOLD), or Center Loop (CLD) - (User Relay 22).	Remove and re-install the Hy5B and press RESET. Replace Hy5B, if necessary.

Table 22. Smart DC Controller - Troubleshooting

Display Condition	Description Alert, Error or Fault	Possible Causes	Solutions
ALERT 11 DETECTOR FAULT	Smart DC Controller has detected a problem within an Hy5B vehicle detector.	Caused by a fault within Hy5B. This message will also indicate which detector alert applies to: Exit Loop (ELD), Inside Obstruction Loop (IOLD), Outside Obstruction Loop (OOLD), or Center Loop (CLD) - (User Relay 22).	Remove and re-install the Hy5B and press RESET. Replace Hy5B, if necessary.
ALERT 12 ON TOO LONG	Smart DC Controller has an active loop input (Hy5B or box detector output) for more than 5 minutes.	Caused when Smart DC Controller sees an active loop for more than 5 minutes. "Active" loop can be actual or false. This message will also indicate which detector alert applies to: Exit Loop (ELD), Inside Obstruction Loop (IOLD), Outside Obstruction Loop (OOLD), or Center Loop (CLD) - (User Relay 22).	Check traffic patterns at site. Loop and lead in wires should be checked for problems or replaced.
ALERT 13 STIFF GATE	Smart DC Controller has detected a gate that, over time, has taken more power to move than it used to.	Caused by degrading gate hardware or debris in track. This alert appears in history log. It does not have any effect with regard to opening or closing gate.	Check and correct gate hardware as required.
ALERT 14 STUCK GATE	Smart DC Controller has detected that it cannot move gate at all.	Caused by broken gate hardware or ice/snow buildup.	Check and correct gate hardware as required.
ALERT 15 NO TARGET	Target magnet on the chain is missing or has not been detected.	Target magnet fell off or target sensor wires are damaged.	<ol style="list-style-type: none"> 1. Make sure target is properly fastened to chain. 2. Check target sensor to make sure it is reading magnet. Change sensor if it or its wires are damaged.

Table 22. Smart DC Controller - Troubleshooting

Display Condition	Description Alert, Error or Fault	Possible Causes	Solutions
ALERT 16 COM BUS ERROR	Smart DC Controller has detected an internal communications error.	Several possible causes: <ul style="list-style-type: none"> ● Excessive electrical noise. ● Lack of earth grounding. ● Internal problem on Smart DC Controller. 	<ol style="list-style-type: none"> 1. Determine and remedy source of electrical noise. 2. Install a ground rod. 3. Replace Smart DC Controller.
ALERT 17 BAD COIN BATTERY	Small battery on Smart DC Controller is loose or needs replacing.	Coin battery is loose or dead.	<ol style="list-style-type: none"> 1. Verify that battery is properly seated. 2. Replace coin battery. 3. Restore power. 4. Press RESET button.
ALERT 18 CHANGE BATTERY	Smart DC Controller has detected that 24VDC UPS batteries need to be replaced.	Batteries are not taking a charge properly.	Buzzer will chirp every minute until UPS batteries are replaced.
ALERT 19 FALSE SLOWDOWN	Not used with DC operators	Not used with DC operators	Not used with DC operators
ALERT 20 LI BLOCK OPEN		An interlock contact is closed, indicating that the gate latch (lock) is engaged, preventing the operator from starting.	Check the interlock terminal and wiring.
FAULT 1 MOTOR RUN TIME	The Smart DC Controller has detected the motor is on longer than the maximum run time selected.	<ul style="list-style-type: none"> ● Broken drive belt ● Broken limit plate ● Taper clamp slipping (SwingSmart DC) 	<ol style="list-style-type: none"> 1. Check and replace drive belt. 2. Increase Max Run Timer in the Installer Menu. 3. Tighten taper clamp and check limit plate. Replace as required.
ALERT 21 DRIVE TRIP	Not used with DC operators	Not used with DC operators	Not used with DC operators

Table 22. Smart DC Controller - Troubleshooting

Display Condition	Description Alert, Error or Fault	Possible Causes	Solutions
ALERT 22 INTLOCK FAILURE	Interlock/ Sequential Gate communication lost	Appears when RS-485 communication connection is lost for more than 5s between interlocked (dual gate) or sequenced gate operators.	<ol style="list-style-type: none"> 1. Check cable connections and wiring. Make sure both operators are working properly and have same current and up-to-date software versions. Alert auto clears when communication between two operators is restored. 2. If operator on site is a solo gate operator and display code ALERT 22 appears, access Installer Menu. Verify Installer Menu items: DG (Dual Gate) and SG (Sequential Gate) are both set to zero.
ALERT 24 - EXTERNAL RELAY FAULT	Communication Lost with Hy8Relay module	Appears when R3-R10 is programmed to a non-zero number in the installer menu, but there is no Hy8Relay module communicating with the board.	If no module is used, reset R3-R10 to 0. If a module is used, ensure that all wiring is correct and the correct module is being used. The STC and SDC communicate at different rates with the module.
ALERT 25 HYPNET LOW BATTERY	Coin Cell Battery in HyNet is Low	Appears when a HyNet is connected and reports that the internal battery of the HyNet is low.	Replace the battery in the HyNet

Table 22. Smart DC Controller - Troubleshooting

Display Condition	Description Alert, Error or Fault	Possible Causes	Solutions
ALERT 28 BATTERY DISCONNECTED	Battery Disconnected from Board	Dead or disconnected batteries detected by SDC board. Operator may still be functional if on AC power but will not have battery backup. Was Error 9 in pre-h5.57 software versions	Replace or reconnect batteries to the controller.
FAULT 2 PHOTO EYE	Photo eye is missing or not working.	This fault can only occur if monitored photo eye check fails. See "Monitored External Entrapment Sensors" on page 110 for details.	Correct malfunctioning photo eye.
FAULT 3 VOLTAGE SAG	Not used in SwingSmart.	Caused by inadequate supply wire size	Correct wire size to AC supply
FAULT 4 GATE NO LOAD	Smart DC Controller has detected there is no load on operator. Gate is non-operational while this fault is triggered.	Possible causes: <ul style="list-style-type: none"> ● Motor wires disconnected. ● DC switch off. ● Linkage failure ● Taper clamp being too loose 	<ol style="list-style-type: none"> 1. Check DC motor wires. 2. Replace drive belt. 3. Turn DC power switch on. 4. Tighten taper clamp. 5. Press RESET to clear fault.
FAULT 5 LIMIT FAILED	Not used with DC operators	Not used with DC operators	Not used with DC operators
FAULT 14 STUCK GATE	Smart DC Controller tries 3 times to overcome stuck gate. Gate is non-operational while this fault is triggered.	Caused by broken gate hardware or ice/snow buildup.	<ol style="list-style-type: none"> 1. Check and correct gate hardware as required. 2. Press RESET to clear fault.
ERROR 1 DIRECTION ERROR	Smart DC Controller detects operator ran in wrong direction.	<ul style="list-style-type: none"> ● Motor wiring. ● Limit switch wiring (SwingSmart DC) 	<ol style="list-style-type: none"> 1. Check motor wiring and correct, as needed. 2. Press RESET to clear fault.

Table 22. Smart DC Controller - Troubleshooting

Display Condition	Description Alert, Error or Fault	Possible Causes	Solutions
ERROR 3 Hy5B FAILED	Smart DC Controller detects communication error with a Hy5B vehicle detector.	Caused by Hy5B removal or lack socket connection integrity. Message indicates which detector alert applies to: Exit Loop (ELD), Inside Obstruction Loop (IOLD), Outside Obstruction Loop (OOLD), or Center Loop (CLD).	<ol style="list-style-type: none"> 1. Press RESET. 2. Remove and re-install Hy5B. 3. Replace Hy5B, if needed.
ERROR 4 PRIMARY- SECONDARY COM	Smart DC Controller has detected a communication error between primary and secondary in a dual gate installation.	<p>Several possible causes:</p> <ul style="list-style-type: none"> ● Primary/Secondary communication cable has not been installed correctly. See Primary and Secondary Wiring Connections. ● Primary/Secondary not configured properly through Installer Menu. ● Operator not properly earth grounded. ● Primary/Secondary communication cable installed in same conduit as high-voltage AC power. ● One operator does not have power applied to it. ● One operator may have a different software version. 	<ol style="list-style-type: none"> 1. Correct communication cable. 2. Verify each operator is configured properly via Installer Menu. Set one operator as Primary, one as Secondary. 3. Install ground rod per NEC/NFPA standard. 4. Install separate communication cables conduit. 5. Ensure AC power is present at both operators and all power switches are ON. 6. Check software version currently loaded in operator by pressing RESET. Make sure both operators are running same software version.

Table 22. Smart DC Controller - Troubleshooting

Display Condition	Description Alert, Error or Fault	Possible Causes	Solutions
ERROR 5 No display	Display provides no indication of this error, but it can appear in START log and means that Smart DC Controller has detected a serious internal error.	Internal software/hardware error. Report any instance of this error to HySecurity Technical Support.	<ol style="list-style-type: none"> 1. Turn both switches off to reset software. 2. Update to latest software version using START. 3. Replace Smart DC Controller.
ERROR 6 STC-VFD COMM ERR	Not used with DC operators	Not used with DC operators	Not used with DC operators
ERROR 7 MENU CHECKSUM	Software issue exists that may require factory reset.	Corrupt software or data.	Call HySecurity Technical Support for assistance.
ERROR 8 RPM SENSOR	RPM sensor disconnected.	Motor Encoder or wires are damaged or unplugged.	Check wiring from motor to Smart DC Controller board.
ERROR 9 BATTERY DISCONN	Smart DC Controller detects no battery connected.	Batteries are disconnected, or a wiring fault exists. SlideSmart operators ship with a wire disconnected to prevent battery drain. Replaced by Alert 29 in h5.57 software version.	<ol style="list-style-type: none"> 1. Ensure red wire in upper left corner of control box is connected to switch. 2. Correct any issues with battery wiring. 3. Check 35 amp fuse on circuit board.
ERROR 10 SLOWDOWN SWITCH	Not used with DC operators	Not used with DC operators	Not used with DC operators

APPENDIX A - FRENCH TRANSLATIONS

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 injury or death:	INSTRUCTIONS DE SÉCURITÉ IMPORTANTES AVERTISSEMENT – Pour réduire les risques de blessures et de mort :
1. READ AND FOLLOW ALL INSTRUCTIONS.	1. LISEZ CETTE NOTICE ET CONFORMEZ-VOUS AUX MISES EN GARDE
2. Never let children operate or play with gate controls. Keep the remote control away from children.	2. Ne laissez jamais les enfants manoeuvrer les commandes de la barrière ou jouer avec celles-ci. Laissez la télécommande hors de la portée des enfants.
3. Always keep people and objects away from the gate. NO ONE SHOULD CROSS THE PATH OF THE MOVING GATE.	3. Tenez toujours à l'écart de la barrière toute personne ou tout objet avoisinant. IL NE FAUT JAMAIS PASSER DANS LA TRAJECTOIRE D'UNE BARRIÈRE EN MOUVEMENT.
4. Test the gate operator monthly. The gate MUST reverse on contact with a rigid object or stop when an object activates the non-contact sensors. After adjusting the force or the limit of travel, retest the gate operator. Failure to adjust and retest the gate operator properly can increase the risk of injury or death.	4. Vérifiez le fonctionnement de l'ouvre-barrière une fois par mois. Le sens de la course DOIT s'inverser lorsque la barrière entre en contact avec un objet dur ou la barrière DOIT s'arrêter lorsqu'un objet active les capteurs sans contact. Vérifiez à nouveau l'ouvre-barrière après tout réglage de la force de déclenchement ou du seuil de fin de course. Un réglage incorrect de l'ouvre-barrière ou l'omission de vérifier à nouveau le fonctionnement de l'ouvre-barrière peut causer des blessures, voire la mort.
5. Use the emergency release only when the gate is not moving.	5. Ne déclenchez le dispositif de désaccouplement d'urgence que lorsque la barrière ne bouge pas.
6. KEEP GATES PROPERLY MAINTAINED. Read the user's manual. Have a qualified service person make repairs to gate hardware.	6. ASSUREZ-VOUS QUE LA BARRIÈRE EST CORRECTEMENT ENTRETENUE. Lisez le manuel de l'utilisateur. Confiez la réparation du matériel de la barrière à un technicien qualifié.
7. The entrance is for vehicles only. Pedestrians must use separate entrance.	7. La voie d'accès est réservée aux véhicules seulement. Les piétons doivent utiliser une voie d'accès différente.
8. SAVE THESE INSTRUCTIONS.	8. CONSERVEZ CES INSTRUCTIONS.

APPENDIX A - FRENCH TRANSLATIONS

English	French
2.3 Install the gate operator only when:	2.3 N'installez l'ouvre-barrière que si :
a. The operator is appropriate for the construction of the gate and the usage Class of the gate,	a. l'ouvre-barrière est approprié pour la structure et la classe d'utilisation de la barrière;
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,	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;
c. All exposed pinch points are eliminated or guarded, and	c. tous les points de pincement sont éliminés ou protégés;
d. Guarding is supplied for exposed rollers.	d. des protections sont fournies pour les galets exposés.
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.	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
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.	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.

APPENDIX A - FRENCH TRANSLATIONS

English	French
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.	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.
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.	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.
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.	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.
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.	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.
2.10 For gate operators utilizing a non-contact sensor	2.10 Pour les ouvre-barrières qui fonctionnent avec des capteurs
a. See instructions on the placement of non-contact sensors for each Type of application,	a. Voir les instructions sur le positionnement des capteurs sans contact pour chaque type d'utilisation.
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	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.
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.	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.
2.11 For a gate operator utilizing a contact sensor	2.11 Pour les ouvre-barrières qui fonctionnent avec des capteurs

APPENDIX A - FRENCH TRANSLATIONS

English	French
<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 postmounted both inside and outside of a vehicular horizontal slide gate.</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. 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>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>

WARRANTY

1. Warranty.

HySecurity Gate, Inc. ("HySecurity") warrants that at the time of sale each HySecurity-branded product that it sells will, in all material respects, conform to its then applicable specification and will be free from defects in material and manufacture.

The following additional durational warranties apply to HySecurity products, depending on whether (1) the product is purchased through an authorized HySecurity distributor and (2) whether a timely and complete product registration is submitted to HySecurity.

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

1(a) HySecurity Products Purchased Through Authorized Distributors and Properly Registered

For any gate operator product that is purchased from an authorized HySecurity distributor (this excludes product purchased through internet resellers or any distributor not authorized by HySecurity), 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. HySecurity warrants that the product will remain serviceable for the following periods:

- a) Hydraulic industrial gate operator hydraulics, controls, and mechanical components: Five Years or 500,000 gate cycles (whichever occurs first) after the date of installation,
- b) Hydraulic wedge operator hydraulics and controls: Five Years or 500,000 cycles (whichever occurs first) after the date of installation. Wedge mechanical components: Two Years after the date of installation,
- c) Electromechanical pad-mounted Slide and Swing operators: Five Years or 500,000 cycles (whichever occurs first) after the date of installation, except single family residential usage, where the warranty term shall be Seven Years after the date the product was shipped from HySecurity,
- d) Electromechanical linear actuator Swing operators: Two Years after the date of installation,
- e) Electromechanical surface mount wedge operator electronics: Two Years or 500,000 gate cycles (whichever occurs first), after the date of installation,
- f) Electromechanical Barrier Arm Operators: Two years or 1,000,000 gate cycles (whichever occurs first) after the date of installation,

provided that the preceding Five Year warranty period in (a), (b), and (c) will not extend beyond seven years from the date that the product was shipped from HySecurity, and the Two Year warranty period in (b), (d), (e), and (f) will not extend beyond four years from the date that the product was shipped from HySecurity.

The preceding warranty durations do not apply to the products or components described below (g-j), which have a shorter warranty period:

- g) Hydraulic gate operator drive wheels, including XtremeDrive™ wheels and rack: Two Years from date of installation.
- h) AC and DC power supplies, chargers, and inverters and HyNet™ Gateway: Two Years from date of installation, except batteries.
- i) Batteries: One Year from date of shipment from HySecurity.
- j) 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) HySecurity Products Not Purchased Through an Authorized Distributor or Not Properly Registered within 60 Days

For any product that is not purchased from an authorized HySecurity 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 warranty will apply: HySecurity warrants that the product will remain serviceable for the following periods, which begin on the date that the product was shipped from HySecurity:

- a) All gate operators: One Year or 100,000 gate cycles, whichever comes first.
- b) AC and DC power supplies, chargers, or inverters: One Year.
- c) HyNet™ Gateway: One Year.
- d) Hydraulic gate operator drive wheels: One Year.

1(c) Replacement Parts

HySecurity warrants that replacement parts (whether new or reconditioned) will remain serviceable for One Year from the date that the part was shipped from HySecurity 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 HySecurity 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 another manufacturer's name plate and they are not a part of the base model. HySecurity disclaims all warranties for such accessory components, which carry only the original warranty, if any, of their original manufacturer. HySecurity hereby assigns its rights under such manufacturer warranties—to the extent that such rights are assignable—to Buyer.

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

2. Exclusion of Other Warranties.

The warranties contained in Section 1 are the exclusive warranties given by HySecurity and supersede any prior, contrary or additional representations, whether oral or written. Any prior or extrinsic representations or agreements are discharged or nullified. HYSECURITY HEREBY DISCLAIMS AND EXCLUDES ALL OTHER WARRANTIES—WHETHER EXPRESS, IMPLIED, OR STATUTORY—INCLUDING ANY WARRANTY OF MERCHANTABILITY, ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ANY LIABILITY FOR INFRINGEMENT, AND ANY WARRANTIES OTHERWISE ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE, OR USAGE OF TRADE.

3. Buyer's Exclusive Remedies for Any Nonconformity.

If a HySecurity 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. HySecurity 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. HySecurity reserves the right to supply used or reconditioned material for all warranty claims. HySecurity 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 HySecurity form, "RMA Procedures."

THE REMEDY SELECTED BY HYSECURITY 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.

HYSECURITY 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 HYSECURITY'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.

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.

HySecurity retains and reserves all right, title, and interest in the intellectual property rights of its 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.

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2 SwingSmart™ DC Models, AC or Solar

Standard	SwingSmart DC 20
Solar	SwingSmart DCS 20
Gate Specs	1,300 lb (590 kg) for 12 ft (4 m) leaf 800 lb (363 kg) for a 16 ft (5 m) leaf 600 lb (272 kg) for a 20 ft (6 m) leaf
Open/Close Time	Open/Close time set independently. Adjustable 10 to 15 seconds.
Duty Cycle	Continuous
Drive	Electromechanical
Horsepower	1/2 hp
UPS Battery Backup Cycles*	Field configurable to fail open or secure when batteries deplete. Standard battery backup gate cycles: Two 12V 8Ah batteries. Up to 300 cycles after AC power loss. Extended battery backup gate cycles: Two 12V 50Ah batteries. Up to 1,200 cycles after AC power loss.
Temperature Rating	-13° to 158° F (-25° to 70° C)
Operating Voltage	24VDC
Input Voltage	115V or 208-230V, 50/60Hz Solar: 24 VDC solar panels*
Accessory Power	12VDC and 24VDC 1A each
Communication	USB or RS-232, RS-485, Ethernet/fiber using optional HyNet™ Gateway accessory
User Controls	Smart DC Controller with 70+ configurable settings. 32 character LCD display and 5 tact buttons or a PC using S.T.A.R.T. software.
Relays	Two configurable user relays: 30VDC, 3A solid state and 250VAC, 10A electromechanical; Optional Hy8Relay™ for 8 additional relay outputs
Finish	Zinc plated chassis; polyethylene clam shell cover
ETL Listed (UL 325)	Usage Class I, II, III, IV
Cycle Tested	500,000 cycles
Warranty	5 year (7 year single-family residential) w/product registration

* The actual number of gate cycles available from battery depends upon gate resistance to travel, cycle length, battery size, state of charge and health, ambient temperature, accessory power draw and frequency of gate cycles during power outage.

To enable fully automatic operation, all SWING gate operators require a minimum of ONE monitored external entrapment protection sensor to protect entrapment zones in either the open or close direction of travel. However, an additional monitored sensor is required if there is a risk of entrapment in both directions of gate travel. Visit hysecurity.com/gatesafety for more information on UL 325 standards and gate safety.

Contact Information:

Visit <https://hysecurity.com/technical-support/> for installation manuals, replacement part instructions, part diagrams and more.

Qualified Nice | HySecurity distributors are experienced and trained to assist in resolving installation problems. For the name of a qualified distributor near you, call HySecurity at 800-321-9947. *Before contacting your distributor or HySecurity Technical Support, obtain the serial number of your operator.