

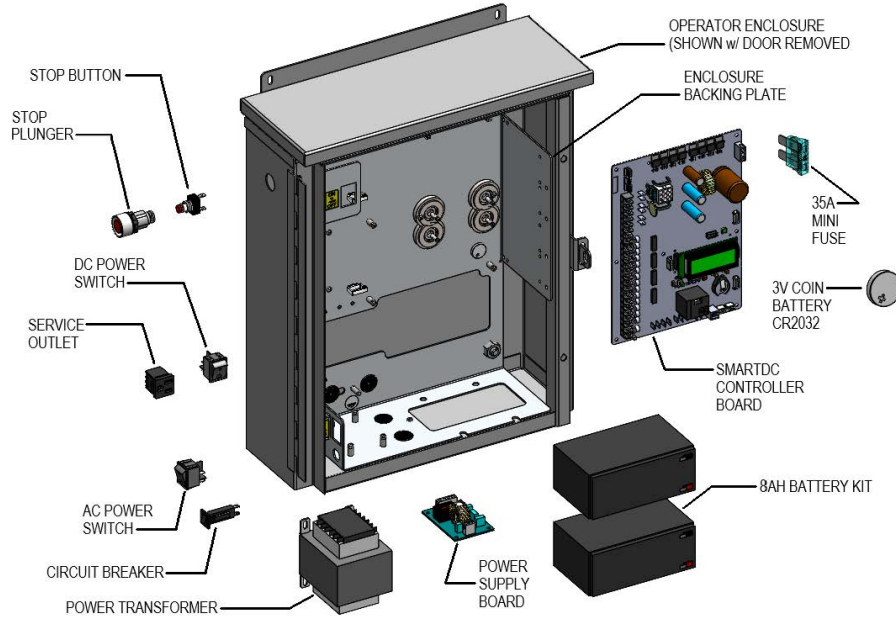
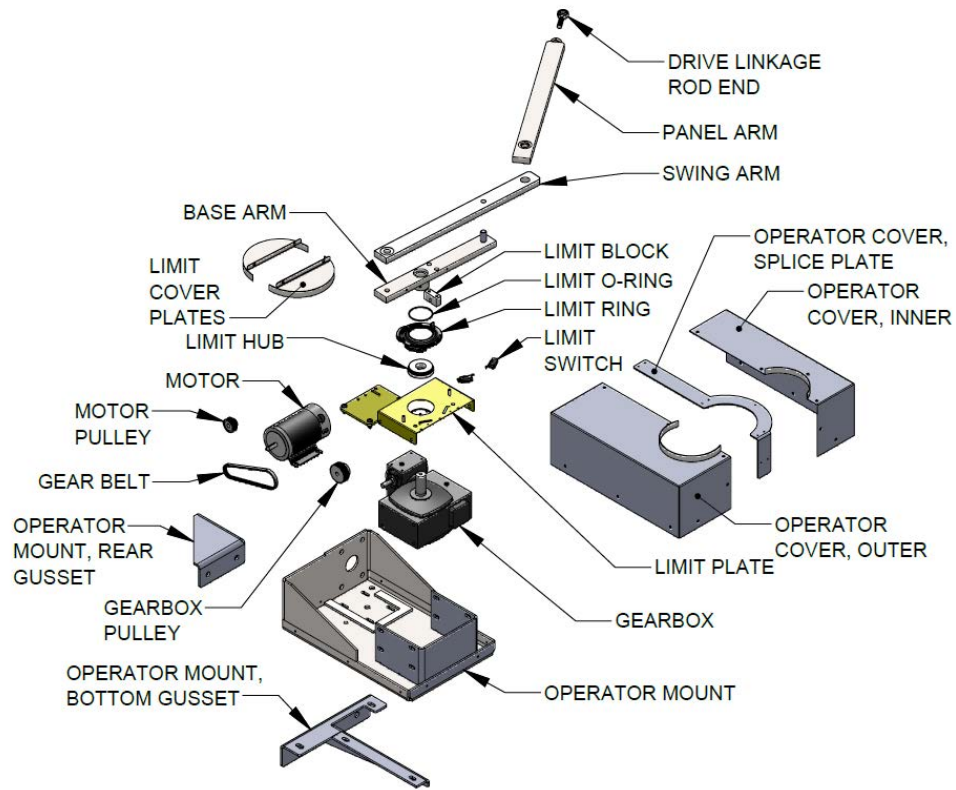
# **FOLDSMART**

## **INSTALLATION AND MAINTENANCE MANUAL**

115 Lawson Crescent  
Winnipeg, Manitoba, Canada R3P 1A6  
Phone: 866.300.1110

[wallaceperimetersecurity.com](http://wallaceperimetersecurity.com)





### Copyright Notice

©Copyright 2025 all rights reserved. No part of this manual may be reproduced by any means (photocopier, electronic, or mechanical), without the express written permission of Wallace Perimeter Security and Nice | HySecurity Gate Inc.

---

## TABLE OF CONTENTS

<b>Introducing FoldSmart .....</b>	<b>7</b>
Intelligent Features: SmartDC Controller™ .....	7
Technical Support .....	8
<b>Installer's Check List .....</b>	<b>9</b>
<b>SAFETY INFORMATION .....</b>	<b>10</b>
Safety Notices.....	10
Common Industrial Symbols .....	10
<b>Safety Requirements .....</b>	<b>11</b>
Important Safety Instructions .....	11
Safety Standards - Installer's Responsibility .....	12
Safety Standards - Owner/User Responsibility .....	14
Hazardous Materials and Proper Disposal .....	15
External Entrapment Protection Sensors .....	16
Identifying Gate System Category and Usage Class.....	18
Choosing External Entrapment Protection.....	19
UL 325 Compliant Sensors .....	20
Stop Button .....	22
Manual Release .....	22
Wind Load Factors & Site Prep .....	23
<b>FoldSmart Gate Delivery and Unloading .....</b>	<b>24</b>
Tools Required.....	26
<b>FoldSmart Gate Installation .....</b>	<b>29</b>
Footing and Foundation Installation .....	29
Gate Installation .....	33
Vehicular Gate Operators (or Systems).....	39
Operator Cabinet Installation.....	40
<b>Installation Adjustments.....</b>	<b>43</b>
Drawbar Adjustment Procedure .....	43

Installing Linkage Arm to Gearbox Limit Hub.....	44
Installing White Spacer on Linkage Arm, for Leveling .....	50
Limit Switch Adjustment Procedure .....	51
Manual Release Procedure .....	53
<b>Power.....</b>	<b>54</b>
Installing the Earth Ground .....	54
Wiring AC Power.....	56
Wiring 115VAC Power .....	57
Wiring 208/230VAC Power.....	58
Connecting DC Power .....	60
Important Considerations for DC-Power Connection .....	60
<b>Display and Menu Options .....</b>	<b>61</b>
INITIAL SETUP.....	61
Turning Both Power Switches On .....	62
Using the SmartDC Controller Buttons in Menu Mode .....	64
Configuring the Setup Menu .....	65
<b>RUN MODE.....</b>	<b>66</b>
Understanding Gate Status Displays.....	66
Using the SmartDC Controller Buttons in RUN Mode.....	67
Viewing Operator Status Displays .....	68
USER MENU.....	69
Adjusting the Close Timer .....	70
Setting the Time and Date .....	71
Setting AC Power Loss Gate Function .....	72
Adjusting the Display Contrast.....	73
USER MENU FUNCTIONS.....	74
Installer Menu .....	78
Adjusting the Gate Speed .....	79
Adjusting the IES Sensitivity.....	80
Reinstating Factory Defaults .....	83
Enabling the Fire Department Override .....	84
INSTALLER MENU FUNCTIONS.....	85

<b>SmartDC Controller .....</b>	<b>95</b>
Overview of the SmartDC Controller .....	96
Preliminary Testing .....	97
Vehicle Detector Installation Options .....	99
Connecting HY5B Vehicle Detectors .....	100
Installing Standard 11-Pin Box Type Vehicle Detectors .....	103
Vehicle Detector Configuration and Quick Close Mode Selection .....	104
Connecting Accessory Devices .....	105
Manual Push-Button Station .....	106
User Relays - Programming Procedure .....	107
<b>Gate Systems .....</b>	<b>110</b>
Power Requirements .....	111
Primary and Secondary Wiring Connections .....	112
Primary and Secondary Menu Setup .....	113
<b>Installer's Reference: Sensors and Accessories .....</b>	<b>115</b>
Connecting a Radio Receiver for Remote Open .....	115
Setting the User Relay Function in the Installer Menu .....	116
Installing Vehicle Detectors and Loops .....	117
Monitored External Entrapment Sensors .....	120
External Entrapment Protection .....	122
Photo Eye Installation Tips .....	122
Installing Photoelectric Sensors for External Entrapment Protection Only ..	124
Operation Notes .....	126
Photo Eye Mounting and Alignment .....	128
How to Install & Program Resistive Gate Edges .....	129
How to Install Model LC2-8 or TL96 Traffic Lights on your FoldSmart Gate..	155
<b>TROUBLESHOOTING .....</b>	<b>166</b>
SmartDC Controller Troubleshooting .....	167
Vehicle Detector and Loop Fault Diagnostics .....	179
<b>General Maintenance .....</b>	<b>183</b>
Smart Touch Analyze and Retrieve Tool (S.T.A.R.T.) .....	183
Electrical Controls .....	185

**Mechanical Maintenance..... 185**

**Software Maintenance ..... 186**

**Drive Belt Tension and Alignment ..... 186**

**DC Battery Replacement ..... 187**

**Clock Battery Replacement ..... 188**

**FoldSmart General Maintenance Checklist..... 189**

**FoldSmart XT Drawings: Generic Site Layout and Options .. 191**

**FOLDSMART ..... 203**

**3 YEAR LIMITED PRODUCT WARRANTY ..... 203**

**Technical Specifications ..... 205**

# **Introducing FoldSmart**

**Robust** - An especially strong twin channel steel chassis and manual disconnect greatly improves the ability for FoldSmart to resist damage from vehicle hits on the gate. The components on the SmartDC 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). FoldSmart is rated for gates up to 30 feet wide and 6 feet high (9.14 meters wide and 1.8 meters high).

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

**Adaptable** - The design incorporates left and right gate arms to assure aesthetic functionality.

**UPS backup** - Two 12V, 8 amp hour (Ah) batteries will provide a fully functional gate system (up to 300 gate cycles) when AC power is unavailable. Four user-selectable UPS modes are available. 24VDC is available to power access controls.

## **Intelligent Features: SmartDC Controller™**

**Automatic adjustment and synchronization of bi-parting gates** - The SmartDC 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 SmartDC Controller has 43 menu items to allow installer configuration of gate function and two user relays, which can be configured for 45 different functions.

**Independent adjustment for open and close gate speeds** - An easy-to-use menu on the SmartDC Controller 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 Safety Standards. 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 connection 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 SmartDC operators. To download this free software, visit the Nice | HySecurity website at <https://hysecurity.com/>.

## Technical Support

For technical support, call Wallace Perimeter Security at 1-866-300-1110. Obtain the serial number of your operator before calling. Refer to the blow-apart image on the inside of the front page.

For information about Wallace Perimeter Security training for installers, maintenance personnel and end-users, refer to the company website at [www.wallaceperimetersecurity.com](http://www.wallaceperimetersecurity.com) or call 1-866-300-1110.



# Installer's Check List


The following list provides a high-level overview of the tasks involved in installing the FoldSmart gate system. 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, conduits and vehicle detector loops properly installed, gate bracket and linkage arm mounting considerations.
	Make sure gate installation complies with ASTM F2200 Specification for Automated Vehicular Gate Construction and UL 325 Safety Standards. Install supplied WARNING signs on both sides of the gate.
	Check for compliance with local codes, site conditions, and NEC standards.
	Install operator on gate column with included hardware.
	Temporarily attach gate bracket and linkage arm(s).
	Adjust open and close limit switches through manual operation of the gate.
	Complete gate arm installation.
	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 SmartDC 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 SmartDC Controller software version. If needed, upload the latest version from <a href="https://hysecurity.com/">https://hysecurity.com/</a> . See Smart Touch Analyze and Retrieve Tool (S.T.A.R.T.).
	Give a copy of the operator instructions to the end user. Show the end user how to:
	Remove the operator covers. Turn the power off and on.
	Turn the DC power switch off, which disengages the motor.
	Loosen the manual disconnect and manually push the gate(s) open & close.
	Remember to re-tighten the manual disconnect before turning the DC power switch back on and replacing the covers.
	Test the red Stop Button located on the side of the control box.
	Take photographs of the completed installation site and send them to <a href="mailto:service@wallaceperimetersecurity.com">service@wallaceperimetersecurity.com</a> .


# SAFETY INFORMATION

## Safety Notices


The following four levels of safety notices are used where applicable within this manual; each notice contains information specific to the situation.

 **DANGER**

Indicates death or severe injury will occur if the hazardous situation is not avoided.

 **WARNING**

Indicates death or severe injury could occur if the hazardous situation is not avoided.

 **CAUTION**

Indicates mild or moderate injury could occur if the hazardous situation is not avoided.

**CAUTION**

Indicates damage to equipment is probable if the hazardous situation is not avoided.

## Common Industrial Symbols

The following international safety symbols may appear on the product or in its literature. The symbols are used to alert you to potential personal injury hazards. Obey all safety messages that follow these symbols to avoid possible severe injury or death.



**Attention - Take Notice**



**DANGER - Keep Away**



**Entrapment Zone**

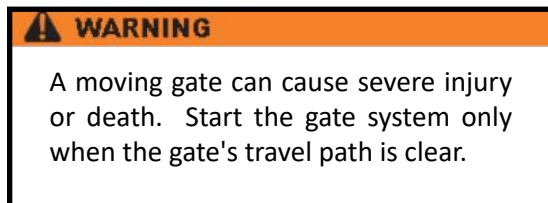


**Possible Pinch Point**

# Safety Requirements

Automatic gate systems provide user convenience and security. However, because these machines can produce high levels of force, it is imperative that gate system designers, installers and end users be aware of potential hazards associated with improperly designed, installed, or maintained systems. The gate system is only one component of the total gate operating system. It is the joint responsibility of the architect, site designer, purchaser, installer and end user to verify that the total system is appropriately configured for its intended use. Additionally, certain municipalities have established licensing, codes or regulations that regulate automated gate system design and installation. Consult local government agencies for up-to-date rules and regulations prior to gate system design or installation.

## 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 Important Safety Instructions in this manual and review all the literature that accompanies the product. It is important that only qualified installer's handle the installation of the FoldSmart gate system. A "qualified" installer has one of the following:

- **A minimum of three years' experience installing similar equipment.**
- **Proof of attending a Wallace Perimeter Security Technical Training seminar within the past three years.**
- **Significant manufacturer endorsements of technical aptitude in gate system 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 systems and automated gates. To pass UL certification, all aspects of gate installation must comply with the appropriate safety standards. For the most up-to-date, ASTM F2200 Gate and Fence Standards, refer to <https://www.astm.org/>. For UL 325 Safety Standard, refer to <https://www.ul.com/>.

## Safety Standards - Installer's Responsibility

- Study the entire contents of this manual prior to installing, operating, or maintaining the FoldSmart gate system. Taking extra time to align the gate system and verify a fully functional installation will reduce maintenance, guarantee longest system life, and ensure customer satisfaction.
- Verify the gate system usage class for the site. Refer to ***"Identifying Gate System Category and Usage Class" on page 18*** for gate classifications. Install FoldSmart only when the gate system class is correct for the site, size, and type of gate.
- Install an automatic operator only on gates that comply with ASTM F2200 Gate and Fence Standards. Screen or enclose openings in the gate per UL 325 Safety Standards.
- Before attaching the operator to the gate, move the gate in both directions. Make sure it is level and moves freely. A gate that swings easily reduces strain on operator components. Gravity should play no part in the opening or closing of the gate.
- Make sure there is a separate walk-through entrance nearby. Make certain a clear pedestrian path is designated and signs direct pedestrians to the walk-through gate. The automated gate entry is for vehicle use only. No one should cross the path of a moving gate.
- Mount access control devices beyond reach of the gate. The control devices that operate the gate must be:
  - Located in a clear line of sight to the gate.
  - Mounted beyond 6 feet (1.83 meters) of the gate to prevent users from touching or accessing the gate while operating the controls. People attempting to access the controls by reaching through or around the gate can be seriously injured or killed by the moving gate.
  - Incorporate a security feature to prevent unauthorized use.
- The gate system must be properly grounded and the incoming power voltage must match the voltage label on the junction box.
- Install enough external entrapment protection sensors so that pedestrians are protected from entrapment in both directions of the gate travel and all hazard areas and possible pinch points are fully protected. Review the information found in External Entrapment Protection Sensors.
- Install the supplied WARNING signs on the inside and outside of the gate so they are clearly visible from both sides of the gate. Installing the signs is a requirement for UL 325 compliance.
- Locate controls (Open, Close, Stop/Reset) where a user will have a clear view of the gate. Refer to ***"Stop Button" on page 22***. Connect radio and other remote access (non-resetting controls) to the RADIO OPEN terminal.

- Connect radio and other remote access (non-resetting controls) to the RADIO OPTIONS terminals.
- Open and close the gate to confirm that it was properly installed and to ensure reduced risk of entrapment. Verify the clearance between the gate and adjacent structures per UL 325 Safety Standards. Have a qualified technician test the gate monthly.
- When you complete the installation, show the end user how to:
  - Remove the operator covers and turn the power off and on.
  - Turn the DC power switch off, which disengages the motor.
  - Loosen the quick disconnect and manually push the gate(s) open & close.
- Remember to re-tighten the quick disconnect before turning the DC power switch back on and replacing the covers.
- Test the red Stop Button located on the side of the control box.

**NOTE**

Gate system instructions must be given to the owner per UL 325 Safety Standards.

## Safety Standards - Owner/User Responsibility

### WARNING

A moving gate can cause severe injury or death. Automatic gate systems move gates with high force. Make sure gates and gate systems are installed to reduce the risks of entrapment. Verify your gate system complies with UL 325 Safety Standards and ASTM F2200 Gate and Fence Standards. Ask for a copy of the gate system's product literature and review it. You are responsible for educating all gate system users about proper use of the automated gate system. Failure to adjust and test the gate system on a regularly maintained schedule can increase the risk of severe injury or death.

- Automatic gates are for vehicular use only; provide and maintain walkways and signs to direct pedestrians to a separate walk-through entrance.
- An automatic gate can start at any time without warning; always keep people away from the gate area.
- Never let children operate or play with gate controls. Keep all remote controls, especially radio transmitters, away from children. Do not allow children to play on or around the gate.
- Learn how to turn the power on and off. Learn how to manually release the gate.

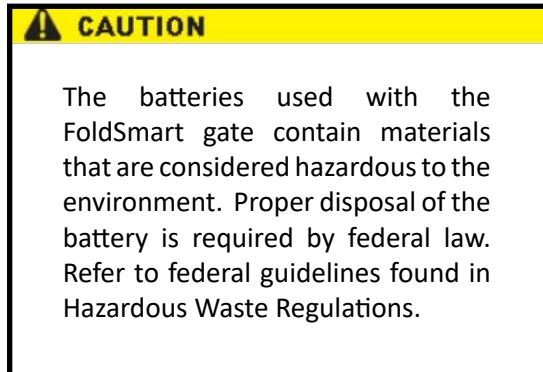
### CAUTION

Before attempting a manual release, make sure the gate is not moving.

- WARNING signs supplied with the gate system must remain installed and clearly visible on both sides of the gate. The signs are required to maintain UL 325 compliance.
- Never disable the Warn Before Operate buzzer and NEVER disconnect or cut its wires. The buzzer provides an alert that the gate is about to move and it must be functional in the event of entrapment regardless of UL 325 gate usage class. Disabling the warning buzzer may increase the risk or extent of injury if entrapment occurs.
- Test the gate system monthly. Specifically, test the internal Inherent Entrapment Sensor (IES) and external entrapment protection sensors. The gate must stop upon contact with a rigid object, and stop or reverse direction, when an object activates the non-contact sensors. After adjusting the force or the limit of travel, retest the gate system. Failure to adjust and test the gate system on a regularly maintained schedule can increase the risk of severe injury or death.
- Have a professional gate installer routinely test the entire gate system and entrapment protection sensors. Have a qualified service person make repairs to gate hardware to keep the gate running smoothly.

## Hazardous Materials and Proper Disposal

FoldSmart uses sealed, state-of-the-art Absorbed Glass Mat (AGM) batteries and highly recommends replacing used batteries with new AGM-type batteries.



To reduce the risk of fire or injury to persons:

- **Observe the polarity between the batteries and charging circuit.**
- **Never mix battery sizes, types, or brands. Wallace Perimeter Security strongly recommends that only sealed AGM style batteries be used.**
- **Exercise care in handling batteries. Be aware that the metal found in rings, bracelets, and keys can conduct electricity, short the batteries, and cause potential injury.**
- **Do not open or mutilate the batteries. Battery cells contain corrosive materials which may cause burns and other injuries. The material within batteries is toxic.**
- **Always dispose of batteries properly. Do NOT place batteries in fire. The battery cells may explode. Follow federal guidelines for proper disposal of hazardous waste.**
- **Replace batteries according to the instructions found in DC Battery Replacement.**

## External Entrapment Protection Sensors

FoldSmart is 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 the entrapment hazards that exist at each particular installation.

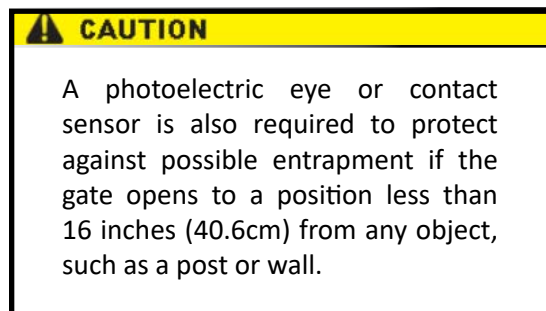
To comply with UL 325, the following external sensors may be used:

- **Contact sensors, such as edge sensors**
- **Non-contact sensors, such as photoelectric eyes**

The site designer or installer can choose either photoelectric eyes or edge sensors or use these devices in combination. Whatever devices are used, protection in both the opening and closing directions of gate travel must be provided.

The UL 325 Safety Standard for automatic bifold gates specifically requires that edge sensors or photoelectric eyes or a combination of both devices be installed to protect against pedestrian entrapment in BOTH directions of the gate travel and where an entrapment hazard exists.

**PHOTOELECTRIC EYES:** One or more photoelectric eyes shall be located where the risk of entrapment or obstruction exists, such as the perimeter reachable by a moving gate.



**EDGE SENSORS:** One or more edge sensors shall be located on the inner and outer leading edge of a bifold gate where the risk of entrapment or obstruction exists. Locate also on the bottom edge(s), if the bottom edge(s) of a bifold gate is/are greater than 101.6 mm (4 in) but less than 406 mm (16 in) above the ground at any point in its arc of travel. [Refer also to "Vehicular Gate Operators (or Systems)" herein.]

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

**SENSOR FUNCTION and COMMUNICATION:** A sensor that transmits its signal to the gate system 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 the end-use conditions.



**UL 325 LISTING:** The edge sensors and photo electric eyes must be tested and labelled as “Recognized Components” under UL 325 in order to be deemed acceptable for use in a gate system. Study the **“Important Safety Instructions” on page 11** and consider your specific installation to determine where the greatest entrapment risks exist. Locate edge sensors and/or photoelectric sensors accordingly.

Be certain that a sufficient number of sensors are used so that pedestrians are protected from entrapment in both directions of the gate travel and all hazard areas are fully protected. Refer to the UL website at <https://www.ul.com/> for the most up- to-date list of gate system safety standards (UL 325). Refer to <https://www.astm.org/> for a complete list of ASTM F2200 Gate and Fence Standards.

## Identifying Gate System Category and Usage Class

The FoldSmart gate system, according to UL 325 Safety Standards, falls in the Bifold Gate category for gate systems. Its usage class is determined by the area that the vehicular gate services. Four different vehicular usage classes are defined by UL 325:



### ***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 multi-family housing units (five or more single family units), hotels, garages, retail stores or other buildings servicing the 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 intended to service 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 the general public, in which access is monitored by security personnel or via closed circuitry.

## Choosing External Entrapment Protection

The site designer or installer must determine which external entrapment sensor devices will be installed with the FoldSmart operator to meet UL compliance. The type(s) of entrapment sensor device systems are described below. For a complete listing of the requirements, see UL 325 Safety Standards.

Usage Class	Inherent Type Device	External Type Device
Class I, II, III	A	B1, B2, C, or D
Class IV	A	B1, B2, C, D, or E

To comply with UL 325, refer to the chart and take the following steps:

1. Select the Usage Class according to the gate's locale and purpose.
2. The required UL 325 inherent Type A sensor is an integral part of the FoldSmart gate system. Based on the gate's usage class, choose External Type Devices: B1, B2, C, D, or E.
  - **To comply using B1 - install non-contact sensors (photoelectric sensor or the equivalent).**
  - **To comply using B2 - install contact sensors (edge sensor device or the equivalent).**
  - **To comply using a Type D device requires a CONSTANT HOLD push-button station. This CONSTANT HOLD push-button station must be the only device that opens and closes the gate. It can only be used where the gate and push-button station will be monitored by personnel 24 hours a day in full view of the gate area. An automatic closing device (such as a timer, loop sensor, or similar device) must not be employed. A Warning placard stating, "WARNING - Moving Gate has the Potential of Inflicting Severe Injury or Death - Do Not Start the Gate Unless the Path is Clear" must be placed adjacent to the gate system controls.**

### NOTE

FoldSmart is equipped with a Type A inherent entrapment sensor (IES) that complies with UL 325. Any impediment to gate travel causes the gate to stop and reverse.

### CAUTION

While compliance is possible with Type C, which is a low force limiting clutch, the FoldSmart operator develops more gate actuation force than is permitted under the UL 325 Safety Standards and, therefore, its clutch cannot be considered an entrapment protection device.

Similar compliance issues exist with a Type E device (audible warn before operate alarm). A Type E device is permitted as a means of external entrapment protection by UL 325 in Class IV applications, but it is not recommended by Wallace Perimeter Security because a buzzer warns, but cannot protect against possible entrapment. Wallace Perimeter Security highly recommends, even for Class IV use, that external entrapment protection (edge or photo-eye sensor) devices be installed to detect possible entrapment.

## UL 325 Compliant Sensors

The following sensors have been tested with Nice | 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.

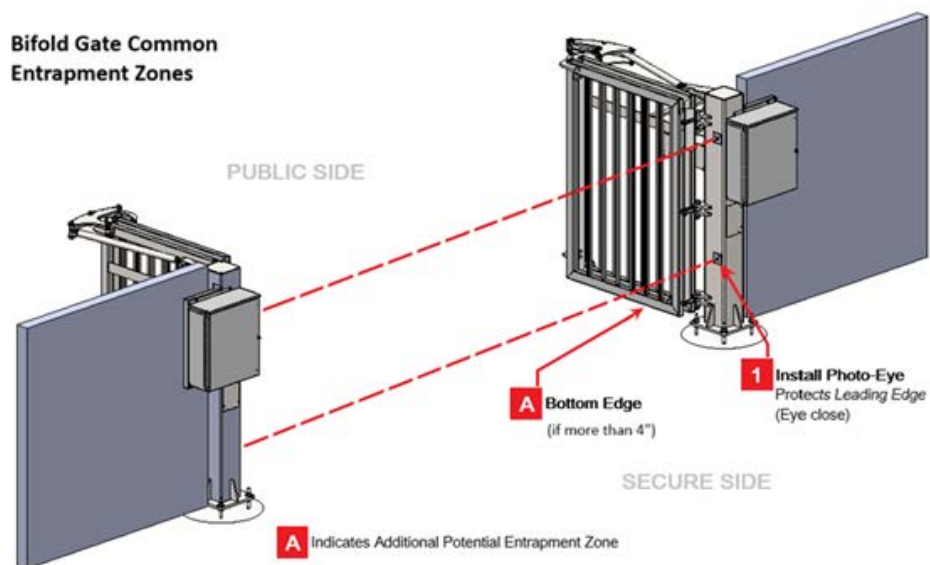
### NOTE

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.

Recommended External Entrapment Protection Sensors List for FoldSmart				
	Mfg. Part # or Model	Brand	Wallace Perimeter Security Part #	Max. Range
Photo Eyes (Retro-reflective)	E3K-R10K4-NR-1	Omron	-	40 ft (12.2m)
	NIR-50-325	EMX	-	45 ft (13.7m)
	IRB-RET	EMX	-	53 ft (16.1m)
	E-931-S50RRGQ	Seco-Larm	-	46 ft (14m)
Photo Eyes (Thru-Beam)	OVS-50TNR	Optex	-	33 ft (10m)
	IRB-MON	EMX	100620	65 ft (19.8m)
	E-960-D90GQ	Seco-Larm	-	90 ft (27.4m)
Edge Sensors	Sentir Series	ASO Safety	100543	-
	CPT210-2U-#-T2	Miller Edge	-	-
Edge Sensor Converters	Hy2NC (Converts 10K to NC Monitoring)	HySecurity	-	-
Multi-Input Module	The Solution – MIM-62	Miller Edge	-	-

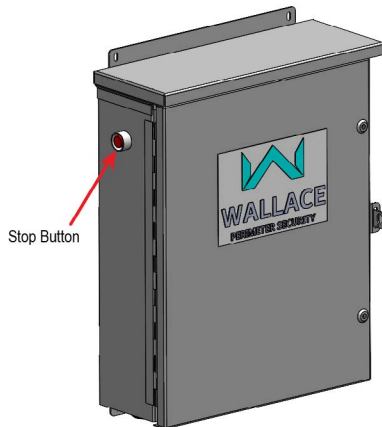
Recommended External Entrapment Protection Sensors List for FoldSmart	
<b>Excerpts from UL 325 Standard:</b>	
The operator shall monitor for the presence of every device at least once during each open and close cycle. (Clause 32.1.8 of the Standard)	
It shall not be possible to make simple modifications 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. (Clause 32.1.10 of the Standard)	
Entrapment zones are now defined for each gate type. (Clauses 4.23, 4.24, 4.29, 4.34 of the Standard)	
<p>Bifold Gates: To enable fully automatic operation, all bifold 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.</p> <p>Preferred solution for bifold 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.</p>	

Installers must assess each specific site and install sensors that protect all potential entrapment zones. See figure below; EYE CLOSE is programmed at the appropriate sensor input (1, 2 or 3). Refer also to **“Figure 28-1. Photo Eye Placement for External Entrapment Protection” on page 124**, and Figures 28-2 to 28-5.



## Stop Button

A stop button is accessible from the outside of the operator. The red stop button on the FoldSmart operator is located on the side of the control enclosure.



Pressing the 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 stop button is located.

## Manual Release

Make sure to teach all users how to turn off electric power and how to move the gate manually. FoldSmart allows a gate to be pushed manually if the quick disconnect bolt is removed from the actuator arm. 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. Remove the quick disconnect bolt using the included key.
3. Swing the gate(s) open or close.

For additional details refer to *“Manual Release Procedure” on page 53.*

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

1. Make sure the gate(s) is not moving.
2. Reinstall the manual disconnect.
3. Flip the DC power switch ON.
4. Clear any faults by pressing RESET.

## 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 system in high wind areas, the gate design will affect the load on the gate system. Because wind force acts the same as an obstruction, it is important that gates be designed to present a relatively low surface area for the wind to push on the gate panel.

If the gate is heavy and near the weight capacity of what the gate system can handle (see specifications for FoldSmart on the back cover), 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 the gate system and is not covered by the Wallace Perimeter Security Limited Warranty.

Several factors play into the calculations of the wind load on a gate panel. To find out the maximum wind speed in areas around the United States/Canada or other regions, search for the relevant 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 the gate system and gate panels.

FoldSmart incorporates a Type-A inherent entrapment sensor (IES) into its design per UL 325 Safety Standards. (More information about adjusting the adaptive IES software can be found in this manual under ***"Adjusting the IES Sensitivity" on page 80.***) When the IES trips, it sends a signal to the gate system to stop and reverse direction. This feature may be falsely triggered in excessively windy conditions because the wind itself, acting over the surface area of the gate panel, can provide the necessary force to trigger the IES.

### CAUTION

Do not adjust IES sensitivity to accommodate for inappropriately designed gate panels. Loss of IES sensitivity increases mechanical wear on the gate hardware and the gate system. It may also pose a safety hazard. Compensating for wind loads by adjusting the IES may set the IES sensitivity to a level which, when encountering an obstruction, ignores the obstruction and fails to reverse direction. For more information, refer to ***"Adjusting the IES Sensitivity" on page 80.***



## FoldSmart Gate Delivery and Unloading

1. Once the truck arrives, you will need a forklift with a minimum lifting capacity of 5,000lbs (2,268 kg) and 6 ft (2m) long forks (or fork extensions) to unload.



4. Take care when lifting.



2. The crates are built with openings at the bottom to be securely lifted by a forklift from the truck.



5. Crates marked with "Open This Side" for unpacking.



3. Crate may be unbalanced.



6. Contents are fragile.





7. Upon opening the crate(s), depending upon gate configuration, you will generally find one of the following.

**A. Single Folding Gate:**

- One post (column) with two hinged-together folding gate panels attached
- One drawbar (bar across top of panels)
- One motor and gearbox container
- One (primary) operator container
- One catch column (accompanies most orders; utilized to mount exterior photo eyes, vertical catches)

**B. Dual Folding Gate:**

- Two posts (columns) with four folding gate panels attached:  
Post 1 attachment: two hinged-together panels to fold one way  
Post 2 attachment: two hinged-together panels to fold the other way
- Two drawbars (one bar across top of each set of panels)
- Two motor and gearbox containers
- Two (primary & secondary) operator containers



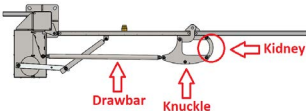
**NOTE:**

Due to its modular construction design, the FoldSmart Gate may be shipped differently than described herein.



## Tools Required

TOOL DESCRIPTION	USED FOR
<b>Anchor Installation:</b>	
SDS - MAX Hammer Drill	Drilling Holes in Concrete
7/8" Masonry Drill Bit for SDS - MAX	Concrete Anchors (hole depth of 9" required, for minimum embedment of 8-1/4")
3/4" Drive adaptor for SDS - MAX	--
Hilti Nuts Provided – 1-1/4" Socket SDS/TE-C Chuck Type	Driving Anchors into Epoxy
Regular Nuts Provided – 1-1/8" Socket SDS/TE-C Chuck Type	
Hilti Nuts Provided – 1-1/4" Combination Wrench x2pcs	For Leveling Anchors
Regular Nuts Provided – 1-1/8" Combination Wrench x2pcs	
Shop Vacuum 3/4" round steel brush, air pump (not bulb type)	Clean Out Anchor Holes in Concrete
Rotating Laser Level	Leveling Anchors
<b>FoldSmart Gate Installation:</b>	
Telescopic boom forklift or equivalent with a reach capacity of at least 4' above gate structure	Lifting Gate/Parts
Scissor lift (preferred) OR Scaffolding with wheels	Working on Gate Structure
Eye-to-Eye Sling with Vertical Lift Capacity of 6400lbs - 1 piece (16' - 20')	Lift Gate/Parts
Eye-to-Eye Sling with Vertical Lift Capacity of 2000lbs - 2 pieces (4' - 6')	Lift Gate/Parts
C-clamps or equivalent - 4 pieces (6" - 8")	Lifting Gate Panels
Bubble/Spirit Level - 4' OR Larger	Leveling Gate Structure & Anchors
Column Hinge Bolts to Panels: 1-1/2" Combination Wrench	For Securing/Leveling Panels
Column Side – 1-1/8" Combination Wrench x2pcs	For Drawbar Installation
Knuckle Linkage Side – 15/16" Combination Wrench x2pcs	
3/8" Hex Driver	For Knuckle Linkage
15/16" Combination Wrench x2pcs	

TOOL DESCRIPTION	USED FOR
3/8" Hex Driver	
15/16" Combination Wrench	
#2 Robertson Bit	
3/8" Combination Wrench	
<b>General FoldSmart Gate Tools:</b>	
Extension Cord 100 - 200'	As Jobsite Conditions Require
Angle Grinder	Cutting Concrete Anchors
3 - 4 lb Sledge/Ball Peen Hammer	Miscellaneous
Combination Wrenches 3/4", 1/2"	Gate Fasteners
Ratchet 1/2" drive with 3/4" Deep Socket OR 3/4" Socket with Extension	Gate Fasteners
Ratchet 3/8" or 1/4" drive with 1/2" & 7/16" Socket	Gate Fasteners
1/2" Cordless Drill with Robertson/Square, Phillips, 1/4" Bit Driver and 1/8" concrete drill bit	Gate Structure & Electrical
1/2" Corded Drill with 1/4", 3/8", and 1/2" Cobalt Drill Bits	Drilling Through ¼" Steel
1/4" Multi-Drive Screwdriver	Gate Fasteners
Measuring tapes, wire cutters/strippers, utility knife, permanent marker, multi-meter	Miscellaneous
Pail/mixing wand/trowel, for grouting beneath flange mount plates	Gate Columns

## Included

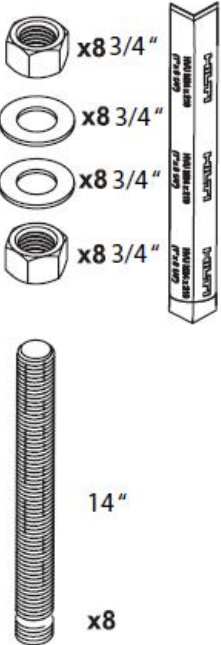

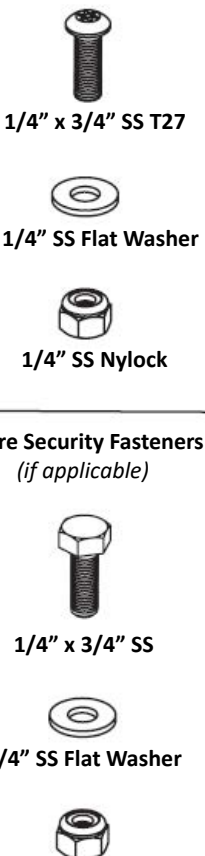


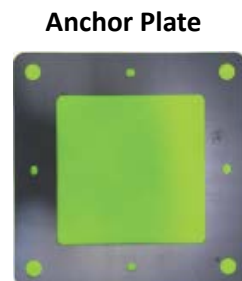
**Penta Key**  
For use with 1/2-inch socket.  
(Socket not supplied with gate.)



**T-27 Security Driver Bit**  
(if applicable)

## Fasteners

 <p><b>Gate Anchor</b></p>	 <p><b>Concrete Template</b></p>	 <p><b>Spare Regular Fasteners</b> (if applicable)</p>
--	--	---



x2

# FoldSmart Gate Installation

The FoldSmart Gate installation should only be carried out by personnel qualified by Wallace Perimeter Security.

## REQUIRED FACILITIES:

The following facilities must be present at the installation site:

- Electricity for the operator cabinet (208 / 230VAC single phase, 2 hot wires, 1 ground wire). [Note that to use the 115VAC service outlet on a 208/230VAC installation, **the electrician needs to run an extra neutral wire to the operator** from the power source and wire the service outlet per code. Refer to ***“Power” on page 54.***]
- Control wiring to the central controls (depending on the chosen control system).

## INSTALLATION CONSIDERATIONS:



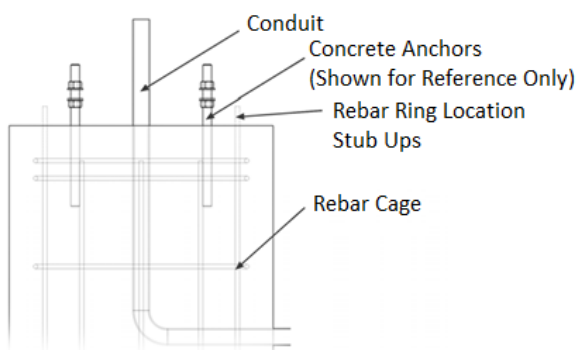
When carrying out all hoisting activities, make sure that the strength of the hoisting straps is sufficient to bear the weight to be hoisted. Pay attention to the angle of the hoisting straps. The greater the angle, the lower the drawing strength of the hoisting straps. (Consult the strap manufacturer for more information).

**During installation, avoid damage to the coating layer of the FoldSmart Gate if it is powder-coated.**

The following step-by-step instructions for the installation and connection of the FoldSmart Gate should be followed.

## Footing and Foundation Installation

1. See standard product drawings for recommendations on foundation design. Final design by others.

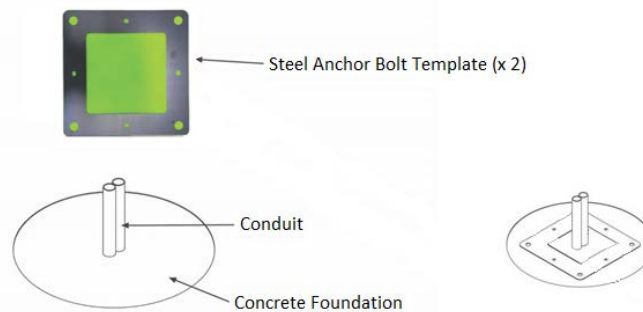


**Footing/Foundation**

### NOTE

The footing details are a guideline and are only for reference, as local environmental and soil conditions should be taken into account. Contact Wallace Perimeter Security for more information.

2. Using a leveling device, check to see that the foundations for the gate are level with each other. In case of foundations that have been set to different elevations, the anchor bolts will need to be lengthened to accommodate the inconsistency. **FoldSmart Gate columns should always be placed as close as possible to the concrete foundation, using leveling nuts in all cases.**
3. Place each steel anchor bolt template on the prepared foundations making sure that templates are aligned and centered on the foundations. If the FoldSmart Gate is being installed near a wall, object or pre-existing opening make sure that each side of the template is the same distance from the wall, object or pre-existing opening. See FoldSmart site-specific general layout drawings that are provided by Wallace Perimeter Security for exact dimensions of the gate foundations.



**Anchor Bolt Template and Foundation**

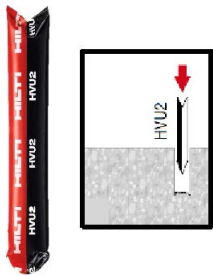
4. Ensure that the required conduits fit in the center of the anchor bolt template. Using 3/4" anchor bolts [.75" (19mm) HILTI HAS 5.8 x 14" (356mm) or equivalent], imbed the anchors using epoxy chemical anchor (HILTI HVU2 or approved equivalent).

**NOTE**

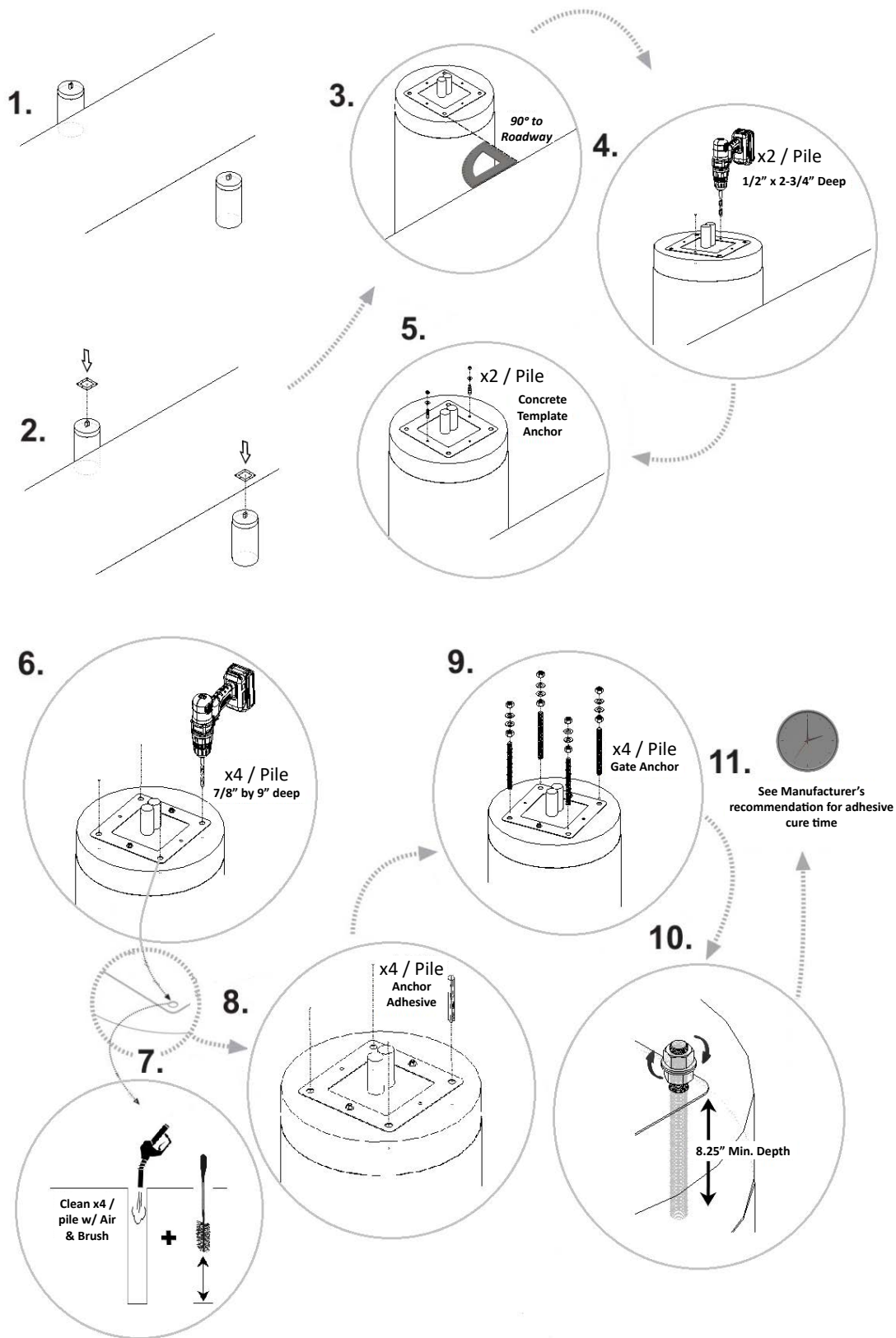
The manufacturer's written instructions must be read and followed prior to using the epoxy system.

5. Ensure minimum of 5-3/4" (14.6cm) thread is exposed above the foundation, and 8-1/4" (21cm) embedment minimum. See chemical anchor installation guide accompanying the product for depth of anchor holes. HILTI anchors and epoxy are available from Wallace Perimeter Security.

The installer shall read and follow the manufacturer's written instructions for HILTI HVU2 3/4" X 8 1/4" accompanying the shipped adhesive capsule product. Refer to step-by-step diagram on the following pages, summarized below.

<b>SUMMARY OF DIAGRAM STEPS 1 TO 11:</b>	
STEPS 1, 2, 3	As indicated in diagram on following page. (Place each steel anchor bolt template on the prepared, leveled foundations and center the conduits.)
STEP 4	On both concrete piles: Drill two (non-corner) 1/2" by 2-3/4" deep holes directly opposite one another into the pre-drilled steel anchor bolt template.
STEP 5	On both concrete piles: Insert two wedge anchors into the 1/2" by 2 3/4" deep holes.
STEP 6	On both concrete piles: In the four corners of each pre-drilled steel anchor bolt template, drill with 7/8" drill bit to achieve a hole for a 3/4" anchor; 9" (23cm) depth--which provides for 8-1/4" (21cm) anchor and epoxy embedment depth.
STEP 7	On both concrete piles: Use a hand-operated air pump in combination with a hole-cleaning brush to clean debris and dust from each of the drill holes prior to anchor installation.
	On both concrete piles: Check the setting depth in each of the (four-corner) hammer-drilled holes. Ensure minimum of 5-3/4" (14.6cm) thread is exposed above the foundation
STEP 8	<p>On both concrete piles: Insert the HILTI foil (mortar) capsule with the peak ahead (tapered end) to the back of the hole.</p> 
STEP 9	Using 3/4" anchor bolts, embed the anchors; drive with plugged tool into the hole(s). A nut and washer shall be tightened on each anchor bolt.
STEP 10, 11	8-1/4" (21cm) is the minimum depth for driving the anchor into the hole. Refer to manufacturer's instructions for appropriate curing time.





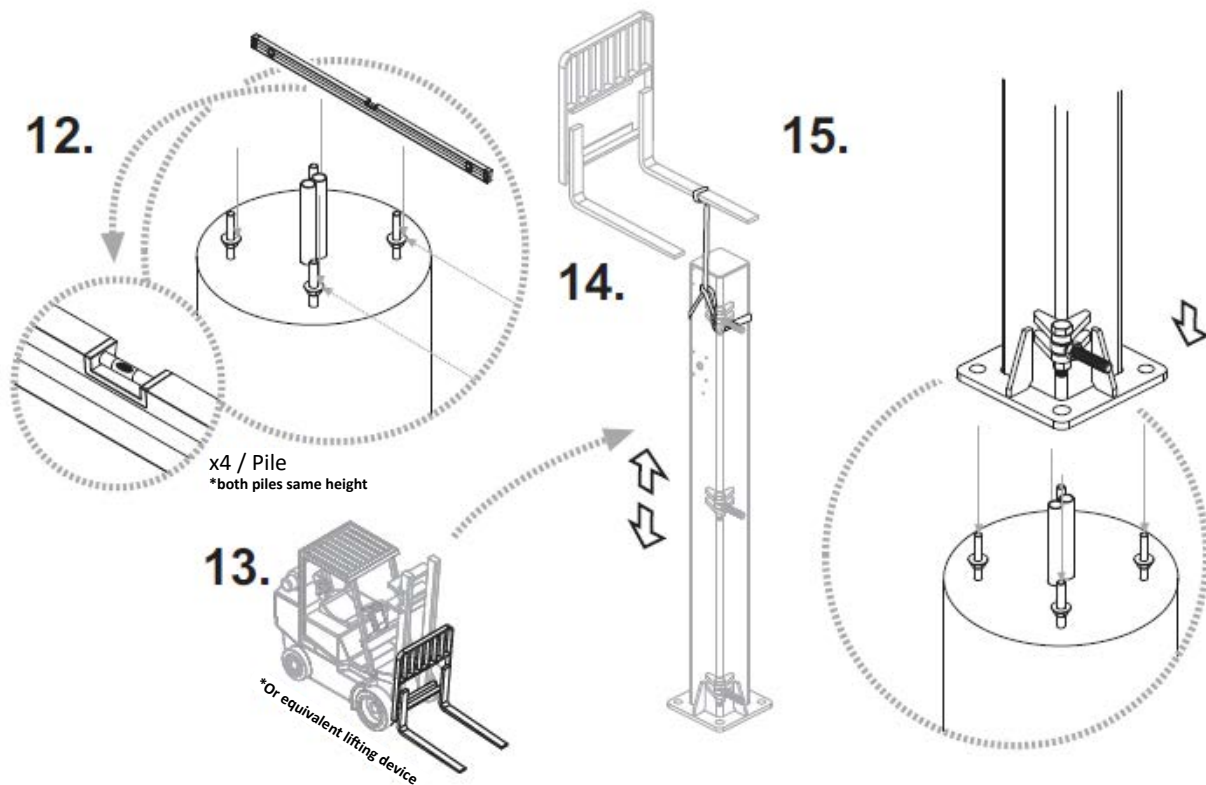


## Gate Installation



Use extreme caution when handling, moving, or slinging the panel sections. Black gate edges may be installed (one horizontal on bottom of outer panel section, two vertical on inner panel section). They are susceptible to damage if mishandled. Always use blocking when working with panels to prevent damage to gate edges.

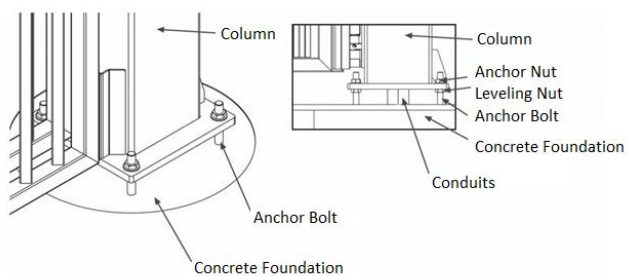
1. Using slings and/or appropriate straps, secure columns and panels in place.



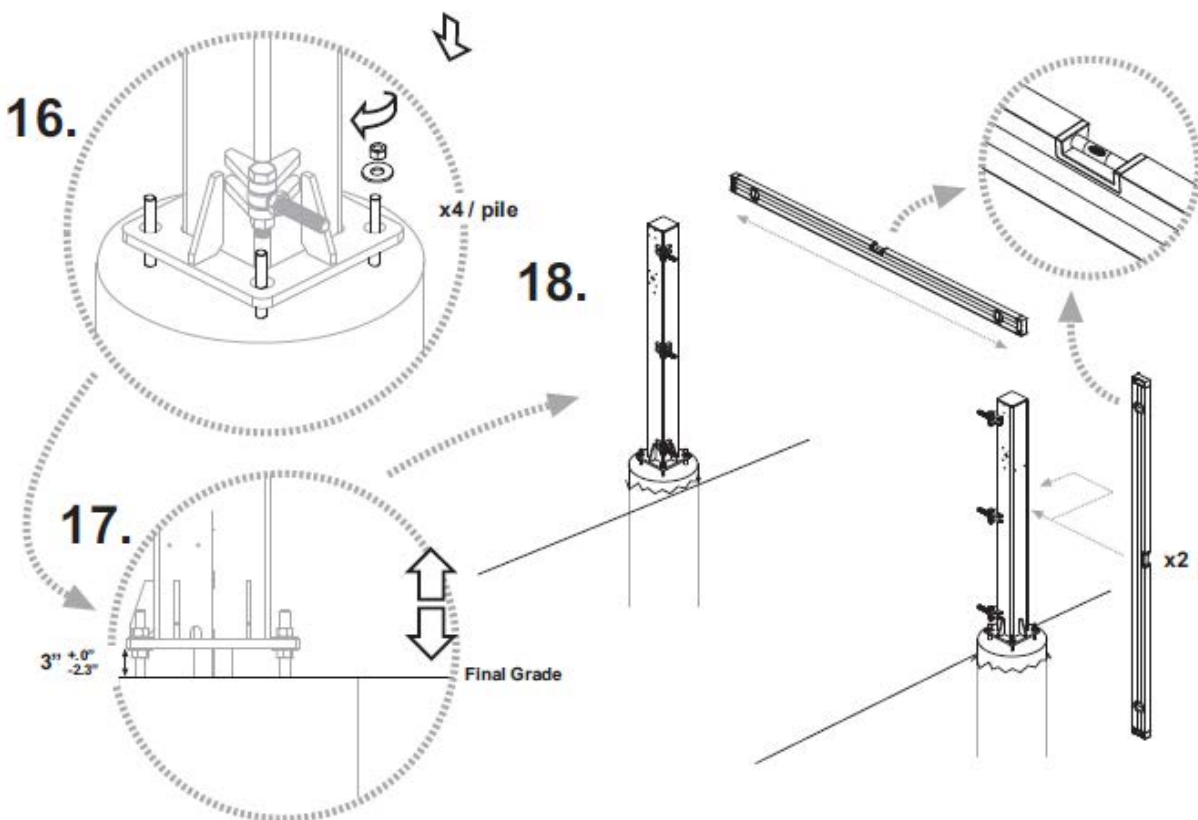
2. Place columns using leveling nuts/washers, maintaining base flange plate as close to the pile surface as possible. Refer to diagram steps 12 to 15 above.

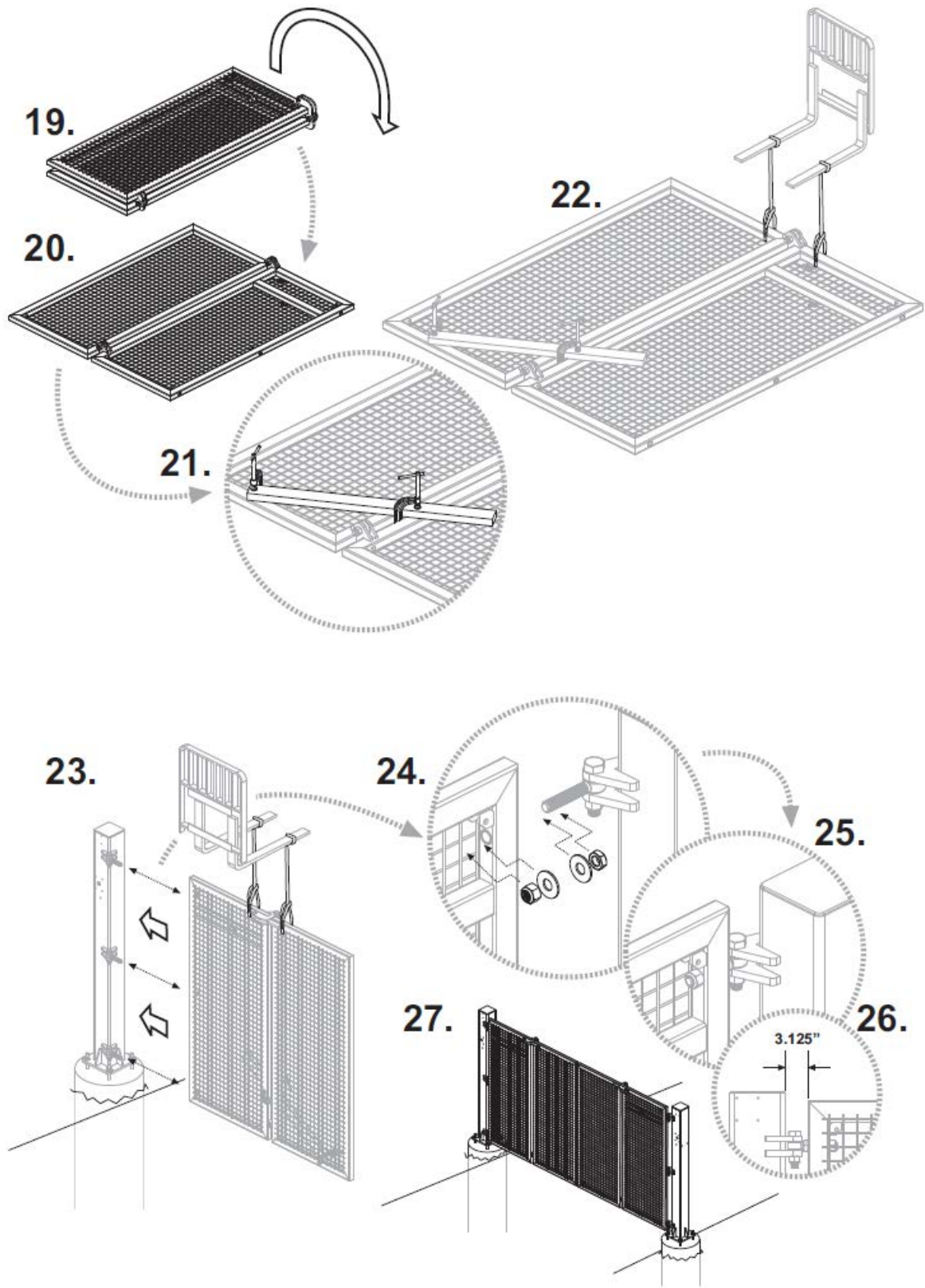
Columns are left/right side specific. Take note of the photo eye plate and hinge mounting hole locations. Photo eye location cut-out should face toward the gate opening; the hinges should face toward the Secure Side (this will allow for the gate to swing into the property when opening). If you require the gate to open AWAY from the Secure Side, reverse the location of the hinge mounting holes. As per UL 325 a FoldSmart Gate opening toward the Public Side must have the panels remain over the owner's property and not move out onto a public sidewalk or street.

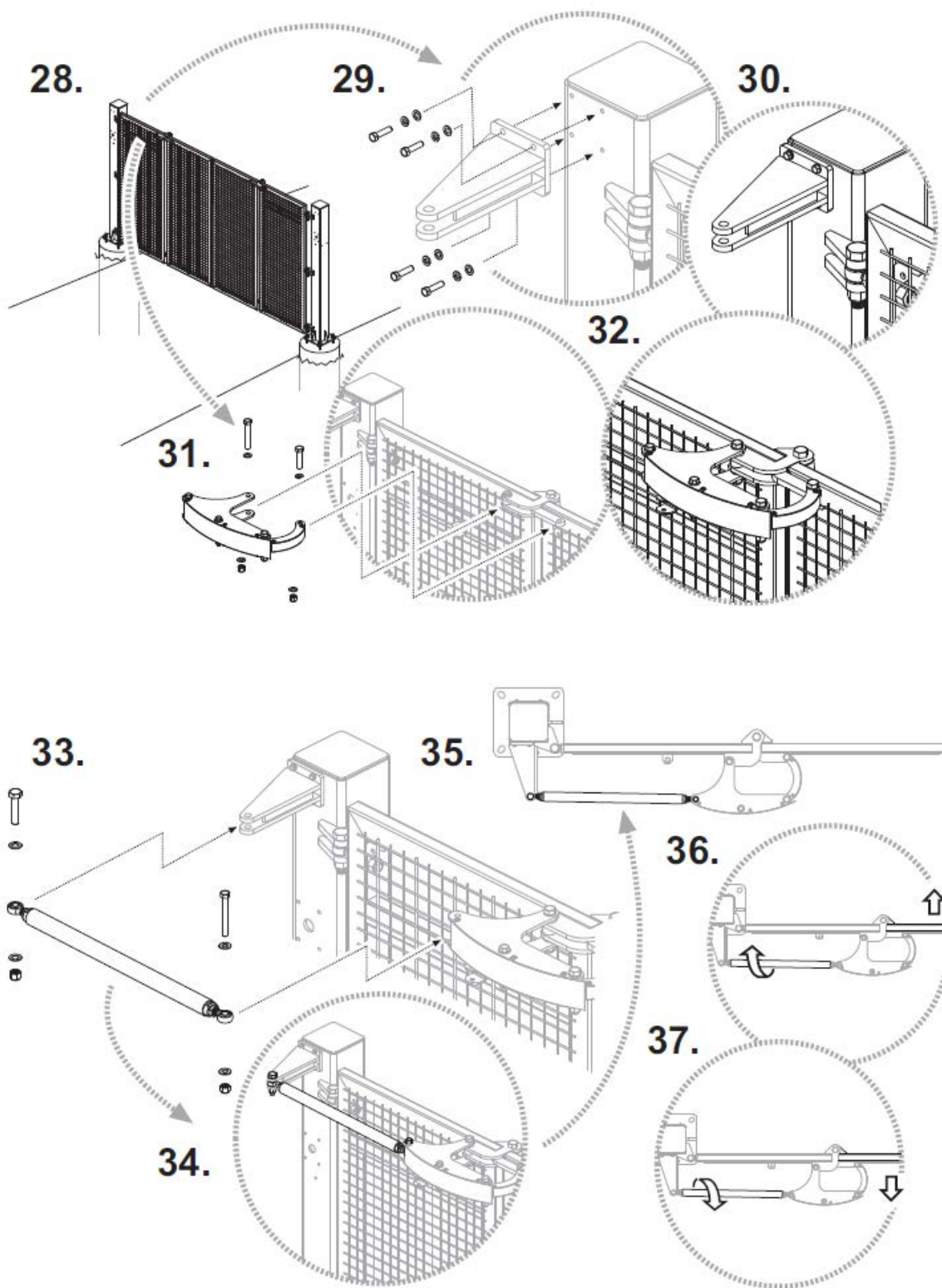
3. Secure both columns using nuts/washers.



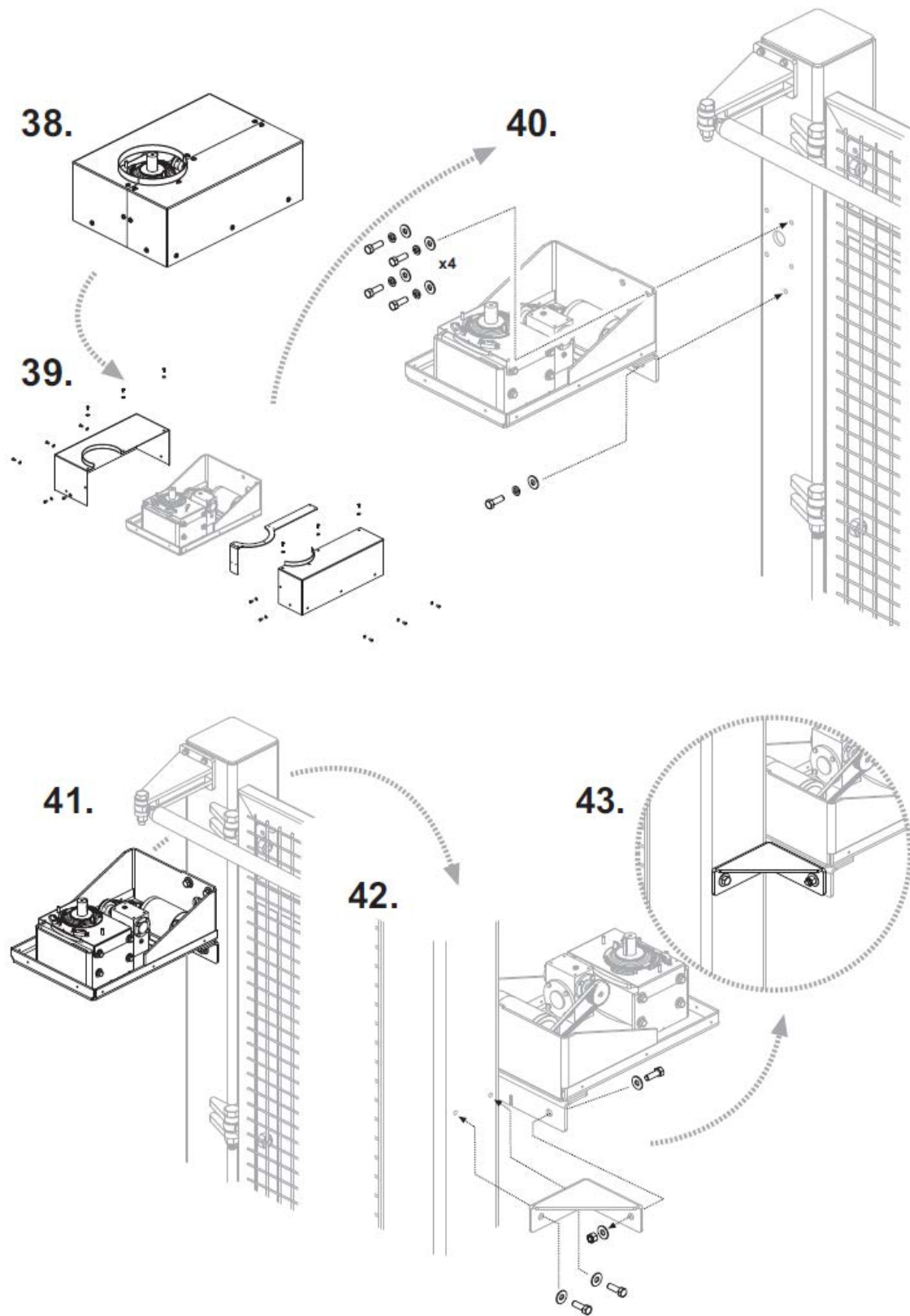
### Securing of Columns

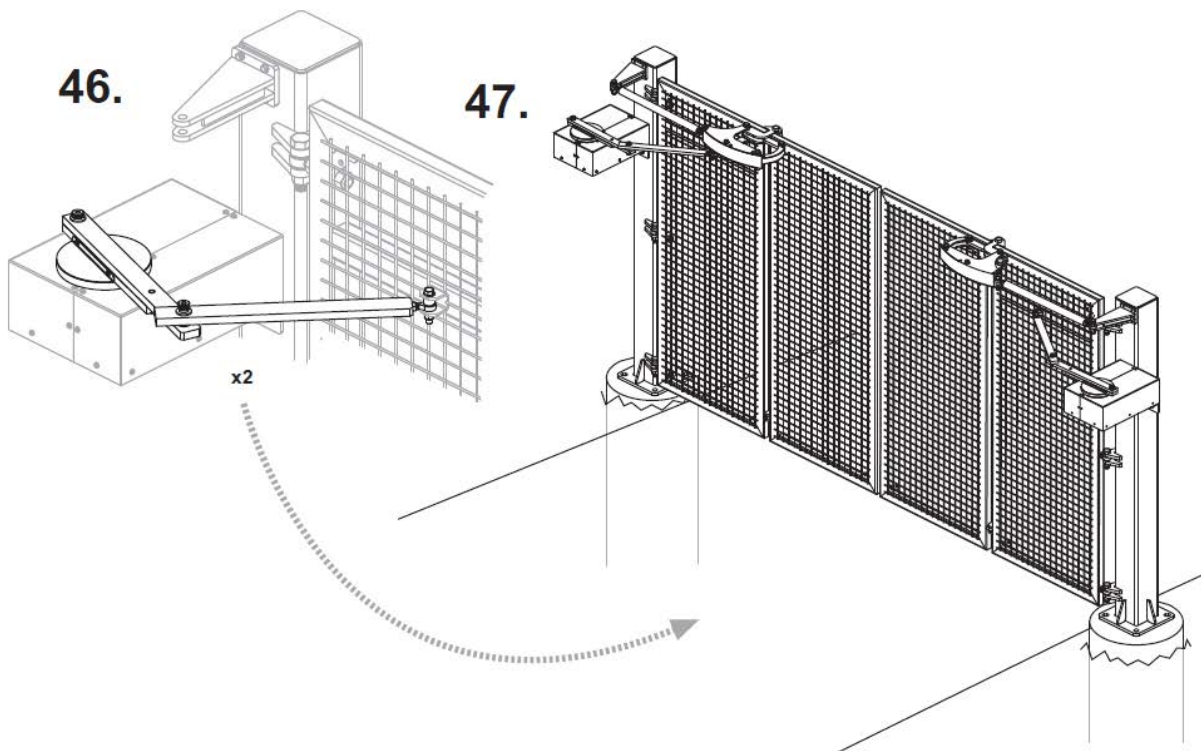
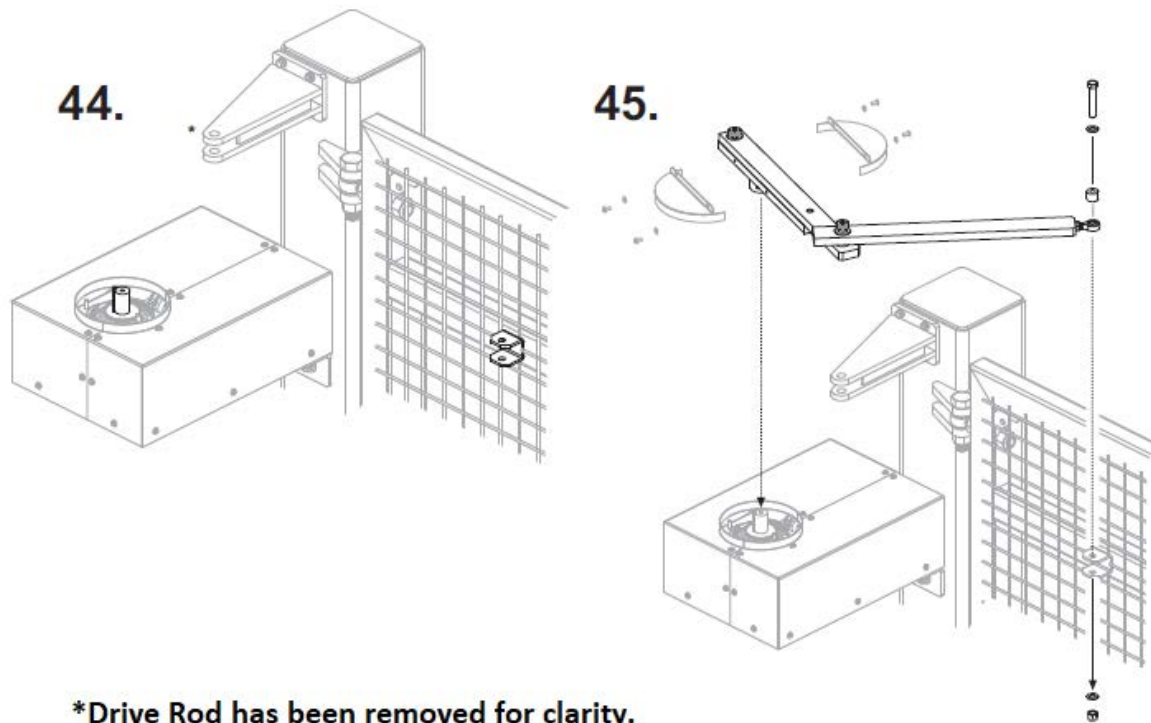












4. Once all gate components have been assembled and installed, double check all components for level/square fitting. Using non-shrink grout, fill the area between the FoldSmart Gate column base plates and the concrete foundation.

## Vehicular Gate Operators (or Systems)

- 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.
- For a gate operator utilizing Type B2, contact entrapment protection in accordance with 32.1.1.1:

One or more contact sensors shall be located where the risk of entrapment or obstruction exists on a bifold gate, such as:

1. At the inner and outer leading edge,
2. Between the outer column panel and the inner bifold panel of an opening bifold gate,
3. Between the outer/column panel and any obstruction within 406mm (16 in) of the gate panel when it is in the fully open position,
4. At hinge points depending on the construction of the gate,
5. On the bottom edge(s), if the bottom edge(s) of a bifold gate is/are greater than 101.6 mm (4 in) but less than 406 mm (16 in) above the ground at any point in its arc of travel.

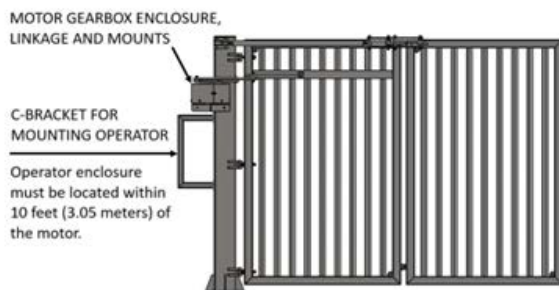
## Operator Cabinet Installation

Mount the operator cabinet in a secure location. It is recommended to mount on the secure side of the fence line; i.e., the property side. Operator cabinet locations will also be based on the specific site environment, infrastructure and security set-up. Additionally, mount the operator cabinet in a location:

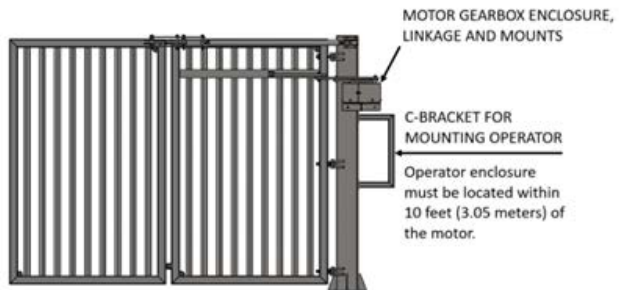
- Permitting adequate work space around the cabinet, so the installer is not within reach of either the moving gate panels or vehicle traffic.
- As near as is practical to the FoldSmart gate, to minimize the electrical wiring requirements between the gate and the operator cabinet.
- Permitting a direct line of sight between the operator cabinet and the gate, enabling visual scanning of the area for obstructions prior to gate operation.
- Facilitating the wiring of the vehicle detector loop leads to the operator cabinet.

In a dual gate configuration (most common) one motor and gearbox, with an operator, are installed on each gate column. **Each operator enclosure must be located within 10 feet (3.05 meters) of motor, whether a dual or single-folding gate.** Enclosure height and position shall be site-determined.

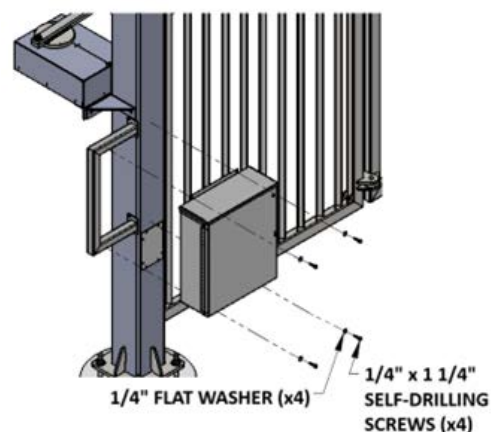
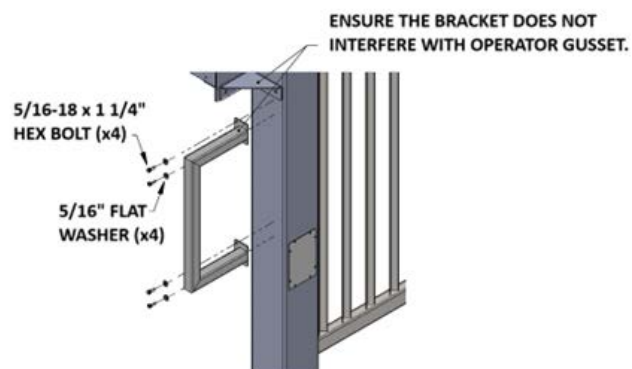
TYPICAL MOUNTING ARRANGEMENT - COLUMN 1 (C1) SIDE OF DUAL FOLDING GATE



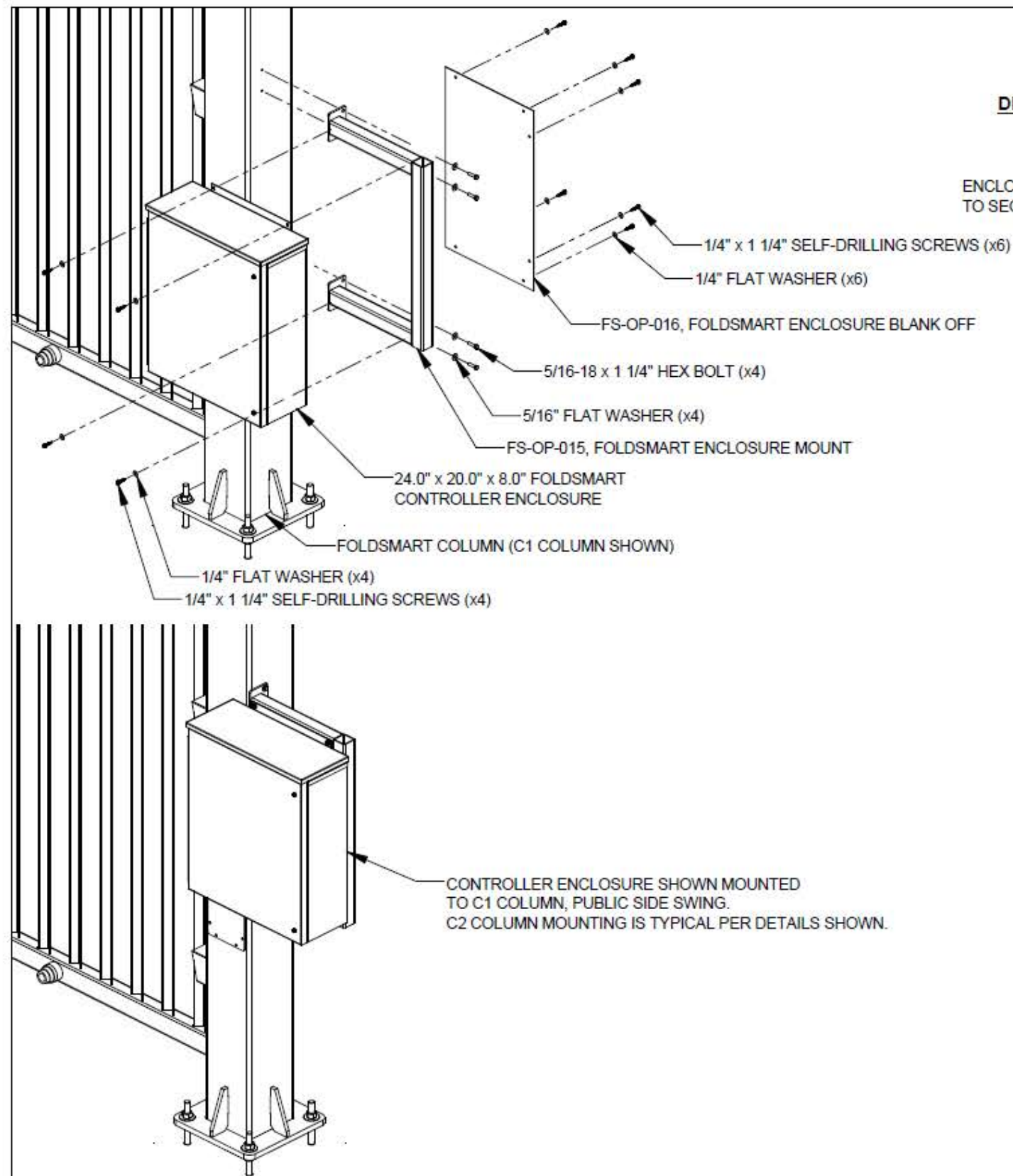
TYPICAL MOUNTING ARRANGEMENT - COLUMN 2 (C2) SIDE OF DUAL FOLDING GATE



Wallace Perimeter Security supplies the drill bit and self-tapping screws for mounting C-brackets and operator cabinets to the side of gate columns, as shown below. Details of a typical operator cabinet mounting are provided in drawing No. FS-Enclosure Mounting - *FoldSmart Controller Enclosure Mounting Details*, on the following page.

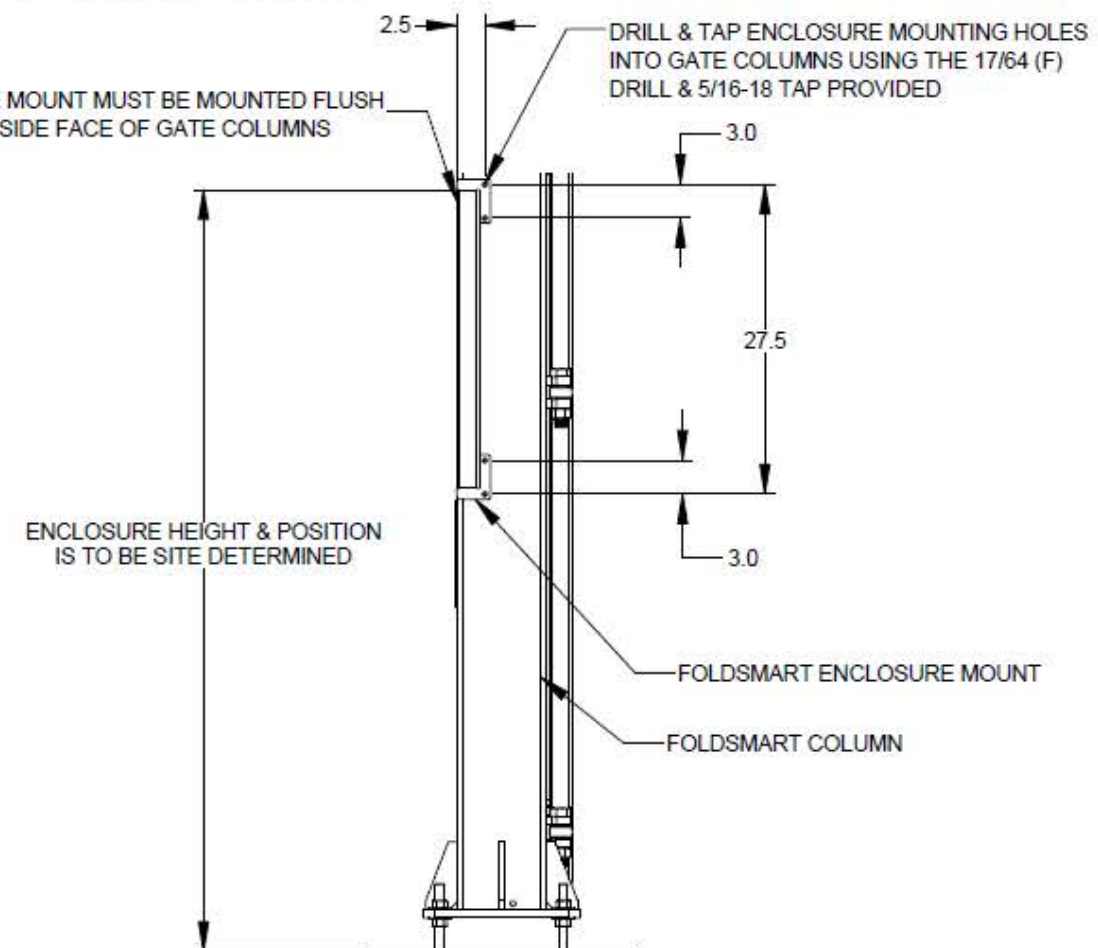






#### DETAIL A - COLUMN PREPARATION

ENCLOSURE MOUNT MUST BE MOUNTED FLUSH TO SECURE SIDE FACE OF GATE COLUMNS



#### NOTE

GATE SWINGING TO PUBLIC SIDE IS SHOWN.  
IF GATE SWINGS TO THE SECURE SIDE, ENCLOSURE WILL BE MOUNTED TO THE OPPOSITE SIDE OF COLUMN.



115 Lawson Crescent  
Winnipeg, Manitoba, Canada, R3P 1A6  
Phone: 1-866-300-1110  
Fax: 1-204-284-1868  
Web: [www.wallaceperimetersecurity.com](http://www.wallaceperimetersecurity.com)

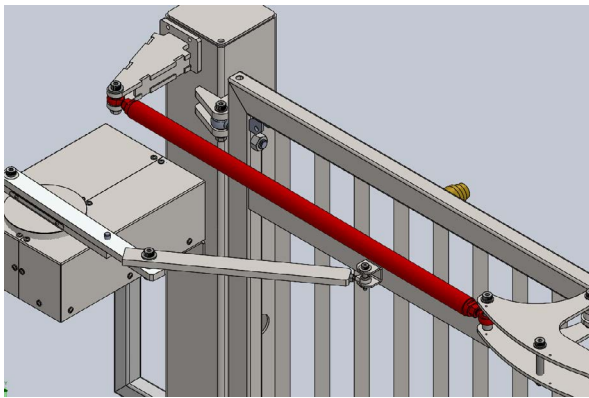
Description: <b>FOLDSMART CONTROLLER ENCLOSURE MOUNTING DETAILS</b>			
Customer:			
Finish:	Date: 12/3/2024		
Drawing No. <b>FS-ENCLOSURE MOUNTING</b>	Rev.:	Sheet: 1 of 1	



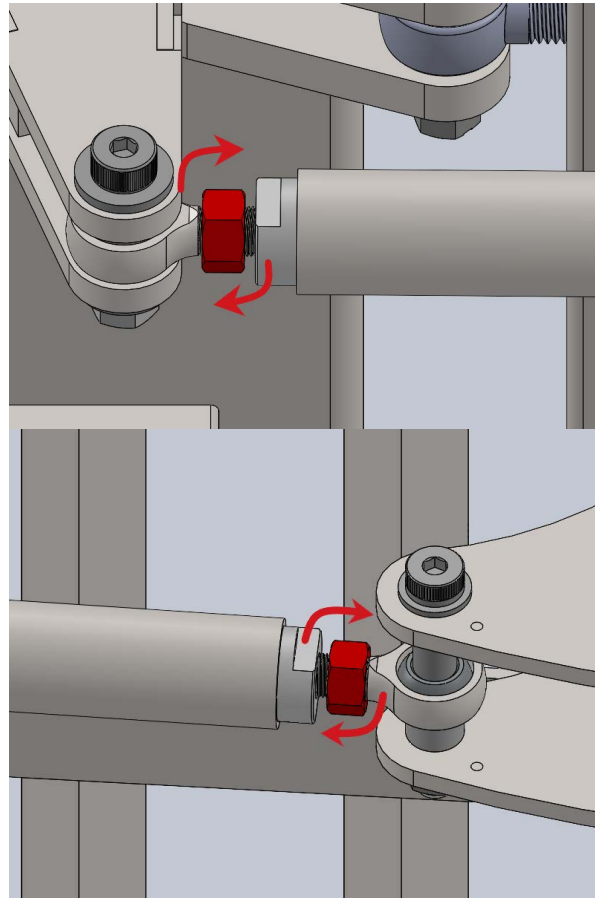
# Installation Adjustments

## Drawbar Adjustment Procedure

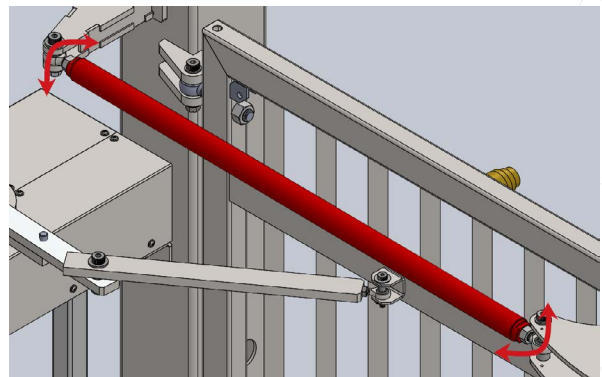
The FoldSmart gate uses a length-adjustable drawbar to align and center the panels.



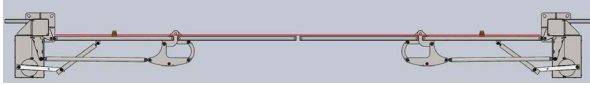
1. This adjustment is to be done in conjunction with limit setting via the limit switches. **Before completing the drawbar adjustment, ensure the gate limits have been set using the Limit Switch Adjustment Procedure.**
2. To complete the drawbar adjustment, first ensure the gate is in the fully closed position. Move the gate closed manually or by utilizing the CLOSE push-button on the SmartDC control board.
3. You will need a 1-1/8 inch wrench to loosen off the nuts on either side of the drawbar. A 1-1/4 inch wrench is required to hold the drawbar in place while loosening off each nut. The threading on each side is opposite.



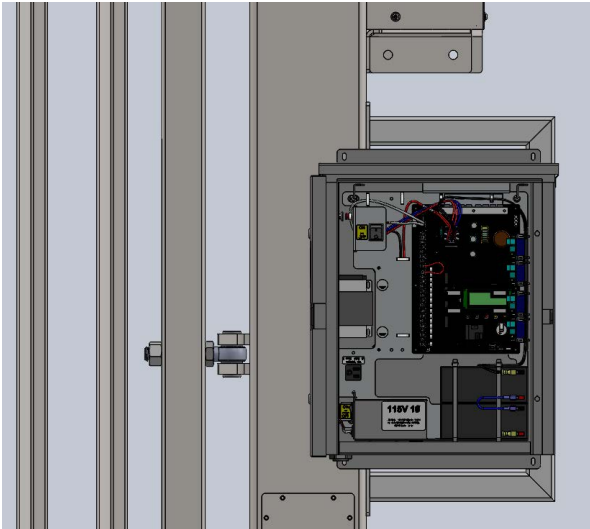
4. Once the nuts have been loosened, a 1-1/4 inch wrench may be used to rotate the drawbar either clockwise or counterclockwise. The direction of rotation will either shorten or lengthen the drawbar, moving the gate panels toward you or away from you.



5. Once adjusted so that the gate panels are square at a 90-degree angle to the roadway, tighten the nuts on either end of the drawbar to lock in the current position.



6. Ensure traffic, both pedestrian and vehicle, is clear and then test the gate by pushing the OPEN push-button on the SmartDC control board.



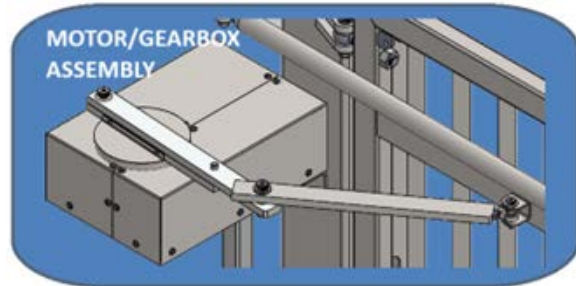
7. Ensure the open limit is suitable and the gate, when closed, does not bind on the steel vertical catches. If there is binding, further adjust the drawbar or limit switches as needed.



## Installing Linkage Arm to Gearbox Limit Hub

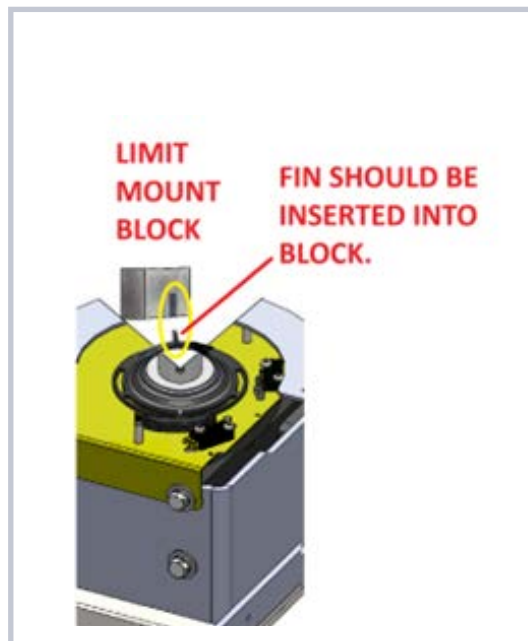
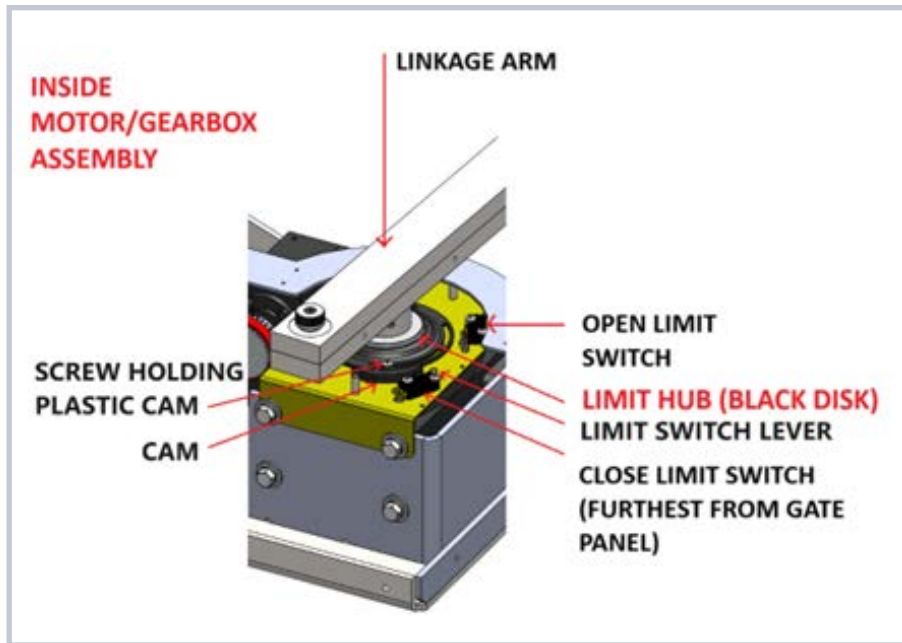
The following installation should be undertaken prior to adjusting limit switch cams.

Inside the motor/gearbox assembly attached to the gate column, there is a limit hub (black disk). An extruded plastic piece, known as a *shark-fin* or *fin* jutting out from the surface of the limit hub, should be inserted into a slot on the limit mount block (bolted underneath the base linkage arm). This prevents limit switch over-travel. Follow these instructions to ensure the fin is inserted, and linkage arms are properly installed.



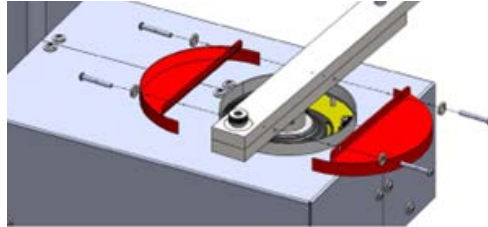
Located in the gearbox, the limit hub is a rotating (spinning) disk with two cams that also spin during each OPEN or CLOSE gate cycle. Each limit switch (open limit switch and close limit switch) is activated by a cam at the appropriate position. Since each cam trips one of the switches, it is important to maintain the proper travel limit; otherwise, gate travel will stop before a cycle (OPEN or CLOSE) is complete.

Each motor/gearbox assembly will have its own pair of limit switches. On a dual gate system (most common), there will be two such assemblies; one at each gate column. Check both.

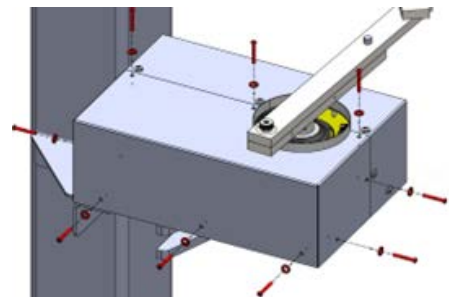




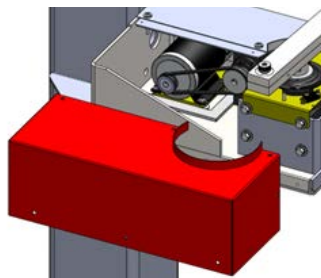
1. Ensure gate is CLOSED and operator DC and AC power switches are turned OFF. To access the limit switches, remove motor/gearbox housing cover:
  - a. Use a T27 Torx security bit to remove the 4 security screws fastening the 2 external limit switch covers ("half- moons") to the gate linkage arm. If using a drill or impact driver, set to a slow speed to avoid damaging the fasteners and/or bit. Remove covers.



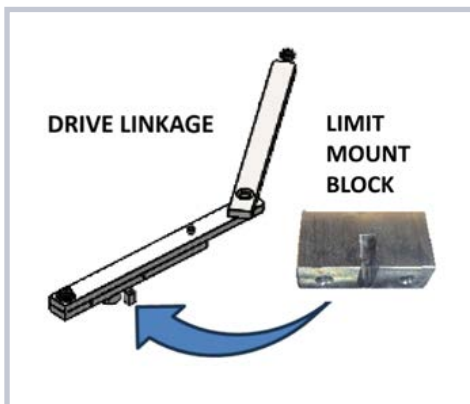
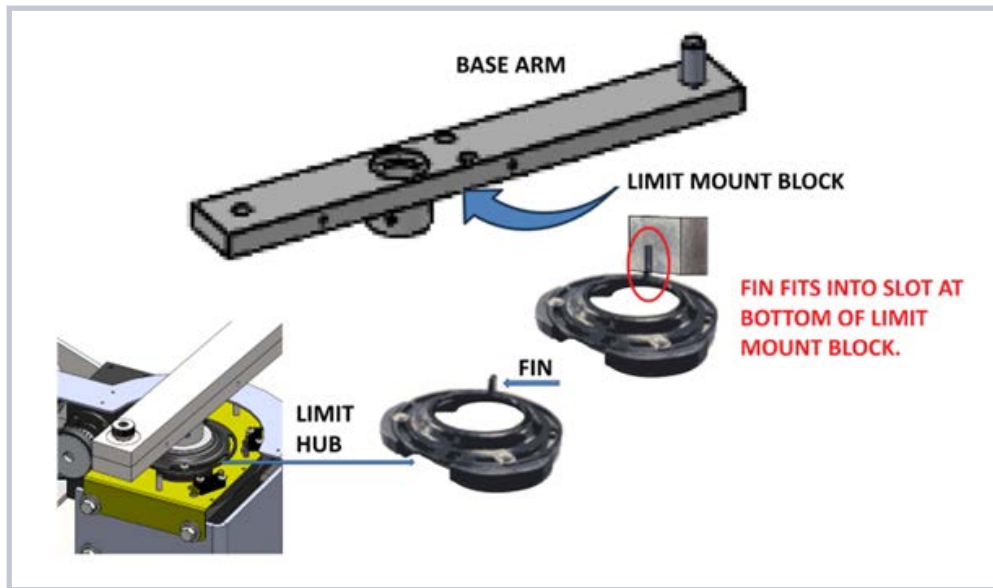
- b. Use a T27 Torx security bit to remove 9 security screws from the side of the gearbox casing adjacent to the end of the gate linkage arm.



- c. Remove motor/gearbox cover.



2. Inspect the limit hub (black disk). You should see an extruded plastic piece, known as a *shark-fin* or *fin* jutting out from the surface of the limit hub, and inserted into a slot on the limit mount block. The limit mount block is a (slotted) piece of rectangular steel bolted underneath the base linkage arm near the point where the arm shaft meets the limit hub. When the limit mount block slot is fit over top of the fin, this acts as a physical deterrent to limit switch over-travel. The enclosed fin stops the limit hub from spinning, and pushing the cam too close to the limit switch.



WPS PART NUMBER 100352  
MX001745 - ASSEMBLY FOR SWINGSMART DC  
INCLUDES LIMIT PLATE, 2 LIMIT BLOCKS\*, AND  
HARDWARE. PARTS NOT SOLD SEPARATELY.

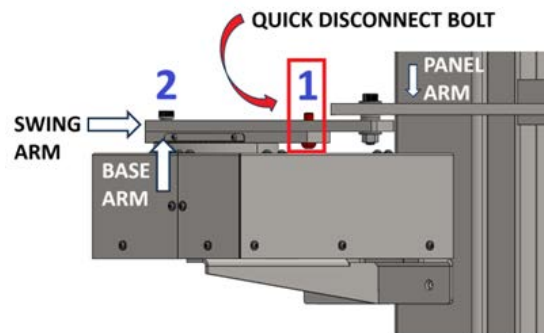


WPS PART NUMBER 100269  
FOLDSMART LIMIT MOUNT BLOCK

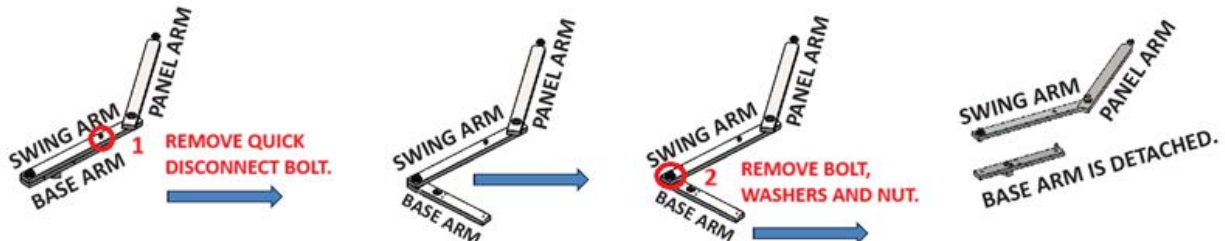


3. **If the slot of the limit mount block is not fit over top of the fin**, you will need to reinstall the limit mount block as follows.
4. Detach the linkage arm from the gearbox shaft. Normally, you will be performing this procedure during a new installation, before the arm is connected. The whole piece should come off easily by loosening set screws and pulling off the assembly. If this is the case, go directly to step 7 after detaching the linkage arm.
5. However, if you need to remove the linkage arm in the field on a gate that is already installed, it will be difficult to disengage the arm from the output shaft. In this situation, the simplest way to achieve access to the limit mount block is to take out the two gearbox side pieces (swing arm, base arm) as follows.

- a. The 3-piece FoldSmart linkage arm has a quick disconnect bolt connecting the two gearbox side pieces together. When this bolt is removed, it allows the top piece (swing arm) to move separately from the bottom (base arm), normally for purposes of manually moving gate panels independently of the gearbox. The quick disconnect bolt can be removed by using the manufacturer-supplied Penta key, and a 1/2-inch socket (socket not supplied with gate). Remove the quick disconnect bolt (see location “1” in the diagrams below). Refer to the Manual Release Procedure section for details.



- b. Remove hex bolt, washers and nut (see location “2” in the diagrams above and below) that attach the swing arm to the base arm (lowest section). Detach the base arm.



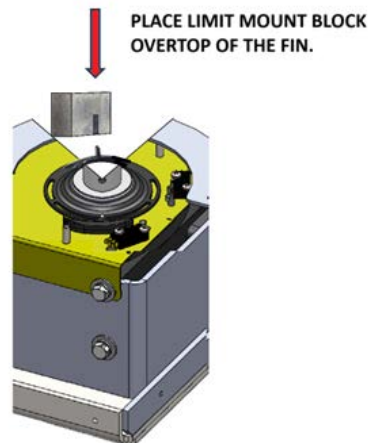
6. Inspect the limit mount block attached underneath the base arm. If the limit mount block slot is not fitted overtop of the limit hub fin, remove the two bolts at top of the base arm securing the limit mount block. Take out the limit mount block.



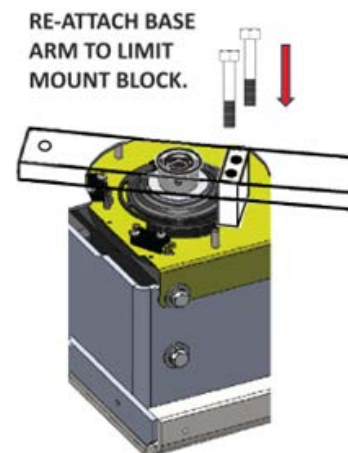


7. Locate the limit hub fin, and place the limit mount block slot overtop of the fin. Insert the fin into the slot. Fit the hollow cylinder at bottom of the base arm, adjacent to the block, over the gearbox output shaft as you insert the fin into the slot.

**NOTE:** The limit block mount will still be attached to the base arm if you did not need to remove it at step 4.



8. Re-attach the base arm to the limit block mount, if you detached it at step 6. Position the base arm so that the two bolt holes align with the holes on top of the limit mount block, which now has the fin inserted into its bottom slot. Re-attach the base arm to the limit mount block by screwing in the two bolts and washers.



9. Re-attach swing arm to base arm, and reinstall quick disconnect bolt connecting the two gearbox side pieces (swing arm and base arm) together. Do not replace motor/gearbox covers yet.
10. The swing arm and base arm must be level with the panel arm. Take advantage of the opportunity to check the linkage arm at the panel side of the gate for level alignment. Use the white bushings supplied with the gate as spacers at the rod end (panel side) of the panel arm for leveling. Refer to Installing White Spacer on Linkage Arm, for Leveling, for details.
11. Adjust limit switch cams as described in Limit Switch Adjustment Procedure.
12. Check that the gate panels are square at a 90-degree angle to the roadway, indicating a properly adjusted drawbar. Ensure driveway and surrounding area is clear, then turn ON operator DC and AC power switches.

13. Test the gate via the open/close push-buttons on the SmartDC control board while observing the open and close limit position of the gate panels for correctness. Re-adjust limits, if required.
14. Replace motor/gearbox covers.
15. On a dual gate system, remember to also check the limit hub and mount block mating at the motor/gearbox assembly on the other gate column.

## Installing White Spacer on Linkage Arm, for Leveling

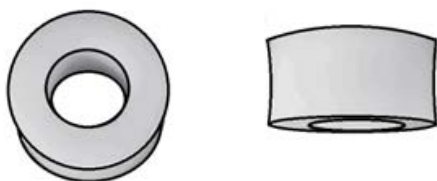
Linkage arm leveling should be performed in conjunction with installing the linkage arm to the gearbox limit hub. Whether you are installing a linkage arm for a new gate, or re-installing/replacing an existing linkage arm assembly, the swing arm and base arm must be level with the panel arm. If the panel arm angles up or down, extra resistance and component wear and tear will result during gate movement. **Use the white bushings supplied with the gate as spacers at the rod end (panel side) of the panel arm for leveling.**

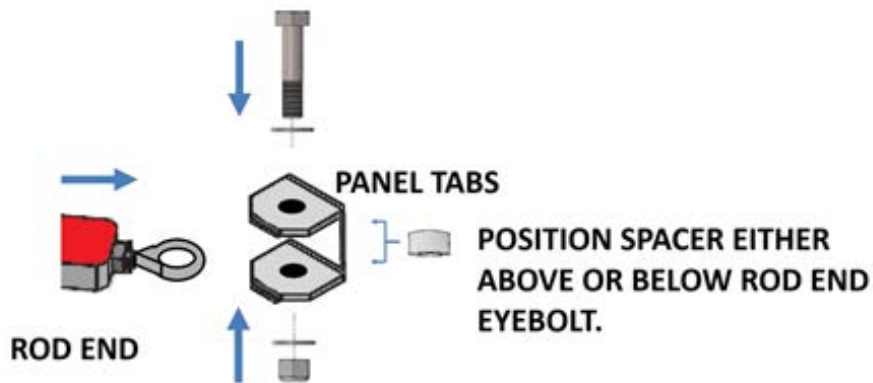
Follow Installing Linkage Arm to Gearbox Limit Hub section, and install the spacer prior to fastening motor/gearbox covers.

### Leveling Procedure:

1. Ensure gate is CLOSED and operator DC and AC power switches are turned OFF.
2. If the panel arm is already attached to the panel side of the gate, inspect for levelness, and adjust if necessary, as follows. For a new installation, follow steps c, d and e.
  - a. Observe whether the panel arm angles upward or downward from the rest of the arm assembly.
  - b. A hex head bolt, inserted through pre-welded panel tabs, fastens the rod end of the panel arm to the panel. Loosen and remove nut, washers and bolt from the tabs.
  - c. Drop bolt, washers and nut through the tab holes and through the eye of panel arm rod end, with a spacer inserted. If panel arm angles upward, insert spacer above the rod end eyebolt. If panel arm angles downward, insert spacer below the rod end eyebolt. Visually inspect for levelness, then tighten.
  - d. Ensure driveway and surrounding area is clear. Turn ON operator DC and AC power switches. Test the gate via the open/close push-buttons on the SmartDC control board while observing the open and close limit position of the gate panels, and panel arm alignment.
  - e. Ensure you have replaced motor/gearbox housing casing and covers, which were removed while installing the linkage arm to the gearbox limit hub. On a dual gate system, do not neglect to also check for levelness of the panel arm at the other gate column.

2 WHITE SPACERS SUPPLIED WITH LINKAGE ARM ASSEMBLIES





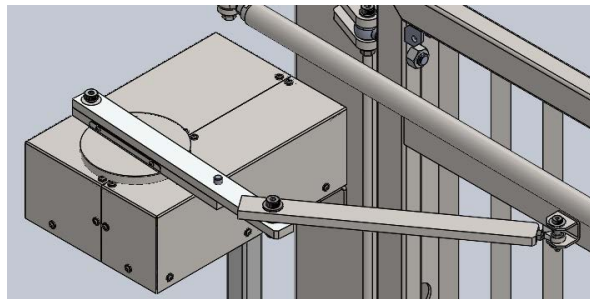
## Limit Switch Adjustment Procedure

The FoldSmart gate uses limit switches to identify the open and closed positions. The open and closed positions can be modified by adjusting the point at which the switches are triggered.

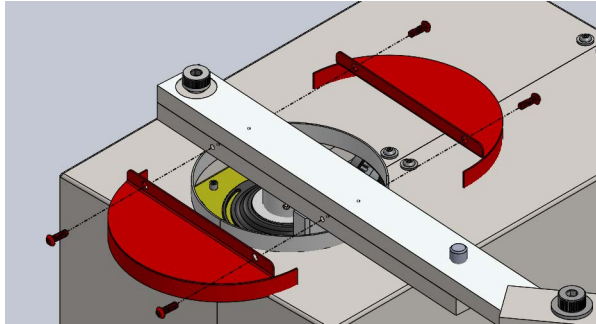
### NOTE

The limit switch adjustment is done in conjunction with the drawbar adjustment. Refer to the instruction set for Drawbar Adjustment Procedure.

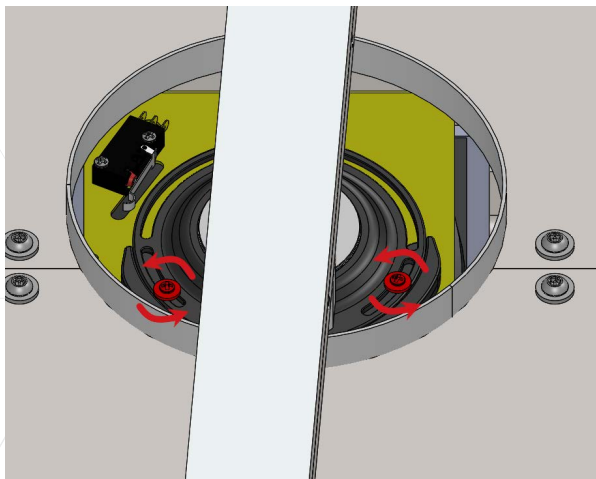
1. Each motor/gearbox assembly will have its own pair of limit switches.



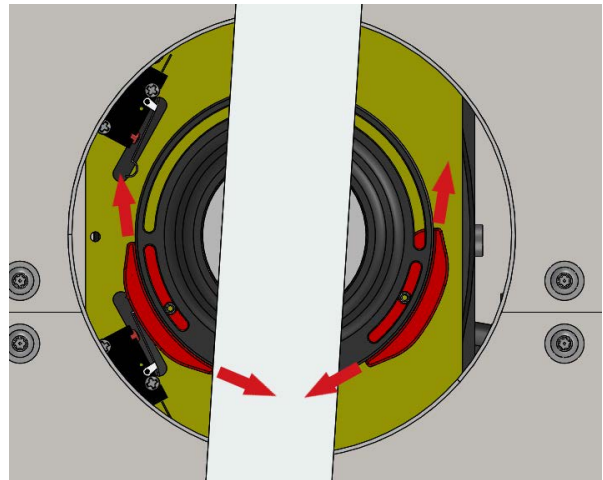
2. To access the limit switches, first remove the motor/gearbox housing covers. You will need a Torx T27 bit to remove the fasteners. If using a drill or impact driver, set to a slow speed to avoid damaging the fasteners and/or bit.



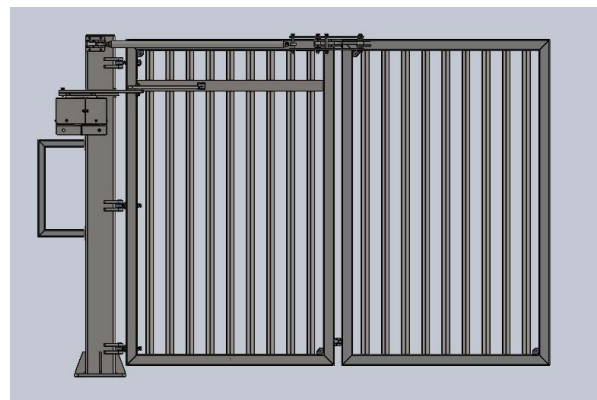
3. Once the covers are removed, identify the open and closed limit switches. **The limit switch furthest from the gate panels is always the closed limit switch, no matter the handing of the gate.**
4. Each switch will have a cam that will rotate on the limit hub and activate its switch at the appropriate position.
5. To adjust a limit, use a #2 Phillips screwdriver to loosen the screw holding the cam in place. You do not need to remove the screw entirely.



6. Once the cam can move freely, adjust it to the required position on the limit hub and re-tighten the Phillips screw. Do not overtighten the screw.



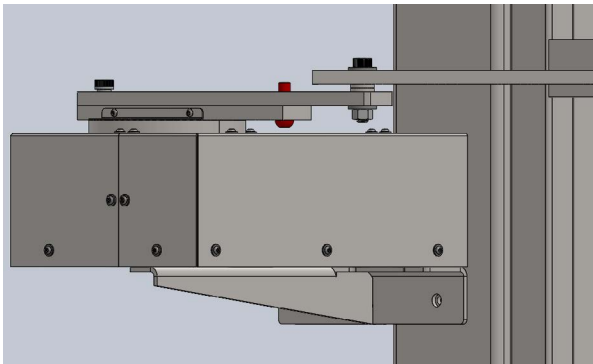
7. When adjusting the cam(s), a small amount of adjustment will result in a much larger adjustment to the limit position of the gate panels. It is helpful to do the initial testing by moving the gate panels manually or via the open/close push-buttons on the SmartDC control board. This will allow easy access to the Stop button in case the limit has been overset.



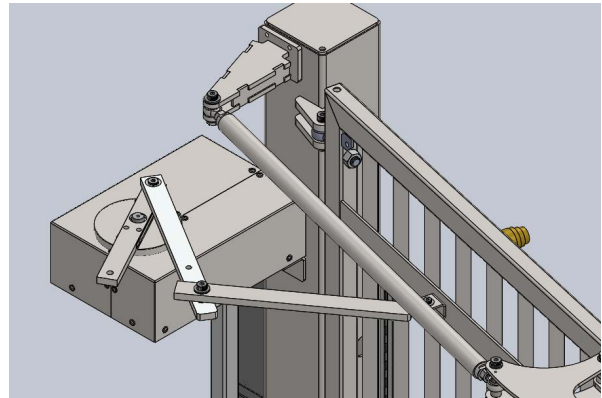
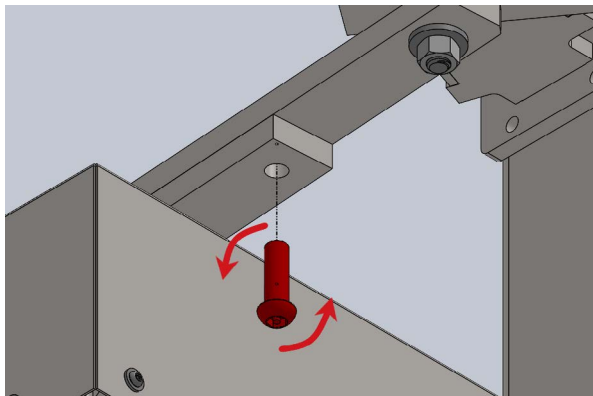
## Manual Release Procedure

The FoldSmart gate has a manual release procedure should the gate not be able to move electronically.

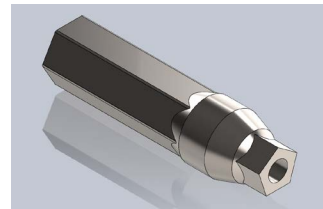
1. Before performing this procedure, ensure the DC power switch is in the Off position. DO NOT turn AC power Off.



2. The 3-piece FoldSmart linkage arm has a quick disconnect bolt connecting the two gearbox side pieces together. When this bolt is removed, it allows the top piece to move separately from the bottom, effectively allowing the gate panels to move independently of the gearbox.



3. The quick disconnect bolt can be removed by utilizing the manufacturer-supplied Penta key. The gate owner will be able to provide the storage location of the Penta key. We recommend keeping it in one of the FoldSmart control cabinets for quick access in the event of an emergency. The key can be used with a 1/2-inch socket. This socket is not supplied with the gate.



4. Note that when the gate is fully closed, the gearbox section of the linkage arm may prevent the gate panels from moving to the fully open position. In the event this occurs, the drive belt may need to be disconnected to allow the gearbox section of the linkage arm to be moved out of the way.
5. When re-installing the quick disconnect bolt, position the gate such that the two sections of the gearbox side of the drive linkage are in line. Re-insert the bolt and thread clockwise until tight. Do not overtighten the bolt.

# Power

## 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, barrier arms, fences and gate systems. National Electric Code (NEC) requires a separate earth ground in addition to the required equipment ground.

### NOTE

If you do not ground the operator with a separate earth ground rod, you risk voiding the Limited Warranty.

Wallace Perimeter Security recommends grounding the operator with a separate earth ground connected to a ground rod to assure proper operation and shield it against electromagnetism and other electrical signals that may cause erratic operation with or damage to the SmartDC Controller.

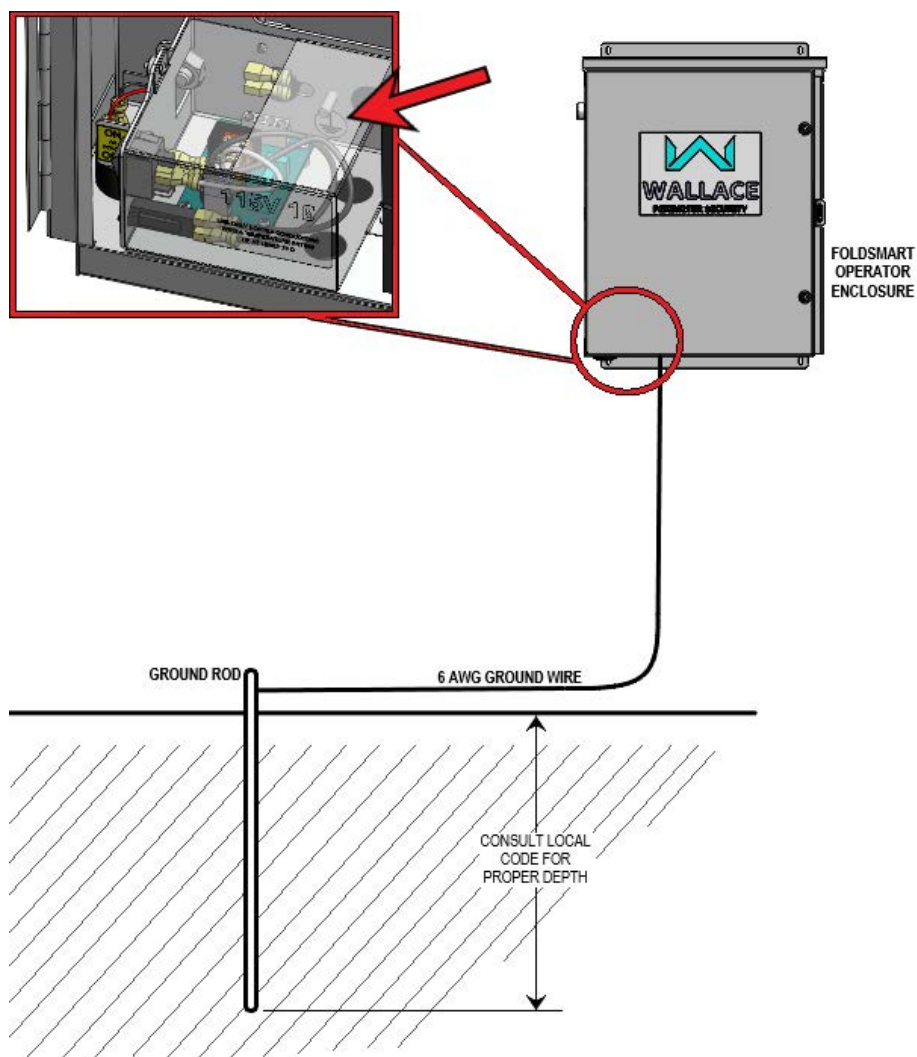
For earth grounding requirements, refer to the National Fire Protection Association (NFPA) 780 - ***Standard for the Installation of Lightning Protection Systems***, which provides American standards referenced in Canadian model codes. Highlights of the standard include:

- The ground rod is a solid copper rod: minimum requirements: 5/8-inch (16mm) diameter and 10 feet (3m) in length.
- The ground rod is driven into the earth (refer to local codes for proper depth requirements).
- The ground rod is electrically bonded to the chassis with a single length of unspliced 6AWG copper wire less than 3 feet (91cm) long.
- Local jurisdictions may impose additional requirements above the NEC and NFPA 780. Consult the local codes and regulations regarding requirements in your area.

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

1. Install a grounding rod per local building codes. See Figure 1.
2. Attach a ring terminal to the earth ground wire (6 AWG) and terminate at the labelled grounding location in the AC junction box.





**Figure 1. Grounding Rod Installation**

Properly grounding the gate system is critical to gate system performance and the life of its electrical components. Use sufficient wire size during installation. Refer to **“Wiring 115VAC Power” on page 57** or **“Wiring 208/230VAC Power” on page 58**.

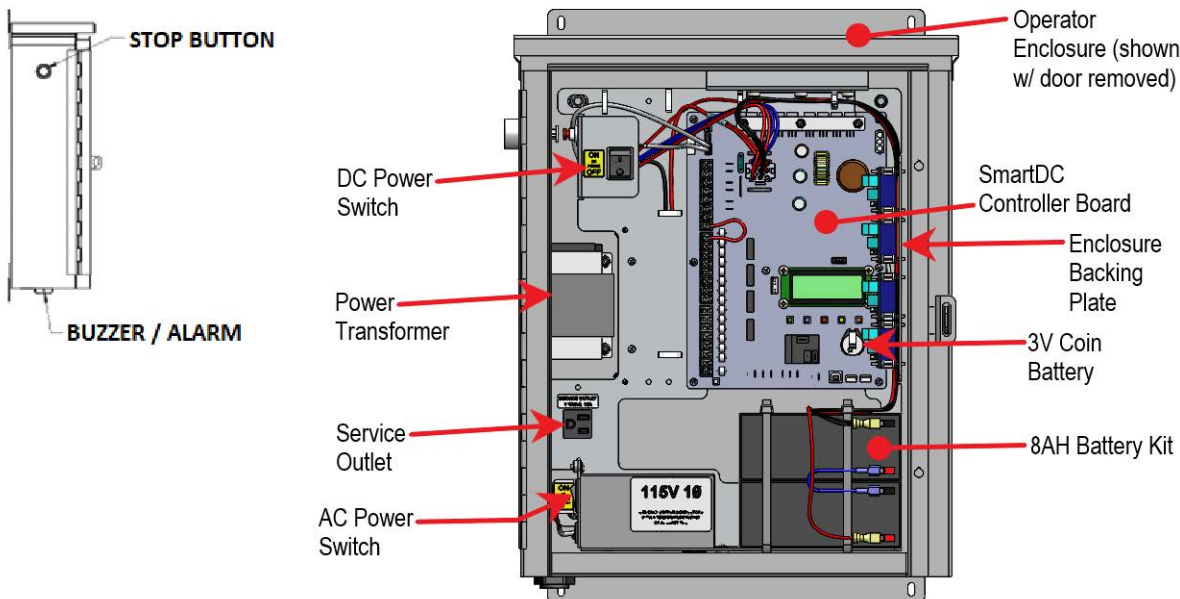
## Wiring AC Power

### **⚠ DANGER**

Turn off AC power at the source (circuit breaker panel) before accessing the wires in the FoldSmart junction box. Follow facility Lock Out/Tag Out procedures. Make sure both the DC and AC power switches, on the side of the FoldSmart control box, are in the off position. See Figure 2.

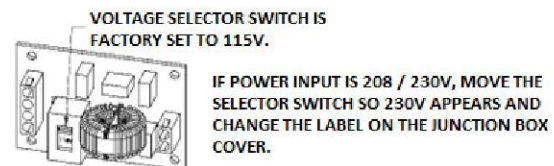
### **⚠ WARNING**

Wiring of gate systems must conform to the NEC standards and comply with all local codes. If you plan to connect to 208/230VAC power, read the voltage selector switch WARNING. See Figure 2. 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.



### **⚠ WARNING**

DO NOT connect the 115VAC service outlet to 208/230VAC power supply wires. To use the 115VAC service outlet on a 208/230VAC installation, the electrician needs to run an extra neutral wire to the operator from the power source and wire the service outlet per code.



**Figure 2. 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 FoldSmart operation if the high and low voltage wires are routed through the same conduit.
- Maximum gate system 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.

**Table 1. Wire Gauge versus Run**

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)

Table 1 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 2.

### NOTE

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

3. Terminate the power supply wires to the corresponding black and white lead wires terminated in the top of the screw terminal termination strip.
4. Terminate the equipment ground wire to the corresponding green ground wire terminated in the top of the screw terminal termination strip.
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

### CAUTION

All FoldSmart operators are shipped from the factory as 115VAC units. When connecting to 208/230VAC power, 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.

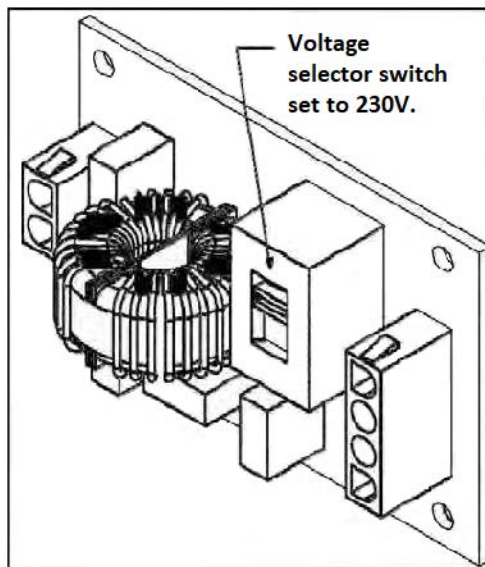
For the 208/230VAC power connection:

- **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 system 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 2. Wire Gauge versus Run for 208/230VAC**

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)

Table 2 assumes a dedicated circuit. Additional loads require that the wire size be increased or the distance of the run be decreased.



**Figure 3. Voltage Selector Switch**

**⚠ 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.

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 cover and secure it. See Figure 3.**
4. **Access the input power wires by removing the two Phillips-head screws that secure the High Voltage Junction Box Cover. See “Figure 2. Wiring AC Power” on page 56.**
5. **Terminate the power supply wires to the corresponding black and white lead wires terminated in the top of the screw terminal termination strip.**
6. **Terminate the equipment ground wire to the corresponding green ground wire terminated in the top of the screw terminal termination strip.**
7. **Neatly organize all wire connections and replace the high voltage junction box cover. Secure it with the two Phillips-head screws.**
8. **Place the 208V or 230V 1Ø label on the Junction Box Cover over the 115V 1Ø label.**

## Connecting DC Power

To connect the DC power:

1. Turn off the DC and AC power switches.
2. Attach the red spade connector to the battery terminal on the DC power switch.

### 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.

## Important Considerations for DC-Power Connection

- 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 “*Hazardous Materials and Proper Disposal*” on page 15.
- 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 3. Wallace Perimeter Security supplies a heater option that mounts near the battery pack, providing residual heat which guards against amp-hour loss in colder climates.

**Table 3. Amp-Hour - Example of Battery Performance**

Temperature	Capacity
77°F (25°C)	100
32°F (0°C)	80
-22°F (-30°C)	50

### NOTE

The FoldSmart 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.

- Wallace Perimeter Security uses a permanently sealed AGM-type battery which lasts 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.

# Display and Menu Options

This section of the manual provides information about the display and menu options. It includes how to:

- Turn both AC and DC power switches on
- Configure the Setup Menu
- Review how to use the SmartDC Controller Buttons in Menu Mode
- Review Run Mode and Gate Status Displays
- Access and Configure User Menu Options
- Adjust the Close Timer
- Set the Time and Date
- Set the AC Power Loss Gate Function
- Adjust the Display Contrast
- Access and Configure Installer Menu Options
- Set the Open and Close Gate Speed
- Adjust IES Sensitivity
- Reinstate Factory Defaults
- Enable Fire Department Access

This section describes what you will see on the display and explains the functionality of the buttons. User and Installer Menu charts provide information about peripheral connections and the corresponding menu items that need to be configured.

## INITIAL SETUP

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

### Method 1:

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.

### Method 2:

Manually navigate through the User and Installer Menus using the buttons located on the SmartDC Controller. The instructions for performing this second option are provided in this section.

#### NOTE

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

## Turning Both Power Switches On

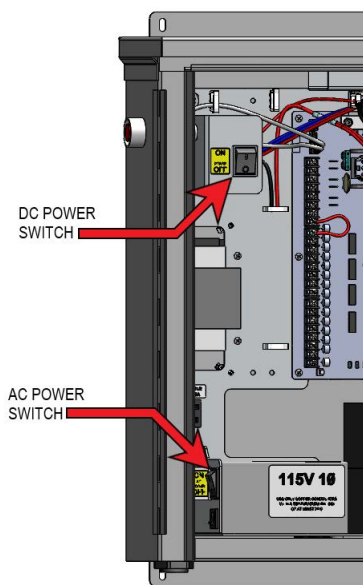
One AC and one DC rocker power switch are located on the outside edge of the control box. Refer to Figure 4.

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

### NOTE

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"* on page 66.
  - Usage class - indicates that the Setup Menu, which consists of four sequential displays, needs to be programmed. Refer to *"Configuring the Setup Menu"* on page 65.
  - Error message - indicates a problem exists with the operator which needs to be resolved before the operator can function properly. Refer to *"SmartDC Controller Troubleshooting"* on page 167.



### NOTE

The SmartDC Controller can be powered when either switch is turned on. However, the operator is a DC-powered unit and runs on its batteries. If the DC power switch is off, the operator will not function (even though the 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.

Figure 4. DC and AC Power Switches

The flashing red indicator light next to the OPEN button on the SmartDC 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** - the operator is stopped.
- **Flashing yellow** - the operator is running.
- **Red** - the operator has experienced an error.

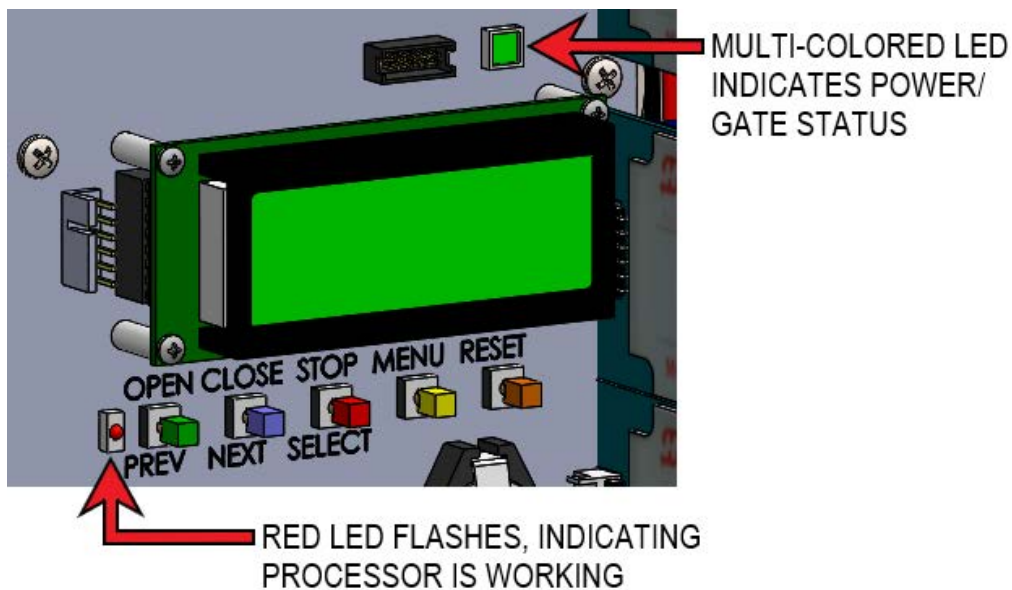


Figure 5. Controller Indicator Lights

- **Not lit** - AC power is lost. Pressing the SHOW LEDs button indicates which inputs, if any, are active.



## Using the SmartDC Controller Buttons in Menu Mode

The buttons on the SmartDC Controller let you navigate, change, or clear the information in the display menus. Refer to Figure 6.

The buttons with text above and below are variable function keys (VFK). Use these buttons to enter or change operational data and navigate through the User and Installer Menus. The singular use of a variable function key is dependent on operator mode. Three different modes exist:

- **Run Mode** - gate is operational awaiting commands. Refer to *“Using the SmartDC Controller Buttons in RUN Mode” on page 67:*

**RUN Mode.**

- **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 S.T.A.R.T. software connection using the USB port.
- **Fault Mode** - errors, faults or alerts 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, and then pressing RESET. Faults indicate a need for diagnosis and resolution. Refer to *“SmartDC Controller Troubleshooting” on page 167.*

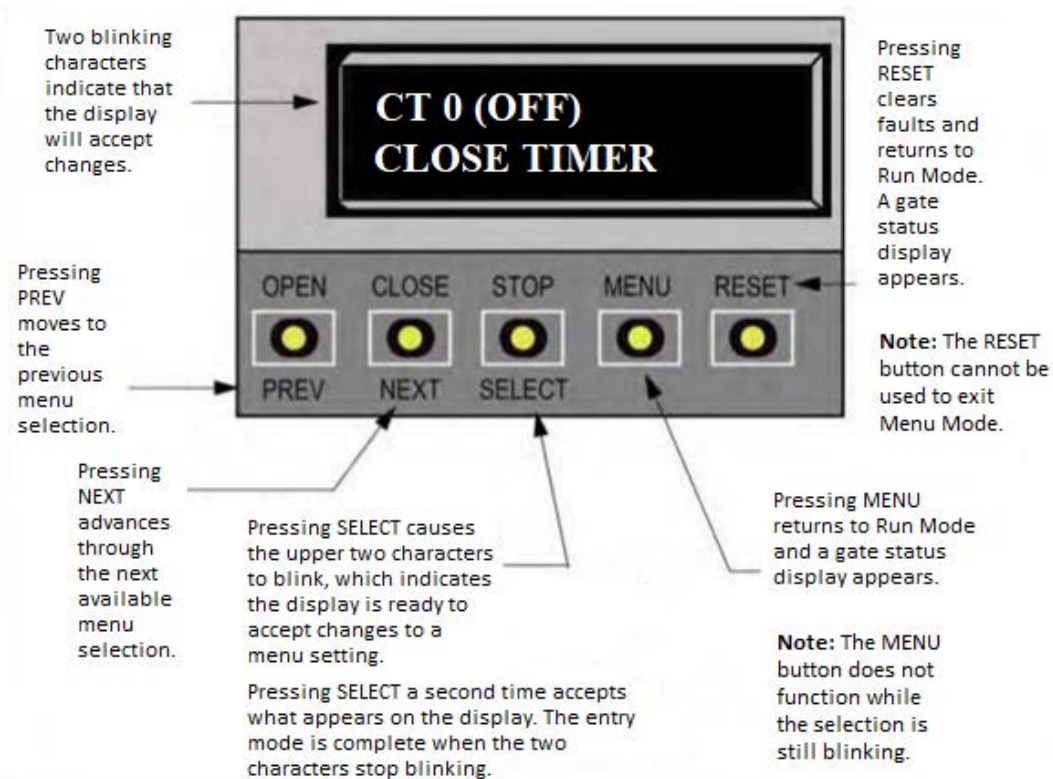


Figure 6. Function of the SmartDC Controller Buttons in Menu Mode

## Configuring the Setup Menu

The USAGE CLASS display appears the first time power is supplied. See Figure 7.

### NOTE

If a gate status display appears, the Setup Menu has already been configured. Refer to *“Understanding Gate Status Displays”* on page 66.

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

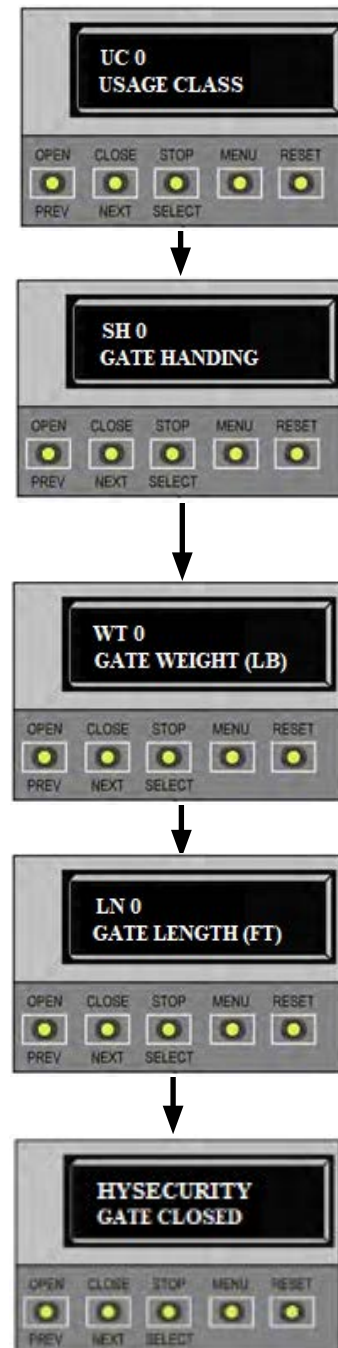
**Programming the Setup Menu is usually a one-time occurrence unless factory defaults are reinstated through the Installer Menu. Refer to *“Reinstating Factory Defaults”* on page 83.**

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 – Single-family residential up to four units.
- 2 – Multi-family, hotel, etc.
- 3 – Industrial use, not for general public access.
- 4 – Guarded and monitored facility or location, not for 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

### Selections:

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

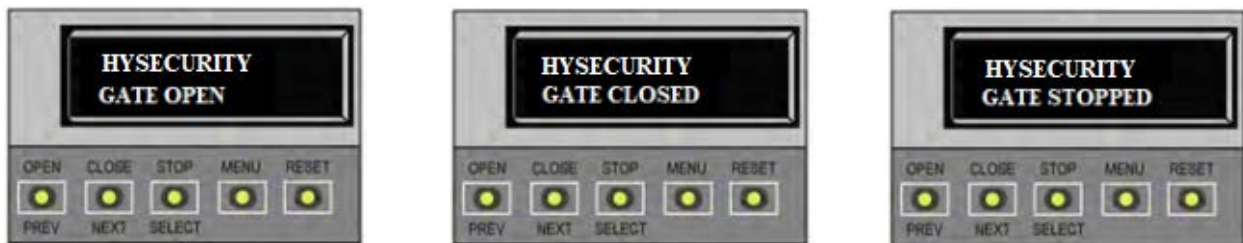
**Note:** The GATE CLOSED display is an example. Any one of three gate status displays could appear depending on the gate operating mode. See *“RUN MODE”* on page 66.

Figure 7. Setup Menu

## RUN MODE

Gate status displays appear when the operator is ready and waiting for a gate operation command. When the menu display is flashing “GATE OPENING” or “GATE CLOSING” a command has been received and the operator is responding appropriately. 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 a gate operation command.

### Understanding Gate Status Displays



**Figure 8. Gate Status Displays**

Three gate status displays are shown in Figure 8. Each indicates the position or status of the gate. When accessing the User or Installer menus, you must begin at one of these gate status displays.

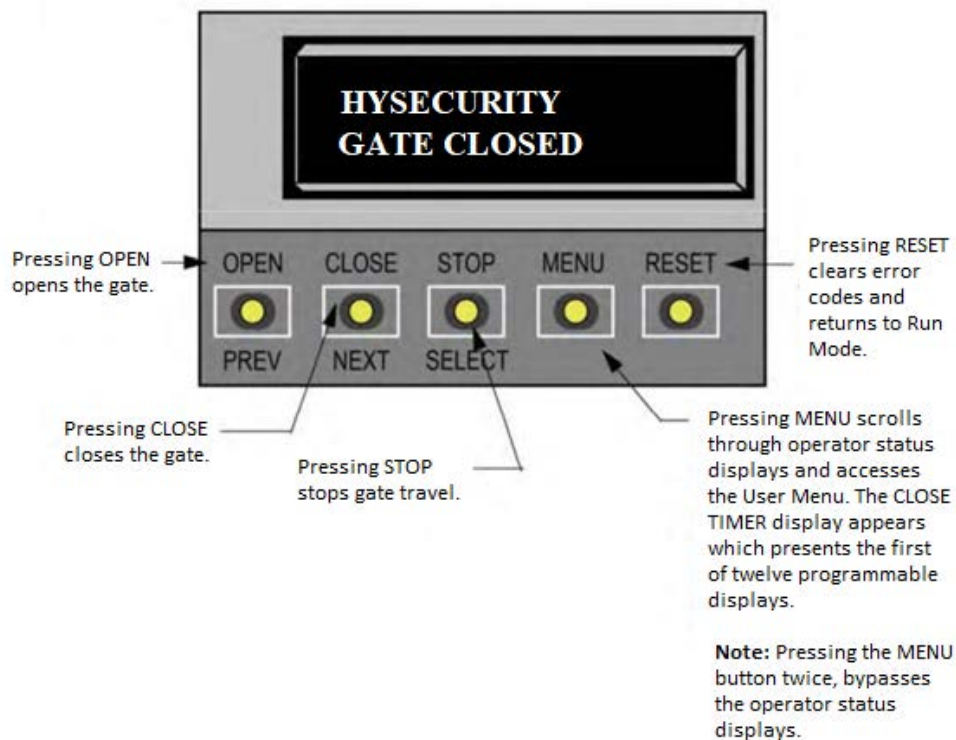
#### NOTE

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

## Using the SmartDC Controller Buttons in RUN Mode

The Run Mode buttons are distinguished by the fact that their name appears above each button. The buttons with text above and below are variable function keys (VFK) and function differently depending on the mode of the operator. Three different modes exist:

- **Run Mode** - gate is operational awaiting commands.
- **Menu Mode** - motor disengages and operator commands are ignored. Menu navigation and menu: Selection can be accomplished using the SmartDC Controller buttons or through a S.T.A.R.T. software connection via the USB port. Refer to *“Using the SmartDC Controller Buttons in Menu Mode”* on page 64.
- **Fault Mode** - errors, faults or alerts 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, and then pressing RESET. Faults indicate a need for diagnosis and resolution. Refer to *“SmartDC Controller Troubleshooting”* on page 167.



**Figure 9. Function of SmartDC Controller Buttons in Run Mode**

## Viewing Operator Status Displays

Eight operator status displays appear in two second intervals and show pertinent information which provides a quick overview of the operator's status or configurations. Refer to Figure 10.

### NOTE

Items shown inside the brackets < > are variables that may change depending on operator configurations. The examples shown in Figure 10 may appear differently on your operator.

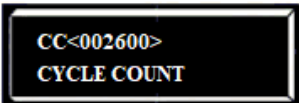
	Variables	Description
	The software version and revision number are hard-coded in the SmartDC Controller.	Displays the software version when you press RESET or cycle power. You will need the software version when calling Technical Support.
	PRIMARY or SECONDARY (This display only appears when the operator is used in bi-parting gate systems.)	Indicates, in a dual gate setting, whether the operator is set to Primary or Secondary. The setting is assigned in the Installer Menu.
	1, 2, 3, 4, 5, 6, 7 and 11, 12, 13, 14	Indicates the software configuration number which is preset at the factory and cannot be changed.
	LEFT or RIGHT	Designates which way a gate opens viewed from the operator. If it swings to the left, it is a left-hand gate. Gate handing is established in the initial Setup Menu.
	1, 2, 3, or 4	Displays the operator's Usage Class designation per UL 325 standards. Refer to <i>"Identifying Gate System Category and Usage Class"</i> on page 18.
	0, 1, or 2 0 = 8Ah 1 = 50 Ah (Extended) 2 = 110Ah (Maximum)	Confirms the operator's battery type which is assigned through the Installer Menu.
	Number varies depending on the voltage that the charger is providing.	Displays the actual voltage that the batteries are delivering to the SmartDC Controller.
	Number varies depending on open and close cycles. One cycle equals a full open and close sequence.	Displays the number of cycles the gate operator has incurred. Similar to an odometer. It resets to zero after 999,999 cycles.

Figure 10. Operator Status Displays

## USER MENU

The User Menu consists of thirteen functions which can be modified using the SmartDC Controller buttons. Refer to *“Using the SmartDC Controller Buttons in Menu Mode” on page 64*.

To access the User Menu, take the following steps:

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



### NOTE

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

2. To bypass the operator status displays and access the User Menu, press the MENU button twice. The CLOSE TIMER display appears.

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

*“Table 4. SmartDC Controller - User Menu Functions” on page 74* describes the User Menus, supplies the factory defaults, and references the hard-wire connections.

For information on how the menu buttons function, review *“Using the SmartDC Controller Buttons in Menu Mode” on page 64*.



## Adjusting the Close Timer

The close timer assigns how many seconds will pass before the operator initiates closure of a fully opened gate after all open commands and reversing sensor inputs have ceased. Every gate operator needs to 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:

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 NEXT or PREV buttons to navigate and change the number on the display.**

### NOTE

Keep the close time 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.**



## Setting the Time and Date

A feature of the SmartDC 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 *“SmartDC Controller Troubleshooting”* on page 167.

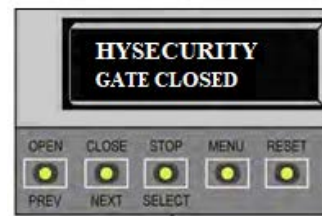
To set or adjust the time or date, take the following steps:

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.

### NOTE

A date or time field must be blinking 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.



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.



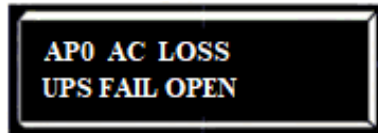
4. Change the time and date using the NEXT and SELECT buttons.

### NOTE

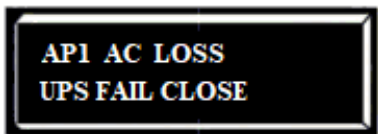
A lithium coin battery on the SmartDC Controller board, supports the clock so the date and time is retained even when the main power is turned off. Replace the battery every five years with a DL 2025, DL 2032 or CR 2025 or CR 2032 battery.

## 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.



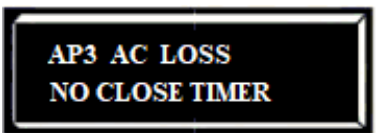
Normal gate functions continue until the system detects a battery voltage drop below 21V. DEAD BATTERY appears on the display and the gate automatically opens. Any push-button CLOSE command will close the gate and any open command will re-open the gate. If the battery continues to diminish and the system detects 18V or less, the system initiates an automatic open cycle. Any new open or close command is ignored and the LCD appears blank. The system remains in this disabled state until reset or the battery recovers to 24V.



Normal gate functions continue until the system detects a battery voltage drop below 21V. DEAD BATTERY appears on the display and the gate automatically closes. The gate can be opened by a special sequence of a STOP input followed by an OPEN push-button or directly opened with the Fire Department Open command. Any push-button CLOSE command will close the gate. If the battery continues to diminish and the system detects 18V or less, the system initiates an automatic open cycle if not already on a limit. Any new open or close command is ignored and the LCD appears blank. The system remains in this disabled state until reset or the battery recovers to 24V.



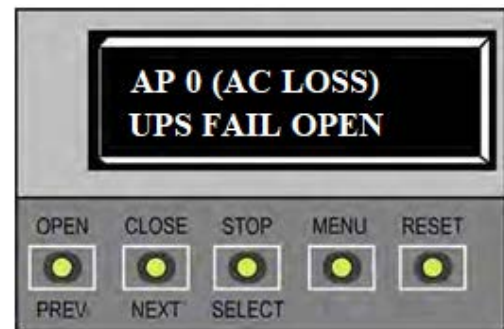
The operator automatically opens the gate five seconds after it detects an AC power loss. The gate remains open until AC power is restored. Any push-button CLOSE command will close the gate and any open command will open the gate. When the battery voltage drops below 21V or less, the system initiates an automatic open cycle. The gate will remain open until the battery recovers to 24V.



The operator initially does nothing after it detects AC power loss until it receives an open command. Once an open command is received, the operator opens and remains in that state. Any push-button CLOSE command will close the gate and any open command will open the gate. When the battery voltage drops below 21V or less, the system initiates an automatic open cycle. The gate will remain open until the battery recovers to 24V.

To designate what you want the operator to do during an AC power loss, take the following steps:

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 AC LOSS display appears.
3. Use the SELECT and NEXT buttons to navigate and change the number on the display. Review Using the SmartDC Controller Buttons in Menu Mode.
4. To exit the User Menu, press the MENU button. A gate status appears in the display indicating you have returned to Run Mode.



## Adjusting the Display Contrast


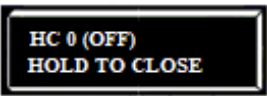

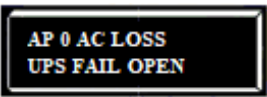
The display contrast can be adjusted from 1 to 9 to increase visibility and ease of use. It is set at the factory to level 5. The text becomes darker as you go up the scale.

To adjust the contrast (1 to 9), take the following steps:


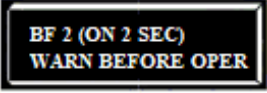


1. **At a gate status display, press the MENU button twice. This accesses the User Menu and the CLOSE TIMER display appears.**
2. **Press NEXT until the LCD CONTRAST display appears.**
3. **Use the SELECT and NEXT buttons to navigate and change the number on the display.**
4. **To exit the User Menu,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







## USER MENU FUNCTIONS

<b>Table 4. SmartDC Controller - User Menu Functions</b>				
Ref. No.	User Menu	Setting Options ( <b>Bold</b> = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
	Display			
1	 CT 0 (OFF) CLOSE TIMER	<b>0 = Timer disabled</b> 1 second to 99 seconds	Assign how many seconds before the open gate initiates closure.  Keep the setting at 0 if a hard-wired, push-button control device is being used.  <b>Note:</b> The CLOSE TIMER display does not appear when the HOLD TO CLOSE is set to 1.	Not applicable (N/A)
2	 HC 0 (OFF) HOLD TO CLOSE	<b>0 = off</b> 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 the 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 <b>"Table Notes" on page 77.</b>	COM CLOSE
3	 HO 0 (OFF) HOLD TO OPEN	<b>0 = off</b> 1 = on	Similar to HOLD TO CLOSE, but configures the 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 <b>Table Notes.</b>	COM OPEN
4	 AP 0 AC LOSS UPS FAIL OPEN	<b>0 = UPS FAIL OPEN</b> 1 = UPS FAIL CLOSE 2 = AUTO OPEN 3 = NO CLOSE TIMER	The setting designates what action the gate performs during an AC power loss.  Refer to <b>"Setting AC Power Loss Gate Function" on page 72.</b>	(N/A)

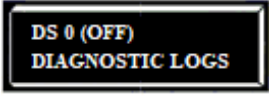
**Table 4. SmartDC Controller - User Menu Functions**

Ref. No.	User Menu	Setting Options ( <b>Bold</b> = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
	Display			
5	 RO 0 (OFF) RADIO OPEN CLOSE	<b>0 = off</b> <b>1 = on</b>	Configures radio input for open only (0) or at setting 1 adds the capability for radio input to close the gate when it is fully open.	COM RADIO OPEN
6	 BF 2 (ON 2 SEC) WARN BEFORE OPER	<b>0 = off</b> <b>1 = on</b> <b>2 = on</b>	<p>Controls the warn-before-operate buzzer and can be configured three ways:</p> <p>Set to 0: Buzzer is disabled. Set at 0 the buzzer will still beep when alerts, faults, errors, or entrapment are detected.</p> <p>Set to 1: Buzzer beeps for 3 seconds before gate motion begins and continues through entire gate travel.</p> <p>Set to 2: Buzzer beeps for 3 seconds before gate motion begins and continues for 2 seconds of gate travel.</p>	(N/A)  <b>WARNING :</b> <b>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 severe injury or death.</b>
7	 FA 0 (OFF) FORCE OPEN ALERT	<b>0 = off</b> <b>1 = on</b>	<p>Intended for highly secure facilities.</p> <p>Set to 1, the operator sounds the 3-second "warn before operate" buzzer alarm, and then initiates a closure if the gate is forced open and the closed limit switch disengages. The motor restarts to secure the gate. If the gate does not fully close within 4 seconds, the motor turns off and the alert buzzer sounds for 30 seconds. The display shows ALERT 1 – FORCED OPEN.</p>	(N/A)
8	 DA 0 (OFF) DRIFT CLOSE ALERT	<b>0 = off (standard)</b> <b>1 = on</b>	<p>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 4 seconds and, if the gate is not fully open at the end of this period, the buzzer sounds for 10 seconds. The display shows ALERT 2 – DRIFT CLOSED.</p>	(N/A)

**Table 4. SmartDC Controller - User Menu Functions**

Ref. No.	User Menu	Setting Options ( <b>Bold</b> = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
	Display			
9	 PE 0 (OFF) PHOTO EYE ALIGN	<b>0 = off</b> <b>1 = on</b>	When set to 1, the operator serves as an aide in photo-eye transmitter/receiver alignment. The buzzer chirps once when the emitter and the 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. The Alignment Mode is reset with a close-limit input or reset input.	Sensor Common, Sensor 1, Sensor 2, Sensor 3
10	 CL 0 SET CLOCK	<b>0 = Display</b> <b>1 = Set Clock</b>	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 the time and date. This feature is useful to read historical operation data, which can be accessed with a computer via the USB or RS232 port or the LG setting in User Menu. See <i>"Setting the Time and Date" on page 71</i> .	(N/A)
11	 LD 5 LCD CONTRAST	<b>5</b> 0 through 9	Under some extreme high or low temperature conditions, it may be necessary to adjust the contrast of the LCD display. The display is adjustable from 0-9 with a factory default setting of 5.	(N/A)
12	 LG 0 (OFF) VIEW EVENT LOG	<b>0 = off</b> <b>1 = on</b>	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)

**Table 4. SmartDC Controller - User Menu Functions**

Ref. No.	User Menu	Setting Options ( <b>Bold</b> = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
	Display			
13	 DS 0 (OFF) DIAGNOSTIC LOGS	<b>0 = off (standard)</b> 1 = on (detailed)	Set this item to 1 to record all gate operator open and close events, in addition to the 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, the 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 S.T.A.R.T. software is required to read the log file.

**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. For additional information, refer to ***“Choosing External Entrapment Protection” on page 19.***

## 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 severe injury or death.



## Installer Menu

The Installer Menu consists of several functions which can be modified using the SmartDC Controller buttons or configured through the use of a laptop computer and the S.T.A.R.T. software available from the Nice | HySecurity website.

The Installer Menu options provide more advanced configurations for the FoldSmart gate system. 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 SmartDC Controller, refer to ***“Using the SmartDC Controller Buttons in Menu Mode” on page 64.***

To access the Installer Menu, take the following steps:

### NOTE

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.

### NOTE

Four menu items, Usage Class, Gate Handing, Gate Weight, and Gate Length must be configured before the operator will function. Refer to ***“Configuring the Setup Menu” on page 65.***

In the pages that follow, a detailed view of the more commonly used menus is provided.

- **Adjusting the Open Speed**
- **Adjusting the Close Speed**
- **Adjusting the IES Sensitivity**
- **Reinstating Factory Defaults**
- **Enabling the Fire Department Override**

***“Table 5. SmartDC Controller - Installer Menu Functions” on page 85*** describes the Installer Menus, supplies the factory defaults, and references the hard-wire connections.

For information on how the menu buttons function, review ***Using the SmartDC Controller Buttons in Menu Mode.***



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



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

2. To access the Installer Menu, simultaneously press OPEN and RESET.



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.

## Adjusting the Gate Speed

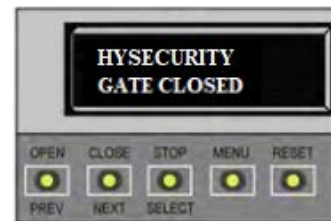
The gate speed designates how quickly the gate opens and closes. The available range from 1 to 10 varies the speed of the motor and the gate speed increases as you go up the number scale. The adjustable speed range is approximately 15 seconds to 10 seconds.

### NOTE

Two displays, one for OPEN SPEED the other for CLOSE SPEED, exist in the SmartDC Controller. 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 at the CLOSE SPEED display. The factory defaults for both are set to a level 5, a mid-range setting.

To adjust the gate speed (1 to 10), take the following steps:

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 USAGE CLASS 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. Access the User Menu by pressing 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.

## Adjusting the IES Sensitivity

FoldSmart uses a Type-A inherent entrapment sensor (IES) per UL 325 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 average.

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 value before the IES will be tripped. The factory setting is 2, which is adequate for most sites.

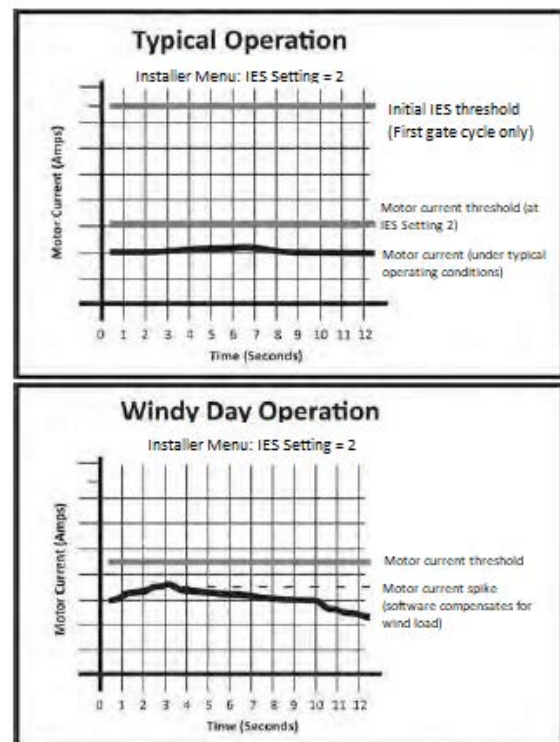
**⚠ WARNING**

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 the average 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, a gate may sag or a hinge begin to fail or other site issues, such as wind loading, can occur. As the gate hardware ages and becomes stiffer, the FoldSmart motor current increases. A failing hinge or other gate condition which causes excessive drag 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 sag or bad hinge is repaired so the gate swings smoothly with minimum resistance.



**NOTE:** When wind load increases, IES software adapts and changes the threshold allowance. The IES threshold automatically increases by 50% when the temperature drops below 32°F (0°C).

**NOTE**

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.

Examples of conditions which affect IES sensitivity include:

**Gate design** - Do not use a solid panel gate design in areas of high wind. Though a higher IES setting may compensate for a minimal amount of wind load, do not use it to compensate for poor site planning and gate design. Refer to *“Wind Load Factors & Site Prep” on page 23*.

If you have gate panels that are open and present little wind resistance, the deviation from the average current will be relatively small and you can use a more sensitive (lower) IES setting.

**Gate condition** - Over time, a gate may sag or a hinge begin to fail. Gate hinges will deteriorate more rapidly near salty sea air. For these issues, you may want to use a higher (less sensitive) IES setting until repairs are made.

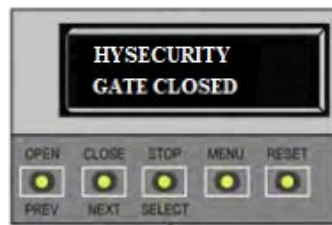
If gate hardware is an issue, upgrade the gate hardware to reduce resistance and increase the longevity of the gate and gate operator.

To adjust the IES sensitivity, take the following steps:

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 USAGE CLASS display appears. It is the first item in the Installer Menu.**
3. **Press NEXT until the IES SENSITIVITY display appears. The factory default setting is 2.**

**WARNING**

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.



1. Start at a gate status display.



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



3. To access the Installer Menu, simultaneously press OPEN and RESET.



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

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 errors occur due to IES issues, SAFE MODE or ENTRAPMENT MODE will appear on the display. For more information about troubleshooting, refer to ***"SmartDC Controller Troubleshooting" on page 167.***

## Reinstating Factory Defaults

Thirteen menu configurations are available in the User Menu. Another 43 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 display 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 S.T.A.R.T. software and download the menu settings as part of the diagnostic log.

### NOTE

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 all four sequential menu parameters are entered: Usage Class, Gate Handling, Gate Weight, and Gate Length. Refer to ***"Configuring the Setup Menu" on page 65.***

To reinstate factory defaults, take the following steps:

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.
3. Release the buttons and the **USAGE CLASS** display appears. It is the first item in the Installer Menu.
4. Press **NEXT** until the **FACTORY DEFAULTS** display appears. The factory default setting is 0.
5. Use the **SELECT** and **NEXT** buttons to navigate and change the number on the display to 1.



1. Start at a gate status display.



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



3. To access the Installer Menu, simultaneously press OPEN and RESET.



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



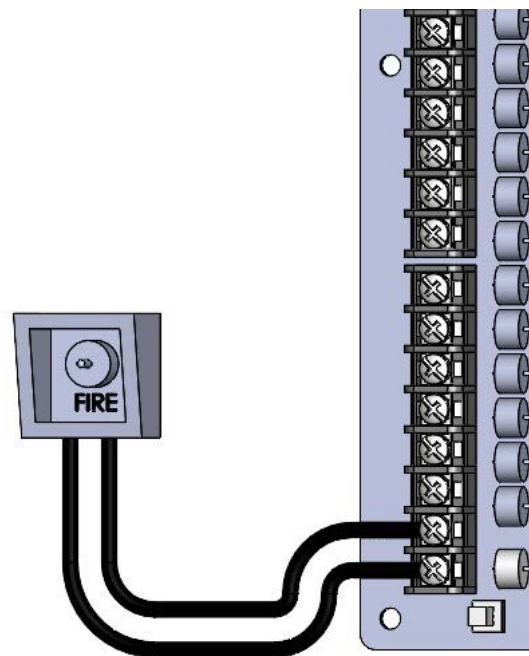
## Enabling the Fire Department Override

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 FoldSmart Controller. The FIRE DEPARTMENT OPEN option must be properly configured through the Installer Menu before the operator will recognize the alert system.

To enable the Fire Department Override, take the following steps:

1. **Connect the contact NO from the alert system or key switch to the following SmartDC Controller terminals:**  
**EMERG OPEN**  
**+24V**
2. **Configure the Installer Menu.**  
At a gate status display, press the MENU button twice. This accesses the User Menu and the CLOSE TIMER display appears.
3. **Simultaneously, press the OPEN and RESET buttons to enter the Installer Menu.** Release the buttons and the USAGE CLASS display appears. It is the first item in the Installer Menu.
4. **Press NEXT until the FIRE DEPARTMENT OPEN display appears.** The factory default setting is 0.
5. **Use the NEXT button to change the number on the display to 1 and then press SELECT.**

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 MENU twice.



3. To access the Installer Menu, simultaneously press OPEN and RESET.



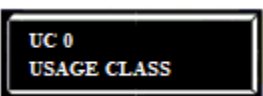



4. Use NEXT to navigate to the menu display. Change the setting using the SELECT and NEXT buttons.








# INSTALLER MENU FUNCTIONS


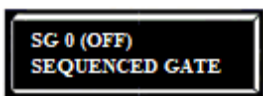
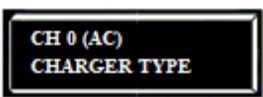

**NOTE:** Menu items are current options and subject to change.

<b>Table 5. SmartDC Controller - Installer Menu Functions</b>				
Ref. No.	Installer Menu	Setting Options ( <b>Bold</b> = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
	Display			
1	 OT 0 SET OPERATOR TYPE	<b>0 = operator type</b>  12 = SwingSmart/ FoldSmart DC 20 & DCS 20 Solar	Select the appropriate number for the operator. <b>Note: This menu item only appears if the SmartDC Controller is being replaced.</b>  <b>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.</b>	Not applicable (N/A)
2	 MN 0 MODEL NUMBER	<b>0 = model type unknown</b> 1 = Model <x> 2 = Model <x>	Select the type of gate operator model used at the site.  <b>Note: This menu item only appears, if applicable, when you set the OT (operator type).</b>	(N/A)
3	 UC 0 USAGE CLASS	<b>0 = Gate disabled</b> 1 = Residential 1 to 4 units 2 = Comm./public access 3 = Light industrial 4 = Industrial secure	Assign the operator's Usage Class designation per UL 325 standards. See <b>"Identifying Gate System Category and Usage Class" on page 18</b> and <b>"SAFETY INFORMATION" on page 10</b> . The installer must designate a usage class before the operator will function. See <b>"Configuring the Setup Menu" on page 65</b> .	(N/A)
4	 SH 0 GATE HANDING	<b>0 = Gate disabled</b> R = Right hand L = Left hand	The handing determines which way the gate opens as you view it from the swing side. See <b>"Limit Switch Adjustment Procedure" on page 51</b> . The installer must designate a left or right handing before the operator will function. See <b>Configuring the Setup Menu</b> .	(N/A)


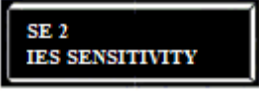

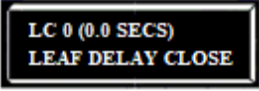
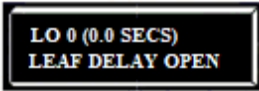
**Table 5. SmartDC Controller - Installer Menu Functions**

Ref. No.	Installer Menu Display	Setting Options (Bold = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
5	 WT 0 GATE WEIGHT (LB)	<b>0 = Gate disabled</b> 1, 2, 3, or 4 Gate weight selections appear in pounds. 1 = 0 to 300 lbs. 2 = 301 to 600lbs. 3 = 601 to 800lbs. 4 = 800 to 1300lbs.	Select the gate's weight range in pounds. The installer must designate the gate's weight before the operator will function. See <b>Configuring the Setup Menu</b> . Designating the correct gate weight allows the operator to determine the appropriate acceleration and deceleration rates.	(N/A)
6	 LN 0 GATE LENGTH (FT)	<b>0 = Gate disabled</b> 1 = 0 to 8 feet 2 = 8 to 12 feet 3 = 12 to 15 feet  4 = 16 to 20 feet – <b>DO NOT USE</b> ; setting of 15 feet is the FoldSmart maximum.	Select the gate's length in feet. The installer must designate the gate's length before the operator will function. See <b>Configuring the Setup Menu</b> . Designating the correct gate length allows the operator to determine the appropriate acceleration and deceleration rates.	(N/A)
7	 OS 5 OPEN SPEED	<b>5</b> 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. See <b>"Adjusting the Gate Speed" on page 79</b> .	(N/A)
8	 CS 5 CLOSE SPEED	<b>5</b> 1 through 10 1 = slowest speed 10 = fastest speed	The range 1 through 10 varies the speed of the motor and the gate closing 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. See <b>Adjusting the Gate Speed</b> .	(N/A)
9	 FD 0 (OFF) LOAD FACTORY DEFAULTS	<b>0 = custom user settings</b> 1 = reload factory default settings	Globally restores all menu settings back to new operator status. Select setting 1 to return the operator to factory defaults.  <b>Note: If factory defaults are restored, the UL usage class, handing, gate weight and length and any other modified menu settings will need to be reprogrammed.</b>	(N/A)

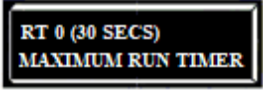



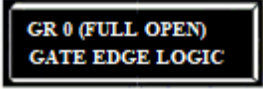

**Table 5. SmartDC Controller - Installer Menu Functions**

Ref. No.	Installer Menu	Setting Options ( <b>Bold</b> = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
	Display			
10	 DG 0 (OFF) DUAL GATE	<b>0 = solo operator</b> 1 = Secondary unit 2 = Primary unit 3 = Sally Port A 4 = Sally Port B	Configures gate operator as a Primary or as a Secondary (or a Sally Port configuration) in a dual-gate installation. When you assign one unit as Primary (or Sally Port A), you must configure the other as Secondary (or Sally Port B) through the Installer Menu. See <b><i>"Primary and Secondary Menu Setup"</i></b> on <b>page 113</b> .  <b>Note:</b> 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.
11	 SG 0 (OFF) SEQUENCED GATE	<b>0 = solo operator</b> 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 menu item only appears if the Dual Gate (DG) is set to 0 (solo operator). See note in above cell.  <b>Note:</b> 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.
12	 CH 0 (AC) CHARGER TYPE	<b>0 = AC powered</b> 1 = solar powered	Assigns charger type usually set at factory. If set to solar at factory then this menu item is hidden.	(N/A)
13	 BT 0 (STANDARD) BATTERY TYPE	<b>0 = standard (8Ah)</b> 1 = extended (50Ah) 2 = maximum (110Ah)	Assign the battery type used by the operator.  <b>Note:</b> 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.




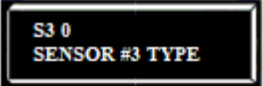
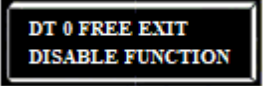
**Table 5. SmartDC Controller - Installer Menu Functions**

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

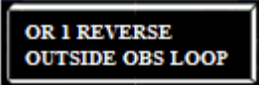

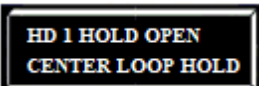
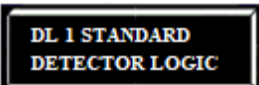
**Table 5. SmartDC Controller - Installer Menu Functions**

Ref. No.	Installer Menu	Setting Options ( <b>Bold</b> = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
	Display			
19	 RT 0 (30 SECS) MAXIMUM RUN TIMER	<b>0 = 30 Seconds max run</b> 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)
20	 EC 0 (STOP ONLY) EYE CLOSE LOGIC	<b>0 = Close eye stops only</b> 1 = 2s reverse to open 2 = Full Open	The default setting is non-reversal if the close photo eye is triggered while closing. A setting of 1 causes the 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
21	 EO 0 (STOP ONLY) EYE OPEN LOGIC	<b>0 = Open eye stops only</b> 1 = 2s reverse to close	The default setting is non-reversal if the open photo eye is triggered while opening. A setting of 1 causes the gate to reverse travel and close for two seconds if triggered while opening.	Sensor Common Sensor Input
22	 GC 1 NC CONTACT GATE EDGE OUTPUT	<b>0 = Normally Open Edge</b> <b>1 = Normally Closed</b>	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
23	 GR 0 (FULL OPEN) GATE EDGE LOGIC	<b>0 = Edge reverses full open</b> 1 = 2s reversal only	The default setting is a full-open reversal if the gate edge is triggered while closing. The optional setting of 1 causes the gate to reverse for 2 seconds if triggered while closing.	Sensor Common Sensor Input
24	 SR 1 REVERSE 2S IES SENSOR LOGIC	<b>0 = IES reverses full open</b> <b>1 = 2 second reversal only</b>	The default setting is a two-second duration reversal if the inherent sensor is triggered. The optional setting of 0 will cause the gate to reopen fully if triggered while closing.	N/A

**Table 5. SmartDC Controller - Installer Menu Functions**

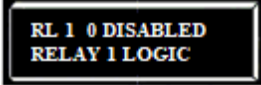
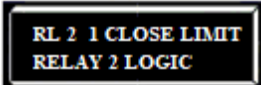
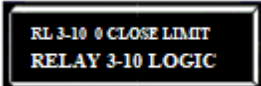
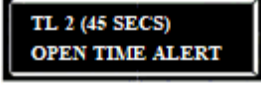
Ref. No.	Installer Menu Display	Setting Options ( <b>Bold</b> = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
25	 PC 1 NC CONTACT PHOTO EYE OUTPUT	0 = Normally Open PE output <b>1 = Normally Closed (supervised)</b>	This menu item only appears when UC is set to 4. The default setting is photo eyes with Normally Close outputs. The optional setting 0 requires a Normally Open (NO) output. When set for NC, the connection is monitored and any open or 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
26	 S1 0 SENSOR #1 TYPE	<b>0 = disabled</b> 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 and Bifold operator types. Eye Both is only available in Slide Gate operator types.	--
27	 S2 0 SENSOR #2 TYPE	Same as Sensor 1.	Same as Sensor 1.	--
28	 S3 0 SENSOR #3 TYPE	Same as Sensor 1.	Same as Sensor 1.	--
29	 DT 0 FREE EXIT DISABLE FUNCTION	<b>0 = Disable Free Exit</b> 1 = Disable Close Timer	Configures the BLOCK EXIT input to disable either the Free Exit Detector function or, alternately, the Close Timer function. The default setting disables the free exit detector.  <b>Note:</b> The free exit is disabled when the gate is at its closed limit. If the closed limit is not tripped, the free exit continues to work normally.	BLOCK EXIT COM

**Table 5. SmartDC Controller - Installer Menu Functions**

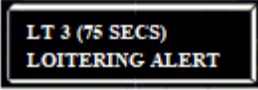

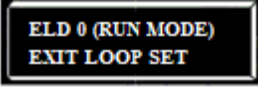
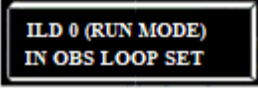
Ref. No.	Installer Menu Display	Setting Options ( <b>Bold</b> = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
30	 OR 1 REVERSE OUTSIDE OBS LOOP	0 = Pause closing only <b>1 = Enable reversing to open</b>	The default is for full reversal when the Outside Obstruction Loop is triggered while closing. A setting of 0 causes the gate to only pause when triggered. Gate closure continues as soon as the loop is clear again.	OUTSIDE OBS LOOP COM or HY5B
31	 IR 1 REVERSE INSIDE OBS LOOP	0 = Pause closing only <b>1 = Enable reversing to open</b>	The default is for full reversal when the Inside Obstruction Loop is triggered while closing. A setting of 0 causes the gate to only pause when triggered. Closure begins as soon as the loop is clear again.	INSIDE OBS LOOP COM or HY5B
32	 HD 1 HOLD OPEN CENTER LOOP HOLD	0 = Hold open only <b>1 = Hold close and hold open</b>	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
33	 DL 1 STANDARD DETECTOR LOGIC	<b>1 = Standard</b> 2 = Quick closed 3 = Forced Time out 4 = Full anti-tailgate	This selection determines whether the close timer begins to count down after vehicles have departed the detector loops or whether the close timer will count down while the loops are occupied. The gate can only close when all loop detectors are clear.  The default setting causes the Close Timer to start when all loops are clear. A setting of 2 causes the Close Timer to start when the 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



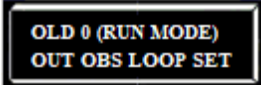
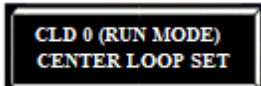
**Table 5. SmartDC Controller - Installer Menu Functions**

Ref. No.	Installer Menu	Setting Options ( <b>Bold</b> = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
	Display			
34	 RL 1 0 DISABLED RELAY 1 LOGIC	<b>0 = Default</b> 1 to 45 available	<p>Configures the function of the user 1 output relay, which is an electromechanical relay. It has the 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 the relay: COM plus NO and NC contacts.</p> <p>Up to 45 optional relay functions exist. See <b><i>“Setting the User Relay Function in the Installer Menu” on page 116.</i></b></p>	User 1 Relay
35	 RL 2 1 CLOSE LIMIT RELAY 2 LOGIC	<b>0 = default</b> 1 to 45 available	<p>Configures the function of the user 2 output relay, which is an electronic relay with the capacity for switching a DC load only. The User 2 Relay is limited to 48 Volts DC and 4 amps maximum load. Up to 45 optional relay functions exist. See <b><i>Setting the User Relay Function in the Installer Menu.</i></b></p>	User 2 Relay
36	 RL 3-10 0 CLOSE LIMIT RELAY 3-10 LOGIC	<b>0 = Disabled</b> Up to 45 available	<p>Similar to Relay 1 logic.</p> <p><b>Note:</b> The Hy8Relay™ module option can be purchased for eight additional NO relay outputs. Relay #39 set aside for Factory Use.</p>	User 3 - 10 Relay
37	 TL 2 (45 SECS) OPEN TIME ALERT	<b>0 = 0 seconds</b> 1 = 15 seconds <b>2 = 45 seconds</b> 3 = 75 seconds 4 = 105 seconds 5 = 135 seconds	<p>Adjusts the time delay before activating a user relay function. Maximum time setting is 135 seconds. See <b><i>Setting the User Relay Function in the Installer Menu.</i></b></p> <p><b>Note:</b> This menu appears only when a user relay is set to Function No. 8.</p>	User relays

**Table 5. SmartDC Controller - Installer Menu Functions**

Ref. No.	Installer Menu	Setting Options ( <b>Bold</b> = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
	Display			
38	 LT 3 (75 SECS) LOITERING ALERT	0 = 0 seconds delay 1 = 15 seconds 2 = 45 seconds <b>3 = 75 second delay</b> 4 = 105 seconds 5 = 135 seconds	This function monitors activation of the Outside Obstruction Loop when the gate is closed and not running. When the adjustable period of time is exceeded, User Relay No. 13 triggers and reports loitering in the diagnostics log.  Adjust the time delay before activating the user relay. Maximum time setting is 135 seconds. See <b>Setting the User Relay Function in the Installer Menu</b> . <b>Note:</b> This menu appears only when a user relay is set to Function No. 13.	User relays
39	 SA 0 (OFF) SDC ADDRESS	<b>0 = No network</b> 1 to 99 = Network "drop" address	Sets the 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
40	 ELD 0 (RUN MODE) EXIT LOOP SET	<b>0 = Run mode</b> 1 = Show frequency 2 = Show call level 0-7 3 = Set Frequency	Controls the HY5A/HY5B/HY5B 2.0 Free Exit detector. If an HY5B is used, additional settings of 4-8 are available:  4 = Show Sensitivity 5 = Set Sensitivity 6 = Show Inductance 7 = Show Loop Health 8 = Set Presence	HY5A/HY5B/ HY5B 2.0
41	 ILD 0 (RUN MODE) IN OBS LOOP SET	<b>0 = Run mode</b> 1 = Show frequency 2 = Show call level 0-7 3 = Set Frequency	Controls the HY5A/HY5B/HY5B 2.0 Inside Obstruction Loop detector. If an HY5B is used, additional settings of 4-8 are available:  4 = Show Sensitivity 5 = Set Sensitivity 6 = Show Inductance 7 = Show Loop Health 8 = Set Presence	HY5A/HY5B/ HY5B 2.0

**Table 5. SmartDC Controller - Installer Menu Functions**

Ref. No.	Installer Menu	Setting Options ( <b>Bold</b> = Factory Settings)	Menu Tasks and Explanations	Associated DC Controller Connections
	Display			
42	 <p>OLD 0 (RUN MODE) OUT OBS LOOP SET</p>	<p><b>0 = Run mode</b>  <b>1 = Show frequency</b>  <b>2 = Show call level 0-7</b>  <b>3 = Set Frequency</b></p>	<p>Controls the HY5A/HY5B/HY5B 2.0 Outside Obstruction Loop detector. If an HY5B is used, additional settings of 4-8 are available:  <b>4 = Show Sensitivity</b>  <b>5 = Set Sensitivity</b>  <b>6 = Show Inductance</b>  <b>7 = Show Loop Health</b>  <b>8 = Set Presence</b></p>	HY5A/HY5B/ HY5B 2.0
43	 <p>CLD 0 (RUN MODE) CENTER LOOP SET</p>	<p><b>0 = Run mode</b>  <b>1 = Show frequency</b>  <b>2 = Show call level 0-7</b>  <b>3 = Set Frequency</b></p>	<p>Controls the HY5A/HY5B/HY5B 2.0 Center Loop (Shadow) detector. If an HY5B is used, additional settings of 4-8 are available:  <b>4 = Show Sensitivity</b>  <b>5 = Set Sensitivity</b>  <b>6 = Show Inductance</b>  <b>7 = Show Loop Health</b>  <b>8 = Set Presence</b></p>	HY5A/HY5B/ HY5B 2.0

# SmartDC Controller

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

1. Review the connections on the SmartDC Controller
2. Perform a Preliminary Test of the Components
3. Connect Vehicle Detectors
4. Connect Accessory Devices
  - Entrapment Sensor Connections
  - Access Controls
  - Manual Push-Button Station
  - User Relays

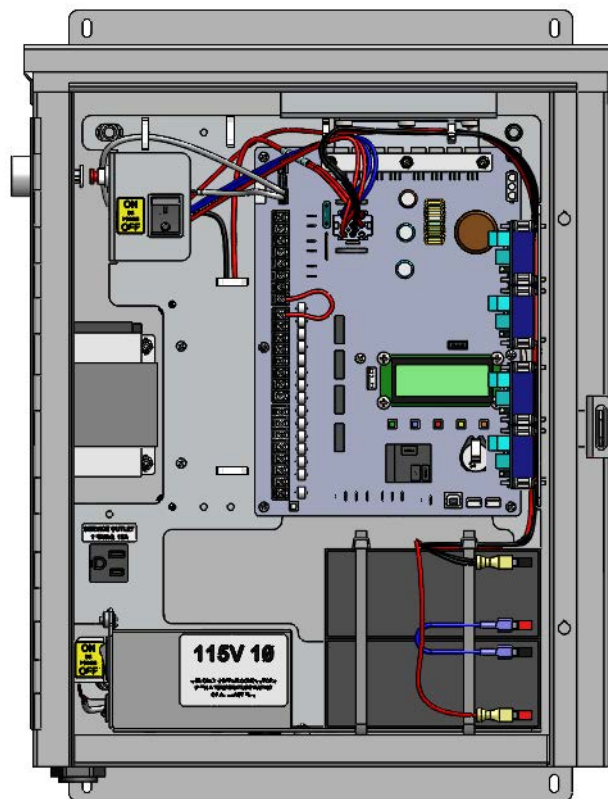


Figure 11. SmartDC Controller

## Overview of the SmartDC Controller

The SmartDC Controller uses LED's to indicate active inputs when AC power is present. For operators that use only DC power, you can push a button to show the active inputs. This button is at the bottom left corner near the EMERG OPEN input.

On a new operator no active inputs should appear until external accessories and wiring are attached. If any inputs are active before connecting external wiring, refer to ***"SmartDC Controller Troubleshooting"*** on page 167.

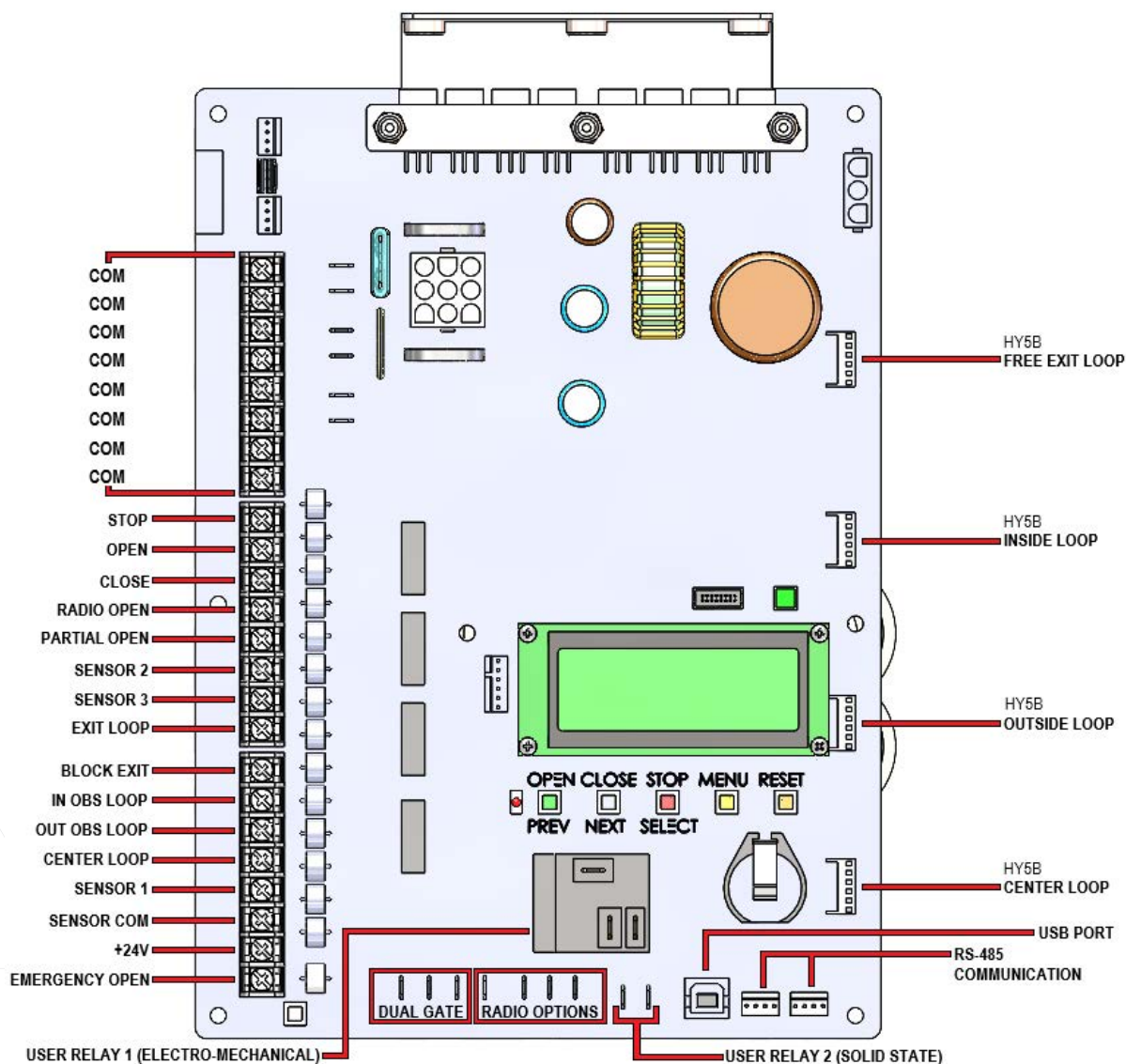


Figure 12. SmartDC Controller Board

## Preliminary Testing

All the control device inputs listed in Table 6 are shown as a single input. The second wire is connected to a Common Terminal Bus (1 - 8) on the SmartDC Controller board. The Fire Department Open input is an exception and requires a +24 Volt input as well as activation in the Installer Menu. For convenience a +24V terminal is located next to the EMERG OPEN terminal. Refer to **“Figure 12. SmartDC Controller Board” on page 96.**

<b>Table 6. SmartDC Controller Board Inputs</b>				
<b>Terminal No.</b>	<b>Input Name</b>	<b>Pre-2016 Models</b>	<b>Wire Connections</b>	<b>Uses</b>
1-8	COM	COM	All user inputs are energized when connected to common except Emergency Open.	Powering sensors and accessories.
9	Stop *	Stop	Normally Closed (N.C.) input. Jumper to Common if not being used.	Line of sight, external stop button or 3-button station.
10	Open *	Open	Normally Open (N.O.) input. Not for radio or remote access controls.	Line of sight, external open button or 3-button station.
11	Close	Close	N.O. input. Connection for a close push-button.	Line of sight, external connection for a close button or 3-button station.
12	Radio Open **	Remote Open and Radio Control	N.O. input. For radio/remote open device. Program to also Close using SmartDC Installer Menu. Access RO in the User Menu and set to 1.	Remote access controls or radio controls.
13	Partial Open	Partial Open	Not used in FoldSmart operators.	N/A
14	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
15	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
16	Exit Loop	Free Exit Vehicle Detector	N.O. input. Connection for free exit vehicle detector.	Free Exit Vehicle Detector

<b>Table 6. SmartDC Controller Board Inputs</b>				
<b>Terminal No.</b>	<b>Input Name</b>	<b>Pre-2016 Models</b>	<b>Wire Connections</b>	<b>Uses</b>
17	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.
18	Inside Obstruction Loop	Inside Obstruction Vehicle Detector	N.O. input.	Inside reversing loop. Optional settings available: Installer Menu item IR.
19	Outside Obstruction Loop	Outside Obstruction Vehicle Detector	N.O. input.	Outside reversing loop. Optional settings available: Installer Menu item OR.
20	Center Loop	Center Loop (Shadow) Vehicle Detector	N.O. input.	Shadow function used for Swing and Bifold gates only.
21	Sensor 1	Edge Sensor	N.C. input. Type of sensor used is programmable in Installer Menu (S1).	External Entrapment Sensor
22	Sensor COM	Photo 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.
23	+24V	+24VDC	Convenient 24VDC power.	Convenient 24VDC power for photo eyes or the Emergency Open input.
24	Emergency Open (Fire Dept. Open) ***	Emergency Open (Fire Dept. Open)	N.O. input.	The Emergency Open must be enabled via the Installer Menu. It is energized by connecting to the +24V terminal above it. The EMERG OPEN overrides photo eye & edge sensor commands.
<p>*Do not connect an external control to the STOP or OPEN inputs unless the controls are located in clear view of the entire gate area.</p> <p>**Use the RADIO OPEN input or RADIO OPTIONS spade connections for all out-of-sight controls, such as a telephone entry or radio operated controls.</p> <p>***The Fire Department Open control must be keyed or guarded so that it can only be used by authorized personnel.</p>				



## Vehicle Detector Installation Options

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

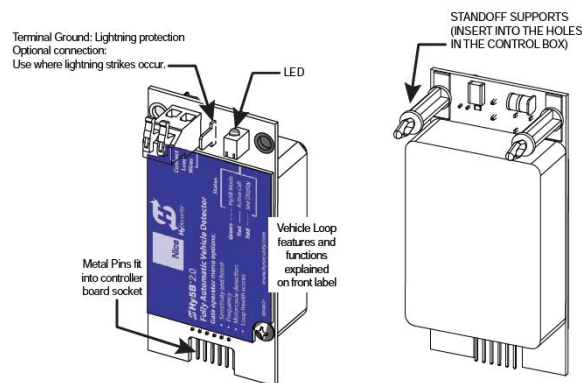
### NOTE

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 13) plugs directly into the SmartDC Controller Board making field installation much faster plus providing a large performance benefit. The detector communicates with the SmartDC Controller microprocessor to achieve the following benefits over common box type detectors:

- **Loop frequency is automatically set and monitored by the SmartDC Controller.**
- **Very low power draw, which is important for maximum UPS capability during a power failure.**
- **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 SmartDC Controller display.**
- **Loop malfunctions are reported and stored by the SmartDC Controller.**
- **Most detector or loop faults that can occur are reported and presented on the SmartDC Controller display.**

It is not mandatory to use two separate detectors for inner and outer obstruction detection, however the benefits of using this additional detector are great. Several new features are possible, such as second vehicle tailgating detection, loitering alert, and selectable non-reversing options.



**Figure 13. HY5B Vehicle Detector Module**

There are four vehicle detector inputs available on the SmartDC Controller as well as via the direct plug-in modules. The vehicle detector input functions are as follows:

- **Free Exit Loop Detector** - This opens a fully closed gate.
- **Outside Obstruction Loop Detector (Out Obs Loop)** - This is for the outside reversing loop.
- **Inside Obstruction Loop Detector (In Obs Loop)** - This is for the inside reversing loop.
- **Center Loop Detector** - This is also known as a Shadow Loop and is used for swing and bifold gates only to prevent a gate from starting open or closed when a vehicle is in the path of the gate.

**NOTE**

Use of any combination of HY5B detectors and box detectors is acceptable. On occasion, multiple obstruction detectors may be mandatory. For example, an area greater than 200 square feet (19 square meters) of loop cannot be connected to any one detector because the sensitivity becomes inadequate.

## Connecting HY5B Vehicle Detectors

Install the HY5B Vehicle Detector modules, one at a time, 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 SmartDC 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. To enable the detector, turn on power. The detector will immediately tune if it is connected to loops. Make sure no cars or other metal objects are over the loops.
6. Repeat Steps 1 through 5 for each HY5B detector.
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.

**NOTE**

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

**8. Pressing the RESET button:**

- Clears any errors
- Tunes the detectors on connected loops
- Un-installs any detectors that have been removed

**9. The SmartDC 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 5 - SmartDC Controller - Installer Menu Functions in “INSTALLER MENU FUNCTIONS” on page 85.****10. Sensitivity is the only adjustment available on the detector itself. Generally, sensitivity does not need to be increased unless the loop is large or there are multiple loops connected to one detector.****NOTE**

Do not exceed more than 200 square feet (18.6 square meters) of loop area to one detector.

If required, adjust the sensitivity using the rotary switch which has the following eight settings:

- **0 = Low with boost (See NOTE.)**
- **1 = Normal with boost (See NOTE.)**
- **2 = Medium with boost (See NOTE.)**
- **3 = High with boost (See NOTE.)**
- **4 = Low without boost**
- **5 = Normal without boost**
- **6 = Medium without boost**
- **7 = High without boost**

**NOTE**

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.

**11. Vehicle detector functions are configurable through the Installer Menu as described in Table 7.**

<b>Table 7. Vehicle Detector - Configurable Functions</b>		
<b>Display</b>	<b>Meaning</b>	<b>Installer Menu Setting Options (Bold - Default)</b>
OR 1	Outside Obstruction loop detector function	0= Pause closing only <b>1= Enable reversing to open</b>
IR 1	Inside Obstruction loop detector function	0= Pause closing only <b>1= Enable reversing to open</b>
HD 1	Center Loop detector function	0= Hold open only <b>1= Hold open and Hold closed</b>
DL 1	Vehicle detector logic	<b>1 = Standard</b> (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)

**12. The outside and inside Obstruction Loop Detectors are factory configured to fully re-open the gate as a default setting. In the Installer Menu, each detector can individually be set so that when the gate is closing there is only a pause if triggered. To change the setting, go to the menu OR or IR item and set to 0.**

## Installing Standard 11-Pin Box Type Vehicle Detectors

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

1. If there is sufficient space, install the sockets in the control box; if not, then install them in a separate external housing. Figure 14 is for general reference only.

### NOTE

Carefully consider your peripheral connections. Any peripheral device required for safe gate operation should be attached 24VDC in case of an AC power outage. Additionally, box detectors with relays require five times more power than HY5B detectors, therefore UPS battery life will be extended if using HY5B detectors.

### NOTE

Always keep the detector loop wires well twisted at all places beyond the area of the loop. The lead in portion sealed in a saw cut does not need to be twisted so long as the wires are encapsulated in loop sealant and cannot move. Refer to Installing Vehicle Detectors and Loops.

2. Connect 24 Volt power to the detector. Connect Pin No. 1 to a 24VAC or 24VDC terminal and Pin No. 2 to common. (You must provide your own power supply if 24VAC is required.)
3. 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 SmartDC Controller.
4. 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 14. The only wires that are separate are the output wire to the SmartDC Controller and the detector loop input wires.

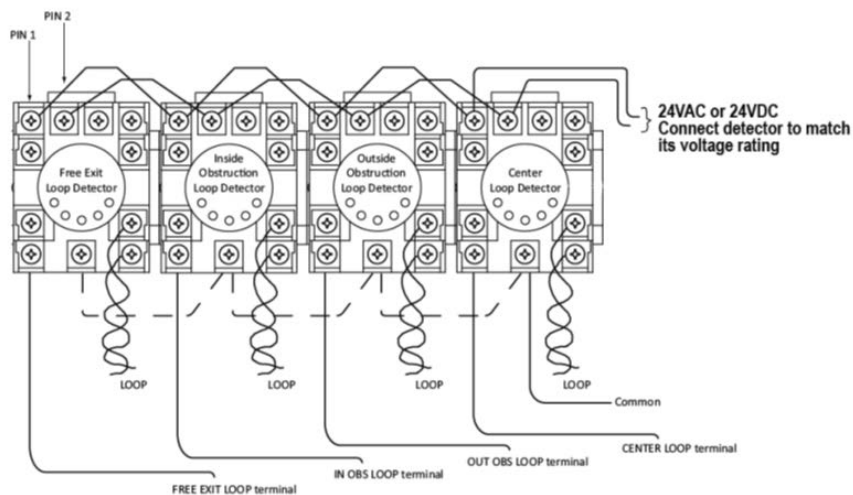


Figure 14. Standard 11-Pin Box Type Vehicle Detector

## Vehicle Detector Configuration and Quick Close Mode Selection

The Standard Quick Close modes are selectable in the Installer Menu. Refer to “**Table 5. SmartDC Controller - Installer Menu Functions**” on page 85.

The two selectable modes are described 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 block all close inputs.

### **Mode 2**

Same function as Mode 1, except the close timer can count to zero even with the Free Exit, Outside Obstruction Loop, Inside Obstruction Loop or the Center Loop detector inputs active. If the close timer has counted to zero, the gate will close when all detector inputs are clear.

## Connecting Accessory Devices

All accessories require a minimum of two connections on the SmartDC controller:

- a device input
- a Common Bus Terminal (COM)

Devices, such as gate edge sensors and photoelectric beams, must be installed to protect against entrapment. These external entrapment protection devices are required so the gate installation is in compliance with UL 325 Safety Standards. Figure 15 illustrates how to connect different sensor devices to the SmartDC Controller.

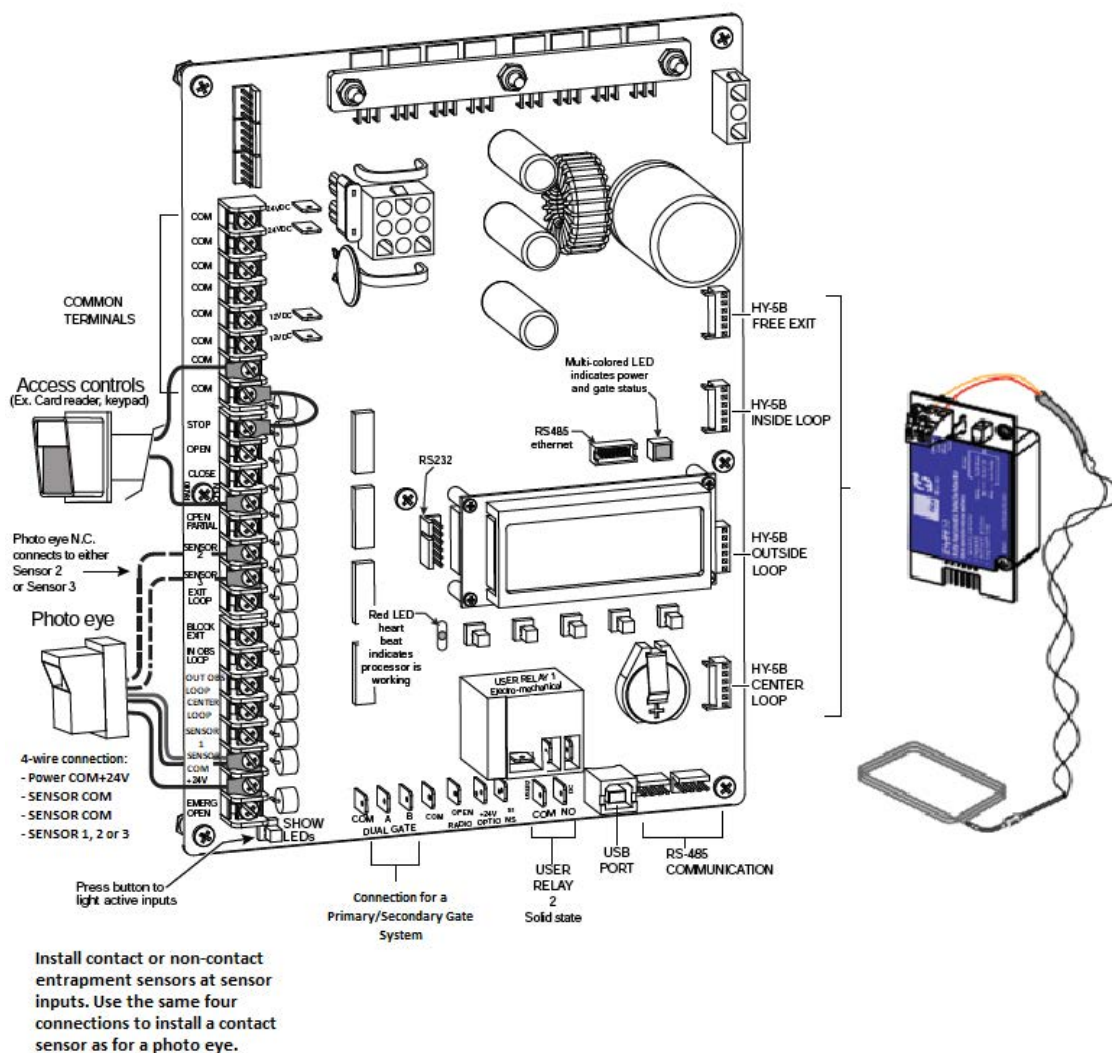


Figure 15. Entrapment Sensors & Accessory Connections

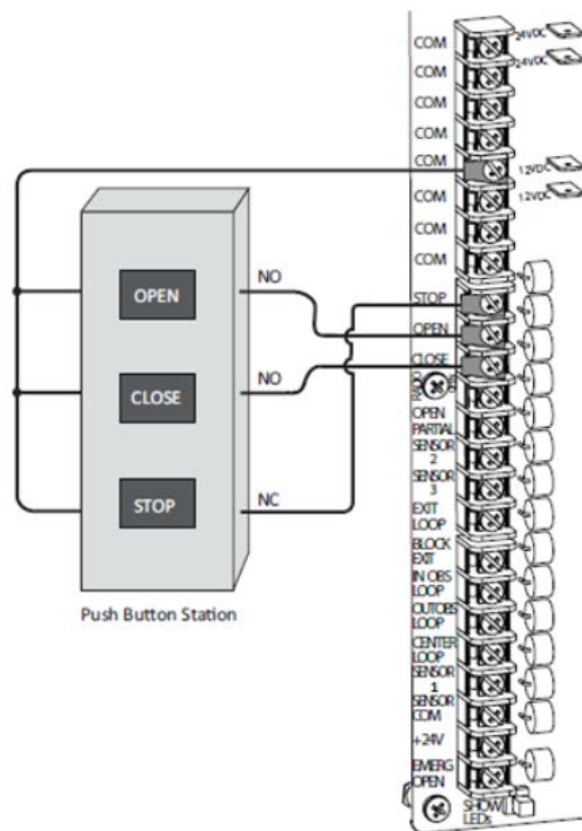


## Manual Push-Button Station

A manual push-button station controls the gate system and opens, stops, and closes the gate. It is most often used by a guard in a 24-hour guard station. An example of the push-button station connections on FoldSmart is shown in Figure 16.

### **CAUTION**

Make sure the manual push-button station is within site of the gate, a distance (six feet, 1.8m minimum) away from the gate's moving parts, and out of reach of children.



**Figure 16. Manual Push-Button Station Connection**

## User Relays - Programming Procedure

The SmartDC Controller is able to interface with many types of external devices through the use of two user-programmable output relays. All of the user relay functions identified and described in Table 8 are accessible in the Installer Menu.

### NOTE

The User Relays will operate normally to less than 18VDC. The USER 2 RELAY is rated for DC only up to 48V and does not have an N.C. (normally closed) connection.

Use the SmartDC Controller buttons to program the user relays according to the following steps:

1. Select the relay you wish to use.
2. Enter the appropriate function using the associated number listed in the table.

<b>Table 8. User-Programmable User Relays - Function Options</b>		
<b>No.</b>	<b>Name</b>	<b>Description</b>
1	Close limit output	Creates an interlock signal to another operator's interlock input, or simply to indicate that the gate is secure or not. The relay is released when the fully-closed limit switch is tripped. The relay is energized when the fully-closed limit is released. (Any open command energizes the 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 the close limit is triggered.
3	Open limit output	Indicates a full-open position. This output becomes active when an open-limit is triggered and deactivates when the 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 the open-limit is triggered. An additional pulse is also generated with any new open command even when the 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 the operator starts moving the gate and remains active while moving as well as for a few seconds after stopping.

**Table 8. User-Programmable User Relays - Function Options**

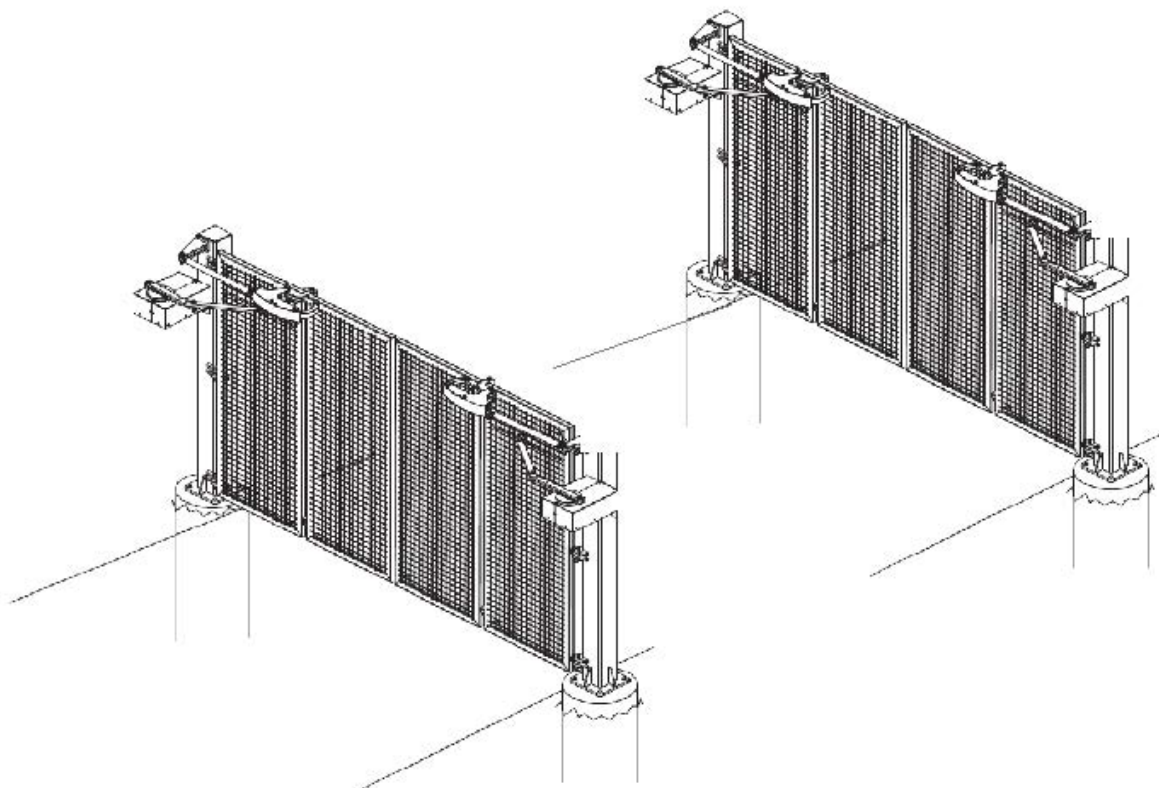
No.	Name	Description
7	Gate forced open output	Activated if the gate is forced off the closed limit switch and operator is not able to restore the gate to full closed within four seconds. The buzzer resets itself in 30 seconds but relay stays active until gate receives a run command.
8	Gate open too long output	Activates when the gate is open longer than a user-selected period of time. Adjustable from a 0 second to 135 second delay in 15-second increments. Note: TL - OPEN TIME ALERT adjustments can be made in the Installer Menu.
9	Safety Mode Alert output	Activated when system is in the Safety Mode or the Entrapment Mode. Safety Mode occurs upon an impact with an obstruction. Entrapment Mode means the gate is stopped and occurs if the internal inherent entrapment sensor triggers while the system is in the Safety Mode.
10	Entrapment Mode Alert output	Activated only when system is in the Entrapment Mode.
11	Unauthorized Vehicle Entry output	Activated when a second vehicle enters from the 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 the gate reaches the close limit position.
12	Outside Obstruction Vehicle Detector output	This output is active whenever the Outside Obstruction Loop Detector is tripped. Interlocks an entry device to prevent pedestrian use.
13	Loitering Alert	Indicates a vehicle or loitering on the Outside Obstruction Loop with the gate closed. Adjustable from a 0 second to 135 second delay in 15-second time intervals. Note: LT - LOITERING ALERT adjustments can be made in the Installer Menu.
14	Gate nearing full travel output	Activated when the gate is approaching full open or full closed, or in a reverse travel mode.
15	Gate Failure output	Activated to report occurrence of a problem. Indicates the system is in an Error Mode, Fault Mode or Entrapment Mode. If active, the gate is disabled.
16	Motor Running output	Active when the motor is running and the 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 the battery power is very low, but the output ceases when the battery is dead (18 volts). The relay is triggered when the battery is less than 21 volts.
19	Flasher Relay	Controls flashing lights that pulse once per second. The relay is constantly pulsing except when the 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 the Exit Loop is tripped.
21	Inside Obstruction Vehicle Detector output	Activated when the Inside Obstruction Vehicle Detector is tripped.
22	Center Loop Detector output	Activated when the Center (Shadow) loop detector is tripped.

**Table 8. User-Programmable User Relays - Function Options**

No.	Name	Description
23	External Latching Gate Lock output	Not functional in the FoldSmart operator.
24	Gate at Partial Open Position	Not functional in the FoldSmart operator.
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 the gate is on open limit.
28	Flasher (w/AC power)	Output identical to relay #19 and pulses relay 500 ms/sec when the gate is not on open limit and AC power is present. Deactivated when AC power fails or the gate is on open limit.
29	Arm Entry Ticket Dispenser	Not functional in the FoldSmart operator.
30	Arm Exit Ticket Dispenser	Not functional in the FoldSmart operator.
31	Reset Ticket Dispenser Pulse	Not functional in the FoldSmart operator.
32	Backoff Pulse	Not functional in the FoldSmart operator.
33	Transient In Pulse	Not functional in the FoldSmart operator.
34	Transient Out Pulse	Not functional in the FoldSmart operator.
35	Tenant In Pulse	Not functional in the FoldSmart operator.
36	Tenant Out Pulse	Not functional in the FoldSmart operator.
37	Special In Pulse	Not functional in the FoldSmart operator.
38	Special Out Pulse	Not functional in the FoldSmart operator.
39	Unknown In Pulse	Not functional in the FoldSmart operator.
40	Unknown Out Pulse	Not functional in the FoldSmart 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 the arm break-away switch is tripped.
43	Warn Before	Combination of relays #5 and #16.
44	Partial Open Limit Pulse	Pulses for 250ms when the gate, commanded with Partial Open input, reaches Partial Open Limit, or, the gate is past Partial Open Limit and Partial Open input is activated. Note: This item is not functional in the DC FoldSmart operator.
45	Outside Obstruction/ Arming Loop Detector	Activated when OOLD/OALD detector input tripped and gate closed. Used for testing purposes.

## **Gate Systems**

Configuring two operators to be a Primary and Secondary pair is easy with the SmartDC 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 RS485 serial port for communication between primary and secondary operators.



**Figure 17. Dual Operators**

## 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 primary-secondary communication wires and any low voltage control wires must be installed in a conduit that is separate from the high voltage power wires. Refer to “*Figure 18. Primary and Secondary Connections*” on page 112.
- 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 <https://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 9. Wire Length Chart**

AC Power - Dual Operators	14-gauge wire	12-gauge wire	10-gauge wire
115V	305 ft (95 meters)	500 ft (150 meters)	775 ft (240 meters)
230V	1220 ft (370 meters)	1950 ft (590 meters)	3100 ft (940 meters)

# Primary and Secondary Wiring Connections

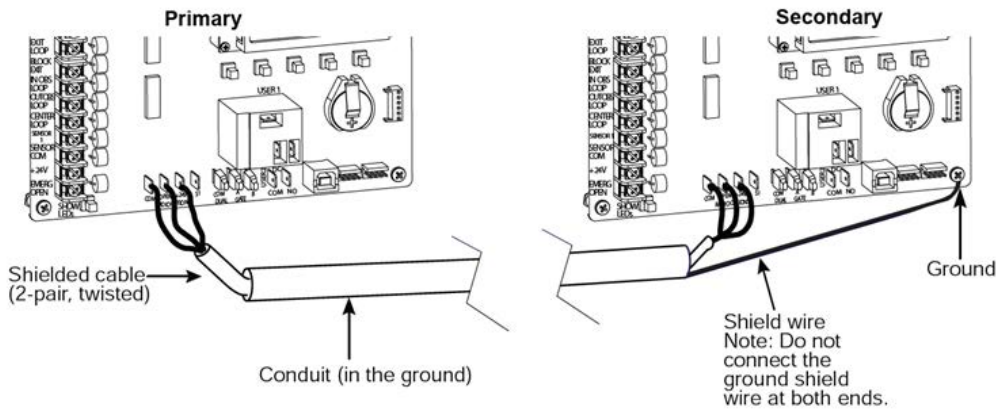


Figure 18. Primary and Secondary Connections

- 1. As shown in Figure 18, connect a shielded communications cable to the DUAL GATE inputs in each unit. The inputs are located near the base of the SmartDC 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 Primary Secondary Connections on SDC Boards - Table 10.

Table 10. Primary Secondary Connections on SDC Boards

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

**NOTE**

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

- 2. Attach a ring terminal to the shield wire and connect it to the SmartDC Controller’s convenient ground screw. Refer to Figure 18.



## 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.

Start by configuring the PRIMARY unit:

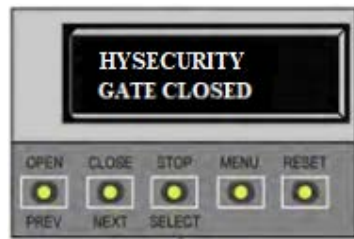
1. **At a gate status display, press the MENU button twice. This accesses the User Menu and the CLOSE TIMER display appears.**
2. **Simultaneously, press the OPEN and RESET buttons to enter the Installer Menu. Release the buttons and the USAGE CLASS display appears which is the first item in the Installer 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.**

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

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

When the FoldSmart 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 the secondary unit will be recognized by the primary once the 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 secondary unit. If a close timer is set in both units, the primary unit overrides the secondary setting.**



1. Start at a gate status display.



2. Access the User Menu by pressing MENU twice.



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



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

#### NOTE

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 ERR4 (Primary/Secondary Communication Error) appears in the display.

# Installer's Reference: Sensors and Accessories

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

- Connecting a Radio Receiver for Remote Open
- Setting the User Relay Function in the Installer Menu
- Installing Vehicle Detectors and Loops
- Monitored External Entrapment Sensors
- External Entrapment Protection
- Photo Eye Installation Tips
- Installing Photoelectric Sensors for External Entrapment Protection Only
- (Photo Eye) Operation Notes
- Photo Eye Mounting and Alignment
- How to Install & Program Resistive Gate Edges (8.2 kΩ terminating resistor)
- How to Install Model LC2-8 or TL96 Traffic Lights on your FoldSmart Gate

## Connecting a Radio Receiver for Remote Open

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

1. **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 19 shows additional wires from a two-channel receiver.**
2. **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.**
3. **Fasten the two crimped wires to the COM terminal.**

4. **Connect the red wire to the +24V spade and connect the other radio output contact wire to the spade marked OPEN.**

This terminal is the same as the input terminal labelled RADIO OPEN along the left edge of the SmartDC Controller.

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

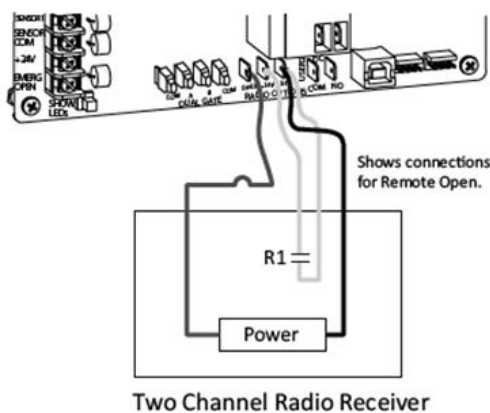


Figure 19. Radio Receiver Connections

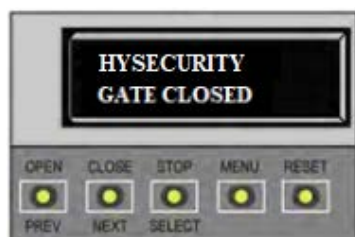
### NOTE

If an edge sensor transmitter is also used to reverse the gate, be certain to use a two-channel commercial receiver. The edge and handheld transmitters must have their codes set to match the receiver or they will not function.

## Setting the User Relay Function in the Installer Menu

For lock installation functions, enter the Installer Menu and set the User 1 Relay to Function 6 - GATE LOCK OUTPUT.

For other installation options, use the SmartDC Controller buttons to program the user relays by selecting the relay you wish to use, and entering the appropriate function using the associated number listed in Table 8 - User-Programmable User Relays - Function Options. Refer to the User Relays - Programming Procedure section for details.



1. Start at a gate status display.



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



3. To access the Installer Menu, simultaneously press OPEN and RESET.



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

## 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 the resultant drop in the inductance, and actuates the detector output.

### Loop Configurations:

Configurations differ depending on the application.

### Rules to Follow for Security Gate Applications:

The side of the loop closest to the gate must be located at least 4 ft (122cm) from the line of travel.

1. The shortest side of the loop should be between 6 and 8 feet (1.8 x 2.4m) in length. The longest side of the loop should be between 6 and 20 feet (1.8 x 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 (18.6 sq. m) of loop area to a single detector.
2. In applications with multiple loops, keep each loop at least 6 feet (1.8m) apart. This avoids “cross talk”. It is possible to have loops closer together by selecting different frequencies. An advantage of using model HY5B detectors is that problematic “cross talk” is not possible.
3. For greater sensitivity and less chance of false calls caused by the motion of the gate, it is better to use multiple smaller loops, connected in a series circuit, to one detector instead of a single large loop.
4. 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.
5. 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.
6. 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.
7. Twist loose tails of lead-in wires tightly, approximately ten times per foot. See Figure 22.
8. 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 6.1 sq. m = 5 turns	6.1 to 18.3 sq. m = 4 turns	18.3 to 73.1 sq. m = 3 turns

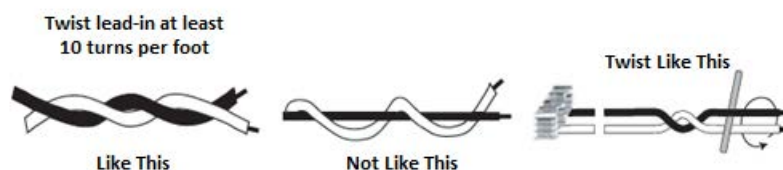


Figure 22. Lead-in Wire Twisting

9. This guide is written from a design perspective, but installation workmanship practices are equally important to ensure proper operation and long loop life. The best way to ensure a quality installation is to employ a professional installer experienced with detector loops. A few important practices are:
  - The slot in the surface of the road should be cut  $\frac{1}{4}$ -inch wide x  $1\frac{1}{2}$ -inch deep (6.3 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.

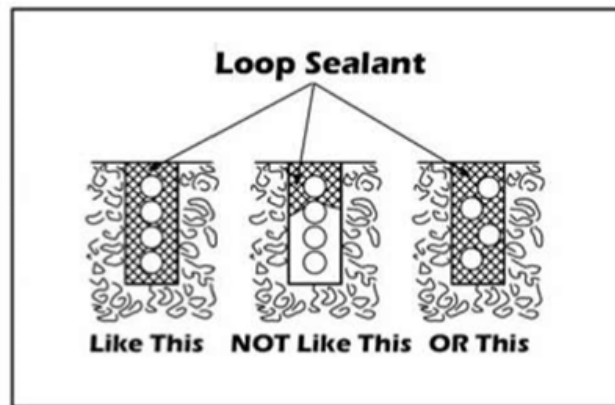


Figure 23. Loop Sealant Application

### Detector Logic

Wallace Perimeter Security 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 Megohmmeter. It should be 100 Megohms or more. Loops may function at less than 100 Megohms 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.**

Schematic for FoldSmart Loop Layout is shown in Figure 24.

Revision 4.0 - JUNE 2025

119



## 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 Bifold 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.

The FoldSmart/HySecurity SmartDC Controller 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
- 7 – Eye Both (N/A)

It is the installer's 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 FoldSmart design are shown in ***"UL 325 Compliant Sensors" on page 20*** (see figure at end of UL 325 Compliant Sensors section depicting Bifold Gate Common Entrapment Zones). Refer also to ***"Figure 28-1. Photo Eye Placement for External Entrapment Protection" on page 124***, and Figures 28-2 to 28-5. Included in the drawings are examples of potential external entrapment sensor mounting/installation locations.

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 25 below shows the wiring and dip switch settings of an EMX-MON photo eye (typical thru-beam wiring). A retro-reflective photo eye will be similar and only have wiring similar to the receiver of the thru-beam photo eye.

### NOTE

For UL 325 compliance, all external entrapment protection sensors **must have N.C. sensor outputs** for monitoring and powering purposes.

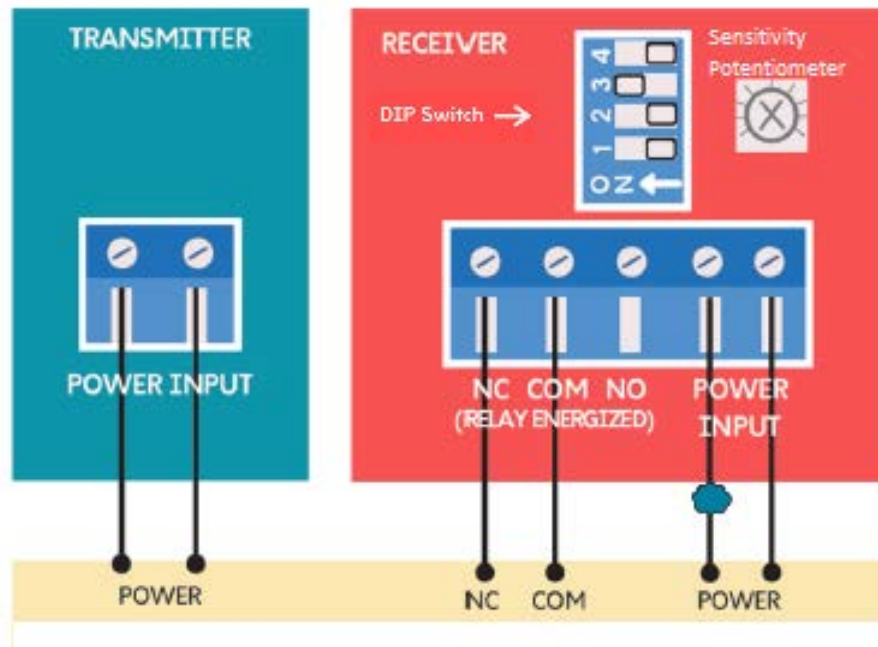


Figure 25. EMX-IRB-MON Photo Eye Wiring

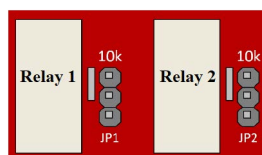
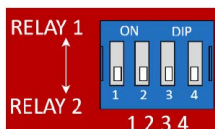
An Edge Sensor can be either hardwired through an adapter module (HY2NC) or a wireless transmitter/receiver combo (WEL-200 or iGAZE RE). Figure 26 below shows the wiring and dip switch settings of a WEL-200.



#### Normally Closed Monitoring: Connect Power Wires Last

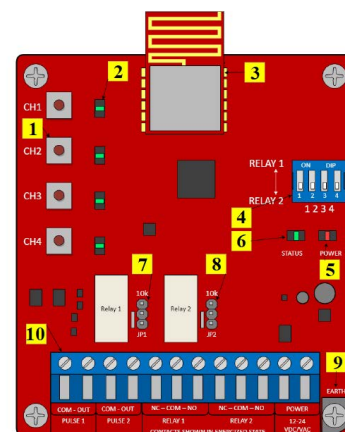
- For channels assigned to Relay 1, connect the sensor common to terminal 6, and the operator input (sensor 1, 2 or 3) to terminal 5.
- For channels assigned to Relay 2, connect the sensor common to terminal 9, and the operator input (sensor 1, 2 or 3) to terminal 8.
- For NC, move the jumper on the receiver to the **top** two pins.
- Connect 24 VDC to terminal 11 and sensor COM to terminal 12.

On the DIP switch, indicate which channels will output through Relay 1 and Relay 2 terminals. The DIP switch in the image shows all four channels outputting through Relay 2 terminals.



NC position

WEL-200 Receiver



#### Receiver Connections:

1. Channel assignment buttons
2. Channel LEDs
3. Radio
4. DIP switch
5. Power LED
6. System Status LED
7. Relay 1 - 10K Jumper
8. Relay 2 - 10K Jumper
9. Earth ground
10. Terminal block

Figure 26. WEL-200 or iGAZE RE

## External Entrapment Protection

Consult a photoelectric sensor manual for wiring details. Make all electrical connections to SmartDC Controller as shown in Figure 27.

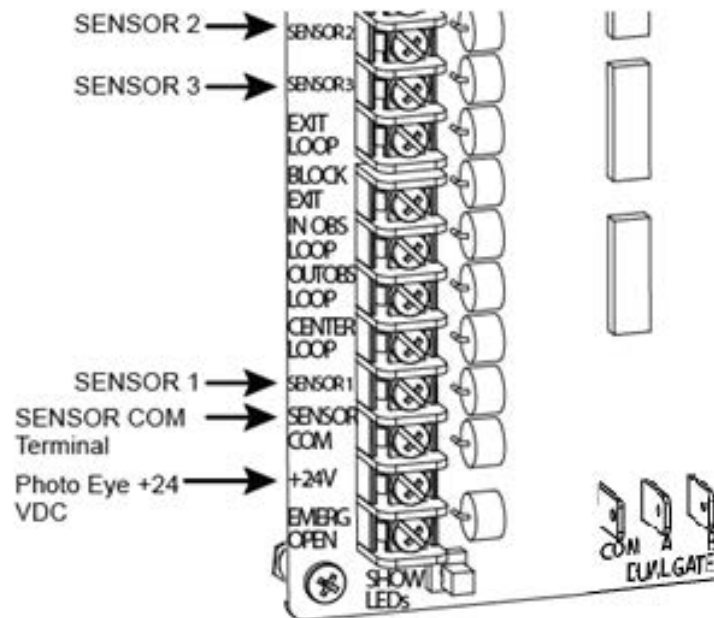


Figure 27. Entrapment Protection Only Connections

## 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" (.38 to .76m) above the ground and as close to the gate as possible. A minimum of one photo eye 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.
- **Four 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 SmartDC Controller.
- The photo eye NC output wires connect to the SmartDC Controller at the Appropriate Sensor Input (1, 2, or 3).
- 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**

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.

**NOTICE**

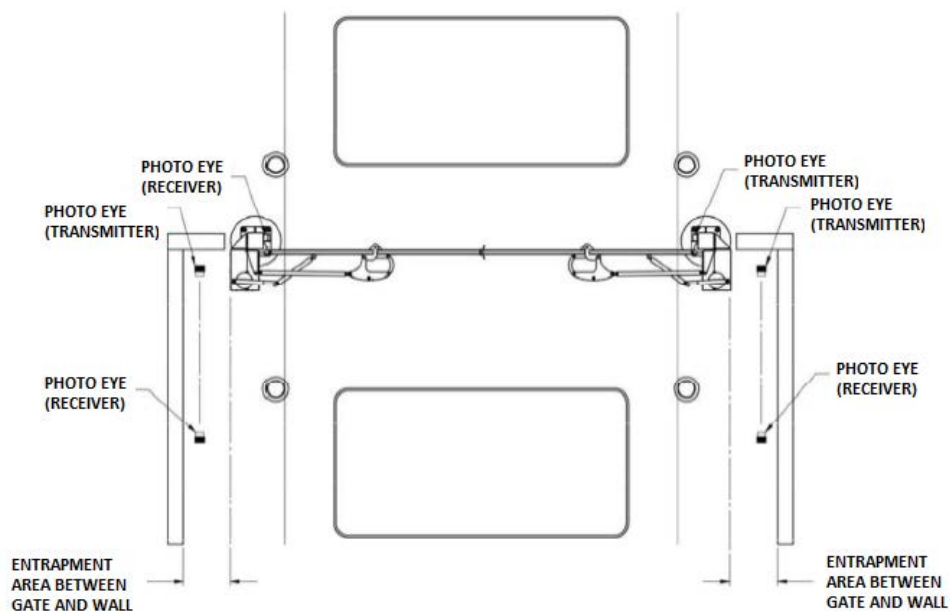
Sensor Common & +24V is the recommended way to connect monitored photo eyes to SmartDC Controller.

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 a NC contact. If the photo eye has a solid-state output you must choose a sinking type connection.

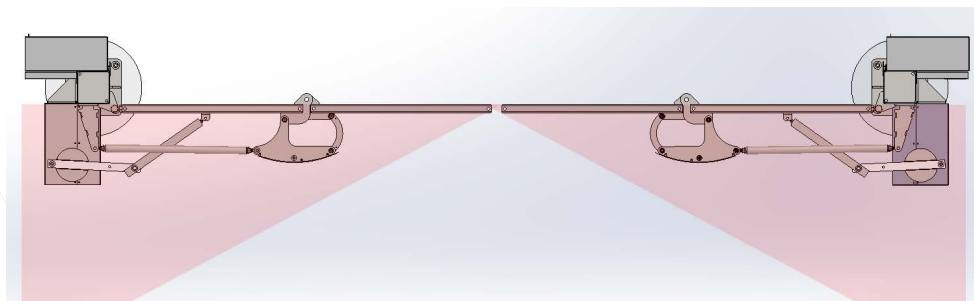
## Installing Photoelectric Sensors for External Entrapment Protection Only

Refer to Figures 28-1 to 28-5 to help plan the most appropriate placement for the photo eyes being installed as external entrapment protection devices. If no other external entrapment protection devices (like edge sensors) are installed, then at least two photoelectric sensors are required to guard the gate in each direction of travel. If the photo eyes are tripped, the operator will temporarily stop the gate.

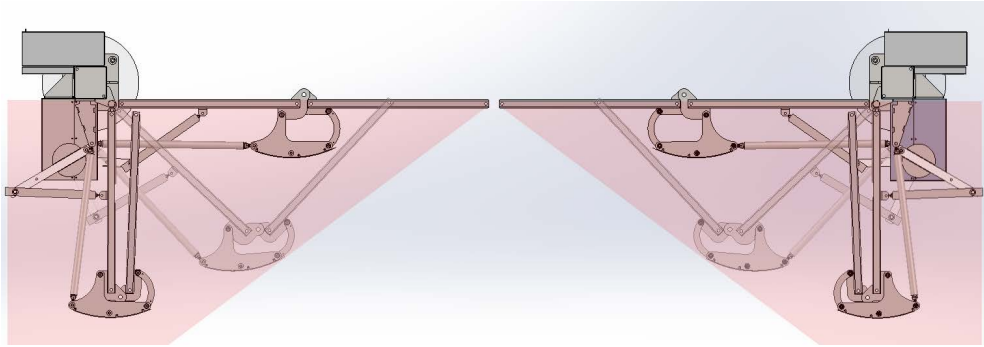
Consult a photoelectric sensor manual for wiring details. Make all electrical connections to SmartDC Controller as shown in Figure 27.



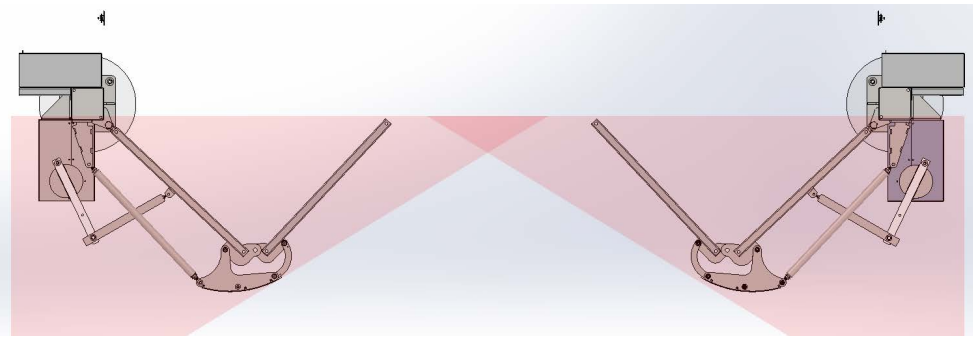
**Figure 28-1. Photo Eye Placement for External Entrapment Protection**



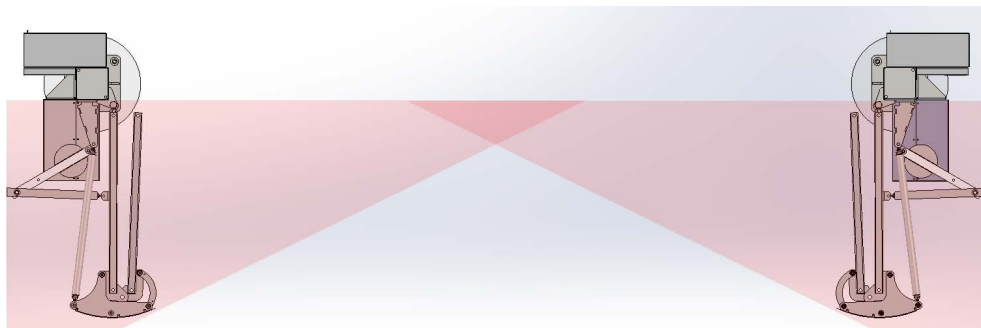
**Figure 28-2. Entrapment Zone - Closed**



**Figure 28-3. Entrapment Zone Progression as Gate Opens**



**Figure 28-4. Entrapment Zone – Half-Open**



**Figure 28-5. Entrapment Zone – Open**

## Operation Notes

- A photo eye trip does not reverse gate.
- The SmartDC Controller software is factory set to stop upon photo eye trip.
- Software is configurable to stop and reverse two seconds upon photo eye trip.
- If the photo eye is cleared within five seconds, the gate will proceed in the direction of travel.

There are two common types of photoelectric sensors, thru-beam and retro-reflective, and each has its advantages. Refer to Photo Eye Installation Tips.

- 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 feet (7.3m) because of performance and reliability issues.

Mount thru-beam type photo eyes approximately 15" to 30" (38cm to 76cm) above the ground and as close to the gate as possible. A minimum of two photo eyes are required, 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. Mount the emitters and the receivers just beyond the travel of the gate in both the full open and full closed positions of travel. The installation locations described above are intended for pedestrian detection. If photo eyes are to be used for vehicular detection, install a low elevation photo eye for cars and another photo eye at a height of about 55" (140cm) to detect semi-trucks.

As stated in Photo Eye Installation Tips, 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.

### NOTE

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.



Four 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 common wire is connected to the SENSOR COM terminal at the bottom left of the SmartDC Controller.**
- **The photo eye NC output wires connect to the SmartDC Controller at the appropriate Sensor Input (1, 2, or 3).**

## Photo Eye Mounting and Alignment

### 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 retro-reflective 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. Wallace Perimeter Security has provided a unique feature that turns power on to the photo eyes and causes our buzzer to chirp when the photo eyes enter and exit alignment. See **“Table 4. SmartDC Controller - User Menu Functions” on page 74** 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. Use only through beam photo eyes for distances greater than 24 feet because the function of a retro-reflective photo eye will be too unreliable.

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 the photo eye is realigned, be sure to perform the centering test again to verify that the reflector is truly in the center.

## How to Install & Program Resistive Gate Edges (8.2 kΩ terminating resistor)

**NOTE:** Component placement instructions herein are subject to change; hook-ups are correct.

Safety edges (edge sensors) are CONTACT safety devices installed on automatic gates at potential crushing or shearing points.

The ends of the outermost gate panel sections (where the risk of entrapment or obstruction exists) include a provision for fitting contact-pressure-sensitive gate edges for connection to the control circuit. When installed gate edges are pushed, they transmit a signal to the gate to stop and react in accordance with UL 325 regulations.

EDGE SENSORS or photoelectric eyes or a combination of both devices must be installed to protect against pedestrian entrapment in BOTH directions of the gate travel and where an entrapment hazard exists. The preferred external entrapment solution for bifold gates is a photo eye (i.e., Type B1 – non-contact) for the close direction and/or a hard-wired EDGE SENSOR (i.e., Type B2 – CONTACT) on the leading edge of the gate, which protects for both directions of gate travel.

In a single bifold gate there will be a total of one vertical and two horizontal safety edge sections. In a double bifold gate there will be a total of two vertical and four horizontal safety edge sections.

Leading edges (vertical) should be programmed to operate when the gate is moving in the CLOSE direction. Horizontal edges should be programmed to operate when the gate is moving in the OPEN direction.

Your Wallace Perimeter Security (WPS) bifold gate uses SENTIR Safety Contact Edges by ASO Safety Solutions with MILLER EDGE Multi-Input Modules.

**NOTE:** The following parts from WPS are subject to change.

WPS Part Number	Description
100543	Sensing Edge - SENTIR 5ft Contact Edge, with Mounting Channel, Attachment and Resistor Set, and Link Kit
100537	ASO-1502-0430 – SENTIR Edge 25.30 TT Contact Profile with length: 25m (82ft), priced per foot

Mfg. Part Number	Description	Quantities
The Solution – MIM-62 (part number pending)	MILLER EDGE Multi-Input Module	WPS supplies 2 multi-input modules when 6 sensing edges are ordered. (FoldSmart gate models).
<b>NOTE:</b> UL325 standard requires gate operators to monitor the presence of all external entrapment sensors, including non-contact (Photo Eyes) and contact (Edge) sensors. Your WPS gate operator monitors all external entrapment sensors connections by looking for Normally Closed (NC) contacts connected to input terminals.		

Tools Required	
Impact Drill	Drill with Vari-Bit for knocking out conduit holes
Phillips-Head Screwdriver	Appropriate Conduit or Cabling Connectors
Wire Strippers	Soapy Water for lubricating gate edge rubber inserts

## STEP ONE: Install Resistive (8.2 kΩ terminating resistor) Gate Edges onto Gate Panels



For UL 325 compliance, all external entrapment protection sensors must have NC sensor outputs for monitoring and powering purposes.



The process for installing the resistive safety edges is described below.

The 8.2 kΩ output goes dead short (closed circuit) when activated. However, for UL compliance control electronics must output a Normally Closed (NC) contact or voltage signal to the gate controller. To fulfill this requirement, the MIM-62 output interface includes an NC relay contact setting that opens when the 8.2 kΩ terminating resistor goes dead short. (The MIM-62 multi-input module, designed for 10 kΩ safety edge termination, works effectively with 8.2 kΩ termination.)



**WARNING:** Deactivate gate during installation.



REFER TO “SENTIR SENSING EDGE INSTALL DETAILS: FSXT” DIAGRAM FOR ADDITIONAL DETAILS.

1. The sensing edges generally consist of 1 gate edge rubber section. Along with each rubber section there will be an accompanying aluminum channel section of the same length.

In a single bifold gate there will be a total of 1 vertical and 2 horizontal sections. In a double bifold gate there will be a total of 2 vertical and 4 horizontal sections.

2. Securely fasten the aluminum channel to the gate panel leading edge. Attach via self-tapping screw or drill and tap hole.
3. Drill a hole from the end of each side of the aluminum channel into the gate frame. This hole should be sized to permit cable to run through the gate frame.
4. Lubricate the edge outer lips with soap and water to allow the rubber edge to slide smoothly into the aluminum channel. When the water dries the edge will no longer slide.

5. There are two cabling formats for resistive edge - a resistive end and a cable end, or both cable ends (for connecting in series). **SERIES CONNECTIONS MUST NOT BE USED; DO NOT USE BOTH CABLE ENDS. EACH SAFETY EDGE SECTION MUST HAVE A RESISTIVE END AND A CABLE END.**

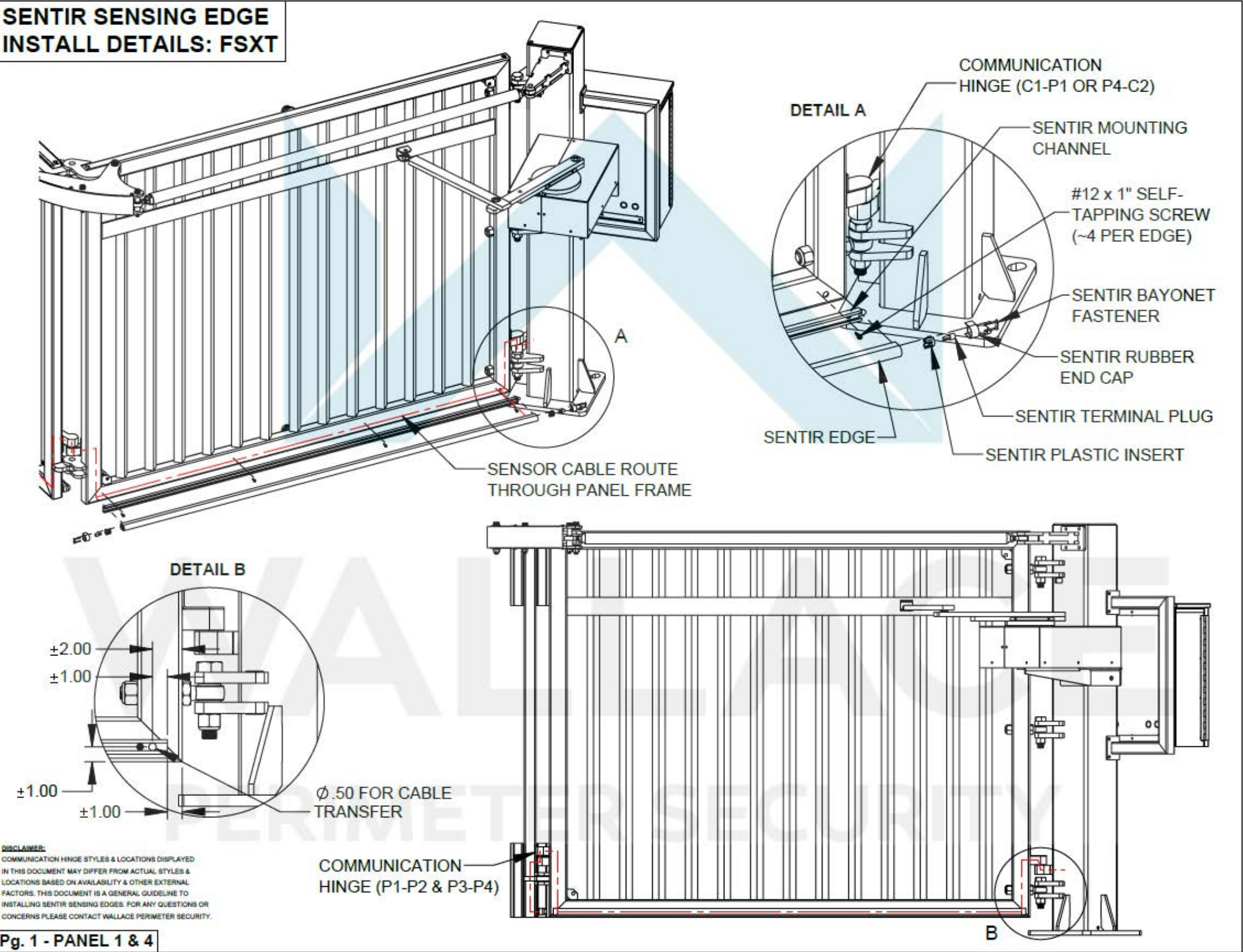
Each resistive safety edge will be independently connected to its own input on the MIM-62 Multi-Input Module. Up to 6 such inputs are provided on each module, with two Normally Closed (NC) output relays. As shown in the connection diagrams, one relay connects to edge inputs programmed at the gate controller to operate in the gate CLOSE direction. The other relay connects to edge inputs programmed to operate in the gate OPEN direction.

Once the edge has been slid into the aluminum channel, each end that has a wire pigtail (i.e., the cable end) must be fed into the hole that was drilled into the aluminum channel and gate frame and run back to the MIM-62 module.

6. Connect gate edge leads to the Multi-Input Module (MIM-62) and controller, and program the gate controller. To achieve this, follow sections (steps) **TWO, THREE and FOUR** on the following pages.

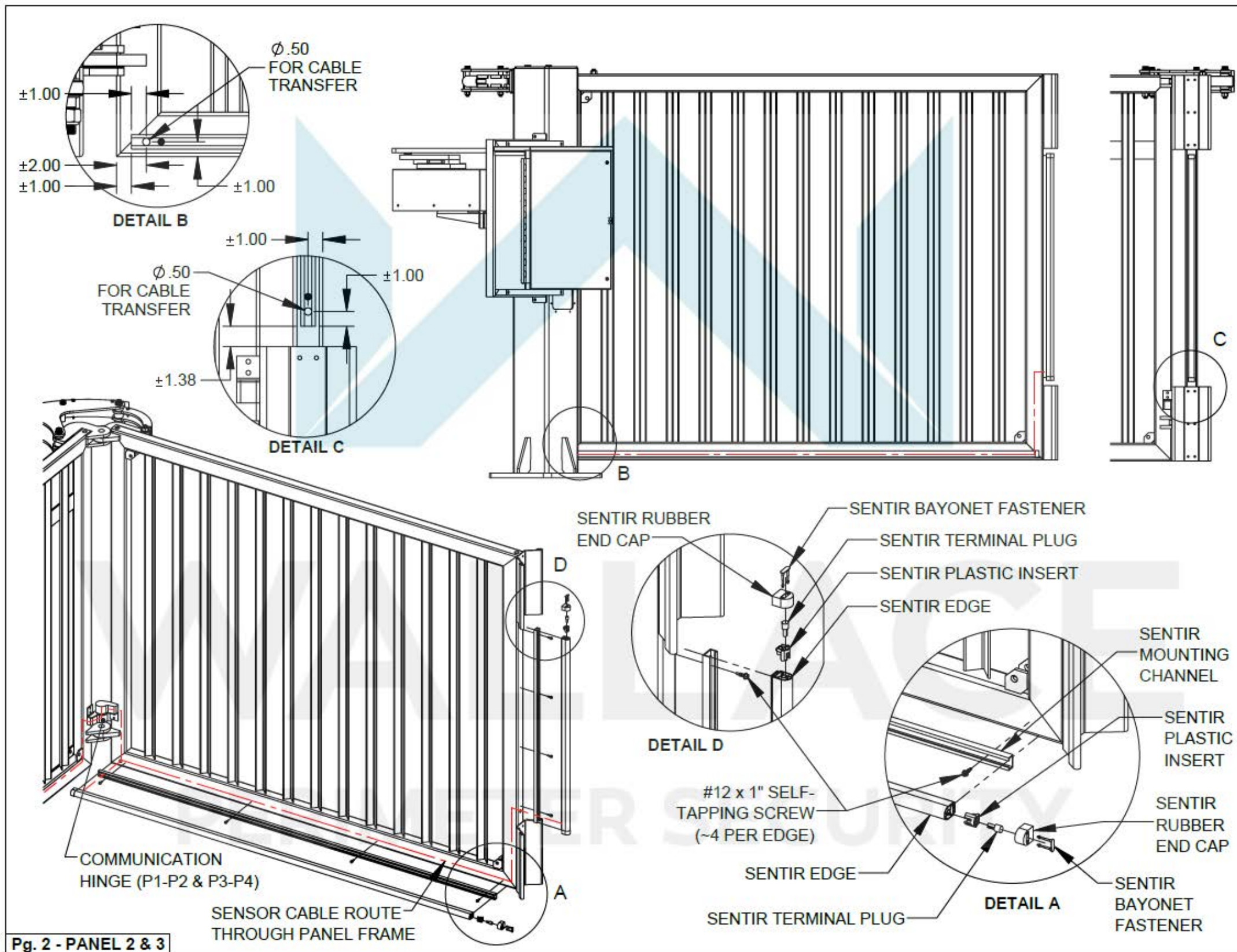


# **SENTIR SENSING EDGE INSTALL DETAILS: FSXT**



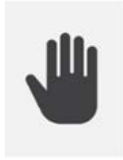






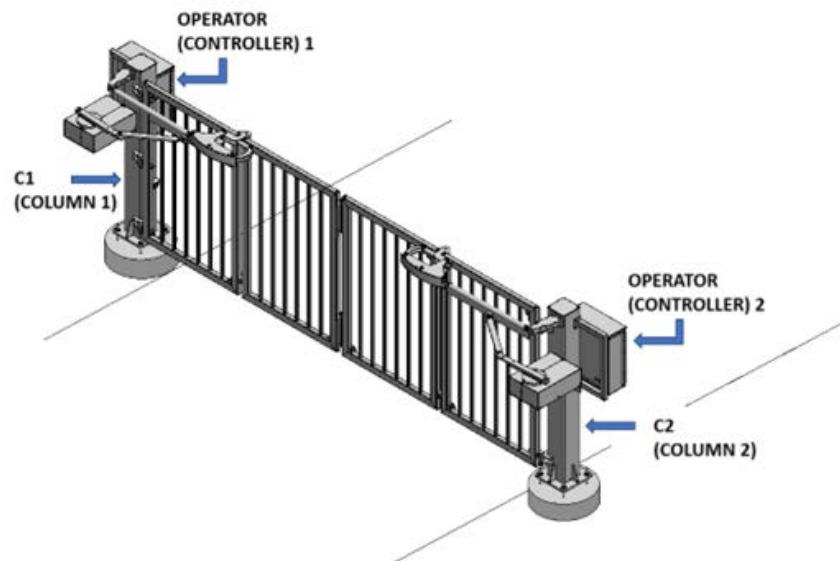


## STEP TWO: Connecting the Gate Edge Leads from Each Panel to the MIM-62 and Controller



**SAFETY WARNING:** Before you start, clear the gate travel area of all obstructions and persons. Restrict gate access.

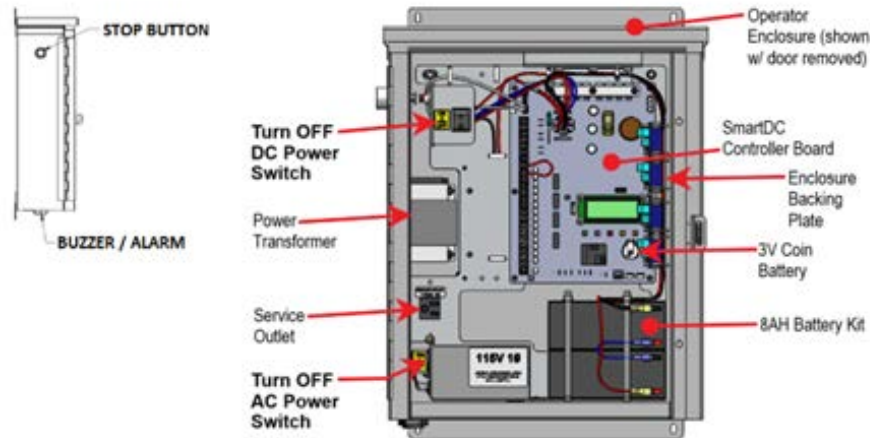
In a double bifold configuration, which is the most common, there are two gate operators housed in separate control cabinets (illustrated below). Each control cabinet will require its own MIM-62 unit; i.e., a total of two (2). **Current FoldSmart models provide a mounting location for the MIM-62 inside the back of each control cabinet, next to the circuit board.**



- Each MIM-62 will accept up to 6 inputs (separate monitored devices) and connect them to either of two outputs for open and close directions. **WPS gates use the inputs for safety edges only.**
- Your WPS gate operator monitors all external entrapment sensors connections by looking for NC contacts connected to input terminals. Non-monitored devices will not work with MIM-62. MIM-62
- **Input Channels 1 and 2 must be used, and are always assigned to Output A.** The other input channels may be assigned to either Output A or Output B using the Input Assignment Switch on the rear panel. Use of all 6 inputs is not required.
- Each of the Output circuits of MIM-62 should be set to “Relay” (normally closed) by the Output Type selection switch on the rear panel.

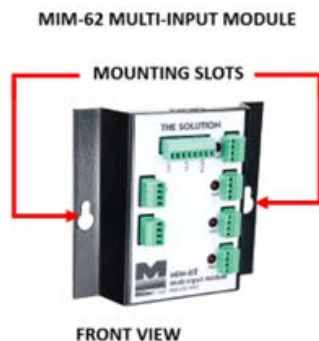
## Install Module and Test

- A. CLOSE both gates. Turn OFF AC power at the source (circuit breaker panel) before accessing the wires in the FoldSmart junction box. Follow facility Lock Out/Tag Out procedures. Make sure both the DC and AC power switches, on the side of **both** (in a double bifold gate) control boxes, are in the **OFF** position.



- B. MIM-62 units will be mounted inside the back of each control cabinet, next to the circuit board. If already mounted, you will need to temporarily remove the unit(s), as the switches and the Learn button on the rear panel of MIM-62 must be accessed during installation.

**THERE ARE TWO MOUNTING SLOTS ON THE TOP COVER OF MIM-62.**



**The switches and the Learn button on the rear panel must be accessed during installation.**



- C. Connect the gate edge leads (Blue/Brown wires in heavy black jacketed gate edge lead) from each panel to the MIM-62 in proximity to the nearest operator control cabinet. Make sure gate edge wiring is not pinched/kinked in at panel to column connection. **See connection diagrams following item H.**

Leave enough slack in your wiring to allow removal of MIM-62 if/when re-learning is required.

- D. When all safety edge inputs are connected to MIM-62's, **ENSURE NO ONE IS STANDING IN THE PATH OF THE GATE BECAUSE OPERATOR(S) WILL RECYCLE DURING START-UP.** Turn ON the power at the circuit breaker panel, and switch ON the operator AC and DC switches. MIM-62 should display a brief light test followed by blinking of the Output A and Output B indicators. The Learn Mode LED on the rear panel will also be lit. This indicates that MIM-62 is in Learn Mode, and will display the present condition of each input channel's sensor:

LED Status	Indication	Applicable to Wire Connections Herein (NC inputs at MIM-62 front and Relay outputs at MIM-62 rear)	Not Applicable
ON: solid	Open circuit (faulty wiring or nothing connected)	X	
BLINKING	10K ohm terminated sensor (no fault indicated)		X
OFF: solid	Normally Closed sensor (no fault indicated)	X	
FAST BLINK	Pulsed sensor (no fault indicated)		X

- E. If there is a fault, correct any wiring or make selection changes before proceeding.

**NOTE:** The LEDs behave differently in Learn Mode versus Run Mode.

- F. When all intended devices are connected and indicating no faults, momentarily press the Learn button on the rear panel. The lights should flash, and then all the LEDs should go OFF, except the green power LED. **Test each safety edge to confirm the associated red LED turns ON when the device is activated.**
- G. MIM-62's should be operational and may be mounted to mounting location(s).

#### H. Troubleshooting the MIM-62

If safety edges are not functioning, check for proper power connections, including polarity, if necessary.

If, after the Learn button is pressed, one or both outputs are in fault (yellow LED ON), check to see which red LEDs are ON. Confirm the edge is connected to the assigned channel. If it is working, confirm the output of the edge is connected properly to the input connector.

If re-learning MIM-62 is necessary:

- Press the Learn button to clear settings.
- Press the Learn button to learn new settings.

This means that after connections have been modified, pressing the Learn button twice will clear old settings, and activate the device to self-learn the new settings.

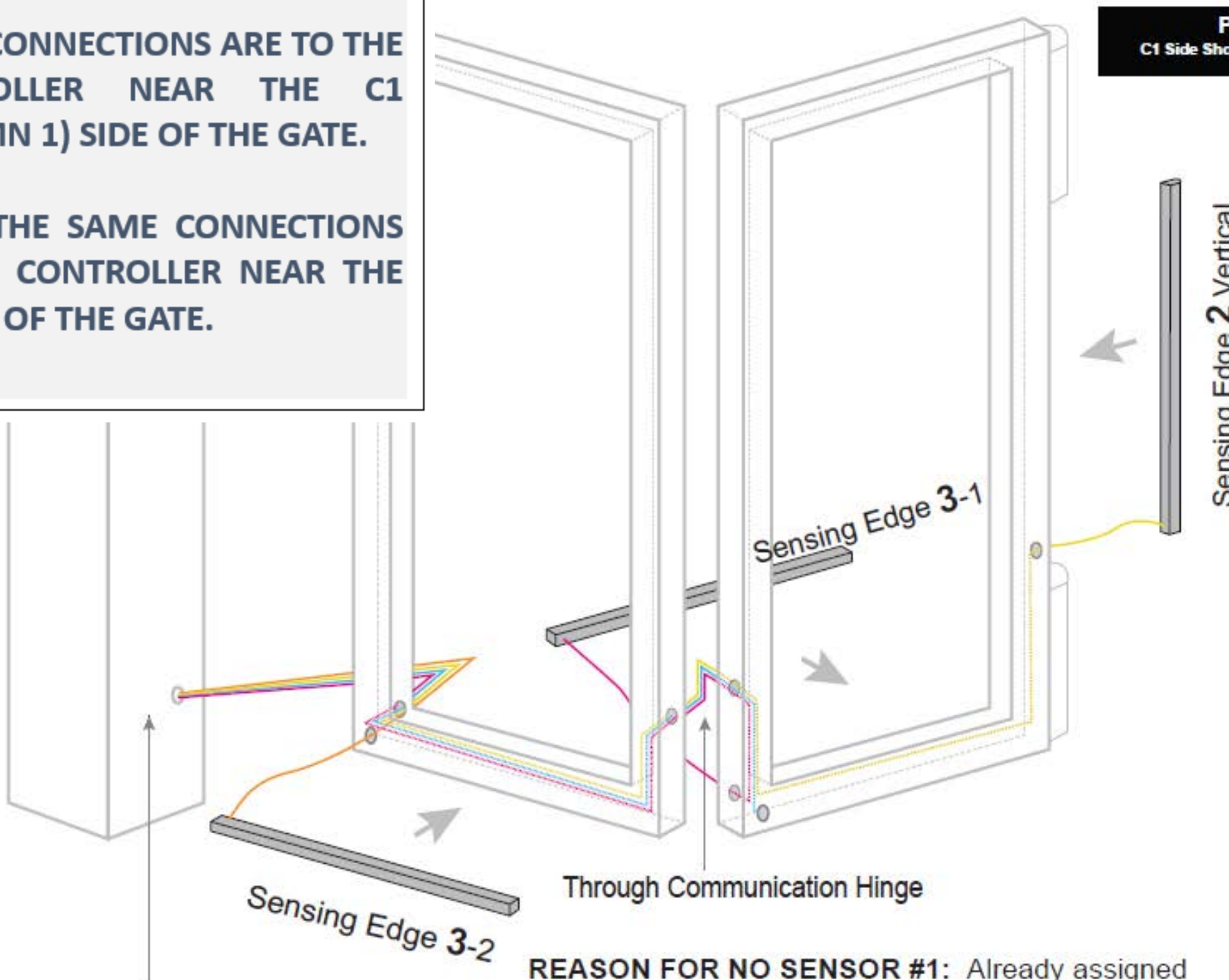
**IMPORTANT:** Input Channels 1 and 2 must be used, and are always assigned to Output A. Otherwise, the MIM-62 will not “learn” new programming.

If all safety edges and MIM-62’s are working (no red or yellow LEDs), and an operator is still reporting a fault, confirm MIM-62 outputs are connected properly to the operator’s inputs. Also, confirm the Output Interface is set correctly to ‘Relay,’ NOT ‘Pulsed’.



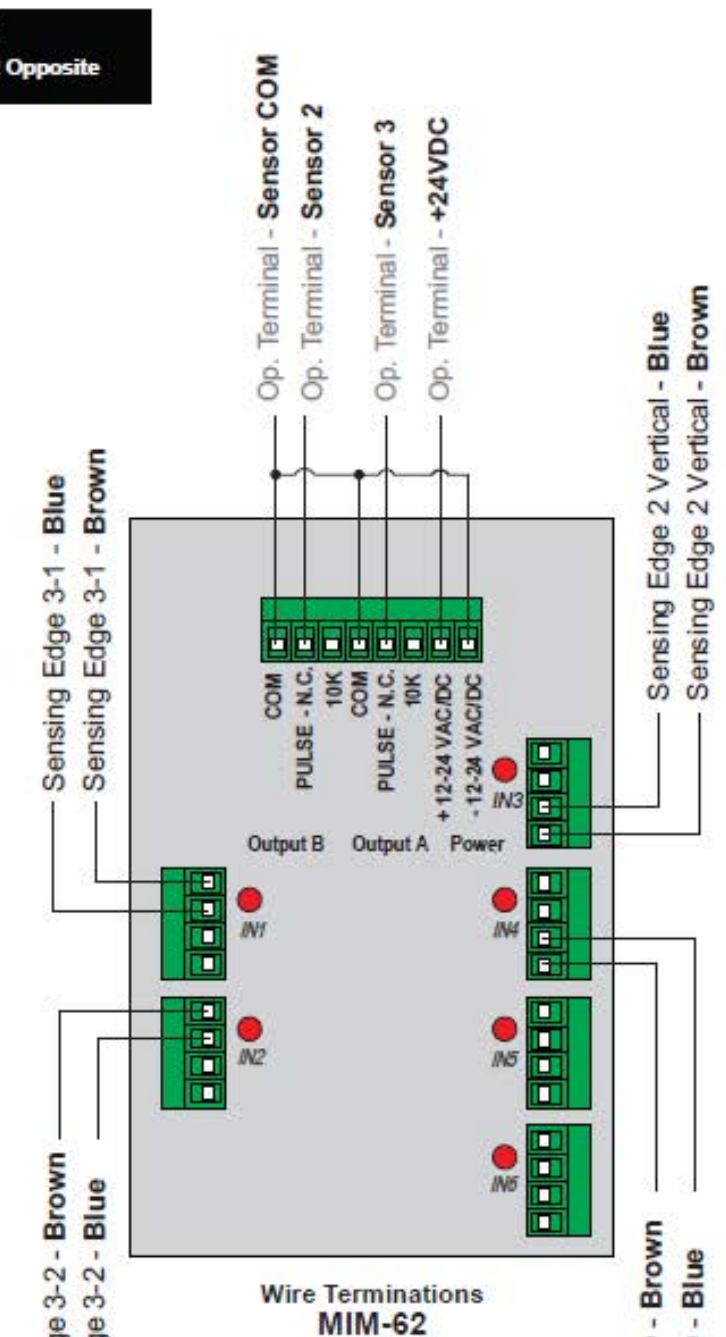
**THESE CONNECTIONS ARE TO THE CONTROLLER NEAR THE C1 (COLUMN 1) SIDE OF THE GATE.**

**MAKE THE SAME CONNECTIONS TO THE CONTROLLER NEAR THE C2 SIDE OF THE GATE.**



## FoldSmart Layout

**AT THE GATE OPERATOR:** 1 vertical edge (Sensor 2) should be programmed EDGE CLOSE. 2 horizontal edges (Sensor 3) should be programmed EDGE OPEN.



Programming:  
Sensor 2 can be set to Edge Close  
Sensor 3 can be set to Edge Open

NOT ASSIGNED - Brown  
NOT ASSIGNED - Blue





## 2 MIM-62 OUTPUT TYPE AND DIP SWITCH SETTINGS



THESE ARE FACTORY SETTINGS,  
PROVIDED FOR REFERENCE.



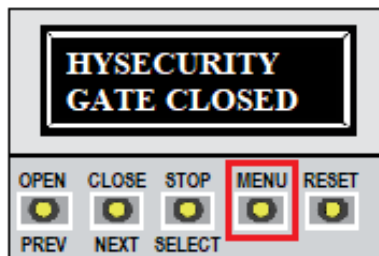
### STEP THREE: Programming the Operator (Controller) Installer Menu to Accept Edge Sensor Inputs

Summary of How to Navigate Functions while in Menu Mode			
To change data appearing on the display:	To navigate through the selections:	To accept what appears on the display:	To navigate between menu items:
Press SELECT.  Pressing SELECT causes the upper two characters to blink, which indicates the display is ready to accept changes to a menu setting.	Press NEXT or PREVIOUS.  Pressing PREV moves to the previous menu selection.  Pressing NEXT advances through the next available menu selection.	Press SELECT.  Two blinking characters indicate that the display will accept changes.  Pressing SELECT a second time accepts what appears on the display. The entry mode is complete when the two characters stop blinking.	Press NEXT or PREVIOUS.  Pressing NEXT advances through the next available menu selection.  Pressing PREV moves to the previous menu selection.
Pressing MENU returns to Run Mode and a gate status display appears.  NOTE: The MENU button does not function while the selection is still blinking.			
Pressing RESET clears faults and returns to Run Mode. A gate status display appears.  NOTE: The RESET button cannot be used to exit Menu Mode.			

To access the Installer menu and configure sensor inputs, take the following steps in both Operators, completing one at a time (in a double bifold gate system).

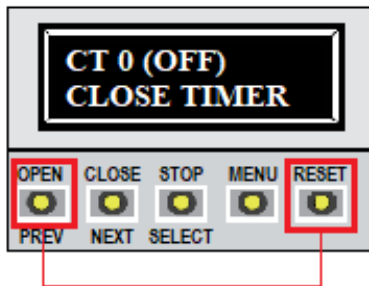
The operator must be in Run Mode with a gate status showing on the display. The motor cannot be engaged and the gate cannot be moving.

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



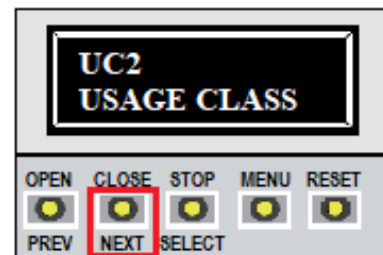
The **CLOSE TIMER** display appears indicating you have accessed the User Menu.

2. To access the Installer Menu, simultaneously press **OPEN** and **RESET**.



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.

3. Press **NEXT** to navigate to the desired **SENSOR** display.



4. When the desired sensor type is shown on the screen press **SELECT**. There are three programmable sensor inputs available, depending upon whether the gate edge has been wired to Sensor input 1, 2 or 3 on the FoldSmart controller circuit board. These are for configuring UL 325 compliant sensor input settings for external entrapment protection sensor monitoring.



One vertical edge should be programmed **EDGE CLOSE** (setting option 3).

Two horizontal edges should be programmed **EDGE OPEN** (setting option 5).



If you have wired gate edges to Sensor 2 and Sensor 3 inputs on the FoldSmart controller board as shown in Connection of MIM-62 to Controller on FoldSmart Gate Models, you will now:

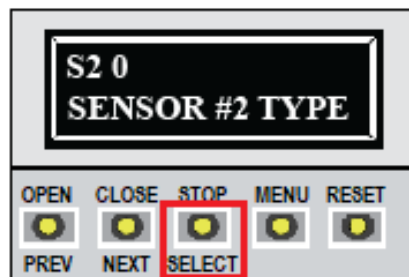
- a) Program Sensor 2 (vertical) to EDGE CLOSE so the edge sensor will only operate when the gate is moving in the close direction.
- b) Program Sensor 3 (the 2 horizontal sections) to EDGE OPEN so the edge sensor will only operate when the gate is moving in the open direction.

**NOTE:**

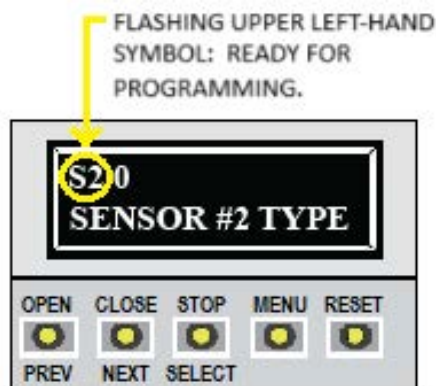
After following instructions 'A' and 'B' below, it is recommended to review the information in:

- C. Program Unused Sensor Inputs to NOT USED; and
- D. Supplementary Programming Information: Gate Edge Logic and Outputs

**A. Program Sensor 2 (vertical) to EDGE CLOSE (setting option 3) so the edge sensor will only operate when the gate is moving in the close direction:**

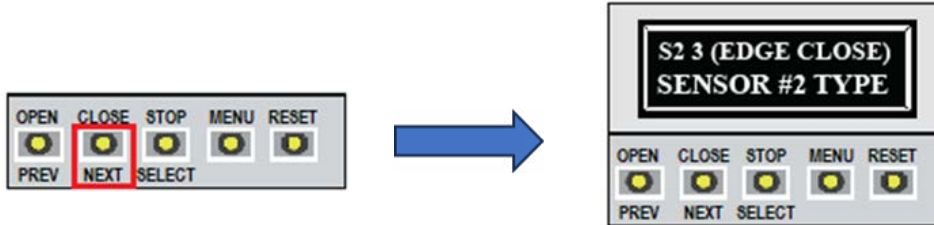


- A-1 In the above example, Sensor 2 input has been selected. This selection is made when the gate edge has been wired to the Sensor 2 input on the FoldSmart controller board. **After pressing SELECT, S2 will begin flashing, indicating readiness to be programmed.**

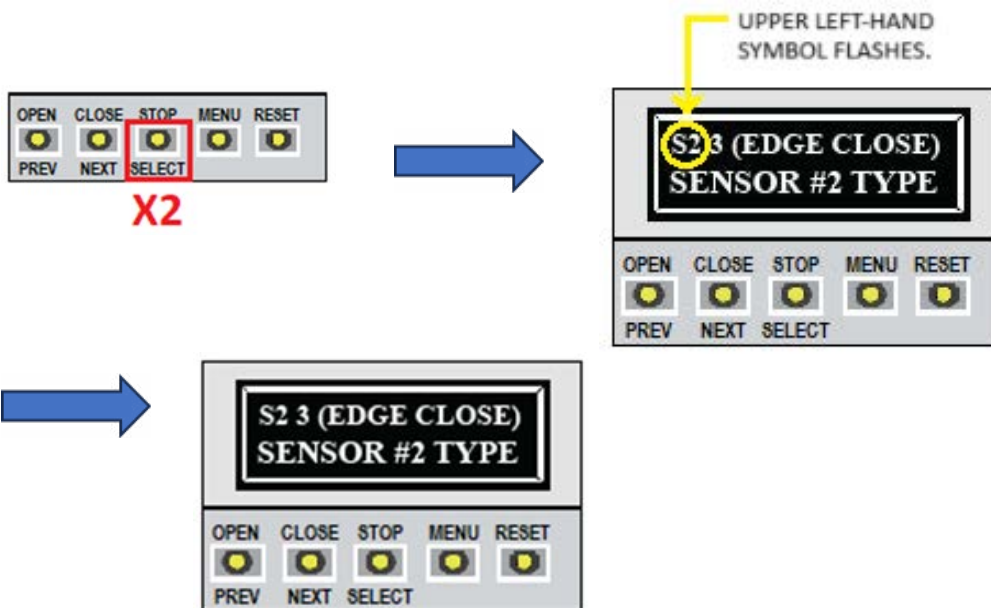




A-2 Press **NEXT** until **S2 = 3 = (EDGE CLOSE)**.



A-3 Enable **EDGE CLOSE** by pressing **SELECT** to choose (symbol flashes), and **SELECT** again (symbol stops flashing).

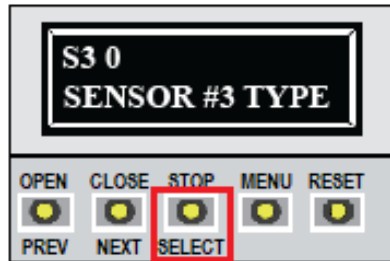


EDGE CLOSE means the edge sensor will only operate when the gate is moving in the close direction. With this input enabled, when the edge comes into physical contact with an obstruction while the gate is CLOSING, the gate will either:

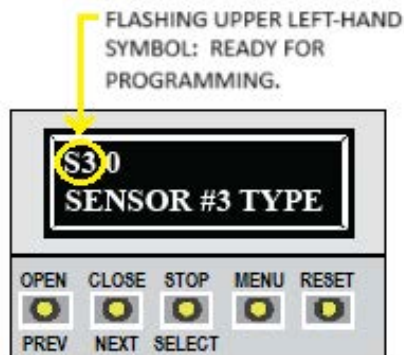
- Reverse to a fully open position (default setting) OR
- Reverse for 2 seconds, if the user has programmed the edge to do this\*.

\*Refer to NOTE 1: GATE EDGE LOGIC in section D.

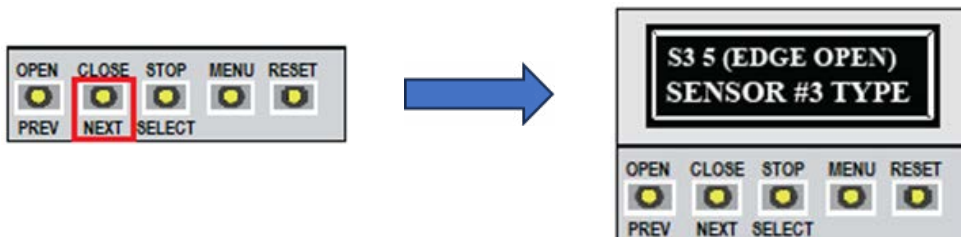
- B. Program Sensor 3 (2 horizontal sections) to EDGE OPEN (setting option 5) so the edge sensor will only operate when the gate is moving in the open direction:**



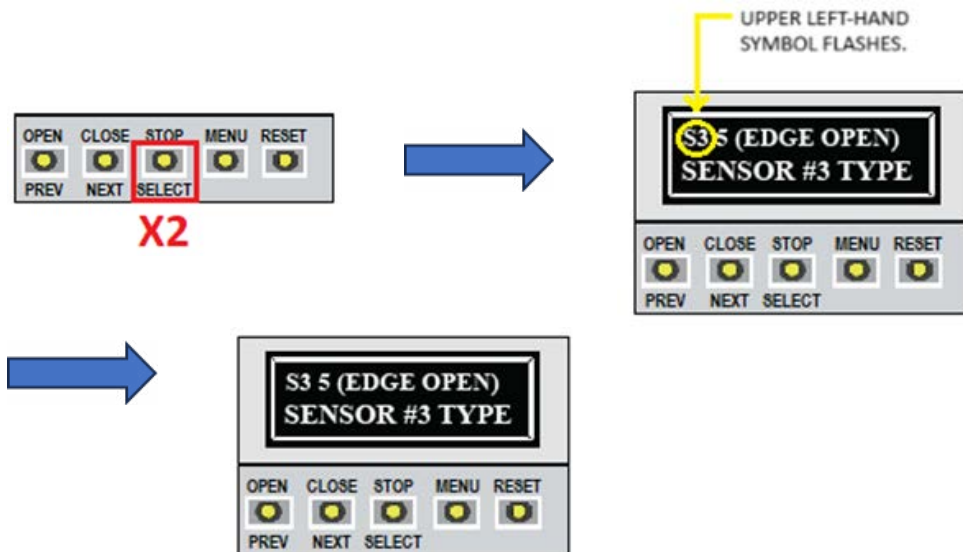
- B-1** In the above example, Sensor 3 input has been selected. This selection is made when the gate edge has been wired to the Sensor 3 input on the FoldSmart controller board. **After pressing SELECT, S3 will begin flashing, indicating readiness to be programmed.**



- B-2** Press NEXT until **S3 = 5 = (EDGE OPEN)**.



- B-3 Enable **EDGE OPEN** by pressing **SELECT** to choose (symbol flashes), and **SELECT** again (symbol stops flashing).



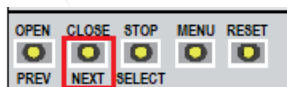
EDGE OPEN means the edge sensor will only operate when the gate is moving in the open direction. With this input enabled, when the edge comes into physical contact with an obstruction while the gate is OPENING, the gate will either:

- Reverse to a fully closed position (default setting) OR
- Reverse for 2 seconds, if the user has programmed the edge to do this\*.

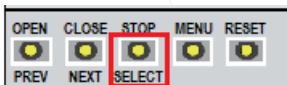
\*Refer to NOTE 1: GATE EDGE LOGIC in section D.

### C. Program Unused Sensor Inputs to NOT USED

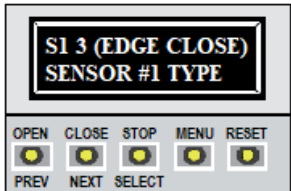
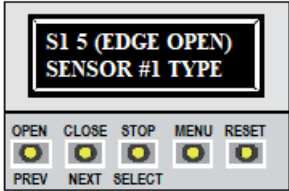
Gate edge sensors must be programmed to a non-zero number when initial configuration is performed. If a sensor input is intended not to be used, it must be programmed to **NOT USED** (see **Setting Options table**). The three programmable sensor inputs are labeled Sensor 1, Sensor 2, and Sensor 3 and are configurable in the installer menu (S1, S2, or S3) for the following options.

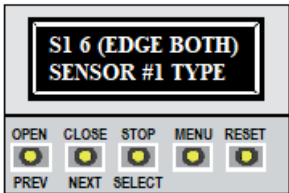


Press **NEXT** to navigate through the Sensor setting options shown below.



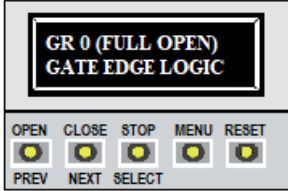
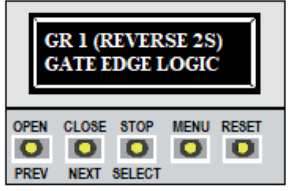
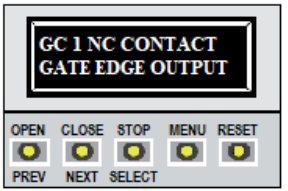
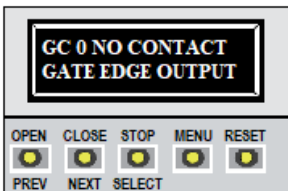
Press **SELECT** to choose (symbol flashes), and **SELECT** again (symbol stops flashing) to enable your desired setting option.

SETTING OPTIONS	What it Means	
(Zero = Factory Setting)		
0 = disabled	Factory setting; press <b>NEXT</b> , then press <b>SELECT</b> to choose and enable the setting option that applies <b>(1, 3, 5 or 6)</b> .	
<b>1 = (NOT USED)</b>	If a sensor input is intended not to be used, it must be configured to <b>NOT USED</b> on the appropriate Sensor # within the installer menu.	
2 = (EYE CLOSE)	This setting applies to a photo eye sensor, not to a gate edge.	
<b>3 = (EDGE CLOSE)</b>	 <p>Press <b>SELECT</b> to choose (symbol flashes), and <b>SELECT</b> again (symbol stops flashing) if you want to enable <b>EDGE CLOSE</b>.</p>	<p><b>EDGE CLOSE</b> means the edge sensor will only operate when the gate is moving in the close direction.</p> <p>If this input is enabled, when the edge comes into physical contact with an obstruction while the gate is <b>CLOSING</b>, the gate will either:</p> <ul style="list-style-type: none"> <li>• <b>Reverse to a fully open position (default setting) OR</b></li> <li>• Reverse for 2 seconds, if the user has programmed the edge to do this*.</li> </ul> <p>*Refer to NOTE 1: GATE EDGE LOGIC in section D.</p>
4 = (EYE OPEN)	This setting applies to a photo eye sensor, not to a gate edge.	
<b>5 = (EDGE OPEN)</b>	 <p>Press <b>SELECT</b> to choose (symbol flashes), and <b>SELECT</b> again (symbol stops flashing) if you want to enable <b>EDGE OPEN</b>.</p>	<p><b>EDGE OPEN</b> means the edge sensor will only operate when the gate is moving in the open direction.</p> <p>If this input is enabled, when the edge comes into physical contact with an obstruction while the gate is <b>OPENING</b>, the gate will either:</p> <ul style="list-style-type: none"> <li>• <b>Reverse to a fully closed position (default setting) OR</b></li> <li>• Reverse for 2 seconds, if the user has programmed the edge to do this*.</li> </ul> <p>*Refer to NOTE 1: GATE EDGE LOGIC in section D.</p>

SETTING OPTIONS	What it Means	
(Zero = Factory Setting)		
<b>6 = (EDGE BOTH)</b>	 <p>Press SELECT to choose (symbol flashes), and SELECT again (symbol stops flashing) if you want to enable EDGE BOTH.</p>	<p>EDGE BOTH means the edge sensor will operate when the gate is moving in either the close direction or the open direction.</p> <ul style="list-style-type: none"> <li>• If this input is enabled, when the edge comes into physical contact with an obstruction while the gate is CLOSING the gate will reverse to a fully open position or reverse for two seconds, subject to how it is programmed.*</li> <li>• If this input is enabled, when the edge comes into physical contact with an obstruction while the gate is OPENING the gate will reverse to a fully closed position or reverse for two seconds, subject to how it is programmed.*</li> </ul> <p>*Refer to NOTE 1: GATE EDGE LOGIC in section D.</p>
7 = (EYE BOTH)	This setting applies to a photo eye sensor, not to a gate edge.	

## D. Supplementary Programming Information: Gate Edge Logic and Outputs

The following NOTES provide supplementary programming information.

<p><b>NOTE 1:</b></p> <p><b>GATE EDGE LOGIC</b></p> <p>To access the GATE EDGE LOGIC function, press NEXT while you are still in the Installer menu and the display is not flashing, until you reach the GATE EDGE LOGIC display.</p>	<p>Press SELECT to choose (symbol flashes), and SELECT again (symbol stops flashing) if you want to enable the default setting of zero.</p>  <p>Press SELECT, then NEXT if you want to reach the optional setting of 1 (2-second reversal). Press SELECT if you want to enable setting 1.</p> 	<p>How the Gate Edge Logic function affects EDGE CLOSE, EDGE OPEN and EDGE BOTH behaviour when an obstruction comes into contact with the gate edge:</p> <p>If set to zero:  <b>0 = the GATE EDGE LOGIC default setting</b></p> <p>(Full open reversal for EDGE CLOSE, full close reversal for EDGE OPEN, and a full reversal whether opening or closing for EDGE BOTH).</p> <p>If set to one:  <b>1 = 2s reversal only</b>          (An optional setting which causes the gate to reverse for 2 seconds if triggered. When choosing response to a gate edge input, consider site set-up and anticipated traffic flow conditions.)</p>
<p><b>NOTE 2:</b></p> <p><b>GATE EDGE OUTPUT</b></p> <p>To access the GATE EDGE OUTPUT function, press NEXT while you are still in the Installer menu and the display is not flashing, until you reach the GATE EDGE OUTPUT display.</p>	<p>Press SELECT to choose (symbol flashes), and SELECT again (symbol stops flashing) if you want to enable the default setting of 1.</p>  <p>Press SELECT, then NEXT if you want to reach the optional setting of 0 (Normally Open Edge).</p>  <p>Press SELECT if you want to enable setting 0.</p>	<p>This menu item only appears when USAGE CLASS is set to 4 (guarded industrial locations).</p> <p>Default setting of 1 = edge sensor with Normally Closed (NC) output.</p> <p>Optional setting of 0 requires a Normally Open (NO) output.</p>

## E: Exit the Installer Menu

Exit the Installer menu at the operator by pressing the MENU button.



The gate status appears in the display (GATE OPEN, GATE CLOSED or GATE STOPPED) indicating you have returned to operator Run Mode.



## STEP FOUR: Perform Safety Edge Gate Tests

Confirm that each safety edge stops and/or reverses as programmed. Test by placing a rigid obstruction in the path of the gate travel (OPEN and CLOSE) so the edge sensor(s) will make contact.

The gate should react as programmed upon contact with the obstruction. If it does not, troubleshoot to ensure safety edges function as programmed. Upon resolution of any issues, advise the user of the gate to be certain to retest this vital function weekly.



## How to Install Model LC2-8 or TL96 Traffic Lights on your FoldSmart Gate

Recommended Traffic Light Signals, available from Wallace Perimeter Security				
Manufacturer		Model	Bulb Description	
1.	Industrial Traffic Solutions	<b>LC2-8</b> Kit; includes application-specific mount*	8" LED Lane Controls, 24VDC 8" (200mm) LED lane control signal with a red X and a green arrow	
2.	iControls	<b>TL96</b> Kit; includes application-specific mount*	TL96 LED Traffic Light, 24VDC 4" (100mm) LED signal	

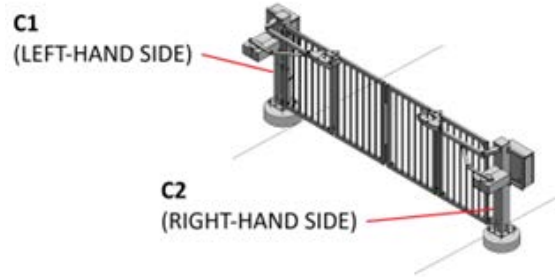
*Choice of Mounting Brackets, available from Wallace Perimeter Security			
WPS Part Number	Model	Description	Compatible with
100684	TL-000-1-Blk	Traffic Light Arm – Universal – Elbow Mount Set - Blk	Items 1 and 2 in above table.
100686	TL96-000-Blk	Traffic Light Mount – Standard – TL96 – Blk	
100680	TL96-000 - G	Traffic Light Mount – Standard – TL96 – Galv	

Tools Required	
Pipe Wrench or Large Channellocks	Drill with Vari-Bit for knocking out conduit holes
Phillips-Head Screwdriver	Appropriate Conduit or Cabling Connectors
Wire Strippers	

### Mounting Locations

Traffic lights can be used to control the flow of traffic in your gate driveway. Each FoldSmart gate column includes 4 pre-drilled holes, in two locations: on top, and on the face of the column, opposite the hinge side of the gate. These pre-drilled holes are provided for mounting traffic lights. Also, hardware is provided with the mount.

If your preference is to mount the traffic lights in a different location, it is recommended to drill and tap the new holes. It is advisable to mount the bottom of the traffic light no lower than 7 feet (2.13m) from the ground.

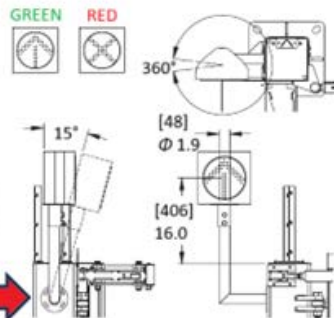


## MODEL LC2-8 COLUMN 1 (C1) MOUNTING OPTIONS

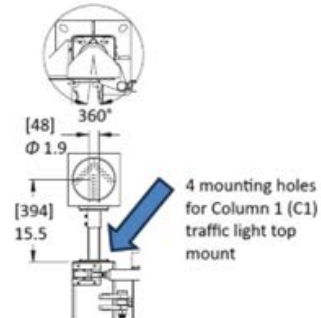


C1

8" [203mm] RED / GREEN LED TRAFFIC LIGHT  
(SIDE MOUNT)

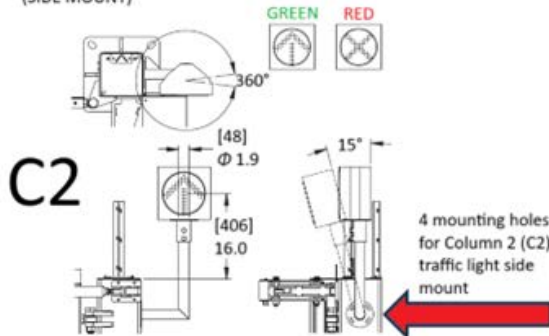


8" [203mm] RED / GREEN LED TRAFFIC LIGHT  
(TOP MOUNT)

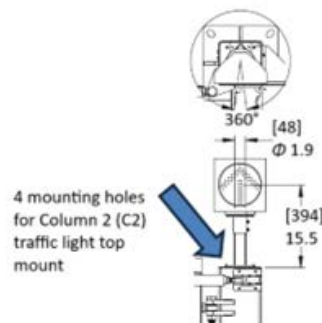


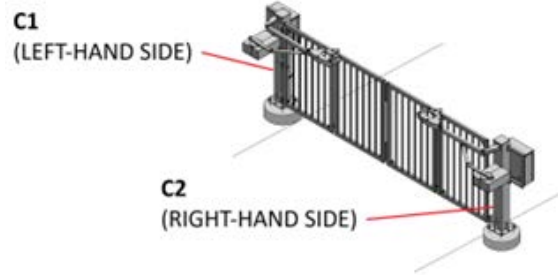
## MODEL LC2-8 COLUMN 2 (C2) MOUNTING OPTIONS

8" [203mm] RED / GREEN LED TRAFFIC LIGHT  
(SIDE MOUNT)



8" [203mm] RED / GREEN LED TRAFFIC LIGHT  
(TOP MOUNT)



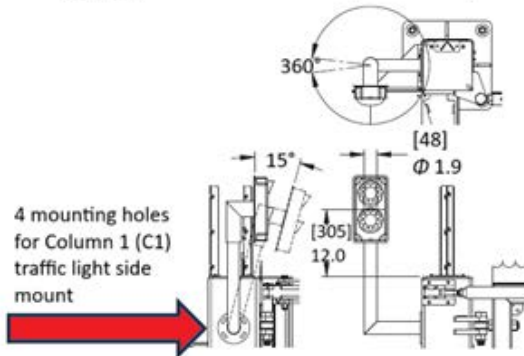


## MODEL TL96 COLUMN 1 (C1) MOUNTING OPTIONS

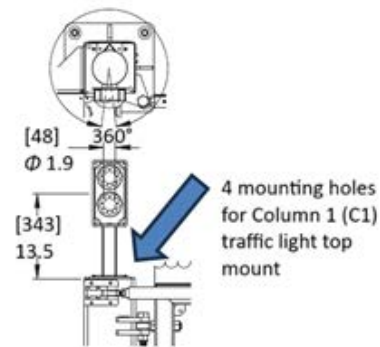


**C1**

4" [102mm] RED / GREEN LED  
TRAFFIC LIGHT (SIDE MOUNT)



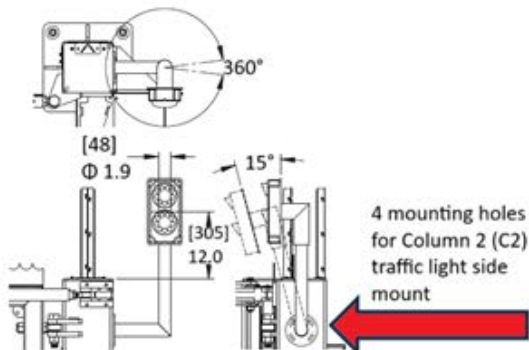
4" [102mm] RED / GREEN LED  
TRAFFIC LIGHT (TOP MOUNT)



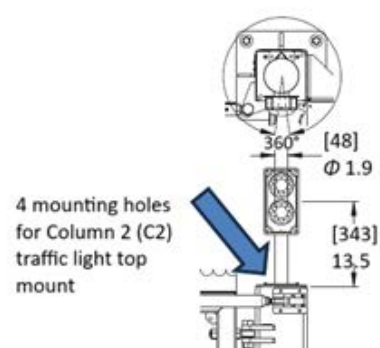
## MODEL TL96 COLUMN 2 (C2) MOUNTING OPTIONS

4" [102mm] RED / GREEN LED  
TRAFFIC LIGHT (SIDE MOUNT)

**C2**

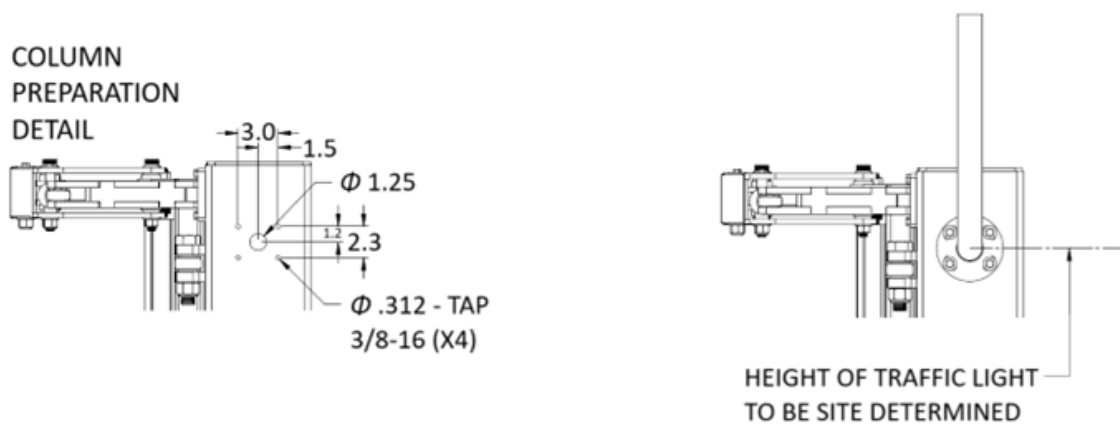


4" [102mm] RED / GREEN LED  
TRAFFIC LIGHT (TOP MOUNT)



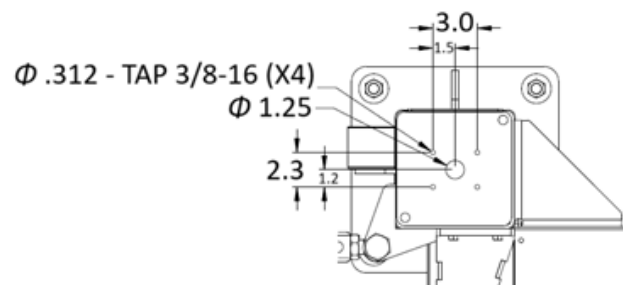
## Pre-Drilled Mounting Hole Dimensions

### COLUMN PREPARATION - UNIVERSAL SIDE MOUNT - FOLDSMART



### COLUMN PREPARATION - UNIVERSAL TOP MOUNT - FOLDSMART

#### COLUMN PREPARATION DETAIL

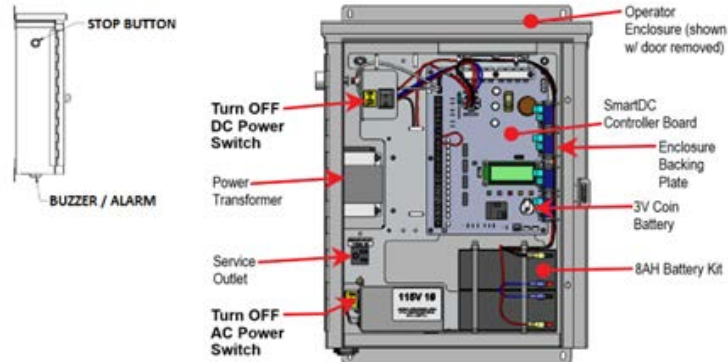


## Traffic Light Assembly



**SAFETY WARNING:** Before you start, clear the gate travel area of all obstructions and persons. Restrict gate access.

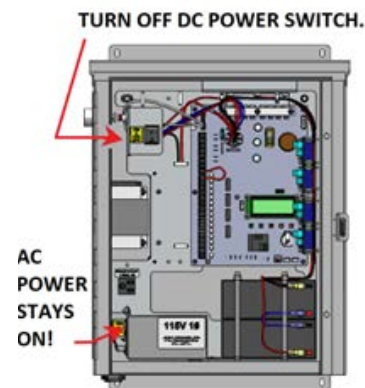
Ensure gate is not moving. Turn OFF AC power at the source (circuit breaker panel) before accessing the wires in the FoldSmart junction box. Follow facility Lock Out/Tag Out procedures. Make sure both the DC and AC power switches, on the side of both (in a double bifold gate) FoldSmart control boxes, are in the OFF position.



### ALTERNATIVELY:

**If it is deemed necessary** to operate the gate manually during traffic light installation, ensure gate is not moving. Turn OFF DC power switch only in both controllers (primary and secondary). When you turn DC power off, the motor disengages. AC power (bottom switch) stays ON. Remove the quick disconnect bolt from the FoldSmart linkage arm using the manufacturer-supplied Penta key. This enables manual operation mode.

Traffic light assembly connections are to DC cable. Exercise **CAUTION** before, during and after installation, and DO NOT CONTACT OR REMOVE AC POWER SWITCH COVER.



### Steps for Mounting the Traffic Light Assembly (see diagram details following this table)

1.	Remove the screws holding the lamp assembly to the front of the housing (the cover).
----	--

Steps for Mounting the Traffic Light Assembly (see diagram details following this table)		
2.	<i>These two steps are usually not required on WPS shop-supplied traffic lights and mounting brackets.</i>	Connect wires to the marked terminals, if required.
3.		Mount the rear backing gasket (only if required) and secure the enclosure to the mounting pipe. When replacing the traffic light cover, check the gasket for correct alignment with all the holes and edges. Proper gasket alignment is critical to successful installation and ongoing traffic light operation.
4.	<i>This step is usually not required, as most WPS shop-supplied mounting brackets will already have provision for wire protection.</i>	<p>Pass the wiring through the bottom of the mounting pipe. If required, run and mount conduit through or up the mounting pipe to meet either the back center or bottom of the housing. Remove the knockout, if required, to run conduit/wiring.</p> <p><b>NOTE:</b> Depending on the application, it is generally desirable to AVOID connecting conduit/wiring through the top or side of the enclosure.</p>
5.	If using conduit, connect to the enclosure using a suitable connector.	
6.	Open the FoldSmart control cabinet and find the wire feed-through location on the controller chassis.	
7.	<p>Feed wires through the controller chassis, and connect the traffic light wiring harness to the controller board:</p> <ol style="list-style-type: none"> <li>1. BLACK wire goes to COM on the circuit board.</li> <li>2. RED wire goes to NC on Relay 1 (R1).</li> <li>3. GREEN wire goes to NO on R1.</li> <li>4. Run a field-made jumper between 24VDC and COM on R1.</li> </ol>	
8.	After ensuring the traffic light and all connections are secure, go to Programming Relay 1 section.	



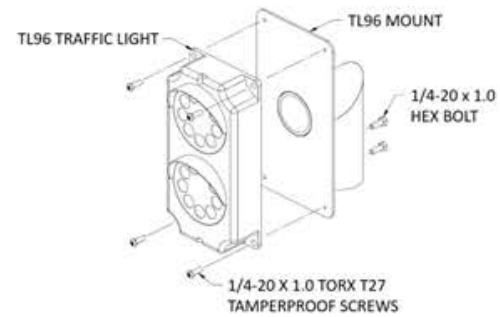


## TRAFFIC LIGHT ASSEMBLY AND CONNECTIONS FOR A FOLDSMART GATE

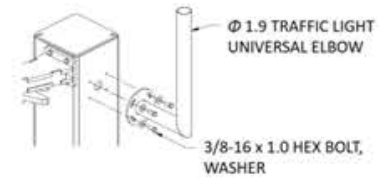
MODEL LC2-8 TRAFFIC LIGHT

-OR-

MODEL TL96 TRAFFIC LIGHT

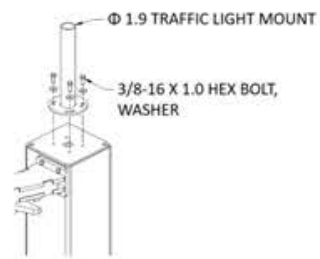


### UNIVERSAL TRAFFIC LIGHT SIDE MOUNT - FOLDSMART



-OR-

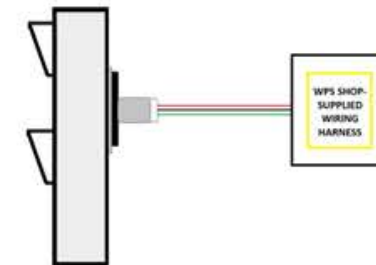
### UNIVERSAL TRAFFIC LIGHT TOP MOUNT - FOLDSMART



MODEL LC2-8 TRAFFIC LIGHT

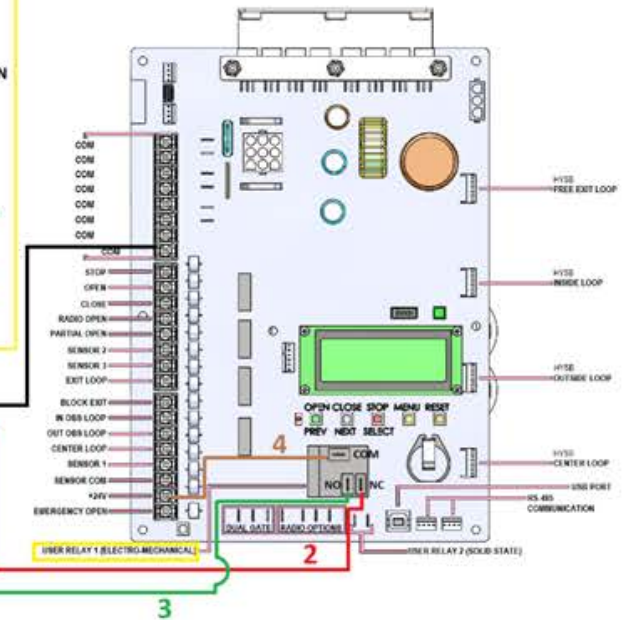
-OR-

MODEL TL96 TRAFFIC LIGHT



TO CONNECT THE TRAFFIC LIGHT WIRING HARNESS TO THE CONTROLLER BOARD IN THE CONTROLLER CABINET:

- 1 BLACK WIRE GOES TO COM ON THE CIRCUIT BOARD.
- 2 RED WIRE GOES TO NC ON RELAY 1 (R1).
- 3 GREEN WIRE GOES TO NO ON R1.
- 4 RUN A FIELD-MADE JUMPER BETWEEN 24VDC AND COM ON R1.



CONNECT FROM WIRING HARNESS TO CONTROLLER BOARD IN THE SAME WAY AS SHOWN ABOVE.



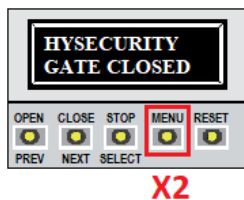


## Programming Relay 1

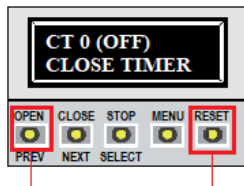
**Ensure gate is not moving, and no one is near the gate travel path.** Turn ON the power at the circuit breaker panel if it was previously switched off. Re-install the quick disconnect bolt to the gate linkage arm if it was removed for manual operation. Flip the DC power switch ON in both controllers (primary and secondary). AC power (bottom switch) remains ON (or must be switched on if it was previously off). Clear any faults by pressing the RESET button on the gate controls.

Relay 1 and Relay 2 are user-programmable output relays. You have connected your traffic light to Relay 1, the electro-mechanical relay. You will need to access the controller Installer menu on the side of the gate (C1 or C2) where you made this connection, then program R1 in the installer menu to Open Limit as follows.

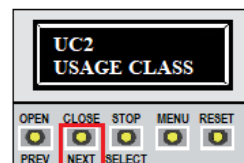
1. At a gate status display, press the MENU button twice. This accesses the User menu, and the CLOSE TIMER display appears.



2. Press the OPEN and RESET buttons at the same time to enter the Installer menu.



3. Release the buttons and the USAGE CLASS display appears. It is the first item in the Installer menu.



4. Press NEXT until you reach the Installer menu function: RL 1. The current setting will be the number appearing on the upper line in the display, which in this case is the default setting of 0 (DISABLED).



- Press the SELECT button. The upper left 'RL' symbol will flash, indicating readiness for programming.



- Press the NEXT button until you reach the RL number displaying OPEN LIMIT. Then press SELECT to lock the adjusted setting in.



Used for a traffic light, the OPEN LIMIT output indicates a full-open position. This output becomes active when an open limit is triggered and deactivates when the open-limit is released.

- Exit the Installer menu by pressing the MENU button.



- The gate status appears in the display (GATE OPEN, GATE CLOSED or GATE STOPPED) indicating you have returned to Run Mode.

## Perform a Traffic Light Test

Cycle the operator OPEN and CLOSE to test that the traffic lights are working properly.

The GREEN traffic signal should be ON (lit) when the gate is OPEN.



At all other times, the RED traffic signal should be ON (lit).



**NOTE:** The traffic light will turn RED before gate movement commences, if warning settings have been programmed:

- The **Installer** menu setting WARN BEFORE/DURING OPERATE OUTPUT is enabled for the **RL 1** function; and
- Activation timing (WARN BEFORE OPERATE) is enabled in the **User** menu. The number of seconds the traffic light will turn RED prior to gate movement is set via this option.

Refer to manual references item 5 in Table 8: User-Programmable User Relays - Function Options, and item 6 in Table 4: SmartDC Controller - User Menu Functions.

# TROUBLESHOOTING

This section is available to help you troubleshoot any problems that may occur with the FoldSmart operator. It provides information about the SmartDC Controller display codes.

The SmartDC Controller system includes many self diagnostics. Specific messages appear on the LCD and the 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 S.T.A.R.T. software available from Wallace Perimeter Security. Refer to ***“Smart Touch Analyze and Retrieve Tool (S.T.A.R.T.)” on page 183.***

The following Table 11 provides solutions to the error codes, faults, and alerts that may appear on the SmartDC Controller display.

## SmartDC Controller Troubleshooting

**Table 11. SmartDC Controller - Troubleshooting**

Ref. No.	Display	Description	Possible Causes	Solutions
	Condition	Alert, Error or Fault		
1	<b>SAFE MODE</b>	Safe Mode Alert	Occurs when either the edge sensor or Inherent Entrapment Sensor (IES) has been tripped. In Safe Mode, the automatic close timer is disabled, but any command will reset and/or start the gate in motion. Safe Mode clears when full travel is reached or the 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"> <li>1. Remove the obstruction.</li> <li>2. Adjust the IES sensitivity.</li> <li>3. Correct the gate hardware.</li> <li>4. Correct faulty edge sensor.</li> <li>5. Check for worn motor brushes and replace, if necessary.</li> </ol>
2	<b>ENTRAPMENT MODE</b>	Entrapment Mode Alert	<p>Occurs when the IES is tripped when the gate is already in Safe Mode. The operator will not function until it is reset, which can occur by:</p> <ul style="list-style-type: none"> <li>- An Open or Stop command from a push-button control</li> <li>- Pressing black button on the operator side</li> <li>- Pressing the RESET button below the display</li> </ul> <p>With any one of these inputs, the operator will return to Safe Mode. Gate binding or wind can cause a false alert.</p>	<ol style="list-style-type: none"> <li>1. Remove the obstruction.</li> <li>2. Adjust the IES sensitivity.</li> <li>3. Correct the gate hardware.</li> </ol>

**Table 11. SmartDC Controller - Troubleshooting**

Ref. No.	Display	Description	Possible Causes	Solutions
	Condition	Alert, Error or Fault		
3	<b>NO AC POWER</b>	No AC Input Power. Advisory only.	AC power is shut off at the source (breaker) or is not connected. The AC power switch on the operator (lower rocker switch) is turned off, or the circuit breaker on the operator has tripped.	<ol style="list-style-type: none"> <li>1. Turn AC power switch on or connect power to the operator.</li> <li>2. Reset the operator circuit breaker or connect power to AC switch.</li> <li>3. Reset circuit breaker at electrical panel.</li> <li>4. Have a licensed electrician check the wiring.</li> </ol>
4	<b>LOW 24VDC</b>	Low 24VDC UPS Batteries. Advisory only.	Occurs when the battery voltage has dropped to less than 22V. At this level, the batteries are 80% depleted. Normal function until 21V.	<ol style="list-style-type: none"> <li>1. No AC Power. See item 3 above.</li> <li>2. Wiring / Connector problem – check all connections. Clean or repair as required.</li> <li>3. Check battery condition.</li> <li>4. SmartDC Controller charger failure – check charger voltage and replace SmartDC Controller.</li> <li>5. Transformer failure – replace Transformer.</li> </ol>
5	<b>DEAD BATTERY</b>	Extremely low UPS batteries – no automatic operation – batteries below 21V.	Occurs when the battery voltage has dropped to less than 21V. At this level, the batteries are 90% depleted. The gate will automatically open or close depending upon the setting chosen. Refer to <b><i>“Setting AC Power Loss Gate Function” on page 72.</i></b> No additional automatic function is possible, but limited push-button control is available to 18V.	<ol style="list-style-type: none"> <li>1. No AC Power. See item 3 above.</li> <li>2. Wiring / Connector problem – check all connections. Clean or repair as required.</li> <li>3. Check battery condition.</li> <li>4. SmartDC Controller charger failure – check charger voltage and replace SmartDC Controller.</li> <li>5. Transformer failure – replace Transformer.</li> </ol>



**Table 11. SmartDC Controller - Troubleshooting**

Ref. No.	Display	Description	Possible Causes	Solutions
	Condition	Alert, Error or Fault		
6	<b>HYSECURITY BAD POWER</b>	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.	<ol style="list-style-type: none"> <li>1. No AC Power. See item 3 above.</li> <li>2. Wiring/Connector problem – check all connections. Clean or repair as required.</li> <li>3. Check battery condition.</li> <li>4. SmartDC Controller charger failure – check charger voltage and replace SmartDC Controller.</li> <li>5. Transformer failure – replace Transformer.</li> </ol>
7	<b>No display. LED blinking.</b>	SmartDC Controller is receiving power, but battery voltage is very low.	Several possible causes: <ul style="list-style-type: none"> <li>- The AC power has been shut off from the operator for too long and the batteries are drained.</li> <li>- Wiring problem.</li> <li>- Batteries no longer hold a charge.</li> <li>- Bad SmartDC Controller.</li> <li>- Bad transformer.</li> </ul>	<ol style="list-style-type: none"> <li>1. No AC power. See item 3 above.</li> <li>2. Wiring/Connector problem – check all connections. Clean or repair as needed.</li> <li>3. Check battery condition.</li> <li>4. SmartDC Controller charger failure – check charger voltage and replace SmartDC Controller.</li> <li>5. Transformer failure – replace transformer.</li> </ol>
8	<b>HYSECURITY LOADER</b>	The SmartDC Controller cannot locate the system software or software is being loaded into the SmartDC Controller.	There is no software loaded on the SmartDC Controller or software is currently being loaded.	Load the latest software version (H5.XX) using S.T.A.R.T. with a download cable (preferably USB) or wait for software to finish loading.
9	<b>ALERT 1 FORCE OPEN</b>	Gate forced open.	The gate has been forced open from a full closed limit and is being prevented from re-closing. Must be enabled in User Menu.	Will self-clear after an open or close input.

**Table 11. SmartDC Controller - Troubleshooting**

Ref. No.	Display	Description	Possible Causes	Solutions
	Condition	Alert, Error or Fault		
10	<b>ALERT 2 DRIFT CLOSED</b>	Gate drifted closed.	The gate has been forced off its open limit and is being prevented from re-opening. Must be enabled in User Menu.	Will self-clear after an open or close input.
11	<b>ALERT 3 EXCESS DRIFT</b>	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.
12	<b>ALERT 4 MOTOR OVERLOAD</b>	Thermal overload alert. When the alert is triggered, the gate can only “fully open” until the alert is cleared.	Motor drive heat sink exceeds 195°F (90.56°C). The alert will temporarily disable the operator, but will automatically reset itself when it cools down. May also occur if the heatsink temperature is 70°F (21.11°C) higher than ambient temperature.	Check gate hardware, weight/length of gate. Alert automatically clears when the temperature drops below threshold.
13	<b>ALERT 5 BOTH LIM ACTIVE</b>	Both limit switches are on at the same time.	<ol style="list-style-type: none"> <li>1. Stuck limit switch.</li> <li>2. Short in wiring.</li> <li>3. Debris in limit plate area.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check limit switches and replace as required.</li> <li>2. Repair any wiring issues.</li> <li>3. Remove debris from limit plate area.</li> </ol>
14	<b>ALERT 6 LIM NOT RELEASED</b>	The limit did not release when the operator was commanded to move.	<ol style="list-style-type: none"> <li>1. Quick disconnect bolt missing.</li> <li>2. Broken drive belt.</li> <li>3. Hardware holding the arm.</li> <li>4. Stuck Limit Switch.</li> <li>5. Broken Limit Plate.</li> <li>6. Debris in limit plate area.</li> </ol>	<ol style="list-style-type: none"> <li>1. Ensure quick disconnect bolt is in place and tight.</li> <li>2. Check and replace drive belt.</li> <li>3. Release any holds on the arm.</li> <li>4. Check limit switches and replace as required.</li> <li>5. Check Limit Plate and replace as required.</li> <li>6. Remove debris from limit area.</li> </ol>

**Table 11. SmartDC Controller - Troubleshooting**

Ref. No.	Display	Description	Possible Causes	Solutions
	Condition	Alert, Error or Fault		
15	<b>ALERT 7 FREQ SHIFT FAULT</b>	The HY5B has detected a frequency change outside the normal range.	Likely causes are poor integrity of loops or metallic objects within range. This message will also indicate which detector the alert applies to: Exit Loop (ELD), Inside Obstruction Loop (IOLD), Outside Obstruction Loop (OOLD), or Center Loop (CLD) - (User Relay 22).	The loop lead in wires and roadway should be checked for problems or replaced.
16	<b>ALERT 8 LOOP SHORTED</b>	The HY5B has detected a loop shorted to ground.	Caused by inadequate insulation of loop wires.	The loop lead in wires and roadway should be checked for problems or replaced.
17	<b>ALERT 9 LOOP OPEN</b>	The HY5B has detected a lack of continuity in the loop wire.	Caused by broken loop wire or wire has come unplugged from detector.	The loop and lead in wires should be checked for problems or replaced.
18	<b>ALERT 10 12C BUS ERROR</b>	The SmartDC Controller has detected a communication error with a HY5B vehicle detector.	Caused by removal of HY5B or lack of integrity of the socket connection. This message will also indicate which detector the 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 the HY5B, if necessary.

**Table 11. SmartDC Controller - Troubleshooting**

Ref. No.	Display	Description	Possible Causes	Solutions
	Condition	Alert, Error or Fault		
19	<b>ALERT 11 DETECTOR FAULT</b>	The SmartDC Controller has detected a problem within a HY5B vehicle detector.	Caused by a fault within the HY5B. This message will also indicate which detector the 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 the HY5B, if necessary.
20	<b>ALERT 12 ON TOO LONG</b>	The SmartDC Controller has an active loop input (HY5B or box detector output) for more than 5 minutes.	Caused when the SmartDC Controller sees an active loop for more than 5 minutes. The "active" loop can be actual or false. This message will also indicate which detector the 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 the site. The loop and lead-in wires should be checked for problems or replaced.
21	<b>ALERT 13 STIFF GATE</b>	The SmartDC 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 the history log. It does not have any effect with regard to opening or closing the gate.	Check and correct gate hardware as required.
22	<b>ALERT 14 STUCK GATE</b>	The SmartDC Controller has detected that it cannot move the gate at all.	Caused by broken gate hardware or ice/snow buildup.	Check and correct gate hardware as required.
23	<b>ALERT 15 NO PICKLE</b>	Not used.	--	--

**Table 11. SmartDC Controller - Troubleshooting**

Ref. No.	Display	Description	Possible Causes	Solutions
	Condition	Alert, Error or Fault		
24	<b>ALERT 16 COM BUS ERROR</b>	The SmartDC Controller has detected an internal communications error.	Several possible causes: <ul style="list-style-type: none"> <li>- Excessive electrical noise.</li> <li>- Lack of earth grounding.</li> <li>- Internal problem on SmartDC Controller.</li> </ul>	<ol style="list-style-type: none"> <li>1. Determine and remedy the source of electrical noise.</li> <li>2. Install a ground rod.</li> <li>3. Replace the SmartDC Controller.</li> </ol>
25	<b>ALERT 17 BAD COIN BATTERY</b>	The small battery on the SmartDC Controller is loose or needs replacing.	The coin battery is loose or dead.	<ol style="list-style-type: none"> <li>1. Verify that the battery is properly seated.</li> <li>2. Replace coin battery.</li> <li>3. Restore power.</li> <li>4. Press RESET button.</li> </ol>
26	<b>ALERT 18 CHANGE BATTERY</b>	The SmartDC Controller has detected that the 24VDC UPS batteries need to be replaced.	Batteries are not taking a charge properly.	The buzzer will chirp every minute until the UPS batteries are replaced.
27	<b>ALERT 19 FALSE SLOWDOWN</b>	Not used with DC operators.	--	--
28	<b>ALERT 20 LI BLOCK OPEN</b>	The SmartDC Controller has detected closure of an interlock contact.	An interlock contact is closed, indicating that the gate latch (lock) is engaged, preventing the operator from starting.	Check the interlock terminal and wiring.
29	<b>ALERT 21 DRIVE TRIP</b>	Not used with DC operators.	--	--

**Table 11. SmartDC Controller - Troubleshooting**

Ref. No.	Display	Description	Possible Causes	Solutions
	Condition	Alert, Error or Fault		
30	<b>ALERT 22 INTLOCK FAILURE</b>	Interlock/Sequential Gate communication lost.	Appears when the RS-485 communication connection is lost for more than 5s between interlocked (dual gate) or sequenced gate operators.	<ol style="list-style-type: none"> <li>1. Check cable connections and wiring. Make sure both operators are working properly and have the same current and up-to-date software versions. The alert auto clears when communication between the two operators is restored.</li> <li>2. If the operator on site is a solo gate operator and the display code ALERT 22 appears, access the Installer Menu. Verify the Installer Menu items: DG (Dual Gate) and SG (Sequential Gate) are both set to zero.</li> </ol>
31	<b>ALERT 24 EXTERNAL RELAY FAULT</b>	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.
32	<b>ALERT 25 HYNET LOW BATTERY</b>	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.
33	<b>ALERT 28 BATTERY DISCONNECTED</b>	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.

**Table 11. SmartDC Controller - Troubleshooting**

Ref. No.	Display	Description	Possible Causes	Solutions
	Condition	Alert, Error or Fault		
34	<b>FAULT 1 MOTOR RUN TIME</b>	The SmartDC Controller has detected the motor is on longer than the maximum run time selected.	Several possible causes: <ul style="list-style-type: none"> <li>- Quick disconnect bolt missing.</li> <li>- Broken drive belt.</li> <li>- Broken Limit Plate.</li> <li>- Max Run Timer may need to be increased.</li> </ul>	<ol style="list-style-type: none"> <li>1. Ensure quick disconnect belt is in place and tight.</li> <li>2. Check and replace drive belt.</li> <li>3. Check Limit Plate and replace, as required.</li> <li>4. Increase Max Run Timer in the Installer Menu.</li> </ol>
35	<b>FAULT 2 PHOTO EYE</b>	The photo eye is missing or not working.	This fault can only occur if the monitored photo eye check fails. See <b>"Monitored External Entrapment Sensors"</b> on page 120 for details.	Correct malfunctioning photo eye.
36	<b>FAULT 3 VOLTAGE SAG</b>	Not used.	Caused by inadequate supply wire size.	Correct wire size to AC supply.
37	<b>FAULT 4 GATE NO LOAD</b>	The SmartDC Controller has detected there is no load on the operator. The gate is non-operational while this fault is triggered.	Possible causes: <ul style="list-style-type: none"> <li>- Linkage failure.</li> <li>- Quick disconnect bolt missing.</li> <li>- Broken drive belt.</li> <li>- Motor wires disconnected.</li> <li>- DC switch off.</li> <li>- Failed 35-amp fuse.</li> <li>- Failed SmartDC controller.</li> </ul>	<ol style="list-style-type: none"> <li>1. Correct linkage.</li> <li>2. Ensure quick disconnect bolt is in place and tight.</li> <li>3. Replace drive belt.</li> <li>4. Turn DC power switch on.</li> <li>5. Check DC motor wires.</li> <li>6. Check the 35-amp fuse on the circuit board.</li> <li>7. Replace SmartDC Controller.</li> <li>8. Press RESET to clear fault</li> </ol>
38	<b>FAULT 5 LIMIT FAILED</b>	Not used.	--	--



**Table 11. SmartDC Controller - Troubleshooting**

Ref. No.	Display	Description	Possible Causes	Solutions
	Condition	Alert, Error or Fault		
39	<b>FAULT 14 STUCK GATE</b>	The SmartDC Controller has tried 3 times to overcome a stuck gate. The gate is non-operational while this fault is triggered.	Caused by broken gate hardware or ice/snow buildup.	<ol style="list-style-type: none"> <li>1. Check and correct gate hardware as required.</li> <li>2. Press RESET to clear fault.</li> </ol>
40	<b>ERROR 1 DIRECTION ERROR</b>	The SmartDC Controller has detected that operator ran in the wrong direction.	Several possible causes: <ul style="list-style-type: none"> <li>- Limit switch wiring.</li> <li>- Motor wiring.</li> <li>- Debris on limit plate.</li> </ul>	<ol style="list-style-type: none"> <li>1. Check limit switch wiring and correct, as needed.</li> <li>2. Check motor wiring and correct, as needed.</li> <li>3. Remove debris from the limit switch area.</li> <li>4. Press RESET to clear fault.</li> </ol>
41	<b>ERROR 3 HY5B FAILED</b>	The SmartDC Controller has detected a communication error with a HY5B vehicle detector.	Caused by removal of HY5B or lack of integrity of the socket connection. This message will also indicate which detector the alert applies to: Exit Loop (ELD), Inside Obstruction Loop (IOLD), Outside Obstruction Loop (OOLD), or Center Loop (CLD).	<ol style="list-style-type: none"> <li>1. Press RESET.</li> <li>2. Remove and re-install the HY5B.</li> <li>3. Replace the HY5B, if needed.</li> </ol>

**Table 11. SmartDC Controller - Troubleshooting**

Ref. No.	Display	Description	Possible Causes	Solutions
	Condition	Alert, Error or Fault		
42	<b>ERROR 4 PRIMARY- SECONDARY COM</b>	The SmartDC Controller has detected a communications error in the communication link between primary and secondary in a dual gate installation.	<p>Several possible causes:</p> <ul style="list-style-type: none"> <li>- Primary/Secondary communication cable has not been installed correctly. See <b><i>“Primary and Secondary Wiring Connections” on page 112.</i></b></li> <li>- Primary/Secondary not configured properly through the Installer Menu.</li> <li>- Operator not properly earth grounded.</li> <li>- Primary/Secondary communication cable installed in same conduit as high-voltage AC power.</li> <li>- One operator does not have power applied to it.</li> <li>- One operator may have a different software version.</li> </ul>	<ol style="list-style-type: none"> <li>1. Correct communication cable.</li> <li>2. Verify that each operator is configured properly through the Installer Menu. One operator must be set as Primary and the other operator must be set as Secondary.</li> <li>3. Install ground rod per NEC/NFPA standard.</li> <li>4. Install separate conduit for communication cables.</li> <li>5. Ensure AC power is present at both operators and both power switches are in the ON position.</li> <li>6. Check the software version currently loaded in the operator by pressing RESET. Make sure both operators are running the same software version.</li> </ol>
43	<b>ERROR 5 No display.</b>	The display provides no indication of this error, but it can appear in the S.T.A.R.T. log and means that the SmartDC Controller has detected a serious internal error.	Internal software/hardware error. Report any instance of this error to Technical Support.	<ol style="list-style-type: none"> <li>1. Turn both switches off to reset software.</li> <li>2. Update to latest software version using S.T.A.R.T.</li> <li>3. Replace SmartDC Controller.</li> </ol>
44	<b>ERROR 6 STC-VFD COMM ERR</b>	Not used with DC operators.	--	--

**Table 11. SmartDC Controller - Troubleshooting**

Ref. No.	Display	Description	Possible Causes	Solutions
	Condition	Alert, Error or Fault		
45	<b>ERROR 7 MENU CHECKSUM</b>	Software issue exists that may require factory reset.	Corrupt software or data.	Call Technical Support for assistance.
46	<b>ERROR 8 RPM SENSOR</b>	Not used.	--	--
47	<b>ERROR 9 BATTERY DISCONNECT</b>	The SmartDC Controller detected there is no battery connected.	The batteries are disconnected, or a wiring fault exists. FoldSmart 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"> <li>1. Ensure the red wire in the upper left corner of the electrical box is connected to the switch.</li> <li>2. Correct any issues with battery wiring.</li> <li>3. Check the 35-amp fuse on the circuit board.</li> </ol>
48	<b>ERROR 10 SLOWDOWN SWITCH</b>	Not used with DC operators.	--	--

## Vehicle Detector and Loop Fault Diagnostics

If HY5B vehicle detector modules are used, the SmartDC Controller has the ability to store and report detector and loop fault information for performance diagnostics.

If the SmartDC 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.

<b>Table 12. HY5B Vehicle Detector Faults and Errors</b>			
<b>Alert or Error #</b>	<b>LCD Description</b>	<b>Advisory</b>	<b>Resolution</b>
<b>ALERT 7</b>	<b>FREQ SHIFT FAULT</b>	HY5B vehicle detector – Abnormal frequency change alert.	The alert indicates an unstable loop frequency. Check the loop and lead-in wires for problems. Replace them, if necessary.
<b>ALERT 8</b>	<b>LOOP SHORTED</b>	HY5B vehicle detector – Loop is shorted.	The alert indicates that the loop and lead-in wires are shorting out. Check the wires for problems. Replace them, if necessary.
<b>ALERT 9</b>	<b>LOOP OPEN</b>	HY5B vehicle detector - Disconnected loop alert.	The alert indicates the loop wires are loose or disconnected. Check the wires for problems. Replace them, if necessary.
<b>ALERT 10</b>	<b>I<sup>2</sup>C BUSS ERROR</b>	HY5B vehicle detector - Communications alert.	The alert indicates the detector is not communicating properly with the SmartDC Controller. The alert occurs if the detector is unplugged or the connection is unstable. If communication is not re-established within 30 seconds, the controller will reset and the message changes to ERROR 3.
<b>ALERT 11</b>	<b>DETECTOR FAULT</b>	HY5B vehicle detector - Malfunction alert.	The display indicates the HY5B detector malfunction. Check detector for problems. Replace it, if necessary.
<b>ALERT 12</b>	<b>ON TOO LONG</b>	Detector input triggered too long – More than five minutes.	The display indicates the HY5B detector malfunction. The alert also works for any input connected to the terminal strip for standard box detectors. Check that a vehicle is not parked on the loop. Also, determine if the loop is stable. An unstable loop can hold the detector in a triggered state.

**Table 12. HY5B Vehicle Detector Faults and Errors**

Alert or Error #	LCD Description	Advisory	Resolution
<b>ERROR 3</b>	<b>DETECTOR FAILED</b>	HY5B vehicle detector - Communication failed. The SmartDC Controller will behave as if the detector is triggered, usually holding the gate fully open.	The alert indicates the detector is not communicating properly with the SmartDC Controller. The alert occurs if the detector is unplugged or the detector has failed. To replace the detector, press the RESET button to clear the error and re-seat the 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 SmartDC Controller by downloading from the RS232 communications port or the USB port. HySecurity's free S.T.A.R.T. software, a PC 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 HY5B Event Log posting:**

Event log:

02/09 EVENT – CLD Loop Health: noise 5, step 6, ref 7.

**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 non-functioning.

<b>Table 13. Setting Loop Presence</b>		
<b>Sub-menu Item</b>	<b>Display</b>	<b>Example Site Scenario</b>
<b>PR 0</b>	<b>(LONG)</b>	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.
<b>PR 1</b>	<b>(INFINITE)</b>	On a site where standing or parked vehicular traffic (on large area loops) is on 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.

**NOTE**

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 that the loop frequency is stable is also very 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.

<b>Table 14. HY5B Vehicle Detector Call Level Display</b>		
<b>Installer Menu</b>	<b>LCD Description</b>	<b>Setting Options (Bold = Factory Settings)</b>
ELD 0	EXIT LOOP SET	<b>0 = Run Mode</b> 1 = Show frequency 2 = Show call level 0-7 3 = Set Frequency 4 = Show Sensitivity 5 = Set Sensitivity 6 = Show Inductance 7 = Show Loop Health 8 = Set Presence
ILD 0	IN OBS LOOP SET	
OLD 0	OUT OBS LOOP SET	
CLD 0	CENTER LOOP SET	



# General Maintenance

## Smart Touch Analyze and Retrieve Tool (S.T.A.R.T.)

HySecurity provides Smart Touch Analyze and Retrieve Tool (S.T.A.R.T.) software to help Wallace Perimeter Security gate system 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 SmartDC Controller (SDC) software**

With S.T.A.R.T. software loaded on your laptop computer, you have an invaluable management tool for all FoldSmart operators. Either the USB port or the RS-232 serial port, found on the SmartDC Controller (see Figure 29), allows you to download system diagnostics and upload system configurations using the S.T.A.R.T. software. The free S.T.A.R.T. software is conveniently located on the Nice | HySecurity website. Instructions for downloading S.T.A.R.T. are found on the website.

### What you need:

- **Standard USB connection or HySecurity Serial RS-232 communication cable. Be sure to install the USB driver in your laptop, if you are using the HySecurity RS-232 to USB adapter.**
- **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).**

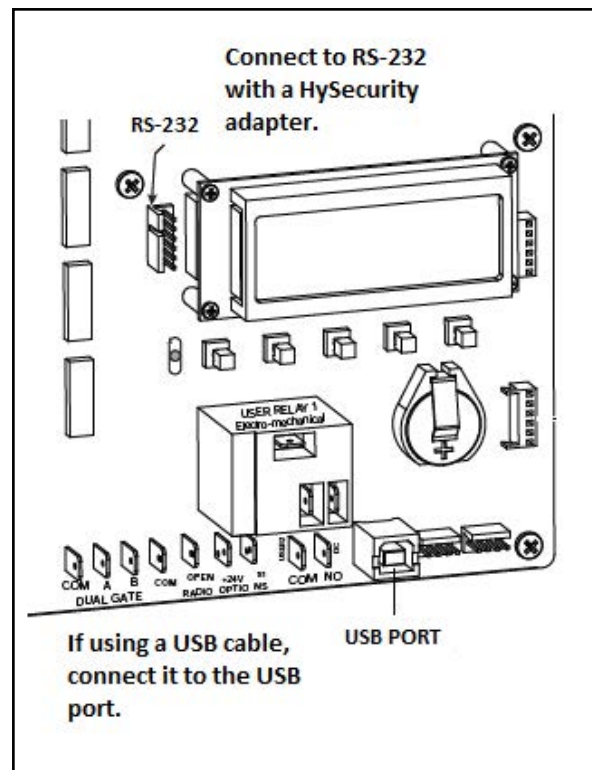


Figure 29. USB Port or RS-232 Serial Port

### ***Installing S.T.A.R.T. Software***

Read the S.T.A.R.T. User Manual, and then take the following steps to download S.T.A.R.T. software:

1. Bring up your web browser and type in <https://hysecurity.com/> in the command line.
2. Click Support on the Nice | 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 SmartDC.
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.
7. If the operating system on your laptop is VISTA or Windows 7, you must first disable the "User Account Control Settings." Refer to the below procedure in Setting User Account Controls, and then continue with step 8.
8. Follow the step-by-step instructions to complete the installation.
9. When the download is complete, log out of the Nice | HySecurity website. Shortcuts for the S.T.A.R.T. and SmartDC Controller History Logs appear on your laptop's desktop.

### ***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 S.T.A.R.T. software onto your laptop. Take the following steps:

#### ***In Windows 7:***

Go to Start Menu -> Control Panel -> User Accounts -> 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.

## 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 Table 11 "SmartDC Controller - Troubleshooting" 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, especially any work that has been done recently.

## Mechanical Maintenance

### CAUTION

Before checking the internal mechanisms of the operator, turn off all power switches.

The FoldSmart mechanical maintenance is not in-depth or difficult, but should be performed on a routine basis.

Schedule regular maintenance and look for the following:

- **Assess that the drive belt has the proper tension. Check for drive belt wear. Fraying edges or missing teeth indicate that the drive belt needs to be replaced. Refer to Drive Belt Tension and Alignment.**
- **Check for signs of rust. If any areas of rust are found, reduce the spread of corrosion by treating the areas with a rust inhibitor.**
- **Check the motor. DC motors contain carbon brushes which wear over time and must be replaced. Failure to replace the brushes will result in damage to the DC motor. 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 and Clock Battery Replacement.**

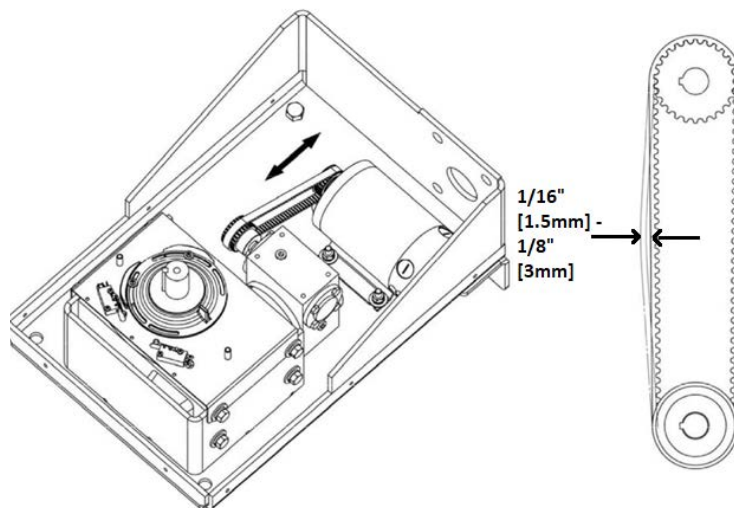
## Software Maintenance

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

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

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

## Drive Belt Tension and Alignment



**Figure 30. Drive Belt**

Proper drive belt tension is important for prolonging the life of the drive belt and maintaining the superior performance of the operator. To check the drive belt tension, take the following steps:

Remove the FoldSmart covers.

1. Turn off the DC and AC power switches.
2. Check to make sure the pulley is aligned vertically.
3. With your finger, apply light outward pressure to the drive belt. If it is properly tensioned, it should only move about 1/16-inch to 1/8-inch (1.6 to 3.2mm). See Figure 30.
4. To replace or re-tension the drive belt, loosen the two motor bracket bolts and move the bracket accordingly.

## DC Battery Replacement

Wallace Perimeter Security provides a one year warranty from the date of shipment for all the batteries supplied with the FoldSmart gate system.

Indicators of a low battery include:

- **LOW BATTERY or DEAD BATTERY** appears on the SmartDC Controller display which may or may not be indicative of normal discharge.
- **Alert 18 CHANGE BATTERY** appears on the SmartDC Controller display. The operator emits an audible chirp every minute to indicate a problem exists.
- **AP (#) AC LOSS** appears on the SmartDC 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.

### NOTE

For detailed information about the AP AC LOSS configuration, refer to Setting AC Power Loss Gate Function.

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 (part number MX002008 or equivalent). The batteries supplied in the FoldSmart operator are state-of-the-art AGM batteries. Do NOT use flooded cell batteries as damage may occur to the unit.

To replace the batteries, take the following steps:

1. Turn off the DC and AC power switches.
2. Unlock and open the control enclosure.
3. Cut the two black zip ties which secure the 8Ah batteries to the tray.
4. Disconnect the black and blue wires from the batteries.
5. Remove the first battery from the enclosure.
6. Disconnect the red and black wires from the second battery and remove it from the enclosure.

To install the two new batteries, reverse the removal procedure:

1. Connect the red wire to the bottom battery.
2. Connect the blue wire between the top and bottom batteries (black and red terminals).
3. Connect the black wire to the black terminal on the top battery.
4. Ensure the batteries are secured properly.

## 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. (See Figure 31.) Replace the battery about every five years (or as needed) with a DL 2025, DL 2032, or CR 2025, or CR 2032 battery.

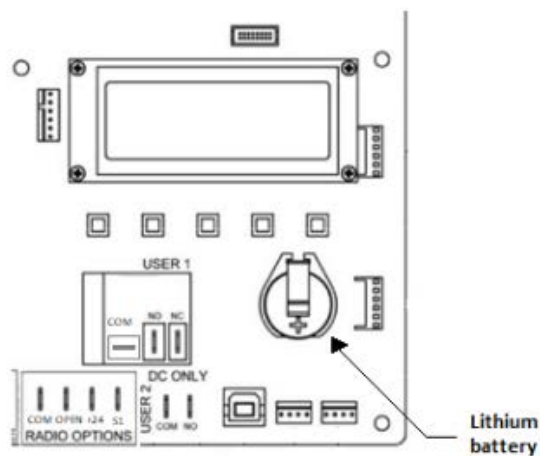


Figure 31. Lithium Coin Battery

# FoldSmart General Maintenance Checklist

Maintenance is essential in order to guarantee the safety and the satisfactory operation of FoldSmart gates. Maintenance checks should be conducted only by qualified maintenance personnel. The following checklist is intended to record repair requirements, maintenance performed and additional observations pertinent to the FoldSmart gate. Checklists must be dated, signed and retained for record-keeping purposes.



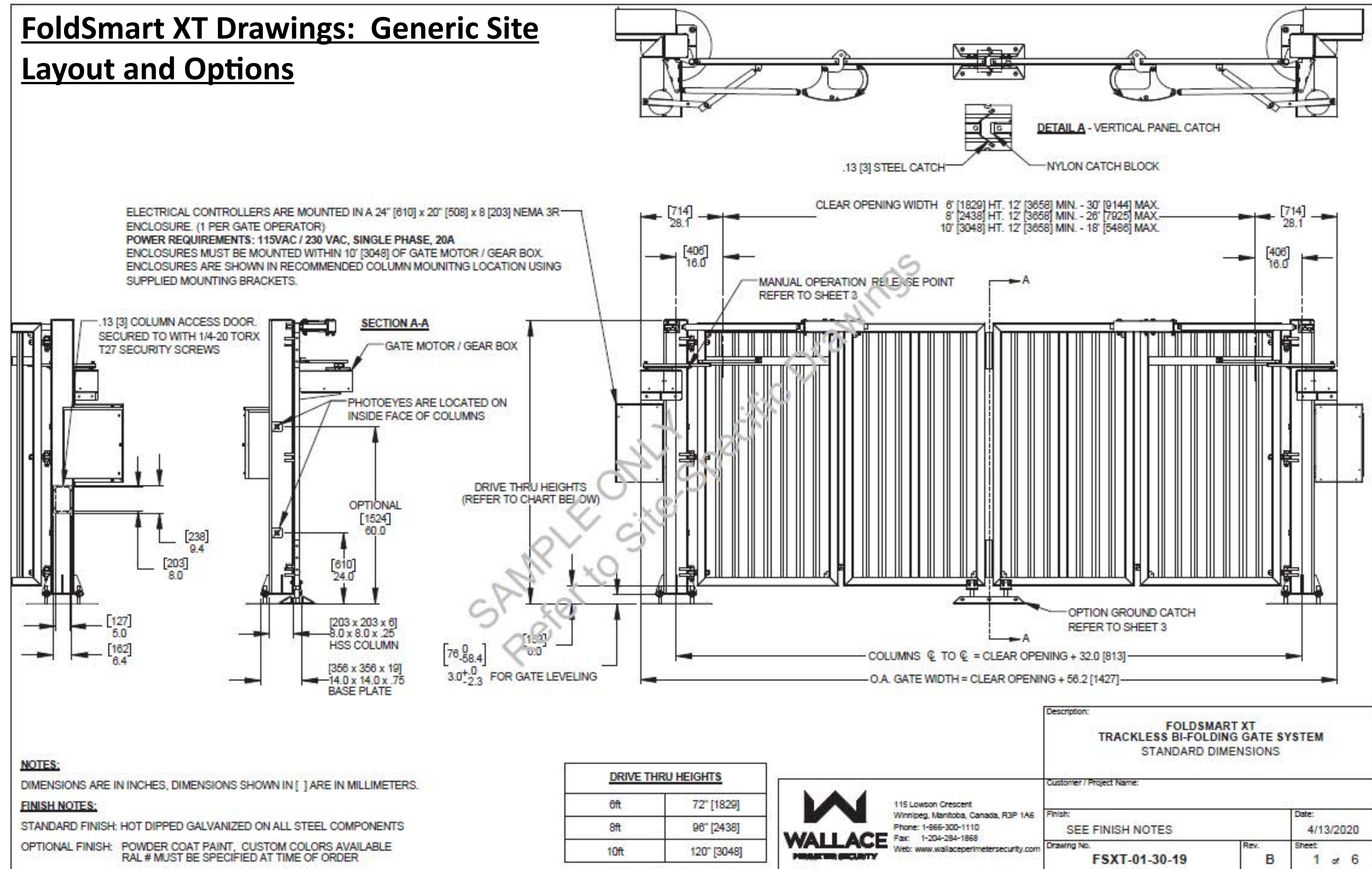
Turn OFF power to the gate whenever assembly and maintenance activities are being carried out.

<b>FOLDSMART GENERAL MAINTENANCE CHECKLIST</b> <b>To be completed approximately every 10,000 cycles</b> <b>or 6 months.</b>	<b>Checked</b>	<b>Good</b>	<b>Needs</b> <b>Attention</b>	<b>N/A</b>
<b>FoldSmart Gate</b> <b>Serial Number:</b>				
1. Physical structure - no damage to gate panels, columns, covers. Access panels functional and secure.				
2. Secure hinge bolts – check for abnormal wear/ misalignment. Lubricate only if necessary.				
3. Secure bolts at linkage arm.				
4. Check all electrical cables for proper clearance from all moving parts inside column. Fasten as required.				
5. Check seal on gearboxes for leaks (gearbox on each column).				
6. Check infrared beam functionality; clean lens with damp rag if necessary.				
7. Check limit switch function (located on top of gearbox).				
8. Check open/close limits – no gate panel “clap/ bounce”.				
9. Ensure stop button is functional.				
10. Check belt tension (1/4” to 1/2”).				



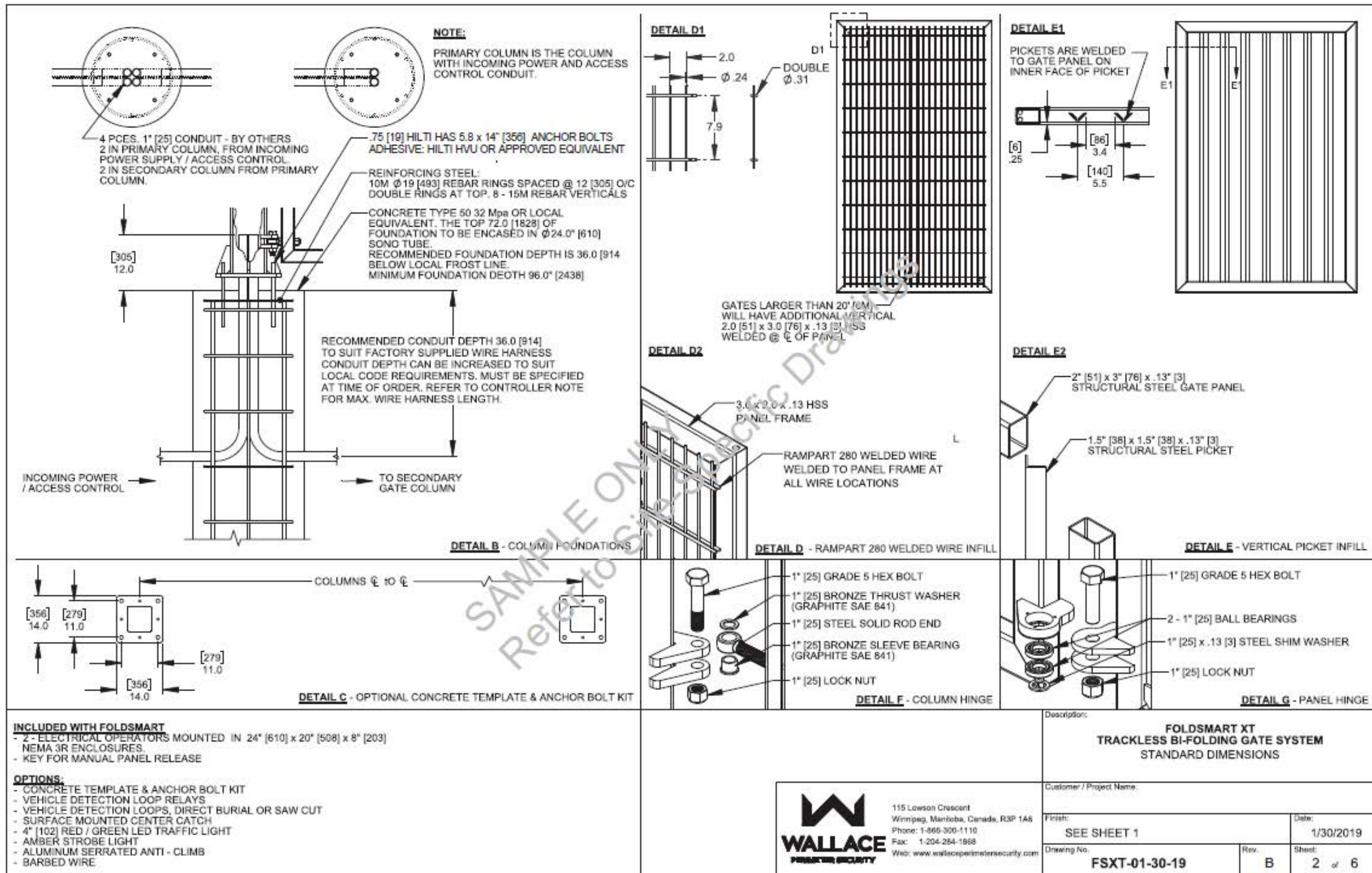
<b>FOLDSMART GENERAL MAINTENANCE CHECKLIST</b> To be completed approximately every 10,000 cycles or 6 months.		Checked	Good	Needs Attention	N/A
11. Check motor and gearbox pulley set screws.					
12. Check knuckle assembly for bushing wear.					
13. Check battery charging / output voltage. Battery charging voltage: Battery output voltage:					
14. Ensure operator cabinet is clean/dry.					
15. Ensure operator cabinet fasteners are secure.					
16. Ensure motor gearbox enclosure covers are installed properly and all fasteners are in place.					
<b>IF EQUIPPED/ENABLED:</b>					
17. Function of traffic light(s)/strobe light(s) correct and working (if equipped).					
18. Heater operational/ cooling fan operational-filter clean (if equipped).					
19. Sensing edges – no rips/tears, functioning correctly (if equipped).					
20. Vehicle detection loop/free exit loop – operational/ good condition (if equipped).					
<b>Comments/Recommendations:</b>					
Customer Signature:		Customer Name (Print):			
Signature of Maintenance Inspector:		Maintenance Check Performed by (Print Name):			
Date:		Date of next Maintenance Inspection:			
Cycle Count:					

# FoldSmart XT Drawings: Generic Site Layout and Options

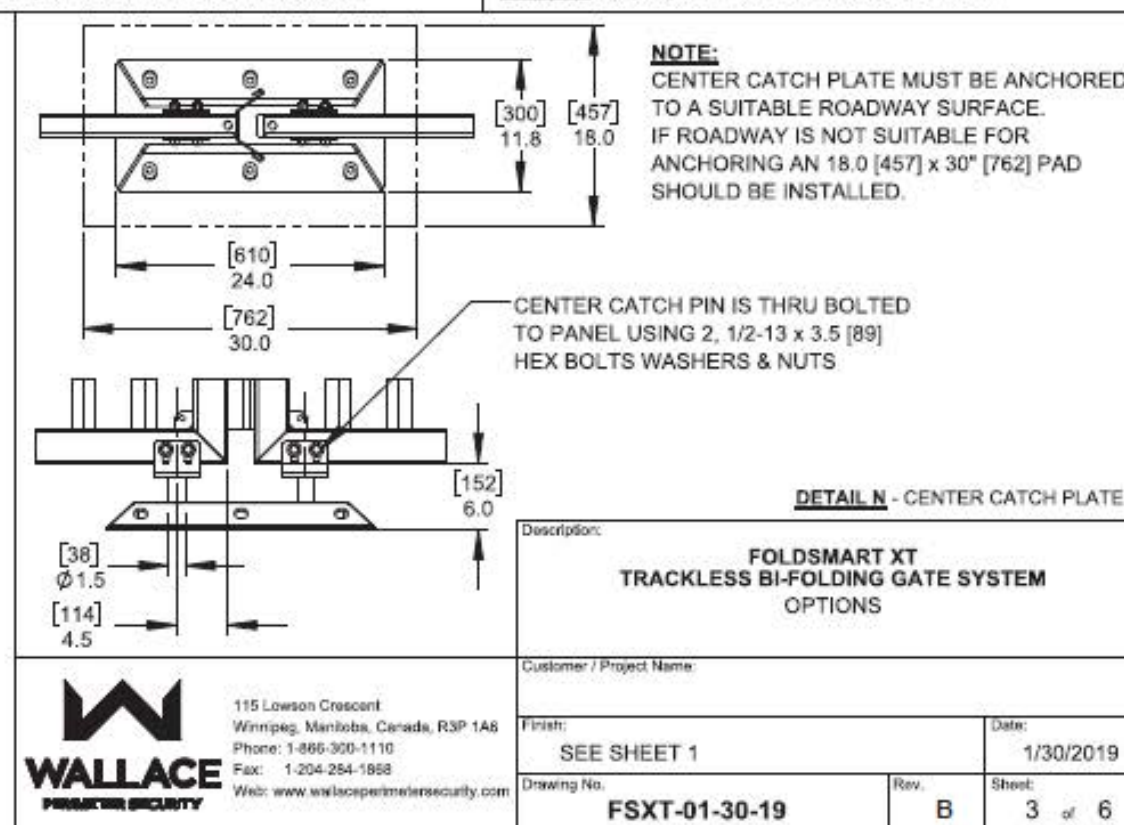
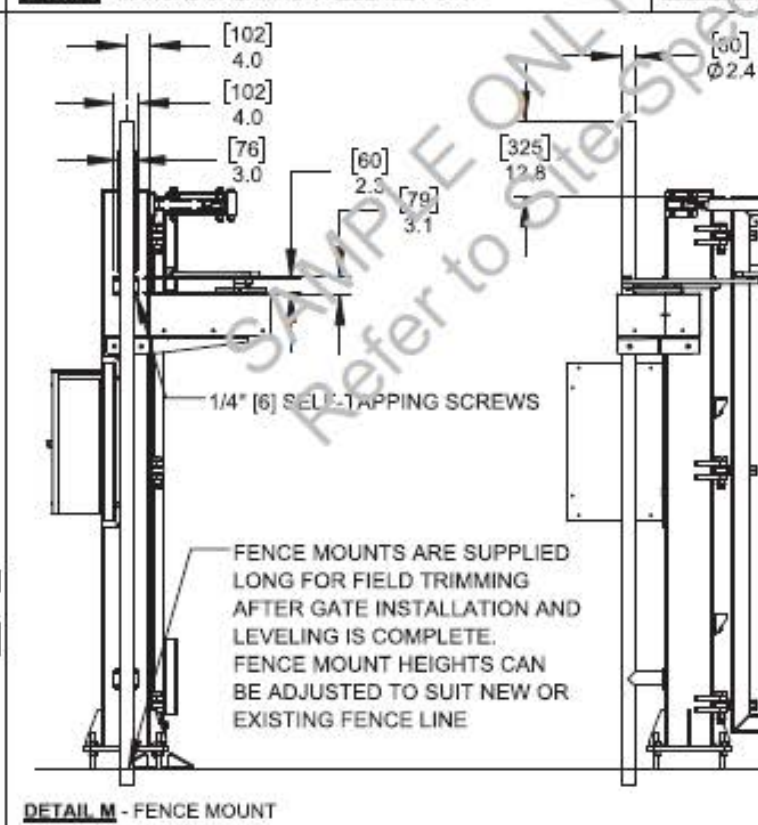
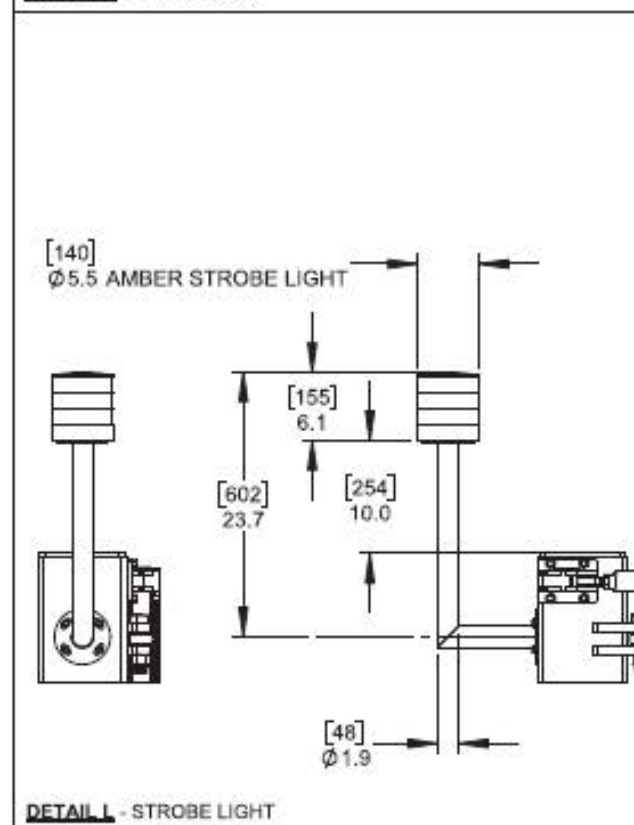
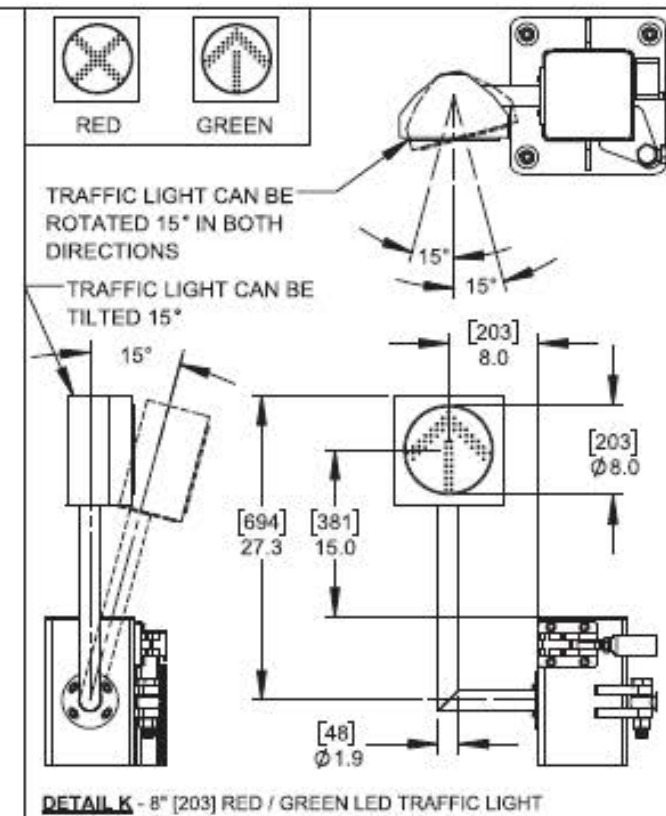
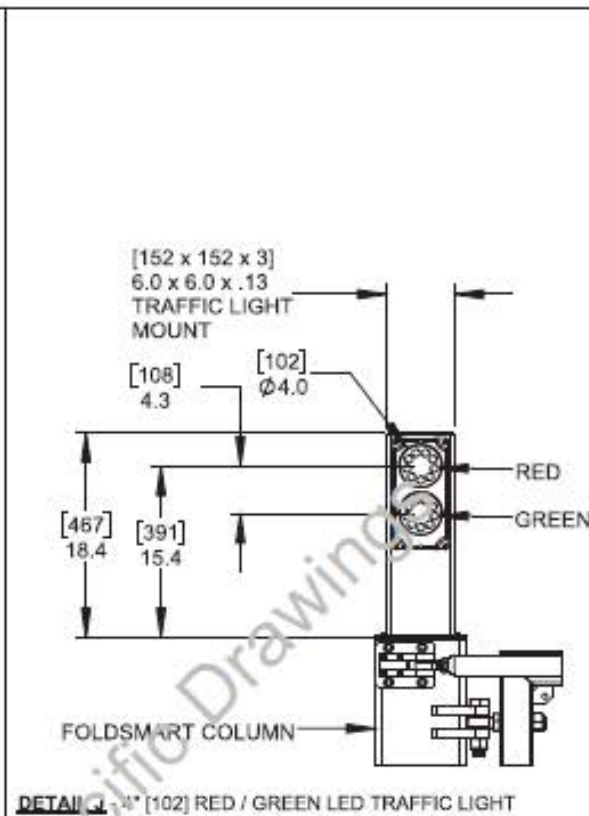
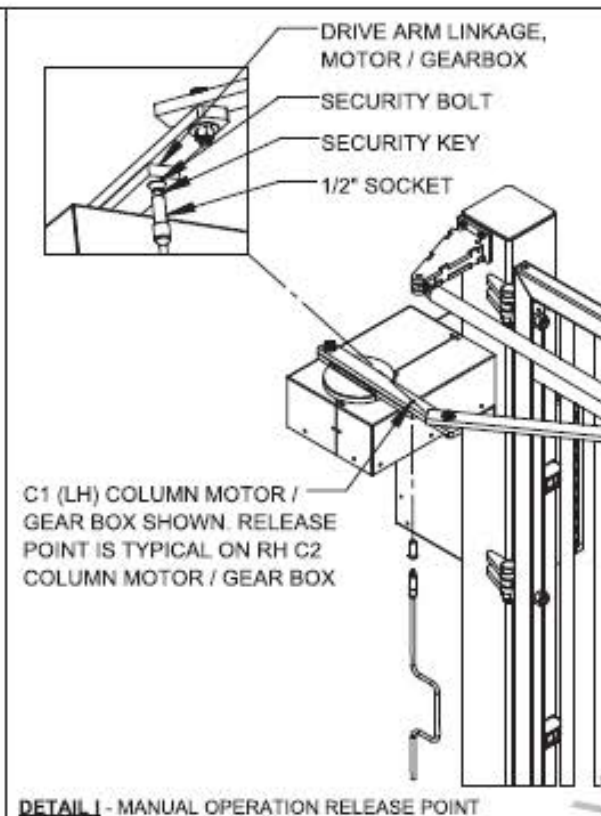
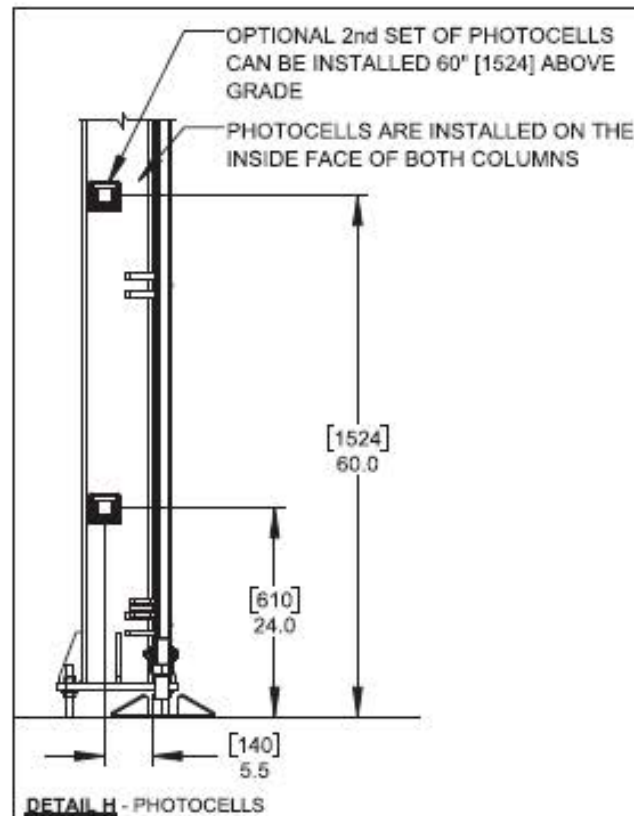






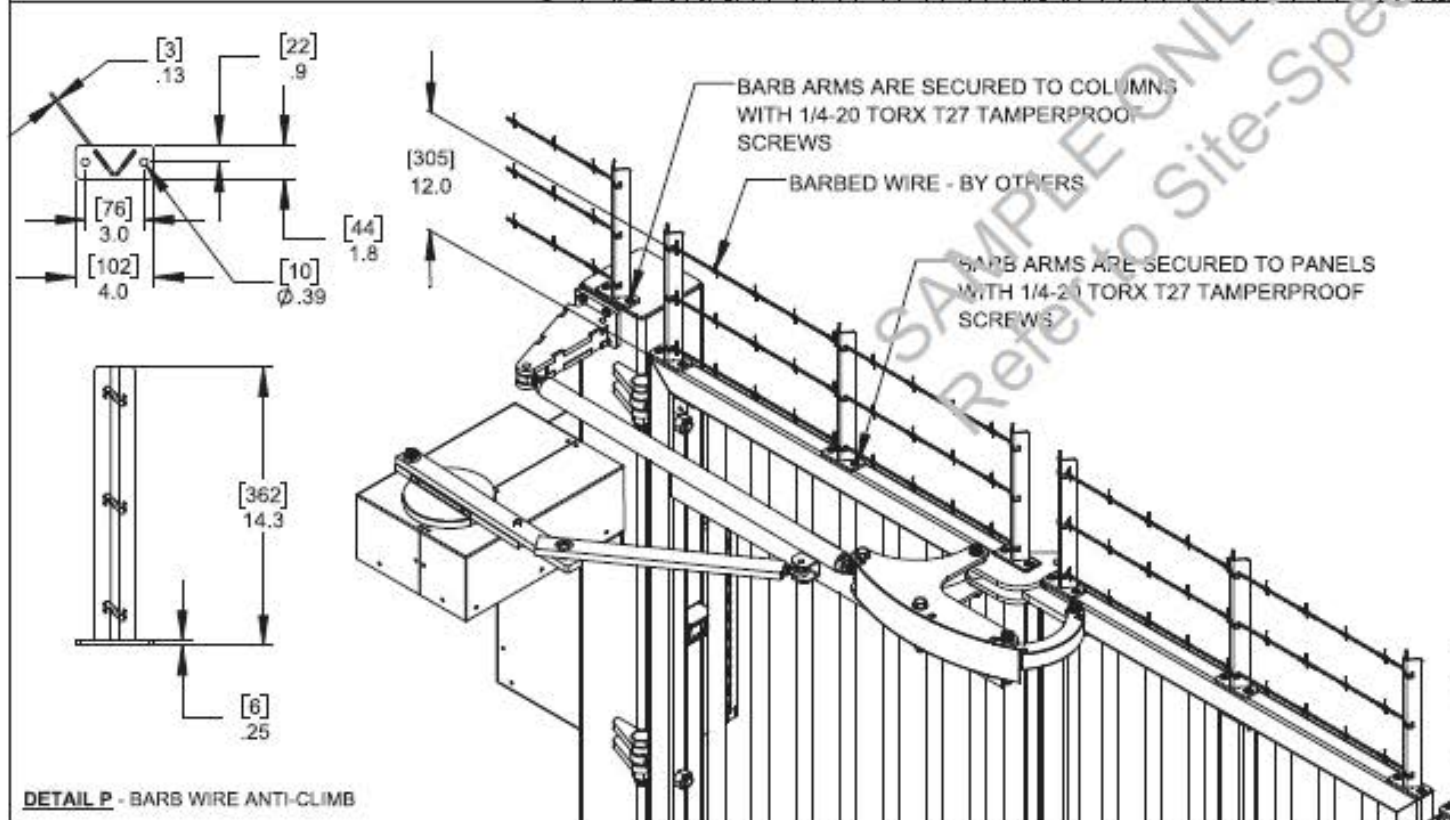
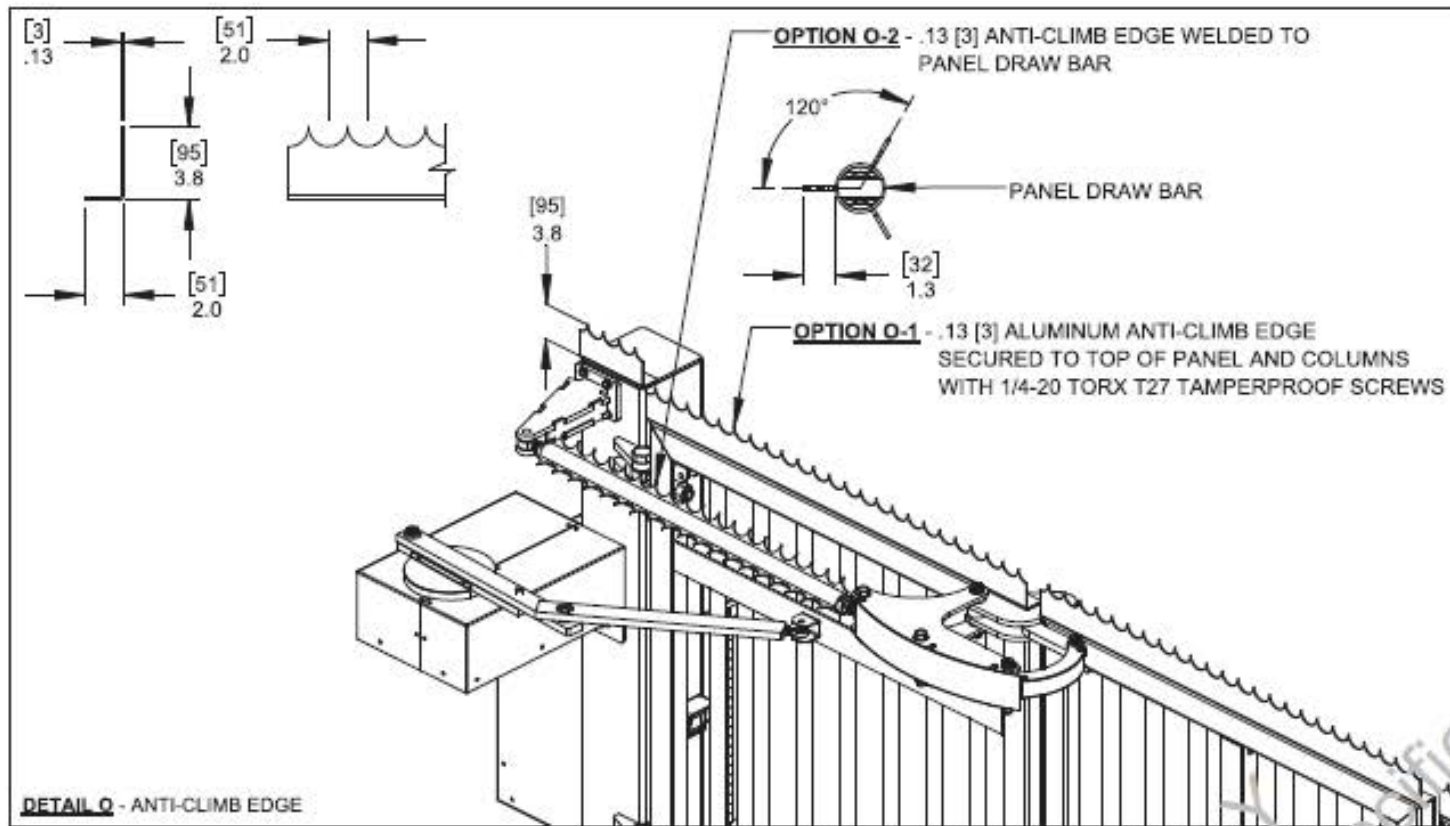








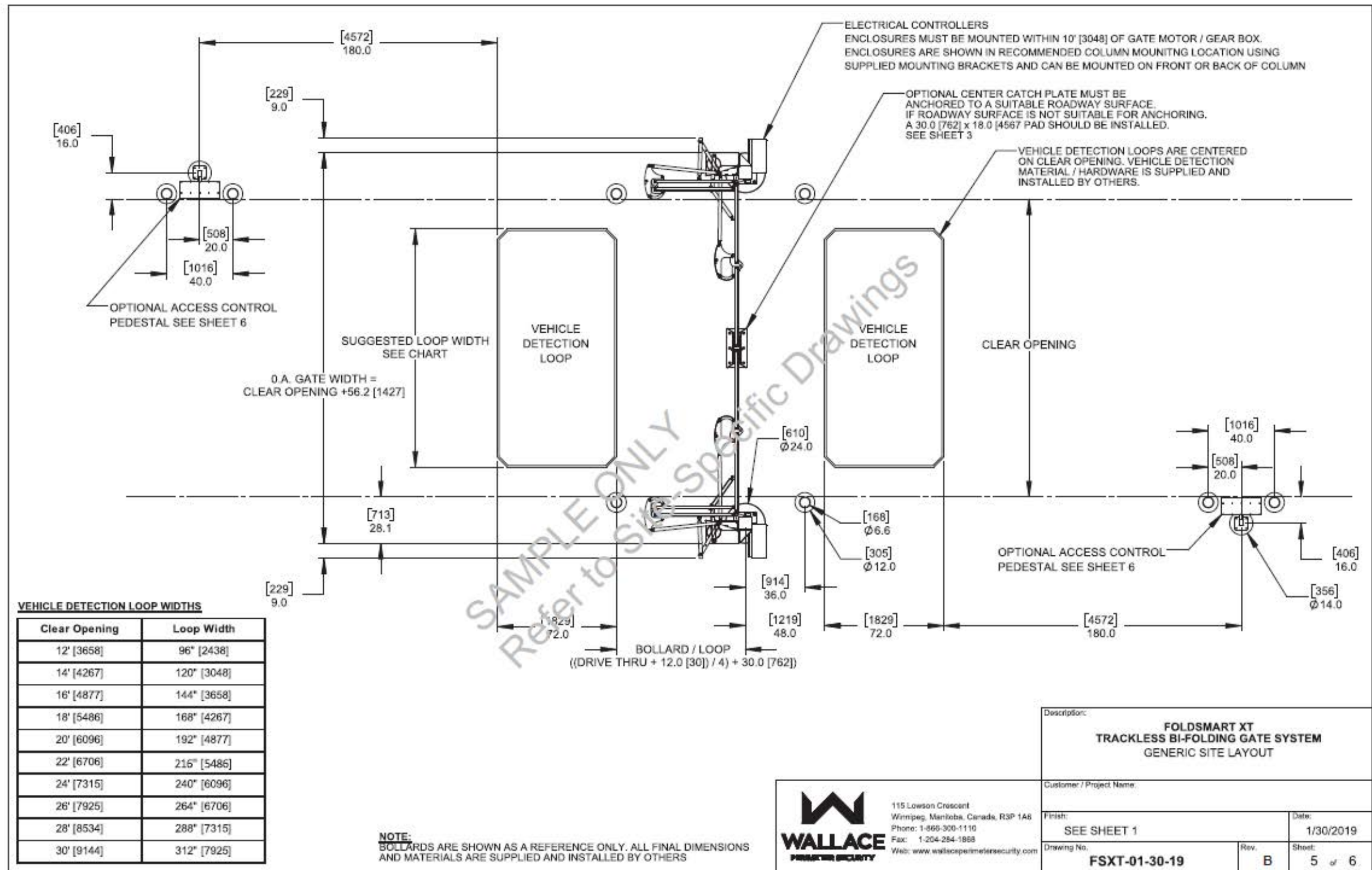




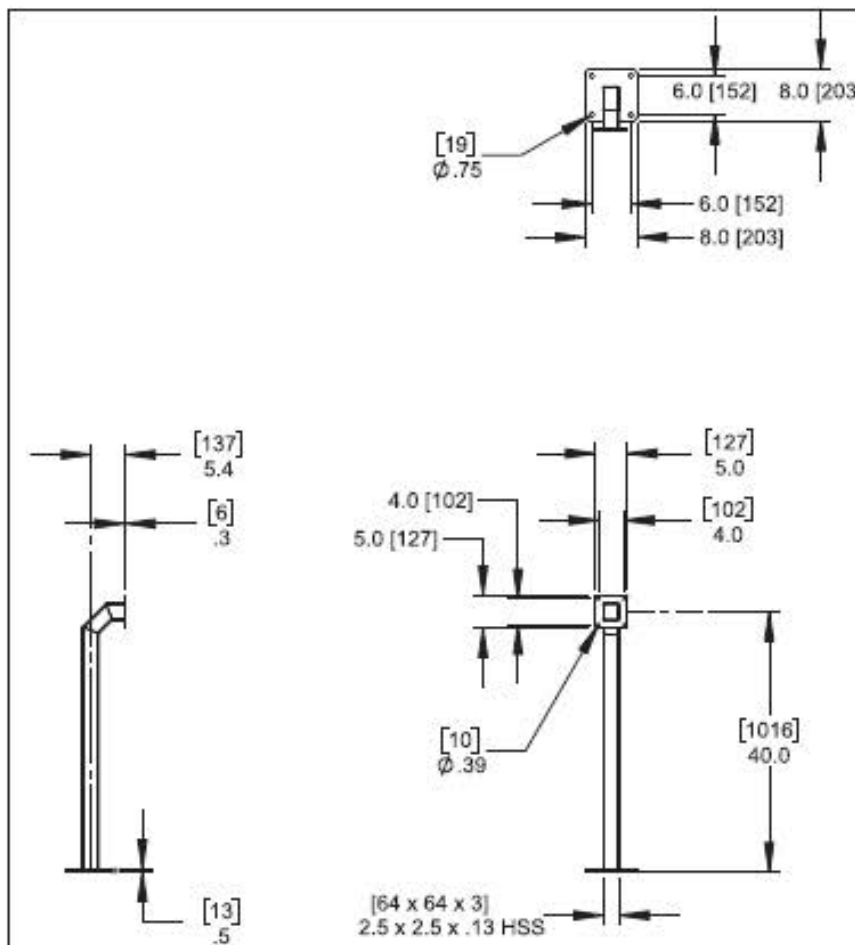
115 Lawson Crescent  
Winnipeg, Manitoba, Canada, R3P 1A8  
Phone: 1-866-300-1110  
Fax: 1-204-284-1888  
Web: [www.wallaceperimetersecurity.com](http://www.wallaceperimetersecurity.com)

Description: <b>FOLDSMART XT TRACKLESS BI-FOLDING GATE SYSTEM OPTIONS</b>			
Customer / Project Name:			
Finish: <b>SEE SHEET 1</b>	Date: <b>1/30/2019</b>		
Drawing No. <b>FSXT-01-30-19</b>	Rev. <b>B</b>	Sheet: <b>4 of 6</b>	

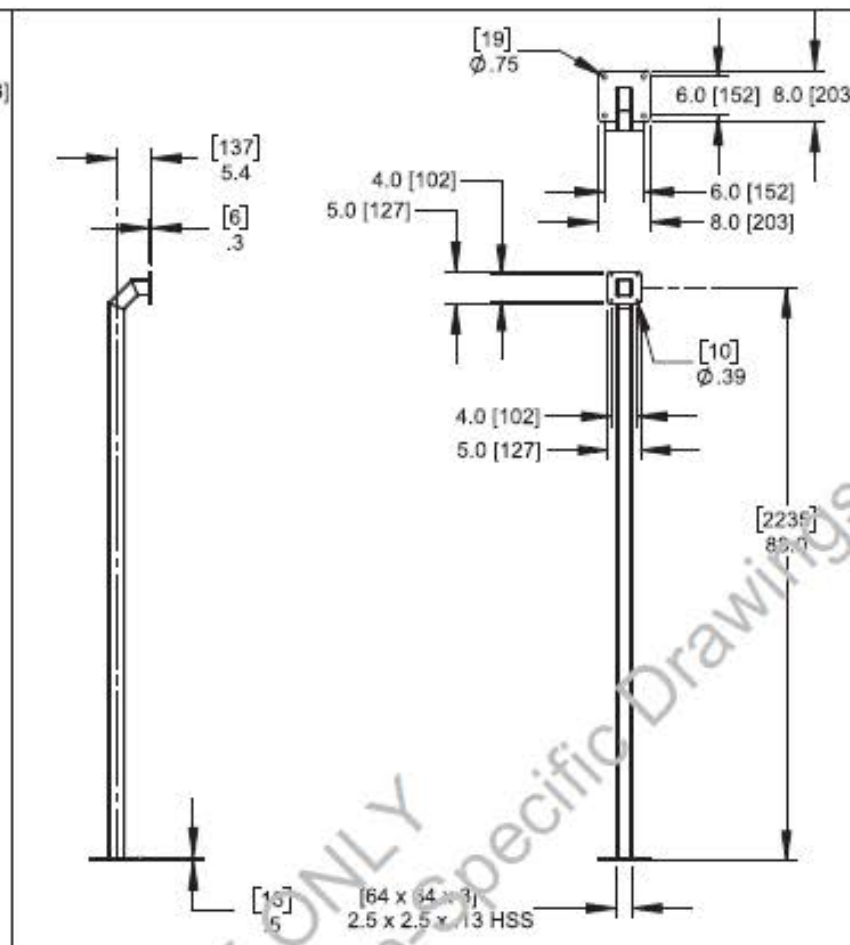




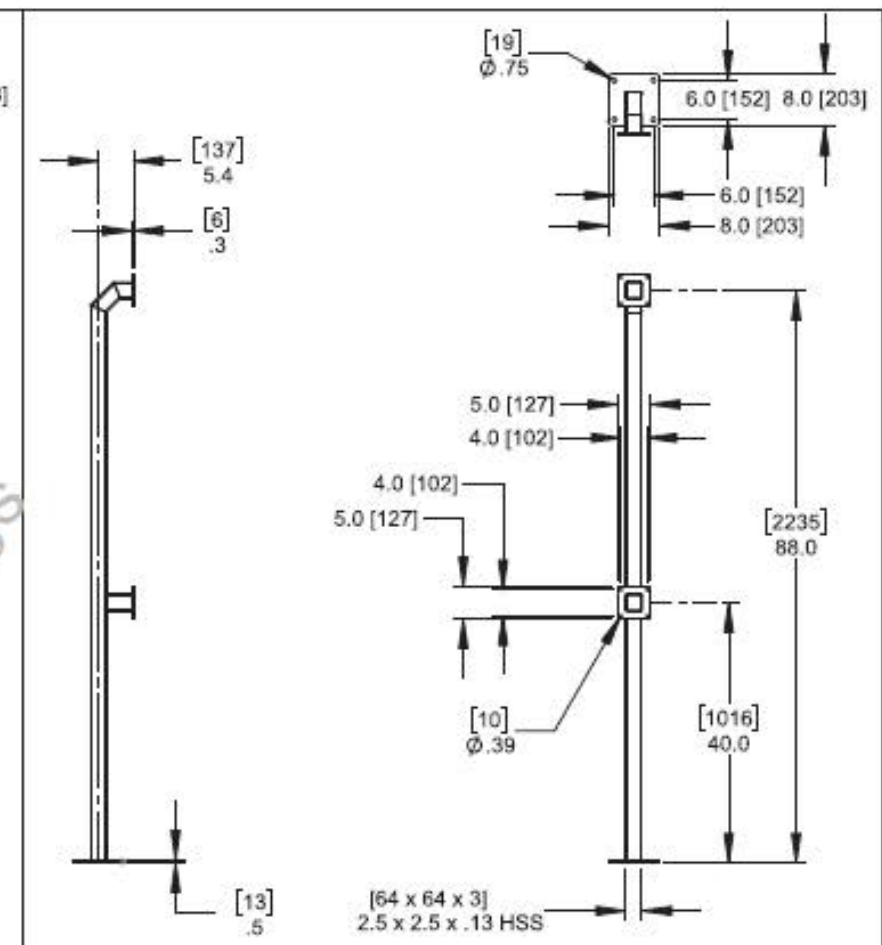




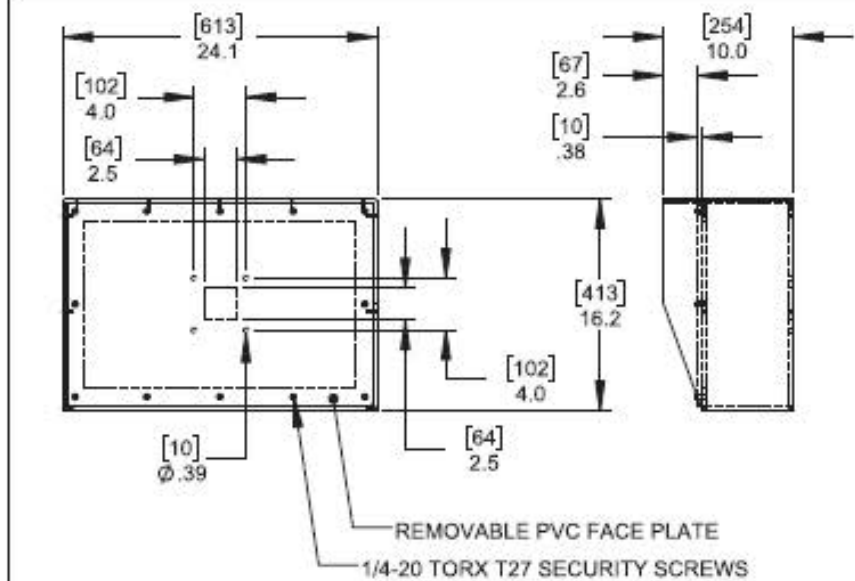
**DETAIL Q-1 - SINGLE HEIGHT PEDESTAL STAND 40.0" [1016]**



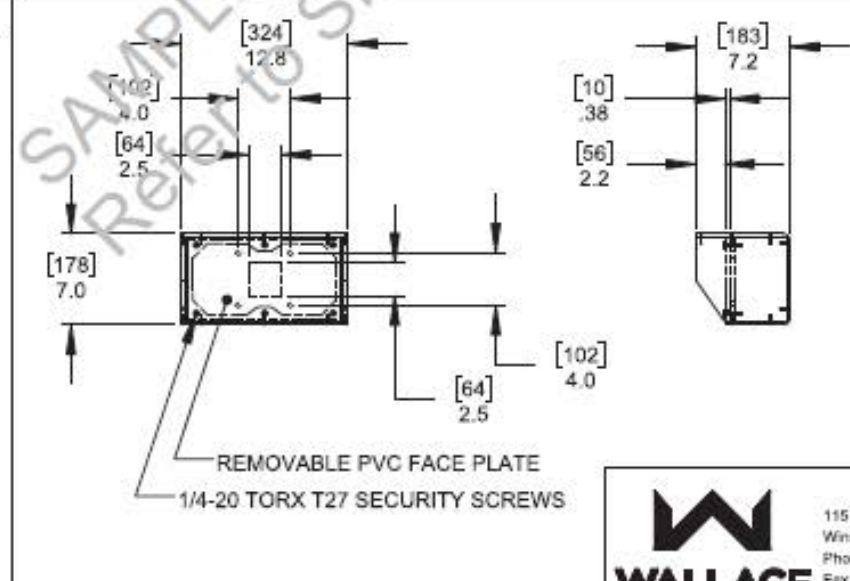
**DETAIL Q-2 - SINGLE HEIGHT PEDESTAL STAND 88.0" [2235]**



**DETAIL Q-3 - DUAL HEIGHT PEDESTAL STAND 40.0" [1016] / 88.0" [2235]**



**DETAIL R-1 - LARGE POLYCARBONATE PEDESTAL HEAD**



**DETAIL R-2 - SMALL POLYCARBONATE PEDESTAL HEAD**



115 Lawson Crescent  
Winnipeg, Manitoba, Canada, R3P 1A8  
Phone: 1-866-300-1110  
Fax: 1-204-284-1868  
Web: www.wallaceperimetersecurity.com

Description: <b>FOLDSMART XT TRACKLESS BI-FOLDING GATE SYSTEM OPTIONAL ACCESS CONTROL PEDESTALS</b>			
Customer / Project Name:			
Finish:		Date: 1/30/2019	
Drawing No. <b>FSXT-01-30-19</b>		Rev. <b>B</b>	
		Sheet: <b>6 of 6</b>	







## **FOLDSMART**

# **3 YEAR LIMITED PRODUCT WARRANTY**

For a period of 3 Years from date of delivery, Wallace Perimeter Security (“WPS”) warrants the product delivered to Buyer as follows: (1) the hardware shall be free from defects in material and workmanship and will conform to the applicable WPS specification and the terms of this proposal, and (2) the software and firmware will conform to the applicable WPS specifications and the terms of use.

This warranty shall be construed and interpreted in accordance with the provincial law of Manitoba and the common law of the government of Canada.

If a defect occurs during the warranty period, Buyer shall return the product to a WPS facility for repair or replacement. WPS shall determine in its sole discretion whether to repair or replace any defective product covered by this warranty. Buyer shall prepay the cost of shipping the product to WPS or to the designated facility and bear the risk of loss while the product is in transit. WPS shall pay the shipping charges to return the product to the Buyer and bear the risk of loss during transit, unless WPS determines that the defect is not covered by this warranty, in which event WPS shall immediately notify the Buyer and request instruction regarding disposition. Buyer’s sole and exclusive remedy for defects in products covered by this warranty is limited to the correction of the defect by repair or replacement.

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications of the product or improper site preparation or maintenance. This warranty shall also not apply to products that have been subjected to testing for other than specified electrical characteristics or have been subjected to mishandling, misuse, neglect, improper testing, repair, alteration, damage, assembly or processing that alters physical or electrical properties.

**IN NO EVENT SHALL WPS BE LIABLE BY VIRTUE OF ANY WPS WARRANTY OR OTHERWISE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL LOSS OR DAMAGE RESULTING FROM THE USE OR LOSS OF USE OF THE PRODUCT OR OTHERWISE. THIS WARRANTY SHALL BE APPLICABLE ONLY IF THE PRODUCT SHALL STILL BE THE PROPERTY OF THE ORIGINAL BUYER OR USER (OR IF THE ULTIMATE BUYER OR USER IS A NATIONAL GOVERNMENT ORGANIZATION). NO OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED AND INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE HAS BEEN OR WILL BE MADE BY OR ON BEHALF OF WPS OR BY OPERATION OF LAW WITH RESPECT TO THE PRODUCT OR ITS INSTALLATION, USE, OPERATION, REPLACEMENT OR REPAIR. THIS WARRANTY WILL BE CONSIDERED NULL AND VOID IF THE MAINTENANCE PROCEDURES AS OUTLINED IN THE OWNER’S MANUAL HAVE NOT BEEN ADHERED TO AND DOCUMENTED.**





## Technical Specifications

<b>Model</b>	<b>FoldSmart</b>					
<b>Solar</b>	FoldSmart XTS					
<b>Gate Specs</b>	<b>Imperial Measurement (Wallace Equipment Standard)</b>			<b>For Reference Only: International System of Units (SI) Approximate Equivalents</b>		
	<b>HEIGHT</b>	<b>MIN Width</b>	<b>MAX Width</b>	<b>HEIGHT</b>	<b>MIN Width</b>	<b>MAX Width</b>
	6 ft	12 ft	30 ft	1.83 m	3.66 m	9,14 m
	8 ft	12 ft	26 ft	2.4 m	3.66 m	7.92 m
	10 ft	12 ft	20 ft	3.05 m	3.66 m	6.10 m
The above specifications take gate weight capacities into account.						
<b>Open/Close Time</b>	Open/Close time set independently. Standard 8 seconds, adjustable up to 15 seconds.					
<b>Duty Cycle</b>	Continuous					
<b>Drive</b>	Electromechanical					
<b>Horsepower</b>	1/2 hp					
<b>UPS Battery Backup Cycles*</b>	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.					
<b>Temperature Rating</b>	-13° to 158° F (-25° to 70° C) (rating to -40° F/-40° C with optional cold weather kit)					
<b>Operating Voltage</b>	24VDC					
<b>Input Voltage</b>	115V or 208-230V, 50/60Hz Solar: 24 VDC solar panels					
<b>Accessory Power</b>	12VDC and 24VDC 1A each					
<b>Included Accessories</b>	EMX IRB-MON photo eye set (or 2 optional) and two 8Ah batteries for backup power					
<b>Communication</b>	USB or RS-232, RS-485, Ethernet/fiber using optional HyNet™ Gateway accessory					
<b>User Controls</b>	SmartDC Controller with 70+ configurable settings. 32 character LCD display and 5 tact buttons or a PC using S.T.A.R.T. software.					
<b>Relays</b>	Two configurable user relays: 30VDC, 3A solid state and 250VAC, 10A electromechanical; Optional Hy8Relay™ for 8 additional relay outputs					
<b>Finish</b>	Hot dipped galvanized, optional powder coat finish, NEMA3R control cabinet					
<b>ETL Listed (UL 325)</b>	Usage Class I, II, III, IV					
<b>Cycle Tested</b>	500,000 cycles					
<b>Warranty</b>	3 year standard					

\* 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 BIFOLD 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 <https://support.hysecurity.com/hc/en-us/categories/360003177593-Safety> for more information on UL 325 standards and gate safety.



115 Lawson Crescent  
Winnipeg, Manitoba, Canada R3P 1A6  
Phone: 866.300.1110

[wallaceperimetersecurity.com](http://wallaceperimetersecurity.com)

