# Hy-Security Gate Operators

# HYDRAULIC SLIDE GATE Operators

With Smart Touch Controller

## Installation and Maintenance Manual

Models 222 SS, E, EX, XI
333 MS, E, EX
222 CF, CE, CX
444 XS
and
DC Battery Operated Models
222 DS, DE, DX
444 DX

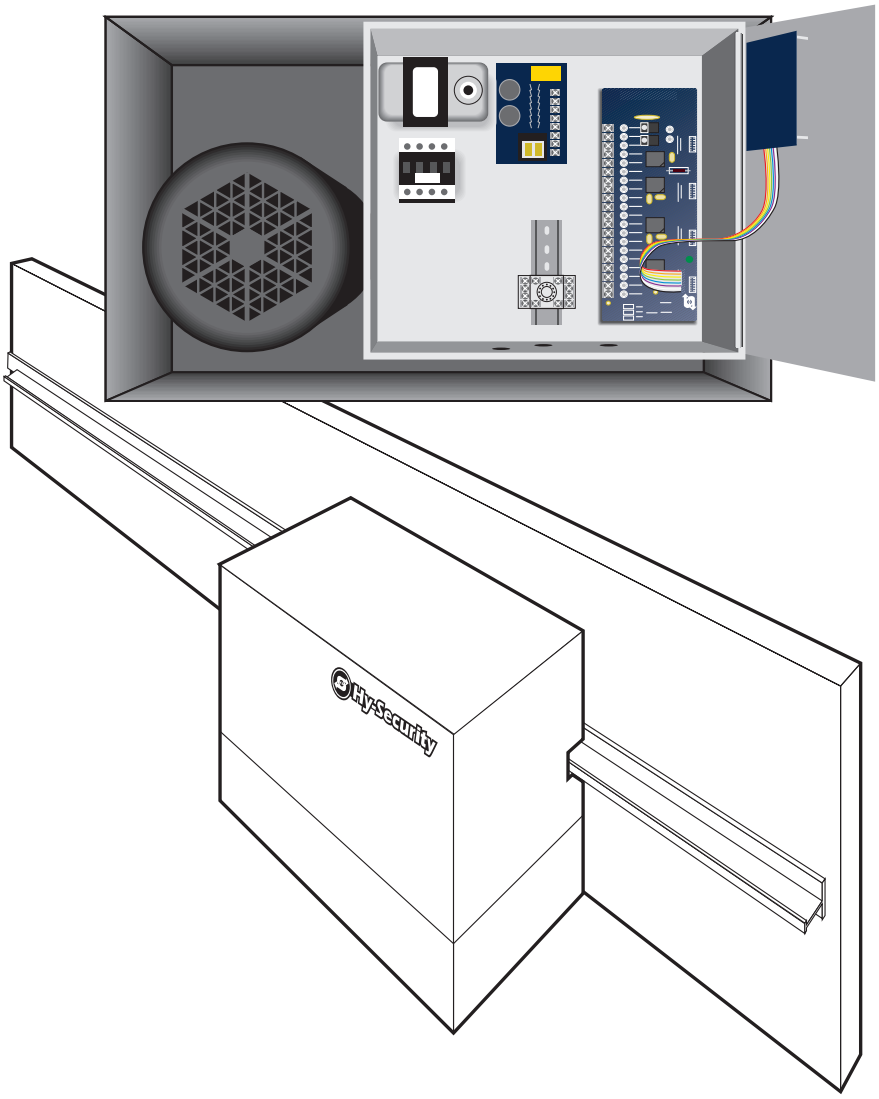
Revision: ___

**Hy-Security Gate Operators**
*Phone: 1-800-321-9947*
*FAX: (206) 286-0614*
*Internet: www.hy-security.com*
*Email: Info@hy-security.com*

INSTR# 103

Date 04/01/02

# Heavy Duty Industrial Slide Gate Operator



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# Introduction

Welcome – We would like to take this opportunity to thank you for this purchase. Hy-Security has manufactured the finest hydraulic gate operators available since the 1970s. Our commitment to quality and innovation will become evident as you become familiar with the features and performance of this expertly engineered machine. All Hy-Security operators are equipped with the Smart Touch Controller, a digital electronic brain that offers unparalleled features.

Please take a few minutes to study the contents of this instruction manual. The benefits of taking a little extra time to align the gate operator properly and to verify a fully functional installation will ensure customer satisfaction and a longer life with minimal maintenance costs.

**Installers and owners must be certain to thoroughly review and understand the Important Information regarding pedestrian entrapment protection contained within this manual. There are hazards associated with automatic gates that can be greatly reduced with proper design, installation use. When an automatic gate is first made functional, the installer must teach the owners and users how to operate this system correctly. When the installation is complete, leave this manual for the owner's use and reference.**

Please do not hesitate to give your Hy-Security distributor a call if you experience any difficulties during the installation. They are experienced and trained to assist in resolving any problems.

**For warranty registration, please fill in this information, fax or mail a copy to Hy-Security, then give this manual to the owner of the gate.**

Owner Name: _____
Telephone number: _____

Hy-Security Distributor: _____
Telephone number: _____

Installer name: _____
Telephone number: _____

Serial number of operator: _____
Date installed: _____

Model of Operator _____

**Warranty Registration**
Hy-Security Address:
1200 W Nickerson
Seattle, WA 98119

FAX: (206) 286-0614

Date: _____

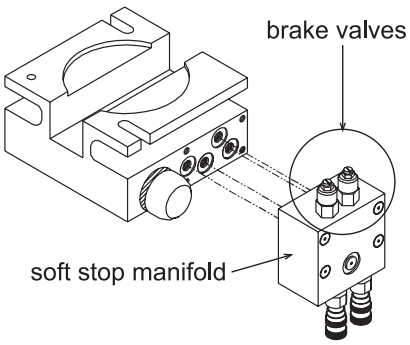
# Available Models and Features

Hy-Security manufacturers eighteen different models of hydraulic slide gate operators to suit the size, weight and desired speed of the gate panel. All of the operator models are derived from the standard 222 SS, upon which this manual is designed. Take a moment to identify the operator model you have and note there are some changes in the instructions, especially in regards to final adjustments. The following chart shows the differences at a glance:

| | | | | |
|---|---|---|---|---|
| **Std. Models** | **222 SS** | **222 E** | **222 EX*** | **444 XS** |
| **Modular Models** | **333 MS** | **333 E** | **333 EX*** | |
| **Prison Models** | **222 CF** | **222 CE** | **222 CX*** | |
| **24V UPS Models** | **222 DS** | **222 DE** | **222 DX*** | **444 DX** |
| | | | | |
| **Features:** | | | | |
| **Horsepower** | **1HP** | **1HP** | **2HP** | **5HP** |
| **Rate of Travel** | **1.0 ft/sec** | **1.0 ft/sec** | **2.0 ft/sec** | **1.0 ft/sec** |
| **UL Usage Class** | **1 - 4** | **1 - 4** | **3 - 4** | **3 - 4** |
| **Warranty** | **5 years** | **5 years** | **5 years** | **5 years** |
| **Soft Stop** | **yes** | **yes** | **yes** | **yes** |
| **Brake Valves** | **no** | **yes** | **yes** | **yes** |
| **Soft Start** | **no** | **no** | **yes** | **yes** |
| **Drawbar Pull** | **300 lbs** | **300 lbs** | **300 lbs** | **1200 lbs** |
| ***X1 Option (1'/sec)** | | **600 lbs** | | |
| | | | | |
| **Weight Capacity** | **1000 lbs** | **4000 lbs** | **4000 lbs** | **contact factory** |
| ***X1 Option** | **8000 lbs** | | | |
| | | | | |
| **Notes:** | **Std. unit 2 drive wheels** | **brake valve for heavy gates** | **heavier gates 2 foot/sec** | **4 drive wheels for very heavy gates** |

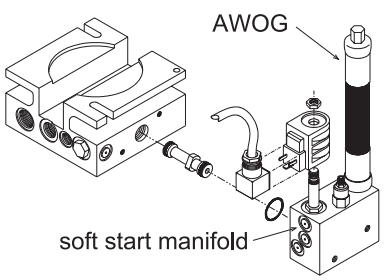
**Stopping the Gate**

All models employ a time delay Soft Stop system. Additionally, optional brake valves (shown at right) are used to control the stopping of heavy or fast moving gates. These valves are exclusive to Hy-Security operators. They are independently adjustable to allow the gate to stop predictably and without banging.




**Starting the Gate**

When starting very heavy gates to accelerate faster than one foot per second, it is necessary to Soft Start the load gently, in addition to stopping it smoothly. Hy-Security accomplishes Soft Start with another exclusive feature we call an AWOG, which diverts some of the start-up hydraulic flow and thereby allows the gate to accelerate over a period of about 2 seconds. This is much like letting your foot slowly off a car clutch - no lurching when the gate starts. The AWOG definitely improves the life and performance of a gate system and never needs adjustment.



# Available Models and Features

**Operators for Heavy Gates: E Models**
Models 222 E, 333 E, 222 CE and 222 DE differ from the base model only by the addition of a hydraulic manifold with two adjustable brake valves, shown on the previous page. The brake valves extend the maximum weight capacity from 1,000 pounds to up to a 4,000-pound gate. Brake valves are highly recommended for heavy-duty applications.

**High Speed Operators: EX Modes (UL class III and IV only)**
The AWOG soft starting system and the brake valves are keys to smoothly moving gates faster than one foot per second. These devices, together with our hydraulic drive, create smooth and predictable handling for both small lightweight or large heavy gates. The 222 EX, CX, and DX models also employ larger drive wheels and a higher flow rate pump to achieve a speed of 2.0 feet per second.

**DC 24-Volt UPS (Un-interruptible Power Supply) Operators**
These gate operators function from 24 Volts DC Batteries all of the time to achieve a true UPS system. Our Un-interruptible Power Supply is the most certain way to know that your gate will work when the local AC power fails. This system features fully sealed maintenance free batteries in a separate insulated and ventilated enclosure. A two-battery version provides at least 3,000 feet of backup gate travel. A four-battery version provides at least 8,000 feet of backup travel during local power loss.

**“CF” Correctional Facility Operators**
The CF models offer an extra heavy 10-gage cover with three different locking options. Type CF operators are shipped ready to interface to the many options and interlocks commonly used at correctional facilities, such as gate position outputs, interlock capability for sally ports and an interface relay to control an external solenoid lock.

**333 Modular Operators**
The family of 333 type operators is a two part modular version of the standard 222 operator. The motor, hydraulic pump and electric controls are located in a separate enclosure from the drive unit. This version allows for a more flexible placement of the operator, which may be required or desirable in some situations involving unique mounting, special security or those wanting a very quiet operator. (When the hydraulic controller is mounted at a distance)

**444 Super Powerful Operators**
The 444 type operators are for heavier gates, weighing up to 20,000 lbs. They employ a much larger chassis with four drive wheels and hydraulic motors, and a five horsepower electric motor to generate up to 1200 pounds of draw bar pull.

**The Smart Touch Controller**
This is the brain of Hy-Security’s automatic operators. Truly high technology, but also very rugged to reliably serve in the harshest environments. The Smart Touch Controller can quickly be configured by an installer or user to adapt to about any functional requirement for a specific site. All system settings are performed with the use of just four programming buttons and an LCD display. The Smart Touch Controller has no switches of any type to set. An RS232 port for external communication is standard. A real time clock and an EEPROM record system events. With optional software, a log of events can be downloaded from the RS232 port. Vehicle detector modules will set a new industry standard by communicating a host of valuable performance data to the main Smart Touch controller via a serial data stream, allowing user-friendly diagnostics.

# READ THIS FIRST!

## Important Information - Review Before Installation

Automatic gate operators provide convenience and security to users. However, because these machines can produce high levels of force it is important that all gate operator system designers, installers and end users be aware of the potential hazards associated with improperly designed, installed or maintained systems. Keep in mind that the gate operator is only one component of the total gate operating system. It is the joint responsibility of the specifier, designer, purchaser, installer and end user to verify that the total system is appropriately configured for its intended use. All parties should be informed that entrapment in a moving gate could cause serious injury or death.

**Common Industry Symbols**

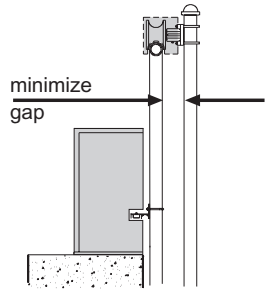
**Important Instructions for Gate System Designers & Installers:**

**WARNING: To reduce the risk of serious injury or death, read and follow all instructions in the gate operator handbook and on the warning labels.**


**Install an Automatic Gate Operator only When:**

- The entry is configured for vehicular use only. Pedestrians must be directed to a separate walk-through entrance. The Warning signs that have been supplied with this operator must be installed, in manner clearly visible, in the area of both sides of the gate.

- All openings of a horizontal slide gate are guarded or screened, from the bottom of the gate to a minimum of 4 feet (1.2 m) height above the ground, to prevent a sphere 2 1/4 inches (57 mm) in diameter from passing through an opening anywhere in the gate or the portion of the adjacent fence that is covered in the open position.

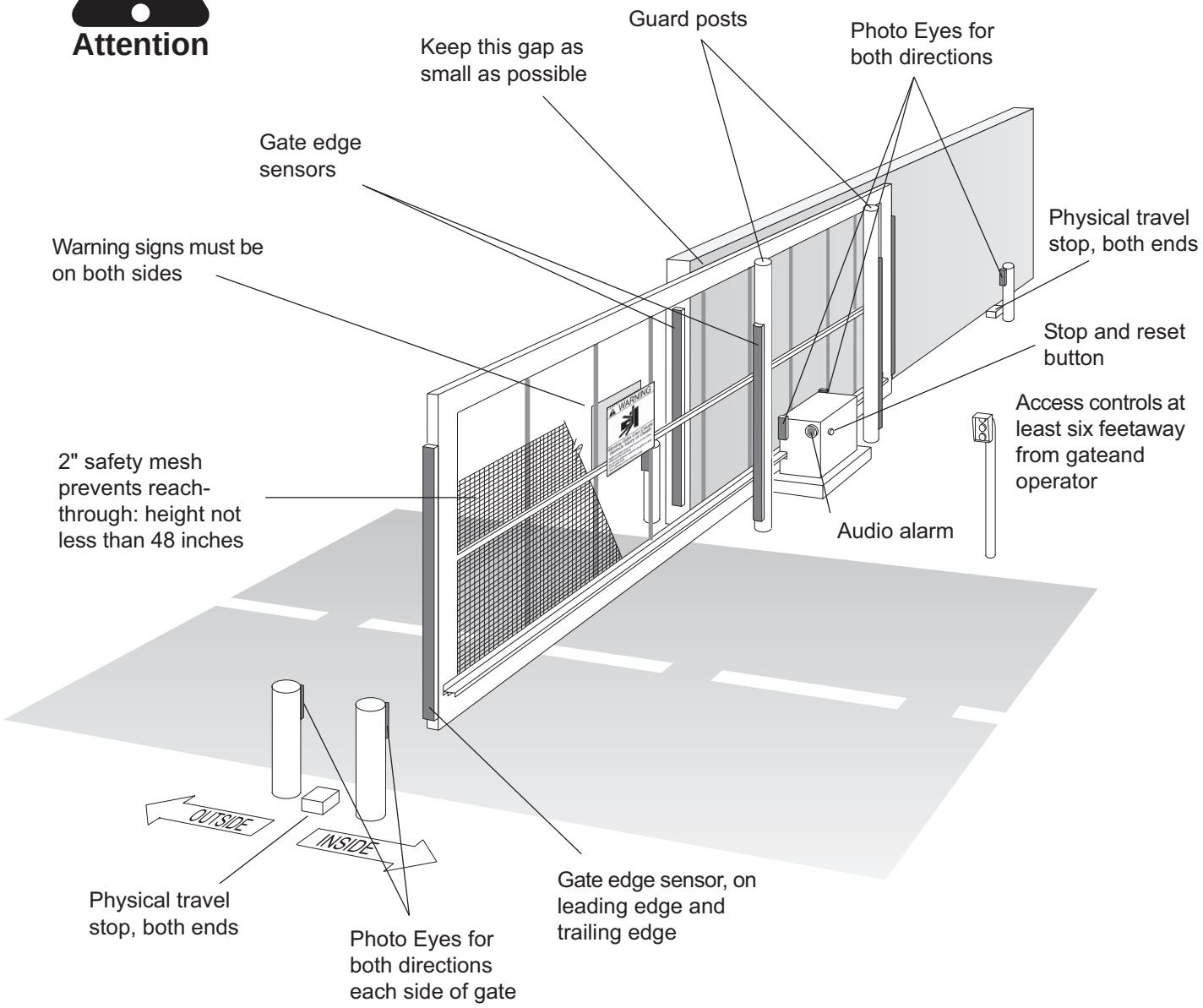



- All exposed pinch points, rollers and wheels are guarded. To reduce the risk of entrapment, the gate must also be installed so that enough clearance is provided between the gate and adjacent structures both when opening and closing. Minimize the parallel gap between the gate and the fence.

- The gate has been constructed with physical stops to prevent over-travel in both directions and has guard posts that prevent the gate from falling in the event of a roller failure.

# Entrapment Protection Device Schematic for Sliding Gates

**Attention**




**Note:** All wheels must be covered. (Wheels and covers not shown for clarity)

This schematic view is not meant to recommend the only way to set up your configuration, but to point out the various elements of a proper automatic vehicular gate installation. The gate operator itself is only one component in the total system. **Always install a separate pedestrian gate.**

## Install An Automatic Sliding Gate Operator Only When:

- The gate moves freely in both directions. Never over-tighten a clutch or pressure relief valve to compensate for a stiff gate.

- The operator will be installed on the secured (non-public) side of the gate.

- The operator will be properly electrically grounded and the intended supply voltage matches the voltage label on the operator.

- The controls that operate the gate have been mounted far enough away from the moving gate such that users cannot touch the gate while operating the controls. All easily accessible controls must have a security feature to prevent unauthorized use.

- The operator controls will be located in a clear line-of-sight to the gate. Radio controls and other remote access controls must be connected only to the Remote Open input.

- The required external entrapment sensors will be installed. Be certain to carefully review the instructions for placement, installation and adjustment of these external entrapment sensors. External entrapment sensors must function to reverse the movement of the gate in both the opening and closing directions. If edge (contact) sensors are used, they are to be mounted on the leading edge, trailing edge of the gate, as well as post mounted on the inside and outside of the gate (See figure on page 4). If photo eyes or other non-contact sensors are used, they are to be mounted in locations most likely to guard against entrapment. A combination of contact and non-contact sensors may be used, but all must be recognized components under the UL 325 standard. See pages 31 and 32 for details on the requirements.

- If the Entrapment protection is provided by a continuous pressure actuation control, a placard stating “WARNING” - “Moving Gate has the Potential of Inflicting Injury or Death - Do Not Start Gate Unless Path is Clear.” Additionally, no other activation device shall be connected and an automatic closing device of any kind shall not be used.

- The automatic operator is labeled as appropriate for both the type and UL usage class of the gate. Note: Sliding gate operators installed in Class I & II applications must not move the gate faster than one foot per second.
  Class I: Intended to serve single to four family residential uses
  Class II: Multi-family use, or any application intended to serve the general public
  Class III: Commercial applications not intended to serve the general public
  Class IV: Highest security. Security personnel prevent unauthorized access

- Sliding gate operators installed in Class III & IV applications do not have a speed restriction and the secondary entrapment sensor requirement is met if the system is configured as described for Class I & II use, or by the following alternate means: Employ the use of a 100dB buzzer, which sounds at least 3 seconds before the gate moves, and/or functions only by use of a constant hold type push button control

# Important Information For Gate System Owners & Users

**WARNING: To reduce the risk of serious injury or death, read and follow all instructions in the gate operator handbook and on the warning labels.**

**Save These Important Owner and User Instructions:**
(Installers - be certain to instruct the owners and users about the following items)

- Automatic gates are for vehicular use only! Provide walkways and signs to direct pedestrians to a separate walk-through entrance. Because an automatic gate can start at any time without warning, always keep people away from the area of the gate. The Warning signs that have been supplied with this operator must remain installed, in manner clearly visible, in the area of both sides of the gate.

- Never allow children to use or play with controls that operate the gate. Keep all remote controls, especially radio transmitters, away from children.

- Teach all users how to turn off the electric power and how to release and move the gate manually. Use the manual release only when the gate is not moving.

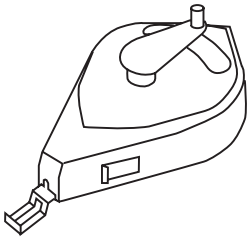
- Test the function of the gate operator monthly. The gate MUST reverse its direction of travel upon contact with a rigid object, and/or stop upon a sensing a 2nd sequential activation prior to reaching a full travel limit. Also test for the normal function of any non-contact sensors. If the gate system employs the use of a transmitting edge sensor, be especially certain to test and replace its battery on a routine basis.

- KEEP AUTOMATIC GATES PROPERLY MAINTAINED. Have a professional gate installer perform routine tests of the entrapment protection sensors, such as photo eyes and gate edges. Also, make all necessary repairs to the gate hardware to keep the gate running smoothly. Failure to adjust and test a gate operator properly can increase the risk of injury or death.

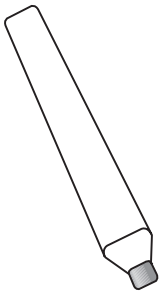
- In addition to appropriately placed external entrapment sensors, ask your installer to reduce the setting of the pressure relief valve to the lowest setting allowable that reliably operates the gate. This valve controls the force of the operator, and the sensitivity of the inherent reversing sensor.

- **Do not attempt disable or muffle the Warn Before Operate buzzer, except in class IV restricted access locations. This buzzer provides an alert that the gate is about to move.**

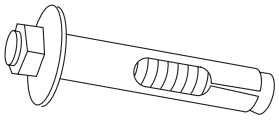
# Tools Required for an Efficient Installation



**1.** chalkline or other builder's string

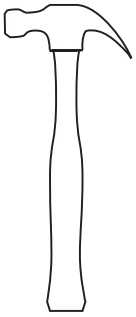


**2.** carpenter's pencil or crayon

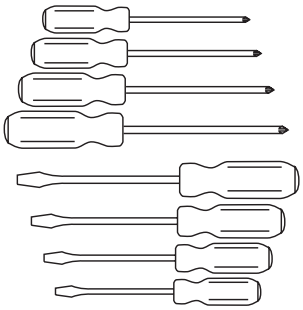


**3.** concrete anchor bolts - four 1/2" x 4

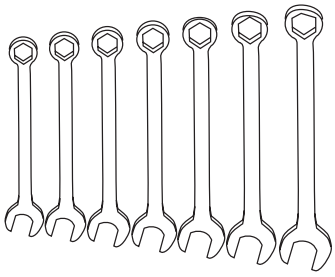
**4.** allen wrench set



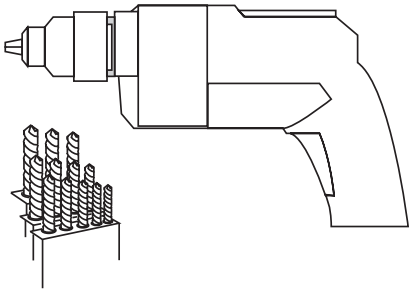
**5.** hammer



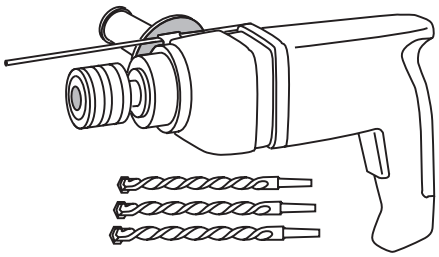
**6.** screwdriver sets, Straight and Phillips



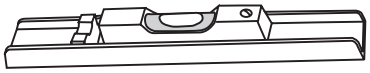
**7.** wrench set, open end, 1/4" through 1"



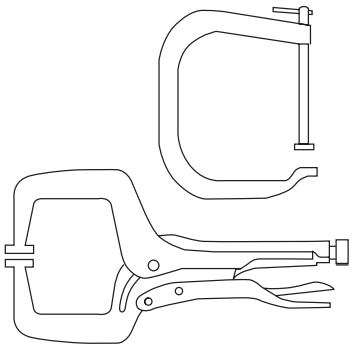
**8.** electric drill and bits 1/8" through 3/8"



**9.** roto-hammer and bits, 3/8" through 1/2"



**10.** level - it doesn't have to look like this one, but the installation needs to be level!

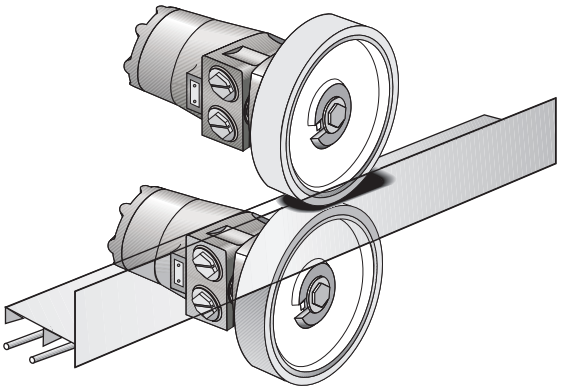


**11.** Two pair wide jaw vice grip pliers, or two C clamps, 4" capacity

# Getting Started with an Automated Gate System

## • How our hydraulic operator works

Hy-Security industrial slide gate operators rotate polyurethane treaded drive wheels which grip a rigid metal drive rail and feed it right or left during the gate travel. The drive wheels are clamped above and below the drive rail and are directly coupled to powerful hydraulic motors, which can easily move huge gates. This simple yet durable drive system is one of the unique features giving our hydraulic operators their reputation for reliability.



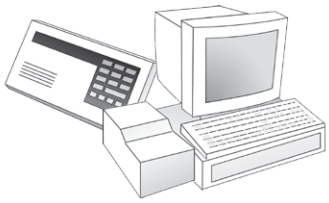
## • Accessory Compatibility

Hy-Security's Hydraulic Slide Operators are fully compatible with all standard access control devices and entrapment protection devices, some of which are listed below.

## • Pedestrian Entrapment Protection

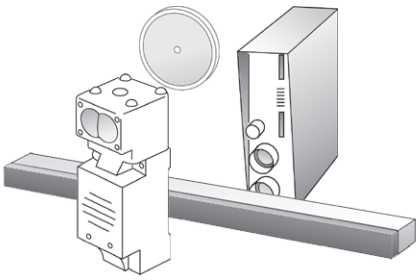
Read and understand all the Important Information in Section 1, the Entrapment Protection Schematic on page 4 and the UL requirements on page 31 before beginning the installation. Be absolutely certain that the required type and quantity of Entrapment Protection devices have been supplied and that you understand how to install them correctly. Contact your local distributor with questions about Entrapment Protection.

**Basic Access Control**
Radio Transmitter
Long Distance Control
Pushbutton Control Station
Programmable Time Clock
Card Reader

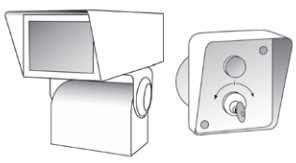


**Advanced Access Control**
Access Control Interface
Card Reader
Keypad
Telephone Entry
Input/Output
Computer Interface RS232/485


**Information**
Signs
Labels
Warnings



**Obstruction Sensing Devices**
Inherent Sensing Device
Gate Edges
Photo Eyes
Vehicle Detectors

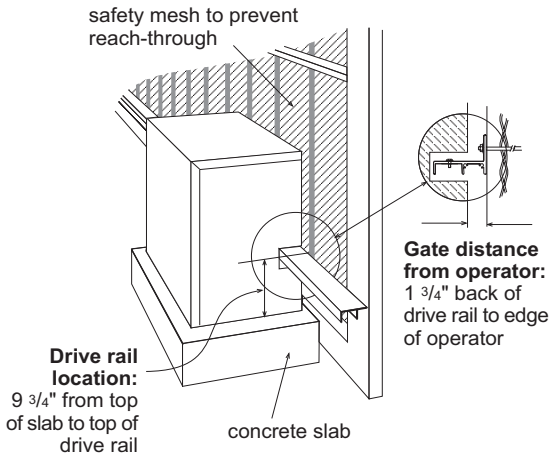


**Security**
Key Locks
Closed Circuit Television
Gate Position Indicator
Interlock/Sally Port
Gate Status Indicator

# Installation Preparation Checklist

1. Read all of the instructions, especially the Important Information in Section 1 at the beginning of this manual, before you attempt installation. This section is focused upon mechanical installation. For electrical setup, refer to Section 3, on system configuration and use of the Smart Touch Controller.

**Figure A**

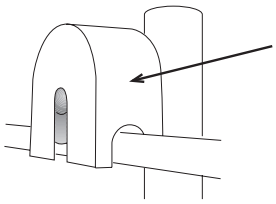



2. Check to see that the mounting slab is the recommended size and ready to have an operator attached. Also check that electrical conduits are correctly located to enter the chassis. Hy-Security recommends a slab reaches below the local frost line and extends somewhat above grade. See the footprint plan and elevation view on pages 14 & 15.

3. Make sure the gate rolls smoothly in both directions, without any binding of the gate hardware. If the gate is warped or hard to move, stop and fix the gate before attempting to automate.

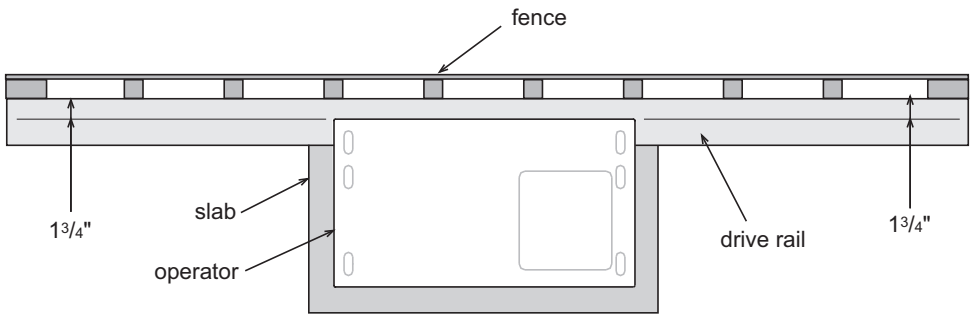
4. Verify that you have covers for all exposed gate support wheels. These must be installed. Also, look around to identify all of the potential pinch points and hazardous areas, and plan the best location for the entrapment protection devices and warning signs. Remember that you are required to advise the owner regarding the potential hazards of an automatic gate and about the function of the entrapment protection sensors that you have selected and installed.

**Figure B**




5. There are 3 steps to a perfect install: location, location, location. One of the most critical adjustments in installation will be to make sure the operator is located the proper distance from the gate, and that the gate and operator are as parallel as possible. See Figure C below. Prepare some shims for aligning the drive rail.

**Figure C**

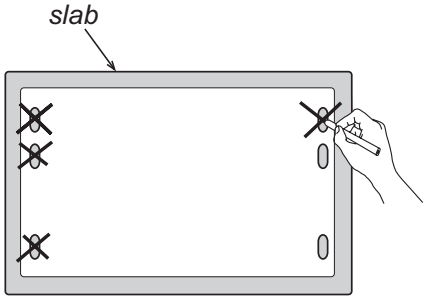



**Note:** If necessary, shim the drive rail so that it is straight 1/4" throughout the travel distance of the gate.

# Installation

**1. Drill four holes for concrete anchors**

Each operator comes with a paper template with the anchor slots. Place the template on the slab; making sure that it is parallel to and 1 3/4" from the gate. Trace the slots, remove the template, and then scribe the locations for your anchor bolts. Drill holes for the anchor bolts in the center of the slots you marked, so that you will have some room for adjustment. There are six mounting slots in the chassis, install at least four 1/2 " x 4" concrete anchor bolts, using two per side.

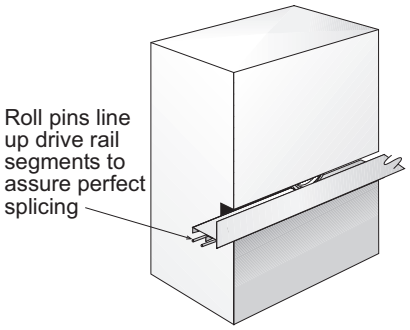



**2. Line up the operator**

Put the operator in position onto the anchor bolts. Verify that the operator is parallel and 1 3/4" away from the gate on both the left and right sides, and then tighten the anchors securely.

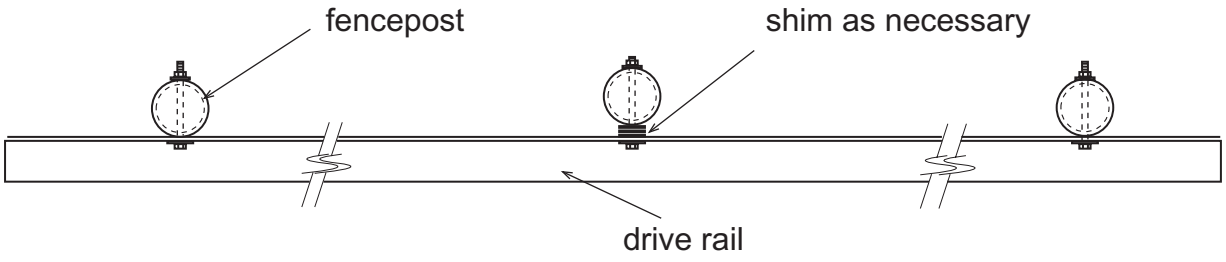
**3. Two part Operators (battery models and 333 modular models)**

These two part operators come with a separate enclosure, which should be mounted within 10 feet of the operator, but not more than 100 feet. We recommend wall mounting or using two 4" posts, with horizontal mounting strut to create a support for this enclosure.



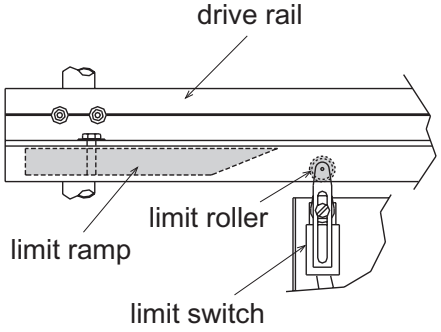

**4. Bolt the Drive Rail to the Gate Panel**

Connect multiple sections of drive rail together with 1/4" roll pins for a perfect splice. The drive rail must be bolted to each vertical member of the gate panel. This may be done with U-bolt clamps or through bolts, however U-bolt clamps allow for easy up down adjustment. If the gate is bent or warped, shim the drive rail so that it is straight ± 1/4" throughout the travel of the gate. When the drive rail has been installed at the correct height, the top surface is 9 3/4" above the operator base. A label on each side of the operator indicates the correct height.




**5. Install Limit Ramps on Underside of Drive Rail**

Push the gate to the fully closed position and drill a 3/8" hole in through the drive rail to mount a 12" plastic limit ramp under the drive rail, in the wheel channel, at a location that will trip the limit switch approx. 6" before the exact spot you want the gate to stop. Adjust the lever arms on the limit switch so that the roller clears the underside of the drive rail by at least 1/4 inch. Push the gate fully open and repeat this procedure with the other limit ramp. See the Drive Rail drawing S22 on page 16.



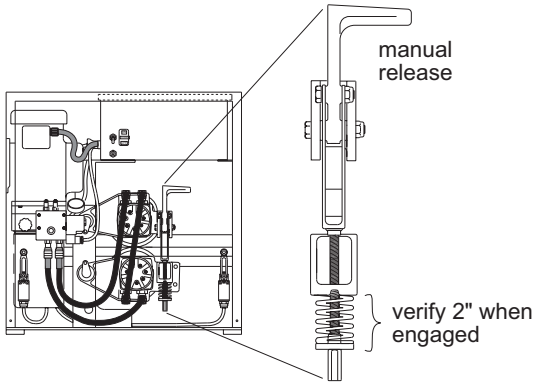
# Installation

**6. Install Grip Tape to Underside of Drive Rail**

Two pieces of grip tape have been provided that should be installed on the underside of the drive rail. Place the tape on the first and last 2 ft. of travel, just in front of each limit ramp. Be certain the drive rail is clean and dry, and then peel off just a bit of the backing to expose only about 2" of the adhesive. Attach the tape to the underside of the drive rail, within 1" of the front of the limit ramp. Now that the tape is lined up, peel the remainder of the backing away and attach the full length of the tape. Repeat this procedure for the other end of the drive rail.

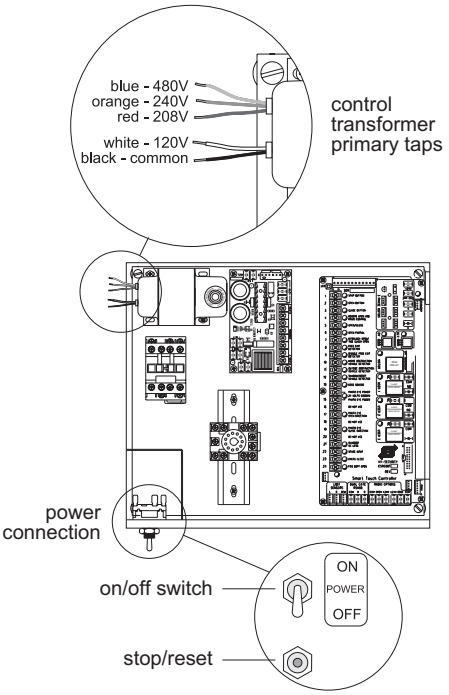
**7. Clamp the Drive Wheels to the Drive Rail**

When the wheels are fully clamped on the drive rail, the red spring should be compressed to 2" in height. If adjustment is necessary, turn the nut at the bottom of the threaded rod assembly. Slightly less compression is okay for lighter gates. See Use of Manual Release on page 54




**8. Electrical Power Connection**

This operator is intended for permanent installation, so all electrical conduits must be properly connected to the control box. The entry for the primary power is a 1/2 - 3/4" knockout on the left side of our control box next to the on-off switch. When this operator was manufactured, it was built to run on a specific voltage and phase for line power. Make sure you have compared the line voltage and phase available with the nameplate on this machine. They must match! Be certain that the wire size of the branch circuit that will supply the operator vs. the distance of the run from the main panel is large enough to avoid excess voltage drop. Also be sure the operator is electrically well grounded. See the Appendix, page 63 for correct wire sizes and detailed electrical wiring information.




**9. Primary Tap of Control Transformer**

(not on battery operators)

Check to make sure that the primary tap on the control transformer matches the line voltage you have connected to the operator. Measure the line voltage carefully to distinguish between 208V and 230V branch circuits. A label on top of the transformer identifies the various voltage taps.

**10. Electrical Power for Two Part 333 type operators**

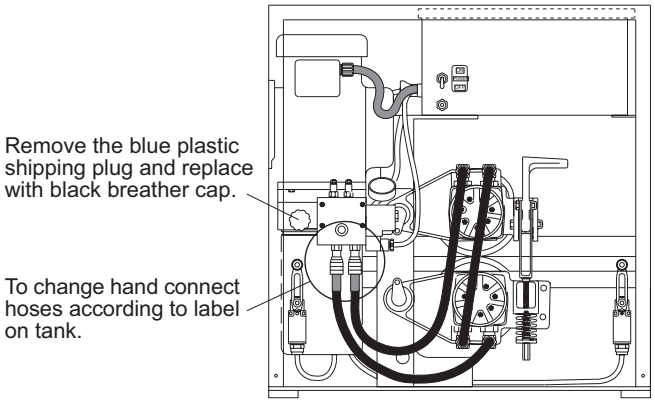
The primary AC power must be routed to the controller enclosure with the pump, but there must also be conduits between the gate operator and the controller enclosure.

Note: AC power is not needed in the gate operator, unless there is an optional heater. A minimum of two separate conduits must be provided, 2" for the hydraulic hoses and 3/4" for the electrical interconnections. Unless there are accessories in the gate operator, the only electrical interconnection between the two enclosures will be three wires between the two terminal strips for the limit switches. Join the hydraulic hoses by plugging the quick coupling together according to the hand of the gate. See the drawing in Section 8, page 60.

# Installation

**11. Connections for Two Part Battery Operators**

The primary AC power must be routed to the DC power supply enclosure, but there must also be at least a 1" conduit between the gate operator and the DC supply enclosure. Note: AC power is not needed in the gate operator enclosure, unless there is an optional heater. Three separate DC circuits are required between the battery supply and the gate operator. Heavy gage wires to supply the motor and two 14-gage circuits for the controls. The heavy gage wire must be at least 6-gage if the DC supply is within 20 feet of the operator, but must be increased to 2-gage if the DC supply is located farther from the operator, or the this is an EX - 2'/sec model. Also see page 56 titled “Wiring and Control Configuration for DC Operators” and Drawing E125 in Section 8, page 58.




**12. Check the “Hand” of the Operator**

All slide operators must have their “hand” set before they can function. The “handing” must be set both by the proper hydraulic hose connection and electrically. The hose connection for proper handing is described on a label near the hose connection point. Also, see the instructions to set handing on page 18 “Installation Configuration for Smart Touch Controller.” Handing is viewed by standing in the middle of the road on the inside looking out.

**13. Replace the Blue Plug!**

Replace the blue plastic shipping plug on the front side of the pump with the black breather cap.

**14. Setup Smart Touch Controller**

The operator controls will not allow the gate to function until the Smart Touch Controller has been configured. Wait to connect the external controls until you have reviewed the Smart Touch Controller instructions and tested the basic functions.

**Note:** Hy-Security has an installation CD available free of charge to installers. Call a Hy-Security distributor for a copy.

# Mechanical and Hydraulic Adjustments

**1. Drive Wheel Spring Tension**

When the drive wheels are fully clamped on the rail, the red spring should be compressed to 2" in height. If adjustment is necessary, turn the nut at the bottom of the threaded rod assembly. Slightly less compression is okay for lighter gates. (See Figure on page 11, and full details on page 54).

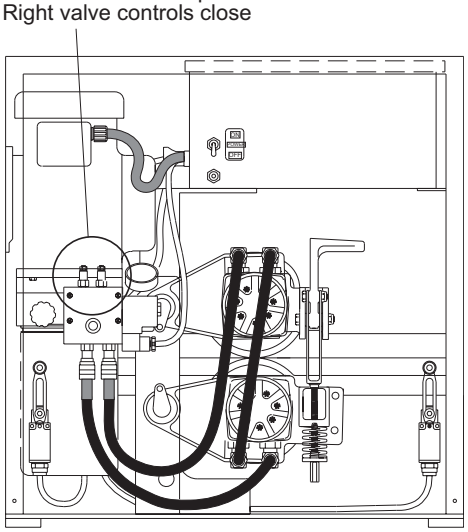
**2. Drive Rail**

Verify that the drive rail does not vary more than 1" up and down, or 1/4" in and out throughout the entire horizontal travel of the gate. Re-alignment is simple if the rail is mounted with U bolts. To adjust in and out, loosen the U bolts and add or remove shim stock. To adjust up or down, loosen the U bolts and simply tap the rail with a hammer until the correct height is reached. Adjusting the rail in or out requires inserting shims between the rail and the gate where necessary.

**3. Brake Valves (suffix E, EX models only)**

If your operator is equipped with brake valves, their proper adjustment is important for smooth operation of the gate. In order for the brake valves to have time to function, the limit ramp must trigger the limit switch at least six inches before the point at when you want the gate to stop. Adjustment of the brake valves, one for each direction of travel, will determine how quickly the gate actually stops. If adjustment is needed, loosen the 9/16" lock nut on the top of the brake valve and turn the adjustment stem, in about 1/4 turn increments, with an Allen wrench. The adjustment works opposite of typical, such that a counter-clockwise adjustment will stop the gate more rapidly. If the adjustment is set too loose, the limit ramps will bang into the drive wheels. If the adjustment is set too tight, the system pressure will increase, the gate speed may decrease and the gate will jerk to a stop. Set the brake valve to achieve a controlled smooth stop, and then retighten the locking nut to hold the setting.

Optional brake valves CCW = quicker stop.
Left valve controls open
Right valve controls close



**4. Pressure Relief Valve**

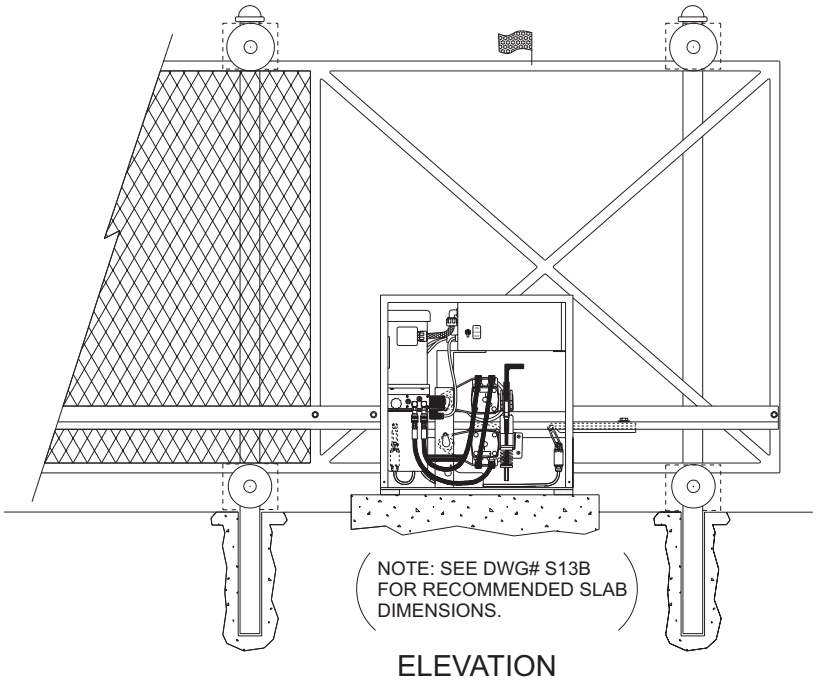
This valve, which governs the maximum system hydraulic pressure available, is located on the backside of the pump, just above the limit switch. Installers are encouraged to reduce the relief valve setting to the lowest pressure that will reliably operate the gate. A lower setting reduces the maximum force that the gate operator can exert. If adjustment is needed, loosen the 9/16" lock nut and turn the adjustment stem with a wrench. Lower pressure (force) is achieved by turning the adjuster stem counter-clockwise. The only way to display the actual relief valve setting is to unplug the hydraulic hoses from the quick disconnect fittings. Be certain to retighten the locking nut to hold the desired setting and reconnect the hoses correctly. Also see the drawing in Section 7, page 52 for the location and a schedule of factory pressure relief settings.

**5. Directional and Quick Stop Valves**

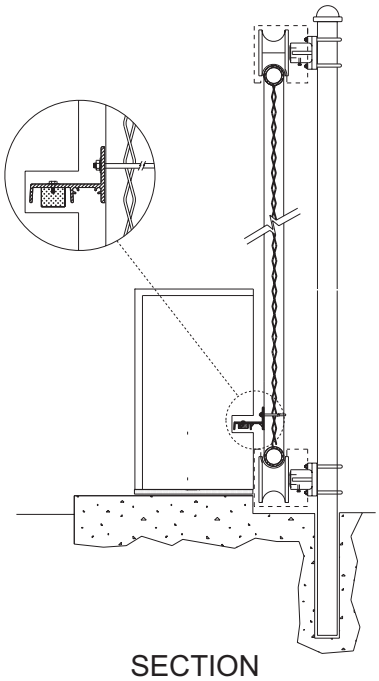
These two valves are solenoid operated. The directional valve is below the motor near the front of the pump and energizes in order to direct the hydraulic flow to open the gate. The quick stop valve, which is near the back of the pump energizes at the beginning of a cycle to allow no load motor starts and at the end of each cycle to aid in decelerating the gate. No adjustment of these valves is possible or ever needed.

NOTE: COVERS MUST BE USED FOR PROTECTION ON ALL EXPOSED WHEELS AND/OR HARDWARE. COVERS ARE SHOWN HERE AS DOTTED LINES.

NOTE: DRIVE RAIL HEIGHT IS MARKED ON THE SIDE OF EACH CHASSIS.




ELEVATION



SECTION

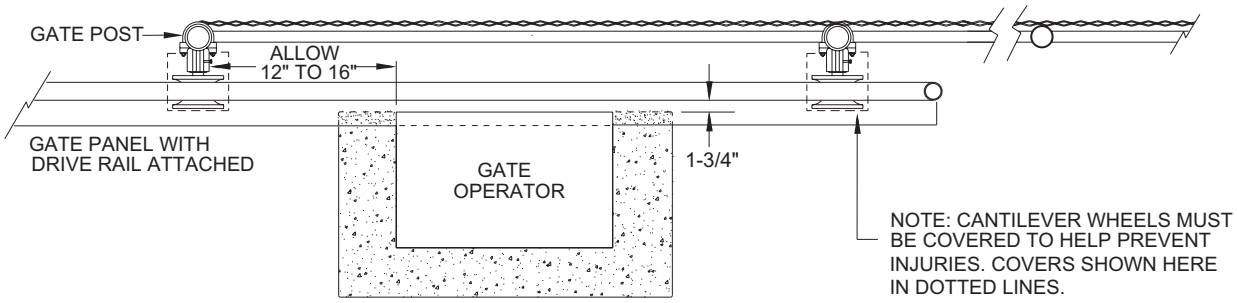
RIGHT HAND CANTILEVER GATE IS SHOWN IN THE FULLY CLOSED POSITION. OPERATOR COVER OMITTED FOR DETAIL. ( DO NOT SCALE )

NOTE: CONSULT FENCE CONTRACTOR FOR RECOMMENDED CANTILEVER POST SPACING. 50% OF GATE OPENING GENERALLY PROVIDES SMOOTH OPERATION.

NOTE: IT MAY BE NECESSARY TO SHIM DRIVE RAIL IF GATE PANEL IS "BOWED". RAIL MUST BE INSTALLED IN A STRAIGHT LINE.

| | | | | | |
|---|---|---|---|---|---|
| Hy-Security Gate Operators ™ seattle, washington | TITLE: Typical Slide Gate Operator with R.H. Cantilever Gate Panel | DRAWN: KERI | DATE: 4/20/00 | THIRD ANGLE PROJECTION | REV: -- |
| | | CHECKED: SHOP | DATE: MM/YY/DD | PART NUMBER: N/A | |
| | | APPROVED: ENGRNG | DATE: MM/YY/DD | DRAWING NUMBER: S13A | SHT 1 OF 1 |

FENCE LINE

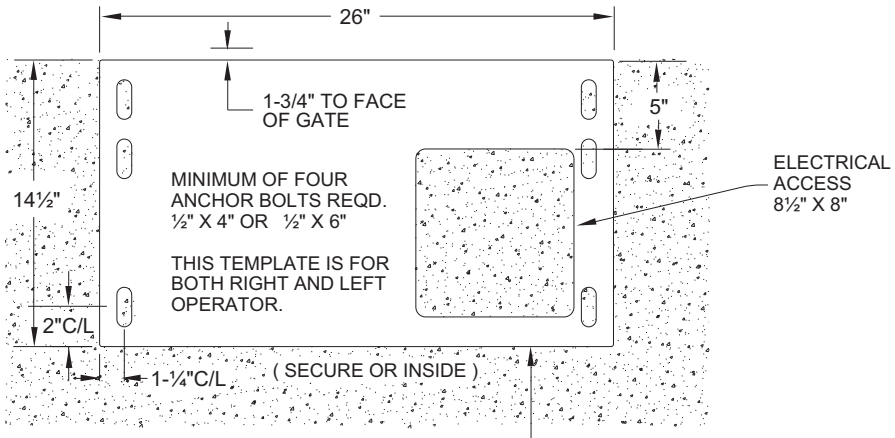



NOTE:

MINIMUM CONCRETE SLAB DIMENSIONS RECOMMENDED ARE:
30"WIDE, 20" FROM FRONT TO BACK AND 16" DEEP.
CHECK LOCAL FROST CONDITIONS AND SOIL CHARACTERISTICS
FOR EXACT REQUIREMENTS IN YOUR AREA.

OPERATOR IS INSTALLED ON A CONCRETE PAD AND CONNECTED
TO THE RIGHT HAND CANTILEVER GATE PANEL. 4" POSTS ARE
SHOWN FOR GATE SUPPORT AND FENCE TERMINATION.

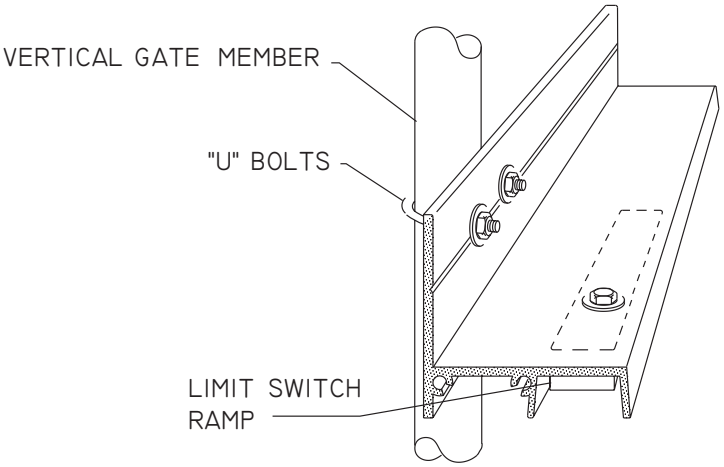

DIMENSIONS OF OPERATOR AND BASE
( FENCE/GATE SIDE)

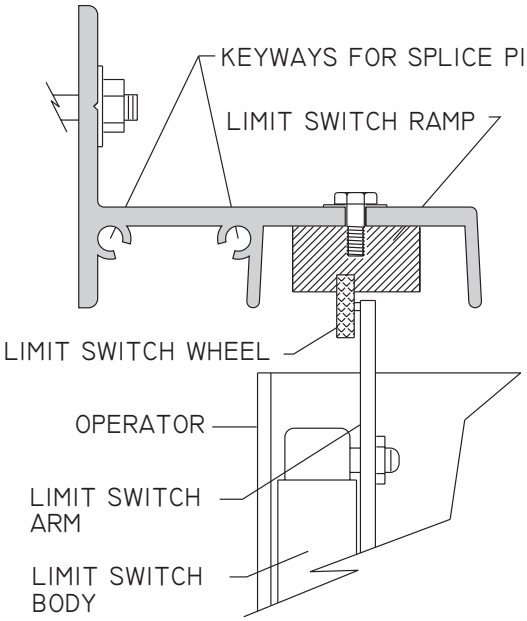



OPERATOR BASE ¼" PLATE, PLAN VIEW

NOTE:
CONTACT A FENCE CONTRACTOR FOR EXACT SPACING ON CANTILEVER POSTS.
50% OF OPENING WIDTH GENERALLY PROVIDES A SMOOTH OPERATION.

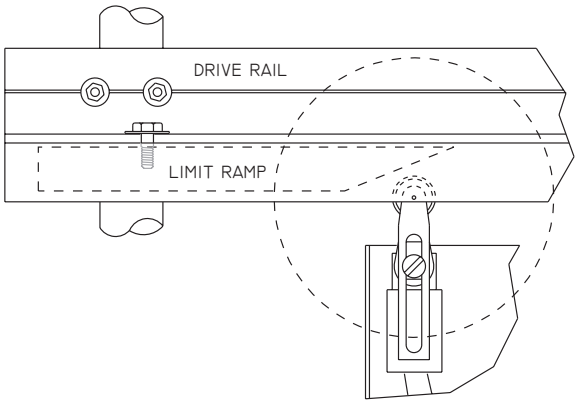
| | | | | | |
|---|---|---|---|---|---|
| Hy-Security Gate Operators, seattle, washington | TITLE: Slide Gate Operator (typ) R.H. Cantilever Gate Panel | DRAWN: KERI | DATE: 6/12/00 | THIRD ANGLE PROJECTION | REV: B |
| | | CHECKED: SHOP | DATE: MM/YY/DD | PART NUMBER: N/A | |
| | | APPROVED: ENGRNG | DATE: MM/YY/DD | DRAWING NUMBER: S13B | SHT 1 OF 1 |




SECTION THROUGH DRIVE RAIL AND LIMIT SWITCH SHOWING RELATIONSHIP OF SWITCH, LIMIT RAMP AND DRIVE RAIL.

SIDE VIEW OF LIMIT RAMP AND LIMIT SWITCH IN OPERATION. TAPERED ENDS, ALWAYS POINT TOWARD THE OPERATOR DRIVE WHEELS.




NOTE: ALUMINUM RAIL SHOWN, STEEL RAIL SIMILAR.

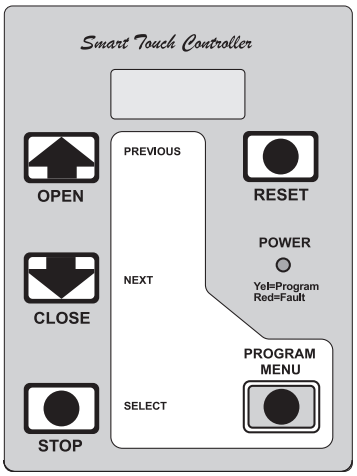
| | | | | | |
|---|---|---|---|---|---|
| HySecurity Gate Operators SEATTLE, WASHINGTON | TITLE: DRIVE RAIL SLIDE GATE OPERATION | DRAWN KERI | DATE 6/12/00 | THIRD ANGLE PROJECTION | REV |
| | | CHECKED SHOP | DATE MM/YY/DD | PART NUMBER N/A | |
| | | APPROVED ENGRNG | DATE MM/YY/DD | DRAWING NUMBER: S22 | SHT 1 OF 1 |

# Basics of Using the Smart Touch Controller System

**Read this page if you are unfamiliar with using the Smart Touch Controller.**

You must learn to navigate and change menu settings within the Smart Touch Controller before an installation can be completed or any control settings or function changes can be made.

**Until a new operator has been configured, the controls are not functional and the display is locked in the menu mode until the User Class 1-4, and Left or Right hand use have been selected. See the next page for instructions on how make these settings.**




1. There are five buttons on the membrane switch pad that provide control of everything. The Open, Close and Stop buttons serve as a three-button control station, but in the Menu Mode, they become Previous, Next and Select buttons. The Program Menu button is used to both enter and exit the Menu Mode. The Reset button clears all Errors and Faults that may occur and returns the control to its normal functioning state.

2. When in a Menu Mode, changes to be made to a Menu setting are accomplished by pressing the Previous, Next and Select buttons in the following sequence:

   a. Press the Next button to move forward through the list of menu items that are available, as shown on pages 22 and 23, or press the Previous button to move back to an item that you recently passed.

   b. Press the Select button if you wish to make a setting change to a menu item. The menu item will flash to indicate that its setting is ready to be changed.

   c. Press Next to move forward or Previous to go back to an earlier setting choice.

   d. When you have located the setting that you want to use, press the Select button and the program will accept the change and stop blinking.

   e. The Program Menu button does not allow an exit to Run Mode while a selection is still blinking. Press the Select button to stop the blinking, then you may exit to Run Mode.

   f. Pressing the Next or Previous buttons when the menu item is not blinking will move to the next or previous menu item.

   g. When done, press Program Menu to exit to the Run Mode.

3. Once configured, the operator will be in the Run Mode. From the Run Mode, to gain access the User Menu or the Installer Menu, follow these steps:

   a. Note that the Program Menu button will not function unless the gate is at rest and no open or close inputs are active. Verify system status by pressing the LED button to disclose any active inputs. There also must not be any Alerts, Faults or Errors. Press the Reset button to clear the system if necessary.

b. Press the Program Menu button and watch the LCD scroll the system data, or press the Program Menu key a 2nd time to skip the scroll. The scrolled data displays the information in the table on page 22.

c. The LCD display scroll will stop at the menu item for the automatic close timer setting [Ct __]. This is the first item in the User Menu.

d. To access the more detailed Installer Menu, the system must first be in the User Menu, and then simultaneously press the Reset button and the Open button. The LCD will change to display the UL usage class menu item [uC __] This is the first item in the Installer Menu.

4. Pressing the Program Menu button when the User or Installer Menu is not blinking will return the system to the Run Mode.

## Installation Configuration for Smart Touch Controller

### Setting Operator Handing and Usage Class

1. Connect the hydraulic hoses to the quick couplers on the pump in order to configure left or right hand opening function (as viewed from the secured side of the gate). There is a label near the connection point describing this procedure. Also see the illustration on page 12. If the hoses are connected incorrectly, the gate will run backwards (close when open button is activated) and this may trigger an error [Err 1] on the LCD display. (The Reset button must be pushed if this happens).

2. Turn on the power switch and observe that the LCD will first show the software version, and then stop at a steady display within two seconds. If the display reads [uC 0] go to step 3. If the operator has previously been configured, the Installer Menu must be accessed in order to reach the system configuration menu items: see step #3d at the top of this page.

3. When turning on the power for a new machine, the LCD display directly enters the Installer Menu at the [uC __] menu item, which is for selecting the user class as defined by UL. Select [uC 1] - [uC 2] - [uC 3] or [uC 4] depending upon the use application. See Section 4, page on page 31, for UL usage class definitions.

4. To set the operator handing, use the “Next” button and move one click down the menu to item [Sh __] Enter r for right hand or L for a gate that opens to the left. Never alter the limit switch mounting or change the order of their connection to the controller board. At this point you should exit the Installer Menu, by pressing the Program Menu button. The LCD display jumps to the close timer [Ct__] setting in the User menu, which may now be set. Either press the Program Menu button again to exit to normal run mode or set the close timer by the same programming sequence described at the previous page.

**5. Note that the Installer menu cannot be exited by any means until the selection for UL usage class [uC __] and the selection for gate handing [Sh __] have been entered.**

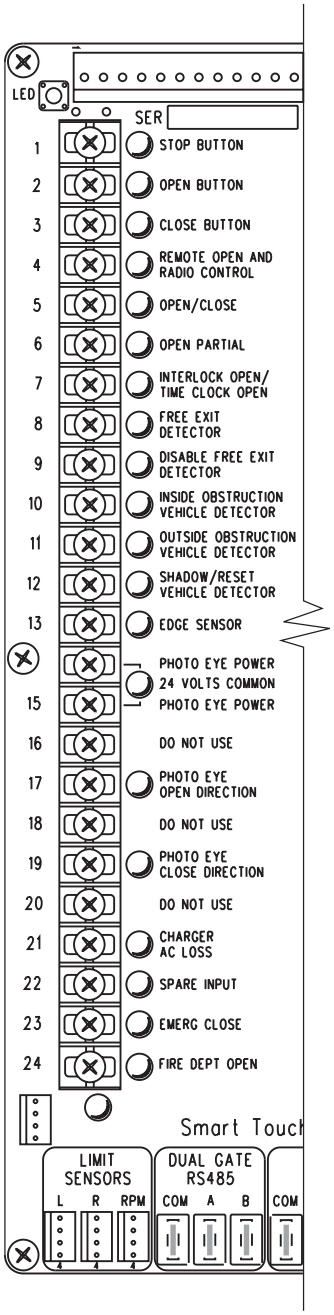
6. Test for normal function of the gate operator, with the wheels unclamped, by running it both open and closed from the pushbuttons on the membrane switch pad. Neither limit switch should be triggered at the start of this test or an alert [ALE6] may trigger because the control did not sense gate motion. If this occurs a new input will restart the motor.

# Wiring Control Inputs to the Smart Touch Controller

1. Test the basic open and close operator function before wiring the external control inputs. This makes it easier to troubleshoot if an unexpected function issue arises.

2. Each input has an LED to indicate when that input is active. To disclose the input status, the LED tact button must be pushed. This button is in corner near the Stop input.

3. All the control device inputs listed below are shown as a single input because the other wire is connected the Common Terminal Buss on the Power Supply board. The Emergency Close and Fire Dept. Open inputs are an exception and require a +24 Volt input in order to be activated. The +24 is available at the spade terminals next to the Common Buss.



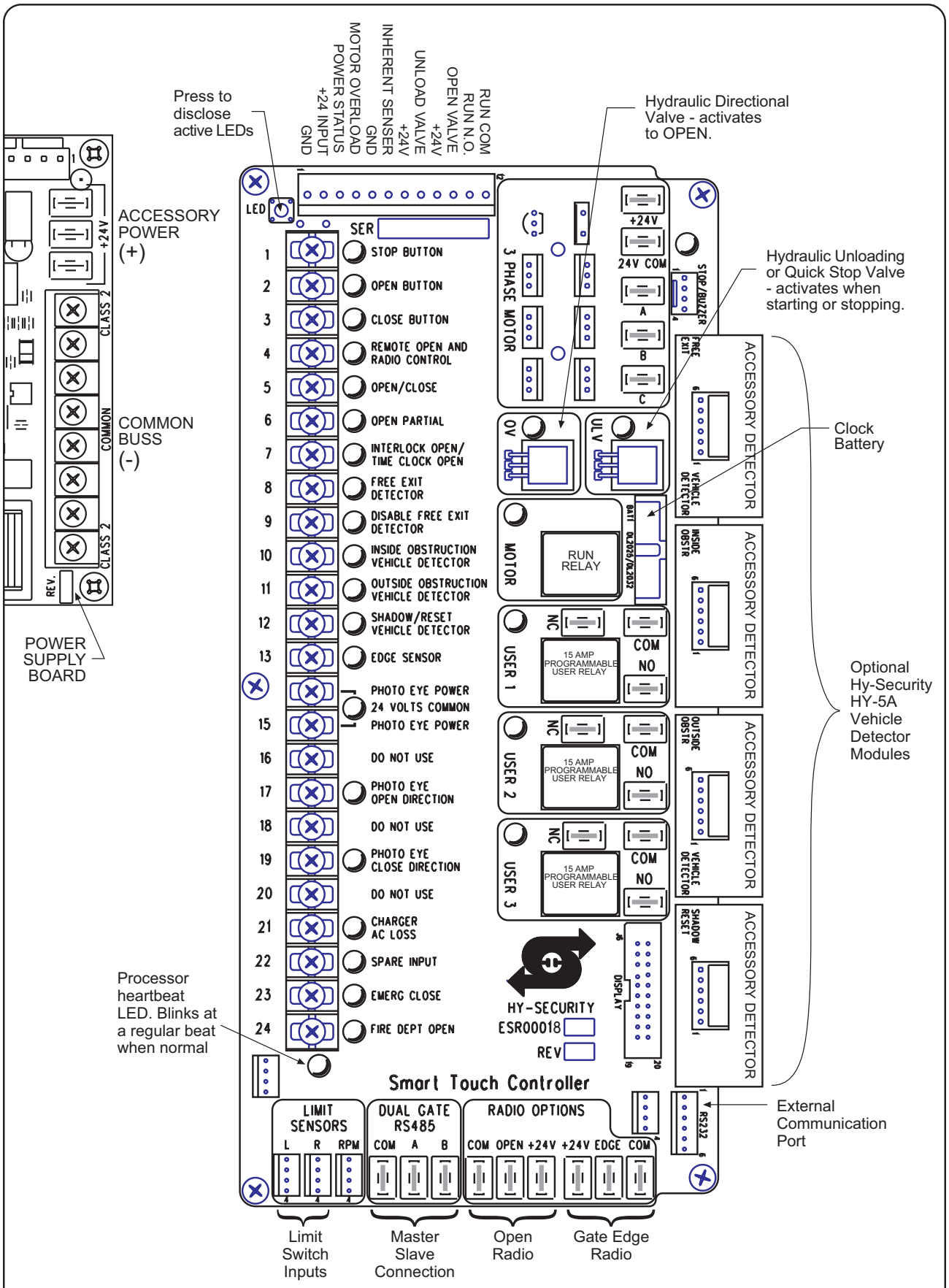

**Smart Touch Controller Inputs**

**1) *Stop Push button** (N.C. input, jumper to Common if unused)
**2) *Open Push Button** (not for radio or remote access controls)
**3) *Close Push button** (not for radio or remote access controls)
**4) Remote Open & Radio Control** (For radio / remote open device - menu opt. to also close)
**5) Open/Close button** (pushbutton or radio controls)
**6) Partial Open** (installer adjustable from 7- 99 seconds)
**7) Open interlock input or Time clock Open** (menu configurable)
**8) Free Exit vehicle detector**
**9) Disable Free Exit vehicle detector**
**10) Inside Obstruction vehicle detector** (Inside reversing loop)
**11) Outside Obstruction vehicle detector** (Outside reversing loop)
**12) Shadow/Reset vehicle detector** (Shadow is for Swing gates only) (Reset function is for Arm gates)
**13) Edge Sensor** (one input works for both directions of travel)
**(14-15) Photo eye Common Power** (supply for PE power & PE Com)
**(17) Photo eye Open direction** (spans the gate storage area)
**(19) Photo eye Close direction** (spans the roadway)
**(21) Charger AC power loss** (only used in battery type operators)
**(22) Spare Input** (unused - may have function in custom applications)
**(23) *Emergency Close** (must menu enable and input +24 Volts to trigger) Overrides photo eyes, gate edge & vehicle detectors.
**(24) *Fire Dept. Open** (must menu enable and input +24 Volts to trigger) Overrides photo eyes & gate edge.

**Attention**

* Do not connect an external control to terminals #1, 2 or 3, unless the controls are located such that there is a clear view of the entire gate area. For controls not within sight, use input terminals #4, 5, 6 or 7.

*The Emergency Close and Fire Dept. Open inputs are to be used only if access to these controls are guarded in sufficient manner such that there is always supervision when activated.




**Smart Touch Controller -** Integrated Circuit Board

**S ICB01**

# Connecting a Master / Slave Pair

Configuring two operators to be a Master & Slave pair is easy with the Smart Touch 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 Master & Slave operators.

1. An electrical conduit for the interconnecting wires must span between the two operators.

2. Complete the installation of both of the operators as separate machines and verify that their basic functions are correct as solo operators before interconnecting them.

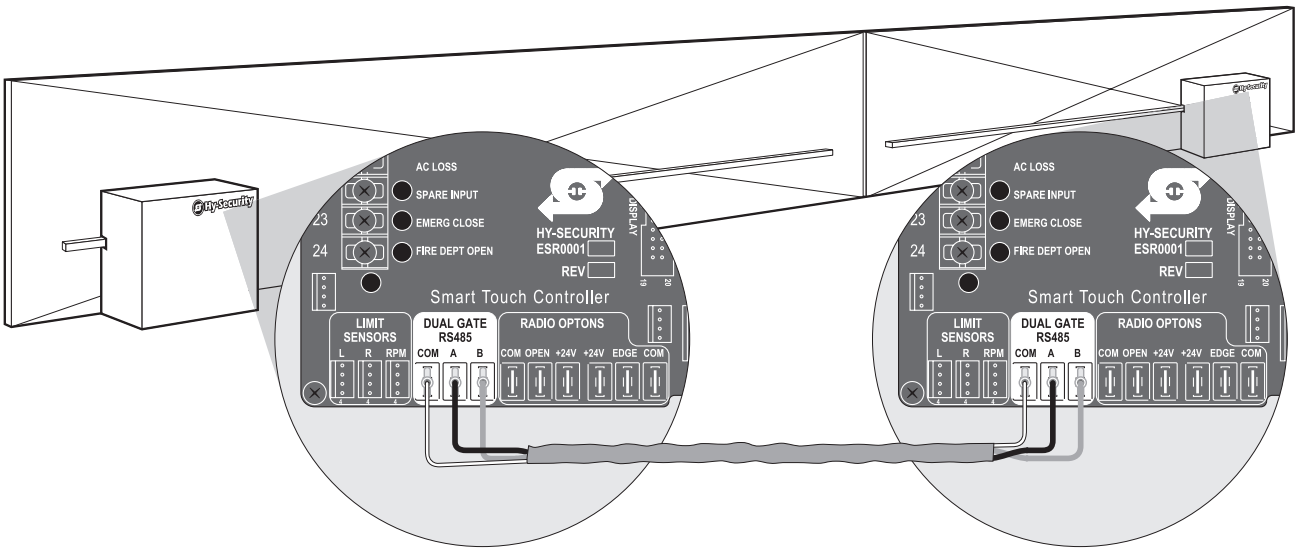
3. The two gate operators should be supplied by home runs from separate 20 Ampere circuit breakers in the main panel, but if there is only one circuit, be absolutely certain that the breaker and wire size is sufficient for the load of two motors. See the Appendix, page 63.

4. External control inputs, vehicle detectors and entrapment protection sensors may be connected to either gate operator without regard to preference.

5. To interconnect the two operators, route a shielded twisted pair with an internal ground wire between the electric control boxes and connect to the RS485 Dual Gate terminals, in matching order on both machines: In the RS485 shaded area connect the terminals for Master Com to Slave Com with the ground shield trace wire, and connect the Master A to Slave A and the Master B to Slave B using the insulated twisted pair of wires.

6. The Installer Menu in each machine must be set as a Master or a Slave under menu item [dg__]. Set one operator as a Slave [dg_1] and the other as a Master [dg_2]. If the function of any external input is to be different than the factory default, configure for the desired function on the operator where that input is connected. Internal functions, such as the close timer or reversal distance, are controlled by the Master operator regardless of the settings in the Slave.

7. Once set as a Master or a Slave the operators will be in constant communication with each other. If that communication stops because the wires become severed or one operator is turned off, both machines will cease functioning and the LCD will display Err4, which is a Master/Slave communication error. This error cannot be reset until both machines are functional and communicating properly again.



# Smart Touch Controller User Menu Functions

**Initial Power Up** - When power is turned on, the display will disclose the software revision:

| | | |
|---|---|---|
| Display Revision Number | 2s delay | Displays software version Number, ex. [h3.02] |

**System Data and accessing the User Menu Settings:**
If the gate is stopped in the Run Mode, pressing of the Menu button accesses the User Menu. After the menu button is pressed, the LCD will scroll the system data in the table below. The scrolling display stops at the close timer setting, which is the beginning of the User Menu. To exit the Menu Mode, the display must not be blinking, then simply pressing the Menu button will return the display to the Run Mode and re-enable the controls. The menu mode will also automatically return to the Run Mode if there is no activity for two minutes.

| | Data Displayed in Scroll | Time | Description |
|---|---|---|---|
| *S1* | *[SLAu] or [LEAd]* | *2s* | *SLAVE Operator or LEAd Operator (master)* |
| S2 | [ot 1] Gate type (1-5) | 2s | Operator type: 1 =HSG, 2 =HRG, 3 HVG, 4 =HTG |
| S3 | [_rh_] or [_Lh_] Hand setting | 2s | Displays hand configuration [_rh_] or [_Lh_] |
| S4 | [uC _] UL usage class (1-4) | 2s | Installer setting of usage class: type 1-4 |
| S5 | [d___] 24VDC Buss Voltage | 2s | Actual VDC buss voltage |
| S6 | [CC__] Life cycle counter | 2s | High digits of 6 digit life cycle counter |
| S7 | [____] Life cycle counter | 2s | Last 4 digits of 6 digit life cycle counter |

Read through the options available in the User Menu and the Installer Menu on the next page and you can see that the functions of this gate operator can be configured to suit most any specific need. Once you have learned to navigate the menus, as described in #2 on page 17, and how to change a setting, the full range of features and choices of the Smart Touch Controller are available to use. The User Menu contains the basic configuration items and the Installer Menu contains the more advanced menu items.

| | User Menu Options | Default | Description |
|---|---|---|---|
| *U1* | *[Ct 0] Close timer setting* | *0* | *0 = Close timer off or 1 - 99 seconds* |
| U2 | [hC 0] Momentary Close | 0 | 0 = momentary, 1 = Constant hold Close PB required |
| U3 | [ho 0] Momentary Open | 0 | 0 = momentary, 1= Constant hold Open PB required |
| *U4* | *[AP 0] Power loss function* | *0* | *0 - 3 (0=Type A, 1 = B, 2 = C, 3 = D) See page 56* |
| U5 | [ro 0] Radio control option | 0 | 0 = Open only, 1 = Adds close ability when full open |
| *U6* | *[bF 2] Warn before operate* | *2* | *0 =off, 1 = Buzzer alerts 3 seconds before + in motion, 2 =Buzzer alerts 3 secs before + 2 seconds in motion* |
| U7 | [FA 0] Forced open Alert and automatic gate reposition | 0 | 0 = OFF, 1 = sound buzzer (2 pulses/sec) if forced open for more than four seconds, time out in 30 Sec |
| U8 | [dA 0] Drift Closed Alert and automatic gate reposition | 0 | 0 = OFF, 1 = sound buzzer (2 pulses/sec) if drift closed and cannot reopen within four seconds. |
| U9 | [PE 0] Photo Eye Align Mode | 0 | 0= off, 1 = on (auto off when close limit triggered) |
| U10 | [CL 0] Clock set (24 hour type) | 0 | 0= display, 1= set mins, 2= set hours, 3= day, 4= month |
| U11 | [Ld 5] LCD Contrast set | 5 | 1 - 9 = Adjusts contrast of the display |

***These Notes Refer to the Menu Above:***

*S1 Appears only if the operator is configured as a master or a slave unit*
*U1 Close timer setting does not appear when set for constant contact close function*
*U4 Power loss function only appears if factory has provided DC battery type operator*
*U6 We strongly advise never disabling the Warn Before Operate buzzer.*

# Smart Touch Controller Installer Menu Functions

The Installer Menu can be accessed only by entering the User Menu first, and then by pressing the **Reset button and the Open button** simultaneously.

**To restore the factory default settings, go to menu item [Fd_0] and change the setting to 1, then press the Program Menu button. The entire menu will reset to the factory defaults.**

| | Installer Menu Options | Default | Description |
|---|---|---|---|
| *I1* | *[uC 0] Set UL Usage Class* | *0* | *0 = gate disabled, Set Class 1 through 4 use* |
| *I2* | *[Sh 0] Set Handing of gate* | *0* | *0 = gate disabled, r = Right Hand, L = Left Hand* |
| I3 | [Fd 0] Load Factory Defaults | 0 | 0 = User settings, 1 = Load defaults (resets full menu) |
| I4 | [dg 0] Set Master/Slave type | 0 | 0 = solo operator, 1 = Slave unit, 2 = Master unit |
| *I5* | *[Ch 0] Set AC Charger or Solar* | *0* | *0 = DC + AC charger 1 = DC + Solar charger* |
| I6 | [Fo 0] Enable Fire Dept. Open | 0 | 0 = disabled, 1 = enabled |
| I7 | [oC 0] Enable Emergency close | 0 | 0 = disabled, 1 = enabled |
| I8 | [SE 3] Inherent Sensor sens. | 3 | 1 = maximum sensitivity, 9 = Lowest sensitivity |
| *I9* | *[SS 0] Inherent Sensor function* | *0* | *1 = stop only (note, functions in usage class 4 only)* |
| *I10* | *[LC 0] Leaf delay Close* | *0* | *0 = none (1-7) 1/2 second steps (Master/Slave only)* |
| *I11* | *[Lo 0] Leaf delay Open* | *0* | *0 = none (1-7) 1/2 second steps (Master/Slave only)* |
| I12 | [rt 0] Maximum run timer | 0 | 0 = 60 Seconds max run, 1 = 300 Seconds max run |
| I13 | [Po 0] Partial Open distance | 0 | 0 = none, or 7 - 99 seconds |
| I14 | [EC 0] PEC reverse to open | 0 | 0 = Close eye stops only, 1 = 2 sec reverse to open |
| I15 | [EO 0] PEO reverse to close | 0 | 0 = Open eye stops only, 1 = 2 sec reverse to close |
| I16 | [gr 0] Edge reverse to open | 0 | 0 = Edge reverses fully open, 1 = 2 sec reversal only |
| I17 | [Sr 1] IES reverse to open | 1 | 0 = IES reverses fully open, 1 = 2 sec reversal only |
| I18 | [PC 0] Set PEO/ PEC - NO/NC | 0 | 0 = Normally Open PE output, 1 = N.C. (supervised) |
| I19 | [gC 0] Set Edge input - NO/NC | 0 | 0 = Normally Open Edge output, 1 = Normally Closed |
| I20 | [tC 1] Time clock/ Interlock input | 1 | 0 = select Time Clock, 1 = select Open Interlock |
| I21 | [or 1] OOLD detector function | 1 | 0 = pause closing only, 1 = enable reversing to open |
| I22 | [ir 1] IOLD detector function | 1 | 0 = pause closing only, 1 = enable reversing to open |
| I23 | [dL 1] Vehicle detector logic | 1 | 1 = std, 2 & 3 = quick close, 4 = full anti-tailgate* |
| I24 | [r1 0] User relay 1 option | 1 | 0 = disabled, 1 - 19 = see output options page 28 |
| I25 | [r2 0] User relay 2 option | 6 | 0 = disabled, 1 - 19 = see output options page 28 |
| I26 | [r3 0] User relay 3 option | 1 | 0 = disabled, 1 - 19 = see output options page 28 |
| *I27* | *[t L 0] Gate Open alert* | *2* | *0 = 0 sec, 1=15s, 2=45s, 3=75s, 4=105s, 5=135s* |
| *I28* | *[Lt 0] Loitering alert* | *3* | *0 = 0 sec, 1=15s, 2=45s, 3=75s, 4=105s, 5=135s* |
| I29 | [ELd0] Test factory ELD* | 0 | 0=Run, 1=show freq, 2=show call level 0-7, 3= set Freq 1-4 |
| I30 | [iLd0] Test factory IOLD* | 0 | 0=Run, 1=show freq, 2=show call level 0-7, 3= set Freq 1-4 |
| I31 | [oLd0] Test factory OOLD* | 0 | 0=Run, 1=show freq, 2=show call level 0-7, 3= set Freq 1-4 |
| I32 | [SLd0] Test factory SLD* | 0 | 0=Run, 1=show freq, 2=show call level 0-7, 3= set Freq 1-4 |

*See page 43 for description of vehicle detector & Loop Fault diagnostics

**These Notes Refer to the Menu Above:**

*I1, I2 These settings must be configured or the gate cannot function and menu will not exit.*

*I5 These settings appear only if the factory has provided a DC powered gate operator*

*I9 IES stop only setting [SS __] does not appear unless set as a class 4 operator*

*I10, I11 These settings appear only if the Installer Menu is set for Master / Slave function*

*I27, I28 These settings appear only if the Installer Menu has set relays r1-r3 for these alerts*

## Description of Functions Available in the User Menu

**User 1** [Ct _] **Close timer setting:** This menu item is the automatic close timer for the gate. The factory setting is zero, which is off. It may be configured up to 99 seconds.

**User 2** [hC 0] **Momentary Close:** This menu item is to configure for the system for constant hold push button Close function. The factory setting is zero, which is momentary contact input.

**User 3** [ho 0] **Momentary Open:** This menu item is to configure for the system for constant hold push button Open function. The factory setting is zero, which is momentary contact input.

**User 4** [AP 0] **Power loss function:** This menu item only appears if the operator is a DC battery powered version. This item is to configure what gate function will occur when the AC power fails. See page 56 for more detailed information on DC operators.

**User 5** [ro 0] **Radio control option:** This menu item is to configure whether a radio input can open only (default) or if set to 1, also has the ability to close the gate when it is fully open.

**User 6** [bF 2] **Warn before operate:** This menu item controls the warn before operate buzzer and can be configured three ways. Setting the menu item to zero turns the buzzer off, but we strongly advise leaving this valuable warning feature active to alert prior to gate motion. **Never cut the wires to the buzzer or unplug it.** Set to 1 and the buzzer will sound three seconds before motion and the entire time during gate motion. Set to 2 (default) and the buzzer will sound three seconds before motion and for the first two seconds of motion.

**User 7** [FA 0] **Forced open Alert and automatic gate reposition:** This function is intended for highly secure facilities. If it is enabled, by setting the selection to 1, it will reinitiate a closure if a gate is somehow forced to open far enough that the close limit switch releases. The Alert buzzer will sound immediately, even if it had been turned off, and the motor will restart to secure the gate fully closed. If the gate is not fully closed within four seconds the motor turns off and the alert buzzer sounds an intruder alert for thirty seconds. The LCD display reads ALE1.

**User 8** [dA 0] **Drift Closed Alert and automatic gate reposition:** If it is enabled, by setting the selection to 1, it will restore a gate to back its fully open position if it drifts closed for any reason. The buzzer will sound a warn before operate alert, even if it had been turned off, and the motor will restart to reopen the gate. The motor will run for a maximum of four seconds and if the gate is not fully open in this period, the buzzer sounds for ten seconds and the LCD display reads ALE2.

**User 9** [PE 0] **PE Alignment Mode:** This feature may be activated as an aide to photo-eye emitter / receiver alignment. The buzzer chirps once as the photo eye is triggered or twice when the photo eye is released. The Alignment Mode is cancelled with any close limit input or reset input.

**User 10** [CL 0] **Clock and date set:** The Smart Touch Controller is equipped with a 24 hour 365 day clock, so that events of significance can be logged and stamped with the time and date. This feature is useful to record historical operation data, which can be accessed via the RS232 port. To set or adjust the hour, minute, day or month, see page 29.

**User 11** [Ld 5] **LCD Contrast set:** 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.

# Description of Functions Available in the Installer Menu

**Installer 1** [uC 0] **Set UL Usage Class:** This menu item is used to set the UL usage class, which must be set by the installer before the operator will function. See page 18, step 3.

**Installer 2** [Sh 0] **Set Handing of gate:** This menu item is used to set the gate handing, which must be set by the installer before the operator will function. See page 18, step 4.

**Installer 3** [Fd 0] **Load Factory Defaults:** This menu item is used to globally restore all menu settings back to new machine status. To activate, change the setting from 0 to 1 and push the Menu button. The UL usage class and the hand configuration will need to be set again.

**Installer 4** [dg 0] **Set Solo, Master or Slave type:** This menu item is used to configure an operator as a Master or a Slave operator in Master/Slave paired gate installations.

**Installer 5** [Ch 0] **Set AC Charger or Solar:** This menu item appears on 24 VDC battery machines only and is set to solar only when there is no AC battery charger.

**Installer 6** [Fo 0] **Enable Fire Dept. Open:** This menu item is used to enable the Fire Dept. Open input. When set to [Fo_1] this input will override vehicle detectors, photo eyes and gate edges to open a gate. A reset is required before the gate can be closed. The LCD display reads ENTR.

**Installer 7** [oC 0] **Enable Emergency Close:** This menu item is used to enable the Emergency Close input. When set to [oC_1] this input will override vehicle detectors, photo eyes and gate edges to close a gate. A reset is required before the gate can be opened.

**Installer 8** [SE 6] **Inherent Sensor sensitivity:.** This menu item is to adjust the sensitivity of the internal inherent sensor. Available settings are 1-9, with 9 being the least sensitive.

**Installer 9** [SS 0] **Inherent Sensor function:** This menu item is only available in UL class 4 operators and allows an option whereby the inherent sensor will only stop the gate.

**Installer 10** [LC 0] **Leaf delay Close:** This menu item only appears if the operator is set up as a Master or a Slave. Available settings are 1-7. Each increment adds 1/2 second, to a maximum of 3 1/2 seconds time delay, before the operator activates when commanded to close.

**Installer 11** [Lo 0] **Leaf delay Open:** This menu item only appears if the operator is set up as a Master or a Slave. Available settings are 1-7. Each increment adds 1/2 second, to a maximum of 3 1/2 seconds time delay, before the operator activates when commanded to open.

**Installer 12** [rt 0] **Maximum run timer:** The maximum run timer has a default setting of 60 seconds. This menu item allows an optional setting of 300 seconds, if changed to [rt_1].

**Installer 13** [Po 0] **Partial Open distance:** This menu item both activates the partial open input and allows an adjustable distance by setting the open duration. The available time settings are 7-99 seconds. The default setting of [Po_0] leaves this input inactive.

**Installer 14** [EC 0] **PEC (photo eye close) reverse to open:** The default for this menu item is for non-reversal if the close photo eye is triggered. The optional setting of [EC_1] will cause the gate to reverse to open for two seconds if triggered while closing.

**Installer 15** [EO 0] **PEO (photo eye open) reverse to close:** The default for this menu item is for non-reversal if the open photo eye is triggered. The optional setting of [EO_1] will cause the gate to reverse to close for two seconds if triggered while opening.

## Description of Functions Available in the Installer Menu

**Installer 16** [gr 0] **Edge reverse to open:** The default for this menu item is for a 2 second reversal if the gate edge is triggered. The optional setting of [gr_1] will cause the gate to reopen fully if triggered while closing.

**Installer 17** [Sr 1] **IES (inherent sensor) reverse to open:** The default for this menu item is for a 2 second reversal if the inherent sensor is triggered. The optional setting of [Sr_1] will cause the gate to reopen fully if triggered while closing.

**Installer 18** [PC 0] **Set PEO/ PEC - NO/NC:** The default for this menu item is for photo eyes with Normally Open outputs. The optional setting of [PC_1] will require a Normally Closed output. If set for N.C. the connection is also supervised and any open or short circuit fault will generate a FAL2 alert, which requires a Stop button reset to re-enable any function if triggered.

**Installer 19** [gC 0] **Set Edge input - NO/NC:** The default for this menu item is for edge sensor with Normally Open outputs. The optional setting of [gC_1] will require a N.C. output.

**Installer 20** [tC 1] **Time clock / Interlock input:** This menu item configures the input at terminal #7 to be either for the gate interlock function, as described on page 27, or for an external time clock to open input, as described on page 44. The default setting is [tC_1] for the interlock function.

**Installer 21** [or 1] **OOLD (Outside Obstruction loop detector) function:** The default for this menu item is for full reversal when the OOLD is triggered. The optional setting [or_0] causes the gate to only pause when triggered. Closure begins as soon as the loop is clear again.

**Installer 22** [ir 1] **IOLD (Inside Obstruction loop detector) function:** The default for this menu item is for full reversal when the IOLD is triggered. The optional setting [ir_0] causes the gate to only pause when triggered. Closure begins as soon as the loop is clear again.

**Installer 23** [dL 1] **Vehicle detector logic:** This menu item is used to configure quick close and anti-tailgate logic. There are four modes. See the full description on page 43.

**Installer 24, 25, 26** [r1 0], [r2 0], [r3 0] **User output relay 1 - 3 programming options:** These three menu items are used to configure the function of the three user output relays. There are 19 optional choices, which are described in detail on page 28.

**Installer 27** [t L 0] **Gate Open alert:** This menu item is to adjust the time delay before activating the user relay function #8, described on page 28. Time settings up to 135 seconds.

**Installer 28** [Lt 0] **Loitering alert:** This menu item is to adjust the time delay before activating the user relay function #13, described on page 28. Time settings up to 135 seconds.

**Installer 29** [ELd0] **Factory ELD:** Controls the HY-5A Free Exit detector, see page 42.

**Installer 30** [iLd0] **Factory IOLD:** Controls the HY-5A IOLD detector, see page 42.

**Installer 31** [oLd0] **Factory OOLD:** Controls the HY-5A OOLD detector, see page 42.

**Installer 32** [SLd]. **Factory SLD:** Controls the HY-5A Shadow detector, see page 42.

# Correctional Facility - User Optional Wiring

A special terminal strip has been pre-wired in Correctional facilities models to the three user relay outputs for easy field wiring of the common interconnect options. If alternate output functions are required, see page 28 titled Options for User Programmable Output Relays 1-3.

**Connecting an Interlocked Pair:**
An interlocked pair of operators is not a Master/Slave system, but is simply two gate operators interlocked such that the one cannot open unless the other is fully closed. This connection is used frequently at correctional facilities for Sally Port gates. The Smart Touch Controller provides both an interlock input (#7) and the interlock output contact that is required.

1. User relay 1 on the Smart Touch Board has been set by the factory to provide the necessary interlock function. Connect a total of four wires between operator #1 and operator #2 as follows: One wire to the Common buss of each operator to the User 1 relay COM terminal of the other operator. Then, connect wires from the User 1 relay NC terminal to the Interlock input (#7) of the other operator.

2. If User relay 1 has already been used for a different function, then one of the other relays User 2 or User 3 must be wired as described above and set to output function 1. The user relays are configured in the Installer Menu as item [r1__], [r2__] or [r3__] according to the definitions described on page 28.

3. The interlock input, terminal #7, is convertible to alternately be a time clock input, so it is possible that it may need to be switched back for the interlock function. If this alteration is needed, go to the Installer Menu, and set item [tC _] to be [tC_1].

**Connecting to an External Lock Mechanism:**
An external solenoid lock or maglock can be controlled by the Smart Touch Controller to unlock just before gate motion begins.

1. User relay 2 has been set by the factory to provide the necessary output for a solenoid lock. Connect the voltage matching the lock solenoid to User 2 COM and connect a solenoid coil to User 2 NO (connect a maglock coil to User 2 NC). The un-switched solenoid or maglock wire connects directly to its supply voltage common conductor.

2. If User relay 2 has already been used for a different function, then one of the other relays User 1 or User 3 must be wired as described above and set to output function 6. The user relays are configured in the Installer Menu as item [r1__], [r2__] or [r3__] according to the definitions described on page 28.

**Connecting the Gate Secure Position Indicator Output:**
An external device can be signaled by the Smart Touch Controller to indicate the gate is secure.

1. User relay 3 has been set by the factory to provide the necessary output for position indication. Connect the voltage matching the indicator light to User 3 COM and connect the gate secure light to User 3 NC. The other indicator light wire connects directly to the voltage common conductor. If an unsecured light is required, connect it to User 3 NO.

2. If User relay 3 has already been used for a different function, then one of the other relays User 1 or User 2 must be wired as described above and set to output function 1. The user relays are configured in the Installer Menu as item [r1__], [r2__] or [r3__] according to the definitions described on page 28.

# Options for User Programmable Output Relays 1-3

**The Smart Touch Controller can be set to interface to many types of external devices through the use of its programmable output relays. All of the output functions listed below are accessible in the Installer Menu under the selection** [r1 __], [r2 __] **and** [r3 __]. **Select which relay you wish to use and enter the appropriate function by the numbers as listed below.**

1. **Close Limit output:** This output can also be used to create an interlock signal to another operators interlock input, or simply to indicate that the gate is secure. The relay is released at full closure.
2. **Close limit pulse output:** This output may be used in a sequenced system to command a 2nd machine to close. Generates a brief pulsed output that occurs when the close limit is triggered.
3. **Open limit output:** This output is used to indicate a full open position indication. This output becomes active when to open limit is triggered and releases when the open limit is released.
4. **Open limit pulse output:** This output may be used to trip a sequenced barrier arm gate operator to open. Generates a brief pulsed output occurs when the open limit is triggered. An additional pulse is also generated with any new open command even when the gate is already fully open.
5. **Warn before/during operate output:** This output may be used to control an external warning device. This output will operate at the same time as the internal warn before operate buzzer.
6. **Gate Lock output:** This output may be used to control external solenoid locks or magnetic locks. In both directions of travel, this output will be activated about 7/10th of a second before the operator starts moving the gate, and remains active while moving and for a few seconds after stopping.
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. This alarm resets itself in 30 seconds.
8. **Gate open too long output:** Activates when the gate has been open longer than a user-selected period of time. Adjustable from 0 delay, then 15 seconds delay to 135 seconds delay in 30-second time increments.
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 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 2nd vehicle enters from the outside, without a valid input from an access control device. 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 may be used to interlock to an entry device to prevent pedestrian use. This output is active whenever the OOLD is tripped.
13. **Special output from "OOLD" only when gate is closed:** Used to annunciate a vehicle or to indicate loitering. Adjustable from 0 delay, then 15 to 135 seconds delay in 30-second time intervals.
14. **Gate nearing full travel output:** For operators with RPM sensors only. This output is activated when the gate is three feet from full travel in both the open and close directions. This output can be used to reduce the sensitivity of a proximity sensor near the ends of gate travel.
15. **Gate Failure output:** This output is activated to report that a problem has occurred. Indicates that system in an Error Mode, Fault Mode or Entrapment Mode. If active, the gate is disabled.
16. **Motor Running output:** This output is active when the motor is running and the gate is in motion.
17. **AC Power Failure output:** This relay is normally energized, but drops with loss of AC power. This output is also active on DC machines when the battery charger is off.
18. **DC Power Failure output:** This output is activated when the battery power is very low, but the output ceases when the battery is dead. The relay is triggered when the battery is less than 20 Volts.
19. **Flasher Relay:** This output is intended to control flashing lights that pulse once per second. This relay is flashing all the time, except when the open limit switch is triggered.

# Clock Functions

**Setting the time and Date**

The Smart Touch Controller is equipped with a 24 hour (military time), 365 day clock, so that events of significance can be logged and stamped with both the time and the date. This feature is useful to record key historical operational data and a log of Alerts, Faults and Errors all of which can be accessed via the RS232 port with a PC computer or a PDA using the Palm OS. Optional Hy-Security supplied software and cables are required in order to read this data.

1. To set or adjust the time or date, go the User menu item [CL_0] and push the **Select button**, so that [CL_0] blinks. Press the **Next button** to change the setting from [CL_0] to 1, 2, 3 or 4 depending upon which setting is to be altered. 1 = minutes / 2 = hours / 3 = days / 4 = months.

2. Once you have selected a blinking setting [CL 1-4], push the **Select button** (Note: you must push the Menu button for software version prior to h3.01) to change the display to a blinking (adjustable) value. The following letters will be displayed on the left side to aid in knowing which setting is being made:

   a. Setting [CL 1] = minutes - display [ni 0-59]
   b. Setting [CL 2] = hours —— display [hr 0-23]
   c. Setting [CL 3] = days —— display [dA 1-31]
   d. Setting [CL 4] = months - display [no 1-12]

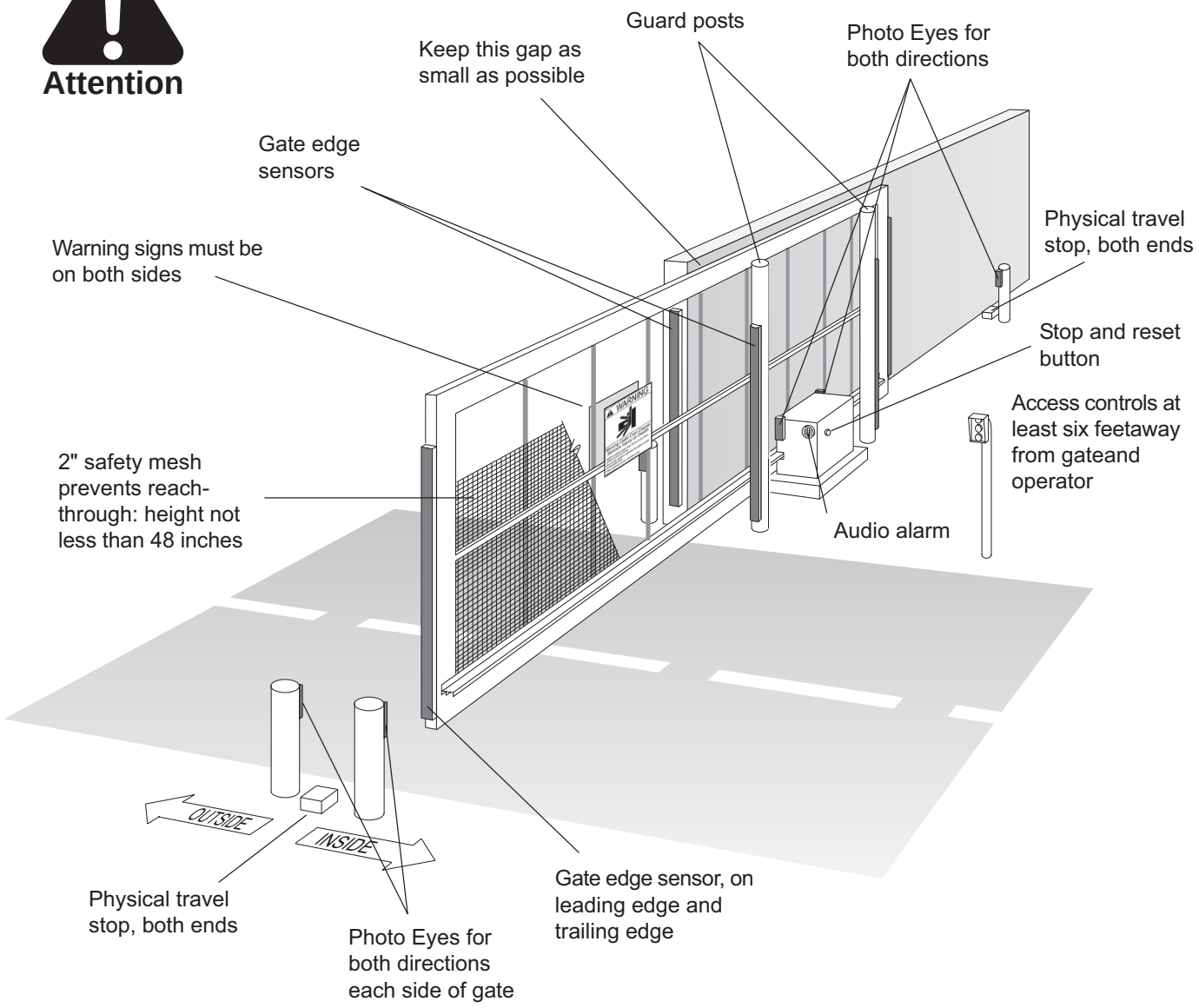
3. Make any required change to the hour, minute, day or month in the typical manner by using the **Next or Previous buttons**, then press the **Select button** to enter the change, just as typical for all of our other menu settings.

**4. When done, be certain to restore the setting to [CL 0] because the Menu button will not function to allow the user to exit the clock setting mode until the user has changed the setting back to [CL 0], which places the clock in its normal display mode.**

5. A lithium disk battery supports the clock so that the time is not lost when the main power is off. This battery should be replaced about every five years. Use a DL 2025 / DL 2032 or a CR 2025 / 2032 battery.

# Entrapment Protection Device Schematic for Sliding Gates

**Attention**




**Note:** All wheels must be covered. (Wheels and covers not shown for clarity)

This schematic view is not meant to recommend the only way to set up your configuration, but to point out the various elements of a proper automatic vehicular gate installation. The gate operator itself is only one component in the total system. **Always install a separate pedestrian gate.**

# UL 325 Standard requirements for Entrapment Protection Devices

Gate Operator Category

***Horizontal Slide, Vertical Lift, Vertical Pivot, Swing and Vertical Barrier (arm)***

| Usage class | Primary type[a] | Secondary type[a] | Primary type[a] | Secondary type[a] |
|---|---|---|---|---|
| Vehicular I and II | A | B1, B2, or D | A, or C | A, B1, B2, C, or D |
| Vehicular III | A, B1, or B2 | A, B1, B2, D, or E | A, B1, or C | A, B1, B2, C, D, or E |
| Vehicular IV | A, B1, B2, or D | A, B1, B2, D, or E | A, B1, C, or D | A, B1, B2, C, D, or E |

Note-The same type of device shall not be utilized for both the primary and the secondary entrapment protection means. Use of a single device to cover both the opening and closing directions is in accordance with the requirement; however, a single device is not required to cover both directions. A combination of one Type B1 for one direction and one Type B2 for the other direction is the equivalent of one device for the purpose of complying with the requirements of either the primary or secondary entrapment protection means.

**[a]Entrapment protection sensor types:**

Type A - Inherent entrapment sensing systems.

Type B1 - A non-contact sensor (photoelectric sensor or the equivalent).

Type B2 - A contact sensor (edge sensor device or the equivalent).

Type C - Inherent adjustable clutch or pressure relief device.

Type D - An actuating device requiring continuous pressure to maintain opening or closing motion of the gate.

Type E - An inherent audio alarm, which warns a minimum of 3 seconds before operation.

**UL Usage Class Information:**

The automatic vehicular operator must also be labeled as appropriate for both the type and usage class of the gate. Installers must verify that the gate operator is labeled for the intended application. Note: Sliding gate operators installed in Class I & II applications must not move the gate faster than 12 inches per second.

**Class I:** Intended for use in a home of one to four single family dwelling, or a parking area associated therewith.

**Class II:** Intended for use in a commercial location or building such as a multi-family housing unit (five or more single family units) hotel, garages, retail store or other building servicing the general public.

**Class III:** Intended for use in an industrial location or building such as a factory or loading dock or other locations not intended to service the general public.

**Class IV:** Intended for use in a guarded industrial location or building such as an airport security area or other restricted access locations not servicing the general public, in which unauthorized access is prevented via supervision by security personnel.

# Placement and Use of Secondary Pedestrian Entrapment Sensors

**WARNING: To reduce the risk of serious injury or death, read and follow all instructions in the gate operator handbook and on the warning labels.**

Automatic gate operators are intended only for vehicular use and pedestrians must be routed to a separate man gate, however sensors are still required in order to provide a degree of protection should anyone happen to stray into the area of an automatic gate. Generally there are two types of external sensors that may be used: Contact type sensors, such as an edge sensor, and non-contact sensors, such as photoelectric eyes. Current industry standards require the use of either type or both of these sensors, as a secondary device, in Class I and Class II automatic sliding gate installations, because the general public is likely to be present. Although there are alternatives for Class III and IV installations, we highly recommend the use of external sensors for all automatic gate applications.

The specifier or installer may choose either photoelectric eyes or edge sensors, or use these devices in combination, but both the open and closing directions of gate travel must be guarded. The UL 325 standard for automatic sliding gates specifically requires the following:

- One or more non-contact sensors (photoelectric eyes) shall be located where the risk of entrapment or obstruction exists, such as the perimeter reachable by a moving gate.

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

- A hardwired contact sensor shall be located and it's wiring arranged so that the communication between the sensor and the gate is not subjected to mechanical damage.

- A contact sensor that transmits its signal to the gate operator shall be located such that the signal is not impeded by building structures or other obstructions and shall function under its intended end-use conditions.

- The contact and non-contact sensors must be tested and labeled as "Recognized Components" under the UL 325 standard in order to be deemed acceptable for use in this application.

**Study the entrapment protection schematic and consider your specific installation to determine where the greatest risks of entrapment exist. Locate edge sensors and/or the photoelectric sensors accordingly. Be certain that a sufficient number of sensors are used so that both directions of gate travel are properly guarded.**

# Installing Gate Edge (Contact Type) Reversing Sensor

1. Follow the guidelines in the Entrapment Protection Schematic to plan the most appropriate mounting positions for the edge sensors to be installed. For sliding gates, one or more sensors shall be located at the leading edge, trailing edge and post mounted both inside and outside of a sliding gate. A requirement of the UL 325 standard is that an edge sensor be laboratory tested and “recognized” under UL 325.

2. Drill holes through the edge’s mounting channel and through the surface that each gate edge is to be mounted. Securely fasten every edge sensor. The edge sensors should all be placed not higher than 6" above the ground.

3. Edge sensors that are not attached to the moving gate, such as post mounted sensors are wired in parallel and directly connected to the gate operator:

a. Mount a gate edge to the wall, pilaster or end post of the fence that aligns with the gate when it is in the open position.
b. Always route the leads of the edge sensors to the gate operator so that they are protected from physical damage.
c. Connect one edge sensor lead to our Common Buss on the power supply board and the other to terminal #13, which is labeled Edge Sensor input.

4. Edge sensors mounted to the leading edge or trailing edge of the gate panel should be used with an edge transmitter and a receiver in order to transmit to the gate operator. We do not recommend the use of retractable cord reels or curl cords because of durability problems with these devices in outdoor environments.

a. Mount gate edge sensors to the leading edge and trailing edge of the gate so that entrapment protection is provided in both directions of travel.
b. Mount one or two edge transmitters (Linear Model #3022 or equivalent) onto the gate panel near the upper corner of the leading edge of the gate. Both gate edges will function correctly if only one transmitter is used, but wiring both edges to a single transmitter may be impractical or displeasing visually.
c. Connect the edge(s) to the terminals in the edge transmitter and set the DIP switches of the transmitter to match the setting in the receiver to be used.

5. Mount a commercial style radio receiver* (external antenna type) on the inside of the operator, below the electrical box. Knock out the smallest hole in the lower right corner of the electrical box and route the wires to the area marked Radio Options. Only three wire connections are needed because the 24-Volt supply and the radio output share a wire. Being certain to observe polarity, crimp the black radio power wire together with one of the radio output wires into a .25" spade connector and connect to the COM terminal. Connect the red wire to the +24V terminal and connect the other radio output contact wire to the spade marked EDGE. Note that this terminal is the same as the #13 input terminal labeled Edge Sensor on the main control board.

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

6. Test the operation of the reversing edge to make sure that it is functions correctly. Advise the user of the gate to be certain to retest this vital function weekly.

* If there is also to be a radio receiver for a hand held transmitter to operate the gate, be certain to use a two channel commercial receiver. Remember that the transmitter and receiver must have their codes set the same or they will not function.

# Installing Photoelectric (Non-contact) Sensors

**General Information:**
Follow the guidelines in the Entrapment Protection Schematic to plan the most appropriate mounting positions for the photo-eye sensors to be installed. If there are no other secondary external entrapment protection sensors (typically an edge sensor), at least two photoelectric sensors are required to serve to reverse the gate in each direction of travel. The Smart Touch Controller has two photoelectric sensor inputs (Photo eye open and Photo eye close).

There are two common types of photoelectric sensors, thru beam and retro-reflective, each has some 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 has the convenience of not requiring the installation and electrical wiring of the remote emitter required in a thru beam system, but is generally more problematic in poor weather. Avoid use of a retro-reflective device to span a distance greater than 24 feet in an outdoor environment or performance will probably be unsatisfactory.

**Compatibility:**
A requirement of the UL 325 standard is that a photoelectric sensor be laboratory tested and “recognized” under UL 325. In order to be compatible with a Hy-Security operator, a photo eye must be rated to function from 24 Volts DC source power.

**Installation:**
Mount the photo eyes approximately 15" to 30" above the ground and as close to the gate as possible. Unless there are also gate edges for entrapment protection, a minimum of two photo eyes will be required to function for both the open and closing directions of travel. Mount the receivers on the left and right sides of the gate operator and the emitters just beyond the travel of the gate in both the full open and full closed positions of travel. In some situations, an additional photo eye should be installed on the public side of the gate. The installation locations described above are intended for pedestrian detection, if photo eyes are also to be used for vehicular detection, consider, in addition to the low elevation photo eye for cars, another photo eye at a height of around 55" to detect semi-trucks.

**Configuration:**
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.

**Connection:**
Three wires to the receiver and two wires to the emitter are all that is required.

a. The +24 Volt source power is obtained at one of the three spade terminals on the power supply board.
b. The -24 Volt source power is obtained from spade terminals on our terminals #14 or 15, labeled (Photo Eye Power) on the Smart Touch Controller board.
Note: The -24 Volt Photo Eye Power also supplies the photo eye output Common.
c. The photo eye NO or NC output connects to the Smart Touch Controller board at terminal #19 if the photo eye spans the road, or at terminal #17 if the photo eye spans the gate’s open storage area.

# Installing Photoelectric Sensors, cont.

**Supervised Connection:**
If the photo eye being installed has a true NC output (one that is NC when the photo eye is powered, aligned and set for Light Operate) then a supervised connection is recommended. A supervised connection will signal a system Fault and prevent gate operation if either the open or close photo eye connection ever becomes an open circuit or a short circuit. The Installer Menu item [PC_0] must be changed to [PC_1] to enable this feature. See Installer menu 18 on page 26.

**Photo Eye Function:**
A tripped photo eye will prevent the gate from starting in either direction if the gate is stationary. If tripped while in motion, the standard function is to pause the gate motion and then automatically restart again if the photo eye is clear within five seconds. An optional setting in the Installer Menu will cause a 2 second reversal of travel. See Installer menu 14 & 15.

**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. Hy-Security has provided a unique feature that causes our buzzer to chirp when the photo eye enters and exits alignment. See User menu 9. Set the Installer menu item [PE_0] to [PE_1] and the buzzer will provide an audible indication both when the beam is broken and remade.

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

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

The ideal mounting for the reflector is suspended inside a twelve 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, so that the reflector can be 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.

# Detector Installation Guide

**Detector Basics**

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

**Loop Configurations**

Configurations differ depending on the application. In parking applications with our HTG 320 operator, a loop may be as small as 3’ x 6’. In a traffic application employing one of our sliding gate, swing gate or vertical lift gate operators, the smallest loop should not be less than six feet square.

**Rules to Follow for Security Gate Applications**

1. The side of the loop closest to the gate shall be located at least four (4) feet distant from its line of travel.

2. The shortest side of the loop shall be between six (6) and eight (8) feet in length. The longest side of the loop shall be between six (6) and twenty (20) feet in length. For applications that need to span a wide area, use several smaller loops. Do not exceed a maximum of 200 square feet of loop area to only one detector.

3. In applications with multiple loops, keep each loop at least six feet apart. This avoids “cross talk”. It is possible to have loops closer together by selecting different frequencies. An advantage of using Hy-Security model HY-5A detectors is that problematic “cross talk” is not possible.

4. For greater sensitivity and less chance of false calls caused by the motion of the gate, it is better to use two smaller loops, connected in a series circuit, to one detector instead of one large, single loop.

5. To avoid interference, keep loops at least two (2) inches 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.

6. 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.

7. 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.

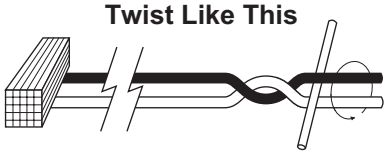
8. Twist loose tails of lead-in wires tightly, approximately ten times per foot.

Twist lead-in at least 10 turns per foot

**Like This**

**Not Like This**

**Twist Like This**

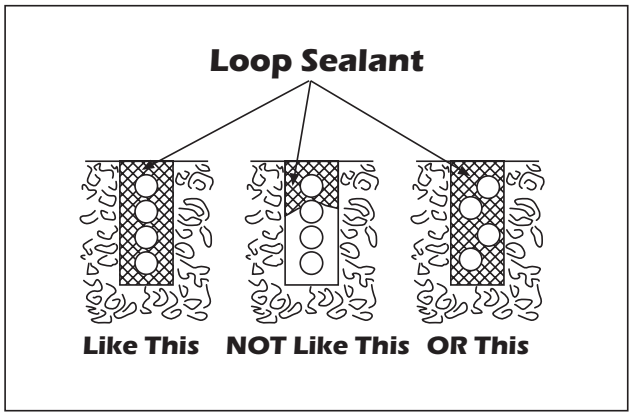


## Detector Installation Guide, continued

9. Follow this guide for the correct number of wire turns according to the perimeter size of the loop:
**10 to 13 lf. = 5 turns  14 to 26 lf. = 4 turns  27 to 45 lf. = 3 turns  46 to 100 lf. = 2 turns**

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

- The slot in the surface should be cut ¼" wide x 1 ½" deep.
- 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. Note that if the loop wires are able to move in the slot after the sealer has set, the detector may give false calls



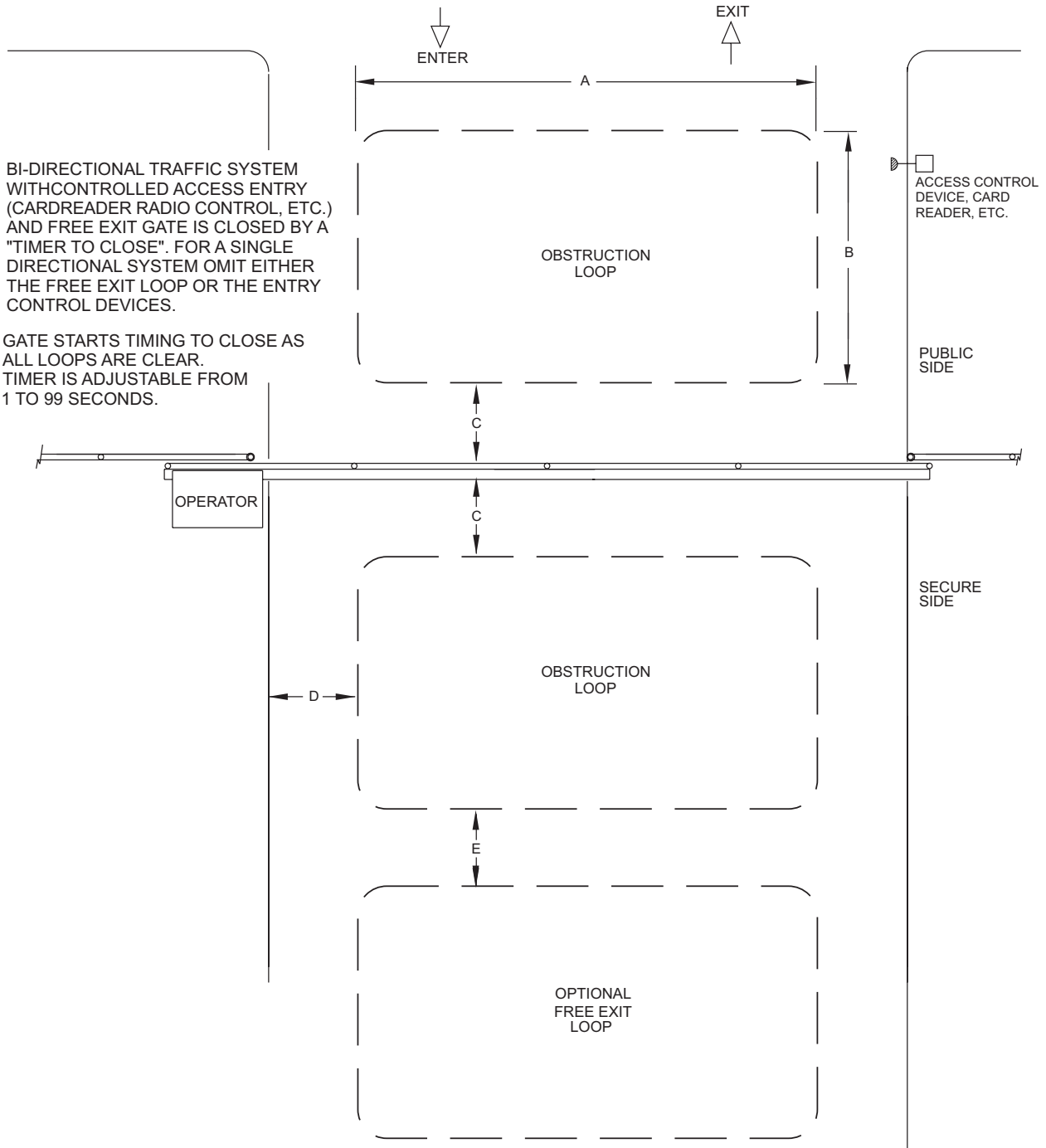

**Detector Logic**
Hy-Security Gate Operators recommends that vehicle detectors be used for free open and obstruction sensing logic only. The exception is in parking applications with our HTG 320 operator where detectors may be also used to close the gate. In applications employing our swing, vertical lift, or sliding gate operators, closing logic cannot be used. 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.

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

**Test #1:**
Resistance of the loop and lead-in wire should not exceed 4.0 Ohms.

**Test #2:**
The resistance to earth, as measured with a 500V "Megger", should be 100 Megohms or more. Loops may function at 10 Megohms or less but will not be reliable (e.g. when the ground is wet from rainfall). Low resistance indicates broken or moisture saturated insulation. This is common if inappropriate wire insulation has been used.

Also see section titled "Detector & Loop Fault Diagnostics" on page 42 for additional tests that may be performed with Hy-Security HY-5A mini detector modules.



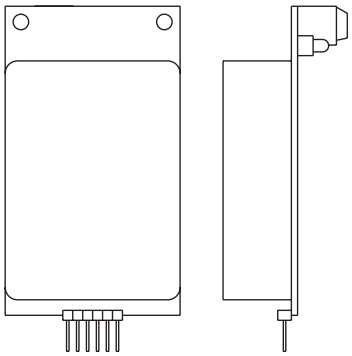

DIMENSION "A" = 6 TO 20 FEET
DIMENSION "B" = 6 TO 8 FEET
DIMENSION "C" = MAINTAIN 4 FEET
DIMENSION "D" = MAINTAIN 5 FEET BETWEEN LOOP AND EDGE OF ROADWAY.
NO VEHICLE CAN PASS THROUGH SUCH A SMALL AREA AND ESCAPE DETECTION
DIMENSION "E" = LOCATED FOR CONVENIENCE OF USE.

| | | | | | | |
|---|---|---|---|---|---|---|
| Hy-Security Gate Operators, seattle, washington | TITLE: SLIDE GATE LOOP LAYOUT | DRAWN: DB | DATE: 05/15/00 | THIRD ANGLE PROJECTION | | REV: A |
| | | CHECKED: - | DATE: - | ERN NUMBER: - | DATE: - | |
| | | APPROVED: - | DATE: - | DRAWING NUMBER: E96 | | SHT 1 OF 1 |

# Vehicle Detector Installation Options

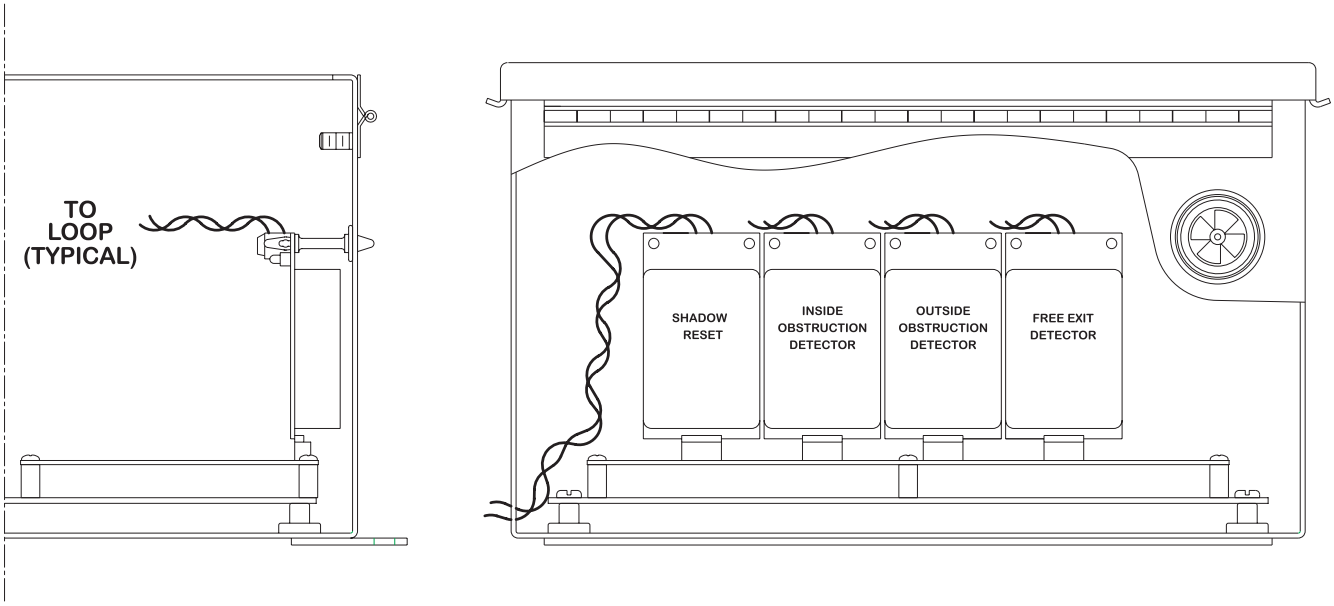
The Smart Touch Controller provides a feature rich interface to four different vehicle detector inputs. Standard box type 11 pin (24 Volt DC or 24 Volt AC) vehicle detectors may be connected in the traditional manner, see page 41. Hy-Security also offers a custom mini detector module that plugs directly into the Smart Touch Control board. Not only is the field installation much faster, but there is also a large performance benefit. The Hy-Security HY-5A detector is controlled by the Smart Touch microprocessor to achieve many benefits over common box type detectors*

a. Loop frequency is automatically set and monitored by the Smart Touch Controller
b. Cross talk between multiple loops is impossible
c. The best operating frequency for each loop is automatically chosen
d. Smart Touch can report the both loop frequency and call strength on its LCD display
e. Smart Touch will report loop malfunctions and store this data in its EEprom memory
f. Most detector or loop faults that could occur are reported and displayed on the LCD display



There are four vehicle detector inputs available both on the main terminal strip and as direct plug in modules. The vehicle detector inputs are for the following functions:
1. Free Exit Loop Detector - “ELD”
2. Outside Obstruction Loop Detector - “OOLD” (this is the outside reversing loop)
3. Inside Obstruction Loop Detector - “IOLD” (this is the inside reversing loop)
4. Shadow Loop Detector - “SLD” (this is for swing gates only)
*A combination of HY-5A detectors and standard box detectors is acceptable

**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 2nd vehicle intrusion detection, loitering alert and selectable non-reversing. Multiple obstruction detectors may be mandatory because not more than 200 sq-ft of loop area may be connected to any one detector or the sensitivity becomes inadequate.



# Hy-Security Hy-5A Vehicle Detector Installation

1. Insert the locking end of each of two 1" long white plastic standoffs into the mounting holes on the detector.

2. Plug the detector into the appropriate socket along the right side edge of the Smart Touch Controller board for the detector function that is desired. Be careful to align the six detector pins into the socket correctly, and then snap the standoffs into the holes on the right side of our control enclosure.

3. Route the loop wires through the wire clips provided and connect the loop leads to the two terminals directly on the detector. Tighten the terminal screws securely.

4. When the power is turned on, the detectors will immediately tune themselves.

5. Once enabled, if the detector module is unplugged, a communications alert [AL10] will be triggered, then if the fault continues, [Err3] “detector failed” is displayed. The operator will also run as if the affected detector is triggered. The [Err3] can only be cleared by pressing the Reset button, which electronically uninstalls the detector. See Detector & Loop Diagnostics on page 42.

6. The Smart Touch Controller automatically governs frequency selection of all Hy-5A detector modules. This simplifies installation and guarantees that there is no cross talk between multiple loops. The frequency can also be manually selected if needed, see the installer menu options.

7. Sensitivity is the only adjustment on the detector itself. Generally sensitivity does not need to be increased unless the loop is large loop or there are multiple loops connected to one detector. Do not exceed more than 200 sq/ft of loop area to one detector.

   The rotary switch for sensitivity has eight settings, which are as follows:
   0 = Low, 1 = Normal, 2 = Medium, 3 = High (0-3 with the boost feature*)
   4 = Low, 5 = Normal, 6 = Medium, 7 = High (4-7 no boost feature*)

   *Boost increases the sensitivity during a call and is very useful for maintaining continuous detection when the signal may become weak, such as semi-trucks.

8. Vehicle detector functions are configurable in the Installer Menu as shown below.

| | **Installer Menu Options** | **Default** | **Description** |
|---|---|---|---|
| I21 | [or 1] OOLD detector function | 1 | 0 = pause closing only, 1 = enable reversing to open |
| I22 | [ir 1] IOLD detector function | 1 | 0 = pause closing only, 1 = enable reversing to open |
| I23 | [dL 1] Vehicle detector logic | 1 | 1 = std, 2 & 3 = fast close timer, 4 = full anti-tailgate* |

The outside and inside Obstruction Loop Detectors “OOLD” or “IOLD” 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 IOLD setting, go to the menu item [ir__] and set to 0. For the OOLD, go to the menu item [or__] and set to 0.

* See page 43 for optional Vehicle Detector logic modes and anti-tailgate options.

# Standard 11 Pin Box Type Vehicle Detector Installation

1. If standard 11 pin vehicle detectors are to be used, snap up to three sockets onto the aluminum DIN mounting rail, with the key in the center hole facing to the left.

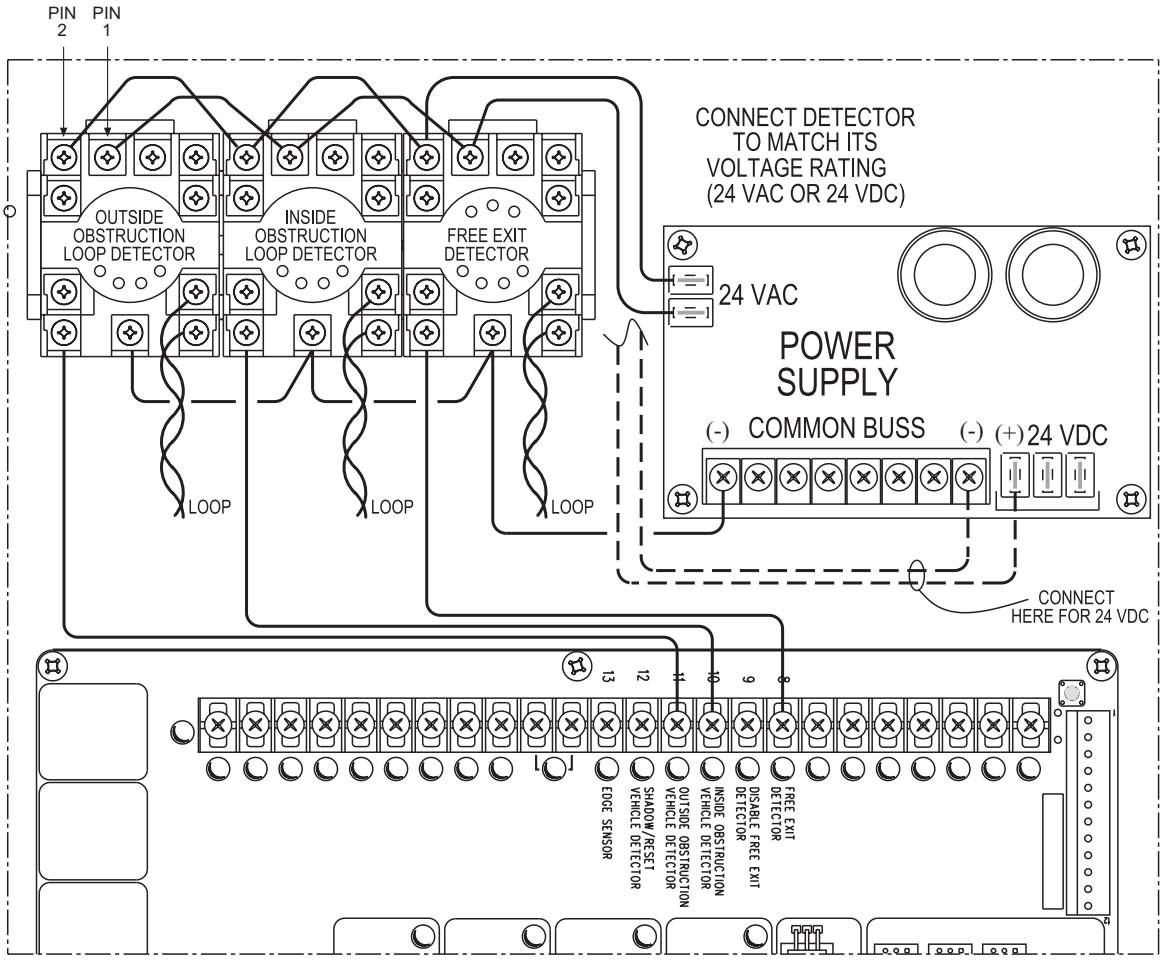
2. Both 24 Volts AC or DC are available, so either detector voltage may be used. (24 VAC is not available if the operator is a battery type) 24 VAC is available at the spade terminals on the lower left corner of our power supply (marked ACC). 24 VDC is available from the Common Buss and the +24 V spade terminals next to the common Buss.

3. Connect 24 Volt power to the detector. Polarity does not matter if the detector is a 24 AC model. If a DC detector is used, pin #1 is (+) on a DC detector and pin #2 is ( - ).

4. Connect the output pin #6 to the common Buss on the power supply and the output pin #5 to one of the four detector inputs (depending upon the detector function required) on the Smart Touch Controller terminal strip.

5. If multiple detectors are used, join the wires from socket to socket rather than run each to the same location separately. The only wire that must be separate is the output wire to the Smart Touch Controller as well as the loop input wires.

6. Always keep the 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.



# Detector & Loop Fault Diagnostics

If Hy-Security HY-5A mini detector modules are used, the Smart Touch Controller has ability to store and report detector and loop fault information for performance diagnostics. If The Smart Touch Controller senses a loop or detector problem, the LCD display will flash the abbreviation for the affected detector (ELd - ioLd - ooLd - SLd) then it will flash the appropriate Alert Code [ALE_] to disclose the nature of the problem and the buzzer will chirp.

| | | |
|---|---|---|
| Loop abnormal freq change alert | ALE7 | 2 chirps/sec every 15 seconds |
| Loop shorted to ground alert | ALE8 | 2 chirps/sec every 15 seconds |
| Loop disconnected alert | ALE9 | 2 chirps/sec every 15 seconds |
| Loop detector active >5 minutes | AL12 | 2 chirps/sec every 15 seconds |
| Loop detector comm. alert | AL10 | 2 chirps/sec every 15 seconds |
| Loop detector function alert | AL11 | 2 chirps/sec every 15 seconds |
| Loop detector failed | Err3 | 3 chirps/sec once per minute |

Even if the loop problem self heals, historical data about detector/loop performance and a log of Alerts, Faults and Errors can be retrieved from the Smart Touch Controller by downloading from the RS232 communications port. This requires optional Hy-Security software and cables, and a PC computer or a PDA using the Palm OS, in order to read this data.

**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, then change the selection to a flashing 1 and then press the Select button. The display will flash between [F_xx] which are the high digits, then the low digits of the loop frequency counter. For example: [F_05] + [3413] would represent a frequency of 53,413 Hertz. The highest digit will probably be only a single digit because loop frequency is usually a five-digit number, between 20,000 to 80,000 Hertz.

**Changing the Loop Frequency:**
HY-5A detectors can never crosstalk, but if for any reason, you want to manually change the loop frequency, change the menu selection to a flashing 4 and then press the Select button. Each detector has a choice of four frequencies. To exit, press the Menu button and the controller will perform a reset and tune to the new frequency setting.

**Call Strength Level:**
Knowing the strength level of a detector call 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 1-7. As indicated in the table below, when a detector’s menu setting is set to 2, and the Select button is pressed, the LCD display will read [LE_x**]. If the call strength is level 4 or less, consider increasing the sensitivity level**, by adjusting the rotary switch on the HY-5A detector.

| | Installer Menu Options | Default | Description |
|---|---|---|---|
| I29 | [ELd0] Test factory ELD | 0 | 0=Run, 1=show freq, 2=show call level 0-7, 3= set Freq 1-4 |
| I30 | [iLd0] Test factory IOLD | 0 | 0=Run, 1=show freq, 2=show call level 0-7, 3= set Freq 1-4 |
| I31 | [oLd0] Test factory OOLD | 0 | 0=Run, 1=show freq, 2=show call level 0-7, 3= set Freq 1-4 |
| I32 | [SLd0] Test factory SLD | 0 | 0=Run, 1=show freq, 2=show call level 0-7, 3= set Freq 1-4 |

**Acronyms:** Free Exit Loop = **ELd,** Outside Obstruction Loop = **ooLd,** Inside Obstruction Loop = **loLd**, Shadow Loop Detector = **SLd** (this is for swing gates only)

# Vehicle Detector Configuration & Anti-Tailgate Modes

**Standard and Anti-tailgate modes are selectable under item** [dL__] **in the Installer Menu**
(See installer menu #23 described on page 23 and 26)
The detector function modes that result in Anti-Tailgating logic (modes 3 & 4 below) require the use of a separate inner and outer obstruction detectors.

In order to use any vehicle detector logic mode other than mode 1, all the loops must be placed with the geometry and spacing as shown in the loop layout drawings in Appendix

**Mode 1: (Default)** An input from either the Free Exit, OOLD, IOLD or the Shadow detector will hold the gate open, reset the close timer, and block all close inputs.

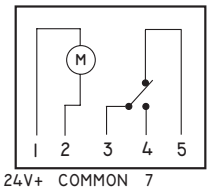
**Mode 2:** Same function as mode 1, except the close timer is allowed to time out, even with the Free Exit, OOLD, IOLD or Shadow detector inputs active. If the close timer has counted to zero, the gate will close when all detector inputs are clear.

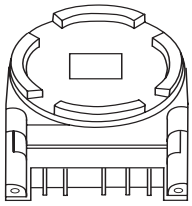
**Mode 3:** Same functions of mode 1, however the close timer is forced to zero when both the OOLD & IOLD are tripped simultaneously. Additionally, any other close inputs are memorized and the gate closes immediately when all open commands and vehicle detector inputs are clear.

**Mode 4:** Full Anti-tailgate logic. Same as Mode 3 functions, plus the gate will stop during the opening cycle when both the OOLD & IOLD are tripped simultaneously. When the OOLD & IOLD loops are cleared, the gate closes immediately. The OOLD and IOLD can be individually set so that, if tripped while closing, the gate may pause only or reverse to reopen. In this mode, the free exit detector input, ELd, is blocked while the gate is closing.

# 24 hr 7 day Timer Connection to Smart Touch Controller

This option generates an open command, which will hold the gate open until released.



Connect Timer Power Pin 1 to 24v (+)
Connect Timer Power Pin 2 to common
Connect Timer Com Pin 3 to common
Connect Timer NO Pin 4 to #7, Time Clock Open

### Selecting AM/PM or Military Time

After pressing reset, the display may show AM. The numbered day symbols will be flashing on and off. If the display does not show AM, it is in military time mode. To change to AM/PM mode, press and hold the **h** key and press the **±1h** key once. AM will appear in display. If display is in AM mode and military mode is desired,press and hold the **h** key, press the **±1h** key once.

### Setting the Time

Press and hold the ◷ key during the following:
(If Daylight Savings Time is in effect, press **±1h** first)

**1.** Press **h** to advanced to the current hour, while holding down the ◷ key.

**2.** Press **m** to advance to the current minute, while holding down the ◷ key.

**3.** Press **Day** repeatedly to advance to current day, while holding the down the ◷ key.

NOTE: If the days are flashing, it indicates the day of the week was not set when setting the time. The timer cannot be programed unless the day of the week is entered. Each year, in the spring, press **±1h** to advance the time an hour. In the fall, press **±1h** to set back an hour.

### Programming 24 hour or 7 day Schedules

*It is helpful to write out the program schedules before beginning.*

*EXAMPLE*

**Program 1:** ON at 7:00AM Monday thru Saturday

**Program 3:** Off at 7:00PM Saturday

**Program 2:** OFF at 5:00PM Monday thru Friday

### Programming 24 hour or 7 day Schedules Continued...

**These Programs need to be entered:**

| | | |
|---|---|---|
| Program 1: | Press the ☜ key once | ON symbol ◉ appears |
| | Press **h** key | to 07AM |
| | Press **m** key once | to 00 |
| | Press **Day** key once | 123456 is displayed |
| | Press **Prog.** key to enter | |
| Program 2: | Press the ☜ key twice | off symbol ◯ appears |
| | Press **h** key | to 05PM |
| | Press **m** key once | to 00 |
| | Press **Day** key twice | 12345 is displayed |
| | Press **Prog.** key to enter | |
| Program 3: | Press the ☜ key twice | off symbol ◯ appears |
| | Press **h** key | to 07PM |
| | Press **m** key once | to 00 |
| | Press **Day** key twice | until only 6 is displayed |
| | Press **Prog.** key to enter | |
| | Press ◷ key to enter Run Mode | |

**IMPORTANT:** If an "ON" time was programed that is earlier than the current time, press ☜ once to turn the timer "ON". (It does not "look back" to determine if it should be on or off after programing.)
*Up to 20 Programs are able to be entered at one time.*

### Reviewing Programs

To review the programs at any time, press **Prog.** key. Programs will appear in the order they were entered with repeat presses of the **Prog.** key. After all programs have been reviewed, the blank display will appear to allow entering another program.

### Manual Override

TEMPORARY: While in the run mode, pressing, the ☜ key once will reverse the output; ON to OFF or OFF to ON. The ☜ symbol appears in the display to indicate a temporary override. At the next scheduled switching time, automatic control resumes eliminating the override. Continuous:While in the run mode...

* Pressing the ☜ key twice will turn the output to ON permanently. ◉ symbol appears in display.

* Pressing the ☜ key three times will turn the output to OFF permanently. ◯ symbol appears in display.

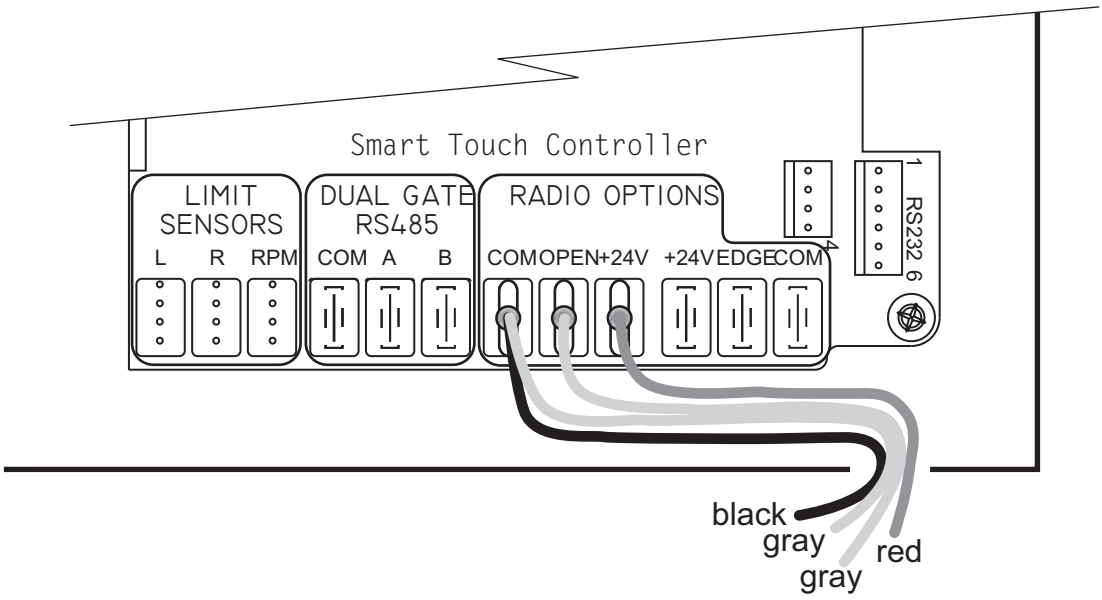
* To terminate a continuous override, press the ☜ key until ◷ appears in the display.

10/27/00 24/7timer

## Connecting a Radio Receiver

Mount a commercial style 24-Volt radio receiver (external antenna type) on the inside of the operator, below the electrical box. Knock out the smallest hole in the lower right corner of the electrical box and route the wires to the area marked Radio Options. Only three wire connections are needed because the 24-Volt supply and the radio output share a wire. Being certain to observe polarity, crimp the black radio power wire together with one of the radio output wires into a .25" spade connector and connect to the COM terminal. Connect the red wire to the +24V terminal and connect the other radio output contact wire to the spade marked OPEN. Note that this terminal is the same as the #4 input terminal labeled Edge Sensor on the main control board.
Mount an external antenna onto the top of a fixed post of the fence near the operator.
Connect the antenna into the socket on the radio receiver.
Set the DIP switches in the receiver to match the same code used in the transmitter.

If there is also to be an edge sensor transmitter to reverse the gate, be certain to use a two channel commercial receiver. Remember that each transmitter and receiver must have their codes set the same or they will not function.



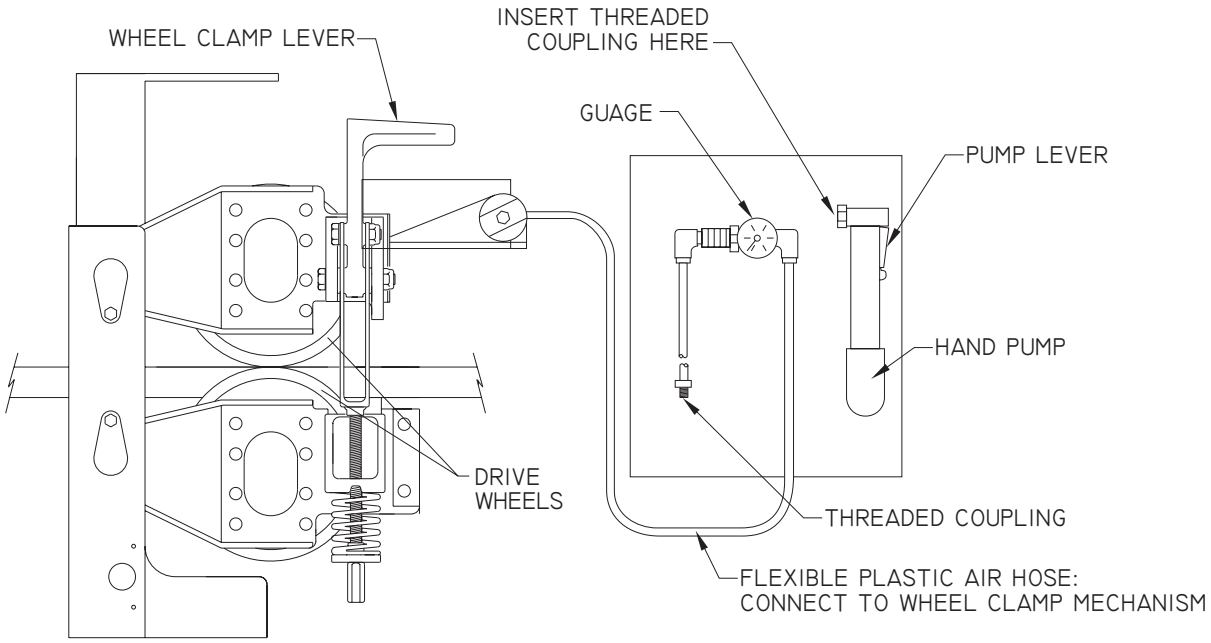

**Radio output wires**

# Remote Release Mechanism

(Model #A MILR 001 R or A MILR 001 RCF)
Instructions for Releasing Drive Wheel Clamp Mechanism for Manual Operation

This remote release device consists of an air cylinder inside the operator, which pushes the wheel clamping device open, a length of flexible air tubing, and a remote box containing a hand pump. The hand pump is just like the ones used to inflate sports equipment or bicycle tires.

1. Remove hand pump from box. (Pull straight out to remove from mounting clips.)
2. Push threaded coupling, attached to end of tubing, into hand pump. Do not screw or twist.
3. Lock coupling in place by toggling the locking lever away from pump.
4. Pump until gauge pressure indicates 50 PSI. The clamp on the wheel should now be released and the gate can be manually operated. Do not release pressure until all manual operations are complete.
5. When ready for automatic operation, release fitting from pump by lowering lever and pulling tubing straight out. This will release the pressure on the wheel clamp mechanism.
6. Put pump and tubing back into enclosure.
7. Re-engage the release mechanism inside the gate operator housing.



# Solenoid Lock Instructions - Internal Type

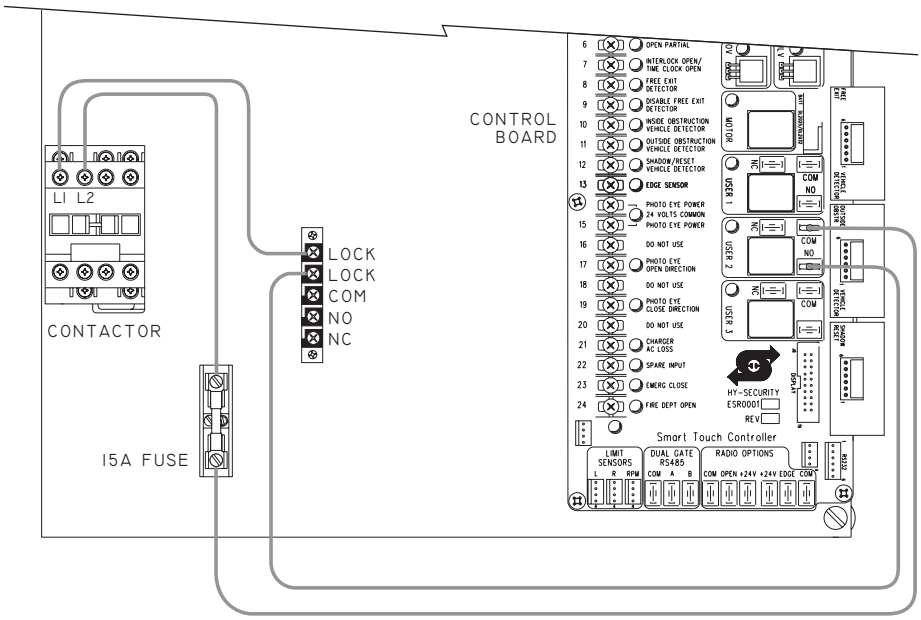
**Internal Solenoid Lock Description:**
Hy-Security offers an optional internal solenoid deadbolt lock that employs a 3/4" stainless steel lock pin that fits into a notch cut into the drive rail. The lock solenoid is voltage specific for 120V, 208V, 230V or 480V, therefore be certain that if the operator voltage is modified that the solenoid is also changed. An internal indicator switch is also provided which may be required in some installations in order to verify whether the deadbolt is in the locked or unlocked position.

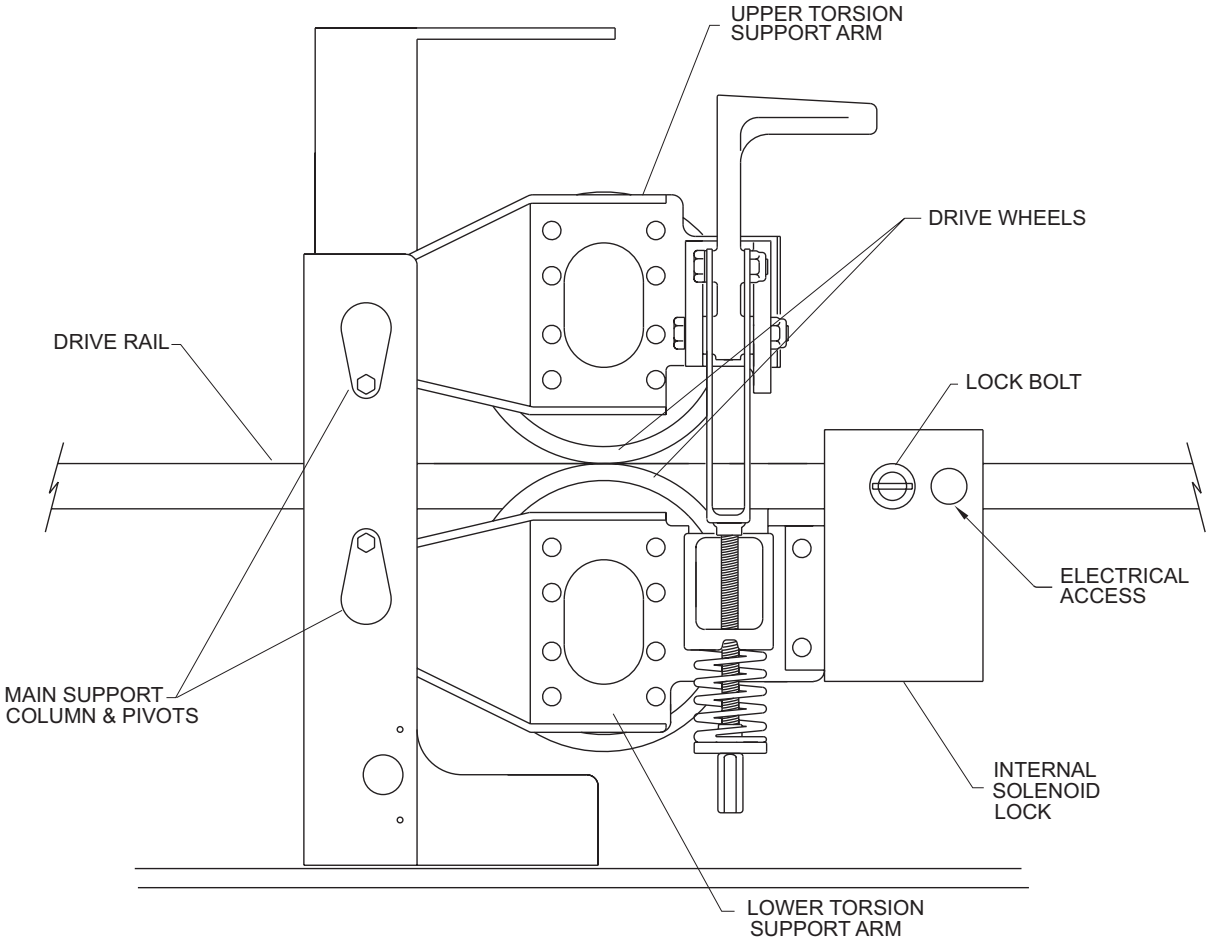
**Activation of a Solenoid Deadbolt Lock:**
A solenoid lock must be activated prior to any gate motion or the gate will bind the lock mechanism. Hy-Security's internal lock must also remain engaged until the soft stop time cycle is complete at the end of travel. To provide the solenoid lock logic requirement, one of the three user relays (typically user relay 2) must be set to function #6 and wired to supply power to the lock solenoid. The same relay function can easily be used to drive an external solenoid lock device as well.

**Adjustment of the Factory Solenoid Lock:**
Operators equipped with our factory solenoid lock require a notch to be cut into the outer vertical face of the drive rail. The notch location is determined in the field after the gate operator is functioning properly. Run the gate to its full closed position and note the location where the deadbolt pin strikes the drive rail. Mark for a 3" wide slot in the rail with the lock pin in the center. Make two cuts with a hacksaw and break out the notched section. Operate the gate a few times to verify that the deadbolt always enters the notched area.

The lock enclosure itself may need to be adjusted so that the lock pin strikes in the center of the vertical edge of the drive rail. The face of the lock enclosure is slotted to accommodate this adjustment. With a 1/2" open end wrench, loosen the two bolts retaining the lock enclosure and move the enclosure up or down to achieve the correct adjustment.

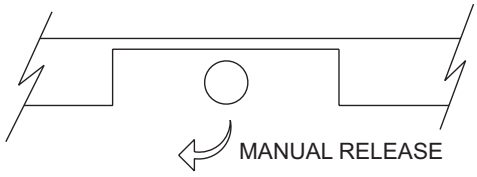
**Electrical:**
When the factory pre-installs the internal solenoid deadbolt lock, a five pole terminal strip is added. Two terminals are the high voltage to the solenoid and the remaining three are the output of the lock position indicator switch. If needed for interlocking or indicator lights, wire accordingly to the terminals labeled: COM, NO and NC.






ELEVATION

ADJUST HEIGHT OF SOLENOID LOCK TO ACHIEVE THIS RELATIONSHIP BETWEEN THE NOTCH IN THE DRIVE RAIL AND THE LOCK BOLT.



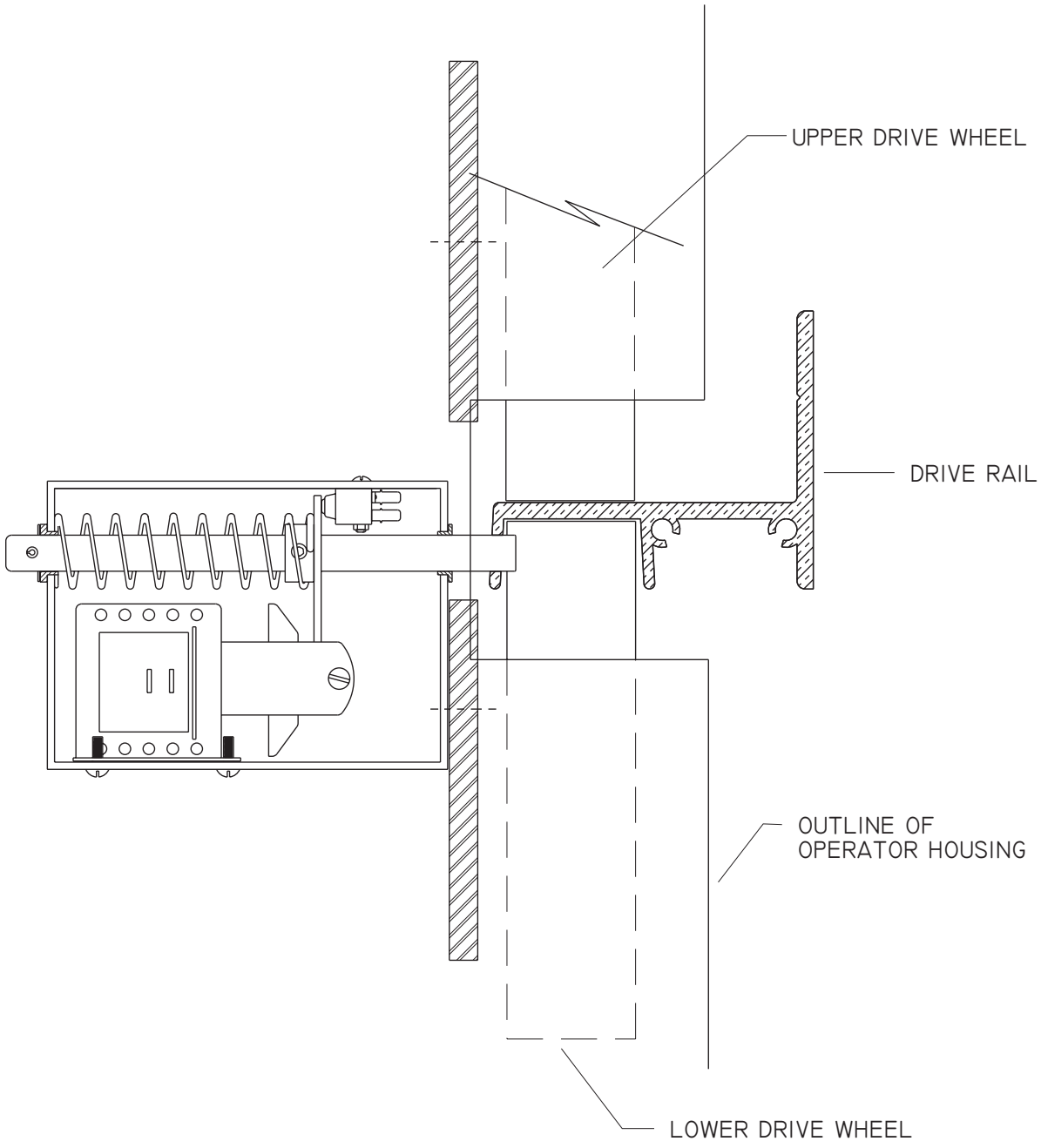

FOR RELIABLE LOCKING, NOTCH OUT A 3" WIDTH OF THE DRIVE RAIL.

NOTE:

ENTIRE INTERNAL SOLENOID LOCK ASSEMBLY, INCLUDING LOCK PIN, PIVOTS DOWN AWAY FROM NOTCH WHEN DRIVE WHEEL TOGGLE ASSEMBLY IS DISENGAGED ALLOWING FOR MANUAL OPERATION IN CASE OF POWER FAILURE.

## INTERNAL SOLENOID LOCK - ELEVATION

SI8B




INTERNAL SOLENOID LOCK

S26B

# Troubleshooting

**Also review Page 13, Mechanical & Hydraulic Adjustments**

**Trouble With Gate Movement in General:**

1. Disengage the operator from the gate and move the gate manually. If the gate does not roll well or is warped, fix the gate before working on the gate operator.
2. For adequate grip, the red spring that clamps the drive wheels must be compressed to 2" in height. Adjust by unclamping and turning the nut at the bottom of the threaded rod.
3. Look inside the operator under the wheels for metal shavings. Shavings indicate that the gate panel or the operator is out of alignment. Realign the operator as necessary. The operator must always be square to the gate and the drive rail must be shimmed if necessary to maintain an in/out tolerance of 1/4" throughout full gate travel.

**Electrical Problems in General:**

The Smart Touch Controller reports system malfunctions on its LCD display and the buzzer will emit a series of chirps at defined intervals. Review the matrix of Alerts, Faults and Errors listed on the next page. To disclose the status of all inputs on the terminal strip, the LED tact button must be pushed. This button is in the upper left corner near the Stop input.

**Specific Types of Problems:**

"I pushed the open and close buttons, but nothing runs."

1. Verify that the line voltage is present and matches the operator voltage + 10%.
2. Verify that control voltage is present at the power supply Common and 24VDC terminals. It may be necessary to reset the circuit breaker (black button) on the transformer.
3. Verify a jumper wire joins Common to Stop, if an external stop button is not used.
4. Verify there are no Faults or Errors reported on the LCD display. See table on next page.
5. If the motor contactor chatters, voltage drop due to undersized wires is the likely cause. Check Appendix 9 for maximum allowable length of wiring runs vs. wire size.

*"The pump is running but the wheels are slow or not turning at all."*

(Hydraulic pressure is between 0 - 700 PSI on the gauge)

1. If the power is three-phase, reverse any two AC lines and verify CCW motor rotation.
2. Check the level of the hydraulic oil by removing the plug in the reservoir. If necessary, add oil at this location to within one inch of the filler hole.
3. Unplug the hoses and run the pump. If the pressure is low, adjust the relief valve.
4. If relief valve does not respond to adjustment, remove it entirely and depress the plunger at the nose end with a blunt tool (Allen wrench) and blow it to remove any debris.
5. If cleaning the relief valve does not help, repeat this procedure with the quick stop valve.

*"Hydraulic pressure is above 700 PSI"*

1. Unclamp and spread the drive wheels, then retest. If the wheels turn, verify that the gate will move by manually pushing it. Fix the gate hardware if necessary.
2. Verify that the hose end quick disconnects are fully seated when connected.
3. If equipped with brake valves (E or EX type), loosen them a little by turning clockwise.

*"The wheels turn backwards, or only in one direction."*

1. Check hose connections for correct handing.
2. Press the Open button and verify that the directional Valve coil develops a strong pull. (This can be tested by removing the nut retaining the coil and grasping the coil)

*"The gate only opens or only closes."*

1. If the gate only opens, the directional valve is probably stuck and needs replacement.
2. If the gate only closes, the valve coil is not being energized, or is defective.

# Troubleshooting

The Smart Touch Controller system includes many self diagnostic capabilities. The LCD will display specific messages and the Audio Alert buzzer will sound distinctive chirps. Any Alerts, Faults or Errors are also logged into a memory and stamped with a time and date. For diagnostic purposes, these messages can be retrieved with optional WinLogger™ software available from Hy-Security Gate.

**The following chart is a listing of codes that would appear on the LCD display if problems are detected by the Smart Touch Controller.**

| Error, Fault, or Alert Status | LCD Display | Buzzer Chirp Sequence |
|---|---|---|
| Cannot respond due to tripped sensor or in Entrapment mode | Entr | 2 chirps/sec every 2 seconds while control input is active |
| Safety Mode Alert | SAFE | 2 chirps once when in Safety Mode |
| Low 24V Control Voltage Alert | Lo24 (ac or dc) | N/A (LCD flashes once every 5 seconds) |
| Critical Low 24V supply power | BadP (ac or dc) | N/A – controls disabled |
| Dead 24V Battery Alert –DC only | bat - dEAd | 3 chirps upon any operating command |
| Gate forced open Alert | ALE1 | 2 pulses/sec for 30 seconds |
| Gate drift closed Alert | ALE2 | 2 pulses/sec for 10 seconds |
| Motor thermal overload Alert | ALE4 | 2 chirps/sec every 15 seconds |
| Both limits tripped Alert | ALE5 | 2 chirps/sec every 15 seconds |
| Limits not released in 10 seconds | ALE6 | 2 chirps/sec every 15 seconds |
| Loop abnormal freq change alert | ALE7 | 2 chirps/sec every 15 seconds |
| Loop shorted to ground alert | ALE8 | 2 chirps/sec every 15 seconds |
| Loop disconnected alert | ALE9 | 2 chirps/sec every 15 seconds |
| Loop detector comm. alert | AL10 | 2 chirps/sec every 15 seconds |
| Loop detector function alert | AL11 | 2 chirps/sec every 15 seconds |
| Loop detector active >5 minutes | AL12 | 2 chirps/sec every 15 seconds |
| Maximum run Fault | FAL1 | 1 chirp once every 15 seconds |
| Photo eye Fault (supervised) | FAL2 | 2 chirps/sec once per minute |
| Critical AC sag – bad supply wire | FAL3 | 2 chirps/sec once per minute |
| Directional motion Error | Err1 | 3 chirps/sec once per minute |
| Disconnected IES Error | Err2 | 3 chirps/sec once per minute |
| Loop detector failed | Err3 | 3 chirps/sec once per minute |
| Master/slave RS485 comm. Error | Err4 | 3 chirps/sec once per minute |
| EEPROM Data Error (factory) | Err7 | 3 chirps/sec once per minute |
| EEPROM Data Error (installer) | Err8 | 3 chirps/sec once per minute |
| EEPROM Data Error (user menu) | Err9 | 3 chirps/sec once per minute |
| Program Data Error | FAiL | 3 chirps/sec once per minute |

**The green LED near #2 on the terminal strip is the heartbeat of the processor. This LED should always blink brightly to indicate normal operation.**

**GATE SPEED:** The speed in which a hydraulic operator moves a gate is determined by the size of the pump and the size of the actuator components. Just like a gear box, this speed is not adjustable. Attempting to slow a gate by changing any valve setting will cause a great deal of inefficiency and heat. If the speed of a gate must be changed, contact your Hy-Security distributor. Extremely cold weather is unlikely to seriously affect the speed of the gate, because Hy-Security employs a special grade of hydraulic oil that we call UNIFLOW oil, which maintains a very linear viscosity over a broad range of temperatures. Because of this high quality oil and other design considerations, we rate our operators for service in ambient temperatures of -40F degrees to 130F degrees. If the speed of your operator has been affected by cold weather, verify that the gate hardware is not impaired by ice and verify that the reservoir it is filled with UNIFLOW oil. In severe conditions, consider adding a heater.

# General Maintenance

## Hydraulic System

**Fluid Level:** Under normal conditions, hydraulic systems do not consume oil. Before adding any oil, check the system thoroughly for leaks. Remove the bright metal plug in the tank, fill to plug level, then replace plug. We recommend our Uniflow hydraulic oil; part number H004 1.0, which is sold in one-gallon containers by our distributors. Automatic transmission fluid may be used, although its performance in cold weather will be sluggish unless the operator is well heated. ***Never use brake fluid. It will severely damage the entire hydraulic system.***

**Look for leaks:** Occasionally there may be slight seeping at the fittings after some usage. Tightening of the fittings will usually correct the problem. If the leaking persists, replace "O" rings, fittings or hoses, if required. No further leaks should occur.

**Oil Change:** A hydraulic system does not foul its oil, unlike a gas engine, so oil changes do not need to be frequent. Oil breakdown caused by heat is the main concern. If the unit is subjected to high use, especially in a warm climate, change the oil more frequently. In general, we recommend draining the reservoir and replacing the oil at five-year intervals.

To change the hydraulic oil, remove the reservoir from the pump unit and completely, empty it and wipe the reservoir clean and clean the derby screen before re-assembling. Refill with new Uniflow hydraulic oil (available from your distributor). To avoid overfilling, fill only through removable plug near the top of the tank. Slowly pour the oil into the tank until the oil is within one inch of the filler port. Replace the plug and wipe up any spilled oil. If any oil is allowed to remain, it will dry to a very sticky and messy consistency.

**Cold Weather:**

1. Check that your reservoir is filled with our *Uniflow* high performance oil.
2. Ice can partly or totally jam gate operation. Check function by operating the gate manually.

## Electrical Controls

**Before servicing, turn off power disconnect switch**

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. A qualified technician may troubleshoot with the aid of the troubleshooting guide in this appendix. If it is necessary to call a distributor for assistance, be sure to have your model and serial number ready. Other helpful information would include the name of the job, approximate date of installation, and the service record of the operator, especially any work that has been done recently.

**How to Adjust the Pressure Relief Valve:** To check your relief valve setting, first disconnect the hoses. Run the operator either open or closed (the gate will not move with the hose disconnected. The relief valve is found on the rear of the hydraulic power unit. It has an adjusting head and lock nut. To adjust, loosen the lock nut and screw the threaded bolt clockwise for increased pressure, counterclockwise to decrease pressure.

| MODEL | FACTORY RELIEIF SETTING |
|---|---|
| SS, MS, E, CF, CE, DS, DE Models | 1000 PSI |
| EX, CX, DX, X1 Models | 1300 PSI |
| 444 Series | 2000 PSI |

*There is only limited value in using the relief valve as an entrapment protection device. Photo Eyes or gate edges are the best methods to protect pedestrians and maintain reserve power to reliably drive the gate.*

# Maintenance Schedule

**Slide Gate Operator Maintenance Schedule**

| Name of part | What to do | | Check at these recommended monthly intervals | | | | |
|---|---|---|---|---|---|---|---|
| | | | 1 | 3 | 6 | 12 | 60 |
| Gate and Hardware | Check for damage and wear | *1 | X | | | | |
| Drive wheels | Check for excessive wear | *2 | | X | | | |
| Wheel clamp spring | Check for clamping tension | *3 | | X | | | |
| Limit Switches | Check for adjustment | *4 | | X | | | |
| Anchor bolts | Check for tightness | | | | X | | |
| Fluid level | Check for loss of fluid | *5 | | | | X | |
| Hydraulic fluid | Drain and replace fluid | | | | | | X |
| Clock Battery | Replace | *6 | | | | | X |

**Special Notes:**

*1 Your gate and it's hardware will require more maintenance than the Hy-Security operator that is moving the gate. A damaged gate or worn hardware may cause operation to appear slow or erratic and will result in excess drive wheel wear. Lubricate the gate hardware more frequently and check for smooth operation by opening the toggle clamping mechanism and then pushing the gate manually. One person should easily be able to push all but the largest of gates. Damaged or warped gate panels should be straightened or replaced.

*2 Normally, the drive wheels will last for many years because they are designed to not slip on the rail. The life of the wheels may be greatly shortened by any of these faults: clamping spring not correctly adjusted, operator misaligned in relation to gate panel, badly warped gate panel or extremely stiff hardware.

*3 Verify that the red clamping spring is compressed tightly, so that the drive wheels apply a strong grip on the power rail. The red spring should normally be compressed to 2" in height.

*4 The limit switch rollers should ride 1/4" to 1/2" below the drive rail, near the center of the channel. Misadjustment may result in false or early tripping or no limit function at the end of travel. Verify that the limit trip ramps are tightly bolted to the drive rail.

*5 The oil level should remain approximately one inch below the filler hole. See maintenance instructions for oil filling. Loss of fluid is not normal and indicates a leak that must be located and repaired. The cap for the filler hole is a breather and needs only to be finger tight. Use "Uniflow" fluid, part H 004 1.0, if additional fluid is required.

*6 Replace battery with DL 2025 / DL 2032 or CR 2025 / CR2032.

# Use and Adjustment of the Manual Release Mechanism

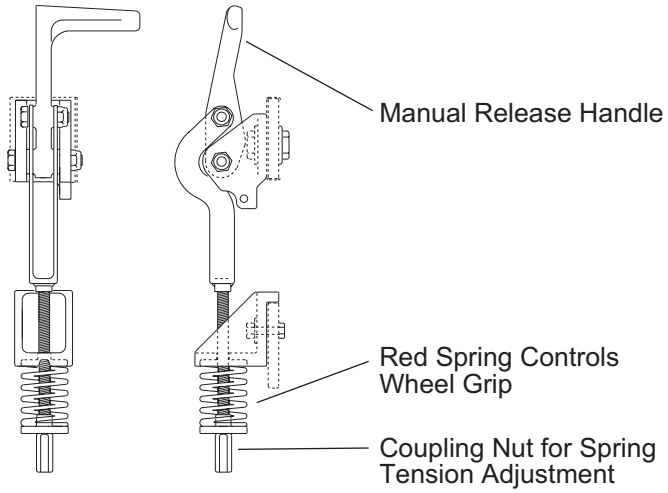
All slide gate series operators come equipped with a toggle handle manual release mechanism to disengage the drive wheels from the drive rail. The manual release is located under the electric control panel and to the right of the hydraulic motors. To disengage the drive wheels, simply pull the aluminum handle down.

**USE CAUTION:** at first the toggle handle will rapidly pop down, as the loaded spring releases. This action will cause the lower drive wheel to drop and disengage from the drive rail. When the coupling nut on the threaded rod drops to its lowest position it will push on the base of the operator which will cause the upper drive wheel to lift and disengage from the drive rail.

For shipment, a piece of wood was placed between the coupling nut and the chassis. If the wood is still in place, discard it.

If the drive rail has been installed at the correct height to the chassis, the manual toggle release mechanism will equally spread both wheels away from the drive rail. If the rail has been mounted higher than specified, it may be necessary to insert a 3/8" bolt into the bottom of the coupling nut which will create additional lift clearance for the upper drive wheel when manually released. If used, adjust the 3/8" bolt so the drive wheels spread equally when the manual toggle release is fully disengaged.

**The coupling nut must always be adjusted correctly so the wheels provide a strong clamping force on the drive rail. The red spring should measure 2" to 2-1/8" in height when under correct compression.**



# IMPORTANT SPECIAL NOTES REGARDING D.C. POWERED GATE OPERATORS

The on/off switch on the electric control panel of the drive unit does not disable all DC power to the operator, even if the AC power has been disabled at its source. The large rotary switch in the DC power supply enclosure must be actuated off to insure disconnect of all DC power to the drive unit.

The disconnect in the power supply must be off if the AC source power will be absent for more than one week. This avoids slowly discharging the batteries into the battery charger. Batteries will self-discharge and therefore the DC power supply must not be stored for a period longer than 6 months without recharging the batteries.

Batteries contain sulfuric acid. If batteries are dropped or damaged, be cautious not to get acid in the eyes, on skin, or on clothing.

Be certain to observe polarity when connecting the batteries, or adding accessories. Reversed polarity may result in a non-functional operator or possibly damage a component. Red is (+) positive, and black is (-) negative.

Since the electrical current under load is very high, be certain that the minimum conductor size, specified in the installation instructions, is used for the connection between the battery pack and the operator. If the battery pack is more than 20 feet from the operator, use a larger wire size, according to the distance between the operator and the batteries.

If shorted, batteries will generate a very high current. Observe special care when connecting the cables to the batteries that the polarity is correct. The batteries are connected in a series circuit: join the positive (+) terminal from one battery to the negative (-) terminal of the next battery.

Since this operator is intended to run on batteries, control of the load is important. Easier moving gates will drain less energy from the battery, preserving capacity for more cycles during a power failure.

Hy-Security uses a permanently sealed type battery, which needs no maintenance over its life span. A low voltage-sensing circuit protects the batteries from damage which could be caused by over-discharge. The charger automatically regulates its output to allow high output when the battery is partially discharged. The output will automatically be reduced to zero as the batteries become fully charged.

Batteries have a finite life. As the batteries age they will lose some of their capacity to store energy. If the total amount of back up capacity is critical, plan to replace the batteries after 5 years of use. Properly dispose of or recycle used batteries.

Batteries are rated to perform to capacity at a temperature of 77 degrees Fahrenheit. Below 77 degrees, the “amp hour” capacity is temporarily reduced. For example, at freezing, the capacity is 75%, at 10 degrees Fahrenheit, the capacity is 50%. Hy-Security insulates the battery pack to guard against this loss. Do not remove any insulation or the performance of the system may be adversely affected.

Batteries can be damaged by excessive heat, which may shorten their life span. Therefore, do not paint the battery enclosure a dark color that could cause it to absorb a lot of heat from sunlight.

# Wiring and Control Configuration for DC Operators

If this installation is a 24-Volt DC battery type gate operator, there are a few additional steps that must be completed before the system can be functional. Review the installation instructions, step #11 on page 12 and the connection diagram on page 58 (2-battery system) or page 59 (4-battery system). Be certain the DC power disconnect switch is turned off before making any connections.

1. Connect the heavy gage wires between the battery enclosure and the gate operator as follows: Be certain to observe polarity carefully!
   a. From the battery enclosure the (+) lead connects to the lug on the large rotary power disconnect switch. The (-) lead connects to the lug on the circuit breaker. At the gate operator the (+) lead connects directly to the lug on the top of the DC electric motor. The (-) lead connects to the bottom lug on the contactor mounted alongside the DC motor. All lug connections must be tightened very securely since they pass high current to the gate operator.

2. Connect two separate 14-gage circuits between the battery enclosure and the gate operator. One circuit provides the 24 VDC to the gate operator controls and the second circuit is required so that the Smart Touch Controller knows that the battery charger is operating normally on AC power. Be certain to observe polarity carefully!
   a. Connect four wires to the terminal strip in the battery supply labeled: (+)24, (-)24, COM, #21. The 24 Volt (+) and (-) terminals connect to the red (+) and black (-) wires at the on/off power switch in the gate operator.
   b. The COM and #21 terminals connect to the Common Buss and to terminal #21 (Charger AC power loss) on the Smart Touch Controller.

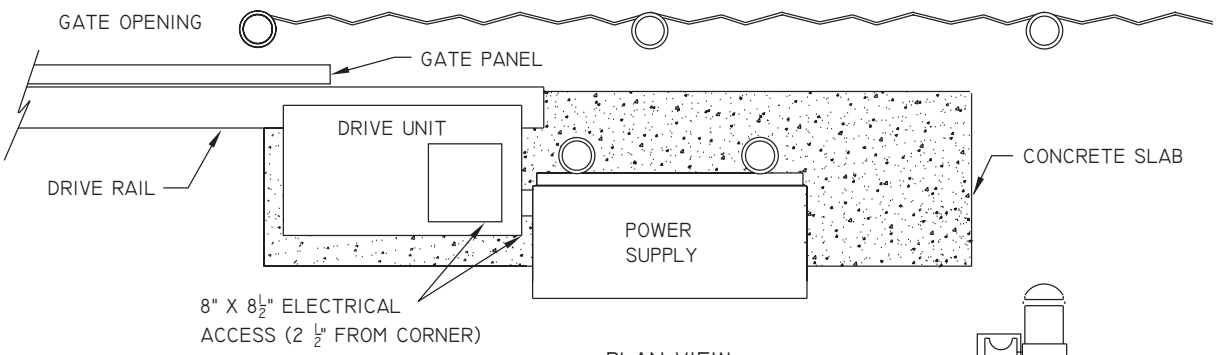
3. The Smart Touch Controller User Menu (U4) provides four optional system configurations for 24-Volt DC battery type gate operators. Since this is an uninterruptible power supply system, the installer must decide, depending upon customer preference, what is to happen when the AC line power fails. There are four functional choices provided in the User Menu, item [AP_].

Setting 0 (Type A): The operator functions normally until the batteries drop to 20 Volts, then auto open and lock until the battery voltage recovers to 23.5 Volts. The gate can still be manually closed only by a Close Pushbutton or an Emergency Close input and will then re-open by any open command until the battery voltage drops to 17 Volts at which time the gate is absolutely locked open, unless moved manually.

Setting 1 (Type B): The operator functions normally until the batteries drop to 20 Volts, then auto close and lock closed until battery voltage recovers to 23.5 Volts. The gate can only be opened by a special combination of a Stop Pushbutton input, then within 1 second, an Open Pushbutton input. The Fire Department open input can open the gate without the special PBS enabling pre-input. The gate can be re-closed only by Close Pushbutton and the Emergency Close inputs. When the battery voltage drops to 17 Volts, the gate completes its final cycle and stays in the full open or full closed position, depending upon which cycle was last.

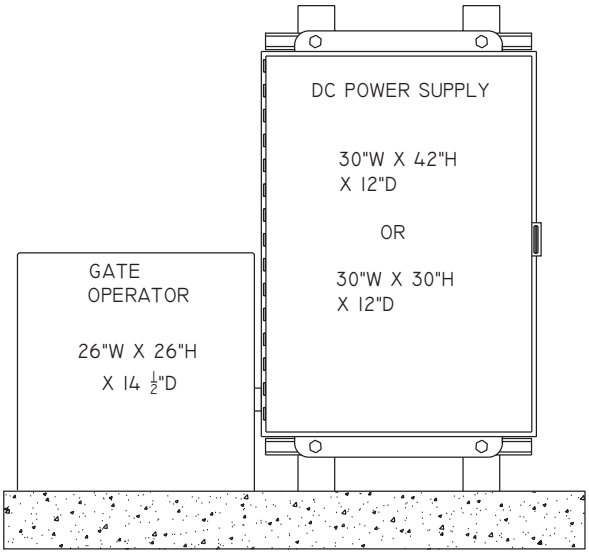
Setting 2 (Type C): The operator automatically opens five seconds after loss of AC power and locks open, until AC power is restored. The gate can still be manually closed only by a Close Pushbutton or an Emergency Close input and will then re-open by any open command until the battery voltage drops to 17 Volts at which time the gate is absolutely locked open.

Setting 3 (Type D): Same as type C, except the operator initially does nothing after loss of AC power, but then locks open after the next open command of any type.

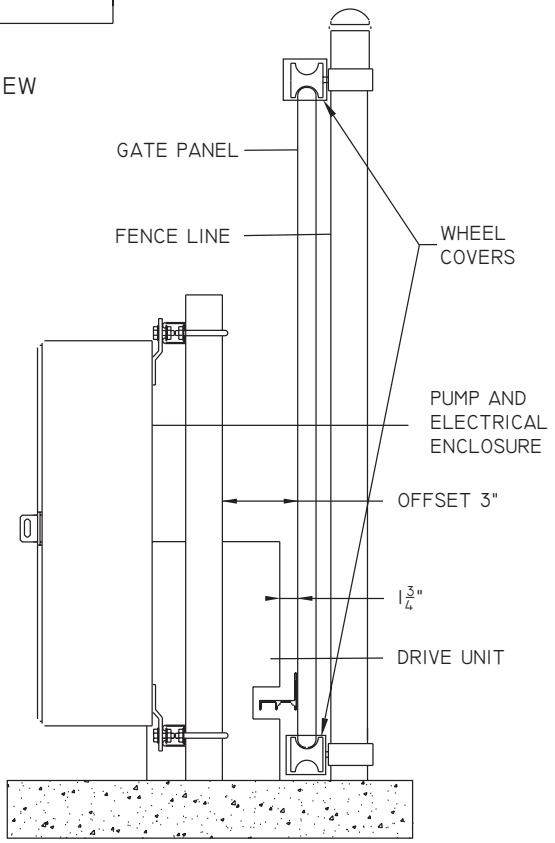



PLAN VIEW

RIGHT HAND GATE SHOWN. REVERSE ENCLOSURE FOR LEFT HAND INSTALLATION.




FRONT VIEW




END VIEW

NOTES:

CONCRETE FOOTINGS MUST BE A MINIMUM OF 16" DEEP OR TO THE FROST LINE. CHECK LOCAL CONDITIONS.

DRIVE UNIT AND POWER PACKAGE MUST BE CONNECTED BY A MINIMUM 2" ROUND CONDUIT FOR PASSAGE OF ELECTRICAL WIRES.

SUPPORT POSTS FOR ELECTRICAL ENCLOSURE ARE 4" MINIMUM. POSTS AND HARDWARE ARE BY OTHERS.

ONE SLAB TO SUPPORT OPERATOR AND ELECTRICAL ENCLOSURE WILL HELP ASSURE ALIGNMENT OF ALL COMPONENTS.

WHEN POSSIBLE, ELECTRICAL ENCLOSURE SHOULD BE LOCATED WITHIN 10 FEET OF OPERATOR. CONTACT FACTORY IF DISTANCE IS GREATER THAN 10 FEET.

D.C. POWER BATTERY PACKS
2 BATTERY, 90AH: 30"W X 30"H X 12" D
4 BATTERY, 170AH: AS SHOWN.

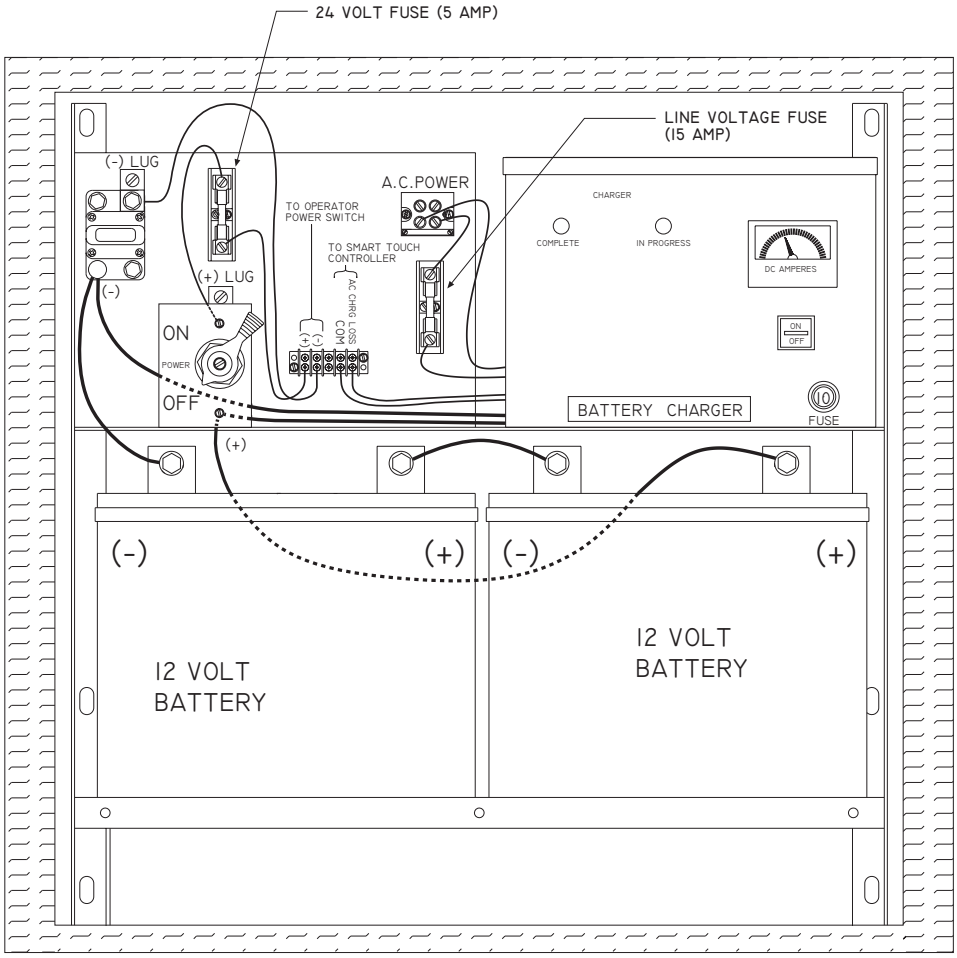
POWER SUPPLY WIRING TO DRIVE UNIT:
4 CONDUCTORS REQUIRED
4 EA. 14GA.MINIMUM FOR CONTROL PANEL
2 EA. HEAVY GAUGE FOR MOTOR.
6 GA. MINIMUM FOR 1 HP MODELS
2 GA. MINIMUM FOR 2 HP MODELS
ADD 2 14 GA.MINIMUM IF DRIVE UNIT HEATER IS SUPPLIED.

Hy-Security Gate Operators
SEATTLE, WASHINGTON

TITLE
DC REMOTE POWER PACKAGE

| | | | |
|---|---|---|---|
| DRAWN KERI | DATE 7/27/0 | THIRD ANGLE PROJECTION | REV – |
| CHECKED - | DATE - | ERN NUMBER ERN000010 | DATE 5/16/00 |
| APPROVED - | DATE - | DRAWING NUMBER SS20 | SHT 1 OF 1 |

# Battery Connection Diagram




CONNECT SIX WIRES TO GATE OPERATOR AS SHOWN.

FOUR 14GA. WIRES TO CONTROL CIRCUIT
CONNECT FROM LUG
TERMINALS TO DC MOTOR:
TWO 6 GA. MINIMUM FOR **222 DS** OR **222 DE**
OR
TWO 2 GA. MINIMUM FOR **222 DX**

INSTALL BATTERIES AS SHOWN, OBSERVING POLARITY.

ALWAYS OBSERVE POLARITY CAREFULLY.
ALWAYS CONNECT RED WIRES TO (+) AND BLACK WIRES TO (-) EXCEPT FOR WIRES CONNECTING THE BATTERIES.

| | | | | | |
|---|---|---|---|---|---|
| HySecurity Gate Operators, SEATTLE, WASHINGTON | TITLE: 24V-100 A.H. BATTERY POWER SUPPLY FOR DC OPERATORS | DRAWN: CMK | DATE: 28JUN01 | REFERENCE RELEASE NOTICE | REV: A |
| | | CHECKED | DATE | PART NUMBER: N/A | |
| | | APPROVED | DATE | DRAWING NUMBER: E125 | SHT 1 OF 1 |

# Battery Connection Diagram

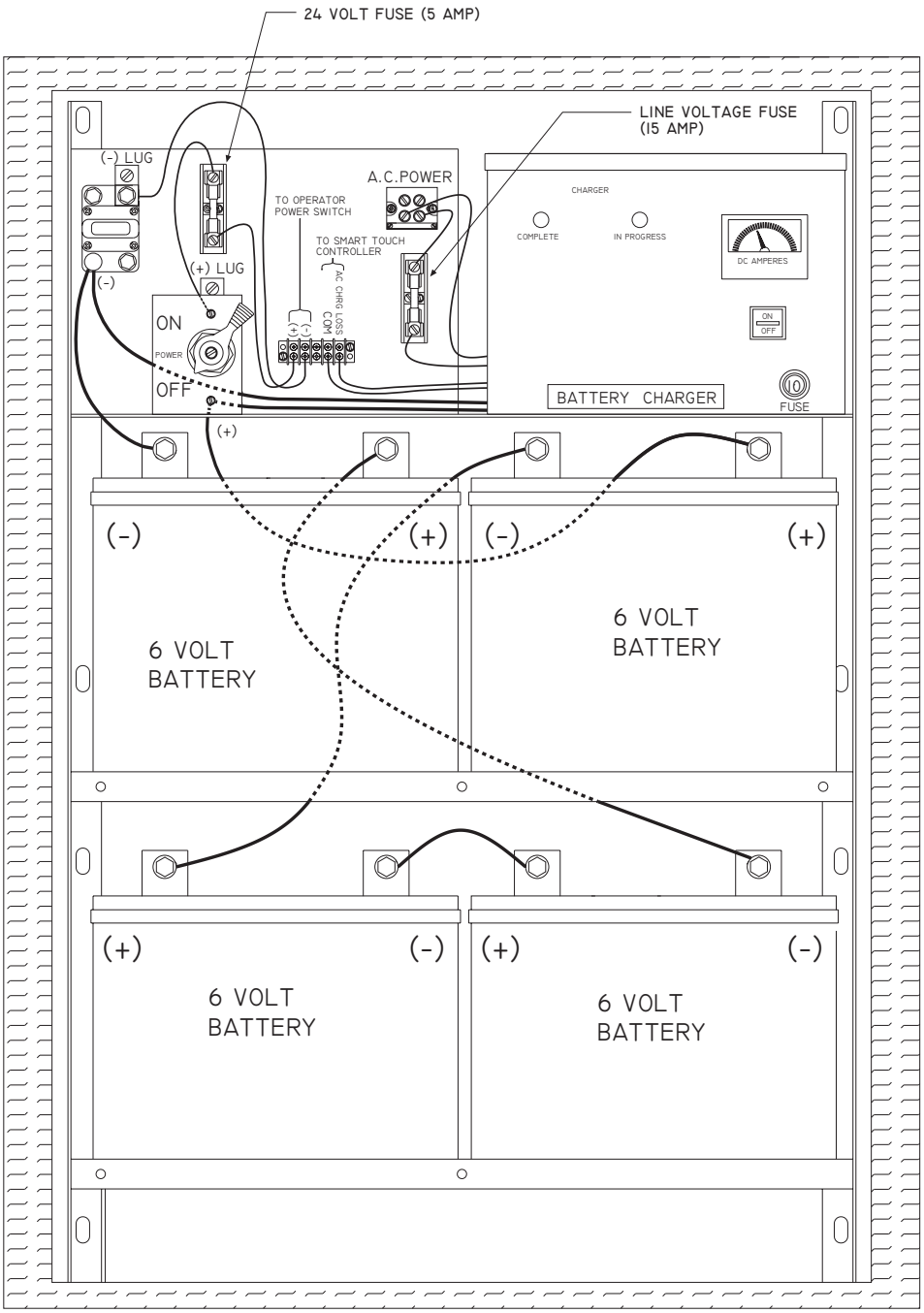
CONNECT SIX WIRES TO GATE OPERATOR AS SHOWN.

FOUR 14GA. WIRES TO CONTROL CIRCUIT

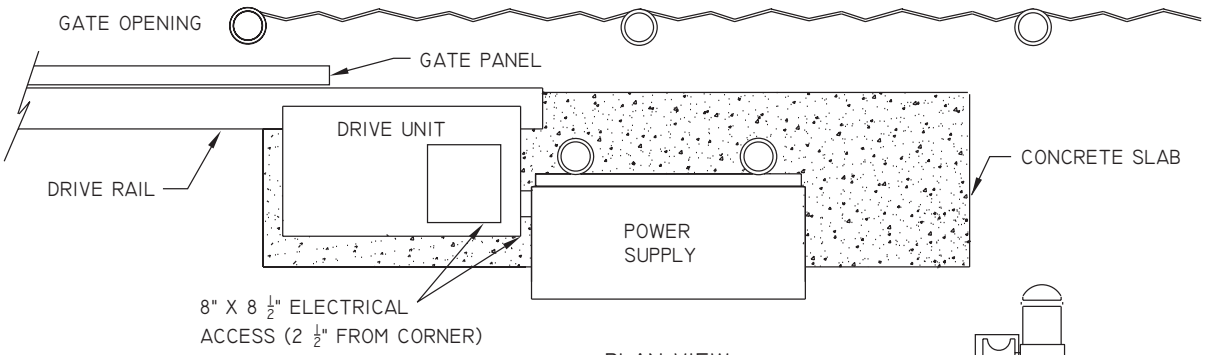
CONNECT FROM LUG TERMINALS TO DC MOTOR: TWO 6 GA. MINIMUM FOR **222 DS** OR **222 DE**
OR
TWO 2 GA. MINIMUM FOR **222 DX**

INSTALL BATTERIES AS SHOWN, OBSERVING POLARITY.

ALWAYS OBSERVE POLARITY CAREFULLY. ALWAYS CONNECT RED WIRES TO (+) AND BLACK WIRES TO (-) EXCEPT FOR WIRES CONNECTING THE BATTERIES.

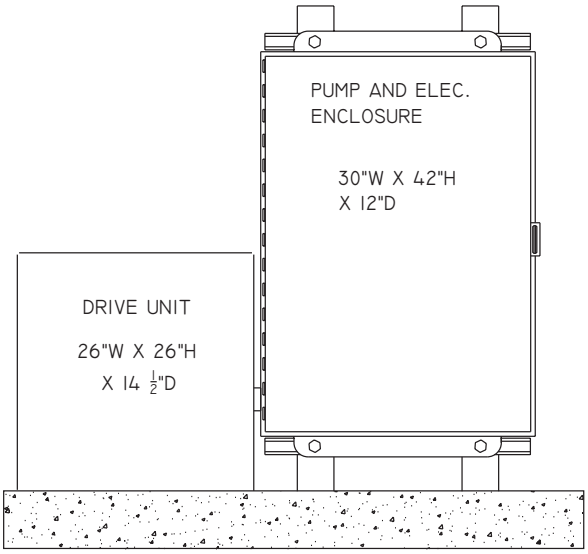



| | | | | | |
|---|---|---|---|---|---|
| HySecurity Gate Operators, SEATTLE, WASHINGTON | TITLE: 24V-170 A.H. BATTERY POWER SUPPLY FOR DC OPERATORS | DRAWN: CMK | DATE: 28JUN01 | REFERENCE RELEASE NOTICE: ERN000309 | REV: A |
| | | CHECKED | DATE | PART NUMBER: N/A | |
| | | APPROVED | DATE | DRAWING NUMBER: E106 | SHT 1 OF 1 |

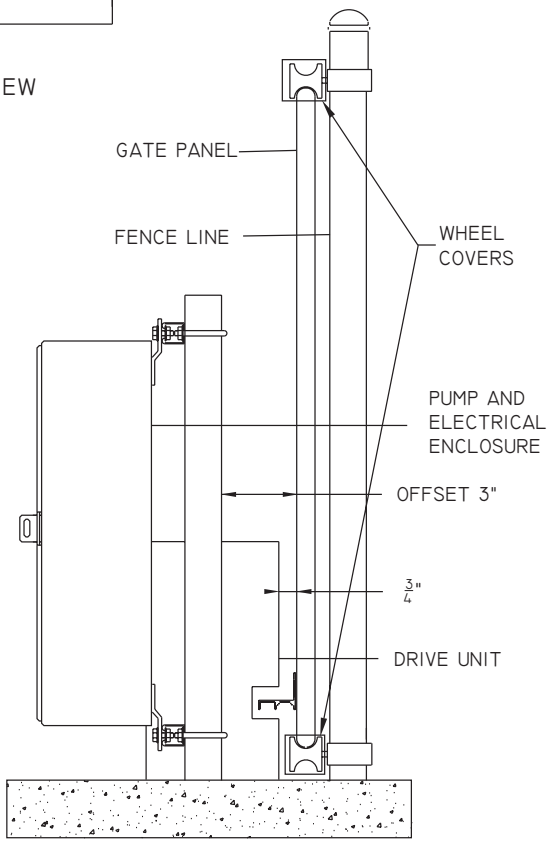



PLAN VIEW

RIGHT HAND GATE SHOWN. REVERSE ENCLOSURE FOR LEFT HAND INSTALLATION.




FRONT VIEW




END VIEW

NOTES:

CONCRETE FOOTINGS MUST BE A MINIMUM OF 16" DEEP OR TO THE FROST LINE. CHECK LOCAL CONDITIONS.

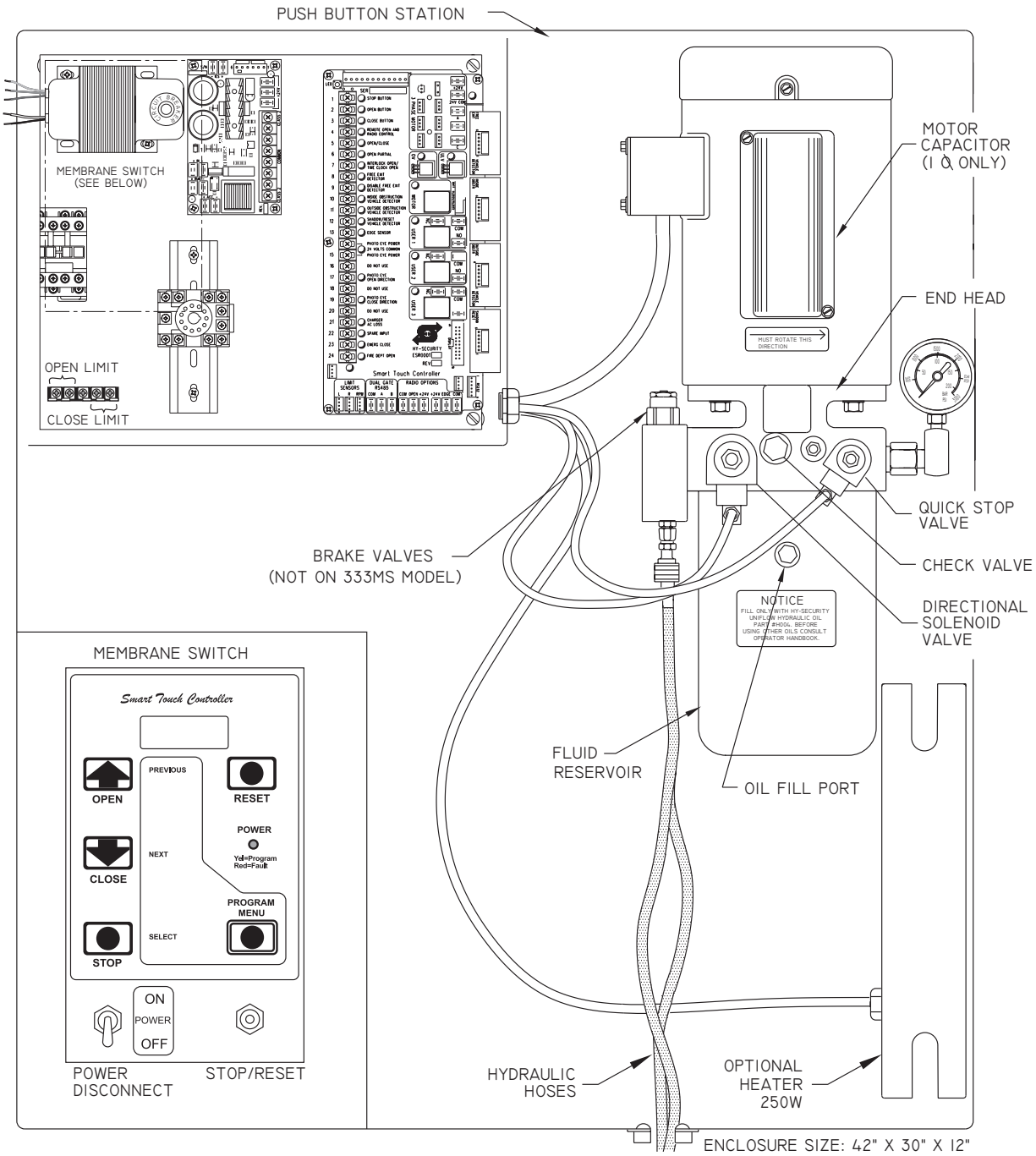
DRIVE UNIT AND POWER PACKAGE MUST BE CONNECTED BY A MINIMUM 2" ROUND CONDUIT FOR PASSAGE OF ELECTRICAL WIRES AND HYDRAULIC HOSES.

SUPPORT POSTS FOR ELECTRICAL ENCLOSURE ARE 4" MINIMUM. POSTS AND HARDWARE ARE BY OTHERS.

ONE SLAB TO SUPPORT OPERATOR AND ELECTRICAL ENCLOSURE WILL HELP ASSURE ALIGNMENT OF ALL COMPONENTS.

WHEN POSSIBLE, ELECTRICAL ENCLOSURE SHOULD BE LOCATED WITHIN 10 FEET OF OPERATOR. CONTACT FACTORY IF DISTANCE IS GREATER THAN 10 FEET.

| | | | | | |
|---|---|---|---|---|---|
| LiftMaster Security Gate Operators SEATTLE, WASHINGTON | TITLE: 333 MODULAR SLIDE GATE OPERATOR | DRAWN: KERI | DATE: 7/27/0 | THIRD ANGLE PROJECTION | REV: – |
| | | CHECKED: - | DATE: - | ERN NUMBER: ERN000010 | DATE: 5/16/00 |
| | | APPROVED: - | DATE: - | DRAWING NUMBER: MSI4 | SHT 1 OF 1 |




| | | | | | |
|---|---|---|---|---|---|
| Hy-Security Gate Operators SEATTLE, WASHINGTON | TITLE: 333MS, 333E, 333EX TYPICAL PUMP AND ELECTRICAL PANEL | DRAWN: D. B. | DATE: 05/08/00 | THIRD ANGLE PROJECTION | REV: A |
| | | CHECKED: - | DATE: - | ERN NUMBER: - | DATE: - |
| | | APPROVED: - | DATE: - | DRAWING NUMBER: MSI2 | SHT 1 OF 1 |

# Wire Size Schedules

**For 1/2-hp through 5-hp motors**

Supplying a gate operator with the right electrical service is crucial to the way the performance of the operator the life of its electrical components. If the wire size used is too small, the voltage loss, especially during motor starting, will prevent the motor from attaining its rated horsepower. The percent of horsepower lost is far greater than the percentage of the voltage loss. A voltage loss could also cause the control components to chatter while the motor is starting, substantially reducing their life due to the resultant arcing. There is no way to restore the lost performance resulting from undersized wires, except to replace them; therefore it is much more economical to choose a sufficient wire size at the initial installation.

The tables on the following page are based on copper wire and allow for a 5% voltage drop. The ampere values shown are the service factor ampere rating (maximum full load at continuous duty) of the motor.

Always connect in accordance with the National Electrical Code, article 430, and other local codes that may apply.

The maximum distance shown is from the gate operator to the power source; assuming that source power is from a panel box with adequate capacity to support the addition of this motor load. The values are for one operator, with no other loads applied to the branch circuit. Avoid placing more than one gate operator to a circuit, but if you must be certain to reduce the maximum allowed distance by half.

**Low Voltage Control Wiring:**

The Smart Touch controller has very sensitive control inputs so the wire size of the control wiring is not a significant issue. The following is a chart of maximum distances for the controls:

| Wire Size | Maximum Distance |
|---|---|
| 18 ga | 7.0 miles |
| 20 ga | 3.5 miles |
| 22 ga | 2.7 miles |
| 24 ga | 2.0 miles |
| 26 ga | 1.0 mile |
| 28 ga | 3700 feet |

## *Wire Sizes for Power Wiring, Single Phase* *Distances are shown in the unshaded boxes*

| | *115 V, SINGLE PHASE* | | | | | | *208 V, SINGLE PHASE* | | | | | | *230 V, SINGLE PHASE* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Amps | 10.0 | 11.06 | 14.4 | 27.2 | NA | NA | 5.5 | 6.1 | 7.6 | 14.2 | 16.2 | NA | 5.0 | 5.8 | 7.2 | 13.6 | 14.8 | 27.0 |
| Horse Power | 1/2hp | 3/4hp | 1hp | 2hp | 3hp | 5hp | 1/2hp | 3/4hp | 1hp | 2hp | 3hp | 5hp | 1/2hp | 3/4hp | 1hp | 2hp | 3hp | 5hp |
| 12ga | 90 | 75 | 60 | 30 | | | 290 | 260 | 205 | 110 | 100 | | 350 | 300 | 245 | 130 | 120 | 65 |
| 10ga | 140 | 120 | 100 | 50 | | | 460 | 415 | 330 | 175 | 155 | | 560 | 480 | 385 | 205 | 190 | 105 |
| 8ga | 220 | 190 | 155 | 80 | | | 725 | 650 | 525 | 280 | 245 | | 880 | 760 | 610 | 325 | 300 | 165 |
| 6ga | 350 | 300 | 245 | 130 | | | 1,150 | 1,040 | 835 | 445 | 390 | | 1,400 | 1,120 | 975 | 515 | 475 | 260 |
| 4ga | 555 | 480 | 385 | 205 | | | 1,825 | 1,645 | 1,320 | 710 | 620 | | 2,220 | 1,915 | 1,550 | 815 | 750 | 410 |
| 2ga | 890 | 765 | 620 | 330 | | | 2,920 | 2,630 | 2,110 | 1,130 | 1,000 | | 3,550 | 3,060 | 2,465 | 1,305 | 1,200 | 660 |

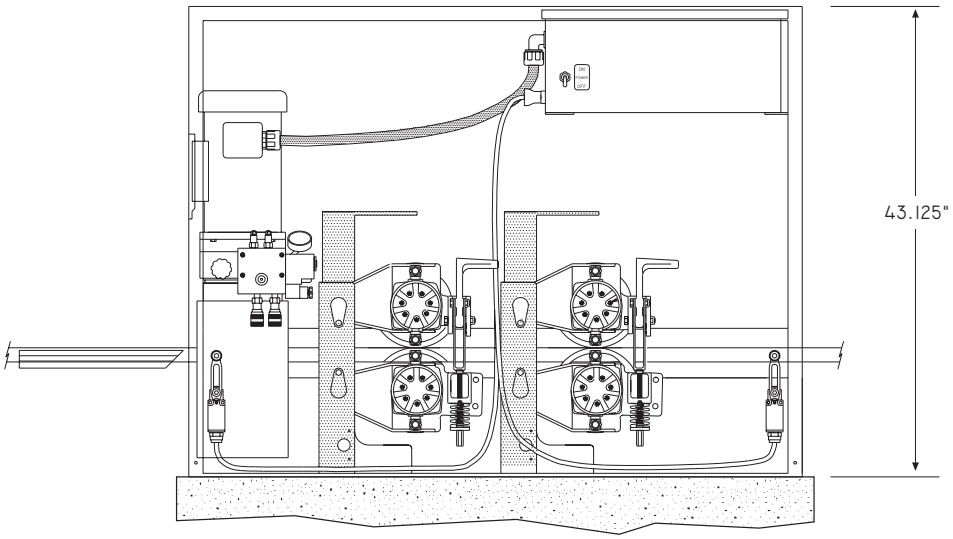
*Wire Gauge*

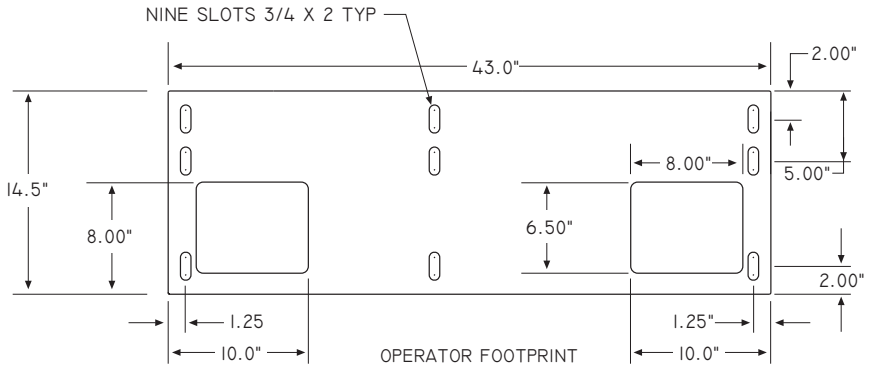
## *Wire sizes for Power Wiring, Three Phase* *Distances are shown in the unshaded boxes*

| | *208 V, THREE PHASE* | | | | | | *230 V, THREE PHASE* | | | | | | *460 V, THREE PHASE* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Amps | 2.7 | 3.1 | 4.2 | 6.5 | 6.7 | 16 | 2.4 | 3.0 | 3.8 | 6.2 | 6.4 | 15.4 | 1.2 | 1.5 | 1.9 | 3.1 | 3.2 | 7.7 |
| Horse Power | 1/2hp | 3/4hp | 1hp | 2hp | 3hp | 5hp | 1/2hp | 3/4hp | 1hp | 2hp | 3hp | 5hp | 1/2hp | 3/4hp | 1hp | 2hp | 3hp | 5hp |
| 12ga | 590 | 510 | 375 | 245 | 235 | 100 | 730 | 585 | 460 | 280 | 270 | 115 | 2,915 | 2,350 | 1,850 | 1,130 | 1,100 | 455 |
| 10ga | 930 | 810 | 600 | 390 | 375 | 160 | 1,160 | 930 | 730 | 450 | 435 | 180 | 4,640 | 3,710 | 2,930 | 1,800 | 1,740 | 725 |
| 8ga | 1,475 | 1,285 | 950 | 615 | 595 | 250 | 1,835 | 1,470 | 1,160 | 710 | 690 | 285 | 7,340 | 5,870 | 4,650 | 2,840 | 2,750 | 1,150 |
| 6ga | 2,350 | 2,045 | 1,510 | 975 | 945 | 400 | 2,925 | 2,340 | 1,845 | 1,130 | 1,095 | 455 | 11,700 | 9,350 | 7,400 | 4,550 | 4,400 | 1,800 |
| 4ga | 3,720 | 3,240 | 2,390 | 1,545 | 1,500 | 630 | 4,625 | 3,700 | 2,920 | 1,790 | 1,735 | 720 | 18,500 | 14,800 | 11,700 | 7,200 | 7,000 | 2,900 |

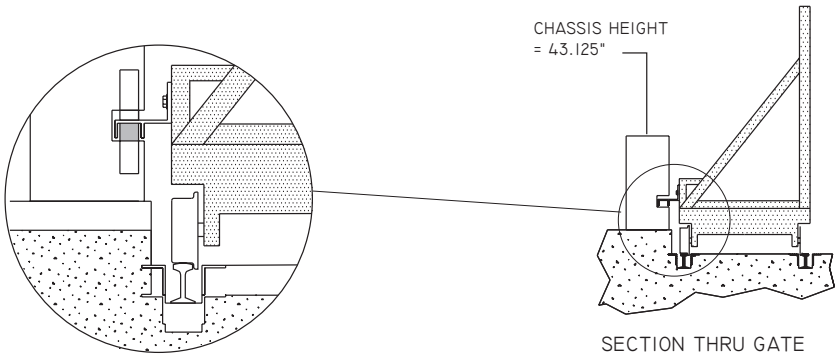
*Wire Gauge*

*Always connect in accordance with the National Electrical Code, article 430, and other local codes that may apply.*




SIX ANCHOR BOLTS 1/2" x 6" ARE REQUIRED TO PROPERLY ANCHOR THE CHASSIS BASE AS SHOWN ABOVE. CUTOUTS SHOWN ARE FOR ELECTRICAL FEED.




NOTES:
IF GATE PANEL IS BOWED, SHIM RAIL FOR EVEN TRAVEL THROUGH GATE OPERATOR.

DISTANCES FROM GATE OPERATOR TO GATE PANEL AND FROM TOP OF RAIL TO TOP OF SLAB ARE CRITICAL.

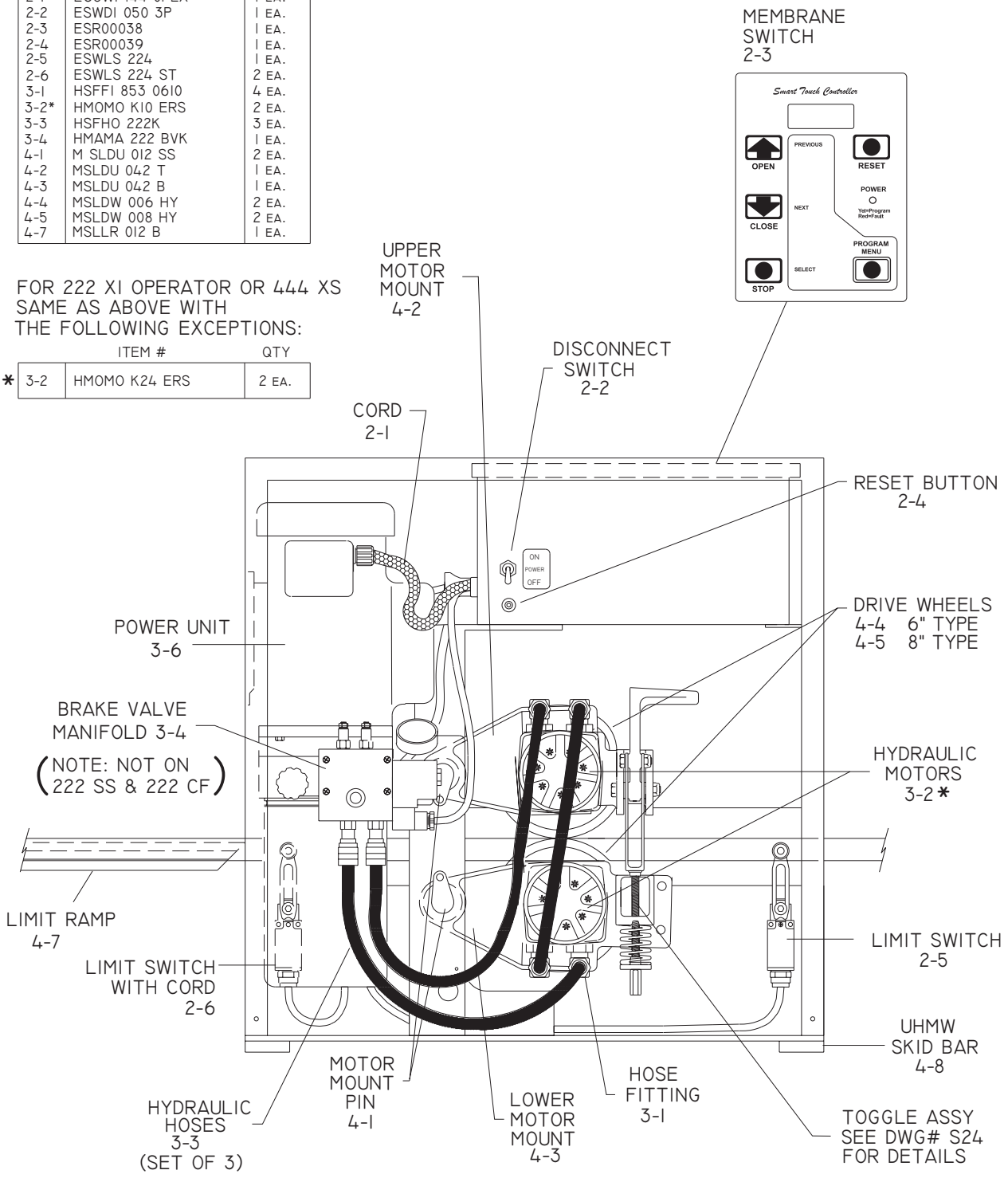
MINIMUM SLAB DIMENSIONS RECOMMENDED ARE 50" WIDE, 20" FROM FRONT TO BACK, AND 20" DEEP. CHECK ALL LOCAL FROST CONDITIONS AND SOIL CHARACTERISTICS FOR EXACT REQUIREMENTS.

## 444 OPERATOR COMPONENTS AND FOOTPRINT XS48-9

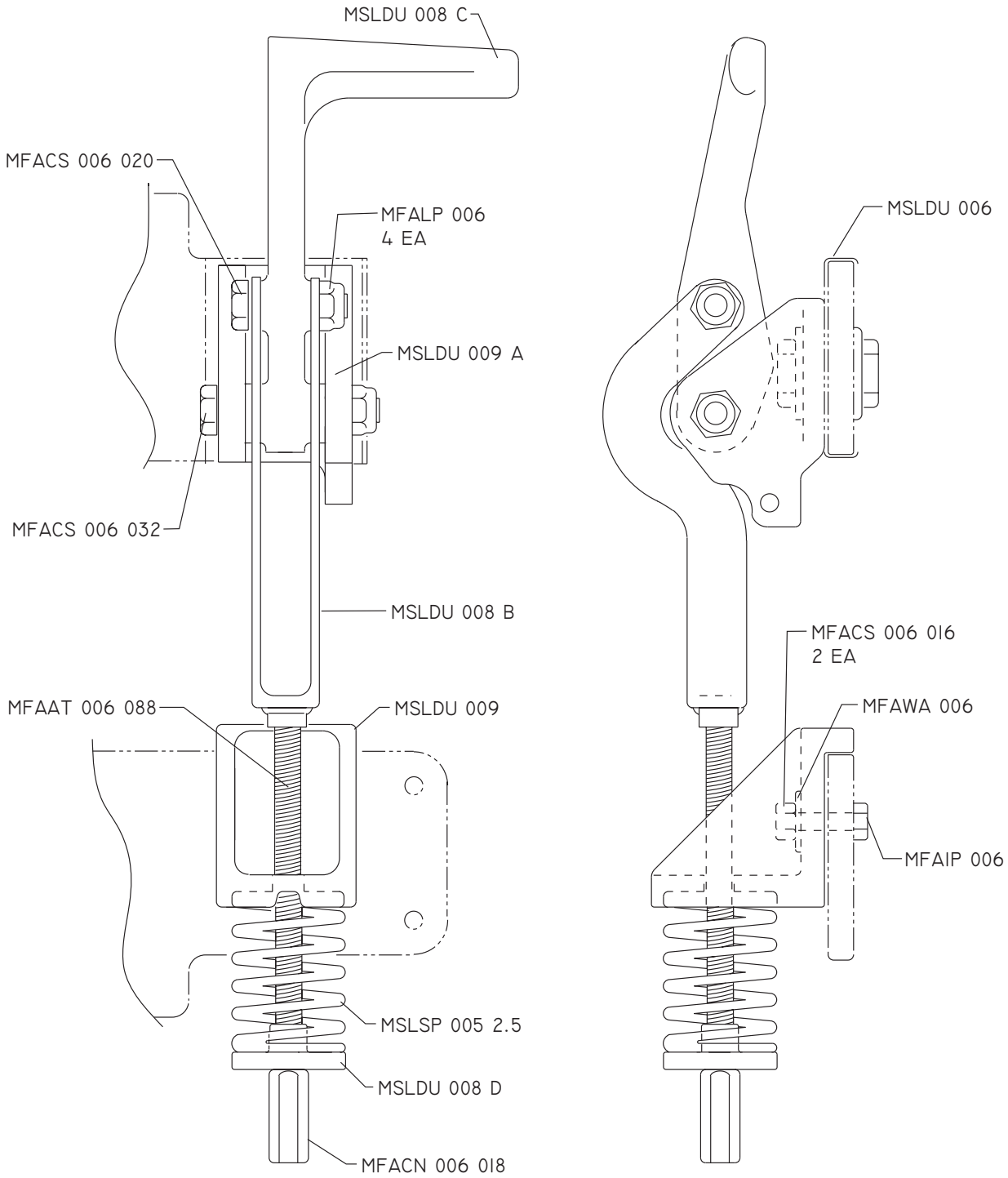
| | ITEM # | QTY |
|---|---|---|
| 2-1 | ECOWI 144 0FLX | 1 EA. |
| 2-2 | ESWDI 050 3P | 1 EA. |
| 2-3 | ESR00038 | 1 EA. |
| 2-4 | ESR00039 | 1 EA. |
| 2-5 | ESWLS 224 | 1 EA. |
| 2-6 | ESWLS 224 ST | 2 EA. |
| 3-1 | HSFFI 853 0610 | 4 EA. |
| 3-2* | HMOMO K10 ERS | 2 EA. |
| 3-3 | HSFHO 222K | 3 EA. |
| 3-4 | HMAMA 222 BVK | 1 EA. |
| 4-1 | M SLDU 012 SS | 2 EA. |
| 4-2 | MSLDU 042 T | 1 EA. |
| 4-3 | MSLDU 042 B | 1 EA. |
| 4-4 | MSLDW 006 HY | 2 EA. |
| 4-5 | MSLDW 008 HY | 2 EA. |
| 4-7 | MSLLR 012 B | 1 EA. |

FOR 222 XI OPERATOR OR 444 XS
SAME AS ABOVE WITH
THE FOLLOWING EXCEPTIONS:

| | ITEM # | QTY |
|---|---|---|
| * 3-2 | HMOMO K24 ERS | 2 EA. |

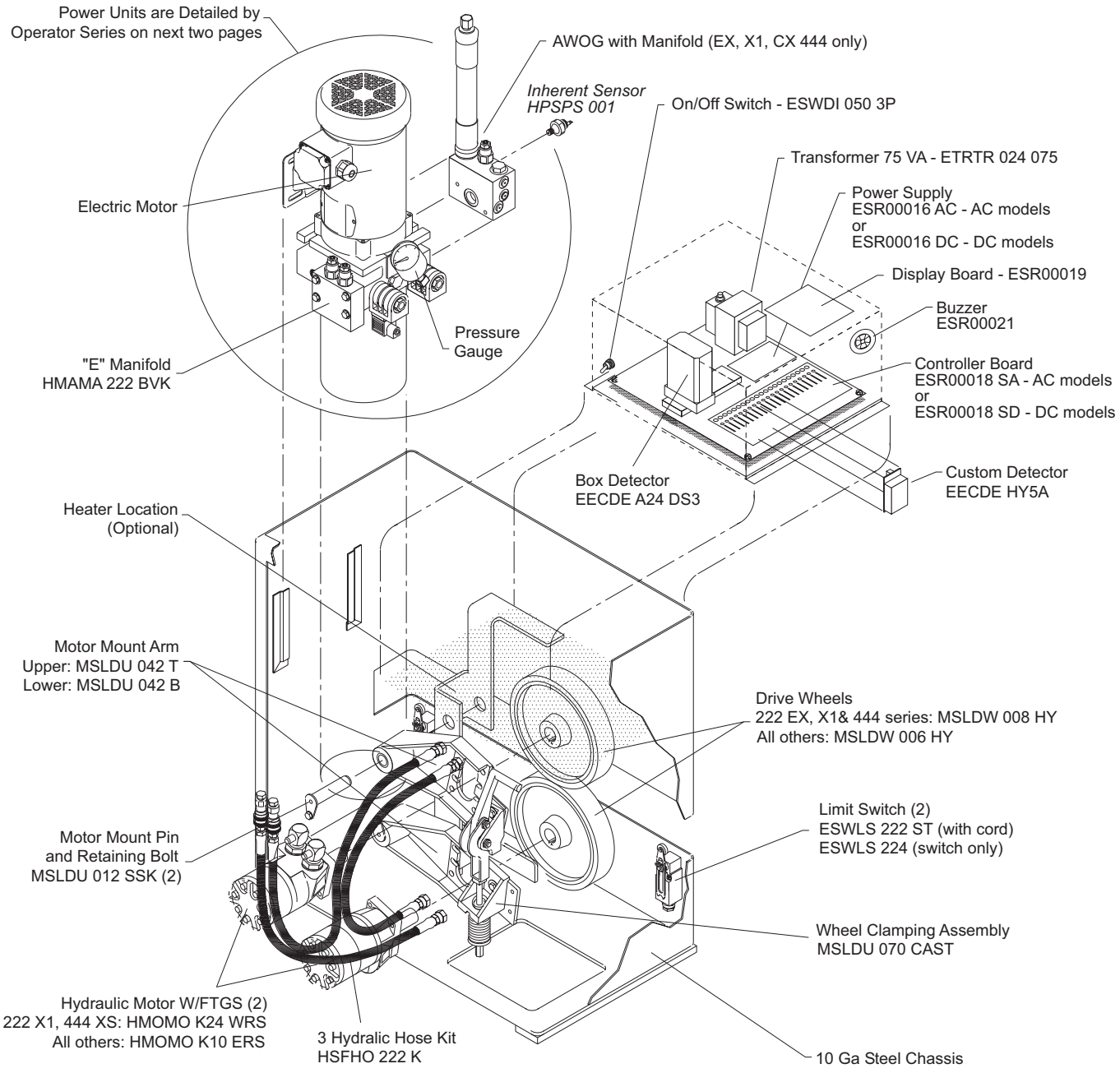



| | | | | | |
|---|---|---|---|---|---|
| Hy-Security Gate Operators, SEATTLE, WASHINGTON | TITLE: COMPONENTS ALL A.C. SLIDE OPERATORS, EXCEPT III LS | DRAWN D.B. | DATE 6/26/0 | THIRD ANGLE PROJECTION | REV |
| | | CHECKED - | DATE - | ERN NUMBER - | DATE - |
| | | APPROVED - | DATE - | DRAWING NUMBER: SS34A | SHT 1 OF 1 |



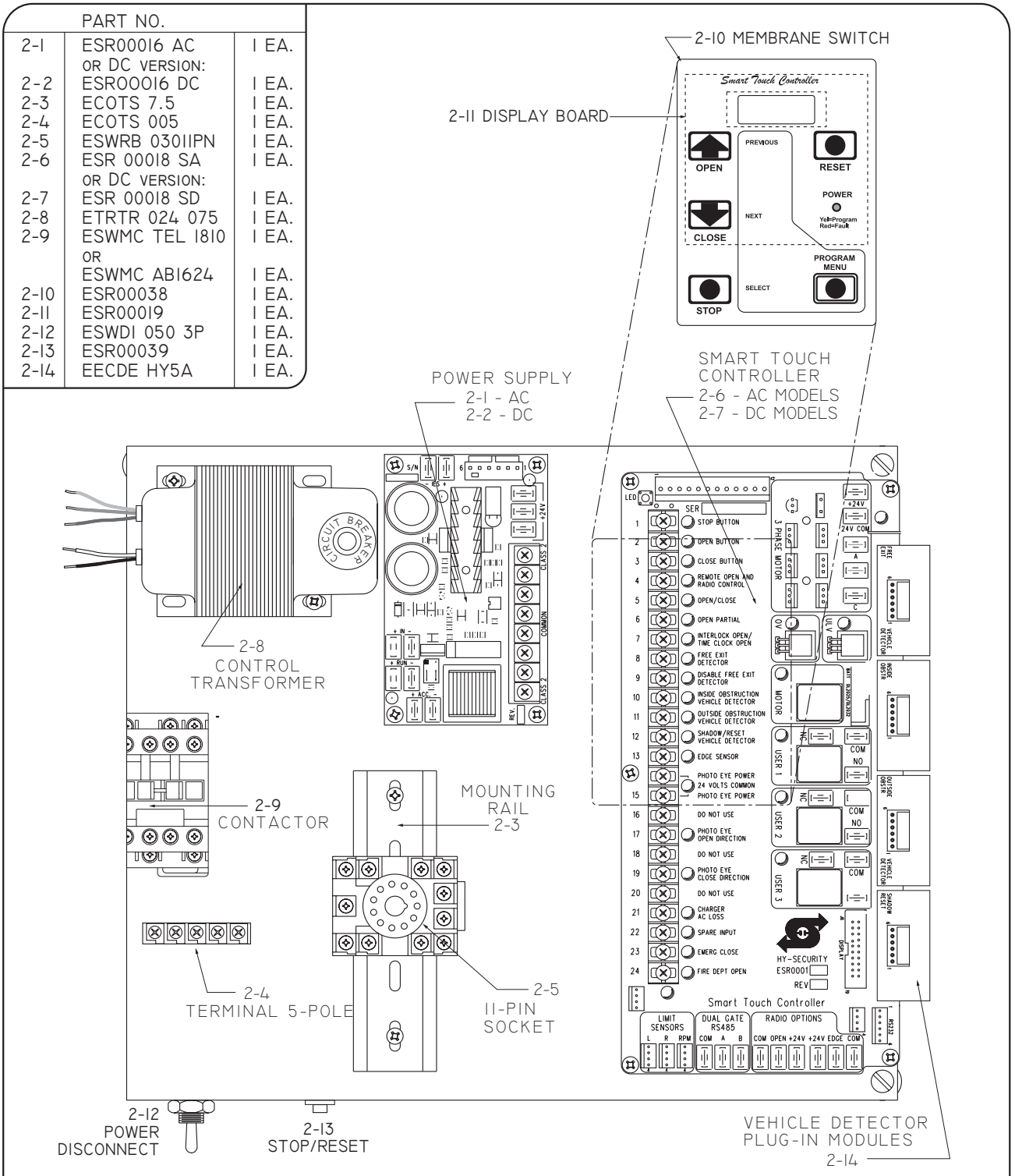

| | | | | | | |
|---|---|---|---|---|---|---|
| Hy-Security Gate Operators, SEATTLE, WASHINGTON | TITLE: COMPONENTS MANUAL RELEASE TOGGLE ASSEMBY FOR ALL SLIDE GATE OPERATORS | DRAWN: D. B. | DATE: 05/12/00 | THIRD ANGLE PROJECTION | | REV: A |
| | | CHECKED: - | DATE: - | ERN NUMBER: - | DATE: - | |
| | | APPROVED: - | DATE: - | DRAWING NUMBER: S24 | | SHT 1 OF 1 |

# Exploded Parts Breakout



# Parts Breakout- Control Box

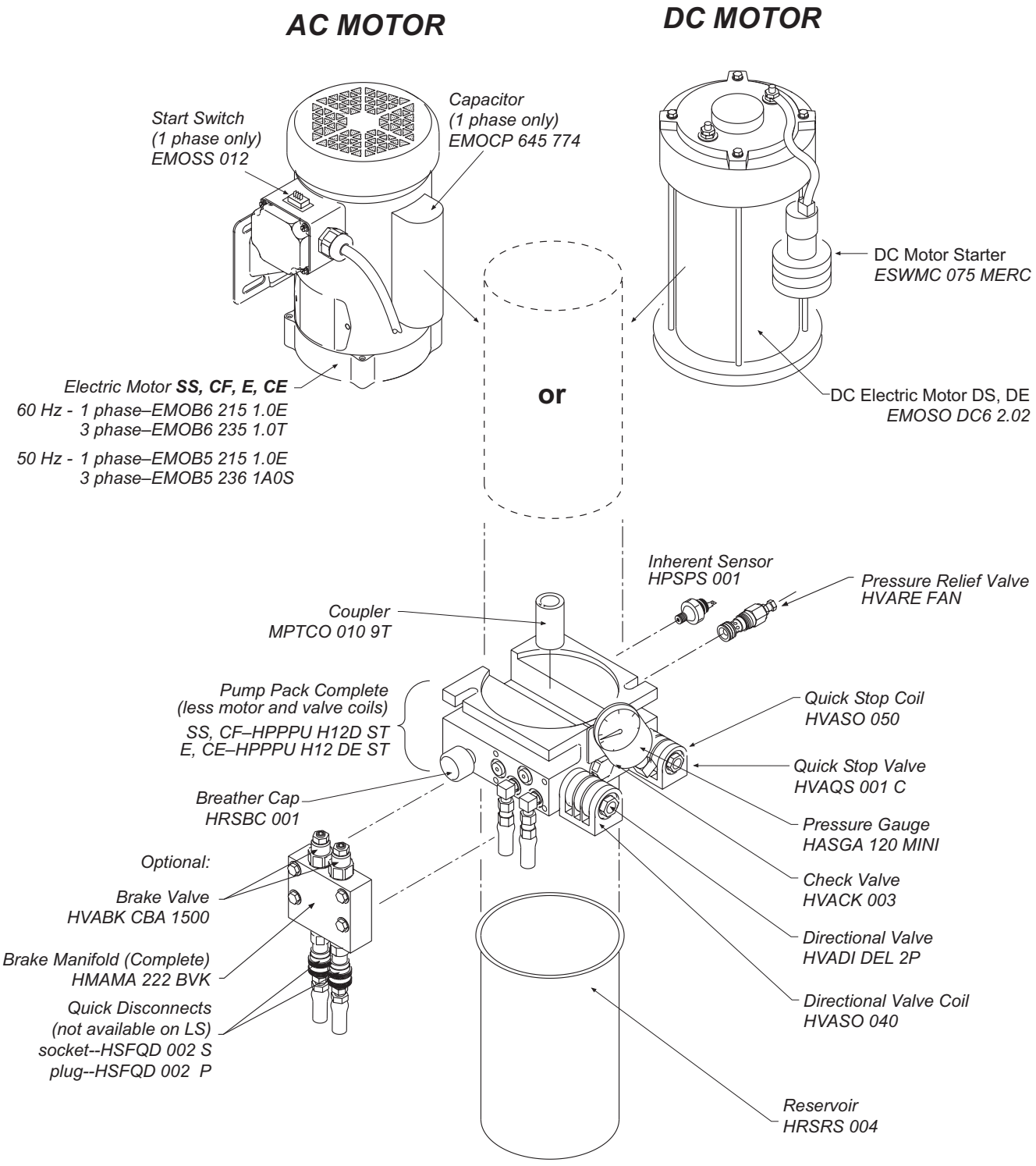
| | PART NO. | |
|---|---|---|
| 2-1 | ESR00016 AC | 1 EA. |
| | OR DC VERSION: | |
| 2-2 | ESR00016 DC | 1 EA. |
| 2-3 | ECOTS 7.5 | 1 EA. |
| 2-4 | ECOTS 005 | 1 EA. |
| 2-5 | ESWRB 0301IPN | 1 EA. |
| 2-6 | ESR 00018 SA | 1 EA. |
| | OR DC VERSION: | |
| 2-7 | ESR 00018 SD | 1 EA. |
| 2-8 | ETRTR 024 075 | 1 EA. |
| 2-9 | ESWMC TEL 1810 | 1 EA. |
| | OR | |
| | ESWMC ABI624 | 1 EA. |
| 2-10 | ESR00038 | 1 EA. |
| 2-11 | ESR00019 | 1 EA. |
| 2-12 | ESWDI 050 3P | 1 EA. |
| 2-13 | ESR00039 | 1 EA. |
| 2-14 | EECDE HY5A | 1 EA. |




COMPONENT DIAGRAM - 222 CONTROL BOX

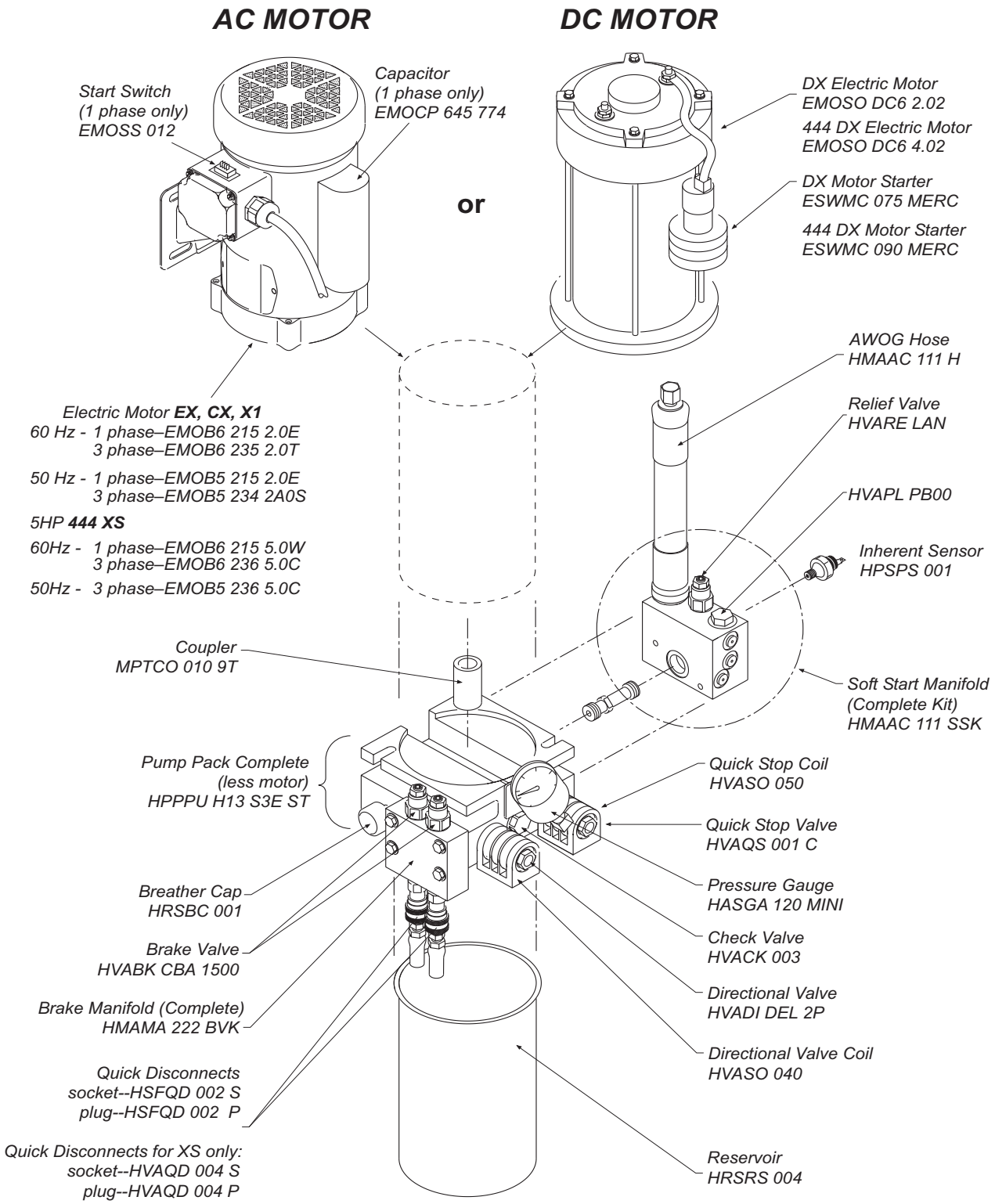
HS40

# Exploded Parts Breakout



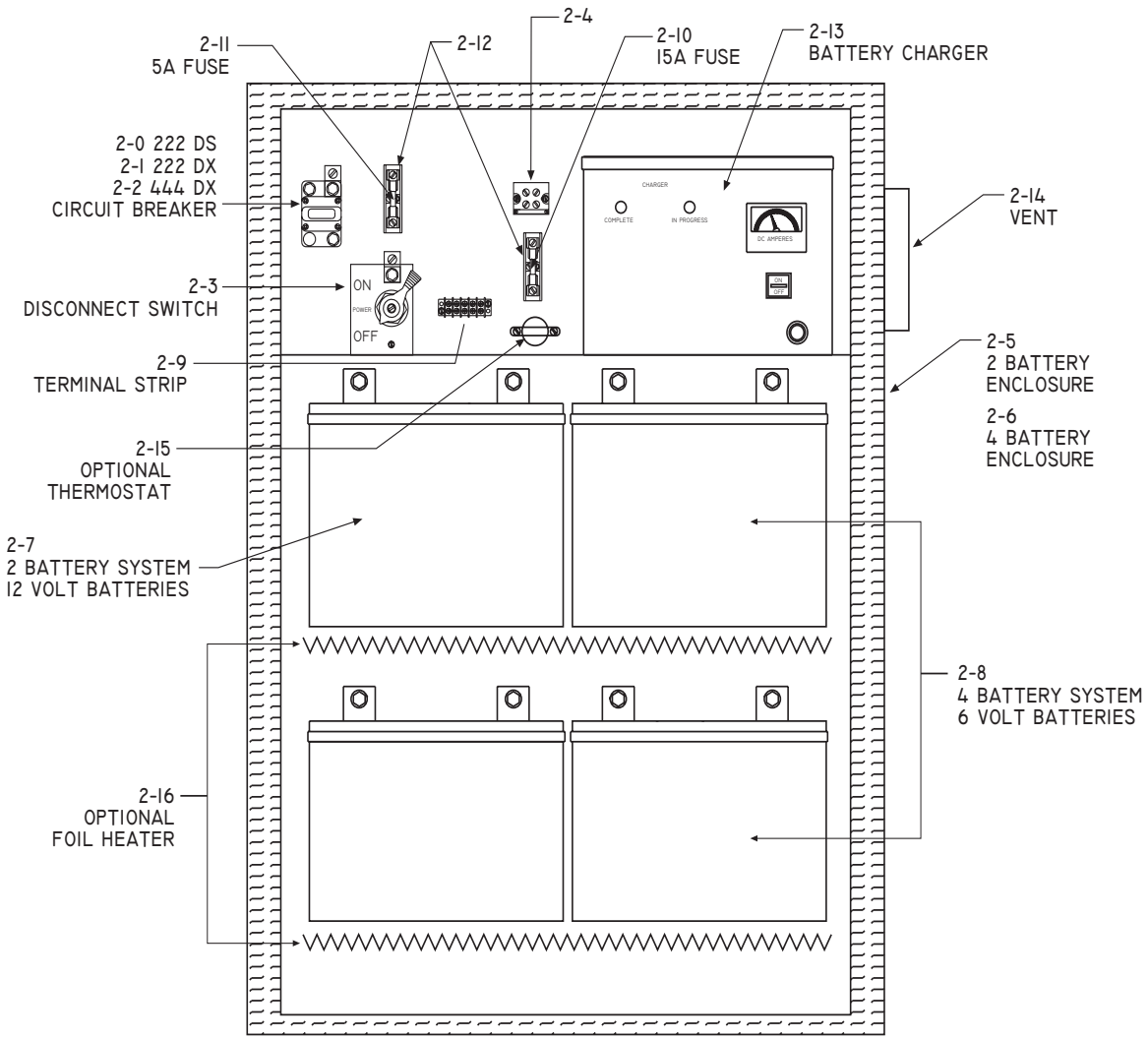

*EX, CX, DX and 444 XS Models*

# Exploded Parts Breakout




*EX, CX, DX and 444 XS Models*

# Parts Breakout - DC Power Supply




| | ITEM NUMBER | QTY |
|---|---|---|
| 2-0 | ESWCB 030 060 | 1 EA. |
| 2-1 | ESWCB 030 120 | 1 EA. |
| 2-2 | ESWCB 030 150 | 1 EA. |
| 2-3 | ESWDI 067 DCEX | 1 EA. |
| 2-4 | ECOTS 1102 | 1 EA. |
| 2-5 | EENEN H01 3030 | 1 EA. |
| 2-6 | EENEN H01 4230 | 1 EA. |
| 2-7 | EDCBY 12B 090 | 2 EA. |
| 2-8 | EDCBY 06V 170 | 4 EA. |
| 2-9 | ECOTS 005 | 1 EA. |
| 2-10 | ESWFU 010 15 | 1 EA. |
| 2-11 | ESWFU 010 05 | 1 EA. |
| 2-12 | ESWFU 001 BLK | 1 EA. |
| 2-13 | EDCBC 024 025 | 1 EA. |
| 2-14 | EDCFV 001 | 1 EA. |
| 2-15 | EACTH B10 021 | 1 EA. |
| 2-16 | EACHE 120 65W | 2 EA. |

COMPONENTS BATTERY PACK FOR DC OPERATORS

# LIMITED WARRANTY

**(Hydraulically Powered Operators)**

Hy-Security Gate Operators warrants all of its manufactured products to the end-user to be free of defects in material and workmanship. All hydraulic operators are warranted for a period of five years from date of shipment. Slide gate operator drive wheels are warranted for a period of two years and batteries in DC operators are warranted for one year from the date of shipment. Even though included as part of a Hy-Security gate operator, accessories carrying another manufacturers name plate, (unless a design component of the gate operator) shall carry only the warranty of the specific manufacturer.

Any modification made to factory products will void the warranty unless the modifications are approved in writing by the factory, in advance of the change. This exclusion does not apply to normal installation of approved accessories and/or safety devices. This warranty shall not apply to equipment which has been improperly installed, subjected to negligence, accident, damage by circumstances beyond Hy-Security Gate Operators' control, or because of improper operation, maintenance, storage or to other than normal use or service.

Labor to install new parts or remove defective parts, travel time, or standby time is specifically excluded from this warranty. Freight (surface or air) and all other incidental costs are NOT covered by this warranty. There are no obligations or liabilities on the part of Hy-Security Gate Inc. for consequential damages arising out of, or in connection with, the use or performance of this product. Hy-Security Gate Inc. assumes no responsibility for other indirect damages with respect to loss of property, profit or revenue. This Limited Warranty is valid only in the 50 United States, the District of Columbia and the Commonwealth of Puerto Rico. Implied warranties, including those of merchantability and fitness for a particular purpose or application, are limited to one year from date of shipment.

Defective products that are in warranty should be returned to our factory. At our option, we may elect to repair or replace, free of charge, any such parts. An invoice will be sent at the time replacement parts are shipped, and a credit will be issued only after the parts have been returned undamaged and accepted as defective. No warranty credits will be allowed without written permission from the factory, and the return of the defective part, together with a completed Merchandise Return Form (see our Terms of Sale policy for additional details on the return procedure.) Replacement parts shall carry the remainder of the original limited warranty or 90 days, whichever is longer.

This Limited Warranty gives you specific rights. You may have others, which vary from state to state. This Hy-Security Gate Operators' limited warranty is in lieu of all other warranties expressed or implied. This Limited Warranty supersedes all other warranties.