

The grooved drive rail has become the standard for all new SlideDriver gate operator installations.

In this manual, several illustrations show the non-grooved, flanged drive rail which is *no longer* available unless a Solenoid Lock option is installed.

The grooved drive rail replaces the non-grooved, flanged drive rail.

A section of the two different drive rails is shown in Figure 1-1.

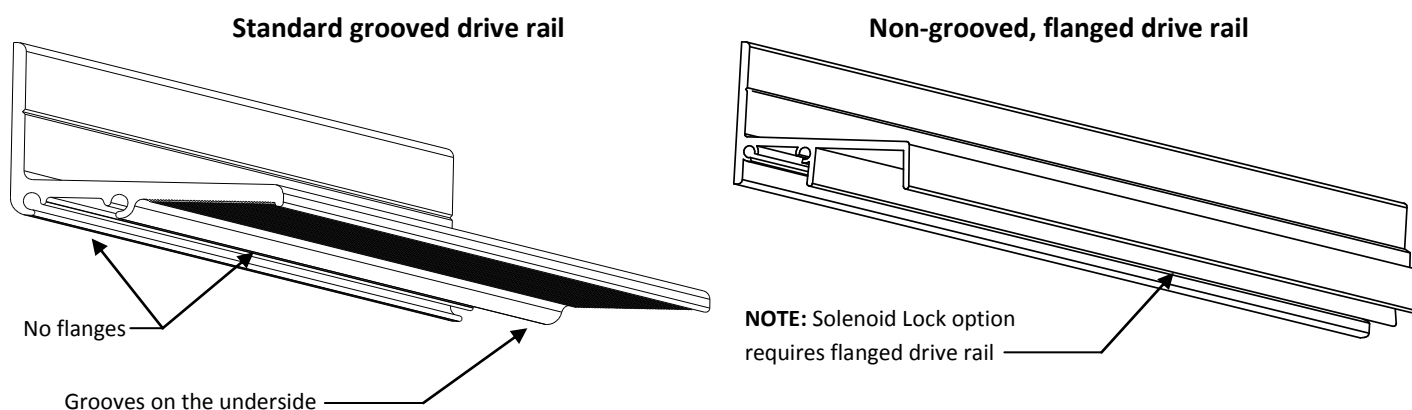


Figure 1-1. Grooved versus non-grooved, flanged drive rail

The small grooves on the underside of the new drive rail improve traction in slick or wet conditions and provide more pulling and stopping power in SlideDriver installations. The three underside flanges have been eliminated which reduces drive wheel wear and drag in misaligned gate installations. Additionally, the no-flange drive rail stacks better for shipping which reduces the likelihood of freight damage.

NOTE: The non-grooved, flanged drive rail is only available when using the Solenoid Lock option. The Solenoid Lock option requires an outer edge flange and therefore must be installed with the non-grooved, flanged drive rail.

Limit Ramp Fasteners

Since the flanged portion of the drive rail has been eliminated, two bolts are necessary to attach the standard limit ramp and nuts have been added to the standard limit ramp packaging.

1. Use the fasteners to secure the standard limit ramp to the drive rail.
2. If you are unfamiliar with installing the limit ramps, refer to Figure 1-2 on the next page and follow the instructions found in this manual.

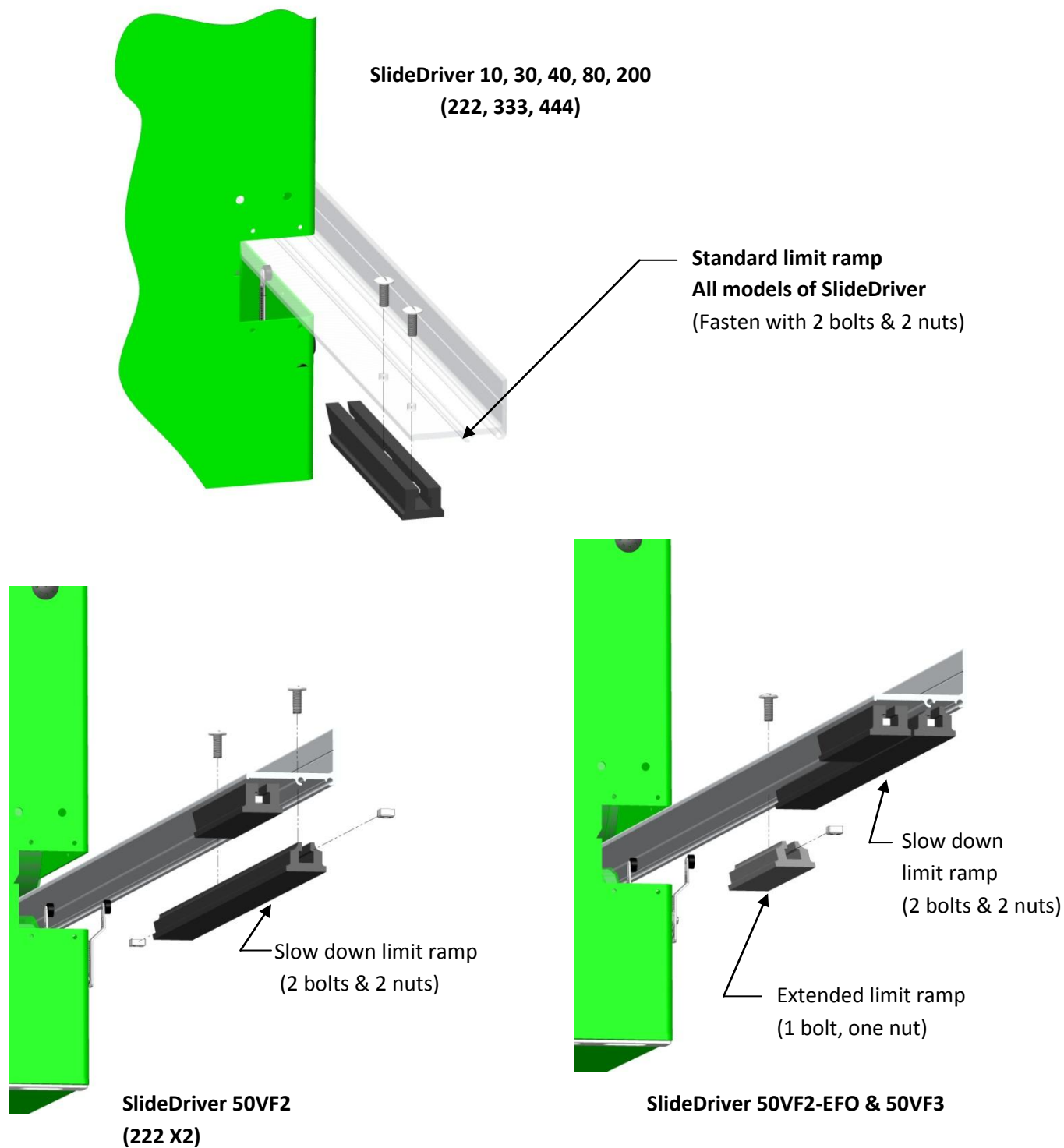


Figure 1-2. SlideDriver Limit Ramp Configurations



HYDRAULIC SLIDE GATE Operators With Smart Touch Controller

Installation and Reference Manual

Models

SlideDriver 50VF2	(222 X2)	Heavier gates, 2.2ft/s open & close speed
SlideDriver 50VF2-EFO	(222 X2EFO ST)	Heavier gates, 2.2ft/s open & close speed with a 3ft/s Emergency Fast Operator (EFO) close
SlideDriver 50VF3	(222 X3)	Heavier gates, 3ft/s open & close speed

Modular and Correctional Facility versions available



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www.hysecurity.com



Quick Start

SlideDriver 50VF2, 50VF2-EFO, 50VF3

These instructions are provided as a quick reference guide for the **experienced** installer who is already familiar with all safety precautions and the installation of this gate operator.



CAUTION: Use this QuickStart as a guide and read and follow the information and instructions found in the other sections of this manual. **DO NOT** attempt to connect this operator to any voltage other than that listed on the nameplate. Be certain the labeled voltage and phase of the operator matches the available supply. For assistance, contact HySecurity Technical Support at 800-321-9947.

Refer to the **Technical Drawings** on pages 14 - 17 when proceeding through the following steps:

1. Mount the operator with at least four mounting bolts. The operator must be square and spaced 1¼ inches (44mm) away from the gate.
2. Attach the drive rail to every vertical member of the gate at a height 9¼ inches (24cm) above the base of the operator. Use ¼" (6mm) roll pins to splice multiple sections of rail.
3. Mount the limit switch stop ramps.
 - Mount the two smaller, 11.5" (29cm) limit switch stop ramps to the underside of the drive rail at each end (flat side up, tapered end toward the wheel) in the drive rail slot closest to the operator. Drill ⅜" (9mm) holes in a position that will allow the limit switches to be tripped 6 to 8 inches (15 to 20cm) before full travel.
 - Mount the two long limit switch deceleration ramps in the outside channel of the drive rail, closest to the gate. Square ends should be even with the back (square) ends of the limit switch trip ramps.
 - On the 50VF2-EFO and 50VF3 (X3) units, mount the 10.5" long (27cm) extension ramps (opposite tapers on each end) in the outside channel (closest to the gate) flush to the tapered ends of the long ramps.
4. Connect the electrical power wires to the loose wires from the ON/OFF switch at the left corner of the control box and attach the grounding wire to the green grounding wire. Be certain the labeled voltage and phase of the operator matches the available supply.
5. Operators are shipped hydraulically configured for "right hand" operation. (From the secure side, the gate moves to right on opening). To change the handing, reconnect the hydraulic hoses at the pump in reverse order. There is a label near the hose quick disconnect fittings describing this procedure. Connecting the hose from the top motor to the left disconnect fitting results in "left hand" operation.
6. With neither limit switch tripped, engage the release mechanism to clamp the wheels to the drive rail and verify that the red spring is compressed to 2 inches (5cm) in height.
7. Turn ON the power switch. The UL usage class [UL 0] appears on the Smart Touch Controller display after a two-second delay. The setting for the usage class must be selected before the gate can function. Press the SELECT button, then the NEXT button and select a usage class of 3 through 4 as appropriate for the site. Press the SELECT button again to lock the setting.
8. Press the NEXT button to move to the next menu item and set the gate handing. The characters [Sh 0] appear on the display. Replace the 0 with [Sh L] or [Sh r] to set the gate handing by following the same button presses described in step 7.
9. Press the PROGRAM button and the close timer setting [Lt 0] appears. If a close timer function is needed, set it in the same manner as above.
10. When you are finished programming the Smart Touch Controller, press the PROGRAM button again to exit to Run Mode. One, of a possible three, operator status displays may appear: StOP, oPEn or CLoS. (oPEn or CLoS appears if a limit switch is tripped.)
11. Test the operation of the gate. If the hoses are connected incorrectly, the gate will move the wrong direction. (See step 5.) If the gate moves in the correct direction, but triggers an Err! alert, the handing is set wrong. (See step 8.)
12. After normal operation has been verified, connect any required accessory device wiring. Note that the control inputs (except Fire Department Open and Emergency Close) are all one wire only to the main terminal strip while the other wire connects to the Common Bus (COM) on the nearby power supply board.
13. To access the User Menu, press the PROGRAM button while there is no active Open or Close input. The operator status displays scroll past and stop at the [Lt _] close timer menu item. This is the beginning of the User Menu which contains 12 menu items. Access to the 34 items in the Installer Menu is also available from the close timer display [Lt _] by simultaneously pressing the RESET and OPEN buttons. The usage class [UL _] which is the first of menu item in the Installer Menu appears. Read the instructions found in this manual before attempting any adjustments!

Smart Touch Controller Menu Guide for Sliding Gates

To gain access to the User Menu, press the PROGRAM button when the gate is stopped. The display scrolls through several operator status items, and then stops at the Close Timer menu setting [Ct _].

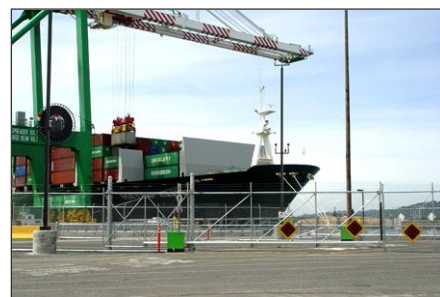
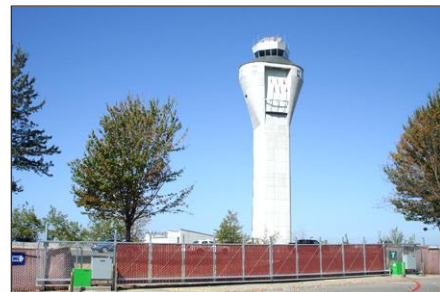
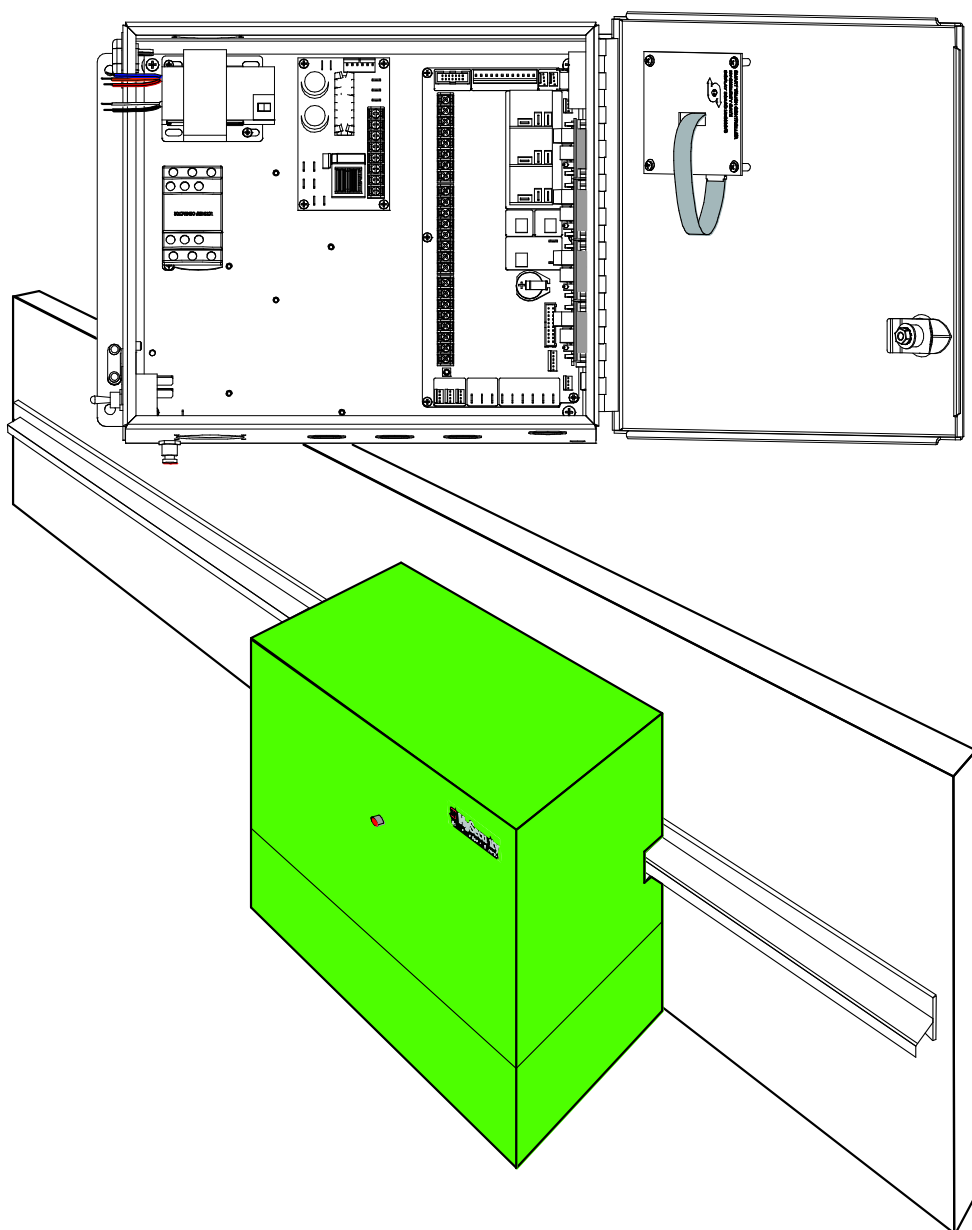
User Menu Options			Default	Description
U1	[Ct 0]	Close timer setting	0	0 = close timer off or 1 – 99 seconds
U2	[hC 0]	Momentary Close	0	0 = momentary, 1 = Constant hold PB required to close gate
U3	[ho 0]	Momentary Open	0	0 = momentary, 1 = Constant hold PB required to open gate
U4	[AP 0]	Power loss function	0	0 – 3 (0 = Type A, 1 = B, 2 = C, 3 = D)
U5	[ro 0]	Radio control option	0	0 = Open only, 1 = Adds Close capability when fully open
U6	[bF 2]	Warn before operate	2	0 = none, 1 = Buzzer alerts 3 sec before & when in motion, 2 = Buzzer alerts 3 sec before + first 2 seconds in motion
U7	[FA 0]	Forced open Alert and automatic gate reposition	0	0 = disabled, 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 = disabled, 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 = set day, 4 = month
U11	[Ld 5]	LCD Contrast set	5	1 - 9 = Adjusts contrast of the display
U12	[dS 0]	Data Log	0	0 = Std. 1 = Extended (resets automatically to 0 in 24 hr) (V4.xx software)

To access the Installer Menu, simultaneously press the RESET & OPEN buttons. See page 18 for clarification.

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 entire menu)
I3a	[bu 0]	Choose Buzzer Type	0	0 = Buzzer not set, 1 = Freq 1, 2 = Freq 2
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 = input disabled, 1 = enabled
I7	[oC 0]	Enable Emergency close	0	0 = input disabled, 1 = enabled
I8	[SE 3]	Inherent Sensor sensitivity	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) ½ second steps (Master/slave only)
I11	[Lo 0]	Leaf delay Open	0	0 = none (1-7) ½ 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 = input disabled, or 7 – 99 seconds of travel
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 = Edge reverses for 2 sec
I17	[Sr 1]	IES reverse to open	1	0 = IES reverses fully open, 1 = IES reverses for 2 sec
I18	[PC 0]	Set PEO/ PEC – NO/NC	0	0 = Normally Open PE output, 1 = N.C. (Supervised mode)
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	[dt 0]	Disable Free Exit/Timer to Close	0	0 = disable Free Exit, 1 = disable Close Timer
I22	[or 1]	OOLD detector function	1	0 = pause closing only, 1 = enable reversing to open
I23	[ir 1]	IOLD detector function	1	0 = pause closing only, 1 = enable reversing to open
I24	[dL 1]	Vehicle detector logic	1	1 = std, 2 & 3 = quick close, 4 = full anti-tailgate logic
I25	[r1 0]	User relay 1 option	1	0 = disabled, 1 – 24 = see output options page 30
I26	[r2 0]	User relay 2 option	6	0 = disabled, 1 – 24 = see output options page 30
I27	[r3 0]	User relay 3 option	1	0 = disabled, 1 – 24 = see output options page 30
I28	[tL 0]	Gate Open alert	2	0 = 0 sec, 1 = 15s, 2 = 45s, 3 = 75s, 4 = 105s, 5 = 135s
I29	[Lt 0]	Loitering alert	3	0 = 0 sec, 1 = 15s, 2 = 45s, 3 = 75s, 4 = 105s, 5 = 135s
I30	[SA 0]	System address	0	0 = no network, 1-99 = network “drop” address
I31	[ELd0]	Test factory ELD	0	0=Run, 1=show freq, 2=show call level 0-7, 3= set Freq 1-4
I32	[iLd0]	Test factory IOLD	0	0=Run, 1=show freq, 2=show call level 0-7, 3= set Freq 1-4
I32	[oLd0]	Test factory OOLD	0	0=Run, 1=show freq, 2=show call level 0-7, 3= set Freq 1-4
I34	[SLd0]	Test factory SLD	0	0=Run, 1=show freq, 2=show call level 0-7, 3= set Freq 1-4



Ultra Reliable, Heavy Duty, Commercial, Industrial, High Security Slide Gate Operators



PRODUCT & WARRANTY REGISTRATION

Enter the following information to register your HySecurity product. Please write legibly.

Today's Date: _____

NOTE: To extend the operator warranty beyond 1 year, you must return this registration within 60 days of purchase. Refer to the *Limited Warranty*.

Installer Information

First/Last Name: _____

Company Name: _____

Address: _____

City: _____ State/Province: _____

Country: _____ Postal Code: _____

Daytime Phone: _____ Fax: _____

E-mail: _____

Product Information

Model name/number: _____

Serial number: _____

Purchase Date: _____

Purchase Price: _____

Distributor's name: _____

Distributor's City: _____

Country: _____

Installation Date: _____

End-user Information

First/Last Name: _____

Company/Association: _____

Address: _____

City: _____ State/Province: _____

Country: _____ Postal Code: _____

Daytime Phone: _____ Fax: _____

E-mail: _____

Who is completing this form?

- ☐ Installer ☐ End User ☐ Distributor
☐ Maintenance Personnel ☐ Other _____

Additional Comments

Did you visit the HySecurity website before purchasing your product?

- ☐ Yes ☐ No

How did you hear about HySecurity gate operators? (Check all that apply.)

- ☐ Advertisement ☐ Exhibition ☐ Distributor
☐ Business associate ☐ Other (please specify): _____

What factor(s) most influenced your purchase? (Check all that apply.)

- ☐ Performance ☐ Price ☐ Power
☐ Reliability ☐ Brand ☐ Prior Experience
☐ Recommendation ☐ Warranty ☐ Product Weight

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HySecurity provides product installation, maintenance and troubleshooting training. View opportunities online at the HySecurity website: www.hysecurity.com/support. For Technical Support, call 800-321-9947.

HySecurity does not share this warranty registration information with third parties unless the requested services, transactions, or legal requirements necessitate it.

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INTRODUCTION

Welcome – Thank you for purchasing a HySecurity premium gate operator. HySecurity 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 HySecurity operators are equipped with the Smart Touch Controller, a digital electronic brain that offers unparalleled user benefits.

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 operator life with minimal maintenance costs.



Installers and owners must read and follow the Important Safety Information contained in this manual, especially the information regarding pedestrian entrapment protection. Hazards associated with automatic gates can be greatly reduced with proper design, installation and use. When an automatic gate is first commissioned, the installer must instruct the owners and users how to correctly operate the system. When the installation is complete, installers should leave this manual for the owner's use and reference.

Do not hesitate to give your HySecurity distributor a call if you experience any installation difficulties. Authorized HySecurity distributors are experienced and trained to assist in resolving any problems.

SlideDriver Models

HySecurity manufactures many hydraulic slide gate operator models to suit the desired gate panel size, weight and speed. This manual should be used for the SlideDriver VF operators only. Identify your operator model and note the changes in instructions and final adjustments.

	SlideDriver 50VF2 (222 X2)	SlideDriver 50VF2-EFO (222 X2EFO)	SlideDriver 50VF3 (222 X3)
General	Commercial industrial, high security	Commercial industrial, high security	Commercial industrial, high security
Gates	Variable frequency drive (easy start and stop) heavy gates (5,000 lbs) and fast (26 in/s).	Variable frequency drive (easy start and stop) heavy gates (5,000 lbs). Opens and closes at 26in/s. Emergency Close at 36in/s on constant HOLD command.	Variable frequency drive (easy start and stop) heavy gates (5,000 lbs) and fast (36in/s).
Duty	Continuous	Continuous	Continuous
Modular	50VF2-M	50VF2-EFO-M	50VF3-M
Correctional Facility	50VF2-C	50VF2-EFO-C	50VF3-C
Horsepower	2 hp	2 hp	2 hp
Speed	26in/s	26in/s, Emergency Close: 36in/s	36in/s
Soft Stop	yes	yes	yes
Brake Valves	yes	yes	yes
Soft Start	ultra soft start and stop	ultra soft start and stop	ultra soft start and stop
Drawbar Pull	300lbs (136kg)	300lbs (136kg)	300lbs (136kg)
Gate Weight Max. Capacity	5,000lbs (2.3MT)	5,000lbs (2.3MT)	5,000lbs (2.3MT)
Drive Wheels	Two 8in. (20.3cm) drive wheels	Two 8in. (20.3cm) drive wheels	Two 8in. (20.3cm) drive wheels
UL Class	III, IV	III, IV	III, IV
Warranty	5 years	5 years	5 years

*Accessory item: Remote Release

Features

High Speed, Very Heavy: SlideDriver 50VF2, 50VF2-EFO, and 50VF3

UL class III & IV.

These operators are designed for very heavy, up to 5,000 lbs gates moving at high and very high speeds. The variable frequency drive moves very heavy gates at the following speeds:

26 inches per second, 50VF2

26 inches per second, 50VF2 – EFO (36in/s Emergency Fast Operate to close on a constant HOLD command.)

36 inches per second, 50VF3

SlideDriver VF models close gates to a very precise point and are extremely easy on gate hardware. SlideDriver VF operators use a variable frequency drive, larger wheels and a higher flow rate pump to reach 2 to 3 inches per second. These operators use the same powerful HySecurity Smart Touch controller and simple and reliable hydraulics of all SlideDriver models.

The Smart Touch Controller

This is the brain of HySecurity operators. Groundbreaking technology combined with sturdy construction to reliably serve in the harshest environments. The Smart Touch Controller can quickly be configured by an installer or user to adapt to nearly any site specific functional requirement. All system settings are performed with the use of four programming buttons and an LCD display. The Smart Touch Controller has no switches to set. An RS232 port for external communication is standard. An EEPROM records date stamped system events. A log of events can be downloaded from the RS232 port to a laptop computer to evaluate abnormal gate system operation. HySecurity HY-5A vehicle detectors set a new industry standard by communicating valuable performance data to the Smart Touch controller, allowing quick and deep, user-friendly diagnostics.

SlideDriver C, Correctional Facility (-C)

The CF models offer an extra heavy 10-gauge cover with three different locking options. Correctional Facility 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.

SlideDriver M, Modular (-M)

This family of operators is a two part modular version of the standard SlideDriver operator. The motor, hydraulic pump and electric controls are located in a separate enclosure, often at a distance 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 (including blast mitigation) or those areas requiring a very quiet operator.

Stopping the Gate

All models employ a time delay **soft stop** system. Additionally, brake valves are used to control the stopping of heavy or fast moving gates. These valves are exclusive to HySecurity operators. They are independently adjustable to allow the gate to stop predictably and without banging.

Starting the Gate

The variable speed drive provides a **soft start** which accommodates for the load and starts the gate smoothly, similar to letting your foot slowly off a car clutch without any lurching.

WARNING: DO NOT attempt to connect to 110/120V power. The variable frequency (VF) drive SlideDriver 50VF2, 50VF2-EFO, and 50VF3 operators can only be connected to 208V, 230V single- and three-phase power supplies or 460V three-phase power supplies. Refer to the *Wire Chart* on page 59 for proper wire sizing and the distances they accommodate. See further WARNINGS on page 59.

Section 1 — READ FIRST! — Important Safety Information

Important Safety Information – Review before Installation

Automatic gate operators provide user convenience and security. However, because these machines can produce high levels of force, it is important that all automated gate 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 automated gate system. It is the joint responsibility of the specifier, designer, purchaser, installer and end user to verify that the system is appropriately configured for its intended use. All parties should be informed that entrapment in a moving gate can cause serious injury or death.

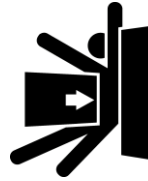
Common Industry Symbols



**Attention
-Take Note-**



**-Danger-
Keep Away**



**Entrapment
Zone**



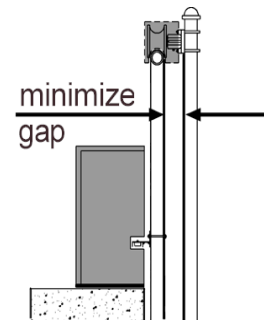
**Possible
Pinch Point**

Important Instructions for Gate System Designers & Installers:

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

Install an Automatic Gate Operator only when:

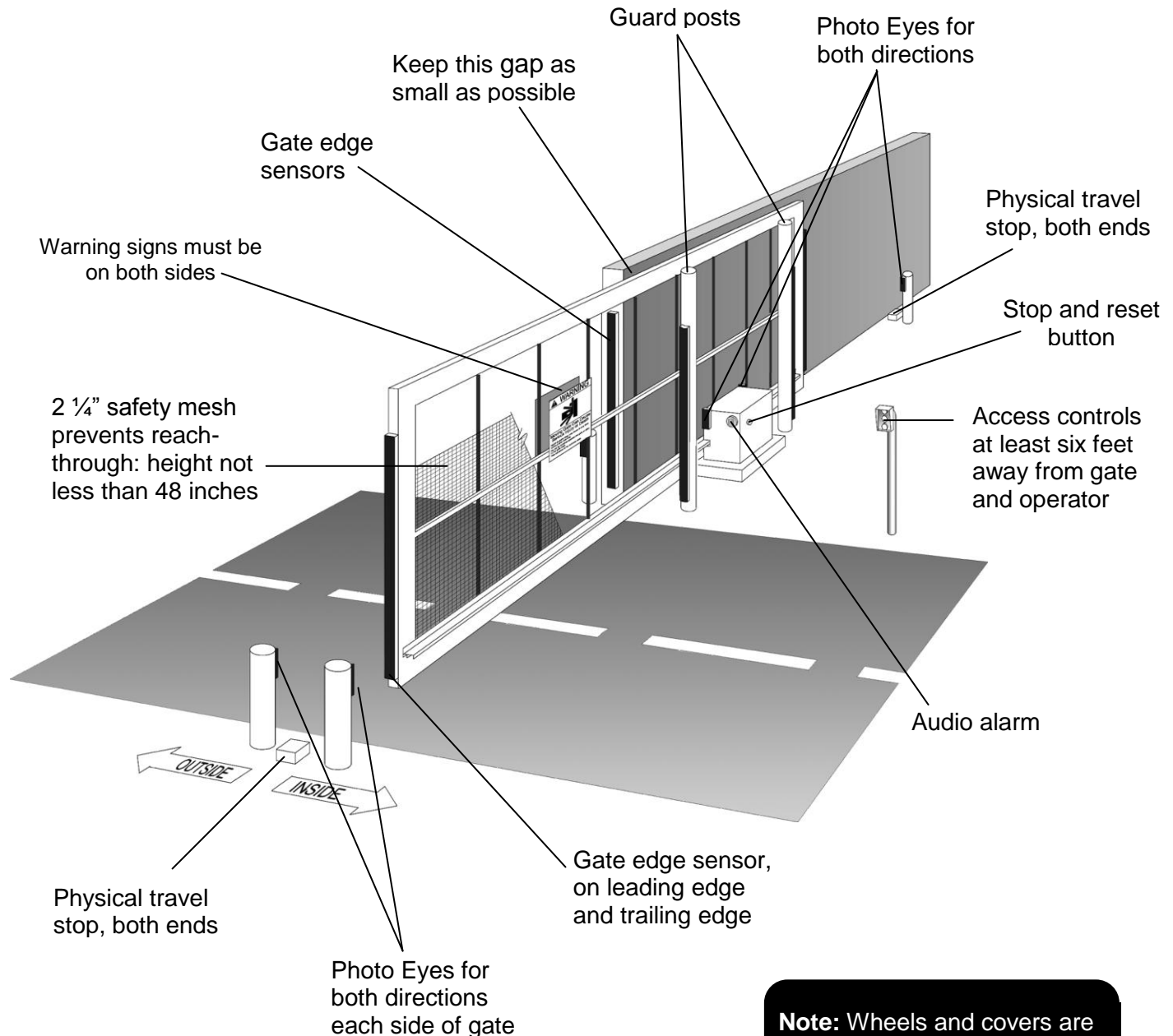
- ❑ The entry is configured for vehicular use only. Pedestrians must be directed to a separate walk-through entrance. The WARNING signs that have been supplied with this operator must be installed in a manner clearly visible on both sides of the gate.
- ❑ All openings of a horizontal slide gate are guarded or screened, from the bottom of the gate to a minimum of 4 feet (1.2m) height above the ground, to prevent a sphere 2¼ inches (57mm) 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.
- ❑ Review and meet all ASTM F-2200 and UL 325 automated gate system standards.





Attention

Sliding Gate Entrapment Protection



Note: Wheels and covers are not shown. However, all gate wheels must be covered.

This schematic view is not meant to recommend a specific configuration. It is not meant to point out the important elements of a proper automatic vehicular gate installation. The gate operator is only one component in the total system. **Always install a separate pedestrian gate.**

Section 1 — READ FIRST! — Important Safety Information

Site, Gate, Equipment and Regulatory Requirements

- ❑ 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 gate operation controls 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 line-of-sight to the gate. Radio controls and other remote access controls must be connected only to the **Remote Open input**.
- ❑ 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 opening and closing directions**. If edge (contact) sensors are used, they are to be mounted on the leading and trailing edges of the gate, as well as post mounted on the inside and outside of the gate (See illustration 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 page 33 for details on the requirements.
- ❑ If 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” must be posted. Additionally, no other activation device shall be connected and no automatic closing device, of any kind, shall be used.
- ❑ The automatic operator is labeled as appropriate for both the type and UL usage class of the gate.

NOTE: SlideDriver 50VF2, 50VF2-EFO and 50VF3 sliding gate operators must be installed only for Class III & IV applications.

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 alternative means, such as:
 - Employing the use of a 100dB buzzer which sounds at least 3 seconds before the gate moves.
 - Employing the use of a constant hold-type push button control.

Section 1 — READ FIRST! — Important Safety Information



WARNING: To reduce the risk of serious injury or death, read and follow all instructions found in this manual and on warning labels.

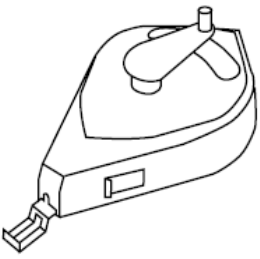
Save These Important Owner and User Instructions:

(Installers – be certain to instruct the owners and users about the following items.)

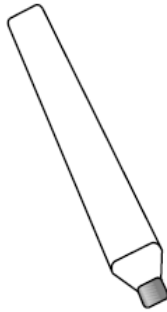
- ❑ Automatic gates are for vehicular use only! Provide walkways and signs to direct pedestrians to a separate walk-through entrance. Because an automatic gate can start at any time without warning, always keep people away from the gate area. The Warning signs that have been supplied with this operator must remain installed, in manner clearly visible on both sides of the gate.
- ❑ Never allow children to use or play with the controls that operate the gate. Keep all remote controls away from children, especially radio transmitters.
- ❑ Teach all users how to turn off the electric power source and how to release and move the gate manually. Use the manual release only when the gate is not moving.
- ❑ Test gate operator functionality monthly. The gate **MUST** reverse direction of travel upon contact with a rigid object, and/or stop upon sensing a second 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 routinely test and replace its battery.
- ❑ **KEEP AUTOMATIC GATES PROPERLY MAINTAINED.** Have a professional gate installer perform routine entrapment protection sensor tests. This includes photo eyes and gate edges. Repair gate hardware when encountered to keep the gate running smoothly. Failure, to make timely repairs or 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 pressure relief valve setting 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 to 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.**



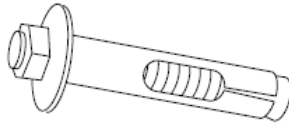
Section 2 — Required Tools



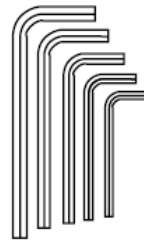
1. Chalkline or other builders' string



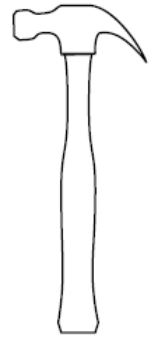
2. Carpenters pencil or crayon



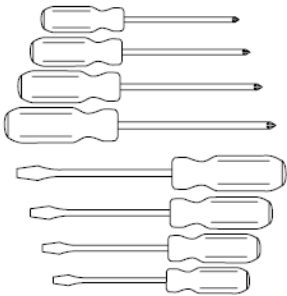
3. Concrete anchor bolts, four ½" x 4"



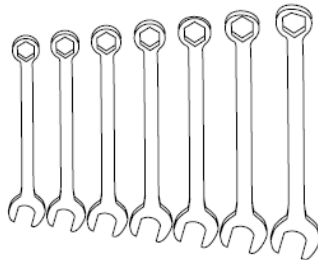
4. Allen wrench set



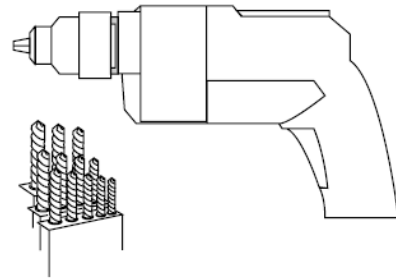
5. Hammer



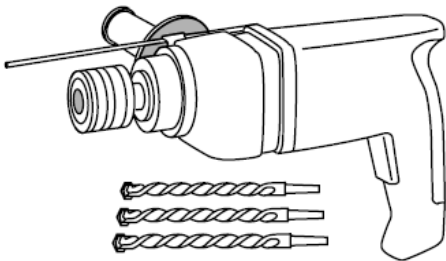
6. Screwdriver sets, Straight and Phillips



7. Wrench set, open end, ¼" through 1"



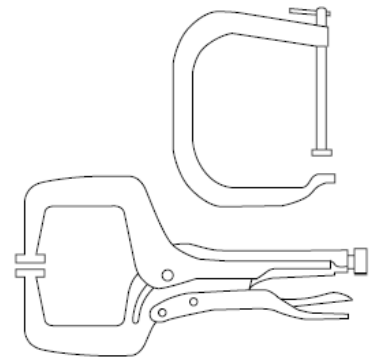
8. Electric drill and bits, ⅛" through ⅝"



9. Roto-hammer and bits



10. Level (installation must be level)

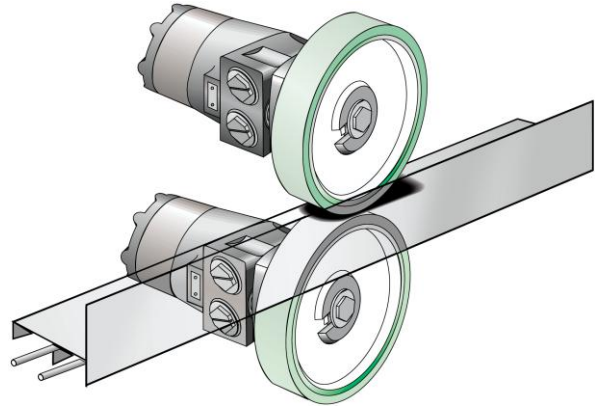


11. Two pair wide Jaw pliers or two C clamps, 4" cap.

Section 2 — Getting Started

How this hydraulic operator works

HySecurity 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 easily move large gates. This simple yet durable drive system is one of the unique features giving our hydraulic operators their reputation for reliability.



Pedestrian Entrapment Protection

Before installing the gate operator, read and understand all the important information in Section 1. 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.

Accessory Compatibility

HySecurity hydraulic slide gate operators are fully compatible with all standard access control devices and entrapment protection devices, some of which are listed below.



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



Entrapment Protection/Obstruction Sensing Devices

- Inherent Sensing Device
- Gate Edges
- Photo Eyes
- Vehicle Detectors (HY-5A)

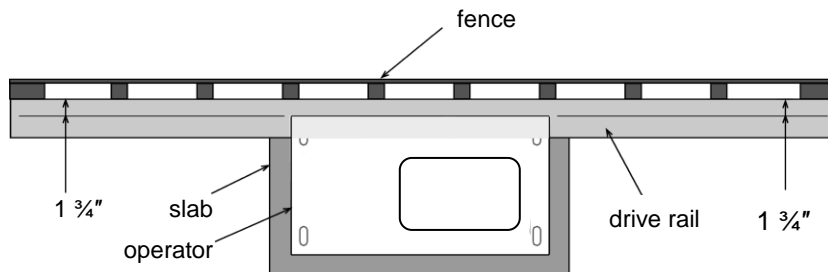
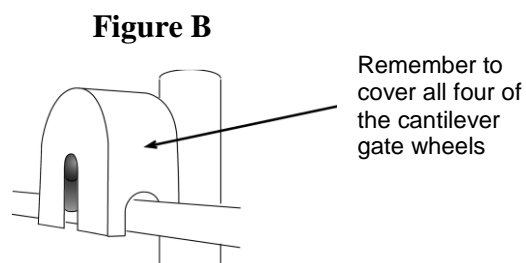
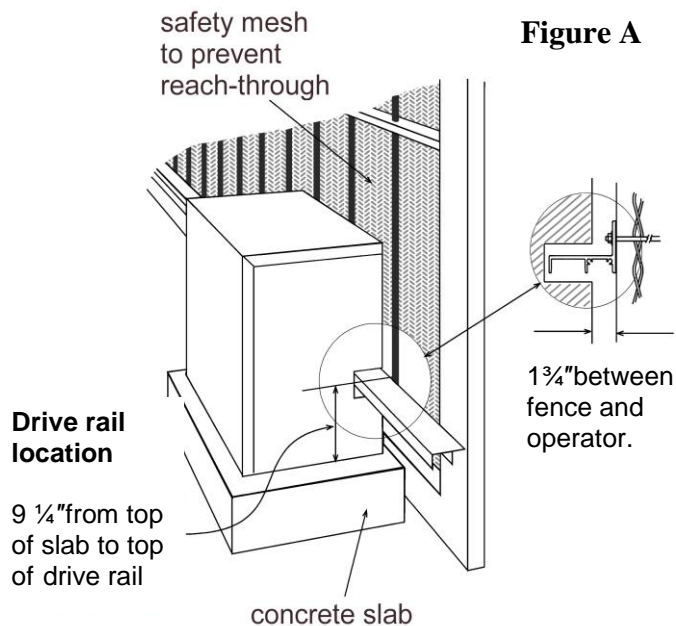


Security

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

Section 2 — Installation Preparation Checklist

1. Read *all* instructions, especially the Important Information in Section 1 at the beginning of this manual, before you install the operator. This section is focused on mechanical installation. For electrical setup and use of the Smart Touch Controller, refer to Section 3.
2. Make sure the concrete pad is the recommended size and ready for operator attachment. Also, check that electrical conduits are correctly located and in proper alignment with the chassis. HySecurity recommends that the concrete pad reaches below the local frost line and extends somewhat above grade. See the footprint plan and elevation view on pages 14 and 15.
3. Make sure the gate rolls smoothly in both directions without any gate hardware binding. If the gate is warped or hard to move, stop and fix the gate before attempting to automate it.
4. Verify that you have covers for all exposed gate support wheels. These **must** be installed. Also, look around to identify all potential pinch points and hazardous areas and plan the best location for entrapment protection devices and warning signs. Remember you are required to advise the owner regarding potential hazards and to discuss the use of the entrapment protection sensors that you have selected and installed.
5. There are three steps to a perfect install: location, location, location. One of the most critical installation aspects is to make sure the operator is positioned the proper distance from the gate and the gate and operator are as parallel as possible. See Figure C below. Prepare shims to align the drive rail.

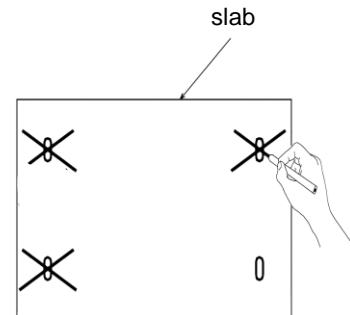


NOTE: If necessary, shim the drive rail so that it is straight ($\pm \frac{1}{4}$ inch) **throughout** the gated travel distance.

Section 2 — Installation

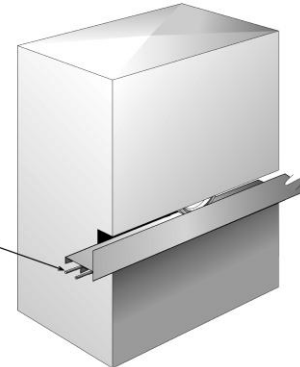
1. Drill four holes for concrete anchors

When you have removed the operator from its shipping container, cut out the template found on the box. Use it to trace the outside edges and anchor slots. Place the template on the concrete pad; making sure that it is parallel to and 1¾-inches from the gate. Trace the slots, remove the template, and then scribe the locations for anchor bolts. Drill holes for the anchor bolts in the center of the slots you marked so that you will have some room for adjustments. Install at least four ½-inch x 4-inch concrete anchor bolts (two bolts per side).



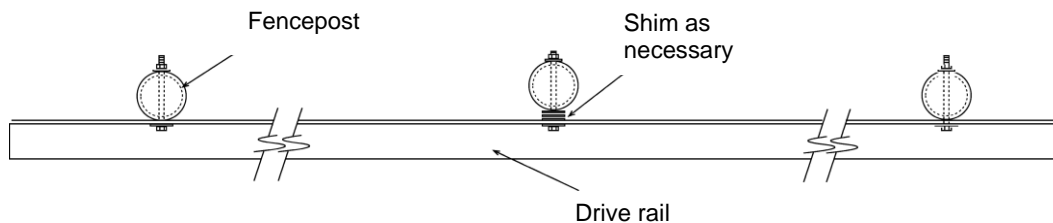
2. Line up the operator

Put the operator in position onto the anchor bolts. Verify that the operator is parallel (within ⅛-inch) and measure the distance between the operator and the gate. It should be 1¾-inch away from the gate on both the left and right sides. Refer to Figure A on page 9. Tighten the anchors securely.

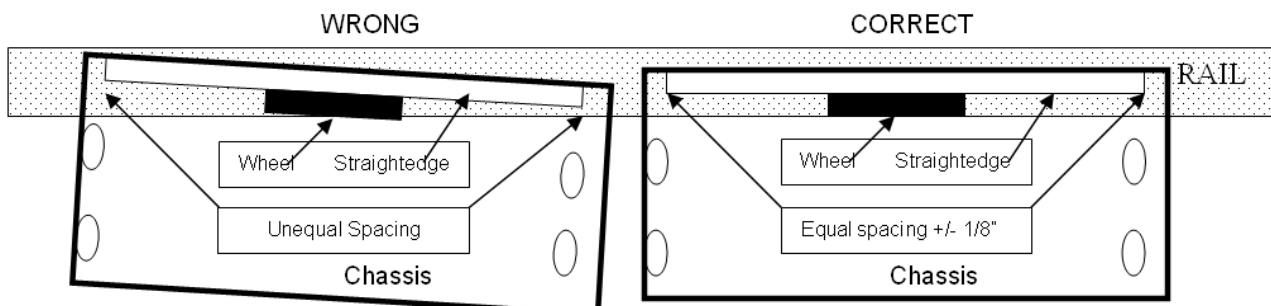


3. Bolt the Drive Rail to the Gate Panel

Connect multiple sections of drive rail together with ¼-inch 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 \pm ¼-inch throughout the travel of the gate. When the drive rail has been installed at the correct height, the top surface is 9¼-inches above the operator base. A label and notch on each side of the operator indicates the correct height. See Figure B on page 9.



Once the gate rail is straight, verify the alignment of the wheels to the rail. Place a straightedge (≥ 24 -inch) across the face of the upper wheel, through the rail slot in the face of the operator. The straightedge should be in line with the rail and touching the aluminum rim of the wheel on across the face. The straightedge and rail should be parallel within ⅛-inch over 24-inch. If not, loosen the chassis mounting bolts and rotate the chassis until the straightedge and rail are parallel then retighten the chassis bolts.



Section 2 — Installation

4. Install Limit Ramps on Underside of Drive Rail

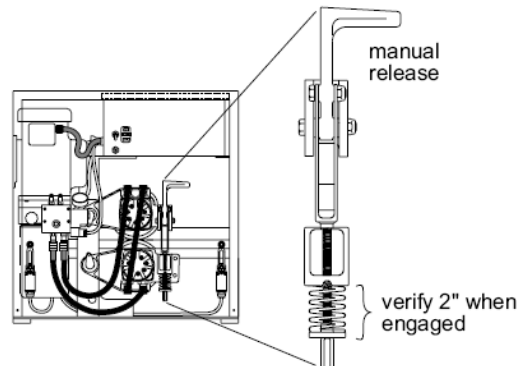
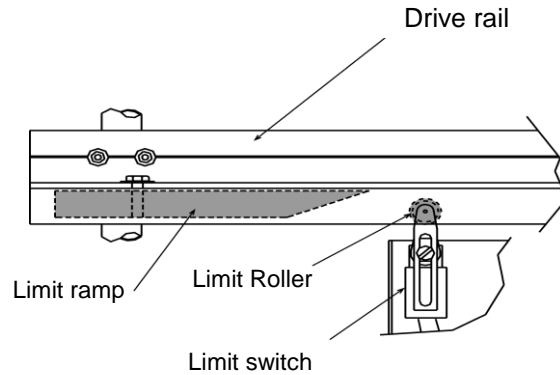
SlideDriver 50VF2, 50VF2-EFO, and 50VF3 operators have two sets of limit ramps. The ramps mounted farthest from the operator and closest to the gate are **deceleration ramps** (these are the longest ramps). The ramps mounted closest to the operator, farthest from the gate are **stop ramps**.

- Push the gate to the fully closed position and drill two $\frac{3}{8}$ -inch holes through the drive rail to mount a 12-inch plastic limit ramp under the drive rail, in the wheel channel.
- Locate drive rail so that it will trip the limit switch approximately 2-inches before the exact spot you want the gate to stop.
- Adjust the ramp left or right to achieve exact stopping point.
- Fully secure by tightening both bolts.
- Adjust the lever arms on the limit switch so that the roller clears the underside of the drive rail by at least $\frac{1}{4}$ -inch.
- Push the gate fully open and repeat this procedure with the other limit ramp.
- Install the deceleration ramps in the outside (farthest from the operator) channel of the drive rail, with the flat end parallel to the flat end of the stop ramp.

NOTE: The 50VF2 has 1 **deceleration** ramp, approximately 29 inches long. The 50VF2-EFO and 50VF3 have one additional ramp, approximately 11 inches long making the total **deceleration** ramp 40 inches long. See pages 16 and 17 for expanded limit ramp views.

5. 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-inch 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 *Section 8 — Use and Adjustment of the Manual Release Mechanism* on page 57.



Section 2 — Installation

6. Electrical Power Connection

This operator is intended for permanent installation. All electrical conduits must be properly connected to the control box. The entry for the primary power is a ½ - ¾-inch knockout on the left side of the control box next to the power switch. The operator is built to run on a specific voltage and phase. Make sure you have compared the available line voltage and phase with the voltage and phase listed on the nameplate on the machine. **They must match!** Be certain that the branch circuit wire size versus the distance of the run from the main panel is large enough to avoid excess voltage drop. At a minimum, a 20A circuit (protected with a 20A Inverse Time Breaker) should be provided. Also be sure the operator is electrically grounded per NEC Article 250 and local codes. See page 58 for correct wire sizes and detailed electrical wiring information.

7. Primary Tap of Control Transformer

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 or between 390V and 460V branch circuits. A label on top of the transformer identifies the various voltage taps. This connection must match the voltage on the operator nameplate.

8. Check the operator “Hand”

All slide operators must have their “hanging” set before they can function. The “hanging” must be set both by the proper hydraulic hose connection and by programming the Smart Touch Controller. The proper hanging hose connection is described on a label near the hose connection point. Also, see the instructions to set hanging on page 19. Operators are shipped configured for right hand operation. Hanging is viewed by standing on the secure side looking out. A gate which opens to the right is a right-handed gate.

9. Replace the Shipping Plug!

Replace the ½” steel or red plastic shipping plug on the front side of the pump with the black breather cap.

10. Setup the Smart Touch Controller

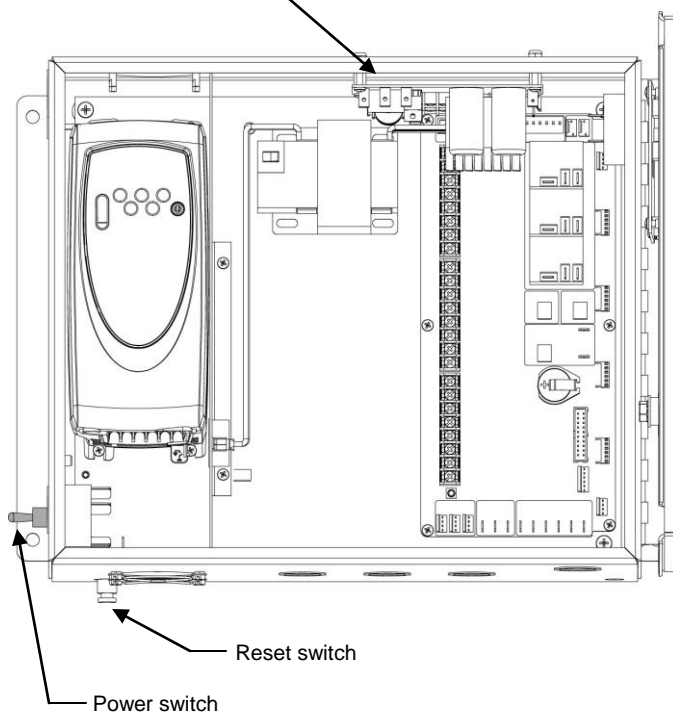
The operator controls will not allow the gate to function until the Smart Touch Controller has been configured. Wait to connect external controls until you have reviewed Smart Touch Controller instructions and tested operator basic functions.

NOTE: HySecurity has an installation CD available free of charge to installers. Call a HySecurity distributor for your copy.

⚠ CAUTION:

Variable frequency (VF) operators:

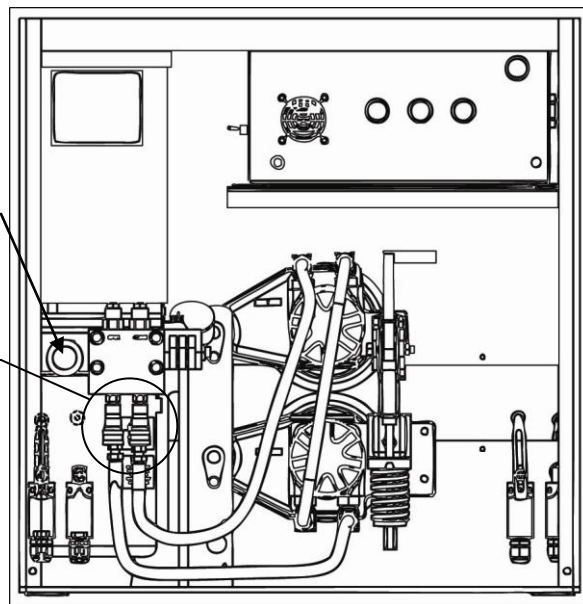
Make sure the connecting wires match the voltage found on the operator’s nameplate. **NEVER** connect to the white – 120V wire.



“Right Hand” shown

Remove red plastic shipping plug and replace with black breather cap.

To change hanging connect hoses according to label on tank.



Section 2 — 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-inch in height. Turn the nut at the bottom of the threaded rod assembly to adjust the spring's tension. Slightly less compression is okay for lighter gates. (See illustration on page 11.)

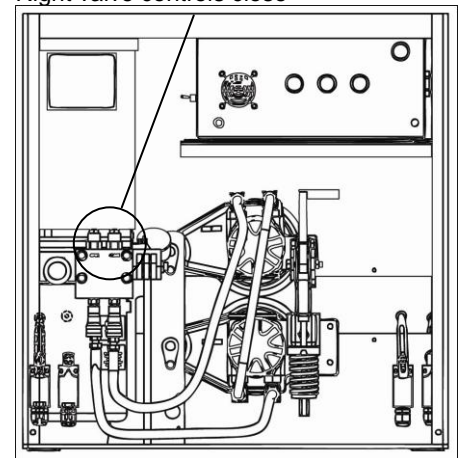
2. Drive Rail

Verify that the drive rail does not move more than 1-inch up and down or ¼-inch side-to-side throughout the entire horizontal travel of the gate. Re-alignment is simple if the rail is mounted with U bolts. Adjusting the rail for side-to-side movements requires inserting shims between the rail and the gate where necessary. To adjust side-to-side movements, 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.

3. Brake Valves

This 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 two 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-inch lock nut on the top of the brake valve and make ¼-inch incremental turns on the adjustment stem with an Allen wrench. The adjustment is counter-intuitive, such that a counter-clockwise adjustment stops 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. Brake valves are factory-set to midpoint, two turns. This *should* be sufficient for most applications. If the switch stops more than two inches into the limit ramp, increase braking. When the adjustment is complete, retighten the locking nut to hold the setting.

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



"Right Hand" Hose connections shown

4. Pressure Relief Valve

This valve governs the maximum system hydraulic pressure. It is located on the backside of the pump. The pressure relief valve is factory set and may need to be adjusted depending on the gate weight. Refer to the yellow tag wire tied to the unit, and follow the instructions.

NOTE: The only way to display the actual relief valve setting is to unplug the hydraulic hoses from the quick disconnect fittings and run the operator. View the setting on the pressure gauge. Retighten the locking nut to hold the desired setting and reconnect the hoses correctly.

5. Open Valve

The open valve is solenoid operated and, when energized, directs the hydraulic flow to open the gate. No adjustment of this valve is possible or necessary. The black solenoid coil mounts on its valve stem.

Pressure Relief Valve



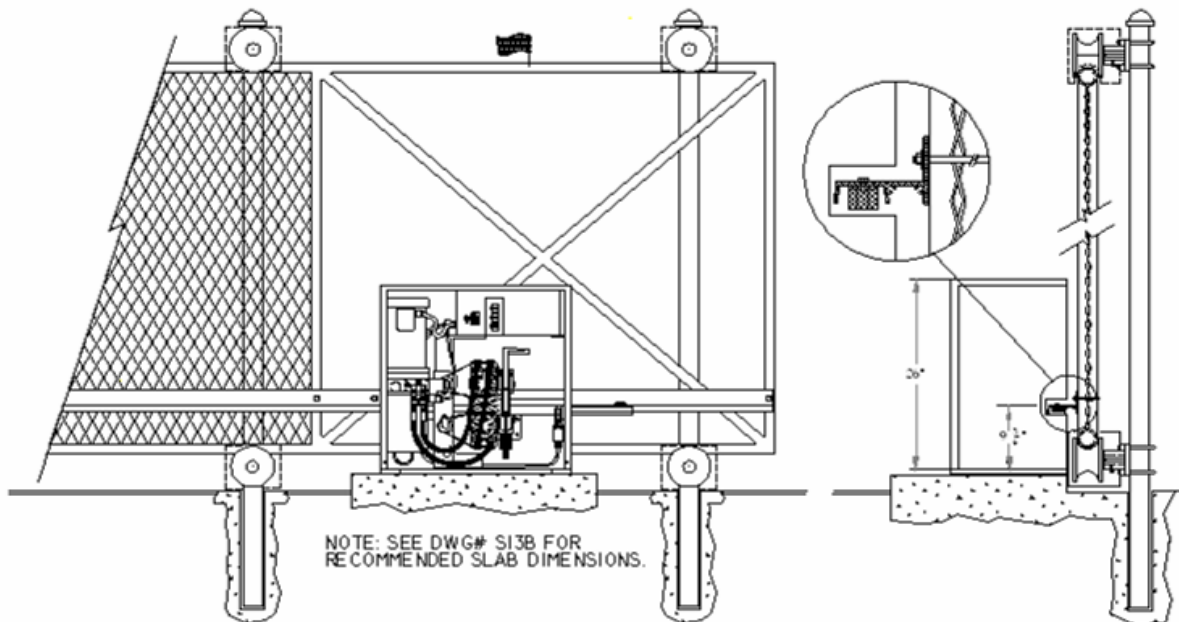
Solenoid

Section 2 — Technical Drawings

NOTES:

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

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



ELEVATION

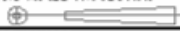
SECTION

NOTES:

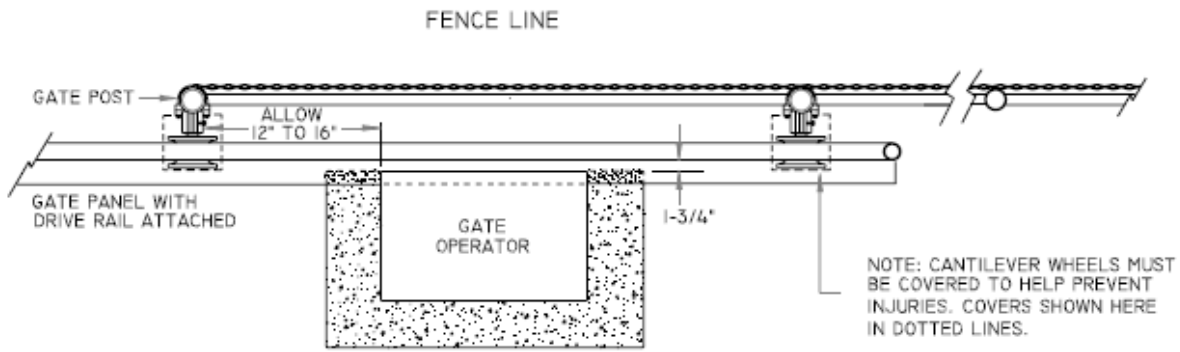
CONSULT FENCE CONTRACTOR FOR RECOMMENDED CANTILEVER POST SPACING. 50% OF GATE OPENING GENERALLY PROVIDES SMOOTH OPERATION.

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

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

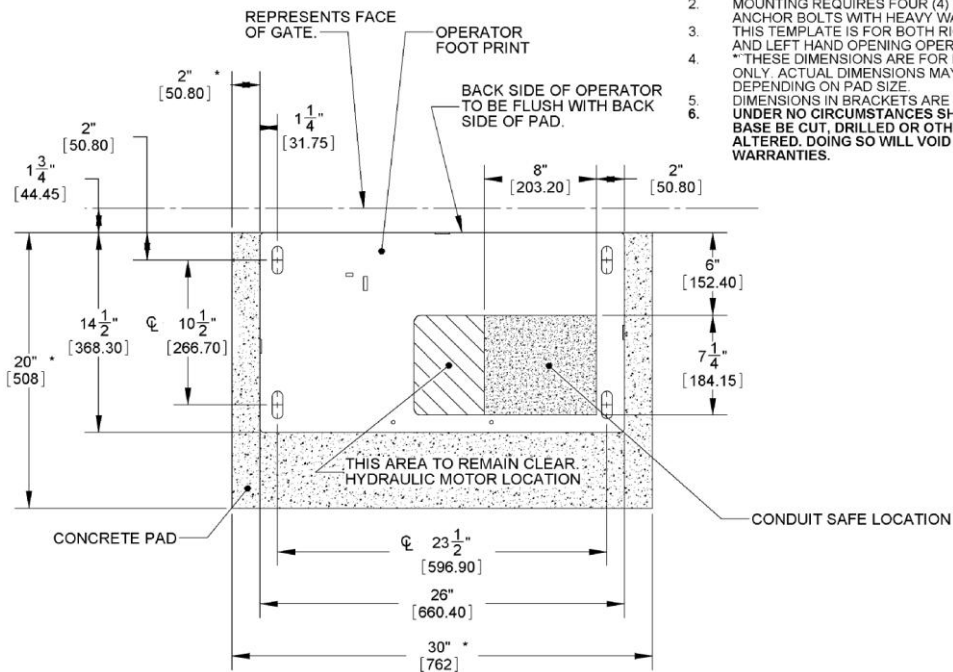
TITLE		DRAWN	DATE	THIRD ANGLE PROJECTION	REV
Slide Gate Operator (typ) R.H. Cantilever Gate Panel		KERI	6/12/00		— —
		CHECKED	DATE	PART NUMBER	
		SHOP	MM/YY/00	N/A	
		APPROVED	DATE	DRAWING NUMBER	
		ENGRNG	MM/YY/00	SI3A	1 OF 1

Section 2 — Technical Drawings



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.



NOTES:

1. RECOMMENDED MINIMUM CONCRETE SLAB DIMENSIONS: 20" W X 30" L X 16" D. CHECK LOCAL FROST CONDITIONS AND SOIL CHARACTERISTICS FOR EXACT REQUIREMENTS IN YOUR AREA.
2. MOUNTING REQUIRES FOUR (4) 1/2" X 6" ANCHOR BOLTS WITH HEAVY WASHERS. THIS TEMPLATE IS FOR BOTH RIGHT HAND AND LEFT HAND OPENING OPERATORS.
3. * THESE DIMENSIONS ARE FOR REFERENCE ONLY. ACTUAL DIMENSIONS MAY VARY DEPENDING ON PAD SIZE.
4. DIMENSIONS IN BRACKETS ARE MILLIMETERS.
5. UNDER NO CIRCUMSTANCES SHOULD THE BASE BE CUT, DRILLED OR OTHERWISE ALTERED. DOING SO WILL VOID ANY AND ALL WARRANTIES.
- 6.

TITLE

Slide Gate Operator (typ) R.H.
Cantilever Gate Panel

DRAWN
KERI

DATE
6/12/00

THIRD ANGLE PROJECTION

REV

CHECKED
SHOP

DATE
MM/YY/DD

PART NUMBER
N/A

B

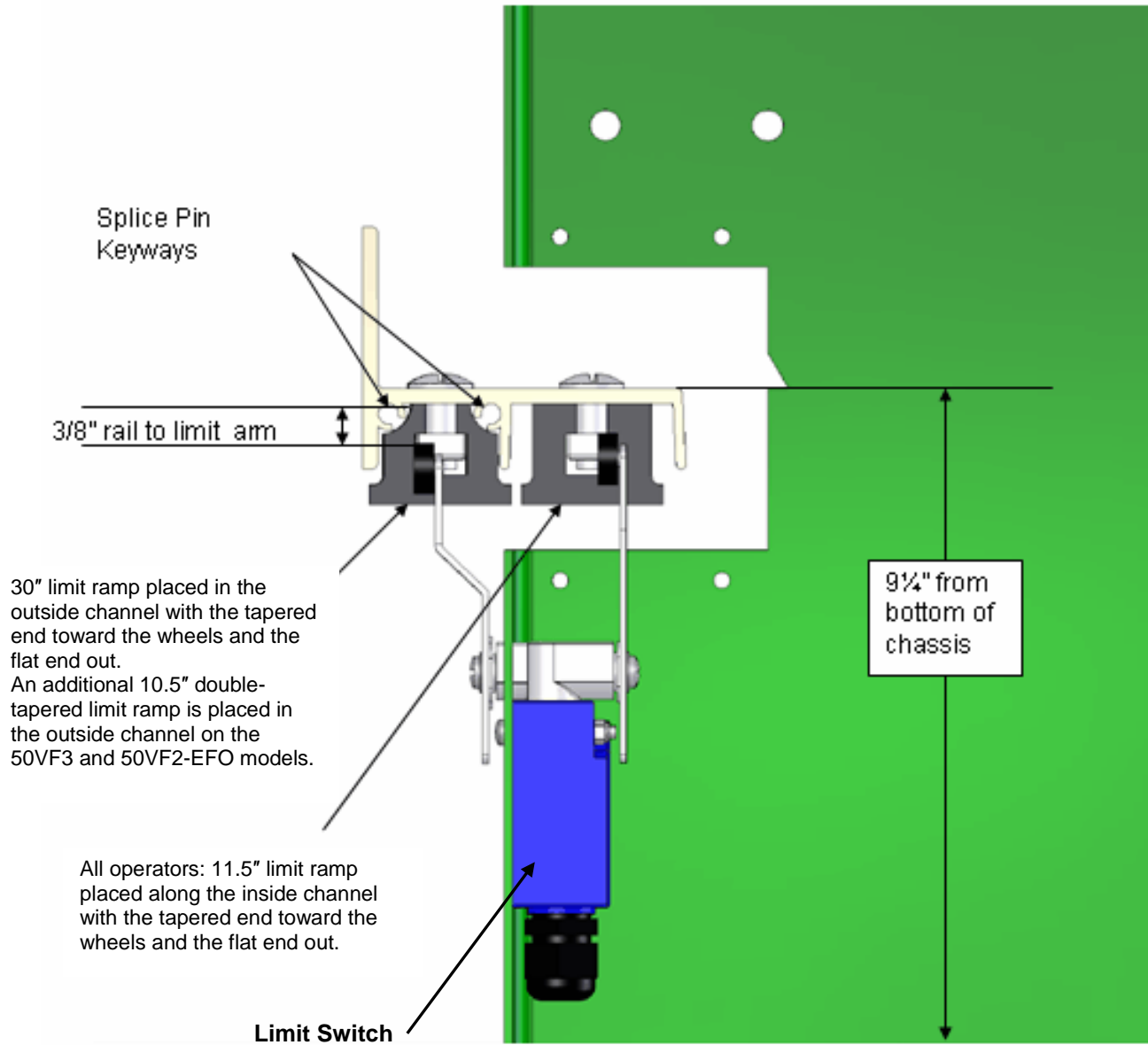
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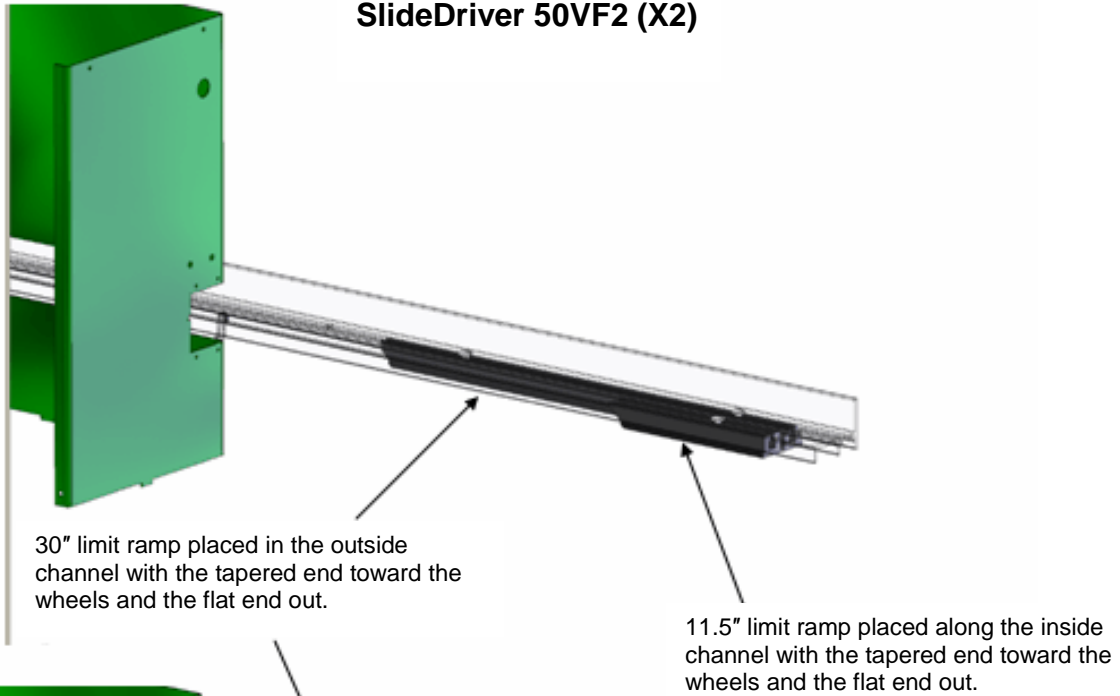
Section 2 — VFD SlideDriver Limit Switch Placement



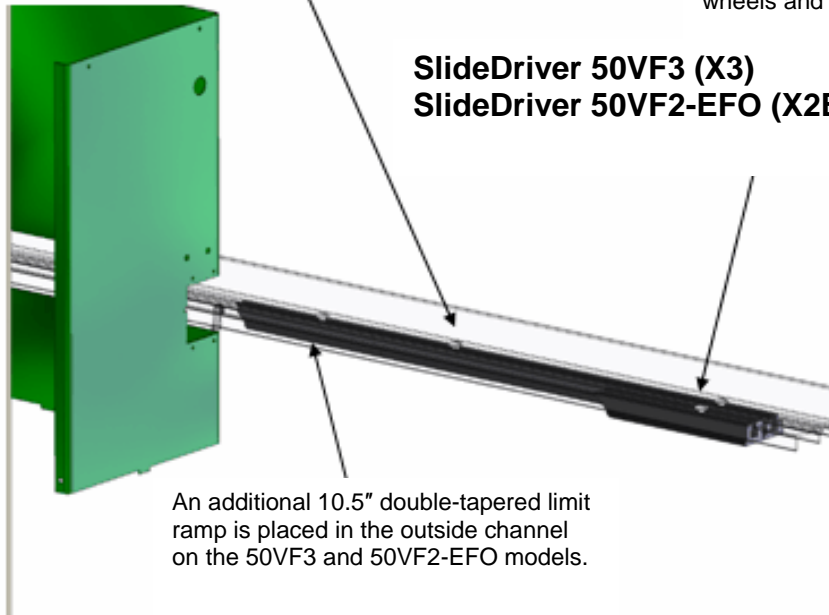
Section 2 — Limit Ramp Configuration

LIMIT RAMP CONFIGURATION

SlideDriver 50VF2 (X2)



SlideDriver 50VF3 (X3) SlideDriver 50VF2-EFO (X2EFO)



NOTE: For the 50VF2-EFO, refer to the setup and programming instructions on page 20.

Section 3 — Smart Touch Basics

You must learn to navigate and change menu settings with the Smart Touch Controller before an installation can be completed or any control settings or function changes can be made. This page describes how to use the Smart Touch Controller keypad and access the User and Installer Menus.

NOTE: Until a new operator has been configured, the controls are not functional and the display is locked in the menu mode until the usage class and handing have been selected. See the page 19 for instructions on how address these settings.



- Five buttons on the membrane switch pad provide total operator control. The OPEN, CLOSE and STOP buttons serve as a three-button control station, but in programming (Menu Mode), they become PREVIOUS, NEXT and SELECT buttons. The PROGRAM button is used to both enter and exit Menu Mode. The RESET button clears all errors and faults and returns the operator to its normal functioning state.
- When in a Menu Mode, programming the operator is accomplished by pressing the PREVIOUS, NEXT and SELECT buttons as described in the chart below:

To edit the display	To navigate through the selections	To choose what appears on the display	To navigate between menus
1. Press SELECT <i>Two characters blink.</i>	2. Press NEXT <i>Continue to press NEXT to view all selections.</i>	3. Press SELECT. <i>Blinking characters become static.</i>	4. Press NEXT or PREV <i>Advance = press NEXT Previous = press PREV</i>

- Once configured, the operator is in the Run Mode. To gain access to the User Menu or the Installer Menu from the Run mode, follow these steps:

NOTE: The PROGRAM button only works when the gate is at rest, when no open or close inputs are active, and when no faults, alerts or errors appear on the display.

- Verify system status by viewing lighted (active) inputs. Active inputs are lighted on all “New Generation” (post September 2006) Smart Touch Controller operators (other than DC operators without AC power). **NOTE:** To verify active inputs on New Generation DC operators (running without AC power) and “Classic” pre-September 2006 operators, press the tact button on the Smart Touch Controller (see page 21).
- Press the PROGRAM button and watch the operator status displays scroll past. Press the PROGRAM button a second time to skip the scroll. The operator status displays are described on page 24.
- The scrolling displays stop at the menu item for the automatic close timer setting [CL #]. This is the first item in the User Menu. Note that the number (#) symbol in the example can be any number from 0 to 99. You can access the Installer Menu when the close timer display appears.
- To access the Installer Menu, press and hold the RESET button and, while holding, press the OPEN button. The display changes to the usage class menu item [uL 3] or item [uL 4]. This is the first item in the Installer Menu.

- Pressing the PROGRAM button from any menu item returns the system to Run Mode.

NOTE: The PROGRAM button does not function if the characters in the menu display are blinking.



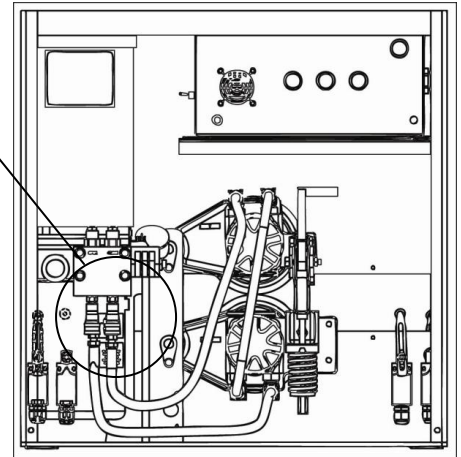
NOTE: The # symbol shown in the example display will appear on your operator as a number (0 to 99).



Section 3 — Setting Operator Usage Class and Handing

NOTE: Make sure the hydraulic hoses are connected properly to the quick disconnect fittings on the manifold. A label near the connection point describes this procedure. If the hoses are connected incorrectly, the gate will run backwards (close when the OPEN button is pressed) and this may trigger an error [Err 1] on the display. If this occurs, the hoses need to be reconnected properly and the RESET button must be pressed to reset the operator).

To change handing connect hoses according to the label on the pump pack.



1. Turn the power switch ON. The operator status displays scroll past. The display directly enters the Installer Menu and the usage class [UL 0] menu item appears.

NOTE: If the operator has been configured, the Installer Menu must be accessed in order to reach the system configuration menu items. See steps 3c and 3d on page 18.

2. While the usage class [UL 0] is being displayed), set the user class as defined by UL. Press SELECT, and then press NEXT to choose between [UL 3] or [UL 4]. See page 33 for UL usage class definitions. Refer to page 18 for a reminder on how to use the Menu Mode buttons.
3. When the appropriate usage class is displayed, press SELECT to accept it. The characters on the display stop blinking.

NOTE: The Installer Menu cannot be exited and the operator will not function until the selection for usage class and gate handing have been entered.

4. To set the gate “hand,” press the NEXT button. The handing menu item appears [Sh _]. Press SELECT, and then press NEXT to choose between “r” for right hand or “L” for a left-hand gate opening.
5. When the appropriate handing is displayed, press SELECT to accept it.

NOTE: Never disconnect the limit switch wires from the Smart Touch Controller or rearrange the limit switch hardware on the chassis to affect the handing of the gate.

6. At this point, you should exit the Installer Menu by pressing the PROGRAM button. The display jumps to the Close Timer [CL _] setting in the User Menu. Either set the Close Timer by the same programming sequence described on the previous page or press the PROGRAM button again to exit to Run Mode.
7. Test for proper handing by observing which way the wheels rotate. With the wheels unclamped, cycle the gate open and close. Use the OPEN and CLOSE buttons on the keypad. Note wheel rotation to verify proper gate handing. If the wheels are rotating opposite from the direction you wish the gate to move, return to the gate handing display and correct gate handing.

NOTE: Since the wheels are unclamped, neither limit switch should trigger at the start of this test. After ten seconds, the ALBB alert may appear because the system did not sense gate motion. This is a “normal” alert and can be reset when you complete the test.

8. Re-clamp the wheels and, if necessary, press RESET to clear the alert status.



Section 3 — 50VF2-EFO: Setting the Emergency Fast Operate

NOTE: For a wiring schematic of the 50VF2-EFO, refer to the Appendix, page 65.

To enable the Emergency Fast Operate option on the SlideDriver 50VF2-EFO, you need to program the Smart Touch Controller by taking the following steps:

NOTE: Since you are in programming mode the buttons on the keypad change from OPEN, CLOSE, and STOP to PREVIOUS, NEXT, and SELECT. See the illustrations.

1. Make sure the operator is turned ON. RD 00 appears on the VFD display and a gate status (STOP, OPEN, or CLOSE) appears on the Smart Touch Controller which indicates the machine is operational.
2. Press the PROGRAM button twice. The close timer menu item appears on the display which indicates you have accessed the User Menu.
3. While the close timer remains displayed, press and hold the RESET button and then the OPEN button. Hold the buttons for two seconds and then release both buttons. CL \# appears on the display which indicates you have accessed the Installer Menu. (The number appearing after CL indicates the operator's usage class.)
4. Press NEXT until the Emergency Close, aCL appears on the display.
5. Press SELECT and aCL starts blinking which indicates the display can be changed.
6. Press NEXT or PREVIOUS to change the display to aCL 1 .
7. Press SELECT to accept the entry. (The characters on the display stops blinking.)
8. Press PROGRAM to exit programming mode and return to Run Mode.



NOTE: The # symbol shown in the example display will appear on your operator as a number (0 to 99).



Install a Push-Button Device

The Emergency Fast Operate (3ft/s emergency close option) is designed for a constant hold function, such as a push-button device that is held for the duration of gate travel. To operate properly, the device must be connected to Terminal 23 on the Smart Touch Controller and a +24VDC terminal in the control box. See the illustration on the next page.

When the connections are made, a constant hold signal transmitted to the Smart Touch Controller causes the Emergency Fast Operate function to close the gate at 3ft/s.

Test the Operator

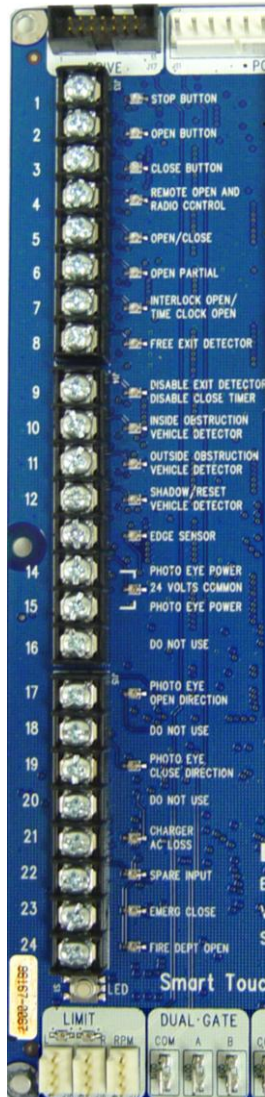
Complete the installation by testing the operation of the gate.

1. Make sure the operator is turned ON.
2. Close the control box lid.
3. Press OPEN to open the gate. The gate should open at 2ft/s.
4. Access gate operation. Observe the travel speed of the gate when you press the EMERGENCY CLOSE (on the constant hold device).
5. If the gate closes at 3ft/s, the operator is working properly. If additional accessories are to be added, read about *Wiring Control Inputs* on the next page.

Section 3 — Wiring Control Inputs

1. Test the open and close function of the gate before wiring to accessory devices (external control inputs). This makes it easier to troubleshoot if an unexpected functionality arises. The Smart Touch Controller has a tact button you can push which lights an LED next to the active inputs. This button is in bottom left corner of the Smart Touch Controller board.
2. All the Smart Touch Controller inputs listed below are shown as a single input. The second wire is connected to the Common Terminal Bus (COM) on the Smart Touch Controller.

NOTE: The Emergency Close and Fire Dept. Open inputs are an exception and require a +24V input. The +24V is located on the spade terminals next to the Common Bus. Refer to the photograph on the next page.



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 – Program to Close using Smart Touch Controller keypad
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 programmable
8.	Free Exit vehicle detector
9.	Disable Free Exit vehicle detector or Timer to Close Free Exit is only disabled if Close Limit Switch is tripped. If the gate is partially opened, the Free Exit detector will trigger the gate to open fully.
10.	Inside Obstruction vehicle detector Inside reversing loop
11.	Outside Obstruction vehicle detector Outside reversing loop
12.	Shadow/Reset vehicle detector Shadow function used for Swing gates only - Reset function is for Arm gates
13.	Edge Sensor One input works for both travel directions
14-15.	Photo eye Common Power 24V common connection for open and close photo eyes
17.	Photo eye Open direction
19.	Photo eye Close direction
21.	Charger AC power loss Only used in DC, battery type operators
22.	Spare Input Software ≤ h3.26,- non functional, Gate Lock Interlock Input Software > h3.26, prevents start until external gate lock releases
23.	**Emergency Close Must menu enable and input +24 Volts to trigger. Requires constant hold or maintained input. This overrides photo eyes, gate edges & vehicle detectors.
24.	**Fire Dept. Open Must menu enable and input +24 Volts to trigger. Overrides photo eyes & gate edge.

↑
Tact button



CAUTION: *Only connect an external control to terminals #1, 2 or 3 when the controls are located in clear view of the entire gate area. For controls that need not be in line of 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 is guarded and supervised.**

Section 3 — Wiring Control Inputs

“New Generation” Smart Touch Board

Runs software
4.xx and higher

- | | INPUTS |
|-----|--|
| 1. | Stop Button |
| 2. | Open Button |
| 3. | Close Button |
| 4. | Remote Open & Radio Control |
| 5. | Open / Close |
| 6. | Open Partial |
| 7. | Interlock Open / Time Clock Oper |
| 8. | Free Exit Detector |
| 9. | Disable Exit Detector / Disable Close Time |
| 10. | Inside Obstruction Vehicle Detector |
| 11. | Outside Obstruction Vehicle Detector |
| 12. | Shadow / Reset Vehicle Detector |
| 13. | Edge Sensor |
| 14. | Photo Eye Power (-) 24 Volts Common |
| 15. | Photo Eye Power (-) 24 Volts Common |
| 16. | DO NOT USE |
| 17. | Photo Eye Open Direction |
| 18. | DO NOT USE |
| 19. | Photo Eye Close Direction |
| 20. | DO NOT USE |
| 21. | Charger AC Loss |
| 22. | Gate Lock Interlock |
| 23. | Emergency Close |
| 24. | Fire Department Oper |

Tact button. Push tact button to make active
input LEDs light up when AC is off on DC
operators.

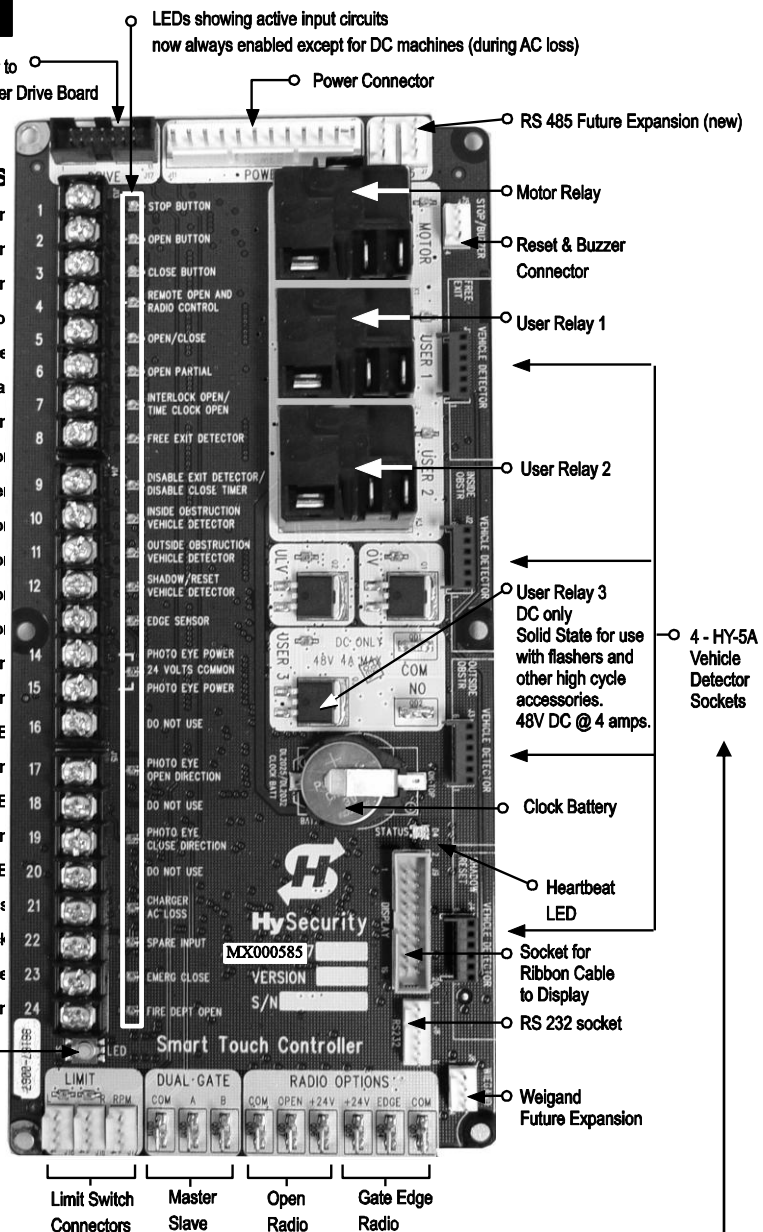
Power Supply Board



24V DC Accessory
Power (+)

Common Buss (-)

24V AC Accessory power



HY-5A Vehicle Detector



Section 3 — Connecting a Master / Slave Pair

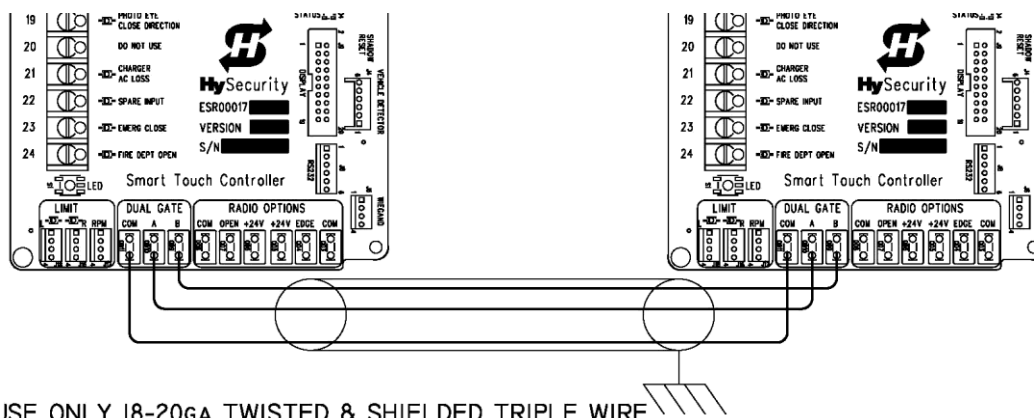
Configuring two operators to be a Master and Slave pair is easy with the Smart Touch Controller. There is no need to order a special model or any adapters. The area of the board marked Dual Gate employs a 3-wire RS485 serial port for communication between Master and Slave operators.

NOTE: Master and Slave operators must have the same version of the Smart Touch Controller and the same software version loaded on both machines.

1. An electrical conduit for the interconnecting wires must span between the two operators. This conduit must contain only low voltage $\leq 24V$ control and signal wiring.
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 20A 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* pages 59 and 59.
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 triple cable 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 as shown in the table below:

Slave	Master
A	A
COM	COM
B	B
Shield wire to Ground*	* NOTE: Only ground to one operator. Do NOT attach the shield wire to both operators. Cut off the shield and insulate (tape up) the exposed strands at the other operator.

6. The Installer Menu in each operator must be set as a Master or a Slave under menu item [d9 _]. Set one operator as a Slave [d9 1] and the other as a Master [d9 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 are 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 *Err4* appears on the display (a Master/Slave communication error). This error cannot be reset until both machines are functional and communicating properly again.



NOTE: USE ONLY 18-20GA TWISTED & SHIELDED TRIPLE WIRE.

Section 3 —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. [h2.17]
-------------------------	----------	---

Operator Status Displays (system data) and accessing the User Menu Settings:

If the gate is stopped in Run Mode, pressing the PROGRAM button accesses the User Menu. When the PROGRAM button is pressed, the operator status displays (shown in the following chart) scroll past. The scrolling display stops at the Close Timer setting, which is the beginning of the User Menu.

Operator Status Displays	Time	Description
S1 [SLAu] or [LEAd]	2s	SLAVE Operator or LEAd Operator (master)
S2 [ot 7] Gate type (1-7)	2s	Operator type: 1 =HSG, 2 =HRG, 3 HVG, 4 =HTG, 5 = SW24, 6 = SW38, 7 = 50VF
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 need. Once you have learned to navigate the menus and how to change a setting, as described in the chart on page 18, the full range of features and choices of the Smart Touch Controller are available to use. The User Menu contains the basic programmable items and the Installer Menu contains the more advanced programmable items.

To exit Menu Mode, simply press the PROGRAM button and return to Run Mode.

NOTE: If the display is blinking, you must press SELECT to accept what appears on the display and then press PROGRAM. Also, the operator automatically returns to the Run Mode if there is no key press activity for two minutes.

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)
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 3s before + in motion, 2 = Buzzer alerts 3s before + 2s in motion
U7 [FA 0] Forced open Alert and automatic gate reposition	0	0 = disabled, 1 = sound buzzer (2 pulses/sec) if forced open for more than 4s, time out in 30s
U8 [dA 0] Drift Closed Alert and automatic gate reposition	0	0 = disabled, 1 = sound buzzer (2 pulses/) 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 minutes, 2= set hours, 3= day, 4= month
U11 [Ld 5] LCD Contrast set	5	1 - 9 = Adjusts contrast of the display
U12 [dS 0] Data Log	0	0 = Std. 1 = Extended (reset to 0 in 24 hr) (V4.xx software)

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 NEVER disable (turn off) the Warn Before Operate buzzer per UL 325 regulations.

Section 3 —User Menu Functions

The User Menu functions shown in the chart on previous page are described in more detail on this page.

User 1 [Ct _] Close timer setting: Assign how many seconds before the open gate initiates closure. Keep the setting at 0 if a hard-wired, push-button control device is being used.

NOTE: The CLOSE TIMER display does not appear when the HOLD TO CLOSE is set to 1.

User 2 [hC 0] Momentary Close: Set to 0 produces a gate closure when a momentary signal is transmitted. Set to 1 if a constant hold to close signal, such as a push-button control, is being used. A setting of 1 also deactivates the automatic close timer and causes its menu to disappear. You must set HC to 1 to comply with UL 325 Type D protection.*

User 3 [ho 0] Momentary Open: Similar to HOLD TO CLOSE, but configures the OPEN push button for a constant-hold function. 0 = Momentary open signal. A setting of 1 means a constant hold open push button is required. You must set HO to 1 to comply with UL 325 Type D protection.*

User 4 [AP 0] Power loss function: This menu item only appears if the operator is a DC battery-powered (UPS) version. Configures the gate function that will occur if AC power fails.

User 5 [ro 0] Radio control option: Configures radio input for open only (0) or at setting 1 adds the capability for radio input to close the gate when it is fully open.

User 6 [bF 2] Warn before operate: Controls the warn-before-operate buzzer and can be configured three ways:

Set to 1: Buzzer beeps for 3 seconds before gate motion begins and continues through entire gate travel.

Set to 2: Buzzer beeps for 3 seconds before gate motion begins and continues for 2 seconds of gate travel.

Set to 0: Buzzer is disabled. Set at 0 the buzzer will still beep when alerts, faults, errors, or entrapment are detected.

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

User 7 [FA 0] Forced open Alert and automatic gate reposition: Intended for highly secure facilities. Set to 1, the operator sounds the 3-second “warn before operate” buzzer alarm, and then initiates a closure if the gate is forced open and the closed limit switch disengages. The motor restarts to secure the gate. If the gate does not fully close within 4 seconds, the motor turns off and the alert buzzer sounds for 30 seconds. The display shows *RL E 1*.

User 8 [dA 0] Drift Closed Alert and automatic gate reposition: Set to 1, the operator sounds the 3-second “warn before operate” buzzer alarm and initiates an open command if the gate is forced, or drifts, off the open limit switch. The motor starts to reopen the gate. The motor runs for a maximum of 4 seconds and, if the gate is not fully open at the end of this period, the buzzer sounds for 10 seconds. The display shows *RL E 2*.

User 9 [PE 0] PE Alignment Mode: When set to 1, the operator serves as an aide in photo-eye transmitter/receiver alignment. The buzzer chirps once when the emitter and receiver are not aligned. When the emitter and receiver are aligned, the buzzer chirps twice. If they go out of alignment again, the buzzer will chirp once. The Alignment Mode is reset with a close-limit input or reset input.

User 10 [CL 0] Clock and date set: The Smart Touch Controller is equipped with a 24 hour 365 day clock; thus events of significance are logged and stamped with the time and date. This feature is useful to read historical operation data, which can be accessed with a computer via the USB or RS232 port. To set or adjust the hour, minute, day or month, see page 31.

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.

User 12 [dD 0] Extended Data Log: Set this item to 1 to record all gate operator open and close events, in addition to the normal alert, fault and error logs. This parameter automatically resets to the default 0 (off) after 24 hours, which is useful when experiencing intermittent problems. Set to 0, the Smart Touch Controller logs pertinent gate operator events such as faults, errors, or menu manipulation.

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

Section 3 —Installer Menu Functions

The Installer Menu is accessed by entering the User Menu first [**U** _], and then pressing the RESET button and the OPEN button simultaneously. The display reverts to the usage class [**U** _] which is the first menu item in the Installer Menu.

	Installer Menu Options	Default	Description
I1	[U C 0] Set UL Usage Class	0	0 = gate disabled, Set Class 1 through 4 use
I2	[S h 0] Set Handing of gate	0	0 = gate disabled, r = Right Hand, L = Left Hand
I3	[F d 0] Load Factory Defaults	0	0 = User settings, 1 = Load defaults (resets full menu)
I3a	[b u 0] Choose Buzzer	0	0 = Buzzer not set, 1 = Freq 1, 2 = Freq. 2
I4	[d g 0] Set Master/Slave type	0	0 = solo operator, 1 = Slave unit, 2 = Master unit
I5	[C h 0] Set AC Charger or Solar	0	0 = DC + AC charger 1 = DC + Solar charger
I6	[F o 0] Enable Fire Dept. Open	0	0 = disabled, 1 = enabled
I7	[e C 0] Enable Emergency close	0	0 = disabled, 1 = enabled (EFO model only)
I8	[S E 3] Inherent Sensor	3	1 = maximum sensitivity, 9 = Lowest sensitivity
I9	[S S 0] Inherent Sensor function	0	1 = stop only (note, functions in usage class 4 only)
I10	[L C 0] Leaf delay Close	0	0 = none (1-7) ½ second steps (Master/Slave only)
I11	[L o 0] Leaf delay Open	0	0 = none (1-7) ½ second steps (Master/Slave only)
I12	[r t 0] Maximum run timer	0	0 = 60 Seconds max run, 1 = 300 Seconds max run
I13	[P o 0] Partial Open distance	0	0 = none, or 7 – 99 seconds
I14	[E C 0] PEC reverse to open	0	0 = Close eye stops only, 1 = 2 sec reverse to open
I15	[E O 0] PEO reverse to close	0	0 = Open eye stops only, 1 = 2 sec reverse to close
I16	[g r 0] Edge reverse to open	0	0 = Edge reverses fully open, 1 = 2 sec reversal only
I17	[S r 1] IES reverse to open	1	0 = IES reverses fully open, 1 = 2 sec reversal only
I18	[P C 0] Set PEO/ PEC – NO/NC	0	0 = Normally Open PE output, 1 = N.C. (supervised)
I19	[g C 0] Set Edge input – NO/NC	0	0 = Normally Open Edge output, 1 = Normally Closed
I20	[t C 1] Time clock/ Interlock input	1	0 = select Time Clock, 1 = select Open Interlock
I20a	[d t 0] Disable Free Exit/Close Tmr	0	0 = disable Free Exit, 1 = disable Close Timer
I21	[o r 1] OOLD detector function	1	0 = pause closing only, 1 = enable reversing to open
I22	[i r 1] IOLD detector function	1	0 = pause closing only, 1 = enable reversing to open
I23	[d L 1] Vehicle detector logic	1	1 = std, 2 & 3 = quick close, 4 = full anti-tailgate*
I24	[r 1 0] User relay 1 option	1	0 = disabled, 1 – 24 = see output options page 30
I25	[r 2 0] User relay 2 option	6	0 = disabled, 1 – 24 = see output options page 30
I26	[r 3 0] User relay 3 option	1	0 = disabled, 1 – 24 = see output options page 30
I27	[t L 0] Gate Open alert	2	0 = 0 sec, 1=15s, 2=45s, 3=75s, 4=105s, 5=135s
I28	[L t 0] Loitering alert	3	0 = 0 sec, 1=15s, 2=45s, 3=75s, 4=105s, 5=135s
I28a	[S A 0] System Address	0	0 = Off, 1-99 = Network “Drop” Address (RS-485)
I29	[E Ld0] Test factory ELD*	0	0 = Run mode, 1 = show freq, 2 = show call level 0-7
I30	[i Ld0] Test factory IOLD*	0	0 = Run mode, 1 = show freq, 2 = show call level 0-7
I31	[o Ld0] Test factory OOLD*	0	0 = Run mode, 1 = show freq, 2 = show call level 0-7
I32	[S Ld0] Test factory SLD*	0	0 = Run mode, 1 = show freq, 2 = show call level 0-7

*See page 44 for description of Vehicle Detector & Loop Fault diagnostics

If you wish to restore the factory default settings, go to menu item [**F**d_0] and change the setting to 1, then press the PROGRAM button. The entire menu will reset to the factory defaults. You will need to reprogram the operator if you want it to recognize any settings other than its factory defaults.

These Notes Refer to the chart above:

I1, I2, I3a These settings must be configured before the gate operator can function. Once set, the User and Installer Menu items become accessible as well

I3a The Option bu=0 only appears if the Controller has been reset to factory default settings

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

I9 IES stop only setting [**S**S _] 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

Section 3 —Installer Menu Functions

The Installer Menu functions shown in the chart on previous page are described in more detail on the next few pages.

Installer 1 [UL 0] **Set UL Usage Class:** Assign the operator's Usage Class designation per UL 325 standards. The installer must designate a usage class before the operator will function. See page 19.

Installer 2 [Sh 0] **Set Handing of gate** The handing determines which way the gate opens as you view it from the operator side. The installer must designate a left or right handing before the operator will function. See page 19.

Installer 3 [Fd 0] **Load Factory Defaults:** Globally restores all menu settings back to new machine status. To activate, change the setting from 0 to 1 and press the PROGRAM button. Note that if the factory defaults are reinstated, the UL usage class, handing, and buzzer type will need to be set again.

Installer 3a [bU 0] **Select Buzzer Type:** Selects the type of audible buzzer installed on the machine. To set, press the SELECT button; the display flashes 0. Press OPEN and listen to the buzzer volume, and then press OPEN again and listen to the buzzer volume. If the volume increased, press SELECT to change to the louder volume. If the volume decreased, push CLOSE to retain the louder volume then push SELECT to lock in the louder volume.

Installer 4 [d9 0] **Set Solo, Master or Slave type:** Configures a Gate Operator as a Master or a Slave operator in Master/Slave paired gate installations.

Installer 5 [Ch 0] **Set AC Charger or Solar:** Appears on 24VDC battery (UPS) machines only.

Installer 6 [Fa 0] **Enable Fire Dept. Open:** Enables the Fire Department Open input. When set to [Fa 1], overrides vehicle detectors, photo eyes and gate edges to open a gate. A reset (or two open commands) is required before the gate can be closed.

Installer 7 [oC 0] **Enable Emergency Close:** Enables the Emergency Close input. When set to [oC 1], overrides vehicle detectors, photo eyes and gate edges to close a gate. A reset is required before the gate can be opened. (EFO model only)

Installer 8 [SE 3] **Inherent Sensor sensitivity:** Adjusts the sensitivity of the internal inherent sensor. Available settings are 1-9 with 9 being the least sensitive.

Installer 9 [55 0] **Inherent Sensor function:** Only available in UL Class 4 Gate Operators and allows an option whereby the inherent sensor will only stop the gate.

Installer 10 [LC 0] **Leaf delay Close:** Only appears if the Gate Operator is set up as a Master or a Slave. Available settings are 1-7. Each increment adds ½ second, to a maximum of 3 ½ seconds time delay, before the operator activates when commanded to close.

Installer 11 [Lo 0] **Leaf delay Open:** Only appears if the Gate Operator is set up as a Master or a Slave. Available settings are 1-7. Each increment adds ½ second (with a maximum of 3 ½ seconds) time delay following a command to open before the operator activates.

Installer 12 [rE 0] **Maximum run timer:** Allows an optional setting of 300 seconds if changed to [rE 1] as opposed to the maximum run timer default setting of 60 seconds.

Installer 13 [Po 0] **Partial Open distance:** 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 [Po 0] leaves this input inactive.

Installer 14 [EC 0] **PEC (photo eye close) reverse to open:** The default setting is 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.

Section 3 —Installer Menu Functions – continued

Installer 15 [E0 0] **PEO (photo eye open) reverse to close:** The default setting is non-reversal if the open photo eye is triggered. The optional setting of [E0 1] will cause the gate to reverse to close for two seconds if triggered while opening.

Installer 16 [gr 0] **Edge reverse to open:** The default setting is to reopen fully. The optional setting of [gr 1] sets the gate at a 2-second reversal if triggered while closing.

Installer 17 [5r 1] **IES (inherent sensor) reverse to open:** The default setting is a 2-second duration reversal if the inherent sensor is triggered. The optional setting of [5r 0] will cause the gate to reopen fully if triggered while closing.

Installer 18 [PC 0] **Set PEO/ PEC – NO/NC:** The default setting is photo eyes with Normally Open outputs. The optional setting [PC 1] will require a Normally Closed (NC) output. If set for NC, 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 [9C 0] **Set Edge input – NO/NC:** The default setting is edge sensor with Normally Open (NO) outputs. The optional setting [9C 1] will require a NC 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 29, or for an external time clock to open input, as described on page 46. The default setting is [tC 1] for the interlock function.

Installer 20a [dE 0] **Disable Free Exit / Close timer:** Configures the input at Terminal No. 9 on the controller circuit board to disable either the Free Exit Detector on terminal #8, or the Timer To Close function. Default setting is [dE 0] allowing disabling of the free exit detector.

NOTE: The free exit is disabled when the gate is at its closed limit. If the closed limit is not tripped, the free exit continues to work.

Installer 21 [or 1] **OOLD (Outside Obstruction Loop Detector) function:** The default is for full reversal when the OOLD is triggered. The optional setting [or 0] causes the gate to only pause when triggered. Gate closure begins as soon as the loop is clear again.

Installer 22 [ir 1] **IOLD (Inside Obstruction Loop Detector) function:** The default 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:** Configures quick close and anti-tailgate logic. There are four modes. See the full description on page 45.

Installer 24, 25, 26 [r1 0], [r2 0], [r3 0] **User output relay 1 - 3 options:** Configures the function of the three user output relays. There are 21 optional choices, which are described in detail on page 30.

Installer 27 [tL 0] **Gate Open alert:** Adjusts the time delay before activating the user relay function #8, described on page 30. 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 30. Time settings up to 135 seconds.

Installer 28a [5A 0] **System Address:** Sets the system address for network communication; 0 = no network communication, 1-99 sets individual polling addresses. Requires v4.24 software or higher.

Installer 29 [ELd0] **Factory ELD:** Controls the HY-5A Free Exit detector, see page 44.

Installer 30 [iLd0] **Factory IOLD:** Controls the HY-5A IOLD detector, see page 44.

Installer 31 [oLd0] **Factory OOLD:** Controls the HY-5A OOLD detector, see page 44.

Installer 32 [SLd]. **Factory SLD:** Controls the HY-5A Shadow detector, see page 44.

Section 3 —Correctional Facility – User Optional Wiring

A special terminal strip has been pre-wired to the three user relay outputs in Correctional Facility (CF) models for easy field wiring of the common interconnect options. If alternate output functions are required, see page 30.

NOTE: User 3 Relay on STC boards is rated for DC only up to 48V and does not have an N.C. (normally closed) connection.

Connecting an Interlocked Pair:

An interlocked pair of operators is not a Master/Slave system. It is 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 the required interlock input (#7) and the interlock output contact.

1. User relay 3 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 bus of each operator to the User 3 relay COM terminal of the other operator. Then, connect wires from the User 3 relay NO terminal to the Interlock input (#7) of the other operator.
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 30.
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:

The Smart Touch Controller can command an external solenoid lock or maglock 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 30.

Connecting the Gate Secure Position Indicator Output:

The Smart Touch Controller can signal an external device that the gate is secure.

1. User relay 1 has been set by the factory to provide the necessary output for position indication. Connect the voltage matching the indicator light to User 1 COM and connect the gate secure light to User 1 NC. The other indicator light wire connects directly to the voltage common conductor. If an unsecured light is required, connect it to User 1 NO.
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 30.

Section 3 —Options for User Programmable Output Relays 1-3

The Smart Touch Controller is able to interface with many types of external devices through the use of three user-programmable output relays. All of the output functions described below are accessible in the Installer Menu under the selection [r1__], [r2__] and [r3__].

NOTE: The User Relays will operate normally to less than 18VDC.

Access the Installer Menu and program the output relays according to the following steps:

1. Select the relay you wish to use; either [r1__], [r2__] or [r3__].
 2. Enter the appropriate function using the associated number listed in the table.
1. **Close limit output:** Creates an interlock signal to another operator's interlock input, or simply to indicate that the gate is secure. The relay is released when the fully-closed limit switch is tripped. The relay is energized when the fully-closed limit is released.
 2. **Close limit pulse output:** Used in a sequenced syst^{em} to command a second machine to close. Generates a brief pulsed output that occurs when the close limit is triggered.
 3. **Open limit output:** Indicates a fully-opened position. This output becomes active when an open-limit is triggered and releases when the open-limit is released.
 4. **Open limit pulse output:** Trips a sequenced barrier arm gate operator to open. Generates a brief pulsed-output when the open-limit is triggered. An additional pulse is also generated with any new open command even when the gate is already fully-opened.
 5. **Warn before/during operate output:** Controls an external warning device. This output operates at the same time as the internal warn before operate buzzer.
 6. **Gate Lock output:** Controls external solenoid locks or magnetic locks. In both directions of travel, this output is activated about 7/10ths of a second before the operator starts moving the gate and remains active while moving as well as for a few seconds after stopping.
 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 close within four seconds. This alarm resets itself in 30 seconds.
 8. **Gate open too long output:** Activates when the gate is open longer than a user-selected period of time. Adjustable from 0 delay to 135 seconds delay in 15-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 second 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:** Interlocks 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:** Annunciates a vehicle or indicates loitering. Adjustable from 0 delay to 135 seconds delay in 15-second time intervals.
 14. **Gate nearing full travel output:** Applies to operators with RPM sensors only. Activated when the gate is three feet from full travel in both the open and close directions. This output is used to reduce the sensitivity of a proximity sensor near the ends of gate travel.
 15. **Gate Failure output:** Activated to report occurrence of a problem. Indicates the system in an Error Mode, Fault Mode or Entrapment Mode. If active, the gate is disabled.
 16. **Motor Running output:** Active when the motor is running and the gate is in motion.
 17. **AC Power Failure output:** This relay is normally energized and drops with loss of AC power. This output is also active on DC machines when the battery charger is off.
 18. **DC Power Failure output:** 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.

Section 3 —Options for User Programmable Output Relays 1-3 , cont.

19. **Flasher Relay:** Controls flashing lights that pulse once per second. The relay is constantly activating except when the open limit switch is triggered.
20. **Free Exit Loop Vehicle Detector output:** Available with software version h3.23 and higher. Active whenever the ELD is tripped.
21. **Inside Obstruction Vehicle Detector output (available in h3.23 and higher software):** Activated when the Inside Obstruction Vehicle Detector (IOLD) is tripped.
22. **Reset/Shadow Loop Detector output:** (Not used in SlideDriver.) Activated when the Reset or Shadow loop detector (RLD/SLD) is tripped. Since this input is not used for a sliding gate, User Relay 22 can be used in combination with a detector to perform the function of an arming-loop detector or annunciation-loop detector because there is no associated gate control logic.
23. **Gate Lock Output:** Available with software version h3.25 or h4.23 and higher. Activates when the Lock Interlock Input (Terminal No. 22) is active at the start of an Open cycle and remains on until the Lock Interlock releases or 10 seconds passes, whichever is sooner. Also, activates at the start of a Close cycle and releases 1 second after reaching the Close limit..
24. **Gate at Partial Open Position:** Available with software version h3.25 and higher. Active when the partial open position is reached or exceeded

Clock Functions

Setting the Time and Date

The Smart Touch Controller is equipped with a 24 hour (military time), 365 day clock, so that significant events can be logged and stamped with the time and date. This troubleshooting feature is useful to record key historical operational data and a log of Alerts, Faults and Errors. The log can be accessed via the RS232 port. Optional software and a serial communication cable are required in order to read this log. Contact your HySecurity distributor or HySecurity to purchase software and download cable*.

1. To set or adjust the time, go the User menu item [CL 0] and push the SELECT button, so that [CL 0] blinks. Using the PREVIOUS and/or NEXT buttons, change the setting from [CL 0] to 1, 2, 3 or 4 depending upon which setting is to be changed. 1 = minutes / 2 = hours / 3 = days / 4 = months.
2. Push the SELECT button. The display will change to a blinking (adjustable) value. Different displays will appear (see table below) based on which [CL] value is selected:

Setting	Value	Display
[CL 1]	minutes	[ni 0-59]
[CL 2]	hours	[hr 0-23]
[CL 3]	days	[dA 1-31]
[CL 4]	months	[no 1-12]
[CL 0]	Run Mode	None

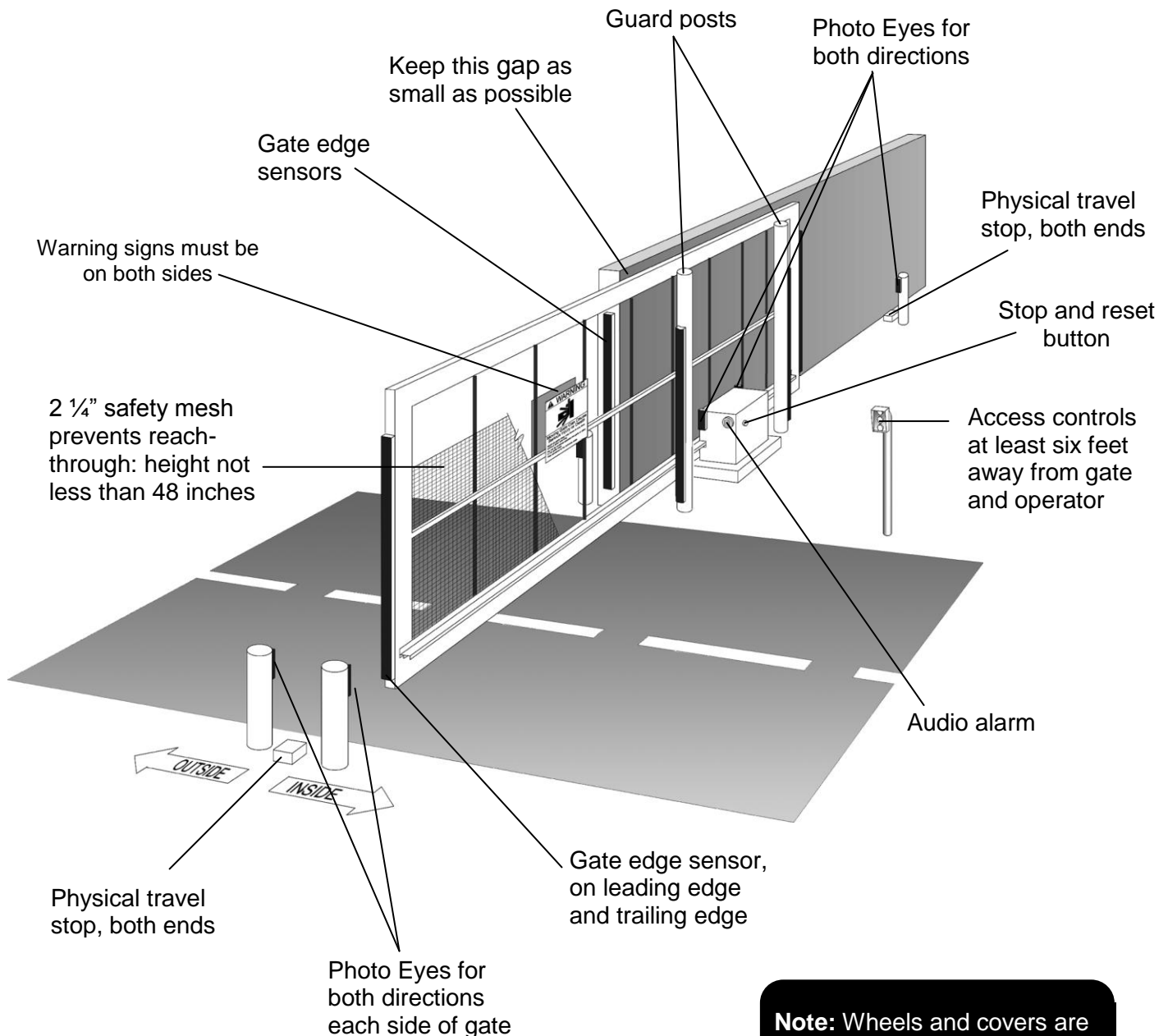
3. Change the hour, minute, day or month to the desired value using the PREVIOUS and/or NEXT buttons, then press the SELECT button to enter the change. [CL 0] will appear.
4. To change another setting, Press the SELECT button, (display will blink), then move to that setting using the PREVIOUS and /or NEXT buttons and repeat steps 2 and 3 until the clock is fully set.
5. When finished, be sure [CL 0] is displayed, then push PROGRAM to exit.
6. 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 CR 2025 / 2032 battery.

* **START** Configuration and Diagnostic software is available at no charge from our website – www.hysecurity.com. A serial communication cable and USB adaptor (Part MX000667) can be ordered through your HySecurity distributor.



Attention

Entrapment Protection Device Schematic for Sliding Gates



Note: Wheels and covers are not shown. However, all gate wheels must be covered.

This schematic view is not meant to recommend a specific configuration. It is not meant to point out the important elements of a proper automatic vehicular gate installation. The gate operator is only one component in the total system. **Always install a separate pedestrian gate.**

Section 4 —UL 325 Standard Requirements for Entrapment Protection Devices

Gate Operator Category & Usage Class

	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
Class III	A, B1, or B2	A, B1, B2, D, or E	A, B1, or C	A, B1, B2, C, D, or E
Class 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. Using 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 a Type B1 for one direction and a 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.

^aEntrapment 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 The 50VF SlideDriver operators can only be used in areas designated as UL usage class III and IV.

The Usage Classes are:

Class I: Intended for use in a location with one to four single family dwellings, 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.

Section 4 —Installing Gate Edge (Contact Type) Reversing Sensor

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 for vehicular use and pedestrians must be routed to a separate main gate. However, to provide a degree of protection should anyone happen to stray into the area of an automatic gate, sensors are required. Generally two types of external sensors may be used:

- Contact type sensors, such as an edge sensor
- Non-contact sensors, such as photoelectric sensors

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 alternative options exist 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 sensors 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 its 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.

Section 4 —Installing Gate Edge (Contact Type) Reversing Sensor, cont.

1. Follow the guidelines in the Entrapment Protection Device illustration 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. The edge and hand held transmitters must have their codes set the same or they will not function.

Section 4 —Installing Photoelectric (Non-contact) Sensors

General Information:

To plan the most appropriate mounting positions for the photoelectric sensors, review the Entrapment Protection Device illustration on page 33. If secondary external entrapment protection sensors (typically an edge sensor) are NOT installed, at least two photoelectric sensors are required. The purpose of the photoelectric sensors is 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).

Two common types of photoelectric sensors exist:

- Thru beam - A thru beam sensor is generally more powerful and able to function reliably with dirty optics and in poor weather.
- Retro-reflective - 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.

NOTE: Avoid use of a retro-reflective device to span a distance greater than 24 feet (7.3 meters) in an outdoor environment because 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 HySecurity operator, a photo eye must be rated to function from 24 Volts DC source power.

Installation:

Mount the photo eyes approximately 15 to 30 feet (4.6 to 9 meters) above the ground and as close to the gate as possible. A minimum of two photo eyes are required for both the opening and closing directions of travel unless gate edges for entrapment protection exist.

NOTE: The installation locations described above are intended for pedestrian detection.

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 close positions of travel. In some situations, an additional photo eye should be installed on the public side of the gate. If photo eyes are also being used for vehicular detection, consider, installing the low elevation photo eye for cars and another photo eye at a height of about 55 inches (140cm) 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.

Section 4 —Installing Photoelectric (non-contact) Sensors – continued

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 18 on page 27.

Photo Eye Function

If the gate is not in motion, a tripped photo eye will prevent the gate from starting in either direction. If tripped while in motion, the gate pauses, and then automatically restarts again if the photo eye is cleared within five seconds. An optional setting in the Installer Menu causes a two-second reversal of travel. See Installer Menu 14 & 15 starting on page 27.

Alignment

Most photo eyes require careful optical alignment in order to aim the emitter beam to the center of the receiver or reflector. 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. HySecurity has provided a unique feature that turns power on to the photo eyes and causes our buzzer to chirp when the photo eye enters and exits alignment. See User Menu item 9 on page 26 to enable this feature. Set the menu item [PE_0] to [PE_1] and the buzzer will chirp twice when the beam is broken and once when remade. (The parameter will automatically reset the next time the Close Limit Switch is triggered.)

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 an enclosure.

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. This would prevent the reflector from being reached for future cleaning. To create a mounting base, attach a 3-inch aluminum flange (electric meter hub) to the connector. This whole package can be mounted to any flat surface.

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

Section 5 —Detector Loop Installation

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 StrongArm operator (HTG 320), a loop may be as small as 4ft x 6ft (1.2m x 1.8m). In traffic applications employing one of our sliding gate operators, or swing gate operators, the smallest loop should not be less than six feet square.

Rules to Follow for Security Gate Applications

NOTE: Refer to the drawing on page 40.

1. The side of the loop closest to the gate shall be located at least 4 feet (1.2 meters) distant from its line of travel.
2. The shortest side of the loop shall be between 6 and 8 feet (1.8 and 2.4 meters) in length. The longest side of the loop shall be between 6 and twenty 20ft (1.8 and 6m) in length. For applications that need to span a wide area, use several smaller loops. Do not exceed a maximum of 200ft² of loop area (61m²) to only one detector.
3. In applications with multiple loops, keep each loop at least 6ft (1.8m) apart. This avoids “cross talk”. It is possible to have loops closer together by selecting different frequencies. An advantage of using HySecurity model 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 multiple smaller loops, connected in a series circuit, to one detector instead of one large, single loop.
5. To avoid interference, keep loops at least 2 inches (5cm) above any reinforcing steel. Do not route loop wires with, or in close proximity to, any other conductors, including other loop leads, unless shielded lead-in cable is used. Never route high voltage circuits in PVC conduit near a loop.
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 number 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 10 turns per foot (10 times per 30cm).

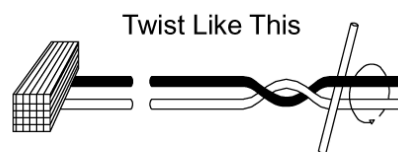
Twist lead-in at least 10 turns per foot



Like This



Not Like This



E31a

Section 5 —Detector Loop Installation, continued

9. Follow this guide for the correct number of turns in the loop;

12 to 20 sq. ft = 5 turns (3.6 to 6 sq. meters)

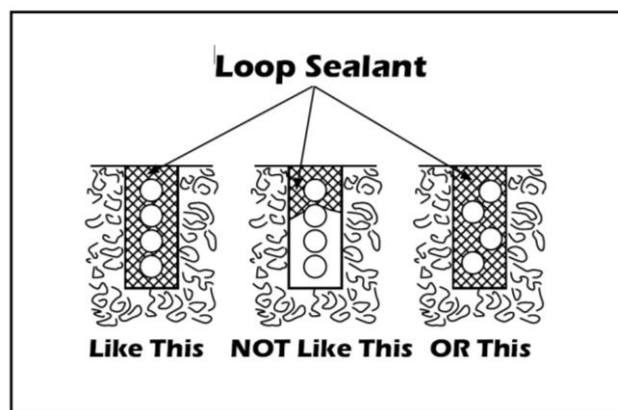
20 to 60 sq. ft. = 4 turns (6 to 18 sq. meters)

60 to 240 sq. ft. = 3 turns (18 to 73 sq. meters)

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 $\frac{1}{4}$ " wide x $1\frac{1}{2}$ " deep (6.3mm x 38mm).
- 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: If the loop wires are able to move in the slot after the sealer has set, the detector may give false calls.



Detector Logic

HySecurity recommends that vehicle detectors be used for free open and obstruction sensing logic only. The exception is in parking applications with our StrongArm operator (HTG 320) 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, our circuit has not been designed to accommodate "detect to close" logic.

Loop Diagnostics

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

Test #1:

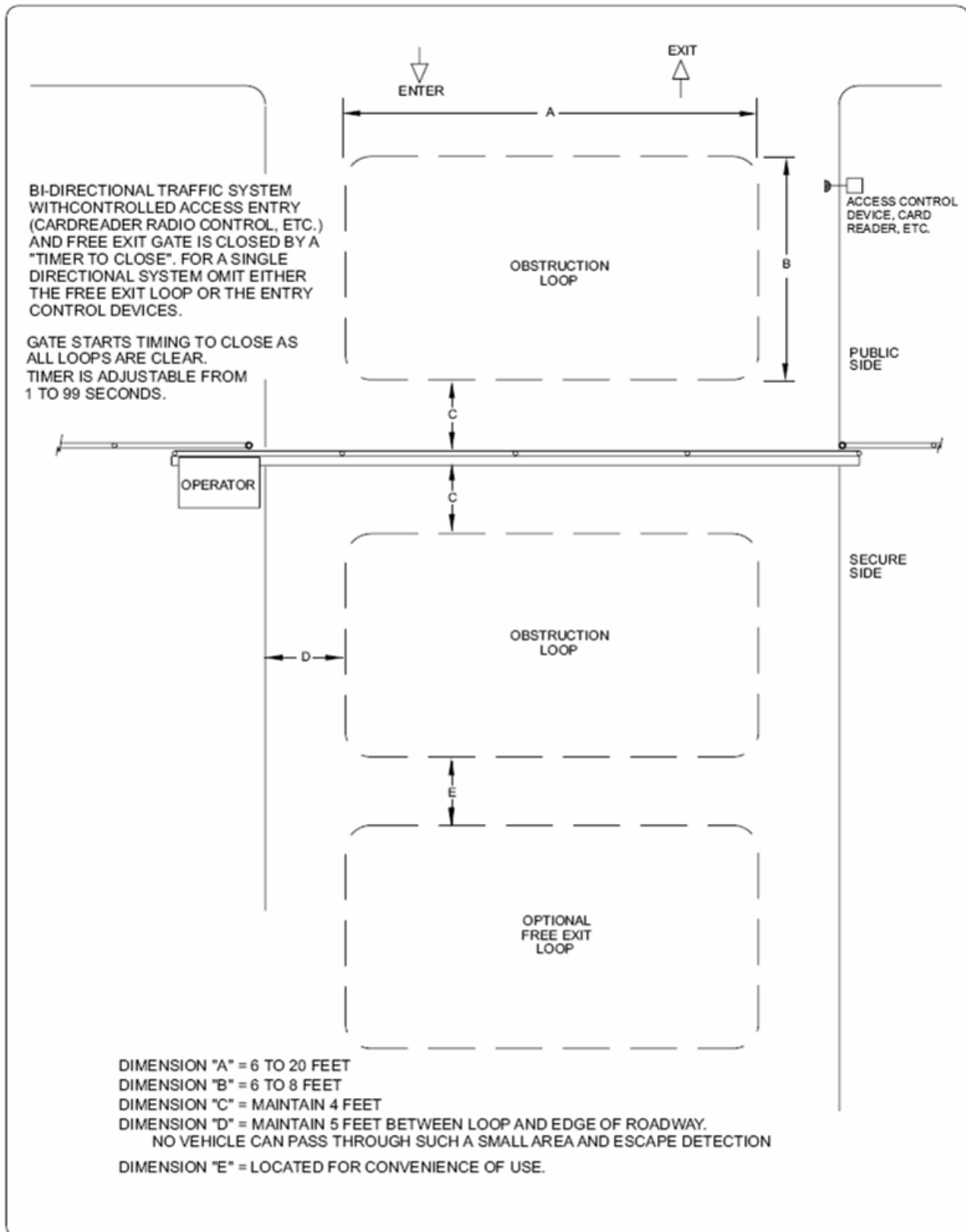
Resistance of the loop and lead-in wire should not exceed 4.0 Ohms.

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.

See also Detector and Loop Fault Diagnostics on page 44 for additional tests that may be performed with HySecurity HY-5A detector modules.

Section 5 —Detector Loop Installation, continued



	TITLE		DRAWN	DATE	THIRD ANGLE PROJECTION		REV
	SLIDE GATE LOOP LAYOUT		DB	05/15/00			A
			CHECKED	DATE	ERN NUMBER	DATE	
			APPROVED	DATE	DRAWING NUMBER		
					E96		SHT OF 1 1

Section 5 —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 43. HySecurity 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 a large performance benefit. The HySecurity 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 memory.
- f. Most detector or loop faults that could occur are reported and displayed on the LCD display

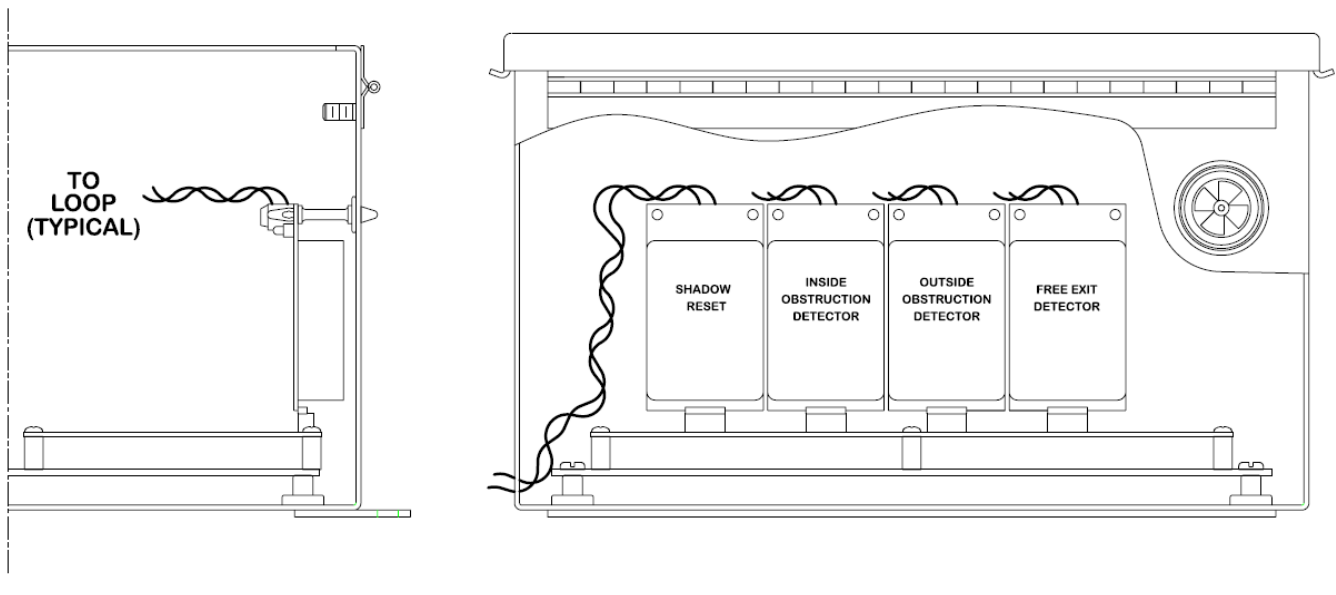


There are four vehicle detector inputs available both on the main terminal strip and as direct plug in modules. The vehicle detector inputs are for the following functions:

1. Free Exit Loop Detector – “**ELD**” for short
2. Outside Obstruction Loop Detector – “**OOLD**” for short (this is the outside reversing loop)
3. Inside Obstruction Loop Detector – “**IOLD**” for short (this is the inside reversing loop)
4. Shadow Loop Detector – “**SLD**” for short (this is for swing gates only)

A combination of HY-5A detectors and 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 second vehicle tailgating detection, loitering alert, several anti-tailgating options and selectable non-reversing. Multiple obstruction detectors may be mandatory because not more than 200ft² of loop area (61m²) may be connected to any one detector or the sensitivity becomes inadequate.



Section 5 —HySecurity HY-5A Vehicle Detector Installation

1. Insert the locking end of each of two white plastic standoffs into the mounting holes on the detector.
2. Plug the detector into the appropriate socket along the right 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 guide 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 detector is triggered. The [ERR3] can only be cleared by pressing the Reset button, which electronically uninstalls the detector. See Detector & Loop Fault Diagnostics on page 44.
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 add the boost feature*)
4 = Low, 5 = Normal, 6 = Medium, 7 = High

*Boost increases the sensitivity during a call and is 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.

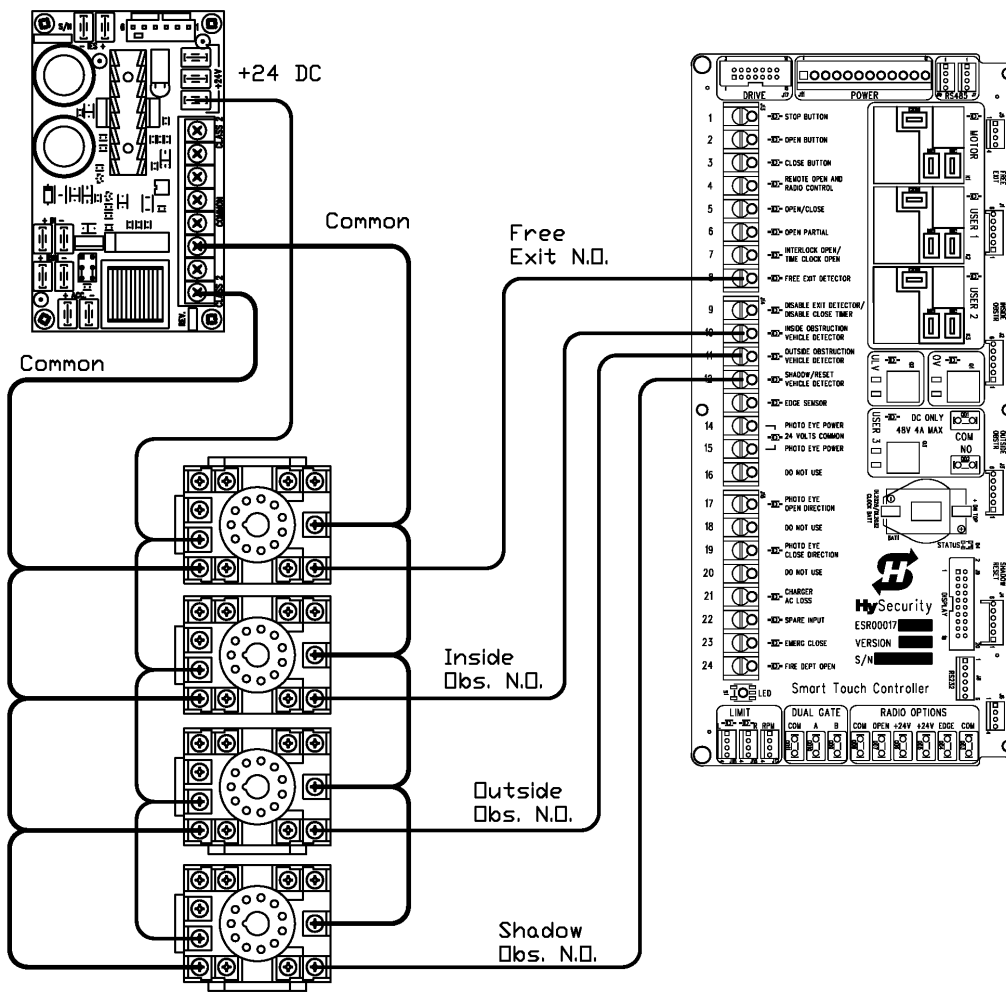
I21	[or 1] OOLD detector function	1	0 = pause only, 1 = enable reversing to open
I22	[ir 1] IOLD detector function	1	0 = pause only, 1 = enable reversing to open
I23	[dL 1] Vehicle detector logic	1	1 – 4, 1 = std, 2&3 = quick close, 4 = full anti-tailgate*

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 45 for optional Vehicle Detector logic modes and anti-tailgate option.

Section 5 —Standard 11 Pin Box Type Vehicle Detector Installation

1. If standard 11 pin vehicle detectors are to be used, install the sockets into the control box (if there is room) or in a separate external housing. The diagram below is for connection reference only. Other items may already be installed in the physical area where the the sockets are shown.
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 Bus and the +24 V spade terminals next to the Common Bus.
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 Bus 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, run the power wires and common wire from socket to socket rather than running each to the same location separately. The only wires that are separate are the output wire to the Smart Touch Controller and 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.



Section 5 —Detector & Loop Fault Diagnostics

If HySecurity 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 detector freq change alert	ALE7	2 chirps/sec every 15 seconds
Loop shorted or open alert	ALE8	2 chirps/sec every 15 seconds
Loop detector failed 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. Optional HySecurity “START” software, a PC computer, and a special download cable are required to retrieve and read this data (see bottom of page 31).

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 switch the selection to 1 and press the PROGRAM 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. 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 PROGRAM 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 PROGRAM 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

I30	[ELd0] Test factory ELD	0	0 = Run mode, 1 = show freq, 2 = show call level 0-7
I31	[iLd0] Test factory IOLD	0	0 = Run mode, 1 = show freq, 2 = show call level 0-7
I32	[oLd0] Test factory OOLD	0	0 = Run mode, 1 = show freq, 2 = show call level 0-7
I33	[SLd0] Test factory SLD	0	0 = Run mode, 1 = show freq, 2 = show call level 0-7

Acronyms: Free Exit Loop=**ELd**, Outside Obstruction Loop=**ooLd**, Inside Obstruction Loop=**IoLd**, Shadow Loop Detector=**SLd**

To return to the Installer Menu, press PROGRAM. Set the selection back to 0 by pressing NEXT, then press PROGRAM twice to return to Run Mode.

Section 5 — 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 28.)

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 may 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.

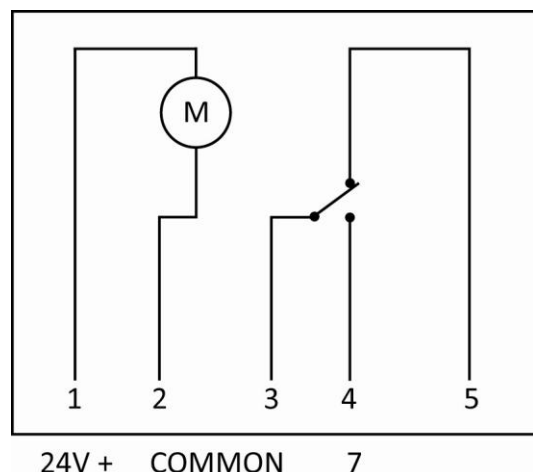
Mode 3: Same functions of mode 1, however the close timer is forced to zero when both the OOLD & IOLD are tripped simultaneously. Additionally, all other close inputs are memorized and the gate closes immediately when all open commands and vehicle detector inputs are clear.

Mode 4: Full Anti-tailgate logic. 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. The free exit detector input is blocked while the gate is closing.

Section 6 — 24-Hour, 7 Day Time Option

This is an option you can order from HySecurity. The timer generates an open command which will hold the gate open until it is released. Instructions on how to use and program it accompany the timer.

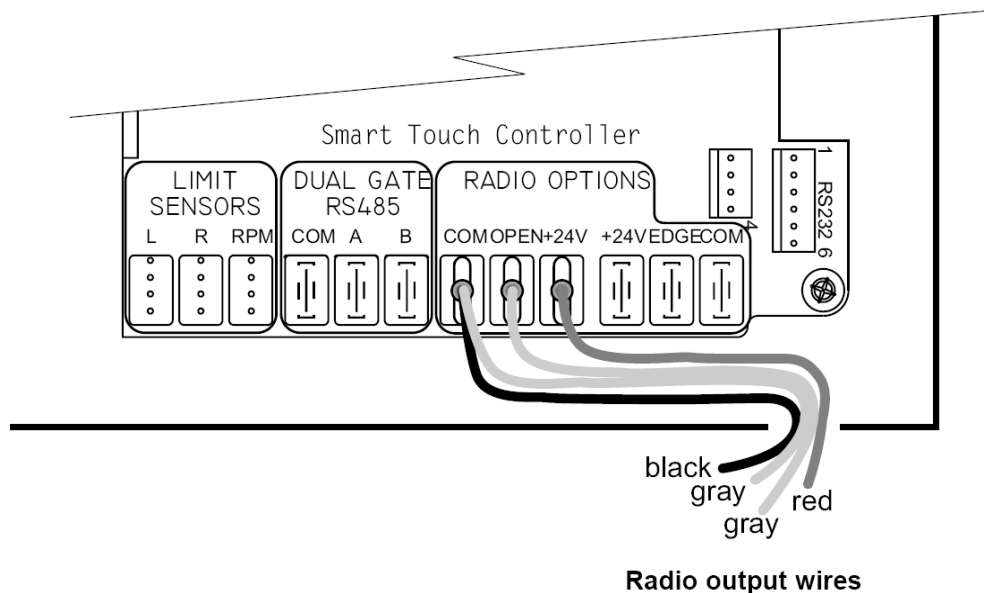
To connect the optional timer to the Smart Touch Controller, use the following schematic:



- Connect the Timer Power Pin 1 to 24V (+)
- Connect the Timer Power Pin 2 to COM
- Connect the Timer Com Pin 3 to COM
- Connect Timer NO Pin 4 to #7, Time Clock Open

Section 6 –Radio Remote Open Option

Mount a commercial style 24VDC 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 REMOTE OPEN AND RADIO CONTROL 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.

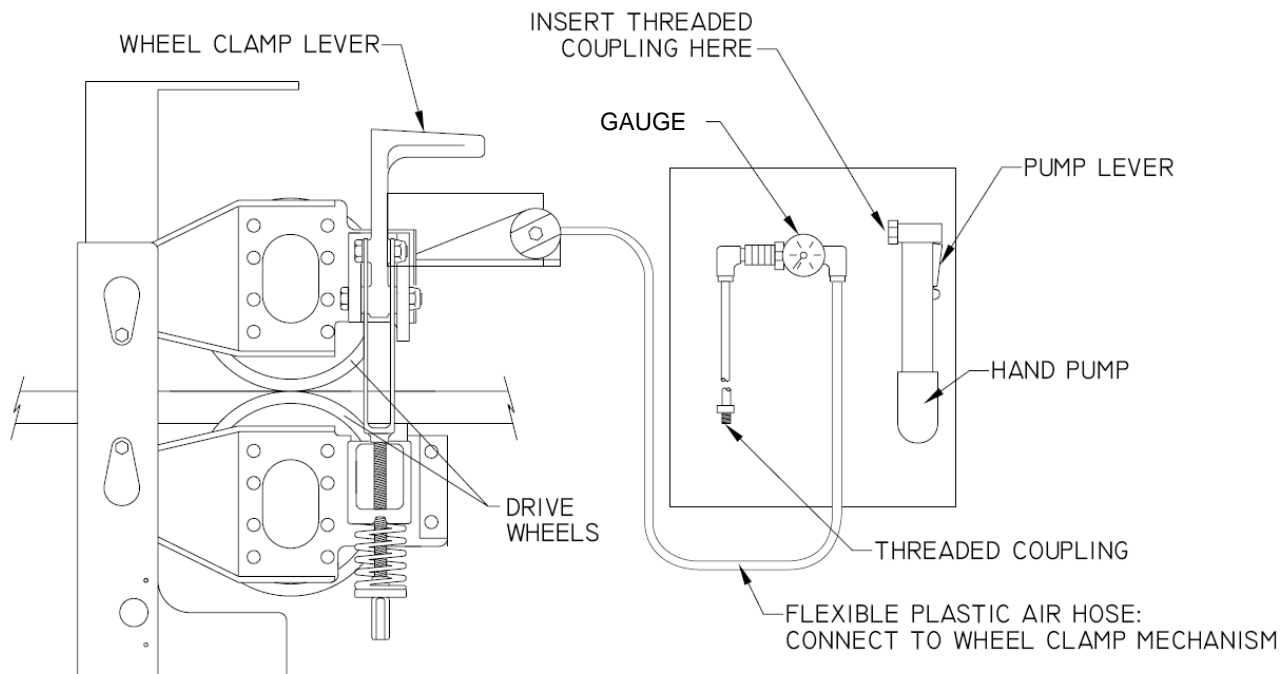
Section 6 — Remote Release Option

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 similar to the type 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.



Instructions for Placing the Operator Back in Service

1. Remove the cover from the operator.
2. Use the wheel clamp lever to re-engage the drive wheels.

Section 6 — Internal Solenoid Lock Instructions

Internal Solenoid Lock Description:

HySecurity offers an optional internal solenoid deadbolt lock that employs a ¾ inch 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 the operator voltage matches the solenoid voltage requirements. 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. HySecurity'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.

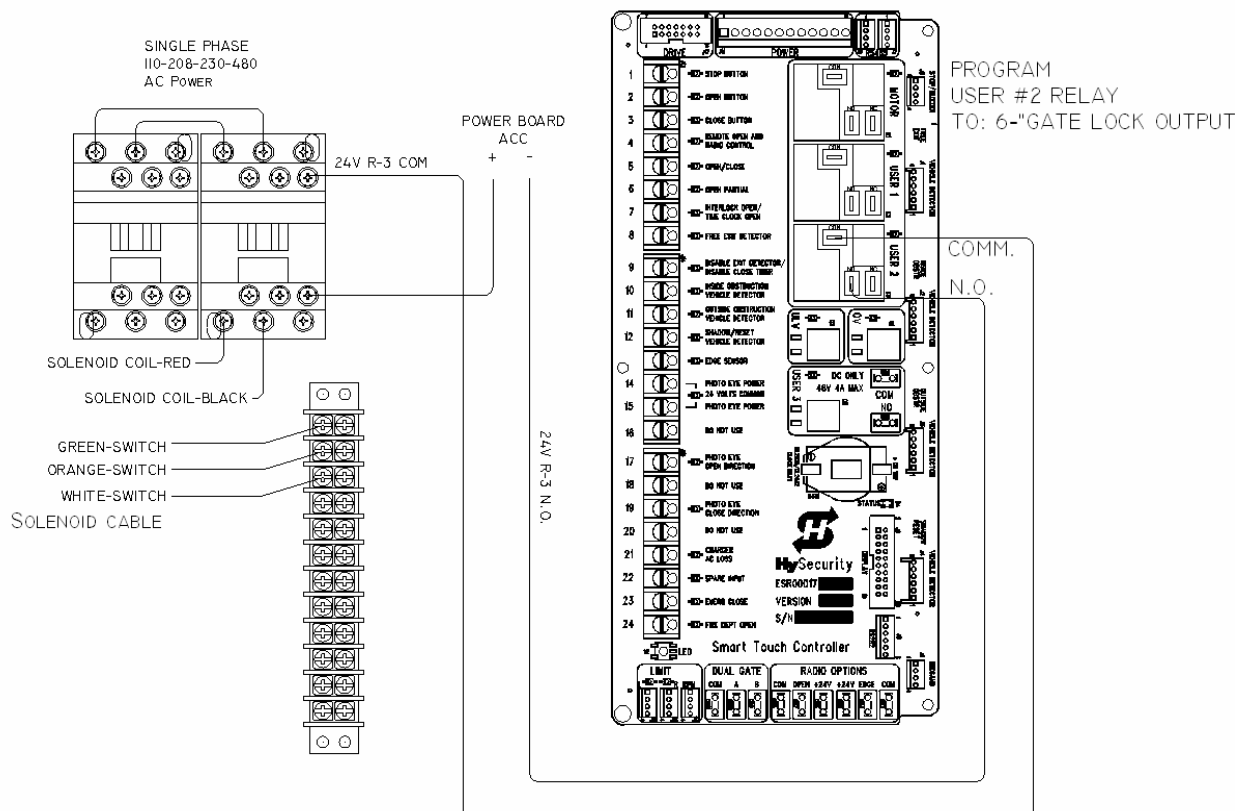
Adjustment of the Factory Solenoid Lock:

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-inch 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.

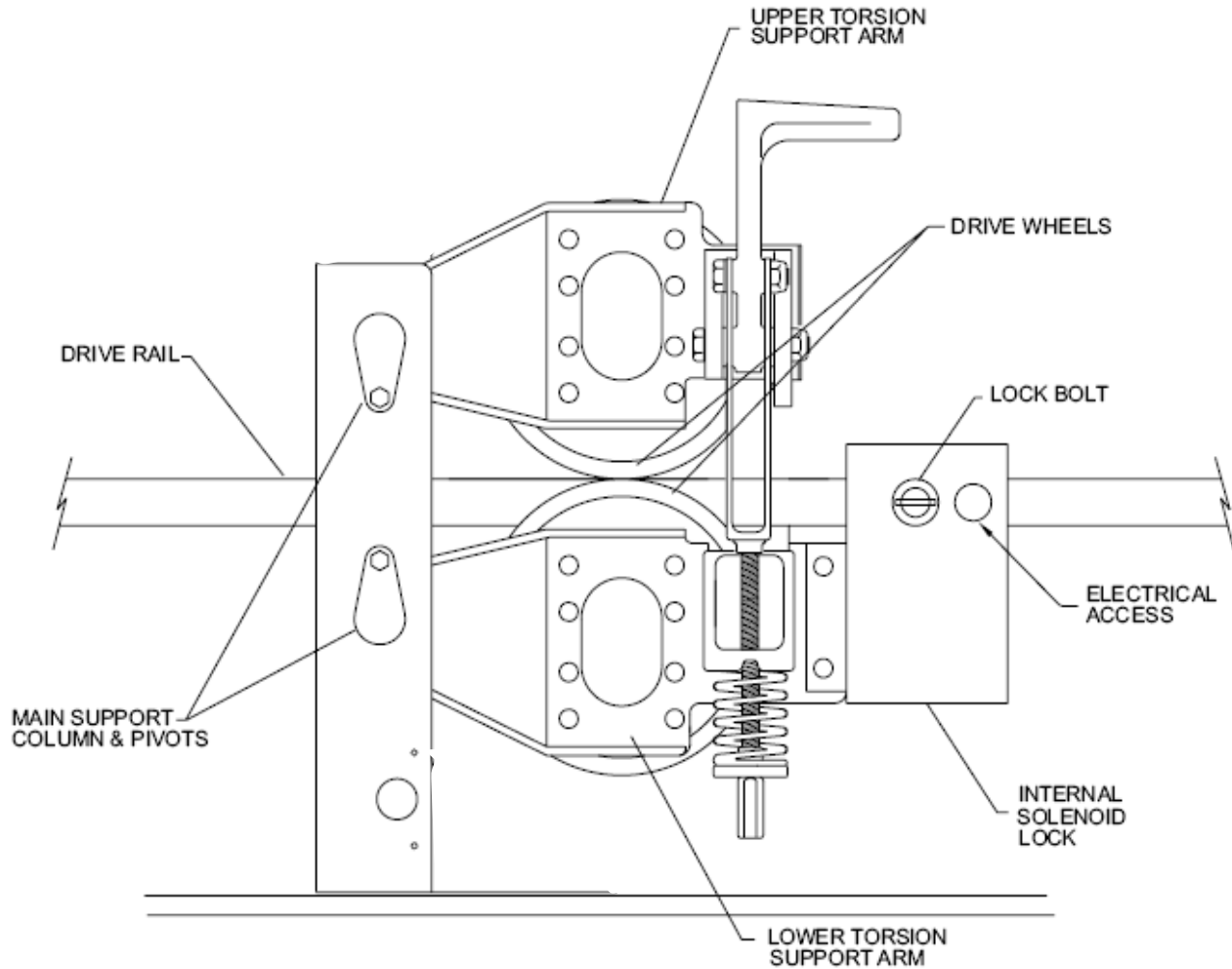
The lock enclosure itself may need to be adjusted so that the lock pin strikes in the center of the vertical edge of the drive rail. The face of the lock enclosure is slotted to accommodate this adjustment. With a ½ inch open end wrench, loosen the two bolts retaining the lock enclosure and move the enclosure up or down to achieve the correct adjustment.

Electrical:

When the factory pre-installs the internal solenoid deadbolt lock, a terminal strip and an auxiliary contactor are added. The two (2) high voltage wires to the solenoid attach directly to the auxiliary contactor as shown. Indicator lights or interlocks can be connected to the contacts brought back to the terminal strip.



Section 6 — Internal Solenoid Lock Drawing



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.

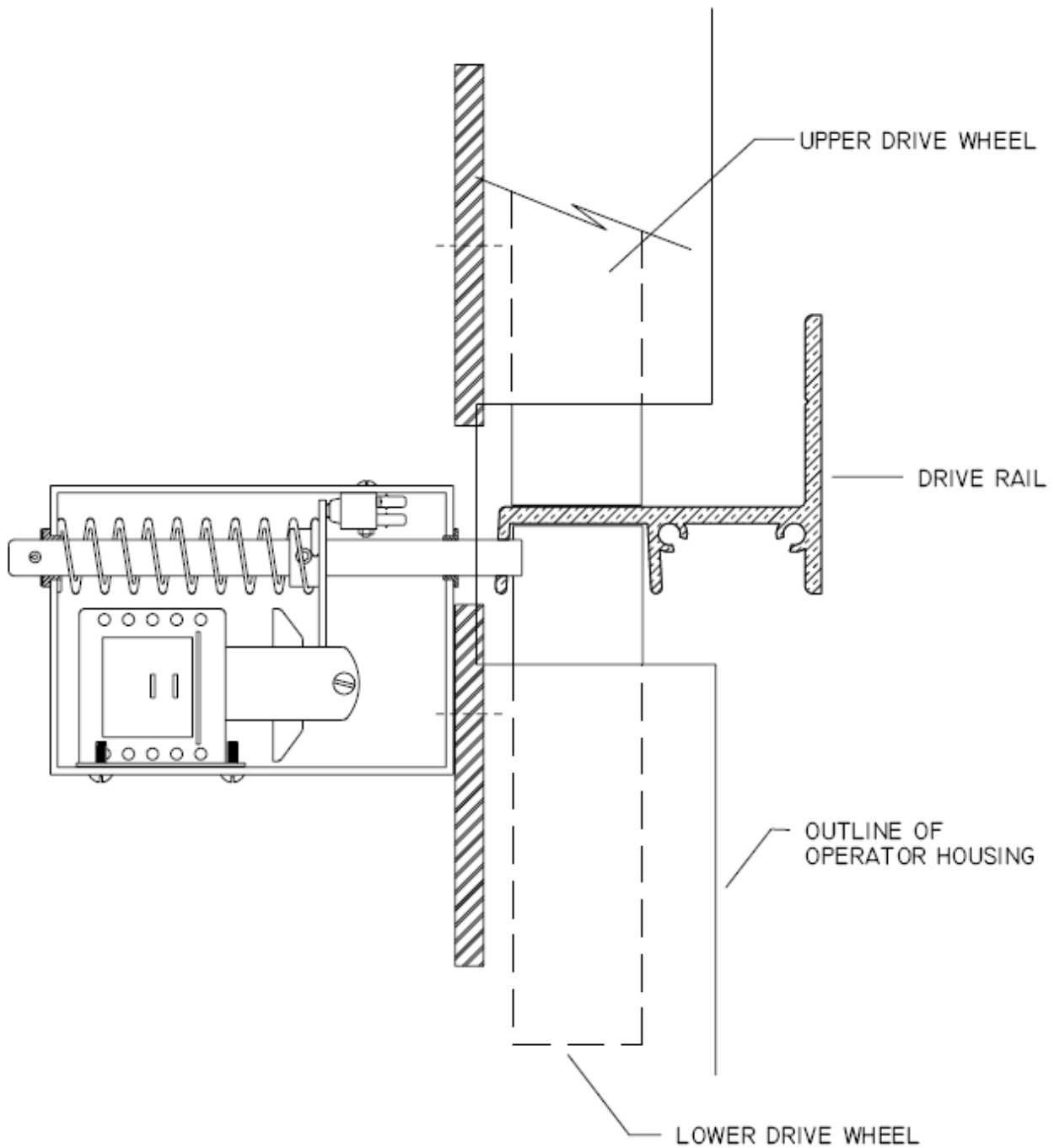
NOTE:

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

Section 6 — Internal Solenoid Lock Drawing



INTERNAL SOLENOID LOCK

S26B

Section 7 — Troubleshooting

Section 2 — Mechanical and Hydraulic Adjustments* and Electrical Issues

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-inch 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 ¼-inch throughout full gate travel.

Electrical Problems in General:

The VFD Motor Controller displays trip and fault codes. The most common are shown in Table 7.1, page 55 which explains the possible causes and resolutions. If you discover a trip code that is not in the table, refer to the *Commander SK Getting Started Guide* published online by the manufacturer of the motor controller, Control Techniques, Ltd.

Similarly, 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 (COM) 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 VFD intermittently shuts off, voltage drop due to undersized wires is the likely cause. See page 59 for maximum allowable length of wiring runs versus 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. Verify VFD display reads 50Hz or greater during normal operation. If not reading >50Hz, verify deceleration switches and ramps are installed correctly.
2. If the motor has been replaced, verify CCW motor rotation. To reverse, switch any two AC lines between the motor and the VFD.
3. 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.
4. Unplug the hoses and run the pump. If the pressure is low, adjust the relief valve.
5. 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.

"Hydraulic pressure is above 1100 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. Loosen brake valves 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 replaced.
2. If the gate only closes, the valve coil is not being energized, or is defective.

* Refer to page 13, as well.

Section 7 — STC Troubleshooting

The Smart Touch Controller (STC) includes many self diagnostics. Specific messages appear on the display and the Audio Alert buzzer sounds distinctive chirps. Any Alerts, Faults or Errors are also logged into memory and date/time stamped. For diagnostic purposes these messages can be retrieved with optional START software available from HySecurity (see bottom of page 31). The following chart lists problem codes detected by the Smart Touch Controller. Updates to this chart appear on HySecurity's website at www.hysecurity.com

Error, Fault, or Alert Status	LCD Display	Reads	Buzzer Chirp Sequence
Cannot respond due to tripped IES sensor or operator is in entrapment mode	Entr	Entr	2 chirps/sec every 2 seconds while control input is active
Safety Mode Alert	SAFE	SAFE	2 chirps once when in Safety Mode
Low 24V Control Voltage Alert (AC or DC)	Lo24	Lo24	N/A (display flashes 1 sec every 5 seconds)
Critical Low Power (AC or DC)	bAdP	bAdP	1 chirp every 3s – controls disabled
Dead 24V Battery Alert – DC only	bAt - dEAd	bat – dEAd	3 chirps upon any operating command
Gate Forced Open Alert	AL1	ALE1	2 pulses/sec for 30 seconds
Gate drift closed Alert	AL2	ALE2	2 pulses/sec for 10 seconds
Motor thermal overload Alert	AL4	ALE4	2 chirps/sec once every 15 seconds
Both Limits Tripped Alert	AL5	ALE5	2 chirps/sec every 15 seconds
Limits not released in 10 seconds	AL6	ALE6	2 chirps/sec every 15 seconds
Loop detector freq change alert	AL7	ALE7	2 chirps/sec every 15 seconds
Loop shorted to ground alert	AL8	ALE8	2 chirps/sec every 15 seconds
Loop open (disconnected) alert	AL9	ALE9	2 chirps/sec every 15 seconds
Loop detector comm. alert	AL10	AL10	2 chirps/sec every 15 seconds
Loop detector failed alert	AL11	AL11	2 chirps/sec every 15 seconds
Loop detector active >5 minutes	AL12	AL12	2 chirps/sec every 15 seconds
General I2C Comm. Buss failure	AL16	AL16	2 chirps/sec every 15 seconds
Bad 3V coin battery	AL17	AL17	2 chirps/sec every 15 seconds
False slow down signal	AL19	AL19	2 chirps/sec every 15 seconds
Lock Intrlk (Input #22) Blocks Open	AL20	AL20	2 chirps/sec every 15 seconds
Maximum Run Fault	FAL1	FAL1	1 chirp once every 15 seconds
Photo eye Fault (supervised)	FAL2	FAL2	2 chirps/sec once per minute
Critical AC sag – bad supply wire	FAL3	FAL3	2 chirps/sec once per minute
Open or Closed limit failed	FAL5	FAL5	2 chirps/sec once per minute
Directional Motion Error	Err1	Err1	3 chirps/sec once per minute
Disconnected IES Error	Err2	Err2	3 chirps/sec once per minute
Serial comm. internal Error	Err3	Err3	3 chirps/sec once per minute or 3 on Cmd.
Serial comm. mast/slave Error	Err4	Err4	3 chirps/sec once per minute
EEPROM Data Error (factory)	Err7	Err7	3 chirps/sec once per minute
EEPROM Data Error (installer)	Err8	Err8	3 chirps/sec once per minute
EEPROM Data Error (user menu)	Err9	Err9	3 chirps/sec once per minute
Open or Close slow down switch failed	Er10	Er10	3 chirps/sec once per minute
Memory Checksum Error	FRIL	Fail	3 chirps/sec once per minute

NOTE: The green LED near the “coin” battery on Smart Touch Controller is the “heartbeat” of the processor. This LED always blinks at a steady pace which indicates normal operation.

Gate Speed: The speed at 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 a valve setting produces inefficiency and heat. If the speed of a gate must be changed, contact your HySecurity distributor. Extremely cold weather is unlikely to seriously affect the speed of the gate, because HySecurity employs a special grade of hydraulic oil that we call *Uniflow* oil, which maintains a 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 is filled with *Uniflow* oil. Consider adding a heater in extreme weather.

Section 7 — Understanding VFD Motor Controller Trip Codes

When **Er** appears on the display it means that the VFD controller has sensed a fault which triggers the operator to move off line. Match the fault code with Table 7.1 on page 55 and follow the procedure discussed in the **Solution** column. Other fault codes may appear that are not documented in the table, but can be found online in the *Commander SK Getting Started Guide* published by the manufacturer of the motor controller, Control Techniques Ltd.

NOTE: A fault code (most often, **ALC 5**) will also appear on the STC display. You can clear the STC display by pressing the RESET button on the STC keypad.

Clearing the VFD Motor Controller Display and Viewing Trip Codes

1. To access the parameter view mode from the status mode (ih or rd display), press and release the **M** (Mode) button.
2. To view previous trip codes once the motor controller has been reset, push and hold either the up or down button until parameter 55 appears on the display.

NOTE: The two digit parameter (01 through 95) locations appear blinking on the left of the display. Each parameter relates to specific set up or diagnostic operation.

3. Parameter 55 is the first of four memory locations (55 through 58) and provides the most recent of four trip/fault codes. Having this information available when contacting HySecurity Technical Support will speed up the troubleshooting process.
4. Compare the trip code to Table 1.1 on page 2. Follow the procedures discussed in the **Solution** column.

If you need further assistance, call HySecurity Technical Support at 800-321-9947.

NOTE: To clear a fault code on the VFD, press the Stop/Reset key.

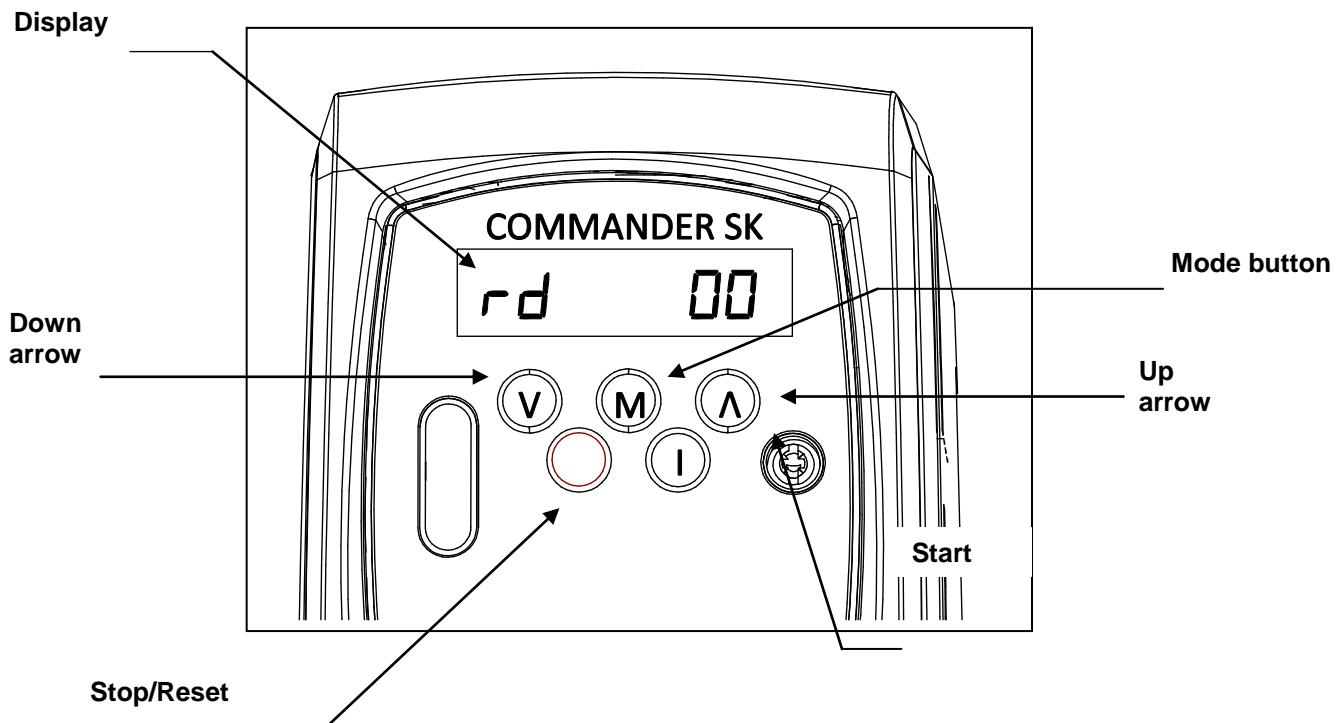
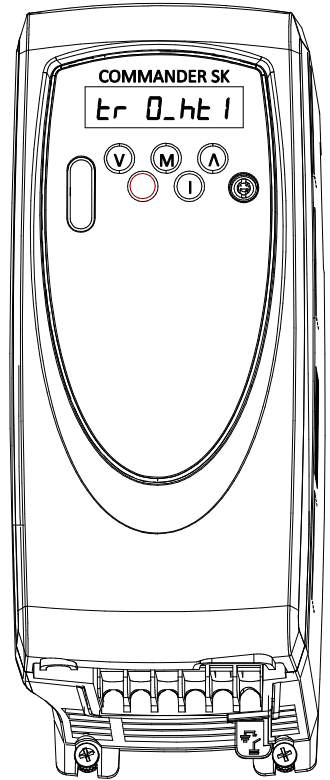


Table 7.1— VFD Fault Code Diagnostics

Fault Code	Meaning	Possible Cause	Solution
Er_DU	VFD DC bus voltage too high	The operator's AC input voltage is too high or too much noise exists on the AC line.	Measure AC input voltage. If it is too high, lower the incoming voltage. Consult with a qualified technician and consider installing a buck transformer to lower the voltage. If noise is the issue, consider an EMI filter on the input lines.
Er_LU	VFD DC bus voltage too low	The operator's AC input voltage is too low or the wire size is too small for the distance being covered from the breaker box to the operator.	Measure AC input voltage. If it is too low, raise the voltage level. Consult with a qualified technician to learn which options will raise the voltage sufficiently to allow for proper operator function.
IE_AC	Excessive power load on VFD	Pressure Relief Valve is set too high. This may occur to compensate for a binding gate or an overweight gate. Brake valves could also be too tight.	Check gate for binding issues or an overweight installation. Make sure brake valves are set to mid-range and the pressure relief valve setting is about 1100psi or less.
OI_AC	Excessive instantaneous load on VFD NOTE: Cannot reset the fault code until 10 seconds elapse after the fault occurs.	Pressure Relief Valve is set too high. This may occur to compensate for a binding gate or an overweight gate. Brake valves could also be too tight.	Check gate for binding issues or an overweight installation. Make sure brake valves are set to mid-range and the pressure relief valve setting is about 1100psi or less.
Oh1 or Oh2	Excessive heat in VFD	Lack of air ventilation around VFD. Excessive load on VFD.	Perform the same resolution steps in OI_AC . And then, check and clear any constriction around the front and back cooling vents on the gray control box. Make sure air ventilation pathways are clear around the VFD inside the control box.

NOTE: To clear a fault code, press the STOP/RESET key.

Section 8 — 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 only recommend our *Uniflow* hydraulic oil; part number **MX000970**, which is sold in one-gallon containers by our distributors. **Never use brake fluid. It will severely damage the hydraulic system. Use of any oil other than Uniflow oil may void the operator warranty.**

Look for leaks: Occasionally there may be slight seeping at the fittings after some usage. Tightening of the fittings usually corrects the problem. If 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. Oil changes do not need to be frequent. HySecurity recommends draining the reservoir and replacing the oil at five-year intervals. 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.

To change the hydraulic oil, remove the reservoir from the pump unit, completely empty it, 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 the removable plug opening near the tank top. 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. Spilled oil 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. Excessive ice buildup can partly or totally jam gate operation. Check function by operating the gate manually.

Electrical Controls

Before servicing, turn off power and 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 electrical enclosure holes. 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 operator service record, 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 pressure gauge will show current relief pressure. The relief valve is found on the pump pack. 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. More information is available on the yellow tag attached to the pump pack.

Models

50VF2, 50VF2-EFO, and 50VF3

Factory Relief Setting

MAX 1200 PSI

NOTE: There is 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.

Pressure Relief Valve



Section 8 — Maintenance Schedule

SlideDriver 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 tightness and wear	*2		X			
Wheel clamp spring	Check for clamping tension	*3		X			
Stop limit switches	Check for adjustment	*4		X			
Deceleration 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 gate hardware will require more maintenance than your HySecurity operator. A damaged gate or worn hardware may cause slow or erratic operation and will result in excess drive wheel wear. Lubricate 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, drive wheel life is many years. They are designed to avoid slipping on the rail. Wheels may be greatly shortened by any of these faults: clamping spring not adjusted correctly, operator misaligned in relation to gate panel, badly warped gate panel, extremely stiff gate hardware, and/or loose wheel mounting bolts (tighten to 25 ft. lb).

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

*4. The limit switch and deceleration switch rollers should ride ¼" to ½" below the drive rail, near the center of the channel. Maladjustment 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 no less than 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. Use *Uniflow* fluid, part MX000970, if additional fluid is required.

*6. Replace the Smart Touch Controller battery with DL 2025 / DL 2032 or CR 2025 / CR 2032.

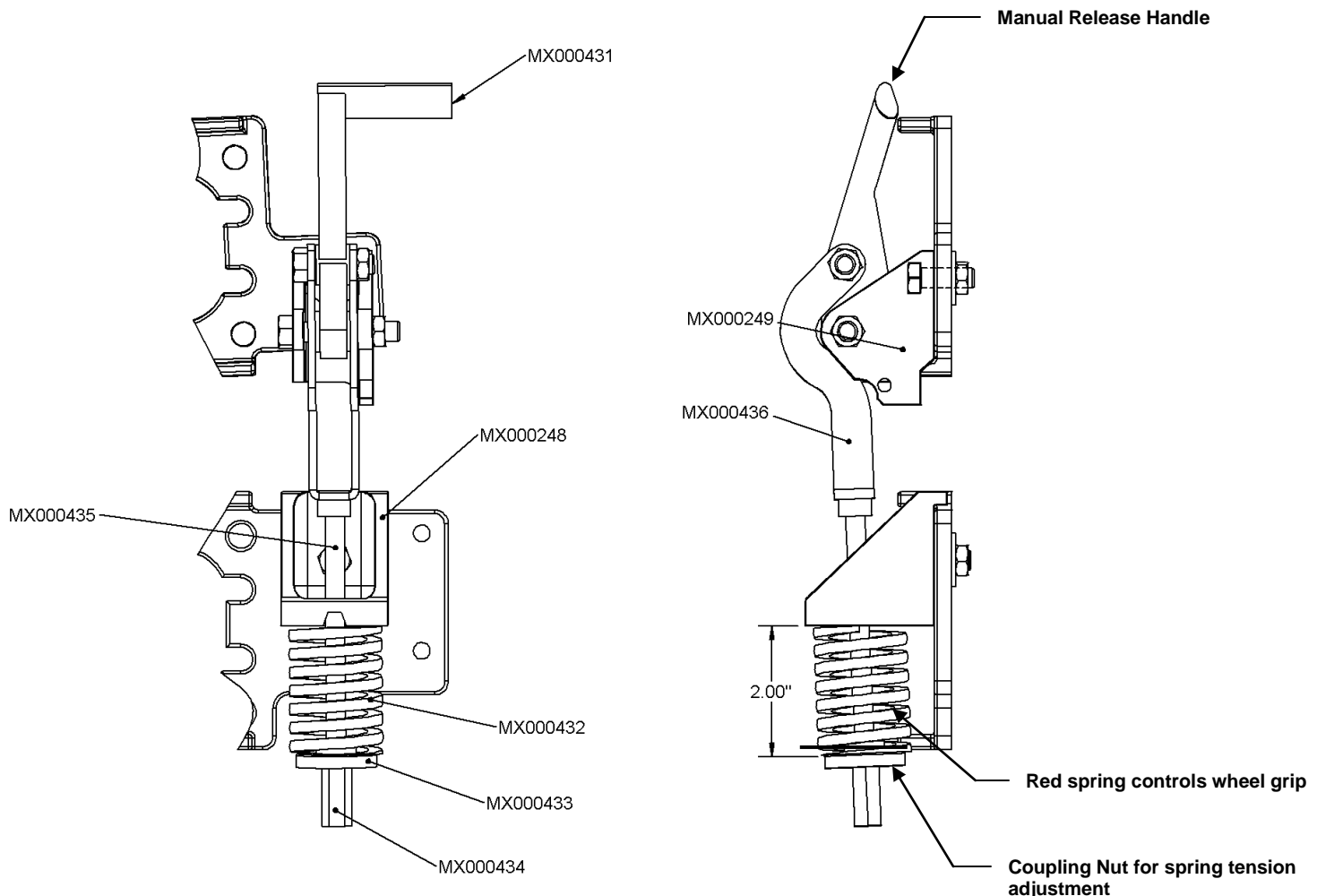
Section 8 — Use and Adjustment of the Manual Release Mechanism

All SlideDriver 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. During shipment, a piece of Styrofoam is placed between the coupling nut and the chassis. If the packaging is still in place, discard it.

To disengage the drive wheels, simply pull the aluminum handle down.

DANGER: The toggle handle rapidly “pops” down as the loaded spring releases. Hold the handle appropriately so your fingers do not get pinched. As the lower drive wheel drops and disengages from the drive rail, it causes the coupling nut on the threaded rod to drop to its lowest position and push on the base of the operator. This causes the upper drive wheel to lift and disengage from the drive rail.

If the drive rail was 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.



MX001103 - TOGGLE HANDLE ASSEMBLY

NOTE: The coupling nut must be adjusted correctly so the wheels provide a strong clamping force on the drive rail. The red spring should measure 2 to 2½-inch (5 to 5.5cm) in height when under the correct compression.

Appendix — Wire Size Schedules & Charts

For 1/2-hp through 5-hp motors

Supplying a gate operator with the right electrical service is crucial to the performance of the operator and the life of its electrical components. If the wire size used is too small, the voltage loss, especially during motor startup, will prevent the motor from attaining its rated horsepower. The percentage of horsepower lost is far greater than the percentage of 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 lost performance resulting from undersized wires, except to replace them; Choose a sufficient wire size at initial installation to avoid costly rewiring.

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. A 20A circuit (protected with a 20A Inverse Time Breaker) should be provided, at minimum.

Always connect electrical power and ground the operator in accordance with the National Electrical Code, article's 430 and 250 plus 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 controls:

Wire Size	Maximum Distance
18 ga	7.0 miles (11km)
20 ga	3.5 miles (5.6km)
22 ga	2.7 miles (4.3km)
24 ga	2.0 miles (3.2km)
26 ga	1.0 mile (1.6km)
28 ga	3700 feet (1.1km)

SlideDriver 50VF2, 50VF2-EFO, & 50VF3: Wire Size Chart

Ø	1	1	3	3	3	3
Voltage	208	230	208	230	380	460
Horsepower	2	2	2	2	2	2
Amps	17.4	17.4	8.7	8.7	5.2	5.2
Drop	11	12	11	12	19	23
Wire	Distance	Distance	Distance	Distance	Distance	Distance
14	60 (18m)	60ft (18m)	140 (43m)	150 (46m)	430 (131m)	520 (158m)
12	90 (27m)	100 (30m)	220 (67m)	240 (73m)	680 (207m)	830 (253m)
10	150 (46m)	170 (52m)	350 (107m)	390 (119m)	1090 (332m)	1310 (399m)
8	240 (73m)	270 (82m)	560 (171m)	620 (189m)	1730 (527m)	2100 (640m)
6	390 (119m)	430 (131m)	900 (274m)	990 (302m)	2750 (838m)	3330 (1015m)
4	620 (189m)	680 (207m)	1430 (436m)	1580 (482m)	4380 (1335m)	5300 (1615m)
2	990 (302m)	1090 (332m)	2280 (695m)	2530 (771m)	6990 (2130m)	8470 (2582m)
0	1560 (475m)	1730 (527m)	3620 (1103m)	4000 (1219m)	11,070 (3374m)	13,400 (4084m)

Appendix — Performance of 50VF Operators on 1Ø/3Ø, 50/60Hz Power

A HySecurity 50VF2, 50VF-EFO, or 50VF3 operator can operate on a wide variety of incoming power.

- 50Hz/60Hz operation with no changes or reconnection
- 1Ø or 3Ø operation by field reconnection.
- The incoming voltage must match the operator nameplate. Although the electric motor can be reconnected, a different VFD (motor controller inside the grey control box) is required between 460V and 208V/230V.
- Any AC powered peripherals such as locks, card readers and other devices need to be checked for compatibility.
- The electric motors in all VF2 and VF3 operators are 3Ø/60Hz motors and are connected for the voltage on the operator nameplate. (208V/230V or 460V)

How is this done?

- The VF controller in the operator is rated to operate on input frequencies ranging from 48Hz through 62Hz on 1Ø or 3Ø power (a jumper connection is required for phase change) but only on either 460VAC or 208V/230V. (A change between 460V and 230V, either direction, requires replacing the VF controller).
- The control transformer in the operator is tapped for multiple voltages and rated for 50/60Hz operation.
- The VF controller first rectifies and filters the incoming power to DC, which has no frequency or phase. It then creates 3Ø variable voltage/variable frequency AC for the motor from the DC.
- Depending on the model, the VF controller ramps the motor voltage and frequency from 0V@0Hz at start, to either 208/230 or 480 VAC @ 60Hz for full speed. This allows use of 60Hz motors regardless of the incoming frequency.

Since the input voltage/frequency is converted to DC to begin with, there is absolutely no relationship between the input frequency/phase and frequency/phase of the power supplied to the motor. The input could be 1Ø or 3Ø, 48Hz or 62Hz and the controller/motor combination wouldn't care. It will create the ramped 3Ø voltage and frequency for which it is programmed.

NOTE: 50VF operators connected for 1Ø operation will draw more current from the utility than those connected for 3Ø (approximately double); because the utility power to run the machine will be carried to the operator on two wires instead of three. Be sure to allow for this difference when specifying wire size.

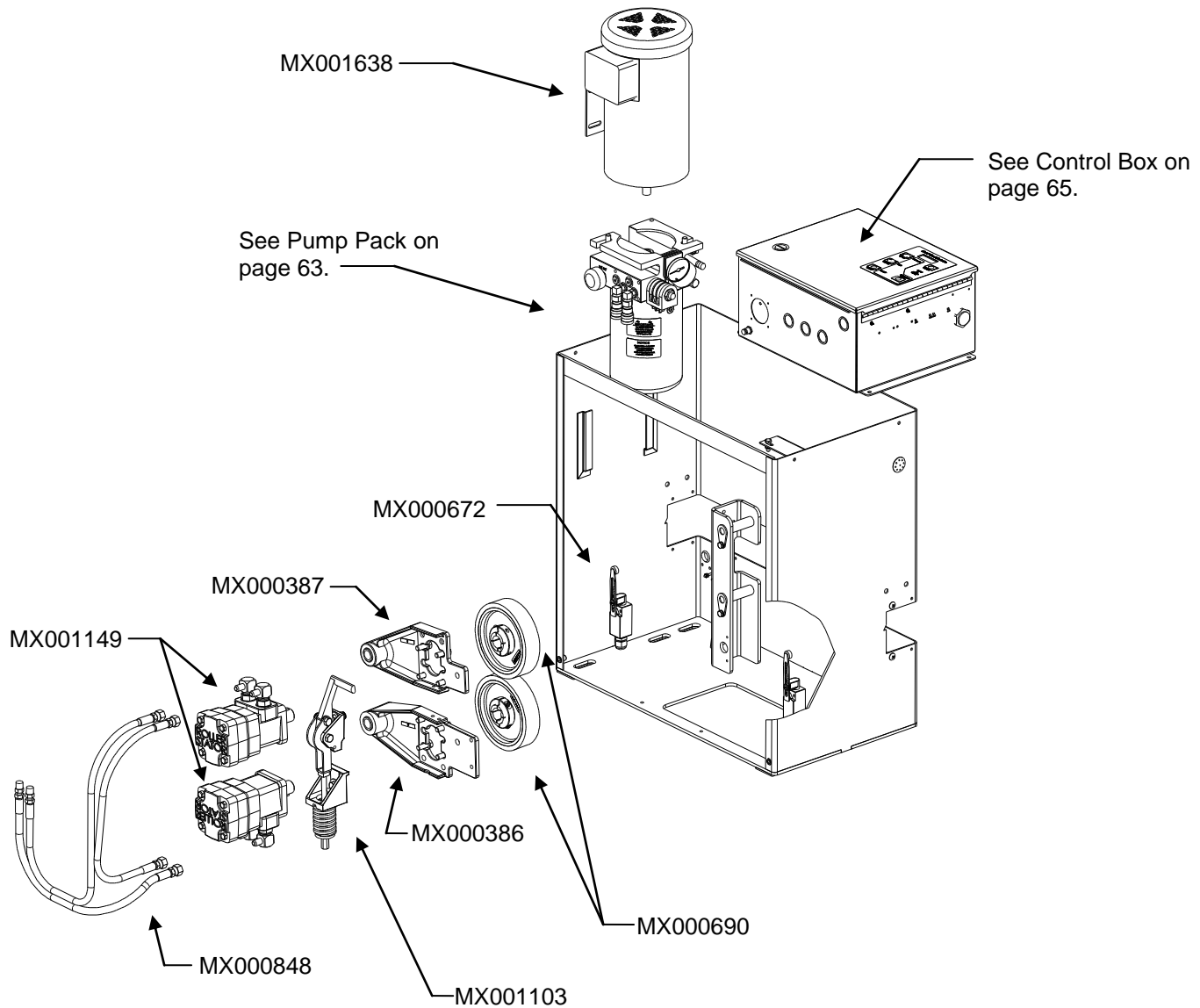
In-Field Connections

50VF-series operators are field re-connectable for 1Ø or 3Ø input power without changing the VFD Controller.

WARNING: 50VF-series operators **CANNOT** be connected to 120V, 1Ø power or 575V, 3Ø power. If any attempts are made to do so, serious injury, electrical shock, or death may result. Any electrical damage occurring to the operator will not be covered by the Limited Warranty.

WARNING: 50VF-series operators are **NOT** field reconfigurable between 208/230VAC and 480VAC power. The VFD Motor Controller in a 208/230VAC unit must be replaced with a VFD Motor Controller manufactured for the higher (480VAC) voltage input.

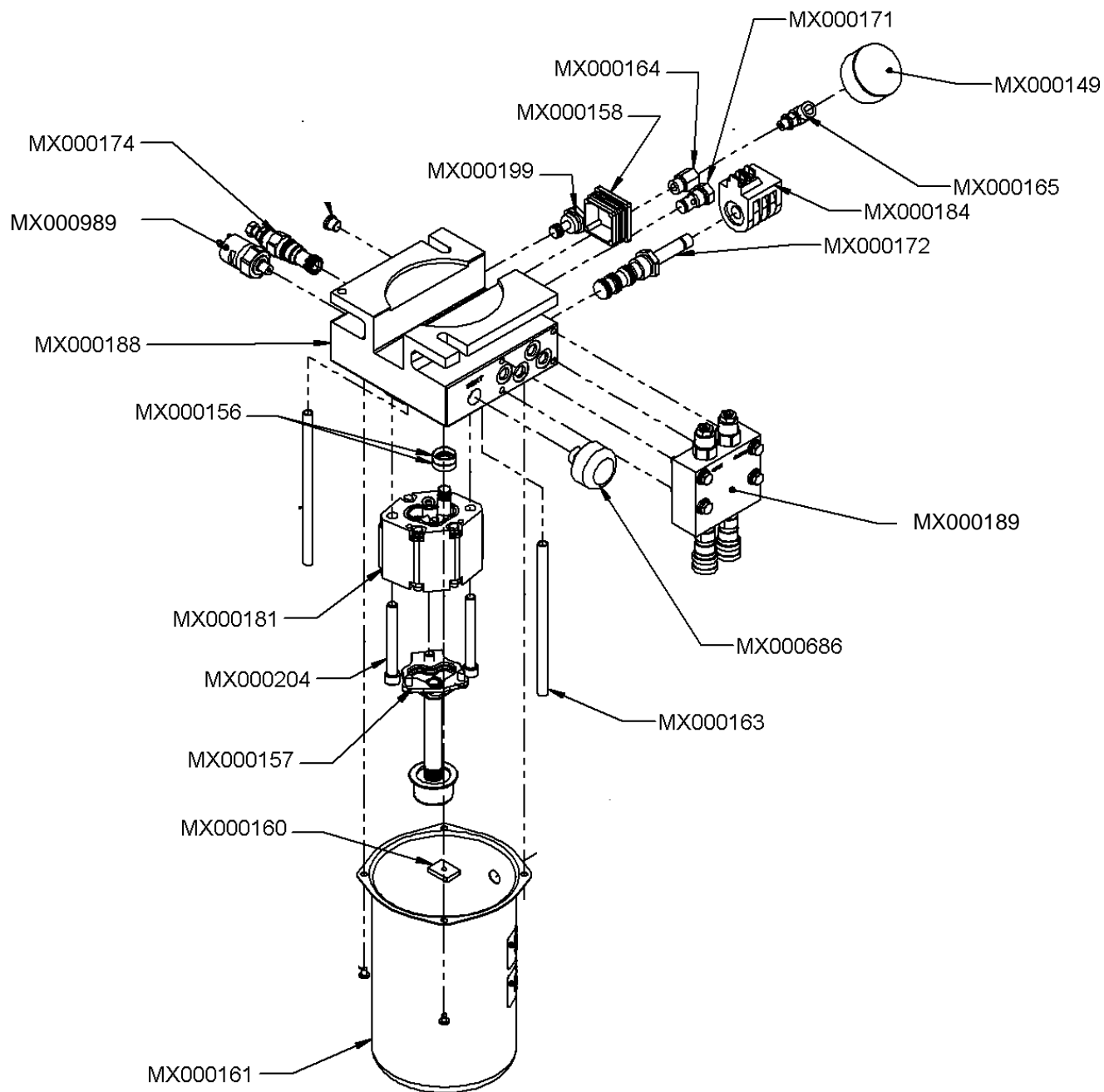
Appendix —Exploded Parts Diagram, Angle View



Exploded Parts

Part Number	Part Description
MX000387	TOP MOTOR MOUNT
MX000690	8" WHEEL AND HARDWARE
MX000386	BOTTOM MOTOR MOUNT
MX001103	MANUAL RELEASE TOGGLE ASSEMBLY
MX001149	MOTOR ASSEMBLY, 10"
MX000848	HOSE ASSEMBLIES 22", 25" & 30"
MX001105	MOTOR MOUNT PIN KIT
MX000672	OPEN/CLOSE LIMIT SWITCH

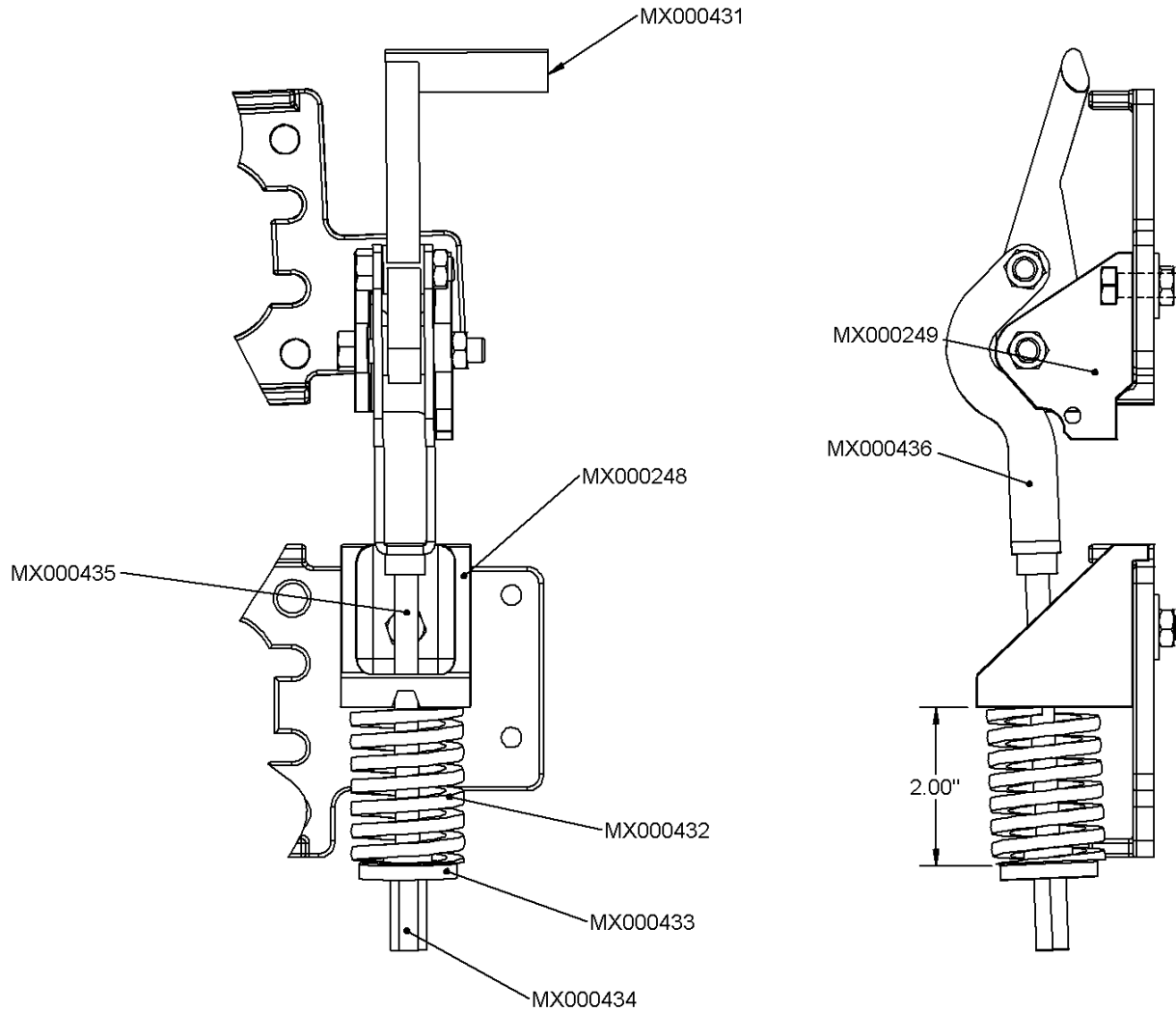
Appendix — Pump Pack



Part Number	Part Description
MX000149	2000 PSI GAUGE
MX000171	VALVE, 8GPM
MX000165	ADAPTER FITTING W/ O-RING, -4-2
MX000164	ADAPTER FITTING W/ O-RING, -6-4
MX000184	DIRECTIONAL COIL
MX000172	SOLENOID VALVE, 2P4W, 3000PSI
MX000158	SQUARE PLASTIC CAP, 1.75"
MX000199	CAVITY PLUG, 2W2P
MX000189	BRAKE MANIFOLD
MX000174	RELIEF VALVE, 3000PSI

Part Number	Part Description
MX000686	BREATHER CAP, 0.375"
MX000163	RESEVOIR RETURN TUBE, 7"
MX000161	RESEVOIR, 4 QT
MX000160	MAGNET, 0.75" X 1"
MX000157	RESEVOIR INLET PLUMBING KIT
MX000181	PUMP, 4.0 GPM
MX000156	SHAFT SEAL, 0.5 X 0.875
MX000188	ALUMINUM ENDHEAD
MX000989	IES SENSOR

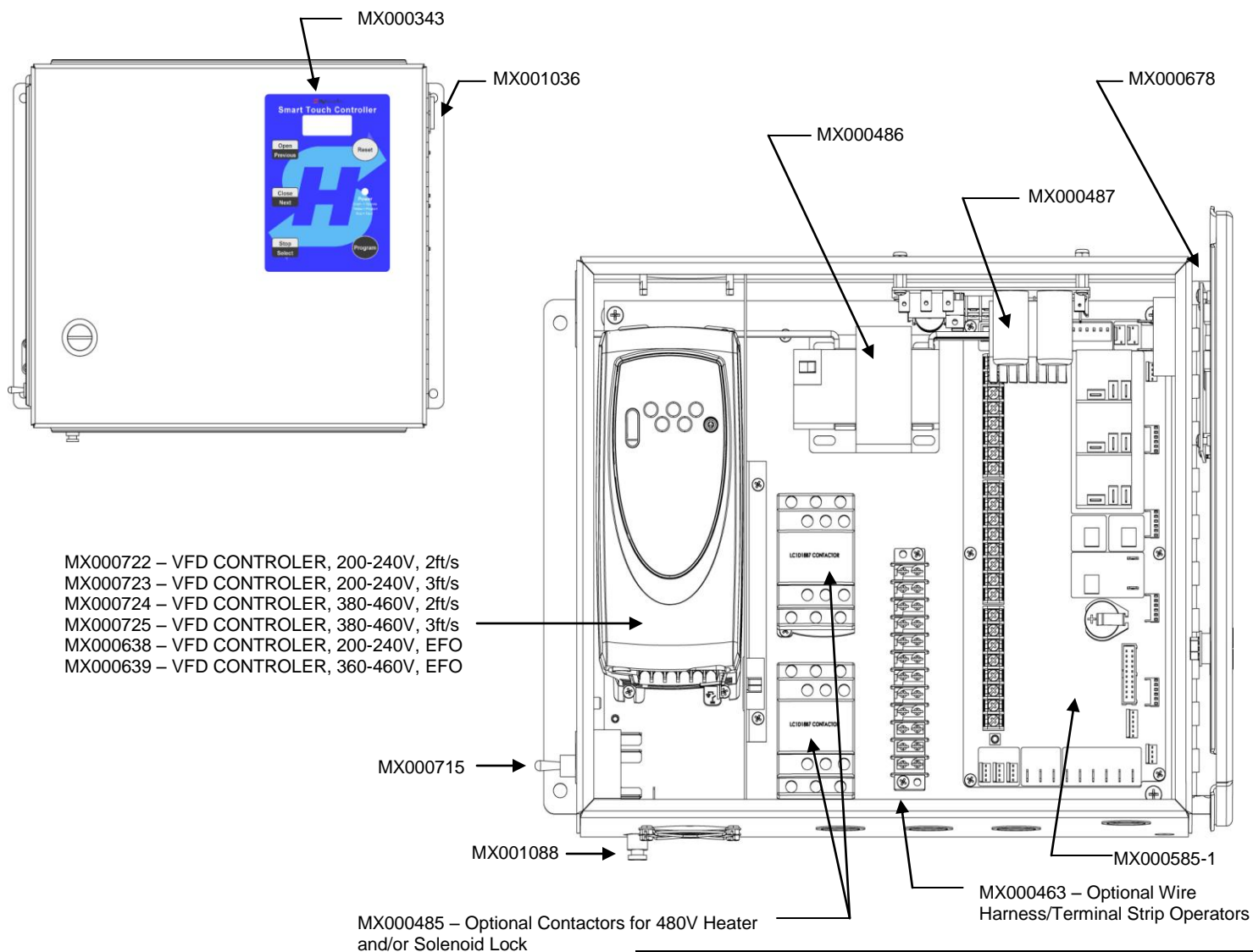
Appendix — Manual Release Toggle Assembly



MX001103 - TOGGLE HANDLE ASSEMBLY

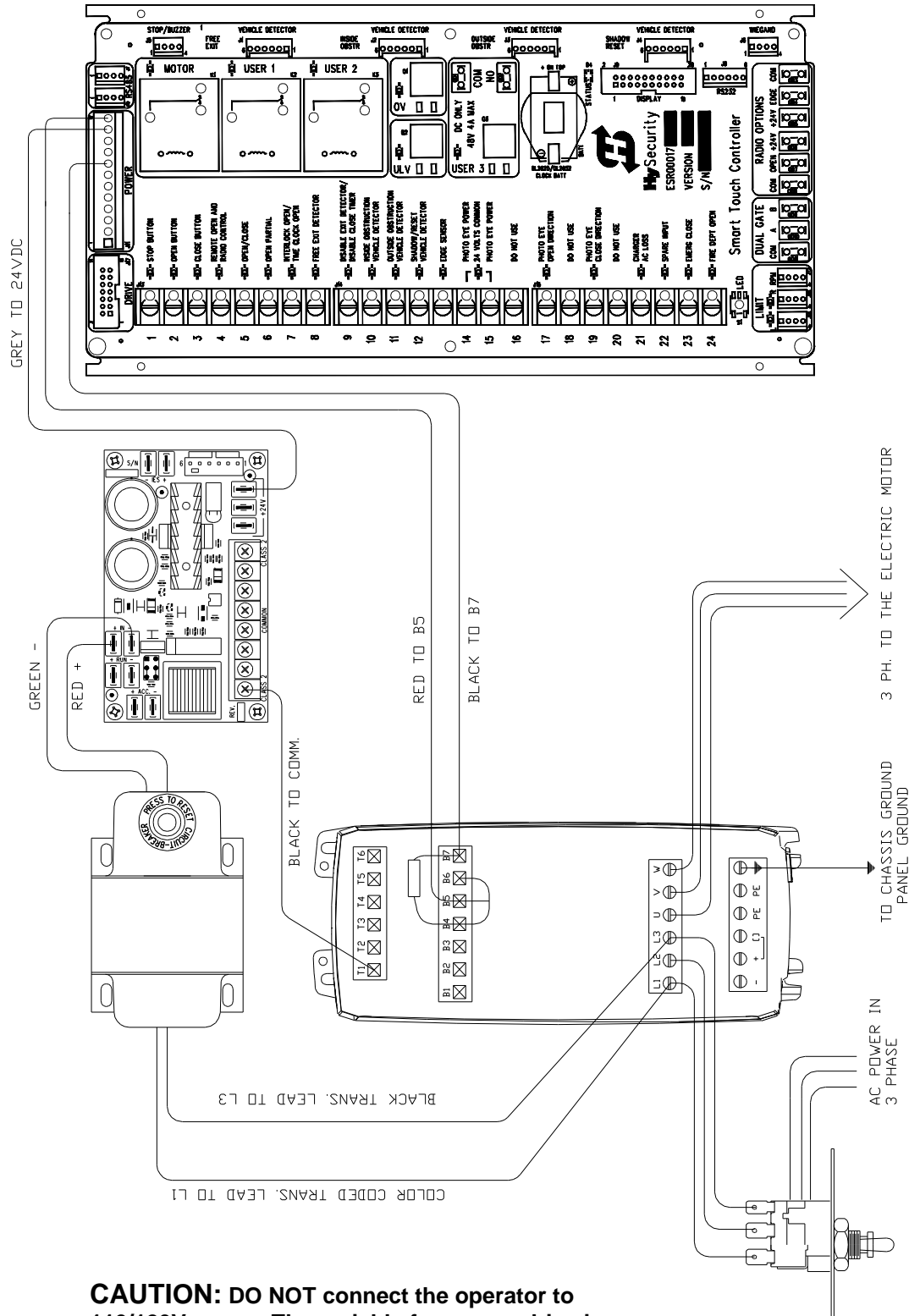
Part Number	Part Description
MX001103	COMPLETE TOGGLE ASSEMBLY
MX000436	TOGGLE YOKE
MX000249	TOGGLE HANDLE MOUNT
MX000434	NUT COUPLER, 3/8-16
MX000433	DRIVE TOGGLE SPRING SEAT
MX000432	DRIVE TOGGLE SPRING
MX000248	TOGGLE SPRING MOUNT
MX000435	TENSION SCREW 3.8-16 X 5.5"

Appendix — Control Box Electric Enclosure



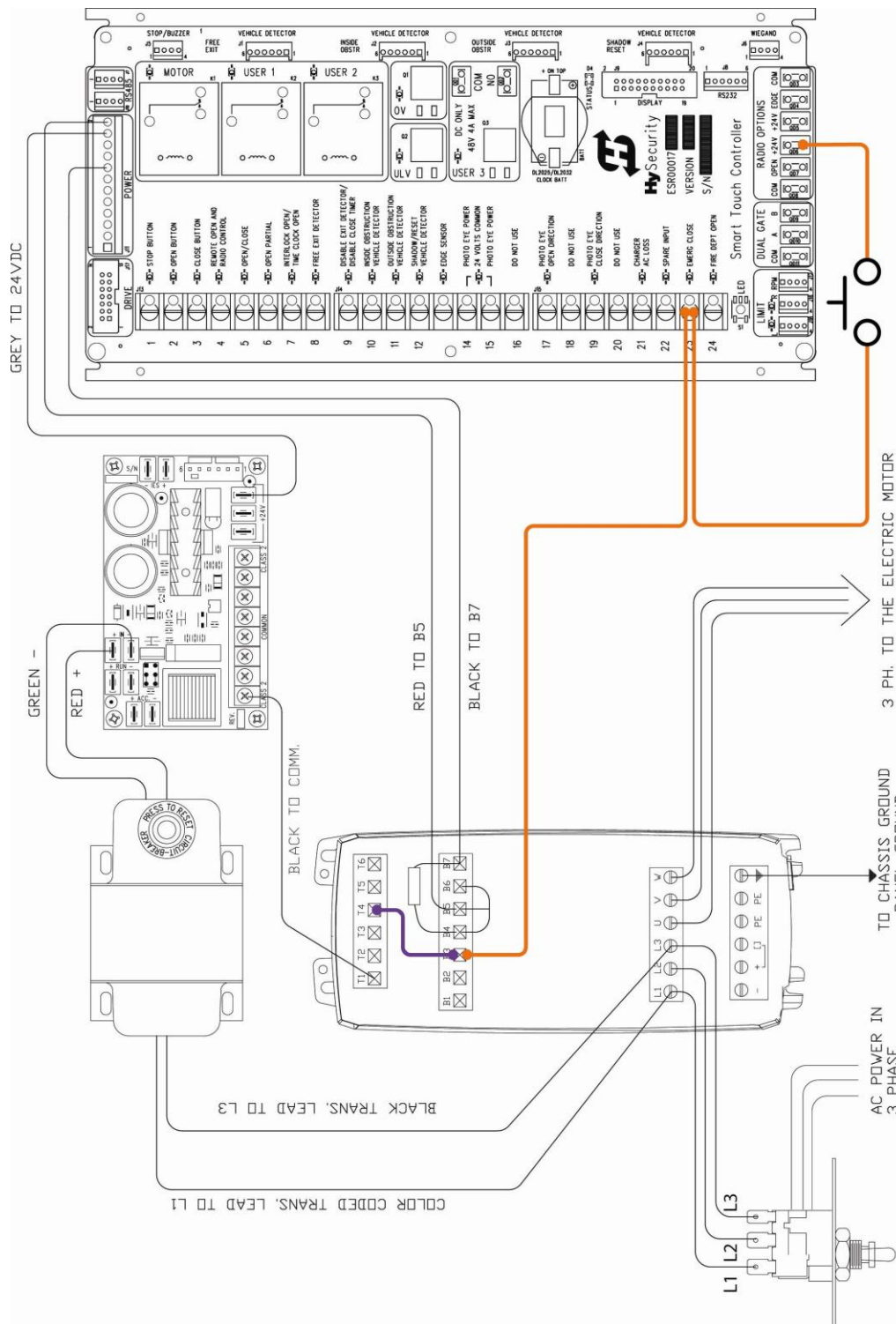
Part Number	Part Description
MX000343	5 BUTTON MEMBRANE KEYPAD
MX001036	PIEZO BUZZER ALARM
MX000722	VFD CONTROLLER, 200-240V, 2FPS
MX000723	VFD CONTROLLER, 200-240V, 3FPS
MX000724	VFD CONTROLLER, 380-460V, 2FPS
MX000725	VFD CONTROLLER, 380-460V, 3FPS
MX000638	VFD CONTROLLER, 200-240V, EFO
MX000639	VFD CONTROLLER, 380-460V, EFO
MX000715	POWER SWITCH
MX001088	INTERNAL RESET SWITCH
MX000485	CONTACTOR RELAY, 18A/32A
MX000463	COMPLETE TERMINAL STRIP (OPTIONAL)
MX000585-1	SMART TOUCH CONTROL BOARD, AC
MX000678	DISPLAY BOARD
MX000487	POWER SUPPLY BOARD
MX000486	TRANSFORMER, 75 VA, 115/230V
MX000716	60MM FAN COVER

Appendix — VFD Control Box Layout



CAUTION: DO NOT connect the operator to 110/120V power. The variable frequency drive is not setup to handle the lower, single phase power supply and damage to the unit may occur which is not covered by the Limited Warranty.

Appendix — 50VF2-EFO Control Box Layout



CAUTION: DO NOT connect the operator to 110/120V power. The variable frequency drive is not setup to handle the lower, single phase power supply and damage to the unit may occur which is not covered by the Limited Warranty.

Appendix — SlideDriver Wheel Change

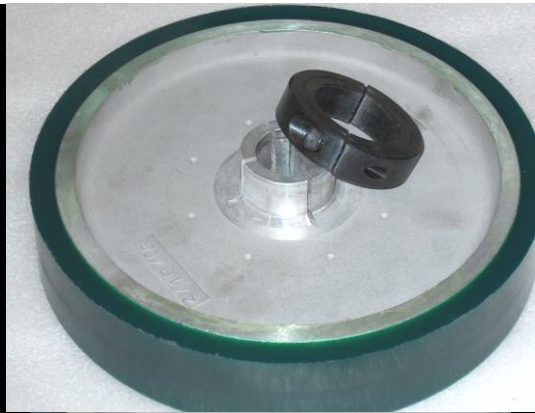
NOTE: Instructions written for installing wheels with retaining collars. For wheels without collars skip steps 2, 6, 7 and 12.

1. Remove drive wheel assembly from SlideDriver.
2. If the old wheel is equipped with a locking collar, loosen the two 3/16-inch Allen head bolts holding the clamp. (Requires a wrench at least 4-inches long for the 8-inch wheels).
3. Remove the bolt and drive wheel. A wheel puller or other mechanical means may be required to slide the wheel off the motor shaft. Remove the old clamp (if any).
4. Clean any debris from the shaft (an emery cloth works well) and replace the motor shaft key with the key included in the installation kit.



Appendix — SlideDriver Wheel Change

5. Locate the new wheel and locking collar. Remove the Cap Screws from the collar. Put blue “thread locker” on the Cap Screws and reinstall them.
6. Place the locking collar on the machined inside hub on the replacement wheel (collar splits between hub splits) and lightly tighten. Make sure the collar is seated against the back of the wheel hub.
7. Slide new drive wheel (with collar) onto the motor shaft and seat with a mallet.
8. Install the new bolt and new washer on the wheel/motor assembly.



Appendix — SlideDriver Wheel Change

9. TIGHTEN BOLT TO APPROXIMATELY 35 – 50*lb.



10. Use a 3/16-inch Allen wrench to tighten the two bolts securely. Be sure the collar is seated against the back of the wheel hub, with the collar splits between the wheel hub splits.

NOTE: If the collar is not fully seated against the wheel, it may contact the motor mounting bolts during operation.)



11. Re-install the drive wheel assembly in the operator.

LIMITED WARRANTY

1. Warranty.

HySecurity Gate, Inc. ("HySecurity") warrants that at the time of sale each of its products will, in all material respects, conform to its then applicable specification and will be free from defects in material and manufacture. This warranty does not extend to items listed as "accessories" in HySecurity's price list, when those items carry another manufacturer's name plate and they are not a part of the base model. HySecurity disclaims all warranties for such accessory components, which carry only the original warranty, if any, of their original manufacturer. HySecurity hereby assigns its rights under such manufacturer warranties—to the extent that such rights are assignable—to Buyer.

The following additional durational warranties apply to HySecurity's products. *The term of these additional warranties is determined by whether (1) the product is purchased through an authorized HySecurity distributor and (2) whether a timely and complete warranty registration is submitted to HySecurity. It is therefore important that you register your product with HySecurity within the 60 day period described below.*

1(a) Five Year / Seven Year Warranty Items (Registered Gate Operators Purchased from Authorized Distributors)

For any gate operator product that is purchased from an authorized HySecurity distributor (this excludes product purchased through internet resellers or any distributor not authorized by HySecurity), if the online Warranty registration is completed at www.hysecurity.com/warranty within 60 days of the date of purchase by the dealer/installer or if the warranty registration form sent with every HySecurity gate operator is completely filled out and returned to HySecurity within the same 60-day period, the following Warranty terms will apply: HySecurity will warrant that the product will remain serviceable for the following periods:

- a. Hydraulic Gate Operators: Five Years or 500,000 gate cycles (whichever occurs first) after the date of installation, or
- b. Electromechanical operators: Five Years after the date of installation—unless installed in a single family residential application, in which case the warranty term shall be Seven Years after the date the product is shipped from HySecurity; *provided that* the Five Year warranty period will not extend beyond Seven Years from the date that the product was shipped from HySecurity. This warranty does not apply to the components described below, which have the shorter warranty period indicated:
- c. Hydraulic Gate Operator Drive Wheels: Two Years from date of installation.
- d. Batteries used in all D.C. operators: One Year from date of shipment from HySecurity.
- e. Items subject to normal wear including, but not limited to, chains, belts, idler wheels, sprockets, fuses and motor brushes: One Year from date of installation.

1(b) One Year Warranty Items (Operators Not Purchased from an Authorized Distributor or Registered within 60 Days)

For any gate operator product that is not purchased from an authorized HySecurity distributor or for which the online Warranty registration or warranty registration form sent with every HySecurity operator was not filled out completely or not returned to HySecurity within 60 days of the date of purchase by the dealer/installer, the following One-Year Warranty will apply to that product: HySecurity warrants that the product will remain serviceable for the following periods, which begin on the date that the product was shipped from HySecurity:

- a. All Gate Operators: One Year or 100,000 gate cycles whichever comes first.
- b. Hydraulic Gate Operator Drive Wheels: One Year

1(c) Replacement Parts

HySecurity warrants that replacement parts (whether new or reconditioned) will remain serviceable for One Year from the date that the product was shipped from HySecurity.

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

The preceding warranties shall not apply to equipment that has been (1) installed or maintained improperly or contrary to instructions; (2) subjected to negligence, accident, vandalism, or damaged by severe weather, wind, flood, fire, or war; or (3) damaged through improper operation, maintenance, storage or abnormal or extraordinary use or abuse. Any modification made to products will void the warranty unless the modifications are approved in writing by HySecurity, in advance of the change (this exclusion does not apply to normal installation of approved accessories and/or protective devices or sensors).

THESE ARE THE ONLY WARRANTIES GIVEN BY HYSECURITY AND ARE IN PLACE OF ALL OTHERS.

These warranties extend to HySecurity's Distributors, to the Dealer/Installer, and to the First User of the product following installation. They do not extend to subsequent purchasers. Dealer/Installers or First Users may receive a replacement HySecurity Warranty form by calling HySecurity at 800-321-9947.

2. Exclusion of Other Warranties.

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

3. Buyer's Exclusive Remedies for Any Nonconformity.

If a HySecurity product fails to conform to the warranties in Section 1, Buyer must notify and order replacement parts from the Distributor through which the product was purchased within a reasonable time and in no event more than thirty (30) days after the discovery of the nonconformity. HySecurity will investigate and, in the event of a breach, will provide, within a reasonable period of time, one of the following: (1) repair or replacement of any nonconforming products or components or (2) refund of the price upon return of the nonconforming items. Replacement goods will conform to this warranty for the unexpired duration of the warranty period for the original, nonconforming product. HySecurity reserves the right to supply used or reconditioned material for all warranty claims. This warranty does not cover or extend to any incidental expenses, including labor, shipping, travel time or standby time, that are incurred for inspection or replacement of any nonconforming items. As a condition of warranty coverage, warranty claims must be submitted in accordance with the following paragraph. THE REMEDY SELECTED BY HYSECURITY IN ACCORDANCE WITH THIS PARAGRAPH SHALL BE THE EXCLUSIVE AND SOLE REMEDY OF BUYER FOR ANY BREACH OF WARRANTY. IN NO EVENT SHALL HYSECURITY BE OBLIGATED TO INDEMNIFY BUYER FOR ANY BREACH OF WARRANTY.

For warranty coverage, you must follow the procedures described on HySecurity's form, "RMA Procedures." A current version of the form is available from HySecurity.

4. Exclusion of Consequential and Incidental Damages.

IN NO EVENT SHALL HYSECURITY BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM NONDELIVERY OR FROM THE USE, MISUSE, OR INABILITY TO USE THE PRODUCT OR FROM DEFECTS IN THE PRODUCT OR FROM HYSECURITY'S OWN NEGLIGENCE OR OTHER TORT. This exclusion applies regardless of whether such damages are sought for breach of warranty, breach of contract, negligence, or strict liability in tort or under any other legal theory. This exclusion does not apply to claims for bodily injury or death.

5. Severability.

If any provision of this warranty is found to be invalid or unenforceable, then the remainder shall have full force and effect, and the invalid provision shall be partially enforced to the maximum extent permitted by law to effectuate the purpose of the agreement.

6. Applicable Law.

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

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D0125, Rev. F