

Hy-Security Gate Operators

**222 DS, 222 DX, 222 DE, SLIDE GATE OPERATOR
HANDBOOK**



Manufacturers and Designers of Hydraulic Systems

READ THIS FIRST!

Important Information

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

Common Industry Symbols



Attention
–Take Note–



–Danger–
Keep Away



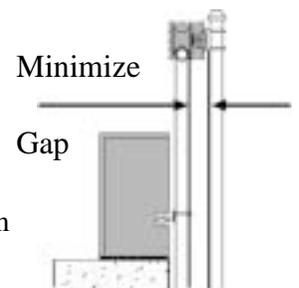
Entrapment
Zone



Possible
Pinch Point

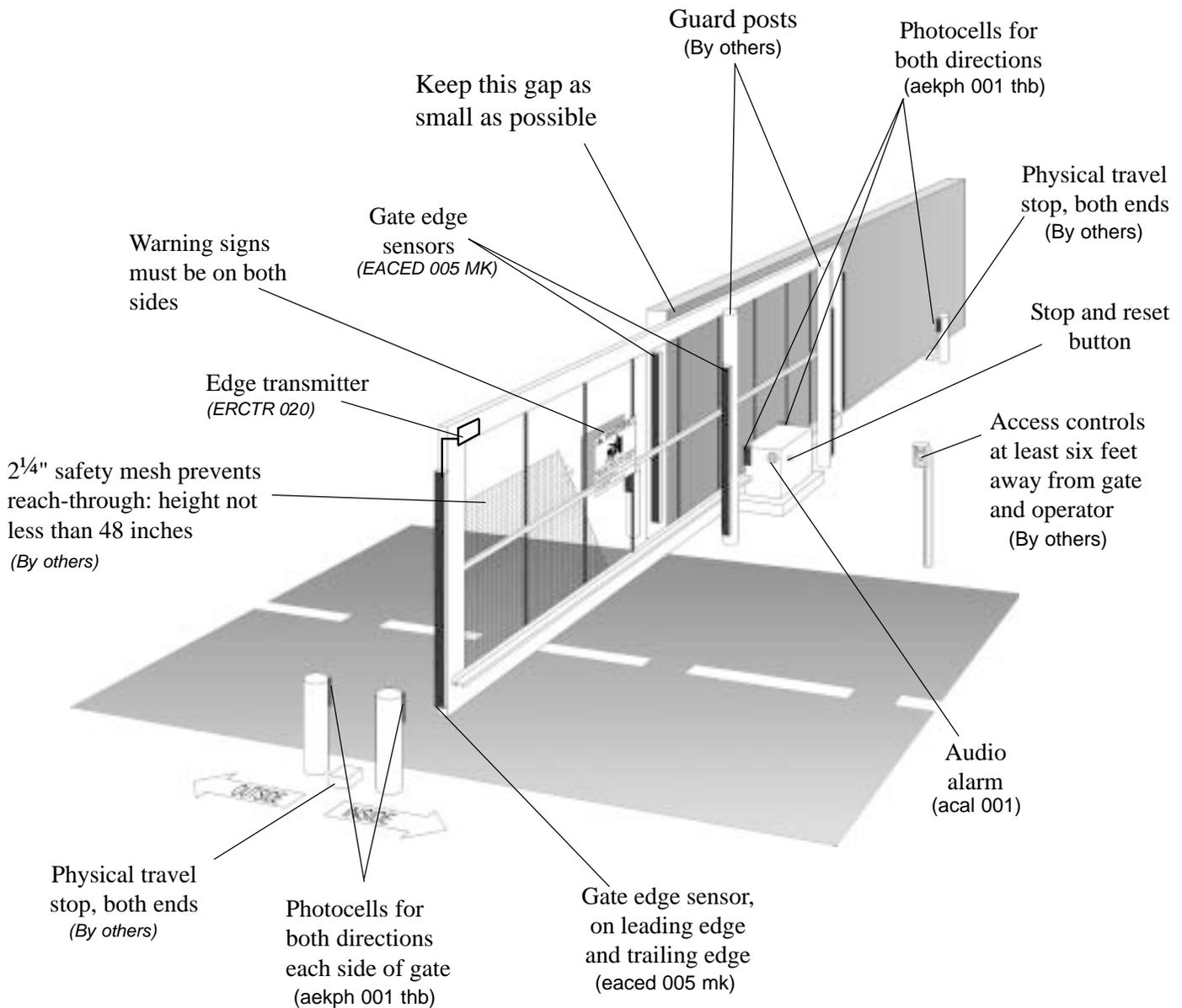
Cautionary Notes also see illustration on next page:

- Hy-Security gate operators are designed for vehicular traffic; *not pedestrians*. Direct all pedestrian traffic to a separate walk-through gate, and clearly display the warning signs on both sides of the vehicle gate.
- Verify that the gate operator is marked as appropriate for the type and usage class of the gate. External sensors must be installed to protect against accidental entrapment in both the opening *and* closing directions of gate travel.
- This type of gate operator must not be installed on the public, or non-secured side of the gate. To minimize the risk of entrapment, assure that the installation includes sufficient clearance between the gate and adjacent structures.
- Children must never be allowed to play on or around the gate.
- All access controls must be mounted at least six feet away from the gate and have a security feature to prevent unauthorized use.
- Install entrapment protection devices and sensors devices appropriate for the type of gate and usage class application: cover exposed rollers, screen across the face of the gate, install electric edge sensors, photoelectric sensors, guard posts, and moving gate alarms. Test all of your entrapment sensors to insure that they are working in the proper manner.
- Install physical stops for the gate panel, in each direction. This will assure that the gate does not accidentally travel farther than intended.
- Always make certain the operator is properly electrically grounded.
- Construct or screen automatic sliding gates, from the bottom of the gate to a minimum height of four feet, so that a sphere 2 1/4" in diameter cannot pass through. The 2 1/4" restriction also applies to the portion of the adjacent fence that the gate covers when open.
- When constructing/installing sliding gates, always minimize the gap between gate and fence. The gate must move freely in both directions. Never over-tighten a clutch or relief valve to compensate for a stiff gate.





Entrapment Protection Device Schematic for Sliding Gates

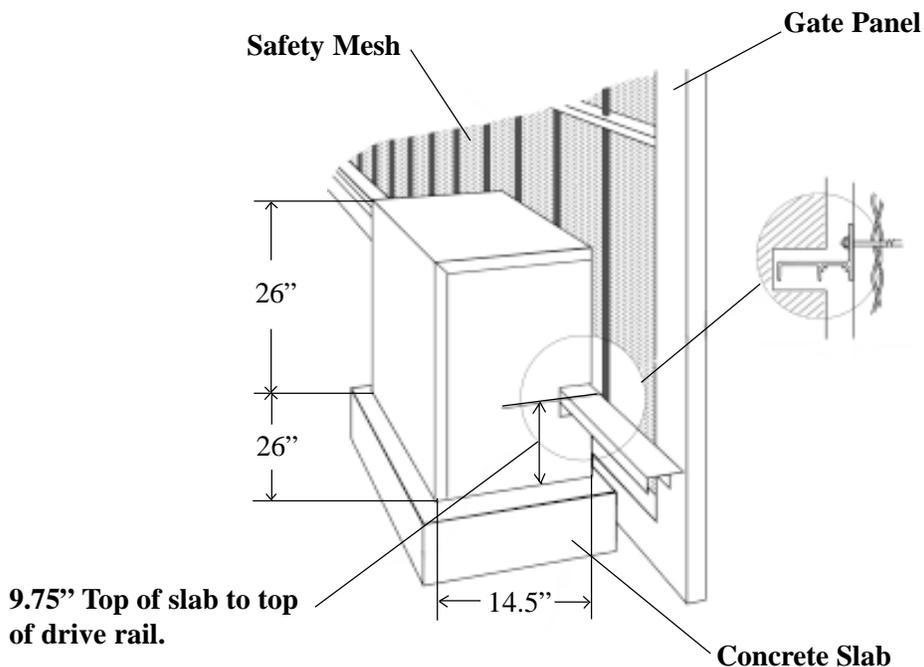
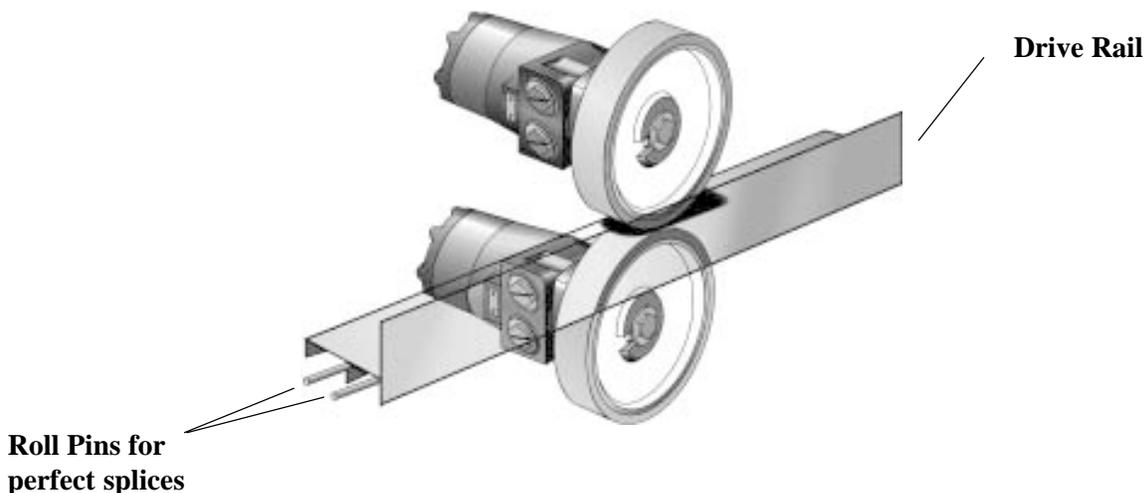


NOTE: All wheels must be covered. (Wheels and covers not shown for clarity).

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

Power transmission: Hydraulic motors to drive rail

Polyurethane drive rail wheel tread eliminates the high wear metal-to-metal contact of conventional chain-drive systems.



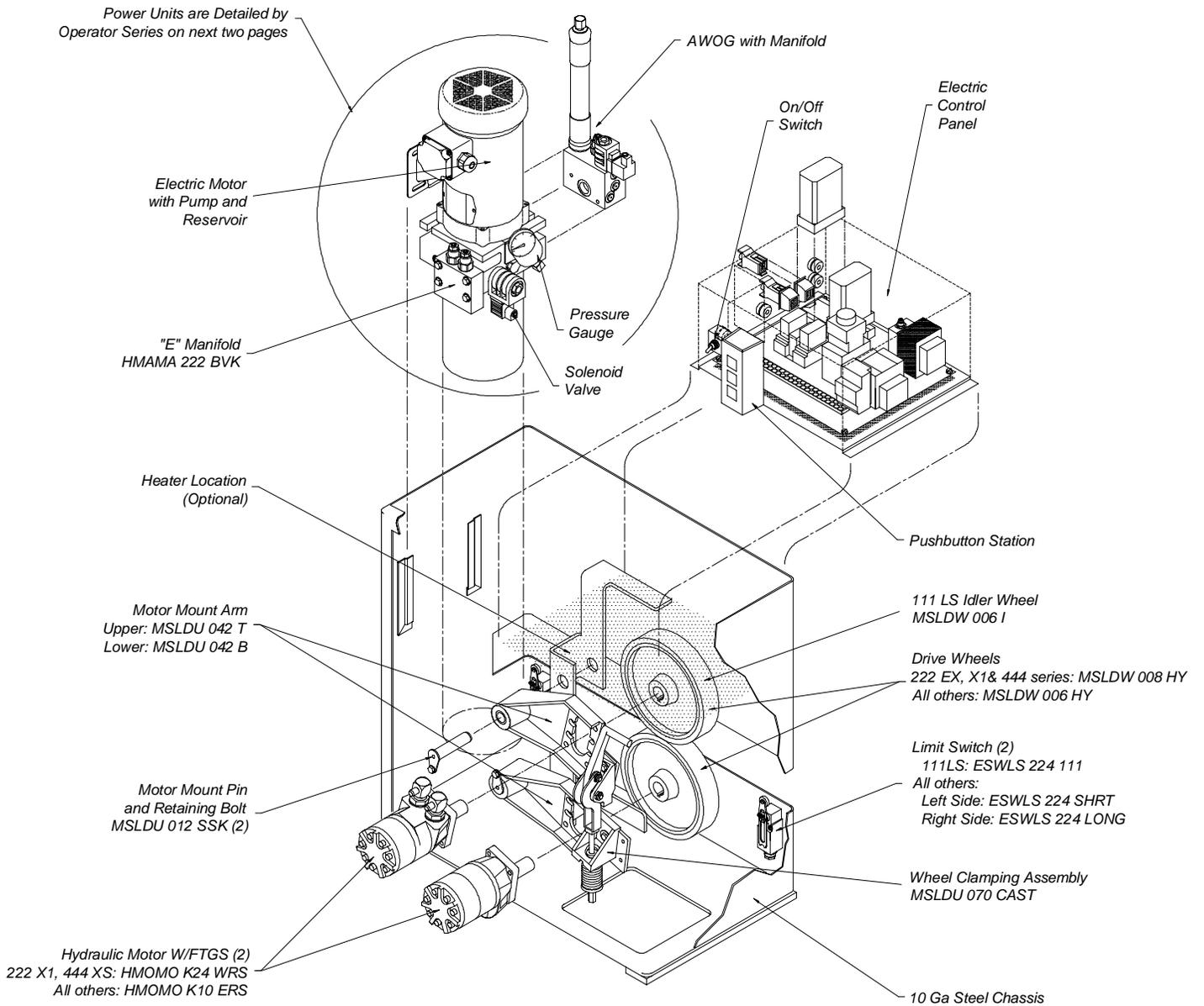
TITLE

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d~íÉ=| eÉê~íçë

DRAWN KERI	DATE 6/1/00	THIRD ANGLE PROJECTION	REV
CHECKED	DATE	PART NUMBER	--
SHOP	MM/YY/DD	N/A	
APPROVED ENGRNG	DATE MM/YY/DD	DRAWING NUMBER: S12	SHT OF 1 1

Exploded Parts Breakout

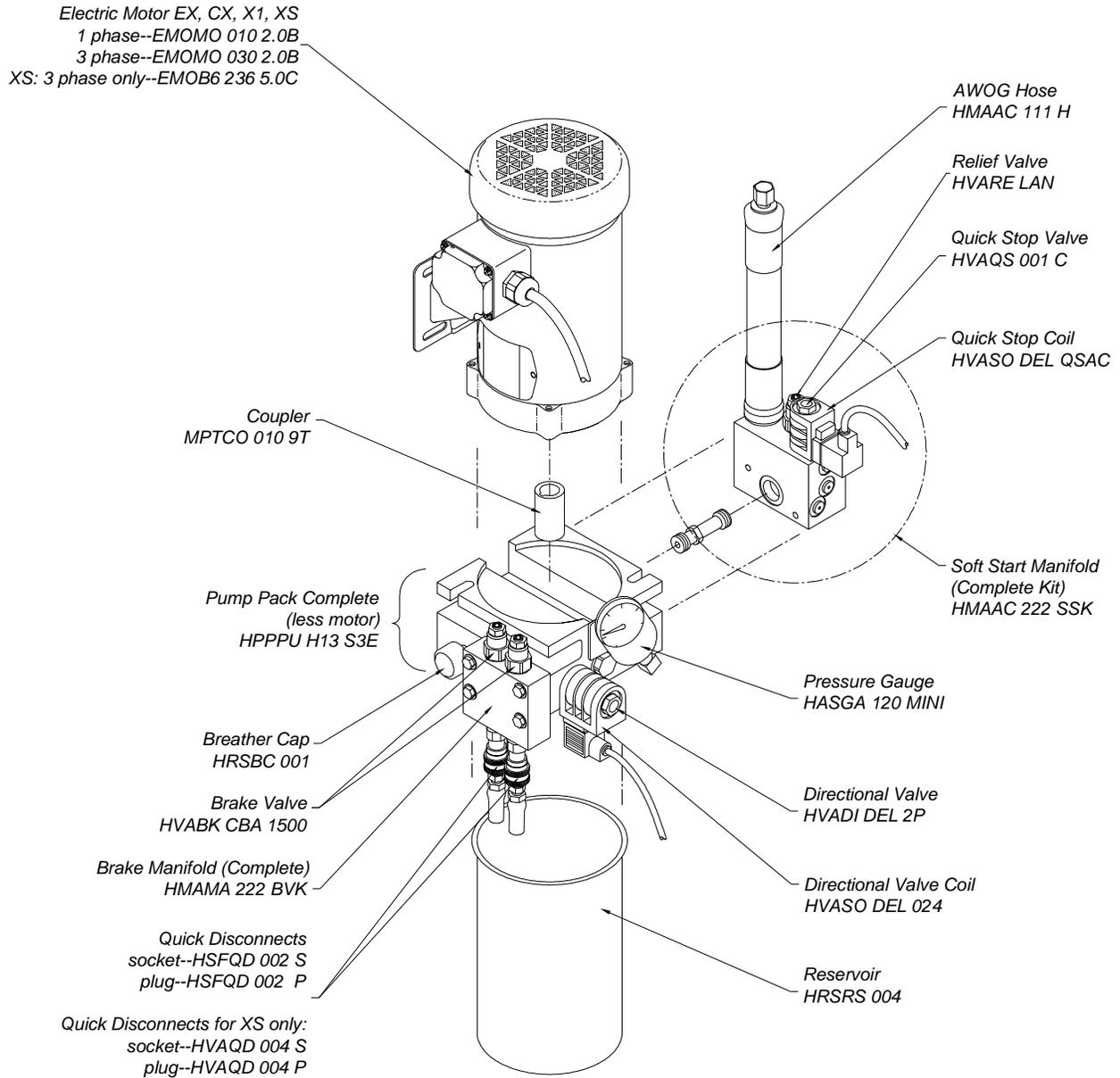
Parts, Part Numbers and Kits



Slide Gate Operator Exploded Parts Breakout

Exploded Parts Breakout

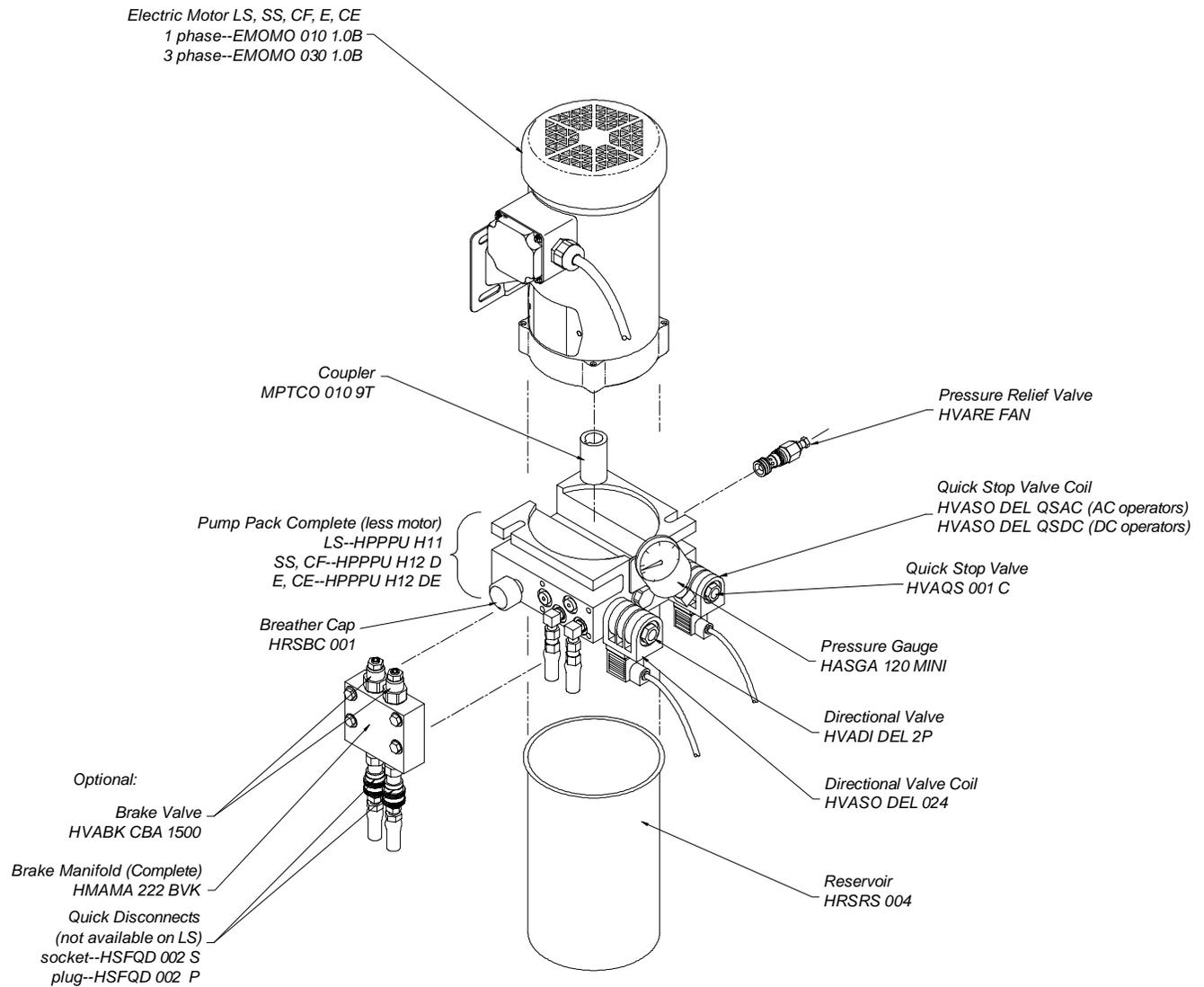
Related Pump Packs



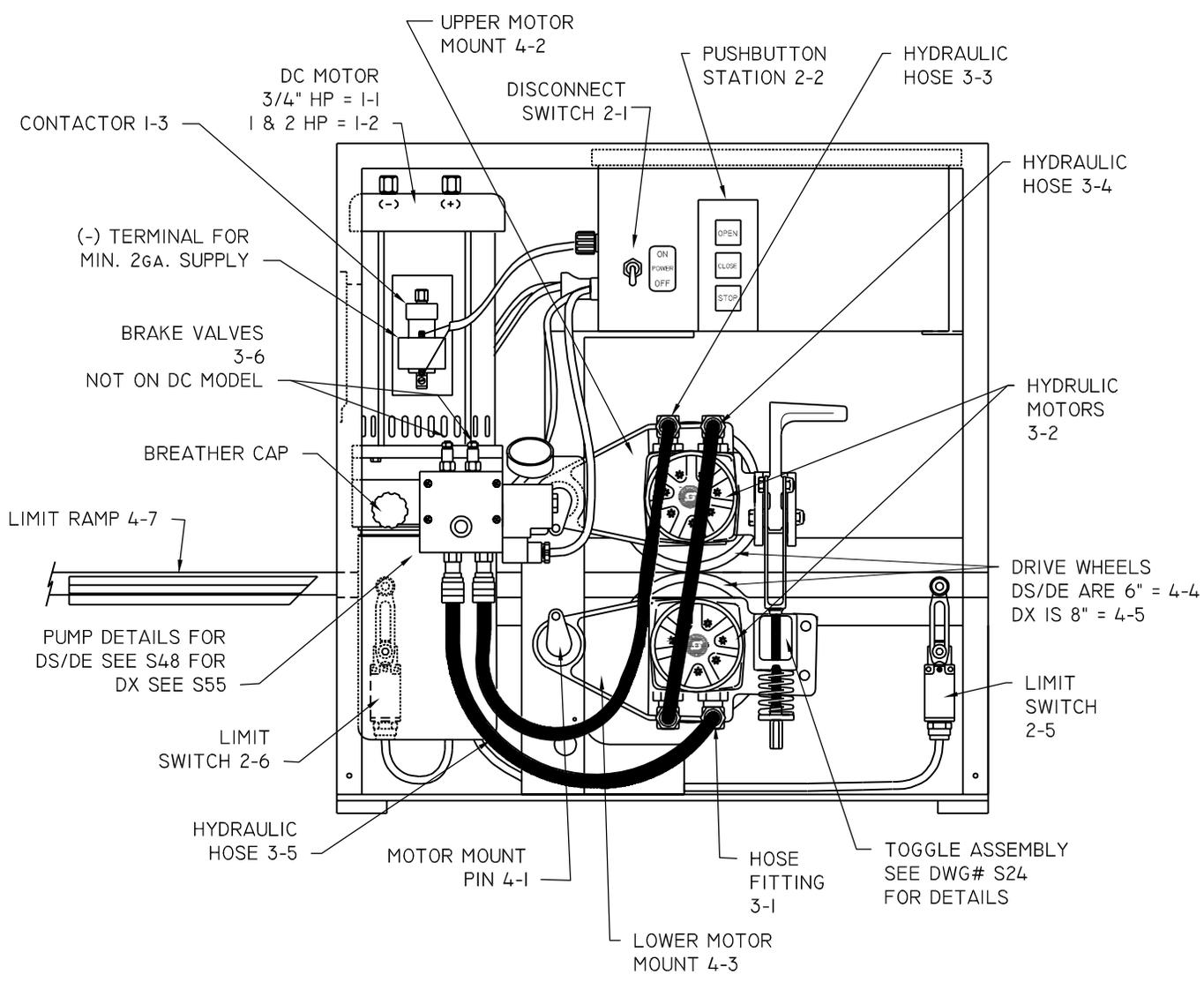
EX, CX, X1, XS Models

Exploded Parts Breakout

Related Pump Packs



LS, SS, CF, E, CE Models



FOR 222 DXI OPERATOR
 SAME AS SHOWN HERE
 WITH THE FOLLOWING
 EXCEPTIONS:

ITEM#	QTY.
3-2 HMOMO 024 WRS	2EA

1-1	EMOMO 024 .75L	1 EA
1-2	EMOSO DC6 2.02	1 EA
1-3	ESWMC 075 MERC	1 EA
2-1	ESWDI 065 50DC	1 EA
2-2	ESWPB 030	1 EA
2-5	ESWLS 224 LONG	1 EA
2-6	ESWLS 224 SHRT	1 EA
3-1	HSFFI 853 0610	4 EA
3-2	HMOMO K12 WRS	2 EA
3-3	HSFHO 222 2S	1 EA
3-4	HSFHO 222 2I	1 EA
3-5	HSFHO 222 18	1 EA
4-1	MSLDU 012 SS	2 EA
4-2	MSLDU 042 T	1 EA
4-3	MSLDU 042 B	1 EA
4-4	MSLDW 008 HY	2 EA
4-7	MSLLR 012 B	1 EA



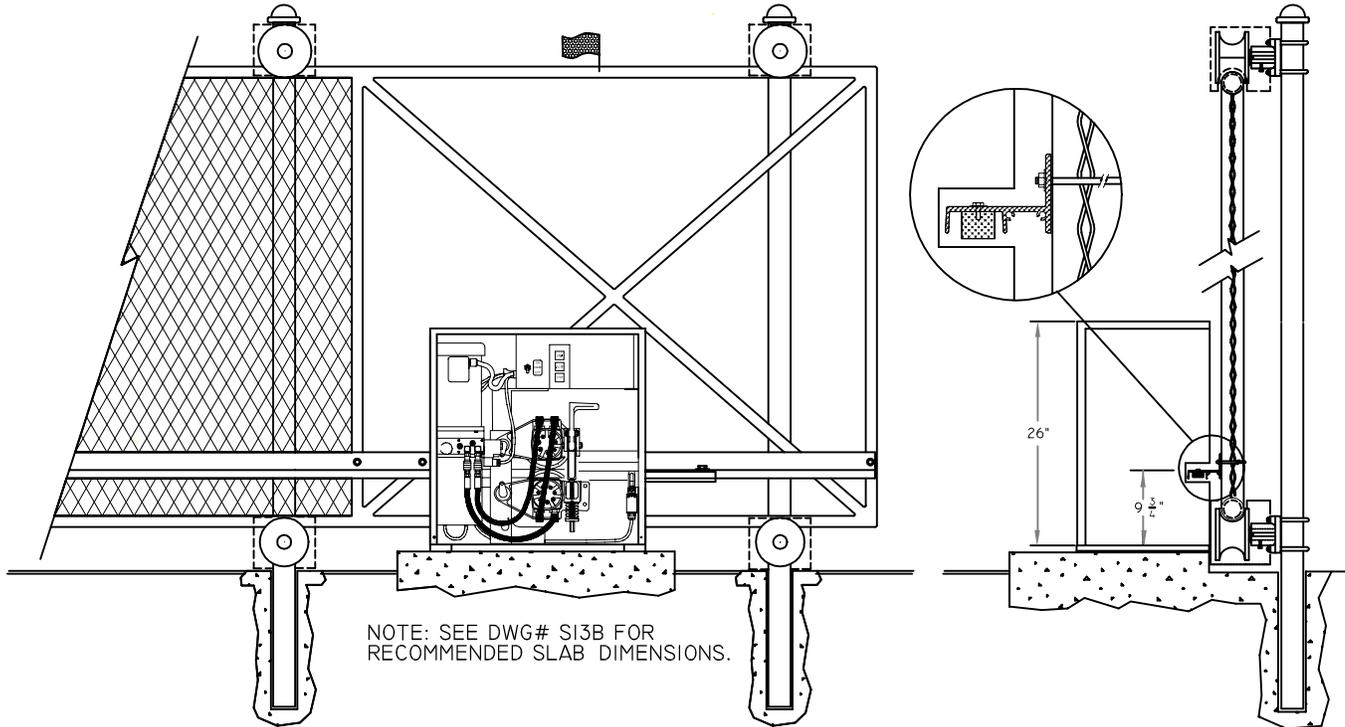
TITLE
COMPONENTTS 222 DS, DE, DX, DX1 OPERATORS

DRAWN KERI	DATE 7/20/00	THIRD ANGLE PROJECTION 	REV ---
CHECKED SHOP	DATE MM/YY/DD	PART NUMBER N/A	
APPROVED ENGRNG	DATE MM/YY/DD	DRAWING NUMBER: SS44	SHT OF 1 1

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.

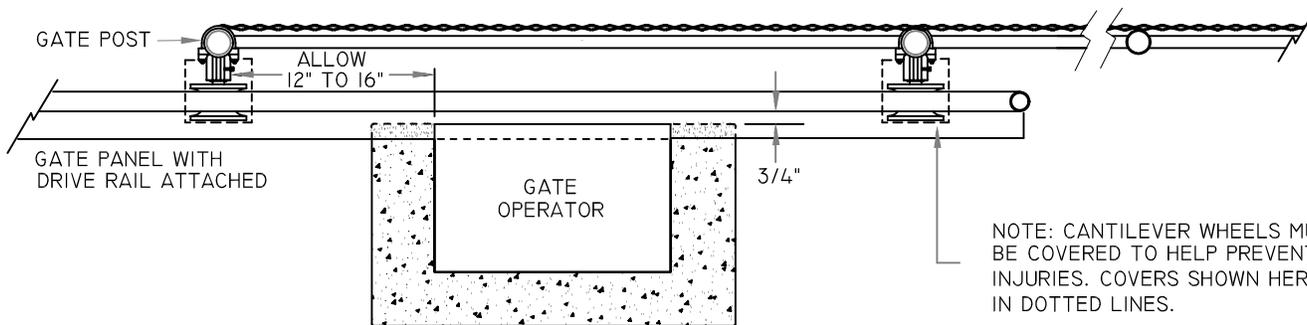


TITLE

**SLIDE GATE OPERATOR (TYP) R.H.
CANTILEVER GATE PANEL**

DRAWN	DATE	THIRD ANGLE PROJECTION	REV
KERI	6/12/00		---
CHECKED	DATE	PART NUMBER	
SHOP	MM/YY/DD	N/A	
APPROVED	DATE	DRAWING NUMBER:	SHT OF
ENGRNG	MM/YY/DD	S13A	1 1

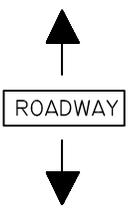
FENCE LINE



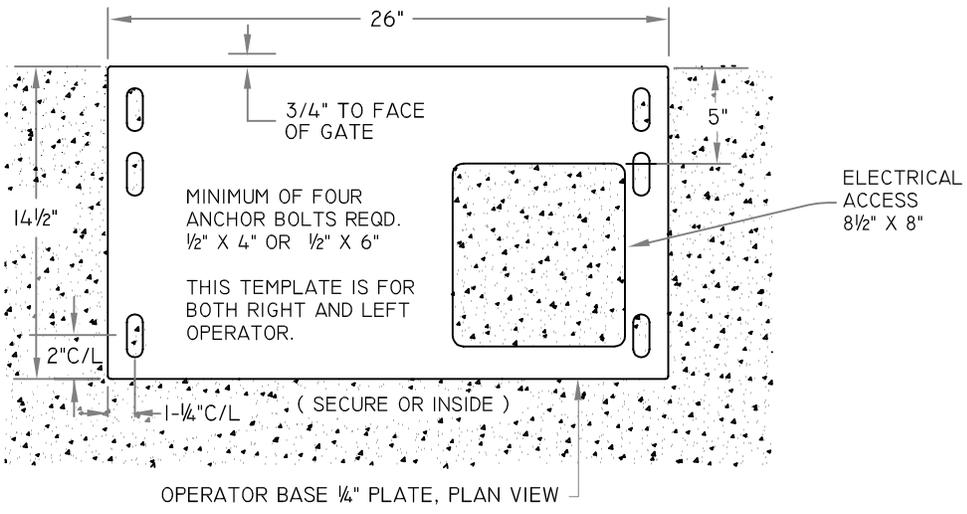
NOTE: CANTILEVER WHEELS MUST BE COVERED TO HELP PREVENT INJURIES. COVERS SHOWN HERE IN DOTTED LINES.

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

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



DIMENSIONS OF OPERATOR AND BASE
 (FENCE/GATE SIDE)



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



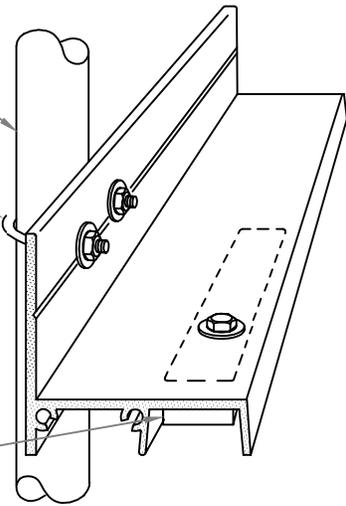
TITLE
**SLIDE GATE OPERATOR (TYP) R.H.
 CANTILEVER GATE PANEL**

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CHECKED SHOP	DATE MM/YY/DD	PART NUMBER N/A	
APPROVED ENGRNG	DATE MM/YY/DD	DRAWING NUMBER: S13B	SHT 1 OF 1

VERTICAL GATE MEMBER

"U" BOLTS

LIMIT SWITCH RAMP



KEYWAYS FOR SPLICE PINS

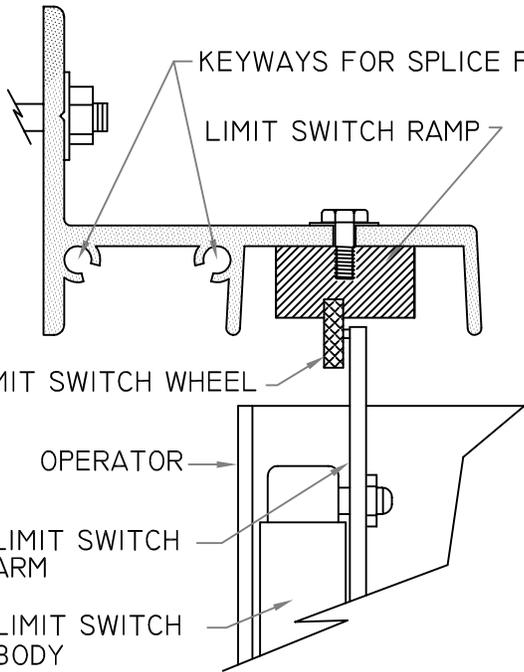
LIMIT SWITCH RAMP

LIMIT SWITCH WHEEL

OPERATOR

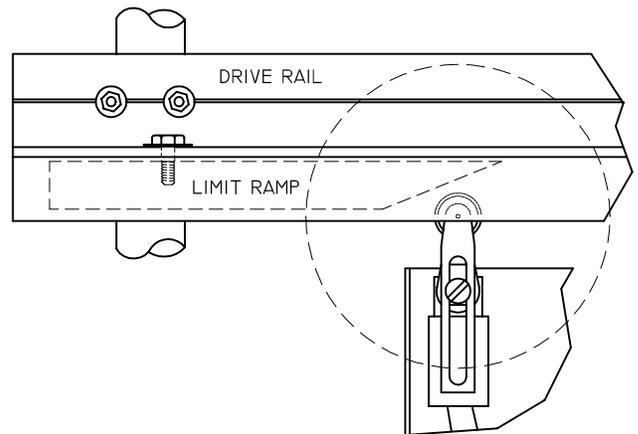
LIMIT SWITCH ARM

LIMIT SWITCH BODY



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

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



NOTE: ALUMINUM RAIL SHOWN, STEEL RAIL SIMILAR.



TITLE

DRIVE RAIL SLIDE GATE OPERATION

DRAWN

KERI

DATE

6/12/00

THIRD ANGLE PROJECTION



REV

CHECKED

SHOP

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MM/YY/DD

PART NUMBER

N/A

APPROVED

ENGRNG

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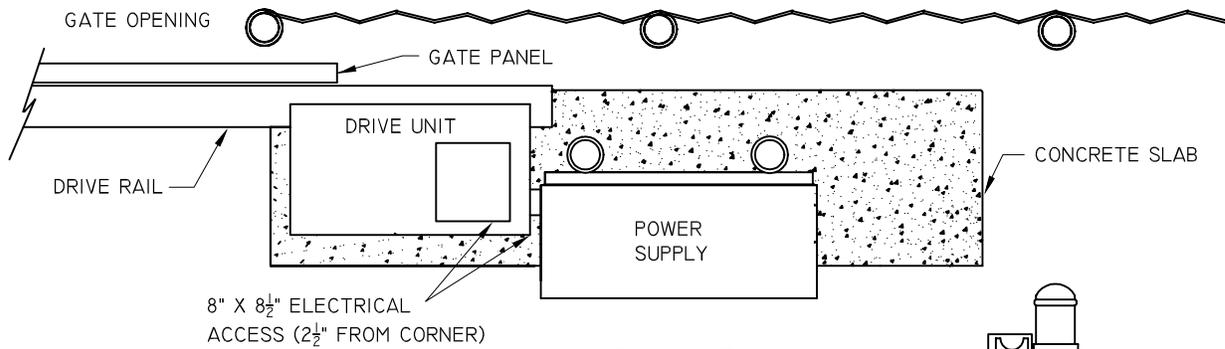
S22

SHT

OF

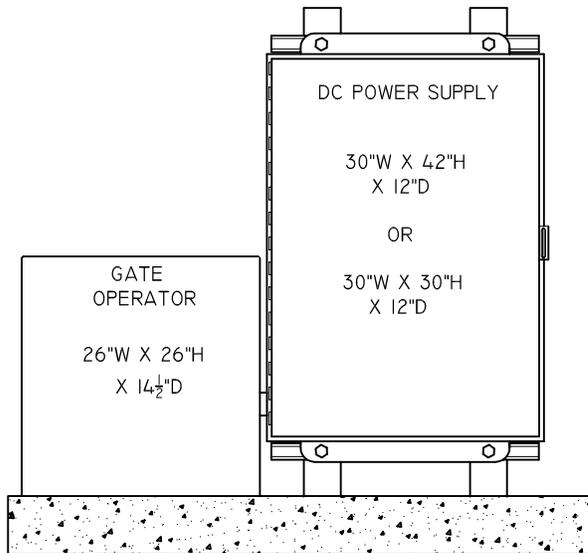
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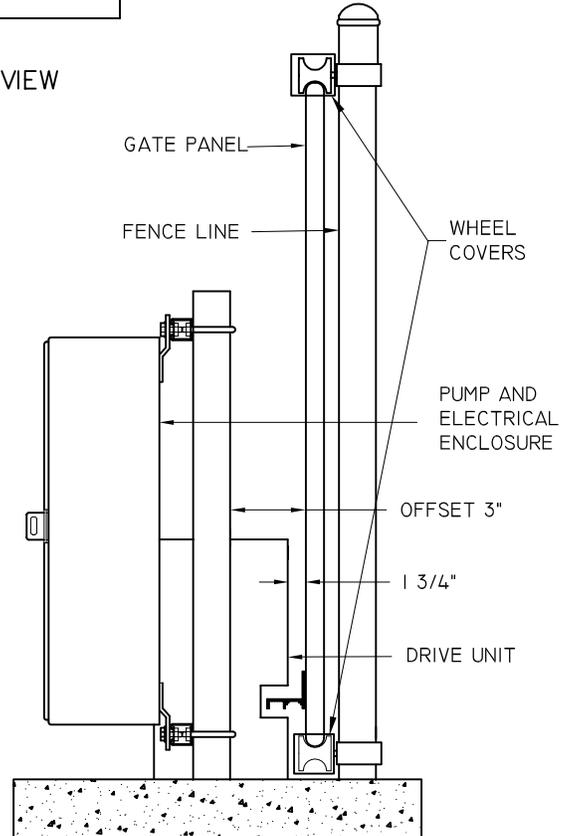


PLAN VIEW

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



FRONT VIEW



END VIEW

NOTES:

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

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

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

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

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

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

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



TITLE
DC REMOTE POWER PACKAGE

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



Hy-Security Gate Operators

Phone: 1-800-321-9947 • Fax: (206) 286-0614 • Web: www.hy-security.com • 1200 W Nickerson St • Seattle, WA. 98119

IMPORTANT SPECIAL NOTES REGARDING D.C. POWERED GATE OPERATORS

The on/off switch on the electric control panel of the drive unit does not disable all DC power to the operator, even if the AC power has been disabled at its source. The disconnect in the DC power supply enclosure must be actuated (either pull disconnect or switch depending upon operator type) to insure disconnect of all DC power to the drive unit.

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

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

Be certain to observe polarity when connecting the batteries, or adding accessories. Reversed polarity may result in a non-functional operator or possibly damage a component. Red is (+) positive, and black is (-) negative. Black is common, terminal #10 is common, and all wires labelled number 10 in the operator are common.

Since the electrical current under load is very high, be certain that the minimum conductor size, specified in the installation instructions, is used for the connection between the battery pack and the operator. If the battery pack is more than 30 feet from the operator, use a larger wire size, according to the distance between the operator and the batteries.

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

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

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

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

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

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



Installation Instructions for DC Powered Sliding Gate Operators (Models 222 DS, DE, DX)

1. See drawings S13A & S13B for concrete slab size, operator footprint, and spacing dimensions. With the aid of the template enclosed inside the operator locate the operator with clearance of 1 3/4" to the gate panel. Mounting slots allow for fine adjustment.
2. Mount operator pad with a minimum of four concrete anchor bolts of 1/2" diameter.
3. Remove the plastic shipping plug on the pump manifold and replace it with the vented cap supplied. You will find it in the bag with the plastic limit ramps.
4. Mount the DC power package on support posts and channel strut as shown on drawings SS19 and SS20. The power supply should be kept near the drive unit because of the high motor current achieved by this system.
5. Injury and Entrapment Protection - Minimum Safeguards:
 - A. Since automatic gates are not intended for pedestrian use, always install a separate pedestrian walkway and access gate. Install signs which direct persons to use the pedestrian gate, and not to enter through the vehicle gate.
 - B. Be certain that all open gate rollers are completely guarded by covers.
 - C. Be certain that the gate has been constructed such that the opportunity for persons to reach through any opening have been minimized. A sphere 2 1/4" must not pass through any part of the gate, or the fence adjacent to the gate when fully open. It may be necessary to install screening to prevent reach through injury.
 - D. Placement of physical stops for maximum open and maximum close is essential to prevent any over travel that might allow the gate to fall. The limit ramps are not to be used as gate stops.
 - E. Be certain that all operating switches are located at least a six foot distance from the gate, to reduce the possibility of any attempt to reach through in order to operate the gate.
 - F. Be certain to mount at least two of the enclosed 8 1/2" x 11" warning placards on each side of the gate to warn users of the hazards of power operated gate.
 - G. **Button Station Operation:** Be certain to mount a warning placard near each button station that warns that the area must be clear before operating the gate. If there are no entrapment protection sensors to guard the open and close operation of the gate, the push button station must be wired for constant hold operation only. This is achieved by cutting jumper wires in the control circuit, see drawing E124T1.
 - H. **Automatic Operation:** Entrapment protection sensors must be installed to guard both the opening and closing of the gate. Install two photo electric eyes, or attach a minimum of two edge sensors to create a reversing function for each direction of gate travel. All sensors guarding the closing direction connect to terminals #1 and #6 in the control box. All sensors guarding the opening direction connect to terminals #9 and #6. See drawing #E41 for mounting and connection details of the edge sensors. **Caution:** Vehicle detectors are not entrapment protection sensors.

Installation Instruction Continued...

6. Connect 115 V, 208V, or 230V source power (according to the version ordered) to the DC power supply at the terminals marked for the AC line connection.
7. **If the optional heater is ordered in the drive unit, connect AC supply wires from the 15 A fuse and AC terminal in the DC power supply to the loose (black and red) heater wires in the drive unit electrical enclosure.**
8. Being careful to observe polarity, connect two separate 24V DC circuits from the DC power supply to the drive unit, one circuit for the controls and the second circuit carries the high current to the motor. Models DS and DE, require minimum 8 gauge wires to connect the power supply to the drive unit. Model DX, requires minimum 2 gauge wires from the power supply to the drive unit. Connect the red wire directly to the (+) terminal on the motor and connect the black wire to the bottom of the contactor mounted on the motor. All DC operators require separate 14 gauge wires minimum for the control circuit. Connect the 14 gauge wires to the loose wires at the back of the ON/OFF switch in the drive unit. (Left front corner of the control box.)
9. Test the basic functions of the operator first, before connecting any external control wiring. If your operator is equipped with vehicle detectors, be certain that they are connected to a loop or un-plugged so that they do not cause interference with the function of the machine. If the motor turns, but nothing moves, be certain that the hose quick connectors are firmly engaged. If the operator works, but open and close functions are reversed, refer to step 11.
10. All slide operators are manufactured to be right hand. If reversing the hand is necessary, simply unplug and reverse the limit wiring on the left side of the control enclosure. A label is affixed on the control panel which describes this procedure in more detail. It is also necessary to reverse the two hydraulic hoses going to the pump. All 222 models are provided with hydraulic quick connectors which require no tools to reverse handing. Run the operator to verify correct functioning. If the hydraulic hoses were incorrectly reversed, the gate will move in the opposite direction than command. If the limit switch cords were incorrectly reversed, the operator would not stop when the gate reached its full travel. Never reverse wiring to the push button station.
11. After testing the basic functions, follow our electrical connection diagrams to add any accessories or external control wiring. Test the operator functions again.
12. Install drive rail on the gate panel at the specified height. The drive rail must be close to the center of the cutout in the operator housing as it passes between the drive wheels. Check to see that the arms supporting the wheels are similar angles from horizontal. Be sure that the drive rail maintains a consistent height in relation to the operator wheels, throughout the travel of the gate. (This may not be level or parallel with the gate frame because the gate panel and the fence may not be level) The maximum up and down variance of the drive rail, as it passes between the wheels, is one inch for the entire length of the gate travel. The point at which the rail should pass between the wheels is marked on the exterior of the operator housing.
13. Actuate the toggle clamp to grip the wheels onto the drive rail. Gauge the tension on the red spring. If more or less tension is needed, release the toggle clamp, adjust the nut on the threaded rod that penetrates the spring. A compression to 2" - 2 1/8" in height will be sufficient even for very heavy gates. Slightly less compression should be used for gates that weigh under 1000 pounds, or roll very easily.

Installation Instruction Continued...

14. Adjust the lever arms of limit switches to maintain at least ¼” clearance from the underside of the drive rail. This will avoid false tripping of the limits (see drawing S22). The limit switch arm should be approximately in the center of the rail channel. **If adjustment is required, remove the limit arm before bending.** This will avoid breaking the head of the switch. Locate the plastic limit ramps in the underside of the drive rail to control maximum travel of the gate in the open and close direction. Mount the limit ramps to trip the limit switches three to six inches ahead of the desired gate stopping position. This clearance is needed for gate deceleration travel, after the limit switch has been tripped.
15. Check the “soft stop” open timer, which is mounted on top of the control relay. The label on the timer dial shows the minimum and maximum settings. In operation the timer only needs to be set long enough for the gate to coast to a smooth stop after opening. There is no bad effect if the timer is set for too long, except that the operator cannot be started closed until this timer times out. There is no “soft stop” timer adjustment for the close direction.
16. Set the maximum run timer, which is located at the extreme right, inside of the electrical panel. The range is adjustable to 1 minute. Set the timer for twice the amount of the needed for the gate to traverse the opening.
17. DC powered operators include a special low voltage sensing relay (VSR) to protect the batteries from damage as a result of over discharge. The factory has preset the VSR relay to drop out 20.5 volts. The VSR relay will re-engage at 24 volts. The circuit design will always allow the gate to attain full travel before the low voltage relay can disable the gate. The VSR relay is factory wired for fail secure (closed) operation. If fail open is desired, the VSR relay must have its normally open contact wired to terminals #3 and #5. Be certain to remove jumper from terminal #3 to #5 and jumper #1 to #1A.

Adjustment of accessories and information about two foot/second operators

1. Set “timer to close” accessory for desired delay. This option timer is located on the left side of the main control relays. The range is adjustable from 1 to 30 seconds. The timer will close the gate from any position, but all open and safety signals must be absent.
2. Models 222 DE and DX, have a reverse delay timer mounted at near center of the control panel (to identify components, see drawing E124T1. The delay is adjustable from .3 to 3 seconds, and works together with the soft stop feature to provide smooth reversing. Larger gates will only need a second or less. The time needed to stop and reverse a gate is partly a function of the optional brake valves that are included with many models (to identify components, see drawing SS44. Review the following step, number three, for correct adjustment of the brake valves.
3. All two foot per second operators, as well as any operator that is intended to drive gates in excess of 1,000 pounds should be equipped with the “E” option which adds a reverse delay and hydraulic brake valves, to rapidly decelerate a gate. The positioning of the limit ramps should be 3 to 6 inches ahead of full gate travel to give some space for deceleration. Adjustment of the brake valves, one for each direction, affects the limit switch adjustment. If adjustment is necessary, loosen the 9/16” lock nut on the end of the brake valves (located on the front side of the hydraulic pump). Turn the adjustment stem with a screwdriver. The adjustment works over a range of four turns. Clockwise adjustment will stop the gate more rapidly. If the adjustment is set to loose, the gate will coast too far, If the adjustment is set too tight the gate speed will decrease. Be certain to re-tighten the locking nut when the adjustment is complete.

Installation Instruction Continued...

Special information about two foot/second operators

To obtain the higher speed of the 222 DX, the pump flow rate and drive wheel size have been increased. The motor horsepower is also doubled. Just like an automobile, a two foot/second operator must also incorporate a means to allow for acceleration to full speed, and to decelerate to a smooth stop. The gate is stopped by adjustable hydraulic brake valves, which are included as standard equipment in this model. For smooth acceleration, the "DX" operator incorporates a device that eases the gate to full speed by dampening the initial hydraulic flow rate during start up. The following are the special instructions that apply only to our two foot/second operators.

1. Verify that the soft stop timer and reverse delay timer have been set for long enough time to allow the gate to come to a smooth stop after opening or when reversing. See step #16 in the installation instructions.
2. Be certain that the brake valve adjustments, described in the previous step #3 have been performed. Since the gate moves at twice the speed, the brake valve adjustment on two foot/second operators is much more important than with one foot/second operators.
3. The feature that creates soft starting is built into the pump unit and is factory pre-adjusted to work correctly for all gates. No adjustment is possible.



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Use and Adjustment of the Manual Release Mechanism

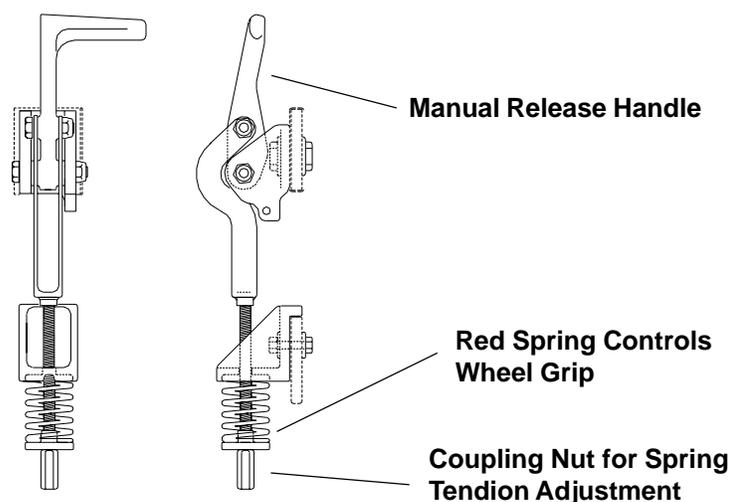
All slide gate series operators come equipped with a toggle handle manual release mechanism to disengage the drive wheels from the drive rail. The manual release is located under the electric control panel and to the right of the hydraulic motors. To disengage the drive wheels, simply pull the aluminum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

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

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

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

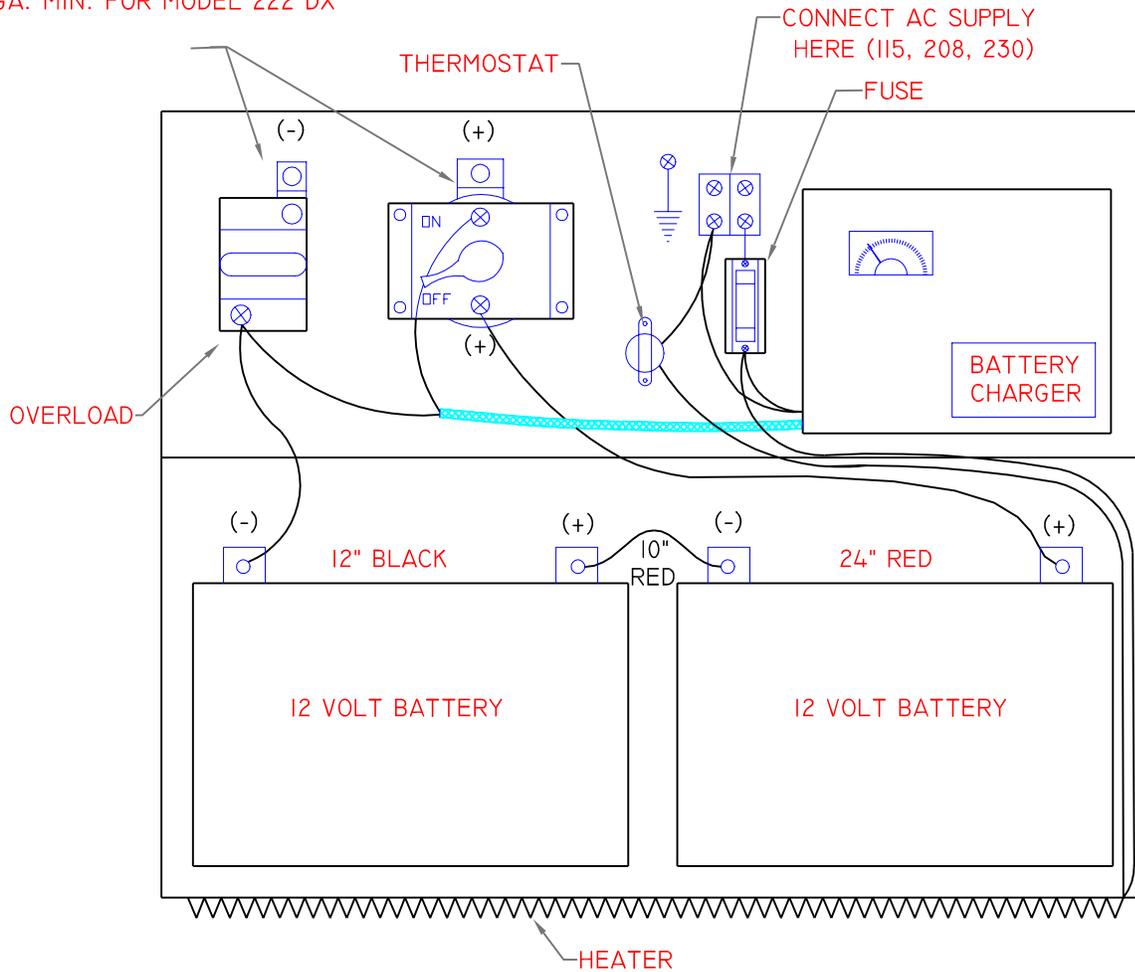
The coupling nut must always be adjusted correctly so the wheels provide a strong clamping force on the drive rail. The red spring should measure 2" to 2-1/8" in height when under correct compression.



For assistance call your Distributor.

CONNECT TWO CIRCUITS
TO THE GATE OPERATOR
AT THE POINTS SHOWN.
USE 14 GA. MIN. TO CONTROL
CIRCUIT. USE VERY LARGE
WIRES TO MOTOR CONTACTOR.

8 GA. MIN. FOR MODEL 222 DS
2 GA. MIN. FOR MODEL 222 DX



BE CAREFUL TO ALWAYS OBSERVE POLARITY.
EXCEPT FOR THE WIRES BETWEEN THE BATTERIES
ALWAYS CONNECT RED WIRE TO (+) AND BLACK WIRE TO (-).
BE CERTAIN TO ATTATCH BATTERY RETAINING PLATES.

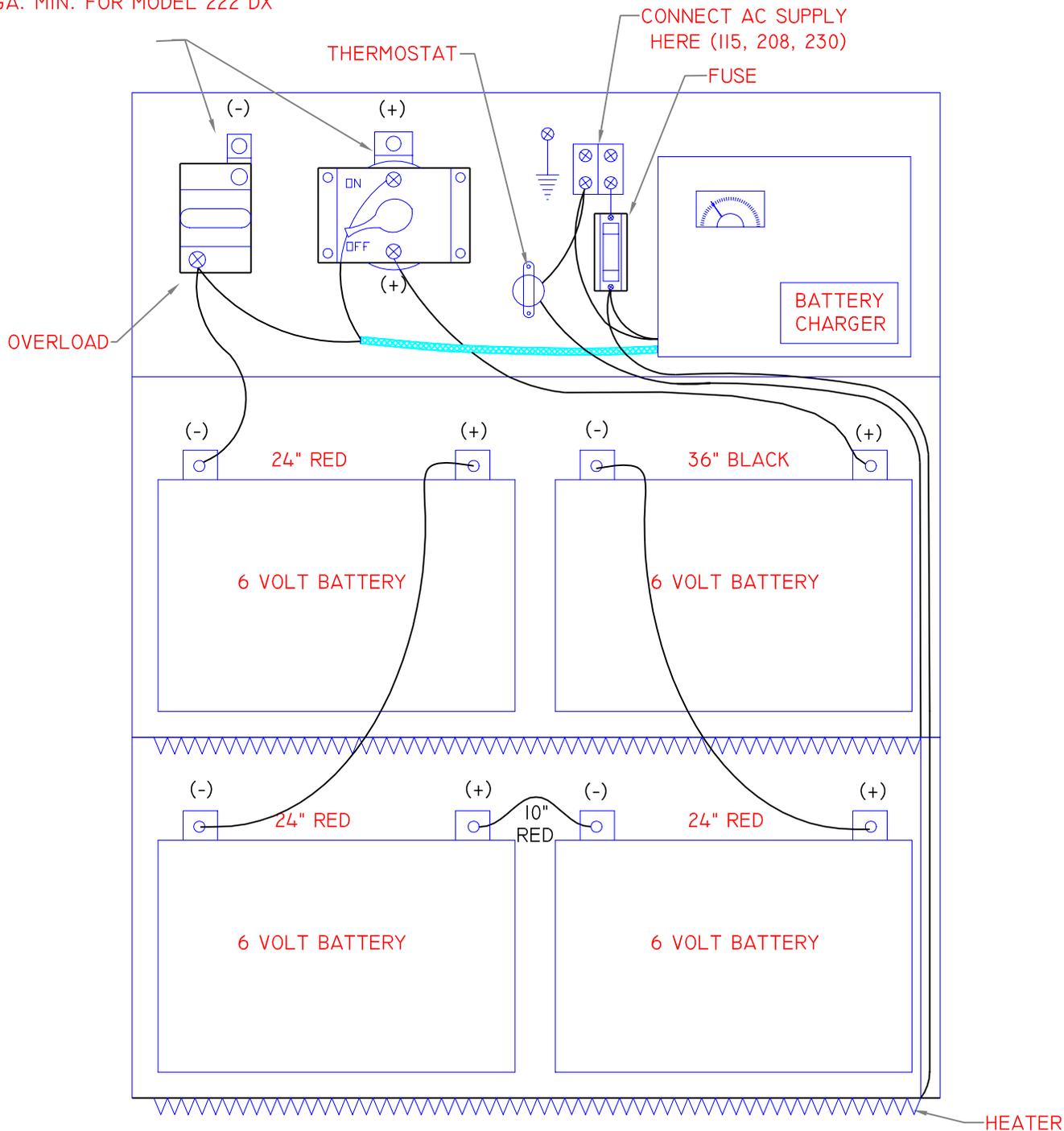


TITLE	24V-90 A.H. BATTERY SUPPLY FOR 222 DC OPERATORS		
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DRAWN KERI	DATE 7/13/00	THIRD ANGLE PROJECTION 	REV ---
CHECKED SHOP	DATE MM/YY/DD	PART NUMBER N/A	
APPROVED ENGRNG	DATE MM/YY/DD	DRAWING NUMBER: E125	SHT OF 1 1

CONNECT TWO CIRCUITS
TO THE GATE OPERATOR
AT THE POINTS SHOWN.
USE 14 GA. MIN. TO CONTROL
CIRCUIT. USE VERY LARGE
WIRES TO MOTOR CONTACTOR.

8 GA. MIN. FOR MODEL 222 DS
2 GA. MIN. FOR MODEL 222 DX

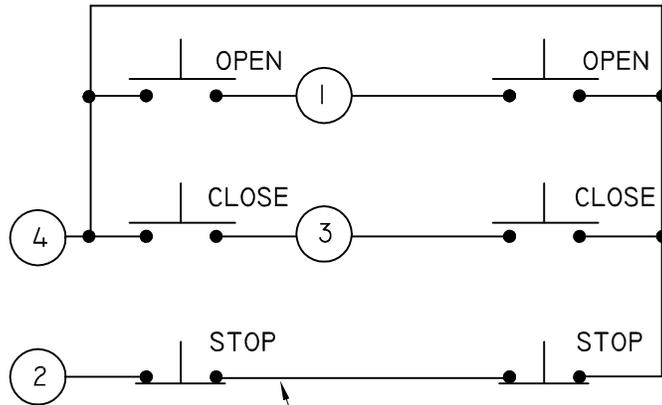
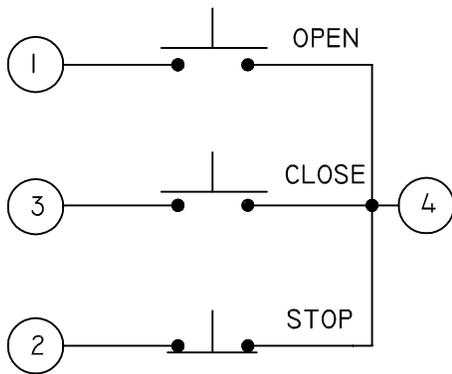


BE CAREFUL TO ALWAYS OBSERVE POLARITY.
EXCEPT FOR THE WIRES BETWEEN THE BATTERIES
ALWAYS CONNECT RED WIRE TO (+) AND BLACK WIRE TO (-).
BE CERTAIN TO ATTATCH BATTERY RETAINING PLATES.



TITLE
24V-170 A.H. BATTERY SUPPLY FOR DC OPERATORS

DRAWN KERI	DATE 7/13/00	THIRD ANGLE PROJECTION 	REV ---
CHECKED SHOP	DATE MM/YY/DD	PART NUMBER N/A	
APPROVED ENGRNG	DATE MM/YY/DD	DRAWING NUMBER: E106	SHT OF



NOTE:
 WIRING FOR ALL REMOTE 24 VAC CONTROL
 PUSHBUTTONS. EXCEPT HTG 320.
 SINGLE BUTTON STATION REQUIRE 4 CONDUCTORS.
 FIRST STATION IN MULTIPLE STATION GROUP
 REQUIRES FIVE CONDUCTORS (SEE EXAMPLE).

NOTE:
 ON MULTIPLE STATIONS BE SURE TO CUT JUMPER
 (CLOSE TO STOP) IN FIRST STATION AND ADD WIRE
 BETWEEN THE TWO STOP BUTTONS.

SINGLE BUTTON STATIONS
 EXCLUDING OPERATOR MOUNTED



MULTIPLE BUTTON STATIONS
 EXCLUDING OPERATOR MOUNTED



THE NUMBERS IN THE CIRCLES ARE WIRES THAT CORRESPOND TO THE CONTROL CIRCUIT. CONNECT
 THE PUSHBUTTON STATION TO THE TERMINAL STRIP INSIDE THE CONTROL BOX. MATCH WIRE NUMBER
 TO THE TERMINAL NUMBER.



TITLE
**REMOTE 4 WIRE
 PUSHBUTTON WIRING**

DRAWN DB	DATE 05/04/00	THIRD ANGLE PROJECTION 		REV A
CHECKED -	DATE -	ERN NUMBER -	DATE -	
APPROVED -	DATE -	DRAWING NUMBER E57		SHT OF



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Master/Slave Interconnection Instructions

FOR ALL MODELS EXCEPT: HTG 320

Operation of two Hy-Security gate operators as a master/slave pair is simply a matter of correctly interconnecting the two control circuits. Join the following four wires from the master operator to the slave:

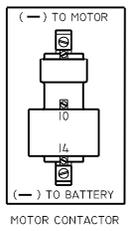
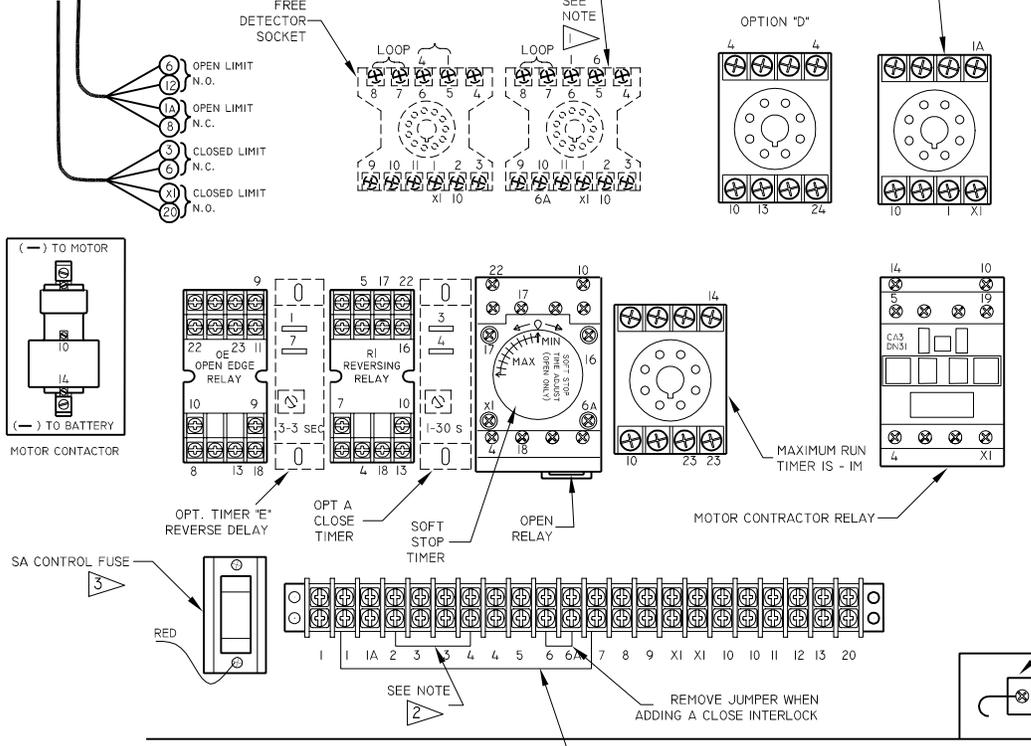
Terminal #1 master to terminal #1 slave,
Terminal #3 master to terminal #3 slave,
Terminal #4 master to terminal #4 slave,
*Terminal #10 master to terminal #10 slave

All stop control inputs must be connected to the master operator only. The slave operator must not have any connection between terminal #2 and terminal #4, such as a stop button or jumper.

*On DC battery powered operators, interconnect the black wires (-) to the on/off switch instead of the #10 wires. This prevents one operator from powering the other when the disconnect switch is off.

For assistance call your Distributor.

LIMIT SWITCH CONNECTIONS
NOTE: 222 TYPE SLIDE GATE OPERATORS HAVE PLUG-IN LIMITS



NOTES:

- 1 SEE NOTES IN E85T, CIRCUIT OPTIONS REGARDING USE OF AN OBSTRUCTION DETECTOR WITH A FREE DETECTOR.
 - 2 LOW VOLTAGE SENSING RELAY (VSR) PROTECTS THE BATTERIES FROM OVER-DISCHARGE. THE CIRCUIT IS FACTORY WIRED FOR FAIL SECURE OPERATION. FOR FAIL OPEN OPERATON JUMPER TERMINALS #1 - #1A REMOVE JUMPER #3 - #5 AND REWIRE VSR N.C. ACROSS TERMINALS #3 AND #5.
 - 3 CONTROL FUSE IS A TRM 5 OR EQUIVALENT.
- CONNECT A SEPERATE HEAVY GAUGE FROM BATTERIES TO THE TERMINALS ON THE MOTOR. JOIN THE (-) TO THE LUG ON THE CONTRACTOR, AND THE (+) TO THE LUG ON THE TOP OF THE MOTOR.
- IF THE THREE BUTTON STATION IS NOT USED, USE JUMPER 2-4 TO REPLACE STOP BUTTON.
- BE CERTAIN TO USE A JUMPER 2-4, IF AN EXTERNAL STOP IS NOT USED.

WIRE #	WIRE COLOR
1	BLUE
1A	WHITE
2	RED/YEL STRP
3	GREEN
4	BROWN
5	WHT/RED STRP
6	ORANGE
6A	YELLOW
7	GREY
8	VIOLET
9	RED/WHT STRP
X1	RED
10	BLACK
11	BLU/WHT STRP
12	WHT/BLK STRP
13	GRN/WHT STRP
20	BLK/WHT STRP
14	BRN/WHT STRP
15	ORG/WHT STRP
16	YEL/BLK STRP
17	GRY/BLK STRP
18	VLT/WHT STRP
19	BLU/RED STRP
21	RED/BLK STRP
22	GRN/BLK STRP
23	BRN/BLK STRP
24	ORG/BLK STRP
25	YEL/RED STRP
26	GRY/RED STRP
26A	VLT/BLK STRP



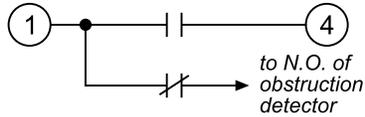
MAS 90
N/A
TITLE **ELECTRICAL COMPONENTS**
24 VDC POWERED OPERATORS
(ALL MODELS EXCEPT HVG AND HTG VERSIONS)

DRAWN DB	DATE 05/04/00	THIRD ANGLE PROJECTION		REV
CHECKED -	DATE -	ERN NUMBER -	DATE -	A
APPROVED -	DATE -	DRAWING NUMBER E124T2		
				SHT 1 OF 1



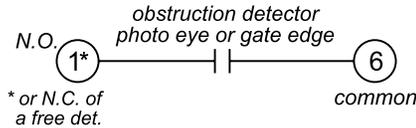
Electrical Circuit Options Applies to all operators except HTG 320 models

A Any Open Device or Free Detector



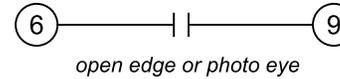
Any device used to open the gate, such as a pushbutton, key switch or detector, connects to #1 to #4. The gate will be held in the open position if contact is maintained.

B Closing Obstruction Sensor



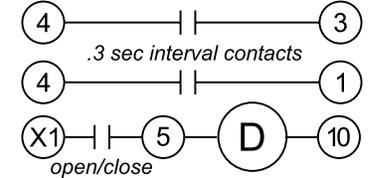
This input allows connection of an obstruction sensor to guard the closing of a gate. Connect the sensor output to #1 and #6. If the sensor is a vehicle detector and is used with a free detector, connect the N.O. of the obstruction detector to the N.C. of the free detector, as shown at left. If tripped while closing, the gate will reverse to the full open position.

C Opening Obstruction Sensor



This input allows connection of an obstruction sensor to guard the opening of a gate. If tripped while opening, the gate will reverse slightly, and then self-disable for two seconds. Connect a N.O. contact (edge sensor or photo eye) to terminals #6 and #9.

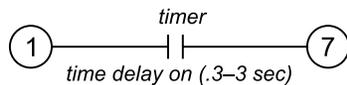
D Open/Close Interface



This special interface allows one contact, two-way control: the gate can be closed only after opening fully, but can be opened from any position. For 222SS models only, option D must be ordered with option E, Reverse Delay. Refer to the connection diagram for detailed wiring information.

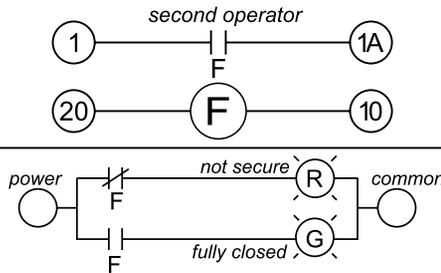
E Reverse Delay

—not available on 111LS—
standard with all operators
except 222SS



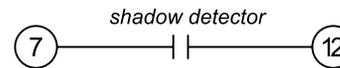
This option delays start in the open direction. It is also used to delay instant reverse. It can be added by itself or as part of several factory modifications necessary to convert operators to 'E' type. Remove the jumper between #1 and #7 when installing the reverse delay.

F Interlock & Relay



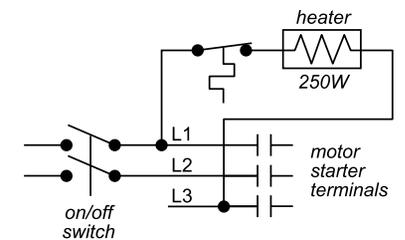
To interlock two Hy-Security machines connect a N.O. pole of the 'F' relay to the other operator (in all but the 111LS), and remove the jumper between #1 and #1A. In the 111LS, remove open limit wire #8 and wire in series with 'F' relay N.O to #8.

G Shadow Detector



Swing gates require an additional loop and detector for the area under the arc of the gate. This detector can hold the gate when open, but is turned off when the gate begins to close.

H Heater



We recommend a heater be installed in colder climates; use one rated for the supplied voltage. Connect to terminals L1 and L3 of the motor starter. On 480 VAC systems an additional relay is required.

Photoelectric Eye, Reflector Adjustment Instructions

Correct installation and alignment of a retro-reflective photo eye and its reflector are important for a trouble free installation. Systems operating at a range of 15' or more are prone to weather caused reductions in range. We feel that if care is taken in the initial mounting and alignment of the 13" reflector then the chance of problems is greatly reduced. Taking steps to protect the reflector from being exposed to fog and being absolutely certain the photo eye is perfectly aligned will greatly increase the apparent power of the photo eye.

The ideal mounting for the reflector is suspended inside a 12" long piece of 3" P.V.C. conduit. Cut the opening of the 3" P.V.C. conduit at a 45 degree angle to act as a drip shield. The reflector is held against the backside of the 3" conduit by attaching a 3" male connector. Do not cement the connector so that the reflector can be reached for future cleaning. To create a mounting base, attach a 3" aluminum meter hub or flange to the connector. The whole package can now be mounted to any flat surface.

Locating the reflector in the center of the invisible beam of infrared light is important to achieve the most sensitive alignment. The 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 the trip point. Mark this position 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.

As a last tip, smearing dish soap on the reflector will also help to repel any possibility of fogging from moisture that gets into the 3" pipe. With all of these steps taken, the optimum performance of the retro-reflective photo eye system will be achieved.

Note: To cover greater distances, or to operate in adverse weather conditions, consider a through-beam photo eye.

For Assistance call your Distributor.



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Installation Instructions For Gate Reversing Sensing Edge

1. Securely bolt the edge sensor to the edge of the gate. The edge should line up with the lower corner of the gate frame.
2. If the reversing edge is to wire directly to the gate operator:
 - A. Locate a mounting position for a curl cord attachment, or retracting cord reel holder where there will be no possibility of the cord rubbing on the moving gate panel.
 - B. Attach the cord to the gate in a position that is roughly near the position of the automatic operator, when the gate is closed.
 - C. Route the wires to the leading edge of the gate and join to the wires of the reversing edge. Wirenut and thoroughly tape the connections so that they are not prone to vibrate loose.
 - D. Join the fixed end of the cord reel or curl cord directly to terminal numbers 1 and 6 inside the control box of the operator.
3. If the reversing edge is to transmit to the gate operator:
 - A. Mount the reversing edge transmitter (Multi Elmac Model #3022, or equivalent) onto the gate panel near the upper corner of the leading edge of the gate.
 - B. Join the wires of the reversing edge to the two terminals inside of the edge transmitter. Set a unique code on the “DIP” switches inside the transmitter. Remount the cover of the transmitter and tighten the screws firmly so that no water will leak inside.

If a receiver for the reversing edge has been prewired inside the operator, proceed directly to step #3D.

 - C. Mount a commercial style radio receiver* (one with a connector for an external antenna) on the inside of our operator enclosure. Connect the 24 Volt supply wires to terminal numbers X1 and 10 on the terminal strip. Connect the radio contact wires to terminal numbers 1 and 6 on the terminal strip.
 - D. 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.
 - E. Set the “DIP” switches in the receiver to match the same code used in the edge transmitter.

*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.
4. Test the operation of the reversing edge to be certain that it is functioning. Advise the user of the gate to be certain to retest this vital function weekly.

Detector Installation Guide

Loop 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 it’s output relay.

Loop Configurations

Configurations differ depending on the application. In parking applications with our HTG320 operator, a loop may be as small as 3’ x 6’. 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

1. The side of the loop closest to the gate shall be located at least four (4) feet distant from it’s line of travel.
2. The shortest side of the loop shall be between six (6) and eight (8) feet in length. The longest side of the loop shall be between six (6) and twenty (20) feet in length. For applications that need to span a wide area, use several smaller loops. Do not exceed a maximum of 200 square feet of loop area to only one detector.
3. In applications with multiple loops, keep each loop at least six feet apart. This avoids “cross talk”. It is possible to have loops closer together by selecting different frequencies.
4. For greater sensitivity and less chance of false calls caused by the motion of the gate, it is better to use two smaller loops, connected in a series circuit, to one detector instead of one large, single loop.
5. To avoid interference, keep loops at least two (2) inches above any reinforcing steel. Do not route loop wires with, or in close proximity to, any other conductors, including other loop leads, unless shielded lead-in cable is used.
6. Loop and lead-in wire should be one continuous piece. Avoid splices, if possible. If a splice is necessary for any reason, “pot” the splice in epoxy or use heat shrink to ensure that the quality of the splice covering is the same as the original wire jacket.
7. Use only number 12, 14, or 16 gauge stranded wire with a direct burial jacket. Cross linked polyethylene insulation types, such as, XLPE or XHHW, will last much longer and are less prone to damage during installation than conventional insulation types. Preformed loops can be used before road surfacing or under pavers.
8. Twist loose tails of lead-in wires tightly, approximately ten times per foot.

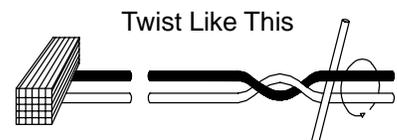
Twist lead-in at least 10 turns per foot



Like This



Not Like This



4/13/00

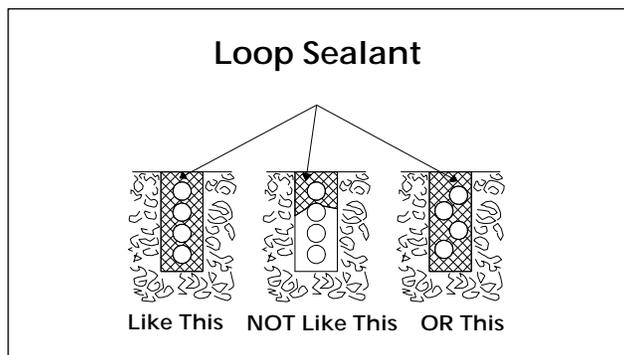
E31a

continued from previous page...

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

12 to 20 sq. ft = 5 turns 20 to 60 sq. ft. = 4 turns 60 to 240 sq. ft. = 3 turns

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: **A.** The slot in the surface should be cut ¼” wide x 1 ½” deep. **B.** The corners of the cut must be at an angle or core drilled to relieve stress on the wires. **C.** After the wire is installed, the slot must be completely backfilled with a non-hardening sealer. Note that if the loop wires are able to move in the slot after the sealer has set, the detector may give false calls.



Detector Logic

Hy-Security Gate Operators recommends that vehicle detectors be used for free open and obstruction sensing logic only. The exception is in parking applications with our HTG320 operator where detectors may be also used to close the gate. In applications employing our swing , vertical lift, or sliding gate operators, closing logic cannot be used. Because of their slower speeds, closing logic is a poor choice for security gate systems. Since there are several ways that the gate may be left standing open and because there is a loss of safety. Our circuit has not been designed to accomodate “detect to close” logic.

Loop Diagnostics

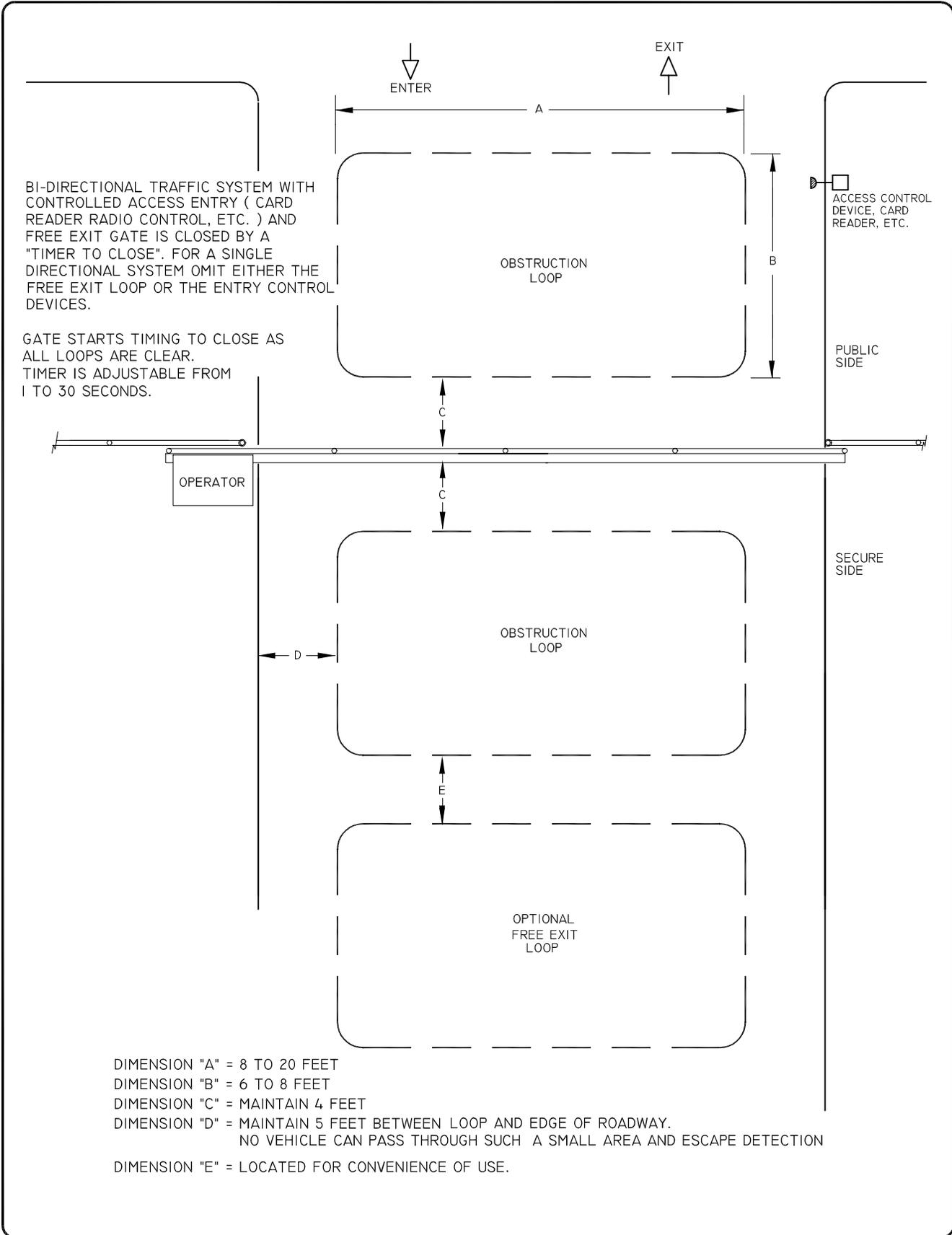
The following tests cannot guarantee a functioning loop, but failure of either test means that the loop is definitely suspect, even though it may still be functioning at the time.

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.



TITLE
SLIDE GATE LOOP LAYOUT

DRAWN DB	DATE 05/15/00	THIRD ANGLE PROJECTION ⊕	
CHECKED -	DATE -	ERN NUMBER -	DATE -
APPROVED -	DATE -	DRAWING NUMBER E96	

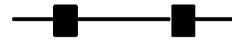
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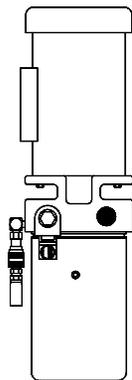


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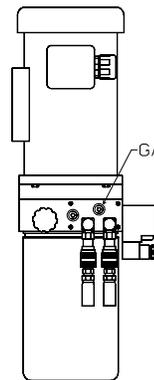
Pressure Relief Valves Adjustment Procedures



RELIEF VALVE

Side View

<u>Model</u>	<u>Factory Setting</u>
111 Series	750 psi
222 SS, E	1000 psi
222 EX	1300 psi
444 Series	1300 psi
HRG Series	1300 psi
HVG Series	2000 psi
HTG 360	1000 psi
HTG 320-6	1000 psi
HTG 320-3	1000 psi
HTG 320-2	700 psi



GAUGE PORT

Front View

The relief valve can be found on the back side (gate side) of the hydraulic power unit. It is the only component located here and has a hex adjusting head and lock nut. To adjust setting, loosen the lock nut screw the threaded bolt CW for increased pressure, turn CCW to decrease pressure.

Pressure relief valves are preset at the factory to utilize maximum available horsepower. The relief valve can be lowered to smooth starting if necessary. This is most easily done by decreasing the pressure until the gate operation slows, and then increasing the pressure just enough to provide normal gate speed.

It must be understood that if you reduce the pressure setting, you will lose horsepower to move the gate if additional resistance (old gate hardware, snow and ice, etc.) is encountered.

Do not attempt to use the relief valve as an entrapment protection device. A photo eye or a gate edge is the best method to protect pedestrians and reserve power to drive the gate.



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Operator Maintenance Hydraulic System

Fluid Level: Under normal conditions, hydraulic systems do not consume oil. Before adding any oil, check the system thoroughly for leaks. Remove the bright metal plug in the tank, fill to plug level, then replace plug. We recommend our *Uniflow* hydraulic oil, part number H-004, which is sold in one gallon containers by our distributors. Automatic transmission fluid may be used, although its performance in cold weather will be sluggish unless the operator is well heated. *Do not use brake fluid.*

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

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

There are several ways to change the hydraulic oil, depending on the type of operator being serviced. If you don't know how to drain the oil, contact your distributor for directions. Refill with new *Uniflow* hydraulic oil (available from your distributor). To avoid overfilling, never pour into the port where the black breather cap is located. Instead, remove only the bright metal plug in the tank. Slowly pour the oil into the tank until the oil is within one inch of the filler port. Replace the plug and wipe up any spilled oil.

Cold Weather:

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

Electrical Controls

Before servicing, turn off power disconnect switch

No routine maintenance is needed for the electrical system or controls. If the environment is very sandy or dusty, seal all holes in the electrical enclosure. Blow dust out of the electric panel with compressed air. A qualified electrician may troubleshoot with the aid of the electrical drawings in Appendix 4.

If it is necessary to call a distributor for assistance, be sure to have your model and serial number ready. Other helpful information would include the name of the job, approximate date of installation, and the service record of the operator, especially any work that has been done recently. Be prepared to describe as exactly as you can what the machine is or is not doing. Describe any unusual sounds or location of oil leaks.

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

MODEL	FACTORY SETTING
111 Series	750 psi
SS, E Models	1000 psi
EX Model	1300 psi
444 Series	1300 psi

Do not attempt to use the relief valve as an entrapment protection device. Photocells or gate edges are the best methods to protect pedestrians and reserve power to the drive gate.



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SLIDE GATE OPERATOR MAINTENANCE SCHEDULE

NAME OF PART	WHAT TO DO		CHECK AT THESE RECOMMENDED MONTHLY INTERVALS					
			1	3	6	12	120	
Gate and Hardware	Check for damage and wear	*1	X					
Drive Wheels	Check for excessive wear	*2		X				
Wheel clamp spring	Check clamping tension	*3		X				
Limit switches	Check 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

Special Notes:

- *1 Your gate and it's hardware will require more maintenance than the Hy-Security operator that is moving the gate. A damaged gate or worn hardware may cause operation to appear slow or erratic and will result in excess drive wheel wear. Lubricate the gate hardware more frequently and check for smooth operation by opening the toggle clamping mechanism and then pushing the gate manually. One person should easily be able to push all but the largest of gates. Damaged or warped gate panels should be straightened or replaced.
- *2 Normally, the drive wheels will last for many years because they are designed to not slip on the rail. The life of the wheels may be greatly shortened by any of these faults: clamping spring not correctly adjusted, operator misaligned in relation to gate panel, badly warped gate panel or extremely stiff hardware.
- *3 111 LS Series and 222 SS series have similar requirements. Verify that the red clamping spring is compressed tightly, so that the drive wheels apply a strong grip on the power rail. The red spring should normally be compressed to 2" in height.
- *4 The limit switch rollers should ride ¼" to ½" below the drive rail, near the center of the channel. Misadjustment may result in false or early tripping or no limit function at the end of travel. Verify that the limit trip ramps are tightly bolted to the drive rail.
- *5 The oil level should remain approximately one inch below the filler hole. See maintenance instructions for oil filling. Loss of fluid is not normal and indicates a leak that must be located and repaired. The cap for the filler hole is a breather and needs only to be finger tight. Use "Uniflow" fluid, part H 004, if additional fluid is required.



Hy-Security Gate Operators

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Troubleshooting Guide D.C. Slide Gate Operators Only

General Mechanical Maintenance Notes: (See maintenance schedule).

No mechanical maintenance is required on slide gates, however, always check the following adjustments:

1. For adequate traction, the red spring that clamps the drive wheels must be compressed to 2 1/8" min - 2" maximum. (Include the portion of the spring that is hidden in the spring retainer, when measuring compression).
2. When viewing the inside of the slide gate chassis, watch for shavings from the wheel or the drive rail, under the wheels. This condition indicates that the machine or the gate panel, or both, are out of alignment. The gate may have been hit by a vehicle or the operator could have twisted on it's anchor bolts. Align gate operator and shim drive rail, as necessary.
3. Be sure to align limit switches again, especially if rail and operator are re-aligned. Roller should be within 1/4" to 1/2" of the underside of drive rail.

Troubleshooting:

A. *"Pushbutton is activated but nothing runs"*.

1. Verify that the VSR relay, red L.E.D., is lighted. If not, check battery supply.
2. Check the control circuit, 5 amp fuse at the left end of the terminal strip.
3. Be sure control voltage is approximately 24 DC volts. Measure voltage between terminals #2 and #10.
4. Check overload by resetting the circuit breaker in the battery power supply.
5. Be sure the limit switch levers are at least 1/4" below the drive rail so the levers won't trip accidentally.
6. Check for a jumper from #2 to #4, if an external stop button is not used.
7. Check the chart for maximum allowable length of control wiring runs to verify that voltage drop is not a problem.

B. *"Pump is running but the wheels are not turning"*.

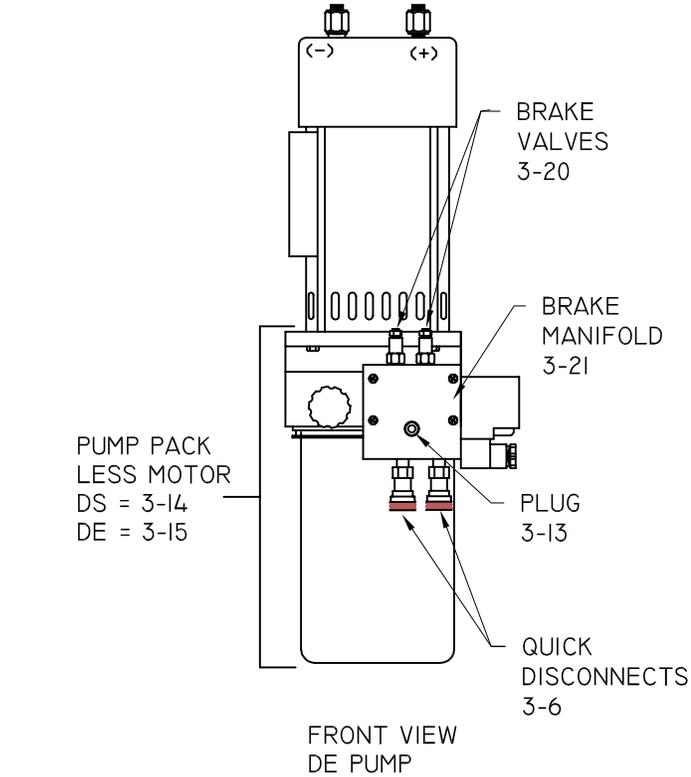
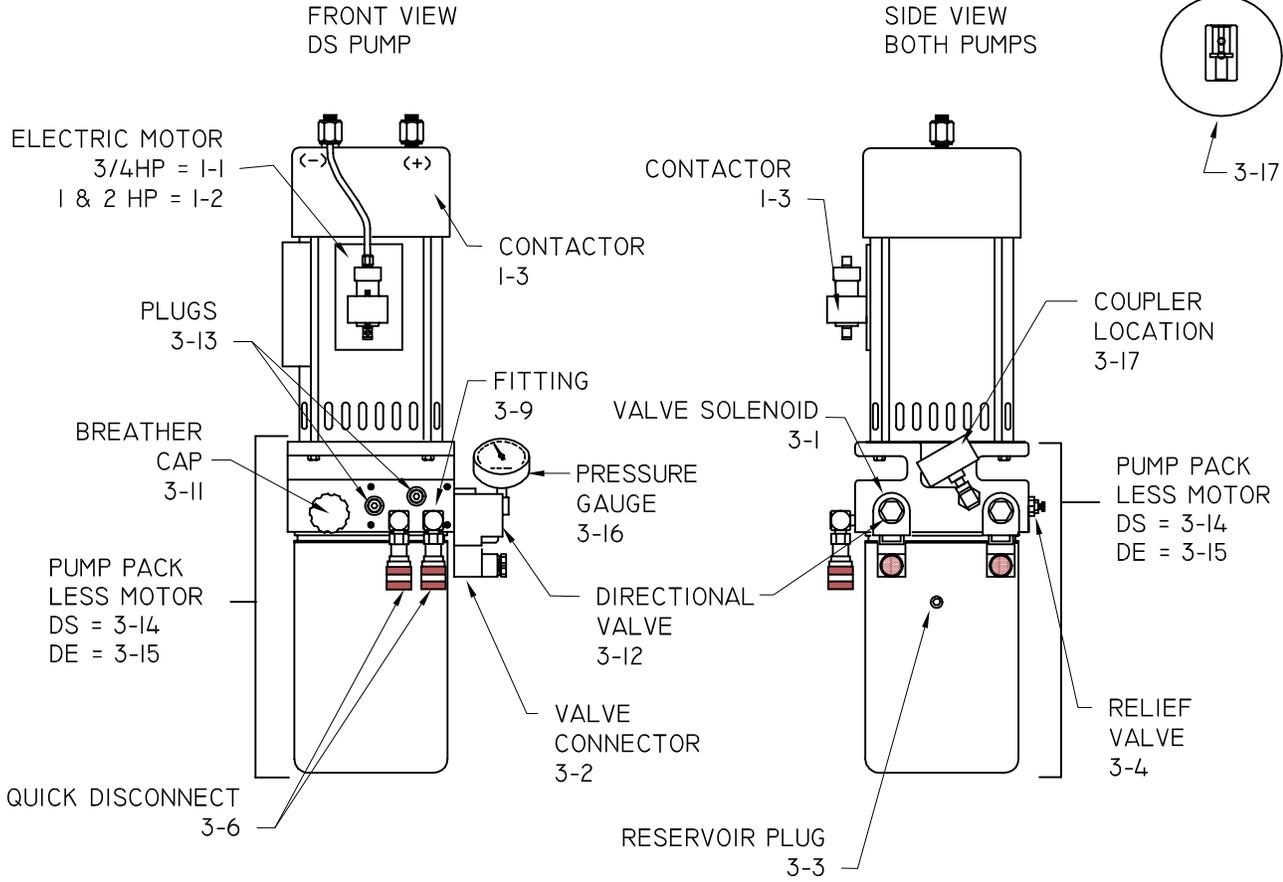
1. Check the polarity of the power supply wires to the DC motor.
2. Check the level of hydraulic oil by removing the plug in the reservoir. Add oil, at this location, to within 1" of the hole that contained the plug.
3. If the hydraulic hoses are connected with quick disconnects, be certain that the connections are fully seated.

C. *"The wheels are turning backwards or only in one direction"*.

1. Check hose connections for correct handing. See step B3
2. Verify that electrical fitting to hydraulic valve is connected.
3. Verify that the pneumatic timer is correctly mounted on top of the control relay.
4. Check for 24 DC volts from the terminal #10 to #11 while gate is opening.

D. *"The wheels are turning but they are slipping on the drive rail"*.

1. Check the quick release toggle clamp to verify it is engaged. Handle should be vertical.
2. Verify that the red tension spring is compressed to approximately two inches.



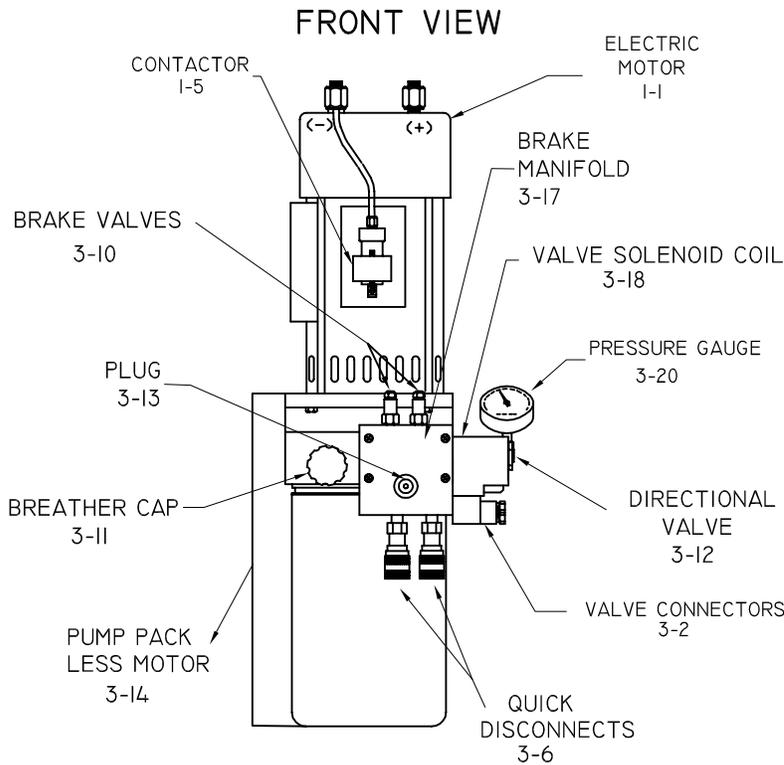
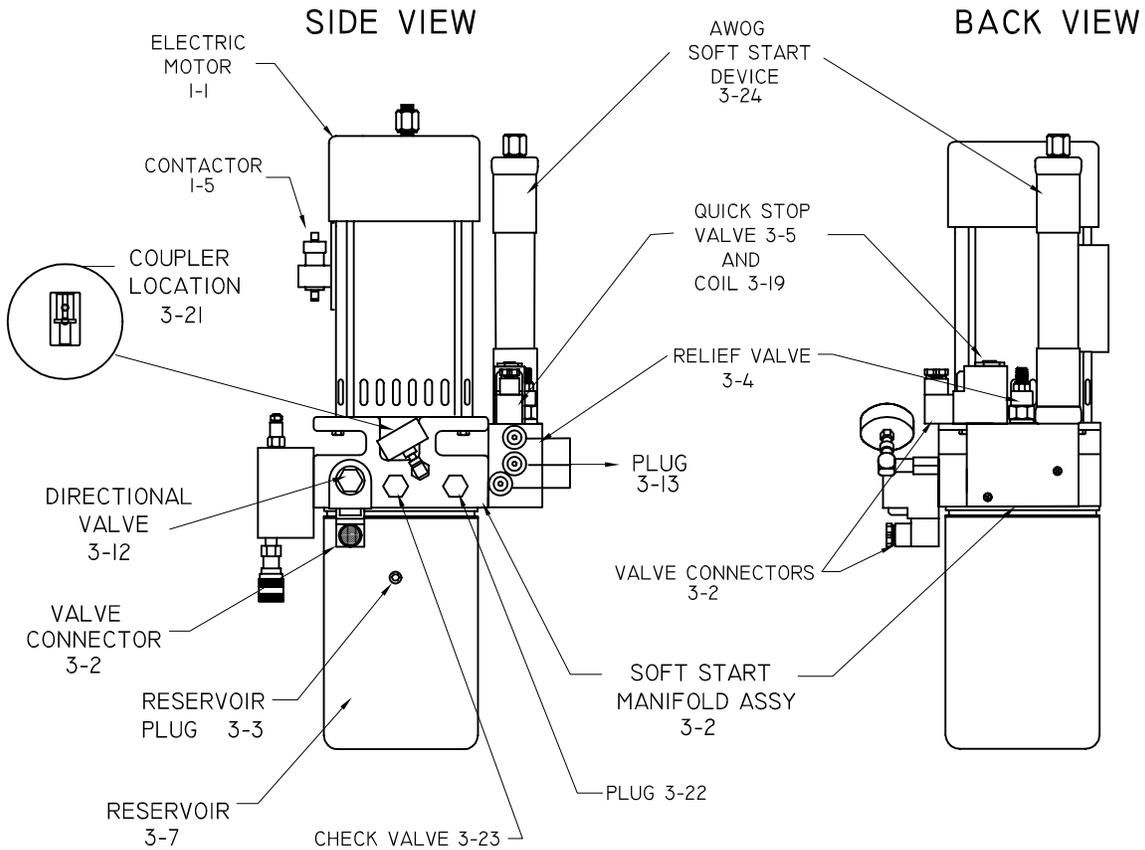
1-1	EMOMO 024 .75L	1	EA
1-2	EMOSO DC6 2.02	1	EA
1-3	ESWMC 075 MERC	1	EA
3-1	HVASO DEL D24	1	EA
3-2	ECOPL 001	1	EA
3-3	HSFFI CSP 06	1	EA
3-4	HVARE FBN	1	EA
3-5	HVABY 001 CRT	1	EA
3-6	HSFQD 002 S	2	EA
3-7	HRSRS 004	1	EA
3-9	HSFFI 686 0402	2	EA
3-11	HRBC 001	1	EA
3-12	HVADI DEL 2P	1	EA
3-13	HSFFI 714 CS04	2	EA
3-14	HPPPU H20	1	EA
3-15	HPPPU H20 E	1	EA
3-16	HASGA 120 MINI	1	EA
3-17	MPTCO 010 9T	1	EA
3-18	HVAQS 002 C	1	EA
3-19	HVASO DEL QSDC	1	EA
3-20	HVABK CBA 1500	2	EA
3-21	HMAMA 222 BVK	1	EA

NOTE: DE PUMP HAS BRAKE VALES, DS DOES NOT



TITLE
COMPONENTS 222 DS & 222 DE POWER UNIT

DRAWN KERI	DATE 7/20/00	THIRD ANGLE PROJECTION 	REV ---
CHECKED SHOP	DATE MM/YY/DD	PART NUMBER N/A	
APPROVED ENGRNG	DATE MM/YY/DD	DRAWING NUMBER: S48	SHT OF 1 1

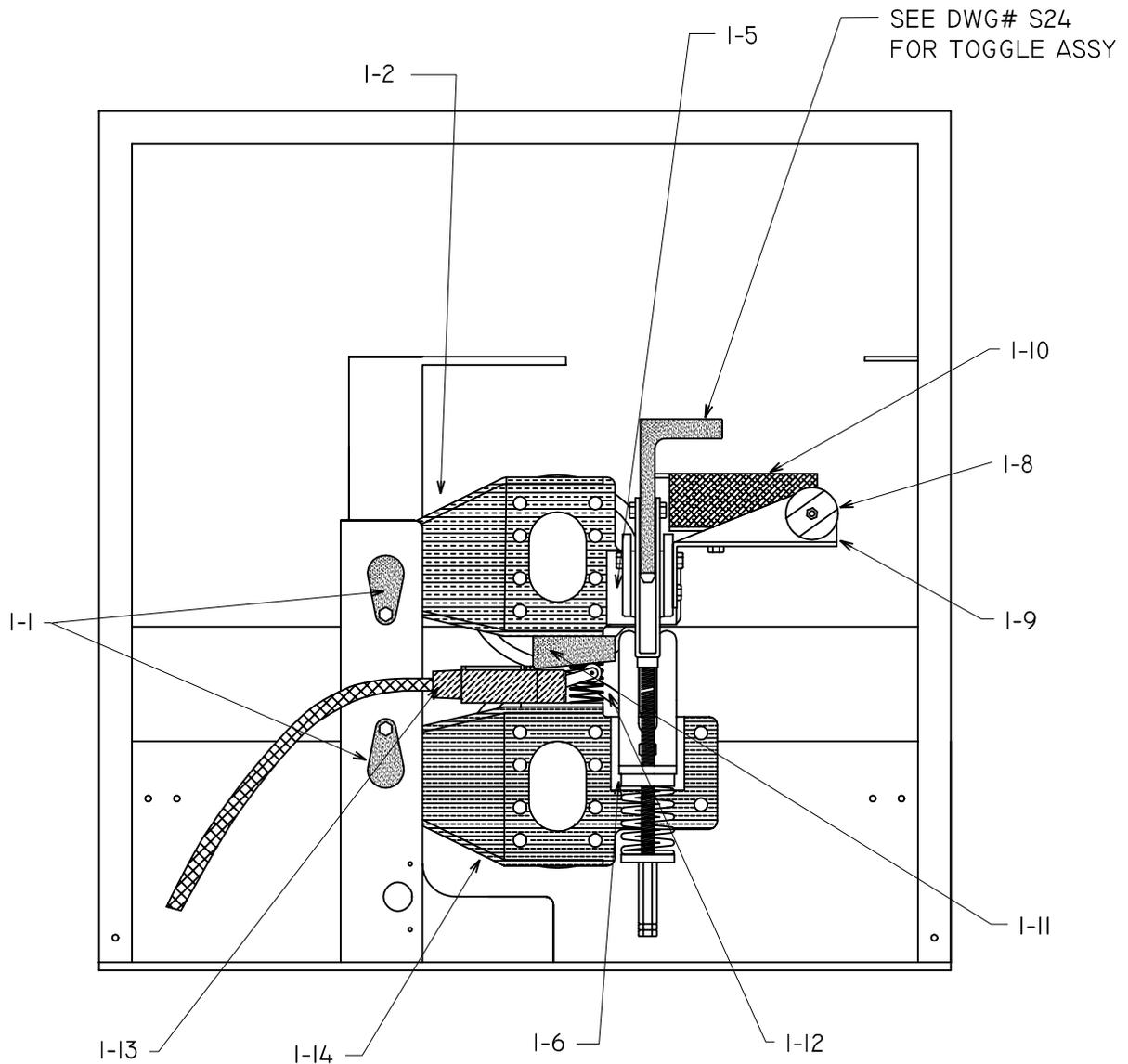


I-1	EMOSO	DC6	2.02	EA
I-5	ESWMC	075	MERC	EA
3-2	ECOPL	CSP		EA
3-3	HSFFI	CSP	06	EA
3-4	HVARE	LAN	C	EA
3-5	HVAQS	002		EA
3-6	HSFQD	002	S	2 EA
3-7	HRSR	004		EA
3-10	HVABK	CBA	1500	2 EA
3-11	HRBC	001	2P	EA
3-12	HVADI	DEL		EA
3-13	HSFFI	714	CS04	EA
3-14	HPPPU	H13	S3*	EA
3-15	HMAAC	111	DSSK	EA
3-17	HMAAC	222	BVK	EA
3-18	HVASO	DEL	D24	EA
3-19	HVASO	DEL	QSDC	EA
3-20	HASGA	120	MINI	EA
3-21	HPTCO	010	9T	EA
3-22	HVAPL	PB00		EA
3-23	HVACK	003		EA
3-24	HMAAC	111	H	EA



TITLE
**COMPONENTS 222 DX POWER UNIT
W/SOFT START ADAPTION**

DRAWN KERI	DATE 7/20/00	THIRD ANGLE PROJECTION ⊕	REV --
CHECKED SHOP	DATE MM/YY/DD	PART NUMBER N/A	
APPROVED ENGRNG	DATE MM/YY/DD	DRAWING NUMBER: S55	SHT OF



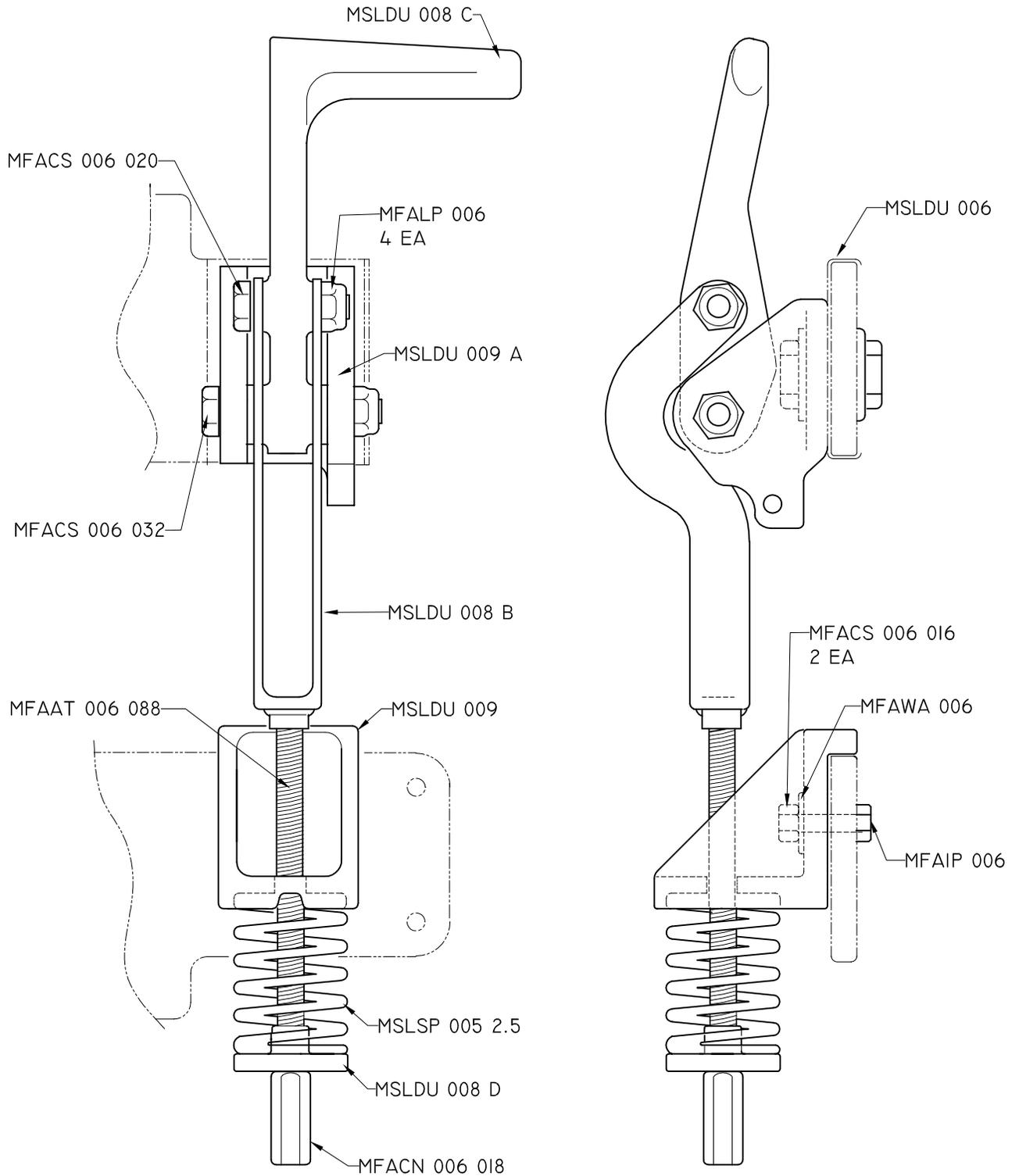
ITEM#	QTY
I-1	MSLDU 012 SS 2 EA.
I-2	MSLDU 042 T 1 EA.
I-3	MSLDU 042 B 1 EA.
I-5	MSLDU 006 1 EA.
I-6	MSLDU 007 1 EA.
* I-8	HCCYCY 030 I 1 EA.
* I-9	MSLDU 038 1 EA.
* I-10	MSLDU 038 A 1 EA.
* I-11	MSLDU 036 1 EA.
* I-12	MSLSP 002 1 EA.
* I-13	ESWLS 224 III 1 EA.
* I-14	MSLDU 037 1 EA.

*OPTIONAL PARTS - MAY NOT BE ON OPERATOR



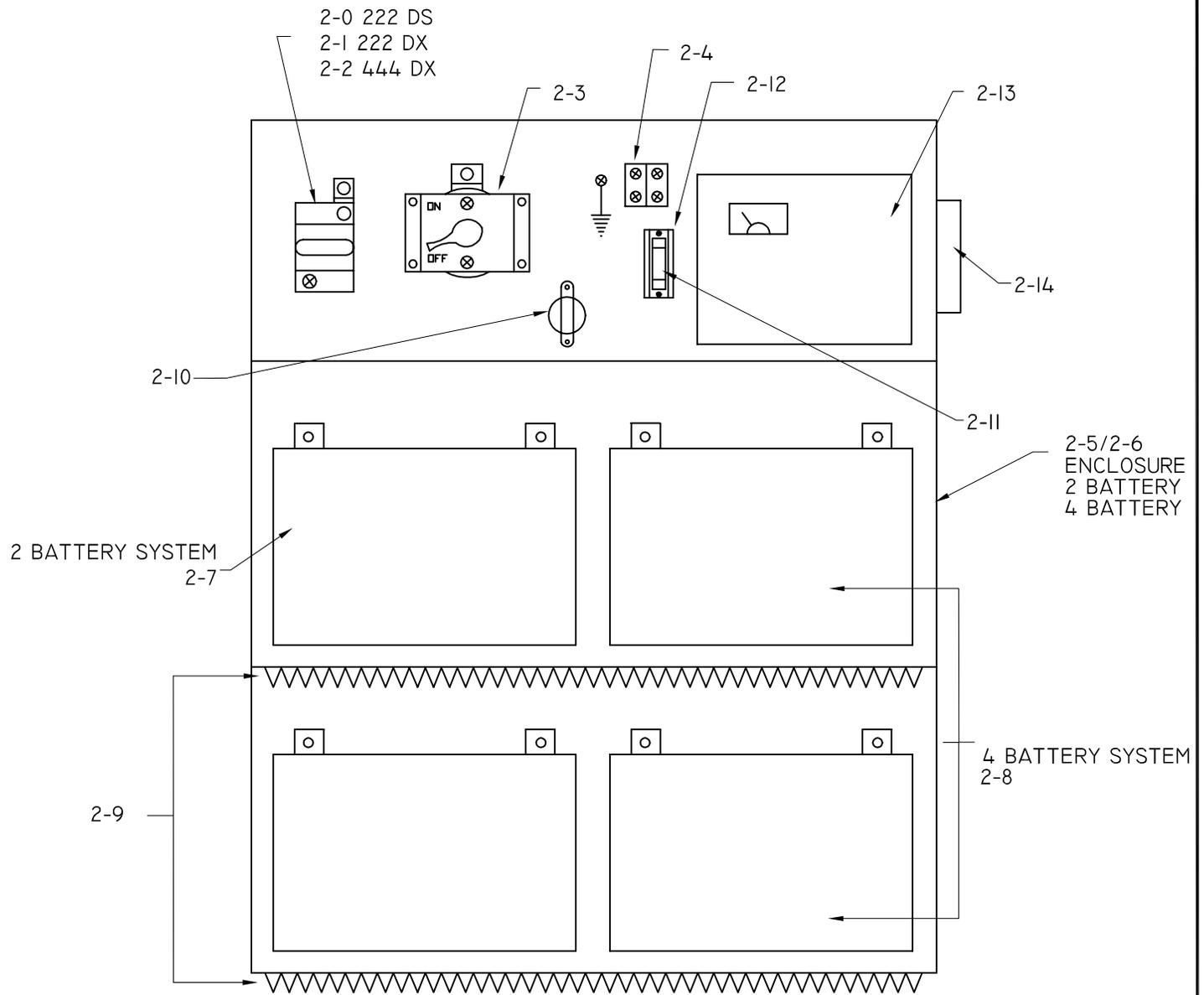
TITLE
**COMPONENTS HYDRAULIC DRIVE
 ARM & TOGGLE ASSEMBLY**

DRAWN KERI	DATE 7/20/00	THIRD ANGLE PROJECTION 	REV ---
CHECKED SHOP	DATE MM/YY/DD	PART NUMBER N/A	
APPROVED ENGRNG	DATE MM/YY/DD	DRAWING NUMBER: S19	SHT OF 1 1



TITLE
**COMPONENTS MANUAL RELEASE
 TOGGLE ASSEMBLY FOR
 ALL SLIDE GATE OPERATORS**

DRAWN D. B.	DATE 05/12/00	THIRD ANGLE PROJECTION 		REV A
CHECKED -	DATE -	ERN NUMBER -	DATE -	
APPROVED -	DATE -	DRAWING NUMBER: S24		SHT OF



ITEM #		QTY
2-0	E SWCB 030 050	1 ea.
2-1	E SWCB 030 120	1 ea.
2-2	E SWCB 030 150	1 ea.
2-3	E SWDI 067 DCEX	1 ea.
2-4	E COTS 1102	1 ea.
2-5	E ENEN H01 3030	1 ea.
2-6	E ENEN H01 4230	1 ea.
2-7	E DCBY 12B 090	2 ea.
2-8	E DCBY 06V 170	4 ea.
2-9	E ACHE 120 65W	2 ea.
2-10	E ACTH B10 021	1 ea.
2-11	E SWFU 010 15	1 ea.
2-12	E SWFU 001 BLK	1 ea.
2-13	E DCBC 024 025	1 ea.
2-14	E DCFV 001	1 ea.



TITLE
COMPONENTS BATTERY PACK FOR DC OPERATORS

DRAWN
KERI

CHECKED
SHOP

APPROVED
ENGRNG

DATE
7/20/00

DATE
MM/YY/DD

DATE
MM/YY/DD

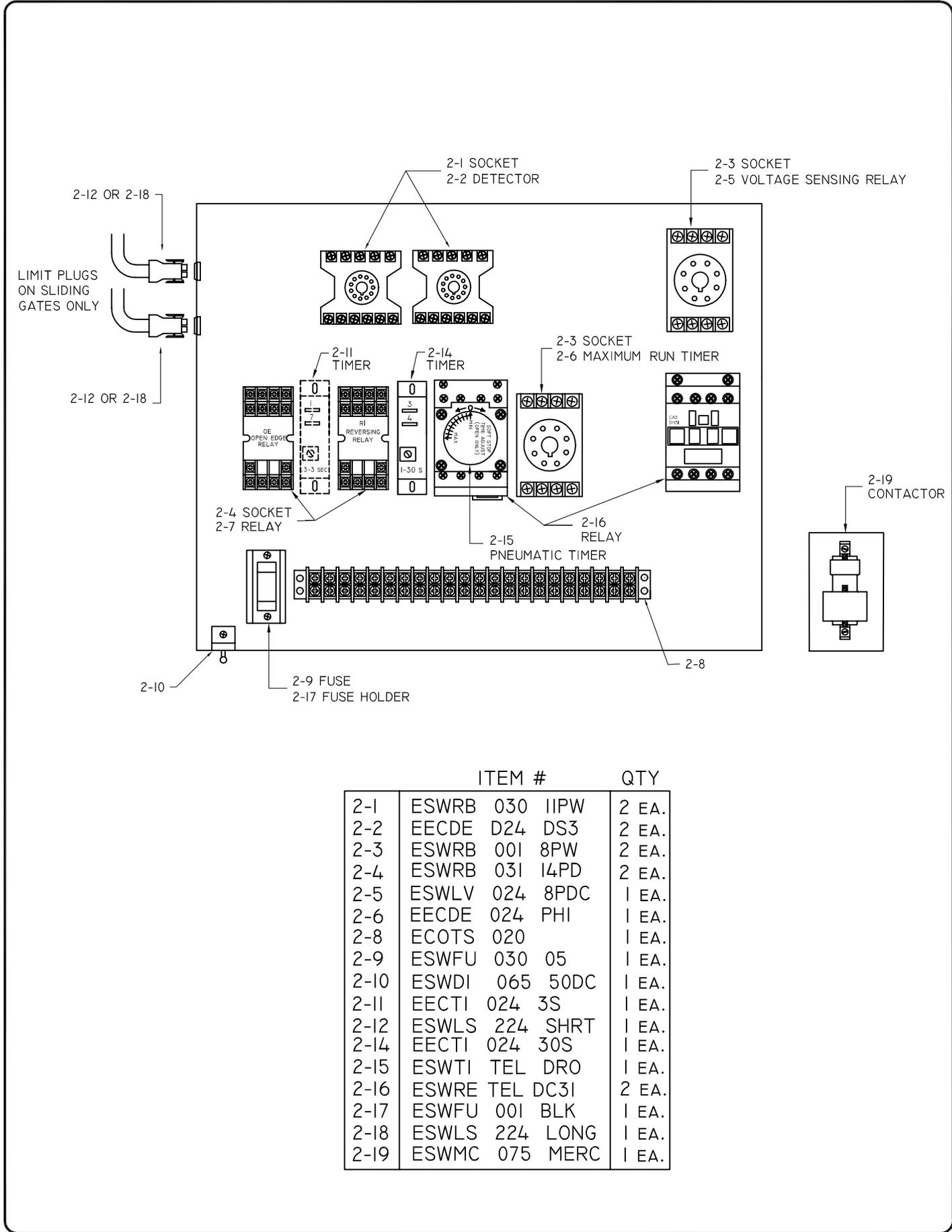
THIRD ANGLE PROJECTION


PART NUMBER
N/A

DRAWING NUMBER:
SS61

REV
--

SHT OF
| |



ITEM #	QTY
2-1	2 EA.
2-2	2 EA.
2-3	2 EA.
2-4	2 EA.
2-5	1 EA.
2-6	1 EA.
2-8	1 EA.
2-9	1 EA.
2-10	1 EA.
2-11	1 EA.
2-12	1 EA.
2-14	1 EA.
2-15	1 EA.
2-16	2 EA.
2-17	1 EA.
2-18	1 EA.
2-19	1 EA.



TITLE
**ELECTRICAL COMPONENTS ALL 24 V DC
 POWERED OPERATORS EXCEPT NOT FOR HTG**

DRAWN KERI
 CHECKED SHOP
 APPROVED ENGRNG
 DATE 7/20/00
 DATE MM/YY/DD
 DATE MM/YY/DD

THIRD ANGLE PROJECTION
 PART NUMBER N/A
 DRAWING NUMBER: **SS72T**

REV --
 SHT 1 OF 1



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LIMITED WARRANTY (Hydraulically Powered Operators)

Hy-Security Gate Operators warrants all of its manufactured products to the end-user to be free of defects in material and workmanship. The model 111LS is warranted for a period of three years from date of shipment. **All other hydraulic operators are warranted for a period of five years from date of shipment.** Drive wheels for slide gate operators are warranted for a period of two years. Batteries in DC operators and individual replacement parts (that are a design component of the gate operator) are warranted for one year from the date of shipment. Even though included as part of a Hy-Security gate operator, accessories carrying another manufacturers name plate, (unless a design component of the gate operator) shall carry only the warranty of the specific manufacturer.

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

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

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

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