

# Sentex Systems

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## **INSTALLATION AND MAINTENANCE MANUAL**

**MODEL: SW420  
Light Duty Swing Gate Operator**

### **IMPORTANT:**

**Please leave this manual at the job site,  
preferably with the end user or facility manager.**

**– READ AND FOLLOW ALL INSTRUCTIONS –**

**01-G0610  
G441**

## SUPPLIED PARTS

There are two cartons for the standard model SW420. The large carton contains the powerhead unit and small parts. The long thin carton contains the two pieces of the control arm. In addition, if the pedestal mount option was ordered, a third carton containing the pedestal and associated hardware is included. Unpack the cartons, checking for possible damage during shipping. Damage claims must be filed with the freight carrier.

### PARTS SUPPLIED

PART NO.	DESCRIPTION	QTY.
SW450	Power unit	1
02-4015	Stop button	1
07-2703	Control arm	1
07-2704	Arm extension	1
40-3500	Warning sign	2
NN	Parts bag containing:	
07-2705	Arm stop	1
10-2111	Gate bracket	1
12-2727	Flange bushing	3
80-206-65	5/8 washer	2
80-217-37	3/8 spacer	2
82-HN38-16	3/8-16x1" bolt	1
82-HN38-18	3/8-16x1-1/4" bolt	2
82-SH37-10	3/8-24x5/8 capscrew	1
84-WH-38	3/8 washer head nut	2
85-FW-38S	3/8 SAE washer	1
80-2754	Special nut for u-bolt	2

## MODEL CLASSIFICATIONS

### Residential Vehicular Gate Operator – Class 1

A vehicular gate operator or system that is intended for use in a home of one to four single family dwelling or a garage or parking area.

### Commercial/General Access Vehicular Gate Operator – Class 2

A vehicular gate operator or system intended for use in a commercial location or building such as a multi-family housing unit of five or more single family units, hotel, garages, retail store, or other building servicing the general public.

### Industrial/Limited Access Vehicular Gate Operator – Class 3

A vehicular gate operator or system intended for use in an industrial location or building such as a factory or loading dock area or other locations not intended to service the general public.

### Restricted Access Vehicular Gate Operator – Class 4

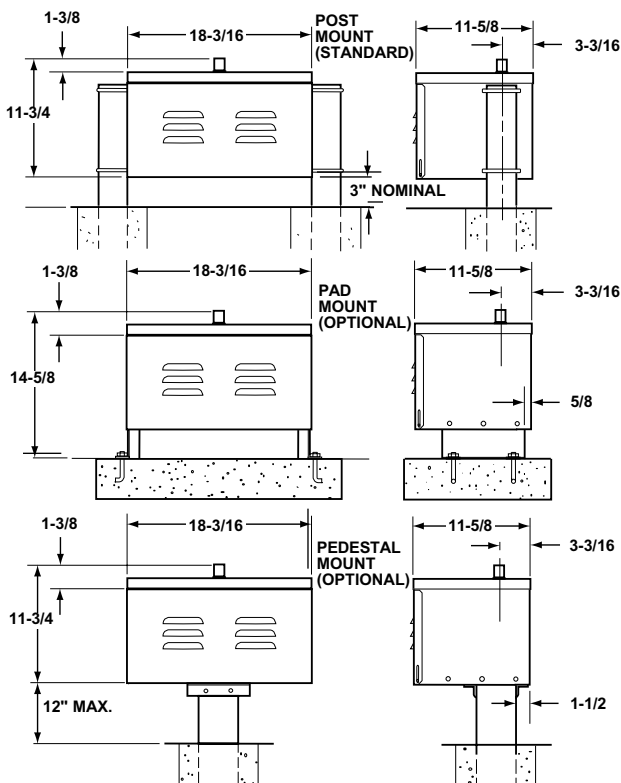
A vehicular gate operator or system intended for use in a guarded industrial location or building such as an airport security area or other restricted access location not servicing the general public, in which unauthorized access is prevented via supervision by security personnel.

MODEL	CLASS 1	CLASS 2	CLASS 3	CLASS 4
SW420	3			

### TYPES OF GATES

This gate operator is intended to be used on a gate that swings in an arc in a horizontal plane.

## SPECIFICATIONS



### RECOMMENDED CAPACITIES

HP	GATE WT.	GATE WIDTH	MAX. STARTS/HR.
1/3	300 lbs.	12 ft.	10

### SPECIFICATIONS

**Power:** 115vac. or 230vac. 60 hz.  
6.5 amps @ 115v.  
3.3 amps @ 230v.

**Motor:** Perm. split cap.  
Speed – 1000 rpm  
Current – 5.2A @ 115v.  
2.6A @ 230v.

**Overload:** Automatic resetting thermal.

**Gate travel:** Adjustable to 105 degrees.

**Gate speed:** Opens in 12 seconds.



# SAFETY IS EVERYONE'S BUSINESS



## Install the Gate Operator only when:

Vehicular gate systems provide convenience and security. Gate systems are comprised of many component parts. The gate operator is only one component. Each gate system is specifically designed for an individual application. Gate operating system designers, installers and users must take into account the possible hazards associated with each individual application. Improperly designed, installed or maintained systems can create risks for the user as well as the bystander. Gate systems design and installation must reduce public exposure to potential hazards.

A gate operator can create high levels of force, in its function as a component part of a gate system. Therefore, safety features must be incorporated into every design. Specific safety features include:

- Gate Edges
- Enclosed Track
- Vertical Posts
- Screen Mesh
- Photo-electric Sensors
- Instructional & Precautionary Signage
- Guards for exposed rollers

Important instructions follow. These instructions are intended to highlight certain safety related issues. These instructions are not intended to be comprehensive. Because each application is unique, it is the responsibility of the purchaser, designer, installer and end user to ensure that the total gate system is safe for its intended use.

	<b>SAFETY INSTRUCTIONS</b>	
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**SELECT INSTRUCTIONS ARE HIGHLIGHTED WITH THIS PRECAUTIONARY SYMBOL . FAILURE TO FOLLOW THESE SELECTED INSTRUCTIONS CAN RESULT IN SERIOUS INJURY OR DEATH.**

### Step 1: Before Installation

1. Confirm gate operator model is specified by Installation and Maintenance Manual for application type, gate size and frequency of use.
2. Confirm ALL appropriate safety features, such as gate edges, photo-electric sensors, vertical posts and enclosed tracks, are specified.
3. Confirm gate system design reduces pinch points and protects against entrapment.
4. Confirm gate system design has pedestrian access separate from vehicular entrance.
5. Confirm gate system design reduces traffic backup.
6. Confirm warning signage is included in design.
7. Confirm gate moves freely before installation of operator.
8. Repair or service worn or damaged gate hardware before installation of operator.
9. To avoid installation hazards, review the gate system operation and installation procedures, such as manual disconnect mechanism procedure.
10. Confirm control design prohibits unauthorized use.

### Step 2: During Installation

1. Disconnect power at service panel before making any electrical connection.
2. Avoid pinch points; be aware of all moving parts.
3. Adjust clutch or load sensing device to minimum force setting.
4. Do not overtighten clutch or adjust force setting above minimum.
5. Install controls where user cannot touch gate while operating controls.
6. Install controls where user cannot touch gate while operating controls.
7. Install two or more warning signs on the gate to alert persons in the area of automatic gate operation. Warning signs must be conspicuous.
8. Install operator inside fence line. DO NOT install operator on public side of fence line.
9. Secure gate operator cover.

### Step 3: After Installation

1. Test all safety features.
2. Train end user about basic functions and safety features of gate system.
3. Leave Installation and Maintenance Manual and Safety Instructions with end user.

### FOR GATE OPERATORS USING NON-CONTACT SENSOR(S)

1. See instruction supplied with sensor for proper placement.
2. Precautions must be taken to reduce the risk of nuisance tripping of the sensor.
3. If there are multiple areas of risk of entrapment or obstruction, then more than one sensor should be incorporated into the system.

### FOR GATE OPERATORS USING CONTACT SENSOR(S)

1. One or more sensors shall be located as shown on page 5.
2. Care must be taken during the wiring of the sensor(s) to the operator. Make sure that the wiring cannot be damaged or interrupted.
3. When using a sensor with a gate edge transmitter, care must be taken to insure that the RF signal is not interfered with or obstructed.

### SECONDARY ENTRAPMENT PROTECTION

It is recommended that secondary safeties always be used for both the open and close directions. Use photo eyes, safety edges or both. In any case, the device must sense people. Loops cannot be used.

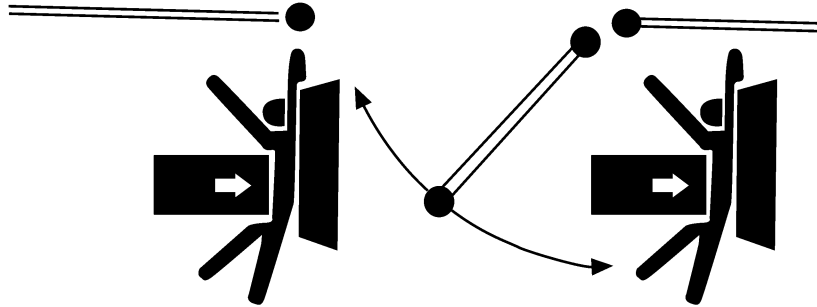


## SAFETY PRECAUTIONS FOR SWING GATES AND ORNAMENTAL "GRILL TYPE" GATES

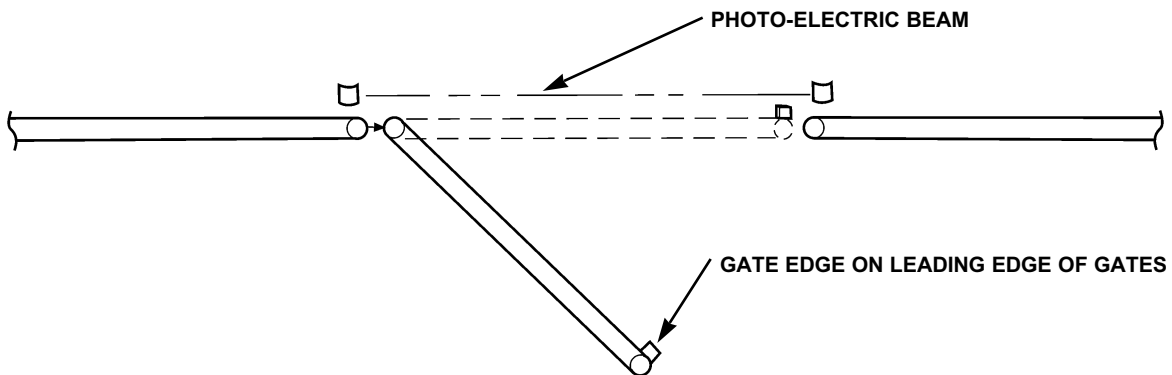


### ENTRAPMENT ZONES

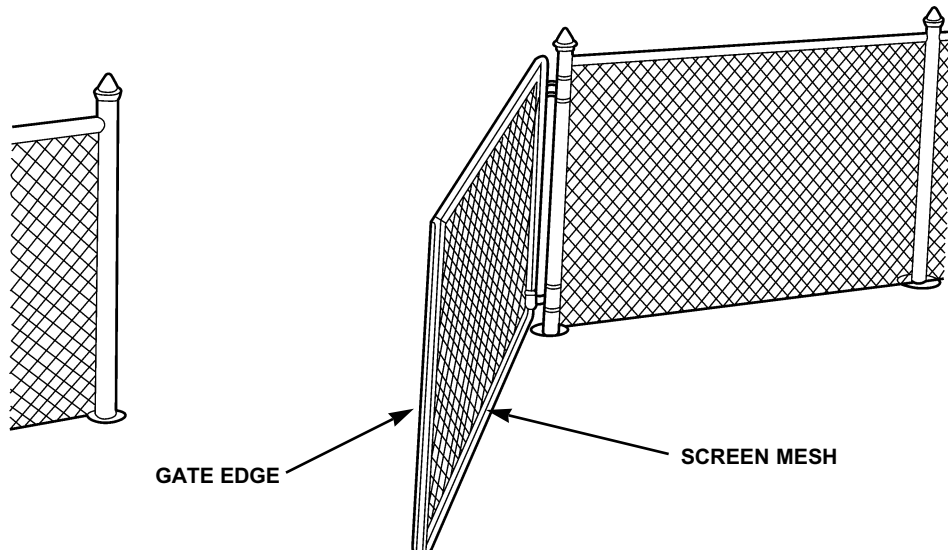
Pedestrians must stay clear of the gate path, particularly the area where the gate can trap them, as shown in the drawing below.



Gate edges and/or photo-electric beams must be incorporated into the swing gate system to assist in the protection of people who may come near the gate operating system. Also, injuries can occur when people put their hands and arms through openings in a grill type gate and it is operated. This potential hazard can be averted by placing a screen mesh on the gate to prevent access through the openings. See illustrations below.



**ALWAYS TEST GATE EDGES AND PHOTO BEAMS ANYTIME THEY ARE ADJUSTED OR SERVICED.**



# PRE-INSTALLATION CHECK LIST

- 3 Check the gate. It **MUST** operate smoothly and freely. If necessary, lubricate the hinges, adjust or repair the gate prior to operator installation. The gate **MUST** be level.
- 3 Double check the size and weight of the gate to make sure that it is proper for this application.
- 3 If wiring has already been installed, check to make sure it meets the following specifications.

# WIRING SPECIFICATIONS

- A. The distances shown are measured in feet from the operator to the power source.
- B. These calculations are based on the National Electrical Code and allows for a 5% voltage drop.
- C. Supply voltage must be within 10% of the operator's rating under load conditions.
- D. These calculations are based on stranded copper wire.
- E. It is highly recommended that only 90% of the distances shown be used; this will allow for a 10% safety factor.
- F. For dual units, the distance shown should be cut in half.
- G. When wire larger than 12 gauge is used, a separate junction box will be required for operator power connections. Not supplied.
- H. **All local codes must be strictly adhered to.** It is very important that operator is properly grounded.
- I. Do not run control wires in the same conduit with power wires.
- J. Do not run multi conductor or parallel conductor cable for controls.
- K. All power wiring should be dedicated and protected.

**POWER WIRING CHART**

WIRE GAUGE	H.P.	SINGLE PHASE	
		115VAC.	230VAC.
6	1/3	684 ft.	3,077 ft.
8	1/3	432 ft.	1,942 ft.
10	1/3	271 ft.	1,218 ft.
12	1/3	170 ft.	763 ft.

CONTROL WIRING		
VOLT	MAXIMUM DIST. (FT.)	WIRE GAGE
24	1000	18

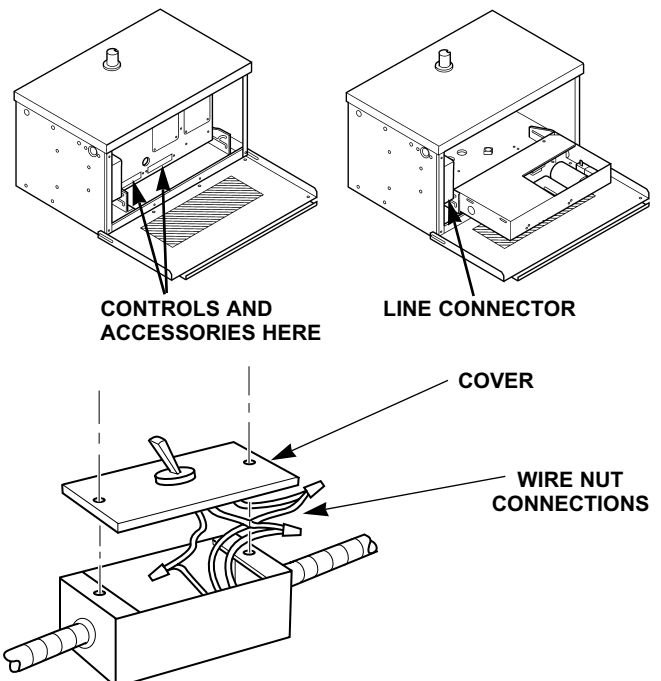
**NOTE:** Calculated using NEC guidelines. Local codes and conditions must be reviewed for suitability of wire installation. Master/Slave units must be installed on separate circuits.

# OPERATOR PREPARATION

Open the service cover on the operator by removing 6 screws and pulling down and out. Inside you will find the electrical enclosure stored vertically. All the electrical connections for controls that the installer needs are provided here on the electrical box. To service the solid state controller or other components of the electrical box, slide the electrical box out, then pivot down. Remove 1 screw securing the electrical box cover.

**CAUTION: NEVER REMOVE COVER OF HIGH VOLTAGE COMPARTMENT UNLESS POWER IS OFF. ELECTRIC SHOCK AND SERIOUS INJURY COULD RESULT.**

The S3 PCB is the major component of the electrical box and settings can be made by changing the two dip switches. There is mixed voltage in this box, both line voltage, and control voltage 24 VAC. Select the preferred method of electrical wire entry. The RSW is provided with (6) holes in the bottom of the chassis for electrical entry. Power supply wiring will be routed to the large double gang electrical box on the left side of the operator.



# INSTALLATION

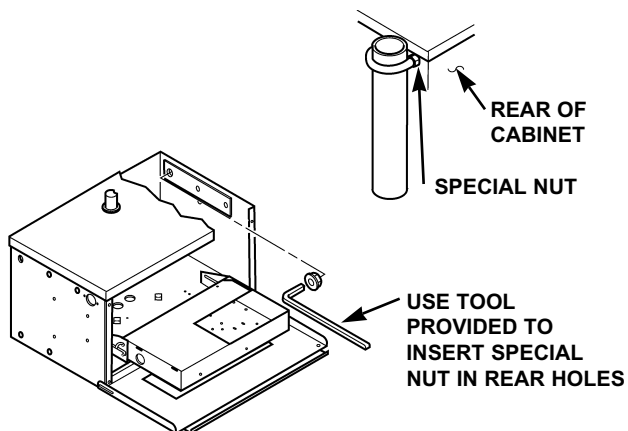
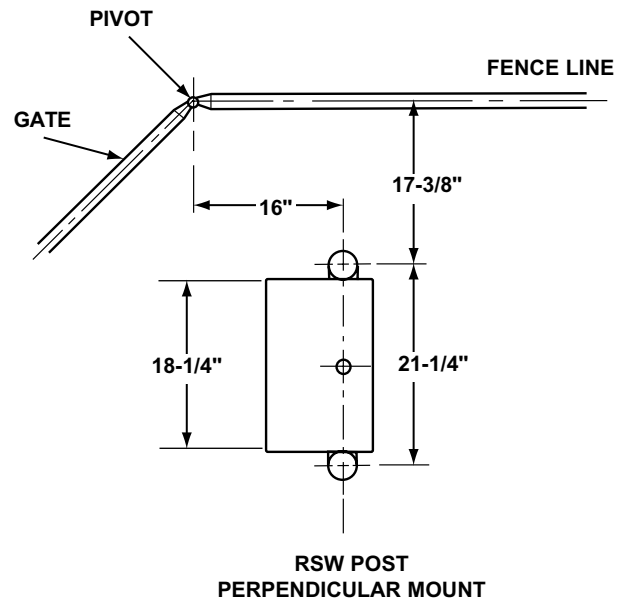
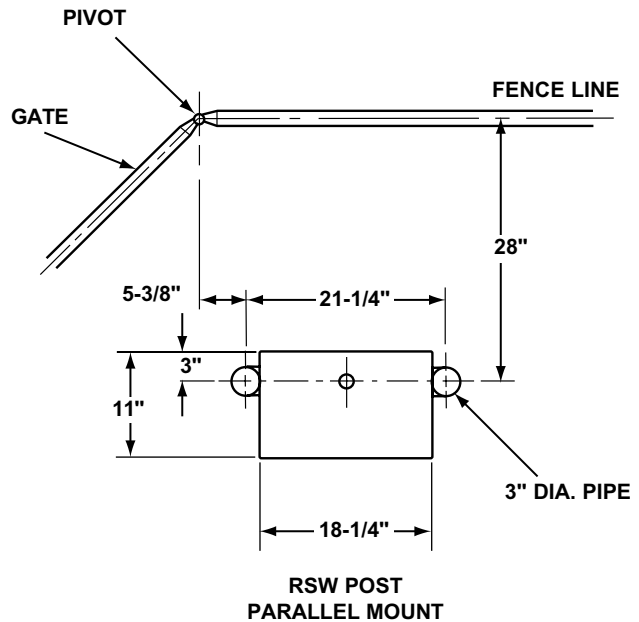
Select the type of mounting desired. The Model is designed for post mounting as factory standard, but may either be pad mounted or pedestal mounted if provided with either the optional pad mount or pedestal mount accessory kit.

## POST MOUNT INSTALLATION

1. Locate mounting posts according to the illustration below. Locate electrical conduit. The operator cabinet may be installed either parallel or perpendicular to the fence with access cover facing away from fence.
2. Excavate required areas for conduit installation and mounting posts.
3. Set mounting posts and conduit in place. Knockouts for 3" pipe clamps (not supplied) are in the operator.

**IMPORTANT: DISTANCE BETWEEN MOUNTING POSTS AND THE RELATIVE LOCATION OF THE OPERATOR TO THE GATE AND FENCE IS CRITICAL. BE SURE THAT THE MEASUREMENTS FOR OPERATOR MOUNTING ARE TAKEN FROM THE CENTERLINE OF THE FENCE AND THE CENTERLINE OF THE GATE HINGE.**

4. Pour cement to secure mounting posts and allow to set for (2) days before installing power unit.
5. Knock out the post mount holes on each end of the cabinet. There are (3) sets of holes vertically. The preferred method of post mounting is to use the (2) sets of holes nearest to the rear side of the cabinet (the side with the access cover is referred to as the front side). If these holes are used, note that the upper rear holes are larger than the other holes. This is because a special nut is required for the U-Bolt in these holes, due to inaccessibility of tools inside the cabinet in the area of these holes (see illustration below).
6. Set the operator between the posts. Allow 3" ground clearance from bottom of cabinet. When the posts are secured, the post tops should not protrude above the top flange of the operator. The operator should be level and square to the gate.
7. Insert the special U-Bolt nut (80-22754) through the cabinet wall from the inside and onto the leg of the U-Bolt. A special tool is provided for this purpose (see illustration). This nut can be tightened with a wrench from outside the cabinet. Use standard 3/8-16 hex nuts to secure all remaining U-Bolts.



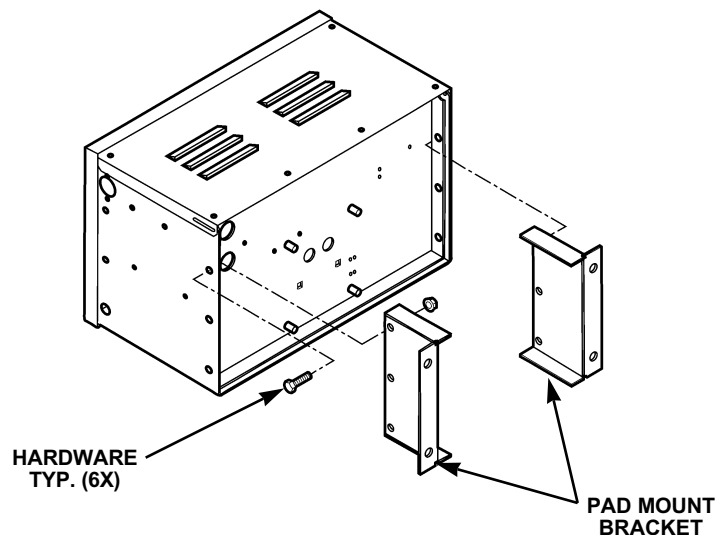
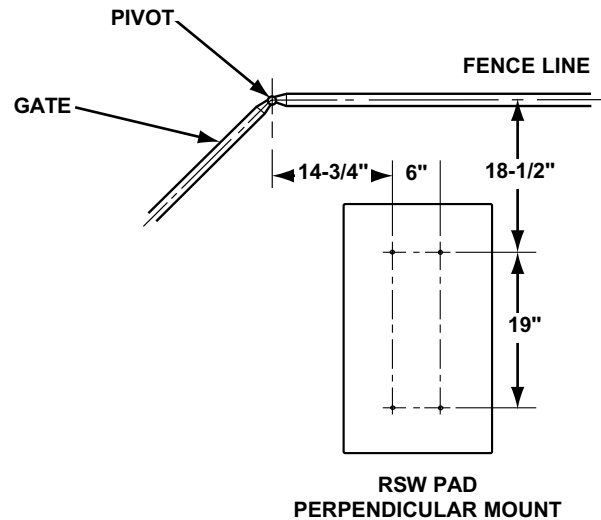
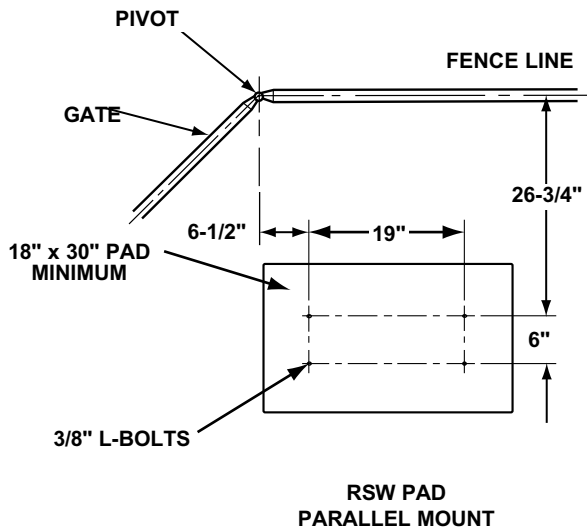
# INSTALLATION, cont.

## PAD MOUNT INSTALLATION

1. Layout the concrete pad as detailed in the illustration below. Locate the electrical conduit. Operator cabinet may be installed either parallel or perpendicular to the fence with access cover away from fence.
2. Excavate required areas for pad and conduit. Pad depth should be below the frost line or as required by local codes.
3. Locate (4)  $\frac{3}{8}$ " x 6" minimum length L-Bolts (not supplied) as shown on illustration below. The L-Bolts should protrude one inch above the pad.

**IMPORTANT: THE RELATIVE LOCATION OF THE OPERATOR TO THE FENCE AND THE GATE IS CRITICAL. BE SURE THAT MEASUREMENTS FOR THE OPERATOR MOUNTING ARE TAKEN FROM THE CENTERLINE OF THE FENCE AND THE CENTERLINE OF THE GATE HINGE.**

4. Pour concrete, insuring that pad is level and above the ground line.
5. Allow concrete to set at least (2) days before installing power unit.
6. Bolt the (2) pad mount brackets to the bottom of the RSW with the hardware provided. Refer to the figure below.
7. After the concrete has set, secure the operator to the pad. The L-Bolts will protrude through the holes in the mounting brackets and should be secured with hex nuts and lockwashers (not supplied). It is very important that the operator be level and square to the gate.



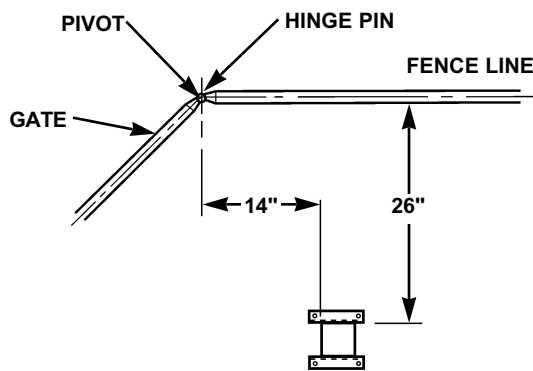
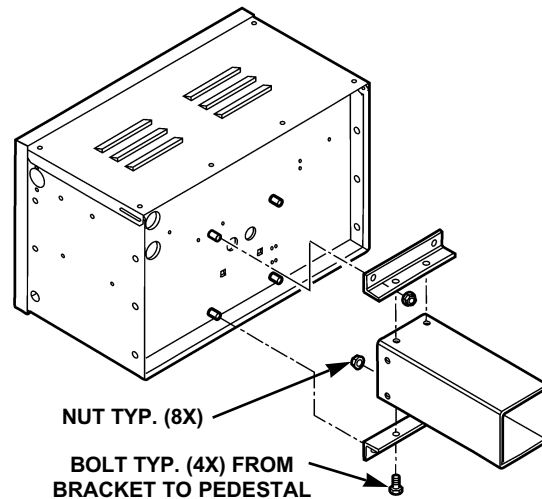
# INSTALLATION, cont.

## PEDESTAL MOUNT INSTALLATION

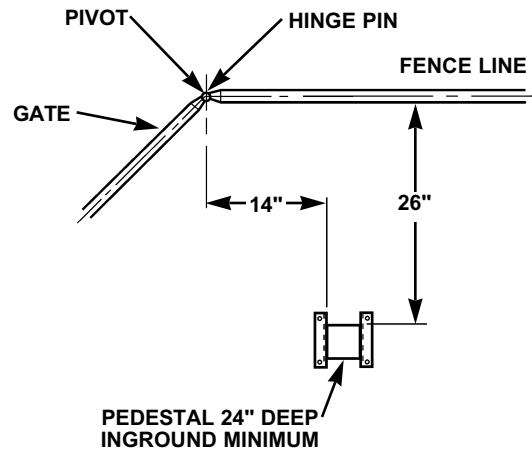
1. Locate pedestal according to the illustration below. Locate electrical conduit. Wires may be run inside pedestal and through holes in the bottom of chassis. The operator may be installed either parallel or perpendicular to the fence.
2. Excavate required areas for pedestal and conduit. Pedestal should be below frost line or as required by local codes. Pedestal should protrude no more than 12" above ground.
3. Bolt the mounting brackets to the pedestal as shown below.
4. Set pedestal and electrical conduit in place.

**IMPORTANT: THE RELATIVE LOCATION OF THE OPERATOR TO THE FENCE AND THE GATE IS CRITICAL. BE SURE THAT MEASUREMENTS FOR OPERATOR MOUNTING ARE TAKEN FROM THE CENTERLINE OF THE FENCE AND THE CENTERLINE OF THE GATE HINGE.**

5. Pour cement to secure pedestal in place and allow to set for (2) days before installing power unit.
6. After the concrete has set, secure the operator to the pedestal by dropping it onto the pedestal and allowing the mounting studs to slip through the holes on the pedestal brackets. Secure with hex nuts provided. It is important that the operator be level.



RSW PEDESTAL  
PARALLEL MOUNT



RSW PEDESTAL  
PERPENDICULAR MOUNT

# INSTALLATION, cont.

## CONTROL ARM ASSEMBLY

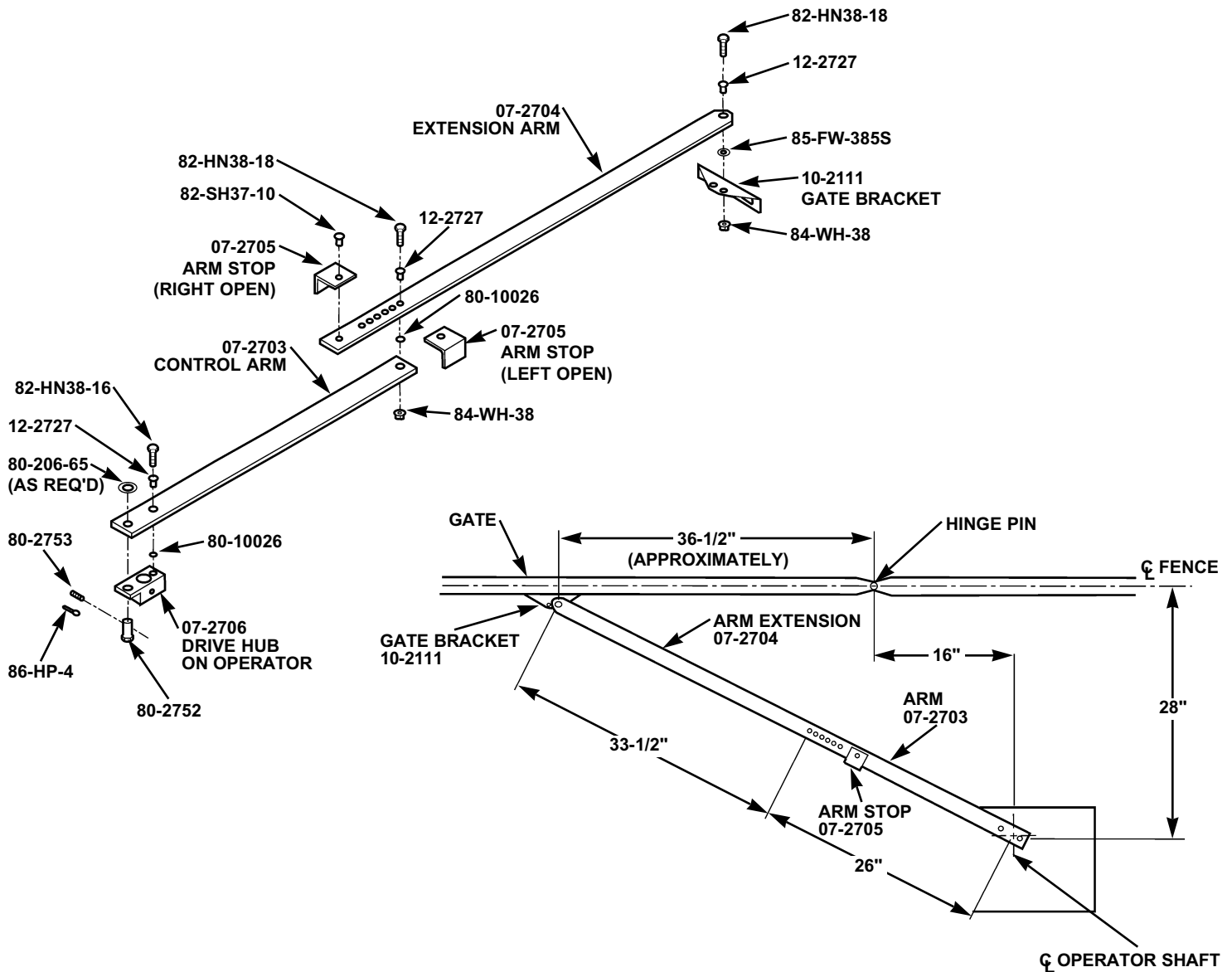
1. Assemble the control arm to the operator hub as shown below. The manual release pin (80-2752) must be pushed up from below the hub and through the control arm, then retained in place with the clevis pin (71-2753). Use shim washers (80-206-65) to take up any play between the clevis pin and the top of the control arm. A cotter pin (86-HP-4) keeps the clevis pin from vibrating out of place. When the manual release pin is allowed to drop down, the control arm should swivel freely about the hub. LEAVE THE ARM FREE TO PIVOT AT THIS TIME.
2. Fasten the arm stop (07-2705) to the extension arm as shown above. Left hand or right hand installations call for mounting the arm stop on opposite sides of the extension arm. Refer to the illustration to determine which way to mount the arm stop.

**CAUTION: IF THE ARM STOP IS INSTALLED INCORRECTLY, THE GATE WILL BE PREVENTED FROM OPENING AND DAMAGE TO THE OPERATOR MAY RESULT!**

3. Assemble the extension arm to the control arm using the hardware provided as shown. Use the center hole in the extension arm. The other holes may be used for arm adjustment at a later time. Then assemble the gate bracket (10-2111) to the extension arm as shown. The gate bracket should pivot freely on the arm.
4. Put the gate in the fully closed position and extend the arm assembly out to the closed gate. Be sure that the control arm is pressed tightly against the arm stop. Mark the point on the gate where the gate bracket will mount to the gate.

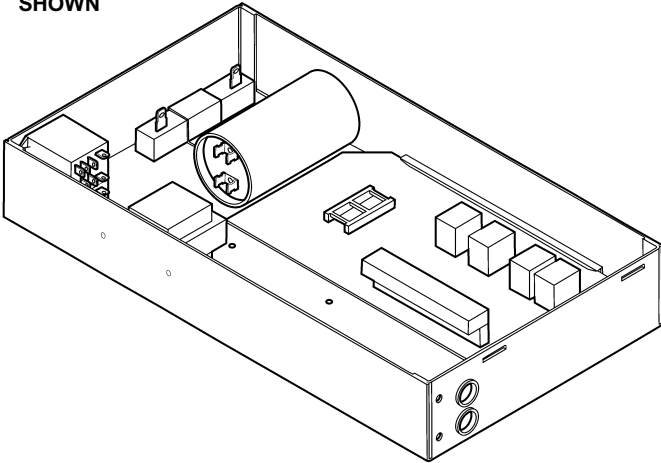
**IMPORTANT: THE GATE BRACKET MUST BE INSTALLED SO THAT THE ARM ASSEMBLY IS LEVEL AND ABLE TO OPERATE SMOOTHLY.**

5. The gate bracket must be installed on a structural member of the gate. If required, install a horizontal support on the gate at the appropriate height. Attach the gate bracket with U-bolts or by welding.



# SYSTEM FEATURES

SW420 CONTROLLER SHOWN



## ACTIVITY LED

- Steady indication when gate is at either open or close limit.
- 1 flash per second when gate is off a limit in normal operation.
- 2 flashes per second when entrapment level one has occurred.

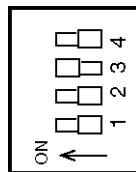
## AUDIBLE WARNING DEVICE

If the operator should have a second inherent obstruction in sequence with the first; i.e. back to back, the sounder will activate for 5 minutes then shut off. Also the sounder can be programmed to come on 2 seconds prior to gate movement and stay on during gate movement.

## THREE BUTTON CONTROL (SEQUENCE OF OPERATION)

Open, stop, close, close is programmable. Stop will override all other functions. If closing, open will cause the operator to stop and reverse to full open. Will close from open limit or midstop only. If SW1 pin 1 is on three button station will only close the operator from the open limit or from mid-stop. If SW1 pin 1 is off, the input will work as a single button (open, close, stop).

SWITCH #1



## SINGLE BUTTON CONTROL (SEQUENCE OF OPERATION)

Open to open limit, close open. If power has been interrupted, will always open with first activation.

## CLOSE SINGLE BUTTON SELECT

The single button (programmable) control can be programmed to either function as a single button or to function as a close button only.

## DIGITAL MICROPROCESSOR

This is the main circuit board for the operator. It contains all the logic and intelligence for the system. All the system programming is done on this circuit board. See page 14. All solid state, with an emergency back-up system that works even if the processor is missing.

## INHERENT OBSTRUCTION PROTECTION

The pulley is equipped with an R.P.M. sensor. When the gate meets an obstruction, the loss of r.p.m's. will cause the gate to reverse. A second obstruction will cause the gate to stop. A renewed wired input will restart the gate.

## EXTERNAL OBSTRUCTION CIRCUIT

This circuit can be used with either a gate edge or a photo beam system. When either of the two devices mentioned are activated, the operator will react in a similar manner to the inherent obstruction described above.

**NOTE:** If external entrapment protection is required by the class of operator, both an open and close protection device must be used.

## SPECIAL NOTE ABOUT OBSTRUCTION SENSING FROM EITHER INTERNAL OR EXTERNAL SYSTEMS

The operator will stop if it senses two sequential obstructions. It will not activate from any automatic system, including the built in time delay to close. Either a manual device such as a pushbutton within site of the gate and operator, or the stop button supplied with the operator must be activated to resume the operator back to its normal operation.

## OPEN ONLY CIRCUIT

Separate open circuits for line-of-sight devices and out-of-sight devices such as open loops or radio controls.

## LOOP CONTROL CIRCUITS

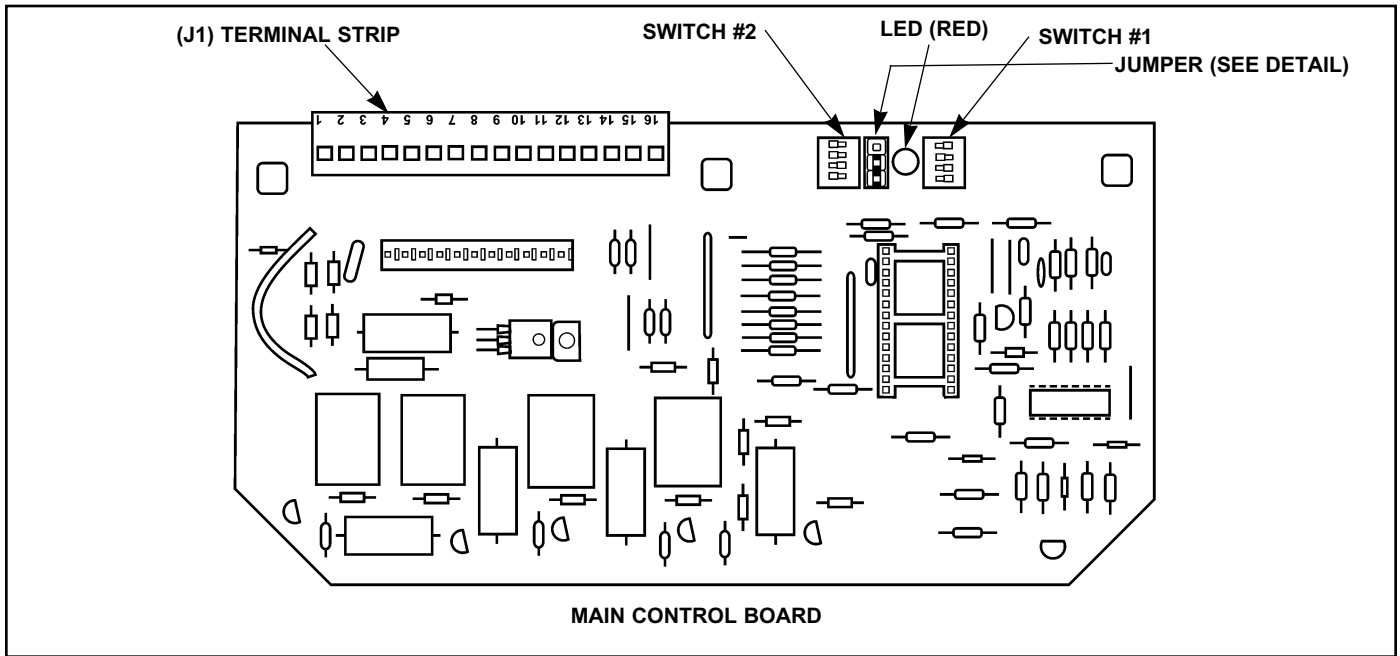
Vehicle control devices such as opening or security loop detectors are connected to this circuit.

## TIME DELAY TO REVERSE CIRCUIT

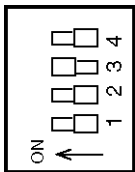
Allows the gate to come to a complete stop before reversing direction. Approximately 1/2 second between stop and reverse.

**NOTE:** This feature is defeated when either the inherent or external obstruction circuits are activated.

# PROGRAMMING



## SWITCH #1 OPERATOR PROGRAMMING



### POLE #1 – SINGLE/CLOSE BUTTON

ON = Close button only  
OFF = Open/Close Button

### POLE #2 – RIGHT HAND / LEFT HAND

ON = Left Hand (gate will open to the left)  
OFF = Right Hand (gate will open to the right)  
(inside of fence looking out)

### POLE #3 – WARNING DEVICE

ON = Warning device will turn on 3 seconds before gate starts to move in either direction.  
OFF = Warning device disabled.

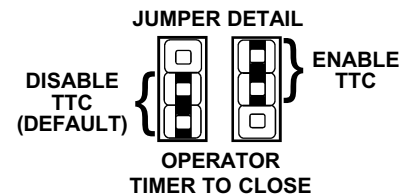
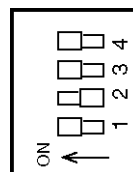
### POLE #4 – MASTER/SLAVE – SINGLE UNIT

ON = Master or Single Unit  
OFF = Slave unit

### RED LED INFORMATION

Continuous ON = Unit is on a limit  
Blinking 1 flash per second = Normal operation  
(gate travel or mid-stop)  
Blinking 2 flashes per second = Entrapment level 1  
(operator reverse to limit)

## SWITCH #2 TIMER TO CLOSE



Timer to close is locked out at the factory, to activate the timer to close, move safety jumper from bottom two pins (show illustration) to top two pins. Then set time per the chart below. During normal operation, if the operator stops on a limit, or mid travel, the operator will time out per the chart below and automatically close. To lock the timer to close program and disable, simply return the jumper to the bottom two pins, or turn on all pins of SW#2.

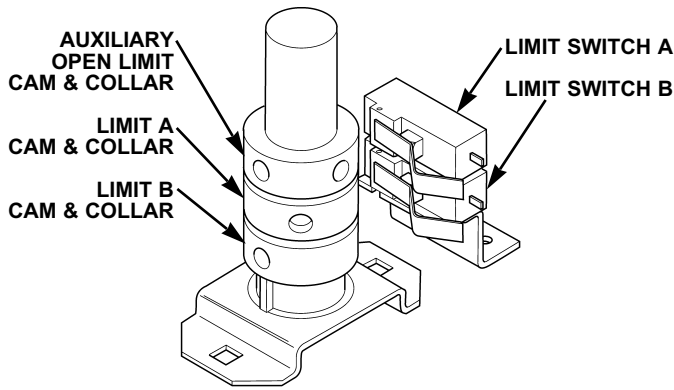
**IMPORTANT: When using master/slave, only set the time for the master operator. The slave operator must be set to disabled position (all poles on).**

Pole #1	Pole #2	Pole #3	Pole #4	Total Time Warning Device Disabled	Total Time Warning Device Enabled
ON	ON	ON	ON	DISABLED	DISABLED
OFF	ON	ON	ON	1 SEC.	4 SEC.
ON	OFF	ON	ON	13 SEC.	16 SEC.
OFF	OFF	ON	ON	26 SEC.	29 SEC.
ON	ON	OFF	ON	40 SEC.	43 SEC.
OFF	ON	OFF	ON	52 SEC.	55 SEC.
ON	OFF	OFF	ON	65 SEC.	68 SEC.
OFF	OFF	OFF	ON	78 SEC.	81 SEC.
ON	ON	ON	OFF	104 SEC.	107 SEC.
OFF	ON	ON	OFF	117 SEC.	120 SEC.
ON	OFF	ON	OFF	129 SEC.	132 SEC.
OFF	OFF	ON	OFF	141 SEC.	144 SEC.
ON	ON	OFF	OFF	155 SEC.	158 SEC.
OFF	ON	OFF	OFF	167 SEC.	170 SEC.
ON	OFF	OFF	OFF	180 SEC.	183 SEC.
OFF	OFF	OFF	OFF	194 SEC.	197 SEC.

# LIMIT SWITCH ADJUSTMENTS

**CAUTION: NEVER PLACE HANDS OR TOOLS INSIDE OPERATOR OR NEAR DRIVE MECHANISM UNLESS POWER IS OFF!**

1. BEFORE TURNING ON ELECTRICAL POWER, disconnect the extension arm from gate bracket so that the gate is no longer connected to the operator. Push the manual release pin up through the control arm and slide clevis pin in place. Secure clevis pin with a cotter pin.
2. Refer to the figure below to identify the limit switches. The limit switches are actuated when the main shaft rotates and causes the large screw heads (cams) on the collars to depress the switch levers. The (3) collars are held fast to the shaft by means of set screws. The collars should all be loose on the shaft at this point. If they are not, loosen all set screws until collars are free moving on the shaft.



DIRECTION OF GATE TO OPEN	OPEN LIMIT	CLOSE LIMIT
RIGHT	B	A
LEFT	A	B

3. **CAUTION: WHEN FOLLOWING THE LIMIT SWITCH ADJUSTMENT PROCEDURE BELOW THE MOTOR BELT WILL TURN AND THE CONTROL ARM WILL MOVE DURING SOME OF THE STEPS. KEEP HANDS AND TOOLS OUT OF THE OPERATOR, AWAY FROM THE ARM AND DRIVE SHAFT UNLESS POWER IS OFF OR SERIOUS INJURY MAY RESULT!**

Turn on electrical power.

**CAUTION: BE AWARE THAT OPERATOR ARM MAY START TO MOVE IF A CONTROL DEVICE HAS BEEN IMPROPERLY CONNECTED. KEEP HANDS AND TOOLS OUT OF THE OPERATOR, AWAY FROM ARM AND DRIVE SHAFT!**

Press the CLOSE button or connect terminals #3 & #1 or #3 & #2 depending on which installation you have (left or right hand opening). The control arm should start to move in the direction that would close the gate if it were connected. If the arm does not start to move, the close limit cam may be already actuating the close limit switch or an improper electrical connection may have been made. **TURN OFF POWER**, inspect and correct the situation and repeat this step.

4. When the control arm is pointed in the approximate direction of the gate bracket (on the fully closed gate) press the STOP button. The control arm should stop. If it does not, the STOP button was improperly connected. **TURN OFF POWER**, inspect and correct the situation and repeat STEPS #3 and #4.

If the control arm does not move far enough to point in the proper direction, the close limit switch has been prematurely actuated. **TURN OFF POWER**. Loosen the set screw on the close limit cam and rotate the nut away from the close limit switch. Repeat STEPS #3 and #4 until the control arm is pointed in the correct direction.

5. **TURN OFF POWER!** Be sure the close limit cam is freely turning. Rotate the cam in the same direction as the shaft turns to close the gate. Stop at the point at which the cam just clicks the close limit switch. Tighten the set screw securely.
6. The close limit switch is now "coarse set." Connect the gate bracket back up to the extension arm. If the arm has moved too far in the close direction to allow connection of the gate bracket, **TURN ON POWER**, press the OPEN button to rotate the arm back a short distance in the opposite direction and press the STOP button when the arm is in the desired position.
7. **TURN ON POWER!** Press the OPEN button (or other "open" actuating control device connected between terminal #1 and #3 on the control terminal strip). The gate should start to open. If it does not, the open limit cam may be already actuating the open limit switch or an improper electrical connection may have been made. **TURN OFF POWER**, inspect and correct the situation, and repeat this step.
8. When the gate reaches the desired fully open position, press the STOP button. The gate should stop.
9. **TURN OFF POWER!** Be sure the open limit cam is freely turning. Rotate the cam in the same direction as the shaft turns to open the gate. Stop at the point at which the cam just clicks the open limit switch. Tighten the set screw securely.

## LIMIT SWITCH ADJUSTMENTS, cont.

10. The open limit switch is now "coarse set." Fine tune both the open and close limit switch settings by using the OPEN, CLOSE and STOP buttons to move the gate and by rotating the limit collars slightly to allow more or less gate travel. Rotating the cam away from the limit switch increases gate travel. Rotating the cam towards the switch allows less gate travel.

**CAUTION: ALWAYS TURN OFF POWER BEFORE PLACING HANDS OR TOOLS IN OPERATOR OR NEAR DRIVE SHAFT AND CONTROL ARM.**

The close limit switch should stop the gate at a point where the elbow of the control arm just passes the position when the (2) arm pieces are in a straight line (180 degrees). Refer to the illustration under CONTROL ARM ASSEMBLY, step #4. The extra holes in the control arm extension may be used to aid in attaining the final desired close position of the gate and arm.

With the control arm past the 180-degree position, the gate is effectively locked against any attempts to push it open from the outside.

### OPTIONAL AUXILIARY LIMIT SWITCH ADJUSTMENT

11. When both the open and close limit switches are satisfactorily set, the auxiliary open limit switch must be set. This switch must be actuated by its cam approximately one to two seconds before the open limit switch is actuated by its cam WHEN THE GATE IS OPENING. To make this adjustment, TURN OFF POWER. Position the auxiliary open limit switch cam so that it is approximately 1/4" ahead of the open limit switch cam. Tighten the set screw securely. TURN ON POWER. Run the gate through a cycle to the full open position and be sure that the auxiliary open limit switch is actuated when the gate stops.

# CONTROLS AND ACCESSORY INSTALLATION

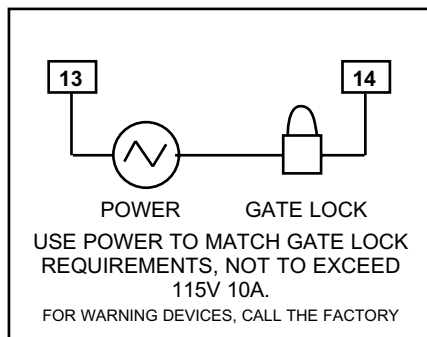
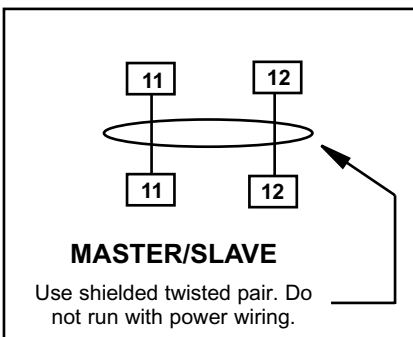
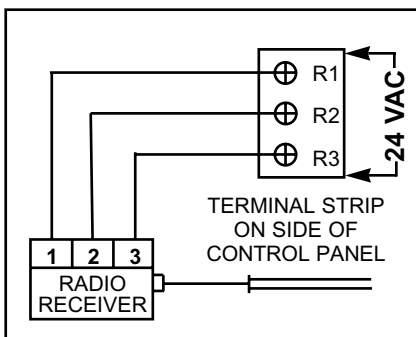
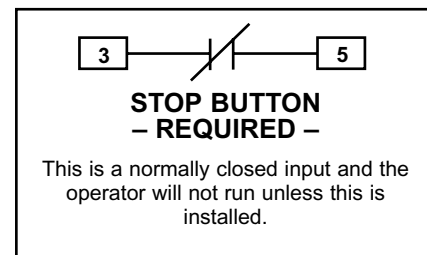
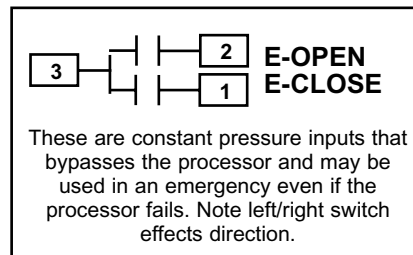
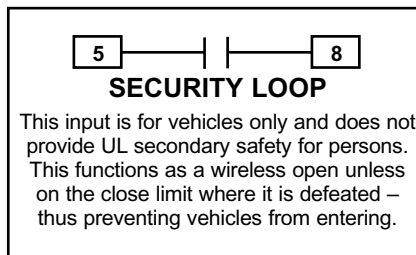
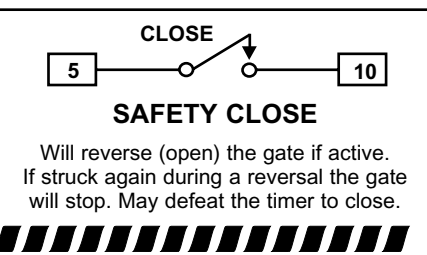
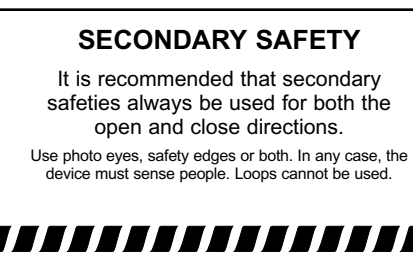
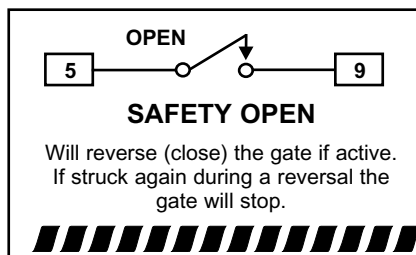
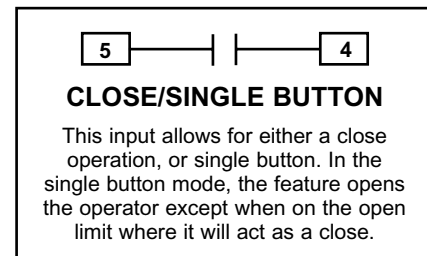
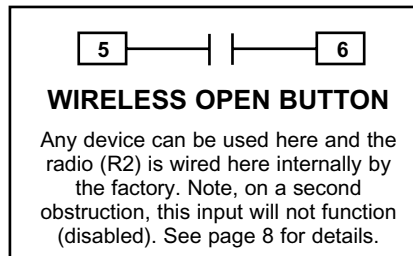
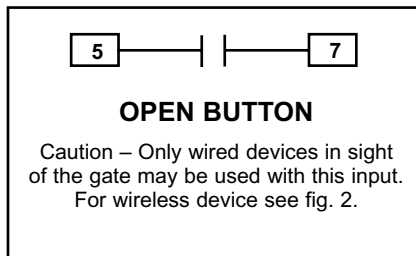
\*SEE WIRING DIAGRAM FOR MORE INFORMATION.

\*SEE PAGE 5 FOR WIRING DISTANCES AND WIRE GAUGE INFORMATION.

**WARNING:** All controls that are to be used to operate the gate system **MUST** be installed where the user cannot touch the gate while operating the controls. Also, always install the controls where the user has full view of gate operation.

All inputs are normally open and momentary, except the stop (NC), and emergency close and emergency open (constant pressure). The following instructions are based upon UL 325, dated March of 1999 and include recommendations for significant increase in safety. We strongly recommend that you follow the UL guidelines presented throughout the manual. Installation device instructions – always follow the instructions provided by the manufacturer when installing and adjusting any control device. If these instructions are contrary to the advice given here, call for assistance.

(FOR DETAILED OPERATIONS SEE PAGE 10)



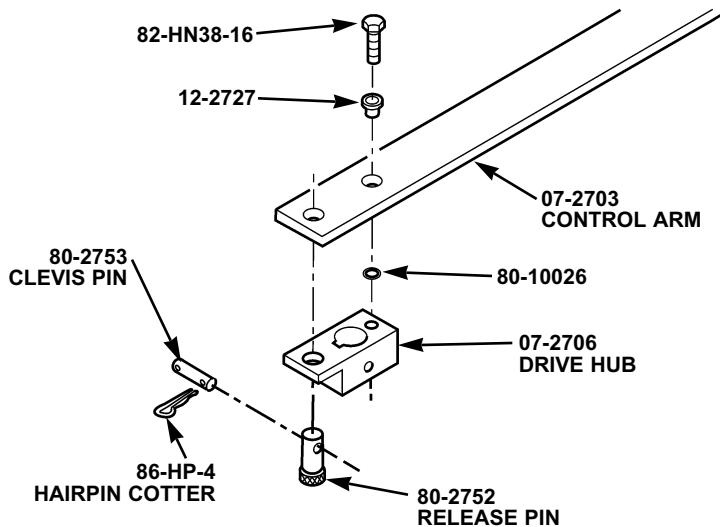
Numbers shown inside a **box** are on the J1 terminal strip on the circuit board.

Connections shown here are field connections. The radio receiver may be ordered factory installed.

# MANUAL OPERATION

To operate the gate manually, disconnect the control arm from the drive hub by removing the hairpin cotter and then the clevis pin and allowing the manual release pin to drop down through the hub. The arm should now be free and the gate can be opened and closed normally.

If desired, a padlock can be used in place of the clevis pin to hold the manual release pin in place.



## REQUIRED MAINTENANCE – NORMAL USAGE

			Check at least once every			
			1	3	6	12
	<b>MONTH INTERVALS</b>					
⚠	Internal speed sensor	Check for proper operation	3			↑ COMPLETE CHECK OUT ↓
⚠	External safety systems	Check for proper operation	3			
⚠	Gate caution signs	Make sure they are present	3			
	Manual disconnect	Check & operate			3	
	Sprockets & pulleys	Check for set screw tightness			3	
	Gate	Inspect for wear or damage			3	
	Accessories	Check all for proper operation			3	
	Electrical	Inspect all wire connections			3	
	Frame bolts	Check for tightness			3	
	Total unit	Inspect for wear or damage				

### NOTES:

- ⚠ A. CAUTION – When servicing, always disconnect operator from electrical power supply.
- B. Severe or high cycle usage will require more frequent maintenance checks.
- C. Inspection and service should always be performed anytime a malfunction is observed or suspected.
- D. When servicing, please do some “house cleaning” of the operator and the area around the operator. Pick up any debris in the area. Clean the operator if needed.
- E. It is suggested that while you are at the site, you take some voltage readings of the operator. Using a VOM, double check the incoming voltage to the operator to make sure it is within ten percent of the operator’s rating.
- F. While you are at the site, now would be a good time to let the owner or manager know about any new items available or any safety items that could and should be added to the site.

# TROUBLESHOOTING



When troubleshooting, one of the first things to do is try to isolate the problem area. The four (4) main areas to check out are:

1. POWER 2. ACCESSORIES 3. OPERATOR'S PRIMARY VOLTAGE 4. OPERATOR'S LOW VOLTAGE

## 1 POWER



Always use extreme Caution!

Some possible symptoms of power problems:

- The obvious one is, the operator will not run.
- The operator runs slow.
- Circuit breakers or fuses keep tripping.
- Motor overload keeps tripping.
- Operator starts but then stops.

1a. Using a V.O.M. take a voltage reading at the control transformer's primary terminals. You should get a reading as follows:

Nominal volt.	Min.	Max.
120v.	108	132
230v.	207	253

If you get a reading that does not fall into the minimum/maximum area, then check out your main power supply. Also, make sure that the operator

was ordered with the proper voltage and phase. Another item to check is the wire run from the power supply to the operator. Double check the gauge of the wire versus the distance.

- 1b. If the voltage reading is O.K. from 1a, then take the same voltage reading with the operator running. If voltage drops below the minimum with this reading, then there could be an excessive current draw somewhere.
- 1c. In some cases, power drops can occur at only specific times during the day or night. This can be caused by increased power demands in a general area at a specific time.

## 2 ACCESSORIES

Add-on accessories can create many of the problems that are credited to the operator. Many applications have more than one accessory item attached to the operator and some of these items even draw their power from the operator. So, before we start blaming the operator, let's take a look at all the add-on's first.

Some of the symptoms that can show up because of accessories:

- The operator won't close.
- The operator won't open.
- The operator will not run.
- The operator begins to run then stops or reverses.

2a. Whenever the problem is thought to be an accessory and there are more than one connected to the operator, always disconnect one accessory at a time and then test the system. This will hopefully isolate which item is causing the problem.

2b. If an accessory item is being used as an access control device (used to open or close), falls in the closed position or sends out a continuous signal. The operator will hold the gate in one position until the signal from the accessory is removed.

2c. In some applications, the gate may begin to move then either stop or stop and reverse within a couple of seconds. This can be caused by an external obstruction device that has failed.

2d. If there are many accessories attached to and powered by the operator, there may be too much current draw for the operator's control transformer. This operator can only supply approximately 2 amps @ 24 vac. Double check all accessories for their current requirements.

## 3 PRIMARY VOLTAGE CIRCUIT



Use extreme caution when troubleshooting the primary voltage circuit!

There are three (3) items in this circuit that could be causing trouble, and they are:

- Motor
- Transformer
- Power disconnect switch

3a. The first thing to check is the incoming power. Is it there at the incoming side of the power disconnect switch?

3b. If there is power, then check for it at the transformer primary terminals. If there is voltage at the switch and none at the transformer, then you probably have a bad power disconnect and it should be replaced.

3c. If the problem is thought to be the motor, it is recommended that it be replaced. It is possible that the thermal overload inside the motor has overheated. Wait approximately 15 minutes, then try running unit. **NOTE:** Some motors have the overload built into the motor itself, while other units have a separate overload in the controller.

# TROUBLESHOOTING, cont.

## 4 LOW VOLTAGE CIRCUIT

- 4a. The first thing to check is the circuit breaker.
- 4b. The secondary voltage must be between 22 and 30 vac. This voltage can be checked at the circuit board at terminals J1-3 & J1-11.
- 4c. The limit switches are S.P.D.T. (single pole, double throw). These limit switches are what tells the operator to shut off at either the full open or full close position.
- 4d. The R.P.M. Sensor counts the three magnets that are on the large pulley on the gearbox. False signals can create “phantom” reactions to obstructions that do not exist. Ensure the sensor is close as possible to the pulley without rubbing during operation. Also check the sensors and magnets for debris that would affect the signal. There are no repairable parts for the sensor or wheel. The only thing that should be checked is the wire harness. Make sure that the wires are crimped and fully seated into the housing. Also make sure that the housing is fully seated into the circuit board.
- 4e. The circuit board is the “brains” of the entire system. It is a non-repairable item. In many cases, un-awareness of the different programs and their functions can make it look like there is a problem when in actuality it is just a missed or wrong program setting. Make sure that all the connections wires on the “J1” terminal board are installed correctly. There MUST also be a stop button connected to J1-3 and J1-5.

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## FEATURES AND PROGRAM TROUBLESHOOTING REVIEW

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\*The internal obstruction sensor (r.p.m. sensor) will cause the operator to either stop or reverse if it senses a slow down in gate speed. A damaged or poorly working gate can trip the sensor and cause “phantom” reversing or stopping.

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## GEAR REDUCER

- If physical signs show a seal has broken in the gear reducer, it may be necessary to replace the reducer.
  - When replacing the gear reducer oil, use Mobil SHC 630 or equivalent. The oil level for the gear reducer allows gear to be dipped but not submerged in oil.
  - DO NOT overfill gear reducer oil reservoir.
- \*Reducer oil – Part #04-DUP220HT

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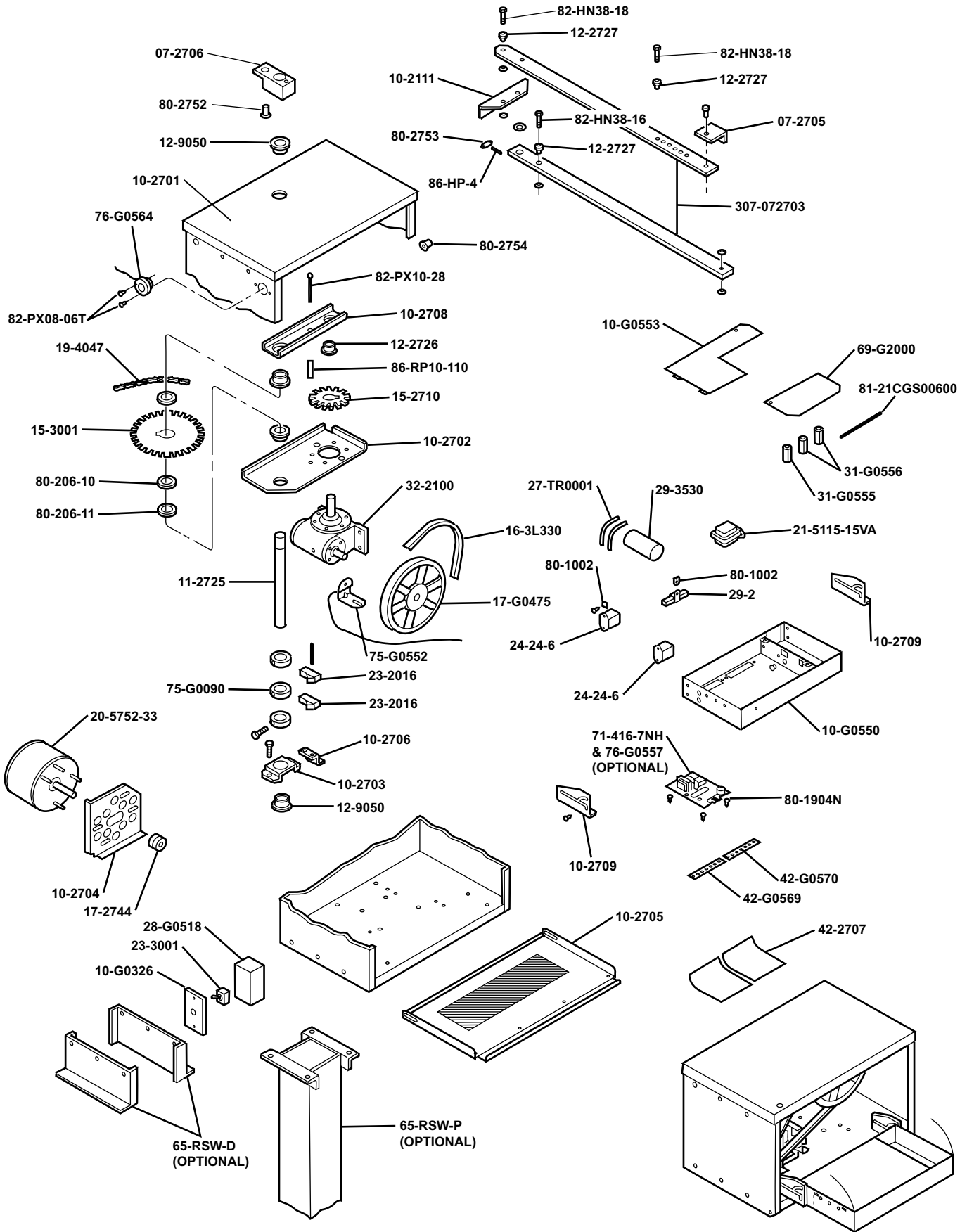
## GENERAL REFERENCE INFORMATION

THE GATE – Double check the gate and its related hardware. Does the gate move freely? If it doesn't, this can affect the internal obstruction sensor.

WIRING DIAGRAM – Always reference the wiring diagram that was supplied with the operator. Note that some of the accessory items may have their own wiring diagram.

If you cannot correct the problem or if you feel you will require technical assistance, the first thing to do is contact your local distributor or dealer. If you do not have a distributor or dealer, then contact us for technical assistance. Please when calling for assistance, make sure you have the gate operator model number, voltage, phase, horsepower and a list of all accessories that are attached to the operator.

# PARTS LIST – SW420



# PARTS LIST

## – MODEL SW420 –

PART NO.	QTY.	DESCRIPTION	PART NO.	QTY.	DESCRIPTION	PART NO.	QTY.	DESCRIPTION
02-401S (N)	1	STOP BUTTON	17-G0475	1	PULLEY W/3 MAGNETS			
07-2705	1	ARM STOP	19-4047	1	#40 CHAIN W/MASTER LINK			
07-2706	1	ARM HUB	20-5752-33	1	MOTOR 1/3 H.P.			
10-2111	1	GATE BRACKET	21-5115-15VA	1	TRANSFORMER, 115/24V			
10-2701	1	HOUSING ASSY.	23-2016	2	LIMIT SWITCH SPST			
10-2702	1	REDUCER BRACKET	23-3001	1	TOGGLE SWITCH			
10-2703	1	BEARING BRACKET	24-24-6	2	RELAY, 24VAC			
10-2704	1	MOTOR PLATE	27-TR0001	2	TIE WRAP			
10-2705	1	FRONT COVER	28-G0518	1	HANDY BOX			
10-2706	1	SWITCH BRACKET	29-2	1	RESISTOR			
10-2708	1	STIFFENER PLATE	29-3530	1	CAPACITOR			
10-2709	2	ELECTRICAL BOX BRACKET	307-072703	1	CONTROL ARM &			
10-G0550	1	ELECTRICAL BOX	EXTENSION					
10-G0326	1	HANDY BOX COVER	31-G0555	1	ALUMINUM STAND OFF			
10-G0553	1	COVER PLATE	31-G0556	2	NYLON STAND OFF			
11-2725	1	DRIVE SHAFT	32-2100	1	GEAR REDUCER			
12-2726	1	BEARING, FLANGED	42-2707	2	INSULATOR			
12-2727	3	FLANGE BUSHING	42-G0569	1	TERMINAL STRIP			
12-9050	4	BUSHING, FLANGED	42-G0570	1	TERMINAL STRIP			
15-2710	1	40B11, GEAR	65-RSW-D	1	PAD MOUNT KIT (OPTIONAL)			
15-3001	1	40B32, GEAR	65-RSW-P	1	PEDESTAL MOUNT KIT			
16-3L330	1	BELT, 3L330			(OPTIONAL)			
17-2744	1	RSW MOTOR PULLEY	69-G2000	1	S3 BOARD			

PARTS DESIGNATED (N) ARE NOT SHOWN ON DRAWING.

# Sentex Systems

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9800 DeSoto Ave., Chatsworth, CA 91311  
e-mail address: <http://www.sentexsystems.com/index.html>

## WARRANTY POLICY

Seller warrants that the goods are free from defect in materials and/or workmanship for a period of one year from the date of shipment from the F.O.B. point. Goods returned to Seller for warranty repair within the warranty period, which upon receipt by Seller are confirmed to be defective and covered by this limited warranty, will be repaired or replaced (at Seller's sole option) at no cost and returned pre-paid. Defective parts will be repaired or replaced with new or factory-rebuilt parts at Seller's sole option. Authorization instructions for the return of any goods must be obtained by Buyer from Seller before returning the goods. The goods must be returned with complete identification, freight prepaid, and in accordance with Seller's instructions or they will not be accepted. In no event will Seller be responsible for goods returned without proper authorization or identification.

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**Your professional Sentex dealer is:**