

CHAMBERLAIN®

LiftMaster®
PROFESSIONAL

Installation and Maintenance Instructions



Swing Gate Operator

Model SW420

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IMPORTANT!

Please leave this manual at the job site, preferably with the end user or facility manager. Read and follow all instructions.

This gate operator is intended for use on a gate that swings in an arc in a horizontal plane.

General Information

Parts Supplied

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.

PART #	DESCRIPTION	QTY.	PART #	DESCRIPTION	QTY.
SW420	Power Unit	1	80-206-65	5/8 Washer	2
02-041-SP	Stop Button	1	80-10026	3/8 Spacer	2
07-2703	Control Arm	1	82-HN38-16	3/8-16 x 1" Bolt	1
07-2704	Arm Extension	1	82-HN38-18	3/8-16 x 1-1/4" Bolt	2
40-3505	Warning Sign	2	82-SH37-10	3/8-24 x 5/8 Capscrew	1
07-2705	Arm Stop	1	84-WH-38	3/8-16 Nut	2
10-2111	Gate Bracket	1	85-FW-38S	3/8 Flat Washer	1
11-2754	U-Bolt Nut Tool	1	80-2754	U-Bolt Nut	2
12-2727	Flange Bushing	3			

Table 1: Parts Supplied

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	*			

Table 2

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.

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

Table 3

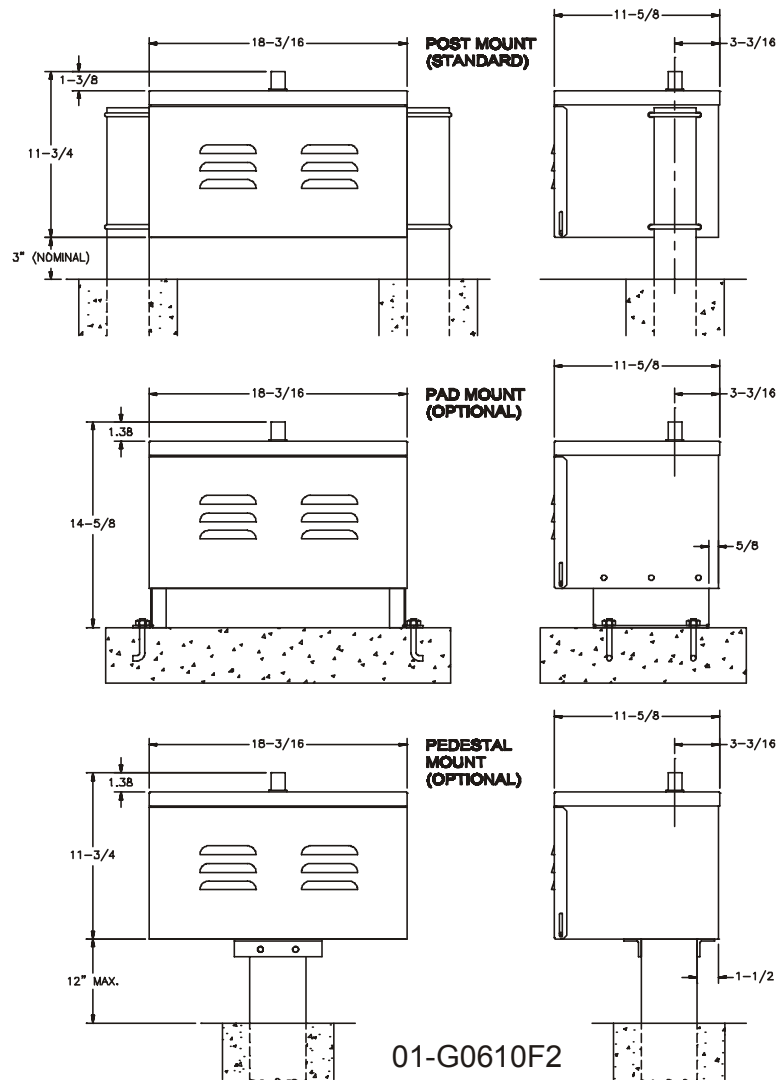


Figure 1

Safety Information

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
- Guards for exposed rollers
- Photo-electric Sensors
- Instructional and Precautionary Signage
- Screen Mesh

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.



Safety Instructions




 Selected Instructions are highlighted with a precautionary symbol (see left margin). 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 the 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 two or more warning signs on the gate to alert persons in the area of automatic gate operation. Warning signs must be conspicuous.
- 7 Install operator inside fence line. DO NOT install operator on public side of fence line.
- 8 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 Information with end user.

FOR GATE OPERATORS USING NON-CONTACT SENSOR(S)

-  See instruction supplied with sensor for proper placement.
-  Precautions must be taken to reduce the risk of nuisance tripping of the sensor.
-  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)

-  One or more sensors shall be located as shown on page 8.
-  Care must be taken during the wiring of the sensor(s) to the operator. Make sure that the wiring cannot be damaged or interrupted.
-  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 Figure 2.

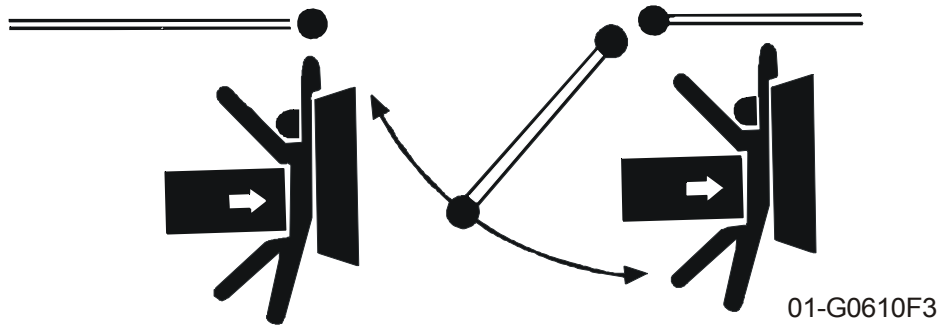


Figure 2

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 Figure 3.

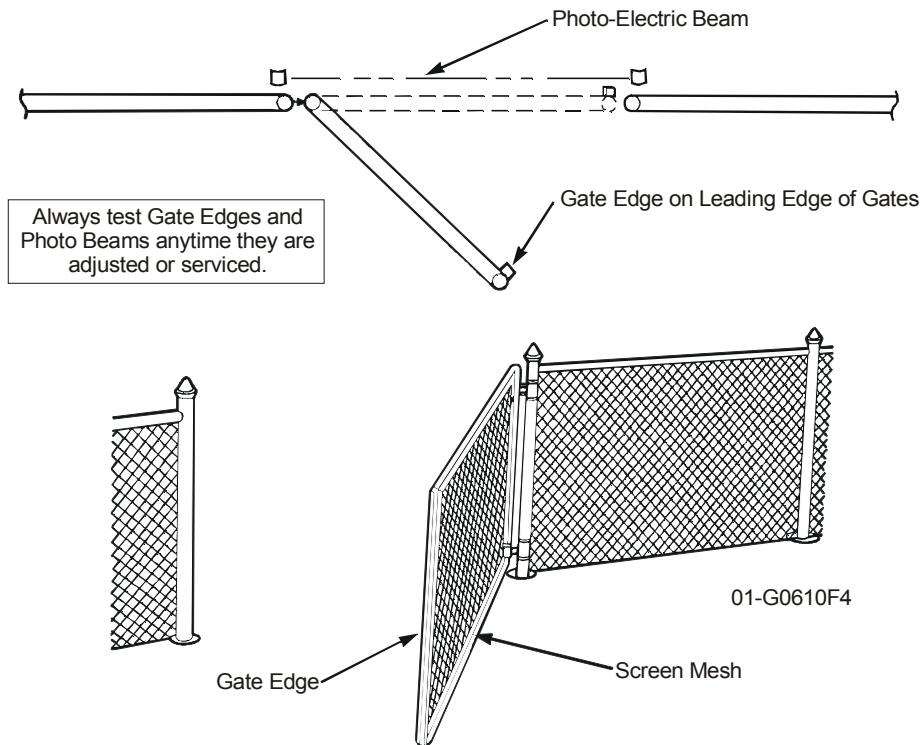


Figure 3

Preparing the Installation

Pre-Installation Check List

- 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.
- Double check the size and weight of the gate to make sure that it is proper for this application.
- 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.

		SINGLE PHASE		CONTROL WIRING		
WIRE GAUGE	H.P.	115VAC.	230VAC.	VOLT	MAX. DISTANCE	WIRE GAUGE
6	1/3	684 ft.	3,077 ft.	24	1000	18
8	1/3	432 ft.	1,942 ft.			
10	1/3	271 ft.	1,218 ft.			
12	1/3	170 ft.	763 ft.			

Table 4: Power and Control Wiring Chart



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

- 1 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.
- 2 To service the solid state controller or other components of the electrical box, slide the electrical box out, then pivot down.
- 3 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.

- 4 Select the preferred method of electrical wire entry. The SW420 is provided with (6) holes in the bottom of the chassis for electrical entry. Power supply wiring will be routed to the large double electrical box on the left side of the operator.

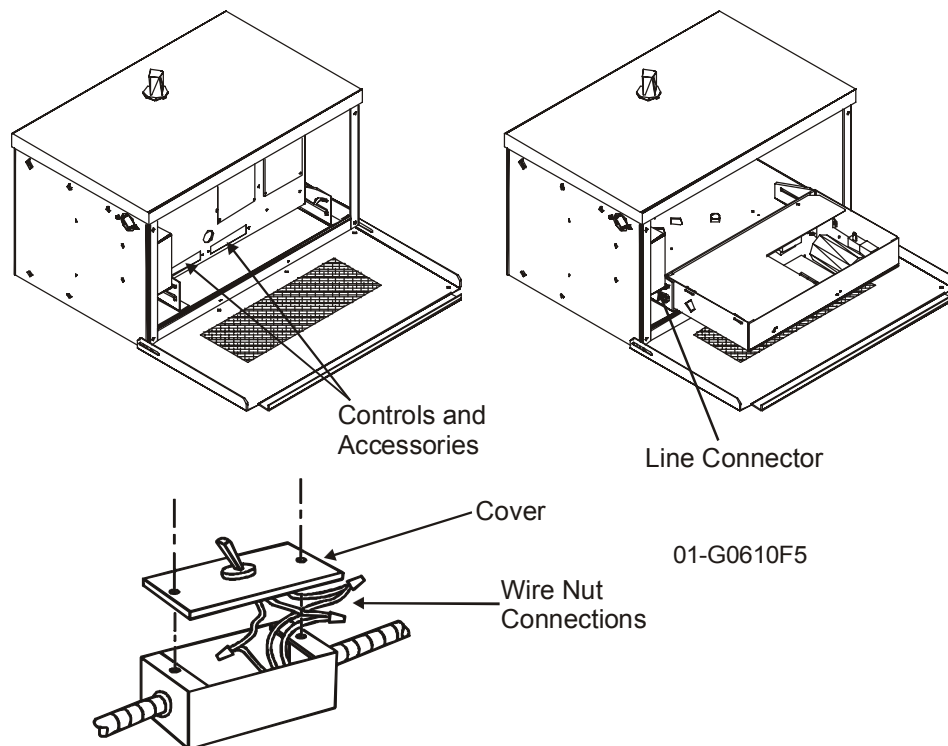


Figure 4

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 on p. 12. Locate electrical conduit.
- 2 Excavate required areas for conduit installation and mounting posts.
- 3 Set mounting posts and conduit in place.

The operator cabinet may be installed either parallel or perpendicular to the fence with access cover facing away from fence (see Figure 5 or Figure 6).



IMPORTANT NOTE: The 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 of the gate hinge.

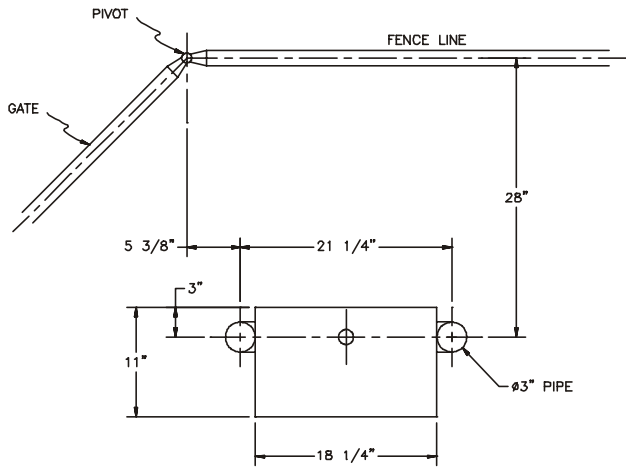
Knockouts for 3" pipe clamps (not supplied) are in the operator.

- 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).
- 6 Set the operator between the posts. Allow 3" ground clearance from bottom of cabinet.
- 7 Insert the U-Bolt Nut (80-22754) through the cabinet wall from the inside and onto the leg of the U-Bolt. This nut can be tightened with a wrench from outside the cabinet.
- 8 Use standard 3/8-16 hex nuts to secure all remaining U-Bolts.

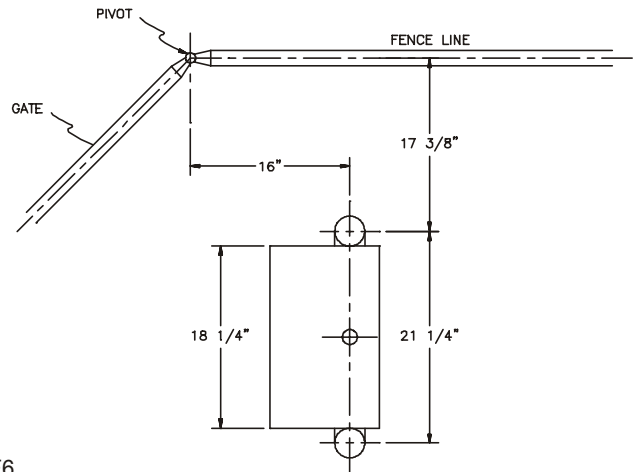
If mentioned holes are used, note that the upper rear holes are larger than the other holes. This is because a special nut is required for the U-Bolt in these holes due to an inaccessibility of tools inside the cabinet in the area of these holes.

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.

A special tool is provided for this purpose (see Figure 6).



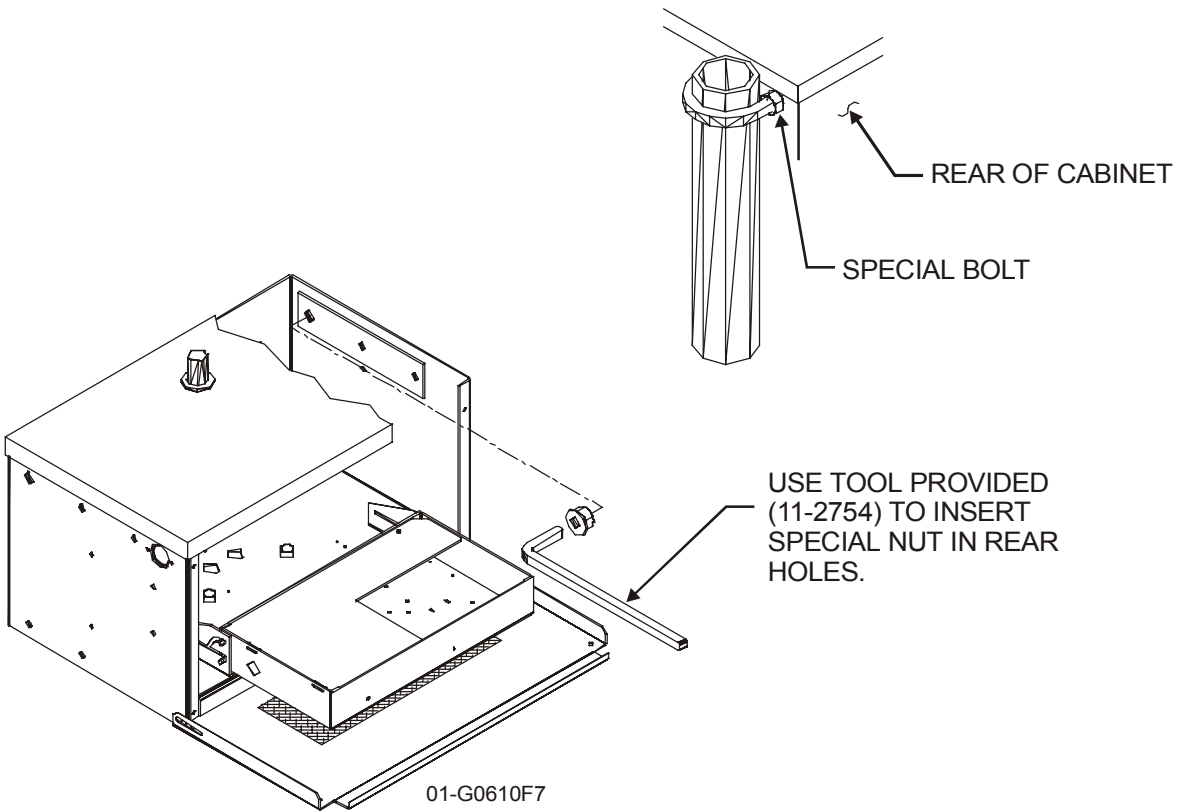
**SW420 POST
PARALLEL MOUNT**



**SW420 POST
PERPENDICULAR MOUNT**

01-G0610F6

Figure 5



01-G0610F7

Figure 6

Pad Mount Installation

- 1 Layout the concrete pad as detailed in Figure 7. Locate the electrical conduit.
- 2 Excavate required areas for pad and conduit.
- 3 Locate (4) 3/8" x 6" minimum length L-Bolts (not supplied) as shown in Figure 7.
- 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 SW420 with the hardware provided.
- 7 After the concrete has set, secure the operator to the pad.
- 8 The L-Bolts should be secured with hex nuts and lockwashers (not supplied).

Operator cabinet may be installed either parallel or perpendicular to the fence with access cover away from fence.

Pad depth should be below the frost line or as required by local codes.

The L-Bolts should protrude one inch above the pad.

IMPORTANT NOTE: *The relative location of the operator to the fence and the gate is critical. Be sure that the measurements for operator mounting are taken from the **centerline** of the fence and of the gate hinge.*

Refer to Figure 7.

It is very important that the operator be level and square to the gate.

The L-Bolts will protrude through the holes in the mounting brackets.

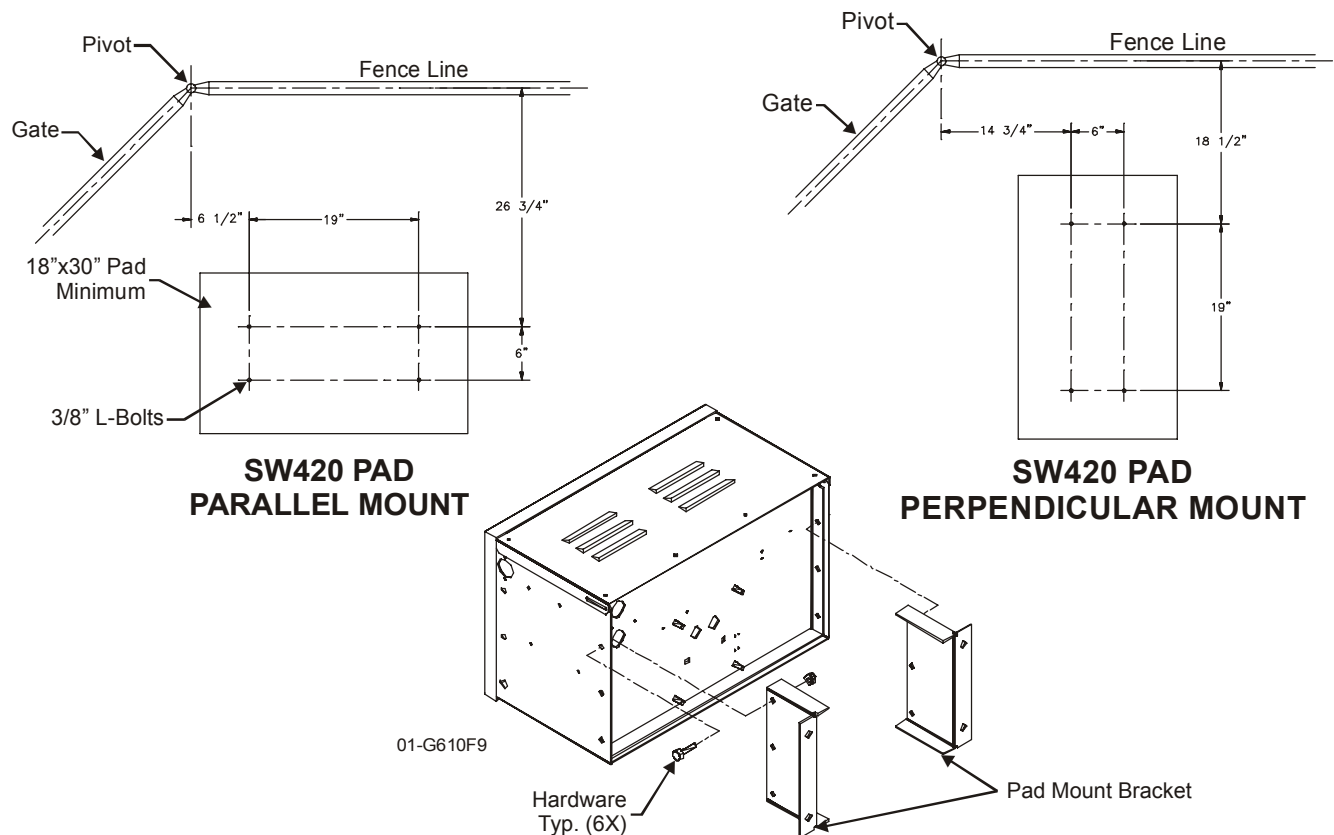


Figure 7

Pedestal Mount Installation

- 1 Locate pedestal according to Figure 8. Locate the electrical conduit. Wires may be run inside pedestal and through holes in the bottom of chassis.
- 2 Excavate required areas for pedestal and conduit. Pedestal should be below the frost line or as required by local codes.
- 3 Bolt the mounting brackets to the pedestal as shown in Figure 8.
- 4 Set pedestal and electrical conduit in place.
- 5 Pour cement to secure pedestal in place.
- 6 After 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.

Operator cabinet may be installed either parallel or perpendicular to the fence.

Pedestal should protrude no more than 12" above ground.

IMPORTANT NOTE: *The relative location of the operator to the fence and the gate is critical. Be sure that the measurements for operator mounting are taken from the **centerline** of the fence and of the gate hinge.*

Allow concrete to set for (2) days before installing power unit.

Secure with hex nuts provided. It is important that the operator be level.

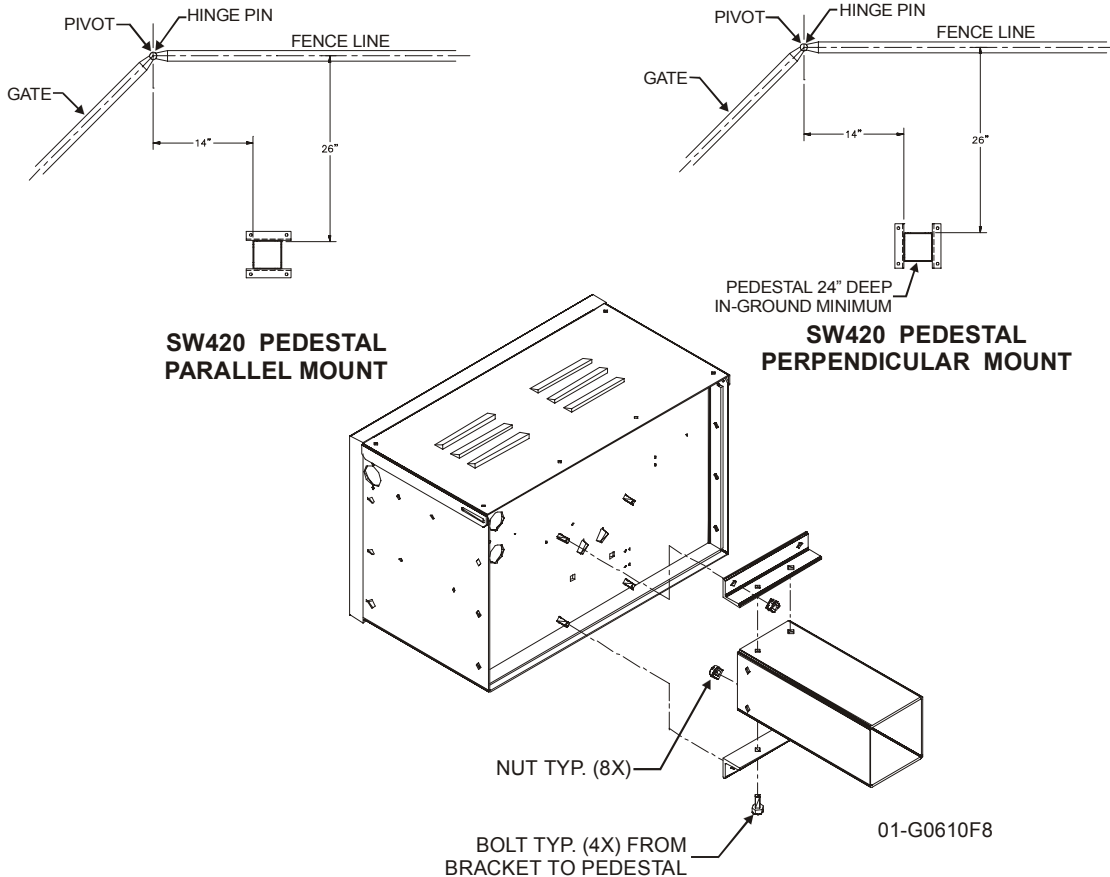


Figure 8

Control Arm Assembly

- 1 Assemble the control arm to the operator hub.
- 2 Push up the manual release pin (80-2752) from below the hub and through the control arm. Then retain in place with the clevis pin (80-2753).
- 3 Using the 3/8" washers (80-206-65), take up any play between the clevis pin and the top of the control arm.
- 4 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.**
- 5 Fasten the arm stop (07-2705) to the extension arm. Left hand or right hand installations call for mounting the arm stop on opposite sides of the extension arm.

See Figure 9.

A cotter pin (86-HP-4) keeps the clevis pin (80-2753) from vibrating out of place.

Refer to Figure 9 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!

- 6 Assemble the extension arm to the control arm using the hardware provided as shown in Figure 9.
- 7 Assemble the gate bracket (10-2111) to the extension arm as shown.
- 8 Put the gate in the fully closed position and extend the arm assembly out to the closed gate. Mark the point on the gate where the gate bracket will mount to the gate.

Use the center hole in the extension arm. The other holes may be used for arm adjustment at a later time.

The gate bracket should pivot freely on the arm.

Be sure that the control arm is pressed tightly against the arm stop.



IMPORTANT NOTE: The gate bracket must be installed so that the arm assembly is level and able to operate smoothly.

- 9 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.
- 10 Attach the gate bracket with U-bolts or by welding.

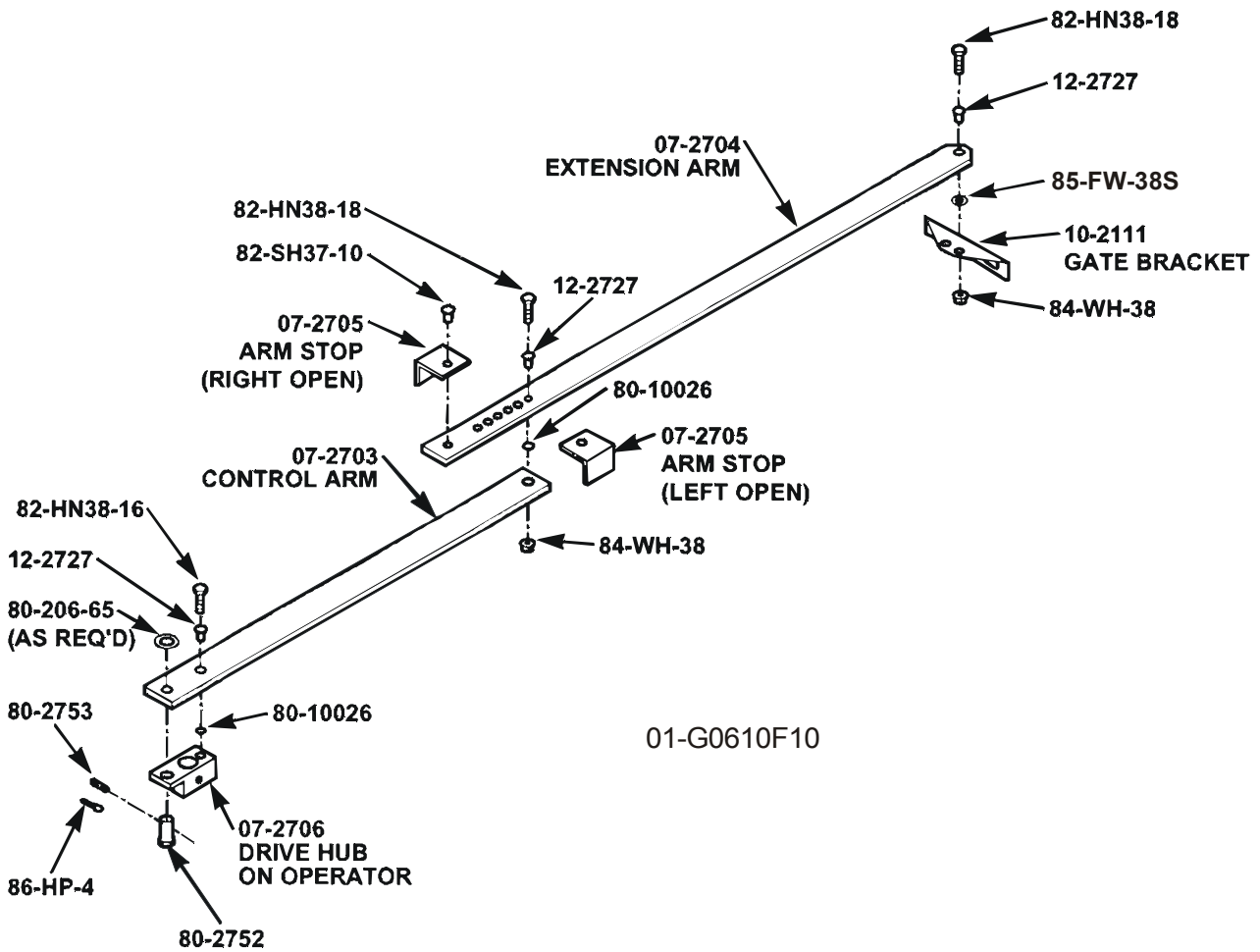


Figure 9

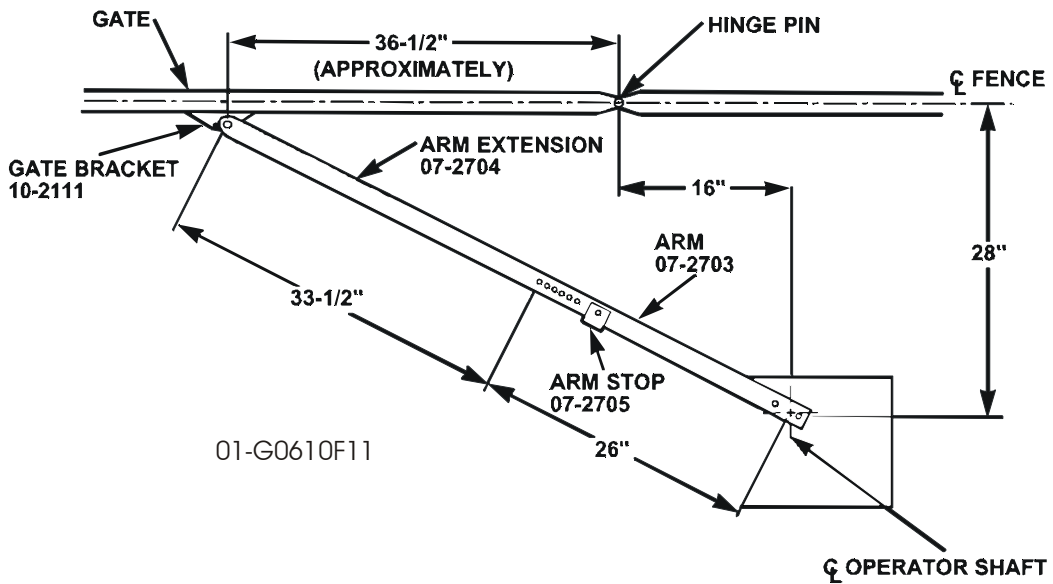


Figure 10

System Features

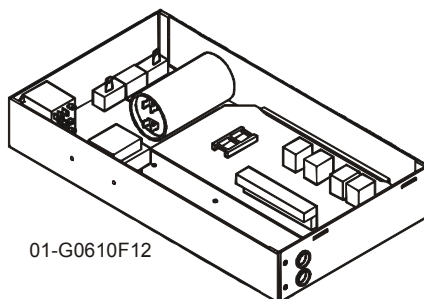


Figure 11: SW420 CONTROLLER

Visible/Audible Devices

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

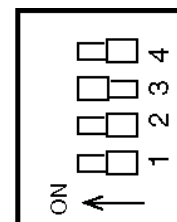
If the operator should have a second inherent obstruction in sequence with the first; (i.e. back to back), the sounder will activate. Also, the sounder can be programmed to come on 2 seconds prior to gate movement, and stay on during gate movement.

Single/Three Button Controls and the Microprocessor

THREE BUTTON CONTROL (SEQUENCE OF OPERATION)

The three controls on the module are Open, Stop, and Close. The Close control is programmable.

- Stop will override all other functions.
- If closing, the Open command will cause the operator to stop and reverse to full open. The Close command will close the gate 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).



01-20213F3

Figure 12

SINGLE BUTTON CONTROL (SEQUENCE OF OPERATION)

Open to open limit, close, reopen. If power has been interrupted, the operator 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 **Controls and Accessory Install** on p. 24.

Obstruction Sensing

INHERENT OBSTRUCTION PROTECTION

The pulley is equipped with an R.P.M. sensor. When the gate meets an obstruction, the loss of R.P.Ms. 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 a gate edge. When the device mentioned activates, 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.

Circuitry

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

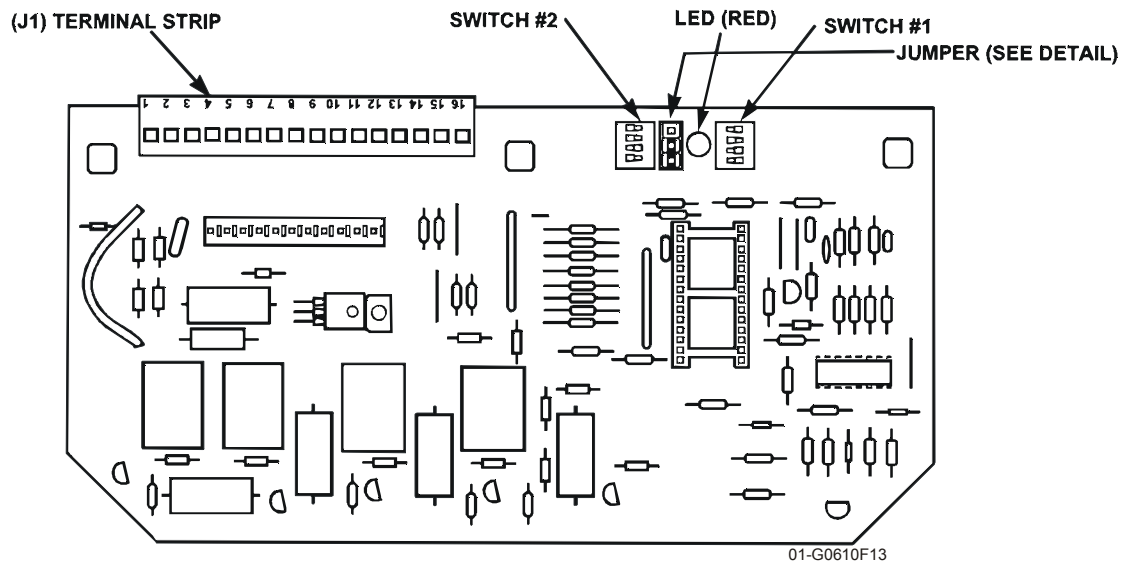


Figure 13: Main Control Board

Switch #1: Operator Programming

Refer to Table 5.

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

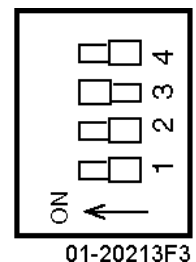
ON = Warning device will turn on 3 seconds before gate starts to move in either direction.
 OFF = Warning device disabled.

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 midstop).
- Blinking 2 flashes per second = Entrapment level 1 (operator reverse to limit).



01-20213F3

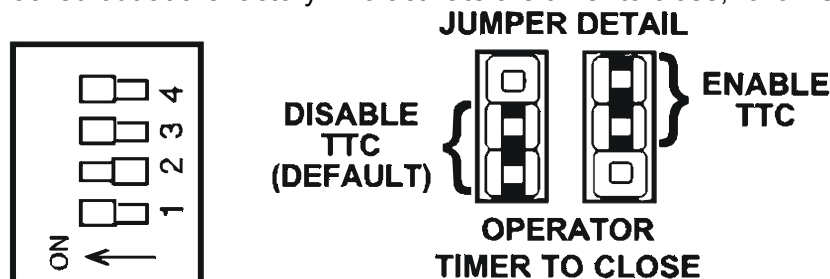
Figure 14

POLE #1	POLE #2	POLE #3	POLE #4	TOTAL TIME WARNING DEVICE <i>DISABLED</i>	TOTAL TIME WARNING DEVICE <i>ENABLED</i>
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.	2 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.

Table 5

Switch #2: Timer to Close

Timer to close is locked out at the factory. To activate the timer to close, follow steps below:



01-G0610F14

Figure 15

- 1 Move safety jumper from bottom two pins to top two pins. Then set time per the chart above (Table 5).
- 2 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.
- 3 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 NOTE: When using master/slave, only set the time for the master operator. The slave operator must be set to disabled position (all poles on).

Limit Switch Adjustments



CAUTION

Never place hands or tools inside operator or near drive mechanism unless power is off.

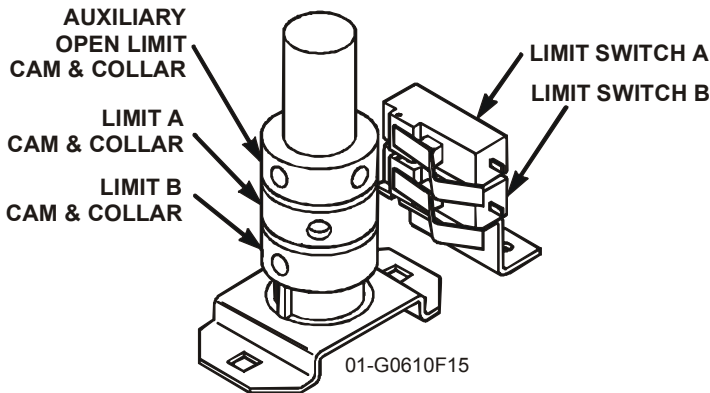
- 1 **Before turning on electrical power**, disconnect the extension arm from gate bracket so that the gate is no longer connected to the operator.
- 2 Push the manual release pin up through the control arm and slide clevis pin in place. Secure clevis pin with a cotter pin.
- 3 Identify the limit switches.

See Figure 16.

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	A	B
Left	B	A

Figure 16



CAUTION

When following the limit switch adjustment procedure, the motor belt will turn and the control arm will move during some of the steps. Keep hands and tools out of the operator and away from the arm and drive shaft unless power is off, or serious injury may result.

- 4 Turn on electrical power.



CAUTION

Be aware that the operator arm may start to move if a control device has been improperly connected. Keep hands and tools out of the operator and away from the arm and drive shaft.

- 5 Press the **CLOSE** button or connect terminals #3 & #1 or #3 & #2, depending on which installation you have (left or right hand opening). The OPEN/CLOSE button is a constant pressure function.

The control arm should start to move in the direction that would close the gate if it were connected.

If the control 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.

- 6 When the control arm is pointed in the approximate direction of the gate bracket (on the fully closed gate), press the **STOP** button or release terminals 3 & 1 or 3 & 2.

The control arm should stop.

If the control arm does not stop, 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.

If 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.

- 7 **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.

The close limit switch is now "coarse set."

- 8 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 off 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.

- 9 **Turn on power!** Press the **OPEN** button (with constant pressure) or connect terminal #1 and #3 (or 2 & 3, depending on right or left hand operation) 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.*

- 10 When the gate reaches the desired fully open position, press the **STOP** button or release terminals 1 & 3.

The gate should stop.

- 11 **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.

The open limit switch is now "coarse set."

- 12 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 cam away from the limit switch increases gate travel. Rotating 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).

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

Refer to Figure 10. 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.

Controls and Accessory Installation

See wiring diagram for more information. See Wiring Specifications on p. 9 for wiring distances and wire gauge information.

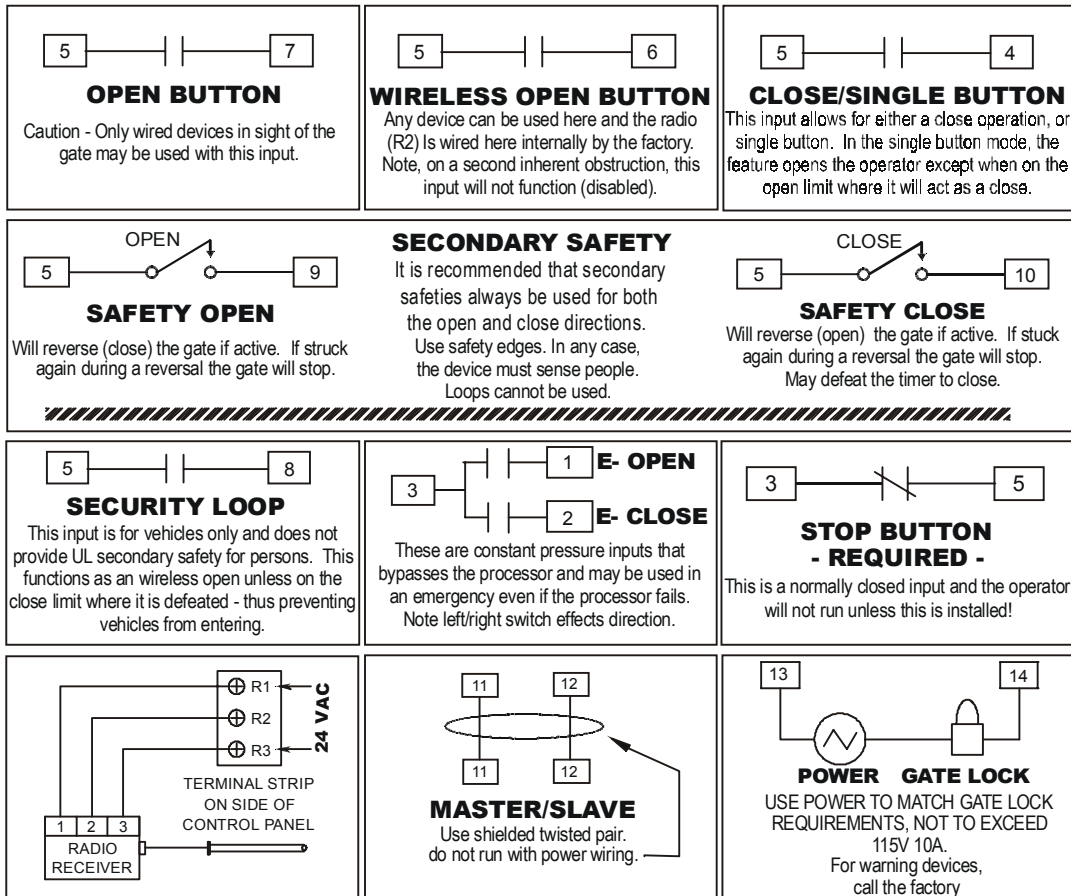
All inputs are normally open and momentary, except the stop (NC), and emergency close and emergency open (constant pressure). The following instructions are based upon UL 325, dated March of 1999 and include recommendations for significant increase in safety.

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.



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.



01-G0610F16

Figure 17



NOTE: 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.

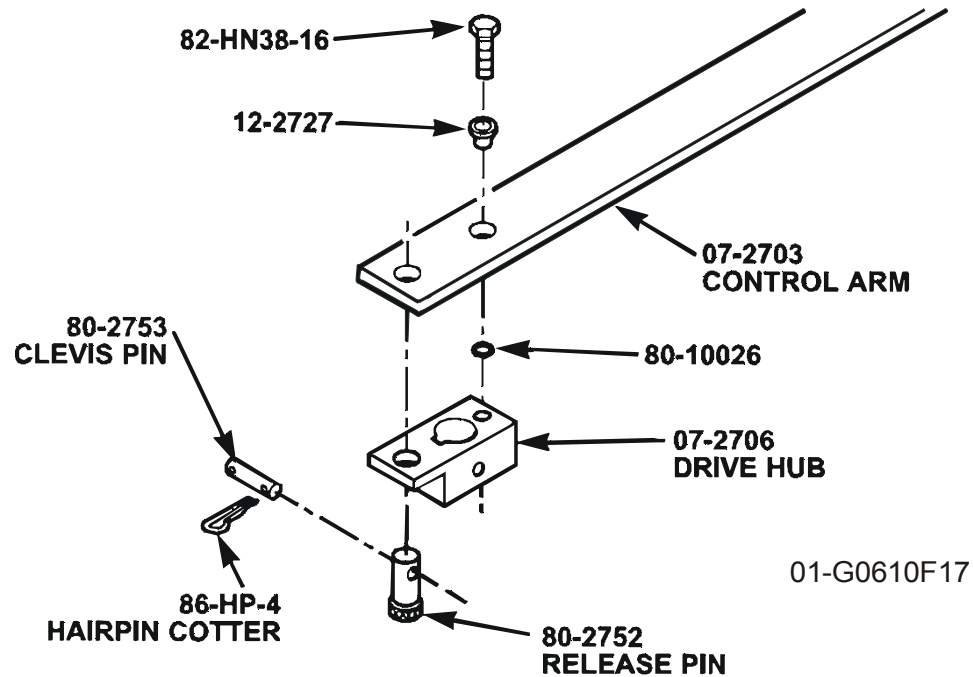


Figure 18

Required Maintenance

Normal Usage




		Check at least once every (#) of months			
ITEM	ACTION	1	3	6	12
 Internal speed sensor	Check for proper operation	*			⇌ Complete Checkout ⇌
 External safety systems	Check for proper operation	*			
 Gate caution signs	Make sure they are present	*			
Sprockets & pulleys	Check for set screw tightness			*	
Gate	Inspect for wear or damage			*	
Accessories	Check all for proper operation			*	
Electrical	Inspect all wire connections			*	
Frame bolts	Check for tightness			*	
Total unit	Inspect for wear or damage				

Table 6



CAUTION

When servicing, always disconnect operator from electrical power supply.



NOTES

- Severe or high cycle usage will require more frequent maintenance checks.
- Inspection and service should always be performed anytime a malfunction is observed or suspected.
- 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.
- It is suggested to take some voltage readings of the operator while at the site. Using a VOM, double check the incoming voltage to the operator to make sure it is within ten percent of the operator’s rating.
- 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 five (5) main areas to check out are:

- Power
- Accessories
- Operator's Primary Voltage
- Operator's Low Voltage
- Gear Reducer



1. Power

Always use extreme caution! Some possible symptoms of power problems include:

- 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

Table 7

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.

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.

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.

5. 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 Mobil1 10W-30 synthetic oil 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 #04-20009

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, 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.

Features and Program Troubleshooting Review

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.

Parts List – SW420

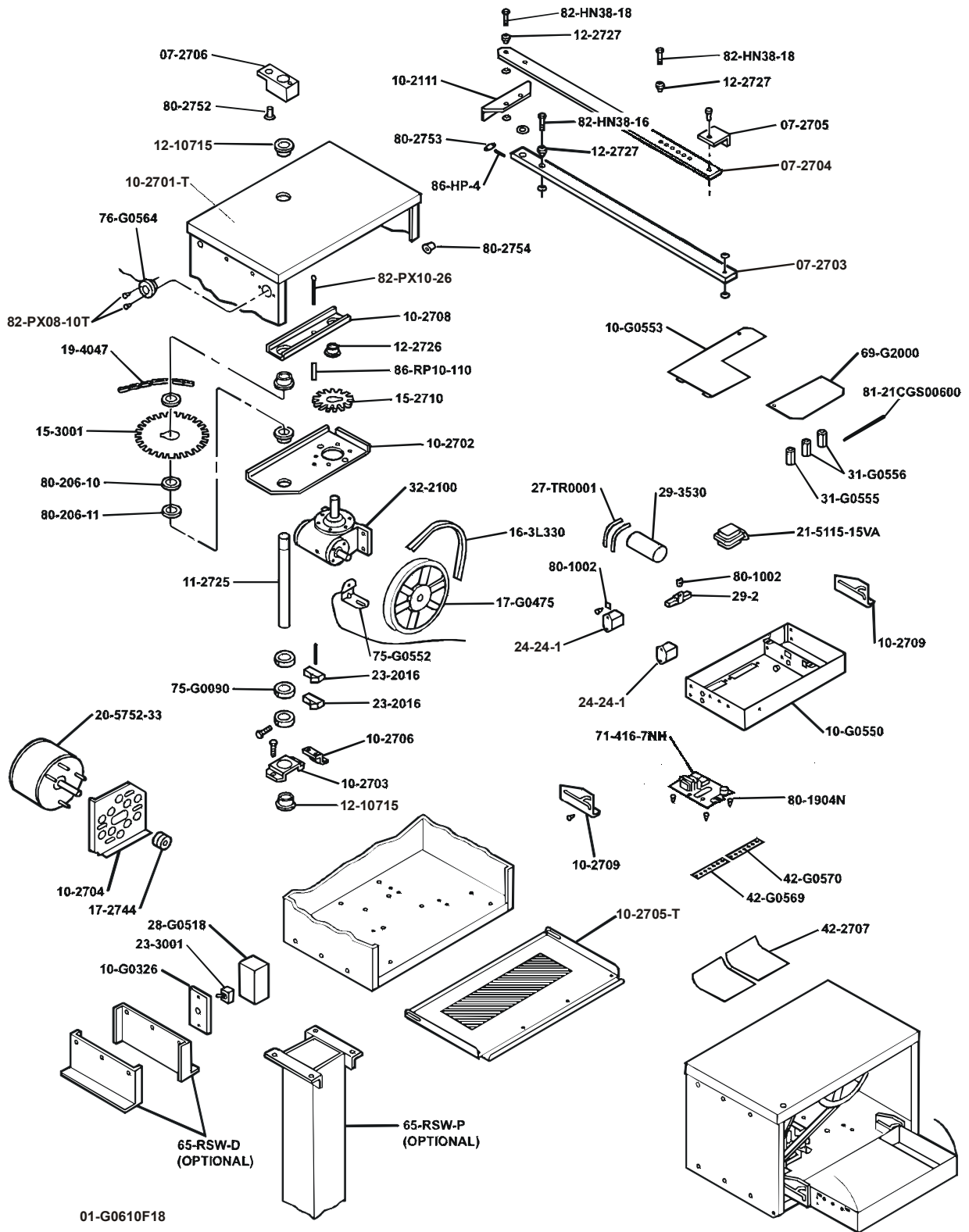


Figure 19

Part #	Description	Qty.	Part #	Description	Qty.
02-041-SP	STOP BUTTON	1	80-1002	6-32 TINNEMAN NUT	5
07-2703	ARM	1	80-10026	3/8 x .010 SHIM (N)	2
07-2704	EXTENSION ARM	1	80-206-10	1-1/2 x 1.03 x .015 SPACER	1
07-2705	ARM STOP	1	80-206-11	1 x 1/16 WASHER	6
07-2706	ARM HUB	1	80-206-65	.656 x 1-1/4 x .06 SPACER (N)	4
10-2111	GATE BRACKET	1	80-207-22	3/16 x 1 KEY (N)	1
10-2701-T	TAN HOUSING ASSY	1	80-207-35	1/4 x 1/4 x 1 KEY (N)	1
10-2702	REDUCER BRACKET	1	80-1904N	STANDOFF FOR FAIL SAFE BOARD (OPTIONAL)	4
10-2703	BEARING BRACKET	1	80-2110	NEOPRENE O-RING (N)	1
10-2704	MOTOR PLATE	1	80-2112	1/4 x 1/4 x 3/4 KEY (N)	1
10-2705-T	TAN FRONT COVER	1	80-2752	5/8 x 1-1/4 CLEVIS PIN	1
10-2706	SWITCH PLATE	1	80-2753	HUB LATCH PIN	1
10-2708	STIFFENER PLATE	1	80-2754	U-BOLT NUT TOOL	2
10-2709	HINGE BRACKET	2	80-G0673	3/16 x 3/4 SQUARE KEY (N)	1
10-G0326	SWITCH BOX COVER	1	81-21CGS00600	6" PLASTIC CARD GUIDE	1
10-G0550	S3 ELECTRICAL BOX	1	82-BH31-06	5/16-18 x 3/8 BUTTON HEAD CAP SCREW (N)	2
10-G0553	ELECTRICAL BOX COVER	1	82-CB31-08	CARRIAGE BOLT 5/16-18 x 1/2 (N)	2
11-2725	DRIVE SHAFT	1	82-FX06-06D	6-32 x 3/8 FLAT HEAD PHILLIP SCREW	2
11-2754	U-BOLT NUT TOOL (N)	1	82-HN25-12	1/4-20 x 3/4 HEX HEAD	3
12-10715	1" ID KEYED 1-1/4 X 1/8 FG	4	82-HN38-16	3/8-16 x 1 HEX HEAD BOLT	1
12-2726	5/8" FLANGED BEARING	1	82-HN38-18	3/8-16x1-1/4 HEX HEAD BOLT	2
12-2727	3/8 x 5/8 FLANGED BUSHING	3	82-HN6M-22	METRIC HEX HEAD CAP SCREW (N)	4
15-2710	5/8 BR 3/16 DW SPROCKET 20B11	1	82-HX10-08T	10-32 x 1/2 HEX HEAD SCREW (N)	24
15-3001	1" x 1/4" SS SPROCKET 40B32	1	82-NH31-06	5/16-18 x 3/8 SET SCREW (N)	3
16-3L320	3L320 BELT	1	82-PX04-04	4-40 x 1/4 PHILLIPS PAN HEAD SCREW (N)	1
17-2744	MOTOR PULLEY 3L x 1-3/8	1	82-PX06-06T	6-32 x 3/8 SELF TAPPING SCREW	3
17-G0475	6" MOLDED PULLEY	1	82-PX06-08	6-32 x 1/2 PHILLIP PAN HEAD SCREW (N)	2
19-4047	#40 CHAIN 47 PITCH	1	82-PX06-26	6-32 x 2-1/2 SLOTTED ROUND HEAD SCREW (N)	2
20-5752-33	MOTOR: 115VAC-1Ø- 60hz	1	82-PX08-04T	8-32 x 1/4 SELF TAPPING PHIL. HEAD SCREW (N)	3
20-5033	MOTOR: 230VAC-1Ø- 60hz	1	82-PX08-04T	8-32 x 1/4 SELF TAPPING PHIL. HEAD SCREW (N)	4
21-5115-15VA	115V x 24V x 1 TRANSFORMER	1	82-PX08-10T	8-32 x 5/8 SELF TAPPING PHILLIP HEAD SCREW	2
23-2016	NC SPST LIMIT SWITCH	2	82-PX10-26	10-32 x 2-1/2 PHILLIP PAN HEAD SCREW	1
23-3001	DPST ON/OFF TAG 20A 125-277VAC	1	82-SH37-10	3/8-24 x 5/8 SOCKET CAP SCREW (N)	1
24-24-1	24VAC DPDT RELAY	2	84-LH-06	6-32 LOCK NUT (N)	2
27-TR0001	14" ZIP TIE	2	84-LH-08	8-32 NYLON HEX LOCK NUT (N)	4
28-4362-1	5/8 HEYCO BUSHING (N)	1	84-LH-10	10-32 NYLON INSERT NUT (N)	1
28-4562	ELECTRICAL BOX BUSHING (N)	1	84-RH-04	4-40 LINK KEYPAD NUT (N)	1
28-4875-1	3/4" SHORTY BUSHING (N)	2	84-WH-25	1/4-20 SERRATE FLANGE NUT (N)	2
28-G0518	CONDUIT BOX 4 x 4 x 2.125 DEEP	1	84-WH-31	5/16 SERRATED FLANGE LOCK NUT (N)	2
29-2	2 OHM RESISTOR w/MTG BRACKET	1	84-WH-38	3/8-16 SERRATED FLANGE NUT (N)	2
29-2700-2	HALL EFFECT BOARD (N)	1	84-WN-06	#6 SOLID WING NUT (N)	2
29-3530	70MFD 220V CAPACITOR	1	85-FW-06	#6 FLAT WASHER (N)	5
29-G0564	ALARM HIGH OUTPUT W/DIODE (N)	1	85-FW-10	#10 FLAT WASHER (N)	4
29-IC-A3122EUA	HALL EFFECT SENSOR (N)	1	85-FW-20	#10 FENDER WASHER (N)	2
31-2712	NYLON SENSOR SPACER (N)	2	85-FW-25	1/4" SAE FLAT WASHER (N)	3
31-G0555	ALUMINUM HEX STANDOFF	1	85-FW-25	1/4 SAE FLAT WASHER (N)	4
31-G0556	NYLON HEX STANDOFF	2	85-FW-31	5/16 SAE FLAT WASHER (N)	1
32-2100	30:1 REDUCER	1	85-FW-38S	13/16 x 13/32 FLAT WASHER (N)	1
41-G0538	S3 ALARM SPACER (N)	1	85-LS-04	#4 LOCK WASHER (N)	1
42-2707	TERMINAL STRIP INSULATOR	2	85-LS-06	#6 LOCKWASHER (N)	2
42-8116-1	16 POSITION TERM. BLOCK PC BOARD (N)	1	85-LS-25	1/4" LOCK WASHER (N)	7
42-G0570	TERMINAL STRIP	1	85-LS-31	5/16" SPLIT LOCKWASHER (N)	2
42-G0569	TERMINAL STRIP	1	86-HP-4	.072 HAIR SPRING COTTER PIN	1
65-RSW-D	PAD MOUNTING KIT (OPTIONAL)	1	86-RP03-10	3/32 x 5/8 ROLL PIN (N)	1
65-RSW-P	PEDESTAL MOUNTING KIT (OPTIONAL)	1	86-RP10-110	5/16 x 1-5/8 ROLL PIN	2
69-G2000	S3 PCB	1	87-E-100	1" PLATED 'E' RING (N)	1
71-416-7NH	24V LOOP BOARD (OPTIONAL)	1	87-P-100	SELF LOCKING EXT. RETAINING SHAFT RING (N)	1
73-G0087	RSW REDUCER ASSEMBLY (N)	1	90-4203311	VARIABLE PHANTOM KIT (N)	1
74-G0568	HALL EFFECT ASSEMBLY (N)	1	90-G0686	RADIO KIT (N)	1
74-G0609	110V WIRING HARNESS (N)	1	91-G0174	1" SHAFT COLLAR ASSY (N)	2
74-G0684	12" COAX CABLE ASSY (N)	1	G412HM	HIGH MEMORY CO-AXIAL RX (N)	1
74-SW420	S3 CONTROL BOX (N)	1	G86LM	LM ANTENNA ACCESSORY KIT (N)	1
75-G0090	LIMIT COLLAR ASSY	1	MG6251002	6-32 x 3/8 SLOTTED HEX SCREW (N)	3
75-G0552	HALL EFFECT ASSEMBLY	1	MG6400102	#6 SHAKE PROOF WASHER (N)	3
76-G0564	ALARM ASSEMBLY (N)	1	MG6400103	#8 EXTERNAL TOOTH WASHER (N)	1

Table 8: Parts List

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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Call our toll free numbers:

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(800) 998-9197

Installation and service information is available six days a week.

TO ORDER REPAIR PARTS

Call our toll free numbers:

(800) 528-2806

(800) 998-9197

Prepare to provide the following information when ordering repair parts:

- **Part Number**
 - **Part Name**
 - **Model Number**
-
-