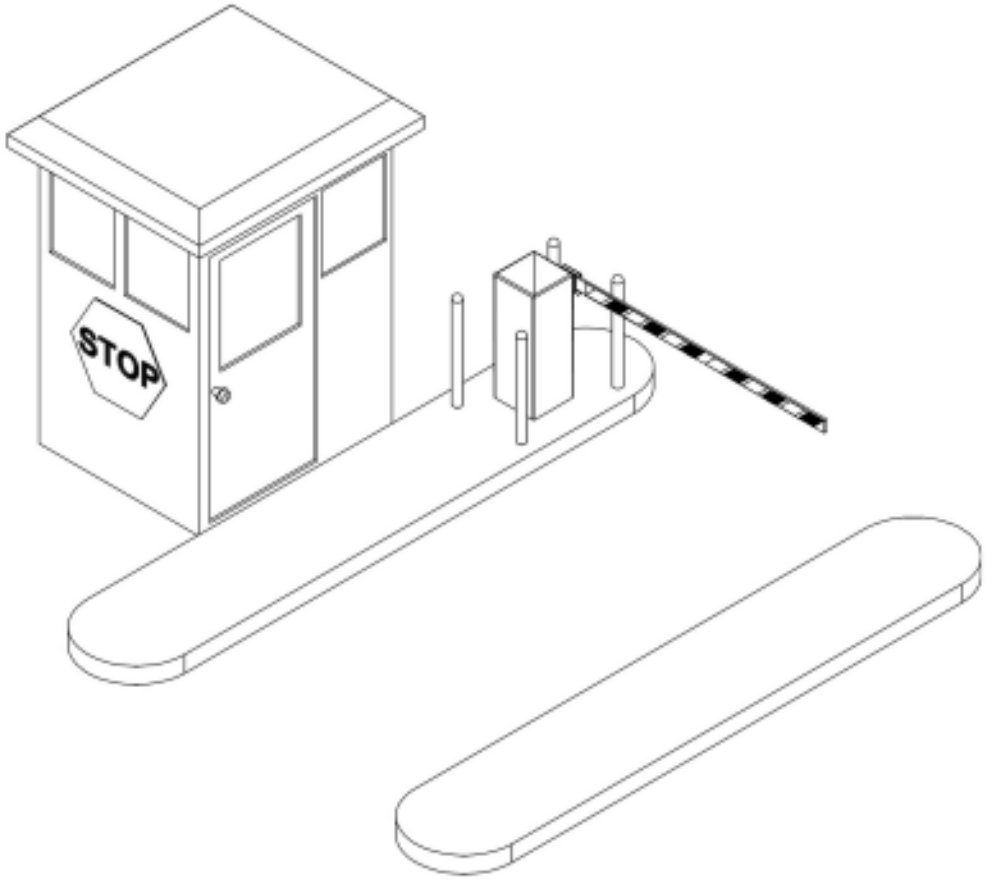
BGU • BGU-D

INSTALLATION GUIDE



OSCO®

OPERATOR SPECIALTY COMPANY, INC.

CASNOVIA, MI 49318 • U.S.A.

Oct. 2005, Rev. 19

TABLE OF CONTENTS

CAUTION!

ONLY QUALIFIED SERVICE TECHNICIANS SHOULD WORK ON AN OSCO BARRIER GATE OPERATOR

GATE OPERATOR CLASSIFICATIONS

All gate operators can be divided into one of four different classifications, depending on their design and usage.

Class I Residential Vehicular Gate Operator
A vehicular gate operator intended for use in a home of one to four single family dwellings, or garage or parking area associated with these dwellings.

Class II Commercial / General Access Vehicular Gate Operator
A vehicular gate operator intended for use in a commercial location or building such as a multifamily housing unit of five or more single family units, hotel, retail store or other building servicing the general public.

Class III Industrial / Limited Access Vehicular Gate Operator
A vehicular gate operator intended for use in an industrial location or building such as a factory or loading dock area or other location not intended to service the general public.

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

OSCO barrier gate operator models BGU and BGU-D meet the requirements for all four classifications.

SAFETY INFORMATION AND WARNINGS

Read the following before beginning to install OSCO barrier gate operators:

1. Read the blue “Safety Instructions” brochure enclosed with the packet of information. If you do not have one, please call OSCO at 1-800-333-1717 to request one. Read and follow all instructions.
2. All electrical connections to the power supply must be made by a licensed electrician and must observe all national and local electrical codes.
3. A separate power-disconnect switch should be located near the operator so that primary power can be turned off when necessary.
4. Barrier gate operators are for vehicular traffic only. If pedestrian traffic is expected, a separate pedestrian gate must be installed.
5. Never reach between, through or around the fence to operate the gate.
6. You must install all required safety equipment.

PRE-INSTALLATION INFORMATION

Before unpacking, inspect the carton for exterior damage. If you find damage, advise the delivery carrier of a potential claim. Inspect your package carefully. You can check your accessory box parts with the enclosed packing slip for your convenience. Claims for shortages will be honored for only 30 days from the date of shipment.

Before installing the operator, read this manual completely to ensure all requirements for proper installation are present. Verify that the voltage to be used matches the voltage of the operator.

The following contact or non-contact obstruction detection devices have been approved for use with OSCO barrier gate operators as part of a UL325 compliant installation:

2520-441	MMTC Model IR-55 photo eye, 165’ with mounting hardware
2520-031	MMTC Model E3K photo eye, 28’ with mounting hardware

WIRING SPECIFICATIONS

1. Select from the chart at the bottom of this page corresponding to the model, voltage and horsepower rating of your operator.
2. The distance shown on the chart is measured in feet from the operator to the power source. **DO NOT EXCEED THE MAXIMUM DISTANCE**. These calculations have been based on standard 115V and 230V supplies with a 10% drop allowable. If your supply is under the standard rating, the runs listed may be longer than what your application will handle, and you should not run wire too near the upper end of the chart for the gauge of wire you are using.
3. When large-gauge wire is used, a separate junction box (not supplied) may be needed for the operator power connection.
4. All control devices are now 24VDC, which can be run considerable distances.
5. Wire run calculations are based on the National Electrical Code, Article 430 and have been carefully determined based on motor inrush, brake solenoids, and operator requirements.
6. Connect power in accordance with local codes. **The green ground wire must be properly connected.**
7. Wire insulation must be suitable to the application.
8. Control wiring must be run in a separate conduit from power wiring. Running them together may cause interference and faulty signals in some accessories.
9. Electrical outlets are supplied in all 115VAC models for convenience with occasional use or low power consumption devices only. If you choose to run dedicated equipment from these devices, it will decrease the distance for maximum run and the charts will no longer be accurate.
10. A three-wire shielded conductor cable is required to connect master and slave operators. You must use Belden 8760 Twisted Pair Shielded Cable (or equivalent) **only** – OSCO part number 2500-1982, per foot). See page **8** for details of this connection, as well as dip switch selection. **Note: The SHIELD wire should be connected in both the master and slave operators.**

USE COPPER WIRE ONLY!

MODEL BGU

Power Wiring			
Volts & HP	Max Distance Single	Dual	Wire Gauge
115V	336	168	12
	534	267	10
	850	425	8
	1350	675	6
1/3HP	2148	1074	4

MODEL BGU-D

Power Wiring			
Volts & HP	Max Distance Single	Dual	Wire Gauge
115V	970	485	12
	1542	771	10
	2452	1226	8
1/2	3898	1949	6
HP	6200	3100	4

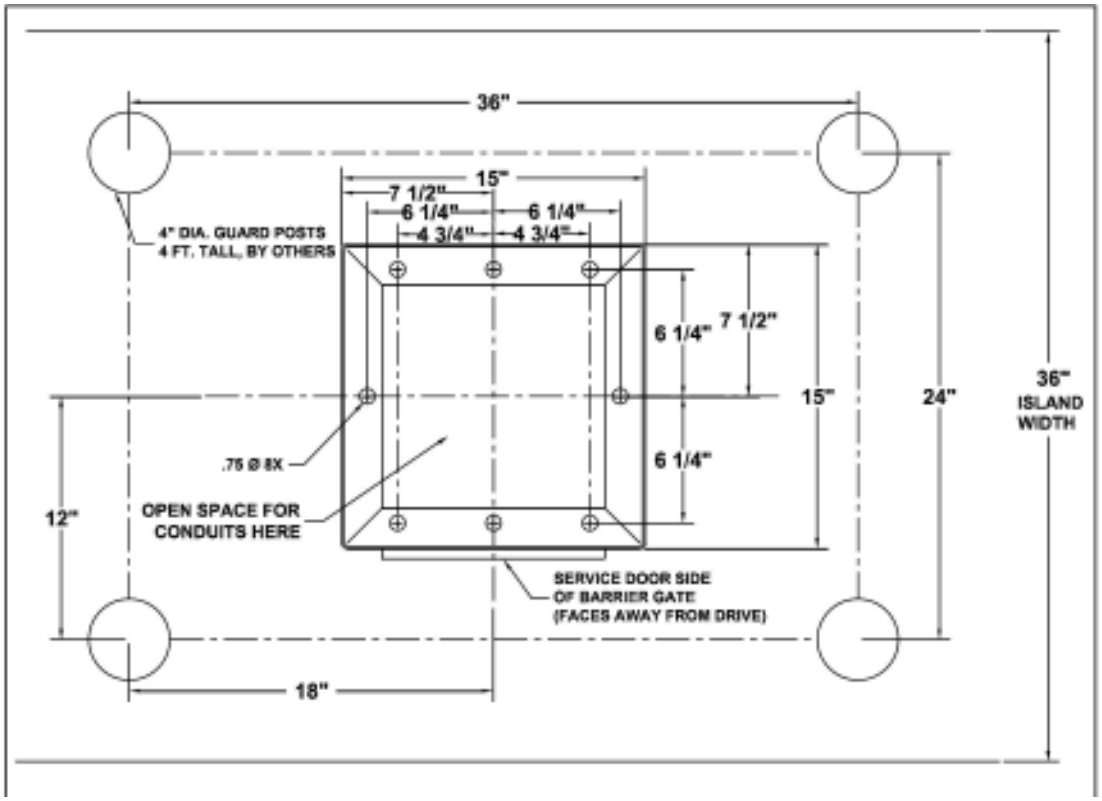
MODEL BGU ACCESSORY WIRING

All Models		
Volts	Maximum Distance (ft.)	Wire Gauge
24VAC	250 350*	14 12
24VDC	0-2000	14
*Over 350 ft. use DC power.		

MODEL BGU-D ACCESSORY WIRING

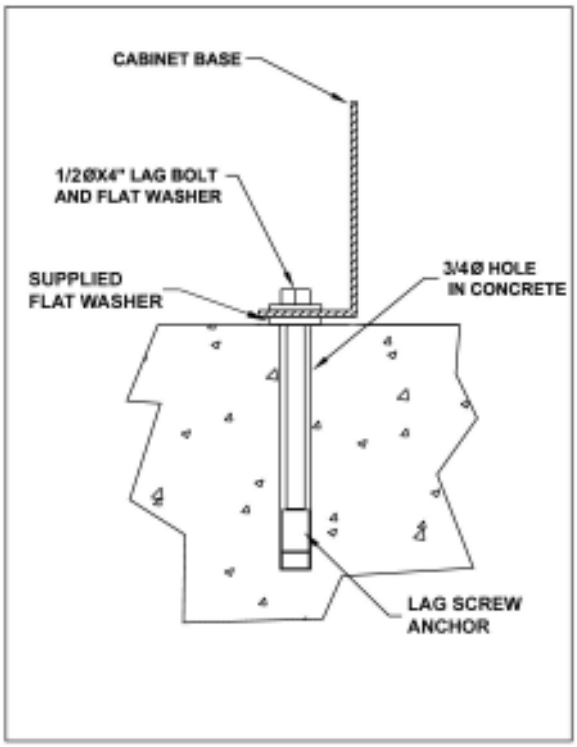
All DC Models		
Volts	Maximum Distance (ft.)	Wire Gauge
24VDC	0-2000	14
*Over 350 ft. use DC power.		

MOUNTING INSTRUCTIONS BGU AND BGU-D



INSTALLATION ON CONCRETE CURB

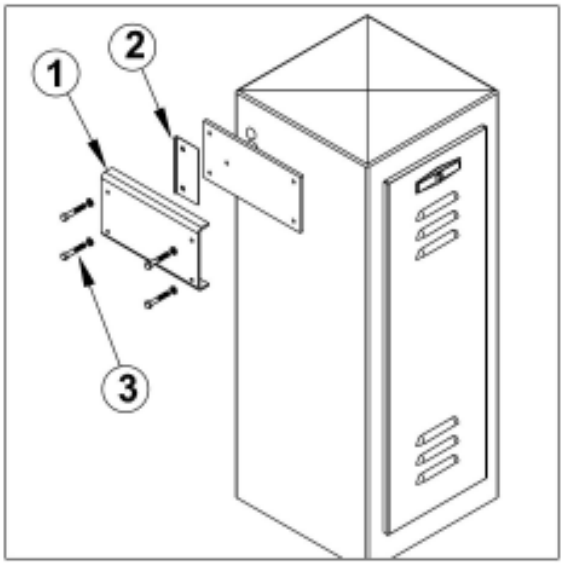
1. Uncrate the gate. Avoid damaging the cabinet finish.
2. Leave the machine bolted to the bottom pallet until ready to install.
3. Open the cabinet door.
4. Remove the bolts holding the gate to its pallet and place the machine in position on the curb. Refer to your Equipment Layout (EL) drawing for proper positioning of your gate.
5. With a pencil, mark the location of the mounting holes on the concrete.
6. Set the gate aside. Drill all four mounting holes using a 3/4" diameter rotary hammer percussion drill bit. Insert lag screw anchors for 1/2" lag bolts. Place the gate back in position, and anchor it with 1/2" lag bolts and flat washers. Lubricate the bolts before installation. Flat washers have been supplied to go between pavement and cabinet. **OSCO highly recommends using the corner mounting holes when mounting barrier gates.**
7. Proceed with the rest of the installation process.



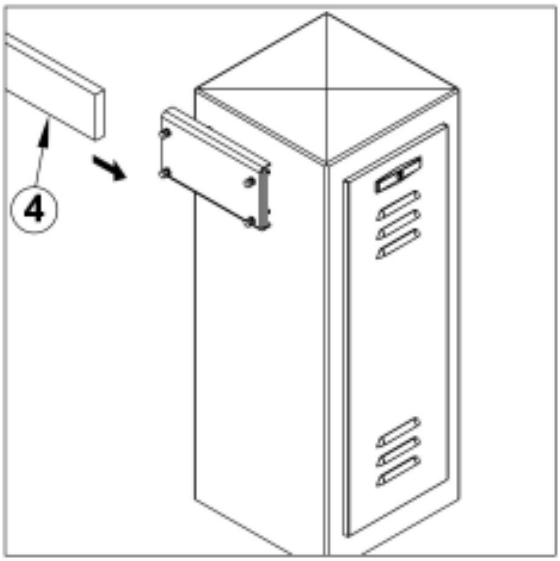
BARRIER GATE ARM INSTALLATION FOR MODELS

BGU AND BGU-D

Numbered items in these drawings are for instructional reference only. For actual part numbers, go to the parts lists in the back of this booklet.



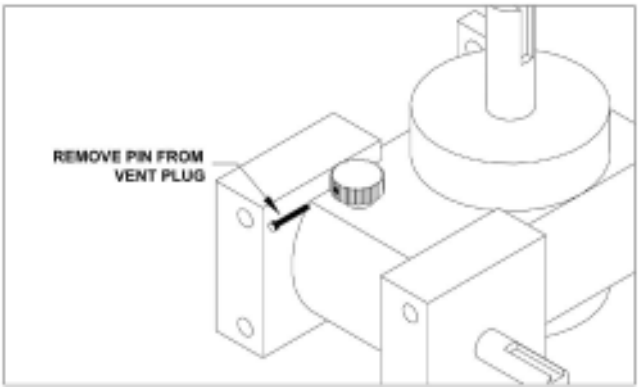
1. Assemble gate arm flange (1) with cutting edge plate (2) onto the arm plate of the operator using the 3/8" hardware provided (3). The cutting edge plate should face toward the direction from which traffic is most likely expected. Do not completely tighten the bolts at this time.



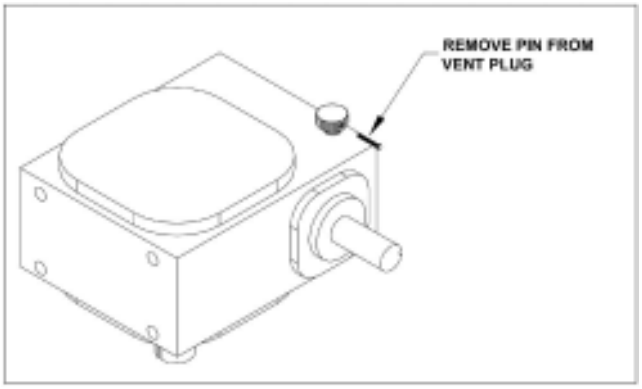
2. Slide the gate arm (4) through the opening in the arm flange assembly as shown. There should be sufficient clearance for the board to slip between the bolts. Once the arm is positioned you can tighten down the bolts.

VENT PLUG INSTALLATION

Gear reducers used in OSCO gate operators will have pinned vent plugs installed prior to shipping in order to keep the oil from spilling out during transportation. During installation this pin should be removed to allow proper ventilation. See the illustrations below.

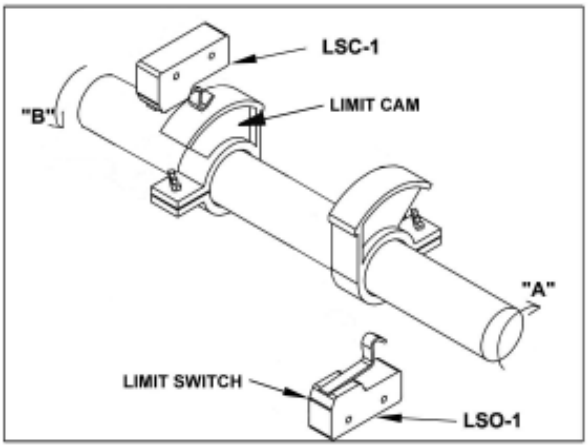


OR



LIMIT CAM ADJUSTMENTS

The limit cams for all models of barrier gate operators have been pre-set at the factory for approximately 90 degrees of motion. If you need to adjust this further, please follow the directions below. If the arm reverses just after you attempt to open it, you may need to adjust the open direction current sensor one turn higher. Refer to page **10** for details of current sensing adjustment.



1. For **more downward travel**, loosen the wingnut on the LSC-1 (down) limit cam and rotate the cam slightly in the "B" direction.
2. For **less downward travel**, loosen the wingnut on the LSC-1 (down) limit cam and rotate the cam slightly in the "A" direction.
3. For **more upward travel**, loosen the wingnut on the LSO-1 (up) limit cam and rotate the cam slightly in the "A" direction.
4. For **less upward travel**, loosen the wingnut on the LSO-1 (up) limit cam and rotate the cam slightly in the "B" direction.

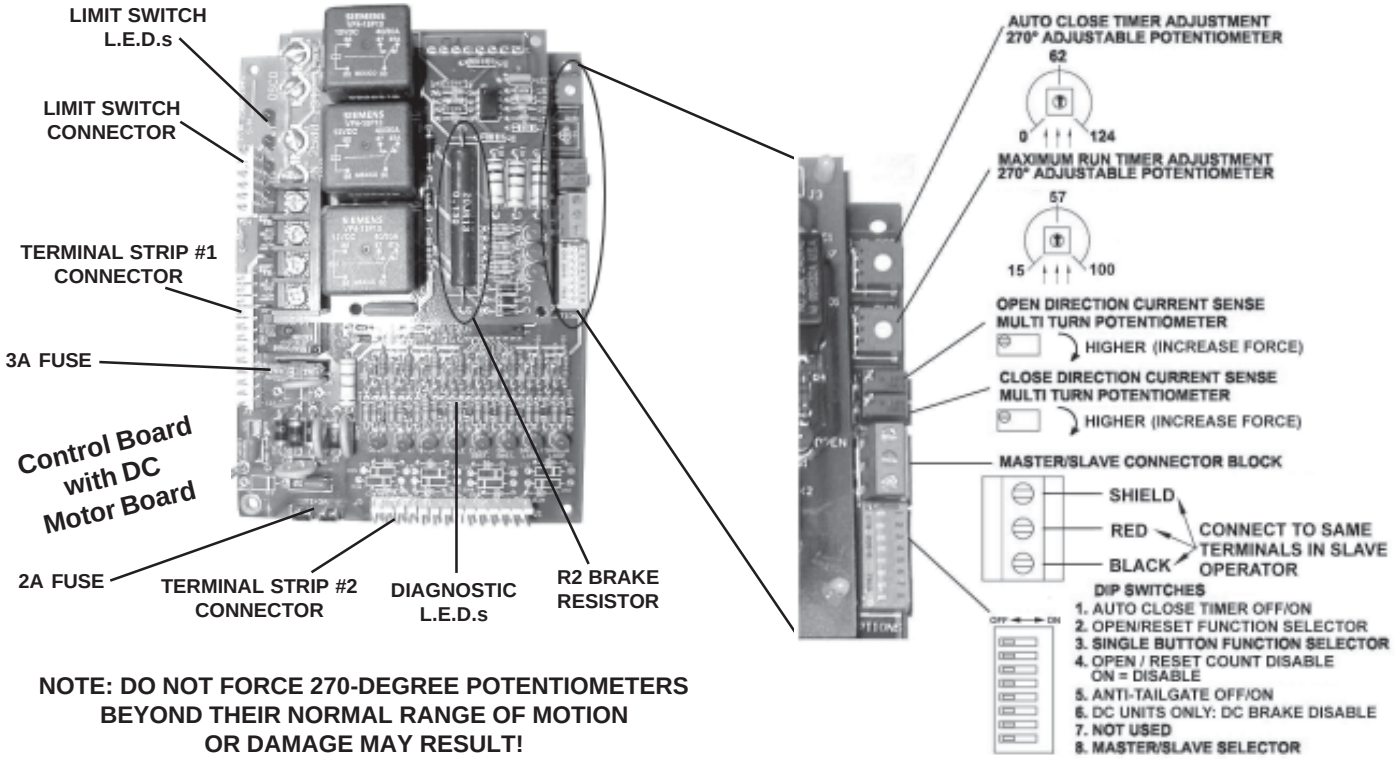
ELECTRICAL CONNECTION AND ADJUSTMENTS

Power supply must be of correct voltage and phase.
Always follow national and local electrical codes when wiring and use a qualified electrician.
Always disconnect power from operator before servicing.
Keep clear of gate arm during operation.

All OSCO gate operators are supplied with a power disconnect switch to turn on and off the power supply available to the operator. Incoming power should be brought into the operator and connected to the labeled pigtails in the disconnect box, following wiring specifications on page **4**. A wiring connections print can be found on the inside cover of the operator.

Proper thermal protection is supplied with the operator. The motor contains a thermal overload protector to protect from overheating the motor due to overload or high-frequency operation. This overload will reset automatically after the motor cools down.

CONTROL BOARD ADJUSTMENTS



NOTE: DO NOT FORCE 270-DEGREE POTENTIOMETERS BEYOND THEIR NORMAL RANGE OF MOTION OR DAMAGE MAY RESULT!

Auto Close Timer Adjustment: This 270-degree adjustable potentiometer will signal the operator to close automatically, from the fully open position, provided no open, reversing or obstruction signals are present. The timer is adjustable from 0 to 124 seconds. This feature is turned off or on using dip switch #1.

Maximum Run Timer Adjustment: This 270-degree adjustable potentiometer should be left in the fully clockwise position on all barrier gate operators.

Open Direction Current Sense Adjustment: This multiturn potentiometer is used to calibrate the built-in current sensing feature for detection of obstructions while running in the open direction.

Close Direction Current Sense Adjustment: This multiturn potentiometer is used to calibrate the built in current sensing feature for detection of obstructions while running in the closed direction.

Master/Slave Connection Block: This terminal block is used in conjunction with two operators to configure two gates to open and close together.

Dip Switches:

#1 This switch turns the auto close timer off/on.

#2 This switch controls the behavior of the open/reset function in barrier gates only. When the switch is turned **ON**, a momentary open/reset pulse will cause the arm to raise and stay raised until a reset or another open/reset signal occures. In the **ON** position, this switch also disables the counting function of Dip Switch #4. When the switch is turned **OFF**, the arm will lower as the open/reset signal is no longer present.

#3 This switch is used in conjunction with single-button controls and radio receivers. In the **ON** position, successive inputs will cause signals in the order of **OPEN-STOP-CLOSE-STOP**. In the **OFF** position, inputs will cause an **OPEN** signal unless the gate is fully open, in which case it will signal **CLOSE**.

#4 In the **OFF** position, for every open signal the barrier gate receives, there must be a reset signal before the arm will come down. In the **ON** position, this feature is disabled.

#5 In the **OFF** position, if two vehicles are close together and the second vehicle triggers the reset loop as the arm is coming down, the arm will stop until the second car is clear of the loop, then continue down. In the **On** position, the arm will continue down even when a second car triggers the reset loop. If the application requires that only a single vehicle pass through at a time, then this featurte should be **ON**. In all other cases the feature should be left **OFF**, as the arm will come down onto a tailgating vehicle.

#6 In the **ON** position, this switch will disable the inherent DC brake **in DC operators only**. In addition, the R2 brake resistor on the DC motor board must be cut from the board (refer to the picture above). In the **OFF** position, the DC brake will function.

#7 Not used at this time.

#8 This switch is used to set Master/Slave configuration. Operators which are stand-alone or master units should be set to **OFF**, while only slave units should have this switch set to **ON**.

TERMINAL CONNECTION DESCRIPTIONS

TERMINALS	FUNCTION	DESCRIPTION OF FUNCTION
24VAC 24VAC N	24VAC	Provides 24Volt AC power for accessories. **Note: DC models will NOT have 24Volt AC power available.**
24VDC+ 24VDC- COMM.	24VDC	Provides 24Volt DC power for accessories.
1 & 4	OPEN	Opens the operator. Several accessories such as button stations, keypads, transmitters and card readers can be wired to open.
3 & 4	CLOSE	Closes the operator. Use caution when wiring accessories to these terminals. **The gate must be clearly visible from the location of any accessories wired to close.**
4 & 5	SINGLE-BUTTON	Performs the single-button function which will alternate between open and close or open, stop and close - depending on dip switch #3. (See page **8** for details.)
2 & 4	STOP	Stops the operator. On barrier gate operators, this button is also the reset button.
4 & 6	REVERSE	This function will cause a reversal when the gate is traveling closed and will travel back to the fully open position. Loop detectors are often wired for reverse.
4 & 50	OPEN/RESET	A signal across these terminals will cause the arm of the barrier gate operator to raise and stay open until the signal is gone, at which point the arm will immediately begin to come down.
4 & 51	CLOSE OBSTRUCTION	This function works only while the arm is coming down. Any signal to this function will cause the arm to stop and fully reverse.
4 & 11	RESET	This function will cause the arm to come down as soon as the signal clears.
24VDC+ & 60	RUN	A 24Volt DC device such as a strobe light or alarm can be wired to these terminals. These devices will be powered while the motor is running. (See page **8** for details.)

You must follow all required safety precautions and instructions at all times. Review the safety brochure included with the operator. If any pages are missing or unreadable, contact OSCO at 1-800-333-1717 to request additional copies.

Never connect a button station within reach of the gate or on the side of the gate operator.

Do not adjust the circuit board current sensing feature too high. It should be adjusted high enough to keep the gate arm from falsely triggering the sensing, but no higher than necessary for the barrier gate to operate. Do not defeat the purpose of this function!

CURRENT SENSING ADJUSTMENTS

Because gates vary in construction and may have different force requirements in the open and close directions to move, the OSCO control board has separate Multi-turn potentiometers for adjusting in both directions independently. The adjustment should be set light enough to maintain minimal force (40 lbs.) should an obstruction occur, but high enough to keep the gate moving under normal conditions without interruption.

Prior to adjusting the operator current sensing functions, make sure the gate moves freely in both directions. A badly aligned or poorly maintained gate may cause false triggering of the current sensor. Refer to page **8** when following the instructions below. A factory adjustment tool has been supplied to make these adjustments easier. This tool has been taped to the control box for your convenience.

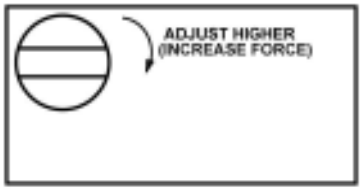
CLOSE DIRECTION CURRENT SENSE ADJUSTMENT

When the gate operator leaves the factory, it has been preset for a relatively light gate function and will require additional adjustment. Begin by starting the gate going closed. If the operator stops and reverses, turn the close direction potentiometer (see page **8**) one turn higher, press the **STOP** button, and try again. Repeat this process until the gate no longer causes false tripping of the current sensor. Note that each time the gate operator reverses, the **STOP** button must be pressed. Next, turn the close direction potentiometer lower slowly while the operator is running the gate closed until the gate operator stops and reverses again. From this point, turn the close direction potentiometer higher by 1 1/2 turns for all 115 Volt AC and 24 Volt DC operators, and by 3/4 of a turn higher for all 230 Volt AC operators. Additional fine adjustment by 1/4 turns may be necessary to eliminate false triggering.

OPEN DIRECTION CURRENT SENSE ADJUSTMENT

Repeat the same process with the open direction potentiometer while running the gate in the open direction. Once this is done, run the gate through several complete cycles and make sure the gate does not false trip in either direction.

Multi-turn Potentiometer



Remember it is important not to set the adjustment too high! Doing so will defeat the purpose of the current sensing as an obstruction detecting feature.

MAXIMUM RUN TIMER ADJUSTMENT

This adjustment is not used in barrier gate operators and should be turned fully clockwise.

AUTO CLOSE TIMER ADJUSTMENT

This adjustable potentiometer sets the length of time which elapses before the gate operator automatically closes the gate, from the fully open position, provided no open, reversing, or obstruction signals are present. This feature can be turned on or off via dip switch selection. See page **8** for details. **Do not use the auto close timer without an appropriate reversing device installed!**

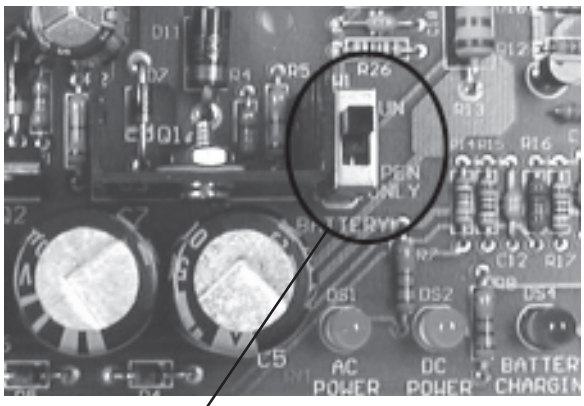
MASTER/SLAVE CONNECTION

A three-wire shielded conductor cable is required to connect master and slave operators. You must use Belden 8760 Twisted Pair Shielded Cable (or equivalent) **only** – OSCO part number 2500-1982, per foot). See page **8** for details of this connection, as well as dip switch selection. Note: The SHIELD wire should be connected in both the master and slave operators. **In addition, you must run power to both the master and slave operators.**

BATTERY BACK-UP FOR DC MODELS ONLY CHARGER BOARD CONFIGURATION

To set the voltage monitor, see the picture below. The **RUN position** will monitor the voltage of the battery only after AC voltage has been interrupted. It will allow the operator to continue to function until the batteries have dropped to 17 volts. When the batteries have reached 17 volts, the operator will open and shut down until AC power has been restored. In the **OPEN ONLY position** when AC power has been interrupted the operator will open and shut down until AC power is restored.

Note: If the charger board is set to open only, removing incoming power will cause the operator to run to full open position. Turn off power switch in operator before removing incoming power!



VOLTAGE MONITOR SHOWN
ABOVE IN THE RUN POSITION

ONBOARD L.E.D. INDICATOR DESCRIPTIONS

Control Board L.E.D. Indicators:

OPEN This indicator is lit when an open signal is present. This signal can come from such devices as button stations, radio receivers, keypads and telephone entry systems.

CLOSE This indicator is lit when a closed signal is present. This signal typically comes from three-button stations.

STOP This indicator is lit when there is a break in the stop circuit. Make sure there is a stop button wired in and working properly.

SINGLE This indicator is lit when a signal from a single-button station or radio receiver is present.

CLOSE OBST This indicator is lit when an open/reset signal is present. This signal can come from loop detector or other switch wired to oepn/reset input terminal #50.

OPEN OBST This indicator is lit when an **open/reset** signal is present. This signal can come from a loop detector or switch connected to terminal #50.

REVERSING This indicator is lit when a reversing signal is present. This signal is generated by a loop detector wired to the safety loop terminals.

SHADOW LOOP This indicator is lit when a reset signal is present. This signal is generated by a loop detector wired to the reset loop terminal #11.

LH	RH	
LSC-1	**LSO-1**	These indicators are lit when the open #1 limit switch is activated on a right-hand operator, or the close #1 switch on a left-hand. If this indicator is lit and the gate is not in its full open/closed position, the limit may need adjusting or the limit switch may need replacing.
LSC-2	**LSO-2**	
LSO-1	**LSC-1**	These indicators are lit when the close #1 limit switch is activated on a right-hand operator, or the open #1 on a left-hand. If this indicator is lit and the gate is not in its full open/closed position, the limit may need adjusting or the limit switch may need replacing.
LSO-2	**LSC-2**	

Motor Board L.E.D. Indicators:

NON LABELED One of these two indicators will be lit when the motor is running the gate open, and the other is lit when the motor is running the gate closed.

BRAKE REL. This indicator is lit when the motor is running in either direction. This function is not used on this operator.

DC Operators Only:

AC POWER Indicates AC power is supplying the unit.

DC POWER Indicates the operator is running on batteries.

BATTERY CHARGING Indicates batteries are being charged. Light goes out when batteries reach 90% of full charge.

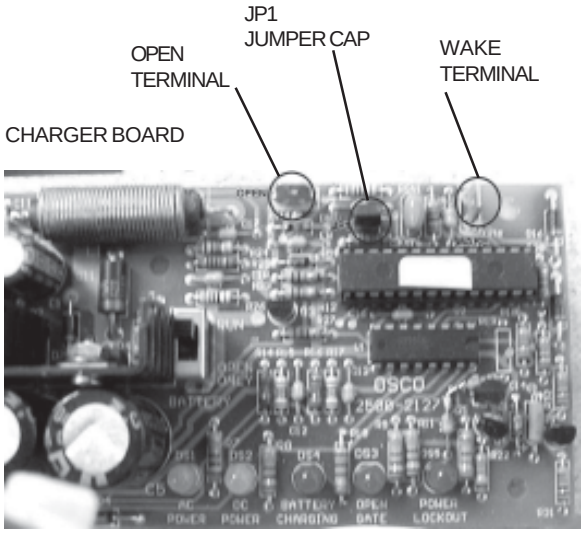
OPEN GATE Operator is in open then lockout stage.

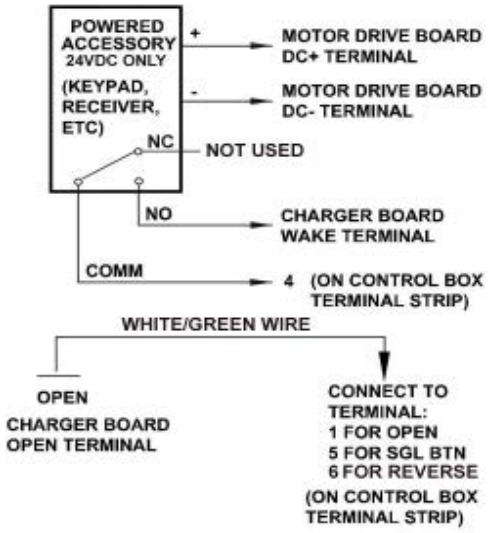
POWER LOCKOUT Flashes when controls/motor are in lockout mode.

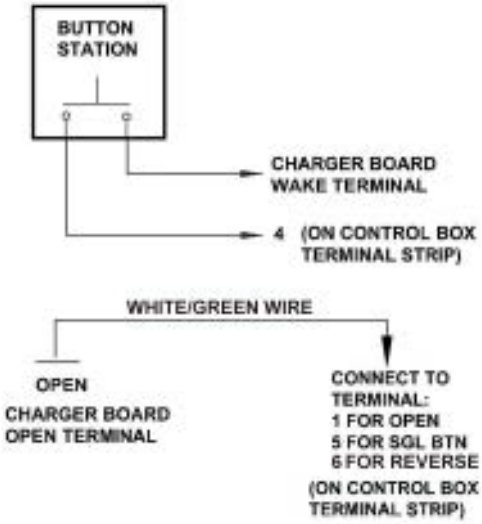
CHARGER BOARD SLEEP MODE

When primary AC power is not available, the operator will continue to operate in battery only mode if the charger board is set in its RUN mode (**see Battery Backup Charger Configuration**). Accessories wired into the operator will continue to draw power, even when the operator is not opening or closing the gate. This can dramatically reduce the amount of standby time available from the batteries.

To extend the available standby time, the charger board has a **"sleep" mode** feature which will turn off power to all controls except for any that are wired according to the schematics below. By removing the black jumper cap **JP1** located in the upper right hand corner of the charger board this feature can be enabled. After fifteen minutes of inactivity, all controls except those wired as shown below will turn off. Those wired as shown will continue to have power at all times and will upon activation generate first a "wake" signal that will power all controls back up, and then create either an open signal or single button signal, depending on how the wire jumper shown below is connected.



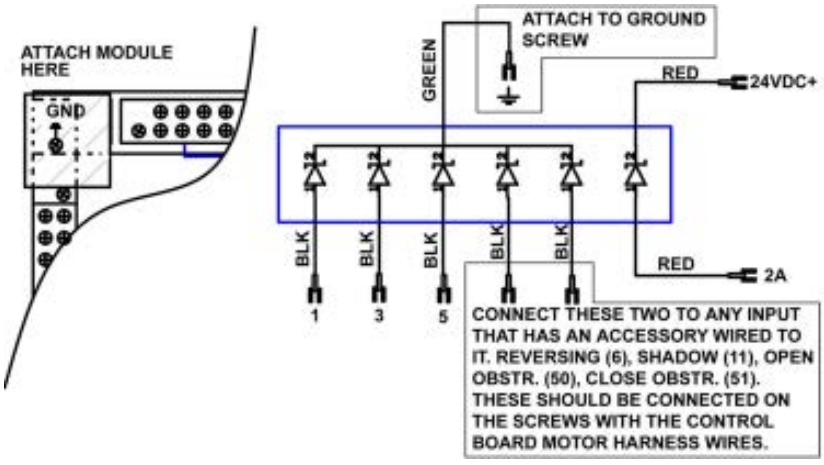




SURGE PROTECTOR INSTRUCTIONS

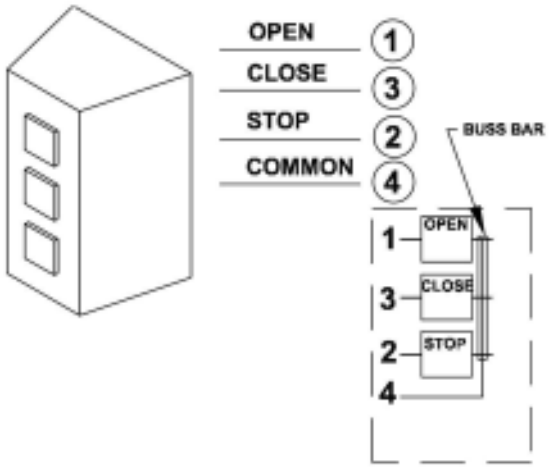
The optional surge protector should be connected to any inputs that have an accessory connected to it. This includes the 3-button station, so it must be connected to 1, 2A and 3 in all cases. The green wire connected to ground, which is electrically the same as terminal 4. The red wires connect to terminals 2A and 24VDC+. This will cause the 2 amp fuse to blow if this section of the module becomes shorted. With any of the other inputs connected to the surge protector, if their protection line becomes shorted due to a surge over the rating of the module, the corresponding LED on the main board will remain lit, causing a constant signal to the controller. If this is found, please replace the entire surge protector with a new unit.

Do not simply unhook the shorted wire, as this removes the protection from the circuit that was saved by the protector in the first place!

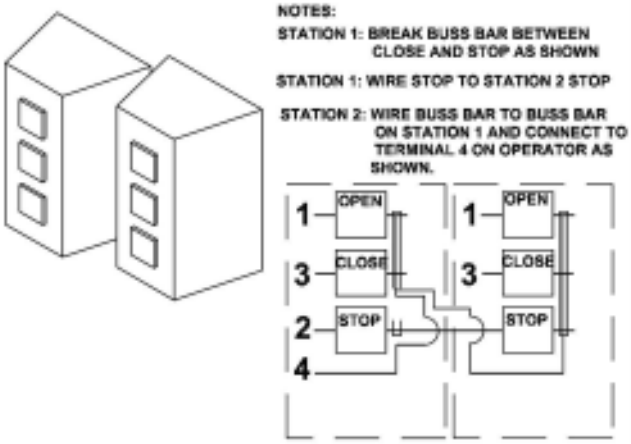


CONTROL and ACCESSORY CONNECTION ILLUSTRATIONS

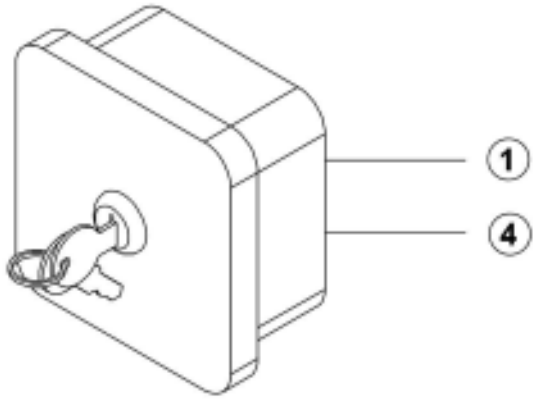
THREE BUTTON STATION



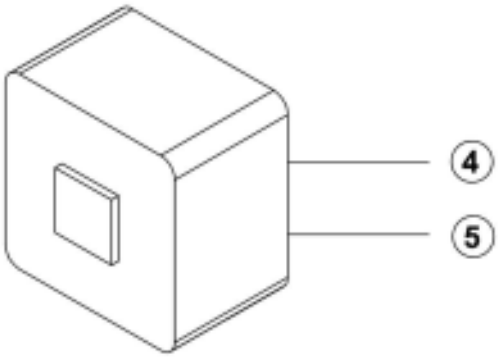
DUAL THREE BUTTON STATION



KEYSWITCH (TO OPEN)

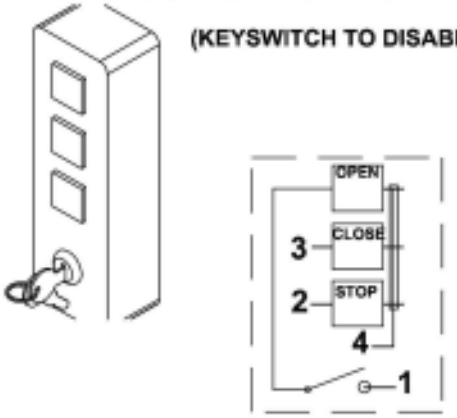


SINGLE BUTTON STATION (OPEN/CLOSE)

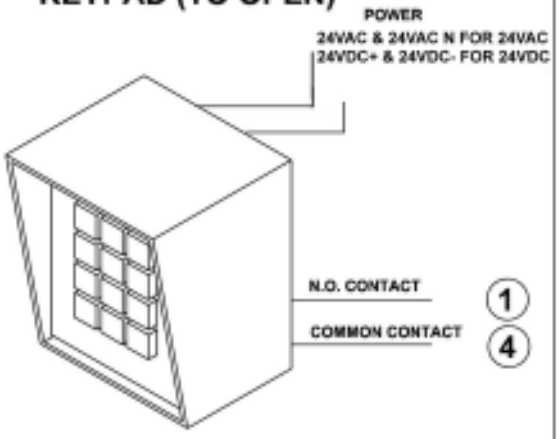


THREE BUTTON W/KEYSWITCH

(KEYSWITCH TO DISABLE OPEN)

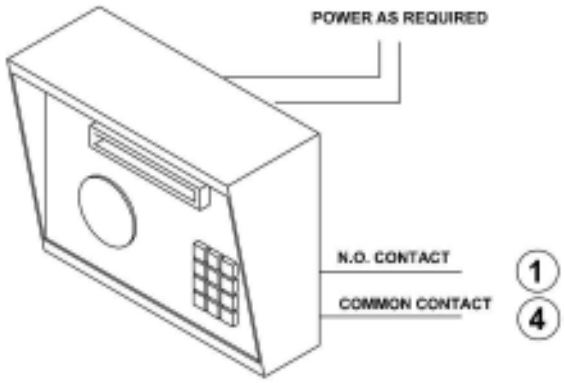


KEYPAD (TO OPEN)

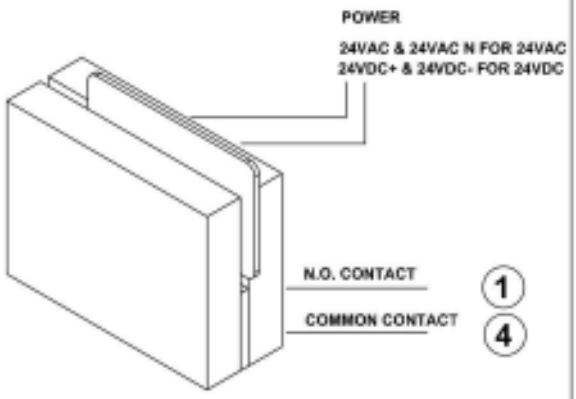


CONTROL and ACCESSORY CONNECTION ILLUSTRATIONS

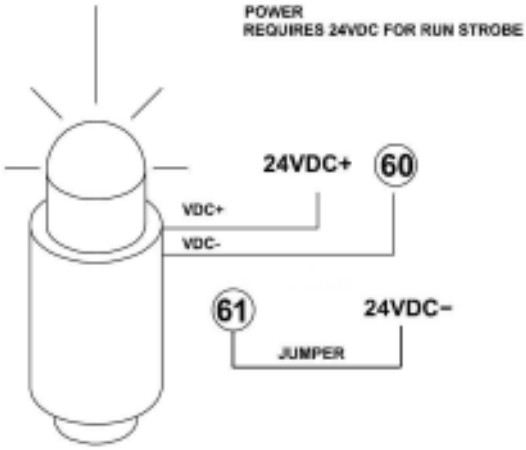
TELEPHONE ENTRY SYSTEM (TO OPEN)



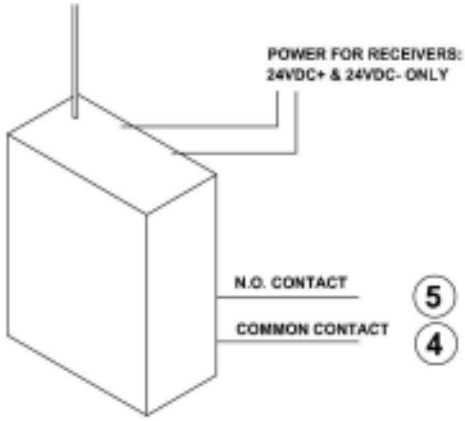
CARD READER (TO OPEN)



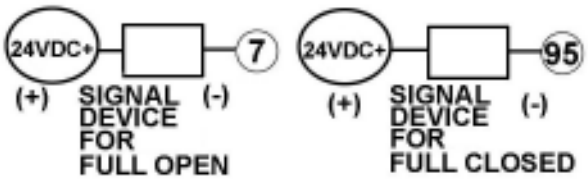
STROBE (WIRED FOR RUN)



FOUR WIRE RECEIVER (OPEN/CLOSE)



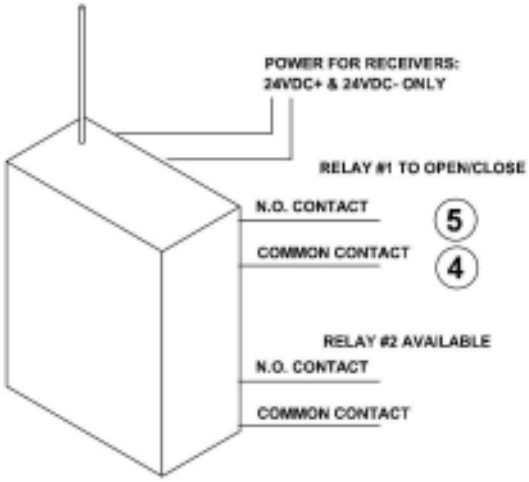
AUXILIARY SIGNALING DEVICE 24VDC



SHOWN FOR RIGHT HAND INSTALLATION; LEFT HAND OPPOSITE

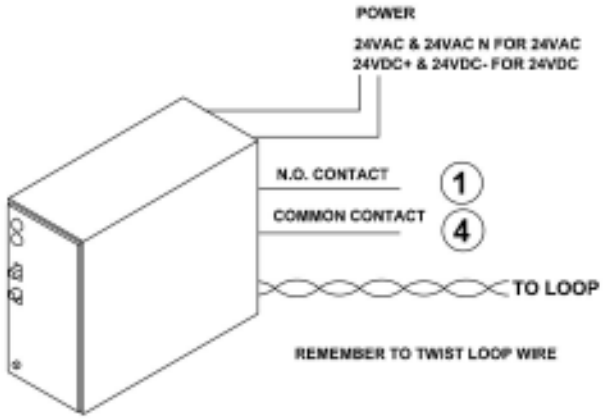
FOR OTHER VOLTAGES, AN OPTIONAL 24VDC RELAY IS REQUIRED. CONSULT THE FACTORY.

TWO CHANNEL RECEIVER (OPEN/CLOSE)

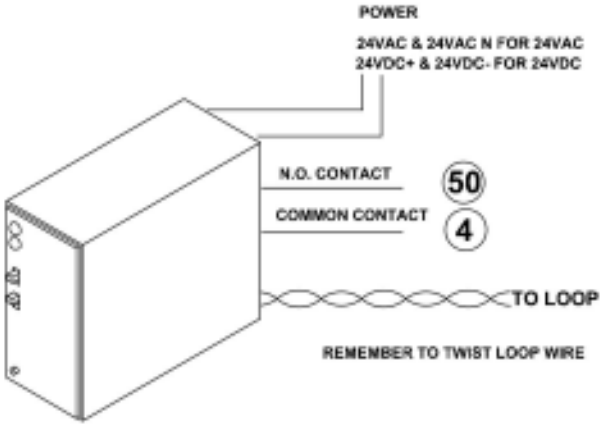


OSCO CONTROL and ACCESSORY CONNECTION ILLUSTRATIONS

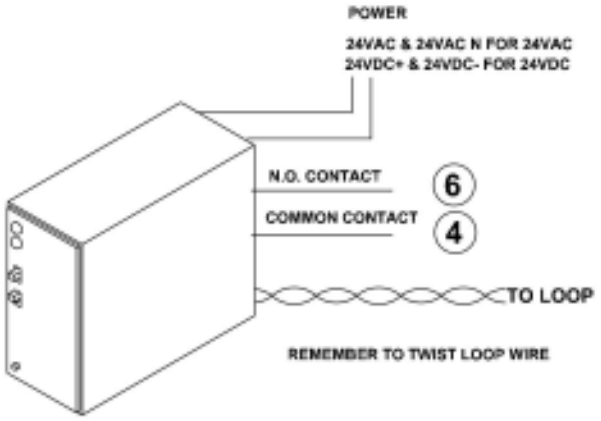
LOOP DETECTOR (OPEN/FREE EXIT)



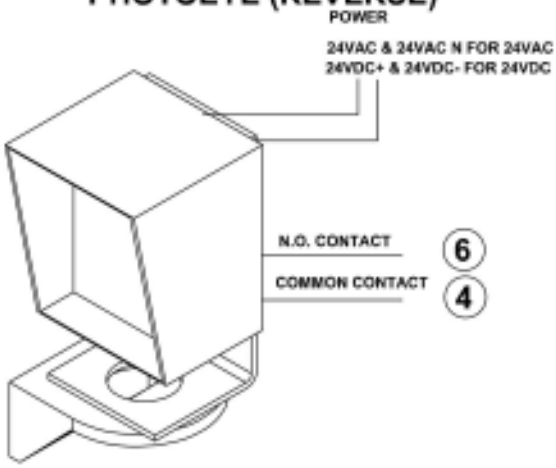
LOOP DETECTOR (OPEN/RESET)



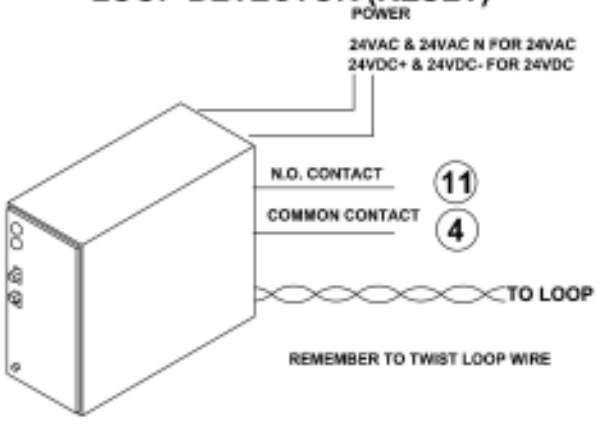
LOOP DETECTOR (TO REVERSE)



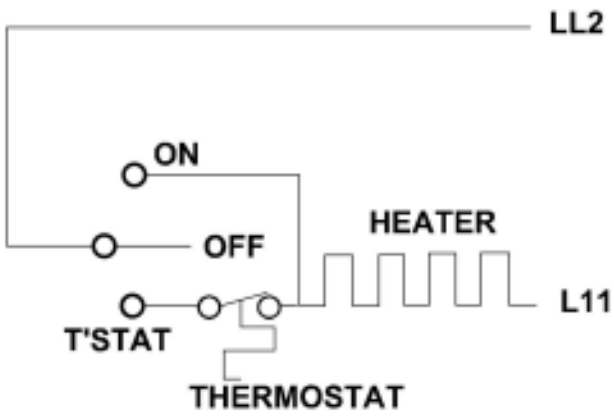
PHOTOEYE (REVERSE)



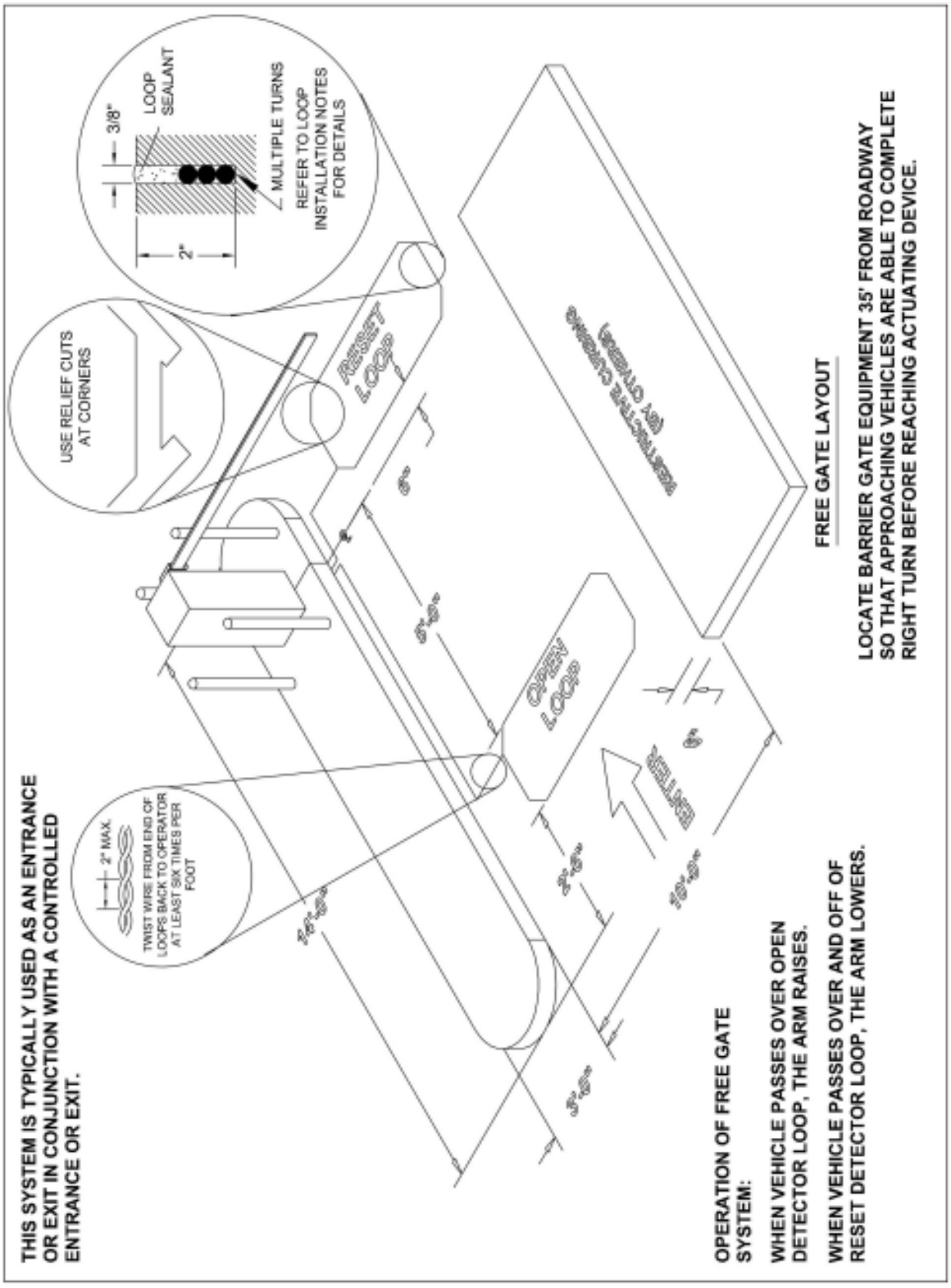
LOOP DETECTOR (RESET)



HEATER ASSEMBLY

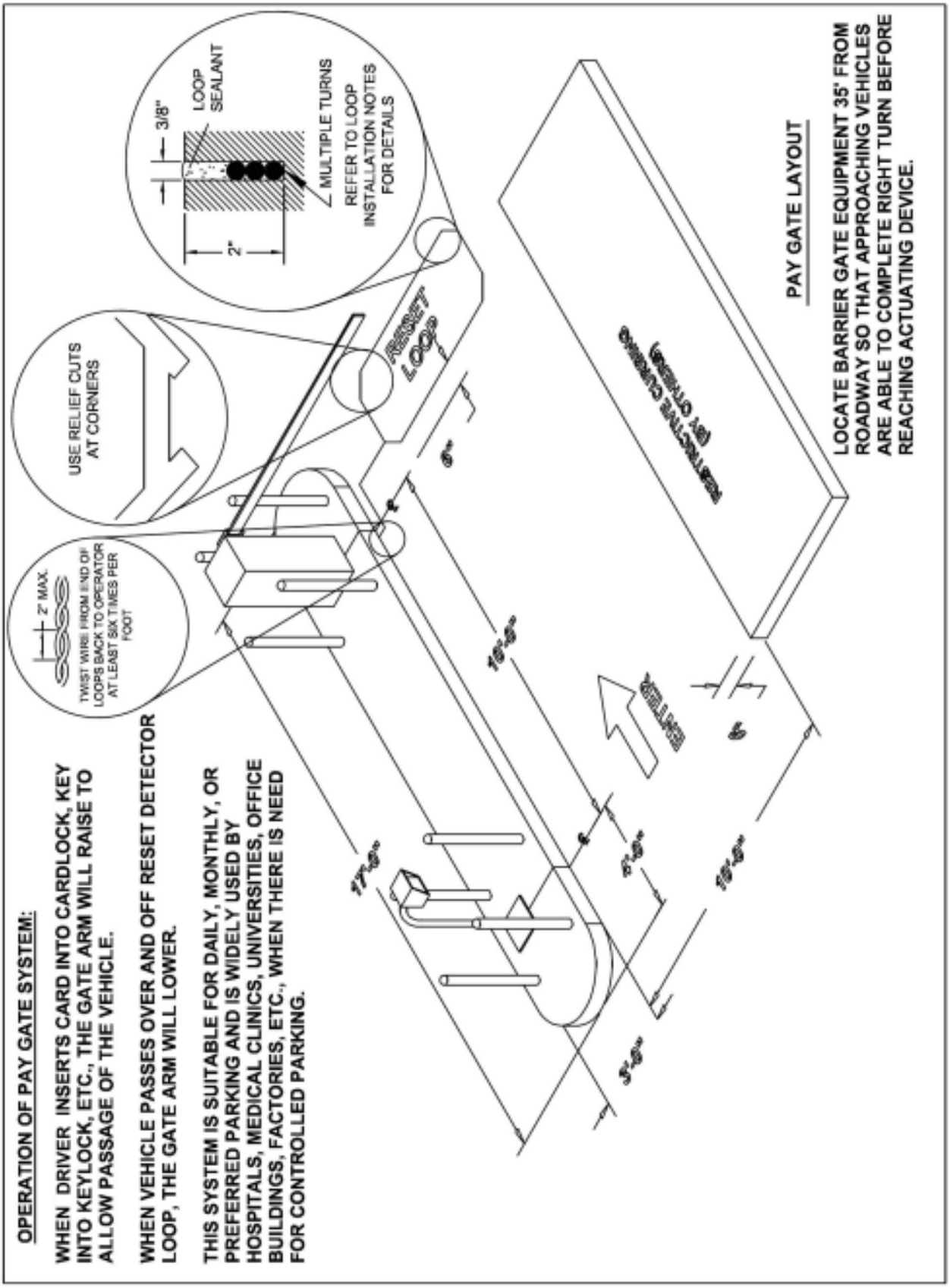


BARRIER GATE INSTALLATION - FREE GATE LAYOUT



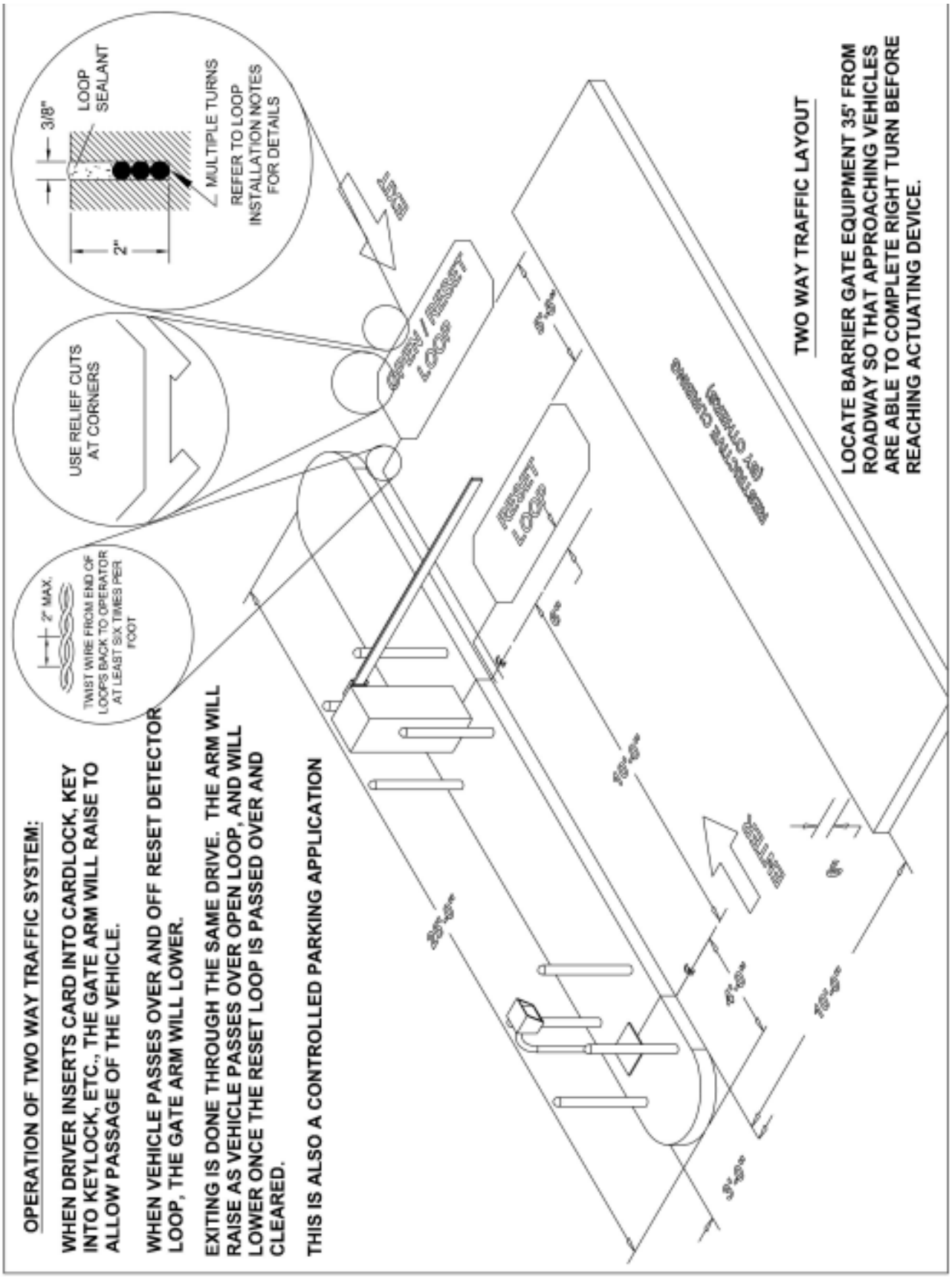
Refer to Terminal Connection Descriptions on page **9** and Loop Accessory Connections on page **15** for additional details.

BARRIER GATE INSTALLATION - PAY GATE LAYOUT



Refer to Terminal Connection Descriptions on page **9** and Loop Accessory Connections on page **15** for additional details.

BARRIER GATE INSTALLATION - TWO-WAY TRAFFIC LAYOUT



Refer to Terminal Connection Descriptions on page **9** and Loop Accessory Connections on page **15** for additional details.

TROUBLESHOOTING

Operator fails to start:

A. If the operator has been running a large number of cycles, the motor may have gotten hot and tripped the overload. Allow the motor to cool down and press the overload reset button in bottom of the motor.
B. Make sure you have power at the master distribution panel and that the power has not been turned off.
C. The secondary fuse on the control board may have blown. Replace the fuse (refer to control box parts list on page **23** [BGU] and page **27** [BGU-D] for part number information).

Motor operates, but gate does not move:

A. Check for broken or worn belts.
B. Check all setscrews on pulleys and sprockets and tighten them if necessary, and check for keys which may have fallen loose from keyways.

Motor sounds like it is working harder than normal:

A. Make sure the gate is moving freely and without binding throughout its entire travel.
B. Check the drive chain for obstructions (if the operator has one).
C. If the operator has an internal brake mechanism, make sure it is releasing.

Limit switch getting out of time:

A. Check the screws in limit cams for tightness. Replace if necessary.

Gate stopping part way open or closed (but no visible obstruction):

A. The control board may have received a false obstruction input triggered by current sensing set too low. Make sure the gate moves freely through its entire travel before adjusting the current sensing.
B. The maximum run timer may have counted down and expired. This can be caused by having the timer set too low, if a chain or belt is broken, or if a sprocket or pulley is slipping. When the timer expires, the gate stops and the stop button must be pressed to reset gate.
C. An obstruction signal from an accessory wired to the obstruction input may have triggered falsely. Check the control board for lit L.E.D. indicators for any of the following inputs: safety, shadow, open obstruction, close obstruction, stop, etc. If any are lit when the operator should be running, remove all devices hooked to that function and hook them up one at a time and try to run the operator until the problem device is found. Refer to page **11** for details on the control board indicators.

Gate staying open with automatic system:

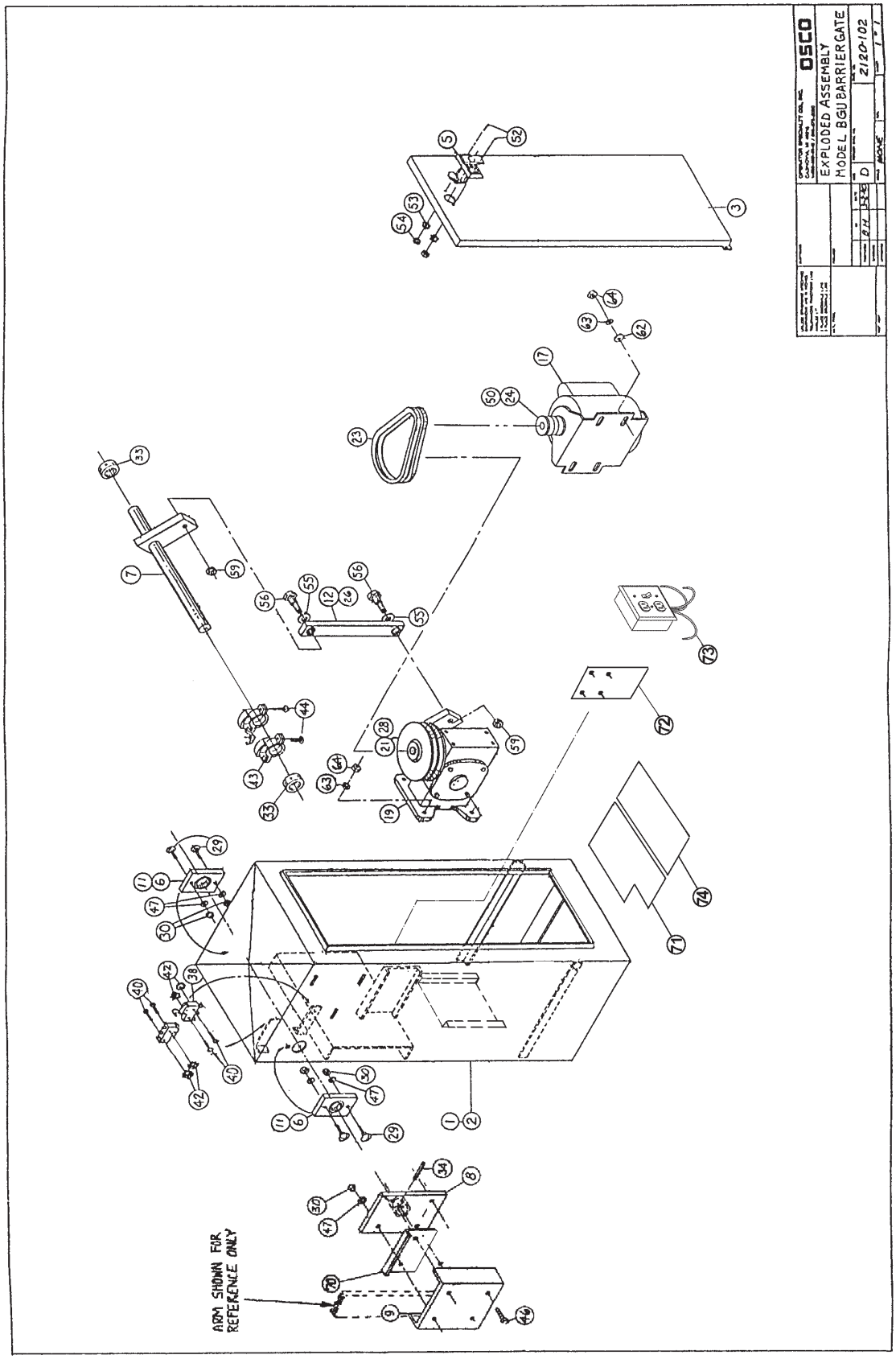
A. If there are vehicle detectors in your machine which are set up for reverse, one of your loops or loop detectors may be sending a false signal. Disconnect the wire harness and try running the operator.
B. An opening or reversing device may be stuck or malfunctioning. Try disconnecting these devices and hook them back up one at a time and try running the operator until the malfunctioning device is found.
C. Make sure the close limit switch isn't activated. If it is, the operator will think the gate is already closed.

HOW TO ORDER REPLACEMENT PARTS

Use the part numbers listed on the following pages. Contact your **local OSCO dealer** or **distributor** to order parts.

1. Supply the model number and serial number of your operator.
2. Specify the quantity of pieces needed and order by part number and name of part.
3. State whether to ship by freight, truck, parcel post, UPS or air express.
4. State whether transportation charges are to be prepaid or collect.
5. Specify name and address of person or company to whom parts are to be shipped.
6. Specify name and address of person or company to whom invoice is to be sent.

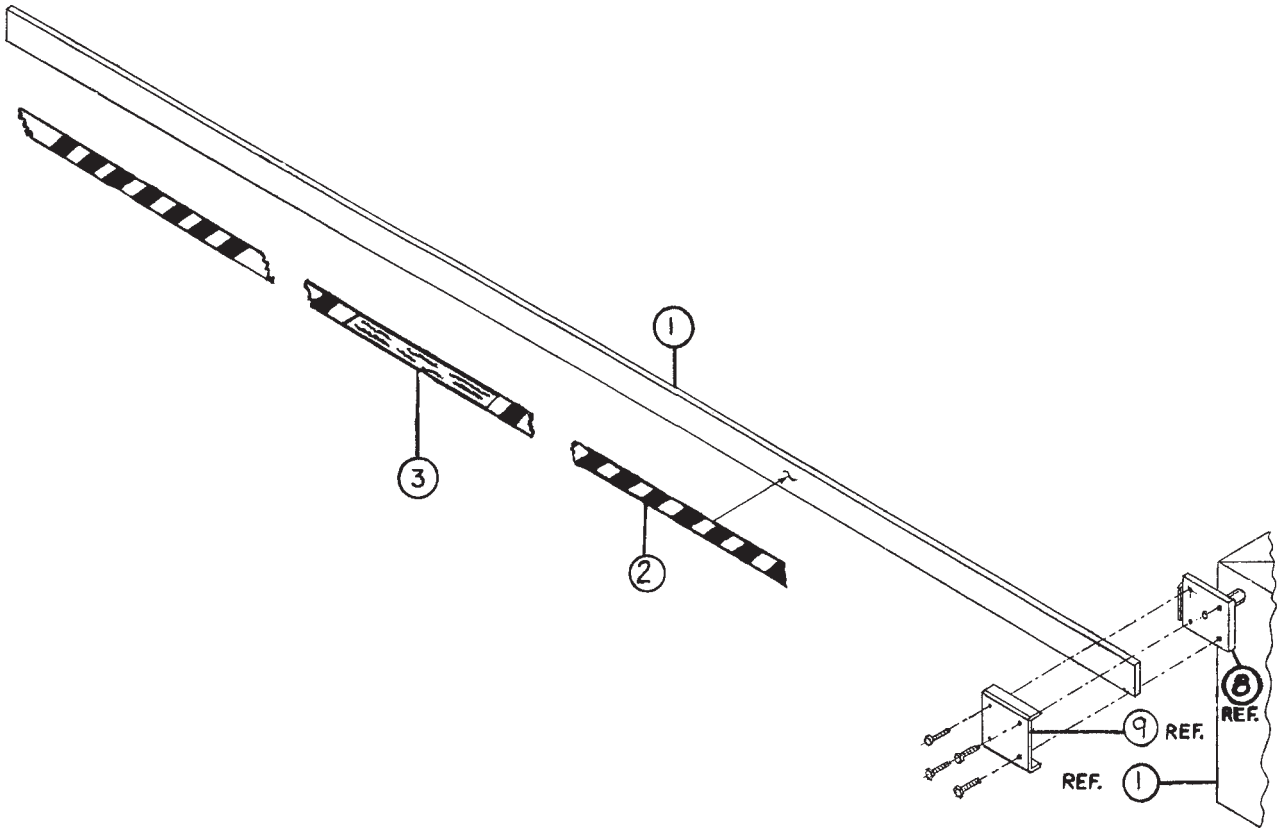
MODEL BGU MECHANICAL PARTS EXPLODED VIEW



MODEL BGU MECHANICAL PARTS LIST

REF NO.	PART NO.	DESCRIPTION
1,2	2120-474*	Enclosure without Door
3	2110-318*	Louvered Door Assembly with Lock
5	2220-008	Lock Assembly with Keys
6	2110-746	Bearing Block Assembly Kit
11	2200-898	Bearing only
7	2110-170	Drive Shaft Assembly
8	2110-732	Gate Arm Flange
70	2100-1670	Arm Flange Bracket with Cutting Edge
71	2100-1804	Rear Accessory Shelf
72	2100-1799	Power Disconnect Box Mounting Bracket
73	2510-251-C	Power On/Off Disconnect Box, 115VAC
	2500-1956	115VAC Duplex Receptacles only
	2500-1957	115VAC Switch only
74	2100-1820	Front Accessory Shelf
9	2100-1886	Arm Attachment Channel
12	2110-441	Connecting Link with Bearings
26	2200-136	Bearing only
21	2200-118	Reducer Pulley, 4" (10' Arm)
	2100-388	Reducer Pulley, 5" (12' Arm)
23	2200-208	V-Belt, 26" (10' Arm)
	2200-234	V-Belt, 28" (12' Arm)
24	2200-235	Motor Pulley, 1 5/8"
28	2400-285	Key, 3/16" x 3/16" x 1 7/8"
29	2400-178	Carriage Bolt, 3/8"-16 x 1 1/2"
33	2200-314	Set Collar, 1 1/4"
34	2400-474	Spring Pin, 0.37" x 2"
38	2500-764	Limit Switch
43	2300-028	Limit Cam
50	2400-134	Key, 3/16" x 3/16" x 1 3/8"
55	2400-188	Thrust Washer
56	2400-165	Shoulder Bolt, 1/2"-13 x 2"
	2510-064	Three-Button Station with Lead Wires
		Motors 1/3 HP 115V 1 PH
17	2500-2108	A.O. Smith
		or
	2500-2252	Emerson
	2510-272	Motor Harness (not shown)
		Gear Reducers 60:1
19	2200-758	MMTC
	OR	
	2200-667	Canimex

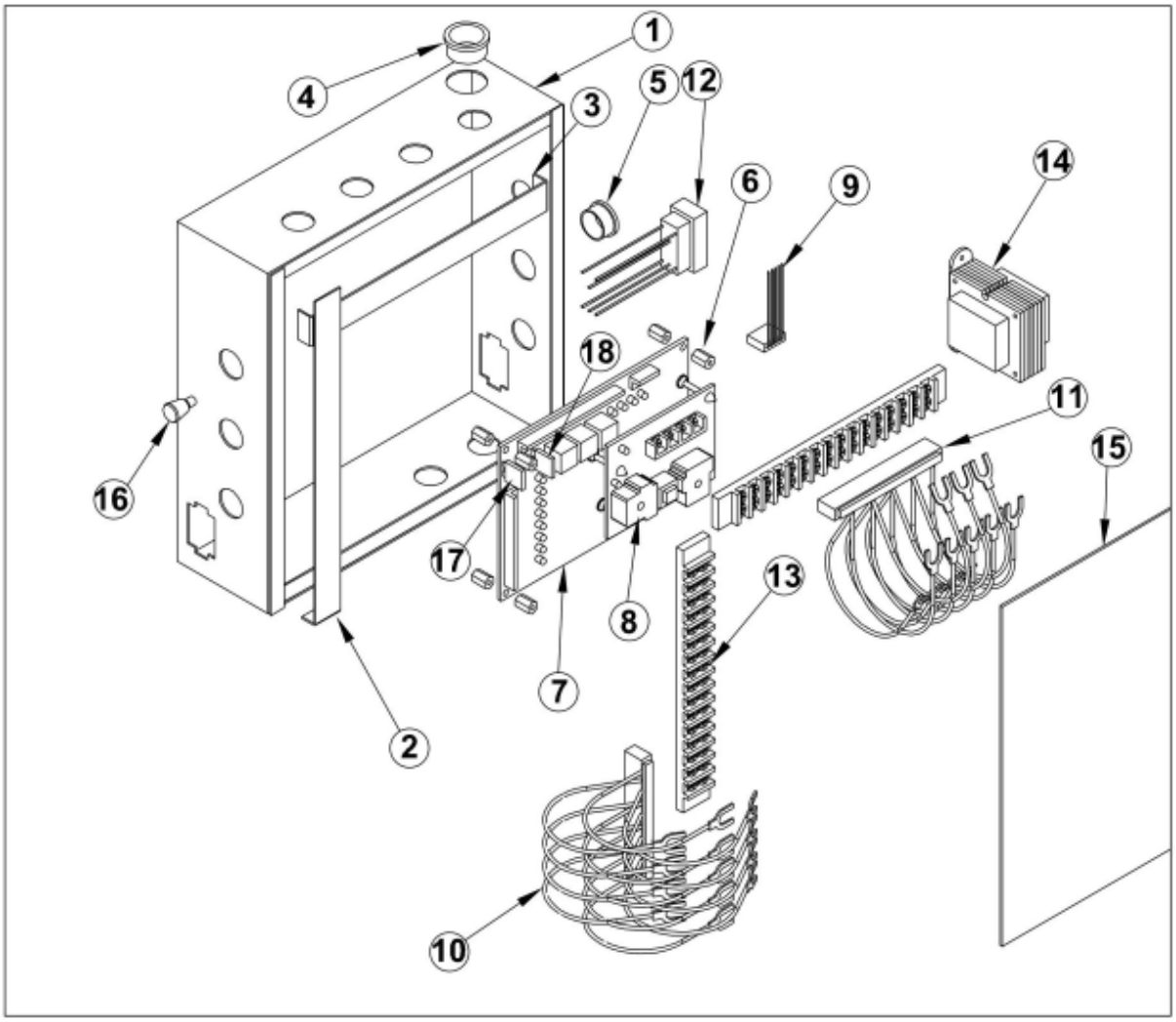
*Specify color and texture



FOR "REF" PART NUMBERS, SEE EXPLODED VIEW AND PARTS LIST ON PAGES 9 AND 10

MODEL BGU ARM PARTS LIST

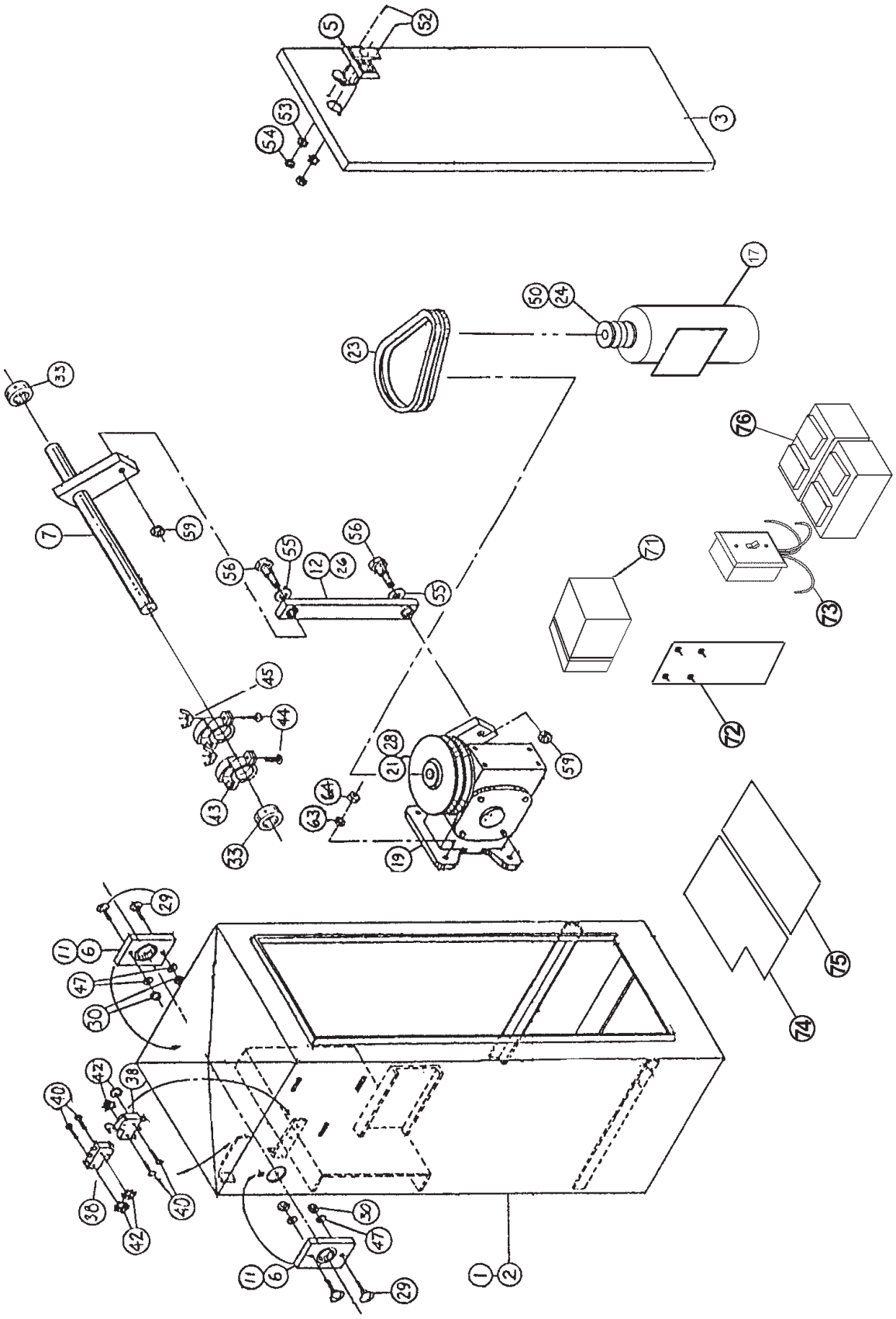
REF NO.	PART NO.	DESCRIPTION
1	2300-206	Wooden Gate Arm, 10'
	2300-207	Wooden Gate Arm, 12'
		OVER 12' CONSULT FACTORY
2	2300-083	Warning Tape, 10'
3	2300-253	Warning Label



MODEL BGU CONTROL BOX PARTS LIST

REF NO.	PART NO.	DESCRIPTION
1	2100-1778	Control Box Wrapper
2	2100-1761	Terminal Strip Bracket, output side
3	2100-1762	Terminal Strip Bracket, input side
4	2300-735	Heyco Bushing, 1.09 diameter
5	2200-122	Heyco Bushing, .87 diameter
6	2500-1948	Control Board Standoff
7	2510-270	Control Board for Barrier Gates
8	2500-1946	AC Motor Drive Board
	2510-246	Control Board for Barrier Gates with AC Motor Drive Board
9	2510-255	Limit Switch Harness Assembly
10	2510-249	Input Wire Harness Assembly
11	2510-250	Output Wire Harness Assembly
12	2510-261	Control Box Motor Harness Assembly
13	2500-071	Terminal Strip, 16-141
14	2500-212	Transformer, 115/24VAC, 40VA
15	2300-696	Clear Control Box Cover
16	2200-876	Plunger, Spring Loaded
17	2500-1966	2 Amp Fuse for Control Board
18	2500-1975	3 Amp Fuse for Control Board
	2520-394	Complete Controller Assembly 115VAC Barrier Gate (order limit harness separately)

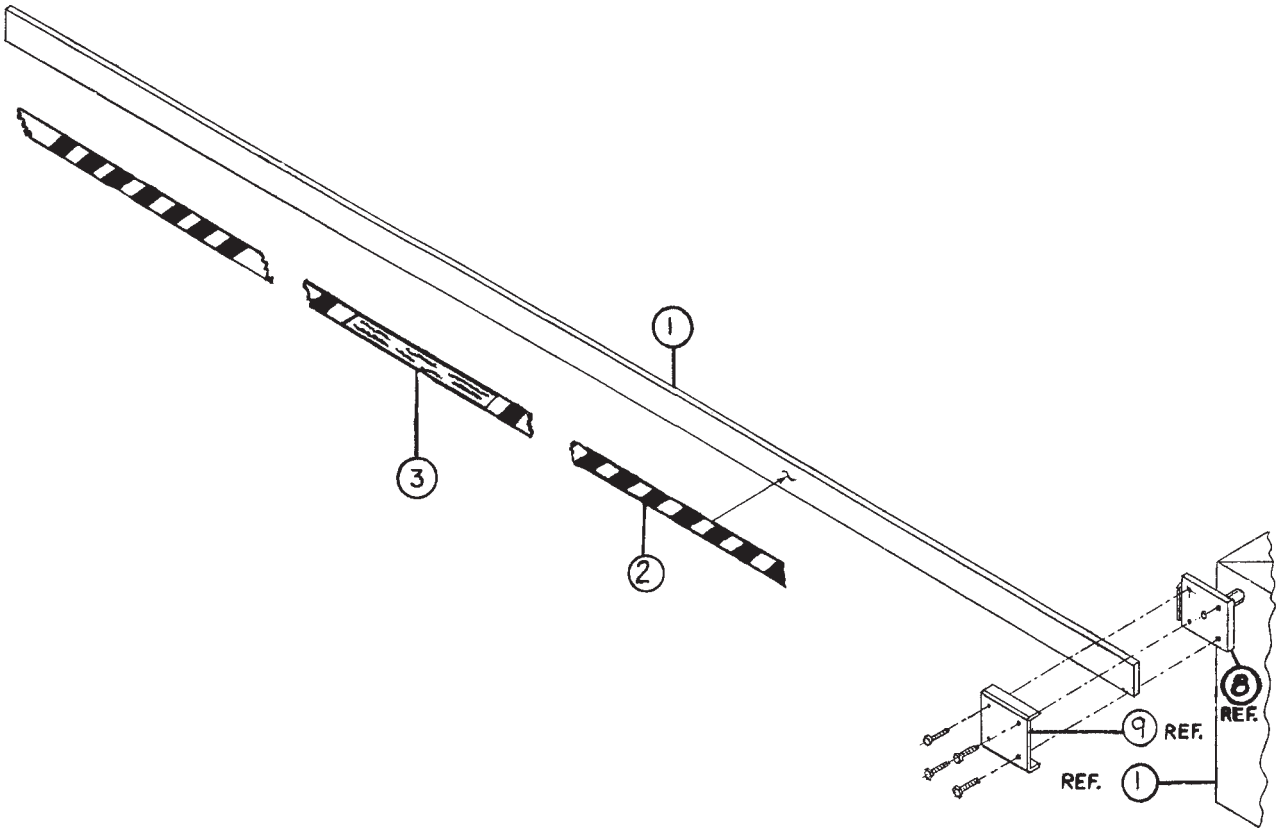
MODEL BGU-D MECHANICAL PARTS EXPLODED VIEW



MODEL BGU-D MECHANICAL PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
1,2	2120-474*	Enclosure without Door
3	2110-318*	Louvered Door Assembly with Lock
5	2220-008	Lock Assembly with Keys
6	2110-746	Bearing Block Assembly Kit
7	2110-170	Drive Shaft Assembly
	2110-732	Gate Arm Flange
	2100-1886	Arm Attachment Channel (not shown)
	2100-1670	Cutting Edge Bracket
12,26	2110-441	Connecting Link with Bearings
21	2100-388	Reducer Pulley, 5”
23	2200-052	V-Belt, 24”
24	2200-883	Motor Pulley, 1 5/8”
28	2400-285	Key 3/16” x 3/16” x 1 7/8”
29	2400-183	Carriage Bolt, 3/8”-16 x 1”
33	2200-314	Set Collar, 1 1/4”
34	2400-474	Spring Pin, 0.37” x 2”
38	2500-764	Limit Switch
43	2300-028	Limit Cam
50	2400-134	Key, 3/16” x 3/16” x 1 3/8”
55	2400-188	Thrust Washer
56	2400-165	Shoulder Bolt, 1/2”-13 x 2”
	2510-064	Three-Button Station with Lead Wires
71	2510-223	Transformer Assembly
	2500-1768	Bridge Rectifier
	2500-1769	Diode
	2500-1776	Transformer only, 115/24V, 250VA
	2500-1819	Fuse Holder
	2500-1742	Fuse, 6A Slow-Blow
72	2100-1995	Power Disconnect Box and Transformer Mounting Bracket
73	2510-266	Power On/Off Switch Assembly
	2500-726	Switch only (20 Amp)
74	2100-1804	Rear Accessory Shelf
75	2100-1820	Front Accessory Shelf
76	2510-182	Battery Assembly *(OSCO supplied - some disbtributors supply other batteries)*
	2500-1118	Battery, 12V (2 required)
	2300-450	Velcro Tape, per foot
17	2500-1902	Motor 24VDC
	2510-243	Brush Replacement Kit
	2110-621	Motor Mounting Bracket (not shown)
		Gear Reducers 60:1
19	2200-667	Canimex
	2200-758	MMTC

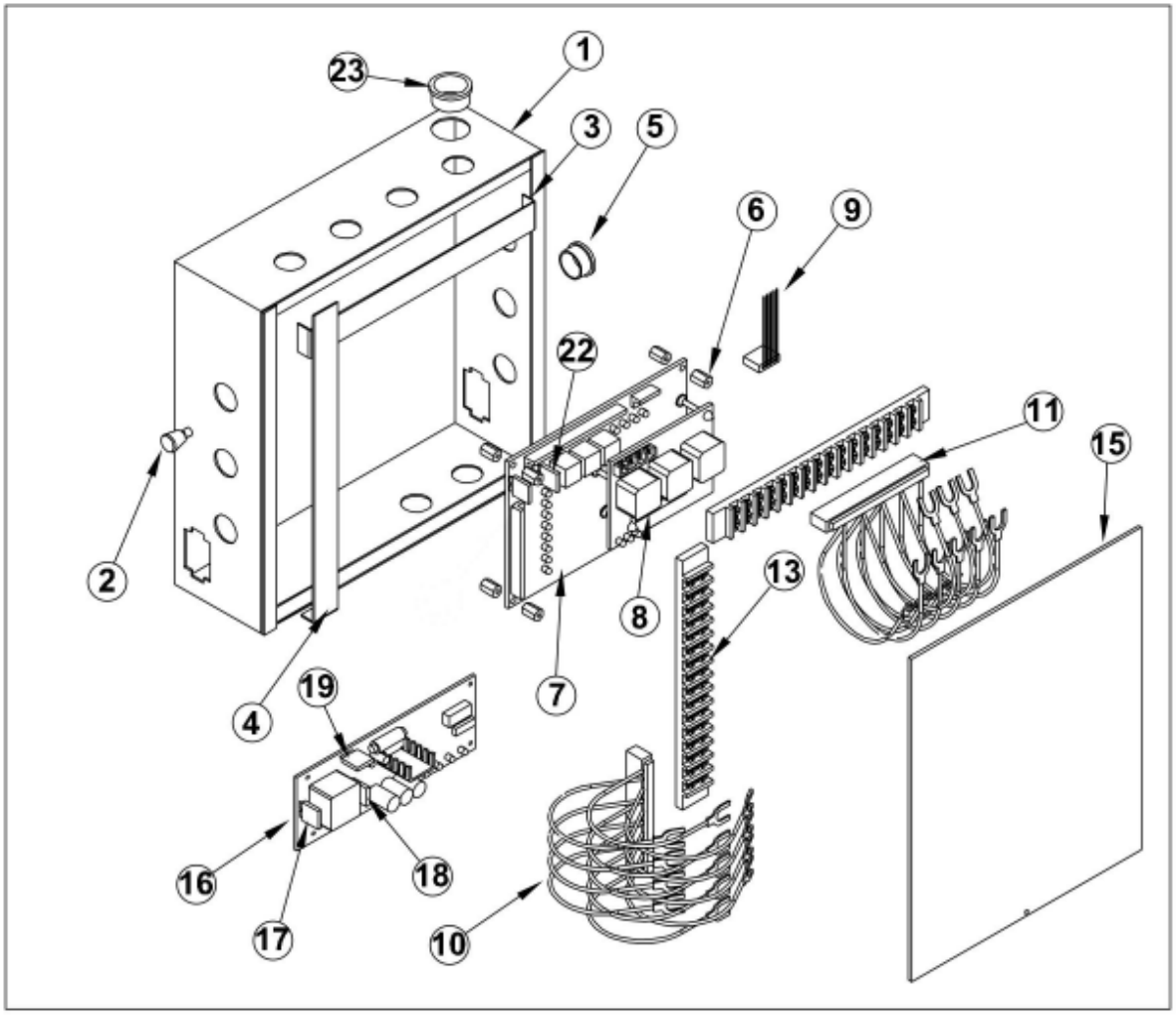
*Specify color and texture



FOR "REF" PART NUMBERS, SEE EXPLODED VIEW AND PARTS LIST ON PAGES 9 AND 10

MODEL BGU-D ARM PARTS LIST

REF NO.	PART NO.	DESCRIPTION
1	2300-206	Wooden Gate Arm, 10'
	2300-207	Wooden Gate Arm, 12'
		OVER 12' CONSULT FACTORY
2	2300-083	Warning Tape, 10'
3	2300-253	Warning Label



MODEL BGU-D CONTROL BOX PARTS LIST

REF NO.	PART NO.	DESCRIPTION
1	2100-1778	Control Box Wrapper
2	2200-876	Plunger, Spring Loaded
3	2100-1762	Terminal Strip Bracket, Input Side
4	2100-1761	Terminal Strip Bracket, Output Side
5	2200-122	Heyco Bushing, .87 diameter
6	2500-1948	Control Board Standoff
7	2510-271	Control Board DC
8	2500-1947	DC Motor Drive Board
	2510-247	Control Board with DC Motor Board
9	2510-255	Limit Switch Harness Assembly
10	2510-249	Input Wire Harness Assembly
11	2510-250	Output Wire Harness Assembly
13	2500-071	Terminal Strip, 16-141 (2)
14	2510-261	Control Box Motor Harness Assembly
15	2300-696	Clear Control Box Cover
	2300-733	Velcro Hook for Box Cover
	2300-734	Velcro Loop for Box Cover
16	2500-2127-CB	DC Chargerboard
17	2500-2293	Circuit Breaker, 15 amp Auto-Reset
18	2500-2293	Circuit Breaker, 15 amp Auto-Reset
19	2500-1975	Fuse, 3 Amp
22	2500-1975	3 Amp Fuse for Control Board
	2520-395	Complete Controller Assembly 115VAC (order limit harness and mounting brackets separately)
23	2300-735	Heyco Bushing, 1.09 diameter

BATTERY MAINTENANCE

The gel-cell batteries in this operator require no routine maintenance. For assured continued performance, they should be replaced every year.

If power is to be removed for one week or more, disconnect the negative wire from the batteries as this will prevent deep discharging.

Fully charge before use after storage or upon initial installation.

BRUSH REPLACEMENT

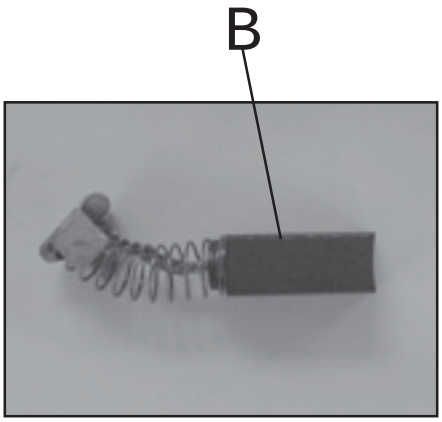
Brushes should be inspected every 100,000 cycles, (200,000 for BGU-D) or yearly, whichever comes first. The motor has two brushes, one on each side.

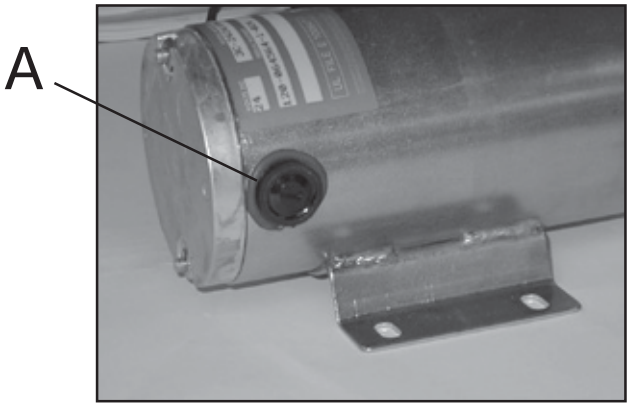
Original brushes are approximately 3/4" long and should be replaced when they are 1/4" long, or sooner. If brushes are allowed to wear beyond this point, permanent damage to the motor may result.

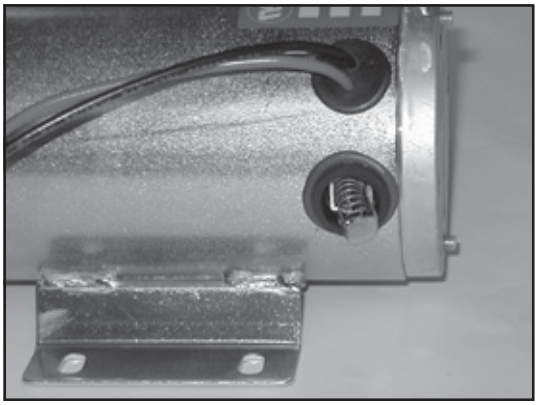
To inspect the brushes, remove retaining cap (A), with straight-blade screwdriver, and carefully pull assembly straight out. Measure remaining brush material (B).

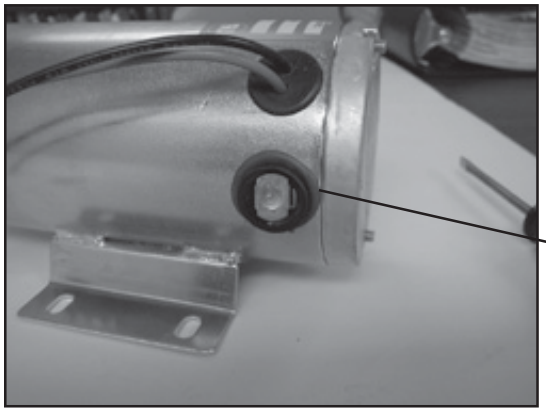
To reinstall, place brush in hold, aligning rounded indentation (C), correctly with motor shaft. Gently push in spring and align contact with oval carrier, push in with retaining cap (D). Hold in place and thread cap into brush carrier. Do not overtighten or cap will crack! Repeat for other brush.

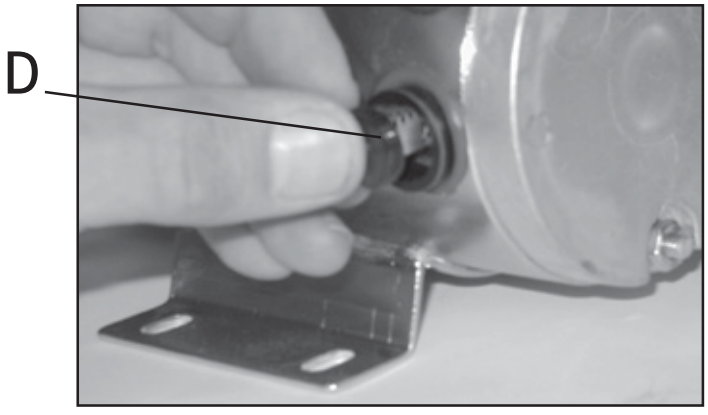
If brushes require replacement, order kit #2510-243.











PREVENTIVE MAINTENANCE

IMPORTANT!
- **Always disconnect power from operator before servicing.**
- **Keep clear of gate during operation.**

GENERAL:
OSCO gate operators are designed for many years of trouble-free operation and, under recommended operating conditions, will require only minimal maintenance. To ensure that your unit is ready for operation at all times--and to preclude serious damage or failure--inspect the unit systematically. Proper adjustments and lubrication should be made as recommended.

LUBRICATION:
Bearings. For models which have pillow block style bearings with greasable fittings, lubricate at least twice a year with a lithium complex based, petroleum oil NLGI 2 rated grease. Oilite and precision sealed bearings do not require additional lubrication.

Motor. Motors have sealed ball bearings and do not require further lubrication. If bearing noise develops after several years of operation, bearings should be replaced by a motor repair company, or the motor should be replaced if necessary.

Drive Chain and Sprocket (slide gate models only). The main drive chain and sprockets should be inspected for wear, cleaned, and wiped down with a lightly oiled rag every six months.

Swing Gate Arm (swing gate models only). Check all bolts for proper tension and tighten if necessary. Make sure the arm folds overextends itself slightly against the overtravel stop to reduce the chance that the gate can be backdriven open. Adjust the close limit slightly if additional travel is required. Lightly lubricate all pivot points with a light machine oil.

Barrier Gate Arm (barrier gate models only). Check all bolts for proper tension and tighten if necessary. If the arm has been warped or damaged, replace as necessary.

ADDITIONAL SIX MONTH PREVENTIVE MAINTENANCE:

1. For operators which utilize torque limiting clutches, check for proper tightness. If there appears to be dust from wear on the pads, inspect the pads and replace if necessary. If the clutch cannot be adjusted tightly enough to move the gate without slipping, the pads must be replaced.
2. For operators with V-belts, inspect for wear and replace as necessary. Check for proper tension and adjust if required. Check all pulley setscrews for tightness and tighten if necessary.
3. For operators with internal chain drives, inspect chain and sprockets for wear and replace if necessary. Check for proper tension and alignment, and adjust if required. Check all hub sprocket setscrews and tighten if required.
4. Check limit switches and limit actuators (cams, limit nuts, etc.) for wear and replace as required. In rotary limit switch assemblies, wipe the limit shaft clean and apply a light coating of dry lubricant.
5. For operators with magnetic brakes, check for proper adjustment. Brake disc must run free when the brake is engaged. For brake assemblies other than C-face style, the brake should be adjusted so that the solenoid plunger throw is between 3/8" to 1/2". Too much throw will damage the solenoid. **If the solenoid emits a loud buzzing sound when the motor is run, the brake must be adjusted.**
6. In operators which have a disconnect handle, inspect disconnect handle for proper function and lubricate if necessary. Use a lithium based grease on all moving parts.
7. Inspect all nuts and bolts for proper tightness and tighten as necessary.
8. Check all reversing devices for proper function. Inspect all contact edges for wear and replace if required. Check photoeyes for proper alignment and function.
9. Check current sensing for proper adjustment when finished with inspection and maintenance.
10. Inspect the installation area. Are all the warning signs intact and visible? If they are missing or need replaced, contact OSCO. Be sure there are no control stations mounted within reach of the gate. Review safety literature with the customer and advise them to remove any such stations found.

For slide and swing gate operators, you must inspect the gate for proper operation. The gate should move easily without binding through its entire travel. If the gate does bind, adjust or fix as required. Failure to keep the gate in good working condition will have adverse effects on the operator.

This page intentionally left blank.

POWER SONIC

MATERIAL SAFETY DATA SHEET

Product Name: Sealed Maintenance Free Lead-Acid Batteries					
DATE:	9/23/2002	ISSUED BY	ENGINEERING	TELEPHONE NO.	(619) 661-2030

HAZARDOUS COMPONENTS

COMPONENTS	WEIGHT %	TLV	LD50	LC50	LC50
			ORAL	INHALATION	CONTACT
Lead (Pb, PbO_2, $PBSO_4$)	about 70%	N/A	(500) mg/kg	N/A	N/A
Sulfuric Acid	about 20%	$1mg/m^3$	(2,140) mg/kg	N/A	N/A
Fiberglass Separator	about 5%	N/A	N/A	N/A	N/A
ABS Plastic	about 5%	N/A	N/A	N/A	N/A

PHYSICAL DATA

COMPONENTS	DENSITY	MELTING POINTS	SOLUBILITY (H_2O)	ODOR	APPEARANCE
Lead	11.34	327.4° C (Boiling)	None	None	Silver-Gray Metal
Lead Sulfate	6.2	1070° C (Boiling)	40 mg/l(15° C)	None	White Powder
Lead Dioxide	9.4	290° C (Boiling)	None	None	Brown Powder
Sulfuric Acid	about 1.3	about 114° C (Boiling)	100%	Acidic	Clear Colorless Liquid
Fiberglass Separator	N/A	N/A	Slight	Toxic	White Fibrous Glass
ABS Plastic	N/A	N/A	None	No Odor	Solid

FLAMMABILITY DATA

COMPONENTS	FLASHPOINT	EXPLOSIVE LIMIT	COMMENTS
Lead	None	None	
Sulfuric Acid	None	None	
Hydrogen		4% - 72.4%	Sealed batteries can emit hydrogen if over charged (float voltage > 2.40 VPC).
Fiberglass Separator	N/A	N/A	Toxic vapors may be released. In case of fire, wear self-contained breathing apparatus.
ABS Plastic	None	N/A	Temp. over 360° C (572° F) may release combustible gases. In case of fire: wear positive pressure self-contained breathing apparatus.

FIRST AID

SULFURIC ACID PRECAUTIONS

Skin Contact:	Flush with water, see physician if contact area is large or if blisters form.
Eye Contact:	Call physician immediately and flush with water until physician arrives.
Ingestion:	Call physician. If patient is conscious, flush mouth with water, have patient drink milk or sodium bicarbonate solution.

REACTIVITY DATA

COMPONENT	Sulfuric Acid
STABILITY	Stable at all temperatures
COLYMERIZATION	Will not polymerize
INCOMPATIBILITY	Reactive metals, strong bases, most organic compounds
DECOMPOSITION PRODUCTS	Sulfuric dioxide, trioxide, hydrogen sulfide, hydrogen
CONDITIONS TO AVOID	Prohibit smoking, sparks, etc. from battery charging area. Avoid mixing acid with other chemicals

SPILL OR LEAK PROCEDURES

Steps to take in case of leak or spill:	If sulfuric acid is spilled from a battery, neutralize acid with bicarbonate (baking soda), sodium carbon (soda ash), or calcium oxide (lime). Flush area with water and discard to the sewage system. Do not allow unneutralized acid into sewage system.
Waste disposal method:	Neutralized acid may be flushed down the sewer. Spent batteries must be treated as hazardous waste and disposed of according to local, state, and federal guidelines. A copy of this MSDS must be supplied to any scrap dealer or secondary lead smelter with battery.

PROTECTION

EXPOSURE SITE	PROTECTION	COMMENTS
SKIN	Rubber gloves, Apron	Protective equipment must be worn if the battery is cracked or otherwise damaged. A respirator should be worn during recharn operations if the TLV is exceeded.
RESPIRATORY	Respirator (for lead)	
EYES	Safety goggles, Face Shield	

ELECTRICAL SAFETY

Due to the battery's low internal resistance and high power density, high levels of short circuit current can be developed across the battery terminals. Do not rest tools or cables on the battery. Use insulated tools only. Follow all installation instructions and diagrams when installing or maintaining battery systems.

HEALTH HAZARD DATA

LEAD: The toxic effects of lead are accumulative and slow to appear. It affects the kidneys, reproductive, and central nervous systems. The symptoms of lead overexposure are anemia, vomiting, headache, stomach pain (lead colic), dizziness, loss of appetite, and muscle and joint pain. Exposure to lead from a battery most often occurs during lead reclaim operations through the breathing or ingestion of lead dust or fumes.

SULFURIC ACID: Sulfuric acid is a strong corrosive. Contact with acid can cause severe burns on the skin and in eyes. Ingestion of sulfuric acid will cause GI tract burns. Acid can be released if the battery case is damaged or if vents are tampered with.

FIBERGLASS SEPARATOR: Fibrous glass is an irritant of the upper repiratory tract, skin and eyes. For exposure up to 10F/CC use MSA Comfo8 with type H filter. Above 10F/CC up to 50F/CC use Ultra-Twin with type H filter. This product is not considered carcinogenic by NTP or OSHA.

ALL DATA MUST BE PASSED TO ANY SCRAP DEALER OR SMELTER WHEN BATTERY IS RESOLD.

Date Prepared: June 12, 1997
Supersedes: February 02, 1996
MSDS Number: 08068

Cette fiche signaletique ast aussi disponible en francais

1. PRODUCT INFORMATION
Product Identifier: ESSO GEAR OIL GX 75W-90
Application and Use: Transmission adn gear lubricant.
Product Description: Mixture of paraffinic and naphthenic hydrocarbons (saturated and unsaturated), and additives.

REGULATORY CLASSIFICATION
WHMIS: Not a controlled product
CEPA: CANADIAN ENVIRONMENTAL PROTECTION ACT
All components of this product are either on the Domestic Substances List (DSL) or are exempt.
TDG INFORMATION (RAIL/ROAD):

Shipping Name:	Not regulated		
Class:	Not regulated	PIN Number:	Not regulated
Packing Group:	Not regulated		

Please be aware that other regulations may apply.

TELEPHONE NUMBERS		MANUFACTURER/SUPPLIER
Emergency 24 hr.	519-339-2145	IMPERIAL OIL
Technical Info.	800-268-3183	Products Division
		111 St. Clair Ave. West
		Toronto, Ontario M5W 1K3
		416-968-4111

2. REGULATED COMPONENTS
The following components are defined in accordance with subparagraph 13(a) (l) to (lv) or paragraph 14(a) of the Hazardous Products Act:
NAME % CAS #
Not applicable

3. TYPICAL PHYSICAL & CHEMICAL PROPERTIES
Physical State: Liquid
Specific gravity: not available
Viscosity: 15.80 cSt at 100 deg. C
Vapour Density: not available
Boiling point: 230 to 460 deg. C
Evaporation rate: <0.1 (1=n-butylacefate)
Solubility in water: negligible
Freezing/Pour Point: -42 deg. C ASTM D97
Odour Threshold: not available
Vapour Pressure: <0.1 kPa at 20 deg. C
Density: 0.89 g/cc at 15 deg. C
Appearance/odour: yellow oil; petroleum odour

4. HEALTH HAZARD INFORMATION
NATURE OF HAZARD:
INHALATION: Negligible hazard at normal temperatures (up to 38 deg. C). Elevated temperatures or mechanical action may form vapours, mists or fumes which may be irritating to the eyes, nose, throat and lungs. Avoid breathing vapours or mists.
EYE CONTACT: Slightly irritating, but will not injure eye tissue.
SKIN CONTACT: Low toxicity. Frequent or prolonged contact may irritate the skin.
INGESTION: Low toxicity.
ACUTE TOXICITY DATA: Based on animal testing data from similar materials and products, the acute toxicity of this product is expected to be:
Oral: LD50 > 5000 mg/kg (rat)
Dermal: LD50 > 3160 mg/kg (rabbit)
Inhalation: LC50 > 5000 mg/m3 (rat)
OCCUPATIONAL EXPOSURE LIMIT:
ACGIH recommends: For oil mists, 5 mg/m3. Local regulated limits may vary.

5. FIRST AID MEASURES
INHALATION: Vapour pressure of this material is low and as such inhalation under normal conditions is usually not a problem. If overexposed to oil mist, remove from further exposure. Administer artificial respiration if breathing has stopped. Keep at rest. Call for prompt medical attention.
EYE CONTACT: Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.
SKIN CONTACT: Flush with large amounts of water. Use soap if available. Remove severely contaminated clothing (including shoes) and launder before reuse. If irritation persists, seek medical attention.
INGESTION: If swallowed, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

6. PREVENTIVE AND CORRECTIVE MEASURES
PERSONAL PROTECTION: The selection of personal protective equipment varies, depending upon conditions of use. In open systems where contact is likely, wear safety goggles, chemical-resistant overalls, and chemically impervious gloves. Where only incidental contact is likely, wear safety glasses with side shields. No other special precautions are necessary provided skin/eye contact is avoided. Where concentrations in air may exceed the occupational exposure limits given in Section 4 and where engineering, work practices or other means of exposure reduction are not adequate, approved respirators may be necessary to prevent overexposure by inhalation.
ENGINEERING CONTROLS: The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.
HANDLING, STORAGE AND SHIPPING: Keep containers closed. Handle and open containers with care. Store in a cool, well ventilated place away from incompatible materials. Do not handle or store near an open flame, sources of heat, or sources of ignition. Odorous and toxic fumes may form from the decomposition of this product if stored at temperatures in excess of 45 deg. C for extended periods of time or if heat sources in excess of 121 deg. C are used. Empty containers may contain product residue. Do not pressurize cut, heat, or weld empty containers. Do not reuse empty containers without commercial cleaning or reconditioning.
LAND SPILL: Eliminate source of ignition. Keep public away. Prevent additional discharge of material. If possible to do so without hazard. Prevent spills from entering sewers, watercourses or low areas. Contain spilled liquid with sand or earth. Recover by pumping or by using a suitable absorbent. Consult an expert of disposal or recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.
WATER SPILL: Remove from surface by skimming or with suitable absorbants. If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in unconfined waters. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

7. FIRE AND EXPLOSION HAZARD
Flashpoint and method: 150 deg. C COC ASTM D92
Autoignition: 240 deg. C Flammable Limits: LEL: NA UEL: NA
GENERAL HAZARDS:
Low hazard; liquids may burn upon heating to temperatures at or above the flash point. Decomposes; flammable/toxic gases will form at elevated temperatures (thermal decomposition). Toxic gases will form upon combustion.
FIRE FIGHTING: Use water spray to cool fire exposed surfaces and to protect personnel. Shut off fuel to fire.
Use foam, dry chemical or water spray to extinguish fire. Respiratory and eye protection required for fire fighting personnel. Avoid spraying water directly into storage containers due to danger of boilover. A self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires. For small outdoor fires, which may easily be extinguished with a portable fire extinguisher, use of an SCBA may not be required.
HAZARDOUS COMBUSTION PRODUCTS: Smoke, carbon monoxide, carbon dioxide and traces of oxides of sulphur. Alkyl mercaptans and sulfides may also be released.

8. REACTIVITY DATA
STABILITY: This product is stable. Hazardous polymerization will not occur.
INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID: Strong oxidizing agents.
HAZARDOUS DECOMPOSITION: Fumes, smoke, carbon monoxide and sulphur oxides in case of imcomplete combustion.

9. NOTES
All components of this product are listed on the U.S. TSCA inventory.

10. PREPARATION

Date Prepared:	June 12, 1997
Prepared by:	Lubricants & Specialties
	IMPERIAL OIL
	Products Division
	111 St. Clair Avenue West
	Toronto, Ontario M5W 1K3
	800-268-3183

IMPERIAL OIL
Products Division **MSDS NO. 8068**

ESSO GEAR OIL GX EXTRA 75W-90