

# OPERATION

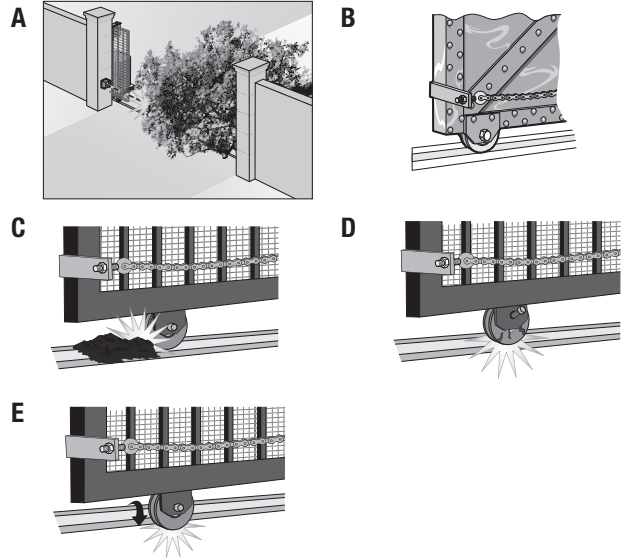
## Operator Alarm

When the inherent force of the operator detects the following twice consecutively, the alarm will sound up to 5 minutes and the operator will need to be reset.

- A. The gate is hitting an obstruction.
- B. The gate does not meet specifications.
- C. Debris is on the gate's track such as mud, rocks, dirt, etc.
- D. The gate has one or more broken axles or wheels.
- E. The gate wheel is off the gate rail.

The operator alarm will beep 3 times with a command if the battery is low.

Remove any obstructions or repair gate system. Press the reset button to shut off the alarm and reset the operator. After the operator is reset, normal functions will resume.



## Remote control

There are 3 different options for programming the remote control depending on how you would like the remote control to function, see page 24.

### Single Button Open Only

When gate is in the closed position, activation of the remote control button will open the gate. The Timer-to-Close can be set to close the gate.

### Single Button Control (SBC) Functionality

Program one remote control button as an open, close, and stop

When gate is in the closed position, activation of the remote control button will open the gate. During the open cycle another activation of the remote control will stop the gate and the next activation of the remote control will close the gate.

When the gate is in the open position, activation of the remote control button will close the gate. If the remote control is activated while the gate is closing, the gate will stop and the next activation will open the gate.

### Three Button Remote Control

Program each remote control button as an open, close, and stop.

# ACCESSORY WIRING

All control wiring used to connect external devices to Class 2 circuits of the operator must be (QPTZ) Power-Limited Circuit Cables, Type CL2, CL2P, CL2R, or CL2X or other cable with equivalent or better electrical, mechanical, and flammability ratings.

## External Control Devices

### NOT TO BE USED AS ENTRAPMENT PROTECTION

#### EXIT (2 Terminals)

This input is a soft open command (maintained switch does not override external safeties and does not reset alarm condition). Used for exit probe, telephone entry, external exit loop detector, or any device that would command the gate to open.

- Opens a closed or closing gate and holds open an open gate, if maintained, pauses Timer-to-Close at OPEN limit.

#### SHADOW (2 Terminals)

This input is used for external shadow loop detector when loop is positioned under the swing of the gate.

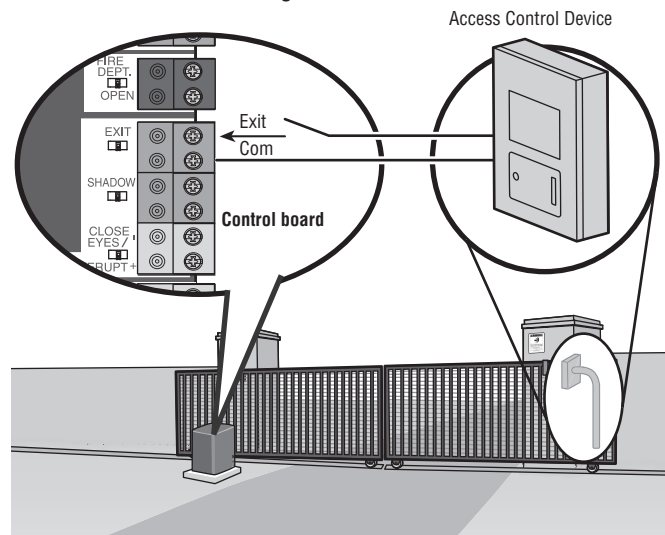
- Holds open gate at open limit
- Only active when the gate is at the OPEN limit, disregarded at all other times
- Pauses Timer-to-Close at OPEN limit

#### INTERRUPT (2 Terminals)

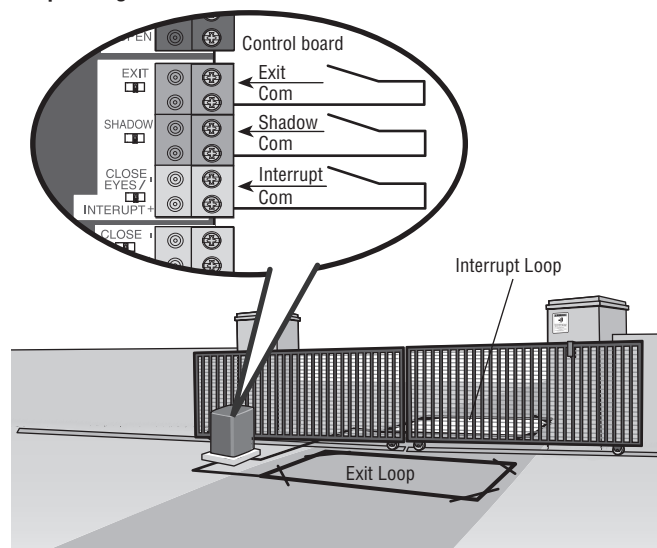
This input is used for an external interrupt loop detector when loop is on the outside of the gate.

- Holds open gate at open limit
- Stops and reverses a closing gate to open limit
- Pauses Timer-to-Close at OPEN limit, activates quick close and anti-tailgate features when enabled on the expansion board

#### Access control device wiring



#### Loop wiring



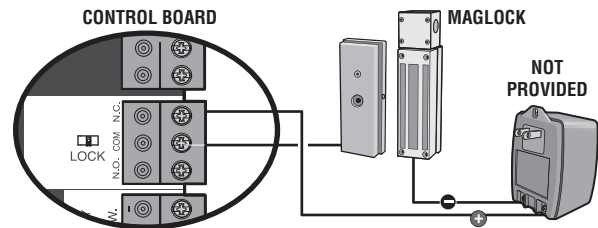
# ACCESSORY WIRING

## Locks

### Maglock (2 Terminals, N.C. and COM)

Relay contact output, Normally - closed (N.C.) output for maglocks.

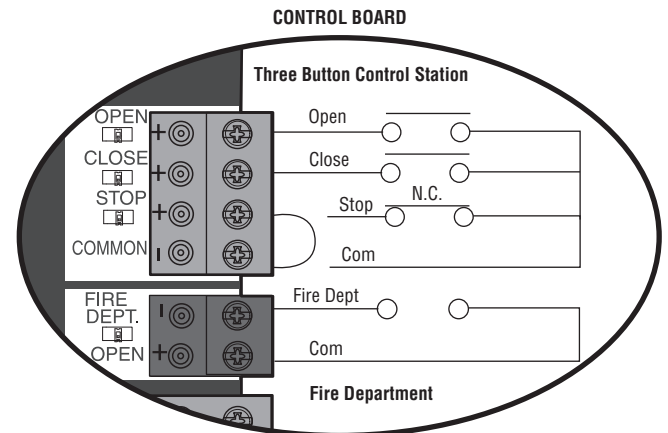
Relay activates prior to motor activation and during motor run. Relay is off when motor is off.



## Miscellaneous Wiring

### Three button control station (4 Terminals)

- OPEN and COM: Opens a closed gate. Hard open (maintained switch overrides external safeties and resets alarm condition). If maintained, pauses Timer-to-Close at OPEN limit. Opens a closing gate and holds open an open gate (within line-of-sight).
- CLOSE and COM: Closes an open gate. Hard close (maintained switch overrides external safeties and resets alarm condition within line-of-sight)
- STOP and COM: Stops a moving gate. Hard stop (maintained switch overrides Open and Close commands and resets alarm condition). If maintained, pauses Timer-to-Close at OPEN limit. Overrides Open and Close commands (within line-of-sight).



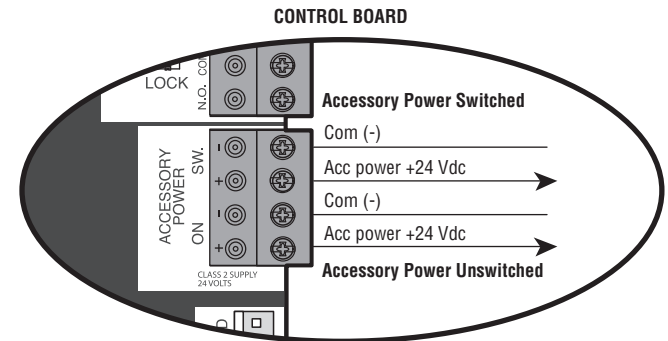
### Fire department open input (2 Terminals)

Acts as hard open.

Maintained input overrides (ignores) external safeties (photoelectric sensor and edge), pauses Timer-to-Close momentary input logic as single button control and safeties remain active, re-enables Timer-to-Close.

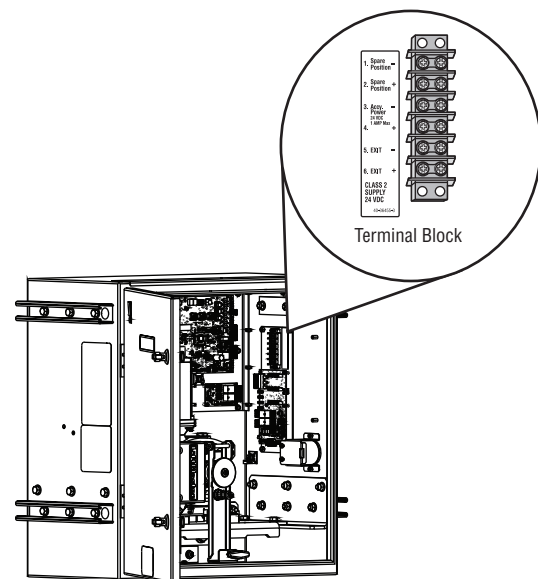
### Accessory power class 2 supply 24 VDC, MAX 1 Amp (4 Terminals)

- SWITCHED: Switched ON with gate motion and at the open limit when Timer-to-Close is active. Turns off 5 seconds after motion.
- UNSWITCHED: 24 Vdc voltage out to power accessories, always ON.



## Terminal Block

The terminal block provides additional space for accessory wiring.



# EXPANSION AND RELAY ADAPTER BOARDS

## ⚠ CAUTION

- To AVOID damaging the circuit board, relays or accessories, DO NOT connect more than 42 Vdc (32 Vac) to the AUX relay contact terminal blocks.

## Expansion and Relay Adapter Boards Overview

### 1. QUICK CLOSE switch:

OFF: No change to the gate's normal operation.

ON: When CLOSE EYES/Interrupt loop is deactivated it causes an opening or a stopped gate to close (ignores the Timer-to-Close).

### 2. AC FAIL switch:

OPEN: Loss of AC power will cause the gate to open approximately 15 seconds after AC power fail and remain OPEN until AC power is restored (enabling the Timer-to-Close).

BATT: With loss of AC power, gate will remain in present position and operator is powered from batteries.

### 3. EXIT FAIL switch:

When set to OPEN, if the EXIT plug-in loop detector (Model LOOPDETLTM) detects a fault, then the gate will open and remain open until fault is cleared. When set to CLOSE, then plug-in EXIT loop detector faults are ignored (EXIT loop is faulted and inoperative).

### 4. ANTI-TAIL switch:

OFF: When CLOSE EYES/Interrupt loop is activated it causes a closing gate to stop and reverse.

ON: When CLOSE EYES/Interrupt loop is activated it causes a closing gate to pause. Once the vehicle is clear the gate will continue to close.

### 5. AUX RELAY switches:

Set the AUX RELAY switches as needed to obtain the desired function as shown on the following page.

### 6. EYE/EDGE switches:

Set the EYE/EDGE switches as needed to obtain the desired OPEN or CLOSE functionality.

### 7. 1, 2, and 3 LEDs:

LEDs indicating the status of the EYE/EDGE inputs. Also used to check the firmware version of the expansion board:

- Locate the 1, 2, and 3 LEDs on the expansion board.
- Disconnect AC/DC power to the control board for 15 seconds.
- Connect power. The 1, 2, and 3 LEDs will flash in sequence until the control board firmware revision is displayed. When the green POWER LED glows solid the LED 1 will flash the version number, then stop, then the LED 2 will flash the revision number (for example: For version 5.1 when the green POWER LED is solid the LED 1 will flash 5 times, then stop, then the LED 2 will flash once).

### 8. J6 and J7 inputs:

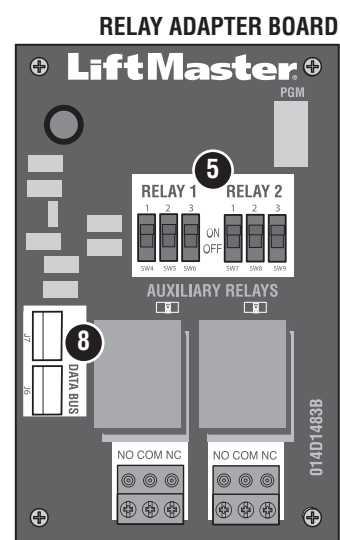
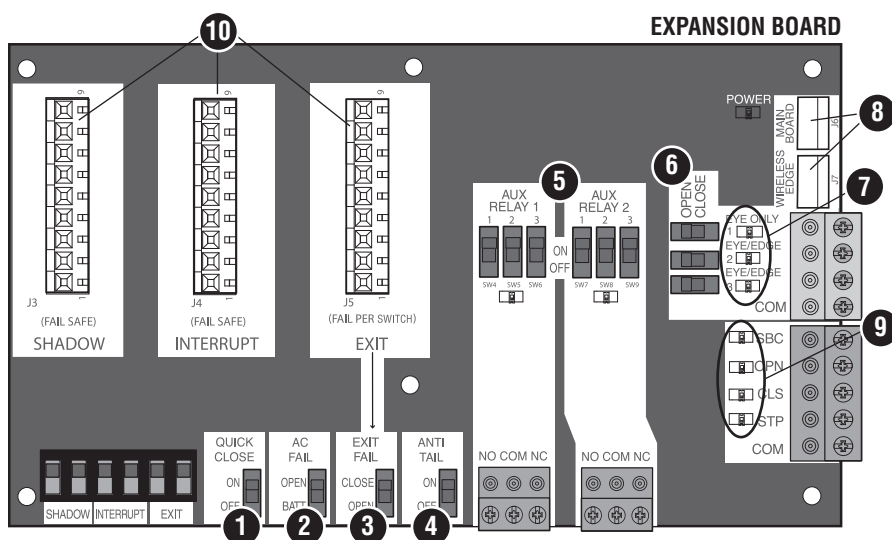
Communication bus connects control board, expansion board, or relay adapter board. Also connects LiftMaster wireless edge receiver LMWEKITU. **NOTE: ONLY one wireless edge receiver may be connected to an operator. Up to 4 wireless edge transmitters LMWETXU may be programmed to the receiver.**

### 9. Input LEDs:

LEDs indicating the status of the SBC, OPN, CLS, and STP inputs.

### 10. Loop detector inputs:

Inputs for the Plug-In Loop Detectors (Model LOOPDETLTM)



# EXPANSION AND RELAY ADAPTER BOARDS

## Auxiliary Relays

The expansion board and relay adapter board provide Normally Open (N.O.) and Normally Closed (N.C.) relay contacts to control external devices, for connection of Class 2, low voltage (42 Vdc [34 Vac] max 5 Amps) power sources only. Function of relay contact activation determined by switch settings.

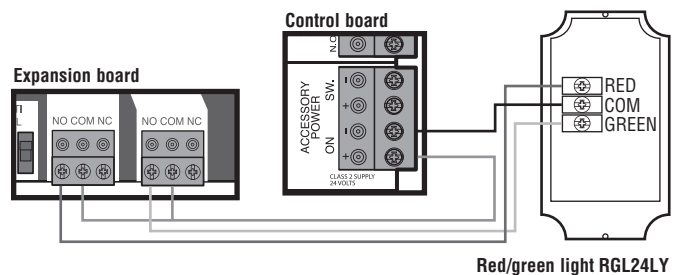
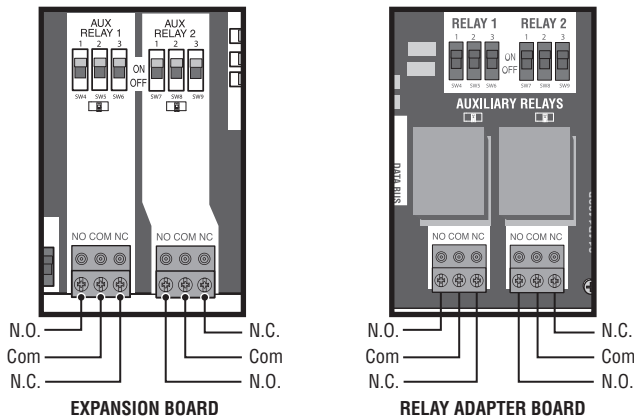
AUX RELAY SETTING	SWITCH SETTINGS			AUX RELAY 1	AUX RELAY 2
	1	2	3		
Off (no feature selected)	OFF	OFF	OFF	Relay always off. Use this Aux Relay setting to conserve battery power.	
Open Limit Switch	OFF	OFF	ON	Energizes at open limit. Use with SAMS (Sequenced Access Management System, jointly with barrier gate).	
Close Limit Switch	OFF	ON	OFF	Energizes when not at close limit. For an additional audible or visual display, connect an external light (low voltage).	
Gate Motion	OFF	ON	ON	Energizes when motor is on (gate in motion). For an additional audible or visual display, connect an external buzzer or light (low voltage).	
Pre-Motion Delay - Expansion Board Only	ON	OFF	OFF	Energizes 3 seconds before gate motion and remains energized during gate motion. The onboard alarm will sound. For an additional audible or visual display, connect an external buzzer or light (low voltage).	Energizes 3 seconds before gate motion and remains energized during gate motion. For an additional audible or visual display, connect an external buzzer or light (low voltage).
Power	ON	ON	OFF	Energizes when AC power or solar power is present. There is approximately a 10-12 second delay before relay cutoff, after AC shutdown.	Energizes when on battery power. There is approximately a 10-12 second delay before relay cutoff, after AC shutdown.
Tamper	ON	OFF	ON	Energizes if gate is manually tampered with by being pushed off of close limit. For an additional audible or visual display, connect an external buzzer or light (low voltage).	
Cycle Count - Expansion Board Only	ON	ON	ON	The 1, 2, and 3 LEDs will blink out the cycle count (cycle count is stored on the control board). See below.	Red/green light functionality, see below.

### \* Cycle count

First, note the current Aux Relay switch positions. To determine the actual cycles that the gate operator has run (in thousands), set all three Aux Relay switches to the ON setting for Aux Relay 1. The Expansion Board's 1, 2, and 3 LEDs will blink out the cycle count, with 1 LED blinking 1000's, 2 LED blinking 10,000's, 3 LED blinking 100,000's, and simultaneously all three LED's blink 1,000,000's (e.g. 1 LED blinks 3 times, 2 LED blinks 6 times, and 3 LED blinks once. Cycle count is 163,000.). Cycle count displayed is between 1,000 and 9,999,000 cycles. After servicing, set Aux Relay switches back to their appropriate positions. Cycle count cannot be reset or changed. If under 1,000 cycles the 1, 2, and 3 LEDs will turn on for 10 seconds, then turn off.

**NOTE:** The expansion board will flash the cycle count 3 times then all the LEDs will turn on solid for 10 seconds then turn off.

RED/GREEN LIGHT FUNCTIONALITY						
Red light wired to AUX RELAY 1. Green light wired to AUX RELAY 2.						
GATE STATE	AUX RELAY 1 SWITCHES			AUX RELAY 2 SWITCHES		
	1 OFF	2 OFF	3 OFF	1 ON	2 ON	3 ON
Closed	Red light OFF*			Green light OFF		
Opening	Red light ON/Flash			Green light OFF		
Open	Red light OFF			Green light ON		
Closing	Red light ON/Flash			Green light OFF		
Defined Mid Stop	n/a			n/a		
Undefined Mid Stop	Red light ON			Green light OFF		
Timer more than 5 seconds	Red light OFF			Green light ON		
Timer less than 5 seconds	Red light ON/Flash			Green light OFF		
* For red light ON when gate is closed, set switch 1 on AUX RELAY 1 to ON						

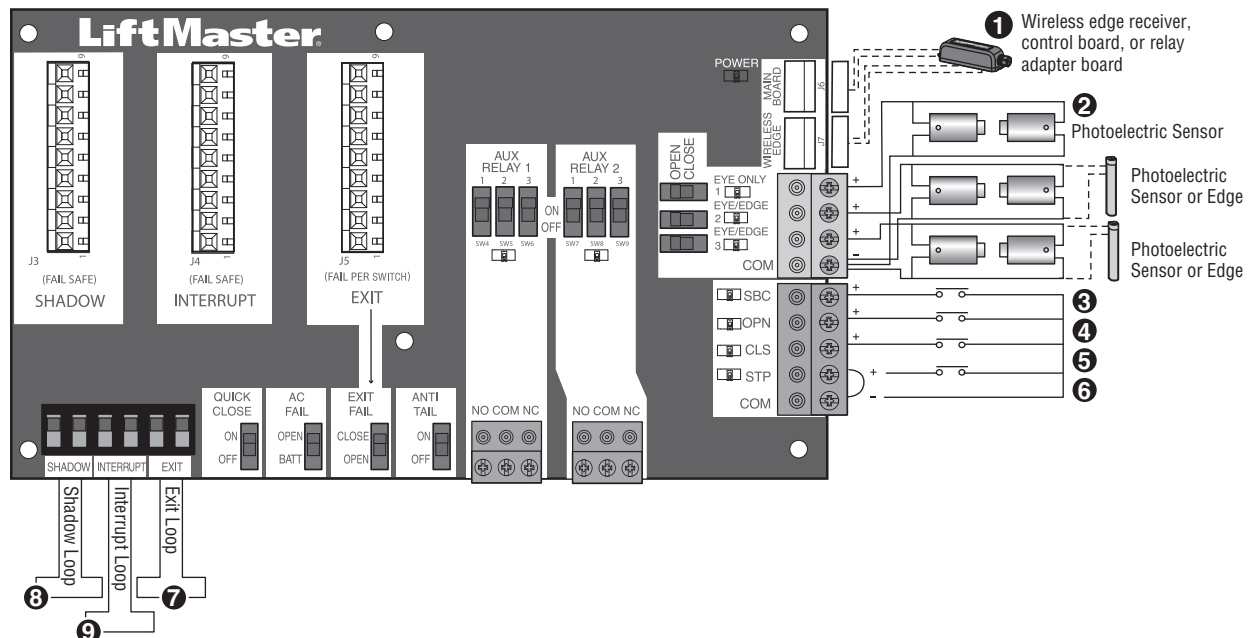


# EXPANSION AND RELAY ADAPTER BOARDS

## Wiring Accessories to the Expansion Board

Refer to the chart below and the corresponding image for a description of the expansion board inputs.

1	Wireless edge, control board, or relay adapter board	Connection for wireless edge receiver, control board or relay adapter board. <b>NOTE: ONLY one wireless edge receiver may be connected to an operator. Up to 4 wireless edge transmitters LMWETXU may be programmed to the receiver.</b>
2	Entrapment Protection Device Inputs (4 terminals total), Open or Close Direction based on switch setting next to inputs	EYES ONLY Input: Open or Close Direction Photoelectric Sensors, Close: reverses fully, Open: reverses 4 seconds. EYES/EDGE Input(s): Open or Close Direction Photoelectric Sensors, Infra-red detector wired or Edge Sensor, Close: reverses fully, Open: reverses 4 seconds.
3	Single Button Control, SBC (2 terminals)	Gate command sequence - Open, Stop, Close, Stop, ... Soft Open ,Soft Close, Soft Stop (maintained switch does not override external safeties and does not reset alarm condition)
4	Open Input (& common) (3-Button Control Station, 4 terminals total)	Open command - opens a closed gate. Soft open (maintained switch does not override external safeties and does not reset alarm condition) If maintained, pauses Timer-to-Close at OPEN limit. Opens a closing gate and holds open an open gate.
5	Close Input (& common) (3-Button Control Station, 4 terminals total)	Close command - closes an open gate. Soft close (maintained switch does not override external safeties and does not reset alarm condition).
6	Stop Input (& common) (3-PB station, 4 terminals total)	Stop command - stops a moving gate. Hard stop (maintained switch overrides Open and Close commands and resets alarm condition) If maintained, pauses Timer-to-Close at OPEN limit. Overrides an Open or Close command.
7	Exit Loop Input (2 terminals)	Loop wire connection for plug-in loop detector when loop is inside secured area near gate. Open command - opens a closed gate. Soft open (maintained switch does not override external safeties and does not reset alarm condition) If maintained, pauses Timer-to-Close at OPEN limit. Opens a closing gate and holds open an open gate.
8	Shadow Loop Input (2 terminals)	Loop wire connection for plug-in loop detector when loop is positioned under the gate. <ul style="list-style-type: none"> <li>Holds open gate at open limit</li> <li>Disregarded during gate motion</li> <li>Pauses Timer-to-Close at Open Limit</li> </ul>
9	Interrupt Loop Input (2 terminals)	Loop wire connection for plug-in loop detector when loop is along the side of the gate. <ul style="list-style-type: none"> <li>Holds open gate at open limit</li> <li>Stops and reverses a closing gate</li> <li>Pauses Timer-to-Close at Open Limit</li> </ul>



## MAINTENANCE

### IMPORTANT SAFETY INSTRUCTIONS

#### WARNING

To reduce the risk of SEVERE INJURY or DEATH:

- READ AND FOLLOW ALL INSTRUCTIONS.
- ANY maintenance to the operator or in the area near the operator MUST NOT be performed until disconnecting the electrical power (AC or solar and battery) and locking-out the power via the operator power switch. Upon completion of maintenance the area MUST be cleared and secured, at that time the unit may be returned to service.
- Disconnect power at the fuse box BEFORE proceeding. Operator MUST be properly grounded and connected in accordance with national and local electrical codes. **NOTE:** *The operator should be on a separate fused line of adequate capacity.*
- NEVER let children operate or play with gate controls. Keep the remote control away from children.
- ALWAYS keep people and objects away from the gate. NO ONE SHOULD CROSS THE PATH OF THE MOVING GATE.
- The entrance is for vehicles ONLY. Pedestrians MUST use separate entrance.
- **TEST THE GATE OPERATOR MONTHLY.** The gate MUST reverse on contact with an object or reverse when an object activates the noncontact sensors. After adjusting the force, speed, or the limit of travel, retest the gate operator. Failure to adjust and retest the gate operator properly can increase the risk of INJURY or DEATH.
- Use the manual disconnect release ONLY when the gate is NOT moving.
- KEEP GATES PROPERLY MAINTAINED. Read this manual carefully. Have a qualified service person make repairs to gate hardware.
- ALL maintenance MUST be performed by a Trained Gate Systems Technician.
- Activate gate ONLY when it can be seen clearly, is properly adjusted and there are no obstructions to gate travel.
- To reduce the risk of FIRE or INJURY to persons use ONLY LiftMaster part 29-NP712 for replacement batteries.
- **SAVE THESE INSTRUCTIONS.**

#### CAUTION

- ALWAYS wear protective gloves and eye protection when changing the battery or working around the battery compartment.

# MAINTENANCE

## Maintenance Chart

Disconnect all power (AC, solar, battery) to the operator before servicing.

DESCRIPTION	TASK	CHECK AT LEAST ONCE EVERY		
		MONTH	6 MONTHS	3 YEARS
Entrapment Protection Devices	Check and test inherent (built into the operator) and external devices for proper operation	X		
Warning Signs	Make sure they are present and replace if worn or broken, see <i>Accessories</i>	X		
Manual Disconnect	Check and test for proper operation		X	
Sprockets and Chains	Check for excessive slack and lubricate		X	
Gate	Inspect for wear or damage; ensure it still complies with ASTM F2200, see page 5	X		
Accessories	Check all for proper operation		X	
Electrical	Inspect all wire connections		X	
Chassis Mounting Bolts	Check for tightness		X	
Operator	Inspect for wear or damage		X	
Diagnostic History	Review diagnostic history for identification of intermittent problems		X	
Batteries	Replace			X

### NOTES:

- High cycle usage may require more frequent maintenance checks.
- Limits may have to be reset after any major drive chain adjustments.
- If lubricating chain, use only lithium spray. Never use grease or silicone spray.
- It is suggested that while at the site voltage readings be taken at the operator. Using a digital voltmeter, verify that the incoming voltage to the operator is within ten percent of the operator's rating.

## Batteries

Batteries will degrade over time depending on temperature and usage. The operator alarm will beep 3 times with a command if the battery is low. Batteries do not perform well in extremely cold temperatures. For best performance, the batteries should be replaced every 3 years. Use only LiftMaster part 29-NP712 for replacement batteries. The batteries contain lead and need to be disposed of properly.

The operator comes with two 7AH batteries. Two 33AH batteries (A12330SGLPK), with battery harness model K41-0102-000 (not provided), may be used in place of the 7AH batteries.

## Drive Train

Over time, the drive chain on the operator will stretch and need to be tightened. To tighten the drive chain adjust either of the two chain eye bolts. **NOTE:** The chain should have no more than 1 inch of sag for every 10 feet of chain length.



# TROUBLESHOOTING

## ⚡ WARNING

To protect against fire and electrocution:

- DISCONNECT power (AC or solar and battery) BEFORE installing or servicing operator.

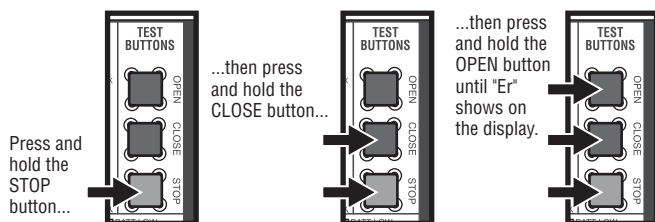
For continued protection against fire:

- Replace ONLY with fuse of same type and rating.

## Diagnostic Codes

### To View the Codes

The codes will show on the diagnostic display.



The operator will show the code sequence number followed by the code number:

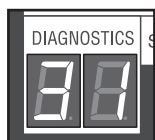
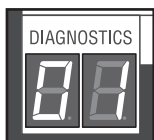
#### CODE SEQUENCE NUMBER

The first number shown is the most recent code (example: "01"). The display will show the sequence of codes that occurred starting with "01" and going up to code "20".

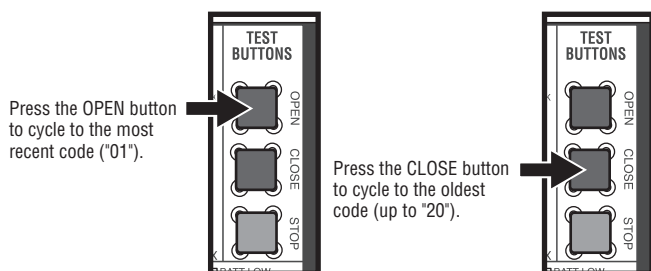
A SECOND  
LATER....

#### CODE NUMBER

The second number shown after the code sequence number is the code itself (31-99, example "31"). Refer to the chart on page 55 for an explanation of each code.

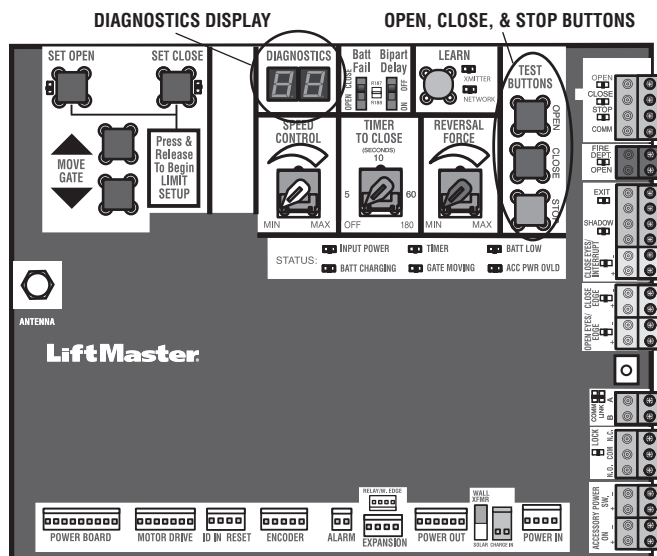


### To Scroll Through the Saved Codes



The operator will only keep track of up to 20 codes, then will start saving over the oldest codes as new codes occur.

See the diagnostic codes table page 55.



### To Exit

Press and release the STOP button to exit. The display will also time out after two minutes of inactivity.

### To Reset the Code History

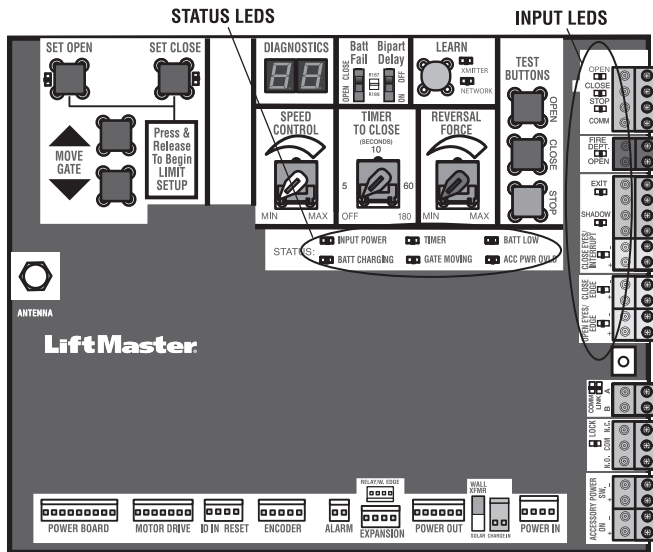
1. Press and hold the STOP button for six seconds. The display will show "Er" then "CL" alternately for six seconds.
2. Release the STOP button. The code history has now been reset and the display will show "- -" until a new code occurs.
3. Press and release the STOP button to exit.

## TROUBLESHOOTING

## Control Board LEDs

STATUS LEDS		
INPUT POWER	OFF	OFF state
	ON	AC charger or Solar power available
BATT CHARGING	OFF	Not charging
	ON	Three stage battery charging
TIMER	OFF	The timer is disabled
	ON	The timer is enabled
	MEDIUM BLINK (1 blink per second)	The timer is running
	FAST BLINK (2 blinks per second)	The timer is paused
	FASTEST BLINK (8 blinks per second)	The timer is canceled
GATE MOVING	OFF	The gate is stopped
	ON	The gate is opening or closing
	MEDIUM BLINK (1 blink per second)	Operator is in E1 (single entrapment)
	FASTEST BLINK (8 blinks per second)	The operator is in E2 (double entrapment)
BATT LOW	OFF	No battery error
	ON	Battery low
	MEDIUM BLINK (1 blink per second)	Battery critically low
ACC PWR OVLD	OFF	Accessory power is okay
	ON	Accessory overload protector opened

INPUT LEDS		
OPEN, CLOSE, STOP INPUT	OFF	Input inactive
	ON	Input active
	BLINK	Input active on other operator or expansion board
FIRE DEPT INPUT	OFF	Input inactive
	ON	Input active
	BLINK	Input active on other operator
EXIT	OFF	Input inactive
	ON	Input active
	BLINK	Input active on other operator
SHADOW	OFF	Input inactive
	ON	Input active
	BLINK	Input active on other operator
CLOSE EYES/INTERRUPT	OFF	Input inactive
	ON	Input active
	BLINK	Input active on other operator
CLOSE EDGE	OFF	Input inactive
	ON	Input active
	BLINK	Input active on other operator
OPEN EYES/EDGE	OFF	Input inactive
	ON	Input active
	BLINK	Input active on other operator
LOCK	OFF	Maglock relay inactive
	ON	Maglock relay active



# TROUBLESHOOTING

## Troubleshooting Chart

SYMPTOM	POSSIBLE CAUSES	SOLUTIONS
<b>Operator does not run and diagnostic display not on.</b>	<ul style="list-style-type: none"> <li>a. No power to control board</li> <li>b. Open fuse</li> <li>c. If on battery power only, low or dead batteries</li> <li>d. Inoperable control board</li> <li>e. Inoperable BLDC Motor Drive Board</li> </ul>	<ul style="list-style-type: none"> <li>a. Check AC and battery power</li> <li>b. Check fuses on the BLDC Motor Drive Board</li> <li>c. Charge batteries by AC or solar power or replace batteries</li> <li>d. Replace inoperable control board</li> <li>e. Replace BLDC Motor Drive Board</li> </ul>
<b>Control board powers up, but motor does not run.</b>	<ul style="list-style-type: none"> <li>a. Reset button is stuck in the RESET position</li> <li>b. Jumper is not in place for stop circuit</li> <li>c. If on battery power only, low or dead batteries</li> <li>d. Open or close input active</li> <li>e. Entrapment protection device active</li> <li>f. Vehicle loop detector or probe active</li> <li>g. Inoperable control board</li> <li>h. Inoperable motor or BLDC Motor Drive Board</li> </ul>	<ul style="list-style-type: none"> <li>a. Check reset button</li> <li>b. Put a jumper on the stop circuit</li> <li>c. Charges batteries by AC or solar power or replace batteries</li> <li>d. Check all open and close inputs for a “stuck on” input</li> <li>e. Check all entrapment protection device inputs for a “stuck on” sensor</li> <li>f. Check all vehicle detector inputs for a “stuck on” detector</li> <li>g. Replace inoperable control board</li> <li>h. Replace motor or BLDC Motor Drive Board</li> </ul>
<b>Gate moves, but cannot set correct limits.</b>	<ul style="list-style-type: none"> <li>a. Gate does not move to a limit position</li> <li>b. Gate is too difficult to move</li> <li>c. Limits are set too close</li> </ul>	<ul style="list-style-type: none"> <li>a. Use manual disconnect, manually move gate, and ensure gate moves easily limit to limit. Repair gate as needed.</li> <li>b. Gate must move easily and freely through its entire range, limit to limit. Repair gate as needed.</li> <li>c. Ensure the gate moves at least four feet between the OPEN limit and the CLOSE limit.</li> </ul>
<b>Gate does not fully open or fully close when setting limits.</b>	<ul style="list-style-type: none"> <li>a. Gate does not move to a limit position</li> <li>b. Gate is too difficult to move</li> </ul>	<ul style="list-style-type: none"> <li>a. Use manual disconnect, manually move gate, and ensure gate moves easily limit to limit. Repair gate as needed.</li> <li>b. Gate must move easily and freely through its entire range, limit to limit. Repair gate as needed.</li> </ul>
<b>Operator does not respond to a wired control/command (example: open, close, SBC, etc.)</b>	<ul style="list-style-type: none"> <li>a. Check open and close command input LEDs</li> <li>b. Reset button is stuck</li> <li>c. If on battery power only, low or dead batteries</li> <li>d. Entrapment protection device active</li> <li>e. Vehicle loop detector or vehicle probe active</li> </ul>	<ul style="list-style-type: none"> <li>a. Check all open and close inputs for a “stuck on” input</li> <li>b. Set reset button to NORMAL OPERATION, see page 29</li> <li>c. Charges batteries by AC or solar power or replace batteries</li> <li>d. Check all entrapment protection device inputs for a “stuck on” sensor</li> <li>e. Check all vehicle detector inputs for a “stuck on” detector</li> </ul>
<b>Operator does not respond to a wireless control or transmitter</b>	<ul style="list-style-type: none"> <li>a. Check XMITTER LED when wireless control is active</li> <li>b. Reset button is stuck</li> <li>c. Poor radio reception</li> </ul>	<ul style="list-style-type: none"> <li>a. Activate wireless control and check XMITTER LED is on. Re-learn wireless control/transmitter to control board. Replace wireless control as needed.</li> <li>b. Set reset button to NORMAL OPERATION, see page 29</li> <li>c. Check if similar wired control operates correctly. Check if wireless controls works properly when within a few feet of operator. Check operator’s antenna and antenna wire. Check other wireless controls or devices.</li> </ul>
<b>Gate stops during travel and reverses immediately.</b>	<ul style="list-style-type: none"> <li>a. Control (open, close) becoming active</li> <li>b. Vehicle loop detector active</li> <li>c. Low battery voltage</li> <li>d. Inherent entrapment protection was activated while moving</li> </ul>	<ul style="list-style-type: none"> <li>a. Check all open and close inputs for an active input</li> <li>b. Check all vehicle detector inputs for an active detector</li> <li>c. Battery voltage must be 23 VDC or higher. Charge batteries by AC or solar power or replace batteries</li> <li>d. If there are no obstructions in gate path, manually disconnect the gate, and ensure it moves easily limit to limit. Repair gate as needed.</li> </ul>

## TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSES	SOLUTIONS
<b>Gate opens, but will not close with transmitter or Timer-to-Close.</b>	<ul style="list-style-type: none"> <li>a. Open control active</li> <li>b. Vehicle loop detector active</li> <li>c. Loss of AC power with AC FAIL set to OPEN</li> <li>d. Low battery with LOW BATT set to OPEN</li> <li>e. Fire dept input active</li> <li>f. Timer-to-Close not set</li> <li>g. Close entrapment protection device active</li> </ul>	<ul style="list-style-type: none"> <li>a. Check all open inputs for an active input</li> <li>b. Check all vehicle detector inputs for an active detector</li> <li>c. Check AC power and AC Fail option setting</li> <li>d. Check if AC power is available. If no AC power, then running on batteries and battery voltage must be 23 Vdc or higher. Charge batteries by AC or solar power or replace batteries.</li> <li>e. Check Fire Dept input</li> <li>f. Check Timer-to-Close (TTC) setting</li> <li>g. Check all entrapment protection device inputs for an active sensor</li> </ul>
<b>Gate closes, but will not open.</b>	<ul style="list-style-type: none"> <li>a. Vehicle loop detector active</li> <li>b. Low battery with LOW BATT option set to CLOSE</li> </ul>	<ul style="list-style-type: none"> <li>a. Check all vehicle detector inputs for an active detector</li> <li>b. Check if AC power is available. If no AC power, then running on batteries and battery voltage must be 23 VDC or higher. Charge batteries by AC or solar power or replace batteries.</li> </ul>
<b>Exit loop activation does not cause gate to open.</b>	<ul style="list-style-type: none"> <li>a. Exit vehicle detector setup incorrectly</li> <li>b. Inoperable exit loop detector</li> <li>c. Low battery with LOW BATT option set to CLOSE</li> </ul>	<ul style="list-style-type: none"> <li>a. Review exit loop detector settings. Adjust settings as needed.</li> <li>b. Replace inoperable exit loop detector.</li> <li>c. Check if AC power is available. If no AC power, then running on batteries and battery voltage must be 23 VDC or higher. Charge batteries by AC or solar power or replace batteries.</li> </ul>
<b>Interrupt loop does not cause gate to stop and reverse.</b>	<ul style="list-style-type: none"> <li>a. Vehicle detector setup incorrectly</li> <li>b. Inoperable vehicle loop detector</li> <li>c. Anti-tail set to ON</li> </ul>	<ul style="list-style-type: none"> <li>a. Review Interrupt loop detector settings. Adjust settings as needed.</li> <li>b. Replace inoperable Interrupt loop detector.</li> <li>c. Set anti-tail to OFF.</li> </ul>
<b>Shadow loop does not keep gate at open limit.</b>	<ul style="list-style-type: none"> <li>a. Vehicle detector setup incorrectly</li> <li>b. Inoperable vehicle loop detector</li> </ul>	<ul style="list-style-type: none"> <li>a. Review shadow loop detector settings. Adjust settings as needed.</li> <li>b. Replace inoperable shadow loop detector.</li> </ul>
<b>Obstruction in gate's path does not cause gate to stop and reverse.</b>	<ul style="list-style-type: none"> <li>a. Force adjustment needed</li> </ul>	<ul style="list-style-type: none"> <li>a. Refer to the <i>Adjustment</i> section to conduct the obstruction test and perform the proper force adjustment that is needed.</li> </ul>
<b>Photoelectric sensor does not stop or reverse gate.</b>	<ul style="list-style-type: none"> <li>a. Incorrect photoelectric sensor wiring</li> <li>b. Inoperable photoelectric sensor</li> </ul>	<ul style="list-style-type: none"> <li>a. Check photoelectric sensor wiring. Retest that obstructing photoelectric sensor causes moving gate to stop, and may reverse direction.</li> <li>b. Replace inoperable photoelectric sensor. Retest that obstructing photoelectric sensor causes moving gate to stop, and may reverse direction.</li> </ul>
<b>Edge sensor does not stop or reverse gate.</b>	<ul style="list-style-type: none"> <li>a. Incorrect edge sensor wiring</li> <li>b. Inoperable edge sensor</li> </ul>	<ul style="list-style-type: none"> <li>a. Check edge sensor wiring. Retest that activating edge sensor causes moving gate to stop and reverse direction.</li> <li>b. Replace inoperable edge sensor. Retest that activating edge sensor causes moving gate to stop and reverse direction.</li> </ul>
<b>Alarm sounds for 5 minutes or alarm sounds with a command.</b>	<ul style="list-style-type: none"> <li>a. Double entrapment occurred (two obstructions within a single activation)</li> </ul>	<ul style="list-style-type: none"> <li>a. Check for cause of entrapment (obstruction) detection and correct. Press the reset button to shut off alarm and reset the operator.</li> </ul>
<b>Alarm beeps three times with a command.</b>	<ul style="list-style-type: none"> <li>a. Low battery</li> </ul>	<ul style="list-style-type: none"> <li>a. Check if AC power is available. If no AC power, then running on batteries and battery voltage must be 23 Vdc or higher. Charge batteries by AC or solar power or replace batteries</li> </ul>
<b>Alarm beeps when running.</b>	<ul style="list-style-type: none"> <li>a. Expansion board setting</li> <li>b. Constant pressure to open or close is given</li> </ul>	<ul style="list-style-type: none"> <li>a. Pre-warning is set to "ON"</li> <li>b. Constant pressure to open or close is given</li> </ul>
<b>Expansion board function not controlling gate.</b>	<ul style="list-style-type: none"> <li>a. Inoperable control board to expansion board wiring</li> <li>b. Incorrect input wiring to expansion board</li> <li>c. Inoperable expansion board or inoperable control board</li> </ul>	<ul style="list-style-type: none"> <li>a. Check control board to expansion board wiring. If required, replace wire cable.</li> <li>b. Check wiring to all inputs on expansion board.</li> <li>c. Replace inoperable expansion board or control board.</li> </ul>

## TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSES	SOLUTIONS
<b>Maglock not working correctly.</b>	a. Maglock wired incorrectly	a. Check that maglock is wired to N.C. and COM terminals. Check that maglock has power (do not power maglock from control board accessory power terminals). If shorting lock's NO and COM wires does not activate maglock, then replace maglock or maglock wiring (refer to wiring diagram).
<b>Solenoid lock not working correctly.</b>	a. Solenoid wired incorrectly	a. Check that solenoid is wired to N.O. and COM terminals. Check that solenoid has power (do not power solenoid from control board accessory power terminals). If shorting lock's NC and COM wires does not activate solenoid, then replace solenoid lock or solenoid wiring (refer to wiring diagram).
<b>Switched (SW) accessory power remaining on.</b>	a. In limit setup mode	a. Learn the limits
<b>Accessories connected to switched (SW) accessory power not working correctly, turning off, or resetting.</b>	a. Normal behavior	a. Move accessory to accessory power "ON"
<b>Accessories connected to Accessory power not working correctly, turning off, or resetting.</b>	a. Accessory power protector active b. Inoperable control board	a. Disconnect all accessory powered devices and measure accessory power voltage (should be 23 – 30 Vdc). If voltage is correct, connect accessories one at a time, measuring accessory voltage after every new connection. b. Replace inoperable control board
<b>Quick close not working correctly.</b>	a. Quick close setting incorrect b. Interrupt loop detector c. Inoperable expansion board	a. Check that quick close setting is ON b. Check operation of interrupt loop detector c. Replace inoperable expansion board
<b>Anti-tailgating not working correctly.</b>	a. Anti-tail setting incorrect b. Interrupt loop detector c. Inoperable expansion board	a. Check that anti-tail setting is ON b. Check operation of Interrupt loop detector c. Replace inoperable expansion board
<b>AUX relay not working correctly.</b>	a. AUX relay setting incorrect b. AUX relay wiring incorrect c. Inoperable expansion board or relay adapter board	a. Check AUX relay switches settings b. Check that wiring is connected to either N.O. and COM or to N.C. and COM. c. Set AUX relay to another setting and test. Replace inoperable expansion board or relay adapter board.
<b>Solar operator not getting enough cycles per day.</b>	a. Insufficient panel wattage b. Excessive accessory power draw c. Old batteries d. Solar panels are not getting enough sunlight	a. Add more solar panels b. Reduce the accessory power draw by using LiftMaster low power accessories c. Replace batteries d. Relocate the solar panels away from obstructions (trees, buildings, etc.)
<b>Solar operator, insufficient standby time.</b>	a. Insufficient panel wattage b. Excessive accessory power draw c. Battery capacity too low	a. Add more solar panels b. Reduce the accessory power draw by using LiftMaster low power accessories c. Use batteries with higher amp hour (AH) rating

# SOLAR PANELS

## Solar Panel(s)

**SOLAR PANELS ARE NOT PROVIDED. SEE ACCESSORIES**

**NOTE:** The use of photoelectric sensor heaters (models LMRRUL and LMTBUL) is **NOT** recommended in solar applications.

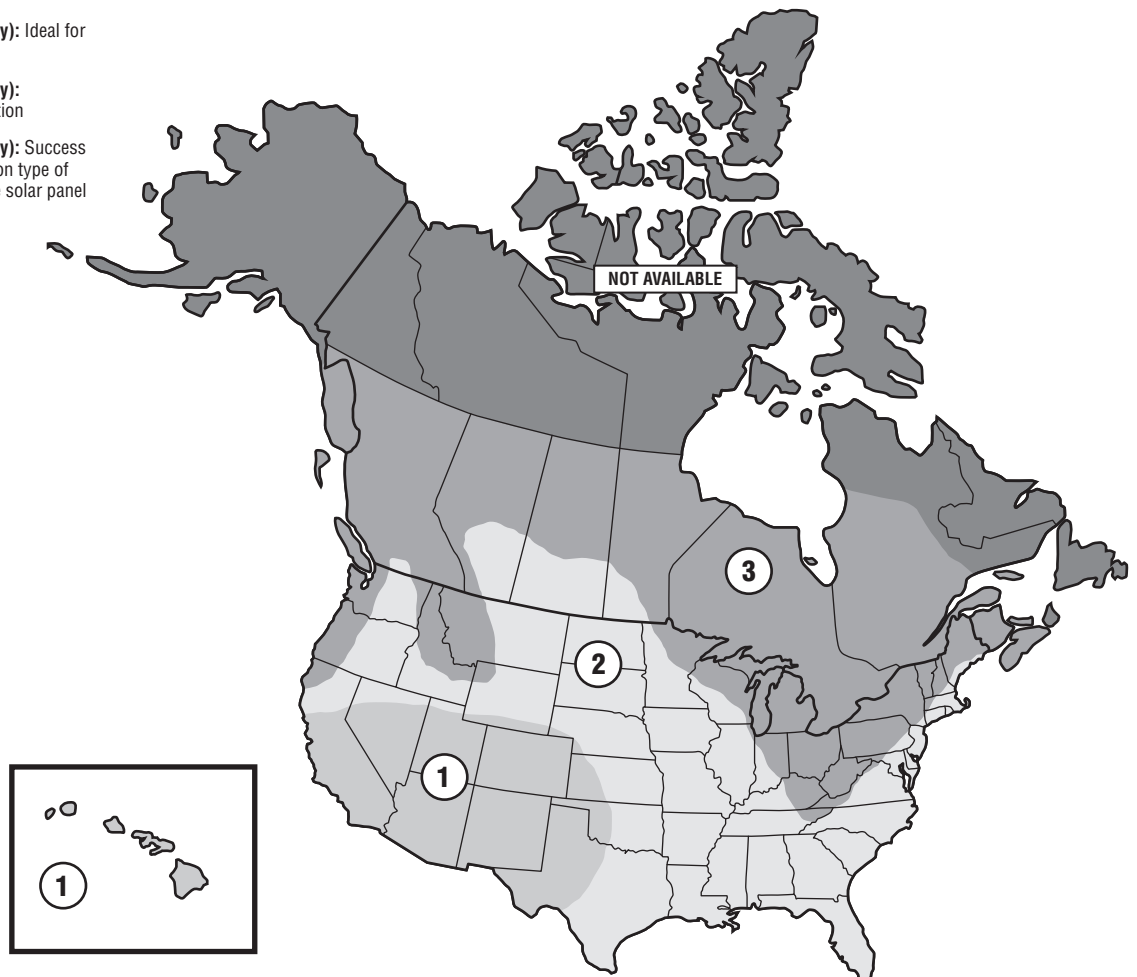
### Solar Application Requirements

- A minimum of two 10W solar panels in series (Model SP10W12V).
- A maximum of six 10W solar panels (Model SP10W12V).
- A heater cannot be used with a solar application.

### Solar Zones

Solar panel recommendations are based upon the average solar radiation and the temperature effects on batteries in the given zones as shown on the map below. Local geography and weather conditions may require additional solar panels. Solar powered gate operator installations are not supported in northern climates due to cold weather and a reduced number of hours of sunlight during the winter months. The cycles/day ratings are approximations. Ratings vary based on gate construction, installation, and temperature. Solar panels cannot be installed in areas that experience long periods of heavy fog, lake effect snow, or rain.

- 1** **ZONE 1 (6 Hours of Sunlight/Day):** Ideal for solar application
- 2** **ZONE 2 (4 Hours of Sunlight/Day):** Recommended for solar application
- 3** **ZONE 3 (2 Hours of Sunlight/Day):** Success of solar application will depend on type of gate operator and location of the solar panel
- NOT AVAILABLE**



# SOLAR PANELS

## Solar usage guide

All performance metrics are estimates and are subject to change at any time. Actual results will vary due to variables specific to the site.

**NOTE:** For additional details and specifications on solar usage, please refer to liftmaster.com.

Typical System Standby Battery Current Consumption (mA)	
System voltage	24V
Control board with no radios programmed	2.7 mA
One or more LiftMaster® remote controls programmed	+1 mA
myQ® device or wireless dual gate programmed	+2.4 mA
Expansion board	+11.1 mA
Relay adapter board	+11.1 mA
Per loop detector LOOPDETLN (up to 3 loop detectors can be plugged in to the expansion board)	+3.8 mA
Add up current draw by feature and accessory to determine total current draw	

**NOTE:** The use of photoelectric sensor heaters (models LMRRUL and LMTBUL) is NOT recommended in solar applications.

INSL24UL SOLAR GATE CYCLES PER DAY - 1,000 lb. gate 20 ft. travel							
	BATTERY CURRENT DRAW (mA)	ZONE 1 (6 Hrs Sunlight/Day)		ZONE 2 (4 Hrs Sunlight/Day)		ZONE 3 (2 Hrs Sunlight/Day)	
		7AH batteries	33AH batteries	7AH batteries	33AH batteries	7AH batteries	33AH batteries
20W SOLAR PANEL	5	20	23	12	14		
	15	18	22	10	12		
	20	18	21		12		
	50	13	16				
	100						
40W SOLAR PANEL	5	38	53	23	32		13
	15	36	51	21	30		12
	20	35	50	20	29		11
	100	20	34		15		
	200		17				
60W SOLAR PANEL	5	47	84	28	51	12	21
	15	45	82	26	49	10	20
	20	44	81	26	48		19
	100	29	63	12	32		
	250		33				

IHSL24UL SOLAR CYCLES PER DAY - 3,000 lb. gate 20 ft travel							
	BATTERY CURRENT DRAW (mA)	ZONE 1 (6 Hrs Sunlight/Day)		ZONE 2 (4 Hrs Sunlight/Day)		ZONE 3 (2 Hrs Sunlight/Day)	
		7AH batteries	33AH batteries	7AH batteries	33AH batteries	7AH batteries	33AH batteries
20W SOLAR PANEL	5		11				
	15		10				
	20						
	50						
	100						
40W SOLAR PANEL	5	18	25	11	15		
	15	17	24		14		
	20	16	23		14		
	100		16				
	200						
60W SOLAR PANEL	5	22	39	13	24		
	15	21	38	12	23		
	20	20	38	12	22		
	100	13	30		15		
	250		15				



# SOLAR PANELS

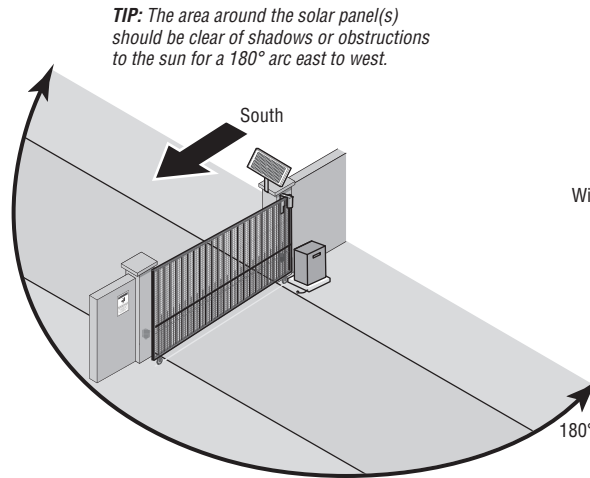
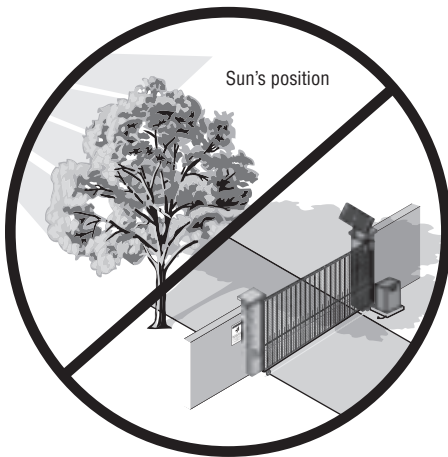
## Position

The location of the panel(s) is critical to the success of the installation. In general, the panel(s) should be mounted using the provided angle bracket facing **due south**. The solar panel(s) should be mounted in an area clear of all obstructions and shade from buildings and trees. If the panel(s) is not casting a shadow, the battery is not being charged.

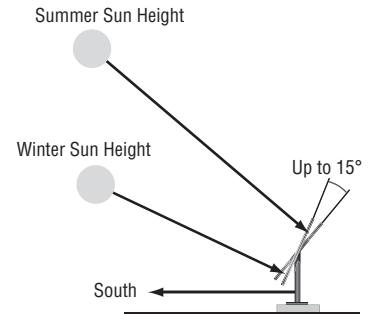
**NOTE:** Tall trees or buildings that do not shade the solar panel(s) in the summer could shade the solar panel(s) during the winter months when the sun sits lower in the sky.

MAXIMUM WIRE LENGTH			
AMERICAN WIRE GAUGE (AWG)	20 WATTS OF PANELS	40 WATTS OF PANELS	60 WATTS OF PANELS
16	235 (71.6 m)	115 (35.1 m)	80 (24.4 m)
14	375 (114.3 m)	190 (57.9 m)	125 (38.1 m)
12	600 (182.9 m)	300 (91.4 m)	200 (61 m)
10	940 (286.5 m)	475 (144.8 m)	315 (96 m)

Chart assumes: copper wire, 65°C, 5% drop, 30V nominal



**TIP:** The area around the solar panel(s) should be clear of shadows or obstructions to the sun for a 180° arc east to west.



**TIP:** To optimize the system for winter operation the angle can be increased an additional 15° (solar panel(s) sits more vertical).

## Installation

Solar panel(s) **MUST** be installed facing south. Use a compass to determine direction. Below are general instructions for installing the solar panel(s). Your installation may vary slightly depending on the solar panel purchased.

1. Position the mounting bracket on the mounting surface. Mark and drill holes.
2. Secure the solar panel to the mounting bracket using the hex bolts, hex nuts and washers provided.
3. Secure the solar panel to the mounting surface using lag screws provided.

