

OWNER'S MANUAL
MODEL GH
LOGIC CONTROL (VER. 2.0)
INDUSTRIAL DUTY DOOR OPERATOR

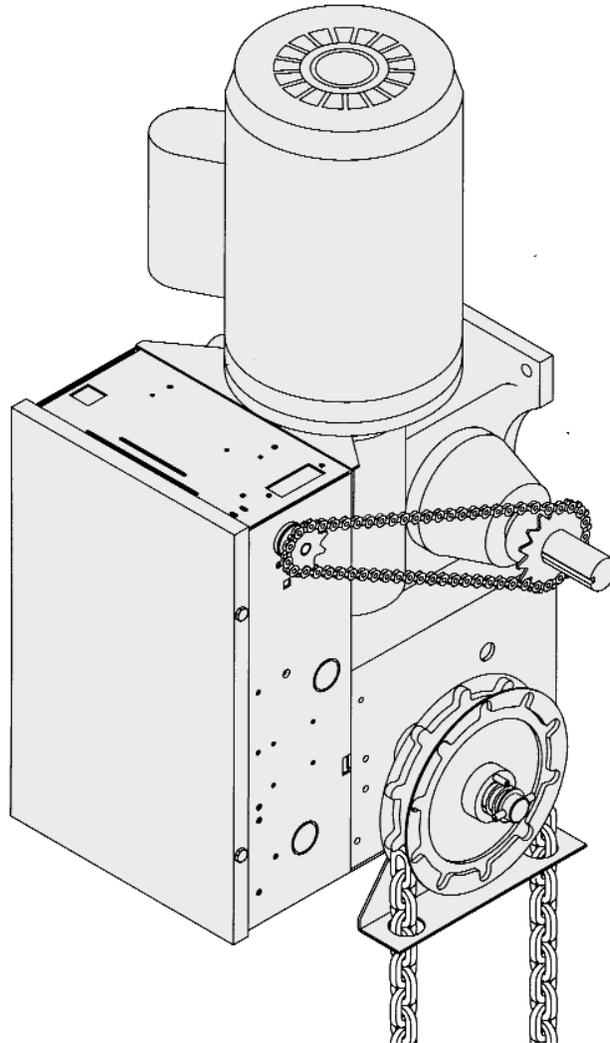
LOGIC CONTROL

L

FACTORY SET

C2 Wiring

See pages 14 and 15
for other wiring
configurations



This Opener Features



Maintenance Alert System

PATENT PENDING

The Maintenance Alert System™ allows the installer to set an internal Maintenance Cycle Counter. An LED on the 3-button station will signal when the set number of cycles is reached or when the opener requires immediate service.

2 YEAR WARRANTY
Serial # _____ (located on electrical box cover)
Installation Date _____
Wiring Type _____

NOT FOR RESIDENTIAL USE





Before attempting to install, operate or maintain the operator, you must read and fully understand this manual and follow all safety instructions.



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

TABLE OF CONTENTS

<u>SPECIFICATIONS</u>	
Packing List . . . . .	.2
Motor Specification . . . . .	.3
Electrical Specifications . . . . .	.3
Mechanical Specifications . . . . .	.3
Safety Specifications . . . . .	.3
Weights & Dimensions . . . . .	.3
<u>PREPARATION</u>	
Site . . . . .	.4
Operator . . . . .	.4
<u>INSTALLATION INSTRUCTIONS</u>	
Wall Mounting . . . . .	.5
Bracket or Shelf Mounting . . . . .	.5
Hand Chain . . . . .	.6
Chain Keeper/Keyhold Bracket . . . . .	.6
<u>ENTRAPMENT PROTECTION ACCESSORIES</u>	
Emergency Manual Operation . . . . .	.6
Contact Reversing Edge Device . . . . .	.6
Sensing Edges & Photo Eyes . . . . .	.7
<u>LIMIT SWITCH ADJUSTMENT</u>	
Limit Location . . . . .	.7
Adjustment . . . . .	.7
<u>POWER & CONTROL WIRING</u>	
Safety Warnings . . . . .	.8
Power Wiring . . . . .	.9
Ground Wiring . . . . .	.9
Control Station Wiring . . . . .	.9
Radio Controls . . . . .	.9
Mounting Instructions . . . . .	.9
Optional Control Mounting . . . . .	.9
Optional Control Wiring . . . . .	.28
<u>CLUTCH ADJUSTMENT</u>	
Clutch Parts . . . . .	.10
Clutch Adjustment . . . . .	.10
<u>BRAKE ADJUSTMENT</u>	
Brake Parts . . . . .	.10
<u>WIRING DIAGRAMS</u>	
1 PH Wiring . . . . .	.11
3 PH Wiring . . . . .	.12
1 PH Wiring w/Contactor . . . . .	.13
<u>STANDARD PROGRAMMING</u>	
Wiring Type . . . . .	.14 & 15
RPM Sensor . . . . .	.16
Maximum Run Timer . . . . .	.16
Maintenance Alert System . . . . .	.17
<u>OPTIONAL PROGRAMMING</u>	
Mid Stop . . . . .	.17
Timer to Close . . . . .	.18
Red Green Warning Lights . . . . .	.18
Board Illustration . . . . .	.19
<u>REPLACEMENT PARTS & MAINTENANCE</u>	
Trouble Shooting Guide . . . . .	.20 & 21
Maintenance Schedule . . . . .	.22
Customer Service Contact Information . . . . .	.22
Electrical Box parts . . . . .	.23 & 24
Chassis Parts (J) . . . . .	.25 & 26

PACKING LIST

Before beginning your installation check that all components were supplied and received undamaged.

PACKING LIST K77-14334		
PART #	DESCRIPTION	QTY
14-10896	GH PARTS BOX	1
19-10929-29	29 FT HAND CHAIN	1
77-11090	GH PARTS BAG	1
19-50106M	# 50 CHAIN, 106 PITCH	1
02-103L	3 BUTTON CONTROL STATION	1

IMPORTANT SAFETY NOTES



CAUTION

TO AVOID DAMAGE TO DOOR AND OPERATOR, MAKE ALL DOOR LOCKS INOPERATIVE. SECURE LOCK(S) IN "OPEN" POSITION.

IF THE DOOR LOCK NEEDS TO REMAIN FUNCTIONAL, INSTALL AN INTERLOCK SWITCH.

DO NOT CONNECT ELECTRIC POWER UNTIL INSTRUCTED TO DO SO.



WARNING

KEEP DOOR BALANCED. STICKING OR BINDING DOORS MUST BE REPAIRED. DOORS, DOOR SPRINGS, CABLES, PULLEYS, BRACKETS AND THEIR HARDWARE MAY BE UNDER EXTREME TENSION AND CAN CAUSE SERIOUS PERSONAL INJURY. CALL A PROFESSIONAL DOOR SERVICE-MAN TO MOVE OR ADJUST DOOR SPRINGS OR HARDWARE.

SITE PREPARATIONS

It is imperative that the wall or mounting surface provide adequate support for the operator.

This surface must:

- Be rigid to prevent play between operator and door shaft.
- Provide a level base.
- Permit the operator to be fastened securely and with the drive shaft parallel to the door shaft.

The safety and wear of the operator will be adversely affected if any of the above requirements are not met.

For metal buildings, fasten 2" x 2" x 3/16" (or larger) angle iron frames to the building purlins. Retain 5-1/2" between frames. See Figure 1.

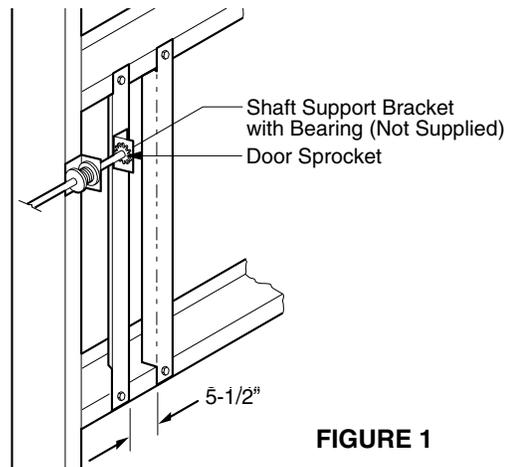


FIGURE 1



WARNING

ALL DOORS INTENDED TO BE MOTOR OPERATED SHOULD BE MANUFACTURED WITH SOLID DOOR SHAFTS.

OPERATOR PREPARATION

The GH operator may be mounted on either the right (standard) or left side of door, and in either a vertical (standard) or horizontal mounting position. Refer to the steps below if you require the hand chain and/or disconnect chain to be on the opposite side of the operator; Or if the operator is being mounted in a horizontal position.

Hand Chain Right/Left Conversion

Remove the two snap rings (1 pc. outer, 1 pc inner) on hand chain shaft assembly. Position roll-pin to fit through cutout in frame and slide complete shaft assembly through housing and bevel gear. Insert shaft assembly on opposite side of housing, and replace bevel gear, bearing, hardware, and snap rings on the opposite side of shaft in the same manner.

Disconnect Lever Right/Left Conversion

Remove cotter pins on the ends of the disconnect shaft (square shaft), move the disconnect lever arm to the opposite side, and replace the cotter pins. Be sure to keep two(2) 12ga. washers on the side without the lever arm.

Horizontal Mounting Conversion

Remove cotter pins on the ends of the disconnect shaft (square shaft), and remove lever. Replace lever using square hole on opposite end of lever. Reposition sash chain to opposite end of lever also. Replace cotter pins.

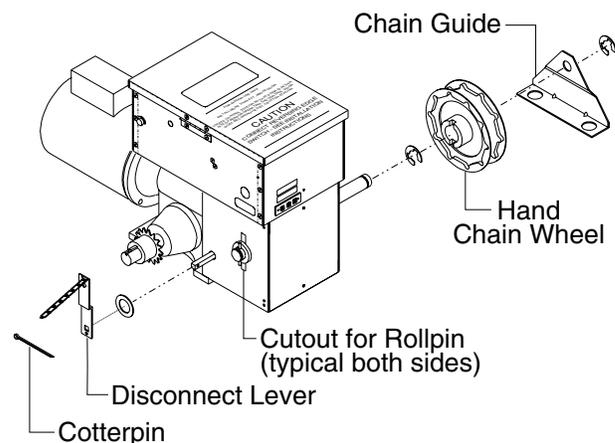


FIGURE 2

OPERATOR MOUNTING

Before your operator is installed, be sure the door has been properly aligned and is working smoothly. The operator may be wall mounted or mounted on a bracket or shelf. If necessary, refer to the operator preparations on page 3. Refer to the illustration and instructions below that suits your application.

1a. Wall Mounting

The operator should generally be installed below the door shaft, and as close to the door as possible. The optimum distance between the door shaft and operator drive shaft is between 12" - 15". Refer to Figure 3.

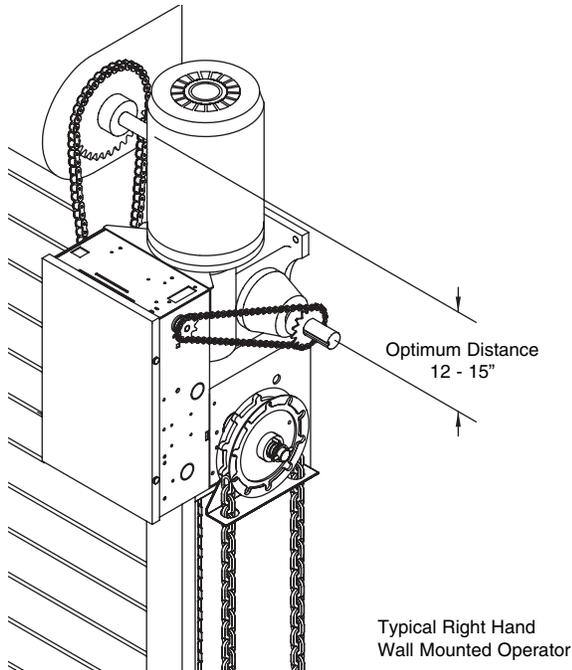
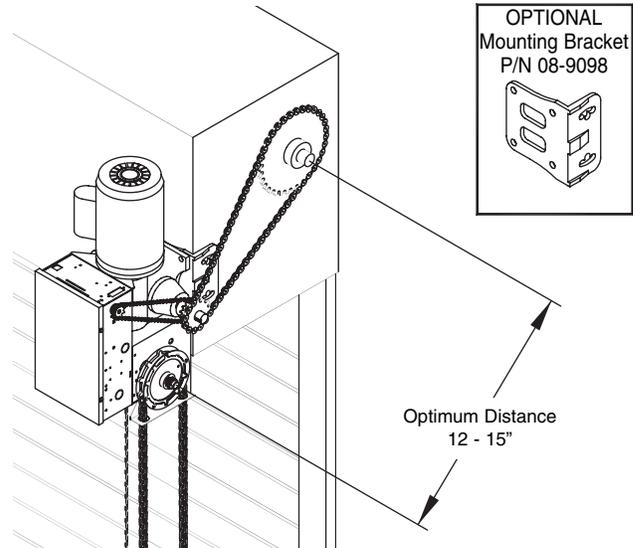


FIGURE 3

- 1c. Place door sprocket on the door shaft. Do not insert the key at this time.
2. Place drive sprocket on the appropriate side of the operator. Do not insert the key at this time.
3. Wrap drive chain around door sprocket and join roller chain ends together with master link.
4. Raise operator to approximate mounting position and position chain over operator sprocket.
5. Raise or lower operator until the chain is taut (not tight). Make sure the operator output shaft is parallel to door shaft and sprockets are aligned. When in position, secure the operator to wall or mounting bracket.
6. Align sprockets and secure, (see Figure 5).

1b. Bracket or Shelf Mounting

The operator may be mounted either above or below the door shaft. The optimum distance between the door shaft and operator drive shaft is between 12" - 15". Refer to Figure 4.



IMPORTANT: The shelf or bracket must provide adequate support, prevent play between operator and door shaft, and permit operator to be fastened securely and with the drive shaft parallel to the door shaft.

FIGURE 4

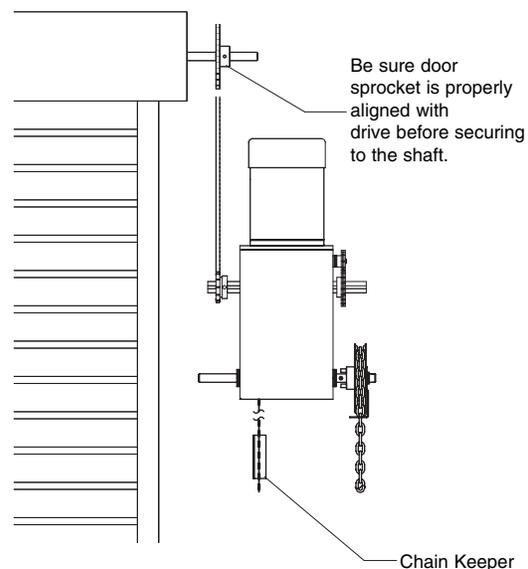


FIGURE 5

7. Install Hand Chain

Place hand chain around hand chain wheel. Be sure to pass it through both openings in the chain guide. Remove enough links so chain hangs approximately two feet above the floor

8. Mount Chain Keeper / Keyhole Bracket

Using suitable hardware mount the chain keeper approximately 4 feet above the floor, near the free hanging chain. Remove disconnect sash chain from bag and place the end through the keyhole in the the chain keeper. Remove excess links if necessary.

EMERGENCY MANUAL OPERATION

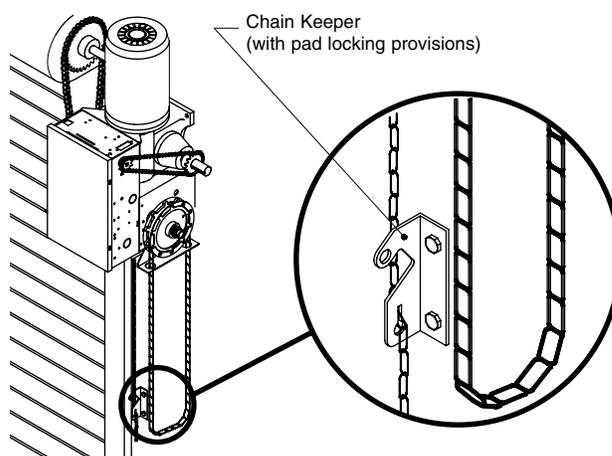
This operator has provisions for manually operating the door in case of emergency or power failure. Refer to the appropriate instructions below for your model operator.

Model GH

These operators are equipped with a manual hoist. An electrical interlock will disable the electrical controls when the hoist is used.

To operate the hoist:

1. Pull the disconnect chain (small chain) to engage the hoist mechanism. The disconnect chain may be locked in position by slipping the end through the keyhole of the chain keeper mounted on the wall.
2. Operate the door in the desired direction by pulling on one side or the other of the continuous loop hoist chain (large chain).
3. The disconnect chain must be released from the chain keeper before the door will operate again electrically.



Electrical Interlock with Hoist for Models H and HJ

ENTRAPMENT PROTECTION ACCESSORIES (OPTIONAL)

REVERSING DEVICE (OPTIONAL)



ENTRAPMENT PROTECTION ACCESSORIES (OPTIONAL) CONT'D

PHOTO EYES & SENSING EDGES

Sensing devices supplied for door industry type operators with an isolated normally open (N.O.) dry contact output are compatible with your operator. This includes through beam and retro reflective photo eyes, and pneumatic and electric edges. If your door does not have bottom safety photo eyes or a sensing edge and you wish to add a safety device to your application, please contact your local LiftMaster Authorized Dealer.

If not pre-installed by the door manufacturer, mount the sensing edge on the door according to the instructions provided with the edge. The sensing edge may be electrically connected by either coiled cord or take-up reel.

Important Notes:

- Proceed with Limit Switch Adjustments before making any sensing edge wiring connections to operator as described below.
- Electrician must hardwire the junction box to the operator electrical box in accordance with local codes.

NOTICE

IT IS STRONGLY RECOMMENDED THAT A SAFETY PHOTO EYE OR SENSING EDGE BE USED IN CONJUNCTION WITH THE OPERATOR.

WIRING: For wiring of your sensing device to the operator, refer to the wiring diagram on pages 11-13. See field connection terminals identified as Reversing Device.

TAKE-UP REEL: Take-up reel should be installed 12" above the top of the door.

COIL CORD: Connect operator end of coil cord to junction box (not supplied) fastened to the wall approximately halfway up the door opening.

LIMIT SWITCH ADJUSTMENT

MAKE SURE THE LIMIT NUTS ARE POSITIONED BETWEEN THE LIMIT SWITCH ACTUATORS BEFORE PROCEEDING WITH ADJUSTMENTS.

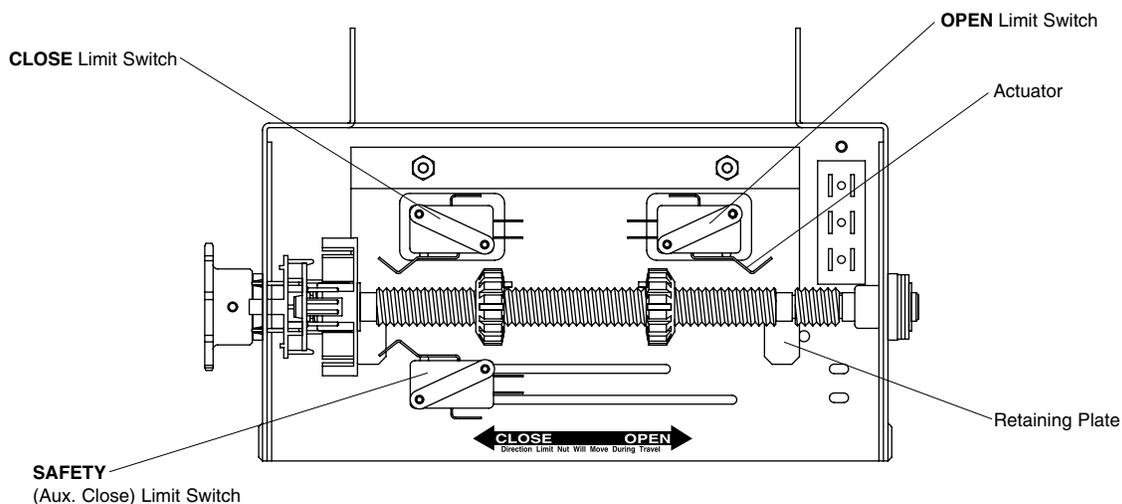
- To adjust limit nuts depress retaining plate to allow nut to spin freely. After adjustment, release plate and ensure it seats fully in slots of both nuts.
- To **increase** door travel, spin nut **away** from actuator. To **decrease** door travel, spin limit nut **toward** actuator.
- Adjust open limit nut so that door will stop in open position with the bottom of the door even with top of door opening.
- Repeat Steps 1 and 2 for close cycle. Adjust close limit nut so that actuator is engaged as door fully seats at the floor.



WARNING

TO AVOID SERIOUS PERSONAL INJURY OR DEATH FROM ELECTROCUTION, DISCONNECT ELECTRIC POWER BEFORE MANUALLY MOVING LIMIT NUTS.

If other problems persist, call our toll-free number for assistance - 1-800-528-2806.



INSTALL POWER WIRING & CONTROL STATION



Before installing power wiring or control stations be sure to follow all specifications and warnings described below. Failure to do so may result in severe injury to persons and/or damage to operator.



The operator electrical box is only to be accessed by trained "LIFTMASTER" technicians. If service is required contact your local LIFTMASTER dealer.



Do not install any wiring or attempt to run the operator without consulting the wiring diagram. Install the optional Reversing Edge before proceeding with the Control Station installation.



Remove the cover from the electrical enclosure. Inside this enclosure you will find the wiring diagram(s) for your unit. Refer to the diagram (glued on the inside of the cover) for all connections described below. If this diagram is missing, call the number on the back of this manual. **DO NOT INSTALL ANY WIRING OR ATTEMPT TO RUN THIS OPERATOR WITHOUT CONSULTING THE WIRING DIAGRAM.**

IMPORTANT SAFETY NOTES



WARNING

INSTALL THE CONTROL STATION IN LINE OF SIGHT WITH THE DOOR, BUT AWAY FROM THE DOOR AND ITS HARDWARE. IF CONTROL STATION CANNOT BE INSTALLED WHERE DOOR IS VISIBLE, OR IF ANY DEVICE OTHER THAN THE CONTROL STATION IS USED TO ACTIVATE THE DOOR, *A REVERSING DEVICE MUST BE INSTALLED ON THE BOTTOM OF THE DOOR.* FAILURE TO INSTALL A REVERSING DEVICE UNDER THESE CIRCUMSTANCES MAY RESULT IN SERIOUS INJURY OR DEATH.



WARNING

ANY MAINTENANCE TO THE OPERATOR OR IN THE AREA NEAR THE OPERATOR MUST NOT BE PERFORMED UNTIL DISCONNECTING THE ELECTRICAL POWER AND LOCKING-OUT THE POWER VIA, THE MAIN DISCONNECT SWITCH. UPON COMPLETION OF MAINTENANCE THE AREA MUST BE CLEARED AND SECURED, AT THAT TIME THE UNIT MAY BE RETURNED TO SERVICE.



WARNING

TO AVOID DAMAGE TO DOOR AND OPERATOR, MAKE ALL DOOR LOCKS INOPERATIVE. SECURE LOCK(S) IN "OPEN" POSITION. IF THE DOOR LOCK NEEDS TO REMAIN FUNCTIONAL, INSTALL AN INTERLOCK SWITCH.



WARNING

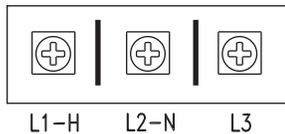
DISCONNECT POWER AT THE FUSE BOX BEFORE PROCEEDING. OPERATOR MUST BE PROPERLY GROUNDED AND CONNECTED IN ACCORDANCE WITH LOCAL ELECTRICAL CODES. NOTE: THE OPERATOR SHOULD BE ON A SEPARATE FUSED LINE OF ADEQUATE CAPACITY. ALL ELECTRICAL CONNECTIONS MUST BE MADE BY A QUALIFIED ELECTRICIAN.

INSTALL POWER WIRING & CONTROL STATION (CONT'D)

POWER WIRING

POWER WIRING CONNECTIONS

1. Connect power wires coming from the main to the captive terminal block in the electrical box enclosure marked with the label shown below.



2. Be sure to run all power wires through the conduit hole in the electrical box enclosure marked with the label shown below.

POWER WIRING

USE COPPER WIRE ONLY 40-10031B

ON THREE PHASE MACHINES ONLY: Incorrect phasing of the power supply will cause the motor to rotate in the wrong direction.

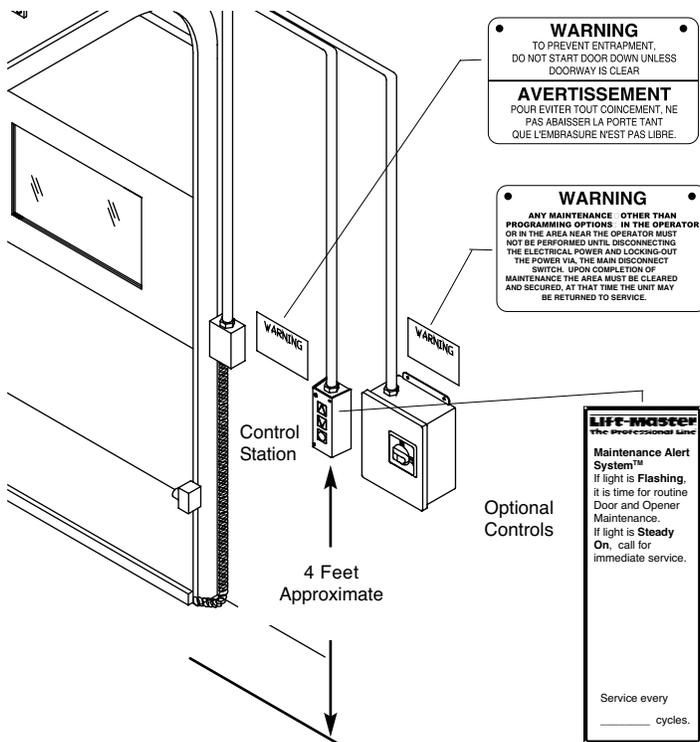
GROUND WIRING

1. Connect earth ground to the chassis ground screw in the electrical box enclosure marked with the label shown below.



2. Use same conduit entry into the electrical box as the power wiring.

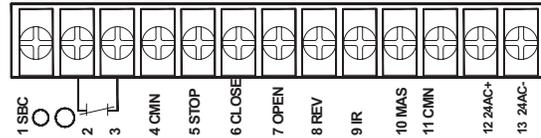
IMPORTANT: THIS UNIT MUST BE PROPERLY GROUNDED. FAILURE TO PROPERLY GROUND THIS UNIT COULD RESULT IN ELECTRIC SHOCK AND SERIOUS INJURY.



CONTROL STATION WIRING

CONTROL WIRING CONNECTIONS

1. Connect control wires to the TB1 terminal block located on the Printed Circuit Board (shown below).



1	SBC	SINGLE BUTTON CONTROL
2	2	INTERLOCK
3	3	INTERLOCK
4	CMN	COMMON
5	STOP	STOP
6	CLOSE	CLOSE
7	OPEN	OPEN
8	REV	REVERSE
9	IR	INFRARED PHOTO EYES
10	MAS	MAINTENANCE ALERT SYSTEM
11	CMN	COMMON
12	24AC+	24 VOLT AC
13	24AC-	24 VOLT AC

2. Be sure to run all control wires through the conduit hole in the electrical box enclosure marked with the label shown below.

CONTROL WIRING

USE COPPER WIRE ONLY 40-10031B

3. Apply power to the operator. Press OPEN push button and observe direction of door travel and then **Press the STOP button.**

If door did not move in the correct direction, check for improper wiring at the control station or between operator and control station.

RADIO CONTROLS

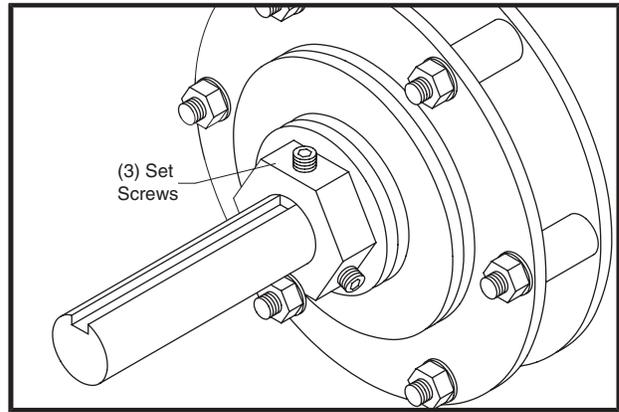
On all models with B2 control wiring, a terminal bracket marked R1 R2 R3 is located on the outside of the electrical enclosure. Any commercial type LiftMaster brand receiver may be mounted to this bracket. The operator will then open a fully closed door, close a fully open door, stop an opening door, and reverse a closing door from the radio transmitter. In TS control wiring the operator will only open the door or reset the timer to close. However, for additional door control from a 3 button transmitter, a commercial three-channel radio receiver (with connections for OPEN/CLOSE/STOP) is recommended.

MOUNTING INSTRUCTIONS

1. Mount Control Stations no further than (12") from each other.
2. Mount Control Stations (12") from the door enclosure.
3. Mount WARNING NOTICE beside or below the Control Station.
4. Mount MAINTENANCE ALERT label to either side of control station.

ADJUST TORQUE LIMITER CLUTCH (OPTIONAL MODIFICATION)

1. Loosen set screws on clutch nut.
2. Back off clutch nut until there is very little tension on the clutch spring.
3. Tighten clutch nut gradually until there is just enough tension to permit the operator to move the door smoothly but to allow the clutch to slip if the door is obstructed. When the clutch is properly adjusted, it should generally be possible to stop the door by hand during travel.



WARNING

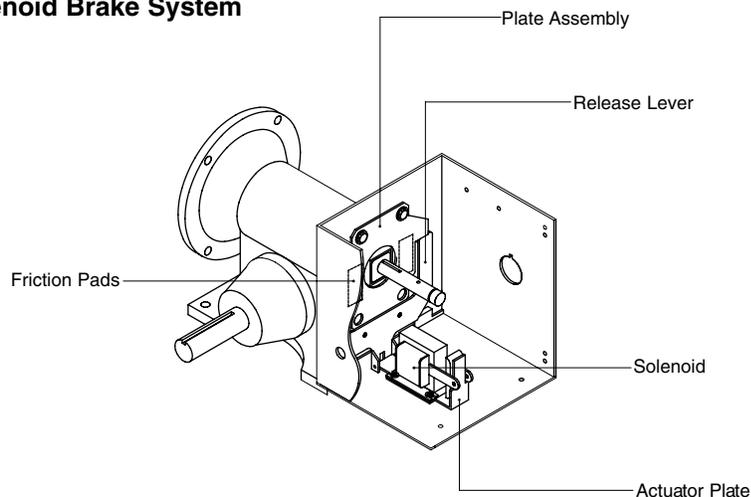
TO AVOID SERIOUS PERSONAL INJURY OR DEATH FROM ELECTROCUTION, DISCONNECT ELECTRIC POWER TO OPERATOR BEFORE ADJUSTING SLIP CLUTCH.

CAUTION: The torque limiter clutch is NOT an automatic reversing device. A Reversing Device can be added to bottom edge of door if desired.

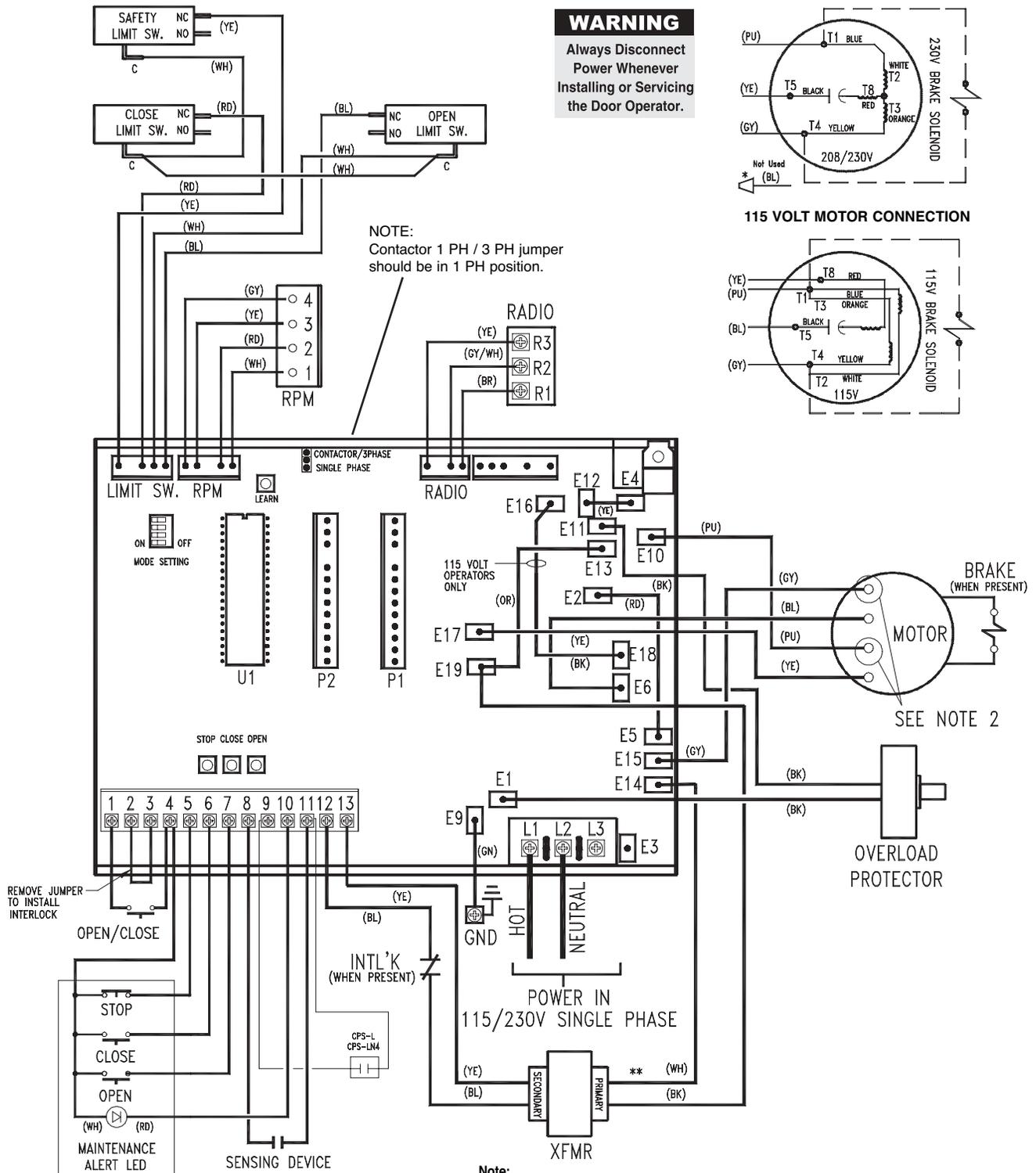
BRAKE ADJUSTMENT

The brake is adjusted at the factory and should not need additional adjustment for the the life of the friction pad. Replace friction pads when necessary. Refer to the illustration for identification of components for the solenoid type brake system.

Solenoid Brake System

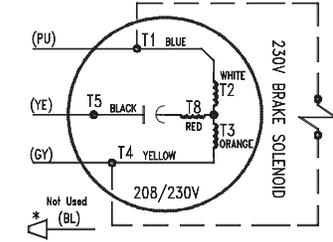


LOGIC CONTROL (VER. 2.0) 1 PHASE WIRING DIAGRAM 1837-1

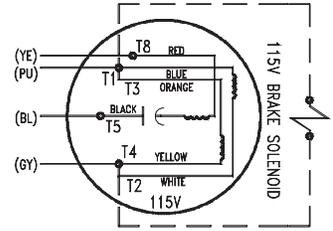


WARNING
Always Disconnect Power Whenever Installing or Servicing the Door Operator.

230 VOLT MOTOR CONNECTION



115 VOLT MOTOR CONNECTION

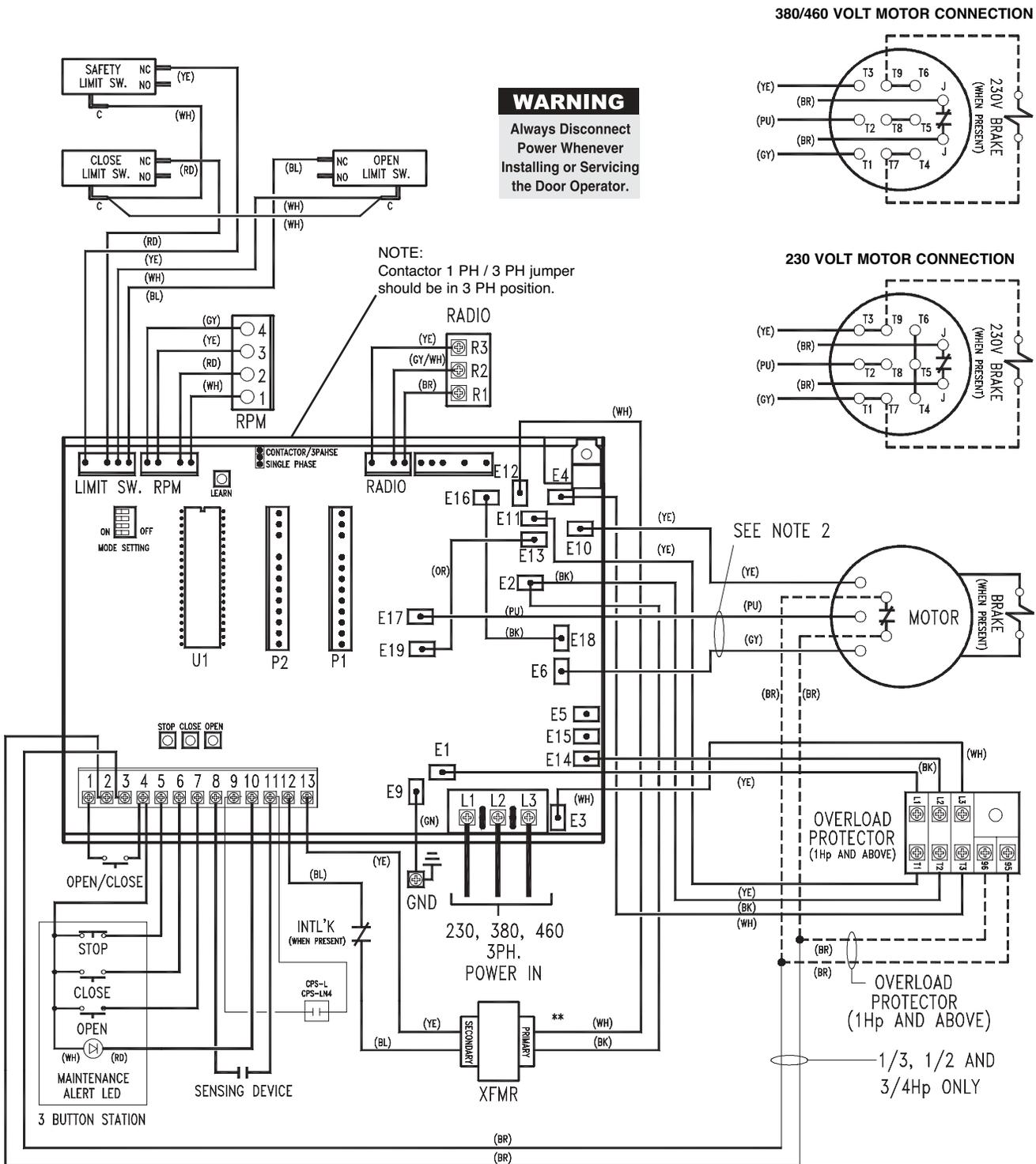


NOTE:
Contactor 1 PH / 3 PH jumper should be in 1 PH position.

- Note:
- 1) See Owner's Manual for Dip Switch Functions and Programming Procedures
 - 2) TO REVERSE MOTOR DIRECTION
115 VOLTS: ALWAYS EXCHANGE PURPLE & GRAY ALL VOLTS & PHASES.
230 VOLTS: INTERCHANGE PURPLE (E10) & GRAY (E15) WIRES AT LOGIC BOARD.
- * - BLUE WIRE MUST BE INSULATED ON 230V 1PH.
** - Transformer Primary Voltage same as Line Voltage..

3 BUTTON STATION

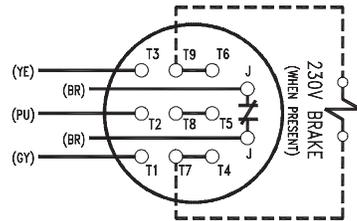
LOGIC CONTROL (VER. 2.0) 3 PHASE WIRING DIAGRAM 1837-3



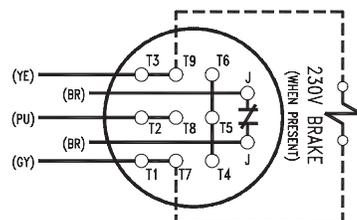
WARNING
Always Disconnect Power Whenever Installing or Servicing the Door Operator.

NOTE:
Contactor 1 PH / 3 PH jumper should be in 3 PH position.

380/460 VOLT MOTOR CONNECTION



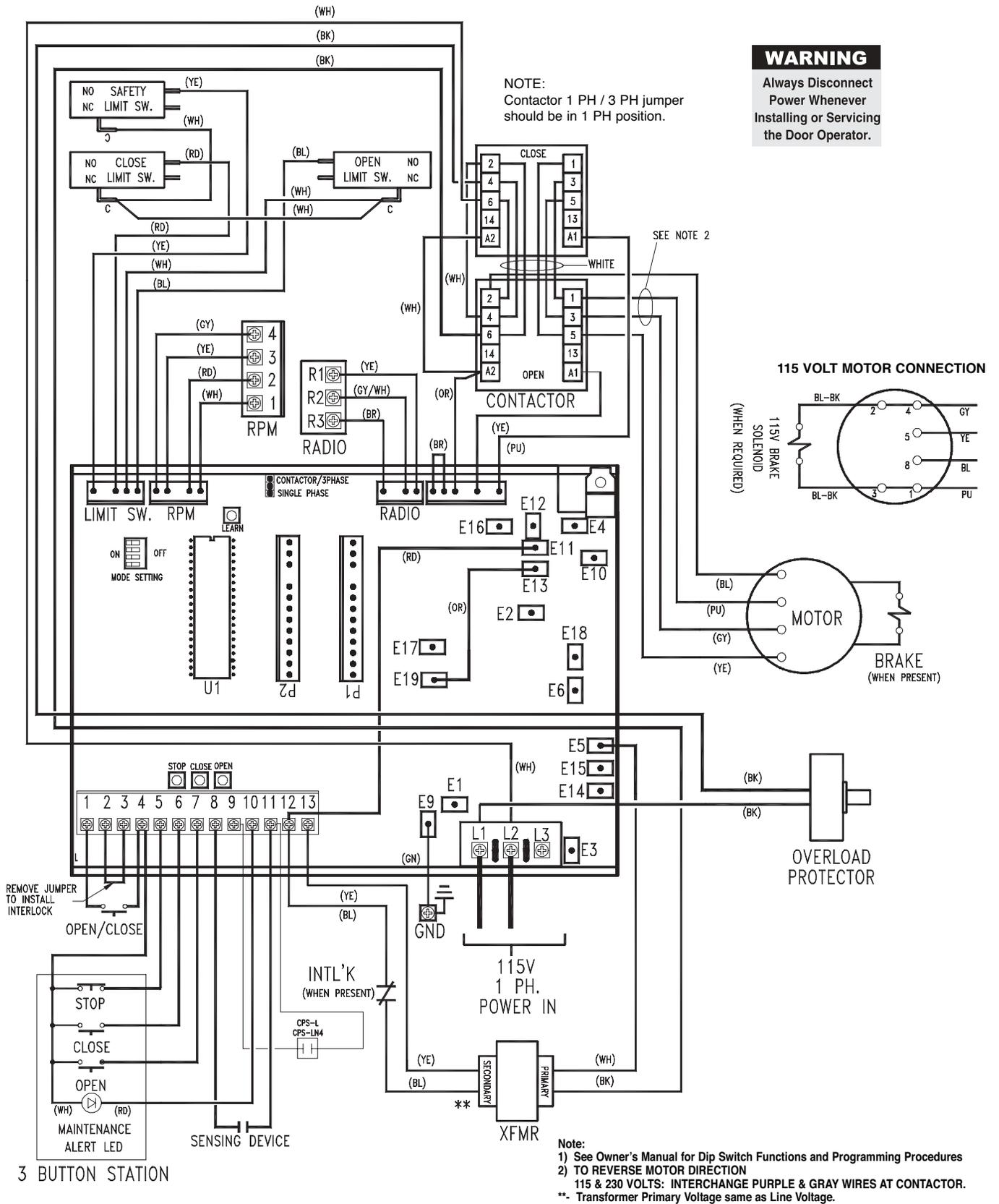
230 VOLT MOTOR CONNECTION



SEE NOTE 2

- Notes:
- 1) See Owner's Manual for Dip Switch Functions and Programming Procedures
 - 2) TO REVERSE MOTOR DIRECTION: INTERCHANGE ANY 2 OF THE 3 POWER WIRES
AT L1, L2 & L3, OR EXCHANGE PURPLE & GRAY MOTOR LEADS AT BOARD CONNECTIONS E17 & E6 (3PH UNITS ONLY).
- ** - Transformer Primary Voltage same as Line Voltage.

LOGIC CONTROL (VER. 2.0) 1 PH WIRING DIAGRAM W/ CONTACTOR 1842-1





Refer to printed circuit board illustration on page 19 for all component locations.



Before Programming the logic board, set the operators open and close limits. LEDs on the logic board are provided to assist setting the limits. As each limit is activated the corresponding LED will light up. The abbreviations are Open Limit Switch (OLS), Close Limit Switch (CLS) and Sensing Limit Switch (SLS). Refer to page 7 for limit switch adjustment instructions.

Logic Control Pushbuttons Open, Close, Stop

Open, Close and Stop buttons are mounted directly on the Logic Control board. This will provide easy programming ability and door control at the electrical box. Either the stop control or a jumper must be wired between terminals 4 and 5 for the on board push buttons to function.

WIRING TYPE PROGRAM SETTINGS

Determine wiring mode:

There are many wiring modes available on the Logic Board. Read the descriptions of the different wiring types to determine which setting will be correct for each application.

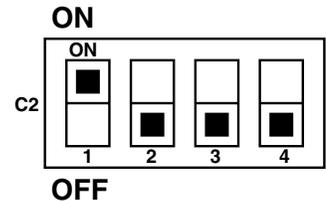
Set the dip switches to the desired wiring mode:

Adjust the 4 dip switches on the logic board to match the settings for the desired wiring type. The dip switches are shown in the picture

TYPE STATION

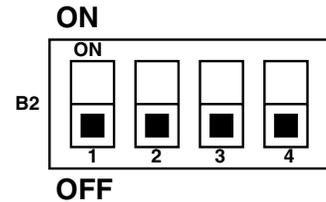
C2 3 Button, 3 Button Radio Control

Function: Momentary contact to open and stop with constant pressure to close, open override plus wiring for sensing device to reverse. Programmable mid stop available with this wiring type.



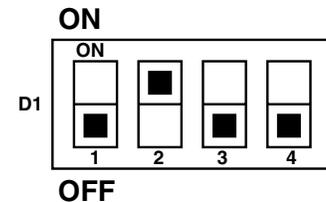
B2 3 Button, 1 Button, 1 & 3 Button Radio Control

Function: Momentary contact to open, close and stop, plus wiring for sensing device to reverse and auxiliary devices to open and close with open override. Programmable mid stop available with this wiring type.



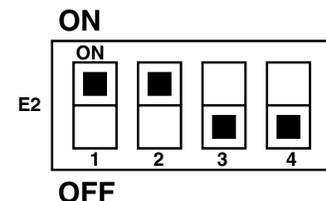
D1 2 Button, 3 Button Radio Control

Function: Constant pressure to open and close with wiring for sensing device to stop.



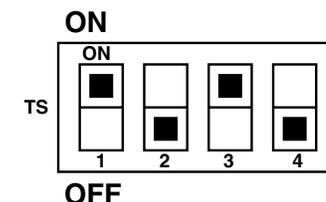
E2 3 Button Radio Control

Function: Momentary contact to open with override and constant pressure to close. Release of close button will cause door to reverse (roll-back feature) plus wiring for sensing device to reverse.



TS 3 Button, 1 Button, 1 & 3 Button Radio Control

Function: Momentary contact to open, close, and stop with open override and Timer To Close. Every device that causes door to open, including a reversing device, activates Timer To Close. Auxiliary controls can be connected to open input to activate the Timer To Close. If the timer has been activated, the open button and radio control can recycle the timer. The stop button will deactivate the Timer To Close until the next command input. The Timer To Close will function from the programmable mid-stop with this wiring type. **(NOTE: Requires Optional self monitoring photo eyes to operate.)**

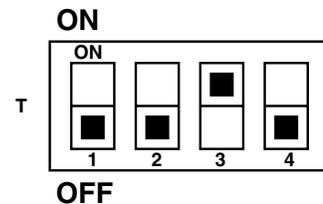


WIRING TYPE PROGRAM SETTINGS CONT'D

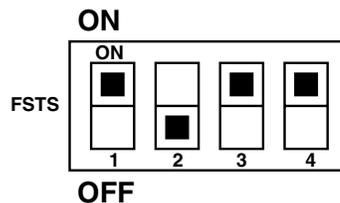
TYPE STATION

T 3 Button, 1 Button, 1 & 3 Button Radio Control

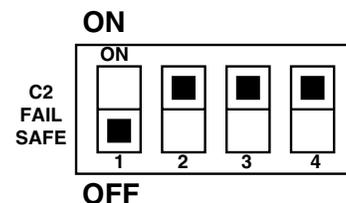
Function: Momentary contact to open, close, and stop, with open override and Timer To Close. Every device that causes the door to open, except a reversing device, activates the Timer To Close. Auxiliary controls can be connected to open input to activate the Timer To Close. If the Timer To Close has been activated, the open button and radio control can recycle the timer. The stop button will deactivate the timer until the next command input. The Timer to Close will function from the programmable mid-stop with this wiring type. **(NOTE: Requires Optional self monitoring photo eyes to operate.)**



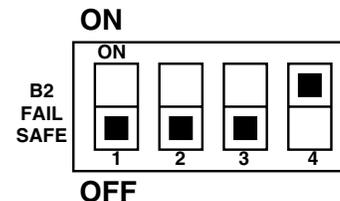
FSTS Momentary button contact for open, close and stop. Radio controls allowing open, close and stop. User set midstop. User set Timer To Close. The single button station opens the door to the full open limit bypassing the mid stop and activates the Timer To Close, putting the operator in TS mode until the door reaches the down limit, or is stopped in travel. At which time the operator enters the B2 mode. **(NOTE: Requires Optional self monitoring photo eyes to operate.)**



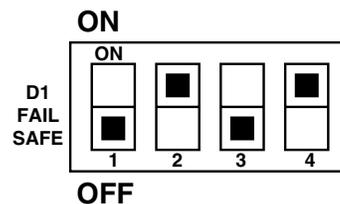
C2 Failsafe 3 Button, 3 Button Radio Control
Same functions as C2. Self Monitoring safety device must be installed to operate door. See Self Monitoring Safety Device Options below.



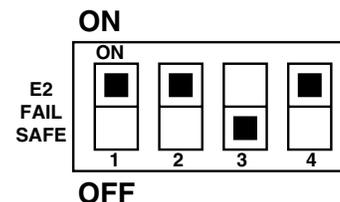
B2 Failsafe 3 Button, 1 Button, 1 & 3 Button Radio Control
Same functions as B2. Self Monitoring safety device must be installed to operate door. See Self Monitoring Safety Device Options below.



D1 Failsafe 2 Button, 3 Button Radio Control
Same functions as D1. Self Monitoring safety device must be installed to operate door. See Self Monitoring Safety Device Options below.



E2 Failsafe 2 Button, 3 Button Radio Control
Same functions as E2. Self Monitoring safety device must be installed to operate door. See Self Monitoring Safety Device Options below.



SELF MONITORING SAFETY DEVICE OPTIONS

To use the operator in any of the Failsafe wiring modes, or Timer To Close wiring modes (TS, T, FSTS), a LiftMaster self monitoring safety device must be installed.

Recommended LiftMaster Self Monitoring Safety Devices:

CPS-L NEMA 1 Direct Connect Eyes
CPS-LN4 NEMA 4 Direct Connect Eyes

NOTE:

1. External interlocks may be used with all functional modes.
2. Auxiliary devices are any devices that have only dry contacts. Examples are: photocell, loop detector, pneumatic or electrical treadles, radio controls, one button stations, pull cords, etc.
3. Open override means that the door may be reversed while closing by activating an opening device without the need to use the stop button first.

STANDARD PROGRAMMING FEATURES

RPM Sensor/Auxiliary Reversal System (Programming is Recommended)

Feature: By programming the RPM sensor to a specific application, the logic board learns the speed the door travels with reference to the spinning motor. This sensor activates the start winding and recognizes clutch slippage.

Benefit: By removing the centrifugal start switch from 1/3 and 1/2 horsepower single-phase motors the leading cause of motor failure is eliminated. The auxiliary reversing benefits of the RPM sensor are designed to prevent excessive door and operator damage upon hitting a solid obstruction. LiftMaster recommends the use of safety devices for primary safety protection.

To Program:

1. The open and close limits must be set before setting the RPM sensor.
2. Start with the door closed and turn all dip-switches to the off position.
3. Press open then press and hold the "learn" button on the Logic board until the door reaches the full open position. You should see the Learn LED turn off after pressing the learn button; it will turn back on about 5 seconds later. If the LED did not cycle, start over and wait about 7 to 10 seconds between pressing "open" and "learn".
4. Return the dip switches to your regular wiring type (C2, B2, etc.) and close the door.

Note: LiftMaster 2.0 Logic operators are designed to work in most cases without adjusting the RPM sensor. It is still recommended to set this feature on every installation. This feature will need to be reset if the motor or logic board is ever replaced.

Maximum Run Timer (Setting is Recommended)

Feature: The door will run in one direction for a set amount of time. Default time is 90 seconds. Installer can adjust the 90 second timer to the open cycle plus 10 seconds.

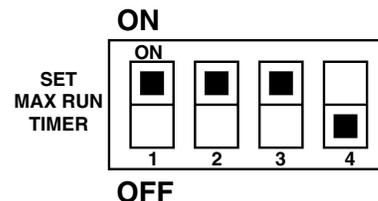
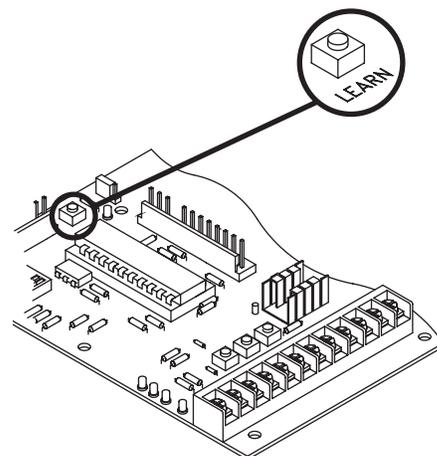
Benefit: Should the door hit an obstruction that is not detected by a sensor, it will stop after the programmed amount of time and not continue to drive into the obstruction. This may help prevent prolonged human entrapment as well as help prevent damage to the door and operator.

To Program:

1. Start with the door closed and the limits set.
2. Set the dip switches to "set Max Run Timer".
3. Press Open and wait for the door to reach the full open limit.
4. Return the dip switches to the desired wiring type (C2, B2, etc.) and Close the door. The Maximum Run Timer is now set and will allow the door to move in one direction no more than 10 seconds longer than it normally takes to travel from close to open.

Example: If it takes the door 13 seconds to open normally, the operator will stop running after 23 seconds. If the Max Run Timer is not programmed, it will run for 90 seconds total in either direction.

Note: For very large, slow moving doors, where the normal travel time is close to 90 seconds setting the MRT is essential to move the door the full travel distance.



STANDARD PROGRAMMING FEATURES CONT'D

MAS (Maintenance Alert System)

Feature: An internal cycle counter will activate a flashing LED on the three-button control station when the preset number of cycles is reached. Setting this feature is optional. By default, this feature will never activate.

Benefit: The consumer will be aware of when it is time for a scheduled maintenance on the door or operator.

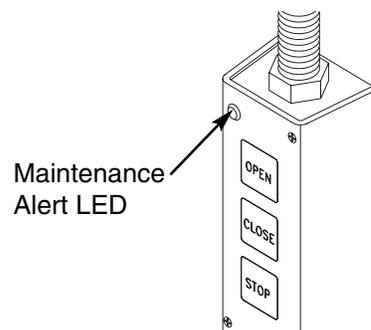
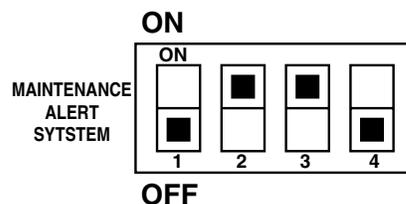
To Program:

1. Close the door.
2. Set the dip switches to "set Maintenance Alert System"
3. Press "close" to zero out the counter.
4. Press "open" for every 5,000 cycles the operator should wait before flashing the LED.
5. Return the dip switches to your regular wiring type (C2, B2, etc.) and close the door.

EXAMPLE: The door is being installed with 30 thousand cycle springs. To set the MAS for 30,000 cycles press close, then open 6 times. Return the dip switches to the desired wiring type.

Special Notes about the MAS: A 5th wire must be run to the control station to activate the MAS LED. When the operator is serviced after the MAS has started the LED flashing, repeat the setup procedure for the next service visit. To see how many cycles the operator has been through set the dip switches to "set MAS" and watch the MAS led. It will flash once for every 1000 cycles the operator has been used then pause and repeat. Every time the operator leaves the close limit is counted as one cycle.

Press This	To Get This
Open	Adds 5,000 cycles to Maintenance Alert System Activation Counter.
Close	Clears memory, sets Maintenance Alert System Activation Counter to 0 cycles.
Stop	Adds 10,000 cycles to Maintenance Alert System Activation Timer.



OPTIONAL PROGRAMMING FEATURES

Mid Stop

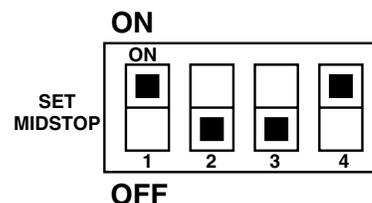
Feature: Door will open to an installer set height that is less than fully open.

Benefit: The door will not open fully which will reduce unwanted airflow through the doorway. The door will not cycle fully providing longer door and operator life.

To Program:

1. Close the door.
2. Set dip switches to "set mid stop".
3. Press open (the door will begin moving)
4. Press stop when the desired mid stop height is reached.
5. Return the dip switches to the desired wiring type (C2,B2,etc.). The door will now stop at this height every time the door is opened.

Notes: A momentary open command will open the door fully from the mid stop position. Photo eyes and other safety devices will not further open the door from the mid stop position. Timer To Close will work from the mid stop position.



OPTIONAL PROGRAMMING FEATURES CONT'D

Timer To Close

Feature: Installer can set a timer to automatically close after a preset amount of time once all safety devices are unobstructed.

Benefits: Door will automatically close after being used. Extremely convenient where users may not be concerned with closing the door. For example Apartment Buildings and Fire Stations.

Requirements: Must have at least one of the following safety devices attached: CPS-L, CPS-LN4, CPSII, CPSII-N4. When running, the dip switches must be set for TS, T, or FSTS

To Program:

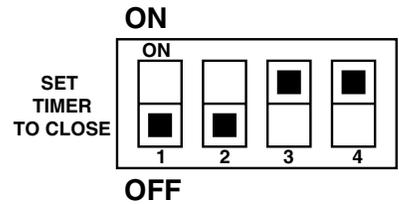
1. Close the door.
2. Set dip switches to "Set Timer To Close"
3. Press "close" to zero out the timer.
4. Press "open" for every 5 seconds the operator should wait before attempting to close the door.

Example: The door is supposed to close 30 seconds after the user drives through. To set the TTC for 30 seconds press close, then open 6 times.

5. Return the dip switches to the desired wiring type. TS, T, or FSTS

Notes: For longer delay time settings, use the Single Button Control (terminal 1) to add 1 minute at a time. To deactivate the timer press stop. The timer will be reactivated on the next operation command.

Reminders: FSTS wiring mode allows the Timer To Close to be activated by the Single Button Control (terminal 1) only. T wiring mode allows the door to attempt to close only one time for safety purposes.



Press This	To Get This
Open	Adds 5 seconds to countdown timer.
Close	Resets the timer to close to 0 seconds. Turns off electronic search for photo eyes after photo eyes have been intentionally removed.
Stop	Adds 5 seconds to "Red warning light before closing" time.
Single Button Control	Adds 60 seconds to countdown timer.

Adjusting your red/green warning lights

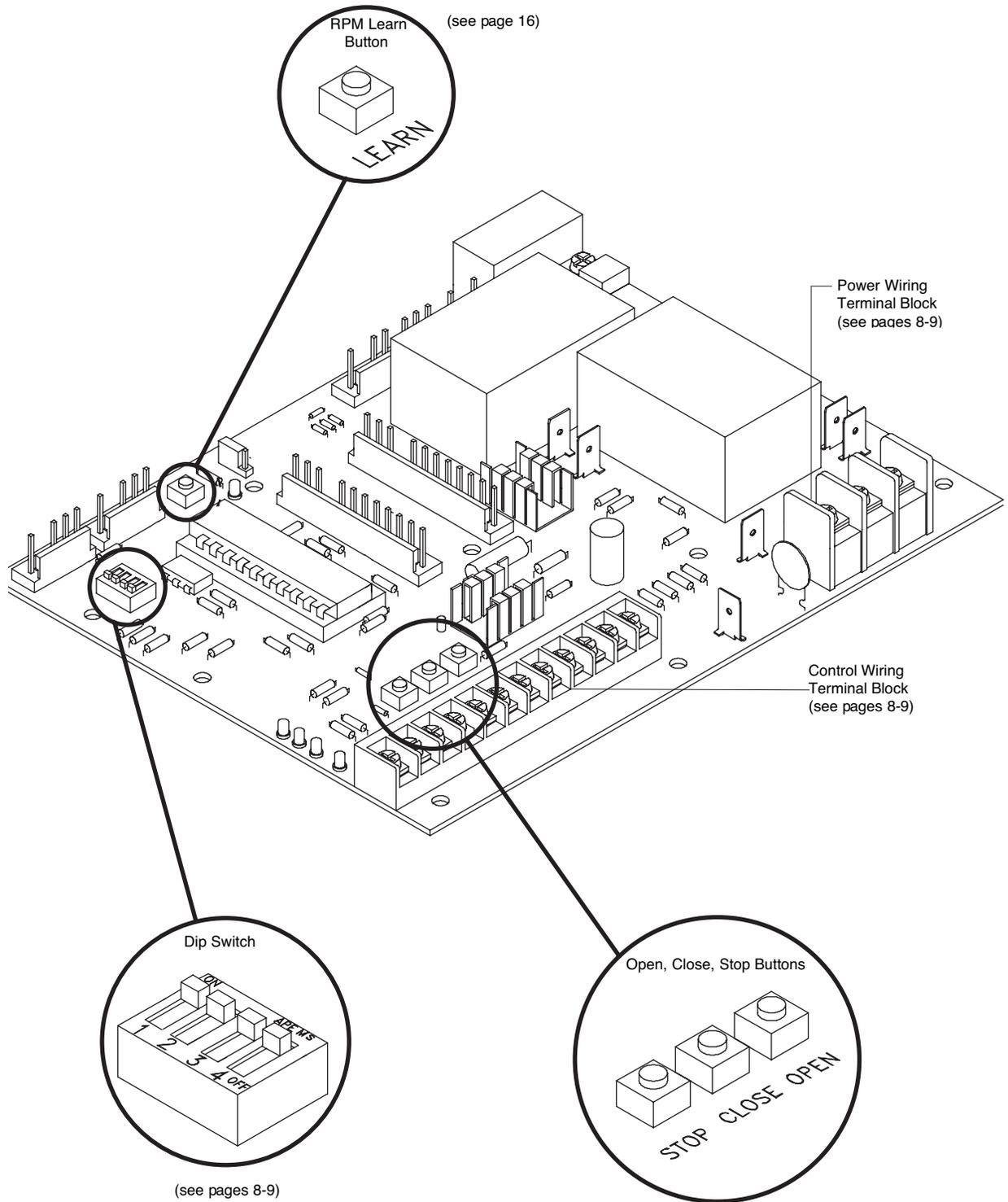
Feature: The logic board can adjust the amount of time that a warning light will flash before the Timer To Close will activate the door to close.

Benefit: Advanced warning of door closure helps prevent traffic collisions with the door.

To Program:

1. Set the dip switches to "Set Timer To Close"
2. Press stop for every additional 5 seconds of pre-movement warning.
3. Return the dip switches to the desired wiring type.

Requirements: Must have the Logic 2 red green warning light kit #001A4730 and must have at least one of the following safety devices attached: CPS-L, CPS-LN4, CPSII, CPSII-N4. When running, the dip switches must be set for TS, T, or FSTS. See red/green warning light instructions for further details.



TROUBLE SHOOTING

Troubleshooting Guide

SYMPTOM	PROBABLE CAUSE	RESOLUTION
Each open command will open the door about a foot and a half then stop, after reaching the open limit each close command will close the door about a foot and a half then reverses back to full open.	RPM sensor is not adjusted correctly.	Reset the RPM sensor. Also verify that the software is version 260 or better. Order replacement chips from Parts and Service.
The door will open some but not completely. And the door will close some and not completely. Extra commands are able to get the door to move completely	The Maximum run timer is not set correctly.	Reset the Maximum Run Timer
The door will open some but not completely. An extra open command is able to get the door to open completely	There may be a Mid Stop set.	Reset the mid-stop by programming it to be at the open limit.
The door will open but will only close after a 5 second delay with constant pressure on the close button.	<ul style="list-style-type: none"> a) The Photo Eyes, edge or other sensing device is obstructed or activated. b) The Logic board thinks that the direct connect photo eyes are attached and blocked 	<ul style="list-style-type: none"> a) Remove the obstruction, check the safety device wires for continuity and shorts. b) Unlearn the photo eyes from the memory (see clear memory section). Also verify that the Logic Board Chip is Version 260 or better. Order replacement Chips from Parts and Service.
The operator will not respond to any commands	<ul style="list-style-type: none"> a) Operator control station is wired wrong b) Motor is malfunctioning 	<ul style="list-style-type: none"> a) Use the LEDs to help check correct wiring (see Diagnostic procedure) Verify that the board is accepting commands by using the onboard control station. b) Verify voltage getting to the motor.

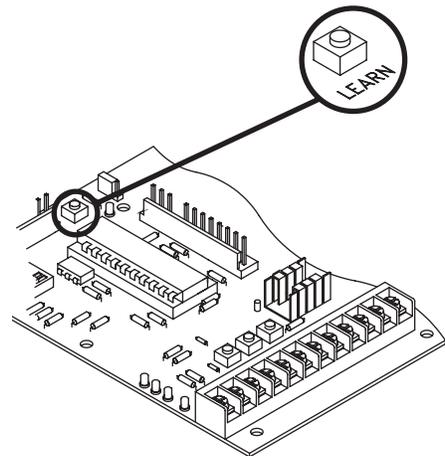
Clearing The Memory 3 - steps

STEP 1: To reset most of the user installed settings back to factory defaults:

1. Turn all the dip switches **ON**.
2. Press and hold the Learn button about 5 seconds.
3. The Learn LED will turn off while you hold the button down and turn back on about 5 seconds later.
4. Return the dip switches to the desired wiring type.

- Note:**
- A. The Max Run Timer is now set to 90 seconds
 - B. The Timer to Close is now set to 0 seconds
 - C. The Mid Stop is now deactivated
 - D. The Maintenance Alert System is now deactivated

Note: To clear the Mid Stop only Set/Program the Mid Stop at the open limit. The logic board understands this to mean that no mid stop is desired.



TROUBLE SHOOTING

STEP 2: To "unlearn" the photo eyes. The latest software automatically learns if direct connect photo eyes (CPS-L or CPS-LN4) are attached during the first open cycle of operation. If they are disconnected at some point after this, they must be unlearned.

1. Set the dip switches to set Timer To Close.
2. Press Open 2 times then Close 2 times and then Stop 2 times (order is not specific).
3. Return the dip switches to the desired wiring type.

STEP 3: Relearn RPM. Because factory default is set without a door attached to the operator, factory default setting is not a preferred status.

1. Start with the door closed and set all Dip switches to the off position.
2. Press open then press and hold the "learn" button on the Logic board (see picture) until the door reaches the full open position. You should see the Learn LED turn off after pressing the learn button; it will turn back on about 5 seconds later. If the LED did not cycle, start over and wait about 1/2 to 1 second between pressing "open" and "learn".
3. Return the dip switches to your regular wiring mode and close the door.

Diagnostic LEDs

There should always be 3 green LEDs activated (24 VAC, 5 VDC, and STOP Button). Check for this first then proceed to check the status of the remaining LEDs

LED	COLOR	MEANING OF EACH LED
24VAC	Green	Indicates that 24 VAC is being received from the transformer
5VDC	Green	Indicates that 5VDC is being generated for the logic board to use
Diag	Red	Indicates that the MAS LED on the 3 button control station is being turned on.
REV	Red	Indicates a short between common and terminal 8. Pressing the edge should turn ON this LED
Open	Red	Indicates a short between common and terminal 7. Pressing the open button should turn ON this LED
Close	Red	Indicates a short between common and terminal 6. Pressing the close button should turn ON this LED
Stop	Green	Indicates a short between Common and terminal 5. Pressing the stop button should turn OFF this LED.
SBC	Red	Indicates a short between Common and terminal 1. Pressing the Single Button Control station should turn ON this LED.
OLS	Red	Indicates the Open Limit Switch being pressed
CLS	Red	Indicates the Close Limit Switch being pressed
SLS	Red	Indicates the Sensing Limit Switch being pressed
Learn	Amber	This LED is normally on and in Diagnostic mode (all dip switches on) this LED will flash to indicate the chip is OK.

Diagnostic Checklist Procedure

1. Look for the 3 Green LEDs
 - A. If the 24 VAC light is out, check the transformer and any interlock switches, then replace either the transformer or the logic board.
 - B. If the 5 VDC light is out, and the 24VAC is lit, replace the board.
 - C. If the Stop Button light is out, check the wiring to the control station, if the site does not require a stop button use a jumper across terminals 4 and 5. If the LED is still not lit call for more assistance.
2. Check your control station:
 - A. Place the operator into diagnostic mode (all DIP switches ON)
 - B. Watch the LEDs as each control button is pressed. The LEDs should light with each Open, Close, and Single Button Control command. The Stop should turn off the LED.
3. Activate the limit switches to verify functionality. Also watch the LED's during door travel to check for over active limit switches.
4. Disconnect all devices and reattach them one at a time testing for failure after each item is replaced. This will determine which device is causing the failure. For further assistance call for technical support.

MAINTENANCE SCHEDULE

- For use with Maintenance Alert System.
- Check at the intervals listed in the following chart.

ITEM	PROCEDURE	EVERY 3 MONTHS OR 5,000 CYCLES	EVERY 6 MONTHS OR 10,000 CYCLES	EVERY 12 MONTHS OR 20,000 CYCLES
Drive Chain	Check for excessive slack. Check & adjust as required. Lubricate	●		◆
Sprockets	Check set screw tightness	●		◆
Clutch	Check & adjust as required		●	◆
Belt	Check condition & tension		●	◆
Fasteners	Check & tighten as required		●	◆
Manual Disconnect	Check & Operate		●	◆
Bearings & Shafts	Check for wear & Lubricate	●		◆

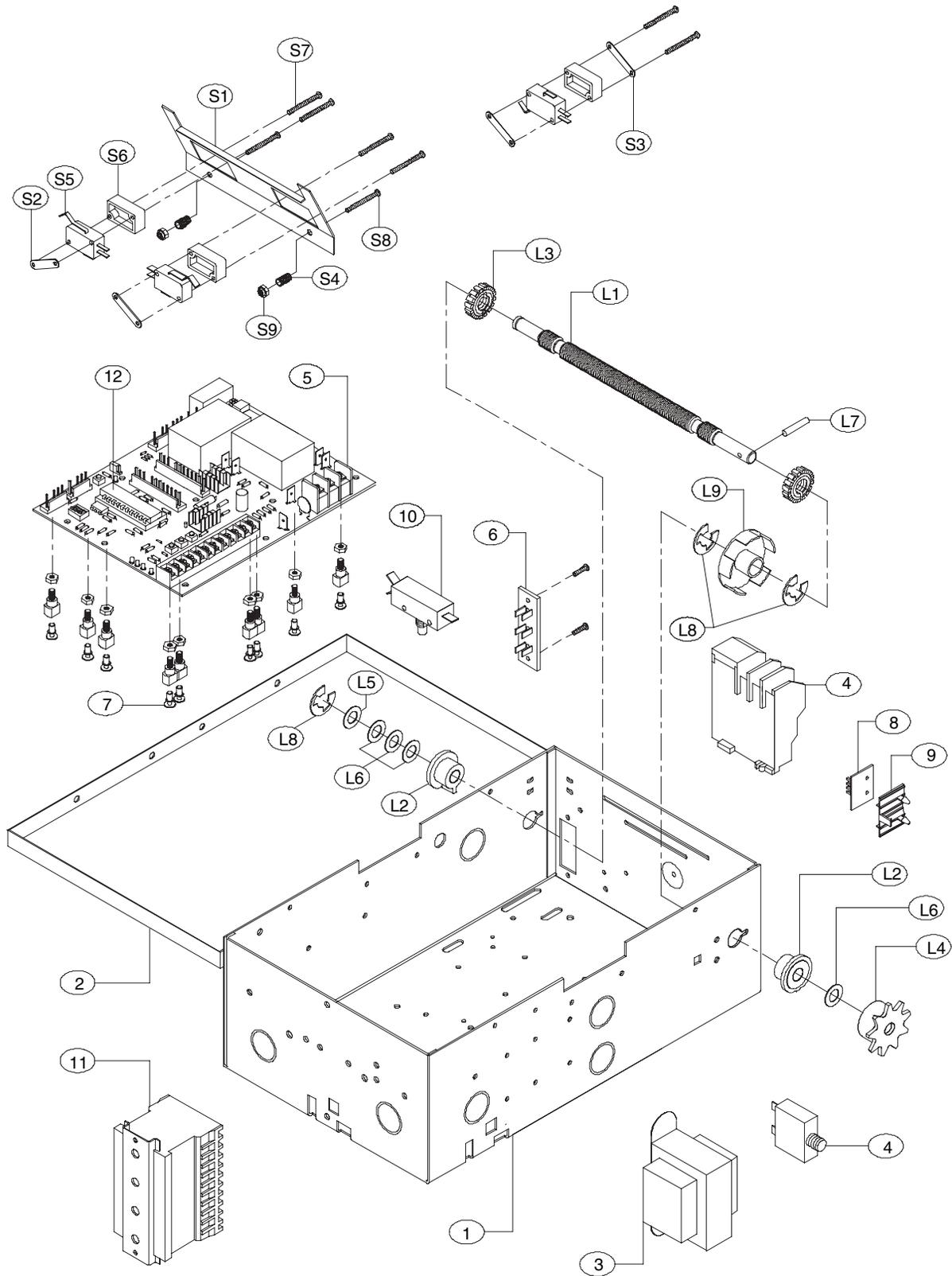
- ◆ Use SAE 30 Oil (Never use grease or silicone spray).
- ◆ Repeat ALL procedures.
- Do not lubricate motor. Motor bearings are rated for continuous operation.
- Do not lubricate clutch or V-belt.
- Inspect and service whenever a malfunction is observed or suspected.
- CAUTION: BEFORE SERVICING, ALWAYS DISCONNECT OPERATOR FROM POWER SUPPLY.

HOW TO ORDER REPAIR PARTS

OUR LARGE SERVICE ORGANIZATION
SPANS AMERICA
INSTALLATION AND SERVICE INFORMATION
ARE AVAILABLE 6 DAYS A WEEK
CALL OUR TOLL FREE NUMBER - 1-800-528-2806
MONDAY THROUGH FRIDAY 5 AM TO 6 PM (MST)
SATURDAY 7 AM TO 3:30 PM (MST)
WWW.LIFTMASTER.COM

**WHEN ORDERING REPAIR PARTS
PLEASE SUPPLY THE FOLLOWING INFORMATION:
PART NUMBER DESCRIPTION MODEL NUMBER**

ILLUSTRATED PARTS – ELECTRICAL BOX



REPAIR PARTS KITS – ELECTRICAL BOX

LOGIC CONTROL (VER. 2.0)

Below are replacement kits available for your operator. For replacement of electrical box, motor or brake components be sure to match model number of your unit to kit number below to ensure proper voltage requirements. Optional modifications and/or accessories included with your operator may add or remove certain components from these lists. Please consult a parts and service representative regarding availability of individual components of kits specified below. Refer to page 19 for all repair part ordering information.

Complete Electrical Box Replacement Kits

To order a complete electrical box replacement kit, add a K- prefix to the model number of your operator. For example:

GH5011L = K-GH5011L

* Electrical Box Kits include parts K72-12510 and K75-12514

Electrical Box Sub-Assemblies

K72-12510 Limit Shaft Assembly
K75-12514 Limit Switch Assembly

Motor Kits

K20-1050C2 Models GH5011L, GH5021L
K20-3050C4 Models GH5023L, GH5043L, GH5038L
K20-5150C6 Models GH5025L
K20-1075C2 Models GH7511L, GH7521L
K20-3075C4 Models GH7523L, GH7543L, GH7538L
K20-5175C6 Model GH7525L
K20-1100C2 Models GH1011L, GH1021L
K20-3100C4 Models GH1023L, GH1043L, GH1038L
K20-5110C6 Model GH1025L
K20-1150C2 Models GH1511L, GH1521L
K20-3150C4 Models GH1523L, GH1543L, GH1538L
K20-5115C6 Model GH1525L
K20-3200C4 Models GH2023L, GH2043L, GH2038L
K20-3300C4 Models GH3023L, GH3043L, GH3038L

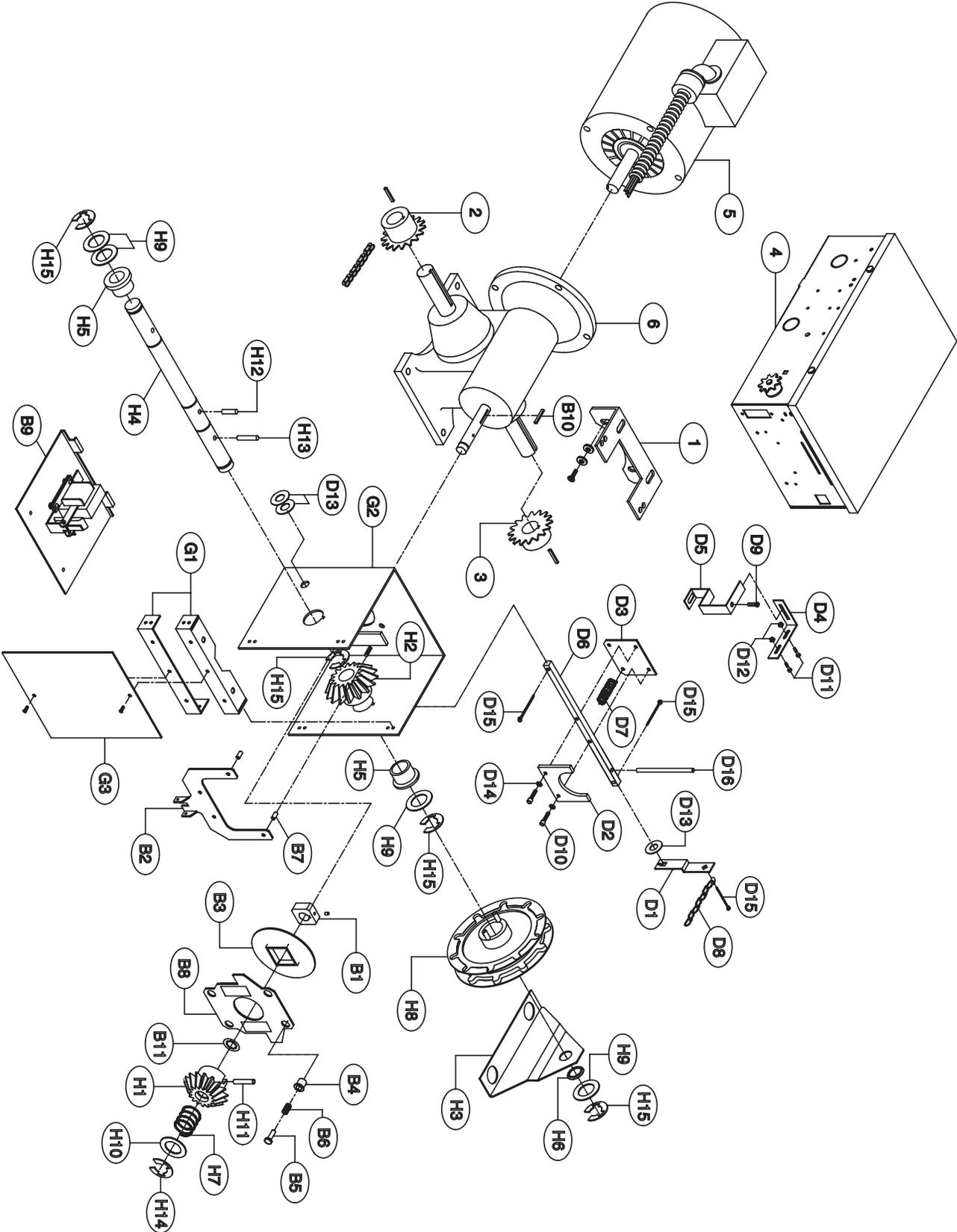
* COMPLETE ELECTRICAL BOX KITS			
Item	P/N	Description	Qty
1	10-13900	Electrical Box	1
2	10-10115	Electrical Box Cover	1
3	21-XXXX	(See Variable Components)	1
4	25-XXXX	(See Variable Components)	1
5	79-13433	Printed Circuit Board Assembly	1
6	42-10040	Terminal Block, Radio	1
7	75-13705	Standoff, Assembly	9
8	79-15016	RPM Sensor Board	1
9	093D0148	Housing, RPM Board	1
10	23-10916	Interlock Switch	1
11	03-8024K	Contactor (See Variable Components)	1
12	29-CDO-XXX	Programmed Chip	1

K72-13912 LIMIT SHAFT ASSEMBLY KIT			
Item	P/N	Description	Qty
L1	11-10021	Limit Shaft, Standard T	1
L2	12-10028	Flange Bearing, 3/8" I.D.	2
L3	13-10024	Limit Nut	2
L4	15-48B9A1	Sprocket 48B9 x 3/8" Bore	1
L5	80-10025	Washer, Shim 3/8" I.D. x .050 THK.	1
L6	80-10026	Washer, Shim 3/8" I.D. x .010 THK.	4
L7	86-RP04-100	Roll Pin, 1/8 DIA. x 1" Long	1
L8	87-E-038	E Ring, 3/8"	3
L9	29-10344	Rotating Cup	1

K75-12514 LIMIT SWITCH ASSEMBLY KIT			
Item	P/N	Description	Qty
S1	10-10013	Depress Plate	1
S2	10-12553	Nut Plate, Switch	3
S3	10-12806	Backup Plate	1
S4	18-10036	Spring, Depress Plate	2
S5	23-10041	Limit Switch	3
S6	31-12542	Standoff, Limit Switch	3
S7	82-PX04-20	Screw, #4-40 x Pan Head Phillips	6
S8	82-PX06-16	Screw, #6-32 x 1" Pan Head Phillips	2
S9	84-LH-06	Locknut, #6-32 Nylon Hex	2

		VARIABLE COMPONENT KITS																														
ITEM	PART NO.	DESCRIPTION	GH5011L	GH5021L	GH5023L	GH5043L	GH5025L	GH5038L	GH7511L	GH7521L	GH7523L	GH7543L	GH7525L	GH7538L	GH1011L	GH1021L	GH1023L	GH1043L	GH1025L	GH1038L	GH1511L	GH1521L	GH1523L	GH1543L	GH1525L	GH1538L	GH2023L	GH2043L	GH2038L	GH3023L	GH3043L	GH3038L
			3	21-14182	Transformer, 115 Volts	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
21-5460	Transformer, 460 Volts				●		●					●		●				●		●			●		●		●		●		●	
21-5575	Transformer, 575 Volts																															
4	25-2006	Overload, 6 Amp		●			●																									
	25-2008	Overload, 8 Amp							●				●			●																
	25-2010	Overload 10 Amp	●																				●			●						
	25-2015	Overload 15 Amp							●						●																	
	25-2020	Overload 20 Amp																														
	25-10296	Overload 2.8-4.4 Amp																●							●		●		●		●	
	25-11107	Overload 5.2-8.0 Amp																						●				●				
25-13840	Overload 2.0-3.0 Amp																	●					●				●					
11	03-8024K	K-Line Contactor																				●										

ILLUSTRATED PARTS - MODEL GH



REPAIR PARTS KITS – MODEL GH

LOGIC CONTROL (VER. 2.0)

Refer to the parts lists below for replacement kits available for your operator. If optional modifications and/or accessories are included with your operator, certain components may be added or removed from these lists. Individual components of each kit may not be available. Please consult a parts and service representative regarding availability of individual components. Refer to page 19 for all repair part ordering information.

INDIVIDUAL PARTS			
ITEM	PART #	DESCRIPTION	QTY
1	10-11045	Elec. Box Mounting Bracket	1
2	15-48B18LGE	Sprocket, 48B18 LGE	1
	15-48B18QGH	Sprocket, 48B18 QGH (3HP Models)	1
3	15-50B12LGH	Sprocket, 50B12 LGH	1
	15-80B9QGH	Sprocket, 80B9 QGH (3HP Models)	1
4	See Page 21	Electrical Box	1
5	See Page 21	Motor	1
6	See Var. Comp.	Gear Reducer	1

K72-12789 OR K72-13379 HAND CHAIN SHAFT KIT			
ITEM	PART #	DESCRIPTION	QTY
H1	08-11012	Bevel Gear, 5/8" ID	1
	75-13334	Bevel Gear Assy, 3/4" ID (3HP)	1
H2	08-11013	Bevel Gear, 3/4" ID	1
	08-13333	Bevel Gear, 3/4" ID 24 Tooth (3HP)	1
H3	10-10882	Hand Chain Guide	1
H4	11-11105	Hand Chain Shaft, GH	1
H5	12-10029	Bearing, 3/4" I.D.	2
H6	12-10883	Nyliner Bearing	1
H7	18-11008	Compression Spring, GH	1
H8	75-10884	Chain Wheel Assembly	1
H9	80-10022	Shim Washer, Thick	4
H10	80-11014	Washer, .656 I.D. x 1.25 O.D.	1
H11	86-RP08-108	Roll Pin, 1/4" x 1-1/2" Long	1
H12	86-RP10-110	Roll Pin, 5/16" x 1-5/8" Long	1
H13	86-RP10-208	Roll Pin, 5/16" x 2-1/2" Long	1
H14	87-E-062	E Ring, 5/8"	1
H15	87-E-075	E Ring, 3/4"	4

K75-12783 DISCONNECT ASSEMBLY KIT			
ITEM	PART #	DESCRIPTION	QTY
D1	10-11021	GH Disconnect Lever	1
D2	10-11023	Bevel Gear Yoke	1
D3	10-11024	Brake Release	1
D4	10-11029	Actuator Bracket	1
D5	10-11030	Switch Actuator	1
D6	11-11106	Disconnect Shaft	1
D7	18-11007	GH Tension Spring	1
D8	19-8A-12	12ft. Of Sash Chain	1
D9	82-PX08-04T	Screw, #8-32 x 1/4" Self Tap	1
D10	82-SH10-14	Screw, #10-32 x 7/8" Long	2
D11	82-WX10-08T	Screw, #10-32 x 1/2" Serrated Fl.	2
D12	84-FN-10	Nut, #10-32 Serrated Flange	2
D13	85-FW-50	USS Flatwasher, 3/4"	3
D14	85-LS-10	#10 Lockwasher ZP	2
D15	86-CP04-108	Cotter Pin, 1/8" x 1-3/4" Long	3
D16	86-RP06-300	Roll Pin, 3/16" x 3" Black Oxide	1

BRAKE ASSEMBLY KITS			
KIT REQUIRED	FOR	OPERATOR(S)	
K75-12584		115 Volt Models	
K75-12585		230-460 Volt Models	
ITEM	PART #	DESCRIPTION	QTY
B1	07-10179	Brake Hub	1
B2	10-10190-C	Brake Release Lever	1
B3	10-10191	Brake Disk	1
B4	11-16094	Spring Cup for Brake Assembly	4
B5	11-16095	Brake Stud	4
B6	18-10194	Spring, Compression x .87"	4
B7	31-10186	Spacer, .20" x .31" Long	2
B8	75-10184	Brake Pressure Plate Assembly	1
B9	75-11034	Brake Solenoid Assembly (115V)	1
	75-11035	Brake Solenoid Assembly (230V)	1
	75-11036	Brake Solenoid Assembly (575V)	1
B10	80-9001	Feather Key	1
B11	87-P-062	Push on Fastener, 5/8" Int. Star	1

COMPLETE GEAR REDUCER HOUSING KITS			
KIT REQUIRED	FOR	OPERATOR(S)	
K75-12829		Up to 1HP, 115 Volts	
K75-12830		Up to 1HP, 230-460 Volts	
K75-12832		1.5 to 2HP, 230-460 Volts	
K75-12834		3HP, 230-460 Volts	
ITEM	PART #	DESCRIPTION	QTY
G1	10-11006	Housing Support Bracket	2
G2	K75-30825	GH Housing with Pads & Pressure Plate	1
G3	10-11046M1	Housing Cover	1

* Gear Housing Kits also include:

- K75-12788 Disconnect Assembly Kit
- K72-12789 Hand Chain Shaft Kit
- K72-13379 Hand Chain Shaft Kit (3HP Models)
- K75-12584 Brake Assembly Kit (115V Models)
- K75-12585 Brake Assembly Kit (230-460V Models)

* Brake Kit Voltage same as Operator Voltage.

VARIABLE COMPONENTS			
ITEM	PART #	DESCRIPTION	QTY
B9	75-11034	Brake Solenoid Assy (115V Oper)	1
	75-11035	Brake Solenoid Assy (230-460V Oper)	1
	32-11009	Gear Reducer (1 HP Oper, 45:1)	1
6	32-11010	Gear Reducer (1.5-2 HP Oper, 45:1)	1
	32-11011	Gear Reducer (3 HP Oper, 45:1)	1

CONTROL CONNECTION DIAGRAM



IMPORTANT NOTES:

- The 3-Button Control Station provided must be connected for operation.
- ◆ If a STOP button is not used, a jumper must be placed between terminals 4 and 5.

