



ORION
Commercial 'LULA' Elevator
INSTALLATION and SERVICE
MANUAL

(To Be Retained by Authorized Savaria Dealer)

IMPORTANT

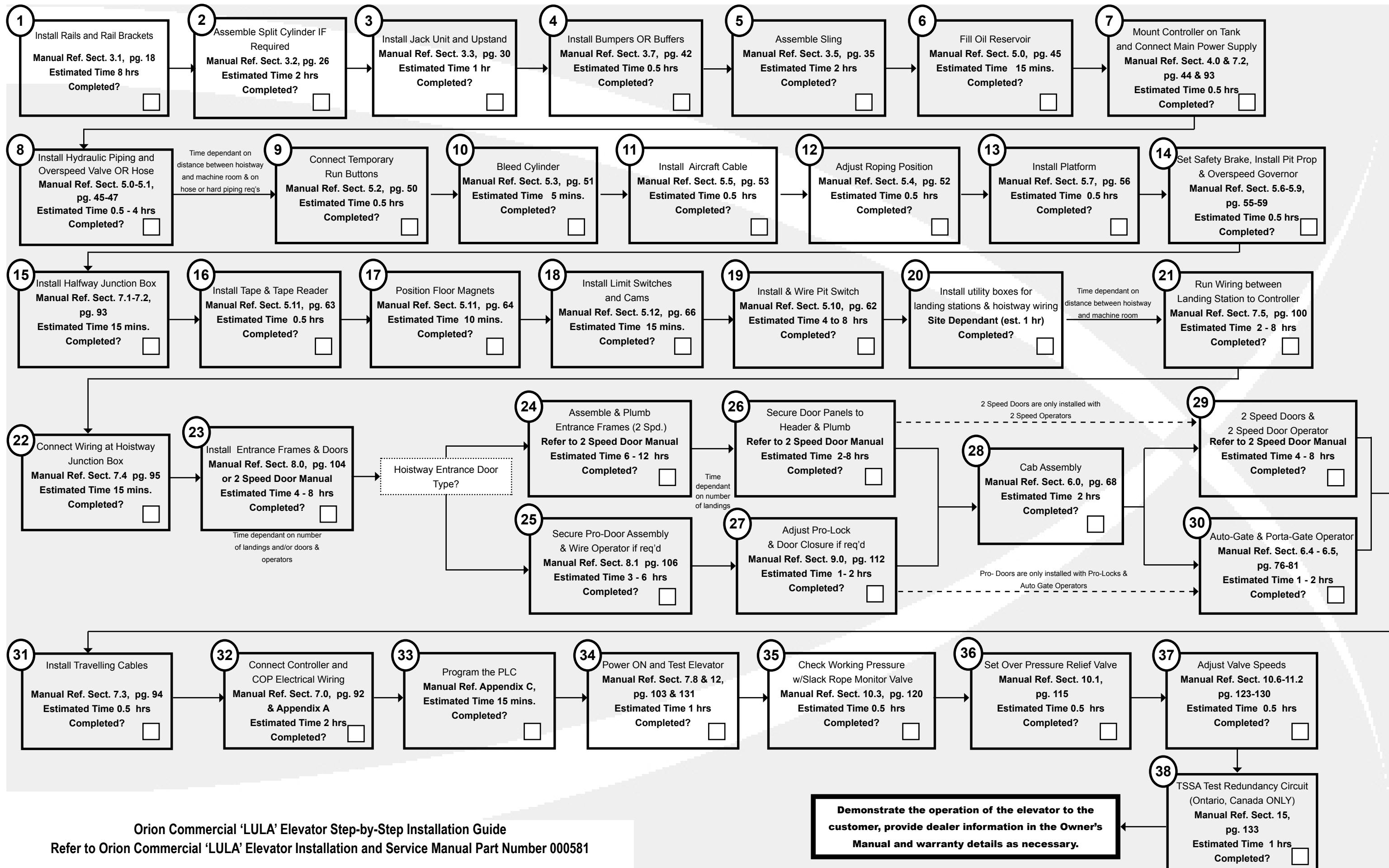
The following details and provided documents replace or augment the published manuals and schematics. The most recent engineering changes and enhancements are reflected in the notes below.

Technical Documentation Modifications and Additions

Orion Commercial 'LULA' Elevator Installation and Service Manual (PN 000581, Rev. 18-m06-2010)

Note: Modifications between revisions are marked M; additions between revisions are marked A.

Section	Details	
Section 5.9, page 60	Added detailed drawing of hardware for overspeed governor cable tensioner assembly	M
Section 5.11, page 63	Updated Tape Reader installation section	M
Section 8.1, page 106	Updated Pro-Auto Door Operator installation section	M
Appendix C	Updated Virginia PLC Controller information to reflect latest version	M



IMPORTANT

This Orion Commercial "LU/LA" Elevator should be installed, maintained and serviced by authorized Savaria dealers only.

The authorized Savaria dealer should refer to this manual for installation, maintenance, service and repair instructions.

The owner is responsible for ensuring the ongoing safe operating condition of the Orion Elevator through proper maintenance and service. An inspection check or service call should be performed on a regular basis every six to twelve months by an authorized Savaria dealer (or as frequently as required by local jurisdiction).

This manual should be retained by the Dealer for future reference. On completion of the installation, the dealer MUST provide the owner with the information below and ensure that it is recorded in the Owner's Manual.

FOR OWNER'S RECORDS

Customer Name: _____

Installing Dealer: _____

Dealer's Telephone Number: _____

Date Installed: _____

Serial/Job Number: _____

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1.0 PRE-INSTALLATION INSTRUCTIONS AND NOTES

General Notes

Important information is highlighted by the headings **WARNING**, **CAUTION**, or **NOTE**. These words are defined as follows:

WARNING Warnings are used to indicate instructions, which if not followed correctly, will likely result in personal injury or substantial damage to equipment.

CAUTION Cautions are used to indicate instructions or information, which if not observed, may result in some damage to equipment if care is not taken.

NOTE Notes are used to indicate instructions or information which is especially helpful in understanding and operating the equipment, and which will usually speed up the installation process.

Important Precautions and Notes

The following general rules and safety precautions must be observed for safe and reliable operation of your system.

Warning The elevator controller must be installed by experienced field installation personnel. The field installation personnel must know and follow all the rules and regulations pertaining to the safe installation and running of elevators. Additional information for specific devices (such as the valves, door operator, etc.) is the responsibility of the manufacturers of those devices.

Warning This equipment is designed and built to comply with ANSI A17.1 and National Electrical Code and must be installed by a qualified contractor. It is the responsibility of the contractor to make sure that the final installation complies with all applicable local, state and national codes, and is installed safely.

Warning The AC power supply to this equipment must come from a fused disconnect switch or circuit breaker which is sized in accordance with all applicable national, state and local electrical codes, in order to provide the necessary overload protection for the controller and motor. Incorrect motor branch circuit protection may create a hazardous condition.



**IT IS RECOMMENDED THAT YOU READ AND FULLY
UNDERSTAND THIS MANUAL BEFORE BEGINNING
THE INSTALLATION OF THE ORION ELEVATOR.**

1.1 INTRODUCTION

This manual contains installation and service instructions for the **Orion Commercial "LULA" Elevator**. We have spent much time and effort ensuring these instructions provide for a safe and efficient installation. Please follow these instructions **exactly** and call us immediately if you have any problems or need assistance.

Please be certain you follow our installation instructions and do not try to "cut any corners", eliminate any installation steps or modify the **Orion Commercial "LULA" Elevator**. It is important for your customer's safety that the installation is thorough and correct. The best way to ensure this margin of safety is by following our installation instructions.

NOTE

Any preparatory work such as finishing electric source, pouring concrete base or pit, or carpentry, must be done before the unit is installed.

HELP LINE

If you have any questions that are not covered in this manual, please contact our **Technical Support Department** for assistance. Please have the following information available before calling to receive the fastest service possible:

- Job Number
- Job Name
- Location
- Product Type
- Initial or Follow-up Visit
- Brief Description of Problem
- Call Back Number

Savaria Corporation
107 Alfred Kuehne Blvd.
Brampton, Ontario, Canada L6T 4K3
Toll Free: (800) 791-7999
Fax: (905) 791-2222



THIS SAFETY ALERT SYMBOL INDICATES AN IMPORTANT MESSAGE IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE AND BE ALERT TO THE POSSIBILITY OF CAUSING DAMAGE TO THE EQUIPMENT AND/OR PERSONAL INJURY.

1.2 GENERAL SPECIFICATIONS

SPECIFICATION	ORION COMMERCIAL "LULA" ELEVATOR
Load Capacity	1400 lb (635 kg)
Rated Speed	30 ft/min (0.15 m/s) (Nominal)
Power Supply	208 volt, three phase, 30 amps or 230 volt, single phase, 50 amps
Drive System	1:2 Cable Hydraulic
Cab Size	48" Wide x 54" Deep (1220 mm x 1372 mm) or 42" Wide x 60" Deep (1067 mm x 1524 mm) or 51" x 51" (1295 mm x 1295 mm) or 54" x 54" (1372 mm x 1372 mm)
Maximum Travel	25 feet (7.6 m)
Maximum # of Stops	5 stops
Pit Depth Required	14" (356 mm) Minimum 96" (2438 mm) Maximum
Minimum Overhead Clearance	120" (3048 mm) - Existing Building 134" (3404 mm) - New Building
Control System	Single Automatic Push Button
Floor Selection	Magnetic Selector
Sub-Floor Material	1/8" Masonite over Plywood sub-floor
Control Panel Finish	Stainless Steel or Brass
Hall Station Finish	Stainless Steel or Brass
Motor	5 HP (3.73 kW)
Cab Panel Finish	Steel Cab with Plastic Laminate Finish Walls or Steel Cab with Steel Finish Walls
Lighting Supply	110 volt, 60 cycle, 15 amps
Door Opening	36" x 80" (890 mm x 2030 mm) nominal
Standard Features	Emergency Battery Powered Lowering Automatic Emergency Lighting Automatic Timed Car Lighting Emergency Lowering Valve at Pump Anti-Creep Re-Levelling Device Slack/Broken Cable Safety Device Upper and Lower Limit Switches Final Limit Switch Stainless Steel Handrail Digital Floor Indicator in Cab

1.3 TOOLS AND MATERIALS REQUIRED

- Allen Wrenches (Keys) ($\frac{1}{8}$ " - $\frac{3}{8}$ " Imperial)
- Allen Wrenches (Keys) (Metric)
- Screwdrivers (Slotted and Phillips)
- Set of Mechanical Sockets and Wrenches ($\frac{1}{4}$ " - $1\frac{1}{4}$ " Imperial Sizes)
- 4 foot (1219 mm) Carpenter's Level and Square
- $\frac{3}{8}$ " Reversible Hand Drill (Variable Speed)
- Carbide Drill Bits, $\frac{3}{8}$ " (10 mm) and $\frac{1}{2}$ " (13 mm)
- $\frac{1}{2}$ " Hammer Drill (for concrete fasteners)
- Pry Bar
- Chain Hoist (required for higher travel units), minimum $\frac{1}{2}$ ton capacity
- Hand Dolly
- Temporary Run Buttons (refer to Appendix B Parts List)
- Scratch Point Awl
- Plumb Bob and Line
- Chalk Line
- Tape Measure
- Wire Tie Wraps
- Wire Puller (50 feet of $\frac{1}{8}$ " fish tape)
- Volt-Ohm Meter (V.O.M.)
- Stop Watch or Tachometer (to set final speed)
- Funnel (for filling the oil reservoir)
- Vise-Grip Pliers (standard and wide jaw welder's type)
- Rags and Cleaning Solvent
- 100 foot (30 m) Extension Cord (Minimum 14 gauge wire)
- 10" (250 mm) (Medium Cut) File (for filing joints, if required)
- Scaffolding or ladders and planks for erection of rails and brackets
- Wire Strippers
- Temporary Light for hoistway
- $\frac{1}{2}$ " Rope, minimum length to be as long as the hoistway height
- Rubber Mallet
- Speedy Jig (refer to Appendix B Parts List)
- 2 Strap Wrenches for Split Cylinders
- Lifting Sling (Cable or Nylon Strap of Adequate Strength)
- Coated Steel Shims, minimum 4" (100 mm) square
- Wall Anchors
- 10 Gauge and 14 Gauge Wire for motor and light wiring
- Assorted Butt Electrical Wire Connectors and Crimping Tool
- 32 Grade Hydraulic Oil, maximum 20 gallon (will vary depending on travel)
- $\frac{1}{2}$ " Electrical Box Connectors
- Hoistway Wiring Materials (varies depending on local codes), 20 gauge stranded multi-wire cable with 20-28 conductors for connecting the pump controller to the travelling cable at the halfway box.

1.4 ELEVATOR TERMINOLOGY

TERMINOLOGY	DESCRIPTION
Cab	This is the compartment of the elevator in which people ride. Also, called the car.
Cable Hydraulic	This is the type of drive system used on the Orion. It involves a hydraulic jack, wire cable and pulley system to raise and lower the cab compartment.
Car	See cab.
Cab Gate/Door	This is a door or gate connected to the cab. Interior gate.
Control System	This is the entire electrical control system, usually identified as the "controller" (mounted at the pump unit).
Cylinder	This is the outside tubular casing of the jack.
D.B.G.	This is the Distance Between Guides (Rails) or the critical measurement between the face of the left rail and the face of the right rail.
Electro-Mechanical Interlock	This is the electrically and mechanically controlled door or gate lock that prevents the door/gate from opening when the elevator is not present at the landing and prevents the elevator from running, unless all doors/gates are closed and locked.
Guide Yoke/Sheave	This is a cable guide arrangement consisting of a sheave, guide shoes, roller bearings and adjustable cable guards. The sheave is furnished with rounded grooves to fit the cables and is mechanically attached to the end of the hydraulic plunger to provide the 1:2 mechanical advantage.
Hoistway/Runway	This is the elevator shaft totally enclosing the elevator.
Hoistway Door	This is a door connected to the hoistway at a landing.
Jack Unit	This is the hydraulic piston/plunger and cylinder used to drive the elevator cab up and down.
L.E.D.	This is a Light Emitting Diode.
Landing	This is any floor level or access level where passengers will enter and/or exit the elevator cab.
Lift	This is another word for elevator.
Load (Rated)	This is the maximum amount of allowable weight that the elevator is rated to carry (in persons or lb/kg).

TERMINOLOGY	DESCRIPTION
Machine Room	This is a separate room usually next to the hoistway to hold the hydraulic power unit and motor control system.
Overhead Clearance	This is the vertical clearance required to fit the elevator and its drive components at the top floor. It is measured from the upper floor level to top of the hoistway.
Pit	This is the bottom area of the hoistway that is below the lowest floor level.
Plunger/Piston	This is the rod portion of the hydraulic cylinder that extends from the cylinder as hydraulic pressure is applied and is attached to the sling.
Power Unit/Pump Unit	This is a hydraulic power producing unit consisting of an electric motor, hydraulic pump, valves, and control panel.
Wire Rope	This is lifting wire cable.
Roped Hydraulic	See Cable Installation.
Safeties	This is a mechanical device used to stop and support the elevator cab, sling, and rated load if a failure in the normal suspension means occurs.
Sling	This is structural steel members that support the elevator cab. The sling carries the cab up and down the hoistway.
Stiles	These are vertical support members of the sling assembly.
Travel	This is the distance from the bottom finished floor level to the top finished floor level.
Travelling Cable	This is the black flat multi-wire electrical cable connecting the elevator control panel in the car to the pump unit, push buttons, and safety devices.
Upstand Post	The upstand post is a rigid steel post of varying lengths used to support the jack unit.



THE FOLLOWING SAFETY INSTRUCTIONS MUST BE ADHERED TO AT ALL TIMES. PRACTICE SAFETY FIRST.

2.0 INSTALLATION SAFETY TIPS

The following safety installation tips must always be followed. Please read and understand this entire manual before installing the unit and carefully follow all procedures.

- 1) Proper, safety-approved protection for your head, eyes, hands, and feet should be worn during all phases of the installation.
- 2) Use extreme caution while raising the elevator components into position to avoid personal injury or damage to the equipment.
- 3) Use extreme care when operating units without panels in place to avoid personal injury from moving parts.
- 4) Power should be removed from the drive unit and operating systems when any electrical work or adjustments are being done.
- 5) To avoid possible electrical shock, you should not work on a wet floor or enter an elevator or elevator pit when it contains water.
- 6) Use only recommended anchor fasteners.
- 7) Never work alone and always be aware of fellow workers and their safety.
- 8) **DO NOT** wear loose-fitting clothing during installation. Shirt cuffs should be buttoned to avoid being caught in moving machinery.
- 9) Ensure that all electrical and mechanical equipment is properly enclosed.
- 10) Never place yourself in a position where you may be harmed (i.e., between shear points, under heavy objects, in the path of moving parts, etc.).
- 11) Never stand directly under the cab or inside the hoistway during testing or when power is being supplied to the cab itself.
- 12) Hoistway doors should be locked or nailed shut any time the area is left unattended.
- 13) Always remember and practice, **SAFETY FIRST**.

2.1 PRELIMINARY CHECKS

Pre-Delivery Check

Carefully check all measurements of the lift hoistway enclosure and compare to the site Installation Drawings. Main items to be checked are:

Items to be checked against site Installation Drawings	Checklist
Total travel from the bottom finished floor level to the top finished floor level.	<input type="checkbox"/>
Clearance overhead. Top finished floor sill to top of the hoistway.	<input type="checkbox"/>
Measure width and depth of hoistway. Check to ensure hoistway is "square".	<input type="checkbox"/>
Pit depth (check for equal depth and level).	<input type="checkbox"/>
Size and location of the landing door or doors rough openings.	<input type="checkbox"/>
Location of the machine (pump) room.	<input type="checkbox"/>
Location of the electrical power disconnect switches.	<input type="checkbox"/>
Correct voltage, three phase or single and the proper size of wire (assure compliance with local codes).	<input type="checkbox"/>
Ensure the jack unit can be placed in the hoistway (clear access to hoistway/runway).	<input type="checkbox"/>
Review "Provisions by Others" with site supervisor.	<input type="checkbox"/>
Check that all walls/barriers surrounding hoistway area are smooth, solid, vertical and perpendicular to the floor and walls are square to each other. NOTE: It is important walls are perfectly level due to tight running clearances.	<input type="checkbox"/>
Check oil and electrical line "sleeves" from machine room to hoistway.	<input type="checkbox"/>
Confirm rail support wall is properly installed with adequate backing as per appropriate drawing.	<input type="checkbox"/>

Pre-Installation Check

We strongly recommend that you conduct a before installation check when you receive shipment to verify contents for damaged or missing parts. Uncrate all boxes and spread out the parts. Carefully check for damages that you must report to your carrier immediately and check for missing materials against our shipping list.

NOTE

NO CLAIMS FOR SHORTAGE WILL BE ALLOWED UNLESS REPORTED WITHIN 24 HOURS OF RECEIPT OF SHIPMENT.

3.0 INITIAL INSTALLATION PROCEDURES

Placement of the Controller Tank

The ideal location for the Controller Tank is as close as possible to the hoistway. Do not place the Tank in an area where extreme temperature changes may occur during the year. It is recommended the power unit be located in an area where temperatures range from 50° F to 120° F (10° C to 49° C).

Note that the current design is equipped with the Variable Speed Valve inside the oil tank. Refer to Figures 2 and 3 for an inside layout view of the tank. Refer to **Section 10 Adjusting and Setting the EPV Valve** for more details.

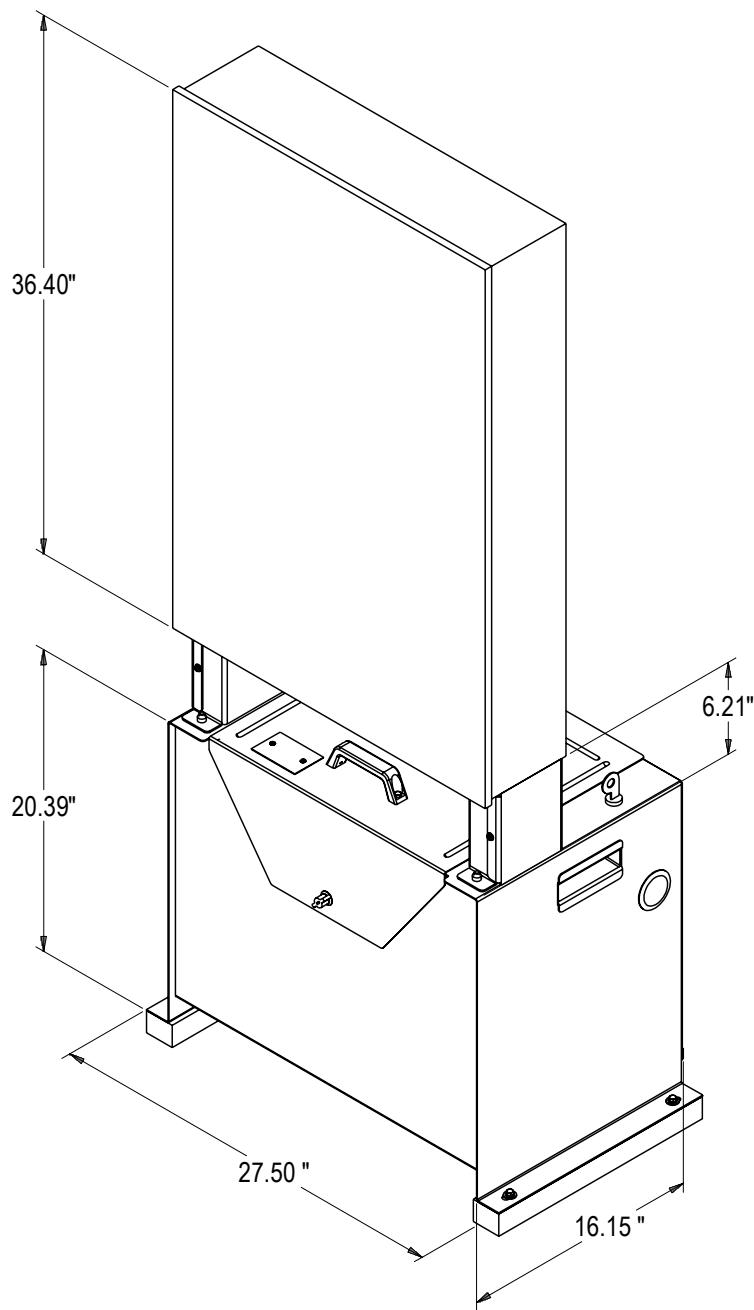


Figure 1 Typical Arrangement of Controller Tank

IMPORTANT

The Controller Tank is shipped drained of hydraulic oil and will require filling during installation. It is recommended to drain the tank before packing and shipping to another location.

The Tank is also equipped with a lockable access panel. The key must be left at the site to allow the owner to gain access to the Manual Lowering Handle.

Specifications		Controller Tank
Dimensions (inches)		H 57" x W 28" x D 17" (PLC)
Minimum Required Clearance (inches)		39"
Valve and Manual Lowering Handle Location		Inside Tank
Rupture Valve Test		T-fitting factory installed
Tank to Controller Wiring		Quick connect valve and motor wiring
Controller Layout		PLC or Relay Board
Keyed Lock to Tank		Yes
Machine Room Required		No*
Tank Capacity (gal/ltr)		15-16.5 gal/57-63 ltr
Max. Dry Weight (lbs/kgs)		147 lbs/55 kg
Max. Filled Weight (lbs/kgs)		312 lbs/117 kg
Operating Environment		50°F - 120°F /10°C - 49°C
Operating Volume		57 dBA

* with local jurisdiction approval

Controller Tank Features

- Hydraulic Hose Connection Port on either side of the tank
- Built in handles on either side of the tank
- Isolation mounting of pump motor valve assembly minimizes operating noise

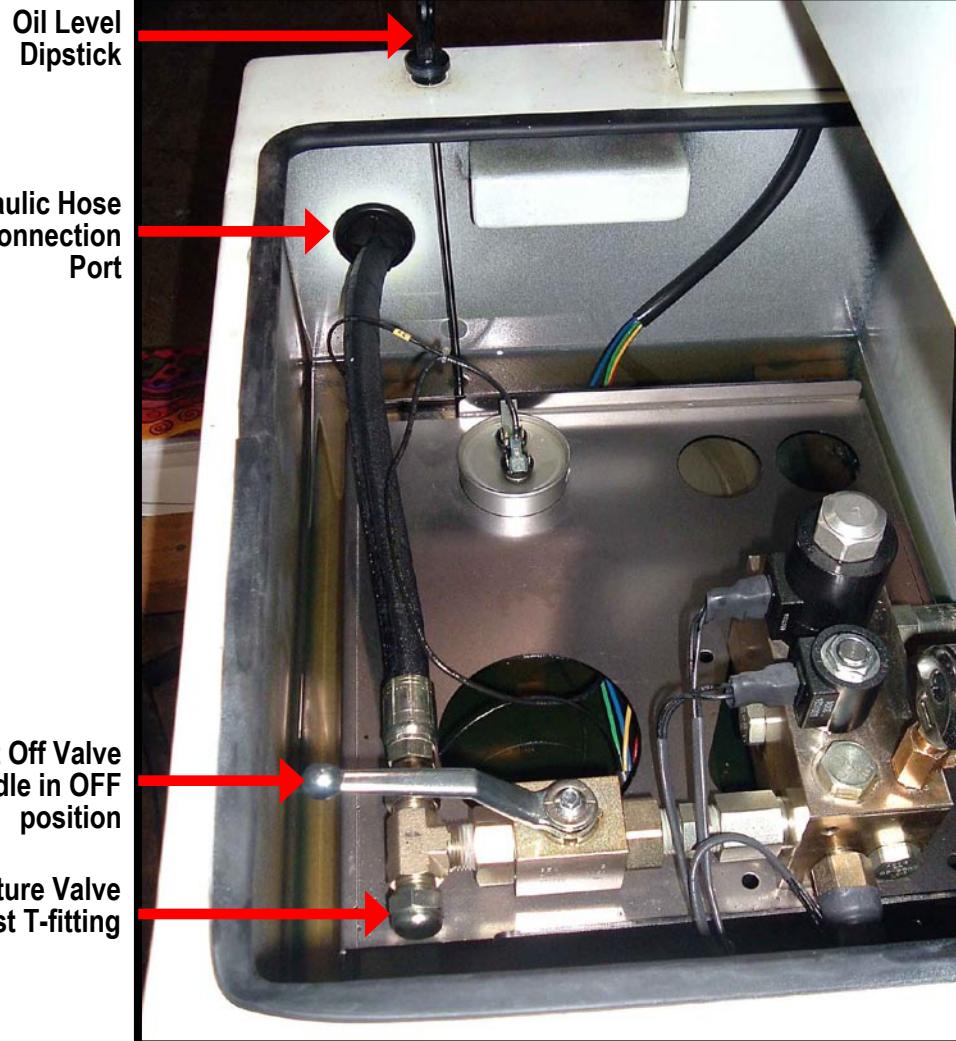


Figure 2 Controller Tank, inside view A

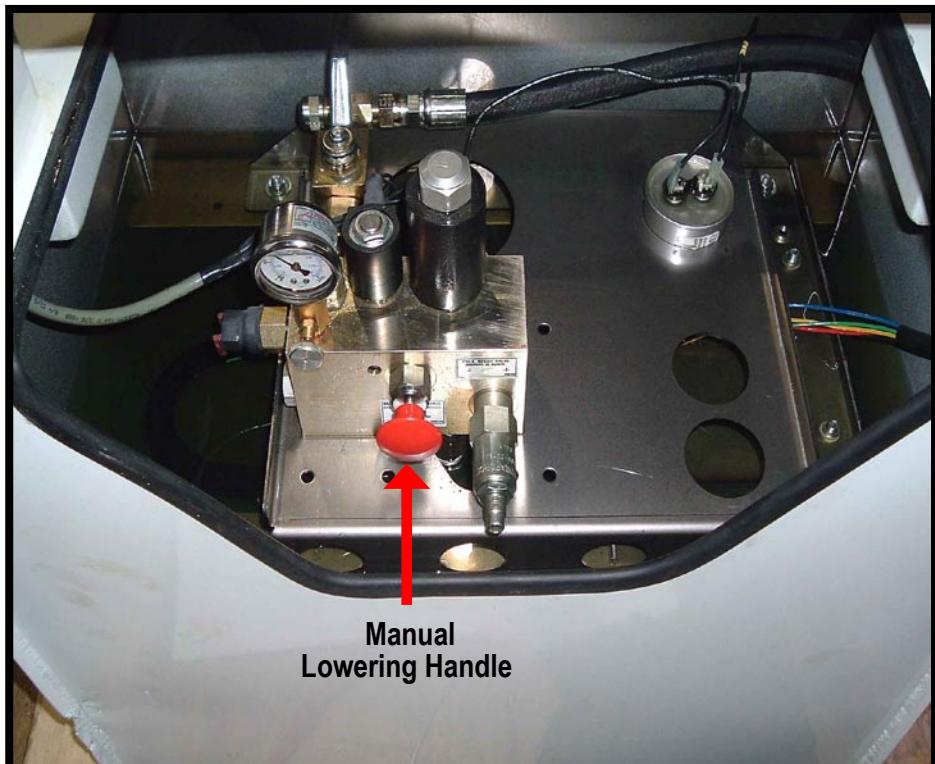


Figure 3 Controller Tank, inside view



LOCAL CODES AND REGULATIONS MAY REQUIRE A LICENSED ELECTRICIAN TO CONNECT TO THE MAINS. CHECK WITH YOUR LOCAL AUTHORITY BEFORE BEGINNING THE INSTALLATION.

Direct the electrician to the proper installation location for the following:

- 1) A fused, lockable, disconnect switch with the proper amperage and voltage supply, as detailed on the Pump Unit Data Plate or the supplied job specific **Installation Drawings**. The disconnect must be fused.
- 2) A fused, lockable, disconnect switch or breaker for the cab lighting supply. The disconnect must be fused.
- 3) A pit light, switch and receptacle. (Optional but may be required by local code.)

NOTE

Before starting the rail installation, it is important to clean the rail sections first. If they are shipped with a protective waxlike coating to prevent rusting, this protective coating must be removed. Once the rails are cleaned, check for any burrs or nicks and file as required. Apply lithium grease to rails when the installation is completed.

3.1 RAIL INSTALLATION WITH SPEEDY JIG

The Speedy Jig (PN 200743) has been designed to speed up the rail installation process and improve the accuracy of the installation. The jig is adjustable to allow use for **the Orion DBG of 30"**. See the photos below showing the two different set ups.

Tools required	Set of mechanical sockets and wrenches ($\frac{1}{4}'' - 1\frac{1}{4}''$), 4 foot Carpenter's level, Carpenter's square, $\frac{3}{8}''$ reversible hand drill, $\frac{1}{2}''$ Hammer drill, $\frac{3}{8}''$ and $\frac{1}{2}''$ carbide drill bits, scratch point awl, chalk line, two plumb lines, tape measure, four vice-grip pliers, rags and cleaning solvent, temporary lighting for hoistway.
Schedule	2 men for 3 to 5 hours

The Leaf Brackets are now left and right handed. The round pre-drilled opening is to be installed on the rail wall side as shown in Figure 13.

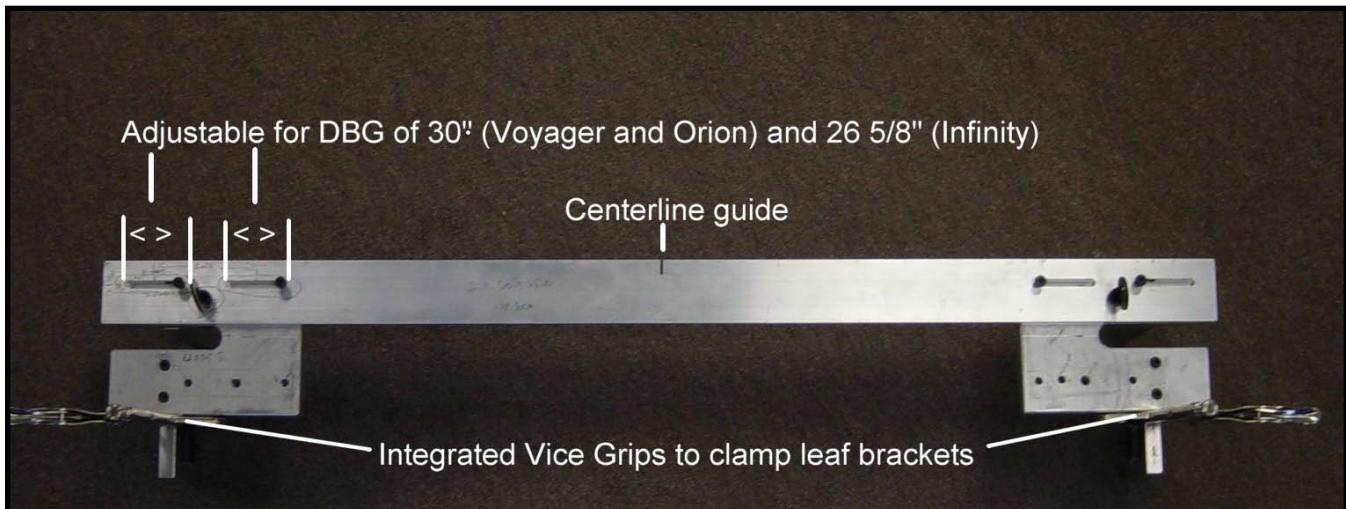


Figure 4

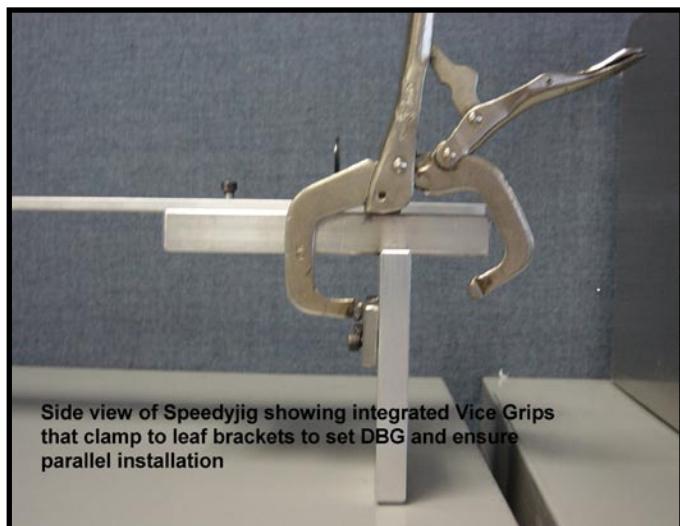


Figure 5

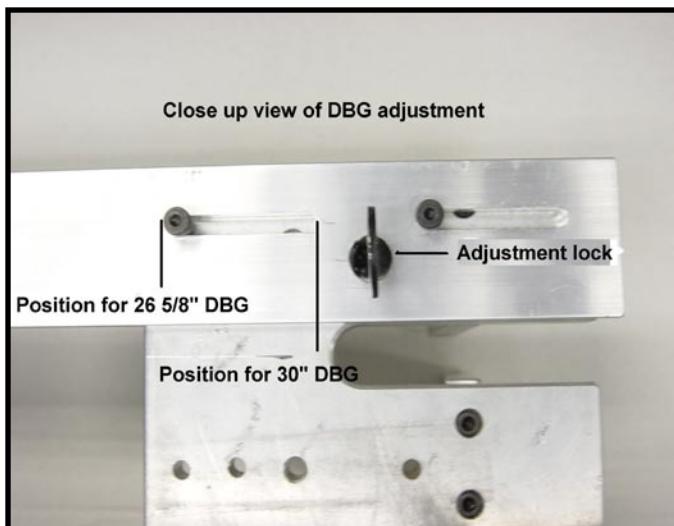


Figure 6

NOTE

The importance of accurately installing the rails is critical. The rails must be supported and aligned properly and they must be true and plumb. The overall performance and “ride” of the elevator depend primarily on how well the rails are installed.



INSTALL THE LADDERS AND/OR SCAFFOLDING TO THE MANUFACTURER'S RECOMMENDATIONS. USE EXTREME CARE WHEN WORKING AT HEIGHTS AND ALWAYS WEAR A SAFETY BELT.

Installation Procedure

NOTE

While 1 mechanic is working on steps 6, 12, 13, 14, 15, 16; the other mechanic can work on steps 7, 8, 9, 10, 11.

To install the rails and rail brackets proceed as follows:

- 1) Start by plumbing the hoistway to determine the tightest spot in order to establish running clearances and the overall condition of the rail support wall.
- 2) Locate the centerline of the rails as referenced from the “sill line” on the **Installation Drawings** supplied with each elevator (Figure 7).

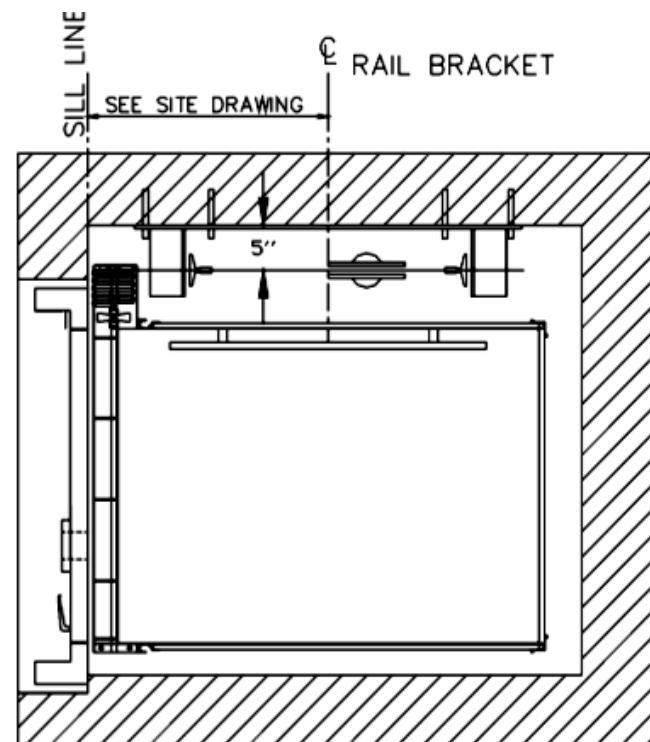


Figure 7 Installation Drawing
(Sample)

3) Mark the centerline location on the wall and then, drop a plumb from this point. Be as accurate as possible here and verify that your measurements are within +/- 1/32". "Snap" a chalked plumb line to mark the centerline from the top of the hoistway to the bottom, refer to Figure 8.

4) Prepare a 4 foot (1219 mm) carpenter's level as a "template" to mark the location of the rail bracket holes. Use a small tip permanent ink marker for this purpose. On the carpenter's level mark the centerline and the position of each bracket hole to be drilled in the wall. Refer to Figure 9.

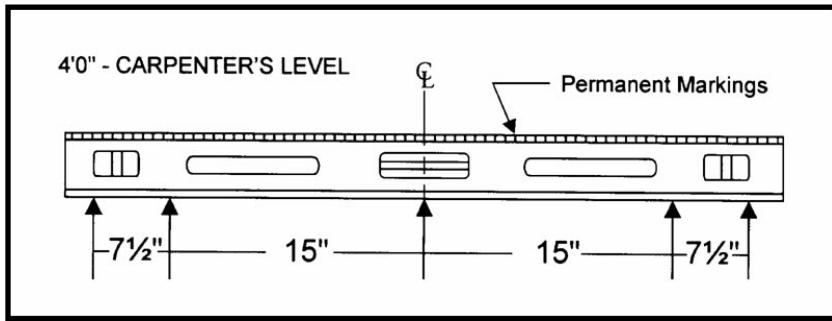


Figure 9 Carpenter Level Template

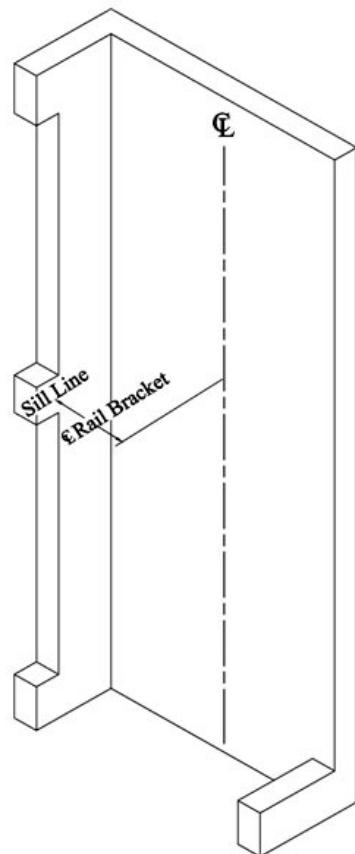


Figure 8 Rail Bracket Centerline

5) Starting at the top of the hoistway, use the prepared 4 foot carpenter's level to mark the position of the rail bracket mounting holes.

- Place the marked center point of the level even with the marked center of the rail bracket/cylinder bracket on the wall.
 - Ensure that the level is "level" and then, mark the location of each rail bracket hole.
 - Descend to each level and repeat this procedure at each rail bracket location.
 - The exact number of brackets and their locations are shown on the Installation Drawings.**
- 6) Drill holes for each rail bracket. (Wall fasteners may be thru bolts, concrete anchors or lag bolts (for wood walls minimum 1/2" bolt). Check your Installation Drawings.

7) Completely remove the protective coating from the rail sections and the splice plates. Once cleaned check the rails for burrs and nicks and file down.

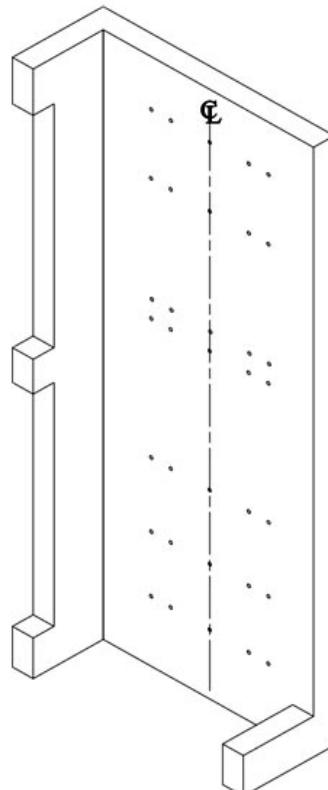


Figure 10 Drill Holes

- 8) Scribe a centre line on the back of each rail using a T-square and scribe as shown in Figure 11. This line will be used to align the rail with the leaf brackets using the diamond cut-out on the leaf bracket.

- 9) **(OPTION)** At this point pre-assemble the rail brackets and leaf brackets OR complete this step after the rail brackets are installed (step 11) using the hardware provided. Assemble the adjustable leaf brackets making sure that the brackets are pushed back fully as shown in Figure 12 and 13. **DO NOT** install the rail bracket clips as they will interfere with the use of the rail alignment jig.

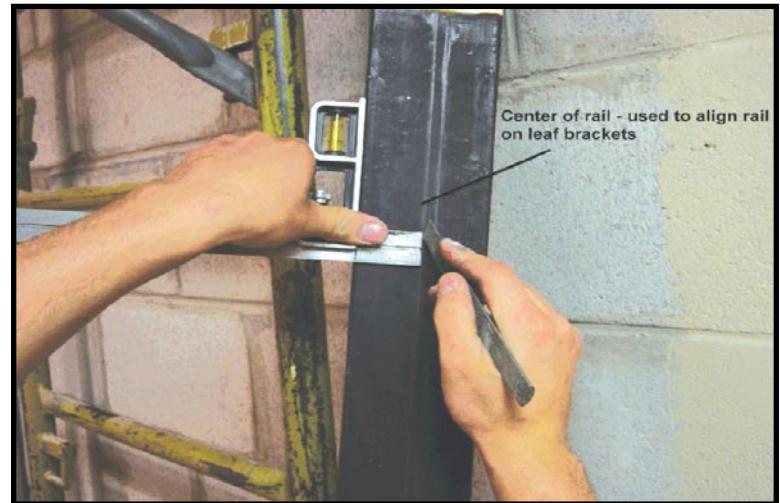


Figure 11



Figure 12 Rail Bracket Installed

- 10) Refer to the installation drawing to install the splice plates to the top of each rail section using 4 of the splice plate bolts, flats, locks and nuts provided. Bolts need to be snug only as they will be tightened up in the hoistway. **CAUTION:** Remember that you will be installing one rail "male" side up and the other "female" side up. See step 19.

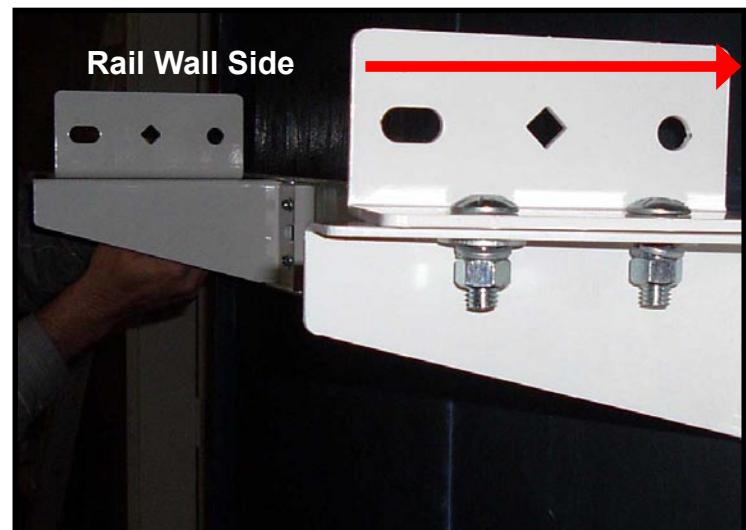


Figure 13 Rail Bracket and Leaf Bracket Assembled

- 11) Install the pre-assembled rail brackets using the wall fasteners making sure that the brackets are level. If thru-bolts are used cut off the excess threaded rod protruding from the rail brackets as shown in Figure 14.
- 12) Proceed to the top rail bracket in the hoistway and install a plumb line on each of the adjustable leaf brackets aligning the plumb line with the diamond cut in the middle of the bracket.

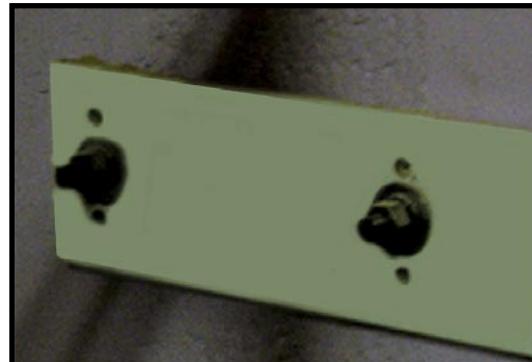


Figure 14 Cut Off excess through bolt

- 13) Install the jig at the top rail bracket as shown in the pictures on below. Using the built in vice-grips pull the adjustable leaf brackets into position making sure that the center line of the jig corresponds to the center line of the leaf bracket and the plumb line. Use the diamond in the middle of the bracket for alignment purposes, refer to Figure 16. Now using a tape measure adjust the jig location to ensure that there is 5" from the back wall to the plumb line.



Figure 15

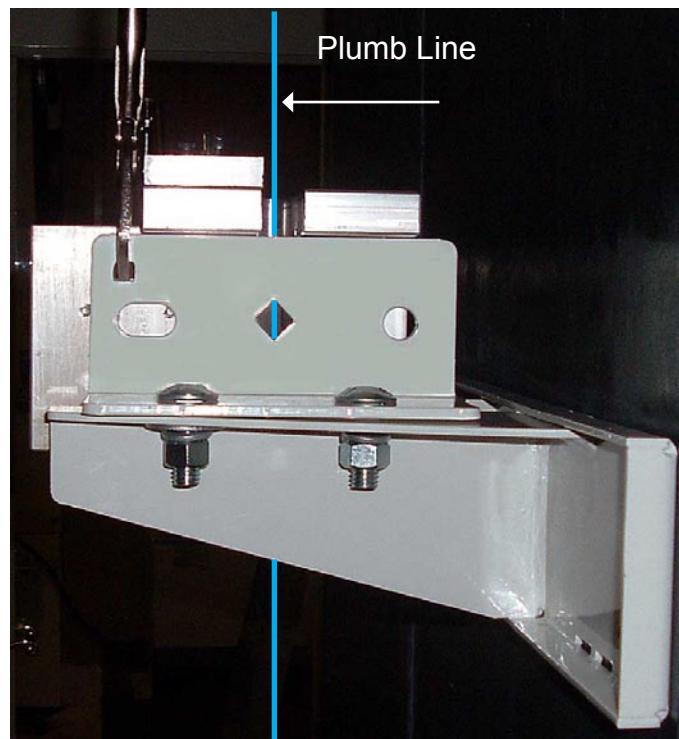


Figure 16

- 14) Now using a tape measure, check the plumb line location relative to the wall at all the other rail brackets. If the plumb line location shows a dimension at a rail bracket of less than 5", it will be necessary for you to adjust the jig location at the top of the hoistway to ensure a minimum plumb line to wall dimension of 5". Once you have the correct position for the top rail bracket tighten the leaf adjustment bolts and remove the jig.

- 15) Proceed to the bottom of the hoistway and install the jig at the bottom rail bracket using the built in vice grips to pull the adjustable leafs into position ensuring the centreline of the leaf is in line with the plumb line. Tighten the adjustable leaf bolts then remove the jig. Now using a set of padded vice grips clamp the bottom of the plumb line to the center of the bottom adjustable leaf bracket.

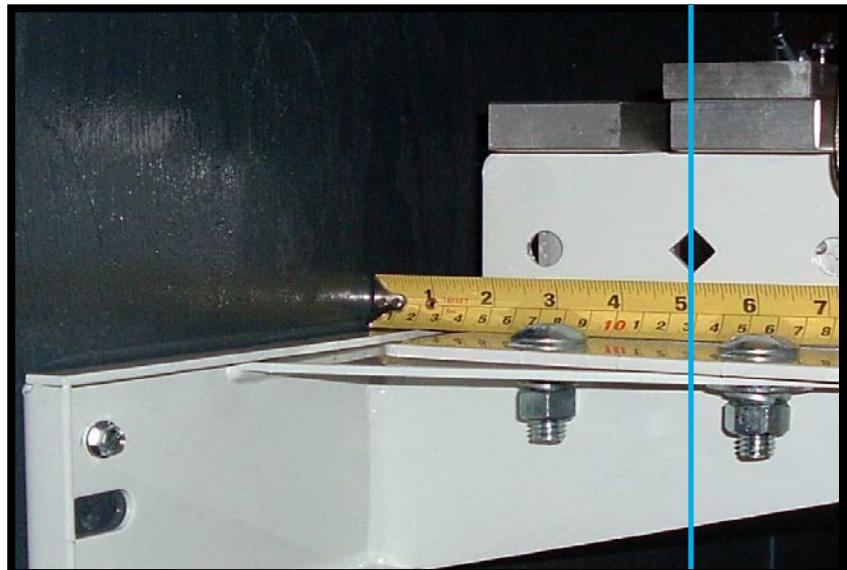


Figure 17

- 16) Proceed up the hoistway using the jig to set all of the adjustable leaf brackets relative to the plumb lines.
- 17) Set the pit channel in place. Leave the pit channel loose but shim it to ensure it is level. The pit channel should be shimmed over its entire length since it supports the full weight of the lift and its rated load. The center directly under the jack upstand post must be shimmed with steel. Do not bolt the pit channel into place at this time.
- 18) Use a pipe wrench to hold the rail clip in place, then install hardware as shown below, **do not tighten**.



Figure 18 Rail Clips on Leaf Bracket



Figure 19 Rail Clips on Rail

- 19) Stand the first two rail sections in the pit channel. CAUTION: Install one rail "**male side up**" and the other "**female side up**".

- 20) Align the centreline on the back of the rail with the diamond in the adjustable leaf bracket and install and tighten the rail clips. Care must be taken to ensure that the rail clips are properly seated on the rails.

- 21) Continue up the hoistway installing the rails, rail bracket hardware and splice plate hardware. Make sure to snug up the splice plate bolts before tightening the rail clips above it. Check the rail joint with the carpenter's level to ensure the rails are properly aligned in the tongue and groove joints before tightening the splice plate bolts.

- 22) All rail joints must be tight, clean and smooth, with no overlapping. File as required to ensure smooth joints. The slightest misalignment here will be multiplied and felt in the cab. A good rail file job will smooth the joint. File at least 4" (102 mm) on either side of the joint. **Do not "point file" at the joint.**

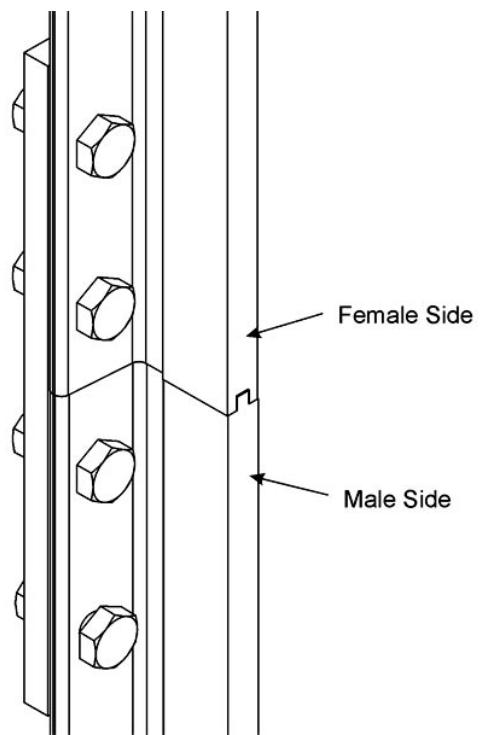


Figure 20 Rail Joints

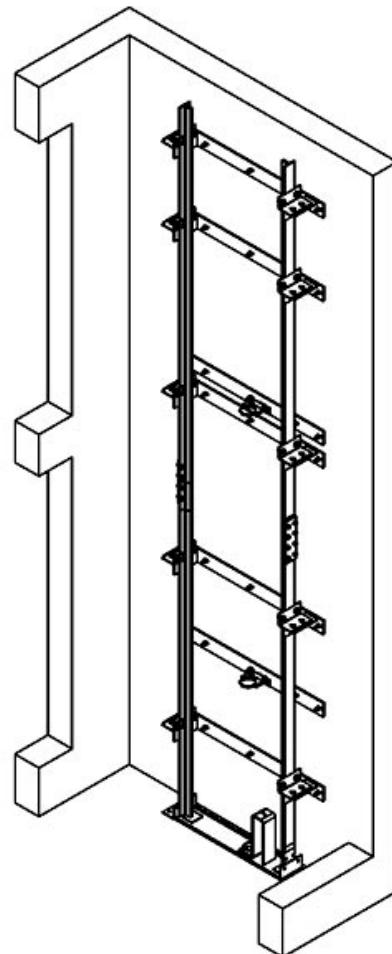


Figure 21 Assembled Rails

NOTE

**The following cab configurations utilize the Leaf Brackets shown below.
These brackets are not handed.**

- ▶ **Orion (51" x 51")**
- ▶ **Voyager (35" x 84" Coffin Cab with 40" DBG)**

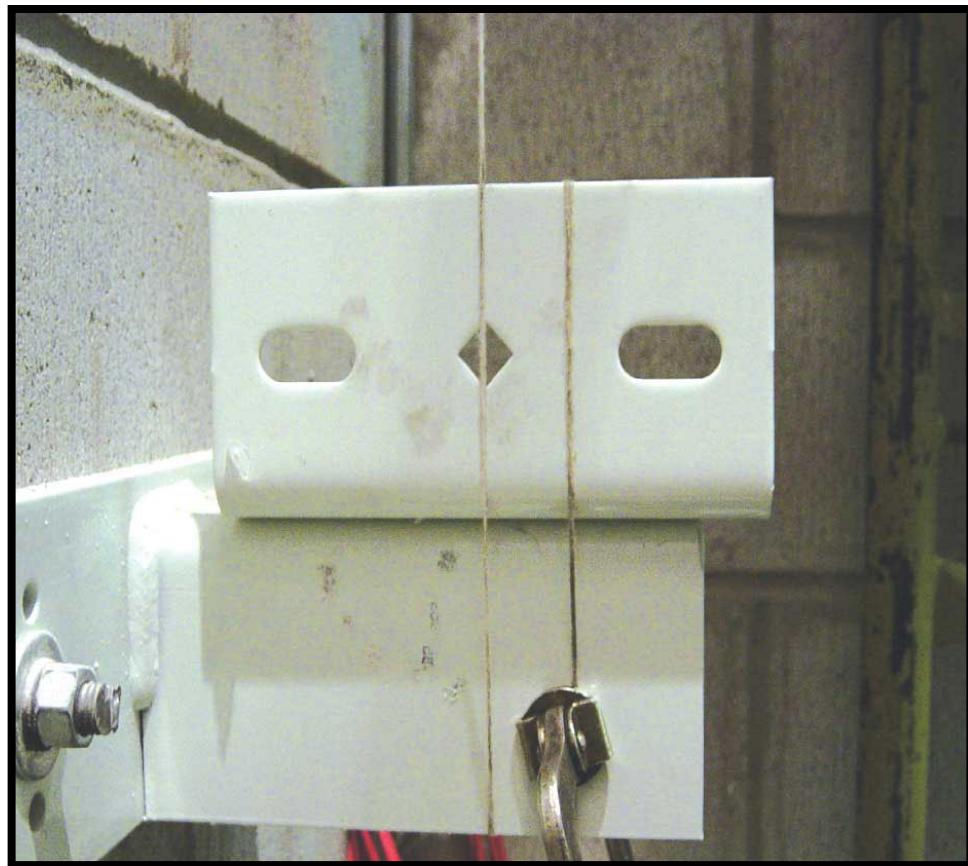


Figure 22 Non - handed Leaf Bracket

3.2 SPLIT CYLINDER ASSEMBLY (IF EQUIPPED)

- 1) Remove all protective tape that has been applied to the ends of the cylinder rod halves.
- 2) Prepare a lifting device for the raising of the cylinder halves in the hoistway.
- 3) Lift the bottom half of the cylinder assembly to a vertical position with the exposed plunger facing upwards. Lean this assembly to one side and secure. Remove the lifting device and connect it to the top half of the cylinder assembly.
- 4) The top half of the outer cylinder barrel and inner plunger must be lifted simultaneously. This may require the use of two separate hoisting devices and two nylon straps of cable slings. When the top assembly is raised, it should hang perfectly vertical, and the plunger should protrude out the bottom of the cylinder barrel about 6" (152 mm). Raise the assembly about 6" (152 mm) higher than the lower assembly.

3.2.1 Plunger Assembly

- 1) Be sure to clean the threads and inspect the O-ring on the bottom of the plunger now hanging in the air. Lubricate the threads with "Lubriplate" (white grease) or similar petroleum based grease.
- 2) Manoeuvre the lower half assembly into position below the upper half. Slowly lower the upper half assembly until the threaded portion of the upper plunger makes contact with the corresponding female thread of the lower piston rod. The initial starting of the thread is best accomplished by hand (since damage may be caused if cross threading occurs at the start). When started, protect the surface of the plunger halves.

NOTE

Tools are needed to screw the two halves together. Strap wrenches are the tools of choice.

Never use a chain wrench or a pipe wrench.

- 3) When the two plunger halves are almost completely screwed together (approximately $\frac{1}{4}$ turn from tight), pause for a moment. Rapidly rotate the rods together so that the flat surfaces mate with sufficient force to create a torqued joint. No finishing should be required, as the joints have been very accurately machined at manufacture but if a lip is noticed it can be sanded, refer to **Section 3.2.3 Split Cylinder Sanding**.

3.2.2 Cylinder Barrel Assembly

- 1) Ensure that the female threads in the lower half cylinder barrel are clean. Inspect the seal of the O-ring just below the internal threads. With grease, lubricate the female threads and the O-ring, as described above.

NOTE

To prevent an external leak from occurring, there must be no nicks or scratches in the O-ring.

- 2) Clean the male threads on the upper cylinder barrel and lubricate with grease.
- 3) Lower the cylinder barrel of the upper assembly and carefully start the thread engagement into the bottom half. The same care and technique should be used, similar to joining the plunger halves. Once completely threaded together there should not be any visible threads.
- 4) When the two-section jack assembly has been assembled, refer to **section 3.3 Jack Unit and Upstand Installation**.

3.2.3 Split Cylinder Sanding

Required Tools

- 80 grit Sandpaper, cut into 1" strips
 - 120 grit Sandpaper, cut into 1" strips
 - 150 or 180 grit Sandpaper, cut into 1" strips
- 1) Once the two split cylinder sections are joined together as per **Section 3.2 Split Cylinder Assembly**, the visible crack at the joint can be sanded out as follows:
 - a) Cut the sandpaper into long 1" strips.
 - b) Begin with the 80 grit paper, place the sandpaper parallel with the crack as shown in Figure 24. Slowly move the sandpaper up and down along the cylinder while sanding the crack.
 - c) Continue with the 120 grit sandpaper in the same direction.
 - d) Finish sanding with the 150 or 180 grit sandpaper in the same direction until the crack is no longer visible.

Once the split cylinder sections are joined together, a visible crack may exist.

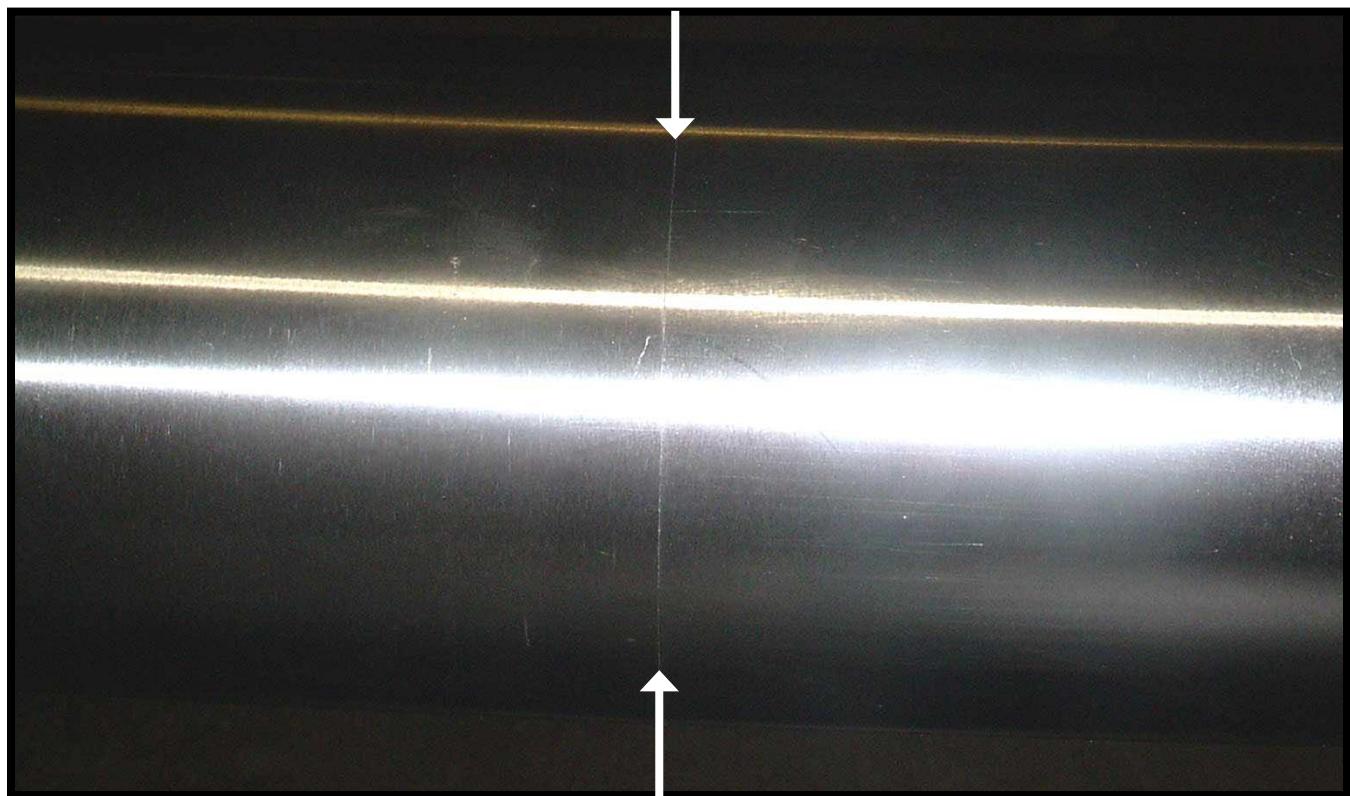


Figure 23 Split Cylinder Crack



Figure 24 Split Cylinder Sanding

3.3 JACK UNIT AND UPSTAND INSTALLATION

The cable hydraulic system features cables, a sheave/guide yoke and a slack/broken cable SAFETY DEVICE.

Care must be taken to ensure that all adjustments of the safety device are properly followed and that the lifting cables are handled according to the recommended procedures.



DO NOT PUT ANY WEIGHT ON THE JACK ASSEMBLY UNTIL BOTH THE JACK AND THE UPSTAND ARE SECURELY FASTENED TO THE WALL.

To install the jack unit and upstand post proceed as follows:

- 1) Place the bottom of the upstand post into the pit channel and secure the top using the jack bracket shown in Figure 27, and 28. Do not tighten at this time. See Installation Drawings for exact bracket locations.
- 2) To adjust the upstand post to the required height (Figure 28):
 - a) Loosen the lock nut at the top
 - b) See Installation Drawings for **"Adjustable Upstand Setting"** dimension
 - c) Turn the screw until the correct height is achieved
 - d) Finger tighten the lock nut.
- 3) Mount the jack unit on top of the upstand post ensuring the male end of the jack's base fits the female socket on the top of the upstand. Secure the top of the jack unit to the rail using the jack bracket supplied (Figure 26 and 27). Do not tighten at this time.

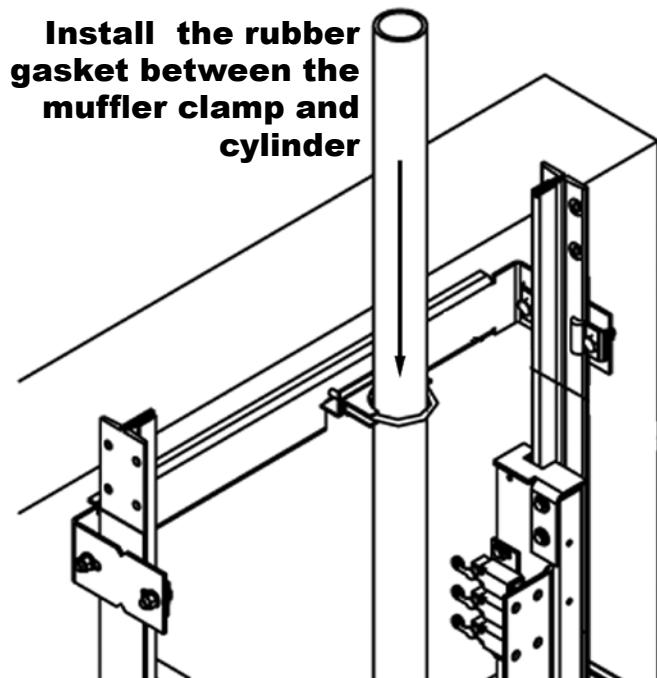


Figure 25 Jack Bracket

NOTE

On elevators equipped with a 2" (51 mm) cylinder, the rubber gasket supplied must be installed on the jack bracket between the muffler clamp and the cylinder in order to provide a tight fit. Refer to Figure 25.

IMPORTANT

The Jack Bracket must be installed as shown below. Note that the square cutout in the bracket must be positioned towards the top of the hoistway.

- 4) Using a plumb line and carpenter's level, ensure the jack and upstand are "in line" with each other and vertically plumb. **Slight misalignment can cause undue wear on the seals and an unsatisfactory ride in the cab.**
NOTE: The jack centerline is $4 \frac{3}{8}$ " (111 mm) in the right of the rail/cab centerline.

- 5) Tighten all jack and upstand brackets.

SUPPORT BRACKET & UPSTAND POST SHOWN

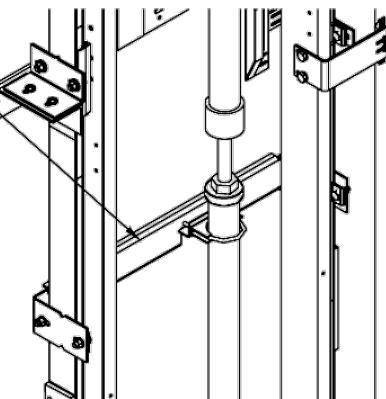


Figure 26 Jack Bracket Upstand

The square cutout in the bracket must be positioned towards the top of the hoistway.

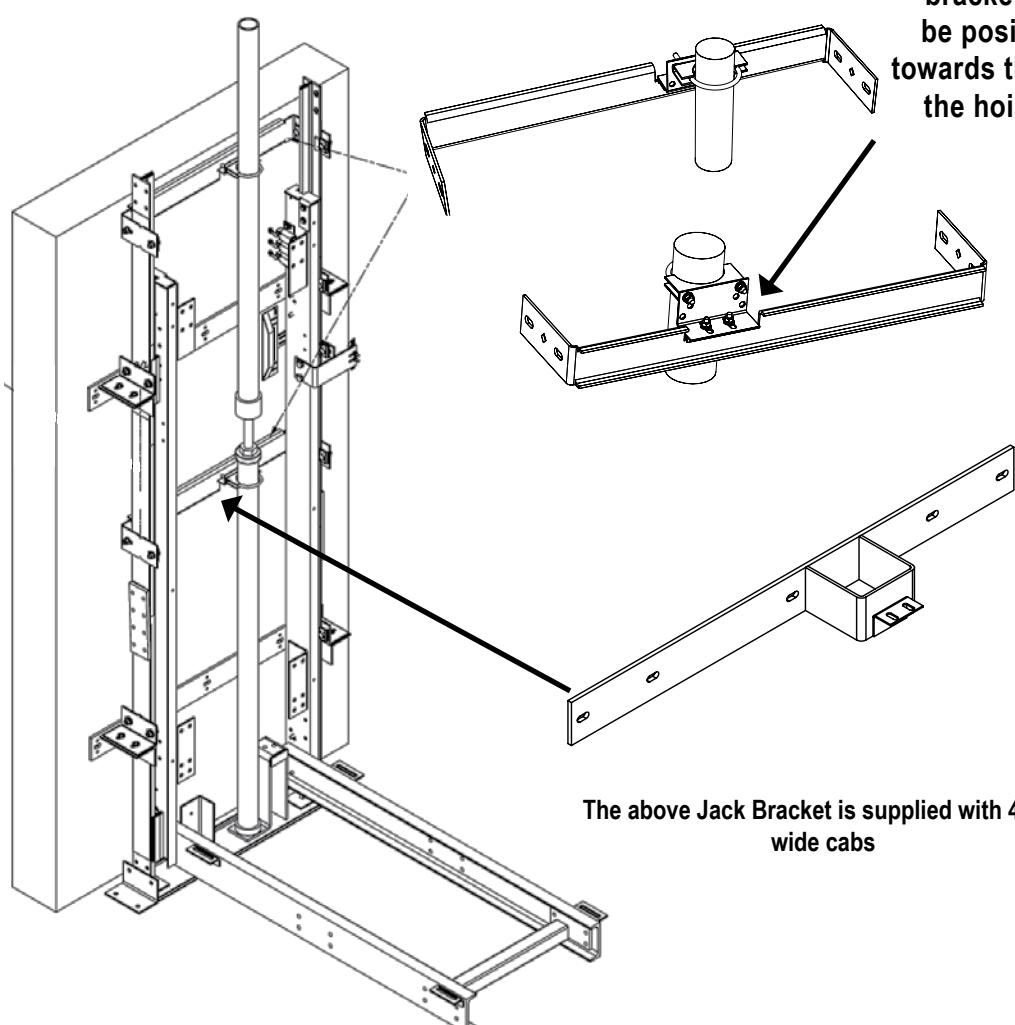


Figure 27 Jack Bracket Installed

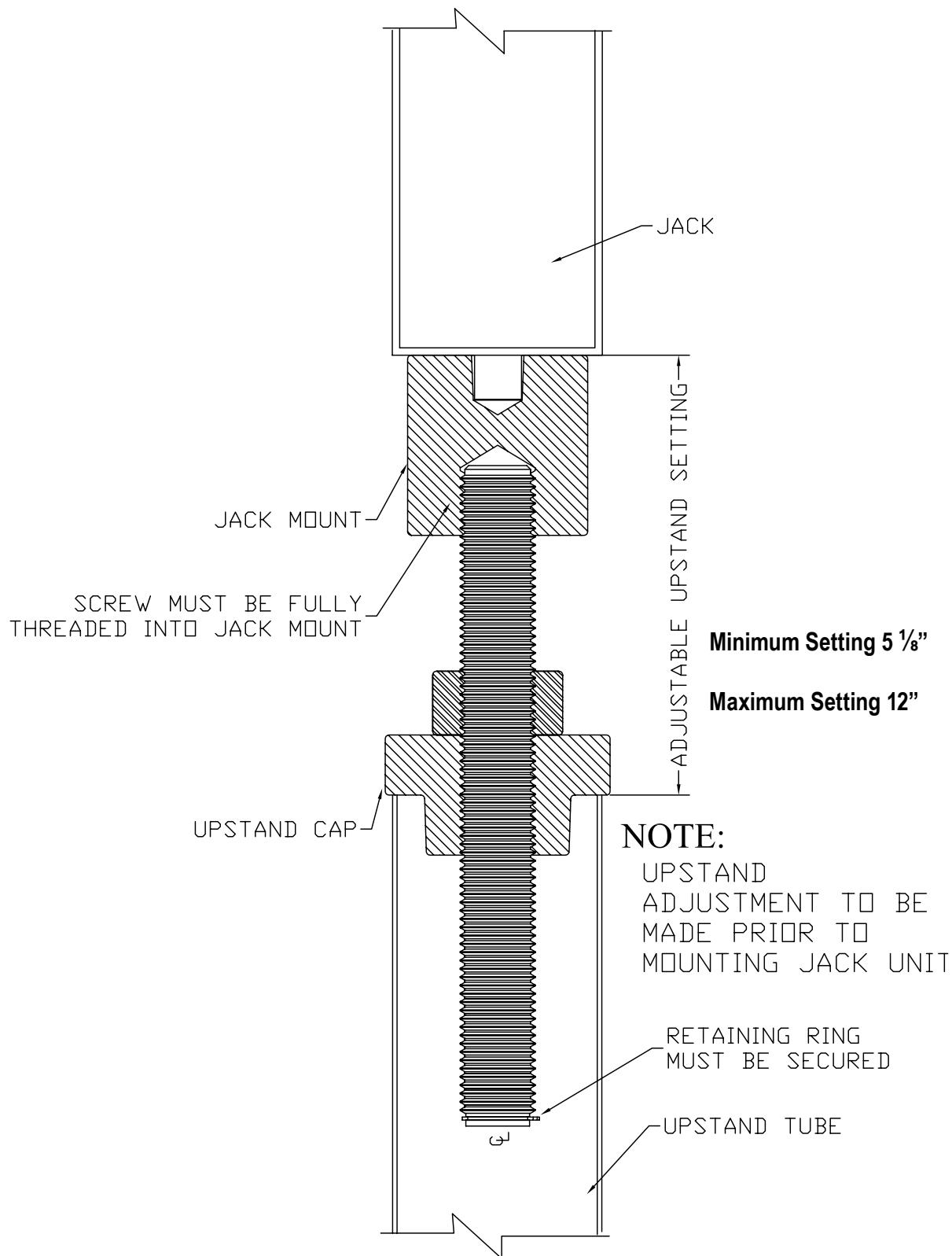


Figure 28 Detail of Adjustable Upstand Post

3.4 SHEAVE/GUIDE YOKE INSTALLATION

The sheave/guide yoke must be installed after the Jack Unit and Upstand Post are assembled and while the scaffolding is still in the hoistway. This is a heavy piece. Make sure you have sufficient help to assist in placing the yoke in position. Use a safety line.

NOTE

To facilitate the mounting of the yoke assembly onto the jack, it is easier to pre-assemble the guide shoes on the yoke before climbing the scaffold.

To install the yoke assembly proceed as follows:

- 1) Install the two (2) guide shoes, one on each side of the yoke and insert the nuts but do not tighten (Figure 29).
- 2) Loosen the eight (8) nuts and bolts on either end of the yoke to make it easier to "squeeze" the yoke assembly between the rails.
- 3) While standing on the scaffold, install the Jack Platen Plate on top of the jack and tighten (Figures 30 and 31). Note the difference when a Car Top Prop is used.

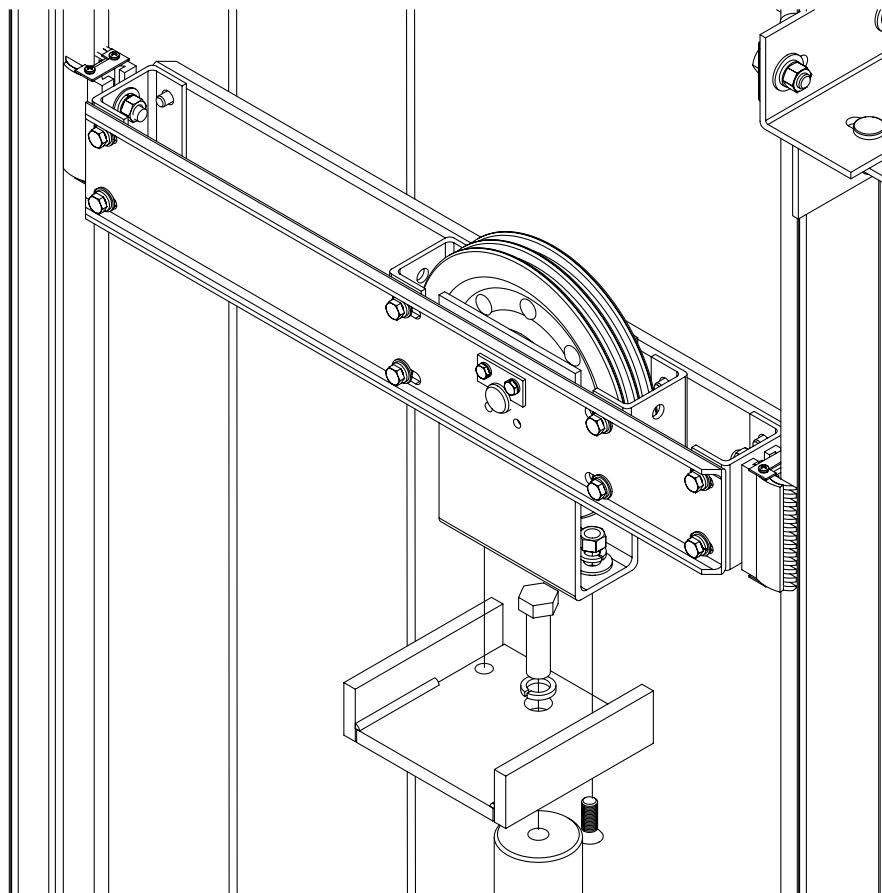


Figure 29 Sheave/Guide Yoke

- 4) Position the yoke assembly on top of the Jack Platen Plate making sure the guide shoes engage smoothly onto the rails and the two bolt holes on the Jack Platen Plate line up. Insert the bolts into the two bolt holes and install the nuts but do not tighten.
- 5) "Line up" the yoke with the centerline of the rails before tightening the shoe bolts and ensure that the clearance between the shoe and the rail is approximately $1/16$ " (2 mm) on each side. Adjustment is provided on each end of the channel.
- 6) Tighten the Jack Platen Plate bolts to the Yoke. The inside edge of the sheave should now be "lined up" with the centreline of the rails and the center of the sheave should be "in line" with the centerline of the jack unit. **THIS IS IMPORTANT!**
- 7) Tighten the shoe bolts to the yoke.
- 8) Ensuring the guide shoes are approximately $1/16$ " from the rail, tighten the eight (8) bolts on the yoke assembly.
- 9) Loosen the four (4) bolts holding each of the two small channels inside the yoke (located on either side of the sheave). These channels are designed to prevent the cables from leaving (jumping) the sheave, in the event of the cables slackening. Once the cables are in place, these small channels will be re-positioned as close to the sheave as possible, usually within $1/8$ " (3 mm), and then tightened.

NOTE

The D.B.G. is 30" and; therefore, the distance inside to inside of the guide shoes should be $29 \frac{7}{8}$ ". It can be a little greater, but it should **NEVER BE LESS**.

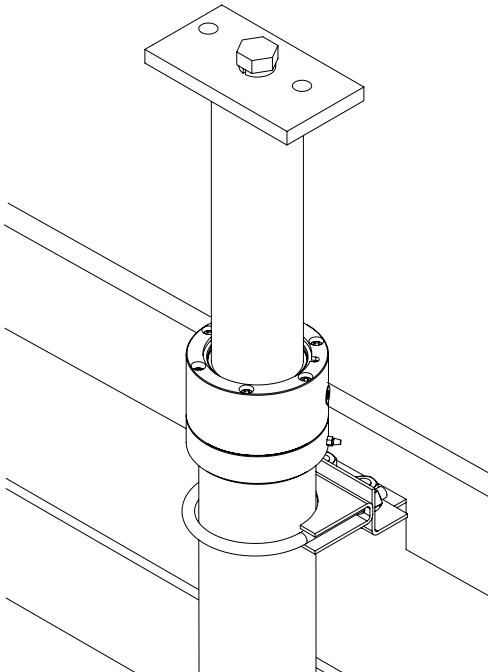


Figure 30 Jack Platen Plate without Car Top Prop

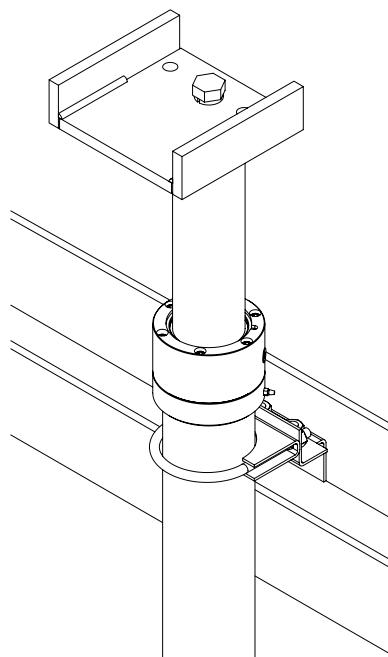


Figure 31 Jack Platen Plate with Car Top Prop

3.5 LIFT CHANNEL UPRIGHTS (STILES) AND SLING

The safety blocks are shipped in a small cardboard box. The blocks are covered with a protective coating that must be removed. The best way to remove the coating is by soaking them in a bucket of paint thinner. Once they are cleaned up, they are ready to install.

NOTE

There is a left and a right safety block. Ensure they are placed properly so that as the sling lowers, the knurled wheel is driven up into the wedge.

To install the sling assembly proceed as follows:

- 1) Bolt the safety blocks securely to the stiles with lock washers. Ensure the proper length bolts are used so that they are threaded at least $\frac{1}{2}$ " (13 mm) into the safety block. See Figure 32 and Figure 33.
- 2) Loosely bolt the four (4) guide shoes on the "inside" of the lift channel uprights (stiles) and position the lift frame (sling) between the guide rails (Figure 34).
- 3) Position the uprights on the rails one side at a time, securing each side to the rails.

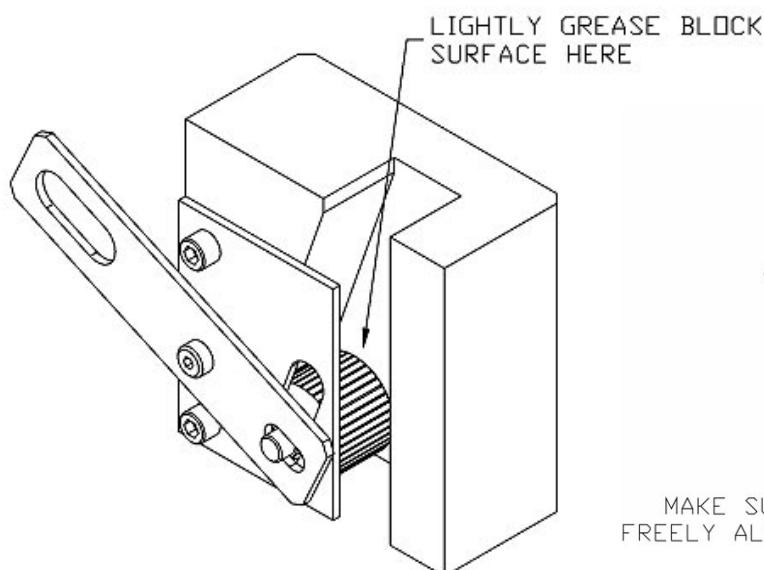


Figure 32 Safety Block (R/H)Shown

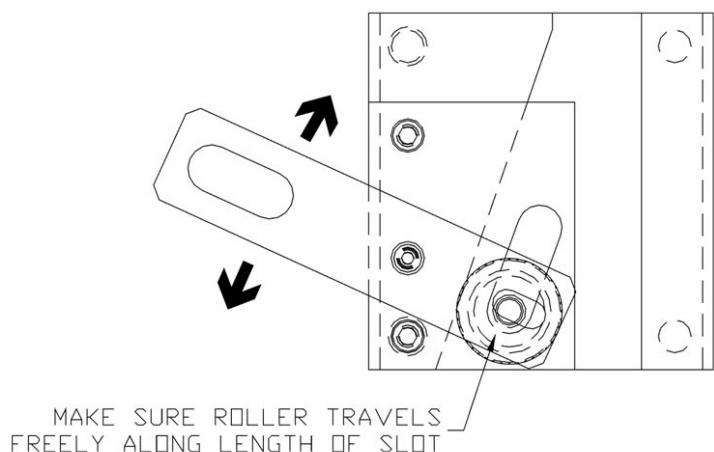


Figure 33 Adjusting Safety Block

- 4) Mount the two (2) torsion bars to the sling (Figure 34).
- 5) Mount the car top prop to the uprights.
- 6) Install the "X" braces on the uprights using $\frac{3}{8}$ " x 1" bolts, lock washers and nuts (Figure 34).

NOTE

The "X" braces are 1" x $\frac{1}{4}$ " flat bar with slots in each end. **ENSURE SLING IS "SQUARE" BEFORE TIGHTENING "X" BRACES!** X braces are installed only when a telephone box is not used.

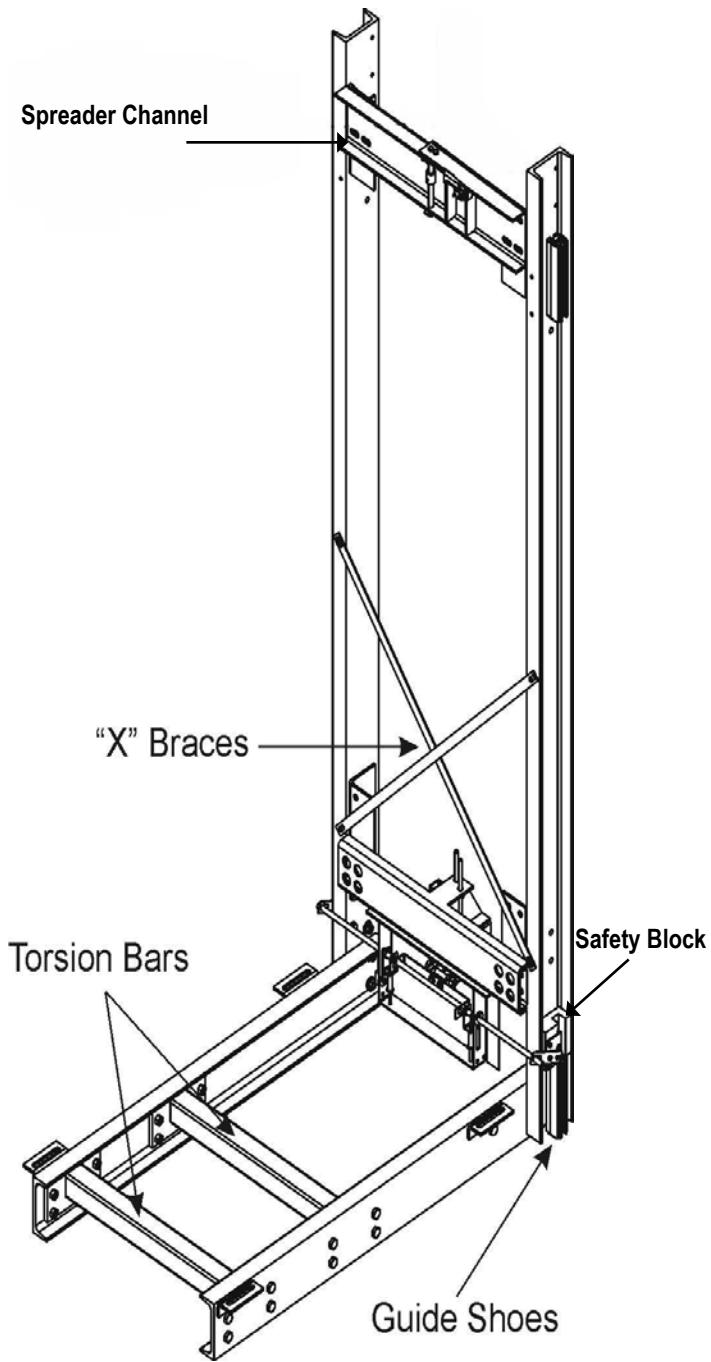


Figure 34 Sling Assembly

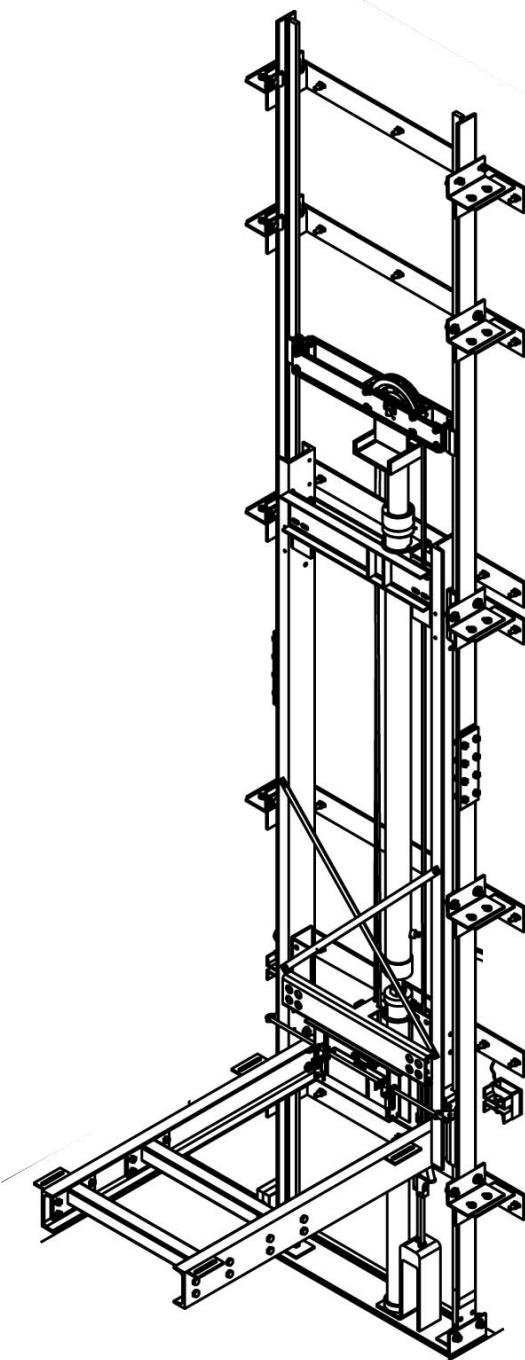


Figure 35 Sling Assembled

- 7) The cables are normally shipped coiled and tied with baling wire. One end of the cable has a permanent "swaged" fitting attached and the other end is taped to prevent unravelling. The swaged end attaches to the sling lifting bracket and the free end attaches to the dead end available on the pit channel.

CAUTION

When uncoiling the cable, never pull it out by its center. Undo the wire and carefully "unroll" the cable. NEVER LET THE CABLE BECOME "KINKED" as this can greatly reduce the safety and life of the cable.

NOTE

The cable has been installed in the sling lifting bracket with two clamps holding the tension of the SAFETY ACTUATING SPRINGS. Do not remove the holding clamps until ready to start the pump unit and place tension on the cables. Refer to Figure 36.

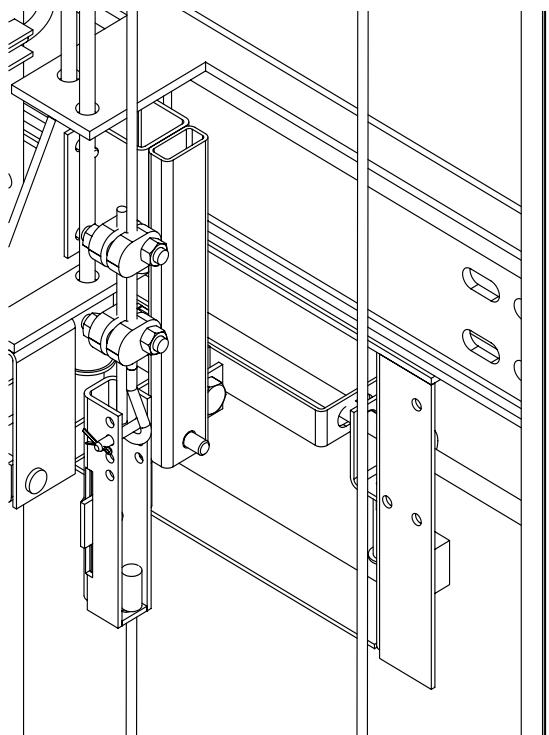


Figure 36 Cables on Lifting Bracket

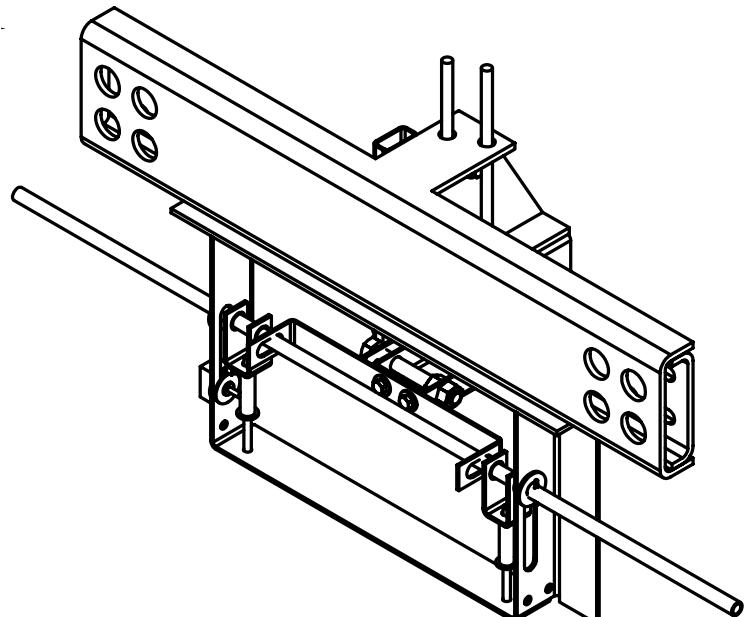


Figure 37 Lifting Bracket

- 8) Position the lifting bracket (with attached cables) so that the $\frac{1}{2}$ " (13 mm) hollow rod extends through each safety block actuating lever. See Figure 38. Using eight (8) carriage bolts, attach the lifting bracket to the uprights.
- 9) With the bracket installed, note that the $\frac{1}{2}$ " (13 mm) hollow rod extends over to each stile and slightly beyond. The safety block actuating levers slide over each end of this rod and attaches to the safety block with the special Allen head screws supplied.

NOTE

At this point, all attachments are "loose" and it should not be necessary to "force" anything into place. Note that the Allen screw acting as a swivel for the tripping lever is a special shoulder bolt. "DO NOT MIX IT UP" with the other two plate attachment screws. When installed, the tripping levers should be in the UP position and holding the knurled wheel clear of the rails.

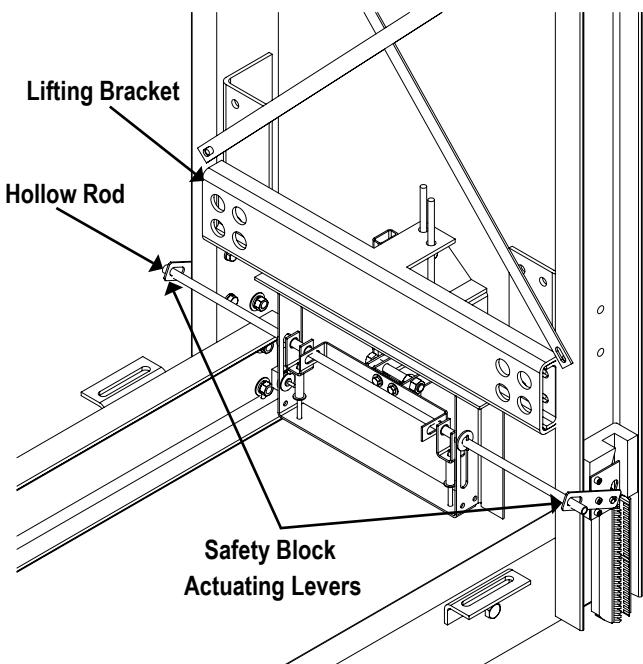


Figure 38 Lifting Bracket Mounted

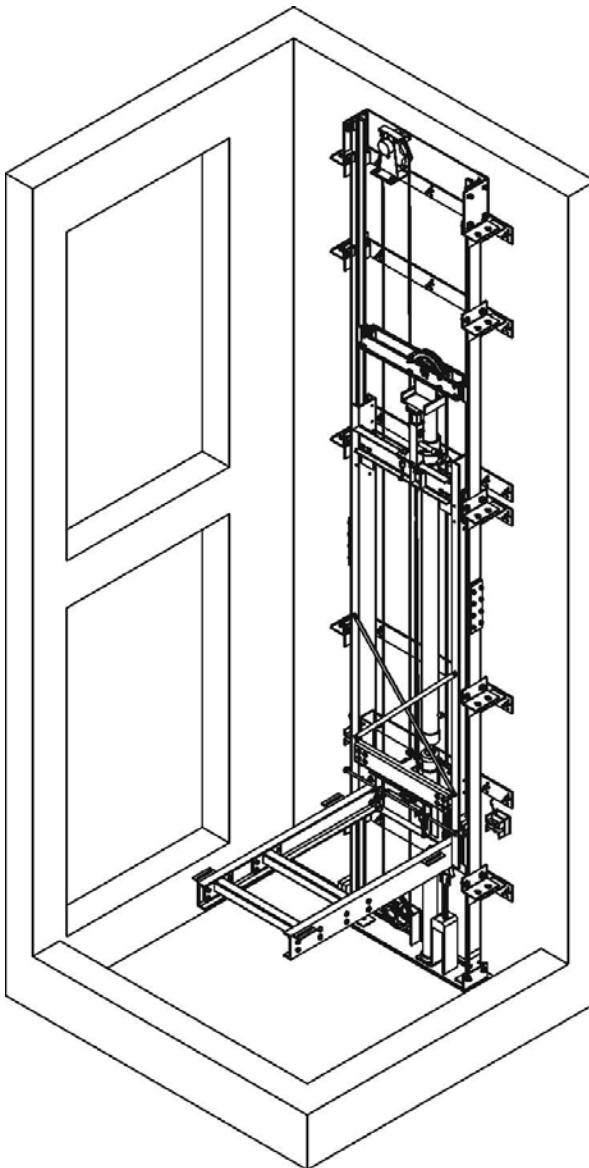


Figure 39 Sling Assembly Mounted

3.5.1 Stile Retainer Bracket Installation

The Stile Retainer Brackets secure the sling to the rails in the event of guide shoe failure. They are handed (250996, RH and 250997, LH).

- 1) Place each bracket on top of the sling, wrap around the rail and secure to the sling with the provided $\frac{3}{8}$ " hardware (102197, 102188, 102191), QTY 4 of each.
- 2) The Stile Retainer Brackets can be installed at any point during the installation.

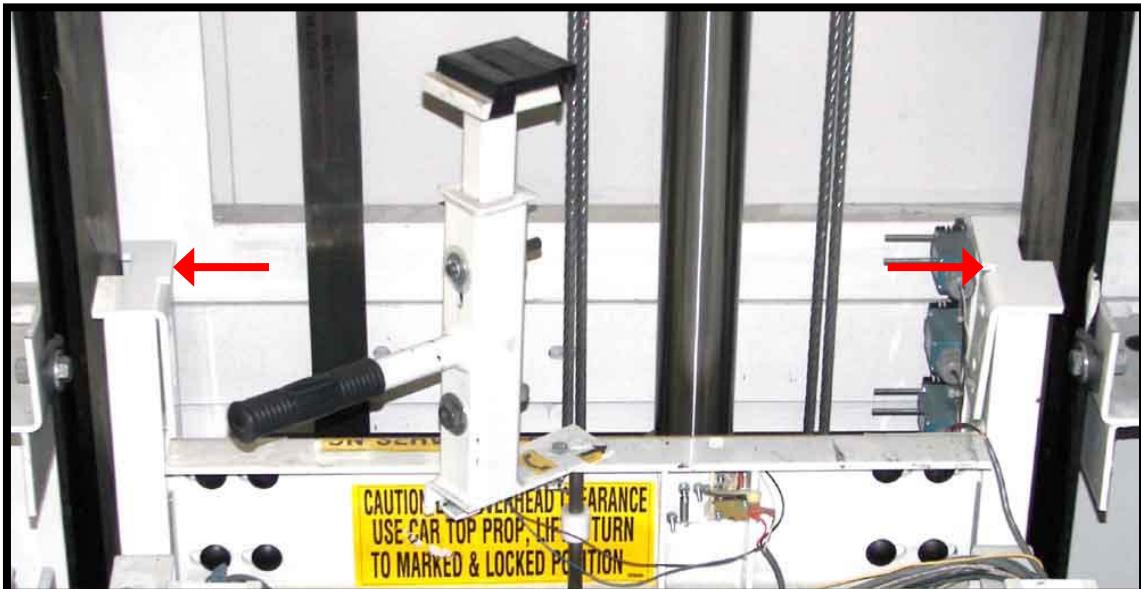


Figure 40 Stile Retainer Installation

3.6 CAR TOP PROP INSTALLATION



THE CAR TOP PROP MUST BE FULLY DEPLOYED TO THE "ON SERVICE" EXTREME RIGHT, ROTATED AND LOCKED POSITION BEFORE ENTERING THE CAR TOP AREA. RULE 5.2.1.4.4

General

The purpose of the Car Top Prop is to provide a refuge space equivalent to Rule 2.4 of A17.1 for elevators with insufficient overhead clearance. According to Rule 5.2.1.4.4, the Car Top Prop may be permitted in an existing building as an alternative to providing sufficient overhead clearance.

Operation

The prop is installed so that when rotated to the "ON SERVICE" position, it is designed to interact with a striking plate mounted at the top of the jack. By design, this will immediately stop the upward movement of the elevator both mechanically and electrically. An electrical protective switch detects movement of the telescoping portion of the prop and opens a control circuit to prevent further upward movement. The switch is sensitive to force and will

open when a maximum of 20 lbs. force is applied. This permits the lift to be operated in the down direction to move away from the prop, if inadvertently actuated. This is in conformance with Rule 5.2.1.4.4.

Storage

During normal operation of the elevator, the prop is lifted and rotated to the left maximum position where it will drop into a “locked” position. In this position, the prop is deactivated and does not contact the striking plate at the top of the jack.

Deployment

Position the elevator so that the car top is approximately level with the top floor landing. To position the car and open the hall door, use the hoistway access switch and the manual unlocking device. In compliance with the code requirements, the Car Top Prop can be deployed

NOTE

The prop must be in either the maximum left or maximum right rotated and locked position for operation of the elevator. In the maximum left position, the elevator is operated by the normal operating controls and with the prop in the maximum right position, the elevator is operated by the car top inspection station.

without full bodily entry into the car top area. The handle of the prop can be reached while leaning out from the landing sill. Lift the handle about $\frac{1}{4}$ " (6 mm) and rotate it to the right to its maximum travel. The prop will automatically drop into the locked position when released.

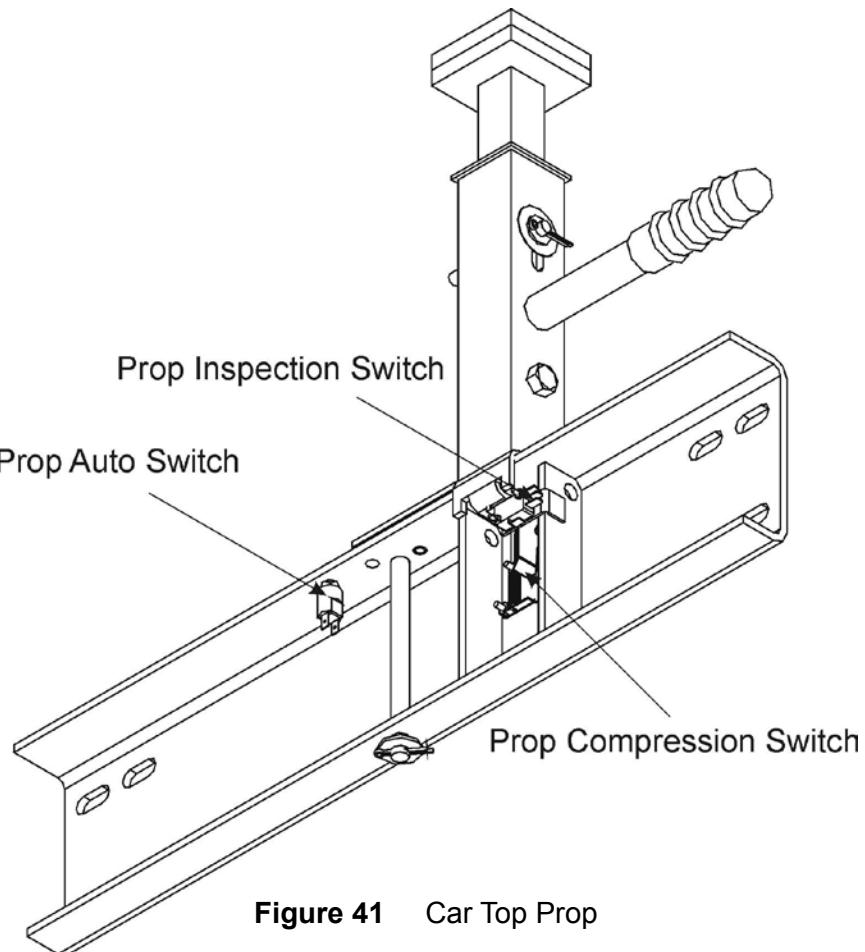


Figure 41 Car Top Prop

NOTE

Before entering the car top area or starting to deploy the prop, set the Car Top Inspection Station Switch from the NORMAL to INSPECT position.

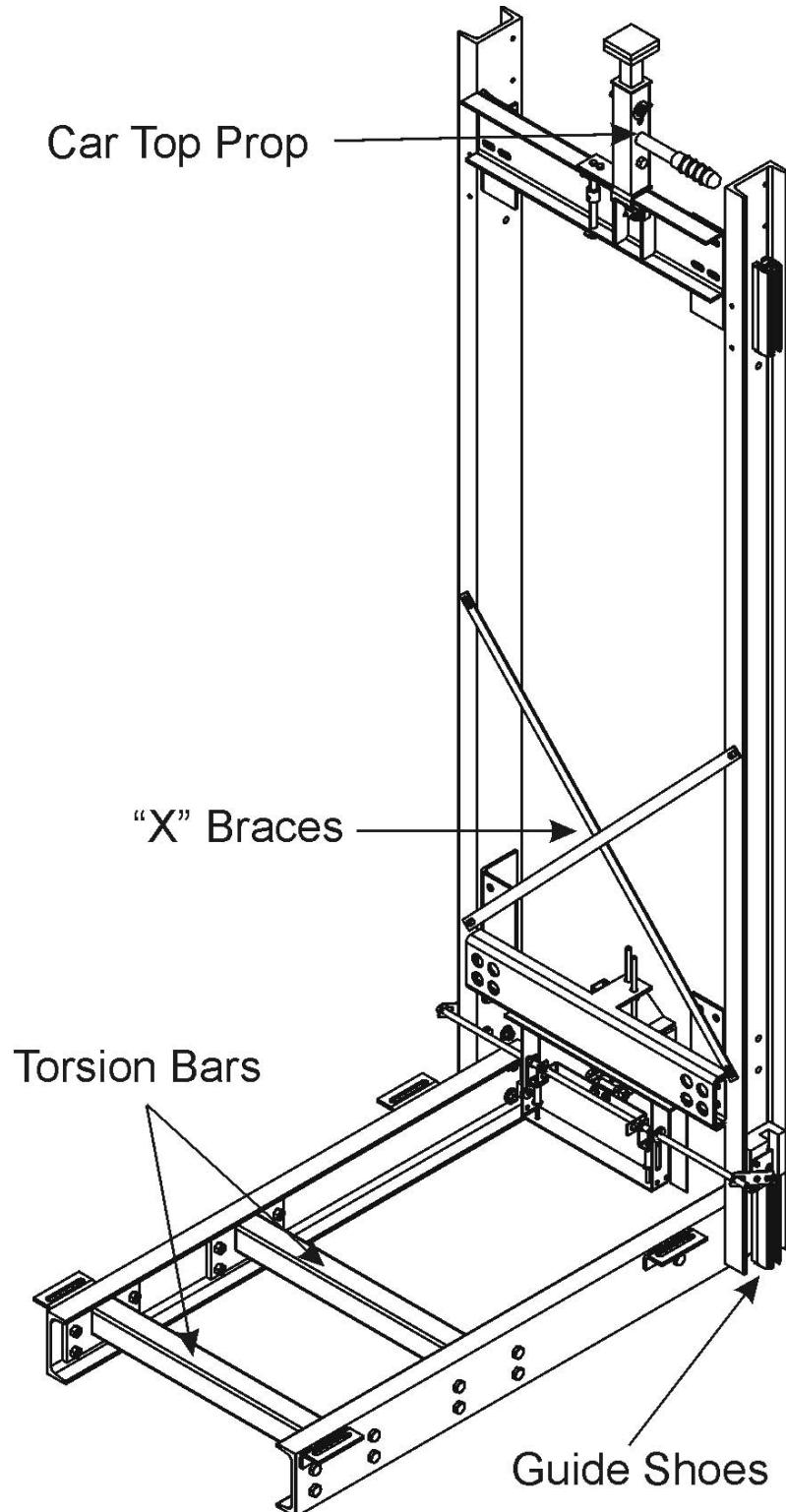


Figure 42 Car Top Prop Mounted

3.7 BUMPERS AND BUFFERS

NOTE

A pit buffer is installed in a shallow pit measuring less than 16 inches, rail buffers are installed in a deep pit measuring more than 17 inches.

To mount the bumper shim, proceed as follows:

- 1) Position the bumper shim so that the buffer shims line up with the torsion bars on the cantilever arms (Figure 44).
- 2) Secure to the pit floor using concrete anchors supplied.

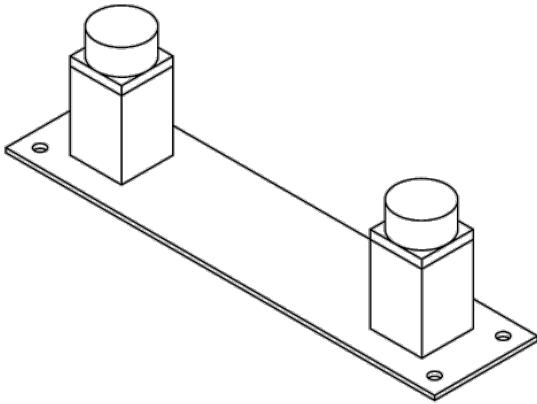


Figure 43 Bumper Shim

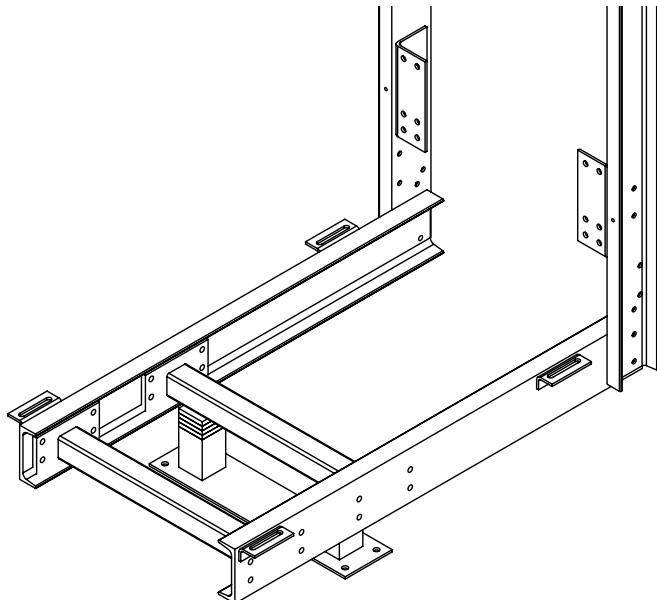


Figure 44 Bumper Shim Mounted

To mount the rail buffers, proceed as follows:

- 1) Calculate the following:
 - Height of finished floor (varies between $\frac{1}{8}$ " – $\frac{5}{8}$ ") plus $16 \frac{7}{8}$ " (429 mm).
- 2) Place a level at the door entrance and mark the height on the rail.
- 3) From the mark, measure the total distance calculated in step 1, and drill $\frac{1}{2}$ " (13 mm) hole (Figure 47) on the “milled” rail face.

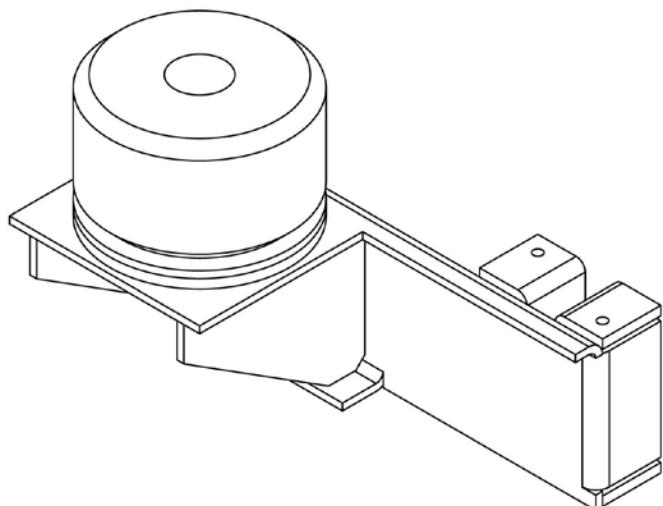


Figure 45 Rail Buffer (L/H Shown)

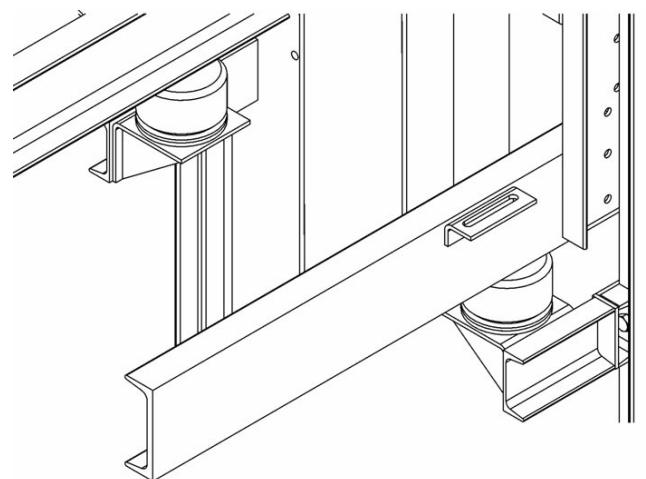


Figure 46 Rail Buffer Mounted

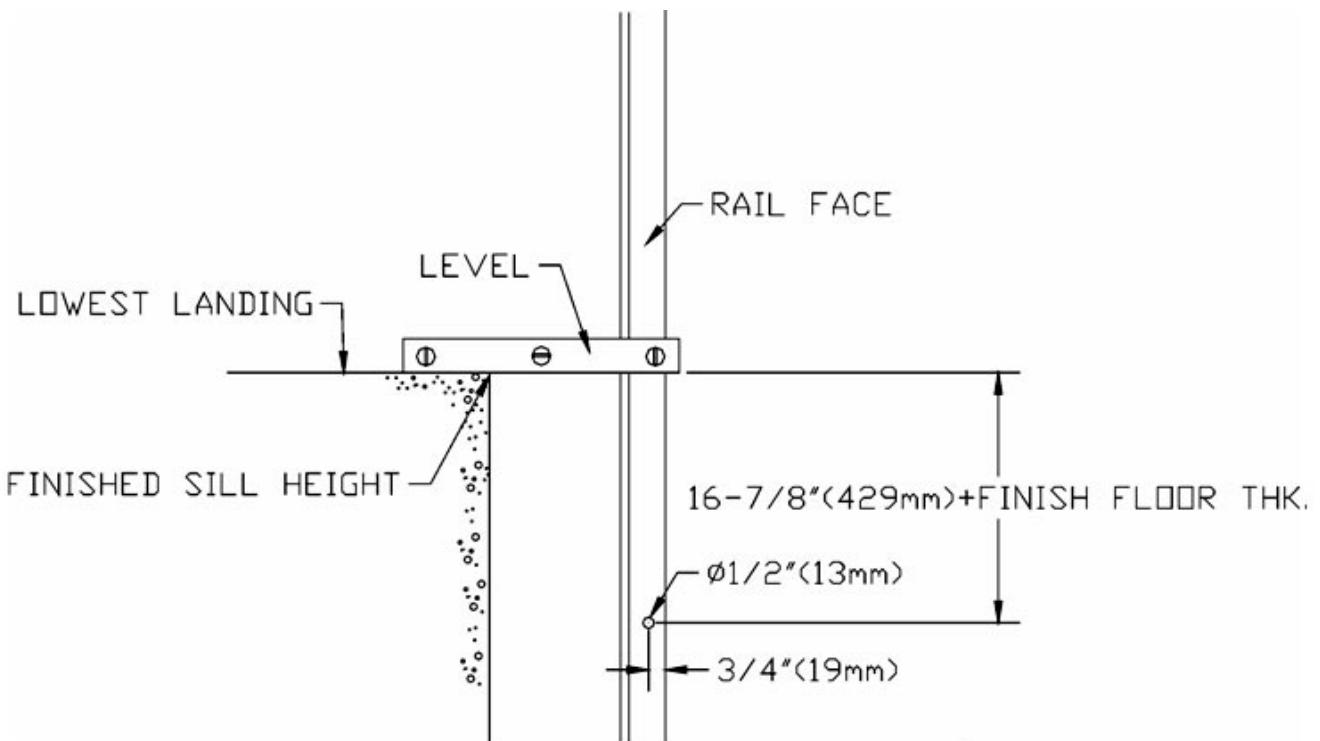


Figure 47 Rail Buffer Mounted Detail

4.0 CONNECTING THE POWER SUPPLY



LOCAL CODES AND REGULATIONS MAY REQUIRE A LICENSED ELECTRICIAN TO CONNECT TO THE MAINS. CHECK WITH YOUR LOCAL AUTHORITY BEFORE BEGINNING THE INSTALLATION.

1) VALVE CONNECTIONS

Connect valve wiring to the LEFT side of the controller tank.

2) MOTOR WIRING

Connect motor wiring to the RIGHT side of the controller tank.

NOTE

For step 3, the auxiliary switch will have to be temporarily jumped.

3) BATTERY POWER SUPPLY (Emergency Lowering/Emergency Lights)

- To test the operation of the emergency lowering battery supply, open the 110 volt power disconnect and the main power supply. The emergency light will illuminate and the elevator will run in the DOWN direction only. Connect UPS (uninterruptible power supply) to supply plug-in socket.

4) CONNECTING THE MAIN POWER LINES

- Make sure the power supply is in accordance with the ordered configuration. Connect to screw terminals L1 & L2 (for single phase) or L1, L2, & L3 (for three phase), as required. Connect ground to grounding strip "G".

5) CONNECTING THE CAB LIGHTING POWER SUPPLY

- Wire the fused 110 volt, 15 amp supply to the Hot and Neutral screw terminals. Connect ground to grounding strip "G".

6) CONNECTING AUX (Auxiliary Contact Switch)

- The National Electrical Code requires that when a secondary power supply or battery is used, the main disconnect must be provided with an auxiliary switch that will open when the disconnect switch is opened. This is a safety device and must be provided by the electrical contractor. Connect auxiliary disconnect switch to screw terminals P4 and 1 on the Controller Relay Board (labelled 4th Pole of the main line disconnect).

NOTE

Refer to the "Electrical Schematics" section (Appendix A) of this manual for power supply connections. To ensure proper power supply to the elevator controls, measure the input voltage for the lighting power supply (nominally 110 VAC) and the main motor and controller power supply (typically 220 VAC or 208 VAC). Ensure that the configuration is correct.

5.0 HYDRAULIC INSTALLATION

When the EPV-12 is installed, the oil line must have a minimum $\frac{3}{4}$ " dia. with a $\frac{1}{2}$ " dia. NPT adapter at the jack.

Steel Piping

Before connecting the oil line, clean it out by placing the jack end of the oil line into a bucket and running the pump enough to flush out a cup or two of oil. **DO NOT PUT THIS OIL BACK IN THE TANK!**

Make sure the pipe and fittings have the proper rating. Most jurisdictions require minimum Schedule 40 oil line and fittings. When routing the oil line to the hydraulic jack assembly, always minimize the number of 90° bends in the line. Each 90° bend causes pressure loss and increases the noise level, as the elevator operates.

Insulate the oil line where it passes through the hoistway wall to prevent vibration. The code permits the use of hydraulic hose within the machine (pump) room. It is recommended practice to install a short length of hydraulic hose from the gate valve on the pump to where the steel oil line starts to pass through the hoistway wall. This will help reduce the noise level from the pump/motor operation.

- 1) The steel oil line must be securely supported to reduce noise and eliminate vibration that may loosen or damage fittings and connections. Support the steel pipe on the upstand post and clip it to the hoistway wall using insulating clips (Figure 48).
- 2) For a 90° elbow, a $\frac{1}{2}$ " male NPT to $\frac{1}{2}$ " male NPT is suggested. Remember, all fittings must be high strength (minimum Schedule 40).
- 3) For long runs of pipe, minimize the number of 90° bends by using 45° and 30° fittings, wherever possible. Use the following chart as a guide.

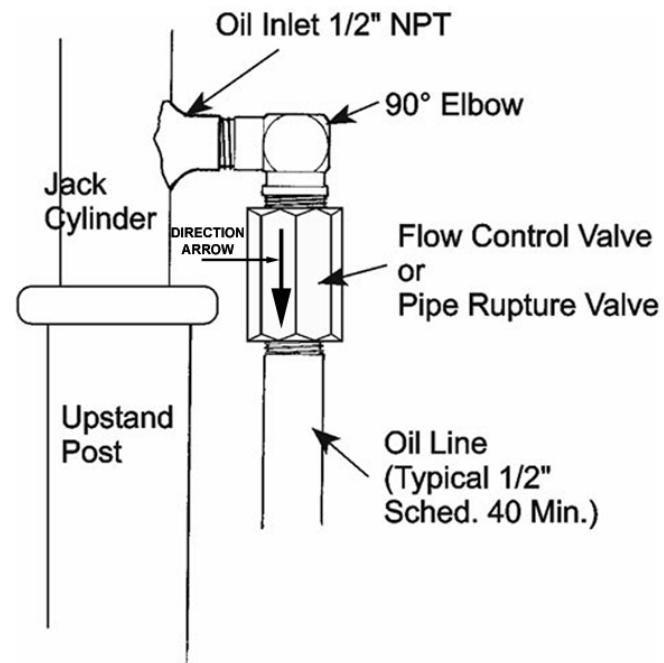


Figure 48 Steel Piping

DISTANCE (Length of Oil Line/Hose)	RECOMMENDED SIZE OF OIL LINE/HOSE
30 feet or less	$\frac{1}{2}$ " Diameter
31 to 60 feet	$\frac{5}{8}$ " Diameter
61 to 100 feet	$\frac{3}{4}$ " Diameter
Over 100 feet	1" Diameter

5.0.1 Filling the Reservoir

The amount of oil required will vary depending on the job. The usable fluid is approximately 20 US gallons or 75.7 litres. When filled to capacity, the tank should hold approximately 15 to 16.5 US gallons or 57 to 63 litres.

NOTE

The pump and motor must be totally submerged in oil.

The recommended oil is a 32 weight (grade) “Hydraulic Oil”. Never use old oil.

When filling the reservoir, “top up” the oil until it can be seen in the filter (with the air breather cap removed). Remember that the hydraulic cylinder and oil line are empty and must be filled first when the motor starts up. This will reduce the amount of “usable” oil for operation when the system is filled. It may be necessary to “top up” the oil again once the system is filled. The oil should be about 1" to 1 ½" (25 mm - 38 mm) below the rim of the tank.



ALWAYS ADD THE HYDRAULIC OIL TO THE RESERVOIR WHEN THE ELEVATOR IS AT THE BOTTOM LANDING.

5.1 OVERSPEED VALVE INSTALLATION AND TESTING

REQUIRED PARTS

Overspeed Valve Kit (PN 207178)

- Overspeed Valve (PN 105229)
- Adaptor, $\frac{1}{2}''$ x $\frac{3}{4}''$ x 90° (PN 104387)
- Adaptor, $\frac{3}{4}''$ x $1\frac{1}{16}''$ Flare (PN 105129)
- Adaptor, Flare JIC $\frac{7}{8}''$ (PN 105116)

The Overspeed Governor and Pipe Rupture Valve are not required when the Overspeed Valve is installed on the Orion.

- 1) Install a $90^\circ \frac{1}{2}''$ elbow adaptor to the oil inlet on the jack.

Note the labelling on the Valve body, the “T” must be on the tank side of the valve assembly and the “Z” must be on the jack side of the valve assembly.

- 2) Install the Overspeed Valve (PN 105229) to the elbow adaptor (PN 104387). Use Teflon tape to seal the threads. Refer to Figure 49.
- 3) Run the steel pipe as per the installation manual.
- 4) The nut labelled “GPM” is the flow control adjustment. This is set at the factory to job specifications and typically will not require adjustment.
- 5) Connect the Flare Adaptors (PN 105116 and PN 105129) to the T-fitting inside the oil tank, then connect the steel pipe to PN 105129. Refer to Figure 50.

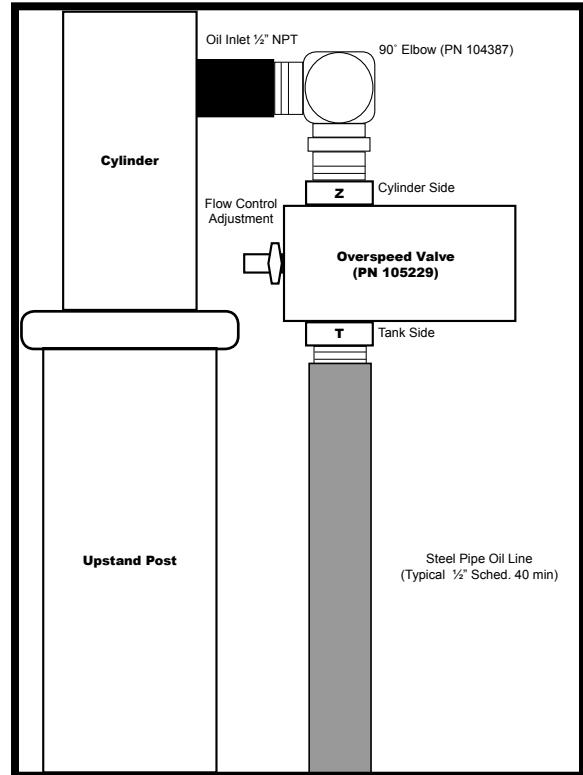


Figure 49 Overspeed Valve

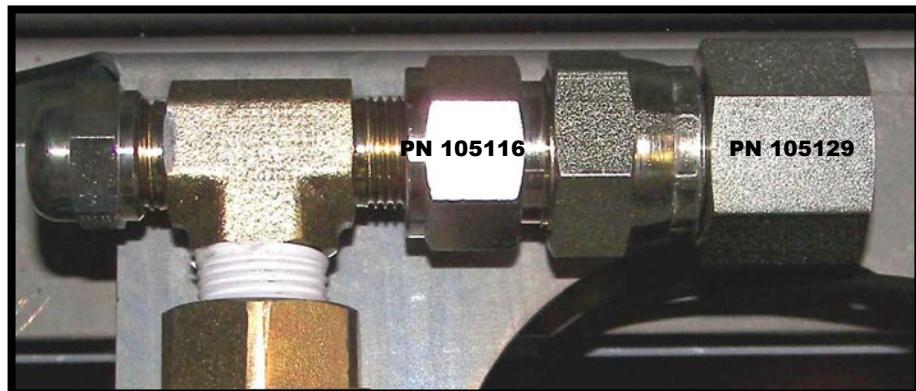


Figure 50 T-fitting with Adaptors

5.1.1 Testing Instructions

- 1) Locate the Valve Operator Board in the controller, note the function and value for DOWN High Speed may be **F6** or **F8** depending on the revision of the board. **Write the existing function value down, it will have to be re-entered once the test is complete.**
- 2) Set the DOWN High Speed (F6 or F8) to 96. Refer to the Valve Programming Instructions in the Orion Installation Manual or the EPV Valve Operator Circuit Board Programming Update.
- 3) To test the Overspeed Valve, run the elevator UP to the second landing.
- 4) Place a call to run the elevator DOWN to the bottom landing, while the elevator is descending, pull the Manual Lowering Release on the valve. Refer to Figure 3.
- 5) As the elevator is travelling in the DOWN direction, it will STOP after approximately 1 foot of travel at full speed after the Manual Lowering Release is pulled.
- 6) Reset the DOWN High Speed (F6 or F8) function to the original value as noted in Step 1.
- 7) If required, an inspection seal can be crimped on the Overspeed Valve adjustment handle.

NOTE

The maximum normal travelling speed is 30 feet per minute, the Overspeed Valve will activate at approximately 37 - 38 feet per minute.

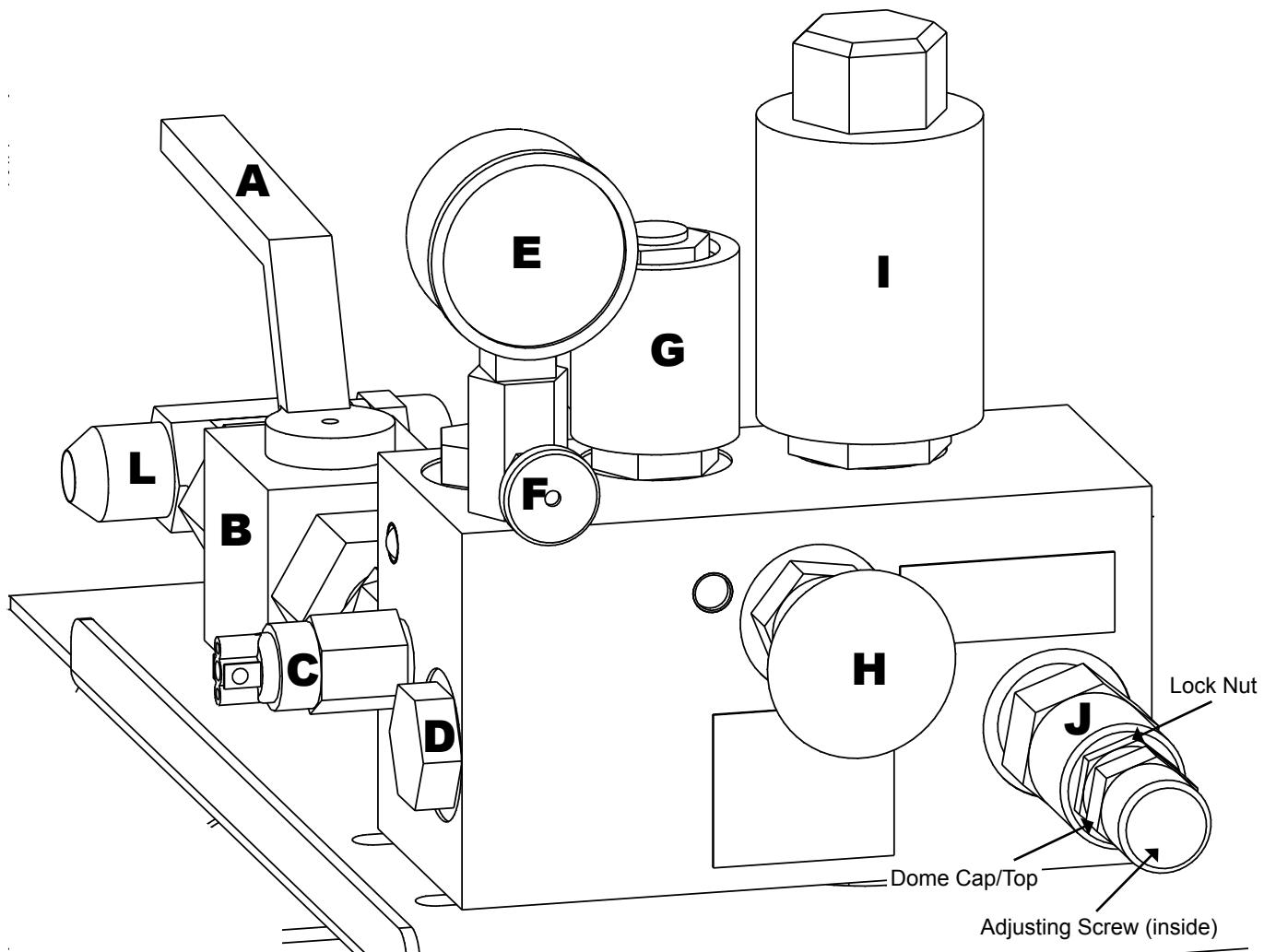


Figure 51 Variable Speed Valve

- | | |
|---------------------------------|---------------------------|
| A Main Shut OFF Valve Handle | H Manual Lowering Release |
| B Main Shut OFF Valve | I Proportional Valve |
| C Low Pressure Switch | J Relief Valve |
| D Check Valve | K Slack Rope Valve |
| E Pressure Gauge | L Rupture Test T-fitting |
| F Pressure Gauge Shut OFF Valve | |
| G Down Solenoid | |

5.2 TEMPORARY RUN BUTTON INSTALLATION

The temporary run buttons (PN 200438) consist of an UP button (FAST and SLOW speed), a DOWN button (FAST and SLOW speed) and a red safety button.

While pressing the red button, press the UP FAST or SLOW speed button to travel in the up direction or the DOWN FAST or SLOW speed button to travel in the down direction.

Release the red button to stop the elevator.



Figure 52 Temporary Buttons

Temporary Button Operating Procedure

- 1) Ensure the red wire inside the battery backup is plugged into the battery terminal.
- 2) Place a temporary wire jumper between screw terminals 1X and 24V on the bottom of the main board to bypass the final limit and plank switches.
- 3) Ensure that the auxiliary disconnect switch (fourth pole of disconnect) is connected to screw terminals 1 and P4 (or place a temporary wire jumper across them).
- 4) Place a temporary clip-on jumper wire across the small wire loops labelled TP1 and TP2, located to the left of the temporary run cord jack on the top right of the main board.
- 5) Plug the temporary buttons into the top right corner of the main relay board.



ALL WIRE JUMPERS ADDED IN THE ABOVE PROCEDURE ARE TEMPORARY AND MUST BE REMOVED PRIOR TO THE LIFT BEING PLACED INTO SERVICE.

NOTE

Use of the temporary buttons must be restricted to trained personnel, since the lift will operate regardless of the status of all safety circuits and door locks.

NOTE

Refer to section called, "Electrical Installation" for pump connection.

The hydraulic system is now ready for start-up. Before starting up, however, first confirm the following:

- 1) Power supply is properly connected to the correct voltage and phase. Use your meter to verify. Check that proper fuses have been supplied. On three phase systems, confirm that the pump is turning in the proper direction. Jog the pump, and if no pressure appears in the gauge after a few seconds, reverse any two (2) motor leads on the incoming L1, L2 or L3 power lines.
- 2) All rails are installed and plumb. All fasteners and anchors are installed and tightened.
- 3) The upstand post is connected plumb and straight to the special rail bracket.
- 4) The jack unit is installed and it is plumb and straight. The cylinder wall mounting bracket is installed and secure.
- 5) The guide yoke is lowered onto the jack unit, and all attachment plates and bolts are fastened correctly and securely.
- 6) Sufficient oil is in the reservoir. The tank must be topped up full.
- 7) A ladder or scaffold is in the hoistway, and access is available to the air bleeder valve at the top of the cylinder.
- 8) The gate valve is open.

5.3 BLEEDING AIR FROM THE CYLINDER

- 1) Open the air bleeder screw a half of a turn. Using the temporary buttons, press the UP button on the temporary run button momentarily and release. The motor will start and then stop. Start and stop the motor quickly. Oil should start to flow through the main valve to the jack cylinder.
- 2) As the oil flows into the cylinder, air will be heard to "hiss" out of the air bleeder valve. An assistant should be near the air bleeder to verify this.
- 3) Do not run the motor continuously to try and speed up the bleeding process or the jack may jump up unexpectedly. This is due to the oil entering faster than the air can escape.
- 4) When the air is exhausted from the cylinder, oil will begin to flow out of the bleeder valve. At this point, close the air bleeder valve. Check for oil leaks.

NOTE

A flow control valve must be specially ordered, if required.

5.4 ROPING POSITION

To adjust the roping position, proceed as follows:

- 1) Refer to Installation Drawings for “**Roping Position**” and run the cylinder to the height specified.
- 2) The roping position will ensure 3” (76 mm) of “runby” at the top floor and the buffers will ensure a maximum of 3” (76 mm) of “runby” at the bottom floor. This may vary by jurisdiction.
- 3) With the piston extended to the roping position and the sling sitting on the bumpers, rope the sling.

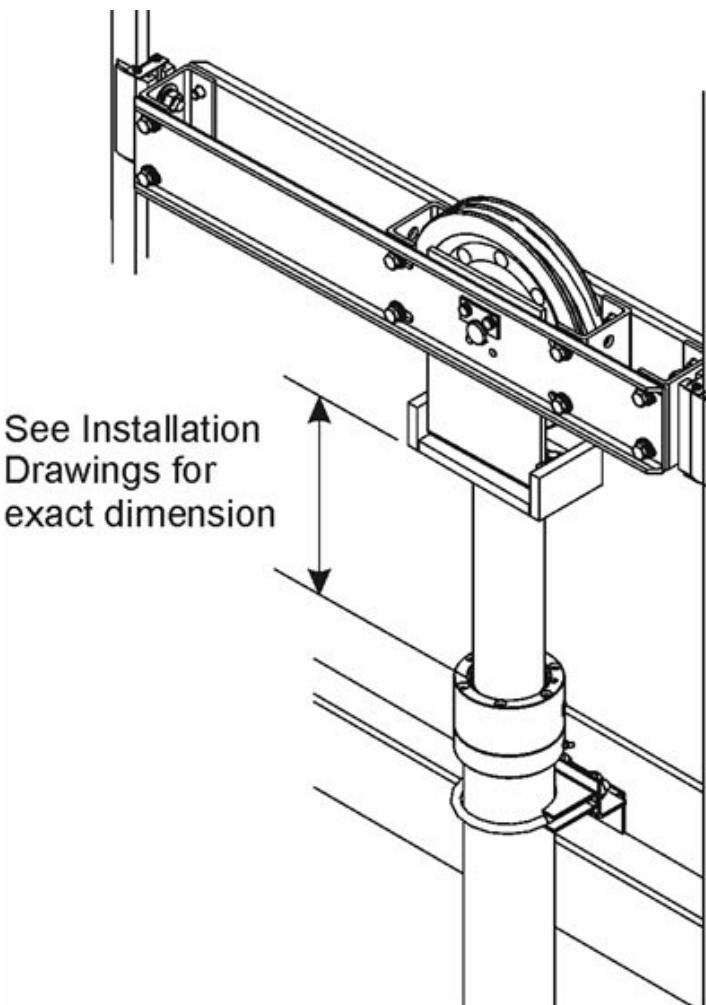


Figure 53 Roping Position

NOTE

The elevator will not reach the top and bottom landings correctly, unless the roping position is set correctly.

5.5 CABLE INSTALLATION



MAKE SURE THERE IS GOOD COMMUNICATION BETWEEN YOU AND YOUR CO-WORKER. DO NOT PLACE YOURSELF IN AN UNSAFE POSITION DURING THIS PROCEDURE. IF SUPPLIED, ATTACH THE SAFETY STOPS.

- 1) Attach the threaded rod of the wedge clamp to the rope tie down bracket located in the pit channel (Figures 54 to 56).
- 2) Identify the cables as they descend the other side of the sheave and attach them to the wedge clamps. **ENSURE THAT THE CABLES DO NOT CROSS OVER.**

NOTE

Before putting any weight on the cables, make sure that the nuts on the wedge clamp threaded rods are “backed off” to the end of the threads on the rod. To ensure plenty of adjustment to equalize the cable tension when weight is applied, leave two full nuts at the end on the thread. When adjusted, there must be two (2) nuts locked together on the underside of each rod. There may also be one nut on top that is used to prevent the wedge clamp from rotating.

- 3) Manually thread the cables into the wedge in a loop, then place the loose wedge piece in the loop. Pull on the loose end to take up the slack in the cable. Confirm that each loaded cable is directly over the threaded rod. **DO NOT REVERSE.**
- 4) Pull up on both cables until they are equal in tension. The wedge piece will hold the cables in place. Tape the loose ends of each cable temporarily to prevent them from becoming wedged in the sling. They will be cut later.



IF CABLE ADJUSTMENT WITHIN THE WEDGE ASSEMBLY IS REQUIRED, MAKE SURE THE PLATFORM IS BOTTOMED OUT OR ON SAFETIES BEFORE RELEASING THE CABLE WEDGE AND CLAMPS.

- 5) Perform a final inspection to ensure that all cables are in correct alignment and that all hardware such as bolts, clamps, wedges and pins are in place.

There may be instances where the platform will not be able to reach the top landing, but the jack can still handle the travel.

When this happens, it usually means that the rope wedge terminations have not been correctly adjusted. If the rope wedge terminations are not properly adjusted and if the pit is deep enough, the elevator may descend 6" (152 mm) below the bottom floor level, but not be able to reach the top landing.

To correct this problem, shorten the cables by tightening the nuts on the $\frac{1}{2}$ " (13 mm) threaded rods. Each cable should be shortened evenly to ensure that the elevator will reach the top landing and the terminal "runbys" with equal tension.

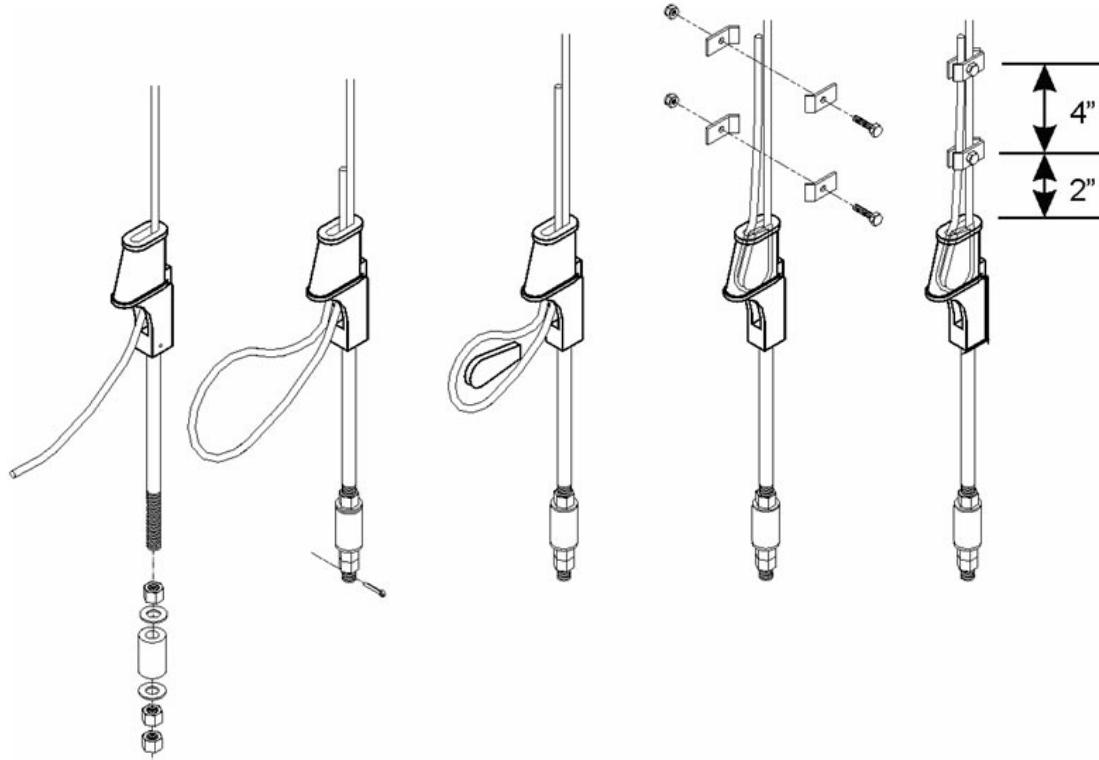


Figure 54 Wedge Clamp Procedure

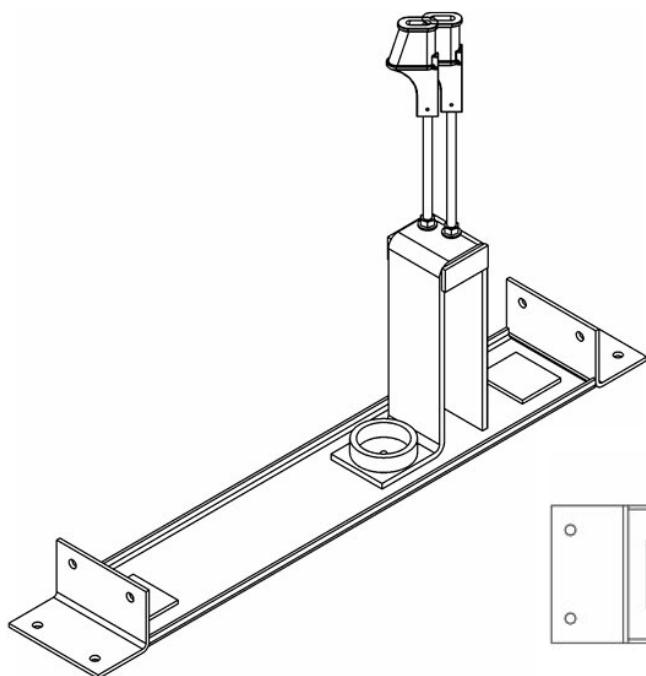


Figure 55 Wedge Clamp

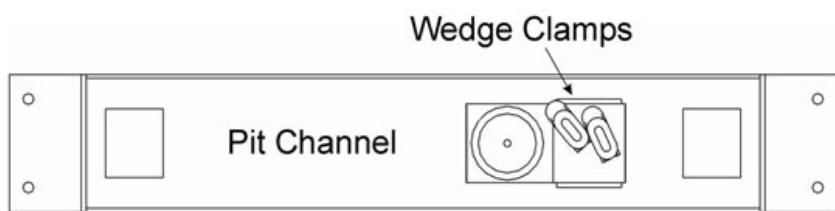


Figure 56 Positioning of Wedge Clamps

5.6 PIT PROP

General

The purpose of the Pit Prop is to provide 36" of pit in conformance with ASME/ANSI A17.1, Rule 5.2.1.4.2, thereby, providing an area in the pit for maintenance and inspection.

Operation

The prop is installed so that without complete bodily entry into the pit, the prop can be rotated, lifted and "set" in the UP position. In the UP "set or locked" position, the prop is designed to physically stop and hold the loaded car at the governor tripping speed. By design, it will immediately stop the downward movement of the elevator and support the loaded weight of the elevator car without causing stresses and deflections in the car frame and platform members.

Storage

During normal operation of the elevator, the prop is lifted, rotated and lowered to its storage position flat on the floor of the pit.

Deployment

Position the elevator so that the platform is a minimum of five (5) feet (1524 mm) above the pit floor level. Use the hoistway access switch, if supplied, or the manual unlocking device and open the lower landing door. In compliance with the code requirements, the Pit Prop can be deployed without full bodily entry into the pit area. The handle of the prop can be reached while leaning into the pit area. Grab the handle and lift the prop UP to the vertical position, lift and "set". The prop will automatically drop into the locked position when released.

Installation

The pit prop is permanently mounted to the pit floor. Locate the pit prop against/centered on the pit channel. Refer to Figure 57. Note, the handle on the pit prop is field reversible.

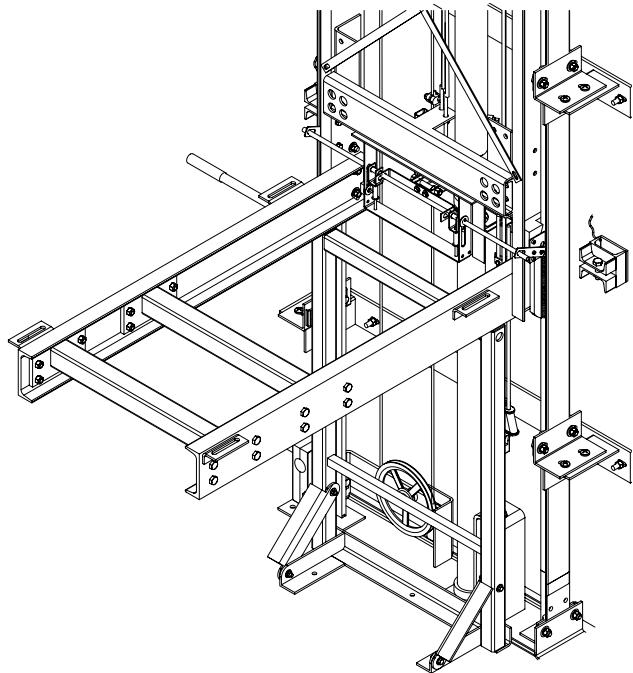


Figure 57 Pit Prop

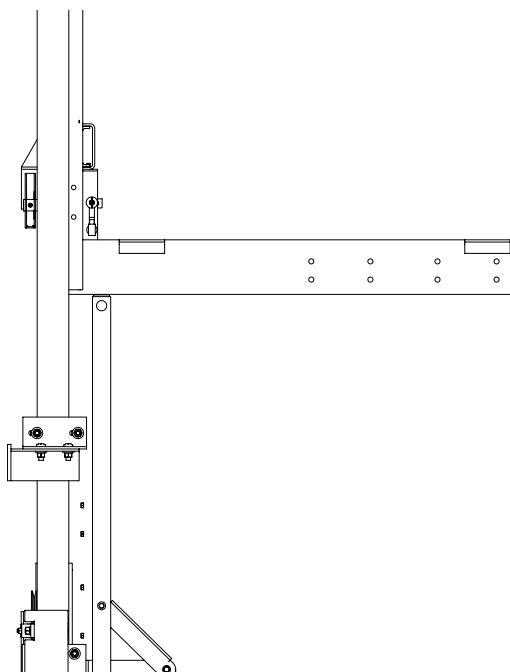


Figure 58 Pit Prop in "Set" (Deployed) Position

5.7 PLATFORM INSTALLATION

Install the cab platform $5 \frac{3}{4}$ " (146 mm) from the centerline of each guide rail and bolt the car door sill(s) to the platform. See Figure 59.

Run the elevator the full travel of the hoistway, while checking for proper clearances between the elevator and the hoistway equipment. Particularly, note the sill clearance at each landing, and adjust the platform if necessary.

For power sliding doors, the platform sill should be aligned evenly with the landing with a clearance of $6 \frac{3}{4}$ " (191 mm) at the tightest point, so that when the landing door is positioned, the sill to sill clearance is $1 \frac{1}{4}$ " (32 mm).

For swing doors, the sill to sill clearance is typically $\frac{5}{8}$ " (16 mm). Refer to job specific **Installation Drawings** for your clearances.

Once proper platform position is determined, level the platform in both directions and tighten bolts to the sling. **Check the running clearance again.**

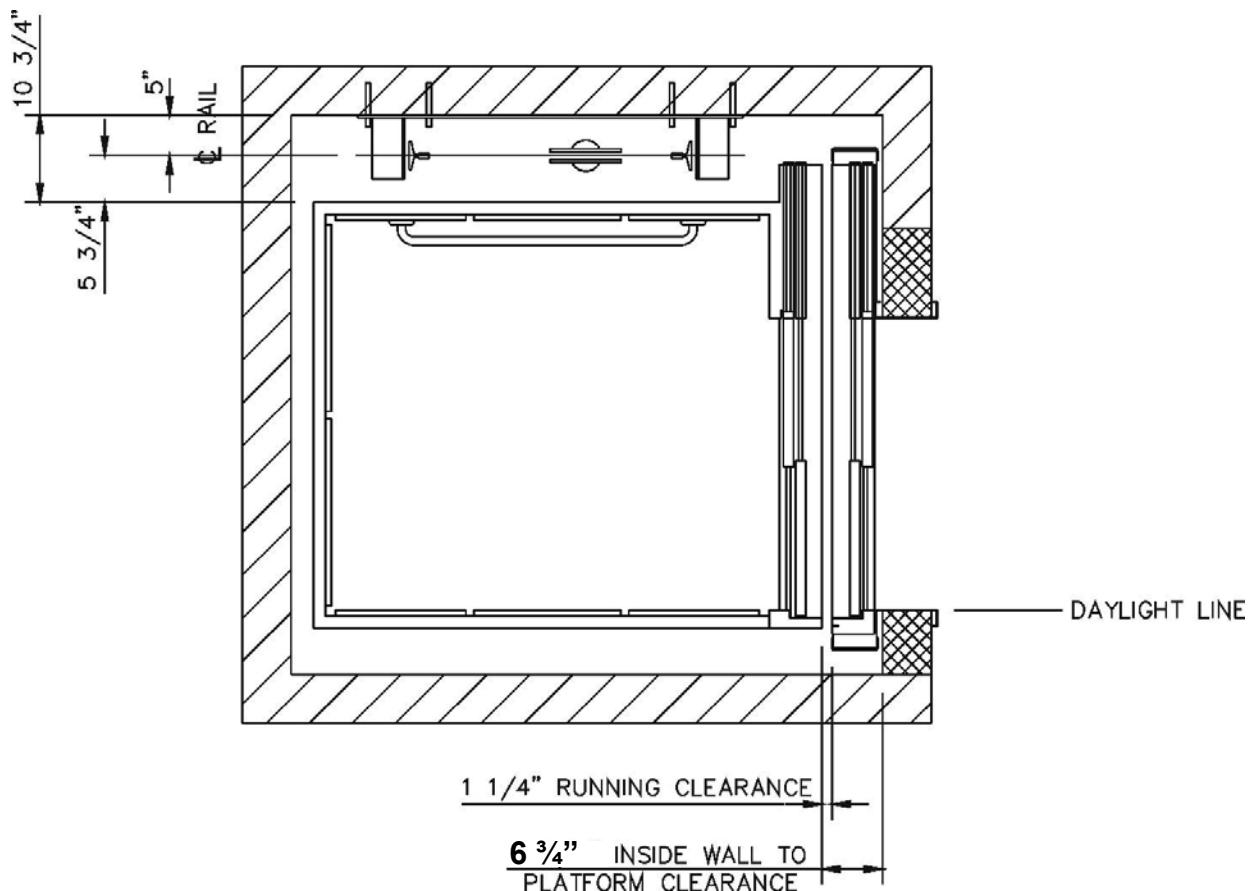


Figure 59 Platform Installation

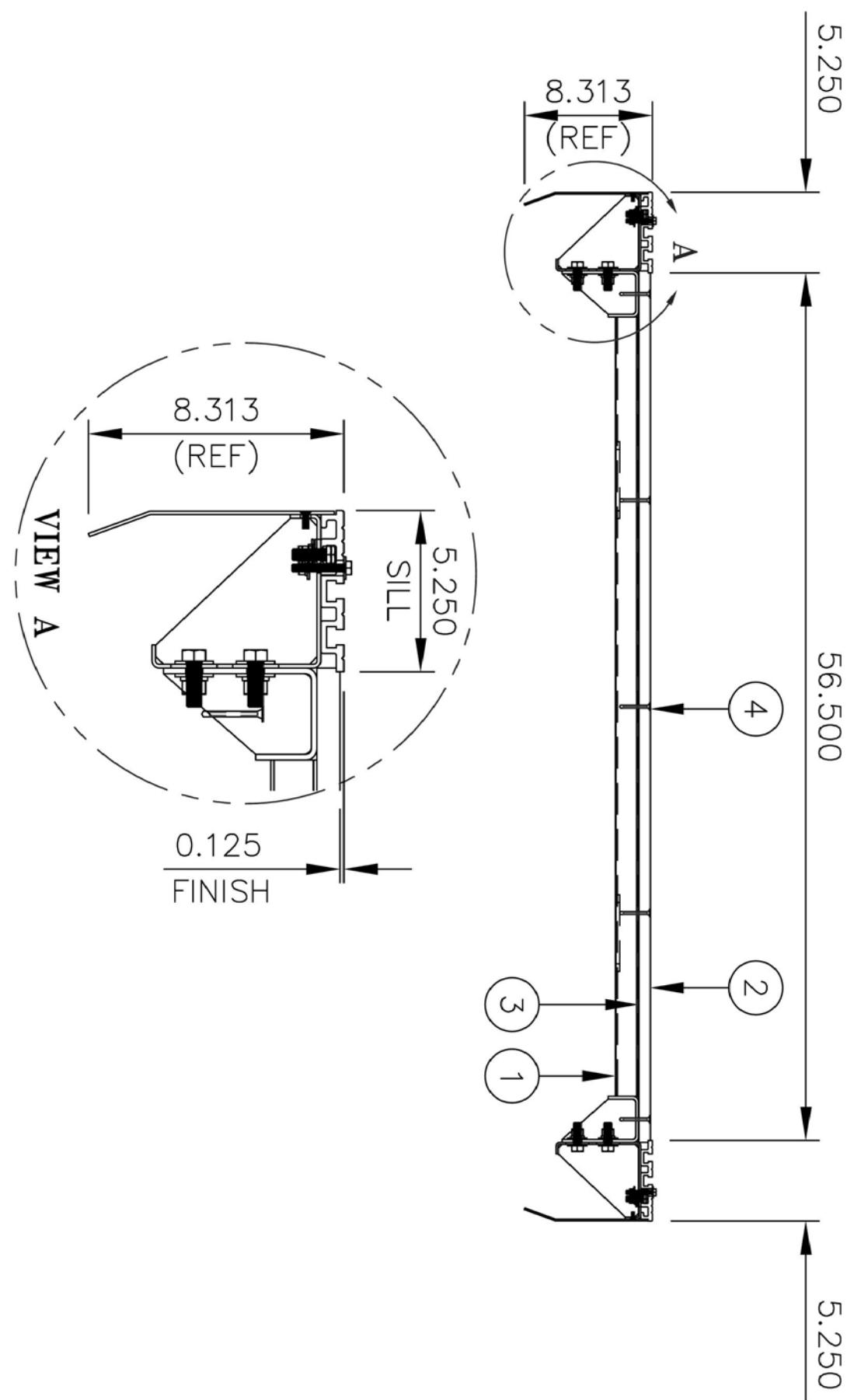


Figure 60 Platform Installation

5.8 SETTING THE SAFETIES



DO NOT ENTER THE PIT AREA UNTIL THE PIT PROP IS SECURELY SET AND LOCKED IN POSITION.

- 1) Position yourself on the platform and make sure the two (2) lower guide shoes are loose on the bolts. It should be possible to manually push the platform toward the hoistway wall and sufficiently open the gap at the back of the safety block to place a $1/16$ " (2 mm) shim on each safety block. The shims should remain in position when the pressure is released from the platform (stop pushing). Refer to Figure 61.
- 2) Instruct your co-worker to pull the manual lowering valve while you press down on the tripping pan.
- 3) While pressing on it, the tripping pan will move down once the platform starts to descend; the safety block's knurled wheels will be forced into position. This will wedge the safeties securely against the rails and prevent any further descent of the platform.
- 4) This also "sets" the distance of clearance at the back of the safety blocks, as the $1/16$ " shims are still in place. Once the safeties have "set" (supported the load), instruct your co-worker to release the manual lowering valve.
- 5) With the safeties set and the shims in place, tighten the bolts on the two (2) lower guide shoes. This will "set" the clearance.
- 6) Start the pump and move the elevator in the UP direction a few inches. This will apply tension to the cables and the safety device will automatically reset itself to its proper running position.

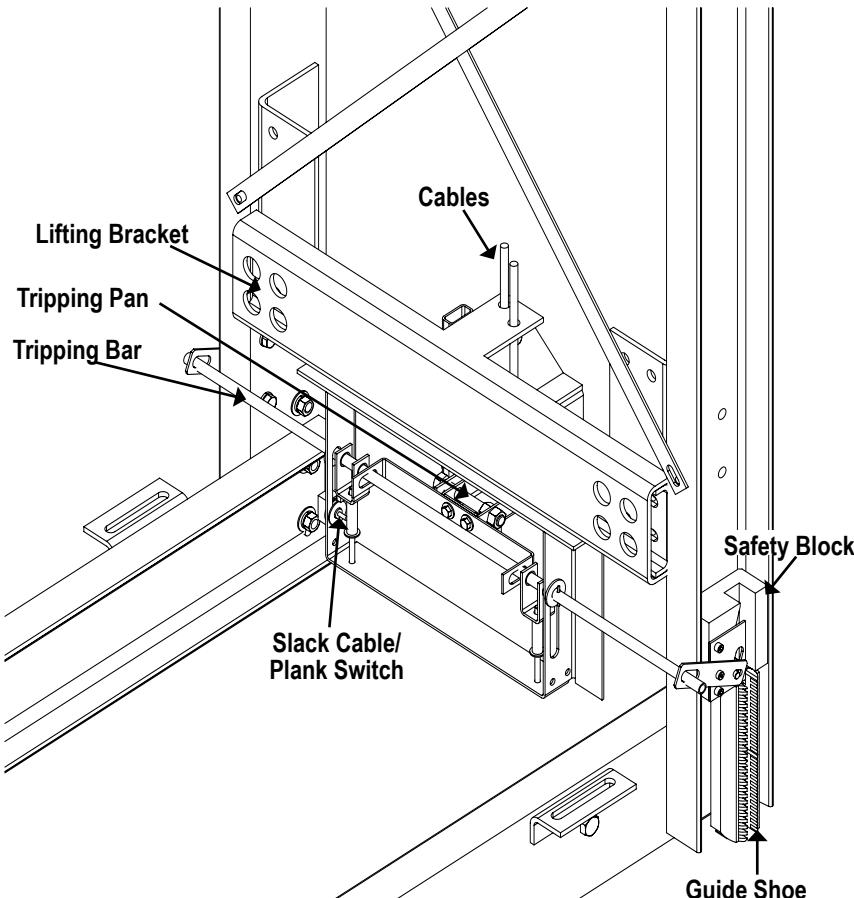


Figure 61 Safety Block and Shim

- 7) Remember to check the Plank Switch. This switch must be checked every time the safeties trip or the elevator will not operate.
- 8) Remove the two (2) shims (behind the safety blocks) before attempting to run the platform. This may be difficult, as they may be "tight" in places and some loosening may be necessary to remove them. Usually, the shims will come out when the elevator is moved in the UP direction and is then lowered.
- 9) Ensure proper tensioning to the cables on re-application of weight.

5.9 OVERSPEED GOVERNOR

- 1) Attach the auxiliary governor bracket to the governor mounting bracket using nuts, bolts and lock washers supplied. See Figure 62 and 63.

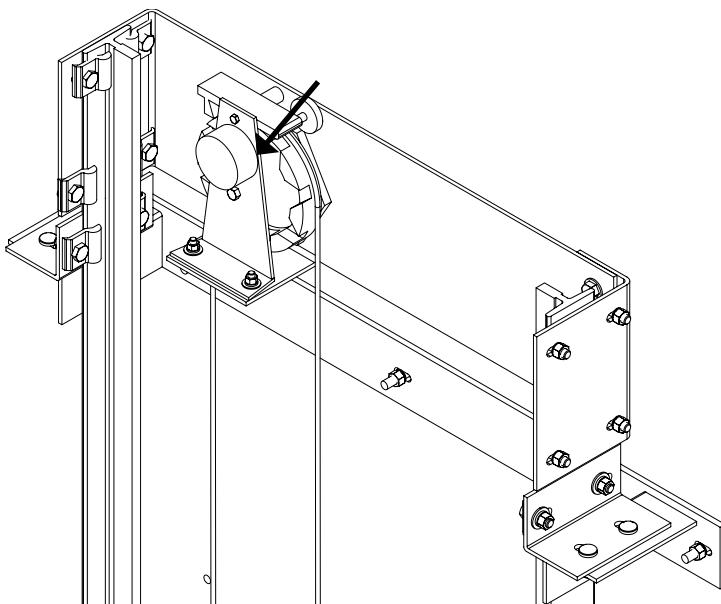
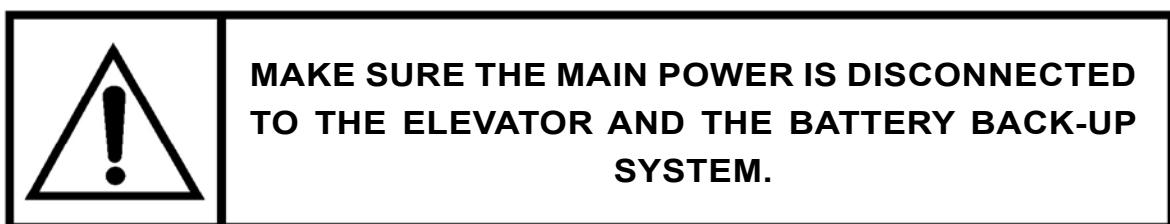


Figure 62 Overspeed Governor Assembly

- 2) While standing on top of the platform, install the overspeed governor assembly at the top of the rails. Fasten the bracket to the rails using four (4) rail clips on each side.
- 3) Lower the elevator to the bottom level.
- 4) Raise the cab approximately six (6) feet (1829 mm) above the pit floor level so that work can be performed.
- 5) Disconnect the power supply to the elevator including the power supply to the battery back-up system.



- 6) Locate the cable tensioner assembly and remove the pulley. Refer to Figure 63.
- 7) Attach the tensioning bar (complete with weight), to the pulley bracket (located in pit channel) using the $\frac{3}{8}$ " (9 mm) shoulder bolt supplied. Re-attach the pulley (refer to the bottom half of Figure 63 below).
- 8) Block the counterweight up; thereby, lifting the pulley up to its' highest position.

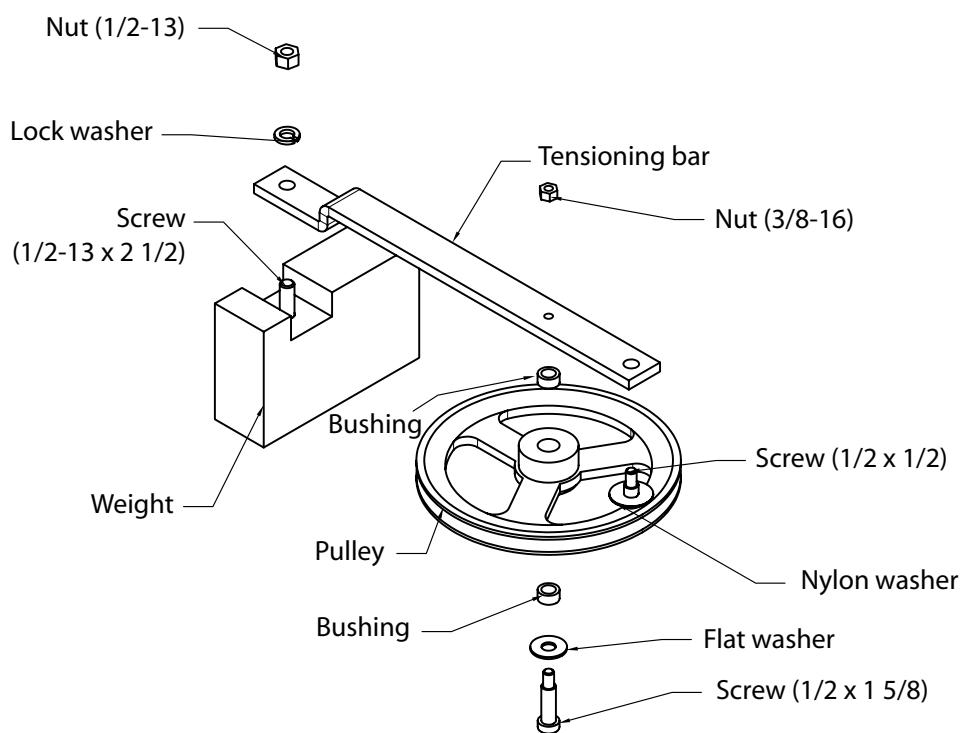
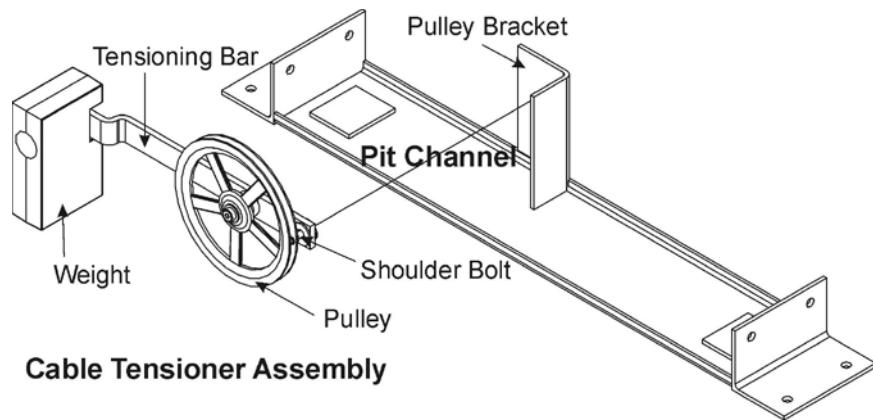


Figure 63 Cable Tensioner Assembly

- 9) Feed the governor cable through the small hole in the bottom of the governor tripping cage. Refer to Figure 64. Continue feeding the entire cable until you reach the swaged button on the end.
- 10) Continue to feed the cable through the bottom pulley, then up through the top pulley and back down to the governor tripping cage.
- 11) Take up the excess slack and create a small loop at the end of the cable, insert the thimble then, clamp it together. Refer to Figure 65.
- 12) Insert the cable loop into the top of the governor tripping cage and secure using clevis pin and cotter pin supplied.
- 13) Remove the block from underneath the counterweight to further tighten the cable.
- 14) Reconnect the power supply, including the power supply to the battery back-up system.

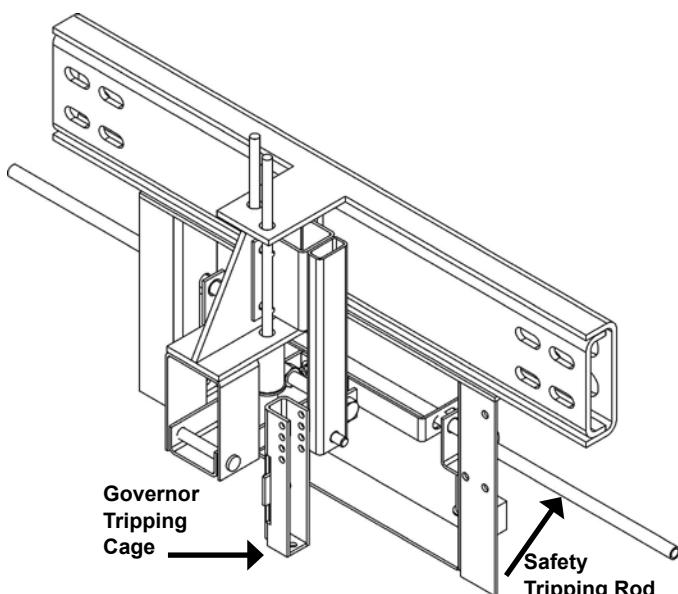


Figure 64 Lifting Bracket

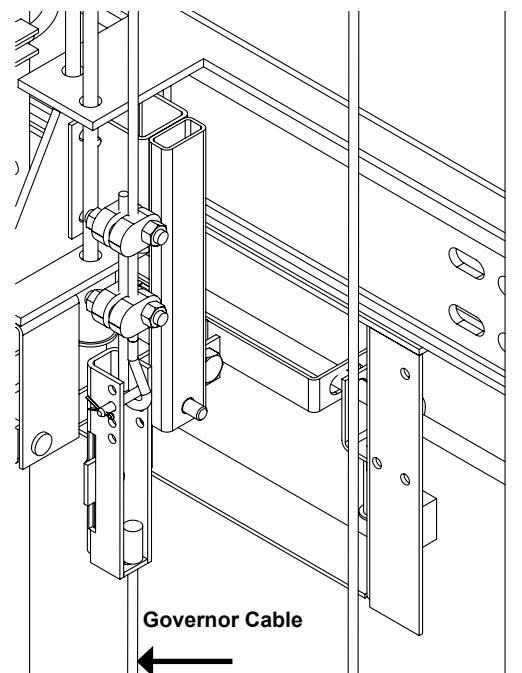


Figure 65 Cables on Lifting Bracket

- 15) Hold the UP - SLOW SPEED (on temporary buttons) to gradually take up the slack in the cable.
- 16) Wire the overspeed governor switch (refer to Figure 62) in series with the pit switch through conduit to the controller, refer to the Electrical Schematics in Appendix A.

5.10 PIT SWITCH INSTALLATION

- 1) Install the "switch-box" portion of the Pit Stop Switch Assembly in the pit area close to the slam side of the door frame. The "switch box" portion should be installed about 4 feet (1219 mm) above the lower landing level, where it can be easily reached while standing in the door opening.
- 2) Run wiring or conduit from the Pit Switch to the Pump Controller. Refer to the Electrical Schematics in Appendix A and connect pit switch across screw terminals 2 and 3.

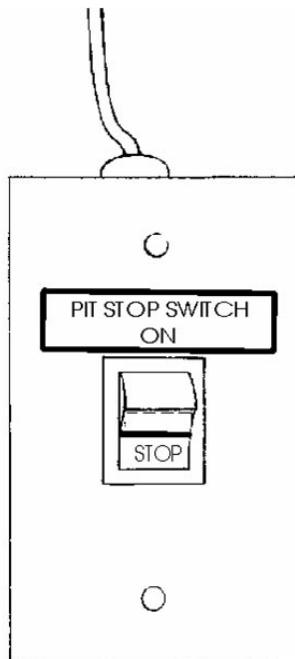


Figure 66 Pit Stop Switch Box



NEVER USE SOLID WIRE SUCH AS THERMOSTAT WIRE TO WIRE THE LIFT. USE THE STRANDED MULTI-WIRE PROVIDED.

5.11 TAPE READER

- 1) Bolt the tape brackets to the rail so that the tape sits "behind" the yoke.
- 2) Attach the tape reader to the left hand sling stile. (Figure 68).
- 3) Slide the tape through the tape reader.
- 4) Attach the tape to the rails (top and bottom) and stretch until taut.
- 5) Level the cab with the floor and mark the center of the tape reader on the tape behind it with a marker. This marked point will be the center of the 8-inch magnets. This procedure will position the magnets roughly in the correct position.



Figure 67 Tape Reader Bracket

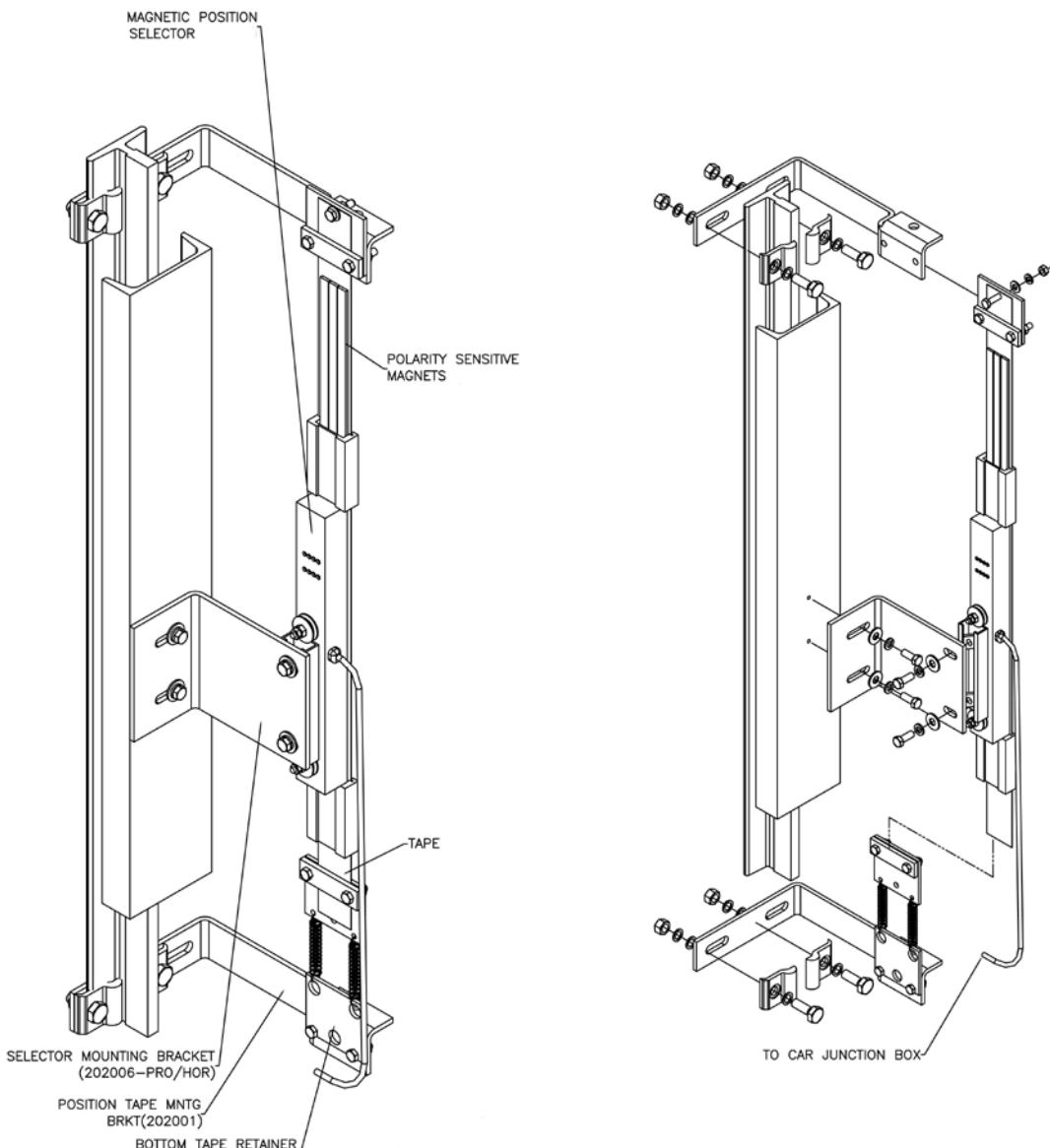


Figure 68 Tape Reader

NOTE

Do not remove the sticky tape from the back of the magnets until the first maintenance **visit**.

- 6) Position the magnets as shown in Figure 69 on the next page making careful note of the placement of + (north, all black) and - (south, yellow stripe) polarities and the 3 vertical column positions. Refer also to the Electrical Schematics in Appendix A.
- 7) Adjust the valve operator board so the lift stops in the center of the magnet. Jump up and down in the cab and confirm that neither LU (level up) or LD (lever down) come on. If they do, the board needs to be adjusted again.
- 8) Once the cab is confirmed to be stopping in the center of the magnets, check the car sill and landing sill alignment and slide the magnets up or down accordingly so the cab stops even with the landing.
- 9) If the tape reader does not sense the magnets, do the following:
 - a) The north and south magents are centered on the tape as shown in Figure 69.
 - b) To adjust the sensors, remove the tape reader and bring it into the cab. Remove the tape reader cover and bend the black sensors (Hall Effect sensors) closer to the magnets.
 - c) Clip additional magnets to the back side of the tape reader, north behind north and south behind south.

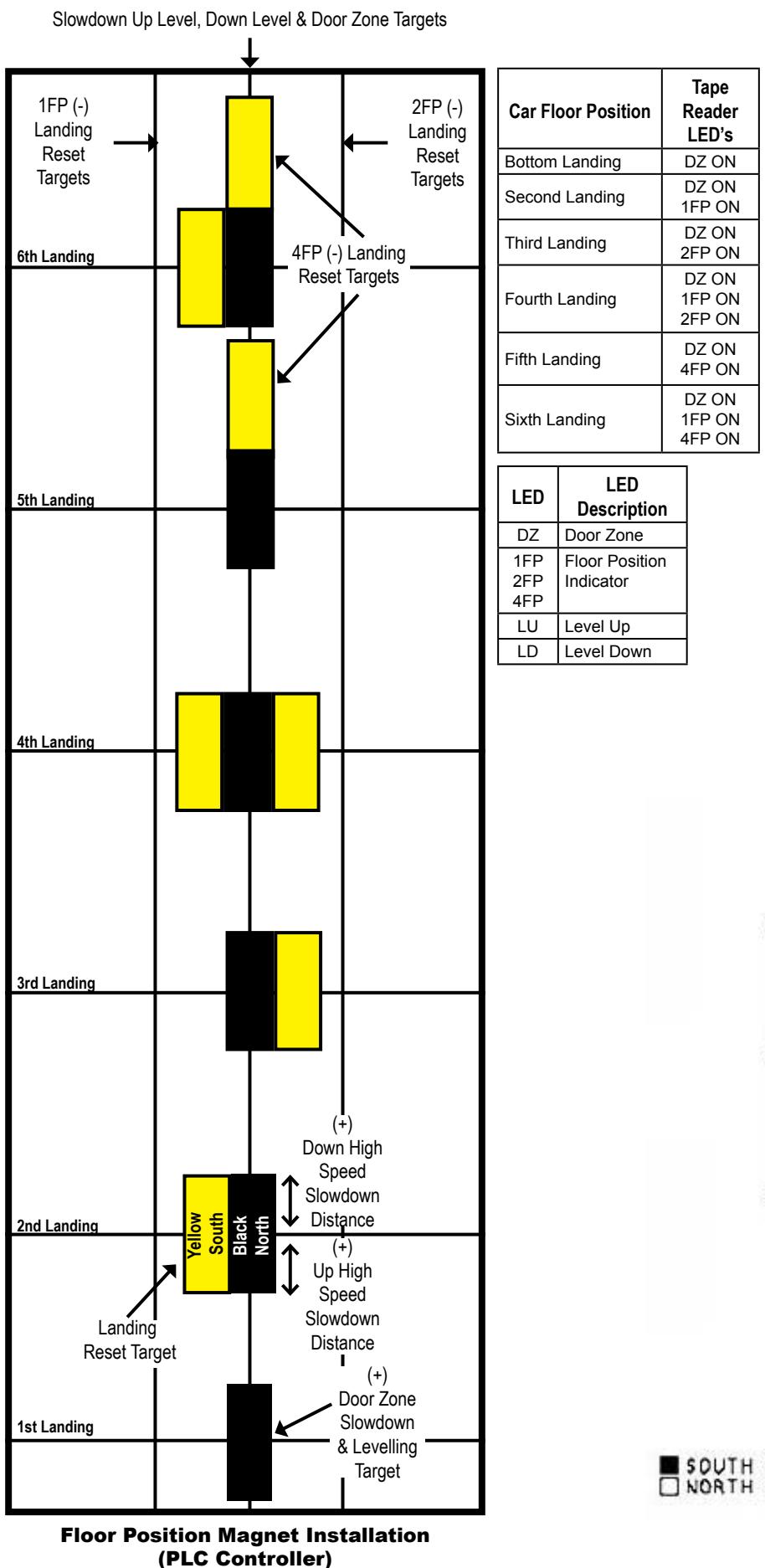


Figure 69 Magnet Positions On Tape

5.12 LIMIT SWITCH/FLOOR ZONE

All elevators are equipped with a Normal Limit Up (NLU), a Normal Limit Down (NLD) and a Final Limit switch which bolt to the right side of the sling. These switches should only contact the cam if the elevator runs past the floor by 1" (25 mm). The floor zone switch is only supplied on elevators with electric solenoid door locks and swing doors, it clips to the rail. This switch is activated by the floor zone cam mounted on the sling and it should make contact 2" (51 mm) above or below the floor.

NOTE

All limit switches and cam adjustments must be installed before the cab is assembled.

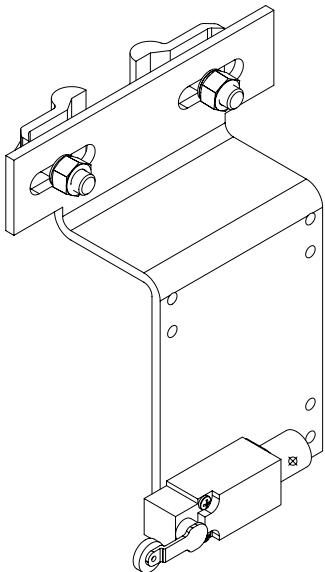


Figure 70 Floor Zone and Hoistway Access

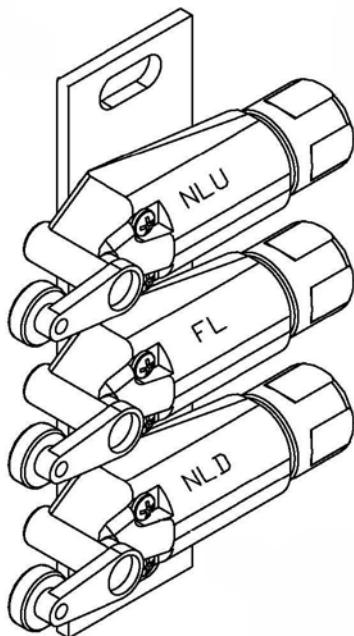


Figure 71 NLU/NLD Limit Switch Assembly

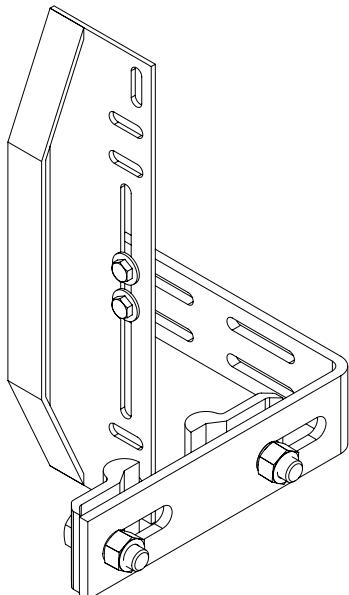


Figure 72 NLU Cam Assembly

Refer to the table below to determine which switches are supplied based on the elevator configuration ordered.

Switch Type	Sliding 2-Speed Doors	Swing Pro-Doors
Floor Zone Switch		
Energizes lock solenoid to open doors at selected landing	No	Yes
Hoistway Access Switch		
Keyswitch in hall call and COP enables doors to remain open and travel away from the top landing for maintenance	Yes, optional based on travel between the top landing and the 2nd from the top landing, and code	
Overtravel Limit Switch		
Prevents overtravel of the cab at top and bottom landing	Yes	Yes

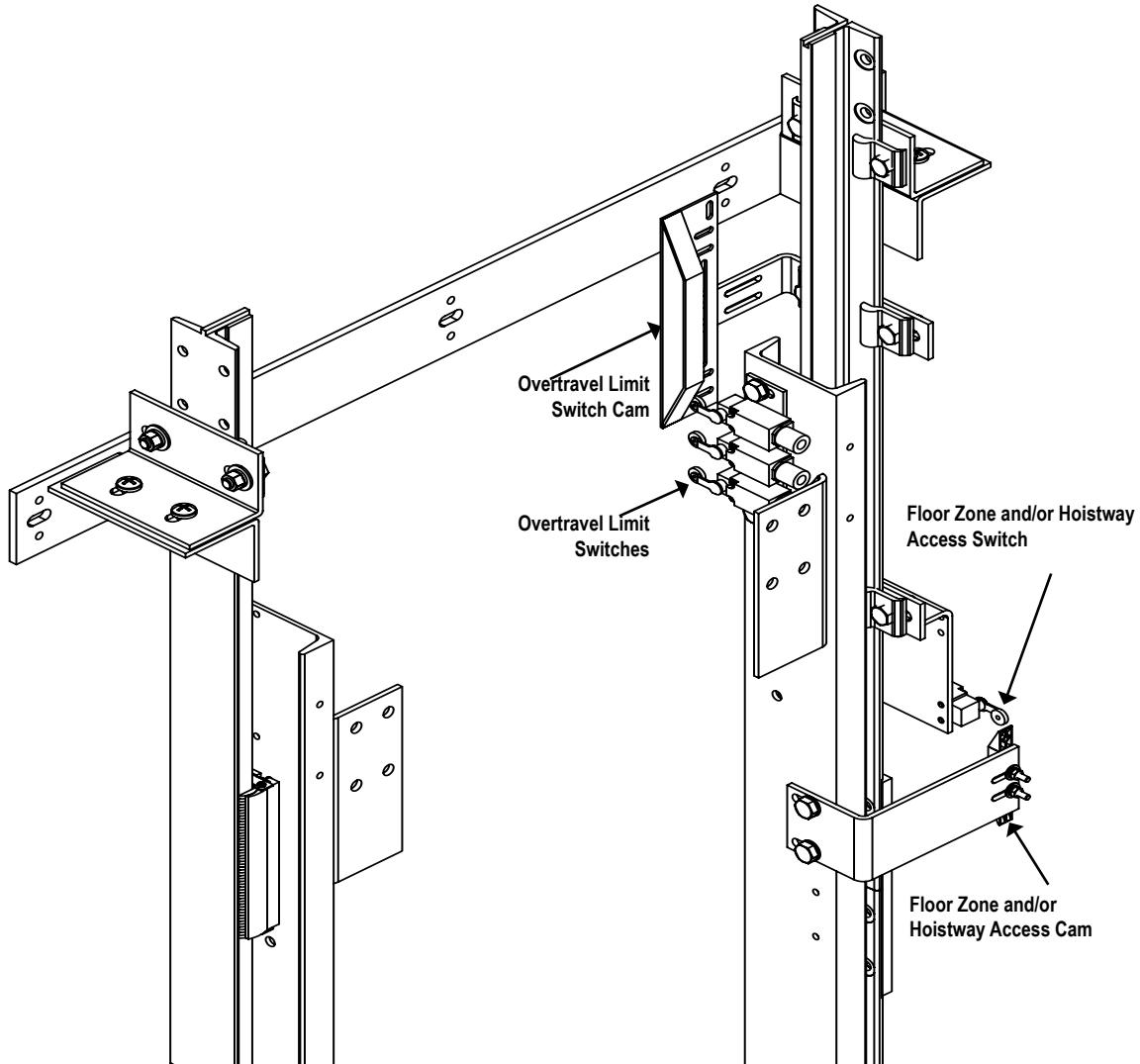


Figure 73 Limit Switches and Floor Zone Arrangement

6.0 CAB ASSEMBLY

To assemble the cab, proceed as follows:

- 1) Bolt the handrail to the control wall.
- 2) Insert washers over the studs on the wall base plates and secure the wall to the base plates using the $\frac{1}{4}$ " - 20 hardware supplied. Note, the number of washers required is determined by sill / finished floor height. Refer to Figure 74.

IMPORTANT

WHEN INSTALLING A LIGHT CURTAIN, SECURE THE STATIC SIDE OF THE LIGHT CURTAIN TO THE STRIKE JAMB PRIOR TO INSTALLING THE STRIKE JAMB.

- 3) Position the cab walls (with base plates) flush to the platform starting with the control wall first, then the front wall, the opposite wall and finally the rear wall. Secure the walls to the platform using #10 - $\frac{3}{4}$ " wood screws supplied. Refer to Figure 76 or 77.

NOTE

The side wall (opposite control wall) for steel cab models is placed $1\frac{1}{2}$ " (38 mm) from the edge of the platform (Figure 74).

- 4) Install all the $\frac{1}{4}$ " - 20 hardware loose until the cab is plumb and square.
- 5) Carefully position the cab ceiling and loosely install all the hardware.

NOTE

In order to allow the cab to be "plumbed and squared", leave all the nuts and bolts loose.

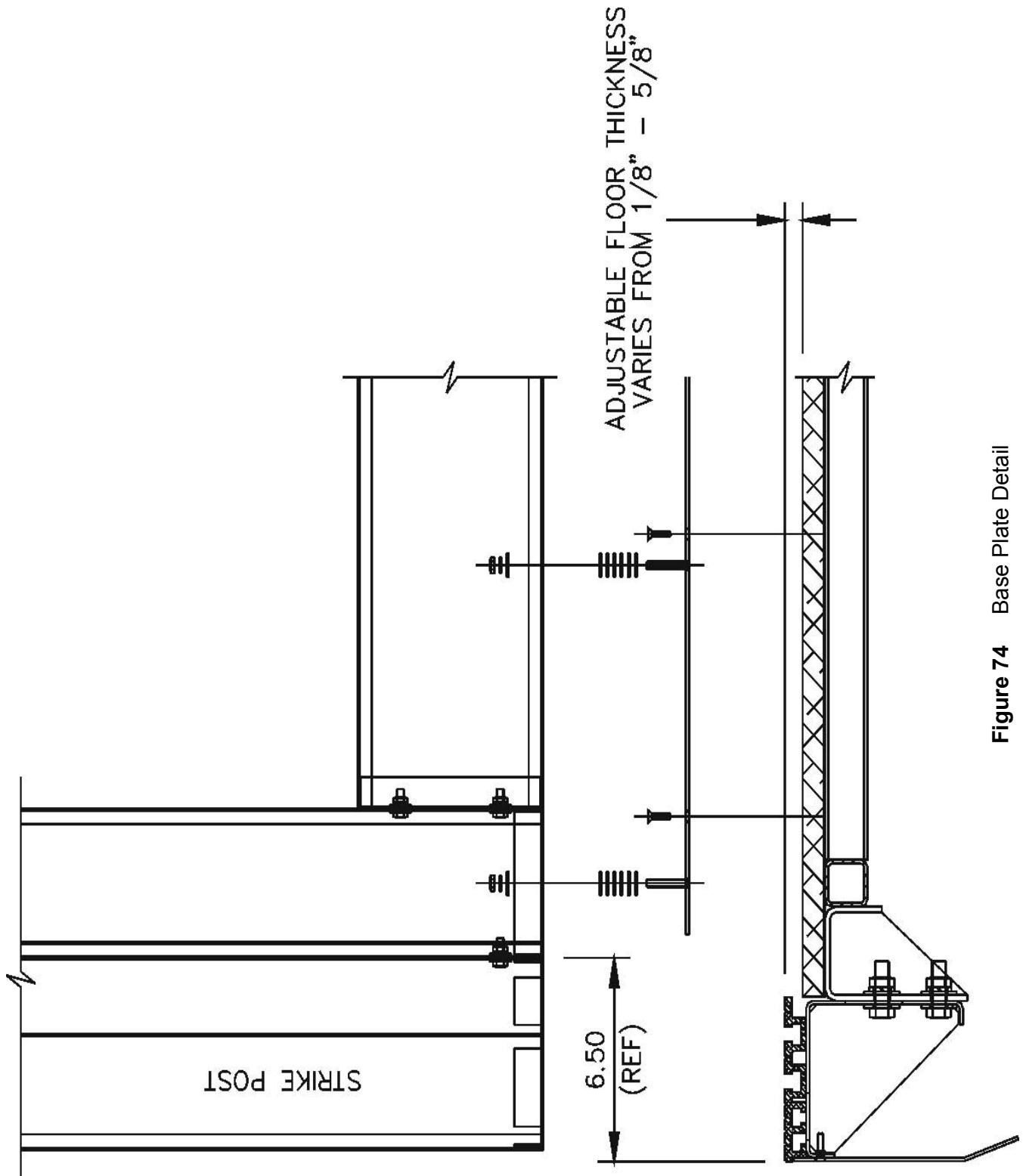


Figure 74 Base Plate Detail

- 6) Install the two (2) cab stabilizer brackets (from the top of the cab to the sling) using $\frac{3}{8}$ " hardware. Do not tighten. Refer to Figure 75. If required, trim each bracket on the cab ceiling side.

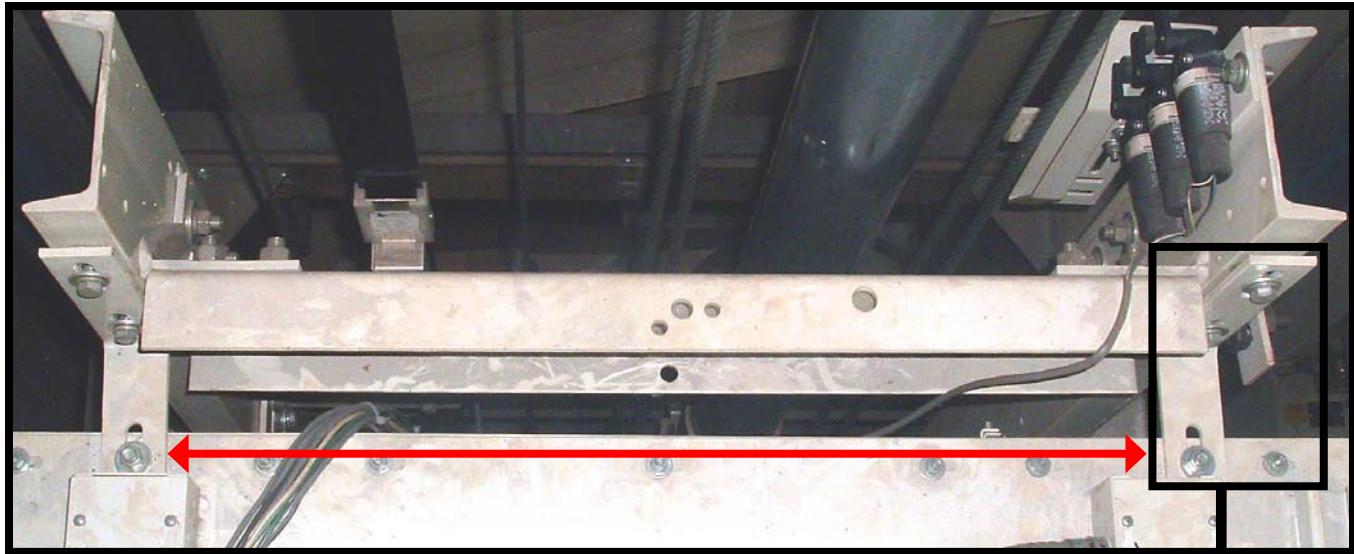


Figure 75 Cab Stabilizer Brackets

- 7) Ensure the cab entrance frame is plumb and square to the landing entrance. Once the entire cab is plumb and square, tighten the hardware starting with the $\frac{3}{8}$ " ceiling mounting angles, the $\frac{1}{4}$ " hardware in all four corners, then the rest of the hardware top, bottom and sides.
- 8)
 - a) For steel cabs, thread the six (6) screws into the pre-installed pem nuts located on the control panel wall.
 - b) **For units equipped with plastic laminate panels**, thread the six (6) inserts into the pre-drilled plastic laminate control panel holes with an Allen key. Note, do not hammer the inserts into place. Thread the six (6) screws into the inserts.
- 9) Install the control panel backing plate.
- 10) Install the control panel box.
- 11) Mount the telephone box (if supplied).
- 12) Install the wire duct from the ceiling to the control panel.



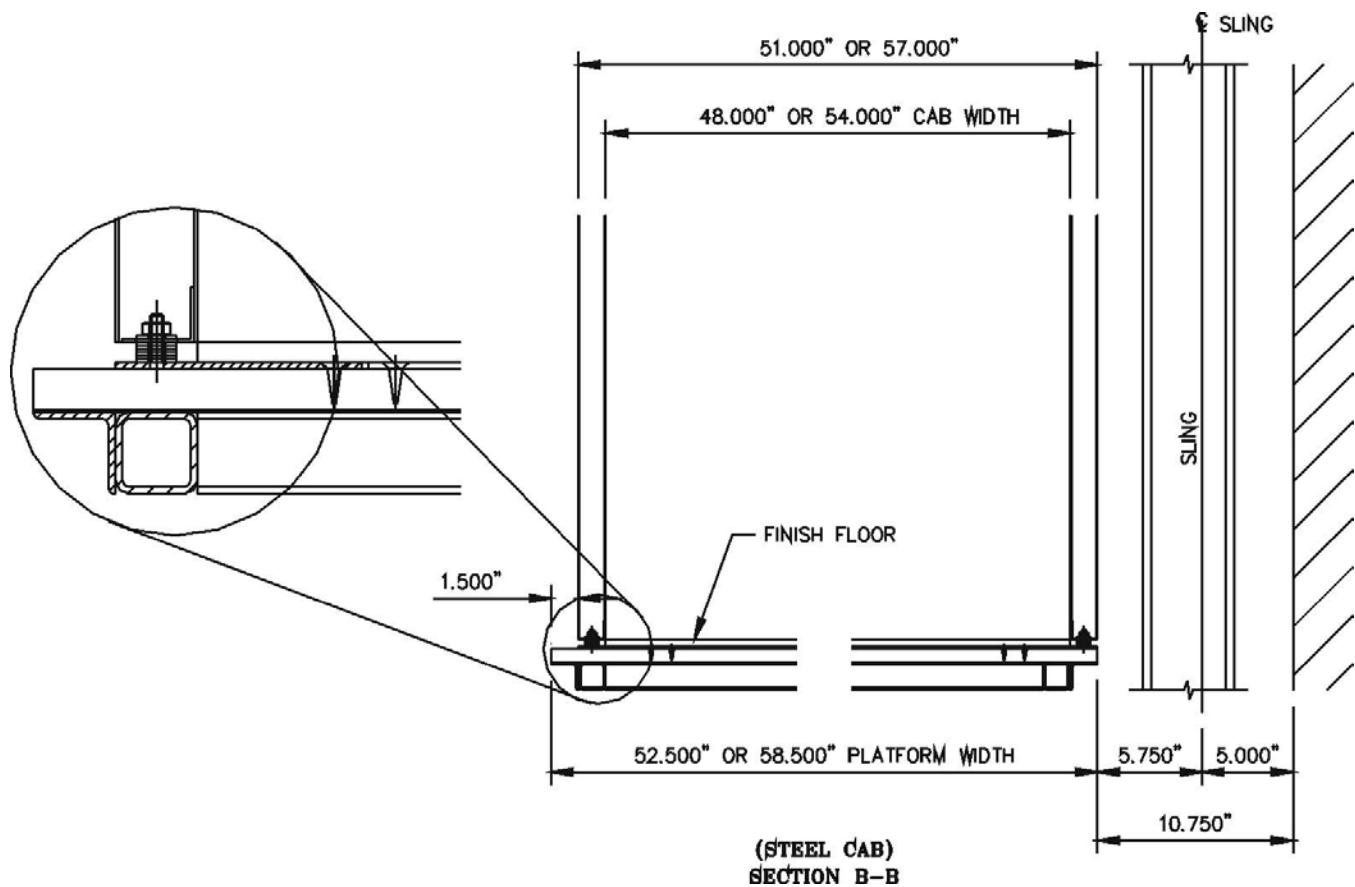


Figure 76 Steel Cab

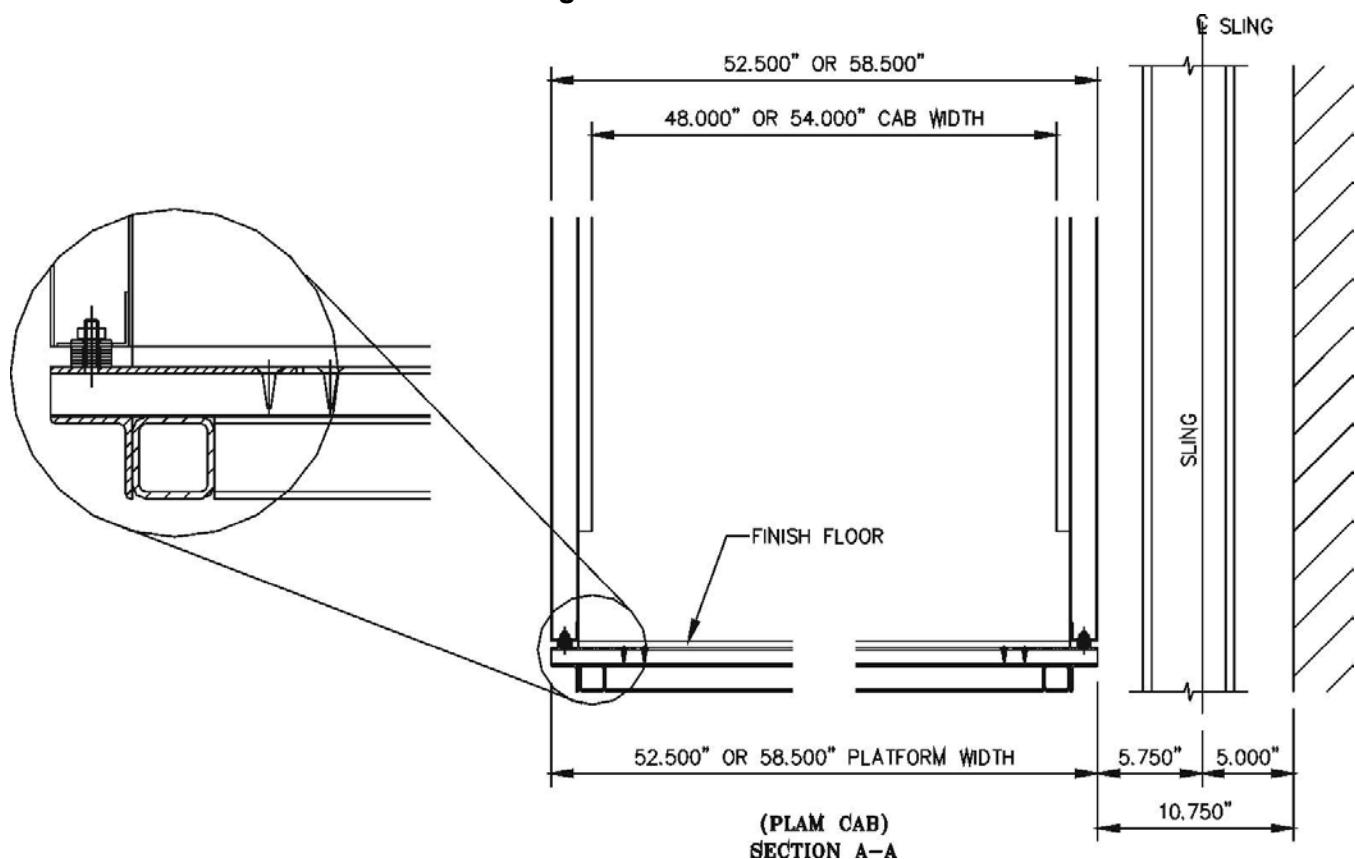


Figure 77 Plum Cab

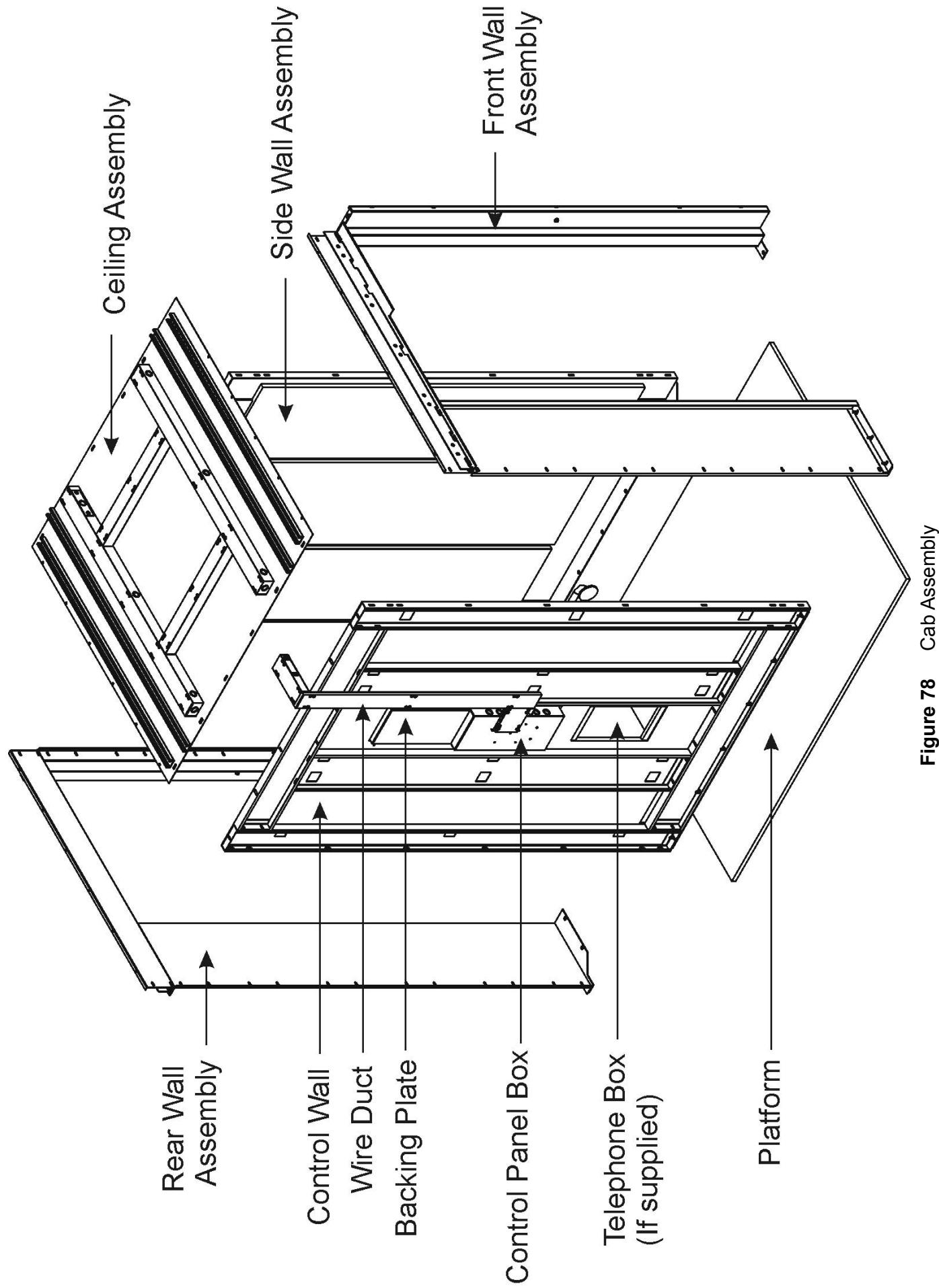


Figure 78 Cab Assembly

6.1 CAR OPERATING PANEL (COP) INSTALLATION

Plastic Laminate Cab (Plam)

- 1) Thread six $7/32$ " machine screws with washers into the provided pre-drilled holes located around the COP cutout of the cab control wall.
- 2) Unpack the COP and loosen the Allen head set screws to gain access to the COP.
- 3) Locate the six slots on the hinge base mounting plate of the COP. Align these slots with the machine screws threaded into the control wall in step 1.
- 4) Loosely mount the COP on the control wall.
- 5) Locate the Car Junction Board assembly and mount to the existing six $7/32$ " screws in the bottom half of the COP cutout (oriented with the Dupline module towards the top).
- 6) Attach the wire duct from the car top to the cutout in the left hand side of the Car Junction Box.

NOTE

The black enclosure box must be installed at the top of the COP cutout **after** the elevator installation is complete to allow access to the tape reader and normal limit switches.
Mount to the existing $7/32$ " screws in the top half of the COP cutout.

6.2 LIGHT CURTAIN INSTALLATION

The safety light curtain provides obstruction sensitivity. It signals the operator to stop and re-open the doors. Refer to Figure 79 below.

Required Parts

- Light Screen Support Bracket (PN 251785)
- Light Screen Strike Post Panel (PN 251581)
- Light Screen, 2000 mm (PN 105274)

The safety light curtain provides obstruction sensitivity. It signals the door operator to stop and re-open the doors. See Figure 79 below. The light curtain assembly consists of the following:

- **transmitter**
- **receiver**
- **24V power supply**
- **mounting brackets and hardware**

When installing the light curtain:

- 1) Ensure the door jamb and the door edge are square to one another, both in the closed and open positions.
- 2) It is imperative that the light screen transmitter and receiver are aligned vertically (have the same line of sight and are pointed directly at one another).
- 3) Verify the vertical alignment of the transmitter and receiver, and then drill holes in the fast car door for the channel mounting bracket.
- 4) Install the channel mounting bracket to the fast car door with the provided self-tapping screws (TEKs), then install the transmitter to the bracket.
- 5) Route the cables from the transmitter along the top of the fast car door and secure with cable ties and sticky bases. Ensure sufficient length of cable remains to allow the doors to fully close without stretching the cable.

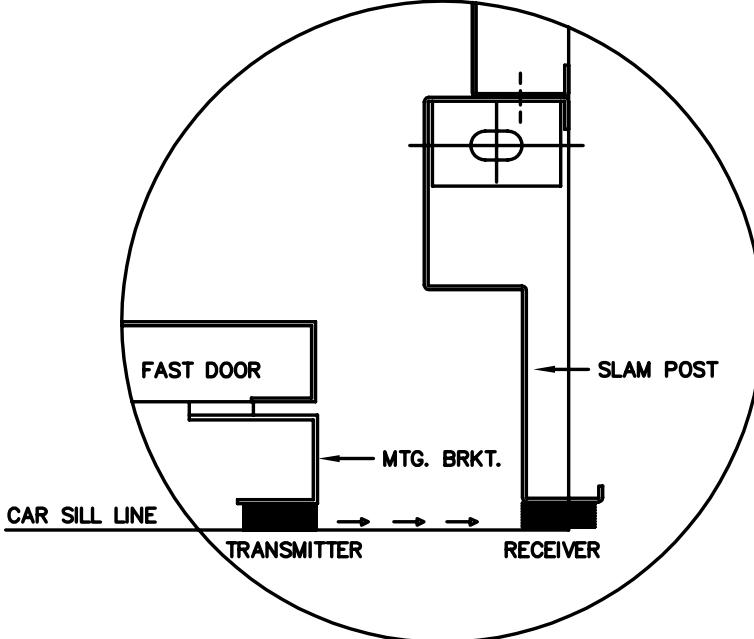


Figure 79 Light Curtain Install

NOTE

If any landing door or car gate is left open then the cab lights will remain on, and the life span of the light bulbs will be reduced.



Figure 80 24V Power Supply

- 6) Remove the terminal plugs from the 24V power supply as shown in Figure 80 and secure to the top of the car near the 2 speed door operator.
- 7) Connect the transmitter and receiver cables to the 24V power supply. Note that each cable can be plugged into either terminal. Refer to Figure 80.
- 8) Replace the terminal blocks on the 24V power supply and connect to the Dupline board as follows, refer to Figure 81.
 - Green terminal 1 to D-
 - Green terminal 3 to DC+
 - Black terminal 4 to I₂
 - Black terminal 6 to D-
- 9) Verify the operation of the light curtain by checking the LED located on the receiver (static door frame side):
 - Red LED must be ON when the light curtain is obstructed

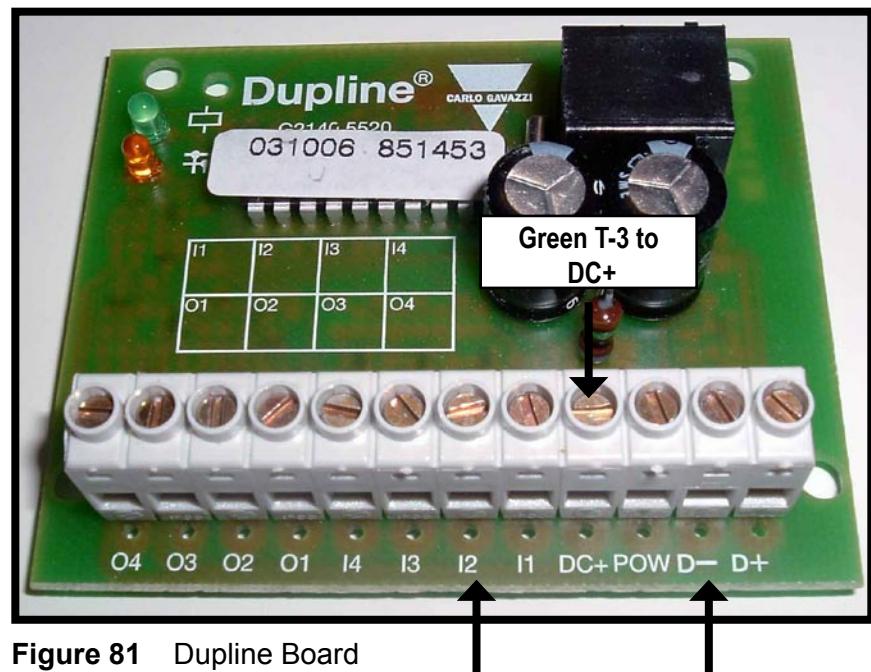


Figure 81 Dupline Board

Black T-4 to I₂

Black T-6 to D-
Green T-1 to D-

6.3 AUTOMATIC CAB LIGHTING

This feature automatically turns the car ceiling lights ON and OFF through the control circuitry. It is not necessary to add a light switch or key switch to control the lighting. The features and sequence of operation are as follows:

1) Calling the elevator from landing controls

Upon pressing the call button, the car lights will automatically come ON when the elevator starts to move. The car will arrive at the landing with the car lights ON.

2) Entering the elevator

If the elevator is at the same landing as the caller, then open the landing door or car gate to enter the elevator. The elevator interior lights will turn ON automatically.

3) Power failure

If there is a power failure in the main power supply to the motor control (not the lighting supply), then the lights will also turn ON as a safety feature.

6.4 CAB GATE INSTALLATION (IF EQUIPPED)

To install the gate assembly, proceed as follows:

- 1) Remove the lower gate track from the platform (Figure 82).
- 2) Shim underneath the lower gate track so that the top of the track is flush with the finished floor. Secure the gate track to the platform.
- 3) Thread the rollers located at the top of the gate assembly onto the upper gate track.

NOTE

If gate assembly is equipped with a power door operator, the operator must be installed prior to the gate assembly. For auto-gates, proceed to section Auto-Gate Operator.

- 4) Mount the upper gate track, along with the gate assembly, to the header using $\frac{3}{8}$ " machine screws. Ensure the guide pin at the bottom of the gate assembly is properly inserted into the lower track.

NOTE

Before threading the rollers onto the upper gate track, place the track against the header and orientate the track in the correct direction by aligning the holes.

- 5) Install the GAL gate switch on top of the door header (Figure 83).

NOTE

For auto-gates, the machine screws pass through the header and screw into the bottom of the gate operator.

- 6) Attach the gate switch arm to the leading edge of the gate assembly.
- 7) Connect the wiring harness to the operator. The wiring harness is pre-wired to the controller. For the operator and card schematics, refer to the gate operator schematics shipped separately with the elevator.

NOTE

For units equipped with auto-gate operator, tighten all the screws that secure the operator to the ceiling.

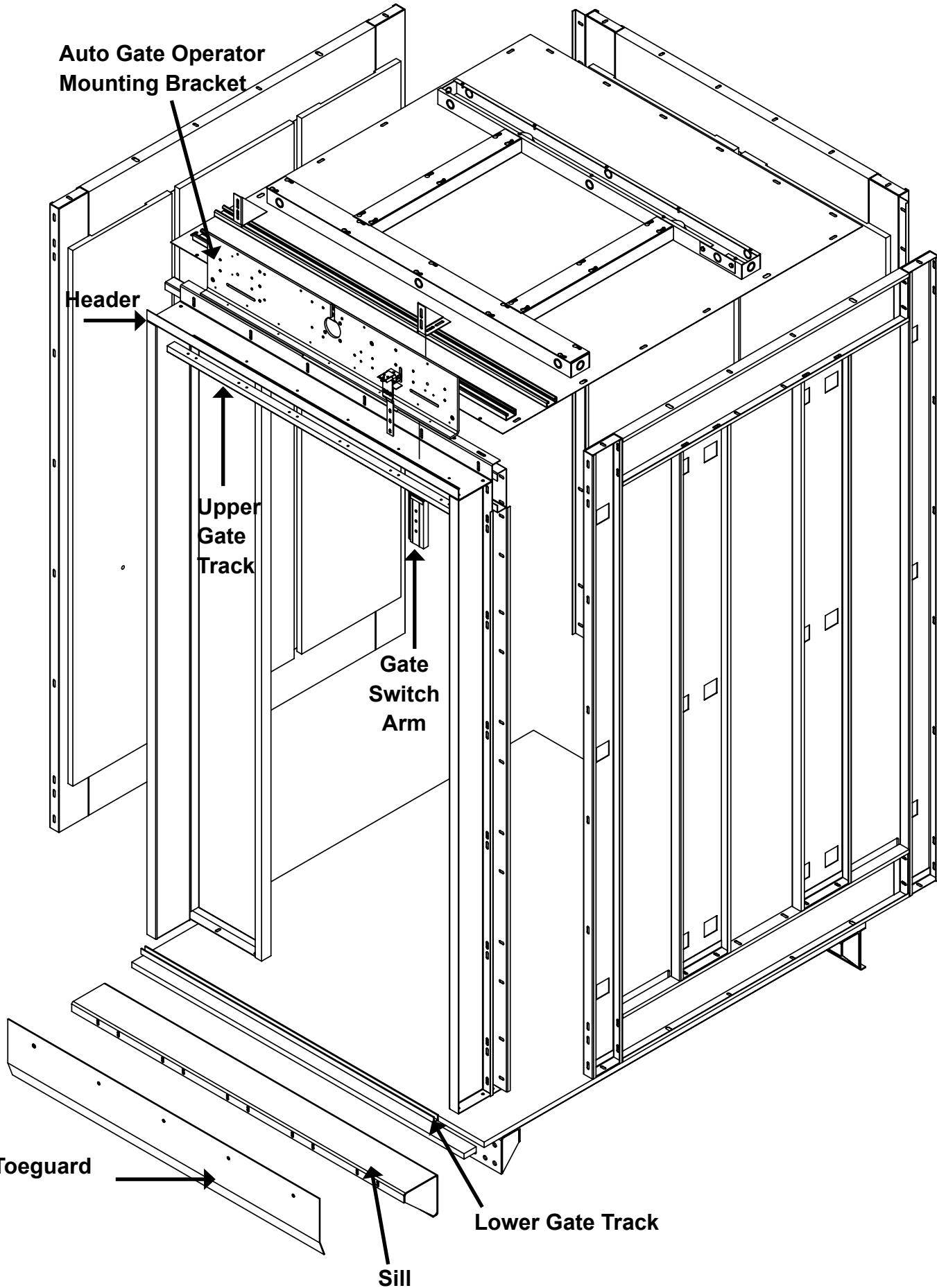


Figure 82 Car Entrance w/Auto Gate

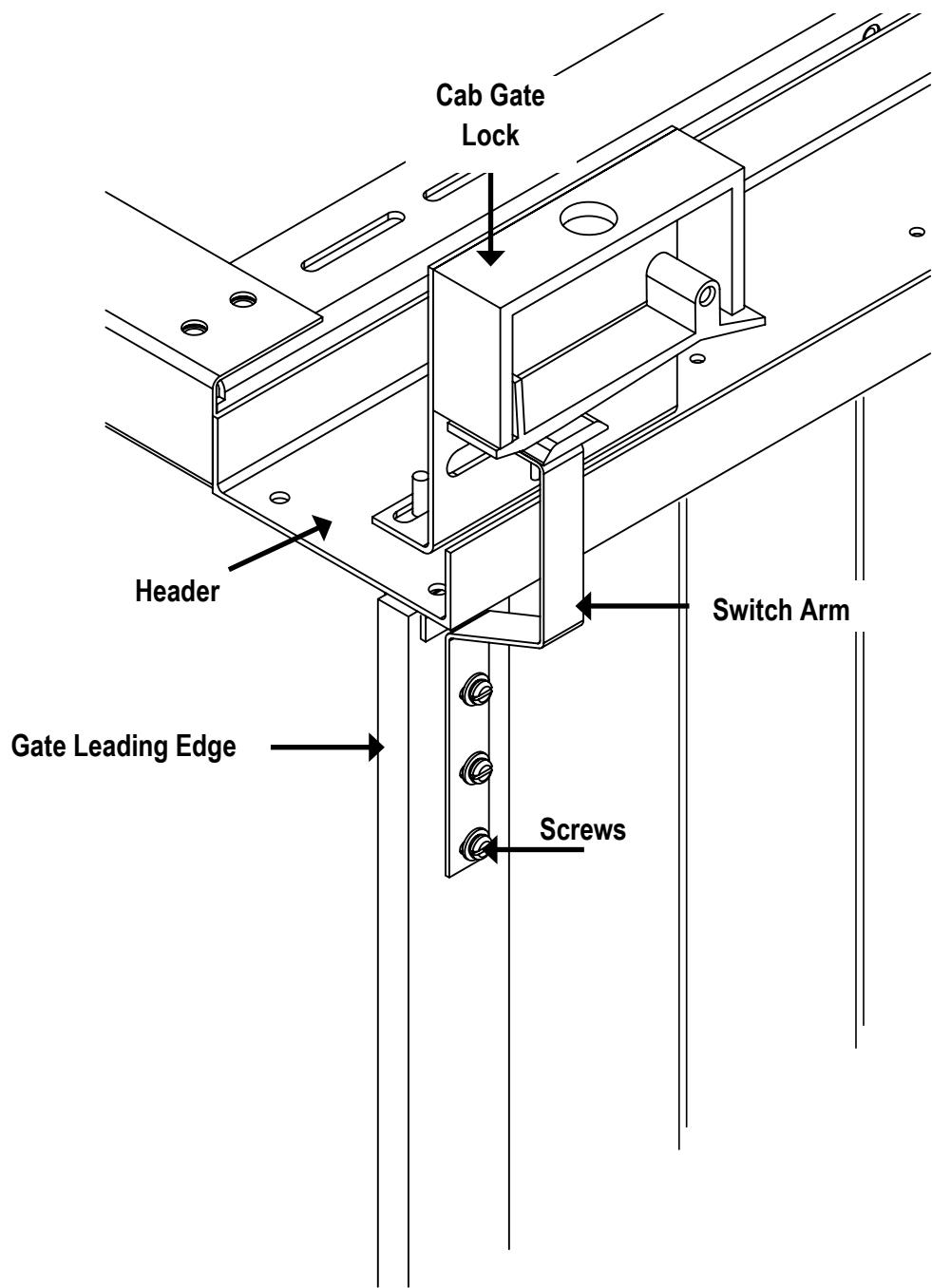


Figure 83 GAL Gate Switch

6.4.1 Gate Lock Channel

Each Gate Lock Channel configuration is based on travel, contact Tech Support for replacements. Install as follows:

- 1) Locate the centre of each landing and install the Door Zone Block Plate(s) (PN 251640) on the **gate latching side** with the provided hardware (PN 101186 #14 - 1 1/4").
- 2) Secure the Cab Gate Lock to the header and slam post.
- 3) If required, assemble the Lock Hook Parts (PN's 251638, 251639) with the provided wing nuts (PN 104499).
- 4) Secure the Gate Lock Channel sections to the hoistway on the **gate latching side** with the provided hardware (PN 101186 #14 - 1 1/4"). The Gate Lock Channel must be aligned with the entire length of the hoisway and mated with the Door Zone Block Plate(s). Refer to Figure 84.

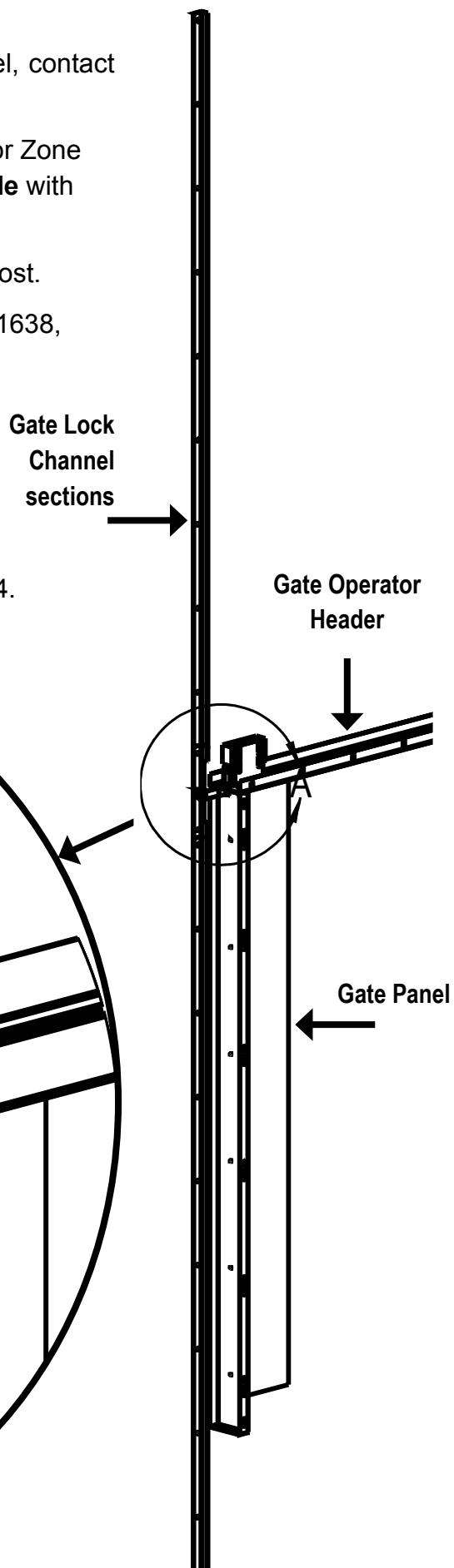


Figure 84 Gate Lock Channel

6.5 PORTA - GATE OPERATOR INSTALLATION

- 1) Unpack the unit, remove the cover, and check for any physical damage before proceeding.
- 2) Check to see that you have the correct hand unit. The operator is designed so the motor is on the stack side of the gate. Although the operator can have its handing reversed, this requires a large amount of overhang and will result in the operator warranty being voided.
- 3) Install the gate assembly as follows using gate hardware pre-pack PN 202054:
 - a) Loosely install the sill to the platform.
 - b) Install the toeguard backing (wood) and the toeguard onto the sill.
 - c) Adjust the sill assembly upwards until the toeguard is flush with the finished floor, then tighten.
 - d) Install the entrance angle.
 - e) Install the pocket angle.
 - f) Install the header.
 - g) Hang the gate assembly from the top track.
 - h) Mount the gate to the top track using the supplied #8-32 x $\frac{3}{4}$ " flat head screws.
 - i) Insert the guide pins located in the bottom of the gate assembly into the bottom track.
 - j) Drill 5 holes spaced equally through the trailing edge of the gate assembly and the pocket angle and secure using #6 x $\frac{3}{4}$ " screws.
 - k) Position the gate jamb post against the entrance angle then mark and drill the entrance angle.
 - l) Install the gate jamb post onto the entrance angle using #6 x $\frac{1}{2}$ " flat head tap screws.
- 4) Operate the gate manually. The door must operate smoothly without any binding. Correct any problems with the gate before proceeding.

NOTE

A separate clear anodized gate operator arm assembly is supplied when Clear Fold gates are ordered (P/N 200788).

- 5) Install the operator onto the gate header using three $\frac{1}{4}$ "-20 nuts, lock washers and flat washers. Align the bottom lip of the Operator Chassis with the edge of the header and tighten the fasteners.
- 6) Attach the gate operator arm to the gate lead post with the $\frac{1}{4}$ "-20 x $1\frac{1}{4}$ " carriage bolts and acorn nuts provided. Refer to Figure 85.
- 7) Pull the gate closed until the gate arm magnet contacts the magnet flag. Note that both magnets needs to be in full contact with the flag.
- 8) Check for any binding or interference during operation by manually rotating the lead screw (it is easier to rotate if you remove the drive O-ring but remember to replace). Re-position the operator or shim the gate arm as necessary to ensure smooth operation.
- 9) Manually rotate the lead screw to open the gate about $\frac{1}{2}$ " from its fully closed position. Adjust the closed limit so that it “clicks” when the gate is about $\frac{1}{4}$ " from being fully closed; check by manually rotating the lead screw.
- 10) Adjust the close slow down limit so that it is about 2" center-to-center from the closed limit.
- 11) Manually rotate the lead screw to about $\frac{1}{2}$ " from its fully open position. Adjust the open limit so that it “clicks” when the gate is about $\frac{1}{4}$ " from being fully open; check by manually rotating the lead screw.
- 12) Adjust the open slow down limit switch so that it is about 2" center to center from the open limit switch.
- 13) Ensure all pivot points rotate freely at the top and bottom of the gate. If the pivot points are stiff, lubricate them with a 3-in-1 oil, then fold and unfold the gate.



Figure 85 Gate Installation

6.6 PORTA - GATE OPERATOR ELECTRICAL INSTALLATION

- 1) The Porta-Gate Operator is field wired including the gate switch. Run electrical field wires from operator through conduit or greenfield. 2 ½" knockouts are provided in the chassis for an appropriate fitting.
- 2) Ground the chassis per local electrical code.
- 3) Verify power before connecting the operator.
- 4) Verify the type and voltage of control signal being used, refer to Appendix A Electrical Schematics.
- 5) There are 5 jumpers on the board:
 - a) SP1: Auto close, with this jumper installed the operator will automatically close when there is no signal to open. This must be installed.
 - b) SP2-SP5: Are used to select the control signalization. Refer to Appendix A Electrical Schematics.
- 6) To test unit, set speed pots in the middle of their range. Then use on board toggle switch to open and close the operator. Adjust the speed control and limit switches as necessary.
- 7) Connect the gate operator harness to the COP board at T11 and/or T14. Reinstall SP1 if using only an open signal from the controller. Refer to Figures 88 and 89.
- 8) Test the unit for automatic operation and replace cover.

**12/24 VDC INPUT
Jumper Setup**

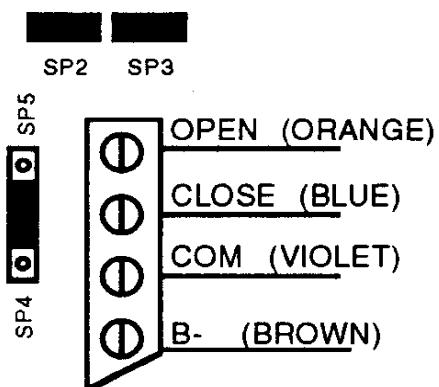


Figure 86

NOTE

If the gate is stalled during the open cycle, it will shut down. To reset, turn the power OFF by turning the car STOP button OFF and ON again.

Electrical Schematic

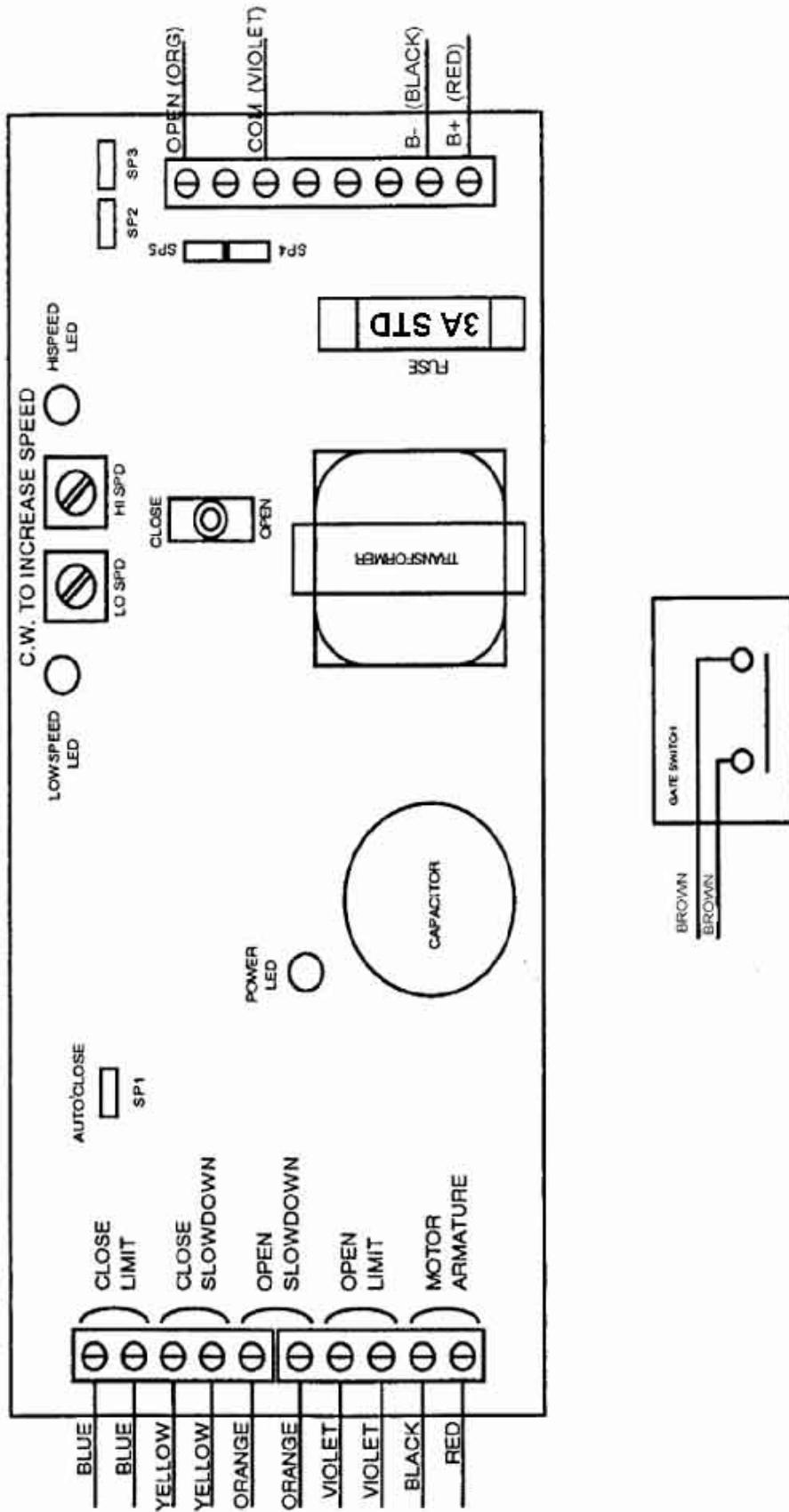


Figure 87 Porta-Gate Operator Board Layout

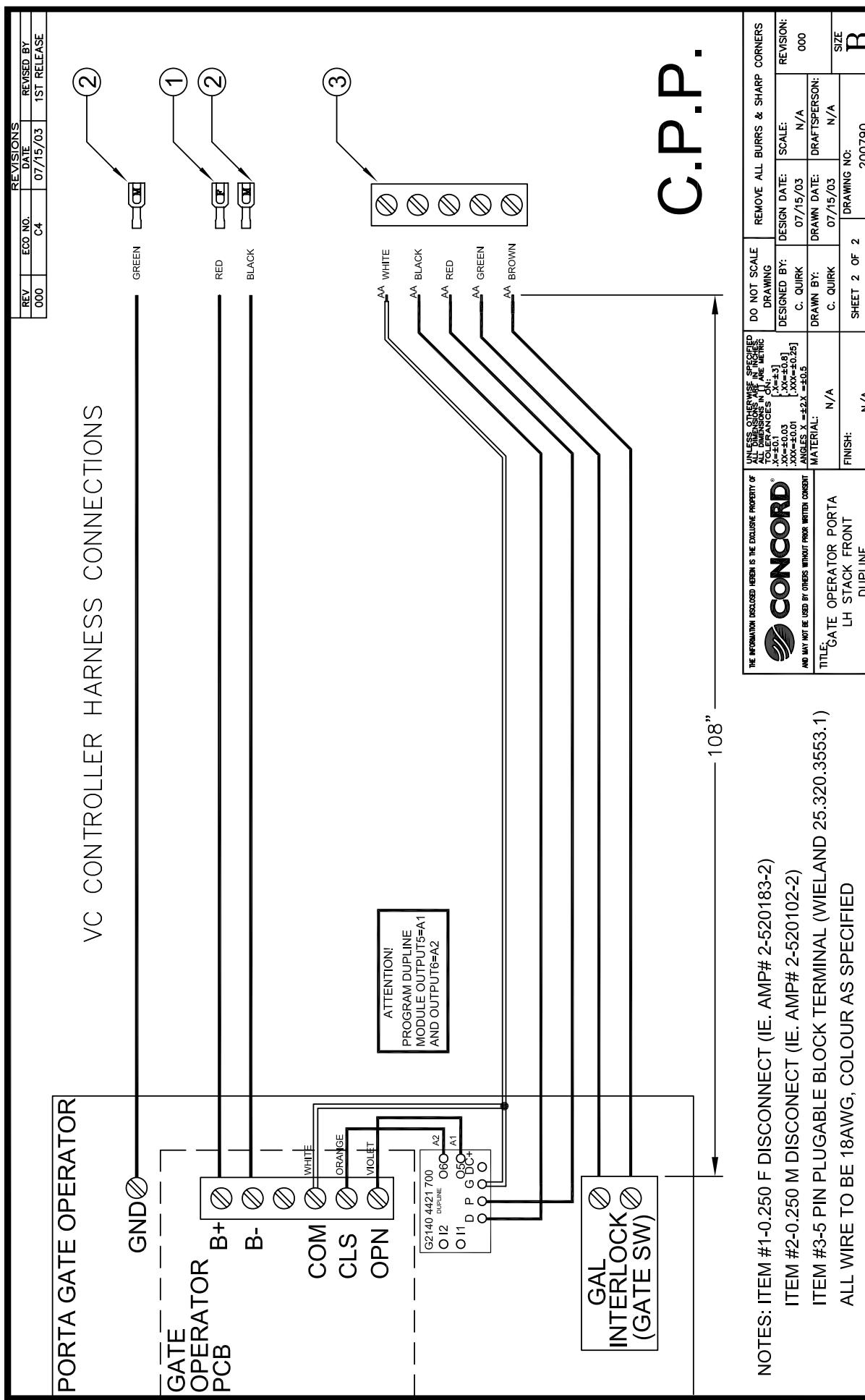
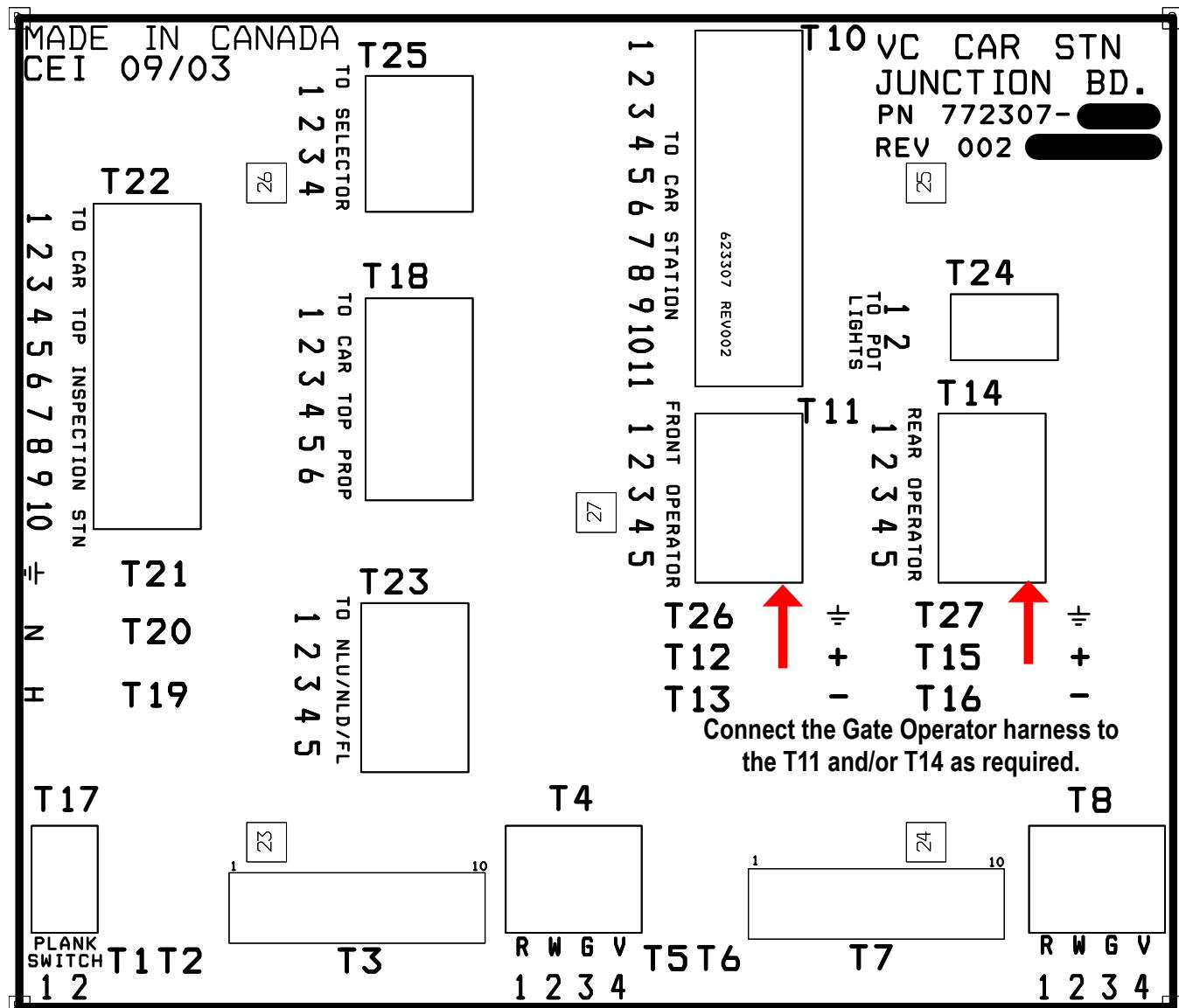


Figure 88 Porta-Gate Operator Wiring Connection



6.7 PORTA - GATE TROUBLESHOOTING

PROBLEM	Possible Cause	Corrective Action
No Function	No power	Verify 24V between "B+" and "B-"
	Fuse	Check Fuse "F1"
	Controller Signal	Check operation with test switch
	Faulty Limit	Verify that limits are open when not actuated
No High Speed	Faulty Slow down	Verify that slow downs are open when not actuated
No low speed	Slow down not engaged	Verify that the cam engages the slow down limit switch.
	Faulty Slow down	Verify that slow downs have continuity when actuated
Motor turns but no gate movement	Loose Pulleys	Verify that the drive and driven pulley's are tight on the shafts
	O-Ring	Check for loose or missing O-ring
	Gate	Check gate for excessive bind
Reverse operation	Board wiring or controller wiring	Check operation with test switch
		DOWN is open. Swap M+ and M- if necessary
Excessive breakaway force	Step 1 Step 2	Put small washers on the magnets opposite the flag. If force is still excessive, go to step 2 Remove a magnet. If force is still excessive, put small washers on the remaining magnet opposite the flag.
Board is powered but motor does not engage	Unit has stalled out	Step 1: Shut off power supply to unit. Step 2: Identify and remove the cause of the stall. Step 3: Power unit back up.

NOTE

If the resistance to gate closure exceeds the magnetic coupler, the gate dis-engages from the operator and becomes a **MANUAL GATE**. Advise the user that they must do one of the following:

- Close the door manually to run the elevator
- Cycle the door to re-engage the magnetic coupler

6.8 DUPLINE BOARD PROGRAMMING FOR DOOR AND GATE OPERATORS

Required Tools

- Dupline Programming Tool (PN 104318)

The Dupline boards for door operators or gates are programmed to "front". Elevators with rear door operators or gates require the Dupline board to be re-programmed for "rear".

Refer to the appropriate Car Wiring Electrical Schematic in Appendix A and Table 1 for Dupline values.

- 1) To program the Dupline board(s), refer to the Dupline OEM instructions provided with the programming tool.
- 2) Locate the operator/gate Dupline board in the door operator/gate header.
- 3) Connect the Programming Tool to the Dupline board, the Tool will disable normal operation to the operator/gate.
- 4) Read/Program the correct Dupline values.

Note that the labelling on the Dupline boards may vary from the provided electrical schematics as follows :

D+ is equivalent to DUP
D- is equivalent to GND

2 Speed Doors (Wittur) and Sliding Doors (ECI)		Swing Door Gate Operator
Front Door Operator	Rear Door Operator	Front Gate Operator
I1 = not used	I1 = not used	I1 & I2 = not used
I2 = B4	I2 = E4	O1 = A1
I3 = B6	I3 = B8	O2 = A2
I4 = B5	I4 = B7	Rear Gate Operator
O1 = not used	O1 = not used	I1 & I2 = not used
O2 = A3	O2 = A7	O5 = A5
O3 = A2	O3 = A6	O6 = A6
O4 = A1	O4 = A5	

Table 1 Dupline Values

6.9 CTIS INSTALLATION

NOTE

CTIS buttons must be accessible from the hoistway entrance.

Select the appropriate procedure:

6.9.1 2-Speed Door Operator Configuration

- 1) Secure the CTIS to the CTIS mounting bracket (PN 251590) using #10-32 machine screws.
- 2) Remove the plug (9-pin or 10-pin TSSA) from the CTIS harness.
- 3) Thread the CTIS harness through the provided $\frac{3}{8}$ " flex conduit ($\frac{1}{2}$ " flex conduit is also suitable).
- 4) Install the CTIS and mounting bracket to the 2-Speed Door Operator mounting bracket using $\frac{7}{16}$ " bolts and washers (QTY 4 ea.) as shown in Figures 90 and 91.
- 5) Locate the appropriate cab ceiling wiring knock-out and route the CTIS harness through the knock-out towards the Car Station Junction board.
- 6) Run the wiring from the CTIS to the Car Station Junction board, removing wiring covers where necessary.
- 7) Secure the flex conduit to the wiring knock-out.
- 8) Connect the 9-pin or 10-pin plug to the CTIS harness and terminate wiring at the Car Station Junction board as per the Car Wiring Diagram in Appendix A, Electrical Schematics.
- 9) Install the light bulb (not provided) and light bulb protective cover on the CTIS.

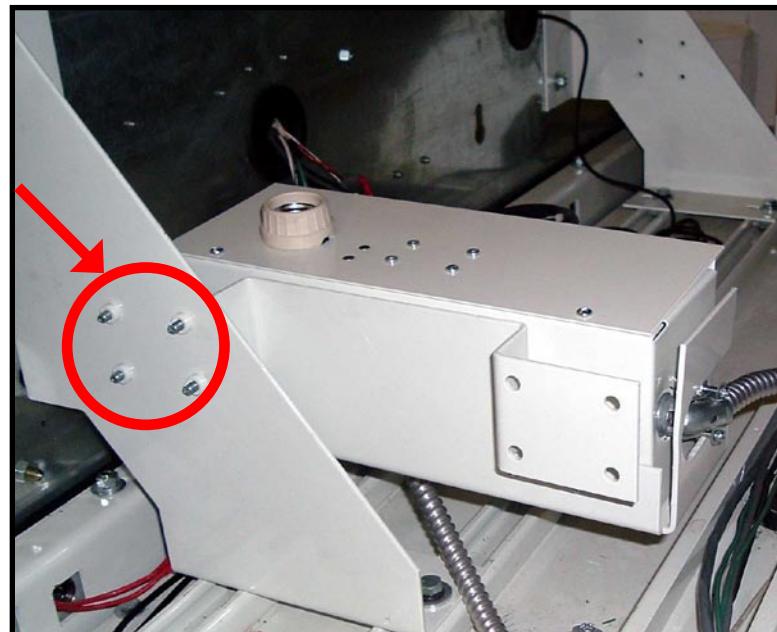


Figure 90 CTIS mounted, rear view



Figure 91 CTIS mounted, top view

6.9.2 Cab Gate and Swing Pro-Door Configuration

Option A

- 1) Insert two (2) spring loaded clips (with spring against the cab ceiling) to the cab ceiling struts at the cab entrance as shown in Figure 92.
- 2) Secure the mounting bracket (PN 251726) to the spring clips with $\frac{1}{4}$ " bolts and lock washers (QTY 2 ea.) as circled in Figure 93.
- 3) Remove the plug (9-pin or 10-pin TSSA) from the CTIS box harness. Thread the CTIS harness through the provided $\frac{3}{8}$ " flex conduit ($\frac{1}{2}$ " flex conduit is also suitable).
- 4) Secure the CTIS box to the mounting bracket with two (2) #10-32 screws as circled in Figure 94.
- 5) Locate the appropriate cab ceiling wiring knock-out and route the CTIS harness through the knock-out to the Car Station Junction board.
- 6) Run the wiring from the CTIS box to the Car Station Junction board, removing wiring covers where necessary.
- 7) Secure the flex conduit to the wiring knock-out.
- 8) Connect the 9-pin or 10-pin plug to the CTIS box harness and terminate wiring at the Car Station Junction board as per the Car Wiring Diagram in Appendix A, Electrical Schematics.
- 9) Install the light bulb (not provided) and light bulb protective cover on the CTIS box.



Figure 92 Spring Clip

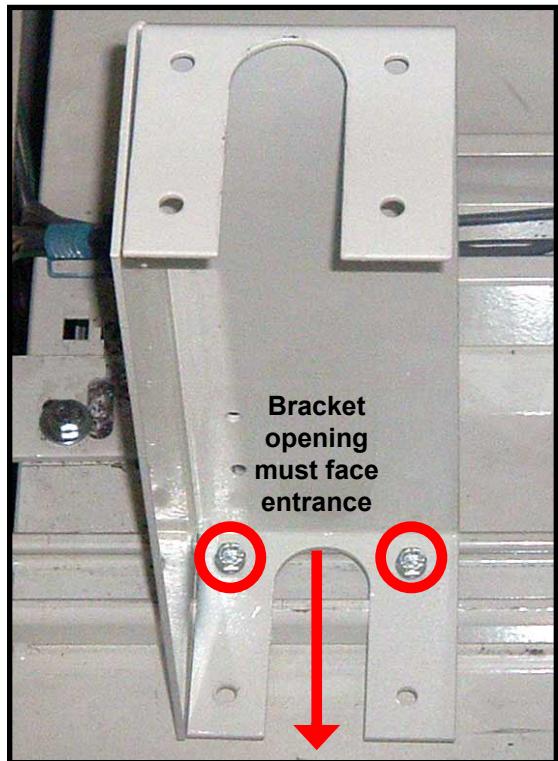


Figure 93 Mounting Bracket



Figure 94 CTIS Assembly Mounted rear view

Option B (If Hoistway Dimensions Permit)

- 1) Secure two (2) spring loaded clips to the mounting bracket (PN 251726) with $\frac{1}{4}$ " bolts and lock washers (QTY 2 ea.) as shown in Figure 95.
- 2) Remove the plug (9-pin or 10-pin TSSA) from the CTIS box harness. Thread the CTIS harness through the provided $\frac{3}{8}$ " flex conduit ($\frac{1}{2}$ " flex conduit is also suitable).
- 3) Secure the CTIS box to the mounting bracket with two (2) #10-32 screws as circled in Figure 95.
- 4) Insert the assembly into the cab ceiling struts from the side of the cab by sliding the springs into the strut. Take care to avoid dropping the springs in the hoistway.
- 5) Locate the appropriate cab ceiling wiring knock-out and route the CTIS harness through the duct to the Car Station Junction board.
- 6) Run the wiring from the CTIS box to the Car Station Junction board, removing wiring knock-out covers where necessary.
- 7) Secure the flex conduit to the wiring knock-out.
- 8) Connect the 9-pin or 10-pin plug to the CTIS box harness and terminate wiring at the Car Station Junction board as per the Car Wiring Diagram in Appendix A, Electrical Schematics.
- 9) Install the light bulb (not provided) and light bulb protective cover on the CTIS box.



Figure 95 CTIS Assembly



Figure 96 CTIS Assembly Mounted

7.0 ELECTRICAL INSTALLATION

Refer to Appendix A for Electrical Schematics (schematics are shipped in a separate package).

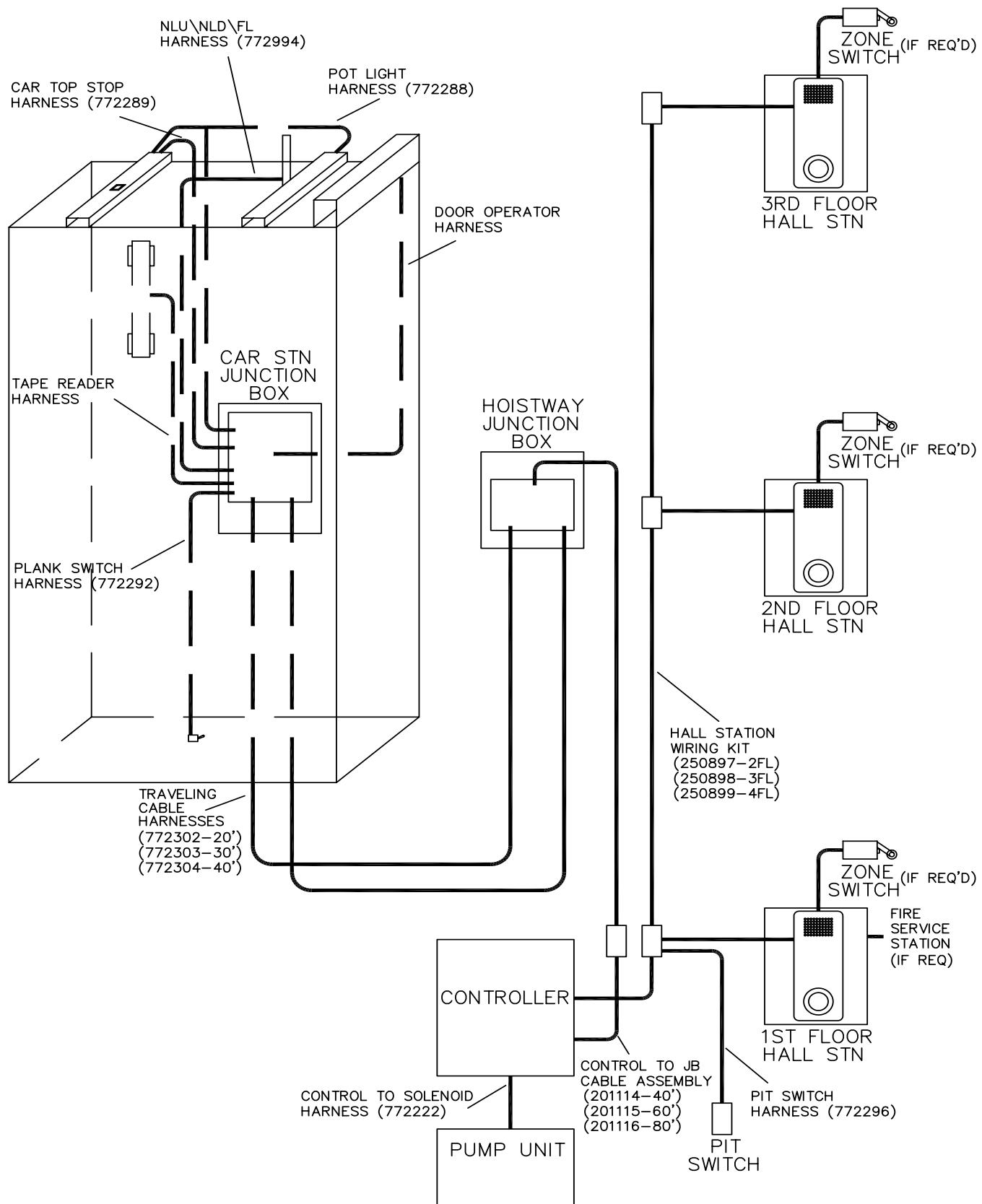
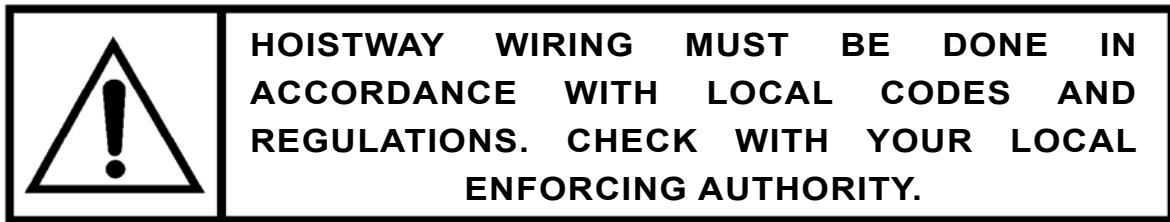


Figure 97 Orion Wiring Layout

7.1 HOISTWAY JUNCTION BOX INSTALLATION



- 1) Prior to starting the wiring review the schematics and field wiring diagrams to ensure you are comfortable with the various harnesses that need to be installed and where they will terminate (hoistway box or controller). Determine where the box will be installed.
- 2) Install the Hoistway Junction Box in the hoistway. It is typically mounted on the rail wall outside the rails, but if there is room, the box may be mounted on any wall without a door. The box should be situated vertically, approximately two (2) feet (610 mm) above the halfway point of the elevator travel.
- 3) Mount the Junction Box using the four (4) #12 x 1" wood screws provided in the Junction Box/Raceway prepack or with Dealer supplied hardware if preferred.

7.2 HOISTWAY JUNCTION BOX CONNECTIONS

Terminate all the travelling cables to their appropriate terminals as shown in Appendix A Electrical Schematics.

- 1) Terminate all the travelling cables to their appropriate terminals.
- 2) Connect wiring from T52 and T53 to the controller box, observing necessary gauge of wiring from chart below.

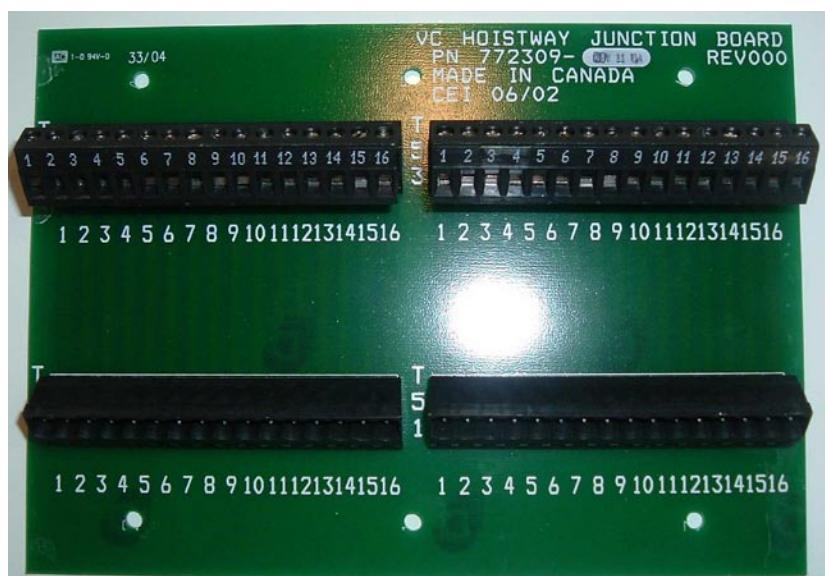


Figure 98 Hoistway Junction Board

T52	
Black, White and Green	14 AWG
All the rest	18 AWG preferred, 20 AWG acceptable
T53	
Black and White	14 AWG
All the rest	18 AWG preferred, 20 AWG acceptable

7.3 TRAVELLING CABLES

- 1) The travelling cables exit the back of the controller box at the bottom. Route them to the underside of the platform.
- 2) Attach the travelling cables to the underside of the platform using the under cab cable bracket (Figures 98 and 99). Secure the under cab cable bracket to the bottom of the platform using #10- $\frac{1}{2}$ " wood screws. Leave a large loop of cable at the point where the travelling cables exit the under cab cable bracket. The loop should be large enough to accommodate the full up and down travel of the elevator. Ensure there is sufficient slack in the cable when the elevator is at the top and bottom landing before final fastening or routing of travelling cable.
- 3) When two (2) travelling cables are used, insert both cables under the wedge.
- 4) To route the travelling cables to the halfway junction box, pass them behind the safety device tripping rod and the lifting bracket up to the hoistway junction box.
- 5) To support the load of the cables, install the tension relief bracket one (1) foot (305 mm) below the bottom of the halfway junction box (Figure 99). The tension relief bracket supports the weight of the travelling cables, so that this weight does not act on the hoistway junction box terminals.
- 6) Ensure that when the elevator is run to the top floor, there is at least 12" (305 mm) of cable hanging below the tension relief bracket and a gentle bend connecting to the cab. With the elevator at the bottom landing, ensure that the cable is not too tight and is not rubbing on the side of the platform or piling up on the pit floor. If the cable is not installed properly, shortened cable life will result.
- 7) If there is extra travelling cable, do not let it pile up on the pit floor. Fold it neatly and fasten the excess travelling cable to a brace under the platform, or fold it between the hoistway junction box and the tension relief bracket.



Figure 99 Bracket Mounted

7.4 CONTROLLER LAYOUT AND WIRING

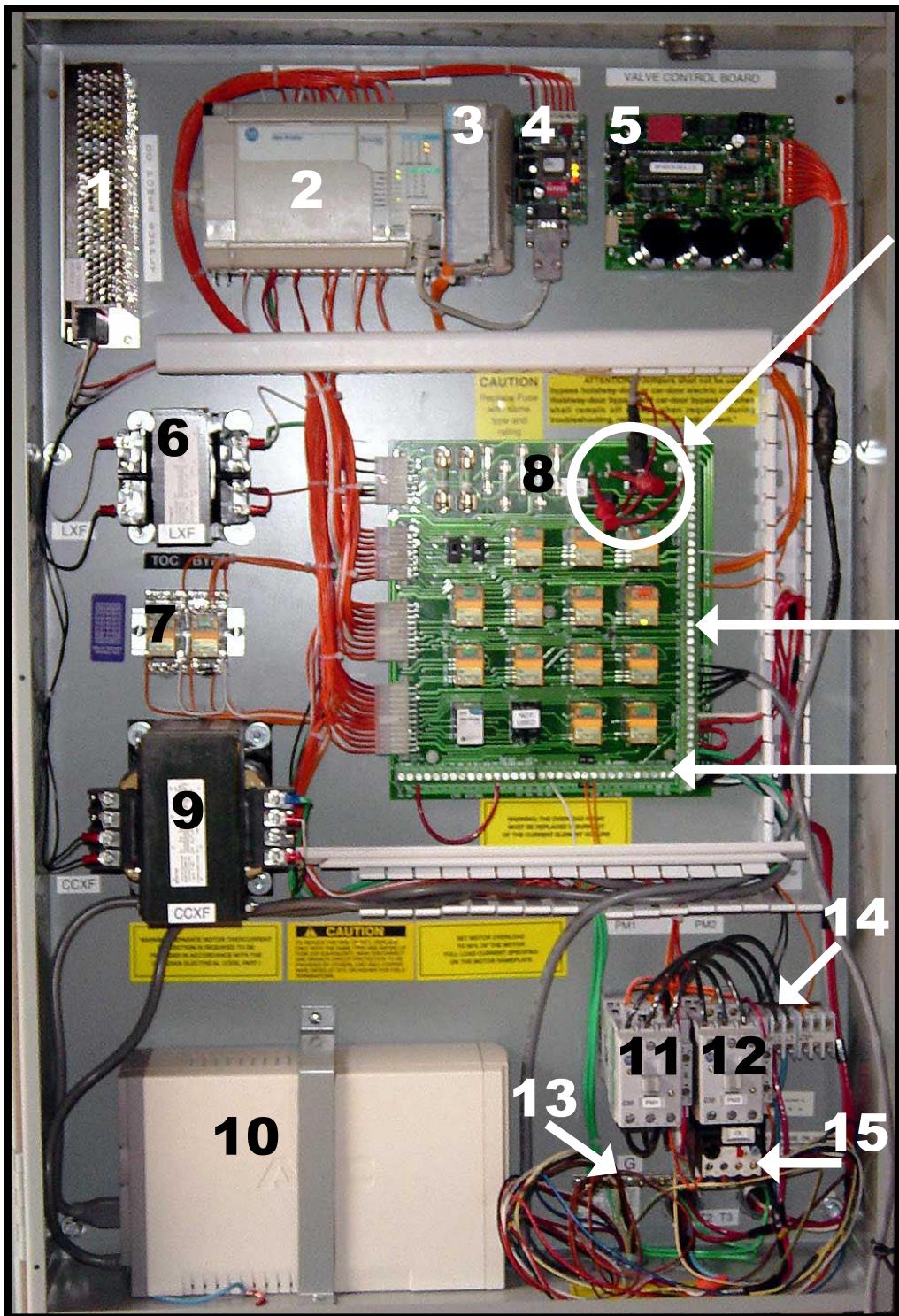


Figure 100 Controller Layout

- | | |
|--|----------------------------------|
| 1 DC Power Supply | 9 Transformer, Controller Supply |
| 2 PLC | 10 Back-Up Battery |
| 3 PLC Expansion Module, TSSA (Ontario only) | 11 Contactor, Pump Motor PM 1 |
| 4 Master Dupline Module | 12 Contactor, Pump Motor PM 2 |
| 5 Valve Operator Board | 13 Ground Terminal Strip |
| 6 Transformer, Cab Lighting Supply | 14 Power In Terminal Block |
| 7 By-pass Relays for CTIS, TSSA (Ontario only) | 15 Pump Motor Overload |
| 8 Main Relay Board | |

7.4.1 Selecting the Controller Location and Environment

Mount the controller in a location that provides:

- adequate support for the weight of the controller (66 lb). The controller is shipped with brackets to allow it to be mounted to the hydraulic unit but it can be remote and mounted to properly reinforced walls.
- adequate lighting for installation and maintenance activities.
- convenient access for the routing of the required conduits and cables,
- convenient access to other devices in the machine room.

For improved controller reliability:

- Keep the machine room clean.
- Do not install the controller in a dusty area.
- Do not install the controller in a carpeted area or area where static electricity is a problem.
- Keep room temperature between 50°F to 120°F (10°C to 49°C) and 95% non-condensing relative humidity. Extended high temperatures will shorten the life of electronic components. Provide adequate ventilation or air-conditioning as required if necessary.
- Avoid condensation on the equipment. Keep the controller away from sources of condensation and water (such as open windows) as these can create a hazardous condition and can damage the equipment.
- Do not install the controller in a hazardous location or where excessive amounts of vapors or chemical fumes may be present
- Make sure power line fluctuations are within $\pm 5\%$.
- High levels of radio frequency emissions may cause interference with the controller micro-processor, and produce unexpected and even dangerous results. This could be caused by hand-held communications devices used near the controller.

7.4.2 Controller Grounding

CAUTION

PROPER GROUNDING IS VITAL FOR THE SAFE OPERATION OF YOUR SYSTEM. BRING THE GROUND WIRE TO THE GROUNDING STRIP LOCATED IN THE UPPER RIGHT HAND CORNER OF THE CONTROLLER BOX (SEE LABELED PICTURE BELOW). YOU MUST CHOOSE THE PROPER CONDUCTOR SIZE. SEE NATIONAL ELECTRICAL CODE ARTICLE 250-95, OR THE RELATED LOCAL APPLICABLE CODE.

Grounding of the controller must conform to all applicable codes. Proper grounding is essential to the safe operation of the equipment and contributes to improved lifetimes/reliability of the electronic components.

Specifically ensure that:

- The grounding wire is sized per the applicable codes.
- The ground is properly connected to a good building ground, such as the structural steel of the building, or a cold water pipe.

7.4.3 Machine Room Connections

Refer to Appendix A for more detail.

- 1) Connect the hydraulic valve to the Main Controller board using cable supplied. Connections are as shown in Figure 101.
- 2) Connect the pump and motor to the appropriate connections in the main controller box. Refer to Figure 102 for single phase units and 3 phase units.
- 3) Connect the Main Power to the terminal blocks in the Controller box as shown in Figure 103.
- 4) Connect the back up battery as shown in Figure 104.

VALVE CONNECTIONS

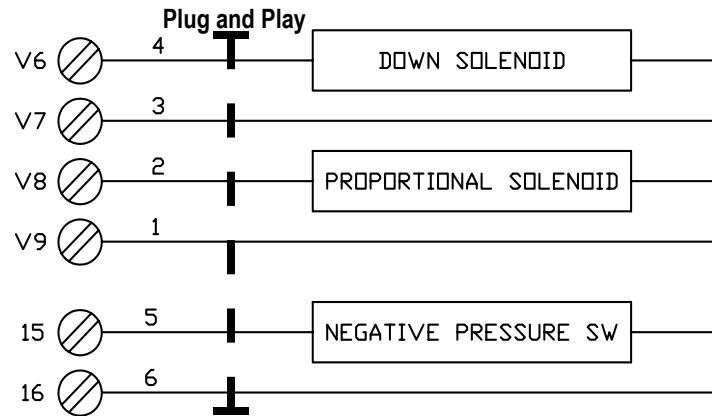


Figure 101

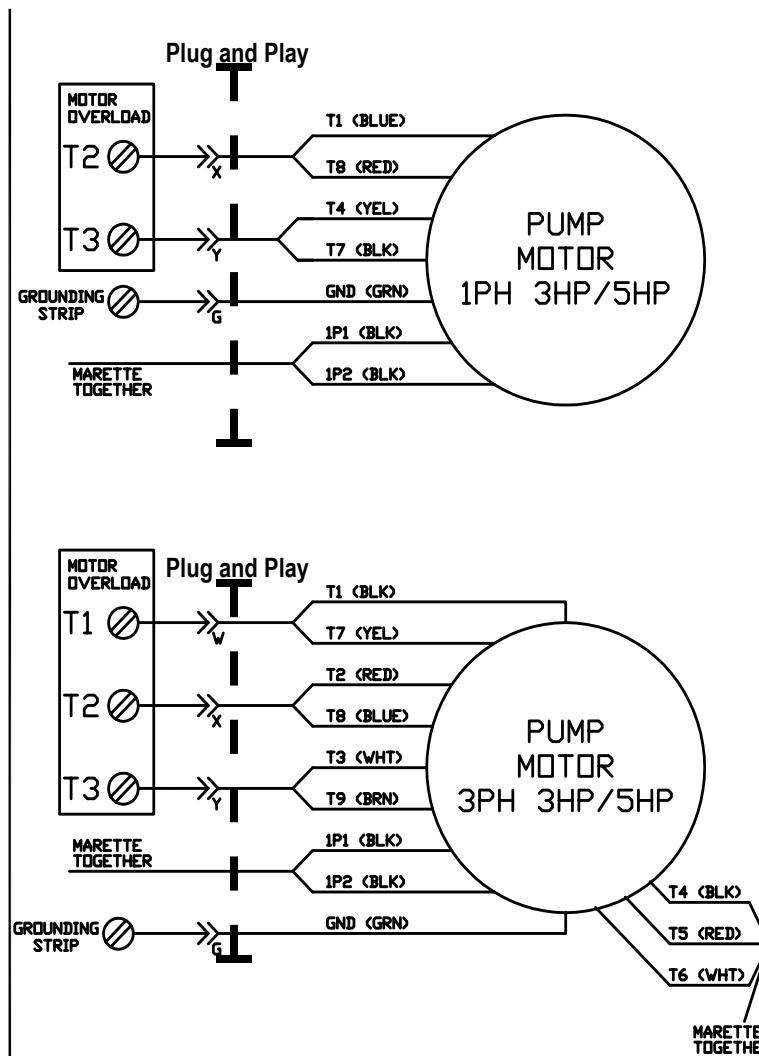


Figure 102

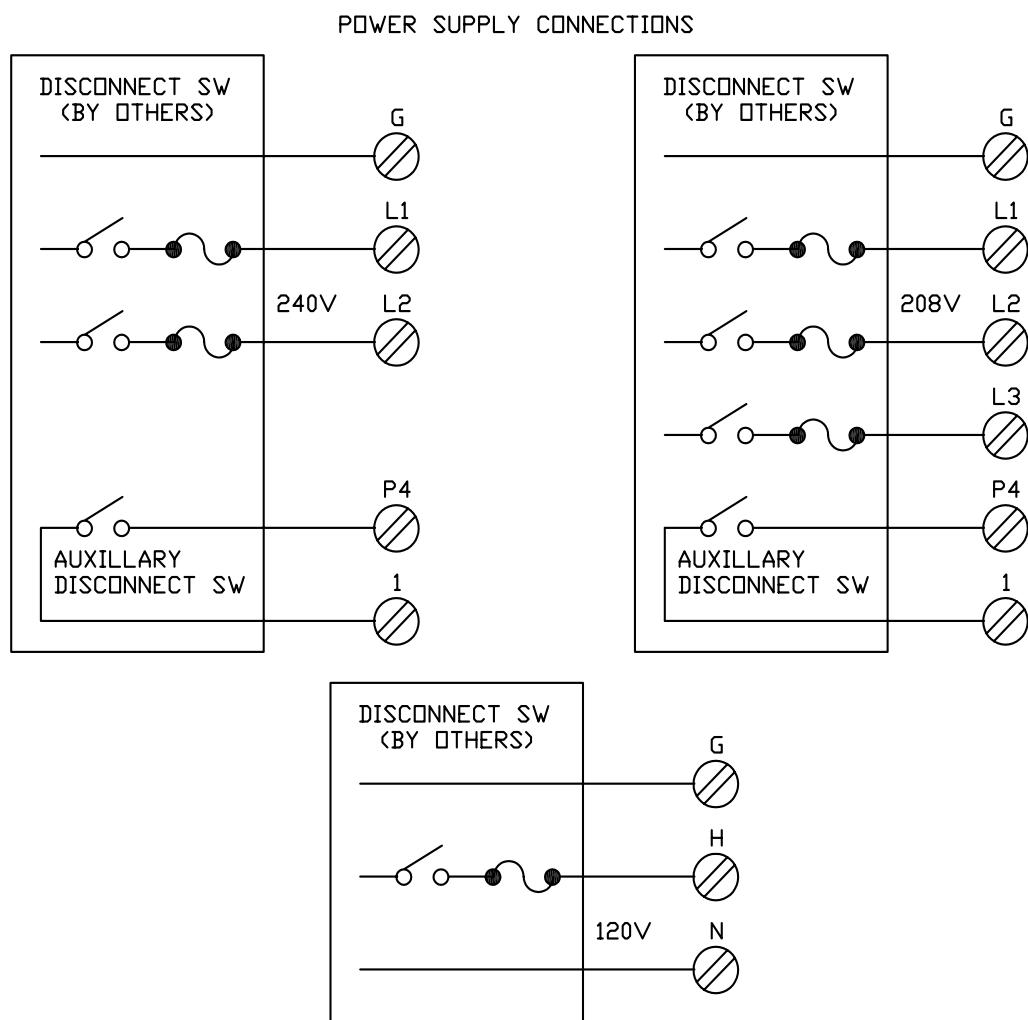


Figure 103

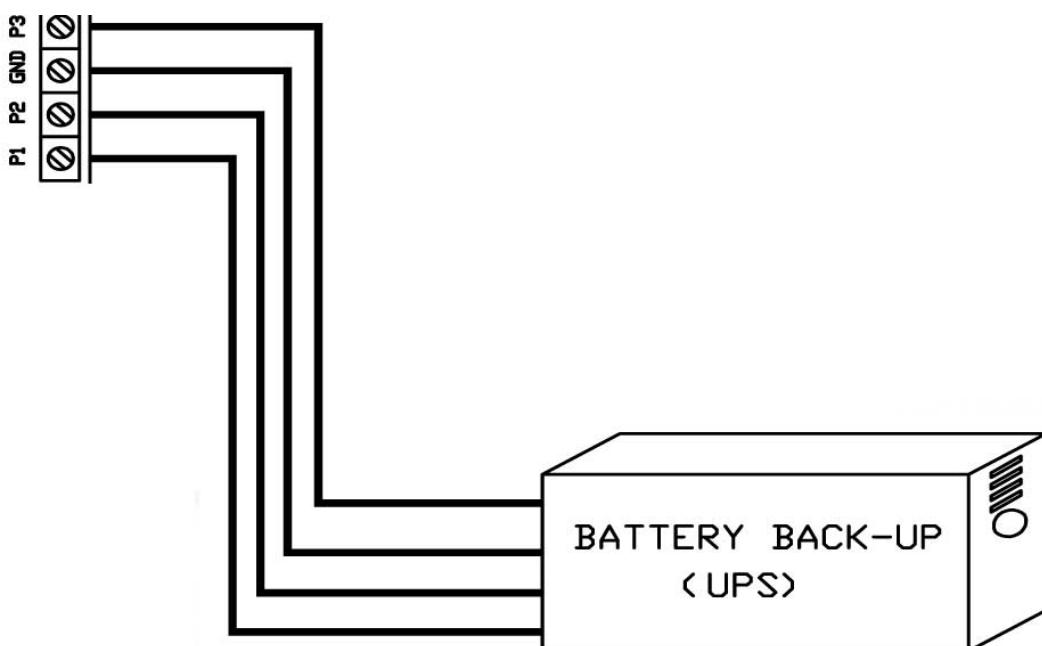


Figure 104

7.5 LANDING CONNECTIONS

Installation and wiring of hall call stations for 2 Speed Doors (Sliding)

Refer to Appendix A Electrical Schematics for more detail.

- 1) Run wiring from the Fire Service Station (if equipped) to the main hall call station. Connect the wiring at each hall call station as shown in the hall call wiring schematics shipped separately with the job (in a box with a large roll of 9-conductor wire).
- 2) Run wiring from the hoistway access station (if equipped) to the hall call station and connect wiring at each hall call station .
- 3) Install wiring from the landing door lock contacts to T109 of the hall call station at each landing.
- 4) Wire T100 and T101 from each hall call station to the next appropriate hall call station and then to the controller's 'hatch wiring" terminals.
- 5) Terminate wiring from hall call stations at the controller.
- 6) Ensure the required jumpers are installed at the top landing hall call station.

Installation and wiring of hall call stations for Pro - Doors (Swing)

- 1) Run wiring from the door operator in the header and connect to T105 of the hall call station.
- 2) Run wiring from the floor zone switch (wired normally open) to T104.
- 3) Run wire from the door close microswitch to T102 of the hall call station.
- 4) Run wiring between hall call stations and the controller, connect T100 and T101 of each hall call station.
- 5) Connect hall call station wiring to the controller.
- 6) Ensure the required jumpers are installed at the top landing hall call station.

7.6 TERMINATION OF WIRING AT CONTROLLER

After wiring all of the hall stations and locks into the halfway box you are ready to terminate the cables at the controller. This step of the installation requires the greatest attention to detail as you will be connecting numerous pre-stripped wires to terminal blocks in the controller . **Attention to detail is very important to ensure a problem free installation and start up.** Starting with travelling cable A connect the correct color and number wire to the numbered terminals on the main control board.

NOTE: If the site is an area prone to lightning strikes, ground the sling to TA 15. Connect the rails to ground is the machine room.

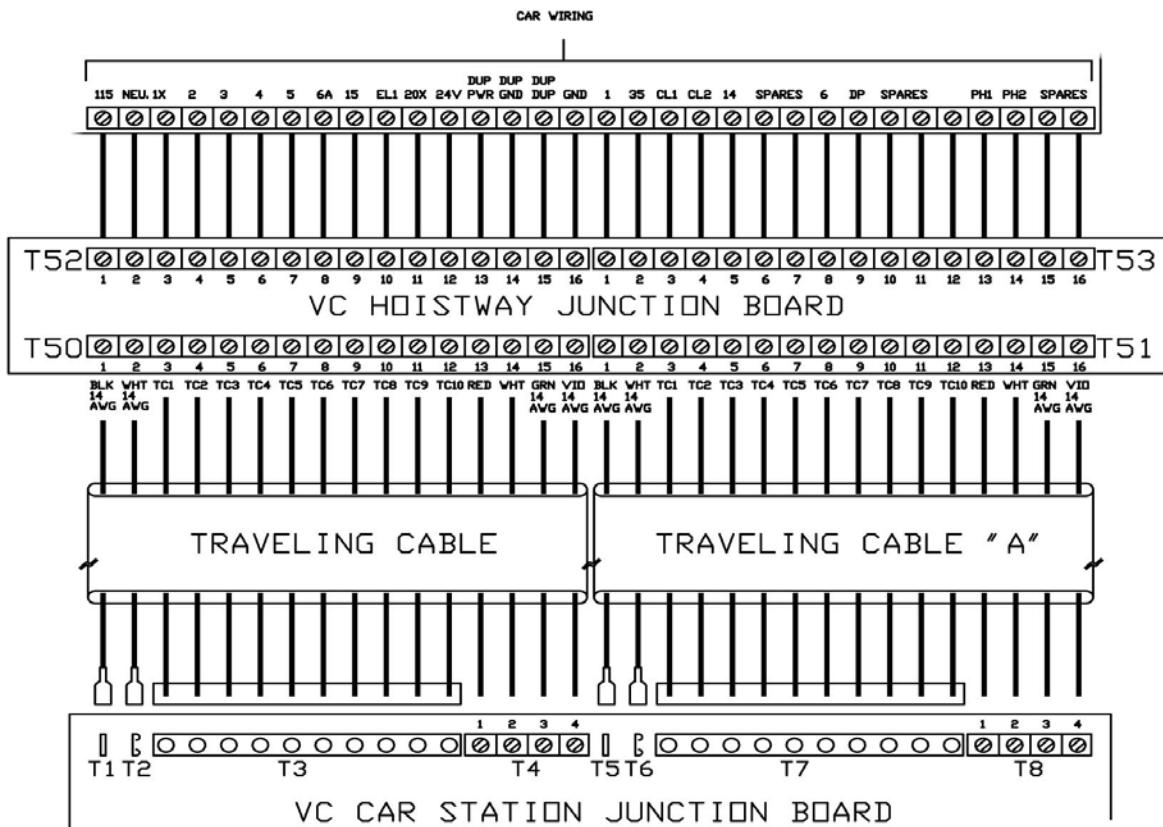


Figure 105 Wiring Connections

7.7 CAR STATION CONNECTIONS

Refer to Appendix A Electrical Schematics and the Car Station Junction Board layout below to connect the harnesses to their appropriate terminals as follows:

- T1, T2, T3, T4, T7, T8 to Hoistway Junction Box Travelling Cables
- T10 to Car Operating Panel (COP) Pushbuttons and Position Indicator Harness
- T11, T12, T13 and T26 to Front Gate Operator Harness
- T14, T15, T16 and T27 to Rear Gate Operator Harness
- T17 to Plank Switch Harness (Slack Cable Switch)
- T18 to Car Top Prop Harness
- T19, T20, T21, T22 to Car Top Inspection Station Harness
- T23 to NLU/NLD/FL Harness
- T24 to Cab Pot Lights Harness
- T25 to Magnetic Tape Selector Harness

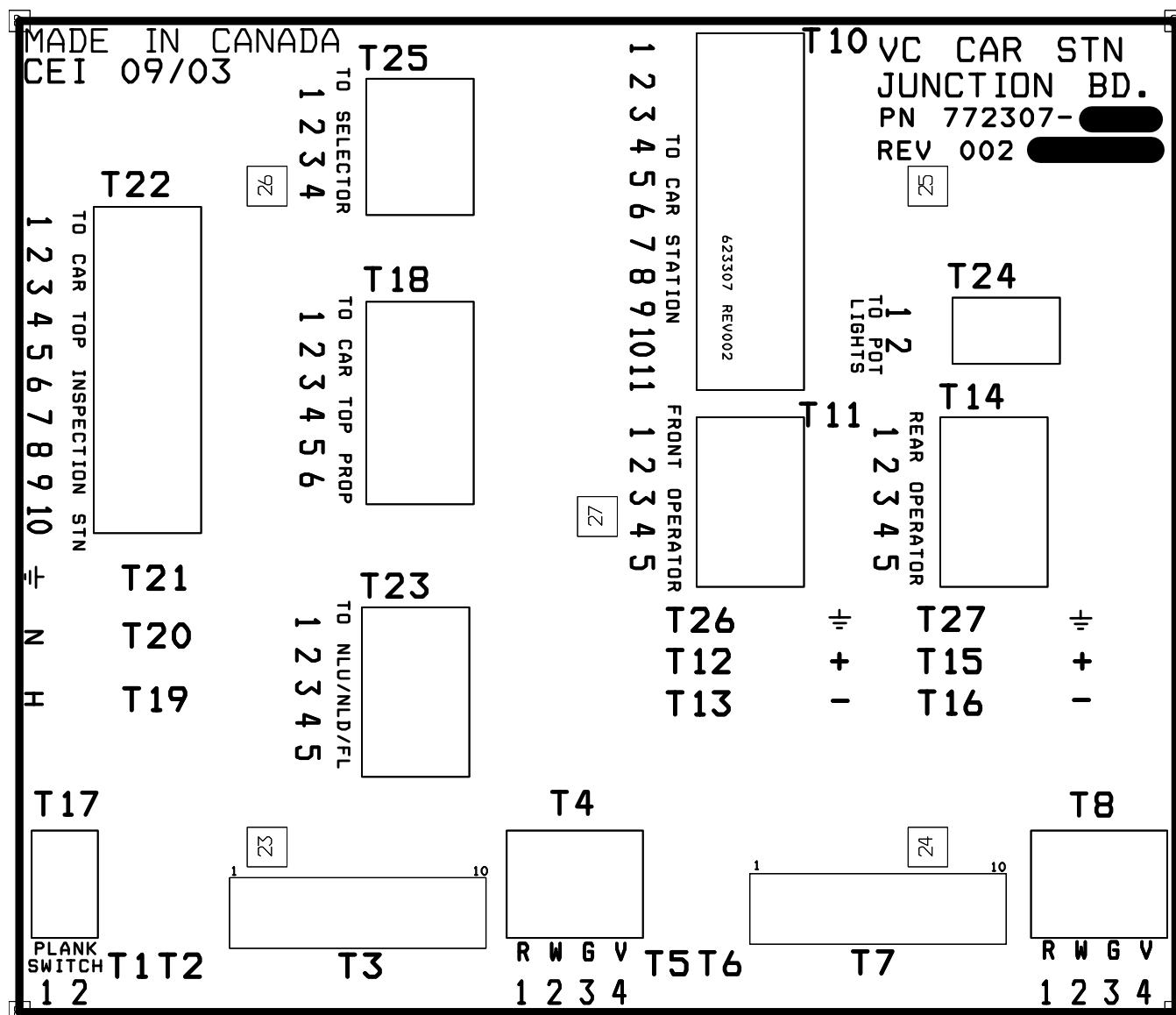


Figure 106 Car Station Junction Board

7.8 POWER UP AND TEST THE ELEVATOR

Once all of the cabling has been completed you are ready to power up and test the lift. Refer to Appendix C, section 3.6 to perform a few simple tests to ensure controller is wired correctly before power is applied. **Failure to do so may cause damage to the controller.**

Calling the lift to the floor:

IMPORTANT

The steps described in Appendix C must be completed before attempting to run the elevator.

- 1) If safety circuit is completed, all doors and gates are closed with CTIS in RUN position, the lift is enabled and the lift is not in use (hall call light OFF); pressing a call button at any landing will register a call for the cab and the button light will come ON. At this point other calls will be prevented (one call only). The lift will go to the floor from which the call was placed, door(s) will unlock and power gate/door will open (if equipped). The door will stay open for a pre-selected time before closing. If the door is held open then gate will remain open and locks will not time-out.
- 2) Inside the cab a call can be placed to any floor. Once the call is entered doors and gates will start closing.
- 3) When the gate(s) close the door will lock and the lift will start moving to selected floor. At this point the call can be cancelled with the car stop switch but not the car key switch. When the lift approaches the selected landing fast speed will be turned OFF approximately 8" from the floor and lift will continue on low speed until the levelling signal (LU or LD) is OFF. Then lift will then stop, locks will open and the power gate/door will open (if equipped).
- 4) After door/gate closes and locks it can be reopened by pressing the DOB button or call button corresponding to current landing.

NOTE

This is not an exhaustive test and all limit switches, zone switches etc. should be tested and their operation confirmed prior to handing over to the owner.

8.0 INSTALLATION OF FIRE RATED PRO-DOORS

The PRO-DOOR LANDING ENTRANCES are fire rated and have been tested and approved for minimum fire separation of two (2) hours. The landing entrances are an integral unit, pre-wired, zinc wipe coated and ready for installation at the site. Each integral landing entrance has a manual or automatic swing type door with a clear opening of 35" wide x 80" high (890 mm x 2030 mm).

NOTE

It is recommended to leave the doors in the frames and make sure the beaks/latch bolts enter the locks freely. This will ensure trouble-free door operation after the frames are bricked in or framed in. There is close running clearance between the door frames and the edge of the platform, therefore, the door frames must be set carefully and exactly.

Align the door and door frames to the platform as shown in Figure 109.

NOTE: Never allow a contractor to install your PRO-DOORS.

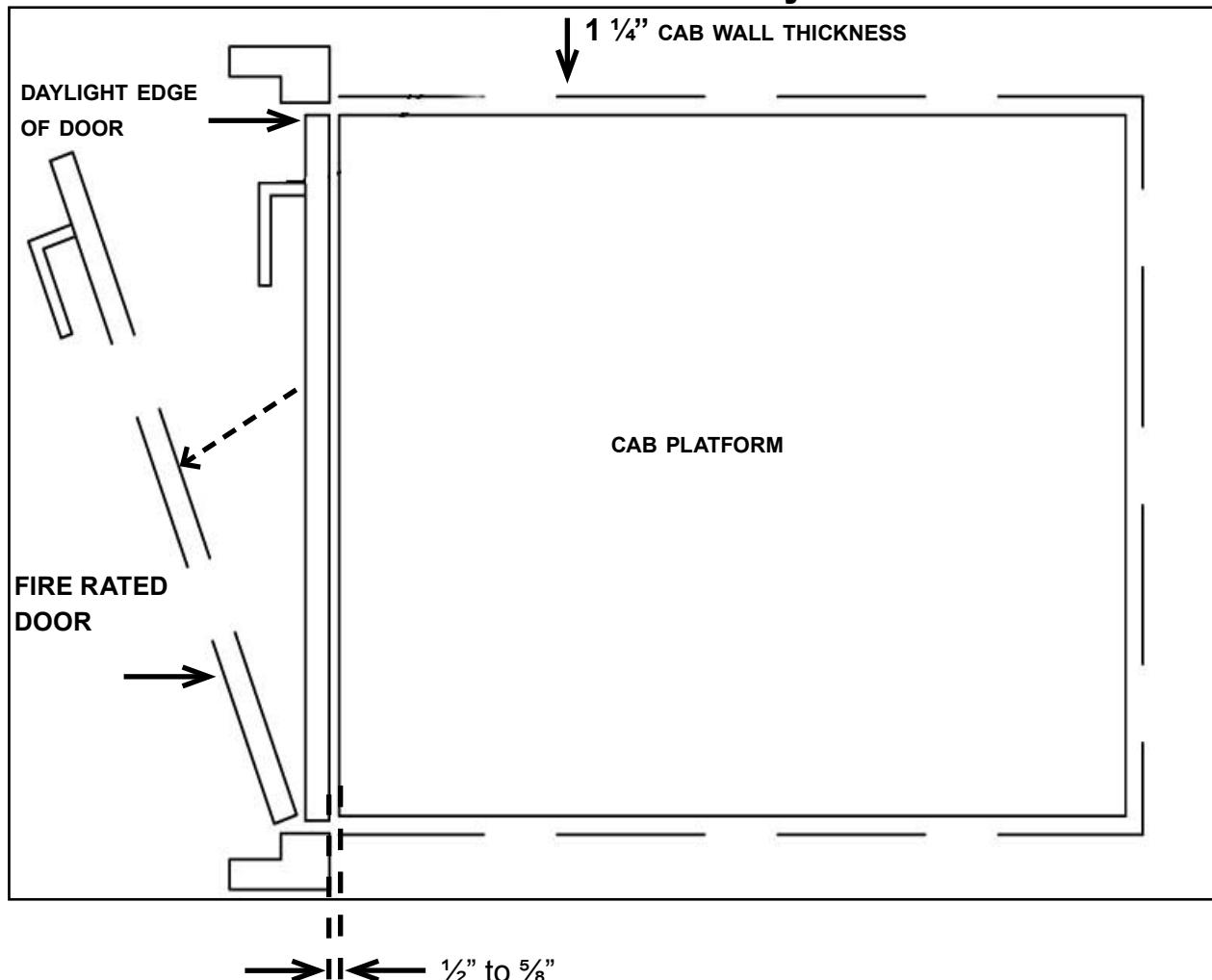


Figure 109 Positioning of Pro-Door and Frame

- 1) Begin at the bottom floor and move the door and frame into the rough opening.
- 2) Ensure the cab is square and level before lining up the doors.
- 3) Line up the door so the car sill to door sill is the required clearance (refer to installation drawings). For the left to right adjustment, line up the door frame to the cab opening. Ensure the door is square and level.
- 4) Fasten the door sill to the floor using large flat head screws (wooden floors); or the $\frac{1}{4}$ " x $1\frac{1}{4}$ " drive pins supplied (concrete floors). It is a good idea to discuss entrance placement (sill) with the contractor since, in some cases, the sill may have to be raised to permit the finished building floor to match the door sill.
- 5) Secure the top of the frame with the frame support brackets, $\frac{3}{8}$ " x $\frac{3}{4}$ " long bolts, washers, nuts and $\frac{1}{4}$ " x $1\frac{1}{4}$ " drive pins supplied.
- 6) After the frame is secured, carefully open the door and check the clearance between the beak/latch bolts and the door lock. The door must latch easily.
- 7) Set the rest of the floor doors and frames in the same manner as above.
- 8) The frames can now be either bricked-in or framed-in and dry-walled. It is recommended that the installer be on-site when the contractor finishes around the door frames.
- 9) When the door frames are complete, install the fascias between the door frames. Note that on through-cabs the fascias must be put on above and below rear door frames, or to meet local code requirements. Install the fascias using pop rivets at the top and bottom of the door frames. Use $\frac{1}{4}$ " drive pins to secure the fascias at the edge.

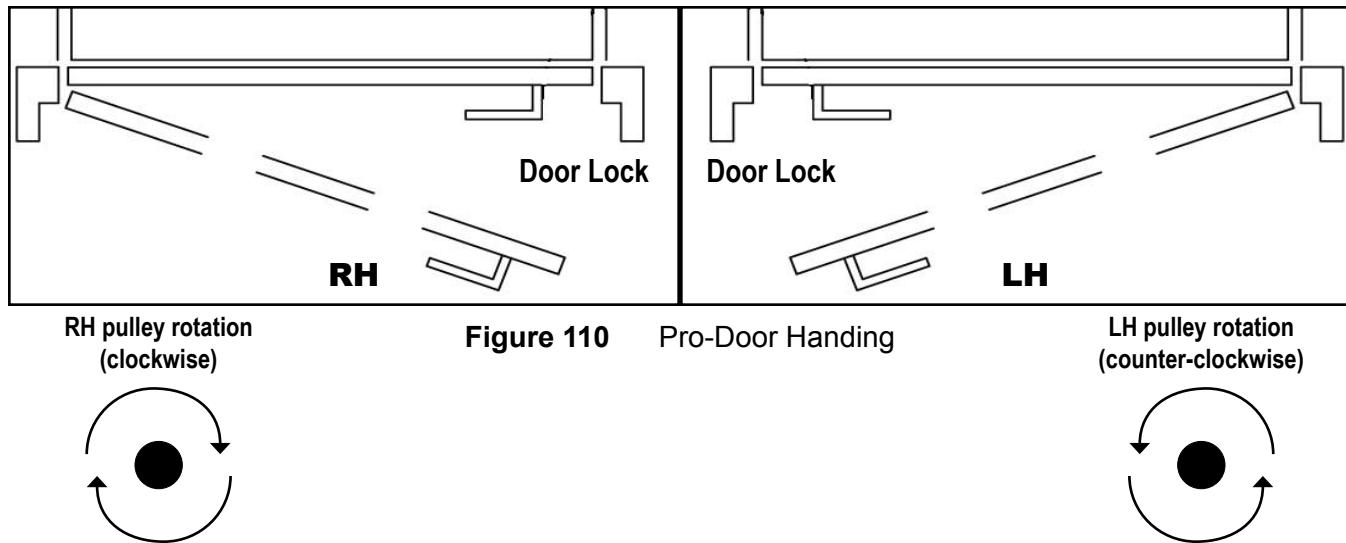
NOTE

Fascias must be custom measured at the site and are a different size for each job. Therefore, they are not supplied by the factory and must be obtained locally.

8.1 PRO-AUTO DOOR OPERATOR III INSTALLATION

8.1.1 Operator Adjustment

The Pro-Auto Door Operator III is factory shipped pre-installed in fire rated Pro-Auto Doors. The handing of the Pro-Auto Door and the Pro-Auto Door Operator III must be the same, LH (PN 300698) or RH (PN 300697). **Note that Pro-Door handing is determined by which side the door lock is on.**



Electrical connections, cam adjustments and tension settings must be completed to enable operation.

- 1) Remove the operator cover from the Pro-Door header. Set the hardware aside.
- 2) Remove the $\frac{1}{4}$ " x $1\frac{1}{4}$ " flat-head Phillips screw securing the arm assembly to the operator spring shaft. Slide the arm from the spring shaft.
- 3) Set the tension on the spring as follows:
 - a) **For right-hand operators**, rotate the pulley in a **clockwise** direction to feel a noticeable resistance. Release the pulley, and when it stops rotating, turn the pulley **clockwise** 3 more times and insert a small flat-head screwdriver between the belt and the pulley. Refer to Figure 111.
 - b) **For left-hand operators**, rotate the pulley in a **counter-clockwise** direction to feel a noticeable resistance. Release the pulley, and when it stops rotating, turn the pulley **counter-clockwise** three more times and insert a small flat-head screwdriver between the belt and the pulley. Refer to Figure 111.

- c) The operator may have to be removed for this step. If drive belt tension adjustment is required, loosen the three $\frac{1}{2}$ " Phillips machine screws from the motor mounting bracket and slide left or right to tighten/loosen the belt around the pulley. Refer to Figure 111.

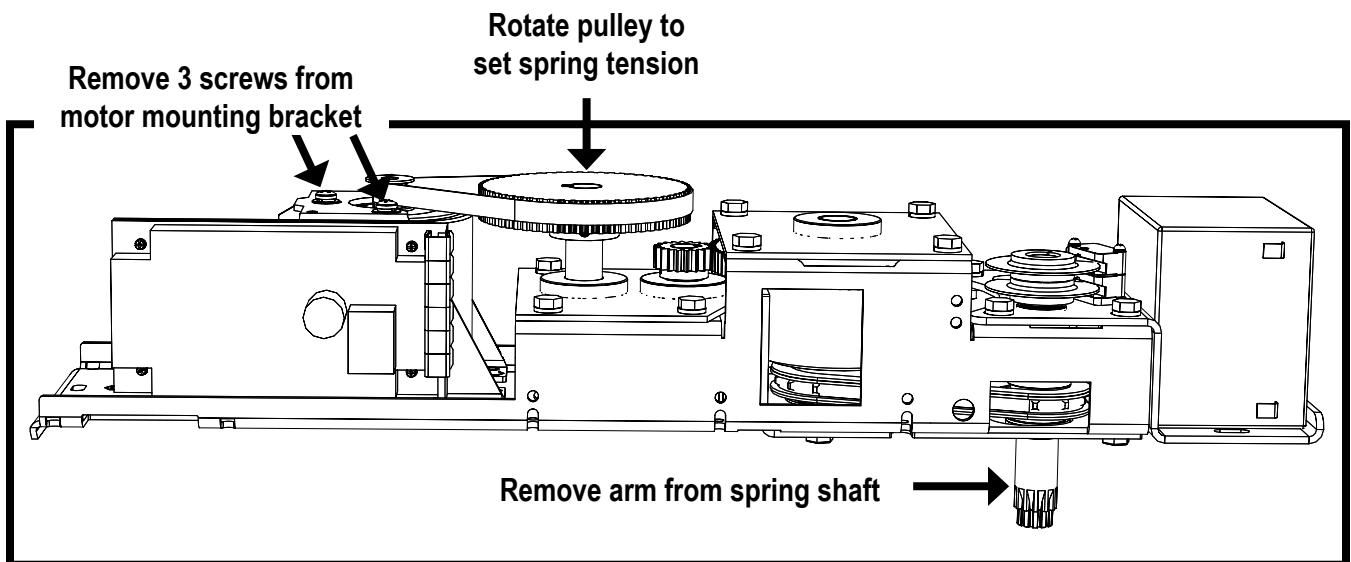


Figure 111 Setting Spring Tension (RH Shown)

- d) With the door at a 45° , place the arm over the spring shaft and secure with the $\frac{1}{4}'' \times 1\frac{1}{4}''$ flat-head Phillips screw. Remove the screwdriver and test door function
- e) If more adjustment is required, open the door to a 45° angle and stop the drive belt by inserting the screwdriver between the belt and pulley. Remove the $\frac{1}{4}''$ screw and separate the arm from the spring shaft.
- f) **To further increase spring force:** from the 45° angle, close the door approximately 12", rotate the arm by one spring shaft groove, and loosely re-attach the arm to the spring shaft with the $\frac{1}{4}''$ screw.

OR

- g) **To further decrease spring force:** from the 45° angle, open the door approximately 12", rotate the arm by one spring shaft groove, and loosely re-attach the arm to the spring shaft with the $\frac{1}{4}''$ screw.
- 4) Connect the electrical wiring as per **Section 8.1.2 Electrical Installation**.
- 5) Adjust cams and pots as per **Sections 8.1.3 Potentiometer Adjustments and 2.4 Setting the Cams**.
- 6) Once no further adjustment is required, remove the $\frac{1}{4}''$ screw, apply blue Loctite thread locker (or equivalent), and firmly re-install the screw through the arm and spring shaft.
- 7) Re-install the door header cover.
- 8) Test operation.

8.1.2 Electrical Installation

IMPORTANT

The battery back-up wires are shipped disconnected. Connect the red and black wires to T4-1 (negative) and T4-2 (positive) terminals and check the F1 fuse for continuity.

- 1) Connect the operator harness from terminal T2 on the Operator Control Board to the elevator Hoistway Junction Board (i.e. TDOB, TDOM, TDOT). Refer to the Electrical Schematics supplied with the lift/elevator. Also refer to Figure 112 on a later page.
- 2) Connect the lock harness located in the door header to the hall station harness. Refer to the Electrical Schematics supplied with the lift/elevator.

Jumper Configuration

Start-Up

J1	Initial Force Jumper, RH two pins for max. or LH two pins for min. Set to the maximum position only if the extra initial opening force is required to get the door started; otherwise set to the minimum position.
J3	Install jumper (should stay installed)

During initial installation set the following:

- 1) **Initial Force Jumper J1 must be set to MIN.**
- 2) **Pot R13 Open Speed must be set to MIN. Remaining pots must be set to top centre as shown in Figure 112.**
- 3) Slowly turn R13 Open Speed clockwise until the door opens. Leave R13 at this setting.
- 4) When R13 Open Speed is set to MAX, the board will shut down. Turn R13 Open Speed counter-clockwise to MIN and repeat step 3.

8.1.3 Potentiometer (POT) Adjustments

The cams “stop” and “start” the opening and closing of the door. However, if fine tuning is required, there are five potentiometers located on the circuit board which can be adjusted. In each case, turning the pot clockwise increases the value, and counter-clockwise decreases the value. Refer to Figure 112.

POT	FUNCTION	INITIAL SETTING
R16	OPEN TIME	CW sets the Open Time to maximum, approximately 1 minute
R13	OPEN SPEED	CCW sets Open Speed to minimum
R18	HOLD CURRENT/BACKCHECK	CCW sets Hold Current to minimum
R39	CLOSE SPEED	CCW sets Close Speed to minimum
R45	OPENING FORCE/OVERCURRENT	CW sets the Overcurrent trip point to maximum

TERMINAL	FUNCTION
T1	Motor power leads connector, T1-1 (+), T1-2 (-)
T2	Lift/Elevator Main Control Board harness connector
T3	Switch and Cam Assembly harness connector
T4	Battery Back-Up leads connector, T4-1 (+), T4-2 (-)
T5	Remote Control Receiver harness connector (not used)
TSS	Electric Strike leads connector (provided by others)
TDOB	Wall mounted Push Button Switch leads connector (not used)
TAC	Wall Transformer (power in) leads connector (not used)

Refer to Figure 112 for pot layout.

- a) Set all the pots as previously indicated.
- b) Press the Door Open button. The Open LED will come ON.
- c) Adjust the Open Speed pot R13 to obtain the desired opening speed.
- d) Once the door reaches the open position, adjust the Hold Current pot R18 to hold the door open against the return spring.
- e) When the open time expires and the door begins to close, adjust the Close Speed pot R39 to obtain the desired closing speed.
- f) Repeat the above procedures as many times as required to fine tune the settings and adjust the Open Time pot R16.
- g) Adjust the Opening Force pot R45 so that the door closes if it encounters an obstruction while opening. The amount of force the door will apply to overcome any obstruction or blockage is determined by the Opening Force pot setting.

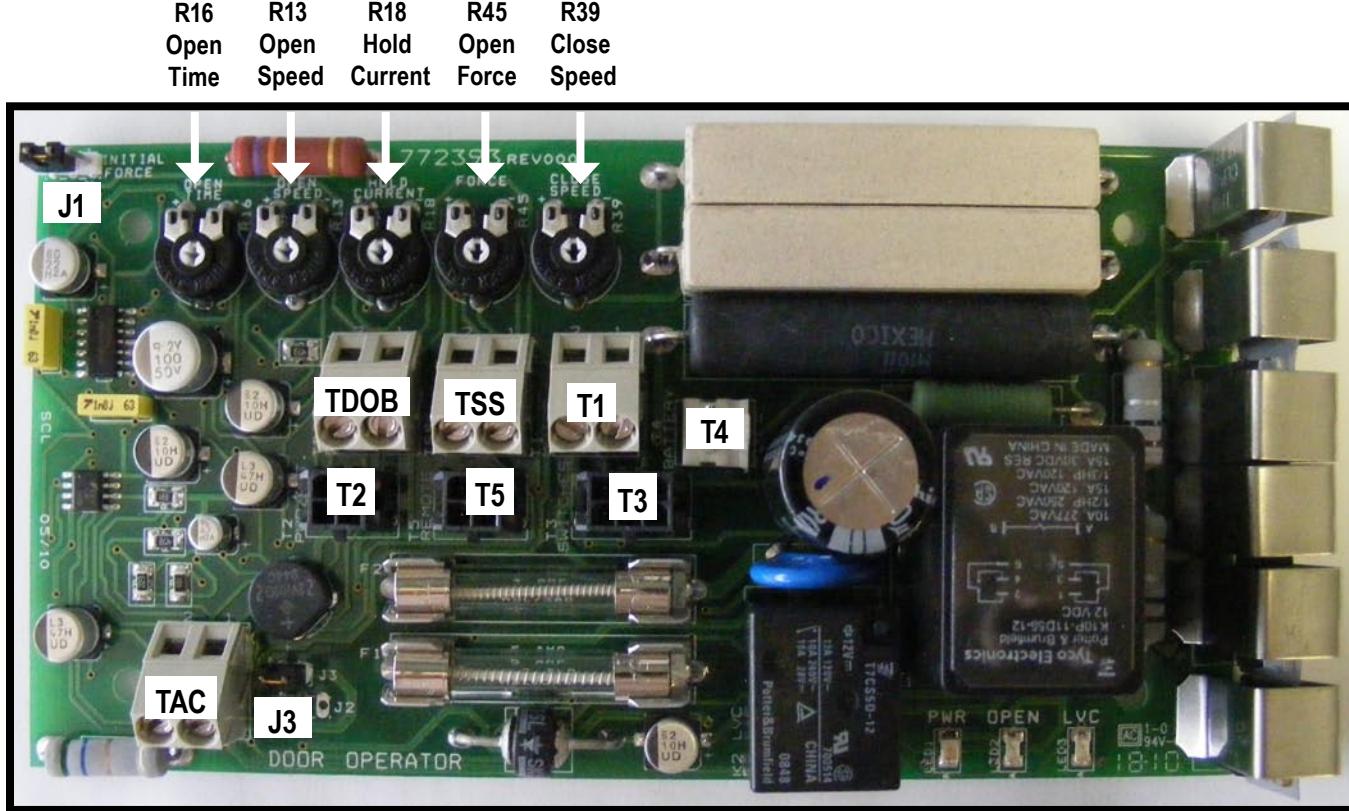


Figure 112 Control Board (PN 772393)

8.1.4 Setting the Cams

There are two cam and switch assemblies which require field adjustment. Adjust each cam in the exact sequence as indicated below:

- 1) Use a pair of needle-nose pliers to hold each cam and manually rotate around the spring shaft into position.

- 2) Brake Switch (Top Switch, Fig. 113-A)

Wire colours are Red and Green; the switch is wired normally open. As the door is closing, adjust the upper cam (Brake Switch cam Figure 113-A) so that the cam stops making contact with the microswitch when the door is 3/4" (19 mm) from the fully closed position.

- 3) Open Limit Switch (Bottom Switch, Fig. 113-B)

Wire colours are Brown and Blue; the switch is wired normally open. Adjust the lower cam (Open Limit cam Figure 113-B) so that the cam stops making contact with the microswitch when the door is in the fully open position.

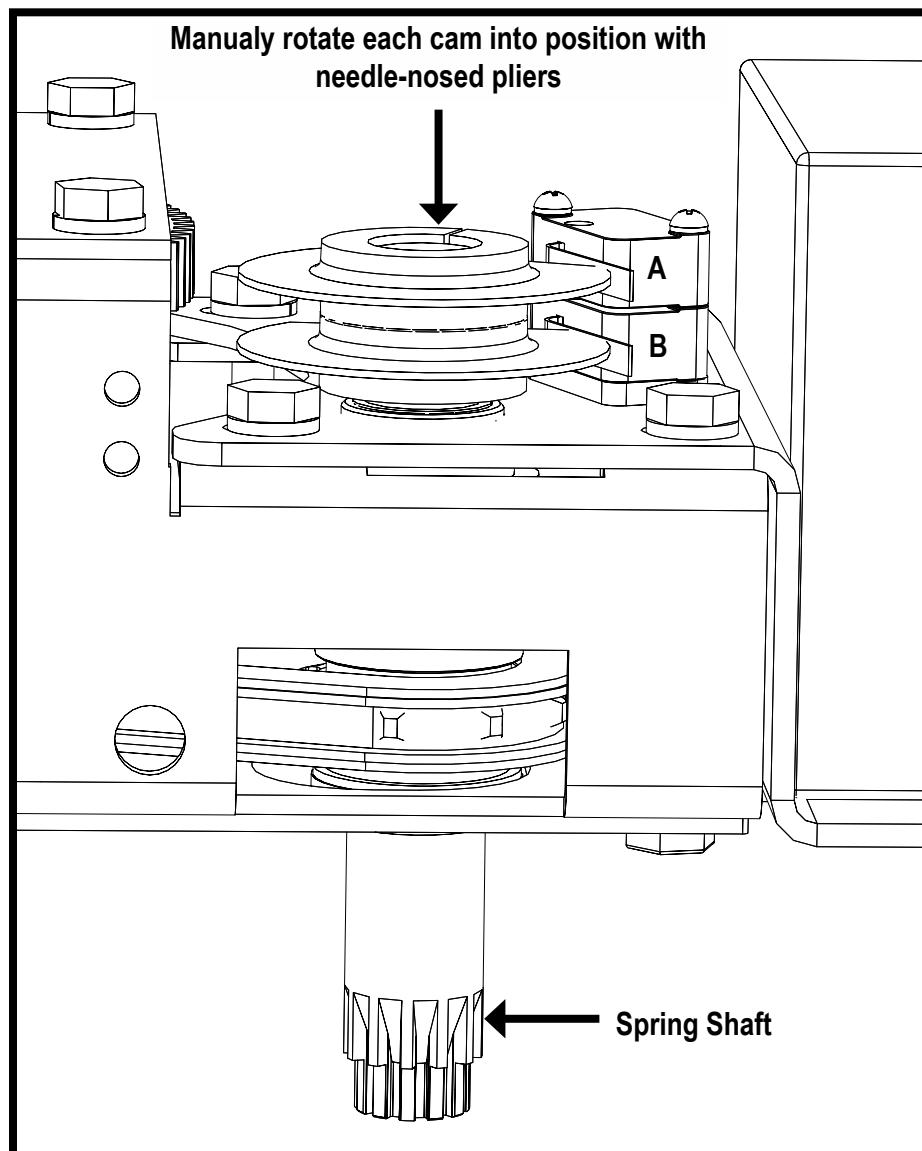


Figure 113 Cam and Switch Assembly

9.0 PRO-LOCK INSTALLATION

The PRO-LOCK is a true interlock (or elevator style lock). An electric contact will interrupt the power to the control mechanism if the door is in the OPEN position or if the door is not securely closed and locked. The interlock will prevent movement of the elevator when the door is OPEN. The PRO-LOCK is also the rated Fire Latch for use with the PRO-DOOR.

9.1 PRO-LOCK OPERATION

- ◆ With the door in the closed position, the Pro-Lock is de-energized and the door is locked in the closed position.
- ◆ The latch-bolt is positioned forward into the doorkeeper.
- ◆ When the latch bolt center pin strikes the post in the center of the keeper, it allows the silver-plated electrical contacts within the Pro-Lock to close.
- ◆ This action informs the controller that the door is "closed and locked", and the lift will respond to a call.
- ◆ When the elevator arrives at a floor, the Pro-Lock is electrically energized to unlock the door.
- ◆ The lock remains unlocked when the door is open. When the door is closed, the lock remains energized until a pre-set time passes. The solenoid then de-energizes to lock the door and complete the circuit to the controller.

9.2 PRO-LOCK ADJUSTMENT

The PRO-LOCK is factory installed in each PRO-DOOR and tested prior to shipping.

Site adjustment may be required to the lock and keeper.

The lock body is mounted in the entrance assembly frame and is accessible from the hoistway side. The keeper is mounted on the face edge of the door.

- 1) To ensure proper and consistent operation of the Pro-Lock, open and close the door and observe the lock function.
- 2) First, remove the lock cover from the hoistway side by removing the four (4) attachment screws. The mechanical action of the lock can be exposed for viewing the manual opening and closing of the lock mechanism.
- 3) From the hoistway side, manually press down on the top of the solenoid where it attaches to the latch bolt lever yoke. This will retract the latch bolt into the lock body and unlock the door.
- 4) Slowly release the pressure on the latch bolt and let it return into the door keeper. If correctly aligned, the movement of the latch bolt will be smooth and easy as it enters the keeper.

- 5) If the latch bolt operation appears to be stiff and does not cleanly enter the keeper, then some adjustment of the keeper and/or lock assembly is needed. There is some movement of the lock body on the slotted mounting holes provided. These can be seen when the cover is removed.

NOTE

Disconnect the power supply before removing the nuts to avoid shorting the electrical contacts to ground.

- 6) Access to the nuts holding the lock is best achieved with a "nut-driver". There is limited space within the lock; therefore, care must be used when inserting the nut driver.
- 7) Loosen the nuts. The lock body may now be moved slightly up and down, as well as in and out, toward the keeper. Tighten the attachment nuts when completed. Make sure that wiring does not get caught under the nuts.
- 8) If the alignment is still not correct, there are four (4) screws on the face of the keeper. The two (2) outside screws are for fastening the keeper mounting plate to the door edge. The two (2) inner screws are for adjusting the position of the keeper itself in relation to the latch bolt in the lock.
- 9) Loosen the two inner screws, just enough to allow the keeper to move. Do not remove the inner screws. Note that the keeper may be adjusted 360° within the back plate holder. If the screws are left "snug", the keeper will stay in any position it is placed.
- 10) Close the door to allow the latch bolt to release and move forward into the keeper. If it does not enter cleanly, then gently push the latch bolt into the keeper. The keeper will adjust its position to align with the latch bolt. With the latch bolt in the keeper, try to open the door. This pressure will assist the keeper to align itself.
- 11) Manually open and close the latch bolt and note that the operation is smooth (since the keeper is now aligned). Manually open the latch bolt and tighten the keeper attachment screws.

9.3 ELECTRICAL CONTACTS ADJUSTMENT

Observe the two (2) electrical contacts on the carrier mounted on top of the latch bolt. When the latch bolt is fully forward into the keeper, there should be at least $\frac{1}{16}$ " (2 mm) of spring compression on each side of the contact.

This indicates sufficient contact pressure to permit consistent electrical operation. If the spring compression is less than $\frac{1}{16}$ " (2 mm), it may be necessary to shim the keeper forward toward the lock assembly.

NOTE

The PRO-LOCK has been certified by CSA International as a true interlock.
The PRO-LOCK has also been tested and certified to the A.S.M.E. A17.1 and the CSA
B44 Standards for elevator interlocks.

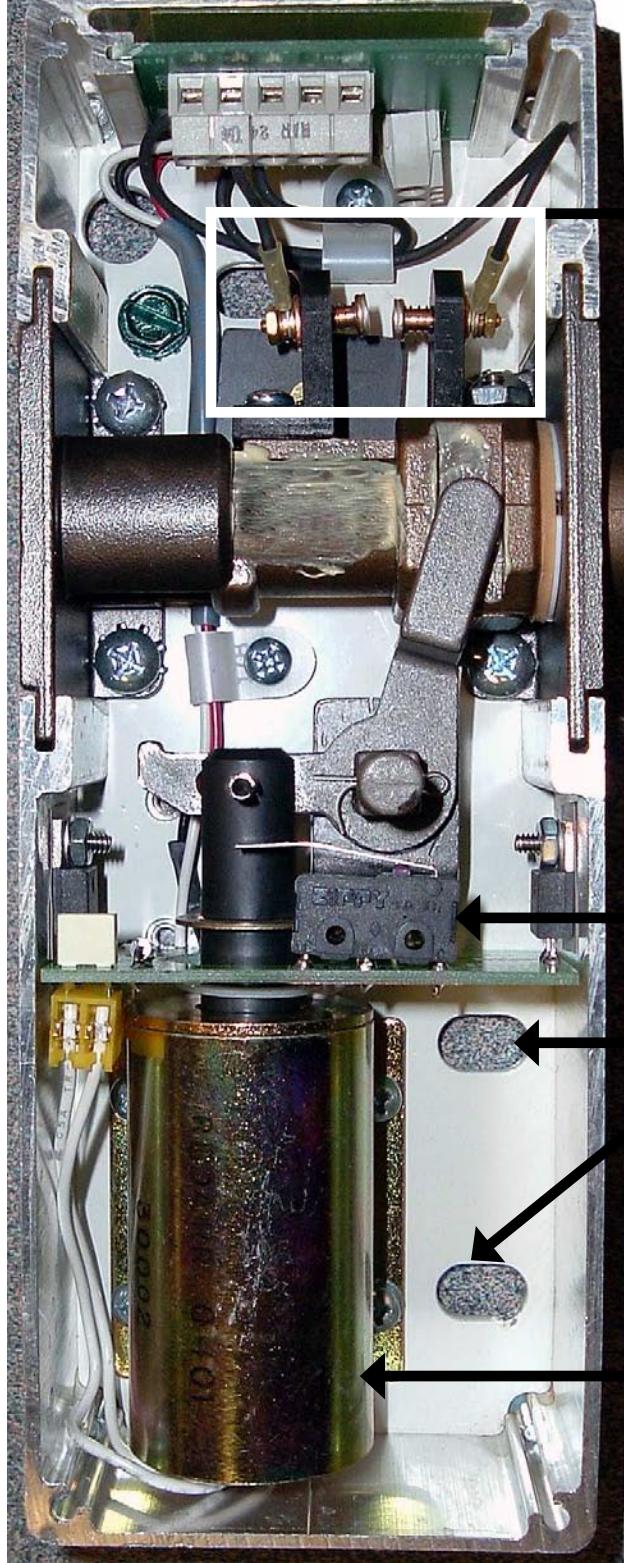
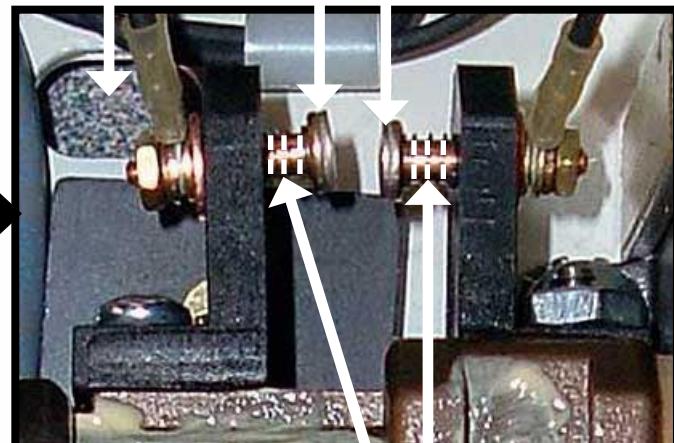


Figure 114 Pro-Lock RH

Mounting nuts
insert slot

Lock contacts



Compression springs

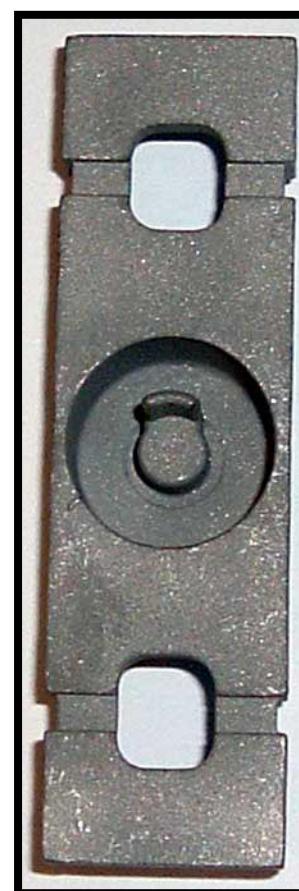


Figure 115 Pro-Lock Keeper

10.0 ADJUSTING AND SETTING THE EPV VALVE

When the EPV-12 is installed, the oil line must have a minimum $\frac{3}{4}$ " dia. with a $\frac{1}{2}$ " dia. NPT adapter at the jack.

MODELS

The EPV variable speed (control) valve is provided in three models:

- EPV-4 is intended for oil flows up to four (4) gallons per minute, the minimum down working pressure is 180 psi.
- EPV-7 is intended for oil flows in excess of four (4) gallons per minute, up to a maximum of seven (7) gallons per minute, the minimum down working pressure is 300 psi.
- EPV-12 is intended for oil flows up to a maximum of twelve (12) gallons per minute, the minimum down working pressure is 300 psi.

10.1 SETTING THE OVER PRESSURE RELIEF VALVE

The EPV Series valves are equipped with an adjustable relief valve that, when set, may be locked and sealed by an inspector. This is also a requirement of most enforcing authorities. As well, it is recommended that the relief valve be tested and set, even in jurisdictions where an inspection is not required.

To set the relief valve, place a full load on the car and run the lift in the UP direction. Read the pressure gauge as the lift ascends, and mark down the pressure indicated. This is the working pressure of the lift. The relief must be set to open at a pressure not greater than 125% of the working pressure. If the indicated pressure was 800 psi, then the maximum relief pressure permissible by the code is 1000 psi ($800 \text{ psi} \times 125\% = 1000 \text{ psi}$).

NOTE

To test the lift and set the valve, connect a jumper between TP1 and TP2 on the controller panel signal board of the Orion if the wiring is not completed. This will send power directly to the valve signal board. The connection of Temporary Run Buttons is also recommended.

NOTE

There is a facility to install a seal, if required by the inspector. The seal may be threaded through the holes in the domed cap and through the hole provided at one corner of the body of the valve.

NOTE

DO NOT exceed a working pressure of 1600 psi.

- 1) Remove the dome cap on the relief valve and expose the Allen Head adjusting screw and lock nut. Refer to Figure 116/J.
- 2) Loosen the lock nut and place a $\frac{1}{4}$ " (6 mm) Allen wrench in the adjusting screw. Initially, turn the adjusting screw out at least two (2) full turns.
- 3) Close the Main Shut OFF valve with the rear handle. (Figure 116/A)
- 4) Using the Temporary Run Buttons, press the UP button and let the motor come up to speed. Continue to allow the motor to run as the adjustment is done. Observe the pressure reading on the gauge.
- 5) To increase the relief valve pressure, turn the screw in (clockwise). To reduce the relief pressure, turn the screw out (counter-clockwise). Turn the adjustor screw until the indicated pressure on the gauge is about 1000 psi.
- 6) Release the button to stop the motor. Tighten the lock nut. The relief valve is now set.
- 7) Install the domed cap.
- 8) Open the Main Shut OFF valve.

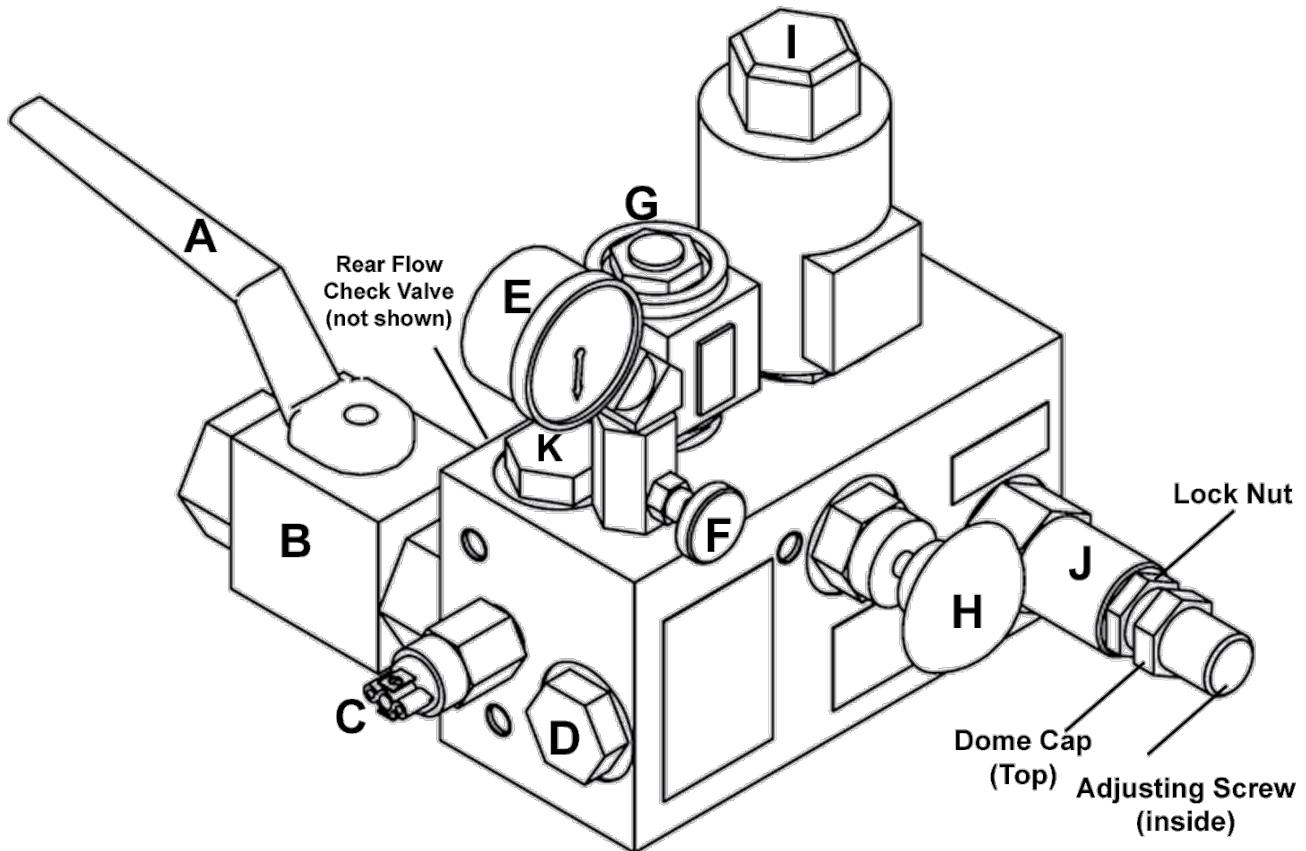


Figure 116 EPV 4-7 Variable Speed Valves

- | | |
|---------------------------------|---------------------------|
| A Main Shut OFF Valve Handle | H Manual Lowering Release |
| B Main Shut OFF Valve | I Proportional Valve |
| C Low Pressure Switch | J Relief Valve |
| D Check Valve | K Slack Rope Valve |
| E Pressure Gauge | |
| F Pressure Gauge Shut OFF Valve | |
| G Down Solenoid | |

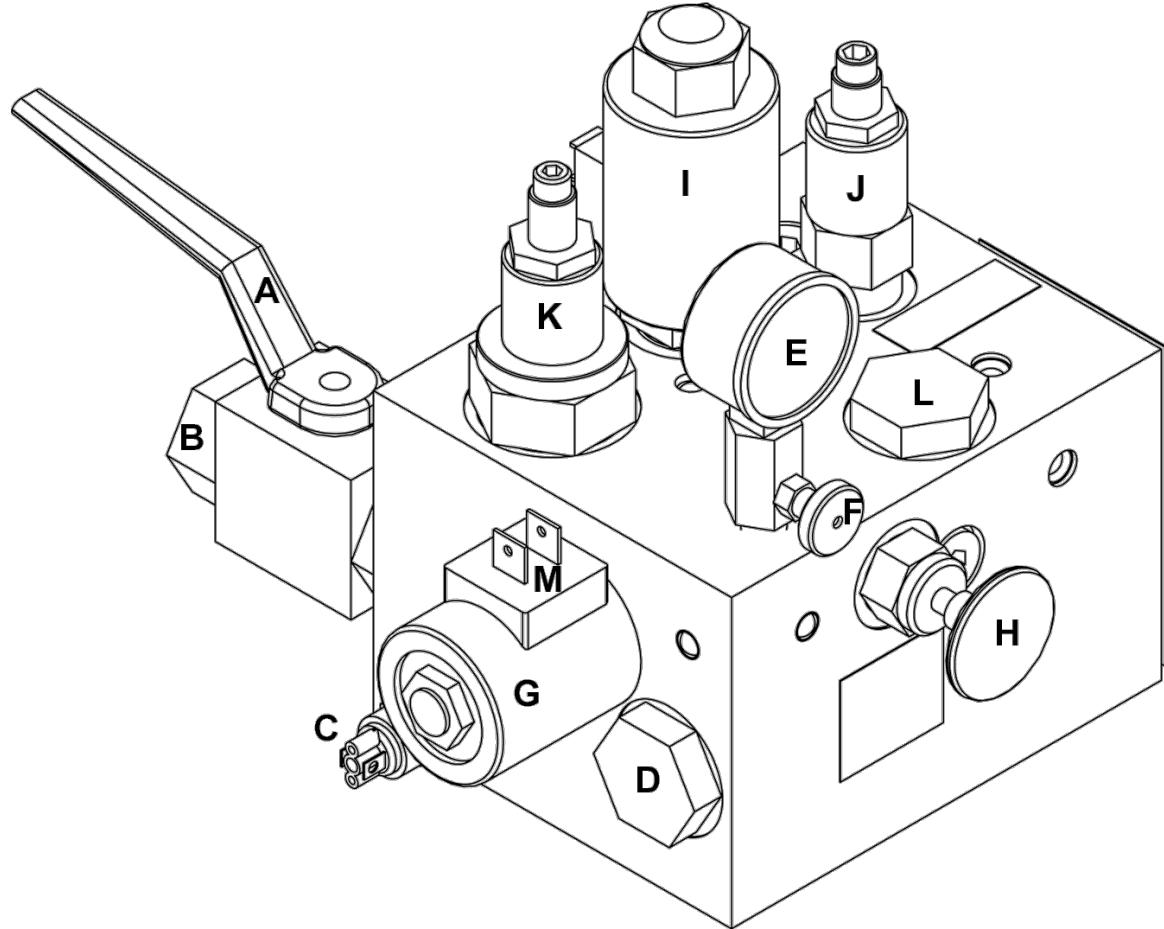
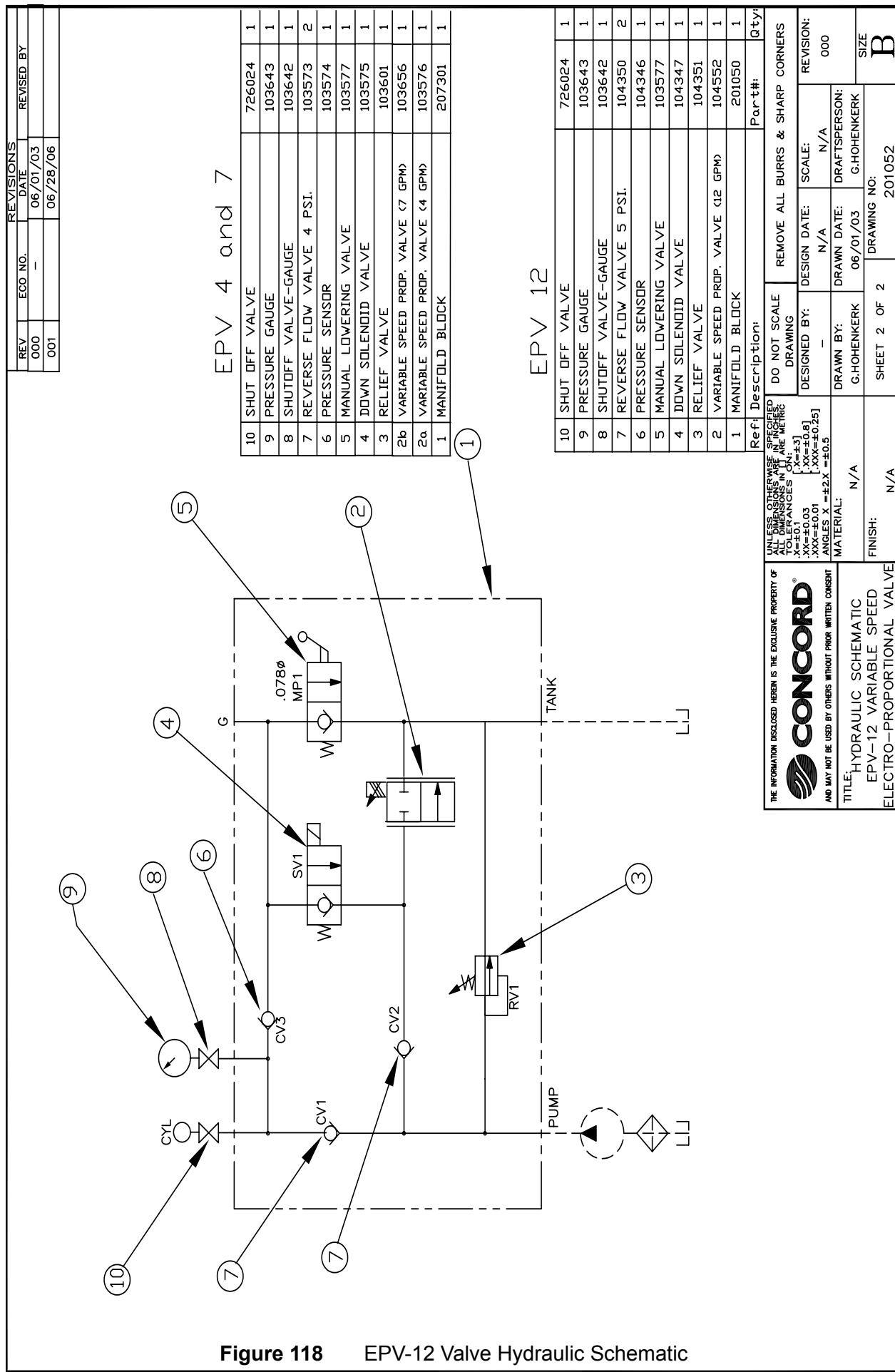


Figure 117 EPV-12 Variable Speed Valve

- | | |
|---------------------------------|-------------------------------------|
| A Main Shut OFF Valve Handle | I Proportional Valve |
| B Main Shut OFF Valve | J Pressure Relief Valve |
| C Low Pressure Switch | K Adjustable Slack Rope Valve |
| D Check Valve | L Check Valve |
| E Pressure Gauge | M Down Solenoid Electrical Contacts |
| F Pressure Gauge Shut OFF Valve | |
| G Down Solenoid | |
| H Manual Lowering Valve | |



10.2 PRESSURE GAUGE

(Figure 116/117 E, F)

Every EPV valve is provided with a standard pressure gauge and a pressure gauge isolating valve. It is recommended that the gauge be isolated from the pressure line by turning the gauge isolating valve to "OFF", unless the lift is being repaired or serviced.

To return the gauge to "ZERO" pressure before closing the isolating valve:

- 1) Rotate the handle of the Main Shut Off valve handle to the "OFF" position.
- 2) Open the manual lowering valve by pulling on the red handle on the front of the valve. The gauge will return to "ZERO".
- 3) Turn the gauge isolating valve to the "OFF" position.
- 4) Return the Main Shut Off to the "ON" position (parallel with the oil line).

10.3 SLACK ROPE MONITOR VALVE

WARNING

INSTALL THE RAIL STOPS AND SET THE SAFETY BRAKES BEFORE MAKING ANY ADJUSTMENTS UNDERNEATH THE CAB WHILE THE LIFT IS IN MOTION. FAILING TO DO SO MAY RESULT IN SEVERE INJURY.

(Figure 116/117 K)

Each EPV valve is provided with a standard monitor to detect the occurrence of slack rope or "loss of pressure" in the hydraulic system. The device is non-adjustable and is **permanently mounted in the body of the valve**. If required, the EPV 4 and 7 valve may be removed for servicing, but otherwise needs no attention. The EPV 12 is also factory pre-set but may require adjustment.

- 1) To test the valve, the technician must create a loss of pressure in the hydraulic system. This can be done by manually setting the safeties on the car, or supporting the car on the rail stops.
- 2) Pull on the Manual Lowering Release (Figure 116/117 H) and observe the hydraulic plunger. There may be a slight movement of the plunger as the remaining pressure bleeds off. The plunger will remain in position while the manual lowering handle is held open, some slack cable may occur.

- 3) Raise the car with the Temporary Run Buttons connected at the pump control and repeat.
- 4) Repeat the test using the Temporary Run Buttons to energize the down solenoid. There may be a slight movement of the plunger as the remaining pressure bleeds off. The plunger will remain in position while the DOWN solenoid is energized. Some slack cable may occur.
- 5) To reset the valve, simply raise the lift from the safeties and allow pressure to return to the hydraulic system. The valve will automatically reset. Take care that any slack cable is carefully aligned with the sheave prior to raising the plunger and reset the slack (plank) cable switch on the sling of the cab. Refer to Figure 119.

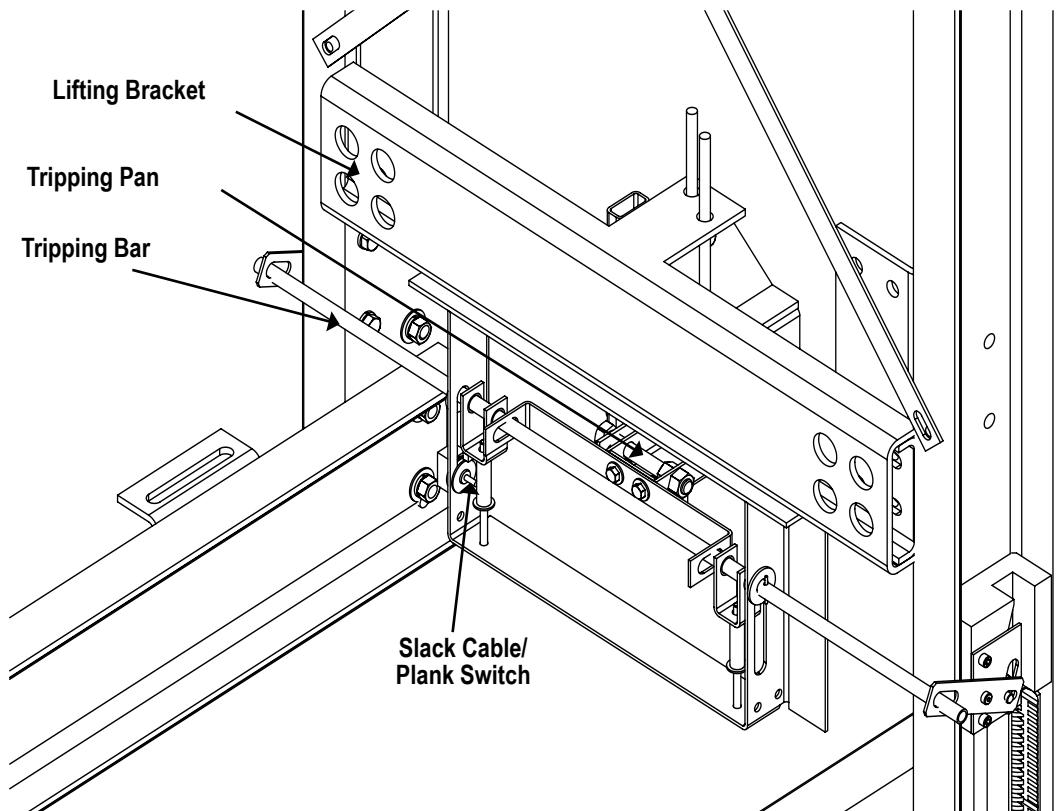


Figure 119 Slack Cable Switch

EPV 12 Adjustment (Slack Rope Monitor)

- 1) Loosen the lock nut. Figure 117 K.
- 2) Insert an Allen key in the adjusting screw and rotate counter clockwise to stop.
- 3) Turn clockwise by 2 turns.
- 4) Check operation and adjust as required. Clockwise increases the pressure required to bring the cylinder down.

10.4 LOW PRESSURE SWITCH (AKA NEGATIVE PRESSURE SWITCH)

(Figure 116/117 C)

When activated due to loss of pressure, an electrical contact in the negative pressure switch on the left side of the valve will open the power supply to the DOWN solenoid. This switch has been factory set, but adjustment on site is possible.

There is an adjustable screw on the end of the switch. Turning the screw clockwise will increase the pressure at which the contacts open. Turning the screw counter-clockwise will reduce the pressure at which the contact opens. Typically, the contact will open at about 75-100 psi.

- 1) To test the switch on-site, place the leads of a VOM test meter directly on the DOWN solenoid and across the two solenoid connections. Refer to Figure 116/117 E.
- 2) Set the meter on low voltage direct current setting. With the lift operating in the DOWN direction, the meter should read approximately 24 Volts DC, because the solenoid is now energized.
- 3) Stop the lift and close the handle of the main gate valve. Attempt to run the lift in the DOWN direction by placing a down call.
- 4) If the main gate valve handle is in the open position, the pressure gauge will read ZERO. The test meter should read ZERO volts on the solenoid connections due to the contacts opening in the negative pressure switch. If there is power on the connections, adjust the switch as instructed.

10.5 SEQUENCE OF OPERATION OF THE EPV VALVE

The following functions (F#) are used to set the various speeds of the lift.

UP Direction	Function	Acronym
UP start time delay	("F0" Function)	F0
UP high (normal) speed	("F4" Function)	uH
UP low (levelling) speed	("F3" Function)	uL
UP acceleration	("F1" Function)	uA
UP deceleration	("F2" Function)	ud

DOWN Direction	Function	Acronym
DOWN high (normal) speed	("F8" Function)	dH
DOWN low (levelling) speed	("F7" Function)	dL
DOWN acceleration	("F5" Function)	dA
DOWN deceleration	("F6" Function)	dd

- 1) The EPV solenoid is fully closed, when a button is pressed to call or send the lift in the UP direction, power is applied to the valve circuit board and the microprocessor.
- 2) On power up, the solenoid fully opens for a short period (about one second), when all the oil sent from the pump returns to the oil reservoir. This permits the motor to start up under very little load.
- 3) This start time is adjusted using the "F0" UP Start Time Delay setting displayed on the valve circuit board. The microprocessor continues to send signals to the EPV solenoid as per the "F0" settings.
- 4) When the timing of the "F0" setting has passed, the display changes to the "F1" UP Acceleration setting and the lift smoothly ACCELERATES.
- 5) The valve circuit board display then changes from "F1" to the "F4" UP High Speed setting.
- 6) When the elevator reaches its selected floor, the magnetic switch at that floor will send a signal to the controller that the elevator is at the correct floor. The processor starts the DECELERATION phase to the floor level.
- 7) The display will indicate a change from "F4" back to "F2" UP Deceleration setting, and the lift will immediately start to slow down, as the solenoid responds to the new signal. The slow down distance from full speed to levelling speed is approximately 5" to 5 ½" (127 mm - 140 mm). (The distance depends on magnet length-and both vary depending on speed).
- 8) As the lift approaches within a few inches of the floor level, the display will change from "F2" to "F3" UP Levelling setting.
- 9) The lift will slow to the preset "LEVELLING SPEED" and will continue ascending until the magnetic switch signals the next STOP.
- 10) The process for the DOWN direction operation and speed signals is identical to the UP direction, except the EPV valve starts closed and opens to increase the DOWN speed. The function numbers are also different, for example, "F5" is the DOWN Acceleration, F6 is the DOWN Deceleration, "F7" is the DOWN Levelling, and "F8" is the DOWN Full Speed setting.

10.6 DETERMINING SPEEDS

A tachometer is recommended to set the speed setting of the lift. Refer to the recommended speed settings and the Installation Drawings for the rated speed of the lift. Note the recommended speed setting are not absolute and may have to be adjusted to suit the application.

The Temporary Run Buttons must be set up and wired, as instructed in the manual, refer to **Section 5.2, Temporary Run Button Installation.**

- Press the UP button to allow the lift will ascend at levelling speed. By holding in the UP button and pressing the High Speed button, the lift will accelerate to full speed. Note the rate of acceleration. The same procedure is required for the DOWN direction settings.
- If a tachometer is not available to set the speeds, use a stopwatch and time the lift to set the speeds. A simple method to set the levelling speed is to use a standard landing doorway height. This height is usually 80" or 84" (2032 mm or 2134 mm).
- For the DOWN direction, set the lift car with the platform opposite to the top of the door panel. This means the platform is now about 80"- 84" higher than the landing sill. Use the stopwatch (or the second hand of a watch) and start the lift down in slow or levelling speed. Time how long it takes to reach the bottom of the door or the landing level. It should take about one (1) minute, and the levelling speed will be approximately seven (7) feet per minute.
- If the speed is faster, the time will be shorter than one minute, decrease the "F7" setting. (The lower the number is set, the slower the levelling speed.)
- If the timing is longer than one minute, then to speed up the lift, the function "F7" will have to be increased. The technician should note that the time of one minute is only approximate, not absolute. The objective is to adjust the levelling speed to be approximately seven or eight (7 or 8) feet per minute.
- Repeat the process for the UP direction levelling speed. Start at the landing level and time how long the lift takes to reach the top of the door panel.

10.6.1 Set Speed Without a Tachometer

- 1) Time the UP fast speed by setting "F4" to the highest number, 96.
- 2) Time how long it takes to travel the full distance from level at the bottom landing to level at the top landing. Note this time.

NOTE

Before making any adjustments to the EPV, fully open the flow control on the jack assembly. Refer to Figure 48, pg. 45. On completion, turn to close the flow control until the speed is affected, back off $\frac{1}{2}$ turn away from that point, then lock.

- 3) Time how long it takes for the lift to travel from the level at the top landing to level at the bottom landing. The time should be approximately the same.
- 4) If the DOWN travel time is significantly longer than the UP travel time, then the lift is travelling slower. To increase the speed in the DOWN direction, the "F8" setting must be increased.

10.7 SPEED SETTING DESCRIPTIONS

The recommended speed settings are starting points only, more adjustment may be required.

EPV 4-7 F0 16

EPV 12 F0 16

- **F0** represents adjustment of the start time delay.

The start time delay is the amount of time between motor start up and lift motion; this delay is usually only required on smaller lifts such as the INFINITY. Adjust the numbers higher to increase the start time delay and downwards to reduce the start time delay.

EPV 4-7 F1 80 F2 60

EPV 12 F1 80 F2 40

- **F1** represents UP acceleration and **F2** UP deceleration.

Setting to a higher number shortens or makes the acceleration or deceleration harsher; setting to a lower number lengthens or softens the acceleration or deceleration.

EPV 4-7 F3 50

EPV 12 F3 85

- **F3** represents UP levelling speed.

Setting to a higher number increases the levelling speed; setting to a lower number decreases the levelling speed.

EPV 4-7 F4 95

EPV 12 F4 95

- **F4** represents UP fast speed.

Setting to a higher number increases the full speed of the lift; setting to a lower number decreases the full speed of the lift.

EPV 4-7 F5 80 F6 55

EPV 12 F5 80 F6 55

- **F5** represents DOWN acceleration and **F6** DOWN deceleration.

Setting to a higher number shortens or makes the acceleration or deceleration harsher; setting to a lower number lengthens or softens the acceleration or deceleration.

EPV 4-7 F7 25

EPV 12 F7 20

- **F7** represents DOWN levelling speed.

Setting to a higher number increases the levelling speed; setting to a lower number decreases the levelling speed.

EPV 4-7 F8 40

EPV 12 F8 30

- **F8** represents DOWN fast speed.

Setting to a higher number increases the full speed of the lift; setting to a lower number decreases the full speed of the lift.

11.0 PROGRAMMING THE VALVE

Each FUNCTION adjustment (F0 through F8) may be set to any number from 1 through 96. Typically, the higher the chosen number is, the further the EPV solenoid will open and the faster the lift will move. Note the value displayed is not the actual speed but a percentage of the speed only. The settings are different depending on speed, jack assembly and type of lift or elevator.

NOTE

The valve is programmed from 1 to 99, however, the use of numbers 97-99 is not recommended as it may cause problems.

The valve PC board is also equipped with several switches and buttons for setting purposes: TEST / NORMAL / LEARN / STORE / ONES / TENS. Refer to Figure 120.

TEST indicates valve programming and allows the reading of preset speeds.

NORMAL indicates the elevator run mode, the settings cannot be viewed or changed.

LEARN displays default settings or hold down and press TENS to change speeds.

STORE will enable the changes of preset speeds to be saved.

ONES allows changes to speeds by a segment of 1. i.e. 1, 2 3.

TENS allows changes to speeds by a segment of 10. i.e. 10, 20, 30 or press during operation to view function acronyms.

- 1) While the unit is running and the selector switch is on TEST (press the Temporary Run Button to run the elevator), then press the ONES and TENS buttons at the same time while a FUNCTION is displayed.
- 2) When the display begins to flash, release both buttons. The processor is now in programming mode.
- 3) While in the TEST mode, in order to scroll through the "F" functions, press the ONES button on the right side of the LED display. The left side of the display indicator shows an "F". The right side of the indicator shows the FUNCTION chosen, a number from 0 to 8. Choose the FUNCTION number that you wish to review, for example F8, DOWN Full Speed. Press the button slowly for each number increase or decrease.
- 4) Once a desired FUNCTION is displayed, press the LEARN button to view the factory setting.
- 5) Ensure that the magnets have been set at the floor levels as instructed in the manual, refer to Figure 69, pg. 65. It is recommended that **each adjustment be performed in the following order:**

UP Direction

1. "F0" Function
2. "F4" Function
3. "F3" Function
4. "F2" Function
5. "F1" Function

DOWN Direction

6. "F8" Function
7. "F7" Function
8. "F6" Function
9. "F5" Function

If the processor detects no input from the technician for five (5) minutes, it will default back to the NORMAL mode, even if the switch is in TEST mode. Any changes made while in TEST mode will be lost, and the processor will default back to the settings, as they were when the technician originally entered TEST mode. The five-minute time limit restarts every time there is input into the processor. To permanently save the settings made while in TEST mode, the TEST switch must be returned to NORMAL before the five-minute delay passes.

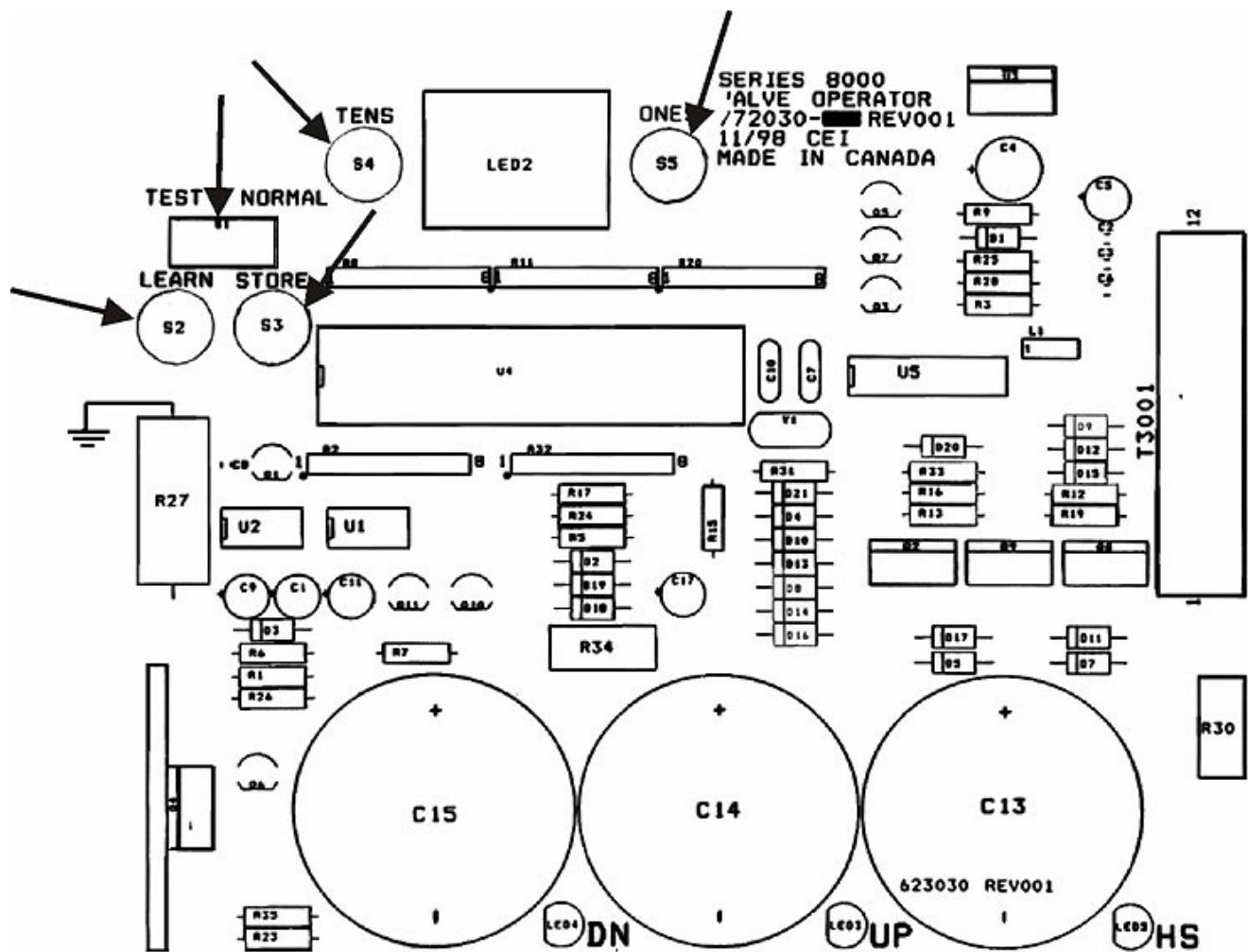


Figure 120 Valve Operator Board

11.1 SETTING SPEED

- 1) Scroll using the ONES button to F8, press the button marked LEARN and the display will change from "F8" to a number between 1 and 96. The indicated number is the value set for F8.
- 2) To check the speed of the lift for the F8 DOWN High Speed, ensure that the lift is high enough to be able to use the tachometer and read the current speed. Situate yourself and your co-worker in a safe position to place the tachometer on the lift.
- 3) Press the DOWN and HIGH SPEED buttons at the same time, and the lift starts and accelerates to full speed as per the current setting of F8. Note the full speed with the tachometer.
- 4) To adjust the DOWN speed, increase or decrease the F8 setting as required. To change the setting, press and hold the LEARN button while scrolling the ONES or TENS buttons. Adjust F8 to the lowest possible value while keeping the speed at the same rate. i.e. If lift runs down at the same rate as 70 and 50, select 50.
- 5) Press the STORE button while holding in the LEARN button. The number is now temporarily stored for use by the processor. When the toggle switch is returned to NORMAL, permanent storage will occur.
- 6) Check the DOWN speed again and compare it to the last measurement. The speed should have increased noticeably. If the speed still is not correct, adjust the settings up or down as indicated, to reach the desired speed. Use the same procedures just described for moving the settings.
- 7) Once the DOWN speed has been set correctly, the next recommended setting is the DOWN levelling speed. This is Function F7 on the display. Position the lift to use the tachometer for measuring the DOWN levelling speed.
- 8) Press the DOWN direction control button (without pressing the high speed button), and read the DOWN levelling speed. Five (5) f.p.m. to eight (8) f.p.m. seems to be the optimum setting, but this may vary depending on job site conditions.
- 9) Press the LEARN button to review the current settings, adjust the settings as instructed for the DOWN full speed, using the F7 function. To reduce or speed up the lift, adjust the numbers either UP or DOWN.

With the full speed and the levelling speed set, the lift can now be tested with a car or hall call to the bottom floor. It is preferable to be on the lift and watch it approach the floor.

- 10) Take the lift UP the runway a short distance using the temporary buttons, and then press a DOWN call. Take note of the DOWN acceleration, whether rough, smooth, or taking too long to reach full speed.

As the lift approaches the bottom floor, the magnetic switch will signal the lift to DECELERATE. If the deceleration is set too short, the lift will reduce its speed to levelling speed in a rough, jerky manner and remain in levelling speed for excessive time.

If the setting is too long, the DECELERATION may take the lift directly to the floor with no slow down or past the floor level. The ideal length of slow down is about 4" to 5" (102 mm - 127 mm), depending on speed of lift and length of the magnets. If the deceleration is too long, then the transition from high speed to levelling speed (deceleration) must be adjusted.

- 11) To set the deceleration, press the LEARN button while the display indicates F6 to observe the current setting. To reduce (or make harsher) the deceleration, the F6 setting must be increased. Check the deceleration again and note if the number must be reduced or increased in order to provide a smooth approach to the floor. (When satisfied with the performance of the valve, return the TEST switch to the NORMAL position).
- 12) The DOWN direction settings have been completed.
- 13) The adjustment of the UP direction settings is similar to the DOWN direction settings . Place the processor in TEST mode and change the display to F0.
- 14) Using the temporary buttons, start the lift in the UP direction at high speed. If there is any appreciable delay in the time between when the motor starts and the lift starts to move, the F0 function must be changed. Note that "appreciable delay" means any time beyond two seconds. As with all adjustments, a higher number means longer delay time and a lower number means shorter delay time.
- 15) The UP direction full speed adjustment, function F4, should be set between 88 and 96. This closes the solenoid and the full amount of the oil produced by the pump and motor will go straight to the jack assembly.
- 16) With the adjustments for UP and DOWN completed at the terminal landings, the technician can now install the magnets at the intermediate landings. It should not be necessary to further adjust the valve settings. The valve should automatically slow down and stop level at each intermediate landing.

11.2 ERROR MESSAGES

Error	Definition
E1	Function value memory error, will repair itself, no adjustment needed
E2	Default function values used, scroll through functions and press STORE
E3	Valve is not connected, check connection between Main Control Board and Proportional Valve
E4	Memory read/write error, faulty memory chip, contact Tech Support
E5	An UP and a DOWN command is received at the same time, check wiring at Main Controller, only 1 signal must be present

11.3 EPV MAINTENANCE

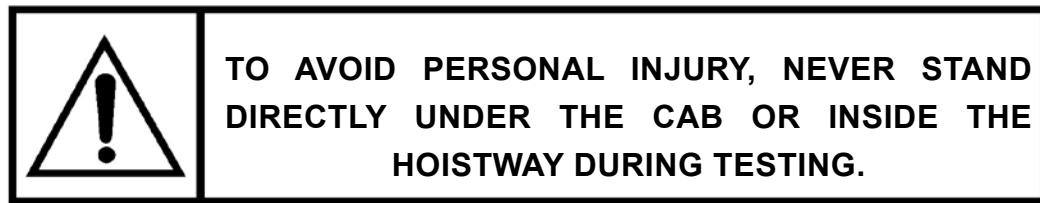
If DOWN leakage occurs clean or replace the valve components as follows:

Refer to Figure 116/117.

- 1) Down Solenoid Valve
- 2) Manual Lowering Valve
- 3) Reverse Flow Check Valve
- 4) If the down speed is slow, there may be debris in the screen underneath the down solenoid valve. Remove the valve and clean the screen.

12.0 TESTING OPERATION

The following features must be verified as operational **before** the elevator can be released to the customer.



1) Cab Key Switch (Optional)

Verify that when the key is in the OFF position, the buttons on the cab station are inoperable. When turned ON, the landing buttons should be inoperable.

2) Call Controls

Verify that controls are inoperable whenever a landing door or the cab gate is left in the open position, or when the key switch is in the OFF position.

3) Emergency Car Stop Button

Verify that turning the stop key to the STOP position, stops the elevator from running and stops the doors from moving.

4) Door Interlock

Verify the following:

- a) **Door Switch:** Verify that when the door is left open, the car will not run in any direction from any station. Check all controls at all stations.
- b) **Lock:** Verify that the door is locked after 2 inches of movement away from the landing. If necessary, adjust the cam accordingly.
- c) **Cab Panifold Gate:** Verify that all controls are inoperable if the gate is left in the open position.
- d) **Light Curtain:** Verify that the Red LED is ON (static door frame side) when obstructed. Refer to **Section 6.2 Light Curtain Installation.**

5) Pit Switch, Car Top Stop Switch, Overspeed Governor, Plank Switch, Final Limit Switch

Turning all switches to the OFF position should render all controls inoperable.

6) Emergency Light

Verify that the emergency light comes on anytime that the 110 volt power to the equipment is interrupted.

7) Emergency Lowering

Verify that when the power to the elevator (both 110 volt and 220 volts) is disconnected, the DOWN button controls in the cab remain operable allowing the cab to operate in the DOWN direction only.

8) Cab Telephone (Option)

Verify that the cab telephone is operable.

9) Travelling Cable

Make sure that the travelling cable is running free and clear from all obstructions while the cab travels to all floors being served.

13.0 AUTOMATIC CAB LIGHTING

1) CALLING THE ELEVATOR FROM LANDING CONTROLS

Upon pressing the call button, the car lights automatically come ON. The elevator starts to move. The car will arrive at the landing with the car lights ON.

2) ENTERING THE ELEVATOR

If the elevator is at the same landing as the caller, then open the landing door or car gate to enter the elevator. The elevator interior lights will turn on automatically.

3) POWER FAILURE

If there is a power failure in the main power supply to the motor control (not the lighting supply), the COP lights will turn on as a safety feature.

14.0 BEFORE LEAVING THE JOB SITE

- 1. Clean up the work area.**
- 2. Make sure all anchoring bolts/nuts are securely tightened (i.e. rail brackets, rail joints, carriage, pump unit, and cab bolts/screws).**
- 3. Make sure all controls operate as outlined in "Testing Operation" section of this manual.**
- 4. Demonstrate the operation of the elevator. During this orientation, stress the importance of proper operation and required maintenance.**
- 5. Mount the operation instructions at an appropriate entrance level.**
- 6. Make sure excess aircraft cable has been cut from the clamp end.**

15.0 TEST REDUNDANCY CIRCUIT (TSSA, ONTARIO ONLY)

15.1 REDUNDANCY BACK-UP TESTING WITH FIREMAN SERVICE

After each test the “CPU” will detect the event and “shutdown” to prevent the elevator from restarting. The in use lights located in the hall station call registration buttons will flash to indicate that the controller is in shutdown mode. To avoid “nuisance” trips there is a built in time delay of less than 3 seconds before the controller will shut down. The relays may be held in the energized position by pushing up the manual latching lever on the top edge of the relay.

181.10 Redundancy & Monitoring in Critical Circuits Tests

a) Critical Component: **PM1 Contactor**

Redundant component: **PM2 Contactor**

Test Procedure:

With the car sitting at any landing “push in” the PM1 contactor. The car will not move due to redundant contactor PM2. Additionally, the “CPU” monitoring system will detect the fault and not allow the car to run again.

Repeat the test using PM2 contactor.

b) Critical Component: **U Relay**

Redundant component: **“CPU”, SF1 & SF2 Relays**

Test Procedure:

While the elevator is moving in the up direction, latch in the “U” relay. When the car stops the “CPU” monitoring system will detect the fault preventing the elevator from restarting. The redundancy relays SF1 & SF2 will not energize thus opening the safety string.

c) Critical Component: **D Relay**

Redundant component: **“CPU”, SF1 & SF2 Relays**

Test Procedure:

While the elevator is moving in the down direction, latch in the “D” relay. When the car stops, the “CPU” monitoring system will detect the fault preventing the elevator from restarting. For redundancy relays SF1 & SF2 will not energize thus opening the safety string.

Contacts U 5/9 & D 5/9 are separately monitored. To test these contacts have the car level at a floor ready to run. Connect a temporary jumper from terminal block 6A to IN/6 on the PLC expansion module. This will simulate a failure of contact U 5/9 or D 5/9. With the car on automatic place a call to run the car to a different landing. The CPU will detect the fault and the car will not start.

Remove the jumper and reset the CPU.

d) Critical Component:	IAS Relay
Redundant component:	IAX Relay

Test Procedure:

With the car on automatic operation, actuate relay IAS. The "CPU" monitoring system will detect the fault and not allow the car to run.

Repeat for IAX relay.

Relay contacts IAS 10/6 and IAX 10/6 are also monitored separately. To test these contacts have the car level at a floor ready to run. Connect a temporary jumper from terminal 4 to terminal IN/2 on the PLC expansion module. This will simulate a failure of contact IAS 10/6 to open. The CPU will detect the fault and not allow the car to restart.

Remove the jumper from terminal 4.

Connect a temporary jumper from terminal 5B to terminal IN/2 on the PLC expansion module. This will simulate a failure of contact IAX 10/6 to open. The CPU will detect the fault and not allow the car to restart.

Remove the jumper from terminal 5B and IN/2.

e) Critical Component:	DZ1 Relay
Redundant component:	DZ2 Relay, "CPU"

Test Procedure:

The DZ1 & DZ2 relays are monitored by the "CPU" for welded contacts. With the car level at a floor and ready to run, place a call at another landing. Actuate DZ1 relay. When the Car stops for the next registered call the "CPU" will initiate shutdown and the car will not run again.

Reset the "CPU" and repeat for relay DZ2.

Contacts DZ1 5/9 & DZ2 5/9 are separately monitored. To test these contacts have the car level at a floor ready to run. Connect a temporary jumper from terminal block 3 to IN/0 on the PLC expansion module. This will simulate a failure of contact DZ1 5/9. With the car on automatic place a call to run the car to a different landing. When the car stops the CPU will detect the fault and the car will not restart.

Reset the "CPU".

Connect a temporary jumper from terminal block 6 to IN/0 on the PLC expansion module. This will simulate a failure of contact DZ2 5/9. With the car on automatic place a call to run the car to a different landing. Upon arrival at the next floor, the CPU will detect the fault and the car will not restart.

Remove the jumper and reset the CPU.

f) Critical Component:	SB1 Relay
Redundant component:	SB2 Relay, "CPU"

Test Procedure:

The SB1 & SB2 relays are monitored by the "CPU" for welded contacts. With the car level at a floor and ready to run, actuate relay SB1. The "CPU" monitoring system will detect the fault and not allow the car to run.

Reset the "CPU" and repeat for relay SB2.

Contacts SB1 5/9 & SB2 5/9 are separately monitored. To test these contacts have the car level at a floor ready to run. Connect a temporary jumper from terminal block 24V to IN/13 where normally closed contact SB2/10 connects to the PLC. Actuate relay SB1. The "CPU" monitoring system will detect the fault and not allow the car to run.

Reset the "CPU" and repeat for relay SB2.**g) Additional Monitored Relays: SF1, SF2, INX**

The relays listed above are also monitored for welded contacts. With the car on automatic operation actuate each listed relay one at a time. The "CPU" will detect the fault and not allow the car to run.

Relay contacts SF1 9/1 and SF2 9/1 are also monitored separately. To test these contacts have the car level at a floor ready to run. Connect a temporary jumper from terminal 4 to terminal IN/1 on the PLC expansion module. This will simulate a failure of contact SF1 9/1 to open. Run the car. The CPU will detect the fault and not allow the car to start.

Remove the jumper from terminal 4.

Connect a temporary jumper from terminal 5A to terminal IN/1 on the PLC expansion module. This will simulate a failure of contact SF2 9/1 to open. Run the car. The CPU will detect the fault and not allow the car to start.

Remove the jumper from terminal 5A and IN/1.

Relay contacts INX 9/5 and INX 6/10 are also monitored separately. To test these contacts have the car level at a floor ready to run. Connect a temporary jumper from terminal 4 to terminal IN/4 on the PLC expansion module. This will simulate a failure of contact INX 9/5 to open. The CPU will detect the fault and not allow the car to restart.

Remove the jumper from terminal 4 and IN/4.

Connect a temporary jumper from terminal 6 to terminal IN/5 on the PLC expansion module. This will simulate a failure of contact INX 6/10 to open. The CPU will detect the fault and not allow the car to restart.

Remove the jumper from terminal 6 and IN/5.

h) Additional Monitoring: Car Door & Hoistway Bypass Switches.

Disconnect the Wire to PLC input IN/10 where the second pole of the car and hoistway door bypass switches connect to the PLC. With the car on automatic operation place the Hoistway doors bypass switch in the bypass position. This will simulate a failure of the 1st. pole contact on the switch. Place a call to another floor. Upon arrival at the next landing, the CPU will detect the fault and the car will not restart.

Reset the CPU.

Place the Car door bypass switch in the bypass position. This will simulate a failure of the 1st. pole contact on the switch. The CPU will detect the fault and the car will not restart.

Reset the CPU and reconnect the wire to PLC input IN/10.

181.20 Solid State Device Test

Not applicable

181.30 Software System Device Test

Not applicable

181.40 Levelling Switches Test

With the elevator at floor level jump out the "Up Level" switch sensor in the selector. The car will run up at level speed for one half of the "Dead Zone" (about 1/4 inch) and the "CPU" will initiate shut down. To Jump out the Up level sensor, remove the cover from the selector control box on top of the car. On the circuit board located in the control box jump "LU" (terminal I2) to terminal GND.

WARNING

DO NOT connect terminal I2 to any terminal other than GND or damage to the selector will result! The elevator will reset once the short is removed

With the elevator at floor level jump out the "Down Level" switch sensor in the selector. The car will run down at level speed for one half of the "Dead Zone" (about 1/4 inch) and the "CPU" will initiate shut down. To Jump out the Down level sensor, remove the cover from the selector control box on top of the car. On the circuit board located in the control box jump "LD" (terminal I1) to terminal GND.

WARNING

DO NOT connect terminal I2 to any terminal other than GND or damage to the selector will result! The elevator will reset once the short is removed

With the elevator at floor level jump out the door zone switch. (T25-4 [24V] to T22-9 [20X] in the controller). Send the car to another floor. The elevator will run to the floor, open the door and the "CPU" will initiate shut down.

181.50 Single Ground Tests

Ground any terminal in the safety string. [(24V, 2, 3, 4, 5A, 5B, 6, 6A, 14 or 16) to GND]. Any single ground applied to the above terminals will prevent the car from running.

With the doors closed and the car ready to run, ground terminal OUT/8 on the "CPU". Place a call below the car. Relays U, SF1, SF2 will energize momentarily and the car will not move. With the doors closed and the car ready to run, ground terminal OUT/9 on the "CPU". Place a call above the car. Relays D, SF1, SF2 will energize momentarily and the car will not move.

284.10 Critical Circuits

Make & Model of Relays & Contactors	Identification Used in Dwgs
IDEC RU4S-D24 (relays)	U, D, IAS, IAX, INX, SB1, SB2, SF1, SF2, DZ1, DZ2
Allen-Bradley 100-C30YJ-E10 (contactor)	PM1, PM2

Additional Tests Procedures Required for Electrical Equipment

EI.4 NTSD:

Remove the car top selector levelling magnets from the top and bottom landings. This will disable the primary means of slow-down. Run the car to the top landing. The up normal limit switch will open and stop the car near the top landing.

Run the car to the bottom landing. The down normal limit switch will open and stop the car near the bottom landing.

Reinstall the car top selector levelling magnets!

EI.5 Phase 1 & 2 Load Weighing Device: Does Not Apply

EI.6 Phase 2 & Ground:

WARNING

This test may damage the Master Dupline Module. Attempt only if required by local code.

Initiate Phase 1 fire service recall. Put the car on phase 2 fire service. Open any hall fixture and one at a time short to ground the three wires that come through the shaftway wall. (The Dupline communications cable). Hallway fixtures will become inoperative. (See that the car is still operable on phase 2 fire service. (Fuse F7 on the relay logic board and fuse TR5 on the Dupline master module PC board will open). At the top landing short out the power feed (24H) connected to the hoistway access switch. (Fuse F6 will open). See that the car still operates on phase 2 fire service. Replace the fuses and reset the car to normal operation.

EI.7 Phase 1 & 2 Power off:

With the car running on Phase 1 or 2 fire service, disconnect the mainline power. Restore power to the controller. The car should level down to the nearest landing and then continue with phase 1 or 2 operation.

EI.8 Recycle Operation: Does not apply**EI.9 Plunger Gripper: Does not apply****EI.10 Phase 1 Under Special Conditions: Low Oil Return**

Place the car at an upper floor. Disconnect the motor leads from PM2 contactor. Place an up call and allow the controller to start up (the car will be unable to move) Initiate phase 1 fire service. Within 30 to 60 seconds the low oil timer in the "CPU" will trip. If the car is above the fire recall landing it should return to the fire recall landing. If the car is below the fire recall landing, it will return to the lowest landing. Reconnect the motor leads!

EI.11 Phase 1 Under Special Conditions: Battery lowering Return

Place the car at an upper floor. Place a jumper from terminal 1 to terminal P4 in the controller. (extra pole of main line disconnect switch) Turn off the mainline disconnect to simulate a power loss. Initiate phase 1 fire service. If the car is above the fire recall landing it should return to the fire recall landing. If the car is below the fire recall landing, it will return to the lowest landing.

EI.12 Phase 1 Under Special Conditions, Plunger Follower: Does Not Apply**EI.13 Phase 2 Under Special Conditions:**

With the elevator on phase 2 fire service near a lower landing, place a call at an upper landing and allow the car to start up. Place a jumper from terminal 1 to terminal P4 in the controller. (extra pole of main line disconnect switch) Turn off the mainline disconnect to simulate a power loss. The car should stop and flash the in car fire light. The car will only respond to calls below its current position. Simulate a low oil return by removing the motor leads from contactor

PM2 and attempting to run up. After the low oil timer (in the "CPU") actuates the car will only be able to run to floors below its current position.

EI.14 Plunger Follower Guide: Does Not Apply**EI.15 Switch for Auxiliary power lowering:**

Place the car at an upper floor. Place a jumper from terminal 1 to terminal P4 in the controller. (extra pole of main line disconnect switch) Turn off the mainline disconnect to simulate a power loss. The car will recall to the lowest landing. Restore power and remove the jumper on terminals 1 and P4. Run the car to an upper landing. Turn off the mainline disconnect switch. The car will not move.

EI.16 Negative Pressure Switch:

Place the car at an upper Landing. Set a call at the bottom landing. When the car starts down remove the hatch wire from terminal 16. The car will stop.

EI.17 Motor Phase Protection:

Reverse two motor leads to simulate a phase reversal. The car will not move and within 120 seconds the "CPU" will shut down the car and lower it to the bottom landing.

EI.18 Emergency Power: Does Not Apply**(189.00) Additional Tests****a) Top of car inspection operation with open door circuits**

Turn the "Car Door Bypass" switch, or the "Hoistway Door Bypass" switch, or both of these switches to the "Bypass" position. Test the non-response of car and hall calls, fire service recall, and levelling operation for all three conditions.

Place the "Top of Car Inspection" switch in the "inspection" position and the "Car Door Bypass" switch in the "bypass" position. Verify that the car can move on inspection operation with the car door open, but all hall doors closed.

Place the "Top of Car Inspection" switch in the "inspection" position and the "Hoistway Door Bypass" switch in the "bypass" position. Verify that the car can move on inspection operation with a hall door open, but the car door closed.

Place the "Top of Car Inspection" switch in the "inspection" position, and both the "Car Door Bypass" switch and the "Hoistway Door Bypass" switches in the "bypass" position. Verify that the car can move on inspection operation with the car door and a hall door opened.

b) Monitoring car and hall door contacts

With the elevator at floor level:

For car door contact test, jump car door lock contacts.

For hall door contact test, jump hall door lock contacts.

For hall and car door test, jump car & hall lock contacts. (see print for terminal numbers)

Initiate opening of doors with "Door Open Button", or a hall or car call.

The "CPU" will detect the fault and shut down the elevator, preventing the elevator from restarting.

NOTE

If the car door is fully open while these tests are being done, the car door will not close.

15.2 REDUNDANCY BACK-UP TESTING WITHOUT FIREMAN SERVICE

After each test the “CPU” will detect the event and “shutdown” to prevent the elevator from restarting. The in use lights located in the hall station call registration buttons will flash to indicate that the controller is in shutdown mode. To avoid “nuisance” trips there is a built in time delay of less than 3 second before the controller will shut down. The relays may be held in the energized position by pushing up the manual latching lever on the top edge of the relay.

181.10 Redundancy & Monitoring in Critical Circuits Tests

- a) **Critical Component:** **PM1 Contactor**
 Redundant component: **PM2 Contactor**

Test Procedure:

With the car sitting at any landing “push in” the PM1 contactor. The car will not move due to redundant contactor PM2. Additionally, the “CPU” monitoring system will detect the fault and not allow the car to run again.

Repeat the test using PM2 contactor.

- b) **Critical Component:** **U Relay**
 Redundant component: **“CPU”, SF1 & SF2 Relays**

Test Procedure:

While the elevator is moving in the up direction, latch in the “U” relay. When the car stops the “CPU” monitoring system will detect the fault preventing the elevator from restarting. For redundancy relays SF1 & SF2 will not energize thus opening the safety string.

- c) **Critical Component:** **D Relay**
 Redundant component: **“CPU”, SF1 & SF2 Relays**

Test Procedure:

While the elevator is moving in the down direction, latch in the “D” relay. When the car stops the “CPU” monitoring system will detect the fault preventing the elevator from restarting. For redundancy relays SF1 & SF2 will not energize thus opening the safety string.

Contacts U 5/9 & D 5/9 are separately monitored. To test these contacts have the car level at a floor ready to run. Connect a temporary jumper from terminal block 6A to IN/6 on the PLC expansion module. This will simulate a failure of contact U 5/9 or D 5/9. With the car on automatic place a call to run the car to a different landing. The CPU will detect the fault and the car will not start.

Remove the jumper and reset the CPU.

d) Critical Component:	IAS Relay
Redundant component:	IAX Relay

Test Procedure:

With the car on automatic operation, actuate relay IAS. The "CPU" monitoring system will detect the fault and not allow the car to run.

Repeat for IAX relay.

Relay contacts IAS 10/6 and IAX 10/6 are also monitored separately. To test these contacts have the car level at a floor ready to run. Connect a temporary jumper from terminal 4 to terminal IN/2 on the PLC expansion module. This will simulate a failure of contact IAS 10/6 to open. The CPU will detect the fault and not allow the car to restart.

Remove the jumper from terminal 4.

Connect a temporary jumper from terminal 5B to terminal IN/2 on the PLC expansion module. This will simulate a failure of contact IAX 10/6 to open. The CPU will detect the fault and not allow the car to restart.

Remove the jumper from terminal 5B and IN/2.

e) Critical Component:	DZ1 Relay
Redundant component:	DZ2 Relay, "CPU"

Test Procedure:

The DZ1 & DZ2 relays are monitored by the "CPU" for welded contacts. With the car level at a floor and ready to run, place a call at another landing. Actuate DZ1 relay. When the Car stops for the next registered call the "CPU" will initiate shutdown and the car will not run again.

Reset the "CPU" and repeat for relay DZ2.

Contacts DZ1 5/9 & DZ2 5/9 are separately monitored. To test these contacts have the car level at a floor ready to run. Connect a temporary jumper from terminal block 3 to IN/0 on the PLC expansion module. This will simulate a failure of contact DZ1 5/9. With the car on automatic place a call to run the car to a different landing. When the car stops the CPU will detect the fault and the car will not restart.

Reset the "CPU".

Connect a temporary jumper from terminal block 6 to IN/0 on the PLC expansion module. This will simulate a failure of contact DZ2 5/9. With the car on automatic place a call to run the car to a different landing. Upon arrival at the next floor, the CPU will detect the fault and the car will not restart.

Remove the jumper and reset the CPU.

f) Critical Component:	SB1 Relay
Redundant component:	SB2 Relay, "CPU"

Test Procedure: Does Not Apply, ONLY TESTED ON FIREMAN SERVICE EQUIPPED UNITS

g) Additional Monitored Relays: SF1, SF2, INX

The relays listed above are also monitored for welded contacts. With the car on automatic operation actuate each listed relay one at a time. The "CPU" will detect the fault and not allow the car to run.

Relay contacts SF1 9/1 and SF2 9/1 are also monitored separately. To test these contacts have the car level at a floor ready to run. Connect a temporary jumper from terminal 4 to terminal IN/1 on the PLC expansion module. This will simulate a failure of contact SF1 9/1 to open. Run the car. The CPU will detect the fault and not allow the car to start. Remove the jumper from terminal 4.

Connect a temporary jumper from terminal 5A to terminal IN/1 on the PLC expansion module. This will simulate a failure of contact SF2 9/1 to open. Run the car. The CPU will detect the fault and not allow the car to start. Remove the jumper from terminal 5A AND IN/1.

Relay contacts INX 9/5 and INX 6/10 are also monitored separately. To test these contacts have the car level at a floor ready to run. Connect a temporary jumper from terminal 4 to terminal IN/4 on the PLC expansion module. This will simulate a failure of contact INX 9/5 to open. The CPU will detect the fault and not allow the car to restart. Remove the jumper from terminal 4 and IN/4.

Connect a temporary jumper from terminal 6 to terminal IN/5 on the PLC expansion module. This will simulate a failure of contact INX 6/10 to open. The CPU will detect the fault and not allow the car to restart. Remove the jumper from terminal 6 and IN/5.

h) Additional Monitoring: Car Door & Hoistway Bypass Switches.

Disconnect the Wire to PLC input IN/10 where the second pole of the car and hoistway door bypass switches connect to the PLC. With the car on automatic operation place the Hoistway doors bypass switch in the bypass position. This will simulate a failure of the 1st. pole contact on the switch. Place a call to another floor. Upon arrival at the next landing, the CPU will detect the fault and the car will not restart. Reset the CPU.

Place the Car door bypass switch in the bypass position. This will simulate a failure of the 1st. pole contact on the switch. The CPU will detect the fault and the car will not restart. Reset the CPU and reconnect the wire to PLC input IN/10.

181.20 Solid State Device Test

Not applicable

181.30 Software System Device Test

Not applicable

181.40 Levelling Switches Test

With the elevator at floor level jump out the “Up Level” switch sensor in the selector. The car will run up at level speed for one half of the “Dead Zone” (about 1/4 inch) and the “CPU” will initiate shut down. To Jump out the Uplevel sensor, remove the cover from the selector control box on top of the car. On the circuit board located in the control box jump “LU” (terminal I2) to terminal GND.

WARNING

DO NOT connect terminal I2 to any terminal other than GND or damage to the selector will result! The elevator will reset once the short is removed

With the elevator at floor level jump out the “Down Level” switch sensor in the selector. The car will run down at level speed for one half of the “Dead Zone” (about 1/4 inch) and the “CPU” will initiate shut down. To Jump out the Down level sensor, remove the cover from the selector control box on top of the car. On the circuit board located in the control box jump “LD” (terminal I1) to terminal GND.

WARNING

DO NOT connect terminal I2 to any terminal other than GND or damage to the selector will result! The elevator will reset once the short is removed

With the elevator at floor level jump out the door zone switch. (T25-4 [24V] to T22-9 [20X] in the controller) Send the car to another floor. The elevator will run to the floor, open the door and the “CPU” will initiate shut down.

181.50 Single Ground Tests

Ground any terminal in the safety string. [(24V, 2, 3, 4, 5A, 5B, 6, 6A, 14 or 16) to GND]. Any single ground applied to the above terminals will prevent the car from running.

With the doors closed and the car ready to run. Ground terminal OUT/8 on the “CPU”. Place a call below the car. Relays U, SF1, SF2 will energize momentarily and the car will not move.

With the doors closed and the car ready to run. Ground terminal OUT/9 on the “CPU”. Place a call above the car.

Relays D, SF1, SF2 will energize momentarily and the car will not move.

284.10 Critical Circuits

Make & Model of Relays & Contactors	Identification Used in Dwgs
IDEK RU4S-D24 (relays)	U, D, IAS, IAX, INX, SB1, SB2, SF1, SF2, DZ1, DZ2
Allen-Bradley 100-C30YJ-E10 (contactor)	PM1, PM2

Additional Tests Procedures Required for Electrical Equipment

EI.4 NTSD:

Remove the car top selector levelling magnets from the top and bottom landings. This will disable the primary means of slowdown. Run the car to the top landing. The up normal limit switch will open and stop the car near the top landing.

Run the car to the bottom landing. The down normal limit switch will open and stop the car near the bottom landing. Reinstall the car top selector levelling magnets!

EI.5	Phase 1 & 2 Load Weighing Device	Does not apply.
EI.6	Phase 2 & Ground	Does not apply.
EI.7	Phase 1 & 2 Power off	Does not apply.
EI.8	Recycle Operation	Does not apply.
EI.9	Plunger Gripper	Does not apply.
EI.10	Phase 1 Under Special Conditions: Low Oil Return	Does not apply.
EI.11	Phase 1 Under Special Conditions: Battery lowering Return	Does not apply.
EI.12	Phase 1 Under Special Conditions: Plunger Follower	Does not apply.
EI.13	Phase 2 Under Special Conditions	Does not apply.
EI.14	Plunger Follower Guide	Does not apply
EI.15	Switch for Auxiliary power lowering	Does not apply.

EI.16 Negative Pressure Switch:

Place the car at an upper Landing. Set a call at the bottom landing. When the car starts down remove the hatch wire from terminal 16. The car will stop.

EI.17 Motor Phase Protection:

Reverse two motor leads to simulate a phase reversal. The car will not move and within 120 seconds the "CPU" will shut down the car and lower it to the bottom landing.

EI.18 Emergency Power: Does not apply.

(189.00) Additional Tests

a) Top of Car inspection operation with open door circuits

Turn the "Car Door Bypass" switch, or the "Hoistway Door Bypass" switch, or both of these switches to the "Bypass" position. Test the non-response of car and hall calls, fire service recall, and levelling operation for all three conditions.

Place the "Top of Car Inspection" switch in the "inspection" position and the "Car Door Bypass" switch in the "bypass" position. Verify that the car can move on inspection operation with the car door open, but all hall doors closed.

Place the "Top of Car Inspection" switch in the "inspection" position and the "Hoistway Door Bypass" switch in the "bypass" position. Verify that the car can move on inspection operation with a hall door open, but the car door closed.

Place the "Top of Car Inspection" switch in the "inspection" position, and both the "Car Door Bypass" switch and the "Hoistway Door Bypass" switches in the "bypass" position. Verify that the car can move on inspection operation with the car door and a hall door opened.

b) Monitoring car and hall door contacts.

With the elevator at floor level: For car door contact test, jump car door lock contacts.

For hall door contact test, jump hall door lock contacts.

For hall and car door test, jump car & hall lock contacts. (see print for terminal numbers)

Initiate opening of doors with "Door Open Button", or a hall or car call.

The "CPU" will detect the fault and shut down the elevator, preventing the elevator from restarting.

NOTE

If the car door is fully open when these tests are being done, the car door will be prevented from closing.

APPENDIX A

ELECTRICAL SCHEMATICS

PN 250994

PN 251614 (TSSA, ONTARIO, CANADA ONLY)

REFER TO PACKAGE SHIPPED WITH PRODUCT

APPENDIX B

PARTS LIST

KITS FOR MASTER PARTS BOX

KIT #	DESCRIPTION	PARTS INCLUDED IN KIT	
251845	SPREADER CAB KIT ORION (1 PER JOB IF O.H. >= 131")	224001	PLATTEN PLATE, (x1)
		250929	CHANNEL SPREADER, 30" DBG (x1)
207051	PREPACK_SAFETY (1 PER JOB)	104789	HEX HEAD CAP SCREW, 7/16"- #14 x 1" ZNC (x8)
		210053	SAFETY BLOCK W/ROLLER ASSEMBLY PRO LH (x1)
		210054	SAFETY BLOCK W/ROLLER ASSEMBLY RH (x1)
		102192	LOCK WASHER, 0.4375" SPNG ZNC 7/16" (x8)
		103023	BAG, SHIPPING 9 X 12 0.004 MIL (x1)
200546	WEDGE ROPE KIT (1 PER JOB)	207020	WEDGE SOCKET S/A 3/8" (x2)
		207047	ROPE WEDGE PREPACK
		200854	GUIDE RAIL SHIM
200009	TELEPHONE CABINET ASSEMBLY STAINLESS STEEL (IF S/S TEL CAB REQ)	200004	TELEPHONE BOX (x1)
		200007	TELEPHONE BOX COVER DOOR PLATE (x1)
		101477	PULL HANDLE, PHONE BOX BLK (x1)
		102304	CABINET HINGE, FERRARI (x2)
		100040	MACHINE SCREW, PHILLIPS HEAD #06-32x0.75" (x4)
		101205	WASHER #06 ZNC (x12)
		101220	LOCK WASHER #06 ZNC (x8)
		101113	HEX NUT, # 6-32 ZNC (x4)
		101837	MACHINE SCREW FLAT HEAD PHILLIPS #10-32 x 1.00" ZNC (x6)
		101210	FLAT WASHER #10 ZNC (x6)
		101223	LOCK WASHER #10 ZNC (x6)
		101116	HEX NUT, #10-32 ZNC (x6)
		103779	MACHINE SCREW TAP PHILLIPS HEAD #8 - 32 x 0.375" 'F' (x2)
		200533	STIFFENER, TELEPHONE BOX (x2)
200545	YODE ASSEMBLY KIT 30" DBG (1 PER JOB)	215402	YODE ASSEMBLY, 30 DBG (x1)
		207046	YODE PREPACK (x1)

KIT #	DESCRIPTION		PARTS INCLUDED IN KIT
200010	TELEPHONE CABINET ASSEMBLY, BRASS (IF BRASS TEL CAB REQ)	200004	TELEPHONE BOX (x1)
		200008	TELEPHONE BOX DOOR COVER PLATE BRS (x1)
		101477	PULL HANDLE, PHONE BOX BLK (x1)
		102304	CABINET HINGE , FERRARI (x2)
		100040	MACHINE SCREW, PHILLIPS HEAD #06-32x0.75" (x4)
		101205	WASHER, #06 ZNC (x12)
		101220	LOCK WASHER, #06 ZNC (x8)
		101113	HEX NUT, # 6-32 ZNC (x4)
		101837	MACHINE SCREW, FLAT HEAD PHILLIPS #10- 32 x 1.00" ZNC (x6)
		101210	FLAT WASHER, #10 ZNC (x6)
		101223	LOCK WASHER, #10 ZNC (x6)
		101116	HEX NUT, #10-32 ZNC (x6)
		103779	MACHINE SCREW, TAP PHILLIPS HEAD #8-32 x 0.375" 'F' (x2)
		200533	TELEPHONE BOX STIFFENER (x2)
201351	READER FLOOR KIT (1 PER JOB)	202006	MOUNTING BRACKET, LEVELLING SELECTOR (x1)
		202001	MOUNTING BRACKET, SELECTOR TAPE (x2)
		201352	MAGNET TAPE/SELECTOR MOUNTING PREPACK, (x1)
		207121	WEDGE CLAMP TO TRAVEL CABLE PREPACK (x1)
251848	CTIS W/FIREMAN SERVICE KIT (1 PER JOB IF 2 SPEED DOOR & FIREMAN SERVICE)	250894	INSPECTION STATION DUPLINE W/FS BOX (x1)
		250950	CAR TOP INSPECTION STATION MOUNTING PREPACK (x1)
251849	CTIS NO FIREMAN SERVICE (1 PER JOB IF MANUAL DOOR & NO FIREMAN SERVICE)	250895	BOX, INSPECTION STATION DUPLINE NO FS (x1)
		250950	CAR TOP INSPECTION STATION MOUNTING PREPACK (x1)
251847	MOUNTING CAM/CAB ORION (1 PER JOB)	250013	CAB WALL TO STILE BRACKET (x2)
		200182	DOOR ZONE CAM (x2)
		200846	CAM/VANE MOUNTING PREPACK (x2)
		210525	CAM MOUNTING BRACKET

KIT #	DESCRIPTION	PARTS INCLUDED IN KIT	
250238	PREPACK SLING (1 PER JOB)	101052	BOLT, CARG 1/2-13X1.5 BRE GR 5 (x18)
		101106	NUT, HEX 1/2#13 ZNC (x40)
		102193	WASHER, LOCK 0.500 SPNG ZNC 1/2 (x40)
		102189	WASHER FLAT 0.500 ZNC 1/2 (x56)
		100188	HHCS_1/2#13x2.00" BRE (x22)
		100172	HHCS_3/8#16x1.00" BRE (x22)
		102188	WASHER FLAT 0.375 ZNC 3/8 (x26)
		102191	WASHER LOCK 0.375 SPNG ZNC 3/8 (x22)
		250966	GUIDESHOE_ASSY 8" LG HORIZON (x4)
		101094	NUT, HEX 7/16 ZNC (x16)
		102192	WASHER LOCK 0.4375 SPNG ZNC 7/16 (x16)
		101199	WASHER FLAT 0.4375 ZNC 7/16 (x16)
		103023	BAG, SHIPPING 9 X 12 0.004 NUK (x1)
		102186	NUT, HEX 3/8#16 ZNC (x4)
251846	CAR TOP PROP KIT (1 PER JOB IF O.H. < 131")	250225	PROP ASSEMBLY TOC SAFETY (x1)
		250191	PLATE, STRIKE W/ ASSEMBLY T-O-C PROP (x1)
200440	UPSTAND JACK SCREW KIT 2-3 1/4" (1 PER JOB)	250867	UPSTAND CAP (x1)
		250868	UPSTAND SCREW (x1)
		200439	UPSTAND JACK 2"-3 1/4 (x1)
		104110	HEX NUT, 1-1/4" SAE GR (x1)
		104277	RING TRNG 1.29" OD x 0.98" (x1)
251719	CYLINDER ASSEMBLY, 2.75"	251674	HOISTWAY ASSEMBLY 2.75" CYLINDER OVR 264-288
		251704	TUBE ASSEMBLY, 2.75" CYLINDER OVR 264-288
		220547	GLAND NUT, CYLINDER ASSEMBLY 2.75" KWIK
		801465	SEAL KIT SK587
		801831	NIPPLE FITTING BLEEDER PER 3206B
		801986	SOCKET HEAD CAP SCREW 1/4"-#28 X 2.50"
		103490	SQUARE HEAD PIPE PLUG NPT 1/2"
		104210	PLASTIC PLUG, #8

DOOR LOCK KITS

- 211199 SMART PRO-LOCK KIT LH (INCLUDES HARNESS)
 211200 SMART PRO-LOCK KIT RH (INCLUDES HARNESS)

DOOR LOCKS

- 772310 PROLOCK, LH
 772311 PROLOCK, RH

HARDWARE

- 201349 FLOOR ZONE/LIMIT SWITCH MOUNTING PREPACK
- 201350 FLOOR ZONE HARDWARE PREPACK
- 201351 FLOOR READER KIT
- 201352 MAGNETIC TAPE MOUNTING PREPACK
- 201353 BUFFER SPRING 60" ASSEMBLY PREPACK
- 201354 SPARE HARDWARE, SAVER CLIP
- 201355 PIT CHANNEL & BUFFER SPRING PREPACK
- 207048 FISH PLATE PREPACK
- 207125 MOUNTING BRACKET 1/2 CNCR ANCHOR PREPACK
- 207131 MOUNTING BRACKET ASSEMBLY, UPSTAND POST PREPACK
- 211431 UPSTAND MOUNTING PREPACK
- 211432 JACK MOUNTING PREPACK, 2.5" AND 2.75"
- 211433 JACK MOUNTING PREPACK, 3.25"
- 221543 RAIL BRACKET PREPACK
- 251814 OVERSPEED GOVERNOR PREPACK
- 255001 WITTUR/ESI 2 SPEED DOORS HARDWARE KIT

DOCUMENTATION

- 000581 INSTALLATION MANUAL
- 000586 OWNER'S MANUAL
- 250994 APPENDIX A ELECTRICAL SCHEMATICS
- 251614 APPENDIX A TSSA ONTARIO, CANADA ONLY ELECTRICAL SCHEMATICS

MISCELLANEOUS PARTS

KIT #	DESCRIPTION
100088	MACHINE SCREW, FLAT HEAD PHILLIPS 1/4-20 x 2
100950	GLASS, .25" x 4.75" x 28.25"
101064	MACHINE SCREW, FLAT HEAD PHILLIPS #12-24 x 1/2" U/CUT
101130	SCREW, SMALL PAN HEAD PHILLIPS #6 X 1/2"
101196	FLAT WASHER, 1/4" USS
101500	GASKET NEOPRENE, 1/4" x 1/4"
101625	BEARING, NDL THRST.75od.312b.0781r
101692	HINGE ASSEMBLY CF-8 PRO DOOR
102115	BEARING, BRONZE OIL IMPREGNATED
102174	PROLOCK EMERGENCY UNLOCKING KEY (NEW REVISION)
102185	HINGE PIN, 0.310"D,1.75"L PRO DOOR
102227	RIVET, SPEED 1/8"
102354	LABEL, FIRE DOOR 2 HR PRODOOR
103318	BRAILLE PLATE "1" W/STAR 3x4 J04
103319	BRAILLE PLATE "2" 3x4 J04
103371	BRAILLE PLATE "B" 3x4 J04 S/S
103989	SINGLE LIMIT/ZONE SWITCH
104318	PROGRAMMER DUPLINE GAP1605
104428	BRAILLE PLATE B VC COP
104473	BRAILLE PLATE 2 (MAIN) VC COP
104681	RETAINER, SPRING GRIP-INTERNAL TOOTH
200026	SWITCH INDICATOR MANUAL/AUTO DR VC
200401	JUNCTION BOX CAR STATION ASSEMBLY
200437	JUNCTION BOX HOISTWAY ASSEMBLY
200438	TEMPORARY RUN BUTTON
200528	BUFFER SHIM ASSEMBLY 4.25" HIGH
200543	FLOOR READER KIT
200549	FLOOR ZONE SWITCH MOUNTING BRACKET
200550	FLOOR ZONE CAM ASSEMBLY
201037	HALL STATION VOY/ORION MODL6 ST HS A
205019	FRAME, W/A LH PRODOOR
205106	PRO-DOOR ASSEMBLY, LH
205133	COVER PLATE, HINGE ACCESS
205226	PUSH PLATE, ALUMINUM PRODOOR
205227	KICK PLATE, ALUMINUM PRO DOOR
205230	FRAME, WINDOW W/ASSEMBLY PRO DOOR
205233	BRACKET, GLASS MOUNTING VERTICAL DOOR
205234	BRACKET GLASS MOUNTING HORIZONTAL DOOR
205260	PULL HANDLE, PRO-DOOR MILL FINISH
205270	STRIKER ASSEMBLY PRO-LOCK
207407	SWITCH ASSEMBLY PIT STOP BOX

KIT#	DESCRIPTION
209095	DECAL LOW OVERHEAD 1" LETTERS
209113	DECAL PIT PROP
209128	DECAL USA ASME CODE A17.1-1996
209163	DECAL BUMPER
209170	DECAL ENTRANCE HOISTWAY SIDE FLOOR 1
209171	DECAL ENTRANCE HOISTWAY SIDE FLOOR 2
209175	DECAL ENTRANCE HOISTWAY SIDE FLOOR B
210001	SLING CROSS BRACE 30" DGB
210434	JACK BRACKET 2.50" & 2.75"
250177	LIMIT/ZONE SWITCH UP/DOWN MOUNTING BRACKET
250235	LIMIT/ZONE SWITCH ASSEMBLY, HONEYWELL
221544	RAIL BRACKET, 30" DBG
250006	TORSION ASSEMBLY BAR 30" D.B.G.
250139	SIGN 1400 AUTO DOOR LANDING OPERATING INSTRUCTIONS
250140	SIGN 1400 CAB OPERATING INSTRUCTIONS
250215	JACK BRACKET WELD ASSEMBLY
250898	HALL WIRING KIT 3 FLOOR
250932	OVER SPEED GOVERNOR 70 FT ROPE
250943	LIFTING BRACKET ASSEMBLY 50' ROPE
250951	PREPACK, MANUAL/STANDARD DECALS ORION
250979	CAR OPERATING PANEL ORION MODEL 4 ST/ST 3 LANDING
250988	WIRING HOISTWAY ACCESS KIT
250992	FLOOR ZONE LIMIT SWITCH NLU/NLD , (Top/Bot/Mid Floor)
251208	HALL STATION ORION MODL5 ST/ST 1FL
251210	HALL STATION ORION MODL5 ST/ST 3FL
251213	HALL STATION ORION MODL5A ST/ST 2FL
251216	HALL STATION ORION MODL7 ST/ST F R
251427	STILE RETAINER KIT
251588	MOUNTING BRACKET OPERATOR 2 SPEED DOOR R.H
251589	MOUNTING BRACKET OPERATOR 2 SPEED DOOR L.H
251590	CAR STATION INSPECTION BRACKET
251606	PIT CHANNEL W/A 30DBG SAVER CLIPS
251783	DUCT WIRE ASSEMBLY JUNCTION BOX TO CONTROLLER
251846	CAR TOP PROP KIT
301045	DATA ACCESS TERMINAL
772290	CAR TOP SELECTOR HARNESS (VIRGINIA)
772291	CAR STATION HARNESS (VIRGINIA)
772296	PIT SWITCH HARNESS (VIRGINIA)
772303	TRAVEL CABLE 30FT TRAVEL
772305	HARNESS VIRGINIA CONTROLS SWING DOOR
772306	HARNESS VIRGINIA CONTROLS DC SWITCH
772310	LOCK ASSEMBLY PRO SMART VC LH
772328	2SP DOOR WITTUR HARNESS (VIRGINIA)
777131	CONTROLLER MAGNETIC POSITIONING SELECTOR 2-4ST
777134	CONTROLLER MAGNETIC POSITIONING TAPE 40'
777140	OPERATOR PRO-DOOR AUTO LH VC

ELECTRICAL PARTS

PART

DESCRIPTION

102268	SWITCH KEY, N/O REMOVABLE OFF POSITION ONLY
102269	SWITCH KEY, N/O REMOVABLE IN BOTH POSITIONS
104260	PCA DUPLINE 4 INPUTS / 4 OUTPUTS
105274	LIGHT CURTAIN, WECO
104295	PCA DUPLINE 2 INPUTS / 2 OUTPUTS
104318	DUPLINE PROGRAMMER
104328	PCA DUPLINE 8 INPUTS
104329	PCA DUPLINE 8 OUTPUTS
104428	PLATE, TACTILE B VC COP
104429	PLATE, TACTILE B (MAIN) VC COP
104430	PLATE, TACTILE M VC COP
104431	PLATE, TACTILE M (MAIN) VC COP
104432	PLATE, TACTILE L VC COP
104433	PLATE, TACTILE L (MAIN) VC COP
104434	PLATE, TACTILE G VC COP
104435	PLATE, TACTILE G (MAIN) VC COP
104473	PLATE, TACTILE 2 (MAIN) VC COP
104477	PLATE, TACTILE 1 VC COP
104478	FUSE 0.05A 250V (FOR 301046)
104479	FUSE 4A 250V (FOR 301046)
104491	BASE RELAY SY4S-05 (301052)
104492	CONTACTOR BLOCK
104570	PLATE, TACTILE 2 VC COP
104571	PLATE, TACTILE 3 VC COP
104572	PLATE, TACTILE 4 VC COP
200438	TEMPORARY BUTTON VC
200743	SPEEDY JIG (RAIL ALIGNMENT FIXTURE)
200790	GATE OPERATOR, LH
200791	GATE OPERATOR, RH
201114	CABLE ASSEMBLY CONTROLLER TO HALFWAY JUNCTION BOX, 40 FT
201115	CABLE ASSEMBLY CONTROLLER TO HALFWAY JUNCTION BOX, 60 FT
201116	CABLE ASSEMBLY CONTROLLER TO HALFWAY JUNCTION BOX, 80 FT
221263	WIRING KIT, HALL 2FL GAL LOCK
221264	WIRING KIT, HALL 3FL GAL LOCK
221265	WIRING KIT, HALL 4FL GAL LOCK
221266	WIRING KIT, COMMANDER 1FL FRONT
221267	WIRING KIT, COMMANDER 2FL FRONT
221268	WIRING KIT, COMMANDER 3FL FRONT
221269	WIRING KIT, COMMANDER 4FL FRONT
221271	WIRING KIT, COMMANDER 2FL REAR
221272	WIRING KIT, COMMANDER 3FL REAR
221273	WIRING KIT, COMMANDER 4FL REAR
250894	INSPECTION STATION BOX, DUPLINE FS BEEPER
250895	INSPECTION STATIONBOX, DUPLINE
250897	HALL WIRING KIT, 2 FLOOR ORION
250898	HALL WIRING KIT, 3 FLOOR ORION

250899	HALL WIRING KIT, 4 FLOOR ORION
250988	HOISTWAY ACCESS WIRING KIT, ORION
250992	FLOOR ZONE LIMIT SWITCH ASSEMBLY (TOP, BOTTOM, MIDDLE)
301037	DC POWER SUPPLY
301038	BATTERY BACKUP (APC)
301039	CONTACTOR (ALLEN-BRADLEY)
301040	OVERLOAD CT7-24-10 (6-10)
301041	OVERLOAD CT7-24-16 (10-16)
301042	OVERLOAD CT7-24-24 (16-24)
301044	PLC BASE UNIT 1764-28BXB
301045	PLC DISPLAY 1764-DAT
301046	MODULE MASTER SPEC 8111
301047	PCA-VALVE OPERATOR 772048
301048	PCA-RELAY BOARD ORION
301049	PCA-RELAY BOARD VOY/INF
301050	RELAY 4POLE 120VAC
301051	RELAY 4POLE 24VDC TUNGSTEN
301052	RELAY 4POLE 24VDC
301053	FUSE 3A 500V
301054	FUSE 1.5A 250V
301055	FUSE 0.5A 250V
301056	FUSE 1.5A 250V
301057	FUSE 4A 250V
301058	FUSE 5A 250V
301059	FUSE 6A 250V
301073	DATA ACCESS TERMINAL COVER
301074	KEY DUPAR ILC001-STOP
301075	KEY DUPAR ILC002-HA
301076	KEY DUPAR ILC003-FS
301077	FIRE SERVICE KEY SWITCH MASS.-COP
301078	FIRE SERVICE KEY SWITCH MASS.-HALL
301079	BUZZER ALARM DUPAR
301083	BATTERY 6V COP
301155	EMERGENCY STOP TOGGLE SWITCH
301156	BULB, REPLACEMENT RED
301158	PCA- ALLEN BRADLEY MEMORY MODULE
301159	ALLEN-BRADLEY CPU
301164	PLATE, TACTILE 1 (MAIN) VC COP
301165	EMERGENCY LIGHT ASSEMBLY-COP
301167	DISPLAY HALL STATION
301168	DISPLAY COP
301169	BARREL FIRE SERVICE KEY
301170	BARREL HA KEY
301171	BULB 6V EM LIGHT
301174	TAPE SPRINGS
301176	BUTTON, COP/HALL - DUPAR US91

301225	TRANSFORMER, CCXF
301226	TRANSFORMER, DXF/LXF
301227	CABLE AB TO MAST. MOD.
301229	ROD, PUSH TO STOP
301230	PUSH BUTTON, PUSH TO STOP
301242	BUZZER ALARM 90DB
301248	KEYSWITCH, SPRING LOAD R-OFF
301294	KEYSWITCH, RUN/STOP RPCA1
301325	FIRE SERVICE KEYSWITCH, NEW YORK-COP
301326	FIRE SERVICE KEYSWITCH, NEW YORK-HALL
301327	FUSE, 3 AMP 250 V
301459	TAPE READER REPLACEMENT SHOE
301479	PCA - EMERGENCY LIGHT CIRCUIT BOARD
301504	CONTACTOR BLOCK, AUXILIARY N/O AB
301505	CONTACTOR BLOCK, AUXILIARY N/C AB
301506	FIRE SERVICE KEYSWITCH, COP, NEW JERSEY
301507	FIRE SERVICE KEYSWITCH, HALL STATION, NEW JERSEY
301327	FUSE 3A 250V MDA-3
655102	CAPACITOR, 1000 UF 50V RAD
772288	HARNESS, POTLIGHTS
772289	HARNESS, CAR TOP STOP
772290	HARNESS, CAR TOP STATION
772291	HARNESS, CAR STATION
772292	HARNESS, PLANK SWITCH
772294	HARNESS, NLU/NLD/FL
772296	HARNESS, PIT SWITCH
772297	HARNESS, CAR TOP PROP
772298	HARNESS, DOWN LIMIT
772299	HARNESS, POWER GATE
772301	HARNESS, 2 SPEED DOOR
772302	HARNESS, TRAVELLING CABLE 20 FT PKG
772303	HARNESS, TRAVELLING CABLE 30 FT PKG
772304	HARNESS, TRAVELLING CABLE 40 FT PKG
772305	HARNESS, SWING DOOR
772306	HARNESS, DC SWITCH
772312	HARNESS, CAR JUNCTION BOARD TO CTIS BOX
777132	MAGNETIC POSITIONING TAPE 20 FT
777133	MAGNETIC POSITIONING TAPE 30 FT
777134	MAGNETIC POSITIONING TAPE 40 FT
777135	MAGNETIC POSITIONING TAPE 50 FT
777131	MAGNETIC POSITIONING SELECTOR 2-4 STOP
777139	MAGNETIC POSITIONING SELECTOR 5-6 STOP

APPENDIX C

VIRGINIA PLC

CONTROLLER

1.0 PRE-INSTALLATION INSTRUCTIONS AND NOTES

The following general rules and safety precautions must be observed for safe and reliable operation of your system.

WARNING: THE ELEVATOR CONTROLLER MUST BE INSTALLED BY EXPERIENCED FIELD INSTALLATION PERSONNEL. THE FIELD INSTALLATION PERSONNEL MUST KNOW AND FOLLOW ALL THE RULES AND REGULATIONS PERTAINING TO THE SAFE INSTALLATION AND RUNNING OF ELEVATORS. ADDITIONAL INFORMATION FOR SPECIFIC DEVICES (SUCH AS THE VALVES, DOOR OPERATOR, ETC.) IS THE RESPONSIBILITY OF THE MANUFACTURERS OF THOSE DEVICES.

WARNING: THIS EQUIPMENT IS DESIGNED AND BUILT TO COMPLY WITH ANSI A17.1 AND NATIONAL ELECTRICAL CODE AND MUST BE INSTALLED BY A QUALIFIED CONTRACTOR. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE SURE THAT THE FINAL INSTALLATION COMPLIES WITH ALL APPLICABLE LOCAL, STATE AND NATIONAL CODES, AND IS INSTALLED SAFELY.

WARNING: THE 3 PHASE AC POWER SUPPLY TO THIS EQUIPMENT MUST COME FROM A FUSED DISCONNECT SWITCH OR CIRCUIT BREAKER WHICH IS SIZED IN ACCORDANCE WITH ALL APPLICABLE NATIONAL, STATE AND LOCAL ELECTRICAL CODES, IN ORDER TO PROVIDE THE NECESSARY OVERLOAD PROTECTION FOR THE CONTROLLER AND MOTOR. INCORRECT MOTOR BRANCH CIRCUIT PROTECTION MAY CREATE A HAZARDOUS CONDITION.

WARNING: PROPER GROUNDING IS VITAL FOR THE SAFE OPERATION OF YOUR SYSTEM. BRING THE GROUND WIRE TO THE GROUND STUD THAT IS LABELLED "GND" OR "G1". YOU MUST CHOOSE THE PROPER CONDUCTOR SIZE. SEE NATIONAL ELECTRICAL CODE ARTICLE 250-95, OR THE RELATED LOCAL APPLICABLE CODE.

2.0 CONTROLLER INSTALLATION AND WIRING

2.1 Car and Hoistway Wiring

Review the schematics and field wiring diagrams before attempting to hook up the controller.

2.2 Car Top Selector (Tape Reader)

The pulsing-type Car Top Selector provides Floor Change/Slowdown signals and Levelling signals, as shown on the car top selector sheet in the schematic. The signals should be a normally open contact that closes as described below.

- 1) RESET SWITCHES close at the floor, while the car is in the Door Zone.
- 2) UP and DOWN LEVEL, and DOOR ZONE/LOW LEVEL.

Floor #	Reset 1 ON	Reset 2 ON
1	NO	NO
2	YES	NO
3	NO	YES
4	YES	YES

The reset magnets at each terminal landing, as shown on the schematic, provide a positive reset at every floor. The reset magnets should be laid out as shown in the attached table.

The Up Level Switch is a normally open contact that closes when the car is in the levelling zone below the floor, and the Down Level Switch is a normally open contact that closes when the car is in the levelling zone above the floor. The length of the levelling magnet determines the slow down distance, since slow down and floor change is initiated when the car rides on to the Levelling Switches. Position the levelling magnet so that when the car is floor level the Up and Down Levelling Switches are centered around the magnet, and both switches are open.

The Door Zone Switch is a switch (or switches) activated by the levelling magnet when the car is within 3" (76 mm) of floor level.

2.3 Terminal Landing Normal Limit Switches

The Terminal Landing Normal Limit Switch is a normally closed contact that opens when the car has travelled 1" (25 mm) past floor level at a terminal landing. The car should not be on the Terminal Landing Normal Limit Switch when the car is floor level at the terminal landing. The Limit Switch will prevent the car from travelling further away from the normal area of car travel, but allows the car to run back towards the normal area of car travel.

2.4 Terminal Landing Final Limit Switches

The Terminal Landing Final Limit Switch, where required by code, is a normally closed contact that opens when the car has gone a considerable distance beyond floor level at a terminal landing. It will prevent any further movement of the car in either direction. Consult the applicable codes for the proper setting of this switch.

2.5 Machine Room Wiring

Mount the controller firmly and install all required conduits before wiring the controller. Note where duct has been provided in the controller for customer access, before deciding where to locate conduit openings.



DO NOT ALLOW ANY METAL SHAVINGS TO GET INTO RELAYS OR CONTACTORS, OR IN BEHIND ELECTRONIC COMPONENTS, AS THIS COULD CAUSE SERIOUS DAMAGE TO PERSONNEL AND/OR EQUIPMENT.

3.0 START-UP INSTRUCTIONS

If it is desired to run the car temporarily during construction, refer to **Section 5.1 Temporary Run Button Installation**. Otherwise, proceed through each of these steps and checks .

3.1 Before Applying Power

The specific settings for the job must be set, as described in the following sections:

- 9.4 Changing Settings and Features Overview
- 9.5 BIT Features
- 9.6 Description of Settings
- 9.7 Floor Position Codes
- 9.8 Protecting Values from Accidental Changes

3.2 Power and Grounding



CONFIRM THAT THE VOLTAGE OF THE INCOMING POWER MATCHES THE CONTROLLER BEFORE APPLYING POWER TO THE CONTROLLER.

Check the system for improper grounds before applying power to the controller.

With the power off, remove the F3 fuse from the secondary of the main control circuit transformer ("CCXF"). Check the safety circuit (terminals 1 through 6, and 6A, 14, 16) for grounds. Using a Volt-Ohm meter connect one lead to terminal 35 (ground) and touch the

NOTE

If the fuses are not removed, the meter will read a short through the windings of the main control circuit transformer.

other lead to each terminal to be tested. The resistance should be considerably greater than 100 ohms.

With the fuse still removed, apply power to the controller, and verify that the voltage at the secondary of the main control circuit transformer ("CCXF") is 110-125VAC.



EACH OUTPUT POINT SHOULD BE ISOLATED FROM GROUND AND HOT SIDE.

3.3 Input/Output Wiring

With the power off, and the fuse removed, check each input point for grounds, as described in the previous **Section 3.2 Power and Grounding**. If a ground is observed, check the schematic to determine if this is correct (it usually is NOT!).

With the power off check each output for grounds, also check for shorts to the hot side (terminal 1). Note that some field devices, such as buzzers, will have very low resistance.

3.4 Applying Power

Remove all fuses before applying power. Re-insert the fuses, one circuit at a time, checking each circuit before adding the next.

3.5 Motor Rotation

With a three phase motor, check that the motor is rotating in the proper direction by turning on the power. Observe the rotation of the motor using a pressure gauge, if it is incorrect, reverse the main power leads (L1, L2, L3) at the main line disconnect.

3.6 PLC Start Up Instructions

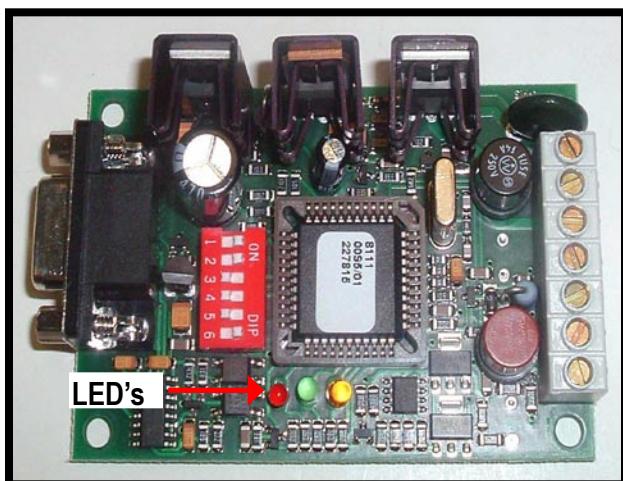
Before making the final wiring connections note that the Dupline Master Module indicators and PLC status are correct as follows:

Dupline Master Module

- Yellow and Green LED's ON solid
- Red LED pulsing

PLC

- Run is ON
- Comm 0 pulsing (in time with Red LED on Master Module)



Dupline Master Module



PLC

Start Up Procedure

After completing the wiring and before connecting power, complete the following tests.

- 1) Remove the wires from the terminals marked DUP PWR and DUP DUP from the **hatch wiring** on the right hand side of the relay board. Refer to the controller hook up schematics labelled VOY-INF HOOK and ORION HOOK.
- 2) Remove the wires from the terminals marked DUP PWR and DUP DUP from the **car wiring** on the bottom edge of the relay board. Refer to the controller hook up schematics labelled VOY-INF HOOK and ORION HOOK.

- 3) Using a Volt/Ohm meter check the resistance between the following, the resistance should be **greater than 1K Ohm (1000 ohms)**.
 - a) GND and DUP PWR wires
 - b) GND and DUP DUP wires
 - c) DUP DUP and DUP PWR wires
- 4) Go to each Dupline Module on both the car and hall landing stations and check the following using a Volt/Ohm meter:
 - a) Continuity between DUP GND and GROUND, the reading should be less than 0.5 Ohms; if the reading is greater than 1 Ohm check the wiring and connections at DUP GND and GROUND.
- 5) Check the resistance between the following, the resistance should be **greater than 1K Ohm (1000 ohms)**.
 - a) DUP GND and DUP PWR (POW)
 - b) DUP GND and DUP DUP (D+)
 - c) DUP GND and DC+
 - d) DC+ and DUP DUP (D+)
 - e) DUP PWR (POW) and DUP DUP (D+)
- 6) Return to the controller and ground out the DUP DUP (D+) wires, go to each module and check for continuity between DUP GND and DUP DUP (D+).

The reading should be less than 0.5 Ohms; if the reading is greater than 1 Ohm check the wiring and connections at DUP DUP and DUP GND.

If the test is satisfactory replace the DUP DUP (D+) wires in the designated terminals.
- 7) Return to the controller and ground out the DUP PWR (POW) wires, go to each module and check for continuity between DUP GND and DUP PWR (POW).

The reading should be less than 0.5 Ohms; if the reading is greater than 1 Ohm check the wiring and connections at DUP DUP and DUP PWR (POW).

If the test is satisfactory replace the DUP PWR (POW) wires in the designated terminals.

Verification of Low Voltage AC Lighting Connections

1) Before powering the elevator, remove the travel cable plugs from T3, T4, T7 and T8 on the Car Station Junction Box. Refer to the electrical schematics labelled CAR WIRING. Turn on the AC power, set a Volt/Ohm meter for 200VAC check for power between:

- a) CL1 and CL2 on the CAR WIRING terminals on the bottom edge of the relay board in the controller (machine room).

Both readings should be approximately 24VAC.

2) Go to the car station and check for voltage between the following pins on the travel cable.

- a) T7.1 and T7.2
- b) T7.2 and T3.8

Both readings should be approximately 24VAC.

If satisfactory, turn off the lighting disconnect and carefully replace the travel cable plugs on the designated terminals.

4.0 FINAL ADJUSTMENTS

When the controller is ready to be run in automatic, it is recommended that all adjustable features be checked.

As the wiring is completed, the following modes of operation can be checked and used.

4.1 Inspection Operation

To run the car on Inspection Operation, the safety string (including the door contacts, terminal landing normal slowdowns, normals and finals) should be operational.

The Doors Closed Input (6) should be energized, and input IN/3 should be ON.

The Inspection Input (Dupline Input A2) should be energized, and Automatic Input (Dupline Input A1) should be de-energized.

Pressing the Up Run and Run Buttons will energize the Inspection Up Input (Dupline Input A3), which will cause the Up Direction and Door Close outputs to come ON.

When the Doors Closed Input comes ON, the UP Run Outputs for the motor and the valves will energize and the car will run up.

4.2 Floor Position and Slow down

The floor relays may need to be reset when the controller is initially installed. This will be accomplished when the elevator is at any floor, due to the floor reset switches.

Remember to install ALL the reset magnets at each landing.

4.3 Position Indicators

Verify that the floor position changes properly as the car goes past each landing. Floor change should take place at the slow down point before each landing.

4.4 Car and Hall Calls

To observe the operation of the car and hall calls, the system must be in automatic operation. Verify that all car and hall calls work.

Each call will be cancelled when the car stops for the call, or when the doors start to re-open for the call if the car is already at the floor.

NOTE

If Collective Operation is not selected then only one call can be registered at a time.

4.5 Door Operation

Verify that any required changes to the Door Operator are correct as per the electrical schematics. Check the physical Door Close Limits for proper operation.

If the doors attempt to open for too long, the open cycle will be stopped. The car will then respond to other calls and try to open the doors again.

If the doors fail to close properly within a preset time, the doors will re-open and try to close again. If the doors are closed, but the car does not run in response to a call, the doors will re-cycle and the car will try again.

For very slow doors, the Door Stuck Timer, which initiates the Door Open and Door Close Fail, as described above, may need to be increased for more than 15 seconds.

If the Nudging Operation is activated, the Light Screen will be disabled when the Nudging Operation has tripped AND the doors are fully open. If the Nudging Timer trips while the doors are closing, the Nudging Buzzer will activate and the Light Screen will remain active. If the doors re-open fully, the Light Screen will de-activate. The Safety Edge Input remains active on Nudging.

4.6 Fire Service

Fire Service Phase 1 can be activated by turning off a Smoke Sensor input or by energizing the Hall Fire Switch ON Input. Confirm that the car returns to the correct Main and Alternate landings. Confirm that the car operates as required on Car Fire Service (Phase 2) operation.

NOTE

To reset Hall Fire Service (Phase 1), most codes require the Bypass input be energized.

To disable Hall Fire Service, jump the Hall Bypass input ON.

A17 2000 Code requires that the Smoke Sensors be in the normal operating condition (inputs ON.)

NOTE

If Car Fire Service (Phase 2) appears to be operating incorrectly, check the Door Open and Close Limits for proper operation. Most codes require that the doors be fully open before allowing a change in the mode of operation on Car Fire Service. Most codes require that Hall Fire Service (Phase 1) be in effect for the car to return automatically to the main fire landing when the Car Fire Switch is turned to the OFF position.

4.7 Faults

Most faults can be reset by pressing the “F2” button on the DAT on the front of the CPU. They will also be reset by turning the main power off then back on. Putting the car on Inspection then back to normal/automatic operation will reset most faults.

4.8 Stuck Button Timer

If a car or hall call button remains on for an adjustable time, and other calls are registered, the stuck button call will be ignored, and the car will answer the other call(s). The car will return to the stuck button call as it answers other calls, and the stuck button timer sequence will be repeated.

Troubleshooting: Check for stuck buttons.

NOTE

The car will not be shut down in this condition, but will be delayed by the Stuck Button Time, prior to proceeding to the next call.

4.9 Up Run Failure Timer

If the car runs up for an adjustable time, without changing floors, then low oil/shutdown operation will be initiated. The Shutdown LED on the CPU will come on. The Shutdown could be caused by a low oil level; a problem with the motor starter circuit(s); or a problem with the up valve circuit(s). The car will stop running up, then return to the lowest landing and cycle the doors. It will then be shut down, with only the Door Open Button or Lowest Landing Car Call Button being operational.

Troubleshooting: Check that the up output comes on; the “U” relay comes on; the Valve Board “UP” LED comes on; the “PM” contactor comes on; and the pump comes on. Check the oil level in the tank.

NOTE

If the main power fails (VR relay de-energizes) this will also initiate a shutdown signal.

4.10 Down Run Failure Timer

The car can run down indefinitely when going from floor to floor. If the car stops between floors, it will attempt to return to the next landing below it. If it cannot reach the next landing within 60 seconds, it will stop the down run, and return to normal service. In this condition it will not be able to answer a call at the current floor (as shown on the Position Indicator) but will be able to run to any other floor.

4.11 Dupline Failure Timer

If the PLC loses communication with the Dupline Master Module, **or** the Dupline Checking Input (Dupline Input A8 which is connected directly to Dupline Output B8) fails to flash then the car will shut down. This fault will reset when the Dupline starts communicating again.

Troubleshooting: Check the dip switches on the Dupline Module (Sws 2, 4, 5 should be ON, the others should be OFF). Check the lights on the Dupline Master Module (the TX led should flash rapidly, and the other two LED's should be on solid). The COMM0 led on the PLC should also be flashing at the same rate as the TX led on the Dupline Master Module. If the COMM0 led is not flashing, then the PLC is not receiving any communication; check the cable from the Dupline Master Module to the PLC.

4.12 Contact Fault (Redundancy Check)

Several key signals are monitored to confirm their proper operation. In these cases, the input is compared to the internal corresponding signal in the PLC, and if there is a difference then a shutdown is initiated. The signals that are compared are:

- “DZ1,DZ2” – Output 1 and Input 2 are compared to Input 14.
- “U,D,PM” – Outputs 8 and 9 are compared to Input 15.
- “SF” – Output 7 is compared to Input 9.

If there is an error for more than 1 second, then a fault is logged and the elevator is shut down. This circuit checks for failed outputs, stuck relays or contactors and short-circuits.

4.13 Levelling Switch Failure Timer

This fault is generated if the Up and Down Levelling Inputs are both on at the same time, while the car is on automatic operation. Troubleshooting: Check the selector.

4.14 Door Zone Failure Timer

If either Door Zone Input stays on while the car is running between floors, this fault is generated. The car will shutdown at the next floor. Troubleshooting: Check the selector.

4.15 Selector Reset Fault

As the car runs past each floor, it will reset to the floor position based on the reset magnets at that floor. If this disagrees with the floor position that is expected (for example if the car is running up from 2, it expects the next floor to be 3) then a fault is counted. If the count reaches 5 the car will shutdown. If the car passes a floor 25 times without a fault, it will reset the counter.

Troubleshooting: Check the selector reset magnets. Especially watch the position indicator as the car passes each floor. If the position indicator changes twice as it passes a floor, then the reset magnet is missing or improperly placed. Check the selector instruction sheet that shows the proper layout for the reset magnets.

5.0 MICRO-PROCESSOR HARDWARE DESCRIPTION

5.1 Major Components

The controller consists of the Micro-Processor system, Power Supply section, and Relay Interface.

The Micro-Processor system consists of the Central Processor Board (CPU), which has the micro-processor central processing unit, and the appropriate hardware to communicate to the DAT display, and Input/Output boards.

The Power Supply section includes the required transformers and fuses to power the Micro-Processor system and the Relay Interface.

The Relay Interface includes the required relays and contactors to interface the field signals and devices to the micro-processor. This usually includes a printed circuit board for normal signals, as well as other relays or contactors for signals required for each specific job.

5.2 CPU

The Central Processing Unit (CPU) board contains the hardware that controls the inputs and outputs which control the elevator.

5.3 LED Description

The lights on the PLC CPU will all come on when the power is first applied. The POWER light will stay on, and the RUN light will flash during the self-check, then will stay on. The POWER and RUN light must both be on for normal operation.

If the RUN light does not come on, check the Run Switch behind the hinged cover on the left of the CPU. The switch should be in the center (REM) position or the left (RUN) position. If there is not a specific hardware fault, the CPU can usually be forced into the Run mode by turning the switch to the RUN position then back to REM, or by cycling the power.

If there is a hardware fault, the DAT (Data Access Terminal) will display the fault code, as described below.

A software fault will not cause the PLC to go out of the run mode, but will display a fault in the fault log. Refer to the Fault section for a description of faults and possible causes.

5.4 DAT (Data Access Terminal)

Non-Existent Elements – When the DAT determines that an element number does not exist in the controller, the element value displays as three (3) dashes.

If the protection bit for an element is undefined, the DAT will assume that the element is unprotected.

Controller Faults – The DAT checks for controller faults every 10 seconds. When the DAT detects a controller fault, the display shows “FL” in the element number field and the value of the controller’s major fault word (S2:6) is displayed in the value field.

Pressing ESC while the fault is being displayed returns the DAT to its previous mode. The fault is not removed from the controller, just from the DAT display screen. The fault that was on screen will not display again and cannot be “recalled”. If a new fault is detected, it will be displayed. If the initial fault is cleared and returns at a later time, the DAT will display the fault at that time.

Error Conditions – When the DAT detects an error in its own operation, it displays the error screen. The error screen consists of “Err” and a two-digit error code.

The DAT can experience two (2) different types of errors, internal errors and communication errors.

Internal DAT Errors – Internal DAT errors are non-recoverable. When the DAT experiences an internal error, it displays the error screen, and does not respond to any key presses. Remove and re-install the DAT. If this does not clear the error, the DAT must be replaced.

Communication Errors – The DAT continually monitors the interface between the DAT and the controller to ensure a good communication path. If the DAT loses communication with the controller for more than three (3) seconds, it generates an interface time-out error. The DAT automatically attempts to re-establish communications. The error screen displays until the DAT regains communications with the processor. All key presses are ignored until the display clears.

NOTE

If an element value is being modified when the fault is detected, the fault is stored until the modification is accepted or discarded. Then, the fault will be displayed.

Error Code	Description	Caused by	Recommended Action
00	Interface time-out	Communication traffic	Add SVC instructions to ladder program
01 to 02	Power-up test failure	Internal failure	Remove and re-insert the DAT. If failure persists, replace the unit.
03 to 07	Internal error	Internal failure	Remove and re-insert the DAT. If failure persists, replace the unit.
08	Processor owned (1)	Another device has ownership of the controller	Release ownership by the other device.
09	Access denied	Cannot access that file because another device has ownership	Release file ownership by the other device.
31 to 34	Internal error	Internal failure	Remove and re-insert the DAT. If failure persists, replace the unit.

- (1) This error can occur after a download in which communications configurations are changed. This error can be cleared by removing and re-installing the DAT, or by cycling power to the controller.

5.5 DAT (Data Access Terminal) Connectors

COMM0 - Dupline Communication Connector

The Duplex Communication Connector is a terminal block located in the upper left corner of the CPU board. A shielded twisted pair is used to connect the two CPU boards together. The shield is connected to the CPU board mounting screw (which is grounded) at ONE END OF THE CABLE ONLY. The termination jumpers next to the connector are factory installed on duplex systems.

Incoming Power Connector

The Incoming Power Connector is part of the terminal block used for the Outputs. The incoming power is 24VDC from the power supply.

Input/Output Terminals

The Input terminal strip is located along the top edge of the CPU base. The inputs are 24VDC. The Output terminal strip is on the lower edge of the CPU base. The outputs are either dry relay contacts, or 24VDC signals.

5.6 Operating Instructions for the Allen Bradley Data Access Terminal (DAT)

NOTE

Make sure you understand the effects of any changes before changing any settings.

The DAT is used to display and change the adjustable settings for the controller. It is also used to display the Input and Output status and internal coil status, and the fault log. The DAT mounts on the front of the CPU (Central Processing Unit). It can be removed or installed with power on. When power is applied, the DAT will perform a self check, then display the setting of the first BIT value.

Available DAT Settings

The BIT settings enable and disable discrete features as described on the list of BIT settings. The DAT will show whether these are on or off.

The INT settings determine the number of floors, Fire Service return landings, presets for timers, IO status, internal coil status, and fault log. The number of floors, fire service return landings, and timer presets can be set during installation, as required on each job.

Changing a Setting

NOTE

For the value to be accepted by the program, INT-39 must be set to a value of 2513 and the F1 button on the DAT must have been pressed so that the light next to F1 is on.

1. Press the BIT or INT button on the DAT, to select an on/off setting (BIT) or a value (INT or integer).
2. Press the up or down button on the right of the DAT to select the setting or value to be changed.
3. Press ENT to change the value of the setting or value being displayed. The value of the setting will start flashing.
4. Press the up or down button to select the new value. Hold the button to scroll the new value more quickly.
5. Press ENT to accept the new value, or ESC to escape without changing the value.

Monitoring Input/Output Status

WARNING

If values are changed without the password setting (INT 39) being set properly, or without F1 being set on, then when the password is set correctly and F1 is turned on, the previously entered values will be accepted. It is strongly recommended that all settings be checked before activating the password setting or setting F1 on, to make sure that improper values are not entered.

The IO status and internal coil status are troubleshooting tools that allow the internal status of the CPU to be displayed. To display the IO or internal memory, set the value of INT-30 (Data Pointer) to the desired value, as shown in the chart below, then the status of the IO will be shown in INT-31,32, which each show the status of four discrete points that may be inputs, outputs or internal coils, depending on the value of INT-30. For INT-31, the bits are shown as 1,2,3 or 4, if they are ON, or 0 or blank if they are OFF. For INT-32, the bits are shown as 5,6,7 or 8, if they are ON, or 0 or blank if they are off.

5.7 Dupline Input/Output Boards

The Dupline Input/Output boards are used to connect the CPU with the field devices. All inputs (unless otherwise stated) are 24VDC, and outputs (unless otherwise stated) are 24VDC.

The boards are available as 8-Input and 8-Output, 4-In/4-Out, or 2-In/2-Out boards. Wiring is done to the terminal blocks at the bottom of the IO boards. There are two LED's on the boards. Both LED's should be on during normal operation. The boards are connected back to the Dupline Master Control Module in the controller by three wires, Power, Ground and Dupline Signal. These wires should be run in a separate shielded twisted cable. Where possible, keep these wires away from other high voltage signals, especially motor wiring.

5.8 Dupline Addressing

Each Input/Output point is given a unique address by means of a hand-held programmer. The schematic shows the address of each point. If a board is replaced, the board must be set up with the SAME ADDRESSES as the board it was replacing. The boards are pre-programmed from the factory according to the intended use. If a board is to be used for different points, the points can be re-programmed as required. Refer to the Dupline instructions for the Dupline programmer for programming instructions.

6.0 SETUP GUIDE FOR PROGRAMMING THE ALLEN BRADLEY MICROLOGIX 1500 PLC

1. Remove the blanking cover from the front of the PLC (if present)
2. Install the DAT (Data Access Terminal). Turn off the power at the battery backup while installing or removing the DAT.

6.1 Setting Bits

1. Turn on the power at the battery backup. Press the pushbutton labelled ‘BIT’ a green led beside it should come on if it is not already lit up. The DAT should indicate a flashing ‘00’ on the left of the display and a solid ‘ON-1’. This means that bit # 00 is turned on.
2. The flashing value can be changed using the up and down arrows to the right of the display readout. Push the up or down arrows to scroll through the list of bits to see which bits are turned ‘ON’ and which are bits are turned ‘OFF’.
3. To change the status of a particular bit use the up and down arrows to select the desired bit number. Push the button labelled ‘ENTER’ to change the status of the selected bit. At this point the readout on the right of the display should start flashing. Press the up or down arrows to change its status to either ‘ON-1’ or ‘OFF-0’.
4. The first step in programming is to set the bit values required for your particular application. To do this, refer to the chart entitled ‘Bit Features’. It is located in Appendix C of the installation manual. In the bit features chart you will find a listing of all bit settings that can be turned ‘ON’ or ‘OFF’.
5. Start setting bits by enabling any doors that are present on your elevator. Turn ‘ON’ the bit to enable any doors that are present and make sure to turn ‘OFF’ the bits for any doors that are not present on your elevator.
 - For a 2 stop elevator with a front door at the 1st landing and front and rear doors at the 2nd landing:
 - Turn ‘ON’ bit #'s: 00, 01, and 07
 - Turn ‘OFF’ bit #'s: 02 – 06, 08-11
6. Doors at landings must be properly programmed correctly in order for the unit to run. Ensure that any doors which are not present are turned ‘OFF’.
7. Bits number 12 to 20 are present to turn on or off any additional features that may or may not be present on your elevator. The pages following the Bit Features chart contain descriptions of the function of each bit listed in the chart.

8. Bit number 21 must be properly set in order for the elevator to run. If fire service is not supplied on the elevator this bit must be turned 'ON' to disable fire service inputs and operation. If fire service is present on the elevator this bit must be turned 'OFF' in order for the fire service inputs and operation to work. Note that all smoke sensors and fire service key switches must be wired up to the controller as indicated in the wiring diagrams provided with the job. Note also, that fire service is only available on the 'Orion' elevator.
9. Bit numbers 22 to 35 are for enabling different elevator operations and codes that may or may not be applicable, depending on local code requirements.
10. Bit number 36 should be turned 'ON' if there is a key switch in the car to enable car call buttons. This key switch is present on Infinity and Voyager elevators and is not present on Orion elevators. Turning this bit 'OFF' is required on all Orion elevators and may be desired if the user of an Infinity or Voyager elevator does not want to use the key switch to enable the car call buttons.
11. Bit number 37 must be turned 'OFF' to enable the function of the Car Top Inspection Station. If the elevator is an Infinity or a Voyager or the Car Top Inspection Station is not present this bit must be turned 'ON' in order for the elevator to work.
12. Bit number 38 to 46 are either 'empty' bits which do not have any function or they are bits used to enable different operational features of the elevator.
13. Bit 47 should be turned 'ON' while the unit is undergoing installation or adjustment. This will allow the elevator to try and run despite running timers, jumped door lock contacts, etc., that would normally cause the elevator to shutdown. After all wiring and setup is complete this bit must be turned 'OFF' so the elevator will not run in an unsafe condition. Note on any PLC software that is revision 16 or higher this bit automatically times 'OFF' after 60 minutes and may have to be reset periodically during the installation process.

6.2 Setting Integers

1. After all bits have been set to their correct status you must set the integer values. Integers are similar to bits, only they contain a number value instead of being 'ON' or 'OFF'. The value can be any number between -32768 and 32767 but will typically be a value between 0 and 1000. Integers are scrolled through and adjusted using the same method described above for changing and checking bits.
2. To determine what the integer settings should be set to for your elevator reference the chart entitled 'Listing of INT settings' on page C-37.
3. Integer number 00 must be set correctly for the elevator to run. This integer should have a value in it which matches the number of landings or stops present on the elevator. It must match the number of landings specified in bit number 00 to 11.

4. Integers 01 to 36 are used to adjust timers and settings used by different functions of the elevator. They may or may not be applicable to your particular application. The function of each integer is listed in the pages of the manual following the 'Listing of INT settings' chart. Note the elevator will operate with the default settings contained in these integers.
5. Integer 37 is used to enable the various types of door operators supported by the Virginia Controller and it must be set correctly for the elevator to run. To set this integer correctly you must refer to the separate description for this integer in the installation manual. A chart tells you which value of integer 37 enables a certain type of operator.
 - Integer 37 setting of 1 would be required for 2 speed sliding doors.
 - Integer 37 setting of 6 would be required for automatic ProDoor and automatic gates.
6. Integer 38 is used to enable different options or methods of operation of the elevator. It must be set correctly in order for the elevator to run. You must refer to the separate description for this integer in the installation manual to determine what its value should be. Following is a listing of the most common integer 38 settings:
 - **For an Orion with 2 speed sliding doors this setting should be 146.**
 - **For an Infinity or Voyager with automatic operation this value should be 178.**
 - **For an Infinity or Voyager with constant pressure operation this value should be 182.**
7. Integers 40 to 47 contain fault codes that show the last 4 faults that were logged by the controller and the appropriate status codes for each fault. The fault code meanings and definitions of status codes can be found in Appendix C of the elevator installation manual.
8. Your PLC should now be programmed to run. Check DC input lights on the PLC before trying to place a call. Inputs 3, 4, and 8 must be lit in order for the unit to run. Integers 30, 31, and 32 can be used to monitor the status of required Dupline inputs. See Appendix C of the installation manual for sections entitled 'Monitoring I/O Status with DAT' and the 'Dupline Inputs' chart to check Dupline inputs.

6.3 Dupline Switch Settings

SW 1 = OFF

SW 2 = ON (Checksum CRC)

SW 3 = OFF

SW 4 = ON (Split IO Mode)

SW 5 = ON (64 IO)

SW 6 = OFF (Clear Data)

Sws are on Master Module Interface # G3496-0006-700

NOTE: For 5 or 6 Ldgs, set SW 5 to OFF, for 128-IO.

LOCATION (Loc): T = TOP OF CAR C = IN CAR H = HALL

Remove the Input Stretching Capacitor on LU.LD. Optional on other Inputs marked “*”

Dupline Inputs

The following inputs apply to a 2 stop Orion with 2-speed sliding doors, type 1 cab (ON/OFF on the same side), no fire service. The lift is level at the bottom landing with all doors closed, with the door zone on the tape reader.

Name	Description	Inputs (see above)	Location	Address	INT-30	
AUTO	Inspection Sw in Auto/Normal	1	T	A1	0	INT-31 INT-32
INS	Inspection Sw in Inspection	0	T	A2		
INSUP	Inspection Up Button	0	T	*A3		
INSDN	Inspection Down Button	0	T	*A4		
IAS	Car Inspection Acces Sw	0	C	A5		
LU	Selector Level Up	0	T	*A6		
LD	Selector Level Down	0	T	*A7		
Check IO	Connect to Output B8	0	T	*A8		
B1FP	Selector Binary Floor Reset	0	T	*B1	1	INT-31 INT-32
B2FP	Selector Binary Floor Reset	0	T	*B2		
B4FP	Selector Binary Floor Reset	0	T	*B3		
EE	Electric Eye	4	C	B4		
DOL/HDOL1	Door Open Limit / 1st Ldg Hall DOL	5	T/H	B5		
DCL/HDOL2	Door Close Limit / 2nd Ldg Hall DOL	0	T/H	B6		
DOLR/HDOL3	Rear DOL / 3rd Ldg Hall DOL	0	T/H	B7		
DCLR/HDOL4	Rear DCL / 4th Ldg Hall DOL	0	T/H	B8		
1C	1st Ldg Car Call Button	0	C	C1	2	INT-31 INT-32
2C	2nd Ldg Car Call Button	0	C	C2		
3C	3rd Ldg Car Call Button	0	C	C3		
4C	4th Ldg Car Call Button	0	C	C4		
SE/HDC1	Safe Edge/1st Ldg Hall Door Closed Magnet	0	H	C5		
SER/HDC2	Safe Edge Rear/2nd Ldg Hall Door Closed Magnet	0	H	C6		
HDC3	3rd Ldg Hall Door Closed Magnet	0	H	C7		
HDC4	4th Ldg Hall Door Closed Magnet	0	H	C8		
1CR	1st Ldg Rear Car Call Button	0	C	D1	3	INT-31 INT-32
2CR	2nd Ldg Rear Car Call Button	0	C	D2		
3CR	3rd Ldg Rear Car Call Button	0	C	D3		
4CR	4th Ldg Rear Car Call Button	0	C	D4		
DOB	Door Open Button	0	C	D5		
DCB	Door Close Button	0	C	D6		
DOBR	Rear Door Open Button	0	C	D7		
DCBR	Rear Door Close Button	0	C	D8		

Dupline Inputs cont.

Name	Description	Inputs	Location	Address	INT-30	
EC-ON	Car Fire Sw in "ON"	0	C	E1	4	INT-31
EC-HOLD	Car Fire Sw in "HOLD"	0	C	E2		
ECOFF	Car Fire Sw in "OFF"	0	C	E3		
EER	Rear Electric Eye	0	C	E4		
EHON	Hall Fire Sw in "ON"	0	H	E5	5	INT-32
EHOFF	Hall Fire Sw in "OFF"	0	H	E6		
EHBY	Hall Fire Sw in "Bypass/Reset"	0	H	E7		
EHON2	Remote Hall Fire Sw in "ON"	0	H	E8		
1H	1st Ldg Hall Call Button	0	H	F1	6	INT-31
2H	2nd Ldg Hall Call Button	0	H	F2		
3H	3rd Ldg Hall Call Button	0	H	F3		
4H	4th Ldg Hall Call Button	0	H	F4		
DUPLS	Dupline Check	5	H	F5		
CAREN	Enable Car Station	0	H	F6	7	INT-32
IAUP	Access Up Run Button/Sw	0	H	*F7		
IADN	Access Down Run Button/Sw	0	H	*F8		
1HR	1st Ldg Rear Hall Call Button	0	H	G1		
2HR	2nd Ldg Rear Hall Call Button	0	H	G2	8	INT-31
3HR	3rd Ldg Rear Hall Call Button	0	H	G3		
4HR	4th Ldg Rear Hall Call Button	0	H	G4		
HDCLR1	1st Ldg Rear Hall Door Closed	0	H	G5	6	INT-32
HDCLR2	2nd Ldg Rear Hall Door Closed	0	H	G6		
HDCLR3	3rd Ldg Rear Hall Door Closed	0	H	G7		
HDCLR4	4th Ldg Rear Hall Door Closed	0	H	G8		
ZONE1	1st Ldg Zone Sw	0	H	H1	7	INT-31
ZONE2	2nd Ldg Zone Sw	0	H	H2		
ZONE3	3rd Ldg Zone Sw	0	H	H3		
ZONE4	4th Ldg Zone Sw	0	H	H4		
HDOLR1	1st Ldg Rear Hall Door Open Limit	0	H	H5	8	INT-32
HDOLR2	2nd Ldg Rear Hall Door Open Limit	0	H	H6		
HDOLR3	3rd Ldg Rear Hall Door Open Limit	0	H	H7		
HDOLR4	4th Ldg Rear Hall Door Open Limit	0	H	H8		
5C	5th Ldg Car Call Button	0	C	I1	8	INT-31
6C	6th Ldg Car Call Button	0	C	I2		
5CR	5th Ldg Rear Car Call Button	0	C	I3		
6CR	6th Ldg Rear Car Call Button	0	C	I4		
5H	5th Ldg Hall Call Button	0	H	I5	8	INT-32
6H	6th Ldg Hall Call Button	0	H	I6		

Dupline Inputs cont.

5HR	5th Ldg Rear Hall Call Button	0	H	I7		
6HR	6th Ldg Rear Hall Call Button	0	H	I8		
HDC5	5th Ldg Hall Door Closed	0	H	J1	9	INT-31
HDC6	6th Ldg Hall Door Closed	0	H	J2		
HDCR5	5th Ldg Rear Hall Door Closed	0	H	J3		
HDCR6	6th Ldg Rear Hall Door Closed	0	H	J4		
HDOL5	5th Ldg Rear Hall Door Open Limit	0	H	J5		
HDOL6	6th Ldg Rear Hall Door Open Limit	0	H	J6		
HDOLR5	5th Ldg Rear Hall Door Open Limit	0	H	J7		
HDOLR6	6th Ldg Rear Hall Door Open Limit	0	H	J8		
ZONE5	5th Ldg Zone Sw	0	H	K1		
ZONE6	6th Ldg Zone Sw	0	H	K2	10	

Notes: With Revision 12, if the system has Front and Rear Non-Selective openings (no front and rear at the same landing) then program all rear signals as if it were a front opening EXCEPT inputs for DOLR, DCLR, EER, SER (all with 2-speed doors).

Dupline Outputs

NAME	Description	Location	Address	INT-30	INT-31
DO / GO	Door Open ECI / Gate Open	T	A1	16	INT-31
DC / GC	Door Close ECI / Gate Close	T	A2		
NUD	Front Door Nudge/Retiring Cam	T	A3		
NB	Front Door Nudging Buzzer	C	A4		
DOR / GOR	Rear Door Open / Gate Open	T	A5		INT-32
DCR / GCR	Rear Door Close / Gate Close	T	A6		
NUDR	Rear Door Nudge	T	A7		
NBR	Rear Door Nudging Buzzer	C	A8		
C1F	Car or Main Ldg PI Bit 1	C,H	B1	17	INT-31
C2F	Car or Main Ldg PI Bit 2	C,H	B2		
C4F	Car or Main Ldg PI Bit 4	C,H	B3		
C8F	Car or Main Ldg PI Bit 8	C,H	B4		
EFS	Fire Light (Phase1,2 or flash)	T,C	B5		INT-32
AV	Fire Audible Visible	T,C	B6		
EFS1	Fire Light, Phase 1 only	H	B7		
CHECK IO	Connect to Input A8	T	B8		
1C	1st Ldg Car Call Light	C	C1	18	INT-31
2C	2nd Ldg Car Call Light	C	C2		
3C	3rd Ldg Car Call Light	C	C3		
4C	4th Ldg Car Call Light	C	C4		
PRO1	1st Ldg Pro Door Open	H	C5		INT-32

Dupline Outputs cont.

PRO2	2nd Ldg Pro Door Open	H	C6		
PRO3	3rd Ldg Pro Door Open	H	C7		
PRO4	4th Ldg Pro Door Open	H	C8		
1CR	1st Ldg Rear Car Call Light	C	D1		
2CR	2nd Ldg Rear Car Call Light	C	D2		INT-31
3CR	3rd Ldg Rear Car Call Light	C	D3		
4CR	4th Ldg Rear Car Call Light	C	D4		
TLU	Up Car Lantern	C	D5		
TLD	Down Car Lantern	C	D6		INT-32
TLUR	Up Car Lantern Rear	C	D7		
TLDR	Down Car Lantern Rear	C	D8		
H1F	PI Bit 1 (can shut off)	H	E1		INT-31
H2F	PI Bit 2 (can shut off)	H	E2		
H4F	PI Bit 4 (can shut off)	H	E3		
H8F	PI Bit 8 (can shut off)	H	E4		
UR	Up Direction Indicator	C	E5		INT-32
DR	Down Direction Indicator	C	E6		
CAG	Car Arrival Gong	C	E7		
Shutdown	Shutdown Indicator	-	E8		
1AG/1UL	1 Arrival Gong / 1U Lantern	H	F1		INT-31
2AG/2DL	2 Arrival Gong / 2D Lantern	H	F2		
3AG/2UL	3 Arrival Gong / 2U Lantern	H	F3		
4AG3DL	4 Arrival Gong / 3D Lantern	H	F4		
5AG/3UL	5 Arrival Gong / 3U Lantern	H	F5		INT-32
6AG/4DL	6 Arrival Gong / 4D Lantern	H	F6		
PG	Passing Gong	C	F7		
IUL	In Use Light	H	F8		

Dupline Outputs cont.

NAME	Description	Location	Address	INT-30
1AGR/1ULR	Rear 1 Arr Gong / 1U Lantern	H	G1	22
2AGR/2DLR	Rear 2 Arr Gong / 2D Lantern	H	G2	
3AGR/2ULR	Rear 3 Arr Gong / 2U Lantern	H	G3	
4AGR/3DLR	Rear 4 Arr Gong / 3D Lantern	H	G4	
5AGR/3ULR	Rear 5 Arr Gong / 3U Lantern	H	G5	
6AGR/4DLR	Rear 6 Arr Gong / 4D Lantern	H	G6	
PDC	Pro Door Cease to Open	H	G7	
Not used			G8	
PRO1R	1st Ldg Rear Pro Door Open	H	H1	23
PRO2R	2nd Ldg Rear Pro Door Open	H	H2	
PRO3R	3rd Ldg Rear Pro Door Open	H	H3	
PRO4R	4th Ldg Rear Pro Door Open	H	H4	
NUUDGE	Front or Rear Nudge	C	H5	
NBUZ	Front or Rear Nudging Buzzer	C	H6	
UR	Up Direction Indicator	C	H7	
DR	Down Direction Indicator	C	H8	
5C	5th Ldg Car Call Light	C	I1	24
6C	6th Ldg Car Call Light	C	I2	
5CR	5th Ldg Rear Car Call Light	C	I3	
6CR	6th Ldg Rear Car Call Light	C	I4	
PRO5	5th Ldg Pro Door Open	H	I5	
PRO6	6th Ldg Pro Door Open	H	I6	
PRO5R	5th Ldg Rear Pro Door Open	H	I7	
PRO6R	6th Ldg Rear Pro Door Open	H	I8	
4UL	4th Ldg Up Lantern	H	J1	25
5DL	5th Ldg Down Lantern	H	J2	
5UL	5th Ldg Up Lantern	H	J3	
6DL	6th Ldg Down Lantern	H	J4	
4ULR	4th Ldg Rear Up Lantern	H	J5	
5DLR	5th Ldg Rear Down Lantern	H	J6	
5ULR	5th Ldg Rear Up Lantern	H	J7	
6DLR	6th Ldg Rear Down Lantern	H	J8	

Notes: With Revision 12, if the system has Front and Rear Non-Selective openings (no front and rear at the same landing) then program all rear signals as if it were a front opening

EXCEPT outputs A5,A6,A7,A8,D7,D8

Rev 16 – UR and DR are disabled on Fire Service, URX and DRX are still active on Fire Service.

7.0 CONTROLLER NOMENCLATURE

SYMBOL	DESCRIPTION	PARTS LIST ITEM NO
D	DOWN RUN RELAY	A1
DZ1-2	DOOR ZONE RELAYS	A1
FS	FAST SPEED RELAY	A1
LIT	CAR LIGHTING CUTOUT RELAY	A1
PM	STARTER (ACROSS THE LINE START)	B1
SF1-2	SAFE TO RUN RELAYS	A1
U	UP RUN RELAY	A1
VR	VOLTAGE RELAY (OPTIONAL)	A1
PLP	KWIKLOCK/PROLOCK UNLOCKING RELAY	A1

8.0 PARTS LIST

ITEM	DESCRIPTION	MANUFACTURER	PART NO
RELAYS			
A1	4PDT, 24VDC, PLUG-IN RELAY		
CONTACTORS, STARTERS, OVERLOAD			
B1	ACROSS-THE-LINE STARTER (IEC)	ALLEN-BRADLEY	100-C30YJ-E10
B2	3 POLE OVERLOAD (IEC)	ALLEN-BRADLEY	193-TA-Cxx
TRANSFORMERS, FUSES, TERMINALS			
C1	460-230-208/230-115, 600VA	RAM	C-4797
C2	250V INSTANTANEOUS FUSE	LITTELFUSE	TYPE BLF
C3	250V FUSEHOLDER	CURTIS	PW1F
C4	TRACK FOR 250V FUSEHOLDERS	CURTIS	SW192
C5	3 POLE TERMINAL, 600V, 50AMP	CURTIS	3PSWT
C6	MOUNTING TRACK FOR TERMINALS	CURTIS	SW192
MICRO-PROCESSOR			
D1	MICROPROCESSOR CPU	ALLEN-BRADLEY	1764-LSP
D2	BASE	ALLEN-BRADLEY	
D3	DAT (DATA ACCESS TERMINAL)		
INPUT-OUTPUT MODULES			
	MASTER MODULE	DUPLINE	SPEC8111
	8 INPUTS	DUPLINE	G21205501700
	4 INPUTS, 4 OUTPUTS	DUPLINE	G21405520700
	2 INPUTS, 2 OUTPUTS	DUPLINE	G21404421700
MISCELLANEOUS COMPONENTS AND HARDWARE			
F1	PRINTED CIRCUIT BOARD	V.C.	MH-3
F2	1"W X 2"H DUCT	TAYLOR	91020
F3	1"W X 3"H DUCT	TAYLOR	91030
F4	1"W DUCT COVER	TAYLOR	99010
F5	1"W DUCT MOUNTING CLIPS	TAYLOR	08010
F6	CONTROLLER ENCLOSURE	PIEDMONT	(SIZE)

9.0 CONTROLLER DIAGNOSTICS USING DAT

The DAT is used to display and change the adjustable settings for the controller. It is also used to display the Input and Output status and internal coil status, and the fault log. The DAT mounts on the front of the CPU (Central Processing Unit). It can be removed or installed with power on. When power is applied, the DAT will perform a self check, then display the setting of the first BIT value.

9.1 Monitor Features and Settings Overview with DAT

The BIT values are ON/OFF settings that enable various features available in the controller. The INT values are integer settings (number of floors, timer values, IO status, fault log, etc.) Refer to the section on features and settings for details of all available settings.

Press the BIT button on the DAT to view the BIT settings, or press INT to view the integer values. Press the up or down button bar on the right of the DAT to scroll through the various settings.

To MONITOR settings continuously, press the F1 button so that the F1 light is ON. NOTE this is vital when monitoring the IO using INT30-32, or when looking at the Fault Log (INT40-47). If F1 is NOT on, then the value of INT30 can be changed but the values in INT31 and INT32 will NOT be updated until F1 is turned on.

9.2 Monitoring the I/O Status with DAT

The status of the local IO on the CPU is shown on the status lights on the PLC Base. To view the status of the Dupline IO, use INT30 as a pointer, and INT31 and INT32 as the data.

- Press “F1” button so that the F1 led on the DAT is ON
- Press “INT” to show the INT settings
- Press the “Up” or “Down” button bar to scroll to INT30
- Press “ENT” to enter the edit mode (the value on the right will start flashing)
- Press the “Up” or “Down” button bar to change the value of INT30
- Refer to the table for the proper value of INT30 to view each IO point
- Press “ENT” when the desired value has been entered
- Press the “Up” or “Down” button bar to view INT31 or INT32

9.3 Monitoring Display Format

Examples of DAT Display to show format of INT-31 and INT-32 data. Numbers in light grey are for other data, and can be the number shown or blank or zero. They are shown just to show the relative position in the display.

DAT DISPLAY	DESCRIPTION - DATA FORMAT FOR INT31
[31 1234]	"1" in thousands column indicates point 1 is ON.
[31 234]	Blank in thousands column indicates point 1 is OFF.
[31 1234]	"2" in hundreds column indicates point 2 is ON.
[31 34]	Blank in hundreds column indicates point 2 is OFF.
[31 1034]	Zero in hundreds column indicates point 2 is OFF.
[31 1234]	"3" in tens column indicates point 3 is ON.
[31 4]	Blank in tens column indicates point 3 is OFF.
[31 1204]	Zero in tens column indicates point 3 is OFF.
[31 1234]	"4" in units column indicates point 4 is ON.
[31 1230]	Zero in units column indicates point 4 is OFF.
DATA FORMAT FOR INT32	
[32 5678]	"5" in thousands column indicates point 5 is ON.
[32 678]	Blank in thousands column indicates point 5 is OFF.
[32 5678]	"6" in hundreds column indicates point 6 is ON.
[32 78]	Blank in hundreds column indicates point 6 is OFF.
[32 5078]	Zero in hundreds column indicates point 6 is OFF.
[32 5678]	"7" in tens column indicates point 7 is ON.
[32 8]	Blank in tens column indicates point 7 is OFF.
[32 5608]	Zero in tens column indicates point 7 is OFF.
[32 5678]	"8" in units column indicates point 8 is ON.
[32 0]	Zero in units column indicates point 8 is OFF.

9.4 Changing Settings or Features Overview

To CHANGE settings, the Password setting (INT39) must be set to “2513” AND F1 must be ON. If BOTH of these conditions are not met then all settings except the password value (INT39) and the IO Pointer (INT30) will be “protected” and will not be changeable.

- When F1 is on and INT39 is set to 2513, to change a feature
- Press BIT or INT to select the feature to be changed
- Press the Up or Down button bar to select the specific feature or value to be changed
- Press ENT to enter the edit mode. The value on the right will flash
- Press the Up or Down button bar to change to the new value
- Press ENT to accept the new value, or ESC to exit without changing the value

9.5 BIT Features

Use this selection to change the features described in the following table. Each feature is either ON or OFF. As you scroll through the features, the feature will be shown as 1-ON or 0-OFF. The feature may be changed by pressing “ENT” then the Up or Down button bar, to select the desired operation (on/enabled or off/disabled), then press “ENT” to store the value.



**MAKE SURE YOU UNDERSTAND THE EFFECTS OF
ANY CHANGES BEFORE ATTEMPTING TO CHANGE
ANY SETTINGS OR FEATURES.**

List of BIT Features

The following settings apply to a 2 stop Orion with 2-speed sliding doors, type 1 cab (ON/OFF on the same side), no fire service. The lift is level at the bottom landing with all doors closed, with the door zone on the tape reader. (All features are normally OFF / disabled, unless otherwise specified).

#	Standard	DESCRIPTION – BIT SETTINGS
00	ON	Enable Front Door at 1 (ON)
01	ON	Enable Front Door at 2 (ON)
02	OFF	Enable Front Door at 3 (ON)
03	OFF	Enable Front Door at 4 (ON)
04	OFF	Enable Front Door at 5 (ON)
05	OFF	Enable Front Door at 6 (ON)
06	OFF	Enable Rear Door at 1 (ON)
07	OFF	Enable Rear Door at 2 (ON)
08	OFF	Enable Rear Door at 3 (ON)
09	OFF	Enable Rear Door at 4 (ON)
10	OFF	Enable Rear Door at 5 (ON)
11	OFF	Enable Rear Door at 6 (ON)
12	OFF	Disable Short Door Time with Light Screen (OFF)
13	OFF	Enable Timed Electric Eye Cutout (OFF)
14	ON	Enable Nudging (ON)
15	OFF	Enable Infrared Curtain
16	OFF	Enable Hall Lanterns, Not Arrival Gongs (ON)
17	OFF	Down Lantern is One Stroke
18	OFF	Disable Arrival Gong from Car Call (ON)
19	OFF	Main Fire Door at Rear
20	OFF	Alternate Fire Door at Rear
21	ON	Disable Fire Service (OFF)
22	OFF	Enable A17 2000 Code (ON)
23	OFF	Enable New York Fire Code (ON)
24	OFF	Enable Chicago Fire Code (ON)
25	OFF	Enable Canadian Fire Code (ON)
26	OFF	Allow Run on Boris and Fire Service (ON)
27	OFF	Do Not Run on Shutdown and Fire Service
28	OFF	Allow Stop at Upper Landing on Shutdown
29	OFF	Enable 2nd Hall Fire Switch (2000 Code) (ON)
30	OFF	Enable Wisconsin Code (ON)
31	OFF	Enable Test Mode (ON)

32	ON	Disable PI Timed Out
33	OFF	Enable Homing (ON)
34	OFF	Disable TSSA Fault Check (OFF)
35	OFF	In Use Light ON Only if Out of Service
36	OFF	Enable Car Enable Switch (ON)
37	OFF	Disable Inspection
38	OFF	Run Slow Speed on Inspection
39	ON	Enable Collective Operation (ON)
40	OFF	Enable Negative Pressure Input (ON)
41	OFF	Enable A17 2005 and later Fire Code
42	OFF	Enable A17 2007 and later Fire Code
43		Not used
44	OFF	Disable Doors and Door Locks (OFF)
45		Not used
46		Not used
47	OFF	Enable Shutdown Fault Defeat (Leave OFF)

BIT Settings are ON/OFF, default is OFF unless otherwise noted.

Description of BIT Features

00 Enable Front Opening at 1st Landing - This feature is enabled if there is a front opening at this landing, or disabled if there is no front opening at this landing.

01 Enable Front Opening at 2nd Landing - This feature is enabled if there is a front opening at this landing, or disabled if there is no front opening at this landing.

02 Enable Front Opening at 3rd Landing - This feature is enabled if there is a front opening at this landing, or disabled if there is no front opening at this landing.

03 Enable Front Opening at 4th Landing - This feature is enabled if there is a front opening at this landing, or disabled if there is no front opening at this landing.

04 Enable Front Opening at 5th Landing - This feature is enabled if there is a front opening at this landing, or disabled if there is no front opening at this landing.

05 Enable Front Opening at 6th Landing - This feature is enabled if there is a front opening at this landing, or disabled if there is no front opening at this landing.

06 Enable Rear Opening at 1st Landing - This feature is enabled if there is a rear opening at this landing AND the elevator has selective openings.

NOTE: This setting does not have to be enabled if the elevator is non-selective.

- 07 Enable Rear Opening at 2nd Landing** - This feature is enabled if there is a rear opening at this landing AND the elevator has selective openings.
- 08 Enable Rear Opening at 3rd Landing** - This feature is enabled if there is a rear opening at this landing AND the elevator has selective openings.
- 09 Enable Rear Opening at 4th Landing** - This feature is enabled if there is a rear opening at this landing AND the elevator has selective openings.
- 10 Enable Rear Opening at 5th Landing** - This feature is enabled if there is a rear opening at this landing AND the elevator has selective openings.
- 11 Enable Rear Opening at 6th Landing** - This feature is enabled if there is a rear opening at this landing AND the elevator has selective openings.
- 12 No Shortened Door Time** - Normally the door time will be shortened by the Door Open Button/Safety Edge/Electric Eye/Infra-red Curtain. Enable this feature to prevent these devices from shortening the door time. This is normally required in nursing homes, where the passengers need more time to enter the car. The Door Close Button will still shorten the door time.
- 13 Enable Timed Electric Eye Cutout** - Enable this feature to allow the Electric Eye input to be disabled after the preset time (see the setting above for the delay before cutting out the Electric Eye). This feature is often provided in the Electric Eye unit itself.
- 14 Door Nudging** - Enable this feature to activate door close nudging. Nudging will be initiated if a call is registered and the doors have been prevented from closing for the preset Door Nudging time. The Electric Eye will be disabled, the Nudging Buzzer will come on, and the Nudging Output will come on if the Electric Eye input is energized. This means the door will only close at slow speed if the Electric Eye is blocked.
Note: Door Nudging operation requires an optional Nudging Buzzer output and Reduced Speed Door Closing output.
- 15 Enable Infrared Curtain** - Enable this feature if a Light Screen is used. Enabling this feature will cause the Safety Edge input to be disabled on Fire Service, and the Door Nudging feature to be initiated while the doors are closing on Fire Service. The Proximity Detector may be connected to the Safety Edge Input or the Electric Eye Input, as desired. (The Electric Eye Input is subject to the Timed Electric Eye Cutout and Nudging, whereas the Safety Edge Input is not.)
Note: Door Nudging operation requires an optional Nudging Buzzer output and Reduced Speed Door Closing output.

- 16 Enable Hall Lanterns Not Arrival Gongs** - This changes the operation of the Arrival Gong outputs to operate like Hall Lanterns.
- 17 One Stroke Down Lanterns** - The lanterns are normally provided with two strokes for the down direction. Enable this feature to provide only one stroke for the down direction.
- 18 Enable Arrival Gongs from Car Calls** - Allow the Arrival Gong to operate when the car is stopping in response to a car call. The Arrival Gong will always sound when stopping for a Hall Call.
- 19 Fire Service Main Landing Opening** - If this feature is enabled, the Fire Service Main Landing will use the rear door if there are selective doors at that landing.
- 20 Fire Service Alternate Landing Opening** - If this feature is enabled, the Fire Service Alternate Landing will use the rear door if there are selective doors at that landing.
- 21 Disable Fire Service** - If this feature is enabled, then Fire Service Phase 1 and 2 will be disabled.
- 22 A17 2000 Fire Code** - Enable A17 2000 Fire Code.
- 23 Fire Service NY City code** - Enable this feature to select Fire Service Operation for New York City code.
- 24 Fire Service Chicago Code** - Enable this feature to select Fire Service Operation for Chicago code.
- 25 Fire Service Canadian Code** - Enable this feature to select Fire Service Operation for Canadian code.
- 26 No BORIS Defeat** - With this feature set, the car will automatically lower if it can, even if the car is on Fire Service. If the feature is NOT set, then the car will not lower on BORIS if the car is on Fire Service. If the car is on Inspection, the car may be run down, but not up. This feature requires BORIS circuitry to be installed on the controller. The setting of this feature will not affect the operation of the controller if BORIS is not provided.
- 27 No Run on BORIS and Fire Service** - With this feature set, the car will not lower on BORIS if the car is on Fire Service. If the feature is NOT set, then the car will automatically lower if it can, even if the car is on Fire Service. If the car is on Inspection, the car may be run down, but not up. This feature requires BORIS circuitry to be installed on the controller. The setting of this feature will not affect the operation of the controller if BORIS is not provided.

- 28 Stop at Main Ldg** - With this feature set, the car will stop at the Main Landing when the car is on shutdown (low oil, Reverse Phase, Emergency Power, etc.). If this feature is NOT set, then the car will stop at the bottom landing.
- 29 Enable 2nd Hall Fire Sw** - Enable the remote Fire Switch located at the Building Fire Panel. This switch is optional with A17 2000 Fire Code.
- 30 Enable Wisconsin Code** - Enable the SB and IAS outputs to operate according to Wisconsin Code. (SB is always energized when the car is running. IAS is only energized after the car has stopped.)
- 31 Enable Test Mode** - Enables calls and door open signals to be input via INT28. See Entering Calls from the Controller.
- 32 Disable PI Timed Out** - Does not allow the Position Indicators to time out.
- 33 Enable Homing** - Enable this feature to enable the homing feature. This will cause the car to home to the Home Landing, when it has been idle for the adjustable Homing delay time.
- 34 Disable TSSA Fault Check** - Turn ON to disable fault check for TSSA expansion module.
- 35 In Use Light Operation** - This feature is enabled to make the In Use Lights on SAPB controller operate while the doors are open or the car is running.
- 36 Enable Car Enable Switch** - Enable the Car Switch Operation. With this operation enabled either the car call buttons OR the hall calls buttons will operate, depending on the position of the Car Enable Switch.
- 37 Disable Inspection** - Disable the Inspection Inputs, and force automatic operation.
- 38 Slow Speed on Inspection** - Enable this feature to run slow speed on Inspection. This is normally required if the car speed is 150 ft/min or above.
- 39 Single Button Collective Operation** - This feature is enabled to select Single Button Collective Operation.
- 40 Enable Negative Pressure Switch** - Enable this feature to move the Negative Pressure Switch to Input 1 on the PLC (Ontario Only)
- 41 Enable A17 2005 and later Fire Code**
- 42 Enable A17 2007 and later Fire Code**

43 Not Assigned

44 Disable Door Open and Gate Open - This prevents a door open signal on normal operation. It may be used in tune-up or troubleshooting, to allow the car to be run without cycling the doors. This allows easy setup, without letting passengers enter the car.

45 Not Assigned**46 Not Assigned**

47 Enable Shutdown Defeat - Turn this feature on during initial setup. It will disable the shutdown features, such as run timers, Dupline failure timers, redundancy checking, etc. This allows the car to be set up before all external wiring is completed.

Some installations require specific settings or features that are not included in the standard program. In this case, a separate sheet (or sheets) will be provided that describes the operation of these settings or features, and what the factory default settings are.



THIS FEATURE SHOULD NOT BE LEFT ON WHEN THE CAR IS IN NORMAL USE, AS IT DEFEATS KEY SAFETY CHECKING CIRCUITS.

Listing of INT Settings

The following settings apply to a 2 stop Orion with 2-speed sliding doors, type 1 cab (ON/OFF on the same side), no fire service. The lift is level at the bottom landing with all doors closed, with the door zone on the tape reader. (All features are normally OFF / disabled, unless otherwise specified). (NOTE: a value of -32768 to 32767 can be entered unless otherwise stated):

#	Typical	Actual	Description of INT Settings
00	2		Number of Landings
01	1		Fire Return Main Landing
02	2		Fire Return Alternate Landing
03	1		Home Landing
04	500		Door Time for Hall Calls (0.01sec)
05	200		Door Time for Car Calls (0.01sec)
06	100		Shortened Door Time (0.01sec)
07	5		Delay Before Locking Prolock/Kwiklock (sec)
08	60		Running Fault (Low Oil) Time (sec)
09	25		Door Nudging Delay Time (sec)
10	20		Electric Eye Cutout Time (sec)
11	30		Delay Before Homing (sec)
12	20		Car Delayed Time (sec)
13	15		Door Stuck Time (sec)
14	4		Direction Hold Time on SBC (sec)
15	6		Non-Interference/In Use Light Time (sec)
16	300		Hold Car Light After Stop (sec)
17	300		Position Indicator Shutoff (sec)
18	10		Door Close Delay – Fire + Shutdown (sec)
19	3		Hold Delay for CPPB Operation (sec)
20	8		Code for PI Blanking
21	2		Code For PI For LDG1
22	5		Code For PI For LDG2
23	4		Code For PI For LDG3
24	12		Code For PI For LDG4
25	13		Code For PI For LDG5
26	15		Code For PI For LDG6
27	100		Door Zone Fault Preset
28	-		Testing Calls
29	-		Program Revision Number
30	-		Pointer For Data Display (0-73)
31	-		Data for first 4 bits
32	-		Data for second 4 bits
33	30		Arrival Gong and Passing Gong Time
34			
35			
36			(Sabbath Service Code)
37	1		Door Code (See Separate Description)
38	146		Bit Features (See Separate Description)
39	2513		Password to Enable DAT
40	-		Status Code for 4th (Oldest) Fault Code
41	-		4th (Oldest) Fault Code
42	-		Status Code for 3rd Fault Code
43	-		3rd Fault Code

continued on next page.....

44	-		Status Code for 2nd Fault Code
45	-		2nd Fault Code
46	-		Status Code for 1st Fault Code
47	-		1st (Most Recent) Fault Code

Set INT39 to password value AND turn ON F1 on DAT to enable DAT.

9.6 Description of Settings

00 Number of Landings - This is the number of landings that the controller can serve, and is a value between 2 and 6. This number should not normally be changed, since the inputs and outputs have to be assigned for the correct number of landings. If the controller is set up to serve future landings, then this value can be used to temporarily cut off future upper landings. This value also determines which floor the controller will reset to when a top landing reset is initiated with a pulsing selector.

01 Main Fire Landing - This is the number corresponding to the Main Fire Landing, and is a number between 1 and 6. The value set is based on the bottom floor being “1”, the 2nd floor is “2” etc., even if this does not match the building designations.

CAUTION: If it is set to a value greater than the number of landings served, the car will go to the top landing, but it will not open its doors.

02 Alternate Fire Landing - This is the number corresponding to the Alternate Fire Landing, and is a number between 1 and 8. The value set is based on the bottom floor being “1”, the 2nd floor is “2” etc., even if this does not match the building designations.

CAUTION: If it is set to a value greater than the number of landings served, the car will go to the top landing, but it will not open its doors.

03 Home Landing - This is the home landing for a simple car for revision 11 programs and later. (Earlier revisions would home to the Main Fire Landing only.) The car can be selected to home to this landing, if desired. This value can be set to any valid landing, as determined by the number of landings setting.

04 Door Time, Hall - This is the time in tenths of a second, that the doors will remain open, after they have opened fully, when the car has stopped in response to a hall call. After this time, the doors will start to close.

NOTE: If a car call is entered while the doors are open, the door time will be reduced to the “Door Time, Car” setting. This setting is normally 50 tenths of a second (that is 5 seconds).

05 Door Time, Car - This is the time in tenths of a second, that the doors will remain open, after they have opened fully, when the car has stopped in response to a car call only. After this time, the doors will start to close.

NOTE: If a car call is entered while the doors are open, the door time will be reduced to the “Door Time, Short” setting. This setting is normally 20 tenths of a second (that is 2 seconds).

- 06 Door Time, Short** - This is the time in tenths of a second, that the doors will remain open, after they have opened fully, when the doors have reopened in response to a Door Open Button/Safety edge/Electric Eye/Infra-red Curtain, and no hall call is entered. After this time, the doors will start to close. The normal setting is 10 tenths of a second (that is 1 second).
- 07 Door Lock Delay Time** - This is the time delay before releasing the power to the door lock. The normal setting is 5 seconds.
- 08 Shutdown Time** - If the car runs up without passing a floor for this time, then shutdown will be initiated. The car will stop, and run down to the bottom landing, and cycle its doors. It will then be shut down. The car can be returned to service by cycling the Inspection Switch, or the Main Line Disconnect Switch. The normal setting is 25 seconds.
- 09 Door Nudging Time** - This is the time delay before initiating door close nudging, if that feature is provided. A call must be registered, and the car must be in automatic operation. The timer is reset when the doors get fully closed, or when the car starts a floor to floor run. The normal setting is 25 seconds.
- 10 Electric Eye Cutout Time** - This is the time delay before cutting out the Electric Eye Input, after it has been continuously energized. It is reset when the car runs to the next floor. The normal setting is 20 seconds.
- 11 Homing Delay Time** - This is the delay before homing a car to the home landing, after it has answered all calls, and is sitting with its doors closed. The normal setting is 10 seconds.
- 12 Car Stuck Time** - This is the time delay before calls at the same landing as the car are disabled, so that the car can answer other registered calls. This operates as a stuck button timer. The normal setting is 15 seconds.
- 13 Door Stalled Time** - This is the time delay before stopping a door open or close cycle. The normal setting is 10 seconds.
- 14 Direction Hole Time on SBC**
- 15 Non-Interference/In-Use Light Time** - This is the time that the In Use Light will remain on after the doors have opened, before the Door Open Bell is activated.
- 16 Hold Car Light After Stop** - This is the time delay that the car lighting is left on before energizing the LIT relay, which turn off the car lights.

17 Delay Before Shut off Position Indicator - The delay before turning off the position indicator, if this feature is not disabled. The position indicator is turned off by sending it the code stored in INT20, which should be set to give the desired code for turning off the position indicator.

18 Delay Before Close Doors on Fire Service - This is the delay before closing the doors on Fire Service, with A17 2000 code, if the car is on battery backup.

19 Hold Delay for CPPB Operation - This holds the car on constant pressure operation after the release of an up or down button. It allows the doors to operate after this time expires.

20 Code for PI Blanking - The value sent to the Position Indicator to blank the display. This value may vary based on the manufacturer's specifications.

21 Code for PI for Ldg 1 - The code to display the desired value on the Position Indicator for the 1st (bottom) floor. Check the list of codes for the specific manufacturer to determine the proper value for each floor.

22 Code for PI for Ldg 2 - see above.

23 Code for PI for Ldg 3 - see above.

24 Code for PI for Ldg 4 - see above.

25 Code for PI for Ldg 5 - see above.

26 Code for PI for Ldg 6 - see above.

27 Door Zone Fault Preset

28 Car Call Manual Entry - Enter the desired value to enter specific front or rear car calls or the front or rear Door Open Button, as described in the section on entering car calls from the controller.

29 Program Version - This value is set by the program (if changed, it will be reset on a power up). It indicated the program version.

30 Pointer for Displaying Data - Enter the value to display the desired input, output, or internal memory data in INT31 and INT32. Refer to the section on Monitoring the I/O Status with the DAT.

31 1st IO Data - This displays the first four data bits, as set by the data pointer in INT30.

32 2nd IO Data - This displays the second four data bits, as set by the data pointer in INT30.

33 Arrival Gong and Passing Gong Time

34 Not Assigned

35 Not Assigned

36 Not Assigned

37 Door Code - The door codes are combined into one INT setting, INT37. The proper number should be determined from the chart below (add up the desired features to get the desired number).

Bit	Value	Description
0	1	Enable 2 speed doors
1	2	Enable power car gate
2	4	Enable automatic Pro Door
3	8	Enable GAL manual door locks
4	16	Enable Commander door
5	32	Park with car gate closed
6	64	Disable hall door contacts (also set INT37 Bit 3)
7	128	Force car gate open when car is idle
8	256	Require hall door contact inputs for run
9	512	Enable door open on hoistway access in door zone
10	1024	(future)
11	2048	(future)
12	4096	(future)
13	8192	(future)
14	16384	(future)
15	32768	(future)

For example, to enable Power Car Gate (2) which will Park Closed (32) with Automatic Pro Door (4), set INT37 to $2 + 32 + 4 = 38$.

38 Bit Features - This value sets additional features that may be determined by Savaria Concord. The proper number should be determined from the chart below (add up the desired features to get the desired number).

Bit	Value	Description
0	1	Prevent door close on Inspection with Car Door Bypass ON
1	2	Disable Dupline Fault Check (currently required)
2	4	Enable Constant Pressure Operation
3	8	Allow both doors to operate on Battery Backup (not recommended)
4	16	Disable Position Reset while car is running
5	32	Electric Eye is normally open or is not provided
6	64	Enable Constant Pressure like Inspection (not recommended)
7	128	Disable False Down Level feature
8	256	Enable automatic return on CPPB and battery backup/shutdown
9	512	Always enable hall call buttons with car enable switch
10	1024	Allow Door Close on Inspection when Run Button is pressed
11	2048	(future)
12	4096	(future)
13	8192	(future)
14	16384	(future)
15	32768	(future)

39 Password to enable DAT - This value must be set to the proper value to remove the protection from the DAT.

40 Status for 4th Fault Code - Refer to the Fault Logging description.

41 4th Fault Code - Refer to the Fault Logging description.

42 Status for 3rd Fault Code - Refer to the Fault Logging description.

43 3rd Fault Code - Refer to the Fault Logging description.

44 Status for 2nd Fault Code - Refer to the Fault Logging description.

45 2nd Fault Code - Refer to the Fault Logging description.

46 Status for 1st Fault Code - Refer to the Fault Logging description.

47 1st Fault Code - Refer to the Fault Logging description.

Some installations require specific settings or features that are not included in the standard program. In this case, a separate sheet (or sheets) will be provided that describe the operation of these settings or features, and what the factory default settings are.

9.7 Floor Position Codes – Grey Code Pi

A binary signal is sent to the Position Indicator. Codes for CE Position Indicator are shown below. Codes may be different for another manufacturer. Enter the desired codes for the appropriate floor in INT20 – INT26 to show the desired number on the PI Display.

Listing in Binary Order		
Output Code	Grey Code	Display
0	0000	-
1	0001	B
2	0010	G
3	0011	M
4	0100	2
5	0101	1
6	0110	L
7	0111	0
8	1000	BLANK
9	1001	9
10	1010	7
11	1011	8
12	1100	3
13	1101	4
14	1110	6
15	1111	5

9.8 Protecting Values from Accidental Changes

To prevent accidental changes to any settings or features, it is recommended that the F1 button be pressed so that the F1 light is OFF. Additionally, for extra security the value in INT39 can be changed from the password value of 2513. To be able to change values, INT39 must be set at 2513, AND F1 must be on.

Entering the Password and turning on F1 removes the protection from all settings and features.

- Press INT to select the integer settings
- Press the Up or Down button bar to go to INT39
- Press ENT to change the value
- Press the Up or Down button bar to change the value to 2513
- Press ENT
- Make sure F1 is ON
- The protection has been removed
- To restore protection either turn off F1, or change the INT39 value

9.9 Fault Logging

NOTE

Make sure F1 is pressed so that the values are being updated.

The four most recent faults along with a status code, are stored in INT40-INT47. These values can be accessed like any other INT settings, by pressing INT then scrolling to the setting.

Memory Addresses and Fault Log Function

INT#	DESCRIPTION
47	1st (Most Recent) Fault Code
46	Status Code for 1st fault
45	2nd Fault Code
44	Status Code for 2nd fault.
43	3rd Fault Code
42	Status Code for 3rd fault.
41	4th (oldest) Fault Code
40	Status Code for 4th (oldest) fault.

Fault Codes

Fault Code	Fault Description
1	Running Shutdown Timer. The car ran for the time specified by the “Shutdown Time” setting without passing a floor. The car will stop and return to the bottom landing. It is reset by cycling power, cycling the Inspection Switch, or pressing F2 on the DAT. The probable causes are: (1) Low oil. (2) Up valve(s) did not operate properly. (3) Pump did not operate properly. Check that the setting of the shutdown timer is long enough for the car to run between floors. The normal shutdown timer setting is 45 seconds.
2	Door Open Fault. The Door Open Limit Switch failed to open after the doors had been opening for the time specified by the “Door Fault” setting. The probable causes are: (1) The Door Open Limit failure. (2) door operator failure. (3) door control circuitry failure.
4	Door Close Fault. The doors failed to close properly when they were parking, or when the car was ready to run for the next call. This fault will not be caused by keeping the doors open through the normal means (Door Open Button, Safety Edge, Infra-red Unit, etc.), but only if the doors should be closing but were not able to close. The probable causes are: (1) Door Close Limit failure. (2) Door Contacts failure. (3) door operator failure. (4) door control circuit failure.
8	Emergency Power. The car went on Emergency Power. The Battery Backup will provide sufficient power to return the car to a landing. The car will normally return to the lowest landing, but this may depend on the applicable codes, and feature selections.

16	Door Check Fault. Door Contacts were closed when the Door Open Limit was broken, and the Door Close Limit was closed. This indicates the Door Contacts were jumped.
32	Door Zone Fault. The Door Zone Input was on while the car was running between floors. This indicates the Door Zone Relay or Input was stuck on. The car will shut down at the next floor.
64	Redundancy Fault. The Input of one of the monitored points did not match the output from the PLC. The PLC monitors the SF1, SF2, IAS, IAX, INX, DZ1, DZ2, U, D, PM1, PM2 relays, and if one or more of these do not match the status of the corresponding output, then this fault will be generated. The car will shut down immediately. The fault can be reset by cycling the power or by pressing F2 on the DAT.
128	Levelling Switch Fault. Both Levelling Switches were on at the same time. This indicates one of the switches have stuck on. If this fault occurs during setup, verify that the Levelling Sensors in the selector are adjusted so that they do not come on at the same time.
256	Dupline Communication Failure. If the Dupline fails to communicate with the PLC, or if the Dupline A8 input does not cycle, then this fault will be generated. The fault will self-reset if the Dupline start communicating again. Verify that Dupline Output B8 is connected to Dupline Input A8, and, using the DAT, verify that the output and input are both toggling.
512	Fire Service. This is not a fault, but a fault code is generated whenever Fire Service is initiated.
1024	Floor Reset Fault. Car reset its position too many times. This indicates a problem with the floor reset magnets on the selector. Check the positioning of the levelling and position magnets.
2048	TSSA Redundancy Check Fault. An additional input block is provided to check the status of contacts in the safety circuit. If any one of these inputs does not match the expected status, then this fault is generated. There is a time delay of 0.2 seconds before tripping this fault, to allow the relay(s) to change state and the inputs to be updated.

If multiple fault conditions occur at exactly the same time, then the fault codes will be combined. For example, a fault code of 48 indicates faults 16 and 32 occurred at the same time.

NOTE

Press F2 on the DAT to reset all shutdown faults. Turn ON BIT47 to defeat all shutdown faults.

9.10 Status Codes

The Status Code is a four digit number that shows information concerning the car when the fault occurred.

The **first digit** of the Status Code shows the car position when the fault occurred. This is a number between 1 and 6, with "1" as the lowest landing, "2" the next landing, etc.

The **second digit** shows the door position according to the following table:

2nd Digit [46 1234]	Front Door was...	Rear Door was...
0	Fully Closed	Fully Closed
1	Partially Open	Fully Closed
2	Fully Open	Fully Closed
3	Fully Closed	Partially Open
4	Partially Open	Partially Open
5	Fully Open	Partially Open
6	Fully Closed	Fully Open
7	Partially Open	Fully Open
8	Fully Open	Fully Open

The **third digit** shows the status of the Door Inputs according to the following table:

3rd Digit [46 1234]	IN3 (Car Door Contacts) was...	IN4 (Hall Door) was...	Car was...
0	Off / Open	Off / Open	Not At Floor Level
1	On / Closed	Off / Open	Not At Floor Level
2	Off / Open	On / Closed	Not At Floor Level
3	On / Closed	On / Closed	Not At Floor Level
4	Off / Open	Off / Open	At Floor Level
5	On / Closed	Off / Open	At Floor Level
6	Off / Open	On / Closed	At Floor Level
7	On / Closed	On / Closed	At Floor Level

The **fourth digit** shows the status of the Selector Inputs according to the following table:

4th Digit [46 1234]	Selector Up Level was...	Selector Down Level was	Door Zone was...
0	Off / Open	Off / Open	Off / Open
1	On / Closed	Off / Open	Off / Open
2	Off / Open	On / Closed	Off / Open
3	On / Closed	On / Closed	Off / Open
4	Off / Open	Off / Open	On / Closed
5	On / Closed	Off / Open	On / Closed
6	Off / Open	On / Closed	On / Closed
7	On / Closed	On / Closed	On / Closed

Example:

INT-47 shows "512" and INT-46 shows "2144", this would indicate the following:

INT-47 = 512 indicates the most recent fault was that the system went on Fire Service

INT-46 = 2xxx indicates the car was at the second landing

INT-46 = x1xx indicates the Front Door was partially open, and the Rear Door was fully closed

INT-46 = xx4x indicates the Door Contacts and Gate Contact were open, and the car was at Floor Level

INT-46 = xxx4 indicates the car was in the Door Zone but not on either Levelling Switch.

10.0 TROUBLESHOOTING SUGGESTIONS

NOTE

It is recommended that all faults are set to 0 before leaving the installation site. (INT 47, 45, 43, 4) The time and date must be recorded in the log book prior to leaving the site.

10.1 Locating Faults

During installation, use the IO monitoring feature to verify that the IO is working properly

Once the system has been installed, and is running properly, the most common problem will be the failure of an external device. The first step in locating the cause is to determine whether the fault is in the micro-processor or whether it is in the external wiring. For example, if a position indicator light is not lit, check the output module for the appropriate output point to determine if the micro-processor is trying to turn the light on or not. If the output light is on, then confirm that there is voltage at the module terminal. If there is voltage at the module terminal, then the problem is external to the micro-processor. It could be in the wiring to the position indicator, or perhaps the position indicator light has burned out. Similarly with input points, check that the input module light is on, that there is power at the terminal, and if not then the problem is external.

If an input or output board fails, it may be possible to temporarily replace that defective board with another board that is used for non-essential functions (such as call register lights), thus providing elevator service while a replacement board is being obtained. See the section on "I/O Board Replacement" for further information.

If this does not correct the problem, the power supply or the CPU module could be faulty. If the CPU fails, it will probably stop flashing LED L5. The CPU and I/O modules can be affected by high transient surges in the power supply, such as the building being hit by lightning. This may damage the CPU, or alter the contents of the program. Proper grounding will protect the controller from most of these problems.

10.2 Relay Description And Operation

VR Energized during normal power. De-energized when power is off, or car is on Battery rescue operation.

U Energized when running up.

- D Energized when running down.
- FS Energized when running fast speed. Will drop when the car hits the levelling magnet of the destination floor.
- SF1 Energized when the car is running. It remains on after the stop to allow the valve board to stay on briefly. When it is off, the Car Door Contact and Hall Door Contact inputs are reconnected so that each can be checked to make sure they are not jumped. If either input goes on when the doors are fully open, as indicated by the Door Open Limit, then a Door Check Fault is detected.
- SF2 Same as SF1.
- DZ1 Car is in the Door Zone, that is, it is within 3" (76 mm) of floor level.
- DZ2 Car is in the Door Zone AND on a Levelling Switch. This allows the Door Contact circuit to be jumped to allow the car to re-level with the doors open.
- LIT Energized after the car has stopped at a floor, with the doors closed, on normal/automatic operation. It will turn off the car lights.
- PLP Energized after the car has stopped, to provide power to the door lock.

10.3 PLC Input Description

- 0 Not Used
- 1 Not Used
- 2 Door Zone. Energized when the car is within 3" (76 mm) of the floor
- 3 Car Gate closed. Energized when the Safety String is closed up to terminal 5. This indicates the Car door is closed, or the Hall doors are closed (with manual hall doors)
- 4 Doors Closed. Energized when the Safety String is closed up to terminal 6. This indicates the doors are closed and locked, or the car is levelling.
- 8 Safety String Input. Used to prevent operation of the doors with the safety string open.
- 9 SF checking input. This should be the same state as the SF output
- 12 VR Input. This is on if there is normal building power. If it goes off, then the car will initiate Battery Operated Rescue Initiation Service (BORIS). This returns the car to the Main Landing or the bottom landing.
- 14 DZ checking input. This should match input 2.
- 15 RUN checking input. This should be on whenever the car is running, and should be off when it stops.

10.4 PLC Output Description

- 0 Pro Lock Output. On to unlock a door. The actual door to be unlocked is determined by the Zone Switch wired in series with the external signal.
- 1 DZ2. Energized when the car is in the Door Zone AND the car is also on a levelling switch. This allows the Door Contacts to be bypassed, and the car to re-level with the doors open.
- 2 In Use Light, LED is energized when the hall landing light is in use.
- 3 Future (PWM output)
- 7 SF. Energized when the car can run, and held for a brief delay (1.5 seconds) to allow the Valve board to power down.
- 8 UP. Energized to run the car up.
- 9 DN. Energized to run the car down.
- 10 FS. Energized to run Fast Speed.
- 11 LIT. Energized to turn OFF the car lights. This is energized the preset time after the car has stopped, with the doors closed, and is on normal operation at a floor.

10.5 PLC Lights

The lights on the PLC CPU will all come on when the power is first applied. The POWER light will stay on, and the RUN light will flash during the self-check, then will stay on. The POWER and RUN light must both be on for normal operation.

If the RUN light does not come on, check the Run Switch behind the hinged cover on the left of the CPU. The switch should be in the center (REM) position or the left (RUN) position. If there is not a specific hardware fault, the CPU can usually be forced into the Run mode by turning the switch to the RUN position then back to REM.

If there is a hardware fault, the DAT will display a fault code.

A software fault will not cause the PLC to go out of the run mode, but will display a fault in the fault log. Refer to the Fault Logging section for description of faults and possible causes.

10.6 EPROM Memory Module (PN 301158)

The software/user program can be updated by means of an EPROM Memory Module containing the new program. To update the program, turn off the power. Remove the DAT or cover plate from the front of the CPU. Plug in the Memory Module. Turn on the Power. While the PLC is powering up, the RUN led will flash, indicating the new program is being downloaded. This will take a few seconds. When the RUN led remains on solid, turn off the power, remove the EPROM Memory Module, replace the DAT or cover plate, and turn the power back on.

10.7 DAT Troubleshooting Techniques

The DAT can be used to view the current settings of BIT Features (ON/OFF settings) and INT Settings (INTEGER values). To change between BIT and INT settings, press the BIT or INT button on the bottom row of the DAT. Scroll through the settings using the up or down button on the right of the DAT.

To MONITOR settings continuously, press the F1 button so that the F1 light is ON. NOTE this is vital when monitoring the IO using INT30-32, or when looking at the Fault Log (INT40-47). If F1 is NOT on, then the value of INT30 can be changed but the values in INT31 and INT32 will NOT be updated until F1 is turned on.

To CHANGE settings, the Password setting (INT39) must be set to "2513" AND F1 must be ON. If BOTH of these conditions are not met then all settings except the password value (INT39) and the IO Pointer (INT30) will be "protected" and will not be changeable.

Car Top Selector

Accurate alignment is vital to avoid wear to guides. After placement of the magnets, they can be spray painted, so that if a magnet falls off, the hole in the paint is quickly noticed.

11.0 DUPLINE SYSTEM: ENTERING CALLS FROM THE CONTROLLER

The car must be on normal operation, not Fire Service, Inspection. Turn on BIT31 to enable the test mode. Enter the code in INT28 according to the table below. Add the numbers in the "Value" column corresponding to the functions to be turned on. (Example: to energize the 2nd Ldg Car Call, enter 2; for the 4th Ldg Rear Car Call, enter 256. To enter several calls, add the value for each desired function to determine the correct number to put in INT28. Example: for 1st and 2nd landing car calls, enter a value of 3.)

Value	Function
1	1st Ldg Car Call
2	2nd Ldg Car Call
4	3rd Ldg Car Call
8	4th Ldg Car Call
16	Front Door Open Button
32	1st Ldg Rear Car Call
64	2nd Ldg Rear Car Call
128	3rd Ldg Rear Car Call
256	4th Ldg Rear Car Call
512	Rear Door Open Button

Press F1. If the Test mode is active the F1 light on the DAT will not go off, and the call(s) will be registered.

NOTE

While the test mode is active, the hall call buttons are deactivated, and the In Use lights will be ON.

12.0 I/O BOARD REPLACEMENT

To replace an I/O board, mark all the wires connected to the existing board. Remove the wires. Install the new board and connect the wires in the same position as on the old board.



WHEN REPLACING A BOARD, THE ADDRESSING ON THE NEW BOARD MUST MATCH THE OLD BOARD.

OEM Assistance

IMPORTANT: IF TROUBLESHOOTING ASSISTANCE IS REQUIRED FROM THE MANUFACTURER, GET THE FOLLOWING INFORMATION BEFORE CALLING (ADDITIONAL TROUBLESHOOTING INSTRUCTIONS MAY BE GIVEN, DEPENDING ON THE NATURE OF THE PROBLEM)

- An exact description of the problem
- The status of all the input and output points
- The status of the lights on the CPU
- The status of appropriate dupline inputs and outputs

Program Changes

CON001.rss = latest program for LRP cpu (with 2nd port)

CON001S.rss = latest program for LSP cpu (without 2nd port)

CON001STSSA = latest for LSP with 8 pt input

The following section lists the changes that are included in program revisions.

05-02-06 and 10-25-06 (INT29=20, TSSA=20001)

- 1) Change Gate Open and Gate Open Rear to hold open signal until close signal (hall doors closed)

12-01-05 (INT29=19, TSSA=19001)

- 1) Add Negative Pressure input and feature. Drops calls if down direction set. Prevents down run, prevents door open from outside

05-31-05 (INT29=18, TSSA=18001)

- 1) Modify Door Close for no auto close on inspection, rungs 230, 239.

03-31-05 (INT29=18, TSSA=18001)

- 1) TSHTDN (Up Run Timer) fault overrides TDZF (Door Zone Sw Fail) fault, so car that never runs up will return to bottom Idg.
- 2) Prevent Door Close on Inspection. Int38 bit10 enables door close from run buttons.

06-01-04 (INT29=17, TSSA=17001)

- 1) TSSA shutdown fault modified so that the car will shutdown when it stops at the next floor.

02-04-04 (INT29=16, TSSA=16001)

- 1) URX/E5 and DRX/E6 are disabled on Fire Service, UR/H7 and DR/H8 are still active on Fire Service.
- 2) Bit47 initiates shutdown defeat for 1 hour only. It must be cycled to reactivate shutdown defeat.

10-06-03 (INT29=15, TSSA=15001)

- 1) Fixed Redundancy Fault Check so that a car stopped on a Normal Limit Switch will not trip a redundancy fault.
- 2) Modified Down Level Fault Counter to prevent fault when the car is being jogged on Constant Pressure operation.
- 3) Fix GateCR contact in ODCR rung (was GateCL)
- 4) Modified In Use Light and Non-Interference circuits to comply with code, and keep In Use Lights on and Hall Call Buttons disabled until adjustable time (int15) after the doors have closed and the Car Enable Sw is off.
- 5) Synchronize TSSA and non-TSSA programs, so the only difference is the IO configuration and rungs with timers TRUNOK and TSSA. Bit 34 defeats the TSSA Fault Checking, which only is enabled on the TSSA version (CON001STSSA.rss). On standard programs, the TSSA Fault Checking is disabled, so the setting has no effect.
- 6) Reworded Int14 and Int15 adjustments. Int14 is only used with Single Button Collective operation (more than one call can be entered at a time), and it sets the delay before allowing a direction reversal. Int15 sets the non-interference delay, which is the delay after the doors have closed, and the Car Enable Switch is turned off, before the In Use Light goes out, and the Hall Buttons are enabled.

1-28-03 (INT29=14)

- 1) DOB/DOBR removed from EEX/EEXR to prevent shortened Door Time from Car or Hall Call Buttons.
- 2) Made OINX subject to ICDBYP for redundancy.

1-14-03 (INT29=13)

- 1) Car Call Button for the current floor operates like Door Open Button. Prevents entrapment with Car Enable Sw.

- 2) Unlock delay made adjustable (INT7).
- 3) Door Time shortened by a new Car Call button being pressed. Prevents short time if button is held while car stops.
- 4) Short door time if car stops outside door zone. Allows car to continue quickly on CPPB.

11-14-02 (INT29=12)

- 1) Added INT38-bit9 selection. This will enable the Hall Call Buttons when a Car Enable Switch is used (BIT36 is ON) and the Car Enable Switch is turned to the "Car" position.
- 2) Address assignments when Front and Rear Non-Selective Openings (no front and rear at the same landing) were simplified, so that front only addresses may be used for all devices EXCEPT Rear Door/Gate Open/Close outputs (A5,A6), Rear Door Open/Close Limit Sw Inputs (B7,B8), Rear Car Lanterns (D7,D8). All other Car and Hall devices (including Hall Lanterns, Arrival Gongs, Pro-door Open signals, Prolock signals, Hall Door Open and Closes signals) may be programmed as front even if they are used at rear openings.
- 3) New outputs were added for Nudging and Nudging Buzzer outputs at H5 and H6. These will energize if EITHER the front or rear nudging outputs energize. These addresses may be used with front and rear systems if only one signal is desired, regardless of the opening being used. It is recommended that the H6 address be used for the Nudging Buzzer, as this could be a constant address for all systems that do not have selective opening doors.

10-15-02 (INT29=11)

- 1) IES input (Stop Sw) drops car and hall calls.
- 2) Running Floor Reset done when car rides off Door Zone, to allow reset inputs through Dupline time to set.

10-10-02 (INT29=10)

- 1) Modify FLRERR (rungs 60,190) so that if reset on the fly is disabled, the Floor Error circuit does not initiate a shutdown, just logs the fault. Also the check is made as the car rides on to the Door Zone or when the car is stopped in the Door Zone.

10-09-02 (INT29=9)

- 1) Fix Hall Call common and In Use Lights when BIT31 is set on, for Car Enable Key Switch.

10-02-02 (INT29=8)

- 1) Change Constant Pressure operation, so that car does not level automatically unless it is in the Door Zone.
- 2) Modify door operation with Commander doors, so that Door Open Button, or call at the same floor will send an open signal to the door.

9-9-02 (INT29=7)

- 1) Disable homing on CPPB. Allow automatic run on shutdown and constant pressure (CPPB) if INT38 BIT8 is ON.
- 2) Revised RUNOK circuit, which checks the Hall Door Contacts, to allow for No Hall Door Contacts, by setting INT37 BIT6. (Note: INT37 BIT3 must also be set ON, to allow the external contacts between terminals 4, 5 and 6 in the safety circuit to operate as the Door Contacts.)
- 3) Added a setting to force the Car Gate open, if there is no demand for the car. The "Park with Gate Open" would not open a closed Gate, it would just leave an open gate open. Enabling INT37 BIT7 will force the Car Gate to open if there is no demand for the car, and it is on normal automatic operation. The Gate will be allowed to close when a call is registered.

BREAKDOWN OF INT37

Bit	Value	Description
0	1	Enable 2 speed doors
1	2	Enable power car gate
2	4	Enable automatic Pro Door
3	8	Enable GAL manual door locks
4	16	Enable Commander door
5	32	Park with car gate closed
6	64	Disable hall door contacts (also set BIT3)
7	128	Force car gate open when car is idle
8	256	Require hall door contact inputs for run
9	512	Enable door open on hoistway access in door zone
10	1024	(future)
11	2048	(future)
12	4096	(future)
13	8192	(future)
14	16384	(future)
15	32768	(future)

BREAKDOWN OF INT38

Bit	Value	Description
0	1	Prevent door close on Inspection with Car Door Bypass ON
1	2	Disable Dupline Fault Check
2	4	Enable Constant Pressure Operation
3	8	Allow both doors to operate on Battery Backup (not recommended)
4	16	Disable Position Reset while car is running
5	32	Electric Eye is normally open or is not provided
6	64	Enable Constant Pressure like Inspection (not recommended)
7	128	Disable False Down Level feature
8	256	Allow automatic run on CPPB and shutdown
9	512	Always enable Hall Call Button Switch/Car Enable Switch
10	1024	(future)
11	2048	(future)
12	4096	(future)
13	8192	(future)
14	16384	(future)
15	32768	(future)

5-01-02

Approximate Date of implementation – 5/1/2002

Initial release

Notes:

To set the desired features, determine which feature should be on, then add up the values for those features and enter that value in INT-37 or INT-38. For example, to enable Power Car Gate (value 2) which will park closed (value 32) with Automatic Pro Door (value 4), set INT37 to $2+32+8= 42$

1. The Electric Eye Input is Normally Closed by default. (Input off to open doors). Change back to Normally Open operation by setting the bit-5 in INT38 (add "32" to value in INT38). If the Electric Eye Input is NOT USED, then this setting MUST be turned ON.
2. To reset to the Factory Default settings, set the number of landings to "0", then the power is cycled. All BIT and INT settings are reset to the factory default. They must now be set for the particular job requirements.
3. To be able to adjust settings or features, the value in INT-39 must be set to the proper value, AND F1 light on the DAT must be on.

13.0 CONTROLLER MAINTENANCE



MAKE SURE THE POWER IS OFF BEFORE CONNECTING OR DISCONNECTING ANY CONNECTORS, ADDRESS JUMPERS OR CABLES ON THE CPU OR I/O BOARDS.

13.1 CPU Exchange

To swap out the CPU board:

- 1) Turn off the power to the controller.
- 2) Push the black tab at the top left of the CPU to push the CPU out of the connector on the right of the base.
- 3) Slide the CPU to the left about 1" (25 mm), then lift and pull it out.
- 4) Replace the new CPU in a similar manner, sliding it into place.
- 5) Push the CPU into the connector firmly by carefully so as not to damage the connectors.
- 6) Turn on the power.

13.2 EPROM Memory Upload

WARNING: IF YOU NEED TO CHANGE THE EPROM PROGRAM CHIP ON THE CPU BOARD, MAKE SURE YOU READ THE INSTRUCTIONS AND KNOW EXACTLY HOW TO INSTALL THE NEW CHIP. PLUGGING THE EPROM IN UPSIDE-DOWN MAY DAMAGE YOUR CHIP. STATIC ELECTRICITY CAN DAMAGE THE EPROM, SO AVOID TOUCHING THE PINS ON THE CHIP, AND GROUND YOURSELF (BY TOUCHING THE CONTROLLER CABINET) BEFORE TOUCHING THE CHIP OR THE CONTROLLER. DO NOT EXPOSE THE EPROM PROGRAM CHIP TO BRIGHT LIGHT, AND DO NOT REMOVE THE LABEL OVER THE EPROM PROGRAM CHIP WINDOW.

To upload the EPROM memory chip on the CPU board:

- 1) Turn off power to the controller.
- 2) Remove the DAT or cover from the CPU.
- 3) Insert the new EPROM chip by orienting it properly, in the area in the middle of the CPU.

- 4) Do not apply power until the orientation of the chip has been checked. Also verify that ALL pins are properly in the socket, and that none of them have been bent out of place.
- 5) Turn on the power. When the Run light stops blinking, the new program has been downloaded.
- 6) Turn off the power, remove the memory chip.
- 7) Replace the DAT or cover panel, and turn the power back on.

14.0 FREQUENTLY ASKED QUESTIONS

Q. Are the Reset Magnets necessary when using a pulsing selector?

Yes.

The reset magnets are required at every landing except the bottom landing, as shown on the car top selector installation sheet, to establish or reset the floor position at each landing.

Q. How Do I Reset All Settings and Features Back to the Original Values?

- 1) Available. Check each setting individually.
- 2) If the number of landings is set to "0", then the power is cycled, all BIT and INT settings are reset to the data in file N12 (which can be viewed and changed using the programming software).

Q. How do I check the current values of the settings and features?

- 1) Press BIT or INT on the DAT.
- 2) Press the Up or Down button to scroll through the settings.

Q. Why is the DAT Display blank?

The LCD Display goes blank after the DAT has been idle for a preset time. The "sleep" mode is indicated by a flashing cursor on the left of the display. Press ESC to restore the display.

If the screen does not activate, confirm that the PLC has power. Unplug the DAT and plug it back in to reset it (this can be done with the power on)

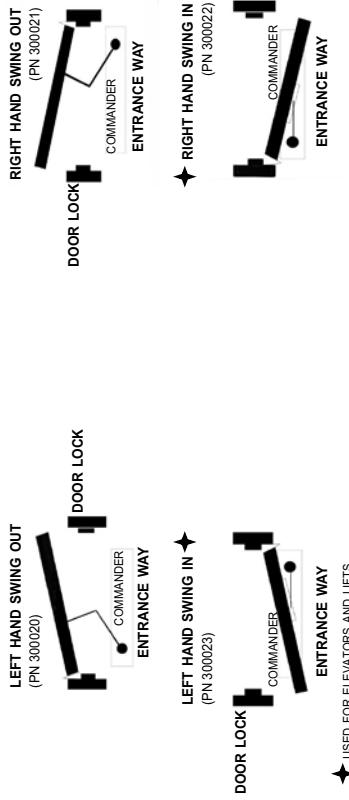
APPENDIX D

CAB TYPES

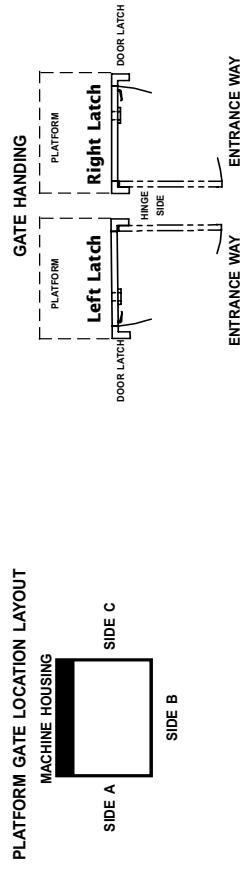
AND GATE HANDING

ORION COMMERCIAL 'LULA' ELEVATOR

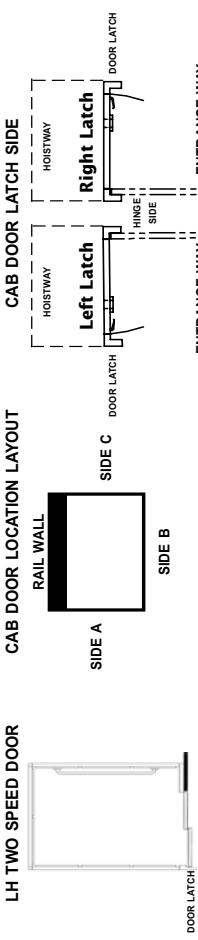
COMMANDER DOOR OPERATOR SWING SELECTIONS



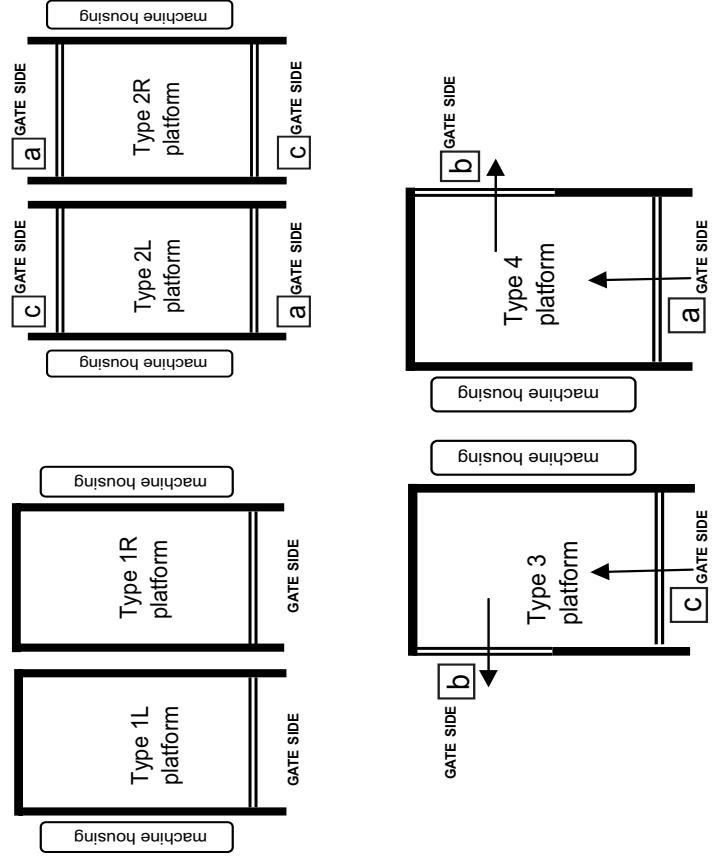
VPL GATE AND LATCH LOCATIONS



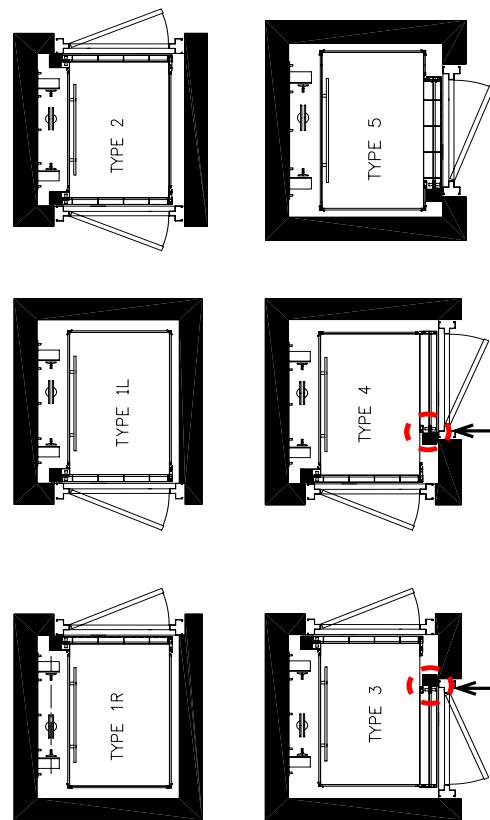
CAB DOOR AND LATCH LOCATIONS



VPL PLATFORM TYPES



ELEVATOR CAB TYPES



LH Door Latch & Folding Gate
(Gate stacks RIGHT)
RH Door Latch & Folding Gate
(Gate stacks LEFT)

NOTE: ALL HANDING IS DETERMINED BY LOOKING INTO THE HOISTWAY.

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NOTE: ALL HANDING IS DETERMINED BY LOOKING INTO THE HOISTWAY.

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APPENDIX E

HANDS FREE TELEPHONE INSTALLATION AND PROGRAMMING INSTRUCTIONS

- 1) Open the COP to access the wiring.
- 2) On the Cab Control Wall, mount the Hands-Free Telephone Panel over the Telephone Box and secure with provided hardware.
- 2) If required, connect the microphone wires (yellow/grey) to the Telephone Junction Board terminal block J10, position 5. Refer to Figure 1.
- 3) If required, connect the speaker wires (orange/purple) to Telephone Junction Terminal Block J10, position 2.
- 4) If required, connect wire PB1 (blue/blue) to the Telephone Junction Board terminal block J10, position 2 and to the Phone Access Button contact block lower pins..
- 5) Locate the black Telephone Cable and cut off the connector. If required, strip the cable and cut off the black and yellow wires.
- 6) Connect the red and green wires from the Telephone Cable to terminal T10 pins 6 and 7 on on the Car Station Junction Board. Refer to Figure 2.
- 7) Connect the pre-terminated end of the black Telephone Cable (with the standard phone jack connector) to J1 on the Phone Junction Board.
- 8) Remove backing and attach the Programming Keypad to the inside of the panel and program using the programming instructions on the next pages.

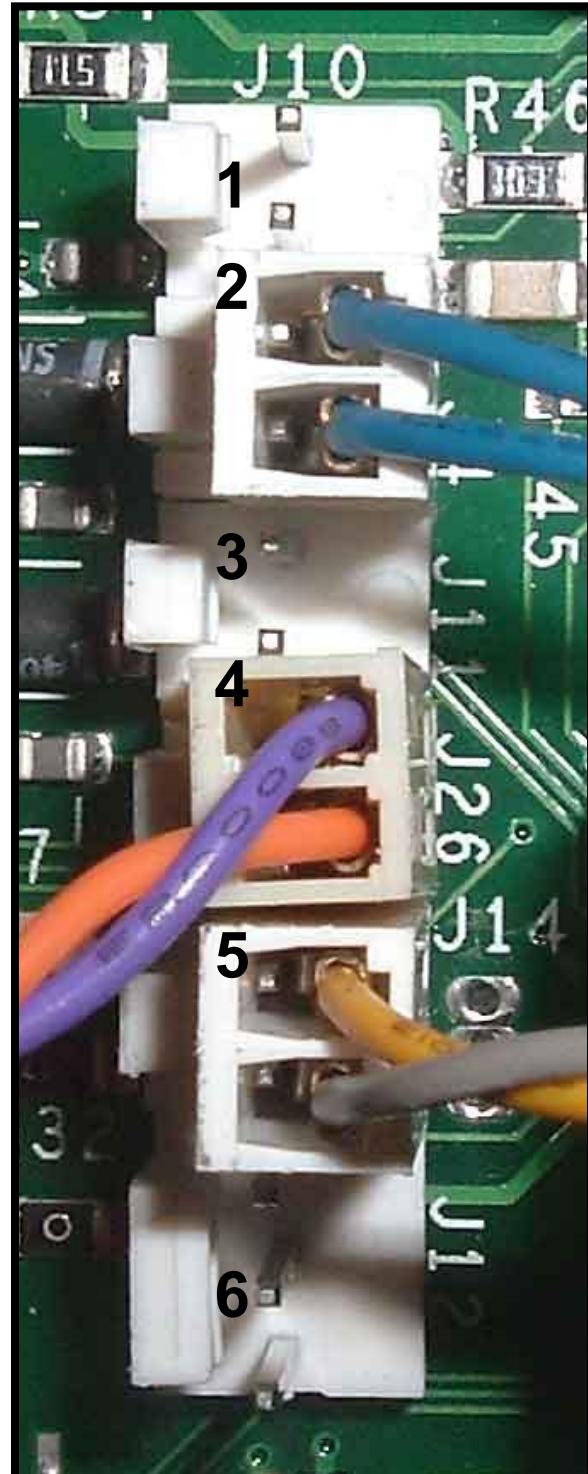


Figure 1

Phone Junction Board - Terminal J10

Connect the red and green wires from the Telephone Cable to available terminal T10 pins 6 and 7 on the Car Station Junction Board as shown

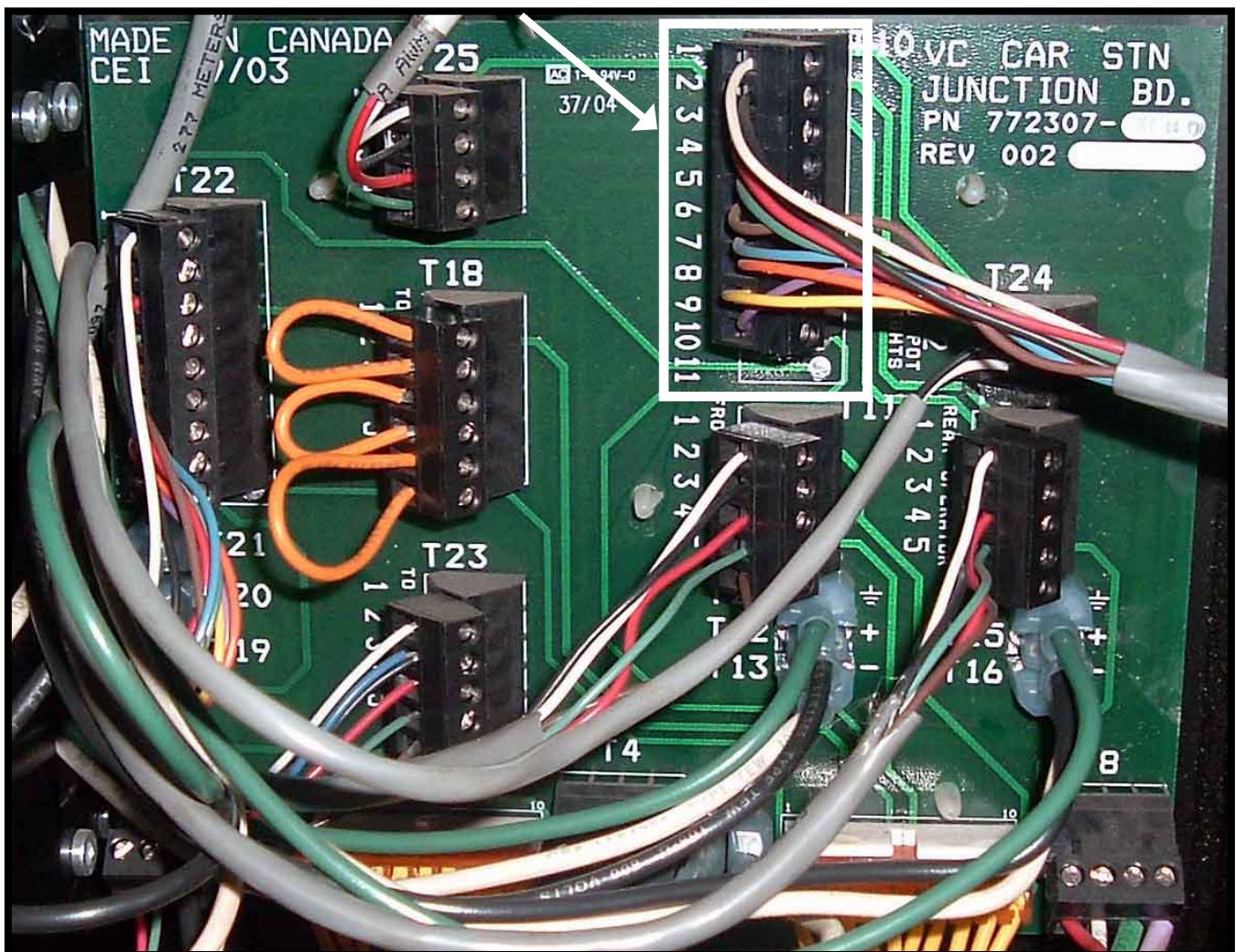


Figure 2

Car Station Junction Board

AE-150 E.M. Hands-Free Autodialer Phone

PROGRAMMING GUIDE

Unless otherwise specified, Savaria Concord Lifts Inc., accepts no responsibility for changes, labour, or replacements incurred from this bulletin

Standard notations

The following notations may be used throughout this guide to emphasize important safety information, mechanical concerns, and other important information. Savaria Concord Lifts Inc. recommends that you review and follow all of these messages.

 DANGER	Danger messages indicate an imminently hazardous situation, which, if not avoided, results in death or serious injury. All danger messages feature a standard ISO safety alert symbol followed by the signal word <i>Danger</i> in capitalized black lettering on a red background.
 WARNING	Warning messages indicate a potentially hazardous situation, which, if not avoided, could result in death or serious injury. All warning messages feature a standard ISO safety alert symbol followed by the signal word <i>Warning</i> in capitalized black lettering on a dark yellow background.
 CAUTION	Caution messages indicate a potentially hazardous situation, which, if not avoided, could result in death or serious injury. All caution messages feature a standard ISO safety alert symbol followed by the signal word <i>Caution</i> in capitalized black lettering on a yellow background.
CAUTION	Caution messages that do not include the ISO safety alert symbol indicate a potentially hazardous situation for the machine only, which, if not avoided, could result in damage to the machine. All caution messages include the signal word <i>Caution</i> in capitalized black lettering on a yellow background.
NOTE	Note messages provide information, such as reminders, general information about a previous statement, or additional guidelines that do not fit into the flow of the preceding text. All note messages include the signal word <i>Note</i> in capitalized white lettering on a blue background.

General

This guide is available through Savaria Concord Lifts Inc., for elevators that include the AE-150 E.M. Hands-Free Autodialer Phone.

Please contact Savaria Concord Lifts Inc. for details regarding ordering information.

For technical support, please call (800) 791-7999.

Hazards and cautions

 ELECTRICAL SHOCK HAZARD
Do not connect or disconnect wiring while the power is on. Failure to comply will result in death or serious injury. Before servicing, disconnect all power to the equipment. To prevent electric shock, wait at least five minutes after all indicators are OFF and measure the DC bus voltage level to confirm safe level.
 WARNING

SUDDEN MOVEMENT HAZARD
System may start unexpectedly upon application of power, resulting in Death or serious injury. Clear all personnel from the drive, motor, and machine area before applying power. Secure covers, couplings, shaft keys, and machine loads before applying power to the drive. Unpredictable equipment operation may result in death or serious injury.

 WARNING
FIRE HAZARD Do not use an improper voltage source. Failure to comply could result in death or serious injury by fire. Verify that the rated voltage matches the voltage of the incoming power supply before applying power.

 WARNING
CRUSH HAZARD Never connect or disconnect the motor from the controller while the controller is outputting voltage. Improper equipment sequencing could result in damage to the controller.

Disclaimer

Follow the instruction steps to ensure your safety while programming the AE-150 phone. Failure to follow instructions renders the Limited Warranty null and void. In addition, any party installing the product who deviates from the installation instructions agrees to indemnify, save, and hold harmless the manufacturer from any and all loss, liability, or damage that may occur as a result of the deviation.

About this document

This document describes the Agintronic Controls Ltd. AE-150 E.M Hands-Free Autodialer Phone and its programming; in addition, it includes a workflow description and programming procedures for the following activities:

- local programming
- remote programming

Audience

This document is for the following users:

- dealers
- installers
- test engineers/technicians
- maintenance engineers
- remote emergency operators.

Autodialer description

The purpose of the AE-150 E.M. Autodialer telephone design is to establish emergency contact between the passenger inside an elevator cab and a service person in case of an emergency incident.

Workflow

There are two sets of telephone numbers; they provide redundancy in case one number is unreachable; for best results, program both numbers into telephone memory.

If there is no connection on the eighth ring, the phone dials the second number.

If there is a busy line signal after the first time primary phone number dial attempt, a 30-second interval occurs before primary phone number redial.

If the phone number successfully rings, but there is no answer, the Autodialer automatically redials up to a maximum of four times.

The Autodialer plays a pre-recorded message to direct the person who answers the call to begin the conversation or play a pre-recorded location message by pressing a key from a touch-tone phone keypad.

If the called party side does not start the conversation within a programmed amount of time, the phone assumes the called party is an answering machine; the Autodialer treats the call as unanswerable.

The Autodialer speaker uses an additional power supply that ensures sound volume and clarity is greater than that of a speaker-phone with only phone line power.

An attached, rechargeable battery pack keeps the unit working during a power outage event.

Program the Autodialer phone from either the unit keypad or remotely from a touch-tone phone, if equipped; to do so, ensure the unit phone connection to a telephone line is valid. The Autodialer answers incoming calls after a predetermined number of rings; the number of rings is programmable.

Revision history of this guide

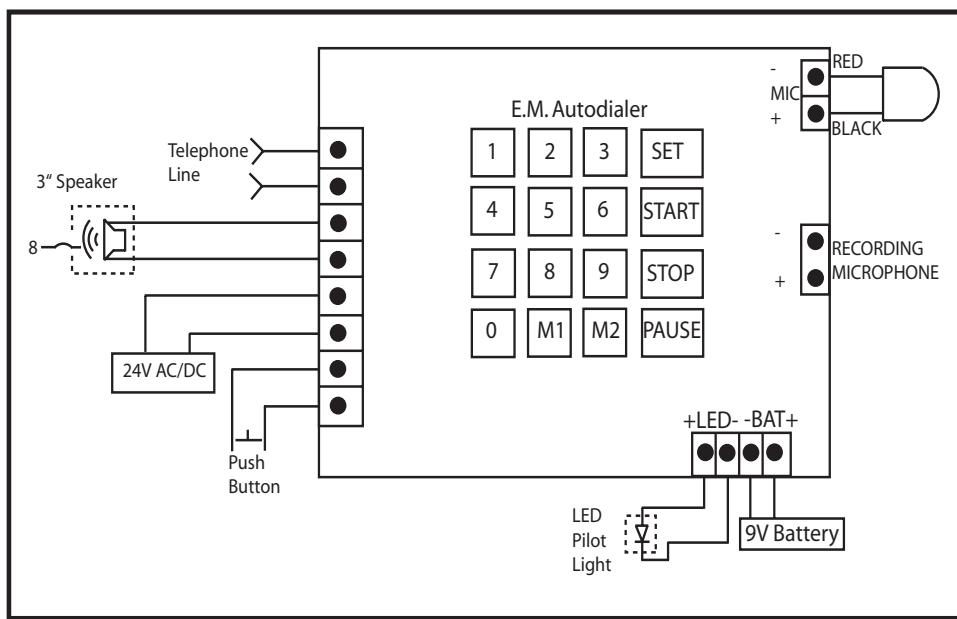
15-m09-2008 – Initial release

16-m12-2009 – Updated Step 6 on page 8 to include two-way communication option.

Board layout

Figure 1 describes the Autodialer board layout.

Figure 1
Auto dialer board layout



Specifications

Refer to Table 1 and Table 2 for AE-150 E.M. autodialer phone specifications:

Table 1
Autodialer phone specifications

Feature	Parameter
Battery pack	Ni-MH rechargeable, 5-9V, 200MAh
Speakers	8 or 16 Ohm, 0.5W, diameter 3 inches
Microphone	Electret condenser, 100-9000Hz, -42+-2 dB
LED pilot light	5mm, red, Vf=1.8-2.2V, IF-20mA max

Table 2
Autodialer phone specifications

On and off hook V/C	Parameter
On hook voltage	42-55V typical 48V
Off hook voltage	6.6-12V typical 6.5V
On hook current	<0.5mA
Off hook current	15-35mA typical 25mA

List of steps in this guide

Table 3 lists all steps found in this guide.

Table 3
Steps in this guide

Step	Page
Adding a primary telephone number	5
Adding a secondary telephone number	6
Setting the call duration	6
Recording and verifying an emergency message	7
Setting the number of rings before Autodialer answers	7
Enabling/disabling outgoing automated message, quick message playback and two-way communication following dealer-recorded location message	8
Remotely accessing programming mode	8
Remotely programming the Autodialer	9

Step 1 Adding a primary telephone number

Purpose

To add a primary telephone number to the Autodialer.

Considerations

Program the phone from the circuit board keypad. Include an alternate number and test each variable that you enter; the phone must work as intended once all programming is complete.

Requirements

Ensure to meet the following requirements before programming:

- power is on
- auxiliary power supply is on or backup battery is connected and charged
- phone line connection is complete.

Step

- 1 Press and release the **START** key.
The phone enters program mode.
- 2 Wait for the beep sound then press and release the **M1** key.
- 3 Enter the primary emergency <phone number>.
- 4 Press the **STOP** key.
The phone exits programming mode and emits a verbal "parameter accepted" response.



CAUTION

This phone requires a separate, dedicated phone line.
Do not use a switched phone line.

Step 2 Adding a secondary telephone number

Purpose

To add a secondary telephone number to the Autodialer.

Requirements

Ensure to meet the following requirements before programming:

- power is on
- auxiliary power supply is on or backup battery is connected and charged
- phone line connection is complete.

Step

- 1 Press and release the **START** key.
The phone enters program mode.
- 2 Wait for the beep sound then press and release the **M2** key.
- 3 Enter the secondary emergency <phone number>.
- 4 Press the **STOP** key.
The phone exits programming mode and emits a verbal "parameter accepted" response.

NOTE

If there is no secondary phone number available; use the primary phone number as the secondary phone number. In all cases, program both for M1 and for M2.

Step 3 Setting the call duration

Purpose

To set the call duration time for the Autodialer.

Considerations

Certain phone lines do not provide a call termination signal should the called party signal connection either hang up or drop.

Always program an appropriate call duration time to ensure the calling party can initiate a second emergency call should the called party phone line not provide a call termination signal.

Requirements

Ensure to meet the following requirements before programming:

- power is on
- ensure auxiliary power supply is on or backup battery is connected and charged
- phone line connection is complete.

Step

- 1 Press and release the **START** key.
The phone enters program mode.
- 2 Wait for the beep sound then press and release the **SET** key.
- 3 Enter the ID Number **0**. Press **SET**.
- 4 Enter the maximum call duration in seconds.
- 5 Press the **STOP** key.
The phone exits programming mode and emits a verbal "parameter accepted" response.

NOTE

The default call duration setting is 180 seconds (3 minutes).

NOTE

The call duration limit is up to 6000 seconds, programmable.

NOTE

Unlimited call duration is achieved by setting the call duration to 0 seconds.

Step 4 Recording and verifying an emergency message

Purpose

To record and to verify an emergency message.

Considerations

Emergency messages should include contact information such as a location address.

The maximum time to record is normally 15 seconds; this is enough time to provide a name and location.

The emergency contact information should be known to the elevator emergency operator; the emergency operator should have additional information about the elevator location, such as emergency access information.

Requirements

Ensure to meet the following requirements before programming:

- power is on
- ensure auxiliary power supply is on or backup battery is connected and charged
- phone line connection is complete.

Step

- 1 Press and release the **START** key.
The phone enters program mode.
- 2 Wait for the beep sound then press and release the **SET** key.
- 3 Wait for the beep sound then press and release the **9** key.
- 4 Wait for the beep sound then press and release the **SET** key.
Wait for the beep sound and the phone is in recording mode.
- 5 Record an **Emergency Message**.
- 6 Once the recording is complete, press and release the **STOP** key to exit record mode.
The phone exits programming mode and emits a verbal "parameter accepted" response.
- 7 To listen to the message, press and release the following keys in sequence:
[Start | SET | 8 | SET]
- 8 Press **STOP** to quit message listening mode.

Step 5 Setting the number of rings before Autodialer answers

Purpose

To set Autodialer to answer remote calls to program the dialer from another phone.

Considerations

The Autodialer does not answer incoming calls when set for 0 rings.

The manufacturer default setting is 3 rings.

Requirements

Ensure to meet the following requirements before programming:

- power is on
- ensure auxiliary power supply is on or backup battery is connected and charged
- phone line connection is complete.

Step

- 1 Press and release the **START** key.
The phone enters program mode.
- 2 Wait for the beep sound then press and release the **SET** key.
- 3 Wait for the beep sound then press and release the **3** key.
- 4 Wait for the beep sound then press and release the **SET** key.
- 5 Type the number of rings before Autodialer answers an incoming phone call.
- 6 Press the **STOP** key and wait for the verbal acknowledgement.
The Autodialer exits programming mode.

Step 6 Enabling/disabling outgoing automated message, quick message playback and two-way communication following dealer-recorded location message

Purpose

To enable or disable the outgoing automated message, enable quick message playback, or enable two-way communication following a dealer-recorded location message.

Considerations

The default value for the outgoing message is **enabled**. The two-way communication option is available on units shipped since January, 2009.

Step

- 1 Press and release the **START** key.
The phone enters program mode and responds with two beeps.
- 2 Press and release the **SET** key.
- 3 Press 7.
- 4 Press **SET**.
- 5 Press “**See Notes**”.
- 6 Press the **STOP** key.

NOTE

Press **0** to enable outgoing automated message.
The outgoing message is enabled.

NOTE

Press **1** to disable outgoing automated message.
The outgoing message is disabled.

NOTE

Press **2** to disable outgoing automated message and autodialing.
The phone dials out but the message does not play; the phone dials once, but hangs up if there is no connection; the phone does not attempt to redial.

NOTE

Press **3** to enable quick automated message playback option.
The quick message playback overrides any delays in message playback and forces immediate playback upon connection. Use Quick message playback option in conjunction with “0” to enable playback.

NOTE

Press **4** to enable two-way communication following playback of dealer-recorded location message.
The called party hears a location message (recorded by the dealer). Following the message, two-way communication is enabled.

Step 7 Remotely accessing programming mode

Purpose

To remotely access the Autodialer programming mode.

Considerations

Program the phone from any remote location that includes a touch tone phone, including a cell phone; ensure to include an alternate number, even if it is the same as the primary number, and to test each variable that you enter. The phone must work as intended once all programming is complete.

Requirements

Ensure to meet the following requirements before programming:

- power is on
- phone line connection is complete

Step

- 1 Dial the Autodialer phone number.
The Autodialer phone answers; a verbal message asks you to either press 1 to connect the call or 2 to hear the message.
- 2 Type “**”.
A verbal message indicating remote programming is initiated, plays; you are in program mode.

Step 8 Remotely programming the Autodialer

Purpose

To remotely modify the Autodialer parameters.

Considerations

The remote program feature is available for models with firmware Version 3.0 or greater. All models ship with firmware equal to or greater than Version 3.0.

Requirements

Ensure to meet the following requirements before programming:

- power is on
- phone line connection is complete.

Step

- 1 While in program mode, refer to [Table 4](#) to access each Access ID type and enter a numerical range or set the enable disable parameter using the appropriate values.
- 2 To set more than one parameter type during one remote session, wait for the verbal *parameter accepted* message then enter the new or additional parameter.
- 3 Enter "*#" then enter the parameter ID number then "#" only followed by the value and finally "##".

***# - parameter ID number - # - value - ##**

A verbal **message accepted** message plays.

NOTE

If programming, and you decide to back out of a command sequence, type "***" to return to initial program mode where you can begin a new program parameter sequence.

Note: To program many parameters at once, wait for the verbal acknowledgement after entering each parameter, then repeat step three for the next parameter to program.

Note 1: Valid entry is any combination of digit "0"- "9". The "*" key is also a valid entry, which stands for approximately a 1 second pause.

Note 2: If both the primary and secondary phone numbers are empty - un-programmed or pause only - the phone works as a *ring-down* phone only, meaning, the phone in the elevator cannot dial out which defeats the emergency call function.

Note 3: Manufacture default setting is 180 seconds (3 minutes).

Note 4: Manufacture default setting is 3 rings, to disable ring down function, enter 0.

Note 5: Manufacture default setting is 0000.

Note 6: Remote program feature only available for models with firmware Ver 3.0 or up. All Concord models shipped are equal to or greater than version 3.

Table 4
List of programming ID's including value ranges

Parameter Type	Access ID	Numerical Range	Manufacturer Notes
Maximum conversion time	0	30-60000 (seconds)	Note 3
Primary phone number	1	0-25 (digits)	Note 1 and Note 2
Secondary phone number	2	0-25 (digits)	Note 1 and Note 2
Number of rings before Autodialer answers	3	0-9 (rings)	Note 4
Phone ID	99	0000-9999	Note 5

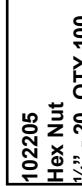
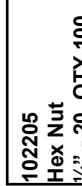
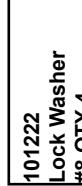
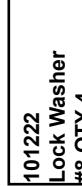
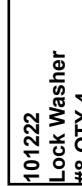
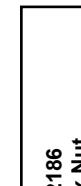
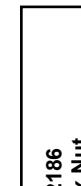
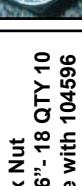
APPENDIX F

ORION CAB ASSEMBLY

HARDWARE PRE-PACK

KIT PN 255001

ORION COMMERCIAL 'LULA' ELEVATOR

 <p>101836 Hex Head Cap Screw $\frac{1}{4}$" - 20 x 1" QTY 100 Cab Wall and Ceiling Assembly</p>	 <p>101196 Flat Washer $\frac{1}{4}$" - 20 QTY 100 Use with 101836</p>	 <p>101213 Lock Washer $\frac{1}{4}$" - 20 QTY 100 Use with 101836</p>	 <p>102205 Hex Nut $\frac{5}{16}$" - 20 QTY 100 Use with 101836</p>
 <p>101140 Phillips Head Machine Screw 8/32" - 1/2" QTY 4 Control Wall Wire Duct from Cab Ceiling to Car Junction Board</p>	 <p>101206 Flat Washer #8 QTY 4 Use with 101140</p>	 <p>101222 Lock Washer #8 QTY 4 Use with 101140</p>	 <p>102186 Hex Nut $\frac{3}{8}$" - 16 QTY 10 Use with 102197</p>
 <p>100700 Flat Head Phillips Wood Screw #10 - $\frac{1}{4}$" QTY 4 Cab Base Plate</p>	 <p>101120 Spring Nut $\frac{3}{8}$" - 16 QTY 8 Operator Support Bracket to Cab Ceiling Use with 102197</p>	 <p>102191 Lock Washer $\frac{3}{8}$" QTY 18 Use with 102197 and 101120</p>	 <p>102188 Flat Washer $\frac{3}{8}$" QTY 18 Use with 102197 and 101120</p>
 <p>102197 Hex Head Cap Screw $\frac{3}{8}$" - 16 x 1" QTY 10 Operator Support Bracket to Cab Ceiling, Cab Stabilizer Bracket to Cab Ceiling</p>	 <p>102189 Flat Washer $\frac{1}{2}$" QTY 4 Use with 102200</p>	 <p>102193 Lock Washer $\frac{1}{2}$" QTY 4 Use with 102200</p>	 <p>102190 Lock Washer $\frac{1}{2}$" QTY 10 Use with 104596</p>
 <p>102200 Hex Head Cap Screw $\frac{1}{2}$" - 13 x 1 $\frac{1}{2}$" QTY 4 Northern Doors Header Plate to Operator Support Bracket</p>	 <p>104596 Carriage Bolt $\frac{5}{16}$" x 1 $\frac{1}{2}$" QTY 10 2 Speed Door Operator to Cab Header Bracket</p>	 <p>102747 Flat Washer $\frac{5}{16}$" QTY 10 Use with 104596</p>	 <p>102800 Pan Head Phillips Machine Screw #6-32 x 1" QTY 20 Light Curtain to Strike Jamb and Fast Door</p>
 <p>101220 Lock Washer #6 QTY 20 Use with 102180</p>	 <p>101113 Flat Washer #6 QTY 20 Use with 102180</p>	 <p>100544 Hex Nut $\frac{5}{16}$" - 18 QTY 10 Use with 104596</p>	

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NOTE: The above illustrations are not to scale.

APPENDIX G

NEW JERSEY FIRE SERVICE SWITCH WIRING

NEW JERSEY FIRE SERVICE KEYSWITCH WIRING

Required Parts

- NJ Hall Station Fire Service Keyswitch (PN 301507)
- NJ Car Station Fire Service Keyswitch (PN 301506)

Hall Station Keyswitch Wiring

- 1) Disconnect all power to the lift.
- 2) Remove the existing Fire Service Keyswitch from the hall station. Note that OFF (I1) is not connected on the NJ Keyswitches.
- 3) Connect the wiring from the Dupline board to the NJ Hall Station Keyswitch (marked BYP) as follows. Refer to Figures 1, 2 and 3.
 - a) Connect terminals A in series to D- on the Dupline board (white wire). DO NOT cut the white wire.
 - b) Connect terminal B to I2 on the Dupline board for BYPASS.
 - c) Connect terminal C to I3 on the Dupline board for ON.

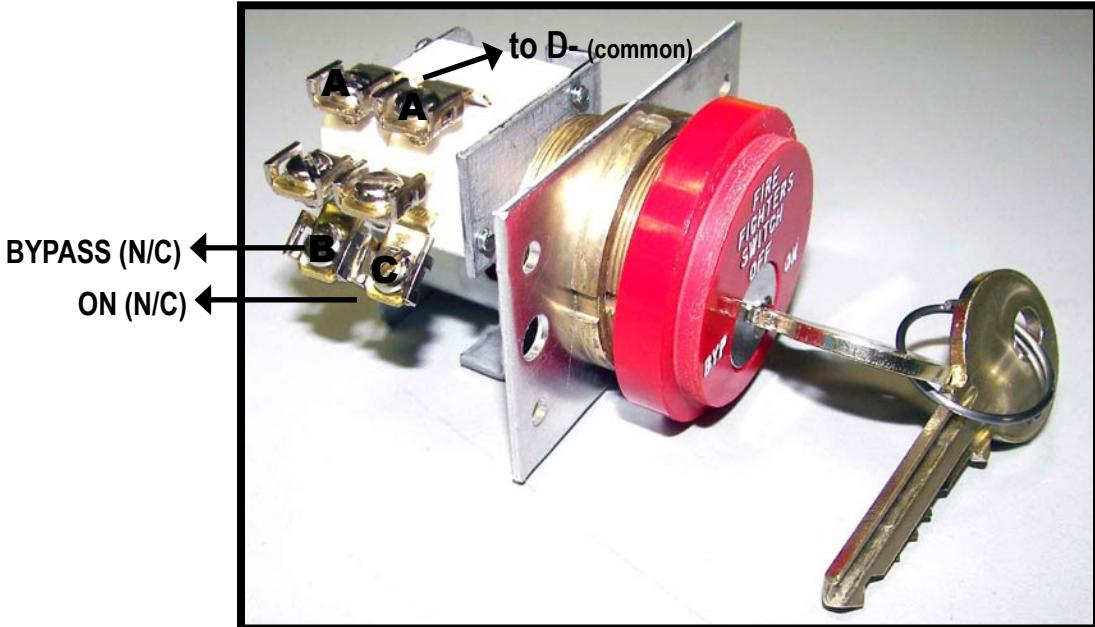


Figure 1 NJ Hall Station Keyswitch

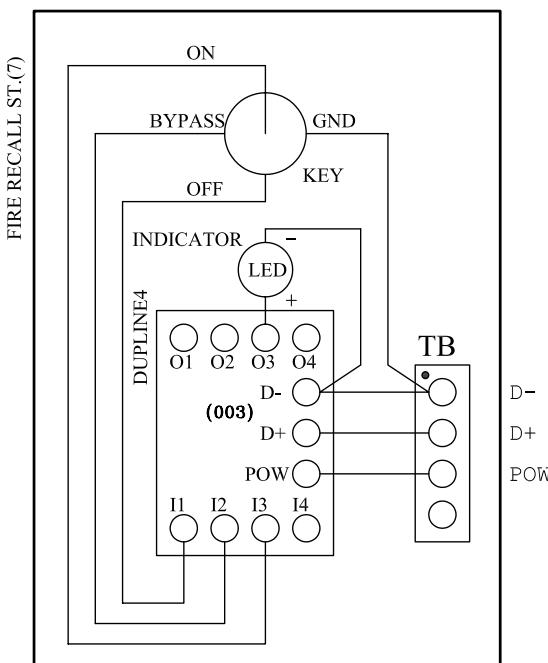


Figure 2 Hall Station Dupline Wiring

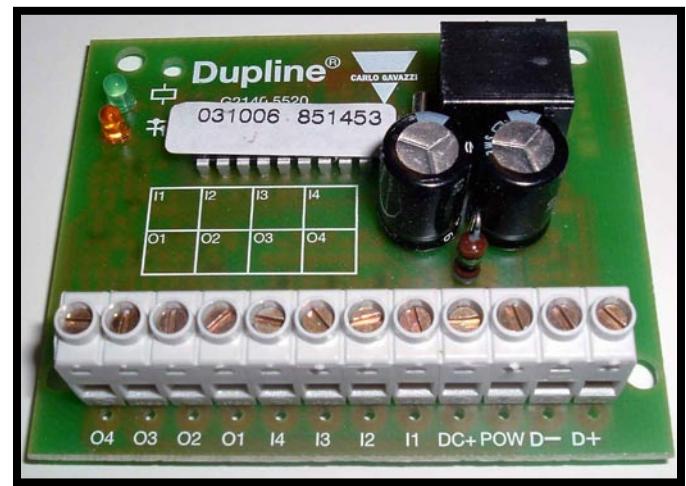


Figure 3 4 IN/4 OUT Dupline Board

Car Station Keyswitch Wiring

- 1) Disconnect all power to the lift.
- 2) Remove the existing Fire Service Keyswitch from the car station.
- 3) Connect the wiring from the Dupline board to the NJ Car Station Keyswitch (marked OFF/ON) as follows. Refer to Figures 3, 4 and 5.
 - a) Connect terminals A in series to D- on the Dupline board (white wire). DO NOT cut the white wire.
 - b) Connect terminal B to I4 on the Dupline board for ON.
 - c) Connect terminal C to I3 on the Dupline board for HOLD.
 - d) Connect terminal D to I2 on the Dupline board for OFF.

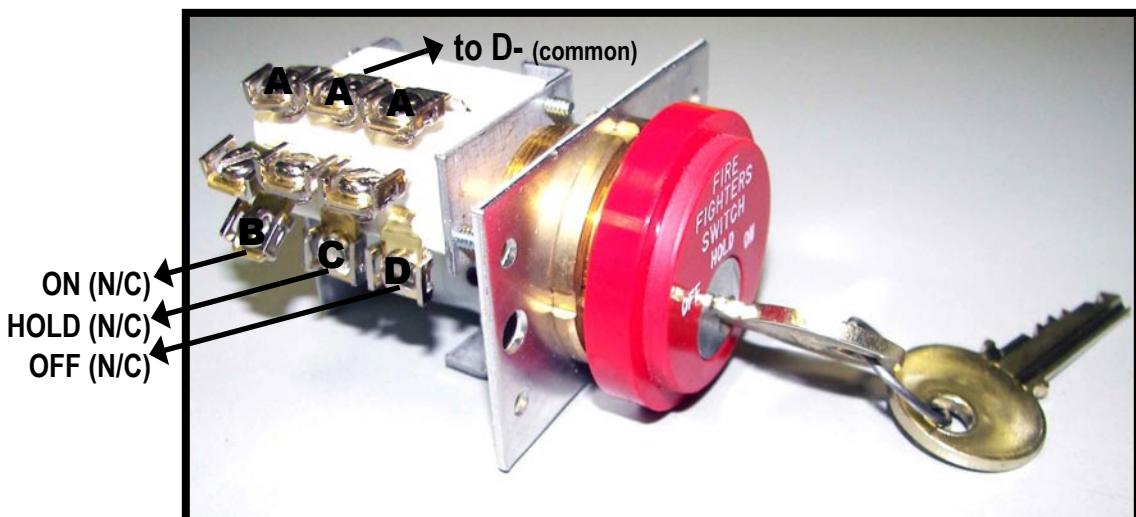


Figure 4 NJ Car Station Keyswitch

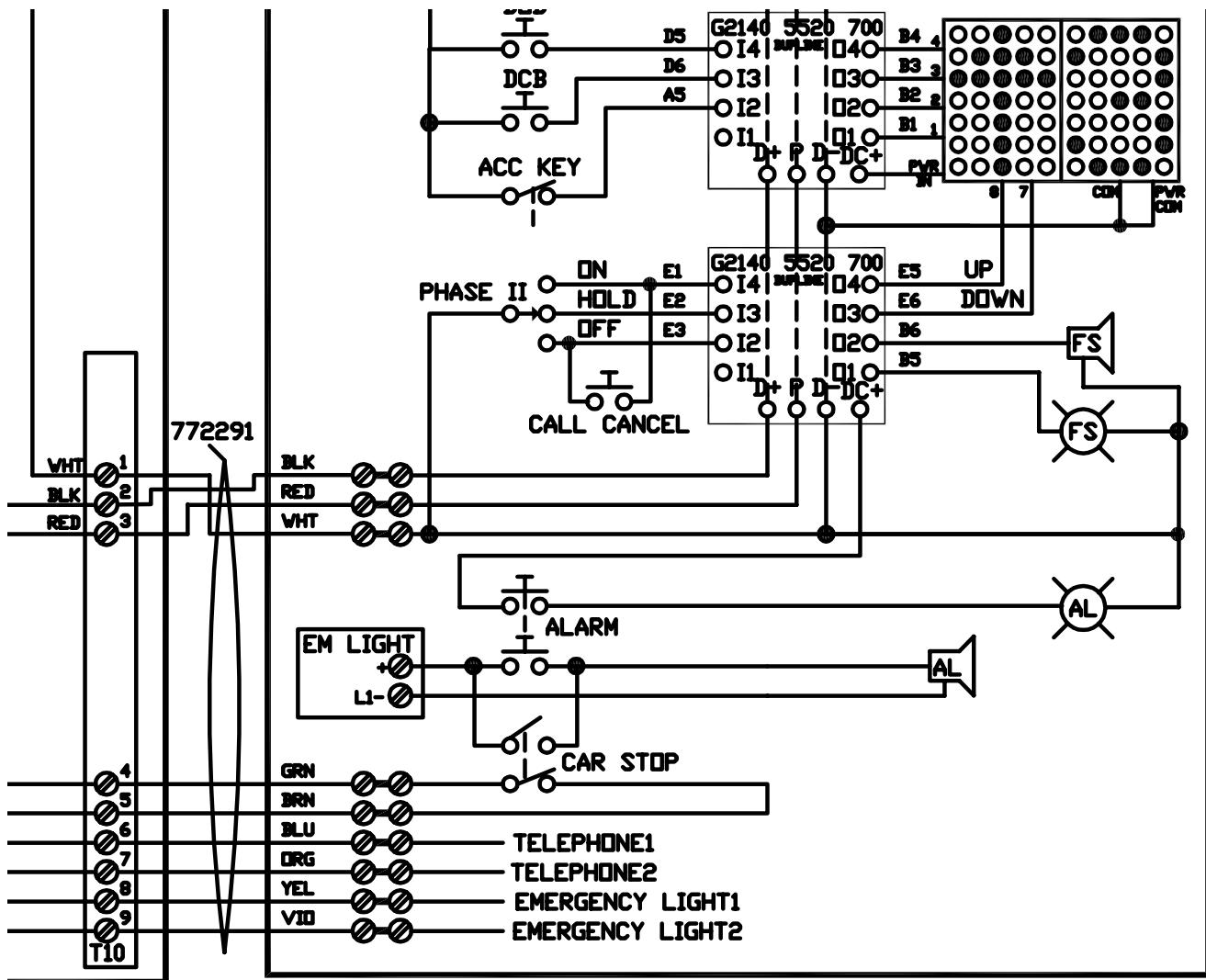


Figure 5 Car Station Dupline Wiring



107 Alfred Kuehne Blvd.

Brampton, ON L6T 4K3

Canada

Toll Free (800) 791-7999

Fax (905) 791-2222