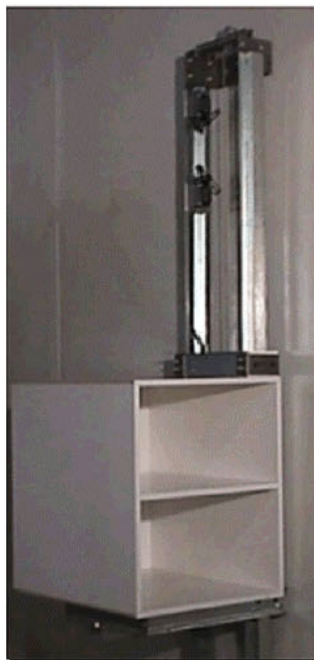


ELEVATOR CONCEPTS.com

Elevator Concepts LTD

**RESIDENTIAL DUMBWAITER
MODEL RD-2
OPERATION & INSTALLATION
MANUAL**



VERSION 7-3/31/05

ELEVATOR CONCEPTS LTD

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MODEL RD-2 RESIDENTIAL DUMBWAITER INSTALLATION v7

A. **REVIEW COMPONENTS.** *Refer to illustration A.* Throughout these instructions, we refer to component parts by the names shown on illustration A. It will be helpful to become familiar with them. Check the parts you received against the bill of materials list. Notify us of any discrepancies.

1. **CHECK HOISTWAY.** *Refer to illustration #1.*

- Check hoistway for conformity with shop drawings, especially:
 - Floor to floor distance
 - Number of stops
 - Overhead distance
 - Door opening dimensions and doorlock roller pocket cutouts
 - Proper blocking for attaching the rail brackets.
- Make sure the hoistway is plumb and square.
- Make sure you have a rough opening wide enough to get the frame and cab into the hoistway - it is usually best to leave a wall out at the bottom landing.

2. **INSTALL RAILS.** *Refer to illustration #2A, 2B, 2C.*

- Drop a plumb line from the top of the hoistway down the center of the rail attachment wall.
- Scribe a line down the center.
- Mount the bottom rail bracket to the wall at the bottom of the hoistway with **5/16" x 2" lagg bolts and flat washers**, with the center of the bracket on the scribed center line.
- Attach the first two rails to the outside of the bracket, using bottom holes, with **5/16" x 1" bolts, locks & nuts**.
- If the machine is basement mounted, also attach motor base/deflector beam angles to the inside of the rail bracket.
- Attach another rail bracket to the top of the first rail sections with **5/16" x 3/4" hex bolts, locks & nuts**, then attach the bracket to the wall with **5/16" x 2" lagg bolts and flat washers**. Center the bracket on the scribed line.
- Use a 4' level to make sure the rails are plumb in both directions. You may have to add shims between the wall and rail bracket to compensate for an uneven wall.
- At this point, if the front of the hoistway is open, it is best to assemble the sling outside of the hoistway, lift it over the first section of rails, and slide it down to rest on the floor. See step 5 for sling assembly.
- Repeat for each section of rail. The top of the rails must extend a minimum of 3' above the top stop, or 6' above the top floor assuming the top stop is 36" above the floor. Depending on the amount of overhead you have available, you may have to cut the top rails. If necessary, cut the rails so you have at least the minimum required as described above, but leave a minimum of 6" between the top of the rail and the ceiling to allow room for the overhead sheave assembly. Cut both rails to the same length with a hacksaw. Drill 5/16" holes in the rail flanges - use the end you cut off as a guide.
- Attach the top rail bracket to the top rails, using the bottom set of holes in the rail bracket. Attach adapter and stop angles to the top rail bracket with **5/16" x 2" hex bolts, flats, locks & nuts**, using the top set of holes in the rail bracket. Recheck rails with 4' level.

3. INSTALL MACHINE. *Refer to illustration #3.*

- The machine base can be installed at the top or bottom of the rail system. The drive machine will already be attached to the machine base.
- For a bottom mounted machine: If the sling is installed, you will need to raise it and tie it off to a rail bracket.
- Attach the machine base to the adapter angles at either the bottom or top of the hoistway as appropriate with **5/16" x 1" hex bolts , locks & nuts.**

4. INSTALL OVERHEAD FRAME. *Refer to illustration #4.*

- Bottom mount machines require an overhead deflector sheave.
- Attach the overhead sheave angles to the adapter angles with **5/16" x 1"bolts, locks & nuts.**
- Attach the overhead sheave to the angles with a **3/8" x 1-1/2 hex bolt and ESNA nut.**

5. INSTALL SLING. *Refer to illustration #5.*

- Attach the roller guide axles and flat washers to the roller guide plates (washer goes between plate and axle) with **1/4" x 1/2" hex bolts & locks.** Slide the plastic rollers onto the axles so the hub is towards the guide plate. Check the roller spacing by placing the assembly onto a guide rail. Adjust the axle so there is just enough clearance between the roller and the rail. You should be able to spin each roller by hand, but not be able to perceive any gap between the roller and rail.
- Attach the side beams and bottom roller guide assemblies to the side stiles with **5/16" x 3/4" bolts & locks.**
- If you have to assemble the sling inside the hoistway after the rails are up, it may be helpful to put a clamp on each rail about 3 to 4 feet from the floor. Rest the sidestiles on the clamps and then temporarily tie them to the rails with some rope.
- Attach the bottom beam to the sidestiles with **5/16" x 3/4" hex bolts, locks & nuts.** The flange with the larger holes should be down.
- Attach the top beam and top beam stabilizer to the flange of the side stile with **5/16" x 3/4" hex bolts, locks.**

- Attach the top roller guide assemblies and the top beam stabilizers (and door lock cam channel adapter if using GAL locks) to the face of the sidestiles with **5/16" x 3/4" hex bolts & locks**. The top beam flange with the larger holes should be up. **NOTE - door lock cam channel adapter not required for electric locks.**
- Attach the stringer beam to the side beams with **5/16" x 3/4" hex bolts , locks & nuts**.
- Attach the pickup beam to the bottom beam and the stringer beam with **5/16" x 3/4" hex bolts , locks & nuts**.
- Check the sling for squareness, and firmly tighten all bolts.
- Double check the roller spacing. You should be able to spin the roller by hand.

6. INSTALL HOISTING CABLE & SLACK CABLE SWITCH. *Refer to illustration #6.*

- Block up the sling about 6" below the bottom stop. Install slack cable switch to underside of the front overhead sheave angle with **8-32 x 1-2/2" bolts & nuts**.
- Install the eyebolt to the lifting beam using double nuts and double washers.
- One end of the cable has a crimp fitting to prevent it from leaving the drum. Thread the other end of the cable through the hole in the edge of the drum, pulling all the through to the crimp fitting. Put 2 wraps of cable on the drum, run the cable up to the overhead sheave, and down to the eyebolt. Attach the cable to the eyebolt with a thimble and two wire rope clips.
- Engage the slack limit switch roller on the cable. Do not cut off excess cable the car has run the entire travel distance.
- Make sure all cable fastenings are secure, and that cable is not crossed on the drum.

7. INSTALL CONTROLLER.

- Install controller in a convenient location, preferably near the motor.
- When the controller is mounted at the bottom of the hoistway, some installers prefer to leave it on the floor. If you can leave some slack in the wiring, you can pull the controller out of the hoistway to work on it.
- Following the wiring diagram supplied, wire the electrical service to the controller, and wire the motor to the controller.
- Run the motor by manually operating the contactors. Push the contactor quickly and firmly to prevent contact and/or motor damage. Some PC board controllers will have a toggle switch marked UP and DOWN for manual operation.
- **Check that the brake releases when the motor is running, and sets when the motor stops.** If the motor doesn't start, the brake may not be releasing. Also make sure the capacitor is wired correctly. If the car coasts when the motor stops, the brake may not be setting properly. See the brake unit instructions for adjustment procedures. Brakes supplied after 2-1-2003 are self adjusting.
- Run the unit all the way up the hoistway - be careful not to go out of the rails at the top. Make sure there are no binds, obstructions, or any unusual noises. Make sure the cable is winding properly on the drum. If so, you can trim the excess cable at this time.

8. INSTALL LIMITS & CAM. *These instructions are for limit model # AAP2T51Z11 - Refer to illustration #8A, 8B, 8C, 8D.*

- First, install **2@ 1/4 -20 x 2-1/4" flat head screws** onto the cam – one side of the cam is countersunk. Install a **1/4 -20 nut** on each screw to secure it to the cam. Then run another **1/4-20 nut** about 1" up each screw. Install the limit cam to the top beam - there are two holes in the web toward the left side of the beam for cam mounting. Secure the cam with 2 nuts.
- Set up the limit switch roller arm - see the "Initial limit setup" detail on illustration #8B for roller arm measurements
- It is usually easier to wire up the limit before you install it in the hoistway. The contact block can be taken out of the switch body to further facilitate wiring. You may run the wire directly back to the controller, using the inside of the rail as a wiring duct. Allow a bit of slack in the wire so you can adjust the limit. Refer to the electrical diagram for connection details.
- Scribe a reference line on the rail at each level – see illustration #8B for locations.
- Loosely attach the limit switch to the limit bracket, which is in two pieces, with **#8-32 x 1-1/2 screws**.
- Spread the 2 pieces of the bracket out, put it over the rail flange, then slide it together tight to the rail.
- There are 2 limits at each landing. Place the switches in their initial position – the upper switch 2.25" above the line, and the bottom 2.25" below. If a rail bracket interferes, use an extension plate.
- Tighten the limit switch screws, then tighten the bracket clamp screw.
- The uppermost limit is called the UP FINAL; the limit directly beneath it is the UP NORMAL, or sometimes called UP TERMINAL. The lowermost limit is called the DOWN FINAL; the limit directly above it is the DOWN NORMAL, or DOWN TERMINAL. Normal limits control the floor stopping – they prevent car motion in one direction only, and affect only the control circuits. Final limits are safety backups and prevent motion in either direction by cutting off the main power supply.
- Intermediate floor stopping is done using two limits in parallel – both must open to stop the car. The upper switch sets the stop with the car traveling up; the lower switch sets the stop with the car traveling down.
- After the cam and limits are installed, inch the car toward the limits. Observe with a flashlight to make sure things line up properly – it is easier to do this with a helper running the car. It is very important that the cam contacts the roller properly. Adjust the cam or limits as required.

9. **INSTALL CAB.** *Refer to illustration #9.*

- At this point, if you do not have open walls to work through, you may want to install the doorlocks - see step 13.
- Assemble the cab with the special screws provided.
- Install cab to sling. Cab should be tight against the sidestiles.
- Secure the cab to the sling with **#10 x 5/8" screws**. There are holes provided in the flanges of the top & bottom beams.

10. **INSTALL PUSHBUTTONS.**

- Install pushbuttons in a convenient location next to door openings. Refer to shop drawing.

11. **WIRE CONTROLLER.**

- Wire limit switches and pushbuttons to controller
- Run wire for doorlocks.

12. **INSTALL DOORS.**

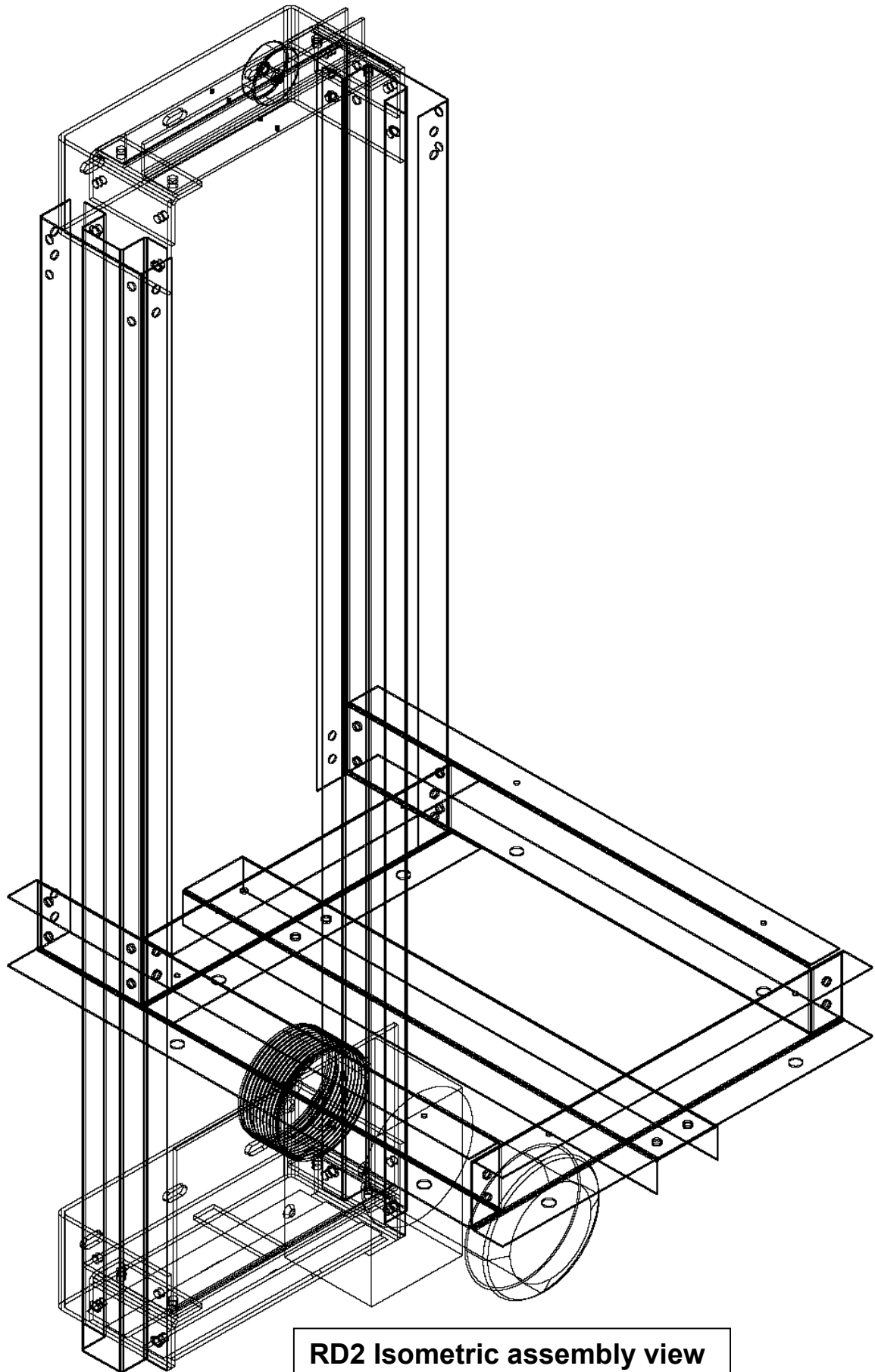
- Install doors. We suggest a magnetic latch on every door.

13. **INSTALL DOORLOCKS.** *Refer to illustration #10 for GAL mechanical locks.*

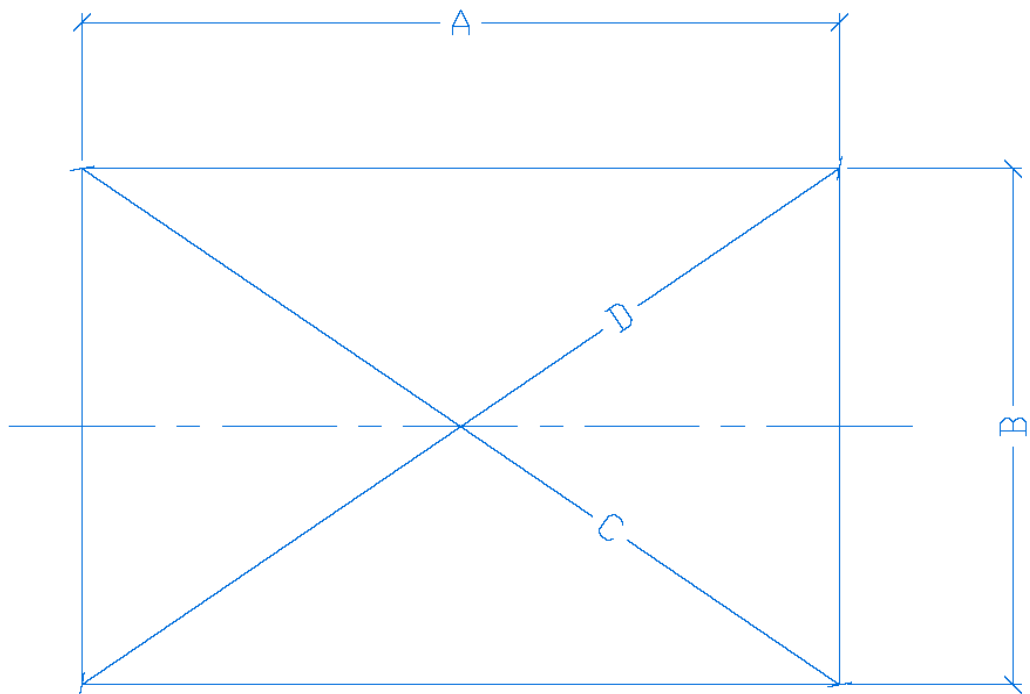
- Install doorlocks to door frame. For ECL electric locks see installation instructions at the back of the manual, which includes a mounting template. There are templates provided for both style locks.
- Mount doorlock keeper on door to suit doorlock. Use the template to locate the holes
- (GAL only) Install cam channel on adapter bracket, and the doorlock cam on the cam channel with **¼-20 spintite bolts**.
- Adjust doorlock cam so doors are unlocked at stopping points.
- Drill hole in door for emergency release key. Use the template to locate the hole.
- Wire door locks into controller.

18. **CHECK ALL ADJUSTMENTS.**

- Run dumbwaiter several trips.
- Remove any temporary jumpers.
- Check limits and door locks for proper operation.
- Adjust top and bottom floor stop switches so the car stops level.
- Adjust final limits to open before the car reaches any obstruction or the end of the rail.
- To adjust intermediate floor stops, adjust lower switch for down direction, and upper switch for up direction.
- Check cable for proper winding on drum and check cable fittings for tightness.
- Check all bolts for tightness.
- Check all electrical connections.
- Place in operation.



RD2 Isometric assembly view



CHECK DIMENSION (A) AGAINST SHOP DRAWING
CHECK DIMENSION (B) AGAINST SHOP DRAWING

$$A^2 + B^2 \text{ SHOULD} = C^2$$
$$A^2 + B^2 \text{ SHOULD} = D^2$$

ILLUSTRATION #1 – SQUARING HOISTWAY AND RAILS

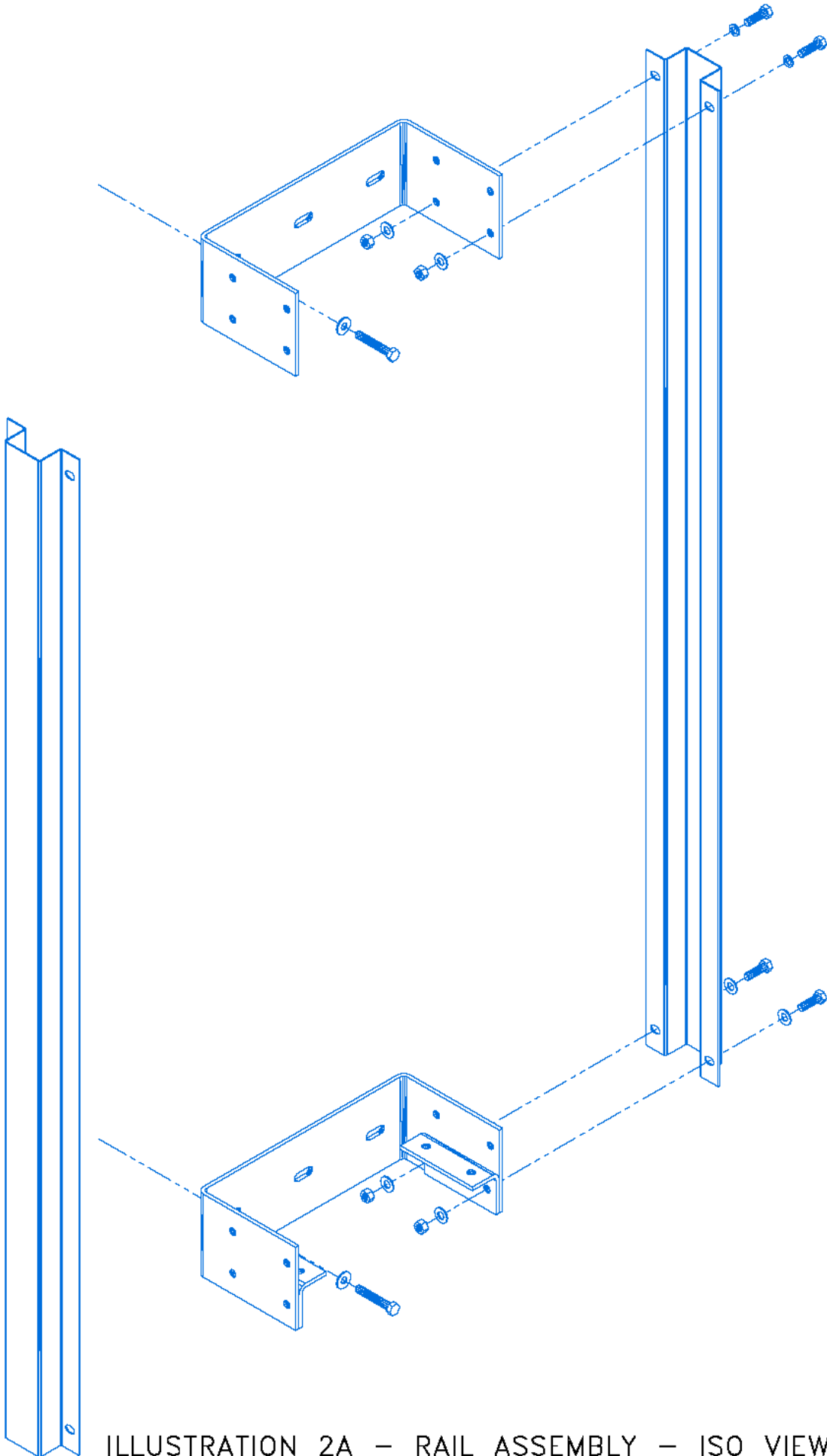


ILLUSTRATION 2A - RAIL ASSEMBLY - ISO VIEW

☉ HOISTWAY

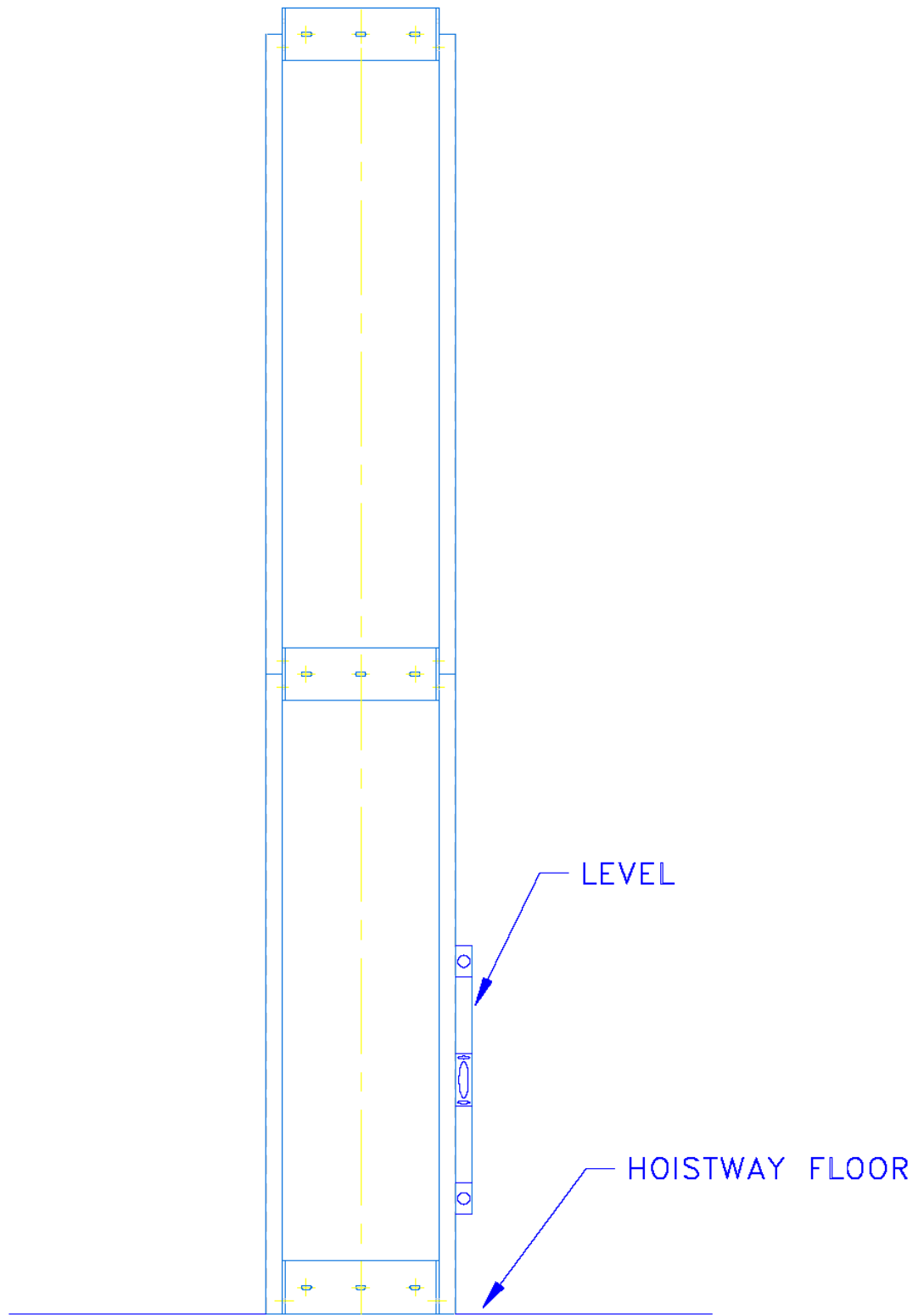


ILLUSTRATION 2B – RAIL ASSEMBLY – FRONT VIEW

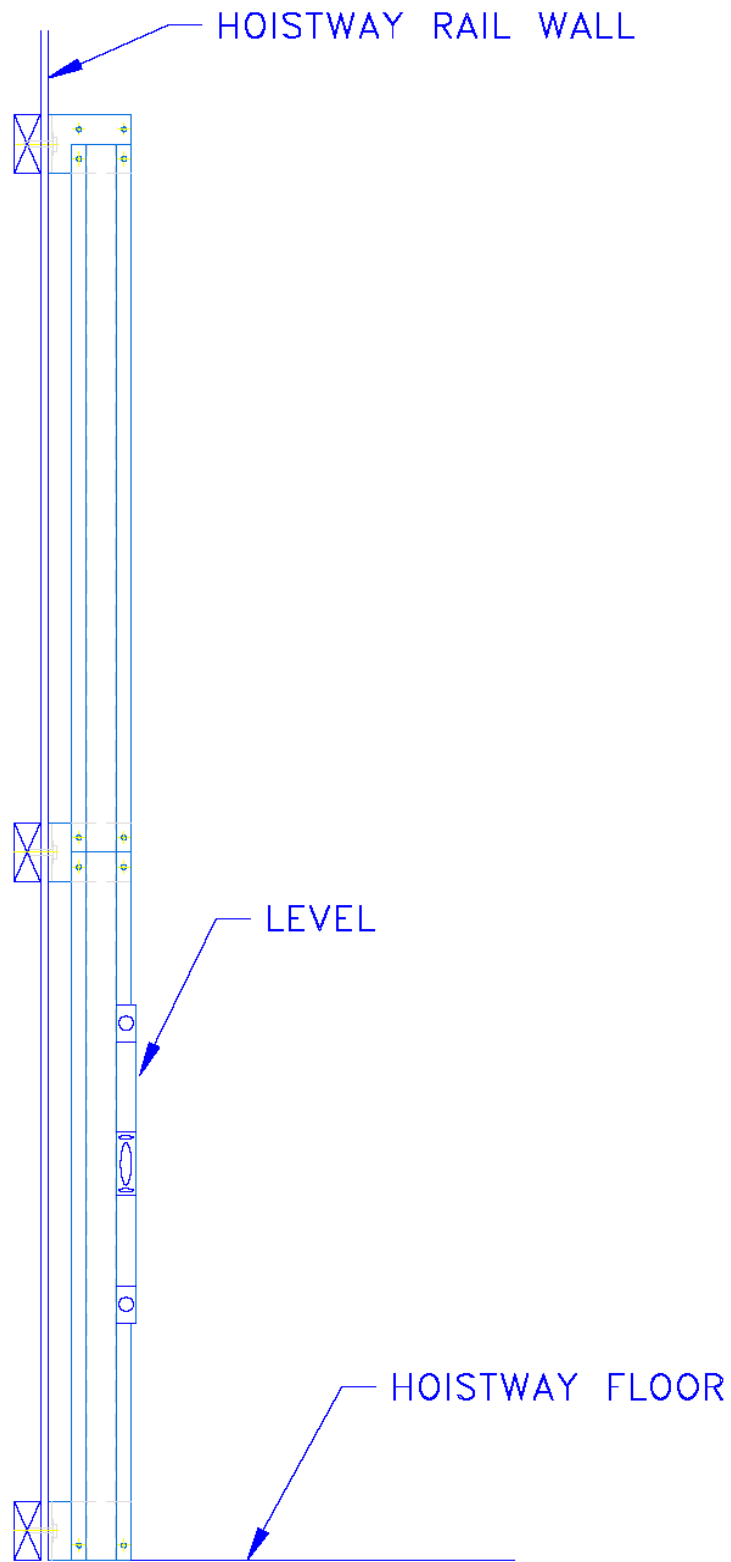


ILLUSTRATION 2C – RAIL ASSEMBLY – SIDE VIEW

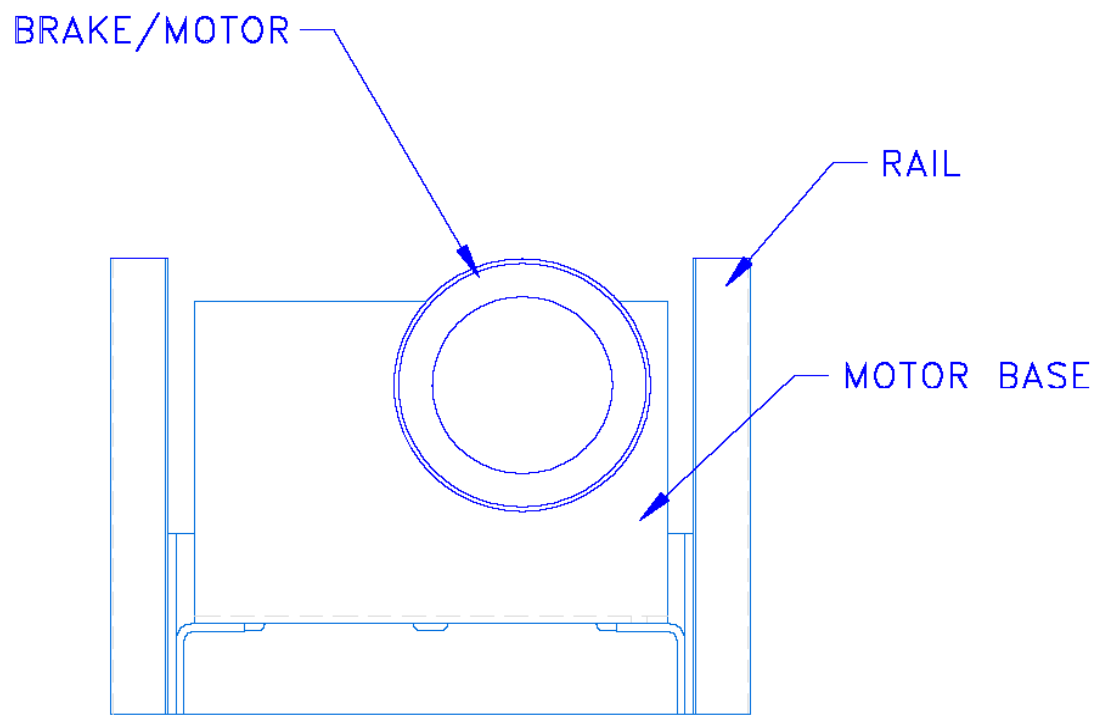
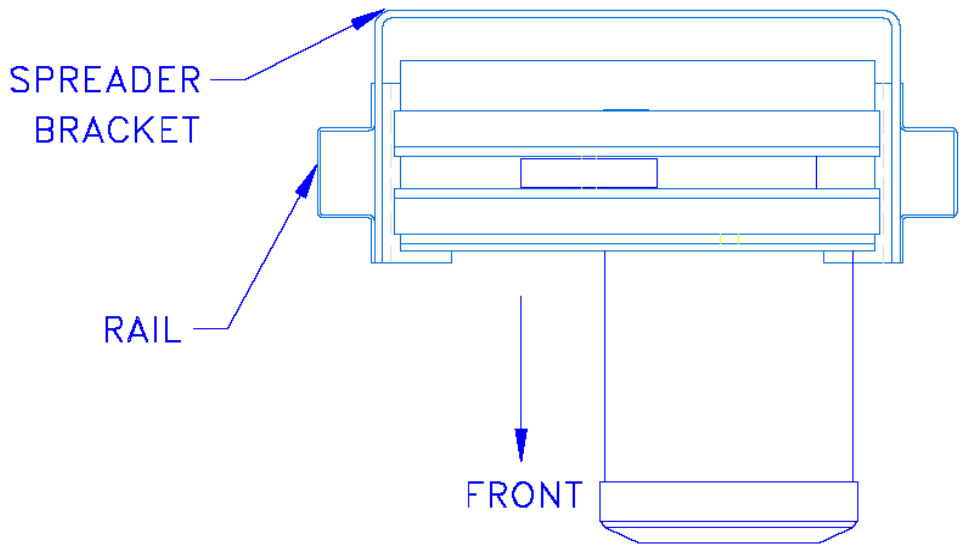


ILLUSTRATION 3 – BASEMENT MACHINE FRAME

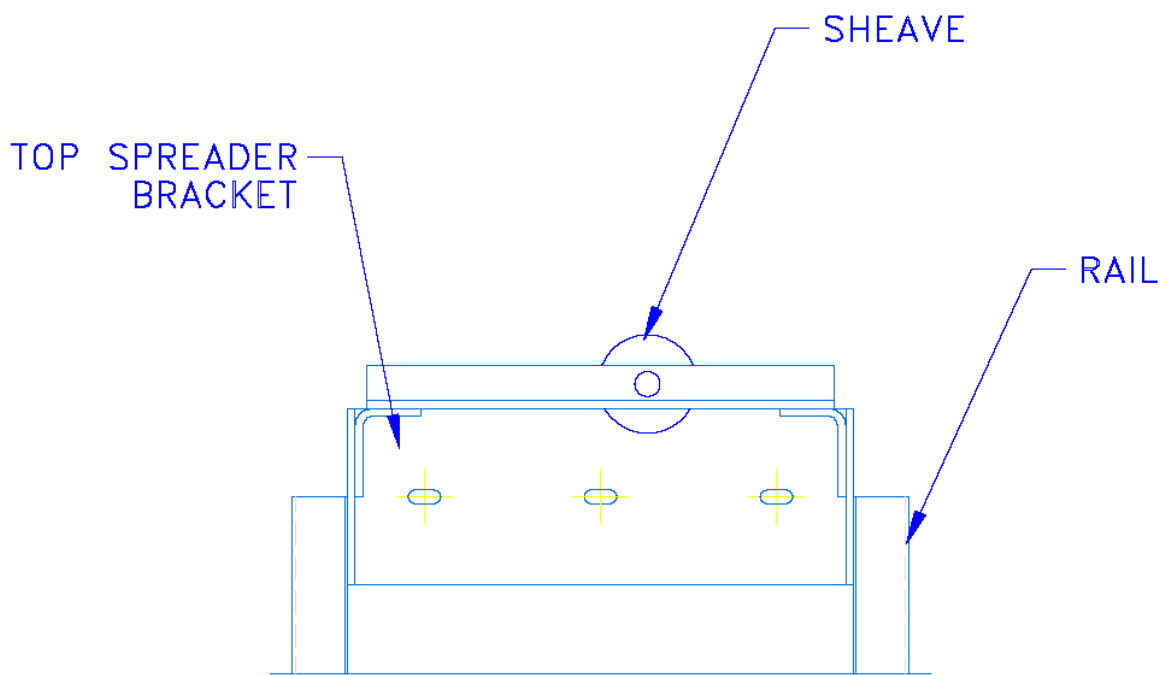
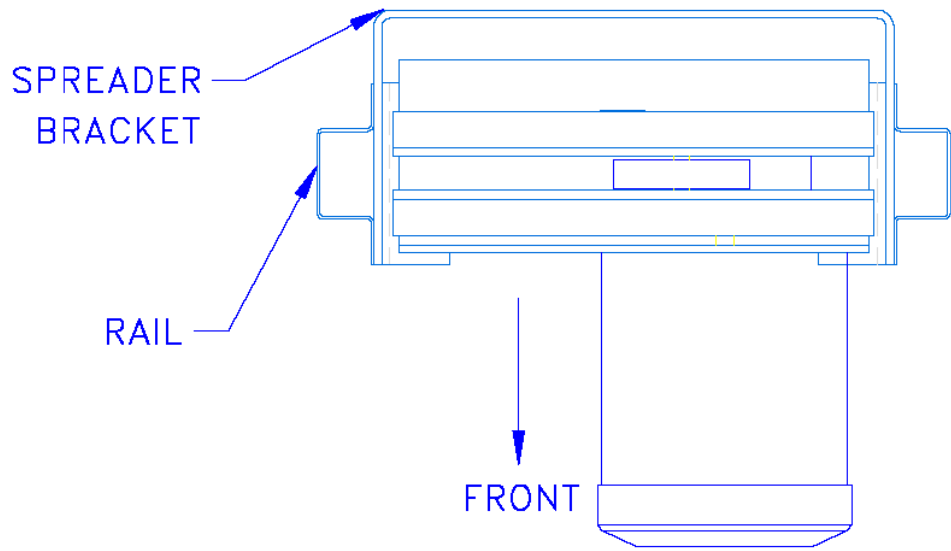
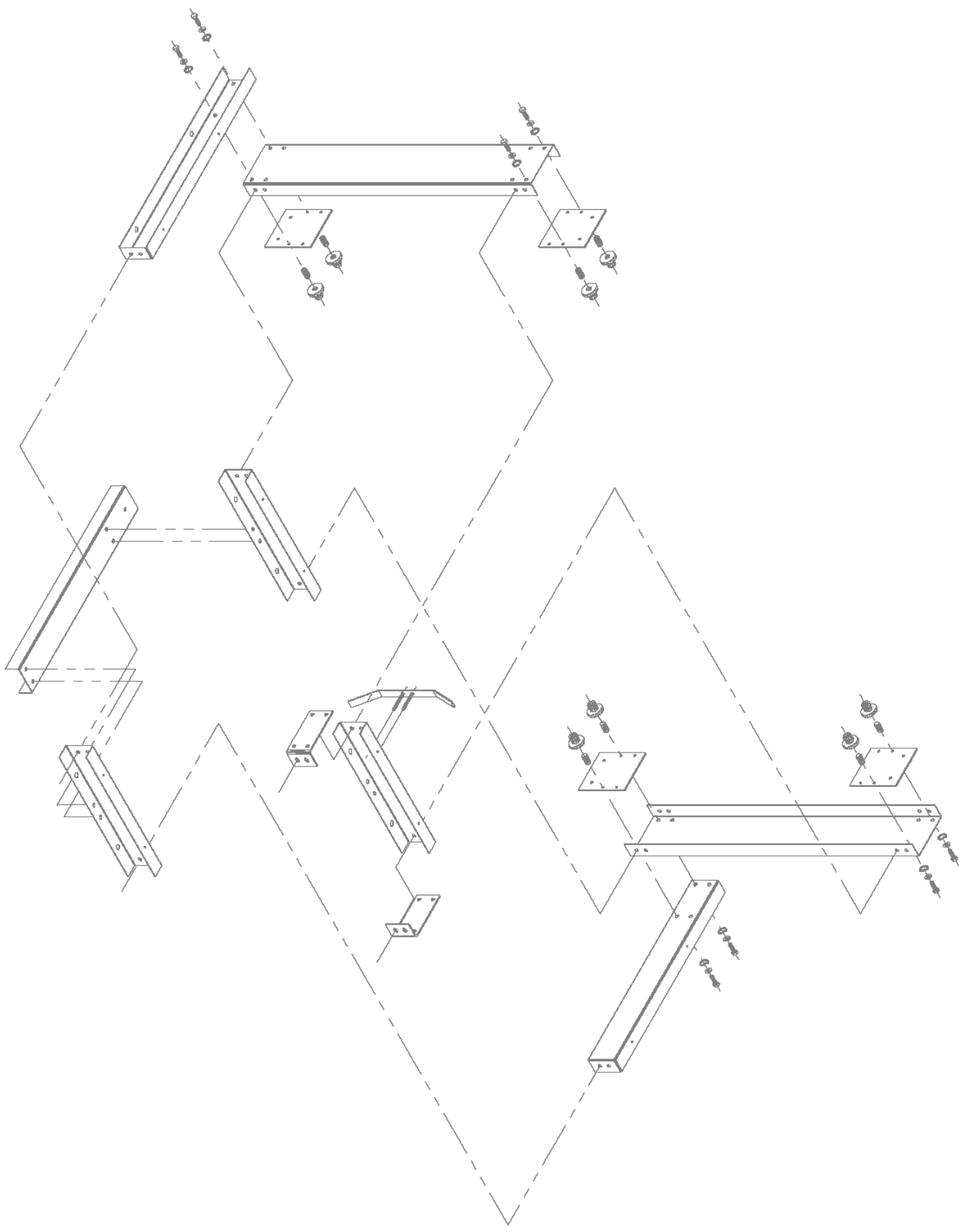


ILLUSTRATION 4 – OVERHEAD SHEAVE FRAME

ILLUSTRATION 5 – SLING ASSEMBLY



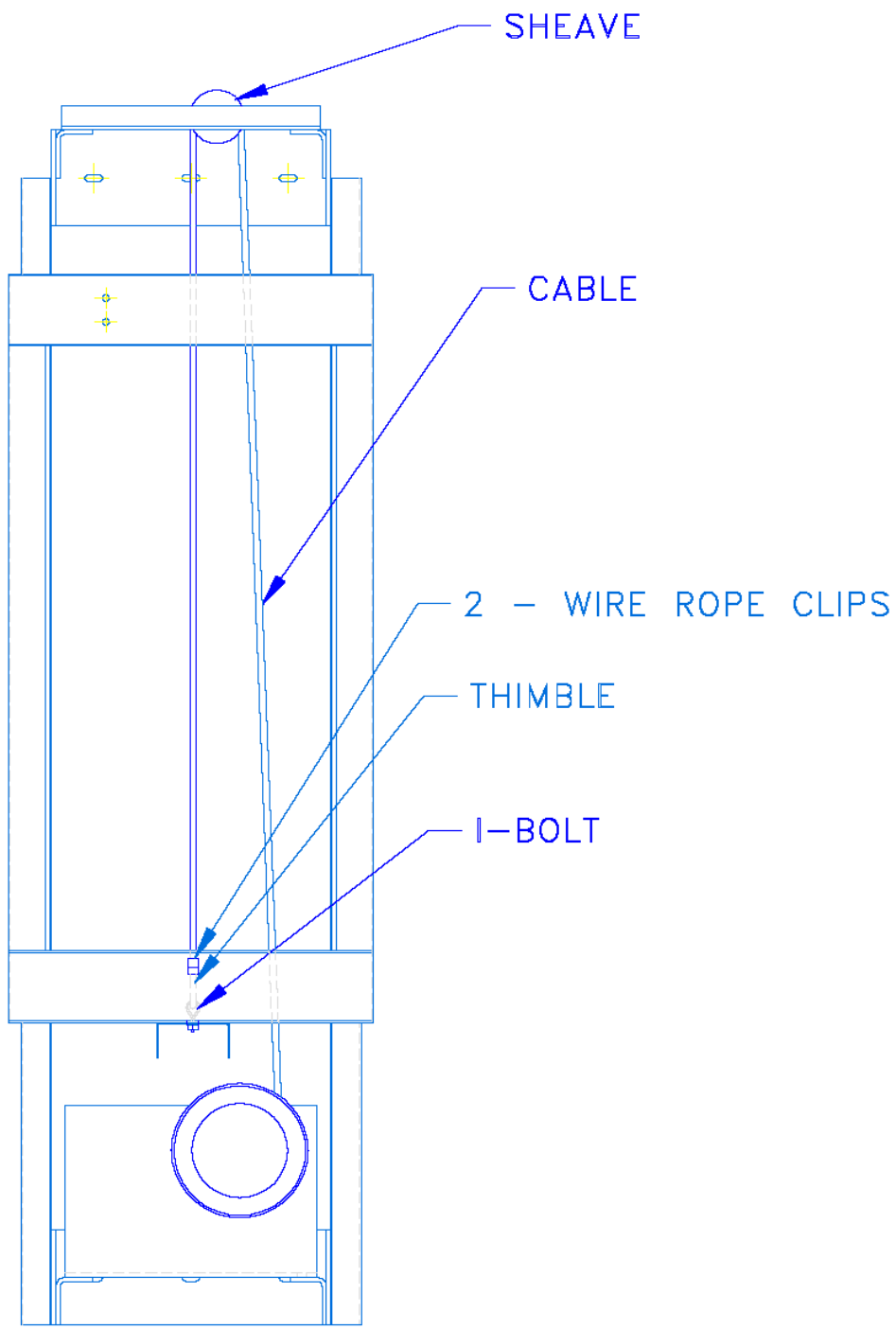


ILLUSTRATION 6 – CABLE INSTALLATION

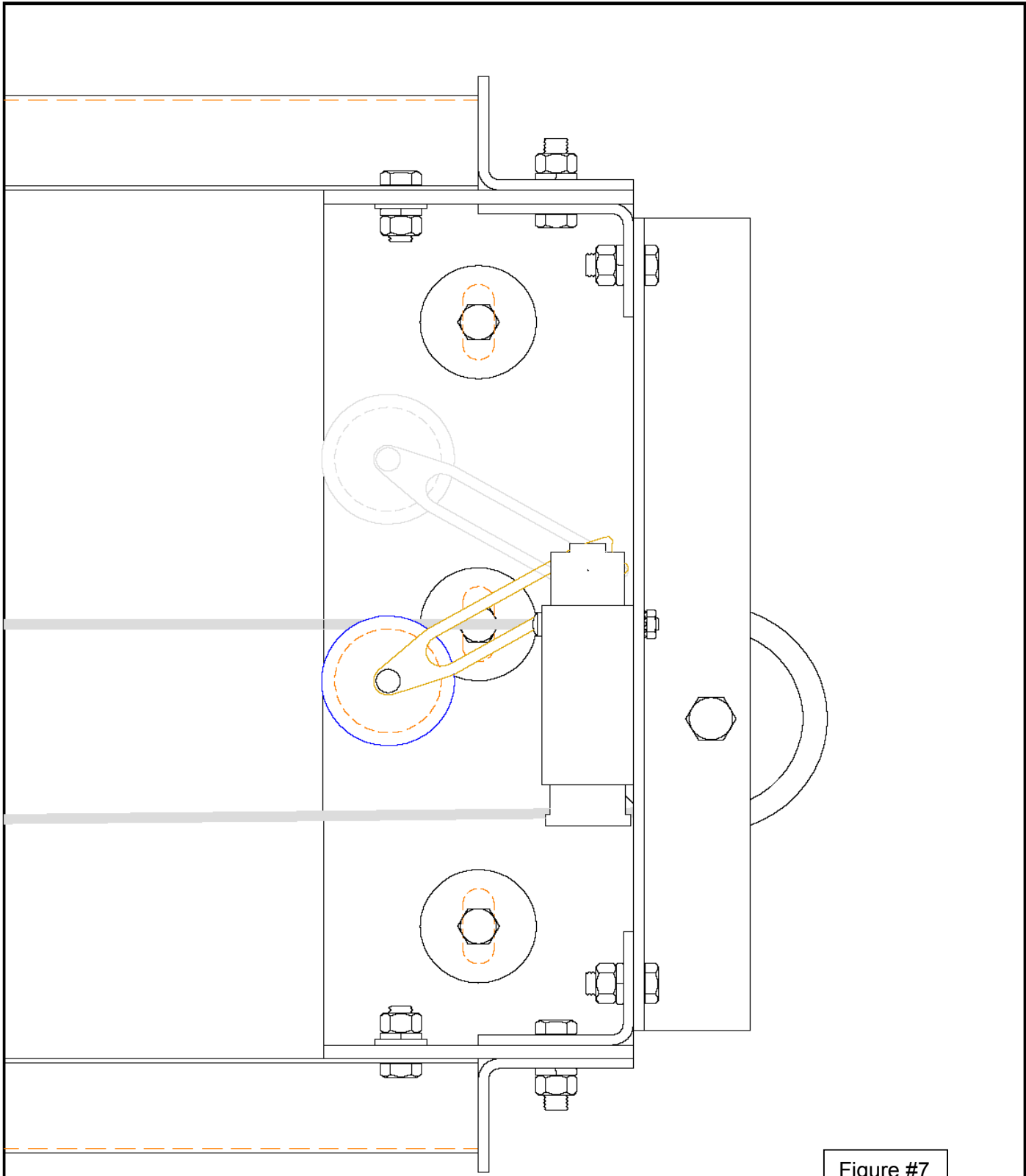
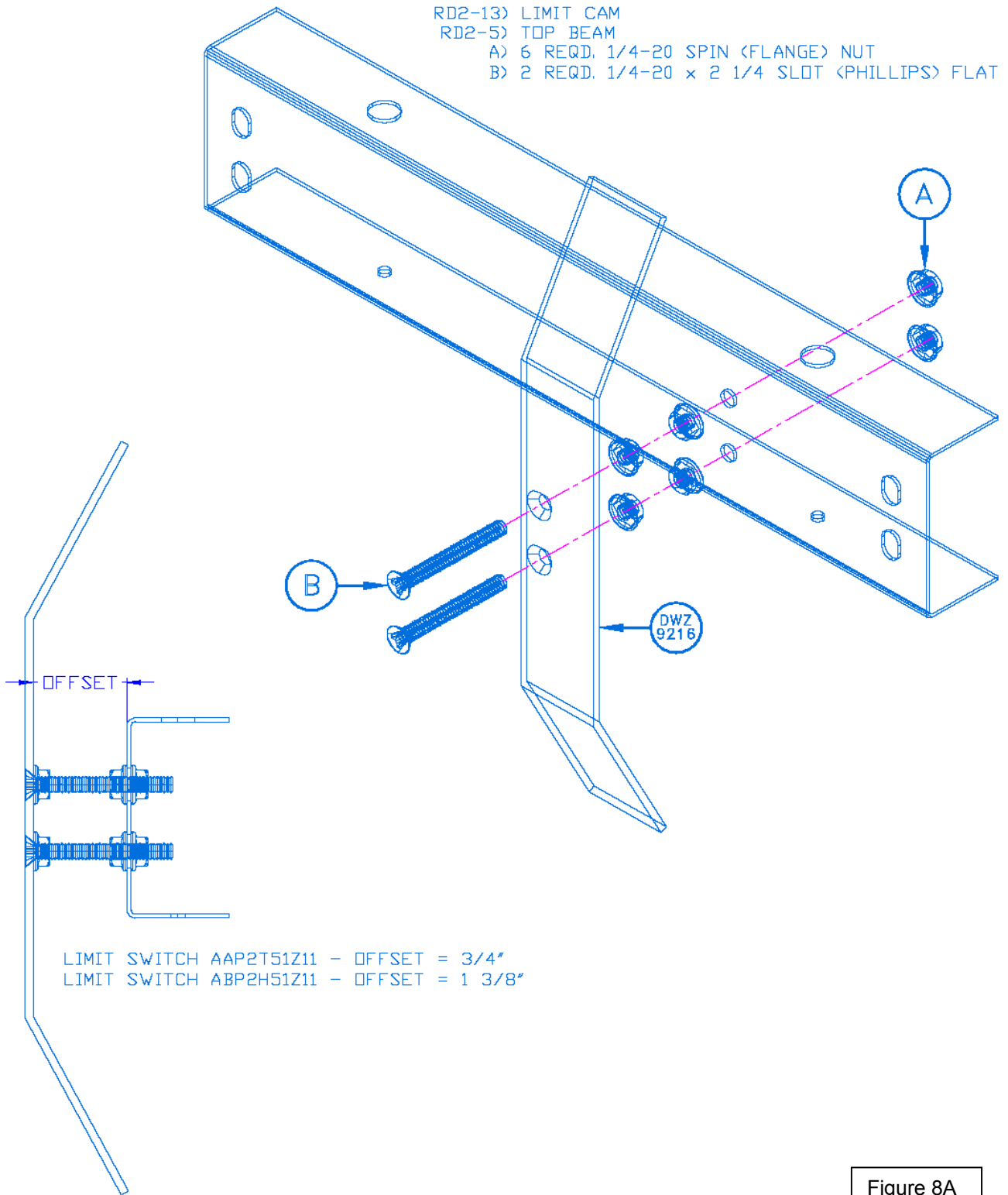


Figure #7

ELEVATOR CONCEPTS	DUWBWAITER SLACK SWITCH VIEW			DWG.#:	SLACKVIEW
	SCALE: VIEW	UNITS: VIEW	DATE: 05/29/03	DRWN.BY: DJB	

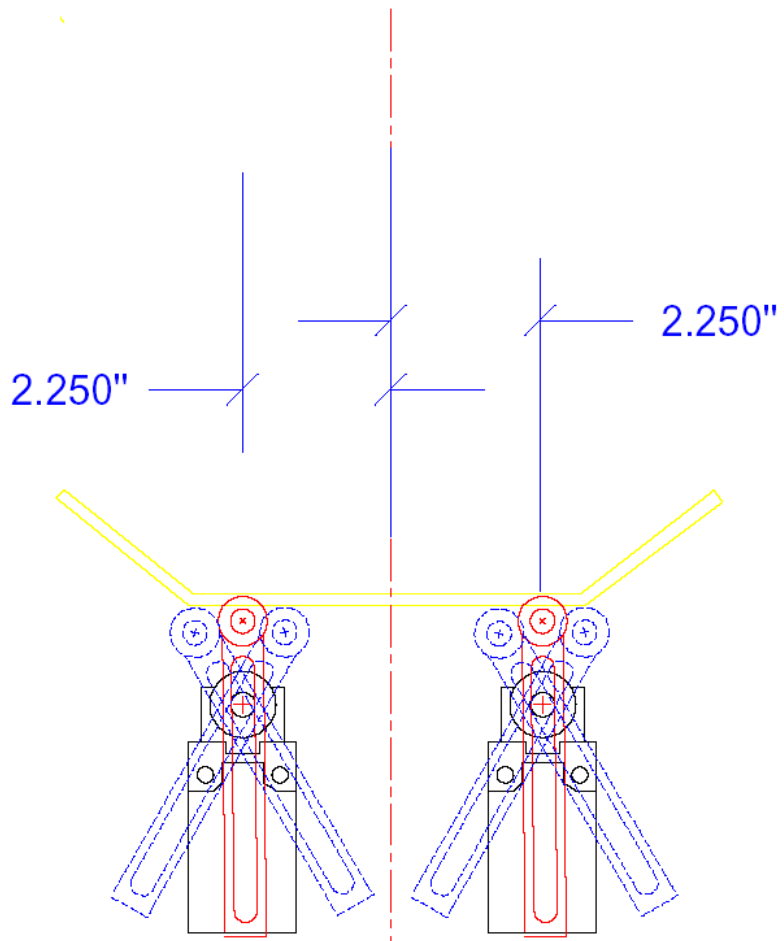
- RD2-13) LIMIT CAM
- RD2-5) TOP BEAM
- A) 6 REQD. 1/4-20 SPIN <FLANGE> NUT
- B) 2 REQD. 1/4-20 x 2 1/4 SLOT <PHILLIPS> FLAT



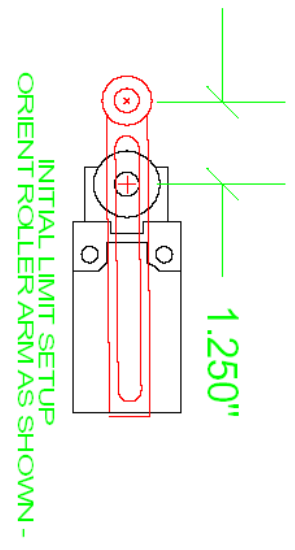
LIMIT SWITCH AAP2T51Z11 - OFFSET = 3/4"
 LIMIT SWITCH ABP2H51Z11 - OFFSET = 1 3/8"

Figure 8A

ELEVATOR CONCEPTS	LIMIT CAM ATTACHMENT			DWG.#:	LCAMVIEW
	SCALE: 1/2	UNITS: INCH	DATE: 09/24/03	DRWN. BY: DJB	



TYPICAL ARRANGEMENT

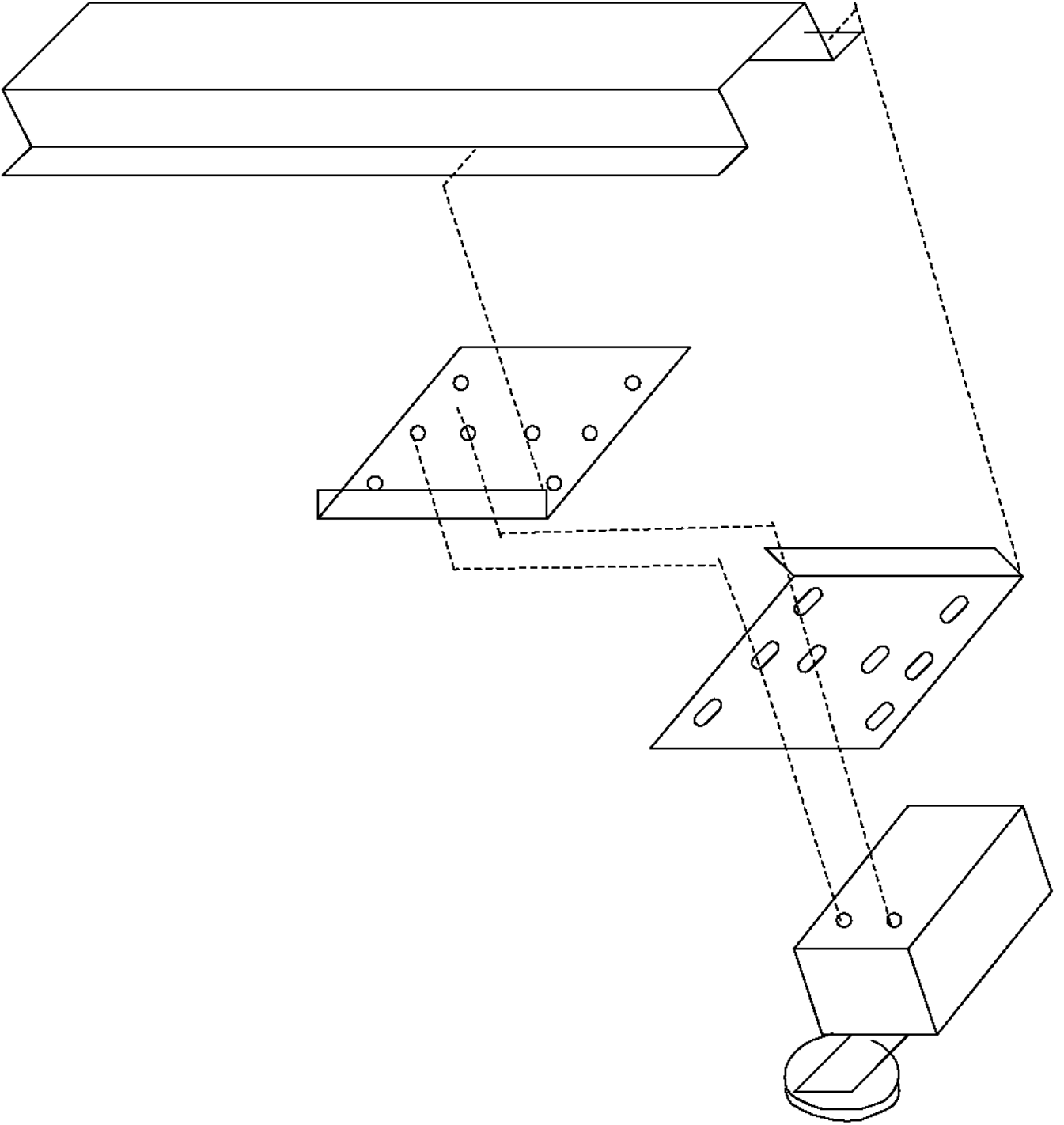


REFERENCE LINE

ON STANDARD HEIGHT CAR FRAMES (24" CAR)
 THE REFERENCE LINE IS:
 22" ABOVE BOTTOM LANDING
 26.5" ABOVE INTERMEDIATE LANDING(S)
 31" ABOVE TOP LANDING
 ADJUST AS NECESSARY FOR OTHER
 CAR FRAME HEIGHTS

ILLUSTRATION #88
 "MINILIMIT" - AAP2151211

ELEVATOR CONCEPTS LTD	
TITLE	RDZ MINILIMIT
DRAWING #	88 RDZ minilimit
DRAWN BY	DJS
CHECKED BY	DJS
DATE	9/06/03
	DW



8C - LIMIT & BRACKET ISO VIEW

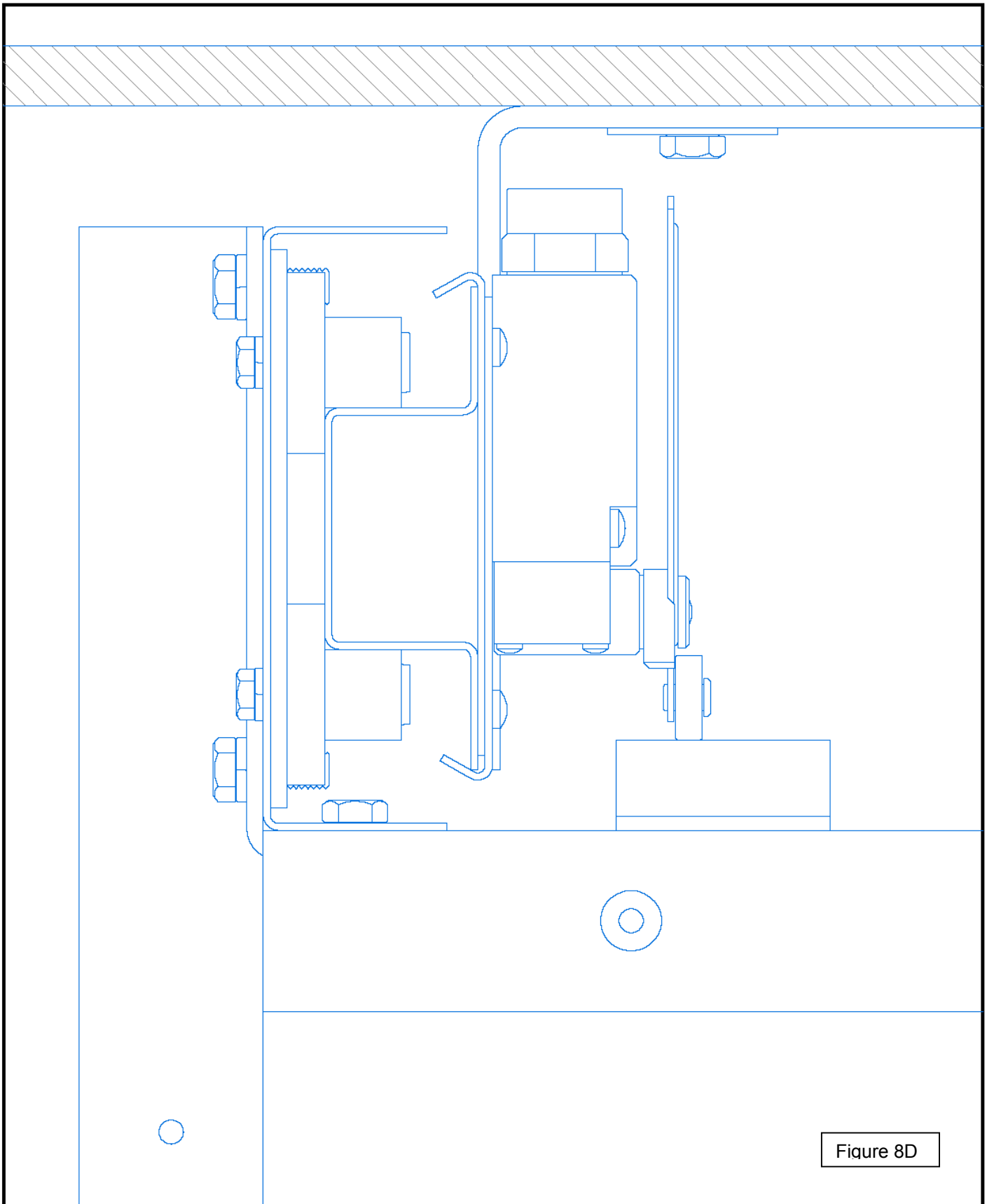


Figure 8D

ELEVATOR CONCEPTS	DUMBWAITER LIMIT SWITCH OVERVIEW			DWG.#:	LIMIT_OVER
	SCALE: FULL	UNITS: INCH	DATE: 09/24/03	DRWN. BY: DJB	

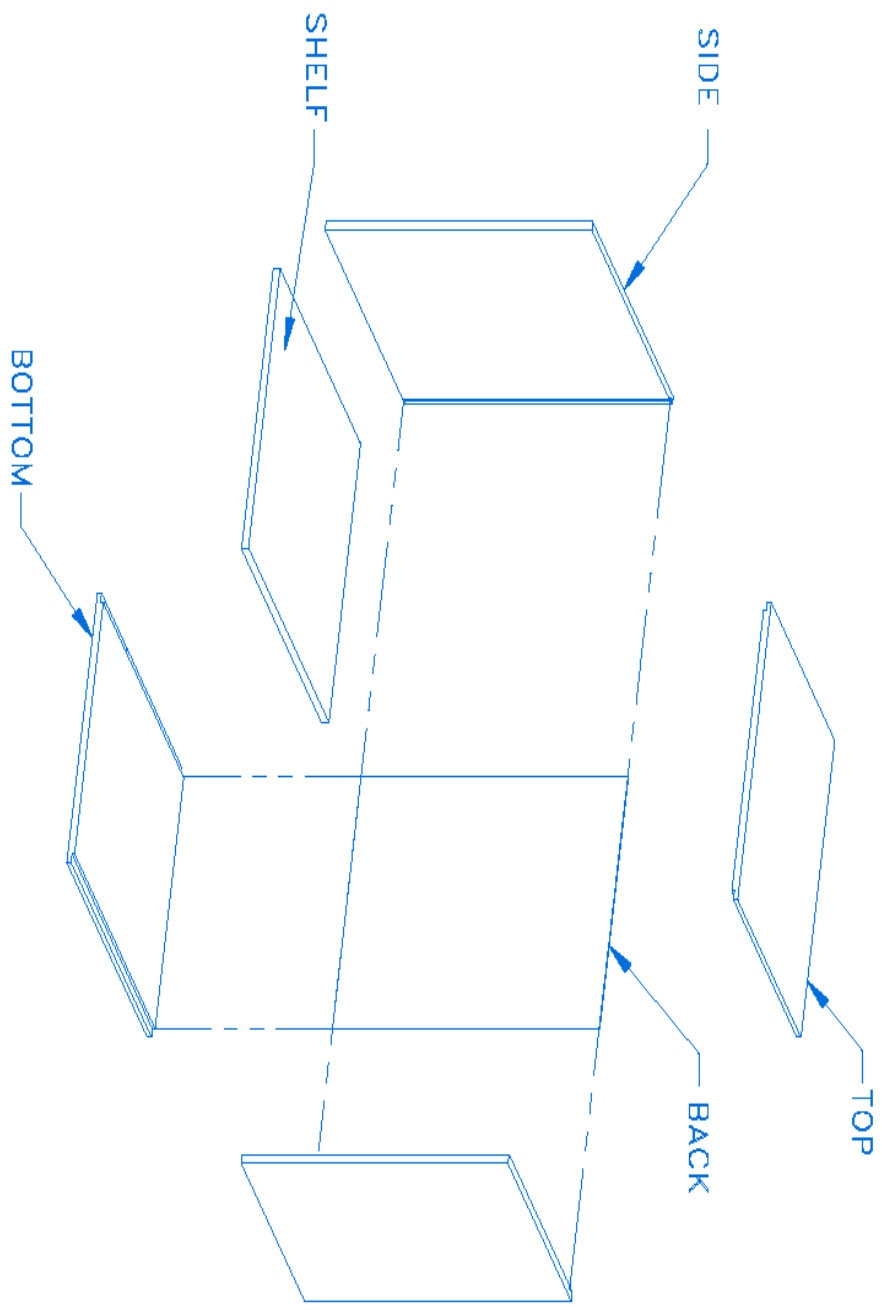


ILLUSTRATION 9 – CAB ASSEMBLY

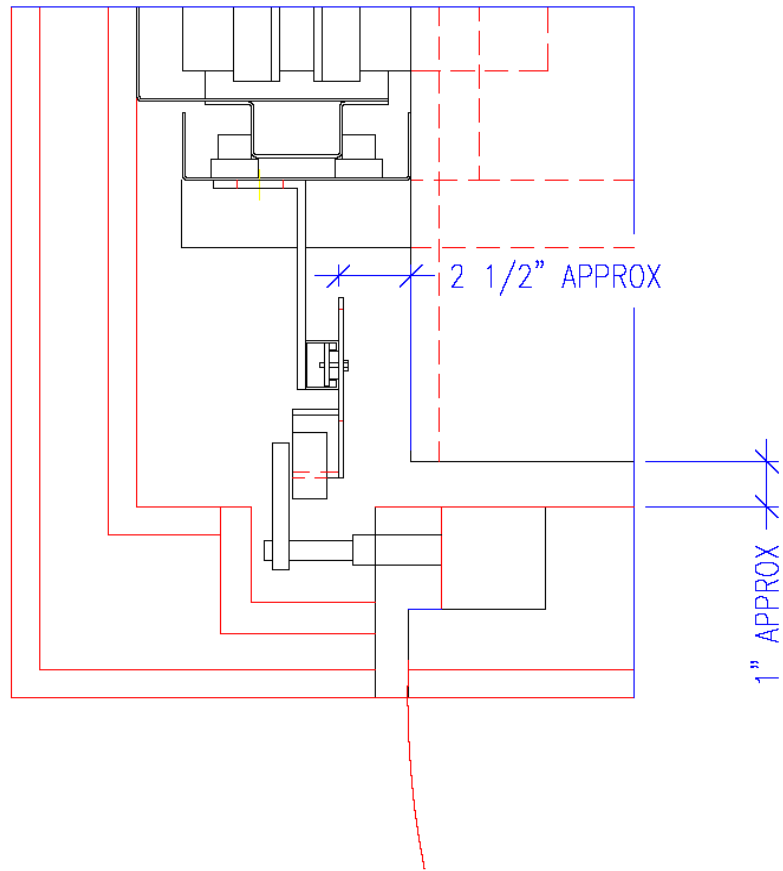
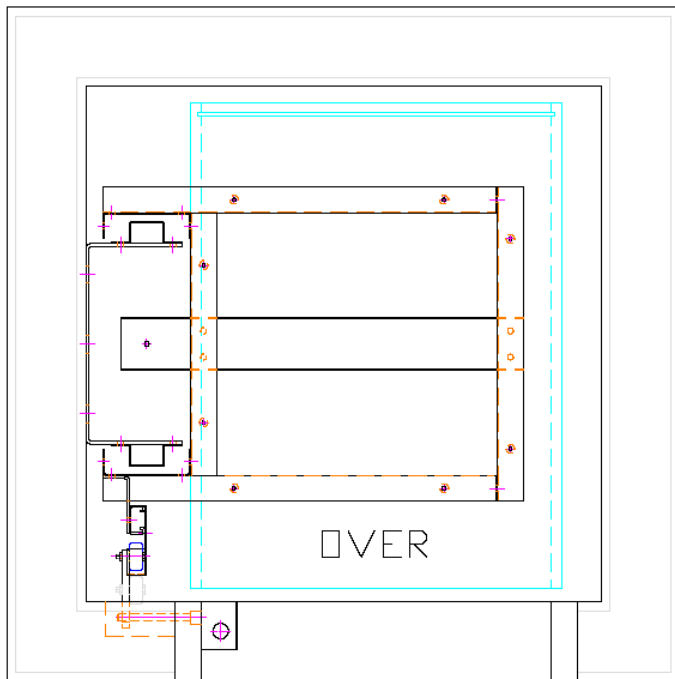
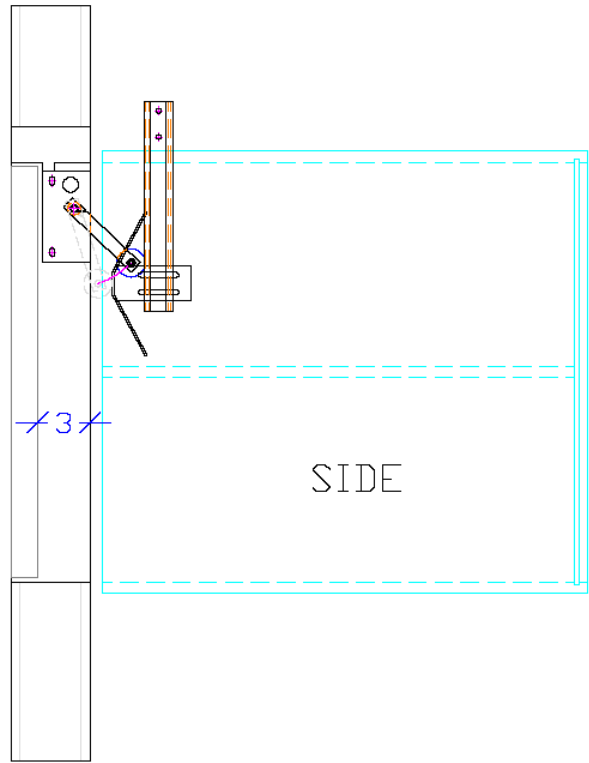
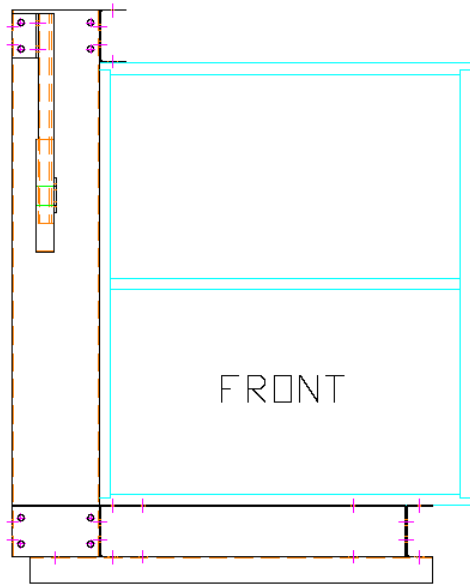
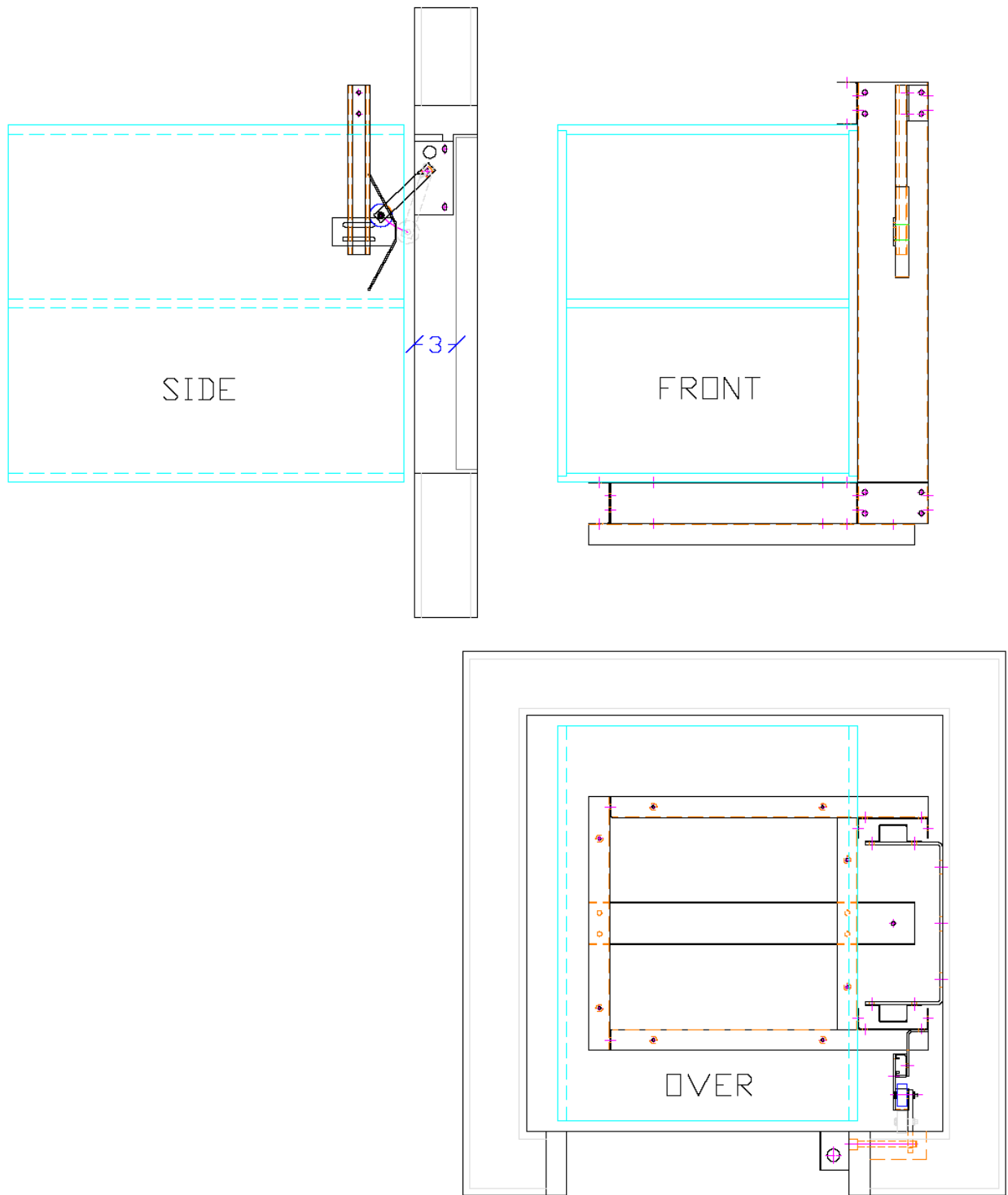


ILLUSTRATION 10 – DOOR CAM – PLAN VIEW



STANDARD DUMBWAITER ENTRY @ #1
 SHOWN w/ G.A.L, SM INTERLOCK

ILL. 10B



STANDARD DUMBWAITER ENTRY @ #2
 SHOWN w/ G.A.L. SM INTERLOCK

ILL. 10C

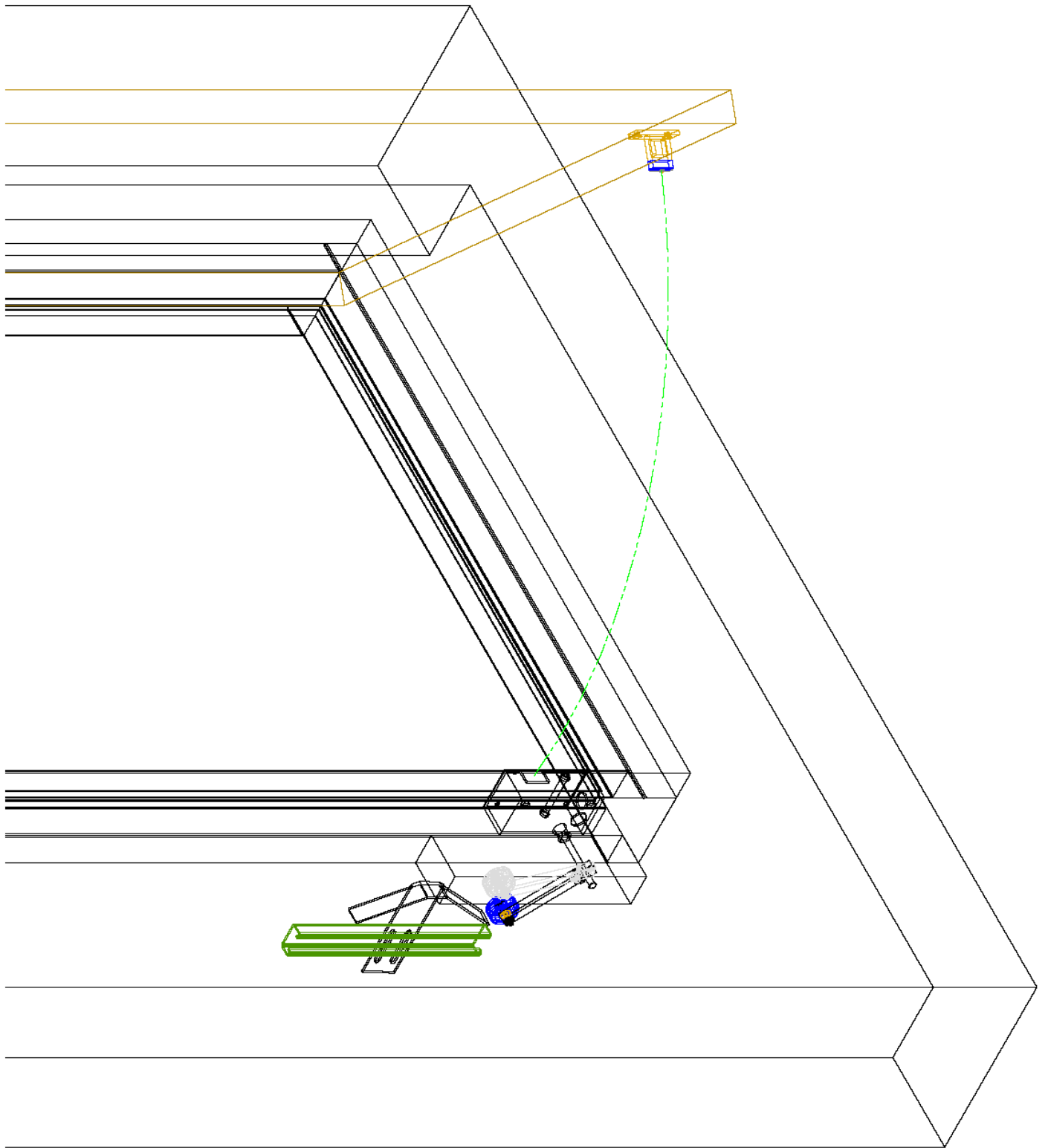


Figure 10D

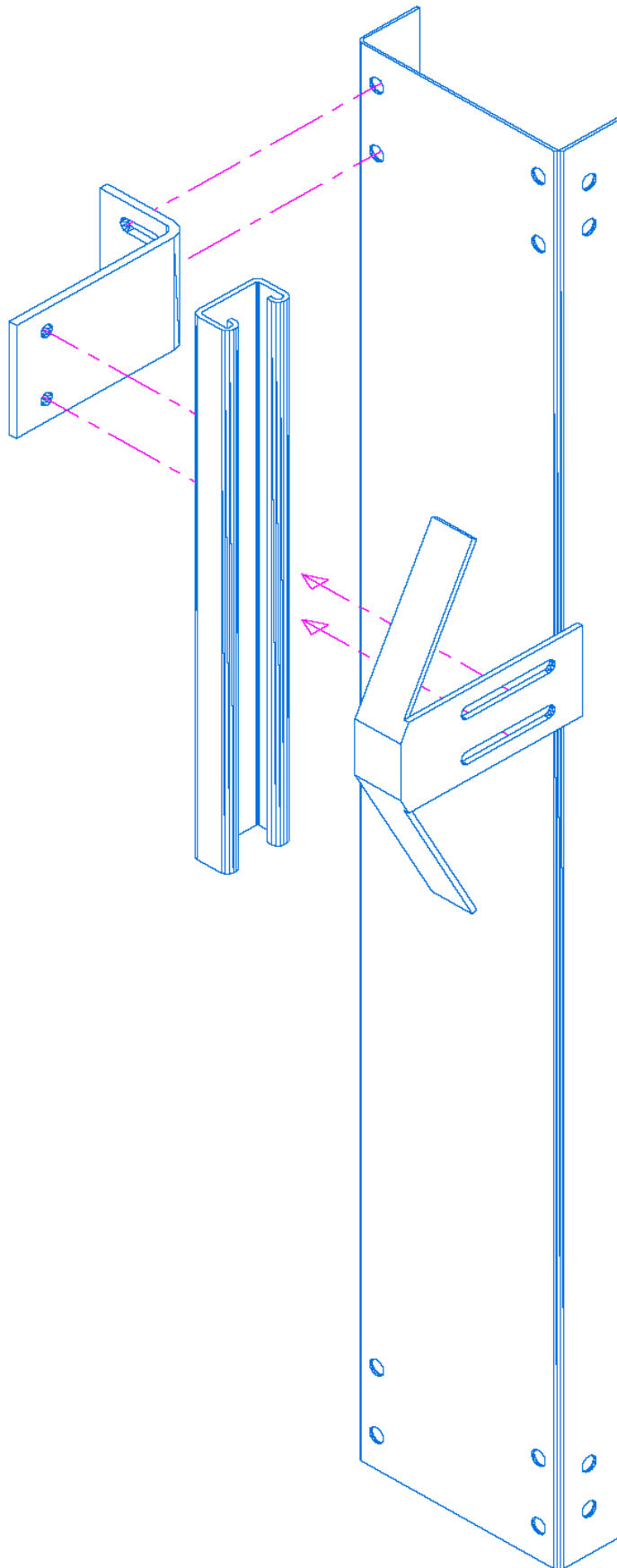


Figure 10 E

DOOR

JAMB

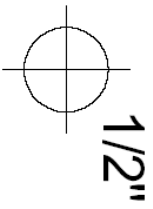
LS

JAMB

DOOR

FOLD

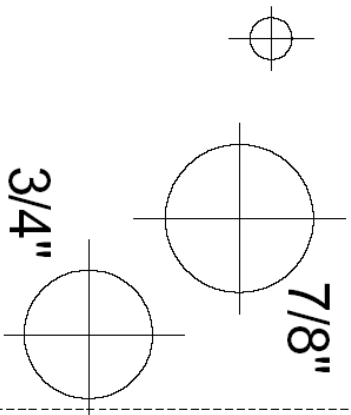
FOLD



1/2"



1/4" -
2 plcs



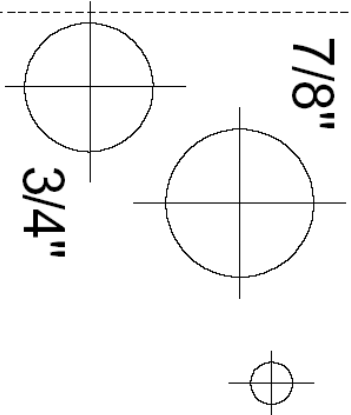
7/8"



3/4"

LH LOCK

To suit lock
mntng screws
2 plcs



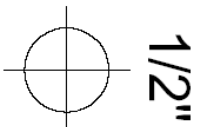
7/8"



3/4"

RH LOCK

To suit lock
mntng screws
2 plcs



1/2"



1/4" -
2 plcs



GAL SM TEMPLATE

1. Cut template in half on the "cut" line.
2. Fold on the "fold" line - the printed sides of the page should touch.
3. Working from the inside of the hole(s), close the door.
4. Put the template at the top of the door jamb at the latch side of door.
5. The side of the template marked "door" should be touching the door.
6. The side that says "jamb" should be on the door jamb. The print should face you.
7. Tape the template in place.
8. Drill holes as per the indications on the template.

NOTE: The latch side of the door is where the lock goes. Lock hand is determined by looking at the door from outside of the doorway. Lock on the right = RH lock.

GAL SM TEMPLATE

1. Cut template in half on the "cut" line.
2. Fold on the "fold" line - the printed sides of the page should touch.
3. Working from the inside of the hole(s), close the door.
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NOTE: The latch side of the door is where the lock goes. Lock hand is determined by looking at the door from outside of the doorway. Lock on the right = RH lock.

DW1c CONTROLLER

PRODUCT DESCRIPTION

The DW1 series of controllers are designed for single speed AC motors up to ¼ horsepower, and 2 or 3 stops in residential applications. Version 1a provides for a non-interference timer for the call circuit and 24VDC auxiliary contactor connections for larger motors. They provide single button automatic operation and provisions for electric door strikes. The control logic operates at 24 VDC, provided by an on-board bridge rectifier. The input voltage, as well as the output section for motor is 120 VAC. The control relays and terminals are all contained in a compact printed circuit board. A brief description of the operation follows.

The final limit and door safety circuits must be complete for any control operation to occur. With these circuits complete, power is available to the call buttons (terminal 11A). Pushing a call button will turn on the corresponding floor relay, unless the car is at that floor, causing the floor switch to be open. A self holding floor relay contact holds the floor relay in until the limit switch is opened. Another floor relay contact will bring in the pilot relays (U or D), along with the power relays (UC or DC), operating the hoist motor.

A second set of limit contacts can be utilized to power the solenoid of an electric lock. There are provisions on the board for a coil-saver timer. After the call has been completed, the NIT timer starts. After it reaches its preset time (adjustable with DIP switches), it picks NI1, which in turn drops NI2, and removes power from the solenoid.

INSTALLATION:

→ IF YOU ARE UNFAMILIAR WITH ELEVATOR CONTROLS, PLEASE SEE THE DETAILED WIRING INSTRUCTIONS SECTION

1. Typical tools used: Screwdrivers, 7/8" knockout punch or drillbit (step type drill -"unitbit"), wire cutters, wire strippers, crimp tool, multimeter, hacksaw and conduit bender (if conduit required by code)
2. Mount the controller in a secure location, where it will not be subject to adverse environmental conditions. Be sure to consider code required clearances and wire or conduit entrance locations when choosing a mounting location. Some installers do not mount the controller, but leave it on the floor of the hoistway with enough extra wire to pull it out into the hallway for easy access.
3. When mounting the controller and cutting wire or conduit holes, it is a good idea to remove the panel from the box. Keep the components covered to prevent chips from causing shorts.
4. Verify the incoming power with a meter before making any connections.
5. Make sure the controller cabinet is properly grounded according to all applicable codes.
6. Before connecting any field wiring, power up the controller. Check for 120 VAC at terminals L1 and N.
7. Connect the field devices as per the print. When complete, check to make sure that none of the controller terminals are short to ground except for N. Connect the motor and brake. If equipped with the NIT timer, check the timer setting; use 60 seconds to start.

At this point you are ready to test automatic operation. Register a call, and verify that the car travels in the proper direction, and stops at or near the landing.

FINAL CHECKS:

1. Verify the correct operation of these safety circuits:
 - A. Final limits
 - B. Door locks
 - C. Floor limits

DO NOT PLACE CAR IN SERVICE IF ANY SAFETY CIRCUIT DOES NOT OPERATE!

DETAILED WIRING INSTRUCTIONS

These instructions provide a step-by-step method of connecting and testing each circuit in a logical order. You will need wiring diagrams, wiring tools, a multimeter and a helper. Make sure that each circuit functions as indicated before moving on to the next circuit. ALWAYS VERIFY STATUS OF INCOMING POWER!

1. Connect the final limits and slack cable switch between 1 and 2: The final limits are the very top and very bottom switches. **This circuit is line voltage; 14 gauge wire is required.**
 - Connect control terminal 1 to contact 21 in the bottom final
 - Connect contact 22 in the bottom final to contact 21 in the top final
 - Connect contact 22 in the top final to contact 13 in the slack cable switch
 - Connect contact 14 in the slack cable switch to control terminal 2

After the connections are made, set up a multimeter to check continuity. Measure between control terminals 1 and 2; you should have continuity (note that the slack cable switch must be engaged on the cable as it is wired normally open). Now have a helper actuate the bottom final; you should lose continuity. Release the bottom final and continuity should return. Actuate the top final; you should lose continuity. Release the top final and continuity should return. Do the same with the slack cable switch.

2. Connect the incoming power between control terminals L1 and N. Ground the control box. Turn on the power. Set up the meter to check AC voltage. Measure between L1 and N; you should have 120 VAC. If not, verify the power source. Next, measure between 1 and N. If you have power at L1 and N but not 1 and N, fuse F1 is bad. Next, measure between 2 and N. If you have power at 1 and N but not 2 and N, a final limit/slack cable switch is actuated, or there are wiring problems with the circuit. Next, while still measuring between 2 and N, actuate each switch; the voltage should go to zero. If not, there is a wiring problem in the circuit. Turn off the power.
3. This instruction is based on motor #2H612: There are 8 motor wires – 6 winding leads and 2 capacitor leads, and 2 brake wires for a total of 10 wires.

AT THE MOTOR:

- Open the wiring junction box on the motor; separate any wires that may be connected together.
- Route the 2 brake wires into the wiring junction box
- Locate the 2 capacitor leads
- Install a 1/2" greenfield connector in the motor wiring junction box
- Cut a piece of 1/2" greenfield to the length you want between the motor and control box location
- Cut a piece of the 8 conductor multicable about 18" longer than the greenfield, and thread it through
- Insert the multicable and the greenfield through the connector, tighten the connector
- Using a wire nut, connect 1 brake lead (doesn't matter which), 1 capacitor lead (doesn't matter which) and the white motor lead to the white multicable lead
- Wire nut the other brake lead and the black motor lead to the black multicable lead
- Wire nut the other capacitor lead to the blue multicable lead
- Wire nut the yellow motor lead to the yellow multicable lead
- Wire nut the orange motor lead to the orange multicable lead
- Wire nut the brown motor lead to the brown multicable lead
- Wire nut the red motor lead to the red multicable lead
- Connect the green multicable lead to the grounding screw in the junction box

IN THE CONTROLLER:

- Drill or punch a 7/8 hole in the control box
- Install a 1/2" greenfield (flexible conduit) connector in the hole
- Insert the multicable and the greenfield through the connector, tighten the connector
- Trim the multicable if necessary
- Connect white to 3 (which is tied to N on the board)
- Connect yellow to 4
- Connect orange to 5
- Connect black to 6
- Connect brown to 7
- Connect blue to 8
- Connect green to ground
- Do not connect red; insulate the end (tape or wire nut)

4. Set up the multimeter to measure DC. Turn on the power and measure between 10 and 26 (there are several terminals labeled 26; they are the same electrically); it should read around 36 VDC. If not, check fuse F2 and F3. If those fuse are good and still no power, recheck steps 1 & 2.
5. The dumbwaiter should be connected to the machine, and free to run up and down. Move and hold the bypass toggle switch on the controller to BYPASS – the DOOR led should come on. Momentarily move the other switch to UP. The UP led should come on and the machine should run in the up direction. If the machine runs in the wrong direction, reverse the yellow and orange wires. Momentarily move the switch to DOWN. The DOWN led should come on and the machine should run in the down direction. Release the bypass switch and turn off power.
6. Connect top floor switch: (also see step 29 if you have electric locks)
 - Connect control terminal 13a to floor switch contact 21
 - Connect control terminal 13 to floor switch contact 22
 - Set meter to check continuity; check between 12 and 13, should have continuity
 - Have a helper manually actuate switch, should lose continuity between 12 and 13
7. Connect bottom floor switch : (also see step 29 if you have electric locks)
 - Connect control terminal 19a to floor switch contact 21
 - Connect control terminal 19 to floor switch contact 22
 - Set meter to check continuity; check between 18 and 19, should have continuity
 - Have a helper manually actuate switch , should lose continuity between 18 and 19
8. Position the car between the top and bottom landing. Turn on the power. Hold the bypass switch to BYPASS, and using a short piece of wire momentarily jump between terminals 11 and 12. The car should run up. Have a helper manually actuate the top floor floor switch about 1 second after the car starts running. Car should stop; if not recheck step 6. Release the bypass switch
9. Hold the bypass switch to BYPASS, and using a short piece of wire momentarily jump between terminals 11 and 18. The car should run down. Have a helper manually actuate the bottom floor switch about 1 second after the car starts running. Car should stop; if not recheck step 7. Release the bypass switch
10. Use the BYPASS and UP button to bring the car to the position where it should stop at the top floor. Check for continuity between 13a and 13, should NOT have continuity. If you do, adjust the limit.
11. Use the BYPASS and DN button to bring the car to the position where it should stop at the bottom floor. Check for continuity between 19a and 19, should NOT have continuity. If you do, adjust the limit.
12. Hold the bypass switch to BYPASS, and using a short piece of wire momentarily jump between terminals 11 and 12. The car should run up and stop at the top floor.
13. Hold the bypass switch to BYPASS, and using a short piece of wire momentarily jump between terminals 11 and 18. The car should run down and stop and the bottom floor.

STEPS 14 – 18 ONLY APPLY IF THERE IS AN INTERMEDIATE STOP. REMOVE POWER FIRST

14. Connect intermediate floor limits (there are two switches at the intermediate floor, called lower and upper herein):
 - Connect control terminal 16a to contact 21 of both middle floor switches
 - Connect control terminal 16 to contact 22 of both middle floor switches
 - Set meter to check continuity; check between 16a and 16, should have continuity
 - Have a helper manually actuate both limits individually, should have continuity between 16a and 16
 - Have a helper manually actuate both limits simultaneously, should lose continuity between 16a and 16.
15. Connect intermediate floor direction signal (also see step 29 if you have electric locks)
 - Connect control terminal 21 to contact 13 of middle floor switch B (lower)
 - Connect control terminal 22 to contact 14 of middle floor switch B (lower)
 - Set meter to check continuity; check between 21 and 22, should NOT have continuity
 - Have a helper manually actuate upper intermediate limit, should have continuity between 21 and 22

16. Turn on power and position car where it should stop at the intermediate landing
 - Check for continuity between 16a and 16; should NOT have continuity. If you do, adjust switches
 - Check for continuity between 21 and 22; should have continuity. If not, adjust lower switches.
17. Use the BYPASS and DOWN switch to bring the car about 3 feet below the intermediate landing. Now hold the bypass switch at BYPASS and momentarily jump between 11 and 15. The car should run up and stop at the intermediate landing. Release BYPASS. Recheck steps 15 and 16 if problems.
18. Use the BYPASS and UP switch to bring the car about 3 feet above the intermediate landing. Now hold the bypass switch at BYPASS and momentarily jump between 11 and 15. The car should run down and stop at the intermediate landing. Release BYPASS. Recheck steps 15 and 16 if problems.
19. Connect control terminal 11A to the common terminal of all call buttons
20. Connect control terminal 12 to the NO terminal of the top button at each floor
21. Connect control terminal 15 to the NO terminal of the middle button at each floor (if there is an intermediate floor)
22. Connect control terminal 18 to the NO terminal of the bottom button at each floor.
23. Hold the bypass switch to BYPASS, and have a helper try each button at each floor, one at a time. If there are problems, recheck steps 19 – 22.
24. Connect control terminal 10 to one contact of the bottom doorlock
25. Connect control terminal 11 to one contact of the top doorlock
26. Connect the other contact of the bottom doorlock to the other contact of the top doorlock unless there is an intermediate floor; in that case connect to a contact of the intermediate floor doorlock,
27. If there is an intermediate floor, connect the other contact of the intermediate floor doorlock to the other contact of the top floor doorlock.
28. With the keepers installed on the doors, close all the doors. The DOOR led should come on. Have the emergency release holes drilled before installing the keepers.
29. If using electric strikes:
 - Connect the common side of the solenoid for all strikes to control terminal 26
 - Connect the other side of the bottom floor solenoid to control terminal 20b
 - Connect the other side of the intermediate floor solenoid to control terminal 17b
 - Connect the other side of the top floor solenoid to control terminal 14b
 - Connect contact 13 of the bottom floor switch to control terminal 20
 - Connect contact 13 of the middle floor switch B (lower) to control terminal 17
 - Connect contact 13 of the top floor switch to control terminal 14
 - Connect contact 14 of the bottom floor switch to control terminal 20a
 - Connect contact 14 of the lower intermediate floor limit to control terminal 17a
 - Connect contact 14 of the top floor limit to control terminal 14a
30. To test electric strike solenoids, install jumper J1 on board. Manually actuate each floor limit; strike should activate. Check setting of jumpers J1, J2, and J3.

TROUBLESHOOTING:

The DW1 is simple to troubleshoot. Most problems can be found in just a few minutes. The detailed wiring instructions above also give some troubleshooting tips.

1. No function:
 - Check incoming power
 - Check F1 fuse
 - Check final limit / slack cable circuit (terminals 1 & 2)
2. F1 fuse blows: If it blows immediately, indicates a problem with the final limit circuit the motor contactors. If it blows when trying to run, indicates a motor problem – make sure the brake is adjusted and picking before suspecting the motor itself. Also make sure the car is not bound up or overloaded.
3. F2 fuse blows: indicates a problem with the transformer
4. F3 fuse blows: indicates a problem with door low voltage wiring or circuit board traces and/or relays
5. F4 fuse blows: indicates a problem with the electric lock circuit
6. 120VAC between 2 and N, fuses good but no function: Check for 24 VDC between 10 and 26. If not, indicates problem with transformer or bridge rectifier.
7. Motor only hums:
 - Check that brake is picking; check by manually releasing brake to see if motor starts
 - Check that car is not overloaded or hung up
 - Check capacitor connections
 - Check start winding connections (yellow and orange)
 - Check UC and DC relay contacts for damage
8. Call buttons don't work:
 - Check door locks (DOOR led must be on for buttons to work)
 - Check that J3 is installed
 - If J3 installed to NIT, check that timer setting
 - Jump between 11 and 12 (top floor), or 11 and 15 (middle floor), or 11 and 18 (bottom floor). If this works, problem is in call button or wiring to call buttons.
9. Car won't stop at floor:
 - Check that limit switch is mechanically opening – adjust cam and/or switch if required
 - Check that limit switch is electrically opening
 - Check that J3 is installed to NIT (pins 1 & 2), and timer is set for 1 second or more
 - Check that brake is setting and holding

These suggestions are simply a guide to developing troubleshooting procedures. They are not a replacement for skill required to properly install and maintain elevator control systems. Only qualified elevator personnel should attempt to install, troubleshoot or repair elevator control systems. If you have any questions regarding this control system, please contact us.

DW1 CONTROLLER DESIGNATIONS

CONTROL RELAYS:

U	Up pilot
D	Down pilot
UC	Up contactor
DC	Down contactor
1/2/3	Call relays
2UD	Direction selection latching relay
NIT	Non interference timer
NI1	NIT timer relay 1
NI2	NIT timer relay 2 (electric solenoid power)
DRO	Door re-open

BOARD COMPONENT LIST

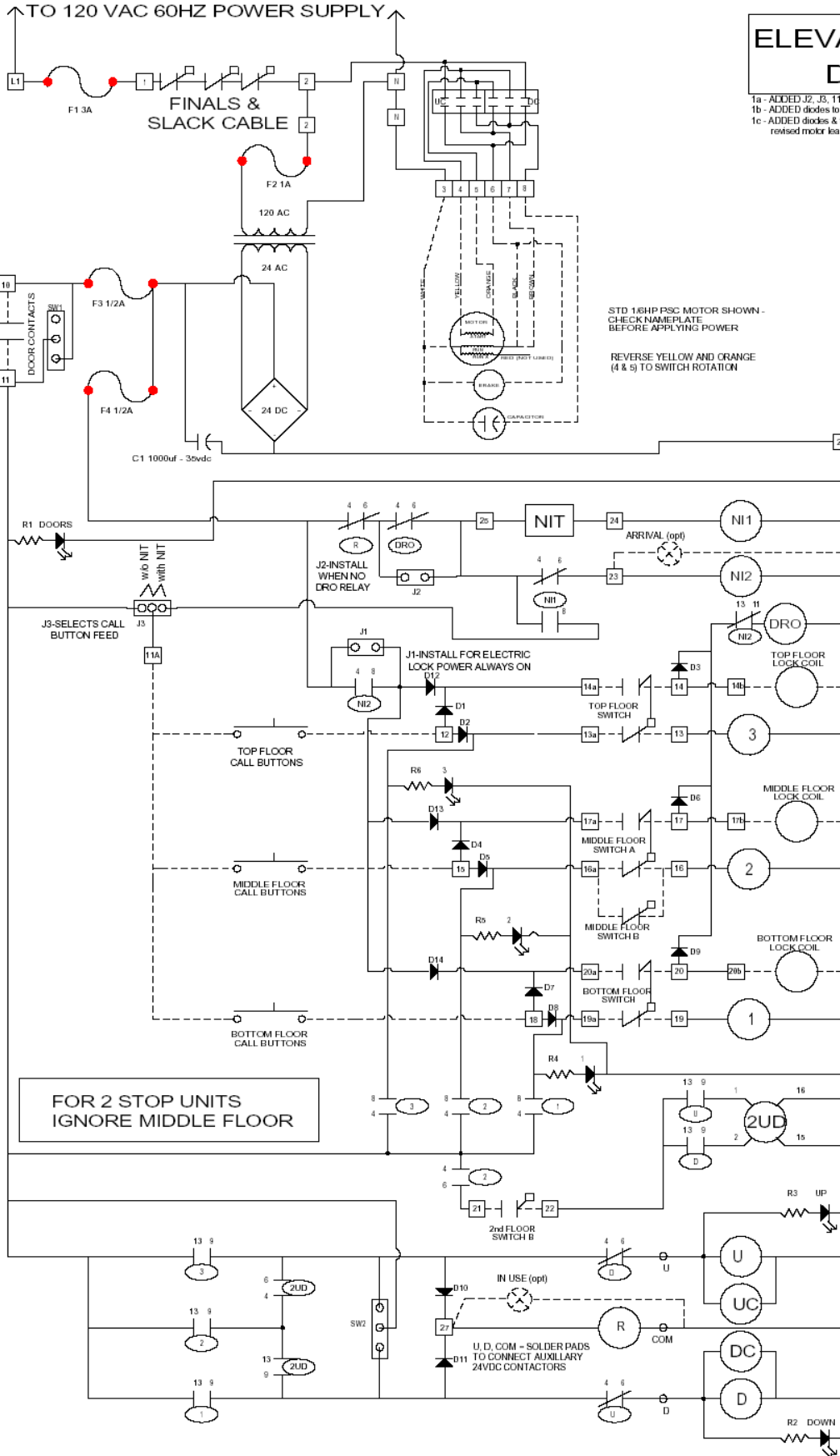
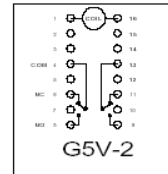
NAME	MFGR DESCRIPTION	PART #	@ BOARD
DIODE	1N914	CNT-2504	8
DIODE	IN4003	CNT-2506	2
CAPACITOR #1	MALLORY 1100 35V SKR102M1VJ21V	LVL-2006	OPTIONAL
RECTIFIER	VM48 9112 MQSI COLLMER DF005	LVL-2008	1
3 POLE TERM	WECO 940-T-DS/O3	LVL-2012	14
FUSE CLIP	LITTLEFUSE 102071	LVL-2013	2
DIP SOCKET	AUGAT 316-AG19DC	LVL-2015	16
CONTACTOR SOCKET	OMRON PT11-0	CNT-2342	2
CONTACTOR	OMRON LY3-DC23	CNT-2341	2
RELAY	OMRON G5V-2-DC24	CNT-2311	Varies
LATCH RELAY	OMRON G6AK 234P ST US 24DC	CNT-2312	1 if req'd
FUSE 1	AGC 3	CNT-1105	1
FUSE 2	AGC 1	CNT-1103	1
FUSE 3 & 4	AGC 1/2	CNT-1102	2
LED	3mm RED	LVL-2010	6
RESISTOR	10K 1/4w 5%	LVL-2009	6

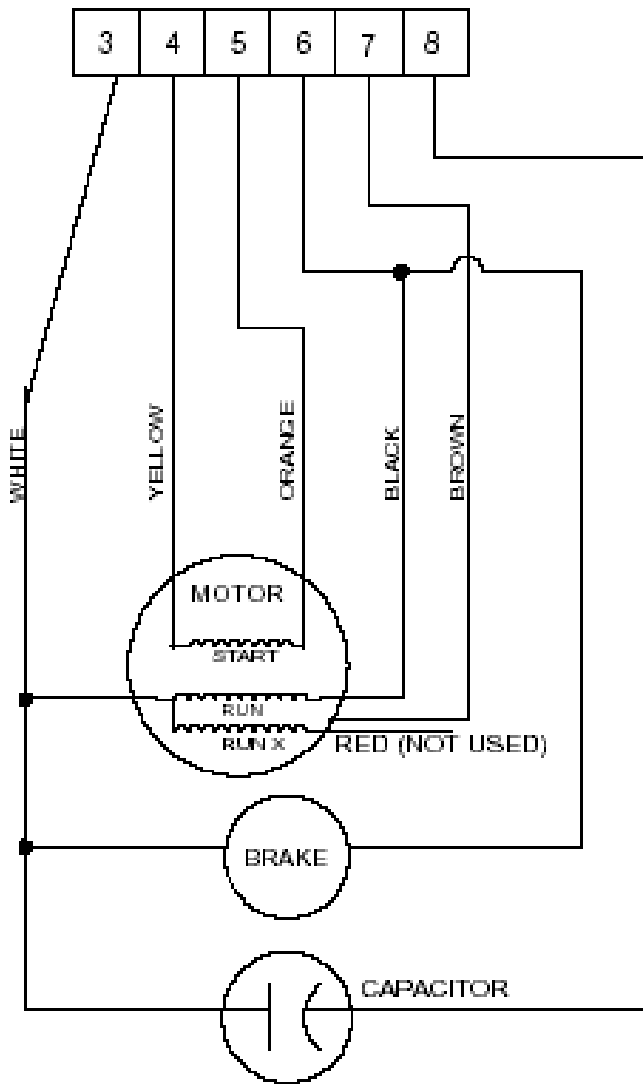
ELEVATOR CONCEPTS DW1c - 5/26/2003

1a - ADDED J2, J3, 11A, U, D, & COM pads
 1b - ADDED diodes to prevent call button feedback
 1c - ADDED diodes & terminals for latch sensing locks, relocate arrival & in use
 revised motr. leads (N connected to 3)

LEGEND

	RELAY COIL
	TERMINAL
	RELAY CONTACT
	LIMIT SWITCH
	TIMER MODULE
	FIELD WIRING
	BOARD TRACES





**STANDARD 1/6 HP MOTOR
SHOWN
BISON #016-656-0116
GRAINGER #2H612**

**CHECK NAMEPLATE
BEFORE APPLYING POWER**

**SWITCH YELLOW & ORANGE
(4 & 5) TO REVERSE ROTATION**

BRAKE AND CAPACITOR LEADS NOT POLARIZED

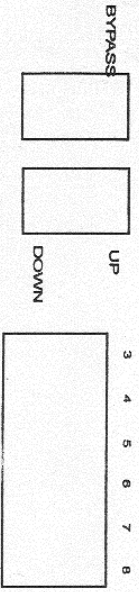
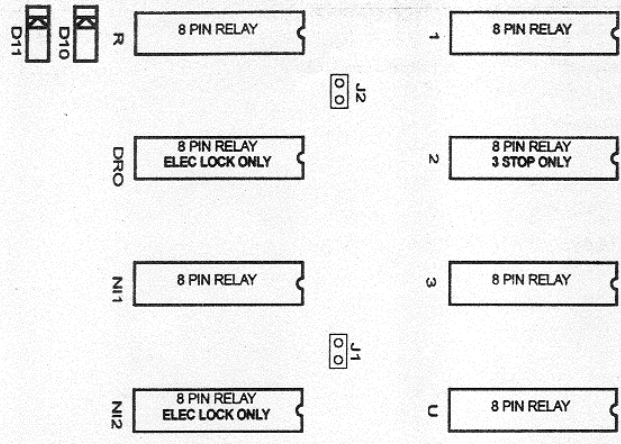
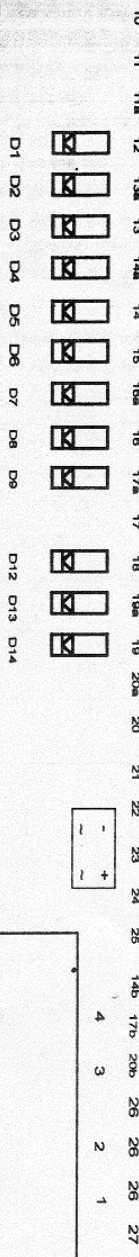
REMOVE ANY WIRENUTS IN MOTOR JUNCTION BOX EXCEPT:

- >ISOLATING WIRENUT FOR RED LEAD
- >CONNECTION FROM ONE SIDE OF CAPACITOR TO WHITE.

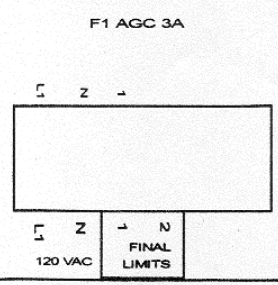
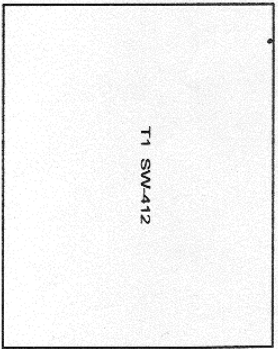
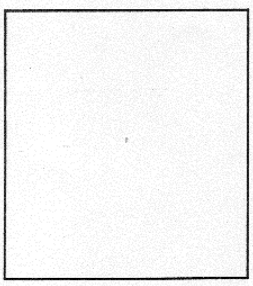
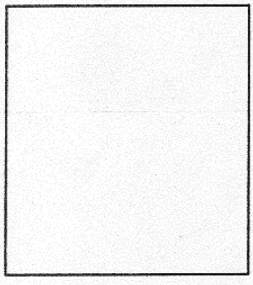
J3-1&2 FOR NIT / 2&3 NO NIT
 J2-INSTALL WHEN NO DRO RELAY
 J1-DOORLOCK POWER ALWAYS ON

1 2 3
 0 0 0

10	DOORS
11	BUTTON FEED
11A	TOPFLR
12	BUTTON
13a	LMT 21
13	TOPFLR
14a	LMT 13
14	TOPFLR
15	MIDFLR
15a	BUTTON
16a	LMT 21
16	MIDFLR
17a	LMT 22
17	MIDFLR
17a	LMT 13
17	MIDFLR
17	LMT 14
18	BTMFLR
18	BUTTON
19a	LMT 21
19	BTMFLR
19	LMT 22
20a	LMT 13
20	BTMFLR
20	LMT 14
21	MIDFLR
21	LMT 13
22	MIDFLR
22	LMT 14
23	ARRIV
24	TIMER
25	TOPFLR
14b	DL SOL
17b	MIDFLR
17b	DL SOL
20b	BTMFLR
20b	DL SOL
26	COM
26	26
26	26
27	IN USE

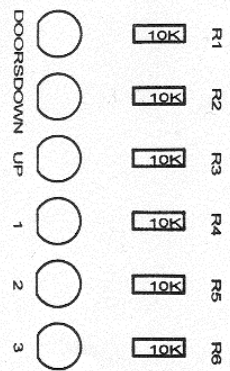


RTD 1/8 HP PEG MOTOR COLOR CODE BROWN
 CHECK NAMEPLATE & WIRING DIAGRAMS
 BEFORE APPLYING POWER



DUMBWATER CONTROLLER VER DW1C
 ELEVATOR CONCEPTS LTD
 18720 KRAUSE
 RIVERVIEW MI 48192
 734-246-4700
 www.elevatorconcepts.com

DATE S/N#



DW2 PLC CONTROLLER

The PLC series of controllers are designed for single speed AC dumbwaiters, generally for 4 or more stops. They can be configured for a wide variety of functions, including single button or collective automatic operation and provisions electric door locks. The control logic operates at 24 VDC, provided by the PLC or auxiliary power supply. The input voltage, as well the output section for contactors, motor and brake 120 VAC. The PLC is factory programmed, and can be reprogrammed in the field with a laptop computer, a communications cable, and the appropriate software. The few external relays and terminals are hardwired. A brief description of the operation follows. The contactors cannot be energized unless the door lock circuit is made up, which is totally independent of PLC operation. When the PLC is first powered up, it will signal to descend to the lowest landing to establish its position. Once position has been established, pushing a call button will send the car to the floor, unless the car is at that floor.

INITIAL INSTALLATION:

1. Mount the controller in a secure location, where it will not be subject to adverse environmental conditions. Be sure to consider code required clearances and conduit entrance locations when choosing a mounting location.
2. MAKE SURE NO METAL CHIPS OR OTHER DEBRIS FALL IN PLC WHEN WORKING IN CONTROLLER!
3. When mounting the controller and cutting conduit holes,, it is a good idea to remove the panel from the box. Keep the components covered to prevent chips from causing shorts.
4. Verify the incoming power with a meter before making any connections.
5. Make sure the controller cabinet is properly grounded according to all applicable codes.
6. Make sure the controller transformer (if used) input jumpers are correctly configured for your incoming voltage before applying power.
7. Before connecting any field wiring, power up the controller. Check for appropriate voltage at the PLC input, and at the 24DC terminals at the PLC output. Also check for 24 VDC at the + and - terminals.
8. Connect the field devices as per the print. Avoid running control wiring near high energy wiring. When complete, check to make sure that none of the controller terminals are short to ground. The DC common terminal (-) SHOULD NOT be grounded. If it is grounded, it will blow the fuse.
9. Connect the motor (and brake where applicable). You can check rotation manually engaging the contactors.
10. At this point you are ready to test automatic operation. When the door circuit made, the car will run down to the lowest landing, unless it is already there. The PLC is looking for the bottom limit to open to tell it is at the lowest landing. Once it has reached the lowest landing, register a call, and verify that the car travels in the proper direction, and stops at or near the landing.

FINAL CHECKS:

Verify the correct operation of these safety circuits:

- A. safety
- B. Car safety
- C. Gate
- D. Door
- E. Inspection

DO NOT PLACE CAR IN SERVICE IF ANY SAFETY CIRCUIT DOES NOT OPERATE!

Remove all safety circuit jumpers; set floor stops; set timers. Check all wiring connections for security.

TROUBLESHOOTING:

The PCL is simple to troubleshoot. Most problems can be found using a meter at the controller in just a few minutes.

1. Board fuse blows: Indicates part of the control circuit has grounded, or shorted. Use the ohmmeter to check between - and other terminals to locate the problem.
2. Controller does not have power: Check for blown fuses. Check for proper power at PLC power inputs and outputs. If you have power at the PLC input, but not the output, the internal power supply may be bad. You could still use the PLC with an external 24VDC power supply for the input section.
3. Car does not run: There are a multitude of reasons why the car will not run, most of which are external to the controller. First try running the car by manually engaging the contactors to rule out the motor, contactors, and brake. The easiest way to troubleshoot the DC logic section is to use the voltmeter. Set it to measure 24 VDC, and connect the common probe to -. Start checking terminals to verify you have power where you should. Verify power at each point before proceeding to the next. Double check all field wiring! Below is a suggested order, and where to look if there is no power at the terminal:
4. Make sure the car has seen the lowest landing after power up. The program will not run until it sees the lowest landing, which is accomplished by opening the bottom limit. On controllers built after 11-1-98, output 0 will flash to signal that the car is in lost car mode and needs to see the lowest landing. Manually position the car at the lowest landing, turn on the power, and check that the bottom floor limit input is off. If not, check the operation of the limit, and check wiring. You can temporarily jump the bottom limit input (usually X4 to +) to simulate.
5. Make sure that all limit switch inputs are ON, except for the floor that the car is at.
6. If an input doesn't work, check the input by jumping from it to the appropriate voltage source. NOTE THAT SOME INPUTS ARE COMMON TO +, AND OTHERS TO -. CHECK THE JOB PRINTS!
7. If an output LED comes on, but the output does not seem to function, check the output with a voltmeter when it is turned on. Make sure there is voltage at the common and at the contact. If there is voltage at the common but not the contact, the internal relay is probably bad. If there is no voltage at the common, look at the feed to the common.

These suggestions are simply a guide to developing troubleshooting procedures. They are not all-inclusive, and they are not a replacement for skill required to properly install and maintain complex elevator control systems. Only qualified elevator personnel should attempt to install, troubleshoot or repair elevator control systems. If you have any questions regarding this control system, please contact us.

STANDARD PLC CONTROLLER DESIGNATIONS

**NOTE: MOST RESIDENTIAL CONTROLS WILL NOT HAVE THESE DESIGNATIONS
NOT ALL DESIGNATIONS PRESENT ON ALL CONTROLLERS
HIGHLY CUSTOMIZED CONTROLS MAY HAVE DESIGNATIONS NOT LISTED HERE**

CONTROL RELAYS: (Terminals that match relay designations indicate the same function)

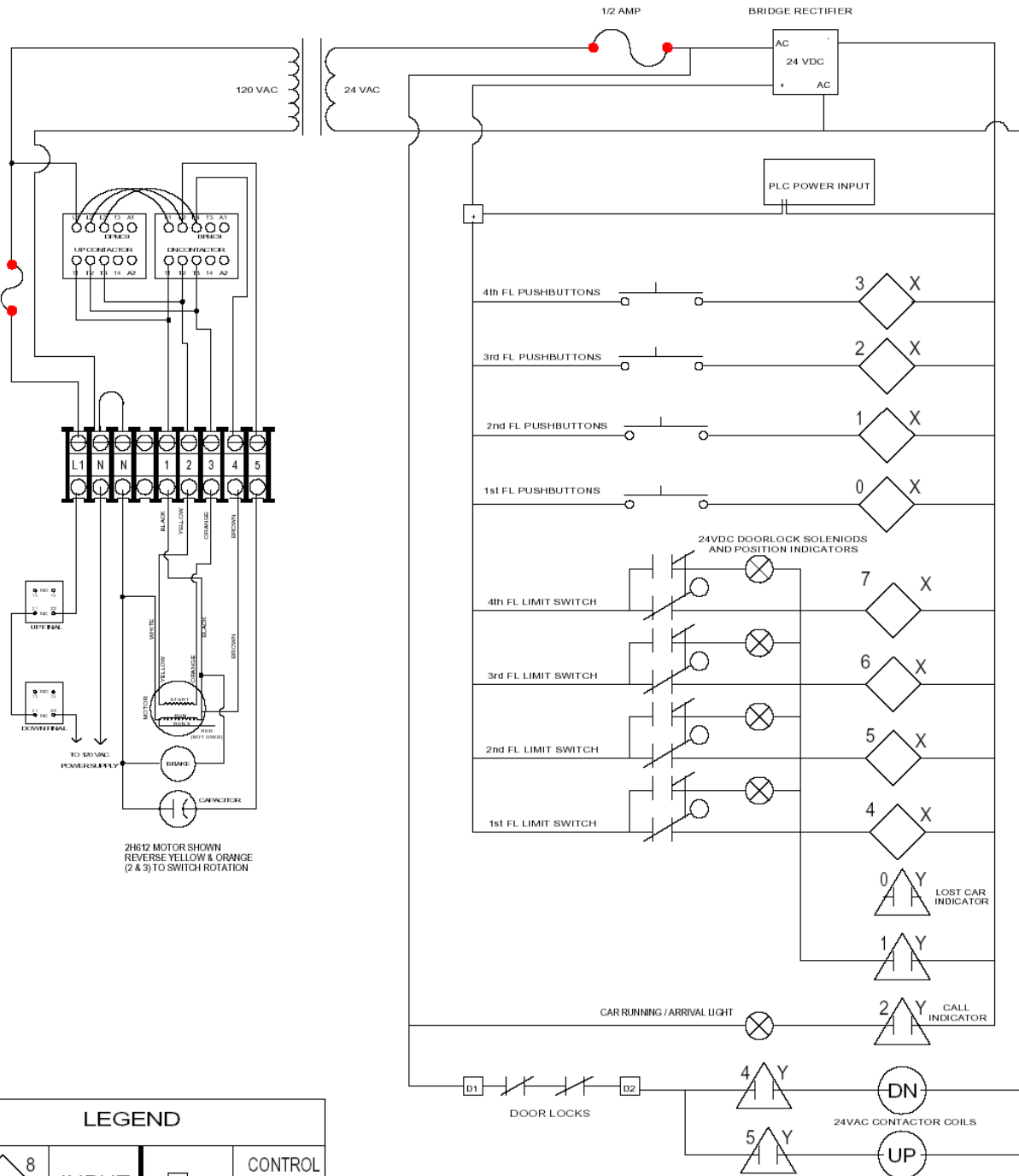
U	Up pilot	RUN	Run - not on inspection
D	Down pilot	FSB	Fire service buzzer
US	Up Contactor	STU/STU	Step up / step down
DS	Down Contactor	LU/LD	Level up / level down
UV	Up Valve	TR1/TR2	Up direction travel restriction device
DV	Down Valve		
HS/HSP	High Speed / High Speed Pilot		
DC	Doors close		
DO	Doors open		
O/C	Door direction pilot		
LE	Level enable		
RC/RCP	Retiring cam / Retiring Cam Pilot		
DZ	Door Zone relay		
DZR	Rear Door Zone		
NIT	Hall call delay module		
INSP	Inspection		
S/SAF	Safety string		
DSAF	Doors & gates closed		
DM	Door monitor		
FS	Fire service		
BYP	Fire service bypass		

Gate control relays:

O	Gate open relay
C	Gate close relay
SE	Safe edge relay
S	Front/rear selector relay

Other terminal designations:

24+	24 VDC control power supply - for logic
24-	24 VDC control power common
+	120 VAC control power supply
-	120 VAC control power common
HS	Hatch safety string
CS	Car safety string
GC/GL	Gate closed
DCL	Door closed
DL	Door locked
CPC	Control power car
CPH	Control power hall
LU	Level up
LD	Level down
LL1 & 2	Lower terminal limit
UL2 & 2	Upper terminal limit
1L	Lower floor switch (connect with 1)
2L	Intermediate floor switch (connect with 2)
3L	Upper floor switch (connect with 3)
DBZ	Door buzzer
OP	Gate open signal
CL	Gate close signal



LEGEND			
	INPUT		CONTROL TERMINAL
	COIL		LIMIT SWITCH
	OUTPUT		FIELD WIRE
	RELAY CONTACT		DOORLOCK SOLENOID

ELEVATOR CONCEPTS LTD

**4 STOP DUMBWAITER
MICROPROCESSOR
ELEMENTARY SCHEMATIC
24VAC CONTACTORS**

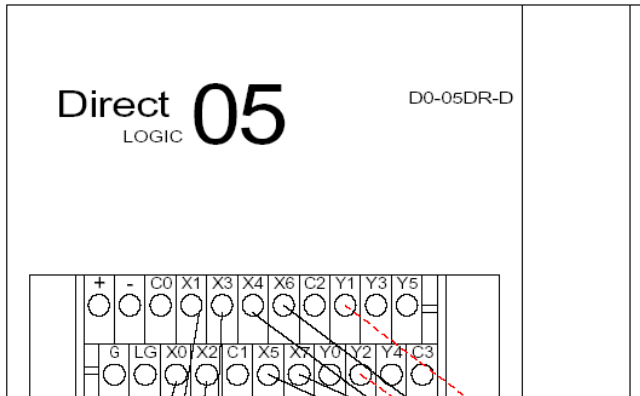
DWPLC24AC10-3-00

ELEVATOR CONCEPTS LTD

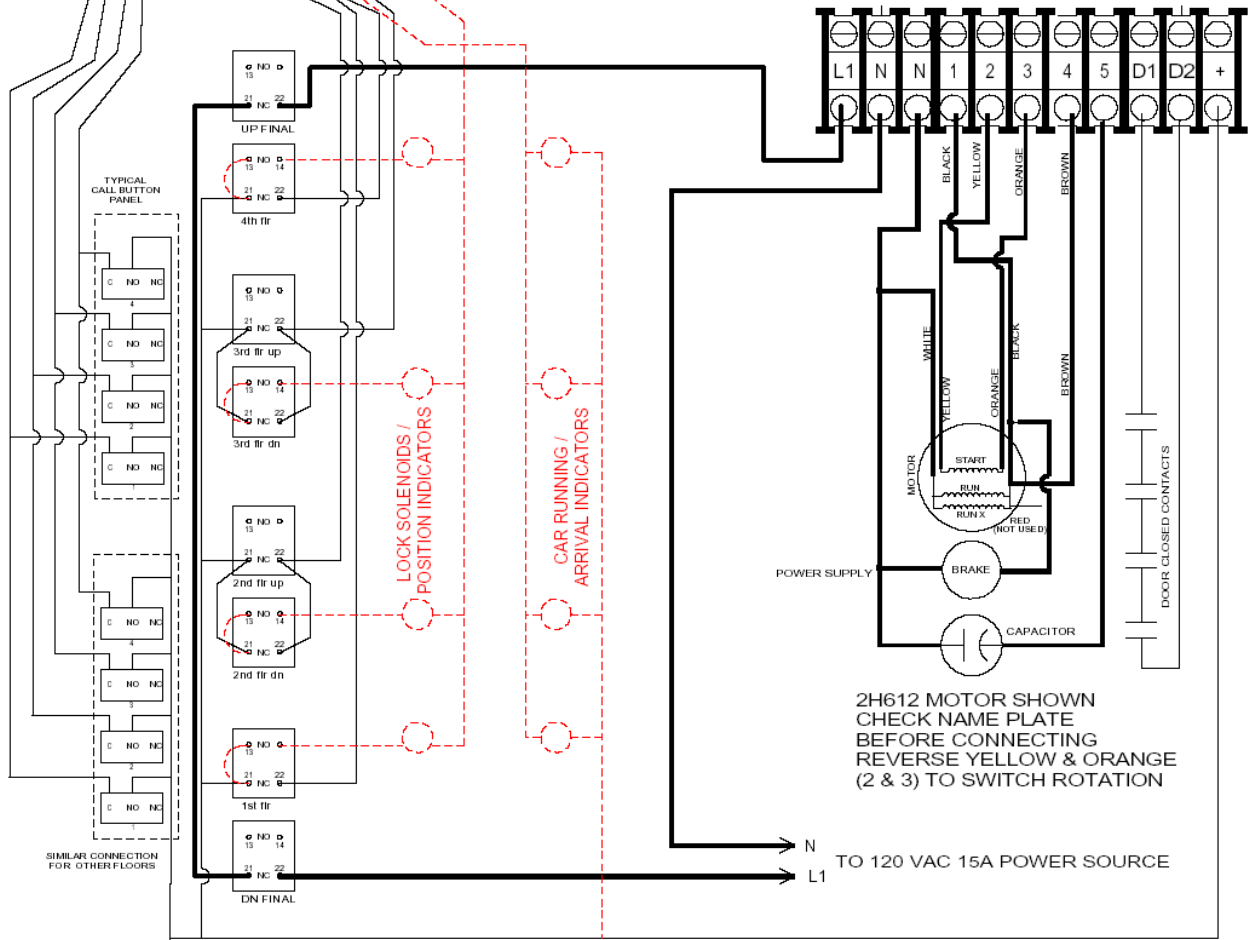
4 STOP DUMBWAITER
MICROPROCESSOR
FIELD HOOKUP DIAGRAM
24VAC or 24VDC CONTACTORS

DWPLCHU

10-3-00



- 120 VAC WIRING
- 24VDC WIRING
- OPTIONAL SIGNALS



ECL ELECTRIC DOOR LOCK INSTALLATION

1. Check that the doorlock is the correct hand. If it is not, it can be easily converted to the opposite hand. Also check that the controller is set up to supply 24 volts DC to the lock solenoid.
2. Determine where the top of the lock will be located. While the lock can be installed at any height, it is typically located near the top of the door; these directions are based on installation at the top. Allow ¼" between the door frame head jamb (or the head jamb stop if present) and the lock when installing at the top. See Fig 1 for a general side view layout.
3. If there is a stop on the side jamb, it either must be removed or spacers will have to be installed. See Fig 2A & 2B.
4. The last page of these instructions is a template. If you can work inside the shaft, simply follow the instructions on the template. If you cannot work inside, you will have to locate the "C" and "top" line on the door:

For doors that overlap the jamb: See Fig 3A & 3B. Measure the side overlap. Add the side overlap to 1-1/2". Measure that distance from the side edge of the door and draw a vertical line on the door ("C"). Draw the "top" line on the side jamb. Measure the top overlap. Measure from the top jamb to the "top" line, then add the top overlap to that distance. Measure the resulting distance from the top edge of the door and make a horizontal line ("top" line). Place the upper corner of the narrow side of the template at the intersection of the two lines. Tape the template to the door and mark the holes

For doors that are inside the jamb: See Fig 4A & 4B. Measure the side gap. Subtract the side gap from 1-1/2". Measure that distance from the side edge of the door and draw a vertical line on the door ("C"). Draw the "top" line on the side jamb. Measure the top gap. Measure from the top jamb to the "top" line, then subtract the top gap from that distance. Measure the resulting distance from the top edge of the door and make a horizontal line ("top" line). Place the upper corner of the narrow side of the template at the intersection of the two lines. Tape the template to the door and mark the holes

5. Drill holes as per the template. Attach the keeper to the door. Drill the ¼" release hole in the door, using the hole in the keeper flange and the top of the keeper as a guide – see Fig 5. Remove the keeper.
6. Install the doorlock. Before reinstalling the keeper, close the door and make sure you can release the latch manually – see Fig 6. NOTE: Once the keeper is installed, you will not be able to open the door unless you can release the latch manually or you can get inside the hoistway.
7. Reinstall the keeper. Close the door fully; the latch should engage the keeper and lock the door. Manually release the lock. If the door will not close and lock, the keeper is not located correctly in relation to the door. If you can get inside the hoistway you should be able to see the problem. If not, you will need move the keeper and/or doorlock until the door will close and lock. Shimming can sometimes correct the problem.
8. Connect wires to the doorlock. If you are surface mounting the wiring, you will have to notch the cover. See Fig 6 for terminal designations.
9. Apply 24volt DC to the solenoid and check for proper operation. If the lock is equipped with a "solenoid saver" switch, the solenoid will not operate until the switch is made by pulling the door open slightly. Check that the door closed / locked circuit is broken when the door is open.
10. Install cover and make a final check of operation.

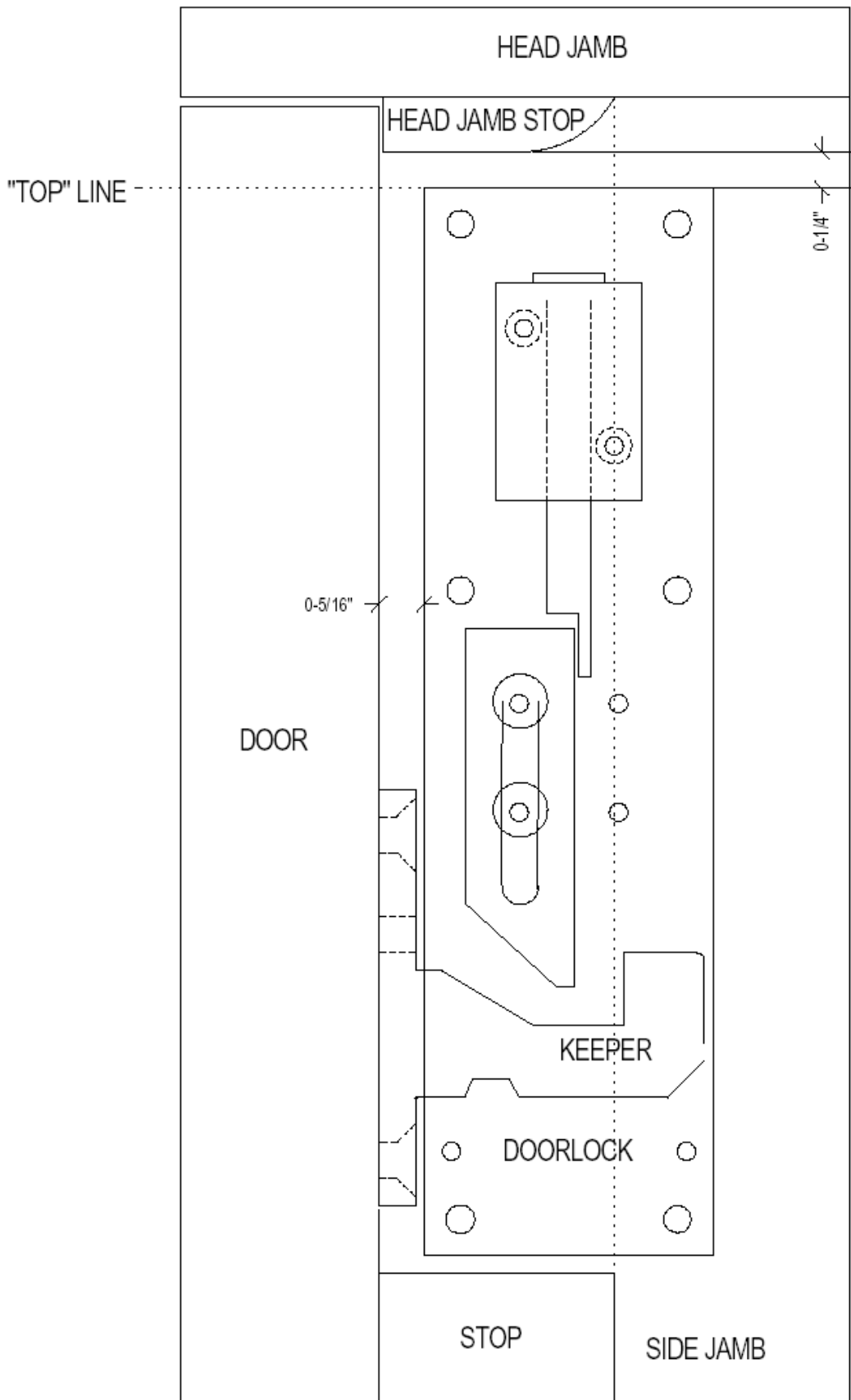


FIG 1

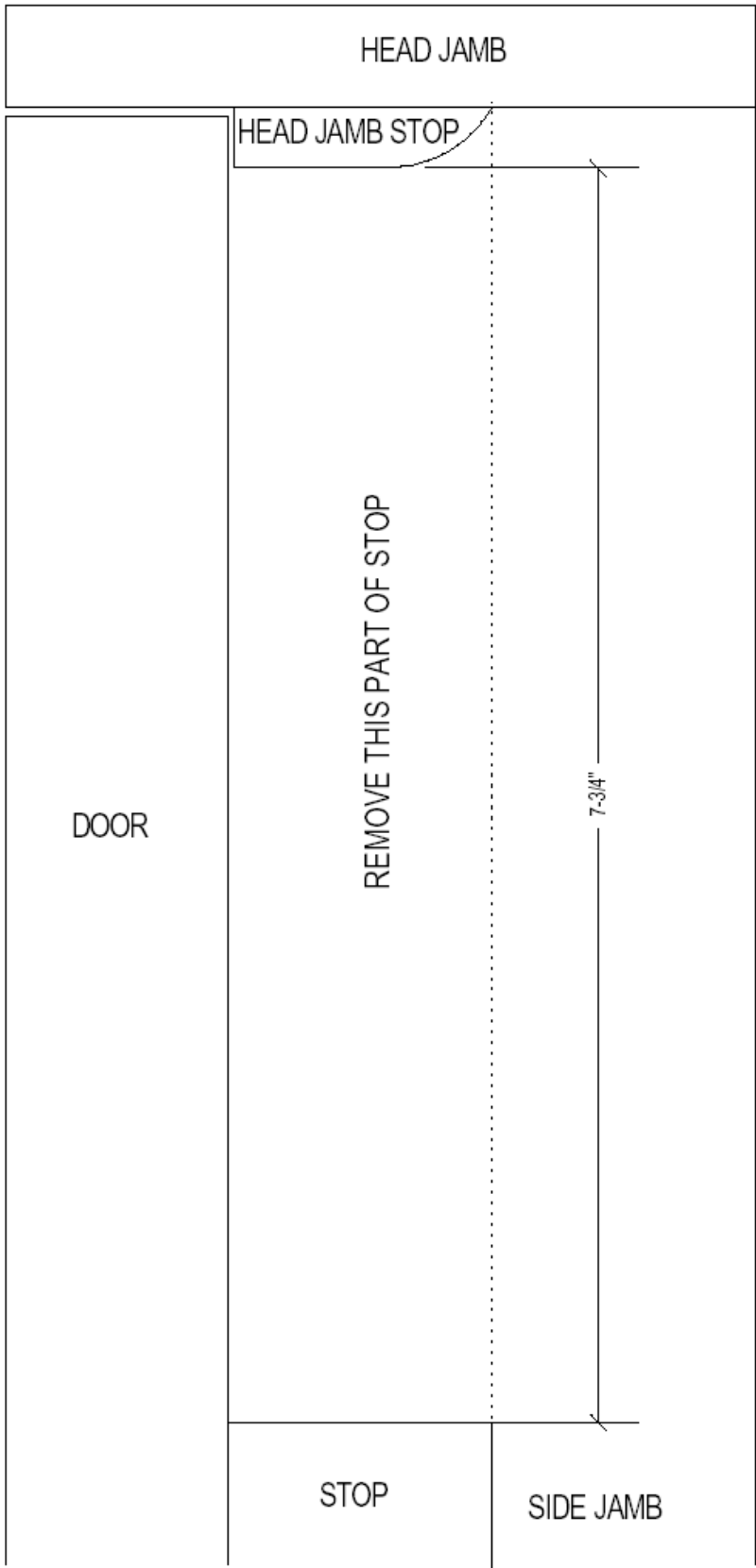


FIG 2A

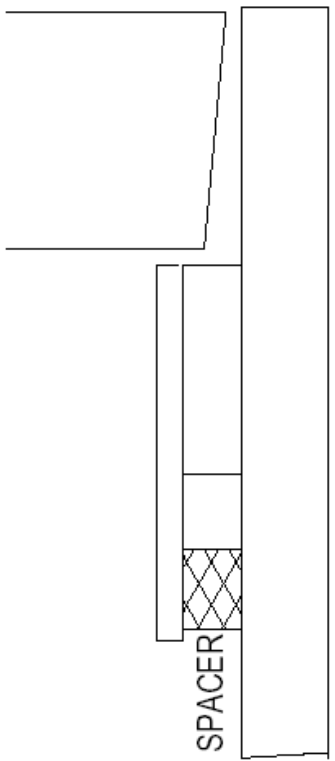
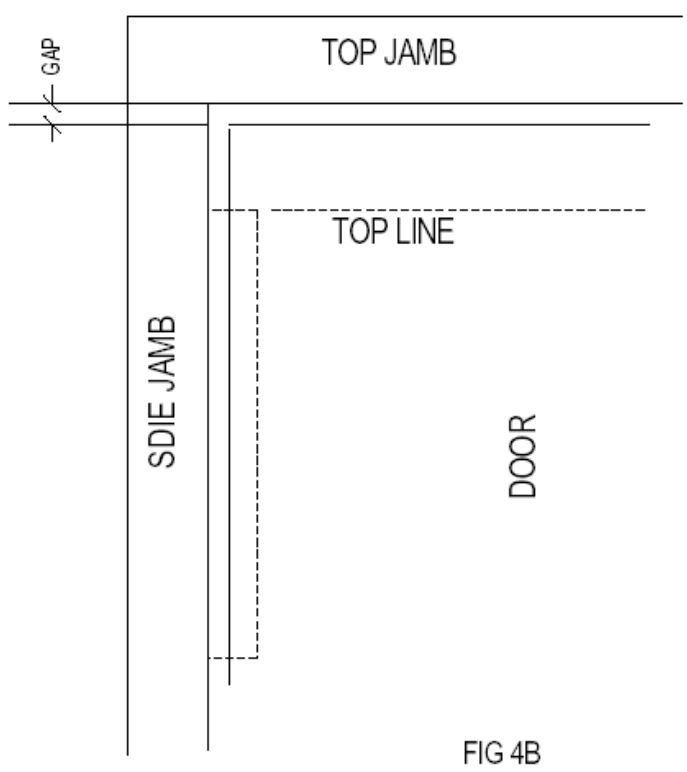
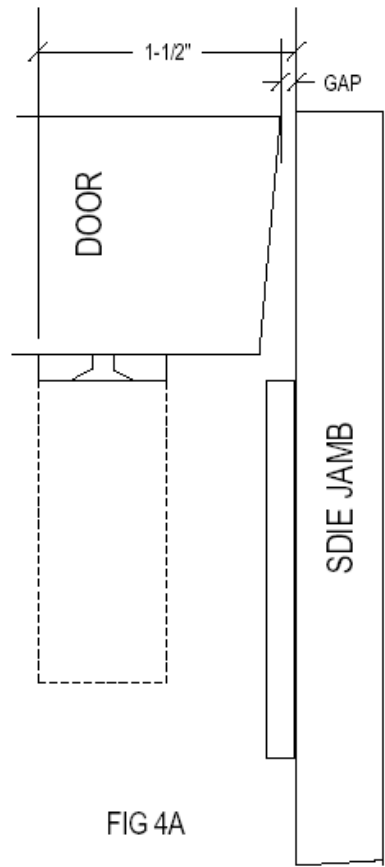
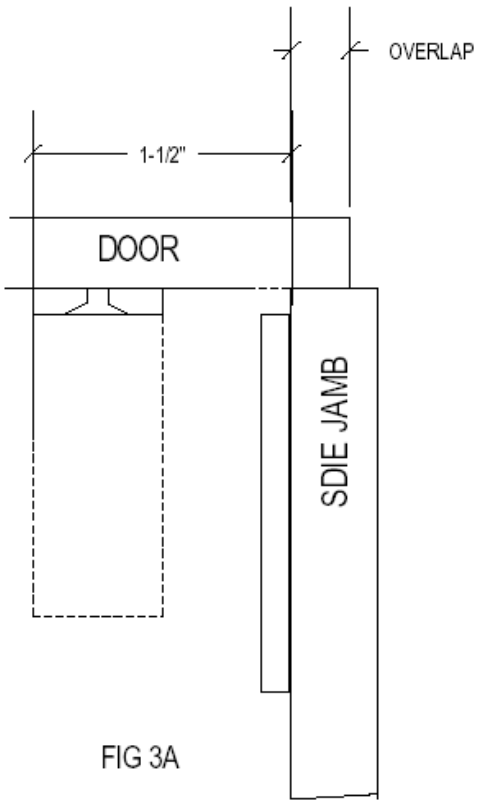
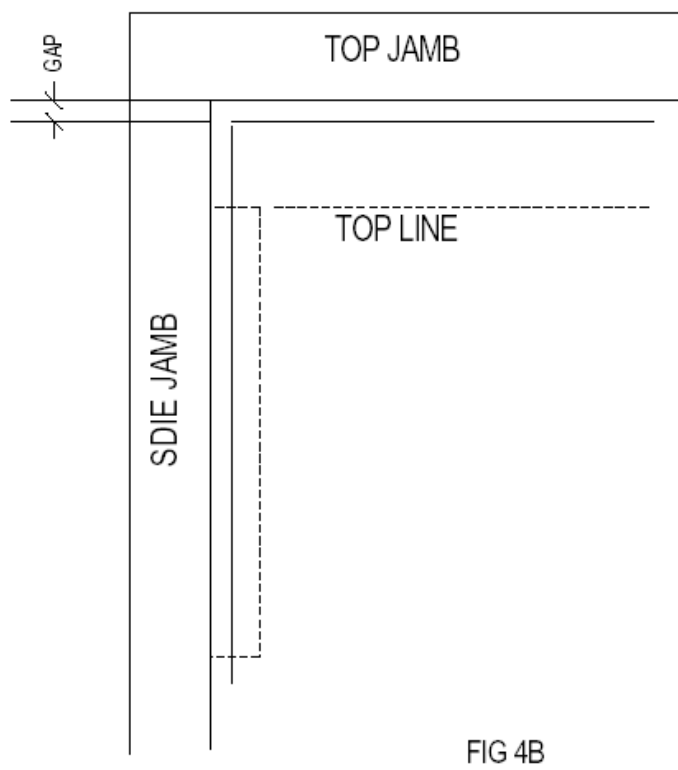
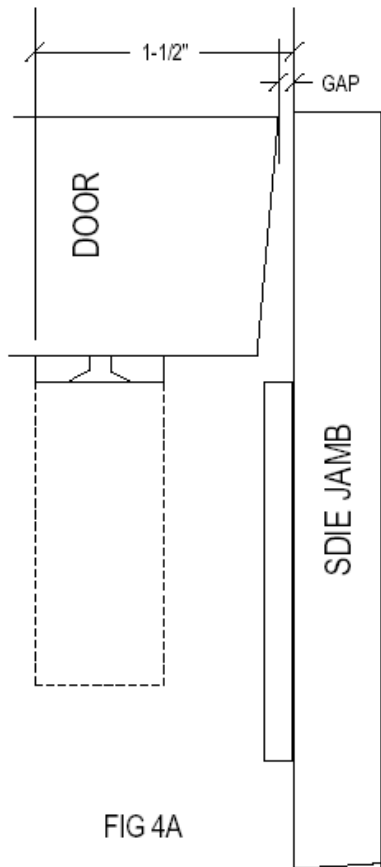
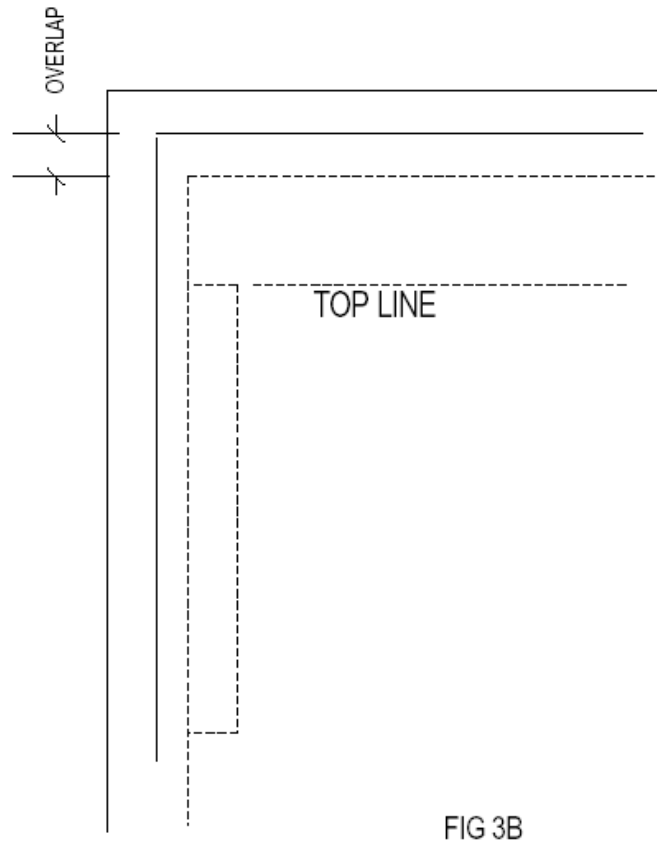
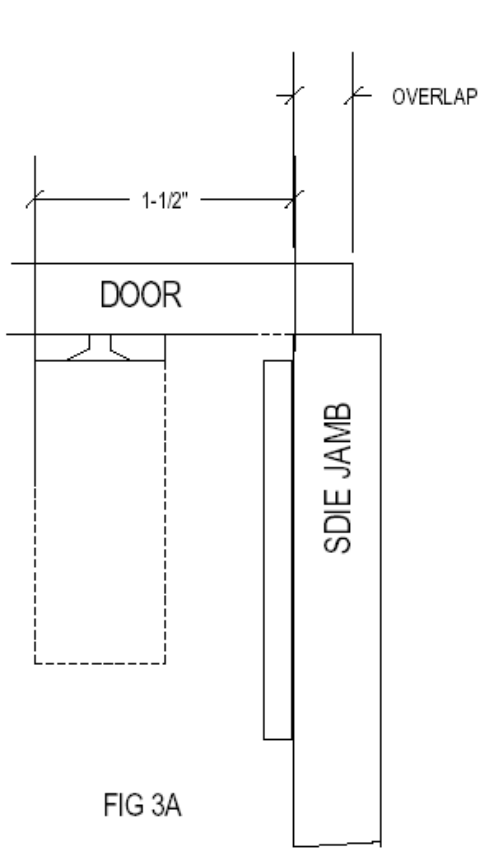


FIG 2B





TERMINAL DESIGNATIONS

1 & 2 - DOOR CLOSED / LOCKED
3 & 4 - SOLENOID

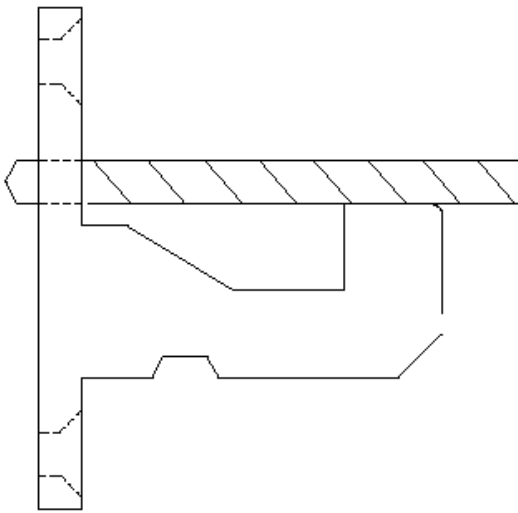


FIG 5

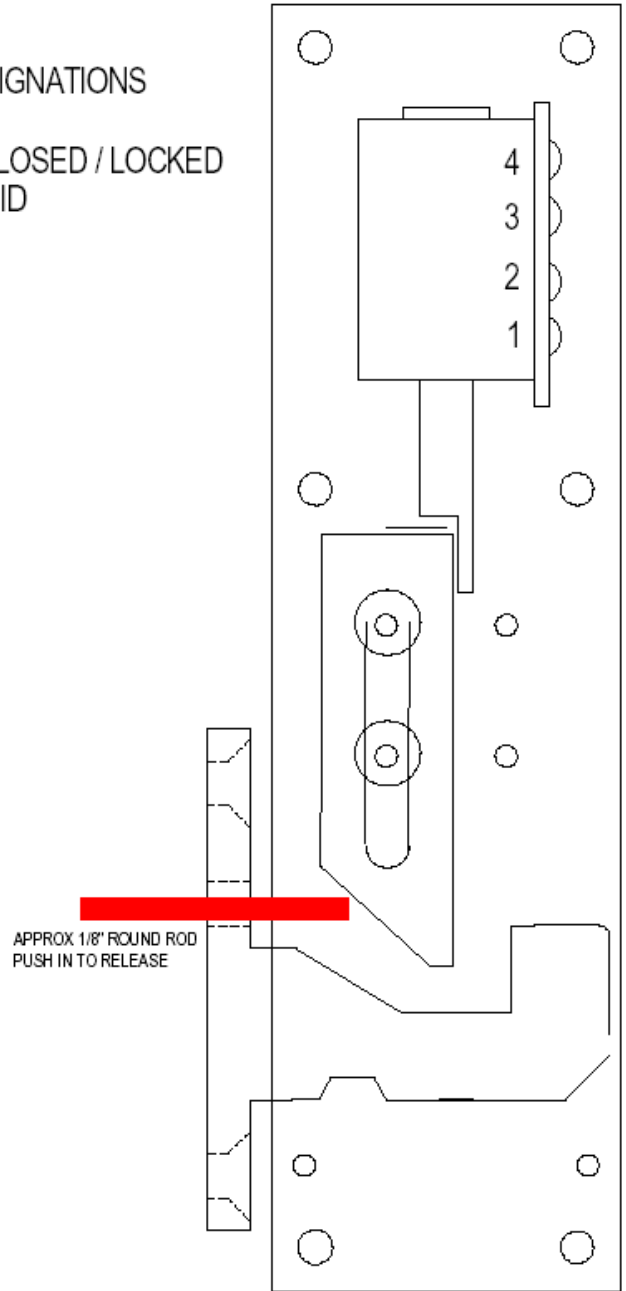
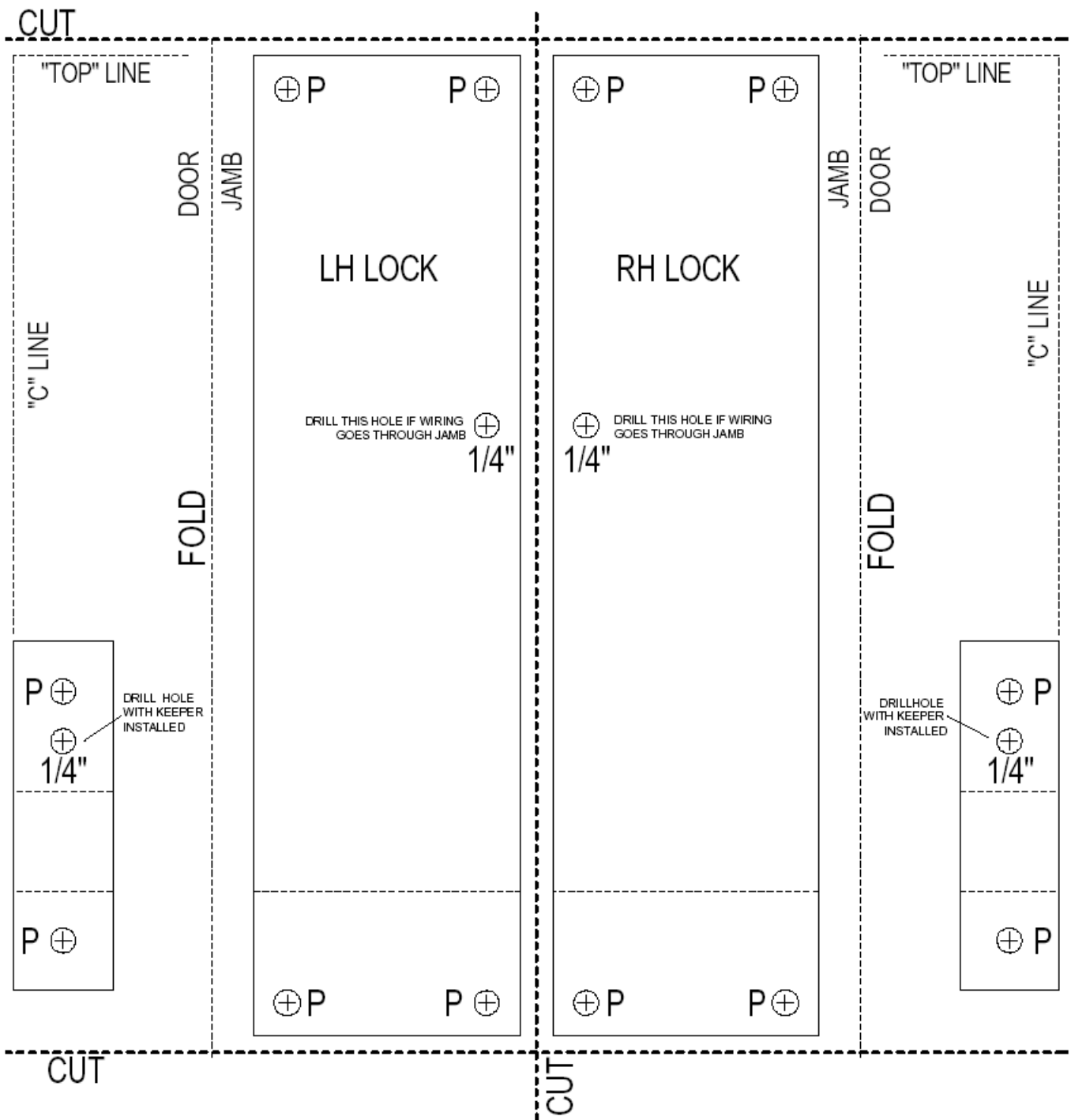


FIG 6



DOORLOCK TEMPLATE

1. Cut out template on the "cut" lines.
2. Fold on the "fold" line - the printed sides of the page should touch
3. Working from the inside of the hoistway, close the door.
4. Place the template at the top of the door jamb on the latch side of door.
5. The side of the template marked "door" should be touching the door;
the side that says "jamb" should be on the door jamb. The print should face you.
6. Tape the template in place.
7. Mark the holes with a punch.
8. Drill holes as per the indications on the template.

NOTE: The latch side of the door is where the lock goes.
Lock hand is determined by looking at the door from outside of the hoistway.
Lock on the right = RH lock.

P= pilot drill
Recommended pilot drill sizes
for #10 fasteners:

Soft wood - 3/32"
Hard wood - 7/64"
Metal - 5/32"