

## TIGER LIFT TYPEX3/X5 INSTALLATION GENERAL

1. Take some time to plan the installation. Read this manual first. It is laid out in sequential order. Make sure that you have the material and tools readily at hand for each sequence. Models III and V are simple to install with a minimum of tools. The following will suffice for most installations:

- ½ ton come a long
- Hammer drill
- electric drill
- hacksaw or sawzall
- common handtools
- ½" or ¾" pipe die
- conduit benders
- rail file
- 4' level
- square
- tape measure
- volt/ohm meter
- wire cutters/strippers
- short 4 x 4 timbers for blocking

2. Make sure you have the correct layout drawing. Carefully review all field dimensions against the layout drawing. It takes 3 times as long to do everything twice.

3. Make sure you have the correct wiring diagrams. Check the power supply with a meter for proper voltage before connecting any equipment.

4. Arrange the material on the jobsite in sequential order. You don't want to be tripping over the cab while you are hauling rails into the hoistway.

5. Plan your wiring and conduit runs carefully. Set up your main stack so you can take it to the controller with a minimum of fancy conduit or duct work.

6. Work safely! No job is worth getting hurt over. Keep your job neat. Wear appropriate clothing. Use a come a long to hoist heavy material. Check all rigging before hoisting. Never stand under hoisted materials. Do not use damaged hoisting equipment, or any other damaged tools. Where safety glasses whenever you cut, drill, weld or burn. Report any unsafe conditions or injuries immediately.

7. Make sure your finished product is safe! If you think something might be unsafe, ask questions about it. Make sure every safety device is tested, and performs as intended. Make sure that your wiring conforms to all code requirements. Make sure you do not leave any jumpers on control terminals or devices. Be absolutely 100% positive when you leave the job that it is right.

8. If you have any questions do not hesitate to call us here at the factory - 734-246-4700. We will be happy to help you with any question. Don't waste a lot of time if something is not clear to you; we can usually answer your question in a matter of minutes.

# TIGER LIFT TYPE X3/X5 INSTALLATION

## I. RAILS & BRACKETS

1. Check hoistway against shop drawing for correct dimensions, plumbness, squareness, correct distances for pit, cylinder hole if required, travel and overhead.

2. Check shop drawing for location of center of the face of the rails in relation to the hoistway entrance. Mark on pit floor. Fig. 1 shows typical dimensions, but CHECK SHOP DRAWING! At this point it is advisable to suspend a plumb line from the ceiling so that it hits the marks, and check that the distance from the line to the back wall is no less than what is indicated on the drawing, and no more than 1/4" greater than indicated.

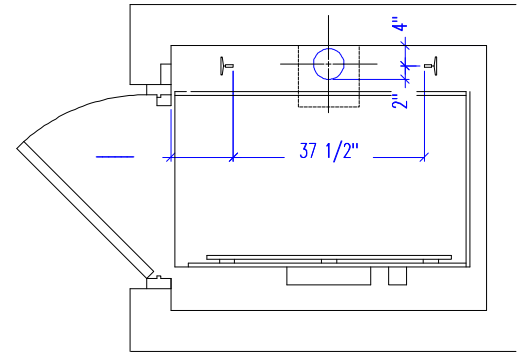


Figure 1

3. Loosely install bottom rail brackets to bottom (female) end of rails (Fig 2a). If you have a roped installation, the bottom rail brackets are part of the bottom plate, which is installed now (Fig 2b).

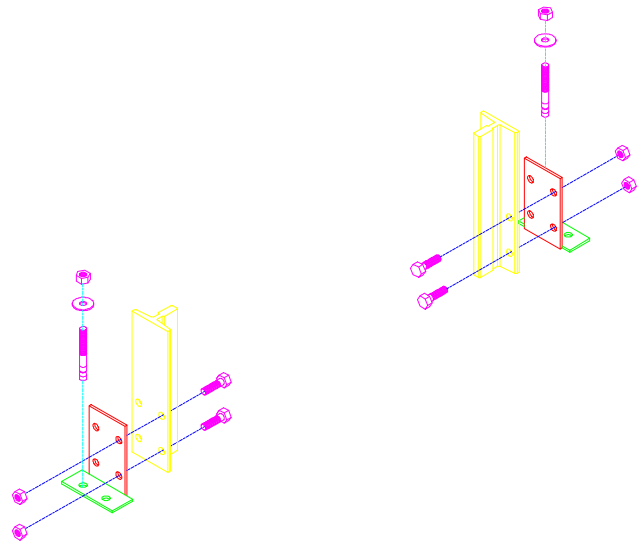


Figure 2a

4. Stand rails on marks (or bottom plate for roped installation). Drill pit floor for bottom bracket anchors. Loosely install anchors. On some roped hydro units an 8" channel is used for a stanchion base. On these units there are 4 additional anchors to secure this channel to the floor.

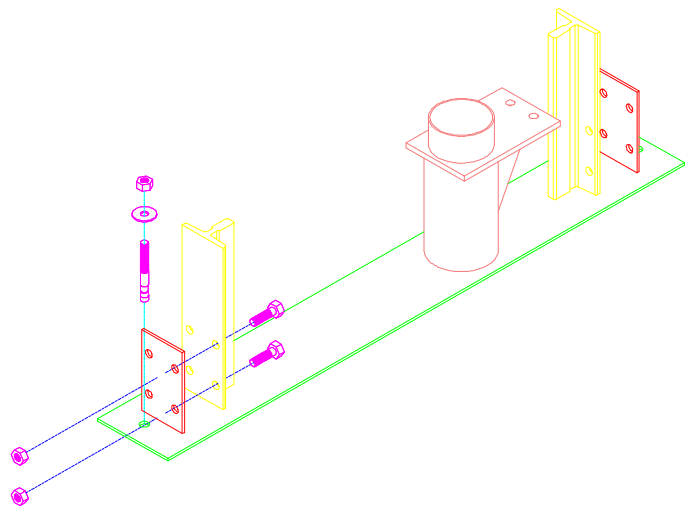


Figure 2b

5. Install the first rail bracket with rail clips and a backup plates. See the shop drawing for elevation; usually 6' from pit floor.

6. Loosely install rail bracket wall mounting angles to the bracket, then attach to wall with appropriate fasteners (Fig 3).

7. Check alignment with 4' level in 2 directions. Check DBG; tighten bolts when rails are aligned.

8. Install shims behind spreader as required. Failure to shim if spreader if required may result in change in DBG and rails out of square. Tighten all bolts and clips.

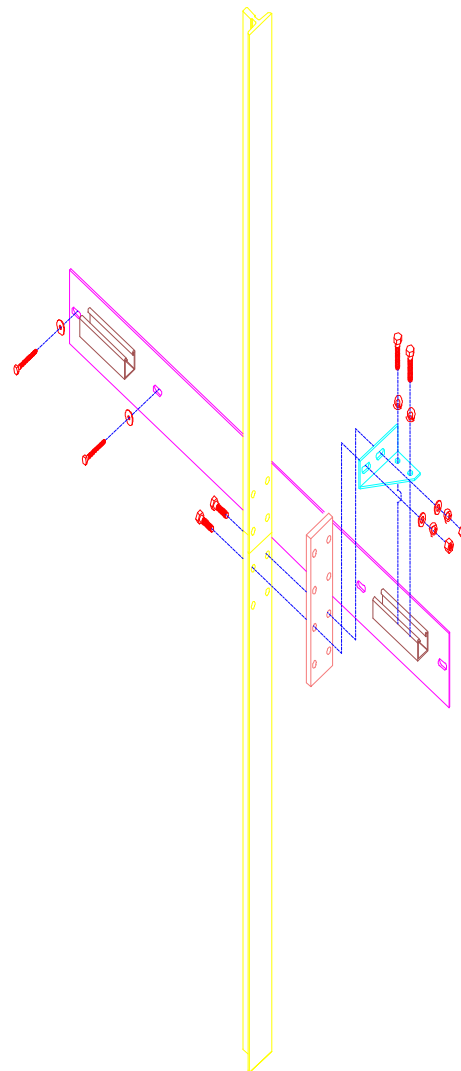


Figure 3

9. Install a fishplate and the next section of rails onto the set just completed, moderately tightening all bolts. Repeat steps 5 - 8.

10. Check all rail joints for smoothness. Shim and/or file as necessary. Securely tighten all bolts.

11. Before you continue the installation, be certain that you are satisfied with your rail installation. If you don't think they are in the right place, or the they are not securely fastened, fix it now. It will be much more difficult once other things are installed in the hoistway.

## IIA. HYDRAULICS - DIRECT (X3)

1. Check jack for proper length - it should be approximately 2' longer than travel distance.

2a. In-ground jack: Place pit channel over well hole. Center of pit channel should correspond with center of jack as indicated on layout drawing.

On most jobs, the pit channel will have one leg made from flat stock, and the other made from angle. The flat stock goes away from the car, towards the back wall. Wrap the jack with protective tape, and lower into the hole through the pit channel (Fig. 4)

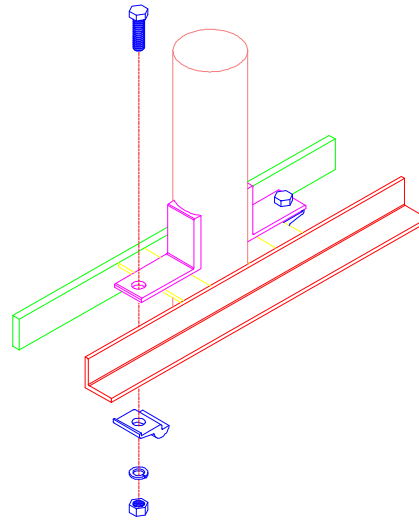


Figure 4

2b. Holeless jack: Your job may or may not have a stanchion tube. If it does, anchor it to the pit, then install the jack on top of it. If you do not have a stanchion tube, anchor the jack directly to the pit.

3. Loosely install stabilizer to jack and wall (Fig 5).

4. Check the inlet orientation to minimize elbows in the hydraulic line. Bolt ears to channel with rail clips.

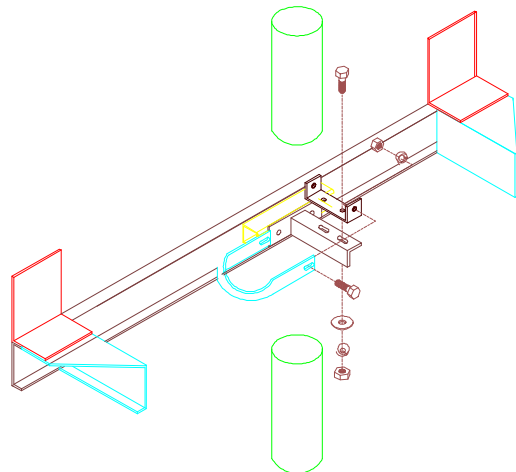


Figure 5

5. Use a 4' level to plumb the cylinder. Check in 3 places. Shim under cylinder ears and/or pit channel as needed. Check that center of cylinder is still in correct location relative to rails.

6. Tighten stabilizer bolts. Anchor pit channel to the pit floor with rail clips. Check cylinder again with the 4' level. Put a little dry sand in the hole, just enough to stabilize the bottom of the cylinder

7. If the jack is long, it will have shipping rings installed onto the plunger. There will be a notice to this effect painted on the cylinder. Remove the shipping rings at this time. If you did not rig a chain fall at the top of the hatch to install the jack, you will need to do so to remove the plunger. Remove the head bolts, and the head. Be careful not to damage the seal or the o-ring. Install a ¾" eye bolt on the plunger, and carefully raise it with the chain fall. Be very careful not to damage the plunger. Remove the shipping rings, then reinstall the plunger and head.

8. Plan your hydraulic piping run. Check the location of the piping outlet on the pumping unit. Set the pumping unit so your piping will have a minimum number of elbows. If you use a flex hose, make sure it is not twisted, kinked, or passing through a wall. Install shut off valves as required by local code. Some installers put a union in the line somewhere near the jack to facilitate removal in the future if it is ever required. Use a high quality thread sealant on all threads. DO NOT use thread sealant on swivel fittings for flex hoses. Clean the inside of all pipes and fitting to prevent metal chips, lint, dirt, etc. from getting in the hydraulic system. If you use pipe or fittings not supplied by Elevator Concepts, make sure they are rated for the system pressure.

9. Fill pump with oil - the motor must be still covered with oil when the plunger is fully extended. Most jobs take between 20 and 25 gallons. Remove the set screw from the lower half of the head and replace with the bleeder valve. Remove the set screw from the upper half of the head and replace with the hose barb, and run the plastic tubing back to the pumping unit, taping it to the hydraulic line.

10. Mount controller. Wire valve and motor - see the controller documentation for full details.

11. Use a temporary run button to engage contactor to run pump. Bleed piston. Check operation. Set bypass pressure for approx. 375# - see the valve documentation for full details.

12. Run piston to ring - check for sufficient travel. Check plunger & cylinder again with 4' level, adjust as required.

13. When you are certain the cylinder is plumb, and it has sufficient travel, backfill the hole evenly with clean dry fill sand except for top 4". Cement top of hole.

## IIB. HYDRAULICS - ROPED (X5)

1. Check for proper length, approximately 1/2 travel + 1' 5"

2. If you haven't done so previously, drill anchor holes for stanchion support beam through holes in the bottom rail bracket pit plate.

3. Install the stanchion support beam on top of the bottom bracket pit plate. The cable holes will be on top, and towards the outside of the hoistway. Install the anchors.

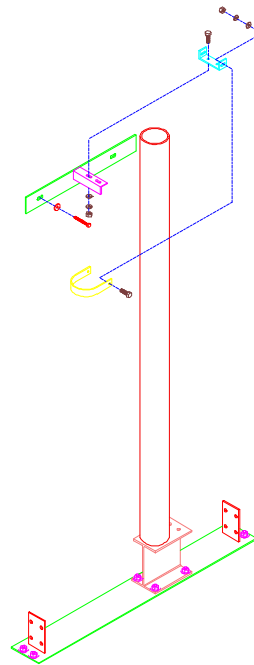


Figure 6

4. Install the stanchion.

5. Install stabilizer bracket to stanchion tube (Fig 6). Depending on the job, the bracket will either mount to a separate wall strap, or to the rail spreader bracket (see Fig 5)

6. Check with 4' level in several directions; tighten bolts

7. If the jack is long, it will have shipping rings inside. There will be a notice on the cylinder. Remove the shipping rings at this time. If you did not rig a chain fall at the top of the hatch to install the jack, you will need to do so to remove the plunger. Remove the head bolts, and the head. Be careful not to damage the seal or the o-ring. Install a  $\frac{3}{4}$ " eye bolt on the plunger, and carefully raise it with the chain fall. Remove the shipping rings, then reinstall the plunger and head. Alternatively, you can remove the plunger while the jack assembly is outside of the hoistway, resting on the floor

8. Install jack to top of stanchion. Check inlet orientation.

9. Loosely install stabilizer to jack and wall. Check with 4' level in several directions; tighten bolts.

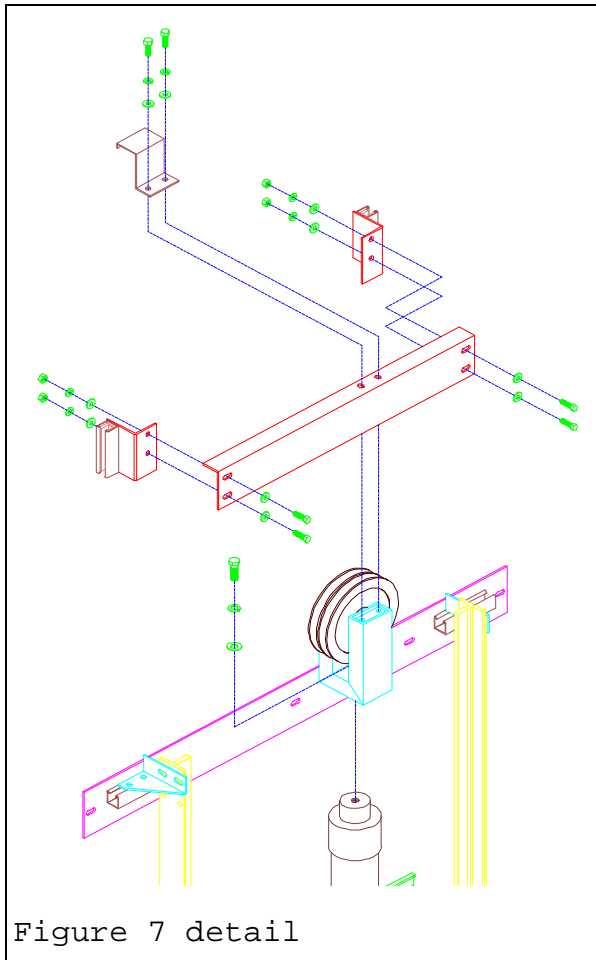


Figure 7 detail

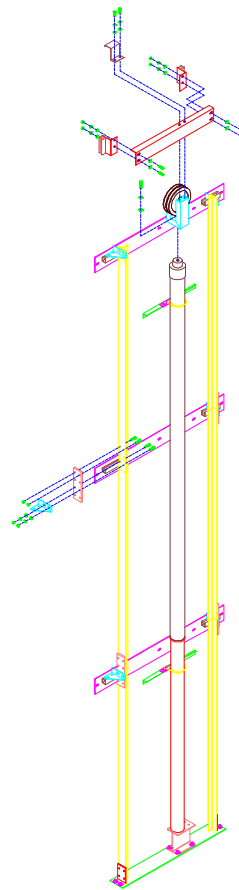


Figure 7

11. Install the sheave and sheave guide assembly. The sheave is installed in a yoke, which is attached to the plunger with a  $\frac{3}{4}$ " bolt. Install the bolt loosely at this point. Install the guide beam to the yoke. Install the gibbs to the guide beam. Allow about  $\frac{1}{32}$ " clearance between the gibbs and the rails. After the gibbs are installed, tighten the  $\frac{3}{4}$ " bolt, making sure you keep the yoke parallel to the rails, so there is no binding in the gibbs. You may wish to leave the cable guard off until after the cables are installed. See Figure 7.

12. Install the pumping unit. Set the pumping unit so your piping will have a minimum number of elbows. If you use a flex hose, make sure it is not twisted, kinked, or passing through a wall. Install shut off valves as required by local code. Some installers put a union in the line somewhere near the jack to facilitate removal in the future if it is ever required. Use a high quality thread sealant on all threads. DO NOT use thread sealant on swivel fittings for flex hoses. Clean the inside of all pipes and fitting to prevent metal chips, lint, dirt, etc. from getting in the hydraulic system. If you use pipe or fittings not supplied by Elevator Concepts, make sure they are rated for the system pressure. THIS IS ESPECIALLY IMPORTANT ON ROPED HYDRAULICS - remember, the pressure is double that of an equivalent direct hydraulic.

13. Fill pump with oil - the motor must be still covered with oil when the plunger is fully extended. Most jobs take between 20 and 25 gallons. Remove the set screw from the lower half of the head and replace with the bleeder valve. Remove the set screw from the upper half of the head and replace with the hose barb, and run the plastic tubing back to the pumping unit, taping it to the hydraulic line.

14. Mount controller. Wire valve and motor - see the controller documentation for full details.

15. Use a temporary run button to engage contactor to run pump. Bleed piston. Check operation. Set bypass pressure for approx. 750# - see the valve documentation for full details.

16. Run piston to ring - check for sufficient travel. Make sure there is sufficient overhead for the sheave beam guides. Make sure the gibbs do not bind in either the up or down direction. Check plunger & cylinder with 4' level, adjust as required.

### III. FRAME

Review figures 8 and 9 for details of the direct hydraulic frame. Review figures 10 and 11 for details of the roped hydraulic frame.

1. On roped hydraulics, install the safety blocks, knurled rollers, roller guide plates, roller arm to the sidestile/platform beam assembly. Install the guide rollers and thrust blocks. There will be 2 rollers at the top of the sidestile, and 1 at the bottom, toward the platform side.
2. Put the stile assemblies in the hoistway, and slip onto rail. Setting them on some short 4 x 4's of equal length (about 12") can make it easier to assemble the rest of the frame. Temporarily tie the stiles to the rails. Install the top crossbeam at top of stiles, and the bottom crossbeam at bottom of stiles.
3. Install the stringer beam to the ends of the platform beams.
4. Install the center beam to the stringer beam and bottom crossbeam. On roped hydraulics, the rope shackles, safety trigger, safety switch, and inertia spring should be installed now if they were not installed at the factory.
5. The roller guide studs are eccentric; adjust so the frame is plumb and level. Make sure the knurled roller and the safety block are clear of the rail. The top front rollers should just touch the rail.
- 6a. Direct hydro: Install the platen to the bottom and top crossbeams. You may have to raise the car to clear the top of the plunger. Run the plunger up to meet the platen, and install the plunger bolt.
- 6b: Roped hydro: Connect hoisting ropes. See "ATTACHING CABLES TO WEDGE SOCKETS" for detailed instructions on using wedge sockets. Raise the plunger until 4-3/4" of plunger is out of the cylinder. Put the platform on the car frame, and block the car up so the platform is about 3" above the bottom landing. Install the hoist ropes, taking out as much slack as you can. The shackle nuts on the dead end should be about 1" past the cotter pin hole to allow for adjustment. The ropes will not be tight, but should not have excessive slack at this time. Now put sufficient weight on platform to compress shackle rod hitch springs fully, and adjust rope length so that platform is floor level. Install the cable guard.
7. Install the safety linkage (roped hydraulics)
8. Install platform extensions and beams, or platform trusses as applicable.
8. Install spring buffers.
9. Check operation of safeties if so equipped. Adjust according to adjustment procedure below.

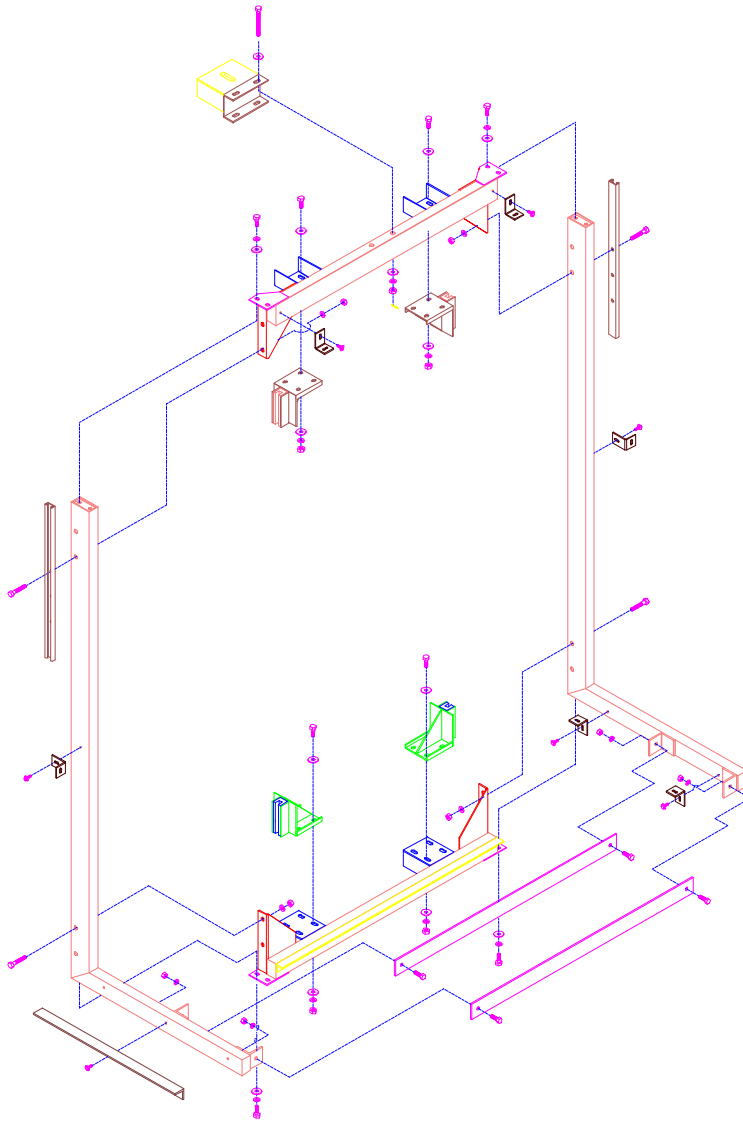


Figure 8

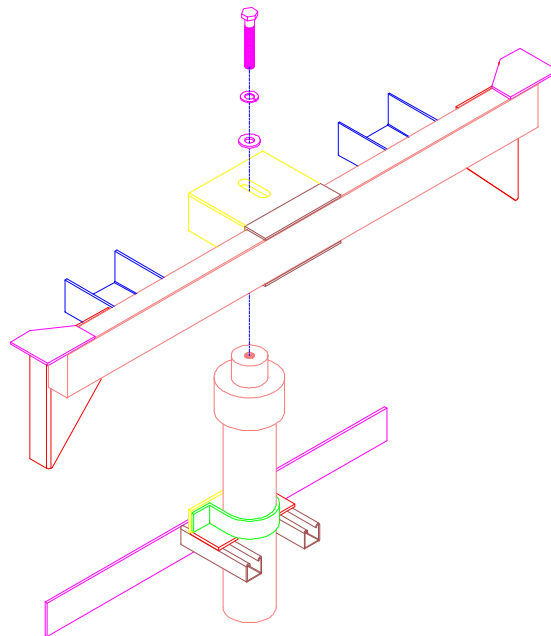


Figure 9

Figure 10

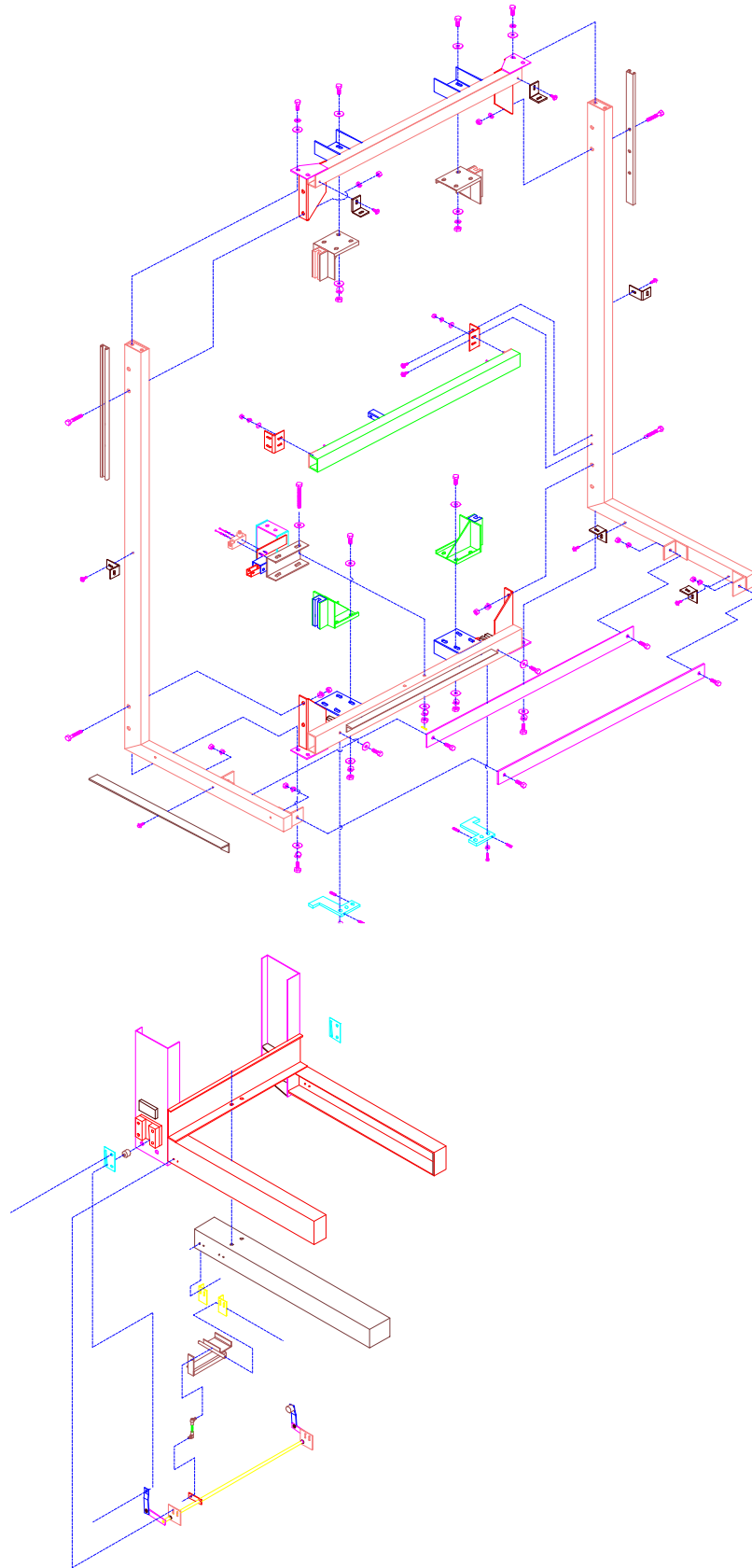
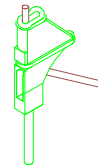


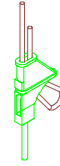
Figure 11

## ATTACHING CABLES TO WEDGE SOCKETS

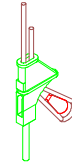
1. Insert end of cable through socket, taking up all slack in the cable.



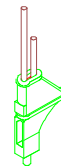
2. Thread the end back through socket, leaving enough loop to install the wedge.



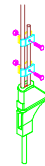
3. Insert wedge into the loop.



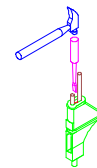
4. Pull down on the live end of the cable to keep it taut. Pull up on the dead end with a quick pull until the rope and wedge are seated in the socket.



5. After all cables are installed, let the weight of the car (and counterweights if so equipped) rest on the cables. The rope and wedge will firmly set in the socket. Install retainer clips - the lower clip at 2" above the socket, and the upper clip 4" above the lower clip.



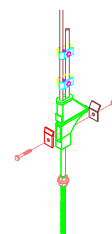
6. If you must change the rope length, remove the weight from the cable, and use a hammer and a drift to tap the wedge out of the socket. You can also use a hammer and drift to roughly equalize the rope tension. With the weight still on the cable, tap the wedge down on the tightest cable until the rope slides through.



7. Finish equalizing cable tension with the rod nuts. Hold the socket to prevent rotation.



8. Some jurisdictions require an additional means to prevent the wedge from dislodging in the event of a slack cable condition. Install the wedge retainers as shown.



## TYPE "A" INSTANTANEOUS SAFETY WITH SLACK ROPE ACTUATION ADJUSTMENT PROCEDURE

1. Adjust the guide shoe or roller so their is about 1/16 clearance between the safety backup and the rail.
2. Adjust the roller arms so that both rollers engage the rails at the same time. Note: some units do not have adjustable arms; in that case, no adjustment is required.
3. Make sure that the distance from the bottom of the shackle rod to the jamb nut is 3/4". This distance is set in the factory. Make all cable adjustments at the dead end set of shackles located on the stanchion base.
4. Now make sure that there is proper clearance between the roller and the rail when the safety is fully retracted. Put enough weight on the car to compress the shackle springs fully to the stop tube. With the actuator T bar touching the bottom of the wedge socket shackle rods, adjust the main link rod to get 3/32" clearance between roller and rail.
5. Check that there is sufficient travel in the linkage to fully engage the safety.
6. Make sure the safety switch is installed and adjusted so that it opens as soon as the safety dog hits the rails. The switch is located inside the center beam.
7. Their are several ways to test the safeties. The safest is to use a hydraulic jack with a remote cylinder, commonly known as a porta-power. You will need on that has sufficient weight capacity (2 tons minimum) and stroke (about 4" minimum). Fully extend the remote cylinder. Place it on top of a good 4 x 4 timber, about 48" long. Land the car on it. Make sure the cables are just slack; excessive slack can cause problems later. Quickly release the porta-power. The safeties should set and hold the car. If not, recheck all steps above. Make sure the safety switch operates correctly. To release the safeties, first check that the cables are in their sheaves and not fouled on any brackets, etc. Then raise the car until all slack is out of the cables. Make sure the safety fully retracts. File any gouges, burrs, etc. from the rails.

## SWITCHES & FIXTURES

1. Most installations will use a MAGLVL landing system. See the MAGLVL manual for complete details on installing this system.
2. If your installation has final or terminal limits in the hatch, install an actuating cam on the sidestile unistrut opposite the landing system. With the car at the bottom landing, set the terminal limit at floor level, and the final limit for approximately 2" beneath floor level.
3. Run the car to the top level, and set the directional and final if applicable.
4. It is much easier to install floor magnets with the cab off. Final floor stop adjustment can be done with the cab on; it is usually just a matter of moving the magnets a fraction of an inch. If you want to set the floor stops with the cab off, you will need to run the travel cord and temporarily connect it to the leveling unit. On most jobs the landing unit control board and the sensor unit are mounted to the ceiling, so you will have to hand the ceiling from the crosshead temporarily.
5. Make sure the valve is adjusted properly before setting floor stops. Follow the procedure below to adjust the valve.
6. Run car to every floor. Check intermediate floors stops from both directions. You should be able to get within 1/2" regardless of direction or load.
7. Make sure all finals operate as intended.
8. Install the safety switch, if so equipped.
9. Install and wire pushbutton stations and doorlocks. Make sure door locks and wiring will not interfere with the platform. In some instances you may need to notch the platform. Run the car carefully through the hoistway to make sure there is no interference.
10. Install pit stop switch.

## BLAIN KV-1P VALVE

This system is designed to provide a leveling tolerance of 1/2" at 32 FPM. Optimum performance at about 25 FPM, and is designed around a coasting distance of 1/2" to 1". These are abbreviated set up instructions to get the car running. See the adjuster's manual for complete information.

### I. Pre-set Relief Valve:

1. With full load on the car, check pressure in up direction. If the cab is not installed yet, add 200#. After noting pressure, turn Adjustment screw S counter clockwise until loose.
2. Place an up call and close main oil line valve.
3. Turn in Adjustment screw S until pressure is between 110% and 125% of full load pressure. . Clockwise increases pressure; counterclockwise lowers pressure.
4. Tighten locking setscrew, recheck adjustment.

II. Set Up Bypass (Adjustment screw #1) so that car begins to move about 1 second after the pump starts with empty car. Clockwise shortens time; counterclockwise lengthens. After bypass is set, recheck relief setting. Adjust relief valve if necessary. Do not re-adjust bypass valve without checking relief setting afterward.

III. Set Down Acceleration (Adjustment screw #6 - inside down solenoid stem) so car accelerates smoothly. Initial adjustment: screw #6 in full clockwise, energize down solenoid, screw out counterclockwise until car starts to move. Final adjustment: Clockwise for softer acceleration, counterclockwise for quicker acceleration.

IV. Set Down Speed (Adjustment screw #9) so that down speed full load is about the same as up speed. If you cannot attain correct speed with adjustment screw, check the following:

1. Check rails & guide shoes for binding
2. If pipe run is long and/or has many bends, 3/4" pipe may be required
3. Check down pilot stem for dirt or binding
4. Check down spool for dirt or binding
5. If none of these items solve problem, a different down insert may be required. Check no load pressure and contact us for further instructions.

### V. Preliminary set up for leveling unit:

1. Set any terminal hatch limit for floor level; set any final limit for 2" beyond floor level

system magnets per the instructions for the unit

VI. Set terminal floor stops:

1. Disconnect wires from LU and LD, disabling leveling
2. Make a terminal UP call.
3. Adjust terminal landing system magnet or hatch switch so car stops floor level.
4. Repeat for bottom landing.

VII. Set intermediate floor stops:

1. Reconnect LU and LD
2. With car at landing, set magnet per landing system instructions.
3. Lower the car at least 3', then call it up to landing. If not level:
  - a. Car stops HIGH - raise LU sensor
  - b. Car stops LOW - lower LU sensor
4. Raise the car at least 3', then call down to landing. If not level:
  - a. Make sure the down solenoid is not hanging up, and down speed is correct.
  - b. Car stops HIGH - raise LD sensor
  - c. Car stops LOW - lower LD sensor
5. Repeat at other intermediate floors.

NOTE: Before adjusting sensors, be absolutely certain the valve is adjusted and functioning properly. The factory sensor spacing is designed for a valve that is functioning properly. If you need to change the spacing, it usually means the valve is not functioning properly.

VIII. If car overshoots and relevels in opposite direction, or oscillates:

1. Check speed; reduce if too high.
2. Increase distance between LU & LD sensors
3. Check stopping distance; if car coasts more than about 1" after solenoid is de-energized, check solenoid needle valve and down spool for binding.

IX. If car stops and then coasts into leveling zone at intermediate floors:

1. In UP direction - increase distance between DZ & LU
2. In DN direction - increase distance between DZ & LD
3. Alternate method - shorten car magnet in 1/4" increments; terminal switches will need to be adjusted. **This the only way to adjust systems with fixed sensors.**

CAB & GATE

14, and 15 for details on the cab assembly.

1. Make sure the following are installed and adjusted first:
  - Landing system
  - Car safety
  - Car safety switch
2. Install the platform, maintaining the running clearance indicated on the layout drawing. The platform is attached to angles on the inside of the sidestile beams.
3. If there are three walls, it is usually easier to put them together on top of the platform, then slide them into the recess around the perimeter of the platform. There will be a screw on each side of the short wall that goes into a keyhole slot in the clamp brackets (Fig 13) that are on the end of the long walls. Attach the wall nearest the sidestile with the mounting angles. There are holes tapped in the sidestiles. Install the ceiling
4. If there are two walls, first install the wall that is against the sidestile. Attach with the mounting angles. There are holes tapped in the sidestiles. Hold the other wall in position, and install the ceiling.
5. Fasten the ceiling to the crosshead with the mounting angles. There are holes tapped in the crosshead. (Fig 14)
6. Install the gate tracks and gates (Fig 15). Adjust the angle of the track so the strike post of the gate is plumb with the strike wall. Adjust the level of the track so that the bottom guide pins are about 1/8" above the bottom of the groove.
7. Install the gate switches. On most jobs they are prewired; simply install them onto the mounting bracket. Check for full engagement with the gate closed.
8. Install the car fixtures and any other cab accessories.
9. Connect the travel cord to the car top box. Connect per controller documentation.
10. Install door locks and door lock cams.

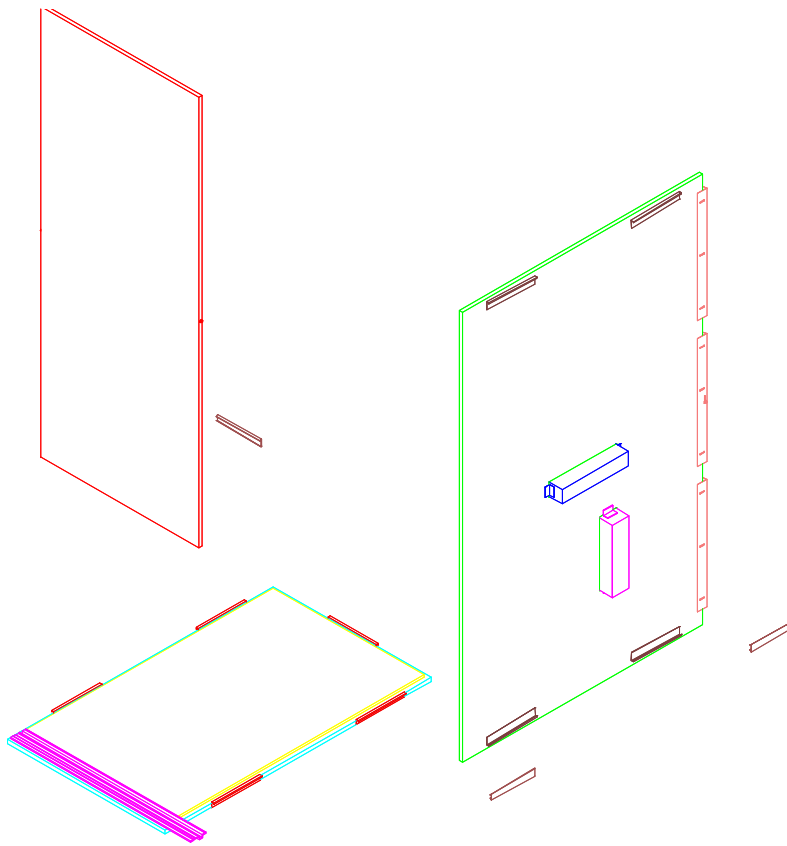


Figure 12

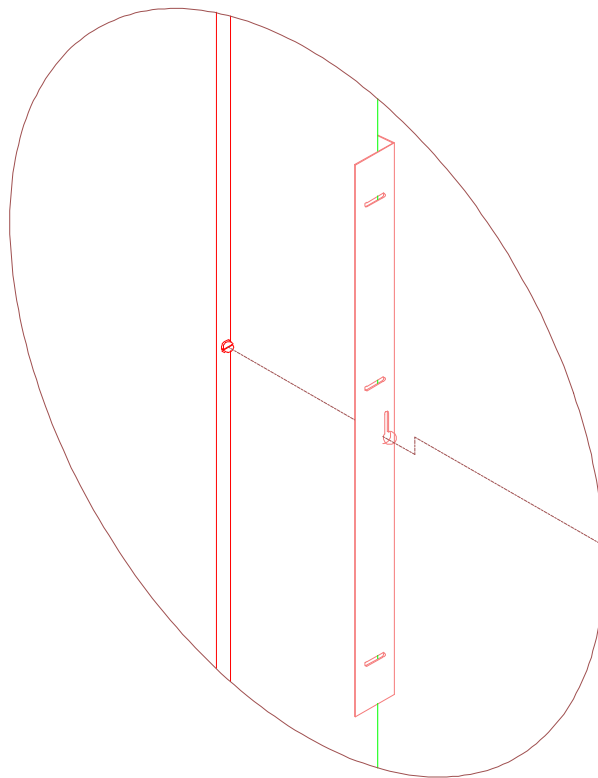


Figure 13

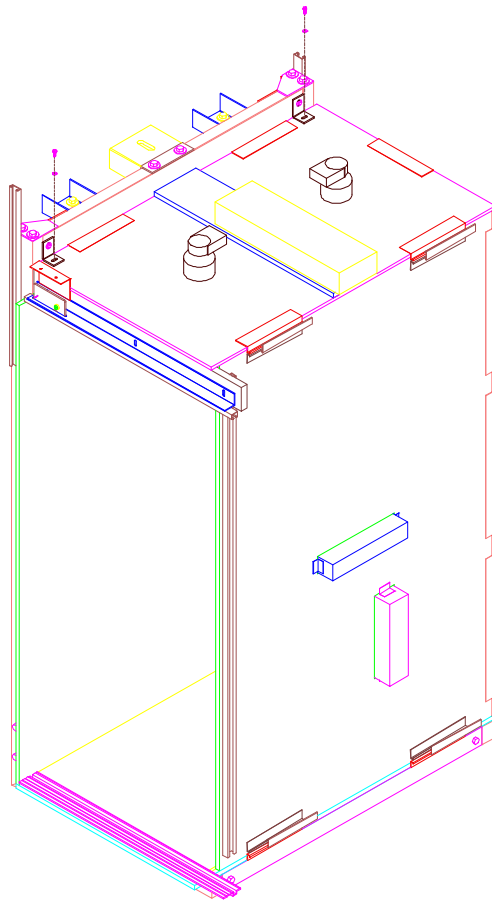


Figure 14

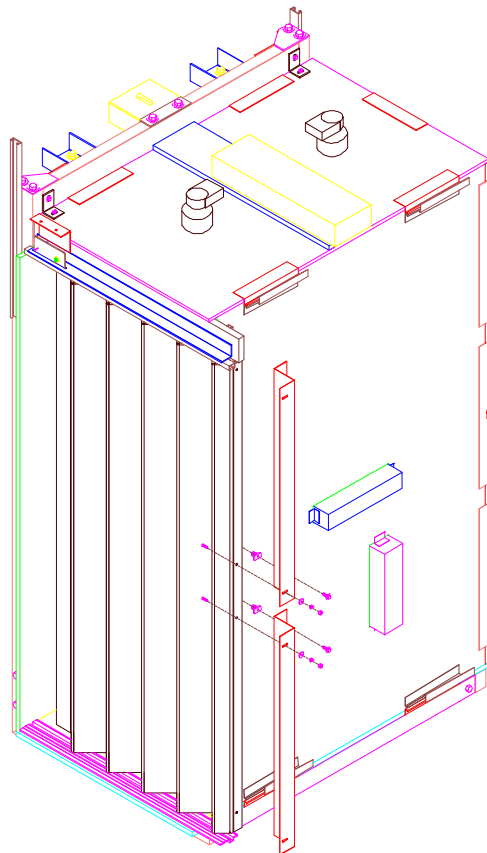


Figure 15

## FINAL CHECKOUT

1. Wire up the car and hatch devices to the controller. See the controller documentation for complete details.
2. Carefully run the car through the entire hatch to make sure there is sufficient clearance.
3. Run the car on the stop ring to make sure there is sufficient overhead clearance. Check that there is sufficient oil in the pump unit.
4. Run the car on the buffers to make sure the plunger does not bottom out in the cylinder.
5. Make sure all door locks function mechanically.
6. Check out automatic operation.
7. Place full load in the car. Check bypass pressure, floor stops, speed in both directions. Adjust control valve and switches as required.
8. Make sure every door lock, gate switch, safety switch and safety device functions as intended. Perform a full load safety test if the car is so equipped.
9. Check that all fixtures function properly and that all light bulbs are working.
10. Make sure all jumpers are removed.
11. Make sure the rails are lubricated.
12. Clean up the installation.
13. Congratulations! Go have a cold one.