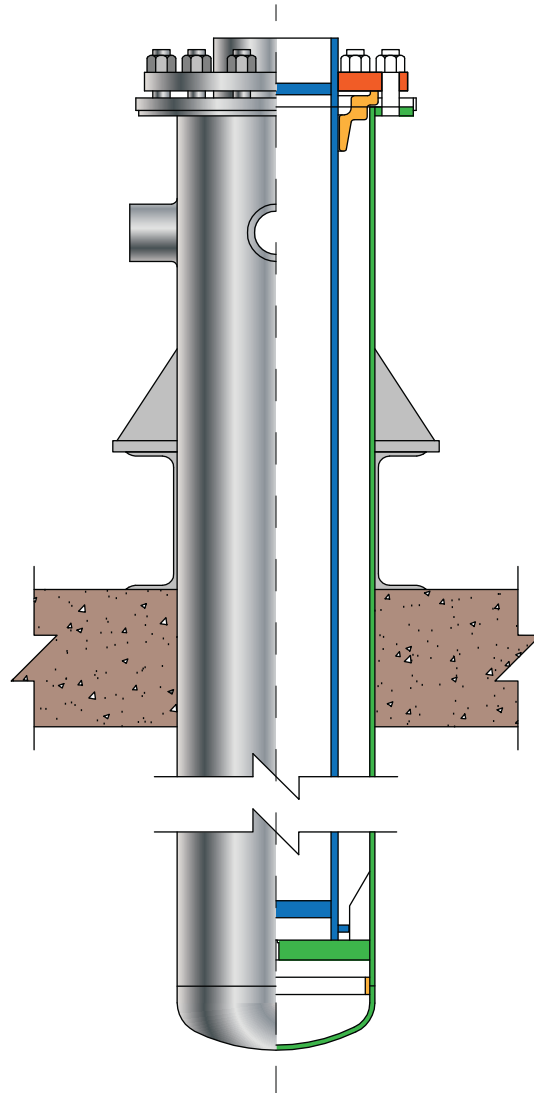




Conventional Jack



Every attempt has been made to ensure that this documentation is as accurate and up-to-date as possible. However, Vertical Express assumes no liability for consequences, directly or indirectly, resulting from any error or omission. The material contained herein is subject to revision. Please report any problems with this manual to Vertical Express, P.O. Box 2019, Memphis, Tennessee 38101.

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Safety Precautions

IMPORTANT!

Read this page before any work is performed on elevator equipment. The procedures contained in this manual are intended for the use of qualified elevator personnel. In the interest of your personal safety and the safety of others, do not attempt any procedure that you are not qualified to perform.

All procedures must be accomplished in accordance with the applicable rules in the latest edition of the National Electrical Code, the latest edition of ASME A17.1, and any governing local codes.

Terms in This Manual

CAUTION

CAUTION statements identify conditions that may result in damage to the equipment or other property if improper procedures are followed.

WARNING

WARNING statements identify conditions that may result in personal injury if improper procedures are followed.

General Safety

CAUTION

Before applying power to the controller, check that all manufacturing wire connections are tight on relays, contactors, fuse blocks, resistors, and terminals on cards and DIN rail terminals. Connections loosened during shipment may cause damage or intermittent operation.

Other specific warnings and cautions are found where applicable and do not appear in this summary. See the *Elevator Employee Safety and Accident Prevention Program Manual* and the *Elevator Industry Field Employees' Safety Handbook* for electrical equipment safety information on installation and service.

Electrical Safety

All wiring must be in accordance with the National Electrical Code and be consistent with all state and local codes.

Use the Proper Fuse

To avoid fire hazards, use only a fuse of the correct type, voltage, and current rating. See the job specific drawings sheet (Power Supplies) for fusing information.

Electric shocks can cause personal injury or loss of life. Circuit breakers, switches, and fuses may not disconnect all power to the equipment. Always refer to the wiring diagrams. Whether the AC supply is grounded or not, high voltage will be present at many points.

Printed Circuit Cards

Printed circuit boards may be damaged if removed or installed in the circuit while applying power. Before installation or removing printed circuit boards, secure all power.

Always store and ship printed circuit cards in separate static bags.

Mainline Disconnect

Unless otherwise directed, always Turn OFF, Lockout, and Tagout the mainline disconnect to remove power from elevator equipment. Before proceeding, confirm that the equipment is de-energized with a volt meter. Refer to the *Elevator Employees' Safety and Accident Prevention Program Manual* for the required procedure.

Electrical Safety

(continued)

- Test Equipment Safety** Always refer to manufacturers' instruction book for proper test equipment operation and adjustments.
- Megger or buzzer-type continuity testers can damage electronic components. Connection of devices such as voltmeters on certain low level analog circuits may degrade electronic system performance. Always use a voltmeter with a minimum impedance of 1M Ohm/Volt. A digital voltmeter is recommended.
- When Power Is On** To avoid personal injury, do not touch exposed electrical connections or components while power is ON.

Mechanical Safety

See the *Elevator Employees' Safety and Accident Prevention Program Manual* and the *Elevator Industry Field Employees' Safety Handbook* for mechanical equipment safety information on installation and service.

Arrival of Equipment

- Receiving** Upon arrival of the equipment, inspect it for damage. Promptly report all visible damage to the carrier. All shipping damage claims must be filed with the carrier.
- Storing** During storage in a warehouse or on the elevator job site, precautions should be taken to protect the equipment from dust, dirt, moisture, and temperature extremes.

Asbestos Compliance

Vertical Express elevator personnel will no longer drill or modify any doors with asbestos containing materials (ACM) or possible asbestos containing materials (PACM). All elevator doors manufactured or installed 1980 and earlier will be treated as having ACM/PACM.

Doors with ACM/PACM should be replaced rather than modified. If replacement is not feasible, abatement modifications shall be done by a licensed asbestos abatement company. tkE mechanics will safely stage the equipment for the abatement team, or remove the doors and seal them with plastic for delivery or pick up by the asbestos abatement company.

Doors manufactured or installed 1980 and earlier may be modified by tkE employees if a test is conducted by a licensed asbestos company prior to work showing zero evidence of ACM/PACM.

All employees that risk exposure to asbestos will complete tkE safety department approved asbestos awareness training.

All employees will stop any work that could expose them to ACM/PACM, and immediately contact their supervisor and their safety manager. All exceptions must be approved by the Director of Health and Safety.

Static Protection Guidelines

IMPORTANT!

Read this page before working with electronic circuit boards.

Elevator control systems use a number of electronic cards to control various functions of the elevator. These cards have components that are extremely sensitive to static electricity and are susceptible to damage by static discharge.

Immediate and long-term operation of an electronic-based system depends upon the proper handling and shipping of its cards. For this reason, Manufacturing bases warranty decisions on the guidelines below.

Handling

- Cards shipped from Manufacturing in separate static bags must remain in the bags until time for installation.
- Anti-static protection devices, such as wrist straps with ground wire, are required when handling circuit boards.
- Cards must not be placed on any surface without adequate static protection.
- Only handle circuit cards by their edges, and only after discharging personal static electricity to a grounding source. Do NOT touch the components or traces on the circuit card.
- Extra care must be taken when handling individual, discrete components such as EPROMS (which do not have circuit card traces and components for suppression).

Shipping

- Complete the included board discrepancy sheet.
- Any card returned to Manufacturing must be packaged in a static bag designed for the card.
- Any card returned to Manufacturing must be packaged in a shipping carton designed for the card.
- “Peanuts” and Styrofoam are unacceptable packing materials.

Failure to adhere to the above guidelines will void the card warranty!

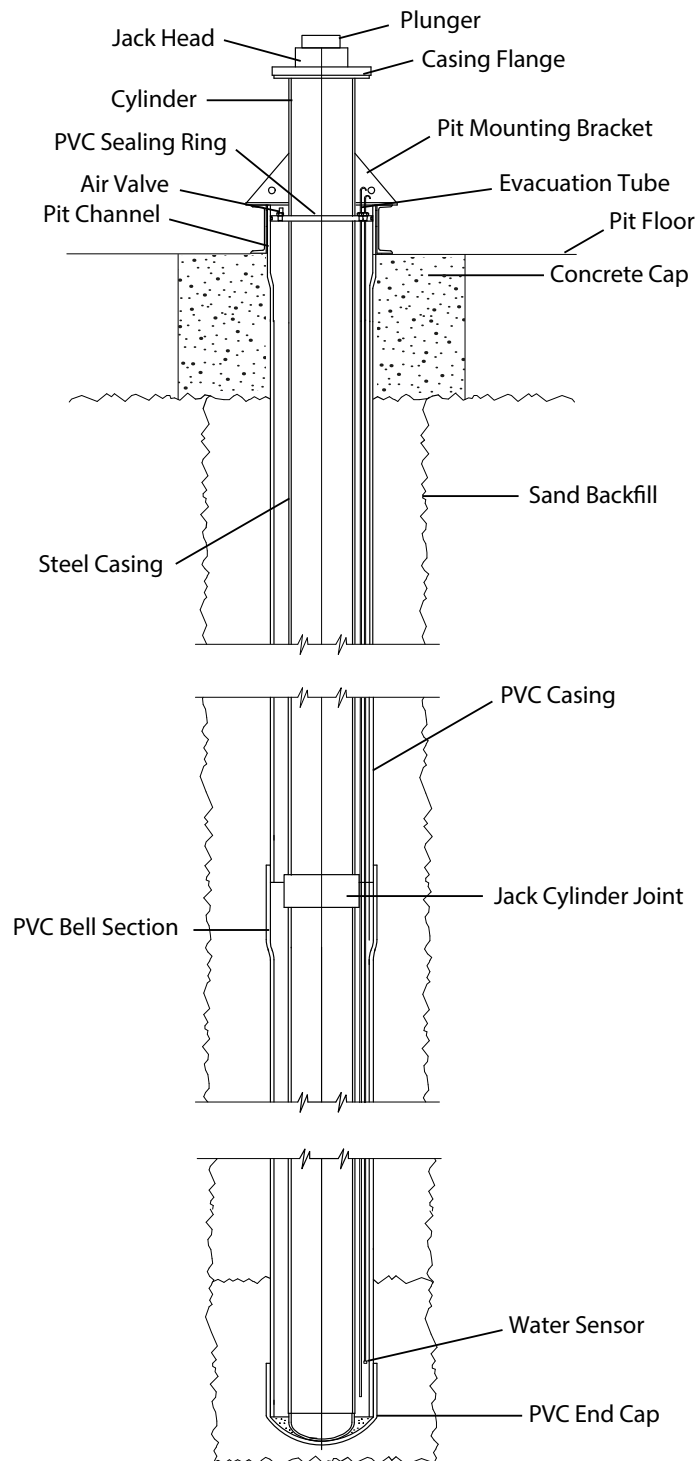
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Multi-Section Jacks

Overview

Before turning the job over to the customer, replace the seal. See Seal Replacement on page 28.

Multi-Section Jack with Polyvinyl Chloride (PVC) Pipe



Jack Hole Measurement and Drilling

1. Use the job layouts that include a sectional view and a hoistway plan to determine the proper location for the jack assembly. For an example, see Figure 1.
2. Verify that the pit dimensions are correct per the job layout.
3. Measure and mark the exact location for the jack's centerlines.
4. Mark the location of the jack hole.
5. Add the following measurements to determine total minimum depth of the jack hole:

The complete length of the jack casing + 3" + length of the bottom seal.

6. Verify the jack casing size, including the protection system and coupling, to determine the proper drill size. See Conventional Jack Data on page 50.
7. Verify that the drill size allows ample space for plumbing.
8. Set up the drilling rig, and begin drilling.



- Check that the hole is plumb every 10'. Make corrections as needed.
- Place a steel casing in the hole to prevent the hole from caving in.

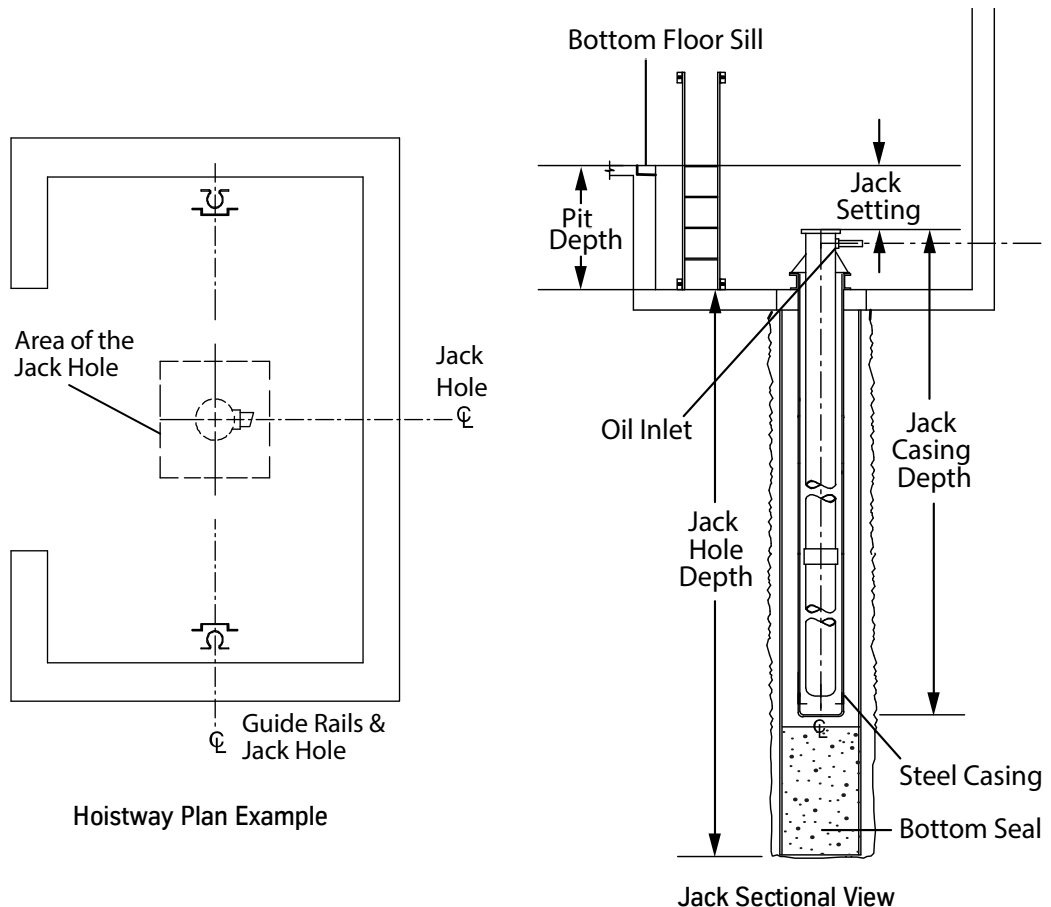


Figure 1 - Hoistway Plan and Sectional View

Prepare the Hoistway

1. Compare the centerline of the rails and the jack hole to the hoistway layout.
See Figure 2.



The rails and the jack must maintain a common centerline. If necessary, relocate (push/pull) the rails. This common centerline may be violated only if the platform design has been checked by Manufacturing for off-center loading. If side-to-side deviation of the placement of the jack between rails occurs, call Manufacturing.

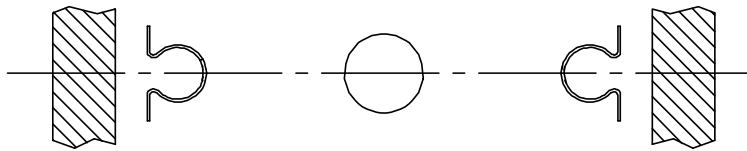


Figure 2 - Rail and Jack Centerline

2. From the top landing, check the travel and plumb of the front walls and floor landings.
See Figure 3.

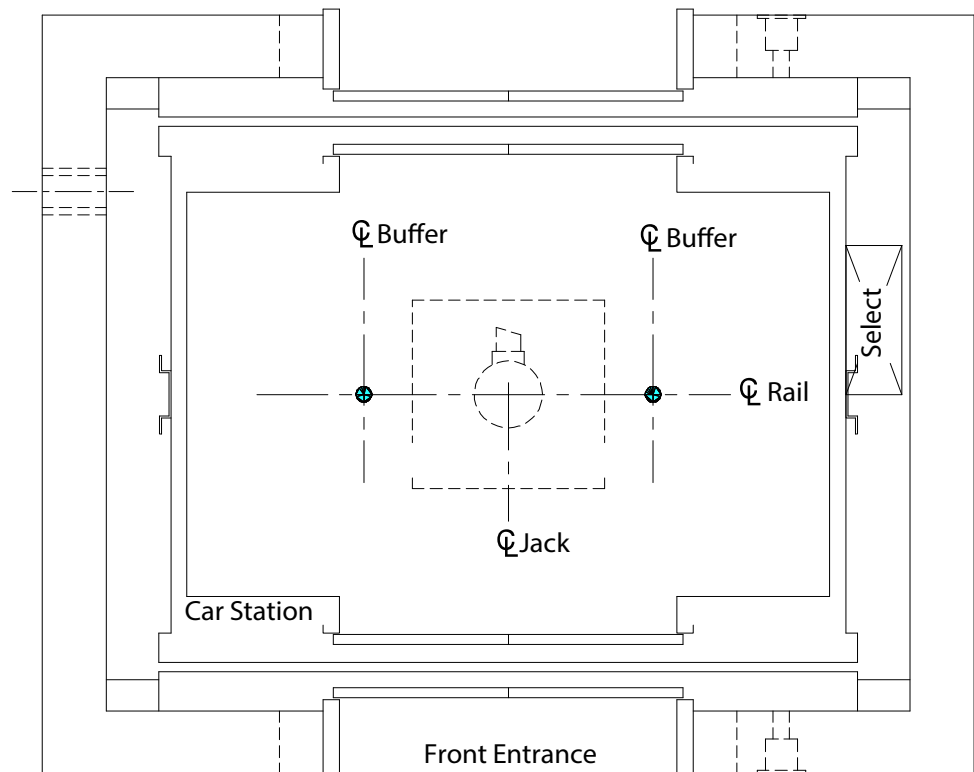


Figure 3 - Example Layout

Installation

Rails & Rail Brackets

1. Mark the centerlines for the jack and the centerline for each rail on the pit floor.



- Use the "corridor line" supplied by the contractor to determine the jack centerline.
- Locate the centerline marks for each rail bracket and the two outer edges of the rail, which Manufacturing has marked for rail alignment.

2. Install a rail bracket on one wall in the pit.
 - a. Use a plumb bob or a laser to determine rail bracket locations.



Use the centerline mark for each rail on the pit floor as a reference.

- b. Mark the wall to show the location of the lowest rail bracket at a solid anchor point 6" to 8" below the lowest floor on the pit side wall.
 - c. Drill the holes for the anchor bolts, or weld the bracket to the beam. See Figure 4.
 - d. Loosen the rail clips, and center and tighten the keyhole bracket (alignment tab).
 - e. Center and tighten the mounting angles to the wall.
 - f. Align and plumb the bracket to the mounting angles (per alignment marks), and lock the bracket to the mounting angles. See Figure 4.
3. Use a proper method for access, and repeat the above steps to install the remaining rail brackets on the current working side.

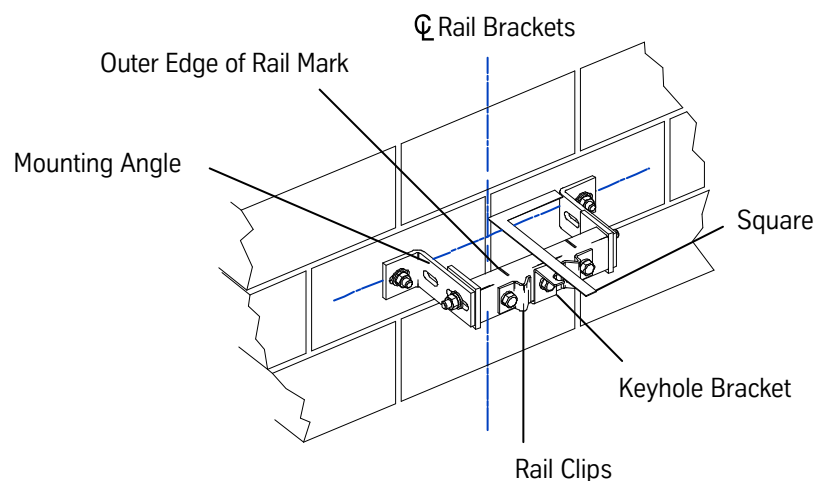


Figure 4 - Rail Bracket Location

Rails & Rail Brackets

(continued)

4. Install the lower rail, and align its outer edges with the marks on the brackets.



Use a 16' section for the first rail (king rail). On jobs with extended floor heights (11', 6" or greater), place the king rail at the bottom to maintain overhead clearance for hoisting the support beam mounting assembly.

5. Plumb the king rail.
 - a. Use magnets to attach plumb lines to the front and side of the upper bracket at the top rail.
 - b. Adjust the top of the rail so that the distance between the plumb line and rail is exactly the thickness of the magnets (measured at the top and bottom).
 - c. Lock the first rail in place.
6. Mount rail brackets on the opposite wall, and align them to the wall marks.
7. Attach the other rail to its brackets, and plumb front-to-back.
8. Use a Distance Between Guides (DBG) gauge to adjust the face of this rail to the king rail.
9. Install the support beam mounting assembly for hoisting and setting the jack. See Figure 5.



If additional height is needed, install a 4' to 6' section of rail on top of the existing rail; then install the support beam mounting assembly.

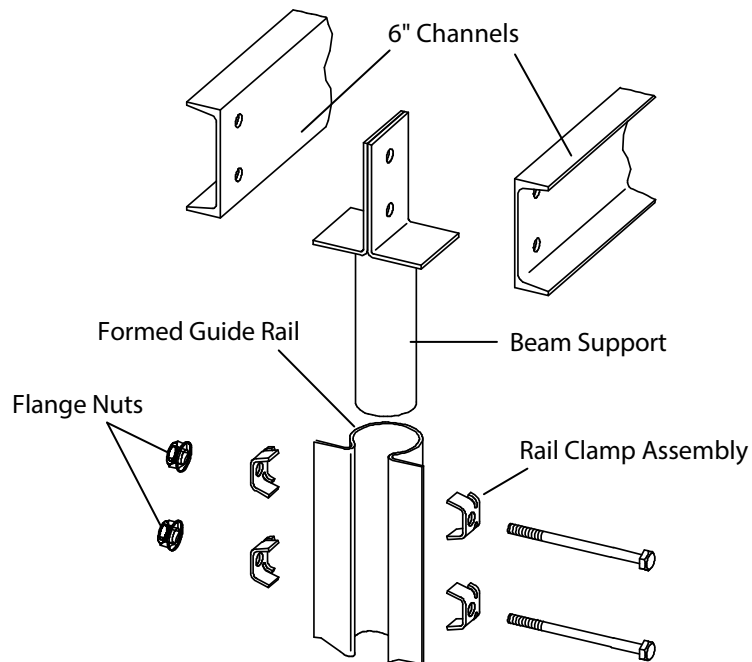


Figure 5 - Support Beam Mounting

Prepare the Jack



To eliminate the risk of possible damage during shipment, the casing flange gasket is not packed in the proper installation sequence. Install the casing flange gasket between the guide assembly and the jack casing flange. See Figure 6 for proper installation sequence.

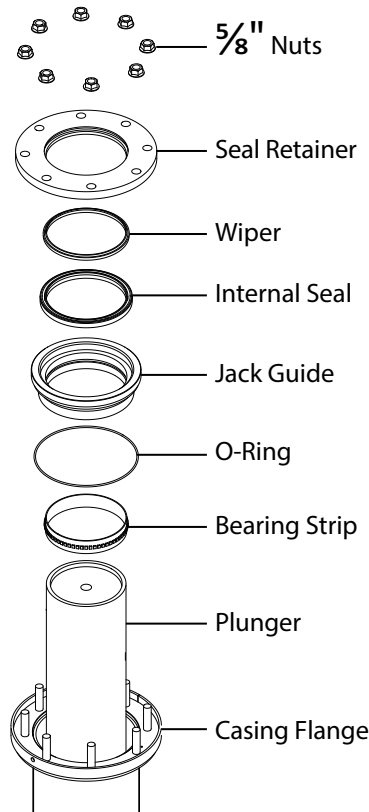


Figure 6 - Guide Assembly Sequence

1. Measure all of the casing sections and add their dimensions. Make allowances for the joints.
2. Measure all of the plunger sections, and add their dimensions. Ensure the length of the casing and the plunger are relatively the same.



The plunger lengths are equal to the total travel.
 Total travel = overtravel + floor-to-floor height – 1¹/₂".

Install the Casing Pipe



To avoid damage to the jack casing during multi-section assembly, closely follow the steps in this procedure, and carefully adhere to the assembly sequence numbers (stamped on casing sections) when assembling the PVC pipe.

1. Locate the bottom section of the casing, and inspect inside. Remove any trash.
2. Lower the casing into the jack hole, and leave 3' to 4' of casing extended out of the hole.
3. Fasten a clamp with a handle around the outside of the lower section of the casing about 2' from the top. See Figure 7. Take care not to over-tighten.

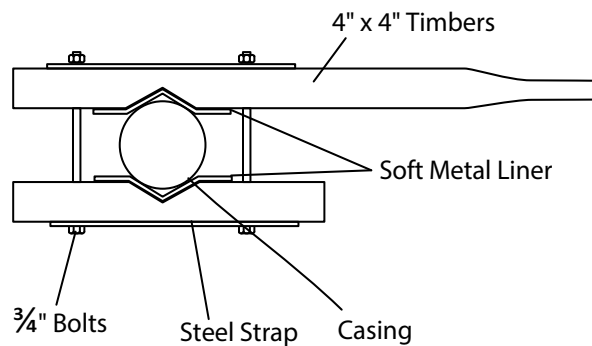


Figure 7 - Casing Clamp

4. Uncover the next section of casing, and inspect the inside. Remove any trash.
5. Hoist and lower the upper section into position over the lower section until the threaded connections line up.
 - a. Fasten a second clamp to the bottom end of the upper section.
 - b. Thoroughly clean the male and female threads.
 - c. Apply a thin coat of plunger joint lubricant (#9840011 or equivalent) on the male threads.
 - d. Align the sections to avoid cross-threading.
6. Screw the two sections together to form a tight joint, and check the straightness of the casing. Use the machined groove on the upper section to verify that the casing is flush with the top of the coupling on the lower casing section. See Figure 8 on page 14.



If the sections do not easily screw together, make sure the threads are clean, lubricated, and properly aligned.



Do not use excessive force to screw the sections together. If resistance occurs before the sections are completely tightened, unscrew the sections, repair the threads, realign the sections, and reassemble.

Install the Casing Pipe (continued)

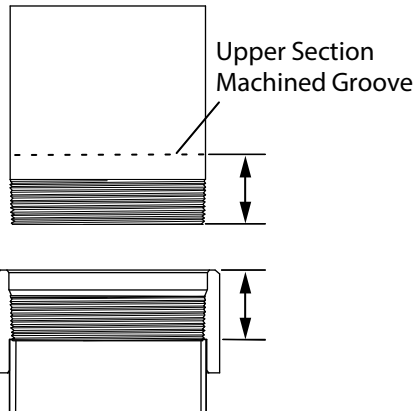


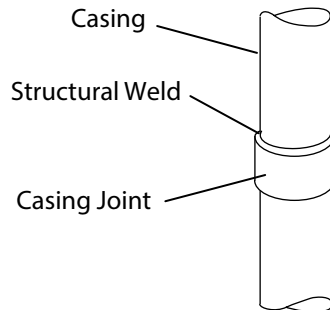
Figure 8 - Machined Groove (available up to 6-S)

7. Weld the casing joint (structural weld). See Figure 9.
 - a. Lay 1" welds on opposite sides and 90° to each other.
 - b. Lay a bead of required size between welds on opposite sides until a continuous bead is achieved. Go back and forth in 1" to 2" segments.
 - c. Check again for straightness.

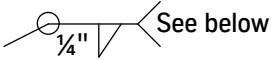


Weld casings at all joints to prevent leaks and ensure adequate pressure resistance.

8. Remove the two clamps from the casing, and lower the casing into the hole.
9. Repeat steps 3 through 8 until you have assembled all casing sections in proper sequence.



The weld must be a structural type, indicated by the symbol.

Jack Size	Weld
ALL	 See below

- Before welding, be sure the steel is clean. Remove burrs, paint, or coating in the weld area.
- Weld only in a well ventilated area. Ref: ANSI Z49.1, safety in welding, cutting, allied processes.
- Welding conforms to ASME A17.1/CSA B44 safety code for elevators and escalators, Section 8.8, other governing elevator code, or appropriate local regulatory authority.
- Fillet weld each cylinder joint to ensure leakproof operation and adequate pressure resistance. Ultimate tensile strength for electrode used should be no less than 70,000 psi.
- Base metal for jack cylinders is ASTM A53, Grade B. Base metal for couplings is ASTM A53 Grade B, A106 Grade B, or A519 Grade 1026.
- Refer to AWS D1.1 for suitable structural mild steel preheat specifications.
- Visually inspect welds to AWS D1.1 or CSA W59 (whichever is applicable) before painting or creating obstructions that prevent the welds from being inspected.

Figure 9 - Structural Welding of Casing Joints

Install the PVC Casing

ASME A17.1 requires corrosion protection for jacks installed below ground.

Recommended Tools

Portable saw	Cable clamp	Hoist
Tape measure	Safety solvent	Wire brush
$\frac{1}{8}$ " diameter steel cable	Gorilla Glue® (supplied with jack)	Drill motor
$\frac{3}{8}$ " drill bit	Black enamel paint, w/brush	

Installation

1. Install and lubricate the O-ring in the PVC flange.
2. Install the evacuation tube.
3. Hoist the assembled and welded jack casing at least 1' clear of the pit floor.
4. Swing the jack casing clear of the hole, and temporarily secure.



- For couplings: Glue the coupling to a piece of PVC that does not have a bell end. See Table 1 on page 16 for Manufacturer's Gorilla PVC Set and Cure Schedules.
- 14" PVC and larger do not have bell ends.

5. While clamping below coupling or bell end, lower a PVC section into the jack hole.



If the jack hole is sufficiently dry, then the PVC cap may be glued in place before lowering the first section into the jack hole.

6. Glue the next section to the previous section per Table 1 on page 16, and repeat this process until all sections of PVC are glued together.



The top of the PVC sticking out of the jack hole must be a bell end or a coupling.

7. With the PVC clamped below the bell end or coupling, lift and lower the jack assembly into the PVC. The PVC must touch or come within $\frac{1}{2}$ " of the pit mounting brackets on the jack.
8. Position the clamp assembly (274BX) so the holes are above the PVC flange by $\frac{3}{8}$ ".
9. Use holes in the clamp assembly as a template, and match drill the PVC for the $\frac{3}{8}$ " bolts.
10. Assemble the $\frac{3}{8}$ " bolts and clamp nuts with the nuts on the inside of the PVC. Do not over-tighten.
11. Glue the PVC cap to the pipe (if not previously installed). See Table 1 on page 16.



If water is present in the hole, lift the entire assembly clear of the jack hole, dry the bottom of the PVC and jack, and glue the PVC cap to the pipe per the instructions on the PVC glue can.



Remove any water present. Do not drill holes to puncture the PVC casing to sink the PVC into a wet hole.

Install the PVC Casing

(continued)

12. Allow the glue to cure per Table 1.
13. Lower the entire assembly into the jack hole.
14. Install the water sensor (as required).

Manufacturer's Gorilla PVC Set and Cure Schedules



Due to many variables in the field, use these figures as a general guide only.

Average Initial Set Schedule for Gorilla PVC Solvent Cement				
Initial Set Schedule is the necessary time to allow before the joint can be carefully handled.				
Temperature Range	Pipe Sizes 2 ¹ / ₂ " to 8"		Pipe Size 10" to 15"	Pipe Size 15" +
60°- 100° F	38 minutes		2.5 hours	5 hours
40°- 60° F	3 hours		11 hours	21 hours
0°- 40° F	18 hours		36 hours	72 hours
Average Joint Cure Schedule for Gorilla PVC Solvent Cement				
Joint Cure Schedule is the necessary time to allow before pressurizing the system. Use the figures below when relative humidity is 60% or lower. In damp or humid weather, allow 50% more cure time. These figures are estimates based on laboratory tests using water. Extended set and cure times are required for chemical applications.				
Temperature Range	Pipe Size 2 ¹ / ₂ " to 8"		Pipe Size 10" to 15"	Pipe Size 15" +
	Up to 160 psi	160 to 370 psi	Up to 100 psi	Up to 100 psi
60°- 100° F	2 hours	30 hours	60 hours	90 hours
40°- 60° F	5 hours	64 hours	128 hours	8 days
0°- 40° F	108 hours	12 days	12 days	21 days

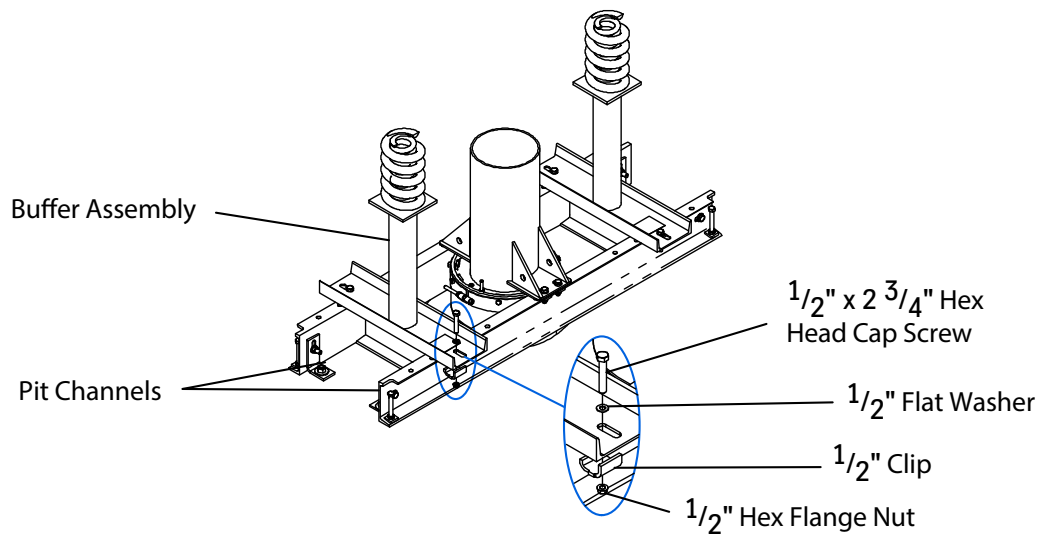
Table 1 - Manufacturer's Gorilla PVC Set and Cure Schedules

Install the Pit Channel & Buffer Stands

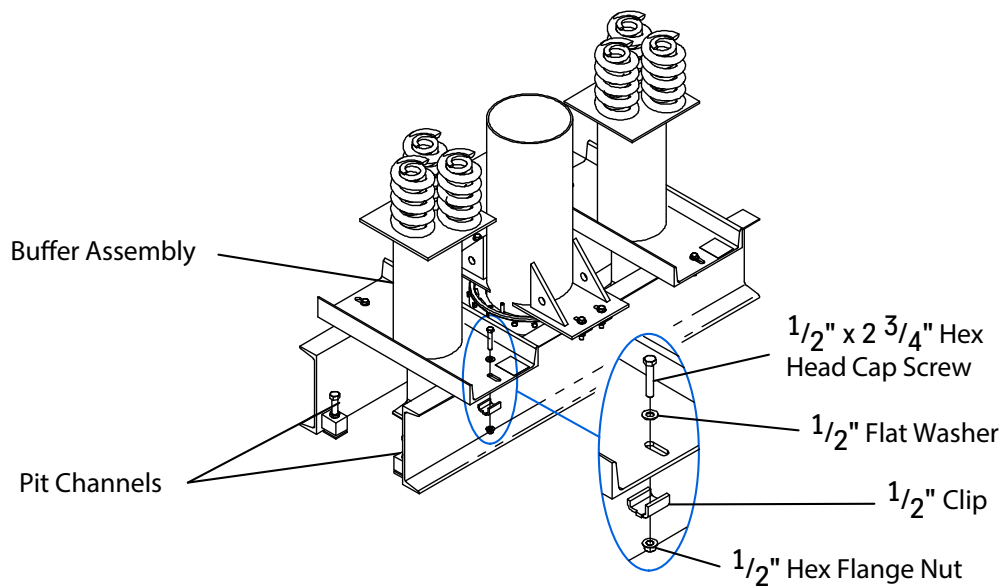
1. Use the supplied leveling brackets and hardware to anchor the pit channels to the pit floor. See Figure 10 on page 17.
2. Position the buffer stands according to the job layout, and attach the buffer stands to the pit channels.

Install the Pit Channel and Buffer Stands

(continued)



Example Buffer Arrangement for 3S - 6S



Example Buffer Arrangement for 6S Oversize - 15S

Figure 10 - Pit Channel with Buffer Stands Installation Examples

Plumb the Jack

Spider Jack Plumb

- An alternate plumbing method is on page 19.
 - Recommended tool - Plunger Lifting Tool (850PR1).
1. Place a support across the hoistway as far above the jack as possible.
 2. Locate the connection (shown as the pulley) directly above the center of the jack. Refer to Figure 11 for all steps in this procedure.



The jack cannot be more than $\frac{1}{2}$ " off the centerline.

3. Fasten the spider to the plumb line, and hang it from the support.
4. Note the location of the spider.
5. Shift the pulley on the support until the spider falls directly above the casing.



If the pulley is not located correctly, the jack cannot be plumbed properly.

6. Fasten the pulley firmly in place so that it cannot shift.
7. Slowly lower the spider into the casing, and note whether the plumb line moves as the spider descends. See Figure 11.
 - When the jack is plumb, the plumb line is in the center of the top of the jack, and the spider rotates freely in the bottom of the casing.
 - If the plumb line is not at the exact center of the top of the jack, the casing is out of plumb. Shift the casing at the bottom to bring it into plumb. Use shims and jack bolts.
 - When the spider is at the bottom of the casing, ensure that the plumb line is at the exact center of the top of the jack.
 - If the top of the jack is moved, relocate the pulley.

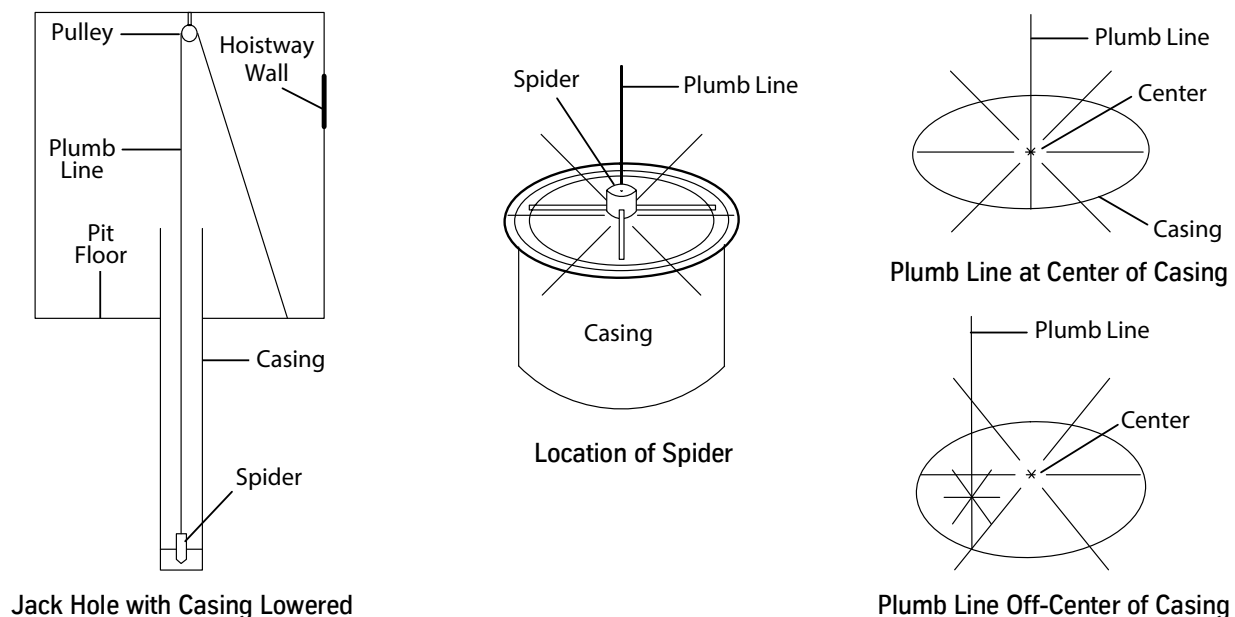


Figure 11 - Spider Jack Plumbing Method

Plumb the Jack

(continued)

Alternate Jack Plumbing Method

(for multi-section, large diameter jack casings)

1. Mount two guide lines 6" from the spider line to form a right angle. See Figure 12.
2. Lower the spider into the casing until it reaches the bottom.



As the spider is lowered, watch for bends or curves in the casing.

3. Move the bottom of the casing until the spider line measures exactly 6' from each of the plumb guide lines.



If unable to shift the casing bottom and the board has to be moved off-center, call Manufacturing to have the platform design checked for off-center loading. The casing may have to be pulled out of the hole and reinserted to obtain a closer center.

4. Move the top of the casing until the spider line falls in the exact center of the casing.



When the casing is plumb, the spider line is exactly 6" from both guide lines and at the exact center of the top of the casing.

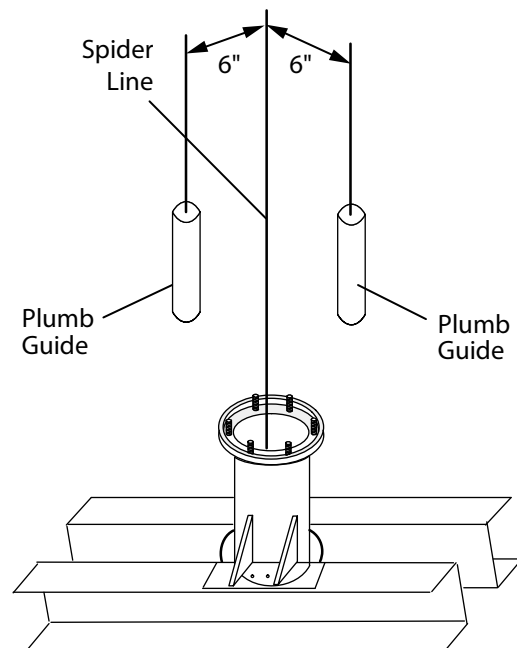
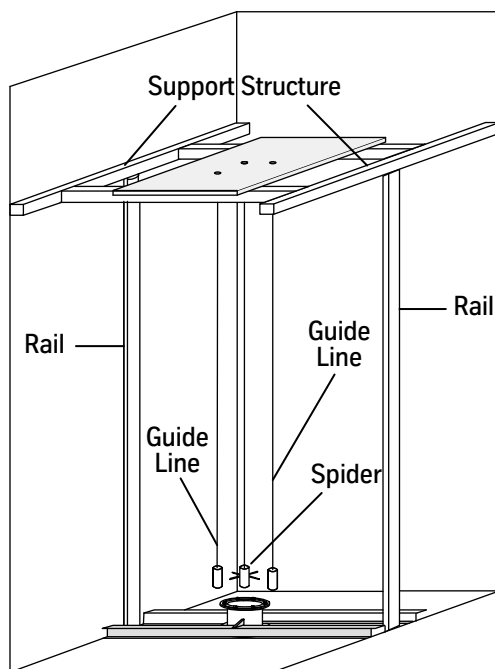


Figure 12 - Alternate Spider Jack Plumbing Method

Backfill the Hole

1. Use sand or a similar non-corrosive material to fill the hole carefully and evenly about 3' above the bottom of the casing.



To avoid pushing the casing out of plumb, slowly add the material in small portions around the casing.

2. Check the plumb line to ensure that the casing did not move.
3. If the casing moves out of plumb, "jet" the jack assembly and adjust as needed to attain the plumb line.
4. Install support material around the top of the jack casing, and seal hole with concrete.
5. Tighten the tie-down bolts on the pit channels.
6. After the jack is plumb, shim or grout (or both) the pit channels between the channel and the floor at the edge of the jack hole.

Install the Plunger

1. Unwrap the lower section of the plunger.
2. Lower the plunger section into the casing until 2' to 3' of the plunger is extended above the casing flange.
3. Secure a jack clamp to the plunger section 2' to 3' below the threaded connection, and lower this section until the clamp rests on the casing flange. See Figure 13.
4. Clean the plunger threads of any foreign material.
5. Unwrap the next section, and check that the identifying numbers match.
6. Hoist and lower this section directly over the first section, and install a second jack clamp 2' to 3' above the threads.
7. Lubricate the O-ring with oil, pass it over the plunger threads, and mount the O-ring in the O-ring groove. See Figure 14 on page 21.

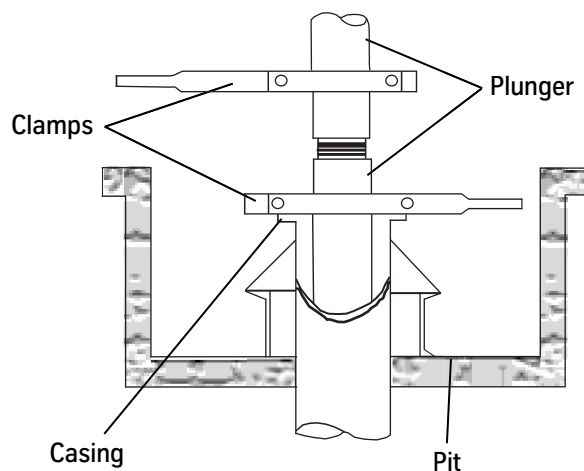


Figure 13 - Jack Clamp

Install the Plunger

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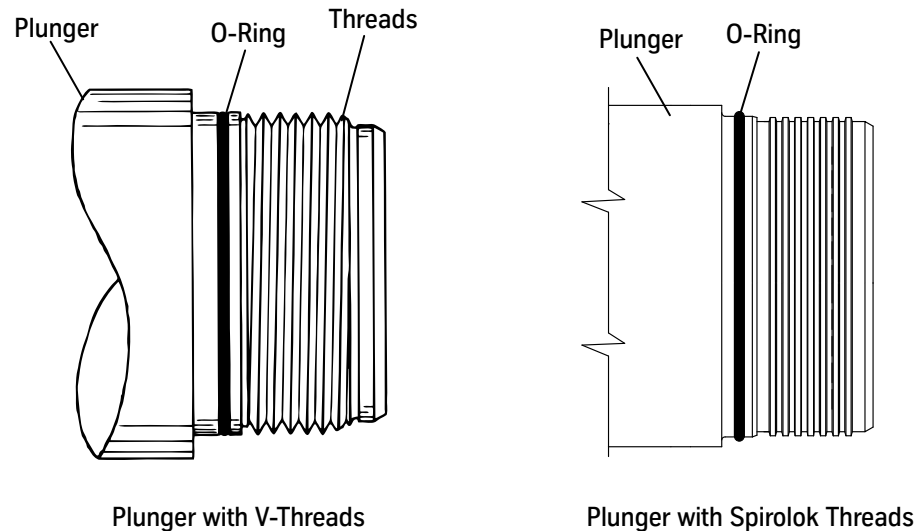


Figure 14 - O-Ring on Plunger Threads

8. Thoroughly clean the male and female threads, and apply a thin coat of plunger joint lubricant (#9840011 or equivalent) on the male threads.
9. Align the sections to avoid cross-threading.



Do not use excessive force to screw the sections together. If resistance occurs before the sections are fully tightened, unscrew the sections, repair the threads, realign the sections, and reassemble.

10. With the threads properly engaged, screw the two sections of the plunger firmly together until the two blue alignment marks (one on either side of the joint) are opposite each other.



- If the threads are clean, lubricated, and properly aligned, the sections easily screw together.
- When fastened, these marks pass each other slightly due to "thread stretch."

11. Inspect the pipe for any burrs at the joint. If any are found, use very fine emery paper to smooth them.


12. Repeat steps 6 through 12 until all sections of the plunger are assembled.

13. Lower the assembled plunger into the casing.



- If a travel limiting sleeve is provided, slip it over the plunger (with longest section last) after the casing is filled with oil. Let it come to rest on the stop ring.
- The travel limiting sleeve fits at the joint of a multi-section plunger.

Install the Guide Assembly and Casing Flange Gasket

1. Dip the casing flange gasket in oil, place the gasket over the end of the plunger, and push the gasket down into the groove in the jack casing flange.
-  • Position the casing flange gasket between the guide assembly and casing flange in the casing flange groove. See Figure 15.
- When installing the guide assembly, take care not to dislodge, pinch, or cut the casing flange gasket.
2. Place the guide assembly over the plunger, and line up the studs on the casing flange with the holes in the guide assembly flange.
 3. Install nuts and washers, and tighten as necessary.

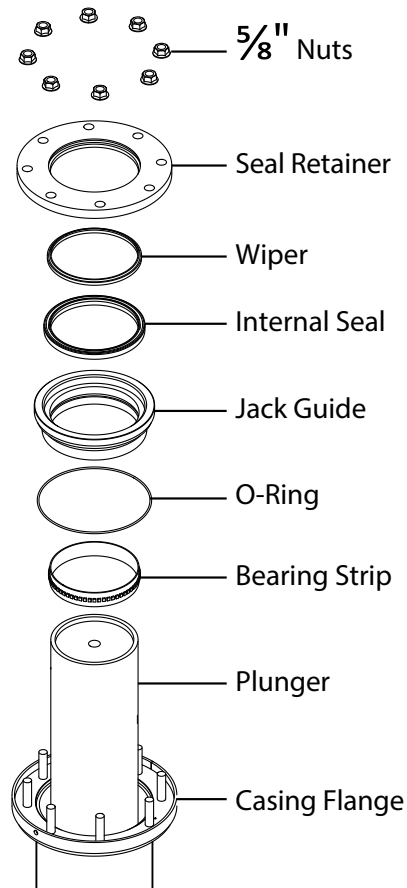


Figure 15 - Guide Assembly Sequence

Install the Seal

1. Use the oil supplied with the job to lubricate the seal and the exposed surface of the plunger.
2. Place the seal on top of the plunger. Make sure the lip of the seal faces down toward the pressure side. See Figure 16.
3. Carefully position the seal to evenly slide down the plunger.

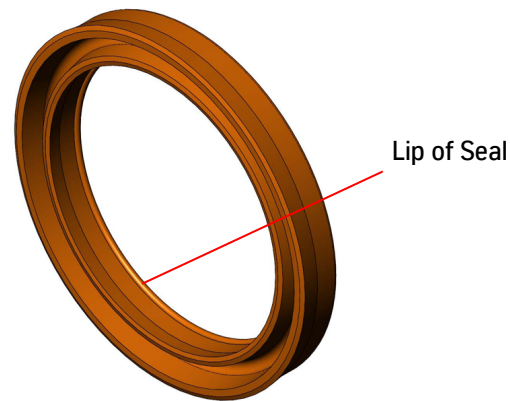


Figure 16 - Seal Orientation

4. Work the seal evenly down the plunger until it bottoms in the stuffing box.
5. Check that the seal is evenly bottomed all the way around the plunger.
 - a. Install the seal retainer with the wiper, if applicable.
 - b. For the 3-S jack: install the retainer ring.
 - c. For the 4-S jack or higher:
 - Install and finger-tighten the retainer nuts.
 - Tighten the nuts in even rotation until the seal retainer seats against the guide assembly flange.



Ensure that there is no gap or clearance between the seal retainer flange and the guide assembly flange.

Install the Overspeed Valve

1. Install the overspeed valve within 12" of the jack. See Figure 17 for proper orientation of the valve.
2. Turn the adjustment screw out (counter-clockwise) to ensure that the valve does not set during construction and adjustment of the control valve.



This valve is directional. Connect the jack to the outlet designated as "JACK."

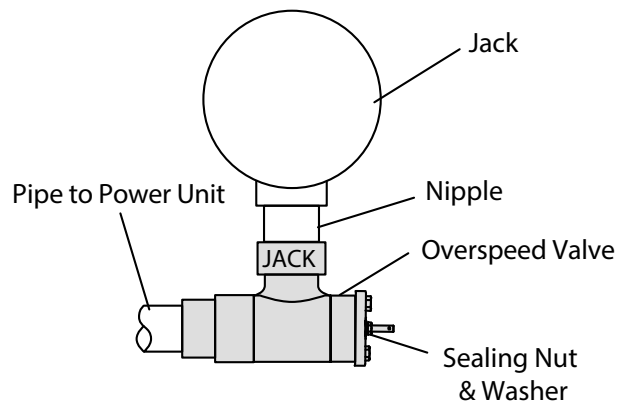


Figure 17 - 2" Overspeed Valve (90° shown, in-line available)

3. Complete the oil line piping from the overspeed valve to the shutoff valve.
4. Install piping from the shutoff valve to the power unit.
5. Install the appropriate pipe stands to support the oil line.

Install the Jack Sensor



Keep the sensor as clean as possible during installation.

When Overall Jack Length is Known

1. Remove the $\frac{1}{4}$ " - 28 manufacturing plug in the metal ring at the top of jack casing.
2. Measure for wire length.
 - a. Measure the L dimension on the jack. See Figure 18.
 - b. Adjust the strain relief nut so that $S = L - 4$ ".
 - c. Make a reference mark as shown in Figure 18.
 - d. Tighten the strain relief nut on the sensor lead.
 - e. Install the sensor through the $\frac{1}{4}$ " - 28 opening in the top of the jack casing.

When Overall Jack Length is Unknown

1. Remove the $\frac{1}{4}$ " - 28 manufacturing plug in the metal ring at top of jack casing.
2. Measure for wire length.
 - a. Find the total travel dimension on the job layout drawings.
 - b. Measure the reference dimension. See Figure 18.
 - c. Adjust the S dimension = Total travel – Reference dimension + 7".



This initial setting must be within ± 6 " of the final adjustment.

- d. Make a reference mark as shown.
- e. Hand-tighten the strain relief nut on the sensor lead.
- f. Install the sensor.
- g. If the cable does not go slack, let the sensor down until the cable goes slack.
- h. After the cable goes slack, pull up until the cable is taut, and then pull up an additional $2\frac{1}{2}$ ".
- i. Slide strain relief down to bulkhead, and tighten strain relief nut on cable.

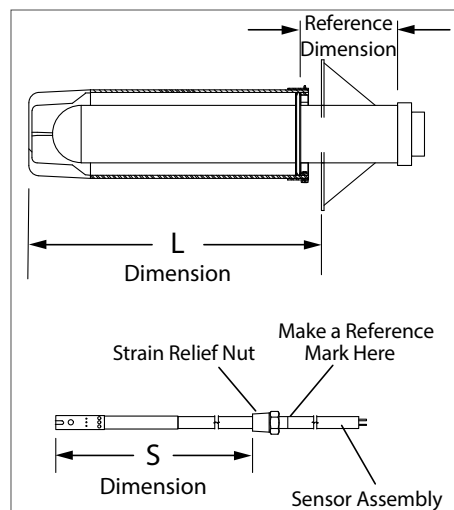


Figure 18 - Jack Sensor Installation Measurements

Install the Jack to the Platen Connection

1. Connect the plunger to the platen, and prepare the elevator for service.
 - a. Use the supplied hardware to clip the platen plate to the bolster channels. Do not fully tighten the hardware so that the platen can be moved.
 - b. Position the platform close to the bottom landing.
 - c. Manually activate the power unit to slowly push the plunger up against the platen plate.
 - d. Install the jump bolt through the platen plate, and tighten in the jack.
 - e. Align the platen (as necessary), and tighten the platen clips to the bolster channels. See Figure 19.
 - f. Move the car up, and remove all material that was used to support the car.
 - g. Check for clear access of the entire hoistway.
2. Verify that oil is at the proper level in the power unit, and bleed all air out of the jack.
3. Run the car up and down several times. Check that the plunger does not rub the casing at any point in the hoistway.



If necessary to prevent the plunger from rubbing on the casing, slightly move the platen.

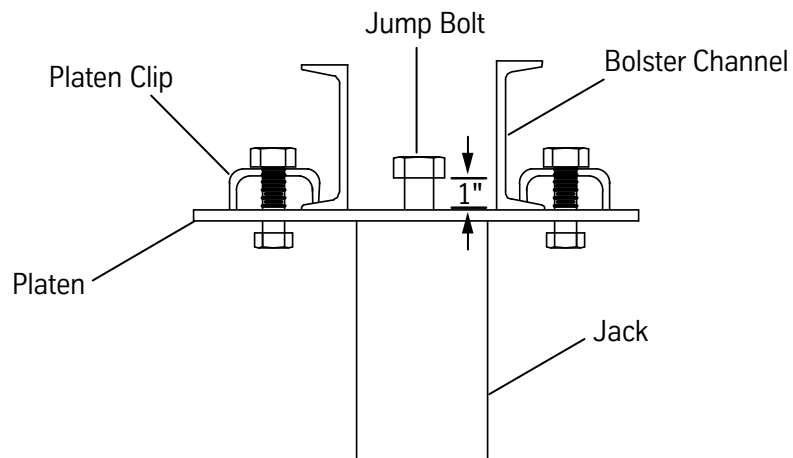


Figure 19 - Jump Bolt through Platen Plate

Control Valve Adjustment Overspeed Valve Adjustment

When the job is complete and all cab weight is final, perform the final control valve adjustment. See the appropriate component manual for details.

Install the Support Pipes

The support pipes can be stored on the rear wall of an Oildraulic[®] installation. Job conditions dictate whether the pipes can be stored there.

1. Remove the springs from the buffer stands.
2. Lower the car until it rests on the buffer stands.
3. Measure to ensure minimum clearance space for pipe storage.



- The distance between the platform and the rear wall must be greater than 3".
 - The distance from the pit floor to the bottom of the platform nearest the rear wall must be greater than 24".
 - If minimum clearance space is not met, do not install the support pipes on the rear wall.
4. Locate and install the provided anchor bolts. See Figure 20 for dimensions.
 5. Place each bracket over a bolt, and tighten the bolt.
 6. Place the support pipes on the brackets.

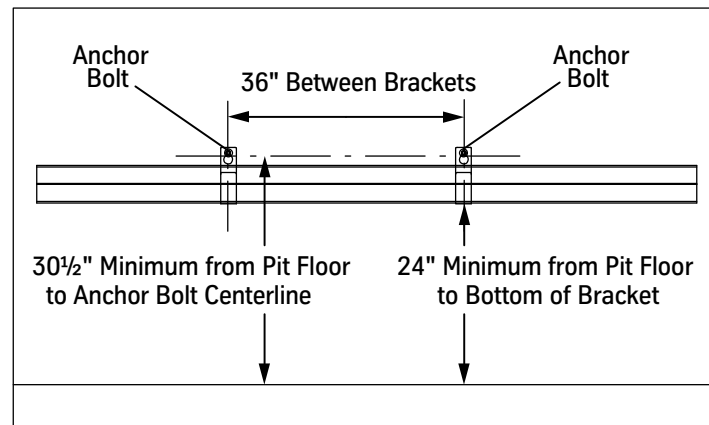
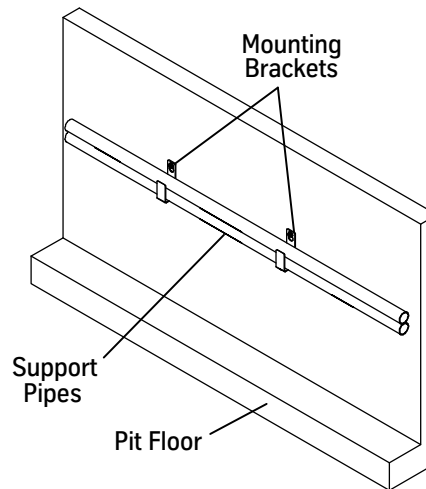


Figure 20 - Support Pipe Mounting Bracket Kit

Maintenance

Seal Replacement

1. Before replacing the seal:
 - a. Slowly run the jack up.
 - b. Check the entire length of the plunger for scratches and nicks.
 - c. Sand or fill imperfections.
2. Place two pipes (approximately 7' in length) over the formed spring guides on the buffer stands.
3. Use Inspection Operation to carefully lower the car down on the pipe stands.
4. Turn OFF, Lockout, and Tagout the mainline disconnect.
5. Mark the exact location of the platen plate on the bolster.
6. Loosen the bolts holding the platen to the bolster channels.
7. Move the clips out of the way.
8. Open the manual lowering valve to lower the plunger completely.
9. Remove the 1" bolt and platen from the top of the plunger.
10. Close the shut-off valve.
11. Use two flat blade screwdrivers to remove the spiral snap ring.
12. Screw two #10-24 screws into the tapped holes in the seal retainer.
13. Use two pairs of pliers to pull the retainer from the recess.
14. Screw the packing removal tools or two drywall screws into the seal.
15. Without scratching the plunger or seal recess in the guide, pull the seal from the recess.
16. Use clean rags to remove all oil from the seal recess to ensure that the seal can properly seat.
17. Check the seal recess for any scratches that can cut the seal. If scratches are present, polish out the scratches or replace the guide.

Install New Seal

See Install the Seal on page 23.

Replacement Parts

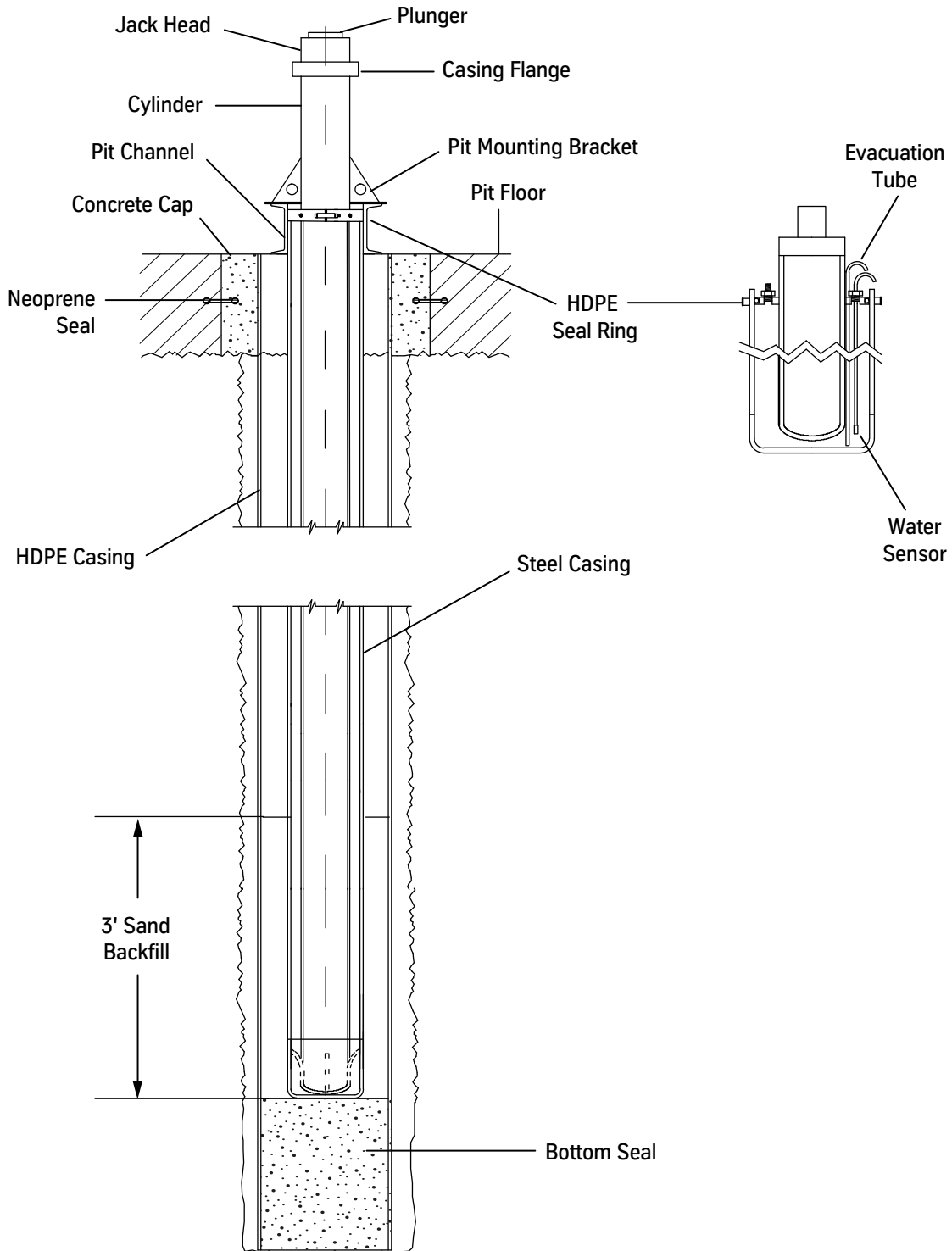
See Replacement Parts on page 45.

Single Section Jacks

Overview


Before turning the job over to the customer, replace the seal. See Seal Replacement on page 44.

Single Section Jack with High Density Polyethylene (HDPE) Pipe



Jack Hole Measurement & Drilling

1. Use the job layouts that include a sectional view and a hoistway plan to determine the proper location for the jack assembly. For an example, see Figure 21.
 2. Verify that the pit dimensions are correct per the job layout.
 3. Measure and mark the exact location for the jack's centerlines.
 4. Mark the location of the jack hole.
 5. Add the following measurements to determine total minimum depth of the jack hole:

The complete length of the jack casing + 3" + length of the bottom seal.
 6. Verify the jack casing size, including the protection system and coupling, to determine the proper drill size. See Conventional Jack Data on page 50.
 7. Verify that the drill size allows ample space for plumbing.
 8. Set up the drilling rig, and begin drilling.
-  • Check that the hole is plumb every 10'. Make corrections as needed.
- Place a steel casing in the hole to prevent the hole from caving in.

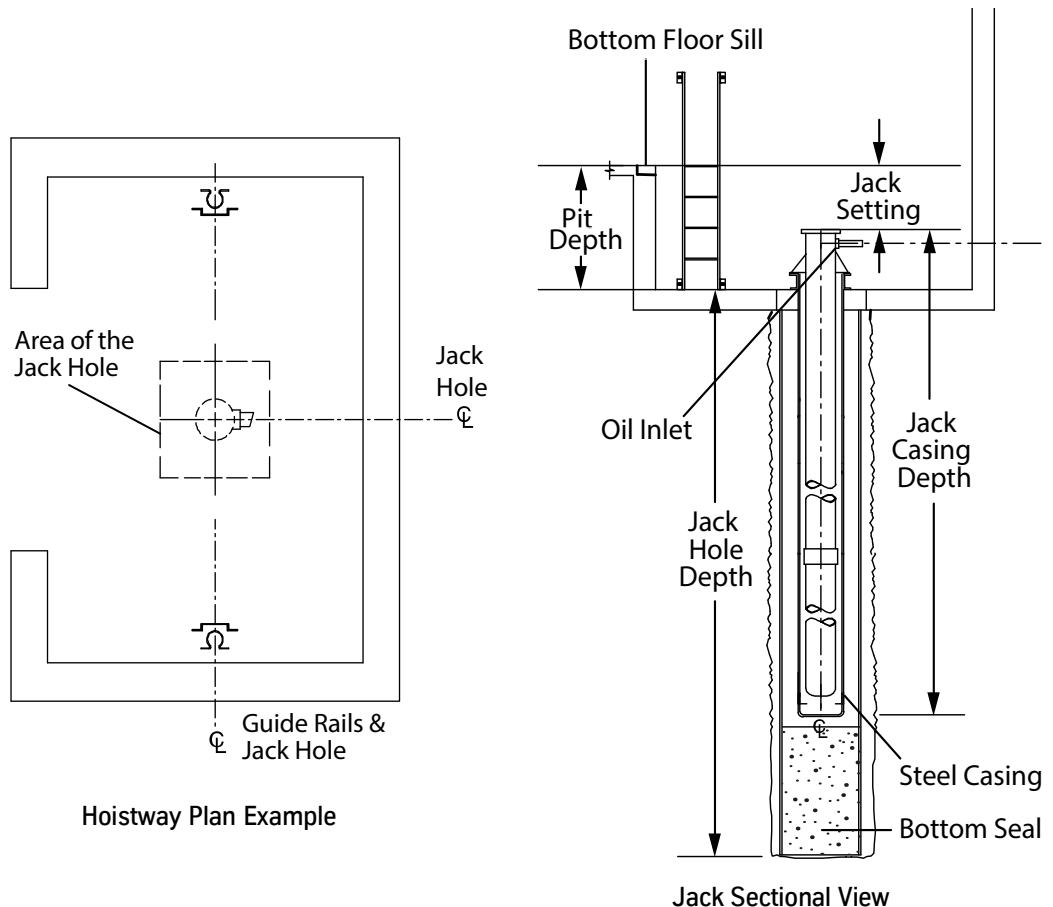


Figure 21 - Hoistway Plan and Sectional View

Prepare the Hoistway

1. Compare the centerline of the rails and the jack hole to the hoistway layout. See Figure 22.



The rails and the jack must maintain a common centerline. If necessary, relocate (push/pull) the rails. This common centerline may be violated only if the platform design has been checked by Manufacturing for off-center loading. If side-to-side deviation of the placement of the jack between rails occurs, call Manufacturing.

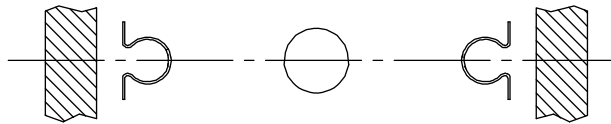


Figure 22 - Rail and Jack Centerline

2. From the top landing, check the travel and plumb of the front walls and floor landings. See Figure 23.

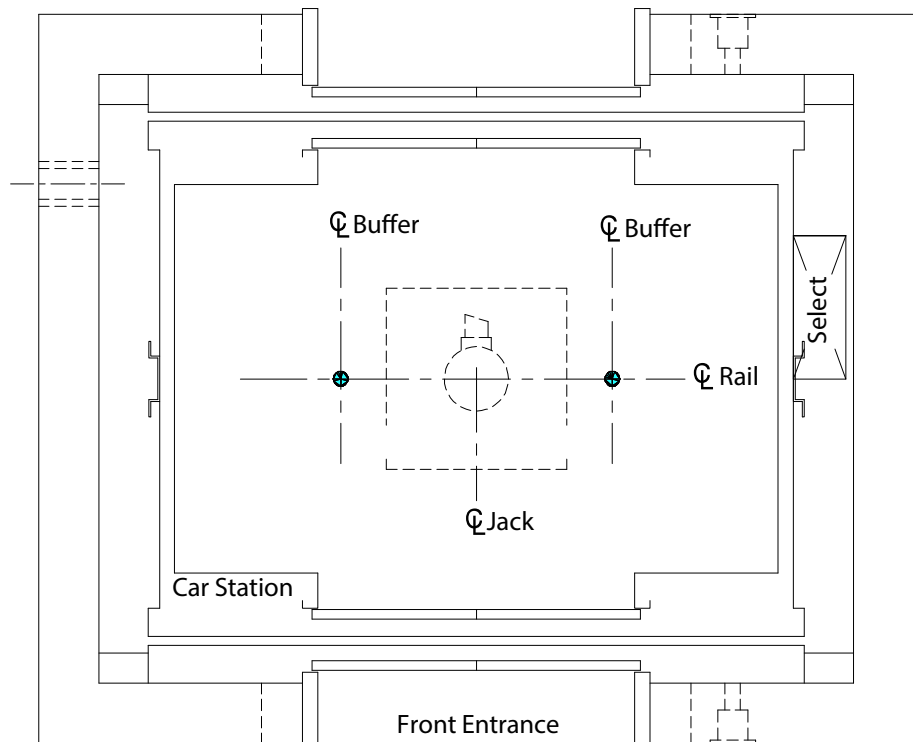


Figure 23 - Example Layout

Installation

Rails & Rail Brackets

1. Mark the centerlines for the jack and the centerline for each rail on the pit floor.



- Use the "corridor line" supplied by the contractor to determine the jack centerline.
- Locate the centerline marks for each rail bracket and the two outer edges of the rail, which Manufacturing has marked for rail alignment.

2. Install a rail bracket on one wall in the pit.
 - a. Use a plumb bob or a laser to determine rail bracket locations.



Use the centerline mark for each rail on the pit floor as a reference.

- b. Mark the wall to show the location of the lowest rail bracket at a solid anchor point 6" to 8" below the lowest floor on the pit side wall.
 - c. Drill holes for anchor bolts, or weld the bracket to the beam. See Figure 24.
 - d. Loosen the rail clips, and center and tighten the keyhole bracket (alignment tab).
 - e. Center and tighten the mounting angles to the wall.
 - f. Align and plumb the bracket to the mounting angles (per alignment marks), and lock the bracket to the mounting angles. See Figure 24.
3. Use a proper method for access, and repeat the above steps to install the remaining rail brackets on the current working side.

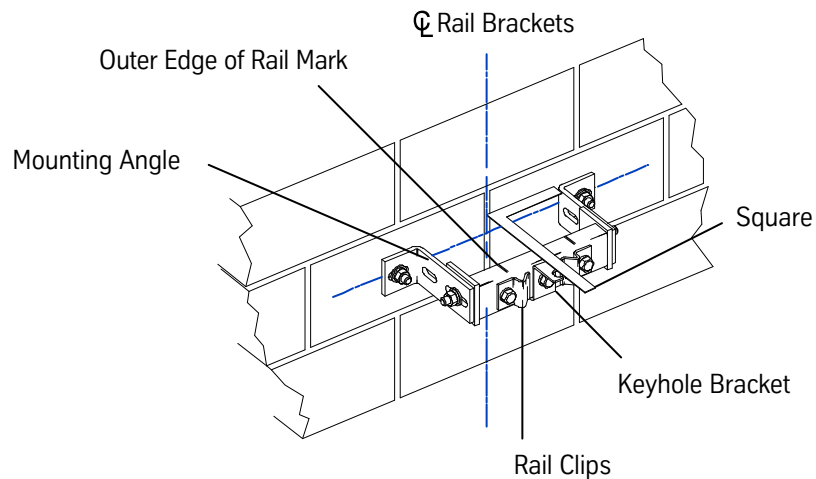


Figure 24 - Rail Bracket Location

4. Plumb the king rail.
 - a. Use magnets to attach plumb lines to the front and the side of the upper bracket at the top rail.
 - b. Adjust the top of the rail so that the distance between the plumb line and the rail is exactly the thickness of the magnets (measured at the top and bottom).
 - c. Lock the first rail in place.
5. Mount rail brackets on the opposite wall, and align them to the wall marks.

Rails & Rail Brackets

(continued)

6. Attach the other rail to its brackets and plumb front-to-back.
7. Use a Distance Between Guides (DBG) gauge to adjust the face of this rail to the king rail.
8. Install the support beam mounting assembly for hoisting and setting the jack. See Figure 25.



If additional height is needed, install a 4' to 6' section of rail on top of the existing rail; then install the support beam mounting assembly.

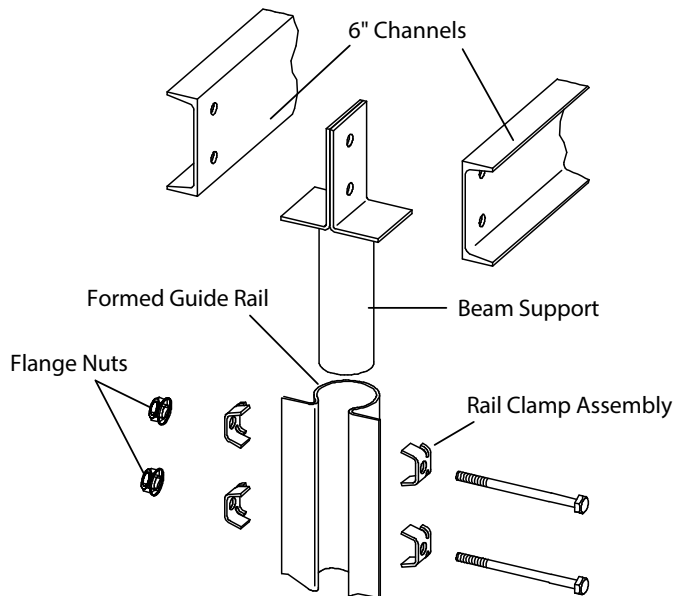


Figure 25 - Support Beam Mounting

Prepare the Jack



If completion of the elevator is not expected to occur soon after the jack assembly is installed, fill the casing with oil to prevent rust.

1. Remove the shipping strap that holds the plunger in the casing, and pull the plunger out to the full extent of its travel.



Take care not to damage the plunger finish.

2. Inspect the exposed plunger. If there is any shipping damage or corrosion that may pass through the seal during inspection, contact Manufacturing.

3. Measure the length of the exposed plunger, which equals the total travel.

$$\text{Total travel} = \text{overtravel} + \text{floor-to-floor height} - 1\frac{1}{2}''.$$

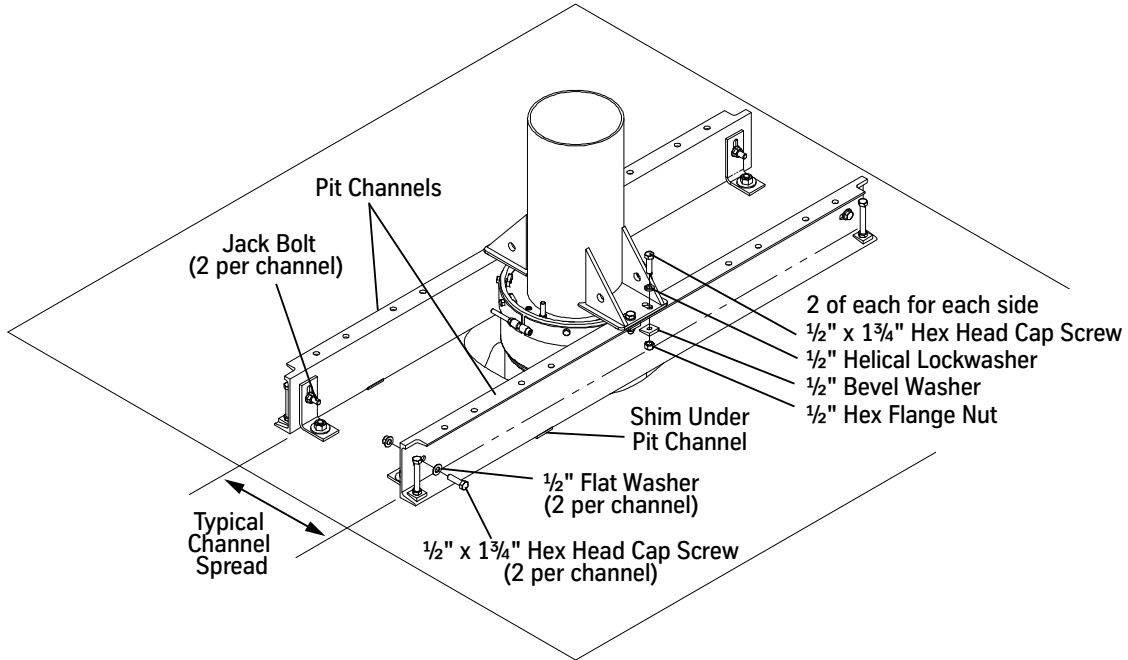


If the exposed plunger measures noticeably less than the total travel, measure the length of the jack casing and compare it with the exposed plunger length. In some cases, plunger protection has been added during manufacturing and a metal tag has been attached to the casing. Before installation, remove the plunger protection.

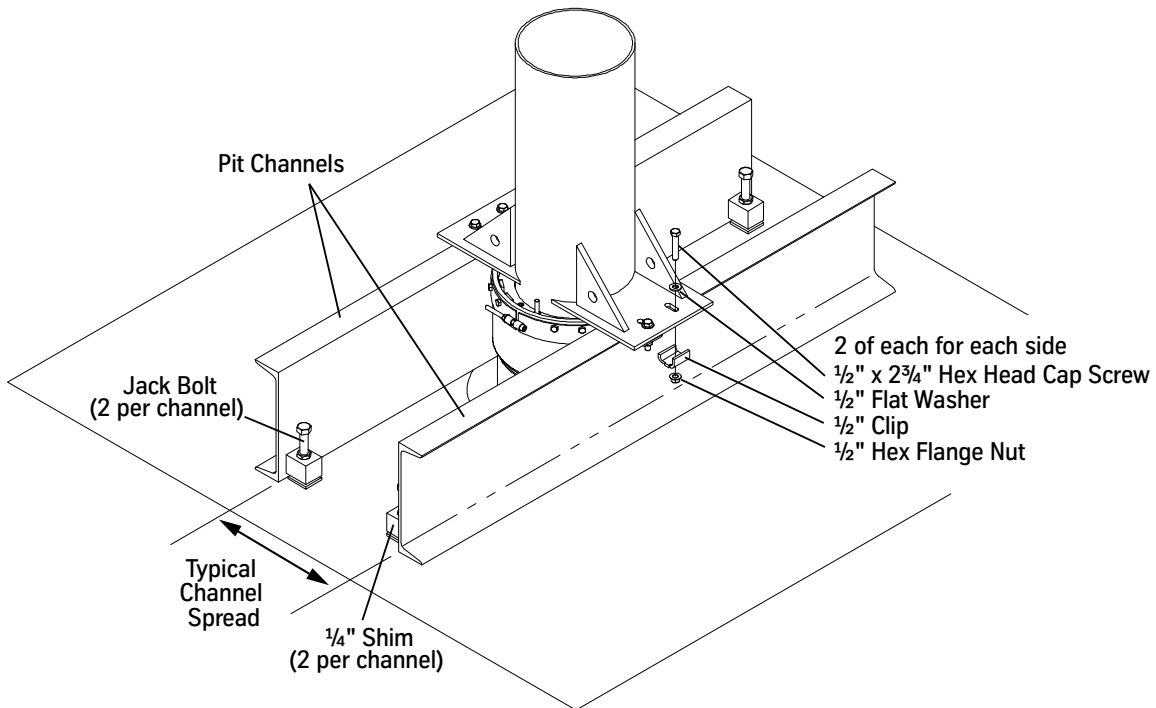
4. Push the plunger back into the jack casing.

Install the Jack

1. Use a clevis and safety hook with latch to hoist and lower the jack into place.
2. Bolt pit channels firmly against clamp ring of HDPE jack covering. See Figure 26.



Installation Arrangement for 3S – 6S Jacks



Installation Arrangement for 6S Oversize – 15S Jacks

Figure 26 - Pit Channel Installation

Plumb the Jack

1. Install and plumb the first rails and brackets.
2. Center piston and pit steel to the center of the rails, and fasten to the pit floor.
3. Pull the centering line cable out $\frac{1}{8}$ ". See Figure 27.
4. String a wire across the top of the first set of rails, and attach the centering line at the center point of the rails.
5. Move jack with jack bolts until centering line is in center of platen plate bolt hole.

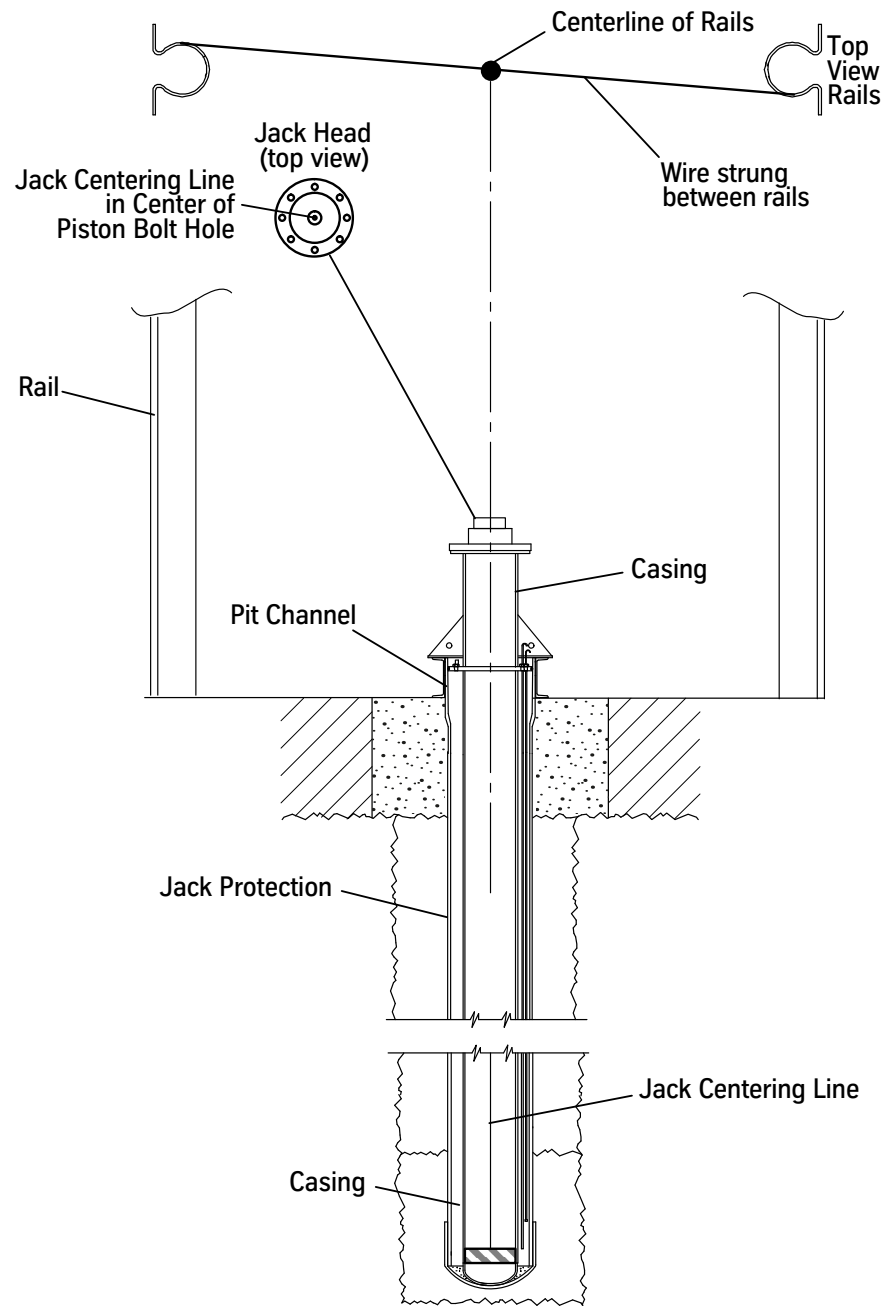


Figure 27 - Jack Alignment

Backfill the Hole

1. Use sand or a similar non-corrosive material to fill the hole carefully and evenly about 3' above the bottom of the casing.



To avoid pushing the casing out of plumb, slowly add the material in small portions around the casing.

2. Check the plumb line to ensure that the casing did not move.
3. If the casing moves out of plumb, "jet" the jack assembly and adjust as needed to attain the plumb line.
4. Install support material around the top of the jack casing, and seal hole with concrete.
5. Tighten the tie-down bolts on the pit channels.
6. After the jack is plumb, shim or grout (or both) the pit channels between the channel and the floor at the edge of the jack hole.
7. Reinstall the plunger, if applicable.

Install the Guide Assembly and Casing Flange Gasket

1. Dip the casing flange gasket in oil, place the gasket over the end of the plunger, and push the gasket down into the groove in the jack casing flange.



- Position the casing flange gasket between the guide assembly and casing flange in the casing flange groove. See Figure 28.
 - When installing the guide assembly take care not to dislodge, pinch, or cut the casing flange gasket.
2. Place the guide assembly over the plunger, and line up the studs on the casing flange with the holes in the guide assembly flange.
 3. Install nuts and washers, and tighten as necessary.

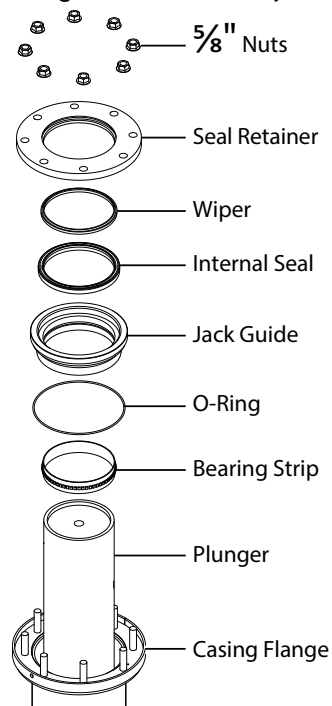


Figure 28 - Guide Assembly Sequence

Install the Seal

1. Use the oil shipped with the job to lubricate the seal and the exposed surface of the plunger.
2. Place the seal on top of the plunger. Make sure the lip of the seal faces down toward the pressure side. See Figure 29.
3. Carefully position the seal to evenly slide down the plunger.

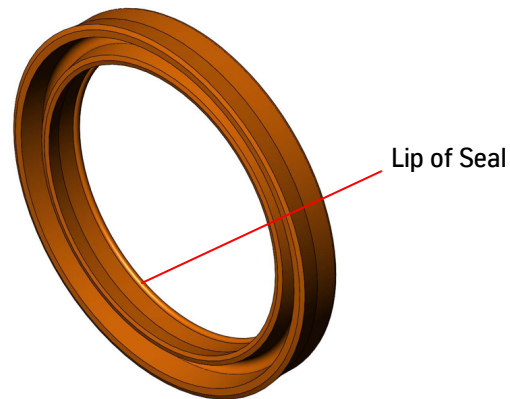


Figure 29 - Seal Orientation

4. Work the seal evenly down the plunger until it bottoms in the stuffing box.
5. Check that the seal is evenly bottomed all the way around the plunger.
 - a. Install the seal retainer with the wiper, if applicable.
 - b. For the 3-S jack: install the retainer ring.
 - c. For the 4-S jack or higher:
 - Install and finger-tighten the retainer nuts.
 - Tighten the nuts in even rotation until the seal retainer seats against the guide assembly flange.
 - d. Ensure that there is no gap or clearance between the seal retainer flange and the guide assembly flange.

Install the Overspeed Valve

1. Install the overspeed valve within 12" of the jack. See Figure 30 for proper orientation of the valve.
2. Turn the adjustment screw out (counter-clockwise) to ensure that the valve does not set during construction and adjustment of the control valve.



This valve is directional. Connect the jack to the outlet designated as "JACK."

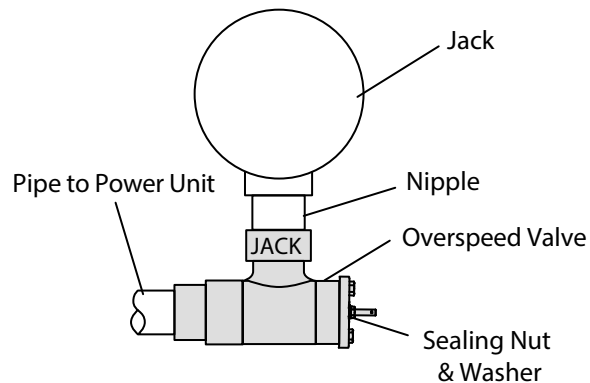


Figure 30 - 2" Overspeed Valve (90° shown, in-line available)

3. Complete the oil line piping from the overspeed valve to the shutoff valve.
4. Install piping from the shutoff valve to the power unit.
5. Install the appropriate pipe stands to support the oil line.

Install the Jack Sensor



Keep the sensor as clean as possible during installation.

When Overall Jack Length is Known

1. Remove the $\frac{1}{4}$ " - 28 manufacturing plug in the metal ring at top of jack casing.
2. Measure for wire length.
 - a. Measure the L dimension on the jack. See Figure 18.
 - b. Adjust the strain relief nut so that $S = L - 4$ ".
 - c. Make a reference mark as shown in Figure 18.
 - d. Tighten the strain relief nut on the sensor lead.
 - e. Install the sensor through the $\frac{1}{4}$ " - 28 opening in the top of the jack casing.

When Overall Jack Length is Unknown

1. Remove the $\frac{1}{4}$ " - 28 manufacturing plug in the metal ring at top of jack casing.
2. Measure for wire length.
 - a. Find the total travel dimension on the job layout drawings.
 - b. Measure the reference dimension. See Figure 18.
 - c. Adjust the S dimension = Total travel – Reference dimension + 7".



This initial setting must be within ± 6 " of the final adjustment.

- d. Make a reference mark as shown.
- e. Hand-tighten the strain relief nut on the sensor lead.
- f. Install the sensor.
- g. If the cable does not go slack, let the sensor down until the cable goes slack.
- h. After the cable goes slack, pull up until the cable is taut, and then pull up an additional $2\frac{1}{2}$ ".
- i. Slide strain relief down to bulkhead, and tighten strain relief nut on cable.

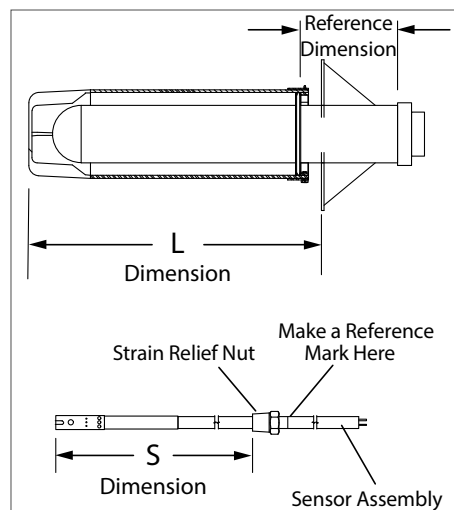


Figure 31 - Jack Sensor Installation Measurements

Install the Jack to the Platen Connection

1. Connect the plunger to the platen, and prepare the elevator for service.
 - a. Use the supplied hardware to clip the platen plate to the bolster channels. Do not fully tighten the hardware so that the platen can be moved.
 - b. Position the platform close to the bottom landing.
 - c. Manually activate the power unit to slowly push the plunger up against the platen plate.
 - d. Install the jump bolt through the platen plate, and tighten in the jack.
 - e. Align the platen as necessary, and tighten platen clips to the bolster channels. See Figure 32.
 - f. Move the car up, and remove all material that was used to support the car.
 - g. Check for clear access of the entire hoistway.
2. Verify that oil is at the proper level in the power unit, and bleed all air out of the jack.
3. Run the car up and down several times. Check that the plunger does not rub the casing at any point in the hoistway.



If necessary to prevent the plunger from rubbing on the casing, slightly move the platen.

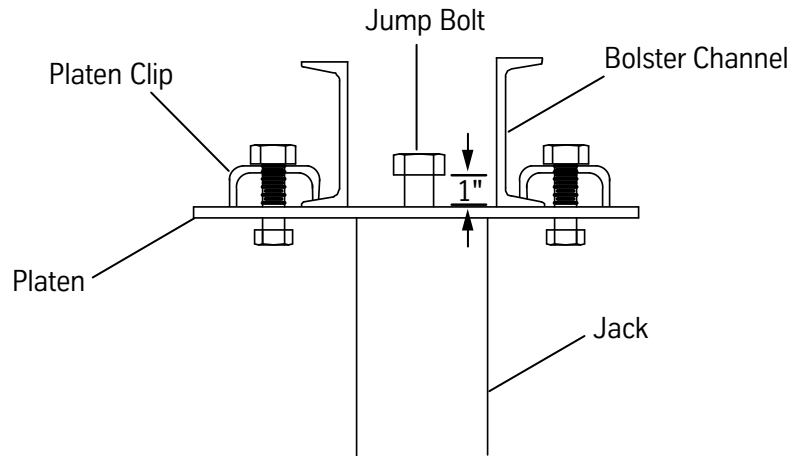


Figure 32 - Jump Bolt through Platen Plate

Control Valve Adjustment Overspeed Valve Adjustment

When the job is complete and all cab weight is final, perform the final control valve adjustment. See the appropriate component manual for details.

Install the Support Pipes

The support pipes can be stored on the rear wall of an Oildraulic[®] installation. Job conditions dictate whether the pipes can be stored there.

1. Remove the springs from the buffer stands.
2. Lower the car until it rests on the buffer stands.
3. Measure to ensure minimum clearance space for pipe storage.



- The distance between the platform and the rear wall must be greater than 3".
 - The distance from the pit floor to the bottom of the platform nearest the rear wall must be greater than 24".
 - If minimum clearance space is not met, do not install the support pipes on the rear wall.
4. Locate and install the provided anchor bolts. See Figure 33 for dimensions.
 5. Place each bracket over a bolt, and tighten the bolt.
 6. Place the support pipes on the brackets.

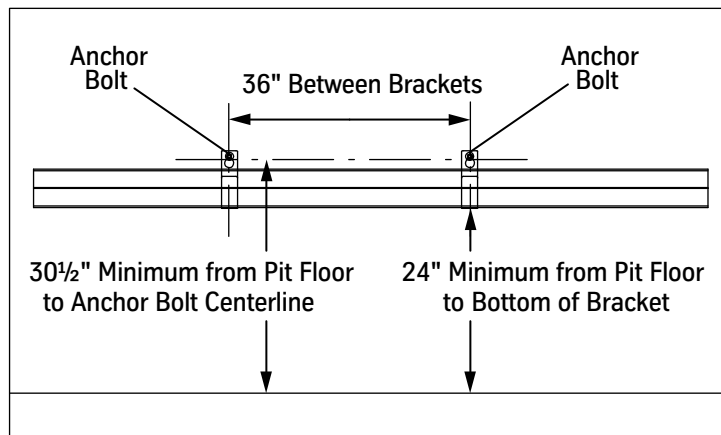
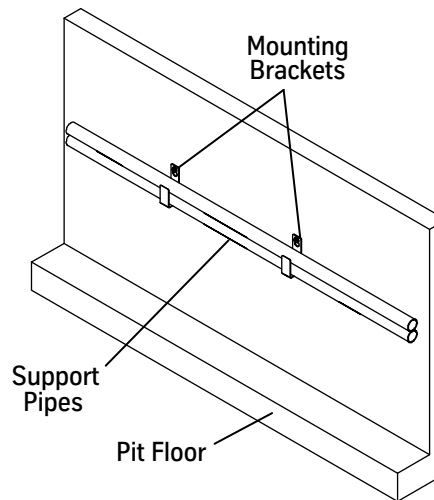


Figure 33 - Support Pipe Mounting Bracket Kit

HDPE System Testing

Sensor Test

If a sensor is not available, continue to the next section.

1. Use an ohmmeter and alligator clips to measure the resistance between the two wires at the sensor leads (red and black).
2. Use Table 2 to determine if any corrective action is needed.

Resistance Reading	Indication / Action
Less than 990,000 Ohm	<ul style="list-style-type: none"> • Water is present in the casing. If water is detected, evacuate the system and measure the resistance again. • Sensor has a short circuit.
990,000 Ohm – 1,010,000 Ohm	Sensor is working and there is no accumulation of water.
Greater than 1,010,000 Ohm	Possible broken lead on the sensor.

Table 2 - Ohmmeter Resistance Readings

Evacuation Test

Use a compressed air source for this procedure. Refer to Figure 34 for all steps.

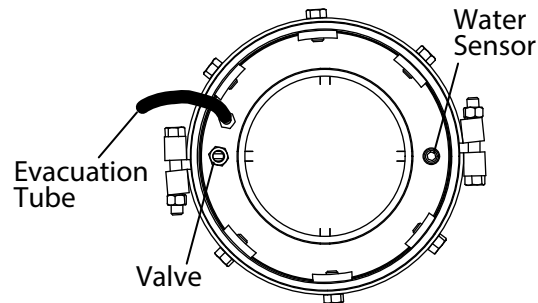


Figure 34 - HDPE Pipe, Top View

1. Make a mark (for correct position on re-installation) where the strain relief fitting is set on the sensor wire, and remove the sensor from the HDPE/PVC.
2. Install a pipe plug (1/4" NPT) to seal the port where the sensor was removed.
3. Remove the tape from the evacuation tube, and apply 10 psi air pressure through the valve and into the system.
4. Check for airflow from the evacuation tube.
 - For positive airflow: the system does not contain water or oil. Continue to next section.
 - For no airflow: the system contains water, oil, or both. Use the following procedure to identify and correct any issues.

Evacuation Test

(continued)

Determine if Oil is Present

- a. Increase air pressure to approximately 20 psi and expel the liquid, retaining some of the liquid in a clear container.
- b. Allow the liquid in the container to rest undisturbed for 30 minutes.
- c. Note the appearance and odor of the liquid to determine if oil is present.
- d. If oil is present, see Table 3 to resolve any issues.

Determine if Water is Present

- a. Visually inspect the area to determine if water is present.
- b. See Table 3 to resolve any issues.

Status	Cause	Solution
If oil is present	Damage to the HDPE/PVC jack O-ring	Contact your supervisor for corrective action. After corrective action is complete, repeat the Evacuation Test.
	A leaking joint	
	A pinhole in the weld	
If water is present	The pit is, or has been, flooded.	Make a mark (for correct position on re-installation) where strain relief fitting is set on sensor wire, and remove sensor from the HDPE/PVC. Repeat this action once daily until all moisture has been removed from the system.
	A wet hole during installation and the PVC end cap was put in place after the casing was exposed to water, which allowed moisture inside the PVC.	
	Damage to HDPE/PVC to the jack O-ring.	Contact your supervisor for corrective action. After corrective action is complete, repeat the Evacuation Test.
	Damage to HDPE/PVC pipe.	

Table 3 - Evacuation Test Results

5. Verify the sensor has an ohmmeter reading between 990,000 and 1,010,000 ohms.
6. Clamp the evacuation tube, and pressurize the system to 20 psi.
7. Record the pressure gauge reading, and let the system stand for 1 hour.
8. Apply soapy water to the edge of the sealing ring and to the fittings installed in the sealing ring when pressure testing the system. The bubbles show any leaks.
9. Check the system pressure after 1 hour.
 - If system pressure does not drop, continue to step 11.
 - If system pressure drops and there are no leaks around the ports or the seal ring, the jack protection system must be removed and repaired. Contact your supervisor for corrective action. When complete, repeat this procedure.
10. Tape the end of the evacuation tube to prevent any water or dirt from entering.
11. Verify the sensor has an ohmmeter reading between 990,000 and 1,010,000 ohms.
12. Remove the pipe plug in the sensor port, and reinstall the sensor assembly.
13. Verify the sensor has an ohmmeter reading between 990,000 and 1,010,000 ohms.

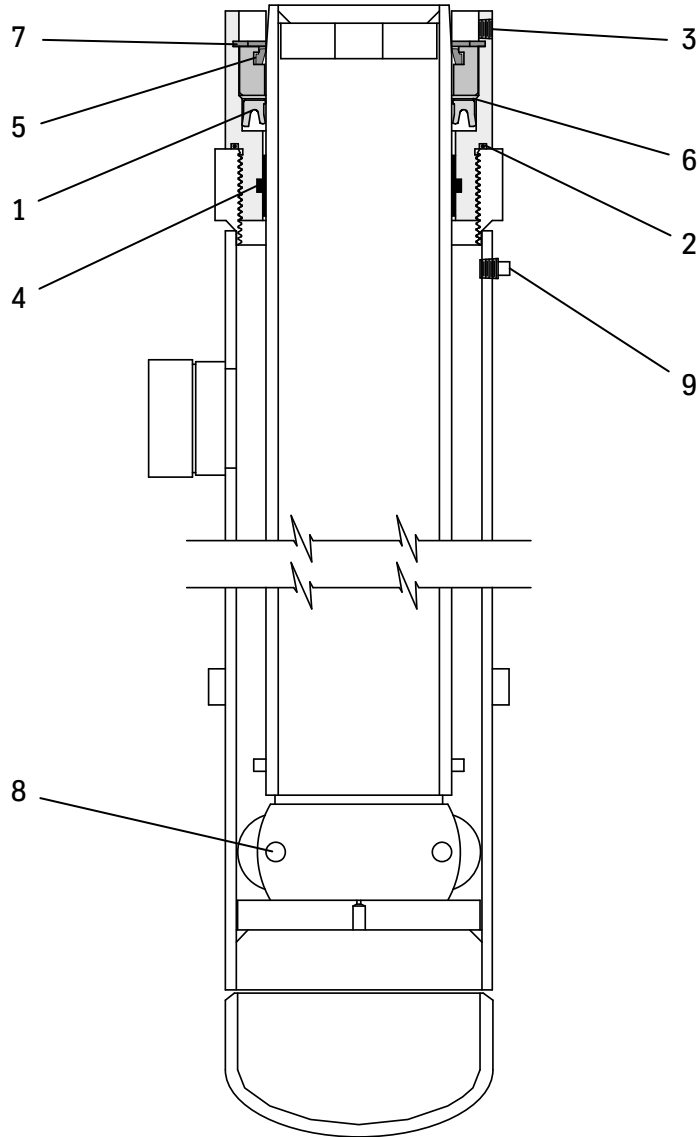
Maintenance

- Seal Replacement
1. Before replacing the seal:
 - a. Slowly run the jack up.
 - b. Check the entire length of the plunger for scratches and nicks.
 - c. Sand or fill imperfections.
 2. Place two pipes (approximately 7' in length) over the formed spring guides on the buffer stands.
 3. Use Inspection Operation to carefully lower the car down on the pipe stands.
 4. Turn OFF, Lockout, and Tagout the mainline disconnect.
 5. Mark the exact location of the platen plate on the bolster.
 6. Loosen the bolts holding the platen to the bolster channels.
 7. Move the clips out of the way.
 8. Open the manual lowering valve to lower the plunger completely.
 9. Remove the 1" bolt and platen from the top of the plunger.
 10. Close the shut-off valve.
 11. Use two flat blade screwdrivers to remove the spiral snap ring.
 12. Screw two #10-24 screws into the tapped holes in the seal retainer.
 13. Use two pairs of pliers to pull the retainer from the recess.
 14. Screw the packing removal tools or two drywall screws into the seal.
 15. Without scratching the plunger or seal recess in the guide, pull the seal from the recess.
 16. Use clean rags to remove all oil from the seal recess to ensure that the seal can properly seat.
 17. Check the seal recess for any scratches that can cut the seal. If scratches are present, polish out the scratches or replace the guide.

Install New Seal See Install the Seal on page 37.

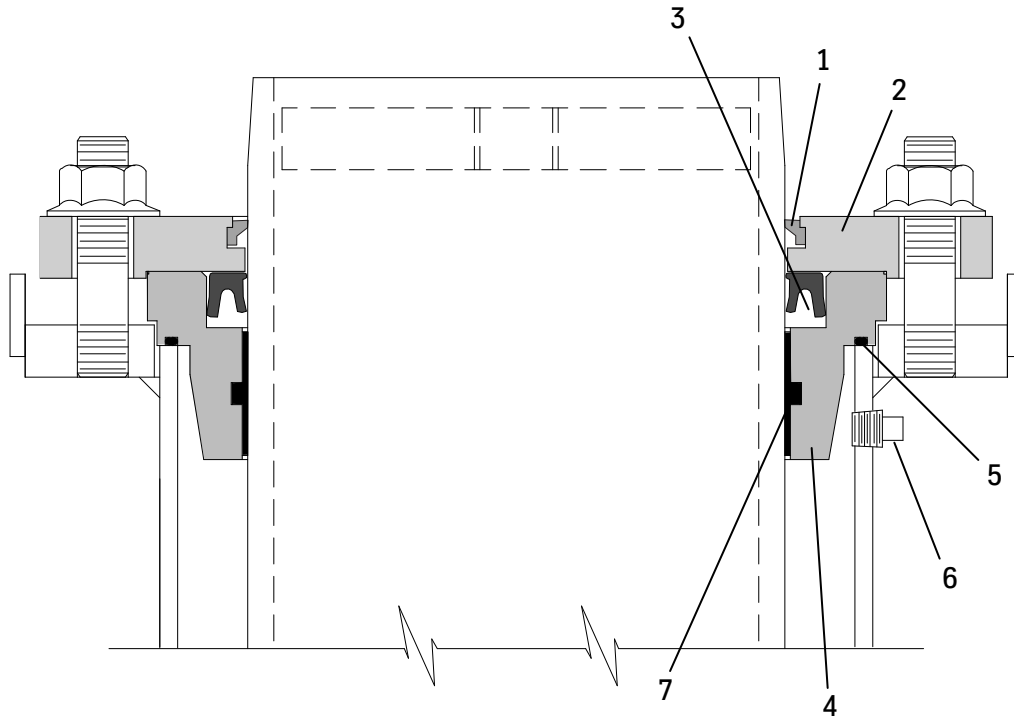
Replacement Parts

3-S Jack



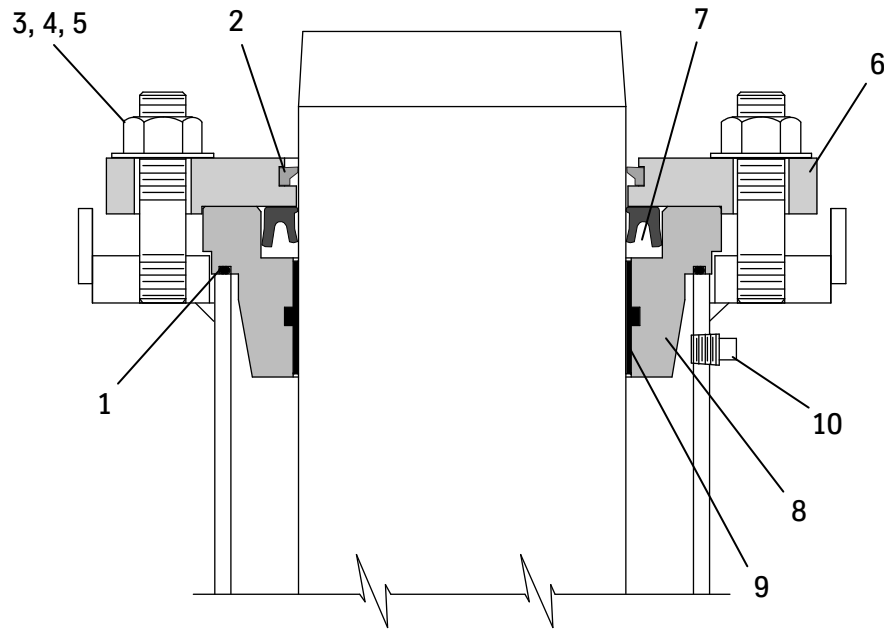
Item	Part No.	Print No.	Description
1	9723134	732BH1	Seal
2	—	139358	Gasket O-ring
3	—	454AN1	Guide Assembly
4	9811576	137995	Bearing Strip
5	9723821	123833	Wiper
6	—	148113	Seal Retainer
7	9739350	139357	Retainer Ring
8	9739610	139612	Roller Kit
9	9826525	886BN1	Bleeder Valve
	—	886CF1	Bleeder Valve Body

4-S, 5-S, and 6-S Jacks



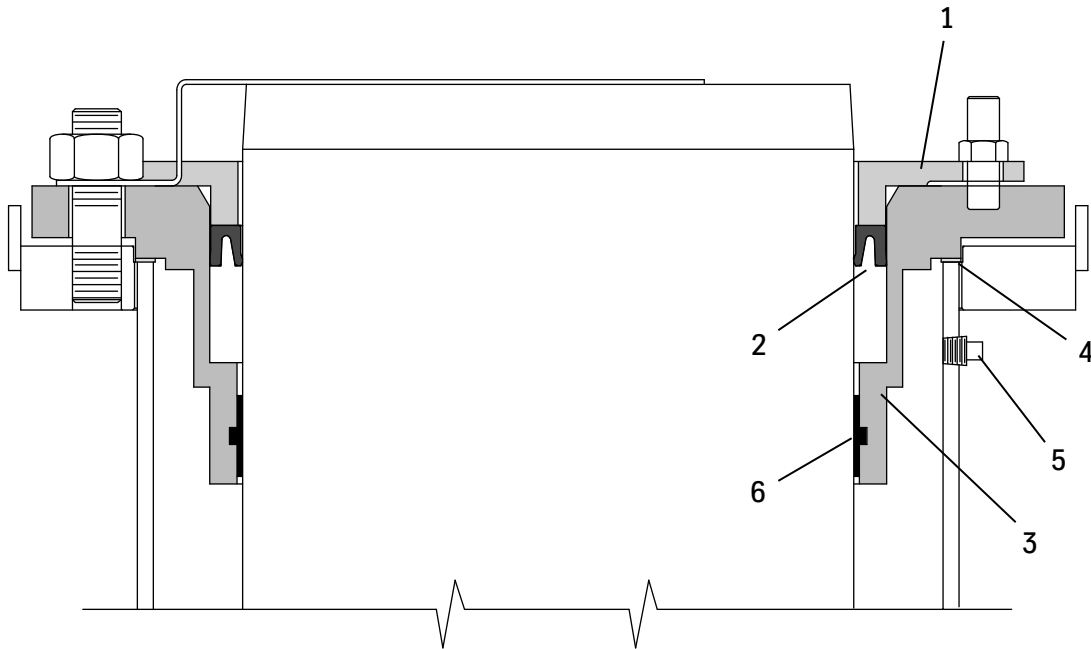
	4-S		5-S		6-S		
Item	Part No.	Print No.	Part No.	Print No.	Part No.	Print No.	Description
1	9767547	732BF1	9767547	732BF2	9767547	732BF3	Wiper
2	—	713AG4	—	713AG5	—	713AG6	Seal Retainer
3	9761500	732BH2	9761512	732BH3	97615241	732BH4	Seal
4	—	454DN4	9811825	454DN5	—	454DN6	Guide Assembly
5	9729010	129029	9729021	129030	9729021	129030	O-Ring
6	—	886CF1	—	886CF1	—	886BN1	Bleeder Valve
	9826525	886BN1	9826525	886BN1	9826525	886CF1	Bleeder Valve Body
7	—	142BX1	—	142BX2	—	142BX3	Bearing Strip

7-S and 8-S Jacks



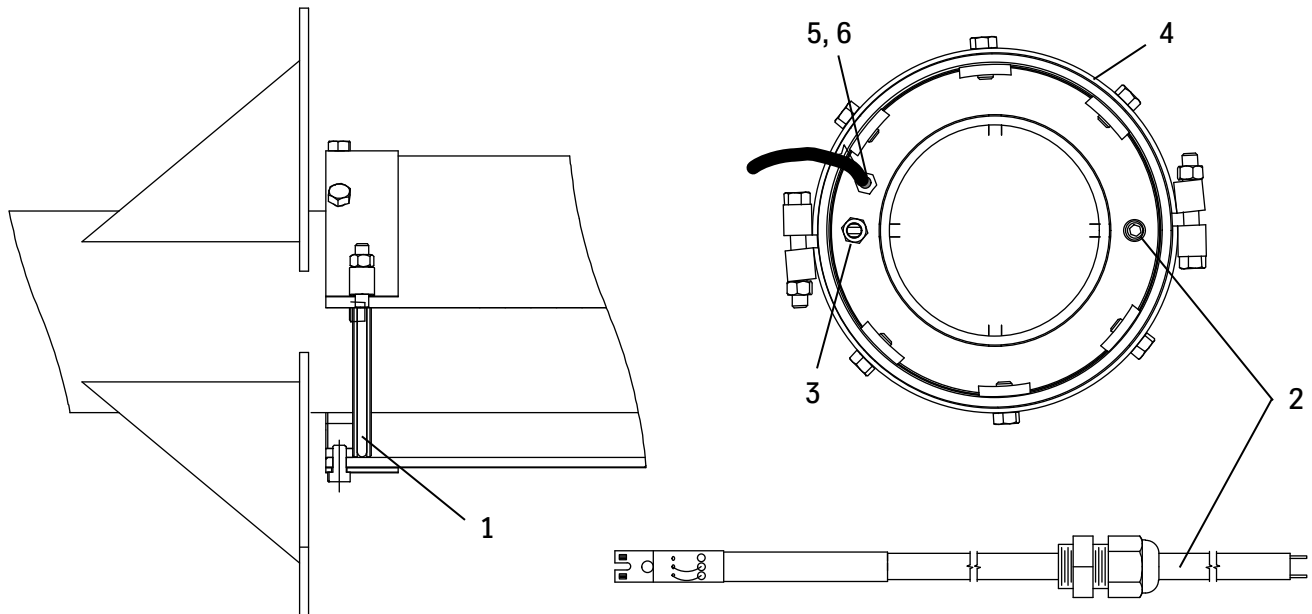
Item	7-S		8-S		Description
	Part No.	Print No.	Part No.	Print No.	
1	9708534	77145	—	77145	Gasket
2	—	732BN7	—	732BN8	Wiper
3	—	398AN1	—	398AN1	Stud, Flange
4	9758214	393DF1	9758214	393DF1	FS, Nut, NHF .625 ZH
5	9877642	27764	9877642	27764	Special Washer
6	—	716AH7	—	713AJ8	Retainer Seal
7	9761536	732BP7	—	732BP8	Seal
8	—	454EB7	—	454EB8	Guide Assembly
9	9739506	142AX5	9739609	142AX6	Bearing Strip
10	—	886CF1	—	886BN1	Bleeder Valve
	9826525	886BN1	9826525	886CF1	Bleeder Valve Body

9-S, 10-S, 12-S, and 15-S Jacks



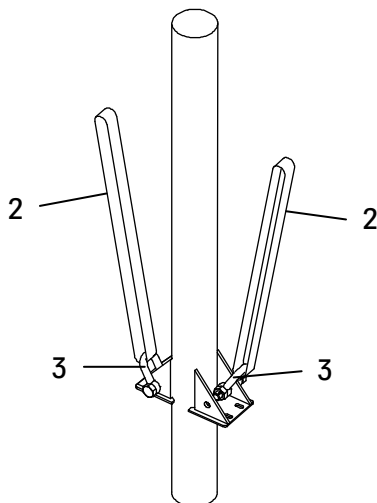
	9-S		10-S		12-S		15-S		
Item	Part No.	Print No.	Part No.	Print No.	Part No.	Print No.	Part No.	Print No.	Description
1	9817141	41978	9817207	114991	—	26940	—	115016	Seal Retainer
2	9767216	102636	9767228	102637	9767230	102638	9767241	102639	Seal
3	—	454AY2	—	454BB2	—	454BB3	—	454BD1	Guide Assembly
4	9708558	77144	9708558	77144	9708613	77143	—	115014	Copper Gasket
5	—	886CF1	—	886CF1	—	886CF1	—	886CF1	Bleeder Valve
	9826525	886BN1	9826525	886BN1	9826525	886BN1	9826525	886BN1	Bleeder Valve Body
6	9739701	142AX7	9738710	142AX8	9738812	142AX9	9738915	142AX10	Bearing Strip

HDPE Pipe



	3-S Jack	4-S Jack	5-S Jack 6-S Jack	
Item	Print No.	Print No.	Print No.	Description
1	608AC1	608AC2	608AC3	O-Ring
2	736AX1	736AX1	736AX1	Water Sensor, 38' lead
3	886BA2	886BA2	886BA2	Tank Valve, Brass
4	274BX1	274BX2	274BX3	Clamp Assy, HDPE or PVC
5	880EG1	880EG1	880EG1	Nylon Evacuation Tube
6	642GC1	642GC1	642GC1	Liquid Tight (Pipe Fitting)

Jack Hoisting Kit



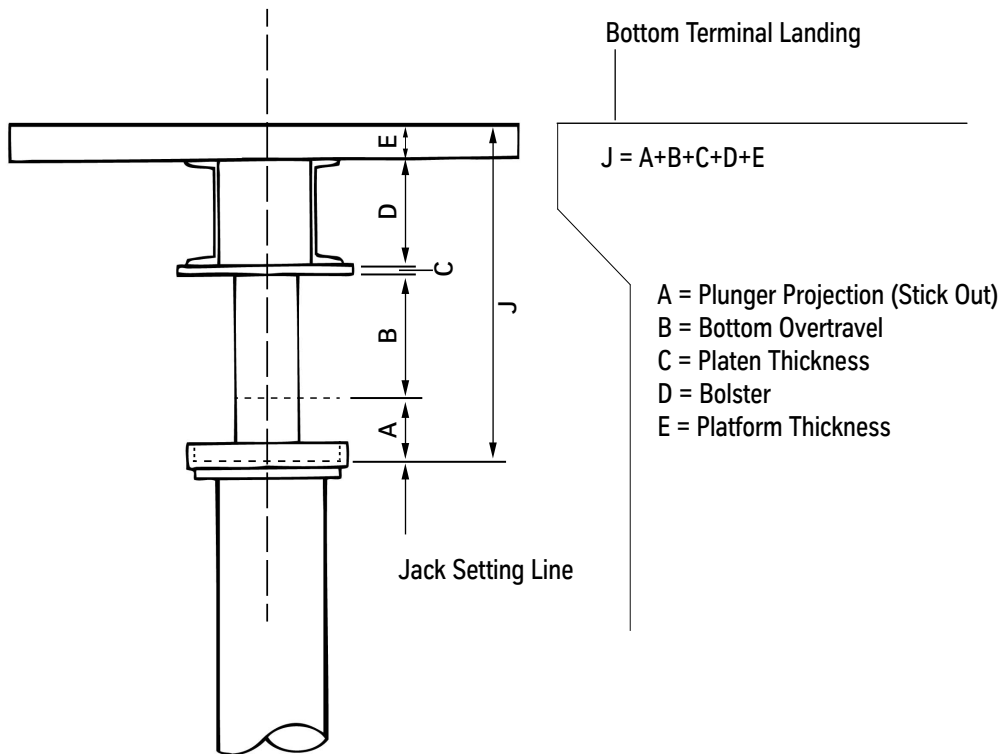
	200ATB1	200ATB2	
Item	Print No.	Print No.	Description
1	—	200BFK2	Jack Bolt Kit (not shown)
	200BFK1	—	Jack Bolt Kit (not shown)
2	—	767A2	Sling, endless, 2.000 width, 2 ply (11,000 lb. vert.)
	767A1	—	Sling, endless, 1.000 width, 2 ply (6,000 lb. vert.)
3	—	741AR2	D Shackle with safety pin, steel .875
	741AR1	—	D Shackle with safety pin, steel .625

Reference Information

Conventional Jack Data

Jack Size	Standard Cylinder Length = Total Travel +	Oversize Cylinder Length = Total Travel +	Plunger Stick Out Above Cylinder Flange	Bolts: Platen-to-Plunger
3-S	9.375	-	3.000	(1) 1.000 x 3.500 Hex Head Cap Screw
4-S	8.813	10.813	3.000	
5-S	9.313	9.750	3.000	
6-S	9.313	9.750	3.000	
7-S	9.938	10.938	3.000	
8-S	9.938	10.938	3.000	
9-S	12.938	14.375	2.500	
10-S	13.313	14.375	2.500	
12-S	15.313	-	2.500	
15-S	15.375	-	6.000	

If the job includes special platen plates, then the bolt length must be checked for each job.



Conventional Jack Dimensions

NOTES:

- SEE SHEET 3-E-12 FOR HYDRAULIC CONVENTIONAL JACK PLUNGER PROPERTIES, AND FOR PLUNGER WALL THICKNESSES.
- THE MAXIMUM PRESSURE ON ANY CONVENTIONAL JACK CYLINDER OVER 12 3/4" DIAMETER IS 400 P.S.I.
- SEE SHEET 3-E-14 FOR NON-ISOLATED PLATENS
- ISOLATED RUBBER PLATENS = 1 3/4" THICK ON 3-S THRU 7-S JACKS, AND 2" THICK ON 10-S AND 12-S JACKS. NOTE 1 3/4" THICKNESS CAN ALSO BE USED ON 8-S AND 9-S JACKS WITH A MAXIMUM GROSS LOAD ON THE JACK OF 12,000 LBS. AND A MAXIMUM PLUNGER WEIGHT OF 2,700 LBS. CALL THE FACTORY IF GROSS LOAD OR PLUNGER WEIGHT EXCEEDS ABOVE ON 8-S AND 9-S JACKS, IF JACK IS LARGER THAN 12-S, OR SPECIAL BOLSTERS REQUIRED.
- THE MINIMUM VERTICAL CLEARANCE BETWEEN THE PIT FLOOR AND THE LOWEST STRUCTURAL OR MECHANICAL PART INSTALLED BENEATH THE PLATFORM, INCLUDING A PLUNGER FOLLOWER GUIDE, SHALL BE NOT LESS THAN 24". THIS CLEARANCE MUST MAINTAIN A HORIZONTAL AREA OF 24" X 47" TRENCHES, DEPRESSIONS, OR FOUNDATION ENCROACHMENTS CANNOT BE INCLUDED. THIS CLEARANCE IS NORMALLY TAKEN BETWEEN THE PIT FLOOR AND CAR BOLSTERS, CALL THE FACTORY IF IN DOUBT OR WHEN A SHALLOW (LESS THAN 4'-0") PIT IS REQUIRED.

	JACK MODEL											
	3-S	4-S	5-S	6-S	7-S	8-S	9-S	10-S	12-S	15-S		
A	9 3/8"	10 3/16"	9 3/4"	9 3/4"	10 15/16"	10 15/16"	14 3/8"	14 3/8"				
B	5 9/16"	10 1/4"	12 1/4"	12 1/4"	15 3/4"	15 3/4"	16 3/4"	16 3/4"	20 3/4"	23"		
C	3"	3"	3"	3"	3"	3"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	6"	6"
D	6 3/4"	5 1/2"	5 1/2"	5 1/2"	6"	6"	6"	6"				
E	9 3/8"	8 13/16"	9 3/16"	9 3/16"	9 15/16"	9 15/16"	12 15/16"	13 5/16"	15 5/16"	15 3/8"		
F	5 9/16"	6 5/8"	8 5/8"	8 5/8"	8 5/8"	10 3/4"	10 3/4"	12 3/4"	12 3/4"	20"		
G	3.873	4.360	5.425	6.485	7.488	8.488	9.488	10.613	12.613	15.738		
H	6 1/4"	7 1/2"	9 5/8"	9 5/8"	12"	12"	14"	14"	17 1/2"	21 1/2"		
J	7/32"	7/32"	7/32"	7/32"	1/4"	1/4"	1/4"	1/4"	5/16"	3/8"		
K	6"	6"	6"	6"	6 1/2"	6 1/2"	6 1/2"	6 1/2"	6 1/2"	8"		
PA	5 1/4"	5 1/4"	5 1/4"	5 1/4"	5 5/16"	5 5/16"	6 7/8"	7 3/8"	8"	8 3/16"		
AREA	11.781	14.93	23.115	33.030	44.032	56.578	70.696	88.456	124.937	194.519		
DISPL	0.61	0.78	1.20	1.72	2.29	2.94	3.67	4.60	6.49	10.10		

NOTE: DISPL = GALLONS OF OIL DISPLACED PER FOOT OF TRAVEL
 AREA = PLUNGER AREA IN SQUARE INCHES

REF. DWG.: 18295, 18295, 1846V, 1846F
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 DATE: 02-16-19

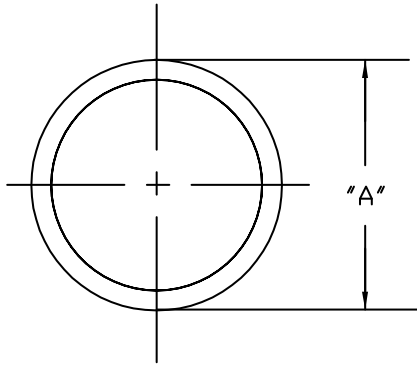
ThyssenKrupp Elevator Americas

HYDRAULIC CONVENTIONAL JACK DIMENSIONS

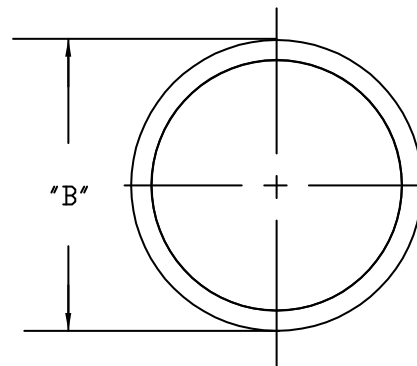
3 E 2

HDPE & PVC Casing & Coupling Diameter

HDPE & PVC CASING & COUPLING OUTSIDE DIAMETER



HDPE & PVC CASING DIAMETER



PVC COUPLING DIAMETER

	"A"	"B"
	CASING	COUPLING
JACK - 3-S	8 5/8"	10 7/8"
JACK - 4-S	10 3/4"	12 3/4"
JACK - 5 & 6-S	12 3/4"	14"
JACK - 7 & 8-S	14"	16"
JACK - 9 & 10-S	16"	18"
JACK - 12-S	20"	25"
JACK - 15-S	24"	28"

FOR OVERSIZE JACK GO TO NEXT SIZE UP INFORMATION

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HDPE & PVC CASING AND COUPLING DIAMETER

REF. DWG.: 642DJ, 642JY

DWN.: HMD

DATE: 02-16-15

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DO NOT SCALE THIS DRAWING

LAYOUT MANUAL

3

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2.1



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