VERTICAL EXPRESS

Roller Guides

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Contents

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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 and/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. Vertical Express 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 Vertical Express 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 Vertical Express 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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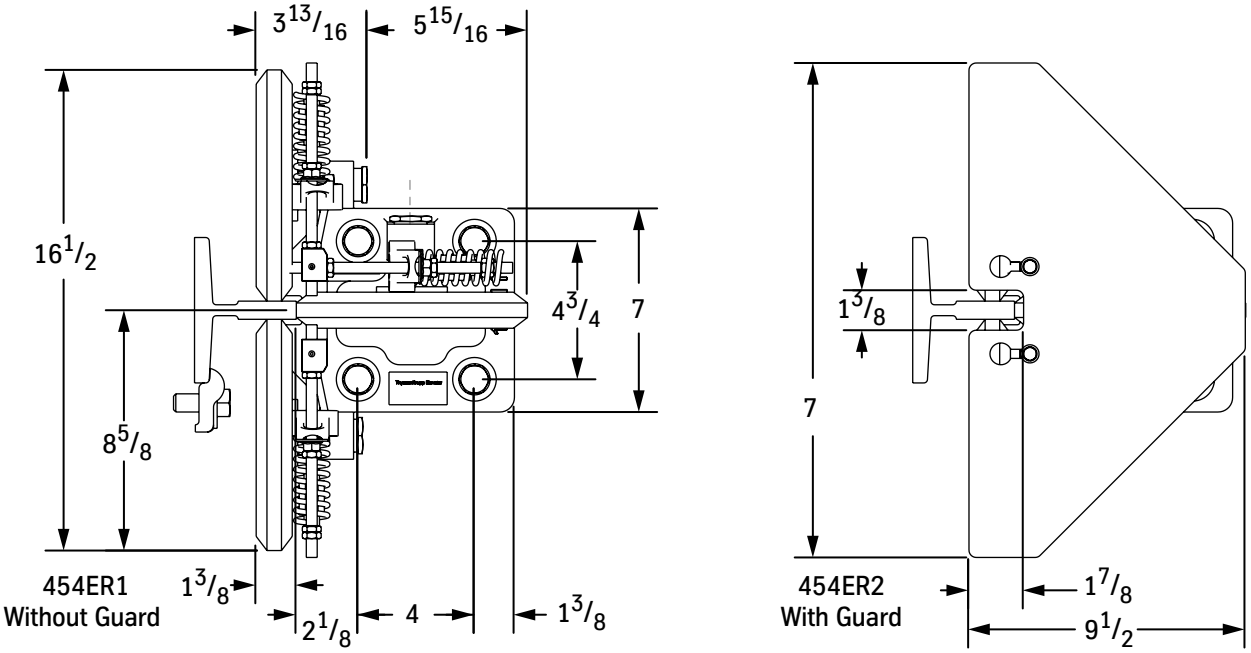
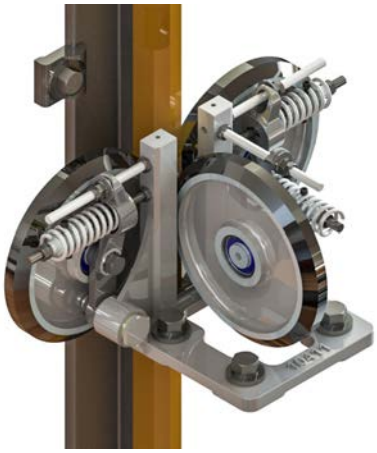
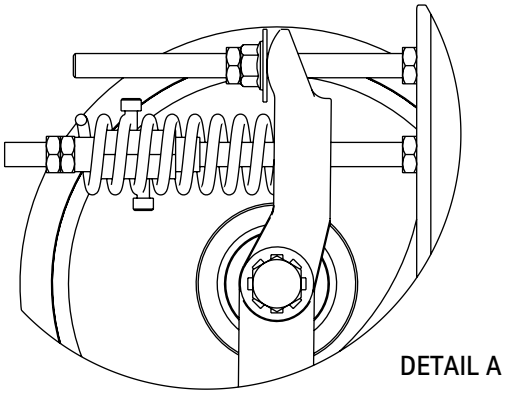
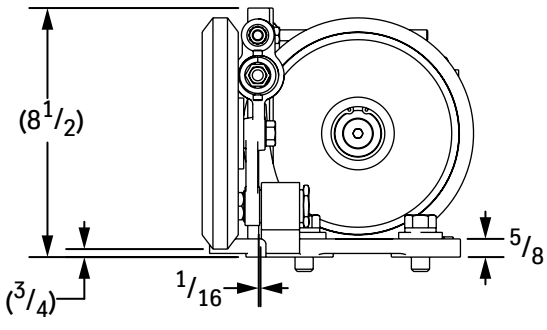
8" Roller Guides for 15 lb. rails, 454ER

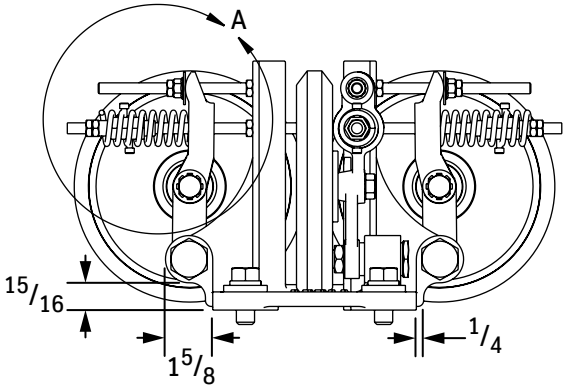
- See page 33 for specifications.
- Perform Installation Procedure on page 9.







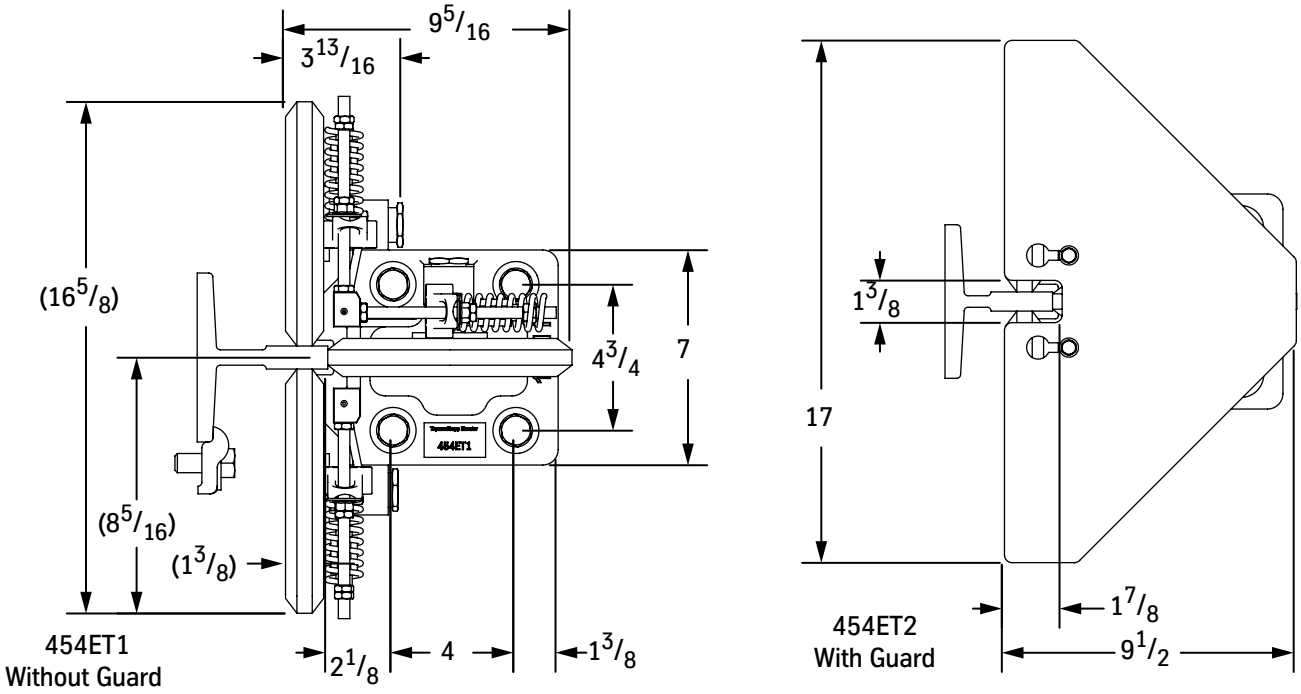


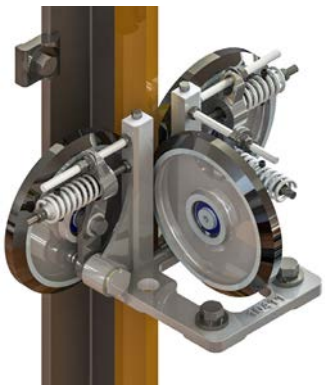


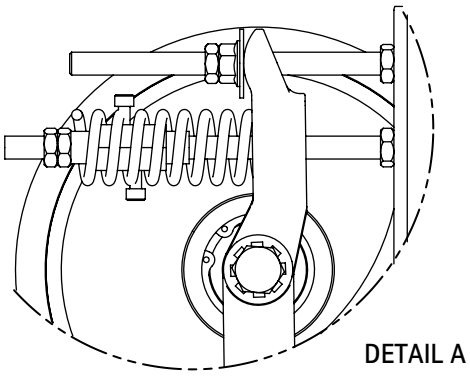
All measurements in inches.

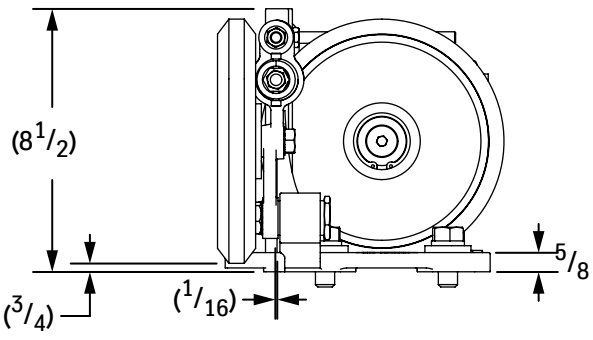
8" Roller Guides for 18.5 lb. rails, 454ET

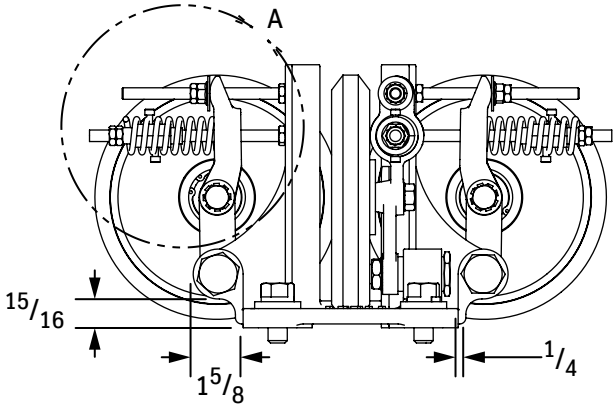
- See page 33 for specifications.
- 17 Perform Installation Procedure on page 9.











All measurements in inches.

Installation

CAUTION **Use temporary guide shoes (Part No. 9825575) instead of roller guides during building construction or temporary service. See Figure 1.**

Figure 1 - Temporary Guide Shoe

Preliminary Check

Verify the following:

a. The rails are smooth, free of rust, clean, and dry.

b. The rail splice joints and gouges have been filled and filed smooth.

c. The car is balanced.

d. The car frame is square and plumb.

Adjustment

NOTE Do not lubricate the rollers or the rail.

1. Position car at the lower end of travel; leave room for access to the pit beneath the car.

2. Place the car on Inspection Operation.

3. Turn OFF, Lockout, and Tagout the mainline disconnect.

4. From the pit, post-wise center the car on the rails, and use the safety jaws to clamp in place.

5. Set the spring adjustment sleeves. See Table 1 below and Figure 1 on page 10.

Net Lifting Capacity (lbs.)	No. of Working Coils*
2750 or less	8
2751 – 3750	7
3751 – 5000	6
	*From the flat end of the spring (not including the spring) to the first Allen setscrew.

Table 1 - Spring Adjustment

6. Place the special $^{5}/_{8}$" thick washers from the roller guide bolt kit (130559) between the base and the lockwashers, and hand tighten the guides to the bottom of the car.

Installation
(continued)

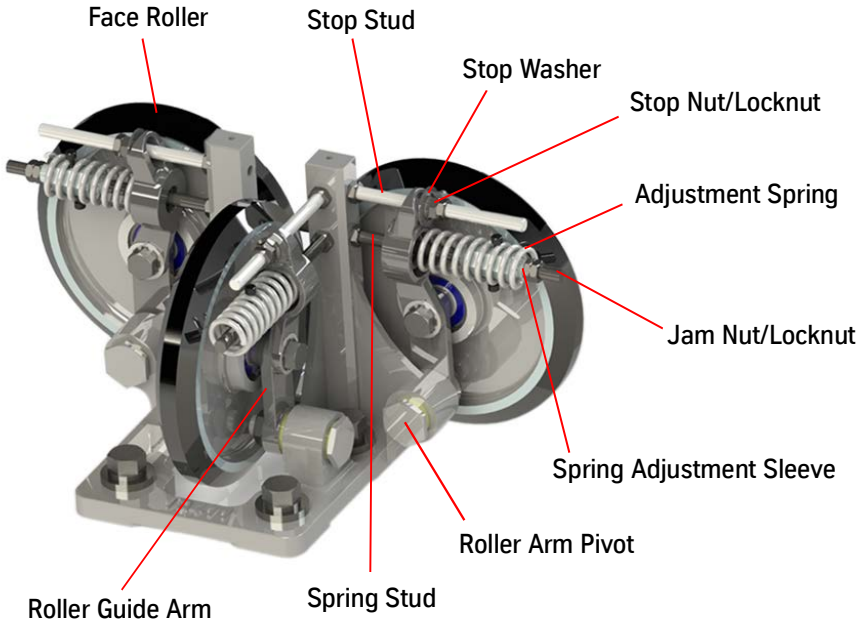


Figure 1 - 8" Roller Guide Assembly, 454ER and 454ET

7. Shift the base as required to center the slot on the rail. See Figure 2.
   a. Verify that the distance from the face of the rail to back of the slot is about $^{1}/_{4}$".
   b. Ensure that the base is square to the rail within ±2°.
   c. Shim the base as needed so that the rollers are perpendicular to the rails.

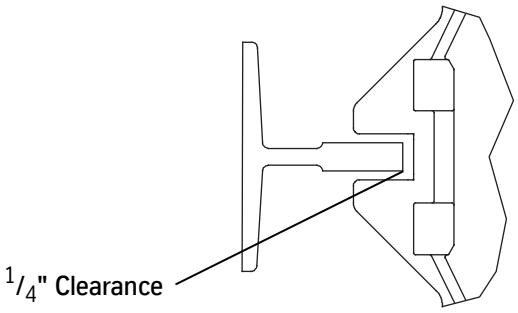


Figure 2 - Rail-to-Guide Throat Clearance

8. Firmly tighten the mounting bolts.

9. Hold the face roller lightly against the rail, and adjust the stop nut for $^{5}/_{16}$" clearance between the face roller arm and the stop washer. Repeat this operation for the opposite roller guide assembly. Hand tighten both stops.

Installation
(continued)

Spring Tension and Stop Clearance Adjustment

1. Place the springs and adjustment sleeves for the face rollers over the studs. Ensure that the studs are straight and tight. See Figure 3 for all steps in this procedure.
2. Put on the jam nuts and the locknuts, tighten them until they come into contact with the adjustment sleeve, and then turn two more times. Verify that the Allen setscrews are set vertical, and then tighten the locknut.
3. Adjust the roller arm stops between the roller arm and the stop washer for a clearance of $^1/_8$".
4. Assemble the post roller springs and adjustment sleeves as performed in step 1 for the face rollers.
5. Adjust the roller stops as performed in step 3.
6. Adjust the roller guide assemblies on top of the car.

NOTE The stiles must be centered on the rails.

7. Turn ON the mainline disconnect.
8. Release the safety device.
9. Run the car slowly up and down the length of the hoistway to check the general clearances, the leveling devices, the door equipment, etc.

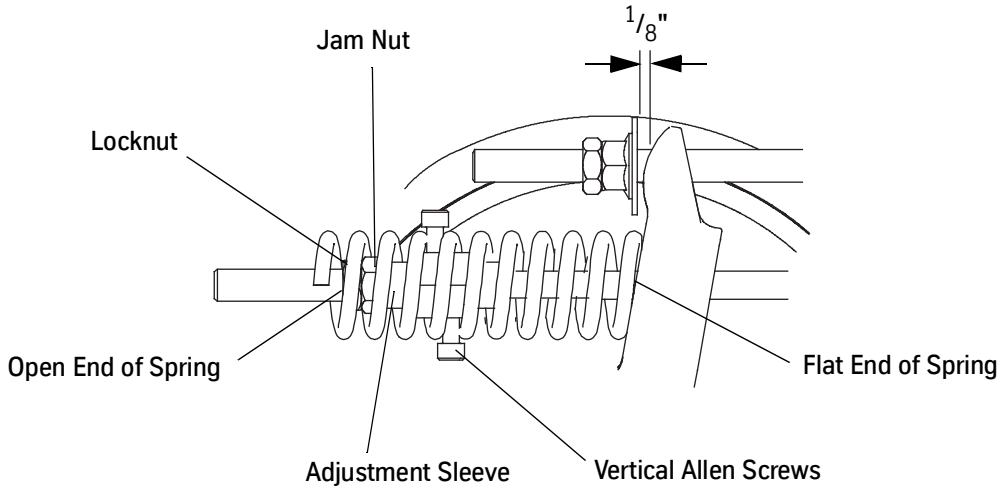


Figure 3 - Spring Tension and Stop Clearance Adjustment

Installation
(continued)

Final Spring Adjustment

CAUTION **Do not create excessive tire pressure on each roller guide while making the following adjustments.**

1. Position an empty car at the middle of the hoistway.
2. Ensure that the car doors are closed.
3. Increase spring tension on one of any pair of springs to center the slot in the guide base on the rail.

NOTE Due to the friction between the rubber tires and the rail, move the car a few feet after each spring adjustment to allow the car to center itself.

Final Stop Adjustment

1. Run the car up and down with eccentric loading for several full trips.

NOTE
- When there is an eccentric load on the car, it is acceptable for the roller arms to hit and ride on their stop washers, but the slots in the guide bases and the safety components must not scrape.
- The amount of eccentric loading depends on the size of the car and how many people can stand comfortably along each side of the car.

2. Place approximately 75 lbs. for each foot of wall length against the rear wall of the cab.
3. Check for clearance between the rail and the guide throat and clearance between the rail and the safety jaws.
4. Ensure that every roller can be turned by hand. If not, determine the cause of the excessive tire pressure, and correct the problem.
5. Install the roller guide guard. See Figure 4 on page 13.

Installation
(continued)

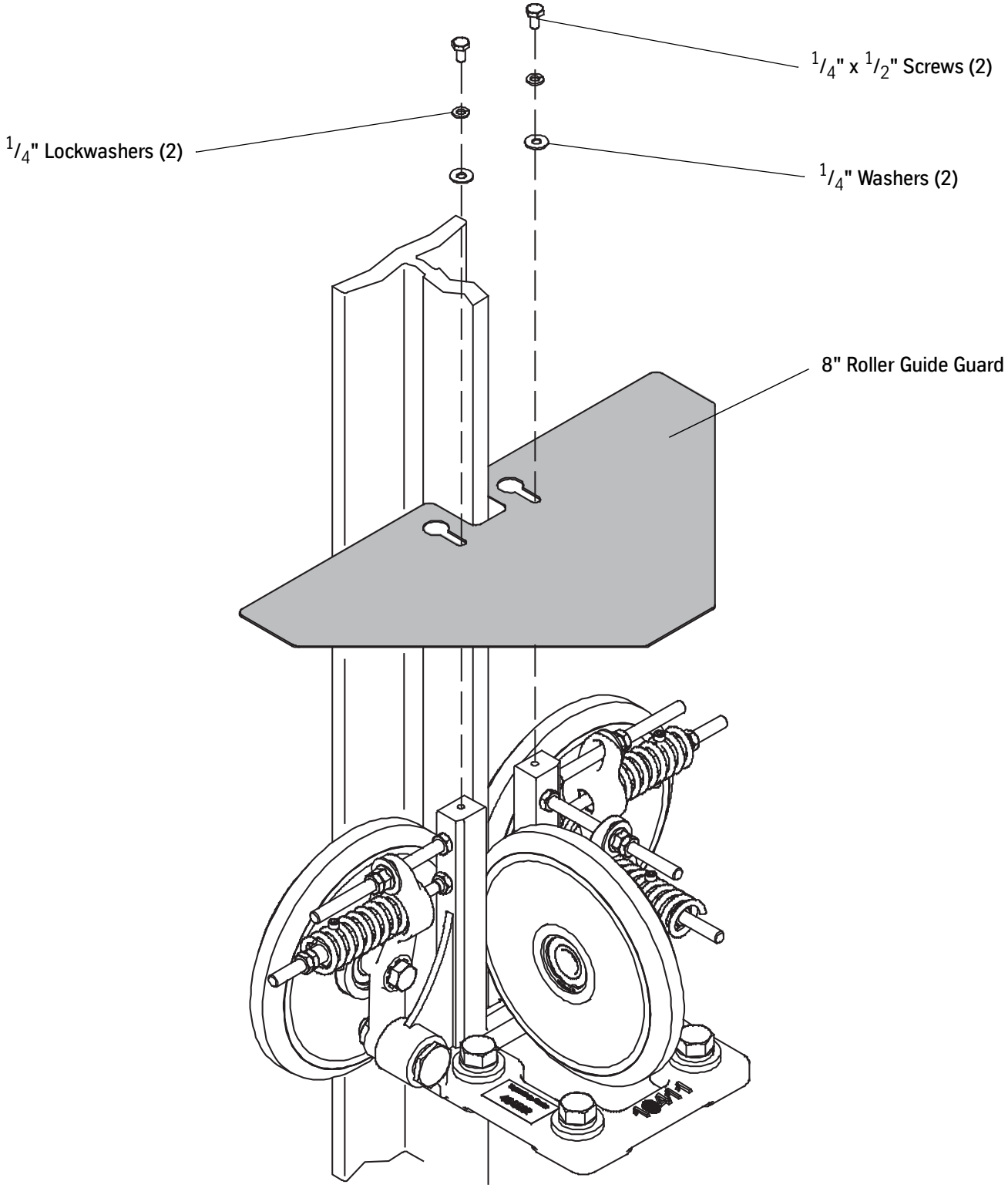
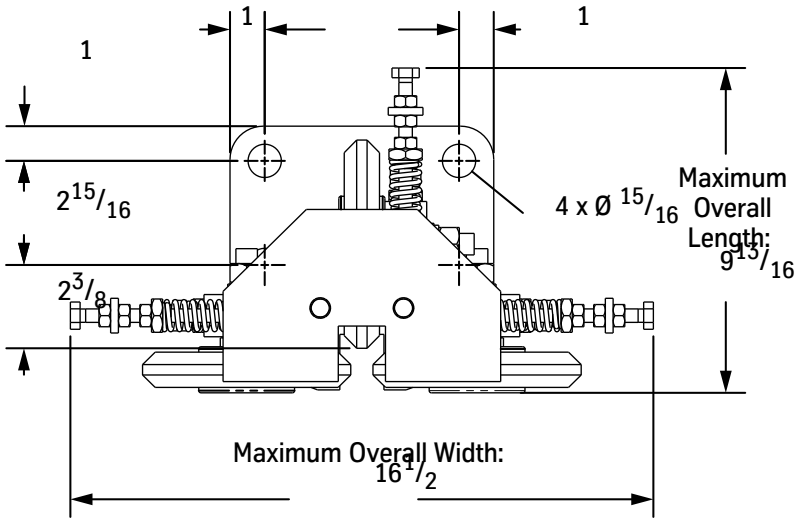
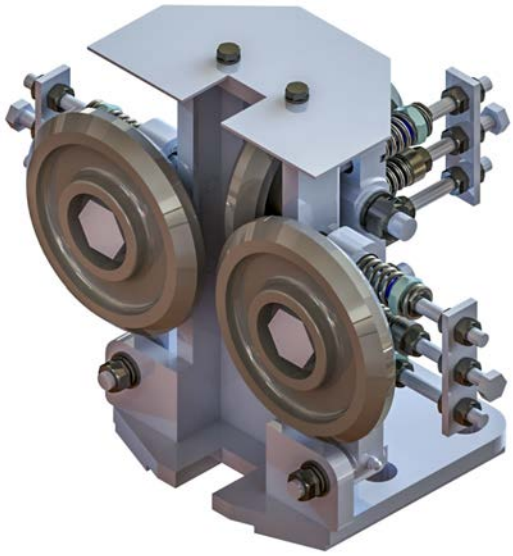


Figure 4 - Roller Guide Guard Installation

6" Roller Guide, 454FA

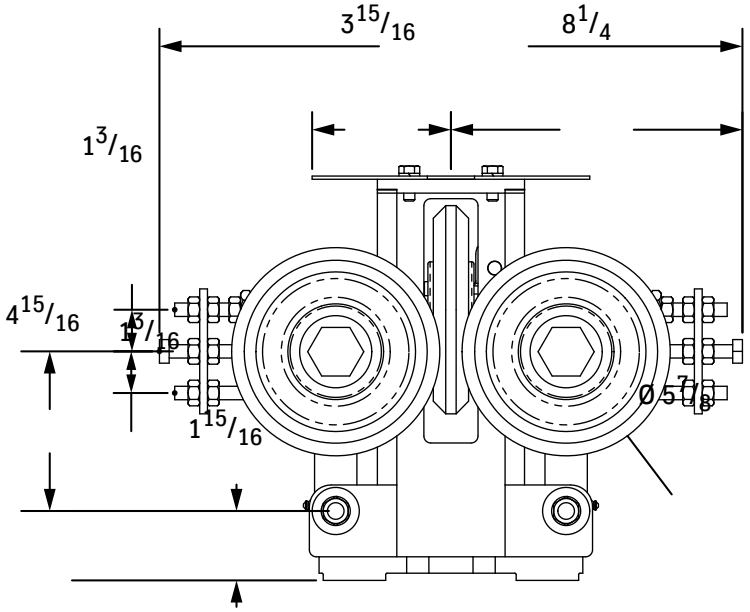
- See page 33 for specifications.
- Individual parts are not available; order complete assembly for replacement.
- Perform Installation Procedure on page 15.

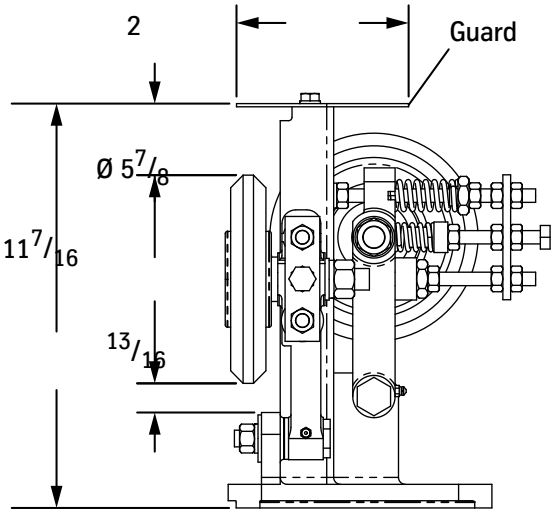




16 1/2

4 7/8





All measurements in inches.

Installation

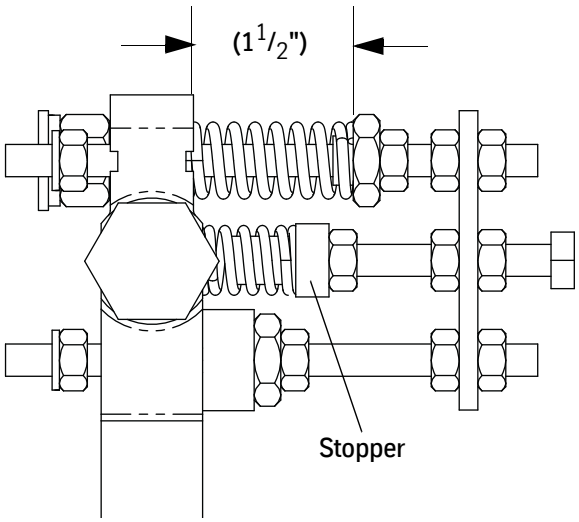
CAUTION **Use temporary guide shoes (Part No. 9825575) instead of roller guides during building construction or temporary service. See Figure 5.**

Figure 5 - Temporary Guide Shoe

1. Perform a preliminary check of the following:
   a. The rails are smooth, free of rust, clean, and dry.
   b. The rail splice joints and gouges have been filled and filed smooth.
   c. The car is balanced.
   d. The car frame is square and plumb.

NOTE Do not lubricate the rollers or the rail.

2. Set the springs and the stoppers. These settings affect the ride quality and the lifetime of the rollers.
   a. Tighten the nut to compress each spring to ~$1\,^1/_2$" so that the roller is in contact with the rail but can still be turned by hand. See Figure 6.
   b. Hand tighten the nut for each stopper so that the nut and the stopper make contact, and then tighten an additional $^1/_4$ turn.

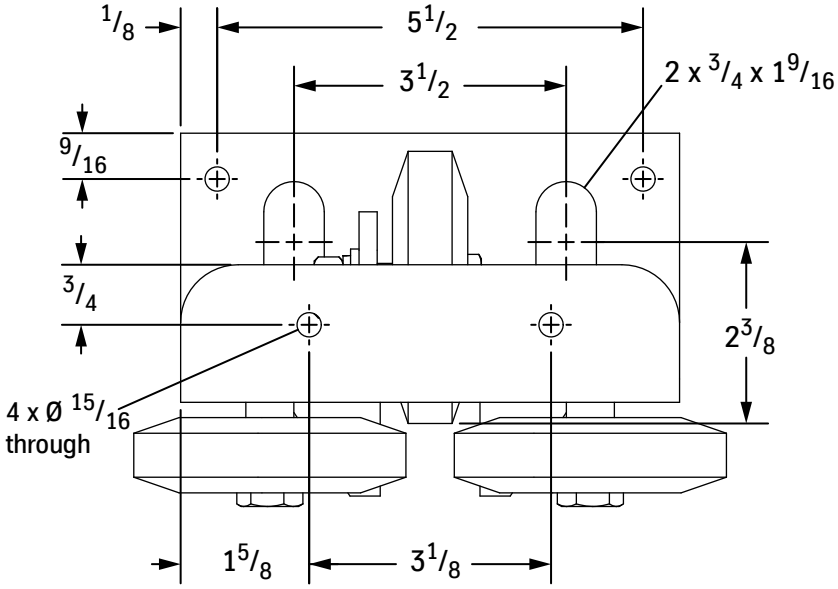


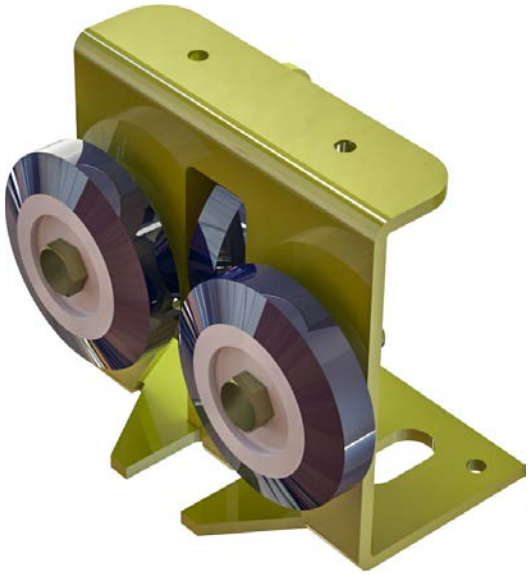
Item	Adjustment Range	
Spring (Compressed)	Side Roller	$^3/_{16}$" ~ $^3/_8$"
	Face Roller	$^3/_8$" ~ $^3/_4$"
Stopper	$^1/_{64}$" ~ $^1/_{32}$"	

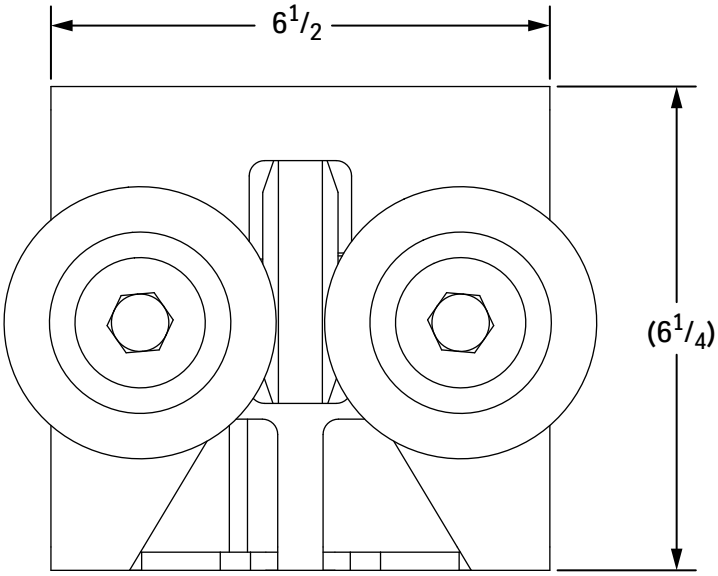
Figure 6 - Set the Spring and the Stopper

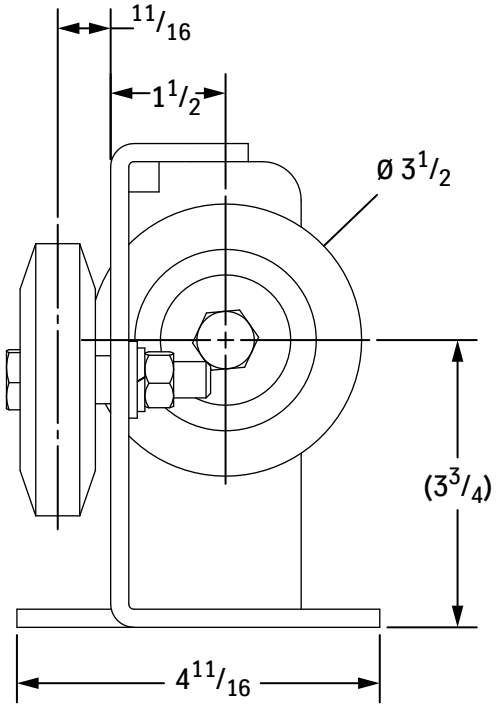
90 mm Roller Guide, 454FM

- See page 33 for specifications.
- Individual parts are not available; order complete assembly for replacement.
- Perform Installation Procedure on page 15.





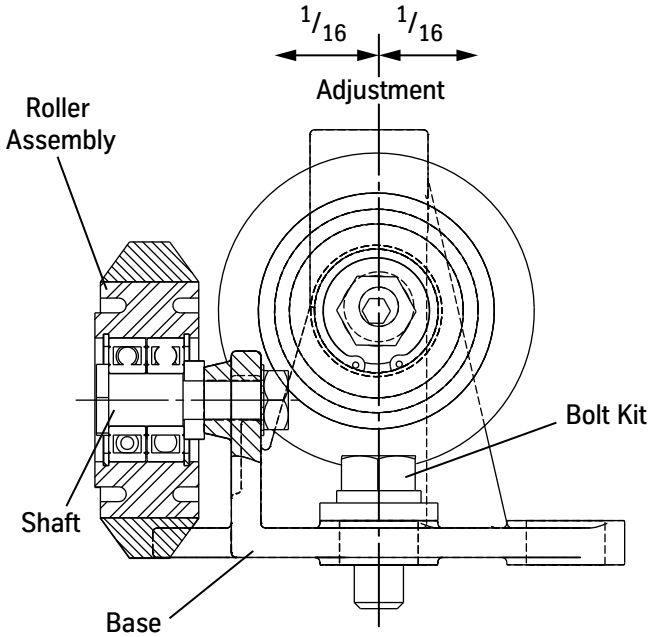


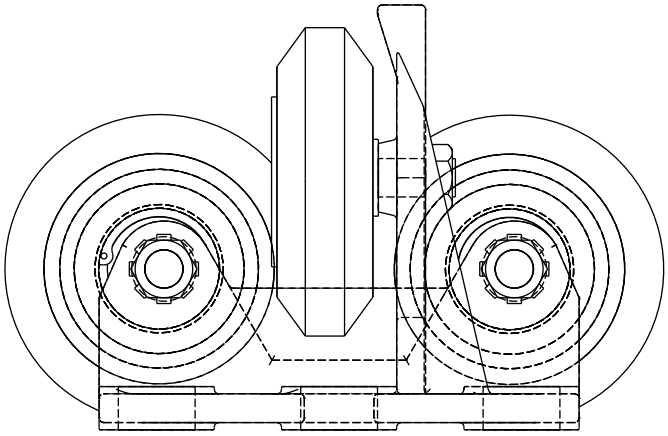


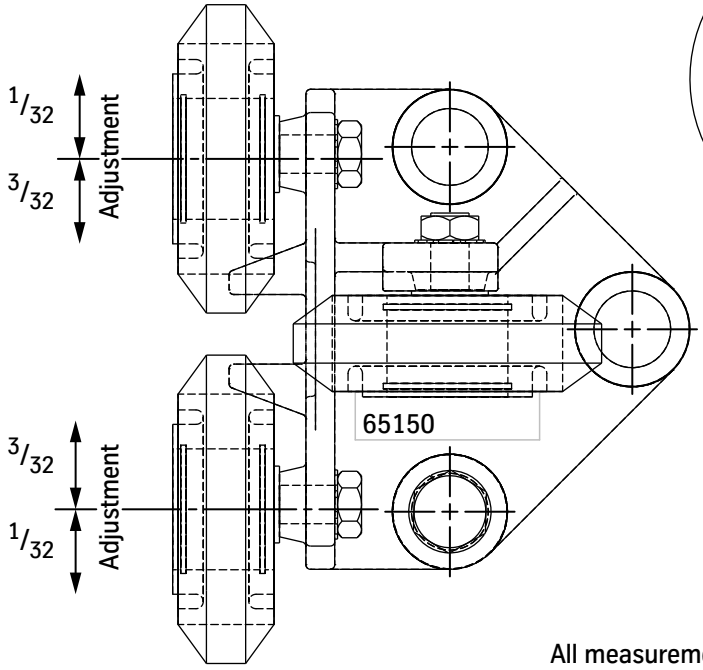
All measurements in inches.

4" Counterweight Roller Guide, 65150

- See page 33 for specifications.
- Perform Installation Procedure on page 18.







All measurements in inches.

Installation

CAUTION **Use temporary guide shoes (Part No. 9825575) instead of roller guides during building construction or temporary service. See Figure 7.**

Figure 7 - Temporary Guide Shoe

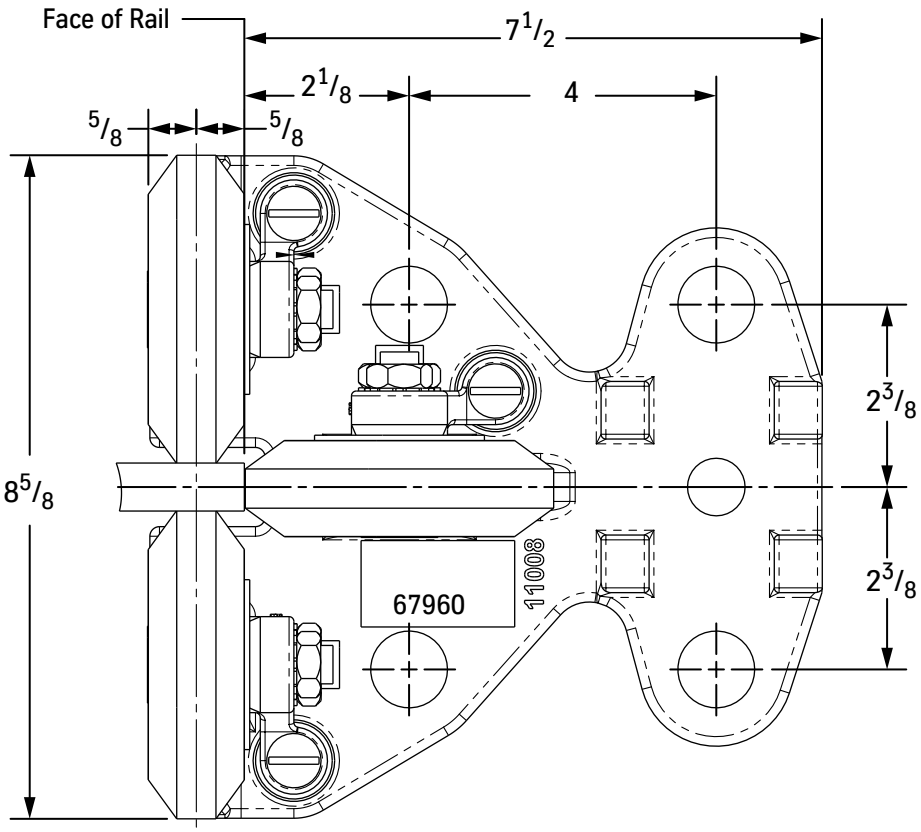
1. Perform a preliminary check of the following:
   a. The rails are smooth, free of rust, clean, and dry.
   b. The rail splice joints and gouges have been filled and filed smooth.
   c. The car is balanced.
   d. The car frame is square and plumb.
   e. The counterweight is not binding.

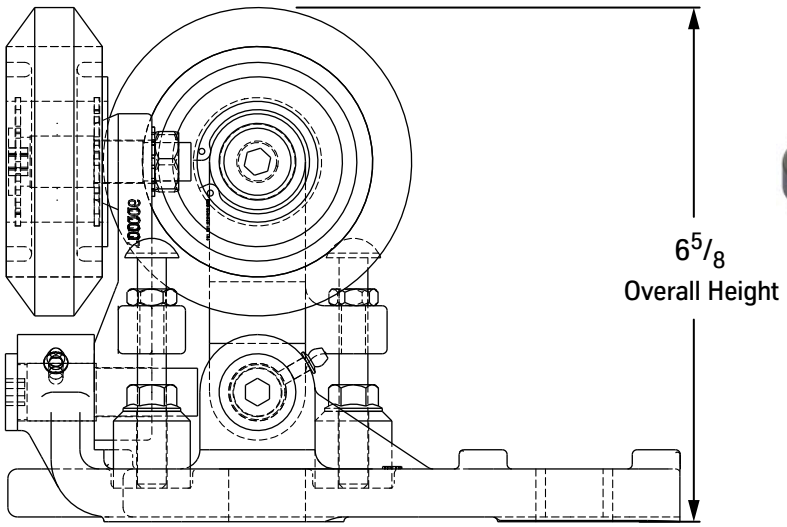
NOTE Do not lubricate the rollers or the rail.

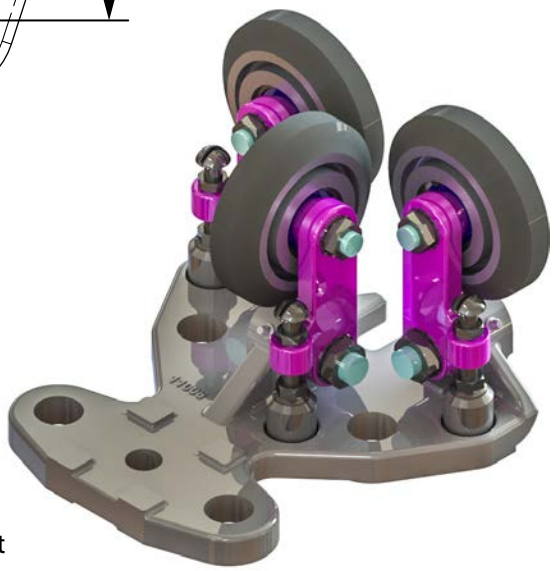
2. Loosen the locknuts, and turn the roller shafts until maximum clearance between the rollers is obtained.
   a. Mount the roller guides, and use the special washers on top of the base between the guide base and the lockwashers.
   b. Block the bottom of the counterweight frame so the frame is on the centerline of the rails and the space between the stile and the rail is the same on both sides.
3. Tightly fasten the base, and tap the base with a hammer until there is equal space and clearance between the rail and the sides of the throat. The face roller should barely touch on the face of the rail.
4. Verify that the rollers are square and plumb with the rail. If necessary, use shims to square up the base.
5. Install the top roller assemblies.
6. Turn the roller shafts to adjust the top face rollers. When adjusted, at least one face roller should turn by hand with little effort.
7. Turn the roller shafts to adjust the top side rollers for equal clearance between the rail and the throat. When adjusted, the side rollers should have the same resistance when turned by hand.
8. Lock the roller shafts so that the shafts will not turn.
9. Turn the roller shafts to adjust the bottom face rollers so that the rollers still turn by hand with little effort. Lock the shafts in place.
10. Adjust the bottom side rollers so that the clearance in the guide throat is evenly divided. Both the front and the rear rollers should have the same resistance when turned by hand. Lock the shafts in place.

4" Roller Guide, 67960

- See page 33 for specifications.
- Perform Installation Procedure on page 20.







All measurements in inches.

Installation

CAUTION **Use temporary guide shoes (Part No. 9825575) instead of roller guides during building construction or temporary service. See Figure 8.**

Figure 8 - Temporary Guide Shoe

1. Perform a preliminary check of the following:
   a. The rails are smooth, free of rust, clean, and dry.
   b. The rail splice joints and gouges have been filled and filed smooth.
   c. The car is balanced.
   d. The car frame is square and plumb.
   e. The counterweight is not binding.

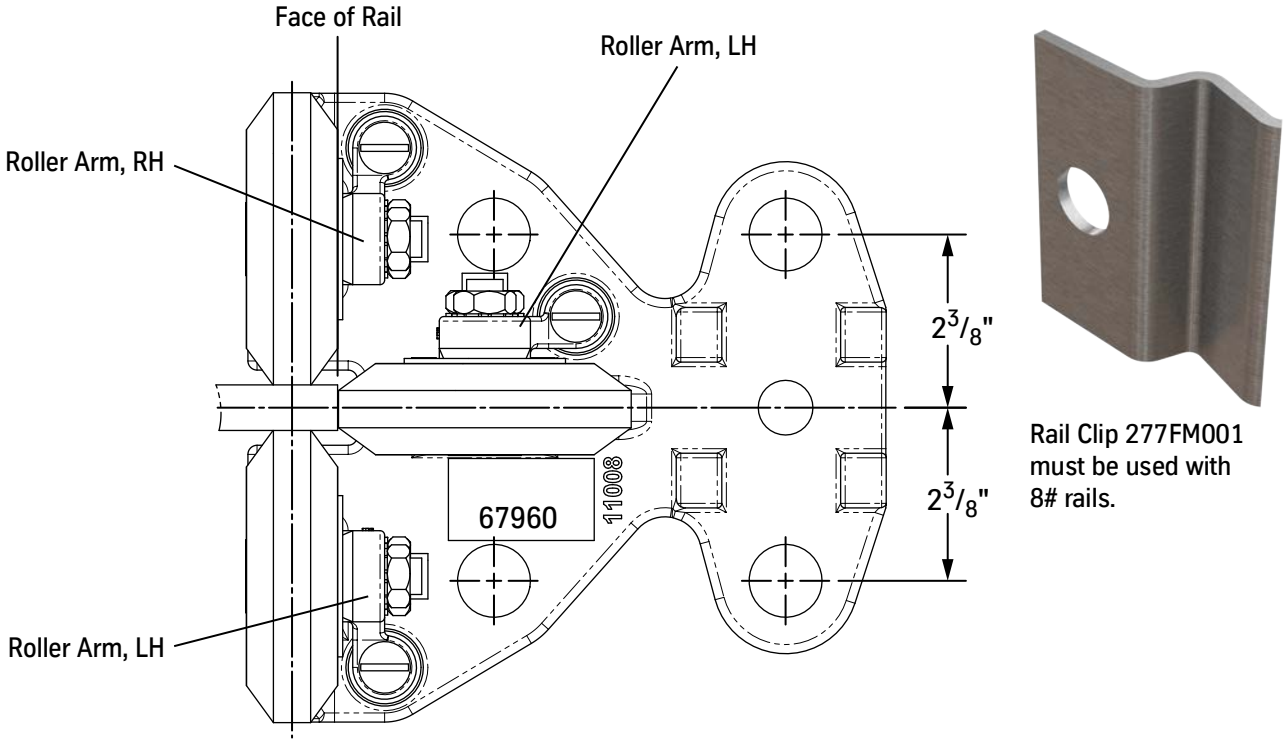
NOTE Do not lubricate the rollers or the rail.

2. Verify that the car is centered post-wise, and set the car on the safety. See Figure 9 on page 21 for this procedure.
3. Back off all of the adjusting screws and the flange nuts until the roller arms lean away from the safety slot in the base.

NOTE If necessary, shim between the base and the mounting plate to plumb all of the rollers.

4. Install the lower roller guides first:
   a. Center each safety on the guide rail approximately $^1/_4$" from the face of the rail.
   b. Hold the face roller in contact with the rail, and turn the adjusting screw until it bottoms out lightly on the base. Back the screw off two turns, and lock it with the jam nut.
   c. Hold each side roller in contact with the rail, and turn the adjusting screw until it bottoms out lightly on the base. Back the screw off one turn, and lock it with the jam nut.
   d. Raise the car to release the safety.
   e. While the car is centered between the rails and the rails are centered in the slots, turn the flange nuts against the rubber springs to bring each roller firmly in contact with the rail.

Installation
(continued)



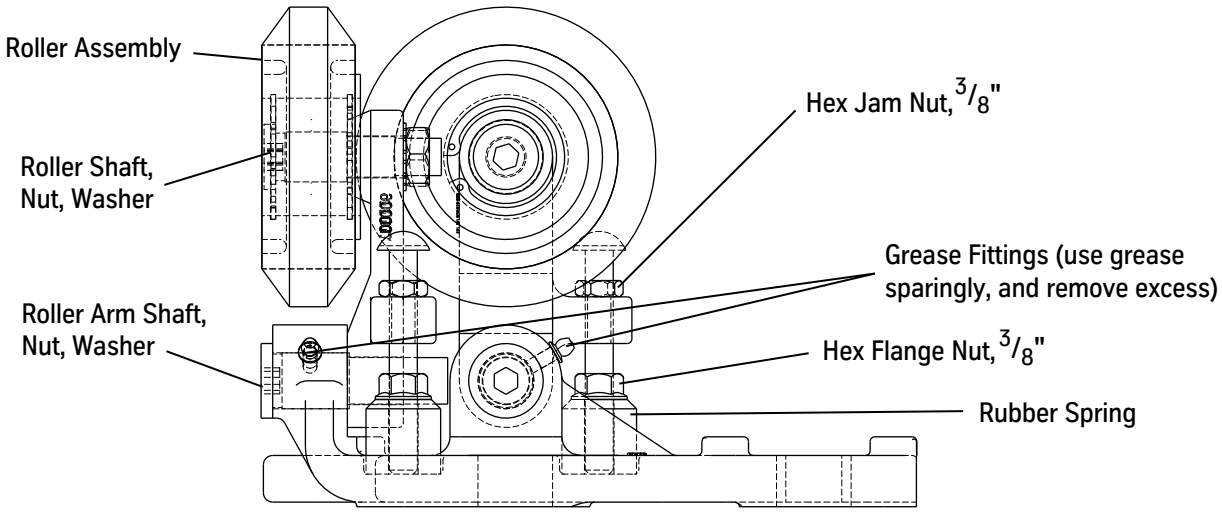


Figure 9 - 4" Roller Guide Assembly, 67960

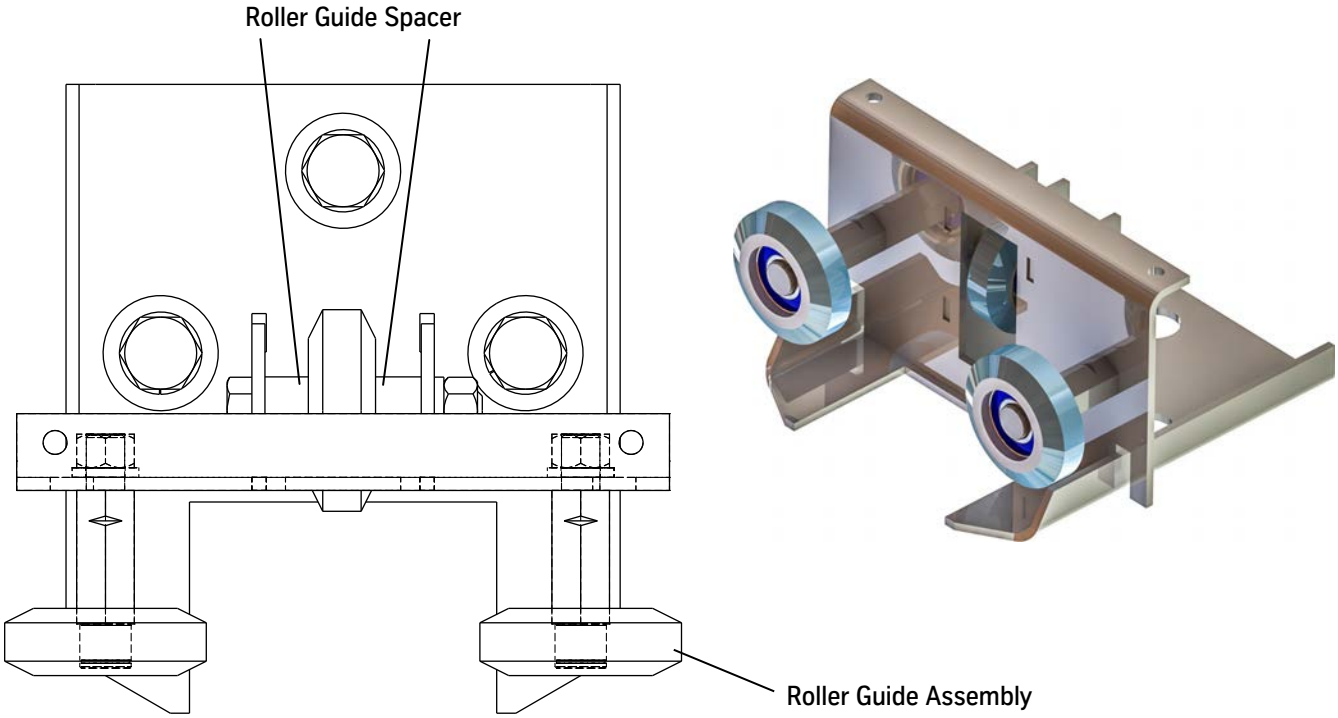
Installation
(continued)

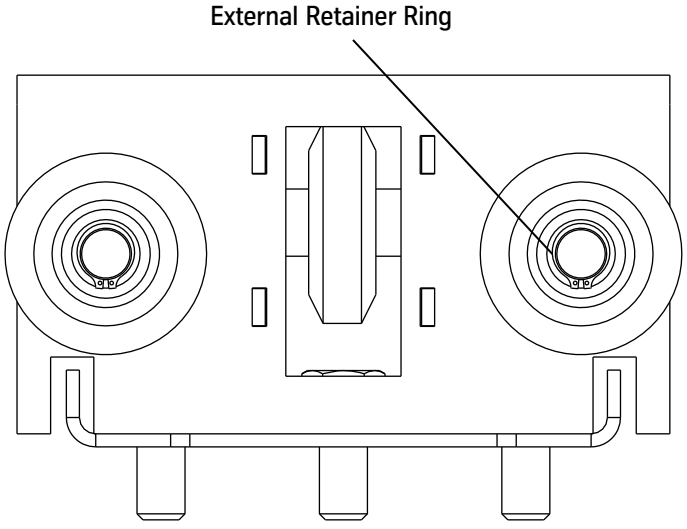
5. With the car still balanced, install the top roller guides:
   a. Center each safety on the rail approximately $^1/_4$" from the face of the guide rail.
   b. Keep the car centered between the rails and the rails centered in the slots, and repeat steps 4b through 4e for the top roller guides.
6. Place 75 lbs. for each foot of cab width against the rear cab wall, and run the car up and down. If the safety jaws/safety slots drag on the rails, turn the adjacent screws $^1/_4$" at a time until clearance is obtained.
7. Move the weights to the front of the cab, and adjust the screws (if necessary).
8. Place 75 lbs. for each foot of cab depth against one cab side wall and, if necessary, adjust the screws as described above. Turn the face roller screw $^1/_4$" at a time until clearance is obtained. Repeat this step for the other side wall.
9. Remove all weights from the car.
10. Turn each flange nut until the chamfer on the rubber spring is no longer visible under the flange. The car should remain centered between the rails with the rails centered in the slots.

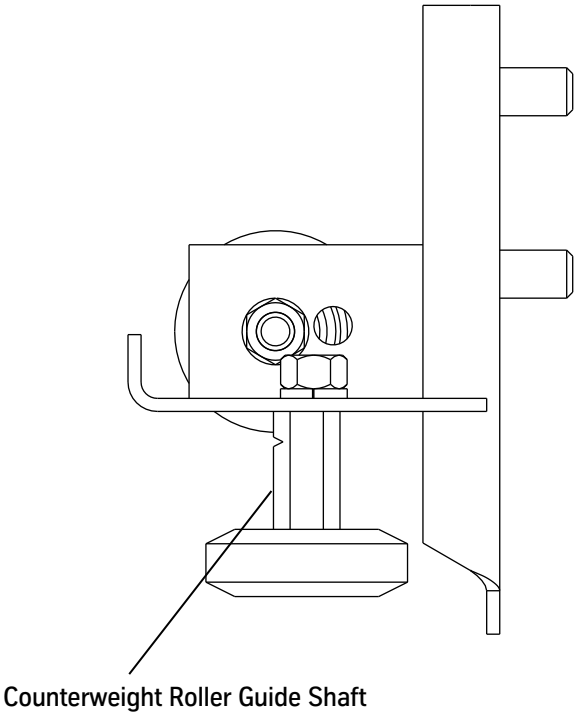
The amount of final preload on the rubber springs depends on the size of the car. Generally, deep cars require more preload on the side springs and wide cars require more preload on the face springs.

C12 & C7 Formed Rail Guide Shoe Assembly, 454BR

- This assembly is used on counterweight rails for traction elevators.
- See the *Twin Post Jacks* manual for Three-Stage Jack Roller Guide instructions.
- Perform Installation Procedure on page 24.







Installation

CAUTION Use temporary guide shoes (Part No. 9825575) instead of roller guides during building construction or temporary service. See Figure 10.

Figure 10 - Temporary Guide Shoe

1. Perform a preliminary check of the following:
   a. The rails are smooth, free of rust, clean, and dry.
   b. The rail splice joints and gouges have been filled and filed smooth.
   c. The car is balanced.
   d. The car frame is square and plumb.
   e. The counterweight is not binding.

NOTE Do not lubricate the rollers or the rail.

2. With the counterweight frame centered and in-line with the counterweight guide rails, square the guide shoe assembly to the counterweight frame. See Figure 11.

3. Tighten down each guide shoe so that the post-wise roller touches the face of the rail.

4. With the guide shoe mounted, rotate the eccentric on the front and rear rollers until the rail is centered in the retainer base of the guide shoe. Do not over-tighten the rollers against the rail.

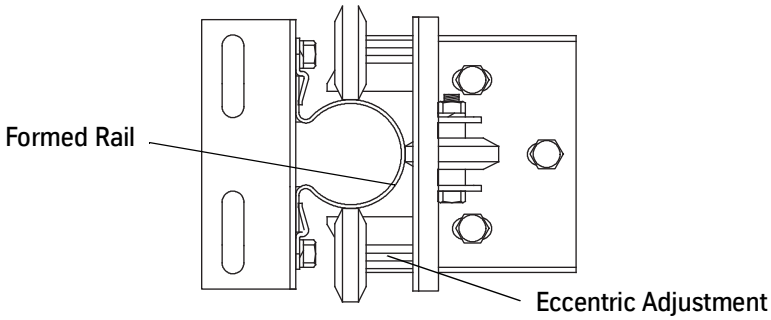


Figure 11 - C12 & C7 Formed Rail Guide Shoe Assembly, 454BR

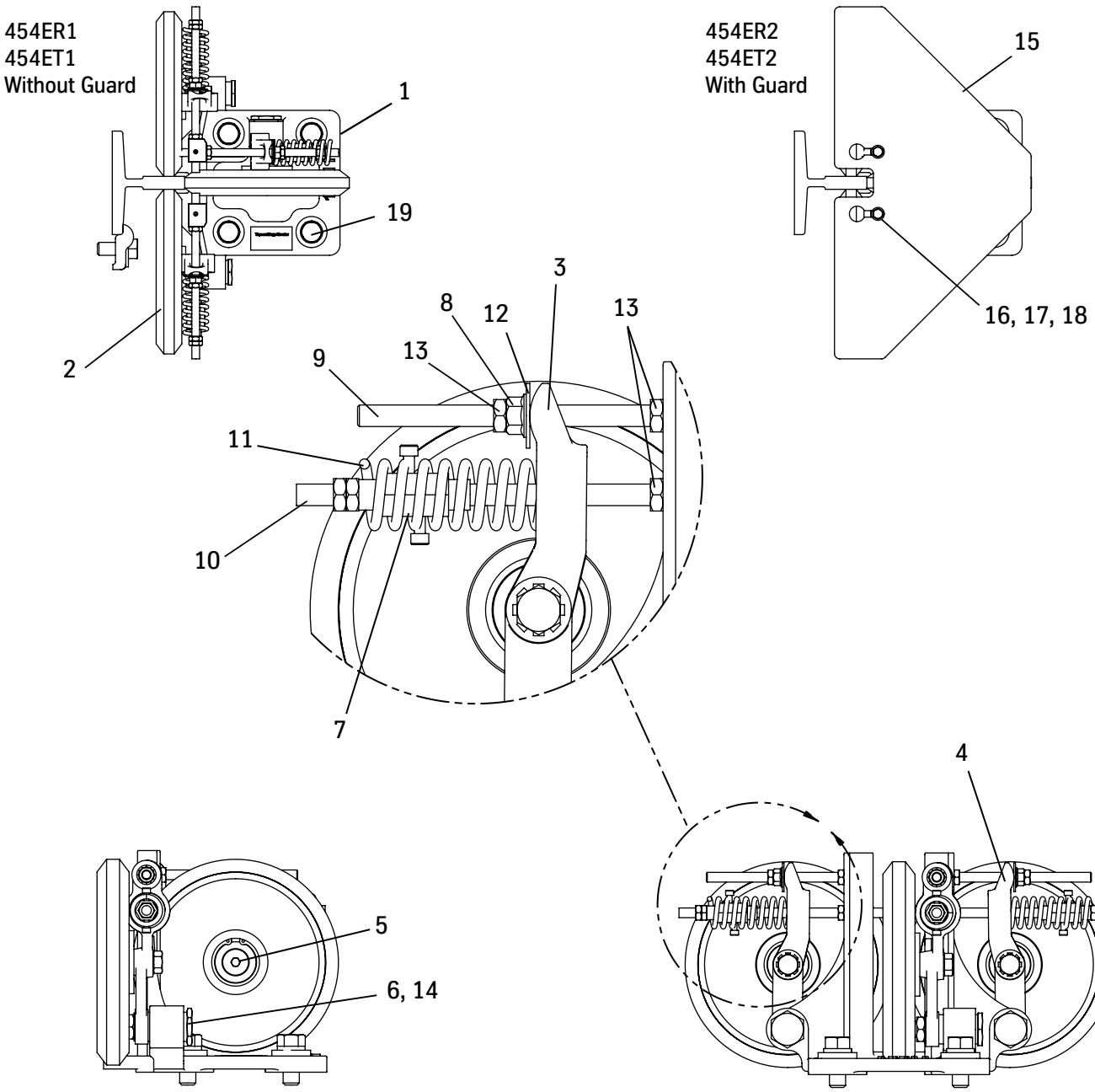
Troubleshooting

Problem	Cause
Noise	Dirty or Damaged Rail
	Bad Roller Assembly
Rapid Wear	Misalignment to Rail
	Excessive Rail Pressure
Vibration	Dirty or Damaged Rail
	Misalignment to Rail
	Bad Roller Assembly
	Misadjusted

Replacement Parts

Individual parts are not available for the 90 mm Roller Guide (454FM) or the 6" Roller Guide (454FA). Order the complete assembly for replacement.

8" Roller Guide, 454ER and 454ET

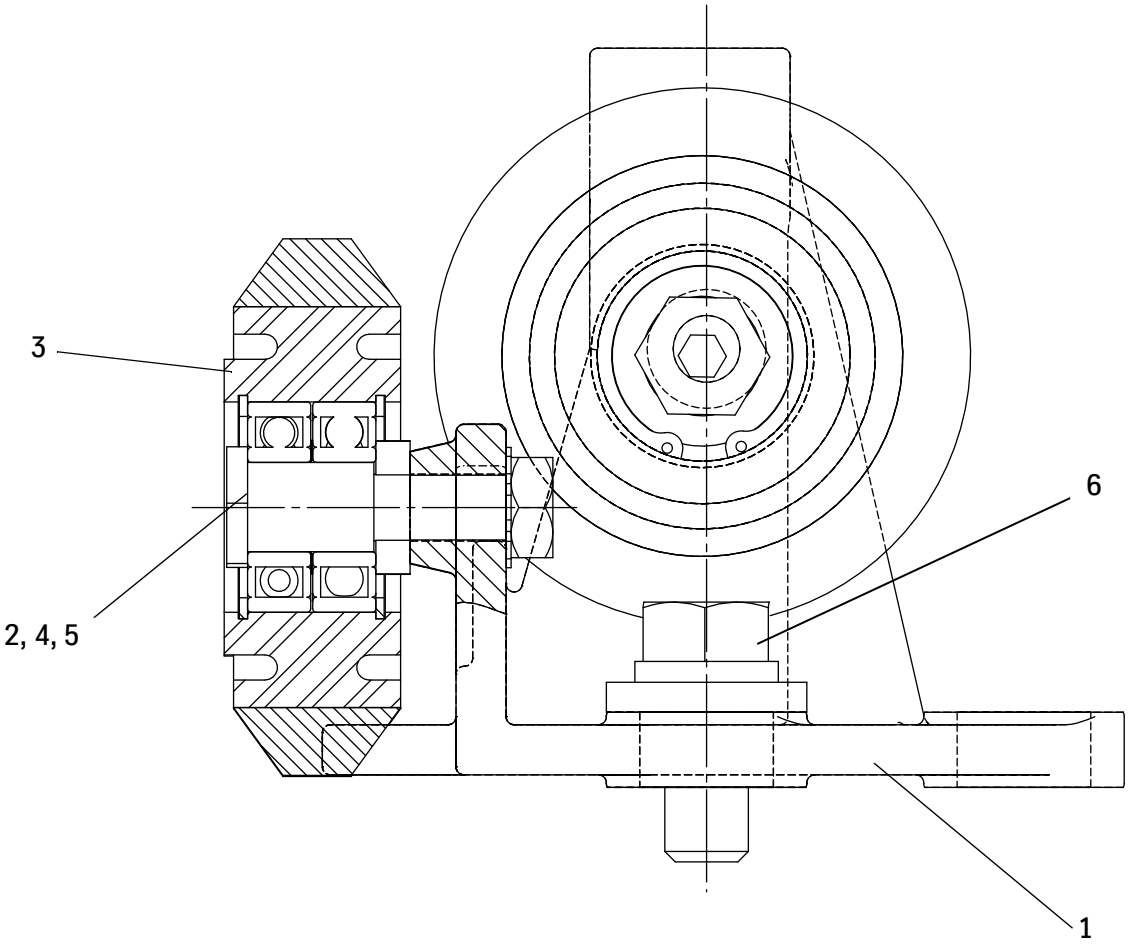


8" Roller Guide, 454ER and 454ET

(continued)

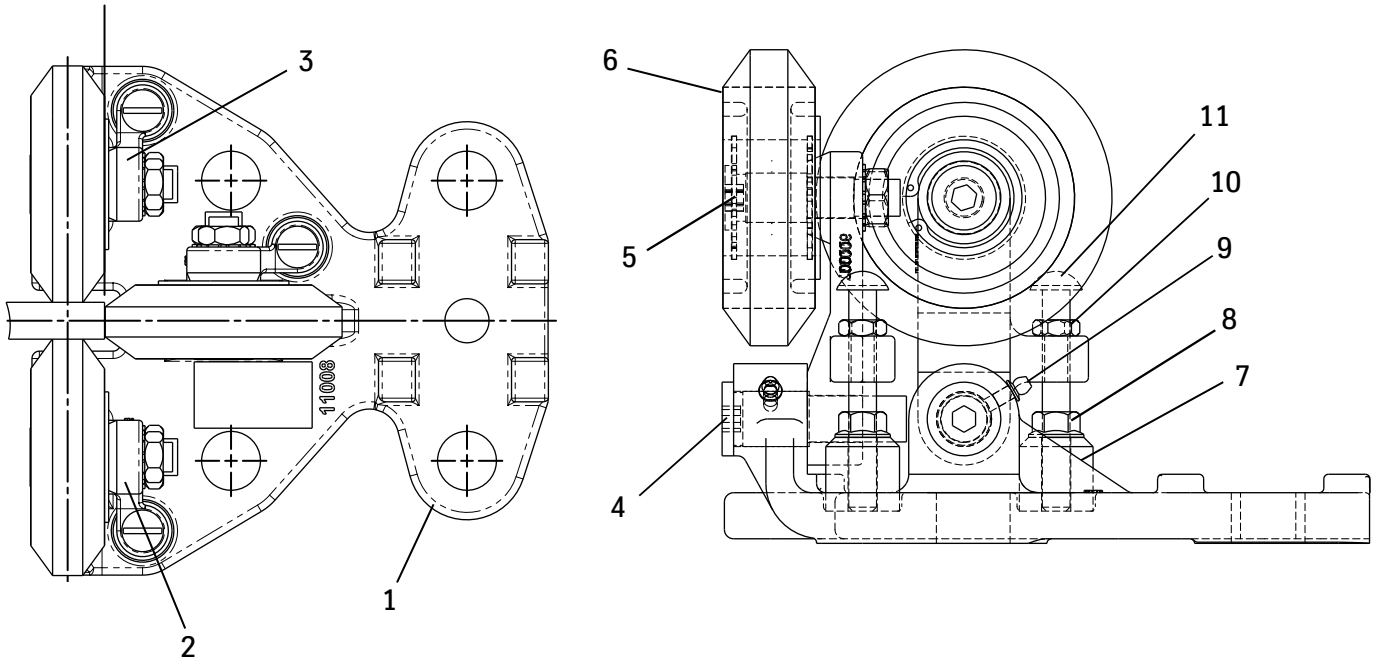
ITEM	PRINT NO.	DESCRIPTION
1	27758	Roller Guide Base, 8" (454ER)
	29942	Roller Guide Base, 8" (454ET)
2	63182	Roller Guide Assembly, 8"
3	27730	Roller Guide Arm, LH
4	27729	Roller Guide Arm, RH
5	27728	Roller Guide Shaft
6	27727	Roller Guide Arm Shaft
7	27734	Spring Adjustment Sleeve
8	143431	Hex Flange Nut, $^{3}/_{8}$"-16 Z
9	143432	Roller Guide Arm Stop Stud
10	718BR2	Threaded Rod, $^{3}/_{8}$", Zinc, 8"
11	75431	Spring Roller
12	131AK1	Rubber Spacer
13	700583	Jam Nut, $^{3}/_{8}$"-16 Z
14	75508	Boston Bronze Bearing
15	451LR	Roller Guide Guard 8"
16	700321	Screw, $^{1}/_{4}$"-20 x $^{1}/_{2}$"
17	700382	Washer, $^{1}/_{4}$" Narrow
18	700405	Lockwasher, $^{1}/_{4}$"
19	130559	Roller Guide Bolt Package

4" Counterweight Roller Guide, 65150



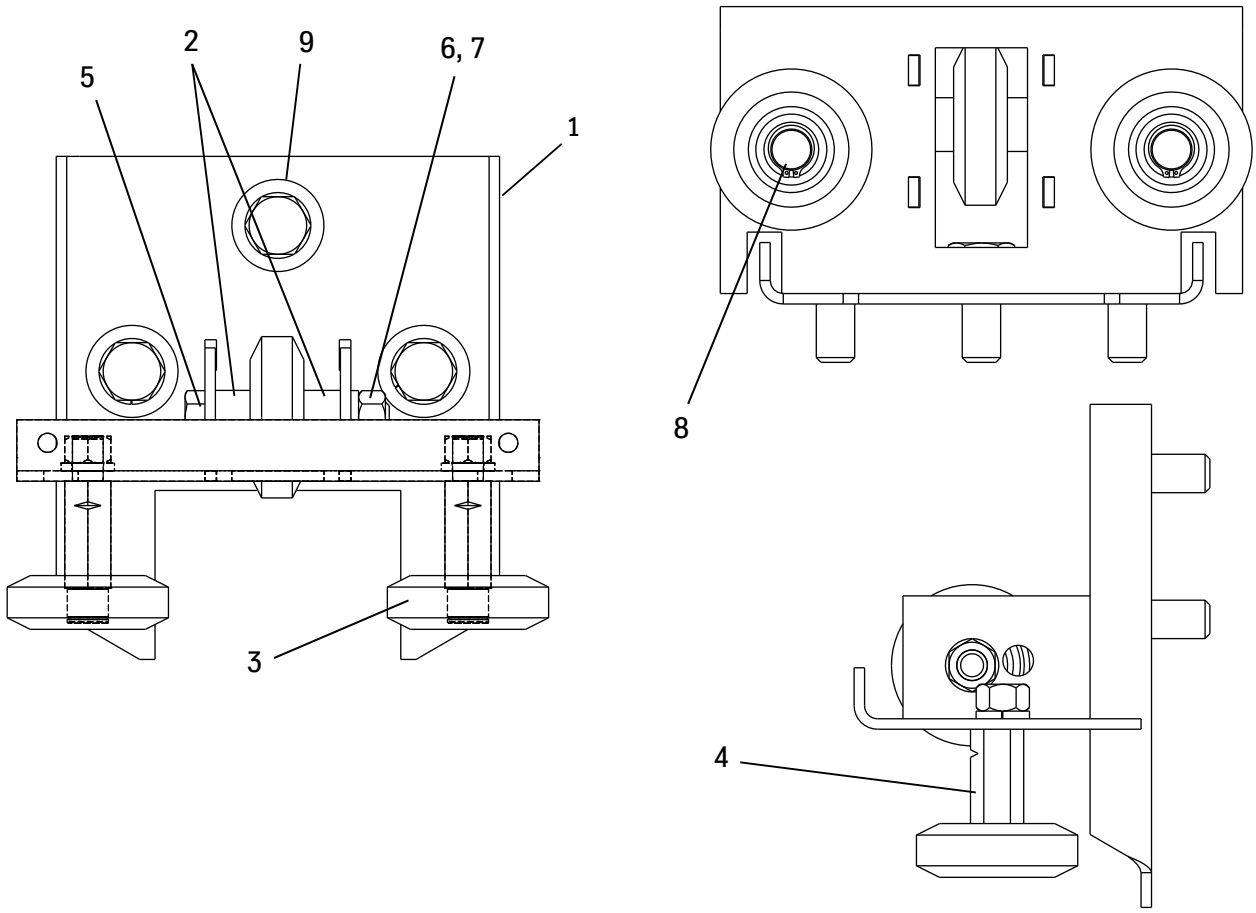
ITEM	PRINT NO.	DESCRIPTION
1	29244	Roller Guide Base
2	28660	Roller Guide Shaft
3	63277	Roller Guide Assembly
4	700579	Washer, Hex Jam Nut $^{1}/_{2}$"
5	72195	Lockwasher, $^{1}/_{2}$"
6	200LG1	Roller Guide Bolt Kit

4" Roller Guide, 67960



ITEM	PRINT NO.	DESCRIPTION
1	45200	Roller Guide Base
2	45201	Roller Guide Arm, LH
3	45198	Roller Guide Arm, RH
4	45196	Roller Guide Arm Shaft
5	744GF1	Roller Guide Shaft
6	63277	Car Roller Guide Assembly, 4"
7	77794	Rubber Spring
8	77572	Hex Flange Nut, $^{3}/_{8}$"
9	72720	Grease Fitting
10	700583	Jam Nut, $^{3}/_{8}$"
11	130559	Roller Guide Bolt Kit

C12 & C7 Formed Rail Guide Shoe Assembly, 454BR



ITEM	PRINT NO.	DESCRIPTION
1	114AM1	Guide Shoe Base Assembly
2	781BL1	Roller Guide Spacer, $2^{5}/_{8}$"
3	454BT1	Roller Guide Assembly, $2^{5}/_{8}$"
4	744DY1	Counterweight Roller Guide Shaft
5	70072	Hex Head Cap Screw, $^{1}/_{2}$"
6	70108	Hex Nut, $^{1}/_{2}$"
7	70083	Helical Lockwasher, $^{1}/_{2}$"
8	717BT3	External Retainer Ring
9	200LG1	Roller Guide Bolt Kit

Car Balancing Frame

Preliminary Check

1. Before balancing the car, verify that the following installations have been completed:
   - Cab
   - Flooring
   - Door Operator
   - Guide Shoes
2. Position the car in the center of the hoistway so that balance weights can be loaded inside the car.

Perform all balancing checks with the car doors closed.

3. Turn OFF, Lockout, and Tagout out the mainline disconnect.
4. Verify that the suspension means are installed correctly.
5. Loosen the locknuts and adjustment nuts on all of the springs on the top roller guides.
6. Loosen the locknuts and adjustment nuts on all of the roller arm stops. This action frees the rollers from the rail and allows the top of the car to move until the throat of the roller guide base touches the rail.
7. With the car suspended only from the cables and with the doors closed, walk to the front and to the back of the car top.

- If the car top remains against one side of the roller guide base while moving from front to back, a car balance frame is required. Perform the Car Balancing Procedure.
- If the car top swings evenly in the direction of the weight on both sides of the cross-head, then the car static balance is correct, and a car balance frame is not required. Skip to step 13 of the Car Balancing Procedure on page 32.

Car Balancing

1. Place balance weights on the floor on the lighter side of the car directly above where the car balance frame will be mounted.
2. After each weight is positioned, repeat step 7 of the Preliminary Check procedure above. Continue until the car static balance is correct.
3. Verify the post-wise position of the balance weights by shifting them until the car moves with equal pressure between the rails.
4. Verify that the car falls back to exactly the same center position, front to back and post-wise, if the top of the car is pushed over in any direction.
5. Record the number and position of the balance weights required to balance the car, and then remove the weights from the car.

Car Balancing
(continued)

6. Temporarily replace the spring adjustment nuts and the stop adjustment nuts to allow car movement.

7. Turn ON the mainline disconnect.

8. Move the car down to a position where the car balance frame can be mounted.

9. Turn OFF, Lockout, and Tagout the mainline disconnect.

10. Mount the car balance frame.

11. Install the number of weights recorded in step 5, minus one weight to compensate for the weight of the frame. Position the weights post-wise according to the location recorded.

12. Use the two provided clamps to lock the weights in place.

13. Turn ON the mainline disconnect.

14. After car balancing, complete the final roller guide adjustment.

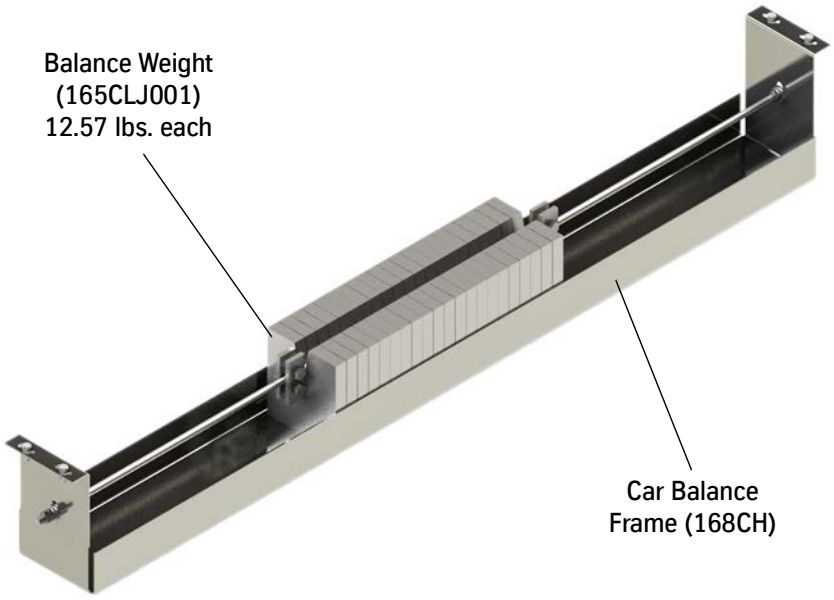


Figure 12 - Frame and Balance Weights

Specifications

Part #	Description	Speed Up to fpm	Load	
			Front to Back	Side to Side
454ER	8" Roller Guide 15 lb. rails	1000 fpm	• 400 lbs. running, empty car balanced • Unbalanced load not to exceed 70 lb. • 35 lbs. for car speed > 500 fpm • 600 lbs. loading	• 400 lbs. running, empty car balanced • 600 lbs. loading
454ET	8" Roller Guide 18.5 lb. rails	1000 fpm		• 450 lbs. running, empty car balanced • 675 lbs. loading
65150	4" Counterweight Roller Guide	1000 fpm	50 lbs.	—
67960	4" Roller Guide	250 fpm per roller	• 350 lbs. running, empty car balanced • 525 lbs. loading	• 400 lbs. running, empty car balanced • 600 lbs. loading
454FM	90 mm Roller Guide	Counterweight: 2.5m/sec	35 lbs. per roller	—
454FA	6" Roller Guide	Counterweight: 240 m/min ~ 480 m/min, capacity: no more than 1800 kg. Car: 105 m/min ~ 180 m/min, capacity: no more than 1800 kg.		

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