



TRAILER AXLE 2-7K OEM INSTALLATION MANUAL

L I P P E R T
C O M P O N E N T S ®

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Introduction

LCI tubular axles are made of high-strength steel to prevent metal fatigue and provide the best possible welding conditions. The round tubular axles allow for even and uniform structure.

The suspension systems incorporated into LCI axles are designed to provide the following benefits:

- Attach the axle to the trailer
- Dampen the effects of road shock
- Provide stability to the trailer

All LCI suspension systems are available in single, tandem and triple axle configurations.

For information on the assembly or individual components of this product, please visit:

<https://support.lci1.com/spring-axles>.

NOTE: Images used in this document are for reference only when assembling, installing and/or operating this product. Actual appearance of provided and/or purchased parts may differ.

NOTE: Axle assemblies are intermittently shown in either underslung and overslung configurations. Axle assembly remains the same for either configuration.

Safety

Read and understand all instructions before installing or operating this product. Adhere to all safety labels. This manual provides general instructions. Many variables can change the circumstances of the instructions, i.e., the degree of difficulty, operation and ability of the individual performing the instructions. This manual cannot begin to plot out instructions for every possibility, but provides the general instructions, as necessary, for effectively interfacing with the device, product or system. Failure to correctly follow the provided instructions may result in death, serious personal injury, severe product and/or property damage, including voiding of the LCI limited warranty.

WARNING

The "WARNING" symbol above is a sign that an installation procedure has a safety risk involved and may cause death, serious personal injury or severe product and/or property damage if not performed safely within the parameters set forth in this manual.

WARNING

Failure to follow instructions provided in this manual may result in death, serious personal injury and/or severe product and property damage, including voiding of the component warranty.

WARNING

Trailer MUST be supported per manufacturer's recommendations before working underneath. Failure to do so may result in death or serious personal injury.

WARNING

Always lift trailer by the frame, never the axle or suspension. Do not go under the trailer unless it is properly supported by jack stands. Unsupported trailers can fall causing death or serious injury.

WARNING

Incorrect raising or lowering of the trailer could result in death, serious personal injury or severe product or property damage. Support frame in accordance with manufacturer's recommendation.

CAUTION

The "CAUTION" symbol above is a sign that a safety risk is involved and may cause personal injury and/or product or property damage if not safely adhered to and within the parameters set forth in this manual.

CAUTION

Moving parts can pinch, crush or cut. Keep clear and use caution.

Resources Required

- Cordless or electric drill or screw gun
- Appropriate drive bits
- Torque wrench (ft-lbs)
- Clamp
- Floor jacks
- Jack stands
- Welder (If needed)
- Personal protective equipment (PPE) (If needed)
- Hammer
- Wrenches

Installation Of Hangers If Needed

The most important portion of axle installation is setting the axle hangers square to the centerline of the trailer. Axles mounted out of square will cause the trailer to dog track. Dog-tracking is when the axle is not square to the direction of travel. A skewed axle will cause the trailer to swing out to the left or right.

When mounting multiple axles to a trailer, take care to get the first axle hangers square to the trailer frame. Proper alignment is most readily achieved by measuring from the center of the trailer hitch to the center of each axle hanger. Once the first axle hanger alignment is established, set the remaining axle hangers parallel with the first. Proper installation allows for correct and safe control, prolonged tread life and will eliminate dog-tracking.

Hanger Spacing Chart

HANGER SPACING CHART					
Double-Eye Spring Setups					
Single Axle					
Approximate eye-to-eye length, no load	Hanger Spacing	Ref. Axle Spacing	Equalizer hole-to-hole length	EQ Ref. #	
20"	20.75"	N/A	N/A	N/A	
23"	23.75"	N/A	N/A	N/A	
25"	25.75"	N/A	N/A	N/A	
Tandem Axle					
Approximate eye-to-eye length, no load	Hanger Spacing	Ref. Axle Spacing	Equalizer hole-to-hole length	EQ Ref. #	
20"	24.5"	28"	5.75" hole to hole	EQ-104 & EQ-130	
23"	27.5"	31"	5.75" hole to hole	EQ-104 & EQ-130	
25"	29.5"	33"	5.75" hole to hole	EQ-104 & EQ-130	
25"	30.5"	35"	7.75" hole to hole	E-1	
25"	34"	42"	14.75" hole to hole	EQ-142	
Triple Axle - Standard Axle Spacing					
Spring Length	Front & Rear Hanger Spacing	Center Hanger Spacing	Ref. Axle Spacing	Equalizer hole-to-hole length	STD AP Kit
25"	29.5"	33"	33"	6.75" front EQ/ 5.57" rear EQ	EQ-104 & EQ-105
25"	30.5"	35"	35"	9.06" front EQ/ 7.75" rear EQ	EQ-E1 & EQ-126

Single Axle Installation

NOTE: If hangers are already welded onto the frame, go to step 3.

NOTE: Red/black lines refer to using a welder to add frame components per instructions.

1. Support trailer in accordance with the manufacturer's recommendations.

CAUTION

Welding generates excessive heat, hot sparks and blinding light, which can cause serious personal injury. Use appropriate personal protective equipment for welding.

2. If needed, center the hangers on frame rails and weld hangers squarely onto the frame, spacing hangers 25.75" on center (Fig. 1). Weld hangers a full 360°. See Hanger Spacing Chart for other sizes.

Install Axle

NOTE: Axle, hub and wheel assembly not shown for clarity.

1. Install shoulder bolt for the spring clip side of the suspension spring through the spring eye and into the front hanger.

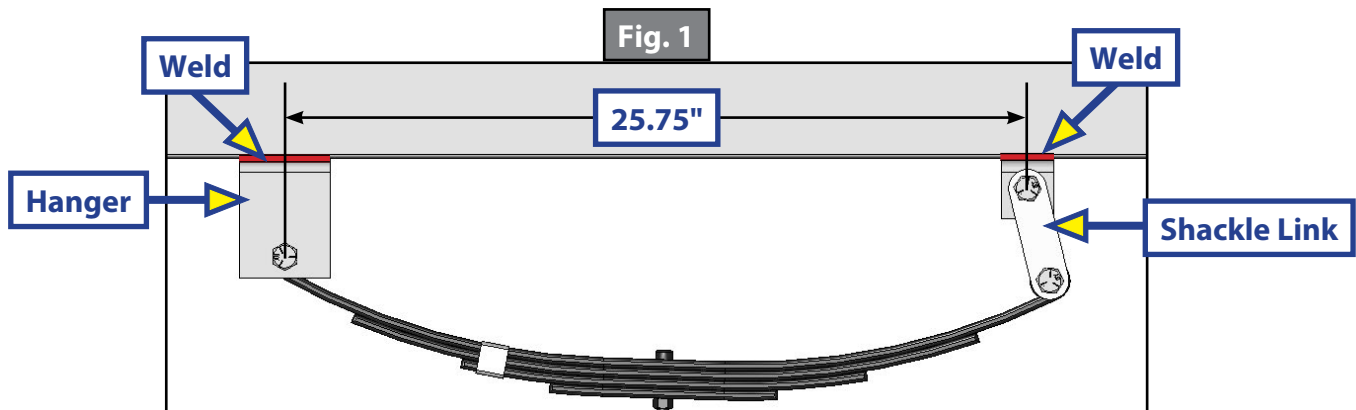
NOTE: The spring clip (Fig. 1) should point toward the front of the trailer and the brake wire should exit the axle tube on the back side. Additionally, the position of the axle serial label designates the rear of the axle. These steps ensure correct orientation of the axle.

2. Using a hammer, drive in the bolt from the outside of the hanger to seat the bolt head against the hanger face.
3. Install flange nut onto the threaded end of the bolt.
4. Use a wrench to hold the bolt head to prevent bolt rotation while tightening the nut to the shoulder of the bolt. Torque nut to 30 to 50 ft-lbs.
5. Rotate the rear spring eye toward the rear hanger and install a bolt of the shackle link/bolt assembly through the spring eye from the outside.
6. Install other bolt in the shackle link/bolt assembly through the hanger.
7. Install the loose shackle link on the inboard side.
8. Install flange nuts onto the threaded ends of the bolts.
9. Use a wrench to hold the bolt heads to prevent bolt rotation while tightening the nuts to the shoulder of bolts. Torque nut to 30 to 50 ft-lbs.
10. The axle is pre-wired and two lead wires are left for trailer wire hookup. One lead will need a 12V DC supply and the other lead will need a ground wire attached.

NOTE: The two leads are non-polar, so the 12V supply and ground can be hooked to either lead.

NOTE: Trailer wire size and connectors should be sized so a minimum supply of 10.5 volts is achieved at lead wires.

11. The axle installation is complete. See Wheels section to mount the tire and wheel assemblies onto the axle. Follow the wheel manufacturer's instructions.



Tandem Axle Installation

Weld Hangers Onto Frame If Needed

NOTE: If hangers are already welded onto the frame, go to Install Equalizer section.

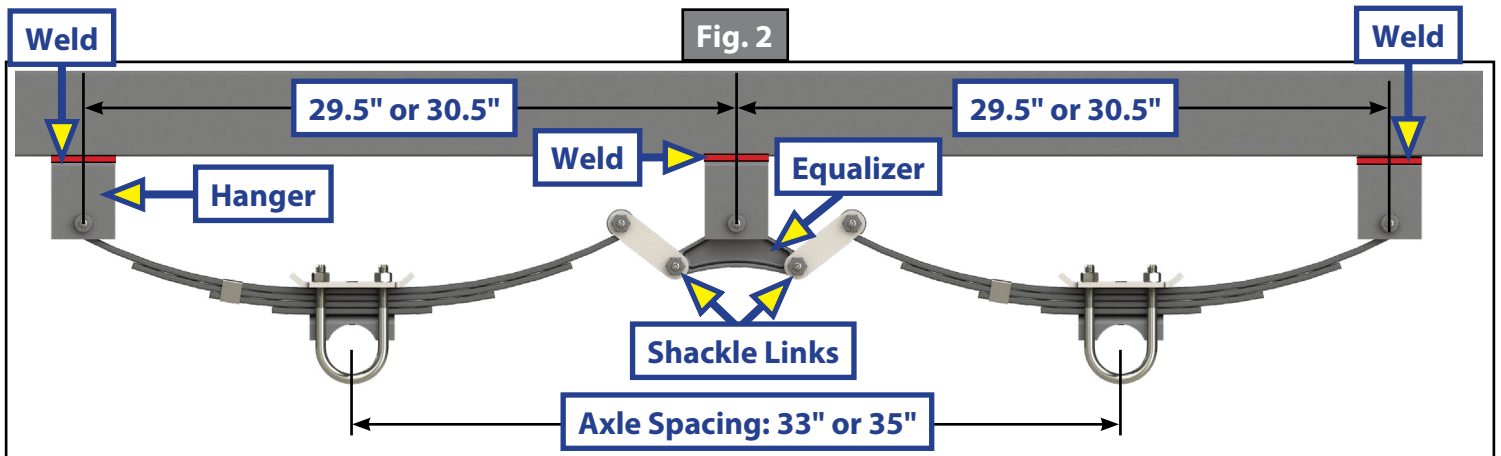
NOTE: Red/black lines refer to using a welder to add frame components per instructions.

1. Support trailer in accordance with the manufacturer's recommendations.

⚠ CAUTION

Welding generates excessive heat, hot sparks and blinding light, which can cause serious personal injury. Use appropriate personal protective equipment for welding.

2. If needed, center the hangers on the frame rails and weld the hangers squarely onto the frame, spacing the hangers 29.5" on center for a 33" axle spacing or 30.5" for a 35" axle spacing (Fig. 2). Weld hangers a full 360 degrees around the hanger. See Hanger Spacing Chart for other sizes.

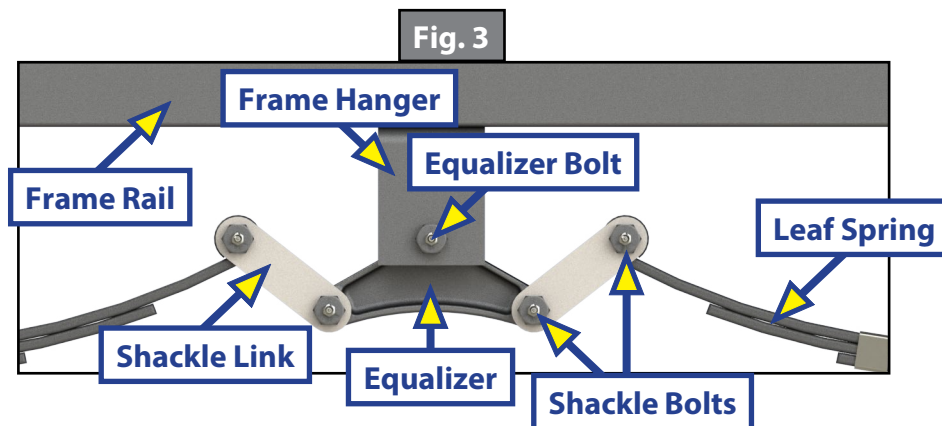


Install Equalizer

NOTE: Reference figure 3 for component clarification during installation.

NOTE: There are different equalizer options.

1. Install the equalizer into the center frame hanger.
2. Insert the equalizer bolt through the first bracket of the hanger, then through the topmost bushing of the equalizer and, finally, through the second bracket of the hanger.
3. Use a hammer or a piece of steel tube (for bolts with a grease fitting) and drive the bolt into the equalizer hanger outside plate until the bolt head is seated against the hanger surface.



NOTE: Both the shackle bolts and equalizer bolt must be installed from the outside in toward the center of the trailer chassis. This ensures the bolt threads do not interfere with any other assemblies. This applies to bolts with or without grease fittings.

4. Thread a nut onto the exposed equalizer bolt thread until the nut seats against the hanger.
5. Use a wrench to hold the bolt head to prevent bolt rotation while tightening the nut to the shoulder of the bolt. Torque nut to 30 to 50 ft-lbs.

Install Axle Assembly

1. Beginning with the front axle, install shoulder bolt for the spring clip side of the suspension spring through the spring eye and into the front hanger.

NOTE: The spring clip should point toward the front of the trailer and the brake wire should exit the axle tube on the back side. Additionally, the position of the axle serial label designates the rear of the axle. These steps ensure correct orientation of the axle.

2. Using a hammer, drive in the bolt from the outside of the hanger to seat the bolt head against the hanger face.
3. Install flange nut onto the threaded end of the bolt.
4. Use a wrench to hold the bolt head to prevent bolt rotation while tightening the nut to the shoulder of the bolt. Torque nut to 30 to 50 ft-lbs.
5. Repeat procedure for the rear spring eye of the rear axle.
6. Rotate rear spring eye of front axle toward the equalizer and install a bolt of the shackle link/bolt assembly through spring eye from the outside.
7. Install loose shackle link from the inboard side.
8. Install flange nut on threaded end of the bolt.
9. Use a wrench to hold the bolt head to prevent bolt rotation while tightening the nut to the shoulder of the bolt. Torque nut to 30 to 50 ft-lbs.
10. Repeat procedure for the front spring eye of the rear axle.
11. The axles are pre-wired and two lead wires are left for trailer wire hookup. One lead will need a 12V DC supply and the other lead will need a ground wire attached.

NOTE: The two leads are non-polar, so the 12V supply and ground can be hooked to either lead.

NOTE: Trailer wire size and connectors should adhere to CSA Z240 requirements so that a minimum supply of 10.5 volts is achieved at the lead wires. Amperage draw should be a minimum of 10 amps when tested at the trailer plug. Make sure a 12 to 15 volt power supply is being used for the test.

12. Repeat equalizer and suspension spring procedures for the opposite side of the trailer.
13. The axle installation is now complete. See Wheels section to mount the tire and wheel assemblies onto the axle. Follow the wheel manufacturer's instructions.

NOTE: Once tires are installed and the frame weight is on the axles, make sure the shackle links are pointing up to form the "W" shape or in the 10 o'clock and 2 o'clock position (Fig. 2).

Triple Axle Installation

Weld Hangers Onto Frame

NOTE: If hangers are already welded onto chassis, skip to Attach Rear Tandem Axle Equalizer section.

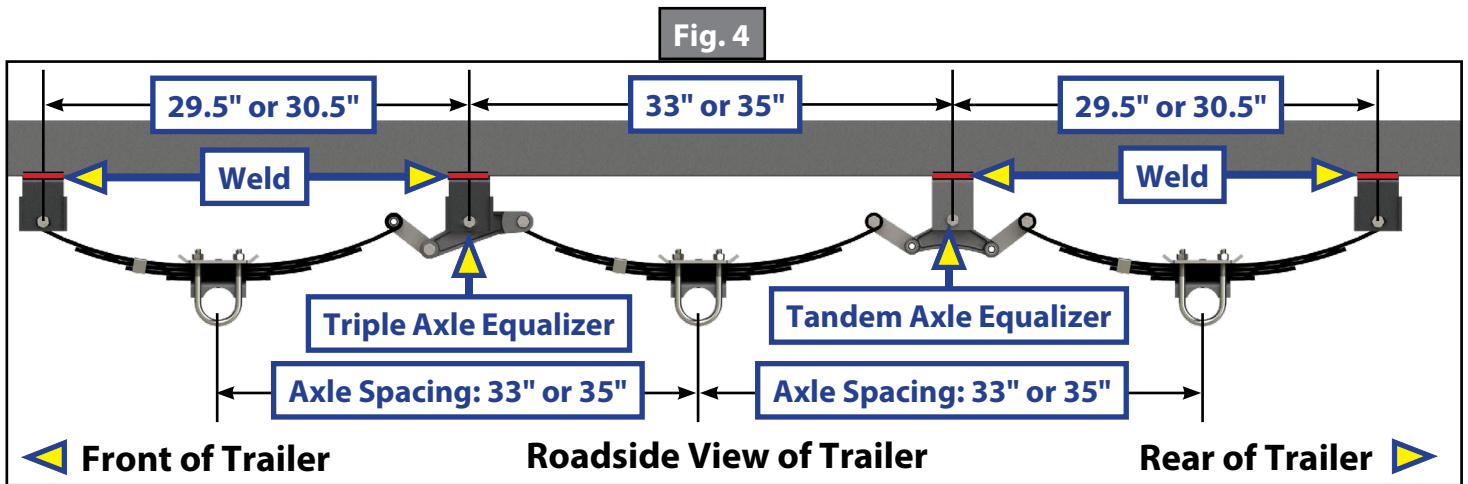
NOTE: Red/black lines refer to using a welder to add frame components per instructions.

1. Support trailer in accordance with the manufacturer's recommendations.

⚠ CAUTION

Welding generates excessive heat, hot sparks and blinding light, which can cause serious personal injury. Use appropriate personal protective equipment for welding.

2. If needed, center the hangers on the frame rails and weld the hangers squarely onto the frame. The center hangers should be spaced 33" on center for a 33" axle spacing or 35" on center for a 35" axle spacing. The outside hangers should be spaced 29.5" on center for a 33" axle spacing or 30.5" for a 35" axle spacing (Fig. 4). Weld hangers a full 360 degrees around the hanger. See Hanger Spacing Chart.



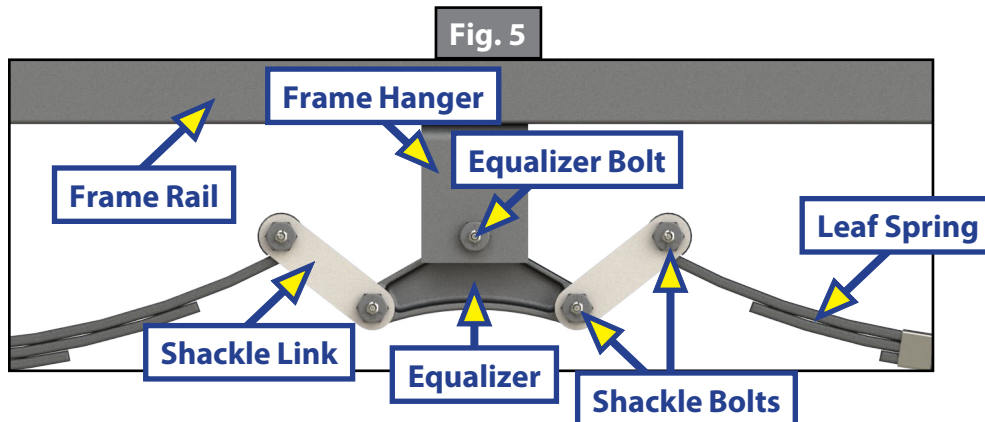
Attach Rear Tandem Axle Equalizer (Between 2nd and 3rd Axles)

NOTE: Support framework in accordance with manufacturer's recommendations.

NOTE: There are different options available for equalizers.

Reference figure 5 for the following procedural steps:

1. Install the tandem equalizer into the hanger.
2. Insert the equalizer bolt through the first bracket of the hanger, then through the topmost bronze bushing of the equalizer and, finally, through the second bracket of the hanger.



3. Use a hammer or a piece of steel tube (for bolts with grease fittings) and drive the equalizer bolt into the hanger. This will seat the serrations of the bolt against the hanger surface and provide resistance to rotation when tightening.

NOTE: The equalizer bolt must be installed from the outside in toward the center of the trailer chassis. This ensures the bolt threads do not interfere with any other assemblies. This applies to bolts with or without grease fittings.

4. Thread a nut onto the equalizer bolt until the nut seats against the hanger.
5. Use a wrench to hold the bolt head to prevent bolt rotation while tightening the nut to the shoulder of the bolt. Torque nut to 30 to 50 ft-lbs.

Attach Front Triple Axle Equalizer (Between 1st and 2nd Axles)

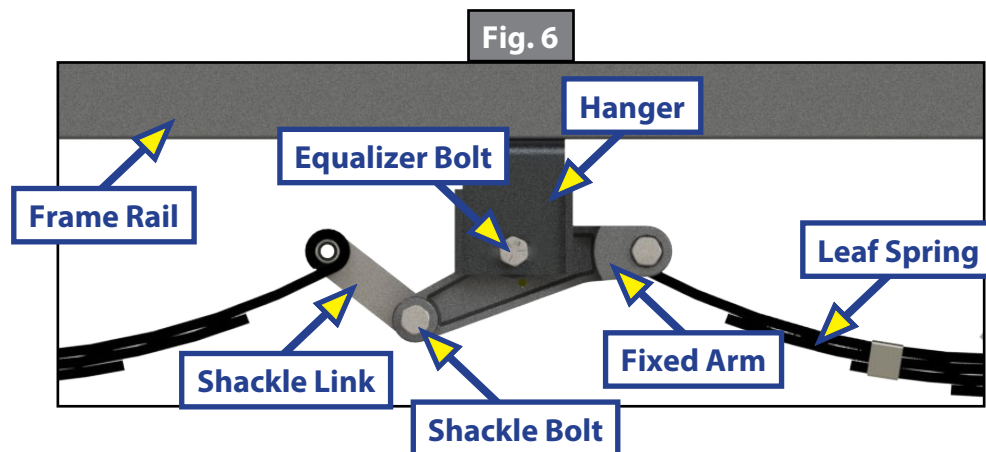
NOTE: Support framework in accordance with manufacturer's recommendations.

Reference figure 6 for the following procedural steps:

1. Install the triple axle equalizer on the hanger with the fixed arm facing the rear of the trailer.
2. Insert the equalizer bolt through the first bracket of the hanger, then through the topmost bushing of the equalizer and, finally, through the second bracket of the hanger.
3. Use a hammer or a piece of steel tube (for bolts with grease fittings) and drive the equalizer bolt into the hanger. This will seat the serrations of the bolt against the hanger surface and provide resistance to rotation when tightening.

NOTE: The equalizer bolt must be installed from the outside in toward the center of the trailer chassis. This ensures the bolt threads do not interfere with any other assemblies. This applies to bolts with or without grease fittings.

4. Thread a nut onto the equalizer bolt until the nut seats against the hanger.
5. Use a wrench to hold the bolt head to prevent bolt rotation while tightening the nut to the shoulder of the bolt. Torque nut to 30 to 50 ft-lbs.



Install Axle Assembly

1. Beginning with the front axle, install shoulder bolt for the spring clip side of the suspension spring through the spring eye and into the front hanger.
NOTE: The spring clip should point toward the front of the trailer and the brake wire should exit the axle tube on the back side. Additionally, the position of the axle serial label designates the rear of the axle. These steps ensure correct orientation of the axle.
2. Using a hammer, drive in the bolt from the outside of the hanger to seat the bolt head against the hanger face.
3. Install flange nut onto the threaded end of the bolt.
4. Use a wrench to hold the bolt head to prevent bolt rotation while tightening the nut to the shoulder of the bolt. Torque nut to 30 to 50 ft-lbs.
5. Repeat procedure for the rear spring eye of the rear axle.
6. Rotate rear spring eye of front axle toward the triple axle equalizer and install a bolt of the shackle link/bolt assembly through spring eye from the outside.
7. Install loose shackle link from the inboard side.
8. Install flange nut on threaded end of the bolt.
9. Use a wrench to hold the bolt head to prevent bolt rotation while tightening the nut to the shoulder of the bolt. Torque to 30 to 50 ft-lbs.
10. Repeat procedure for the front spring eye of the back axle.
11. Install a bolt of through the fixed arm of the triple axle equalizer and through the spring eye of the front of the second axle.
12. Install flange nut on threaded end of the bolt.
13. Use a wrench to hold the bolt head to prevent bolt rotation while tightening the nut to the shoulder of the bolt. Torque nut to 30 to 50 ft-lbs.
14. Rotate rear spring eye of second axle toward the front of the tandem axle equalizer and install a bolt of the shackle link/bolt assembly through spring eye from the outside.
15. Install loose shackle link from the inboard side.
16. Install flange nut on threaded end of the bolt.
17. Use a wrench to hold the bolt head to prevent bolt rotation while tightening the nut to the shoulder of the bolt. Torque nut to 30 to 50 ft-lbs.
18. The axles are pre-wired and two lead wires are left for trailer wire hookup. One lead will need a 12V DC supply and the other lead will need a ground wire attached.

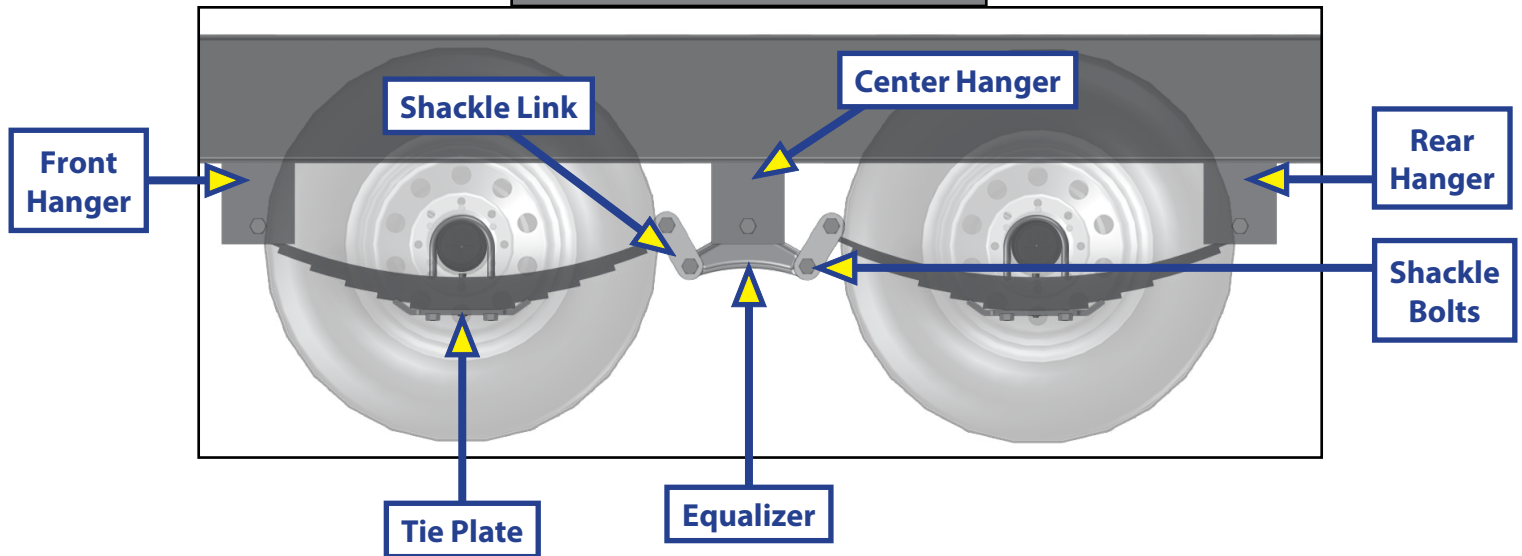
NOTE: The two leads are non-polar, so the 12V supply and ground can be hooked to either lead.

NOTE: Trailer wire size and connectors should adhere to CSA Z240 requirements so that a minimum supply of 10.5 volts is achieved at the lead wires. Amperage draw should be a minimum of 10 amps when tested at the trailer plug. Make sure a 12 to 15 volt power supply is being used for the test.

19. Repeat equalizer and suspension spring procedures for the opposite side of the trailer.
20. The axle installation is now complete. See Wheels section to mount the tire and wheel assemblies onto the axle. Follow the wheel manufacturer's instructions.

NOTE: Once tires are installed and the frame weight is on the axles, make sure the tandem equalizer shackle links are pointing up to form the "W" shape and in the 10 o'clock position for the shackle link on the triple axle equalizer (Fig. 4).

Fig. 7 - Double-Eye Leaf Springs



Double-Eye Leaf Springs

Double-eye leaf springs have eyes at either end of the spring assembly with nylon bushings to assist in preventing wear. U-bolts hold the springs to the axle with a tie plate (Fig. 7). Refer to Spring Axle Torque Specifications chart for bolt torque requirements.

Spring Axle Torque Specifications		
Bolt Type	Axle Capacity	Torque
Spring Eye, Equalizer and Shackle Nuts	All Double Eye	30-50 ft-lbs
Spring Eye, Equalizer and Shackle Nuts	All Slipper	Snug nut only

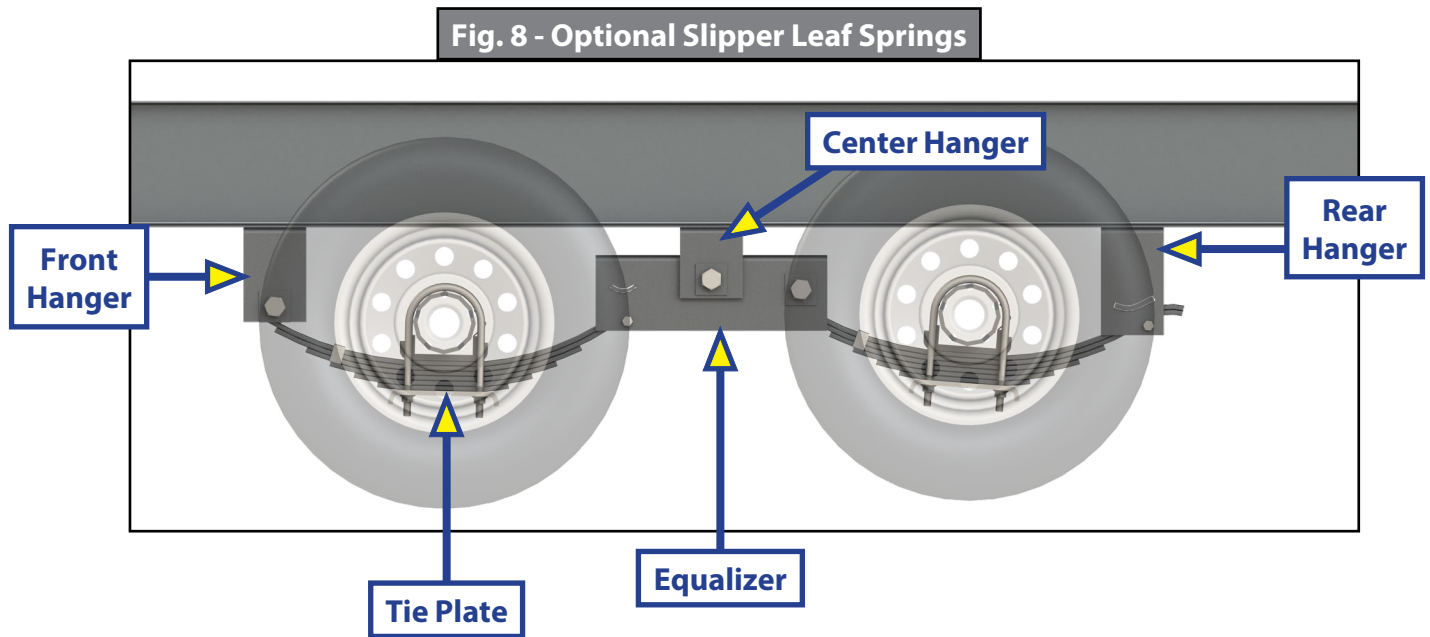
The articulation of this suspension occurs when the eyes rotate on the wear surfaces provided in eyes of the springs and on the equalizers. This suspension is also available in single and multiple axle configurations. In trailers with two or more axles, the additional movement is maintained by an equalizer. This feature allows for even load handling from axle to axle.

Double-eye suspension systems are available on axles up to 8,000-lb. ratings. Tandem and triple axle mounting kits are available for both 33" and 35" axle spacing.

Slipper Leaf Springs - Optional

Slipper springs have a loop eye formed on one end and a reverse radius on the other (Fig. 8). The front eye is secured to either the front hanger or rear of the equalizer with a bolt and nut. The slipper end rides against a wear block located in either the front of the equalizer or the rear hanger. Refer to Spring Axle Torque Specifications chart for bolt torque requirements.

A keeper bolt or strap is placed under the slipper end to contain the spring when the trailer is lifted off the ground. The 3.5-8K tandem and triple axle attaching kits are available for both 33.5" and 36" axle spacing.



Torsion Suspension System

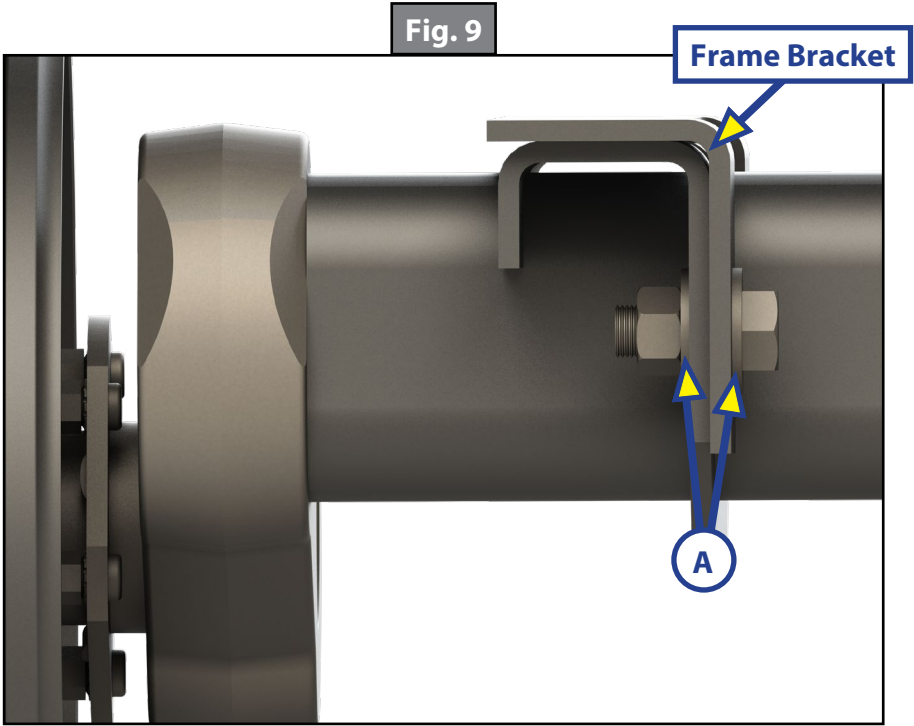
The LCI Torsion Suspension system is bracketed to the trailer’s frame and housed inside the trailer axle’s tube. The spindle is connected to a swing arm, which is connected to a square inner bar surrounded by four rubber cords inside the axle tube. As the swing arm rotates, the rubber absorbs and distributes torque and resistance loads generated by driving conditions. Torsion axles provide independent wheel-end suspension, quieter ride and more vertical wheel travel for a softer ride compared to leaf spring axles.

Normal inspection of the entire LCI Trailer Axle system can be applied to the Torsion Suspension system.

For Torsion Suspension System installation:

- 1. Mount axle bracket to frame bracket (Fig. 9).
- 2. Torque fasteners as specified in the Torsion Axle Torque Specifications chart.
- 3. Washers **MUST** be placed on both sides of the bracket, including under the nut and under the bolt head (Fig. 9A).

Torsion Axle Torque Specifications		
Axle Size	Bolt Size	Torque Range
2K Axle Capacities	1/2"	70-90 ft-lbs
3.5K-10K Axle Capacities	5/8"	120-150 ft-lbs



Wheels

Wheel Selection

WARNING

Air pressure on a weakened or cracked rim can create an unsafe, explosive condition and may result in serious personal injury or death. Do not attempt to modify or repair a wheel. Replace damaged or weakened wheel and rim with new wheel and rim.

WARNING

Use manufacturer's suggested rim contours only. Failure to use recommended rim contours may result in dramatic separation between tire and wheel, and may result in possible serious personal injury or death.

Trailer wheels, tires and axles **MUST** be properly matched when specifying or replacing trailer wheels. Make sure the following critical wheel replacement characteristics are observed:

1. Bolt Circle — Wheels have varying bolt circle patterns, some close enough to allow installation of mismatched wheel bolt patterns to axle hub bolt patterns.
2. Capacity — Wheel load capacity **MUST** match tire and trailer maximum load ratings.
3. Offset — The relationship of the tire's centerline to the axle's hub face **MUST** match across replacement parts. Failure to match offset reduces axle carrying capacity.
4. Rim Contour — Replacement wheels **MUST** directly match the mating rim contour.

Torque Requirements

It is important to maintain proper wheel mounting torque limits on the trailer axle. Use of torque wrenches will ensure proper torque limits are applied to wheel mounting lug nuts. Use no other method to torque wheel lug nuts.

Make sure wheel fasteners match the cone angle of the wheel (usually 60 degrees or 90 degrees) being serviced. Attach new wheel to the axle hub as follows:

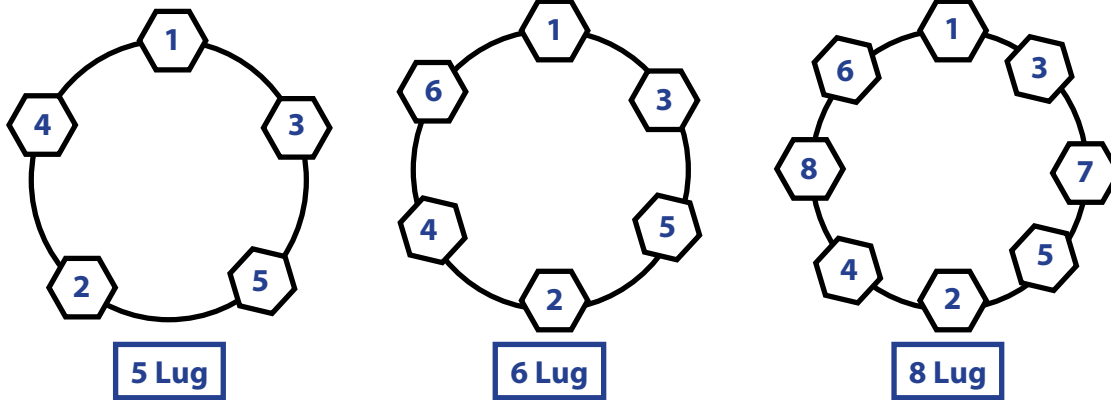
1. Start all bolts or nuts by hand to prevent cross-threading.
2. Continue to hand-tighten wheel lug nuts in the sequential pattern shown in figure 10.
3. After wheel lug nuts are fully hand-tightened, torque nuts in stages in the sequential pattern shown in figure 10.

WARNING

Proper and accurate torque **MUST be maintained to prevent wheels from loosening, studs from cracking and/or breaking or other possible hazardous breakage, which may resulting in serious injury or death.**

4. Torque wheel lug nuts to the torque values listed in the Wheel Torque Requirement Chart.

Fig. 10



Wheel Torque Requirement Chart				
Wheel Size	Stud Size	Torque Sequence		
		1st Stage	2nd Stage	3rd Stage
14"	1/2"	20-25 ft-lbs	50-60 ft-lbs	90-120 ft-lbs
15"	1/2"	20-25 ft-lbs	50-60 ft-lbs	90-120 ft-lbs
16"	1/2"	20-25 ft-lbs	50-60 ft-lbs	90-120 ft-lbs
16.5" x 6.75"	1/2"	20-25 ft-lbs	50-60 ft-lbs	90-120 ft-lbs
16"	9/16"	20-25 ft-lbs	60-70 ft-lbs	120-130 ft-lbs
16.5" x 6.75"	9/16"	20-25 ft-lbs	60-70 ft-lbs	120-130 ft-lbs
16" Dual and 17.5" Cone Nut	5/8"	50-60 ft-lbs	100-120 ft-lbs	190-210 ft-lbs
16" Dual and 17.5" Flange Nut	5/8"	50-60 ft-lbs	150-200 ft-lbs	275-325 ft-lbs
14.5" Demount	1/2"	Tighten sequentially to 85-95 ft-lbs		

Tires

Prior to mounting tires onto wheels, do as follows:

1. Make sure rim size and contour are approved by the Tire and Rim Association Yearbook or the tire manufacturer's catalog.
2. Verify tire load rating. If the load is not evenly distributed across all tires, use the tire rated for the heaviest wheel position.
3. Consult the Rubber Manufacturers Association or the tire manufacturer's guidelines for wheel mounting procedures.

Tire pressure is important to promoting tire life and performance. Tire pressure should always be in accordance with the manufacturer's recommended pressure rating for any given load. Check tire pressure as follows:

1. Always check tire pressure cold before operation.
2. Do not bleed air from tires when they are hot.
3. Check inflation pressure weekly.



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