

## INSTALLATION, OPERATIONS, & SERVICE MANUAL R-1110/R-1150

### Safety Precautions

If any installation problems are encountered, please call G&B Specialties for technical assistance before continuing with the installation process.



- Failure to heed to any of the following warnings could result in severe bodily injury and/or equipment damage.
- Read and understand this manual completely before attempting installation of the equipment.
- Installation instructions provided below only address the Rafna railgear equipment. Applicable railway company procedures and policies must be adhered to.
- Before performing any work under the vehicle or railgear, ensure the engine is turned off and the parking brake is set.
- Beware of all pinch points on the railgear and keep all parts of the body clear.
- Always disconnect the vehicle's battery when welding on the vehicle or railgear to protect the vehicle's electrical system.

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## 1.0 GENERAL INFORMATION

### WORK AREA

The work area in which the railgear is to be installed should meet these minimum requirements to facilitate the installation and conditions that allow the work to be completed in a safe, accurate and timely manner.

- Floor - The floor should be level to provide good measurements required to check alignment of the railgear. The floor should also be sufficiently hard to prevent damage by the railgear wheels.
- Lighting - The work area should be adequately lighted.
- Space - There should be enough space to maneuver the railgear components into position and to safely work around other equipment.

### TRUCK CONDITION

Before installation, the truck should be checked in some important areas.

- Tires - The tire pressure should be checked for the manufacturer's recommended inflation and checked for consistent pressure readings from all tires. This will ensure correct traction of the tires on the rails. In addition, the condition of the rear tires must be determined. If they are worn, they should be replaced.
- Alignment - Rear truck axle should be square with the truck frame. G&B Specialties recommends that a reputable alignment shop should check this. 0- degree thrust angle (which can be different than the manufacturer's specification) is required for proper railgear operation.
- Frame and Suspension - On a new truck these should be in good condition. On a used truck, the frame should be inspected for damage. The suspension components should also be checked for damage or wear. If any problems in these areas are not corrected, it will cause difficulty aligning and operating the railgear.
- Transverse Torque Rods - On vehicles that will regularly experience high center of gravity loads on rails, it is advised to install rear tandem control rods to limit transverse axle displacement. This is also necessary on long wheelbase vehicles to limit front tandem walking off in tight radius curves.

### PRELIMINARY INSTALLATION

Roll the rear railgear up on the rear installation rails under the truck frame in the back. The railgear is usually installed with the safety pin offs on the rear. However, truck bodywork may dictate locating pin offs in the front.

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## 2.0 HYDRAULIC SYSTEM CONNECTION

### NEW HYDRAULIC SYSTEM

If G&B Specialties' railgear is to be the only hydraulic components and there is not an existing hydraulic system, equip the truck with a 5 to 7 GPM, 2500-PSI pump, Suction Filter and a 5-gallon reservoir. The tank should have a minimum of one suction port (3/4" NPT), one return port (1/2" NPT) and a tank filler-breather. Fill the tank with UNAX Oil Rx 46 or equivalent hydraulic oil.

Route a pressure line (SAE 100r2-8 and -8JIC swivels at each end) from the pump to the center of the front bumper. The in port of the hydraulic control valve is connected to the pressure line. The outlet port of the front hydraulic control valve is routed to the inlet port of the rear hydraulic control valve. The outlet port of the rear hydraulic control valve is connected to the return port in the hydraulic reservoir. See **Figure 2-1**. The remaining ports on the front valve are connected to the front cylinders. The bottoms of the both cylinders connect, with a tee at the valve, to the same valve port. Check that proper hose clearance is obtained to avoid chafing and shield hoses if necessary.

### WARNING

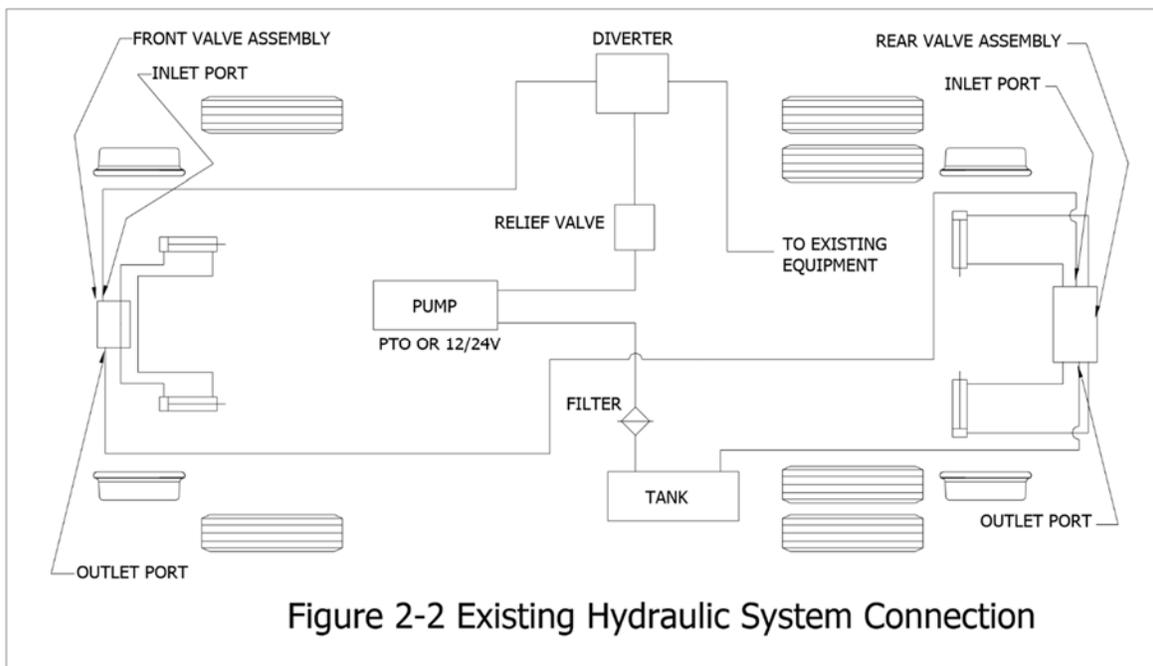
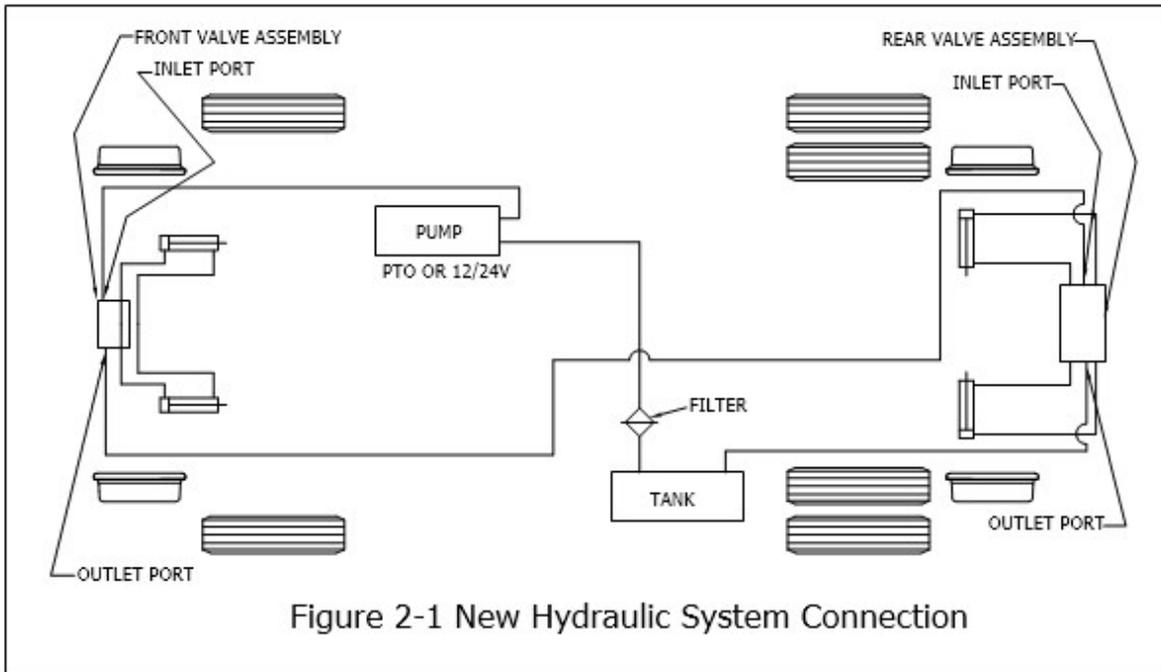
*Be certain that front and rear valves are plumbed correctly. Each valve port is marked "INLET" or "OUTLET". Plumbing valve backwards will result in an unsafe condition, possible injury and/or damage.*

### EXISTING HYDRAULIC SYSTEM

If the truck has an existing hydraulic system, install an appropriately sized diverter valve in the pressure line after the pump and before any existing equipment valves. One-outlet routes to the existing valves and the other to the center of the front bumper. The in port of the hydraulic control valve is connected to the pressure line. The outlet port of the front hydraulic system valve is routed to the inlet port of the rear hydraulic control valve. The outlet port of the rear hydraulic control valve is connected to the return port in the hydraulic reservoir. See **Figure 2-2**. The remaining ports on the front valve are connected to the front cylinders. The bottoms of both cylinders connect, with a tee at the valve, to the same valve port. Check that proper hose clearance is obtained to avoid chafing and shield hoses if necessary. Directly after the pump, it is good practice to install a relief valve, set for the system pressure to provide overpressure protection for the pump.

**NOTE**

Railgear valves have built in pressure reliefs and the hydraulic working pressure of the system is 2000 PSI. The front valve is pre-set to 1500 PSI at the relief and the rear valve is pre-set to 2000 PSI. All other components supplied by G&B Specialties are rated 2500 PSI. Care must be exercised that the relief pressures at the valves don't exceed this. To ensure proper system pressure, check with a gauge



### 3.0 FRONT RAILGEAR INSTALLATION

#### NOTE

*If the vehicle has been supplied with an integral extended front frame, then frame extensions will most likely not be required. The front valve plate can be welded directly to the extended front frame.*

#### PRELIMINARY INSTALLATION

1. Remove front truck bumper.
2. Bolt/weld a frame extension to the truck frame as required. Make sure that tilt cabs or hoods will clear the frame extensions when opened. Trim the brackets and gusset as necessary. All truck frame extensions with bolt-on brackets must use 5/8" -11 bolts minimum, hardened steel washers, and grade-8 prevailing torque locknuts. All the grade-8 hardware should be tightened to the hardware manufacturer's specifications. Check that the frame extensions are level, and square with the truck frame.
3. In normal applications, mount the front valve plate assembly between the front frame extensions (with the hydraulic valve underside and the handle facing forward) and weld valve plate in place. In case this is not possible, mount the valve plate in the most appropriate, and easily accessible location.
4. Check to make sure that there is a minimum of 65" between the tires for the railgear to operate.
5. Before installation make sure that you have the correct link arms for your vehicle. The correct arms will allow the railgear to fully engage the rails and not interfere with the truck itself throughout its range of motion.

## INSTALLATION RAILS

When installing Railgear it is necessary to get proper tire traction on the rail. This is accomplished by employing standard gauge rails, or surrogate "installation rails" (which can be fabricated from 3" square steel tubing per Figure 3-1) during installation of your railgear, to properly set the mounting height of the system. Make sure you have something ready to use as surrogate installation rails but do not position your vehicle on them at this time. These "rails" can be simple 2x4's or steel "C" channel, as long as they are level, will not crush under the weight of the vehicle, cannot move or tip over, and are tall enough that the wheel edge does not hit the ground.

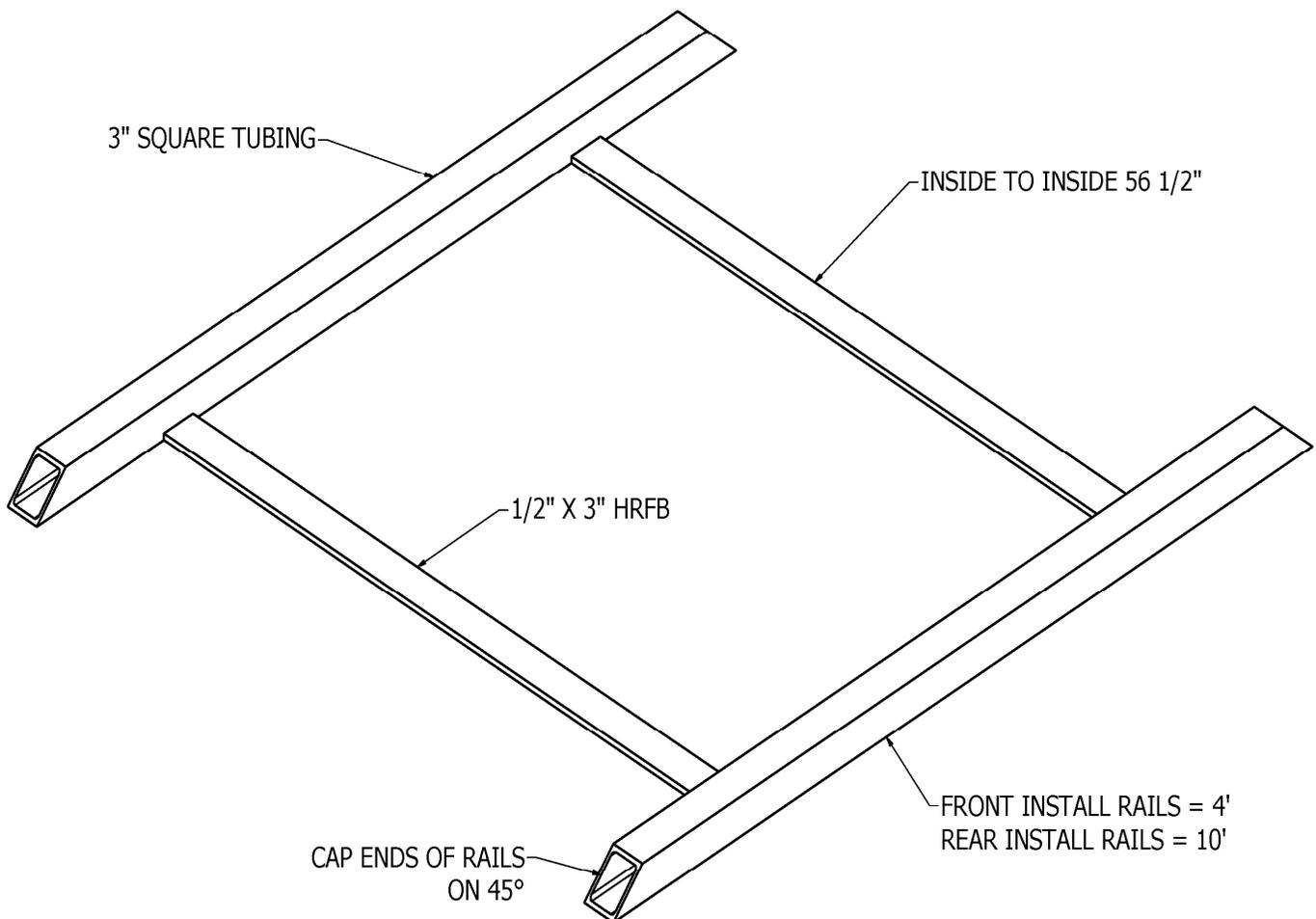
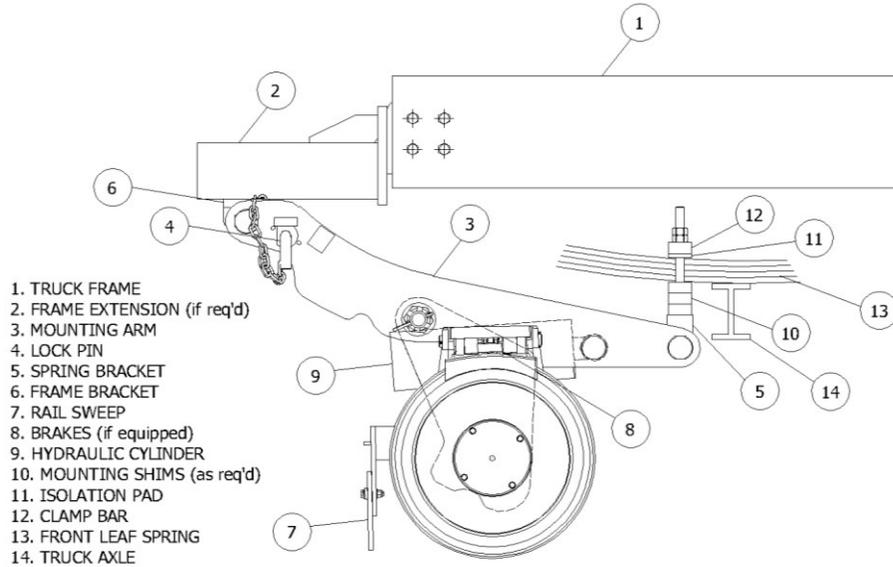


Figure 3-1 Front and Rear Installation Rails

**FRONT RAILGEAR INSTALLATION**

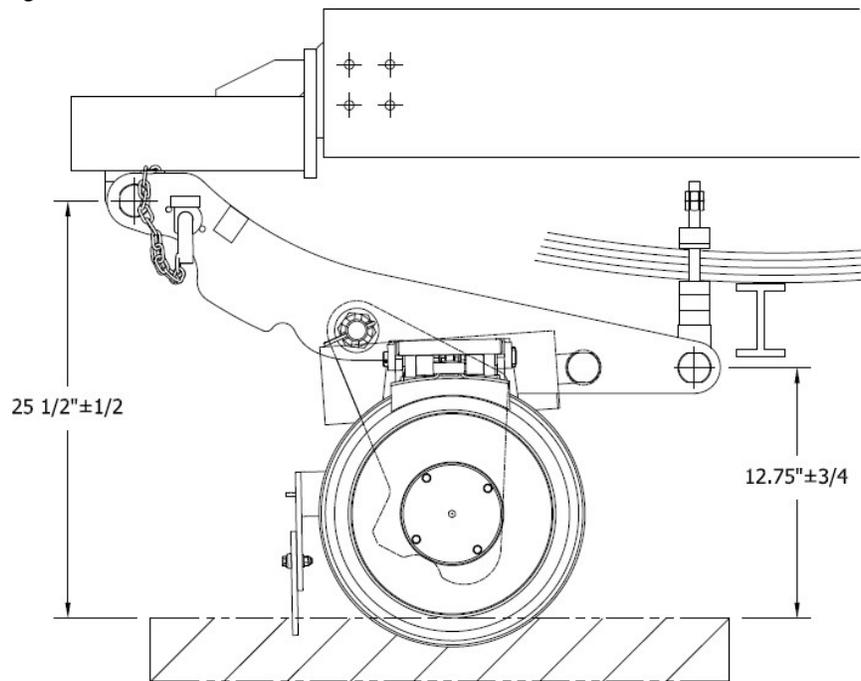
**Figures of Key Features**



**Figure 3-2 Front Railgear Components**

**WARNING**

*Before rotating front gear, ensure the axle is positioned correctly or damage to the cylinders could occur. (Figure 3-2)*



MEASUREMENT FROM CENTER OF HOLE TO GROUND

**Figure 3-3 Critical Height Measurements**

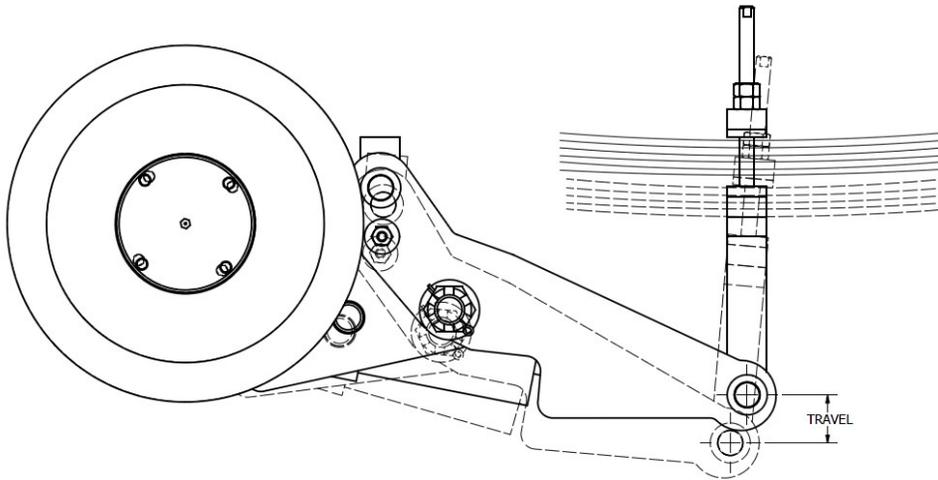


Figure 3-4 Interference Range

**Clearance Note**

*Proper clearance will allow the railgear to move up and down with the truck's front suspension. As the truck tire bumps on the road, the truck spring allows the front axle to move upward. Since the railgear is attached to the spring just forward of the front axle, sufficient clearance must be allowed to prevent interference with other truck parts. The front mounting pin does not move in relation with the truck frame because it is fastened to the frame extension or the truck frame. As the front mounting pin does not move and the rear-mounting pin does, the railgear effectively rotates around the front mounting pin. Therefore, the part of the railgear near the rear mounting pin moves more than the part near the front mounting pin and attention needs to be paid to possible clearance problems that this movement may cause.*

**NOTE**

*If the vehicle has been supplied with an integral extended front frame, then frame extensions should not be necessary. The frame-mounting bracket can be brought up to the extended frame. Follow all instructions for finding the proper ground clearance with frame extensions. Solid or load bearing spacers may be required to obtain the proper ground clearance to the front mounting pin.*

## MOUNT SPRING BRACKET

- Slide the Railgear under the truck frame, positioning the spring bracket hangers as close to the front truck axle as possible. Have a minimum of half of the spacer sitting on the spring. The hanger can be moved a max of 6" from the truck axle.
- Once in position use floor jacks under the outboard and inboard long arm on the driver's side. Use jack to raise spring hanger toward trucks spring leaves. Raise until the rear mounting pin is 12.75" from the ground.
- Once at the correct height attach the spring bracket to the truck spring using a rubber spacer directly on top of the leaf springs. Then use flat bar to secure the spring hangers.
- Tighten until the rubber spacer just begins deforming.
- Repeat on passenger's side.

Spacers will need to be added to ensure spring bracket is 12.75" from the ground.

The spacers are to be placed between the spring bracket, and the underside of the truck spring. After lifting the Link Arms into place, attach the spring brackets to the truck spring, using two 3/4"-10 hex nuts per stud. Push the spring brackets against the axle beam and tighten the hex nuts onto the top spacer to cage the springs. The front railgear can now be actuated with the hydraulic system, which will easily position the front of the Link Arms to the level of the frame extensions for securement. The frame needs to be raised just enough to touch the frame extensions or truck frame.

To check the spring bracket location, check:

- That the spring bracket to truck axle is the same on both sides.

## MOUNTING CROSS TUBE

- Ensure that both spring brackets are installed correctly before installing the mounting cross tubes.
- Remove the front pins off and make sure the steering tires are pointed forward. Actuate the hydraulic cylinders which will allow for the long arms to be raised toward the frame. The cross tubes must be elevated until touching the frame or extension.
- The center of the front mounting pin must be 25.5" from the ground. If required, up to 3" of load bearing shims may be used to achieve the correct height. If more than 3" is needed, a mounting block may be required.
- The hydraulic cylinders should be properly positioned to hold shims in place until alignment can be completed.
- Check the truck frame and make sure that there is no interference with the railgear.

## TIRE CLEARANCE

### NOTE

*When the railgear is completely lowered the front of the truck tires should be approximately 2 inches from the top of the installation rails. If the test is being done off-rail, the wheel flange will add an extra inch and a quarter of height, so the wheel should be about 3.25" off the ground (Use a smooth hard surface for this! If the vehicle sinks into the ground, getting accurate measurements will be impossible). The front and rear mounting pins may be lowered to allow for tire clearance. Minimum height for the mounting pin is 23" on front and 10" on rear. This allows the railgear to have a minimum of 8" ground clearance when in the road position.*

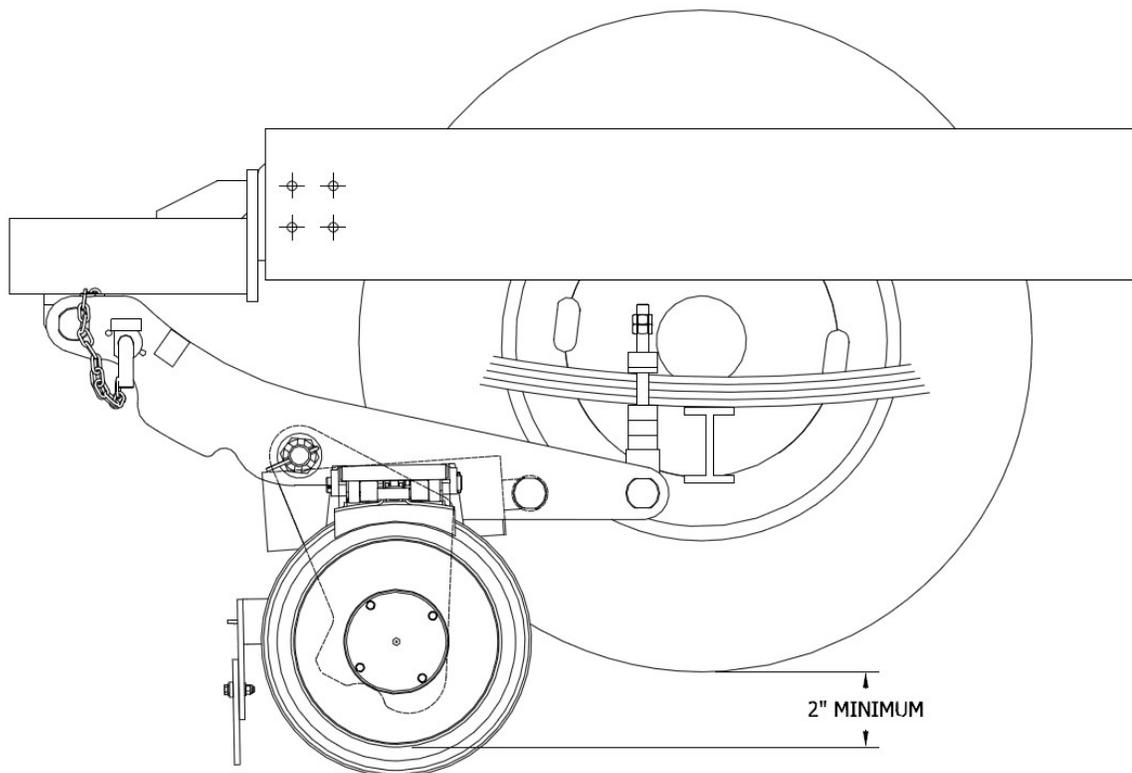


Figure 3-5 Front Tire Clearance

### NOTE

*Because the angle of the cobra brakes needs to be set before welding the front railgear axle, you should now begin brake installation.*

## 4.0 FRONT COBRA BRAKE/RAILSWEEP INSTALLATION

### COBRA BRAKE GENERAL INFORMATION

First an air toggle valve will need to be installed in the instrument panel of the vehicle. This valve disconnects the railgear brake system when not in use.

On the front valve plate assembly, and rear frame bracket, a relay valve will be located. The control line feeding this relay valve comes from the control valve described above. The supply line to this relay valve comes from the check valve screwed into the air reservoir. There is a ball valve and a pressure regulator inline between the check valve and relay valve. The ball valve will disconnect the railgear brake system from the vehicle air system regardless of the position of the air toggle valve. The pressure regulator will allow adjustment of the front to rear bias, so that both axles will brake evenly and not allow one axle to lock, which would cause the wheels to slide.

The railgear Cobra Brake Assembly brake actuators are connected to the delivery ports on the railgear air relay valve.

### KIT COMPONENTS

Table 4-1 Air Brake Kit

K-R1150BXVX001 AIR BRAKE KIT, FRONT (R1110/50)		
Part #	Description	Qty
R-11076A	Operating Valve Assembly	1
R-19035	Air Brake Hose	1
R-19039	Air Brake Hose	1
R-19033	90 Degree Elbow, Male Flare X 3/8" NPT	2
R-32030D	Brake Assembly, Drivers Side	1
R-4920	Bracket, Brake Valve	1
R-19043	Valve, Pressure Protection	1
R-32030P	Brake Assembly, Passengers Side	1
R-990KIT-446	Brake Valve Bracket Hardware Kit	1
K-R11BXVX002B	Air Brake Control Kit	1
K-R1150RSFR001 RAIL SWEEP KIT, FRONT (R1110/50)		
Part #	Description	Qty
R-16589D	Rail Sweep Assembly, Drivers Side	1
R-16589P	Rail Sweep Assembly, Passengers Side	1
R-990KIT-436	Hardware Kit, Rail Sweep/Air Brake	1

**INSTALLATION**

Install airlines and valves as shown in Air Brake Schematic, Figure 4-2. Make certain that the front air brake pressure regulator is set to 75 PSI.

It is the responsibility of the installer to supply the required air to the in-cab control valve, and from the in-cab control valve to the relay valve. The hoses, fittings etc., required for this connection are not included in this kit.

**NOTE**

*The brakes should not be tested until the front railgear unit has been fully welded on the vehicle.*

1. The brakes/sweeps bolt to the collars on the axle. Welding the collar is unnecessary.
2. Fasten the brakes with the provided hardware, as shown in Figure 4-1, through the railsweep bracket (use longer provided bolts on the side with the railsweep) towards the front of the vehicle.
3. Repeat step 2 for other side of axle.
4. Proceed to plumb brakes as shown in Figure 4-2.

**NOTE**

*The sweeps should only be adjusted with the front railgear unit in the fully lowered rail position, and with the axle and brake/sweep mounting bracket angled 5° down toward to the running surface of the rail, as is required for the brake assembly.*

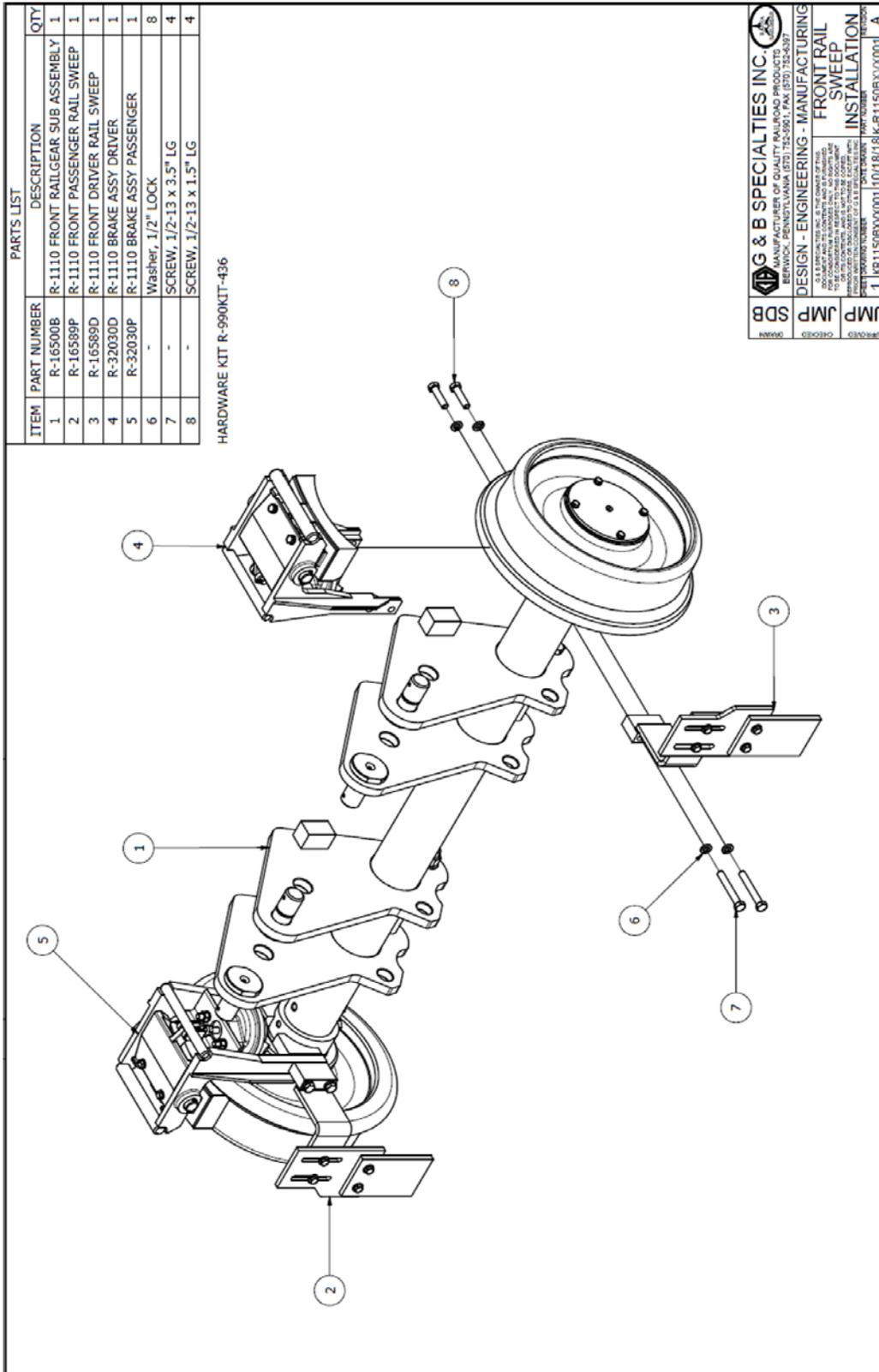


Figure 4-1 Rail Sweep Installation with Cobra Brakes

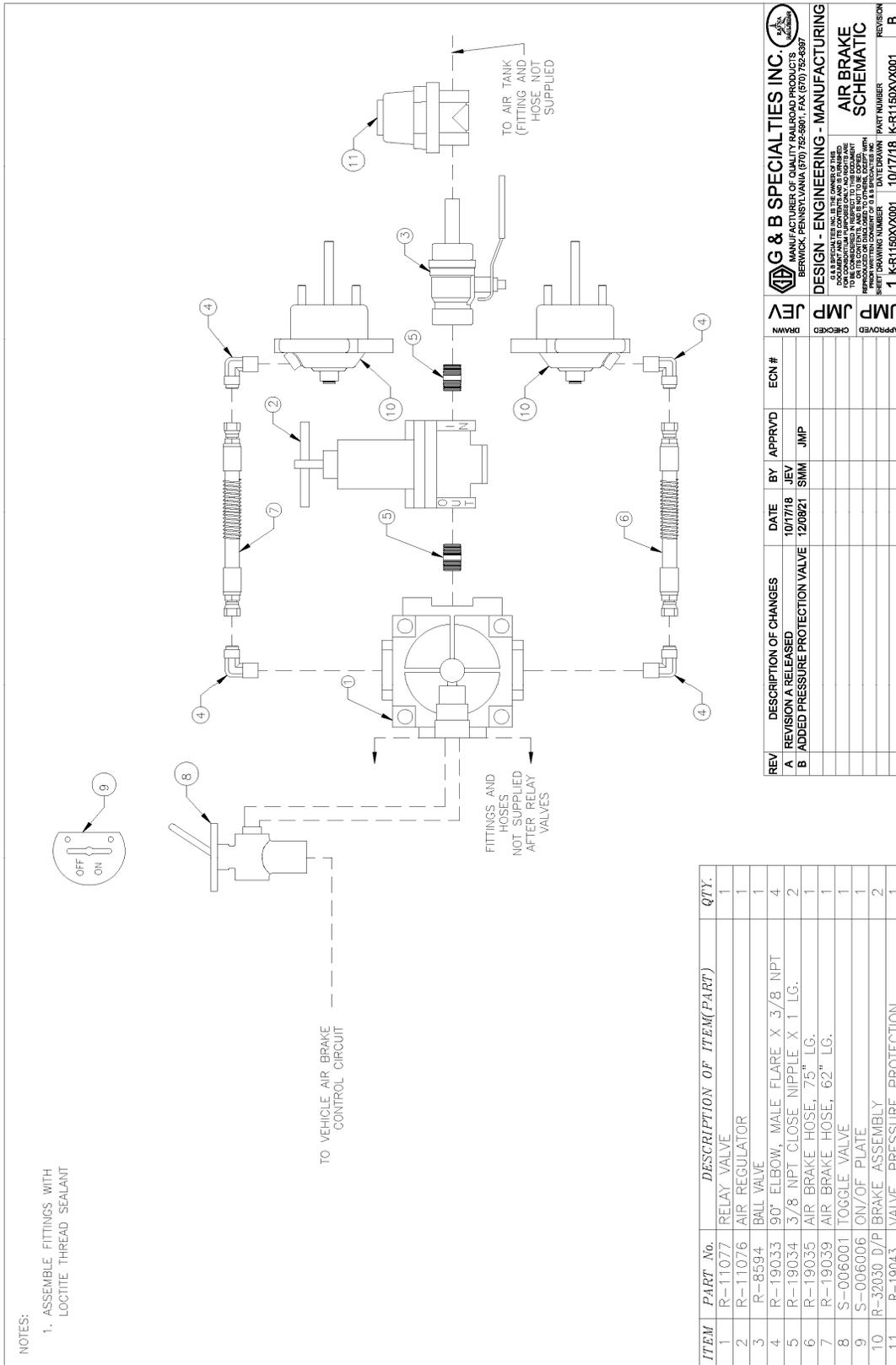


Figure 4-2 Brake Pneumatic Schematic

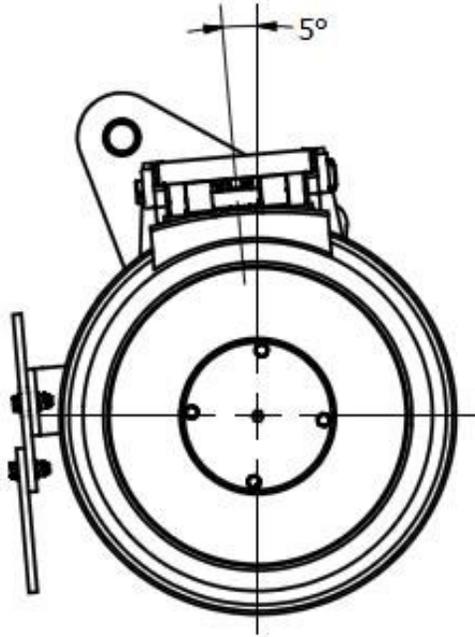


Figure 4-3 Brake alignment

#### BRAKE ADJUSTMENT/TESTING

1. Proceed to the next section and weld the front railgear axle before testing brakes!
2. There is a jam nut and clevis located on the threaded rod attached to the air brake chamber. This is used to adjust the gap between the wheel and brake shoe.
3. Operate the vehicle on a test track. With the air toggle valve in the "on" position and the ball valves open, check that:
  - When the vehicle brake pedal is depressed, the railgear brake clamps the rail wheel enough to slow its rotation but not enough to stop its rotation. The rail wheels should not be allowed to lock up.
  - That the brakes release properly when the pedal is released.

If the brakes do not function properly, contact a service representative at G&B Specialties.

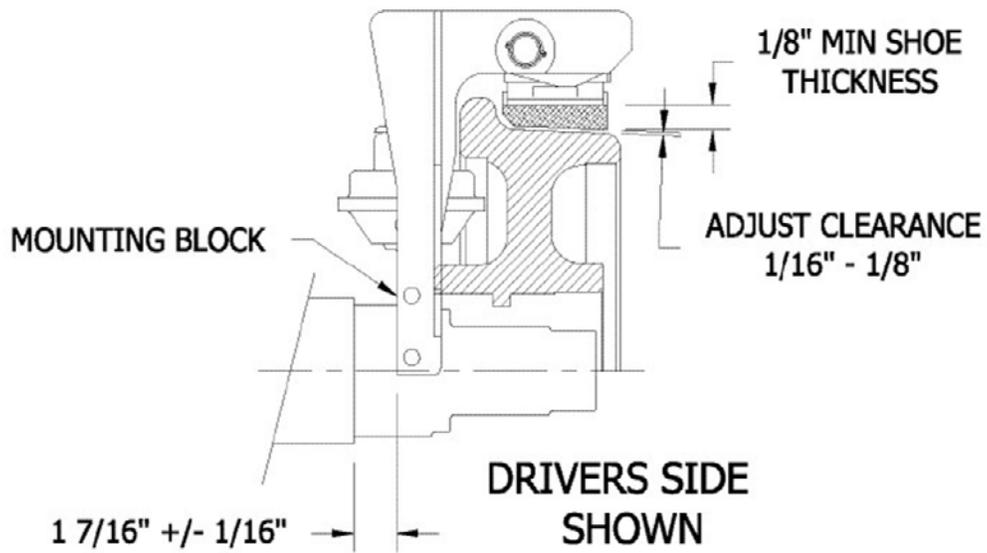


Figure 4-4 Brake Dimensions.

## FRONT RAILGEAR ALIGNMENT

Now that the brakes are attached, the front railgear is now ready to be aligned and squared. Three measurements need to be taken to ensure that everything is properly aligned. Before welding, ensure brakes have 5 Degrees of offset, as shown in Figure 4-3.

To align to link arms, check:

- That they are parallel with each other and the truck frame.

The distance between the Link Arms should be the same at the front mounting pin as it is at the rear-mounting pin. This prevents the railgear from binding during up and down movements. In addition, the distance from the truck frame to the Link Arms should be uniform on both sides of the railgear.

- That they are the same distance forward.

Measure the distance from the front mounting pin to the common point on the truck frame. If the measurements are off, square the railgear by loosening the nuts on spring hanger and move the appropriate distance, then re-tighten.

Measure the distance from each spring hanger back to the truck axle. Since the forward position of the Link Arms has been verified in step (2), an off measurement here probably means that the truck axle is miss-aligned and needs to be corrected.

After these alignment checks, and after ensuring that there is sufficient clearance, the frame mounting brackets can be tack welded to the frame extensions, as shown in Figure 4-6.

### NOTE

*Do not attach welding ground clamp to the railgear wheels. This will cause arcing across the bearings and lead to premature bearing failure.*

Raise the front rail wheels just above the floor, making sure there is enough room to slide the surrogate installation rails under the railgear wheels.

Because the railgear axle assembly is not fixed to the pivot arms, the rail wheels will need to be centered. To center the wheels, measure the distance from the inside of the rail wheels to the truck frame. If the measurements are not identical, slide the axle assembly in the appropriate direction and re-check rail wheel to truck frame distances. With the axle tube now centered, tack weld the axle tube to the outer pivot arms.

The front railgear is now ready to be lowered onto the installation rails. When the railgear is completely lowered, the front truck tires should be about 2" off the top of the installation rails. If the railgear will not lift the truck, check that the cylinders are not cross plumbed. If they are not, and the railgear still will not lift, you may need to adjust the hydraulic pressure. Check that the system pressure relief valve, and the front hydraulic control valve are both set high enough for your application.

**NOTE**

*Hydraulic pressure is set at the factory, and is sufficient for most typical installations, so always check for other operational issues before increasing pressure. All hydraulic adjustments must be done by a qualified technician who is familiar with hydraulic operation and should be performed in small increments.*

As a final review, recheck the center alignment of the railgear wheels to the truck frame. If it is off, break the tacks between the outer pivot arms and the axle tube, move the axle tube to the correct position and re-tack.

## FINAL FRONT INSTALLATION

Ensure that the hex nuts on the spring hangers are tight and secured with Loctite Red or equivalent thread compound. Remove the excess stud length from both spring hangers. Leave approximately 1" of threads above the hex nuts. If these studs are not trimmed, they may cause a clearance problem with other parts of the truck.

After the studs are trimmed, you may hard-weld tacked components as shown in Figure 4-6. Weld as follows:

- Weld inboard side of outside pivot arms to axle tube all the way around.
- Fully weld, on all sides, front mounting blocks / cross tubes to truck frame.
- If shims were required, fully weld shims into place on all sides for each shim location.

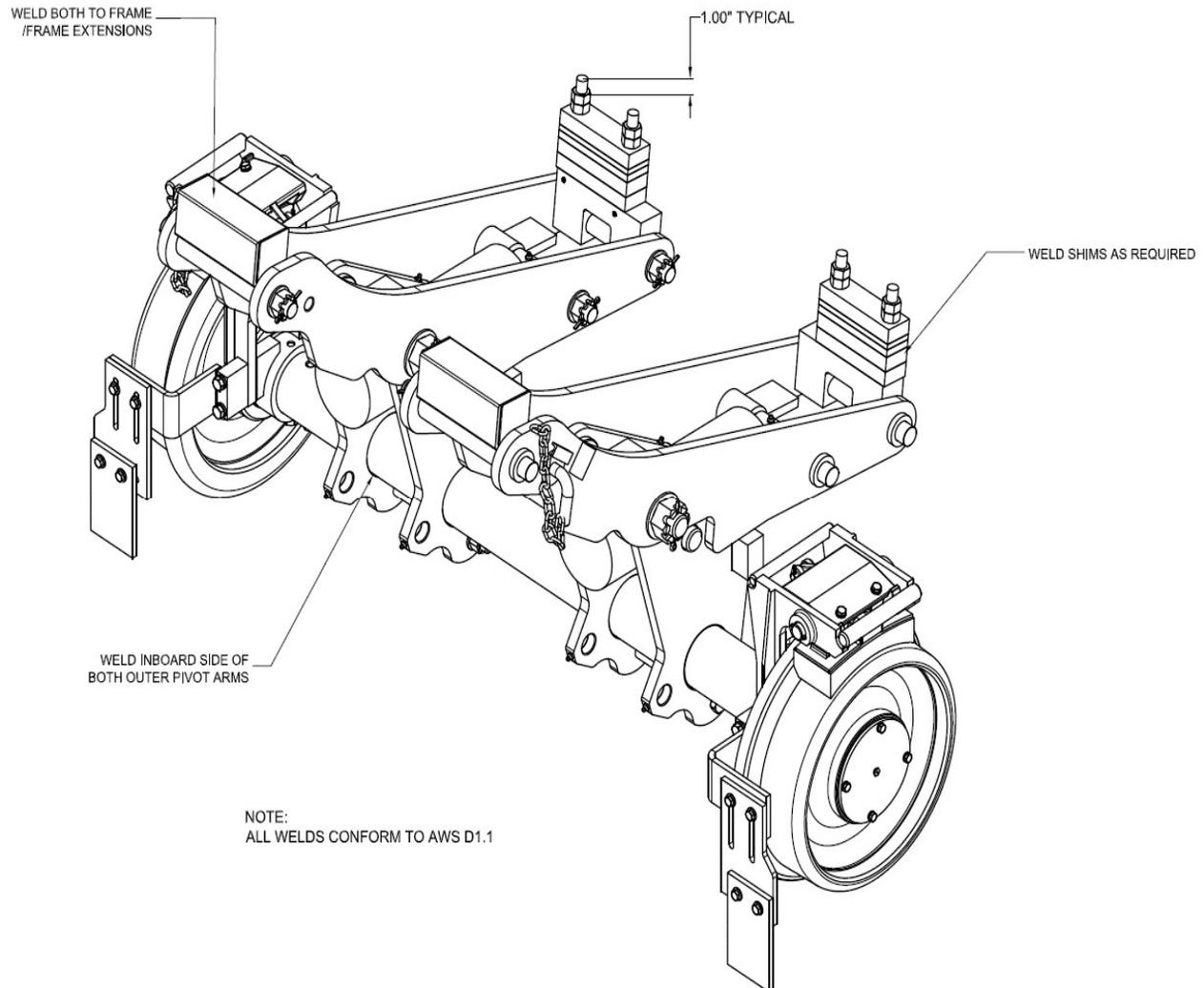


Figure 4-6 Welding Diagram

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## 5.0 REAR RAILGEAR INSTALLATION

### NOTE

*It is important to check truck tire pressure (especially the rear tires) to be sure that it is at the manufacturer's recommended level.*

With the truck on the rear installation rails, position the rear railgear as close to the rear tires as practical (allowing clearance for mud flaps). The following table gives standard location and clearance guidelines for the rear railgear. Generally, it is advisable to leave a minimum of 2" clearance to any tire, spring or suspension component.

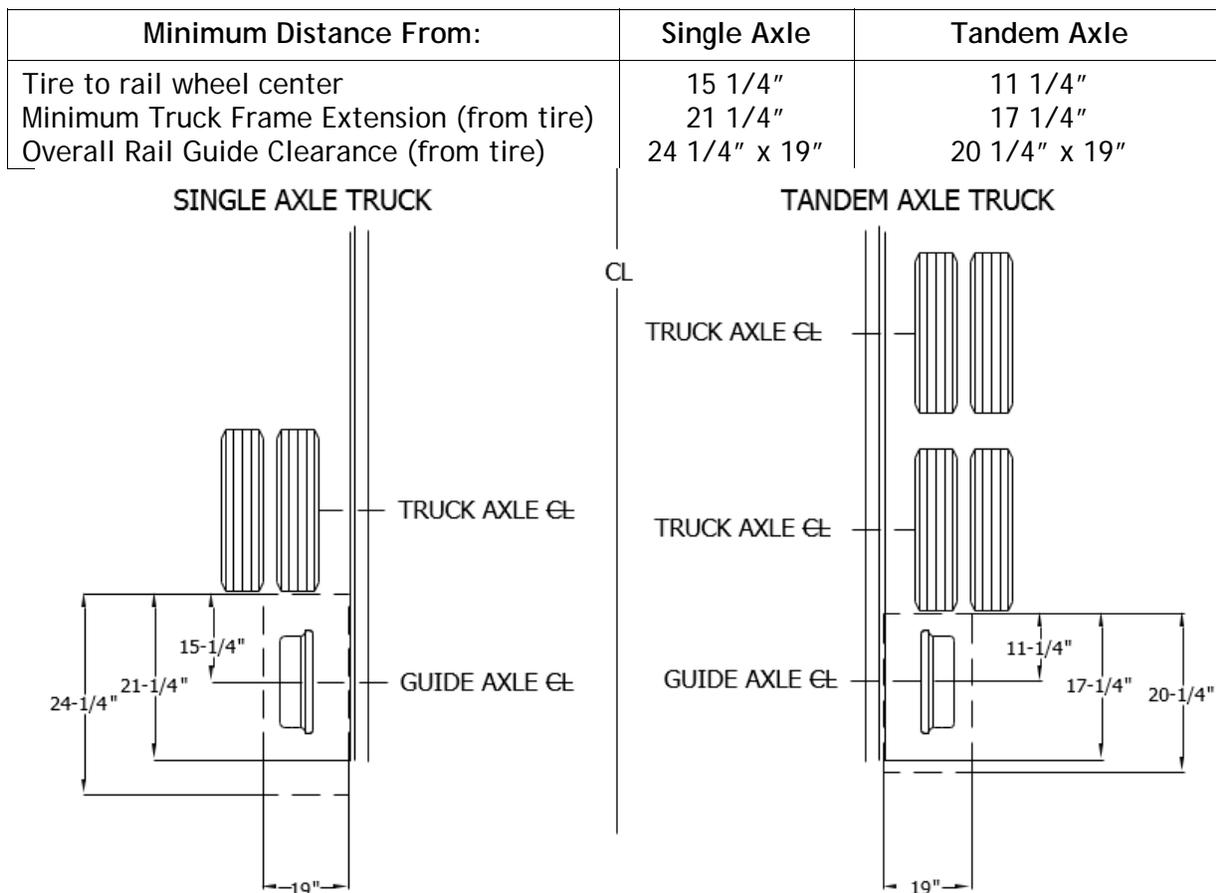


Figure 5-1

If the truck frame does not extend a minimum of 21 1/4" for a single axle or 17 1/4" for a tandem axle trucks, beyond the rear tire/mud flap, it should be extended to provide the necessary clearance for mounting the railgear.

In addition, while the railgear typically drops straight down, it can also articulate from side to side, to allow alignment of the vehicle with the rail. As such a clear space must extend out from the frame outward on either side for at least 19" .

## REAR SPACER INSTALLATION

Before proceeding, place a temporary 6" x 6" x 3/8" wall steel tube spacer between the truck frame and railgear mounting plate. Actuate both rear cylinders to raise the rear railgear mounting plate to the truck frame.

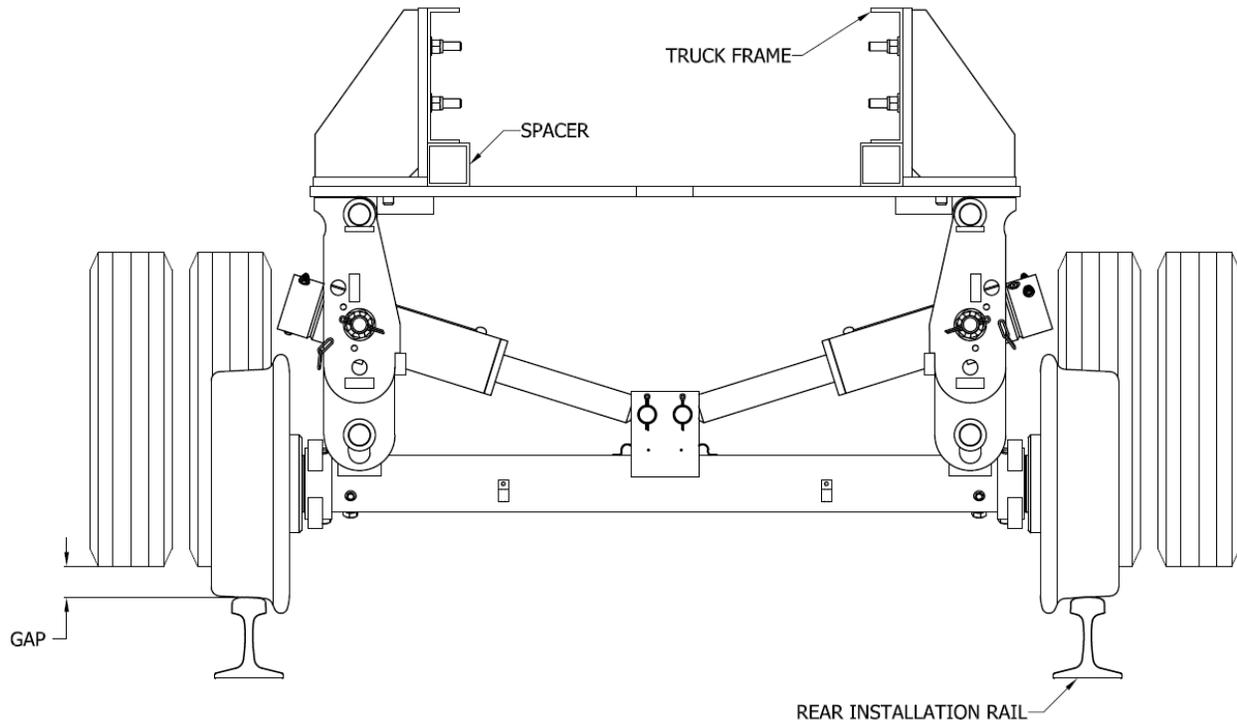


Figure 5-2

### NOTE

*Temporarily secure the rear railgear in place to prevent any movement during the remaining installation.*

Raise the rear mounting plate and the truck frame to lift the truck wheels off the rear installation rails. Measure the gap between the truck tires and the rear installation rails. In general, the truck spring deflection equals 6" minus this gap. To calculate the required spacer thickness, multiply the spring and tire deflection by 60%. The formula is:

$$\text{Calculated Spacer Thickness} = (6.0'' - \text{Gap}) \times .6$$

The following table shows the calculated spacer thickness for several common gaps. Use the table below as a quick reference. Please note, the actual measurements may vary slightly, and should be calculated before fabricating a spacer out of solid steel pieces. This spacer will bear the full force of the vehicle rear axle and should not be hollow.

Table 5-1

If Gap =	Spring and Tire Deflection (6.0" -Gap)	Calculated Spacer Thickness (6.0 -Gap) x .6
5"	1"	3/4"
4"	2"	1 1/4"
3"	3"	1 3/4"
2"	4"	1 3/8"
1"	5"	3"

Release the clamps holding the rear railgear mounting plate to the truck frame. Collapse the railgear to its folded position (which will lower the truck tires down to the installation rails). Replace the temporary 6" spacers with the permanent, calculated spacers, and tack in place onto the rear railgear mounting plate.

Extend the rear railgear to the rail position (which will raise the truck frame). The truck inner duals should be flat to slightly cupping the installation rails. Too much weight on these tires (truck frame too low) will cause rapid tire wear. Not enough weight (truck frame too high) will cause spin and poor braking.

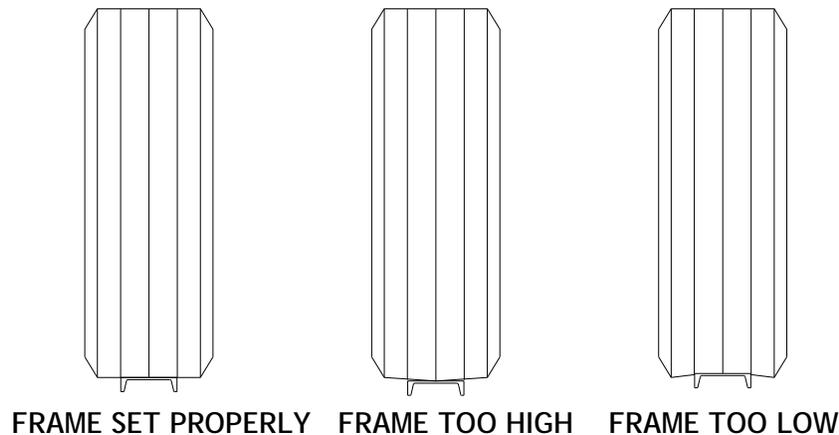


Figure 5-3

If necessary, adjust the spacer thickness to achieve proper tire cup on the installation rails.

## SQUARE REAR RAILGEAR WITH TRUCK AXLE

Once the proper spacer height, and the railgear has been spaced away from the rear truck tires, the rear railgear needs to be made square with the rear truck axle. Four measurements must be taken to ensure this requirement.

- The distance from the truck axle to the Rear Railgear at both ends. Distance "A" must be equal to "B" (within 1/16").
- The diagonal distance from the truck axle to the opposite side of the Rear Railgear.

Distance "C" must equal "D" (within 1/8")

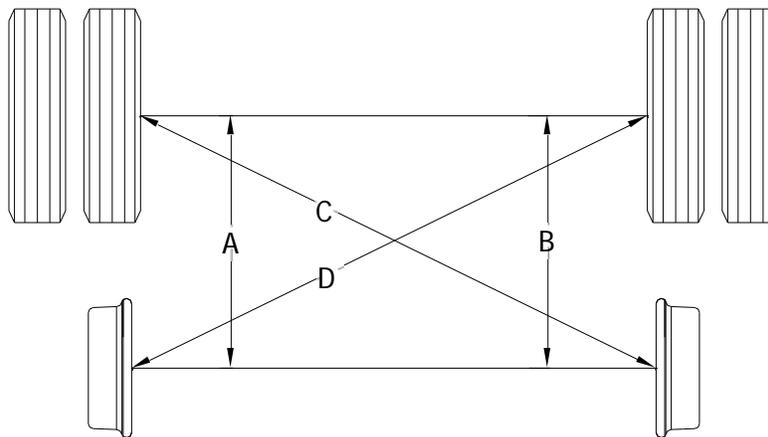


Figure 5-4

### NOTE

*Although the previous mounting conditions and alignment may be met, be certain that enough room exists between the rear railgear and other equipment. As previously stated, this should include a 2" clearance around the Railgear (more if equipped with remote pin offs). Also, ensure that there is clearance to remove the pin offs from their holes.*

**FINAL REAR INSTALLATION**

Using the mounting plate as a template, drill four 21/32" dia. holes through the truck frame. Locate the mounting plate to allow for maximum adjustment of the rear railgear mounting plate. Bolt the mounting plate on the rear railgear mounting plate and truck frame with 5/8"-11 grade 5 bolts and Nylock nuts. Tack weld the mounting plate to the rear railgear mounting plate. If readjustments are needed later, the welds can be ground off and the rear railgear mounting plate can be slid up or down by loosening the bolts in the slots.

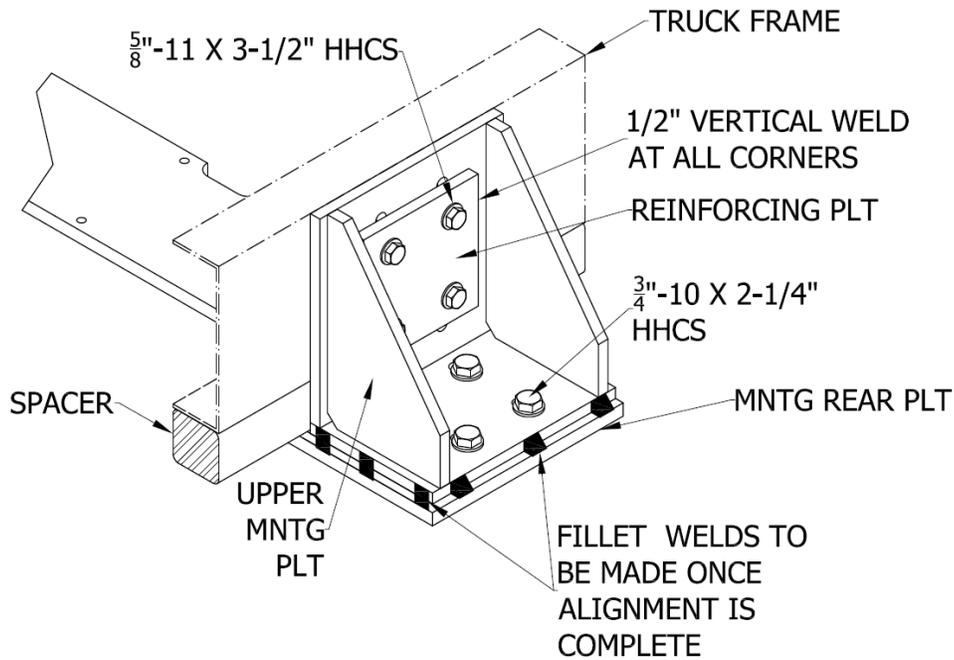


Figure 5-5

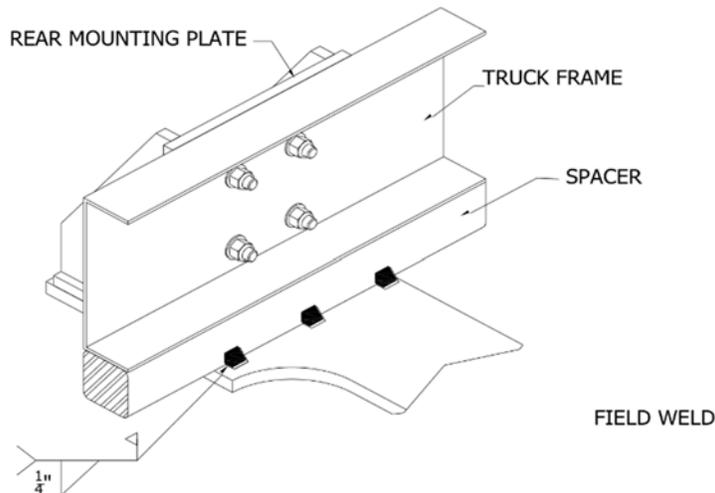


Figure 5-6 Welding of Spacer

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## 6.0 OPTIONAL EQUIPMENT

### RAIL SWEEPS

#### Units with Brakes

On units equipped with brakes, front and/or rear, the rail sweeps are assembled on the railgear prior to shipment.

#### Units without Brakes

On units without brakes, rail sweeps are assembled to the railgear prior to shipment.

#### Rail Sweep Adjustment

Adjust the rubber sweeps so that they are slightly touching the rail head.

#### Rear Railsweep Installation (without brakes)

The rear railsweep assemblies are shipped assembled and should be parallel with the rail as shown. See pgs. 90, 91, and 92, for assemblies and parts.

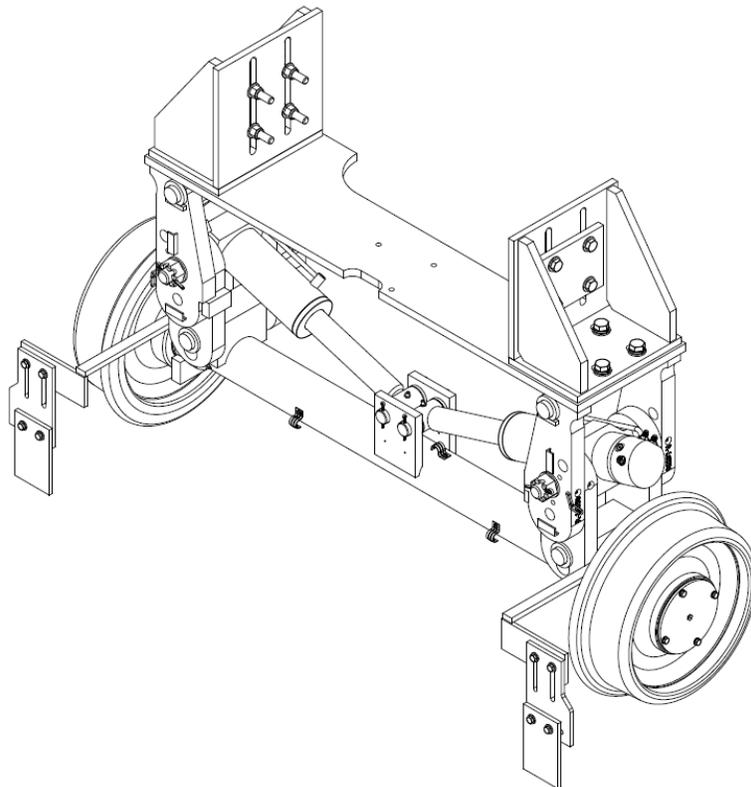


Figure 6-1

### Rear Railsweep Installation (with brakes)

The rear brake assemblies are shipped assembled along with the railsweeps. Unlike the front sweeps, they should be parallel with the rail.

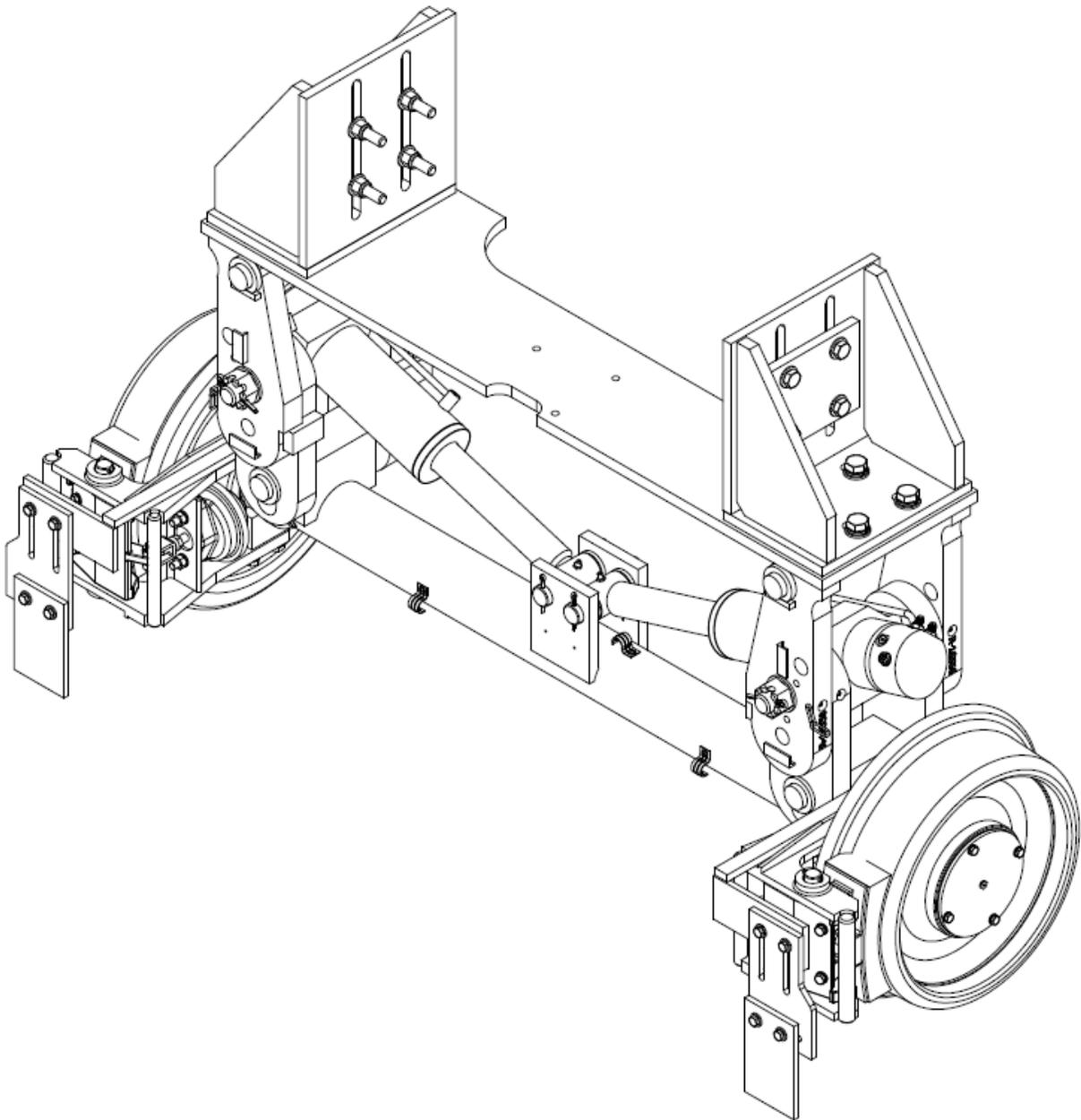


Figure 6-2

## BRAKES

### Plumbing Installation

An air toggle valve will need to be installed in the instrument panel of the vehicle. This valve disconnects the railgear brake system when not in use.

On the front valve plate assembly and rear frame bracket, a relay valve will be located. The control line feeding this relay valve comes from the control valve described above. The supply line to this relay valve comes from the check valve screwed into the air reservoir. There is a ball valve and a pressure regulator inline between the check valve and relay valve. The ball valve will disconnect the railgear brake system from the vehicle air system regardless of the position of the air toggle valve. The pressure regulator will allow adjustment of the front to rear bias, so that both axles will brake evenly and not allow one axle to lock and slide.

The railgear Cobra Brake Assembly brake chambers are connected to the delivery ports on the railgear air relay valve.

Install airlines and valves as shown in the **Air Brake Schematic**. Make certain that the front air brake pressure regulator is set to 75 PSI and the rear air brake pressure regulator is set to 30 PSI.

### Testing

Operate the vehicle on a test track. With the air toggle valve in the "on" position and the ball valves open, check that:

- (1) When the vehicle brake pedal is depressed, the railgear brake clamps the rail wheel enough to slow its rotation but not enough to stop its rotation. The rail wheels should not be allowed to lock up.
- (2) That the brakes release properly when the pedal is released.

If the brakes do not function properly, contact a service representative at G&B Specialties.



**Brake Installation**
**Table 6-1 Kit Components**

<b>Rafna Industries Ltd.</b>				17-Jul-19
				Rev. E
<b>HR K-R1150BXR001 AIR BRAKE KIT, REAR (R1150)</b>				
Part Number	Description	# Req.	Remarks	Check
R-11076A	Operating Valve Assembly	1		
R-19039	Air Brake Hose, 62"	2		
R-19032	3/8 Male Connector, Flare	2		
R-32030D	Brake Assembly, Drivers Side	1		
R-32030P	Brake Assembly, Passengers Side	1		
R-16593D	Rail Sweep Assembly, Rear Driver's	1		
R-16593P	Rail Sweep Assembly, Rear Passenger's	1		
R-4920	Brake Valve Bracket	1		
R-990KIT-446	Screw, 5/16" x 1 1/4" Gr. 8 Z/Y	2	BRAKE VALVE BRACKET HARDWARE KIT	
	Washer, 5/16" Type-A Z/Y	4		
	Nut, 5/16" Nylock, gr.8 Z/Y	2		
R-990KIT-433	Washer, 1/2" Lock Z/Y	8	BRAKE/RAIL SWEEP HARDWARE KIT	
	Screw, 1/2" x 1 3/4" Gr. 8 Z/Y	4		
	Screw, 1/2" x 1-1/4" Gr. 8 Z/Y	4		

On the Front Valve plate assembly, and rear frame bracket, relay valves will be located. The control line feeding these relay valves comes from the air toggle valve described above. The supply lines to the relay valves comes from a check valve screwed into the air reservoir. There is a ball valve and a pressure regulator inline between the check valves and each relay valve. The ball valve will disconnect the railgear brake system from the vehicle air system regardless of the position of the air toggle valve. The pressure regulator will allow adjustment of the front to rear bias, so that both axles will brake evenly and not allow one axle to lock and slide.

The railgear Cobra Brake Assembly brake chambers are connected to the delivery ports on the railgear air relay valves.

Install airlines and valves as shown in the above Air Brake Schematic. Make certain that the front air brake pressure regulator is set to 75 PSI.

It is the responsibility of the installer to supply the required air to the in-cab control valve and from the in-cab control valve to the relay valve. The hoses, fittings etc. required for this connection are not included in this kit.

See pages 71, 72, and 93, for Assembly and Parts.

1. Place brake assemblies on stub axle and bolt them fast.
2. Install railsweeps, using the longer hardware on the side of the horizontal brake assembly.
3. Proceed to plumb the brakes.
4. Adjust and test brakes as outlined.
5. Loosen the sweep plate hardware, and lower or raise the rubber sweep as required so the bottom of the sweep is just above the top of the rail head.
6. Adjust and test brakes as outlined on pg. 33.

**AIR LOCK OPTION**

The following procedure details the installation of the rear air lock kit.

**Table 6-2 Kit Components**

PART NUMBER	DESCRIPTION	QTY
R-26022	Pneumatic Locking Plate	2
R-26024	Pin Mounting Bracket	2
R-26023	Pneumatic Cylinder	2
R-26021	Threaded Rod	4
R-26011	Locking Pin - Highway Position	2
R-26026	Locking Pin - Rail Position	2
R-11230	Female Union Tee, 1/4" Tube OD	2
R-11231	90° Elbow, 1/8" MPT x 1/4" Tube OD	7
R-11232	Dash Mount Air Valve	1
R-11233	1/4" Polyurethane Tubing (100')	1
R-990KIT-432	Washer, 3/8" Flat	4
	Nut, 3/8" Gr.8 Nylock Nut Z/Y	4
	Hex Nut, 1/2" Jam Z/Y	12
	Hex Nut, 5/16"	4

1. Fasten the two locking pins (Item 4 & 6, Fig 6-4) to the pin mounting bracket (Item 3, Fig 6-4) using two 3/8" flat washers and two 3/8" nylock nuts (Items 7 & 10, Fig 6-4) as shown in Figure 6-4.
2. Thread the threaded rods (Item 5, Fig 6-4) into one 1/2" jam nut (Item 9, Fig.6-4) until there is 3/4" of thread sticking out. Thread the guide rods into the drilled holes, making sure only 3/4" of thread is in the holes, as shown in Figure 6-4.
3. Fasten the Pneumatic Locking plate (Item 2, Fig 6-4) to the Pneumatic cylinder (Item 1, Fig 6-4) as shown in Figure 6-4.
4. Fully extend the Pneumatic cylinder and fasten the rod end of the cylinder to the pin mounting bracket using two 5/16" jam nuts (Items 8, Fig 6-4) as shown in Figure 6-4.
5. Place the pin mounting bracket onto the threaded rods and thread two 1/2" jam nuts (Item 9, Fig 6-4) onto the threaded rods as shown in Figure 6-4.
6. Push the assembly down the guide rods until the pin plate hits the lower link arm spacers and fasten the tie plate with the two remaining jam nuts and tighten the 1/2" jam nuts.

7. Make sure that the cylinder rod end does not contact the arm when assembled. Adjust the pin plate on the cylinder rod end if there is contact.
8. Repeat same procedure for the opposite side.
9. Plumb the air cylinders using the correct fittings and valves.
10. Cover any part of the air hoses that contact sharp edges on the vehicle with wire loom.
11. Run the railgear up and down, making sure the pin plate contacts the link arm flush when the lockup is engaged in the lock position.



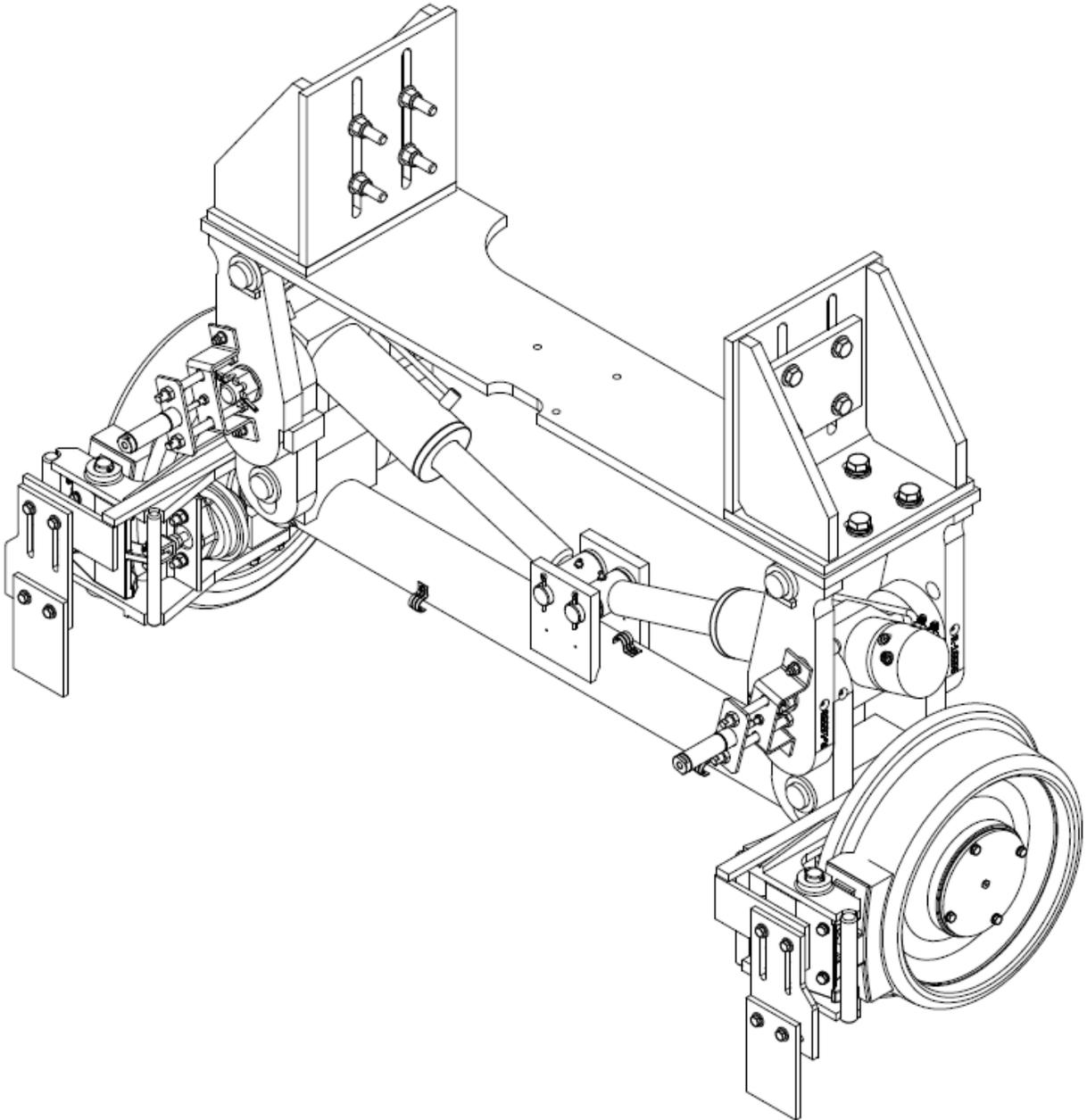


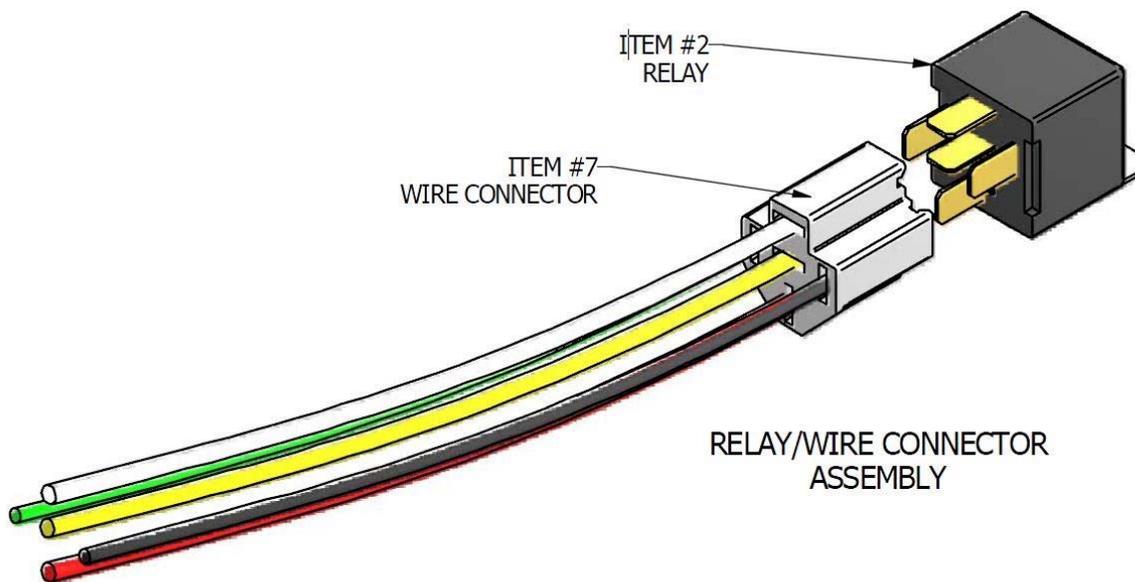
Fig 6-5

**DUAL AXLE SHUNT**

When using a dual axle shunt kit, it should be applied to both the front and rear axle. This shunt kit will provide continuity between the right and left rail wheels on each axle. It should be noted; the kit will not create continuity between the front and rear rail gear axles.

**Table 6-3 Dual Axle Shunt Components**

Part Number	Description	Qty
CO-106	Pilot Switch Red	1
CO-124	Relay, 30 Amp Dual 87 Terminal	2
CO-071	Circuit Breaker, 10 Amp	1
R-10422	Wire Connector for Relay	2
R-16320	Insulator, Axle Bolt	4
R-16319	Washer, 1/4" Insulation	4
R-16316	Ring Terminal, 1/4" 16 Ga	4
990722-100-22	Screw, 1/4" X 1" (Use On R-1110)	4
990722-125-22	Screw, 1/4" X 1 1/4" (Used On R-1150)	4
R-16321	Dash Shunt Sticker	1
R-16317	Quick Disconnect Term., Ins. 1/4"	12
R-16318	Black Wire, 16 Ga 100 Ft.	4



## Shunt Installation

1. Find an ignition activated power supply on your vehicle, and install the provided fuse holder, fuse, and pilot lighted switch.
2. Mount the provided relays in a suitable location.
3. Connect the power wire from the red pilot switch, to both relays at terminal #85, via the black wires on the provided connector assemblies, and solder and heat shrink.
4. Secure the green wires coming from the #86 terminals to a suitable ground. The front and rear relays do not need to be connected to the same spot on the vehicle, but there should be continuity between grounding points.
5. Using a 12-gauge THHN stranded jumper wire, connect the Shunt/Sweep Assembly, from the #10 stud welded on shunt/sweep assembly, to the rail axle as per the WRP Shunt Connection Wiring Diagram, (K-R1115SHUNT001), provided in this manual. Be sure to connect both axles.
6. Run the white wire, coming from terminal #87 of the front relay, to the front passenger's side ring terminal, as per the drawing provided. Solder and heat shrink all connections.
7. Run the red wire, coming from terminal #30 of the front relay, to the driver's side axle ring terminal, as per the drawing provided. Solder and heat shrink all connections.
8. Do not use the yellow wire, coming from terminal #87 on the front relay (not shown in drawing). Instead wire nut or heat shrink the end of the wire to prevent it from making contact with the vehicle or railgear. The Yellow wire WILL be used on the rear relay, while the rear white wire (also not shown) will be masked off.
9. Run the yellow wire, coming from terminal #87 of the rear relay, to the driver's side rear axle ring terminal as per the drawing provided. Solder and heat shrink all connections.
10. Run the red wire, coming from terminal #30 of the rear relay, to the rear passenger's side axle ring terminal as per the drawing provided. Solder and heat shrink all connections.
11. This completes the installation of the dual axle shunt kit. When the interior switch is turned on it will pull in the relays and provide continuity between the front axle wheels and the rear axle wheels. It will not provide continuity between the front and rear rail wheels.

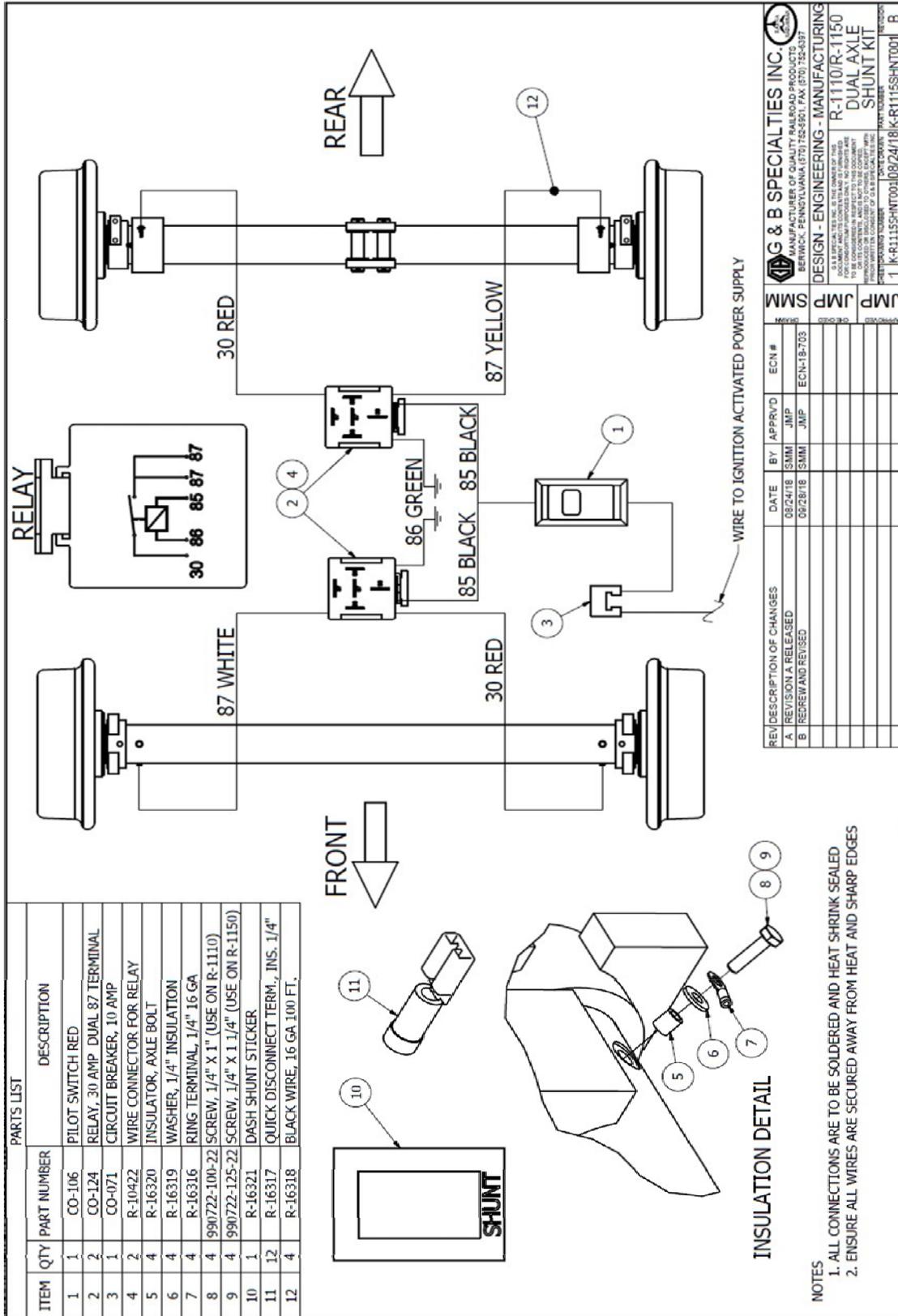


Figure 6-6 Dual Axle Shunt

## 7.0 FRONT TO REAR ALIGNMENT

### FINAL ALIGNMENT

These final adjustments are necessary to align the front railgear to the rear railgear (which has already been aligned with the rear truck axle). The alignment of the railgear to the truck will affect the way the vehicle tracks down the rail. If the vehicle is not properly aligned the railgear may pull to one side, have excessive wheel flange wear and be prone to derailment. Four measurements need to be taken to do this final alignment and should be taken with the railgear fully deployed in the rail position

- (1) The distance from the Front Rail Wheel to the Rear Rail Wheel on each side in figure 7-1, distance "E" must equal to "F" (within 1/8").
- (2) The diagonals from the Front Rail Wheel to the Rear Rail Wheel on the opposite side.

In figure 7-1, distance "G" must be equal to "H" (within 1/4")

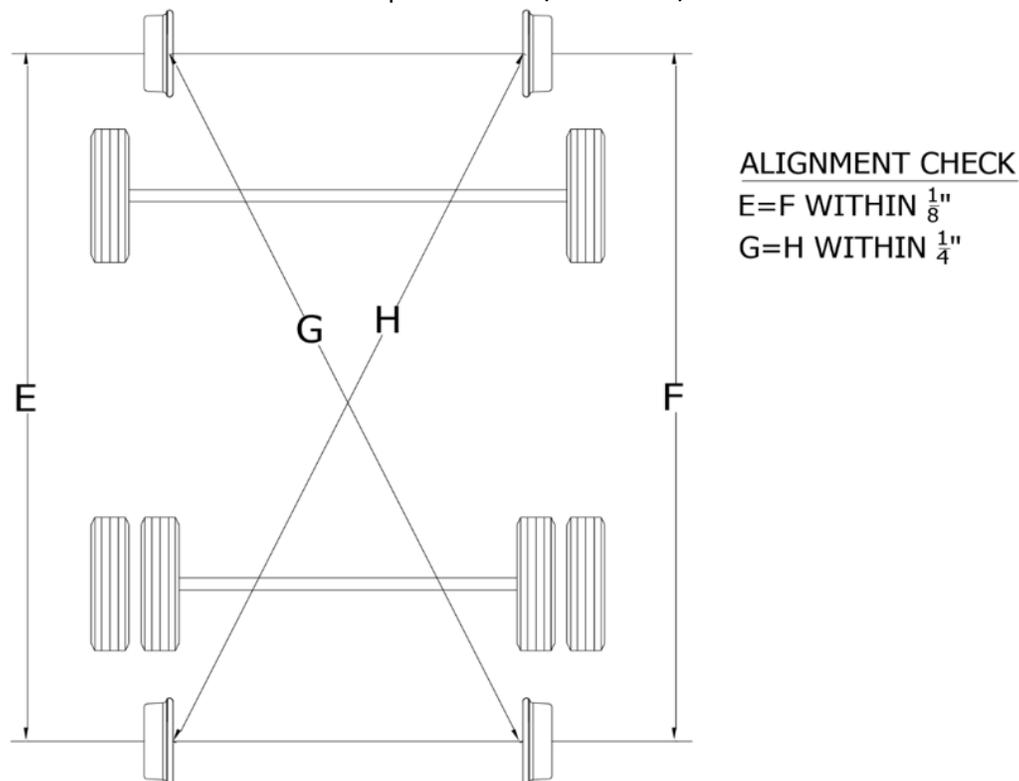


FIGURE 7-1

After the front and rear railgear have been properly aligned, complete structural welds may be applied at the locations that were previously only tacked:

- On the front railgear, between the frame mounting brackets and frame (or frame extensions, if required).
- On the front railgear between the axle tube and the lower portion of the clamp assembly.

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## 8.0 FINAL CHECKLIST

- ✦ Rail test the vehicle to check for good traction and braking. An industrial siding, or some authorized track time will be required. Check that the rail wheels do not lock up and slide.
- ✦ Adjust the railgear for proper height as required.
- ✦ Cross check the rear railgear to the vehicle rear axle again.
- ✦ Weld the mounting plate to the rear frame mounting plate with two 2" welds per side.
- ✦ Welding the plates must be done, do not forget it.
- ✦ Double-check that all welds, nuts, cotter pins and fasteners are in place and installed properly.
- ✦ Route and secure all hoses and wires, making sure that there will be sufficient clearance from pinch points and exhaust.
- ✦ Check the Hydraulic reservoir for proper fill level.
- ✦ Raise the railgear to the road position and install locking pins.
- ✦ Apply the decal kit as shown on page 102, 103, and 104.

### INSTALLATION CHECK LIST

Check tire pressures

#### Front Alignment

- Front mounting Pin height: 25 1/2"
- Rear mounting Pin height: 12 3/4"

#### Rear Alignment

	<u>Single Axle</u>	<u>Tandem Axle</u>
• Tire rail Wheel Center	15 1/4"	11 1/4"
• Minimum truck frame extension	22 1/4"	17 1/4"
• Calculate Spacer thickness (with 6" spacer) =	$(6.0" - \text{GAP}) \times .6$	

#### Check overall measurements

- Rear truck axle to rear railgear (straight)      A=B (within 1/16")
- Rear truck axle to rear railgear (diagonal)      C=B (within 1/8")
- Front Rail Gear to rear railgear (straight)      E=F (within 1/8")
- Front Rail Gear to rear railgear (diagonal)      G=H (within 1/4")

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## 9.0 INSTALLATION SUMMARY

### Initial Instructions

- ✦ Provide adequate work area (floor, lighting, and space)
- ✦ Inspect truck condition: tire pressure and condition, frame and suspension bushings on truck, alignment, and transverse torque rods
- ✦ Fabricate front and rear installation rails
- ✦ Drive truck onto installation rails

### Hydraulic System Connection

- ✦ For new hydraulic system: Install pump, PTO, tank & main hydraulic lines to Front and Rear Valves.
- ✦ For existing hydraulic systems: Install diverter valve, main relief valve and main hydraulic lines to Front and Rear valves.

### Rear Railgear Installation

- ✦ Location of Rear Railgear
- ✦ Recheck tire pressure
- ✦ Measure for location with single axle truck and tandem axle truck

### Spacer installation with Front Railgear on rails in track position

- ✦ Place 6" spacer between frame and mounting bracket then lower rail guide to track position ▪ Calculate Spacer thickness (using formula)
- ✦ Raise railgear to road position and remove temporary spacer
- ✦ Install permanent spacer and tack in position
- ✦ Lower railgear to track position and check tire cup

### Square Railgear with Truck Frame

- ✦ Primary: Measure Rear railgear to truck axle (both sides)
- ✦ Secondary: Measure diagonal from rail wheel axle to truck axle
- ✦ Check Rail Guide clearance including lock pins 2" clearance minimum

### Final Rear Installation

- ✦ Drill holes for mounting plate, install and tighten bolts
- ✦ Tack weld mounting plate and spacers to rear mounting plate

### Front to Rear Alignment

- ✦ Measure Front to Rear Rail Wheels: E=F (within 1/8")
- ✦ Measure Front to Back diagonal: G=H (within 1/4")
  - ✦ If necessary, add shims to Front railgear and tack in place
  - ✦ Upon completion of alignment, weld:
- ✦ Frame mounting brackets to frame (or frame extensions)

#### Rail Sweeps

- ✦ Rail Sweep components
- ✦ Rail Sweep installation

#### Brakes

- ✦ Brake Components
- ✦ Plumbing Installation
- ✦ Testing

#### Air-Lock

- ✦ Air-Lock Components
- ✦ Air-Lock Installation

#### Final Checklist

- ✦ Rail test truck for traction and braking
- ✦ Re-adjust railgear height as required
- ✦ Cross check rear rail wheel to truck rear axle
- ✦ Weld mounting plate to mounting bracket
- ✦ Check welds, fasteners, and cotter pins. Secure hoses and wires.
- ✦ Top off hydraulic fluid
- ✦ Touch-up Paint
- ✦ Raise Front & Rear railgear and install locking pins
- ✦ Apply Decal Kit

## 10.0 STEERING WHEEL LOCK

All Vehicles must be using a steering wheel lock while on the rail.

### Telescoping Steering Wheel

If steering wheel is telescoping, make sure that the steering wheel is in the minimum position or in a position such that the steering wheel lock can be easily applied.

### INSTALLATION

Table 10.1 Steering Wheel Lock Kit Components

Part Number	Description	Qty
S-001050	Steering Wheel Lock	1
S-001040	Steering Wheel Lock Decal	1
R-21167	Speed Decal	1

1. Ensure the front wheels are pointing straight ahead and the steering wheel is centered before installation.
2. The steering wheel lock consists of one steering wheel lock patch with Rafna logo and three adhesive back strips.
3. Without removing the protective backing, position one adhesive back strip on top of the steering column cover and another on the steering wheel. The strips should be close enough together so that the patch will cover both when the steering wheel lock is engaged. Ensure that the adhesive back strips do not interfere with any devices, such as the hazard light button on the steering column cover or the air bag cover on the steering wheel. Modify the adhesive back strips as required to clear any obstructions. Mark their locations on the steering column cover and the steering wheel.
4. Without removing the protective backing, position the third adhesive back strip in a convenient location on the dash (so that it does not interfere with the view and/or operation of the vehicle). This adhesive back strip will serve as a holder when the steering wheel lock is disengaged. Mark the location.
5. Scuff the three areas previously marked with medium / fine sandpaper. The areas should be free of dust, dirt, and any oily residue. Thoroughly clean the areas with denatured alcohol or a similar non-oil-based degreaser that will not react with the plastic. Let the degreaser dry.
6. Take care when placing the adhesive back strips; once they are applied, they should not be removed. Do not touch the adhesive with your fingers. Removing the adhesive back strips once installed or touching the adhesive may cause poor adhesion.

7. Peel off the protective backing from the adhesive back strips. Firmly press them into place as previously located. Do not disturb the adhesive back strips for 24 to 30 hours to allow the adhesive to fully cure.
8. Store the steering wheel lock patch on the adhesive back strip located on the dash.
9. Stick the steering wheel lock decal in a highly visible spot on the dashboard.
10. Stick the maximum speed decal in a highly visible spot, within clear sight of the operator, on the dashboard.

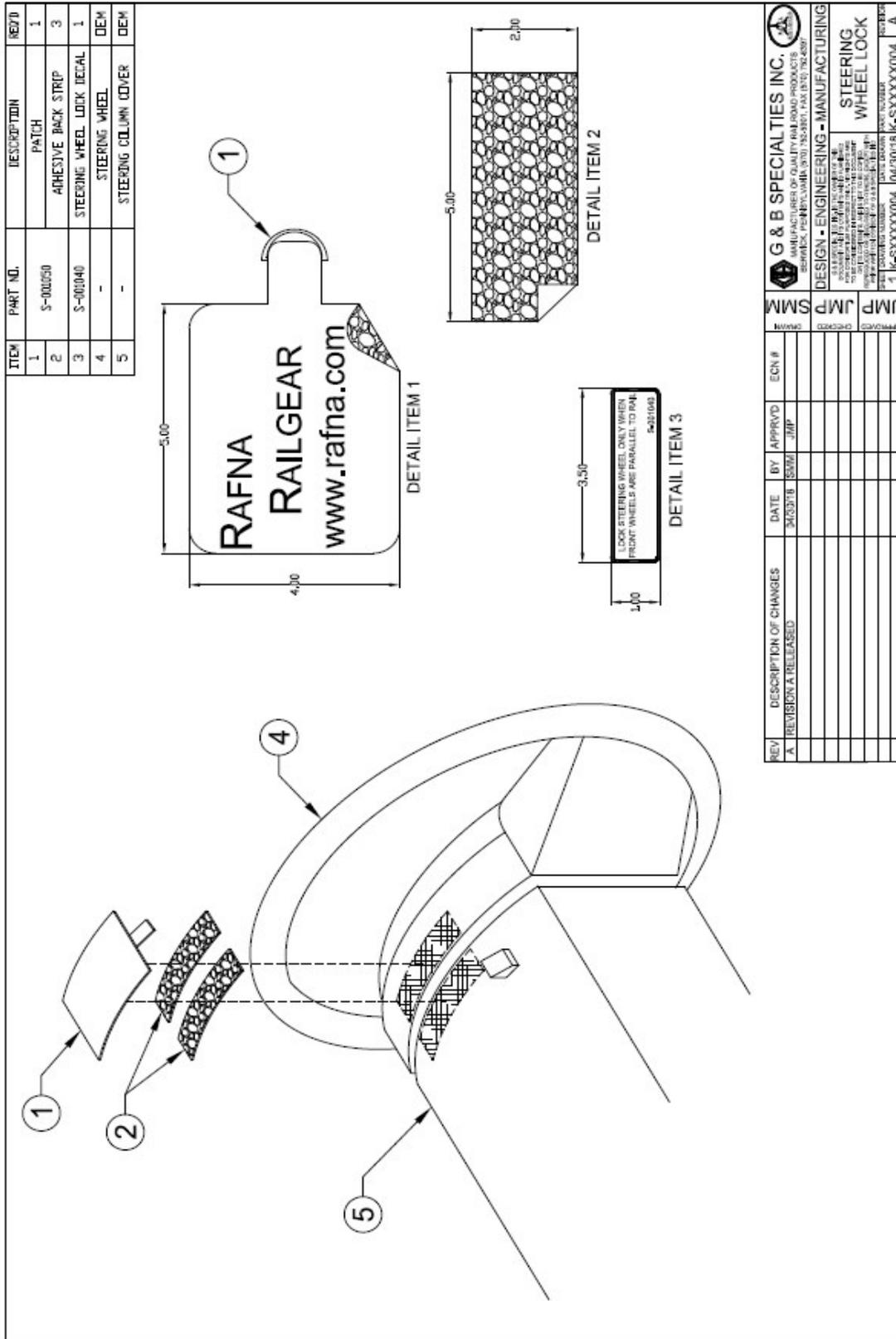


Figure 10-1 Steering Wheel Lock

**R-21167 THIS VEHICLE IS EQUIPPED WITH  
A RAIL CONVERSION UNIT  
RAFNA MODEL  
R-1110/1130/1150  
30 MPH / 48 KM/H  
RECOMMENDED MAXIMUM SPEED ON RAIL  
Railway company rules governing rail travel must be observed at all times.**

## OPERATION

The following procedure details the steering wheel lock operation.

1. **Placing the Vehicle on The Track:**
  - a) Engage the steering wheel lock after both the front and rear railgear are fully deployed and prior to rail travel.
  - b) Turn the steering wheel until the front tires point straight ahead.
  - c) Position the patch portion of the steering wheel lock onto the adhesive back strips affixed to the steering wheel and steering column cover. Press firmly into place. When installed on the adhesive back strips the patch should restrict the steering wheel from turning.
2. **Traveling on Rail:**
  - a) The steering wheel lock must always be engaged while on rail.
3. **Removing the Vehicle from The Track:**
  - a) Disengage the steering wheel lock after both the front and rear Railgear are fully retracted in the road position and prior to road travel.
  - b) Firmly grasp the steering wheel lock patch's d-ring and peel it off the adhesive back strips.
  - c) Store the patch on the adhesive back strip which serves as the holder located on the dash.

## SERVICE OF STEERING WHEEL LOCK

Take care when removing the Patch. Due to certain plasticizers in the steering wheel steering column cover and dash, along with the vehicle's operating environment, the adhesive back strips may peel off and be removed. If the adhesive back strips do peel off, replace the strips with new ones at the earliest convenience.

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## 11.0 RAILGEAR OPERATION AND MAINTENANCE

### RAILGEAR OPERATION

Check to be sure that the railgear is in good operating condition. Inspections should include:

- All air and hydraulic fittings
- All air and hydraulic hoses
- Brake operation
- Railgear parts for damage
- Rail wheel wear
- Hydraulic fluid level

### Engage Front Railgear

1. Drive truck into position to line up front Railgear with the rail.
2. Engage truck's parking brake to prevent the truck from rolling.
3. Engage PTO or electric pump.
4. Remove locking pins.
5. Engage front Railgear.
6. Stow the pins in locking hole.

### Engage Rear Railgear

1. If the Railgear has air brakes, turn the valve on.
2. Engage the PTO or electric pump.
3. Remove the locking pins.
4. Engage the Railgear.
5. When the Railgear is fully extended, replace the locking pins.

### On Track

- ✦ Do not exceed 30 MPH while on track. All railroad rules should be observed
- ✦ Be aware that some railgear is designed so that it does not operate crossing circuits
- ✦ Reduce speed at crossings, curves, branch lines, switches, and frogs
- ✦ Traction is reduced on track; tire damage may result if the wheels are allowed to spin
- ✦ Braking distance is increased while on track. Do not slide the truck tires or wheels on rail
- ✦ Do not exceed rated load of equipment

### Removing Railgear from Track

1. Be sure that the PTO is engaged
2. Engage the truck parking brake
3. Leave the truck running and in neutral
4. Remove Locking Pins
5. Lift both sets of railgear
6. Both sets of railgear must have the locking pins reinstalled
7. Disengage the switch that controls the railgear Air Brakes
8. Disengage the truck PTO before moving truck

## RAILGEAR MAINTENANCE

If your hi-rail vehicle is heavily used or operated under extreme conditions, the inspections listed below may need to be performed more frequently than stated.

### Daily

- Visually inspect for hydraulic fluid leaks
- Visually inspect all hoses for wear or damage
- Visually inspect railgear units for damaged or worn parts
- Check and make sure that all threaded fasteners are secured
- Inspect wheel flanges for excessive wear
- Ensure that the railgear unit hydraulic system and brakes (if equipped) are in good operating condition

### Weekly

Perform standard daily inspection points as listed above, and then check the following:

- Grease and lubricate all grease fittings on front and rear railgear and guide wheels
- Check level of hydraulic oil and all other fluids.
- Check air pressure in tires and inflate to proper inflation pressure (if required).

### Bi-annually

Perform standard daily and weekly inspection points as listed above, and then check the following:

- Remove the hubcaps from the rail wheels and inspect for deterioration or loss of wheel bearing grease
- Clean the strainer / filter in the hydraulic power unit tank
- Rail test for proper traction and adjust as needed
- Rail test for proper braking and adjust as needed
- Check Railgear alignment

## LUBRICATION

Grease fittings are provided at all railgear lubrication points. The recommended lubricant for all lubrication points on this railgear is **MYSTIK JT-6 LOW TEMP GREASE** or equivalent. In cold weather, -20F or colder, Shell Darina XL102 or equivalent may be used.

**WHEEL WEAR STANDARDS AND RECOMMENDATIONS**

At the present time, G&B produces 8", 10", 12", 14", and 16" steel wheels. Each size has a different flange and tread thickness, which dictates the allowable wear. Although the following numbers are recommended limits, risk of failure is increased when not followed. Rail gauge can be supplied by G&B Specialties for 8", 10", 12", 14", and 16" rail wheels. They are used as go/no go gauges. When placed on rail wheels they will indicate how much wear is still permissible or if the rail wheels need to be replaced.

The gauge for the R-1110/1150 model railgear can be ordered using the following part number; R-14030WG

- Rail wheel failure can result in equipment damage or failure, personal injury or death.

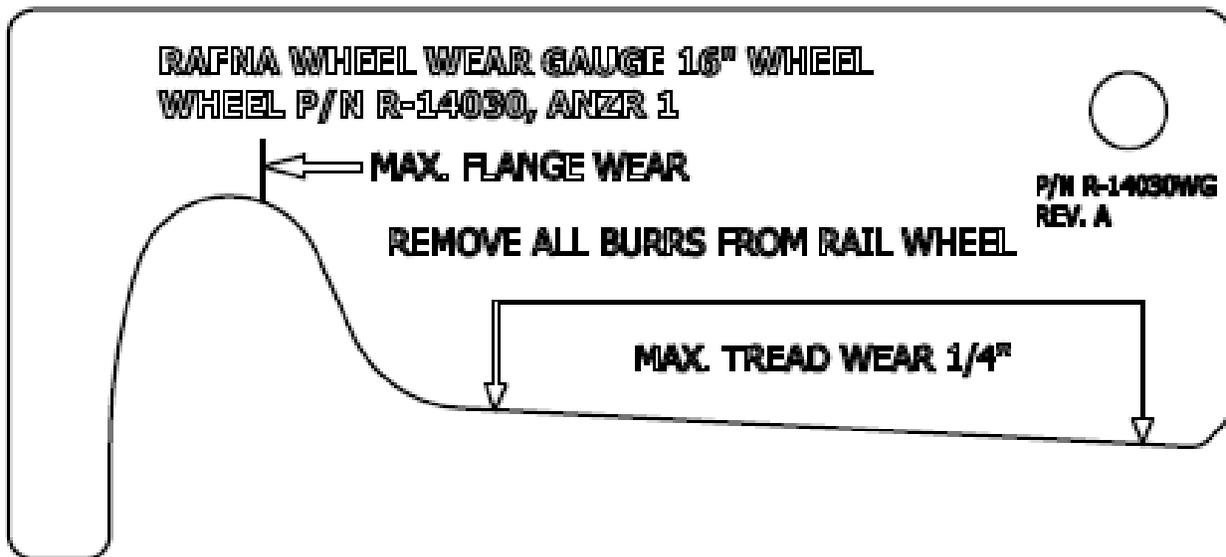
**Flange Wear Limits:**

The maximum flange wear is indicated on the rail wheel gauge. When the gauge is placed on the rail wheel, if a gap is seen between the gauge and the maximum flange wear line, the rail wheel needs to be replaced.

**Tread Wear Limits:**

For tread wear, use the following chart in conjunction with the appropriate rail wheel gauge.

NOMINAL RAIL WHEEL DIAMETER (INCHES)	MIN. ALLOWABLE WHEEL DIAMETER (INCHES)
16	15 3/4



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**12.0 PARTS**

ITEM		QTY	PART NUMBER	DESCRIPTION
1	1	1	SEE TAB	SEE TAB
2	1	1	K-R1150RFLUA002	STANDARD FRONT UPPER RAILGEAR ASSY

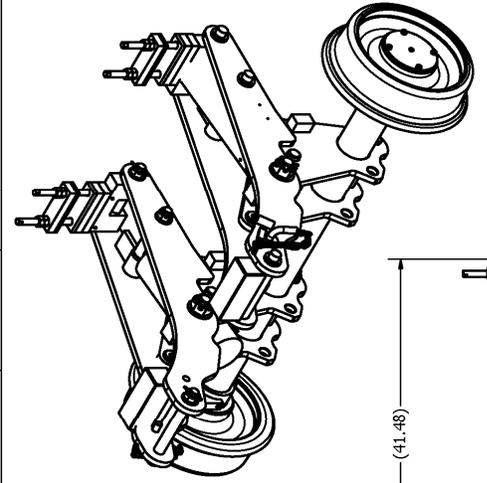
  

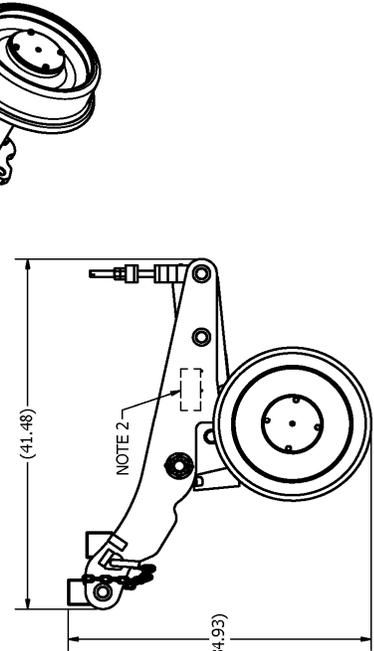
PARTS LIST				
ITEM	QTY	PART NUMBER	DESCRIPTION	
1	1	SEE TAB	SEE TAB	
2	1	K-R1150RFLUA002	STANDARD FRONT UPPER RAILGEAR ASSY	

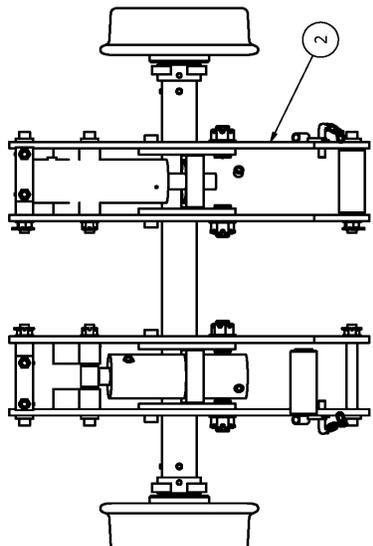
R-16315 OPTIONS				
ASSEMBLY NUMBER	INSULATION	PART NUMBER	PART DESCRIPTION	
R-16315	INS	R-16500B	FRONT AXLE ASSEMBLY INS	
R-16315NON	NON INS	R-16500BNON	FRONT AXLE ASSEMBLY NON INS	

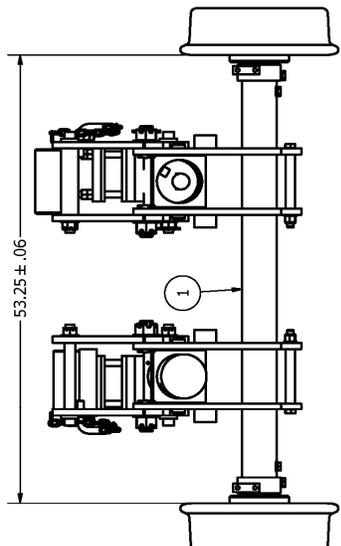
  









**NOTES**

- SEE SHEET 2 FOR ROAD POSITION
- DRILL TWO 1/8" HOLES SPACED AT 2 5/16" APART FOR SERIAL TAG
- ALL INSTALLED HOSES AND FITTINGS TO BE CAPPED/PLUGGED PRIOR TO SHIPPING
- CYLINDER ROD TO BE COVERED WITH CARDBOARD PRIOR TO SHIPPING

REV/DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #
A. REVISION A RELEASED	11/09/18	JMP	JMP	ECN-18-886
B. ADDED NOTES TO DRAWING	11/07/18	SMI	JMP	

APPROVED	CHECKED	DESIGN
JMP	JMP	JMP

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

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11/09/18	JMP	JMP	ECN-18-886
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DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

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11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

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11/07/18	SMI	JMP	

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11/07/18	SMI	JMP	

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11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

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11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

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11/07/18	SMI	JMP	

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11/07/18	SMI	JMP	

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11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

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11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
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DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

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DATE	BY	APPRVD	ECN #
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DATE	BY	APPRVD	ECN #
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11/07/18	SMI	JMP	

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11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

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11/09/18	JMP	JMP	ECN-18-886
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11/09/18	JMP	JMP	ECN-18-886
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11/09/18	JMP	JMP	ECN-18-886
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11/09/18	JMP	JMP	ECN-18-886
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DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

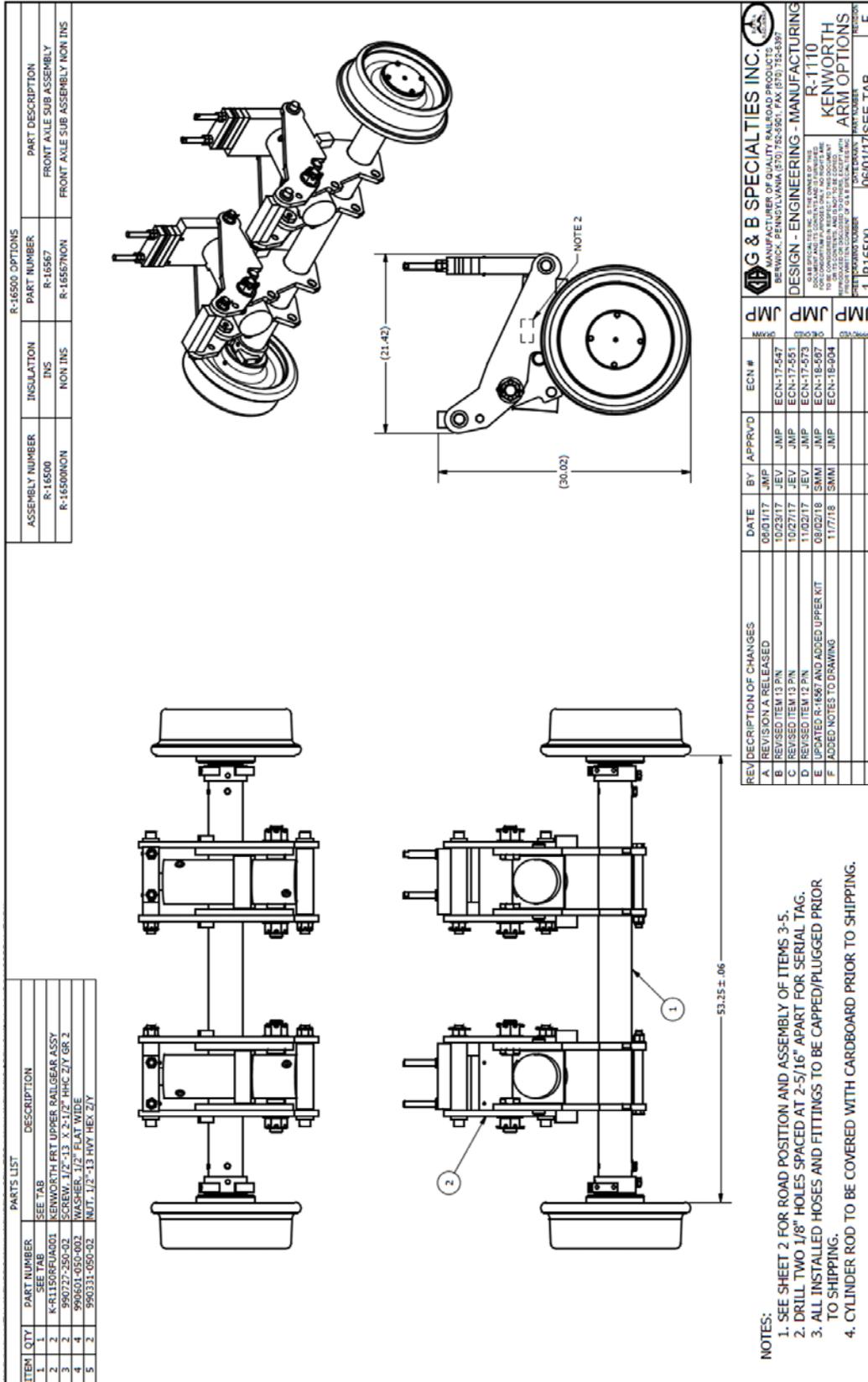
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11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	

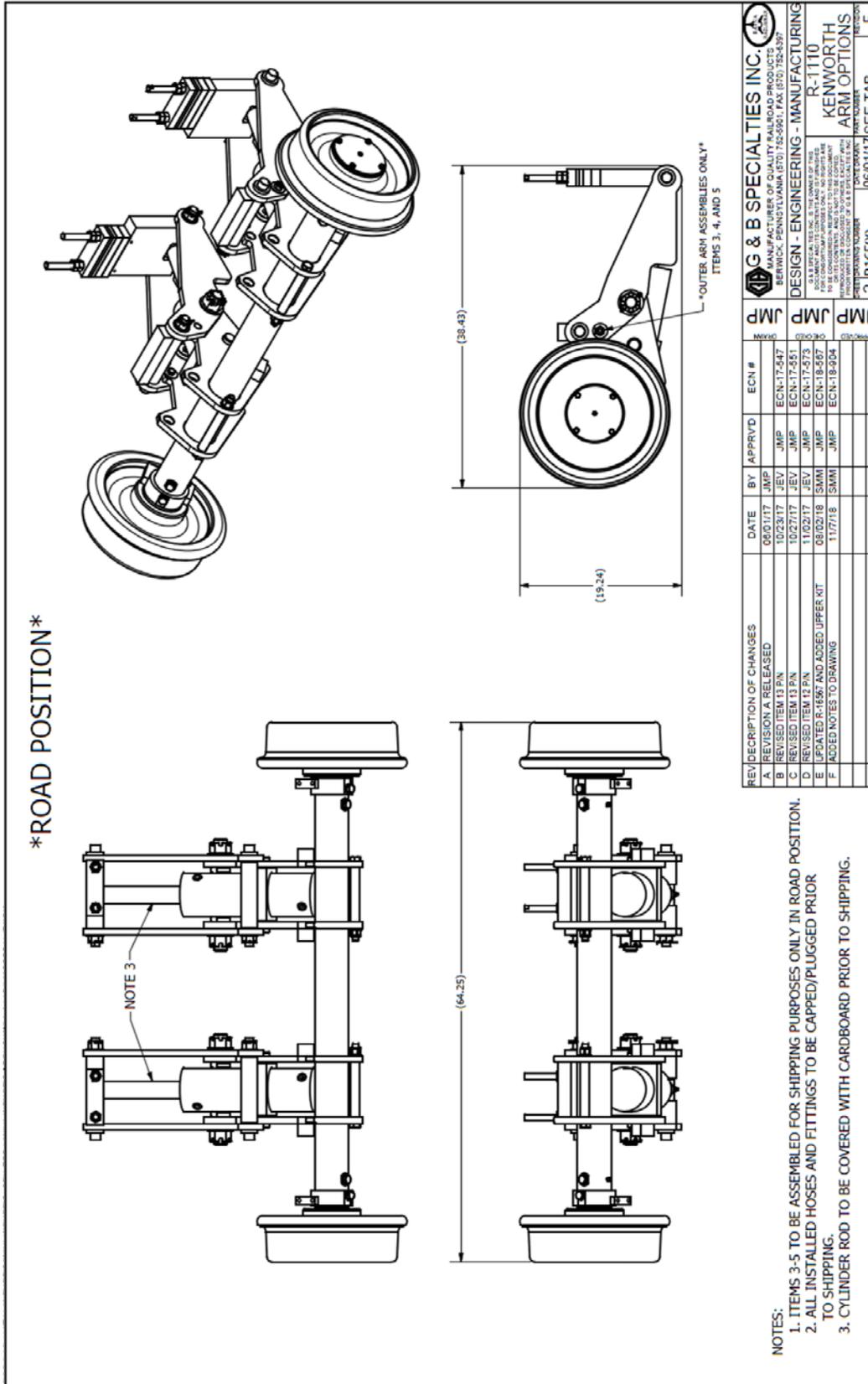
  

DATE	BY	APPRVD	ECN #
11/09/18	JMP	JMP	ECN-18-886
11/07/18	SMI	JMP	



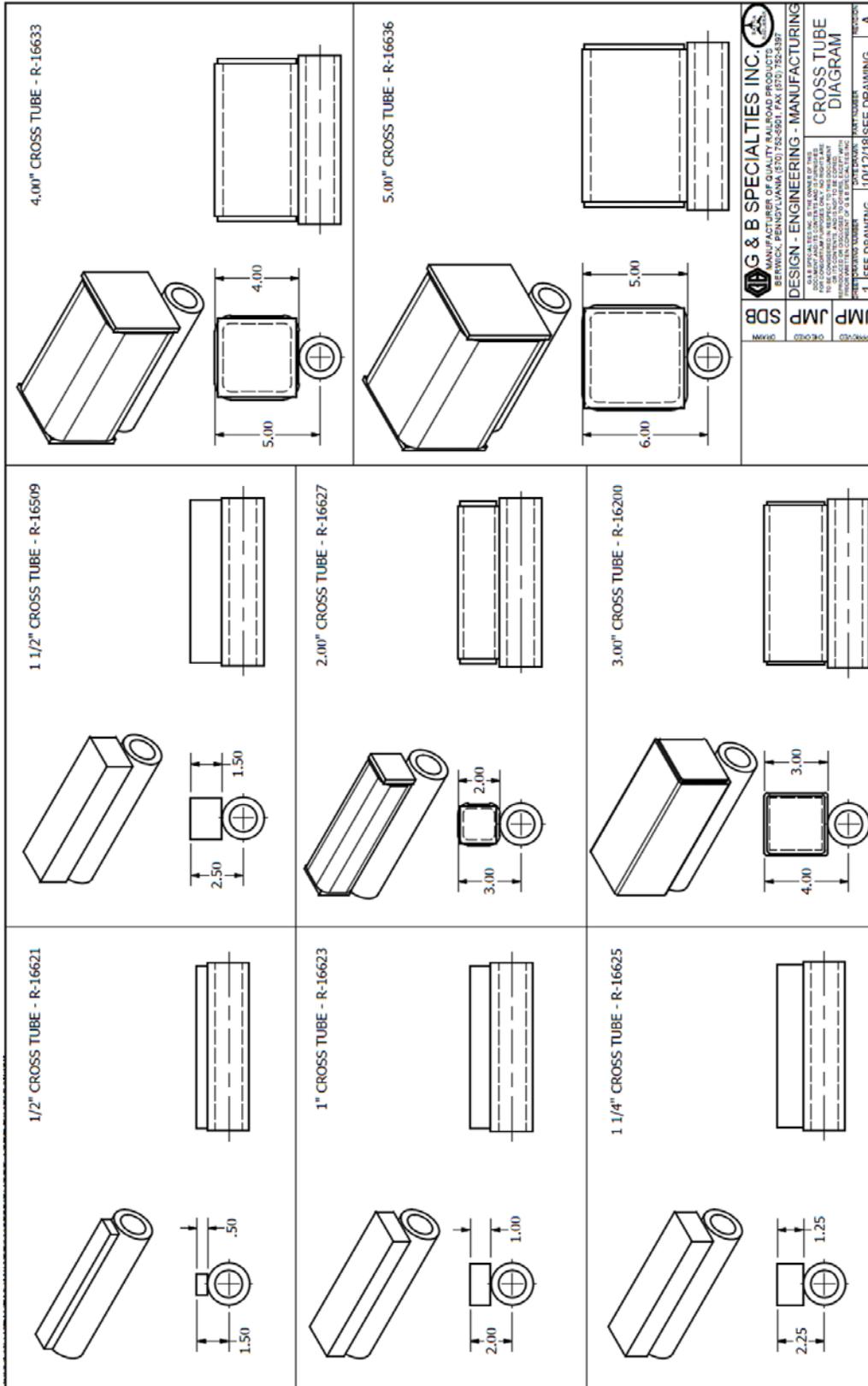














ASSEMBLY NUMBER		INSULATION	PART NUMBER	PART DESCRIPTION
R-16500B		INS	R-16574	SCREW, 1/4"-20 X 1" NYLON
R-16500B/NON		NON INS	990722-100-12	SCREW, 1/4" X 1" GR-5 HEX CAP Z/Y

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	R-16507	FRONT AXLE TUBE
2	2	SEE TAB	SEE TAB
3	2	R-16518	BRAKE SADDLE
4	2	990729-400-22	SCREW, 5/8" X 4" GR 8 HEX CAP Z/Y
5	2	990729-500-22	SCREW, 5/8" X 5" GR 8 HEX CAP Z/Y
6	2	990731-950-22	SCREW, 3/4" X 9 1/2" HEX CAP Z/Y
7	4	990403-062-02	5/8" XDUTY LOCK WASHER Z/Y
8	2	990600-075-002	3/4" NARROW FLAT WASHER
9	2	990335-075-02	NUT, 3/4" HWY HEX NYLOCK GR 8
10	2	R-16568	STUB AXLE ASSEMBLY
11	4	990900-009	FITTING, 1/8 NPT GREASE ZERK
12	2	R-16508	TUBE, SPACER
13	2	R-16313P	PASS. FRONT PIVOT ARM
14	2	R-16313D	DRIVER FRONT PIVOT ARM
15	2	Z-STICKER009	STICKER, R-1150 WELDING

**NOTES**

1. INSTALL ALL INSULATORS ON STUB AXLE BEFORE PRESSING INTO AXLE TUBE
2. CHECK FOR ZERO CONTINUITY AFTER ASSEMBLY
3. PLACE 1 STICKER (ITEM 15) ON THE INSIDE OF THE ARMS WHERE NOTED

REVISION	DESCRIPTION OF CHANGES	DATE	BY	APPROVD	ECN #
A	REVISION A RELEASED	08/01/18	SM	JMP	ECN-18-504
B	UPDATED PIVOT ARMS	10/16/18	JEV	JMP	ECN-18-545
C	REMOVED NOTE ABOUT SILICONE	10/22/18	SDB	JMP	ECN-18-545

DESIGN - ENGINEERING - MANUFACTURING	MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK, PENNSYLVANIA (570) 752-5901, FAX (570) 752-6397
DESIGN - ENGINEERING - MANUFACTURING	G & B SPECIALTIES INC. (G&B) MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK, PENNSYLVANIA (570) 752-5901, FAX (570) 752-6397
DESIGN - ENGINEERING - MANUFACTURING	G & B SPECIALTIES INC. IS THE OWNER OF THIS INFORMATION. IT IS THE PROPERTY OF G & B SPECIALTIES INC. AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION SYSTEMS WITHOUT PERMISSION IN WRITING FROM G & B SPECIALTIES INC.
REVISION NUMBER	08/01/18/SEE TAB
REVISION	C

PARTS LIST		R-16567 OPTIONS	
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	R-16507	FRONT AXLE TUBE
2	2	SEE TAB	SEE TAB
3	2	R-16518	BRAKE SADDLE
4	2	990729-400-22	SCREW, 5/8" X 4" GR 8 HEX CAP Z/Y
5	2	990729-500-22	SCREW, 5/8" X 5" GR 8 HEX CAP Z/Y
6	4	990403-062-02	WASHER, 5/8" XDUTY LOCK Z/Y
7	2	R-16568	STUB AXLE ASSY
8	2	R-16504L	LEFT FRONT PIVOT ARM
9	2	R-16504R	RIGHT FRONT PIVOT ARM
10	4	990900-009	FITTING, 1/8 NPT GREASE ZERK
11	2	R-16508	TUBE, SPACER
12	2	990600-075-002	3/4" NARROW FLAT WASHER
13	2	990335-075-02	NUT, 3/4" Hvy HEX NYLOCK GR 8
14	2	990731-950-22	SCREW, 3/4" X 9 1/2" HEX CAP Z/Y
15	2	Z-STICKER009	STICKER, R-1150 WELDING

ASSEMBLY NUMBER	INSULATION	PART NUMBER	PART DESCRIPTION
R-16567	INS	R-16574	SCREW, 1/4" X 1" NYLON
R-16567NON	NON INS	990722-100-12	SCREW, 1/4" X 1" GR.5 HEX CAP Z/Y

NOTE 3

NO WELDING ON AXLE TUBE OUTBOARD OF SHUNT BOLT

BOLT FACES REAR OF VEHICLE

TORQUE BOLTS TO 120 FT-LBS

NOTES:

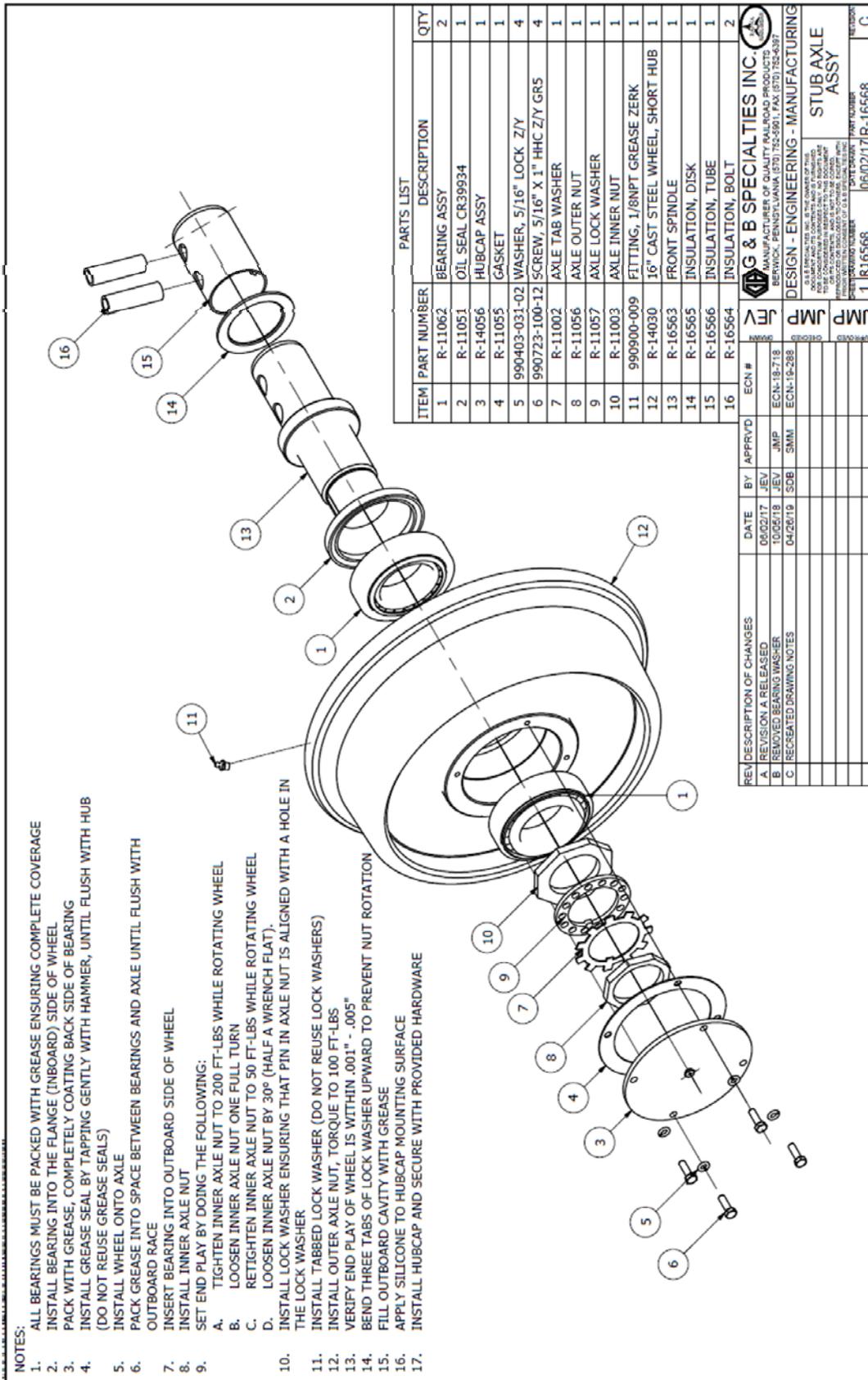
1. INSTALL ALL INSULATORS ON STUB AXLE BEFORE PRESSING INTO AXLE TUBE
2. CHECK FOR ZERO CONTINUITY AFTER ASSEMBLY
3. PLACE 1 STICKER (ITEM 15) ON THE INSIDE OF THE ARMS WHERE NOTED

REVISION	DESCRIPTION OF CHANGES	DATE	BY	APPROVD	ECN #
A	REVISION A RELEASED	06/02/17	JEV	JMP	ECN:18-558
B	ADDED R-16508 AND HARDWARE	08/02/18	SMMI	JMP	ECN:18-548
C	REMOVED NOTE ABOUT SILICONE	10/22/18	SDB	JMP	ECN:18-548

G&B SPECIALTIES INC.		MANUFACTURER OF QUALITY RAILROAD PRODUCTS	
BERWICK, PENNSYLVANIA 67917-5901, FAX (570) 752-6397		DESIGN - ENGINEERING - MANUFACTURING	
G&B SPECIALTIES INC. IS THE OWNER OF THIS		R-1110 KENWORTH	
FOR INFORMATION PURPOSES ONLY. NO WARRANTIES		FRONT SUB AXLE	
OR GUARANTEES ARE MADE AND NO PARTS OR SERVICES		ASSY	
SHOULD BE OBTAINED FROM THE ORIGINAL MANUFACTURER		REVISED	
G&B SPECIALTIES INC. IS NOT RESPONSIBLE FOR		1   R16567	
REVISIONS TO THIS DOCUMENT OR TO A RAILROAD PRODUCT		06/02/17/SEE TAB	
		C	



- NOTES:**
- ALL BEARINGS MUST BE PACKED WITH GREASE ENSURING COMPLETE COVERAGE
  - INSTALL BEARING INTO THE FLANGE (INBOARD) SIDE OF WHEEL
  - PACK WITH GREASE, COMPLETELY COATING BACK SIDE OF BEARING
  - INSTALL GREASE SEAL BY TAPPING GENTLY WITH HAMMER, UNTIL FLUSH WITH HUB (DO NOT REUSE GREASE SEALS)
  - INSTALL WHEEL ONTO AXLE
  - PACK GREASE INTO SPACE BETWEEN BEARINGS AND AXLE UNTIL FLUSH WITH OUTBOARD RACE
  - INSERT BEARING INTO OUTBOARD SIDE OF WHEEL
  - INSTALL INNER AXLE NUT
  - SET END PLAY BY DOING THE FOLLOWING:
    - TIGHTEN INNER AXLE NUT TO 200 FT-LBS WHILE ROTATING WHEEL
    - LOOSEN INNER AXLE NUT ONE FULL TURN
    - RETIGHTEN INNER AXLE NUT TO 50 FT-LBS WHILE ROTATING WHEEL
    - LOOSEN INNER AXLE NUT BY 30° (HALF A WRENCH FLAT).
  - INSTALL LOCK WASHER ENSURING THAT PIN IN AXLE NUT IS ALIGNED WITH A HOLE IN THE LOCK WASHER
  - INSTALL TABBED LOCK WASHER (DO NOT REUSE LOCK WASHERS)
  - INSTALL OUTER AXLE NUT, TORQUE TO 100 FT-LBS
  - VERIFY END PLAY OF WHEEL IS WITHIN .001" - .005"
  - BEND THREE TABS OF LOCK WASHER UPWARD TO PREVENT NUT ROTATION
  - FILL OUTBOARD CAVITY WITH GREASE
  - APPLY SILICONE TO HUBCAP MOUNTING SURFACE
  - INSTALL HUBCAP AND SECURE WITH PROVIDED HARDWARE

PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-32031	BRKT ASSY	1
2	R-32029	BRAKE ACTUATOR ASSY	1
3	HEX NUT	1/2" UNF (INCLUDED W/ ITEM #2)	1
4	HEX NUT	7/16" UNC (INCLUDED W/ ITEM #2)	2
5	L WASHER	7/16" (INCLUDED W/ ITEM # 2)	2
6	R-32040	ACTUATOR ARM	1
7	R-5601	CLEVIS ASSY	1
8	R-20143	CLEVIS PIN (INCLUDED WITH ITEM #7)	1
9	COTTER PIN	1/8" X 1" Z/Y (INCLUDED WITH ITEM #7)	1
10	R-32027	PIVOT SHAFT	2
11	R-32034	PIVOT SHAFT	1
12	R-32035	RETAINER CLIP	1
13	R-32033	RETAINER BLOCK	2
14	R-5599B	BRAKE SHOE - COBRA V-265	1
15	L WASHER	3/8" GR.8	2
16	H.I.C.S	3/8" UNC GR.8 X 1"	2
17	ROLL PIN	3/16" X 1 3/8"	4

NOTE 1  
NOTE 2

NOTE 4

REVISION	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	CHECKED	APPROVED
A	REVISION A RELEASED	07/24/14	AML	JMP	ECN-18-529		
B	REVISED BORDER AND BOM	07/24/18	JEV	JMP	ECN-19-087		
C	MADE CLEVIS/ACTUATOR ASSYS, ADDED NOTES	02/27/19	SDB	JMP	ECN-20-460		
D	ADDED RUST PREVENTATIVE NOTE	07/09/20	JMP	JMP	ECN-21-397		
E	CORRECTED ACTUATOR ORIENTATION	06/18/21	SWM	JMP			

REVISION A RELEASED  
REVISED BORDER AND BOM  
MADE CLEVIS/ACTUATOR ASSYS, ADDED NOTES  
ADDED RUST PREVENTATIVE NOTE  
CORRECTED ACTUATOR ORIENTATION

NOTES:  
1. FOR BRAKES MOUNTED ON FRONT RAILGEAR, ORIENT PORT OF BRAKE ACTUATOR APPROX. 45° OFF CENTERLINE  
2. FOR BRAKES MOUNTED ON REAR RAILGEAR, ORIENT PORT OF BRAKE ACTUATOR APPROX. 7-15° OFF CENTERLINE  
3. REFERENCE HARDWARE KIT R-990KIT-383  
4. COAT THREADS WITH RUST PREVENTATIVE.

DATE	BY	APPRVD	ECN #
07/24/14	AML	JMP	ECN-18-529
07/24/18	JEV	JMP	ECN-19-087
02/27/19	SDB	JMP	ECN-20-460
07/09/20	JMP	JMP	ECN-21-397
06/18/21	SWM	JMP	

REVISION A RELEASED  
REVISED BORDER AND BOM  
MADE CLEVIS/ACTUATOR ASSYS, ADDED NOTES  
ADDED RUST PREVENTATIVE NOTE  
CORRECTED ACTUATOR ORIENTATION

DATE ORIGIN: 07/25/18 R-32030D  
PART NUMBER: 1 IR32030D  
REVISION: E

G & B SPECIALTIES INC. MANUFACTURER OF QUALITY RAILROAD PRODUCTS  
BERWICK, PENNSYLVANIA (570) 752-5901 FAX (570) 752-6397  
DESIGN - ENGINEERING - MANUFACTURING

BRAKE ASSY  
DRIVERS SIDE

PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-32031	BRKT ASSY	1
2	R-32029	BRAKE ACTUATOR ASSY	1
3	HEX NUT	1/2" UNF (INCLUDED W/ITEM #2)	1
4	HEX NUT	7/16" UNC (INCLUDED W/ITEM #2)	2
5	L' WASHER	7/16" (INCLUDED W/ITEM # 2)	2
6	R-32040	ACTUATOR ARM	1
7	R-5601	CLEVIS ASSY	1
8	R-20143	CLEVIS PIN (INCLUDED WITH ITEM 7)	1
9	COTTER PIN	1/8" X 1" Z/Y (INCLUDED WITH ITEM 7)	1
10	R-32027	PIVOT SHAFT	2
11	R-32034	PIVOT SHAFT	1
12	R-32035	RETAINER CLIP	1
13	R-32033	RETAINER BLOCK	2
14	R-55998	BRAKE SHOE - COBRA V-265	1
15	L' WASHER	3/8" GR.8	2
16	H-I.C.S	3/8" UNC GR.8 X 1"	2
17	ROLL PIN	3/16" X 1 3/8"	4

NOTE 1: [Pointing to the front view]

NOTE 2: [Pointing to the rear view]

NOTE 4: [Pointing to the side view]

REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECH #
A	REVISION A RELEASED	07/24/14	AVL	JMP	ECN-18-530
B	REVISED BORDER AND BOX	07/24/18	JEV	JMP	ECN-19-088
C	MADE CLEVISACTUATOR ASSYS. ADDED NOTES	02/27/19	SDB	JMP	ECN-20-461
D	ADDED RUST PREVENTATIVE NOTE	07/06/20	JMP	JMP	ECN-21-398
E	CORRECTED ACTUATOR ORIENTATION	06/16/21	SWM	JMP	

NOTES:

- FOR BRAKES MOUNTED ON FRONT RAILGEAR, ORIENT PORT OF BRAKE ACTUATOR APPROX. 45° OFF CENTERLINE
- FOR BRAKES MOUNTED ON REAR RAILGEAR, ORIENT PORT OF BRAKE ACTUATOR APPROX. 7-15° OFF CENTERLINE
- REFERENCE HARWARE KIT R-990KIT-383
- COAT THREADS WITH RUST PREVENTATIVE.

JMP	JMP	JMP	JMP	JMP	JMP
APPROVED	CHECKED	DESIGNED	MANUFACTURED	INSPECTED	DATE
					07/25/18 R-32030P
					1 R32030P
					07/25/18 R-32030P
					E

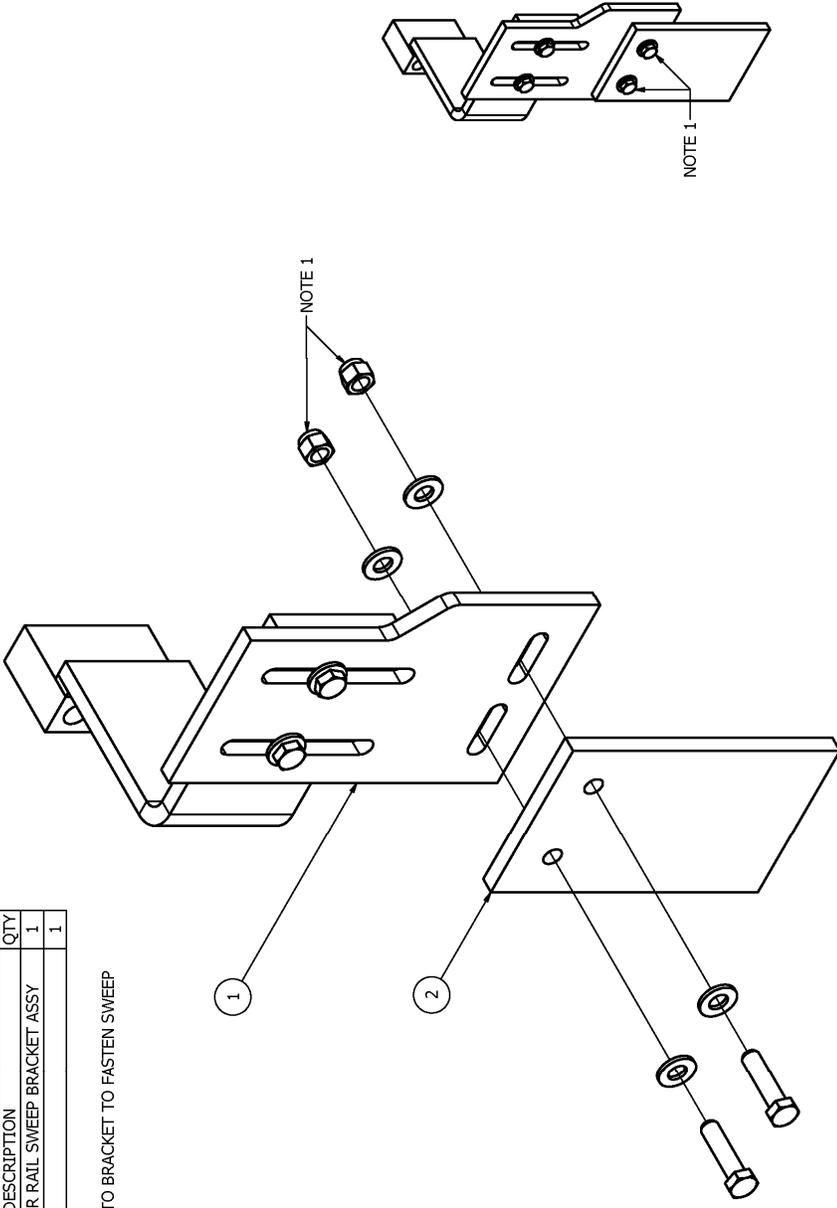
  

**G & B SPECIALTIES INC.**  
MANUFACTURER OF QUALITY RAILROAD PRODUCTS  
BERWICK, PENNSYLVANIA (717) 752-5901, FAX (717) 752-6397  
DESIGN - ENGINEERING - MANUFACTURING  
BRAKE ASSY  
PASSENGERS  
SIDE

PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-16589D-A	R-1150 FRONT DRIVER RAIL SWEEP BRACKET ASSY	1
2	R-16530	RUBBER SWEEP PAD	1

NOTES

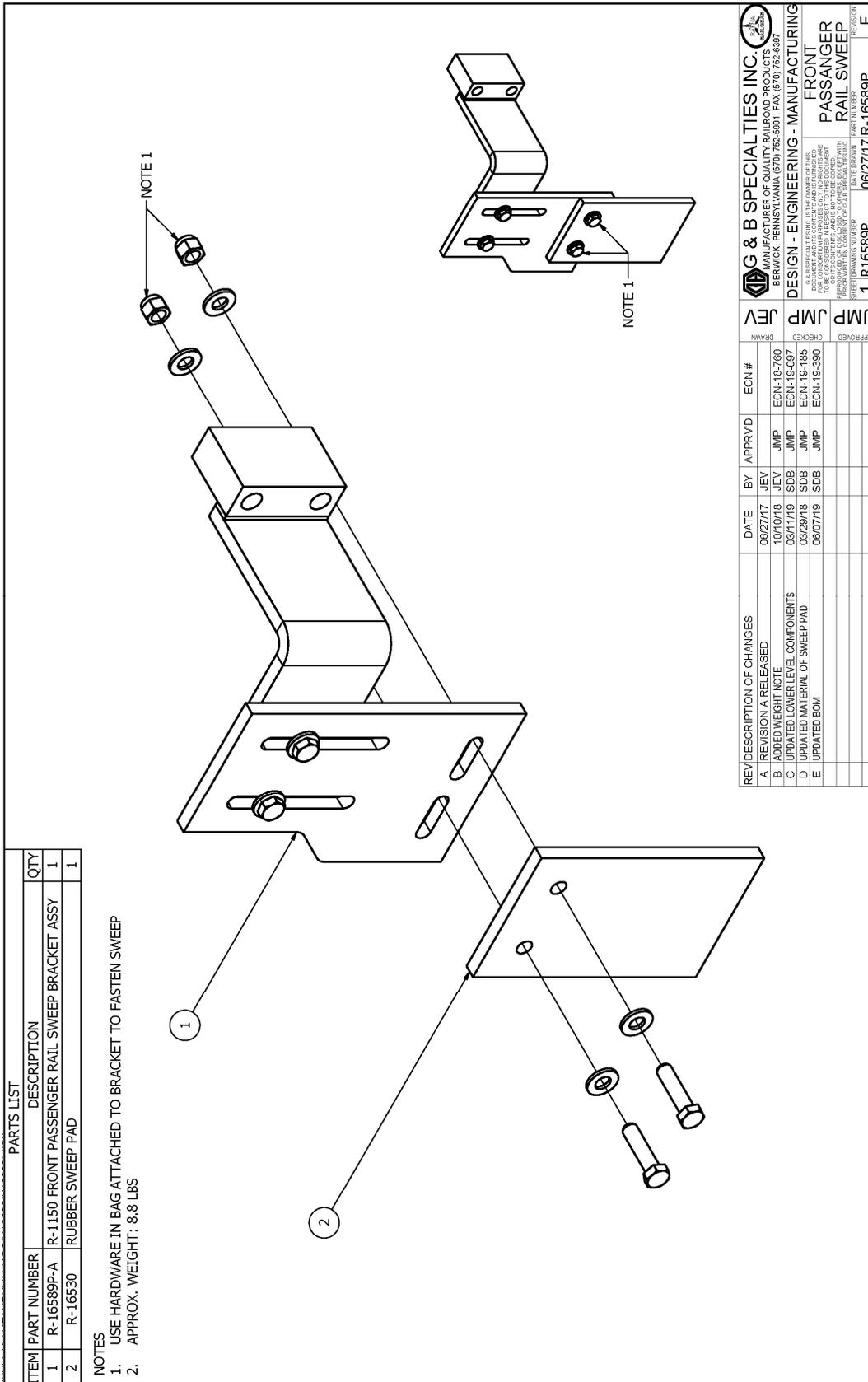
1. USE HARDWARE IN BAG ATTACHED TO BRACKET TO FASTEN SWEEP
2. APPROX. WEIGHT: 8.8 LBS



REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	DESIGN	FUNCTION
A	REVISION A RELEASED	06/27/17	JEV	JEV	ECN-18-759	JEV	FRONT DRIVER RAIL SWEEP
B	ADDED WEIGHT NOTE	10/10/18	JEV	JMP	ECN-19-096	JMP	FRONT DRIVER RAIL SWEEP
C	UPDATED LOWER LEVEL COMPONENTS	03/11/19	SOB	JMP	ECN-19-104	JMP	FRONT DRIVER RAIL SWEEP
D	UPDATED MATERIAL OF SWEEP PAD	03/29/18	SOB	JMP	ECN-19-388	JMP	FRONT DRIVER RAIL SWEEP
E	UPDATED BOM	06/07/19	SOB	JMP		JMP	FRONT DRIVER RAIL SWEEP

**G & B SPECIALTIES INC.**  
 MANUFACTURER OF QUALITY RAILROAD PRODUCTS  
 BERWICK, PENNSYLVANIA (570) 752-5901 FAX (570) 752-6397  
 DESIGN - ENGINEERING - MANUFACTURING  
 G & B SPECIALTIES INC. IS THE OWNER OF THIS  
 DOCUMENT. IT IS THE PROPERTY OF G & B SPECIALTIES INC.  
 AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS  
 WITHOUT THE WRITTEN CONSENT OF G & B SPECIALTIES INC.

1 R16589D 06/27/17/R-16589D E



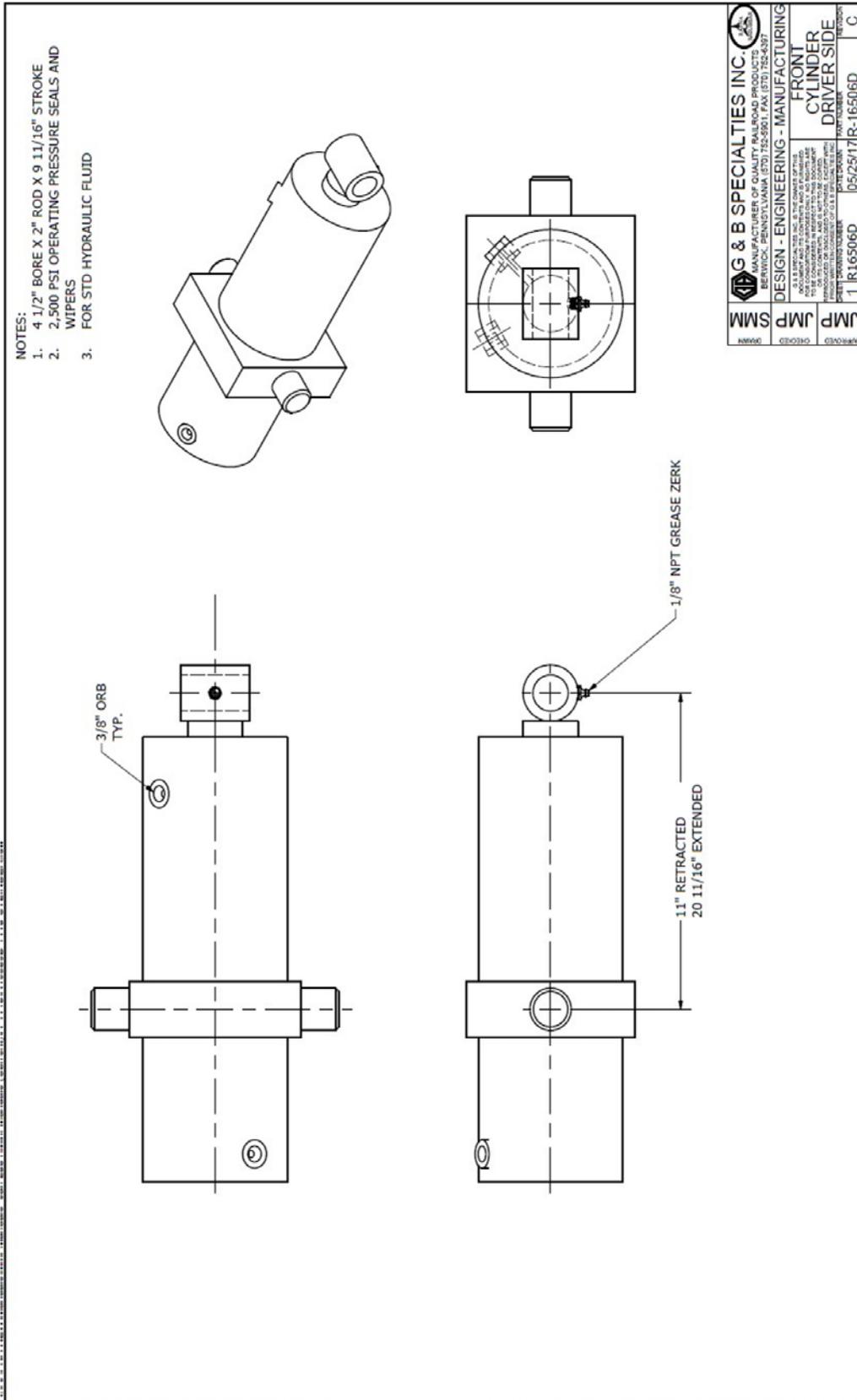
PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-16589P-A	R-1150 FRONT PASSENGER RAIL SWEEP BRACKET ASSY	1
2	R-16530	RUBBER SWEEP PAD	1

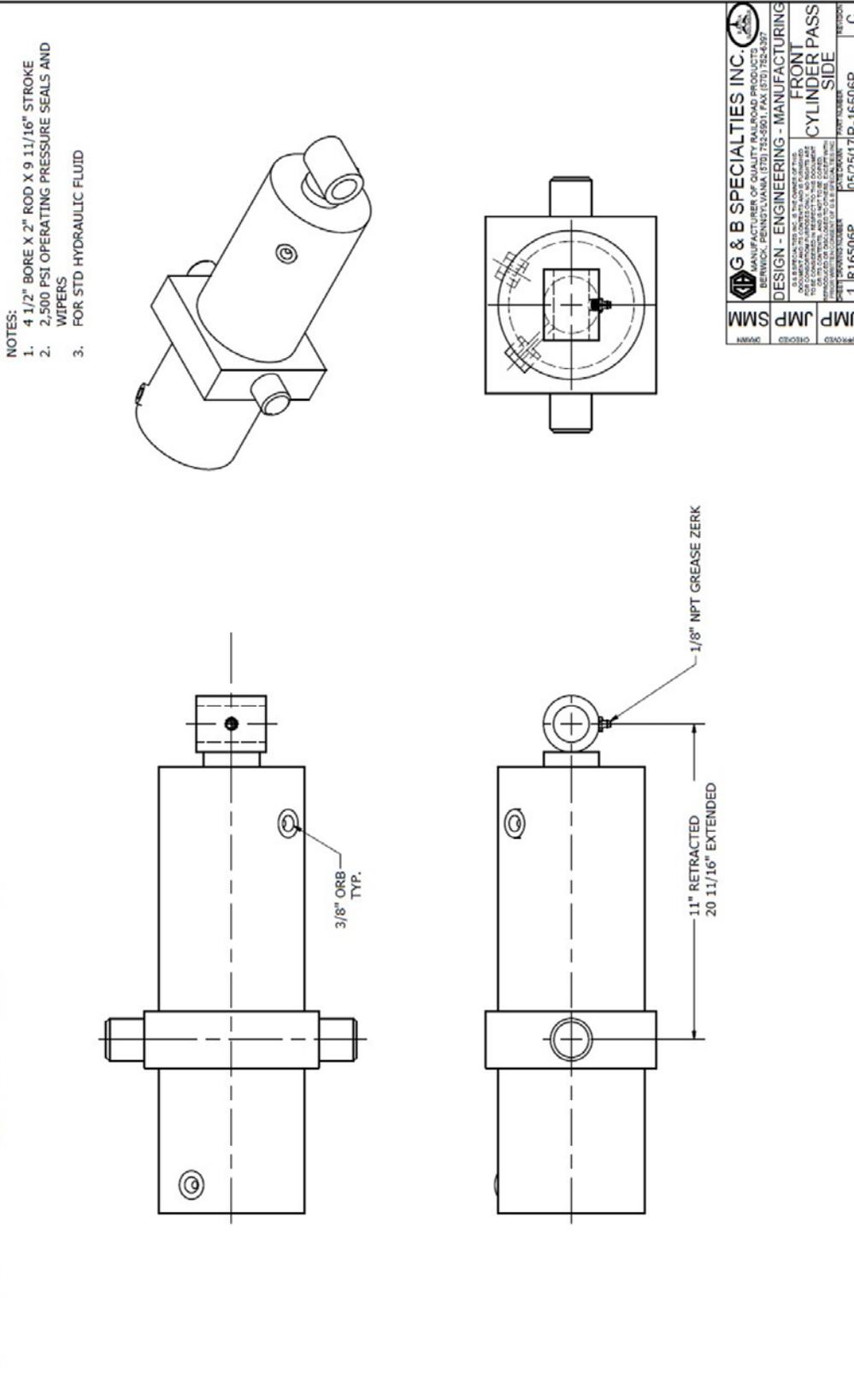
- NOTES
1. USE HARDWARE IN BAG ATTACHED TO BRACKET TO FASTEN SWEEP
  2. APPROX. WEIGHT: 8.8 LBS

REV/DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	CHECKED	APPROVED
A. REVISION A RELEASED	06/27/17	JEV	JEV	ECN-18-780	JMP	JMP
B. ADDED WEIGHT NOTE	10/10/18	JEV	JMP	ECN-19-087	JMP	JMP
C. UPDATED LOWER LEVEL COMPONENTS	03/11/19	SDB	JMP	ECN-19-185	JMP	JMP
D. UPDATED MATERIAL OF SWEEP PAD	03/29/18	SDB	JMP	ECN-19-390	JMP	JMP
E. UPDATED BOM	06/07/19	SDB	JMP		JMP	JMP

MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK, PENNSYLVANIA (570) 752-5901, FAX (570) 752-6397	G & B SPECIALTIES INC.
DESIGN - ENGINEERING - MANUFACTURING	
FRONT PASSENGER RAIL SWEEP	
SHEET/DRAWING NUMBER	06/27/17 R-16589P
PART NUMBER	E







ITEM	PART No.	DESCRIPTION OF ITEM(PART)	QTY.
1	R-11085	OPERATING VALVE - FRONT	1
2	R-11220	REDUCIN BUSHING, 1/2 MPT x 1/4 FPT	2
3	R-11221	MALE BRANCH TEE, 1/4 JIC x 1/4 JIC x 1/4 MPT	2
4	R-11222	90° ELBOW, 1/2 JIC x 3/4 MPT	2
5	R-11225	VINYL CAP, 1/4 JIC	4
6	R-11226	VINYL CAP, 1/2 JIC	2

NOTES:  
1. ASSEMBLE FITTINGS WITH  
LOCTITE THREAD SEALANT

REV	DATE	BY	APP
001	9/22/08	1 of 1	

<b>G &amp; B SPECIALTIES INC.</b> MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK, PENNSYLVANIA (570) 752-5901 FAX (570) 752-6397	
<b>DESIGN - ENGINEERING - MANUFACTURING</b>	
OPERATING VALVE FRONT ASSEMBLY	R-1110
PART NUMBER: R-11085A	REV: R-11085A

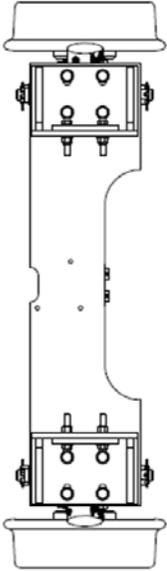
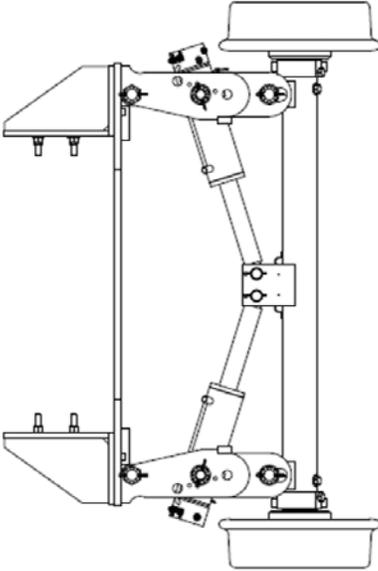
Rear Railgear

PARTS LIST		R-1110-35 OPTIONS	
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R-16308	R-1110 REAR AXLE ASSEMBLY INSULATED	1
2	SEE TAB	SEE TAB	1

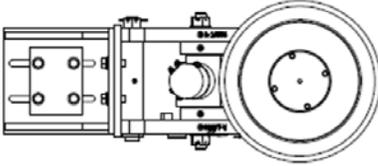
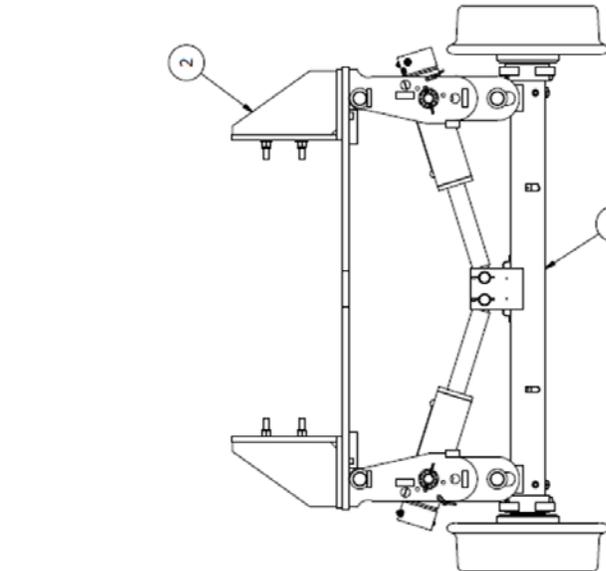
  

ASSEMBLY NUMBER	LOCK-UP	PART NUMBER	PART DESCRIPTION
R-1110-30	MANUAL PINS	R-1110R-UPPER	R-1110 REAR UPPER ASSY
R-1110-30AIR	AIR LOCK	R-1110R-UPPAIR	R-1110 REAR UPPER ASSY - AIR

**REV/DESCRIPTION OF CHANGES**

REV	DESCRIPTION	DATE	BY	APPRVD	ECN #
A	REVISION A RELEASED	07/09/20	JMP	JMP	
B	MANUAL UPDATES	10/14/20	JMP	JMP	

**NOTES:**

- MANUAL PINS ARE DEPICTED.
- HOSES NOT SHOWN FOR CLARITY.
- ALL INSTALLED HOSES AND FITTINGS TO BE CAPPED/PLUGGED PRIOR TO SHIPPING.

REV	DATE	BY	APPRVD	ECN #
1	07/09/20	JMP	JMP	

REV	DATE	BY	APPRVD	ECN #
1	07/09/20	JMP	JMP	

REV	DATE	BY	APPRVD	ECN #
1	07/09/20	JMP	JMP	

REV	DATE	BY	APPRVD	ECN #
1	07/09/20	JMP	JMP	

REV	DATE	BY	APPRVD	ECN #
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REV	DATE	BY	APPRVD	ECN #
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REV	DATE	BY	APPRVD	ECN #
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REV	DATE	BY	APPRVD	ECN #
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1	07/09/20	JMP	JMP	

REV	DATE	BY	APPRVD	ECN #
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REV	DATE	BY	APPRVD	ECN #
1	07/09/20	JMP	JMP	



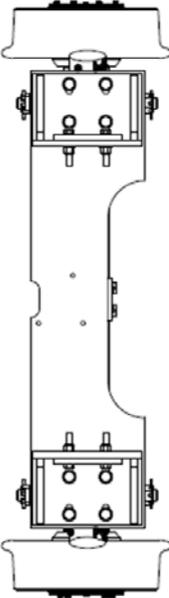
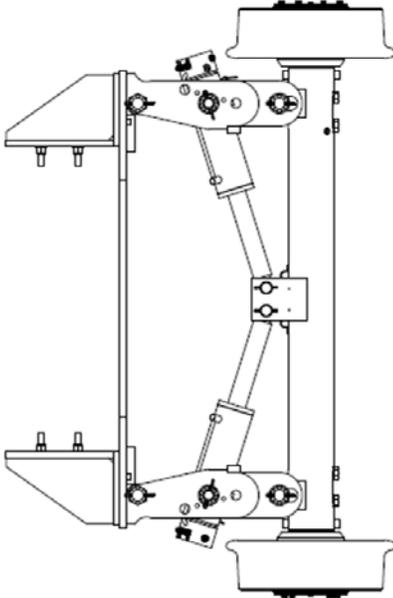


PARTS LIST		R-1110-55 OPTIONS	
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R-16586NON	R-1150 REAR AXLE ASSEMBLY NON-INSULATED	1
2	SEE TAB	SEE TAB	1

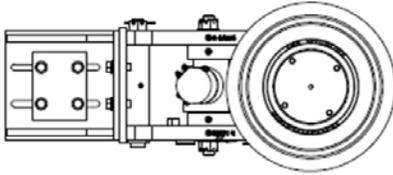
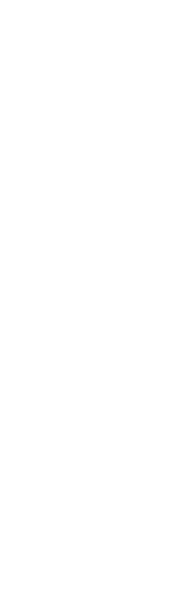
  

ASSEMBLY NUMBER	LOCK-UP	PART NUMBER	PART DESCRIPTION
R-1110-55	MANUAL PINS	R-1110R-UPPER	R-1150 REAR UPPER ASSY
R-1110-55AIR	AIR LOCK	R-1110R-UPAIR	R-1150 REAR UPPER ASSY - AIR

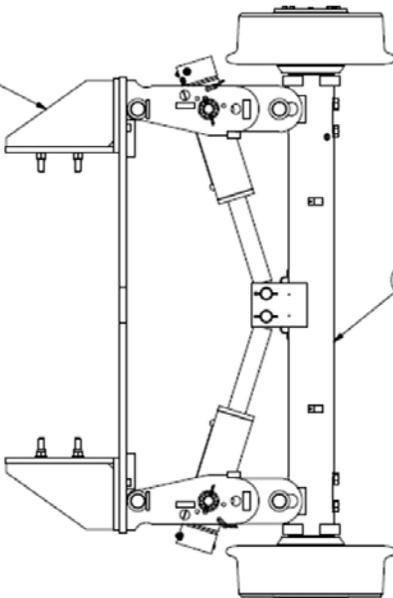
  



**NOTES:**

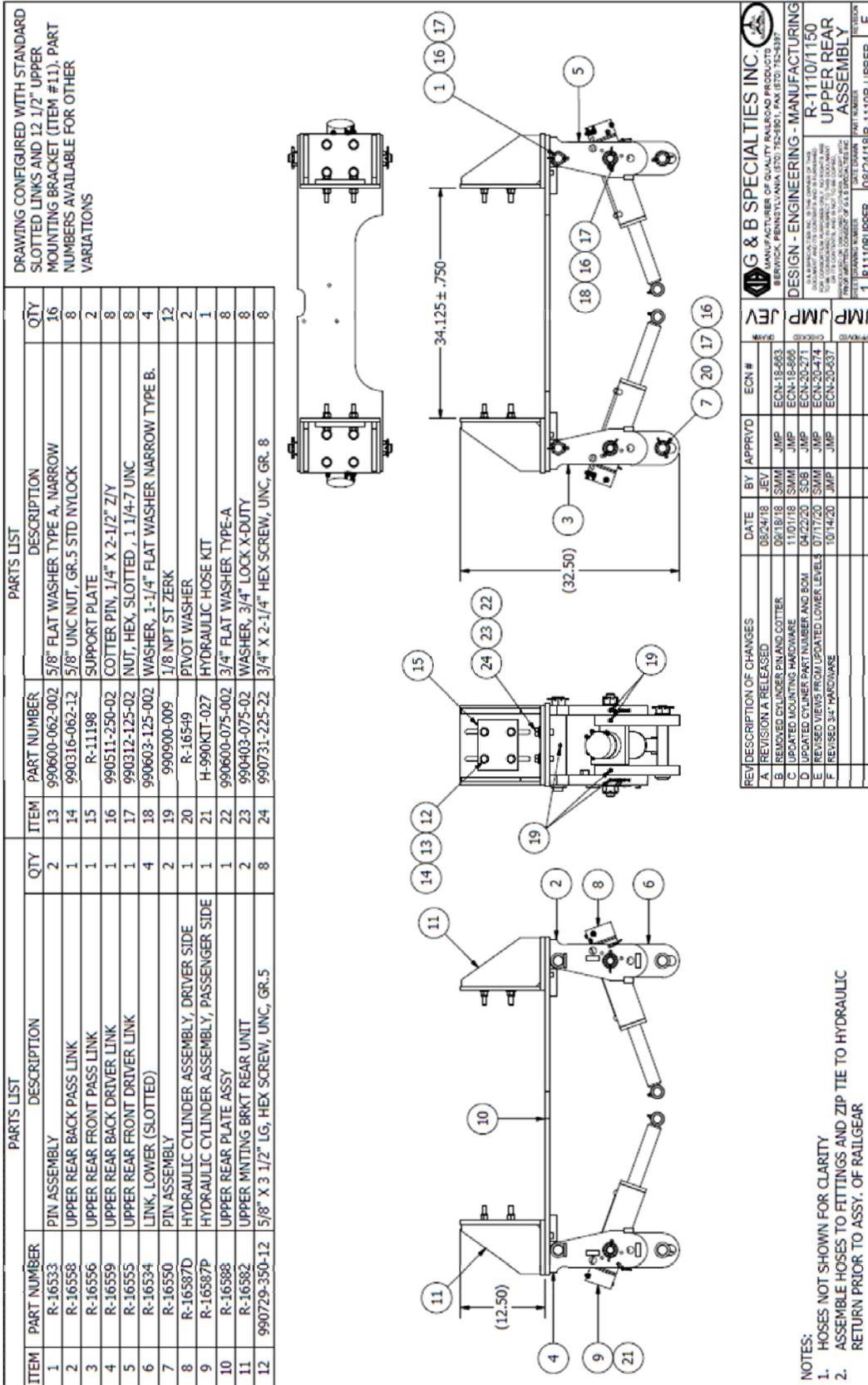
1. MANUAL PINS ARE DEPICTED.
2. HOSES NOT SHOWN FOR CLARITY.
3. ALL INSTALLED HOSES AND FITTINGS TO BE CAPPED/PLUGGED PRIOR TO SHIPPING.

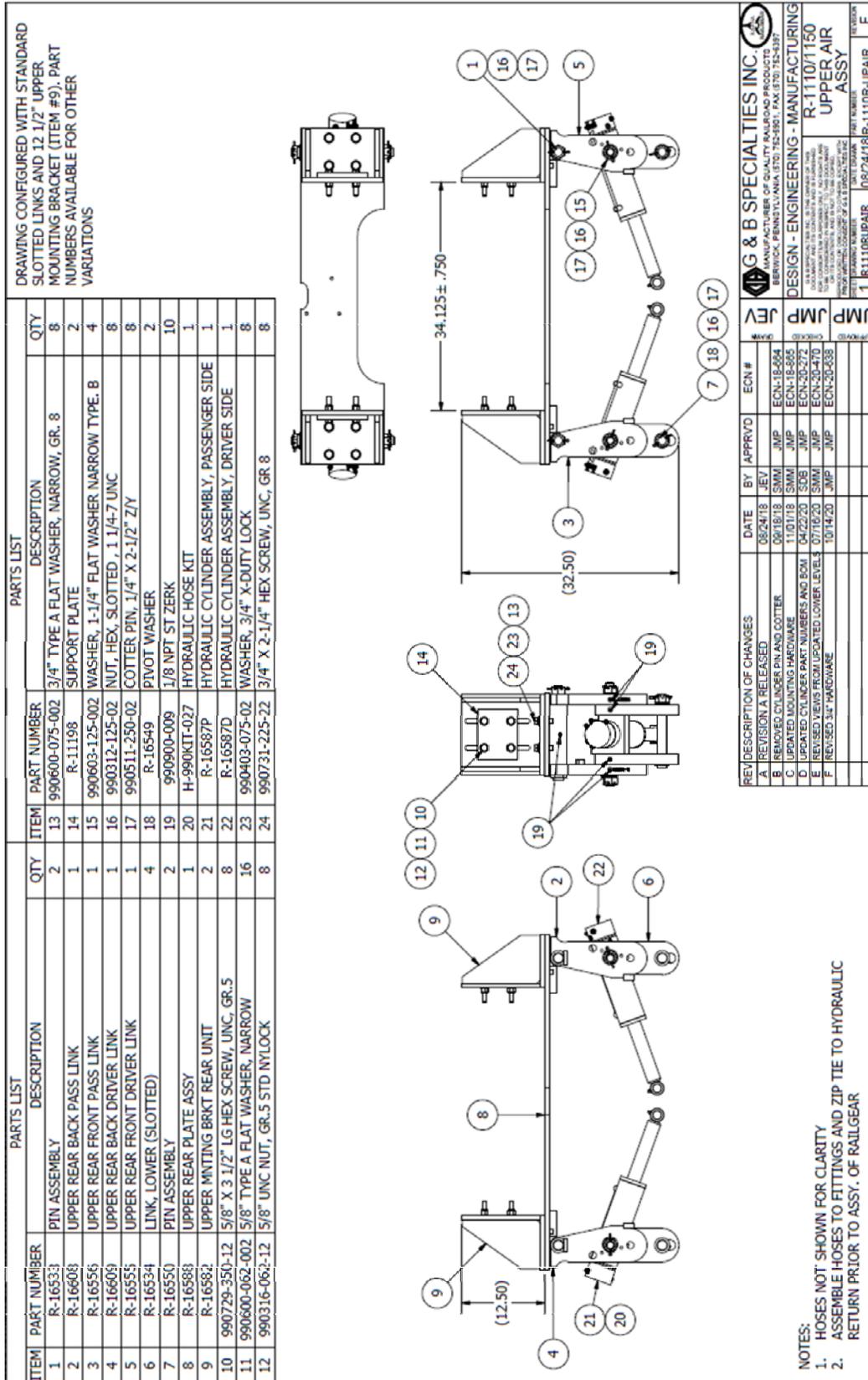
  

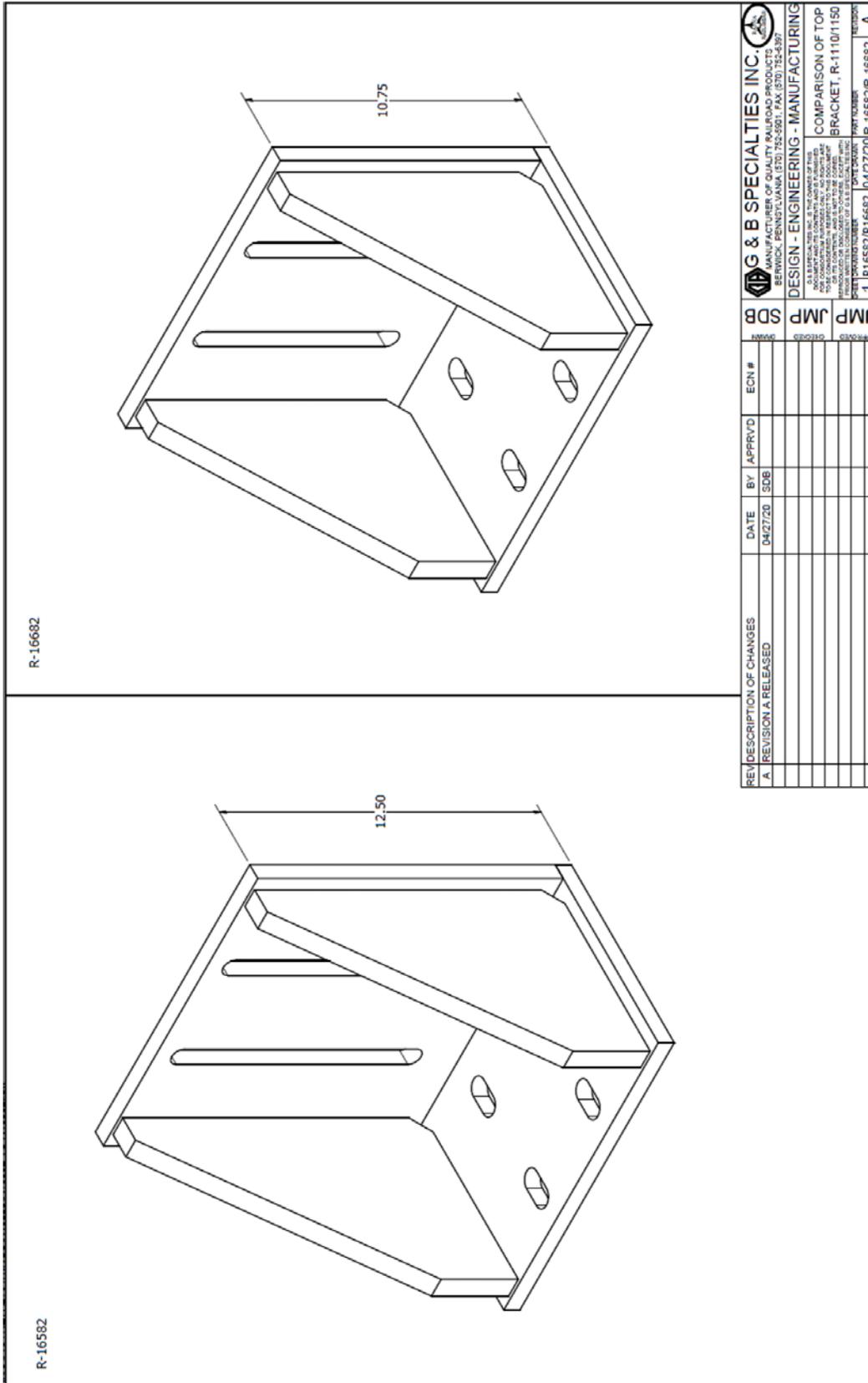
REVISIONS	DATE	BY	APPRVD	ECN #	CHECKED	DRAWN
A. REVISION A RELEASED	07/09/20	JMP	JMP			
B. MANUAL UPDATES	10/14/20	JMP	JMP			

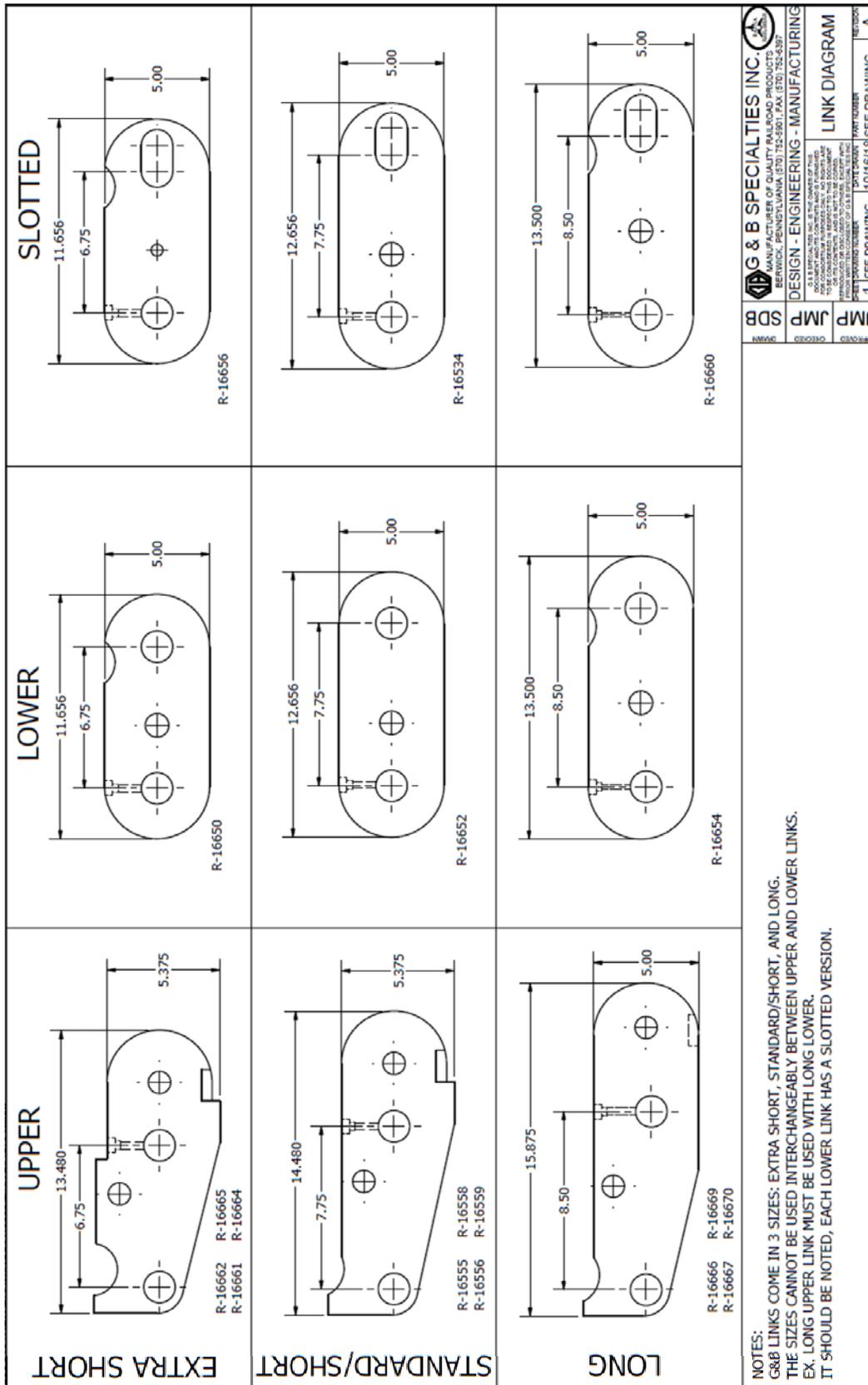
  

<b>G &amp; B SPECIALTIES INC.</b> MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK, PENNSYLVANIA (570) 752-5901, FAX (570) 752-6397	<b>JMP</b>	<b>JMP</b>	<b>JMP</b>
DESIGN - ENGINEERING - MANUFACTURING			
USA OFFICE: 535 WEST 3RD STREET, BERWICK, PA 17604 CANADA OFFICE: 10000 HWY 101, UNIT 101, MISSISSAUGA, ONTARIO L4V 1V1 EUROPEAN OFFICE: 10000 HWY 101, UNIT 101, MISSISSAUGA, ONTARIO L4V 1V1			
R-1150 REAR ASSEMBLY NON-INS OPTIONS			
REVISION NUMBER	DATE DRAWN	PART NUMBER	REVISION
1	07/09/20	R111055	B









**NOTES:**  
G&B LINKS COME IN 3 SIZES: EXTRA SHORT, STANDARD/SHORT, AND LONG.  
THE SIZES CANNOT BE USED INTERCHANGEABLY BETWEEN UPPER AND LOWER LINKS.  
EX. LONG UPPER LINK MUST BE USED WITH LONG LOWER.  
IT SHOULD BE NOTED, EACH LOWER LINK HAS A SLOTTED VERSION.

**APPROVED:** JMP/SDB  
**DESIGNED:** JMP/SDB  
**CHECKED:** JMP/SDB  
**DATE:** 10/16/18  
**REVISED:** 10/16/18  
**PART NUMBER:** 1016670  
**METHOD:** A

**G&B SPECIALTIES INC.**  
MANUFACTURER OF QUALITY RAILROAD PRODUCTS  
BERWICK, PENNSYLVANIA (570) 752-5901, FAX (570) 752-6397  
DESIGN - ENGINEERING - MANUFACTURING

G&B SPECIALTIES INC. IS THE OWNER OF THE  
INTELLECTUAL PROPERTY RIGHTS IN THE  
DRAWINGS AND SPECIFICATIONS. NO PARTS ARE  
TO BE REPRODUCED OR USED IN ANY MANNER  
WITHOUT THE WRITTEN PERMISSION OF G&B SPECIALTIES INC.

**LINK DIAGRAM**

PARTS LIST		R-16586 OPTIONS			
ITEM	PART NUMBER	DESCRIPTION	QTY	ASSEMBLY NUMBER	PART DESCRIPTION
1	R-16547	WELDMENT, AXLE	1	R-16586	HHCS 1/4-20 X 1 1/4" NYLON
2	R-16591	STUB AXLE ASSY. REAR	2	NON INS	990722-125-12
3	SEE TAB	SEE TAB	2	INS	
4	990731-500-22	SCREW, 0.750 X 5.000 GR.8 HEX Z/Y	4	NON INS	HHCS 1/4-20 X 1 1/4"
5	990403-075-02	WASHER, 0.750 X-DUTY LOCK Z/Y	4		
6	990900-007	FITTING, 0.125 45 DEG PTF	2		
7	R-16551	PIN, CYLINDER	2		
8	990509-200-02	COTTER PIN, 3/16" X 2" Z/Y	4		

NO WELDING ON AXLE TUBE  
OUTBOARD OF SHUNT BOLT

TORQUE BOLTS TO 200 FT.-LBS

**NOTES:**  
 1. INSTALL ALL INSULATORS ON STUB AXLE BEFORE PRESSING INTO AXLE TUBE  
 2. CHECK FOR ZERO CONTINUITY AFTER ASSEMBLY

REV/DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #
A REVISION A RELEASED	06/18/17	SMM		
B REVISED BILL OF MATERIAL	10/31/17	JEV	JMP	ECN-17-564
C CHANGED BORDER	06/07/18	JEV	JMP	ECN-18-051
D ADDED CYLINDER PIN AND COTTER	06/19/18	SMM	JMP	ECN-18-060
E REMOVED NOTE ABOUT SILICONE. REVISED #1	10/17/19	SDB	JMP	ECN-18-814
F UPDATED VIEW TO SHOW HOSE CLIPS	11/12/18	SMM	JMP	ECN-18-932

MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK, PENNSYLVANIA (570) 752-5901, FAX (570) 752-6397	<b>G &amp; B SPECIALTIES INC.</b>
DESIGN - ENGINEERING - MANUFACTURING	REAR AXLE
ASSEMBLY NUMBER	R-1150 ASSY
OPTIONS	
DATE	06/19/17
BY	JEV
APPRVD	
ECN #	

R-16586 OPTIONS			
ASSEMBLY NUMBER	INSULATION	PART NUMBER	PART DESCRIPTION
R-16308	INS	R-16578	HHCS 1/4-20 X 1 1/4" NYLON
R-16308NON	NON INS	990722-125-12	HHCS 1/4-20 X 1 1/4"

ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-16568	STUB AXLE ASSY	2
2	R-16311P	SADDLE, PASS SIDE BRAKE	1
3	R-16311D	SADDLE, DRIVER SIDE BRAKE	1
4	R-16302	AXLE WELDMENT, REAR	1
5	SEE TAB	SEE TAB	2
6	990403-062-02	WASHER, 5/8" XDUTY LOCK Z/Y	4
7	990729-400-22	SCREW, 5/8" X 4" GR 8 HEX CAP Z/Y	2
8	990729-500-22	SCREW, 5/8" X 5" GR 8 HEX CAP Z/Y	2
9	990900-007	FITTING, 0.125 65 DEG	2
10	R-16310	PIN,CYLINDER	2
11	990509-200-02	COTTER PIN, 3/16" X 2" Z/Y	4

**NOTES**

- INSTALL ALL INSULATORS ON STUB AXLE BEFORE PRESSING INTO AXLE TUBE
- CHECK FOR ZERO CONTINUITY AFTER ASSEMBLY

REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #
A	REVISION A RELEASED	04/17/18	SMM	JMP	ECN-18-982
B	REVISED ITEMS 2 & 3 ADDED 10 & 11	06/18/18	SMM	JMP	ECN-18-916
C	REMOVED NOTE ABOUT SILICONE REVISED #4	10/17/19	SDB	JMP	ECN-18-926
D	UPDATED VIEW TO SHOW HOSE CLIPS	11/12/18	SMM	JMP	ECN-18-926

<b>G&amp;B SPECIALTIES INC.</b>	<b>MANUFACTURER OF QUALITY RAILROAD PRODUCTS</b>	<b>DESIGN - ENGINEERING - MANUFACTURING</b>	<b>REAR AXLE</b>
BERWICK, PENNSYLVANIA (570) 752-5961, FAX (570) 752-6397			<b>R-1110 ASSY</b>
<small>AS A SPECIALTY INC. IS THE OWNER OF THIS DOCUMENT, IT IS THE PROPERTY OF G&amp;B SPECIALTIES INC. AND IS TO BE USED ONLY FOR THE PROJECT AND FOR THE CUSTOMER AND NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.</small>			<b>OPTIONS</b>
ORDER NUMBER	DATE ORDERED	PART NUMBER	REVISION
1 R16308	04/17/18	SEE TAB	D

**NOTES:**

- ALL BEARINGS MUST BE PACKED WITH GREASE ENSURING COMPLETE COVERAGE
- INSTALL BEARING INTO FLANGE (INBOARD) SIDE OF WHEEL
- PACK WHEEL WITH GREASE; COMPLETELY COATING BACK SIDE OF BEARING
- INSTALL GREASE SEAL BY TAPPING GENTLY WITH HAMMER, UNTIL FLUSH WITH HUB (DO NOT REUSE GREASE SEALS)
- INSTALL WHEEL ONTO AXLE
- PACK BEARING CAVITY WITH GREASE UNTIL FLUSH WITH OUTBOARD RACE
- INSERT BEARING INTO OUTBOARD SIDE OF WHEEL
- INSTALL FIRST AXLE NUT
- SET END PLAY BY DOING THE FOLLOWING:
  - TIGHTEN AXLE NUT TO 200 FT-LBS WHILE ROTATING WHEEL
  - LOOSEN AXLE NUT ONE FULL TURN
  - RETIGHTEN AXLE NUT TO 50 FT-LBS WHILE ROTATING WHEEL
  - LOOSEN AXLE NUT BY 30° (HALF A WRENCH FLAT)
- INSTALL TABBED LOCK WASHER (DO NOT REUSE LOCK WASHERS)
- INSTALL SECOND AXLE NUT, TORQUE TO 100 FT-LBS
- VERIFY END PLAY OF WHEEL IS WITHIN .001" - .005"
- BEND THREE TABS OF LOCK WASHER UPWARD TO PREVENT NUT ROTATION
- FILL OUTBOARD CAVITY WITH GREASE
- APPLY SILICONE TO HUBCAP MOUNTING SURFACE
- INSTALL HUBCAP AND SECURE WITH PROVIDED HARDWARE

**PARTS LIST**

ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-16569	REAR SPINDLE	1
2	R-16572	INSULATION, TUBE	1
3	R-16571	INSULATION, RING	1
4	R-16570	INSULATION, BOLT	2
5	R-16573	16" 1150 REAR WHEEL	1
6	R-16575	SEAL, WHEEL	1
7	R-16576	NUT, AXLE	2
8	R-16577	AXLE TAB WASHER	1
9	R-11028A	HUB CAP ASSEMBLY	1
10	R-16592	BEARING ASSEMBLY	2
11	990723-075-22	SCREW, 5/16-18 X 3/4" HEX Z/Y	4
12	990401-031-02	WASHER, 5/16" REG LOCK Z/Y	4
13	R-11055A	GASKET 16" WHEEL	1

**REVISIONS**

REVISION	DATE	BY	APPROVED	DESCRIPTION OF CHANGES
A	06/19/17	SMM	JMP	REVISION A RELEASED
B	03/20/18	JEV	JMP	ADDED ITEM 13, REVISED NOTES
C	06/10/18	JEV	JMP	CHANGED BORDER
D	04/26/19	SCB	SMM	RECREATED DRAWING NOTES

**MANUFACTURER INFORMATION**

**G & B SPECIALTIES INC.**  
MANUFACTURER OF QUALITY RAILROAD PRODUCTS  
BERWICK, PENNSYLVANIA (570) 752-5901, FAX (570) 752-6397

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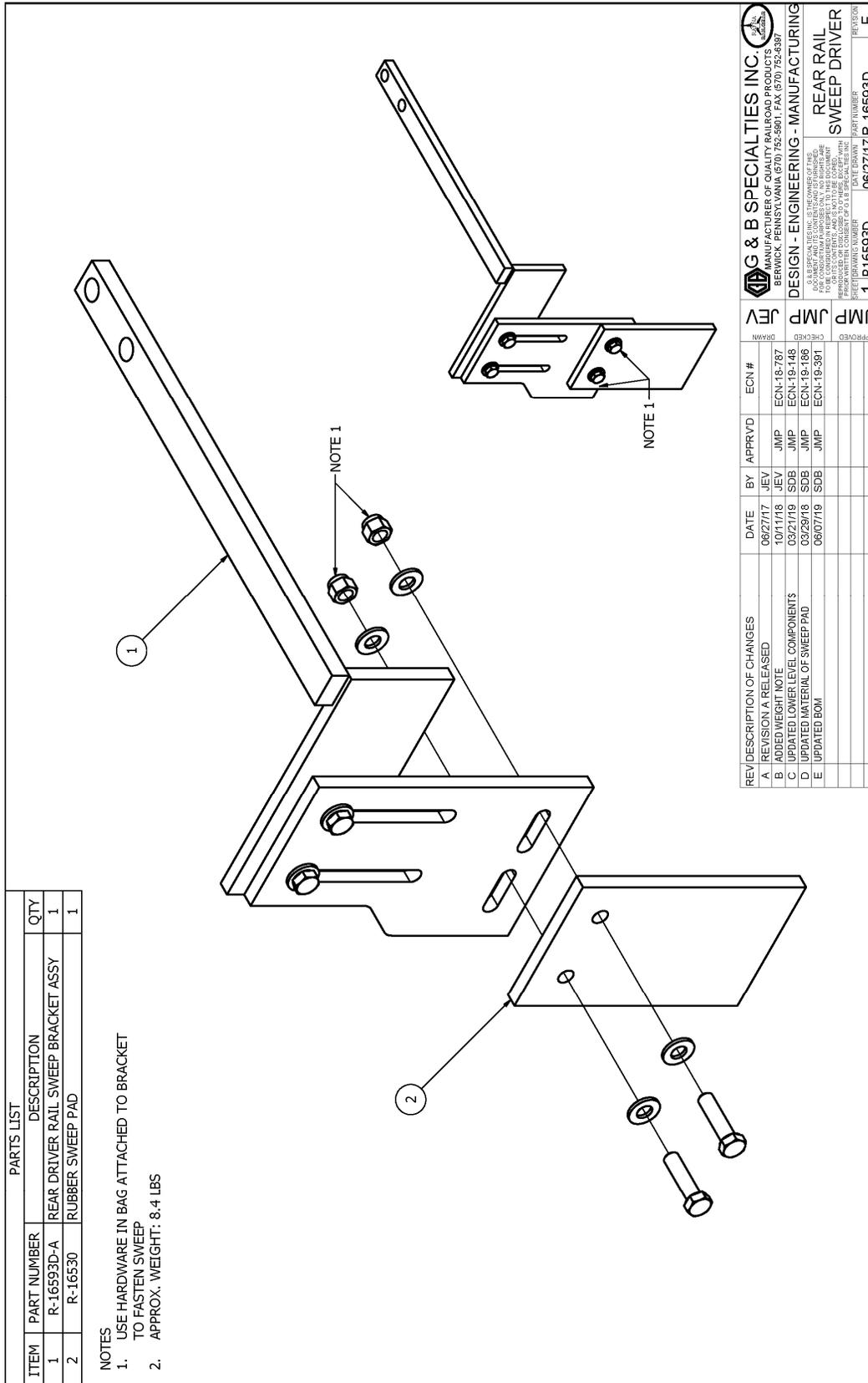
**JMP JMP SMM**

**1150 REAR STUB AXLE ASSEMBLY**

**DATE: 06/19/17**

**REV: 1**

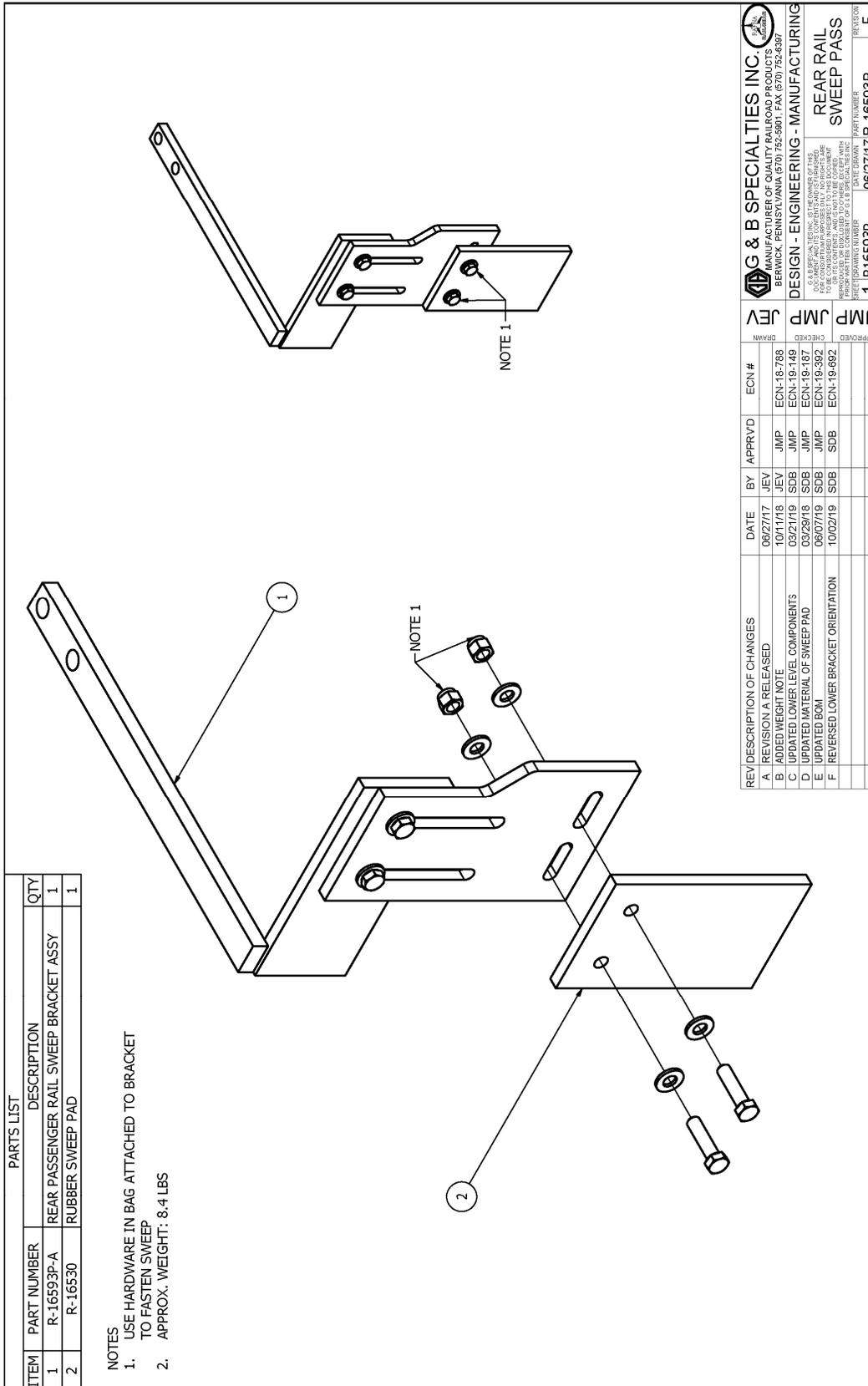
**REVISED BY: D**



REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	APPROVED	DATE	REVISION
A	REVISION A RELEASED	06/27/17	JEV		ECN-18-787			
B	ADDED WEIGHT NOTE	10/11/18	JEV		ECN-19-148			
C	UPDATED LOWER LEVEL COMPONENTS	03/21/19	ISDB		ECN-19-166			
D	UPDATED MATERIAL OF SWEEP PAD	03/29/18	ISDB		ECN-19-391			
E	UPDATED BOM	06/07/19	ISDB					

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DRAWN: JEV  
 CHECKED: JEV  
 APPROVED: JEV  
 PART NUMBER: R16593D  
 DATE: 06/27/17  
 REVISION: E



PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-16593P-A	REAR PASSENGER RAIL SWEEP BRACKET ASSY	1
2	R-16530	RUBBER SWEEP PAD	1

- NOTES  
 1. USE HARDWARE IN BAG ATTACHED TO BRACKET TO FASTEN SWEEP  
 2. APPROX. WEIGHT: 8.4 LBS

REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	APPROVED	DATE	DESCRIPTION
A	REVISION A RELEASED	06/27/17	JEV	JMP	ECN-18-768	JMP	06/27/17	REAR RAIL SWEEP PASS
B	ADDED WEIGHT NOTE	10/11/18	JEV	JMP	ECN-19-149	JMP	10/11/18	REAR RAIL SWEEP PASS
C	UPDATED LOWER LEVEL COMPONENTS	09/21/19	SDB	JMP	ECN-19-187	JMP	09/21/19	REAR RAIL SWEEP PASS
D	UPDATED MATERIAL OF SWEEP PAD	09/29/18	SDB	JMP	ECN-19-392	JMP	09/29/18	REAR RAIL SWEEP PASS
E	UPDATED BOM	06/07/19	SDB	JMP	ECN-19-692	JMP	06/07/19	REAR RAIL SWEEP PASS
F	REVERSED LOWER BRACKET ORIENTATION	10/02/19	SDB	SDB	ECN-19-692	JMP	10/02/19	REAR RAIL SWEEP PASS

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 DESIGN - ENGINEERING - MANUFACTURING

DATE OF DRAWING: 06/27/17  
 PART NUMBER: R-16593P  
 PART NAME: REAR RAIL SWEEP PASS



PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY REF
1	R-1110/1150	REAR ASSEMBLY	1
2	R-32030D	BRAKE ASSEMBLY, DRIVER'S	1
3	R-32030P	BRAKE ASSEMBLY, PASSENGER'S	1
4	R-16593D	REAR SWEEP ASSEMBLY, DRIVER'S	1
5	R-16593P	REAR SWEEP ASSEMBLY, PASSENGER'S	1
6	-	WASHER, 1/2" LOCK Z/Y	8
7	-	SCREW, 1/2" X 1-3/4" GR. 8 Z/Y	4
8	-	SCREW, 1/2" X 1-1/4" GR. 8 Z/Y	4

HARDWARE KIT: R-990KIT-433

REVISION	DATE	BY	APPROV'D	ECN #
A	06/25/18	JEV	JMP	
B	07/09/20	JMP	JMP	
C	10/14/20	JMP	JMP	

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DESIGN - ENGINEERING - MANUFACTURING

REAR ASSEMBLY  
SWEEP W/ BRAKES

1 | K1150BR0001 | 09/26/18 | K-R1150BR0001 | C







PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-16587R	HYDRAULIC CYLINDER, R-1110, RIGHT	1
2	R-16597	FITTING, 1/4 MALE JIC TO 3/16 MALE ORB	2

**NOTES:**  
 TO DETERMINE IF CYLINDER IS A PASSENGER OR DRIVER SIDE CYLINDER, PLACE IT ON A TABLE OR THE FLOOR WITH THE FITTINGS/TUBE FACING UP (DO NOT ATTEMPT THIS WHILE HOLDING THE CYLINDER), AND POSITION THE CYLINDER IN FRONT OF YOU AS IF YOU WERE HOLDING THE BASE IN YOUR LEFT HAND, AND THE THE ROD END IN YOUR RIGHT HAND. EXAMINE THE TUBE AND FITTINGS:  
 IF THE TUBE/FITTINGS ANGLE AWAY FROM YOU, IT IS THE PASSENGER SIDE CYLINDER (R-16587P)  
 IF THE TUBE/FITTINGS ANGLE TOWARDS YOU, IT IS THE DRIVER SIDE CYLINDER (R-16587D)

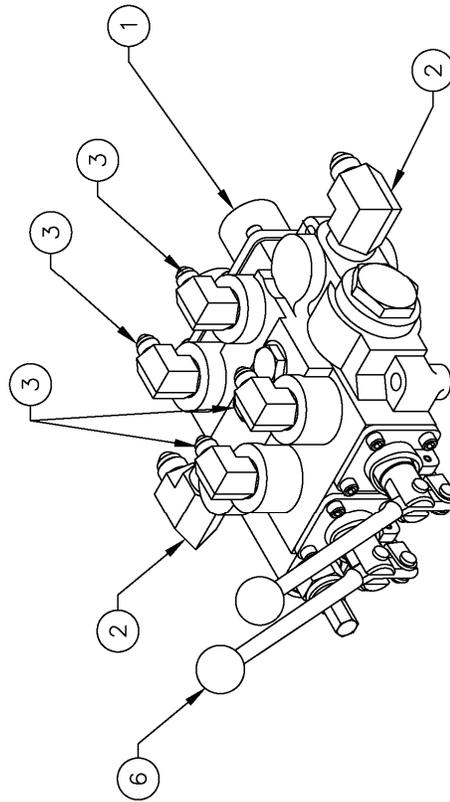
  
  

REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	ISSUED	CHANGED	APPROVED
A	REVISION A RELEASED	04/22/20	SDB					

<b>G &amp; B SPECIALTIES INC.</b> MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK, PENNSYLVANIA (570) 752-5901, FAX (570) 752-6397	DESIGN - ENGINEERING - MANUFACTURING	R-1110 HYDRAULIC CYLINDER ASSEMBLY, PASSENGER	PART NUMBER: R-16587P DATE: 04/22/20
--	--------------------------------------	---	---

ITEM	PART No.	DESCRIPTION OF ITEM(PART)	QTY.
1	R-11084	OPERATING VALVE, REAR	1
2	R-11222	90° ELBOW, 1/2 JIC x 3/4 MPT	2
3	R-11223	90° ELBOW, 1/4 JIC x 1/2 MPT	4
4	R-11225	VINYL CAP, 1/4 JIC	4
5	R-11226	VINYL CAP, 1/2 JIC	2
6	R-11084B	OPERATING VALVE HANDLE	2



REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	APPROVED	CHECKED	DRAWN
A	REVISION A RELEASED	12/13/21	SMM					

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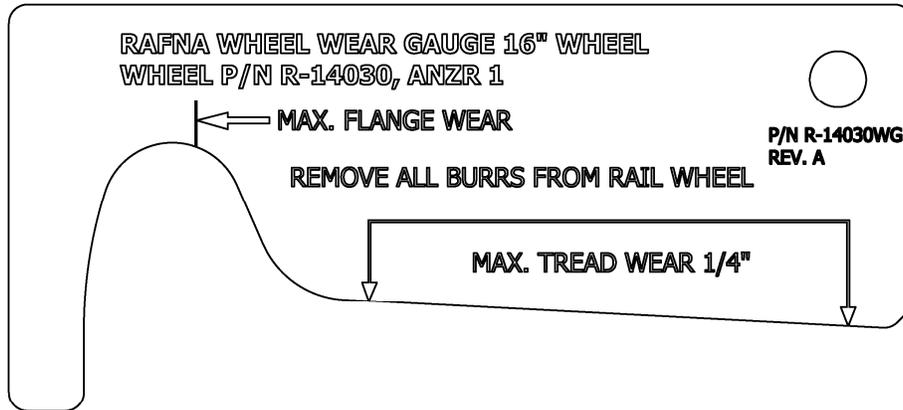
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DATE DRAWN: 12/13/21  
PART NUMBER: R-11084A  
REVISION: A

NOTES:  
1. ASSEMBLE FITTINGS WITH  
LOCTITE THREAD SEALANT







**GAUGE NOT SHOWN TO SCALE**



## OPERATION OF RAFNA GUIDE WHEEL UNIT



### TO PLACE VEHICLE ON RAIL:

1. Drive vehicle on crossing, centering it over tracks.
2. Once centered over tracks, remove front and rear safety pins.
3. Lower rear wheels first:
  - A. If rear is not completely centered (within 4"), rear rail wheels will center truck on rail
  - B. With the rear wheels fully extended and properly seated on rail, install safety pin into lower hole on both sides.
4. Center front rail wheels over rail:
  - A. If front is not completely centered over rail, maneuver truck so that it is.
  - B. Front vehicle wheels must be straight ahead.
  - C. Lower front rail wheels until cylinders are fully retracted. Front rail unit incorporates an over-center design.
  - D. Install front safety pins in rail position.
5. Check all rail wheel flanges to assure they are seated properly on rail.
6. Ensure that the rear safety pins are installed properly.
7. Engage vehicle steering wheel lock.

### TO REMOVE VEHICLE FROM RAIL:

1. Drive vehicle on to crossing.
2. Either front or rear unit may be activated first.
3. Front Unit:
  - A. Remove safety pins.
  - B. Retract front rail wheels completely.
  - C. Re-install safety pins.
4. Rear Unit:
  - A. Remove safety pins.
  - B. Retract rear rail wheels completely.
  - C. Re-install safety pins.
5. Check to ensure that all safety pins are in their proper location.
6. Disengage steering wheel lock.

**SAFE OPERATING SPEEDS ON RAIL WILL BE GOVERNED BY TRACK CONDITIONS AND EXISTING RAILROAD RULES AND REGULATIONS. UNDER NO CIRCUMSTANCES SHOULD THIS VEHICLE BE OPERATED OVER 30MPH WHILE ON TRACK.**

**RAFNA RAILGEAR, G&B SPECIALTIES**

**(570) 752-5901**

**BERWICK, PA**

**R-11210-1**



### OPERATION INSTRUCTIONS:

1. REMOVE SAFETY PINS.
2. ACTIVATE VALVE:
- A. PUSH - RAIL POSITION
- B. PULL - ROAD POSITION
3. REPLACE SAFETY PINS IN PROPER LOCATION.

R-11210-2



### OPERATION INSTRUCTIONS:

1. REMOVE SAFETY PINS.
2. ACTIVATE VALVE:
- A. PUSH - RAIL POSITION
- B. PULL - ROAD POSITION
3. REPLACE SAFETY PINS IN PROPER LOCATION.

R-11210-2

### LOCKING PINS

PULL TO OPEN



PUSH TO CLOSE

REAR RAILGEAR  
R-11210-4

**R-11210 REV C**

**INSPECTION AND MAINTENANCE OF RAFNA GUIDE WHEEL UNIT**

DAILY:

1. Visually inspect railgear unit for hydraulic leaks, loose fasteners, and excessive wear.
2. Spin all four rail wheels and note any bearing noise or resistance.
3. Check hydraulic fluid level.
4. Check rail wheel flanges for irregular wear.

Weekly:

1. Grease all fittings on front and rear railgear units:
  - A. Twentyfour (24) on front unit
  - B. Fifteen (15) on rear unit
2. Inspect bearing grease every 2,000 miles or 6 months (whichever comes first)
3. Inspect bearings and grease cavity by removing hubcaps. Unless bearing problem is suspected, the bearings do not need to be removed or repacked.
4. Install new hubcap gasket. If necessary replace hubcaps.

R-11210-5

**THINK FIRST** R-11210-6  
DRIVE WITH CARE!

**R-11210-A REV C**

 **CAUTION** 

RELIEF VALVE SETTINGS:  
FRONT: 2000 PSI, 2500 PSI MAX.  
REAR: 1500 PSI, 2000 PSI MAX.  
DO NOT BOTTOM-OUT RELIEFS, IF ADJUSTED.  
R-11210-7

 **CAUTION** 

RELIEF VALVE SETTINGS:  
FRONT: 2000 PSI, 2500 PSI MAX.  
REAR: 1500 PSI, 2000 PSI MAX.  
DO NOT BOTTOM-OUT RELIEFS, IF ADJUSTED.  
R-11210-7



LOCK STEERING WHEEL ONLY WHEN  
FRONT WHEELS ARE PARALLEL TO RAIL  
R-11210-10

RAILGEAR VEHICLE COMPLETED BY: \_\_\_\_\_  
WITH RAILGEAR INSTALLED AND FINISHED  
BODY, THIS VEHICLE HAS \_\_\_\_\_ LBS OF  
AVAILABLE PAYLOAD.

DATE OF COMPLETION OF RAILGEAR  
INSTALLATION: \_\_\_\_\_ mo \_\_\_\_\_ yr

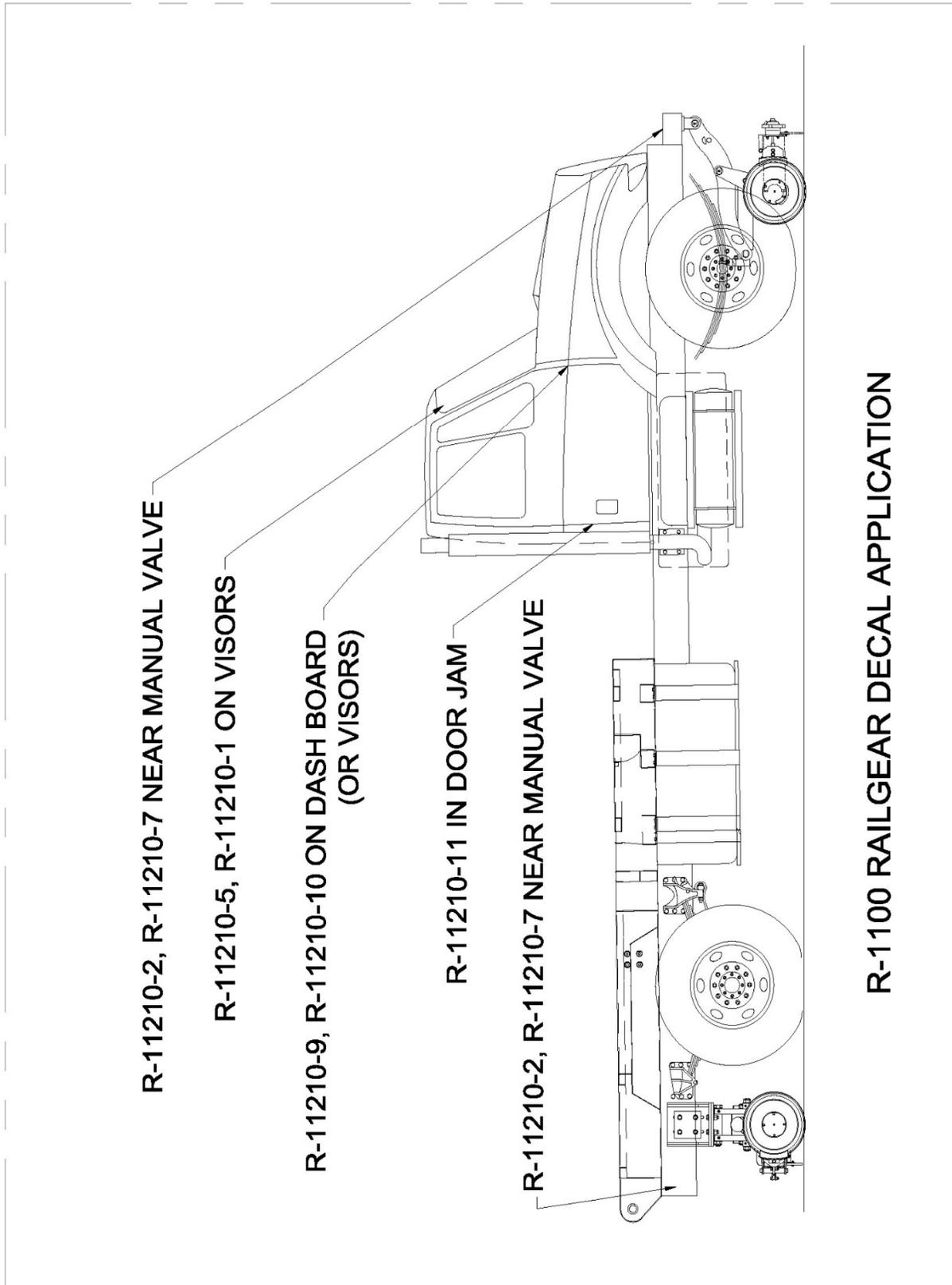
**CAUTION:**

THIS VEHICLE HAS SPECIAL DESIGN AND EQUIPMENT  
FEATURES FOR OFF-HIGHWAY USE. IT HANDLES  
DIFFERENTLY FROM ORDINARY PASSENGER VEHICLES IN  
DRIVING CONDITIONS WHICH MAY OCCUR ON AND OFF  
HIGHWAY.

WEIGHT AND LOCATION OF PAYLOAD MAY ALSO AFFECT  
THE HANDLING OF THIS VEHICLE.

PRIOR TO OPERATION, PLEASE READ THIS VEHICLES  
OWNERS MANUAL, THE RAIL GEAR OPERATIONS, AND  
SERVICE MANUAL.

R-11210-11



VEHICLE MAKE: \_\_\_\_\_ VEHICLE MODEL: \_\_\_\_\_

VEHICLE YEAR: \_\_\_\_\_ VEHICLE VIN #: \_\_\_\_\_

VEHICLE UNIT #: \_\_\_\_\_

FRONT RAILGEAR SERIAL #: \_\_\_\_\_

REAR RAILGEAR SERIAL #: \_\_\_\_\_

**ALIGN REAR RAILGEAR**

**A1 & A2 MUST BE EQUAL WITHIN 1/16"**

A1 = \_\_\_\_\_

A2 = \_\_\_\_\_

**B1 & B2 MUST BE EQUAL WITHIN 1/8"**

B1 = \_\_\_\_\_

B2 = \_\_\_\_\_

**ALIGN FRONT RAILGEAR TO REAR**

**C1 & C2 MUST BE EQUAL WITHIN 1/8"**

C1 = \_\_\_\_\_

C2 = \_\_\_\_\_

**D1 & D2 MUST BE EQUAL WITHIN 1/4"**

D1 = \_\_\_\_\_

D2 = \_\_\_\_\_

**RAIL WHEEL FLANGE TO GROUND CLEARANCE**

LEFT FRONT \_\_\_\_\_

RIGHT FRONT \_\_\_\_\_

LEFT REAR \_\_\_\_\_

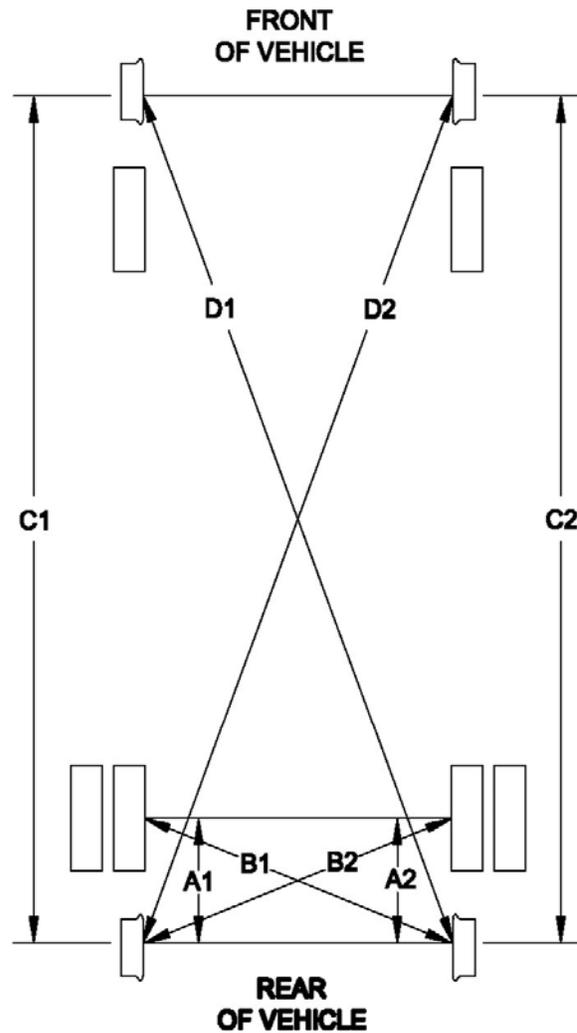
RIGHT REAR \_\_\_\_\_



VEHICLE WHEEL



RAIL WHEEL



INSTALLER/INSPECTOR SIGNATURE: \_\_\_\_\_