

Installation, Operations & Service Manual R-1130 Rear Railgear

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 Industries 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 in order 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 in order 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 in order 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.

1.1

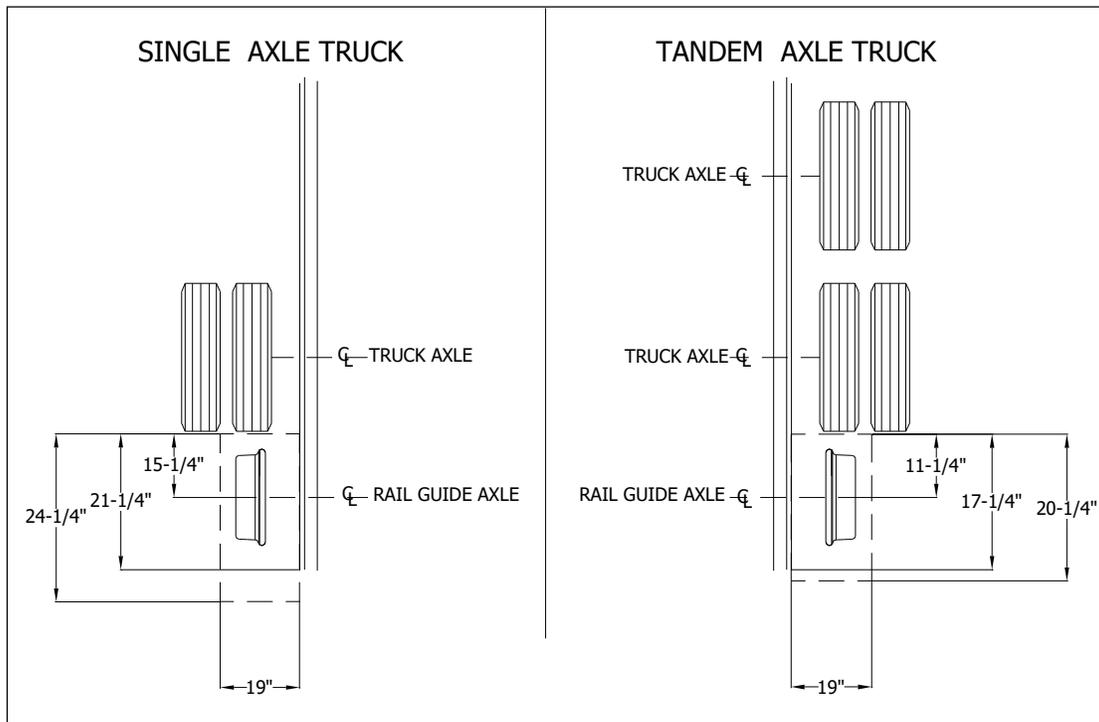
Rear Railgear Installation

NOTE:

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

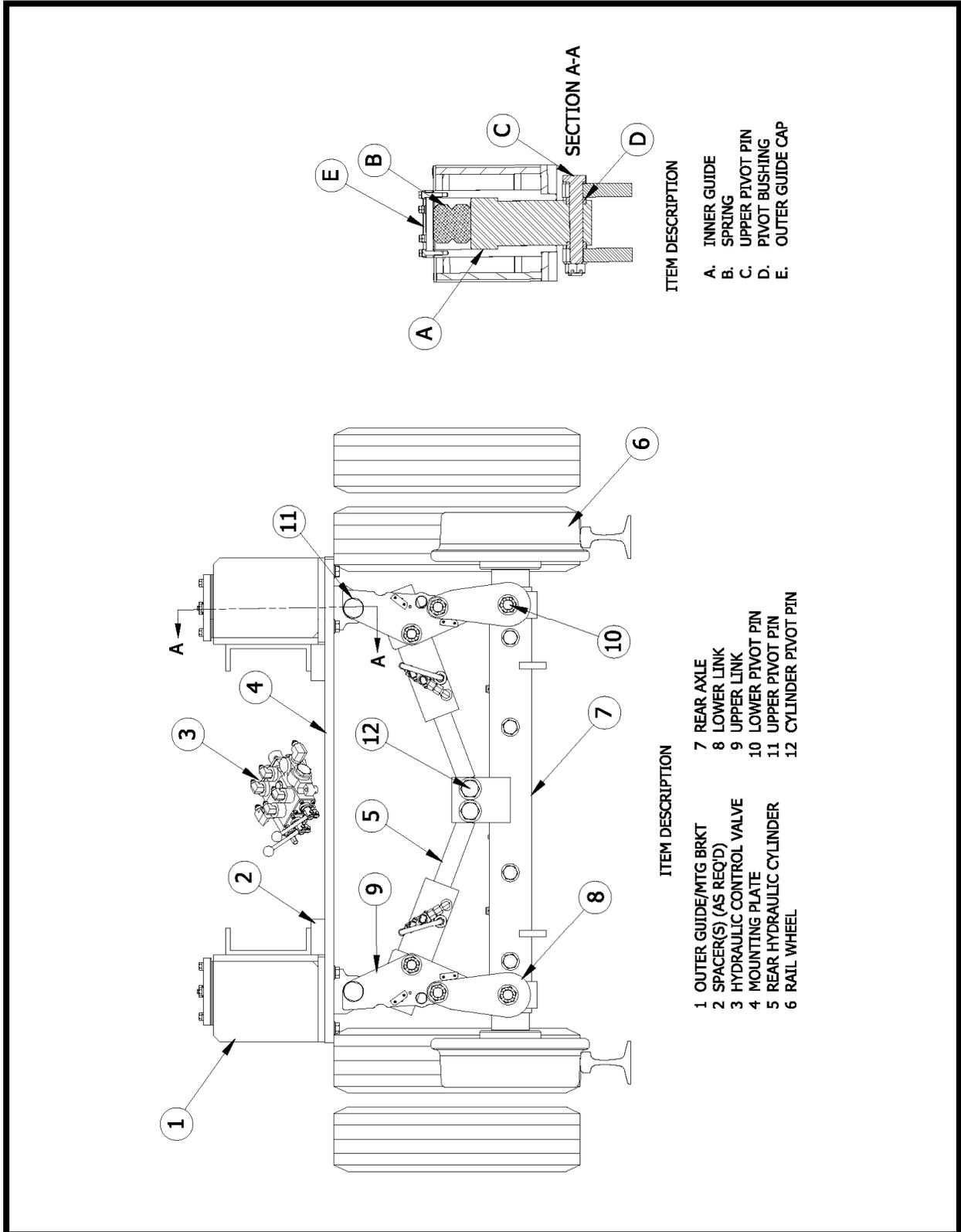
With the truck on the rear installation rails, position the rear railgear as close to the rear tires as practical (allowing clearance for mud flaps). The following table gives standard location and clearance guidelines for the rear railgear. Generally, leave a minimum of 2" clearance to any tire, spring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

Minimum Distance From:	Single Axle	Tandem Axle
Tire to rail wheel center	15 ¼"	11 ¼"
Minimum Truck Frame Extension (from tire)	21 ¼"	17 ¼"
Overall Rail Guide Clearance (from tire)	24 ¼" x 19"	20 ¼" x 19"



If the truck frame does not extend a minimum of 21 ¼" for a single axle or 17 ¼" for a tandem axle trucks, it should be extended to provide the necessary clearance for mounting the railgear.

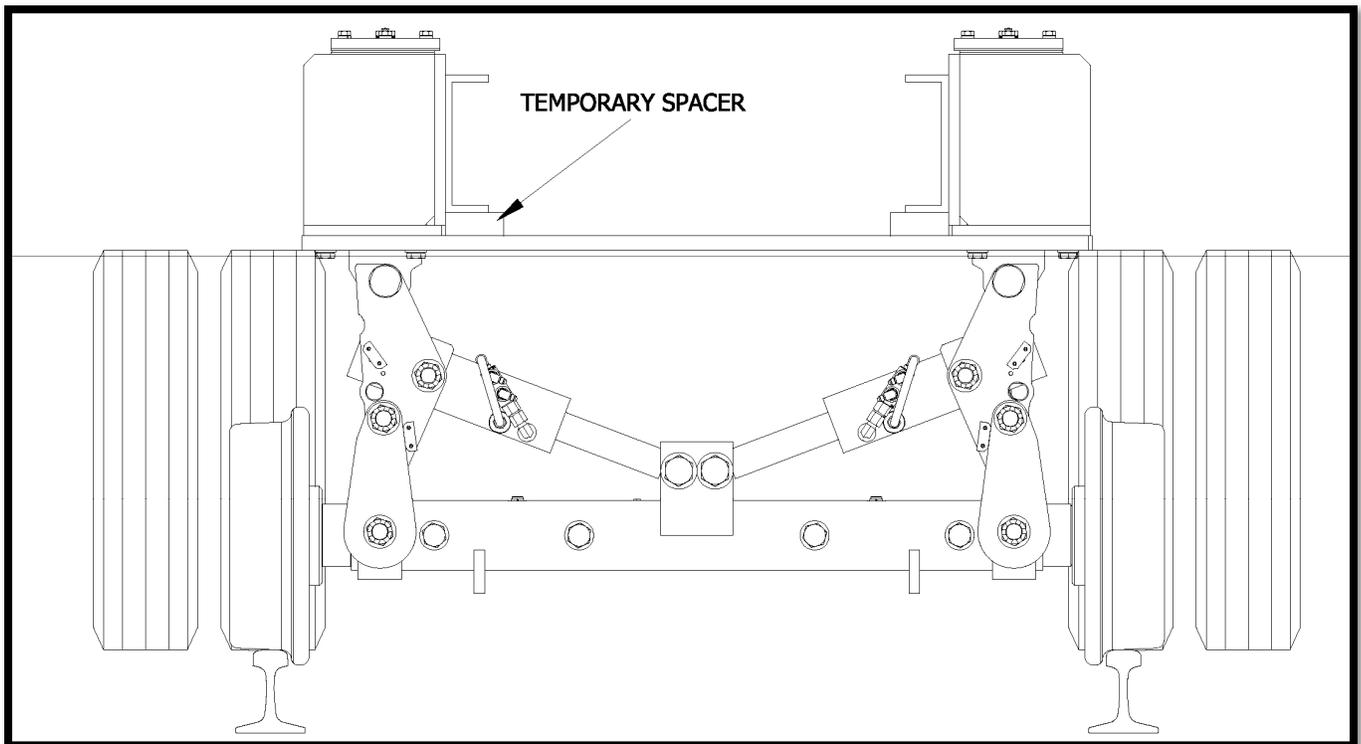
In addition, because the railgear typically drops straight down, but can also articulate from side to side to allow alignment of the vehicle with the rail, a clear space must extend out from the frame outward on either side of at least 19".



1.1

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.



NOTE:

With the rear railgear in position, temporarily secure in place to prevent any movement during the remaining installation.

Then 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. 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:

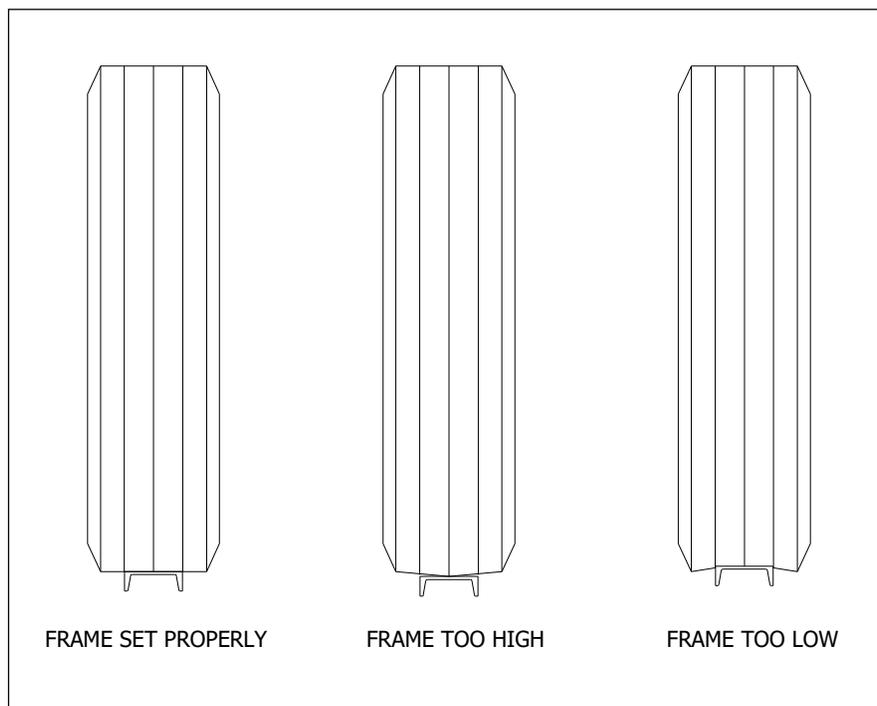
$$\text{Calculated Spacer Thickness} = (6.0'' - \text{Gap}) \times .6$$

The following table shows the calculated spacer thickness given a certain gap. (This table is given as an example. The actual gaps may include fractions and the spacer thickness will need to be calculated for that specific gap)

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"	2 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 tire to the installation rails). Replace the temporary 6" spacers with the permanent calculated spacers and tack in place onto the rear railgear mounting plate. **These permanent spacers should be solid steel pieces because the wheel will experience the full structural loads seen by the Rear frame.**

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.

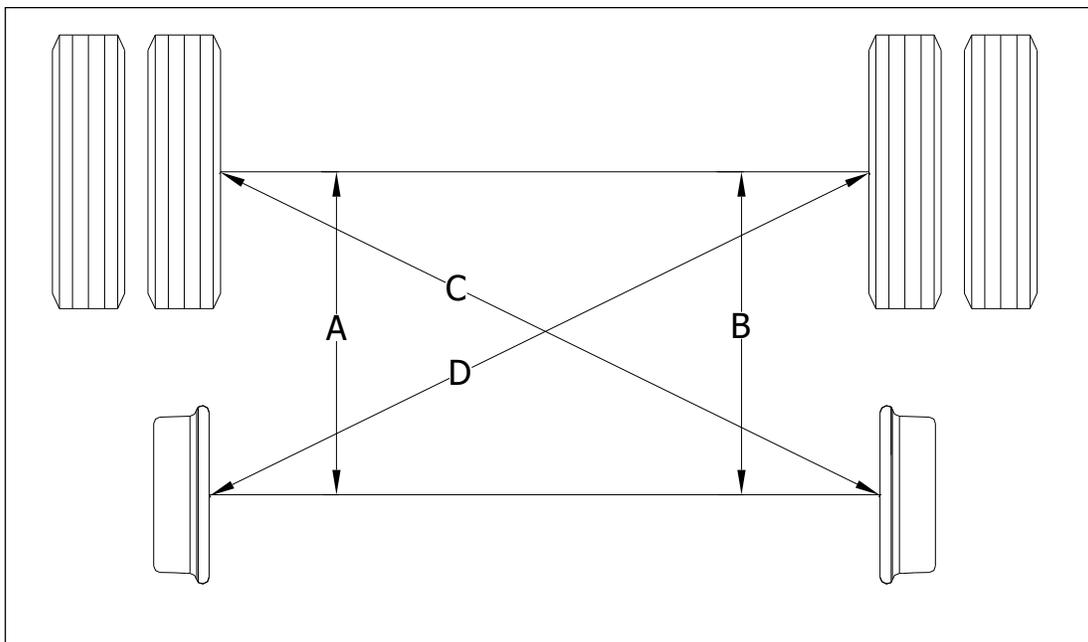


If necessary, adjust the spacer thickness to achieve proper tire cup on the installation rails.

1.2 Square Rear Railgear with Truck Axle

Once the proper height and tire to railgear location has been achieved, the rear railgear needs to be made square with the rear truck axle. Four measurements must be taken to ensure this requirement.

- (1) **The distance from the truck axle to the Rear Railgear at both ends.**
Distance "A" must be equal to "B" (within 1/16").
- (2) **The diagonal distance from the truck axle to the opposite side of the Rear Railgear.**
Distance "C" must equal "D" (within 1/8")



NOTE

Although the previous mounting conditions and alignment may be met, be certain that enough room exists between the rear railgear and other equipment. In general, 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.

1.3

Final Rear Installation

NOTE

If more than 1/16" of space exists between the truck frame and the rear railgear mounting bracket, it will be necessary to install shim plates to center the railgear. They should be 12"x 12" shims of the proper thickness, with equal thickness on both sides.

Using the mounting plate as a template, drill four 25/32" 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 (through the shims, if necessary) and truck frame with 3/4" grade 8 bolts and Nylock nuts.

Tack Weld the mounting plate to the rear railgear Mounting Plate. If re-adjustments 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.

2.0

Hydraulics

2.1 New Hydraulic System

(Figure 2.0)

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, one return port and a tank filler-breather. Fill the tank with UNAX Oil Rx 46 or equivalent hydraulic oil.

Route a pressure line 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. 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.

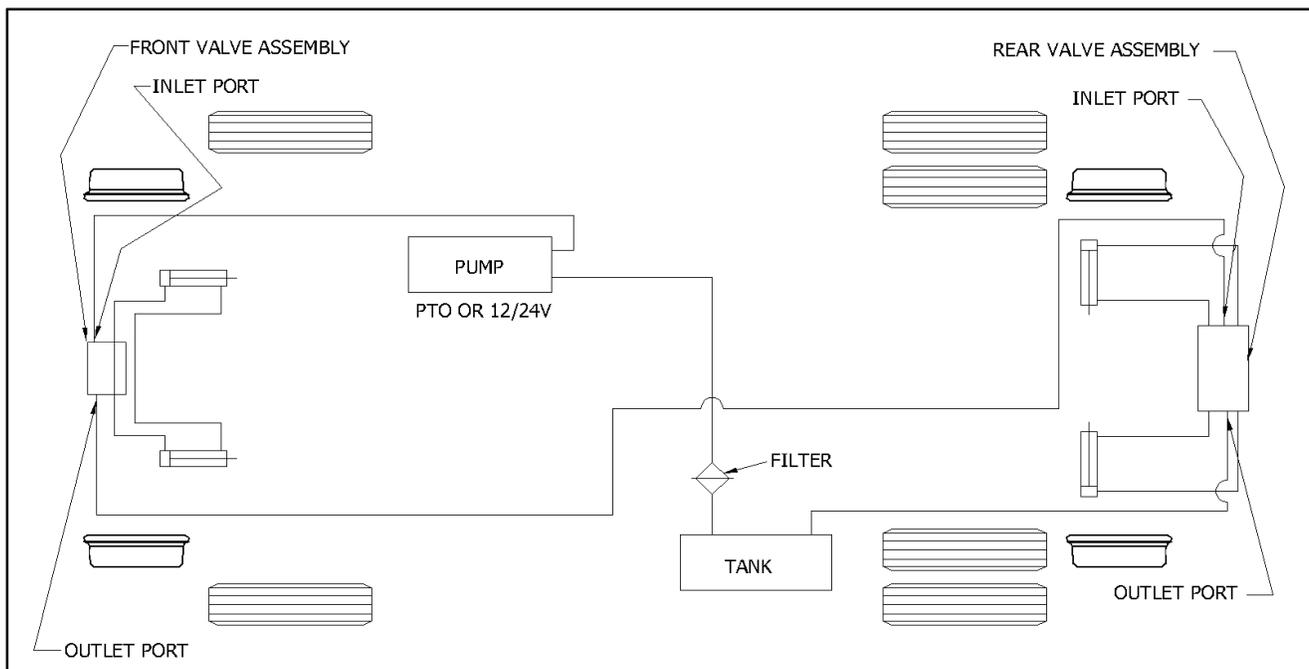
2.2 Existing Hydraulic System

(Figure 2.1)

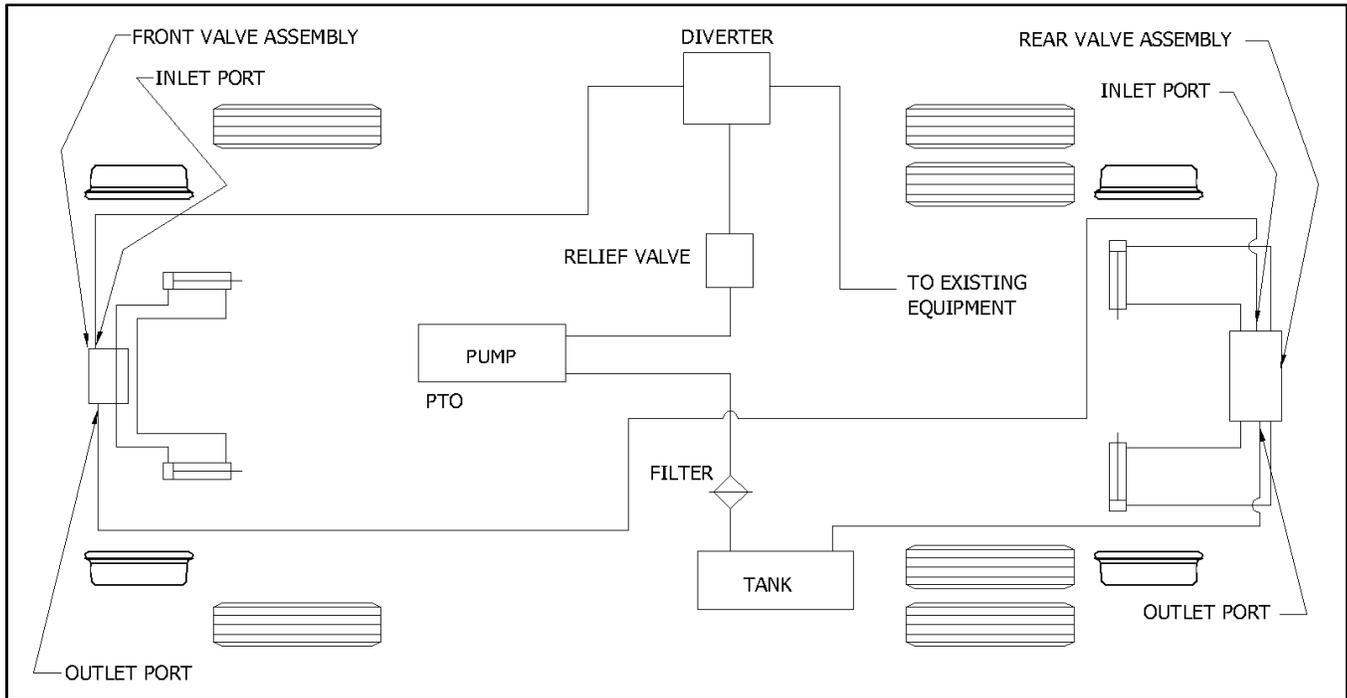
If the truck has an existing hydraulic system, install an appropriate sized diverter valve in the pressure line after the pump and before any existing equipment valves. One-outlet routes to the existing valves and the other to the center of the front bumper. The inlet port of the hydraulic control valve 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. 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 preset to 2000 PSI at the relief and the rear valve is preset to 1500 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



New Hydraulic Installation (Figure 2.0)



Existing Hydraulic Installation (Figure 2.1)

3.0

Railsweep Installation

Figure 3.1

4.0

Operation

Daily Inspection

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

All air and hydraulic fittings
Brake operation
Rail wheel wear

All air and hydraulic hoses
Railgear parts for damage
Hydraulic fluid level

4.1 Placing Truck On Rail

4.1.1 Lower Rear Guide Wheels

1. If the Railgear has brakes, turn brake switch on.
2. Engage the hydraulic system for the railgear unit.
3. Remove the safety pin-off pins.
4. Lower wheels and engage rail.
5. You can use the valve handles independently to lower one side at a time to engage the rail, at which point you can then lower the opposite side. This will cause your vehicle to side-shift and align itself with the rail.
6. When both wheels are fully down and properly engaging rail, replace safety pin-off pins.

4.1.2 Lower Front Guide Wheels

1. If necessary, position the truck to line up the front guide-wheels with the rail.
2. Ensure that the hydraulic system for the railgear unit is unengaged.
3. Check and make sure that the front guide wheels line up with the rail.
4. Remove lock pin.
5. Push valve handle to lower wheels and engage rail.
6. If equipped, ensure lock for rail position is engaged.

NOTE:

As a standard, the front railgear unit is designed to operate rotated over center and does not require a railgear lock when in rail position. Depending on options, the front railgear unit may have an optional lock in the rail position. If this is the case ensure that the lock is engaged when in the rail position

4.2 Removing Truck From Rail

1. Engage railgear hydraulic system.
2. Disengage lock pins (if applicable) for the railgear unit being operated.
3. Lift both sets of Railgear (there is no preference for removal order).
4. Ensure all lock pins are engaged on both units in highway position.
5. Disengage the switch that controls the Railgear brakes (if applicable).
6. Disengage the railgear hydraulic system.

4.3

While On Rail

Do not exceed posted track speed limit, and at no time exceed 30 MPH while on the track

- Be aware that some hi-rail gear is insulated, and will not operate the crossing circuits.
It is the responsibility of the operator to knowing if your hi-rail equipped vehicle has insulated or non- insulated wheels.
- All railroad rules and safety guidelines should be observed.
- Reduce speed while in reverse and/or at all crossings, curves, branch lines, switches and frogs.
- Traction is reduced on the track. Tire damage may result from spinning wheels on track.
- Braking distance is increased on the track. Do not slide tires or guide wheels on track.
- Do not exceed the maximum rated capacity of the equipment.

5.0

Maintenance

If your hi-rail vehicle is high-use or operated under extreme conditions, the levels of 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 appropriate
- Rail test for proper braking and adjust as appropriate
- Check Railgear alignment

5.1 Lubrication

Grease fittings are provided at all railgear lubrication points. The recommended lubricant for all lubrication points on this railgear is ESSO LONAX EP2 grease or equivalent. In cold weather, -20F or colder, SHELL DARINA XL102 or equivalent may be used.

5.2 Replacing Rear Springs

!WARNING!

Extreme caution must be used when attempting to service the rear spring suspension. The rear springs are under constant compression and failure to follow the proper service procedure can result in injury.

5.2.1 General Information

The rear springs are contained in the inner guide housing and are pre-compressed at assembly in order to maintain a constant downward load on the railgear wheels. Extreme caution must be used when attempting to service the rear suspension.

Failure to follow the proper procedures as outline in this manual can result in severe bodily injury.

5.2.2 Spring Removal (Figures 5.2.2.1 & 5.2.2.2)

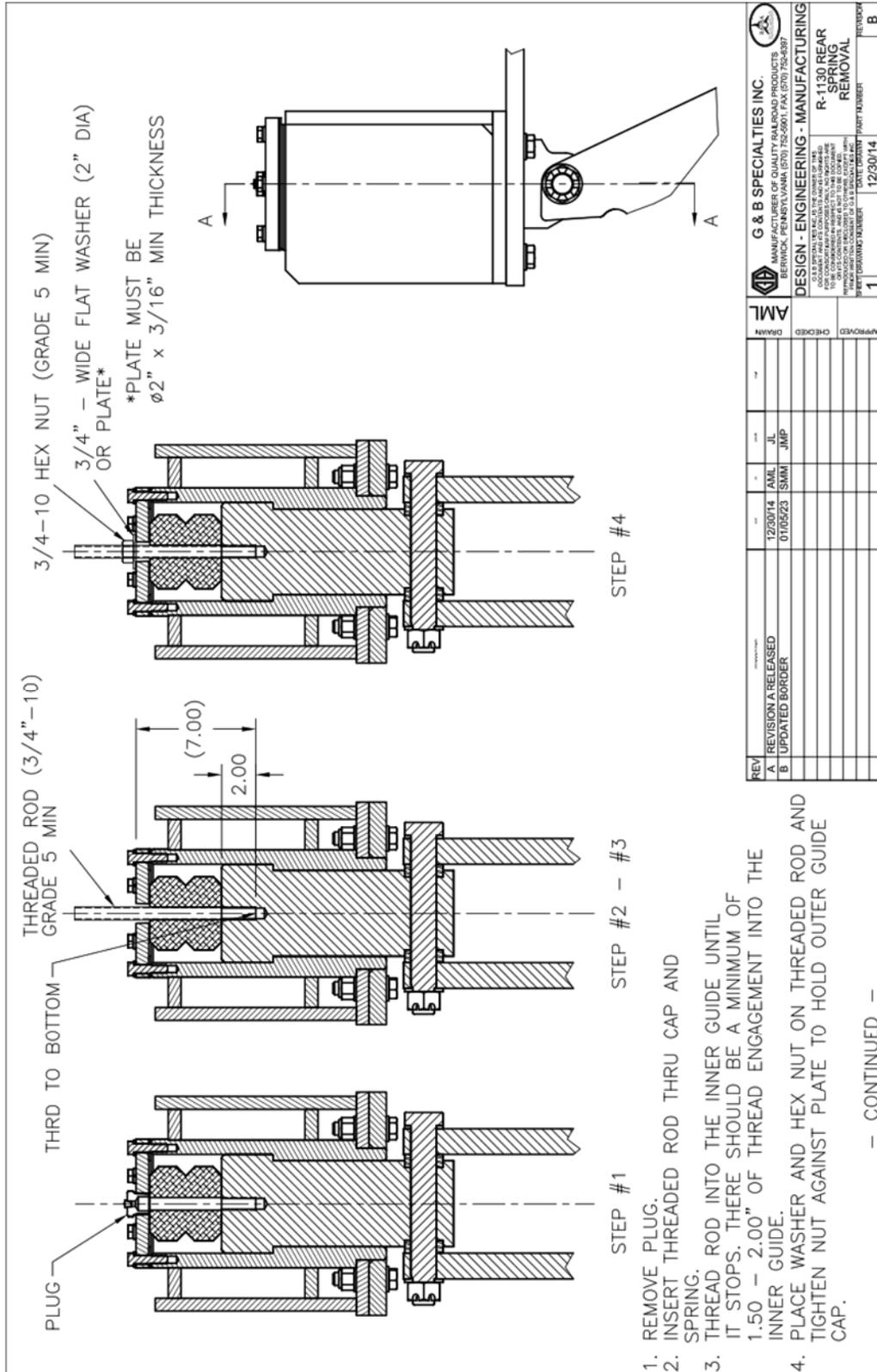
1. The rear rail wheels should be raised to allow the suspension to relax as much as possible. There should be no load on the rear railgear unit.
2. Starting with the driver or passenger side, remove the plug from the center of the outer guide cap.
3. Insert a length of $\frac{3}{4}$ " UNC threaded rod thru the cap and spring and thread into the top of the inner guide. There should be a minimum of 1.50" of thread engagement into the top of the inner guide.
4. Place a washer (or plate) down over the threaded rod and thread a $\frac{3}{4}$ " UNC hex nut on to the threaded rod securing the washer (or plate) tightly against the cap.
5. Slowly loosen and remove the $\frac{1}{2}$ " bolts securing the cap to the guide tube.
6. Holding the threaded rod securely, slowly loosen the $\frac{3}{4}$ " hex nut until the all spring tension is relieved. **DO NOT ALLOW THE THREADED ROD TO TURN WHEN LOOSENING THE HEX NUT.**
7. The cap will need to be raised approx. 1" to relieve the compression on the spring.
8. The threaded rod, hex nut, washer (or plate) and spring can now be removed.

5.2.3 Spring Replacement

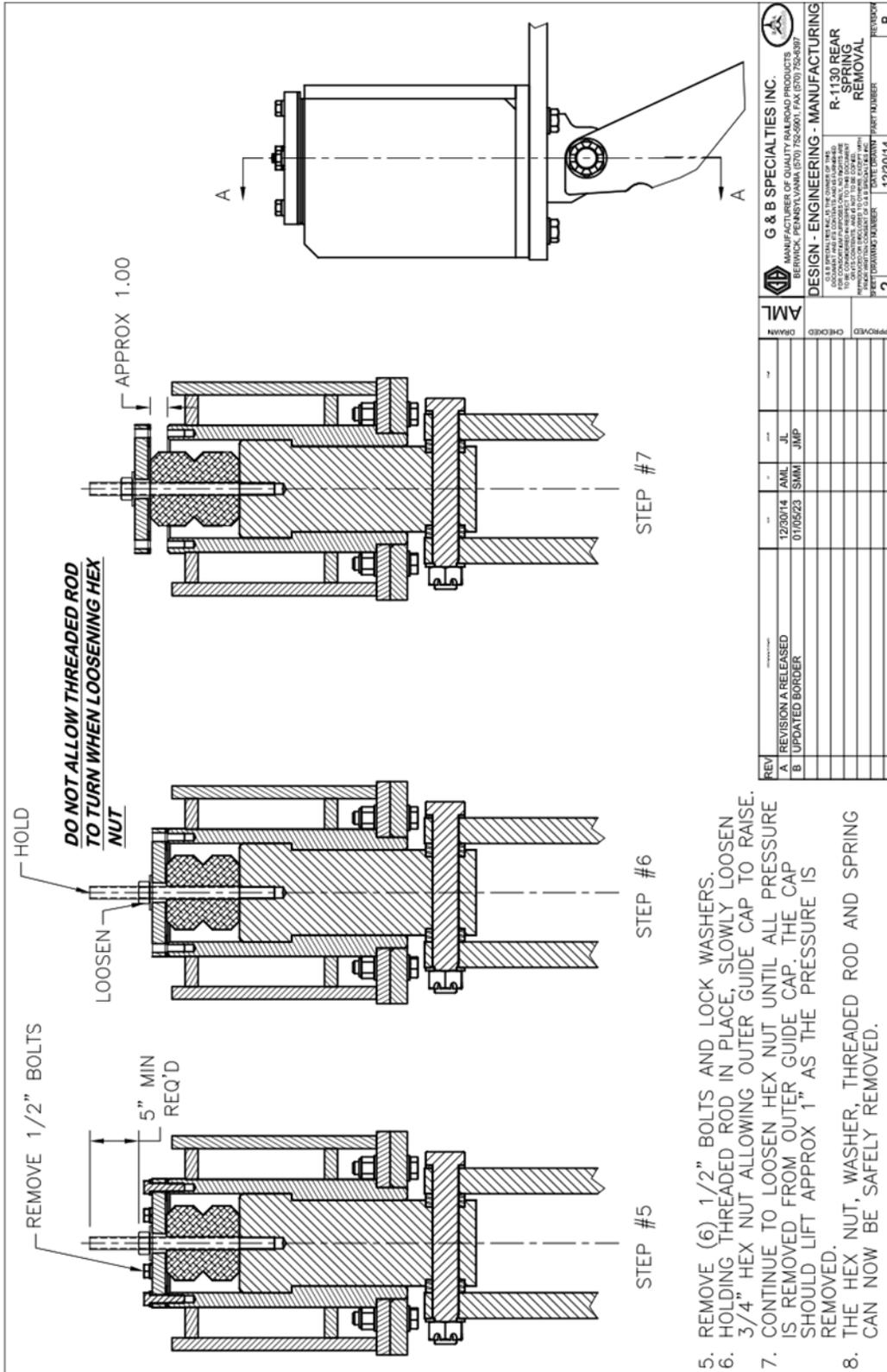
1. Follow the reverse of the procedures for spring removal.

5.3 Inner Guide Removal/Replacement

1. The rear rail wheels should be raised to allow the suspension to relax as much as possible. There should be no load on the rear railgear unit.
2. Once the inner guide pivot bolt is removed the axle is free to fall.
3. The rear railgear axle will need to be supported on the side that is being worked on.
4. **Follow the procedure for spring removal.**
5. Remove the pivot pin and bushings.
6. Remove the inner guide.
7. Replace inner guide.
8. Assemble pivot pin and bushings.
9. **Follow the procedure for spring replacement.**



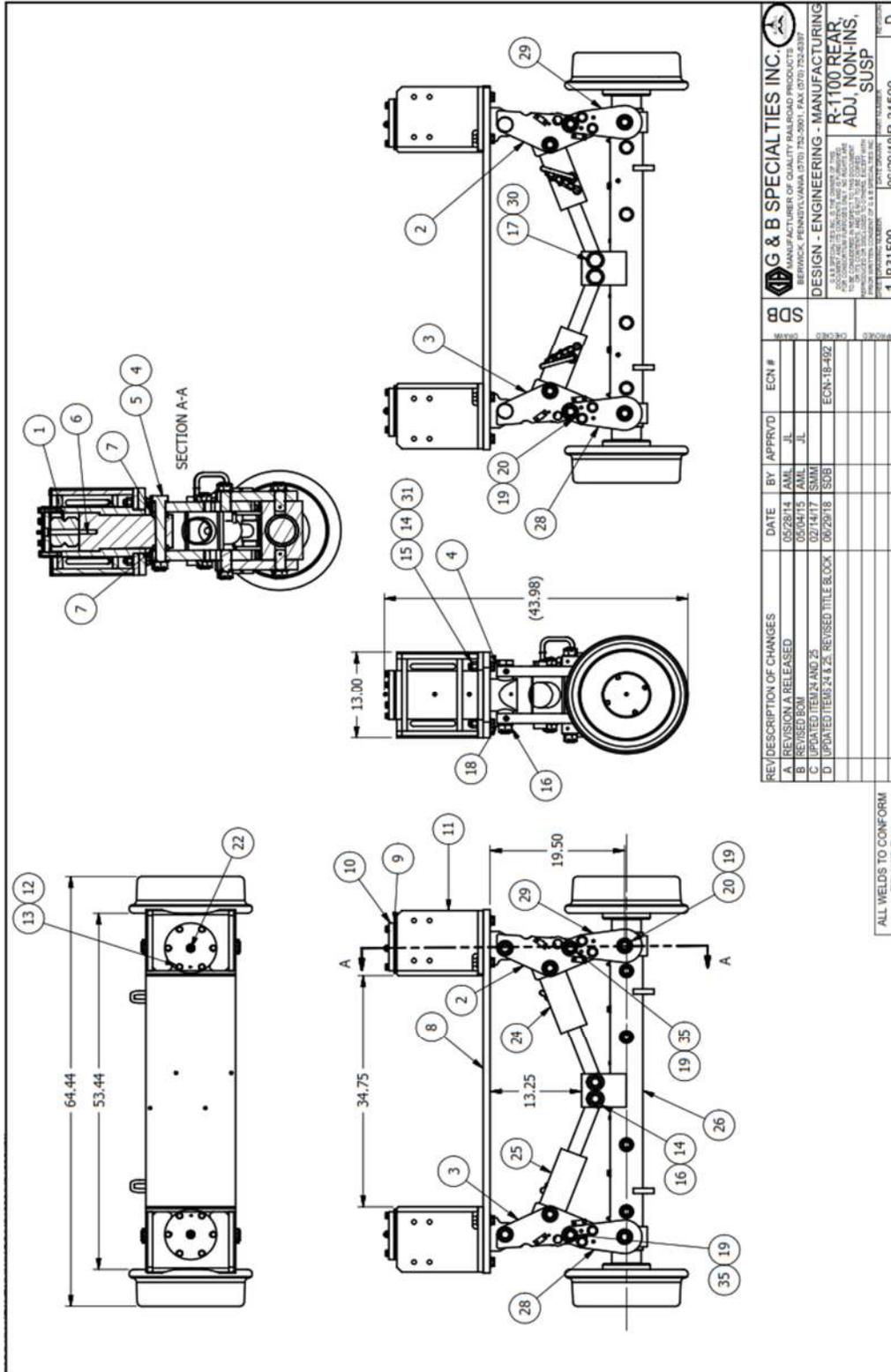
(Figure 5.2.2.1)



(Figure 5.2.2.2)

6.0

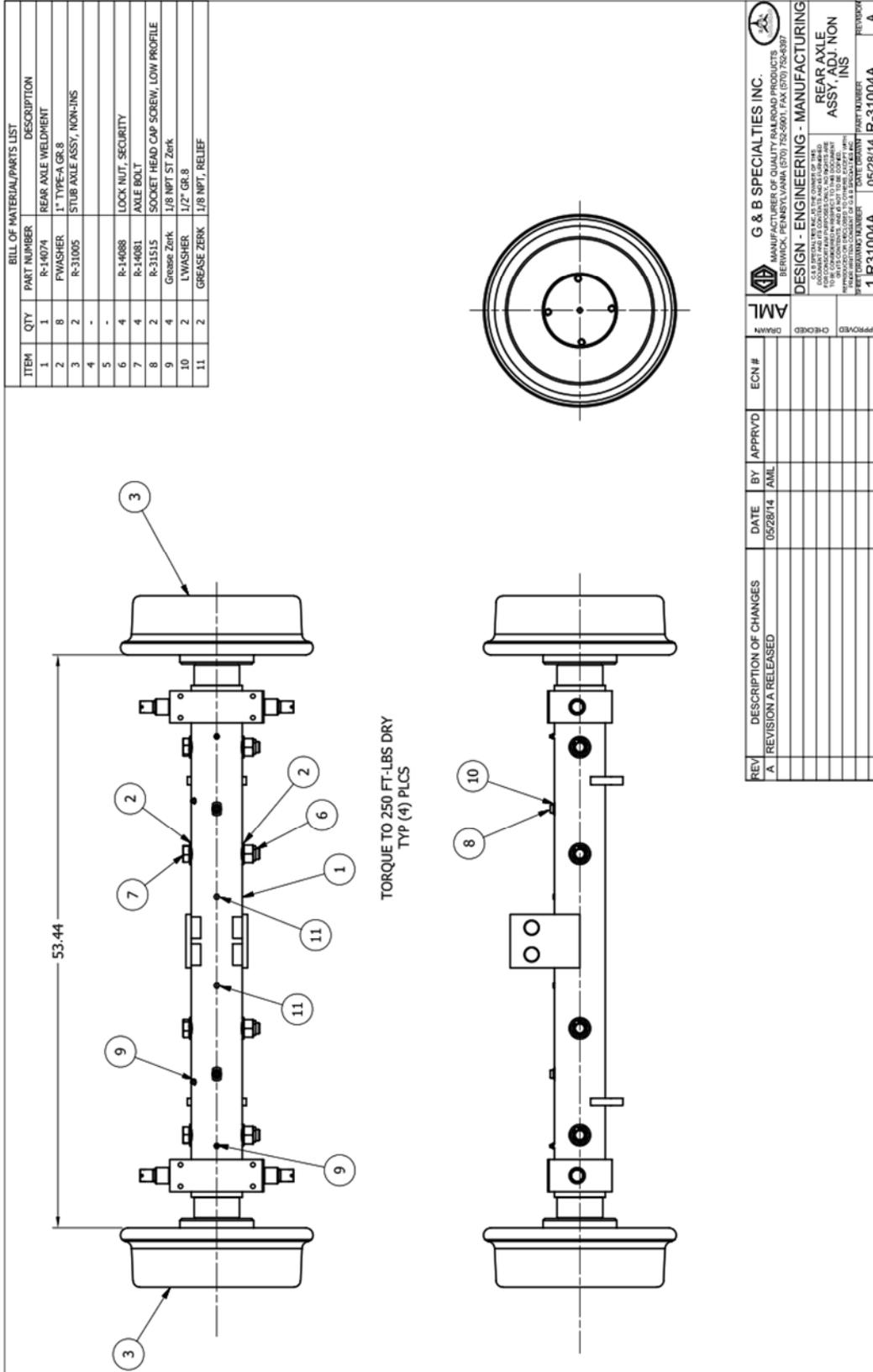
Parts/Schematics



BILL OF MATERIAL/PARTS LIST		BILL OF MATERIAL/PARTS LIST	
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	R-31519	TIMBERN SPRING
2	2	R-11196P-M	UPPER LINK, MODIFIED
3	2	R-11196D-M	UPPER LINK, MODIFIED
4	2	R-11007A	WASHER, PIVOT BOLT
5	2	R-11006	PIVOT BOLT
6	2	R-31501	INNER GUIDE
7	4	R-31502	SPACERS, INNER GUIDE
8	1	R-31503	LOWER CROSS PLATE
9	2	R-31512	GASKET, OUTER GUIDE
10	2	R-31511	CAP, OUTER GUIDE
11	2	R-31505	OUTER GUIDE BOX ASSY
12	14	L/WASHER	1/2" GR.8
13	12	H.H.C.S.	1/2" UNC GR.8 X 2"
14	16	F/WASHER	3/4" TYPE-A GR.8
15	8	INTLOCK NUT	3/4" UNC GR.8
16	4	SLOTTED HEX NUT	1-1/4" UNC GR.5
17	2	R-14082	LOWER PIVOT BOLT
18	2	R-11007	WASHER PIVOT BOLT
19	12	SLOTTED HEX NUT	1-1/8" UNC GR.5
20	10	F/WASHER	1-1/8" TYPE-A GR.8
21	2	R-31513A	PIPE PLUG
22	2	GR999 Z6PK	1/8 NPT ST. RELIEF
23	4	GR999 Z6PK	1/8 NPT ST
24	1	R-31555L	CYLINDER ASSY
25	1	R-31555R	CYLINDER ASSY
26	1	R-31004A	LOWER AXLE ASSY
28	2	R-31517D	LOWER LINK ASSY
29	2	R-31517P	LOWER LINK ASSY
30	4	F/WASHER	1-1/4" TYPE-A GR.8
31	8	H.H.C.S.	3/4" UNC GR.8 X 3.25"
32	4	COTTER PIN	7/32" X 2.50"
33	14	COTTER PIN	5/32" X 2"
34	2	R-31514	WARNING LABEL
35	2	R-11008	WASHER, PIVOT BOLT

ITEM	QTY	PART NUMBER	DESCRIPTION
17	2	R-14082	LOWER PIVOT BOLT
18	2	R-11007	WASHER PIVOT BOLT
19	12	SLOTTED HEX NUT	1-1/8" UNC GR.5
20	10	F/WASHER	1-1/8" TYPE-A GR.8
21	2	R-31513A	PIPE PLUG
22	2	GR999 Z6PK	1/8 NPT ST. RELIEF
23	4	GR999 Z6PK	1/8 NPT ST
24	1	R-31555L	CYLINDER ASSY
25	1	R-31555R	CYLINDER ASSY
26	1	R-31004A	LOWER AXLE ASSY
28	2	R-31517D	LOWER LINK ASSY
29	2	R-31517P	LOWER LINK ASSY
30	4	F/WASHER	1-1/4" TYPE-A GR.8
31	8	H.H.C.S.	3/4" UNC GR.8 X 3.25"
32	4	COTTER PIN	7/32" X 2.50"
33	14	COTTER PIN	5/32" X 2"
34	2	R-31514	WARNING LABEL
35	2	R-11008	WASHER, PIVOT BOLT

REF:
HARDWARE KIT R-990KIT-328
HARDWARE KIT R-990KIT-381



NOTES:

- ASSEMBLE AS SHOWN.
- BEARINGS ARE TO BE PACKED WITH GREASE AT ASSEMBLY
- BEARING TORQUE PROCEDURE:
A.) While rotating the rail wheel forward, torque the bearing nut to 20 ft-lbs., loosen nut and repeat
B.) Loosen the bearing nut and re-torque to 6 ft-lbs.
C.) Check bearing end play with a magnetic dial indicator.
End play should be within 0.001" - 0.005"
D.) If bearing end play is not within the required specification, bearings should be re-torqued following the procedure outlined in steps A thru C.
- APPLY BEAD OF SILICONE ON HUB AND HUB CAP PRIOR TO ASSEMBLY

BILL OF MATERIAL/PARTS LIST	
ITEM	DESCRIPTION
1	BEARING CLIP
2	OIL SEAL
3	HUBCAP ASSY
4	GASKET
5	5/16" GR.B
6	5/16" UNC GR.8 X 1"
7	LOCK WASHER
8	OUTER NUT
9	LOCK WASHER
10	INNER SPINDLE NUT
11	BEARING WASHER
12	GREASE ZPK 1/8 NPT
13	STUB AXLE
14	16" CAST STEEL WHEEL
15	BEARING CONE

REV/DESCRIPTION OF CHANGES

REV	DESCRIPTION	DATE	BY	APPROV'D	ECN #
A	REVISION A RELEASED	01/21/14	AML		
B	UPDATED ITEM 13	01/19/17	SMH		
C	ADDED NOTE ON WHEEL HUB	05/22/18	JEV	JMP	ECN-18-426

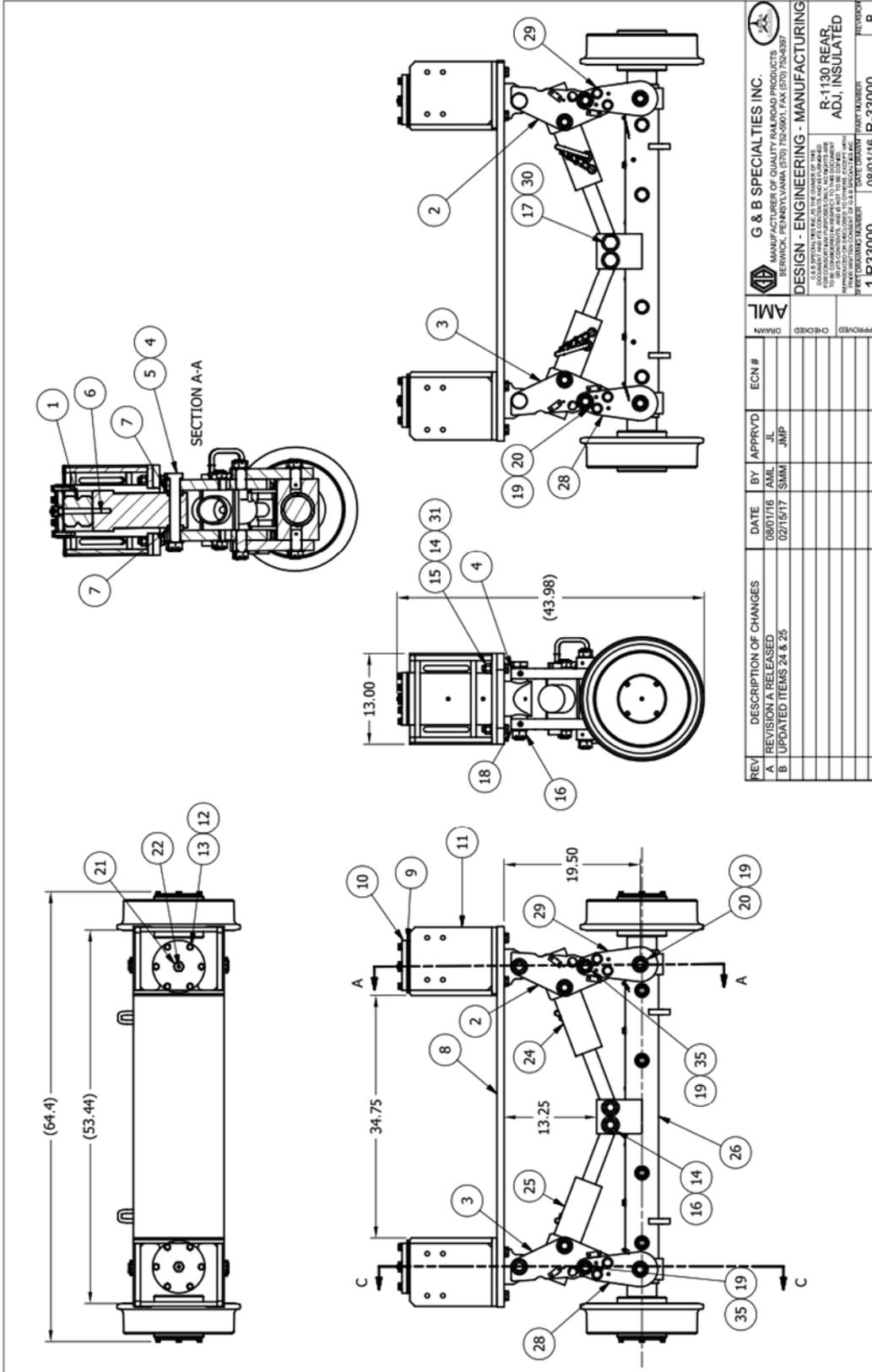
G & B SPECIALTIES INC.
MANUFACTURER OF QUALITY RAILROAD PRODUCTS
BERWICK, PENNSYLVANIA 17510-2901, FAX (570) 752-6397

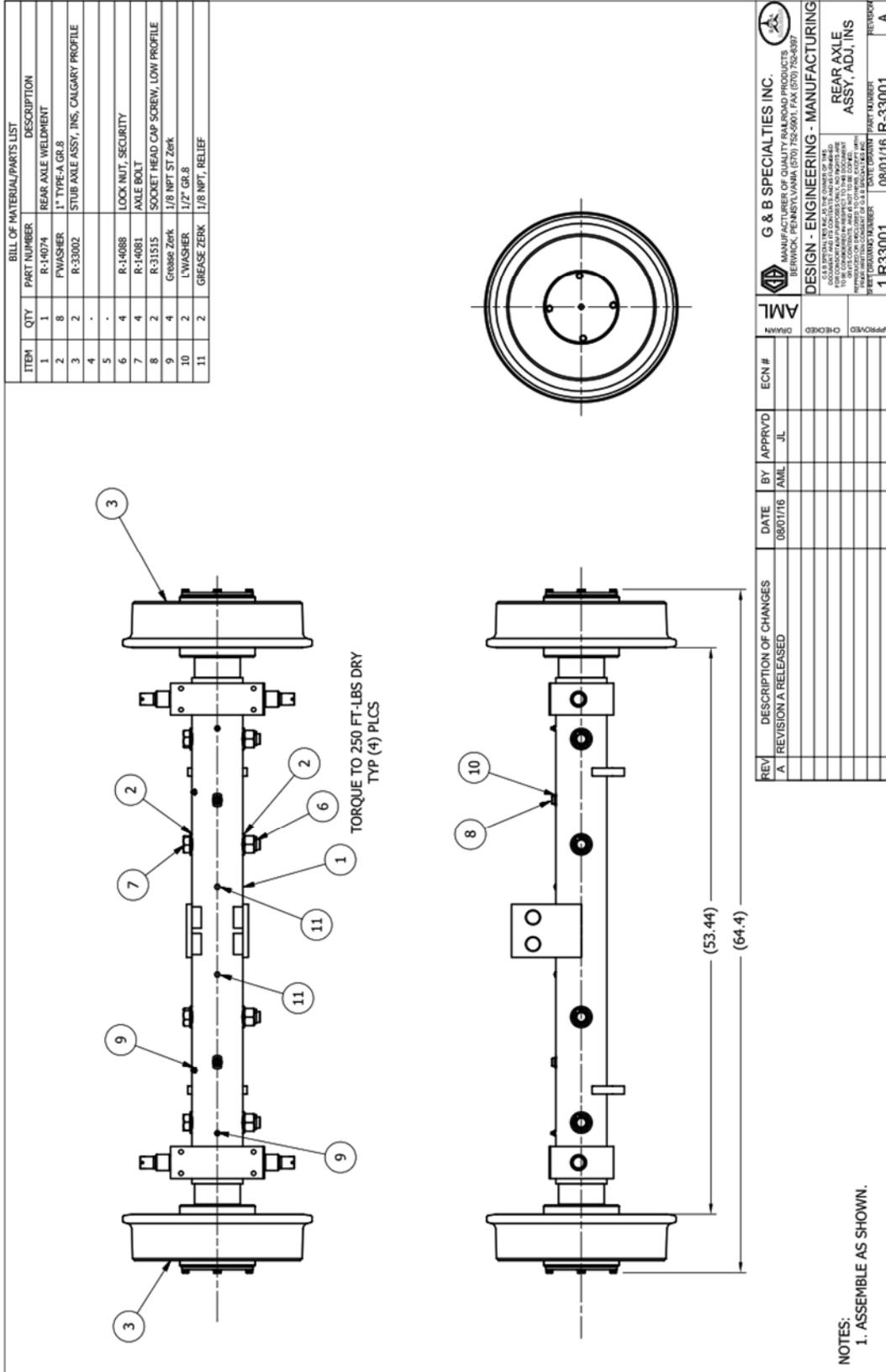
DESIGN - ENGINEERING - MANUFACTURING

IT IS SPECIFIED IN THE DRAWING OF THIS PART THAT THE MANUFACTURER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY MATERIALS AND SUPPLIERS. THE MANUFACTURER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY MATERIALS AND SUPPLIERS. THE MANUFACTURER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY MATERIALS AND SUPPLIERS.

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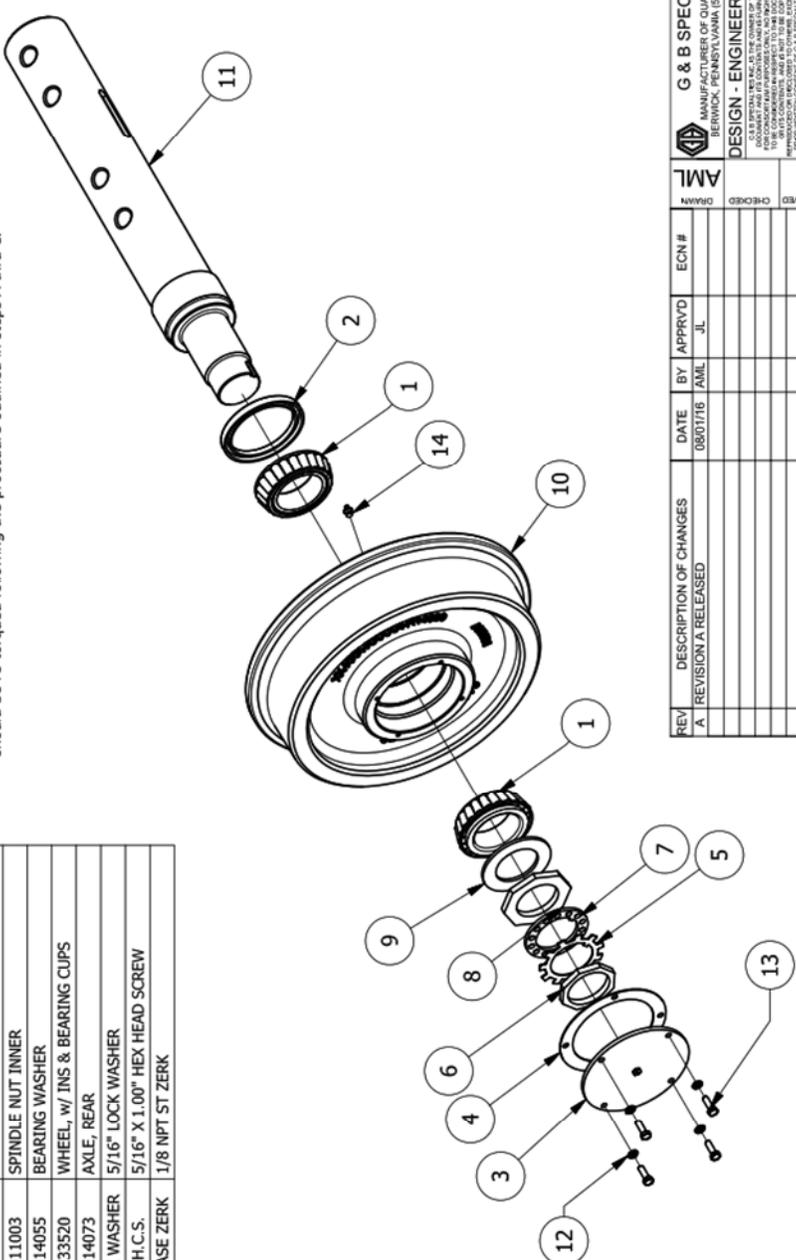




BILL OF MATERIAL/PARTS LIST	
ITEM	DESCRIPTION
1	BEARING
2	OIL SEAL
3	HUBCAP ASSEMBLY
4	GASKET
5	LOCK WASHER
6	OUTER NUT
7	LOCK WASHER
8	SPINDLE NUT INNER
9	BEARING WASHER
10	WHEEL, w/ INS & BEARING CUPS
11	AXLE, REAR
12	LOCK WASHER
13	H.H.C.S. 5/16" X 1.00" HEX HEAD SCREW
14	GREASE ZERK 1/8 NPT ST ZERK

NOTES:

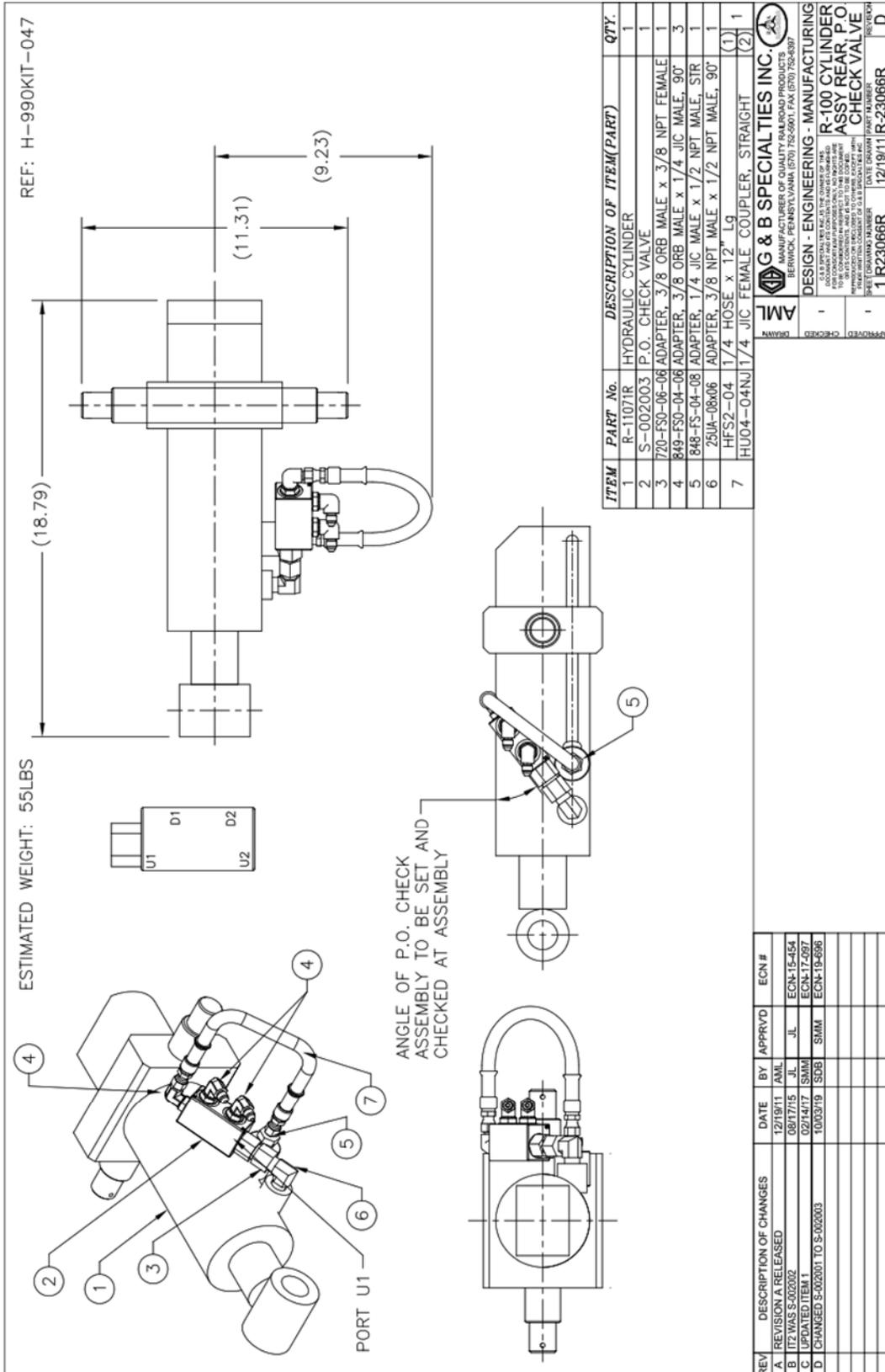
1. ASSEMBLE AS SHOWN.
2. BEARINGS ARE TO BE PACKED WITH GREASE AT ASSEMBLY
3. BEARING TORQUE PROCEDURE:
A.) While rotating the rail wheel forward, torque the bearing nut to 20 ft-lbs., loosen nut and repeat
B.) Loosen the bearing nut and re-torque to 6 ft-lbs.
C.) Check bearing end play with a magnetic dial indicator. End play should be within 0.001"-0.005"
D.) If bearing end play is not within the required specification, bearings should be re-torqued following the procedure outlined in steps A thru C.



REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	APPROVED	CHECKED	DESIGNED
A	REVISION A RELEASED	08/01/16	JL	JL				

G & B SPECIALTIES INC.
 MANUFACTURER OF QUALITY RAILROAD PRODUCTS
 BERWICK, PENNSYLVANIA (570) 752-5901, FAX (570) 752-6397
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 SHEET NO. 1 OF 1
 1 R33002 08/01/16 R-33002

STUB AXLE ASSY INSULATED
 DATE DRAWN: 08/01/16
 DRAWN BY: JL
 CHECKED BY: JL
 APPROVED BY: JL



REF: H-990KIT-047

ESTIMATED WEIGHT: 55LBS

ITEM	PART No.	DESCRIPTION OF ITEM(PART)	QTY.
1	R-11071L	HYDRAULIC CYLINDER	1
2	S-002003	P.O. CHECK VALVE	1
3	770-F50-06-08	ADAPTER, 3/8 ORB MALE x 3/8 NPT FEMALE	1
4	849-F50-04-08	ADAPTER, 3/8 ORB MALE x 1/4 JIC MALE, 90°	3
5	849-F5-04-08	ADAPTER, 1/4 JIC MALE x 1/2 NPT MALE, STR	1
6	25UA-08X06	ADAPTER, 3/8 NPT MALE x 1/2 NPT MALE, 90°	1
7	HFS2-04	1/4 HOSE x 12" Lg	(1)
	HU04-04NJ	1/4 JIC FEMALE COUPLER, STRAIGHT	(2)

REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #
A	REVISION A RELEASED	12/19/11	AML		
B	ITZ WAS S-002002	08/17/15	JL		
C	UPDATED ITEM 1	02/14/17	SMAM		ECN-17-095
D	CHANGED S-002001 TO S-002003	10/03/19	SCB	SMAM	ECN-19-695

DATE	BY	APPRVD	ECN #
12/19/11	AML		
08/17/15	JL		
02/14/17	SMAM		
10/03/19	SCB	SMAM	

DATE	BY	APPRVD	ECN #
12/19/11	R-23066L		

AML
DRAWN

DESIGN - ENGINEERING - MANUFACTURING

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

R-1100 CYLINDER
ASSY REAR, P.O.
CHECK VALVE

DATE DRAWN: 12/19/11
DRAWN: R-23066L
REVISION: D

