

INSTALLATION OF R-490 ADJUSTABLE ROTARY REAR RAILGEAR KIT 2019 AND UP INTERNATIONAL CV515/CHEVY SILVERADO 4500-6500

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.
- Do not start the vehicle with the power steering hoses disconnected. Reconnect all hoses and secure the power steering cooler if the vehicle is started.
- Ensure all removed components are given to the vehicle owner after the installation of the railgear. These components must be re-installed if the railgear is removed from the vehicle.
- Always disconnect the vehicle's battery when welding on the vehicle or railgear in order to protect the vehicle's electrical system.

INSTALLATION OF ROTARY REAR RAILGEAR KIT
Table 1: Rotary Rear Railgear with Hydraulic Lockup (K-R49RXR20520)

Part Number	Description	Qty
R-20520	R-490 Rotary Rear Upper Assembly Adj. Trolley	1
R-001	10" Light Wheel Assembly	2
R-20502	Plate Assembly Adj. Sliding (Trolley)	2
R-20120D	Rail Sweep, Driver Side	1
R-20120P	Rail Sweep, Passenger Side	1
R-25108	Pin, Quick Release	4
R-20136A	Operating Decals	1
R-20525	Hydraulic Axle Lock Assembly	1
R-990KIT-461 Wheel Hardware Qty 2X	Flat Washer, 1/2" Type A, Gr. 8	8
	Nylock Nut, 1/2"-20 UNF Reg, Gr. 8	8
R-990KIT-449 Railgear Mounting Hardware	Hex Screw, 5/8" UNC X 2 1/4" Long, Gr. 8	8
	Hex Screw, 3/4" UNC X 2 1/2" Long, Gr. 8	6
	WASHER, 5/8" Type A, Gr. 8	16
	WASHER, 3/4" Type A, Gr. 8	12
	Nylock Nut, 5/8" UNC Reg, Gr. 8	8
	Nylock Nut, 3/4" UNC Reg, Gr. 8	6

- Loosen the fasteners securing the railgear support angles to the railgear mounting plates. Position and support the railgear so that the railgear mounting brackets are on either side of the rear of the vehicle frame with the blind end of the hydraulic cylinders facing the rear of the vehicle. The mounting plates will fit around the vehicle's suspension hangers. (Figure 1&2)
- The holes in the mounting plates should align with existing holes in the vehicle frame. It may be necessary to loosen the fasteners that support the railgear cross brace and/or the railgear lockup weight bar to be able to fit the railgear on the frame. (Figure 1)
- Ensure that there is approximately 19 3/8" between the railgear pivot bearing center and the ground as shown and that the railgear mounting plates are level with top of the vehicle frame as shown. If this height cannot be achieved, the vehicles suspension will need to be modified. This modification is not included with the RAFNA railgear. It is important that the top of the railgear brackets be level as shown in (Figure 5), or it may be difficult to perform a correct "over center adjustment" as described in the "Operation, Service & Parts" section of this manual.
- Fasten each railgear mounting plate to the vehicle frame, using the supplied 5/8" and 3/4" fasteners, through the existing frame holes as shown. Tighten but do not torque these fasteners. (Figure 1)
- Using the mounting plates as a guide, drill the vehicle frame as shown for the remaining railgear mounting fasteners. (Figure 1)

6. Tighten the bolts securing the railgear cross brace and/or railgear lockup bar if required. If there is a gap between these components and the railgear mounting plates it will be necessary to add flat washer shims. Where possible, both sides should be shimmed equally.
7. Install the Adjustable Sliding Plate Assemblies (R-20502) onto the axle by using the 1/2"-20 UNF Nylock Nuts and Washers provided in this kit. **NOTE:** Aligning the hole on the ear of the axle with the front hole should put the plate flush with the end of the axle and be for Standard Gage. Extending the plate past the end of the axle and aligning with the rear hole will be for Trolley Gage. Once Gage is selected, place the Quick Release Pin (R-25108) through the holes and torque nuts to 120 ft-lbs dry. Do not Over-torque. (Figure 3 & 4)
8. Place the rail wheels below the mounting tables on the railgear axle. Place the rail sweeps behind the rail wheels and on the bottom of the mounting tables. Fasten the rail wheels and rail sweeps to the mounting tables using the 1/2"-20 UNF Nylock Nuts and Washers supplied in the kit. (Figure 1 & 4) Tighten but do not torque the 1/2" Nuts as they will be torqued following the railgear alignment procedure.

Note:

If vehicle was ordered with brakes, they will come installed from factory. They will be installed at Standard Gage. Refer to K-B49RXR20530 Rear Brake Installation Manual for proper plumbing of the brakes and adjustment between Gage.

Note:

Install the railgear hydraulic system as per the Hydraulic Kit Installation manual before continuing with the following steps.

9. Follow the Rail Wheel Load procedure detailed in the Operations, Service and Parts section of this manual.
10. Follow the Railgear Alignment procedure detailed in the Operations, Service and Parts section of this manual.
11. Follow the Railgear Lock System Adjustment Procedure detailed in the Operations, Service and Parts section of this manual.
12. Follow the Rail Sweep Adjustment procedure detailed in the Operations, Service and Parts section of this manual.
13. Torque all fasteners as detailed in the Operations, Service and Parts section of this manual.
14. Grease the railgear at all lubrication points as detailed in the Operations, Service and Parts section of this manual.

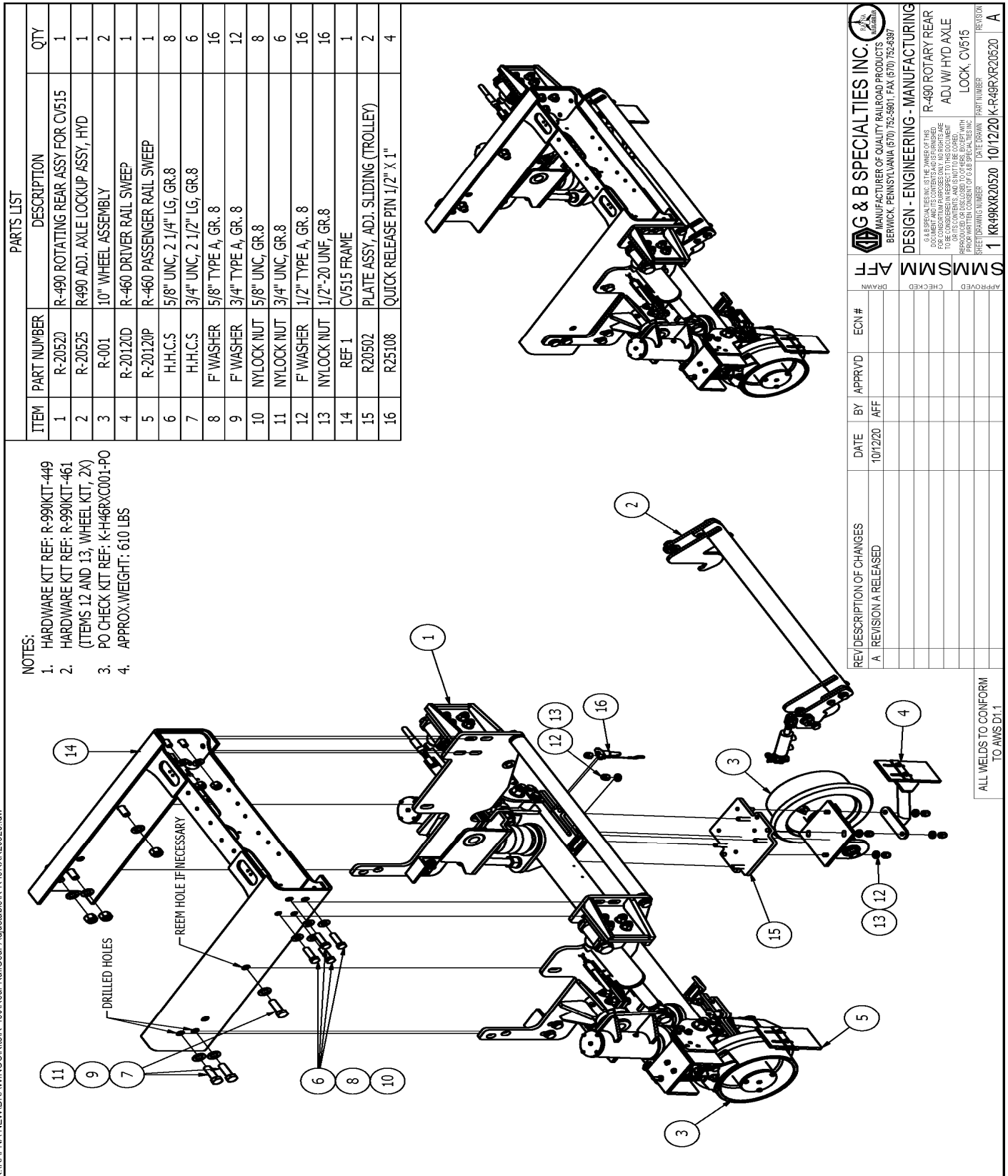


Figure 1: Installation of R-490 Rotary Rear K-R49RXR20520

REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	REVISION
A	REVISION A RELEASED	10/12/20	AFF			1

DATE DRAWN	PART NUMBER	REVISION
10/12/20	K-R49RXR20520	A

APPROVED	CHECKED	DATE

DATE	BY	APPRVD	ECN #

DESCRIPTION	DATE	BY	APPRVD
DESIGN - ENGINEERING - MANUFACTURING			

DATE	BY	APPRVD	ECN #

G & B SPECIALTIES INC.
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DESIGN - ENGINEERING - MANUFACTURING

R-490 ROTARY REAR
 ADJ. W/ HYD AXLE
 LOCK, CV515

DATE	BY	APPRVD	ECN #

DATE	BY	APPRVD	ECN #

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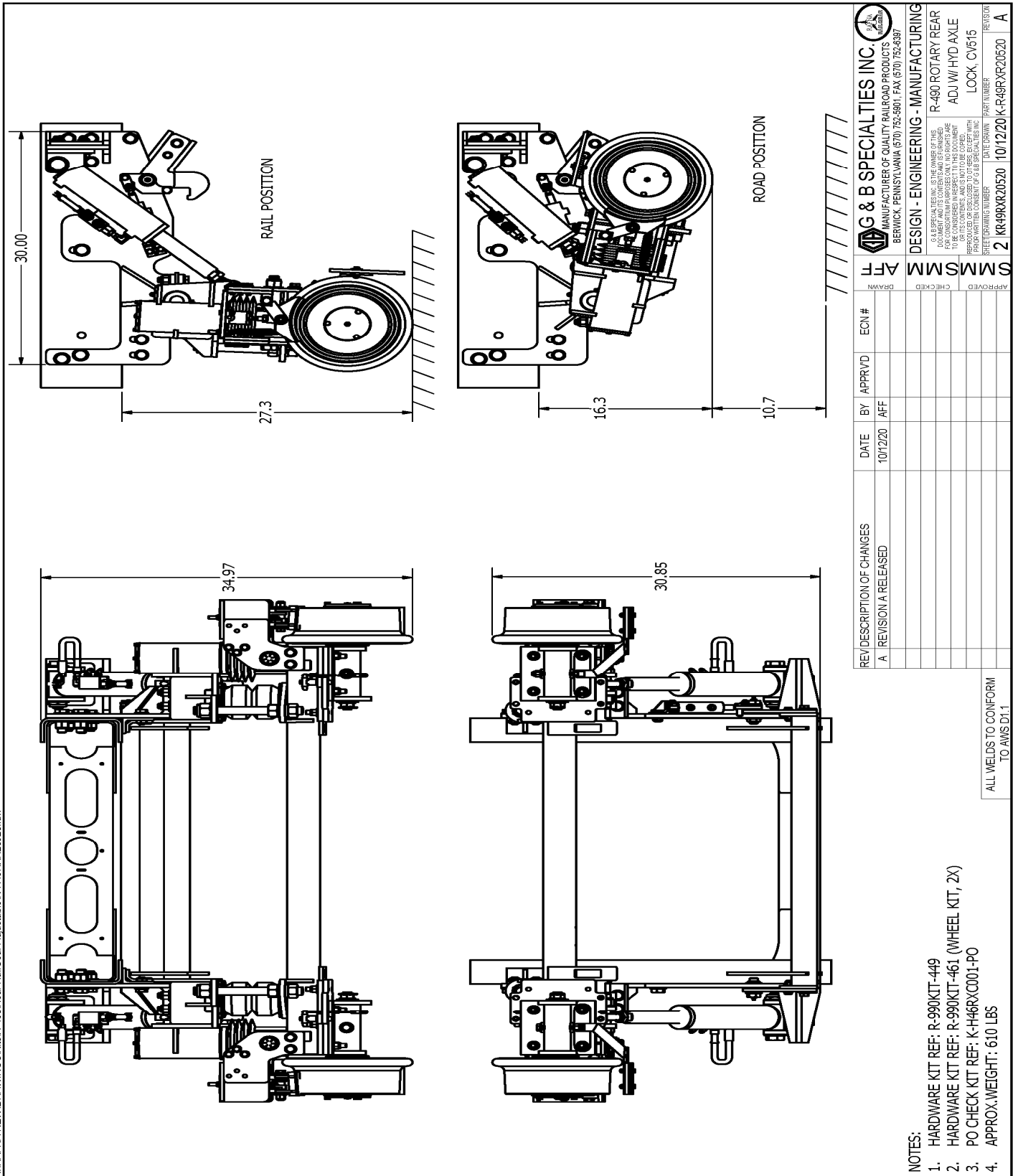
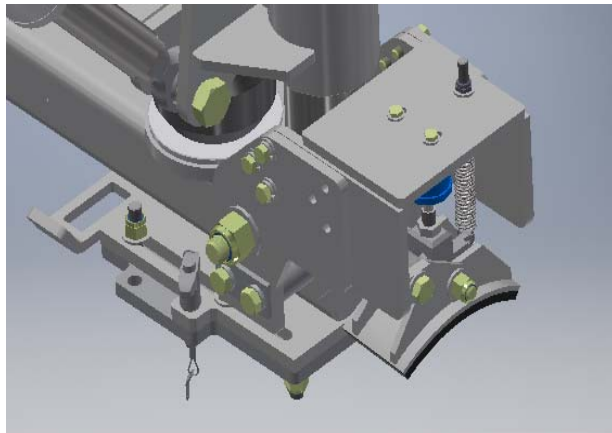
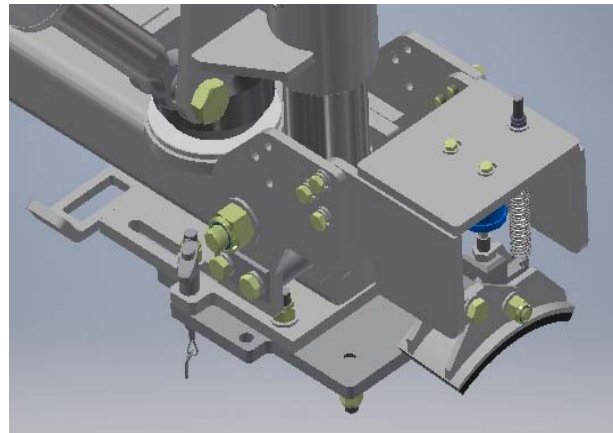


Figure 2: Installation of R-490 Rotary Rear K-R49RXR20520



Standard Gage



Trolley Gage

Figure 3: Adjustable Sliding Plate

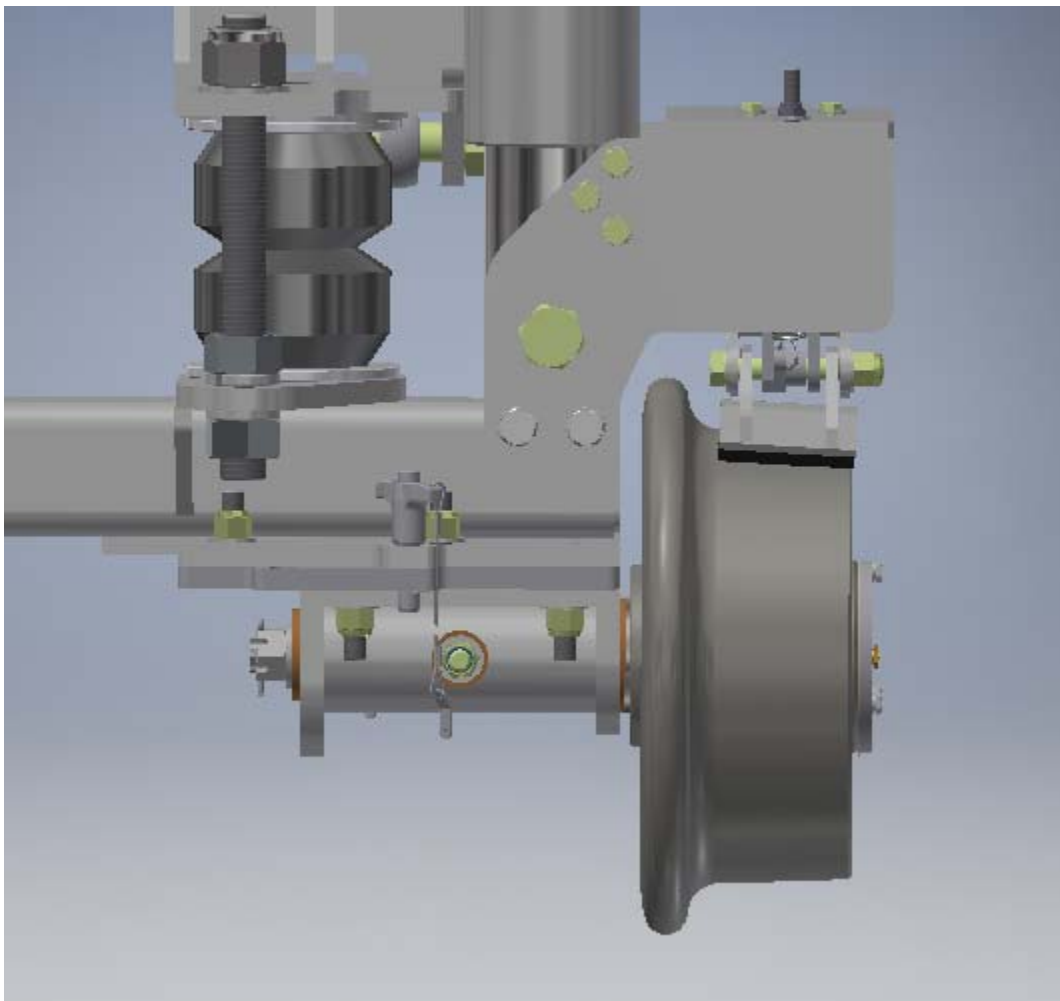


Figure 4: Wheel Installed On Adjustable Sliding Plate (Note: Figure Shown With Plate at Standard Gage)

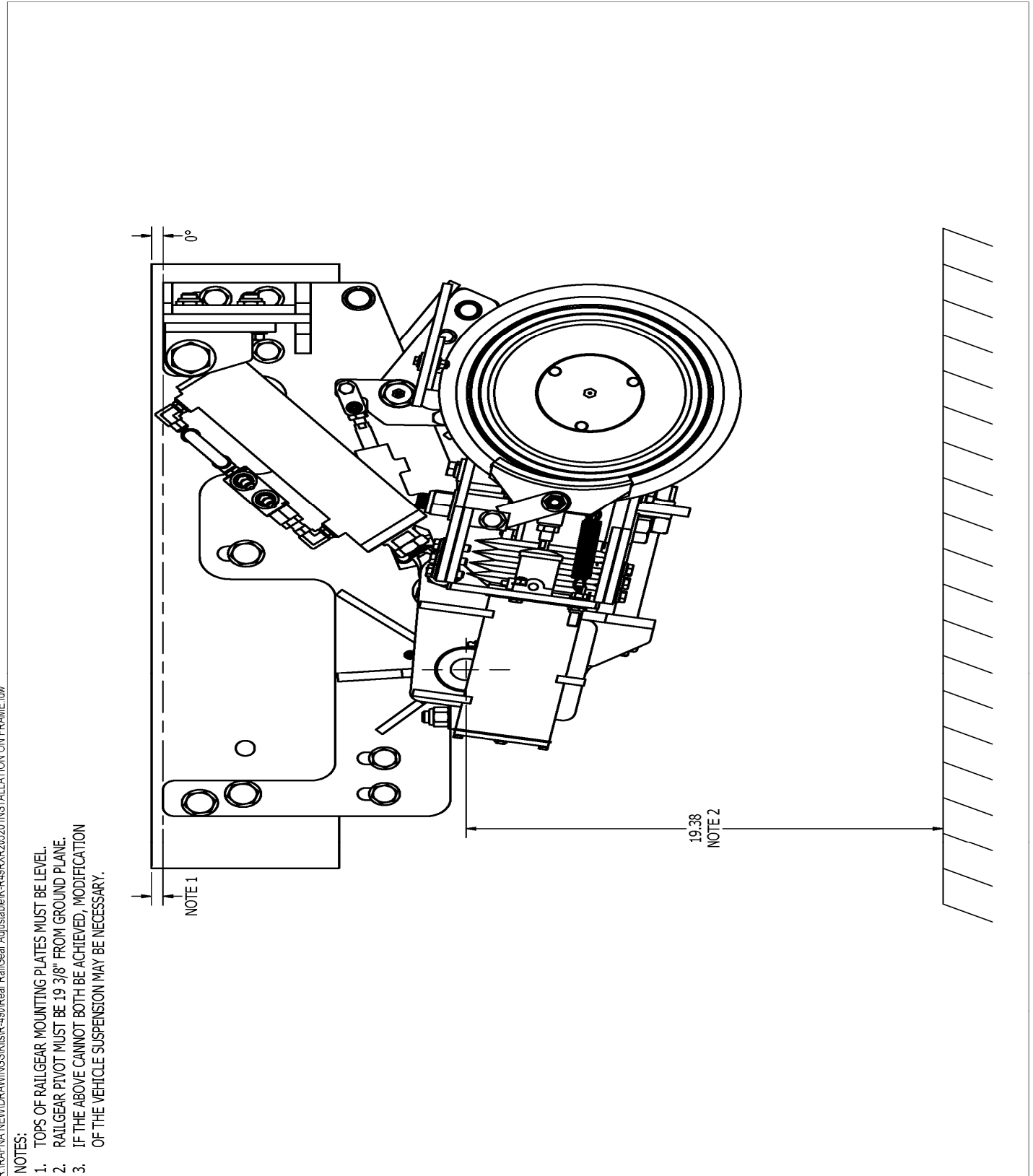


Figure 5: Mounting Position of R-490 Rotary Rear K-R49RXR20520

RAILGEAR LOCK SYSTEM INSTALLATION

The railgear lock system provides automatic mechanical locking hooks for the road position and an over-center hydraulic lock for the rail position.

The rear railgear axle lock should not be adjusted until the railgear over-center adjustment has been made as this can affect the engagement of the railgear lock.

The main components of the rail gear lock system are assembled and installed to the rear railgear unit at the factory.

1. Lower the rear railgear unit until the hook supports welded to the rear axle are clear of the lockup hooks.
2. Ensure that rear railgear lockup weight bar is free to move thru its entire range of motion, that the pivot points are properly greased and that all lockup components are free of any obstructions that would hinder movement.
3. Adjust the actuating cylinder by loosening the jam nut securing the cylinder rod to the clevis. Using the flats on the end of the cylinder rod, turn the rod to lengthen or shorten the movement of the actuating arm.
4. Raise the rear railgear slowly, as the rear axle raises the hook supports should push the lockup hooks back and out of the way. Both lock up hooks should contact both hook supports at the same time. Once the rear axle is completely raised the lockup hooks should automatically engage the hook supports.
5. Repeat steps 1 thru 5 until the rear lockup is engaging properly.
6. Once the lockup hook engagement has been set, disengage the rear lockup by activating the lockup cylinder. The actuator arm should push the lockup hooks back and out of the way of the hook supports.
7. Lower rear railgear unit to ensure that there is no unwanted contact with any vehicle or railgear components.
8. Tighten actuating cylinder jam nut.

- NOTES:
1. LOCKUP AND CROSS BRACE MAY NEED TO BE LOOSENED TO INSTALL RAILGEAR OVER VEHICLE FRAME
 2. REMEMBER TO TIGHTEN LOCKUP AND CROSS BRACE AFTER RAILGEAR INSTALLATION IF IT REQUIRED LOOSENING

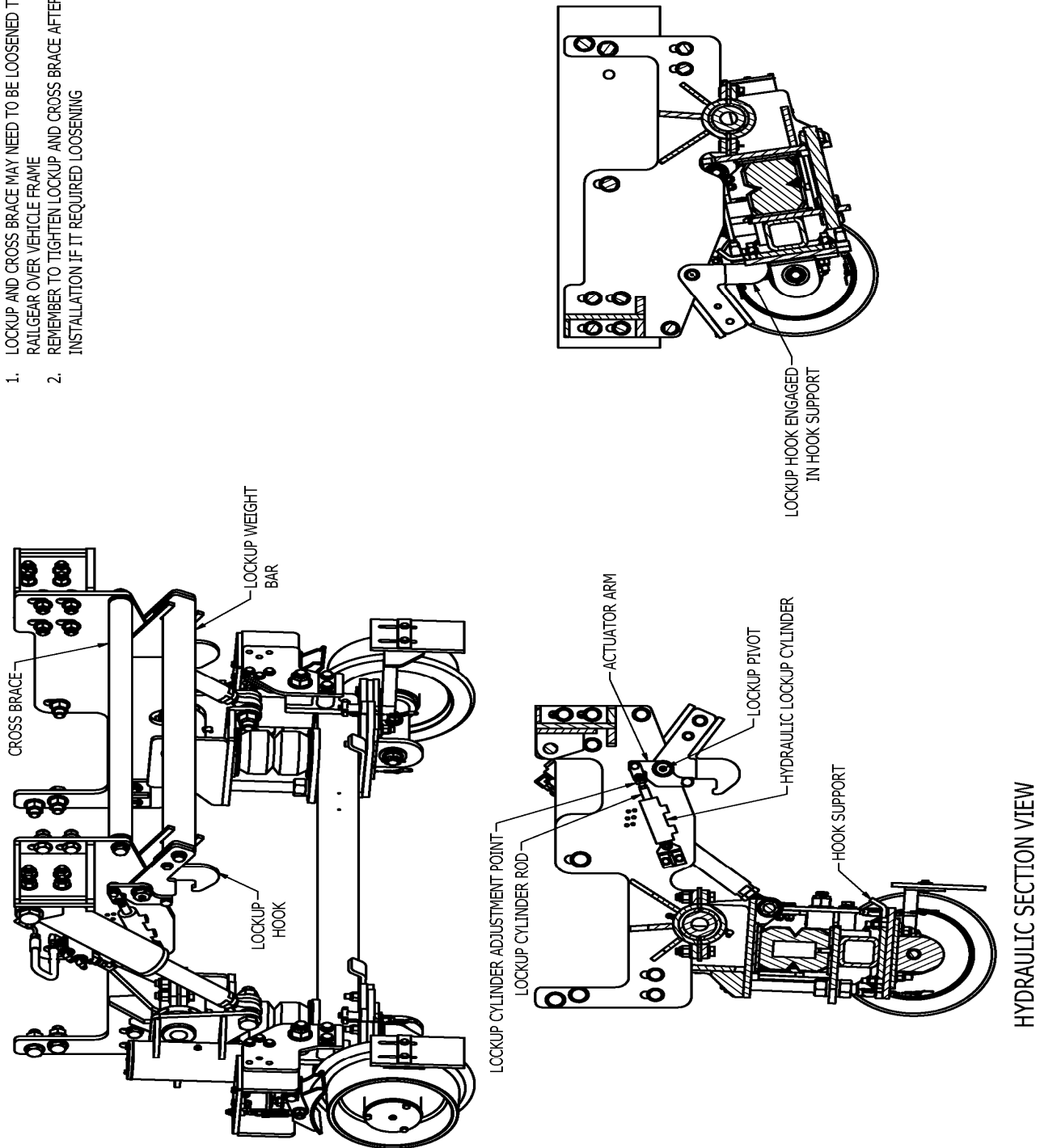


Figure 6: R-20525 Hydraulic Lockup Installation

**OPERATION, SERVICE & PARTS OF R-490 ADJUSTABLE ROTARY REAR
RAILGEAR KIT
2019 AND UP INTERNATIONAL CV515/CHEVY SILVERADO 4500-6500**

OPERATION, SERVICE & PARTS SAFETY PRECAUTIONS

If any operating, service or parts problems are encountered, please call G&B Specialties, Inc. for technical assistance.



- 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 operation of the railgear equipped vehicle.
- Operating instructions provided below only address the RAFNA railgear equipment. Applicable railway company procedures and policies must be adhered to.
- Railway company rules governing rail travel must always be observed.
- Before performing any work under the vehicle or railgear, ensure the engine is turned off and the parking brake is set.
- Ensure all body parts and loose clothing are clear of any moving parts of the railgear. Be aware of all pinch points.
- If operating the railgear using the emergency hand pump, ensure that the correct manual valve over-ride is open for the desired railgear (front or rear) and desired direction of operation (raise or lower).
- Do not use the emergency hand pump to raise and lower the railgear on a routine basis. If the hydraulic pump or manifold should fail, have it repaired as soon as possible.
- Ensure the hydraulic pump has been de-energized before starting road or rail travel.

OPERATION OF R-490 ROTARY REAR RAILGEAR

With the railgear kit installed on this vehicle, it may be operated as normal, however the vehicle has decreased ground clearance and angles of approach and departure due to the railgear. Caution must be used when operating the vehicle.

Placing the Vehicle on Rail - To Lower the Railgear (Hydraulic Lock):

1. Disengage the railgear axle lock by operating the hydraulic valve for the railgear axle lock.
2. Once the hooks are clear of the latch, lower the railgear.
3. As the railgear is being deployed, it will start taking some of the vehicle's load. The railgear's spring suspension should be observed compressing at least 1" under this load.
4. Continue lowering the railgear until the hydraulic cylinders are fully extended. In this position, the railgear should be about 2°-3 ° over center.

Removing the Vehicle from Rail - To Raise the Railgear (Hydraulic Lock):

5. Raise the railgear fully. The railgear lock hooks should engage the axle and lock automatically.
6. Verify that the railgear axle lock has engaged properly

SERVICE OF R-490 ROTARY REAR RAILGEAR

The railgear kit must be serviced regularly to avoid damage to the equipment. Table 2 below provides the Recommended Service Schedule and the detailed service procedures follow.

Table 3 provides Standard Fastener Torque Values for all fasteners.

Grease fittings are provided at all railgear lubrication points as shown in Figure 7. The recommended lubricant for all lubrication points on this railgear is MYSTIK JT-6 LOW TEMP grease or equivalent. In cold weather areas/seasons, SHELL DARINA XL102 or equivalent may be used.

Table 2: Recommended Service Schedule

	Description	Daily	Weekly	Monthly	Every 6 Months
1	Visually inspect the railgear prior to use for damaged or worn parts	✓			
2	Check for loose wheels and fasteners	✓			
3	Ensure the rail gear locking mechanism is functioning properly in both the road and rail positions	✓			
4	Check and adjust truck tire pressure as per requirements			✓	
5	Ensure the vehicle is in good operating condition based on the vehicle operating and maintenance instructions	✓			
6	Check and adjust rail wheel end play (0.005" max.)				✓
7	Inspect railgear wheel flanges for wear. Use the "RAFNA Wheel Flange Indicator" for measurement				✓
8	Inspect all hydraulic fittings and hoses for leaks or wear			✓	
9	Inspect rail sweeps for close proximity to rail head	✓			
10	Grease inner tubes				✓
11	Lubricate locking mechanism				✓
12	Check level on hydraulic reservoir. Top off with appropriate filtered fluid		✓		
13	Inspect and grease railgear wheel bearings				✓
14	Check and correct rail wheel alignment if gear is removed or damaged, or every 12 months				

Note:

For continuous service at ambient temperatures above 40°C (105°F), more frequent lubrication is required.

Table 3: Standard Fastener Torque Values

Fastener Size	Fastener Torque Value (ft-lbs) Dry
1" UNC Gr. 8 Fasteners	250
¾" UNC Gr. 8 Fasteners	175
5/8" UNC Gr. 8 Fasteners	150
½" UNC Gr. 8 Fasteners	100
3/8" UNC Gr. 8 Fasteners	40
¼" UNC Gr. 8 Fasteners	12

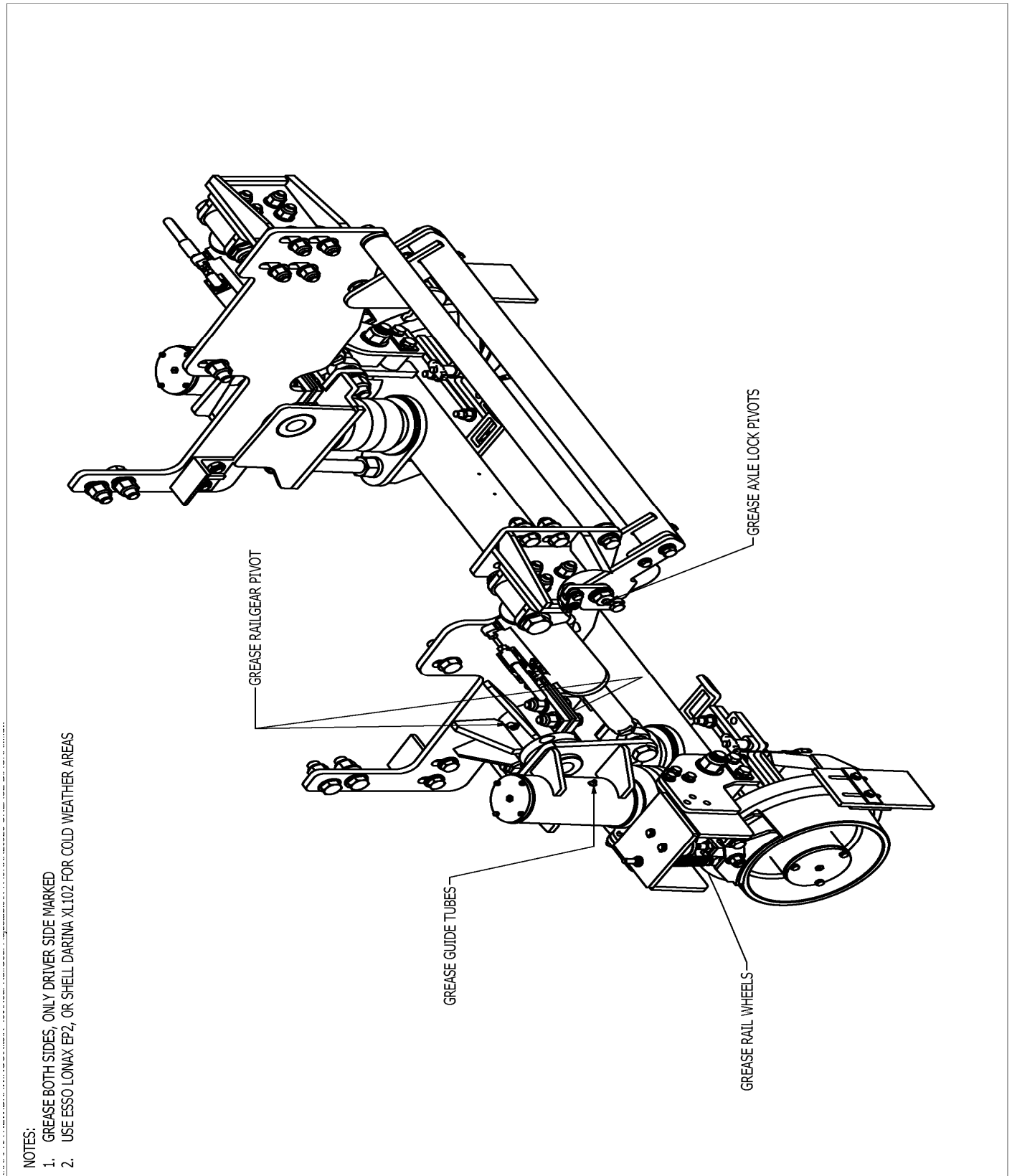


Figure 7: Railgear Lubrication Points

RAILGEAR OVER-CENTER ADJUSTMENT

The railgear is designed to rotate slightly past vertical into the rail position in order to provide a safety feature in the event of a hydraulic failure. This additional rotation past vertical is called the over-center angle and is adjustable via a threaded rod end on the end of the hydraulic cylinder. The location of the railgear in the road position is also a function of the over-center adjustment, however, DO NOT use the over-center adjustment to adjust the road position of the railgear. This will have adverse effects on the over-center safety feature.

The over-center angle is defined as the angle between the vertical edge of the outer guide tubes and the vertical. It can be measured with the vehicle on a level section of rail with the railgear in the rail position using an angle meter. The over-center angle must be between 2°-3° past vertical. If this is not the case, adjust as follows:

1. Unload the railgear hydraulic cylinder by raising the railgear just off rail.
2. Loosen the jam nut on the hydraulic cylinder rod end and adjust the rod to increase or decrease the over-center angle. Note that the cylinder rod can be turned instead of turning the rod end.
3. Re-deploy the railgear to the rail position and re-check the over-center angle. Re-adjust as necessary.
4. Tighten the jam nut on the hydraulic cylinder rod end.
5. Repeat process for other cylinder.
6. Both cylinders should be adjusted so that both cylinders have the same amount of stroke over center. This will help to eliminate any binding or twisting of the railgear when deployed to the rail position.
7. Following the over-center angle adjustment, the railgear may contact the vehicle if not enough clearance was left during installation. Check the railgear clearance to all vehicle components throughout the full range of railgear and railgear suspension movement. If there is interference with the vehicle bumper, it can be trimmed and reinforced as required.
8. With the railgear fully raised to the road position, ensure that the railgear lock has properly engaged.

RAIL WHEEL BEARING ADJUSTMENT

The rail wheel bearings require periodic adjustment in order to keep the endplay within specification. If the rail wheel bearings are not correctly adjusted, failure may occur and will not be covered under the railgear warranty. Check and adjust the bearing endplay with the railgear in the road position and with the rail wheels free to turn.

Use a magnetic base dial gauge to measure the endplay of each rail wheel bearing. The bearing endplay must be between 0.001" and 0.005". If this is not the case, adjust as follows:

1. Remove the rail wheel hubcap and gasket by removing the three 1/4" bolts and 1/4" lock washers. Remove and discard the cotter pin from the 3/4" slotted spindle nut.
2. Ensure the wheel-bearing cavity is full of grease.
3. While rotating the rail wheel forward, torque the spindle nut to 20 ft-lbs. Then loosen the spindle nut and re-torque it to 6 ft-lbs. Re-check and re-adjust the bearing endplay if required. If no torque wrench is available, tighten the spindle nut until the rail wheel is difficult to turn by hand. Then loosen the spindle nut and retighten it just until no play can be felt in the bearings. Re-adjust the bearing endplay with a torque wrench as soon as possible.
4. Install a new 3/16" x 2" long cotter pin through the spindle nut. Tighten the spindle nut slightly if needed to insert the cotter pin.
5. Re-install the hubcap and gasket using the 1/4" bolts and new 1/4" split lock washers. Blue Loctite can be used on the bolts as an added safety measure. Tighten and torque the 1/4" fasteners to 12 ft-lbs dry. Do not over torque.

RAIL SWEEP ADJUSTMENT

The distance between the rail sweep rubber and the rail is adjustable and should be maintained at approximately 1/8". To adjust the rail sweep rubber, with the railgear in the rail position, loosen the two 1/4" fasteners that secure the rail sweep rubber to the rail sweep bracket. Slide the rail sweep rubber up or down for the correct clearance. Tighten and torque the 1/4" fasteners to 12 ft-lbs dry. Do not over torque.

RAIL WHEEL LOAD

During rail travel, the railgear removes a predetermined portion of the vehicle's load from the vehicle's wheels and carries it on the rail wheels. A minimum amount of load must be maintained on the rail wheels in order to avoid derailment. Likewise, a minimum amount of load must be maintained on the vehicle wheels in order to provide traction for acceleration and braking.

The rail wheel load should be checked following the installation of the railgear once the vehicle has had all its permanent load (service body, crane, welders, etc.) installed. The rail wheel load requires periodic checks; however it should only require re-adjustment if the railgear is moved, the vehicle equipment is changed, or the vehicle suspension settles or is changed. As non-permanent load is added to and/or removed from the vehicle, the rail wheel load will change also. This is acceptable as long as the weight ratings of the vehicle, axles, wheels, tires and railgear are not exceeded and as long as the minimum rail wheel load is maintained.

The rail wheel load must be a minimum of 700-1400 lbs with approx. 3/4" - 1" of railgear spring compression and is checked as described below using a hydraulic bottle jack equipped with a gauge. If the gauge on the hydraulic bottle jack reads in pounds per square inch (psi), use Table 4 along with the jack bore diameter to convert this reading to pounds (lbs). If the gauge reads in pounds, then no conversion is required.

Check Each Rail Wheel Load as Follows:

1. Place the vehicle on a straight and level section of rail with the railgear lowered to the rail position. Ensure the railgear is taking load through the tread of the rail wheel and not on the flange of the rail wheel. The vehicle should only be carrying the permanently attached load (service body, crane, etc) and any always carried non-attached load (welders, etc.) during this procedure. Do not include the operator or passengers. Ensure the vehicle tires have been inflated to the manufacturer's recommended air pressure and that they are not in contact with any obstructions except the rails.
2. Place the hydraulic bottle jack on a solid surface beneath the rail wheel spindle housing and jack the rail wheel off the rail.
3. Insert a piece of paper between the rail and the rail wheel. Lower the jack until the rail wheel squeezes the paper so that it cannot be pulled out.
4. Slowly jack up the rail wheel while pulling on the paper and observe the jack gauge. When the paper can be pulled out, stop jacking.
5. Record the load or pressure reading on the jack gauge.

Table 4: Rail Wheel Load vs Jack Pressure and Bore

Jack Pressure (PSI)	Jack Cylinder Bore Diameter (inches)								
	7/8	15/16	1	1 1/16	1 1/8	1 3/16	1 1/4	1 5/16	1 3/8
540	320	370	420	480	540	600	660	730	800
560	340	390	440	500	560	620	690	760	830
580	350	400	460	510	580	640	710	780	860
600	360	410	470	530	600	660	740	810	890
620	370	430	490	550	620	690	760	840	920
640	380	440	500	570	640	710	790	870	950
660	400	460	520	590	660	730	810	890	980
680	410	470	530	600	680	750	830	920	1010
700	420	480	550	620	700	780	860	950	1040
720	430	500	570	640	720	800	880	970	1070
740	440	510	580	660	740	820	910	1000	1100
760	460	520	600	670	760	840	930	1030	1130
780	470	540	610	690	780	860	960	1060	1160
800	480	550	630	710	800	890	980	1080	1190
820	490	570	640	730	820	910	1010	1110	1220
840	510	580	660	740	830	930	1030	1140	1250
860	520	590	680	760	850	950	1060	1160	1280
880	530	610	690	780	870	970	1080	1190	1310
900	540	620	710	800	890	1000	1100	1220	1340
920	550	640	720	820	910	1020	1130	1240	1370
940	570	650	740	830	930	1040	1150	1270	1400
960	580	660	750	850	950	1060	1180	1300	1430
980	590	680	770	870	970	1090	1200	1330	1460
1000	600	690	790	890	990	1110	1230	1350	1480
1020	610	700	800	900	1010	1130	1250	1380	1510
1040	630	720	820	920	1030	1150	1280	1410	1540
1060	640	730	830	940	1050	1170	1300	1430	1570
1080	650	750	850	960	1070	1200	1330	1460	1600
1100	660	760	860	980	1090	1220	1350	1490	1630
1120	670	770	880	990	1110	1240	1370	1520	1660
1140	690	790	900	1010	1130	1260	1400	1540	1690
1160	700	800	910	1030	1150	1280	1420	1570	1720
1180	710	810	930	1050	1170	1310	1450	1600	1750
1200	720	830	940	1060	1190	1330	1470	1620	1780
1220	730	840	960	1080	1210	1350	1500	1650	1810
1240	750	860	970	1100	1230	1370	1520	1680	1840
1260	760	870	990	1120	1250	1400	1550	1700	1870
1280	770	880	1010	1130	1270	1420	1570	1730	1900
1300	780	900	1020	1150	1290	1440	1600	1760	1930
1320	790	910	1040	1170	1310	1460	1620	1790	1960
1340	810	920	1050	1190	1330	1480	1640	1810	1990
1360	820	940	1070	1210	1350	1510	1670	1840	2020
1380	830	950	1080	1220	1370	1530	1690	1870	2050
1400	840	970	1100	1240	1390	1550	1720	1890	2080
1420	850	980	1120	1260	1410	1570	1740	1920	2110
1440	870	990	1130	1280	1430	1590	1770	1950	2140
1460	880	1010	1150	1290	1450	1620	1790	1980	2170
1480	890	1020	1160	1310	1470	1640	1820	2000	2200
1500	900	1040	1180	1330	1490	1660	1840	2030	2230
1520	910	1050	1190	1350	1510	1680	1870	2060	2260
1540	930	1060	1210	1370	1530	1710	1890	2080	2290
1560	940	1080	1230	1380	1550	1730	1910	2110	2320
1580	950	1090	1240	1400	1570	1750	1940	2140	2350
1600	960	1100	1260	1420	1590	1770	1960	2160	2380
1620	970	1120	1270	1440	1610	1790	1990	2190	2410
1640	990	1130	1290	1450	1630	1820	2010	2220	2440
1660	1000	1150	1300	1470	1650	1840	2040	2250	2460
1680	1010	1160	1320	1490	1670	1860	2060	2270	2490
1700	1020	1170	1340	1510	1690	1880	2090	2300	2520
1720	1030	1190	1350	1530	1710	1900	2110	2330	2550
1740	1050	1200	1370	1540	1730	1930	2140	2350	2580

Rail Wheel Load (lbs)

NOTE

IF THE APPROPRIATE WHEEL LOADS CANNOT BE ACHIEVED, SUSPENSION WORK WILL BE NEEDED TO THE VEHICLE IN ORDER TO OBTAIN THEM.

RAILGEAR ALIGNMENT

The railgear must be correctly aligned in order to perform properly, safely, and avoid excessive wear and derailment. The rail wheels can be independently aligned for toe-in/toe-out and the railgear can be adjusted side to side (laterally) on the vehicle. A parallel line system and the following procedure should be used to perform the railgear alignment.

The rail wheel loads should be checked and adjusted, the vehicle should have had a four-wheel alignment (with the complete railgear package installed on the vehicle and any suspension modifications done) and the tires should be properly inflated prior to performing the railgear alignment.

The railgear alignment is done with the vehicle on a straight and level section of rail with the railgear in the rail position and the vehicle wheels pointing straight ahead. The individual rail wheel alignment should be done first, followed by the lateral alignment of the railgear.

Each rail wheel is aligned by loosening the four 1/2" fasteners that secure it to the railgear axle. The rail wheel is then turned into alignment. The four 1/2" fasteners should then be tightened and torqued to 100 ft-lbs dry. Do not over torque.

Lateral alignment is achieved by loosening the shaft collars and sliding the lower half of the railgear unit in the pivot bearings. It may be necessary to loosen the bearing caps slightly to ease the adjustment process. Once the railgear is in alignment, tighten the shaft collars and tighten the bearing caps to 45 ft-lbs dry. Do not over torque.

Following the railgear alignment, the railgear may contact the vehicle if not enough clearance was left during installation. Check the railgear clearance to all vehicle components throughout the full range of railgear and railgear suspension movement. If there is interference with the vehicle exhaust system, it can be modified to fit, ensuring any exhaust system modifications conform to applicable laws and regulations.

RAFNA RAILGEAR ALIGNMENT RACK DATA

GAS OR DIESEL _____ VIN# _____

VEHICLE MAKE: _____ VEHICLE MODEL: _____ VEHICLE YEAR: _____
 DOOR STICKER GVWR: _____ DOOR STICKER GAWR FRT: _____ DOOR STICKER GAWR RR _____
 RAILGEAR S/N: FRT _____ RR _____ VEHICLE UNIT #,S/N: _____
 RAILGEAR TYPE: _____ INSTALLER: _____ DATE: _____

SET UP PARALLEL STRING LINES
 A & B MUST BE EQUAL WITHIN 1/32"
 C & D MUST BE EQUAL WITHIN 1/32"

ADJUST STRING LINES AROUND VEHICLE
 E, F, G, & H MUST BE EQUAL WITHIN 1/16"
 I, J, K, & L MUST BE EQUAL WITHIN 1/16"
 (E, F, G, & H MAY NOT EQUAL I, J, K, & L)

ADJUST RAIL WHEEL ALIGNMENT
 M & O MUST BE EQUAL WITHIN 1/16"
 N & P MUST BE EQUAL WITHIN 1/16"
 Q & S MUST BE EQUAL WITHIN 1/16"
 R & T MUST BE EQUAL WITHIN 1/16"

ADJUST RAILGEAR LATERAL ALIGNMENT
 M & O MUST EQUAL N & P WITHIN 1/8"
 Q & S MUST EQUAL R & T WITHIN 1/8"

ENSURE THAT U & V ARE BETWEEN
 53- 7/16" AND 53- 9/16"

OVER-CENTER ANGLE (DEGREE)
 FRONT _____
 REAR _____

TREAD TO TREAD, (NOT SIDEWALL)
 OEM FRONT: _____
 OEM REAR: _____
 MODIFIED FRONT: _____
 MODIFIED REAR: _____

RAIL WHEEL LOADS (LBS)
 LEFT FRONT _____ RIGHT FRONT _____
 LEFT REAR _____ RIGHT REAR _____

RAIL WHEEL FLANGE TO GROUND CLEARANCE
 LEFT FRONT _____ RIGHT FRONT _____
 LEFT REAR _____ RIGHT REAR _____

TIRE MFG _____
 TIRE SIZE _____

MOUNTING HEIGHT FRONT: _____ MOUNTING HEIGHT REAR: _____
 STOCK TURNING DIAMETER: _____ MODIFIED TURNING DIAMETER: _____
 OEM: VEHICLE WEIGHT: _____ FRONT GAWR: _____ REAR GAWR: _____
 MODIFIED: VEHICLE WEIGHT: _____ FRONT GAWR: _____ REAR GAWR: _____

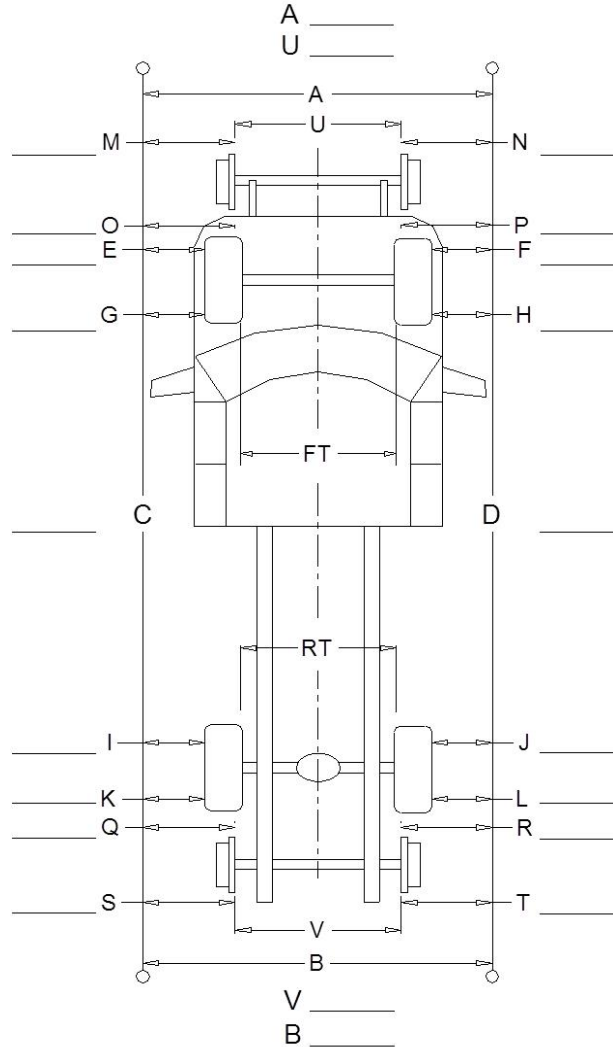


Figure 8: Alignment Inspection Sheet (Rack)

RAFNA RAILGEAR PORTABLE ALIGNMENT DATA

GAS OR DIESEL _____ VIN# _____

VEHICLE MAKE: _____ VEHICLE MODEL: _____ VEHICLE YEAR: _____
 DOOR STICKER GVWR: _____ DOOR STICKER GAWR FRT: _____ DOOR STICKER GAWR RR _____
 RAILGEAR S/N: FRT _____ RR _____ VEHICLE UNIT #, S/N: _____
 RAILGEAR TYPE: _____ INSTALLER: _____ DATE: _____

U _____

ADJUST RAILGEAR LATERAL ALIGNMENT
 A MUST EQUAL B WITHIN 1/8"
 C MUST EQUAL D WITHIN 1/8"

ENSURE THAT U & V ARE BETWEEN
 53- 7/16" AND 53- 9/16"

OVER-CENTER ANGLE (DEGREE)
 FRONT _____
 REAR _____

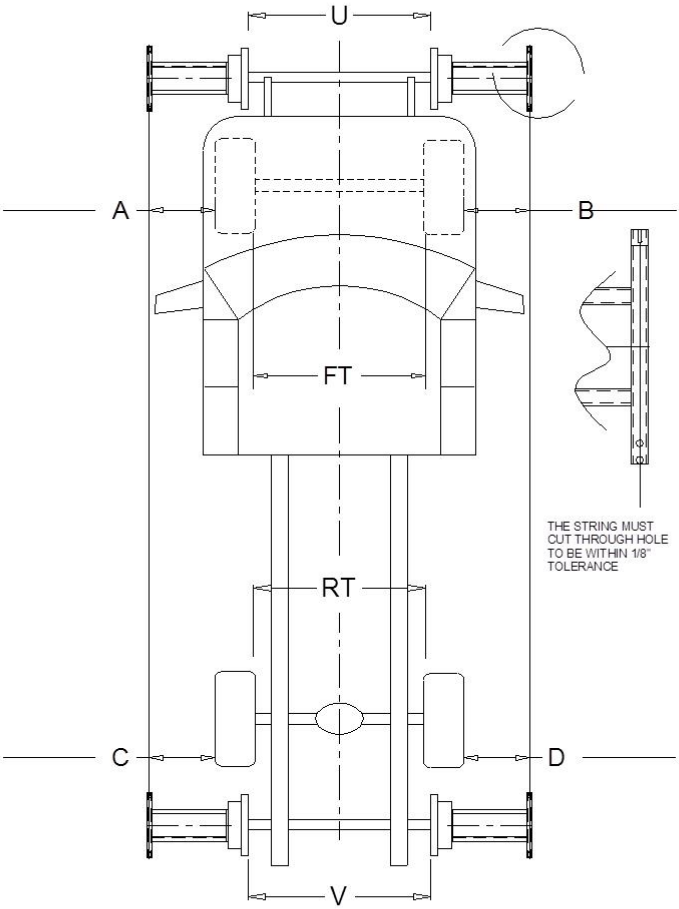
TREAD TO TREAD, (NOT SIDEWALL)
 OEM FRONT: _____
 OEM REAR: _____
 MODIFIED FRONT: _____
 MODIFIED REAR: _____

RAIL WHEEL LOADS (LBS)
 LEFT FRONT _____ RIGHT FRONT _____
 LEFT REAR _____ RIGHT REAR _____

RAIL WHEEL FLANGE TO GROUND CLEAR-
 ANCE
 LEFT FRONT _____ RIGHT FRONT _____
 LEFT REAR _____ RIGHT REAR _____

TIRE MFG _____
 TIRE SIZE _____

MOUNTING HEIGHT FRONT: _____ MOUNTING HEIGHT REAR: _____
 STOCK TURNING DIAMETER: _____ MODIFIED TURNING DIAMETER: _____
 OEM: VEHICLE WEIGHT: _____ FRONT GAWR: _____ REAR GAWR: _____
 MODIFIED: VEHICLE WEIGHT: _____ FRONT GAWR: _____ REAR GAWR: _____



V _____

Figure 9: Alignment Inspection Sheet (Portable)

REAR RAILGEAR SPRING REPLACEMENT

Please take caution when working with the springs on this railgear unit. The springs contain a small amount of preload.

1. Ensure that all weight has been removed from the railgear unit by either raising the rear railgear until the rail wheels are off the ground or lowering the railgear to the rail position and lifting the rear of the vehicle off the ground.
2. It is recommended that only one spring at a time be replaced. As it may be difficult to compress both springs at once for reassembly while the railgear unit is mounted to the truck.
3. Remove the inner guide pivot bolt. Inspect for damage and replace if necessary. (It may be necessary to compress the rear spring to ease the removal of the inner guide bolt. To compress the rear spring, tighten the nut on the top of the threaded rod until the inner guide pivot bolt can be removed.)
4. Slowly loosen the threaded rod top nut to release the preload on the spring. Continue to loosen the nut until the spring becomes loose.
5. Remove the old spring and insert new spring. Ensure that the spring spacers have also been installed, 1 on the top and 1 on the bottom of the spring.
6. Slowly tighten the threaded rod top nut until the inner guide pivot bolt can be installed. It may be necessary to over compress the spring using the threaded rod as this may allow the inner and outer guide to align with less binding.
7. Install the inner guide pivot bolt. Torque to 100 ft-lbs dry. Do not over torque.
8. Slowly loosen the threaded rod top. The threaded rod top nut should be tight against the outer guide assembly but not so tight as to add any additional preload to the spring.
9. Repeat steps 1 thru 9 for opposite spring.

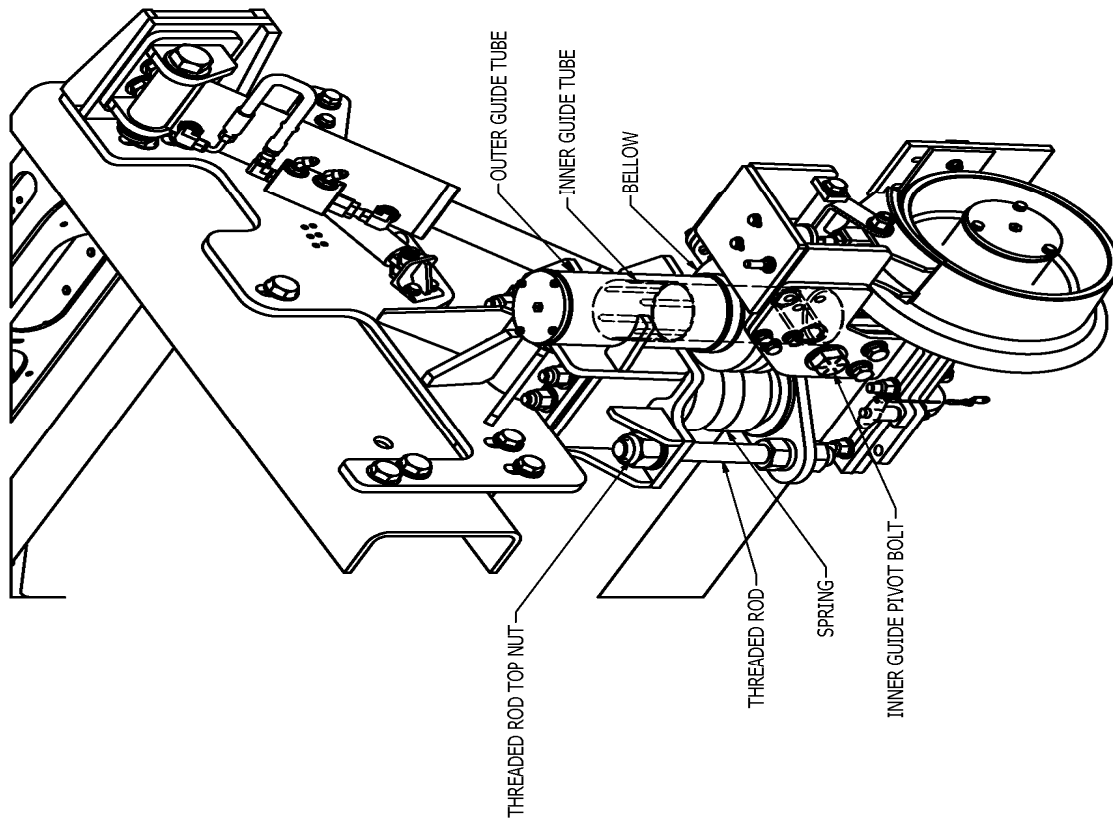


Figure 10: Components Related to Changing a Rear Spring

RAIL WHEEL GAGE ADJUSTMENT

This unit is equipped with adjustable sliding plates that allow the adjustment between Standard and Trolley gage. Both wheels must be adjusted the same before use. **G&B recommends replacing the lock nuts during any adjustment procedure.** Grade 8, 1/2"-20 nylock nuts are to be used. Torque spec is 120 ft-lbs dry.

Observe the railgear. If the wheel table is flush with then ends of the axle, the unit is setup for Standard Gage. If the wheel table sticks out past the ends of the axle, it is setup for Trolley Gage. To adjust from one gage to the other, the process is listed below:

1. Loosen the four 1/2" nylock nuts used to fasten the assembly to the axle.
2. Pull the Quick Release Pin used to lock in the position of the assembly.
3. Slide assembly out to the end of the slot to go to Trolley Gage, slide assembly in to end of slot to go to Standard Gage.
4. Re-insert Quick Release Pin to lock assembly in place.
5. Lower railgear to apply pressure to wheel assembly to keep everything from moving.
6. Remove the four 1/2" nylock nuts and replace with new. Nuts are 1/2"-20 Nylock nuts and should be torqued to 120 ft-lbs dry.
7. Repeat the same process for the opposite wheel.
8. If nothing was touched regarding the nuts fastening the wheel to the plate, the alignment should not have changed. **NOTE:** Depending when the alignment was last checked or if unusual wear on the rail wheels can be visually noticed, now would be a good time to re-align the wheels.

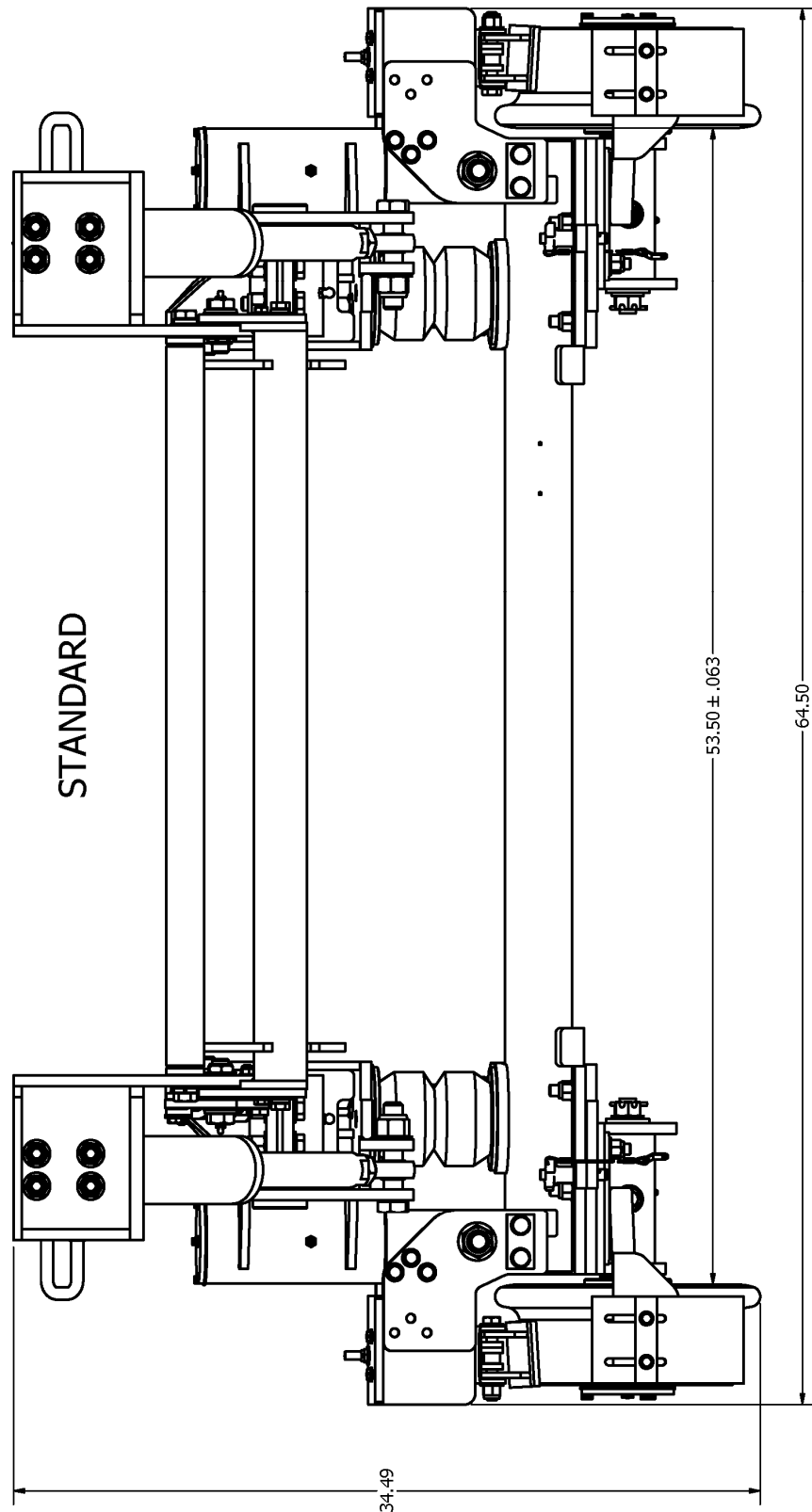


Figure 11: Gear In Standard Gage

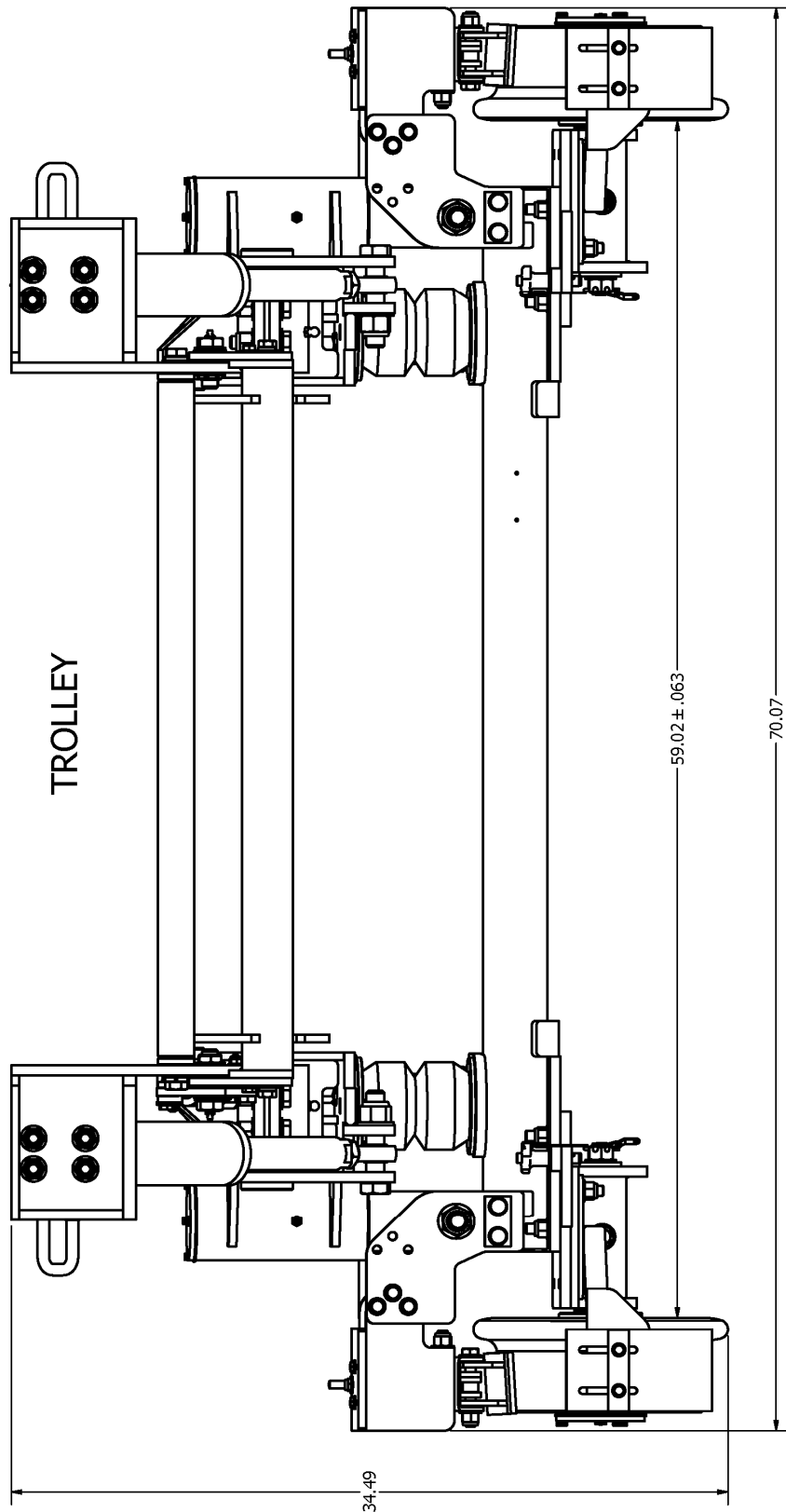
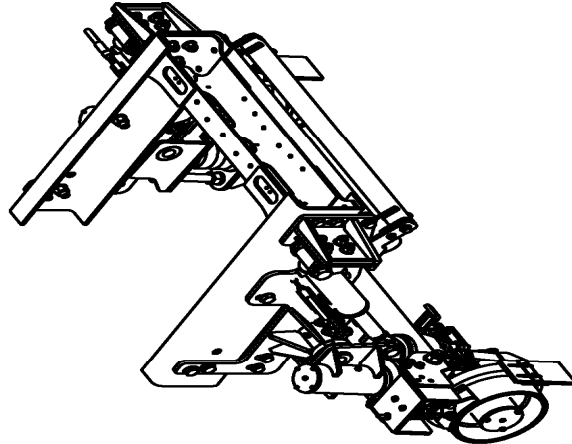
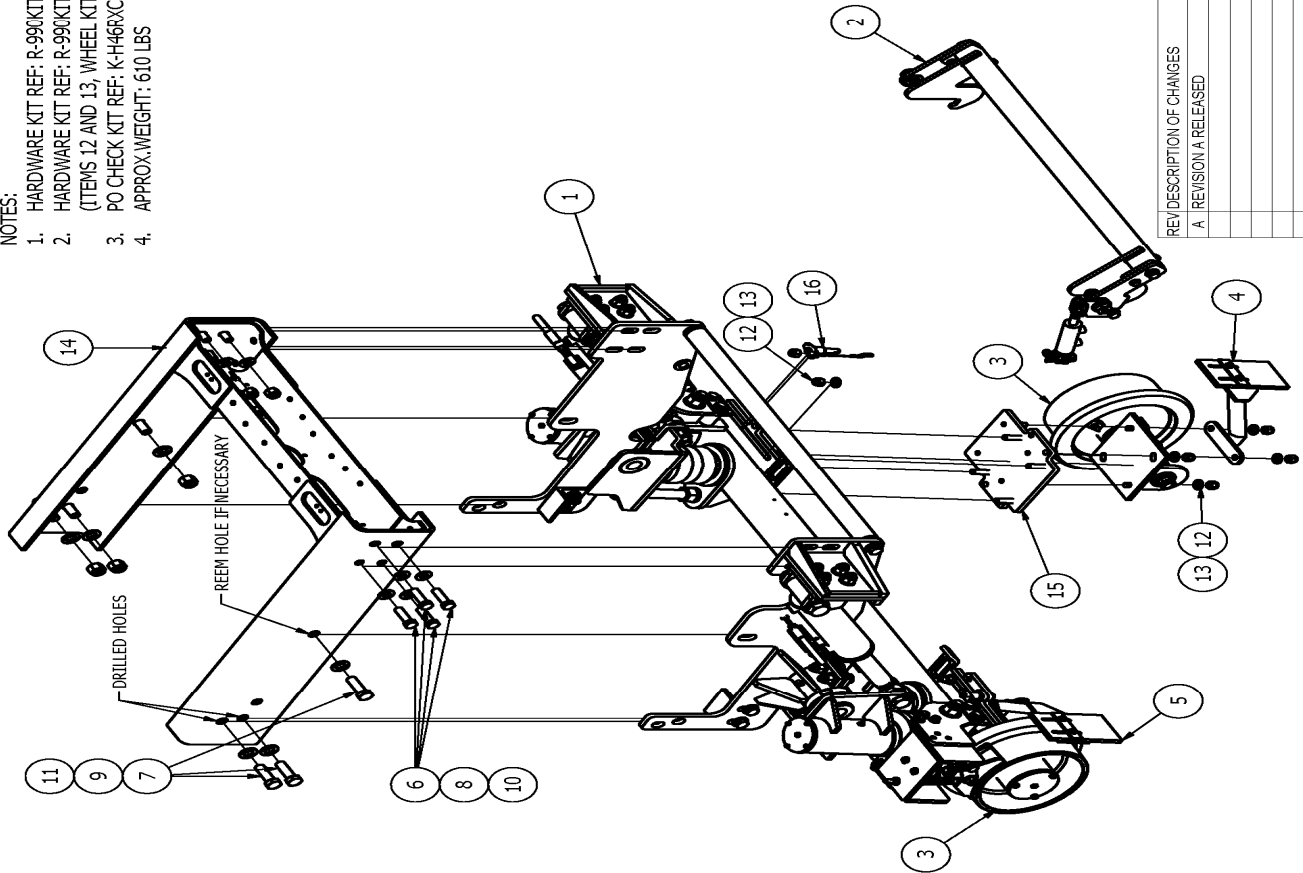


Figure 12: Gear In Trolley Gage

PARTS OF R-490 ROTARY REAR RAILGEAR

PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-20520	R-490 ROTATING REAR ASSY FOR CV515	1
2	R-20525	R-490 ADJ. AXLE LOCKUP ASSY, HYD	1
3	R-001	10" WHEEL ASSEMBLY	2
4	R-20120D	R-460 DRIVER RAIL SWEEP	1
5	R-20120P	R-460 PASSENGER RAIL SWEEP	1
6	H.H.C.S	5/8" UNC, 2 1/4" LG, GR.8	8
7	H.H.C.S	3/4" UNC, 2 1/2" LG, GR.8	6
8	F' WASHER	5/8" TYPE A, GR. 8	16
9	F' WASHER	3/4" TYPE A, GR. 8	12
10	NYLOCK NUT	5/8" UNC, GR.8	8
11	NYLOCK NUT	3/4" UNC, GR.8	6
12	F' WASHER	1/2" TYPE A, GR. 8	16
13	NYLOCK NUT	1/2"-20 UNF, GR.8	16
14	REF 1	CV515 FRAME	1
15	R20502	PLATE ASSY, ADJ. SLIDING (TROLLEY)	2
16	R25108	QUICK RELEASE PIN 1/2" X 1"	4

- NOTES:
 1. HARDWARE KIT REF: R-990KIT-449
 2. HARDWARE KIT REF: R-990KIT-461 (ITEMS 12 AND 13; WHEEL KIT, 2X)
 3. PO CHECK KIT REF: K-H46RX/C001-PO
 4. APPROX. WEIGHT: 610 LBS



G & B SPECIALTIES INC. MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK, PENNSYLVANIA (717) 752-5901, FAX (717) 752-6397				
DESIGN - ENGINEERING - MANUFACTURING R-490 ROTARY REAR ADJ. W/ HYD AXLE LOCK, CV515 SHEET/FORMING NUMBER: 10/11220 DATE DRAWN: PART NUMBER:				
REV/DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #
A REVISION 1 RELEASED	10/12/20	AFF		
APPROVED	CHECKED	DESIGNED	MANUFACTURED	TESTED
S	M	M	S	M
1	10/12/20	K-R49RXR20520	10/12/20	K-R49RXR20520
ALL WELDS TO CONFORM TO AWS D1.1				REVISION
				A

Figure 11: K-R49RXR20520 Sheet 1 (R-490 Rotary Rear with Hydraulic Lock)

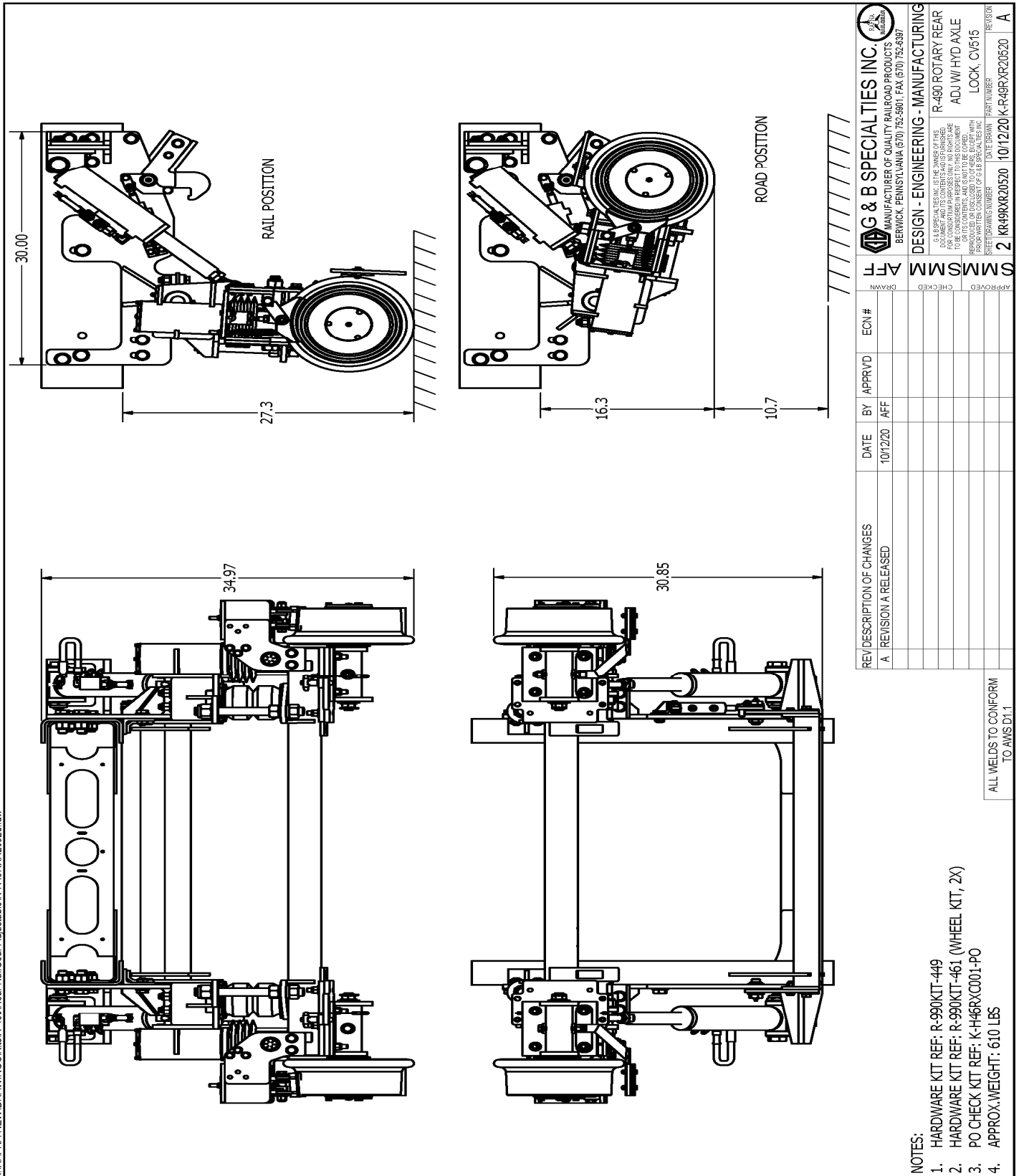


Figure 12: K-R49RXR20520 Sheet 2 (R-490 Rotary Rear with Hydraulic Lock)

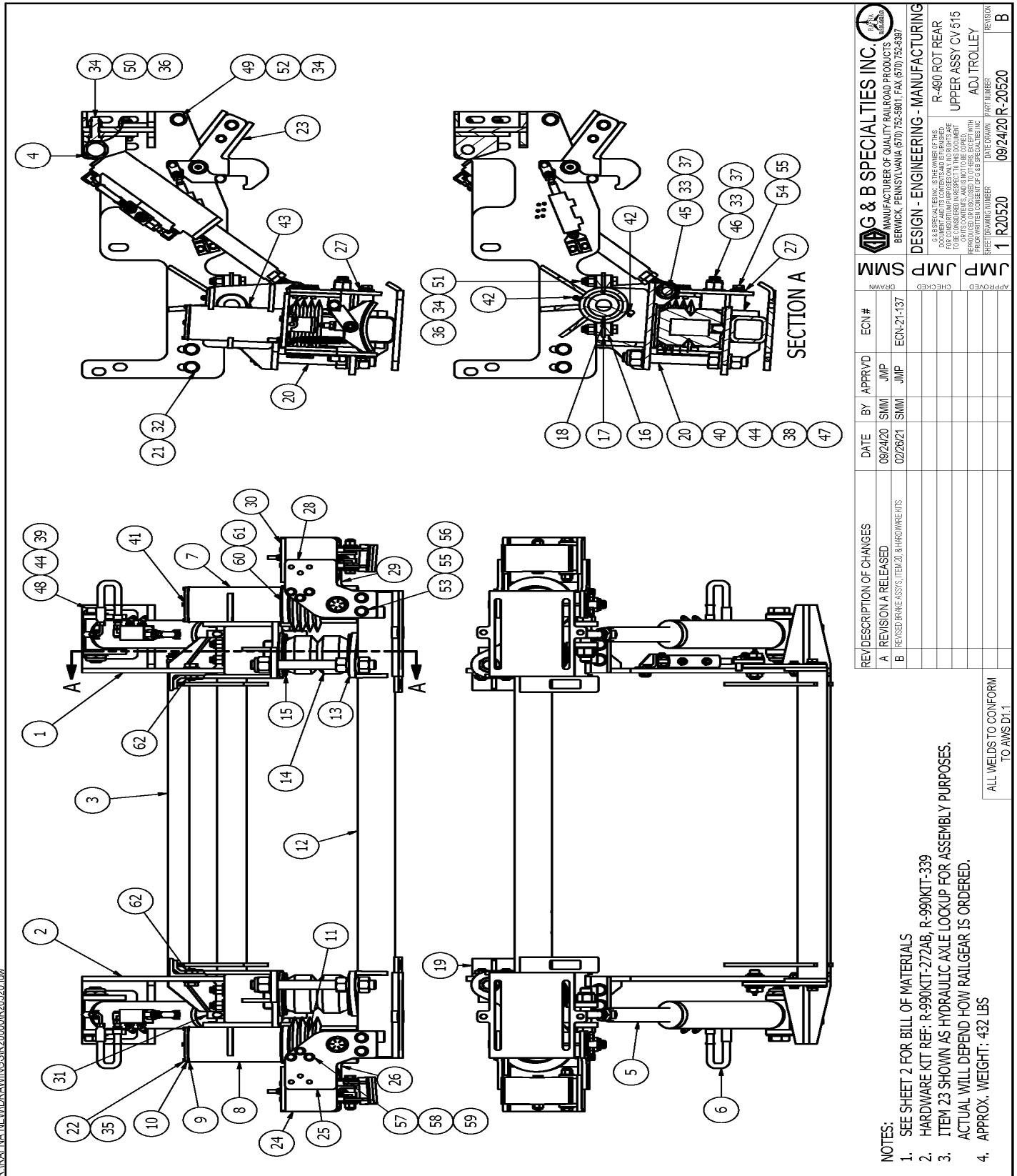


Figure 13: R-20520 Sheet 1 (R-490 Rotary Rear Upper Assembly)

REVISION	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	APPROVED	DRAWN
A	REVISION A RELEASED	09/24/20	SMM	JMP	ECN-21137		SMM
B	REVISED BRAKE ASSY ITEM 21 & HARDWARE FITS	02/26/21	SMM	JMP			JMP

DESIGN - ENGINEERING - MANUFACTURING	DESIGN - ENGINEERING - MANUFACTURING
R-490 ROT REAR UPPER ASSY CV 515	R-490 ROT REAR UPPER ASSY CV 515
ADJ TROLLEY	ADJ TROLLEY
1 R20520	09/24/20 R-20520
B	B

NOTES:

- SEE SHEET 2 FOR BILL OF MATERIALS
- HARDWARE KIT REF: R-990KIT-272AB, R-990KIT-339
- ITEM 23 SHOWN AS HYDRAULIC AXLE LOCKUP FOR ASSEMBLY PURPOSES. ACTUAL WILL DEPEND HOW RAILGEAR IS ORDERED.
- APPROX. WEIGHT: 432 LBS

ALL WELDS TO CONFORM TO AWS D1.1

PARTS LIST				PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-20401D	R-460 MOUNTING BRACKET DRIVER SIDE CV 515	1	32	990729-150-22	SCREW, 5/8" X 1 1/2" JNC GR. 8 Z/Y	4
2	R-20401P	R-460 MOUNTING BRACKET PASSENGER SIDE CV 515	1	33	990600-087-002	WASHER, 7/8" NARROW FLAT Z/Y	8
3	R-20228	CROSS BRACE	1	34	990600-062-002	WASHER, 5/8" NARROW FLAT Z/Y	34
4	R-20186	CYLINDER SUPPORT BRACKET REAR	2	35	990401-010-02	#10 GR. 8 LOCK WASHER	8
5	R-20087B	HYD CYLINDER ASSY 2 3/4" BORE 7.44" STROKE	2	36	990316-062-22	NUT, 7/8" GR 8 HEX NYLOCK Z/Y	16
6	K-H46XC001-PO	HYDRAULIC PO CHECK ASSY CV 515	1	37	990338-087-22	NUT, 7/8" GR 8 HEX NYLOCK Z/Y	4
7	R-20171D	UPPER PIVOT BOX WELDMENT DRIVER	1	38	990316-100-22	NUT, 1" GR 8 HEX NYLOCK Z/Y	2
8	R-20171P	UPPER PIVOT BOX WELDMENT PASSENGER	1	39	990314-100-22	NUT, 1" REG HEX JAM NYLON INSERT	2
9	R-20085A	GASKET, OUTER GUIDE TUBE CAP	2	40	990311-100-22	NUT, 1" REG HEX GR 8 Z/Y	2
10	R-20183	CAP OUTER GUIDE	2	41	R-021	1/8 NPT STRAIGHT GREASE ZERK RELIEF	2
11	R-20194A	INNER GUIDE ASSEMBLY	2	42	990900-008	1/8 NPT 90° ZERK	4
12	R20521	LOWER AXLE R-450 REAR	1	43	990900-009	1/8 NPT ST ZERK	2
13	R-20190A	SPRING PLATE, REAR	2	44	990603-100-002	WASHER, 1" NARROW FLAT Z/Y	6
14	R-5683	TIMBREN 540175 SPRING	2	45	990285-450-22	SCREW, 7/8" X 4 1/2" JNC GR. 8 Z/Y	2
15	R-20190	SPRING PLATE, REAR	2	46	990733-900-22	SCREW, 7/8" X 9" UNC GR. 8 Z/Y	2
16	R-20192	BEARING CAP 2 1/2"	2	47	990401-100-02	WASHER, 1" REG LOCK Z/Y	4
17	R-20191	SHIM BEARING CAP	4	48	990735-550-22	SCREW, 1" X 5 1/2" GR 8 HEX CAP Z/Y	2
18	R-20193	BEARING	2	49	990729-200-22	SCREW, 5/8" X 2" GR 8 HEX CAP Z/Y	2
19	R-20205	ANGLE, SUPPORT	2	50	990729-225-22	SCREW, 5/8" X 2 1/4" GR 8 HEX CAP Z/Y	8
20	R-20543	ADJUSTING ROD	2	51	990729-250-22	SCREW, 5/8" X 2 1/2" GR 8 HEX CAP Z/Y	8
21	R-20273	WASHER, SPACER	4	52	990401-062-02	WASHER, 5/8" REG LOCK Z/Y	2
22	R-20105	MACHINE SCREW, 10-24 X 5/8" LG	8	53	990727-175-22	SCREW, 1/2" X 1 3/4" GR 8 HEX CAP Z/Y	4
23	R-20525	LOCK-UP ASSY, HYDRAULIC	1	54	990727-300-22	SCREW, 1/2" X 3" GR 8 HEX CAP Z/Y	4
24	R-20530P	R490 ADJ. PS REAR BRAKE HALF ASSY	1	55	990401-050-02	WASHER, 1/2" REG LOCK Z/Y	8
25	R-20532P	ARM, SLOTTED REAR WELDMENT INSIDE PS	1	56	990600-050-002	WASHER, 1/2" SAE FLAT Z/Y	4
26	R-20533P	ARM, SLOTTED REAR WELDMENT OUTSIDE PS	1	57	990725-125-22F	SCREW, 3/8" X 1 1/4" JNF GR 8 HEX CAP Z/Y	12
27	R-20539	WASHER, BRAKE	2	58	990403-037-02	WASHER, 3/8" XDUTY LOCK Z/Y	12
28	R-20532D	ARM, SLOTTED REAR WELDMENT INSIDE DS	1	59	990600-037-002	WASHER, 3/8" SAE FLAT Z/Y	12
29	R-20533D	ARM, SLOTTED REAR WELDMENT OUTSIDE DS	1	60	R-6523	BELLOW	2
30	R-20530D	R490 ADJ. DS REAR BRAKE HALF ASSY	1	61	R-064	CLAMP, BELLOWS	2
31	R-20189	SHAFT COLLAR	2	62	990314-062-22	NUT, 5/8" GR 8 REG HEX JAM NYLOCK Z/Y	4

NOTES:

- SEE SHEET 2 FOR BILL OF MATERIALS
- HARDWARE KIT REF: R-990KIT-272AB, R-990KIT-339
- ITEM 23 SHOWN AS HYDRAULIC AXLE LOCKUP FOR ASSEMBLY PURPOSES. ACTUAL WILL DEPEND HOW RAIL GEAR IS ORDERED.
- APPROX. WEIGHT: 432 LBS


 G & B SPECIALTIES INC. MANUFACTURER OF QUALITY RAILROAD PRODUCTS. BERWICK, PENNSYLVANIA (570) 752-5901 FAX (570) 752-6387	
DESIGN - ENGINEERING - MANUFACTURING	
R-490 ROT REAR UPPER ASSY CV 515	R-490 ROT REAR UPPER ASSY CV 515
DATE DRAWN: 09/24/20	PART NUMBER: R-20520
SHEET DRAWING NUMBER: 2	REV: 001
APPROVED: JMP	CHECKED: JMP
DATE: 02/28/21	BY: JMP
DATE: 09/24/20	BY: JMP
ECN #: ECN-21-137	ECN #: ECN-21-137

Figure 14: R-20520 Sheet 2 (R-490 Rotary Rear Upper Assembly)

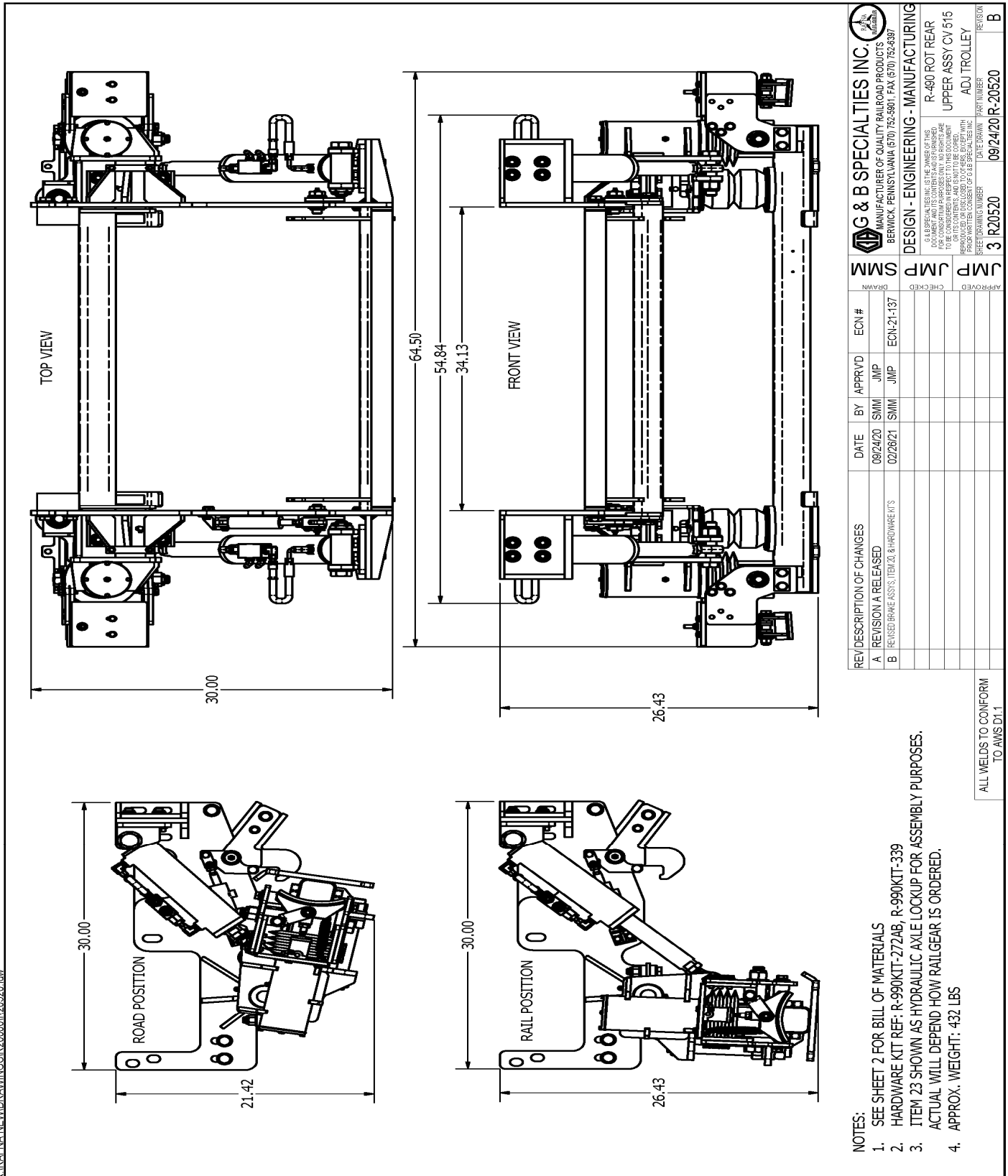


Figure 15: R-20520 Sheet 3 (R-490 Rotary Rear Upper Assembly)

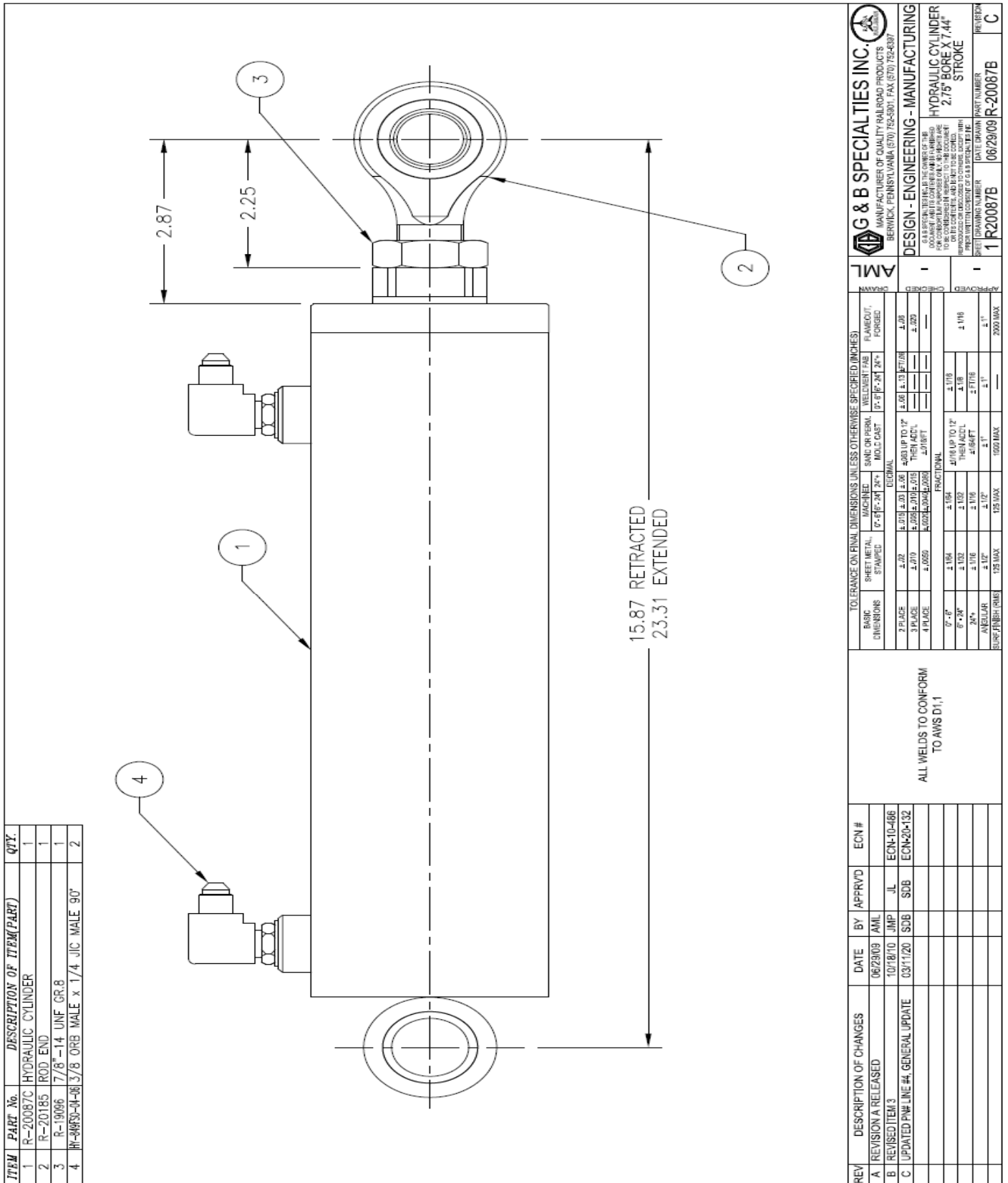


Figure 16: Hydraulic Cylinder (R-20087B)

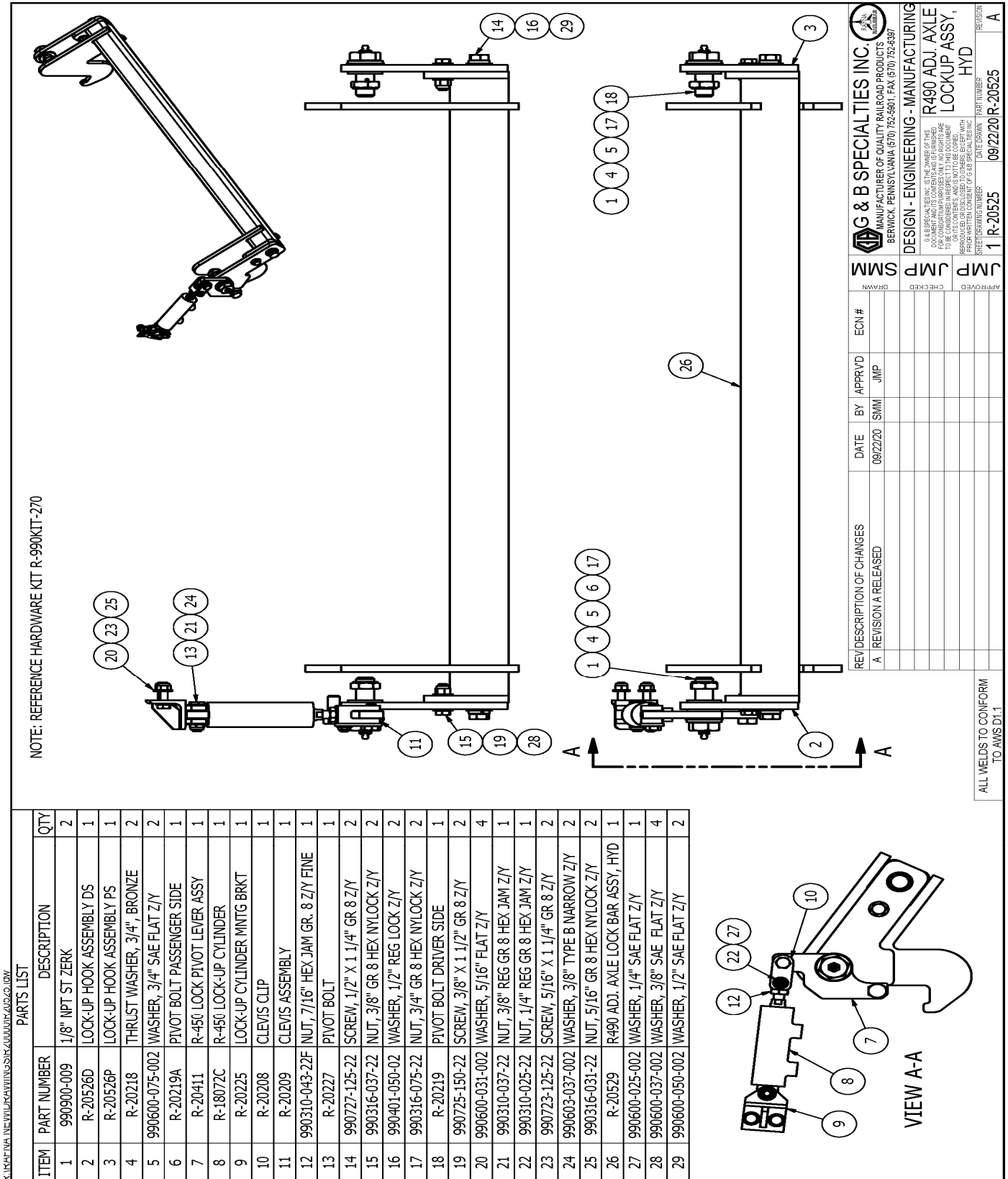


Figure 17: R-20525, Hydraulic Lock Assembly

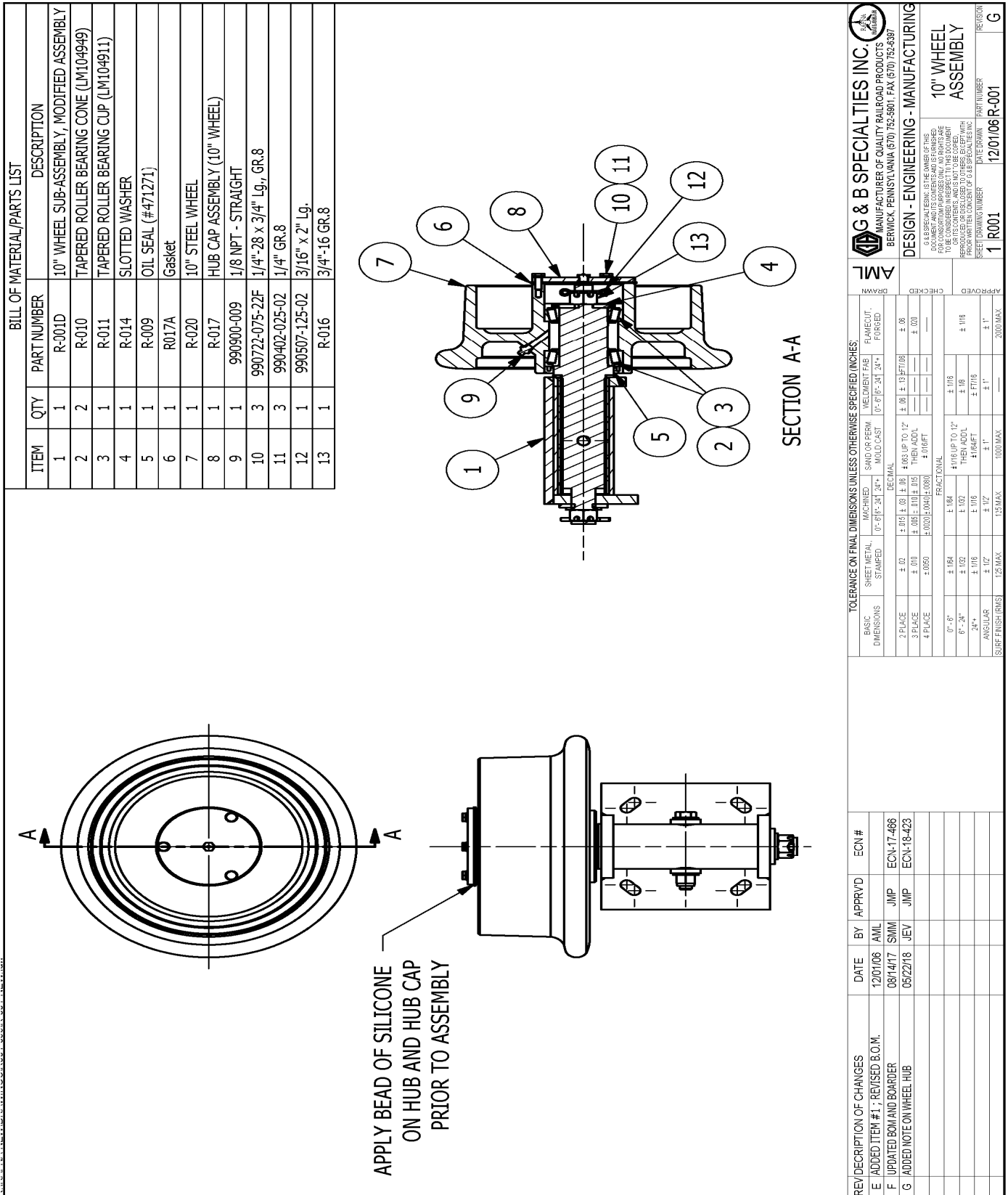


Figure 18: Rail Wheel Assembly (R-001)

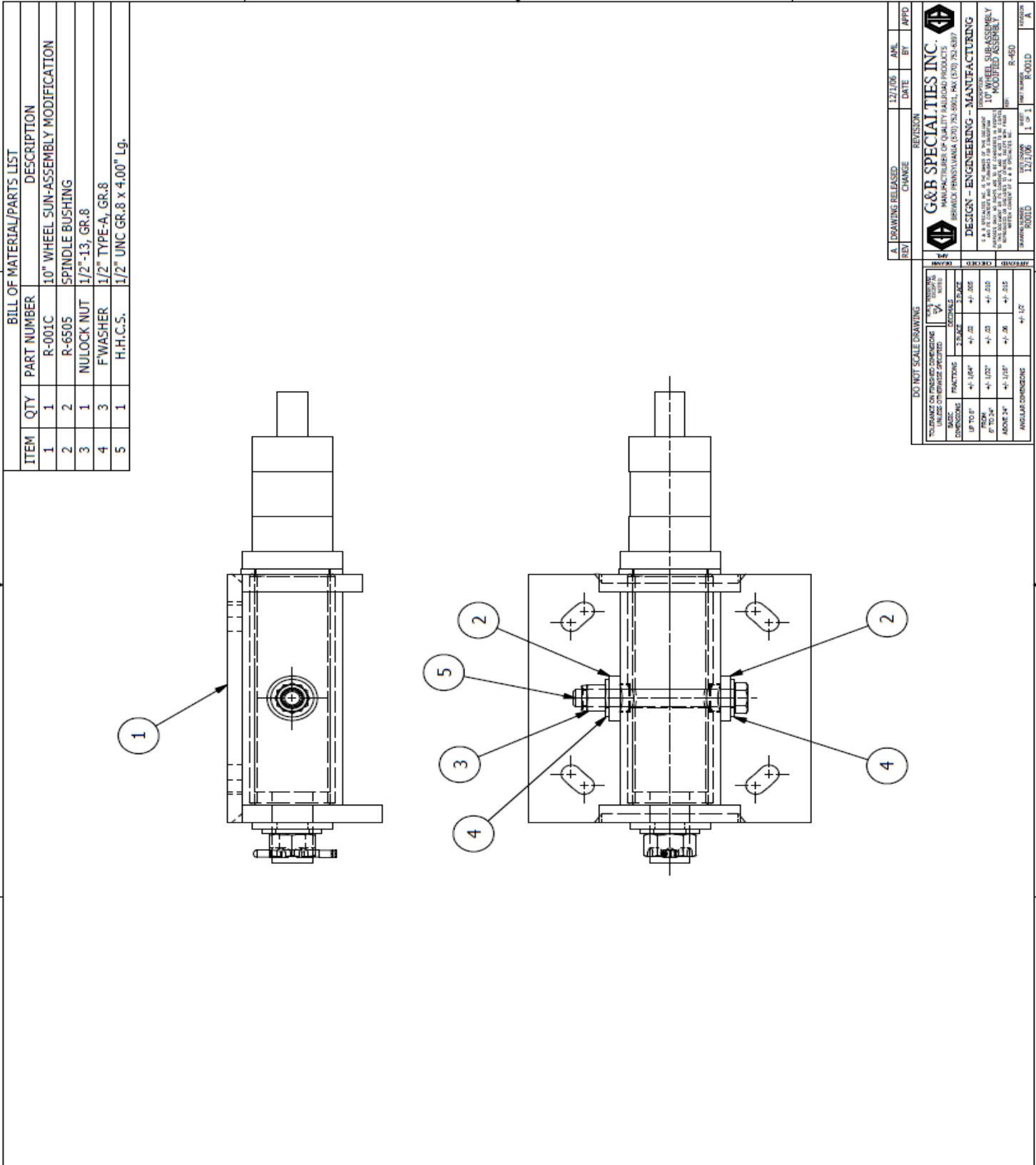


Figure 19: R-001D (Spindle Assy Complete)

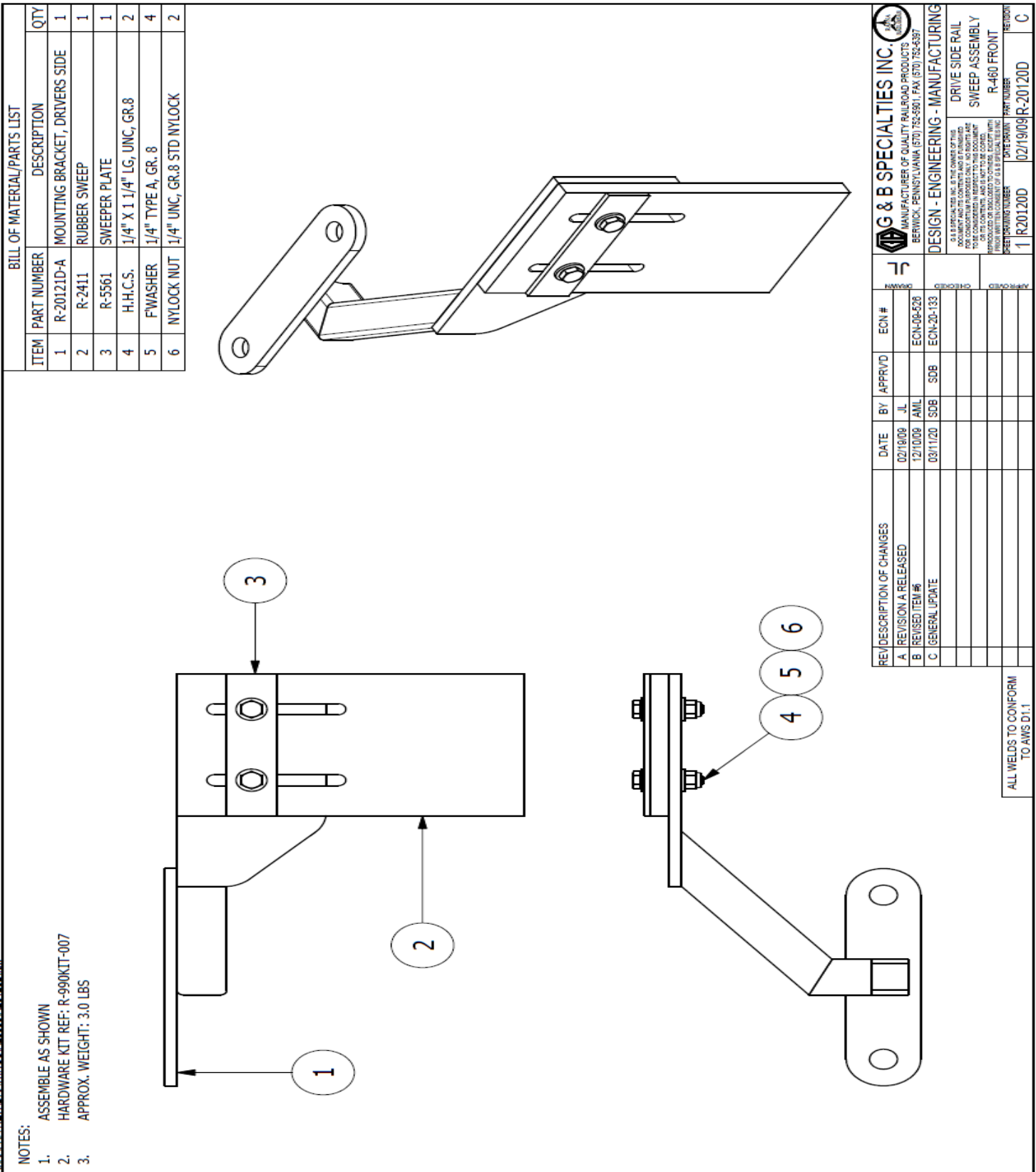


Figure 20: Driver Side Rail Sweep (R-2012D)

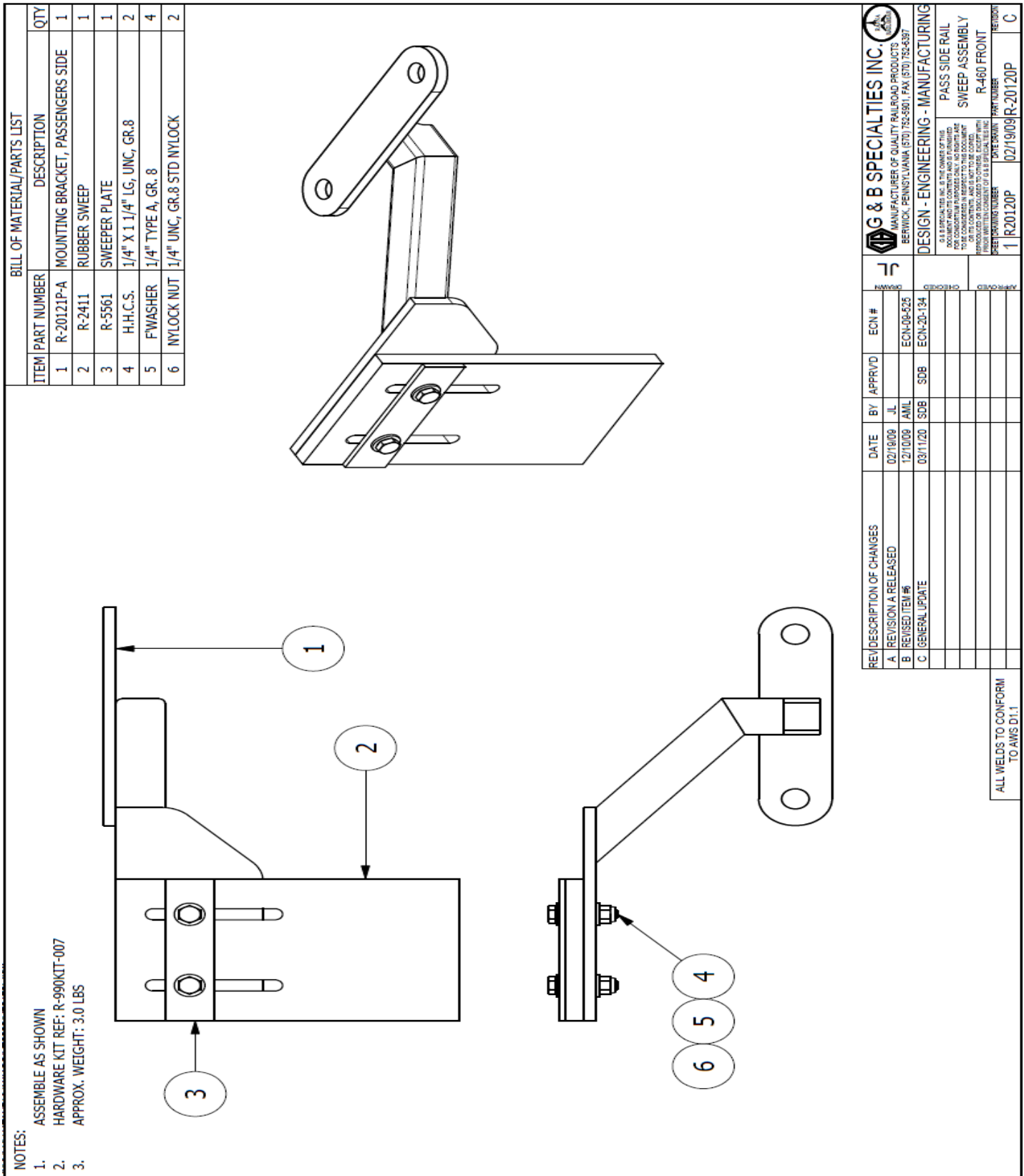


Figure 21: Passenger Side Rail Sweep (R-20120P)