

**INSTALLATION OF R-230 REAR RAILGEAR KIT
STANDARD / IN-CAB / FULL IN-CAB CONTROLS
2005-2012 GMC CANYON/ CHEVROLET COLORADO
2017-PRESENT FORD RANGER (MEXICO)
2019-PRESENT FORD RANGER (U.S.)**

INSTALLATION SAFETY PRECAUTIONS

If any installation problems are encountered, please call G&B Specialties, Inc. 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.
- 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.
- Railway Company rules governing rail travel must always be observed.
- Never operate the vehicle if the Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rating (GAWR), or the wheel or tire load ratings are exceeded.
- Max vehicle speed on rail not to exceed 45 MPH.

INSTALLATION OF REAR RAILGEAR KIT

The following procedure details the installation of the rear railgear kit.

Table 1: Railgear Kit Installation Parts

Part Number	Description	QTY
R-20341	R-230 31" Upper Unit Assembly (Standard/In-Cab)	1
R-20361	R-230 31" Upper Unit Assembly (Full In-Cab)	
R-20060	Rail Wheel Assembly	2
R-20242D	Rail Sweep	1
R-20242P	Rail Sweep	1
R-990KIT-283 Wheel Mounting Hardware	1/2" UNC Gr. 8 Bolt x 1.50"	4
	1/2" UNC Gr. 8 Bolt x 1.75"	4
	1/2" Gr. 8 Washer	16
	1/2" UNC Gr. 8 Nylon Insert Lock Nut	8

1. Ensure that the rear mounting kit has been installed on the vehicle prior to installing the railgear kit.
2. To install the railgear at the correct height, ensure that the vehicle is resting on its four properly inflated tires. The recommended minimum tire size is 235/75R15.
3. Measure from the bottom of the railgear mounting bracket to the ground as shown and subtract 1 1/2" from that measurement. (1 1/2" is the estimated drop in suspension with the railgear mounted) Determine what combination of railgear mounting shims are required to set the railgear mounting surface at approximately 14 1/2" - 15" from the ground. Railgear mounting shims are supplied with the respective mounting kit. If this height cannot be achieved with the supplied shims, the vehicle suspension will need to be modified. This modification is not included with the Rafna railgear.

Example:

Initial measurement from mounting bracket to ground: 19"

Subtract 1 1/2" from initial measurement: 19" - 1 1/2" = 17 1/2"

Use 17 1/2" to determine the amount of railgear shim to be used:

17 1/2" - 15" = 2 1/2" shim

4. If using more than one shim, it is important to stagger the shims as shown.
5. The hydraulic cylinder should be facing towards the rear of the vehicle when installed.
6. Raise the railgear to the mounting plates using the railgear mounting shims as required between the mounting plates and the railgear. Align the holes in the railgear and shims with the slots in the mounting plates. Center the railgear on the mounting plate slots. Ensure that the railgear does not contact any vehicle components (the vehicle exhaust system and bumpers can be modified as noted later in this procedure). Fasten the railgear and shims to the mounting plates using four suitably long 5/8" bolts, eight 5/8" washers, and four 5/8" nuts.

7. Check the railgear mounting height after the railgear is installed. The mounting height should be between 14 1/2" -15" from the ground.
8. If the mounting height needs to be adjusted: loosen but do not remove the 5/8" railgear mounting bolts to allow shims to be removed or added as required to achieve the proper mounting height. Be sure to stagger the shims as shown.
9. Tighten but do not torque the 5/8" fasteners as they will be torqued following the railgear alignment procedure.
10. Manually rotate the railgear to mid travel to ease installation of the rail wheels and rail sweeps.
11. Place the rail wheels below the mounting tables on the railgear axle. Place the rail sweeps in front of the rail wheels and below mounting tables. Fasten the rail wheels and rail sweeps to the mounting tables with the supplied 1/2" hardware.

12. Tighten but do not torque the 1/2" fasteners as they will be torqued following the railgear alignment procedure.

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

13. Follow the Railgear Over-Center Adjustment procedure detailed in the Railgear Kit Operation, Service and Parts manual. Ensure the cylinder rod-end lock nut is re-tightened following this adjustment.
14. With the railgear fully raised to the road position, ensure that the railgear lock pin properly engages the lock cam. It may be necessary to grind the lock cam slightly to ensure proper fit.
15. Follow the Rail Wheel Load Adjustment procedure detailed in the Railgear Kit Operation, Service and Parts manual.
16. Follow the Railgear Alignment procedure detailed in the Railgear Kit Operation, Service and Parts manual.
17. Follow the Rail Sweep Adjustment procedure detailed in the Railgear Kit Operation, Service and Parts manual.
18. Torque all fasteners as detailed in the Railgear Kit Operation, Service and Parts manual.
19. Grease the railgear at all lubrication points as detailed in the Railgear Kit Operation, Service and Parts manual.
20. Install the vehicle bumper. Rotate the railgear up to the road position. Take note of where the railgear, rail wheels, and/or rail sweeps contact the vehicle bumper. Trim and reinforce the bumper as required. Ensure there is enough clearance to accommodate side-to-side adjustment and rail wheel load adjustment of the railgear.

OPERATION, SERVICE AND PARTS REAR OF R-230 RAILGEAR KIT
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OPERATION AND SERVICE SAFETY PRECAUTIONS

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



CAUTION
WARNING

- 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.
- Ensure that the position and function of all railgear controls are known before attempting operation.
- Ensure the railgear is locked in road or rail position before starting road or rail travel respectively.
- Ensure all body parts and loose clothing are clear of any moving parts of the equipment.
- If misalignment of the railgear equipment is indicated, promptly perform the alignment procedure.
- Before performing any work under the vehicle or railgear, ensure the engine is turned off and the parking brake is set.
- Never operate the vehicle if the Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rating Front or Rear (GAWR), or the wheel or tire load ratings are exceeded.

OPERATION OF RAILGEAR KIT (STANDARD/IN-CAB CONTROLS)

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.

Never operate the vehicle if the Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rating Front or Rear (GAWR), or the wheel or tire load ratings are exceeded.

Refer to the Hydraulic Kit Operation, Service, and Parts manual for information on the location and operation of the railgear hydraulic system controls.

Placing the Vehicle on Rail - To Lower the Railgear:

1. Disengage the lock pin by pulling on the locking cable handle. Do not force the locking cable. If the lock pin cannot be disengaged, raise the railgear slightly.
2. Hold the locking cable handle in the disengaged position.
3. Lower the railgear and release the locking cable handle once the railgear has rotated past the road locked position.
4. As the railgear is being deployed, it will start taking some of the vehicle's load. (If this is not the case, **DO NOT** use the railgear. Inspect the railgear for lubrication and damage.)
5. Continue lowering the railgear until the hydraulic cylinder is fully extended and the lock pin re-engages in the rail position. Some railgear models have a lock cam converter installed to prevent the lock pin from engaging in the rail position; they have a hydraulic lock instead.
6. Ensure that the railgear is fully deployed and about 2° - 3° over-center before proceeding.

Removing the Vehicle from Rail - To Raise the Railgear:

1. Disengage the lock pin by pulling on the locking cable handle. Do not force the locking cable. If the lock pin cannot be disengaged, lower the railgear slightly. Some railgear models have a lock cam converter installed to prevent the lock pin from engaging in the rail position in which case the lock pin does not need to be disengaged.
2. Raise the railgear and release the locking cable handle once the railgear has rotated past the rail locked position.
3. Continue raising the railgear until the lock pin clicks into the road locked position. The hydraulic cylinder should be completely retracted.

OPERATION OF RAILGEAR KIT (FULL IN-CAB CONTROLS)

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.

Never operate the vehicle if the Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rating Front or Rear (GAWR), or the wheel or tire load ratings are exceeded.

Refer to the Hydraulic Kit Operation, Service, and Parts manual for information on the location and operation of the railgear hydraulic system controls.

Placing The Vehicle On Rail - To Lower The Railgear:

1. Prior to approaching the rail crossing, remove the manual safety lock pins from the front and rear railgear. It may be necessary to raise the railgear off the lock pins. Store the lock pins in secure place in the vehicle.
2. Lower the railgear.
3. As the railgear is being deployed, it will start taking some of the vehicle's load. (If this is not the case, **DO NOT** use the railgear. Inspect the railgear for lubrication and damage.)
4. Continue lowering the railgear until the hydraulic cylinder is fully extended.
5. Ensure that the railgear is fully deployed and about 2° - 3° over-center before proceeding.

Removing The Vehicle From Rail - To Raise The Railgear:

1. Raise the railgear.
2. Continue raising the railgear until the hydraulic cylinder is completely retracted.
3. Once the vehicle is clear of the rails, insert the manual safety lock pin through the lock guides.

SERVICE OF RAILGEAR KIT

The railgear kit must be serviced regularly to avoid damage to the equipment. Table 1 below provides the Recommended Service Schedule and the detailed service procedures follow.

Non-standard fastener torque values relative to this railgear are shown in Figure 1. Table 2 provides all other Standard Fastener Torque Values.

Grease fittings are provided at all railgear lubrication points as shown in Figure 2. 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 1: Recommended Service Schedule

Service Required	Daily	Weekly	Monthly	3 Months	6 Months	12 months
Visually inspect the railgear for damaged or worn parts	✓	✓	✓	✓	✓	
Check for loose rail wheels and fasteners (re-torque if required)	✓	✓	✓	✓	✓	
Ensure railgear lock pin is functioning correctly	✓	✓	✓	✓	✓	
Ensure the vehicle is in good operating condition	✓	✓	✓	✓	✓	
Inspect the rail wheel flanges for wear (use Rafna wear gauge)				✓	✓	
Inspect all hydraulic components for leaks or wear	✓	✓	✓	✓	✓	
Check and adjust rail sweeps			✓	✓	✓	
Grease railgear inner and outer guide tubes		✓	✓	✓	✓	
Grease railgear inner tube lower pivot point			✓	✓	✓	
Grease railgear locking pin			✓	✓	✓	
Check and adjust rail wheel bearing end-play			✓	✓	✓	
Grease rail wheel bearings (every 3000 rail kms or 1900 rail miles)				✓	✓	✓
Check and adjust rail wheel load						✓
Check and adjust rail wheel alignment						✓
Check and repack rail wheel bearings						✓

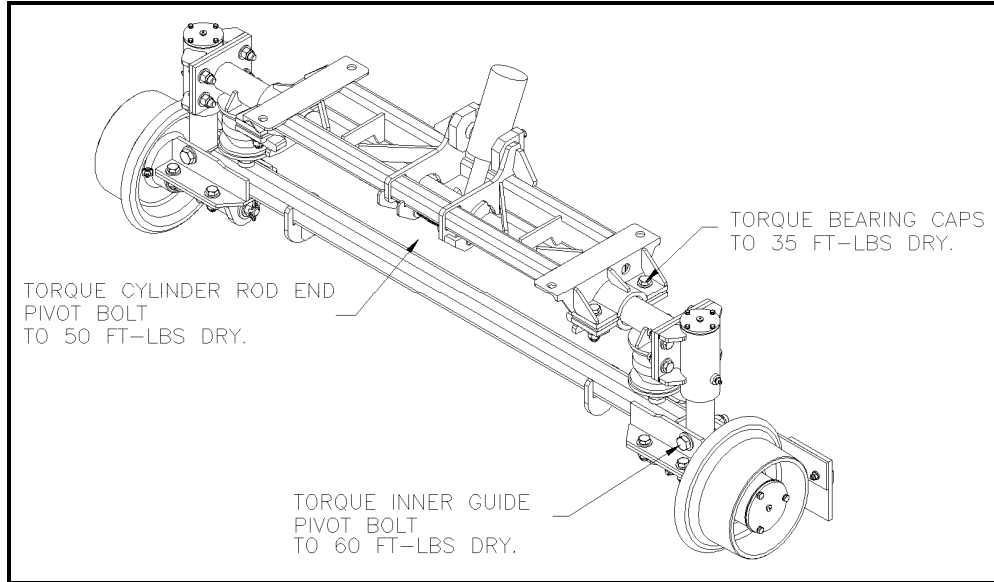


Figure 1: Non-standard torque values

Table 2: Standard Fastener Torque Values	
Fastener Size	Fastener Torque Value (ft-lbs)
5/8" UNC Gr. 8 Fasteners	150
1/2" UNC Gr. 8 Fasteners	100
3/8" UNC Gr. 8 Fasteners	40
1/4" UNC Gr. 8 Fasteners	12

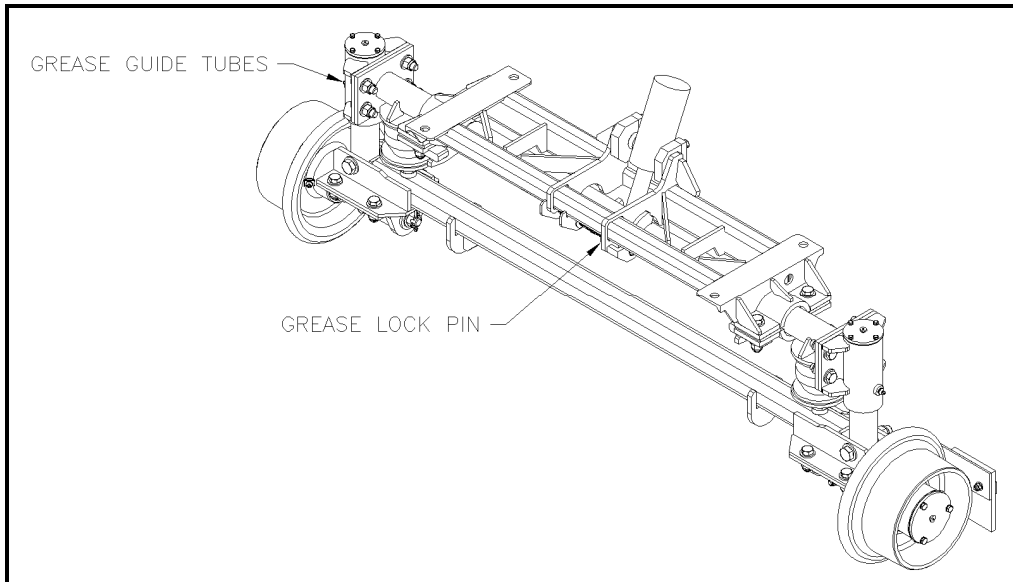


Figure 2: Railgear lubrication

RAILGEAR OVER-CENTER ADJUSTMENT

The railgear is designed to rotate slightly past vertical into the rail position to provide a secondary safety feature in the event of a hydraulic and / or lock pin failure. With this additional rotation, the railgear would have to lift the vehicle before it could rotate out of the rail position. 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 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 end out to increase the over-center angle or in to 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. Ensure that the cylinder is at full stroke.
4. Tighten the jam nut on the hydraulic cylinder rod end.
5. 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 and/or exhaust, it can be trimmed and reinforced as required. If vehicle exhaust modifications are necessary, ensure any exhaust system modifications conform to applicable laws and regulations.
6. With the railgear fully raised to the road position, ensure that the railgear lock pin properly engages the lock cam. It may be necessary to grind the lock cam slightly to ensure proper fit.
7. Note that some hydraulic kit installations provide a lock cam converter to prevent the railgear lock pin from engaging in the rail position. If such a lock cam converter was installed, skip this step. Otherwise, with the railgear fully lowered to the rail position, ensure that the railgear lock pin properly engages the lock cam. It may be necessary to grind the lock cam slightly to ensure proper fit.

RAIL WHEEL BEARING ADJUSTMENT

The rail wheel bearings require periodic adjustment in order to keep the end-play 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 end-play with the railgear in the road position and with the rail wheels free to turn.

Use a magnetic base dial gauge to measure the end-play of each rail wheel bearing. The bearing end-play 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 ¼" bolts and ¼" lock washers. Remove and discard the cotter pin from the ¾" 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 end-play 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 loose can be felt in the bearings. Re-adjust the bearing end-play with a torque wrench as soon as possible.
4. Install a new 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 ¼" bolts and new ¼" split lock washers. Blue Loctite can be used on the bolts as an added safety measure. Tighten and torque the ¼" 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 ¼" fasteners which 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 ¼" fasteners to 12 ft-lbs dry. Do not over torque.

RAIL WHEEL LOAD ADJUSTMENT

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 to avoid derailment. Likewise, a minimum amount of load must be maintained on the vehicle wheels to provide traction for acceleration and braking, this load at installation must be a minimum of 450 lbs and a maximum of 700 lbs and is checked as described below using a bottle jack equipped with a gauge.

The rail wheel load should be adjusted following the installation of the railgear and once the vehicle has had all of 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 permanent vehicle equipment is changed, or the vehicle suspension settles or is changed. The rail wheel load should be checked at regular intervals that coincide with regular maintenance schedule for the vehicle or minimally once a year during vehicle annual FRA inspection. 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 and the maximum wheel load of 1500 lbs per wheel is not exceeded.

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, if necessary, convert the pressure reading to a load reading using the supplied table.

Table 3: 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
300	180	210	240	270	300	330	370	410	450
310	190	210	240	270	310	340	380	420	460
320	190	220	250	280	320	350	390	430	480
330	200	230	260	290	330	370	400	450	490
340	200	230	270	300	340	380	420	460	500
350	210	240	270	310	350	390	430	470	520
360	220	250	280	320	360	400	440	490	530
370	220	260	290	330	370	410	450	500	550
380	230	260	300	340	380	420	470	510	560
390	230	270	310	350	390	430	480	530	580
400	240	280	310	350	400	440	490	540	590
410	250	280	320	360	410	450	500	550	610
420	250	290	330	370	420	470	520	570	620
430	260	300	340	380	430	480	530	580	640
440	260	300	350	390	440	490	540	600	650
450	270	310	350	400	450	500	550	610	670
460	280	320	360	410	460	510	560	620	680
470	280	320	370	420	470	520	580	640	700
480	290	330	380	430	480	530	590	650	710
490	290	340	380	430	490	540	600	660	730
500	300	350	390	440	500	550	610	680	740
510	310	350	400	450	510	560	630	690	760
520	310	360	410	460	520	580	640	700	770
530	320	370	420	470	530	590	650	720	790
540	320	370	420	480	540	600	660	730	800
550	330	380	430	490	550	610	670	740	820
560	340	390	440	500	560	620	690	760	830
570	340	390	450	510	570	630	700	770	850
580	350	400	460	510	580	640	710	780	860
590	350	410	460	520	590	650	720	800	880
600	360	410	470	530	600	660	740	810	890
610	370	420	480	540	610	680	750	830	910
620	370	430	490	550	620	690	760	840	920
630	380	430	490	560	630	700	770	850	940
640	380	440	500	570	640	710	790	870	950
650	390	450	510	580	650	720	800	880	970
660	400	460	520	590	660	730	810	890	980
670	400	460	530	590	670	740	820	910	990
680	410	470	530	600	680	750	830	920	1010
690	410	480	540	610	690	760	850	930	1020
700	420	480	550	620	700	780	860	950	1040
710	430	490	560	630	710	790	870	960	1050
720	430	500	570	640	720	800	880	970	1070
730	440	500	570	650	730	810	900	990	1080
740	440	510	580	660	740	820	910	1000	1100
750	450	520	590	660	750	830	920	1010	1110
760	460	520	600	670	760	840	930	1030	1130
770	460	530	600	680	770	850	940	1040	1140
780	470	540	610	690	780	860	960	1060	1160
790	480	550	620	700	790	870	970	1070	1170
800	480	550	630	710	800	890	980	1080	1190
810	490	560	640	720	810	900	990	1100	1200
820	490	570	640	730	820	910	1010	1110	1220
830	500	570	650	740	830	920	1020	1120	1230
840	510	580	660	740	830	930	1030	1140	1250
850	510	590	670	750	840	940	1040	1150	1260
860	520	590	680	760	850	950	1060	1160	1280
870	520	600	680	770	860	960	1070	1180	1290
880	530	610	690	780	870	970	1080	1190	1310
890	540	610	700	790	880	990	1090	1200	1320
900	540	620	710	800	890	1000	1100	1220	1340

Rail Wheel Load (lbs)

ADJUST EACH RAIL WHEEL LOAD AS FOLLOWS:

The load on the rail wheels is adjusted by adding or removing railgear shims as necessary to attain the proper rail wheel load. The same number of shims should be used on both sides of the railgear. The threaded adjustment rods can be used to fine tune the rail wheel load *but should not be used for the primary rail wheel load adjustment.*

1. Raise the railgear until the rail wheels are off the rails.
2. Loosen, but do not remove, the 5/8" fasteners securing the railgear to the railgear mounting brackets. Let the railgear drop far enough to enable shims to be added or removed.
3. It is recommended that shims be added or removed in 1/2" - 3/4" increments.
4. Ensure that the railgear shims are staggered as shown.
5. Tighten the 5/8" railgear mounting bolts.
6. Lower the railgear to the road position and check the rail wheel load. The railgear suspension spring should be compressed approximately 3/4"-1 1/2" under the recommended rail wheel load of 450 - 700lbs.
7. Repeat steps 1 thru 5 until the proper rail wheel load is achieved.
8. Following the rail wheel load 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.

RAILGEAR ALIGNMENT

The railgear must be correctly aligned 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.

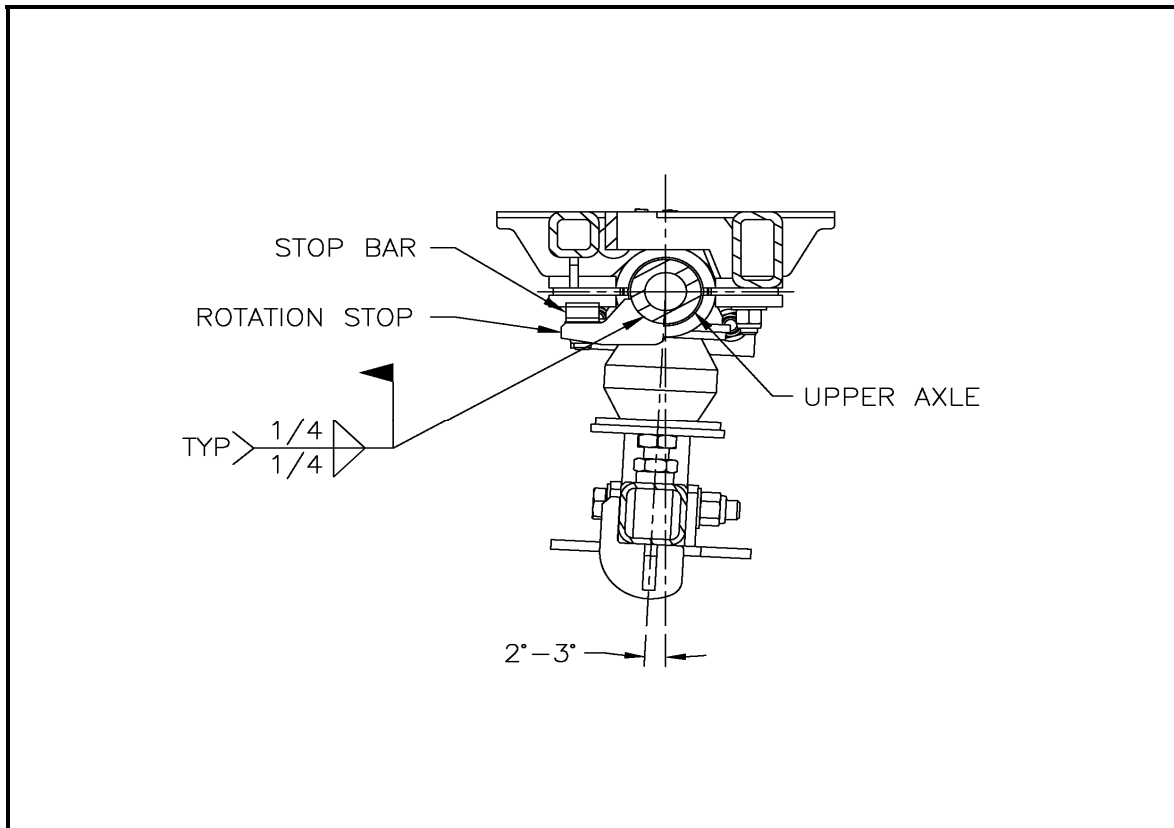
Each rail wheel is aligned by loosening the four ½" fasteners which secure it to the railgear axle. The rail wheel is then turned into alignment. The four ½" fasteners should then be tightened and torqued to 100 ft-lbs dry. Do not over torque.

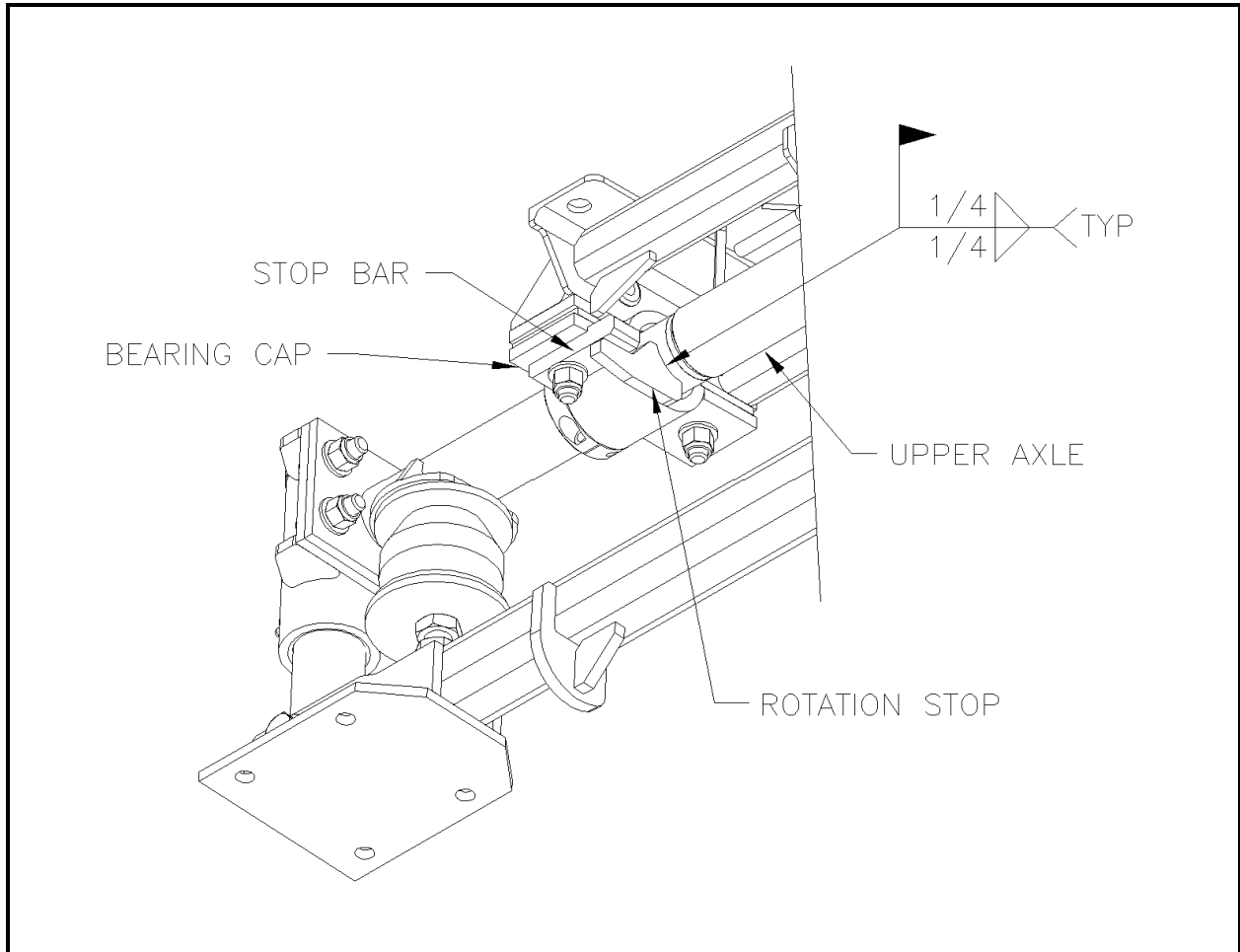
The railgear is aligned laterally by loosening the four 5/8" fasteners which secure it to the mounting plates and shaft collars. The railgear is then moved sideways into alignment. It may be necessary to raise the railgear off the rails to move the railgear side to side. Do not use any force against the railgear guide tubes as this may damage them and restrict suspension movement. The four 5/8" fasteners should then be tightened and torqued to 150 ft-lbs dry. Do not over torque. Tighten shaft collars.

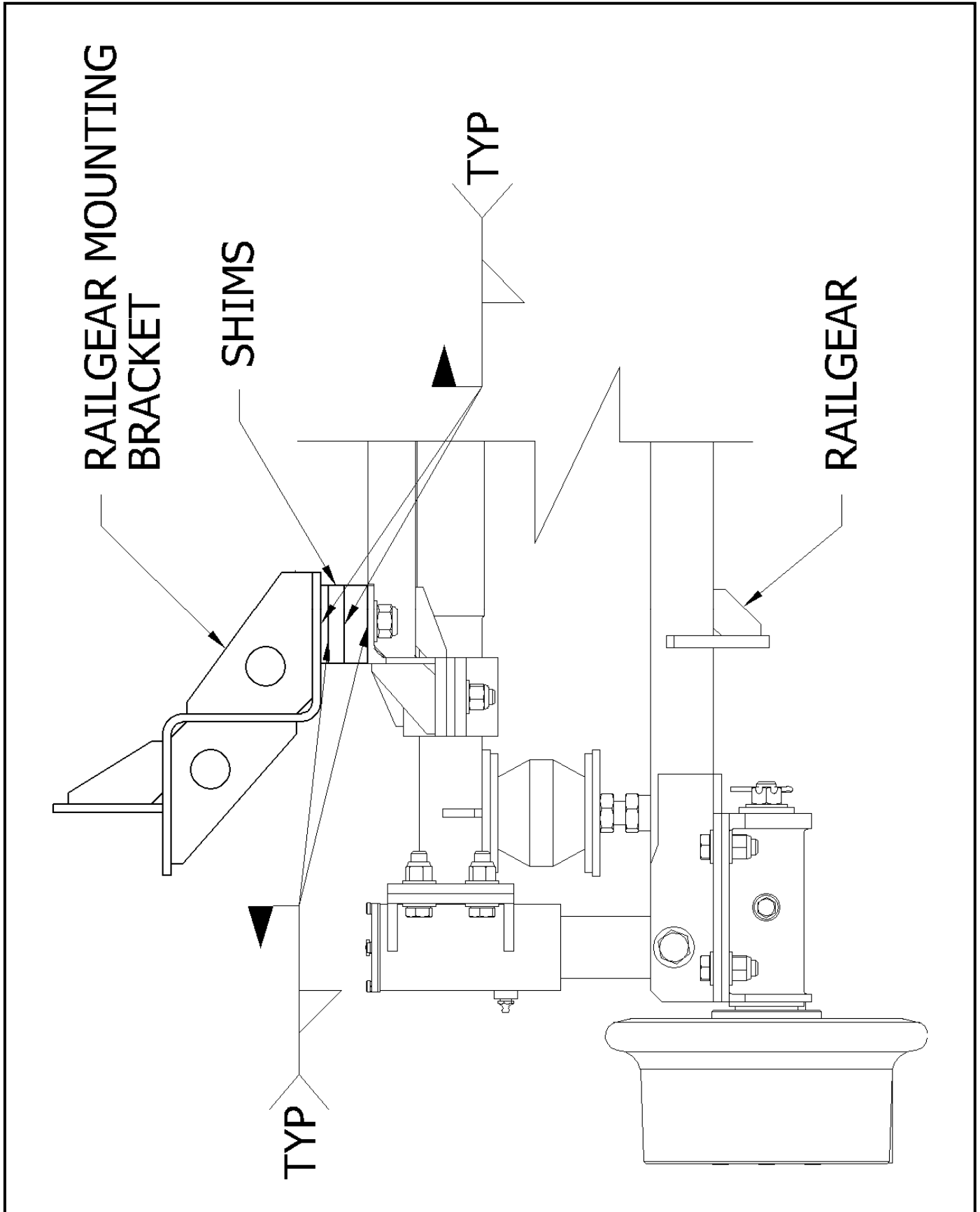
The railgear shims need to be tack welded to each other and to the railgear and railgear mounting bracket as shown. This is not to be done until all rail wheel loads have been adjusted and the railgear has been properly aligned.

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 bumper, it can be trimmed and reinforced as required. If there is interference with the vehicle exhaust system, it can be bent to fit, ensuring any exhaust system modifications conform to applicable laws and regulations.

Once the railgear alignment and the over center adjustment are complete, it will be necessary to weld the rotation stops to the railgear upper axle as shown.







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-230 model railgear can be ordered using the following part number; S-001200

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

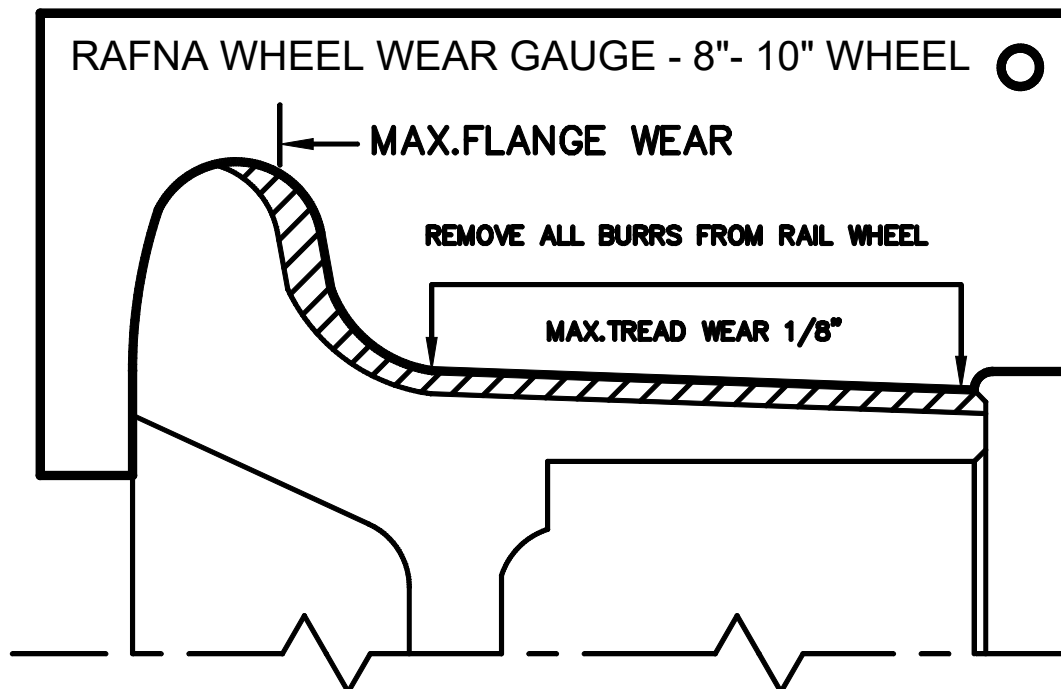
Flange Wear Limits:

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)
8	7 3/4



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"

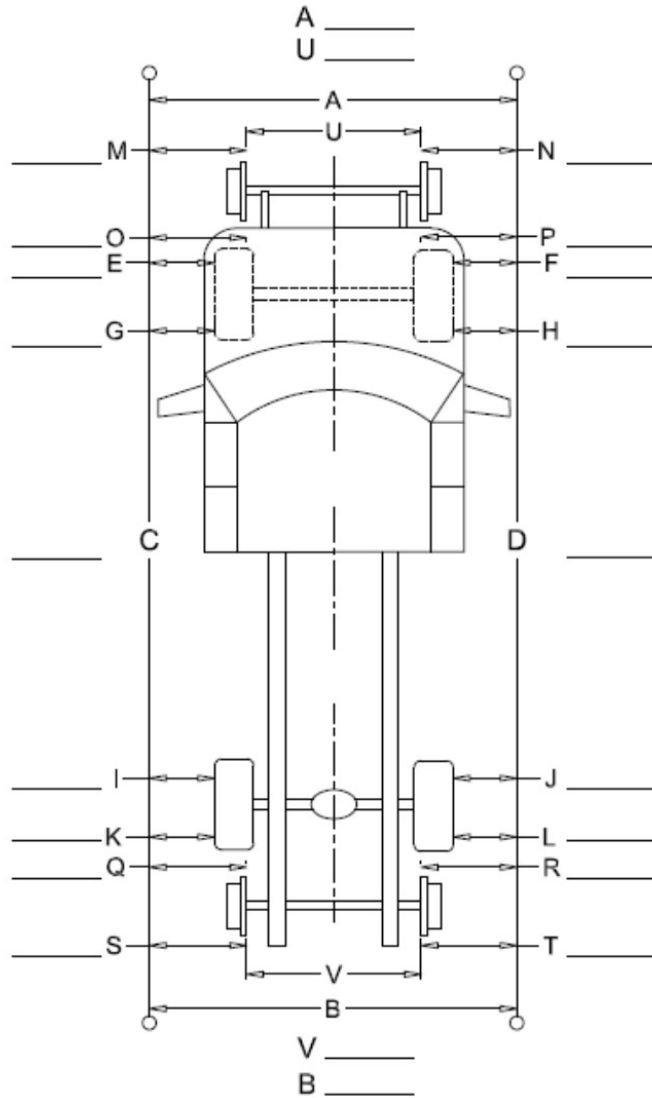
ADJUST RAILGEAR LATERAL ALIGNMENT
 M & O MUST EQUAL N & P WITHIN 1/8"
 Q & S MUST EQUAL R & T WITHIN 1/8"

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

OVER-CENTER ANGLE (DEGREE)
 FRONT _____
 REAR _____

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 _____



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: _____

FAX COMPLETED FORM TO JAKE SANUTE AT FAX # 570-802-0491

MAY 31, 2018 REV "D"

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: _____

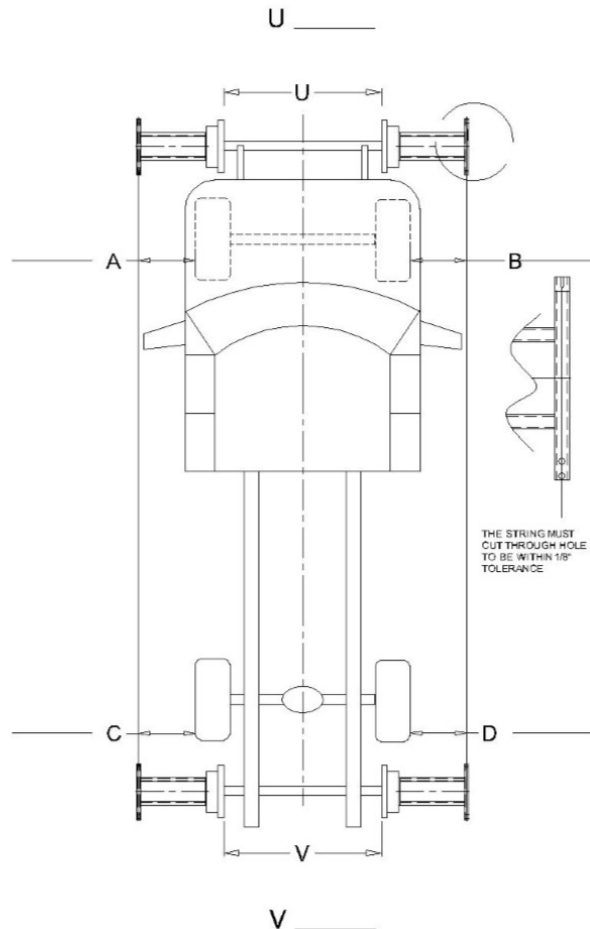
ADJUST RAILGEAR LATERAL ALIGNMENT
 A MUST EQUAL B WITHIN 1/8"
 C MUST EQUAL D WITHIN 1/8"

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

OVER-CENTER ANGLE (DEGREE)
 FRONT _____
 REAR _____

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 _____



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: _____

FAX COMPLETED FORM TO JAKE SANUTE AT FAX # 570-802-0491

MAY 31, 2018 REV B

PARTS OF RAILGEAR KIT

PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-20341	R-230 REAR UNIT	1
2	R-20060	8" WHEEL ASSEMBLY	2
3	R-20242D	RAIL SWEEP, DRIVERS SIDE	1
4	R-20342P	RAIL SWEEP, PASSENGERS SIDE	1
5	-	REAR MNTG BRKT, DS ASSY	1
6	-	REAR MNTG BRKT, PS ASSY	1
7a	R-20040	SHIM, 3/4"	AS NEEDED
7b	R-20042	SHIM, 1/2"	AS NEEDED
7c	R-20041	SHIM, 1/4"	AS NEEDED
8	-	SCREW, 5/8" GR 8 HEX CAP Z/Y	4
9	990600-062-002	WASHER, 5/8" SAE THRU HARD FLAT Z/Y	8
10	990316-062-22	NUT, 5/8" GR 8 HEX NYLOCK NUT	4

NOTES
 1. REFERENCE MOUNTING KIT FOR MOUNTING BRACKET PART NUMBERS AND 5/8" MOUNTING HARDWARE

STAGGER SHIM - AS SHOWN
 DETAIL A

TOWARDS FRONT OF VEHICLE

14 1/2" - 15" TO GROUND

REV/DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	APPROVED
A REVISION A RELEASED	02/04/22	SMM			

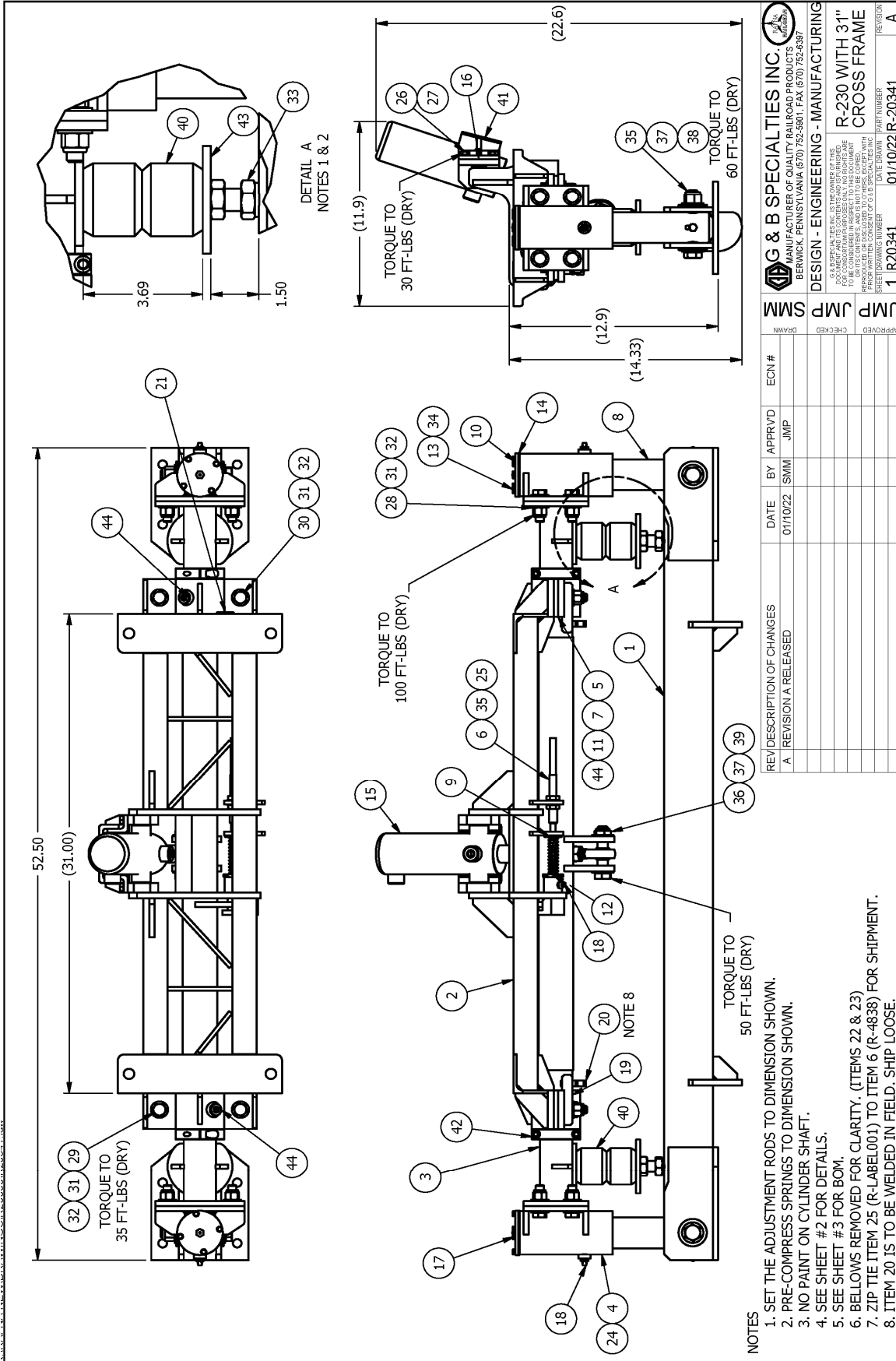
ALL WELDS TO CONFORM TO AWS D.1.1

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

DESIGN - ENGINEERING - MANUFACTURING

R-230 REAR RAILGEAR INSTALLATION

DATE DRAWN: 02/04/22
 PART NUMBER: K-R18RXR20341
 REVISION: A



G & B SPECIALTIES INC.
A DIVISION OF WABTEC CORPORATION
BERWICK, PENNSYLVANIA (570) 752-5901 FAX: (570) 752-5938

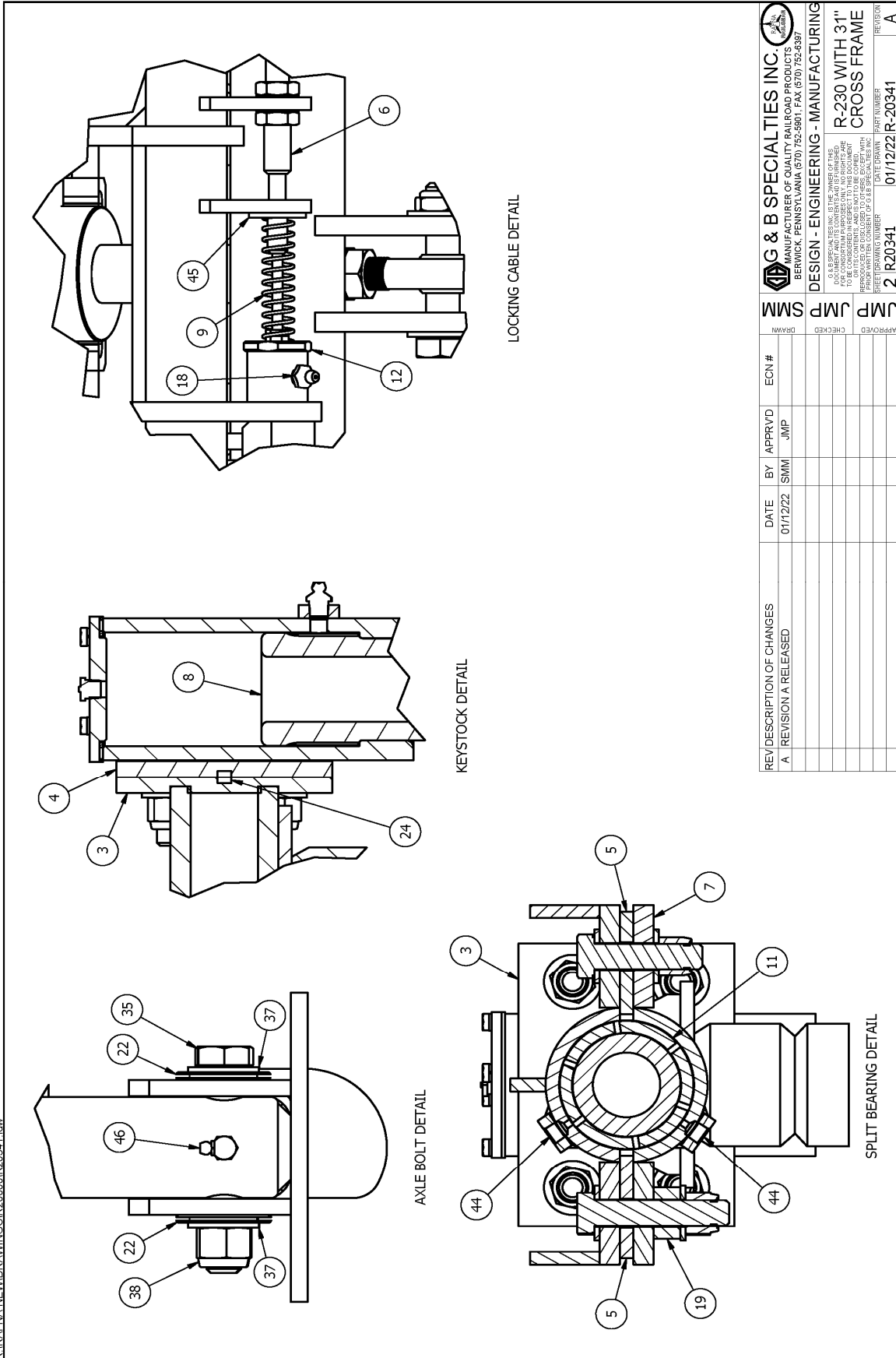
DESIGN - ENGINEERING - MANUFACTURING


R-230 WITH 31" CROSS FRAME

DRAWING NUMBER: 1 R20341
DATE DRAWN: 01/10/22
PART NUMBER: R-20341
REVISION: A

REV/DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #
A REVISION A RELEASED	01/10/22	SMM	JMP	

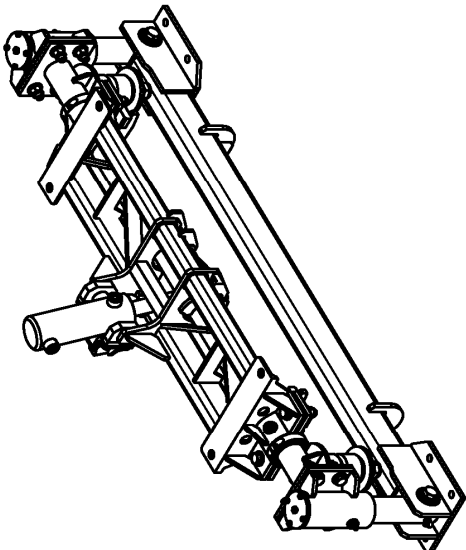
- NOTES**
1. SET THE ADJUSTMENT RODS TO DIMENSION SHOWN.
 2. PRE-COMPRESS SPRINGS TO DIMENSION SHOWN.
 3. NO PAINT ON CYLINDER SHAFT.
 4. SEE SHEET #2 FOR DETAILS.
 5. SEE SHEET #3 FOR BOM.
 6. BELLOW REMOVED FOR CLARITY. (ITEMS 22 & 23)
 7. ZIP TIE ITEM 25 (R-LABEL001) TO ITEM 6 (R-4838) FOR SHIPMENT.
 8. ITEM 20 IS TO BE WELDED IN FIELD. SHIP LOOSE.



REVISION		PART NUMBER		DATE DRAWN		DRAWING NUMBER	
A		R-230 WITH 31" CROSS FRAME		01/12/22		2 R20341	
APPROVED		CHECKED		DESIGN		SHEET NUMBER	
JMP		SMM		JMP		SMM	
DATE		BY		APPROVD		ECN #	
01/12/22		SMM		JMP			
REV/DESCRIPTION OF CHANGES							
A REVISION A RELEASED							
G & B SPECIALTIES INC. IS THE OWNER OF THIS DESIGN. ALL RIGHTS ARE RESERVED. FOR CONSTRUCTION PURPOSES ONLY. NO PARTS OR MATERIALS SHOULD BE ORDERED OR USED WITHOUT THE WRITTEN CONSENT OF G & B SPECIALTIES INC.							
 G & B SPECIALTIES INC. MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK, PENNSYLVANIA (570) 752-5901 FAX (570) 752-6397 DESIGN - ENGINEERING - MANUFACTURING R-230 WITH 31" CROSS FRAME							



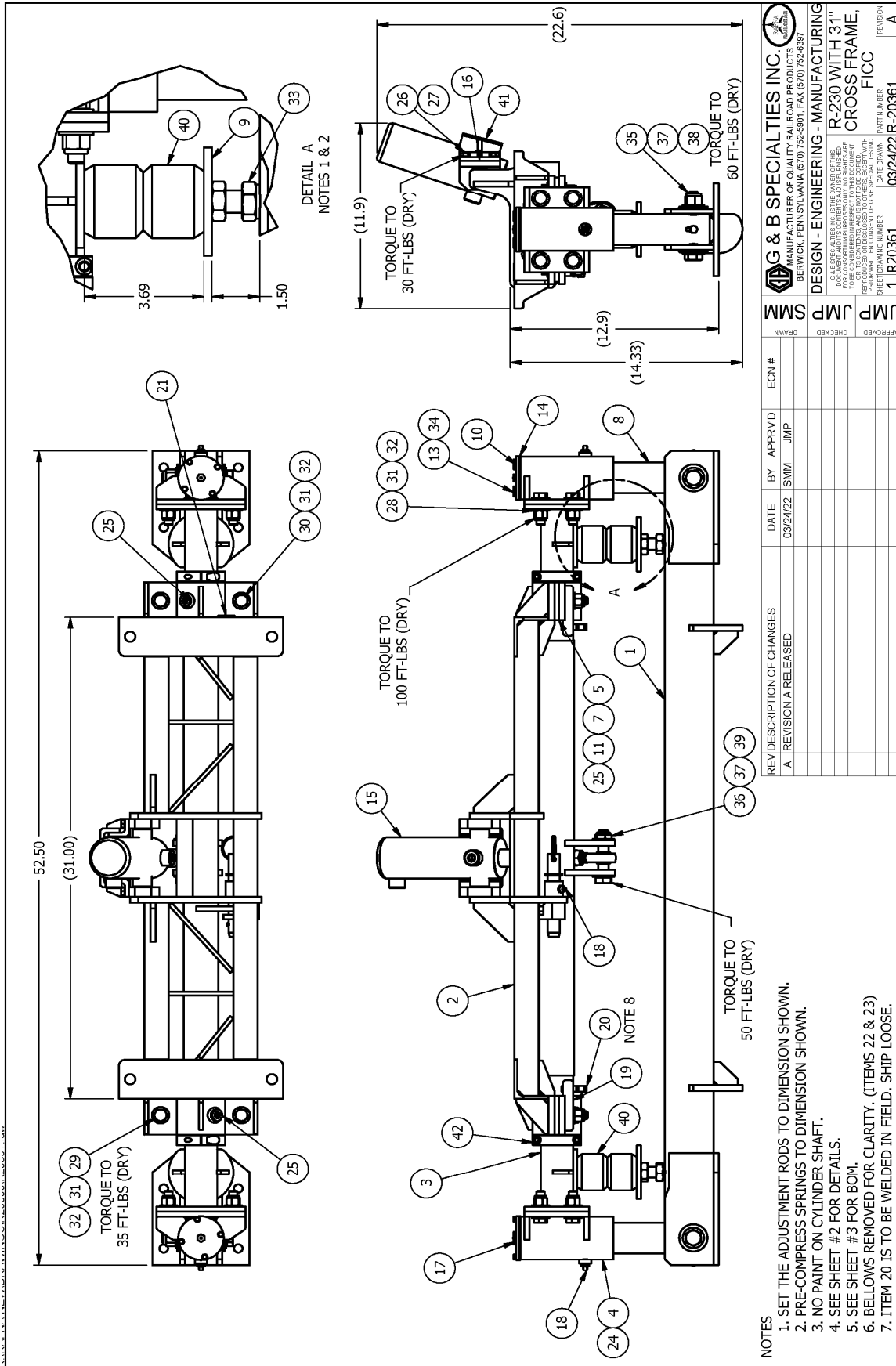
BILL OF MATERIAL/PARTS LIST				BILL OF MATERIAL/PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY	ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-20333	AXLE, LOWER	1	23	R-602	CLAMP, BELLOW	2
2	R-20015B	UPPER CROSS FRAME	1	24	KEY STOCK	1/4" SQ. x 4.00"	2
3	R-20016C	LOWER CROSS FRAME	1	25	R-LABEL001	PULL-TO-UNLOCK PLACARD	1
4	R-20009A	OUTER GUIDE TUBE ASSEMBLY	2	26	H.H.C.S.	5/16" UNC GR.8 x 1.50"	4
5	R-3602A	SHIM	4	27	L/WASHER	5/16" GR.8	4
6	R-4838	LOCKING CABLE W/ NUTS AND WASHERS	1	28	H.H.C.S.	1/2" UNC GR.8 x 1.75"	8
7	R-3602B	BEARING END CAP	2	29	H.H.C.S.	1/2" UNC GR.8 x 2.00"	2
8	R-28064	INNER TUBE	2	30	H.H.C.S.	1/2" UNC GR.8 x 2.50"	2
9	R-3561	SPRING	1	31	FWASHER	1/2" TYPE-A GR.8	25
10	R-20240	CAP, OUTER GUIDE	2	32	NYLOCK NUT	1/2" UNC GR.8	12
11	R-3618	SPLIT BEARING	2	33	JAM NUT	3/4" UNC GR.8 HEX	2
12	R-2940	LOCKING PIN	1	34	L'WASHER	#10 GR.5	8
13	R-20105	MACHINE SCREW	8	35	H.H.C.S.	5/8" UNC GR.8 x 4.00"	2
14	R-20241	GASKET, OUTER GUIDE CAP	2	36	H.H.C.S.	5/8" UNC GR.8 x 3.00"	1
15	R-20014B	CYLINDER	1	37	FWASHER	5/8" TYPE-A GR.8	6
16	R-2950A	TRUNNION CAP	2	38	NYLOCK NUT	5/8" UNC GR.8	2
17	GREASE ZERK	1/8 NPT RELIEF	2	39	NYLOCK NUT	5/8" UNC JAM	1
18	GREASE ZERK	1/8 NPT STRAIGHT	3	40	R-130	SPRING	2
19	R-20257	STOP BAR	2	41	P-00142A	BRACE	1
20	R-20258	ROTATION STOP	2	42	R-2589	SPLIT COLLAR	2
21	R-20259	GROMMET	1	43	R-2948	ADJUSTMENT ROD	2
22	R-3590	BELLOW	2	44	R-125	PIPE PLUG, 1/8 NPT HEX HEAD, STEEL	4
				45	FWASHER	3/8" TYPE-A GR.8	1
				46	990900-008	FITTING, 0.125 90 DEG PTF	2

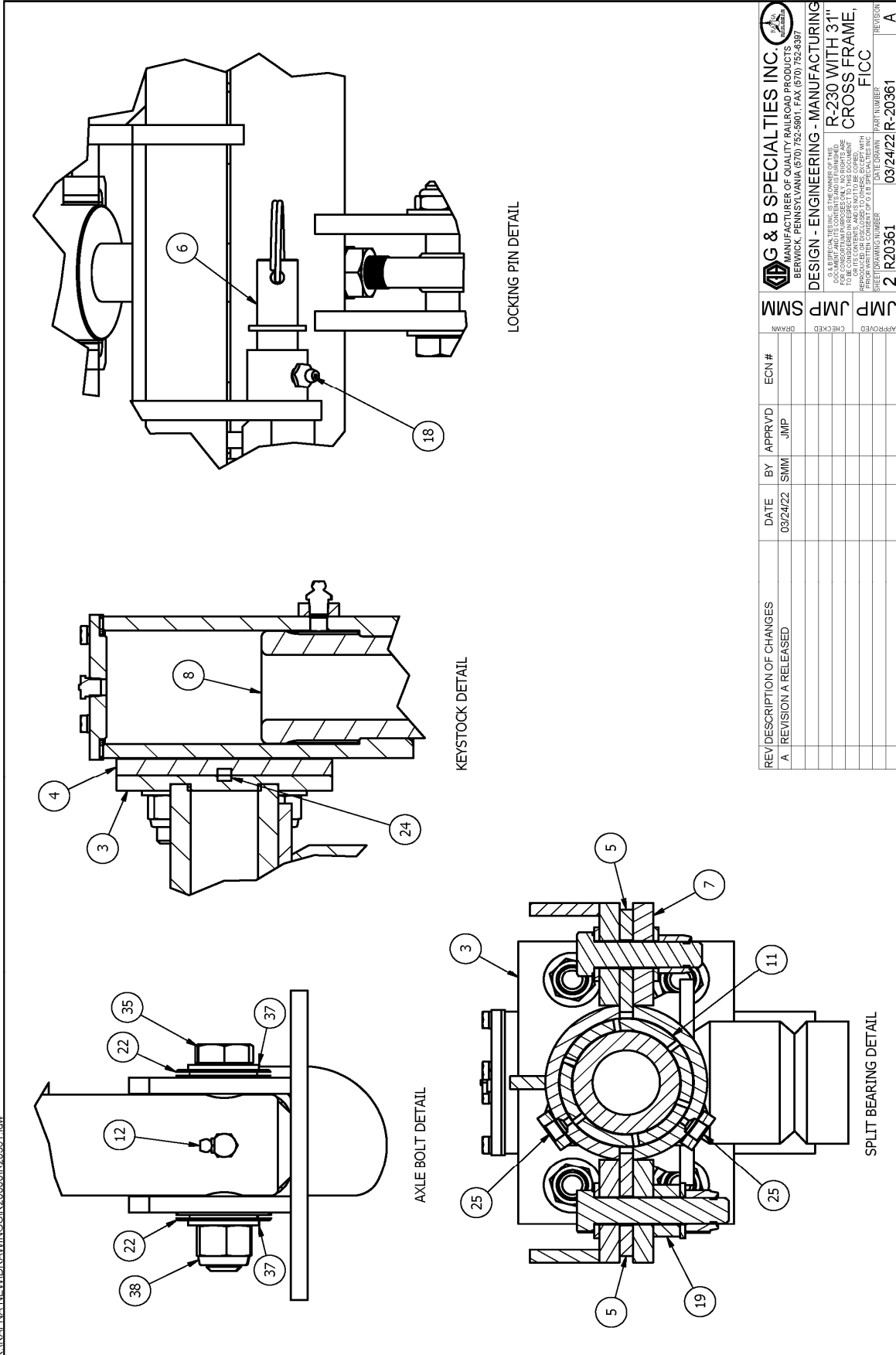



REFERENCE R-990KIT-284 FOR HARDWARE

REV/DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	DRAWN	DATE	BY	APPRVD	ECN #
A REVISION A RELEASED	01/10/22	SMM	JMP						

G & B SPECIALTIES INC.
 BERWICK, PENNSYLVANIA (570) 752-5901 FAX (570) 752-6397
DESIGN - ENGINEERING - MANUFACTURING
 R-230 WITH 31" CROSS FRAME
 SHEET DRAWING NUMBER: 3 R20341 PART NUMBER: 01/10/22 R-20341 REVISION: A





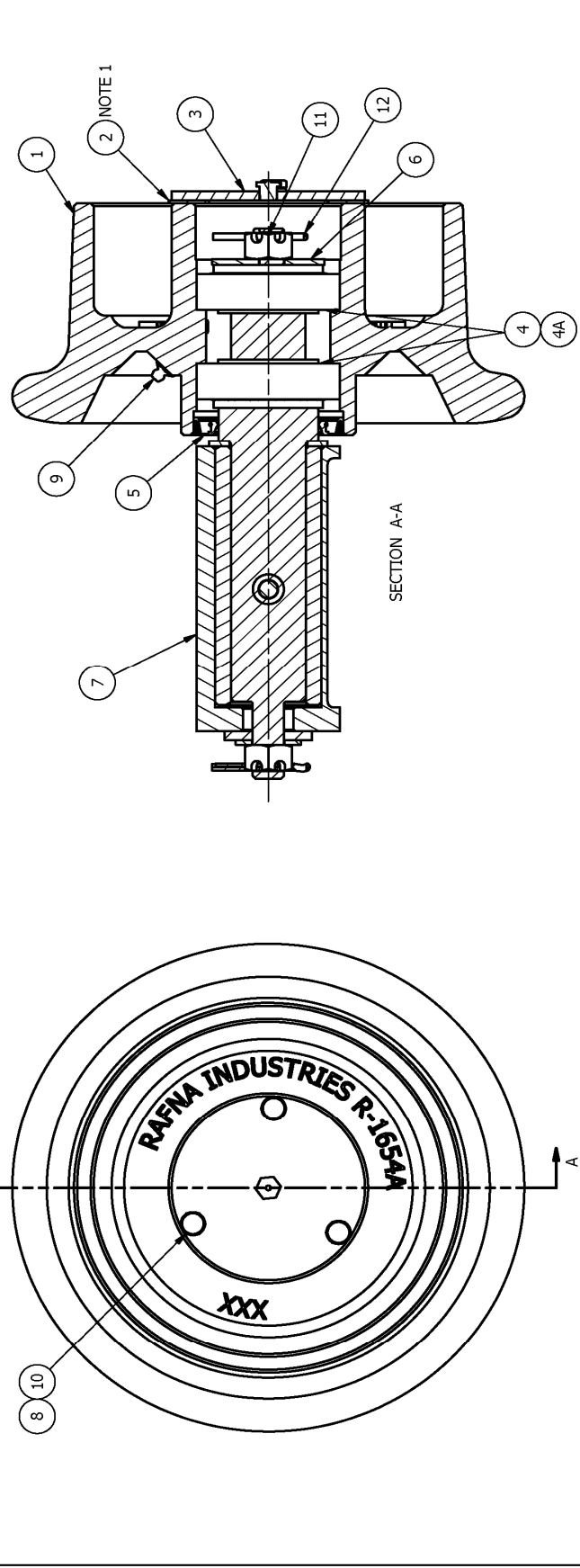
 G & B SPECIALTIES INC. MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK, PENNSYLVANIA (570) 752-5901, P.A. (570) 752-6397		DESIGN - ENGINEERING - MANUFACTURING R-230 WITH 31" CROSS FRAME, FICC	
REVISION A DESCRIPTION OF CHANGES A REVISION A RELEASED	DATE 03/24/22	BY SMM	APPROVD JMP
ECN #	DATE DRAWN 03/24/22	PART NUMBER R-20361	REVISION A
APPROVED JMP	CHECKED JMP	DRAWN SMM	SHEET NUMBER 2



ESTIMATED WEIGHT: 48 LBS

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	R-1654A	8" FORGED STEEL WHEEL
2	1	R-1656	GASKET
3	1	R-1706A	HUB CAP ASSEMBLY
4	2	R-1655	TAPERED ROLLER BEARING CUP
4A	2	R-1660	TAPERED ROLLER BEARING CONE
5	1	R-20135	OIL SEAL
6	1	R-0148	SLOTTED WASHER
7	1	R-20060C	8" SPINDLE ASSEMBLY, COMPLETE
8	3	L'WASHER	1/4" HELICAL GR.5
9	1	GREASE ZERK	1/8 NPT STRAIGHT
10	3	H.H.C.S.	1/4" UNF GR.5 X 3/4"
11	1	SLOTTED HEX NUT	5/8" UNF GR.8
12	1	COTTER PIN	5/32" X 1.50"

1. APPLY BEAD OF SILICONE ON HUB AND HUB CAP PRIOR TO ASSY.

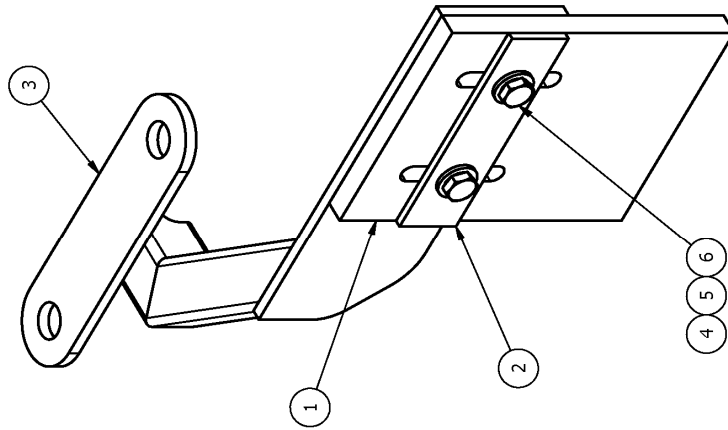


REV	DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #
A	REVISION A RELEASED	12/30/09	AML		ECN-15-353
B	REVISED PART ITEM #1	01/05/18	AML		ECN-18-097
C	REVISED TO USE FORGED WHEEL	01/05/18	SNM/JMP		ECN-18-422
D	ADDED NOTE ON WHEEL HUB	05/22/18	JEV/JMP		

APPROVED	CHECKED	DRAWN	AML
G & B SPECIALTIES INC. MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK, PENNSYLVANIA (570) 752-5901 FAX (570) 752-8397			
DESIGN - ENGINEERING - MANUFACTURING			
8" FORGED WHEEL ASSEMBLY			
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SHEET DRAWING NUMBER	PART DESIGN	PART NUMBER	REVISION
1 R20060	12150009R-20060		D



BILL OF MATERIAL/PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	R-20246	RUBBER SWEEP	1
2	R-5561	SWEEPER PLATE	1
3	R-20243D	MTG BRKT	1
4	990722-125-22	1/4" UNC GR.8 x 1.25"	2
5	990316-025-22	1/4" UNC GR.8	2
6	990600-025-002	1/4" TYPE-A GR.8	4



REV/DESCRIPTION OF CHANGES	DATE	BY	APPRVD	EON #	APPROVED	DATE	BY	APPRVD	EON #	APPROVED
A REVISION A RELEASED	12/29/09	AML	JMP	ECN-22-075	CHECKED					
B UPDATED BORDER	02/03/22	SMM	JMP		CHECKED					
					APPROVED					

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

DESIGN - ENGINEERING - MANUFACTURING

R-230 DS RAIL SWEEP ASSY

ALL WELDS TO CONFORM TO AWS D1.1

1 R2024ZD 12/29/09 R-2024ZD B

