

## INSTALLATION R-890 VERTICAL FRONT BEHIND CAB RAILGEAR KIT

### 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 G&B Specialties railgear equipment. Applicable railway company procedures and policies must be adhered to.
- Before performing any work under the vehicle or railgear, ensure that 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.

**INSTALLATION**

Part Number	Description	Qty
R-8902/R-8904	R-890 Behind Cab Front Railgear	1
R-8912	Angled Shim	2
R-8961	Handle (Included w/R-8902 & R-8904)	1
R-8998	Washer Plate (Included w/ R-8902 & R-8904)	8
	$\frac{3}{4}$ " UNC Gr. 8 Bolt x 3.5" Long (Included w/ R-8902 & R-8904)	8
	$\frac{3}{4}$ " Gr. 8 Washer (Included w/ R-8902 & R-8904)	16
	$\frac{3}{4}$ " UNC Gr. 8 Nylock Nut (Included w/ R-8902 & R-8904)	8

**Note: R-8902 is for Standard Gauge and R-8904 is Adjustable between Standard and Trolley Gauge**

1. Prior to installing the railgear, the vehicle's rear axle(s) should be aligned to zero tolerance by a qualified alignment professional. The rear axles should be parallel to each other and perpendicular to and centered on the frame.
2. The rear railgear should have already been installed and aligned with the rear axle(s) of the vehicle.
3. The railgear is supplied with the necessary installation fasteners, which are packaged separately, and integral "L" shaped mounting brackets. The railgear should be mounted behind the cab as close to the cab as possible without interfering with other components of the vehicle. Ensure that there is a minimum of 18.5" of clear frame space to mount the railgear. Ensure that there will be sufficient clearance above the railgear cylinders for the hydraulics and for railgear suspension movement, considering future adjustments of the railgear. It may be necessary to relocate some components.
4. The railgear is symmetrical and has no "front" or "back" and can therefore be mounted in either direction if the rail sweeps will be facing forward. If the opposite mounting direction is desired, the rail sweeps can be removed and re-installed on the opposite side of the railgear. Similarly, the vertical lock system can be installed on the opposite side of the railgear at any time by re-installing the lock hook, return spring and lock handle on the opposite side. If this is done, replace with any cotter pins that are removed with new cotter pins. Torque the  $\frac{1}{4}$ " fasteners to 12 ft-lbs dry. Do not over torque.
5. Position and support the railgear on the outside of the frame with the angled shims between the horizontal part of the railgear mounting brackets and the bottom of the frame. Use the angled shims with the thickest part forward so that the railgear will be as vertical as possible when the vehicle is on rail. Use appropriate shims between the bottom of the frame and the angled shims to achieve the correct mounting height of 28" from the mounting bracket to the ground. Tack weld all shims together and to the railgear so that they cannot fall out. Using multiple thin shims in place of one thick shim will make future adjustments much easier.

6. Use appropriate shims between the outside face of the web of the frame and the railgear mounting brackets to achieve a bracket-to-bracket mounting distance of 35" and to center the railgear on the frame. Tack weld all shims together and to the railgear so that they cannot fall out. Using multiple thin shims in place of one thick shim will make future adjustments much easier.
7. Align the railgear as per the Railgear Operation, Service and Parts manual.
8. Using the slots in the mounting brackets as guides, drill four  $\frac{3}{4}$ " holes a minimum of 5" apart in each side of the frame extension. Ensure that all vehicle manufacturer frame-drilling guidelines are followed. Ensure that enough room is left in the slots for future height adjustments.
9. Fasten the railgear to the frame using the supplied  $\frac{3}{4}$ " mounting fasteners including the washer plates, which should be centered over the slots in the mounting brackets. Torque all  $\frac{3}{4}$ " fasteners to 175 ft-lbs dry. Do not over torque.
10. Insert the vertical lock handle through the bushings provided on the railgear above the lock hooks. The handle can be angled, cut and/or modified as desired to fit properly. Ensure that there will be sufficient room for the handle to rotate, considering if railgear brakes will be installed later. Ensure that the handle will be positioned close to the vertical front railgear hydraulics operating valve. Align the links that are attached to the vertical lock-up hook onto the handle. The links should be on the inside of the bushings. Weld the links to the handle using a  $\frac{1}{4}$ " fillet weld around the outside surface of the links. Ensure that the weld will not interfere with the motion of the handle and links. Ensure that the hooks can be fully engaged and disengaged from the axle.
11. Re-install/mount any accessories that were removed to accommodate the railgear.
12. Torque all fasteners as per the Railgear Kit Operation, Service and Parts manual.
13. Grease the railgear at all lubrication points as described in the Railgear Kit Operation, Service and Parts manual.

Following the installation of the railgear Hydraulic Kit and the vehicle Front Axle Lock-Up Kit, the railgear will need to be adjusted:

14. Perform the Railgear Alignment procedure as described in the Railgear Kit Operation, Service and Parts manual.
15. Perform the Vehicle Front Tire Clearance adjustment procedure as described in the Railgear Kit Operation, Service and Parts manual. Ensure that the washer plates are welded in position.
16. Adjust the rail sweeps as described in the Railgear Kit Operation, Service and Parts manual.

## OPERATION, SERVICE AND PARTS OF R-890 VERTICAL FRONT BEHIND CAB RAILGEAR KIT

### SAFETY PRECAUTIONS

If any operating, services 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 be observed at all times.
- Ensure that the position and function of all railgear controls are known before attempting operation.
- Ensure the railgear is locked in road position before starting road travel.
- Ensure all body parts and loose clothing is 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.
- Always disconnect the vehicle's battery when welding on the vehicle or railgear to protect the vehicle's electrical system.

## OPERATION OF VERTICAL FRONT BEHIND CAB RAILGEAR KIT

With the railgear kit installed on this vehicle, it may be operated as normal. The vehicle, however, 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. Engage the vehicle front axle lock as per the Front Axle Lock Operation, Service and Parts manual.
2. Disengage the railgear's vertical lock hooks by rotating the lock handle appropriately. If the hooks cannot be disengaged, raise the railgear slightly.
3. Hold the lock handle in the disengaged position.
4. Lower the railgear. Release the lock handle once the railgear axle has lowered sufficiently that the lock hooks will not engage the axle.
5. As the railgear reaches the rails, it will begin taking some of the vehicle's load. The railgear's rubber suspension springs should be observed compressing under this load. (If this is not the case, **DO NOT use the railgear**. Inspect the railgear for lubrication and damage.)
6. Continue lowering the railgear until the hydraulic cylinders are fully extended. The vehicle front tires should be approximately 3" above the rail.
7. Ensure that the railgear is fully deployed.

### REMOVING THE VEHICLE FROM RAIL - TO RAISE THE RAILGEAR:

1. Raise the railgear fully. The railgear's vertical lock hooks should automatically engage the axle in the locked position.
2. Ensure that the vertical lock hooks are engaged and that the railgear is locked in the road position.
3. Disengage the vehicle front axle lock as per the Front Axle Lock Operation, Service and Parts manual.

## SERVICE OF VERTICAL FRONT BEHIND CAB 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.

Table 2 provides the Standard Fastener Torque Values.

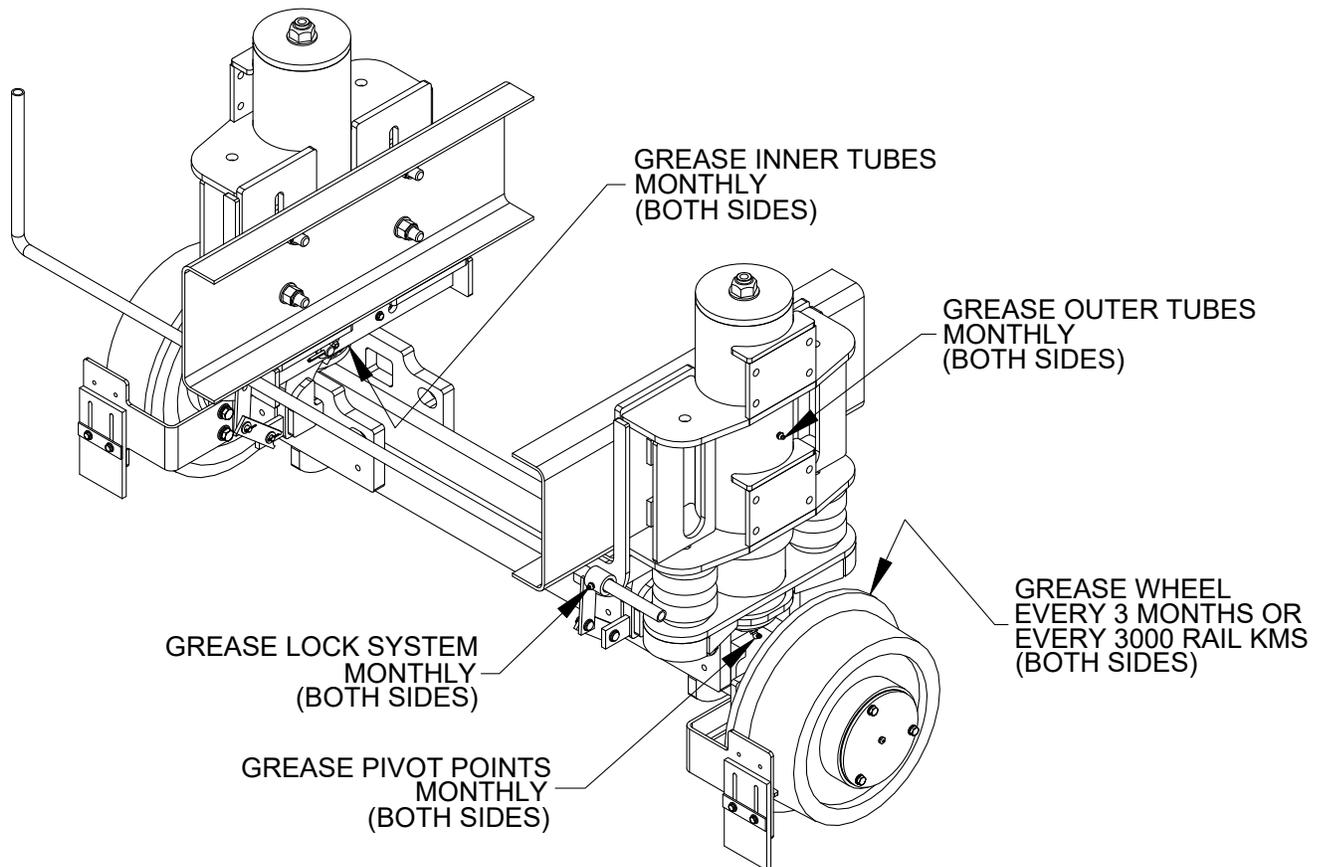
Grease fittings are provided at all railgear lubrication points as shown in Figure 1. The recommended lubricant for all lubrication points on this railgear is MYSTIK JT-6 LOW TEMP grease or equivalent. In cold weather areas/seasons, SHELL DARINA XL102 or equivalent may be used.

**Table 1: Recommended Service Schedule**

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

**Table 2: Standard Fastener Torque Values**

Fastener Size	Fastener Torque Value (ft-lbs) Dry
1" UNC Gr. 8 Fasteners	250
¾" UNC Gr. 8 Fasteners	175
⅝" UNC Gr. 8 Fasteners	150
½" UNC Gr. 8 Fasteners	100
⅜" UNC Gr. 8 Fasteners	40
¼" UNC Gr. 8 Fasteners	12



Railgear Lubrication Points

## RAIL SWEEP ADJUSTMENT

The distance between the rail sweep rubber and the rail is adjustable and should be maintained at approximately  $\frac{1}{8}$ ". To adjust the rail sweep rubber, with the railgear in the rail position, loosen the two  $\frac{1}{4}$ " 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  $\frac{1}{4}$ " fasteners to 12 ft-lbs dry. Do not over torque.

## RAIL WHEEL BEARING ADJUSTMENT

The rail wheel bearings require periodic adjustment 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  $\frac{3}{8}$ " bolts and  $\frac{3}{8}$ " lock washers.
2. Remove the lock tab from the spindle by removing the  $\frac{1}{4}$ " bolt and  $\frac{1}{4}$ " lock washer.
3. Ensure that the wheel bearing cavity is full of grease.
4. 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 looseness can be felt in the bearings. Re-adjust the bearing end-play with a torque wrench as soon as possible.
5. Re-install the lock tab with the  $\frac{1}{4}$ " bolt and a new  $\frac{1}{4}$ " lock washer. Tighten the spindle nut slightly if needed to insert the lock tab. Torque the  $\frac{1}{4}$ " bolt to 12 ft-lbs dry. Do not over torque.
6. Re-install the hubcap and gasket using the  $\frac{3}{8}$ " bolts and new  $\frac{3}{8}$ " lock washers. Blue Loctite can be used on the bolts as an added safety measure. Tighten and torque the  $\frac{3}{8}$ " fasteners to 40 ft-lbs dry. Do not over torque.

## VEHICLE FRONT TIRE CLEARANCE ADJUSTMENT

The vehicle front tires must remain at a minimum height above the rail to ensure sufficient clearance when travelling on rail. Both the setting of the front axle lock and the mounting height of the railgear affect the clearance height. If the front tires are less than 3" from the rails when the railgear is in the rail position OR the front rail wheels are less than 9" from the ground when the railgear is in the road position, the front tire clearance must be adjusted as follows:

1. Ensure that the vehicle front axle lock is correctly adjusted as per the Front Axle Lock Operation, Service and Parts manual.
2. Determine how much the railgear must be adjusted up or down to obtain the correct road and rail clearance.
3. With the railgear in the road position, support the railgear and grind off the welds from the washer plates. Loosen the eight  $\frac{3}{4}$ " mounting bolts.
4. Add or remove shims as necessary between the bottom of the flange of the vehicle frame and the top surface of the mounting brackets.
5. Tack weld the shims to each other and to the railgear, so they will not fall out.
6. Torque the  $\frac{3}{4}$ " fasteners to 175 ft-lbs dry. Do not over torque.
7. Ensure that the railgear will not contact any vehicle components throughout the full range of railgear and railgear suspension movement. Ensure that the railgear lock handle will not contact the vehicle's driveshaft and that the tops of the railgear's hydraulic cylinders and their hydraulic fittings will not contact the vehicle during railgear suspension travel.
8. Re-check the road and rail clearances and re-adjust if necessary.
9. If the minimum clearances cannot be met after adjusting the railgear and vehicle front axle lock, then the cylinder stopper can be removed from inside the hydraulic cylinders to provide 1" more cylinder travel.
10. Re-weld the washer plates using a  $\frac{3}{8}$ " fillet weld all around.

## RAILGEAR ALIGNMENT

The railgear must be correctly aligned to perform properly and safely, and to avoid excessive wear and derailment. The railgear rail wheels must be aligned to point in the same direction as and be centered on the vehicle rear tires. The railgear is supplied with fixed non-adjustable rail wheels. For the rail wheels to be aligned with the vehicle rear wheels, the entire railgear must be moved on the vehicle frame.

Prior to performing the railgear alignment, the vehicle should have a rear axle alignment done to within zero tolerance by a qualified alignment professional and the tires should be properly inflated.

The railgear alignment is checked with the vehicle on a straight, level section of rail with the railgear in the rail position. Refer to figure 2 for railgear alignment measurements and specifications.

To move the railgear on the vehicle frame, raise the railgear until it is just off the rails, support the railgear and then loosen the eight  $\frac{3}{4}$ " mounting fasteners. To center the railgear on the vehicle rear tires (lateral alignment), adjust the shim thicknesses between the railgear mounting brackets and the web of the vehicle frame. Ensure that the railgear guide tubes remain parallel to each other and that the railgear mounting brackets remain at 35" apart. To align the rail wheels to point in the same direction as the vehicle tires (directional alignment), move the railgear mounting brackets forwards or backwards with respect to each other along the vehicle frame. This will change the directional angle of the railgear axle and wheels. It may be necessary to weld closed the  $\frac{3}{4}$ " mounting holes in the vehicle frame and drill new holes.

When the railgear is correctly aligned, the  $\frac{3}{4}$ " mounting fasteners should be torqued to 175 ft-lbs dry. Do not over torque. Ensure that the washer plates are welded to the railgear mounting brackets with a  $\frac{3}{8}$ " fillet weld all around.

Check the railgear clearance to all vehicle components throughout the full range of railgear and railgear suspension movement.

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

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

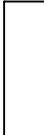
RAILGEAR S/N: \_\_\_\_\_

ALIGN REAR RAILGEAR  
A1 & A2 MUST BE EQUAL WITHIN 1/16"  
B1 & B2 MUST BE EQUAL WITHIN 1/8"

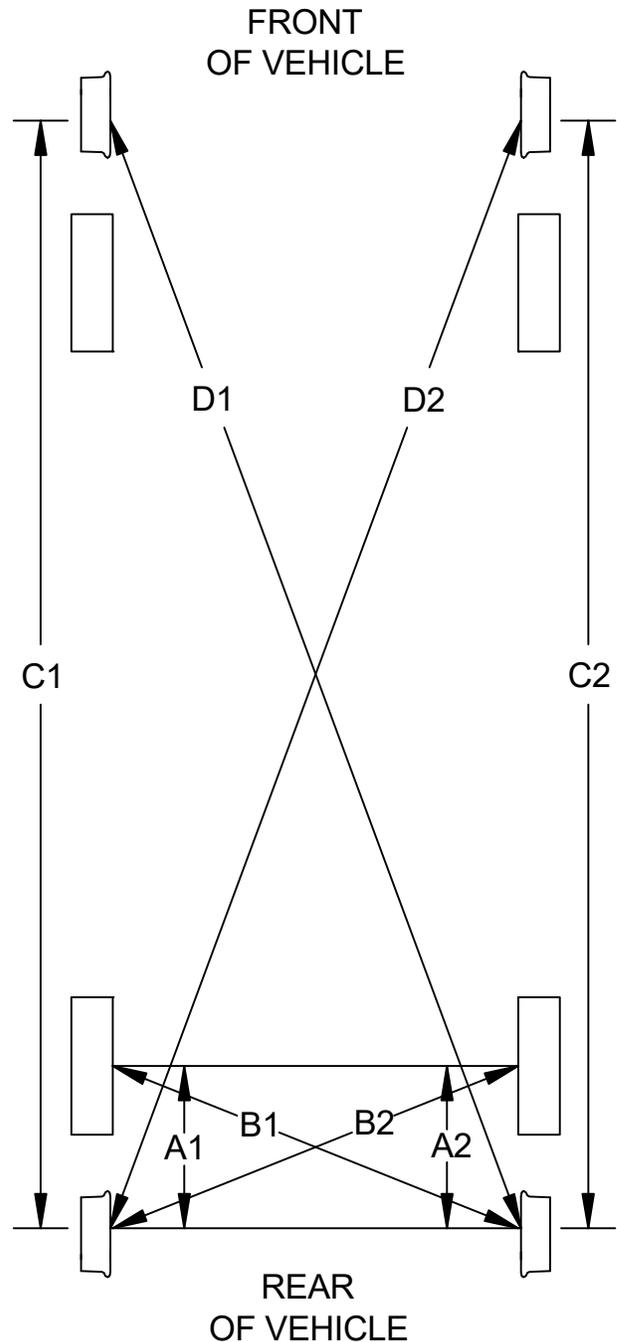
ALIGN FRONT RAILGEAR TO REAR  
C1 & C2 MUST BE EQUAL WITHIN 1/8"  
D1 & D2 MUST BE EQUAL WITHIN 1/8"

RAIL WHEEL FLANGE TO  
GROUND CLEARANCE

LEFT FRONT \_\_\_\_\_  
RIGHT FRONT \_\_\_\_\_  
LEFT REAR \_\_\_\_\_  
RIGHT REAR \_\_\_\_\_

 VEHICLE WHEEL

 RAIL WHEEL



## CONVERSION FROM STANDARD TO TROLLEY GAUGE (R-8904 IF EQUIPT)

### Safety Precautions

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



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- 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.

## GENERAL INFORMATION

The RAFNA R-890 Railgear unit is designed, and built, with the capability to be adjusted from Standard to Trolley Gauge. The railgear unit is shipped from the factory, assembled for Standard Gauge Travel.

### Note:

The gauge of the railgear unit should only be changed if travel on Trolley Gauge is required. If this is not the case then the axle should be left unadjusted, as shipped from the factory.

As defined and for the purpose of the RAFNA R-890 only, Standard and Trolley Gauge are as described below. This railgear unit was designed for, and will only work on, the gauges as shown below.

Standard Rail Gauge:           4'-8 1/2" (56-1/2"), 1435mm  
Trolley Rail Gauge:           5'-2 1/2" (62-1/2"), 1588mm

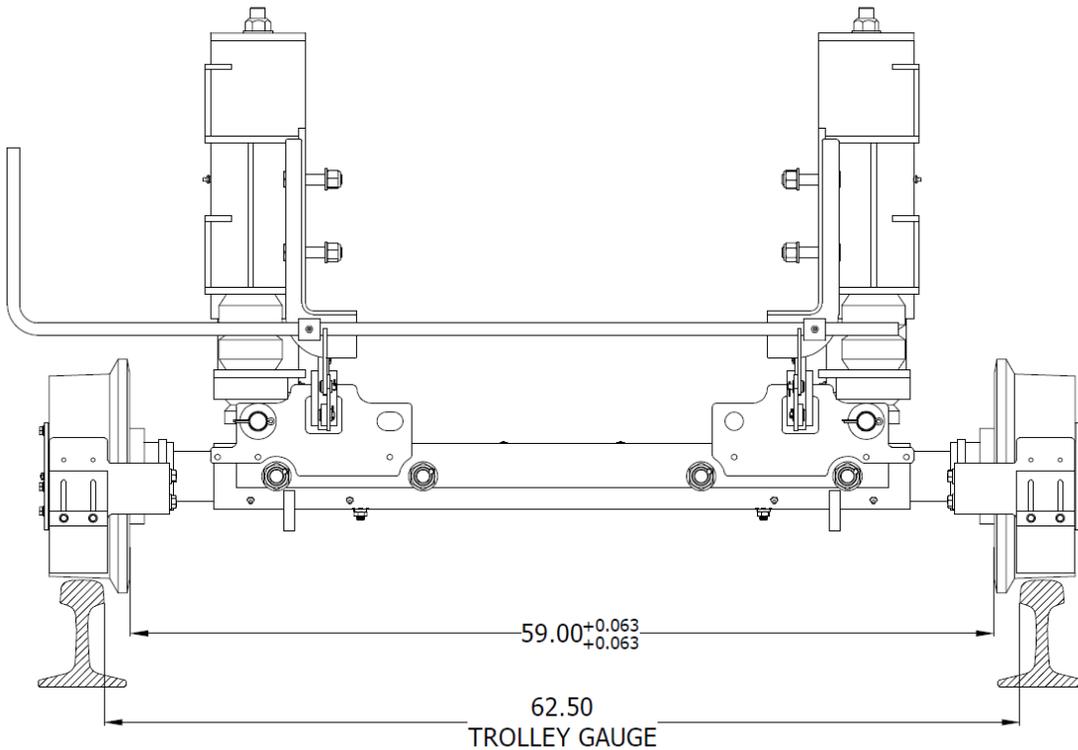
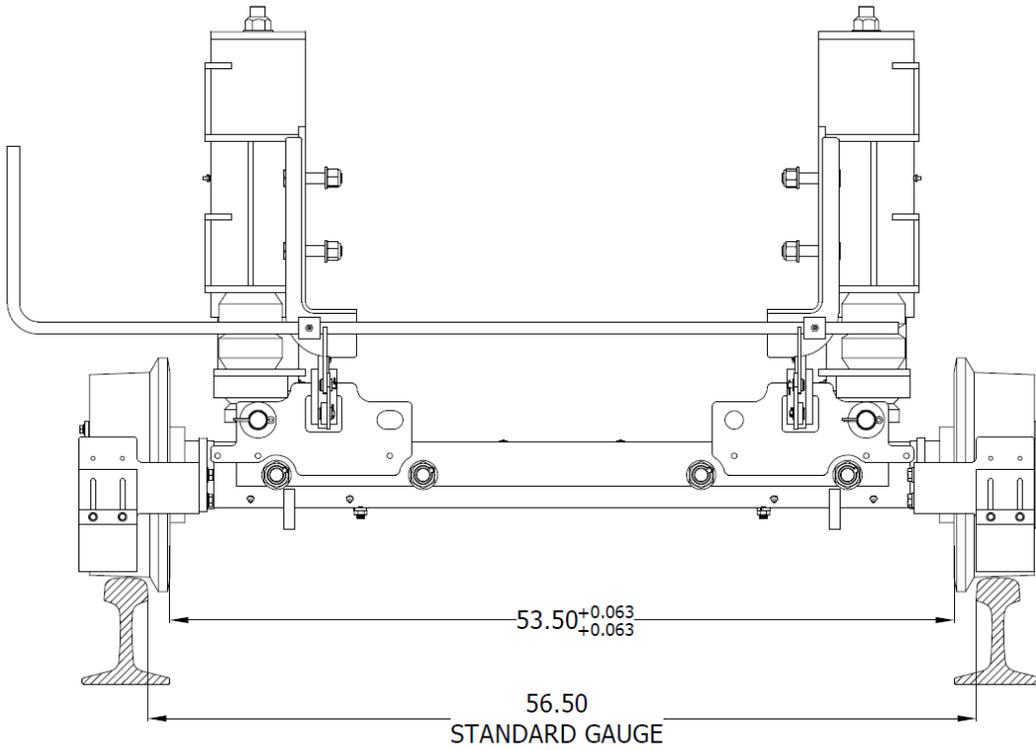
## ADJUSTMENT PROCEDURE

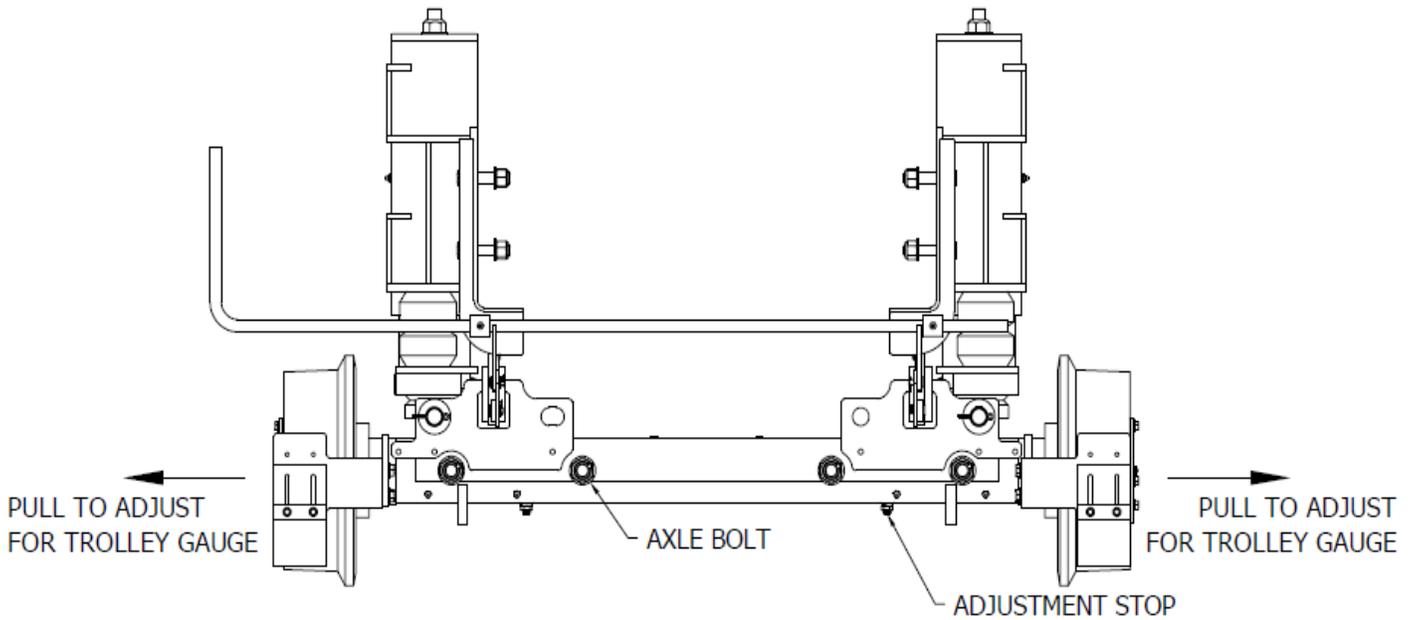
From Standard to Trolley Gauge (same for front and rear units):

1. The railgear must be raised above rail far enough that the rail wheel flange does not interfere with the rail during adjustment.
2. Remove the axle bolts (2 per side - 4 per axle).
3. Grasping the rail wheel, pull firmly towards the outside of the vehicle.
4. When in the proper position, the axle will hit the adjustment stop.
5. Re-insert the axle bolts (2 per side - 4 per axle).
6. Verify gauge.
7. Repeat above steps for remaining spindles/axle.

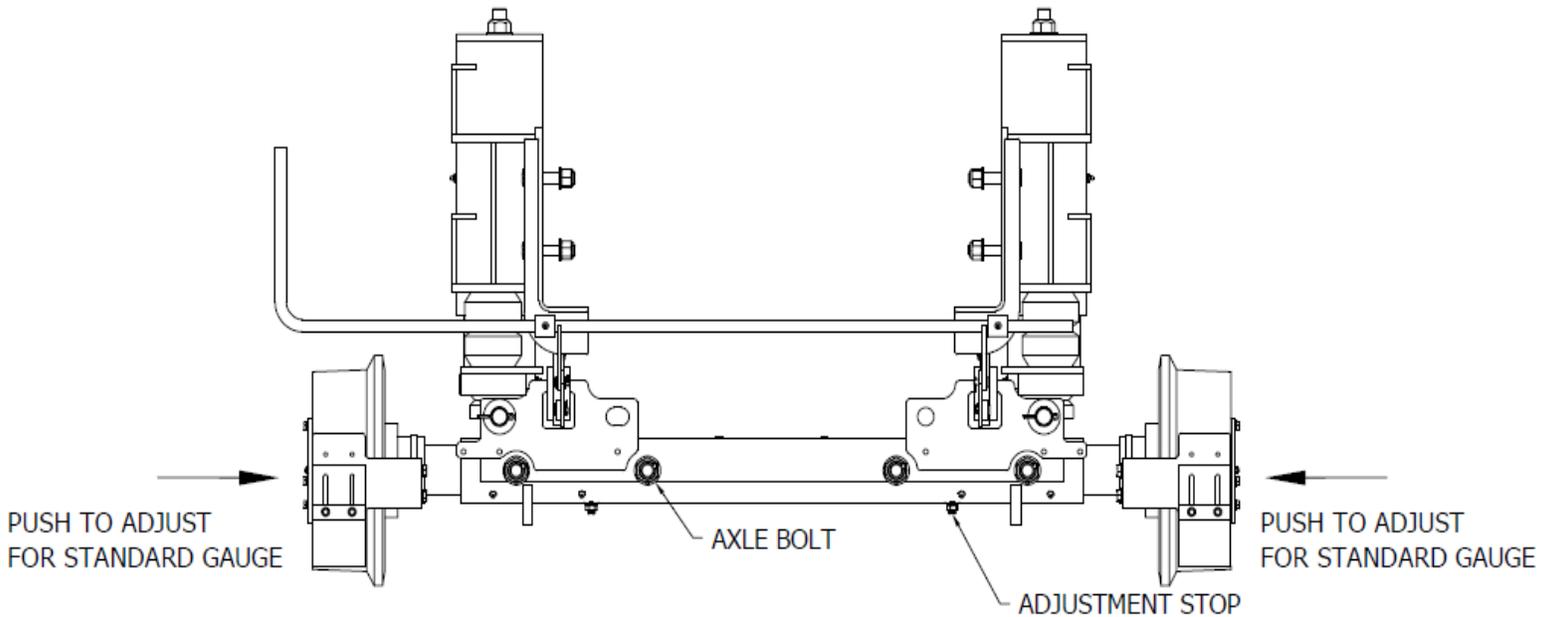
From Trolley to Standard gauge (same for front and rear units):

1. The railgear must be raised above rail far enough that the rail wheel flange does not interfere with the rail during adjustment.
2. Remove the axle bolts (2 per side - 4 per axle).
3. Grasping the rail wheel, push firmly towards the inside of the vehicle.
4. When in the proper position, the axle will hit the adjustment stop.
5. Re-insert the axle bolts (2 per side - 4 per axle).
6. Verify gauge.
7. Repeat above steps for remaining spindles/axle.



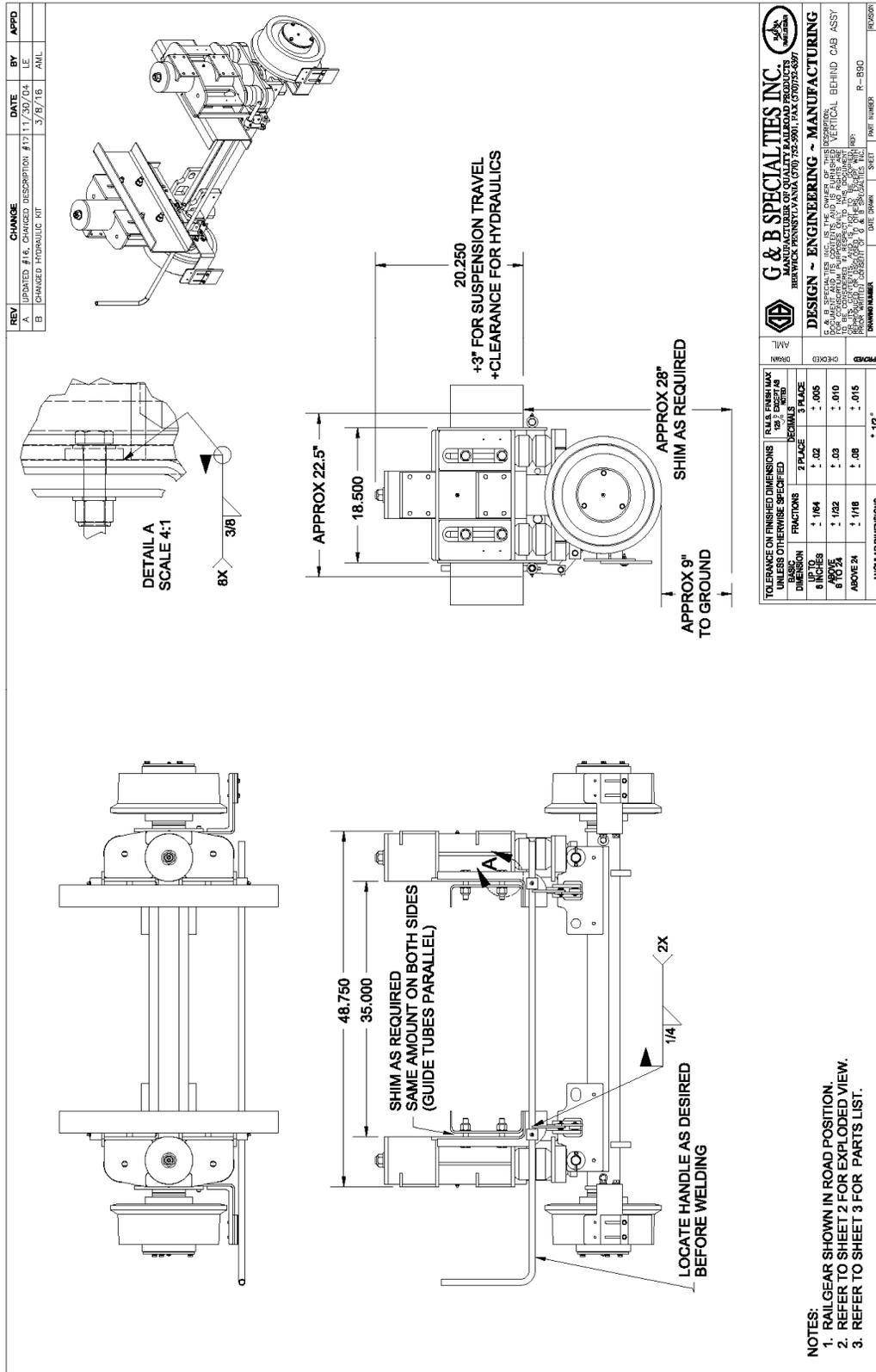


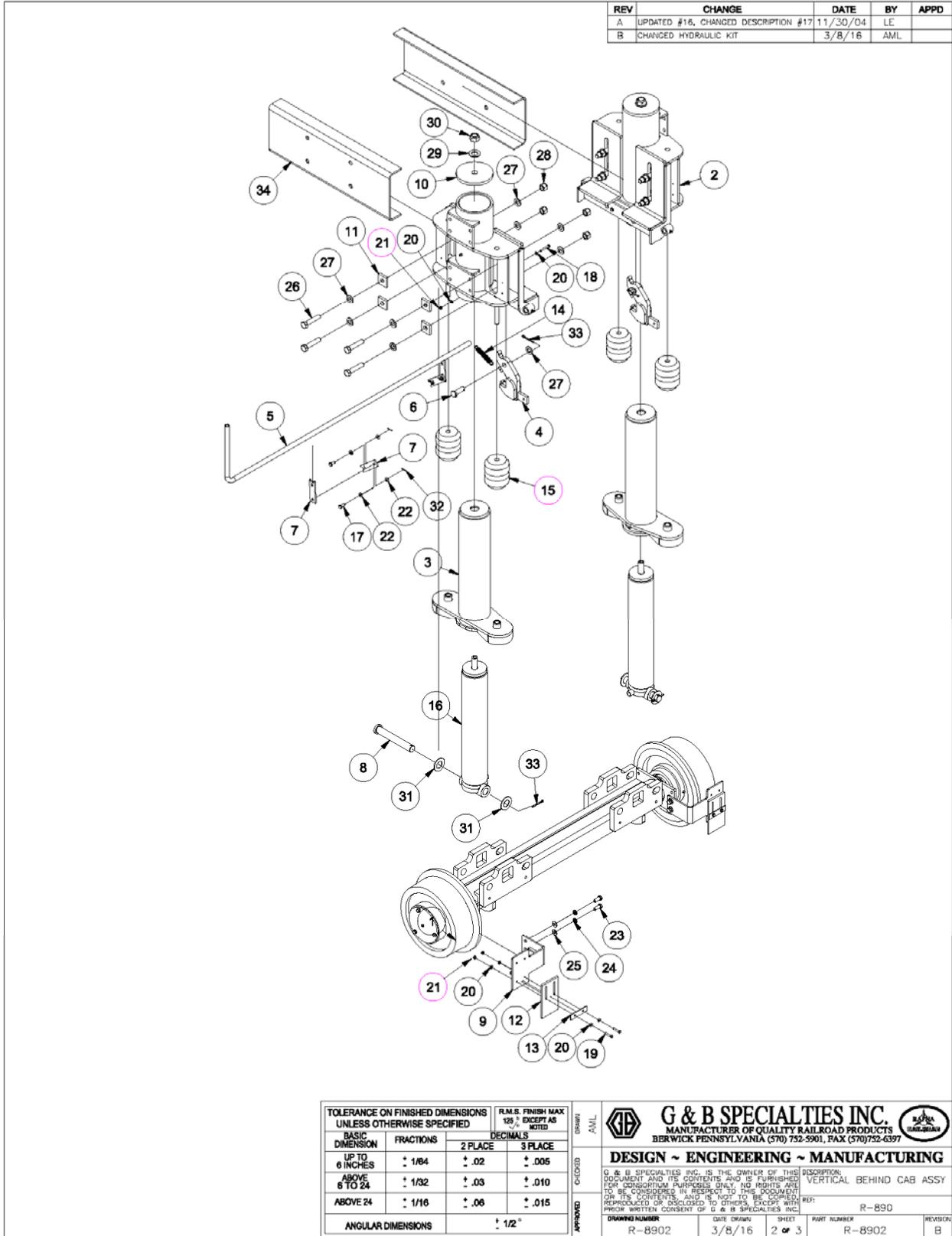
**STANDARD TO TROLLEY GAUGE ADJUSTMENT**



**TROLLEY TO STANDARD GAUGE ADJUSTMENT**

PARTS OF VERTICAL FRONT BEHIND CAB RAILGEAR KIT





REV	CHANGE	DATE	BY	APPD
A	UPDATED #16, CHANGED DESCRIPTION #17	11/30/04	LE	
B	CHANGED HYDRAULIC KIT	3/8/16	AML	

ITEM	PART No.	DESCRIPTION	QTY
1	R-8910	AXLE ASSEMBLY	1
2	R-8928	OUTER GUIDE TUBE ASSEMBLY	2
3	R-8939	INNER GUIDE TUBE ASSEMBLY	2
4	R-8960	HOOK ASSEMBLY	2
5	R-8961	HANDLE	1
6	R-8964	PIN	2
7	R-8966	LINK	4
8	R-8991	PIN	2
9	R-8992	RAIL SWEEP BRACKET ASSEMBLY	2
10	R-8997	TOP PLATE	2
11	R-8998	WASHER PLATE	8
12	R-2411	RUBBER SWEEP	2
13	R-5561	SWEEPER PLATE	2
14	R-5604	SPRING	2
15	R-5683	TIMBREN 540/75 SPRING	4
16	R-9116A	HYDRAULIC CYLINDER (EXTERNAL CHECK VALVE)	2
	R-9116A-CV	HYDRAULIC CYLINDER (INTERNAL CHECK VALVE)	
17	S-005001	3/8" OD X 7/8" LONG PIN	4
18	-	1/4" UNC GR. 8 BOLT X 2.25" LONG	2
19	-	1/4" UNC GR. 8 BOLT X 1.5" LONG	4
20	-	1/4" SAE WASHER	12
21	-	1/4" UNC GR. 3 NYLOCK NUT	6
22	-	3/8" SAE WASHER	8
23	-	1/2" UNC GR. 8 BOLT X 1.25" LONG	4
24	-	1/2" LOCK WASHER	4
25	-	1/2" GR. 8 WASHER	4
26	-	3/4" UNC GR. 8 BOLT X 3.5" LONG	8
27	-	3/4" GR. 8 WASHER	18
28	-	3/4" UNC GR. 8 NYLOCK NUT	8
29	-	1" GR. 8 WASHER	2
30	-	1" UNC STOVER NUT	2
31	-	1.25" GR. 8 WASHER	4
32	-	3/32" COTTER PIN X 0.75" LONG	4
33	-	1/4" COTTER PIN X 2" LONG	4
34	-	VEHICLE FRAME	N/A

ALL OF ITEMS 11, 26 AND 28, AS WELL AS ONLY 16 X ITEM 27,  
 ARE TO BE PACKAGED TOGETHER FOR SHIPPING.

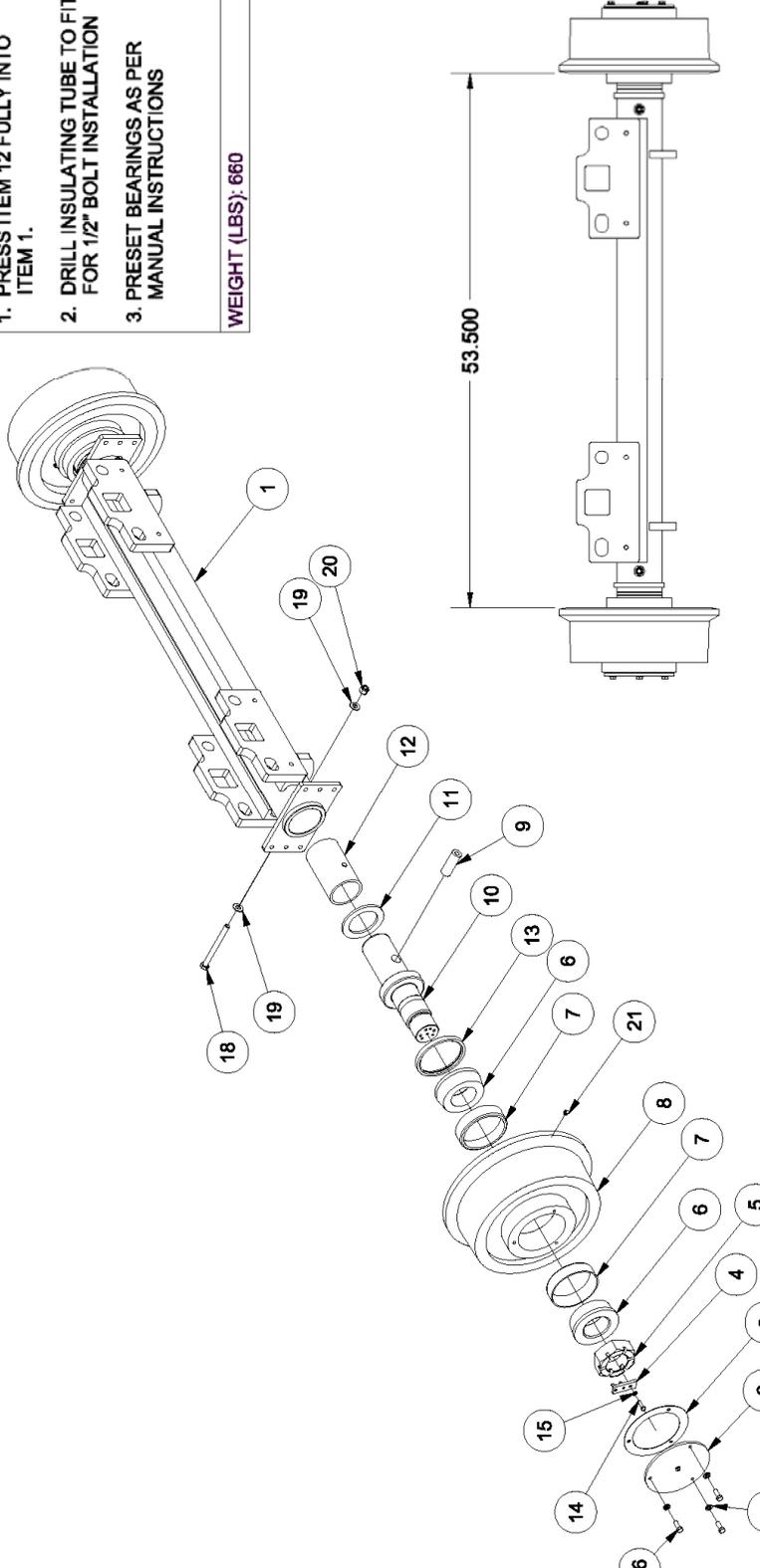
ITEM 5 IS TO BE SHIPPED LOOSE.

TOLERANCE ON FINISHED DIMENSIONS UNLESS OTHERWISE SPECIFIED		R.M.S. FINISH MAX 125 μ INCHES AS NOTED		DRAWN AML	G & B SPECIALTIES INC. MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK PENNSYLVANIA (570) 752-5901, FAX (570) 752-6397	
BASIC DIMENSION	FRACTIONS	DECIMALS				
UP TO 6 INCHES	± 1/64	2 PLACE	± .02	CHECKED AML	<b>DESIGN ~ ENGINEERING ~ MANUFACTURING</b> G & B SPECIALTIES INC. IS THE OWNER OF THIS DOCUMENT AND ITS CONTENTS AND IS FURNISHED FOR CONSORTIUM PURPOSES ONLY. NO RIGHTS ARE TO BE CONSIDERED IN RESPECT TO THIS DOCUMENT REPRODUCED OR DISCLOSED TO OTHERS WITHOUT PRIOR WRITTEN CONSENT OF G & B SPECIALTIES INC.	DESCRIPTION: VERTICAL BEHIND CAB ASSY
		3 PLACE	± .010			
		± .015				
ANGULAR DIMENSIONS		± 1/2°		APPROVED	DRAWING NUMBER: R-8902 DATE DRAWN: 3/8/16 SHEET: 3 OF 3 PART NUMBER: R-8902 REVISION: B	

**NOTES:**

1. PRESS ITEM 12 FULLY INTO ITEM 1.
2. DRILL INSULATING TUBE TO FIT FOR 1/2" BOLT INSTALLATION
3. PRESET BEARINGS AS PER MANUAL INSTRUCTIONS

**WEIGHT (LBS): 660**

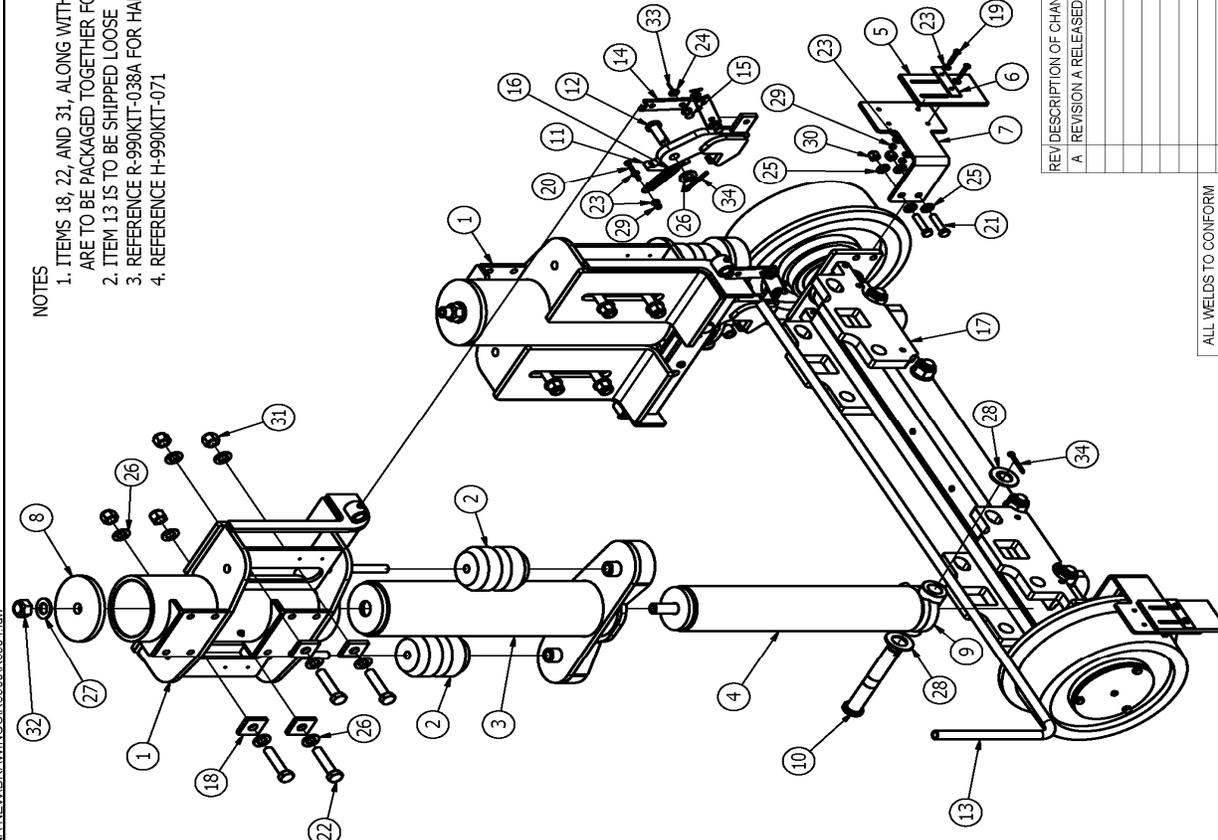


ITE	PART No.	DESCRIPTION	QTY	ITE	PART No.	DESCRIPTION	QTY
1	R-8918	AXLE	1	12	R-8996	INSULATING TUBE	2
2	R-8517	HUB CAP	2	13	S-801001	OIL SEAL	2
3	R-8515	GASKET	2	14	-	1/4" UNF GR. 8 BOLT X 1" LONG	2
4	R-8513	LOCK TAB	2	15	-	1/4" LOCK WASHER	2
5	R-8516	2-1/2" - 12 SLOTTED NUT	2	16	-	3/8" UNC GR. 8 BOLT X 1" LONG	6
6	R-8510	BEARING CONE	4	17	-	3/8" LOCK WASHER	6
7	R-8511	BEARING CUP	4	18	-	1/2" UNC GR. 8 BOLT X 5.5" LONG	2
8	R-8520	14" RAIL WHEEL	2	19	-	1/2" GR. 8 WASHER	4
9	R-8985	BUSHING	2	20	-	1/2" UNC GR. 8 NYLOCK NUT	2
10	R-8994	SPINDLE	2	21	-	1/8 NPT GREASE ZERK	2
11	R-8995	INSULATING WASHER	2				

A	REVISED ITEM #1	AL	39/18	DATE
	CHANGE	BY		
<b>RAFNA INDUSTRIES LTD</b>				
A Global Railway Industries Company				
19500 Clark-Cromton, Bois d'Arce, Quebec				
Tel: (514) 457-4373 Fax: (514) 457-3957				
DESCRIPTION: <b>AXLE ASSEMBLY</b>				
TOLERANCE (UNLESS SPECIFIED): APPR. DATE:				
3 DECIMAL PLACES ±0.010"				
1 DECIMAL PLACE ±0.050"				
1 DECIMAL PLACE ±0.000"				
ALL DIMENSIONS SPECIFIED IN INCHES				
DRAWN: <b>LE</b> DATE: <b>MAY17/04</b>				
APPROVED: <b>R-8910</b> RESIDUE: <b>A</b>				

**NOTES**

- ITEMS 18, 22, AND 31, ALONG WITH QT. 16 OF ITEM 26 ARE TO BE PACKAGED TOGETHER FOR SHIPPING
- ITEM 13 IS TO BE SHIPPED LOOSE
- REFERENCE R-990KIT-038A FOR HARDWARE KIT
- REFERENCE H-990KIT-071



PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	R-8928	TUBE ASSY, OUTER GUIDE
2	4	R-5683	TIMBREN 540/75 SPRING
3	2	R-8939	GUIDE TUBE ASSEMBLY, INNER
4	2	R-9116A-CV	CYL, R-890 FRONT INT. CHK VALVE
5	2	R-2411	RUBBER, RAIL SWEEP
6	2	R-5561	PLATE, RAIL SWEEP
7	2	R-8992	RAIL SWEEP BRACKET ASSEMBLY
8	2	R-8997	TOP PLATE
9	2	990900-008	FITTING, 1/8" 90 DEG PTF
10	2	R-8991	PIN
11	2	R-8960	HOOK ASSEMBLY
12	2	R-8964	PIN
13	1	R-8961	HANDLE
14	4	R-8966	LINK
15	4	S-005001	3/8" OD X 1" LONG PIN
16	2	R-5604	SPRING, EXTENSION
17	1	R-8913	R890 AXLE ASSY, ADJUSTABLE
18	8	R-8998	PLATE, WASHER
19	4	990722-150-22	SCREW, 1/4" X 1 1/2" GR 8 HEX Z/Y
20	2	990722-250-22	SCREW, 1/4" X 2 1/4" GR 8 HEX Z/Y
21	4	990727-175-22	SCREW, 1/2" X 1 3/4" GR 8 HEX Z/Y
22	8	990731-350-22	SCREW, 3/4" X 3 1/2" GR 8 HEX Z/Y
23	12	990600-025-002	WASHER, 1/4" NARROW FLAT Z/Y
24	16	990600-037-002	WASHER, 3/8" NARROW FLAT Z/Y
25	8	990600-050-002	WASHER, 1/2" NARROW FLAT Z/Y
26	18	990600-075-002	WASHER, 3/4" NARROW FLAT Z/Y
27	2	990600-100-002	WASHER, 1" NARROW FLAT Z/Y
28	4	990600-125-002	WASHER, 1 1/4" NARROW FLAT Z/Y
29	6	990316-025-22	NUT, 1/4" GR 8 HEX NYLOCK Z/Y
30	4	990316-050-22	NUT, 1/2" GR 8 HEX NYLOCK Z/Y
31	8	990316-075-22	NUT, 3/4" GR 8 HEX NYLOCK Z/Y
32	2	037278-100-01	NUT, 1" HVY HEX TOP LOCK Z/C
33	4	990504-075-02	COTTER PIN, 3/32" X 3/4" Z/Y
34	4	990511-200-02	COTTER PIN, 1/4" X 2" Z/Y
35	4	R-33020	CLAMP, HOSE (NOT SHOWN)

REV/DESCRIPTION OF CHANGES	DATE	BY	APPRVD	ECN #	DRAWN	CHECKED	APPROVED
A. REVISION A RELEASED	10/05/18	SMMI	JMP				

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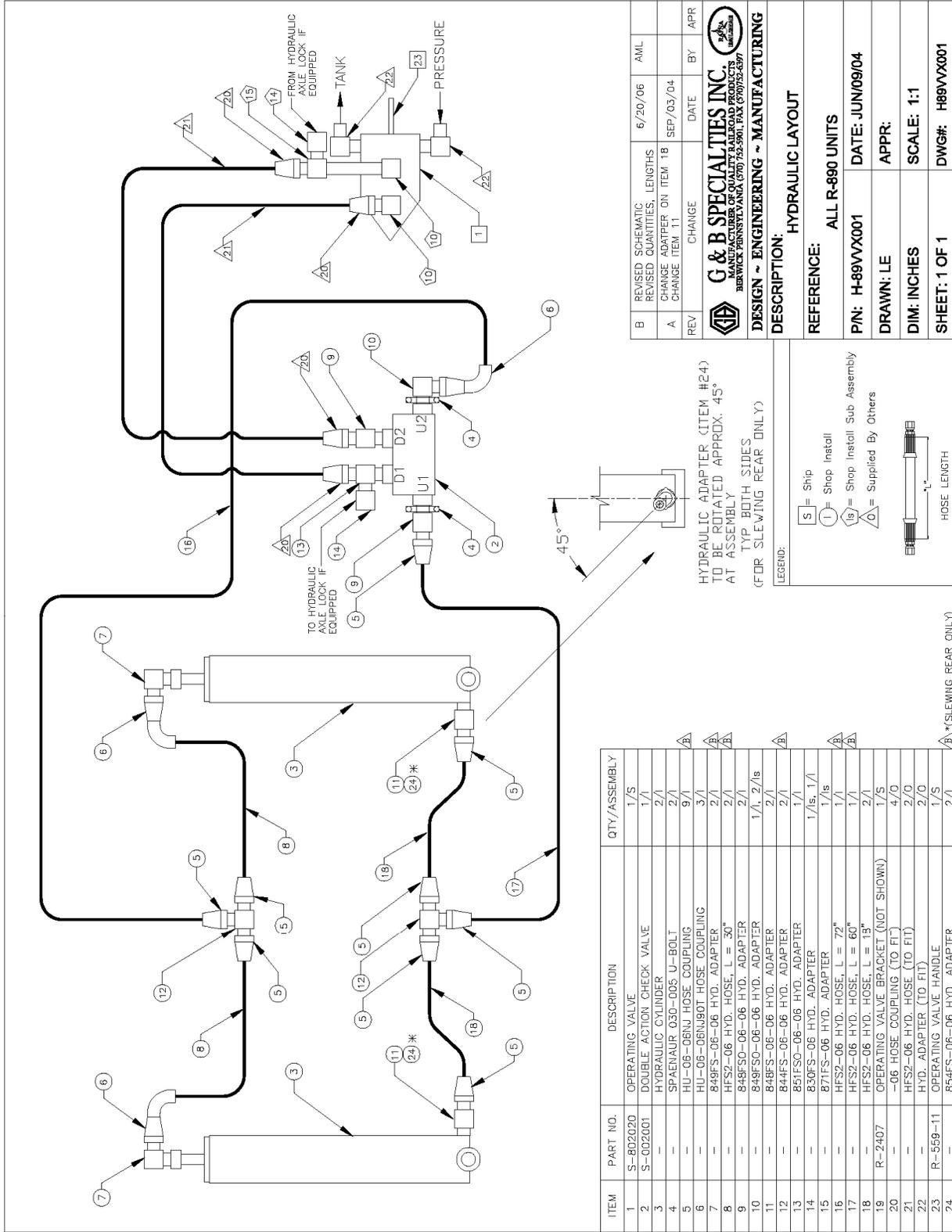
SHEET/DRAWING NUMBER: 1 R8904      DATE DRAWN: 10/05/18/R-8904      PART NUMBER: A











REV	CHANGE	DATE	BY	APR
B	REVISED SCHEMATIC	6/20/06	AML	
A	CHANGE ADAPTER ON ITEM 18	SEP/03/04		
	CHANGE ITEM 11			

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

**DESIGN ~ ENGINEERING ~ MANUFACTURING**

**DESCRIPTION:** HYDRAULIC LAYOUT

**REFERENCE:** ALL R-890 UNITS

**P/N:** H-89VAX001 **DATE:** JUN/09/04

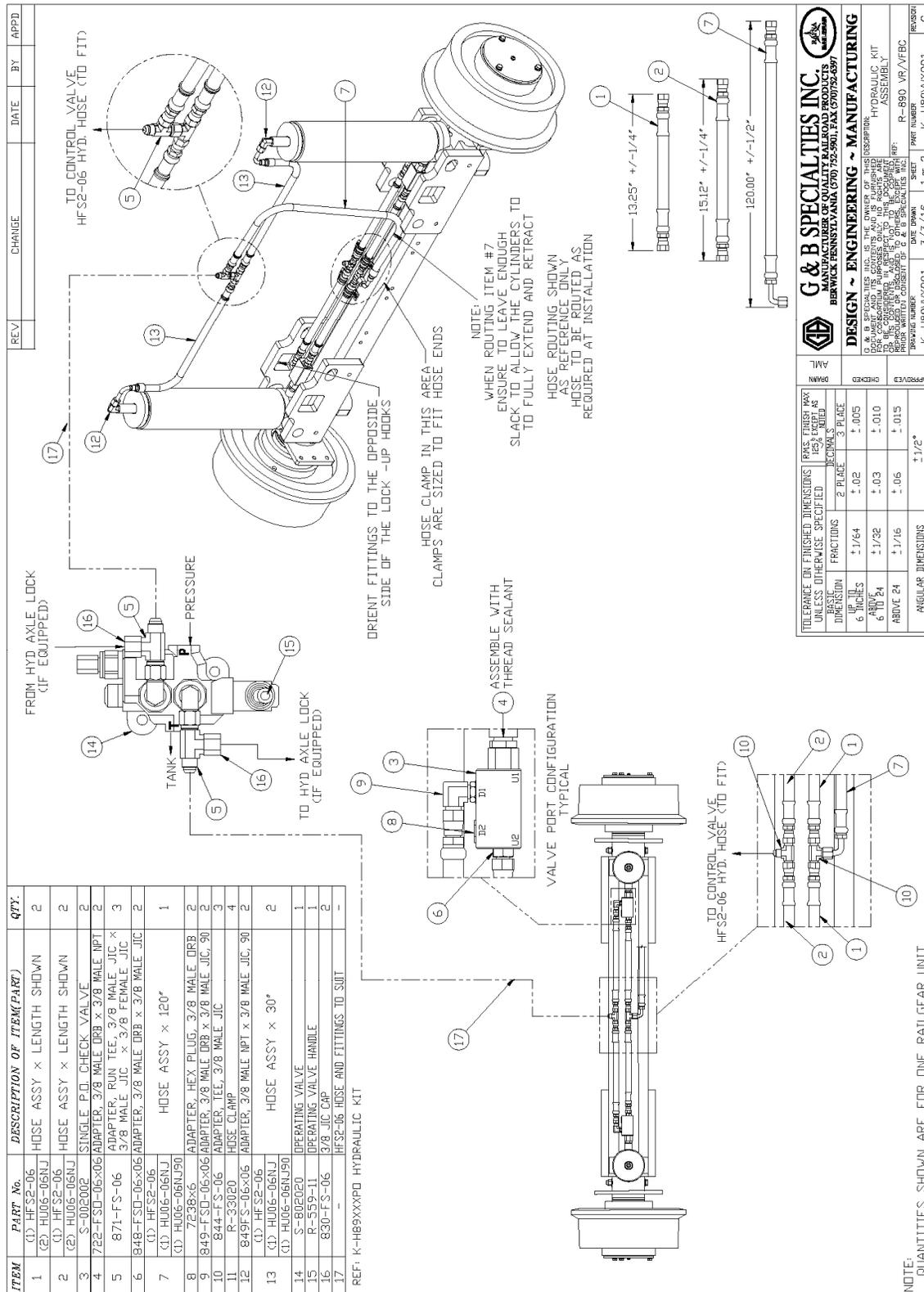
**DRAWN:** LE **APPR:**

**DIM:** INCHES **SCALE:** 1:1

**SHEET:** 1 OF 1 **DWG#:** H89VAX001

ITEM	PART NO.	DESCRIPTION	QTY/ASSEMBLY
1	S-802020	OPERATING VALVE	1/S
2	S-002001	DOUBLE ACTION CHECK VALVE	1/1
3		HYDRAULIC CYLINDER	2/1
4		SPAENAUR 030-005 U-BOLT	2/1
5		HU-06-06NU HOSE COUPLING	9/1
6		HU-06-06NU90T HOSE COUPLING	3/1
7		849FS-06-06 HYD. ADAPTER	2/1
8		HF52-06 HYD. HOSE, L = 30"	2/1
9		849FS-06-06 HYD. ADAPTER	2/1
10		849FS-06-06 HYD. ADAPTER	1/1, 2/1s
11		844FS-06-06 HYD. ADAPTER	2/1
12		851FS-06-06 HYD. ADAPTER	2/1
13		830FS-06 HYD. ADAPTER	1/1s, 1/1
14		871FS-06 HYD. ADAPTER	1/1s
15		HF52-06 HYD. HOSE, L = 72"	1/1
16		HF52-06 HYD. HOSE, L = 60"	1/1
17		HF52-06 HYD. HOSE, L = 13"	2/1
18	R-2407	OPERATING VALVE BRACKET (NOT SHOWN)	1/S
19		-06 HOSE COUPLING (TO FIT)	4/0
20		HF52-06 HYD. HOSE (TO FIT)	2/0
21		HYD. ADAPTER (TO FIT)	2/0
22	R-559-11	OPERATING VALVE HANDLE	1/S
23		854FS-06-06 HYD. ADAPTER	2/1
24			△ (SLEWING REAR ONLY)

REF: EXTERNAL MOUNTED P.O. CHECK VALVE



ITEM	PART No.	DESCRIPTION OF ITEM(PART)	QTY.
1	(1) HF52-06	HOSE ASSY x LENGTH SHOWN	2
2	(2) HU06-06NJ	HOSE ASSY x LENGTH SHOWN	2
3	(3) HF52-06	HOSE ASSY x LENGTH SHOWN	2
4	(4) HU06-06NJ	SINGLE P.O. CHECK VALVE	2
5	(5) S-002002	ADAPTER, 3/8 MALE ORB x 3/8 MALE NPT	2
6	(6) 871-FS-06	ADAPTER, RUN TEE, 3/8 MALE JIC x 3/8 MALE JIC	3
7	(7) 848-FSD-06x06	ADAPTER, 3/8 MALE ORB x 3/8 MALE JIC	2
8	(8) HF52-06	HOSE ASSY x 120"	1
9	(9) HU06-06NJ90	ADAPTER, HEX PLUG, 3/8 MALE ORB	2
10	(10) 849-FSD-06x06	ADAPTER, 3/8 MALE ORB x 3/8 MALE JIC, 90	3
11	(11) R-33020	ADAPTER, TEE, 3/8 MALE JIC	4
12	(12) 849FS-06x06	ADAPTER, 3/8 MALE NPT x 3/8 MALE JIC, 90	2
13	(13) HF52-06	HOSE ASSY x 30"	2
14	(14) HU06-06NJ	OPERATING VALVE	1
15	(15) S-509020	OPERATING VALVE HANDLE	1
16	(16) R-359-11	3/8 JIC ORB	2
17	(17) 830-FS-06	HF52-06 HOSE AND FITTINGS TO SUIT	-

REF: K-H89XXXXP HYDRAULIC KIT

REF: PORT MOUNTED EXTERNAL P.O. CHECK VALVE

TOLERANCE ON ENGED DIMENSIONS UNLESS OTHERWISE SPECIFIED	FRACTIONS	DECIMALS	ANGULAR DIMENSIONS
BASIC DIMENSION	+1/64	+0.02	
6 DECIMALS	+1/32	+0.03	
ANGULAR	+1/16	+0.05	+1/2°

DATE	BY	APPD
3/3/16	1 of 2	K-H89BXX001

DATE	BY	APPD
3/3/16	1 of 2	K-H89BXX001

DATE	BY	APPD
3/3/16	1 of 2	K-H89BXX001

**G & B SPECIALTIES INC.**  
MANUFACTURER OF QUALITY RAILROAD PRODUCTS  
BERWICK, PENNSYLVANIA (717) 752-5901 FAX (717) 752-6397

**DESIGN ~ ENGINEERING ~ MANUFACTURING**

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DESCRIPTION: HYDRAULIC KIT ASSEMBLY

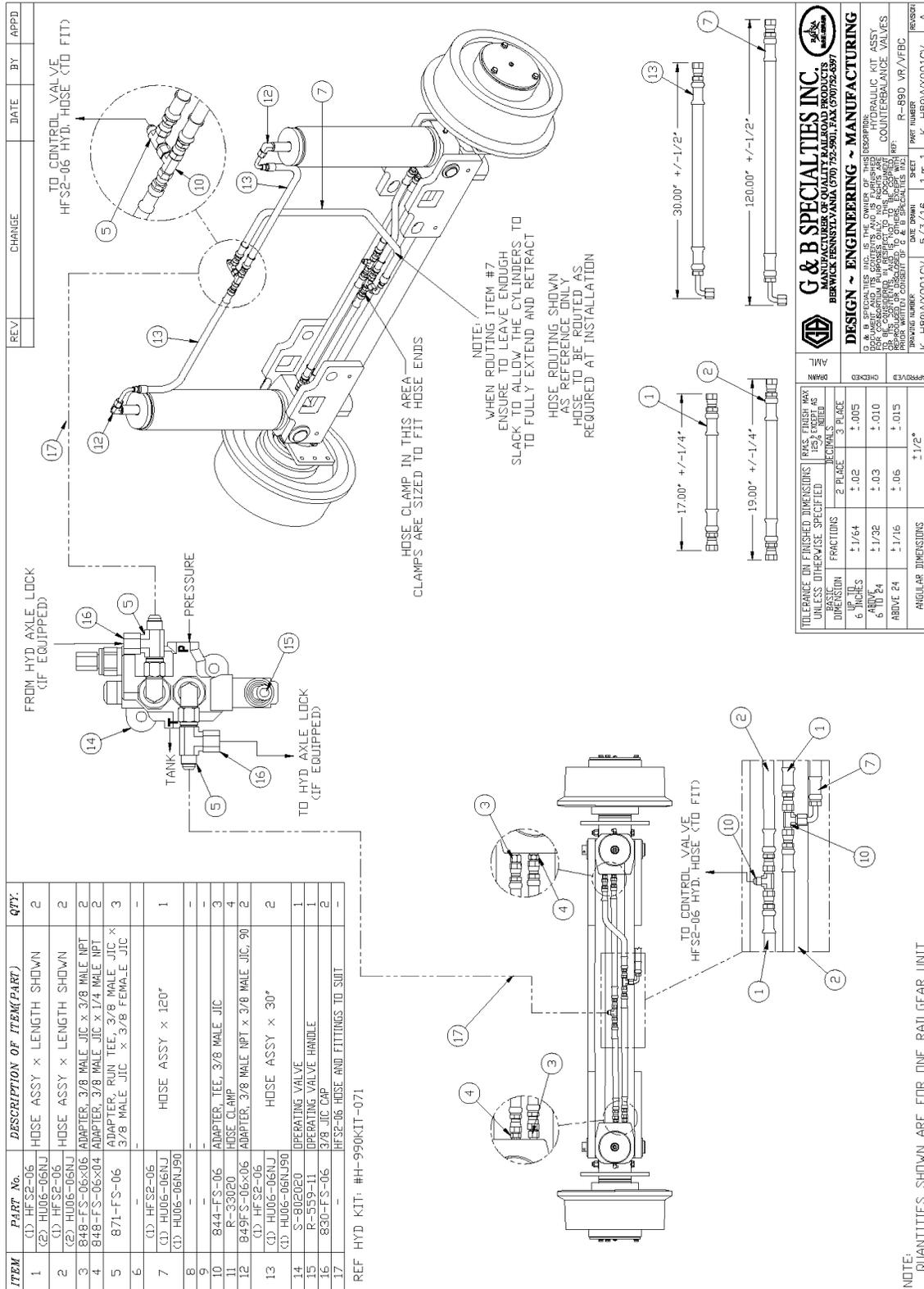
REF: K-H89XXXXP HYDRAULIC KIT

DATE TOWN: 3/3/16

SHEET: 1 of 2

PART NUMBER: R-890 VR/AFBC

REASON: C



ITEM	PART No.	DESCRIPTION OF ITEM(PART)	QTY:
1	(1) HF S2-06 (2) HU06-06NJ	HOSE ASSY x LENGTH SHOWN	2
2	(1) HF S2-06 (2) HU06-06NJ	HOSE ASSY x LENGTH SHOWN	2
3	848-FS-06x06	ADAPTER, 3/8 MALE JIC x 3/8 MALE NPT	2
4	848-FS-06x04	ADAPTER, 3/8 MALE JIC x 1/4 MALE NPT	2
5	871-FS-06	ADAPTER, RUN TEE, 3/8 MALE JIC x 3/8 MALE JIC x 3/8 FEMALE JIC	3
6	(1) HF S2-06 (1) HU06-06NJ	HOSE ASSY x 120"	1
7	(1) HU06-06NJ		1
8			-
9			-
10	844-FS-06	ADAPTER, TEE, 3/8 MALE JIC	3
11	R-33020	HOSE CLAMP	4
12	849FS-06x06	ADAPTER, 3/8 MALE NPT x 3/8 MALE JIC, 90	2
13	(1) HF S2-06 (1) HU06-06NJ	HOSE ASSY x 30"	2
14	S-902020	OPERATING VALVE	1
15	R-3359-11	OPERATING VALVE HANDLE	1
16	830-FS-06	3/8 JIC CAP	2
17		HF S2-06 HOSE AND FITTINGS TO SUIT	-

REF HYD KIT: #H-990KIT-071

REF: INTERNAL CHECK VALVE

 <b>G &amp; B SPECIALTIES INC.</b> MANUFACTURER OF QUALITY RAILROAD PRODUCTS BERWICK, PENNSYLVANIA (717) 752-5901 FAX (717) 752-6397	<b>DESIGN ~ ENGINEERING ~ MANUFACTURING</b> D. B. SPECIALTIES INC. IS THE OWNER OF THIS DESIGN. THE DESCRIPTION OF THIS DESIGN IS FOR REFERENCE ONLY. NO WARRANTIES ARE MADE BY SPECIALTIES INC. FOR THIS DESIGN. THE USER OF THIS DESIGN SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS PRIOR TO INSTALLATION. THIS DESIGN IS THE PROPERTY OF SPECIALTIES INC. AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.
AML: _____ DWM: _____ DCD: _____ DPC: _____ DATE: 3/3/16	SHEET: 1 OF 1 PART NUMBER: K-H89BXX001CV DATE: 3/3/16 1 OF 1 K-H89BXX001CV REVISION: A