



**G&B Specialties, Inc.**  
A Global Railway Industries Company



Bulletin MO-R89BXX001 (Rev A)

## **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 in order 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 approximately 2" 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.



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**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 ESSO LONAX EP2 grease or equivalent. In cold weather areas/seasons, SHELL DARINA XL102 or equivalent may be used.

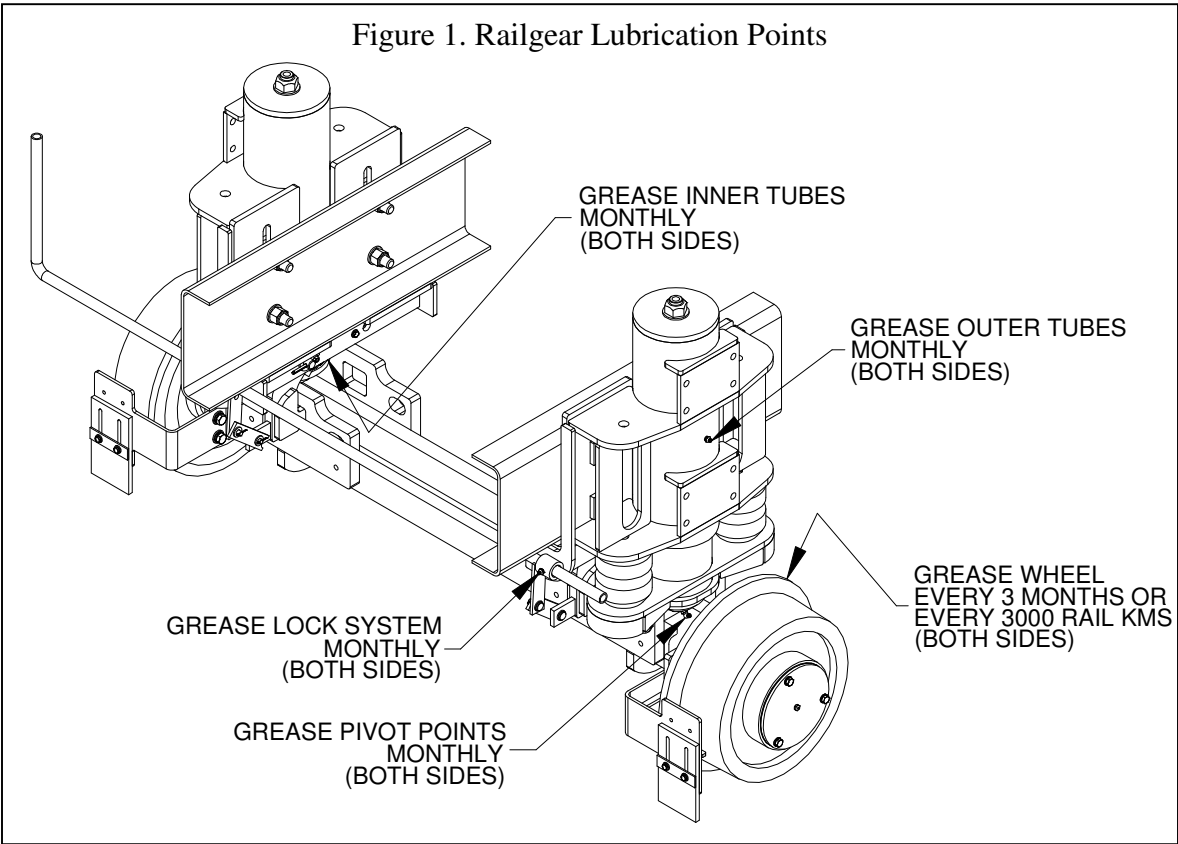
Table 1: Recommended Service Schedule

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 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
3/4" UNC Gr. 8 Fasteners	175
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



**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 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  $\frac{3}{8}$ " 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 in order 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 in order 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. In order 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.

In order 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. In order 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. In order 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.





Figure 2. Railgear Alignment

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

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

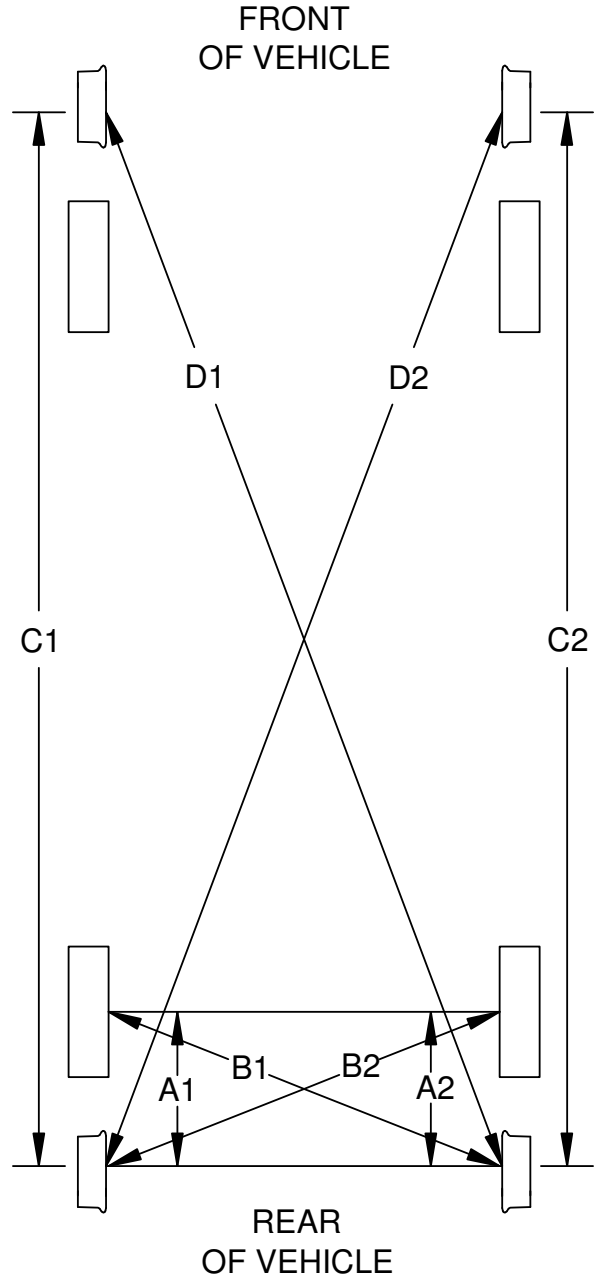
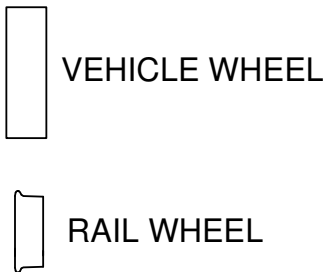
RAILGEAR S/N: \_\_\_\_\_

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"

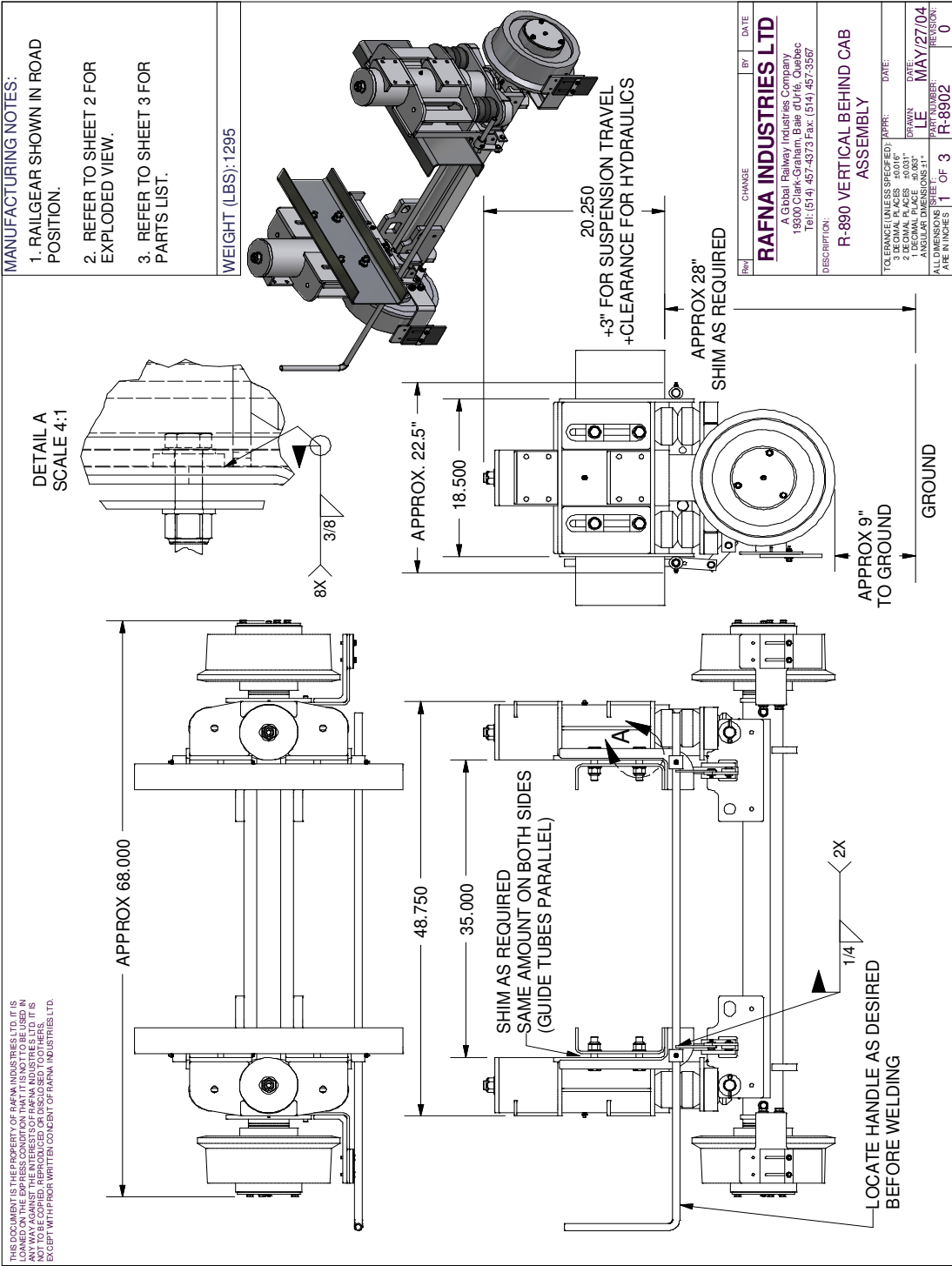
RAIL WHEEL FLANGE TO  
GROUND CLEARANCE

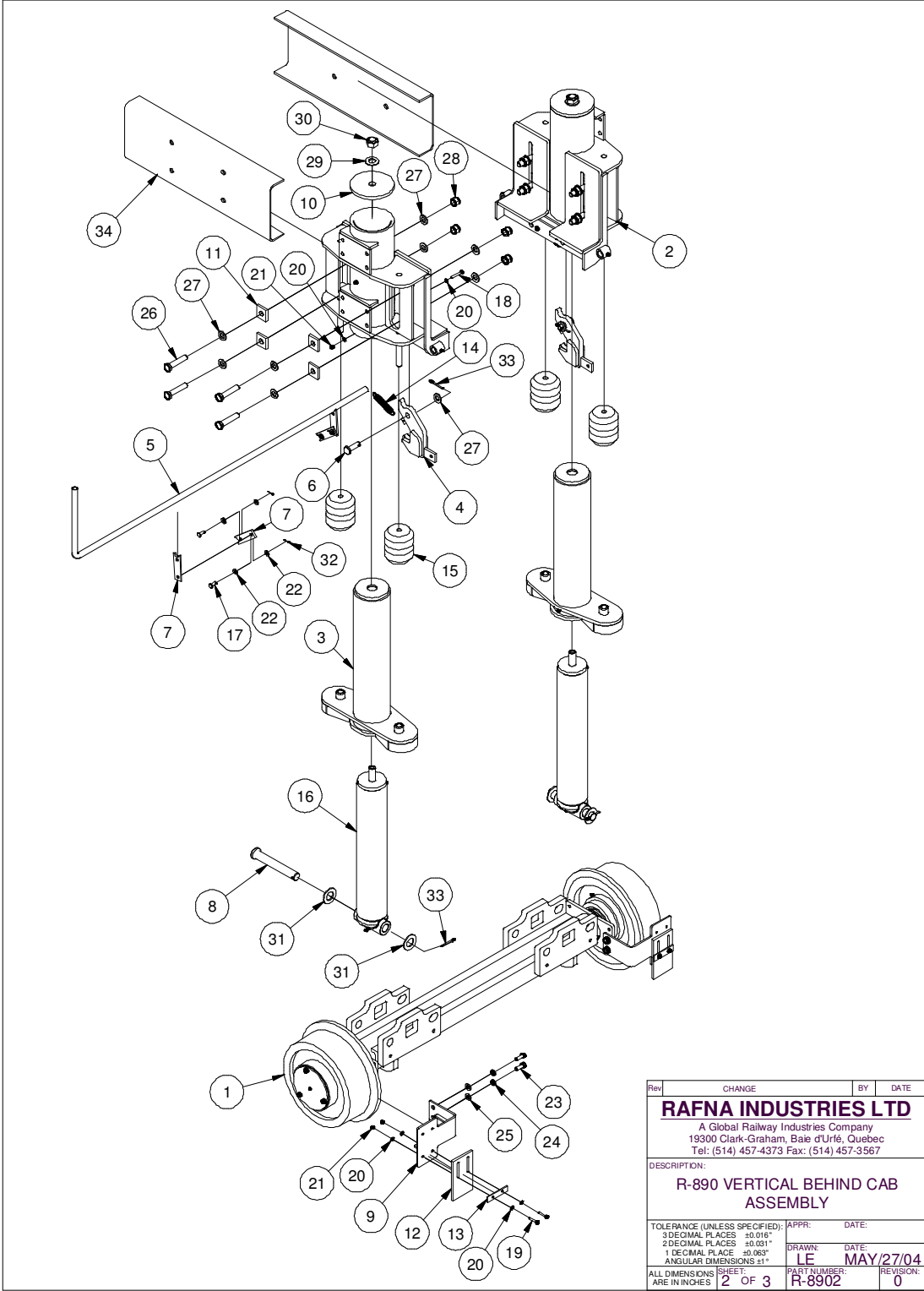
- LEFT FRONT \_\_\_\_\_
- RIGHT FRONT \_\_\_\_\_
- LEFT REAR \_\_\_\_\_
- RIGHT REAR \_\_\_\_\_





**PARTS OF VERTICAL FRONT BEHIND CAB RAILGEAR KIT**





Rev	CHANGE	BY	DATE
<b>RAFNA INDUSTRIES LTD</b>			
A Global Railway Industries Company 19300 Clark-Graham, Bate d'Urle, Quebec Tel: (514) 457-4373 Fax: (514) 457-3567			
DESCRIPTION:			
<b>R-890 VERTICAL BEHIND CAB ASSEMBLY</b>			
TOLERANCE (UNLESS SPECIFIED):		APPR:	DATE:
3 DECIMAL PLACES ±0.016"			
2 DECIMAL PLACES ±0.031"			
1 DECIMAL PLACE ±0.063"			
ANGULAR DIMENSIONS ±1°			
ALL DIMENSIONS SHOWN ARE IN INCHES		DRAWN: <b>LE</b>	DATE: <b>MAY/27/04</b>
2 OF 3		PART NUMBER: <b>R-8902</b>	REVISION: <b>0</b>



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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 ASSEMBLY	2
17	S-005001	3/8" OD X 3/4" 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	2

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.

REFER TO DRAWING H89VVX001 FOR HYDRAULIC PARTS.

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Rev	CHANGE	BY	DATE
<b>RAFNA INDUSTRIES LTD</b>			
A Global Railway Industries Company 19300 Clark-Graham, Bate d'Urle, Quebec Tel: (514) 457-4373 Fax: (514) 457-3567			
DESCRIPTION:			
<b>R-890 VERTICAL BEHIND CAB ASSEMBLY</b>			
TOLERANCE (UNLESS SPECIFIED):		APPR:	DATE:
3 DECIMAL PLACES ±0.016"			
2 DECIMAL PLACES ±0.031"			
1 DECIMAL PLACE ±0.063"			
ANGULAR DIMENSIONS ±1°			
ALL DIMENSIONS UNLESS SPECIFIED ARE IN INCHES		DRAWN: <b>LE</b>	DATE: <b>MAY/27/04</b>
3 OF 3		PART NUMBER: <b>R-8902</b>	REVISION: <b>0</b>



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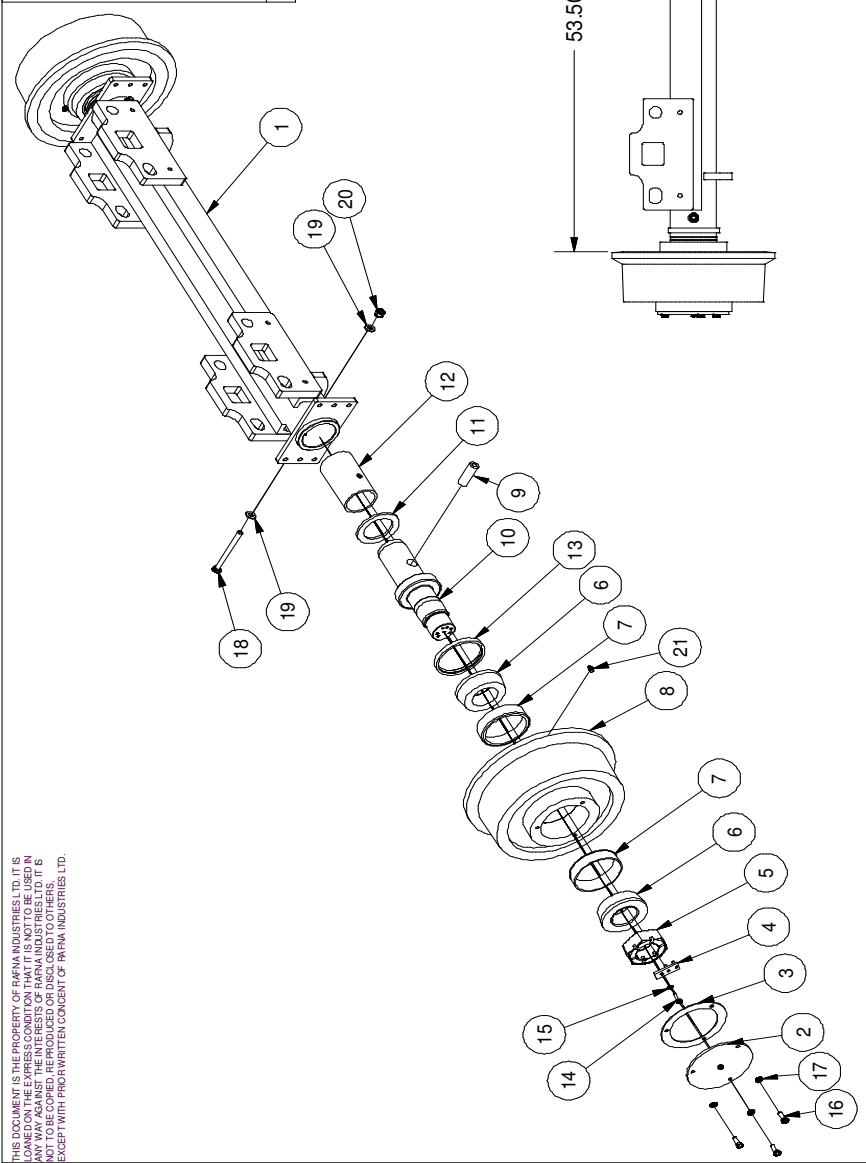


Bulletin MO-R89BXX001 (Rev A)

**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**



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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 CAB	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				

**RAFNA INDUSTRIES LTD**  
 A Global Railway Industries Company  
 19300 Highway 100, Berwick, Pa. 18703  
 Tel: (514) 457-4373 Fax: (514) 457-3557

**AXLE ASSEMBLY**

TOLERANCE (UNLESS SPECIFIED): PPR: DATE:  
 3 DECIMAL PLACES .0031"  
 DRAWN: LE MAY/17/04  
 PART NUMBER: R-8910  
 ALL DIMENSIONS IN INCHES  
 SHEET: 1 OF 1  
 REVISION: 0



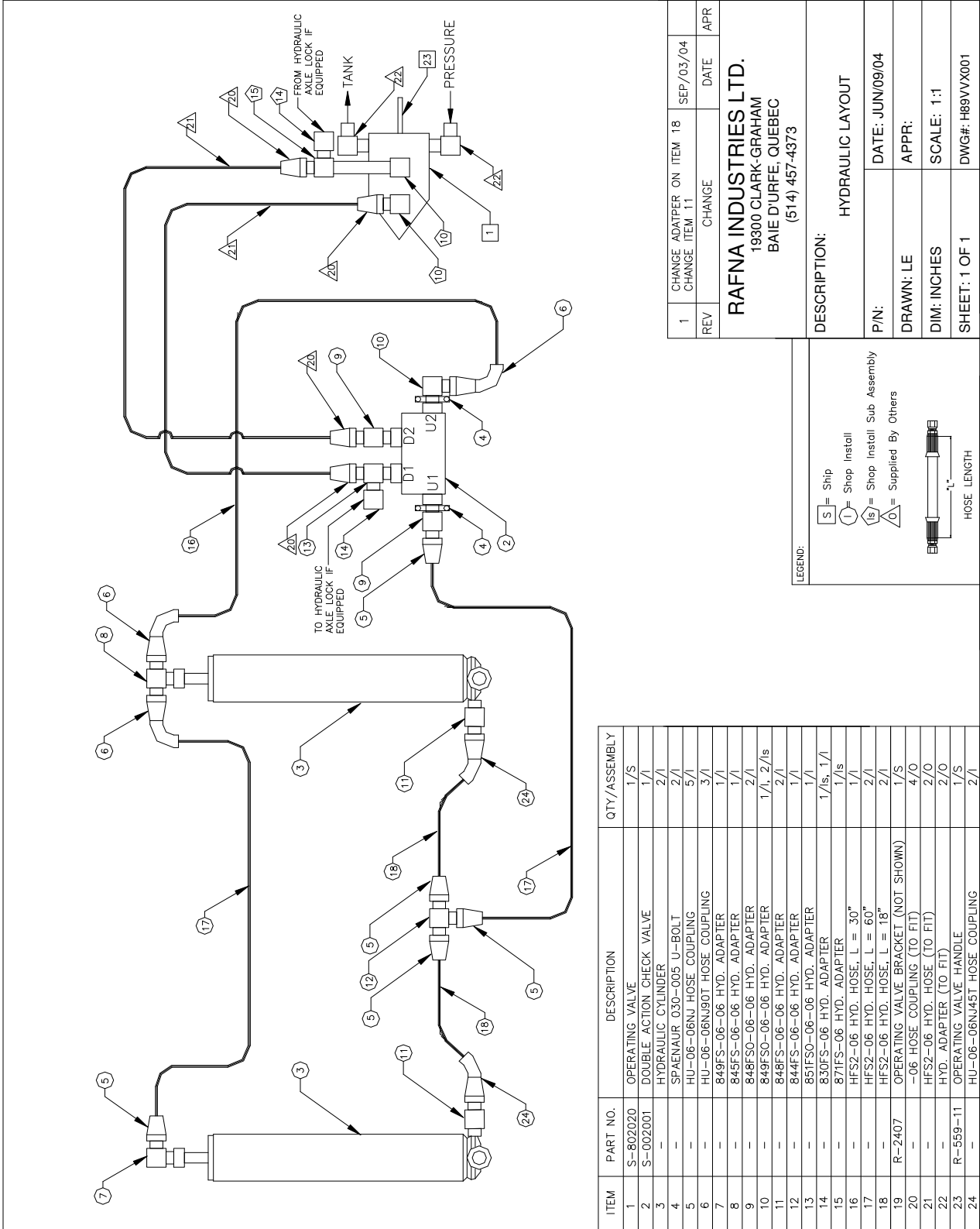


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Bulletin MO-R89BXX001 (Rev A)



1	CHANGE ADAPTER ON ITEM 18 CHANGE ITEM 11	SEP/03/04	DATE	APR
<b>RAFNA INDUSTRIES LTD.</b> 19300 CLARK-GRAHAM BAIE D'URFE, QUEBEC (514) 457-4373				
DESCRIPTION: HYDRAULIC LAYOUT				
P/N: DATE: JUN/09/04				
DRAWN: LE APPR:				
DIM: INCHES SCALE: 1:1				
SHEET: 1 OF 1 DWG#: H89VX001				

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	-	SPAENAUER 030-005 U-BOLT	2/1
5	-	HU-06-06NU HOSE COUPLING	5/1
6	-	HU-06-06NU90T HOSE COUPLING	3/1
7	-	849FS-06-06 HYD. ADAPTER	1/1
8	-	845FS-06-06 HYD. ADAPTER	1/1
9	-	848FSO-06-06 HYD. ADAPTER	2/1
10	-	849FSO-06-06 HYD. ADAPTER	1/1, 2/1s
11	-	848FS-06-06 HYD. ADAPTER	2/1
12	-	844FS-06-06 HYD. ADAPTER	1/1
13	-	851FSO-06-06 HYD. ADAPTER	1/1
14	-	830FS-06 HYD. ADAPTER	1/1s, 1/1
15	-	871FS-06 HYD. ADAPTER	1/1s
16	-	HF52-06 HYD. HOSE, L = 30"	1/1
17	-	HF52-06 HYD. HOSE, L = 60"	2/1
18	-	HF52-06 HYD. HOSE, L = 18"	2/1
19	R-2407	OPERATING VALVE BRACKET (NOT SHOWN)	1/S
20	-	-06 HOSE COUPLING (TO FIT)	4/0
21	-	HF52-06 HYD. HOSE (TO FIT)	2/0
22	-	HYD. ADAPTER (TO FIT)	2/0
23	R-559-11	OPERATING VALVE HANDLE	1/S
24	-	HU-06-06NU45T HOSE COUPLING	2/1