



**MANUAL**

**INSTALLATION – OPERATION – PARTS – SERVICE**

**MODEL G-35/LS-35 HI-RAIL UNIT**

**(26,000 to 39,000 lbs GVWR TRUCKS)**

**UNIVERSAL MOUNTING PLATES**

May 2022  
Revision 2

**CONTINENTAL RAILWORKS**  
7380 Vérité, St-Laurent, QC, Canada, H4S 1C5  
Phone : 514-956-8081 Fax : 514-956-0737

## INTRODUCTION

The following installation, operation, parts, and service manual has been prepared to be used with the Continental Railworks **35 Series** hi-rail unit on a 26,000 to 39,000 lbs GVWR heavy truck.

All Continental Railworks hi-rail kits are designed to make operation and service as simple as possible. There is no adjustment required when varying loads are placed on a vehicle. The use of independent mounting plates provides for easy complete unit removal and re-installation when required, as well as a complete range of adjustment to tailor the hi-rail unit to the vehicle.

At any time technical assistance can be obtained from the hi-rail manufacturer. A simple phone call to Continental Railworks can eliminate many time consuming problems or questions. Technical assistance is available Monday to Friday, from 8:30 a.m. to 4:30 p.m. ET, by calling **(514) 956-8081** or emailing **admin@continentalrailworks.com**. Support personnel are frequently available during off-peak hours as well, so please do not hesitate to call or fax outside the hours listed above, including nights and weekends. It is also possible to leave a message at any time, and your call will be returned as soon as possible.

## **GENERAL INFORMATION**

### **GENERAL DESCRIPTION**

The Continental Railworks Model G-35/LS-35 is designed for single axle heavy trucks with a GVWR between 26,000 and 39,000 lbs. For this application, the G-35/LS-35 is the only model currently available that does not require manual locking mechanisms such as pins, levers or cables. The hydraulic actuation effectively and automatically locks and unlocks the hi-rail unit in position, in both raised and lowered positions.

Drop forged 12" guide wheels offer good service life due to the depth of hardness. Material selection in key areas (pins, slots, structural assemblies) ensure adequate wear resistance and improve the overall service life of the hi-rail unit.

Rubber aeon down-force in the rear unit contributes to maintaining proper rail contact over crossings or irregular rail sections. Braking is achieved using front air brakes (front standard, rear optional) or hydraulic brakes (front and rear available).

The combined weight of the G-35/LS-35 hi-rail, mounting plates and all necessary valves is approximately 1760 lbs.

## **OPTIONS**

Options are available upon request; please contact Continental Railworks for more details.

### **REAR AIR BRAKES**

Front air brakes are standard on all G-35 hi-rail units, but rear brakes are available if required. The same components are used on the rear unit as on the front unit. Plumbing the air lines to the rear brakes is detailed in the Pneumatic Brake Valve Kit section of the manual.

### **AUXILIARY HYDRAULIC BRAKES (FRONT)**

Front air brakes can be substituted for hydraulic brakes if the chassis is equipped with hydraulic brakes. The brakes are powered by a separate hydraulic power pack and are pressure adjustable. Details can be found in the Auxiliary Hydraulic Brake Kit section of the manual.

### **TRACK SIGNAL SHUNT KIT**

Continental Railworks offers an option to temporarily shunt track signals by overriding the spindle insulators on demand through a switch in the cab. Details can be found in the Track Signal Shunt Kit section of the manual.

### **PNEUMATIC SUSPENSION KIT**

Continental Railworks offers an option to allow proper chassis air bag adjustability when installing hi-rail on an air ride truck. Regulating the air pressure in the suspension is required to maintain proper traction on track. Details can be found in the Pneumatic Suspension Kit section of the manual.

## **APPROVED CHASSIS MODELS**

International 4300-4400  
Freightliner M2-108SD-114SD  
Ford F750  
Etc

The truck needs to have front frame extensions (integral recommended) for installation of front hi-rail.

See mounting envelope in Appendices for minimal space requirements.

# INSTALLATION

## SPECIAL CONSIDERATIONS

### VEHICLE CONDITION

Prior to installing hi-rail, it should be determined that the vehicle is in good working order. More specifically, the vehicle's suspension and frame need to be inspected and in good condition.

### VEHICLE REAR SUSPENSION

If the vehicle is equipped with rear air bag suspension, a Pneumatic Suspension Kit will be required to bypass the chassis' OEM leveling valve. This will ensure that the vehicle provides consistent and reliable traction while on rail. Vehicles equipped with leaf springs or rubber suspension only require proper height and pre-load adjustment.

### EXHAUST TAILPIPE

If the truck is equipped with a horizontal exhaust system, the exhaust tailpipe may need to be modified to make room for the rear hi-rail. It is recommended to have this performed at a specialized shop, especially for a Diesel engine, where the manufacturer's guidelines are more stringent. This manual does not cover exhaust tailpipe modifications.

### MODIFICATIONS TO HI-RAIL OR MOUNTING COMPONENTS

Although the mounting components delivered with the hi-rail are custom to every vehicle, there might be unforeseen interferences with some vehicle components (frame mounted equipment, radiators, hood hinges, bumper mounts, etc). Modifications to the mounting components are allowed, but please contact Continental Railworks for guidance. Modifications to the hi-rail units should not be required, and would void the warranty if performed without Continental Railworks' consent.

## **! SAFETY WARNING !**

**DO NOT WELD ON THE VEHICLE FRAME. - TAKE PROPER INSULATION MEASURES IF WELDING ON THE VEHICLE IS REQUIRED, INCLUDING DISCONNECTING BOTH BATTERY CABLES.**

**REFER TO BOLT TORQUE TABLE IN APPENDIX 1, AND TO MANUFACTURER'S SPECIFICATIONS FOR WHEEL STUDS**

**NEVER REUSE NYLOC LOCKING NUTS OR STOVER LOCKING NUTS**

**CONTACT CONTINENTAL RAILWORKS PRIOR TO MODIFYING ANY PART OF THE HI-RAIL OR MOUNTING HARDWARE**

**DO NOT ATTACH OTHER EQUIPMENT OR ACCESSORIES TO THE HI-RAIL OR MOUNTING PLATES**

## FRONT UNIT INSTALLATION

Continental Railworks provides a universal mounting bracket system that is designed to adapt the hi-rail to any chassis. Refer to the drawings in the Appendices for more details.

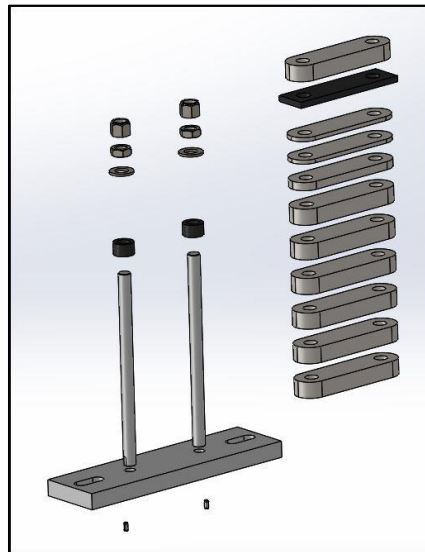
### CHASSIS PREPARATION

- 1- Remove the front bumper and place in a safe location to avoid damage. The bumper may be reinstalled at the end of the front hi-rail installation.
- 2- Remove the frame mounted tow hooks. Tow hooks may be reinstalled at the end of the front hi-rail installation.
- 3- Remove the frame mounted bumper brackets. Reinstall at the end of the front hi-rail installation if required.
- 4- Disconnect the truck batteries.
- 5- For ease of access and an easier alignment, it is recommended to raise the chassis on 12" blocks for the duration of the hi-rail installation and alignment.

### INSTALLATION – UNIVERSAL FRONT MOUNTING BRACKETS

Continental Railworks provides a Universal Front Mounting Bracket system that is designed to adapt to the majority of heavy chassis and to provide optimal ground clearance and liftoff. Refer to the drawings in the Appendices for details and nomenclature.

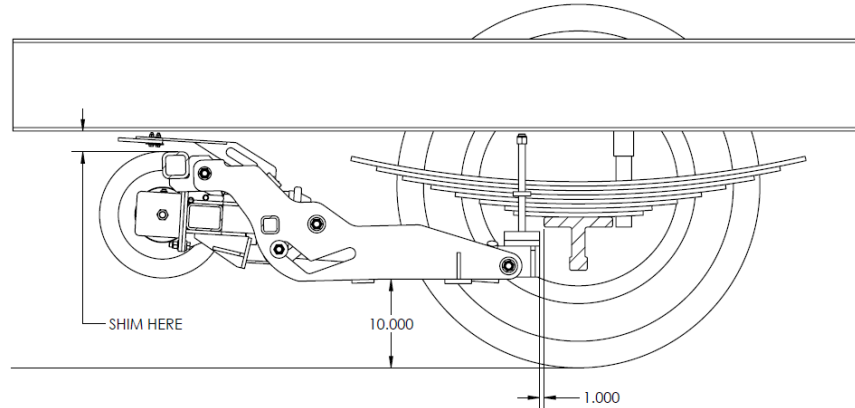
- 1- Remove the nuts, jam nuts, washers, bushings, steel plates (top and shims) and rubber pads from the universal spring mounting brackets installed at the rear of the front hi-rail.



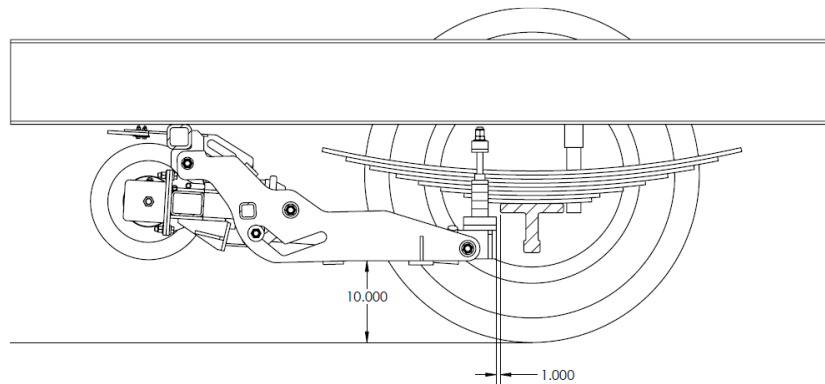
**Figure 1: Universal spring mounting bracket (components removed)**

2- Once adjusted, the mounting plates and spring mounts should position the hi-rail so that:

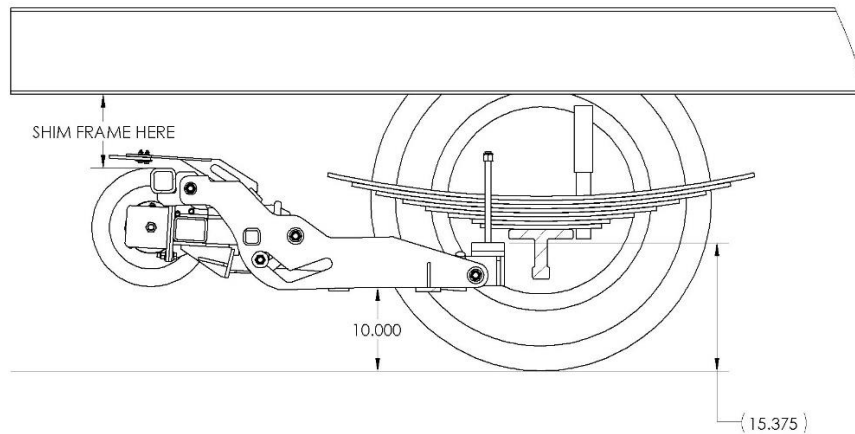
- a. The bottom of cam plates is parallel to the ground
- b. The bottom of cam plates is 10" – 10.5" from the ground
- c. The spring mounting brackets are as close as possible to the center of the leaf spring, 1" ahead of the axle or shock absorber
- d. The mounting bracket beam is parallel to the underside of the frame extensions



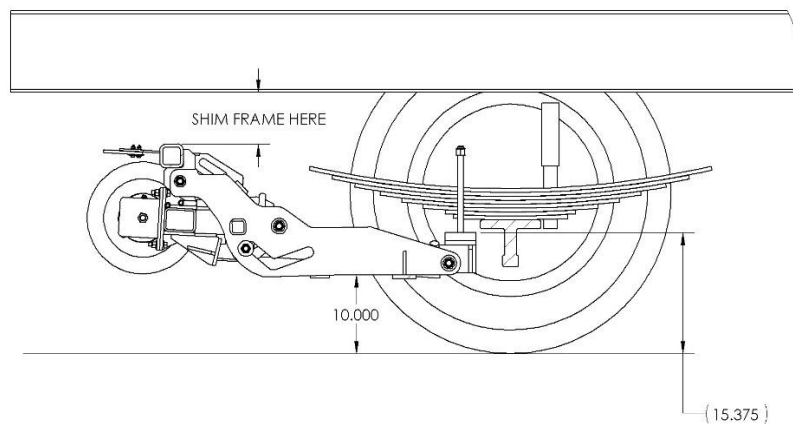
**Figure 2: Cam at 10" and parallel to the ground and spring hangers set 1" in front of the axle. In this figure the mounting beam is oriented towards the front of the chassis.**



**Figure 3: Mounting beam oriented up towards the frame extensions.**



**Figure 5: Front Installation dimensions (configuration 1)**



**Figure 6: Front Installation dimensions (configuration 2)**

**3- Adjust the spring mounting brackets:**

- a. Disassemble the spring mounting brackets (keep the nuts, jam nuts, washers, bushings, top steel plate and rubber pad close for installation on the leaf springs) and measure the gap between the underside of the leaf springs and the top of the spring mounting bracket (without shims).
- b. Arrange supplied shim plates to fill the previously measured gap.
- c. While doing so, the height of the hi-rail should remain at around 10" – 10.5" from the ground.

**4- Adjust the front mounting beam:**

- a. Rotate and orient the beam as required and measure the gap between the front mounting beam and the underside of the frame extensions.
- b. Fabricate weight-bearing shims to fill the previously measured gap.
  - i. Use HSS tubing minimum 3/8" wall thickness and end caps or;
  - ii. Plate steel welded to prevent rust



- c. While doing so, the height of the hi-rail should remain at around 10" – 10.5" from the ground.
- 5- After the front mounting beam and spring mounting bracket are adjusted for height, position the hi-rail under the front of the vehicle as pictured above.
- NOTE – Ensure the spring mounting bracket shims sit on a full leaf prior to securing.
- 6- Weld the front mounting beam (or the shims if necessary) to the underside of the frame extension using a 3/8" fillet weld and a 3/8" bevel flare weld.
- 7- Reassemble the spring mounting brackets above the leaf springs by sliding the components (bushings, rubber pad, top plate) over the two threaded rods, with the rubber pad making contact with the top of the leaf springs.
- 8- Tighten the 3/4"-10 jam nuts over the spring mounting bracket's top plates so that the rubber pad starts to deform. Do not use air tools for this operation.
- 9- While holding the jam nut in position, tighten the 3/4"-10 standard nuts over the jam nuts. Torque nuts adequately. Refer to the Bolt Torque Table in the Appendices.
- 10- If required, cut the excess threaded rods, leaving a minimum of 1/2" above the nuts.
- 11- Torque all bolts adequately. Refer to the Bolt Torque Table in the Appendices.
- 12- If required, trim or cut the unused portion of front frame extensions.
- 13- If required, reinstall the front bumper mounts, front bumper and tow hooks.

## REAR UNIT INSTALLATION

The LS-35 hi-rail is manufactured to accommodate truck frame widths of 35" or less using Width Shims. It accommodates frame heights of 27" and greater, using height spacers at installation and for weight adjustment. All measurements should be taken with the truck suspension air bags and tires properly inflated.

### CHASSIS PREPARATION

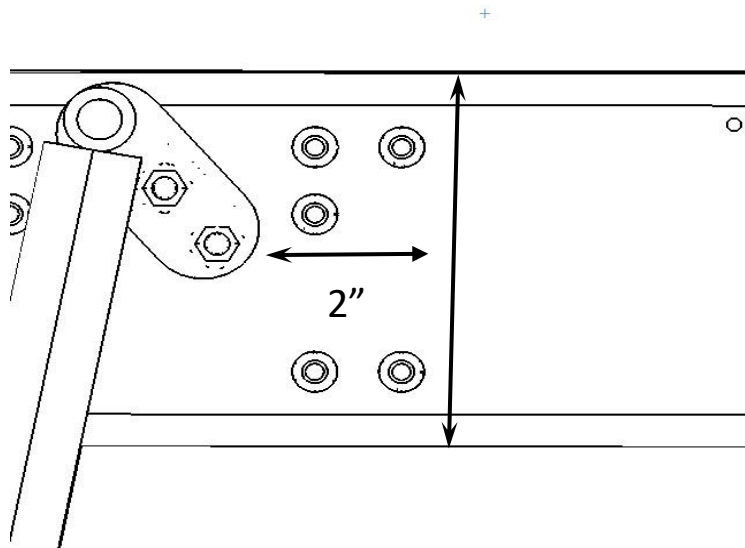
- 1- Inflate tires to recommended pressure.
- 2- Prior to measuring the frame height, ensure the air bags are properly inflated, if equipped.
- 3- Disconnect the truck batteries.
- 4- Ensure the rear axles are aligned laterally to the truck frame. If the axles are misaligned by more than 1/2", have the axles aligned and centered.

Note: For ease of access and alignment, it is recommended to raise the chassis on 12" blocks for the duration of the hi-rail installation and alignment.

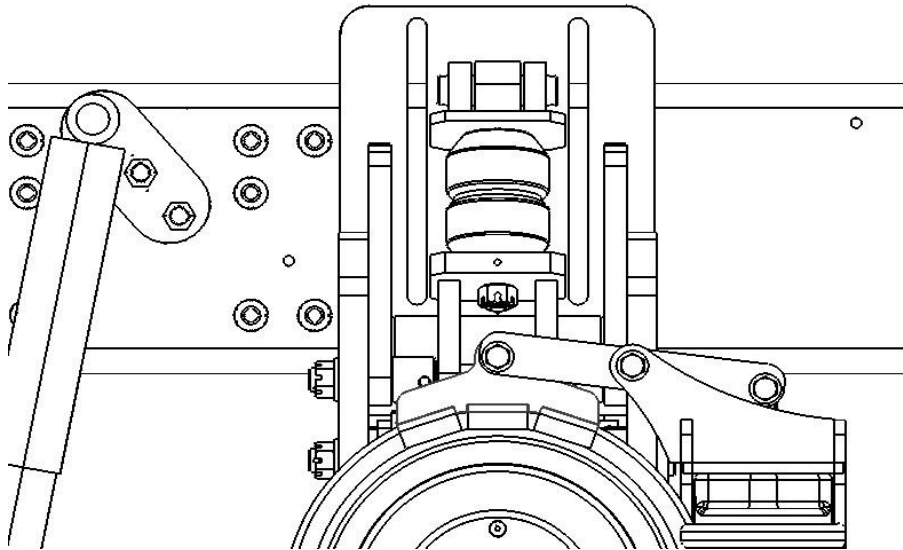
### RAIL GEAR MOUNTING

The LS-35 rear should be mounted as close to the rear tires as possible for the best performance going around tight curves on the rail. The LS-35 is primarily mounted on single axle chassis with either air ride or spring suspensions. This makes it tougher to get the LS-35 close to the rear axle due to the width of the leaf spring or air suspension components. The front of the LS-35 mounting bracket must be 2 inches away from the rear leaf spring hanger or air ride mounts.

- 1- Start by measuring back from the rear leaf spring mount or air suspension mount 2 inches and making a mark on the frame on both side of the frame.

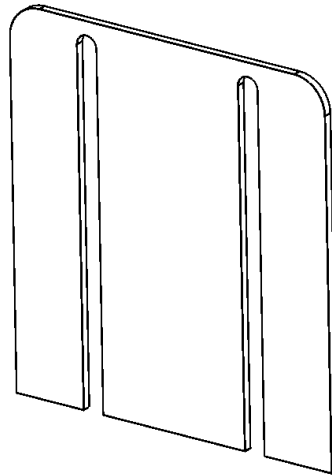


- 2- Check the area behind the marks on the frame and remove any bolts or fasteners that interfere with the rail gear when it's raised into position. The LS-35 rear mounting bracket is 10.5" wide.
- 3- Using two squares or straight edges, measure the width of the frame. Then add  $\frac{1}{8}$ " to the measurement. Example  $(34\text{-}\frac{3}{8}" + \frac{1}{8}" )$  would give you an adjusted frame width of 34.5".
- 4- Then you would subtract the adjusted frame with from 35" to get the amount of shim required to get the rear bracket to fit properly to the chassis frame.
- 5- The shims should be installed equally between the Rail Gear mounting bracket and the frame of the chassis on both sides. Example  $(35" - 34.5" = \frac{1}{2}"$  of shim required. Divide  $\frac{1}{2}"$  by 2 and  $\frac{1}{4}"$  of shim should be installed on each side of the rail gear. Note- for ease of installation wait to install the shims after step 6.
- 6- Lift the rear Rail Gear into place by using a forklift or overhead crane, making sure to align the front edge of the bracket to the marks on the frame from step 1.



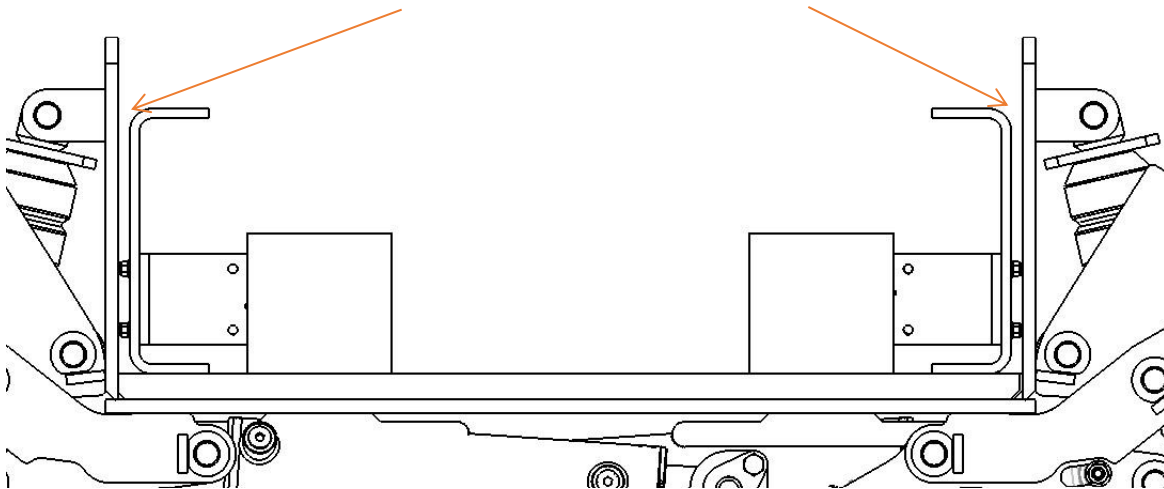
Rear Railgear in position

- 7- Locate the shims supplied with the kit and get the correct size for each side. Refer back to steps 3-5 for determining the correct size for each side.



Width shims (1/4" and 1/8" thick)

- 8- Insert the shims between the mounting bracket and chassis frame on each side.



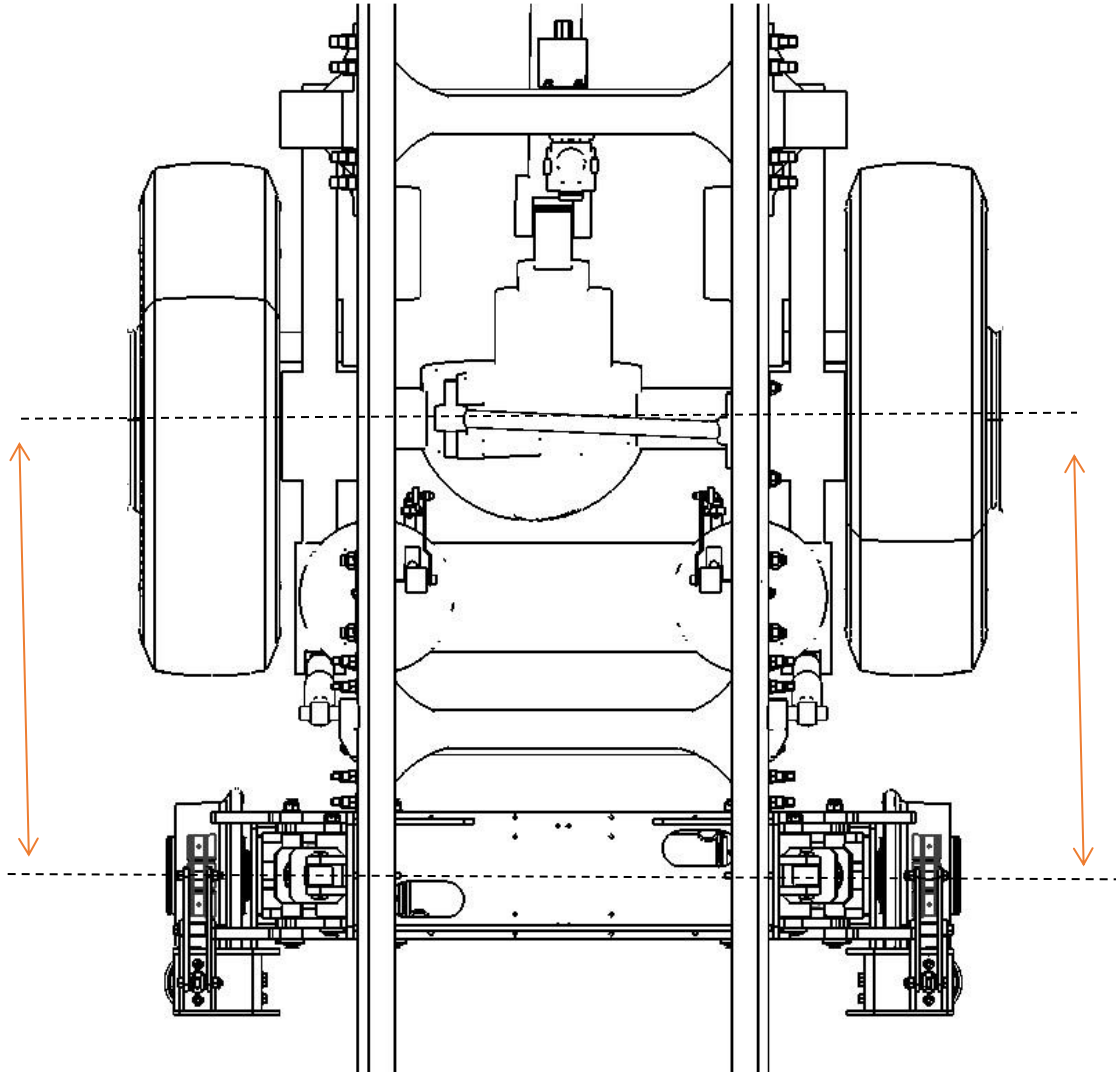
Rear Shim Location

- 9- Raise the rear Rail Gear until the Rail Gear is touching the frame and then secure the Rail Gear to the chassis by using clamps.

The LS- 35 rear rail gear does not have independent adjustable spindles or an adjustable rear bracket. The next steps should be followed closely to make sure that the rear Rail Gear is aligned with the rear axle of the truck. If the rear axle is not in proper alignment with the axle this will cause the Rail Gear alignment to be off.

**NOTE:** See String Line Sheet in the Appendices for Tolerances

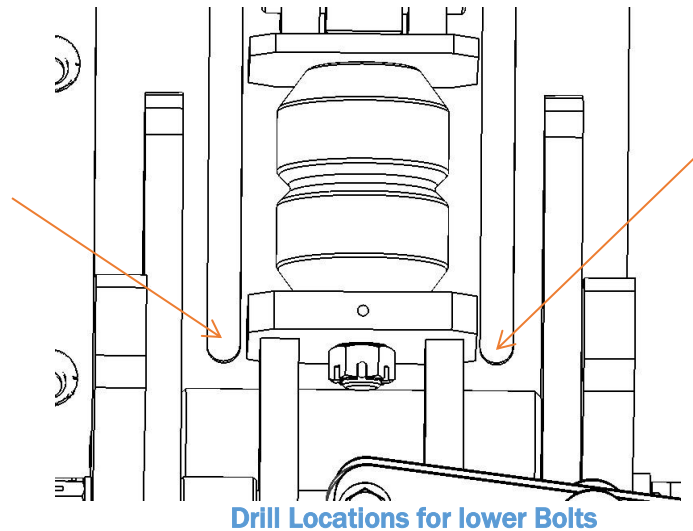
- 10- Measure from the Rail Gear axle to the axle on the chassis. This measurement should be no more than 1/8" difference from side to side



- 11- Loosen the clamps and adjust the Rail Gear until the measurements are within spec and then retighten the clamps

**12-** To drill the 5/8" holes in the frame of the chassis start by drilling the lower bolts holes first.  
**Note:** Spring assembly may need to be removed to drill holes in the frame. Refer to the appendix for proper removal instructions.

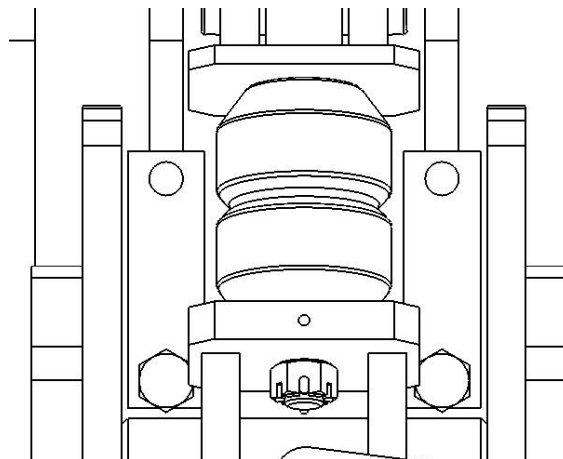
- If using a frame drill align the 5/8" drill bit into the slots and then lower, it until the bit is at the bottom of the slot. Then drill all four lower holes.
- If you are using a mag drill, you will need to use a center punch to mark the lower holes on the Rail Gear. Once the holes are marked, lower the Rail Gear out of the way and drill the lower holes.



**Drill Locations for lower Bolts**

**13-** Once the lower holes are drilled, use rear washers and install 5/8" bolts in the lower holes to help locate the upper holes.

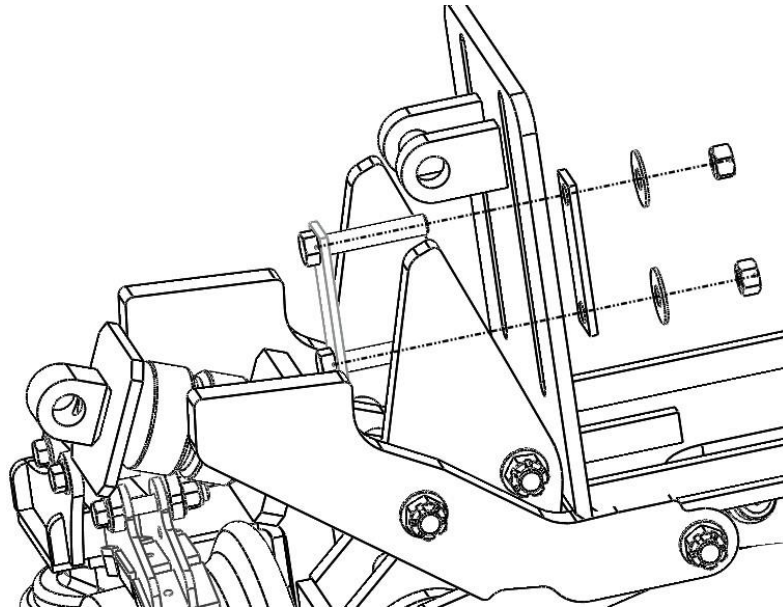
- If you are using a frame drill, make sure the upper holes are aligned with the slots in the bracket and tighten lower bolts.
- If you are using a Mag drill, use a framing square to make sure the square washers are straight with the frame then tighten the lower bolts. Use the center punch to mark the center.



**Temp bolts and square washers**

**14-** Drill the upper holes, then remove the bolts and square washers. Note- if you are using a mag drill or had to remove the Rail Gear repeat steps 6-10 before continuing.

**15-** Install the supplied captured bolt assemblies, square washers, and nuts as shown below.  
Note- the spring assembly may need to be removed to install the captive bolts. Please see the appendix for detailed instructions on proper spring removal.



**Bolts installed**

**16-** Tighten all the bolts and then remove C-clamps, forklift, or overhead crane.

**17-** Reinstall the Spring assembly.

## RAILGEAR SPACER AND WEIGHT SETTINGS

When installing the rear rail gear, you can use the table below to preinstall the rail gear spacers before setting the weights and rail testing the unit.

### AIR SUSPENSION

- 1- Support the rail gear with a forklift or overhead crane.
- 2- Loosen the 8- 5/8" bolts that hold the rail gear to the frame of the chassis.
- 3- Measure the frame height of the chassis and using the bare/ unladen table below to find out how much shim is required.

BARE AND UNLADEN CHASSIS (NO BODY OR CRANE INSTALLED)	
DIMENSION UNDERSIDE OF FRAME TO GROUND	SHIM THICKNESS
29"	0"
30"	1"
31"	2"
32"	3"

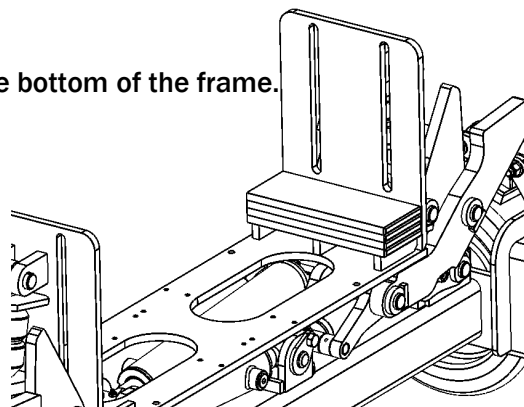
**NOTE:** For 3" and over, confirm with the factory

**NOTE:** For air ride rear suspension, refer to the BARE AND UNLADEN height table

LOADED CHASSIS (BODY OR CRANE INSTALLED)	
DIMENSION UNDERSIDE OF FRAME TO GROUND	SHIM THICKNESS
27"	0"
28"	1"
29"	2"
30"	3"

**NOTE:** For 3" and over, confirm with the factory

- 4- Fabricate the required Height Shims by stacking mild steel flat bar, painted individually, and welded at the ends.  
Note –Painting the shims prevents rust that may lead to the steel plates expanding and breaking the welds.
- 5- Install shims as shown in figure to the side.
- 6- Raise the rear rail gear until the shims are touching the bottom of the frame.
- 7- Tighten the 8 – 5/8" frame bolts.
- 8- Don't tack shims until after the track test.



**For Final Adjustment please refer to the air suspension override section of the manual.**



## LEAF SUSPENSION

- 1- Support the rail gear with a forklift or overhead crane.
- 2- Loosen the 8- 5/8" bolts that hold the rail gear to the frame of the chassis.
- 3- Measure the frame height of the chassis and using the table below to find out how much shim is required.

BARE AND UNLADEN CHASSIS (NO BODY OR CRANE INSTALLED)	
DIMENSION UNDERSIDE OF FRAME TO GROUND	SHIM THICKNESS
29"	0"
30"	1"
31"	2"
32"	3"

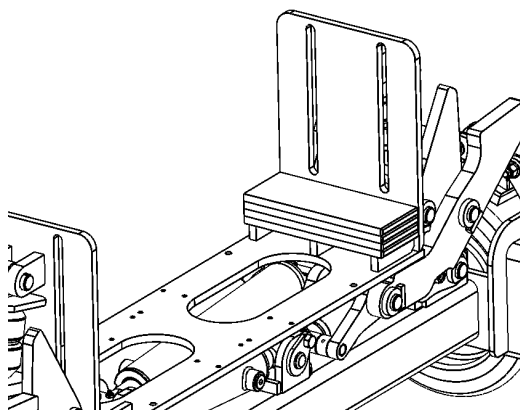
**NOTE:** For 3" and over, confirm with the factory

**NOTE:** For air ride rear suspension, refer to the BARE AND UNLADEN height table

LOADED CHASSIS (BODY OR CRANE INSTALLED)	
DIMENSION UNDERSIDE OF FRAME TO GROUND	SHIM THICKNESS
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28"	1"
29"	2"
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**NOTE:** For 3" and over, confirm with the factory

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Note –Painting the shims prevents rust that may lead to the steel plates expanding and breaking the welds.
- 5- Install shims as shown in figure below.

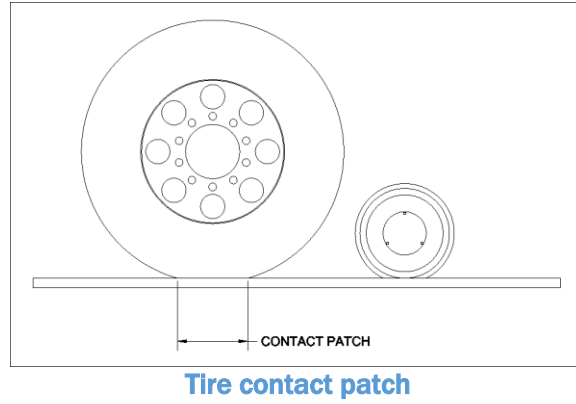


- 6- Raise the rear rail gear until the shims are touching the bottom of the frame.
- 7- Tighten the 8 – 5/8" frame bolts.
- 8- Wait to tack the spacers to the rear bracket until the track test is complete. Spacers may need to be added or removed to get the proper contact patch.

## PRESSURE ADJUSTMENT AND CONTACT PATCH

The rear unit may require adjustment to allow for the proper balance between traction and guidance. The following adjustment procedure is for an empty, unladen vehicle, but should remain adequate as the vehicle gets loaded up.

- 1- With the vehicle on track, measure the length of the tire contact patch of the rearmost axle with the rail head. The measurement should be between 10" and 14", ideally around 12"



- 2- If less than 10", the traction of the vehicle must be increased. This is achieved by performing the following steps:
  - a. Deploy the hi-rail on track.
  - b. Loosen the captive mounting bolts by loosening the nylon insert locknut from in between the frame rails.
  - c. Slowly retract the hi-rail deployment cylinders. The hi-rail mounting plate and height shims should separate from the truck frame.
  - d. Remove the previously installed height shims from between the truck frame and mounting plate.
  - e. Adjust the thickness of the height shims (reduce thickness).
  - f. Reinstall the height shims on the mounting plate.
  - g. Slowly deploy the hi-rail deployment cylinders until fully stroked.
  - h. Measure the length of the tire contact patch.
  - i. Repeat as required until a contact patch of around 12" is achieved.
  - j. Tighten all mounting bolts. Refer to the bolt torque chart in the Appendices.
- 3- If more than 14", the traction of the vehicle must be decreased. This is achieved by performing the following steps:
  - a. Deploy the hi-rail on track.
  - b. Loosen the captive mounting bolts by loosening the nylon insert locknut from in between the frame rails.
  - c. Slowly retract the hi-rail deployment cylinders. The hi-rail mounting plate and height shims should separate from the truck frame.
  - d. Remove the previously installed height shims from between the truck frame and mounting plate.
  - e. Adjust the thickness of the height shims (add thickness).
  - f. Reinstall the height shims on the mounting plate.
  - g. Slowly deploy the hi-rail deployment cylinders until fully stroked.
  - h. Measure the length of the tire contact patch.
  - i. Repeat as required until a contact patch of around 12" is achieved.
  - j. Tighten all mounting bolts. Refer to the bolt torque chart in the Appendices

## STEERING WHEEL LOCK

- 1- Clean all surfaces with adequate cleaning solution to ensure proper adhesion of the Velcro pads.  
**Note** – Because of the different chassis models and equipment, the exact location of the Velcro pads is left unspecified.
- 2- Install a narrow Velcro tape (hooks) on the dash to hold the Velcro lock when not in use.
- 3- Install a narrow Velcro tape (hooks) on the steering column.
- 4- Install a narrow Velcro tape (hooks) on the steering wheel.
- 5- Cover both Velcro tapes with the wide Velcro steering lock pad (loops) and ensure adequate adhesion.

**NOTE** – Ensure that the installation of the steering wheel lock does not interfere with the normal operation of the steering wheel, turn signal indicators, or any other function located on the steering wheel or steering column.

# HYDRAULICS

## PTO / PUMP SETUP

The hi-rail system requires a working pressure of 2500 psi and a flow rate of 5 - 10 gpm. The system may not function adequately at a pressure below 2500 psi. The system will function at a lower flow rate but will function more slowly.

In all cases, the minimum hydraulic hose to be used is a steel braided 1/4" diameter hose, with a minimum working pressure of 4000 psi. Hoses run along the vehicle must be adequately secured to the body or frame of the vehicle and kept well away of any moving or rotating parts.

The LS-35 models hi-rail feature either a "joystick" setup with control valve handles running through a mechanical linkage, or a valve block that houses key hydraulic components. The cartridge valves used are factory set to the correct values and should not be tampered with. Contact Continental Railworks directly for assistance if required.

Refer to the hydraulic schematic in the Appendices and to the following steps:

### ***For the Joystick Setup:***

- 1- Install the front and rear control valves in a suitable location, preferably on the driver's side of the vehicle and close to the hi-rail units.
- 2- Run a 1/2" hydraulic hose from the pressure source (either PTO / Pump or a diverter valve) to the front hydraulic control valve and connect it to the pressure port (P) of the control valve to allow flow through the valve.
- 3- Run a 1/2" hydraulic hose from the discharge port (T) of the front control valve to the side pressure port (P) of the rear control valve.
- 4- Run a 1/2" hydraulic hose from the side discharge port (T) of the rear control valve to the return line to the tank.
- 5- Run a 1/4" hydraulic hose from the discharge port of the flow control valve directly to the tank (drain line), avoiding any backpressure.
- 6- Connect the two ports on the front hydraulic control valve to the front hydraulic cylinders, through T fittings splitting the flow to both cylinders.
  - a. Connect the A port to the piston side of the cylinders (retraction).
  - b. Connect the B port to the rod side of the cylinders (deployment).
- 7- The rear control valve and other hydraulic components are connected at factory. Ports and hoses can be identified if connections need to be interrupted, and should be as follows:
  - a. Locking cylinders
    - i. A1 capped / B1 connected to 4-way T fitting.
    - ii. A4 capped / B4 connected to 4-way T fitting.
    - iii. 4-way T fitting connected to 3-way T fitting feeding both locking cylinders.
    - iv. 4-way T fitting connected to flow control valve.
  - b. Deployment cylinders
    - i. A2 (valve) to V2 (PO check valve) – C2 (PO check valve) to Left Cylinder Deploy Side
    - ii. B2 (valve) to V1 (PO check valve) – C1 (PO check valve) to Left Cylinder Retract Side
    - iii. A3 (valve) to V2 (PO check valve) – C2 (PO check valve) to Right Cylinder Deploy Side

- iv. B3 (valve) to V1 (PO check valve) – C1 (PO check valve) to Right Cylinder Retract Side

8- Secure all hoses in a way to avoid pinching or rubbing, but also to allow enough play for the hi-rail units to travel their full range of motion.

9- Verify the entire system for leaks.

## **PNEUMATIC BRAKE VALVE KIT**

(STANDARD WITH AIR BRAKE CHASSIS)

### **GENERAL DESCRIPTION**

The Continental Railworks Pneumatic Brake Valve Kit has been designed to isolate the hi-rail air brakes from the chassis' main air brake system. It features brake pedal proportionality and pressure adjustability to fine tune the braking performance on rail.

The valve kit is designed to be installed between the frame rails of the vehicle.

**Part number for replacement of the Pneumatic Brake Valve Kit is H105A020 (front brakes or front and rear brakes).**

### **OPERATION**

#### ***On Rail***

The Pneumatic Brake Valve Kit is designed to replicate the proportionality of the chassis' main brake system, based on the input from the foot pedal. No additional input is required from the operator for the hi-rail brakes to apply.

The hi-rail brake application force can be adjusted by varying the air pressure with the supplied regulator (pre-set to 50 psi).

#### ***On Road***

The supplied ball valve assembly is designed to completely isolate the hi-rail brakes from the chassis brakes when closed.

It is recommended to close the ball valve when operating the vehicle off rail.

### **! SAFETY WARNING !**

**ALL MODIFICATIONS TO THE CHASSIS AIR BRAKE SYSTEM PERFORMED BY THE INSTALLER MUST CONFORM TO FMVSS 121 (US VEHICLES) OR CMVSS 121 (CANADIAN VEHICLES)**

**ENSURE AIR LINES AND WIRES ARE SECURED PROPERLY TO PREVENT PINCHING OR RUBBING WHICH MAY LEAD TO FAILURE**

## INSTALLATION

### Contents of Kit

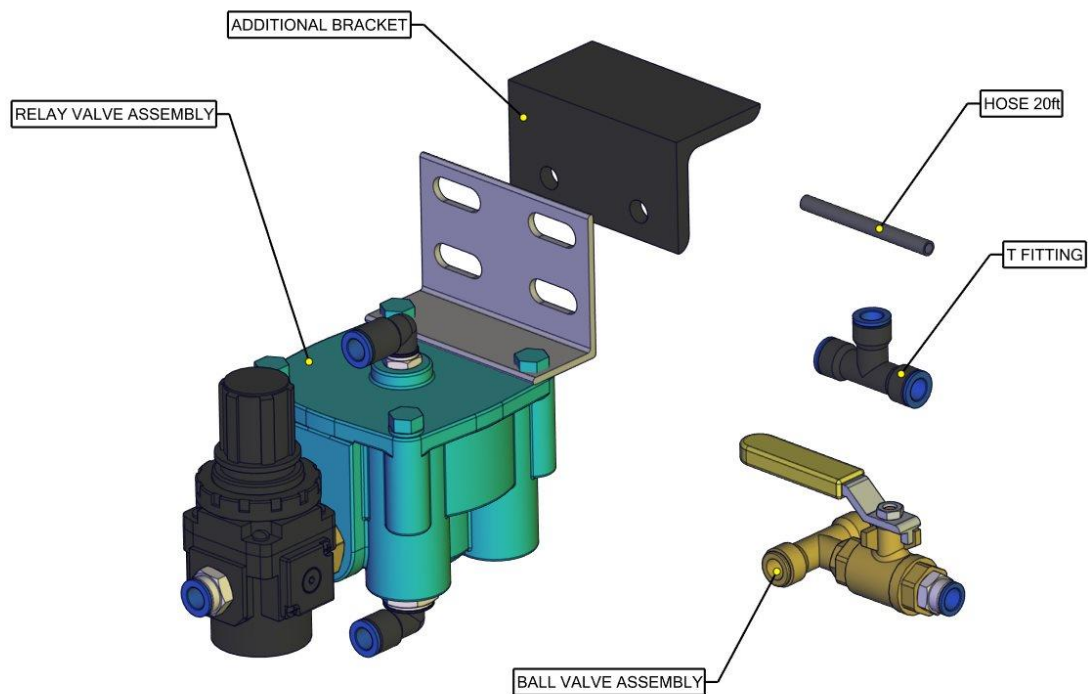


Figure 4: Pneumatic Brake Valve Kit

### INCLUDED

- RELAY VALVE ASSEMBLY
- ADDITIONAL BRACKET
- 20ft of 3/8" HOSE
- T FITTING (for optional rear brakes)
- BALL VALVE ASSEMBLY

Note: Components may be slightly different in appearance.

### NOT INCLUDED

- Various fittings for connection to chassis air system
- Various fittings for connection of the hi-rail brakes
- Mounting hardware

## ***Location and Mounting***

- 1- Find a suitable location between the vehicle's frame rails to mount the valve kit. The valve kit needs to be accessible relatively easily for pressure adjustment.

**NOTE** – The relay valve needs to be mounted vertically, with the exhaust pointing down and the service port pointing up.

- 2- Secure the valve assembly to one of the vehicle's cross members using the mounting bracket located on the relay valve. An additional angle bracket is also provided for more mounting options.
- 3- Ensure the pneumatic brake valve assembly will not interfere with the vehicle's body, crane, or other accessory.

## ***Plumbing***

**REFER TO THE PNEUMATICS SCHEMATICS IN THE APPENDICES FOR DETAILS**

- 1- Find an adequate air source to power the system:
  - a. The system needs to feed from the secondary or auxiliary air tanks.
  - b. The air source needs to be pressure protected.
  - c. **DO NOT CONNECT DIRECTLY TO MAIN CHASSIS AIR BRAKE PRESSURE LINE.**
  - d. **DO NOT CONNECT TO THE CHASSIS' PRIMARY AIR TANK CIRCUIT.**
- 2- Using 3/8" air brake tubing, make the following connections:
  - a. Connect the main air source to the fitting on the regulator attached to the **SUPPLY** port on the relay valve.
  - b. Connect the bottom **DELIVERY** port of the relay valve to the hi-rail brakes:
    - i. For a front brake only application, connect the **DELIVERY** port fitting to the front hi-rail air brake chambers through the T fitting installed on the hi-rail unit that splits the flow adequately between the left and right side chambers.
    - ii. For a front and rear brake application, connect the **DELIVERY** port fitting to the supplied T fitting, then connect the T fitting to the front and rear hi-rail air brake chambers through the T fittings installed on the hi-rail units.  
**NOTE** – Ensure the air hose lengths going to the front and rear T fittings are approximately the same length to provide adequate brake timing.
- 3- Locate an adequate air brake signal line between the foot pedal and the OEM relay valve.
- 4- Install the supplied ball valve assembly on the main signal line.

**NOTE** - The ball valve needs to be accessible so the operator can shut the system off if/when required. The ball valve assembly is supplied with DOT rated fittings. **DO NOT REPLACE FITTINGS ON THE BALL VALVE ASSEMBLY.**

- 5- Run an air line between the ball valve and the **SERVICE** port of the relay valve assembly.
- 6- Pressurize the system and verify for air leaks.

### ***Adjustment***

- 1- The regulator is supplied already adjusted to 50 psi.
- 2- Perform a track test with the vehicle and assess the hi-rail brakes' performance.
- 3- Adjust the pressure value as required to provide enough braking force without locking the wheels in usual track conditions.



# SHUNT KIT

(OPTIONAL)

## GENERAL DESCRIPTION

The Continental Railworks Track Signal Shunt Kit has been designed to allow temporary or permanent track signal shunting by essentially removing the hi-rail insulation. Its purpose may be for testing of track signals or to comply with company policy.

The shunt kit is designed to be wired either through a switch in the cab (not supplied) to allow temporary shunting, or to be wired direct to allow permanent shunting.

**Part number for replacement of the Track Signal Shunt Kit is E077A300 (Individual shunt).**

## INSTALLATION

### *Contents of Kit*

#### INCLUDED

- 2 or 4 x Individual assembled plastic bushings and hardware
- 1 x Installation / Operation manual

**Note:** Components may be slightly different in appearance.



Figure 5: Shunt - Exploded View

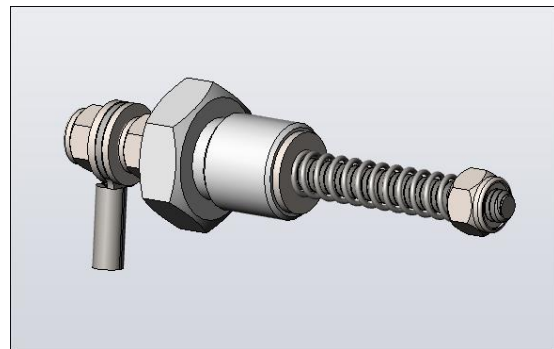


Figure 6: Shunt - Assembled

#### NOT INCLUDED

- 14-16 awg electrical wire
- Momentary or Maintained switch (if required)

## ***Location and Mounting***

- 1- The assembled plastic bushings can be installed once the hi-rail installation is complete and the rail gauge adjustment has been performed. Installing the bushings prior to performing the gauge adjustment may restrict the spindles from moving and prevent proper gauge adjustment.
- 2- The shunt kit can be installed either on the front or rear hi-rail unit. Installation on the front hi-rail is generally recommended due to the proximity to the cab and better accessibility for inspections.
- 3- Thread the plastic bushing through the  $\frac{3}{4}$ " nut welded to the back of the spindle housings, until the bolt head makes contact with the spindle. Proper contact can be verified by following the "Adjustment" instructions that follow.

## ***Electrical***

- 1- Using 14-16 awg electrical wire, connect the two terminals on the assembled plastic bushings. Connection can be established as follows:
  - a. Wire directly from one side to the other, to allow permanent track signal shunting, or;
  - b. Wire to a momentary switch installed in the cab, to allow momentary track signal shunting, or;
  - c. Wire to a maintained switch installed in the cab, to allow maintained track signal shunting.
- 2- Ensure all wires are properly secured and kept away from moving parts.

## ***Adjustment***

- 1- With all electrical connections complete, perform a resistance test by measuring resistance between each wheels of the axle where the shunt kit is installed. The resistance value can be taken between the two rail wheels by poking through the paint layer.
- 2- With a megohmmeter, ensure values are as follows:
  - a. Shunt position (switch ON or hard wired): Lower than 22 k $\Omega$
  - b. Insulated position (switch OFF): Higher than 22 k $\Omega$
- 3- If values are not satisfactory, review all wiring connections and ensure the plastic bushing is inserted so that the bolt head comes in contact with the spindle.

## ***Length Adjustment***

Depending on the hi-rail model or the state of alignment (spindles pushed to one side), the effective length of the shunt may need to be adjusted. A  $\frac{1}{4}$ " washer on the spindle side of the threaded rod can be removed to shorten the shunt to the appropriate length.

See the drawing in the Appendices for details and measurements.

# **PNEUMATIC SUSPENSION KIT**

**(OPTIONAL WITH AIR BRAKE/SUSPENSION CHASSIS)**

## **GENERAL DESCRIPTION**

The Continental Railworks Pneumatic Suspension Kit has been designed to provide a means of regulating the chassis' air bag pressure to ensure a constant ride height and wheel pressure while traveling on rail. It offers additional guidance / traction adjustability and is adaptable to many suspension types.

Some single axle trucks require a different system that diverts the air pressure going to the OEM leveling valve. This manual covers both systems:

**Part number for replacement of the Pneumatic Suspension Override Kit is H105E003 for tandem axle trucks.**

**Part number for replacement of the Pneumatic Suspension Override Kit is H105E004 for single axle trucks with air bag pressure sensors.**

## **! SAFETY WARNING !**

**AIR NEEDS TO BE SOURCED FROM SECONDARY OR AUXILIARY AIR TANK**

**ENSURE AIR LINES AND WIRES ARE SECURED PROPERLY TO PREVENT PINCHING OR RUBBING WHICH MAY LEAD TO FAILURE**

## INSTALLATION – H105E003 TANDEM AXLE TRUCKS

### ***Contents of Kit***



**Figure 7: Suspension Assembly with Regulator**

### **INCLUDED**

- Suspension Assembly with Regulator

**Note:** Components may be slightly different in appearance.

### **NOT INCLUDED**

- 3/8" OD Nylon Air Brake Tubing (SAE J844 compliant)
- Various fittings for connection to chassis air system
- Electrical proximity switch for hi-rail
- Electrical relays, wire and connectors
- Mounting hardware

**Note:** The electrical proximity switch for hi-rail (sending signal to the air valves) is not supplied. The choice of the type of switch is left to the customer / installer.

## ***Location and Mounting***

- 1- Find a suitable location between the truck frame rails or in a compartment of the vehicle to mount the valve assembly.
- 2- Secure the mounting bracket to the vehicle in a way that allows access to the pressure regulator unit.

**Note** – The valve kit needs to be mounted with the quick exhaust valve (release port EXHAUST) pointing down, as shown in pictures and drawings below.

- 3- Select and install a proximity switch for the rear hi-rail.

**Note** – Mechanical proximity switches are not recommended for reliability reasons. Continental Railworks recommends the use of either magnetic or induction proximity switches.

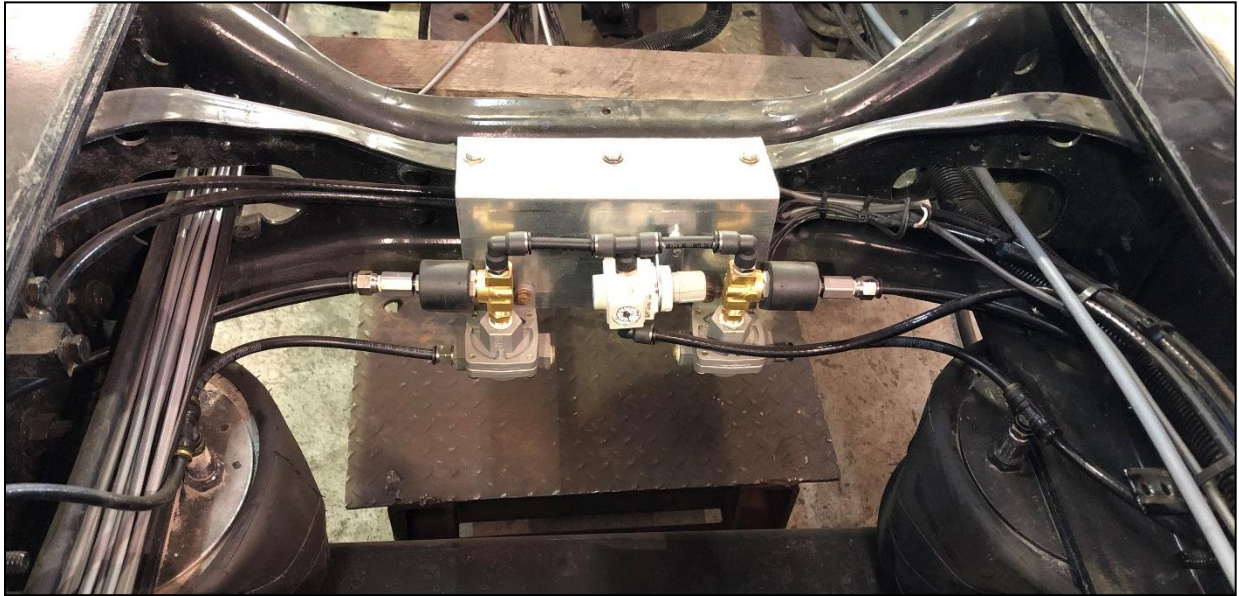
**Note** – The proximity switch needs to be installed on the rear hi-rail so the system adjusts as soon as possible (rear hi-rail gets deployed first).

## ***Electrical***

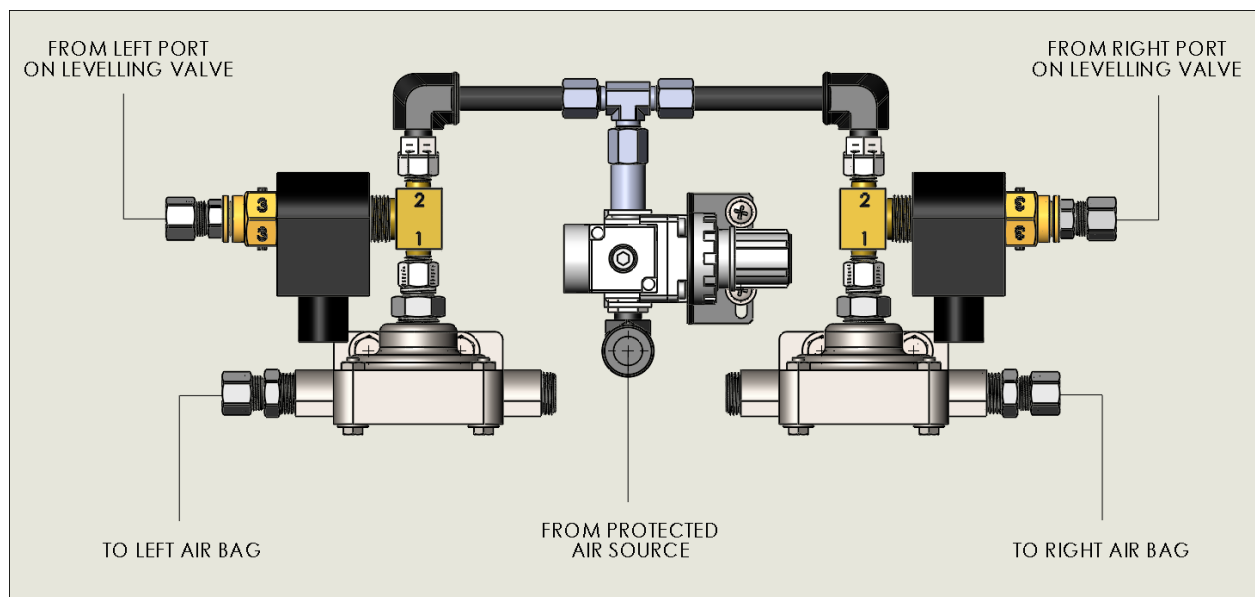
Refer to the electrical schematic in the next pages and to the following steps:

- 1- Select and install a method of activating the system:
  - a. A proximity switch installed on the rear hi-rail unit (magnetic or induction type recommended)
  - b. A toggle switch installed in the cab (not recommended)
- 2- The air solenoid valves need to be energized to redirect air pressure from the leveling valves (normal mode) to the air regulator (override mode).
- 3- Install a 12V automotive relay close to the Pneumatic Suspension Override Kit.
- 4- Feed the relay from the chassis' IGNITION ON circuit.
- 5- Connect the relay with:
  - a. The two (2) solenoid valves in parallel
  - b. The hi-rail sensor / switch in series with the solenoid valves

## Plumbing



**Figure 8: Typical air line routing**



**Figure 9: Simplified representation**

Refer to the pneumatic schematic in the next pages and to the following steps:

7- Find an adequate air source to power the system:

- a. The system needs to feed from the secondary or auxiliary air tanks
- b. The air source needs to be pressure protected
- c. **DO NOT CONNECT DIRECTLY TO MAIN CHASSIS AIR BRAKE SYSTEM**
- d. **DO NOT CONNECT TO THE CHASSIS' PRIMARY AIR TANK CIRCUIT**

**NOTE** – The most convenient and safe place to connect the air source is to tee off from the supply line of the load leveling valve.

8- Using 3/8" air brake tubing, make the following connections:

- a. Connect the main air source to the Pressure Regulator Unit.
- b. Connect the left side output from the chassis' leveling valve to the left side Port #3 on the air solenoid valve.
- c. Connect the right side output from the chassis' leveling valve to the right side Port #3 on the air solenoid valve.
- d. Connect the left side chassis air bags to the DELIVERY port on the left side quick exhaust valve.
- e. Connect the right side chassis air bag to the DELIVERY port on the right side quick exhaust valve.

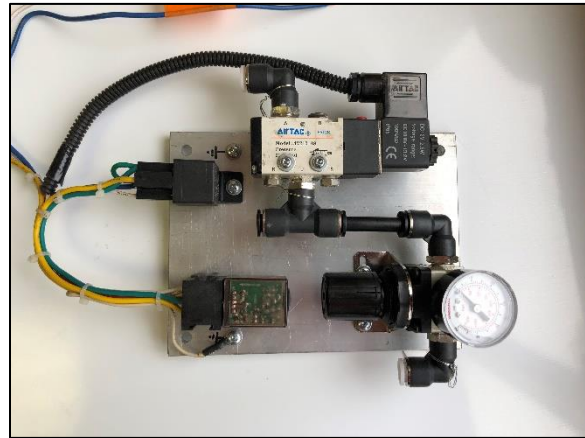
9- Pressurize the system and verify for air leaks.

## INSTALLATION – H105E004 SINGLE AXLE TRUCKS

### **Contents of Kit**



**Figure 10: Suspension Assembly**



**Figure 11: Diverter Valve Assembly**

### **INCLUDED**

- Suspension Assembly
- Diverter Valve Assembly with Regulator

**Note:** Components may be slightly different in appearance.

### **NOT INCLUDED**

- 3/8" OD Nylon Air Brake Tubing (SAE J844 compliant)
- Various fittings for connection to chassis air system
- Electrical proximity switch for hi-rail
- Electrical relays, wire and connectors
- Mounting hardware

**Note:** The electrical proximity switch for hi-rail (sending signal to the air valves) is not supplied. The choice of the type of switch is left to the customer / installer.



## ***Location and Mounting***

- 1- Find a suitable location between the truck frame rails or in a compartment of the vehicle to mount the Suspension Assembly.
- 2- Secure the mounting bracket to the vehicle.

**Note** – The valve kit needs to be mounted with the quick exhaust valve (release port EXHAUST) pointing down, as shown in pictures and drawings below.

- 3- Find a suitable location inside the vehicle cab or inside a compartment to mount the Diverter Valve Assembly.
- 4- Secure the plate to the vehicle in a way that allows access to the pressure regulator.
- 5- Select and install a proximity switch for the rear hi-rail.

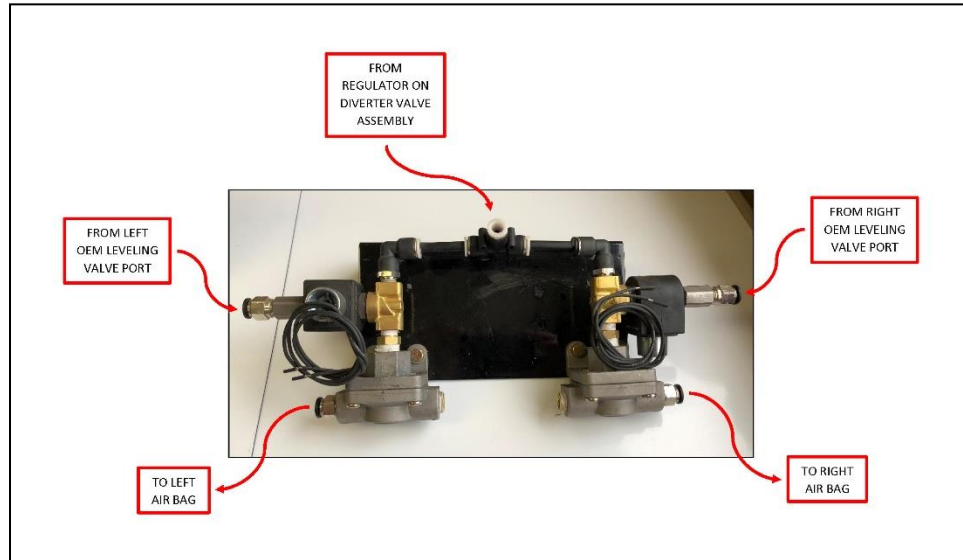
**Note** – Mechanical proximity switches are not recommended for reliability reasons. Continental Railworks recommends the use of either magnetic or induction proximity switches.

**Note** – The proximity switch needs to be installed on the rear hi-rail so the system adjusts as soon as possible (rear hi-rail gets deployed first).

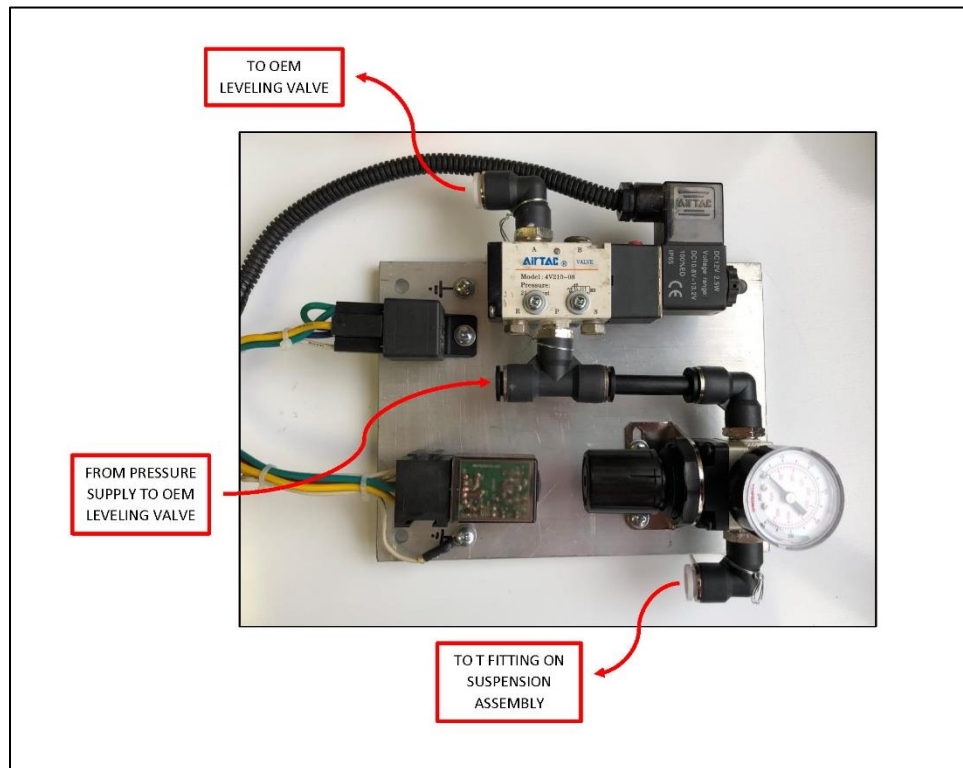
## ***Electrical***

Refer to the electrical schematic in the Appendices and to the following steps:

- 1- Select and install a method of activating the system:
  - a. A proximity switch installed on the rear hi-rail unit (magnetic or induction type recommended)
  - b. A toggle switch installed in the cab (not recommended)
- 2- The air solenoid valves need to be energized to redirect air pressure from the leveling valves (normal mode) to the air regulator (override mode).
- 3- Connect the IGN + wire to the vehicle's ignition on circuit.
- 4- Connect the GROUND VIA SENSOR wire to the proximity switch's ground lead.
- 5- Connect the TO SUSPENSION OVERRIDE VALVE wire to the solenoid wires on the Suspension Assembly (in parallel).



**Figure 12: Suspension Assembly**



**Figure 13: Diverter Valve Assembly with Regulator**

Refer to the pneumatic schematic in the next pages and to the following steps:

- 1- Using 3/8" air brake tubing, divert the air pressure going to the OEM leveling valve.
  - a. Connect the air line leading to the leveling valve (pressure source) to the P port of the 5-way solenoid valve.
  - b. Connect an air line to feed the OEM leveling valve from the A port on the 5-way solenoid valve (neutral state).
- 2- Using 3/8" air brake tubing, connect the Diverter Valve Assembly to the Suspension Assembly
  - a. Connect an air line between the air regulator on the diverter valve assembly to the T fitting on the Suspension Assembly
- 3- Using 3/8" air brake tubing, make the following connections:
  - a. Connect the left side output from the chassis' leveling valve to the left side Port #3 on the air solenoid valve.
  - b. Connect the right side output from the chassis' leveling valve to the right side Port #3 on the air solenoid valve.
  - c. Connect the left side chassis air bags to the DELIVERY port on the left side quick exhaust valve.
  - d. Connect the right side chassis air bag to the DELIVERY port on the right side quick exhaust valve.
- 4- Pressurize the system and verify for air leaks.

#### ADJUSTMENT

- 1- With the vehicle on rail (hi-rail deployed) and all air and electrical connections complete, perform initial adjustment to the Pneumatic Suspension Override Kit assembly as follows:
  - a. Ensure that the chassis air tanks are full before performing any tests or adjustments.
  - b. Pull up on the pressure regulator knob and adjust to approximately 25 psi.
  - c. Adjust air pressure as required in 5 psi increments until the tire contact patch reaches an acceptable dimension (see individual hi-rail manuals for details).
    - i. Raise pressure to increase contact patch and traction.
    - ii. Lower pressure to reduce contact patch and traction.
- 2- Ensure there are no air leaks in the system.
- 3- Ensure the air lines and wiring are properly secured and kept away from moving or rotating parts of the vehicle.
- 4- Perform a track test with the vehicle and ensure proper suspension functionality both on road and on rail.

# ALIGNMENT AND ADJUSTMENT

## ALIGNMENT PROCEDURE

The simplest method of aligning the hi-rail unit to the vehicle is to use a set of parallel strings attached to heavy mobile objects on the floor, such as jack stands or pylons (string line).

The goal is to achieve the following:

- The rear hi-rail unit is centered on the rear axle.
- The center of the rear truck wheel is the same distance to the center of the rear hi-rail wheel on both sides of the vehicle.
- The front hi-rail unit is centered on the rear axle.
- The center of the rear truck wheel is the same distance to the center of the front hi-rail wheel on both sides of the vehicle.

The directions for aligning the vehicle are as follows. **Please refer to the alignment diagram in the Appendices. Use the Alignment and Pressure Data Form in the Appendices to record final values.**

**Note** – A straight edge (approximately 2' in length) can be clamped onto the hi-rail wheels in order to adjust the front wheels' toe-in and toe-out.

- 1- Ensure the vehicle is on a hard flat surface with the front wheels pointing straight ahead. Place 2" blocks under all wheels.
- 2- Lower the front hi-rail unit to 90 degrees.
- 3- Lower the rear unit completely.
- 4- Set up pylons at the four corners of the vehicle.
- 5- Attach 2 high tension strings of exactly equal length (dimension A) to the pylons, running them along the length of the vehicle (strings are not required along the front and rear of the vehicle).
- 6- Position the pylons so that the strings are an equal distance from each rear rim (dimension C), an equal distance from each side of the frame rails at the front (dimension E), and the pylons are an equal distance apart front and rear (dimension B).
- 7- Adjust the rear hi-rail left to right so that the wheel faces are parallel and of equal distance to the strings on both sides.
- 8- Adjust the rear hi-rail so that the distance from the rear hi-rail wheel to the string is equal on both sides of the vehicle (dimension D). This can be performed by adding supplied shims of different thicknesses between the vertical portions of the mounting plate and the side of the truck frame.
- 9- Adjust the front hi-rail toe-in and toe-out so that the wheel faces are parallel to the strings on both sides. This can be performed by adjusting the swiveling spindle housings. Once adjusted, the spindle housing can be welded to the axle with a 1" tack weld on the back face of the axle to allow easy replacement.

- 10- Adjust the front hi-rail so that the distance from the front hi-rail wheel to the string is equal on both sides of the vehicle (dimension D). This can be performed by shifting the whole hi-rail unit from side to side (there are lateral slots at the spring mounts, and enough play at the front pins). The hi-rail gauge needs to be adjusted and maintained by sliding the spindle in the spindle housing (a 3/4" bolt can be used through the nut welded at the back of the spindle housing). An inside distance of 53-1/2" between the flanges of the hi-rail wheels must be maintained while performing this adjustment. Once the gauge is adjusted, a 1/2" washer can be welded to the spindle housing to transform the adjustment slot into a hole and lock in the adjustment.**
- 11- Ensure all mounting plate adjustment bolts are properly tightened and torqued after adjusting the unit. Please see the bolt torque chart in the Appendices.**
- 12- Install shims (various thicknesses supplied) on the front main support pins to lock the Alignment Adjustment in place. The shims should be installed on the inside surface, towards the centerline of the vehicle, on both pins.**
- 13- Tighten the gauge adjustment bolts on the front and rear hi-rail units, locking the wheel spindles in place.**
- 14- Perform a track test on the unit ensuring there is no excessive flanging.**

## **TRACK TEST**

When putting the vehicle on track, first lower the rear unit and then lower the front unit after re-positioning the vehicle as required (see OPERATION section below for details).

Verify the following items:

- 1- Ensure the units raise and lower easily, and that hydraulic hoses are all of adequate length and that hydraulic fittings have adequate clearance.
- 2- Ensure the hi-rail units deploy completely, forming a straight and linear connection from the top of the unit all the way to the wheel.
- 3- Adjust the front and rear rail sweep brackets as necessary so that the rubber sweeps just contact the rail with the hi-rail in the lowered position.
- 4- Verify that there is 2" to 3" of clearance between the front tires and the rail head.
- 5- Verify that there is an 10" to 12" contact patch on the rearmost tires with the rail, with the vehicle empty. (This dimension will increase with a loaded vehicle).
- 6- Ensure the vehicle tracks properly down the track, and that there is no excessive flanging of the hi-rail wheels.
- 7- Ensure there is no excessive vibration of the vehicle when on track.

## **FINALIZING ALIGNMENT / ADJUSTMENT**

As explained in the sections above, ensure that the following steps are performed to finalize the alignment and adjustment:

- Weld spindle housing cross bolts – Weld the thick washer installed on the  $\frac{1}{2}$ " spindle housing cross bolt to the spindle housing, on both sides, to transform the gauge adjustment slot into a hole to lock in the gauge adjustment.
- Weld spindle housings – Tack weld (about 1") the spindle housing top plate to the axle plate, to lock in the toe adjustment.
- Weld the captive bolt assembly in the rear mounting plates to the mounting plate with 1" skip welds that can easily be removed with a grinder if future adjustment is necessary.



**Figure 29: Welded spindle housing (toe and gauge adjustment)**

## **OPERATION**

### **ON ROAD**

A few factors should be taken into consideration when operating a hi-rail vehicle on road:

#### **VEHICLE DIMENSIONS**

Once modified with hi-rail, the vehicle's dimensions, ground clearances and approach / departure angles change considerably. Operators should be familiar with the truck's new dimensions.

#### **VEHICLE PAYLOAD**

The addition of hi-rail to a vehicle reduces its available payload. The operator needs to be conscious of the weight of the vehicle in operating conditions to determine the remaining payload.

### **ON RAIL**

To place the vehicle on track, the vehicle must be positioned parallel to the rails over a level crossing or a similar access point in a rail yard where the track is approximately level with the pavement. The vehicle must be placed on the track rear unit first, so that the front unit can be steered into position afterwards as required.

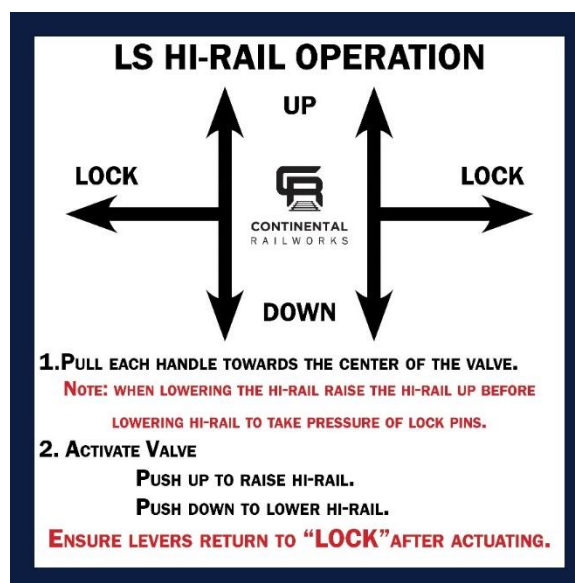


## REAR UNIT OPERATION

- 1- Position the vehicle so that the rear hi-rail wheels are directly over the track and aligned with the track rails.
- 2- Turn on PTO / pump or turn on the dash mounted switch to activate power pack.
- 3- Using the rear rail gear control valve, Raise the rear rail gear to take any pressure of the safety pins.

Note - The rear hi-rail unit has an automatic locking and unlocking mechanism. It is not necessary to manually disengage any hooks, pins, or levers.

- 4- Lower the hi-rail unit to engage the hi-rail wheels with the track. Adjust the position of the vehicle if necessary to ensure proper alignment.
- 5- Stroke the cylinders completely when lowering the hi-rail until the control valve or pump relieves. Ensure the cylinders are completely stroked and the cylinder pins have moved into their locking slots.



## Front Unit Operation

- 1- Adjust the position of the vehicle if necessary so that the front hi-rail wheels are directly over the track and aligned with the track rails. Turn the vehicle steering wheel so that the tires are pointed straight ahead.
- 2- Turn on PTO / pump or turn on the dash mounted switch to activate power pack.
- 3- Actuate the front hydraulic valve to lower the front hi-rail unit.  
**Note** – The front hi-rail unit has an automatic locking and unlocking mechanism. It is not necessary to manually disengage any hooks, pins or levers.
- 4- Lower the hi-rail unit to engage the hi-rail wheels with the track. Adjust the position of the vehicle if necessary to ensure proper alignment.
- 5- Stroke the cylinders completely when lowering the hi-rail until the control valve or pump relieves. Ensure the cylinders are completely stroked and the cylinder pins have moved into their locking slots.

## STEERING WHEEL LOCK

The steering wheel lock must be engaged when the unit operates on rail. The wheels are to be locked straight ahead to ensure proper operation of the vehicle on track.

- 1- After the vehicle has been placed on track, position the steering wheel so that the wheels are pointed straight ahead.
- 2- Lock the steering wheel in position by removing the Velcro pad from its stowing location on the dash and applying it over the steering column and steering wheel corresponding Velcro pads.

## SPEED LIMITS

The maximum speed limit of a vehicle equipped with a model G-35 hi-rail unit is 40 kilometers per hour (25 miles per hour) on tangent (straight) sections of track, and 30 kilometers per hour (20 miles per hour) on curved sections of track. This is the maximum speed limit of the unit in ideal conditions, and this speed limit must be reduced during poor weather conditions, reduced visibility, slippery track surfaces, or when being operated on poorly maintained rail.

Despite this speed limit, local railway dictated speed limits must also be observed, and must be followed if lower than 40 kilometers per hour.

Remember to perform regular braking distance tests, initially and as track or weather conditions change.

## TRACK CURVATURE

The maximum track curvature a truck equipped with G-35 hi-rail depends on numerous factors (truck wheelbase, hi-rail wheelbase, rear axle spread, rear axle length, tire sizes, tread type, etc). Continental Railworks can assist in determining the maximum track curvature for a given vehicle.

**! PLEASE DRIVE SAFELY !**

## SERVICE

### RECOMMENDED MAINTENANCE INTERVALS

ITEM	FREQUENCY	DESCRIPTION
Nuts and Bolts	Every week	Inspect for loose fasteners. Tighten.
Grease Fittings	Every month	Lubricate as required.
Wheels	Every month	Inspect for excessive wear in tread or flange, cracking or pitting. Replace as required.
Wheel Bearings	After 8 hours of operation	Remove hub caps. Visually inspect bearings. Adjust and lubricate bearings as required.
	Every 6 months	Remove wheels and bearings. Clean bearings and inspect for excessive wear, burning, pitting or discoloration. Replace as required. Repack and reinstall.
Wheel Insulators	Every month	Visually inspect for damage.
	Every 6 months	Inspect for excessive wear or cracking. Replace as required.
Wheel Spindles	Every 6 months	Inspect surfaces for excessive wear, burning, pitting or discoloration. Replace as required.
Inner Tubes	Every 2 years	Inspect surfaces for excessive wear. Replace as required.
Inner Tube Wear Rings	Every 2 years	Inspect for excessive wear. Ensure a good fit with inner tube. Replace as required.
Axle and Frame Assemblies	Every month	Visually inspect for damage, cracks or broken welds. Repair or replace as required.
	Every 2 years	Inspect all pins for excessive wear. Replace as required. Inspect all holes and slots for excessive wear. Repair or replace as required.
Rubber Springs	Every 6 months	Visually inspect for cracks or deformation. Replace as required.
Hydraulics	Every day	Inspect for leaks.
	Every month	Inspect for leaking or damaged hoses, fittings or cylinders. Repair or replace as required.
Pneumatic Components	Every week	Inspect for leaks.
	Every month	Inspect for leaking or damaged hoses, fittings or cylinders. Repair or replace as required.
Electrical Components	Every week	Inspect for proper connections or loose wires.
	Every month	Test for proper resistance and functionality of the system.

## **WHEEL WEAR**

The hi-rail wheels need to be replaced when worn as follows:

**5/16"** wear on flange

**3/16"** wear on tread

Wheel wear gauges are available on request.

## **WHEEL BEARING ADJUSTMENT**

Wheel installation procedure

- 1- Press bearing cups into wheel
- 2- Insert grease seal at the back of the wheel
- 3- Pack bearing cone with grease
- 4- Insert one cone over the spindle
- 5- Slide wheel onto the spindle
- 6- Insert the other bearing cone over the spindle
- 7- Insert wheel washer over the threaded end of the spindle
- 8- Thread the castle nut onto the spindle
- 9- Torque lightly
- 10- Shake the wheel and ensure there is no play
- 11- Turn the castle nut counterclockwise by half a turn
- 12- Turn the castle nut clockwise by a quarter turn
- 13- Adjust the castle nut to line up a notch with the hole in the spindle
- 14- Insert and lock the cotter pin
- 15- Add grease between the bearings through the grease fitting until grease flows through the bearings
- 16- Reinstall hub cap gasket and hub cap with bolts and lock washers

## **SPINDLE REMOVAL**

If the spindles need to be removed or replaced, it is recommended to melt the black plastic insulator before prying out the spindle from the spindle housing. The plastic insulator swells up by absorbing moisture and locks the housing and spindle together. The insulator will need to be replaced when removing a spindle.

## **BRAKE SHOE ADJUSTMENT**

The brake boxes feature an adjustable linkage that allows for slack adjustment. The yoke can be moved down on the threaded rod from the air chamber / hydraulic cylinder in order to maintain a space between the wheel and brake shoe of about **1/8"**.

## BRAKE SHOE REPLACEMENT

Brake shoes need to be replaced when the compound is worn to about 5/16" (when the rivet is showing). When installing a new brake shoe, ensure it is oriented the right way, with the vertical plate with a hole towards the inside as pictured below.

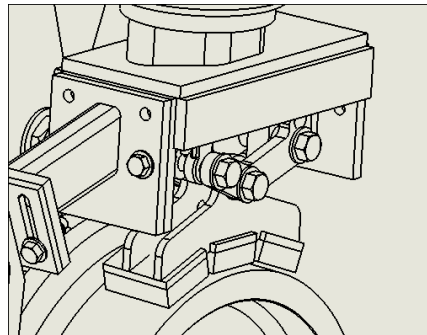


Figure 31: Brake shoe installation

## GREASE POINTS

All pins (pivoting or traveling through a slot) feature a grease fitting.

Pins and slots should be greased every month to ensure a smooth operation and to minimize wear.

## RECOMMENDED GREASE

Continental Railworks uses and recommends the use of Castrol Pyroplex Blue 2 (Product Code: 55178 (US) – 01050-18 (Canada)).

## RECOMMENDED HYDRAULIC FLUID

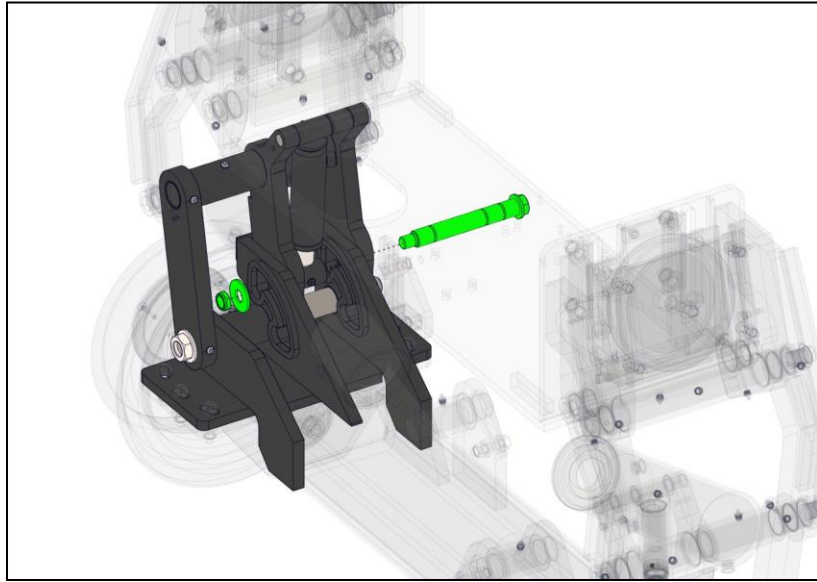
For best performance in cold weather, Continental Railworks recommends the use of low viscosity – low temperature hydraulic fluid such as Petro Canada Hydrex XV or Shell Tellus S4 VX.

## LOCKING PIN REPLACEMENT ON REAR UNIT

The LS models of rail gear are equipped with mechanical locking pins on the rear unit. The locking pins are operated with the rear hydraulic control valve. If the safety pins become bent or broken refer to the steps below to replace the damaged pin.

### PROCEDURE

- 1- Place the vehicle on level ground or level track.
- 2- Deploy the rear hi-rail completely.
- 3- Remove the 3/4"-10 thin hex nyloc nut and washer from the existing pins.
- 4- Remove the damaged safety pins from the hi-rail assembly.  
Note: The pin will need to be cut in pieces if bent, using a reciprocating saw.



- 5- Insert the new Safety pin in the hi-rail assembly.
  - a. Use a pry bar to align components if required.
  - b. Drive the pin all the way with a hammer if required.
- 6- Install the supplied 3/4" washer and 3/4"-10 thin nyloc nut.
  - a. Tighten all the way with impact or key.
  - b. Back off the nut until the washer is allowed to rotate freely.
- 7- Verify the functionality of the hi-rail and locking system.

## CONTACT INFORMATION

To order parts or for technical support, please contact Continental Railworks from Monday to Friday, 8:30 a.m. to 4:30 p.m. ET, by calling **(514) 956-8081** or faxing **(514) 956-0737**. Please have the hi-rail assembly's serial number available for easier tracking.

CANADA + US
Continental Railworks 7380 Vérité St-Laurent, QC, H4S 1C5 (514) 956-8081

## LIMITED WARRANTY INFORMATION

The following warranty applies to all products manufactured by Continental Railworks.

Continental Railworks (hereinafter referred to as "Continental") warrants to the original purchaser that all equipment supplied shall be free from defects in material and workmanship for a period of 12 months from the date of purchase. If such a defect appears during the warranty period, Continental will repair or replace the defective part or product (at its option) without charge if applicable claim procedures are followed.

The product must have been properly installed, adjusted, maintained, and serviced in order to be eligible for warranty.

The warranty does not cover defects or damage to products that have been improperly installed, abused, misused, or damaged due to accident. Continental disclaims liability for indirect, incidental, and consequential damages, such as damage incurred during shipping and handling. This disclaimer applies during and after the warranty period.

Warranty claims may be made by contacting our Customer Service Department at the address indicated above, or by calling (514) 956-8081. All claims must be made in writing.

Continental or its authorized representative reserves the right to inspect products claimed to be defective for warranty purposes and dispose of the claim as it sees fit, including repair or replacement. Unauthorized repair or replacement prior to inspection may void the warranty. Use of non-OEM parts will immediately void the warranty.

All products or parts claimed to be defective must be returned to Continental for warranty consideration within 30 days of the claim. All items shipped from Continental for warranty reasons will be sent freight prepaid, and all items returned to Continental must be sent freight prepaid.

Labor performed for warranty reasons must be done by an authorized Continental representative or by a person or company pre-approved by Continental in writing. Labor performed without prior written approval will not be warranted.

## APPENDIX 1

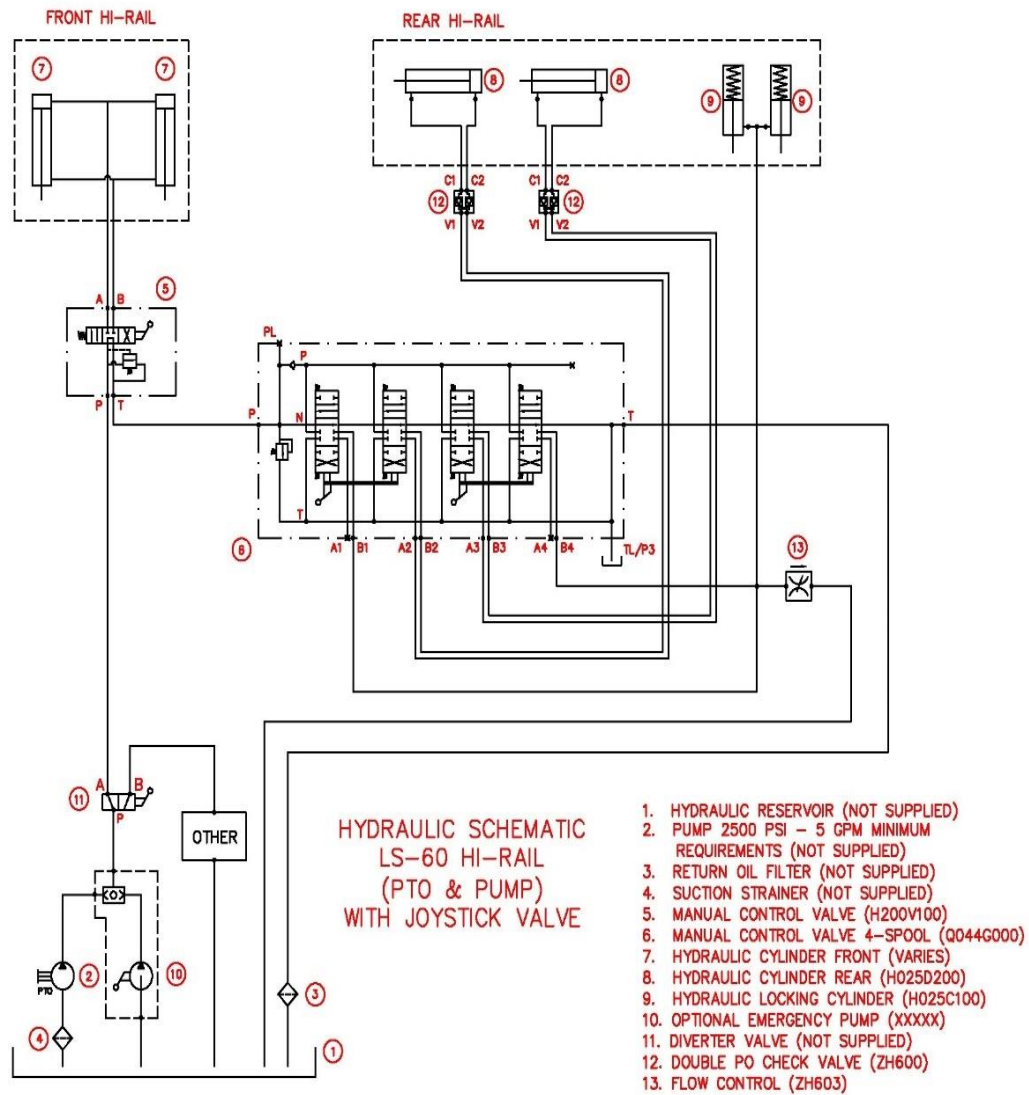
### BOLT TORQUE TABLE

Bolt Torque Requirements Grade 8 Fasteners	
Bolt Diameter <i>(in)</i>	Torque (Lub.) <i>(ft-lbs)</i>
3/8"	35
1/2"	80
5/8"	170
3/4"	280
1"	680



## APPENDIX 2

### HYDRAULIC SCHEMATICS – JOYSTICK VALVE SETUP



APPENDIX 3

SHUNT KIT

REV.	DESCRIPTION	DATE	BY
A	REDESIGN, NOT FOR LS60-D AND OLDER UNITS!	3/11/2020	N. Gromak
B	REDESIGN	4/16/2020	N. Gromak

SEE APPLICATION GUIDE ON SECOND PAGE

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	E077A004	HEX. NYLON PLASTIC BUSHING	1
2	ZQ564	MCMASTER CARR SPRING 9434K8	1
3	ZQ565	MCMASTER CARR 1/4\"	
4		1/4\" REGULAR FLAT WASHER	3
5		1/4\" UNC LIGHT NYLON INSERT LOCKNUT	3
6		HD Terminal, 16-14 AWG, 5/16\" Stud, Noninsulated	1

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DESIGNED: 6/13/2016  
DRAWN: 6/13/2016  
CHECKED: 6/13/2016  
ENG APPR: 6/13/2016  
MFG APPR: 6/13/2016  
PRINTED: 4/16/2020  
COMMENTS:

SEE BOM

FINISH: MACHINED SURFACES B.O.S.

GEOMETRIC VIEWS: NOT TO SCALE

SHUNT USED ON

SCALE: 1:2

WEIGHT: 0.11

REV: A

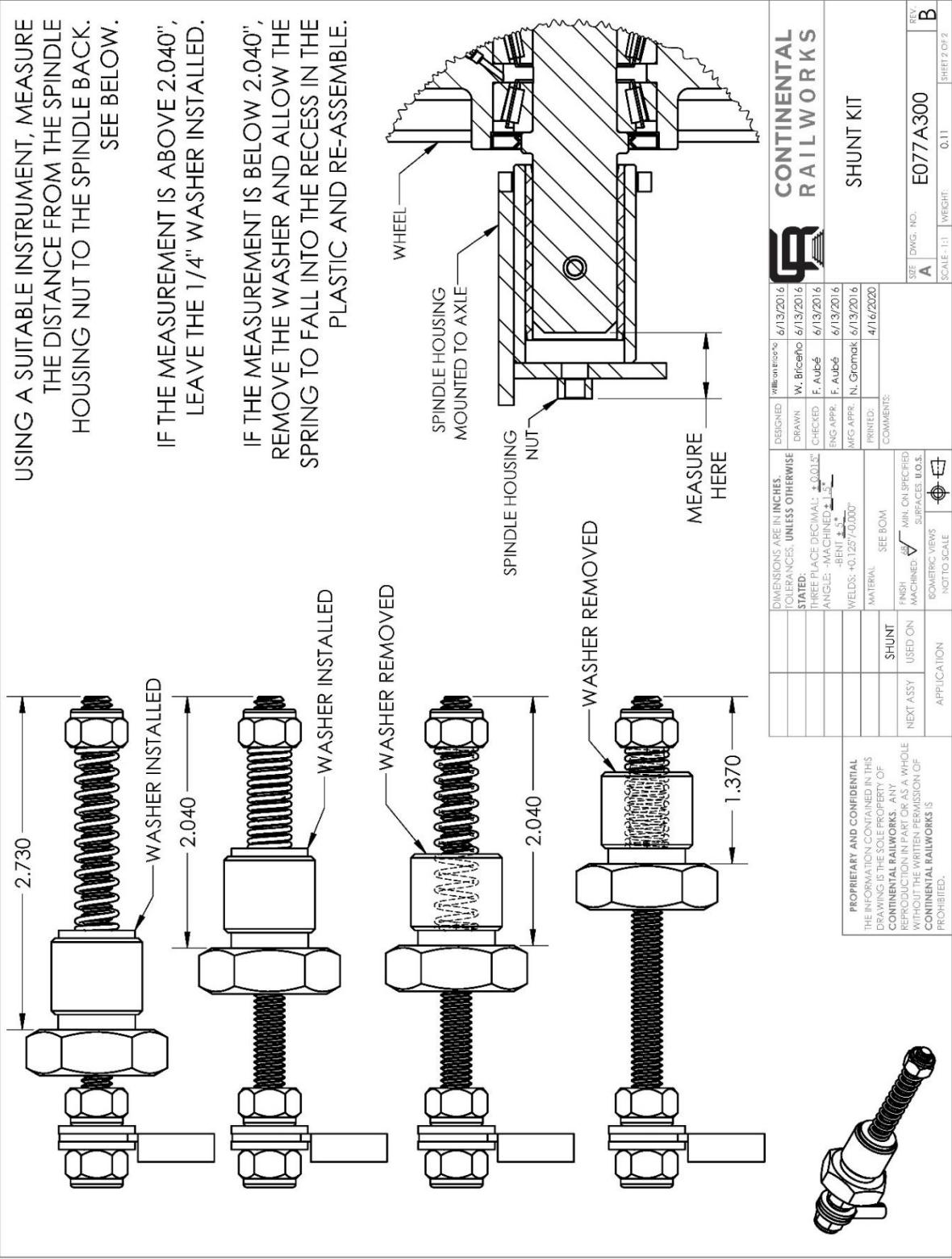
DWG. NO.: E077A300

REV: B

SHEET 1 OF 2

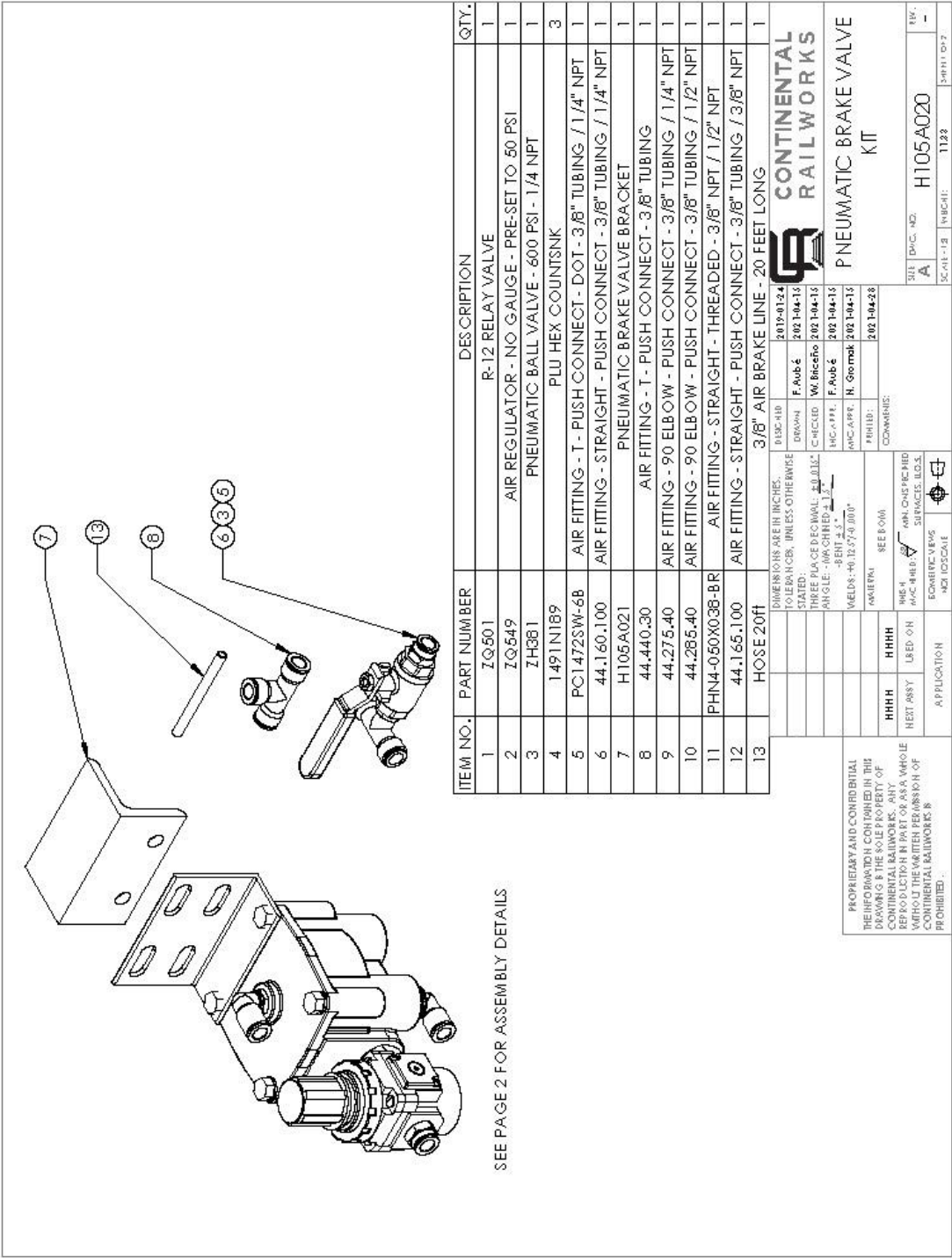
CONTINENTAL RAILWORKS

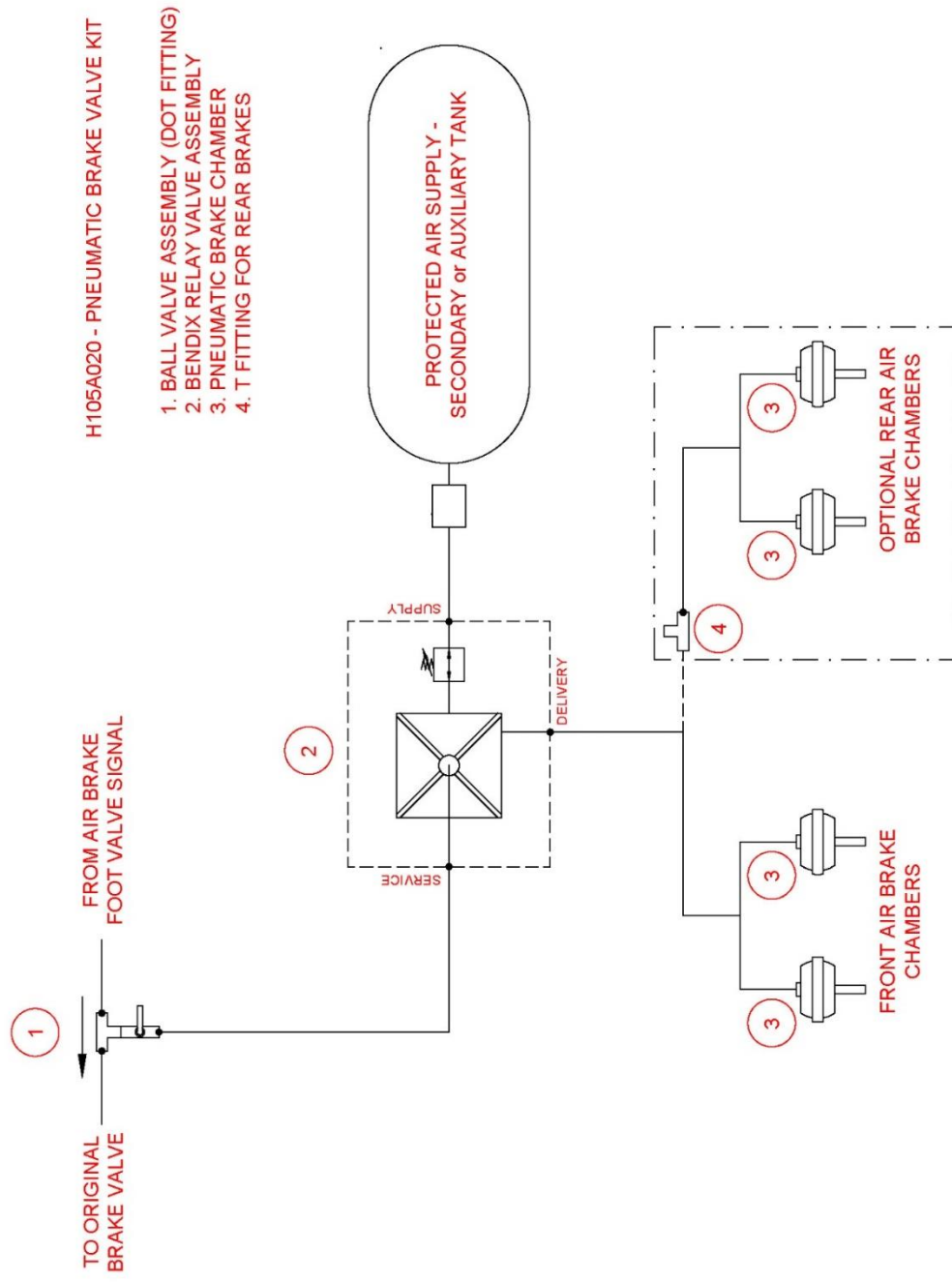
SHUNT KIT

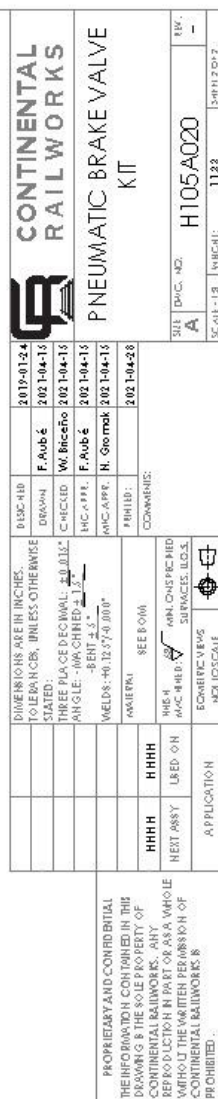


APPENDIX 4

PNEUMATIC BRAKE DIAGRAM







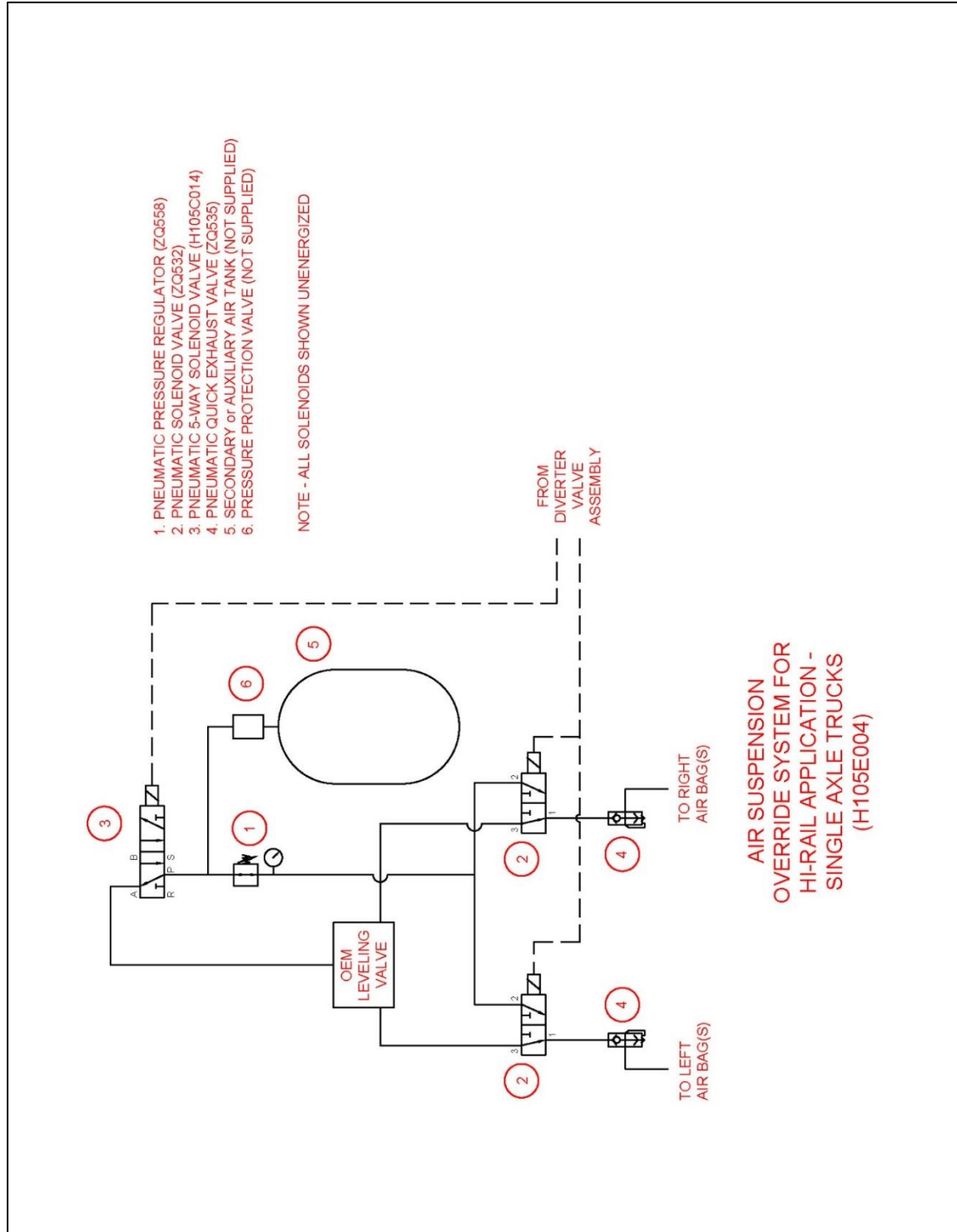
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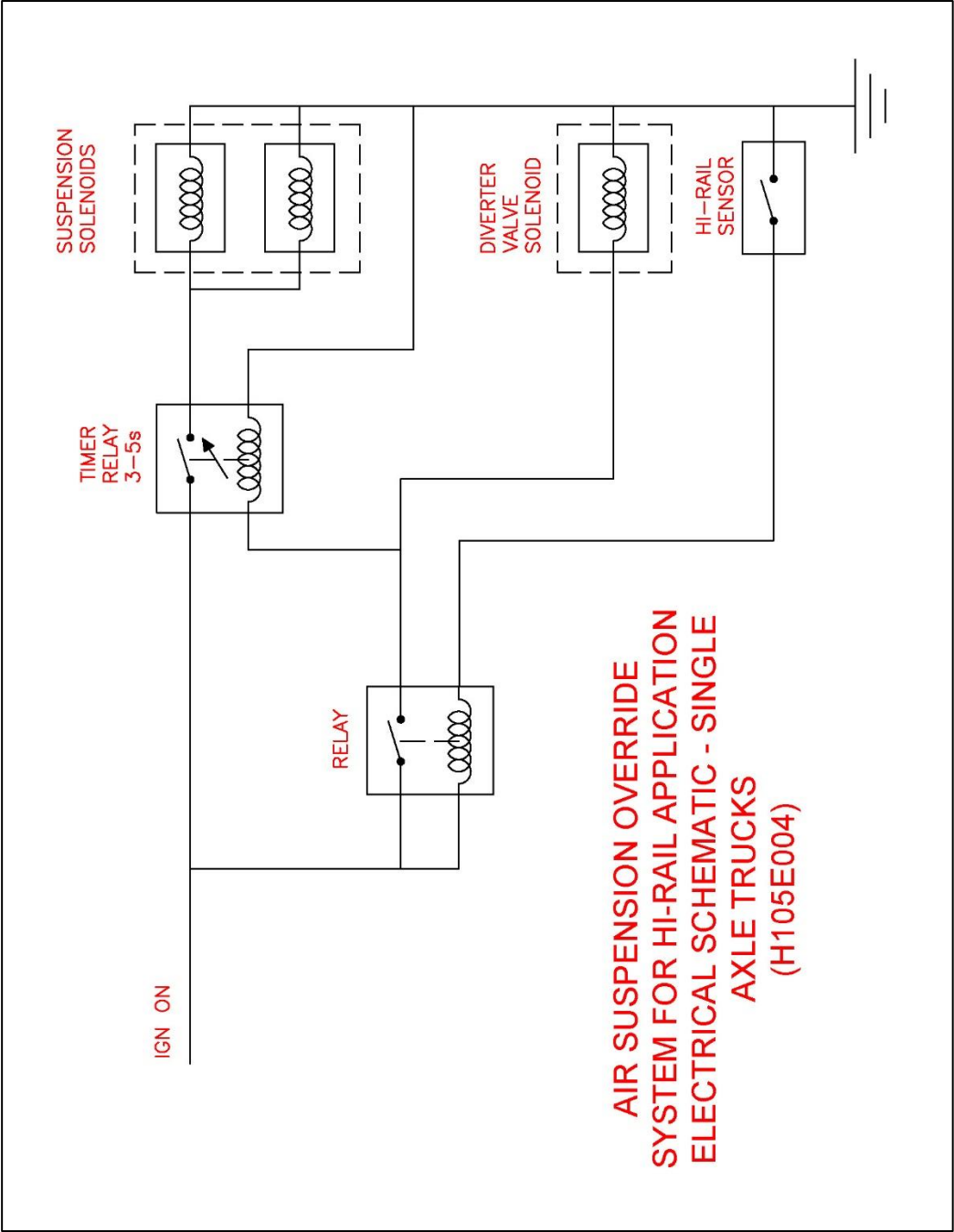
## APPENDIX 5

### PNEUMATIC SUSPENSION KIT

#### PNEUMATIC SCHEMATICS – H105E004 SINGLE AXLE TRUCKS

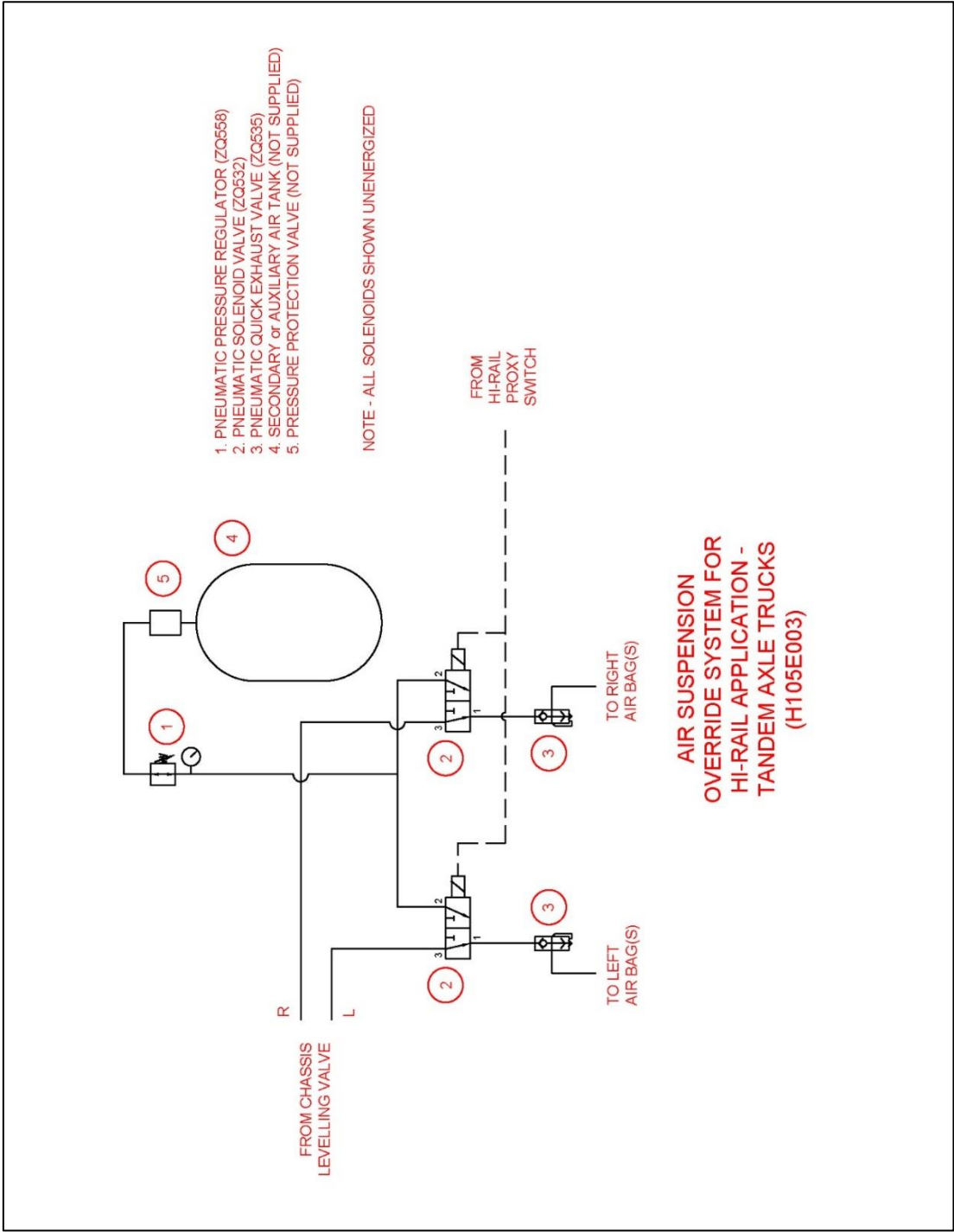


ELECTRICAL SCHEMATICS – H105E004 SINGLE AXLE TRUCKS

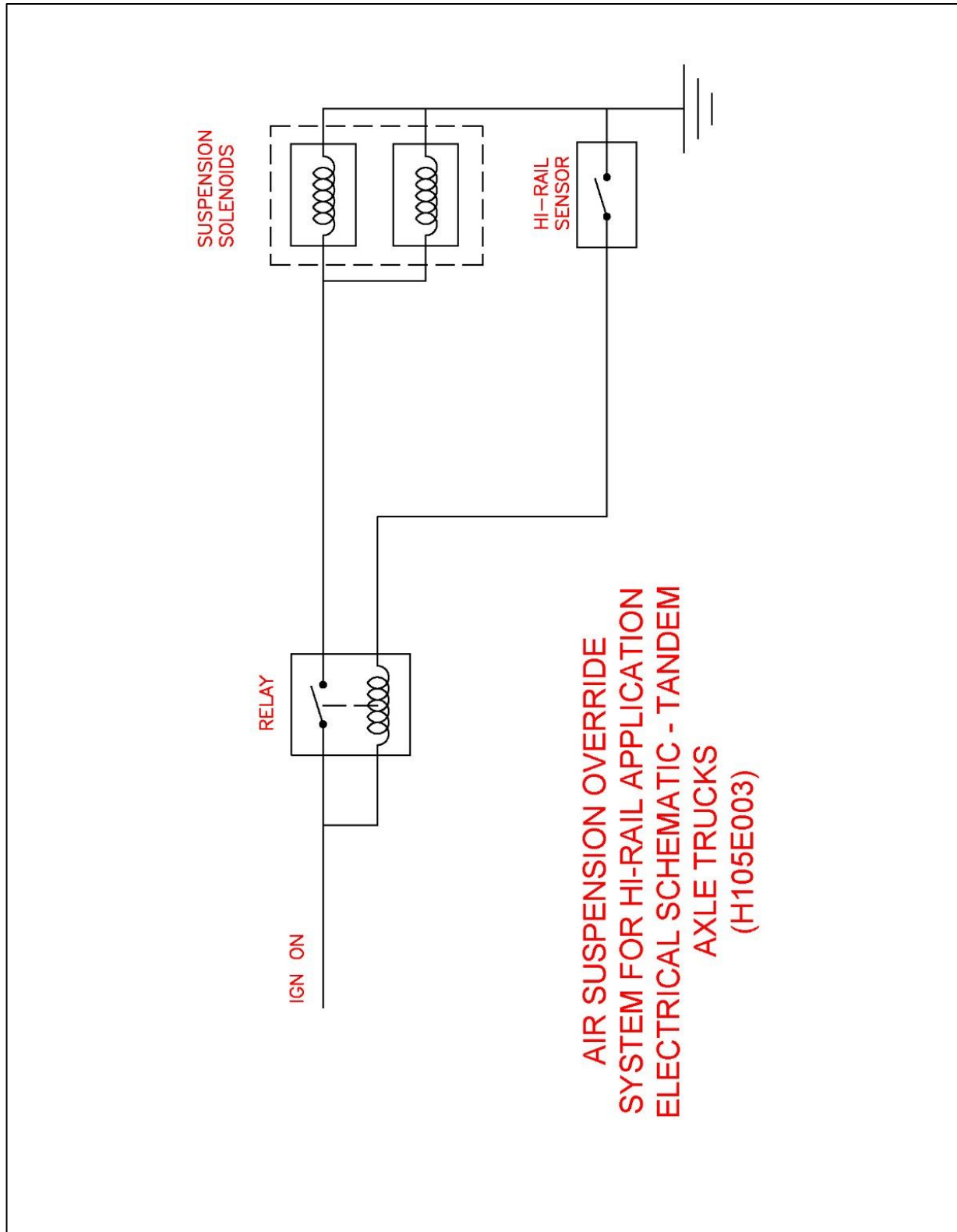




PNEUMATIC SCHEMATICS – H105E003 TANDEM AXLE TRUCKS



## ELECTRICAL SCHEMATICS – H105E003 TANDEM AXLE TRUCKS



# APPENDIX 6

## ALIGNMENT AND PRESSURE DATA FORM



7380 Rue Verite, St- Laurent, QC H4S 1G5 Tel: 514-95-8081

### Annual Rail Gear Inspection Form

Customer: \_\_\_\_\_  
 Vehicle Number: \_\_\_\_\_ Year: \_\_\_\_\_  
 VIN: \_\_\_\_\_

License: \_\_\_\_\_  
 Mileage: \_\_\_\_\_  
 Date: \_\_\_\_\_

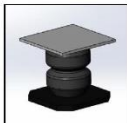
Hi-Rail Model Front: \_\_\_\_\_ Year: \_\_\_\_\_  
 Hi-Rail Model Rear: \_\_\_\_\_ Year: \_\_\_\_\_

Serial: \_\_\_\_\_  
 Serial: \_\_\_\_\_

### Rail Gear Alignment

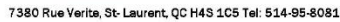
P-Guage Front Axle _____ (53.5" +/- 1/8")	B (+/- 1/32") _____	
L _____ (+/- 1/16") K _____	FRONT △	N _____ (+/- 1/16") M _____
E _____ E&D (+/- 1/32")	CHASSIS FRAME	D _____ E&D (+/- 1/32")
Contact Patch _____ FT RT	F T R T	Contact Patch _____ FT RT
F _____ C&F (+/- 1/32")		C _____ C&F (+/- 1/32")
J _____ (+/- 1/16") I _____		H _____ (+/- 1/16") G _____
O-Guage Rear Axle _____ (53.5" +/- 1/8")	A (+/- 1/32") _____	

### Height of Rear spring in the stowed position



Drivers Side : \_\_\_\_\_  
 Passenger Side : \_\_\_\_\_

Note: If compressed more than 6-3/4" stoppers will to be adjusted.  
 See Manual for Instructions



## CHASSIS

- ## HI-RAIL BRAKES & RAIL SWEEPS

- ## HI-RAIL WHEELS & BEARINGS

- ## HI-RAIL ASSEMBLIES

- ## HYDRAULICS

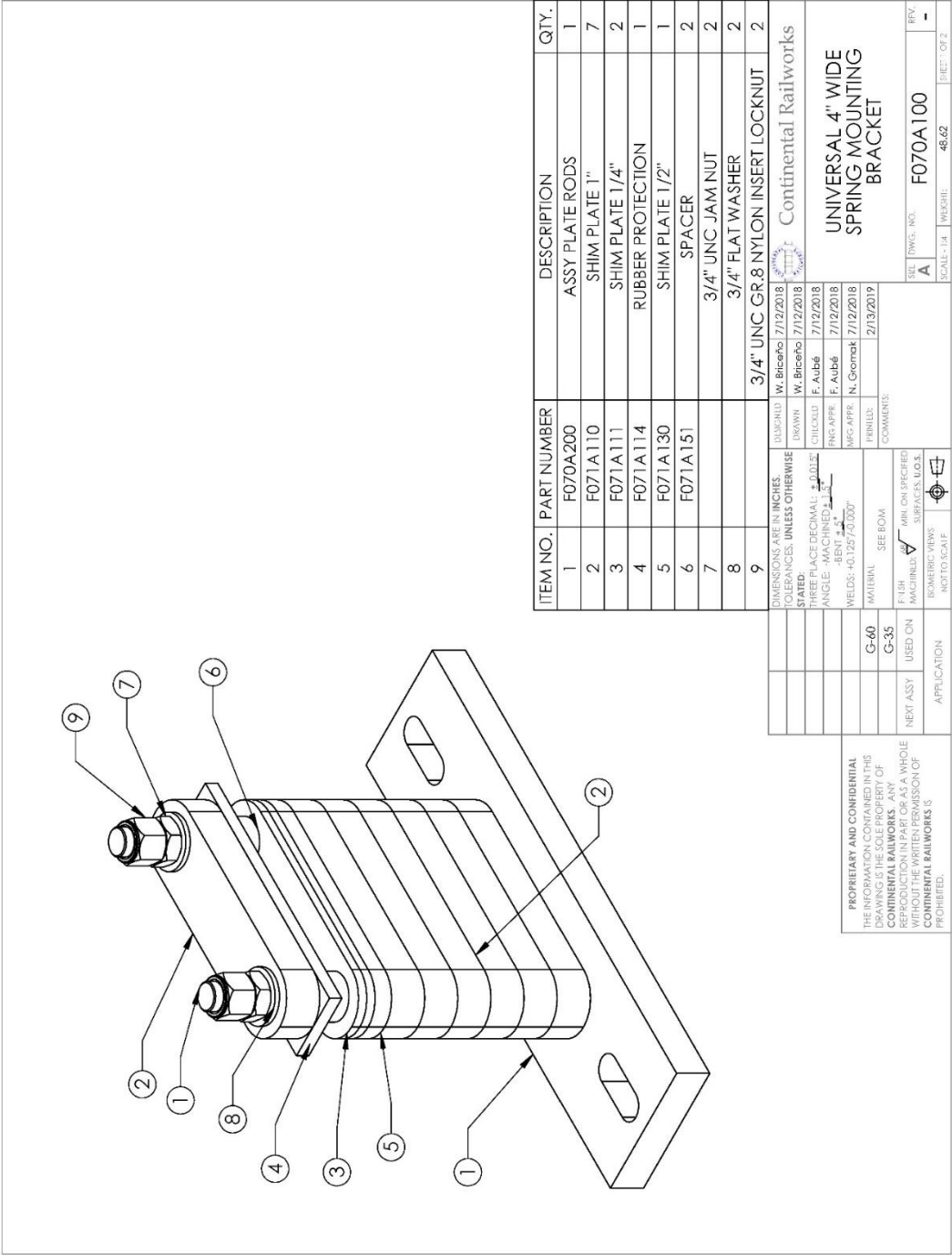
- ## COMMENTS & NOTES

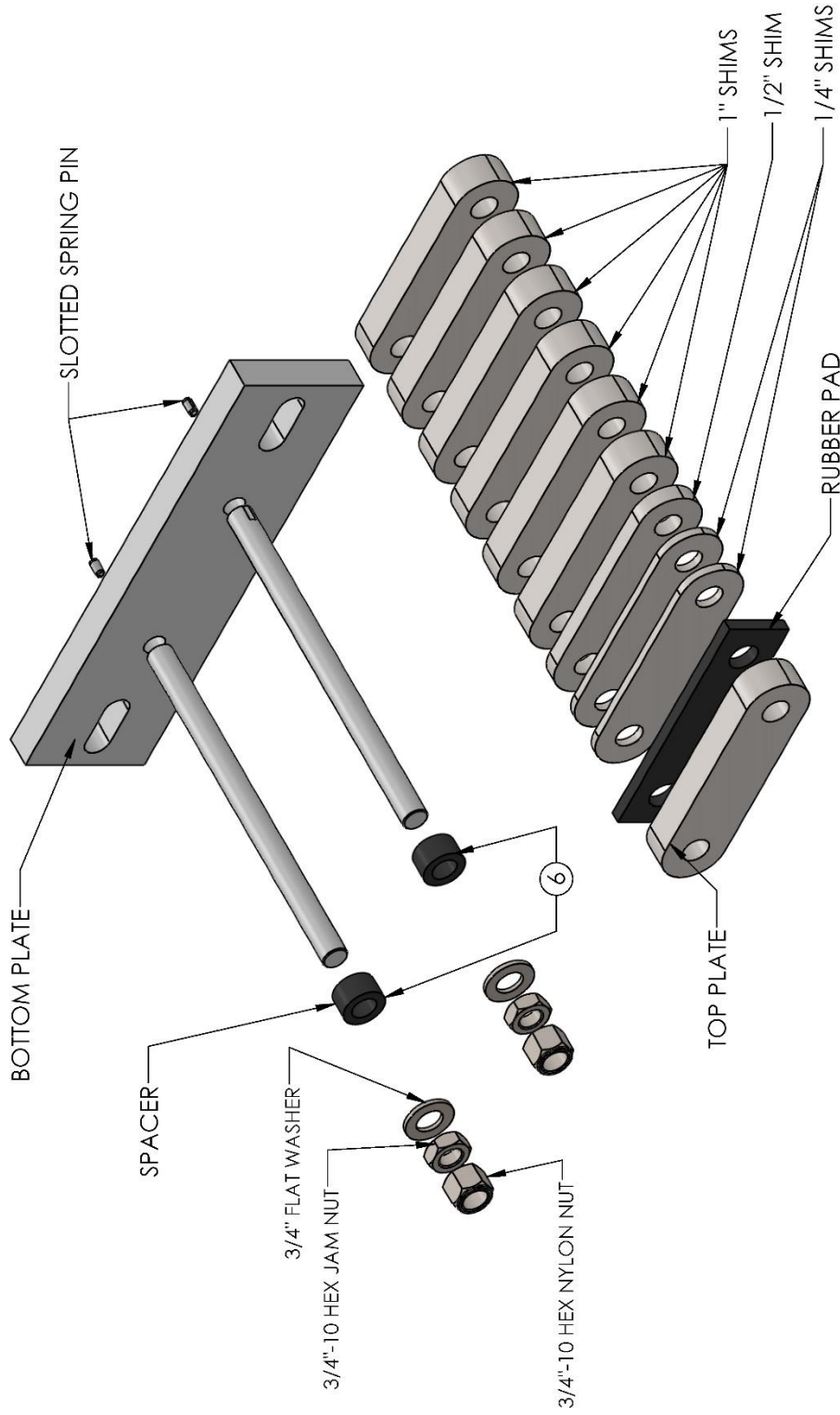
[illegible]

APPENDIX 7

UNIVERSAL MOUNTING BRACKET SYSTEM DRAWINGS

NOTE – Some components may differ slightly from drawings shown.





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		MATERIAL G-60 G-35 USED ON NEXT ASSY		FINISH F-11 SH MACHINING MIN. ON SPECIFIED SURFACES, U.O.S.		APPLICATION		ISOMETRIC VIEWS NOT TO SCALE		CONTINENTAL RAILWORKS IS PROHIBITED.		UNIVERSAL 4" WIDE SPRING MOUNTING BRACKET					

