



INTERNATIONAL CV SERIES /  
GM 4-5-6500 HD

INSTALLATION – OPERATION – PARTS – SERVICE

**20 SERIES HI-RAIL UNIT**  
**(19,000 to 26,000 lbs. GVWR TRUCKS)**

CV-20A FRONT  
SC-20G REAR

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Revision 0

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

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## INTRODUCTION

The following installation, operation, parts, and service manual has been prepared to be used with the Continental Railworks **20 Series** hi-rail unit on a 17,500 to 26,000 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 adjustments 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 email 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 20 Series hi-rail is designed for Single axle trucks with a GVWR between 17,500 and 26,000 lbs. For this application, the 20 series 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 mechanically, in both raised and lowered positions.

Drop forged 10" 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 suspension in the unit contributes to maintaining proper rail contact over crossings or irregular rail sections. Rear air brakes are optional although all front hi-rail units come standard with air brakes. Traction is adjustable by simply shimming the rear unit higher or lower on the frame.

The combined weight of this configuration of the 20 series hi-rail and all necessary valves is approximately 1325 lbs.

### CONFIGURATIONS

The 20 Series is available in many configurations from combining the adequate front and rear models for the application.

#### FRONT MODELS

G-20 – Rotary front (on frame extensions only)

V-20 – Vertical front

CV-20 – Rotary front (on leaf springs)

#### REAR MODELS

G-20 – Rotary rear (requires frame extensions)

SC-20 – Rotary (no frame extensions)

## OPTIONS

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

### REAR HYDRAULIC BRAKES

Front hydraulic brakes are standard on all 20 series hi-rail units, but rear brakes are available for the 20 series if required. Plumbing the hydraulic to the rear brakes is detailed in the Hydraulic Brake Valve Kit section of the manual.

### EMERGENCY HAND PUMP

Continental Railworks offers an optional emergency hand pump to complement the hydraulic PTO/pump setup. This can be used to deploy or retract the hi-rail in the event of an electrical or mechanical failure at the main hydraulic power source. Hydraulic schematics can be found in the Appendices.

### 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.

### POWER PACK

Continental Railworks offers an option to run the rail gear off a 12-volt power unit. This power unit is required if the chassis will not be equipped with a PTO and Pump. While we supply a 12v pump to run the braking system, this pump is required in addition to the braking system pump to run the rail gear.

## APPROVED CHASSIS MODELS

Ford F450/550  
International CV series  
Dodge 5500's  
Chevy 4500-6500 models

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. The truck axles should be aligned as well.

### 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

In case of unforeseen interferences with some vehicle components (frame mounted equipment, radiators, hood hinges, bumper mounts, etc) small modifications to the mounting components may be required. 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

### CHASSIS PREPARATION

- 1- Inflate tires to recommended pressure.
- 2- Prior to measuring the frame height, ensure the air bags are properly inflated, if equipped and required.
- 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.
- 5- 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.

### NOMENCLATURE

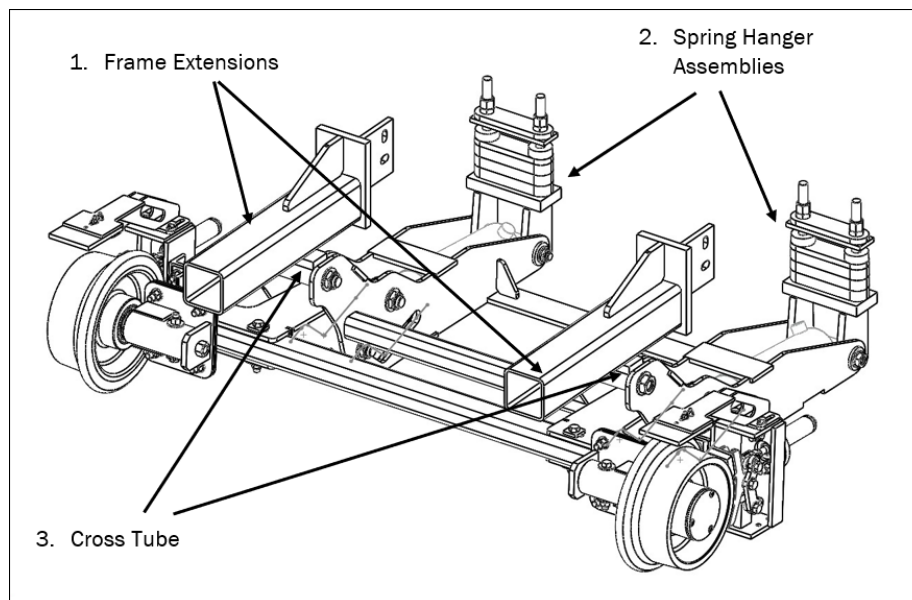
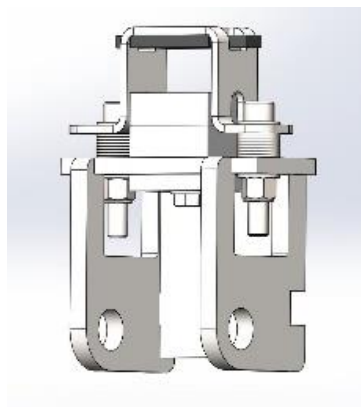


Figure 1: CV-20 nomenclature

Note: For units shipped in 2022 + There has been a change to the spring hangers with additional instructions below:



## FRONT FRAME EXTENSIONS

- 1- Remove the front bumper of the vehicle. Store the bumper in a safe location to avoid damage.
- 2- Start on the driver's side by removing the bolts that hold on the bumper bracket (Item 5 below) and the Bumper bracket (item 4) from the chassis.

Note: Make sure to save Item 4. This will be reused later to attach the factory bumper to the frame extensions.

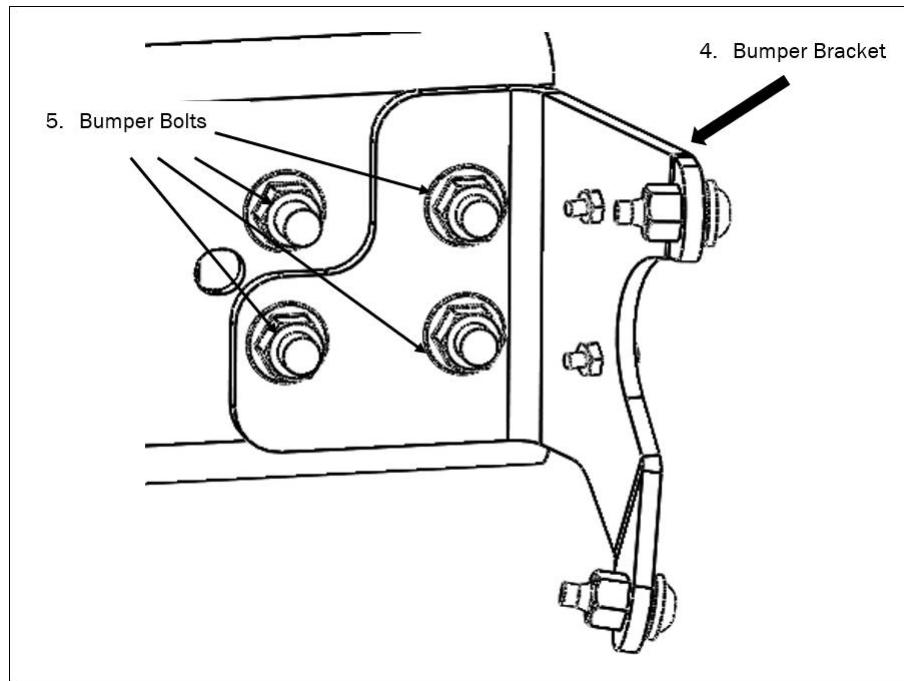


Figure 2: Bumper bracket example

- 3- Take Item 1 (Frame Extension) and place inside the frame rail of the chassis making sure to align the holes in the frame extension with the holes in the frame. See figure below for frame extension location.

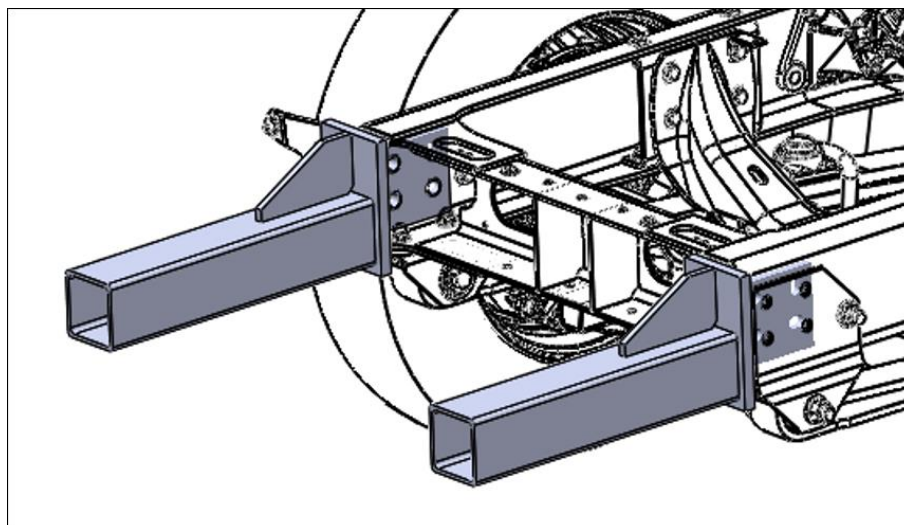


Figure 3: Front frame extensions



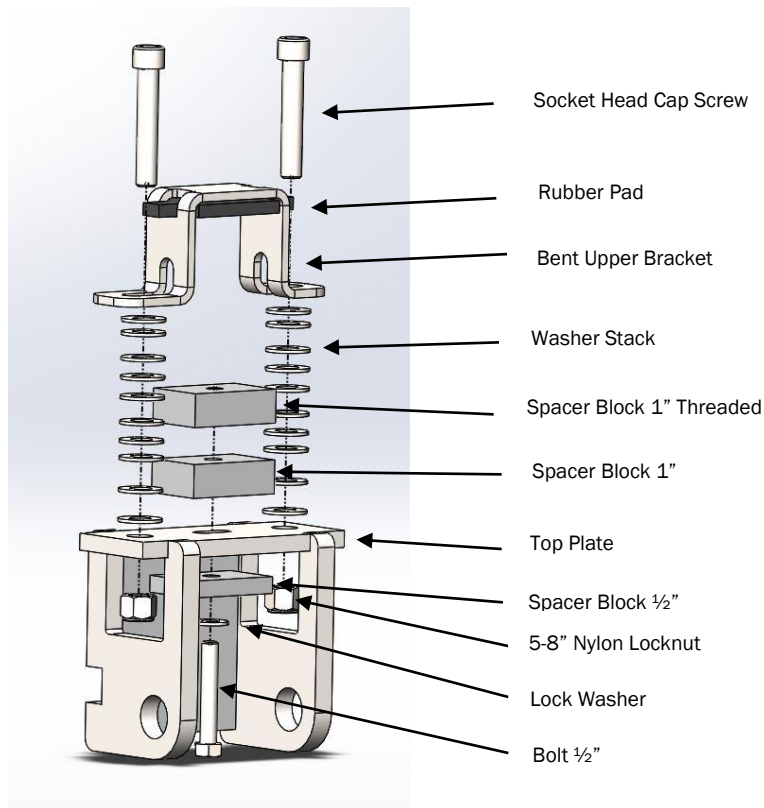
- 4- Install four (4) 5/8 -11 Grade 8 bolts, washers, and nyloc nuts to secure the frame extension to the chassis. Do not fully tighten at this point.
- 5- Repeat steps 1 through 4 on the on the passenger's side of the chassis.
- 6- Using a level check that both frame extensions are level across the chassis and are both parallel with the frame of the truck. Adjust as needed.
- 7- Torque all bolts to the correct specs using the table below.

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

Figure 4: Bolt torque specifications

**FRONT HI-RAIL UNIT**

- 1- Start by determining the number of required spring hanger spacers:
  - a. Measure from the bottom of the leaf springs to the ground.
  - b. Subtract 16-3/4" from the measurement.
  - c. This value represents the spacers required under the leaf springs.
- 2- Raise the spring hangers up until the stack of spacers sit flush with the bottom of the leaf spring.



**Figure 5: Spring hanger assembly**

- 3- In the case where a spacer(s) blocks in the center of the assembly need to be removed, it should be placed under the top plate in order to use the supplied 1/2" bolt. There is a 1/2" spacer under the top plate which can be moved up above the top plate if needed. The top 1" block is threaded and must remain on top of the top plate and at the top of any stack of spacers.
- 4- Adjust the number of washers that will sit on top of the top plate and beneath the bent bracket to the spacer blocks used. The bracket should be snug against the leaf springs and should cause some deflection in the rubber pad across the top of the bent bracket.
- 5- Tighten the socket head cap screws using the supplied 5/8" nylon locknut on each side.
- 6- Once the height has been set on the leaf spring, tighten the 1/2" bolt in the center with the lock washer. At the end of alignment and height adjustment the spacer blocks will be welded to each other and to the top plate.

- 7- Measure and adjust the spring hanger to be 1" in front of the axle.

Note: This measurement is critical to ensure proper clearance of the spring hanger.

- 8- Place a pallet jack, forklift or other adequate lifting equipment under the front axle of the hi-rail and lift until the cross tubes (Item 3) touch the frame extensions (Item 2).

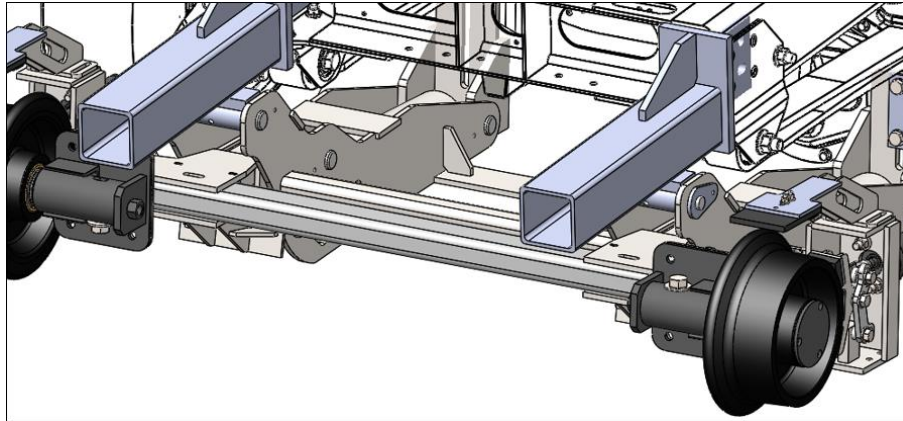


Figure 6: Front hi-rail in position

Measure from the bottom of the cam arm (Item 6) to the ground.

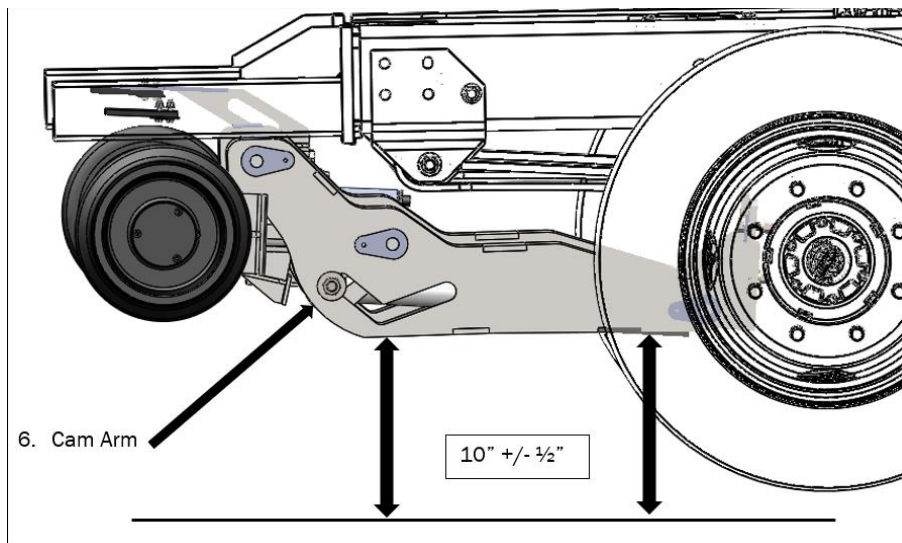
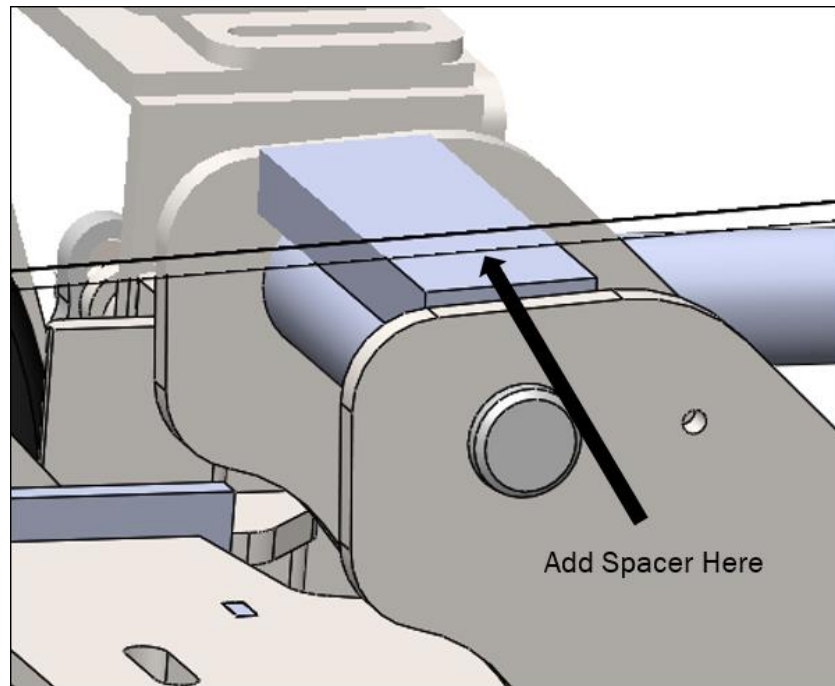


Figure 7: Front hi-rail height

- 9- The measurement from the bottom of the cam arm to the ground should be around 10" at the front and rear of the cam assembly.
- If the measurements are set properly skip to step 13.
  - If the measurements are higher than 10" proceed to step 11 to lower the hi-rail.
  - If the measurements are lower than 10", please contact Continental Railworks at 514-956-8081.
- 10- To lower the front of the hi-rail, add solid steel spacers between the cross tubes (Item 3) and frame extensions (Item 1) on both sides until front of the cam assembly (Item 7) is at 10" from the ground.

Note – Both sides should be shimmed with equal amounts of spacers.

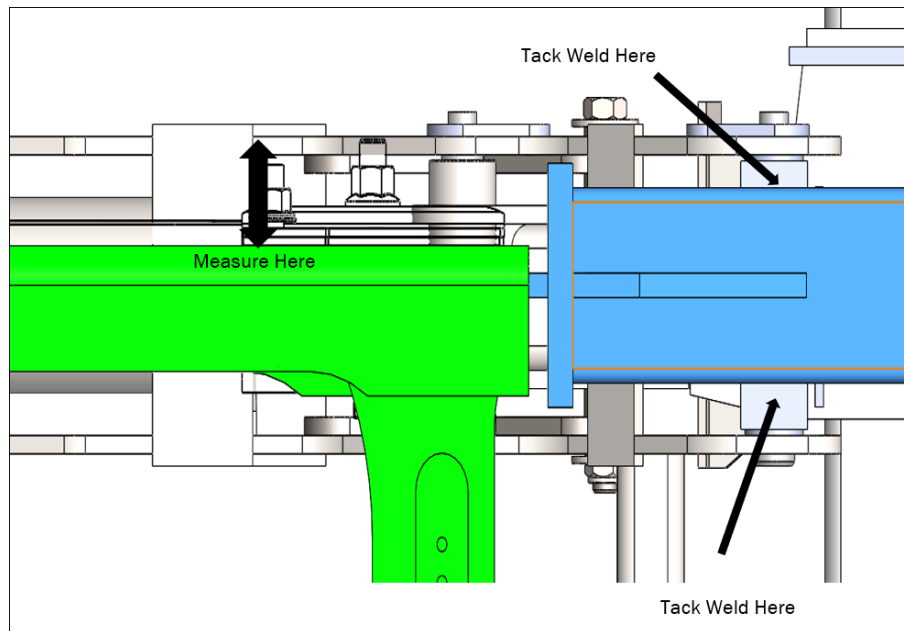


**Figure 8: Securing to the front frame extensions**

11- To lower the rear of the hi-rail, adjust the number of spring hanger shims as required. Refer to previous steps for details.

Note – Both sides should be shimmed with equal amounts of spacers.

12- Tack weld the cross tubes (Item 3) and / or cross tube spacers to the frame extensions (Item1).



**Figure 6: Securing to front frame extensions**

This completes the initial installation of the front hi-rail unit.

Refer to the next sections for alignment, adjustment, and final welding.

## REAR UNIT INSTALLATION

### NOMENCLATURE

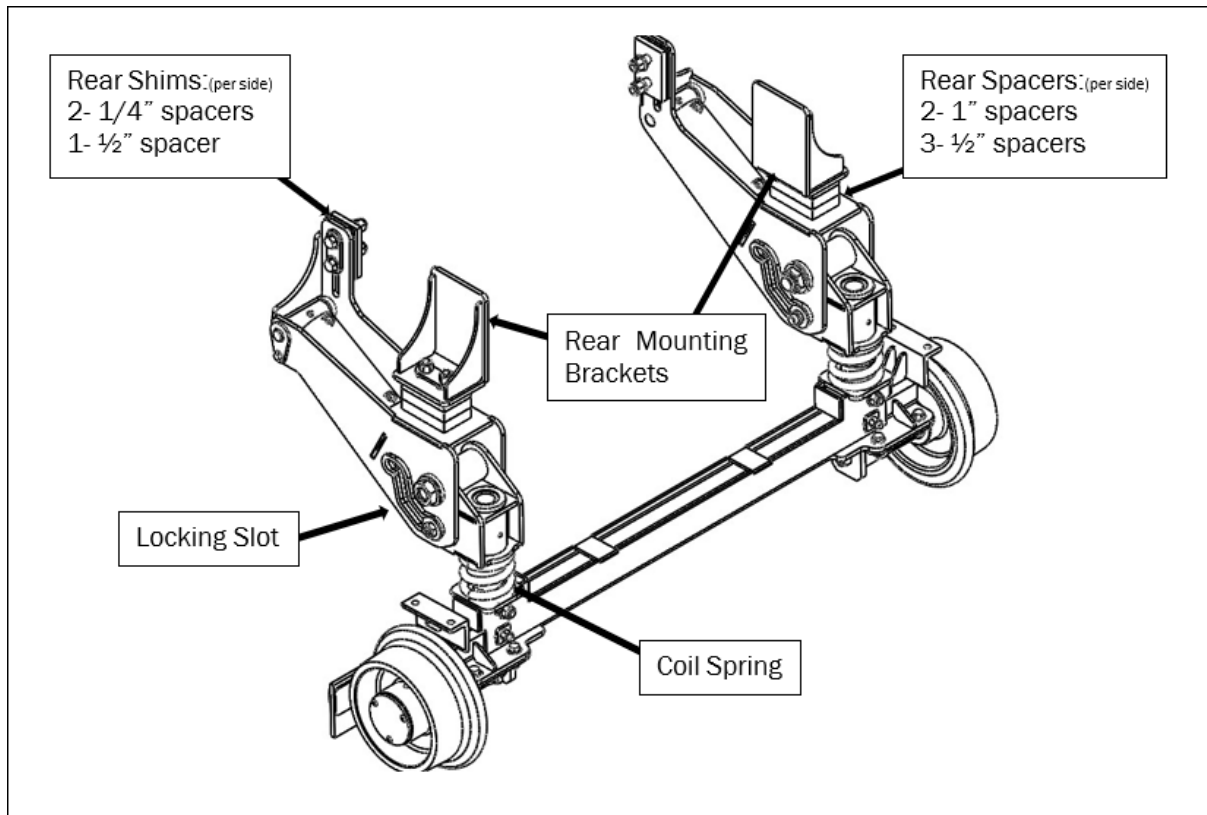


Figure 7: SC-20G nomenclature

## REAR MOUNTING PLATES

- 1- Start by removing the rear mounting brackets from the rear hi-rail assembly and setting the supplied hardware and spacers to the side.
- 2- Start by making a mark on the frame 16-11/16" from the center rearmost bolts (or 18-5/8" from the end of the frame).
- 3- Place the bracket against the frame and line up the front edge of the bracket with the mark that was just made.
- 4- Clamp the bracket to the frame.
- 5- Using a hammer and a straight edge, align the top of the mounting bracket so its flush with the top of the frame.
- 6- Make sure the front edge is still aligned with the mark made in step A.
- 7- Drill three (3) 5/8" clearance holes in the mounting bracket.
  - a. Drill holes in a V pattern as wide as possible.
  - b. Spread holes as far as possible if using existing frame holes.

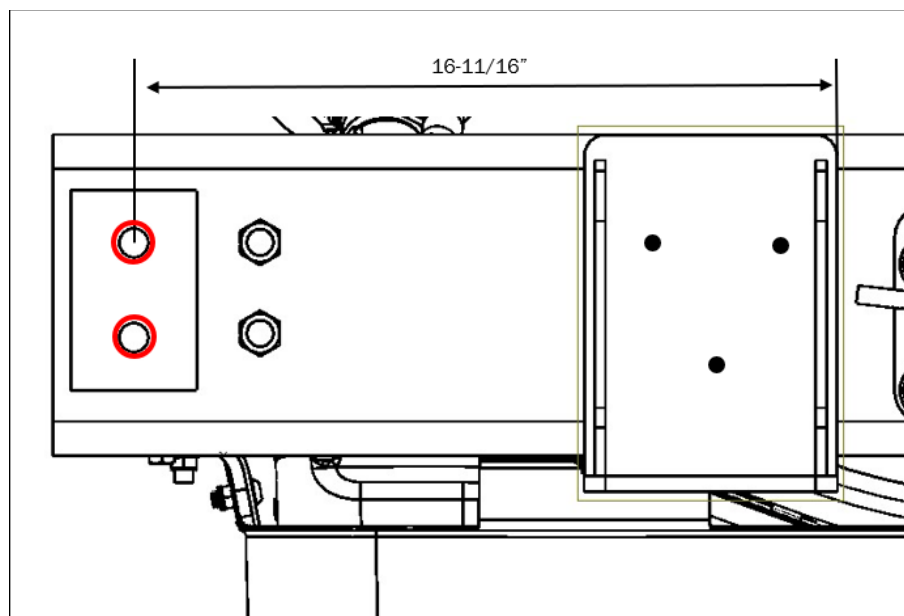


Figure 8: Rear mounting bracket location

- 8- Remove the rearmost bolts (circled in red in the figure above).
- 9- Repeat the Steps above on the opposite side.

## REAR HI-RAIL UNIT

- 1- Start by removing the rear shims from the rear hi-rail assembly and setting the supplied hardware and spacers to the side.

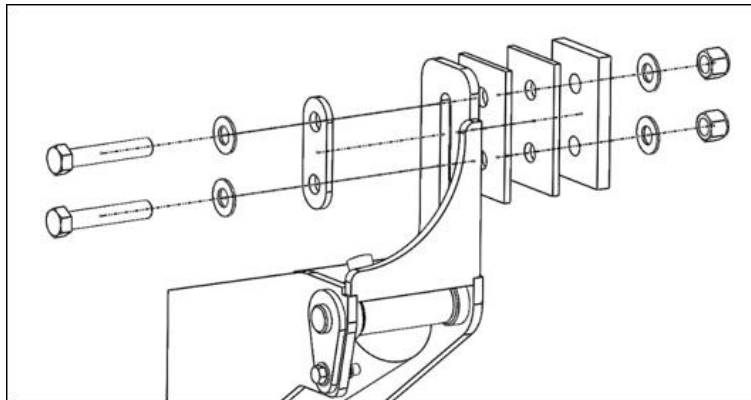


Figure 9: Rear hi-rail shims

- 2- Position the rail gear under the rear of the chassis with the hi-rail wheels facing out towards the back of the chassis.
- 3- Place a pallet jack, forklift or other adequate lifting equipment under the rear hi-rail until the rear mounting slots are above the frame.
- 4- Position the rear hi-rail so that slots on the rear of the rail gear align with the holes in the rear of the frame.
- 5- Install the supplied shims equally on each side.
  - a. Normally, one (1)  $\frac{1}{2}$ " shim and one (1)  $\frac{1}{4}$ " shim should be used on each side.
  - b. The 20 series rear hi-rail could accommodate a  $\frac{3}{4}$ " body shear plate between the mounting brackets and truck frame rails.

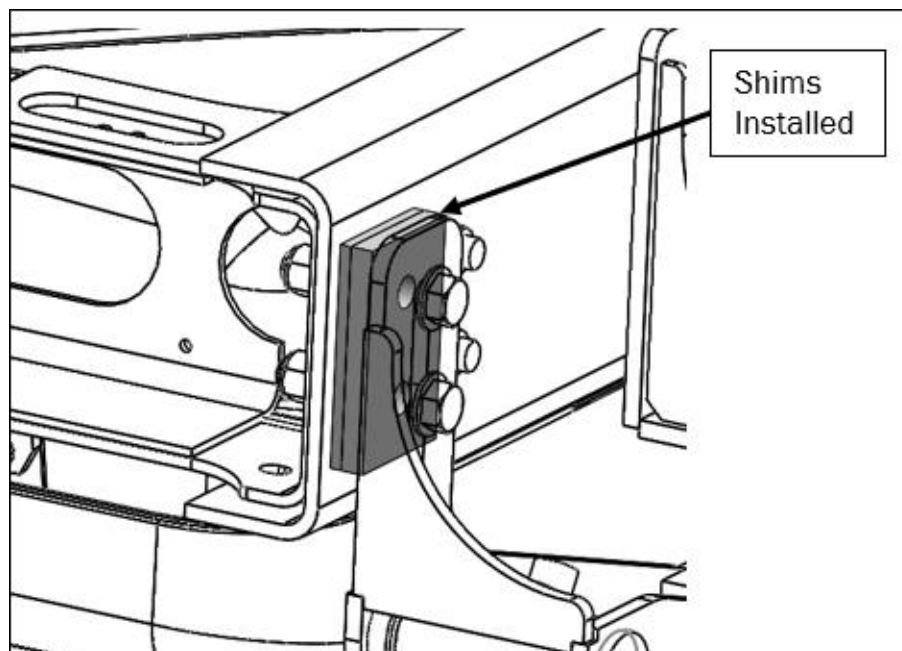


Figure 10: Side shim installation

- 6- Install the supplied shim hardware on both sides and leave loose until final adjustment.
- 7- New installations should retain all height spacers between the hi-rail and mounting plates.

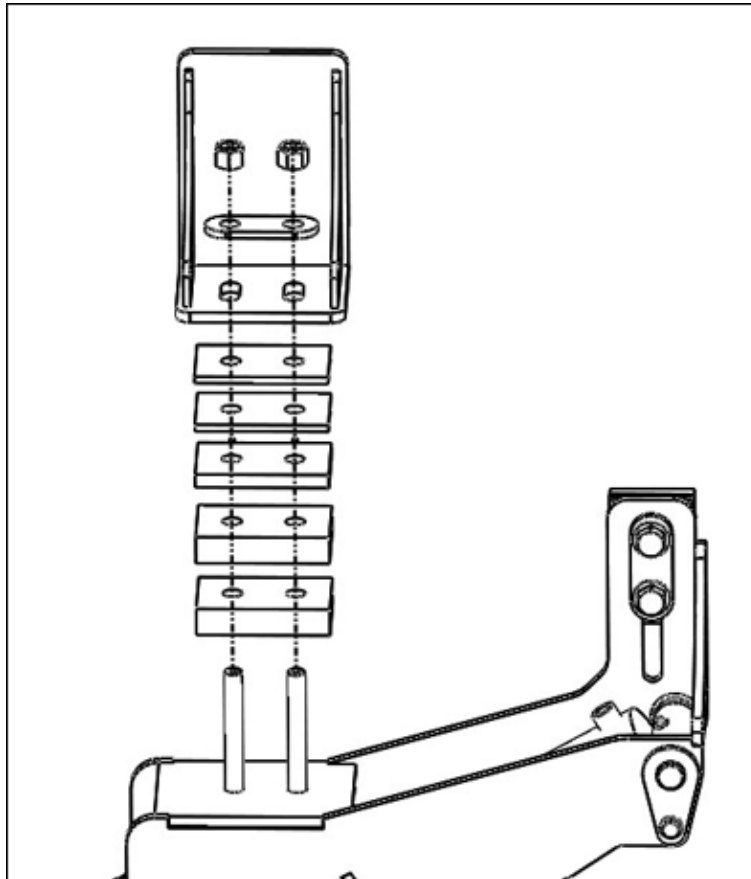


Figure 11: Rear hi-rail spacers

- 8- Torque all bolts to the correct specs using the table below.

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

Figure 12: Bolt torque specifications



## 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.

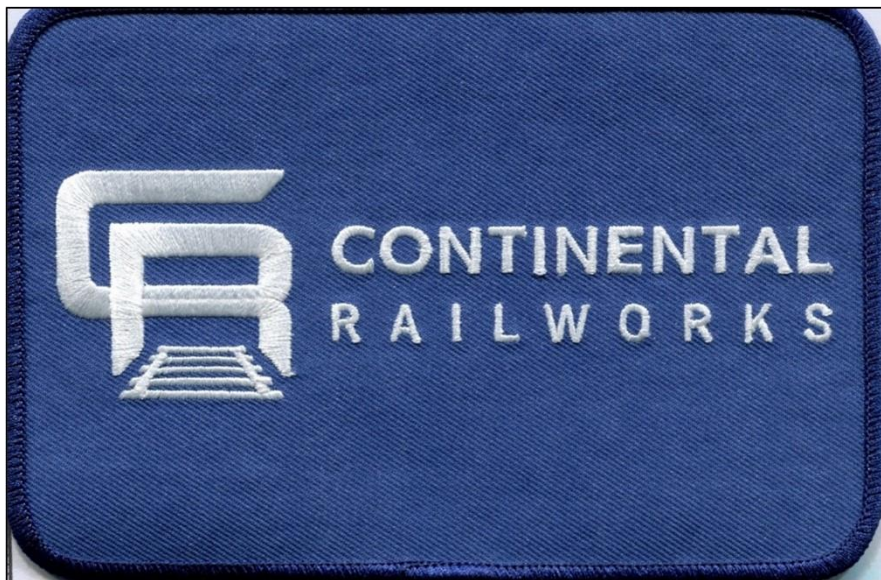


Figure 13: Steering wheel lock

## HYDRAULICS

### PTO / PUMP SETUP

The hi-rail system requires a working pressure of 2500 psi and a flow rate of 5 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.

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

- 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 pressure port (P) of the rear control valve.
- 4- Run a 1/2" hydraulic hose from the discharge port (T) of the rear control valve to the return line to the tank.
- 5- Connect the two ports on the front hydraulic control valve to the front hydraulic cylinders, through T fittings to split 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).
- 6- 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.
- 7- Verify the entire system for leaks.

### POWER PACK SETUP

An electric / hydraulic power pack can be supplied to replace the PTO / Pump on the vehicle and provide adequate performance to power the hi-rail. The power pack will provide approximately 1.0 gpm, which translates in a slower deployment and retraction than with a typical PTO / Pump.

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.

Refer to the manual supplied with the power unit for full details.

# HYDRAULIC BRAKE KIT

## GENERAL DESCRIPTION

The Continental Railworks 20 Series is delivered with front hydraulic brakes and optional rear hydraulic brakes. The brakes are actuated through a hydraulic power unit that is controlled from the vehicle's brake signal (foot pedal).

A single power unit can be used for the hi-rail deployment and brake actuation. For a PTO application, a separate power unit is supplied to actuate the brakes.

In both cases, a brake timer and brake release valve ensures the power unit shuts off after prolonged used (stationary with foot on brake pedal), keeping the fluid in the brake cylinders until the foot pedal is released.

Refer to the hydraulic schematic in the Appendices and to the instructions below for details.

## LOCATION AND MOUNTING

- 1- Install the brake power unit in a suitable location (under the hood or in the vehicle's service body).
- 2- Secure the power pack adequately, with access to the fluid filler cap.
- 3- Install the brake timer unit (black plastic box) inside vehicle cab, with means of running wiring to the brake power unit.

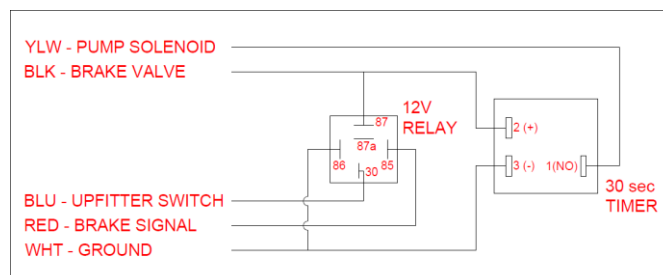
## PLUMBING

- 1- Using ¼" steel braided hydraulic hose, make the following connections:
  - a. PTO and BRAKE PUMP
    - i. Connect Power unit P to Brake release valve P
    - ii. Connect Power unit T to Brake release valve T
    - iii. Connect Brake release valve FB to brake cylinders, through T fitting to split the flow
  - b. SINGLE PUMP (BRAKE and DEPLOYMENT)
    - i. Connect Power unit P to Brake release valve P
    - ii. Connect Power unit T to Brake release valve T
    - iii. Connect Brake release valve FB to brake cylinders, through T fitting to split the flow
    - iv. Connect Brake release valve PB to Front control valve P
    - v. Connect Front control valve T to Rear control valve P
    - vi. Connect Rear control valve T to Power unit T
- 2- Ensure the hydraulic hoses are of sufficient length to go through the entire range of motion of the hi-rail unit(s).
- 3- Secure hydraulic hoses adequately.
- 4- Adjust the Power unit pressure relief to 2500 psi.
- 5- Adjust the Brake release valve pressure relief to 300 psi.

**ELECTRICAL**

- 1- Locate an available OEM upfitter switch powered feed and connect to the BLUE wire on brake timer unit.
- 2- Locate the vehicle's brake light switch and connect to the RED wire on brake timer unit.
- 3- Connect the WHITE wire on brake timer unit to the vehicle ground.
- 4- Connect the BLACK wire on brake timer unit to the BLACK wire on the Brake release valve.
- 5- Connect the YELLOW wire on brake timer unit to the brake pump solenoid signal lug.
- 6- Install the supplied circuit breaker near the battery.
- 7- Connect 12V IGN ON battery power to the brake pump solenoid through the circuit breaker.
- 8- Connect ground to the brake pump solenoid.
- 9- Test the system
  - a. With the dash switch on, the brake pump should activate and the hi-rail brakes should apply when the vehicle brakes are applied.
  - b. Before releasing the brakes, the pump should run for 30 seconds and turn off but keep fluid in the brake cylinders.
  - c. When the vehicle brakes are released, the brake pump should de-activate (if within 30 sec from application) and the pressure in the brake lines should dissipate.
  - d. With the dash switch off, the brake pump should not activate when the vehicle brakes are applied.
- 10- Test track the vehicle.
  - a. Adjust the brake release valve pressure relief for the particular vehicle application until the front brakes are able to lock the hi-rail wheels.
  - b. Reduce the pressure by 50 psi.
- 11- Verify the entire system for leaks.

YELLOW	TO PUMP RELAY
BLACK	TO BRAKE MANIFOLD
BLUE	12V FROM DASH SWITCH
RED	FROM BRAKE LIGHT SIGNAL
WHITE	GROUND



## TRACK SIGNAL 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 E077A200K.**

### **! SAFETY WARNING !**

ENSURE WIRES ARE SECURED PROPERLY TO PREVENT PINCHING OR RUBBING WHICH MAY LEAD TO FAILURE.

ENSURE SHUNT KIT IS INCORPORATED IN THE HI-RAIL ANNUAL INSPECTIONS TO VERIFY ITS FUNCTIONALITY

## INSTALLATION

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

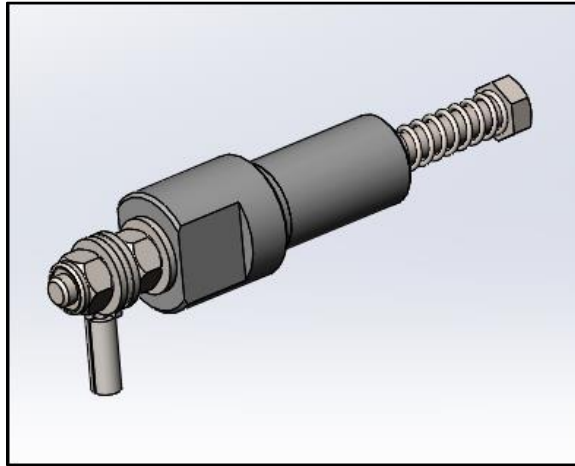
#### INCLUDED

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

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

#### NOT INCLUDED

- 10 gauge electrical wire
- Momentary or Maintained switch (if required)



**Figure 14: Assembled shunt**

### **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.



**Figure 15: Installed shunt**

### **Electrical**

- 1- Using 10 gauge 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 rail wheel and any part of the axle, but 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.

## ALIGNMENT AND ADJUSTMENT

### CV-20 FRONT UNIT SIDE TO SIDE ADJUSTMENT

While adjusting the alignment, if the front axle needs to be adjusted side to side, it can be done by loosening the bolts shown below. Once the axle is adjusted re-tighten the bolts.

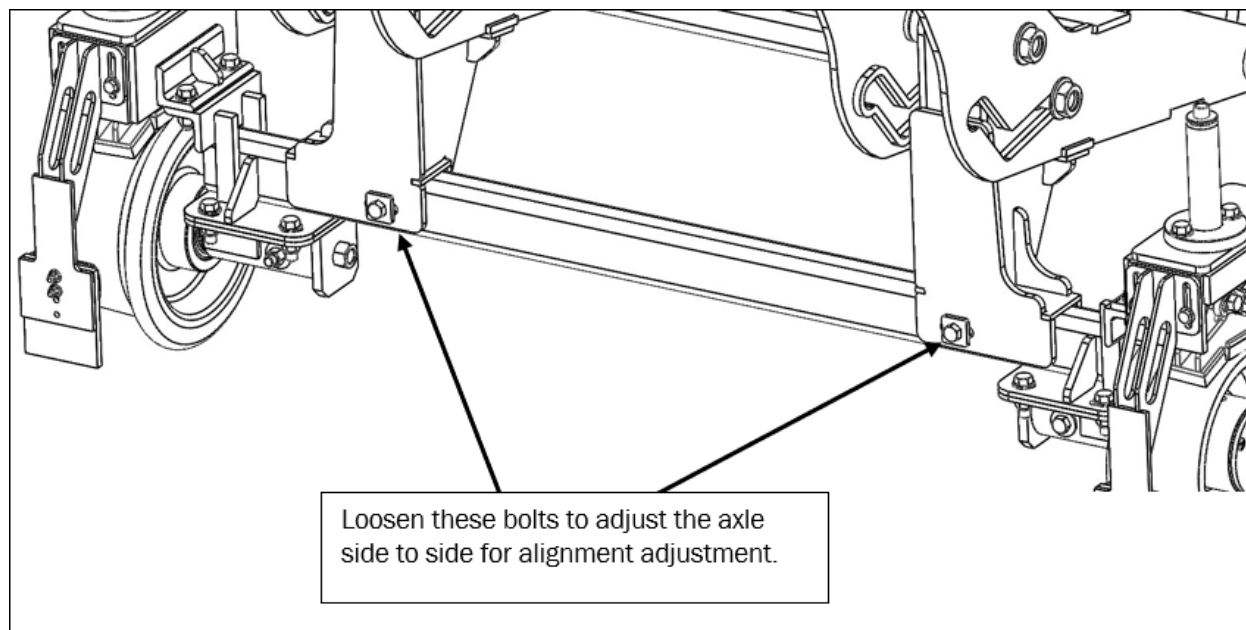


Figure 16: CV-20 front side to side adjustment

### SC-20 REAR UNIT SIDE TO SIDE ADJUSTMENT

If the axle of the rail gear needs to be adjusted side to side while aligning the rail gear it can be done by loosening the bolts shown below. Once the axle is adjusted re-tighten the bolts.

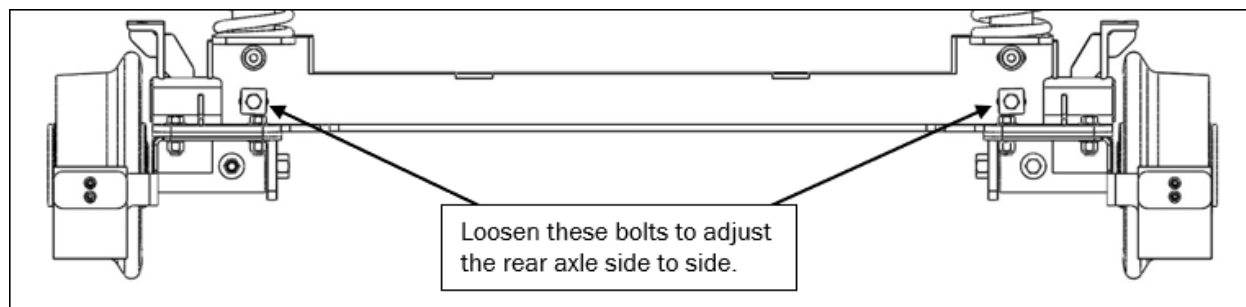


Figure 17: SC-20G rear side to side adjustment



## ALIGNMENT PROCEDURE STANDARD GEAR

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 wheels' toe-in and toe-out.

- 1- Ensure the vehicle is on a hard flat surface with the front wheels pointing straight ahead. Place 12" blocks under all wheels.
- 2- Lower the front hi-rail unit so the axle is perpendicular to the ground (a few degrees before full deployment).
- 3- Lower the rear unit so the axle is perpendicular to the ground (a few degrees before full deployment).
- 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 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 front face of the axle to allow easy replacement.
- 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 shifting the whole hi-rail unit from side to side. The hi-rail gauge needs to be adjusted and maintained by sliding the spindle in the spindle housing (a 3/4" threaded rod 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.
- 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. 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 ½” 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- Tighten the gauge adjustment bolts on the front and rear hi-rail units, locking the wheel spindles in place. Tack weld the cross bolt washer to the spindle housing to lock in the gauge adjustment.
- 13- Perform a track test on the unit ensuring there is no excessive flanging.

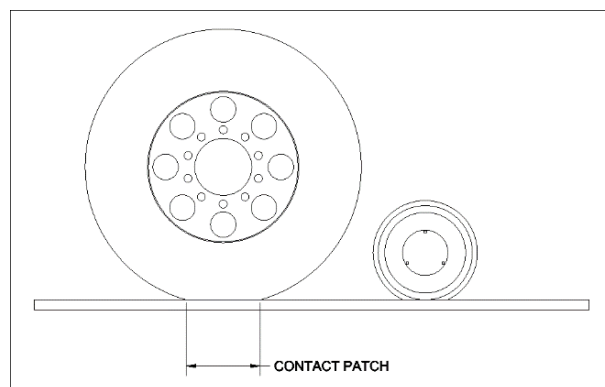
## PRESSURE ADJUSTMENT

Prior to adjusting the alignment on the 20 series rail gear it is recommended that the pressure setting for the hi-rail weight be adjusted first.

If possible, place the unit on rail to adjust the weight on the rail gear, if you can't place the unit on rail use 3"x2" tubing that's long enough to go under the chassis tires and rail wheels on the front and rear.

## PRESSURE ADJUSTMENTS

- 1- Start by placing the chassis on rail or on steel tubing.
- 2- Lower the front and rear rail gear.
- 3- Check the tire pressure on the rear inside tires to make sure they are properly inflated and adjust if needed.
- 4- Using two small thin squares:
  - a. Place one square on top of the rail or tubing on both sides of the rear tire that is sitting on the rail.
  - b. Slide the squares until they touch the tire on the rail or tube.
  - c. Using a tape measure, take the measurement between the two squares.
- 5- The contact patch should be 8".
  - a. If the contact patch is less than 8" continue to step 6.
  - b. If the contact patch is greater than 8" with all original shims installed, please contact Continental Railworks.
  - c. The figure below illustrates the contact patch measurement.



**Figure 18: Contact patch**

- 6- If the contact patch is less than 8”:
- Raise the hi-rail to the stowed position.
  - Place a jack under the axle as close to the center of the axle as possible to support the hi-rail adequately as the height is adjusted.
  - Loosen the four (4) bolts at the rear of the hi-rail, connected to the frame and the four (4) bolts between the hi-rail and mounting plates, through height shims.
  - Start by removing the height shims from both sides equally.
  - Store the removed shims to the top of the mounting bracket to conserve bolt length.

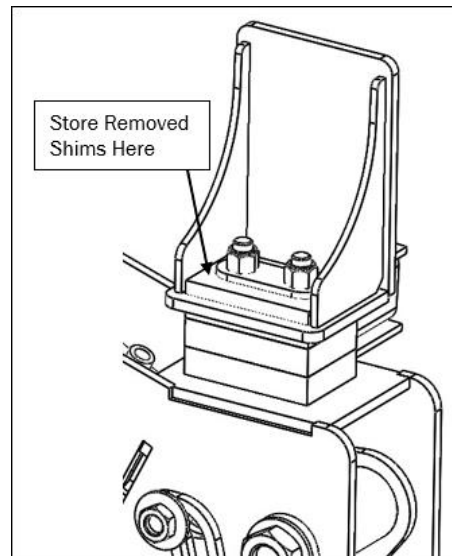


Figure 19: Shim storage

- Lift the hi-rail until the remaining height shims touch the mounting brackets.
  - Tighten the mounting hardware at the front and rear of the hi-rail.
  - Measure contact patch again, adjust as required.
- 7- Torque all bolts to the correct specs using the table below.

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

Figure 20: Bolt torque specifications

## 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:

- Ensure the units raise and lower easily, and that hydraulic hoses are all of adequate length and that hydraulic fittings have adequate clearance.
- 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.
- 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.
- Verify that there is 2" to 3" of clearance between the front tires and the rail head.
- Verify that there is an 8" to 10" contact patch on the rearmost tires with the rail, with the vehicle empty. (This dimension will increase with a loaded vehicle).
- Ensure the vehicle tracks properly down the track, and that there is no excessive flanging of the hi-rail wheels.
- 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 once the wheel pressure is set, the alignment performed and with the vehicle track tested:

### 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.

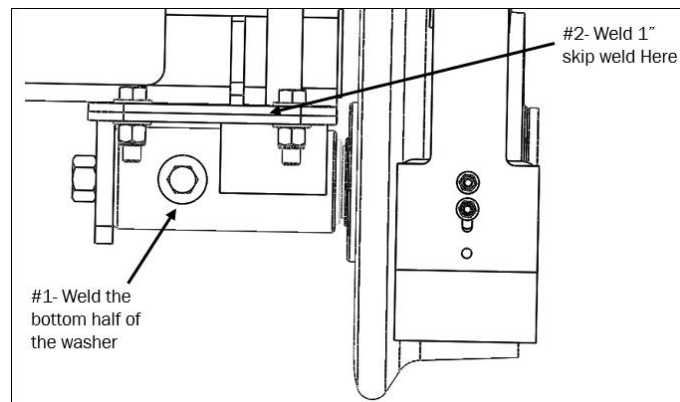
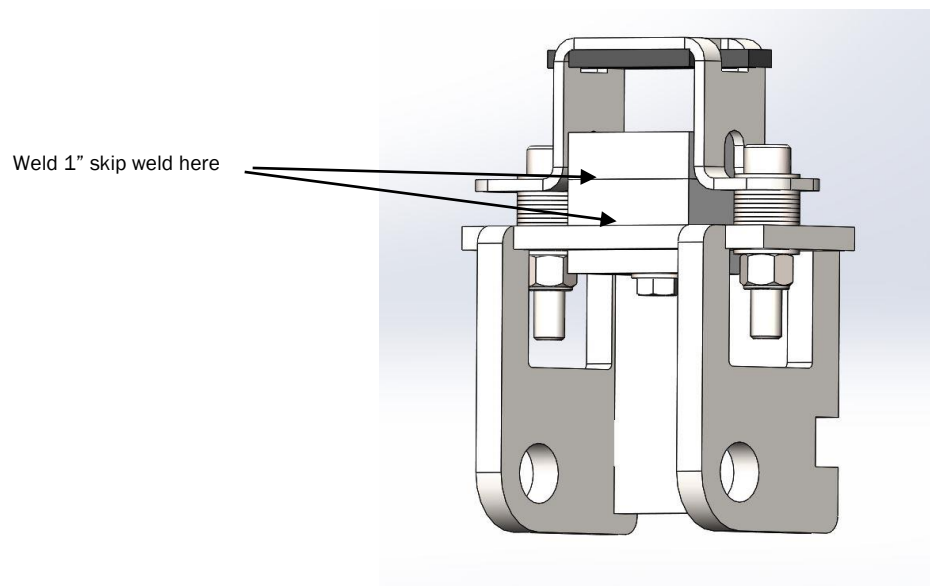


Figure 21: Spindle housing welds

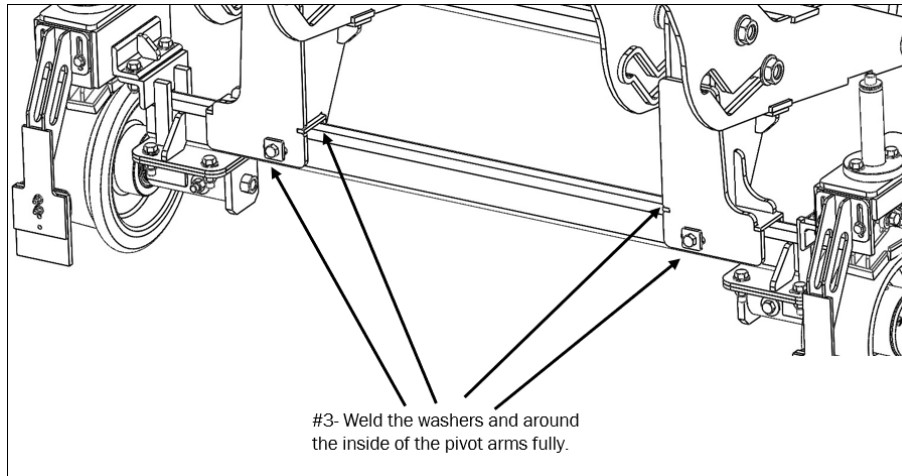
### WELD SPRING HANGER SPACER BLOCKS

Tack weld (about 1") across each spacer block joint and between the bottom of the spacer blocks to the top plate to lock the spacers in place.



**CV-20 FRONT AXLE SIDE TO SIDE**

The Square washers that hold the cross bolts for the axle on the front should be fully welded and the inside of both pivot arms should be welded fully.



**Figure 22: CV-20 front axle welds**

## CV-20 FRONT CROSS TUBES TO FRAME EXTENSIONS

Each cross tube should be fully weld all the way around to the frame extensions on both the drivers and passenger side.

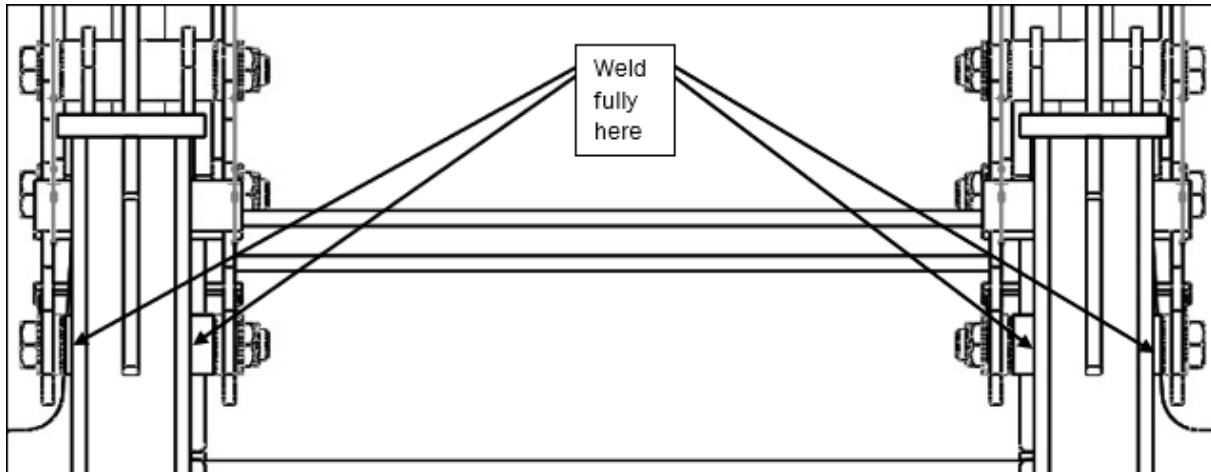


Figure 23: CV-20 Front mount welds

## SC-20G REAR AXLE SIDE TO SIDE

The Square washers that hold the cross bolts for the axle on the rear should be fully welded and 3- 1" skip welds along the bottom of the axle.

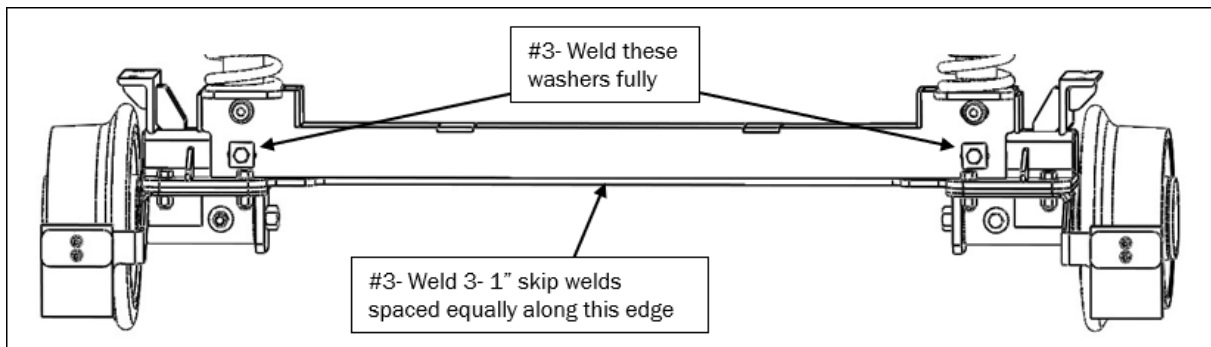


Figure 24: SC-20G rear axle welds



## SC-20G REAR SHIMS

All the shims on the rear rail gear should be welded together with a small 1" skip weld on the outward facing side. Do not fully weld these shims because they may need to be removed later if the load on the chassis changes. Weld both the passenger and drivers side shims.

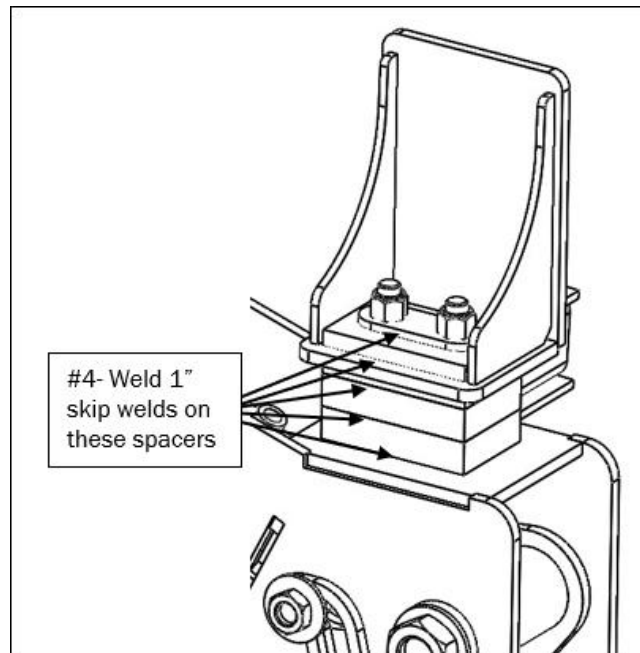


Figure 25: SC-20G rear spacer welds

## SC-20G REAR RAIL GEAR BOLTS

Weld the steel washer that goes over the slot on the rear of this rail gear. This will keep the rail gear from slipping down while traveling down the highway

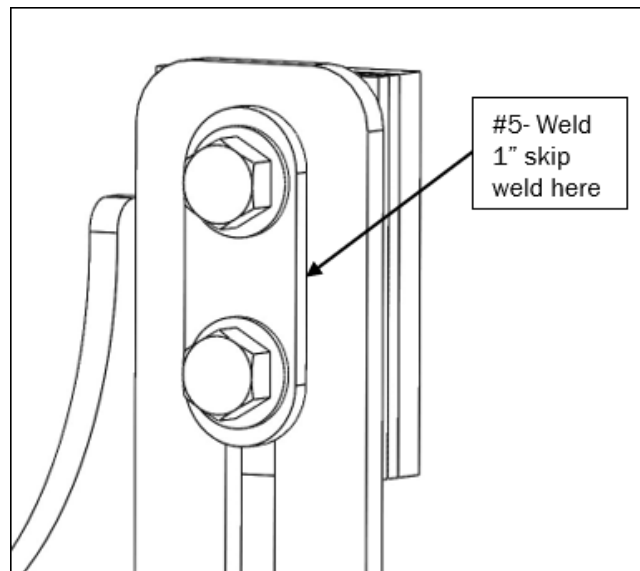


Figure 26: SC-20 rear mount welds

## 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

Position the vehicle so that the rear hi-rail wheels are directly over the track and aligned with the track rails.

Turn on PTO / pump or turn on the dash mounted switch to activate power pack.

Actuate the rear hydraulic valve or push button remote to lower the rear hi-rail unit.

**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.

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.

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

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.

Turn on PTO / pump or turn on the dash mounted switch to activate power pack.

Actuate the front hydraulic valve or push button remote 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.

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.

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.

After the vehicle has been placed on track, position the steering wheel so that the wheels are pointed straight ahead.

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 20 Series 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 a 20 Series 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 !**

PARTS
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**FRONT CV-20 UNIT (HYDRAULIC BRAKES)**

CV-20 FRONT COMPONENTS (HYDRAULIC BRAKES)		
PART NUMBER	DESCRIPTION	QTY
D005CV00	CV-20 FRONT AXLE	1
D015CVD0	DRIVER SIDE LEG ASSY	1
D015CVP0	PASSENGER SIDE LEG ASSY	1
E002L000	10" WHEEL ASSEMBLY H-12B & G-20	2
F071A110	SHIM PLATE 1"	6
F071A114	RUBBER PROTECTION	2
F071A130	SHIM PLATE 1/2"	4
F071A152	SPACER	4
F075CV20	HIRAIL MOUNTING BRACKET	2
F105CV00	CV-20 FRONT CAM ASSY	1
G089SW04	WIDE SQUARE WASHER 1/2"	4
H027AD00	G-35 HYDRAULIC CYLINDER DRIVER SIDE (BU3508)	1
H027AP00	G-35 HYDRAULIC CYLINDER PASSENGER SIDE (BU3508)	1
H075AFD0	HYDRAULIC BRAKE ASS'Y 10" WHEEL DRIVER'S SIDE	1
H075AFP0	HYDRAULIC BRAKE ASS'Y 10" WHEEL PASSENGER'S SIDE	1
P005A020	1-1/4" PIN X 6.625" ASS'Y	6
P008E030	1-1/4" PIN X 7.125" ASS'Y	2
R005CA00	UNIVERSAL REAILSWEPT BRKT 10"	2
	3/8" UNC GR.8 BOLT X 1.500" LONG	4
	3/8" REGULAR FLAT WASHER	8
	3/8" UNC GR.8 NYLON INSERT LOCKNUT	4
	1/2" UNC GR.8 BOLT X 1.750" LONG	12
	1/2" REGULAR FLAT WASHER	24
	1/2" UNC GR.8 NYLON INSERT LOCKNUT	14
	1/2" UNC GR.8 BOLT X 4.250" LONG	2
	3/4" REGULAR FLAT WASHER	2
	3/4" UNC GR.8 LIGHT NYLON INSERT LOCKNUT	2
	1" REGULAR FLAT WASHER	6
	1" UNC GR.8 LIGHT NYLON INSERT LOCKNUT	6
	3/4" UNC HEX JAM NUT	4
	3/4" UNC GR.8 NYLON INSERT LOCKNUT	4

## REAR SC-20G UNIT

SC-20G REAR COMPONENTS		
PART NUMBER	DESCRIPTION	QTY
B005M000	INNER TUBE ASS'Y	2
D005M300	AXLE ASSEMBLY NO BRAKES	1
D005M250	OUTER SLIDING AXLE	1
E002L000	10" WHEEL ASSEMBLY H-12B & G-20	2
F005M000	GUIDE TUBE ASSEMBLY	2
F105MD20	DRIVER SIDE CAM	1
F105MP20	PASSENGER SIDE CAM ASSEMBLY	1
G089SW04	WIDE SQUARE WASHER 1/2"	4
H025A300	3" HYDRAULIC CYLINDER x 6" STROKE	2
P005M010	1" PIN x 6.500" LONG ASS'Y	2
P005M020	1-3/4" PIN x 6.500" ASS'Y	2
P005M040	AXLE PIN	2
R005MD10	DRIVER SIDE RAILSWEPT ASSY	1
R005MP10	PASSENGER SIDE RAILSWEPT ASSY	1
V005M001	COIL SPRING	2
V015A001	WEAR RING W2-2500-0750	4
	3/8" UNC GR.8 BOLT x 1.500" LONG	2
	3/8" REGULAR FLAT WASHER	4
	3/8" UNC GR.8 NYLON INSERT LOCKNUT	2
	1/2" UNC GR.8 BOLT x 1.750" LONG	8
	1/2" UNC GR.8 BOLT x 4.500" LONG	2
	1/2" REGULAR FLAT WASHER	16
	1/2" UNC GR.8 NYLON INSERT LOCKNUT	10
	5/8" REGULAR FLAT WASHER	2
	5/8"-11 FLANGE NYLON LOCKNUT	2
	SHOULDER BOLT Ø 3/4" x 3.5" LONG - 5/8"-11	2
	3/4" UNC GR.8 LIGHT NYLON INSERT LOCKNUT	2
	3/4" WIDE FLAT WASHER	2
	1-1/4" REGULAR FLAT WASHER	2
	1-1/4" UNC GR.8 LIGHT NYLON INSERT LOCKNUT	2

## 20 SERIES WHEEL ASSEMBLIES

20 SERIES WHEEL ASSEMBLIES		
PART NUMBER	DESCRIPTION	QTY
E005B001	10" FORGED WHEEL	1
E022A001	8" WHEEL SPINDLE	1
E032A001	Timken LM104949 CONE	2
E032A002	Timken LM104911 CUP	2
E042A001	SPINDLE INSULATOR	1
E042A002	INSULATING TUBE	1
E062A001	SPINDLE CASTLE NUT (8" AND 10" S-B)	1
E062A002	(LP) G-12 G-20 WHEEL WASHER	1
E067A005	3/16" COTTER PIN 1.500"	1
E085B000	SPINDLE HOUSING	1
E112A001	National 471271 GREASE SEAL (8" & 10"SB WHEELS)	1
E122A001	HUB CAP 8"- 10"	1
E172A001	HUB CAP GASKET 8"	1
ZQ88	1/8 NPT GREASE FITTING	1
	1/2" UNC GR.8 BOLT x 4.000" LONG	1
	1/2" WIDE FLAT WASHER	2
	1/2" UNC GR.8 NYLON INSERT LOCKNUT	1
	1/4" UNF COUNTERSINK SCREW	3

## CV-20 BRAKE BOX COMPONENTS

CV-20 BRAKE BOX COMPONENTS		
PART NUMBER	DESCRIPTION	QTY
H067AFD0	BRAKE HOUSING 12" WHEEL (DRIVER)	1
H067AFP0	BRAKE HOUSING 12" WHEEL (PASSENGER)	1
H18A0702	SPACER	4
H18B0402	YOKE	2
H025A000	1" HYDRAULIC BRAKE CYLINDER x 1.7" STROKE	2
H186E001	(LP) LINKAGE	4
	1/2" UNC GR. 8 BOLT x 3.500" LONG	6
	1/2" UNC GR. 8 BOLT x 2.250" LONG	4
	1/2" FLAT WASHER	24
	1/2" UNC HEX JAM NUT	10
	1/2" UNC GR. 8 NYLON INSERT LOCKNUT	2
H088A000	14" WHEEL BRAKE SHOE	2

**CV-20 FRONT MOUNTING COMPONENTS**

CV-20 FRONT MOUNTING COMPONENTS		
PART NUMBER	DESCRIPTION	QTY
F075CV10	FRONT PIVOT MOUNT	2
G015CV00	EXTENSION ASSY	2

**SC-20G REAR MOUNTING COMPONENTS**

SC-20G REAR MOUNTING COMPONENTS		
PART NUMBER	DESCRIPTION	QTY
G005MU00	DS. AND PS. FRONT MOUNT	2
G005M002	1/4" SHIM	
G005M003	1/2" SHIM	
G005M004	1" SHIM	
G005M005	PLATE WASHER	4

## 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 always 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.

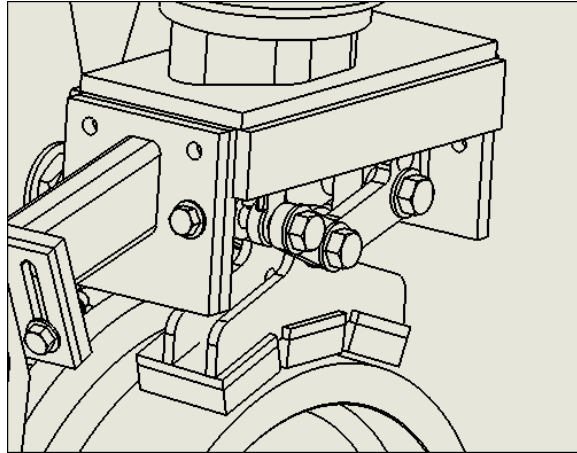


Figure 27: Brake shoe orientation

## GREASE POINTS

All bushings and pivoting pins feature grease fittings. Pins travelling through slots must have grease applied to them manually.

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.

## 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.

<b>CANADA + US</b>
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.

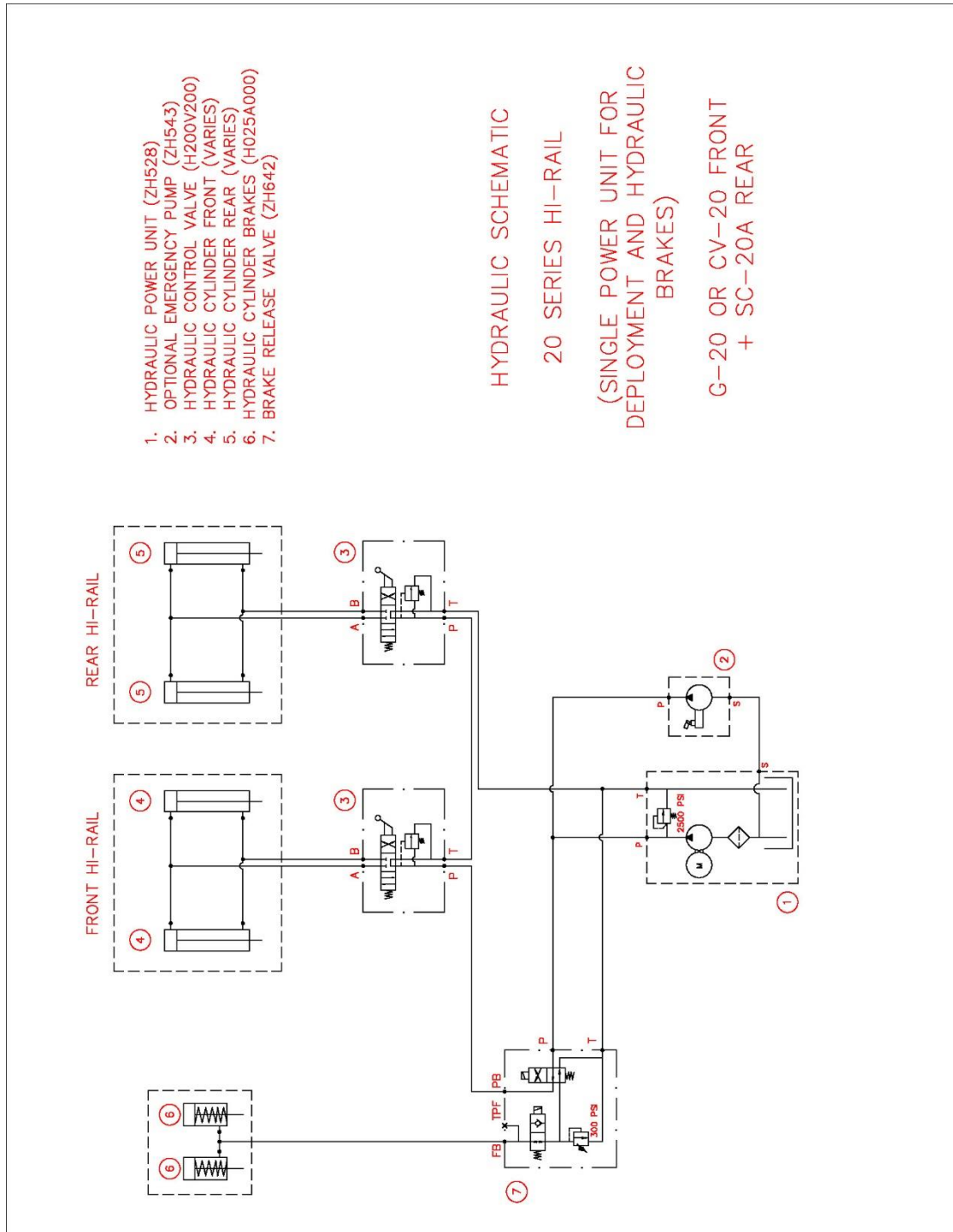
APPENDIX 1
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### BOLT TORQUE TABLE

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

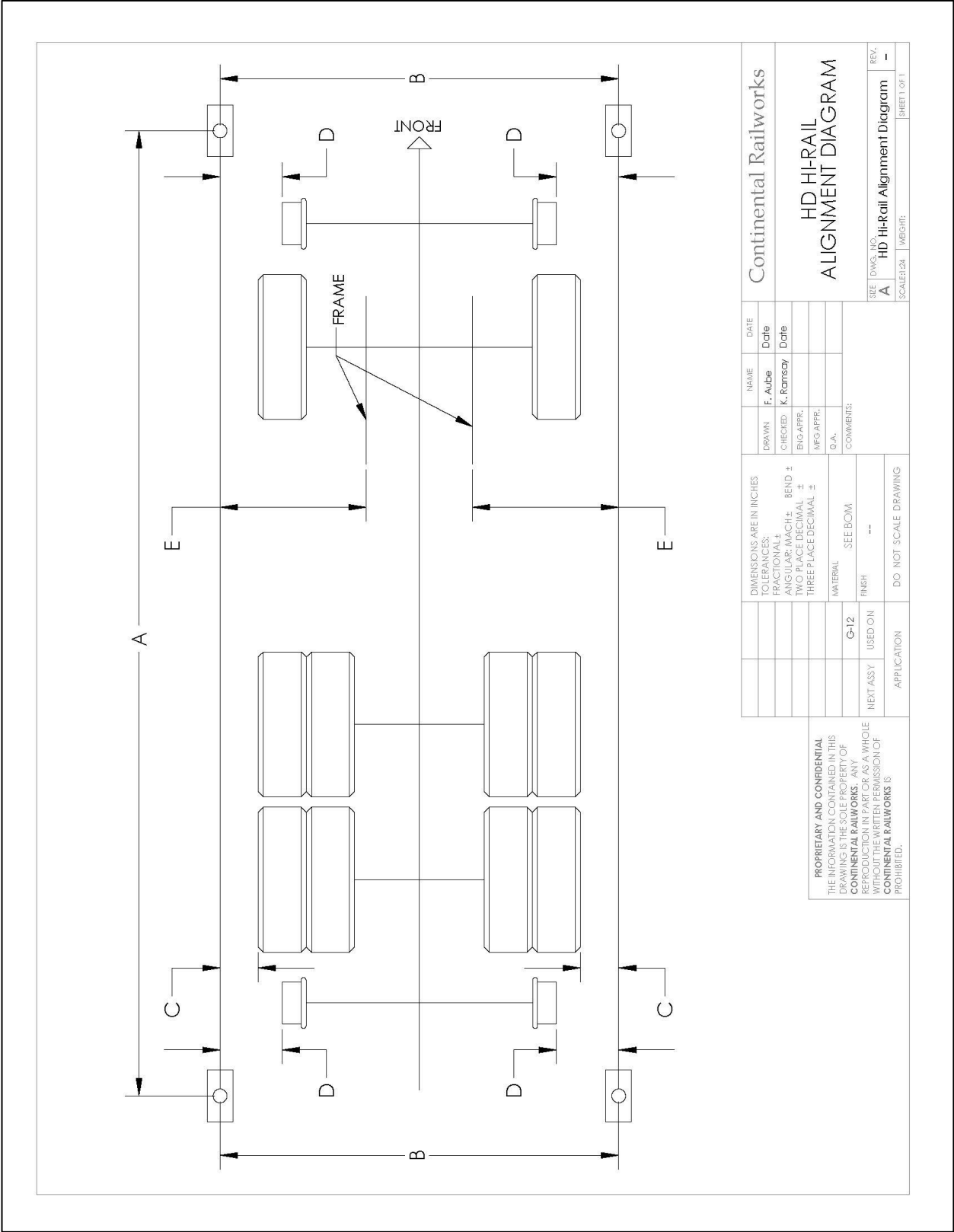


HYDRAULIC BRAKES  
POWER UNIT DEPLOYMENT  
POWER UNIT FOR BRAKES  
(SINGLE PUMP)



APPENDIX 3

ALIGNMENT DIAGRAM



# APPENDIX 4

## ALIGNMENT AND PRESSURE DATA FORM



Continental Railworks  
7380 rue Vérité  
St-Laurent, QC H4S 1C5

Tel : 514-956-8081  
Fax : 514-956-0737

### ALIGNMENT AND PRESSURE DATA FORM

<b>Customer:</b> _____	<b>License:</b> _____
<b>Vehicle Number:</b> _____	<b>Mileage:</b> _____
<b>VIN:</b> _____	<b>Date:</b> _____
<b>Hi-Rail Manufacturer:</b> _____	
<b>Hi-Rail Model Front:</b> _____	<b>Year:</b> _____
<b>Hi-Rail Model Rear:</b> _____	<b>Year:</b> _____
	<b>Serial:</b> _____
	<b>Serial:</b> _____

#### DRIVER FRONT

STRING TO RAIL WHEEL _____ (in)	<b>HI-RAIL WHEEL</b>	INSIDE TO INSIDE _____ (in)
STRING TO RAIL WHEEL _____ (in)		
WEIGHT or PRELOAD _____ (lbs or in)		< DEPLOYED > (LD HI-RAIL)
TIRE CLEARANCE _____ (in)		< DEPLOYED > (HD HI-RAIL)
WHEEL CLEARANCE _____ (in)		< RETRACTED > (LD / HD HI-RAIL)
TIRE PRESSURE _____ (psi)		< VEHICLE > (LD / HD HI-RAIL)

#### PASSENGER FRONT

STRING TO RAIL WHEEL _____ (in)	<b>HI-RAIL WHEEL</b>	STRING TO RAIL WHEEL _____ (in)
STRING TO RAIL WHEEL _____ (in)		
WEIGHT or PRELOAD _____ (lbs or in)		< DEPLOYED > (LD HI-RAIL)
TIRE CLEARANCE _____ (in)		< DEPLOYED > (HD HI-RAIL)
WHEEL CLEARANCE _____ (in)		< RETRACTED > (LD / HD HI-RAIL)
TIRE PRESSURE _____ (psi)		< VEHICLE > (LD / HD HI-RAIL)

#### NOTES

#### DRIVER REAR

STRING TO RAIL WHEEL _____ (in)	<b>HI-RAIL WHEEL</b>	INSIDE TO INSIDE _____ (in)
STRING TO RAIL WHEEL _____ (in)		
WEIGHT or PRELOAD _____ (lbs or in)		< DEPLOYED > (LD HI-RAIL)
CONTACT PATCH _____ (lbs)		< DEPLOYED > (HD HI-RAIL)
WHEEL CLEARANCE _____ (in)		< RETRACTED > (LD / HD HI-RAIL)
TIRE PRESSURE _____ (psi)		< VEHICLE > (LD / HD HI-RAIL)

#### PASSENGER REAR

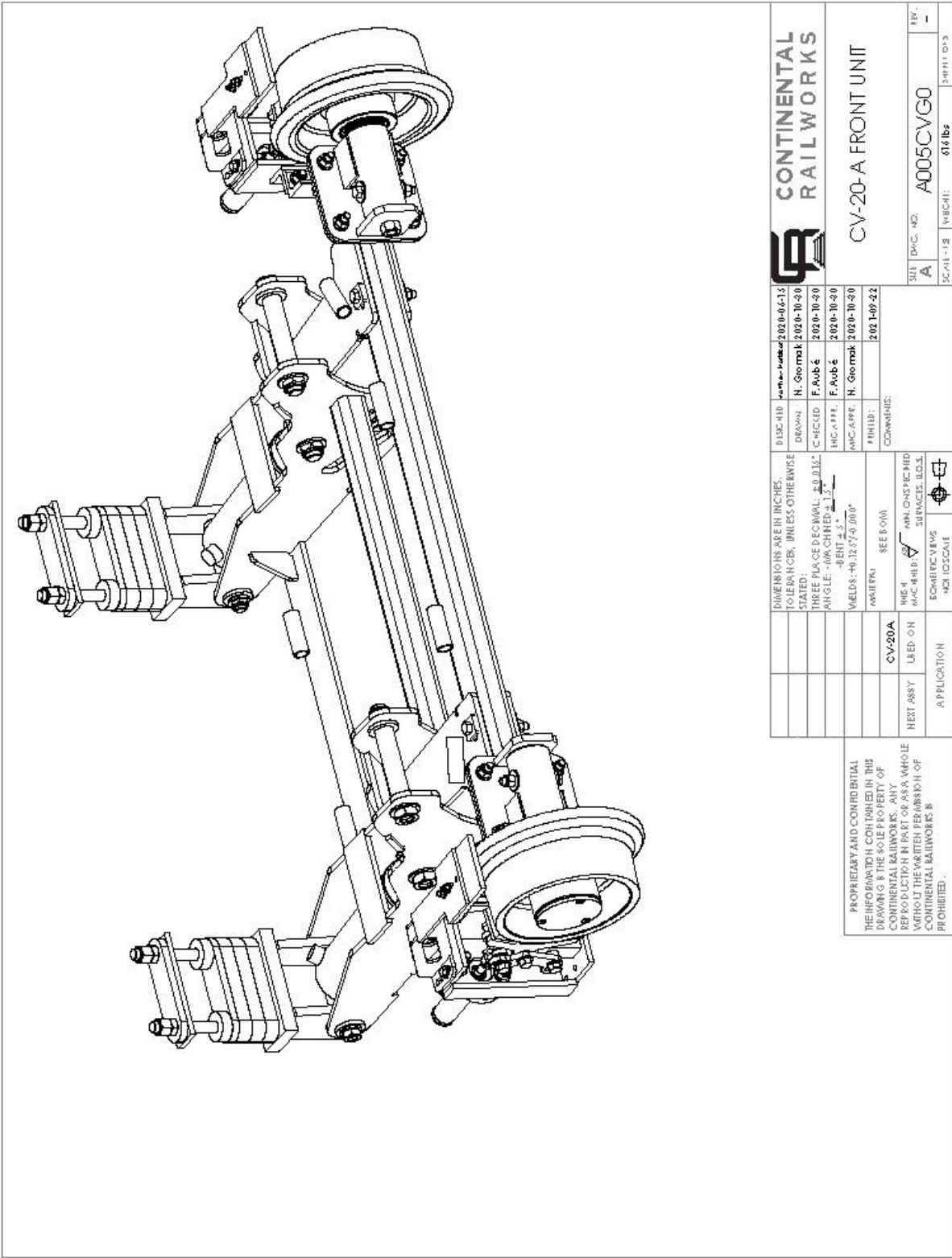
STRING TO RAIL WHEEL _____ (in)	<b>HI-RAIL WHEEL</b>	STRING TO RAIL WHEEL _____ (in)
STRING TO RAIL WHEEL _____ (in)		
WEIGHT or PRELOAD _____ (lbs or in)		< DEPLOYED > (LD HI-RAIL)
CONTACT PATCH _____ (lbs)		< DEPLOYED > (HD HI-RAIL)
WHEEL CLEARANCE _____ (in)		< RETRACTED > (LD / HD HI-RAIL)
TIRE PRESSURE _____ (psi)		< VEHICLE > (LD / HD HI-RAIL)

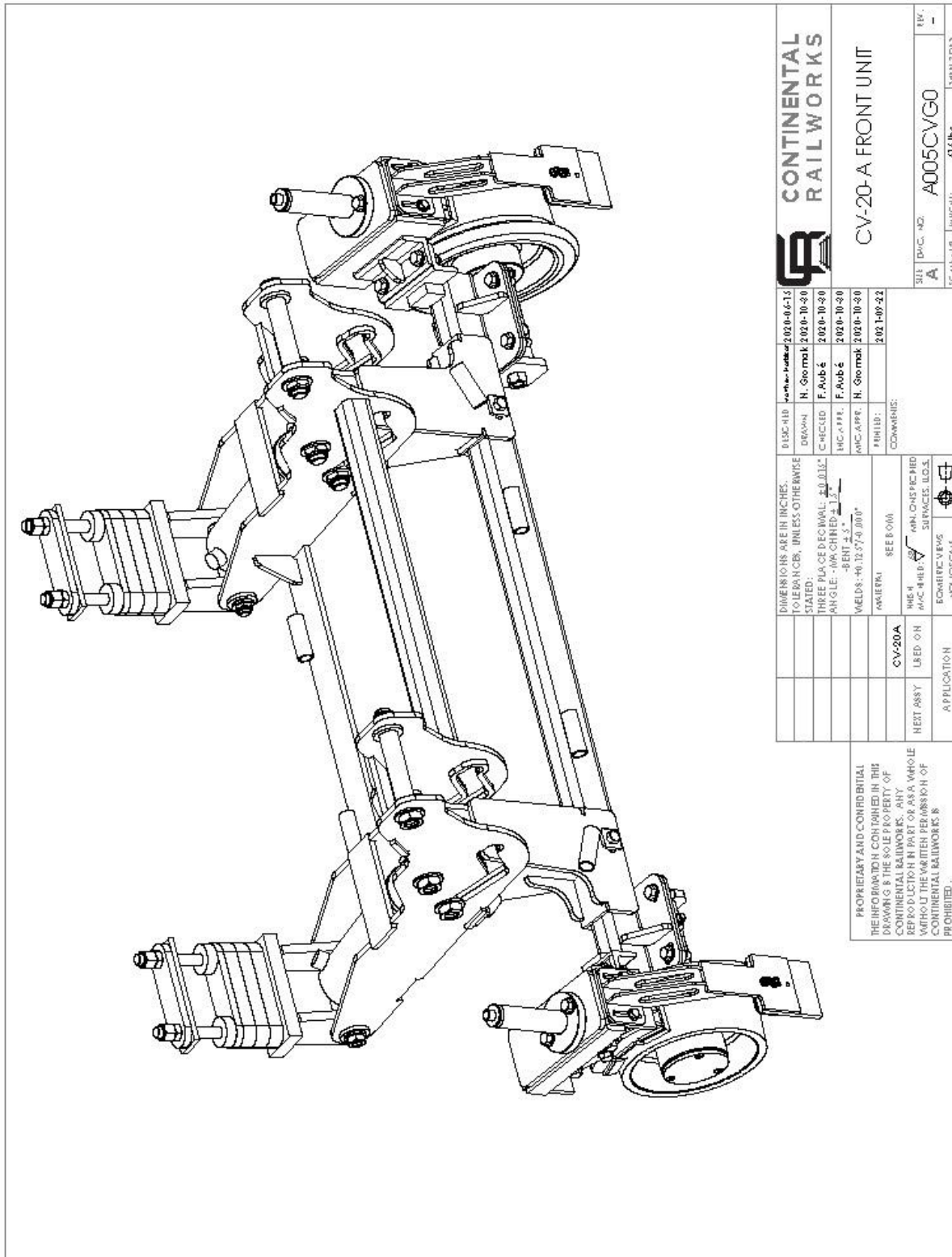


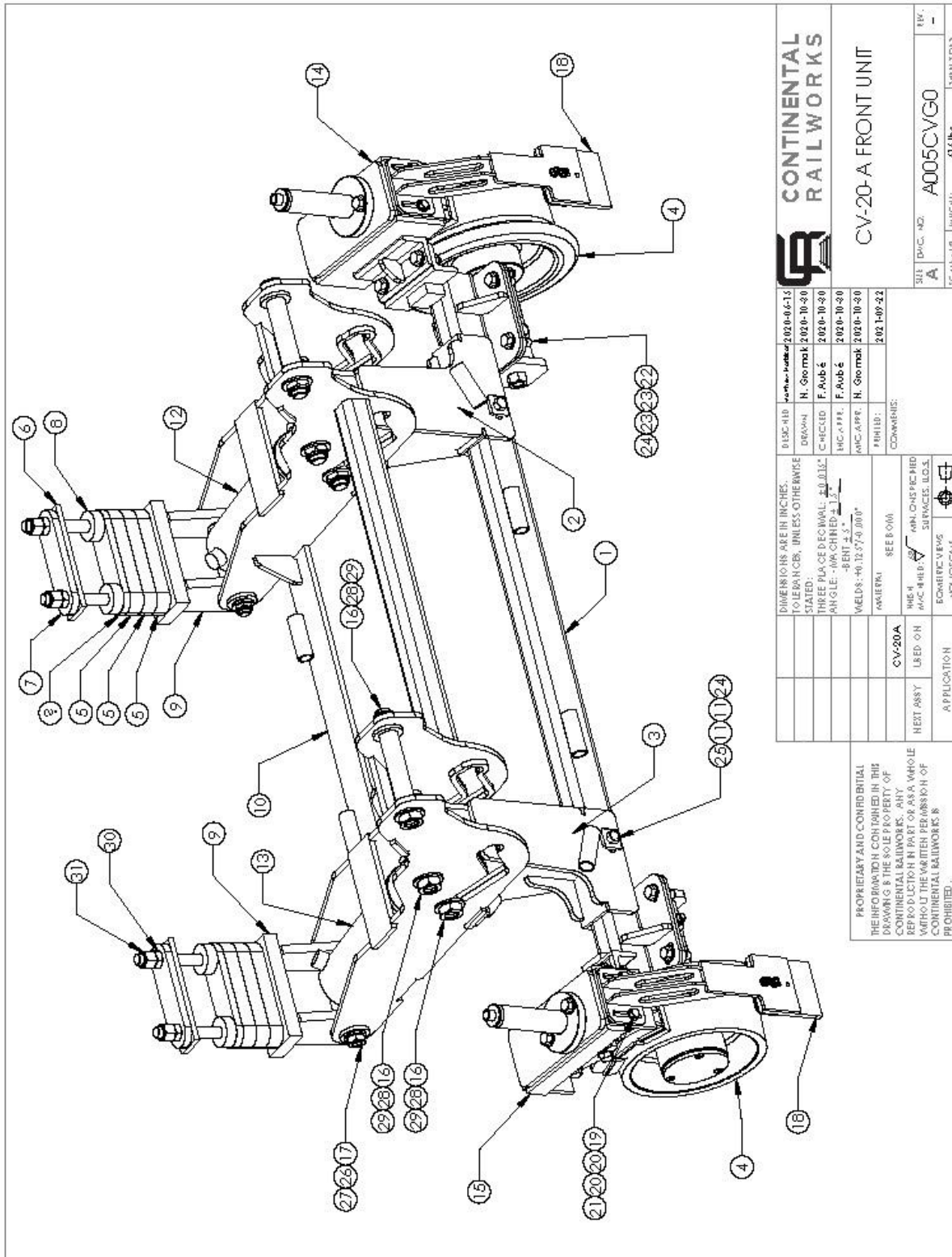
## APPENDIX 5

### FRONT CV-20 DRAWINGS (HYDRAULIC BRAKES)

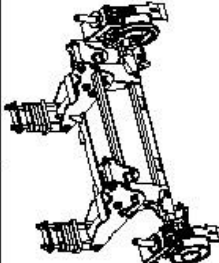
**NOTE** – Some components may differ slightly from drawings shown.







ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	D005CV00	CV-20 FRONT AXLE	1
2	D015CVD0	DRIVER SIDE LEG ASSY	1
3	D015CVP0	PASSENGER SIDE LEG ASSY	1
4	E002L000	10" WHEEL ASSEMBLY H-12B & G-20	2
5	F071A110	SHIM PLATE 1"	6
6	F071A114	RUBBER PROTECTION	2
7	F071A130	SHIM PLATE 1 1/2"	4
8	F071A152	SPACER	4
9	F075CV20	HIRAIL MOUNTING BRACKET	2
10	F105CV00	CV-20 FRONT CAM ASSY	1
11	G089SW04	WIDE SQUARE WASHER 1 1/2"	4
12	H027AD00	G-35 HYDRAULIC CYLINDER DRIVER SIDE (BU3508)	1
13	H027AP00	G-35 HYDRAULIC CYLINDER PASSENGER SIDE (BU3508)	1
14	H075AFD0	HYDRAULIC BRAKE ASSY 10" WHEEL DRIVER'S SIDE	1
15	H075AFP0	HYDRAULIC BRAKE ASSY 10" WHEEL PASSENGER'S SIDE	1
16	P005A020	1-1/4" PIN X 6.625" ASS'Y	6
17	P008E030	1-1/4" PIN X 7.125" ASS'Y	2
18	R005CA00	UNIVERSAL RAILSWEPT BRKT 10"	2
19		3/8" UNC GR.8 BOLT X 1.500" LONG	4
20		3/8" REGULAR FLAT WASHER	8
21		3/8" UNC GR.8 NYLON INSERT LOCKNUT	4
22		1/2" UNC GR.8 BOLT X 1.750" LONG	12
23		1/2" REGULAR FLAT WASHER	24
24		1/2" UNC GR.8 NYLON INSERT LOCKNUT	14
25		1/2" UNC GR.8 BOLT X 4.250" LONG	2
26		3/4" REGULAR FLAT WASHER	2
27		3/4" UNC GR.8 LIGHT NYLON INSERT LOCKNUT	2
28		1" REGULAR FLAT WASHER	6
29		1" UNC GR.8 LIGHT NYLON INSERT LOCKNUT	6
30		3/4" UNC HEX JAM NUT	4
31		3/4" UNC GR.8 NYLON INSERT LOCKNUT	4

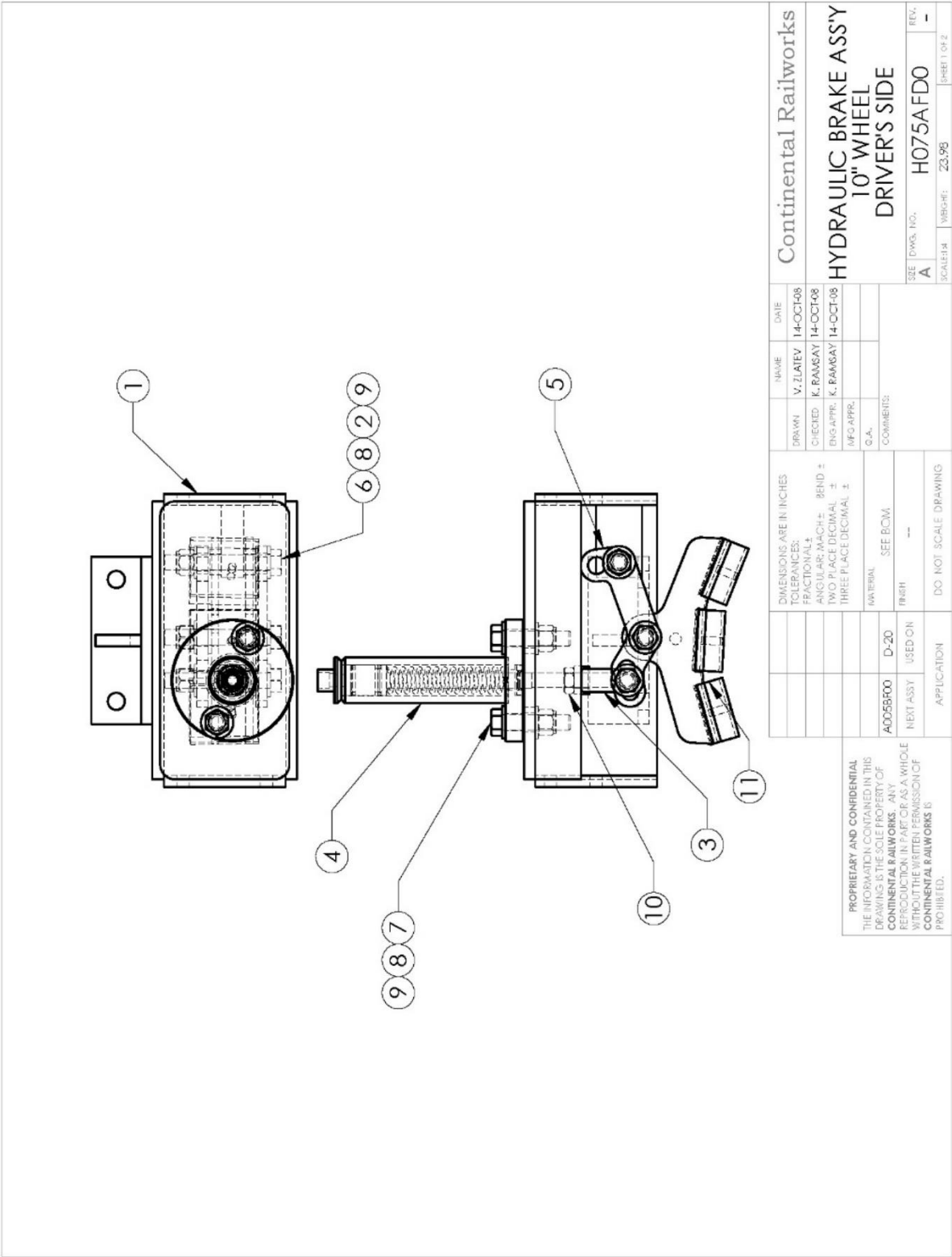


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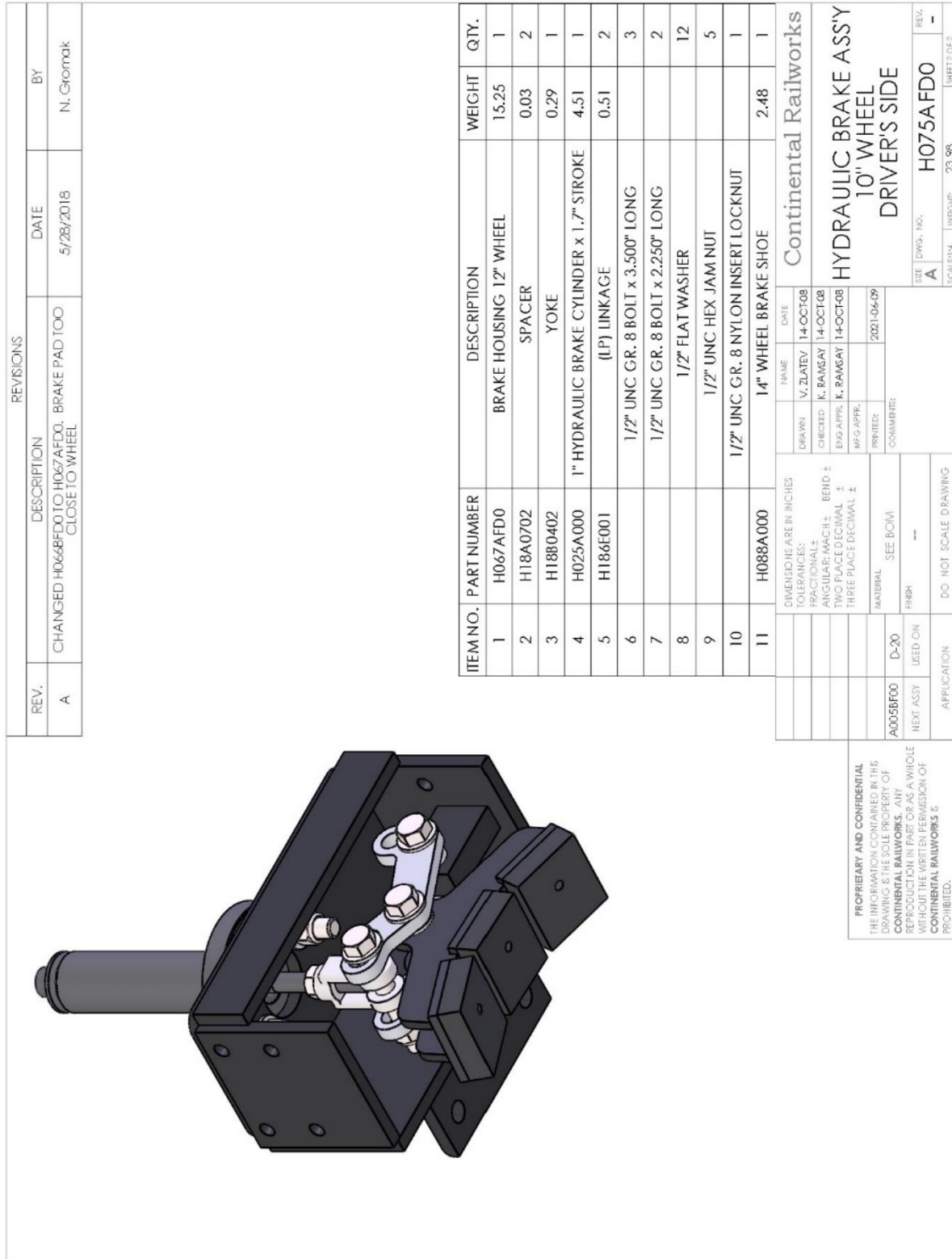
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RAILWORKS

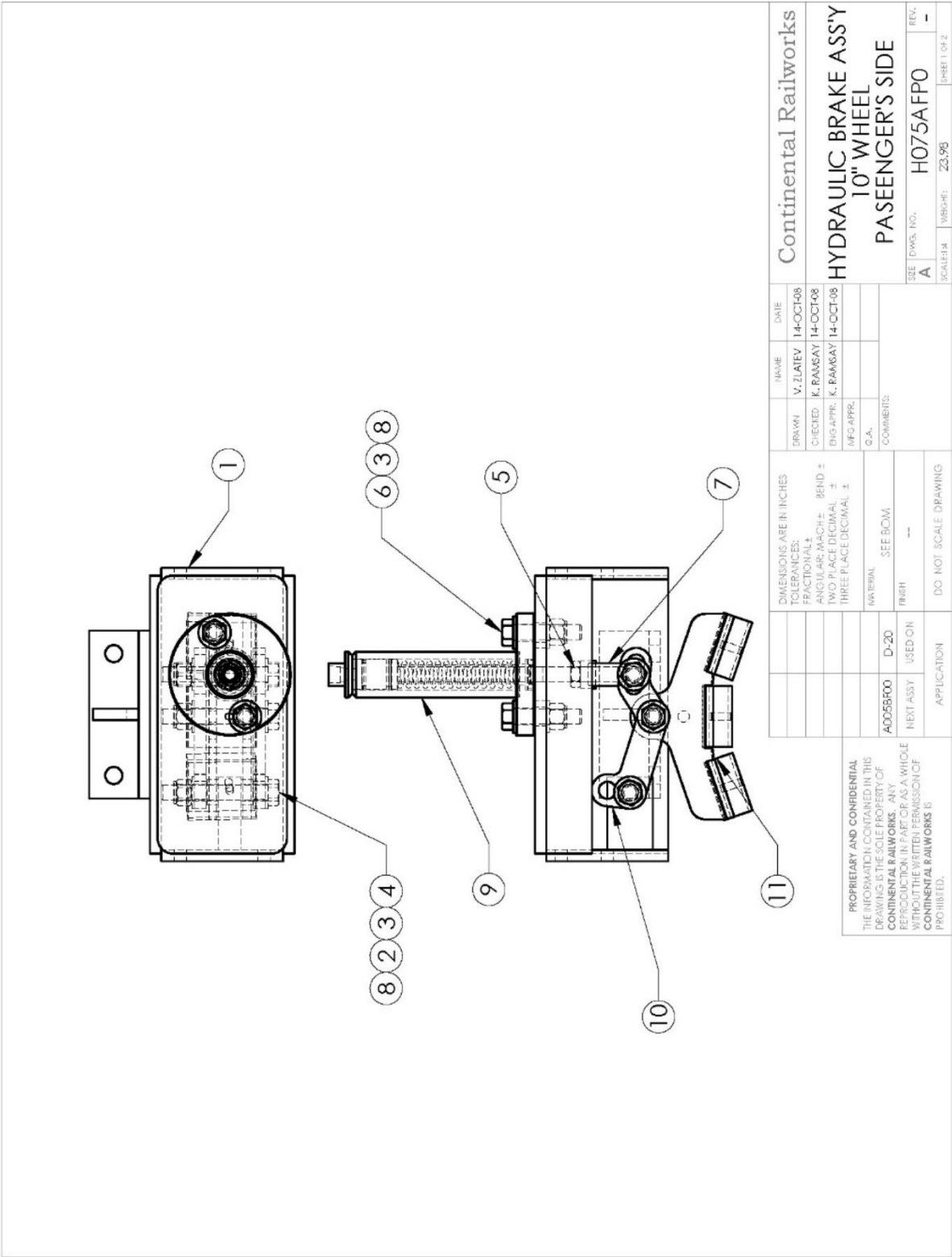
CV-20-A FRONT UNIT

311 Dwg. No. **A005CVG0** REV. **-**  
SCALE: 1/32"=1" WEIGHT: 616 lbs. 3/21/2023



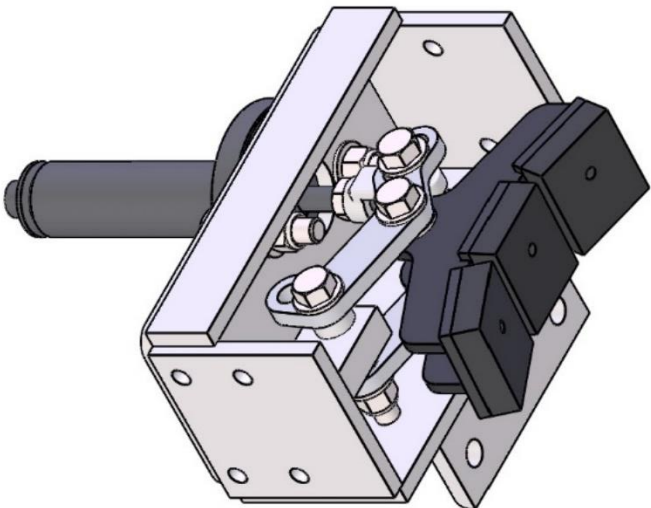








REVISIONS			
REV.	DESCRIPTION	DATE	BY
A	CHANGED H066BFPO TO H067AFPO. BRAKE TOO CLOSE TO WHEEL.	5/28/2018	N. Gromak



ITEM NO.	PART NUMBER	DESCRIPTION	WEIGHT	QTY.
1	H067AFPO	BRAKE HOUSING 12" WHEEL	15.25	1
2	H18A0702	SPACER	0.03	2
3		1/2" FLAT WASHER		12
4		1/2" UNC. GR. 8 BOLT x 3.500" LONG		3
5		1/2" UNF HEX JAM NUT		1
6		1/2" UNC GR. 8 BOLT x 2.250" LONG		2
7	H18B0402	YOKE	0.29	1
8		1/2" UNF HEX JAM NUT		5
9	H025A000	1" HYDRAULIC BRAKE CYLINDER x 1.7" STROKE	4.50	1
10	H186E001	(LP) LINKAGE	0.51	2
11	H088A000	14" WHEEL BRAKE SHOE	2.48	1

DIMENSIONS ARE IN INCHES		DATE	Continental Railworks	
TOLERANCES:	DRAWN	V. ZLATEV	14-OCT-08	
FRACTIONAL ±	CHECKED	K. RANSAY	14-OCT-08	
ANGULAR/MACH ±	ENG APPR.	K. RANSAY	14-OCT-08	
TWO PLACE DECIMAL ±	MF-G APPR.			
THREE PLACE DECIMAL ±	PRINTED		2021-04-09	
	MATERIAL		COMMENTS	
	SEE BOM			
	FINISH	---		
APPLICATION	DO NOT SCALE DRAWING			

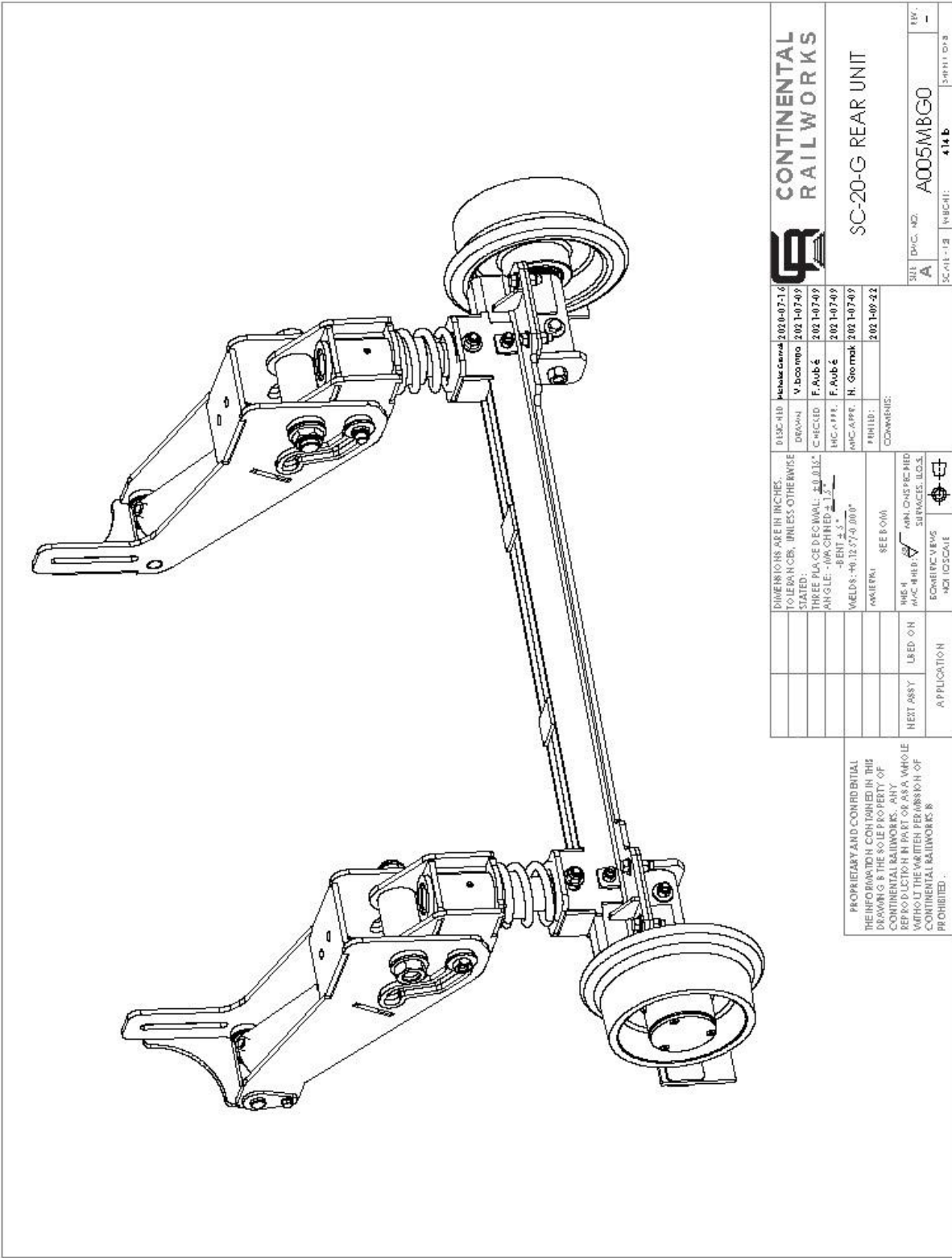
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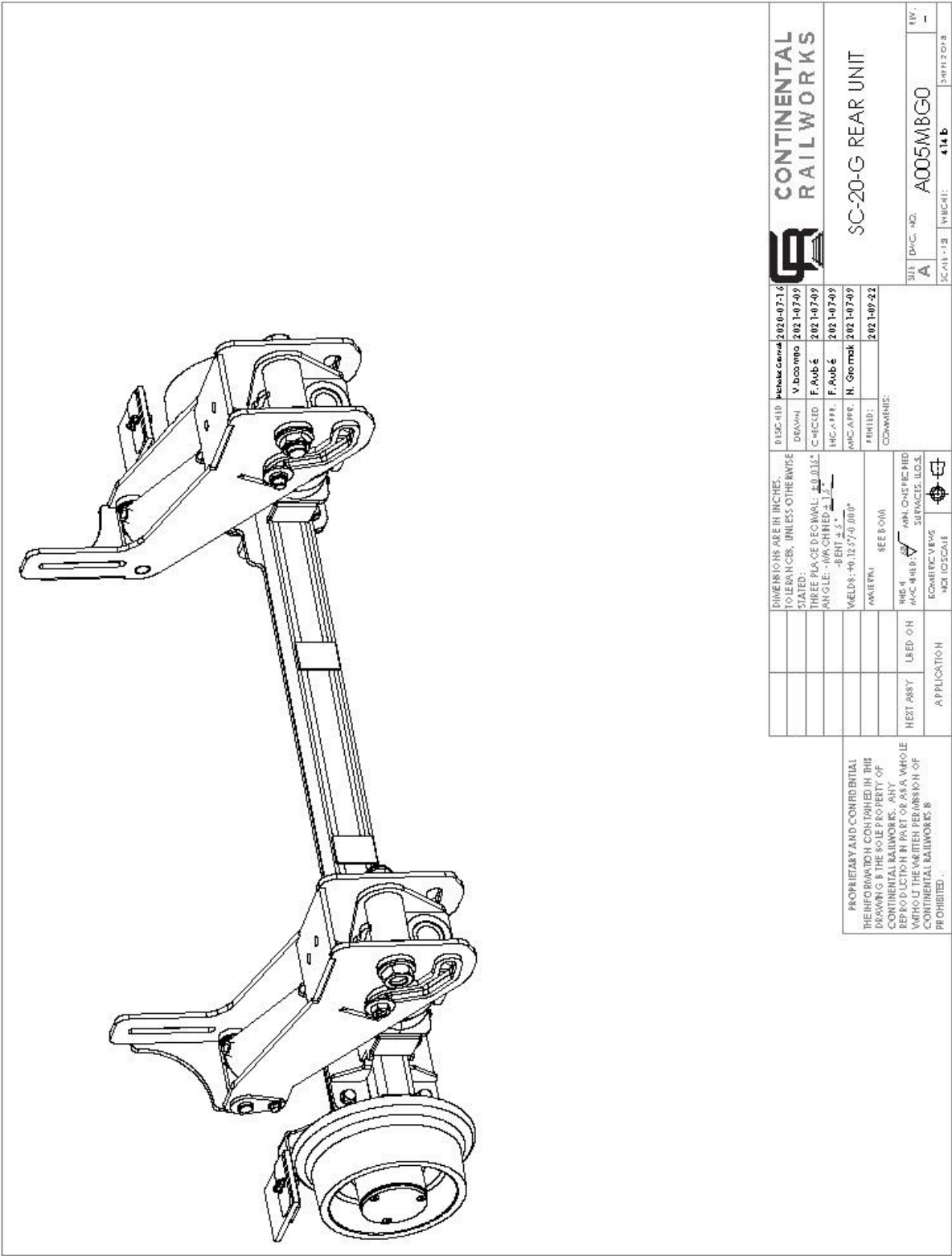
A005BF00	D-20	USED ON	
NEXT ASSY			
HYDRAULIC BRAKE ASSY 10" WHEEL PASSENGER'S SIDE			
SIZE	DWG. NO.	WEIGHT	REV.
A	H075AFPO	23.98	-
SCALE 1:18		SHEET 2 OF 2	

## APPENDIX 6

### REAR SC-20G DRAWINGS

**NOTE** – Some components may differ slightly from drawings shown.

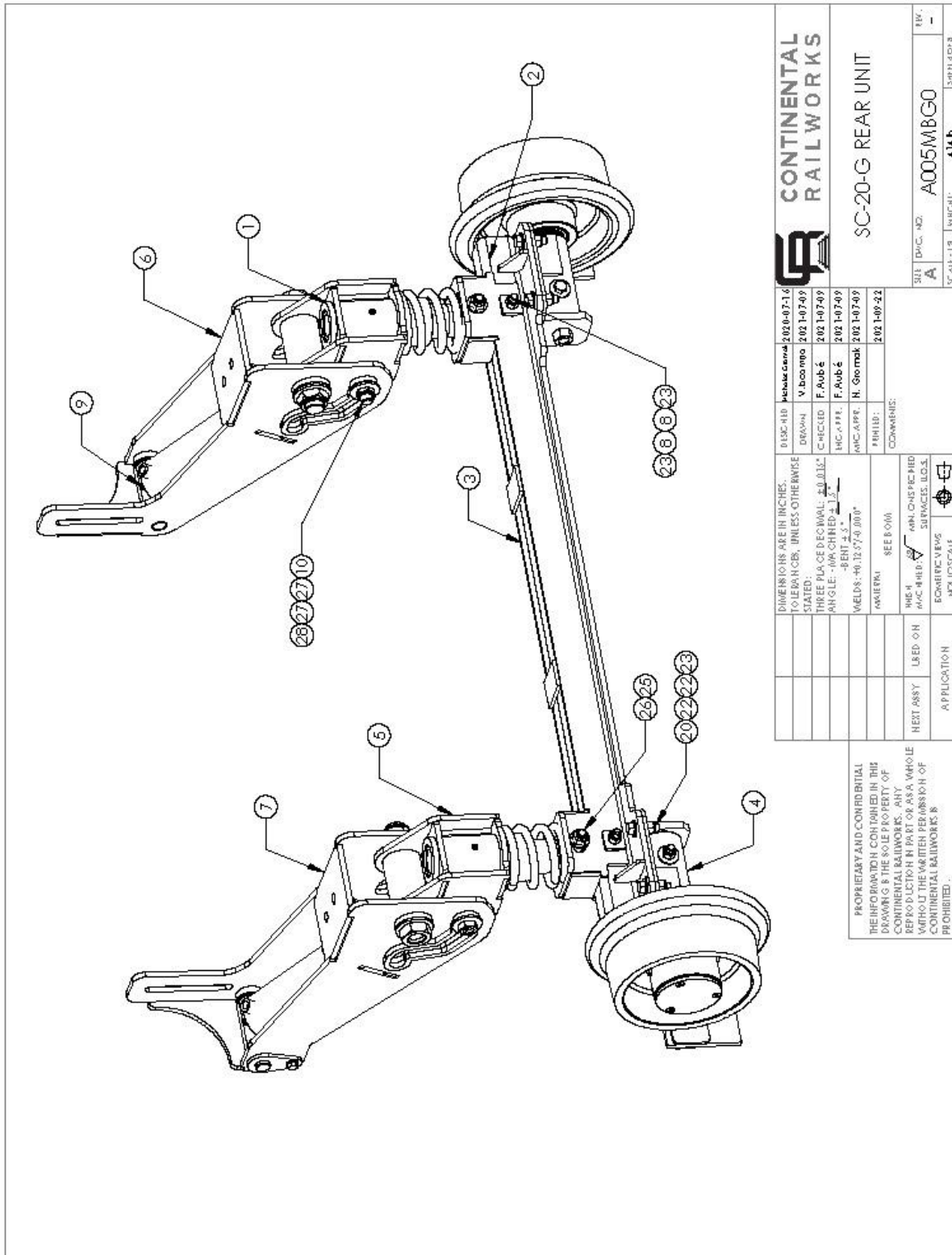




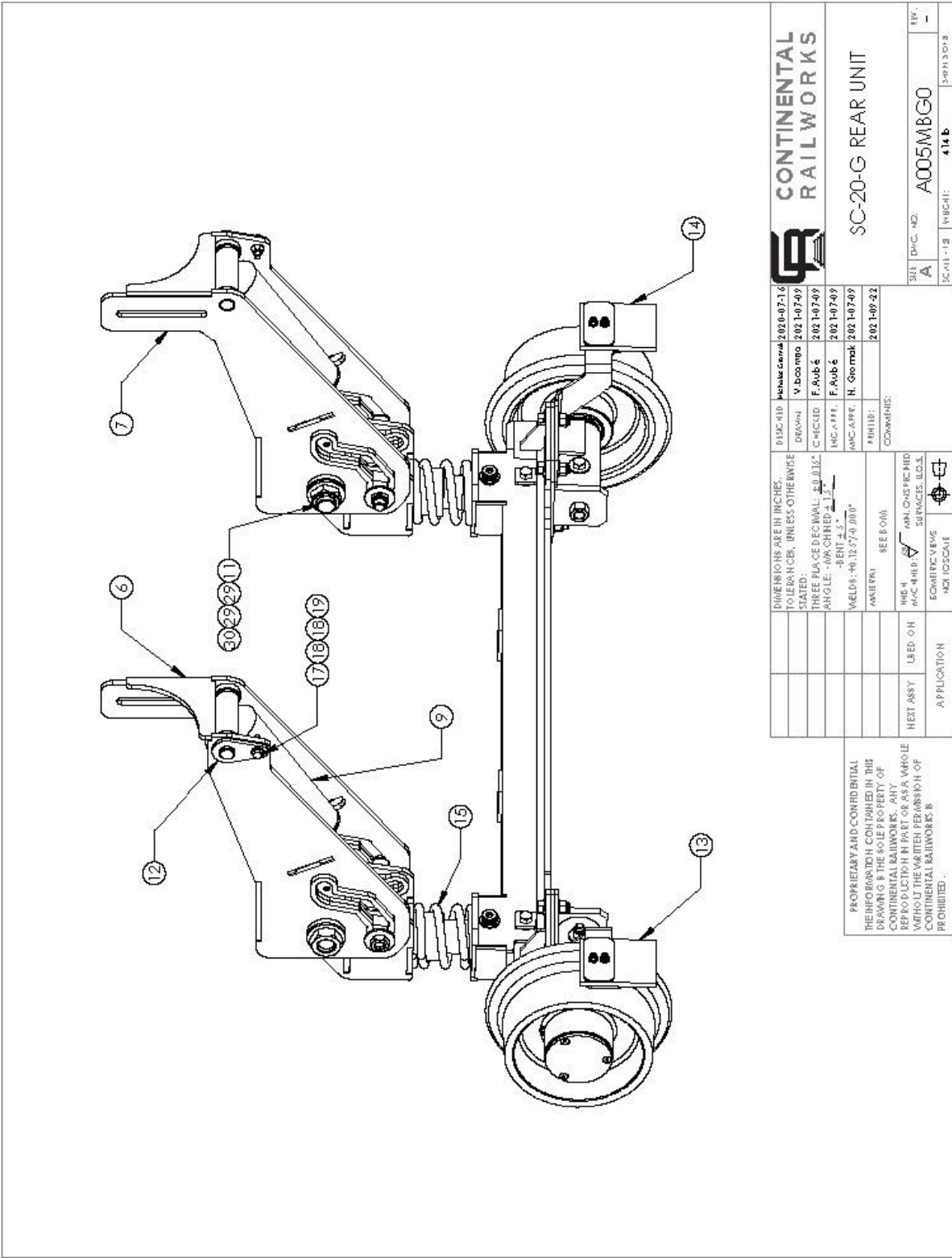
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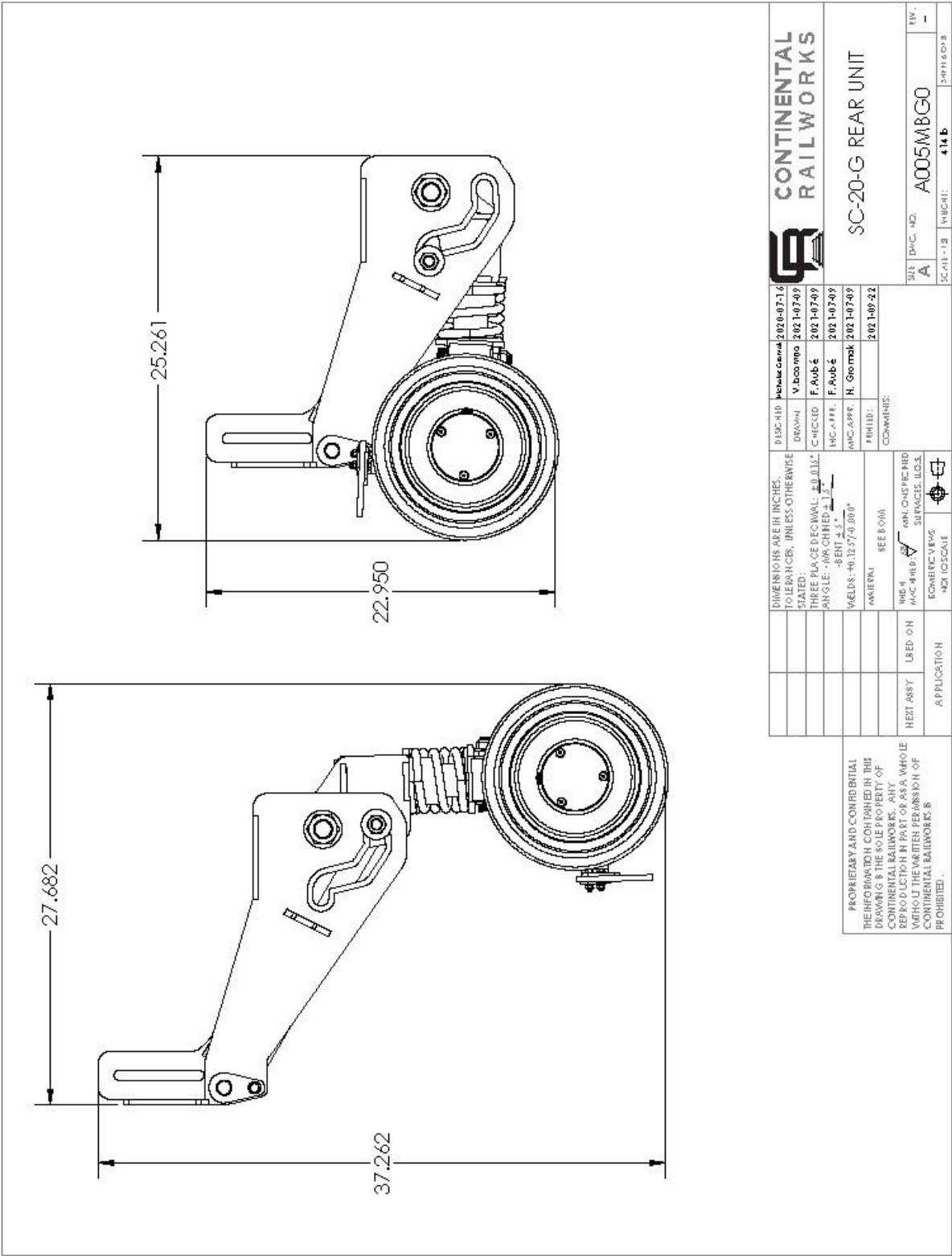
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	B005M000	INNER TUBE ASSY	2
2	D005M300	AXLE ASSEMBLY NO BRAKES	1
3	D005M250	OUTER SLIDING AXLE	1
4	E002L000	10" WHEEL ASSEMBLY H-12B & G-20	2
5	F005M000	GUIDE TUBE ASSEMBLY	2
6	F105MD20	DRIVER SIDE CAM	1
7	F105MP20	PASSENGER SIDE CAM ASSEMBLY	1
8	G089SW04	WIDE SQUARE WASHER 1/2"	4
9	H025A300	3" HYDRAULIC CYLINDER x 6" STROKE	2
10	P005M010	1" PIN x 6.500" LONG ASSY	2
11	P005M020	1-3/4" PIN x 6.500" ASSY	2
12	P005M040	AXLE PIN	2
13	R005MD10	DRIVER SIDE RAILS WEEP ASSY	1
14	R005MP10	PASSENGER SIDE RAILS WEEP ASSY	1
15	V005M001	COIL SPRING	2
16	V015A001	WEAR RING W2-2500-0750	4
17		3/8" UNC GR.8 BOLT x 1.500" LONG	2
18		3/8" REGULAR FLAT WASHER	4
19		3/8" UNC GR.8 NYLON INSERT LOCKNUT	2
20		1/2" UNC GR.8 BOLT x 1.750" LONG	8
21		1/2" UNC GR.8 BOLT x 4.500" LONG	2
22		1/2" REGULAR FLAT WASHER	16
23		1/2" UNC GR.8 NYLON INSERT LOCKNUT	10
24		5/8" REGULAR FLAT WASHER	2
25		5/8"-11 FLANGE NYLON LOCKNUT	2
26		SHOULDER BOLT Ø 3/4" x 3.5" LONG - 5/8"-11	2
27		3/4" UNC GR.8 LIGHT NYLON INSERT LOCKNUT	2
28		3/4" WIDE FLAT WASHER	2
29		1-1/4" REGULAR FLAT WASHER	2
30		1-1/4" UNC GR.8 LIGHT NYLON INSERT LOCKNUT	2

DIMENSIONS ARE IN INCHES. TOLERANCES, UNLESS OTHERWISE STATED: THREE PLACE DECIMAL: ±0.013" ANGLE: ±0.1° BENT: ±5° WELDS: ±0.125" ±0.000"		BASIC DIM V. loc memo CHECKED EDC, APP FINISH COMMENTS:	2020-07-16 2021-07-09 2021-07-09 2021-07-09 2021-07-09 2021-07-22	CONTINENTAL RAILWORKS SC-20-G REAR UNIT	311 DWG. NO. A SC-20-G-113	414 B WEIGHT 399150.8
DIMENSIONS ARE IN INCHES. TOLERANCES, UNLESS OTHERWISE STATED: THREE PLACE DECIMAL: ±0.013" ANGLE: ±0.1° BENT: ±5° WELDS: ±0.125" ±0.000"		SEE BOM WELD M/C H-B FIN. CHS SURFACES B.L.S.	NEXT ASSY USED ON APPLICATION	APPLICATION NEXT ASSY USED ON APPLICATION		

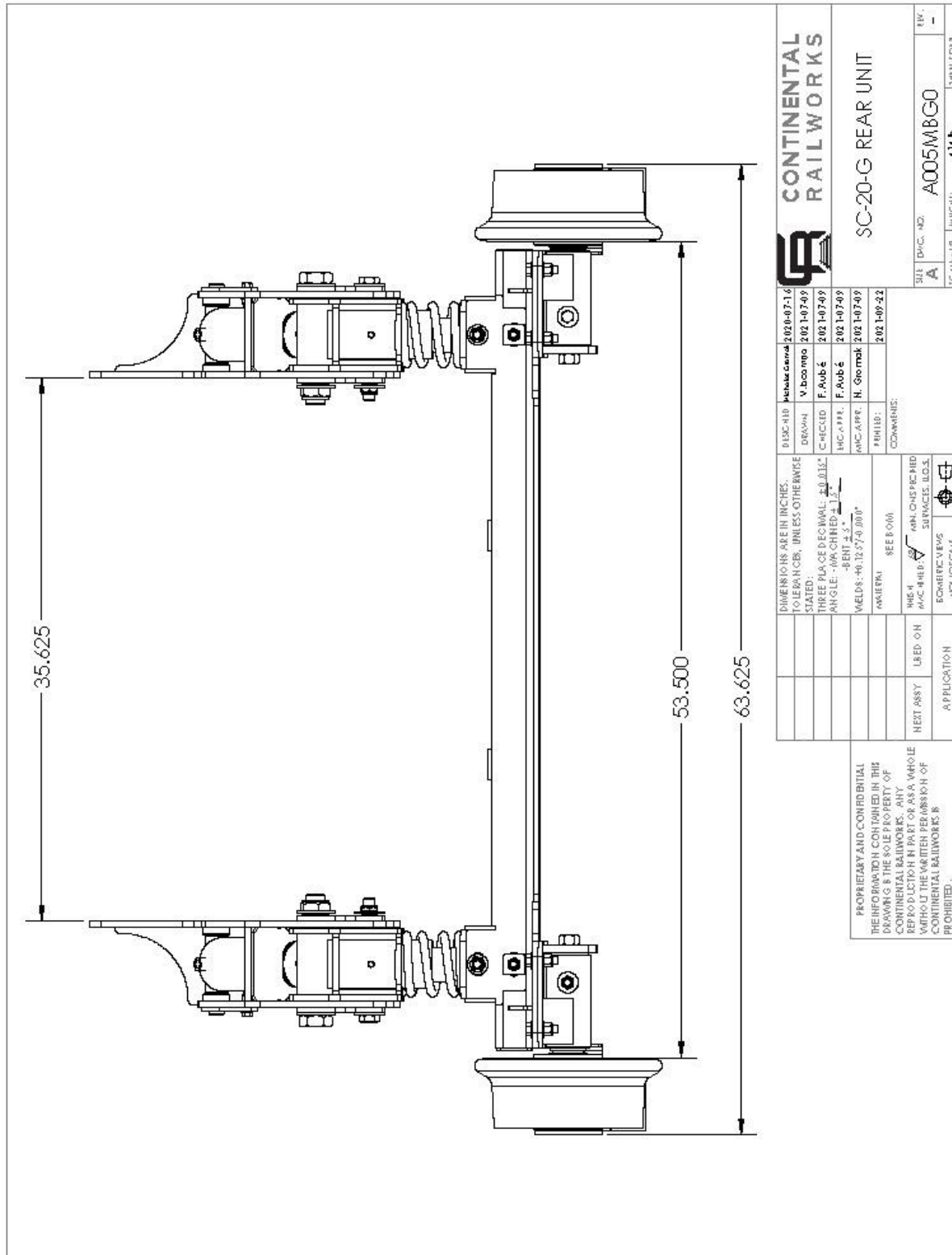








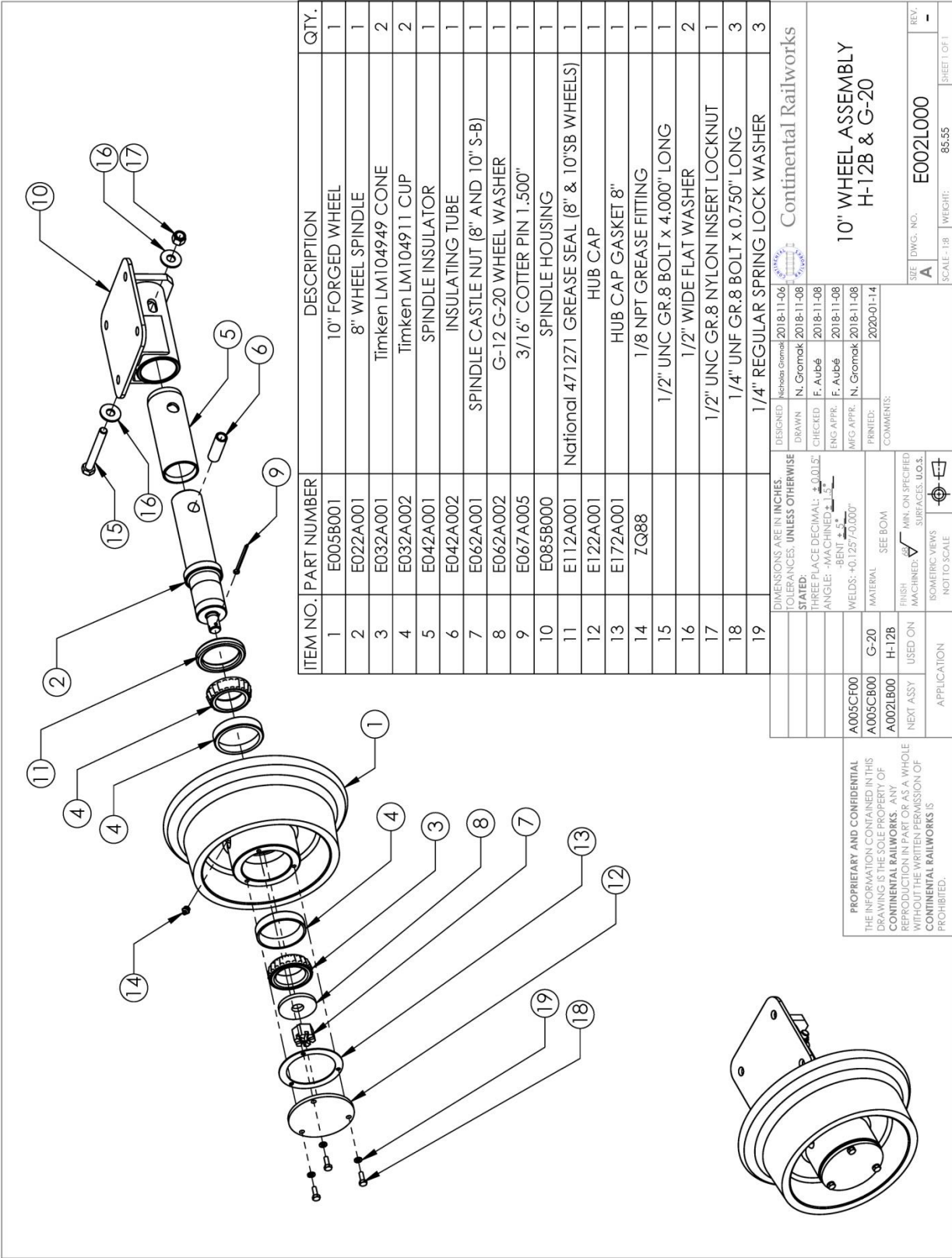




## APPENDIX 7

### 10" WHEEL ASSEMBLY DRAWINGS

**NOTE** – Some components may differ slightly from drawings shown.



**APPENDIX 8**

**PACKING LIST**