

# DIVERSIFIED METAL FABRICATORS, INC.



## Parts & Service Manual Excavator Railgear



August 2021

SERIAL NUMBER (FRONT) \_\_\_\_\_

SERIAL NUMBER (REAR) \_\_\_\_\_

### **NOTICE**

Please refer to the serial numbers when ordering parts or inquiring about warranty items.

## **Message from DMF**

No matter what your job function is, Operation, Installation, Maintenance, or Repair, it is your responsibility to familiarize yourself with the entire manual. Once you have read the entire manual, there are some specific sections that you will want to pay special attention to, depending on your role.

If you find anything missing, incorrect or unclear in this manual, please contact us. We are always trying to improve our manuals.

Manuals, service bulletins and general information are available on our website listed below.

We reserve the right to update our manuals without notice. You can download a current manual at our website (<http://www.dmfatlanta.com>).

Thank you for choosing DMF Railgear. We make every effort to provide quality, safe and rugged products for the railroad. We hope you'll find our gear to be satisfactory in every way. We take product support very seriously, so if you have any questions, please contact us.

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# SECTION 1.0    GENERAL INFORMATION

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## 1.1 GENERAL DESCRIPTION

DMF's excavator Railgear is customized to fit each supported application. Most excavators are rough terrain machines with RW-1650 axles front and rear. The actuation of the railgear can vary from machine to machine. Some railgear mounts to an outrigger bulkhead and others pin on in place of a factory dozer blade.

Some highway speed excavators use a RW-1630 front axle and traditional long arms similar to a class-8 truck. The RW-1650 rear axle on those machines is configured similar to other excavators with a bulkhead mount.

### 1.1.1 Options

- Rail wheel brakes (air or hydraulic, depending on the machine)
- Electrical axle insulation
- Railsweeps
- Slotted links
- Custom track gauges and/or wheel profiles

### 1.1.2 Brakes

#### WARNING

The rail wheel brake system is intended to assist the existing vehicle brakes when in the rail mode. As the vehicle tires are in contact with the railhead, the primary braking effort is derived from the rubber tires. Rail wheel brakes alone are insufficient to stop the vehicle in a reasonable distance.

The optional rail wheel brakes are of the external Cobra shoe type. The rail brakes use a truck style air chamber or hydraulic cylinder to supply the clamping force. Supply pressure comes from the vehicle's air or hydraulic system. A pressure protection valve separates the Railgear and the excavator's air systems, preventing a failure in the rail brake system from adversely affecting excavator braking. The rail brakes are applied simultaneously with the excavator brakes when the operator presses the brake pedal. There is a dashboard-mounted switch or bulkhead mounted ball valve that permits the operator to enable or disable the rail braking system.

## 1.2 RW-1630 FRONT RAILGEAR

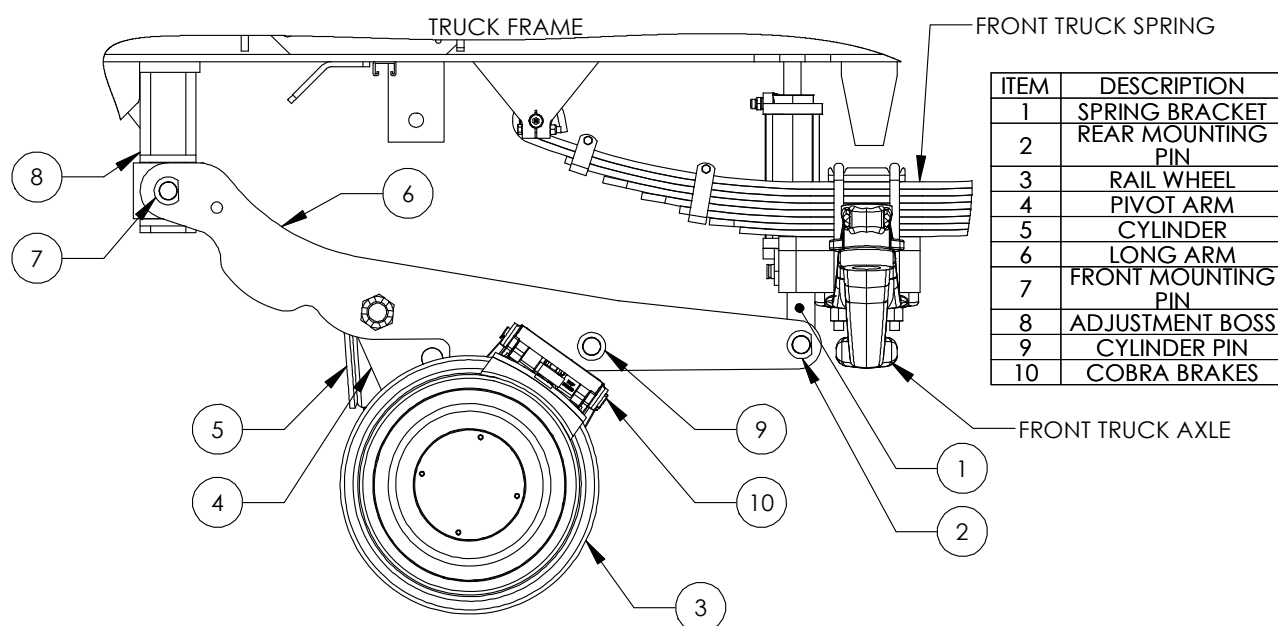
Some machines can accept DMF's traditional front-mounted railgear, designed for class 8 trucks. The hydraulic cylinders, cross tubes, and spring hangers are modified to support the extra weight. Otherwise, the railgear is very similar to the legacy design used on trucks.

RW-1630 front

Approximate installed weight: 1,385 lbs

Capacity: 40,000 lbs per Railgear axle @ 20 MPH

Figure 1.2 shows the individual parts of the installed front Railgear. These item descriptions will be used throughout this installation manual. DMF Railgear assemblies are also referred to as guide wheels, Rail wheels, or hi-rail gear.



**Figure 1.2** Front Railgear Components

For installation instructions, see Section 4.0, and for parts drawings, see Section 7.0.

### 1.3 BULKHEAD MOUNTED GEAR

DMF offers two different configurations of the bulkhead mounted railgear, slotted and non-slotted:

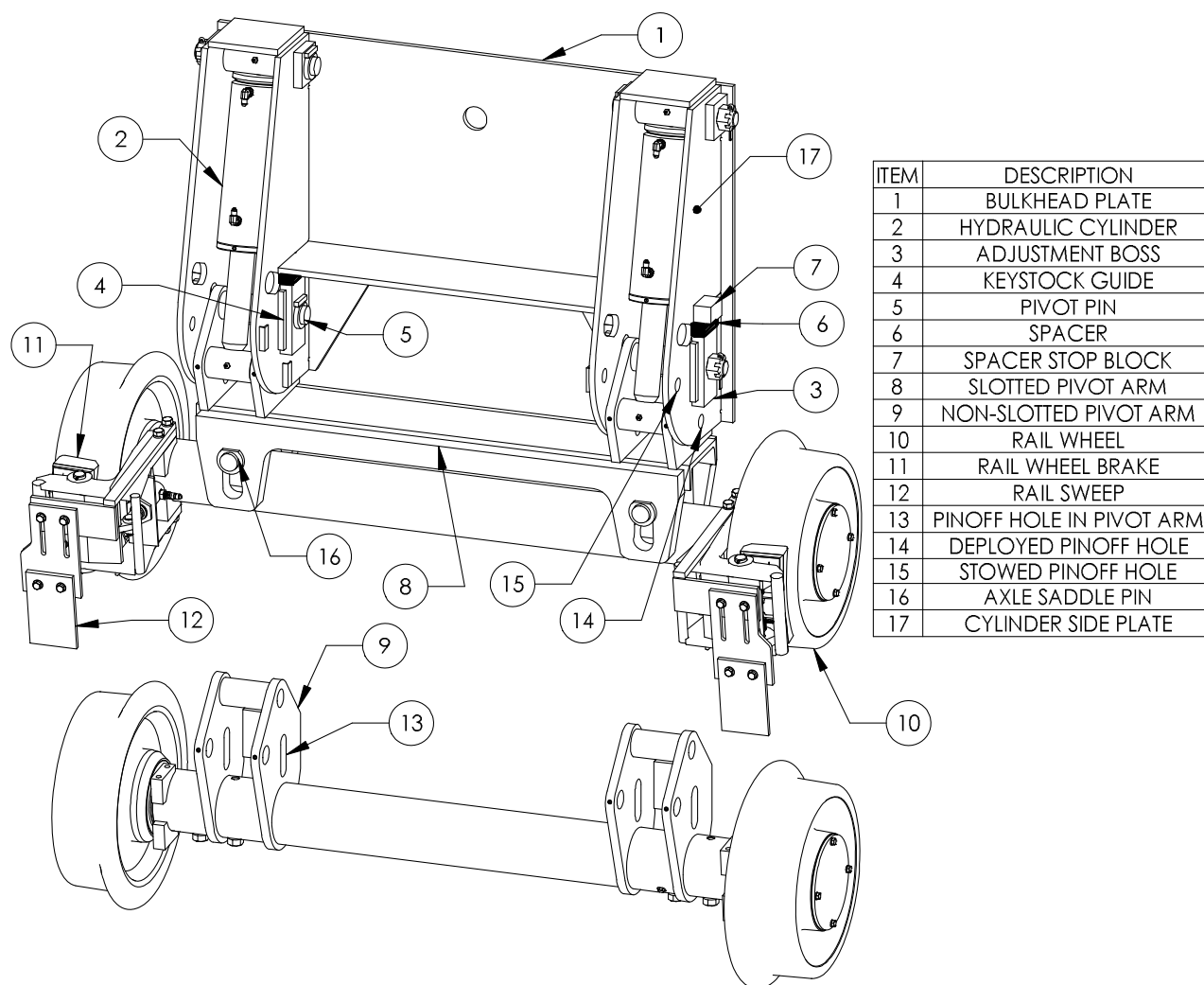
**The non-slotted gear is traditionally installed at the front of the machine, near the steer tires. The slotted gear is usually mounted behind the rear tires, and helps navigate cross-level and high crossings.**

RW-1650 bulkhead mounted (front or rear)

Approximate installed weight: 1200 lbs non-slotted / 1700 lbs slotted

Capacity: 70,000 lbs per Railgear axle @ 20 MPH

Figure 1.3 shows the individual parts of the bulkhead mounted Railgear with the rail wheels in the rail position. These item descriptions will be used throughout this installation manual.



**Figure 1.3** Bulkhead Mounted Railgear Components

For installation instructions, see Section 4.0, and for parts drawings, see Section 7.0

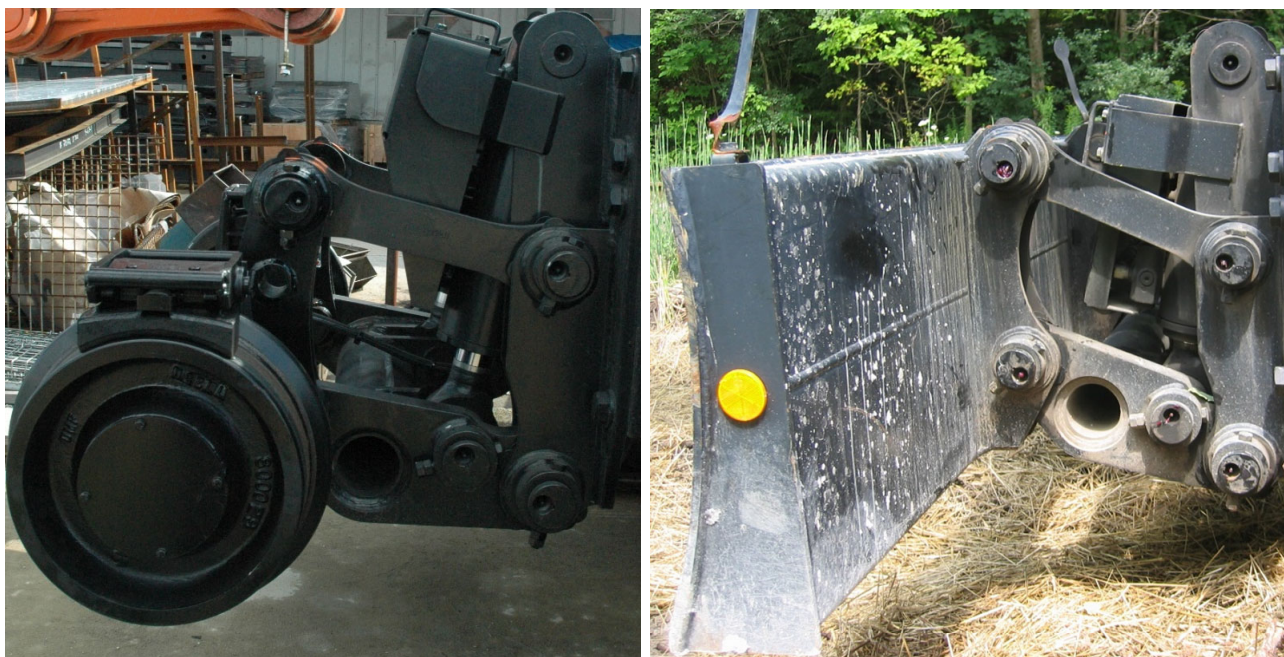
## 1.4 DOZER BLADE REPLACEMENT GEAR

Some railgear is designed to pin onto the machine in place of the factory-installed dozer blade. These configurations can appear on the front and/or rear of the machine. These designs re-use the hydraulic cylinders from the dozer blade to operate the Railgear. See Figure 1.4.1 for an example.



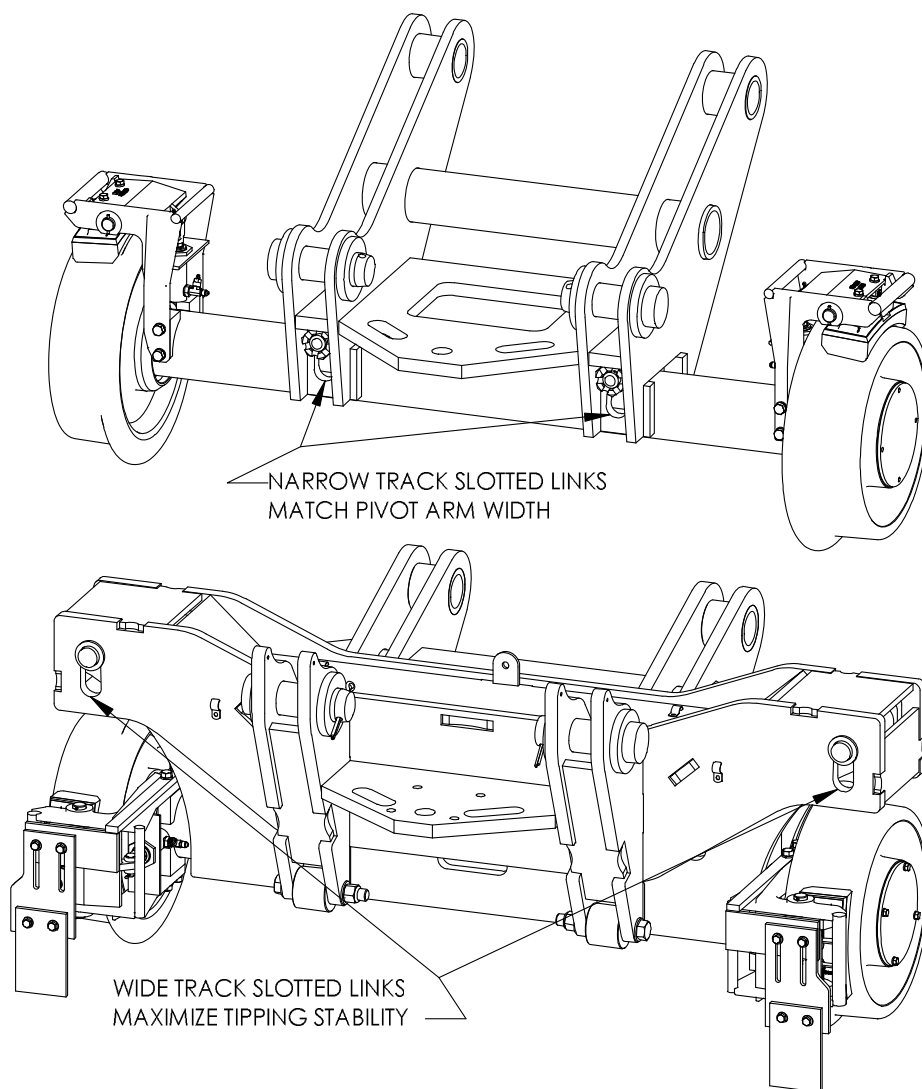
**Figure 1.4.1** Dozer Blade Replacement Railgear Example

There are various styles of dozer blade replacement gear. Some styles, like the one shown in Figure 1.4.1 carry over very little hardware from the original dozer blade assembly. Others re-use most of the dozer blade actuation linkage, such as the one shown in Figure 1.4.2.



**Figure 1.4.2** Dozer Blade Replacement Railgear Example

Dozer blade replacement Railgear is available with slotted links for some machines. Newer designs offer a wider track width of the slots to provide more lifting stability. See Figure 1.4.3 for a couple of examples.



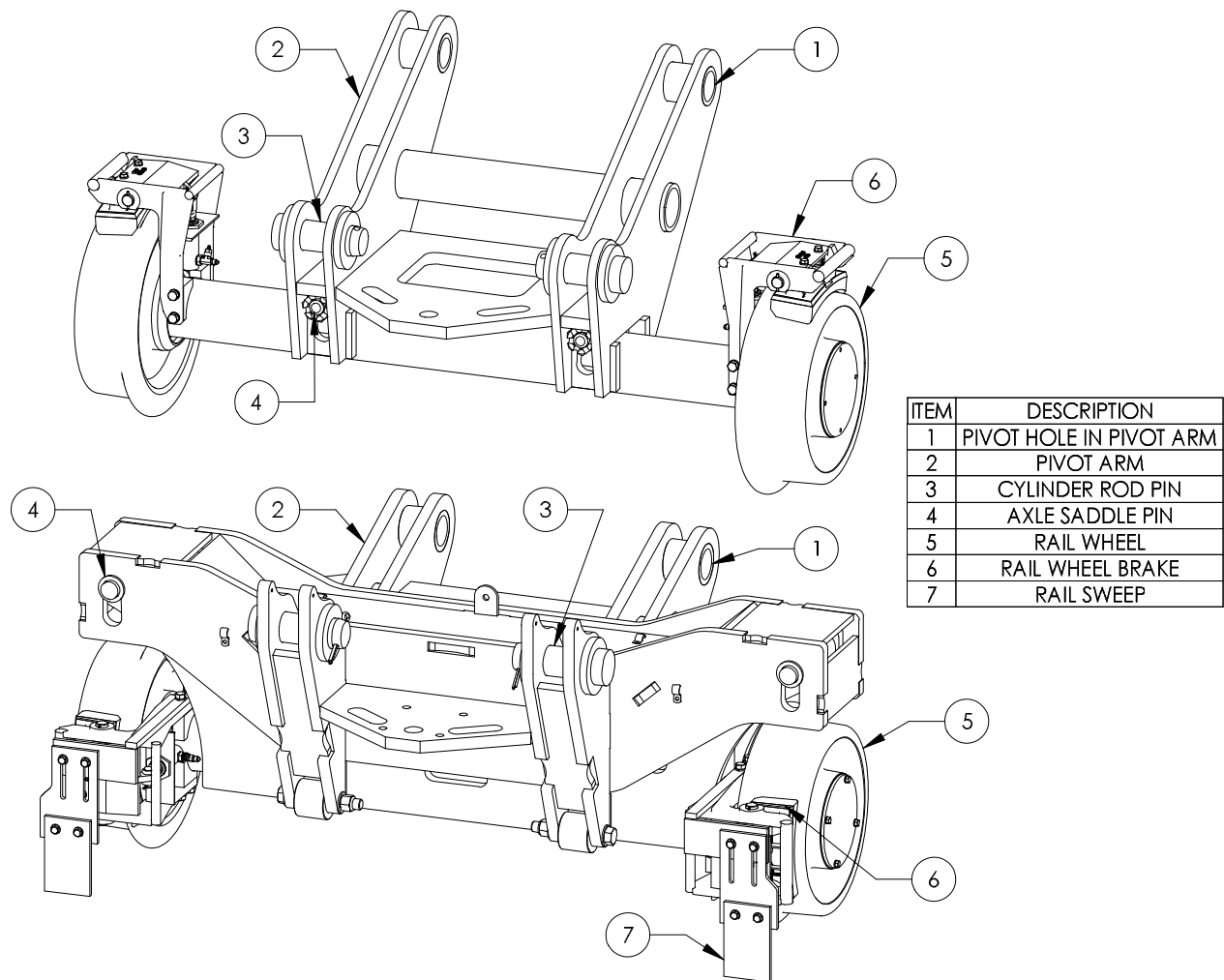
**Figure 1.4.3** Narrow Track & Wide Track Slotted Links

RW-1650 dozer blade replacement gear

Approx. Installed Weight: 1600 lbs standard, 2100 lbs wide track

Capacity: 70,000 pounds per Railgear axle @ 20 MPH

Figure 1.4.4 shows the individual parts of the Railgear with the rail wheels in the rail position. The specific shape and size of the parts will vary from one machine to another. These item descriptions will be used throughout this installation manual.



**Figure 1.4.4** Dozer Blade Replacement Railgear Components

For parts drawings, see Section 7.0, and for installation instructions, see Section 4.0.



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## 2.1 BEFORE YOU OPERATE THE RAILGEAR

### 2.1.1 Familiarize Yourself with the Railgear

#### Clearances & Approach Angles

The installation of Railgear typically reduces the ground clearance & approach angle in the front and back. In some installations, the guide wheels extend slightly beyond the corners of the front bumper. Operators should familiarize themselves with the modified clearance & approach angles.

#### Pin-off Systems and Locations

Walk around vehicle and identify the location and type of pin-off system(s) that are installed on this particular vehicle. Please note that front and rear Railgear may have different types of pin-off systems (i.e. front may be cable, while rear may be manual pin-offs). See section 5.0 for more information on pin-offs.

DMF offers the following Pin-off options:

- Manual Pin-Offs
- Cable Remote Pin-Offs
- Locking valve only

#### Operation Controls

- Locate and familiarize yourself with the front and rear Railgear operating controls. Sometimes these are located inside the operator's cab.
- If your machine is equipped with Railgear brakes, locate the brake switch or control valve on the dashboard or bulkhead.
- Identify the type of steering lock used on your machine

### 2.1.2 Daily Inspection

Before operating your Railgear-equipped vehicle, whether for highway or rail use, it is imperative that you perform a daily inspection – see Section 3.1.1 for Daily Inspection List. If any items found during your inspection do not conform to requirements, it is your responsibility to take corrective action before any use of the vehicle.

## 2.2 ANTI-LOCK BRAKE SYSTEM (ABS)

### 2.2.1 Trucks Equipped with ABS

All medium and heavy duty trucks manufactured after March 1, 1998, and equipped with air brakes, are required by federal law to also include ABS. The system is designed to prevent wheel lock-up during braking.

The ABS consists of wheel speed sensors, an **"ECU"** (electronic control unit) and all wiring and airlines that link the ABS component to the brakes and the truck's electrical system.

During braking, the sensors will detect if one or more of the wheels are locking and automatically engage the ABS. The ECU then signals the system to apply and release brake pressure as much as 15 times per second, allowing the wheel(s) to turn just enough to maintain optimum traction.

Vehicles equipped with WABCO or Allied-Bendix ABS have an amber dash-mounted warning / diagnostic lamp. During normal road operation, the lamp will come ON when the truck engine is started and, depending on the type of system, will go OFF after about 3 seconds or when the truck reaches a speed of approximately 5-7 mph. A self-diagnostic check of the ABS is conducted during this time. If the lamp stays on, or comes on any other time during road operation, a possible malfunction is indicated, which will shut off only the part of the system at fault. The affected wheel(s) will revert back to conventional braking. For complete information and instructions relative to the ABS system, please refer to the truck's operation manual.

### 2.2.2 Rail Operation of Trucks with ABS

When the Railgear is in the rail position, the front truck tires are lifted off the ground. This may produce an ABS fault and cause the ABS light to illuminate. In this condition, the brakes will still function but the ABS system will not. If the amber ABS dash light remains on during rail operation, the truck engine must be turned off and restarted after returning to highway operation. This will clear the ABS light after a few seconds. If the amber light remains on during road operation, the truck's brake system may have an active fault and should be checked out. Please refer to the truck's operation manual.

## 2.3 HIGHWAY OPERATION

Before operating a Railgear-equipped vehicle on the highway:

1. Verify Railgear is in highway position
2. Verify pin-off pins are properly and fully inserted in both front and rear Railgear (if applicable)
3. Steering wheel lock has been removed (if applicable)
4. Verify that Railgear brakes have been disengaged (if applicable)
5. Verify PTO has been disengaged and that the indicator light is OFF (if applicable)

## 2.4 GETTING ON THE RAIL

### 2.4.1 Getting onto the Rail

1. At the track crossing, drive past the track, then back the vehicle onto the rails. Engaging the rear Railgear first will make it easier to engage the front Railgear.
  - a. For wheeled bucket excavators or vehicles with bulkhead mount or dozer blade railgear on both ends, ensure that a slotted set of railgear is facing the primary direction of travel. Uneven track or low crossings may cause derailment if non-slotted railgear is in the direction of travel.
2. Engage the vehicle's parking brake to prevent it from rolling.

### 2.4.2 Lower Rear Guide Wheels

3. If the Railgear has brakes, turn brake switch or valve on.
4. Engage the PTO, leave the truck running and the transmission in neutral gear (if applicable).
5. Remove the safety pin-off pins, if equipped. If pins are too tight to be easily removed, verify that Railgear is fully raised by briefly pulling (bumping) the valve handle towards you.
6. Push valve handles or controller buttons to lower wheels and engage rail.
7. When both wheels are in rail position and properly engaging rail, replace safety pin-off pins, if equipped.
8. Some vehicles with dozer blade replacement gear use a painted line across several components to identify when the railgear is fully deployed, instead of a hard mechanical stop. This allows fine tuning of the traction on the vehicle tires.

### 2.4.3 Lower Front Guide Wheels

9. If necessary, drive the truck into position to line up the front guide-wheels with the rail.
10. Ensure that the PTO is engaged (this was engaged during the lowering of the rear Railgear).
11. Ensure front safety pin-off pins are removed, if equipped.
12. Check and make sure that the front guide wheels line up with the rail.
13. Push valve handle or controller buttons to lower wheels and engage rail.
14. When both wheels are in rail position and properly engaging rail, replace safety pin-off pins, if equipped.
15. Some vehicles with dozer blade replacement gear use a painted line across several components to identify when the railgear is fully deployed, instead of a hard mechanical stop. This allows fine tuning of the traction on the vehicle tires.
16. Engage the steering wheel lock (if applicable).
17. If you do not require the use of the PTO for additional equipment, it can now be disengaged.
18. Disengage the truck's parking brake when you are ready to proceed.

#### 2.4.4 On the Tracks

- Do not exceed posted track speed limit, and at no time exceed 30 MPH while on track.
- Be aware that some Railgear is insulated, and will not operate the crossing gate circuits.
- You are responsible for knowing if your Railgear equipped vehicle has insulated or non-insulated wheels. To assist in identifying insulated rail wheels, a grooved ring is machined around the inside of the front and rear driver's side wheels.
- All railroad rules and safety guidelines should be observed.
- Reduce speed while in reverse and/or at all crossings, curves, branch lines, switches and frogs (no more than a slow walking pace is recommended).
- Traction is reduced on the track, especially in wet conditions.
- Braking distance is increased on the track, especially in wet conditions.
- Do not slide tires or guide wheels on the tracks as this will cause premature wear.
- Do not exceed the maximum rated capacity of the equipment.
- On newer trucks with Anti-Lock braking systems, the amber 'ABS' dash light may remain on with the front wheels elevated. This will not affect rear truck braking or rail wheel braking.
- Tipping stability is more limited on rail than with tires on the ground. Some machine manufacturers publish modified stability charts for use on rail.
- Always deploy outriggers or stabilizers, if available, before digging, lifting, or using machine attachments.

## 2.5 GETTING OFF THE RAIL

### 2.5.1 Removing Equipment from Track

1. Safely pull onto the track crossing, paying attention to traffic and other obstacles.
2. Set the parking brakes and engage the PTO, if equipped.
3. Leave the vehicle running and the transmission in neutral gear.
4. Disengage front and rear safety pin-offs, if equipped.
5. Lift both sets of Railgear (there is no preference for removal order).
6. Engage all safety pin-off pins in highway position, if equipped.
7. Disengage the switch or valve that controls the Railgear brakes (if applicable).
8. Disengage the steering wheel lock (if applicable).
9. Disengage the PTO and the parking brakes.
10. Make sure surrounding area is free and clear of any obstacles and vehicles before pulling off of the rail and onto the road.
11. If the amber ABS dash light remains on during rail operation, the engine must be turned off and restarted after returning to highway operation. This will clear and ABS light after a few seconds. If the amber light remains on during road operation, the vehicle's brake system may have an active fault and should be checked out. Please refer to the vehicle's operation manual.

# SECTION 3.0 ROUTINE MAINTENANCE

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### 3.1 Inspection and Maintenance

If your Railgear vehicle is high-use or operated under extreme conditions such as operating in mountainous regions or extreme temperatures, the levels of inspections listed below may need to be performed more frequently than stated.

The following are instructions for routine inspections recommended by Diversified Metal Fabricators. In some circumstances, government or corporate regulations may require additional inspections be performed. Please ensure that you are aware of any inspection requirements that pertain to your Railgear and that you abide by all local and national laws regarding Railgear maintenance and safety.

#### 3.1.1 Daily

- Visually inspect for hydraulic fluid leaks.
- Check and make sure that all threaded fasteners are secured. NOTE: All hex nuts are either nylon insert or slotted hex nuts with cotter pins.
- Check and make sure all tie straps that secure hoses from moving parts are in place. Replace if cracked or worn.
- Inspect wheel flanges for excessive wear (see Section 3.3 for wear gauge), primarily noting differences in wear between wheels on the same axle or diagonally. If an abnormal pattern is noted, check Railgear alignment (see alignment procedure in Section 4.7).
- Inspect wheel "end-play": Placing one hand at the 9 o'clock position and your other hand at the 3 o'clock position, firmly grab the wheel and push and pull it a few times. There should be no discernable movement in and out, and the wheel should rotate freely. If you feel there is too much movement in and out, or if the wheel does not rotate freely, a detailed inspection should be performed. See Sections 7.0 for appropriate axle assembly drawings.
- Throughout the day, inspect wheel temperature. If extremely hot, this could indicate bearing adjustment is too tight. For adjustment information, see Section 7.0 for appropriate axle assembly drawings.
- If your vehicle is equipped with DMF "two piece" wheels, check the bolt torque indicators (the tabs around each bolt) to ensure that they have not moved. If torque indicators are missing or damaged, please contact DMF for replacements. If torque indicators have moved, you must check bolt torque – see Section 5.4 for additional information.

#### 3.1.2 Weekly

Perform standard daily inspection points as listed above, and then check the following:

- Grease and lubricate all grease fittings on front and rear Railgear and guide wheel assemblies. See drawing in Section 3.2 for details.
- Check level of hydraulic oil and all other fluids.
- Check air pressure in tires and inflate to proper inflation pressure (if necessary).
- Inspect brakes and adjust if necessary. Refer to Section 5.3.6 & 5.3.7.
- Brake Testing
  - Operate the vehicle on a test track. With the "on/off" toggle valve "on" and the ball valve(s) open, check that:
    - (1) When the vehicle brake pedal is depressed, the guide wheel brakes clamp the Rail wheel enough to begin slowing its rotation, but not enough to totally lock the Rail Wheel. The Rail Wheels should not be allowed to lock up since that will cause a flat spot on the wheel due to the sliding action on the rail.
    - (2) The brakes properly release when the brake pedal is released.
  - If brakes do not function properly, contact a Service Representative at DMF.

**3.1.3 Bi-annually**

Perform standard daily and weekly inspection points as listed above, and then check the following:

- Remove the hubcaps from the Rail wheels and inspect for deterioration or loss of wheel bearing grease. Unless there is a problem, the cavity may be topped off with the recommended grease without removing and/or re-packing the bearings.
- Clean the hubcap and mating surfaces and apply a bead of silicone gasket and re-attach securely.
- Clean the strainer / filter in the hydraulic power unit tank.
- Rail test for proper traction and adjust as appropriate (see Section 4.7).
- Rail test for proper braking and adjust as appropriate (see Section 5.3).
- Check Railgear alignment (see Section 4.10)

**3.1.4 Annual Maintenance or as required**

In addition to the items listed in 3.1.1 Daily Maintenance, 3.1.2 Weekly Maintenance and 3.1.3 Bi-annual Maintenance; perform the following:

- Disassemble, inspect, repack and reassemble Rail Wheel Bearings as shown in Sections 7.0 and 8.0.



### 3.2 Lubrication Specification

Hydraulic Oil:




- Follow recommendations of vehicle manufacturer.

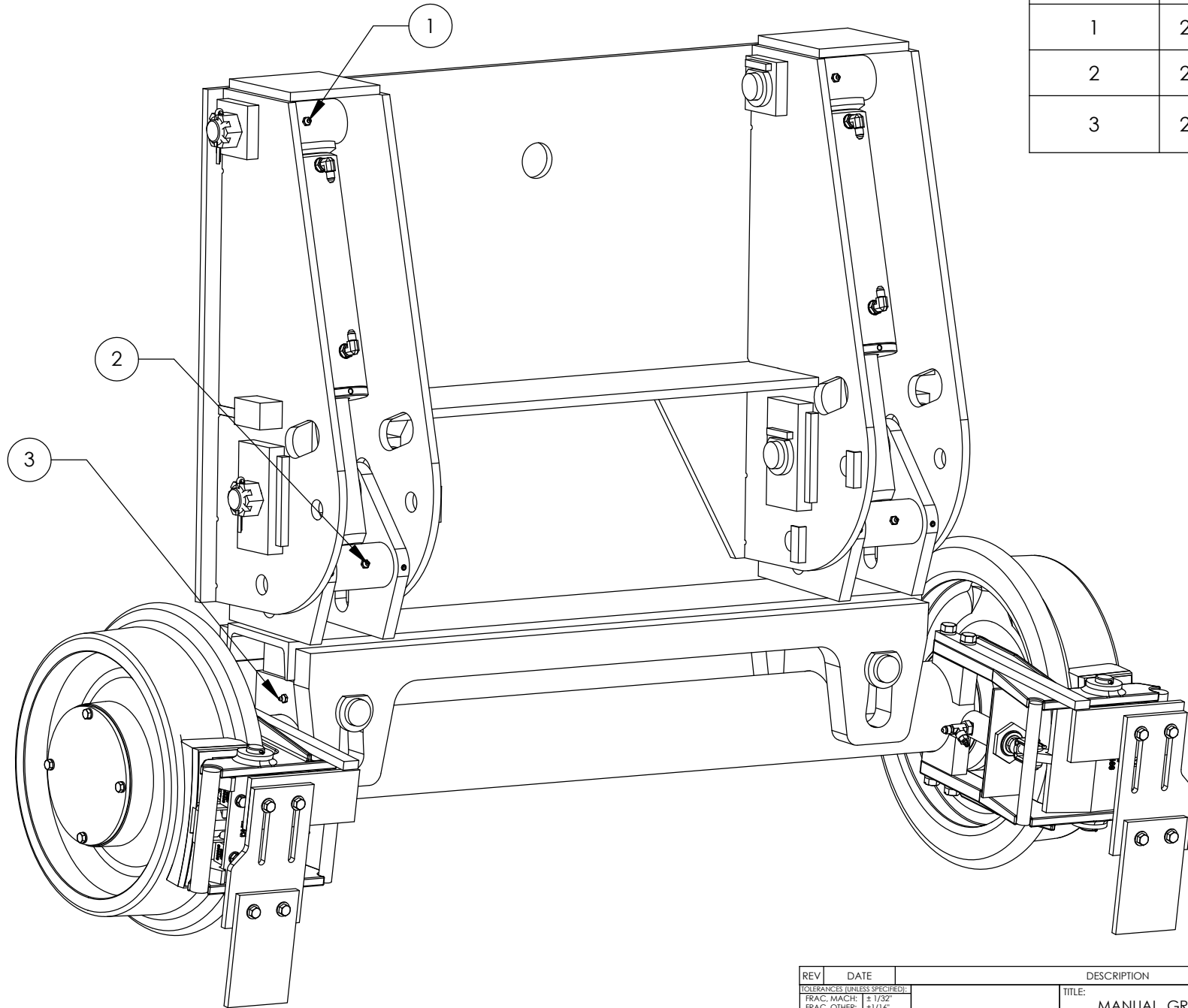
Wheel Bearing Grease / Grease Fittings:

- **Factory Standard:** Citgo Syndurance Premium Synthetic 460 #2
- **Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)


\*ONLY APPLIES TO STUB AXLE

[illegible][illegible]

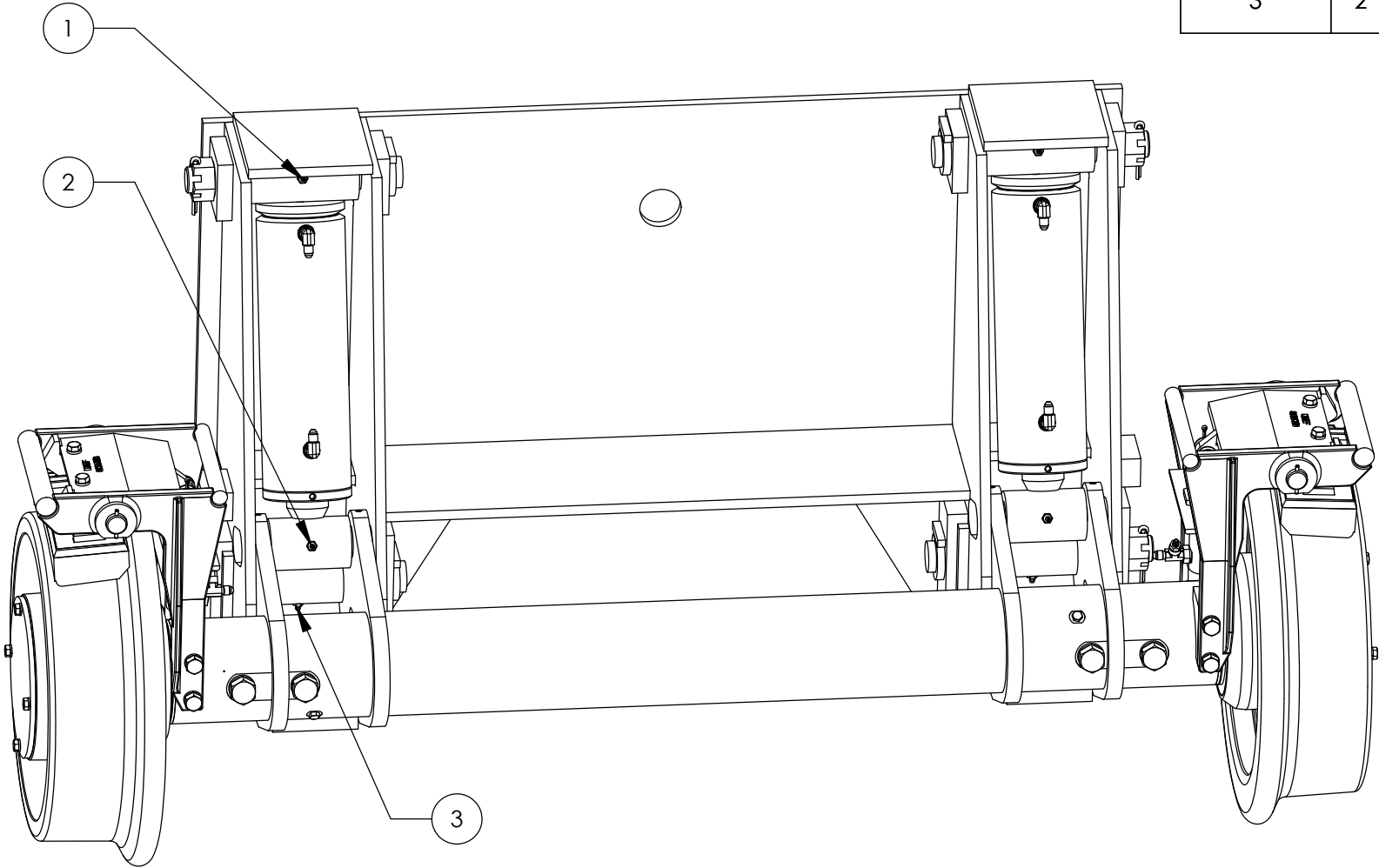
3/11/15	GREASE STANDARD CHANGED	JDI							
6/24/14	ADDED STUB AXLE GREASE POINTS	JDI							
REV	DATE	DESCRIPTION	BY	AP					
<table><tr><td colspan="2"><b>TOLERANCES</b> DIMENSIONS: FRACTIONS DECIMALS FRACTIONS: 1/16 1/8 3/16 1/2 5/8 3/4 DECIMALS: .030 .063 .125 .250 .500 HOLE OR 30000: .015 .015 ANGULAR: 1/2 1/4 THREADS: 1/8-20 MICRO 1/4-28 AND 3/4-16</td><td colspan="3"><b>TITLE:</b>  RW-1630/50 GREASE POINT LOCATIONS  DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512  DRAWN BY:    APPD BY:  KLC  DATE: 10/14/98  DRAWING NUMBER: M1630126 REV: B</td></tr></table>					<b>TOLERANCES</b> DIMENSIONS: FRACTIONS DECIMALS FRACTIONS: 1/16 1/8 3/16 1/2 5/8 3/4 DECIMALS: .030 .063 .125 .250 .500 HOLE OR 30000: .015 .015 ANGULAR: 1/2 1/4 THREADS: 1/8-20 MICRO 1/4-28 AND 3/4-16		<b>TITLE:</b>  RW-1630/50 GREASE POINT LOCATIONS  DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512  DRAWN BY:    APPD BY:  KLC  DATE: 10/14/98  DRAWING NUMBER: M1630126 REV: B		
<b>TOLERANCES</b> DIMENSIONS: FRACTIONS DECIMALS FRACTIONS: 1/16 1/8 3/16 1/2 5/8 3/4 DECIMALS: .030 .063 .125 .250 .500 HOLE OR 30000: .015 .015 ANGULAR: 1/2 1/4 THREADS: 1/8-20 MICRO 1/4-28 AND 3/4-16		<b>TITLE:</b>  RW-1630/50 GREASE POINT LOCATIONS  DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512  DRAWN BY:    APPD BY:  KLC  DATE: 10/14/98  DRAWING NUMBER: M1630126 REV: B							




LOCATION	QTY	DESCRIPTION
1	2	CYLINDER BASE END
2	2	CYLINDER ROD END
3	2	AXLE PIN

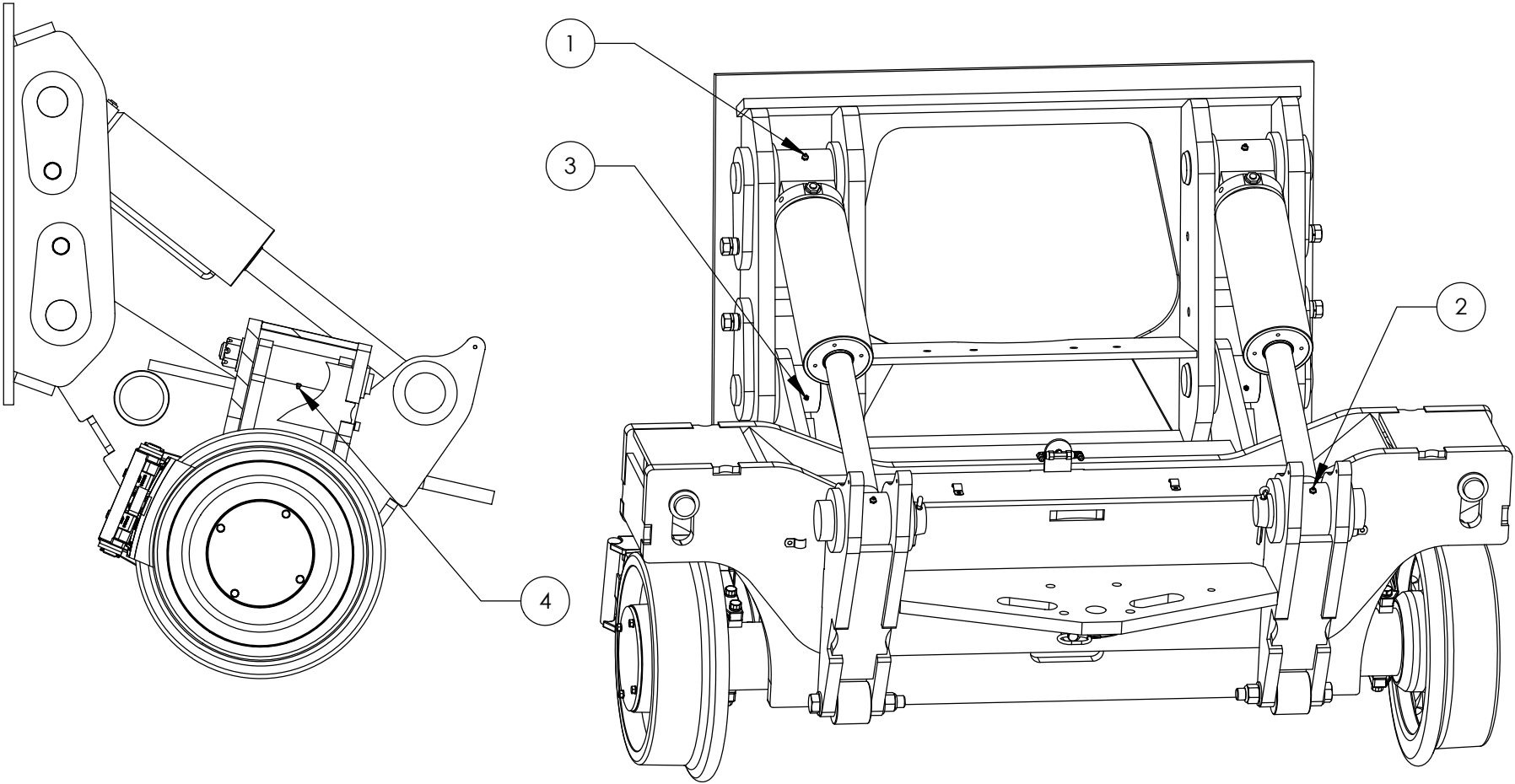
REV	DATE	DESCRIPTION		BY	APP
TOLERANCES (UNLESS SPECIFIED):					
FRAC. MACH:		± 1/32"			
FRAC. OTHER:		± 1/16"			
.X		± .063			
.XX		± .030			
.XXX		± .005			
DRILL SIZES:		± .015			
ANGULAR:		± 1°			
SURF FINISH:		125 MICRO			
THREADS:		2A AND 2B			
BREAK SHARP EDGES:		.03 X 45° MAX			
DMF (404)875-1512					
RW-1650G		TITLE: MANUAL, GREASE POINT LOCATIONS, BULKHEAD MOUNT RW-1650G, SLOTTED AXLE			
THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.					
DRAWN BY:	ARB	APPD BY:	-	DATE:	6/4/21
					
		DRAWING NUMBER:		M1650G07	REV:
				#	

LOCATION	QTY	DESCRIPTION
1	2	CYLINDER BASE END
2	2	CYLINDER ROD END
3	2	AXLE PIVOT PIN



REV	DATE	DESCRIPTION			BY	APP
TOLERANCES (UNLESS SPECIFIED): FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX ± .005 DRILL SIZES: ± .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES .03" X 45° MAX DMF (404)875-1512		RW-1650G		TITLE: MANUAL, GREASE POINT LOCATIONS, BULKHEAD MOUNT RW-1650G THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.		
DRAWN BY: ARB		APPD BY: -		DATE: 6/4/21		DRAWING NUMBER: M1650G08 REV: #

LOCATION	QTY	DESCRIPTION
1	2	CYLINDER BASE END
2	2	CYLINDER ROD END
3	2	MOUNTING PIN
4	2	SLOT PIN



REV	DATE	DESCRIPTION		BY	APP
TOLERANCES (UNLESS SPECIFIED):		TITLE:			
FRAC. MACH:		RW-1650GX			
FRAC. OTHER:		MANUAL, GREASE POINT LOCATIONS, RW-1650GX			
.X		THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.			
.XX		DRAWN BY:			
.XXX		ARB			
DRILL SIZES:		APPD BY:			
ANGULAR:		-			
SURF FINISH:		DATE:			
THREADS:		6/4/21			
BREAK SHARP EDGES .03 X .45" MAX		DMF (404)875-1512			
		DIVERSIFIED METAL FABRICATORS, INC. (DMF)		DRAWING NUMBER:	REV:
				M1650G09	#

### **3.3 Wheel Wear Gauge**

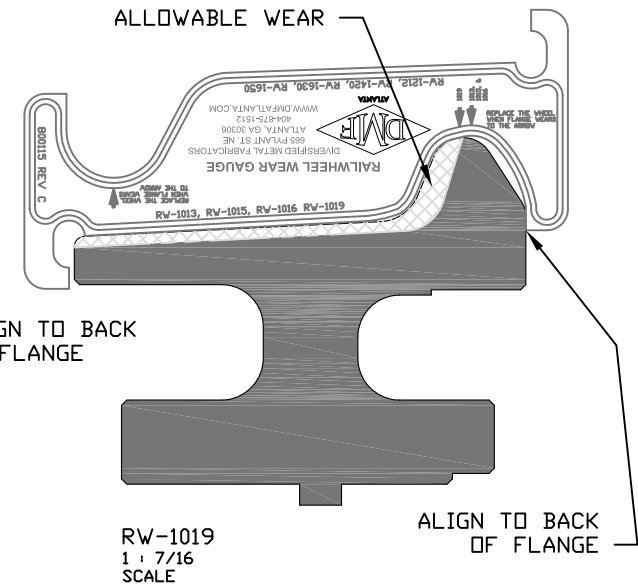
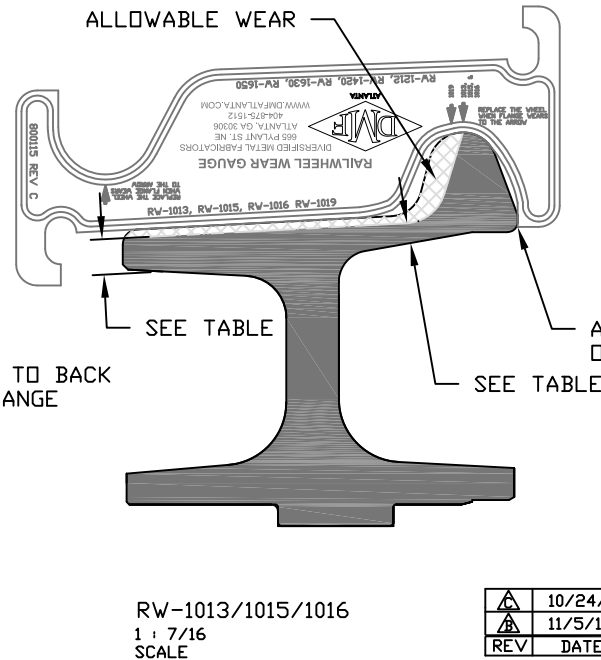
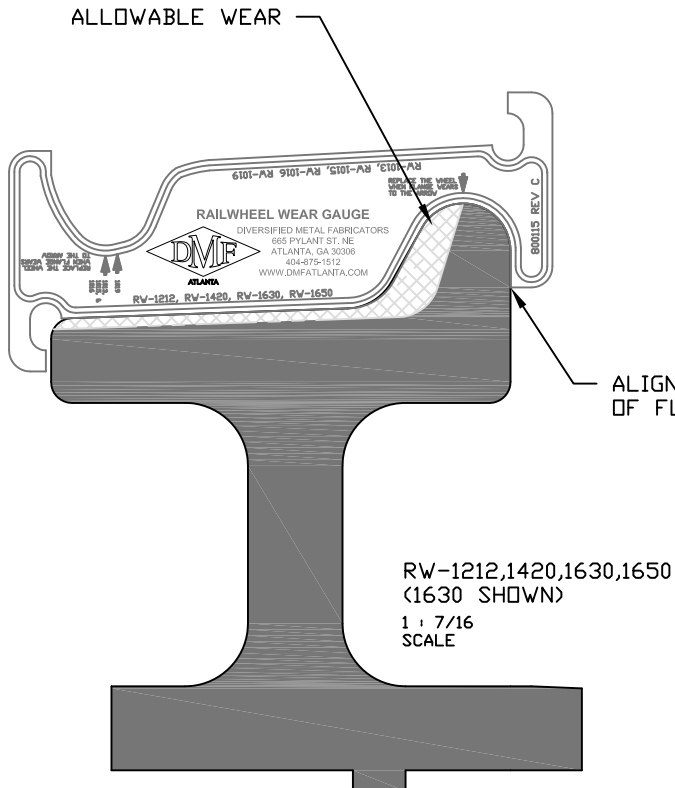
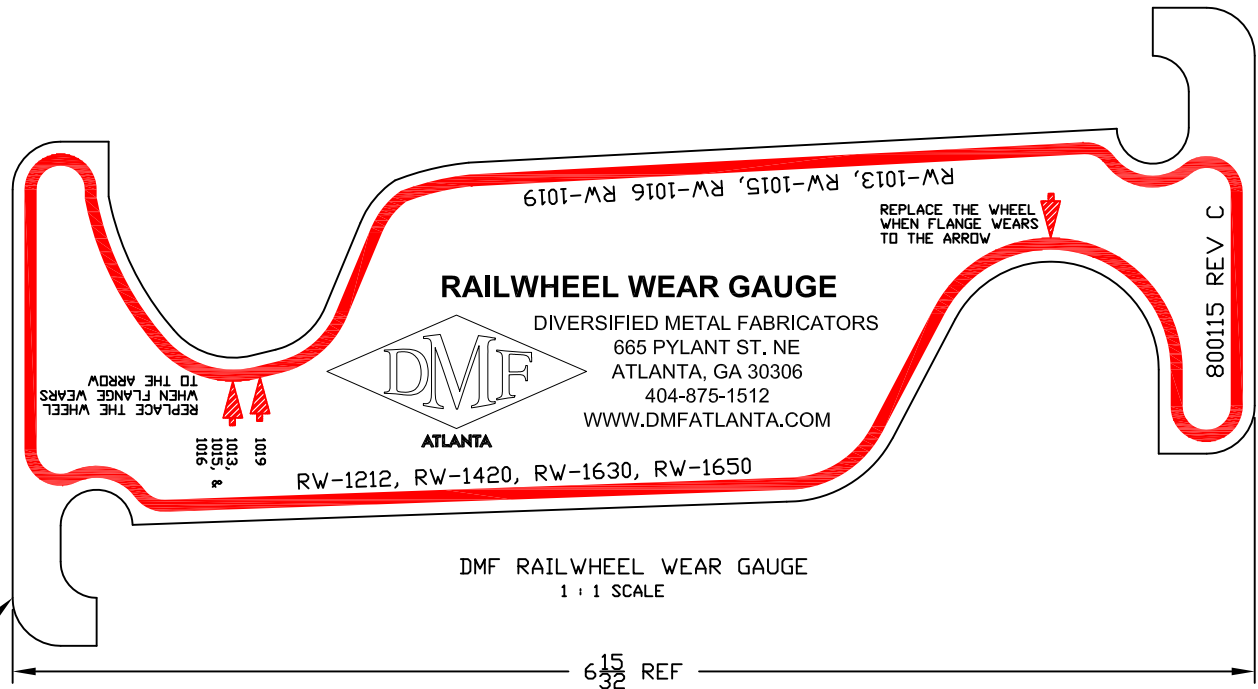
A metal wheel wear gauge (DMF part number 800115) is available to aid in inspecting worn wheels. The drawing on the next page illustrates how to use the gauge and also lists specifications for minimum wall thickness on the wheel tread as well as tolerance on wheel back-to-back spacing.

NOTE:  
THIS GAGE IS USED TO DETERMINE FLANGE WEAR.  
FLANGE IS TYPICALLY THE MOST SIGNIFICANT  
WHEEL WEAR AND THE CAUSE OF MOST WHEEL  
REPLACEMENT. WHEELS MAY ALSO BE CONDEMED  
FOR TREAD CONDITIONS SUCH AS HOLLOW GROUND  
TREADS OR CORRUGATION IF IT AFFECTS TRACKING  
ON RAIL, OR INSUFFICIENT TREAD WALL  
THICKNESS.

△ TREAD WALL THICKNESS & WHEEL BACK-TO-BACK:

WHEEL SIZE	MINIMUM WALL (IN)	WHEEL FLANGE BACK-TO-BACK (IN) +/- 1/8
RW-1630/50	3/4	52 7/8
RW-1212/1420	1/2	52 15/16
RW-1019	3/8	53 1/4
RW-1013/1015/1016	1/4	

0.063 ALUMINUM



△	10/24/16	ADDED BACK-TO-BACK DATA & 1016 WHEELS	BJF	
△	11/5/14	ADDED TREAD WEAR LIMITS, REVISED PROFILE FOR 500066	BJF	
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES:				
UNLESS SPECIFIED, COMMON SENSE PREVAILS				
FRACTIONAL: 1/32"				
FRACTIONAL: 1/16"				
X: .063				
XX: .030				
XXX OR XXXXX: .005				
DRILL SIZES: .015				
ANGULAR: 1°				
SURF FINISH: 125 MICRO				
THREADS: RA AND 2B				
SMALL SHOTS: 1/8" & 1/4" MAX				
DMF		TITLE:		
DRAWN BY: WAK		DET, GAUGE, WHEEL WEAR		
APPD BY:		DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512		
DATE: 2/2/10		DRAWING NUMBER: 800115		
		REV: C		

## 3.4 Troubleshooting

### 3.1.5 Troubleshooting On-track Problems

Symptom	Possible Cause	Diagnostic Step	Corrective Action
Rail wheel vibration/ noise	Damaged Tread/Flange	Inspect treads/Flange	Replace wheel
	Patterned Wear on Tread/Flange	Inspect treads/Flange	Replace wheel
	Loose Wheel	Check wheel end play (detailed instructions at Sections 7.0 and 8.0 for appropriate wheel & axle assy. drawings)	Follow detailed instructions at Sections 7.0 and 8.0
Vehicle tracking to one side, wandering	Misalignment	Check Alignment (see Section 4.7)	Adjust Alignment
	Overload or load imbalance	Visually inspect, scale vehicle	Unload and/or redistribute load
	Un-Even Rail Wheel Load/ Vehicle Load	Weigh Vehicle and Check Rail Wheel Load	Adjust Load Distribution and Re- set Rail Wheel Load
	Excessive Wheel Wear	Check Alignment and Wheel Wear	Adjust Alignment, Replace Worn Wheels
Insufficient traction or braking	Rail Wheel Load set too low	See Section 4.7	Set Rail Wheel Load
	Tires worn	Inspect Tires	Replace tires

**Table 3.4.1** Troubleshooting On-Track Problems



### 3.5 Derailment

In the case of a minor derailment, the cause of the derailment should be determined and corrective steps taken. The vehicle should be inspected to determine if repairs or adjustments are required. This inspection should include, but should not be limited to, the following:

- Visually inspect Railgear for hydraulic leaks
- Ensure all lines and hoses are still secured and out of the way of any moving parts
- Ensure all hydraulic hose connections and fittings are securely in place and not broken
- Verify that all threaded fasteners are secure, and that cotter pins are not broken
- Visually inspect wheels to ensure that tread and flange are not severely damaged
- Spin all 4 Rail wheels, noting any bearing noise, resistance, and end play

Any items noted should be repaired using specifications in the manual, to ensure they are repaired to initial install standards.

In case of a major derailment, a complete inspection should be performed, including but not limited to the following:

- Perform all inspection items as listed above in the Minor Derailment section
- Inspect all long arms, pivot arms, and links, to ensure they are not bent, cracked, or broken
- Inspect and test rail brake system (see Section 5.3).
- Ensure spring brackets are securely fastened, and are not bent, cracked or broken
- Ensure all welds are intact and show no signs of cracking or breaking
- Ensure all mounting hardware and brackets are securely fastened, and are not bent, cracked, or damaged in any way
- A full alignment should be performed. See Section 4.7.
- Wheels should be removed and the bore, bearings, races, and insulation (if applicable) should be inspected for any damage. For further wheel details, see section 7.0 for appropriate wheel & axle assembly drawings.
- Ensure axle threads are not stripped or damaged

Any items noted should be repaired using specifications in the manual, to ensure they are repaired to initial install standards.

Please contact DMF for any assistance you may require.

# SECTION 4.0 RAILGEAR INSTALLATION

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## 4.1 PRE-INSTALL

### NOTICE

The proper installation of this equipment is solely the responsibility of you, the installer. When in doubt, contact DMF for assistance.

### NOTICE

During Railgear installation, there are 3 different alignments - front Railgear to machine frame, rear Railgear to machine frame, and a final procedure that aligns both sets of Railgear to each other.

### 4.1.1 Safety Statements

- Always block up gear before getting underneath
- Always use jack stands when jacking up vehicle
- Use personal protective equipment and clothing

### 4.1.2 Installation Order

This manual presents the installation information in the order that we find to work best. Your shop, tools, personnel or other factors may dictate a different order. This is acceptable as long as the Rail Test, Road Test, and Final Inspection are performed at the end.

### 4.1.3 Required Tools & Materials

Aside from general shop tools and safety equipment the following tools will be required:

- Arc or MIG Welder
- Surge Protector (Protects ECM from damage during welding)
- Cutting Torch
- Hand Grinder
- Air Saw
- Angle Finder
- Test Rail – See Section 4.2.4
- Hydraulic Oil: See machine manufacturer's recommendations.
- Wheel Bearing Grease / Grease Fittings:
  - **Factory Standard:** Citgo Syndurance Premium Synthetic 460 #2
  - **Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)

Additionally the following tools are recommended:

- Transmission Jack, Motorcycle Lift, Pallet Jack or Forklift
- Overhead Crane
- Work Lights
- Wheel Dolly

### 4.1.4 Bolt Torque Specifications

See following page for recommended torque specifications.

**TITLE:** Purchased Fastener Torque Specifications

**PURPOSE:** To establish production methods for the installation of commonly purchased threaded fasteners.

**COMMON USAGE:** Most areas of multiple part assembly and retention.

**PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE:** Most common sizes of SAE J429 Grade 5 and 8 and of ASTM A574 socket head cap screws.

**PROCEDURE:**

A) Identify the fastener as either fine or coarse thread, select the appropriate chart below.

B) Identify the fastener size (diameter and threads per inch), select the appropriate row in the chart selected.

C) Identify grade of the bolt.

D) Read across the size row and down the grade column. The intersection of row and column gives torque.

#### FINE THREAD BOLTS

SIZE (DIA-TPI)	SAE J429 GRADE 5 (3 MARKS) PLATED (FTLB)	SAE J429 GRADE 8 (6 MARKS) PLATED (FTLB)	ASTM A574 SOCKET HEAD CAP SCREW (FTLB)
1/4-28	6	8	12
5/16-24	12	15	24
3/8-24	21	27	43
7/16-20	33	43	68
1/2-20	51	66	105
9/16-18	72	96	-
5/8-18	100	135	202
3/4-16	180	223	354
7/8-14	260	350	564
1-12	390	530	860
1 1/8-12	540	750	-
1 1/4-12	745	1050	1697
1 3/8-12	-	-	2288
1 1/2-12	1320	1850	3001

#### COARSE THREAD BOLTS (MATCHING HEX NUTS)

SIZE (DIA-TPI)	SAE J429 GRADE 5 (3 MARKS) PLATED (FTLB)	SAE J429 GRADE 8 (6 MARKS) PLATED (FTLB)	ASTM A574 SOCKET HEAD CAP SCREW (FTLB)
1/4-20	5	7	10
5/16-18	19	14	22
3/8-16	19	24	38
7/16-14	30	38	61
1/2-13	45	59	93
9/16-12	66	84	-
5/8-11	90	120	179
3/4-10	160	200	317
7/8-9	240	320	511
1-8	360	480	767
1 1/8-7	480	670	1087
1 1/4-7	670	930	1533
1 3/8-6	-	-	2010
1 1/2-6	1170	1650	2668

#### COMMENTS:

A) Torque values specified are for bolts with residual oils or no special lubricants applied. If special lubricants of high stress capacity (such as Never-Seez, graphite and oil, molybdenum disulphide, colloidal copper or white lead) are applied, multiply the torque values in charts by 0.90. The use of Loctite does not affect the torque values in charts.




B) All values are in Foot-Pounds (FTLB). Multiply by 12 for Inch-Pounds.

C) Flat washers of equal strength must be used.

D) Bolt manufacturer's specs should be used when available.

E) Values shown are for Nylock nuts or Grade C prevailing torque nuts.

F) Never re-use a highly stressed, torque fastener: IT MAY FAIL!

	07/15/15	UPDATED ALL TORQUE VALUES, REMOVED PLAIN TORQUE SPECS		DJJ	
	12/29/99	ADDED RECOMMENDED TORQUE CHART		LOR	
REV	DATE	DESCRIPTION			BY APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRACTIONAL: ± 1/32" FRACTIONAL, OTHER: ± 1/16" X: ± .063 .XX: ± .030 .XXX OR .XXXX: ± .005 DRILL SIZES: ± .005 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES		DRAWN BY: TSH		APPD BY:	
		TITLE: PRODUCTION PROCEDURE 006 FASTENER TORQUE SPECIFICATION			
		DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512			
		DATE: 06/02/94		DRAWING NUMBER: PP006	REV: B

#### 4.1.5 Welding Information

- Dual Shield Wire spec. → AWS E71T-1
- Low Hydrogen spec. → AWS E-7018

Low Hydrogen Electrodes (AWS E-7018)

Manufacturer	Equivalent Rod
Air Products	AP-7018, 7018IP
Airco	7018C, 7018-A1
Arcos	Ductilend 70
Air Products	170-LA, SW-47,616
Chemtron	170-LA, SW-47,616
Hobart	718, 718-SR
Marquette	7018
McKay Co	7018
Reid-Avery	7018
Uniblaze	7018
Westinghouse	Wiz-18
Lincoln	Jetweld LH-70

**Table 4.1.5** Manufacturer Equivalent Welding Rod

## 4.2 INITIAL INSTRUCTIONS

### 4.2.1 Work Area

The area in which the Railgear installation is to occur should meet minimum requirements in order to facilitate the process and provide adequate conditions in which the work can be completed safely, accurately and in a timely manner.

- Floor - The floor should be level in order to provide good measurements required to check the alignment of the Railgear.
- Lighting - The work area should be adequately lighted.
- Space - There should be enough space to maneuver the Railgear components into position and to safely work around other equipment.

### 4.2.2 Vehicle Condition

Before installation, the vehicle should be checked in some important areas.

- Tires - The tire pressure should be checked for the manufacturer's recommended inflation and for consistent pressure readings from all the tires. This will ensure correct traction of the tires on the rail. Also the condition of the tires needs to be determined. If the tires are worn, they should be replaced.
- Alignment - Rear vehicle axle must be square with truck frame. DMF recommends that a reputable alignment shop check this. 0-degree thrust angle (which may be different than the factory specification) is required for proper Railgear operation.
- Frame & Suspension - On a new vehicle, these should be in good condition. On a used vehicle, the frame should be inspected to ensure that it has not been damaged or bent. The suspension bushings should also be examined for excessive wear and replaced if necessary. If any problems in these areas are not corrected, it will cause difficulties aligning and operating the Railgear.

### 4.2.3 Hydraulic System

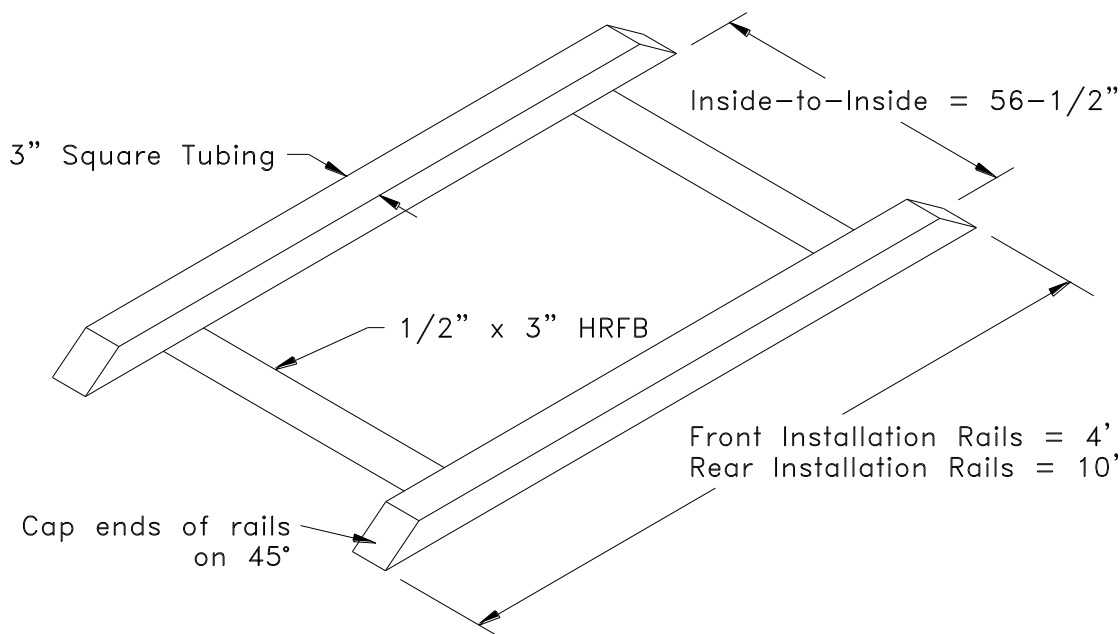
The vehicle should have a hydraulic system installed before installing the railgear. Hydraulic pressure will be needed to assist during the installation process. Please see section 6.0 for information on installing or modifying an existing hydraulic system for railgear.

### 4.2.4 Front and Rear Installation Rails

In order to install the Railgear to get proper tire traction on the rail, it is necessary that standard gauge rails or Installation Rails be fabricated from 3" square tubing per Figure 4.2.4. When needed, drive the vehicle into the work area (pulling forward and back several times to align the axles) and up onto the Installation Rails. The rear inside tires should be on the rails with the rear outside tires off the floor. The front tires on some machines line up with the rail. For those vehicles, use two sets of Rear Installation Rails, one at the front and another at the rear.

#### **WARNING**

Before proceeding, be certain that the front vehicle tires are chocked & the parking brake is set.



**Figure 4.2.4** Installation Rails

#### **NOTICE**

Inside-to-Inside measurement of 56-1/2" is the standard gage for the United States. If your equipment is to be operated on any other gage, adjust measurements according.

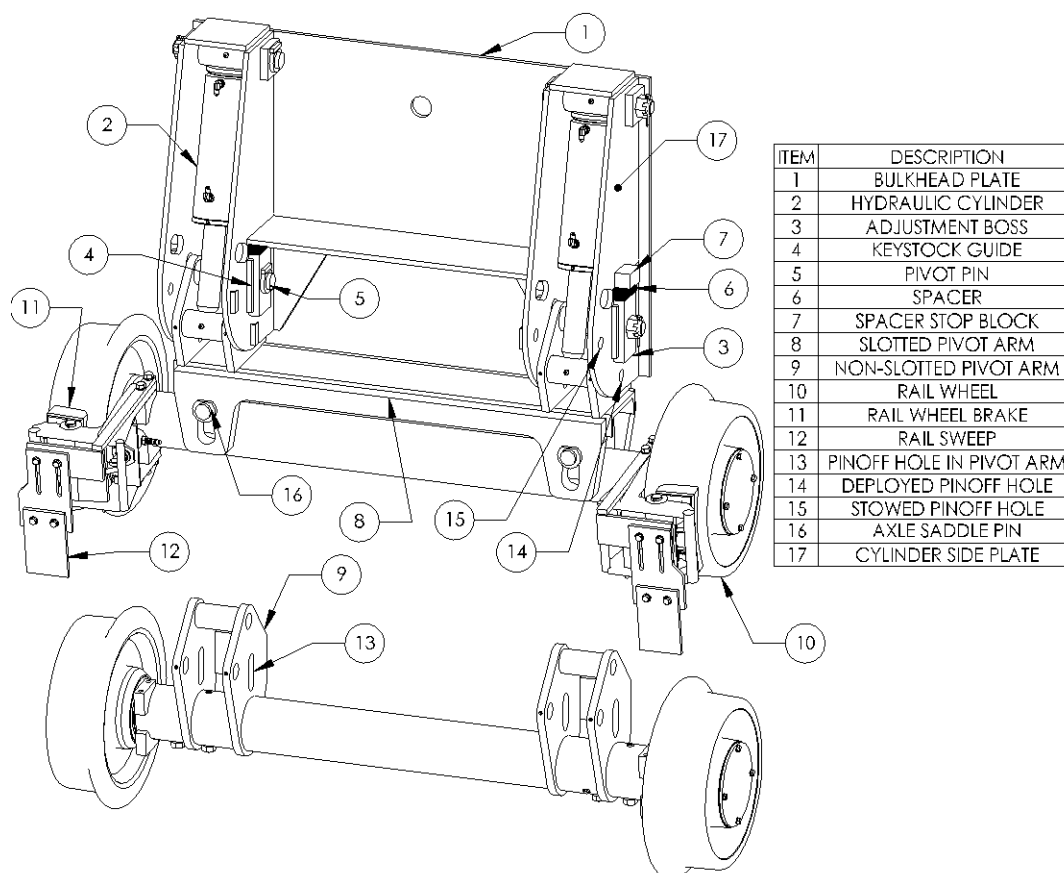
## 4.3 BULKHEAD MOUNTED RAILGEAR

### 4.3.1 General Information

- Before you begin Railgear installation, please read installation instructions for the options you have ordered. Some options may affect the Railgear installation process.
- Before permanently welding your rear railgear to the vehicle, be aware that during the locating, shimming, spacing, squaring, and weight setting procedures, your rear Railgear will be making slight movements during each of these steps. So you will want to only TEMPORARILY secure Railgear using tack welds after each procedure.
- The insulated Rail Wheels should always be on the driver's side of the Railgear, if equipped.
- If both the front and rear railgear are bulkhead style gear, the slotted axle typically goes on the rear (farthest from the steer tires).
- Install and align rear Railgear first, before completing the front.

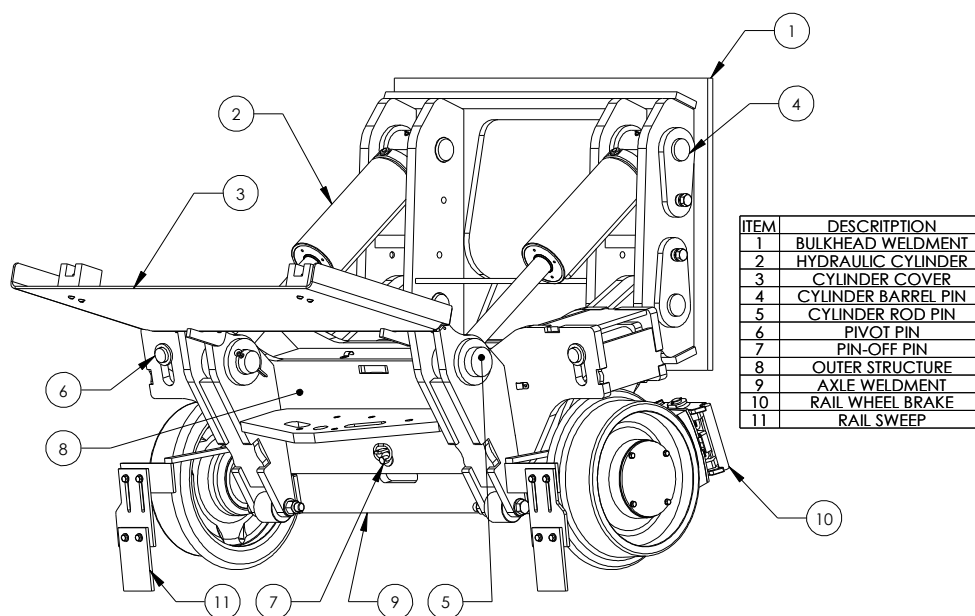
### 4.3.2 Diagram of Key Components

See Figures 4.3.2 and 4.3.3 for a diagram of Railgear components. Please familiarize yourself with these item descriptions as they will be used throughout this installation manual.



**Figure 4.3.2A** Bulkhead Mounted Railgear Parts





**Figure 4.3.2B** Bulkhead Mounted RW-1650GX Parts

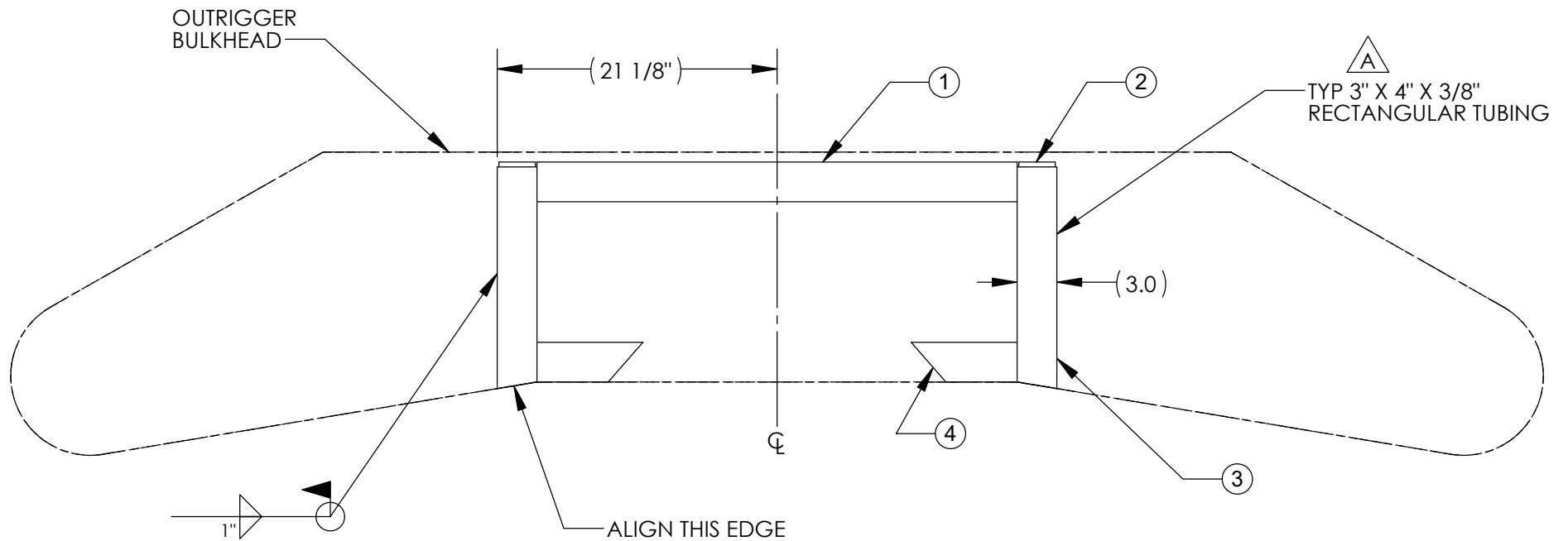
### 4.3.3 Bulkhead Spacer

Sometimes a spacer is required between the railgear and the outrigger bulkhead on the machine. This prevents the rail wheels from crashing into the outrigger bulkhead when the railgear deploys, as shown in Figure 4.3.4. If one is required, see drawing 83636 on the following page for an example of how to construct it.



**Figure 4.3.3** Bulkhead Spacer

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	83632	1	UPPER CROSS BEAM, MOUNTING SPACER, CAT M318 W/OUTRIGGERS
2	83635	2	VERTICAL BEAM END CAP, MOUNTING SPACER, CAT M318 W/OUTRIGGERS
3	83634	2	VERTICAL BEAM, MOUNTING SPACER, CAT M318 W/OUTRIGGERS
4	83633	2	LOWER CROSS BEAM, MOUNTING SPACER, CAT M318 W/OUTRIGGERS



A		7/10/2020		ADDED (3.0) DIMENSION & TUBING SIZE NOTE			8JF					
REV		DATE		DESCRIPTION					BY		APP	
TOLERANCES: (UNLESS SPECIFIED)				RW-1650G							TITLE: MOUNTING SPACER, CAT M318 W/OUTRIGGERS	
											DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512	
FRAC. MACH:		± 1/32"		DRAWN BY:		APPD BY:		DATE:		DRAWING NUMBER:		REV:
FRAC. OTHER:		± 1/16"		JDI		-		3/8/13		83636		A
.X		± .063										
.XX		± .030										
.XXX		± .005										
DRILL SIZES:		+ .015										
ANGULAR:		± 1°										
SURF FINISH:		125 MICRO										
THREADS:		2A AND 2B										

#### 4.3.4 Bulkhead Access Hole

Sometimes machines may require a hole to be torched in the bulkhead plate in order to service parts of the machine or to provide clearance for an obstruction. See Figure 4.3.5 for an example.



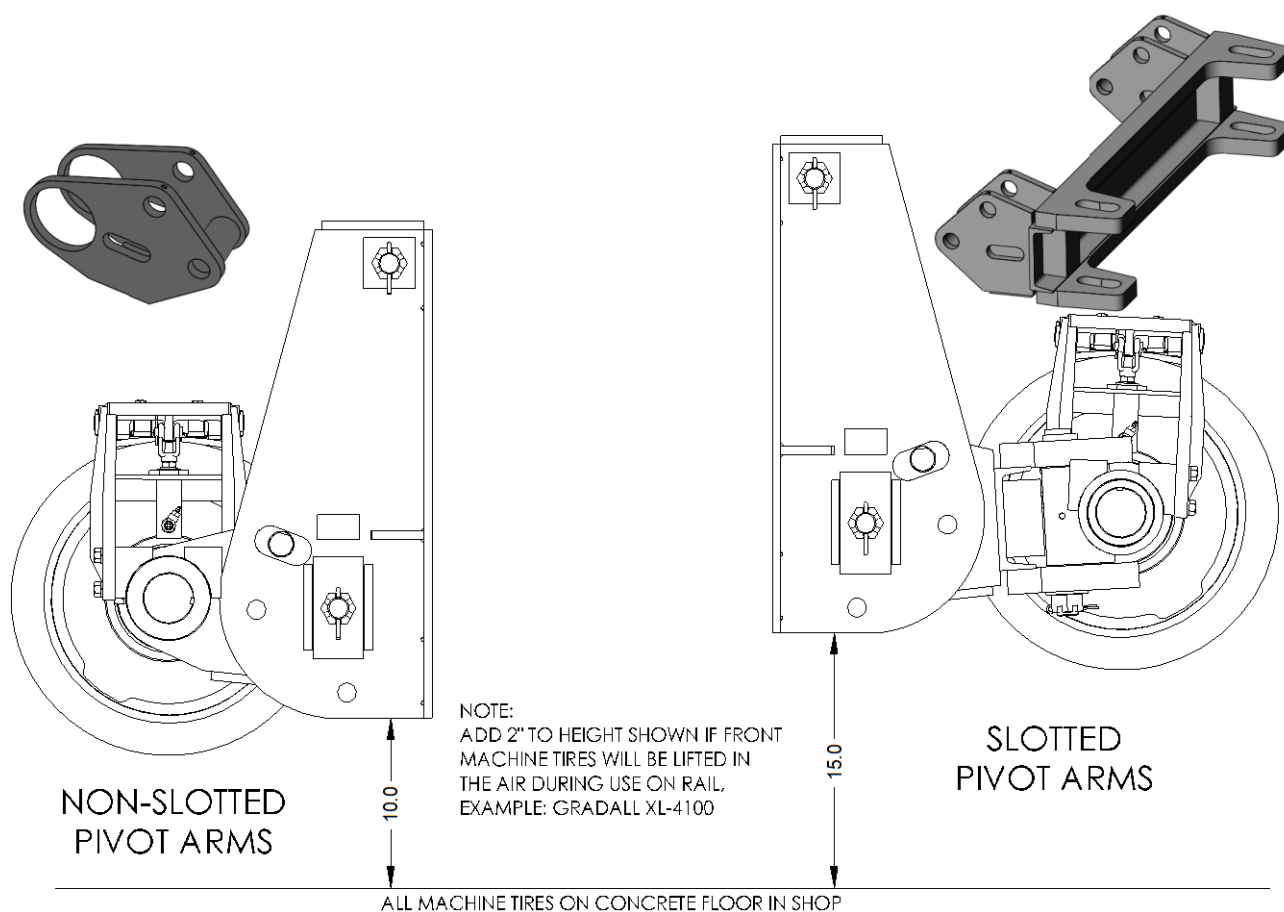
**Figure 4.3.4** Access Hole

#### 4.3.5 Set Bulkhead Height & Tack Weld

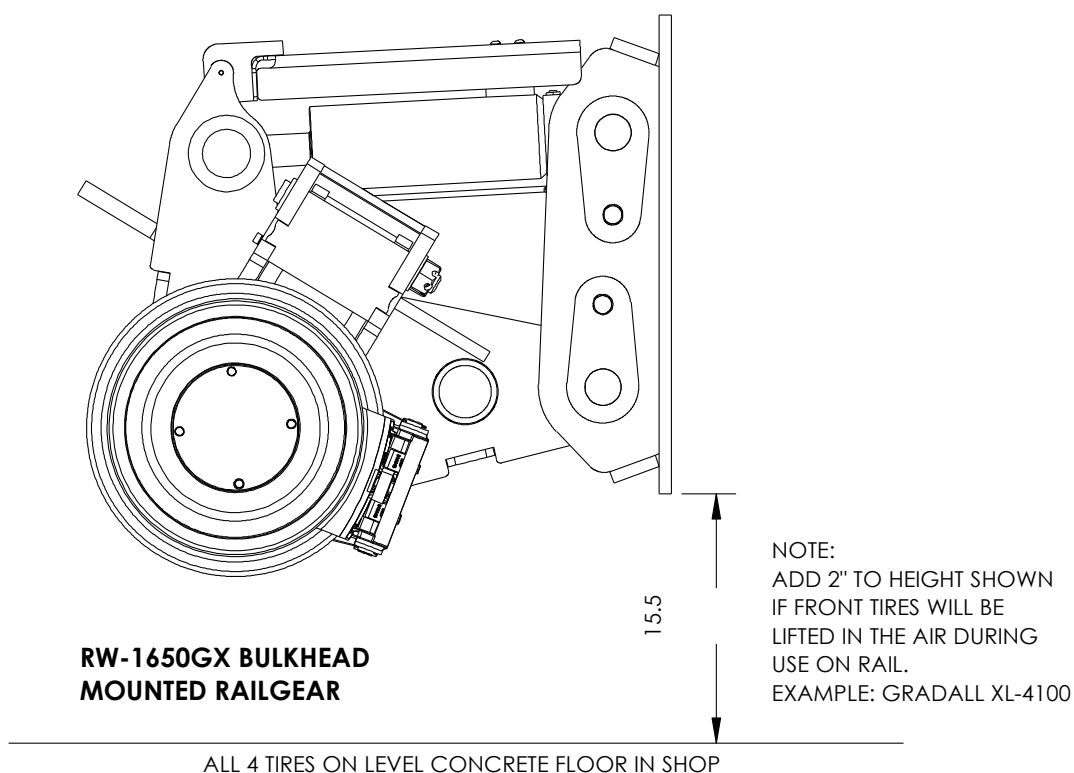
See Figures 4.3.6 and 4.3.7 to set the height of the bulkhead gear off the rail. Railgear with slotted links gets installed at a different height than Railgear with non-slotted links.

If the front Railgear on the machine is 1630 front-mounted gear instead of bulkhead gear, the machine frame will be lifted up on an incline on rail. Therefore, the installation height of the bulkhead rear Railgear has to be adjusted in order to set the rail wheel weights properly.

RW-1650GX railgear has a bulkhead plate separate from the railgear. The bulkhead plate is attached to the railgear when shipped and will need to be removed from the railgear to be welded to the machine. See Figure 4.3.7 for starting height of RW-1650GX bulkhead plate.



**Figure 4.3.5A Bulkhead Gear Starting Height Location**



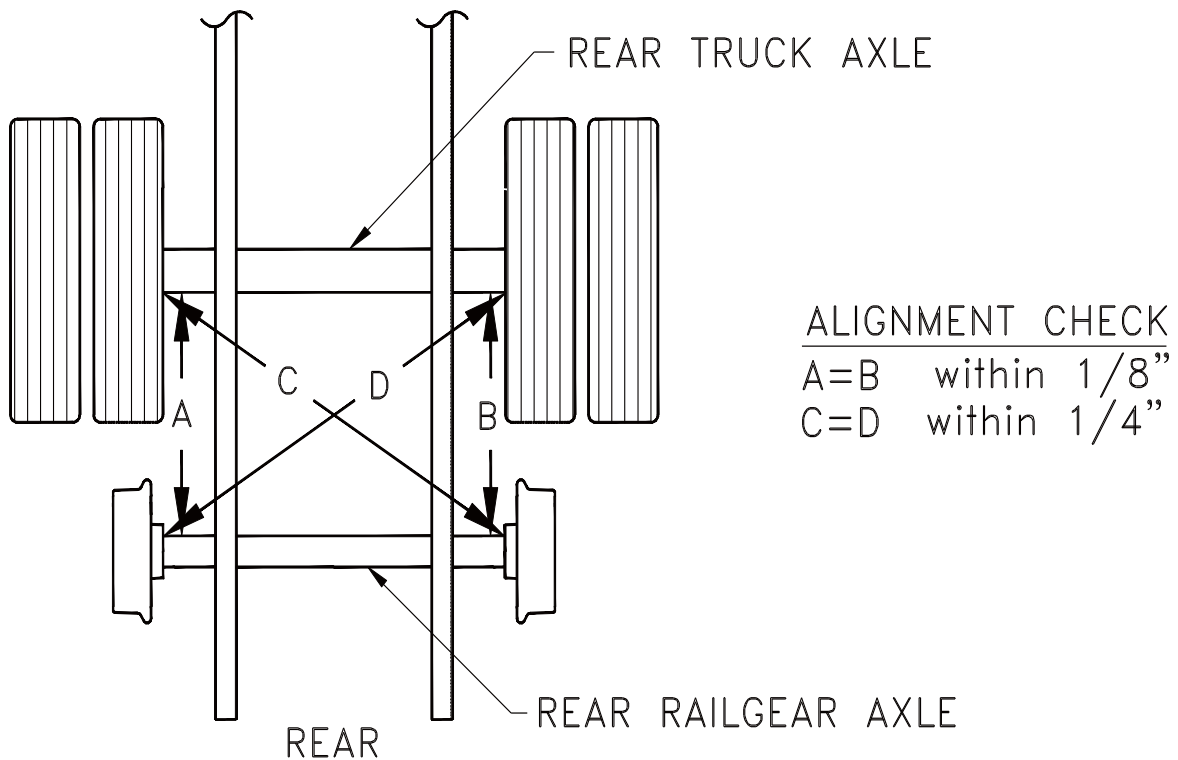
**Figure 4.3.5B RW-1650GX Bulkhead Gear Starting Height Location**



#### 4.3.6 Square Rear Railgear with Vehicle Axle

The Rear Railgear needs to be made absolutely square with the rear vehicle axle. Four measurements (shown in Figure 4.3.8) need to be taken to ensure this requirement:

- (1) The distance from the truck axle to the Rear Railgear Axle at each end. In Figure 4.3.8, distance "A" must be equal to "B" (within 1/8"). This is an important alignment check.
- (2) The diagonal from the truck axle to the opposite Rear Rail Wheel. In Figure 4.3.8 distance "C" must be equal to "D" (within 1/4").



**Figure 4.3.6** Squaring Rear Railgear

#### 4.3.7 Temporarily Securing Rear Railgear

Now that the bulkhead plate is correctly centered, vertically positioned, and aligned, you can temporarily tack weld the bulkhead plate to the bulkhead of the machine.

Final rear Railgear alignment and weight settings can only be performed after front Railgear is installed. The procedures for these final steps can be found in Section 4.7.

#### 4.3.8 Connect hydraulics

See Section 6.0 to tie the Railgear cylinders into the hydraulic system of the machine.

**4.3.9 Next Steps**

If you've just completed installing the rear Railgear, and the front Railgear is bulkhead mounted also, repeat the same procedures from Sections 4.3.1 thru 4.3.8 to temporarily secure the front railgear.

If the front Railgear is dozer blade replacement gear, proceed to Section 4.4.

If the front Railgear is a conventional 1630 front set of gear, then proceed to Section 4.5.

If both the front and rear Railgear are now installed, proceed to Section 4.7 for weight setting and final alignment.

## 4.4 DOZER BLADE REPLACEMENT RAILGEAR

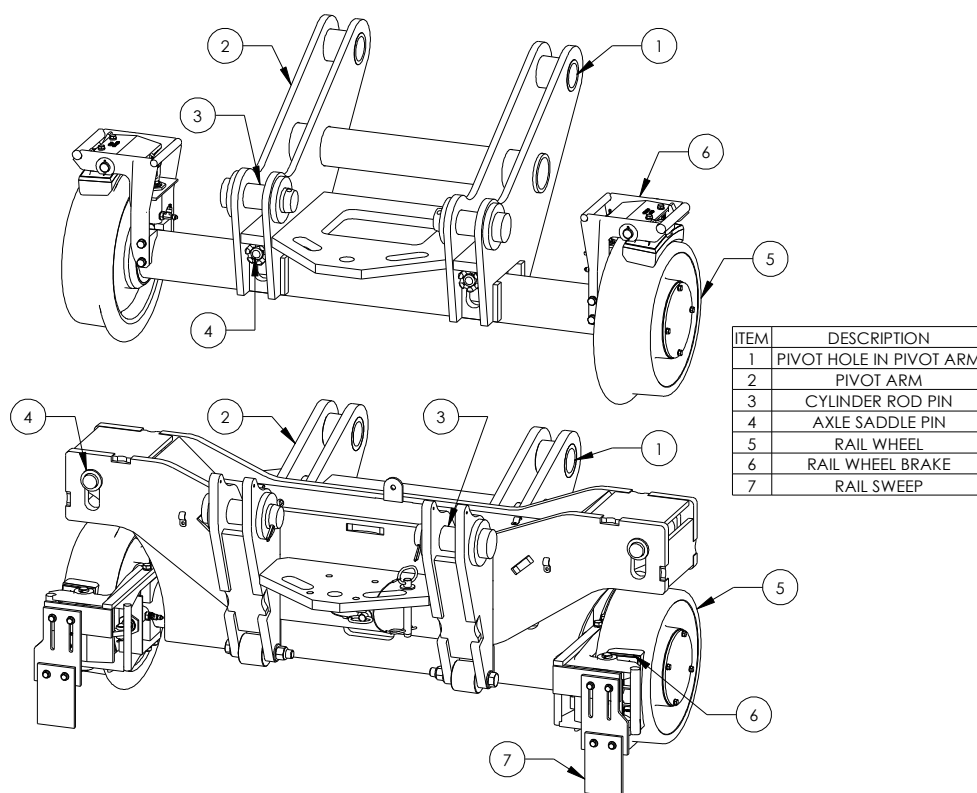
### 4.4.1 General Information

There are various styles and configurations of dozer blade replacement gear available for different makes and models of excavators. Keep in mind:

- Some machines can accommodate dozer blade replacement gear front and rear, while others will require bulkhead mounted gear instead on one end.
- Install and align rear Railgear first, before completing the front.
- Some Railgear axles come already welded into the pivot arm structure and others require alignment adjustment and then welding once installed on the machine.
- Be mindful of proper brake and sweep orientation on axle tubes that aren't already welded in place from DMF.
- The insulated rail wheels should always be on the driver's side of the Railgear, if equipped.

### 4.4.2 Diagram of Key Components

See Figure 4.4.2 for a diagram of Railgear components. Please familiarize yourself with these item descriptions as they will be used throughout this installation manual.



**Figure 4.4.2** Dozer Blade Replacement Gear Parts



### **4.4.3 Attach Railgear to Machine**

If the factory dozer blade is still installed, remove it. Then pin the excavator Railgear pivot arms onto the machine, typically re-using the pins from the dozer blade. Next, attach the hydraulic cylinders to the Railgear.

### **4.4.4 Temporarily Secure Axle**

If the axle tube for the Railgear is not already welded to the pivot arms, then center the rail wheels in the pivot arm assembly. Rotate the brakes and sweeps to the proper orientation. Then tack weld the axle tube to the pivot arms. Final structural welds will be performed later after the rail wheel load has been adjusted and the final alignment is complete.

### **4.4.5 Next Steps**

If you've just completed the rear Railgear, and the front is also a dozer blade replacement set, repeat Section 4.4.1 thru 4.4.4 for the front Railgear.

If the front Railgear is bulkhead mounted, see section Sections 4.3 to temporarily secure the front railgear.

If the front Railgear is a conventional 1630 front set of gear, then proceed to Section 4.5.

If both the front and rear Railgear are now installed, proceed to Section 4.7 for weight setting and final alignment.

## 4.5 CONVENTIONAL RW-1630 FRONT RAILGEAR INSTALLATION

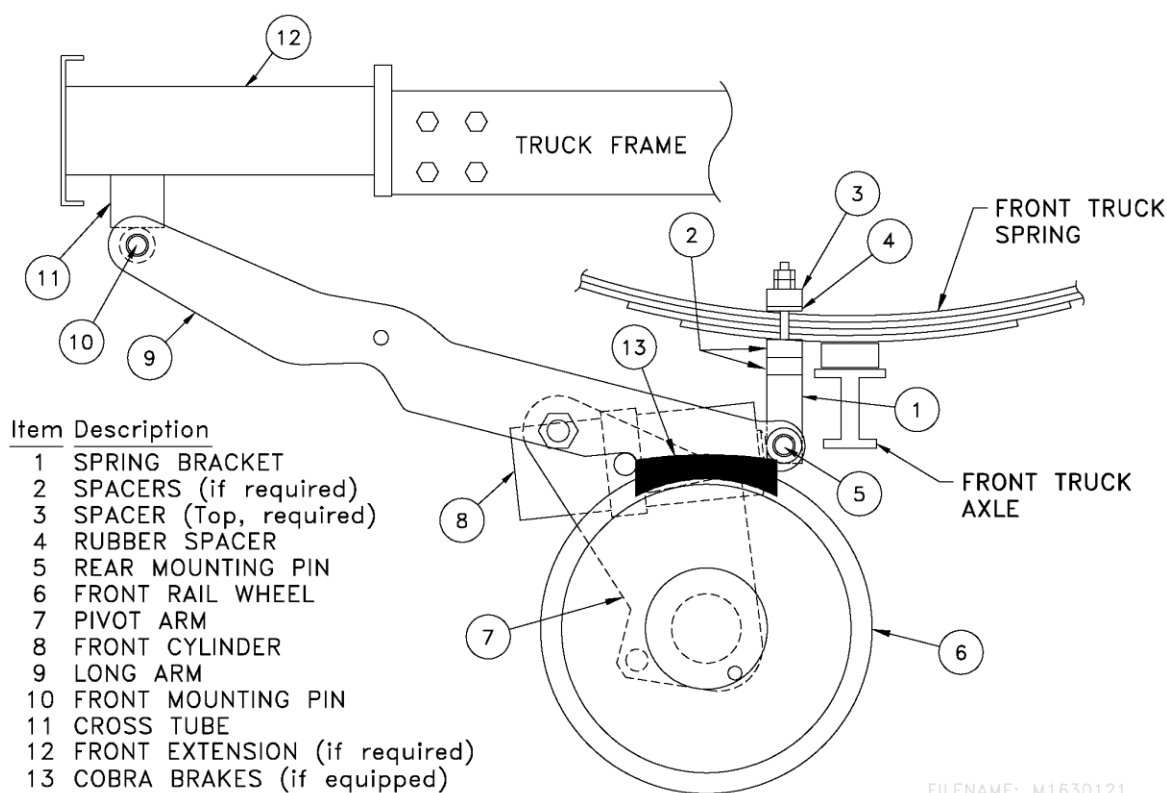
### 4.5.1 General Information

There are several items to note before you begin the installation of the front Railgear:

- The Railgear unit that we have shipped to you has been designed for your machine. However, before starting the front Railgear installation, check the vehicle's front tire spacing. The front Railgear operates between the front steering tires; therefore, you must have a minimum of 65" between the tires. If this is not the case, contact DMF.
- Check for sufficient clearances to prevent interference with Railgear and other parts of the truck (ie. Frame, steering boxes, shocks, oil filters, etc.) See section 4.5.7 for complete Clearance Note. If notable clearance issues are found, please contact DMF prior to continuing installation.

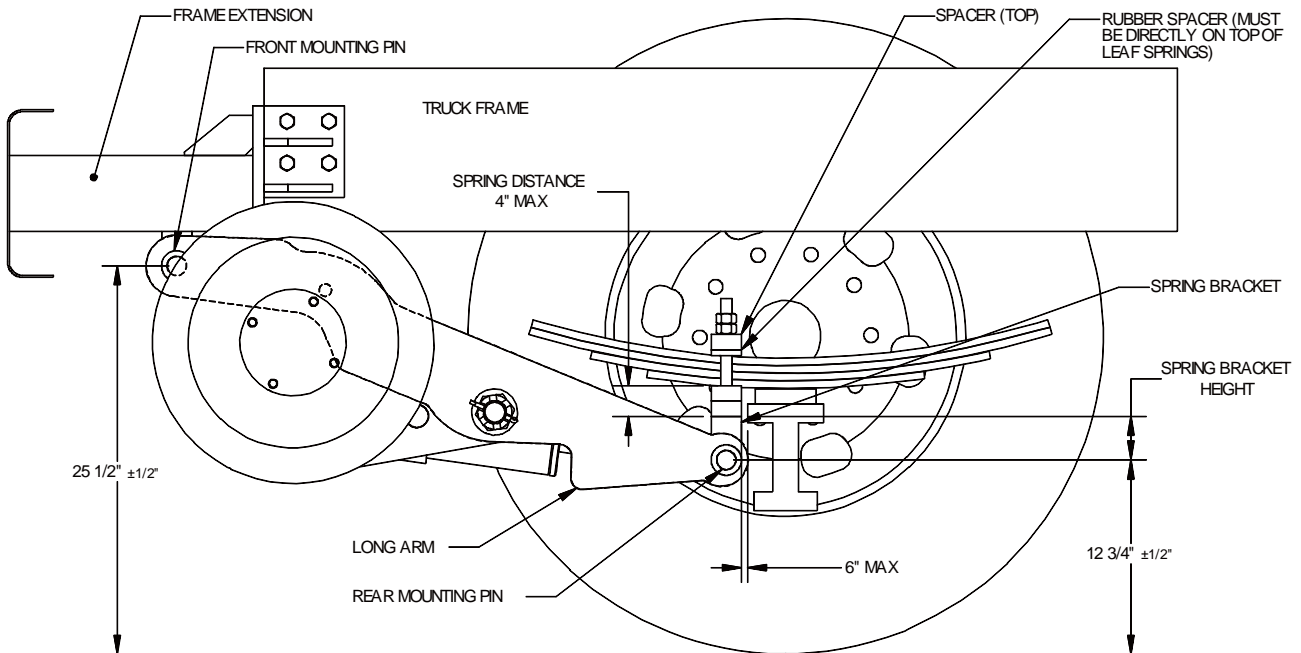
### 4.5.2 Diagram of Key Components

Figure 4.5.2 shows the individual parts of the installed front Railgear. Please familiarize yourself with these item descriptions as they will be used throughout this installation manual.



**Figure 4.5.2** Diagram of Key Components

### 4.5.3 Front Mounting Dimensions



**Figure 4.5.3** Front Mounting Dimensions

### 4.5.4 Mount Front Railgear

Mounting spring bracket hangers:

1. Slide the front Railgear under the vehicle frame, positioning the spring bracket hangers as close as possible to the front vehicle axle. Make sure at least half of the spacer is seated on the leaf spring closest to the vehicle truck axle. If the spacer is not at least half-seated, move spring bracket hanger forward to next leaf spring. The spring hanger can be moved 6" max from front vehicle axle.
2. Once positioned, place a floor jack under the outboard and inboard long arm, close to the spring hanger on the driver's side. Using the jack, raise the spring hanger up toward the truck's leaf springs. You will raise and lower the long arms until the "Rear Mounting Pin" is 12-3/4" (+/- 1/2") from the floor. See Figure 4.5.3.
3. Once you achieve the desired height, insert 1"x2" flat bar spacers between spring hanger and leaf spring, up to a maximum of 4". If you need more than 4" of spacers, a change of spring brackets may be required (see Section 7.0 for spring bracket information). Contact DMF for assistance.
4. Once spacers are in place with spring bracket at the appropriate height, attach the Spring Bracket to the truck spring using a Rubber Spacer (already supplied) directly on top of the leaf springs, and then a 1" x 2" flat bar Spacer (already supplied) on top of the Rubber Spacer and two 3/4"-10 hex nuts per stud. The top Spacer has no effect on the height of the Railgear and is only used for clamping purposes.
5. The nuts should be tightened down until the Rubber Spacer begins to deform from the downward pressure (**Caution: Do not over tighten**).
6. Repeat process on passenger side.

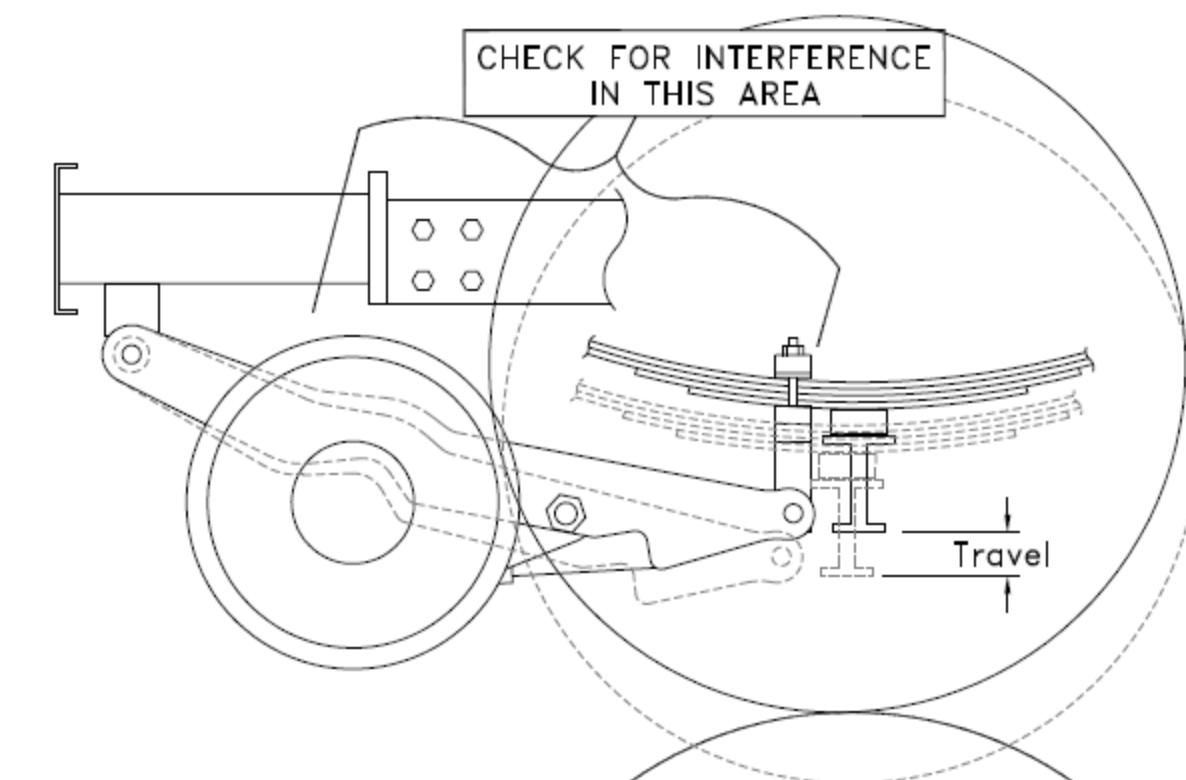
Route Hydraulic lines

1. Route all hydraulic lines as shown in Section 6.0.
2. Engage the PTO and allow hydraulic circuit to self-bleed.
3. Inspect all connections for leaks and tighten as necessary.

Mounting Front Cross Tubes:

1. Ensure that both spring bracket hangers are properly installed before attempting to install front cross tubes.
2. Remove the Front Pin-Offs and set the steering tires straight ahead. The front Railgear can now be actuated with the hydraulic system, which will cause the Long Arms to be raised up to the Frame (see Figure 4.5.3). The cross tubes only need to be brought up to where they touch the Frame Extension or truck frame (not raised all the way to lift the truck frame and raise the truck tires).
3. In order to install the front of the front Railgear at the correct height, the center of the Front Mounting Pins must be located at 25-1/2" (+/- 1/2") from the ground (with the truck tires on the ground) as shown in Figure 4.5.3. If required, shim the cross tubes to obtain this 25-1/2". Any shims used should be load bearing members (no thin wall tubing). If necessary, a different cross tube can be used to obtain the desired height of the Front Mounting Pin, up to a maximum of 3" of shims. If you need more than 3" of shims, a change of cross tubes / mounting block may be required (see Section 7.0 for information). Contact DMF for assistance.
4. Once properly shimmed, the hydraulic system should already be properly positioned to hold the shims in place until alignment can be completed.
5. Check for vehicle frame, spring, steering gear or other vehicle component interference with the Railgear (particularly the Long Arms – see CLEARANCE NOTE in section 4.5.5). The Front and Rear Mounting Pins may be lowered evenly (front to rear and also left to right) to correct a clearance problem. The minimum heights (with railgear stowed for highway travel) are 23" for the Front Mounting Pin and 10" for Rear Mounting Pin. These heights will allow the Railgear to have 8" of ground clearance when stowed.

#### 4.5.5 Front Railgear Clearance



**Figure 4.5.5** Front Railgear Clearance

**NOTICE**

Proper clearances will allow the Railgear to move up and down with the vehicle front suspension. As the tire hits bumps in the road, the vehicle spring allows the front axle to move upward (see Figure 4.5.5). Since the Railgear is attached to the spring just in front of the axle, sufficient clearance must be allowed to prevent interference with other parts on the vehicle (i.e. frame, radiator, steering boxes, shocks, oil filters, spring hangers, hydraulic lines, etc.). The Front Mounting Pin does not move in relation to the vehicle frame because it is fastened through the directly to the vehicle frame. As the Front Mounting Pin does not move and the Rear Mounting Pin (at the axle) does, the Railgear effectively rotates about the Front Mounting Pin. Therefore, the part of the Railgear near the Rear Mounting Pin moves more than the part near the Front Mounting Pin, and attention needs to be paid to the possible clearance problems that can be caused by this movement.

**4.6 COMPLETING FRONT INSTALLATION OF CONVENTIONAL RW-1630****4.6.1 Align Front Railgear**

The front Railgear now is ready to be squared up and aligned. Three measurements need to be taken to ensure that everything is aligned properly.

To align the Long Arms, check:

- (1) That they are parallel with each other and the truck frame.  
The outside Long Arms should be the same distance apart at the Rear Mounting Pin as they are at the Front Mounting Pin. This prevents the mechanism from binding during up/down operation of the Railgear. Also, the distance from the Long Arms to the vehicle frame should be the same on each side.
- (2) That they are the same distance forward.  
Measure the distance from the Front Mounting Pin to a common point in the vehicle frame. If the measurements are off, square the Railgear by loosening the nuts on one spring hanger and moving forward on the vehicle spring and re-tighten.

To check the Spring Bracket location, check:

- (3) That the Spring Bracket to vehicle axle distance is same on both sides.  
Measure the distance from each Spring Bracket back to the vehicle axle. Since the forward position of the Long Arms has been verified (Check #2), an off measurement here probably means the front vehicle axle is misaligned and needs to be corrected.

After these alignment checks and after ensuring there are sufficient clearances, the cross tubes can be tack welded to the vehicle frame.

**⚠ WARNING**

Do not attach the welding machine ground clamp onto the Rail Wheels. This will cause arcing across the bearings inside the wheels and lead to premature bearing failure.

Raise the front Rail Wheels just above the floor, enough to slide the front Installation Rails into place under the Rail Wheels. Because the Railgear Axle assembly is not fixed to the Pivot Arms (outside pivot arms will be completely welded to at final weld-out), the Rail Wheels need to be centered. To center, measure the distance from the inside of the Rail Wheel to the vehicle frame. If the measurements are off, slide the Rail Wheels and Axle assembly to one side (the Axle Tube will slide through the holes in the Pivot Arms).

Depending on the brake configuration used, the Axle Tube will need to be rotated in order to locate front Railgear components in the right position. The possible configurations are:

Without Brakes:

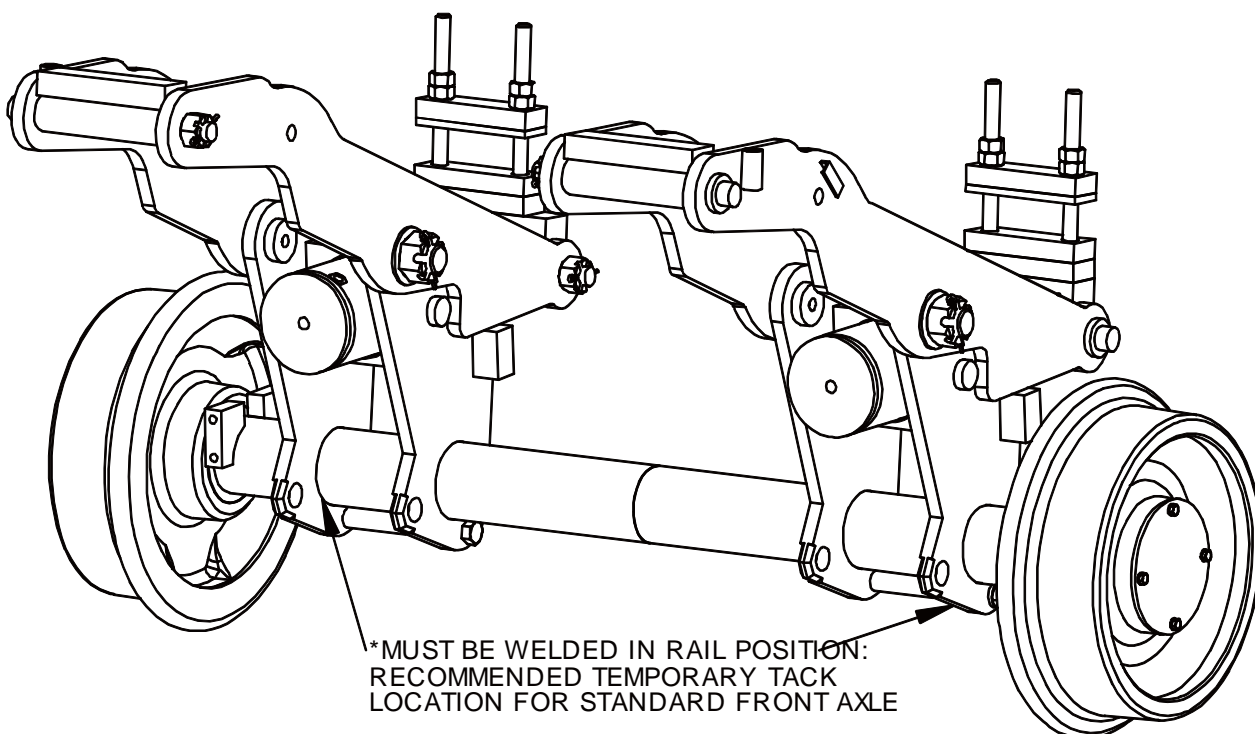
If the Railgear is not supplied with any brakes, the Steering Wheel Locks must be aligned. When the front Railgear is in the rail position, these Steering Wheel Locks prevent the front truck wheels from interfering with the Railgear operation.

With Cobra Brakes:

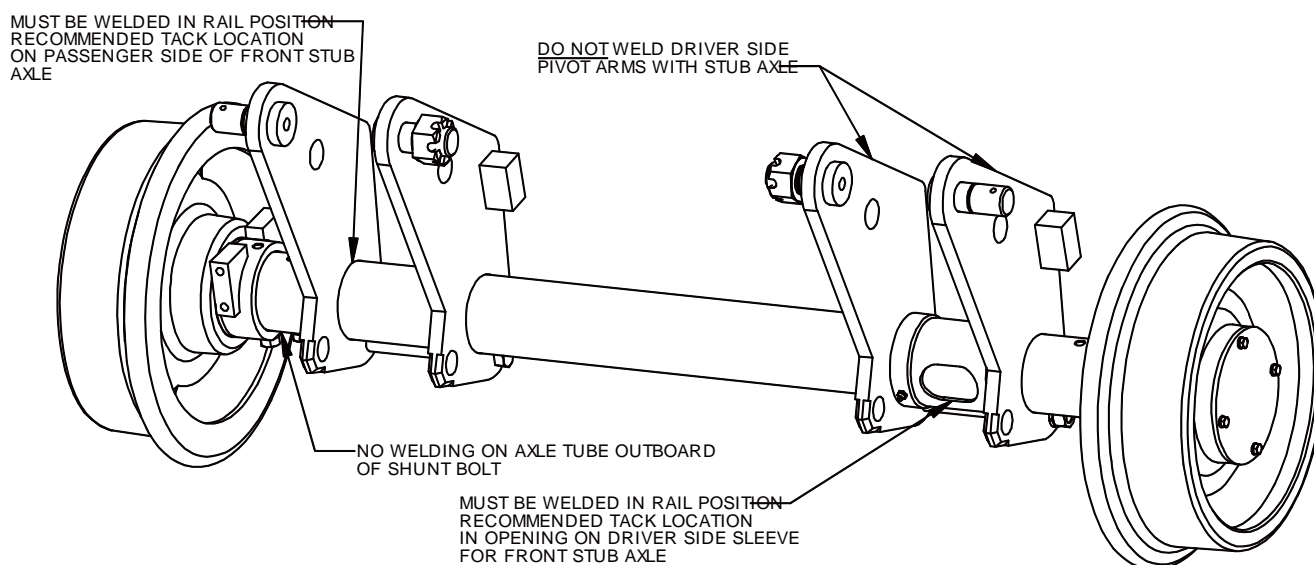
If the Railgear is supplied with Cobra Brakes (factory-installed), then they need to be rotated around so that they are oriented in the correct position (see Section 5.3.1). For the rest of the brake installation, see Section 5.3.

With the Axle Tubes now centered and brake configuration determined, the Axle Tubes should be temporarily tacked (at final adjustment, the tacks can be ground off and the axle re-

adjusted if necessary). See Figures 4.6.1.A and 4.6.1.B for diagram of recommended tack locations for standard and stub axle. The front Railgear is ready to be lowered on the Installation Rails. As the Railgear is lowered, check the clearance from the vehicle tire to the Rail Wheels. (If there is any interference, stop lowering the wheels, and retrace the installation steps to fix the problem.)

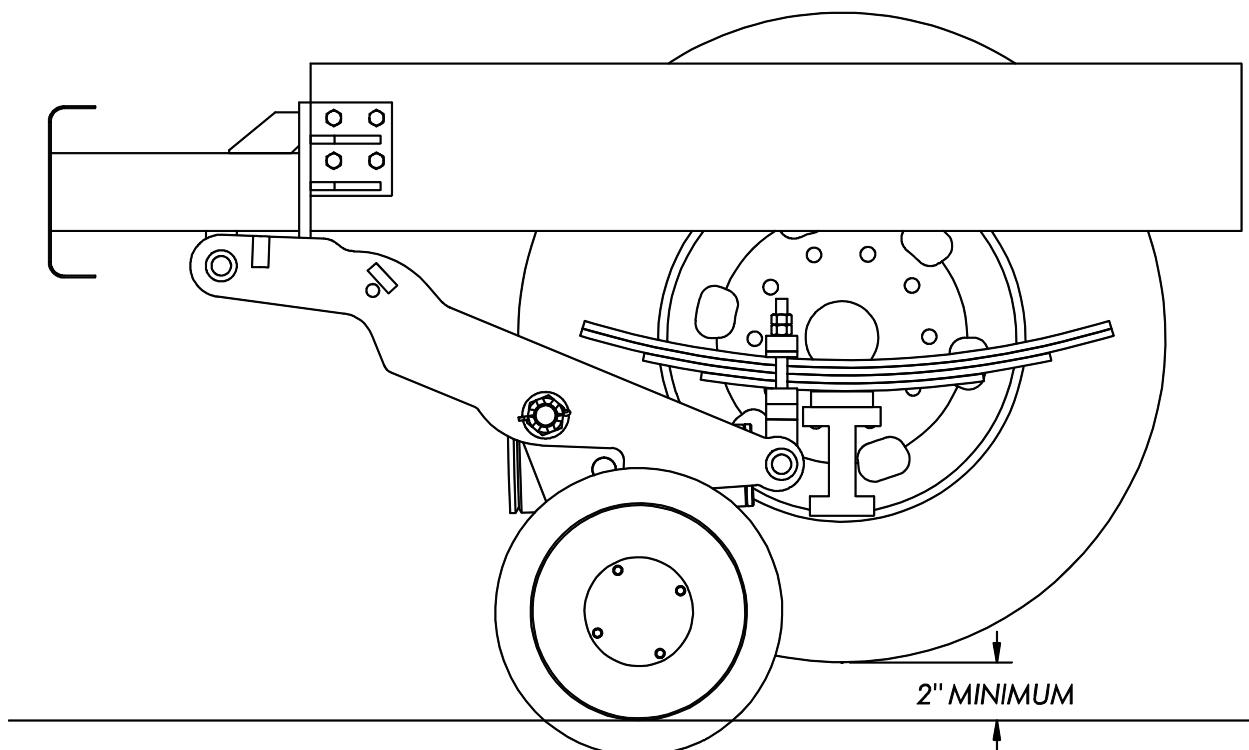


**Figure 4.6.1.A** Recommended Tack Location for Standard Front Axle



**Figure 4.6.1.B** Recommended Tack Location for Front Stub Axle

When the Railgear is completely lowered, the front truck tires should be approximately 2 inches above the Installation Rails as shown in Figure 4.6.1.C. If this check is being performed off the rail (such as a concrete shop floor), note that the rail wheel flange is roughly 1.25" tall. The Front and Rear Mounting Pins may be lowered evenly (front to rear and also left to right) to provide more tire clearance above the rail. The minimum heights (with railgear stowed for highway travel) are 23" for the Front Mounting Pin and 10" for Rear Mounting Pin. These heights will allow the Railgear to have 8" of ground clearance when stowed.



**Figure 4.6.1.C** Front Tire Clearance Above Rail

If Railgear will not lift the vehicle, check that the cylinders are not cross plumbed, that the system pressure relief valve (if present) is set high enough and that the pressure relief on the Front Railgear Valve is set high enough. As a final review, recheck the center alignment of the Rail Wheels to the truck frame. (If it is off, break the tacks holding the Axle Tube and slide the Axle Tube to the correct position and re-tack in place.)

#### **4.6.2 Final Steps**

If the Spring Bracket location had to be adjusted, make sure that the hex nuts (two per stud) on both Spring Brackets have been tightened down. Then with a torch, cut the excess stud length on the Spring Brackets. If these studs are not trimmed down, they may pose a clearance problem with other parts on the vehicle (see CLEARANCE NOTE and Figure 4.5.5).



## 4.7 WEIGHT ADJUSTMENT & OVERALL ALIGNMENT PROCEDURE

### 4.7.1 Weight Adjustment on Bulkhead Mounted Gear

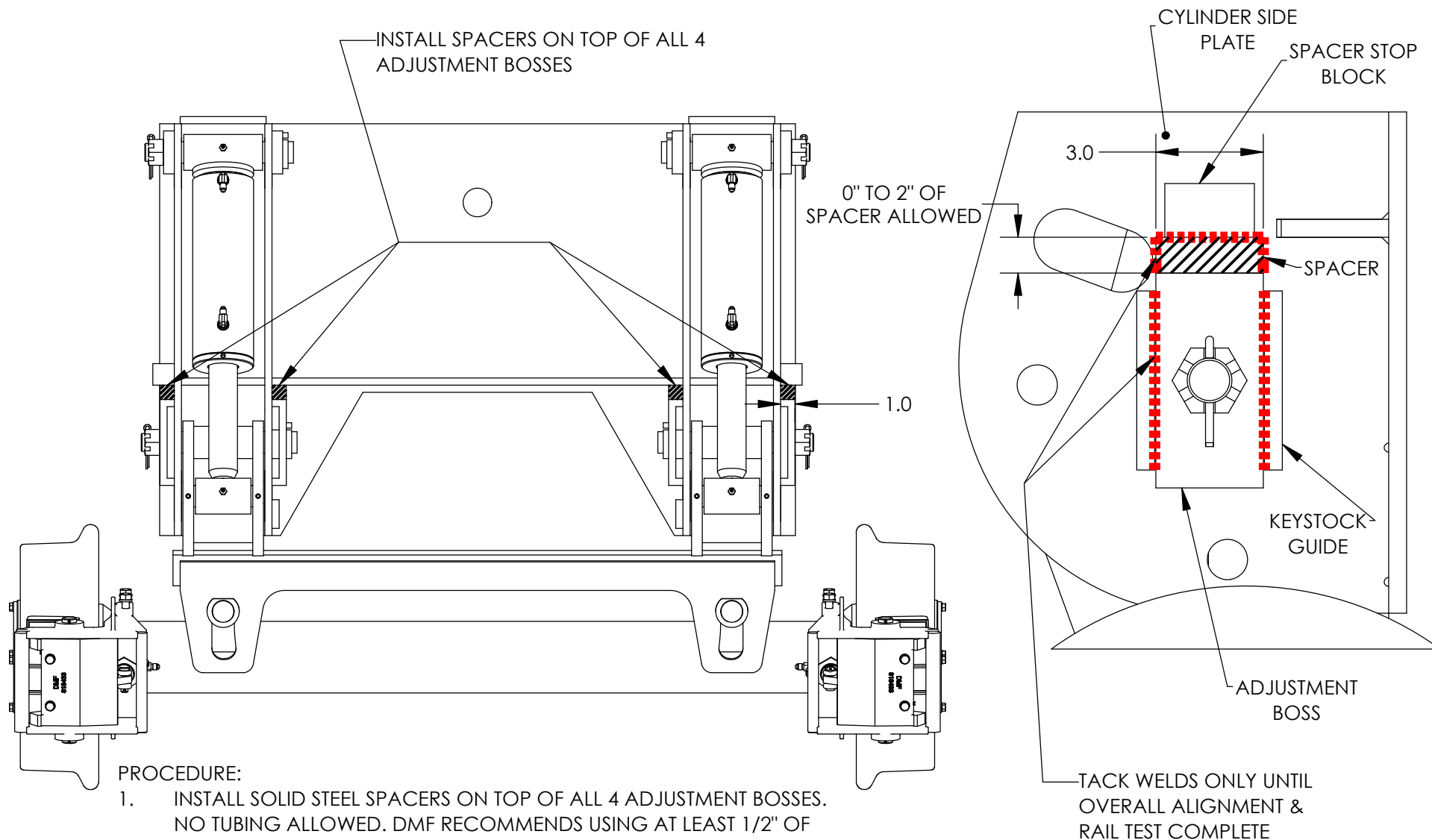
See drawing M1650G05 on the following page for instructions on how to adjust rail wheel load on bulkhead mounted gear. Drawing M1630115 in Section 4.7.3 shows how the tire will look when properly loaded. Tack weld all 4 spacers to the stop block and cylinder side plate. Tack weld all 4 adjustment bosses to both keystick guides. Wait to complete full structural welds until after overall alignment procedure and rail test are complete.

### 4.7.2 Weight Adjustment on Dozer Blade Replacement Gear

Raise and lower the railgear as needed to fine tune the rail wheel load. Take note of the cylinder eye length, as shown in Figure 4.7.2, when the weights are properly adjusted. Visual cues will be added to the Railgear later once the overall alignment procedure and rail test are complete.




**Figure 4.7.2** Dozer Blade Cylinder Eye Length



# PROCEDURE:

1. INSTALL SOLID STEEL SPACERS ON TOP OF ALL 4 ADJUSTMENT BOSES. NO TUBING ALLOWED. DMF RECOMMENDS USING AT LEAST 1/2" OF SPACER TO ALLOW FOR LOAD ADJUSTMENT AS PARTS AND TIRES WEAR.
2. CHANGE SPACER THICKNESS AS NEEDED TO ADJUST RAIL WHEEL LOAD. USE THE SAME THICKNESS SPACER IN ALL 4 LOCATIONS.
3. TACK WELD EACH SPACER TO STOP BLOCK AND CYLINDER SIDE PLATE.
4. TACK WELD ADJUSTMENT BOSES TO EACH KEY STOCK GUIDE.
5. COMPLETE ALIGNMENT PER DRAWING M1630115.
6. COMPLETE RAIL TEST, INCLUDING TEST OF TRACTION AND BRAKING.
7. FULLY WELD EACH SPACER TO STOP BLOCK AND CYLINDER SIDE PLATE.
8. FULLY WELD EACH ADJUSTMENT BOSS TO BOTH KEYSTOCK GUIDES.

REV	DATE	DESCRIPTION				BY	APP
TOLERANCES (UNLESS SPECIFIED):		<div>TITLE:  WEIGHT ADJUSTMENT &amp; WELDING - BULKHEAD MOUNTED RAILGEAR</div> <div>THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC (DMF). COPYRIGHT DMF. ALL RIGHTS RESERVED.</div>					
FRAC. MACH: ± 1/32"							
FRAC., OTHER: ± 1/16"							
.X ± .003							
.XX ± .030							
.XXX ± .005							
DRILL SIZES: ± .015							
ANGULAR: ± 1°							
SURF FINISH: 125 MICRO							
THREADS: 2A AND 2B							
BREAK SHARP EDGES .03 X 45° MAX							
DMF (404)875-1512							
RW-1650G							
DRAWN BY:		APPD BY:		DATE:		DRAWING NUMBER:	REV:
BJF		-		7/31/20		M1650G05	#

**4.7.3 Overall Alignment Procedure**

See next page for alignment and weight drawing. Once you have completed the alignment procedure, return to Section 4.8 for continued installation instructions.

With the front and rear Railgear both installed, each squared individually to the truck frame, and weights adjusted, you must perform a final overall alignment of front to rear Railgear. If you make any changes to the railgear during the alignment process, go back and check weight adjustments again too.

### ALIGNMENT PROCEDURE

A) STEPS 1) and 2) must be completed in listed order and are assumed to be within specifications and should only be addressed, if after alignment of the railgear, excessive flanging occurs.

- 1) Frame should be square, to within 1/8" maximum, on the diagonal.
- 2) Rear drive axle should be square to frame within 1-1/6" maximum on the diagonal to achieve 0° thrust angle. this should be checked by a qualified alignment shop.

B) The following procedure applies to shop or field inspection.

- 1) Check air pressure in all tires. tires should be inflated to the minimum rating of the wheel or tire.
- 2) Place vehicle on straight and level track, or 3" channel to simulate rail. Lower the railgear to the rail so that front to rear and diagonal measurements can be made. (Note: these measurements can be made from any convenient locations, as long as it stays consistent from side to side.
- 3) If diagonal measurement is out of tolerance, adjustment of the front railgear must be made. The procedure for this is as follows (for D-1 & D-2 only): Place shim material between the stop block on the pivot arm (see dwg below) & where it comes into contact with the long arm. The location for the shim is most accessible from behind the front Railgear axle (example: shim on left side, it will push left axle forward). Once proper shimming has been obtained, weld the shim into place on the pivot arm. Max. allowable 1/4" - Contact DMF if outside the maximum range.

### RAIL WHEEL LOAD ADJUSTMENT PROCEDURE

Tire traction varies w/ every truck based on several factors such as weight & tire design. It can also vary on the same truck as equipment is added or deleted. Thus, we recommend performing the traction adjustments after all equipment is installed or removed. Since every truck differs, there is no exact procedure. However, we have found the following two methods to be a good guide. The true test is how the vehicle performs on rail.

#### METHOD #1

Note: Method #1 is a visual procedure of the tire capping on rail.

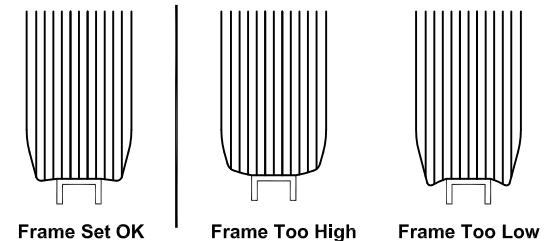
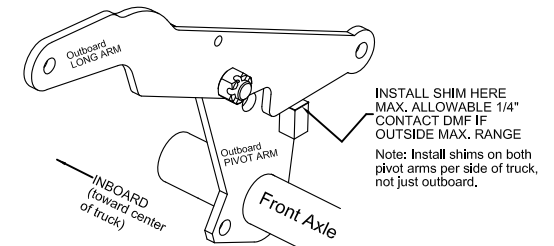
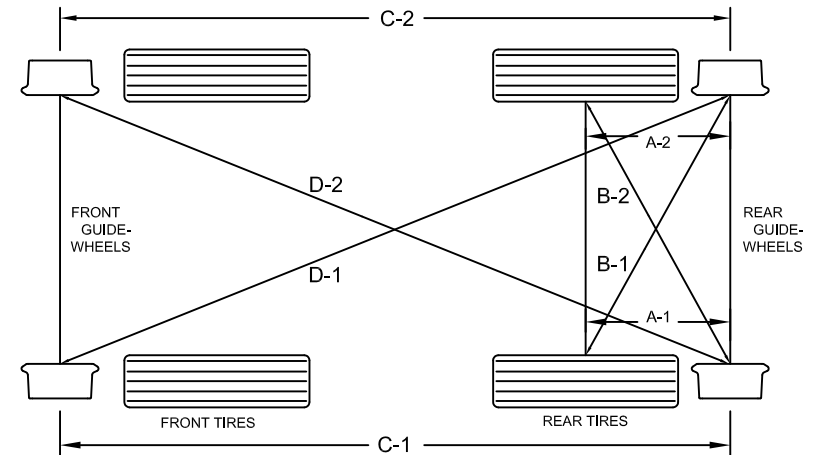
- 1) Grind off the welds on the (2) four hole mounting plates at the rear mounting bracket.
- 2) Loosen the (8) rear bracket mounting bolts.
- 3) Lower the railgear supporting the railgear with a floor jack or with the unit itself.
- 4) Remove or add spacer shim material located between the bottom of the truck frame and the shelf on the rear mounting bracket. Add shim to decrease traction and remove shim to increase traction (ref. side dwg. for illustration of proper tire capping).
- 5) Raise Railgear once again to contact the bottom of the truck frame.
- 6) Re-tighten the rear mounting bracket bolts to 154 ft/lb. torque and re-weld the mounting plates, and shims to the bracket (per rear install detail in section 5.1). If multiple spacers are used, remember to weld spacers to one another.

#### METHOD #2

Note: Method #2 distributes the vehicles rear axle(s) weight(s) equally over all rear axles, including the Railgear.

- 1) If truck scales are available, weigh the vehicle's rear axle (if tandem, weigh both)
- 2) With front and rear Railgear in the rail position, add or remove shims until rear Railgear axle weight is distributed equally between rear truck axle & Railgear. If truck has tandem axle, the weight should be equally distributed over all 3 axles (tandem & railgear axle - 1/3, 1/3, 1/3).
- 3) Once weight is equally distributed, then raise Railgear to the highway position.
- 4) Re-tighten the rear mounting bracket bolts to 154 ft/lb. torque and re-weld the mounting plates, and shims to the bracket (per rear install detail in section 5.1). If have multiple spacers, remember to weld spacers to one another.

INSPECTOR:			DATE:
SPECIFICATION	S/B = to	SPECIFICATION	TOLERANCES
A-1 _____	=	A-2 _____	± 1/8"
B-1 _____	=	B-2 _____	± 1/4"
C-1 _____	=	C-2 _____	± 1/8"
D-1 _____	=	D-2 _____	± 1/4"



4/17/12	UPDATED AS PER 1630 MANUAL CHANGES	JDI	
9/14/09	UPDATED AS PER 1630 MANUAL CHANGES	JBG	
REV	DATE	DESCRIPTION	BY APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X .063 .XX .030 .XXX OR .XXXX ± .005 DRILL SIZES: ± .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES (.005 MAX)			
DRAWN BY: TSH		APPD BY: APP	
DATE: 12/20/91		DRAWING NUMBER: M1630115	
TITLE: ALIGNMENT PROCEDURE & TEAR SHEET & TRACTION ADJUSTMENT PROCEDURES DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512		REV: B	

## 4.8 RAIL TEST

- Run vehicle forwards and backwards on rail.
- If available, run the vehicle through curves and switches.
- Verify alignment by observing the wear pattern on the wheel and the behavior of the vehicle. If adjustment is required, refer to Section 4.7.

## 4.9 FINAL WELD-OUT

### 4.9.1 Bulkhead Mounted Gear

Fully weld bulkhead plate to outrigger bulkhead or bulkhead spacer. Add structural gussets as needed if there is a large overhang.

See drawing M1650G05 in Section 4.7 for instructions to fully weld the adjustment bosses and spacers in place.

### 4.9.2 Dozer Blade Replacement Gear

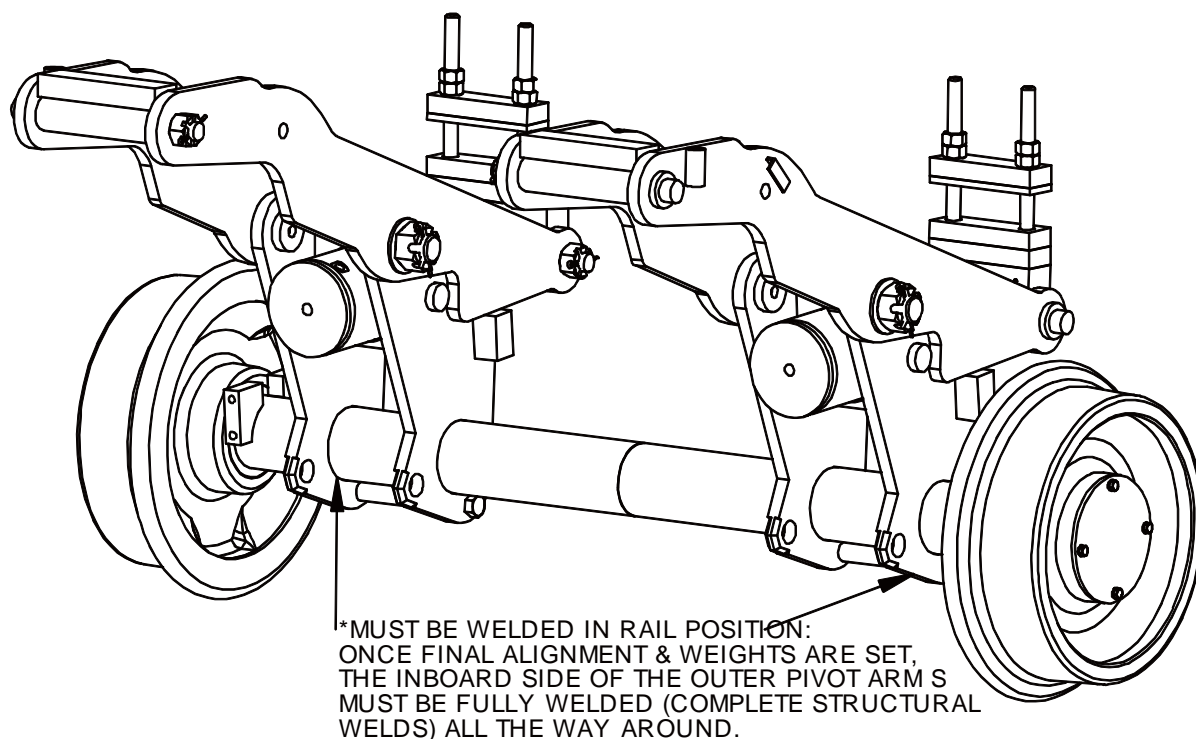


**Figure 4.9.2** Paint Stripe on Dozer Blade Replacement Gear

### 4.9.3 Conventional Front Mounted RW-1630 Gear

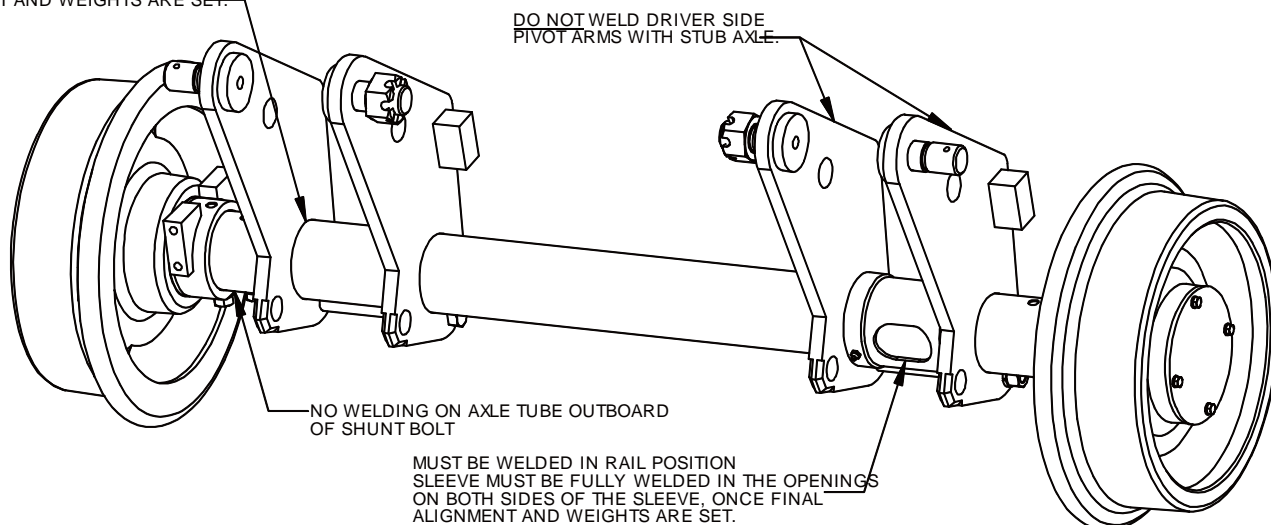
- Weld inboard side of outside pivot arm to axle tube all the way around as shown in Figure 4.9.3.A. When welding stub axles, weld the driver side sleeve in the openings to the axle and the inboard side of the passenger side outer arm, see Figure 4.9.3.B, do not weld on the axle tube outboard of the shunt bolt. The inside Pivot Arms should not be welded to the Axle Tube to facilitate ease of disassembly for repair or future maintenance.





**Figure 4.9.3.A** Standard Railgear Final Weld-out

MUST BE WELDED IN RAIL POSITION  
THE INBOARD SIDE OF THE OUTER PIVOT ARM  
MUST BE FULLY WELDED (COMPLETE STRUCTURAL  
WELDS) ALL THE WAY AROUND, ONCE FINAL  
ALIGNMENT AND WEIGHTS ARE SET.



**Figure 4.9.3.B** Stub Axle Final Weld-out

- Fully weld, on all sides, front mounting blocks / cross tubes to vehicle frame.
- If shims were required, fully weld shims into place on all sides for each shim location.

## **4.10 INSTALL DECALS**

- Install decal kit 800190 provided with the railgear. This kit includes 2 pages of decals. There is a drawing on the backside of each page to show where the decals belong on the vehicle.

**4.11 VELCRO STEERING WHEEL LOCK****Installation Instructions for****The DMF Velcro® Steering Wheel Lock****4.11.1 Standard Steering Wheel Lock Installation**

Overview: The DMF Velcro® steering wheel lock consists of two 2" wide adhesive backed "hook" strips and a 4" wide piece of "loop" fabric. A piece of adhesive backed hook is placed on the steering wheel column and a second piece placed on the top flat of the steering wheel hub. The 4" wide piece of loop fabric can then be applied to bridge the gap between column and wheel preventing the front tires from accidentally being turned while on the rail. However, in the event of an emergency, the steering wheel can be forcibly turned and the Velcro fasteners will separate allowing the driver to steer the vehicle.

- 1) Clean the areas where the self-adhesive 2" wide "hook" strips will be applied on the steering column and wheel with rubbing alcohol and a clean cloth.
- 2) Allow the column and wheel to dry.
- 3) Remove the adhesive backing from the "hook" strips and apply them to the top of the steering wheel hub and the column as close to the wheel-column gap as possible.

NOTE: Trim the strips to fit around obstructions such as hazard light switches.



**Figure 4.11.1A** Steering Wheel Lock installation

- 4) Allow the adhesive to cure for 24 hours prior to attaching the 4" loop fabric.
- 5) When putting the truck on the rail, position the 4" loop fabric to bridge the gap between the hooks on both the column and wheel as shown below and press firmly.



**Figure 4.11.1B**

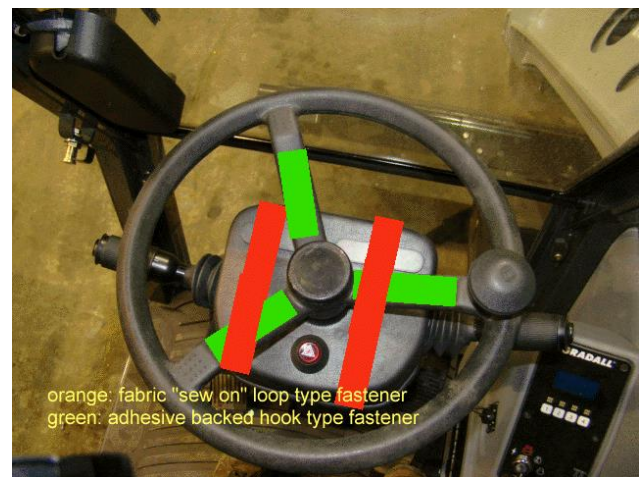
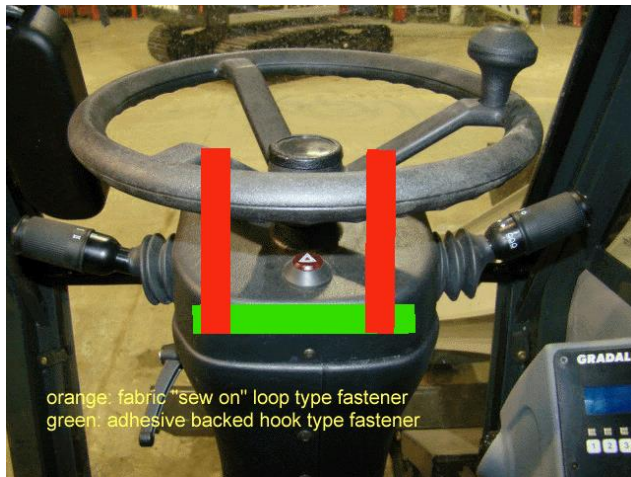
- 6) To remove the lock simply pull on the 'D' ring and store the piece of Velcro fabric.



### 4.11.2 Vertical Steering Wheel Lock Installation

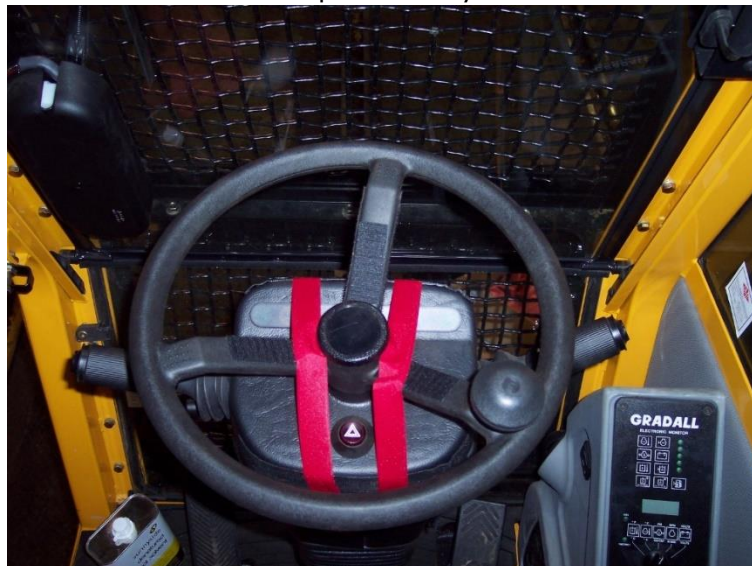
The traditional DMF Velcro® steering wheel lock will not work on some equipment with a vertical steering column. In this case, use DMF part #835043 in its place. DMF 835043 consists of 2 30-1/2" long 1" wide orange colored "loop" fabric and one 91" long 1" wide adhesive backed black "hook" fabric. The orange loop fabric attaches to the steering column and wraps around the wheel to the other side of the steering column.

- 1) Clean the areas where the self-adhesive 1" wide "hook" strips will be applied on the steering column and wheel with rubbing alcohol and a clean cloth.
- 2) Allow the column and wheel to dry.
- 3) Trim "hook" fabric to fit in the areas shown in the images below. Pieces should be about equal length. A piece should be placed on the front and back side of the steering column as well as on each of the arms of the steering wheel.



**Figure 4.11.2A** Vertical Steering Wheel Lock Installation

- 4) Remove the adhesive backing from the "hook" strips and apply them to the top of the steering wheel arms and the column front and back.  
NOTE: Trim the strips to fit around obstructions such as hazard light switches.
- 5) Allow the adhesive to cure for 24 hours prior to attaching the 4" loop fabric.
- 6) When putting the truck on the rail, position the orange loop fabric to wrap around the steering wheel as shown below and press firmly.



**Figure 4.11.2B** Excavator Steering Wheel Lock Installed

## 4.12 INSTALLATION REVIEW CHECKLIST

The following checklist is intended to assist the installer in re-checking and verifying aspects of the installation that are often overlooked or forgotten.

- ☐ Check tire pressures.
- ☐ Rail test the vehicle to check for good traction and braking. A good industrial siding or some authorized track time will be required. Check that Rail wheels with brakes do not lock-up or slide.
- ☐ Adjust the Railgear height as required.
- ☐ Double check all welds and fasteners, and mounting cotter pins. Tie strap all hydraulic hoses, air hoses, and electrical wires away from exhausts and moving parts. Ensure that all hydraulic and air hoses have sufficient radius at bends.
- ☐ Top off the hydraulic oil in the tank.
- ☐ Verify grease installed at all grease fittings (see Section 3.2)
- ☐ Touch-up the black acrylic enamel paint on the Front and Rear Railgear.
- ☐ Apply the Decal Kit.
- ☐ Check overall alignment measurements:
  - Rear Truck Axle to Rear Railgear Axle (straight):      A1 = A2 (within 1/8")
  - Rear Truck Axle to Rear Railgear Axle (diagonal):      B1 = B2 (within 1/4")
  - Front Railgear to Rear Railgear (straight):      C1 = C2 (within 1/8")
  - Front Railgear to Rear Railgear (diagonal):      D1 = D2 (within 1/4")
- ☐ Raise and lower Railgear and verify pin-off at highway and rail positions, if equipped.
- ☐ In a parking lot or open area, verify that the vehicle tires and rims do not contact the Railgear in any bump, droop, or steering position.
- ☐ Check for any rattles and vibration.

## SECTION 5.0 RAILGEAR OPTIONS

<b>5.1</b>	<b>RAIL SWEEPS .....</b>	<b>5-2</b>
<b>5.2</b>	<b>PIN-OFF OPTIONS.....</b>	<b>5-6</b>
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## **5.1 RAIL SWEEPS**

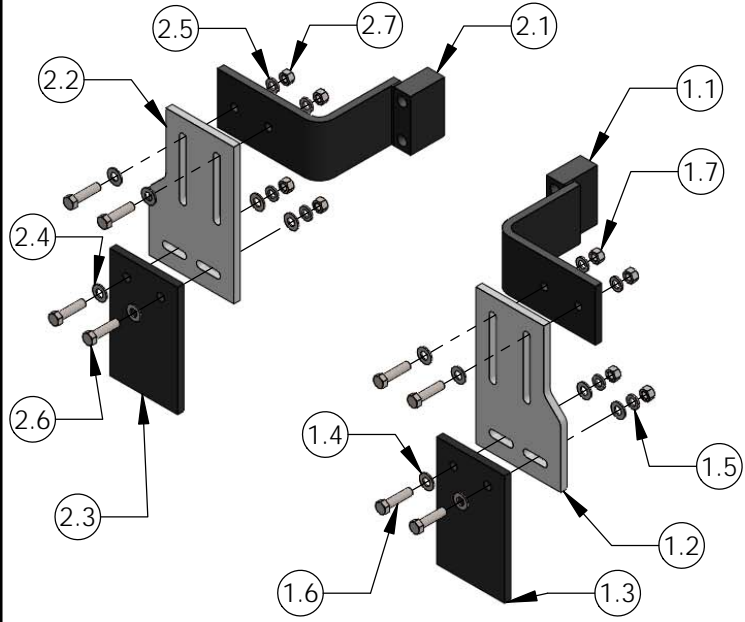
The components that make up the standard Front and Rear Rail Sweeps for Railgear without any brakes are different than Rail Sweeps for Railgear with Cobra Air Brakes. For Rail Sweeps provided with Cobra Air Brakes, the mounting brackets are shorter.

Installation of Rail Sweeps is done while the Railgear is in the rail position. For standard Rail Sweeps (without brakes), weld the Mounting Bracket directly to the Railgear axle tube oriented so that the Rubber is flush with the rail. For Rail Sweeps with Cobra Air Brakes, bolt the shorter Mounting Bracket directly to the Air Brake structure. On the front, bolt on the side facing forward; on the rear, bolt to the top of the Air Brake (which faces backward). See drawing M630144 on the following page for assembly drawings.

Contact DMF for sweep drawings 818692 and 818693 for Under Cab railgear.

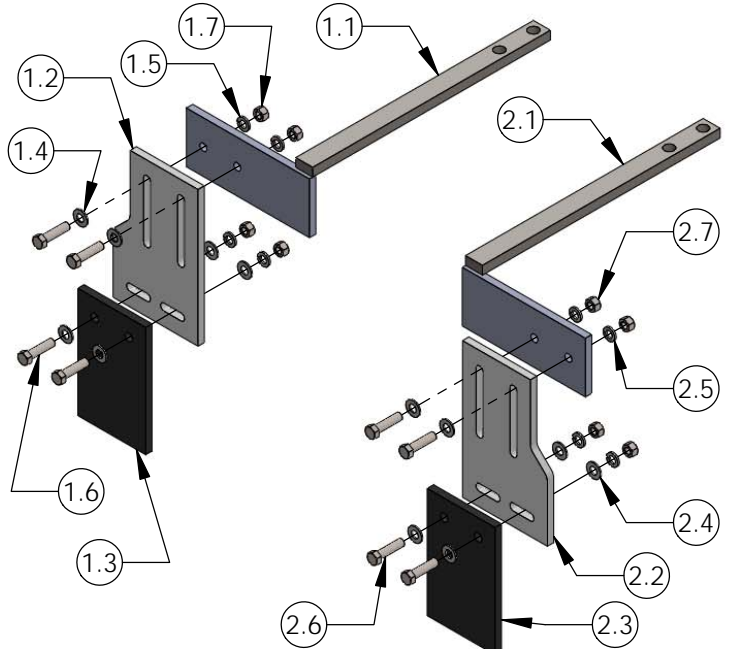
# 818512: RW-1630 RAILSWEPT FRONT AXLE SET, BOLT-ON

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	818515	1	RW-1630 RAILSWEPT ASSEMBLY, FRONT LH, BOLT-ON
1.1	818620	1	RW-1630 RAIL SWEEP FRONT MOUNTING BRACKET (BOLT-ON)
1.1.1	818621	1	FRONT RAIL SWEEP BLOCK DETAIL
1.1.2	818633	1	RAIL SWEEP SPACER
1.1.3	818623	1	RW-1630 RAIL SWEEP FLAT BAR DETAIL
1.2	818501	1	RAILSWEEP RUBBER MOUNTING PLATE
1.3	818503	1	RAILSWEEP RUBBER BELTING DETAIL
1.4	818508	6	FLAT WASHER, 3/8", GR8
1.5	12566	4	LOCK WASHER, 3/8", GR8
1.6	102408	4	HHCS, 3/8-16 X 1-1/2", GR8
1.7	605103	4	HEX NUT, 3/8-16, GR5
2	818516	1	RW-1630 RAILSWEPT ASSEMBLY, FRONT RH, BOLT-ON
2.1	818620	1	RW-1630 RAIL SWEEP FRONT MOUNTING BRACKET (BOLT-ON)
2.1.1	818621	1	FRONT RAIL SWEEP BLOCK DETAIL
2.1.2	818633	1	RAIL SWEEP SPACER
2.1.3	818623	1	RW-1630 RAIL SWEEP FLAT BAR DETAIL
2.2	818501	1	RAILSWEEP RUBBER MOUNTING PLATE
2.3	818503	1	RAILSWEEP RUBBER BELTING DETAIL
2.4	818508	6	FLAT WASHER, 3/8", GR8
2.5	12566	4	LOCK WASHER, 3/8", GR8
2.6	102408	4	HHCS, 3/8-16 X 1-1/2", GR8
2.7	605103	4	HEX NUT, 3/8-16, GR5



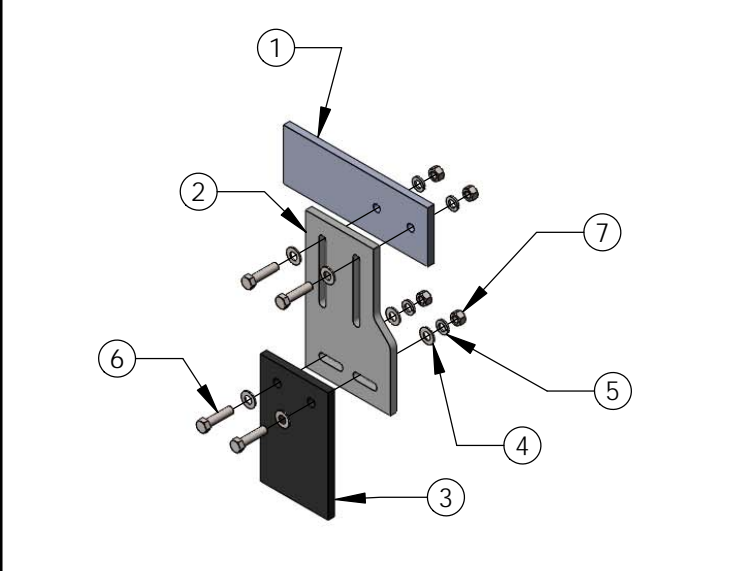
# 818514: RW-1630/50 RAILSWEPT REAR AXLE SET, BOLT-ON

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	818517	1	RW-1630/50 RAILSWEPT ASSY, REAR LH, BOLT-ON
1.1	818630	1	RAILSWEEP REAR WELDMENT, LH, BOLT-ON
1.1.1	818632	1	1" FLAT BAR DETAIL - REAR RAIL SWEEP
1.1.2	818634	1	3/8" X 3" FLAT BAR DETAIL - REAR RAIL SWEEP
1.2	818501	1	RAILSWEEP RUBBER MOUNTING PLATE
1.3	818503	1	RAILSWEEP RUBBER BELTING DETAIL
1.4	818508	6	FLAT WASHER, 3/8", GR8
1.5	12566	4	LOCK WASHER, 3/8", GR8
1.6	102408	4	HHCS, 3/8-16 X 1-1/2", GR8
1.7	605103	4	HEX NUT, 3/8-16, GR5
2	818518	1	RW-1630/50 RAILSWEPT ASSY, REAR RH, BOLT-ON
2.1	818630	1	RAILSWEEP REAR WELDMENT, RH, BOLT-ON
2.1.1	818632	1	1" FLAT BAR DETAIL - REAR RAIL SWEEP
2.1.2	818634	1	3/8" X 3" FLAT BAR DETAIL - REAR RAIL SWEEP
2.2	818501	1	RAILSWEEP RUBBER MOUNTING PLATE
2.3	818503	1	RAILSWEEP RUBBER BELTING DETAIL
2.4	818508	6	FLAT WASHER, 3/8", GR8
2.5	12566	4	LOCK WASHER, 3/8", GR8
2.6	102408	4	HHCS, 3/8-16 X 1-1/2", GR8
2.7	605103	4	HEX NUT, 3/8-16, GR5



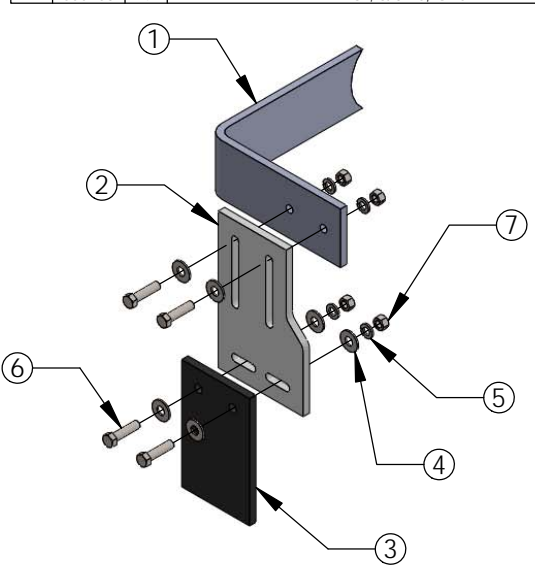
# 818721: RW-1650BC RAILSWEPT ASSEMBLY, WELD-ON, ONE SIDE

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	818821	1	DETAIL, BEHIND CAB RAILSWEPT BRACKET (WELD-ON)
2	818501	1	RAILSWEEP RUBBER MOUNTING PLATE
3	818503	1	RAILSWEEP RUBBER BELTING DETAIL
4	818508	6	FLAT WASHER, 3/8", GR8
5	12566	4	LOCK WASHER, 3/8", GR8
6	102408	4	HHCS, 3/8-16 X 1-1/2", GR8
7	605103	4	HEX NUT, 3/8-16, GR5



# 818510: RW-1630/50 RAILSWEPT ASSEMBLY, WELD-ON, ONE SIDE

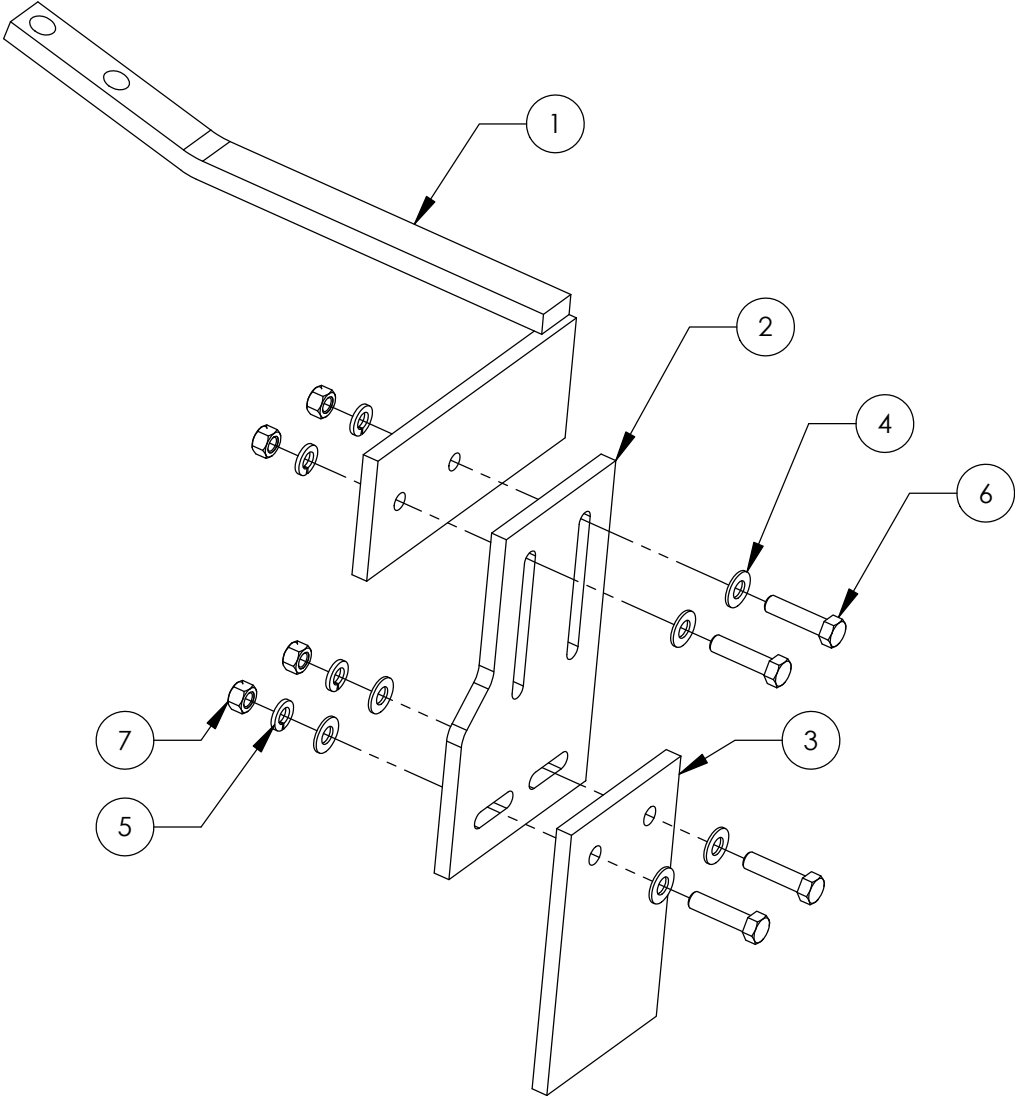
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	818502	1	RAILSWEEP MOUNTING BRACKET, WELD-ON, RW-1630/50
2	818501	1	RAILSWEEP RUBBER MOUNTING PLATE
3	818503	1	RAILSWEEP RUBBER BELTING DETAIL
4	818508	6	FLAT WASHER, 3/8", GR8
5	12566	4	LOCK WASHER, 3/8", GR8
6	102408	4	HHCS, 3/8-16 X 1-1/2", GR8
7	605103	4	HEX NUT, 3/8-16, GR5



NOTE:  
SEE DRAWING 818692 &  
818693 FOR SWEEPS ON  
UNDER CAB RAILGEAR

REV	DATE	DESCRIPTION			BY	APP
TOLERANCES (UNLESS SPECIFIED):						
FRAC, MACH:	± 1/32"	RW-1630/50				
FRAC, OTHER:	± 1/16"					
X	± .063					
XX	± .030					
XXX	± .005					
DRILL SIZES:	+ .015					
ANGULAR:	± 1°					
SURF FINISH:	125 MICRO					
THREADS:	2A AND 2B					
BREAK SHARP EDGES .03 X 45° MAX						
DMF (404)875-1512						
RW-1630/50		RW-1630/50 RAILSWEPT OPTIONS				
		THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF. ALL RIGHTS RESERVED.				
DRAWN BY:	APPD BY:	DATE:	DRAWING NUMBER:		REV:	
BJF	-	12/18/18	M1630144		#	

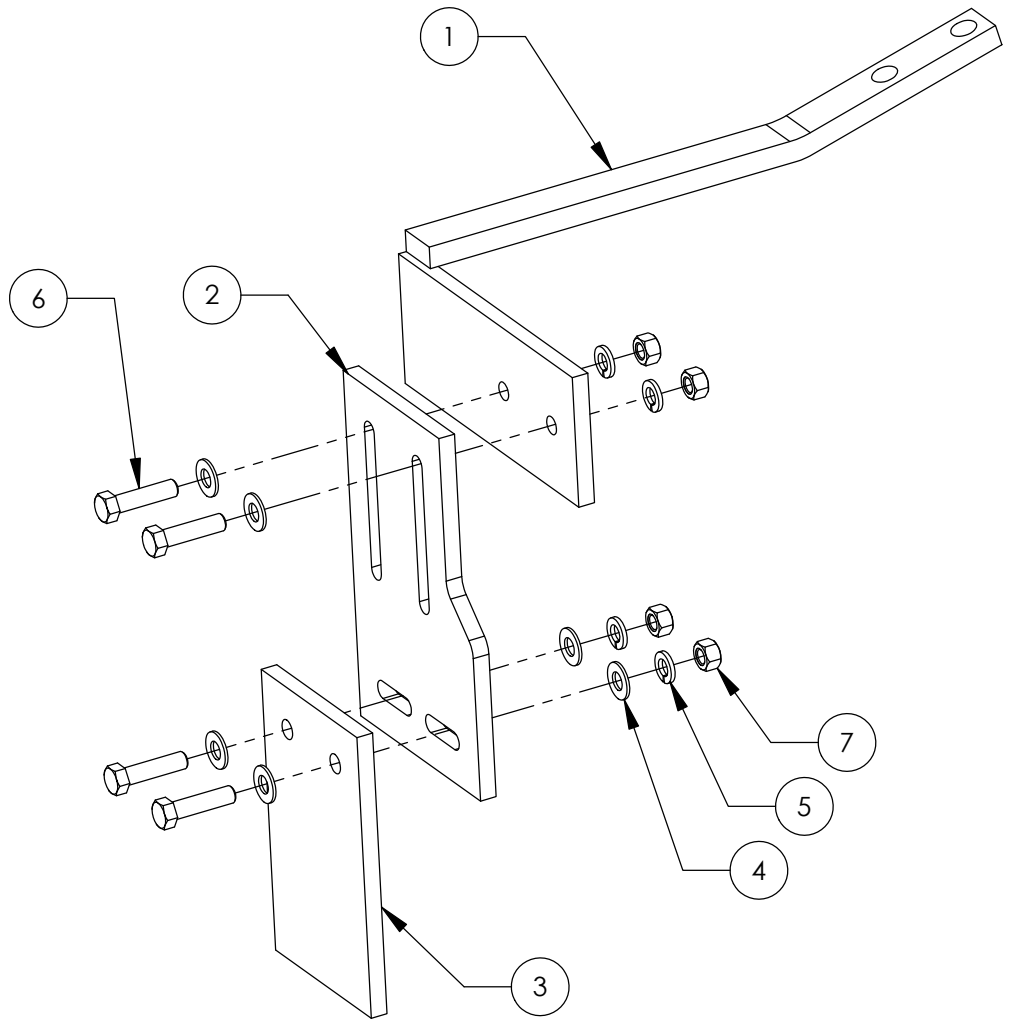
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	818943	1	RAILSWEEP REAR WELDMENT, LH, BOLT-ON, RW-1650GX
2	818501	1	RAILSWEEP RUBBER MOUNTING PLATE
3	818503	1	RAILSWEEP RUBBER BELTING DETAIL
4	818508	6	FLAT WASHER, 3/8", GR8
5	12566	4	LOCK WASHER, 3/8", GR8
6	102408	4	HHCS, 3/8-16 X 1-1/2", GR8
7	605103	4	HEX NUT, 3/8-16, GR5



RH PART #818940

REV	DATE	DESCRIPTION				BY	APP		
TOLERANCES (UNLESS SPECIFIED):									
FRACTIONAL: ± 1/32"		TITLE: RW-1650GX RAILSWEEP ASSY., REAR LH, BOLT-ON							
FRACTIONAL, OTHER: ± 1/16"									
X ± .063		THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.							
XX ± .030									
XXX ± .005									
DRILL SIZES: ± .015									
ANGULAR: ± 1°									
SURF FINISH: 125 MICRO									
THREADS: 2A AND 2B									
BREAK SHARP EDGES .03 X 45° MAX									
DMF (404)875-1512									
RW-1650GX									
DRAWN BY:		APPD BY:		DATE:		DRAWING NUMBER:		REV:	
ARB		-		11/25/20		818939		#	

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	818942	1	RAILSWEEP REAR WELDMENT, RH, BOLT ON, RW-1650GX
2	818501	1	RAILSWEEP RUBBER MOUNTING PLATE
3	818503	1	RAILSWEEP RUBBER BELTING DETAIL
4	818508	6	FLAT WASHER, 3/8", GR8
5	12566	4	LOCK WASHER, 3/8", GR8
6	102408	4	HHCS, 3/8-16 X 1-1/2", GR8
7	605103	4	HEX NUT, 3/8-16, GR5



LH PART #818939

REV	DATE	DESCRIPTION				BY	APP
TOLERANCES (UNLESS SPECIFIED):		RW-1650GX					
FRAC. MACH: F 1/32							
FRAC. OTHER: ±1/16		TITLE: RW-1650GX RAILSWEEP ASSY., REAR RH, BOLT-ON					
X ±.063							
XX ±.030		THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC (DMF). COPYRIGHT DMF. ALL RIGHTS RESERVED.					
XXX ±.005							
DRILL SIZES: ±.015		DRAWN BY: ARB    APPD BY: -    DATE: 11/25/20					
ANGULAR: 125 MICRO							
SURF FINISH: ZA AND 2B		DMF					
THREADS:							
BREAK SHARP EDGES .03 X .45" MAX		DRAWING NUMBER: 818940    REV: #					
DMF (404)875-1512							

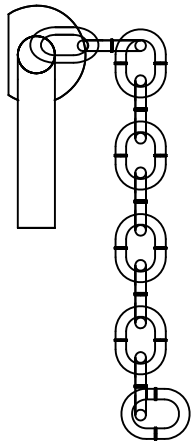
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**5.2 PIN-OFF OPTIONS**

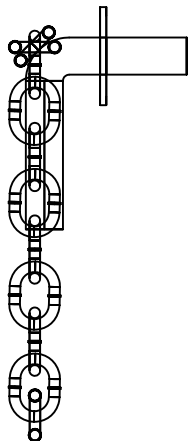
See drawings on next three pages.



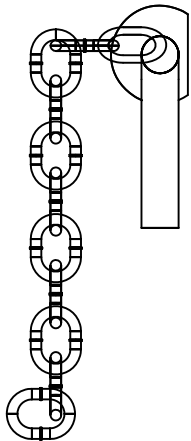
NOTE: IF YOU ORDER MANUAL PIN-OFFS WITH YOUR RAILGEAR, THEY SHOULD ALREADY BE WELDED IN THEIR PROPER LOCATION.



P/N 818163  
DRIVER'S SIDE  
FRONT

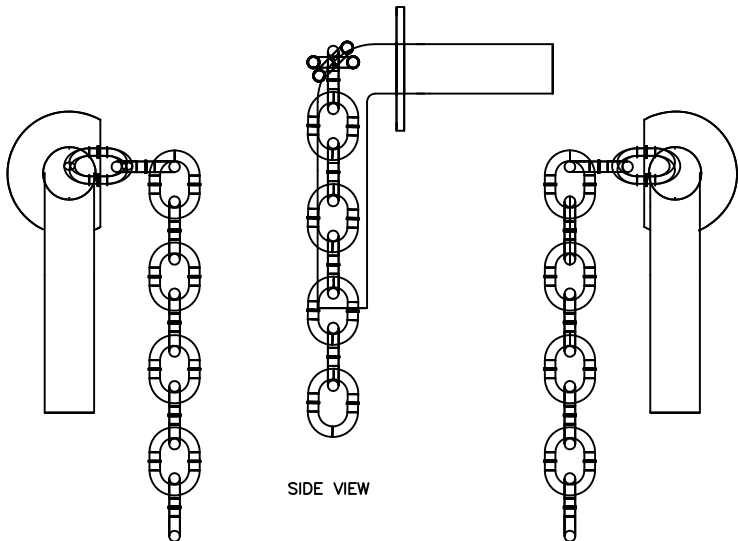


SIDE VIEW

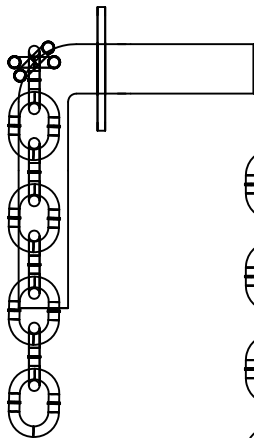


P/N 818164  
PASSENGERS SIDE  
FRONT

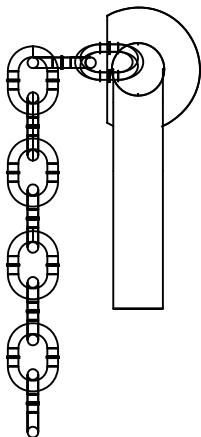
## 1630/50 MANUAL PIN/OFFS



P/N 818234  
PASSENGER SIDE  
REAR



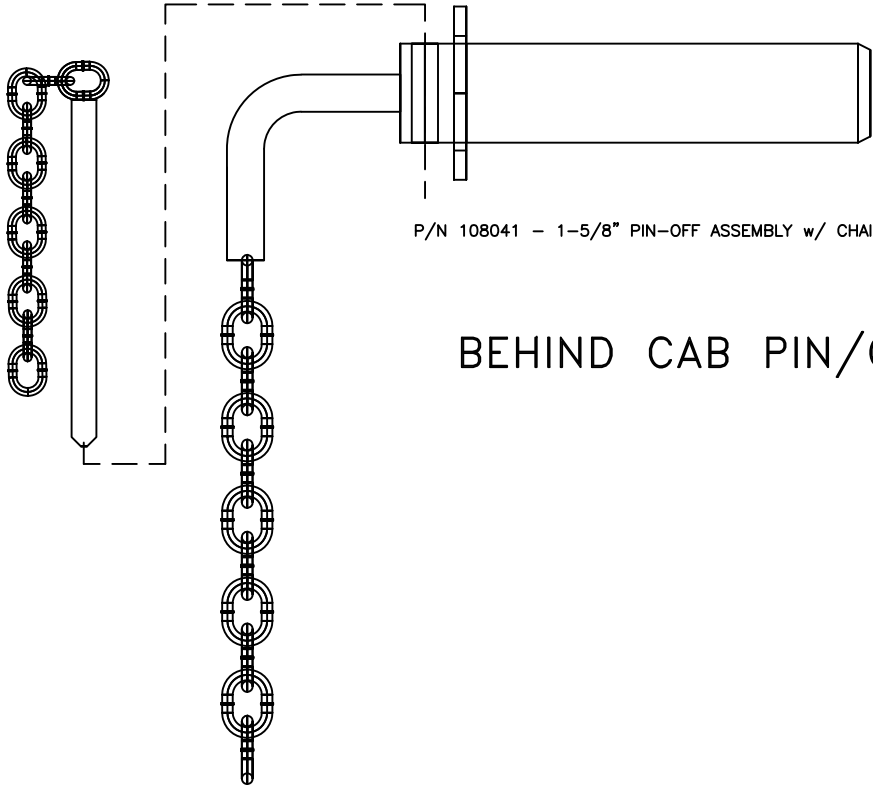
SIDE VIEW



P/N 818245  
DRIVER SIDE  
REAR

ITEM	PART NO.	QTY	DESCRIPTION
1			
2			




P/N 108045 - AUXILIARY PIN-OFF ASSEMBLY  
P/N 108044 - AUXILIARY PIN-OFF CHAIN



P/N 108041 - 1-5/8" PIN-OFF ASSEMBLY w/ CHAIN (BEHIND-CAB)

## BEHIND CAB PIN/OFF

**\*Must have serial # when ordering parts\***

	5/26/11	FIXED TYPO (AUXILIARY)		NEH		
	8/11/10	CHANGED P/N 108042 TO 108041		JBG		
REV	DATE	DESCRIPTION			BY	APP
<b>TOLERANCES:</b> (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX OR .XXXX ± .005 DRILL SIZES: ± .005 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES				TITLE:  RW-1630 ASSORTED PIN-OFF ASSEMBLIES		
DIVERSIFIED METAL FABRICATORS, INC.(404)875-1512						
DRAWN BY: JBG		APPD BY:	DATE: 1/25/10		DRAWING NUMBER: M1630100	REV: B

NOTE #1:  
SPECIFY THE CABLE THAT  
BEST FITS YOUR APPLICATION.

REPLACEMENT CABLES	
P/N	LENGTH
818577	41"
818576	50"
818575	64"
818578	78"
818579	97"
818580	120"

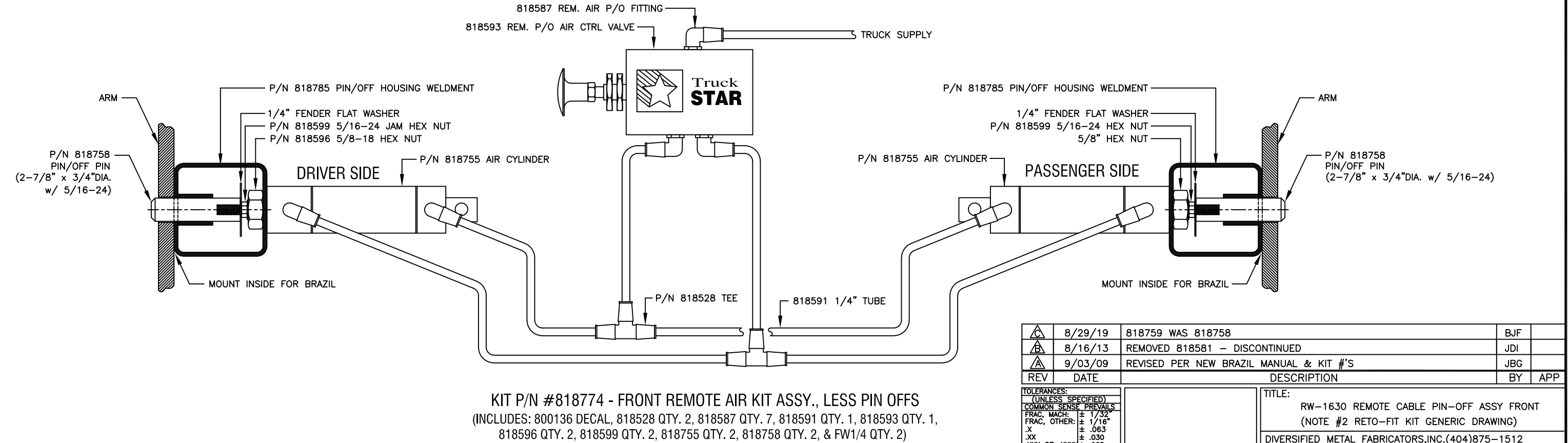
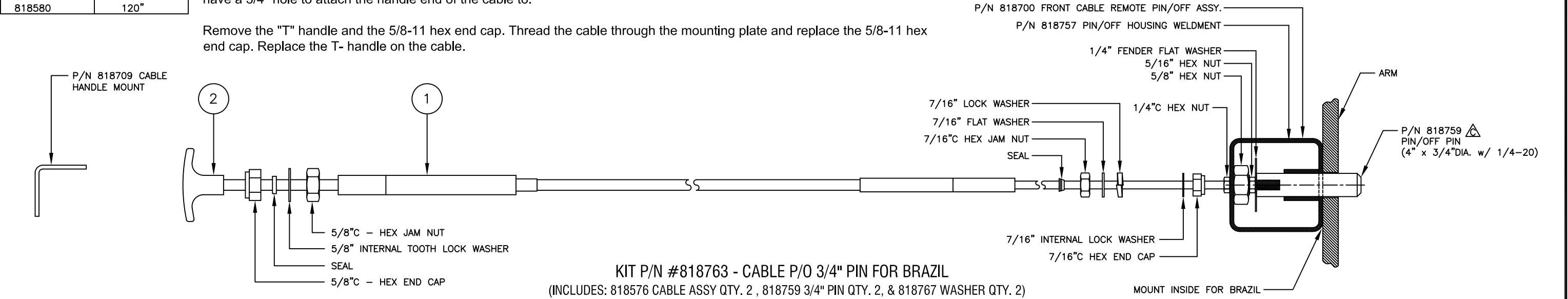
**Note: Remote Front Pin-Offs**  
There are two different types of remote pin-offs available for both front and rear Railgear, and they can be used in any combination. The two different types are:

- Cable operated
- Air operated

Remote pin-offs are not installed at the factory to prevent damage during shipment.

**Note: Remote Front Pin-Offs (Shown w/ & w/o Air Cylinder)**  
Once cables are installed to pins, route cables to easily-accessible location for operator use, preferably as near as possible to the front Railgear control valve. In this location, mount two cable handle-mounting plates (not supplied). These plates should have a 3/4" hole to attach the handle end of the cable to.

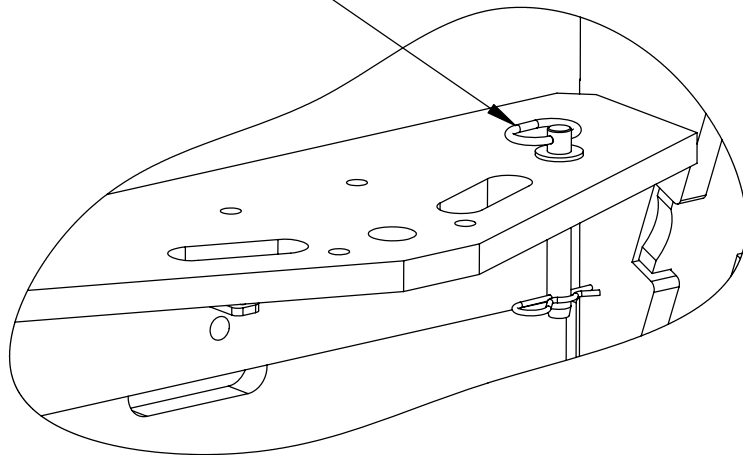
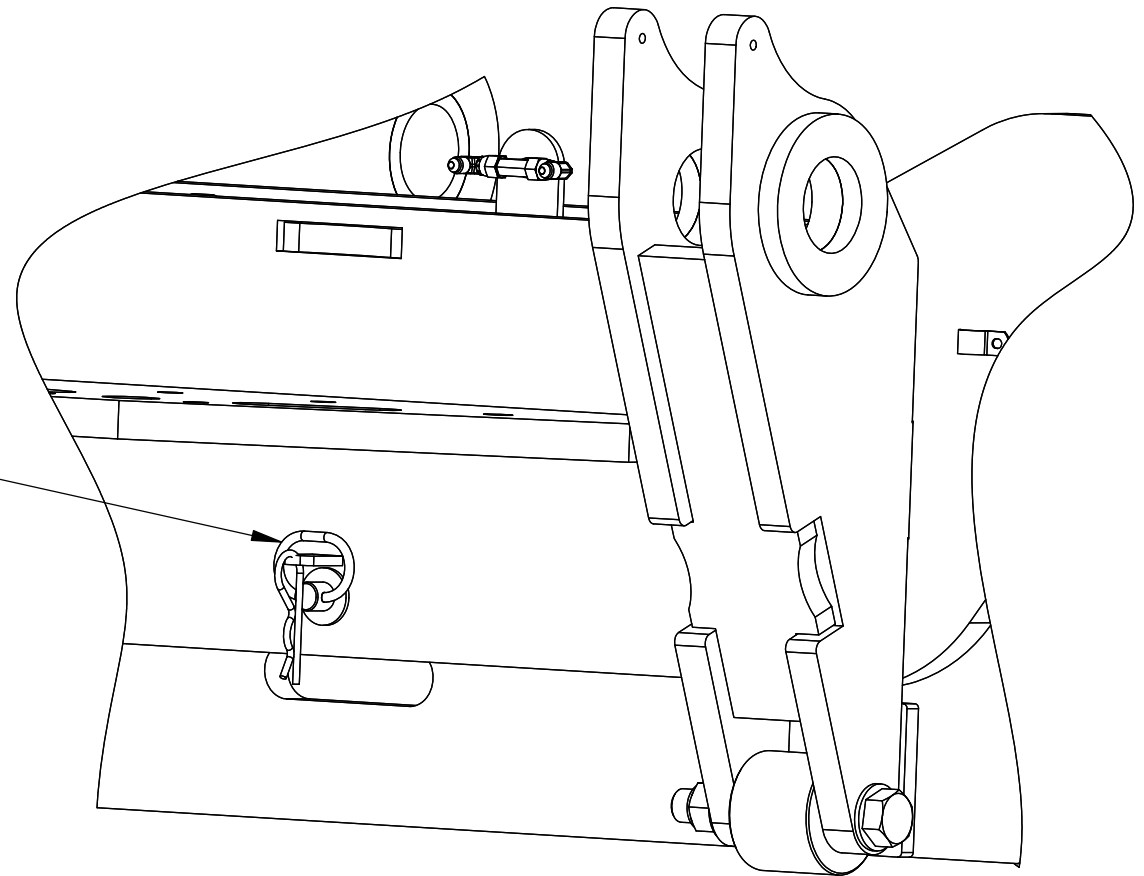
Remove the "T" handle and the 5/8-11 hex end cap. Thread the cable through the mounting plate and replace the 5/8-11 hex end cap. Replace the T- handle on the cable.



	8/29/19	818759 WAS 818758	BJF	
	8/16/13	REMOVED 818581 - DISCONTINUED	JDI	
	9/03/09	REVISED PER NEW BRAZIL MANUAL & KIT #'S	JBG	
REV	DATE	DESCRIPTION	BY	APP
<b>TOLERANCES:</b> (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH: ± 1/32 FRAC. OTHER: ± 1/16 .X ± .063 .XX ± .030 .XXX OR .XXXX ± .005 DRILL SIZES: ± .005 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES				
DRAWN BY:		APPD BY:	TITLE:	
KLC			RW-1630 REMOTE CABLE PIN-OFF ASSY FRONT (NOTE #2 RETO-FIT KIT GENERIC DRAWING)	
			DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512	
			DATE:	REV:
			10/06/98	C
				DRAWING NUMBER:
				M1630112

INSTALL PIN-OFF WITH  
RAILGEAR IN THE DEPLOYED  
POSITION TO INCREASE  
GROUND CLEARANCE. LOCK  
PIN IN PLACE USING ATTACHED  
COTTER PIN.

STOW PIN IN DRAW BAR WHEN  
NOT IN USE.



REV	DATE	DESCRIPTION		BY	APP
TOLERANCES (UNLESS SPECIFIED):		TITLE:			
FRAC. MACH:		RW-1650GX			
FRAC. OTHER:		ASSEMBLY, BULKHEAD MOUNT RW-1650GX			
.X		W/ HYD. BRAKES			
.XX		THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED			
.XXX		METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF. ALL RIGHTS RESERVED.			
DRILL SIZES:		DRAWN BY:	APPD BY:	DATE:	DRAWING NUMBER:
ANGULAR:		ARB	-	6/9/21	605804
SURF FINISH:		DMF (404)875-1512		REV:	#
THREADS:					
BREAK SHARP EDGES .03" X 45° MAX					

## 5.3 BRAKES

### **⚠ WARNING**

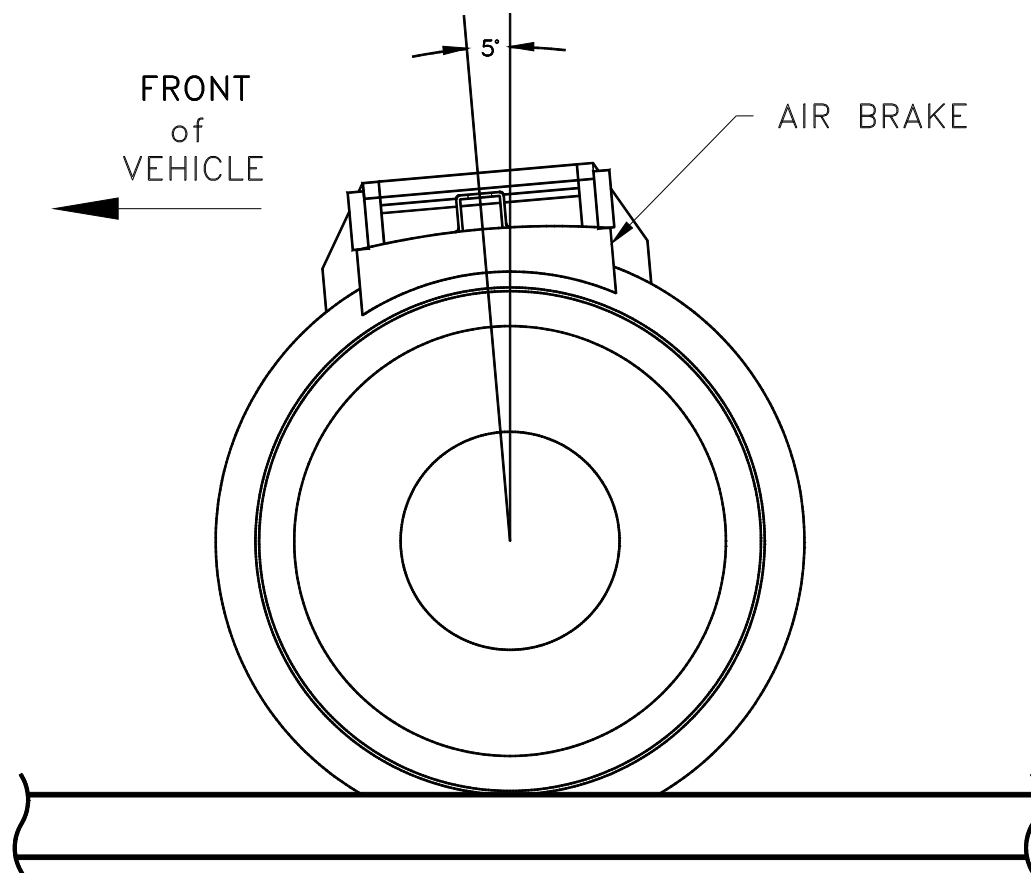
The rail wheel brake system is intended to assist the existing vehicle brakes when in the rail mode. As the vehicle rear tires are in contact with the railhead, the primary braking effort is derived from the rubber tires. Rail wheel brakes alone are insufficient to stop the vehicle in a reasonable distance.

DMF's RW-1630 Railgear uses an optional air braking system. The same Cobra air braking system is used for both the front and rear Railgear. For a detailed drawing of the Cobra Air Brake Assembly, section 5.3.8.

Bulkhead and dozer blade mounted railgear use an optional hydraulic Cobra braking system. The same system is used for both front and rear Railgear. For detailed drawings of the Cobra Hydraulic Brake Assembly, See Section 5.3.8. For hydraulic and electrical components, see Section 6.

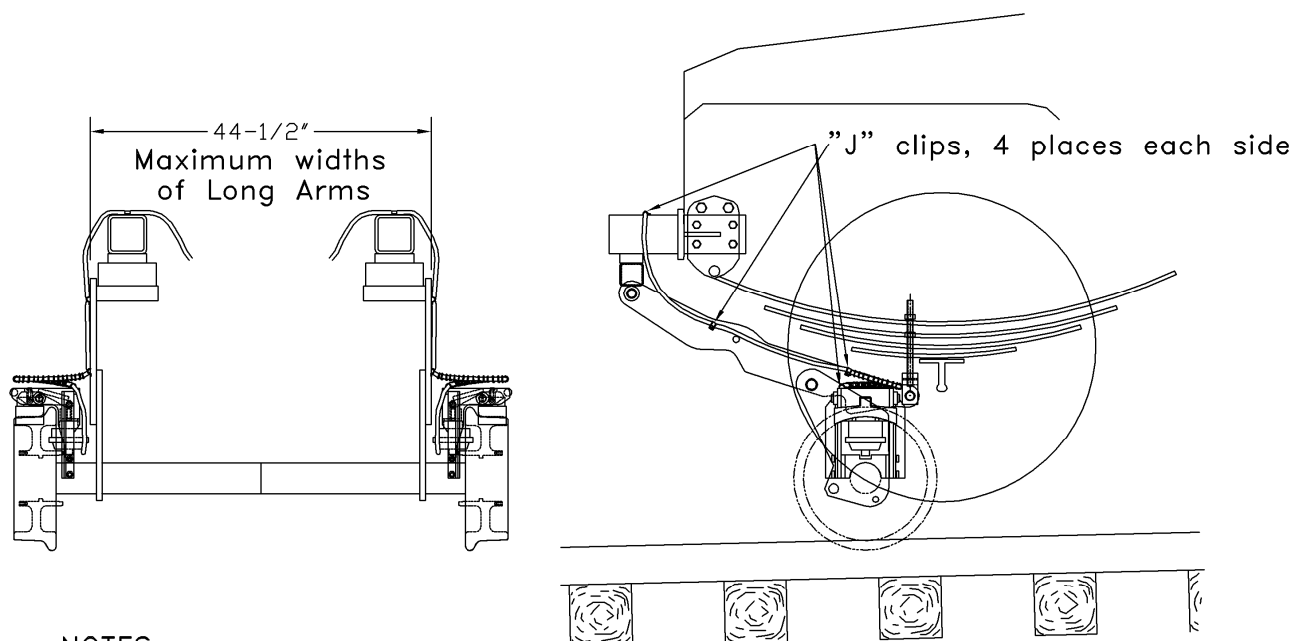
If the vehicle uses standard RW-1630 front railgear, the brakes will need to be positioned during final welding. While the Front and Rear Railgear is in the rail position, the front Cobra Air Brake assembly should be located as shown below. The rear Cobra Brake assembly is oriented at the factory and will not need to be changed.

### 5.3.1 Cobra Air Brake Location



**Figure 5.3.1** Cobra Air Brake Location

### 5.3.2 Front Air Brake Installation

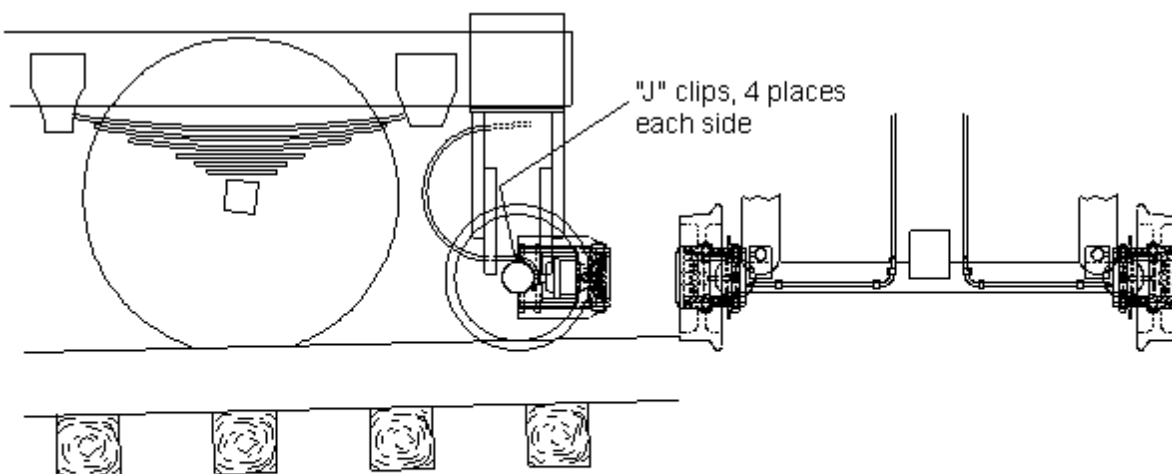


#### NOTES:

- \* Run the supplied hoses through the "J" clips with the spring guards located in the loops left at the Brake Assemblies. The 75" Hose is for the passenger side & the 62" Hose is for the driver side.
- \* Mount Air Brake Valve Assembly to an appropriate place near the Front Railgear (usually on the Front Valve Assembly Plate) with supplied Relay
- \* Brake Hoses attach to the Front Valve Assembly.

**Figure 5.3.2** Front Air Brake Installation

### 5.3.3 Rear Air Brake Installation (RW-1630)



- \* Run the supplied hoses through the "J" clips. Rear Hoses are 59" long.
- \* Mount Air Brake Valve Assembly to an appropriate place near the Rear Railgear (usually on the Rear Frame Bracket) with supplied Relay Mount.
- \* Attach Brake Hoses to the Air Brake Valve Assembly.

**Figure 5.3.3** Rear Air Brake Installation

### **5.3.4 Air Brake Plumbing Installation**

An air toggle valve, on a plate labeled brakes "on/off", is to be located on the vehicle instrument panel. This valve disconnects the guide wheel braking system from the vehicle airbrake system by interrupting the CONTROL line air pressure to the guide wheel system only.

On the Front Valve Plate Assembly and Rear Frame Bracket, an airbrake relay valve will be located. The CONTROL line to this relay valve comes from the toggle valve described above. The SUPPLY line to this relay comes from the Pressure Protection Valve, which is plumbed onto the air reservoir. There is a ball valve and an adjustable pressure regulator in the SUPPLY line before the relay valve. The ball valve will disconnect the guide wheel braking system from the vehicle airbrake system (regardless of the position of the toggle valve) by interrupting the SUPPLY line air pressure to the guide wheel system only. The adjustable pressure regulator allows the braking effort on each axle to be set so that the Rail wheels do not lock up and slide.

The guide wheel brake chambers are connected to the DELIVERY ports on the guide wheel air brakes relay valve.

Install air lines and valves per the drawing on next page. Make certain that the Front Air Brake Valve indicates that it has been preset to 75 psi and the Rear Air Brake Valve is labeled 30 psi. The brake valves are already preset at the factory (front at 75 psi, rear at 30 psi).

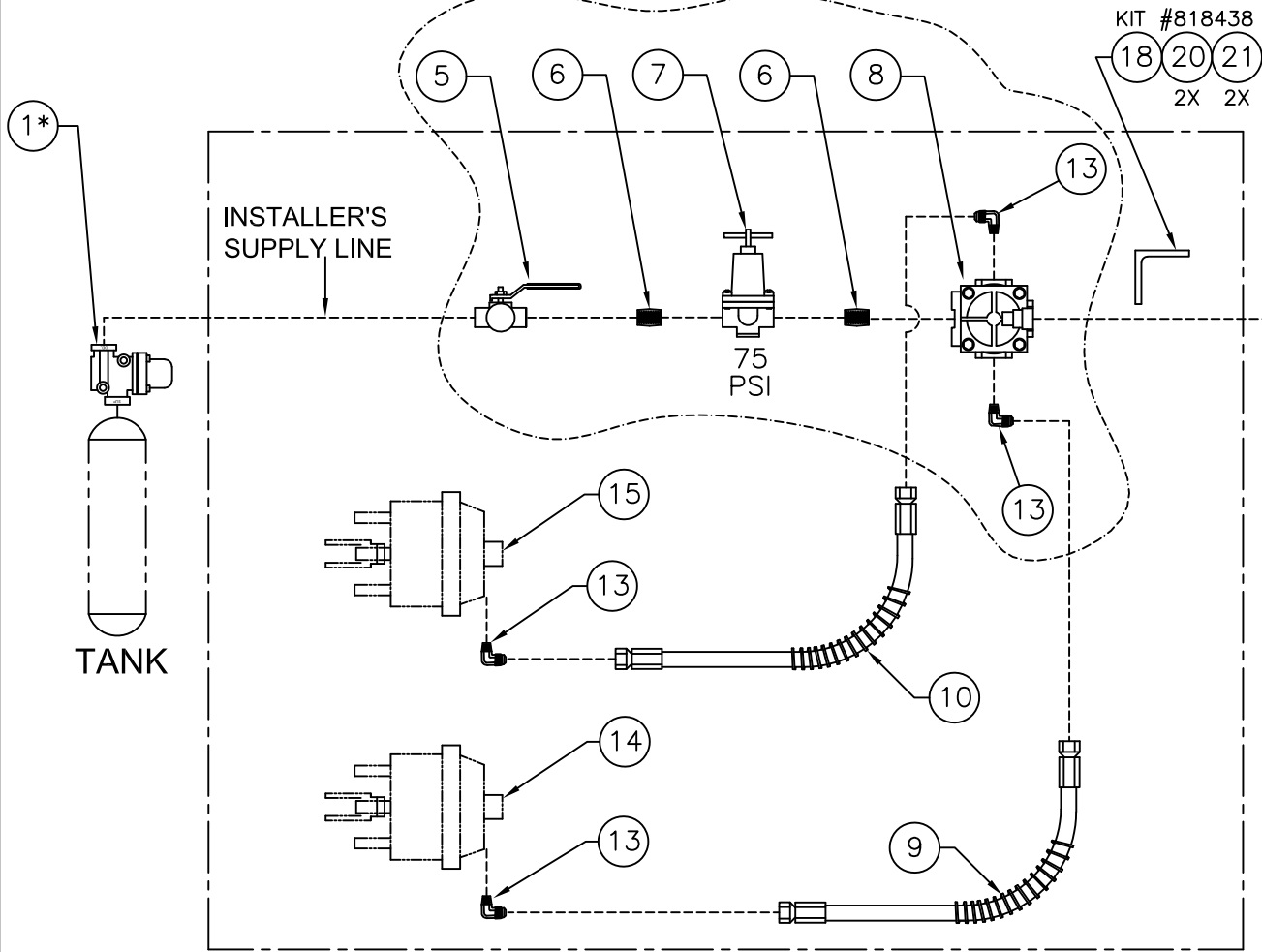
### **5.3.5 Cobra Air Brake System Plumbing Overview**

**\*\* See additional detailed drawing on next page \*\***

ITEM	PART NO.	QTY	DESCRIPTION
1	818483	1*	VALVE, PRESSURE PROTECTION (BW103976)(SPL PR-4)
2	818484	1	MTG ANGLE BRKT, AIR BRAKE VALVE – OPTIONAL
3	818485	1	VALVE, TOGGLE AIR (VE032037)
4	818486	1	LEGEND PLATE (ON-OFF FOR TOGGLE AIR VALVE)
5	818488	2	VALVE, BRASS BALL (3/8" – PBV500P-6)
6	818498	4	FITTING, NIPPLE (215PN-6)
7	818489	2	REGULATOR, AIR (MIDLAND KN31070)
8	818490	2	VALVE, AIR RELAY (MIDLAND KN28500)
9	818492	1	HOSE, AIR LINE; FRONT LH w/SPRING GUARD (H06906 x 62")
10	818494	1	HOSE, AIR LINE; FRONT RH w/SPRING GUARD (H06906 x 75")
11	818496	2	HOSE, AIR LINE; REAR (H06906 x 59")
12	818497	2	FITTING, STRAIGHT (0104-6-6B SAE)
13	818499	6	FITTING, 90ø (2104-6-6B)
14	818458	1	AIR BRAKE CHAMBER, FRONT DRIVER'S SIDE
15	818459	1	AIR BRAKE CHAMBER, FRONT PASSENGER'S SIDE

Note: Items #5, 6, 7, 8,  
& 13 shipped assembled.  
(Front Kit p/n 818413)

FROM VEHICLE AIR BRAKE  
CONTROL CIRCUIT



FRONT AXLE

\*Item #1 p/n 818483 – only qty. 1 included w/ front brakes

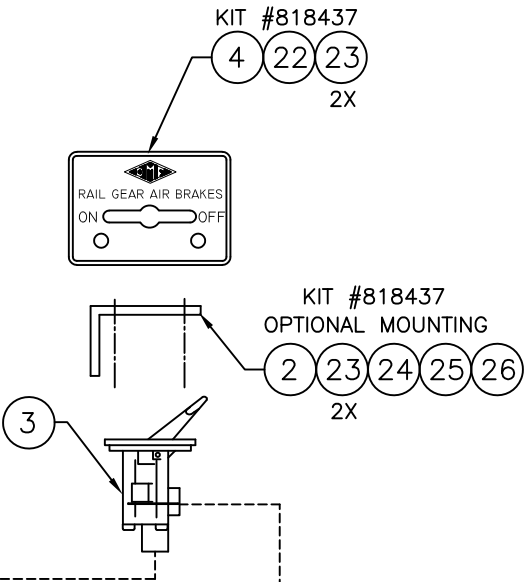
**KIT #818413 (FRONT) INCLUDE ITEMS: #5, #6, #7, #8, & #13**

**KIT #818415 (REAR) INCLUDE ITEMS: #5, #6, #7, #8, & #13**

**KIT #818437 INCLUDE ITEMS: #2, #3, #4, #22, #23, #24, #25, & #26**

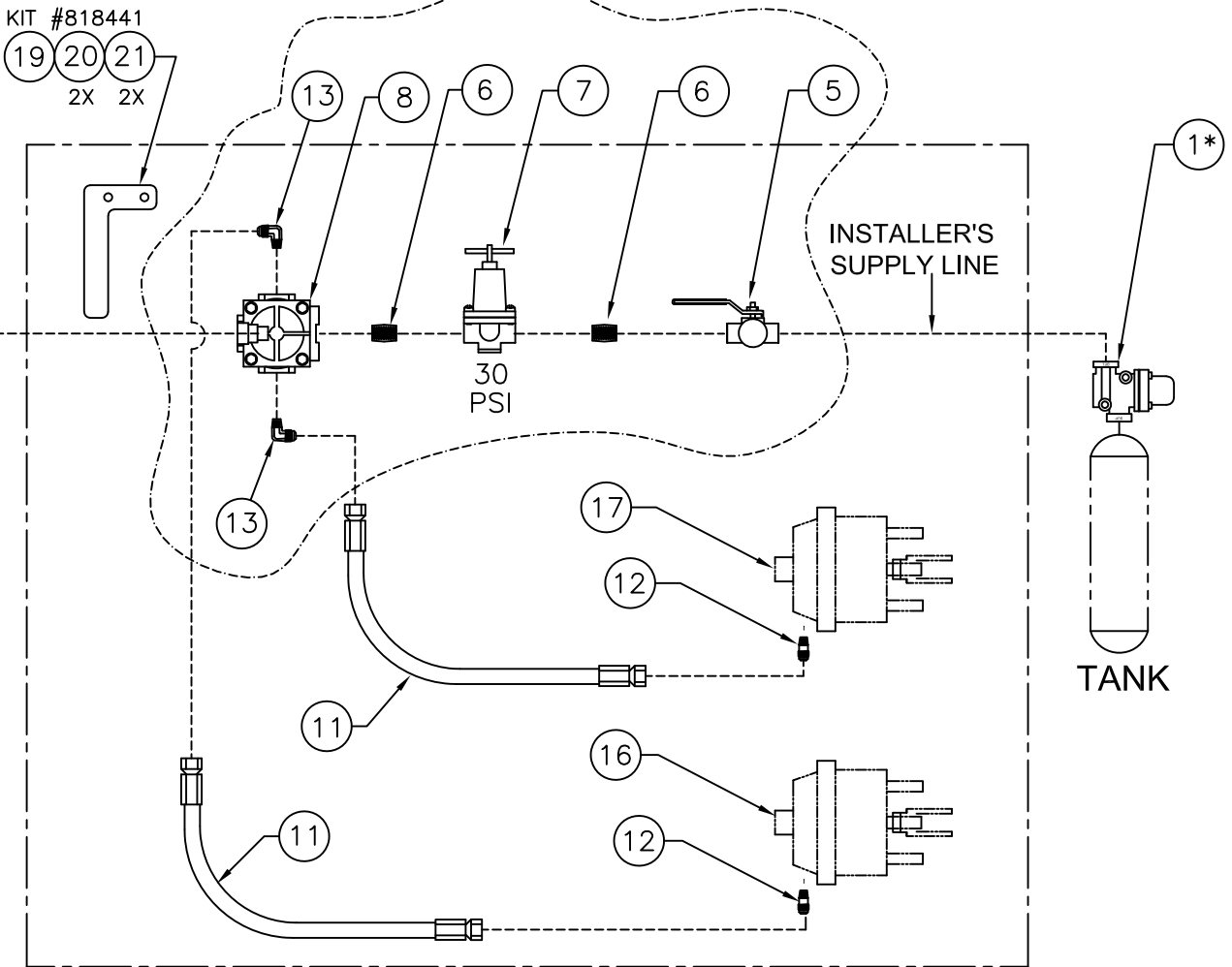
**KIT #818438 INCLUDE ITEMS: #18, #20 (2x), & #21 (2x)**

**KIT #818441 INCLUDE ITEMS: #19, #20 (2x), & #21 (2x)**







ITEM	PART NO.	QTY	DESCRIPTION
16	818460	1	AIR BRAKE CHAMBER, REAR DRIVER'S SIDE
17	818461	1	AIR BRAKE CHAMBER, REAR PASSENGER'S SIDE
18	818491	1	VALVE MOUNT BRKT, FRONT AIR BRAKE
19	818493	1	VALVE MOUNT BRKT, REAR AIR BRAKE
20	818421	4	HEX HEAD 5/16-18 X 1-1/4"
21	20342	4	5/16-18 NYLON LOCK NUT
22	818424	2	ROUND HEAD MACHINE SCREW #10-24 X 3/4"
23	818425	4	#10 LOCK WASHER (LW#10)
24	605101	2	#10 FLAT WASHER
25	605028	2	#10-24 HEX NUT
26	818887	2	RD HEAD MACHINE SCREW #10-24 X 1.00"

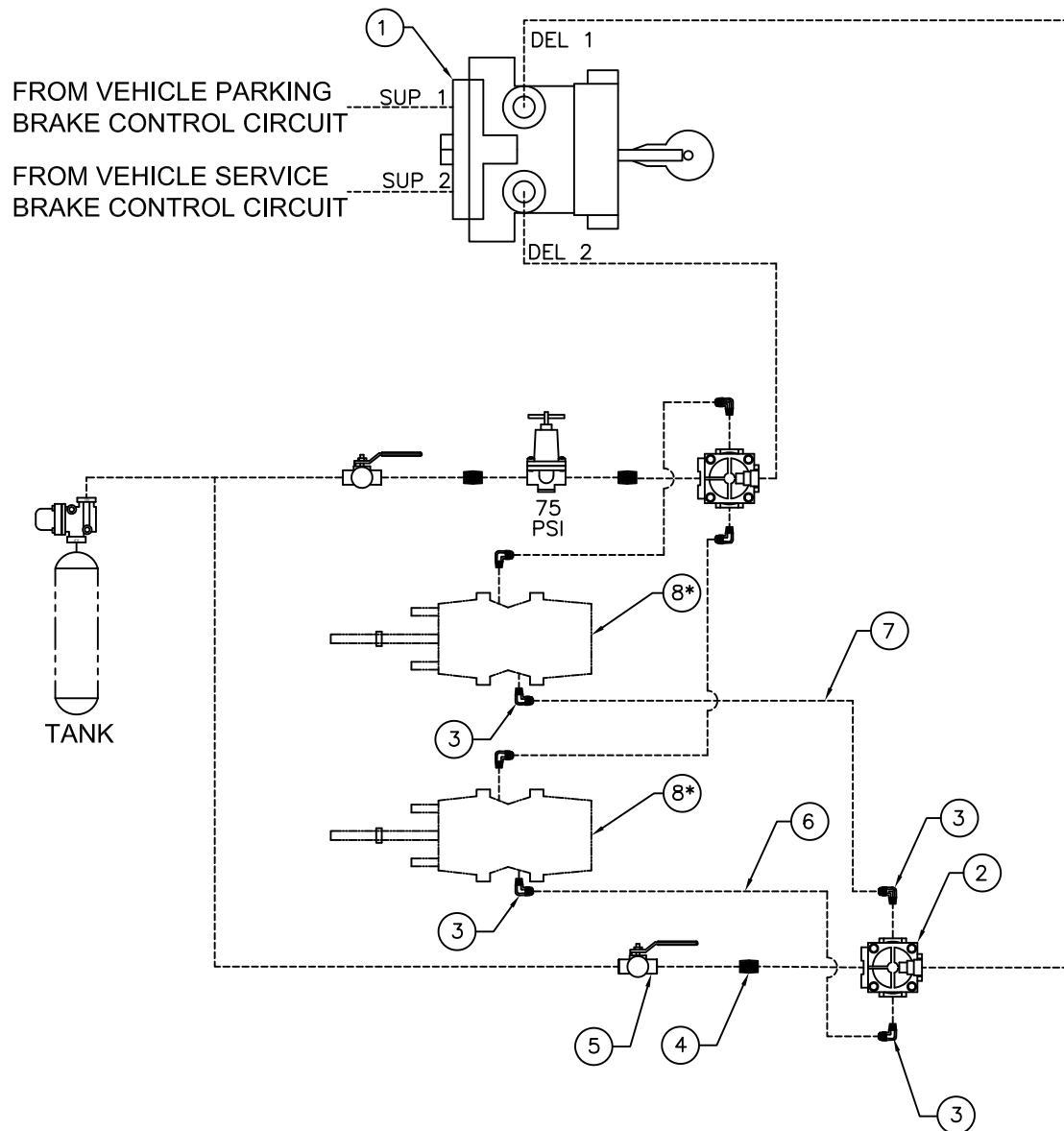
Note: Items #5, 6, 7, 8,  
& 13 shipped assembled.  
(Rear Kit p/n 818415)




INCLUDED WITH REAR AXLE KIT ONLY

	9/27/18	CORRECTED PRESSURE PROTECTION VALVE ORIENTATION	BJF	
	7/17/13	CORRECTED HARDWARE PART #'S	BJF	
	8/19/09	REVISED ITEM #1 TO QTY. 1 AND ADDED NOTES	JBG	
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX OR .XXXX ± .005 DRILL SIZES: + .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES < 0.030 X 45° MAX >				
DRAWN BY: TSH  APPD BY:		TITLE:  COBRA AIR BRAKE CONTROL SYSTEM ASSEMBLY		
		DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512		
		DATE: 05/17/92		DRAWING NUMBER: 818400
			REV: D	

ITEM	PART NO.	QTY	DESCRIPTION
1	78703	1	AIR TOGGLE VALVE, TWO CIRCUIT BENDIX TW-2
2	818490	1	VALVE, AIR RELAY (MIDLAND KN28500)
3	818499	4	90 DEGREE FITTING, 3/8 JIC MALE TO 3/8 NPT MALE
4	818498	1	3/8 NPT MALE NIPPLE
5	818488	1	VALVE, BRASS BALL (3/8" - PBV500P-6)
6	818492	1	HOSE, AIR LINE, FRONT LH W/ SPRING GUARD (H06906 X 62")
7	818494	1	HOSE, AIR LINE, FRONT RH W/ SPRING GUARD (H06906 X 75")
8	78798	2	BRAKE CHAMBER, TYPE 24 COMBO (NOT PROVIDED SHOWN FOR REF.)



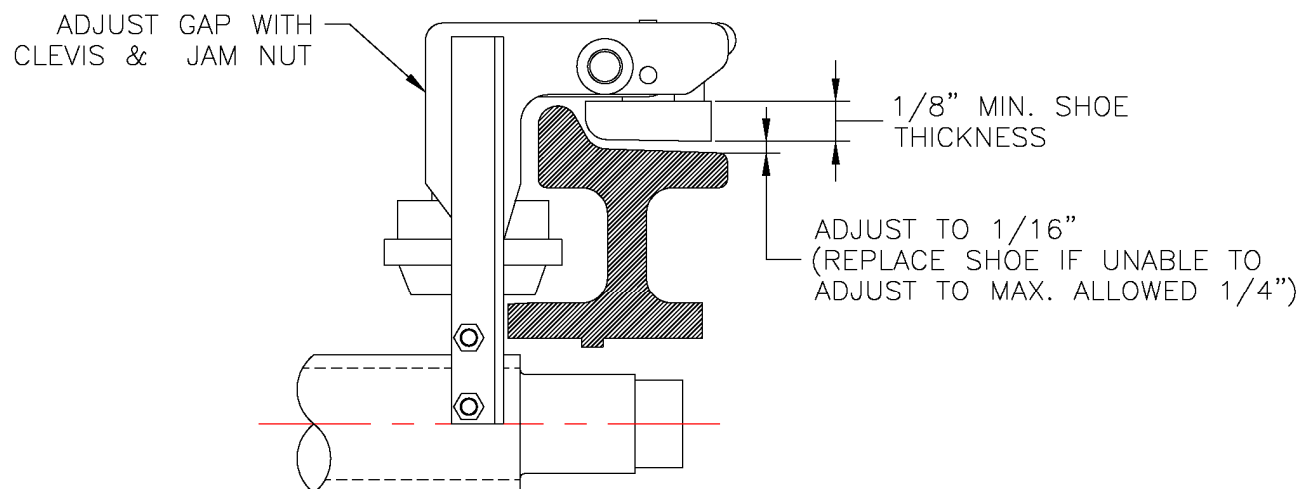
SEE DRAWING 818400 FOR REAR BRAKES AND PART NUMBERS FOR OTHER COMPONENTS

9/27/18	CORRECTED PRESSURE PROTECTION VALVE ORIENTATION	BJF	
REV	DATE	DESCRIPTION	BY APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC, MACH: ± 1/32" FRAC, OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX OR .XXXX ± .005 DRILL SIZES: + .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP CORNERS (0.005 X 45° MAX.)			
RW-1650BC		TITLE: AIR BRAKE CONTROL KIT FOR BEHIND CAB GEAR	
DRAWN BY: BJF		APPD BY: DATE: 7/17/13	
		DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512 	
		DRAWING NUMBER: 78701	REV: A



### 5.3.6 Inspection and Adjustment

Inspect and adjust brake shoes per Figure 5.3.6.



FILENAME: M1630131

**Figure 5.3.6** Brake Inspection and Alignment

### 5.3.7 Testing

Operate the vehicle on a test track. With the "on/off" toggle valve "on" and the ball valve(s) open, check that:

- (1) when the vehicle brake pedal is depressed, the guide wheel brakes clamp the Rail wheel enough to begin slowing its rotation, but not enough to totally lock the Rail Wheel. The Rail Wheels should not be allowed to lock up since that will cause a flat spot on the wheel due to the sliding action on the rail.
- (2) the brakes properly release when the brake pedal is released.

If brakes do not function properly, contact a Service Representative at DMF.




#### **WARNING**

The rail wheel brake system is intended to assist the existing vehicle brakes when in the rail mode. As the vehicle rear tires are in contact with the railhead, the primary braking effort is derived from the rubber tires. Rail wheel brakes alone are insufficient to stop the vehicle in a reasonable distance.

### 5.3.8 Brake Parts

- See diagrams on the following pages for replacement brake actuation part
- See Section 6 for hydraulic and electrical control components

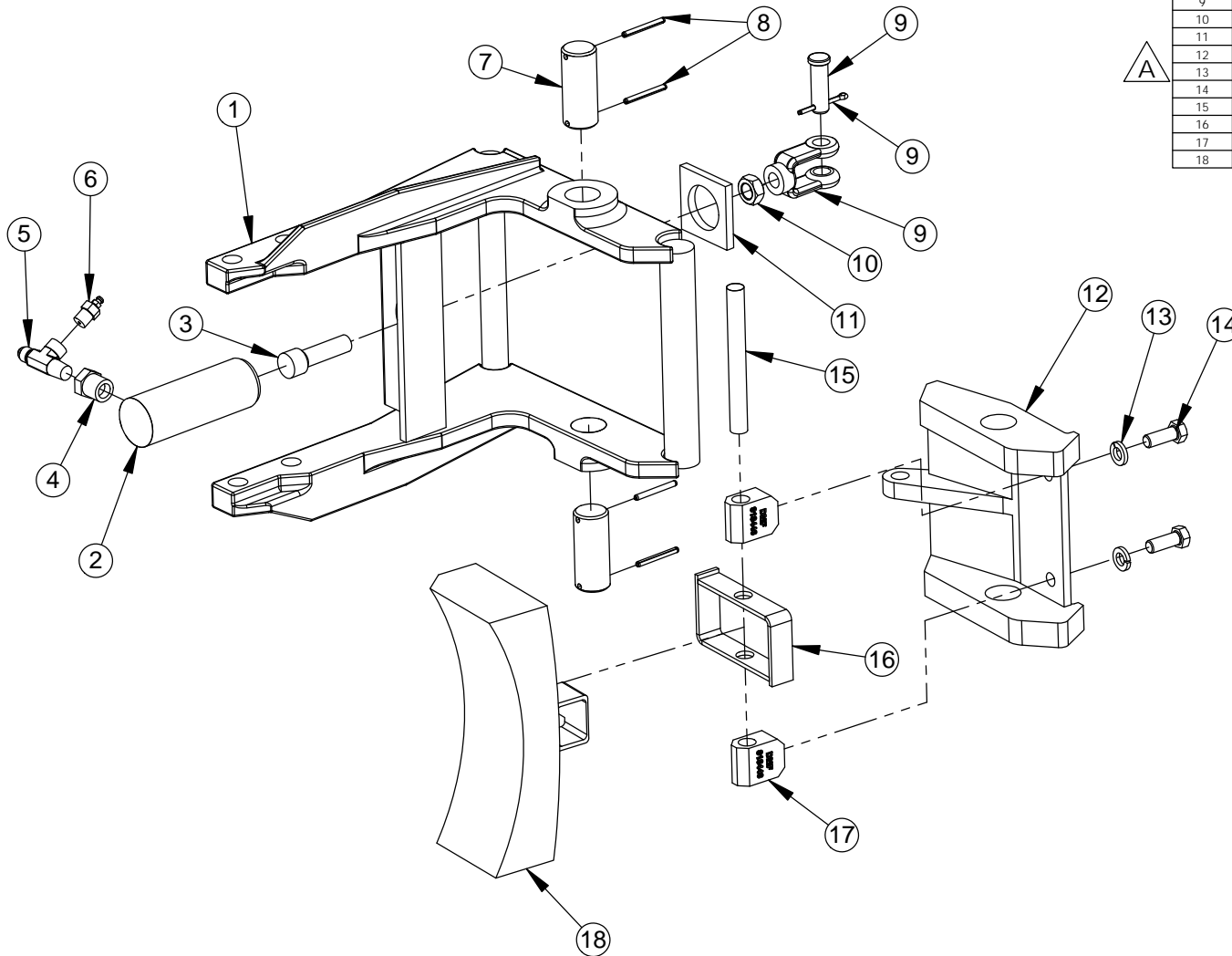
PART NO.	DESCRIPTION
818458	AIR BRAKE CHAMBER, FRONT DRIVER'S SIDE
818459	AIR BRAKE CHAMBER, FRONT PASSENGER'S SIDE
818460	AIR BRAKE CHAMBER, REAR DRIVER'S SIDE
818461	AIR BRAKE CHAMBER, REAR PASSENGER'S SIDE

							
		3/26/12		818513 WAS 818426		JDI	
REV		DATE		DESCRIPTION			
BY				APP			
<b>TOLERANCES:</b> (UNLESS SPECIFIED) COMMON SENSE PREVALS FRAC. MACH: ± 1/32 FRAC. OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX OR .000 ± .015 DRILL SIZES: ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 1/25 MICRO 2ND AND 2B <small>MECHAN. SHOP CHECKS ( S. 000 S. 40P. 000 S. )</small>				<b>TITLE:</b> COBRA AIR BRAKE ASSEMBLY (SEE NOTE #1) DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512			
DRAWN BY:		APPD BY:		DATE:		DRAWING NUMBER:	
JBG				1/25/10		M1630101	
						REV:	
						A	

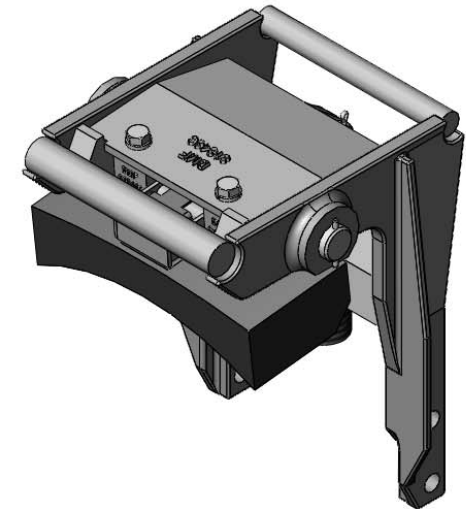
**NOTE #1**


\*KIT P/N #818445 - AIR BRAKE PIVOT PIN w/ (2) ROLL PINS  
(INCLUDES: #5 818454 BRAKE SHOE PIVOT PIN QTY. 1 & #17 818509 ROLL PIN QTY. 2)

NOTE #2



ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	818787	1	WELDMENT, HYDRAULIC BRAKE
2	818789	1	1630 COBRA HYD. CYLINDER / JACK
3	818791	1	1630 HYDRAULIC BRAKE THREADED ROD ADAPTER
4	605025	1	ADAPTER BUSHING, 3/8" NPT MALE TO 1/4" NPT FEMALE
5	605026	1	TEE, #04 MJIC X 1/4" MPT X 1/8" FPT
6	12726	1	HYDRAULIC BRAKE CYLINDER BLEEDER SCREW
7	818454	2	AIR BRAKE PIVOT PIN
8	818509	4	ROLL PIN 5/32" x 1-1/2"
9	818457	1	AIR BRAKE CLEVIS ASSY., w/ COTTER PIN
10	106237	1	JAMB NUT, 1/2-20 UNF
11	818790	1	HYDRAULIC BRAKE CYLINDER LOCK NUT
12	818431	1	AIR BRAKE ARM CASTING
13	12566	2	LW 3/8" GR 8
14	605172	2	HHCS, 3/8-16 X 1", GR8
15	818452	1	AIR BRAKE SHOE PIN
16	818513	1	WELDMENT, BRAKE CLIP, FORMED&WELDED
17	818446	2	AIR BRAKE SHOE BLOCK RETAINER DETAIL
18	818470	1	AIR BRAKE SHOE: COBRA V-265



A		10/20/14		ITEM 13 WAS 605080			DJJ				
REV		DATE		DESCRIPTION				BY		APP	
TOLERANCES: (UNLESS SPECIFIED)				RW-1630							
FRAC. MACH:		± 1/32"		TITLE: HYDRAULIC BRAKE ASSEMBLY, RW-1630							
FRAC. OTHER:		± 1/16"									
.X		± .063		DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512							
.XX		± .030									
.XXX		± .005		DRAWN BY:      APPD BY:							
DRILL SIZES:		± .015									
ANGULAR:		± 1"		DATE:				DRAWING NUMBER:		REV:	
SURF FINISH:		125 MICRO		9/23/13				818788		A	
THREADS:		2A AND 2B									
DRAWN BY: DJJ				APPD BY: -							
DATE: 9/23/13											
DRAWING NUMBER: 818788											
REV: A											

## 5.4 TWO-PIECE WHEELS

DMF offers a two-piece, insulated wheel option for extreme applications, such as material handlers. If your material handler will be insulated, then DMF requires the use of our two-piece wheel.

DMF's two-piece wheels require additional maintenance (over and above our standard wheels), so we only recommend them for use in heavy-duty applications. The additional maintenance procedures center around proper monitoring of the torque of the 8 bolts holding the tread and hub together. To assist in monitoring the torque of these bolts, DMF has provided "Loose Wheel-Nut Indicators" (also referred to as torque indicators) on all 8 bolts. See the following checklist for additional maintenance procedures.

### Additional Checklist for Two-Piece Wheels:

In addition to following the inspection and maintenance procedures as defined in Section 3.1, Two-Piece Wheels require the following specific inspections:

- As previously specified in Section 3.1.1, check the bolt torque indicators (the tabs around each bolt) daily to ensure that they have not moved. If torque indicators are missing or damaged, please contact DMF for replacements. If torque indicators have moved, follow the procedure below to remedy the situation:
  1. Remove the green torque indicator. Re-torque the loose nut (see torque specifications in drawing M1630106 on the next page) and then replace with a red torque indicator (DMF provides one red torque indicator per wheel). To install a torque indicator, place it over the nut with the raised collar resting against the wheel. Push with both thumbs or a socket flush to the wheel.
  2. The next time that the vehicle is in a shop for service or repair, disassemble the wheel and inspect all the components for damage. Replace damaged or worn components and re-assemble the wheel with new bolts, nuts, and washers. See drawing M1630106 on the next page for the type of hardware required and the torque spec.

Nuts, bolts, and washers may only be used once. If the wheel is disassembled, all of the nuts, bolts, and washers must be replaced.

Please contact DMF if you have any questions regarding our two-piece wheels.

## RW-1650 2-PC. WHEEL (820496) PARTS:

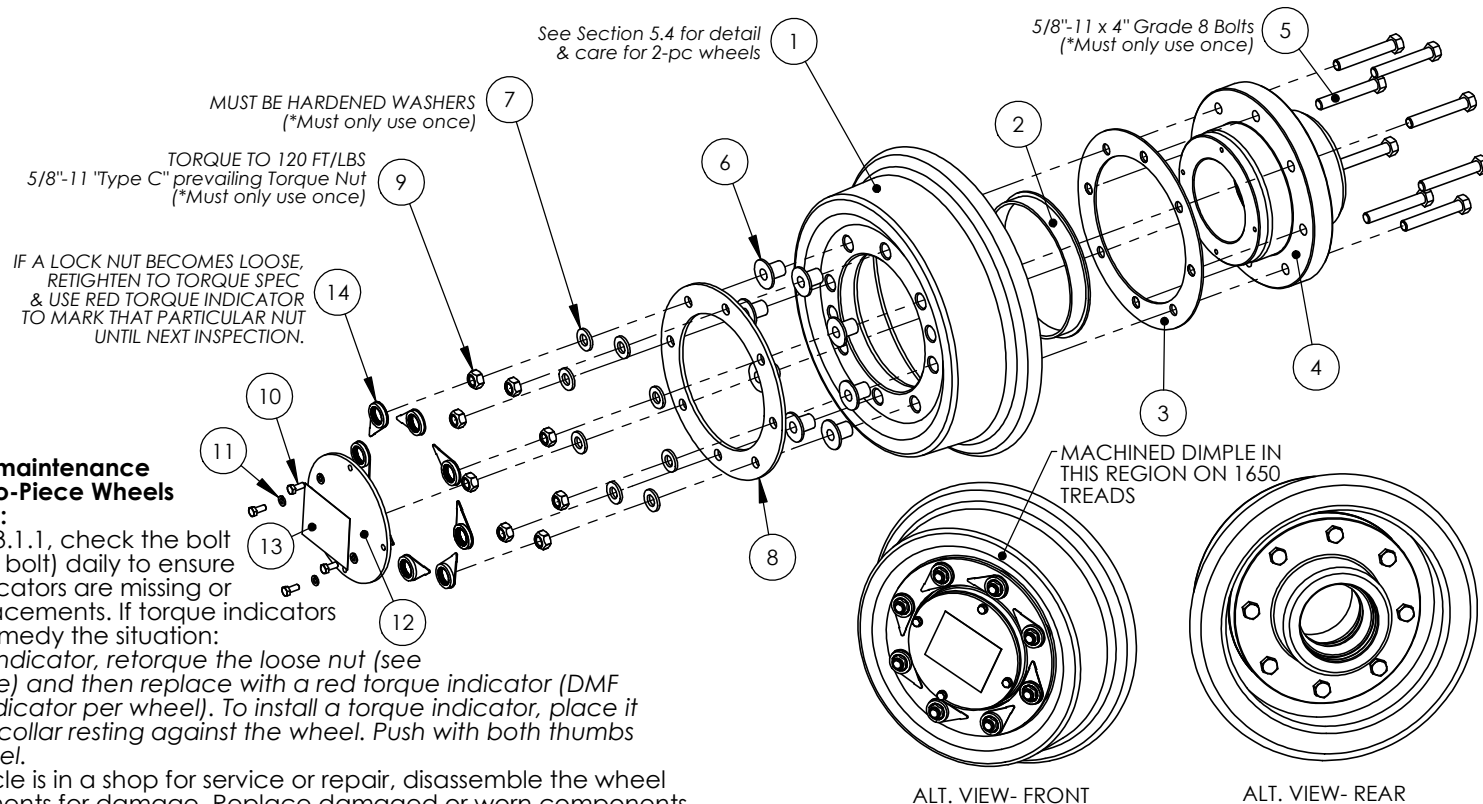
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	820520	1	RW-1650 2 PC. WHEEL TREAD; THRU HARDENED
2	820482	1	FIBER RING WHEEL INSULATOR DETAIL
3	820478	1	2-PC. WHEEL FIBER SPACER RING
4	820475	1	HUB WITH RACES, RW-1650 2-PC WHEEL
	820490	1	RW-1650 2-PC. WHEEL HUB DETAIL
	800125	2	RW-1650 BEARING RACE (TIMKEN-6420)
5	820486	8	HHCS 5/8-11 UNC x 4", GRADE 8
6	820480	8	FIBER BOLT COLLAR, 2-PC. WHEEL
7	820485	8	2-PC. WHEEL, HARDENED 5/8" FLAT WASHER
8	820484	1	STEEL WASHER RING, 2 PIECE WHEEL
9	820487	8	NUT, LOCK (LN5/8-11 TYPE "C")
10	800108	4	HUBCAP BOLTS (HHCS 5/16"-18 X 3/4")
11	800109	4	5/16" LOCK WASHER, GRADE 8
12	820441	1	HUBCAP, 1650 - 7" B.C. (FLAT)
13	800300	1	DECAL, 2-PC. WHEEL RW-1630/50 INSPECTIONS
14	800301	1	KIT, 2-PC. WHEEL INDICATORS (8 GREEN/1 RED)

P/N #800021 - ALL HARDWARE KIT FOR RW-1650 WHEEL (see drawing M1650103 in Section 7)

## RW-1630 2-PC. WHEEL (820494) PARTS:

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	820492 OR 820520	1	RW-1630 2-PC. WHEEL TREAD DETAIL
2	820482	1	FIBER RING WHEEL INSULATOR DETAIL
3	820478	1	2-PC. WHEEL FIBER SPACER RING
4	820483	1	RW-1630 2-PC. HUB DETAIL W/ QTY. 2 RACE BEARINGS
	820488	1	RW-1630 2-PC. WHEEL HUB DETAIL
	800101	2	RW-1630 BEARING RACE (TIMKEN-563)
5	820486	8	2 PC. WHL HEX BOLT (HHCS5/8-11 X 4.00" GR8)
6	820480	8	FIBER BOLT COLLAR, 2-PC. WHEEL
7	820485	8	2-PC. WHEEL, HARDENED 5/8" FLAT WASHER
8	820484	1	STEEL WASHER RING, 2 PIECE WHEEL
9	820487	8	NUT, LOCK (LN5/8-11 TYPE "C")
10	800108	4	HUBCAP BOLTS (HHCS 5/16"-18 X 3/4")
11	800109	4	HUBCAP LOCK WASHERS (LW-5/16")
12	820441	1	HUBCAP, 1650 - 7" B.C. (FLAT)
13	800300	1	DECAL, 2-PC. WHEEL RW-1630/50 INSPECTIONS
14	800301	1	KIT, RW-1630/50 2-PC. WHEEL 23.8MM INDICATORS

P/N #800020 - ALL HARDWARE KIT FOR RW-1630 WHEEL (see drawing M1630103 in Section 7)



### In addition to following the inspection & maintenance procedures as defined in Section 3.1, Two-Piece Wheels require the following specific inspections:

- As previously specified in Section 3.1.1, check the bolt torque indicators (the tabs around each bolt) daily to ensure that they have not moved. If torque indicators are missing or damaged, please contact DMF for replacements. If torque indicators have moved, follow this procedure to remedy the situation:
  - Remove the green torque indicator, retorque the loose nut (see torque specifications above) and then replace with a red torque indicator (DMF provides one red torque indicator per wheel). To install a torque indicator, place it over the nut with the raised collar resting against the wheel. Push with both thumbs or a socket flush to the wheel.
  - The next time that the vehicle is in a shop for service or repair, disassemble the wheel and inspect all the components for damage. Replace damaged or worn components and re-assemble the wheel with new bolts, nuts, and washers. See above for the type of hardware required and the torque specifications.

- Nuts, bolts, and washers may only be used once. If the wheel is disassembled, all of the nuts, bolts, and washers must be replaced.

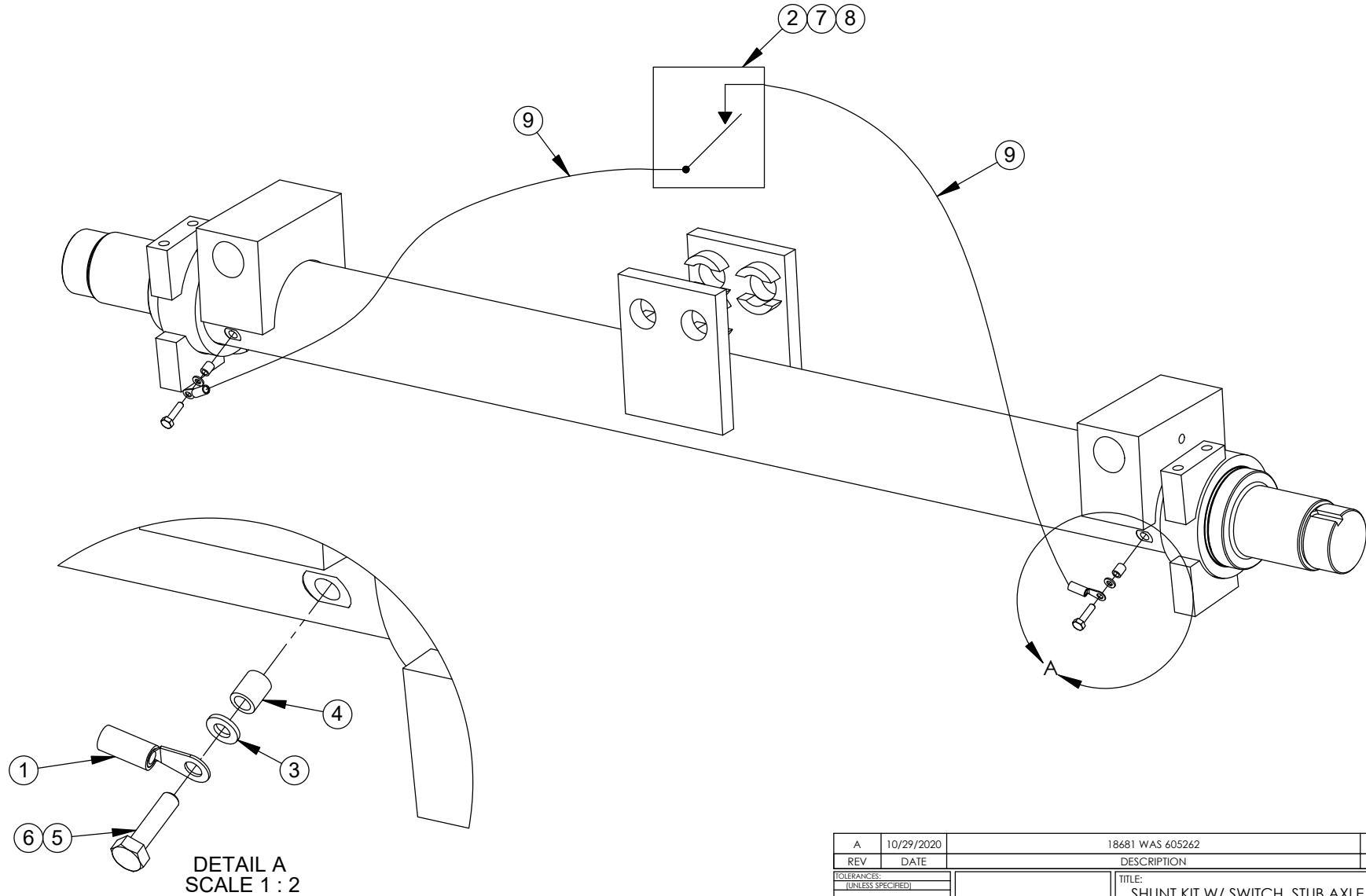
4/14/20	CORRECTED TYPES; ADDED NOTE FOR 1650 WHEEL ID FEATURE	BJF	
10/27/17	UPDATED BOM'S & SECTION REFERENCES	BJF	
REV	DATE	DESCRIPTION	BY APP
TOLERANCES:			
(UNLESS SPECIFIED)			
FRAC. MACH:	± 1/32"	RW-1630/50	
FRAC. OTHER:	± 1/16"		
.XX	± .063	TITLE:	
.XXX	± .030		
.XXX	± .005	RW-1630/50 INSULATED 2-PC. WHEEL ASSY.	
DRILL SIZES:	± .015		
ANGULAR:	± 1°	DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512	
SURF FINISH:	125 MICRO		
THREADS:	2A AND 2B		
DRAWN BY: JBG		APPD BY:	
		DATE: 4/6/2010	
		DRAWING NUMBER: M1630106	
		REV: C	


---

**5.5 STUB AXLE SHUNTS**

See drawing 818808 on the next page for stub axle shunt wiring instructions.

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	605178	2	RING TERMINAL, 1/4", 14-16 GA
2	605261	1	SWITCH, SPST, 25 AMP
3	605267	2	FLAT WASHER, 1/4", NYLON
4	818809	2	BOLT INSULATOR, SHUNT KIT, STUB AXLE
5	605177	2	HHCS 1/4-20 UNC X 1" (USE WITH RW-1630)
6	605263	2	HHCS, 1/4-20 UNC X 1-1/4" (USE WITH RW-1650)
7	818810	1	SHUNT SWITCH STICKER (NOT SHOWN)
8	18681	2	HEAT SHRINK RING TERMINAL, #10, 14-16 GA
9	818811	1	BLACK WIRE, 16 GA X 30 FT.



A	10/29/2020	18681 WAS 605262		BJF	
REV	DATE	DESCRIPTION		BY	APP
TOLERANCES: (UNLESS SPECIFIED)		RW-1630/50		TITLE: SHUNT KIT W/ SWITCH, STUB AXLE, RW-1630/50	
FRAC, MACH: ± 1/32" FRAC, OTHER: ± 1/16" X ± .063 .XX ± .030 .XXX ± .005 DRILL SIZES: + .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B <small>MIL-SPEC 8835 (C100) (1000) (40) (1000)</small>				DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512	
DRAWN BY: JDI		APPD BY: -		DATE: 6/7/13	 DRAWING NUMBER: 818808
				REV: A	

# SECTION 6.0    HYDRAULIC SYSTEM

**6.1    GENERAL INFORMATION ..... 6-2**

    6.1.1    New Hydraulic System for Vehicle without Hydraulic System ..... 6-2

    6.1.2    Hydraulic System for Multiple Uses (Railgear and other application(s)) ..... 6-2

    6.1.3    Hydraulic System Installation Continued ..... 6-3

    6.1.4    Fitting Installation..... 6-4

**6.2    VALVE ASSEMBLIES AND HYDRAULIC SCHEMATIC ..... 6-7**

**6.3    HYDRAULIC CYLINDER DRAWINGS .....6-13**

**6.4    CYLINDER ASSEMBLY PROCEDURES .....6-19**



## 6.1 GENERAL INFORMATION

### NOTICE

DMF only provides hydraulic hoses from front and rear control valves to Railgear cylinders. Customer is responsible for all other system components (tank, diverter, PTO, pump, filter, pressure relief valve, etc.)

### 6.1.1 New Hydraulic System for Vehicle without Hydraulic System

If only DMF Railgear is to be installed and there is not an existing hydraulic system, outfit the truck with a 5 to 7 GPM, 2500 psi pump, suction filter (such as a Vickers OFSS-10), with an appropriate sized reservoir. The tank should have a minimum of (1) one suction port (3/4 NPT), (1) one 1/2" NPT return and a tank filler breather. Fill the tank with Unax RX-46 hydraulic oil (or equivalent). If other equipment is to be installed in addition to your DMF Railgear, you will need to adjust your tank specifications accordingly.

Once your new hydraulic system is installed, if your vehicle is going to have multiple applications for the hydraulic system, please proceed to Section 6.1.2 for instructions on installing a diverter valve.

### 6.1.2 Hydraulic System for Multiple Uses (Railgear and other application(s))

If the truck has an existing hydraulic system, you must first install an appropriately sized pressure relief valve in the pressure line after the pump. Install an appropriate sized diverter valve (depending on pump volume) in the pressure line after the pressure relief valve and before any existing equipment. One diverter outlet routes to the existing equipment's valves, the other diverter outlet routes to the front Railgear. See Section 6.2 for additional information on installation of the pressure relief valve and diverter valve.

### ⚠ WARNING

Railgear control valves have built-in pressure reliefs and the hydraulic working pressure of the system is 2500 psi. The front valve should be set to 2300 psi at the relief. The rear valves should be set to 2000 psi and all other parts supplied by DMF are rated to 2500 psi. Care must be exercised that the relief in any of the valves is not inadvertently exceeded. It is possible for a relief to be adjusted much higher than its valve can withstand. To ensure correct system pressure, check with a gauge.

### 6.1.3 Hydraulic System Installation Continued

From the output side of the Pressure Relief valve (or the Diverter valve, if appropriate), route a pressure line (SAE 100R2-8 and #8 JIC swivels at each end) to the center of the front bumper. Connect the pressure line to the "IN" port of the front Railgear valve. From the "OUT" port of the front Railgear valve, route a pressure line (SAE 100R2-8 and #8 JIC swivels at each end) to the "IN" port of the rear Railgear valve. Lastly, run a hydraulic line from the "OUT" port of the rear Railgear to the tank, ensuring that there are no obstructions, such as filters or other equipment. The remaining ports on the front and rear valve assemblies connect to the Railgear cylinders with SAE 100R1-4 hose and #4 JIC swivels. The rear cylinder hydraulic hoses are pre-installed at the factory. Check that proper hose clearance is obtained to avoid chafing and shield hoses if necessary.

**⚠ WARNING**

Be certain that the front and rear valves are plumbed correctly. Each valve port is marked "IN" or "OUT". Plumbing the valves backward will cause an unsafe condition, resulting in possible injury and/or damage.

ITEM	PART NO.	QTY	DESCRIPTION
1			
2			

TITLE: SAE (JIC) 37 Degree Fitting Installation.

PURPOSE: To Establish Production Methods For The Installation Of SAE (JIC) Medium Pressure Hydraulic Fittings.

COMMON USAGE: Hydraulic Systems Operating With Petroleum-Based Fluids At Pressures Below 4000 PSI Or Minimum Component Rating.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Purchased Fittings With SAE (JIC) 37 Degree Flared Ends.




PROCEDURE: A) Inspect fitting components to ensure that mating parts are free of burrs, nicks, scratches or any foreign material.

B) Align tube flare against nose of fitting body and screw on the nut, finger tight, clamping the tube flare between the fitting nose and the nut.

C) Tighten the nut the indicated Flats From Finger Tight (F.F.F.T.) listed in the chart below. Use a second wrench to hold the hose in proper alignment while tightening to avoid twisting the lay line. One flat on a hex is equal to 1/6th of a full turn. Tolerance on tightening is plus or minus 1/4 flat ( 1/24th of full turn).

SAE (JIC) 37° Flare Fittings

Size	Thread Size	Tube Connection F.F.F.T.	Swivel Nut or Hose Connection F.F.F.T.
-4	7/16-20	2	2
-6	9/16-18	1.5	1.25
-8	3/4-16	1.5	1
-12	1 1/16-12	1.25	1
-16	1 5/16-12	1	1
-20	1 5/8-12	1	1
-24	1 7/8-12	1	1

					
					
REV	DATE	DESCRIPTION			BY APP
<small>           TOLERANCES:            (UNLESS SPECIFIED)            COMMON SIZES PREVAIL            FRAC. MACH: ± 1/32"            FRAC. OTHER: ± 1/16"            .X ± .063            .XX ± .030            .XXX OR .XXXX ± .005            DRILL SIZES: ± .005            ANGULAR: ± 1°            SURF FINISH: 125 MICRO            THREADS: 2A AND 2B            BREAK SHARP EDGES         </small>		<small>           TITLE:            PRODUCTION PROCEDURE 005            JIC FITTING INSTALLATION            DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512         </small>		<small>           DATE:            06/02/94         </small>	
<small>           DRAWN BY:            TSH         </small>		<small>           APPD BY:         </small>			<small>           DRAWING NUMBER:            PP005         </small>
				<small>           REV:            #         </small>	

ITEM	PART NO.	QTY	DESCRIPTION
1			
2			

TITLE: SAE O-Ring Fitting Installation

PURPOSE: To Establish Production Methods For The Installation Of O-Ring Medium And High Pressure Hydraulic Fittings.

COMMON USAGE: Hydraulic Systems Operating With Petroleum-Based Fluids At Pressures Below 4000 PSI Or Minimum Component Rating.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Purchased Fittings With O-Ring Seals And SAE Straight Threads.

PROCEDURE:



- A) Inspect to ensure that both mating parts are free of burrs, nicks, scratches or any foreign particles.
- B) Lubricate O-Ring with light coat of system fluid or compatible oil.
- C) For adjustable fittings, back off lock nut as far as possible. Make sure back up washer is not loose and is pushed up to nut.
- D) Screw fitting into port until finger tight. Back up washer (adjustable) or hex face (non-adj.) should contact port face. Light wrenching may be necessary.
- E) To align an adjustable fitting, unscrew by desired amount but not more than one full turn. Use wrench to hold in position. Screw nut down to port face until finger tight.
- F) Tighten lock nut (adjustable) or fitting (non-adj.) the indicated Flats From Finger Tight (F.F.F.T.) in either the Adjustable chart or the Non-Adjustable chart below. One Flat on a hex is equal to 1/6th of a full turn. Tolerance on tightening is plus or minus 1/4 flat (1/24th of full turn).
- G) Inspect to ensure that O-Ring is not pinched and back up washer/hex seats flat on face of port.

#### ADJUSTABLE FITTINGS

Fitting Size	SAE Port Thread Size	F.F.F.T.
2	5/16-24	1.0
4	7/16-20	1.5
6	9/16-18	1.5
8	3/4-16	1.5
10	7/8-14	1.5
12	1 1/16-12	1.5
14	1 3/16-12	1.5
16	1 5/16-12	1.5
20	1 5/8-12	2.0
24	1 7/8-12	2.0

#### NON-ADJUSTABLE FITTINGS

Fitting Size	SAE Port Thread Size	F.F.F.T.
2	5/16-24	1.0
4	7/16-20	1.0
6	9/16-18	1.5
8	3/4-16	1.5
10	7/8-14	1.5
12	1 1/16-12	1.5
14	1 3/16-12	1.5
16	1 5/16-12	1.5
20	1 5/8-12	1.5
24	1 7/8-12	1.5

					
					
REV	DATE	DESCRIPTION			BY APP
<small>           TOLERANCES:            (UNLESS SPECIFIED)            COMMON SENSE PREVAILS            FRAC. MACH: <math>\pm 1/32</math>            FRAC. OTHER: <math>\pm 1/16</math>            .X <math>\pm .063</math>            .XX <math>\pm .030</math>            .XXX OR .XXXX <math>\pm .005</math>            DRILL SIZES: <math>\pm .005</math>            ANGULAR: <math>\pm 1^\circ</math>            SURF FINISH: 125 MICRO            THREADS: 2A AND 2B            BREAK SHARP EDGES         </small>		<small>           TITLE:            PRODUCTION PROCEDURE 003            O-RING FITTING INSTALLATION            DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512         </small>		<small>           DRAWN BY: TSH            APPD BY:            DATE: 06/02/94            DRAWING NUMBER: PP003            REV: #         </small>	

ITEM	PART NO.	QTY	DESCRIPTION
1			
2			

TITLE: National Pipe Thread (NPT) Fitting Installation.

PURPOSE: To Establish Production Methods For The Installation Of NPT Medium Pressure Hydraulic Fittings.

COMMON USAGE: Hydraulic Systems Operating With Petroleum-Based Fluids At Pressures Below 3000 PSI Or Minimum Component Rating.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Purchased Fittings With Tapered Pipe Threads.

PROCEDURE: A) Inspect port components to ensure that male and female threads are free of nicks, burrs, dirt etc.

B) Apply sealant/lubricant to male pipe threads. Use only Permatex #14D "Thread Sealant With Teflon" paste (or Engineering approved equal). The first few threads must be left uncovered to avoid system contamination.



C) Screw fitting into female pipe port to the finger tight position.

D) Wrench tighten the fitting to the appropriate Turns From Finger Tight (T.F.F.T.) shown in chart below. Make sure that tube end of shaped fitting is aligned to receive in coming tube or hose assembly.

### STEEL PIPE THREAD FITTINGS

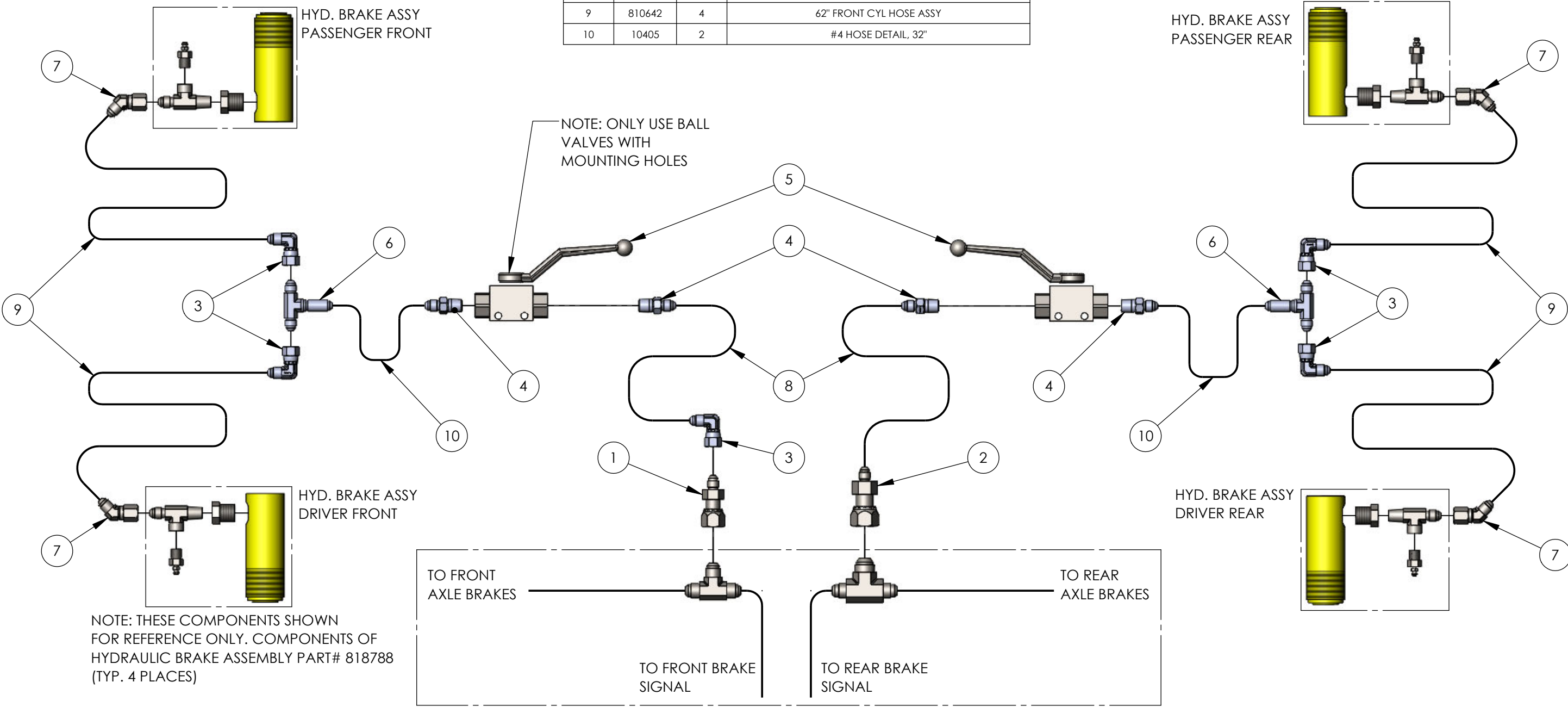
Fitting Size	Pipe Thread Size, NPT	T.F.F.T.
2	1/8-27	2.0-2.5
4	1/8-27	2.0-2.5
6	1/4-18	1.5-2.0
8	3/8-18	2.0-2.5
10	1/2-14	2.0-2.5
12	3/4-14	1.5-2.0
14	3/4-14	1.5-2.0
16	1-11 1/2	1.5-2.0
20	1 1/4-11 1/2	1.5-2.0
24	1 1/2-11 1/2	1.5-2.0

COMMENTS: Teflon Tape May Be Used In Certain Situations With Engineering Approval. A Pipe Fitting Is Limited To One Or Two Re-Uses.

					
REV	DATE	DESCRIPTION			BY APP
<small>           TOLERANCES:            (UNLESS SPECIFIED)            COMMON SENSE PREVAILS            FRAC. MACH: ± 1/32"            FRAC. OTHER: ± 1/16"            .X ± .063            .XX ± .030            .XXX OR .000 ± .005            DRILL SIZES: ± .005            ANGULAR: ± 1°            SURF. FINISH: 125 MICRO            THREADS: 2A AND 2B            BREAK SHARP EDGES         </small>		<small>DRAWN BY:</small> TSH		<small>APPD BY:</small>	<small>DATE:</small> 06/02/94
<small>           TITLE: PRODUCTION PROCEDURE 004            PIPE FITTING INSTALLATION            DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512         </small>				<small>DRAWING NUMBER:</small> PP004	<small>REV:</small> #

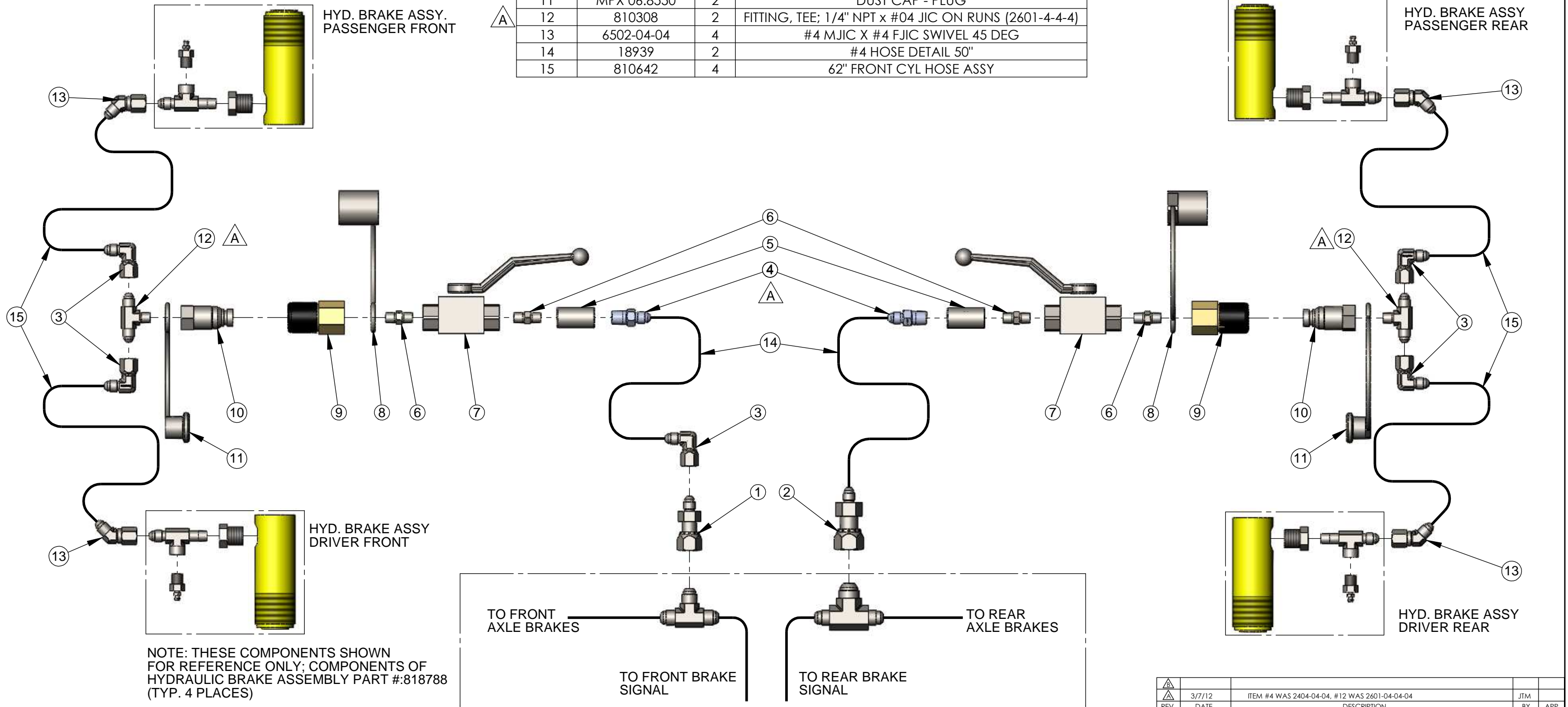


ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	605205	1	#6 FACESEAL X #4 MJIC
2	605521	1	#8 FACESEAL X #4 MJIC
3	605048	5	#04 MJIC X #04 FJIC SWIVEL 90 DEG FITTING (6500-04-04)
4	819536	4	FITTING 2404-04-04 -- JIC TO MP
5	500723	2	RW-1013 1/4" BALL VALVE
6	605714	2	#4 MJIC BULKHEAD TEE FITTING
7	605131	4	#4 MJIC X #4 FJIC SWIVEL 45 DEG
8	18939	2	#4 HOSE DETAIL, 50"
9	810642	4	62" FRONT CYL HOSE ASSY
10	10405	2	#4 HOSE DETAIL, 32"



REV	DATE	DESCRIPTION	BY	APP
1	9/27/19	HYD. BRAKE PLUMBING SCHEMATIC, FRONT AND REAR, NON QD, GRADALL XL3330	ARB	
TOLERANCES (UNLESS SPECIFIED): FRACTIONAL: ± 1/32" DECIMAL: ± .003" ANGULAR: ± .005" SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES .03 X 45° MAX DMF (404)875-1512				
RW-1650G		THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF. ALL RIGHTS RESERVED.		
DRAWN BY:	APPD BY:	DATE:	DRAWING NUMBER:	REV:
ARB	-	9/27/19	818922	#

ITEM	PART #	QTY	DESCRIPTION
1	FS6504-06-04	1	#6 FACESEAL x #4 MJIC
2	FS6504-08-04	1	#8 FACESEAL x #4 MJIC
3	6500-04-04	5	#4 MJIC X #4 FJIC SWIVEL 90 DEG
4	819536	2	FITTING 2404-04-04 --JIC TO MPT
5	CPLG1/4-3000#FS	2	1/4" NPT COUPLING
6	5404-04-04	4	1/4" NPT HEX NIPPLE
7	500723	2	RW-1013 1/4" BALL VALVE
8	MPX 06.8500	2	DUST CAP - SOCKET
9	MPX 06.1201/JV	2	SOCKET - STAUBLI DRY BREAK
10	MPX 06.7201/JV	2	PLUG - STAUBLI DRY BREAK
11	MPX 06.8550	2	DUST CAP - PLUG
12	810308	2	FITTING, TEE; 1/4" NPT x #04 JIC ON RUNS (2601-4-4-4)
13	6502-04-04	4	#4 MJIC X #4 FJIC SWIVEL 45 DEG
14	18939	2	#4 HOSE DETAIL 50"
15	810642	4	62" FRONT CYL HOSE ASSY



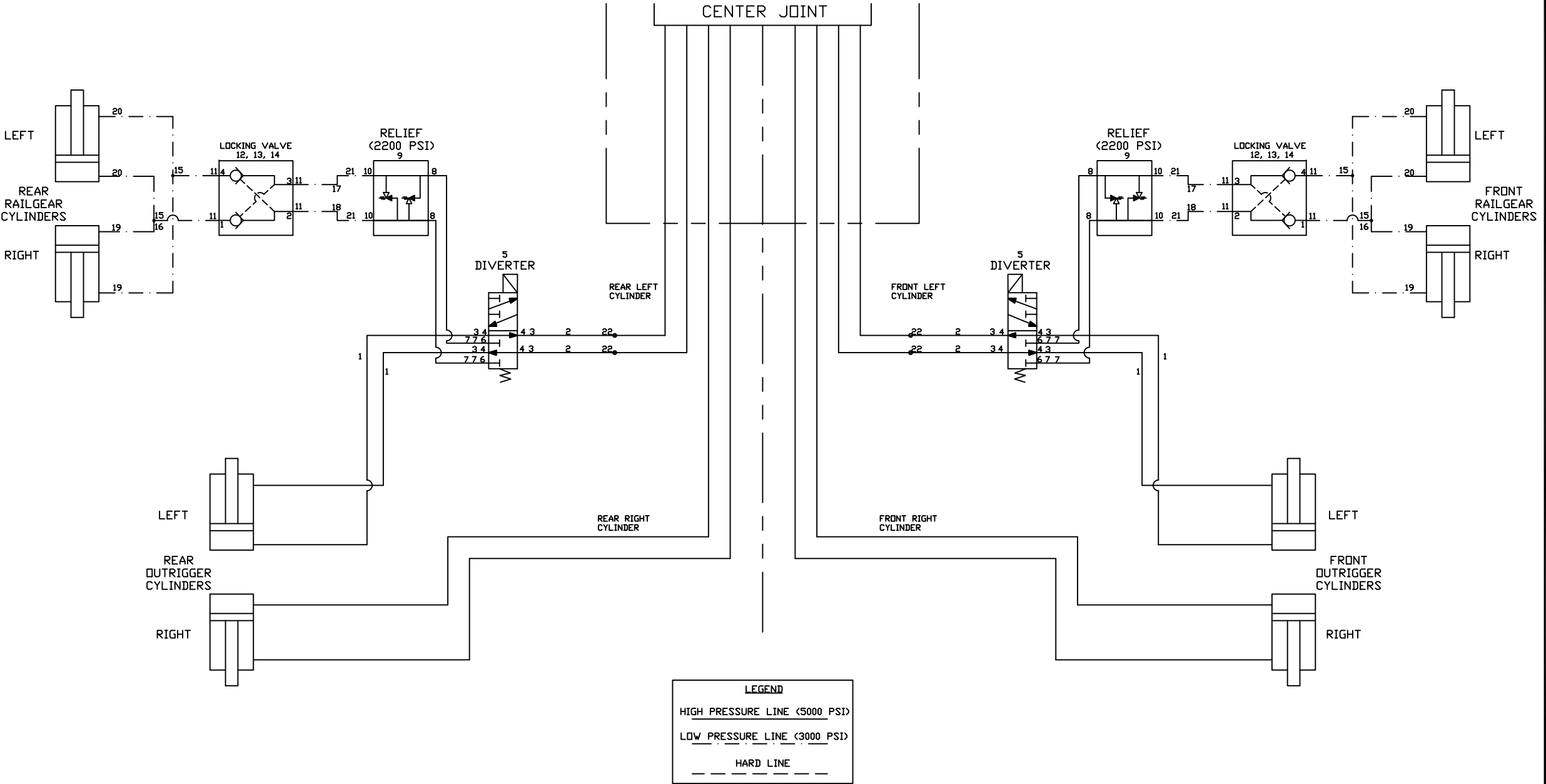
NOTE: THESE COMPONENTS SHOWN FOR REFERENCE ONLY; COMPONENTS OF HYDRAULIC BRAKE ASSEMBLY PART #:818788 (TYP. 4 PLACES)

NOTE: OPTIONAL BRAKE LINE TEES PROVIDED BY GRADALL WHEN ORDERED FOR HI-RAIL APPLICATIONS

REV	3/7/12	ITEM #4 WAS 2404-04-04, #12 WAS 2601-04-04-04	JTM
DATE		DESCRIPTION	BY APP
TOLERANCES: (UNLESS SPECIFIED)		TITLE:	
FRAC. MACH: ± 1/32"		HYD. BRAKE PLUMBING SCHEMATIC, F&R,	
FRAC. OTHER: ± 1/16"		GRADALL XL-3300	
X: ± .063		DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512	
XX: ± .030		DATE: 5/10/11	
XXX: ± .015		DRAWING NUMBER: 818799	
DRILL SIZES: ± .015		REV: A	
ANGULAR: ± 1°			
SURF FINISH: 125 MICRO			
THREADS: 2A AND 2B			

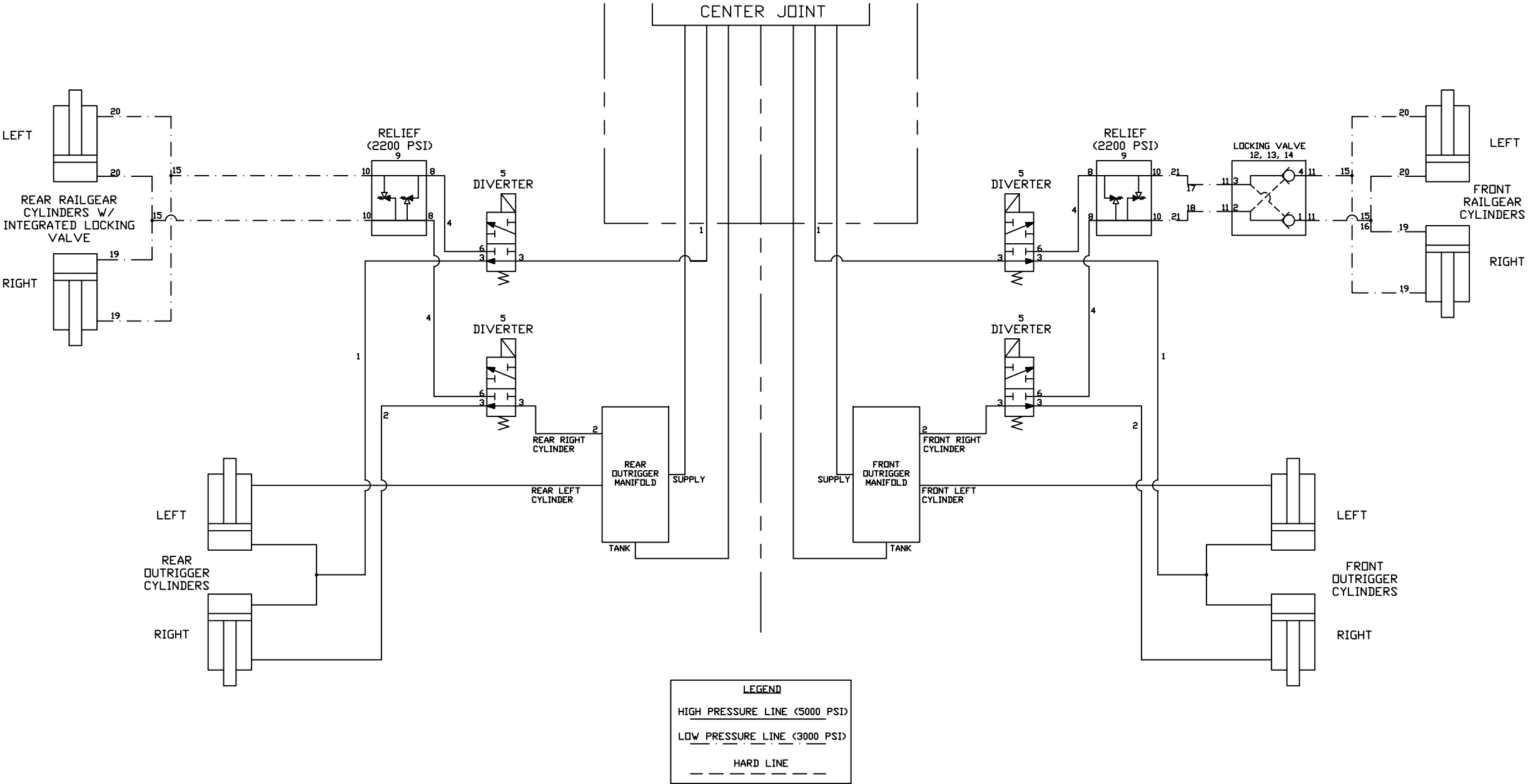


ITEM	PART NO.	QTY	DESCRIPTION
1	605210	4	HOSE ASSY.- 3/8" X 60", FACESEAL
2	605211	4	HOSE ASSY.- 3/8" X 48", FACESEAL
3	605212	8	#06 MFS X #06 MADRB X 90°
4	605213	8	#12 MORB X #06 FORB, STRAIGHT
5	605214	2	DIVERTER, 5000 PSI
6	605215	4	#06 MJIC X #12 MORB, STRAIGHT
7	605216	8	#06 MJIC X #06 FJIC SWIVEL X SWEPT 45°
8	605217	4	#08 MP STRT X #06 FJIC SWIVEL
9	605051	2	DOUBLE RELIEF VALVE, 3000 PSI
10	605372	4	#06 MJIC X 1/2" MPT
11	10457	8	#04 MJIC X #04 MADRB X 90°
12	600612	2	LOCKING VALVE BODY
13	241016	2	LOCKING VALVE, PARKER CPD-084P
14	600613	2	ORIFICE, .070"
15	605206	4	TEE, #04 MJIC X #04 FJIC SWIVEL X #04 MJIC
16	605131	2	#04 MJIC X #04 FJIC X 45°
17	10416	2	HOSE ASSY.- 1/4" X 19"
18	10415	2	HOSE ASSY.- 1/4" X 14"
19	605060	4	HOSE ASSY.- 1/4" X 28"
20	605220	4	HOSE ASSY.- 1/4" X 42"
21	605300	4	#04 MJIC X #06 FJIC SWIVEL X 90°
22	605596	4	#06 MFS X # 06 MFS, STRAIGHT
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REV	DATE	DESCRIPTION	BY	APP
<b>TOLERANCES:</b> (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" X ± .063 .XX ± .030 .XXX OR .XXXX ± .005 DRILL SIZES: ± .005 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES				
RW-1650G		TITLE: VOLVO EW180 EXCAVATOR HYDRAULIC SCHEMATIC W/OUTRIGGERS DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512		
DRAWN BY: BJF	APPD BY: -	DATE: 8/23/18		DRAWING NUMBER: 83644
				REV: #

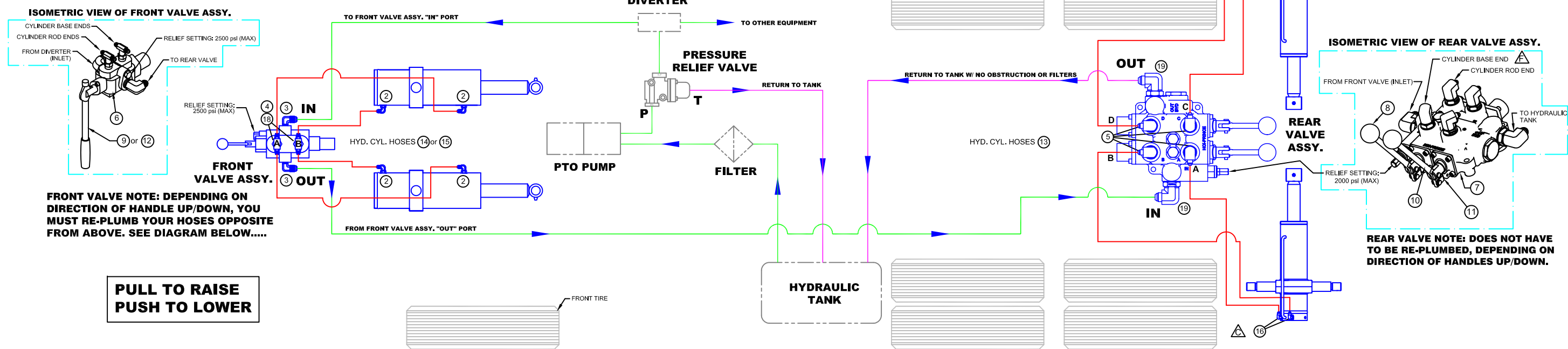
ITEM	PART NO.	QTY	DESCRIPTION
1	605210	4	HOSE ASSY.- 3/8" X 60", FACESEAL
2	605211	4	HOSE ASSY.- 3/8" X 48", FACESEAL
3	605212	8	#06 MFS X #06 MADRB X 90°
4	TBD	4	HOSE ASSY.- 1/4" X TBD"
5	83658	4	SINGLE SELECTOR, 5000 PSI, 24V
6	18952	4	#04 MJIC X #06 MDRB X 90°
7	-	-	-
8	605217	4	#08 MP STRT X #06 FJIC SWIVEL
9	605051	2	DOUBLE RELIEF VALVE, 3000 PSI
10	605372	4	#06 MJIC X 1/2" MPT
11	10457	4	#04 MJIC X #04 MADRB X 90°
12	600612	1	LOCKING VALVE BODY
13	241016	1	LOCKING VALVE, PARKER CPD-084P
14	600613	1	ORIFICE, .070"
15	605206	4	TEE, #04 MJIC X #04 FJIC SWIVEL X #04 MJIC
16	605131	1	#04 MJIC X #04 FJIC X 45°
17	10416	1	HOSE ASSY.- 1/4" X 19"
18	10415	1	HOSE ASSY.- 1/4" X 14"
19	605060	4	HOSE ASSY.- 1/4" X 28"
20	605220	4	HOSE ASSY.- 1/4" X 42"
21	605300	2	#04 MJIC X #06 FJIC SWIVEL X 90°
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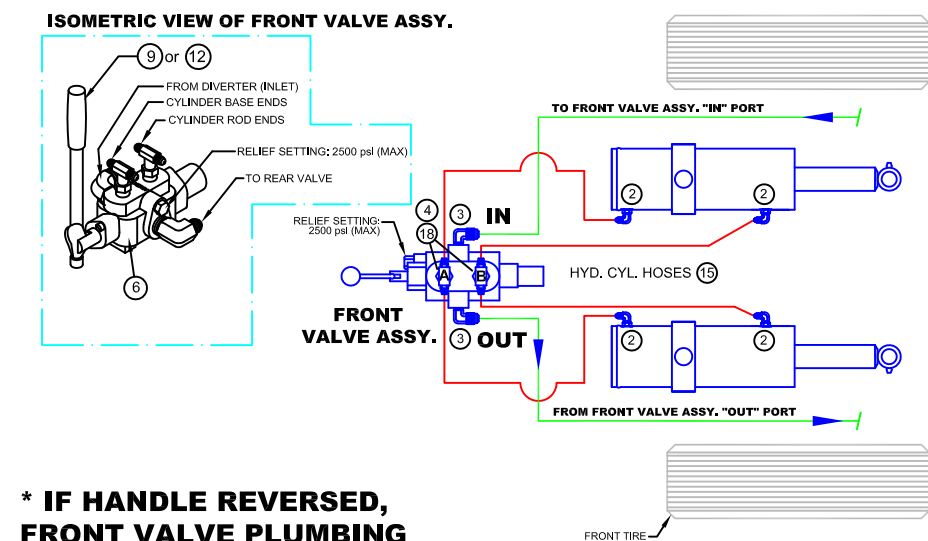
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	-	-	-	-
REV	DATE	DESCRIPTION	BY	APP
<div><div><div>TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS</div><div>FRAC, MACH: ± 1/32" FRAC, OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX OR .XXXX ± .005 DRILL SIZES: ± .005 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES</div></div><div><div>RW-1650G/GX</div><div>DRAWN BY: BJJ APPD BY: -</div></div><div><div>TITLE: CATEPILLAR M320F W/ OUTRIGGERS HYDR SCH, 1650G BHD FT/1650GX RR DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512</div><div>DATE: 12/18/20</div><div></div><div>DRAWING NUMBER: 83657</div><div>REV: #</div></div></div>				


**NOTE: DMF ONLY PROVIDES HYDRAULIC HOSES FROM FRONT & REAR CONTROL VALVES TO RAILGEAR CYLINDERS. CUSTOMER IS RESPONSIBLE FOR ALL OTHER SYSTEM COMPONENTS (TANK, DIVERTER, PTO, PUMP, FILTER, PRESSURE RELIEF VALVE, ETC.)**

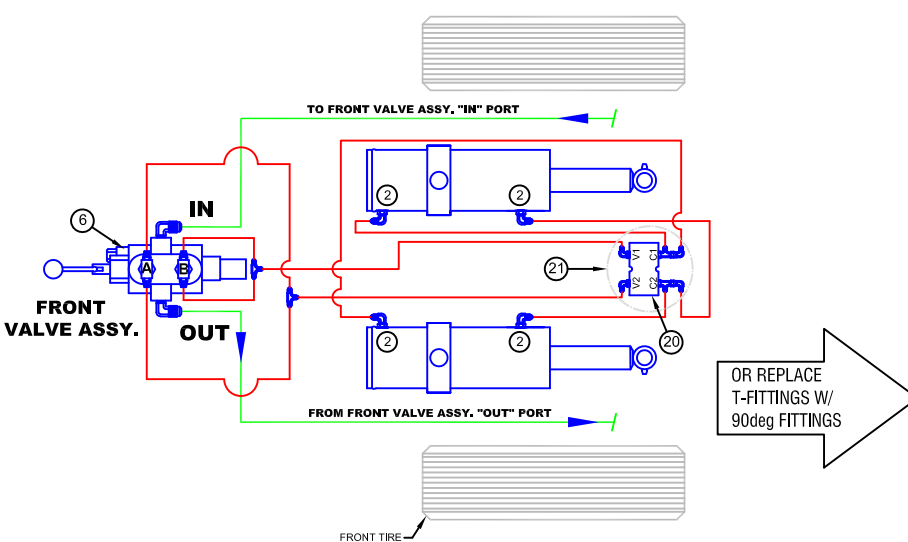
NOTE: ON THE FRONT VALVE THE RELIEF SETTING MAY BE LOCATED IN DIFFERENT LOCATIONS, DEPENDING ON THE MANUFACTURING BRAND. ALL ELSE REMAINS THE SAME. WE SHOW THE TWO MOST COMMON LOCATIONS BELOW FOR THE RELIEF SETTING.



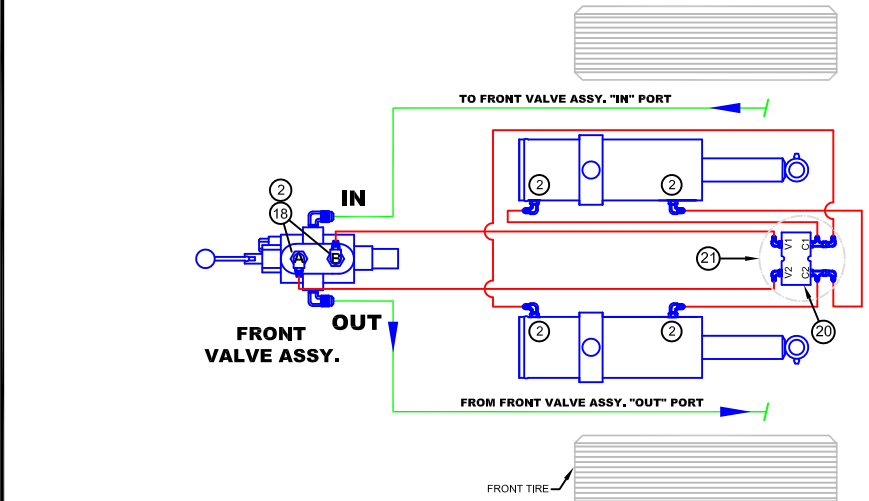
### PLUMBING FOR REVERSED HANDLE ONLY \*



### PLUMBING FOR EXTERNAL LOCKING VALVE WITH T FITTINGS ON FRONT VALVE (STD. HANDLE)



### PLUMBING FOR EXTERNAL LOCKING VALVE W/ 90deg FITTINGS ON FRONT VALVE (STD. HANDLE)



**SEE SECTION 6 OF MANUAL WHICH SPECIFIES HYDRAULIC SYSTEM REQUIREMENTS**

### LUBRICATION SPECIFICATIONS

#### HYDRAULIC OIL:






\* ASTM D6158 HM (UNAX RX-46 HYDRAULIC OIL, SHELL TELLUS EE 46 OR EQUAL)

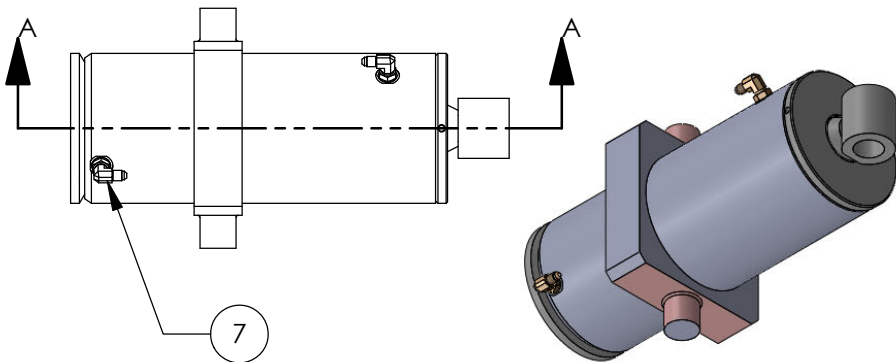
OR

\* SOME CUSTOMERS OPERATE ON DEXRON III ATF

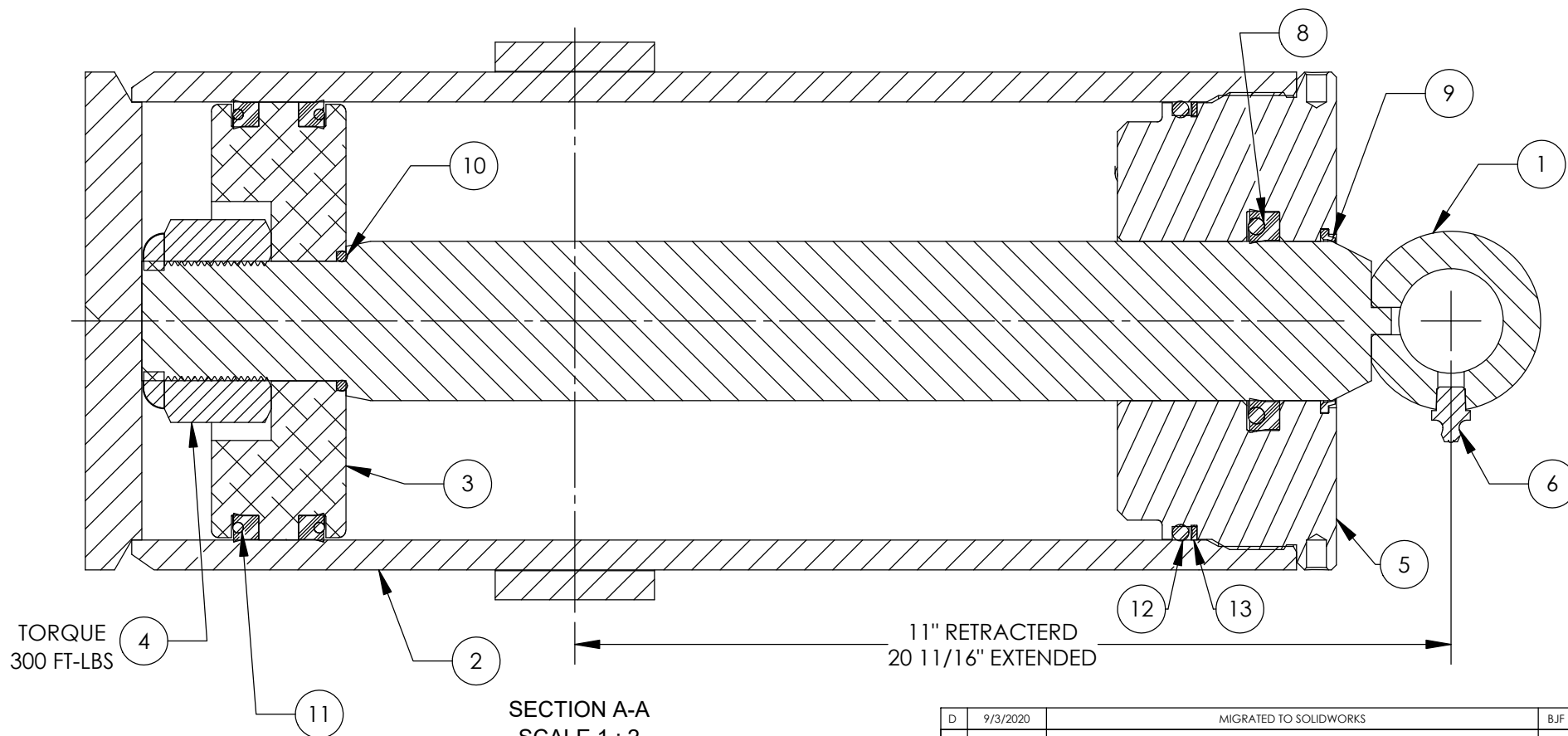
ITEM	PART NO.	QTY	DESCRIPTION
1	(REF.)	1	PUMP (EXISTING) 5 to 7 gpm @ 2000 psi MINIMUM
2	18952	4	FITTING, ELBOW (#04 MJIC x #06 MORB)
3	605387	2	FITTING, ELBOW (#08 MJIC x #10 MORB)
4	605575	2	FITTING, TEE (#04 MJIC x #04 MJIC x #06 MORB)
5	605462	4	FITTING, ELBOW (#04 MJIC x #10 MORB)
6	810204	(REF.)	PRINCE FRONT VALVE ASSEMBLY w/ FITTINGS
7	810210	(REF.)	PRINCE REAR VALVE ASSEMBLY w/ FITTINGS
8	810214	(REF.)	GRESEN VALVE HANDLE, REPLACEMENT; w/LINK KIT
9	810215	(REF.)	GRESEN VALVE HANDLE, REPLACEMENT; ASSEMBLY
10	810217	(REF.)	GRESEN VALVE HANDLE, REPLACEMENT; HANDLE ONLY

ITEM	PART NO.	QTY	DESCRIPTION
11	810218	(REF.)	GRESEN VALVE HANDLE, REPLACEMENT; (LINK KIT ONLY)
12	810219	(REF.)	GRESEN VALVE HANDLE BRACKET, REPLACEMENT;
13	810615	(REF.)	HYD.CYL.HOSES,96" (qty. 4)(#04 w/#04JIC SWIVEL)
14	810630	(REF.)	HYD.CYL.HOSES,38" (qty. 4)(#04 w/#04JIC SWIVEL)
15	810640	(REF.)	HYD.CYL.HOSES,62" (qty. 4)(#04 w/#04JIC SWIVEL)
16	240258	4	FITTING, ELBOW (#04 MJIC x #03 MORB)
17			
18	605574	2	FITTING, STRAIGHT (#08 MORB x #06 FORB)
19	605388	2	FITTING, ELBOW (#08 MJIC x #12 MORB)
20	600603	(REF.)	LOCKING VALVE (DPC1-10-P-6T)
21	600606	(REF.)	LOCKING VALVE W/ FITTINGS

	8/30/19	REVISED FRONT AND REAR PLUMBING TO MATCH REVISED DECAL	BJF		
	8/2/19	CORRECTED REAR PLUMBING; UPDATED HYDRAULIC FITTING PART #S	BJF		
	5/26/17	CORRECTED SECTION REFERENCE	BJF		
	5/9/11	CORRECTED SECTION REFERENCE	NEH		
REV	DATE	DESCRIPTION		BY	APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS		TITLE: VALVE ASSEMBLIES & HYDRAULIC SCHEMATIC			
FRAC. MACH: ± 1/32"		DIVERSIFIED METAL FABRICATORS, INC.(404)875-1512			
FRAC. OTHER: ± 1/16"					
.X ± .063		DATE: 10/07/98			
.XX ± .030					
.XXX OR .XXXX ± .005		DRAWING NUMBER: M1630114			
DRILL SIZES: ± .005					
ANGULAR: ± 1°		REV: G			
SURF FINISH: 125 MICRO					
THREADS: 2A AND 2B					
BREAK SHARP EDGES					
RW-1212 / 1420 / 1630 / 1650					
DRAWN BY:  KLC		APPD BY:			




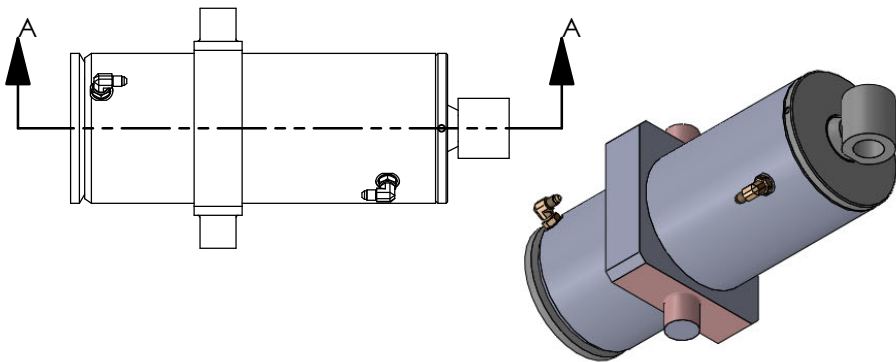
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	240420	1	5-1/2" BORE ROD ASSEMBLY
2	240417	1	RW-1630G FRONT CYLINDER BARREL WELDMENT, RH, 5-1/2"
3	240401	1	5-1/2" BORE CYLINDER PISTON
4	240403	1	NYLON LOCK NUT, 1-1/2"-12
5	240402	1	5-1/2" BORE CYLINDER GLAND
6	818235	1	GREASE FITTING, 1/8" NPT, STRAIGHT
7	18952	2	#04 MJIC X #06 MAORB X 90 FITTING
8	240105	1	GLAND SEAL, POLYPAK, 2.75" BORE, .375"W, 2" ROD (3750-2000)
9	240106	1	2" ROD WIPER (AN-21)
10	240407	1	O-RING, #222, NBR, 90A DURO
11	240404	2	PISTON SEAL, POLYPAK, 5.5" ID, .312"W, 3.875" BORE (3120-4875)
12	240408	1	O-RING 5-1/2" OD X 3/16" (2-354)
13	240409	1	BACKUP RING FOR 5-1/2" OD X 3/16" WALL O-RING (8-354)



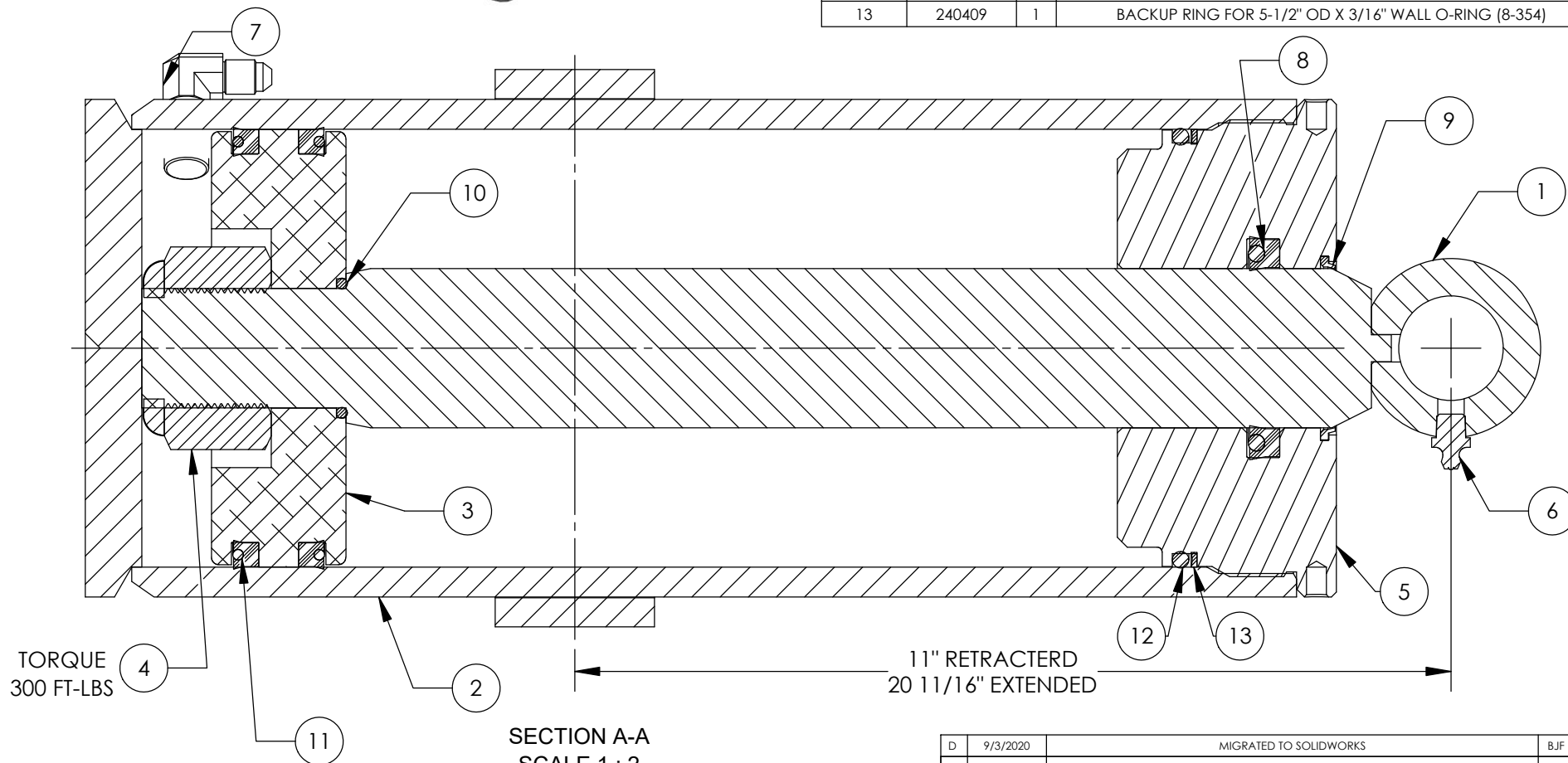
#### NOTES:

1. SEE PP008 FOR CYLINDER ASSEMBLY & TEST PROCEDURE.
2. DO NOT ALLOW ROD TO CONTACT CYLINDER BOTTOM.
3. SEAL KIT 240425 INCLUDES ITEM #'S 8-13

D	9/3/2020	MIGRATED TO SOLIDWORKS				BJF							
REV	DATE	DESCRIPTION				BY	APP						
TOLERANCES (UNLESS SPECIFIED):		RW-1630G		TITLE: 5-1/2" BORE, FRONT RH, GRADALL CYLINDER ASSEMBLY									
FRAC. MACH: ± 1/32"		DRAWN BY: WEG		APPD BY: -		DATE: 12/8/93				DRAWING NUMBER: 240400		REV: D	
FRAC. OTHER: ± 1/16"													
.X ± .063													
.XX ± .030													
.XXX ± .005													
DRILL SIZES: ± .015													
ANGULAR: ± 1°													
SURF FINISH: 125 MICRO													
THREADS: 2A AND 2B													
BREAK SHARP EDGES .03 X 45° MAX													
DMF (404)875-1512													



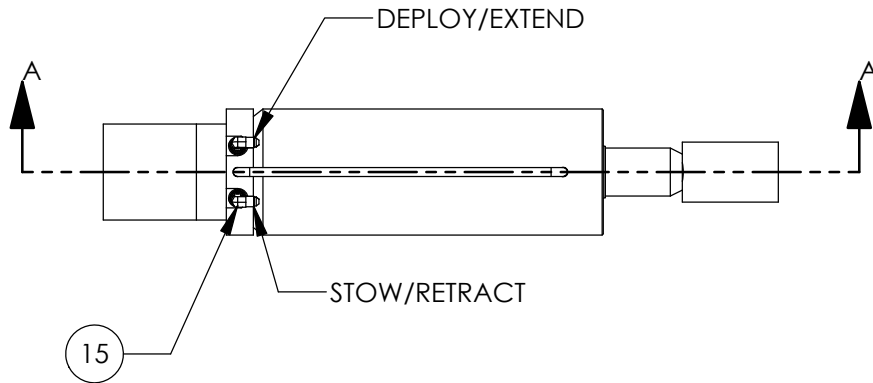
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	240420	1	5-1/2" BORE ROD ASSEMBLY
2	240410	1	RW-1630G FRONT CYLINDER BARREL WELDMENT, LH, 5-1/2"
3	240401	1	5-1/2" BORE CYLINDER PISTON
4	240403	1	NYLON LOCK NUT, 1-1/2"-12
5	240402	1	5-1/2" BORE CYLINDER GLAND
6	818235	1	GREASE FITTING, 1/8" NPT, STRAIGHT
7	18952	2	#04 MJIC X #06 MAORB X 90 FITTING
8	240105	1	GLAND SEAL, POLYPAK, 2.75" BORE, .375"W, 2" ROD (3750-2000)
9	240106	1	2" ROD WIPER (AN-21)
10	240407	1	O-RING, #222, NBR, 90A DURO
11	240404	2	PISTON SEAL, POLYPAK, 5.5" ID, .312"W, 3.875" BORE (3120-4875)
12	240408	1	O-RING 5-1/2" OD X 3/16" (2-354)
13	240409	1	BACKUP RING FOR 5-1/2" OD X 3/16" WALL O-RING (8-354)



#### NOTES:

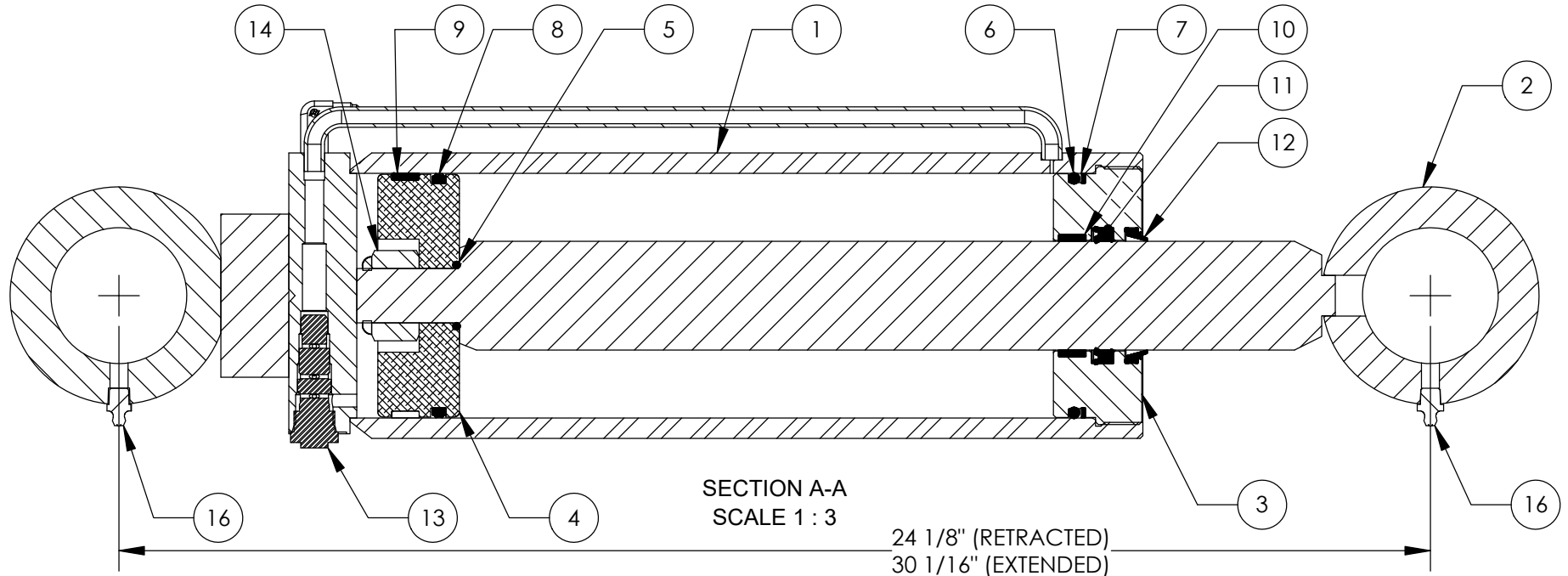
1. SEE PP008 FOR CYLINDER ASSEMBLY & TEST PROCEDURE.
2. DO NOT ALLOW ROD TO CONTACT CYLINDER BOTTOM.
3. SEAL KIT 240425 INCLUDES ITEM #'S 8-13

D	9/3/2020	MIGRATED TO SOLIDWORKS				BJF	
REV	DATE	DESCRIPTION				BY	APP
TOLERANCES (UNLESS SPECIFIED):		RW-1630G		TITLE: 5-1/2" BORE, FRONT LH, GRADALL CYLINDER ASSEMBLY			
FRAC. MACH: ± 1/32"				THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED			
FRAC. OTHER: ± 1/16"				METAL FABRICATORS, INC (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.			
.X ± .063							
.XX ± .030		DRAWN BY:		DATE:		DRAWING NUMBER:	
.XXX ± .005		WEG		12/8/93		240415	
DRILL SIZES: ± .015		APPD BY:		-		REV:	
ANGULAR: ± 1°						D	
SURF FINISH: 125 MICRO							
THREADS: 2A AND 2B							
BREAK SHARP EDGES .03 X 45° MAX							
DMF (404)875-1512							



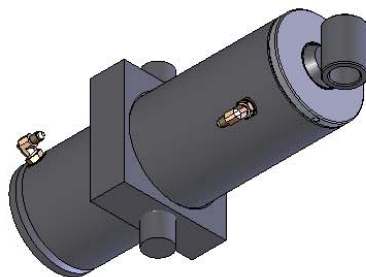
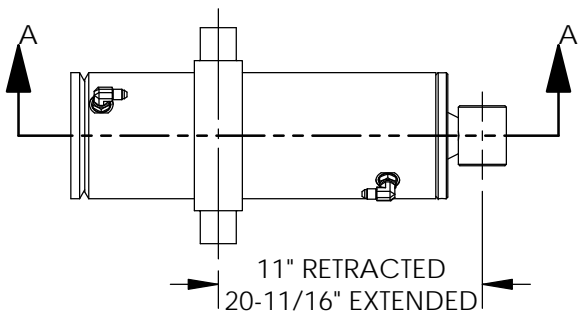
TORQUE:  
300 FT-LBS

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	835403	1	WELDMENT, CYLINDER BARREL, 4-1/2" BORE, RW-1650GX
2	835408	1	WELDMENT, CYLINDER ROD, BULKHEAD MOUNT RW-1650GX
3	41003	1	GLAND DETAIL; 4-1/2" BORE; RW-1630B
4	41002	1	PISTON DETAIL; 4-1/2" BORE; RW-1630B
5	240107	1	O-RING, 1" ID X 1-1/4" OD (2-214)
6	240108	1	O-RING 4-1/2" OD X 3/16" (2-346)
7	240109	1	BACKUP RING FOR 4-1/2" OD X 3/16" WALL O-RING (8-346)
8	605664	1	PISTON SEAL; BI-DIRECTIONAL, 4.5" BORE
9	605665	1	PISTON WEAR RING, 4.5" BORE, .5" WIDE
10	605666	1	ROD WEAR RING, 2" ROD, .5" WIDE
11	605667	1	ROD SEAL; 2"X.25"X.375"
12	605668	1	SNAP-IN ROD WIPER; 2"
13	241016	1	VALVE, LOCKING, CPD-084P, PARKER
14	605119	1	NYLON LOCK NUT, 1-14
15	605674	2	#04 MJIC X #04 MAORB X 90 DEG LONG (6801-04-04-L)
16	818235	2	GREASE FITTING, 1/8" NPT, STRAIGHT

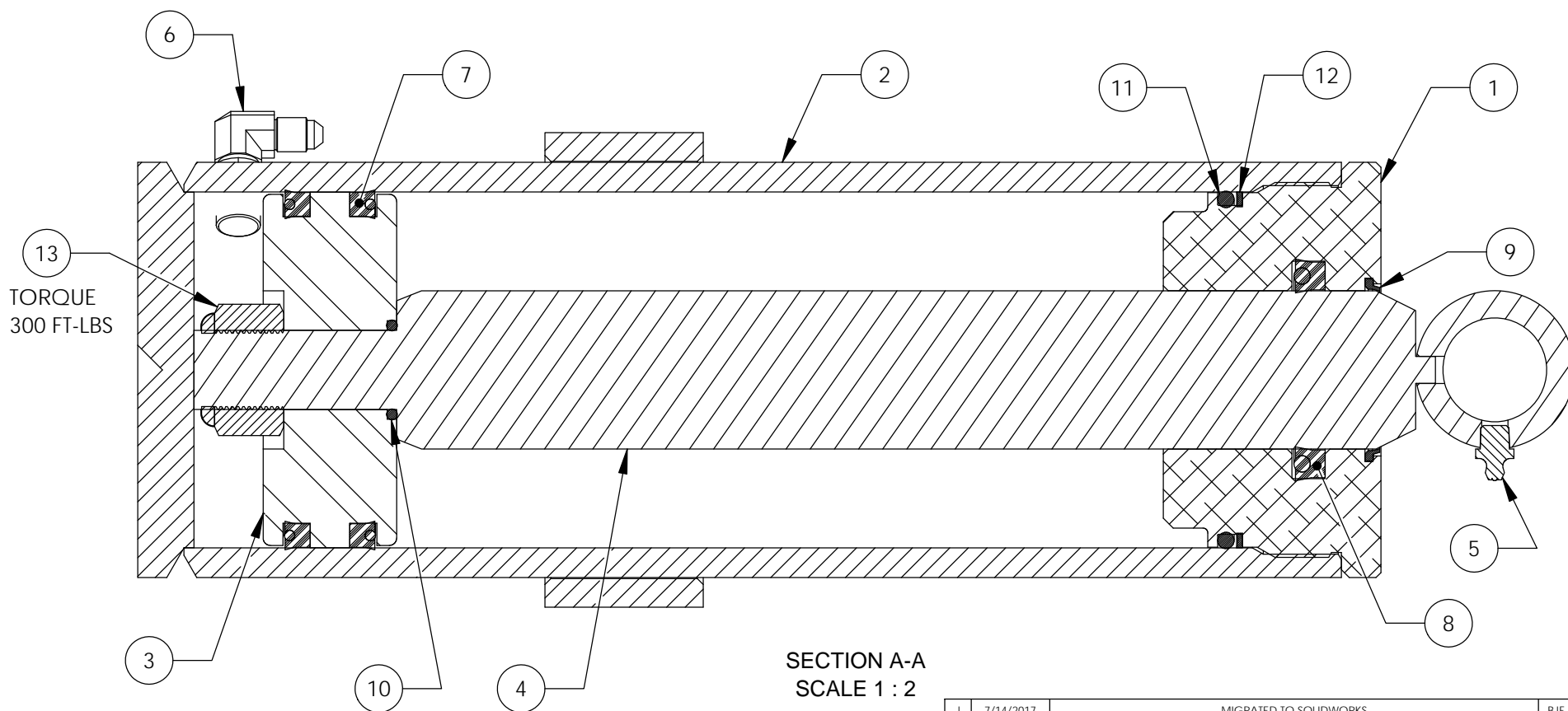


**DMF SEAL KIT #XXXXXXX INCLUDES ITEMS 5-12**  
**USE DMF GLAND WRENCH 41032**  
**SEE PP008 FOR CYLINDER ASSEMBLY AND TEST PROCEDURE**

REV	DATE	DESCRIPTION	BY	APP
TOLERANCES (UNLESS SPECIFIED): FRACTIONAL: ± 1/32" DECIMAL: ± 1/16" .XX ± .063 .XXX ± .030 .XXXX ± .005 DRILL SIZES: ± .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO 2A AND 2B THREADS: ± 1° BREAK SHARP EDGES .03 X 45° MAX DMF (404)875-1512				
RW-1650GX		TITLE: LV CYLINDER; 4-1/2" BORE; RW-1650GX THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.		
DRAWN BY: ARB	APPD BY: -	DATE: 10/9/20	DRAWING NUMBER: 835402	REV: #



ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	240102	1	HYDRAULIC CYLINDER GLAND, 4-1/2" BORE
2	240110	1	RW-1630 FRONT CYLINDER BBL WELDMENT, DS
3	240101	1	PISTON DETAIL, 4-1/2" CYLINDER
4	240120	1	HYDRAULIC CYLINDER ROD ASSEMBLY, RW-1630 FRONT
5	818235	1	GREASE FITTING, 1/8" NPT, STRAIGHT
6	18952	2	#04 MJIC X #06 MAORB X 90 FITTING
7	240104	2	PISTON SEAL, POLYPAK, 4.5" ID, .312"W, 3.875" BORE (3120-3875)
8	240105	1	GLAND SEAL, POLYPAK, 2.75" BORE, .375"W, 2" ROD (3750-2000)
9	240106	1	2" ROD WIPER (AN-21)
10	240107	1	O-RING, 1" ID X 1-1/4" OD (2-214)
11	240108	1	O-RING 4-1/2" OD X 3/16" (2-346)
12	240109	1	BACKUP RING FOR 4-1/2" OD X 3/16" WALL O-RING (8-346)
13	605119	1	NYLON LOCK NUT, 1-14




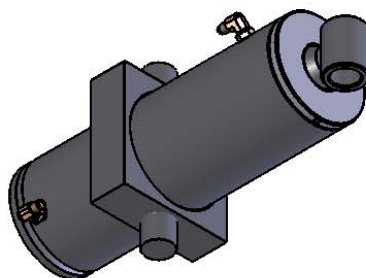
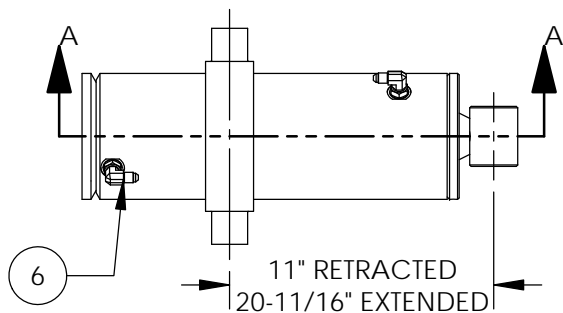
SECTION A-A  
SCALE 1 : 2

NOTES:

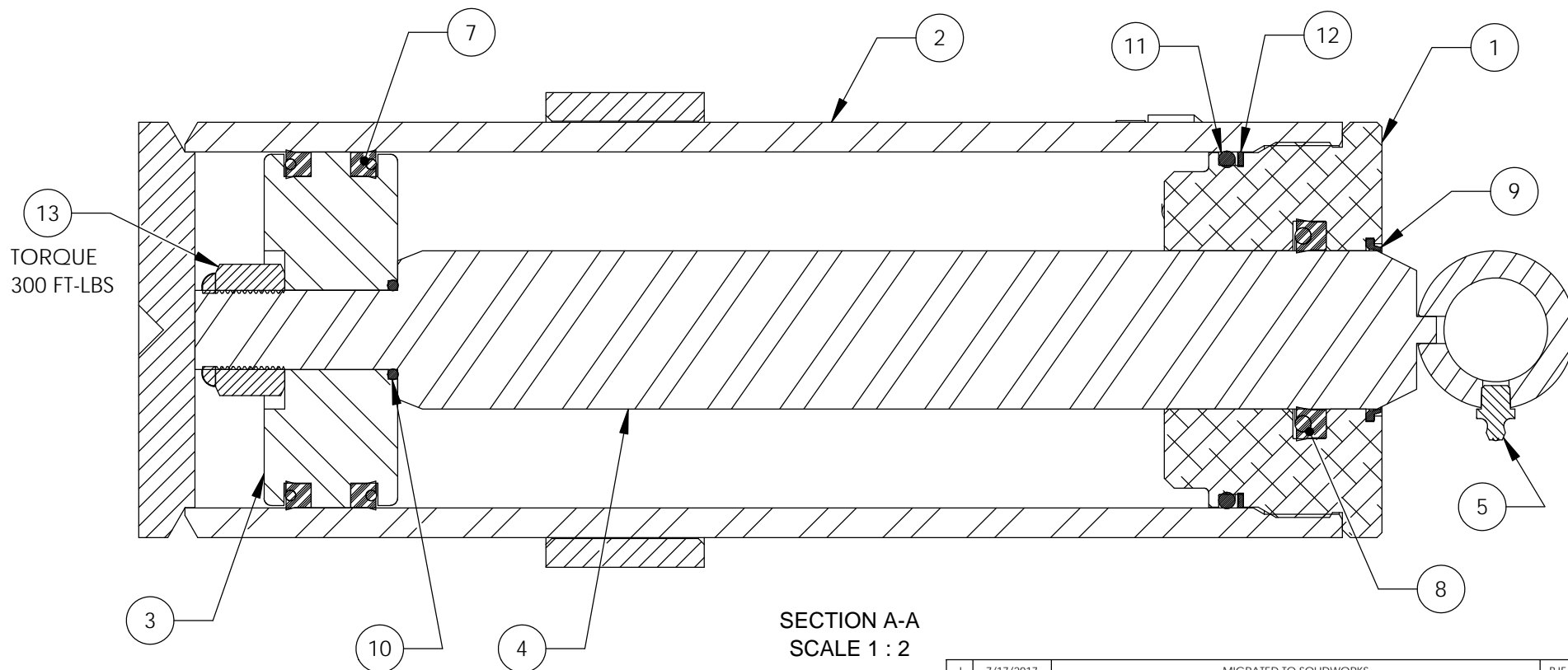
DMF P/N 240125 SEAL KIT INCLUDES ITEM #'S 7, 8, 9, 10, 11, 12

SEE PP008 FOR CYLINDER ASSEMBLY & TEST PROCEDURE

J	7/14/2017	MIGRATED TO SOLIDWORKS				BJF			
REV	DATE	DESCRIPTION				BY	APP		
TOLERANCES (UNLESS SPECIFIED):		RW-1630 / 1420 / 1212 / 1019		TITLE: HYDRAULIC CYLINDER ASSEMBLY, FRONT DRIVER SIDE, RW-1630/1420/1212/1019					
FRACTIONAL: ± 1/32"				THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF. ALL RIGHTS RESERVED.					
FRACTIONAL, OTHER: ± 1/16"									
.X ± .063									
.XX ± .030									
.XXX ± .005									
.015									
ANGULAR: ± 1°		DRAWING NUMBER: 240099							
SURF FINISH: 125 MICRO 2A AND 2B						REV: J			
THREADS: ± 1°									
BREAK SHARP EDGES .03 X 45° MAX		TSH		-		11/10/92			
DMF (404)875-1512									




ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	240102	1	HYDRAULIC CYLINDER GLAND, 4-1/2" BORE
2	240115	1	RW-1630 FRONT CYLINDER BARREL WELDMENT (PS)
3	240101	1	PISTON DETAIL, 4-1/2" CYLINDER
4	240120	1	HYDRAULIC CYLINDER ROD ASSEMBLY, RW-1630 FRONT
5	818235	1	GREASE FITTING, 1/8" NPT, STRAIGHT
6	18952	2	#04 MJIC X #06 MAORB X 90 FITTING
7	240104	2	PISTON SEAL, POLYPAK, 4.5" ID, .312"W, 3.875" BORE (3120-3875)
8	240105	1	GLAND SEAL, POLYPAK, 2.75" BORE, .375"W, 2" ROD (3750-2000)
9	240106	1	2" ROD WIPER (AN-21)
10	240107	1	O-RING, 1" ID X 1-1/4" OD (2-214)
11	240108	1	O-RING 4-1/2" OD X 3/16" (2-346)
12	240109	1	BACKUP RING FOR 4-1/2" OD X 3/16" WALL O-RING (8-346)
13	605119	1	NYLON LOCK NUT, 1-14



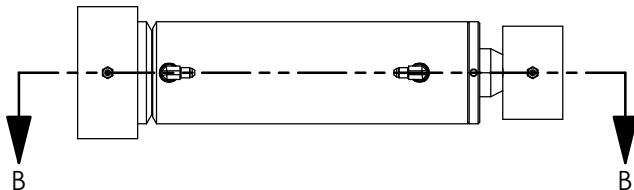
SECTION A-A  
SCALE 1 : 2

NOTES:  
DMF P/N 240125 SEAL KIT INCLUDES ITEM #'S 7, 8, 9, 10, 11, 12

SEE PP008 FOR CYLINDER ASSEMBLY & TEST PROCEDURE

J	7/17/2017	MIGRATED TO SOLIDWORKS				BJF	
REV	DATE	DESCRIPTION				BY	APP
TOLERANCES (UNLESS SPECIFIED):		RW-1630 / 1420 / 1212 / 1019		TITLE: HYDRAULIC CYLINDER ASSEMBLY, FRONT PASSENGER SIDE, RW-1630/1420/1212/1019			
FRAC. MACH: ± 1/32 FRAC. OTHER: ± 1/16 X .063 XX .030 XXX .005 + .015				THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF. ALL RIGHTS RESERVED.			
DRILL SIZES: ± .015		DRAWN BY: TSH	APPD BY: -	DATE: 11/10/92		DRAWING NUMBER: 240100	REV: J
ANGULAR: ± 1°							
SURF FINISH: 125 MICRO 2A AND 2B							
THREADS:							
BREAK SHARP EDGES: .03 X 45° MAX							
DMF (404)875-1512							

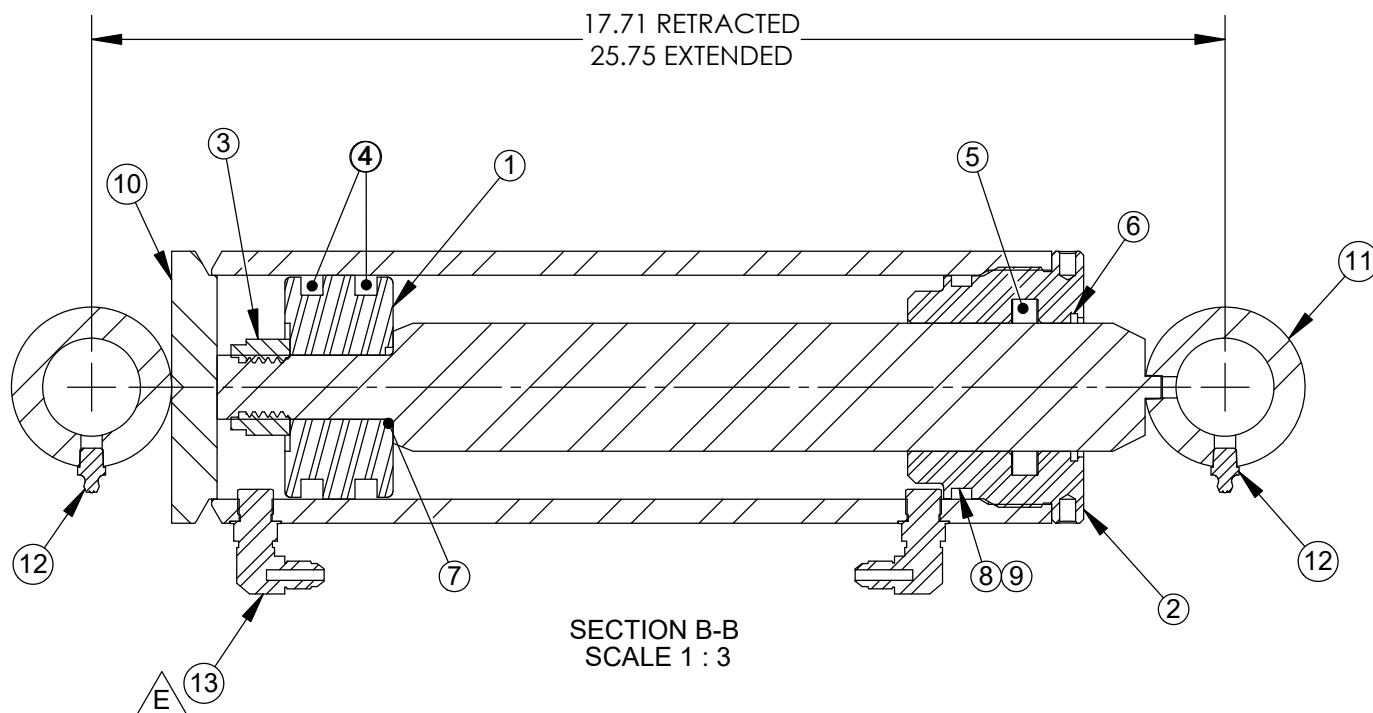







△C  
△C

ITEM	PART NO.	FREE/ QTY.	DESCRIPTION
1	240201	1	HYD. CYL. PISTON (3-1/2")
2	240202	1	HYDRAULIC CYLINDER GLAND, 3-1/2
3	240103	1	HYD. CYL. NUT. (ESNA 1"-14)
4	240304	2	PISTON SEAL, 3-1/2
5	240105	1	ROD SEAL 2"
6	240106	1	ROD WIPER 2"
7	240107	1	O-RING 1"
8	240308	1	O-RING 3-1/2"
9	240309	1	BACK-UP RING 3-1/2"
10	240360	1	G3 REAR CYL TUBE ASSY
11	240370	1	G3 REAR CYL ROD ASSY
12	818235	2	GREASE FITTING, 1/8" NPT, STRAIGHT
13	18952	2	#04 MJIC X #06 MAORB X 90 FITTING

△D



△	7/22/20	ADDED 18952	BJF																																				
△	2/29/12	818235 WAS 240123	JTM																																				
△	9/16/99	PART #'S WERE 240301 & 240302 RESPECTIVELY	WT																																				
△	9/08/94	REDRAW	MSM																																				
△	1/07/93	COMBINED BOM AND LAYOUT	WEG																																				
REV	DATE	DESCRIPTION	BY	APP																																			
<table border="1"> <tr> <td colspan="2">TOLERANCES: (UNLESS SPECIFIED)</td> <td rowspan="2">RW-1630/1650</td> <td colspan="2" rowspan="2">TITLE: G3 REAR CYL- 3-1/2" BORE X 8" STROKE</td> </tr> <tr> <td>FRAC. MACH:</td><td>± 1/32"</td> </tr> <tr> <td>FRAC. OTHER:</td><td>± 1/16"</td> <td rowspan="2">DRAWN BY: TSH</td> <td rowspan="2">APPD BY:</td> <td rowspan="2">DATE: 10/6/89</td> </tr> <tr> <td>.X</td><td>± .063</td> </tr> <tr> <td>.XX</td><td>± .030</td> <td colspan="3" rowspan="4"> <div style="display: flex; justify-content: space-between;"> <div>           DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512   </div> <div>           DRAWING NUMBER: 240350            REV: E         </div> </div> </td> </tr> <tr> <td>.XXX</td><td>± .005</td> </tr> <tr> <td>DRILL SIZES:</td><td>+ .015</td> </tr> <tr> <td>ANGULAR:</td><td>± 1"</td> </tr> <tr> <td>SURF FINISH:</td><td>125 MICRO</td> <td colspan="3"></td> </tr> <tr> <td>THREADS:</td><td>2A AND 2B</td> <td colspan="3"></td> </tr> </table>					TOLERANCES: (UNLESS SPECIFIED)		RW-1630/1650	TITLE: G3 REAR CYL- 3-1/2" BORE X 8" STROKE		FRAC. MACH:	± 1/32"	FRAC. OTHER:	± 1/16"	DRAWN BY: TSH	APPD BY:	DATE: 10/6/89	.X	± .063	.XX	± .030	<div style="display: flex; justify-content: space-between;"> <div>           DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512   </div> <div>           DRAWING NUMBER: 240350            REV: E         </div> </div>			.XXX	± .005	DRILL SIZES:	+ .015	ANGULAR:	± 1"	SURF FINISH:	125 MICRO				THREADS:	2A AND 2B			
TOLERANCES: (UNLESS SPECIFIED)		RW-1630/1650	TITLE: G3 REAR CYL- 3-1/2" BORE X 8" STROKE																																				
FRAC. MACH:	± 1/32"																																						
FRAC. OTHER:	± 1/16"	DRAWN BY: TSH	APPD BY:	DATE: 10/6/89																																			
.X	± .063																																						
.XX	± .030	<div style="display: flex; justify-content: space-between;"> <div>           DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512   </div> <div>           DRAWING NUMBER: 240350            REV: E         </div> </div>																																					
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ANGULAR:	± 1"																																						
SURF FINISH:	125 MICRO																																						
THREADS:	2A AND 2B																																						

TITLE: Cylinder Assembly

PURPOSE: To Establish Production Methods For The Assembly Of Cylinders

COMMON USAGE: All Models

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: D.M.F. Manufactured Hydraulic Cylinders With "PolyPack" Piston Seals

#### ASSEMBLY PROCEDURE:

- PISTON: A) Inspect for sharp edges. Deburr as necessary.  
B) Clean and blow off with shop air.  
C) Use Blue Assemblee Goo (19260) to aid in assembly.  
D) Install two (2) seals with each lip (o'ring insert side) facing the closer piston face.

- GLAND: A) Inspect OD and bore for sharp edges. Deburr as necessary.  
B) Clean and blow off with shop air.  
C) Use Blue Assemblee Goo (19260) to aid in assembly.  
D) Install wiper ring in bore with lip facing outboard.  
E) Install seal in bore with lip (o'ring insert side) facing inboard.  
F) Inspect for seal damage. Any shaved seal material requires replacement.  
G) Install backing ring in O'ring groove on OD with concave surface facing inboard.  
H) Install O'ring on inboard side of groove in Step G.  
I) Inspect O'ring for damage.

#### ROD ASSEMBLY:

- A) Clean and inspect shaft surface for scratches and dings.  
B) Install grease fitting in rod end per PP001.  
C) Use Blue Assemblee Goo (19260) to aid in assembly.  
D) Install gland assembly onto rod with the outboard side facing the rod end.  
E) Install rod O'ring onto threaded end of rod.  
F) Inspect O'ring for damage.  
G) Install piston assembly onto rod with the O'ring counterbore facing O'ring in Step E. Be certain that O'ring seats in counterbore.  
H) Install self locking rod nut on rod. Tighten to 200 to 300 foot-pounds torque (Torque will vary based on rod & nut size).

#### CYLINDER ASSEMBLY:

- A) Inspect cylinder ports for minimum three (3) threads and no burrs. Deburr as necessary.  
B) Clean tube ID threads and bore and blow out with shop air.  
C) Inspect threads for debris.  
D) Support cylinder barrel assembly with gland end facing up.  
E) Maintain rod assembly in vertical position, align piston with tube bore, engage piston in tube bore, strike rod end with hammer until piston is below first cylinder port.  
F) Slide gland down on rod, engage gland threads into barrel by hand.  
G) Screw gland into barrel with spanner wrench until gland face contacts barrel tube-end.  
H) Install two (2) hydraulic fittings into cylinder ports per PP003.

#### PRESSURE TESTING:

- A) Connect hydraulic power unit to cylinder.  
B) Operate cylinder through complete cycle to purge air and fill with clean hydraulic oil.  
C) Operate cylinder to full extension and retraction and maintain at 3300 PSI for 15 seconds at each extent. While maintaining pressure at each extent, visually inspect ports, rod seal, gland OD seal, and cylinder bottom areas for leakage.  
D) Disconnect hydraulic power unit and install caps on port fittings.



COMMENTS: Specific assembly instructions on prints are performed with preference over this procedure.

**FOR CYLINDERS GREATER THAN Ø4.5", DO NOT ALLOW CYLINDER TO BOTTOM DURING TESTING. BLOCK ROD AGAINST GLAND WITH PIN AND 1" BLOCKS.**

	11/7/14	REMOVED STEP E	JDI	
	5/25/12	USE 19260 INSTEAD OF HYDRAULIC OIL	JDI	
	7/16/11	REMOVED CYLINDER PART #'S	NEH	
	9/27/07	ADDED CYLINDER TESTING WARNING	WAK	
REV	DATE	DESCRIPTION	BY	APP
<b>TOLERANCES:</b> (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX OR .XXXX ± .005 DRILL SIZES: + .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B <small>BREAK SHARP EDGES (R.000 X .001 MAX.)</small>		TITLE: PRODUCTION PROCEDURE 008 CYLINDER ASSEMBLY  DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512		
DRAWN BY:		APPD BY:	DATE:	DRAWING NUMBER:
WAK			6/24/94	PP008
				REV: D

# SECTION 7.0 REAR RAILGEAR PARTS

7.1 BEFORE ORDERING PARTS ..... 7-2

7.2 REAR PARTS DETAIL DRAWINGS..... 7-3

7.3 REAR AXLE DIAGRAMS ..... 7-10

## 7.1 BEFORE ORDERING PARTS

### Required Information for Ordering Parts:

- You must have your Railgear serial numbers when ordering parts. This uniquely identifies your Railgear, as it was built to your specifications, and also allows DMF to help you maintain a history of your Railgear. If you are placing a parts order through a maintenance facility, please inform them of the serial number, so that they can relay the information when placing your order.
- Returns: DMF has a Return Authorization Procedure. You must contact DMF for an RA# before returning any parts for any reason. Parts will not be credited without an RA#.
- Labor: In extremely rare situations, on a discretionary basis, and with prior approval, DMF will reimburse certain, specific labor costs. If you feel this may apply in your situation, you must contact DMF's Service Department for a Service Authorization Number (SA#). No labor will be reimbursed without an SA#. The SA# must be included on your request for reimbursement.
- Please use driver's side / passenger's side terminology (instead of left/right side) when describing issues with your Railgear. This ensures that everyone involved is clear about where the issue is occurring.

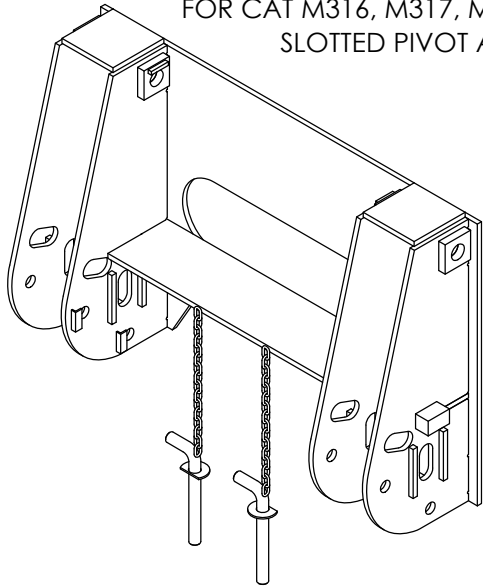
### Other Considerations for Ordering Parts:

This is a list of considerations to make before placing a parts order with DMF. There are many variations and customer requirements that we strive to accommodate, and as a result, the more information you can provide to us when placing an order, the more likely that we will be able to help you quickly and efficiently.

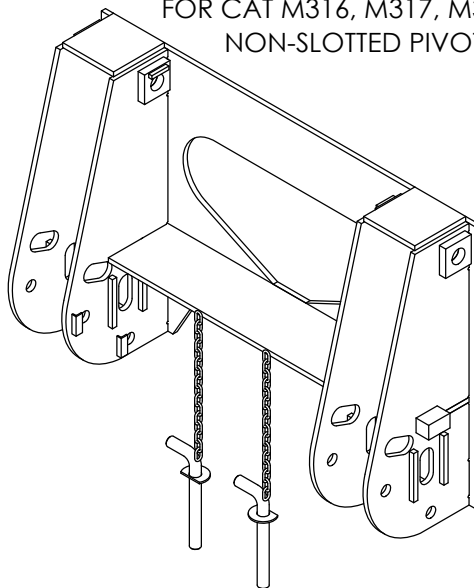
### Wheels:

- If you are a customer using special wheel profiles (this is especially prevalent in Metros), please be sure to inform the DMF Parts Department that there may be a special wheel profile involved in your order.
- DMF offers both insulated and non-insulated wheels – Please confirm which wheel you need before ordering. Insulated wheels can be identified by a grooved ring machined around the inside of the rail wheel. This grooved ring can be seen and felt, and is located about an inch in from the outside tread.

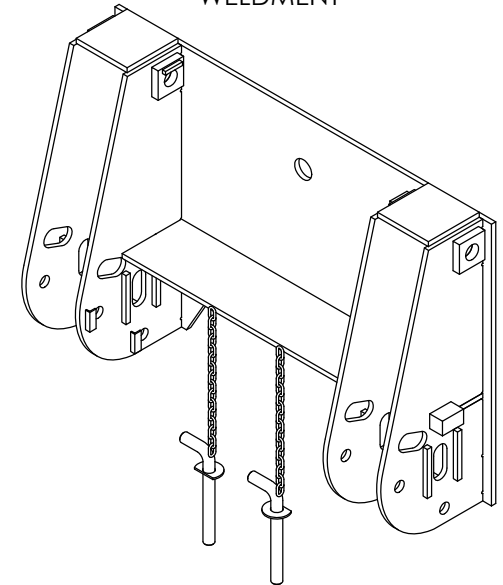
81217 - BULKHEAD PLATE WELDMENT  
FOR CAT M316, M317, M318, M320 &  
SLOTTED PIVOT ARMS



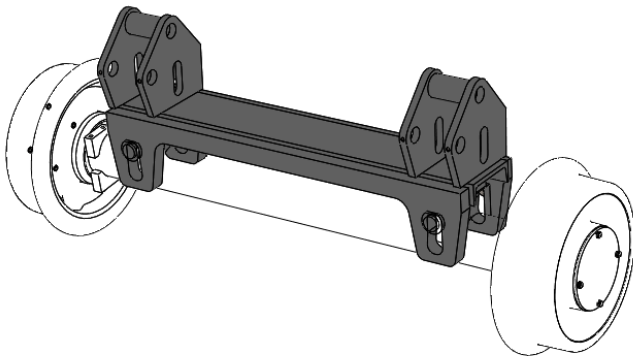
81216 - BULKHEAD PLATE WELDMENT  
FOR CAT M316, M317, M318, M320 &  
NON-SLOTTED PIVOT ARMS



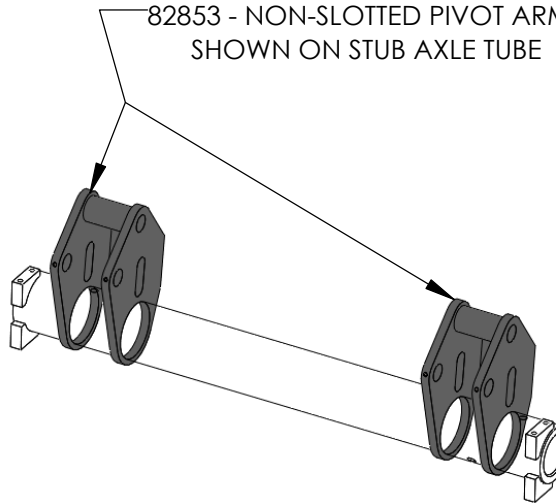
81210 - GENERIC BULKHEAD PLATE  
WELDMENT



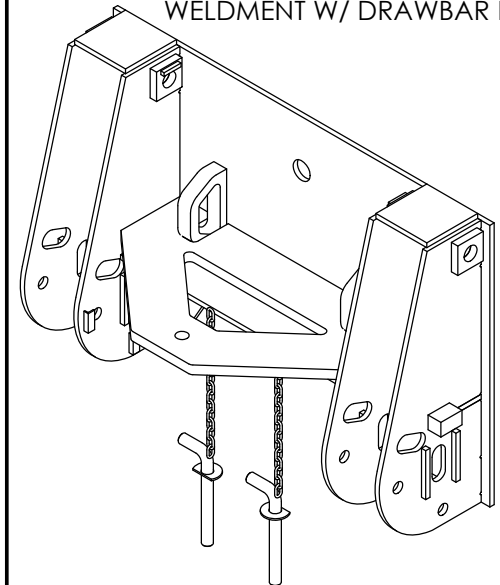
83474 - SLOTTED PIVOT ARM WELDMENT  
SHOWN ON WHEEL & AXLE ASSEMBLY



82853 - NON-SLOTTED PIVOT ARMS  
SHOWN ON STUB AXLE TUBE

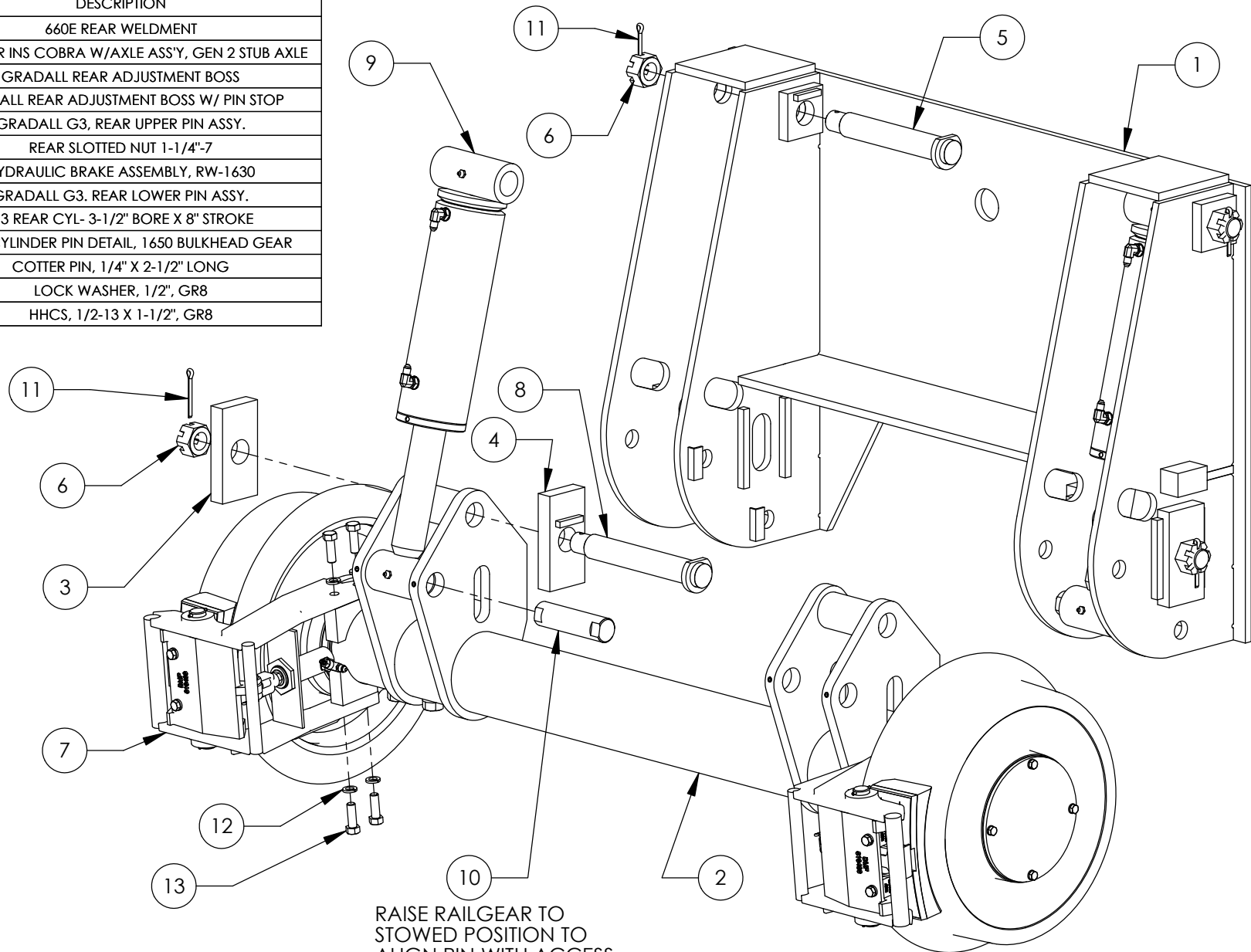


83476 - GENERIC BULKHEAD PLATE  
WELDMENT W/ DRAWBAR PLATE



REV	DATE	DESCRIPTION	BY	APP
<div> <div> TOLERANCES (UNLESS SPECIFIED):  FRAC. MACH: <math>\pm 1/32"</math>  FRAC. OTHER: <math>\pm 1/16"</math>  .X: <math>\pm .063</math>  .XX: <math>\pm .030</math>  .XXX: <math>\pm .005</math>  DRILL SIZES: <math>\pm .015</math>  ANGULAR: <math>\pm 1^\circ</math>  SURF FINISH: 125 MICRO  THREADS: 2A AND 2B  BREAK SHARP EDGES .03 X 45° MAX  DMF (404)875-1512 </div> <div> RW-1650G  DRAWN BY: BJF  APPD BY: -  DATE: 7/10/20 </div> <div> TITLE:  EXCAVATOR BULKHEAD PLATE &amp; PIVOT ARM  CONFIGURATIONS  THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED  METAL FABRICATORS, INC (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.  DRAFTING NUMBER: M1650G02  REV: # </div> </div>				

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	81210	1	660E REAR WELDMENT
2	81318	1	660E REAR INS COBRA W/AXLE ASS'Y, GEN 2 STUB AXLE
3	82826	2	GRADALL REAR ADJUSTMENT BOSS
4	82861	2	GRADALL REAR ADJUSTMENT BOSS W/ PIN STOP
5	82803	2	GRADALL G3, REAR UPPER PIN ASSY.
6	818256	4	REAR SLOTTED NUT 1-1/4"-7
7	818788	2	HYDRAULIC BRAKE ASSEMBLY, RW-1630
8	82806	2	GRADALL G3, REAR LOWER PIN ASSY.
9	240350	2	G3 REAR CYL- 3-1/2" BORE X 8" STROKE
10	82808	2	REAR CYLINDER PIN DETAIL, 1650 BULKHEAD GEAR
11	818258	4	COTTER PIN, 1/4" X 2-1/2" LONG
12	12481	8	LOCK WASHER, 1/2", GR8
13	818466	8	HHCS, 1/2-13 X 1-1/2", GR8

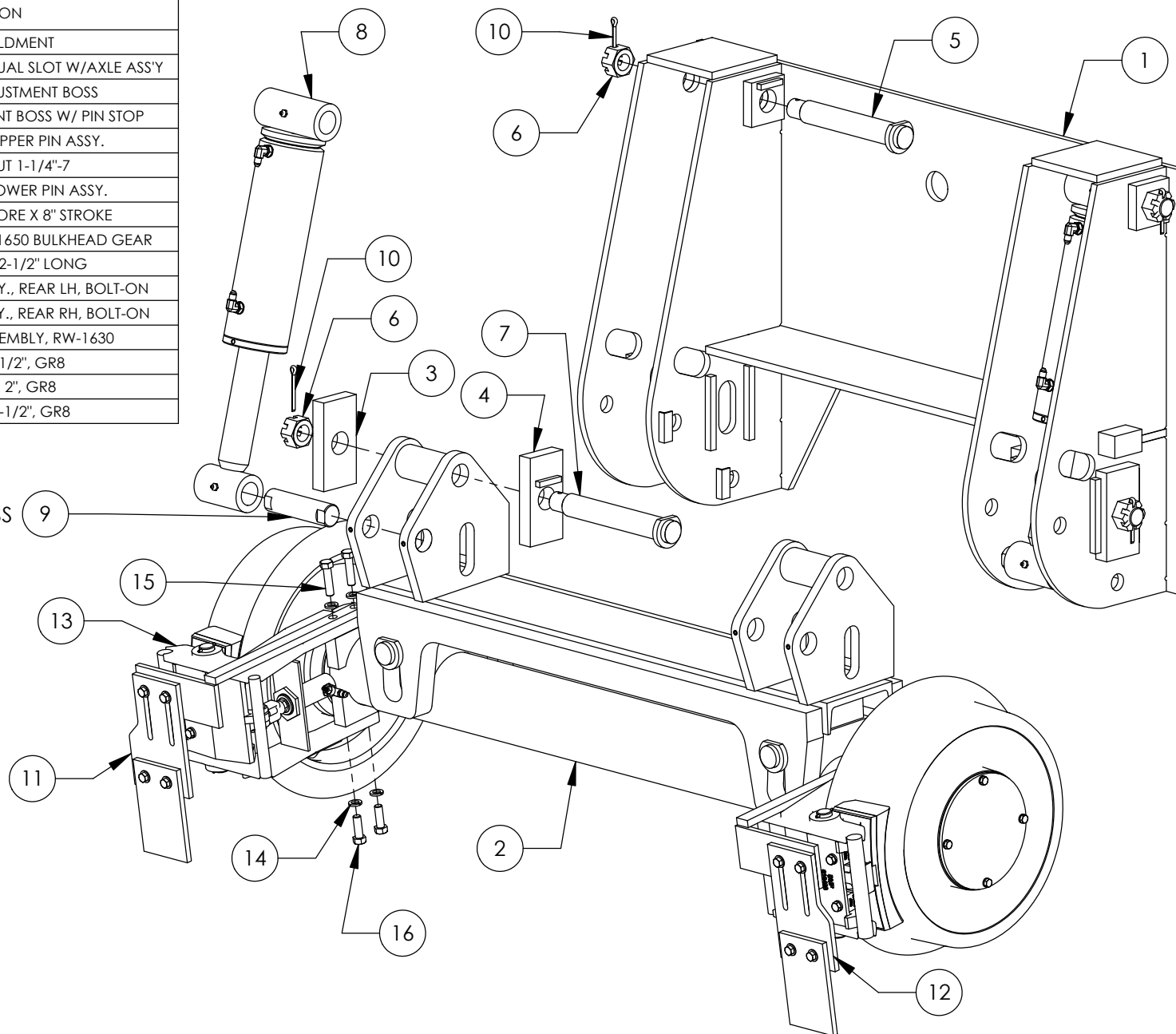


RAISE RAILGEAR TO  
STOWED POSITION TO  
ALIGN PIN WITH ACCESS  
HOLE FOR  
INSTALLATION/REMOVAL

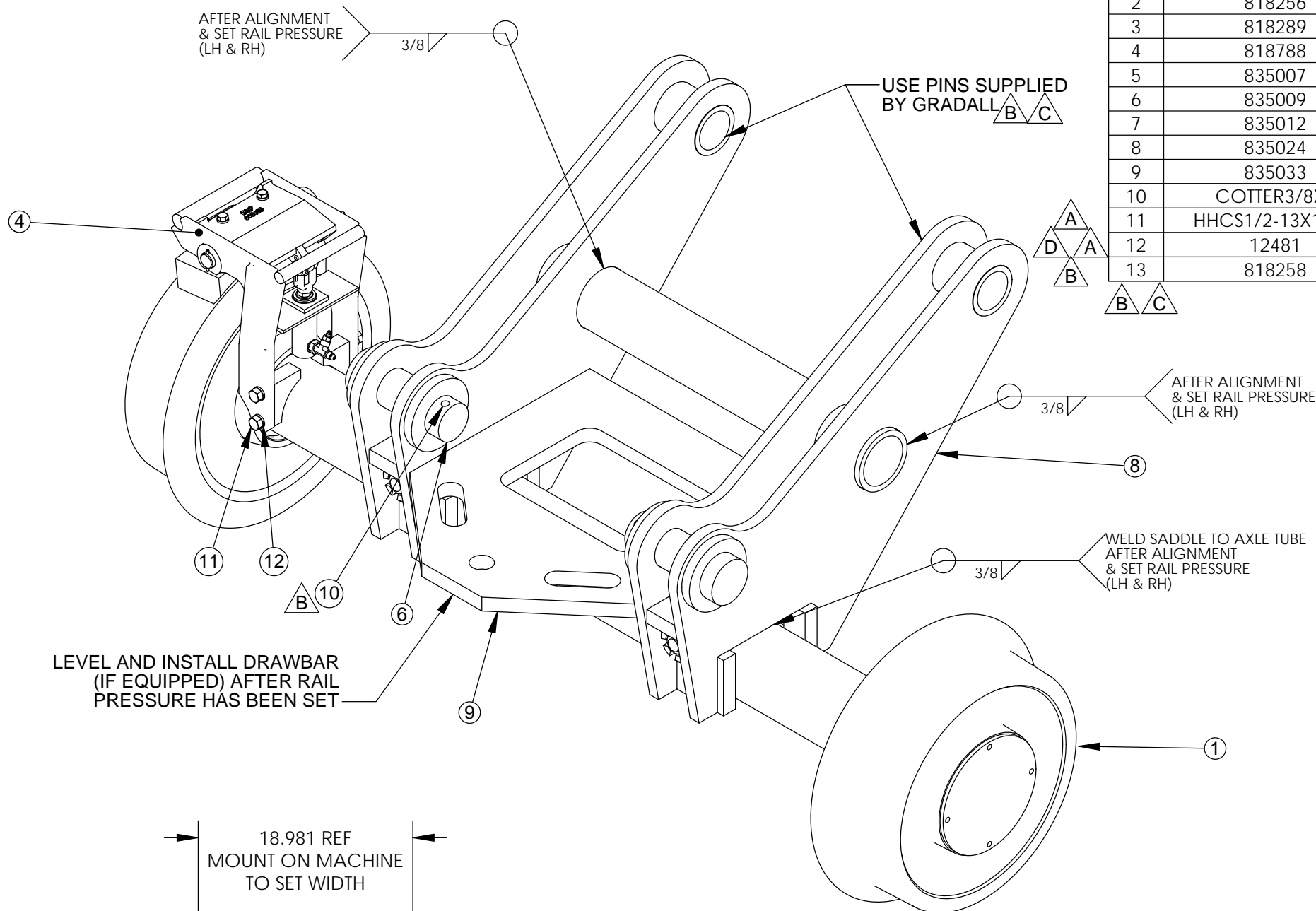
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES (UNLESS SPECIFIED): FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX ± .005 DRILL SIZES: ± .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES .03 X 45° MAX DMF (404)875-1512				
RW-1650G		TITLE: 1650HC GRADALL REAR ASSY, HYDRAULIC BRAKES, GEN 2 STUB AXLE THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.		
DRAWN BY: BJF	APPD BY: -	DATE: 7/29/20	DRAWING NUMBER: 81260	REV: #

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	81210	1	660E REAR WELDMENT
2	83475	1	GRADALL 4100 REAR ART'G DUAL SLOT W/AXLE ASS'Y
3	82826	2	GRADALL REAR ADJUSTMENT BOSS
4	82861	2	GRADALL REAR ADJUSTMENT BOSS W/ PIN STOP
5	82803	2	GRADALL G3, REAR UPPER PIN ASSY.
6	818256	4	REAR SLOTTED NUT 1-1/4"-7
7	82806	2	GRADALL G3, REAR LOWER PIN ASSY.
8	240350	2	G3 REAR CYL- 3-1/2" BORE X 8" STROKE
9	82808	2	REAR CYLINDER PIN DETAIL, 1650 BULKHEAD GEAR
10	818258	4	COTTER PIN, 1/4" X 2-1/2" LONG
11	818517	1	RW-1630/50 RAILSWEEP ASS'Y., REAR LH, BOLT-ON
12	818518	1	RW-1630/50 RAILSWEEP ASS'Y., REAR RH, BOLT-ON
13	818788	2	HYDRAULIC BRAKE ASSEMBLY, RW-1630
14	12481	8	LOCK WASHER, 1/2", GR8
15	605006	4	HHCS, 1/2-13 X 2", GR8
16	818466	4	HHCS, 1/2-13 X 1-1/2", GR8

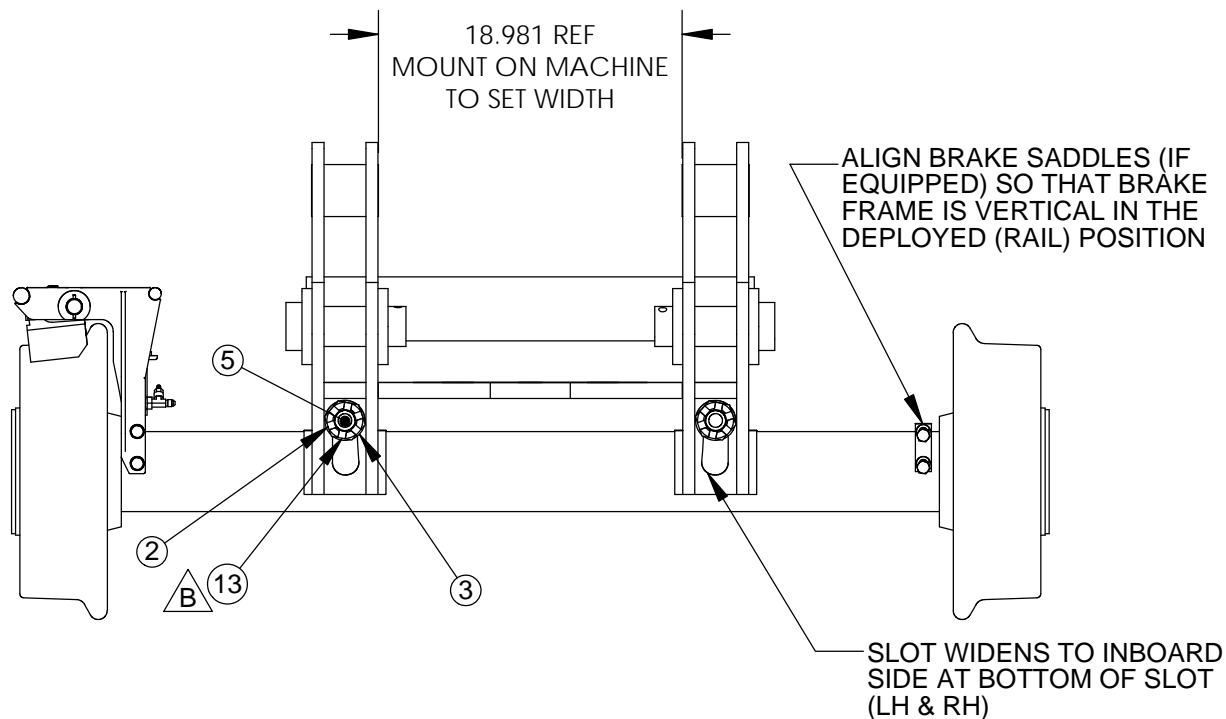
RAILSE RAILGEAR TO STOWED POSITION TO ALIGN PIN WITH ACCESS HOLE FOR INSTALLATION/REMOVAL



REV	DATE	DESCRIPTION	BY	APP
TOLERANCES (UNLESS SPECIFIED): FRAC. MACH: ± 1/32" FRAC. OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX ± .005 DRILL SIZES: ± .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES .03 X 45° MAX DMF (404)875-1512				
RW-1650G		TITLE: 1650HC GRADALL ARTICULATING REAR ASSY, HYDRAULIC BRAKES, SWP, NO VALVE THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.		
DRAWN BY: BJF	APPD BY: -	DATE: 7/27/20	DRAWING NUMBER: 83555	REV: #



ITEM	PART NO.	QTY.	DESCRIPTION
1	800248	1	ASSY, AXLE&WHL&BRKS, GRADALLXL-3300
2	818256	2	RW-1630 REAR SLOTTED NUT (1-1/4"-7)
3	818289	2	RW-1630 REAR CYL. TRUNNION FLAT WASHER (FW 1-1/4")
4	818788	2	HYDRAULIC BRAKE ASSY. 1630
5	835007	2	WELDMENT, PIN, LOWER, GRADALL XL-3300
6	835009	2	DETAIL, PIN, CYLINDER ROD, XL-3300
7	835012	2	DETAIL, AXLE SADDLE, GRADALL XL-3300
8	835024	1	WELDMENT, SWING FRAME, GRADALL XL-3300-III
9	835033	1	DRAWBAR PLATE, GRADALL XL-3300-III
10	COTTER3/8X5	2	COTTER PIN 3/8" DIA. X 5"
11	HHCS1/2-13X1-1/4	8	HEX HEAD CAP SCREW 1/2-13 X 1-1/4"
12	12481	8	1/2" LOCK WASHER, GR 8
13	818258	2	COTTER PIN (1/4"x 2-1/2")

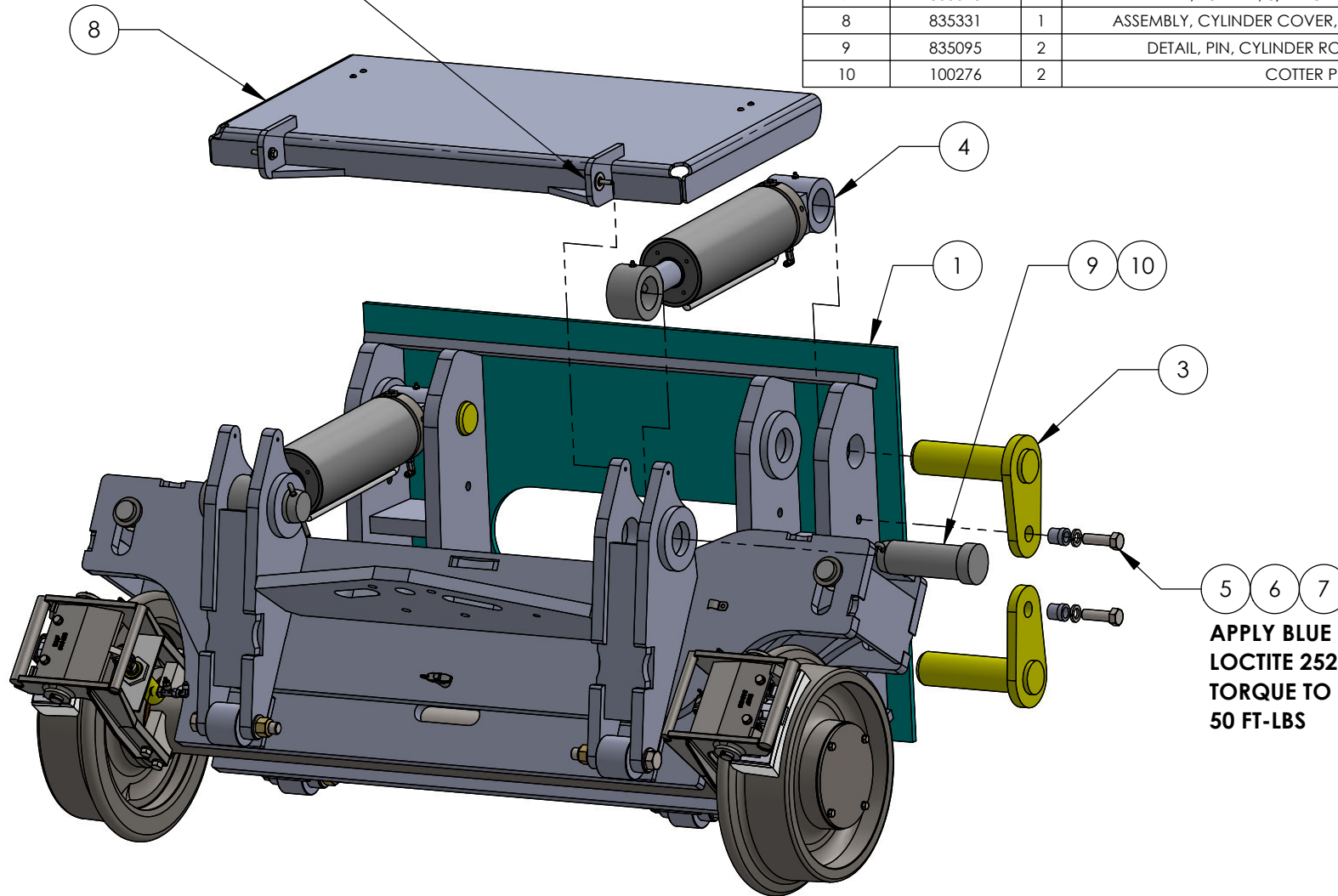


NOTE: PINS SUPPLIED BY GRADALL WERE PART #:835022

10/20/14	12481 WAS LW-1/2	DJJ	
6/22/11	DELETED ITEM 14 (835022), ADDED NOTE REGARDING PINS SUPPLIED BY GRADALL	NEH	
5/9/11	ADDED ITEMS 13, 14: ADDED BALLOONS FOR COTTER PIN LOCATIONS	NEH	
4/1/11	ADDED BALLOON NOTATIONS AND BOM: ADDED ITEMS 11 & 12	NEH	
REV	DATE	DESCRIPTION	BY APP
TOLERANCES: (UNLESS SPECIFIED)			
FRACTIONAL: MACH: ± 1/32"			
FRACTIONAL: OTHER: ± 1/16"			
X: ± .063			
XX: ± .030			
XXX: ± .015			
DRILL SIZES: ± .015			
ANGULAR: ± 3'			
SURF FINISH: 125 MICRO			
THREADS: 2A AND 2B			
DRAWN BY: BJJ			
APPD BY:			
DATE: 2/4/11			
DRAWING NUMBER: 835023			
REV: D			



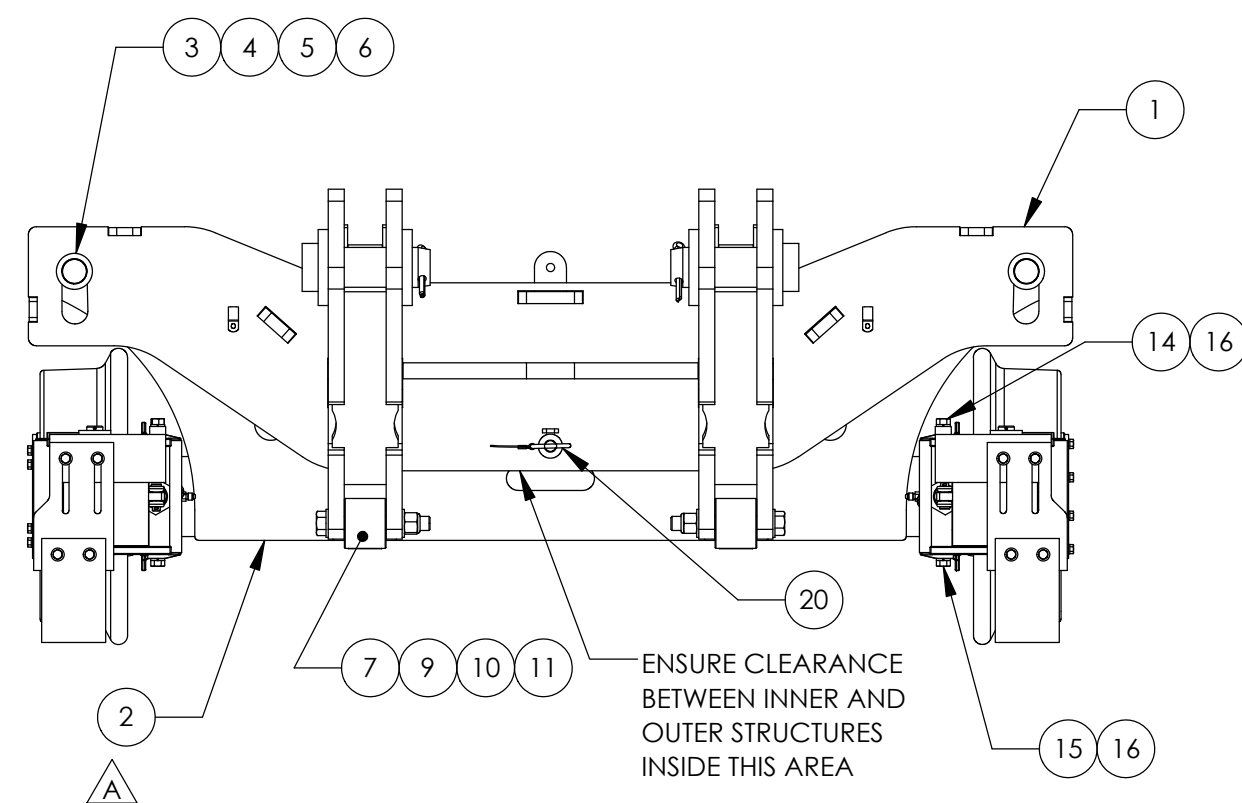
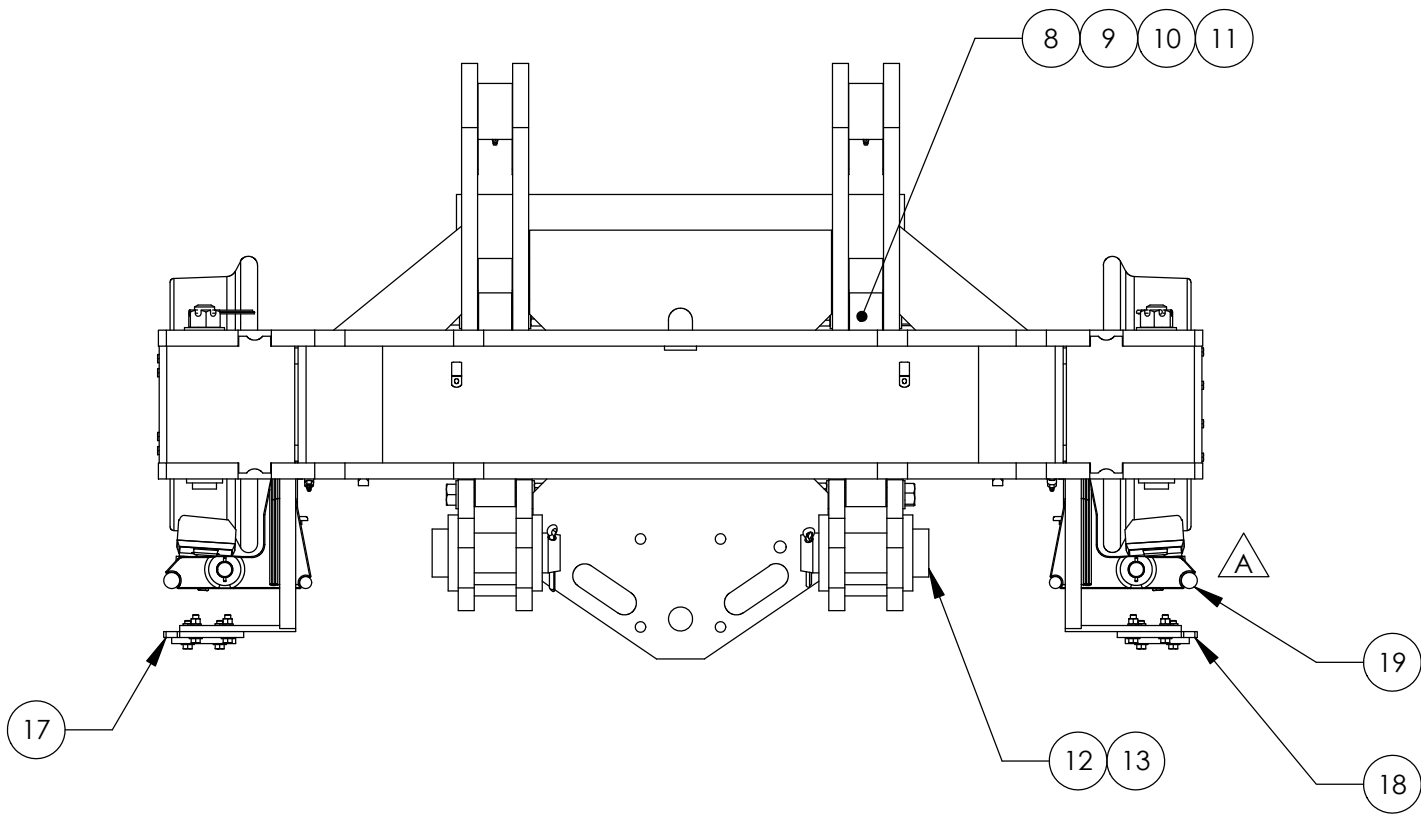
APPLY BLUE  
LOCTITE 252  
TORQUE TO  
30 FT-LBS



ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	835312	1	WELDMENT, BULKHEAD MOUNT, BULKHEAD MOUNT RW-1650GX
2	835301	1	ASSEMBLY, BULKHEAD MOUNT RW-1650GX W/ HYD. BRAKES
3	835332	4	PLATED MOUNTING PIN, BULKHEAD MOUNTED RW-1650GX
4	835402	2	LV CYLINDER; 4-1/2" BORE; RW-1650GX
5	605305	4	HHCS, 3/4-10 X 2-1/2", GR8
6	820462	4	LOCK WASHER, 3/4", GR8
7	835348	4	DETAIL, TOPHAT, 3/4" BOLT, RW-1650GX BULKHEAD PIN
8	835331	1	ASSEMBLY, CYLINDER COVER, BULKHEAD MOUNT RW-1650GX
9	835095	2	DETAIL, PIN, CYLINDER ROD, GRADALL XL-3300 WIDE
10	100276	2	COTTER PIN, 3/8" X 4"

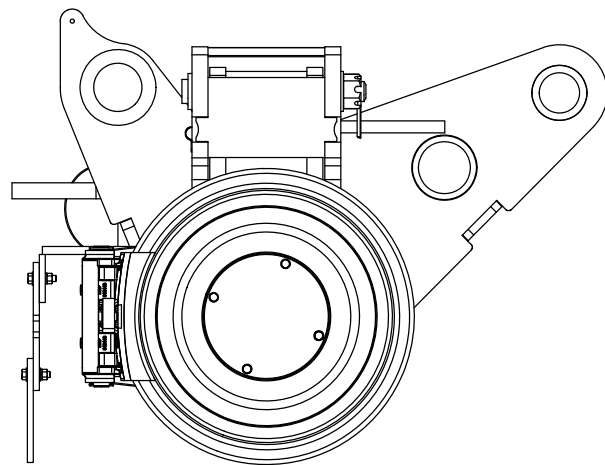
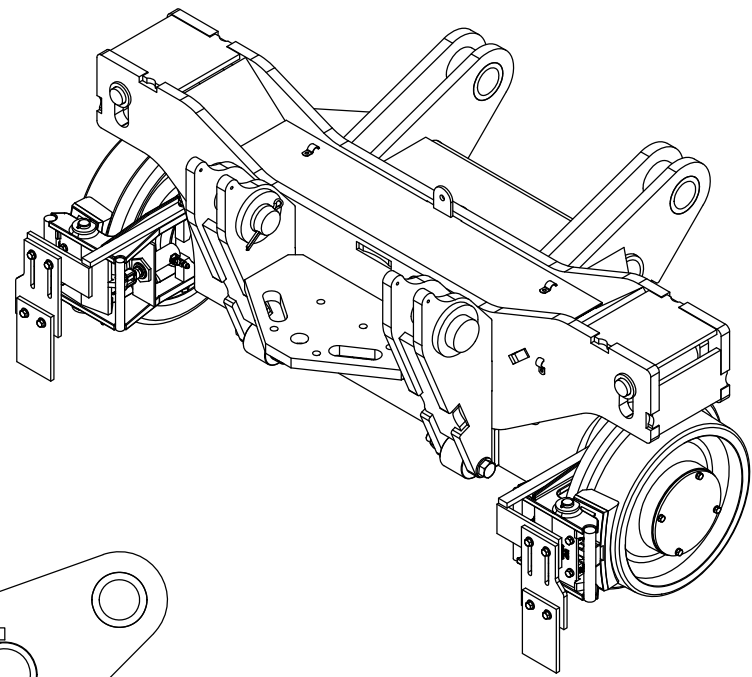
APPLY BLUE  
LOCTITE 252  
TORQUE TO  
50 FT-LBS

REV	DATE	DESCRIPTION			BY	APP
TOLERANCES (UNLESS SPECIFIED):						
FRAC. MACH: ± 1/32"		TITLE: BULKHEAD MOUNT RW-1650GX WITH HYDRAULIC BRAKES				
FRAC. OTHER: ± 1/16"						
± .063		THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.				
± .030						
± .005		DRAWN BY: ARB    APPD BY: -    DATE: 10/13/20    DRAWING NUMBER: 835300    REV: #				
± .015						
ANGULAR: ± 1°						
SURF FINISH: 125 MICRO						
THREDS: 2A AND 2B						
BREAK SHARP EDGES .03 X 45° MAX						
DMF (404)875-1512						

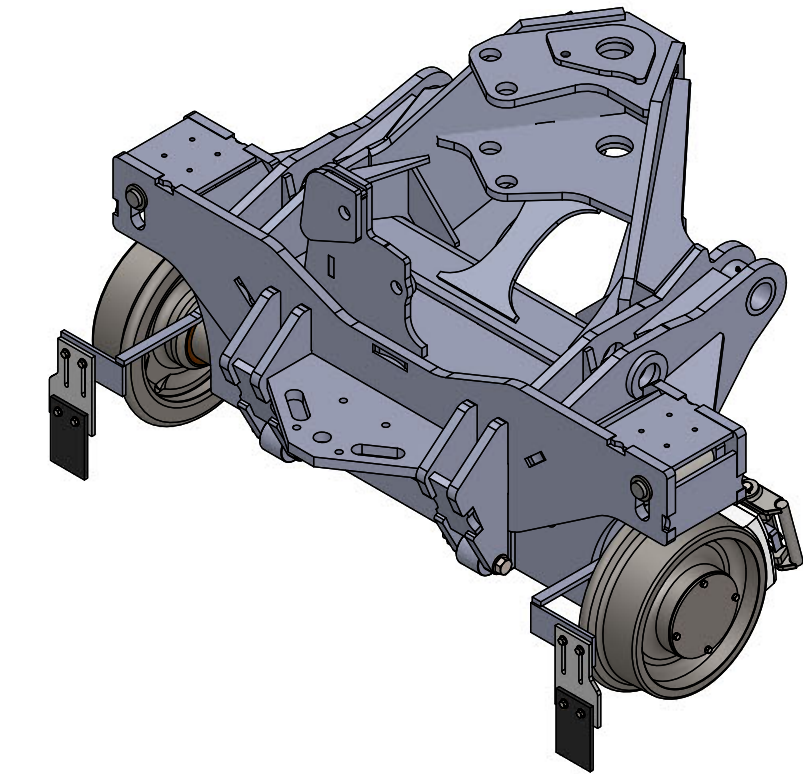
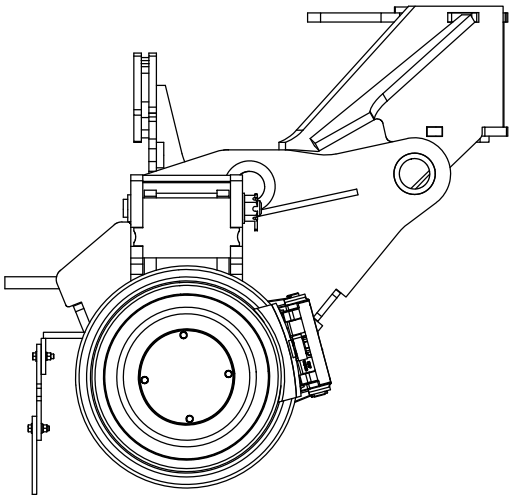
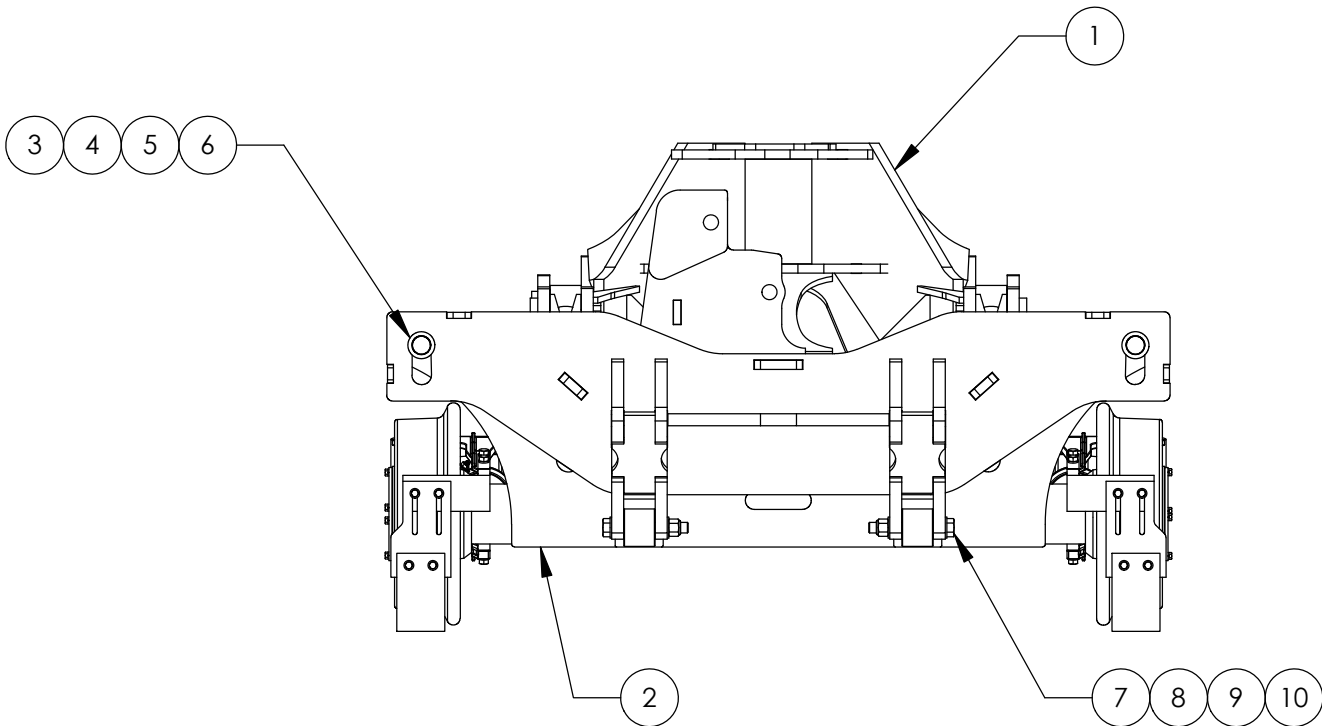
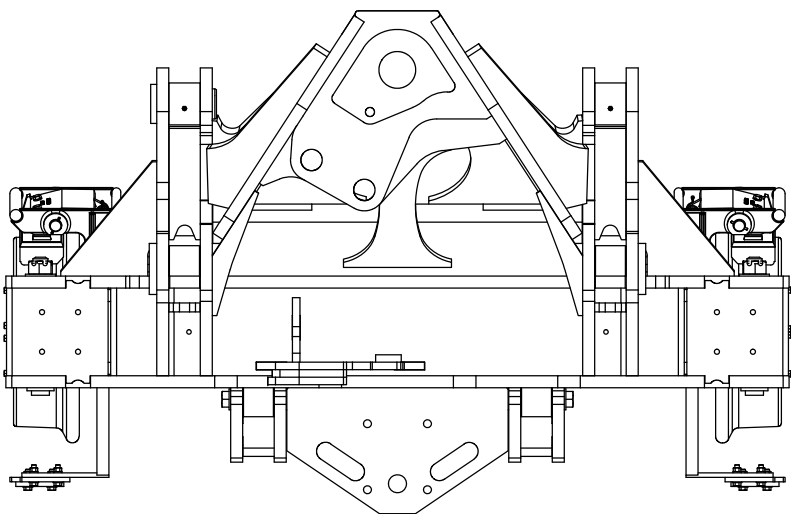


A


ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	835064	1	WELDMENT, OUTER STRUCTURE, GRADALL XL-3300 WIDE
2	835097	1	ASSEMBLY, INNER STRUCTURE W/ WHEELS, NON-INS, GRADALL XL-3300 WIDE
3	835094	2	WELDMENT, UPPER PIN, GRADALL XL-3300 WIDE
4	500124	2	FLAT WASHER, 1-1/4"
5	818258	2	COTTER PIN, 1/4" X 2-1/2" LONG
6	818256	2	SLOTTED NUT 1-1/4"-7 GR5
7	835092	2	DETAIL, OUTSIDE WEAR TUBE, GRADALL XL-3300 WIDE
8	835093	2	DETAIL, INSIDE WEAR TUBE, GRADALL XL-3300 WIDE
9	605689	4	HHCS, 7/8-9 X 6.5", GR8
10	605690	4	7/8"-9 NYLOCK NUT
11	605687	8	FLAT WASHER, 7/8", GR8
12	835095	2	DETAIL, PIN, CYLINDER ROD, GRADALL XL-3300 WIDE
13	100276	2	COTTER PIN, 3/8" X 4"
14	605006	4	HHCS, 1/2-13 X 2", GR8
15	12479	4	HHCS, 1/2-13 X 1-1/4", GR8
16	12481	8	LOCK WASHER, 1/2", GR8
17	818517	1	RW-1630/50 RAILSWEEP ASSY., REAR LH, BOLT-ON
18	818518	1	RW-1630/50 RAILSWEEP ASSY., REAR RH, BOLT-ON
19	818788	2	HYDRAULIC BRAKE ASSEMBLY, RW-1630
20	605804	REF	3/4" X 4-1/2" 17-4PH STAINLESS HITCH PIN W/ HANDLE

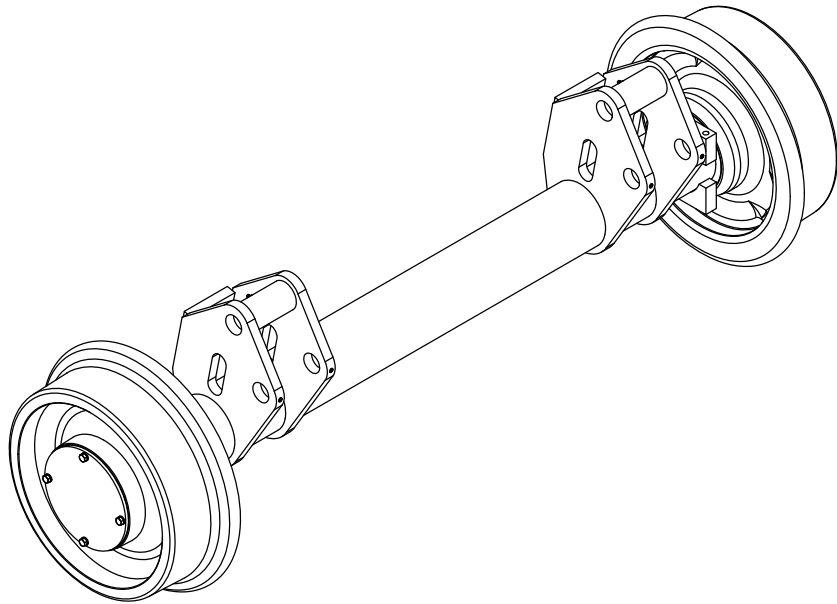


A	9/6/2019	835097 WAS 835094, CHANGED ORIENTATION OF 818788			ARB	
REV	DATE	DESCRIPTION			BY	APP
TOLERANCES (UNLESS SPECIFIED): FRAC, MACH: ± 1/32" FRAC, OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX ± .005 DRILL SIZES: ± .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES .03 X 45° MAX DMF (404)875-1512		RW-1650G		TITLE: ASSEMBLY, GRADALL XL-3300 WIDE  THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF. ALL RIGHTS RESERVED.		
DRAWN BY: ARB		APPD BY: -		DATE: 10/26/18	DRAWING NUMBER: 835063	REV: A

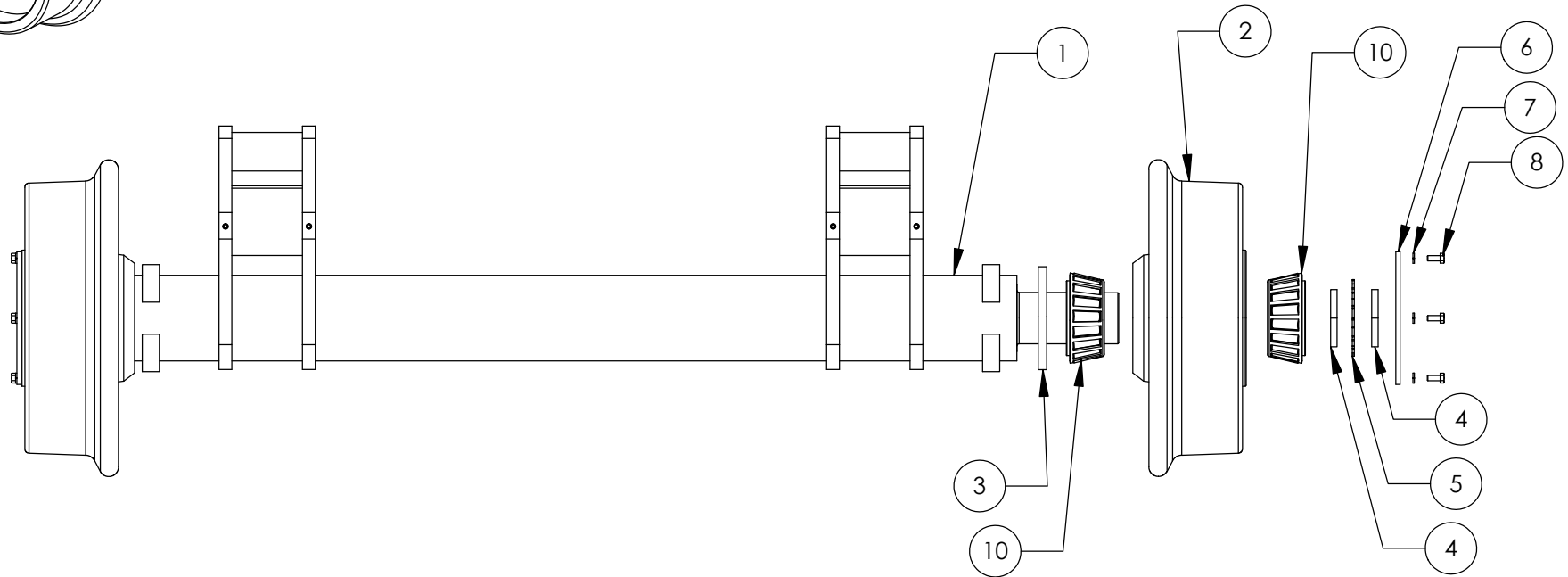


ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	835140	1	WELDMENT, OUTER STRUCTURE W/ COUPLER, GRADALL 4100 WIDE
2	835214	1	INNER STRUCTURE W/ WHEELS, GRADALL 4100 WIDE W/ COUPLER
3	818258	2	COTTER PIN, 1/4" X 2-1/2" LONG
4	818256	2	SLOTTED NUT 1-1/4"-7 GR5
5	500124	2	FLAT WASHER, 1-1/4"
6	835094	2	WELDMENT, UPPER PIN, GRADALL XL-3300 WIDE
7	605689	4	HHCS, 7/8-9 X 6.5", GR8
8	605687	8	FLAT WASHER, 7/8", GR8
9	835092	4	DETAIL, OUTSIDE WEAR TUBE, GRADALL XL-3300 WIDE
10	605690	4	7/8"-9 NYLOCK NUT


A	2/15/2021	REMOVED 835161, 12481, 12479; 818398 & 818399 MOVED TO AXLE ASSY 835214			BJF	
REV	DATE	DESCRIPTION			BY	APP
TOLERANCES (UNLESS SPECIFIED): FRAC, MACH: ± 1/32" FRAC, OTHER: ± 1/16" .X ± .063 .XX ± .030 .XXX ± .005 DRILL SIZES: ± .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES .03 X 45° MAX DMF (404)875-1512		RW-1650GX		TITLE: ASSEMBLY, RR, GRADALL 4100 WIDE W/ COUPLER PREP, COBRA BRAKES THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF. ALL RIGHTS RESERVED.		
DRAWN BY: ARB		APPD BY: -		DATE: 5/18/20		DRAWING NUMBER: 835215
				REV: A		

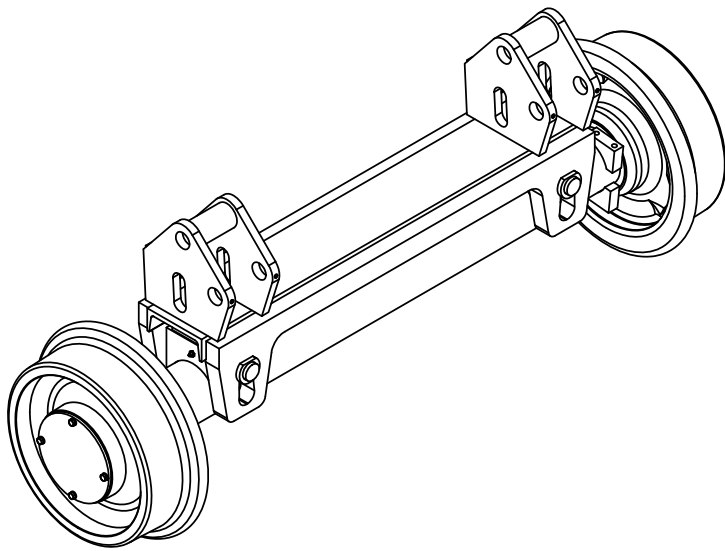


ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	820414	1	RW-1650 AXLE & TUBE, 5"OD X 52.120", COBRA BRAKES
2	800015	2	RW-1650 WHEEL, NON-INS., W/ RACES (EXTERNAL BRAKES)
3	800127	2	RW-1650 SEAL, STANDARD (CR-49928 OR NAT 415725)
4	800130	4	RW-1650 NUT, AXLE (EUCLID E-2465)
5	800131	2	RW-1650 WASHER, AXLE TAB (EUCLID E-2464)
6	820441	2	HUBCAP, 1650 - 7" B.C. (FLAT)
7	800109	8	5/16" LOCK WASHER, GRADE 8
8	800108	8	HHCS 5/16-18" x 3/4"
9	82853	2	660E PIVOT ARM ASSY
10	800126	4	RW-1650 BEARING CONE (TIMKEN - 6466)

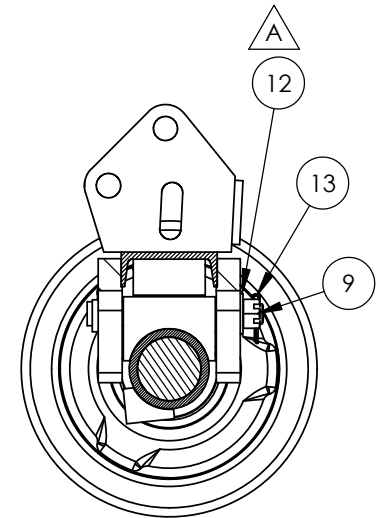
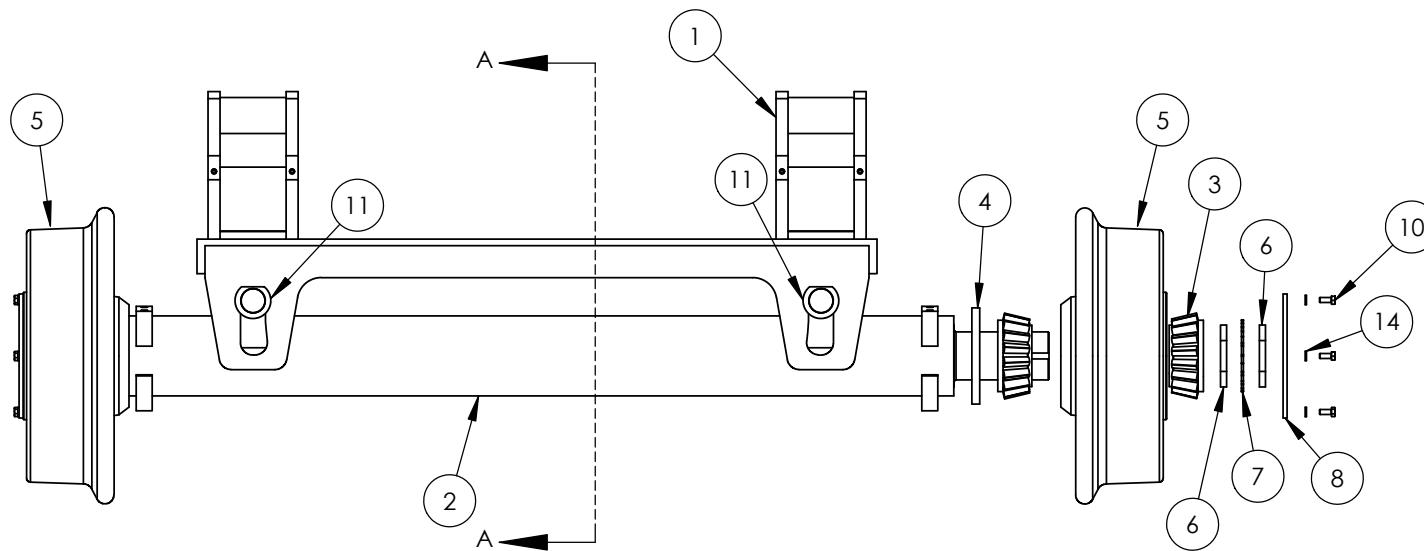


SEE M1630103 FOR WHEEL INSTALLATION PROCEDURE

REV	DATE	DESCRIPTION	BY	APP
TOLERANCES (UNLESS SPECIFIED): FRAC. MACH: $\pm 1/32$ FRAC. OTHER: $\pm 1/16$ .X: $\pm .063$ .XX: $\pm .030$ .XXX: $\pm .005$ DRILL SIZES: $\pm .015$ ANGULAR: $\pm 1^\circ$ SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES .03 X 45° MAX DMF (404)875-1512				
RW-1650G		TITLE: 660E REAR COBRA WHEEL AND AXLE ASSEMBLY THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.		
DRAWN BY: ARB	APPD BY: -	DATE: 6/8/21		DRAWING NUMBER: 81316 REV: #








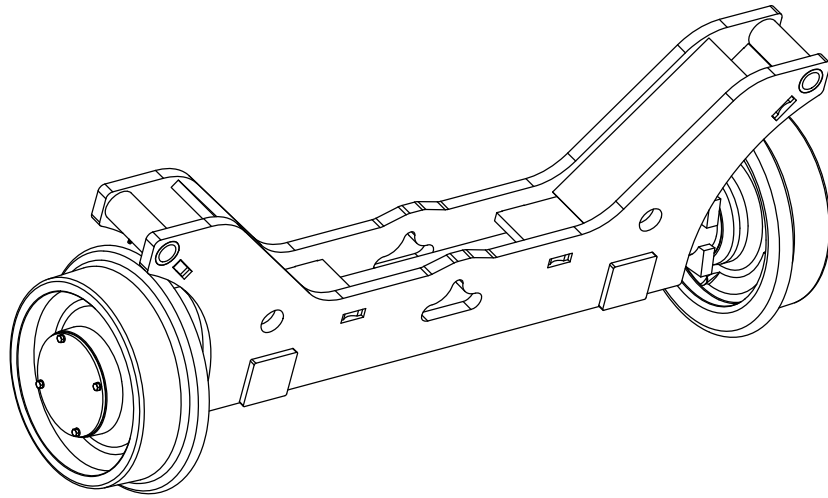
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	83474	1	ARTICULATING RR ARM WELDMENT DUAL SLOT
2	83473	1	ARTIC. 1650C AXLE/TUBE WELDMENT DUAL SLOT
3	800126	4	RW-1650 BEARING CONE, TIMKEN 6466
4	800127	2	RW-1650 SEAL, STANDARD (CR-49928 OR NAT 415725)
5	800015	2	RW-1650 WHEEL, NON-INS., W/ RACES (EXTERNAL BRAKES)
6	800130	4	RW-1650 NUT, AXLE (EUCLID E-2465)
7	800131	2	RW-1650 WASHER, AXLE TAB (EUCLID E-2464)
8	820441	2	RW-1650 HUBCAP DETAIL
9	818256	2	REAR SLOTTED NUT 1-1/4"-7
10	800108	8	HUBCAP BOLTS (HHCS 5/16"-18 X 3/4")
11	818251	2	REAR LOWER PIN ASS'Y., W/ HEAD 1-1/2" X 11"
12	818289	2	FLAT WASHER, 1-1/4", GR5
13	818258	2	COITER PIN, 1/4" X 2-1/2" LONG
14	800109	8	LOCK WASHER, 5/16", GR8



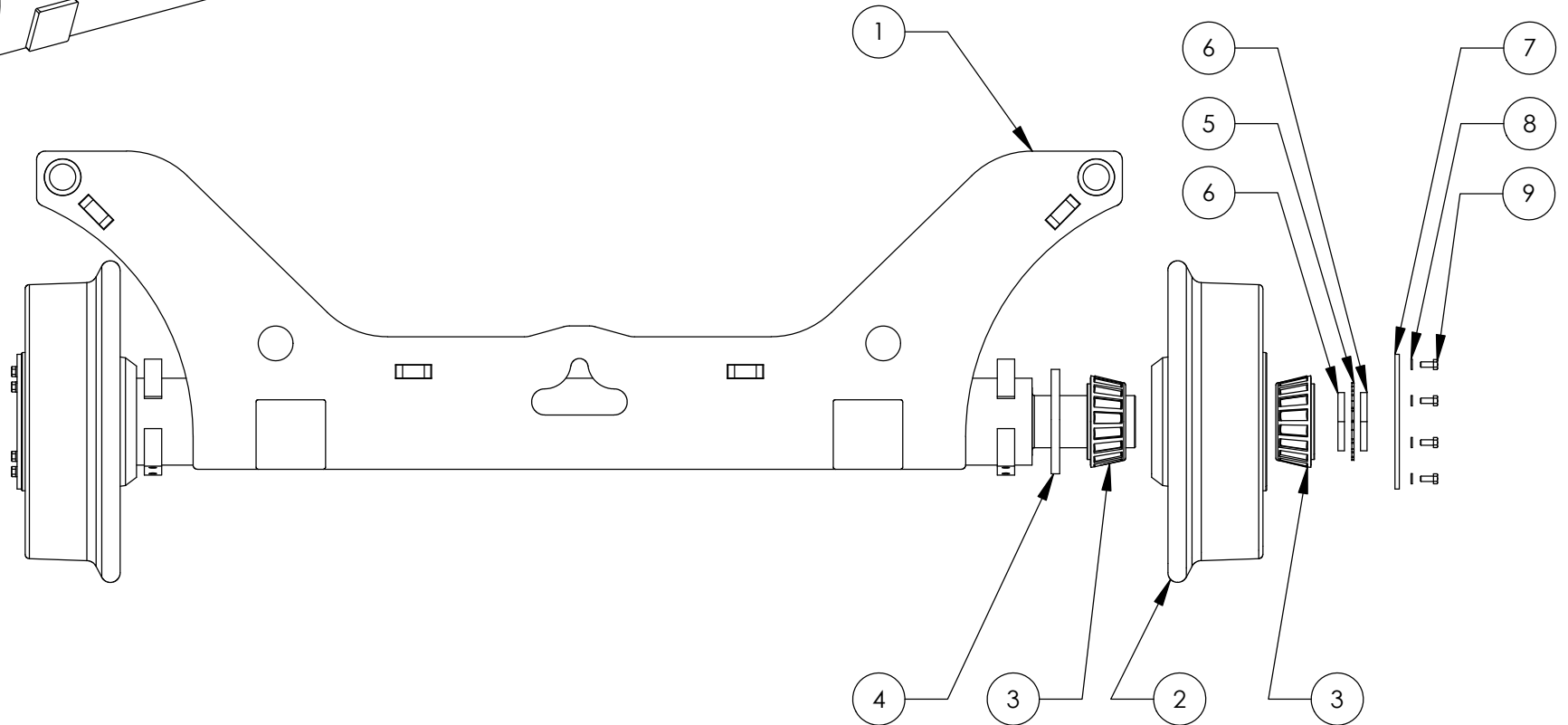
SECTION A-A  
SCALE 1 : 12

SEE M163103 FOR WHEEL INSTALLATION PROCEDURE


		-	-		-																										
		7/27/20	ADDED 2 OF 818289		B.JF																										
REV	DATE	DESCRIPTION			BY	APP																									
TOLERANCES:		<table><tr><td colspan="2" rowspan="5">RW-1650G</td><td colspan="3">TITLE: GRADALL 4100 REAR ARTICULATING DUAL SLOT WHEEL/AXLE ASS'Y.</td></tr><tr><td colspan="3">DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512</td></tr><tr><td>DRAWN BY:</td><td>APPD BY:</td><td>DATE:</td><td></td><td>DRAWING NUMBER:</td><td>REV:</td></tr><tr><td>JBG</td><td></td><td>11/25/08</td><td></td><td>83475</td><td>A</td></tr><tr><td colspan="5"></td></tr></table>					RW-1650G		TITLE: GRADALL 4100 REAR ARTICULATING DUAL SLOT WHEEL/AXLE ASS'Y.			DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512			DRAWN BY:	APPD BY:	DATE:		DRAWING NUMBER:	REV:	JBG		11/25/08		83475	A					
RW-1650G									TITLE: GRADALL 4100 REAR ARTICULATING DUAL SLOT WHEEL/AXLE ASS'Y.																						
									DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512																						
									DRAWN BY:	APPD BY:	DATE:		DRAWING NUMBER:	REV:																	
									JBG		11/25/08		83475	A																	
(UNLESS SPECIFIED):																															
FRAC. MACH: ± 1/32"																															
FRAC. OTHER: ± 1/16"																															
X ± .063																															
XX ± .030																															
XXX ± .015																															
DRILL SIZES: ± .015																															
ANGULAR: ± 1°																															
SURF FINISH: 125 MICRO																															
THREADS: 2A AND 2B																															
REF: SHAW-WALKER (2002) 1-407-0000																															



ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	835311	1	AXLE WELDMENT
2	800015	2	RW-1650 WHEEL, NON-INS., W/ RACES (EXTERNAL BRAKES)
3	800126	4	RW-1650 BEARING CONE (TIMKEN - 6466)
4	800127	2	RW-1650 SEAL, STANDARD (CR-49928 OR NAT 415725)
5	800131	2	RW-1650 WASHER, AXLE TAB (EUCLID E-2464)
6	800130	4	RW-1650 NUT, AXLE (EUCLID E-2465)
7	820441	2	HUBCAP, 1650 - 7" B.C. (FLAT)
8	800109	8	LOCK WASHER, 5/16", GR8
9	800108	8	HHCS, 5/16-18 X 3/4", GR5



**SEE M1630103 FOR WHEEL INSTALLATION PROCEDURE  
DRAWING FOR ILLUSTRATIVE PURPOSE  
YOUR PARTS MAY DIFFER  
CONTCT DMF FOR ASSISTANCE**

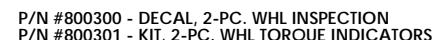
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES (UNLESS SPECIFIED): FRAC. MACH: $\pm 1/32$ FRAC. OTHER: $\pm 1/16$ .X $\pm .063$ .XX $\pm .030$ .XXX $\pm .005$ DRILL SIZES: $\pm .015$ ANGULAR: $\pm 1^\circ$ SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES .03 X 45° MAX DMF (404)875-1512		RW-1650GX  DRAWN BY: ARB APPD BY: -	DATE: 6/8/21 	TITLE: RW-1650GX AXLE ASSEMBLY  THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.  DRAWING NUMBER: M1650G15 REV: #

**COMPLETE REAR AXLE ASSEMBLY OPTIONS (AXLE, AXLE TUBE, WHEELS):**  
 NON-INSULATED, WITH BRAKES (1650) - 800213  
 NON-INSULATED, NO BRAKES (1650) - 800214  
 INSULATED, NO BRAKES (1650) - 800216  
 INSULATED, WITH BRAKES (1650) - 800227  
 2-PC. WHEEL, NO BRAKES (1650) - 800218  
 2-PC. WHEEL WITH BRAKES (1650) - 800261

**1650 & BEHIND CAB WHEELS:**  
 NON-INSULATED, 1650 WHEEL W/ RACES - 800015  
 INSULATED, 1650 WHEEL W/ RACES - 800016  
 • INNER INSULATOR - 820020  
 • OUTER INSULATOR - 820018  
 INSULATED, 2 PIECE 1650 WHEEL W/ RACES - 820496  
 • INSULATOR KIT W/ BOLTS & NUTS - 820479  
 • BOLTS & NUT KIT - 820539  
 \* NOTE: SPECIAL PROFILE WHEELS - PLEASE CALL

**1650 & BEHIND CAB BEARING RACE:**  
TIMKEN 6420 BEARING RACE - 800125

- **Factory Standard:** Citgo Syndurance Premium Synthetic 460 #2
- **Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)



- A. PACK ALL BEARINGS ENSURING COMPLETE COVERAGE (INSIDE AND OUT)
- B. INSERT BEARING IN INBOARD SIDE OF WHEEL (FLANGE SIDE)
- C. PACK GREASE ON INBOARD SIDE OF BEARING, COVERING BACK SIDE OF BEARING
- D. INSTALL A NEW SEAL BY GENTLY TAPPING WITH HAMMER UNTIL FLUSH WITH WHEEL HUB
- E. PLACE WHEEL ON AXLE
- F. FILL CAVITY BETWEEN BEARINGS AND AROUND AXLE UNTIL FLUSH WITH OUTBOARD RACE
- G. INSERT BEARING IN OUTBOARD SIDE OF WHEEL
- H. INSTALL INNER AXLE NUT (ITEM 8)
- I. ADJUST BEARING END-PLAY
  1. TIGHTEN AXLE NUT TO 200 FT-LBS WHILE ROTATING WHEEL
  2. BACK OFF AXLE NUT ONE FULL TURN
  3. TIGHTEN AXLE NUT TO 50 FT-LBS WHILE ROTATING WHEEL
  4. BACK OFF AXLE NUT (ITEM 8) BY 20 DEGREES (ONE THIRD OF A WRENCH FLAT)
- J. INSTALL A NEW TAB WASHER (ITEM 9)
- K. INSTALL OUTER AXLE NUT (ITEM 8) AND TORQUE TO 100 FT-LBS
- L. VERIFY BEARING END-PLAY IS  $0.001''-0.005''$  WITH A DIAL INDICATOR
- M. SELECT THREE TABS THAT MOST NEARLY LINE UP WITH FLATS ON OUTER AXLE NUT (ITEM 8) AND BEND THEM UP TO SECURE NUTS
- N. FILL OUTBOARD CAVITY WITH GREASE
- O. RUN A BEAD OF SILICONE ON HUBCAP MOUNTING SURFACE (OUTBOARD FACE OF HUB)
- P. INSTALL HUBCAP WITH PROVIDED HEX SCREWS AND LOCK WASHERS.

**P/N # 800021 - ALL HARDWARE KIT FOR RW-1650 & BEHIND CAB WHEEL (& 1650 2-PC. WHEEL)**  
(DOES NOT INCLUDE SILICON FOR HUBCAP OR WHEEL GREASE OR BEARING RACE)

**NOTE: DRAWING & PART NUMBERS ARE APPLICABLE FOR BOTH 1650 AND BEHIND CAB. FOR BEHIND CAB AXLE PARTS, SEE FRONT RAILGEAR PARTS SECTION OF MANUAL.**

### 1650 & BEHIND CAB AXLE

[illegible]

# SECTION 8.0    FRONT RAILGEAR PARTS

8.1	BEFORE ORDERING PARTS .....	8-2
8.2	FRONT ASSEMBLY DIAGRAMS .....	8-3
8.3	FRONT AXLE DIAGRAMS.....	8-5



## 8.1 BEFORE ORDERING PARTS

### Required Information for Ordering Parts:

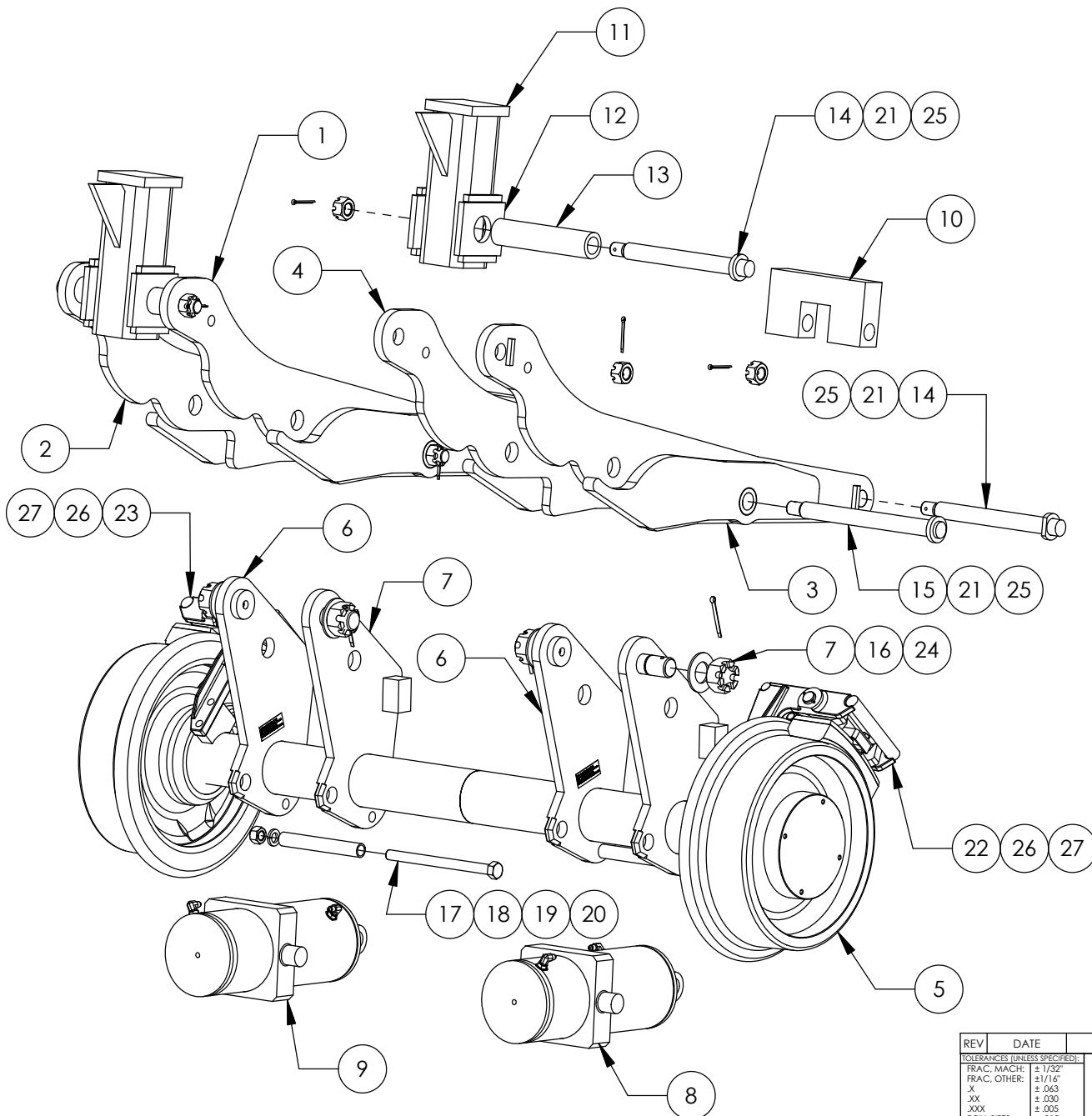
- You must have your Railgear serial numbers when ordering parts. This uniquely identifies your Railgear, as it was built to your specifications, and also allows DMF to help you maintain a history of your Railgear. If you are placing a parts order through a maintenance facility, please inform them of the serial number, so that they can relay the information when placing your order.
- Returns: DMF has a Return Authorization Procedure. You must contact DMF for an RA# before returning any parts for any reason. Parts will not be credited without an RA#.
- Labor: In extremely rare situations, on a discretionary basis, and with prior approval, DMF will reimburse certain, specific labor costs. If you feel this may apply in your situation, you must contact DMF's Service Department for a Service Authorization Number (SA#). No labor will be reimbursed without an SA#. The SA# must be included on your request for reimbursement.
- Please use driver's side / passenger's side terminology (instead of left/right side) when describing issues with your Railgear. This ensures that everyone involved is clear about where the issue is occurring.

### Other Considerations for Ordering Parts:

This is a list of considerations to make before placing a parts order with DMF. There are many variations and customer requirements that we strive to accommodate, and as a result, the more information you can provide to us when placing an order, the more likely that we will be able to help you quickly and efficiently.


### Wheels:

- If you are a customer using special wheel profiles (this is especially prevalent in Metros), please be sure to inform the DMF Parts Department that there may be a special wheel profile involved in your order.
- DMF offers both insulated and non-insulated wheels – Please confirm which wheel you need before ordering. Insulated wheels can be identified by a grooved ring machined around the inside of the rail wheel. This grooved ring can be seen and felt, and is located about an inch in from the outside tread.

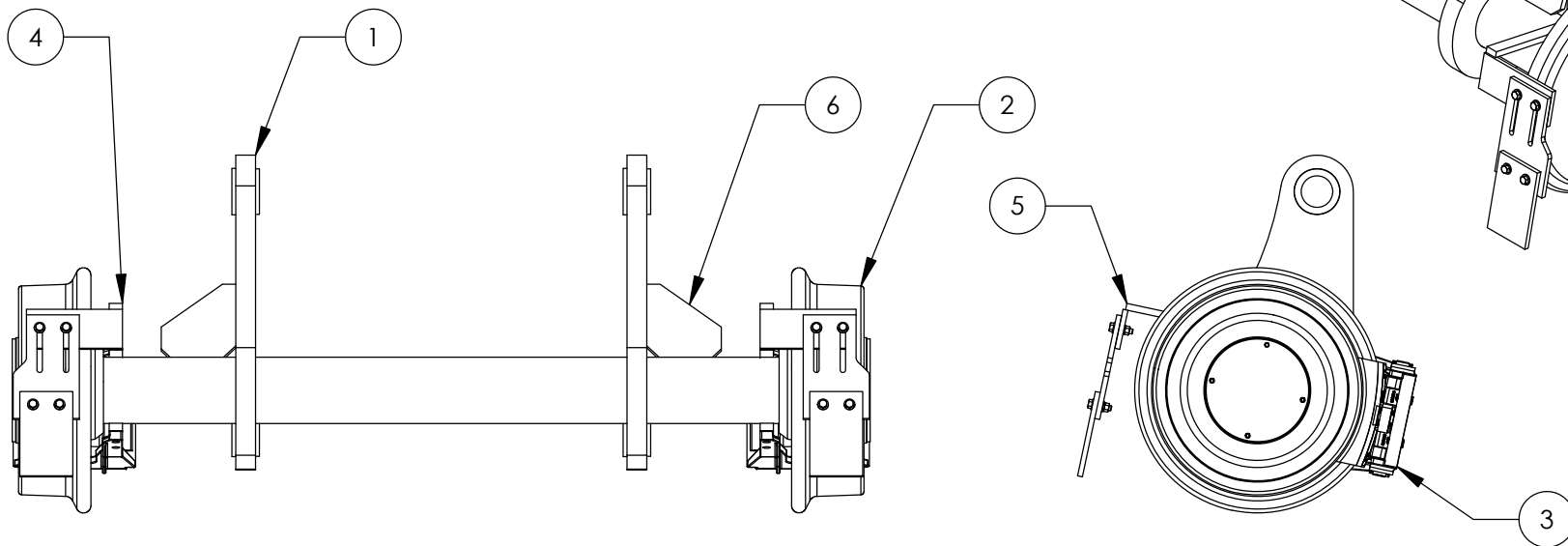
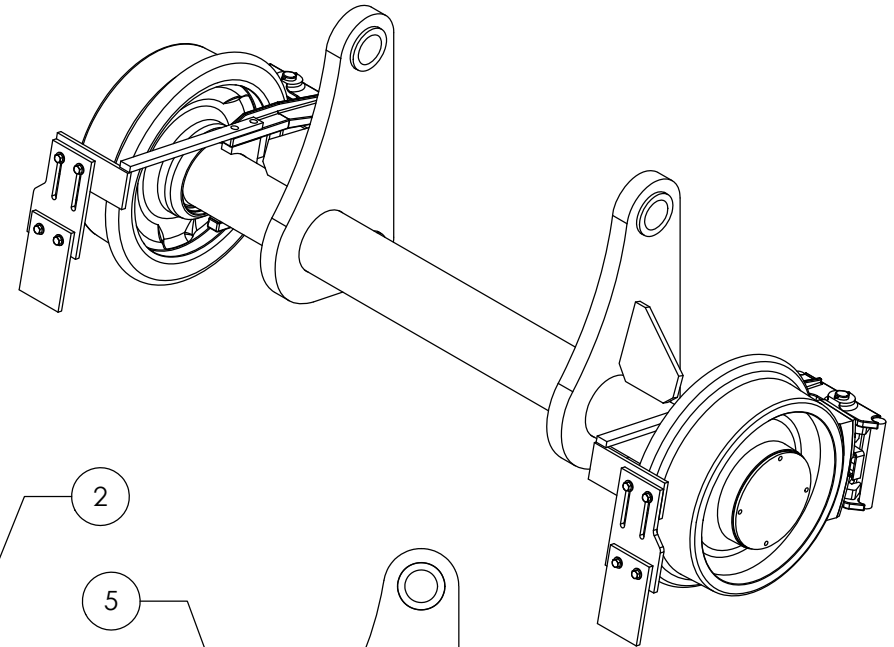
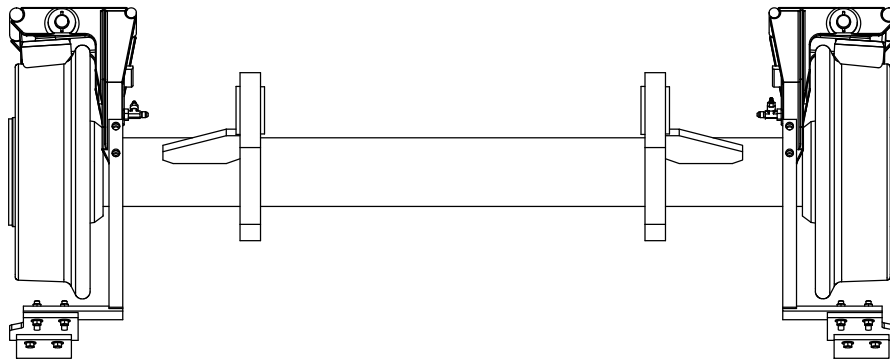


ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	808232	1	EXTRA CLR EXT LONG ARM ASSEMBLY, RH INNER, GRADALL
2	808231	1	EXTRA CLR EXT LONG ARM ASSEMBLY, RH OUTER, NO PINOFF, ANTI-ROTATION, GRADALL
3	808230	1	EXTRA CLR EXT LONG ARM ASSEMBLY, LH OUTER, NO PINOFF, ANTI ROTATION, GRADALL
4	808233	1	EXTRA CLR EXT LONG ARM ASSEMBLY, LH INNER, GRADALL
5		1	WHEEL AND AXLE ASSEMBLY
6	818106	2	FRONT PIVOT ARM WELDMENT, PASSENGER SIDE OUTER
7	818107	2	FRONT PIVOT ARM WELDMENT, DRIVER SIDE OUTER
8	240400	1	5-1/2" BORE, FRONT RH, GRADALL CYLINDER ASSEMBLY
9	240415	1	5-1/2" BORE, FRONT LH, GRADALL CYLINDER ASSEMBLY
10		2	SPRING HANGER
11		2	ADJUSTMENT BOSS
12	82922	4	660 E FRONT BRACKET SPACER DETAIL
13	818185	2	CROSS TUBE SPACER; FOR GRADALL CYL
14	818932	4	RW-1630 FRONT PIN ASSY W/ FLAT, 1-1/4" DIA X 13" L, GRADALL
15	818951	2	FRONT PIN ASSY, 1-1/4" DIA X 14-1/2" L, RW-1630, GRADALL CYL
16	818136	4	FLAT WASHER, 1-1/2" GR5
17	605458	2	HHCS 3/4-10 X 10, GR8
18	818152	2	PIVOT ARM SPACER(5-1/2"CYL)
19	820462	2	LOCK WASHER, 3/4", GR8
20	818161	2	HEX NUT, 3/4-10, GR5
21	818127	6	SLOTTED HEX NUT, 1"-8, GR8
22	818396	1	AIR BRAKE ASSEMBLY, FRONT LH
23	818397	1	AIR BRAKE ASSEMBLY, FRONT RH
24	818137	4	COTTER PIN, 1/4"x2-1/2"
25	108078	6	COTTER PIN, 3/16" X 2"
26	12481	8	LOCK WASHER, 1/2", GR8
27	818466	8	HHCS, 1/2-13 X 1-1/2", GR8

**DRAWING FOR ILLUSTRATIVE PURPOSES  
YOUR PARTS MAY DIFFER  
CONTACT DMF FOR ASSISTANCE**

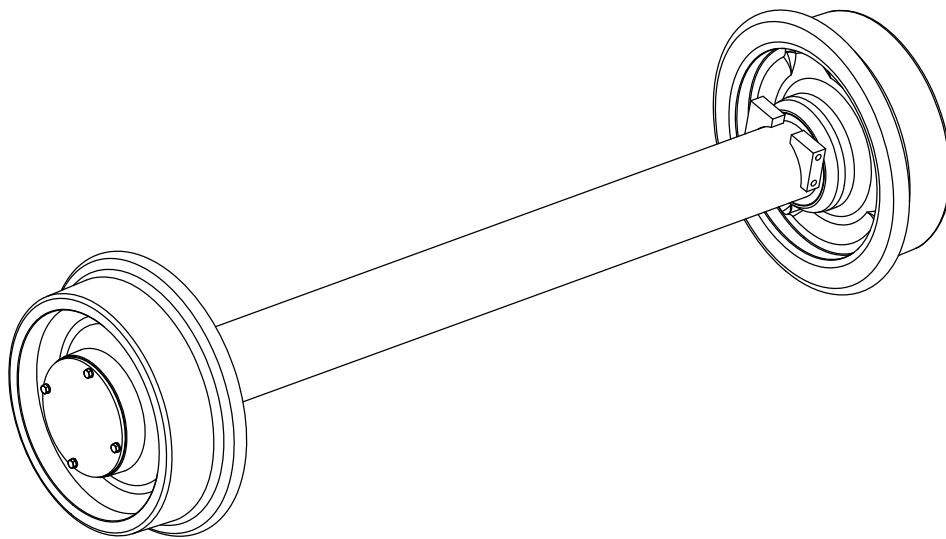
REV	DATE	DESCRIPTION	BY	APP
<small>           TOLERANCES (UNLESS SPECIFIED):            FRAC. MACH: ± 1/32"            FRAC. OTHER: ± 1/16"            .X ± .063            .XX ± .030            .XXX ± .005            DRILL SIZES: ± .015            ANGULAR: ± 1°            SURF FINISH: 125 MICRO            THREADS: 2A AND 2B            BREAK SHARP EDGES .03 X .45" MAX            DMF (404)875-1512         </small>				
RW-1650G		TITLE: GRADALL FRONT RW-1630 ASSEMBLY  <small>THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.</small>		
DRAWN BY: ARB	APPD BY: -	DATE: 6/8/21		DRAWING NUMBER: M1650G13 REV: #

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	83647	2	WELDMENT, PIVOT ARM, CAT M317F EXCAVATOR
2	800248	1	ASSEMBLY, 1650 AXLE, NON-INSULATED
3	818788	2	RW-1630 HYDRAULIC BRAKE ASSEMBLY
4	818517	1	RW-1630/50 RAILSWEEP ASSY., REAR LH. BOLT-ON
5	818518	1	RW-1630/50 RAILSWEEP ASSY., REAR RH. BOLT-ON
6	108036	2	BURNOUT, GUSSET, FRAME BOX, UPPER, RW-1650BC

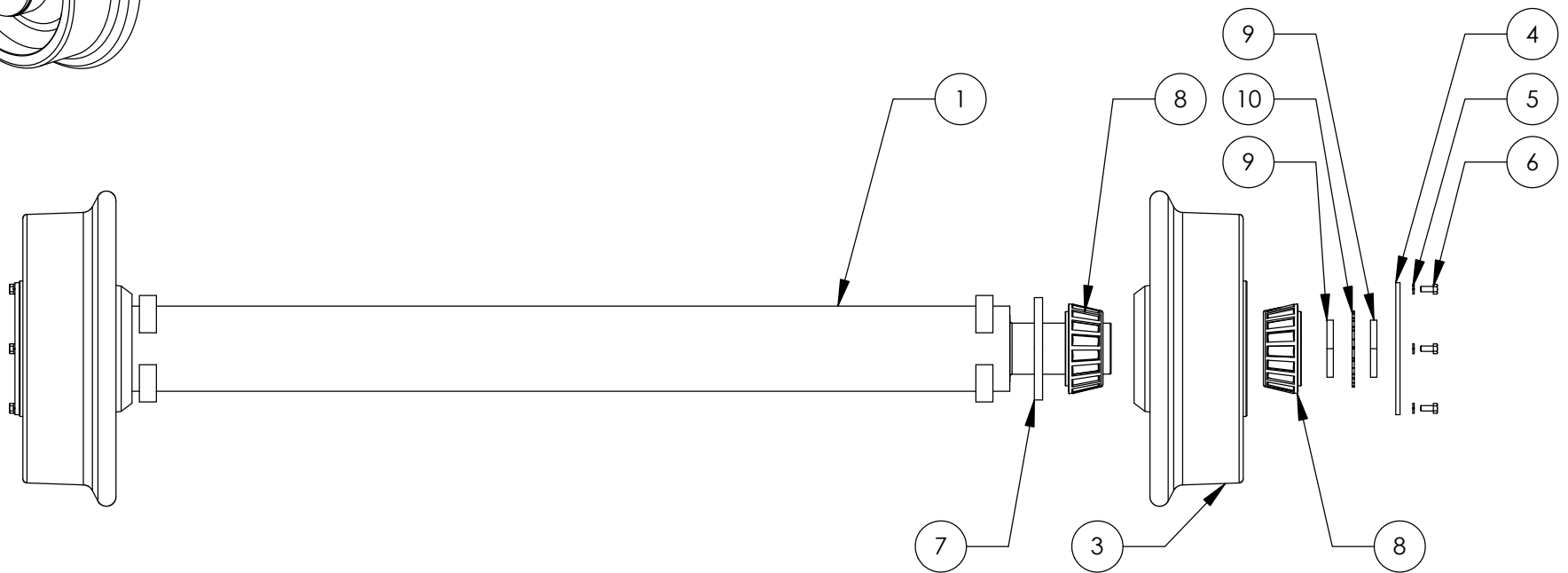


**DRAWING FOR ILLUSTRATIVE PURPOSE ONLY  
YOUR PARTS MAY DIFFER  
CONTACT DMF FOR ASSISTANCE**


REV	DATE	DESCRIPTION			BY	APP
TOLERANCES (UNLESS SPECIFIED):		RW-1650G				
FRAC. MACH: ± 1/32"						
FRAC. OTHER: ± 1/16"		TITLE: DOZER BLADE AXLE ASSEMBLY				
.X ± .063						
.XX ± .030		THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF, ALL RIGHTS RESERVED.				
.XXX ± .005						
DRILL SIZES: ± .015		DRAWN BY: ARB				
ANGULAR: ± 1°						
SURF FINISH: 125 MICRO		APPD BY: -				
THREADS: 2A AND 2B						
BREAK SHARP EDGES .03 X .45" MAX		DATE: 6/8/21				
DMF (404)875-1512						
		DRAWING NUMBER: M1650G14				
		REV: #				



ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	820402	1	RW-1650 AXLE TUBE, PLAIN
2	820401	1	RW-1650 AXLE, HD (4" x 64")
3	800015	2	RW-1650 WHEEL, NON-INS., W/ RACES (EXTERNAL BRAKES)
4	820441	2	HUBCAP, 1650 - 7" B.C. (FLAT)
5	800109	8	LOCK WASHER, 5/16", GR8
6	800108	8	HHCS, 5/16-18 X 3/4", GR5
7	800127	2	RW-1650 SEAL, STANDARD (CR-49928 OR NAT 415725)
8	800126	4	RW-1650 BEARING CONE (TIMKEN - 6466)
9	800130	4	RW-1650 NUT, AXLE (EUCLID E-2465)
10	800131	2	RW-1650 WASHER, AXLE TAB (EUCLID E-2464)

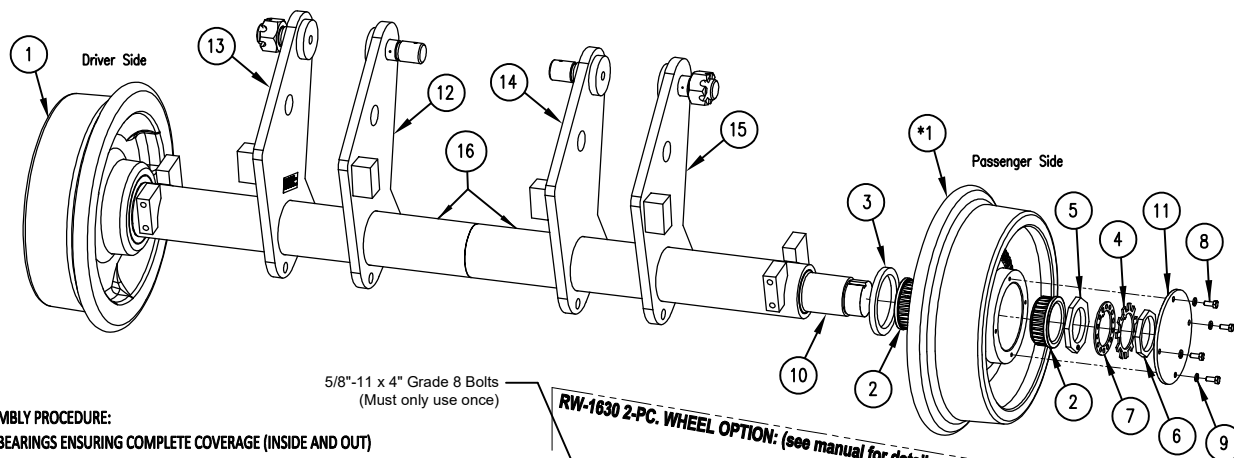


SEE M1630103 FOR WHEEL INSTALATION PROCEDURE

REV	DATE	DESCRIPTION				BY	APP	
TOLERANCES (UNLESS SPECIFIED):		RW-1650						
FRAC. MACH: ± 1/32"								
FRAC. OTHER: ± 1/16"		TITLE: ASSEMBLY, 1650 AXLE, NON-INSULATED						
.X ± .063								
.XX ± .030		THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF. ALL RIGHTS RESERVED.						
.XXX ± .005								
DRILL SIZES: ± .015		DRAWN BY:		APPD BY:		DATE:	DRAWING NUMBER:	REV:
ANGULAR: ± 1°		ARB		-		6/8/21	800248	#
SURF FINISH: 125 MICRO								
THREADS: 2A AND 2B								
BREAK SHARP EDGES .03 X 45° MAX								
DMF (404)875-1512								

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	WHEEL	2	1630 WHEEL ASSY. NON-INSULATED, w/ RACES
2	800100	4	RW-1630 BEARING CONE (TIMKEN-567)
3	800102	2	RW-1630 SEAL STANDARD (CR-39934)
4	800104	2	RW-1630 WASHER, AXLE TAB (EUCLID E-2237)
5	800105	2	RW-1630 NUT, INNER WHEEL (EUCLID E-540)
6	800106	2	RW-1630 NUT, OUTER WHEEL (EUCLID E-572)
7	800107	2	RW-1630 WASHER, AXLE LOCK (EUCLID E-573)
8	800108	8	HHCS 5/16-18 x 3/4
9	800109	8	5/16" LOCKWASHER
10	818101	1	RW-1630 AXLE, STANDARD (3-1/4" x 61-29/32")
11	818104	2	RW-1630 HUBCAP DETAIL (7" DIA.)
12	INNER PIVOT ARM	1	INNER, DRIVER SIDE PIVOT ARM
13	OUTER PIVOT ARM	1	OUTER, DRIVER SIDE PIVOT ARM
14	INNER PIVOT ARM	1	INNER, PASSENGER SIDE PIVOT ARM
15	OUTER PIVOT ARM	1	OUTER, PASSENGER SIDE PIVOT ARM
16	-	2	RW-1630 AXLE TUBE ASSY., FRONT (w/ BRAKE SADDLES)

**\*Must have serial # when ordering parts\***



5/8"-11 x 4" Grade 8 Bolts  
(Must only use once)

**RW-1630 2-PC. WHEEL OPTION:** (see manual for details & care for 2-pc. wheels)

Must be hardened washer  
(Must only use once)

Torque to 120 ft/lbs  
5/8"-11 Type C prevailing Torque Nut  
(Must only use once)

2-pc. wheel uses  
1650 hubcap #820441

Decal #800300  
(apply to hubcap cover  
when using 2-pc. wheel)

P/N #800300 - DECAL, 2-PC. WHL INSPECTION  
P/N #800301 - KIT, 2-PC. WHL TORQUE INDICATORS

P/N #820494 - (2-PC. INSULATED,  
1630 WHEEL W/ RACES) REPLACES ITEMS  
#1. KEEP ALL OTHER PARTS, EXCEPT HUBCAP.



#### WHEEL ASSEMBLY PROCEDURE:

- PACK ALL BEARINGS ENSURING COMPLETE COVERAGE (INSIDE AND OUT)
- INSERT BEARING IN INBOARD SIDE OF WHEEL (FLANGE SIDE)
- PACK GREASE ON INBOARD SIDE OF BEARING, COVERING BACK SIDE OF BEARING
- INSTALL A NEW SEAL BY GENTLY TAPPING WITH HAMMER UNTIL FLUSH WITH WHEEL HUB
- PLACE WHEEL ON AXLE
- FILL CAVITY BETWEEN BEARINGS AND AROUND AXLE UNTIL FLUSH WITH OUTBOARD RACE
- INSERT BEARING IN OUTBOARD SIDE OF WHEEL
- INSTALL INNER AXLE NUT (ITEM 5)
- ADJUST BEARING END-PLAY
  - TIGHTEN AXLE NUT TO 200 FT-LBS WHILE ROTATING WHEEL
  - BACK OFF AXLE NUT ONE FULL TURN
  - TIGHTEN AXLE NUT TO 50 FT-LBS WHILE ROTATING WHEEL
  - BACK OFF AXLE NUT (ITEM 5) BY 30 DEGREES (ONE HALF OF A WRENCH FLAT)
- INSTALL LOCK WASHER (ITEM 7) AND ADJUST AXLE NUT (ITEM 5) AS NEEDED TO LINE UP WITH THE NEAREST HOLE IN THE LOCK WASHER. IT MAY BE NECESSARY TO FLIP LOCK WASHER FOR CLOSEST HOLE.
- INSTALL A NEW TAB WASHER (ITEM 4)
- INSTALL OUTER AXLE NUT (ITEM 6) AND TORQUE TO 100 FT-LBS
- VERIFY BEARING END-PLAY IS 0.001"-0.005" WITH A DIAL INDICATOR
- SELECT THREE TABS THAT MOST NEARLY LINE UP WITH FLATS ON OUTER AXLE NUT (ITEM 6) AND BEND THEM UP TO SECURE NUTS
- FILL OUTBOARD CAVITY WITH GREASE
- RUN A BEAD OF SILICONE ON HUBCAP MOUNTING SURFACE (OUTBOARD FACE OF HUB)
- INSTALL HUBCAP WITH PROVIDED HEX SCREWS AND LOCK WASHERS.

**P/N #800020 - ALL HARDWARE KIT FOR RW-1630 WHEEL** (Does not include silicon for hubcap or wheel grease or bearing race)

#### Wheel Bearing Grease:

- Factory Standard:** Citgo Syndurance Premium Synthetic 460 #2
- Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)

**NOTE: ALL PARTS ARE NOT THE SAME BETWEEN 1630 FRONT & UNDER CAB FRONT. (SEE FRONT RAILGEAR PARTS SECTION OF MANUAL FOR SPECIFIC UNDER CAB PARTS)**

## PARTS: (Must have serial # when ordering)

### COMPLETE FRONT AXLE ASSEMBLY OPTIONS (AXLE, AXLE TUBE, WHEELS, PIVOT ARMS) - 1630 ONLY:

NON-INSULATED, WITH BRAKES (1630) - 800060  
NON-INSULATED, NO BRAKES (1630) - 800022  
INSULATED, NO BRAKES (1630) - 800026  
INSULATED, WITH BRAKES (1630) - 800061  
2-PC. WHEEL, INSULATED, WITH BRAKES (1630) - 800075 ▲  
STUB AXLE (1630) - 800071

### FRONT AXLE TUBES - 1630 ONLY:

FRONT TUBE, W/OUT BRAKE SADDLES - 818113  
FRONT TUBE, W/ BRAKE SADDLES - 818114  
STUB AXLE TUBE - 820600

\*NOTE: PART #'S ARE FOR ONE SIDE, IF YOU NEED THE WHOLE FRONT AXLE THEN YOU WOULD ORDER QTY. 2 OF 818114)  
DOES NOT INCLUDE PIVOT ARMS.

### 1630 & UNDER CAB WHEELS:

NON-INSULATED, 1630 WHEEL w/ RACES - 800050  
INSULATED, 1630 WHEEL w/ RACES - 800052  
• INNER INSULATOR - 820009  
• OUTER INSULATOR - 820008  
INSULATED, 2 PIECE 1630 WHEEL w/ RACES - 820494  
• INSULATOR KIT W/ BOLTS & NUTS - 820479  
• BOLTS & NUTS KIT - 820539

\*NOTE: SPECIAL PROFILE  
WHEELS - PLEASE CALL

### UNDER CAB AXLE ASSEMBLY ONLY:

NON-INSULATED, WITH BRAKES - 110510  
INSULATED, WITH BRAKES - 110513

### UNDER CAB AXLE TUBES ONLY:

FRONT TUBES, W/ BRAKE SADDLES - 818114

## 1630 & UNDER CAB FRONT AXLE

REV	DATE	DESCRIPTION	BY	APP
1	1/28/20	CORRECTED BEARING RACE PART #	BUF	
2	3/24/17	REVISED BEARING SETTING PROCEDURE	BUF	
3	3/11/15	CHANGED GREASE STANDARD	JDO	
4	8/1/14	REMOVED WELD NOTE	JDO	
5	6/26/14	ADDED 800071, 820000	JDO	
6	5/16/13	ADDED 820008, 820009, 820479, 820539	JDO	
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# DMF LIMITED WARRANTY POLICY

**Diversified Metal Fabricators (DMF)** products are designed to provide the utmost service and reliability. Competent workmen, guided by stringent quality standards, manufacture the products from high-grade material. **DMF** warrants products of its manufacture to be free of defects in material and workmanship, under normal use and service, for a period of **ONE CALENDAR YEAR**. **DMF's** obligation under this warranty is limited to repairing or replacing at its factory, or other location designated by us, any part or parts there-of which shall, within 30 DAYS of the date of failure or notice of defect, be returned, and which upon examination shall appear to **DMF's** satisfaction to have been defective. Such repair or replacement does not include the cost of installing the new part or any other expenses incident thereto; however, the outbound direct ground freight on the part will be prepaid to locations within the continental United States and Canada. **DMF** shall not be liable for other loss, damage, or expense directly or indirectly arising from the use of its products.

Ordinary wear and tear, abuse, misuse, neglect, or alteration is not covered by this warranty. **DMF** assumes no liability for expenses or repairs made outside its factory except by written consent. Warranty is null and void if instructions and operating procedures specifically referring to warranty coverage are not followed.

Equipment or parts not manufactured by this company, but which are furnished in connection with **DMF** products are covered directly and solely by the warranty of the manufacturer supplying them.

This warranty is in lieu of other warranties, expressed or implied, including any implied warranties of merchantability or fitness for a particular purpose and any liability for special or consequential damages.

All warranty claims must reference a serial number. Returns must reference a RA number.

