

# DIVERSIFIED METAL FABRICATORS



## **Installation and Parts & Service Manual RW-1013 & RW-1013HD**



July 2019

### **NOTE:**

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

DMF ♦ 665 Pylant Street ♦ Atlanta, Georgia 30306  
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<http://www.dmfatlanta.com>

# PREFACE

## Message from DMF

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.

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

Contact:

Diversified Metal Fabricators

665 Pylant St. NE

Atlanta, GA 30306

(404) 875-1512

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(404) 607-1684 Parts

[www.dmfatlanta.com](http://www.dmfatlanta.com)

[info@dmfatlanta.com](mailto:info@dmfatlanta.com)

Ship to:

668 Drewry St. NE

Atlanta, GA 30306

## How to use this manual

Please read this manual carefully. If you are an operator, you need to concentrate on the operation & maintenance section. Installers and Up-fitters should become familiar with the entire manual, paying special attention to the "Installation Sheet" that corresponds to your specific chassis. The current installation sheets are found in 5.1.

If you are reading this to learn more about our railgear, you'll want to start with the section on Specifying a Truck, Operations and then look through the remaining material.

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

We reserve the right to update our manuals without notice. You can download a current manual at our website listed above.

# 1.0 GENERAL INFORMATION

## 1.0 General Information

- 1.1 General Description
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## 1.1 General Description

DMF RW-1013 Railgear is designed for vehicles in the 6400 to 9900 GVWR range. It is applicable to many Pick-up Trucks, Cab & Chassis, and SUV's in this range. It is not intended for vehicles with dual rear wheels.

RW-1013 Railgear does not provide braking or drive power. Unlike most of our larger models, RW-1013 does not lift the steering axle. All vehicle tires are in contact with the rail. Many vehicles require alternate wheels and tires to properly track the rail. DMF provides Wheel Modification Kits for use on standard gage rail where necessary for supported chassis. These kits can include rims, wheel adapters, wheel spacers, steering stops, steering wheel locks and wheel hardware.

The railgear is hydraulically actuated and is over-center when in the rail position. This prevents a hydraulic leak from allowing the gear to collapse. In the highway position, the railgear prevented from falling from the highway position as a result of a hydraulic leak by hydraulic locking valves integrated into the actuator. The system includes a hand pump to allow the gear to be stowed in the case of an electrical or hydraulic failure.

RW-1013 Railgear incorporates independent rubber torsion suspensions to provide a smooth ride and rail guidance over uneven track surfaces. We offer both steel and rubber treaded guide wheels.

RW-1013HD is a variant intended for vehicles with GVWR of 9900 to 11,500 lbs. RW-1013 make use of a heavier torsion suspension and uses a cylinder in the rear in place of the rear rotary actuator.



**Figure 1.1: '03 GM/Chevy C25HD w/ RW-1013 Installed**

## **1.2 Currently Approved Chassis**

### **1.2.1 Chevy/GM**

'00-'08	C2500HD Pick-up (preferred to C2500)
'00-'08	C25HD Cab & Chassis
'00-'08	C3500 (Single Rear Wheels Only)
'00-'04	C2500
'00-'08	C2500 Suburban

### **1.2.2 Ford**

'99-'04	F2/350 Pick-up (Single Rear Wheels only)
'99-'04	F350 Cab & Chassis (Single Rear Wheels only)
'05-'08	F2/350 Pick-up (Single Rear Wheels only)
'05-'08	F350 Cab & Chassis (Single Rear Wheels only)

### **1.2.3 Dodge**

'98-'03	Durango* (4x4 recommended**)
'04-'08	Durango* (4x4 recommended**)
'97-'05	Dakota* (4x4 recommended**)
'05-'08	Dakota* (4x4 recommended**)

\* Does not require a Wheel Modification Kit

\*\* 4x2 models have marginal ground clearance

## 1.3 Specification Considerations

There are many things to consider when specifying a vehicle for use with railgear. Attention to these factors during specification will prevent confusion, delay and expense during the install. It also will often result in a better truck for the operator.

### 1.3.1 Rail Gage / Wheel Track

Probably the biggest factor determining the suitability of a chassis for use on the rail is the vehicle's track relative to the rail gage. Wheel track is defined as the center-to-center distance between the tires on the same axle on steering and single wheel rear axles. Full-sized Pickups and SUVs nearly always require a Wheel Modification Kit to narrow the vehicle track to fit on the rail. Some vehicles, like the '98-'03 Durango/Dakota are just right from the factory and do not require a Wheel Modification Kit. We provide Wheel Modification Kits as required for approved chassis for standard gage (56.5"). If you require a wide gage (or other) solution, please contact us.

### 1.3.2 Body Requirements

If a body is to be mounted, look at the body clearance diagram in the install section. Most chassis require replacement or modification of the factory front bumper. Occasionally modifications to the rear wheelhouse are required.

### 1.3.3 Rail Curvature

RW-1013 Railgear has excellent curvature performance due to the close spacing of the guide-wheels to the vehicle tires. All curves should be taken at reduced speed. Curves in excess of 18 degrees (<320' Radius) should be taken at a further reduced speed. We recommend Steel Wheels for customers with curves in excess of 24 degrees (<240' Radius). Customers with curvature under 120' Radius should contact us for curvature analysis and special instructions.

### 1.3.4 Rail Clearance

Any special clearance requirements such as third rail clearance, catenary clearance, and platform clearance should be investigated before ordering the chassis or railgear. Obtain a static and dynamic clearance envelope drawing for your rail. You need to know the limiting curvature for your rail.

### 1.3.5 Equipment

The weight, stability requirements and location of any additional truck equipment must be accounted for. This allows the suspension settings and alignment to be done more accurately. If equipment is to be added later, provide the installer with the weight and location to allow for proper set up. After any change in equipment or operating payload the vehicle should have the rail pressure checked and re-set prior to use.

### 1.3.6 Railgear Weight

The installed weight of the rail gear must be considered.

Typical installed weights are:

Front: 293 lbs      Rear: 354 lbs      (RW-1013)

### 1.3.7 Railgear Options

You need to know what options you require such as:

Rail Sweeps (typical)  
In-Cab controls (typical)

Steel vs. Rubber Rail Wheels  
Locking Valves

## 1.4 Questions Installers Should Ask

- What is this vehicle to be used for?
- What types of tires are required? Highway fronts, Mud & Snow on rear?
- Does the customer specify a particular brand of tires?
- Is any equipment to be added to the truck after railgear installation?
  - Where is it going and how much does it weigh?
- Are there any restrictions on the location of the switchbox in the cab?
- Is the installer responsible for exhaust modifications?
- Is the installer responsible for a spare tire carrier?

## 1.5 Chassis Spec Sheet

Please complete the following Chassis Spec Sheet and include with any orders.

CHASSIS INFO

UPFITTER	
CHASSIS MAKE	
CHASSIS MODEL	
MODEL YEAR	
ENGINE&XMISSION	
CAB STYLE	
VIN NUMBER	
GVWR	
GAWR-F	
GAWR-R	
TIRE SIZE	
OPTIONS	

INSTALLATION OPTIONS

	YES	NO
SPECIAL FRONT TIRE TYPE		
SPECIAL REAR TIRE TYPE		
HITCH REQUIRED?		
AUTOMATIC OR MANUAL PINS		
STEEL OR RUBBER TREADS?		
STROBE?		
STEPS?		
BACKUP ALARM?		
GRAB HANDLES?		

APPLICATION REQUIREMENTS

END-USER	
SPEC NUMBER	
FOR USE ON WHICH RAILROAD OR TRANSIT?	
INTENDED USE	
ESTIMATED TYPICAL PAYLOAD	
ESTIMATED MAX PAYLOAD	
GAGE	
MIN REQUIRED CURVE RADIUS	
CLEARANCE REQUIREMENTS?	
MOUNTED EQUIPMENT	

PLEASE FILL-OUT THIS SHEET AS COMPLETELY AS POSSIBLE.

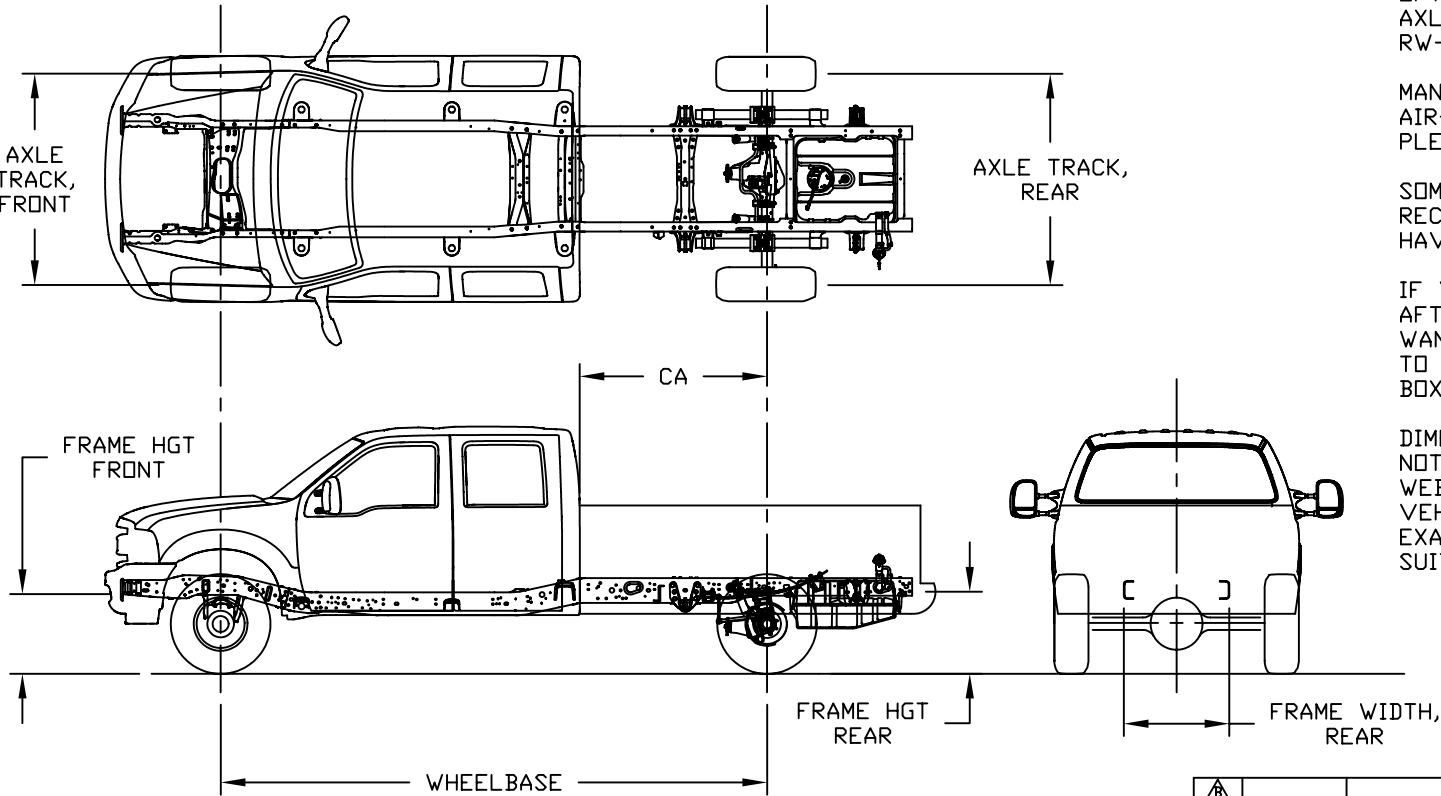
OPTIONS SUCH AS REAR FUEL TANKS AND REAR AXLE STEERING ARE NOT COMPATIBLE WITH RW-1013 RAILGEAR.

MANY OPTIONS SUCH AS SECONDARY AIR-CONDITIONERS CAN CAUSE PROBLEMS. PLEASE INCLUDE ANY UNUSUAL OPTIONS.

SOME APPLICATIONS PRECLUDE THE USE OF A RECIEVER HITCH, LET US KNOW IF YOU MUST HAVE ONE.

IF YOUR TRUCK IS GOING TO THE RADIO SHOP AFTER INSTALLATION LET US KNOW IF YOU WANT US TO LEAVE THE CONTROL BOX LOOSE TO ALLOW FOR EASIER RADIO INSTALLATION AND BOX LOCATION.

DIMENSIONS INDICATED ON THE DRAWING ARE NOT NECESSARY FOR VEHICLES LISTED ON OUR WEBSITE: [WWW.DMFATLANTA.COM](http://WWW.DMFATLANTA.COM). IF YOUR VEHICLE IS NOT LISTED WE WILL HAVE TO EXAMINE A CHASSIS AND DECIDE IF IT IS SUITABLE.



REV		DATE		DESCRIPTION		BY	APP
TOLERANCES (UNLESS SPECIFIED)		COMMON SENSE PREVAILS		TITLE:		RW-1013 SPEC SHEET	
FRACTION: 1/32"		FRACTION: 1/16"		DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512			
.XXX OR .XXXX		.005		DRAWN BY:		APPD BY:	
DRILL SIZES:		.015		DATE:		12/08/04	
ANGULAR:		1°		DRAWING NUMBER:		1013 SPEC	
SURF FINISH:		125 MICRO		REV:		#	
THREADS:		PA AND 2B					
DRAUGHTSMAN (SHEET 1 OF 1000 X 400 DIA.)							

## 2.0 OPERATIONS

### 2.0 OPERATIONS

- 2.1 Familiarize yourself with the railgear
- 2.2 Operation on the Road
  - 2.2.1 Highway Locking System
  - 2.2.2 Reduced Turning Radius
  - 2.2.3 Clearances & Approach Angles
  - 2.2.4 Highway Speeds
- 2.3 Operation on the Rail
  - 2.3.1 Getting on the Rail
  - 2.3.2 On the Track
  - 2.3.3 Getting off the Rail
- 2.4 Emergency Hand Pump
  - 2.4.1 Emergency Hand Pump Instructions – 2 Pump System (pre 2008)  
Safety Notes  
Clearing the rail in the event of an electrical failure
  - 2.4.2 Emergency Pump Instructions – Single Pump Manifold (2008 to present)

### 2.1 Familiarize yourself with the railgear

You should read the entire Operation section. You should know where the following item/parts are:

- Emergency Pump
- Emergency Pump Fittings
- Cab Switches
- Exterior/Bumper Switches
- Hydraulic Reservoir



## 2.2 Operation on the Road

If you operate a vehicle modified for on-track use, you need to keep in mind several factors:

### 2.2.1 Highway Locking System

DMF now offers a pilot-operated check valve locking system to restrain the railgear in the highway position. This system will reduce maintenance and improve reliability. The locking valves are integrated in to the rotary actuator on 2008 units and located on the lift port of the hydraulically tight rotary actuator on older systems.

The original pin-off system is still offered to those who require it. The pin-off system prevents hydraulic leak-down or a leaky connection or hose from allowing you gear to move from the stowed position. The operator should verify that the railgear is pinned off properly before driving on the road.

If you have a problem with your locking valves or pin-off system, chain or strap the gear in the stowed position in order to move the vehicle on the road. You should have the vehicle serviced as soon as possible.

### 2.2.2 Reduced Turning Radius

Vehicles with Wheel Modification Kits typically have reduced steering angles. Operator should familiarize themselves with the turning limitations.

Any noise occurring when the wheel is turned to the limit may indicate a problem with your steering stops. Have them checked if necessary.

### 2.2.3 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.

### 2.2.4 Highway Speeds

Vehicles with Wheel Modification Kits should not exceed the wheel or tire ratings. Current wheel kits provided by DMF are rated for 70 or 65 mph. The operator is responsible for maintaining lug nut torque. Lug nut torque must be checked according to section 3.2 (Wheel Modification Kit – Inspection & Maintenance). Operators should have or have access to a torque wrench.

## 2.3 Operation on the Rail

### 2.3.1 Getting on the Rail

1. At the track crossing, drive past the track and then back the vehicle onto the rails, centering rear tires on the track.
2. Enable "Guidewheel Power Switch" in cab.
3. Engage the truck's parking brake to prevent the truck from rolling.
4. Retract and lock front and rear manual pin-offs. Electric pin-offs retract automatically (if equipped with pins).

#### Lower Rear Guidewheels first:

(Note: Front/Rear Guidewheels cannot be actuated simultaneously)

5. Raise or "top-out" rear railgear to free pins (if equipped with pins).
6. Using electric switch at rear bumper, lower Guidewheels within 2-3 inches of railhead.
7. Verify alignment with rail, move truck to adjust if necessary.
8. Using electric switch at rear bumper, deploy rear wheels fully and properly engage the rail. The Guidewheels are an over center design and do not require pin-offs in the rail position.

#### Engage Guidewheels:

(Note: Front/Rear Guidewheels cannot be actuated simultaneously)

9. Raise or "top-out" rear railgear to free pins (if equipped with pins).
10. Using electric switch at rear bumper, lower Guidewheels within 2-3 inches of railhead.
11. Verify alignment with rail, move truck to adjust if necessary.
12. Using electric switch at rear bumper, deploy rear wheels fully and properly engage the rail. The Guidewheels are an over-center design and do not require pin-offs in the rail position.
13. Double check all flanges to assure that they are properly engaged with the rail.
14. Engage steering wheel lock and verify its proper function.
15. Turn off "Guidewheel Power" switch in cab.
16. Drive back and forth to assure flange engagement.

### 2.3.2 On the Track

1. Recommendations given here are for welded rail in good condition. Jointed rail or rail in poor condition, require further reductions in speed and additional caution.
2. Do not exceed 40 MPH while on the track.
3. All railroad speed rules should be observed.
4. Operator is responsible for determining Safe speed.
5. Be aware that RW-1013 rail gear is typically insulated, and may not operate the crossing gate circuits unless it is equipped with a shunt kit. DMF can provide supplementary insulation kits if more stringent insulation methods are required.
6. Reduce speed at all crossings, curves, switches and frogs.
7. Spring frogs should be taken at walking speed or less. If a passenger is available, it is advisable to have someone monitor progress of guide-wheel through the spring frog.
8. Tight curves (>18deg or <320' R) should be taken at less than 15 mph.
9. Extremely tight curves should be taken at walking speed with a person monitoring guide-wheel progress and vehicle tire coverage.
10. Braking distance is increased on the track. Do not slide tires or guide-wheels on the tracks. Braking distance is further reduced in wet or icy conditions.
11. Monitor track condition and look for obstacles on, above and near the track. Even small obstacles should be removed before proceeding.

12. Monitor the engine temperature gage when reversing for long distances. Extended operation in reverse may cause overheating.
13. Do not exceed the maximum rated capacity of the equipment.
14. Do not attach tow straps or other equipment to the railgear.

### **2.3.3 Getting off the Rail**

1. Drive vehicle to road crossing.
2. Enable "Guidewheel Power Switch" in cab.
3. Either front or rear wheels may be actuated first. (Note: Front/Rear Guide wheels cannot be actuated simultaneously)
4. Front Guidewheels:
  - a. Retract front rail wheels completely using switch in cab or at front bumper.
  - b. Once retracted, engage and lock manual pin-offs. Electric pin-offs engage automatically.
5. Rear Guidewheels:
  - a. Retract front rail wheels completely using switch in cab or at rear bumper.
  - b. Once retracted, engage and lock manual pin-offs. Electric pin-offs engage automatically.
6. Disengage Steering Wheel Lock.
7. Drive vehicle off of crossing onto road surface.
8. Verify proper Pin-off operation.

## 2.4 Emergency Hand Pump

### 2.4.1 Emergency Hand Pump Instructions – 2 Pump System (pre 2008)

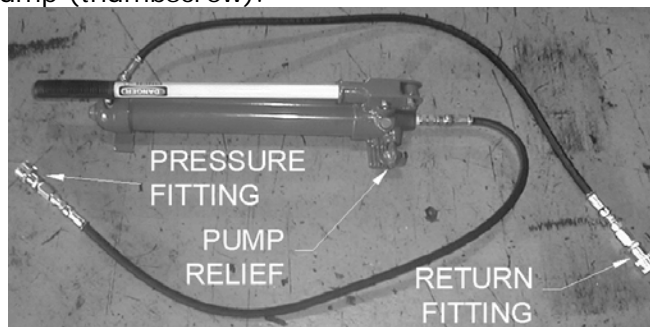
The emergency pump is provided to allow a malfunctioning vehicle to be removed from the rail in the event of an electrical fault or pump failure.

#### Safety Notes

- When raising gear and holding the pins, careful of pinch points!
- If pump relief opened while gear is raised, the gear will fall. Do not get between rail gear and ground!
- Do not drive vehicle at normal highway speeds if rail gear is not restrained by the safety pins or chained up!
- If railgear is chained up, and not fully stowed, be aware of your ground clearance!

#### Clearing the rail in the event of an electrical failure

1. Proceed to a level crossing.
2. Place vehicle in park w/ parking brake on, railgear power off.
3. Get emergency pump (usually in tool box or behind seat).
4. Open relief on pump (thumbscrew).

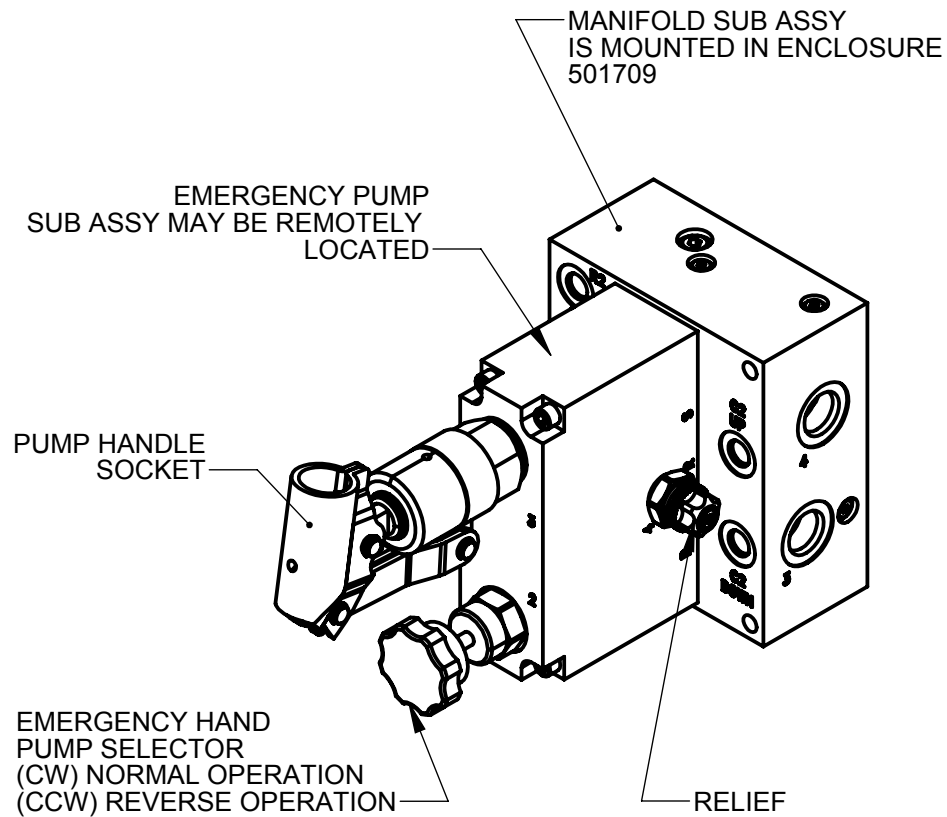


**Figure 2.4.1:** Emergency Pump

5. Screw both pump hoses into quick-connect fittings at front railgear. The pump's pressure side should go into the fitting on the right.
6. Close pump relief (thumbscrew).
7. Operate hand pump until rail wheels are well clear of rail but do not raise gear to stowed position. This can damage the automatic safety pins.
8. Stow & restrain railgear.
  - a. If automatic safety pins are functional, use bumper switch to retract pins while hand pumping railgear to stops (turn on rail gear power).
  - b. If automatic safety pins are not working, use a tool (screw driver or hammer handle etc.) to hold back pin while pumping gear to stops (be careful of pinch points).
  - c. If automatic safety pins are not working or pins are damaged, chain or tie gear up.
9. Disconnect pump at quick connect fittings.
10. Repeat for rear railgear.
11. Once retracted and retrained vehicle can be moved for service.

### 2.4.2 Emergency Pump Instructions – Single Pump Manifold (2008 to present)

See drawing 501737 on the next page.



501737 RW-1013 MANIFOLD & EMERGENCY PUMP ASSY




## EMERGENCY HAND PUMP OPERATION

### TO RAISE GEAR

1. TURN OFF RAILGEAR SYSTEM AT CAB POWER SWITCH
2. LOCATE HAND PUMP  
MAY BE MOUNTED:
  - IN CROSS BODY TOOL BOX
  - IN SERVICE BODY CABINETS
  - REMOTELY MOUNTED ON OR BEHIND BUMPER
3. **DO NOT INSERT HANDLE INTO SOCKET UNTIL STEP 7  
HANDLE MAY MOVE DURING STEP 6**
4. TURN SELECTOR FULLY CLOCKWISE (CW)
5. INSERT HANDLE
6. PUMP HANDLE (PUMPS ON UP AND DOWN STROKE)  
**FRONT AND REAR RAILGEAR MAY NOT  
MOVE TOGETHER, PUMP UNTIL BOTH  
UNITS ARE STOWED**
7. WHEN RAIL GEAR IS RAISED COMPLETELY RESTRAIN WITH  
CHAINS OR CARGO STRAPS TO MOVE ON HIGHWAY
8. TAKE VEHICLE IN FOR SERVICE

NOTE: THE RELIEF CAN BE OPEN THEN CLOSE TO BLEED OFF PRESSURE IF THE CIRCUIT IS PRESSURIZED TO A DEGREE THAT PREVENTS THE USE OF THE EMERGENCY HAND PUMP.

**NOTE:**  
**HAND PUMP IS INTENDED ONLY TO ALLOW A MALFUNCTIONING  
VEHICLE TO BE REMOVED FROM THE RAIL. PLEASE  
TAKE VEHICLE IN FOR SERVICE IF HAND PUMP OPERATION  
IS REQUIRED.**

							
	2/24/09	CHANGED INSTRUCTION REGARDING RELIEFS				WAK	
REV	DATE	DESCRIPTION				BY	APP
TOLERANCES: (UNLESS SPECIFIED)		<div>RW-1013</div> <div>EMERGENCY HAND PUMP INSTRUCTIONS 2008 to present</div> <div>DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512</div>					
FRAC. MACH: ± 1/32"		<div>DRAWN BY: WAK</div> <div>APPD BY:</div> <div>DATE: 9/04/08</div> <div></div> <div>DRAWING NUMBER: 501737</div> <div>REV: A</div>					
FRAC. OTHER: ± 1/16"							
.X ± .063							
.XX ± .030							
.XXX ± .005							
DRILL SIZES: + .015							
ANGULAR: ± 1°							
SURF FINISH: 125 MICRO							
THREADS: 2A AND 2B							
REFER ASME Y14.5 (2000) FOR ALL DETAILS							

## 3.0 MAINTENANCE & INSPECTION

### 3.0 Maintenance & Inspection

- 3.1 Recommended Maintenance & Inspection Frequency
  - 3.1.1 Daily Maintenance
  - 3.1.2 Weekly Maintenance
  - 3.1.3 Bi-Annually Maintenance or as required
  - 3.1.4 Annual Maintenance or as required
  - 3.1.5 Lubricant & Fluids Specs
- 3.2 Wheel Modification Kit – Inspection & Maintenance
  - 3.2.1 Wheel Mod Kits
  - 3.2.2 General Maintenance Requirements: (superseded by Wheel Kit Manuals)
  - 3.2.3 Warnings!
  - 3.2.4 Balance & Rotation
- 3.3 Rail Wheel Wear Gauge
- 3.4 Troubleshooting
  - 3.4.1 Troubleshooting On-track Problems
  - 3.4.2 Derailment
- 3.5 Rail Wheel Load
  - 3.5.1 When To Check Rail Wheel Load
  - 3.5.2 Adjustments
  - 3.5.3 Setting Rail Wheel Load
  - 3.5.4 Checking & Adjusting Rail Wheel Load
- 3.6 Alignment
  - 3.6.1 Alignment Adjustments
  - 3.6.2 Rail Test After Alignment

### 3.1 Recommended Maintenance & Inspection Frequency

If your hi-rail vehicle is high-use or operated under extreme conditions, such as material handlers or weed-spraying vehicles, or 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 rail gear and that you abide by all local and national laws regarding rail gear maintenance and safety.

#### 3.1.1 Daily Maintenance

- Visually inspect for hydraulic leaks.
- Verify that railgear has not leaked down from highway position.
- Check hydraulic fluid level under the hood.
- Verify that all threaded fasteners are secure.
- Spin all four guide-wheels, noting and bearing noise or resistance.
- Inspect the general condition of guide-wheels.
- Inspect the condition of tires and rims.
- Check air pressure in tire and inflate to max tire rating.

#### 3.1.2 Weekly Maintenance

In addition to the items listed in 3.1.1 Daily Maintenance perform the following:

- Lubricate front & rear pin-off assemblies with a light lubricant (WD-40, Tri-Flow etc.).
- Inspect guide-wheel flange wear. Uneven or excessive wear may indicate alignment or rail wheel load problem. See Section 3.6 for alignment information or Section 3.5 for rail wheel load.
- Inspect condition of rubber or steel guide-wheel treads.
- Visually inspect wheels & tires. (See the Wheel bearings / Grease Fittings:
- Factory **Standard:** Citgo Syndurance Premium Synthetic 460 #2
- **Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)
- Wheel Modification Kit – Inspection & Maintenance, see Section 3.2.
- Verify that ABS sensor wires and brake lines are restrained and not contacting the rims.

#### 3.1.3 Bi-Annually Maintenance or as required

In addition to the items listed in 3.1.1 Daily Maintenance and 3.1.2 Weekly Maintenance perform the following:

- Inspect bearing grease and replenish as necessary. Repack if bearing grease has deteriorated. Replace hubcap with a bead of silicone gasket material. If parts appear worn or damaged, replace and repack as shown in Section 5.2

#### 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 Section 5.2.

### 3.1.5 Lubricant & Fluids Specs

#### Pin-off Lubricant:

- Light Lubricant (WD-40, Tri-Flow etc.)

#### Hydraulic Fluid:

- DEXRON III ATF (or equal)

#### Wheel bearings / Grease Fittings:

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

## 3.2 Wheel Modification Kit – Inspection & Maintenance

### 3.2.1 Wheel Mod Kits

DMF offers wheel kits match to specific vehicles. Wheel kits are supplied with instructions for installation and service.

There are two main categories of wheel kits:

#### Custom Wheels Kits:

Wheels specifically designed to adapt a specific chassis for on-rail use.

#### Adapter Wheels Kits:

Adapters allow specific aftermarket wheels to adapt a specific chassis for on-rail use.

### 3.2.2 General Maintenance Requirements: (superseded by Wheel Kit Manuals)

- Visually inspect wheels & tires weekly (look for damage, loose hardware etc.).
- After service ensure that wheels were not damaged.
- Check the torque 50 miles after wheel/tire change and every 2000 miles or 6 months.

### 3.2.3 Warnings!

- Never use anti-seize on studs or lug nuts!
- Never use pneumatic (air) wrenches on lug nuts! Hand torque to specifications. Do not trust tire installers to properly torque lug nuts, tell them that you are going to check with your own wrench!
- Get or have access to a torque wrench!
- Always inspect the condition of the wheel before and after service!
- Loose lug nuts can lead to metal fatigue and ultimately to wheel failure or broken studs.

### 3.2.4 Balance & Rotation

Balance and Rotate as necessary/recommended by tire manufacturer. Verify that balance weights placed on inside bead of rim are clear of obstructions. Rims provided by DMF are “low point marked” which can be useful for customers who can get run-out marked tires (National Accounts/OEM).



### **3.3 Rail Wheel Wear Gauge**

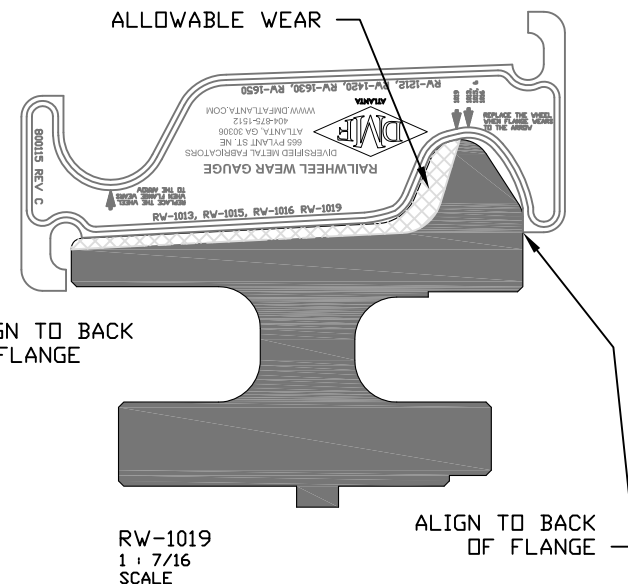
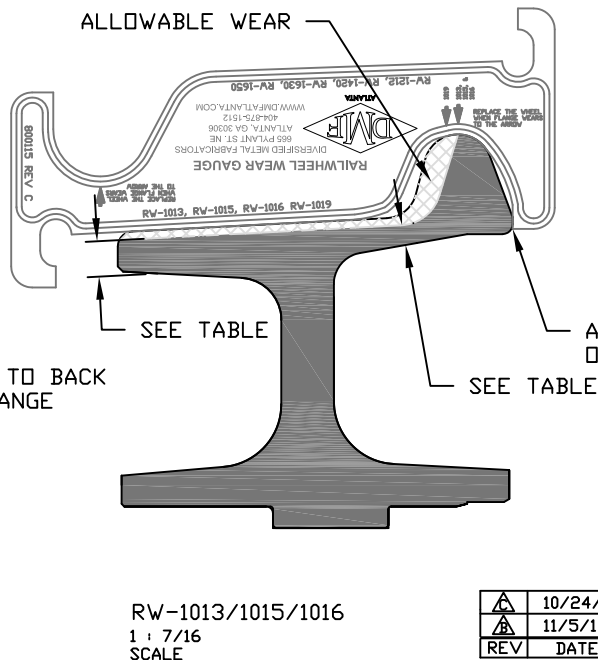
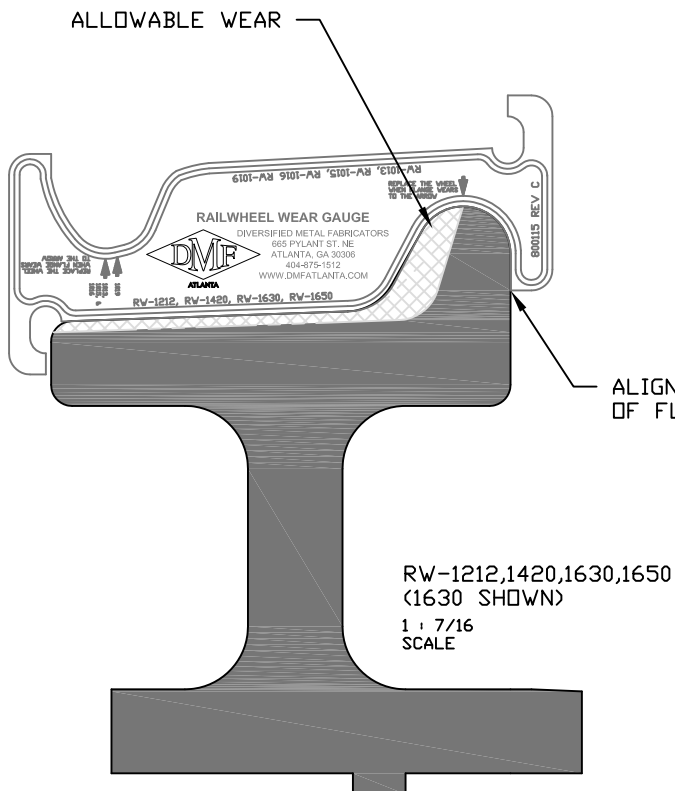
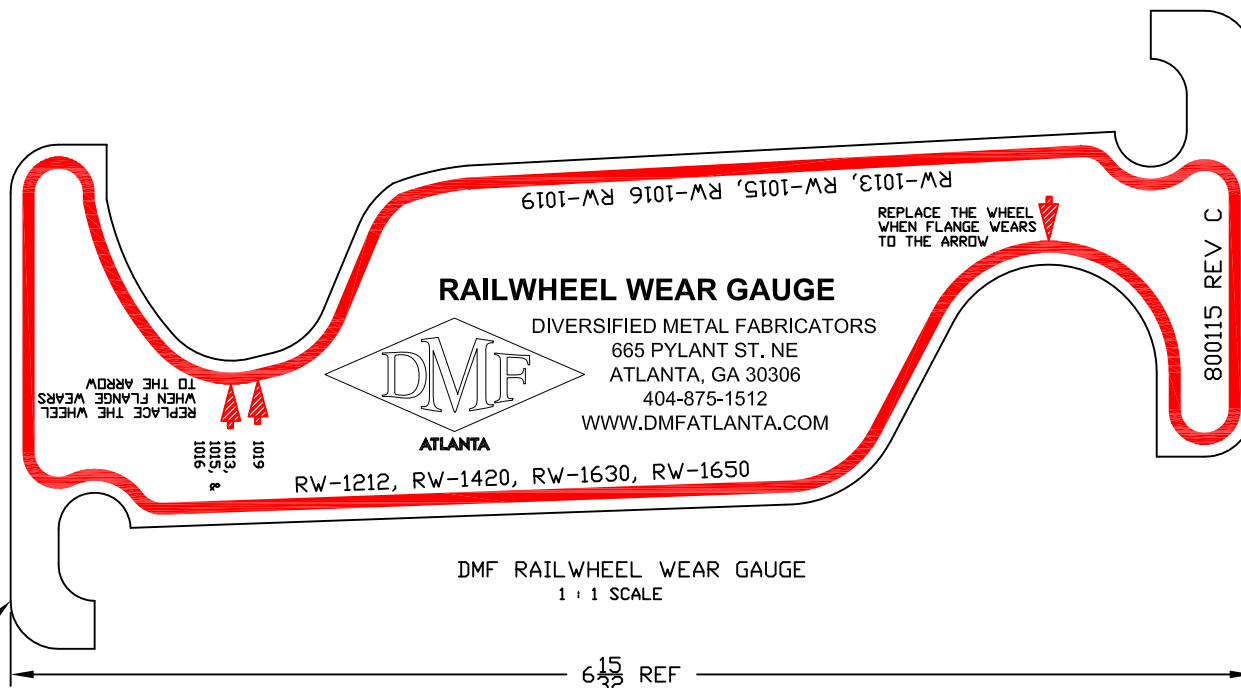
A metal wheel wear gauge (DMF part number 800115) is available to aid in inspecting worn wheels. The drawing on the next page illustrates how to use the gauge and also lists specifications for minimum wall thickness on the wheel tread as well as tolerance on wheel back-to-back spacing.

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				
FRAC. MACH. ± 1/32"				
FRAC. OTHER ± 1/16"				
X ± .063				
XX ± .030				
XXX OR XXXXX ± .025				
DRILL SIZES ± .015				
ANGULAR ± 1°				
SURF FINISH: .125 MICRO				
THREADS: RA AND 2B				
SMALL SHOTS: 1/16" & 1/8" & 3/16" & 1/2"				
DMF		TITLE: DET, GAUGE, WHEEL WEAR		
DRAWN BY: WAK		APPD BY:		
		DATE: 2/2/10	DRAWING NUMBER: 800115	REV: C

## 3.4 Troubleshooting

### 3.4.1 Troubleshooting On-track Problems

Symptom	Possible Cause	Diagnostic Step	Corrective Action
Rail wheel vibration/ noise	Rubber tread run-out	Inspect treads	Turn or replace tread
	Damaged Tread Patterned Wear on Tread Suspension Arm Loose	Inspect treads Inspect Bearings & Suspension Inspect Arm and Splined Shaft	Tighten, adjust or replace Tighten and/or replace arm or suspension body
	Loose Wheel	Inspect Suspension, Bearing and Spindle	Tighten, adjust or replace
Vehicle tracking to one side, wandering	Misalignment	Check Alignment	Adjust Alignment
	Overload or load imbalance Un-Even Rail Wheel Load / Vehicle Load	Visually inspect, scale vehicle Weigh Vehicle and Check Rail Wheel Load	Unload and/or redistribute load Adjust Load Distribution and Re-set Rail Wheel Load
Insufficient Traction or Braking	Rail wheel load set too high		Set rail wheel load
	Tires worn	Inspect Tires	Replace tires

**Table 3.4.1: Troubleshooting On-track Problems**

### 3.4.2 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 for bent or damaged suspension assemblies.
- 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 the Railgear for bent, cracked, or broken components.
- Ensure all welds are intact and show no signs of cracking or breaking.
- A full alignment should be performed and rail wheel loads adjusted. See Section 3.6 & 3.5.
- Wheels should be removed and the bore, bearings, and races should be inspected for any damage. For further wheel details, see Section 5.2.
- Inspect tires, wheels and, wheel mod kit for damage.

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.

### 3.5 Rail Wheel Load

It is important the rail wheel load is set within the limit of safe operation. Too little rail wheel load can lead to derailing. Too much rail wheel load can cause premature tread wear and suspension wear, prevent the railgear from deploying and affect traction and braking.

#### 3.5.1 When To Check Rail Wheel Load

- Once a year
- If you have changed the minimum weight of your truck by adding or subtracting fixed equipment or tools
- If you suspect low rail wheel load is the cause of a derailment
- If you are getting premature tread wear

#### 3.5.2 Adjustments

##### Rear Bracket Channel Height

The Rear Bracket Channel can be positioned vertically by loosening the bolts. Take care to preserve the horizontal position of the gear. It is useful to scribe marks on the brackets to indicate the original position before adjusting the channel position.

##### Suspension Arm Angle

The angle of the suspension arms can be changed by moving it on the splined shaft. The shaft has a 60-tooth spline giving 6 degree adjustments which gives about ½" of vertical adjustment. Keep in mind that changing the suspension angle may require adjustment to up-stops to clear bodywork.

The Flexi-Ride suspension will not provide a proper ride stiffness if set at angles exceeding 45 degrees below horizontal. The optimum angle for an empty vehicle is 25 degrees below horizontal, but some vehicles require deviation from this. It is useful to scribe marks on the splined shaft and arm when making angle adjustments.

##### Spacers

Spacers can be added between the suspension and the swinging frame. This is a more difficult way of adjusting the rail wheel load and should only be used in the following cases:

- If the suspension arms are at the maximum downward angle of 35 degrees below horizontal
- If the required adjustment is too fine to be made by adjusting the suspension arms.
- If the rear channel is at the bottom of the slots on the rear bracket.

Keep in mind that the addition of spacers may require adjustment to up-stops to clear bodywork.

##### Travel Stops

Adjusting the travel stops is an easy way to make small adjustments. You can increase rail wheel load by running the travel stop bolts out and decrease rail wheel load by running the stop bolts in. Always verify that there is sufficient thread engagement in the lug and that the jamb nut is tightened. Adjustment may require a longer or shorter bolt.

#### 3.5.3 Setting Rail Wheel Load

Rail wheel loads should be set with the vehicle in an operational configuration. If rail wheel loads are set on a bare truck, and later equipment is added, rail wheel loads may exceed

allowable limits. Likewise, if rail wheel weights are set for a heavily loaded truck, and equipment is later removed, the rail wheel weights may fall below allowable limits.

Rail wheel loads should be maintained at the target rail wheel loads listed in Table 3.5.3. Minimum and maximum values are given as limits on individual rail wheel loads when the vehicle is carrying a non-fixed payload, and are not ranges within which to set rail wheel loads on an empty vehicle.

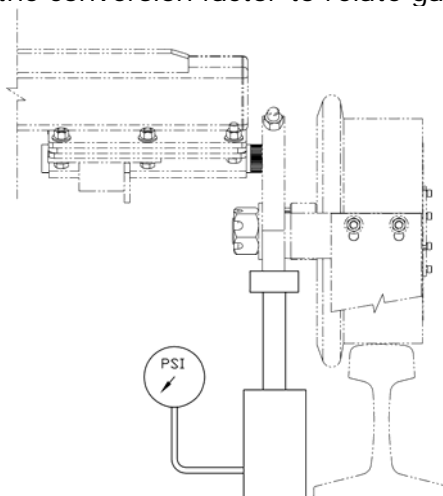
**RAIL WHEEL LOADS MUST REMAIN WITHIN 50lbs LEFT-TO-RIGHT ON AN AXLE.  
UNEVEN RAIL WHEEL LOADING CAN CAUSE DERAILMENT.**

	Min. rail wheel load (each, lbs.)	Target rail wheel load (each, lbs.)	Max. rail wheel load (each, lbs.)
Front Railgear	500	625±25	700
Rear Railgear	500	625±25	700

**Table 3.5.3** Target rail wheel loads

### 3.5.4 Checking & Adjusting Rail Wheel Load

Rail wheel loads can be determined by use of a bottle jack with an attached pressure gauge. DMF recommends the use of a DMF 501749 Jack and Pump Assembly (Fig. 3.5.4). Using this model will allow the gauge to display force directly (PSI gauge = pounds force). If another jack is used you will need to determine the conversion factor to relate gauge pressure to force.



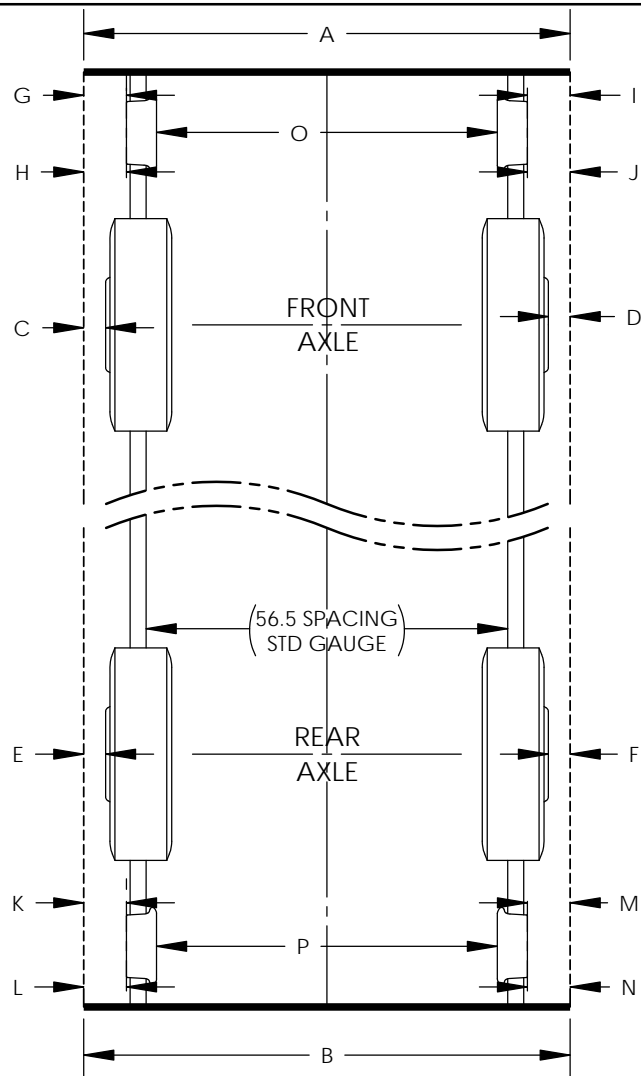
**Figure 3.5.4** Checking rail wheel load

#### Procedure:

1. Confirm that the truck is at its operational weight, the chassis and rail wheels are in alignment, and that all 4 tires are properly inflated (85 psi when using DMF wheel modification kits).
2. Place truck on rail or simulated rails. Apply parking brake and shut off engine. If using simulated rail, verify that the rail wheel flange is not touching the ground. Ensure that none of the rail wheel flanges are riding right up against the rail, as this may affect weight settings.
3. Place the jack under the suspension arm, as close as possible to the rail wheel.
4. Support jack as necessary with wooden blocks so that the distance from the jack to the axle tube is less than ½" with the jack in the retracted position.
5. Jack up slightly and place a piece of paper between the rail wheel and track.
6. Lower the rail wheel back onto the track.
7. Jack the rail wheel up very slowly while pulling on the paper.

8. When the paper begins to slip out from under the wheel note the gauge pressure.
9. If using the DMF 501749 jack, the reading on the gauge in PSI is equivalent to the rail wheel load on the adjacent wheel.
10. Repeat this procedure for the remaining rail wheels and note the measured loads.
11. After any adjustments are made repeat this procedure for each wheel.

<p style="text-align: center;"><b>WHEN CHECKING AND/OR ADJUSTING RAIL WHEEL LOADS, BOTH FRONT AND REAR RAILGEAR MUST BE IN THE RAIL POSITION.</b></p>
---



RAILWHEEL LOADS MUST REMAIN WITHIN 50 lbs. LEFT-TO-RIGHT ON AN AXLE.  
UNEVEN RAILWHEEL LOADING CAN CAUSE DERAILMENT

Railwheel Loads (per wheel, lbs.)					
	Min	Target	Max	Installed	
				DS	PS
Front	500	625 ±25	700		
Rear	500	625 ± 25	700		

STEP	LOCATION	SPEC	MEASURED	
1) SQUARE STRINGLINES TO TRUCK AXLES	A=B	±1/32		
	C=D			
	E=F			
2) CENTER AND SQUARE FRONT RAILWHEELS TO STRINGLINES	G=H	±1/16		
	I=J			
	G=I			
3) CENTER AND SQUARE REAR RAILWHEELS TO STRINGLINES	K=L	±1/16		
	M=N			
	K=M			
4) CHECK BACK-TO-BACK BETWEEN WHEEL FLANGES	O	53.25* ±1/8"		
	P			

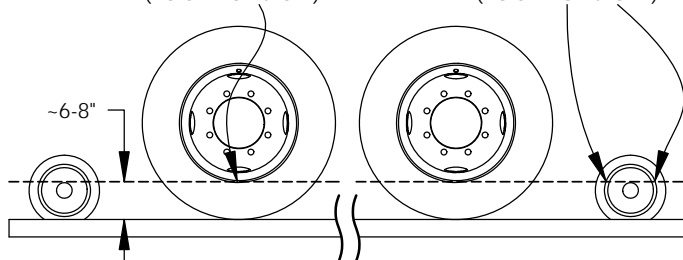
\*STD. GAUGE ONLY


### STRINGLINE ALIGNMENT PROCEDURE

- Rails (or simulated rails) should be spaced at proper gauge and parallel. Truck should be centered on rails, with steering wheel straight.
- For accuracy, stringlines should be taut and equally spaced at both ends of the vehicle.
- Measurements C/D at front axle may not match E/F at rear axle on all vehicles, as manufacturers may use different track widths at the front and rear truck axles.
- Work slowly and make small adjustments.
- If laterall adjustment range is insufficient, adjust shims between railgear and brackets.
- Re-check measurements after tightening bolts.

MEASURE FROM STRINGLINES TO  
EDGE OF RIM  
(LOCATIONS C-F)

MEASURE FROM STRINGLINE  
TO EDGES OF RAIL WHEELS  
(LOCATIONS G-N)



REV	DATE	DESCRIPTION			BY	APP	
TOLERANCES (UNLESS SPECIFIED):		RW-1013					
FRACTIONAL, MACH:							± 1/32"
FRACTIONAL, OTHER:							± 1/16"
.XX							± .063
.XXX							± .030
DRILL SIZES:							± .005
ANGULAR:							± .015
SURF FINISH:							125 MICRO
THREADS:							2A AND 2B
BREAK SHARP EDGES .03 X .45" MAX							
DMF (404)875-1512							
DRAWN BY:		APPD BY:	DATE:	DRAWING NUMBER:		REV:	
BJF		-	7/24/19	M1013003		#	
		THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC. (DMF). COPYRIGHT DMF. ALL RIGHTS RESERVED.					
							

## 3.6 Alignment

Over time your railgear may require adjustment to ensure safe operation and prevent excessive wear. If your railgear is running on the flanges excessively or derailing, it needs to have the alignment checked. Refer to drawing M1013003 in Section 3.5.4 **Error! Reference source not found..**

### 3.6.1 Alignment Adjustments

#### (4) Suspensions/Wheel Units

The suspension/wheel units can be aligned by loosening the (6) bolts attaching the suspension and tapping the suspension into alignment. It is sometimes useful to leave one bolt tight to force the unit to pivot about that point. The unit should have both wheels running parallel and at the specified gage.

#### Rear Bracket Channel

The rear bracket can be shifted right and left to center the gear on the vehicle. Center the bracket relative to the rear axle not the body.

#### (2) Pilot Plates/Bracket

The individual units can be pivoted on the front and rear brackets. This is done to align the rear gear to the vehicle's rear axle and aligning the front gear to the rear gear. The (5 or 6) bolt that clamps these parts together can be loosened and the unit tapped into position. As with the suspensions, it can be useful to leave one bolt tight to force the unit to pivot about that point.

#### (4) Travel Stops

The Travel Stops can affect alignment if they are not properly adjusted.

### 3.6.2 Rail Test After Alignment

After alignment, paint wheels and track test on straight rail. Observe marking on wheel is even if no adjust alignment was necessary.



## 4.0 INSTALLATION

### 4.1 Installation Checklist

#### 4.0 Installation

- 4.1 Installation Checklist
- 4.2 Pre-Install
  - 4.2.1 Safety Statements
  - 4.2.2 Installation Order
  - 4.2.3 Installation Sheets
  - 4.2.4 Receiving
  - 4.2.5 Required Tools & Materials
- 4.3 Chassis Prep
  - 4.3.1 Vehicle Condition
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  - 4.3.4 Tire Pressure Monitoring (TPMS)
  - 4.3.5 Speedometer Recalibration
  - 4.3.6 Re-Springing
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- 4.4 Install Wheel Modification Kit
  - 4.4.1 Safety Statement
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  - 4.4.3 Spacers
  - 4.4.4 Studs
  - 4.4.5 Install Steering Stops
  - 4.4.6 Wheelhouse/Body Modifications
- 4.5 Steering Wheel Lock Installation
- 4.6 Install Rear Bracket
  - 4.6.1 Remove Rear Bumper (optional)
  - 4.6.2 Remove Receiver Hitch
  - 4.6.3 Install Rear Bracket
- 4.7 Install Electrical System
  - 4.7.1 Locate Components
  - 4.7.2 Route Wires
  - 4.7.3 Electrical Insulation
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  - 4.8.1 Route Hydraulic Hoses
  - 4.8.2 Install Pump Enclosure
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- 4.9 Install Rear Railgear
  - 4.9.1 Install Rear Gear
  - 4.9.2 Set Rail Wheel Load & Rear Bracket Height
  - 4.9.3 Install Hydraulic Lines
  - 4.9.4 Set Travel Stops
  - 4.9.5 Align Rear Gear to Vehicle Rear Axle
  - 4.9.6 Set Rear Up-Stop Blocks
  - 4.9.7 Set Rail Sweeps
  - 4.9.8 Exhaust Modifications
- 4.10 Install Front Railgear
  - 4.10.1 Remove Front Bumper
  - 4.10.2 Install Front Bracket
  - 4.10.3 Install Front Gear
  - 4.10.4 Hook up Hydraulics
  - 4.10.5 Set Travel Stops
  - 4.10.6 Set Rail Wheel Load
  - 4.10.7 Align Rear Gear to Vehicle Rear Axle
  - 4.10.8 Bumper Installation / Modification & Up-Stop Installation
  - 4.10.9 Set Rail Sweeps
- 4.11 Verify & Adjust Rail Wheel Load & Alignment
- 4.12 Rail Test
- 4.13 Final Weld-out
- 4.14 Install Decals
- 4.15 Inspection & Function Test
  - 4.15.1 General Inspection
  - 4.15.2 Function Test
- 4.16 Road Test
- 4.17 Final Inspection

## 4.2 Pre-Install

### 4.2.1 Safety Statements

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

### 4.2.2 Installation Order

We've presented 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 Inspection, Rail Test, Road Test and Final Inspection are performed at the end. You should pay attention to the warnings in the Chassis Modifications and Wheel Modification Kits sections.

### 4.2.3 Installation Sheets

Refer to the installation sheet for your specific chassis located in 5.1 Installation Guides. Study this sheet before proceeding through the general instructions.

### 4.2.4 Receiving

#### General Supplied Parts Checklist

PARTS	QTY
Manual	1
Front RW-1013 Unit	1
Rear RW-1013 Unit	1
Front Mounting Bracket Assembly	1
Rear Mounting Bracket Assembly	1
Hydraulic Power Unit and Bracket	1
Wiring Harness Assembly	1
In-Cab Switch Box	1
Wheel Modification Kit: (if required, see appendix for details)	Varies
Wheels	
Adapters/Spacers	
Lug nuts	
Steering Wheel Stops Assembly	
Steering Wheel Lock Assembly	

#### 4.2.5 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 from welding)
- Cutting Torch
- Hand Grinder
- Frame Drill
- Air Saw
- Angle Finder
- Test Rail ((4) TS3x2x36" or actual rail)
- Shims for weight setting (HRFB3/4x3x12-18"L) or Jack w/ gauge
- ATF Fluid - DEXRON III
- Electrical Terminal Insulation (Spray-on or Brush-on)
- Wire ties, wire loom and electrical tape

Additionally the following tools are recommended:

- Transmission Jack, Motorcycle Lift, Pallet Jack or Forklift
- Overhead Crane
- Work Lights
- Work Area
- Minimum Requirement
- Level Floor
- Sufficient Lighting
- Wheel Dolly

## 4.3 Chassis Prep

### 4.3.1 Vehicle Condition

The vehicle's suspension and frame should be in good condition. If the vehicle's stock wheels and tires are to be used, they should be inspected and inflated to the maximum rated pressure.

### 4.3.2 Alignment

It is important for Guidewheel alignment that the rear axle of the vehicle is square to the truck frame. It is recommended that all (even new vehicles) be laser aligned before railgear installation. Some alignment equipment can't accept a truck after the installation of railgear. The vehicle should be aligned for a zero thrust angle. Factory alignment specifications are set to account for the crown of the road so is specific.

### 4.3.3 Mount and Balance Tires

If your vehicle requires a wheel modification kit (refer to 5.1 Installation Drawings) you should have the tires mounted before installation. The early stages on install can be done without the modified wheels but they must be installed before rail pressures are set. Make sure your tire installer understands how to orient a new tire to a wheel to minimize run out and required balance weights. Surprisingly, many do not. Tire should be inflated to the maximum rated pressure. Rims should be mounted using a torque wrench and not air tools. Torque values are listed in the Technical Details Section for your chassis.

### 4.3.4 Tire Pressure Monitoring (TPMS)

The TREAD act has made TPMS mandatory on passenger vehicle under 10k GVWR. Typically this is done with RF transmitter located in the tire or the valve stem. If the wheels are replaced as a part of the upfit, these systems must be installed and calibrated to the higher pressure appropriate for these tires (typically 225/70R19.5 or 245/70R19.5 at 75-95psi). The re-calibration is usually performed by a dealer. Please refer to the TPMS information in the appendix. Provide this information to the dealer when having the re-calibration done.

### 4.3.5 Speedometer Recalibration

If your truck requires a wheel modification kit, it is typically going from a 16 or 17-inch rims and tires to 19.5-inch rims and tires. This changes the rolling radius of the tires significantly, requiring the speedometer to be recalibrated. Dealerships are able to perform this work at a moderate cost. There are tools available to allow an installer to perform the calibration but they are expensive and often model-specific. Speedometer re-calibration is usually done at the same time as the TPMS re-calibration. Please check the appendix for information specific to your chassis.

### 4.3.6 Re-Springing

Some vehicles need to be re-sprung in order to improve ground clearance, to stiffen the vehicle to stabilize mounted equipment or stiffen the truck to allow better rail operation near max GVWR. Re-springing is often recommended for Cab & Chassis applications.

If re-springing a vehicle is necessary, it should be done before railgear installation. If not, the rail wheel loads will have to be checked and adjusted. Re-springing asymmetrically for cranes or other equipment is not recommended. It can lead to uneven rail wheel wear and difficult in aligning and setting the suspensions.

#### **4.3.7 Timbren Springs**

Some installers use Timbren load springs in place of re-springing. We only recommend them for Pick-ups and SUV's intended primarily for patrol work and not for trucks intended to operate near max GVWR continuously.

#### **4.3.8 Exhaust Modifications**

Some vehicles require the exhaust to be modified to clear the rail gear. Usually, the installer cuts the exhaust and has a muffler shop complete the work after the gear is installed. If multiple identical vehicles are being worked on, you may want to have the exhaust modification done before the railgear installation. Flexible exhaust pipes can be used temporarily during the install but is not recommended as a permanent exhaust pipe.

In general, EPA'07 diesel exhausts should only be modified aft of the after-treatment device. Every attempt should be made to preserve the back pressure so that the required pressure sensors are not affected. This can be done using an equivalent length method. Many systems use a diffuser tip to lower the exhaust temperature to safe levels. Diffusers should be retained if modifications are necessary. Please refer to the chassis vendor's body builder's information on exhaust modifications.

#### **4.3.9 Tire Carrier**

Often the vehicle's spare is located in the area to be occupied by the rear railgear. Installers are often expected to provide a tire carrier in the bed for pickups or on the lift gate for SUV's.

## 4.4 Install Wheel Modification Kit

In order for the tires to rest on the rail many vehicles will require replacement wheels with a greater inset (negative offset). These wheels are usually very heavy and a wheel dolly is recommended. Some vehicles will also require spacers to get both the wheels over the rail. These can be on one or both axles. Some vehicles will also require stud replacement to allow for an unusually thick set of spacers. As with spacers, this can be on one or both axles.

### 4.4.1 Safety Statement

Brake lines and ABS Sensor Wires usually need to be tied back in order to clear the new wheels. Zip-ties and springs are useful for this purpose. Ensure that Brake/ABS wires and lines do not come in contact with the wheel/tire or suspension in any position. Make sure there is sufficient slack to allow the line to reach in any suspension position. Refer to Section 5.5 Chassis/Wheel Modifications to determine which of the following applies to your installation:

### 4.4.2 Wheel Adapters

Some vehicles will use wheel adapter to allow the use of a stock 19.5 rim. These adapters will bolt to the vehicle hub and the rim will then bolt to the adapter.

### 4.4.3 Spacers

If required, spacers are easily installed by slipping them on the studs before installing a wheel/tire. Care should be taken to prevent thin spacers from binding and being bent or crushed. Refer to 5.5 Chassis/Wheel Modifications to determine if and where spacers are required. **IF YOUR KIT CAME WITH WHEEL SPACERS, USE THEM!** If you don't, you can damage brake lines, ABS Sensor wires, tires and/or suspension parts.

### 4.4.4 Studs

Some kits require stud replacement to accommodate longer/larger studs. This should be completed before installation. See 5.5 Chassis/Wheel Modifications for details.

If required, studs should be changed before any installation work begins. Stud installations that require machining will have a detail drawing on the Installation Sheet. Most stud changes are simple push out, replace and push in jobs. If your shop is not equipped to do this, have a qualified mechanic do the work.

### 4.4.5 Install Steering Stops

#### Cautions

- STEERING WHEEL STOPS MUST BE VERIFIED BEFORE A VEHICLE IS OPERATED ON THE HIGHWAY! CHECK THIS ON EVERY VEHICLE! Incorrectly installed Steering Stops can cause serious tire damage and create a hazard for anyone operating the vehicle.
- INSTALL STEERING STOPS BEFORE MOVING THE VEHICLE! If you don't, you can cause serious tire damage and create a hazard for anyone operating the vehicle.

#### Installation

- Install Stops. Refer to 5.5 Chassis/Wheel Modifications for the details on your specific steering stops.
- Verify that the steering stops limit the wheels or tires from any contact with frame, sway bar, wheelhouse, suspension etc. DMF recommends at least 1/8" clearance from any fixed obstruction to the wheel or tire in any suspension position.

- To check clearance in the normal suspension position, jack the vehicle under the axle, suspension or upright until the tire clears the ground.
- To check clearance in the drooped position, jack the vehicle under the frame, cross-member or body jack point until the tire clears the ground.
- Check the steering clearance on both sides. Many suspensions are not entirely symmetrical. (Ford Twin I-beam)

#### Adjustments

- Due to variables and tolerances in the vehicle construction, the provided steering wheels stops may need adjusting to properly limit steering.
- If there is excessive clearance, stops may be ground down to improve the turning performance of the vehicle. Before you do this, re-check that everything clears. Don't forget to check clearance to the upright and suspension parts inside the wheel. Grind a little at a time and watch anything and everything that could contact the wheel/tire. If you go to far, the entire block can be replaced.
- If there is contact, the steering stops will need to be shimmed up or modified. Experiment with different thickness shim by holding them with pliers while someone turns the wheel. When the required thickness is found, weld the shims in place. You can also cut and replace the entire stop block.

#### **4.4.6 Wheelhouse/Body Modifications**

Occasionally a vehicle will require modification to the wheelhouse. If your vehicle requires wheelhouse modifications they will be explained in 5.1 Installation Sheets.

## 4.5 Steering Wheel Lock Installation

### DMF Velcro Steering Wheel Lock Operation

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.

### DMF Velcro Steering Wheel Lock Installation

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 4.5.A:** Steering Wheel Lock Installation



**Figure 4.5.B:** Steering Wheel Lock In Use

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



## 4.6 Install Rear Bracket

Refer to 5.1 installation Drawings for specifics on the position and hardware used in mounting the rear bracket. Be careful to note the orientation of each part. Refer to the Parts manual for assembly drawings detailing the parts and hardware for your bracket. Be careful to note the orientation of each part.

### 4.6.1 Remove Rear Bumper (optional)

If desired, remove and save the rear bumper. Many installers think the time spent doing this is worth the access gained at the rear of the truck.

### 4.6.2 Remove Receiver Hitch

We recommend that unless specifically directed to keep the factory receiver hitch, you remove the hitch. Some installations allow a factory receiver hitch to be kept. Usually this will result in lower ground clearance in the rear. Poor ground clearance can result in difficulty for the operator and increase the chance for damage to the railgear. If the vehicle's spare is under the bed, remove and set aside. The spare bracket and/or retraction equipment may need to be removed to allow for the installation.

### 4.6.3 Install Rear Bracket

Refer to 5.1 Installation Drawings for illustrations. Rear Brackets are typically made up of two side brackets that attach to either side the frame and a slotted channel that spans between them. The channel can be adjusted up or down and side-to-side to set the proper position for the railgear.

Wherever possible, secure rear brackets using existing holes in the frame to avoid drilling. Some rear brackets will require match drilling to bolt to the frame.

After installing the side brackets on the frame, assemble the channel using the provided hardware. Leave the bolts that hold the channel loose to allow later adjustment. The vertical position of the rear bracket will set later.

## 4.7 Install Electrical System

Refer to 5.4 Electrical Schematics

### 4.7.1 Locate Components

- Determine location under the hood for the terminal strip. It should be accessible and protected from road spray. High on the firewall, along the inside of the fender and attached to the battery box are typical locations.
- Determine the location of the pumps & solenoids. DMF recommends locating them in following locations in order of preference:
  - Inside tool cabinet or cross body tool box.
  - Under cross body tool box.
  - Underbody and attached to front of rear railgear.

If placed in a toolbox or cabinet covers should be made to protect pumps and solenoids. Covers must be easily removed for service.

- Determine switchbox location. Consider safety and convenience when selecting the position for the switch box. Pickup Trucks usually provide several options but SUV's can be more difficult. Typically the box is located as shown in
- Figure 4.7.1: In-Cab Switchbox **Locations**. When in doubt, check with your customer for their preferences.



**Figure 4.7.1: In-Cab Switchbox Locations**

- Determine the bumper switch locations. Refer to Section 5.4.
- If using Solenoid Pin-offs, determine the Pin-Off Module locations front and rear. Front Pin-Off Modules should be mounted behind the front bumper or grill. Rear Pin-Off Modules should be mounted to the rear frame, frame cross-members or the rail gear itself.

### 4.7.2 Route Wires

- Route the electrical harness according to 5.4 Electrical Schematics. Observe the following guidelines:
  - We recommend running the wires in split loom.
  - Route wires away from the drive train, exhaust, and any moving parts.
  - Ensure that wires do not interfere with railgear motion.
  - Wires can be routed inside the frame.
  - Support and restrain wires with wire ties or wire clips
  - Tie up Pin-Off Solenoid and bumper switches until they are mounted.

- **All electrical terminations should be protected with liquid electrical tape or other means.**
- **Heat shrink terminals are provided and should be used wherever possible.**
- Pay attention to Bumper switch route and orientation
- Run wires from chassis locations (bumpers, cab, pumps, pin-offs) to the terminal strip under the hood.
- All bulkhead or firewall penetrations must be protected with grommets.
- Attach wires to the terminal strip as shown in 5.4 Electrical Schematics
- Attach the (2) Battery Source leads and the (1) Ignition Source Lead. The ignition source is made using the provided mini-ATO fuse tap.
- Where possible attach grounds to the battery posts or remote ground provided.

#### **4.7.3 Electrical Insulation**

All Electrical terminations should be protected with a spray or brush-on electrical insulation product. This includes the bumper switches, the pin-off grounds, pump grounds, solenoid connections, terminal strip connections and the terminal strip ground. Failure to adequately protect the electrical components can lead to corrosion and system malfunction. The manufacturer does not warranty the installation of a third party installer. This is the installer's responsibility.

## 4.8 Install Hydraulic System

Refer to 5.3 Hydraulic Schematics

### 4.8.1 Route Hydraulic Hoses

- Use supplied hydraulic hoses. Take care to use the indicated lengths where shown. Route all hydraulic hoses according to the Hydraulic Schematic. Observe the following guidelines:
- Route all hoses away from the drive train, exhaust, and any moving parts.
- Ensure that hoses do not interfere with railgear motion
- Hoses can be routed inside the frame.
- Support and restrain hoses with wire ties or wire clips
- Hoses should be marked and capped before routing through the frame to prevent collecting debris.

### 4.8.2 Install Pump Enclosure

- Install pump enclosure in truck bed, tool box, or cargo area (SUVs). Be careful to allow access to the Emergency Pump. The emergency pump can be remotely located for convenience.

### 4.8.3 Install Reservoir

- Mount reservoir under the hood in an accessible location. On some vehicle it will require the fabrication of a bracket and on others the reservoir can be attached to the sheet metal with tech-screws.
- If pumps are located in tool box or under tool box, install reservoir in box. Be careful to remain clear of lid, trays and locate in an accessible location.



**Figure 4.8.3: Typical Reservoir Installation**

## 4.9 Install Rear Railgear

### Safety Statements

If the gear is in a raised position and not pinned off (you haven't installed the pin-offs yet!) it can drop if any of the fittings are opened or leaky. The gear is heavy enough to hurt you badly! Block up the gear before you crawl under it!

Refer to 5.1 Installation Guides

### 4.9.1 Install Rear Gear

Use a forklift, pallet jack or floor jack, position the rear railgear under the rear bracket and attach with the provided hardware and plate washers. (See the Parts Manual and Installation Sheet.) Draw the gear up snug but not tight to allow later alignment.

### 4.9.2 Set Rail Wheel Load & Rear Bracket Height

Set rail wheel load using the procedure outlined in Section 3.5. Use setup weight as necessary to simulate any uninstalled fixed equipment or load.

### 4.9.3 Install Hydraulic Lines

Attach hydraulic lines to rear actuator as shown in 5.3 Hydraulic Schematics.

### 4.9.4 Set Travel Stops

Set the travel stop bolts to provide the proper amount of over-center travel. The over-center dimension is the horizontal distance between the center of the guidewheel and the pivot point (center of actuator shaft). The recommended over-center dimension is 3" – 4" in the rear. This ensures that a hydraulic failure will not cause the gear to collapse.

### 4.9.5 Align Rear Gear to Vehicle Rear Axle

Refer to Section 3.6 Alignment. Secure rear railgear with air wrench.

### 4.9.6 Set Rear Up-Stop Blocks

The rear up-stop blocks are welded in place to stop the gear in the stowed position. They must be positioned and sized to prevent the railgear from contacting the bodywork of the vehicle.

### 4.9.7 Set Rail Sweeps

The angle of the rail sweeps should be set to allow the sweep rubber to contact the rail when adjusted to the top of the slots. This allows adjustment when the rubber wears. The rail sweep arm should be tacked to the suspension arms.

### 4.9.8 Exhaust Modifications

Some vehicles require exhaust modifications to clear the railgear. Exhaust pipes can be cut as required and re-routed after the rail gear is installed. Flexible exhaust pipe can be used as a temporary solution during the installation. Flexible pipe is not recommended as a permanent exhaust pipe.

## 4.10 Install Front Railgear

### Safety Statements

If the gear is in a raised position and not pinned off (you haven't installed the pin-offs yet!) it can drop if any of the fittings are opened or leaky. The gear is heavy enough to hurt you badly! Block up the gear before you crawl under it!

Refer to 5.1 Installation Guides

### 4.10.1 Remove Front Bumper

See manufacturers manual for instructions on how to remove trucks bumper. Be careful to retain all hardware. Unless your Installation Sheet directs otherwise, you can discard any underbody plastic parts. Protect the radiator to prevent damage with cardboard.

### 4.10.2 Install Front Bracket

The Front Bracket mounts to the frame underneath or ahead of the radiator. On some vehicles, the oil cooler needs to be relocated to clear the front bracket. Refer to 5.1 Installation Guides for specific model information.

Front brackets typically use existing holes in the frame and/or cross members. Install with the provided hardware. In some case, hardware saved when removing the factory bumper is used to install the front bracket. Align and square the front bracket to the frame and tighten the fasteners.

### 4.10.3 Install Front Gear

Use a forklift, pallet jack or floor jack, position the front railgear under the installed front bracket and attach with the provided hardware and plate washers. Draw the gear up snug but not tight to allow later alignment. Refer to Refer to 5.1 Installation Guides.

### 4.10.4 Hook up Hydraulics

Attach hydraulic lines to front actuator per as shown in 5.3 Hydraulic Schematics.

### 4.10.5 Set Travel Stops

Set the travel stop bolts to provide the proper amount of over-center travel. The over-center dimension is the horizontal distance between the center of the guidewheel and the pivot point (center of actuator shaft). The recommended over-center dimension is  $\frac{3}{4}$ " – 2" in the front. This ensures that a hydraulic failure will not cause the gear to collapse.

### 4.10.6 Set Rail Wheel Load

Refer to Section 3.5.

### 4.10.7 Align Rear Gear to Vehicle Rear Axle

Refer to Section 3.6. Align the front railgear to the rear railgear per the Alignment sheet. Secure rear gear with air wrench.

**4.10.8 Bumper Installation / Modification & Up-Stop Installation**

Refer to 5.1 Installation guides on modifying and installing the bumper. Pickups and Suburban's typically only require modification to the front bumper. The Durango requires modification to the rear bumper also. The front up-stop blocks are welded in place to stop the gear in the stowed position. They must be positioned and sized to prevent the railgear from contacting the bodywork of the vehicle. The up-stop blocks are shown in

**4.10.9 Set Rail Sweeps**

The angle of the rail sweeps should be set to allow the sweep rubber to contact the rail when adjusted to the top of the slots. This allows adjustment when the rubber wears. The rail sweep arm should be tacked to the suspensions arms as shown in 5.1 Installation Guides

### 4.11 Verify & Adjust Rail Wheel Load & Alignment

- Verify and adjust the rail wheel load and alignment. Refer to Sections 3.5 & 3.6.

### 4.12 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 3.6 Alignment.

### 4.13 Final Weld-out

- Weld the plate washers on the slotted plates on the front a rear to fix the alignment of the unit. Weld as indicated on 5.1 Installation Guides.
- Weld the rear plate washers to fix the position of the rear bracket. Weld as indicated on 5.1 Installation Guides.

### 4.14 Install Decals

- Label the reservoir "RAILGEAR RESERVIOR DEXRON ATF III ONLY".
- Label the vehicles according to the diagram on the back of the decal sheet provided. Refer to the decal placement diagram on the back of the decal sheet.



## 4.15 Inspection & Function Test

### 4.15.1 General Inspection

- Check that all fasteners are tight.
- Check that all hoses and wire are routed properly.
- Verify that the area is clear.
- Verify that all electrical terminations are insulated and protected.

### 4.15.2 Function Test

- Verify the battery is charged and hydraulic fluid is full.
- Verify the power indication on the power switch in the cab.
- Verify the function of the front and rear pin-offs. They should pull in and hold as long as the corresponding switch is held. Check from bumper initially and have another watch as you check from the cab.
- Verify that the rear switches (bumper & in-cab) actuate the rear railgear, and the front switches (bumper & in-cab) actuate the front railgear, and that the switches are oriented properly.
- Verify that the railgear does not operate with the power switch in the off position.
- Follow 2.4 to verify emergency pump function.
- Load test vehicle to GVWR and verify railgear function.

**Note:** If there is any cross functionality (such as front controls operating rear), a wiring error should be suspected. Typically this is at the terminal strip or the solenoids.

## 4.16 Road Test

- Before road testing inspect steering stops, wheel and tires. Verify that the lug nuts have been torqued to the value on the Installation Sheet.
- Verify that all bodywork is replaced and secure.
- In a parking lot or open area, verify that the steering stops prevent the tire or rim from contacting the frame, suspension or other items.
- Inspect brake lines and ABS sensor lines to verify clearance from rim.
- Check for any rattles and vibration.
- Verify speedometer calibration by timing a distance, GPS or from another vehicle. (This may not be necessary for every install.)

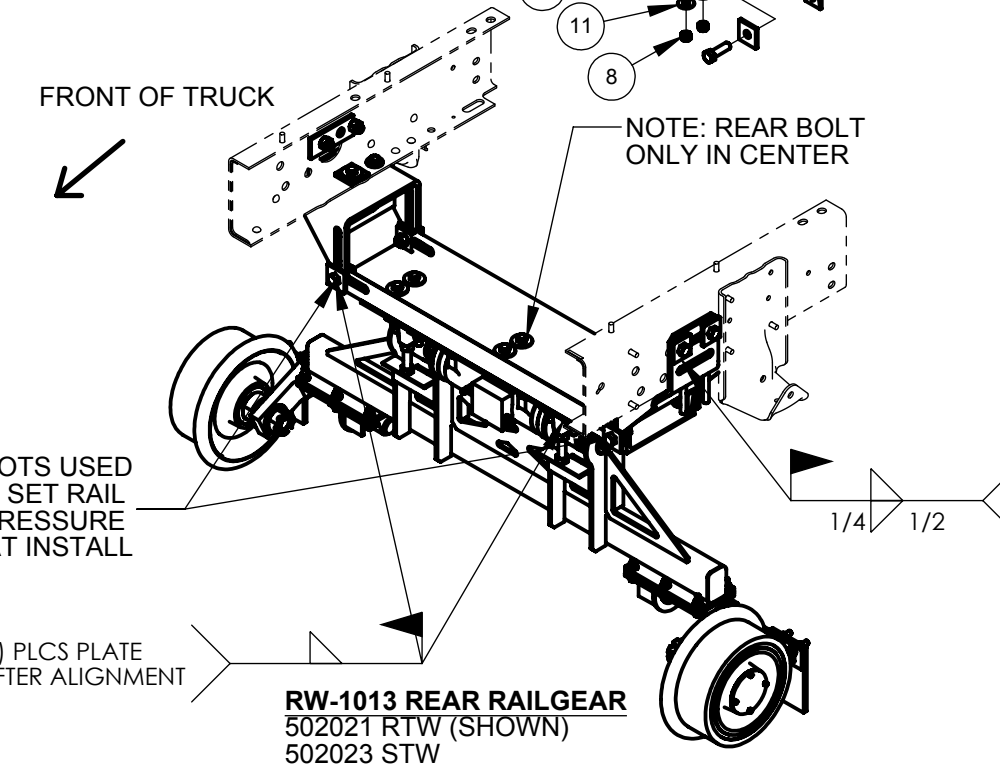
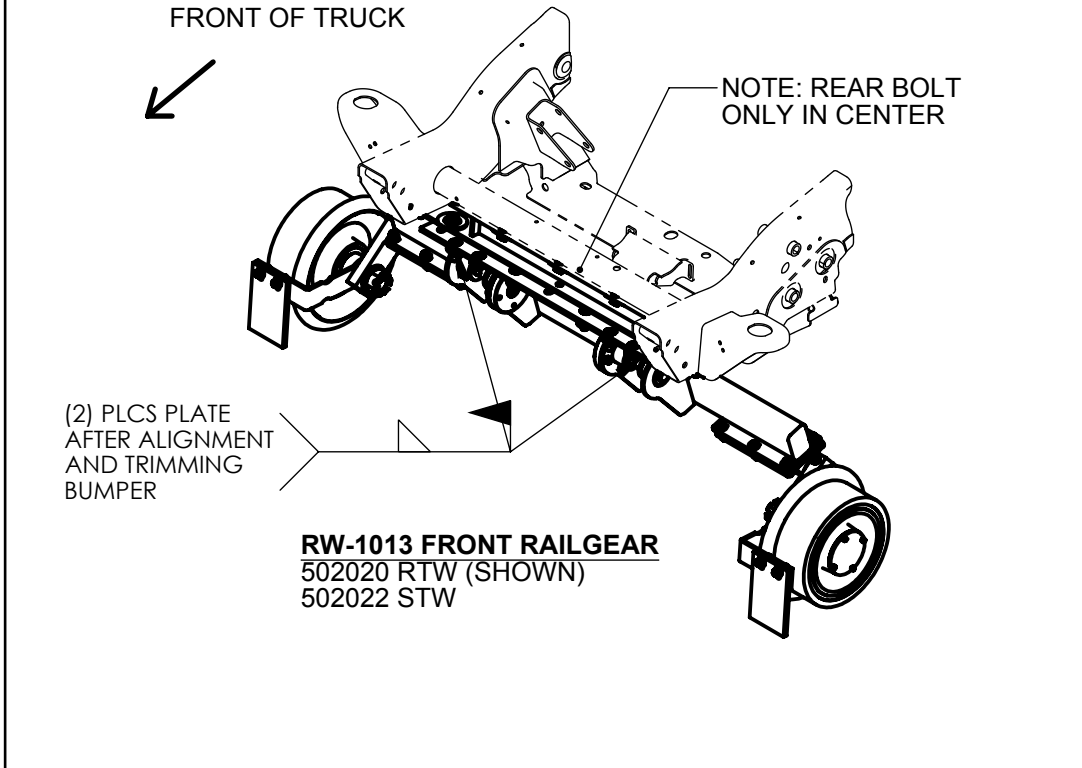
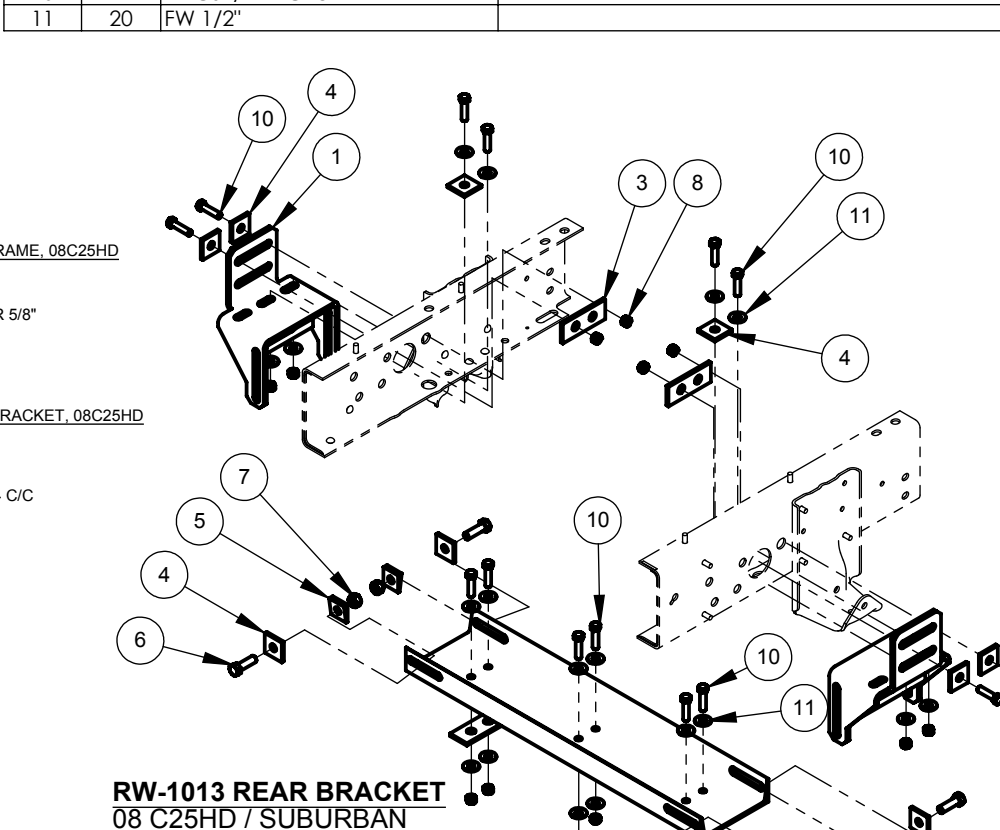
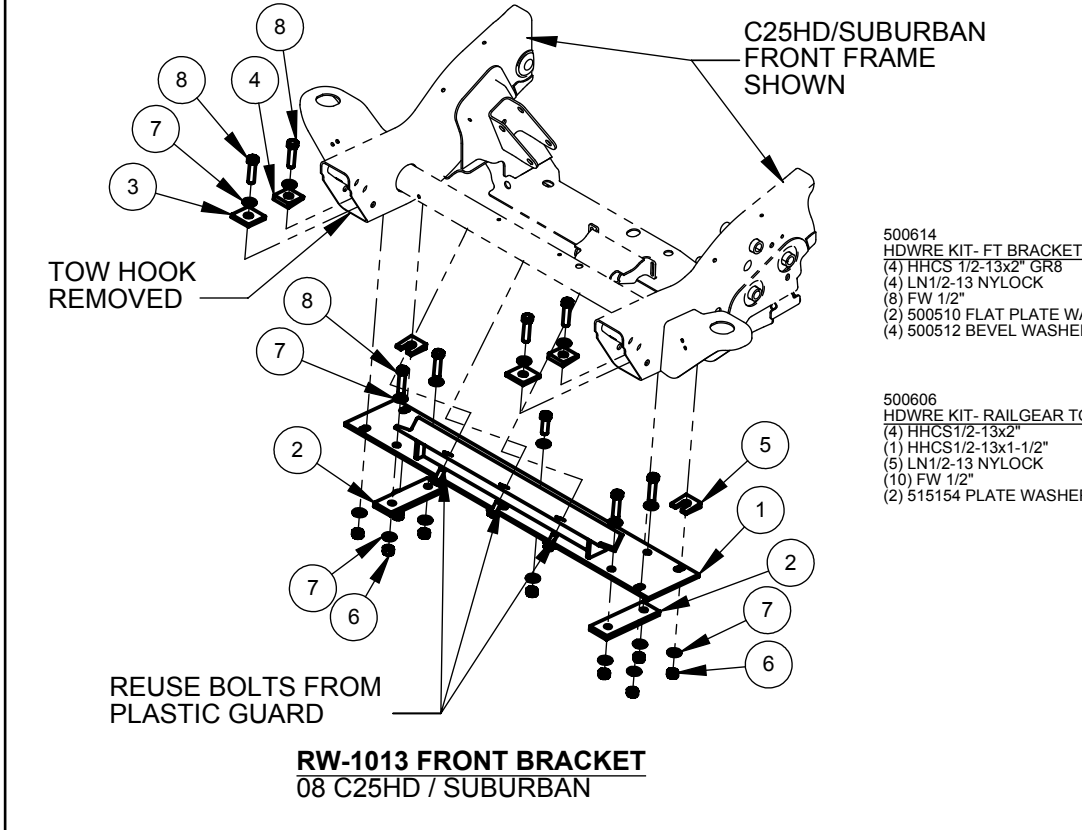
## 4.17 Final Inspection

- Verify that the hydraulic fluid is full.
- Verify that the reservoir is labeled.
- Touch up paint as necessary.
- Lubricate Pin-off pins with a light lubricant.
- Verify decals are installed on wheels.
- Verify that the decals are installed at bumper switches.
- Verify that the decals are installed in cab.
- Verify that the manual is in the cab.
- Verify that the emergency pump in the cab, tool box or bed.
- Check the tire inflation.
- Verify that all bodywork is replaced and secure.
- Verify lug nut torque.

ITEM NO.	exploded /QTY.	PART NUMBER	DESCRIPTION
1	1	500441	WELDMENT, FT BKT, 08C25HD/SUB
2	2	515154	DET, PLATE, SLOT ADJ, 4-1/2
3	2	500510	DET, SLOT FLAT BAR, 5/8
4	2	500512	WASHER, BEVEL, 5/8
5	2	500513	WASHER, BEVEL, 5/8
6	9	LN 1/2-13 NYLOCK	
7	21	FW 1/2	FLAT WASHER
8	8	HHCS1/2-13x2 GR8	
9	1	HHCS1/2-13x1.5 GR8	

ITEM NO.	exploded /QTY.	PART NUMBER	DESCRIPTION
1	2	500520	BRACKET, SIDE, FORMED, GM25HD
2	1	500508	DET, REAR CHANNEL 34-3/4
3	4	500498	PLATE, SLOT ADJUSTMENT, 2"
4	10	500510	DET, SLOT FLAT BAR, 5/8
5	4	500512	WASHER, BEVEL, 5/8
6	4	HHCS1/2-13x2" GR8	
7	4	LN5/8-11 NYLOCK	
8	14	LN1/2-13 NYLOCK	
10	14	HHCS1/2X2 GR8	
11	20	FW 1/2"	

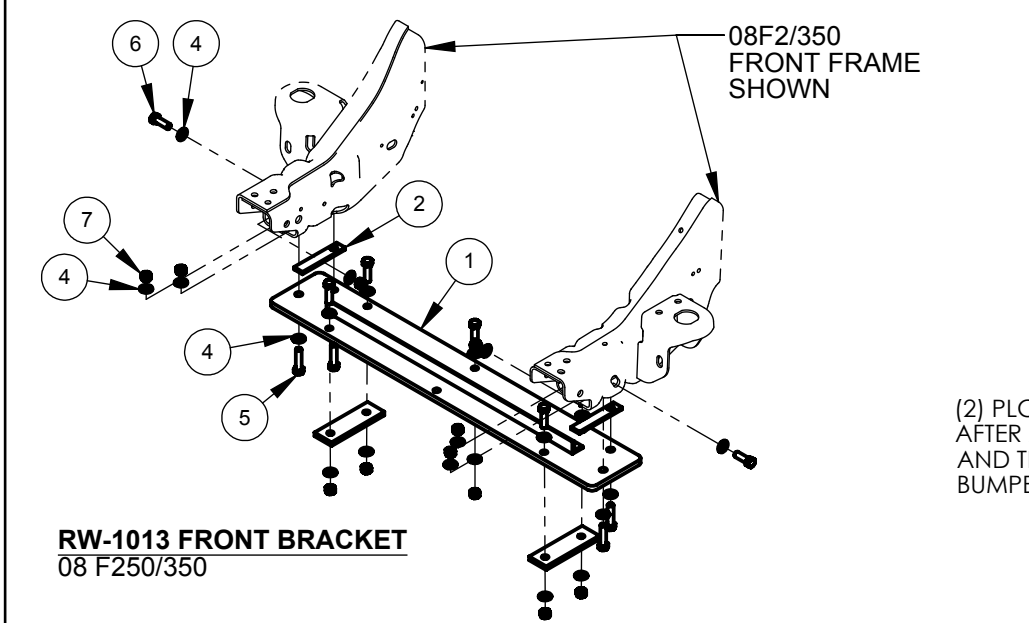
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CHASSIS NOTES & RESTRICTIONS	- MAX GVWR: XXXX - NO RESTRICTIONS REGARDING: WHEELBASE, AXLES, CAB OR BED - BOTH 4X2 & 4X4 APPROVED (4X4 MAY REQUIRE ADD'L SUSPENSION SPACERS) - USE OF TOWING HITCH MAY REQUIRE MODIFICATION OF HITCH AND SOME LOSS OF GROUND CLEARANCE
REQUIRED CHASSIS PREP	- RESPRING RECOMMENDED FOR VEHICLES WITH LARGE PAYLOAD VARIANCES - FRONT BUMPERS REQUIRE TRIMMING TO CLEAR STOWED RAILWHEELS
REQUIRED WHEEL MODIFICATIONS	- REQUIRES WHEEL & TIRE CHANGES TO MATCH STANDARD GAGE - TIRES TO BE CHANGED TO 245/70R19.5 (GY, G124, GY647, MICH XDE M/S OR EQUAL WITH A TREAD WIDTH <=8.5" (NOT OVERALL WIDTH)) - REQUIRES SPACERS (3/16" THK) ON REAR - REQUIRES STEERING STOPS TO PREVENT TIRE DAMAGE - BRAKE LINES AND ABS WIRES MUST BE RESTRAINED TO PREVENT DAMAGE - REFER TO WHEEL KIT MANUALS FOR DETAILS



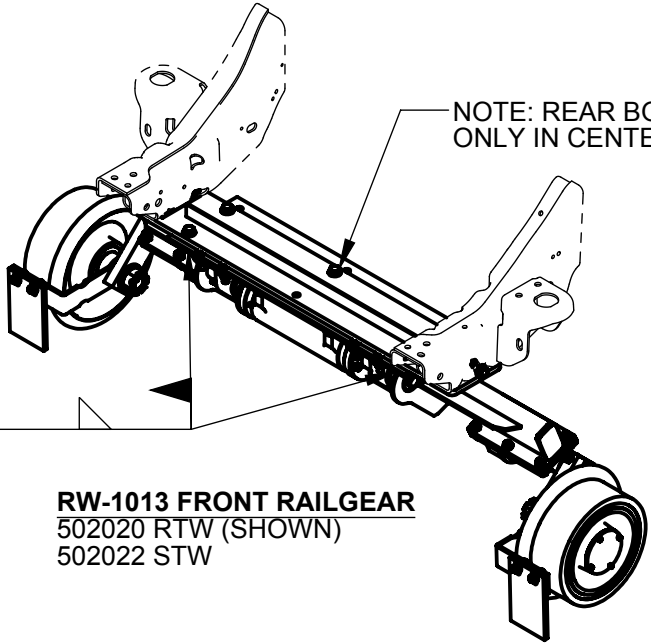
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(4) HHCS 1/2-13x2" GR8  
(8) LN1/2-13 NYLOCK  
(16) FW 1/2"  
(2) 500498 ADJUST SLOT FLAT BAR DET  
(6) 500512 BEVEL WASHER 5/8"
- 500611**  
HDWRE KIT- RR BRACKET TO CHANNEL, 08C25HD  
(4) HHCS 5/8-11x2-1/4" GR8  
(4) LN5/8-11 NYLOCK  
(2) 500498 ADJUST SLOT FLAT BAR DET  
(4) 500512 BEVEL WASHER 5/8"  
(4) 500510 FLAT PLATE WASHER 5/8"
- 500615**  
HDWRE KIT- RAILGEAR TO CHANNEL, 08C25HD  
(4) HHCS 1/2-13x2" GR8  
(2) HHCS 1/2-13x1-1/2" GR8  
(6) LN1/2-13 NYLOCK  
(12) FW 1/2"  
(2) 500498 ADJUST SLOT FLAT BAR DET

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FRAC. OTHER: ± 1/16"							
.XX ± .063							
.XXX ± .030							
JOK ± .015							
DRILL SIZES: ± 1°							
ANGULAR: ± 1°							
SURF FINISH: 125 MICRO							
THREADS: 2A AND 2B							
BRIEF SHARP EDGES (100% & 40° MAX.)							
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WAK		8/21/08			513101/102	A	

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2	2	500499	PLATE, SHIM, FT BKT, 08F2/350
3	2	515154	DET. PLATE, SLOT ADJ, 4-1/2
4	22	FW1/2	1/2" FLAT WASHER
5	4	HHCS1/2-13X2	1/2-13 X 2" LONG HEX HEAD BOLT
6	2	HHCS1/2-13X1-1/2	1/2-13 X 1.50" LONG HEX HEAD BOLT
7	11	ESNA1/2-13	ESNA 1/2-13 LOCK NUT
9	5	HHCS1/2-13X1-3/4	1/2-13 X 1.75" LONG HEX HEAD BOLT

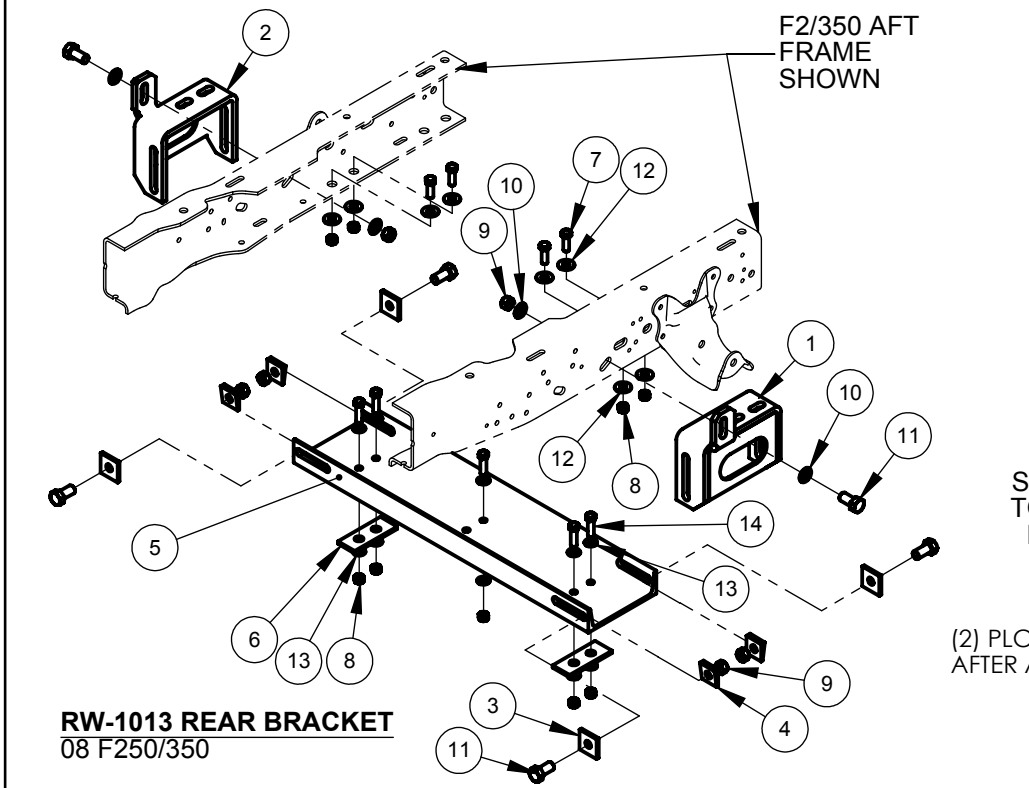


**RW-1013 FRONT BRACKET**  
08 F250/350

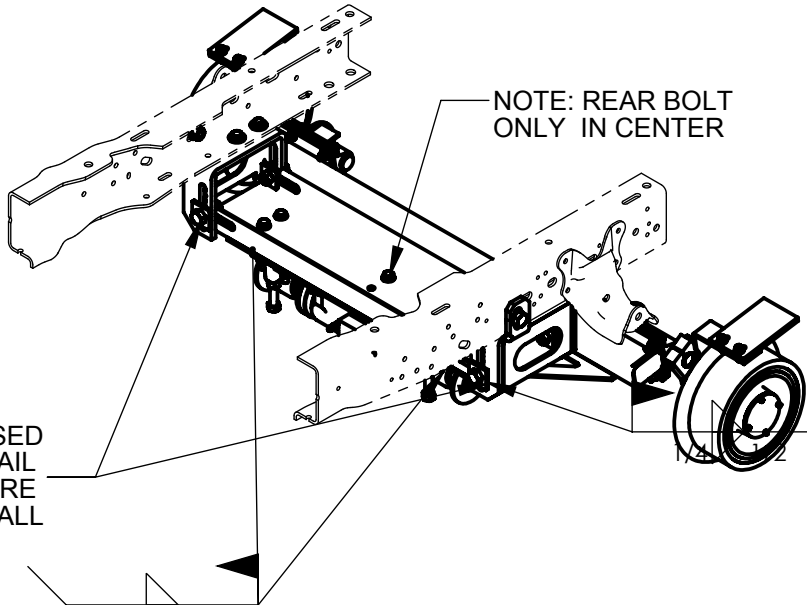


**RW-1013 FRONT RAILGEAR**  
502020 RTW (SHOWN)  
502022 STW

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2	1	500531	BO, FORMED, RR DS BKT, 05F2/350
3	4	500510	DET. SLOT FLAT BAR, 5/8
4	4	500512	WASHER, BEVEL, 5/8
5	1	500508	DET. CHANNEL REAR, 34-3/4
6	2	500498	PLATE, SLOT ADJUSTMENT, 2"
7	4	HHCS1/2-13X1-1/2	1/2-13 X 1.50" LONG HEX HEAD BOLT
8	9	HN1/2-13	1/2-13 HEX NUT
9	6	HN5/8-11	5/8-11 HEX NUT
10	4	FW5/8	5/8" FLAT WASHER
11	6	HHCS3/4-10X1-1/2	3/4-10 X 1.50" LONG HEX HEAD BOLT
12	8	FW1/2	1/2" FLAT WASHER
13	10	FW1/2GR8	1/2" FLAT WASHER - GRADE 8
14	5	HHCS1/2-13X1-3/4	1/2-13 X 1.75" LONG HEX HEAD BOLT



**RW-1013 REAR BRACKET**  
08 F250/350




SLOTS USED  
TO SET RAIL  
PRESSURE  
AT INSTALL

(2) PLCS PLATE  
AFTER ALIGNMENT

**RW-1013 REAR RAILGEAR**  
502021 RTW (SHOWN)  
502023 STW

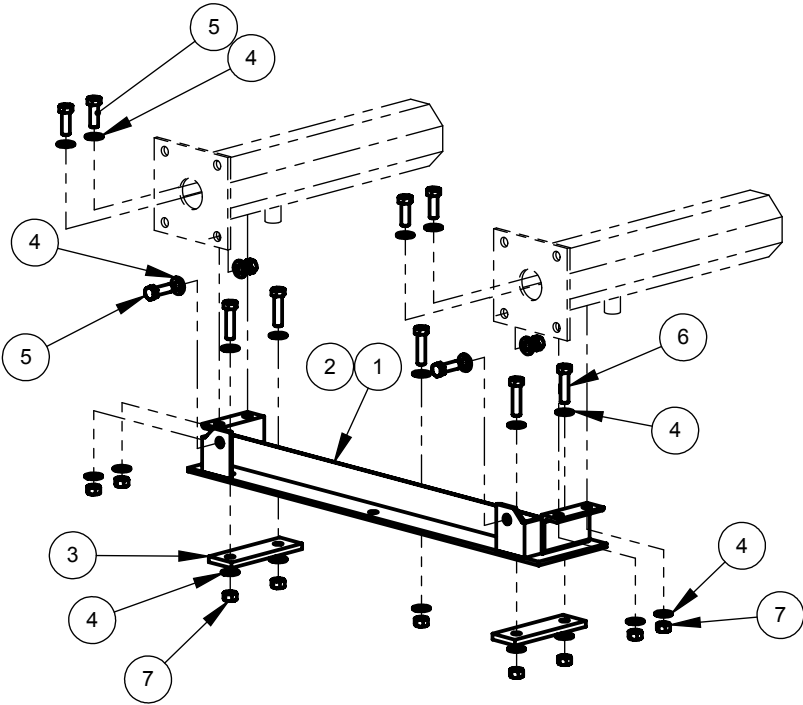
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REQUIRED CHASSIS PREP	- RESPRING RECOMMENDED FOR VEHICLES WITH LARGE PAYLOAD VARIANCES - FRONT BUMPERS REQUIRE TRIMMING TO CLEAR STOWED RAILWHEELS
REQUIRED WHEEL MODIFICATIONS	- REQUIRES WHEEL & TIRE CHANGES TO MATCH STANDARD GAGE - TIRES TO BE CHANGED TO 225/70R19.5 (GY G124, GY647, MICH XDE M/S OR EQUAL WITH A TREAD WIDTH <=8.25" (NOT OVERALL WIDTH) - REQUIRES SPACERS (.135 THK) ON FRONT - REQUIRES STEERING STOPS TO PREVENT TIRE DAMAGE - BRAKE LINES AND ABS WIRES MUST BE RESTRAINED TO PREVENT DAMAGE - REFER TO WHEEL KIT MANUALS FOR DETAILS

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FRACTIONAL: OTHER: ± 1/16"							
X ± .063							
XX ± .030							
XXX ± .015							
DRILL SIZES: ± .015				DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512			
ANGULAR: ± 1°							
SURF FINISH: 1/25 MICRO							
THREADS: 2A AND 2B				DRAWN BY:		APPD BY:	
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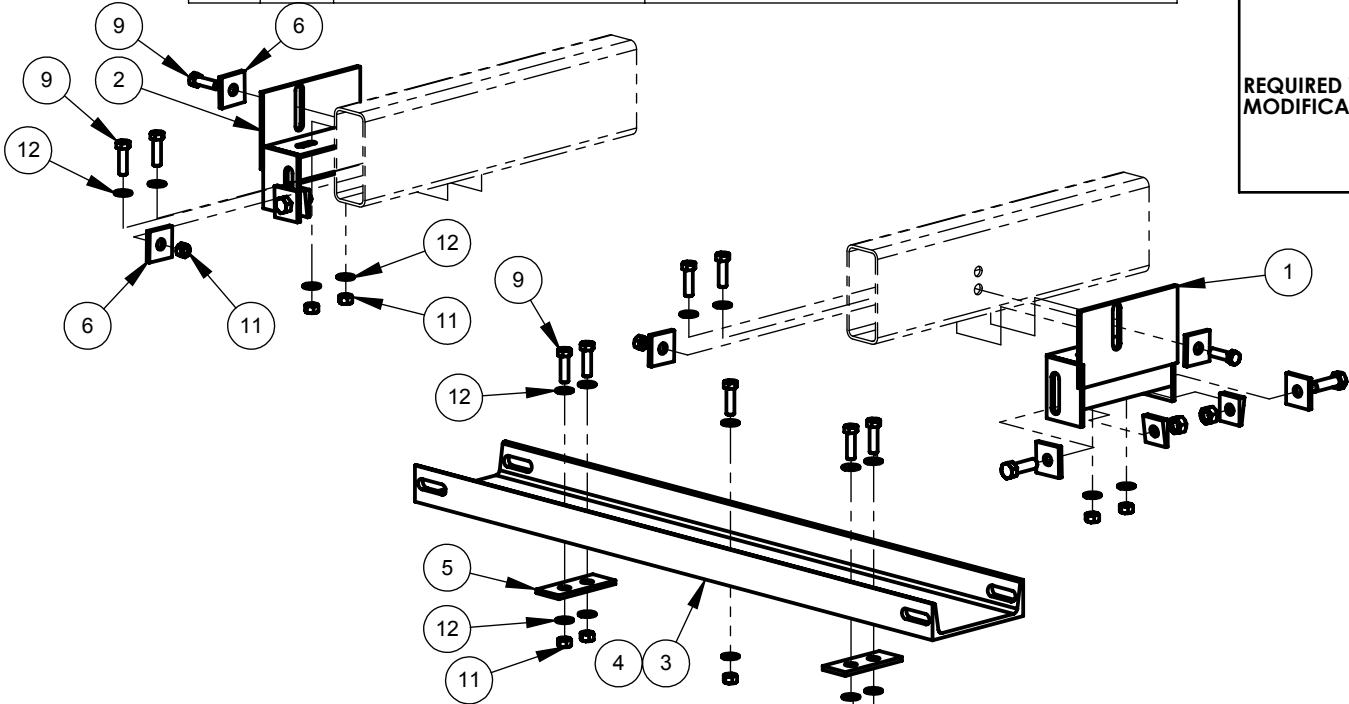
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2		515280 (NOT SHOWN)	WELDMENT, FT BRACKET 08 DURANGO
3	2	515154	DET.PLATE,SLOT ADJ,4-1/2
4	22	Preferred Narrow FW 0.5	FLAT WASHER
5	6	HBOLT 0.5000-13x1.5x1.25-N	
6	5	HBOLT 0.5000-13x2x1.25-N	
7	11	HNUT 0.5000-13-D-N	

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2	1	515261	WELMT,BRACKET,REAR,DS,02DUR/DAK
3	1	515269	DET.CHANNEL,REAR,45-3/4, DURANGO
4		500509 (NOT SHOWN)	DET CHANNEL REAR 36.5, DAKOTA
5	2	500498	PLATE, SLOT ADJUSTMENT, 2"
6	8	500510	DET, SLOT FLAT BAR, 5/8
7	4	500512	WASHER, BEVEL,5/8
8	4	HBOLT 0.6250-11x2x1.5-N	
9	11	HBOLT 1/2-13x1.75 NYLOCK	
10	3	HNUT 0.6250-11-D-N	
11	11	HNUT 0.5000-13-D-N	
12	18	Preferred Narrow FW 0.5	FLAT WASHER

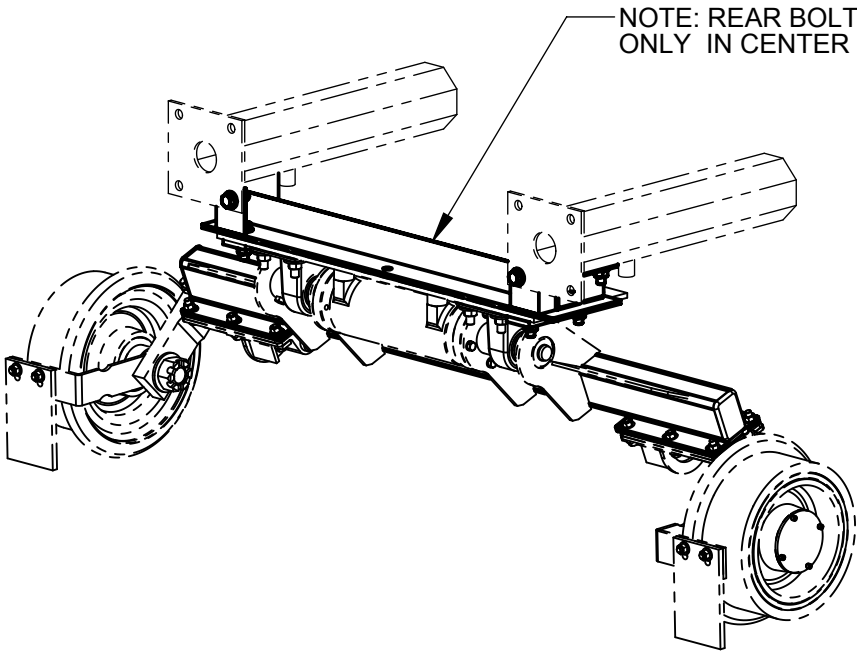
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REQUIRED CHASSIS PREP	-RESPRINGING RECOMMENDED FOR VEHICLES WITH LARGE PAYLOAD VARIANCES -FRONT BUMPERS REQUIRE TRIMMING TO CLEAR STOWED RAILWHEELS
REQUIRED WHEEL MODIFICATIONS	STOCK WHEEL AND TIRES ARE USED TIRES OF 245MM WIDTH OR GREATER RECCOMENDED



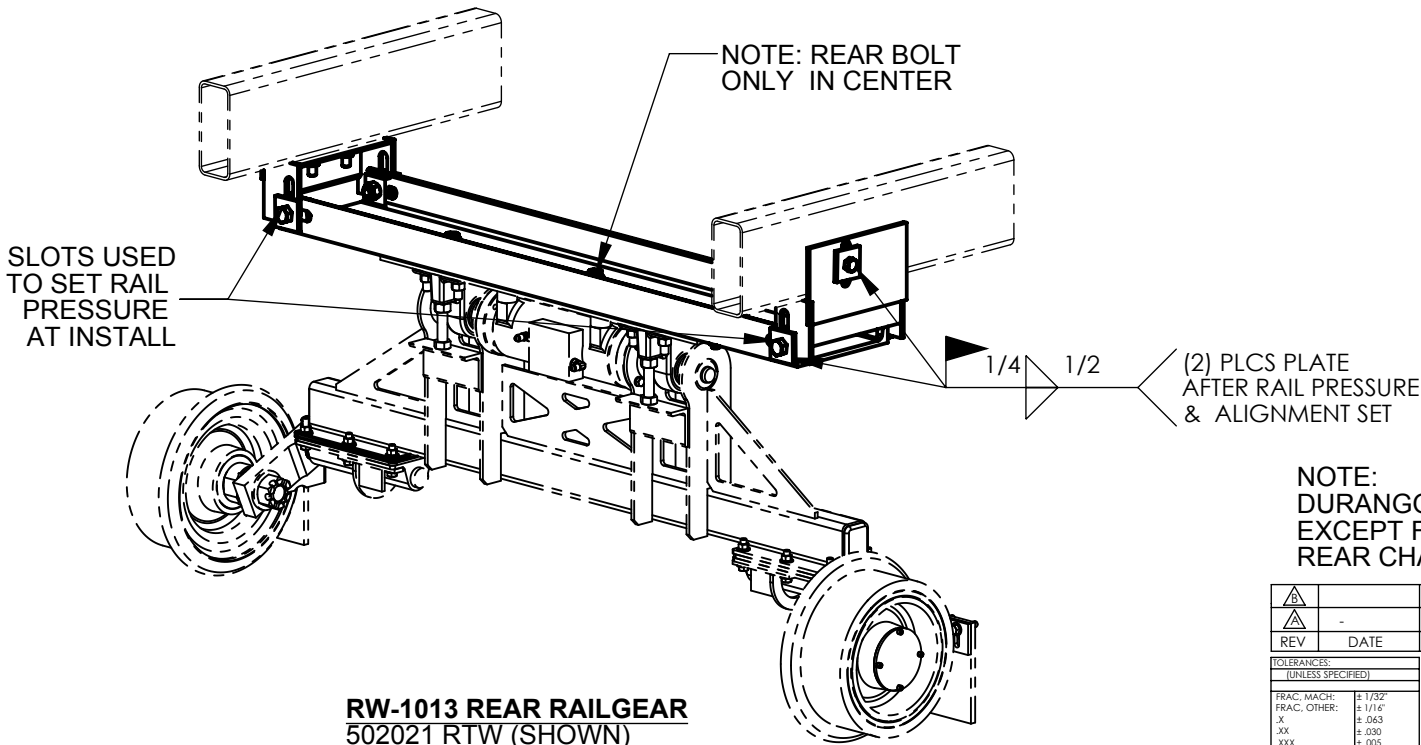
RW-1013 FRONT BRACKET  
08 DURANGO / DAKOTA



RW-1013 REAR BRACKET  
08 DURANGO / DAKOTA



RW-1013 REAR RAILGEAR  
502021 RTW (SHOWN)  
502023 STW

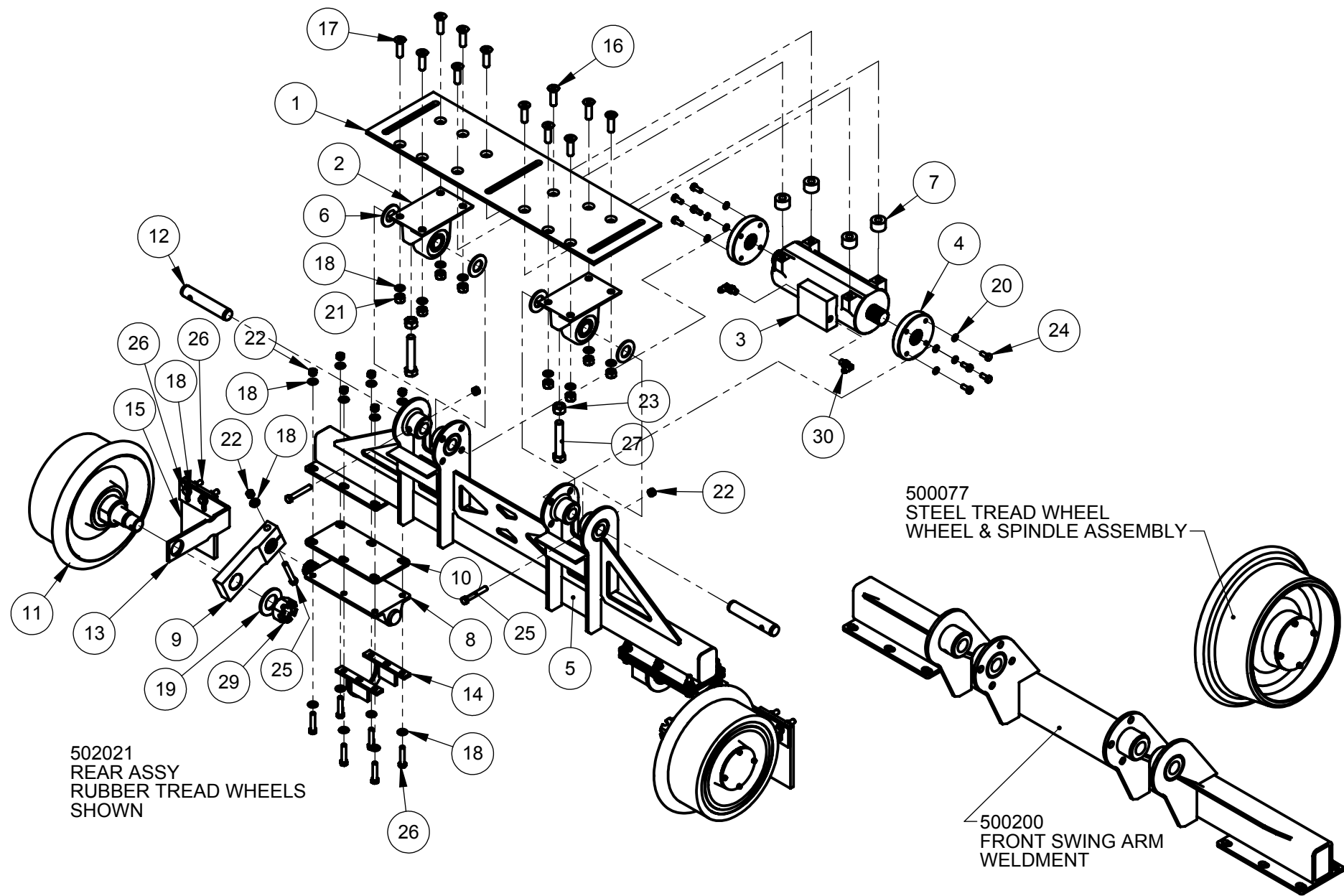


RW-1013 REAR RAILGEAR  
502021 RTW (SHOWN)  
502023 STW

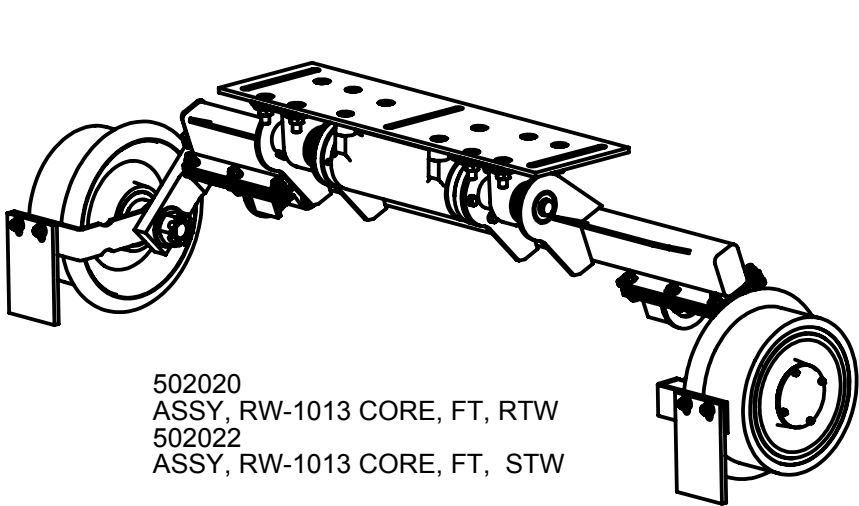
NOTE:  
DURANGO & DAKOTA INSTALLATIONS ARE IDENTICAL  
EXCEPT FOR THE FRONT BRACKET WELDMENTS AND  
REAR CHANNEL LENGTHS

REV	DATE	DESCRIPTION	BY	APP
1				
TOLERANCES: (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			
DRAWING NUMBER: 513301/302 303/304				
DATE: 8/24/08				
DRAWN BY: WAK				
APPD BY:				
TITLE: INSTALLATION, RW-1013, RTW & STW, 08 DURANGO & DAKOTA				
DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512				
REV: #				

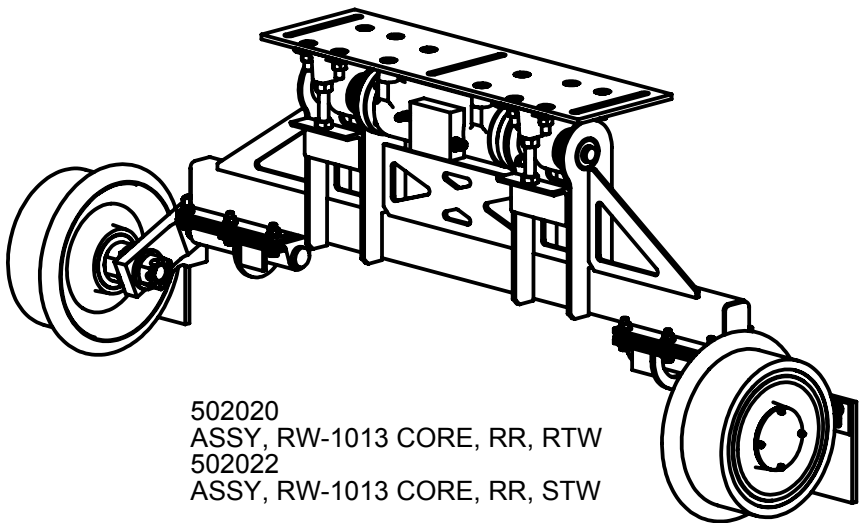




ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	1	500294	DETAIL, PILOT PLATE, RW-1013
2	2	500280	ASSY, LUG,RW-1013
3	1	500724	ACTUATOR, INTEGRATED HOLDING VALVES
4	2	500262	DETAIL,DRIVE COLLAR
5	1	500230	WELDMENT, SWING FRAME, LONG (10-3/4)
6	4	500274	WASHER,THRUST,PIVOT (2.0ODX1.0IDX1/8)
7	4	500260	DETAIL, ACTUATOR MOUNTING SPACER
8	2	500320	SUSPENSION, FLEXIRIDE, NO6
9	2	500322	DETAIL,SUSPENSION ARM 115mm
10	2	500228	DETAIL,SUSPENSION SPACER 1/4"
11	2	500072	ASSY, RAILWHEEL RTW (WHEEL,SPINGLE,TREAD)
12	2	500270	DETAIL, PIVOT PIN,RW-103
13	2	500392	DETAIL, RAILSWEET BRACKET
14	2	500330	CASTING, DE-RAIL SKID
15	2	818503	RAILSWEET
16	4	500696	FHSS 1/2-13x1-3/4
17	8	500697	FHSS 1/2-13x1-3/4
18	42	FW 0.375	FLAT WASHER
19	2	FW 1.25	FLAT WASHER
20	8	LW 0.3125	
21	8	HNUT 0.5000-13-D-N	
22	20	HNUT 0.3750-16-D-N	
23	2	HNUT 0.6250-11-D-N	
24	8	HBOLT 0.3125-18x0.75x0.75-N	
25	3	HBOLT 0.3750-16x2.5x2.5-N	
26	16	HBOLT 0.3750-16x1.75x1.75-N	
27	2	HBOLT 0.6250-11x3.5x3.5-N	
28	1	HBOLT 0.3750-16x0.75x0.75-N	
29	2	HSNUT 1.2500-7-D-N	HEX NUT, SLOTTED, 1-1/4-7
30	2	6801-4-4	04 JIC X 04 O'RING 90 FITTING



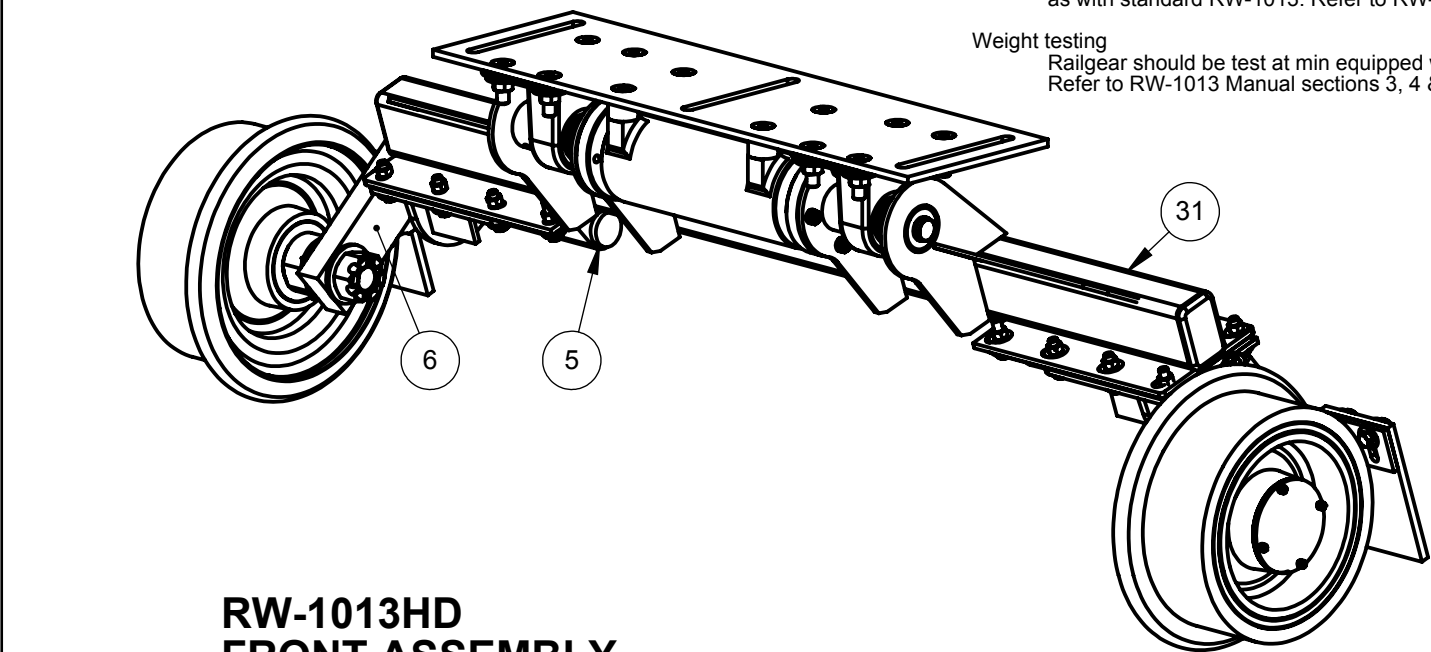
502020  
ASSY, RW-1013 CORE, FT, RTW  
502022  
ASSY, RW-1013 CORE, FT, STW



502020  
ASSY, RW-1013 CORE, RR, RTW  
502022  
ASSY, RW-1013 CORE, RR, STW

REV	DATE	DESCRIPTION			BY APP
TOLERANCES: (UNLESS SPECIFIED)					
FRAC. MACH: ± 1/32"		RW-1013			
FRAC. OTHER: ± 1/16"					
X ± .063		DRAWN BY: WAK			
XX ± .030					
XXX ± .005		APPD BY:			
DRILL SIZES: + .015					
ANGULAR: ± 1°		DATE: 7/17/08			
SURF FINISH: 125 MICRO					
THREADS: 2A AND 2B					
		DRAWING NUMBER: 502020/21		REV: #	

ITEM NO.	Deploy ed/QT Y.	PART NUMBER	DESCRIPTION
1	1	500294	DETAIL, PILOT PLATE, RW-1013
2	2	500280	ASSY, LUG,RW-1013
3	1	502028	WELDMENT, SWING FRAME, LONG (10-3/4) HD
4	4	500274	WASHER,THRUST,PIVOT (2.00DX1.0IDX1/8)
5	2	500326	SUSPENSION, FLEXIRIDE, NO6
6	2	500327	DETAIL,SUSPENSION ARM 115mm
7	2	500335	RW-1013 DE-RAIL SKID WELDMENT #10 SUSPENSION
8	2	500072	ASSY, RAILWHEEL RTW (WHEEL,SPINGLE,TREAD)
9	2	500270	DETAIL, PIVOT PIN,RW-103
10	2	500392	DETAIL, RAILSWEEP BRACKET
11	2	818503	RAILSWEEP
12	8	500697	FHSS 1/2-13x1-3/4
13	1	501781	ASSY, CYLINDER, REAR, Ø2", RW-1013 HD
14	1	501797	DET, PIN, CYL ROD, RW-1013 HD
15	1	501795	DET, ROD BRACKET, REAR, RW-1013 HD
16	1	501796	DET, ROD BRACKET, REAR, RW-1013 HD
17	4	500696	FHSS 1/2-13x1-3/4
18	2	HSNUT 1.2500-7-D-N	HEX NUT, SLOTTED, 1-1/4-7
19	2	FW 1.25	FLAT WASHER
20	2	HBOLT 0.6250-11x3.5x3.5-N	
21	2	HNUT 0.6250-11-D-N	
22	4	HBOLT 0.5000-13x1.75x1.75-C	
23	12	HNUT 0.5000-13-D-N	
24	4	LW 0.5	
25	12	FW 0.5	
26	4	HBOLT 0.3750-16x2.5x2.5-N	
27	4	HBOLT 0.3750-16x1.75x1.75-N	
28	16	HBOLT 0.3750-16x1.5x1.5-N	
29	42	FW 0.375	
30	24	HNUT 0.3750-16-D-N	
31	1	500199	WELDMENT, SWING FRAME, SHORT (6") HD



**RW-1013HD  
FRONT ASSEMBLY  
502031  
(PARTS AS 502020/21 EXCEPT WHERE NOTED)**

**RW-1013HD Retrofit Instructions**

PN 502031 Front Assy, RW-1013HD  
PN 502032 Rear Assy, RW-1013HD

**Description**

In an effort to adress concerns fro mthe customer and increase the capacity of the RW-1013 railgear RW-1013HD has been developed. By strengthening selected components, incresing the sized of the suspensions and changing the rear to use a 2" cylinder, the capacity of the railgear have been increased to better accommodate 3/4 & 1-ton trucks at or near max GVWR.

**Changes from RW-1013**

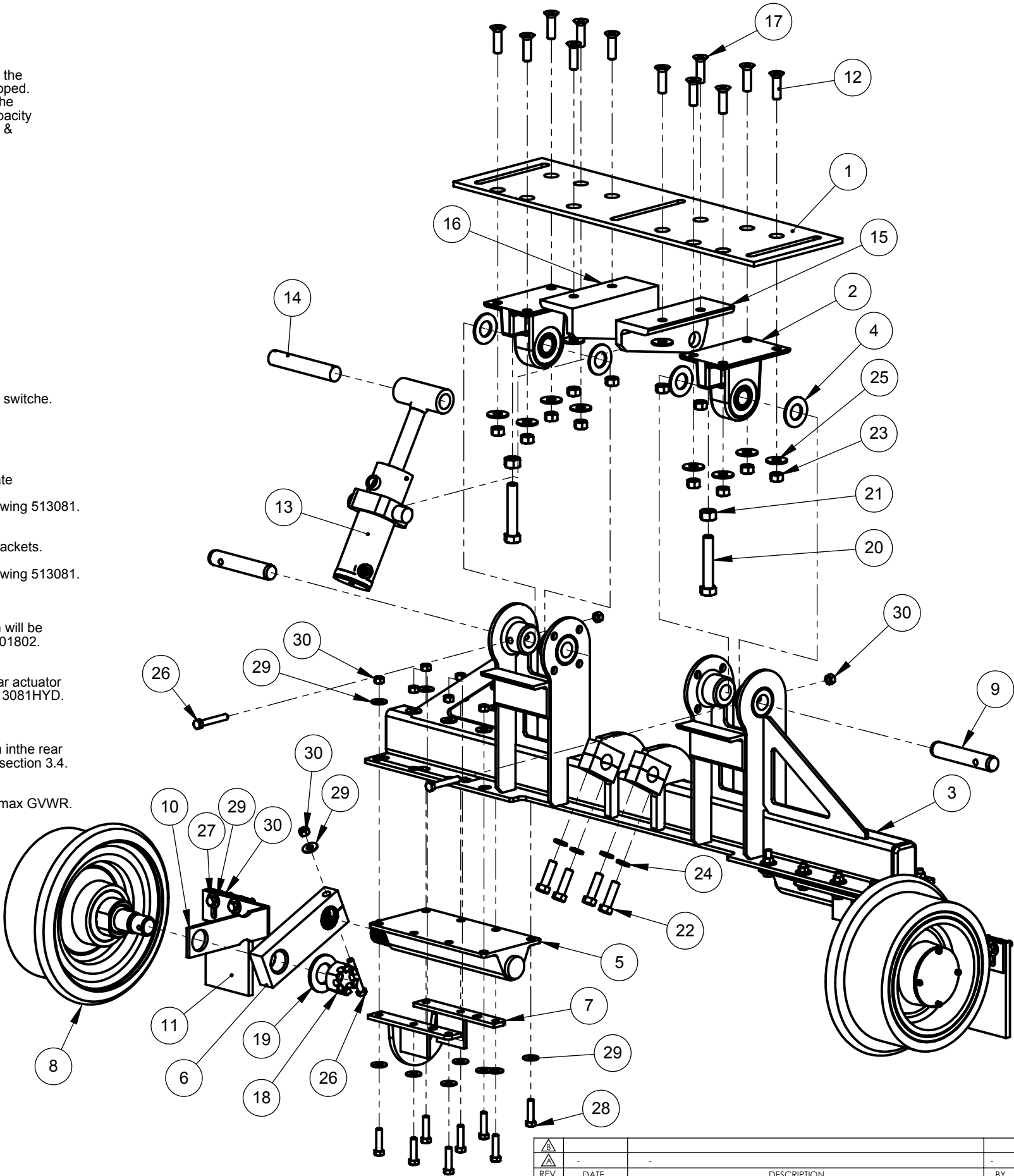
- Front
- Heavier Front mounting plate
  - Heavier crosstube 1/8"thk --> 1/4"thk
  - One piece suspension mount
  - Changed to A10 suspension from A6 suspension
- Rear
- Changed to 2" cylinder from rotary acutator
  - Heavier Rear Brackets
  - Heavier crosstube 1/8"thk --> 1/4"thk
  - One piece suspension mount
  - Changed to A10 suspension from A6 suspension

**Updates made to PNR units to bring to current DMF standard**

Exterior switches changed to enclosed push button from toggle switche. refer to 5008

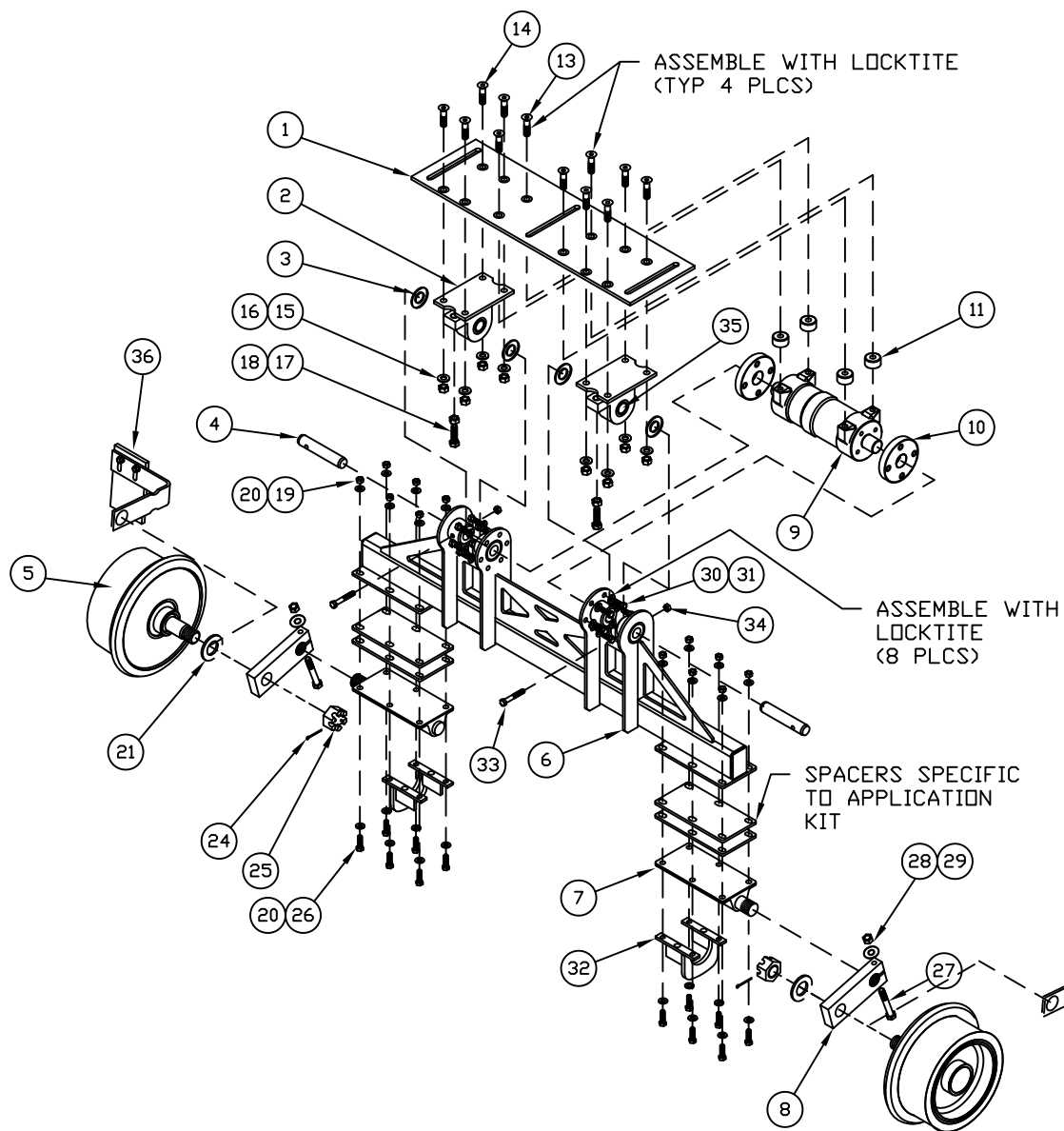
**Installation (retrofit) from RW-1013 to RW1013HD**

- Front
- Remove existing RW-1013 including front mounting plate  
Installation is identical to standard RW-1013.  
Refer to RW-1013 Manual section 513201/202 and drawing 513081.
- Rear
- Remove existing RW-1013 includeing rear mounting brackets.  
Installation is identical to standard RW-1013.  
Refer to RW-1013 Manual section 513201/202 and drawing 513081.  
Reuse the channel cross beam and related hardware.
- Electrical
- Existing units may have toggle switches installed which will be replaced with enlosed push button switches. Refer to 501802.
- Hydraulic
- The only hydraulic change is the replacement of the rear actuator with a cylinder. Re-install hydraulic line as shown on 513081HYD. Refer to 501800 for standard arrangement.
- Rail Pressure
- Rail pressure is set using 3/4" shim in front and 1" shim inthe rear as with standard RW-1013. Refer to RW-1013 Manual section 3.4.
- Weight testing
- Railgear should be test at min equipped weight and at max GVWR. Refer to RW-1013 Manual sections 3, 4 & 5.






**RW-1013HD  
REAR ASSEMBLY  
502032**

REV	DATE	DESCRIPTION			BY APP
TOLERANCES: (UNLESS SPECIFIED)		TITLE:			
FRAC. MACH: ± 1/32"		RW-1013 HD FRONT/REAR ASSY			
FRAC. OTHER: ± 1/16"					
X ± .063		DIVERSIFIED METAL FABRICATORS,INC.,(404)875-1512			
XX ± .030					
XXX ± .005					
DRILL SIZES: ± .015					
ANGULAR: ± 1°					
SURF FINISH: 125 MICRO					
THREADS: 12A AND 2B					
BTRHS SHARP EDGES (1250X) 4P AND 2B					
		DRAWN BY:	APPD BY:	DATE:	
		WAK		11/17/08	
				DRAWING NUMBER:	REV:
				502031/32	#



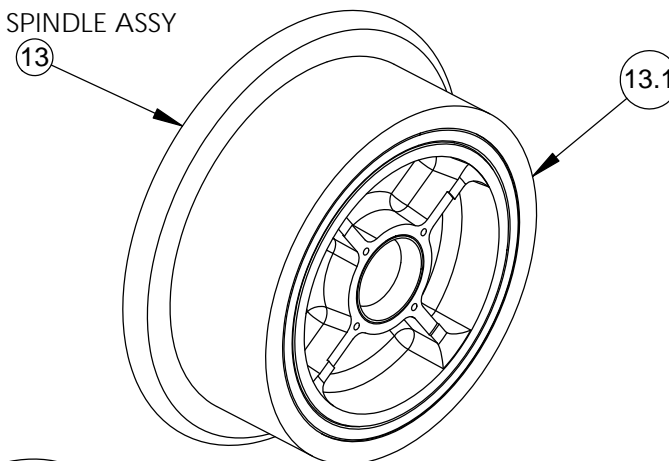
ITEM	PART NO.	QTY	DESCRIPTION
1	500294	1	PILOT PLATE DETAIL
2	500280	2	LUG ASSEMBLY
3	500274	4	PIVOT THRUST WASHER (1.00"ID x 2.00"OD x 1/8")
4	500270	2	PIVOT PIN DETAIL
5	500160	2	10" NON-INSUL WHEEL, SPINDLE, BEARINGS, SPACERS & NUT ASSY.
6	500230	1	REGULAR (10-3/4") FRAME WELDMENT
7	500320	2	ND6 BODY FLEXRIDE SUSPENSION
8	500321	2	ND6 FLEXRIDE SUSPENSION ARM 115mm
9	500710	1	ACTUATOR (HELAC - 27003) (10KS)
10	500262	2	DRIVE COLLAR DETAIL (HELAC - 24826)
11	500260	4	HELAC MOUNTING SPACER DETAIL
12			
13	500696	4	SET SCREW (FHSS - 1/2"-13UNC x 1-3/4" LOCKING)
14	500697	8	SET SCREW (FHSS - 1/2"-13UNC x 1-3/4")
15	500699	8	PREVAILING TORQUE NUT (1/2"-13UNC)
16	500698	8	CASE HARDENED FLAT WASHER (FW - 1/2")
17	PUR.	2	MOUNTING BOLT (5/8"-11UNC x 1-3/4" Gr.8)
18	PUR.	2	HEX NUT (5/8"-11UNC Gr.8)
19	500685	12	NYLON LOCK NUT (3/8"-16UNC)
20	500686	24	FLAT WASHER (FW-3/8")
21	50012480	2	SPINDLE SPACER (1/8" THICK) (QTY. 8 IF NO RAILSWEPT)
22	500130	2	COTTER PIN (1/4"x 2-1/2")
23	500128	2	SLOTTED NUT (1-1/4"-12UNF)
24	500687	12	MOUNTING BOLT (HHCS - 3/8"-16UNC x 1-1/4")
25	PUR.	2	MOUNTING BOLT (HHCS - 1/2"-20UNC x 3/-1/2" Gr.5)
26	PUR.	2	HEX NUT (HN 1/2"-20UNC)
27	PUR.	2	FLAT WAHER (FW 1/2")
28	500694	8	MOUNTING BOLT (HHCS 3/8"-16 x 1" Gr.8)
29	500695	8	LOCK WASHER (LW 3/8" Gr.8)
30	500330	2	DERAIL SKID WELDMENT
31	500692	2	MOUNTING BOLT (HHCS 3/8"-16UNC x 2-1/2" Gr.5)
32	500693	2	NYLOCK NUT (3/8"-16UNC)
33	500288	2	BRONZE BUSHING (McMASTER 6364K36)
34	500399	1	RAILSWEEP ASSEMBLY, AXLE SET (OPTIONAL)
35			
36			

**PRE 2008**

	8/23/05	REMOVED HELAC ACTUATOR PAD 500266	WAK		
	4/23/03	REVISED SPINDLE 500118, FROM 6 TO 4 COLLAR BOLTS	WAK		
REV	DATE	DESCRIPTION	BY	APP	
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS		RW1013	TITLE:  RW-1013 BASIC CORE UNIT, REAR 2007 AND PRIOR		
FRACTIONAL: 1/32" FRACTIONAL: 1/16" .X .063 .XX .030 .XXX OR .XXXX .005 DRILL SIZES: +.015 ANGULAR: ± 1° SURF FINISH: .125 MICRO THREADS: .0005 AND .0003 BREAK SHARP EDGES (0.000 X 45° MAX)			DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512		
DRAWN BY: WAK		APPD BY:	DATE:  12/12/00	 DRAWING NUMBER: 502002	REV: B

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	500115	1	DETAIL,SPINDLE,RW-1013, LOCKING
2	500108	1	SEAL, N412920/CR22532
3	500102	1	BEARING CONE (TIMKEN 25590)
4	500106	1	BEARING CONE, RW-1013 OUTER (TIMKEN 15106)
5	500125	1	WASHER,TONGUE,RW-1013 LOCKING
6	500123	1	DET. SLHN 7/8-14UNF
7	10563	1	COTTER PIN: 1/8" X 1.5"
8	500132	1	HUBCAP,CAST,RW-1013
9	500138	4	HI-COLLAR LOCK WASHER, 1/4"
10	500136	4	SHCS 1/4-20 X 3/4"
11	500156	1	RW-1013 WHEEL W/ RACES, STW
12	500162	1	WHEEL ASSY W/RACES, STW, 1013 SPOKELESS WHEEL
12.1	500100	1	BEARING RACE, TIMKEN 25520
12.2	500104	1	BEARING RACE, TIMKEN 15243
13	500150	1	RW-1013 WHEEL W/ RACES, RTW
13.1	500144	1	RW-1013 RUBBER TREAD DETAIL

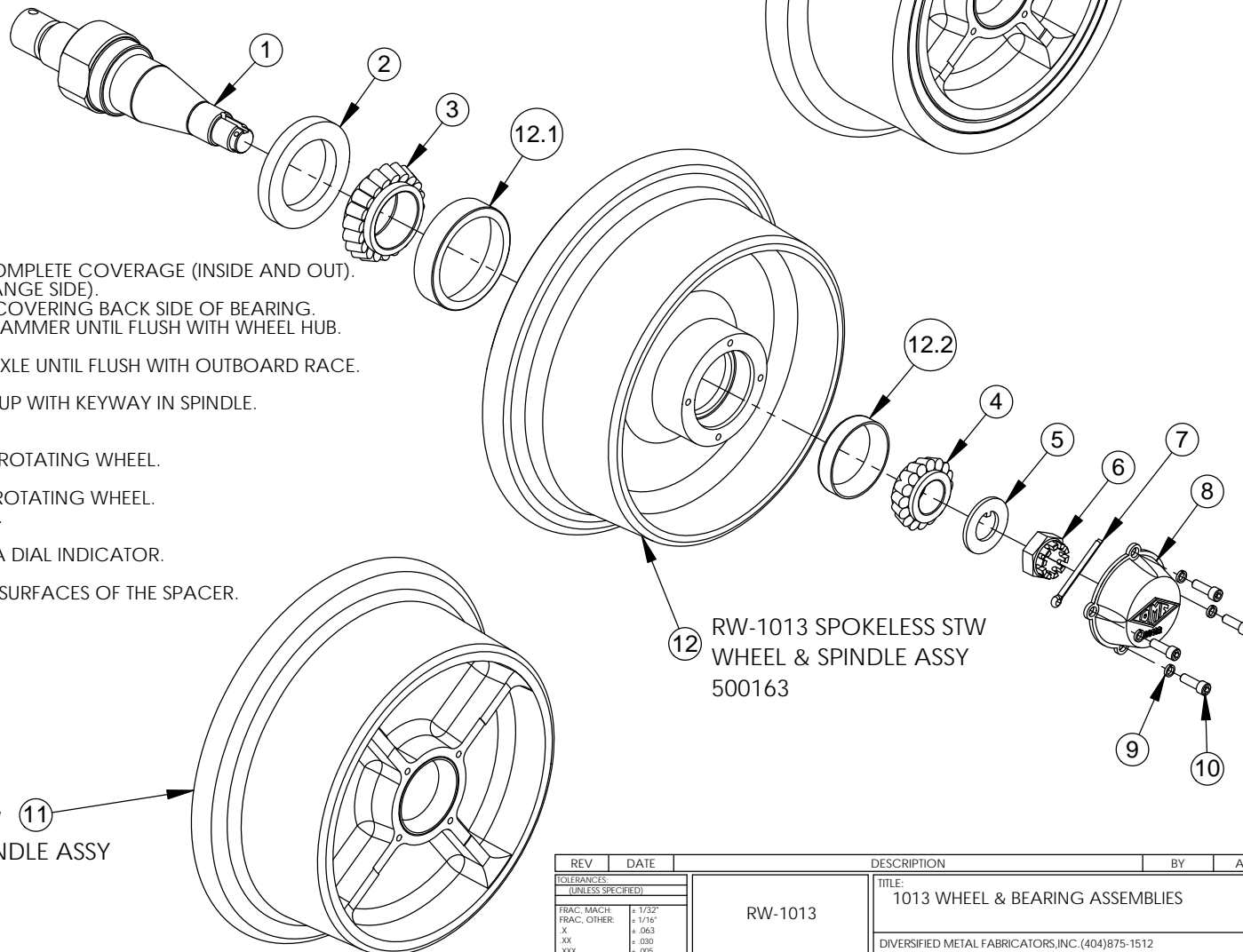
RW-1013 RTW  
WHEEL & SPINDLE ASSY  
500159



#### WHEEL ASSEMBLY PROCEDURE:

- PACK ALL BEARINGS COMPLETELY 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 TONGUE WASHER (ITEM 5), LINE THE TAB UP WITH KEYWAY IN SPINDLE.
- INSTALL CASTLE NUT (ITEM 6).
- ADJUST BEARING END-PLAY:
  - TIGHTEN CASTLE NUT TO 100 FT-LBS WHILE ROTATING WHEEL.
  - BACK OFF CASTLE NUT ONE FULL TURN.
  - TIGHTEN CASTLE NUT TO 50 FT-LBS WHILE ROTATING WHEEL.
  - BACK OFF CASTLE NUT BY TWO NOTCHES.
- INSTALL COTTER PIN.
- VERIFY BEARING END-PLAY IS 0.001"-0.005" WITH A DIAL INDICATOR.
- FILL OUTBOARD CAVITY WITH GREASE.
- RUN A BEAD OF SILICONE ON BOTH MOUNTING SURFACES OF THE SPACER.
- INSTALL HUBCAP WITH PROVIDED SCREWS.

RW-1013 STW  
WHEEL & SPINDLE ASSY  
500158



RW-1013 SPOKELESS STW  
WHEEL & SPINDLE ASSY  
500163

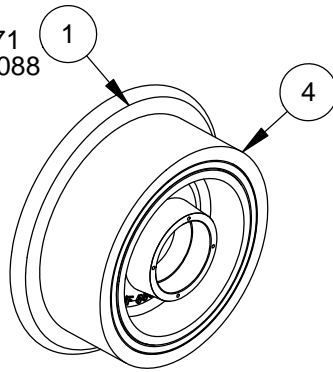
#### Wheel Bearing Grease:

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

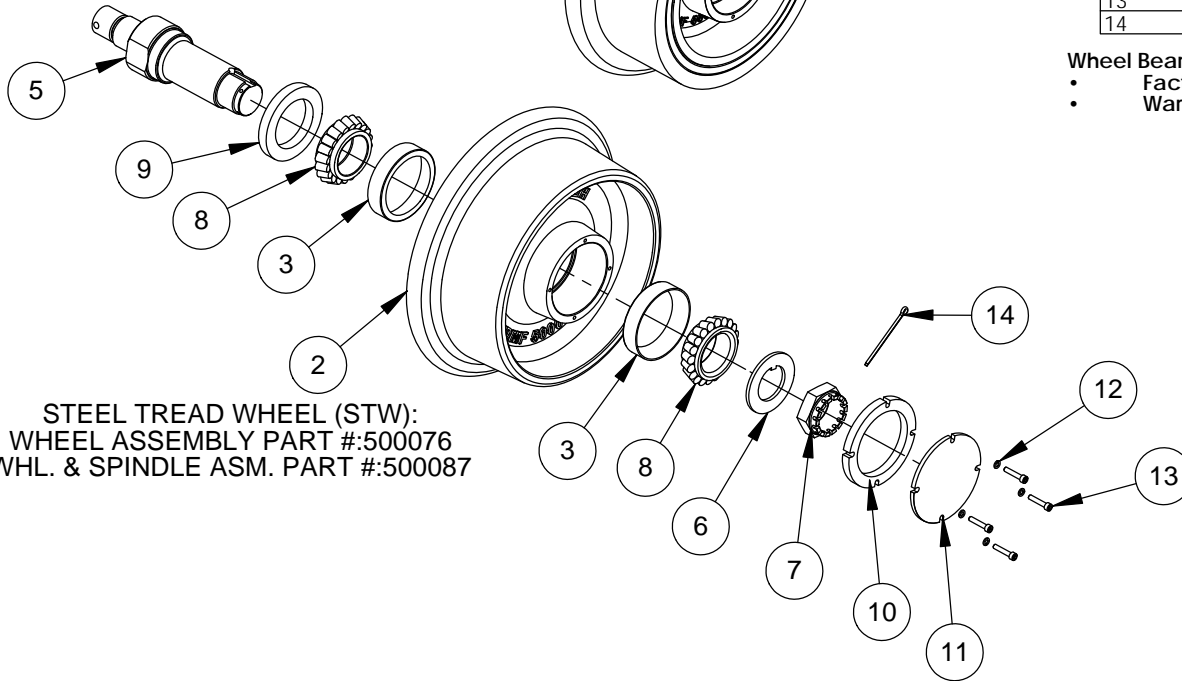
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED)				
FRAC. MACH: ± 1/32"				
FRAC. OTHER: ± 1/16"				
.XX ± .063				
.XX ± .030				
.XXX ± .005				
DRILL SIZES: ± .015				
ANGULAR: ± 1"				
SURF FINISH: 125 MICRO				
THREADS: 2A AND 2B				
RW-1013				
TITLE: 1013 WHEEL & BEARING ASSEMBLIES				
DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512				
DRAWN BY:	APPD BY:	DATE:	DRAWING NUMBER:	REV:
BJF	-	9/11/17	M1013001	#



RUBBER TREAD WHEEL (RTW):  
WHEEL ASSEMBLY PART #:500071  
WHL. & SPINDLE ASM. PART #:500088



STEEL TREAD WHEEL (STW):  
WHEEL ASSEMBLY PART #:500076  
WHL. & SPINDLE ASM. PART #:500087



ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	500070	1	DETAIL, RAILWHEEL, 1013HD
2	500075	1	DETAIL, RAILWHEEL, RW-1013/15HD, STW
3	500100	4	BEARING RACE, (TIMKEN 25520)
4	500144	1	TREAD, RUBBER
5	500121	1	DETAIL, SPINDLE, HD, RW-1013HD
6	10596	1	WASHER, TONGUE (TIMKEN K-91508)
7	10599	1	DET, SLHN 1-9/16-18 AFBMAX14SL
8	500102	2	BEARING CONE (TIMKEN 25590)
9	500108	1	SEAL, N412920/CR22532
10	500073	1	BO, HUBCAP SPACER, 1015HD, LOCKING
11	500078	1	BO, HUBCAP
12	818425	4	#10 SPRING LOCK WASHER
13	605009	4	SOCKET HEAD CAP SCREW, 10-24 X 1
14	100263	1	COTTER PIN 1/8 X 2-1/2

#### Wheel Bearing Grease:

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

#### WHEEL ASSEMBLY PROCEDURE:

- PACK ALL BEARINGS COMPLETELY 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 TONGUE WASHER (ITEM 6), LINE THE TAB UP WITH KEYWAY IN SPINDLE.
- INSTALL CASTLE NUT (ITEM 7).
- ADJUST BEARING END-PLAY:
  - TIGHTEN CASTLE NUT TO 200 FT-LBS WHILE ROTATING WHEEL.
  - BACK OFF CASTLE NUT ONE FULL TURN.
  - TIGHTEN CASTLE NUT TO 50 FT-LBS WHILE ROTATING WHEEL.
  - BACK OFF CASTLE NUT BY ONE NOTCH.
- INSTALL COTTER PIN.
- VERIFY BEARING END-PLAY IS 0.001"-0.005" WITH A DIAL INDICATOR.
- FILL OUTBOARD CAVITY WITH GREASE.
- RUN A BEAD OF SILICONE ON BOTH MOUNTING SURFACES OF THE SPACER.
- INSTALL HUBCAP WITH PROVIDED SCREWS.

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REV	DATE	DESCRIPTION				BY	APP
TOLERANCES:		RW-1013HD					
(UNLESS SPECIFIED)							
FRAC. MACH:		± 1/32"		TITLE: RW-1013HD WHEEL & BEARING ASSEMBLIES			
FRAC. OTHER:		± 1/16"					
X		± .063		DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512			
XX		± .030					
XXX		± .005					
DRILL SIZES:		± .015		DRAWN BY: BJF      APPD BY:      DATE: 9/11/17			
ANGULAR:		± 1"					
SURF FINISH:		125 MICRO					
THREADS:		2A AND 2B		<div><div><div></div></div></div>			
				DRAWING NUMBER: M1013002			
				REV: #			

**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.

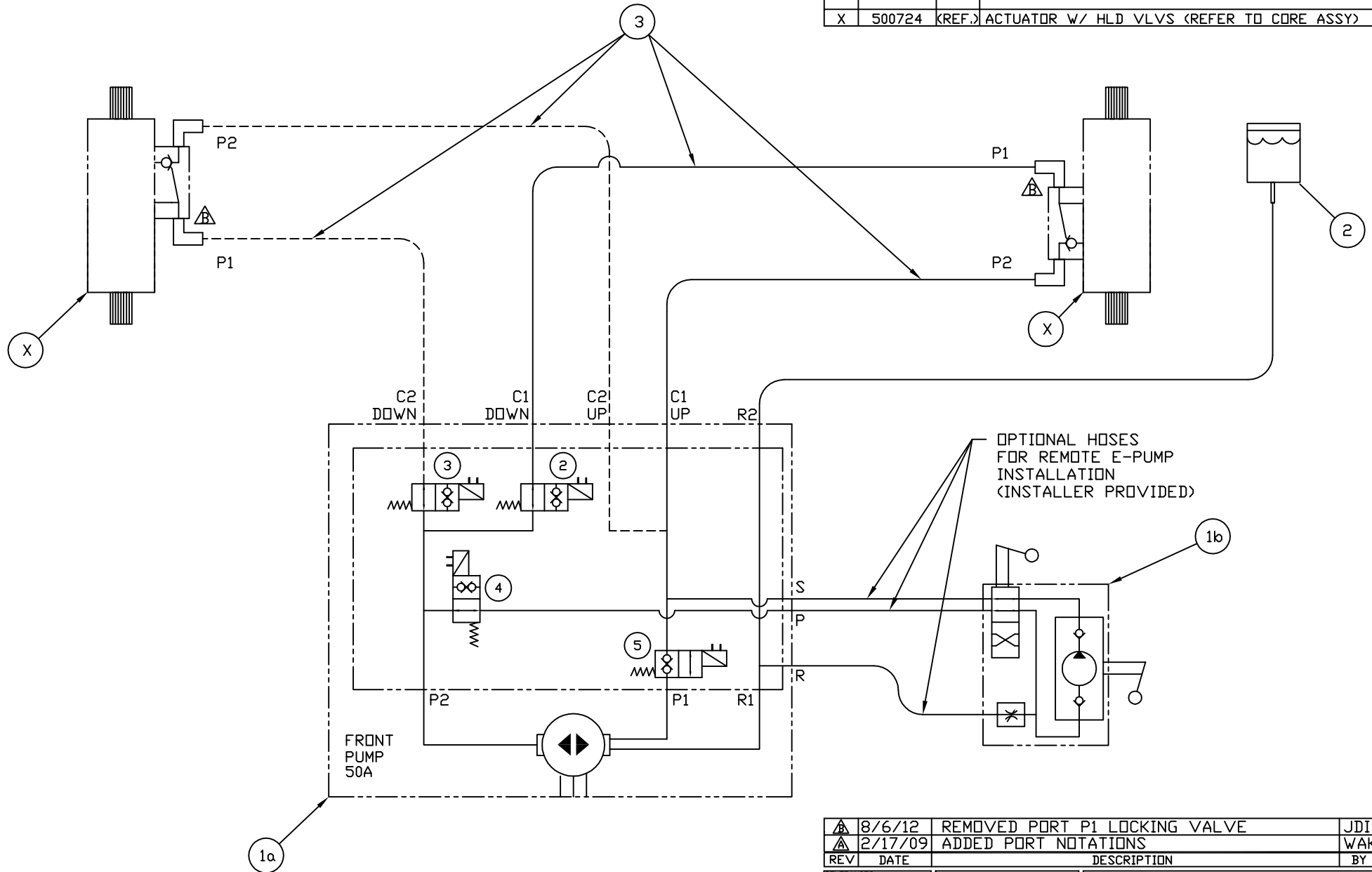
D) Bolt manufacturer's specs should be used when available.




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!

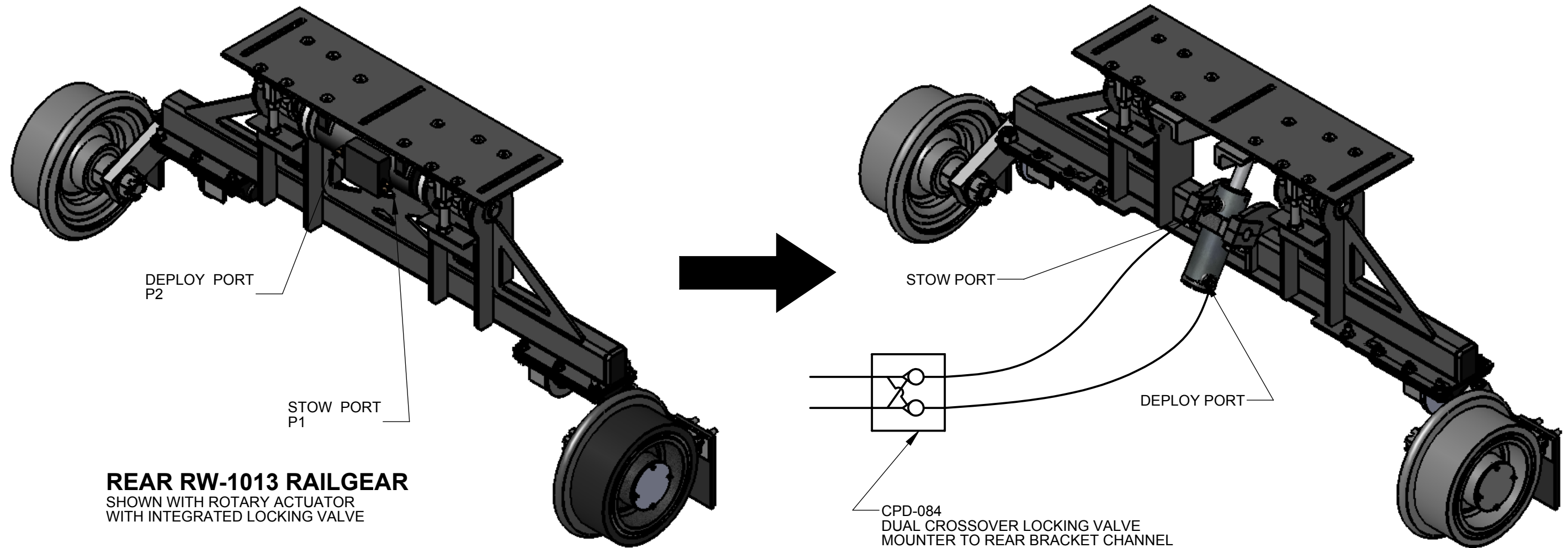
	07/15/15	UPDATED ALL TORQUE VALUES, REMOVED PLAIN TORQUE SPECS		DJJ	
	12/29/99	ADDED RECOMMENDED TORQUE CHART		LOR	
REV	DATE	DESCRIPTION			BY APP
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRACTIONAL: ± 1/32" FRACTIONAL, OTHER: ± 1/16" X: ± .063 .XX: ± .030 .XXX OR .XXXX: ± .005 DRILL SIZES: ± .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

ITEM	PART NO.	QTY	DESCRIPTION
1a	501739	1	ASSY, PUMP ENCLOSURE 08RW1013
1b	501739	1	ASSY, PUMP ENCLOSURE, REMOTE EMERGENCY PUMP
2	500736	1	ASSY, RESEVOIR KIT 08RW1013
3	500738	1	ASSY, HOSE KIT, 08RW1013
X	500724	[REF.]	ACTUATOR W/ HLD VLVS (REFER TO CORE ASSY)



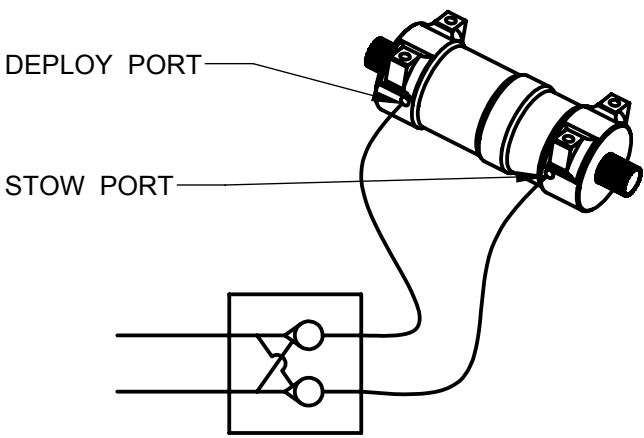
	8/6/12	REMOVED PORT P1 LOCKING VALVE		JDI		
	2/17/09	ADDED PORT NOTATIONS		WAK		
REV	DATE	DESCRIPTION			BY	APP
TOLERANCES: (UNLESS SPECIFIED)		<div><div>RW-1013</div><div><div><div>DRAWN BY:</div><div>WAK</div></div><div><div>APPD BY:</div><div></div></div></div><div><div>DATE:</div><div>7/17/08</div></div><div></div><div><div>DRAWING NUMBER:</div><div>501740</div></div><div><div>REV:</div><div>B</div></div></div>				
FRAC. MACH. ± 1/32"						
FRAC. OTHER ± 1/16"						
X ± .063						
XX ± .030						
XXX ± .005						
DRILL SIZES ± .015						
ANGULAR ± 1°						
SURF FINISH ± .25 MICRO						
THREADS 2A AND 2B						
BREAK SHARP EDGES (.5 RND X 45° MAX.)						
TITLE:		ASSY, HYDRAULIC SYSTEM, 08RW1013 2008 to present				
DIVERSIFIED METAL FABRICATORS, INC.(404)875-1512						

RW-1013 TO RW-1013HD COVERSION  
HYDRAULIC CONNECTIONS



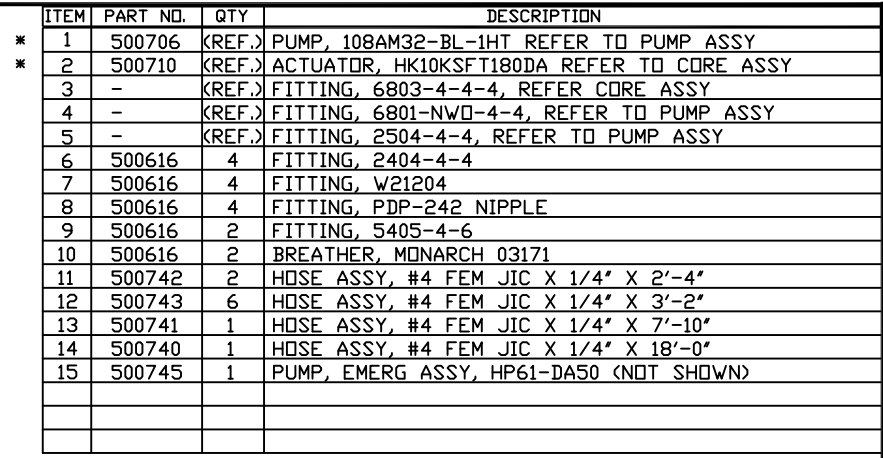
**REAR RW-1013 RAILGEAR**  
SHOWN WITH ROTARY ACTUATOR  
WITH INTEGRATED LOCKING VALVE




**REAR RW-1013HD RAILGEAR**  
Ø2" CYLINDER AMD EXTERNAL LOCKING VALVE

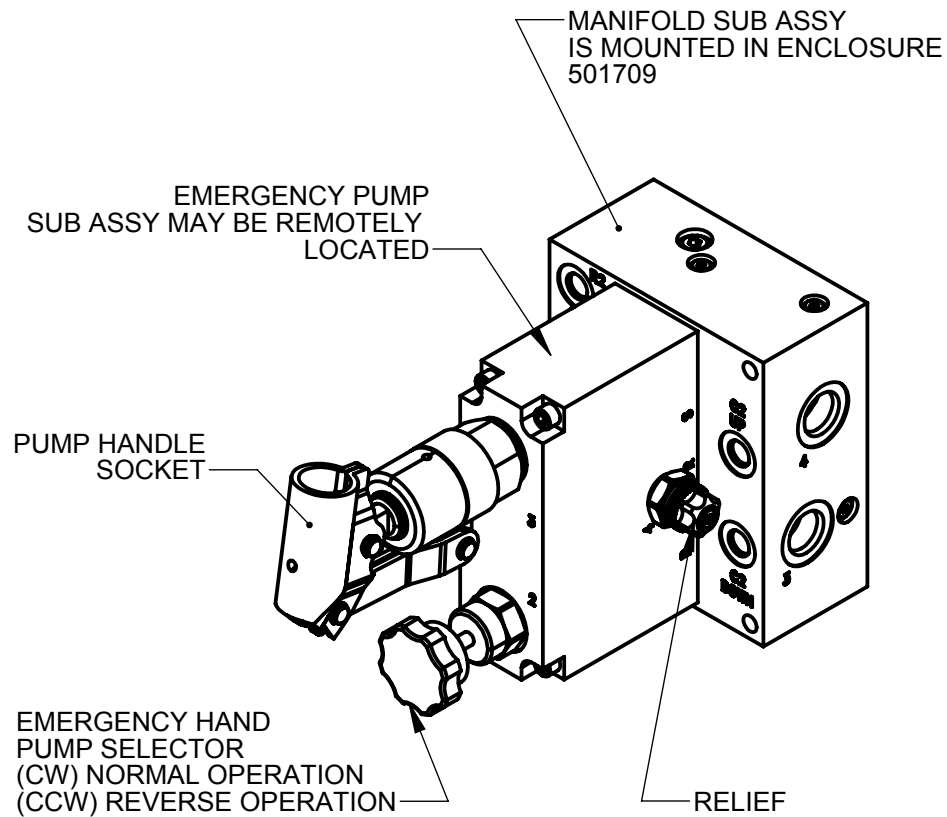


**ROTARY ACTUATOR**  
W/ EXTERNAL LOCKING VALVES

REV	DATE	DESCRIPTION			BY APP	
TOLERANCES:		<div>TITLE: RW-1013 TO RW-1013HD COVERSION HYDRAULIC CONNECTIONS</div> <div>DIVERSIFIED METAL FABRICATORS, INC., (404)875-1512</div>				
(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				
SERIAL NUMBER CODES (110101 - 991040)						
		</				



					
	-	-		-	
REV	DATE	DESCRIPTION			BY APP
TOLERANCES: (UNLESS SPECIFIED)		TITLE: HYDRAULIC SCHEMATIC, 2-PUMP 2002-2008 DIVERSIFIED METAL FABRICATORS, INC.(404)875-1512			
RW-1013					
FRAC. MACH. ± 1/32" FRAC. OTHER ± 1/16" .XX ± .063 .XX ± .030 .XX ± .005 DRILL SIZES: ± .015 ANGULAR: ± 1° SURF FINISH: 125 MICRO THREADS: RA AND 2B		DRAWN BY:	APPD BY:	DATE:	DRAWING NUMBER:
WAK				02/03/02	500701
					#



501737 RW-1013 MANIFOLD & EMERGENCY PUMP ASSY

## EMERGENCY HAND PUMP OPERATION

### TO RAISE GEAR

1. TURN OFF RAILGEAR SYSTEM AT CAB POWER SWITCH
2. LOCATE HAND PUMP  
MAY BE MOUNTED:
  - IN CROSS BODY TOOL BOX
  - IN SERVICE BODY CABINETS
  - REMOTELY MOUNTED ON OR BEHIND BUMPER
3. **DO NOT INSERT HANDLE INTO SOCKET UNTIL STEP 7  
HANDLE MAY MOVE DURING STEP 6**
4. TURN SELECTOR FULLY CLOCKWISE (CW)
5. INSERT HANDLE
6. PUMP HANDLE (PUMPS ON UP AND DOWN STROKE)  
**FRONT AND REAR RAILGEAR MAY NOT  
MOVE TOGETHER, PUMP UNTIL BOTH  
UNITS ARE STOWED**
7. WHEN RAIL GEAR IS RAISED COMPLETELY RESTRAIN WITH  
CHAINS OR CARGO STRAPS TO MOVE ON HIGHWAY
8. TAKE VEHICLE IN FOR SERVICE

NOTE: THE RELIEF CAN BE OPEN THEN CLOSE TO BLEED OFF PRESSURE IF THE CIRCUIT IS PRESSURIZED TO A DEGREE THAT PREVENTS THE USE OF THE EMERGENCY HAND PUMP.

**NOTE:**  
**HAND PUMP IS INTENDED ONLY TO ALLOW A MALFUNCTIONING  
VEHICLE TO BE REMOVED FROM THE RAIL. PLEASE  
TAKE VEHICLE IN FOR SERVICE IF HAND PUMP OPERATION  
IS REQUIRED.**

<div><div><div></div><div></div></div></div>							
<div><div><div></div><div></div></div></div>		2/24/09		CHANGED INSTRUCTION REGARDING RELIEFS		WAK	
REV		DATE		DESCRIPTION		BY	
APP							
TOLERANCES: (UNLESS SPECIFIED)		RW-1013		TITLE:			
FRAC. MACH: ± 1/32"				EMERGENCY HAND PUMP INSTRUCTIONS 2008 to present			
FRAC. OTHER: ± 1/16"							
.X ± .063							
.XX ± .030							
.XXX ± .005							
DRILL SIZES: ± .015		DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512					
ANGULAR: ± 1°		DRAWN BY:		APPD BY:		DATE:	
SURF FINISH: 125 MICRO		WAK				DRAWING NUMBER:	
THREADS: 2A AND 2B						501737	
REWORK STAMP PERFORMED (DATE) (BY NAME)						REV:	
						A	

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

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: TSH            APPD BY:         </small>		<small>           TITLE: PRODUCTION PROCEDURE 004            PIPE FITTING INSTALLATION            DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512            DATE: 06/02/94             DRAWING NUMBER: PP004            REV: #         </small>	



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

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

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:

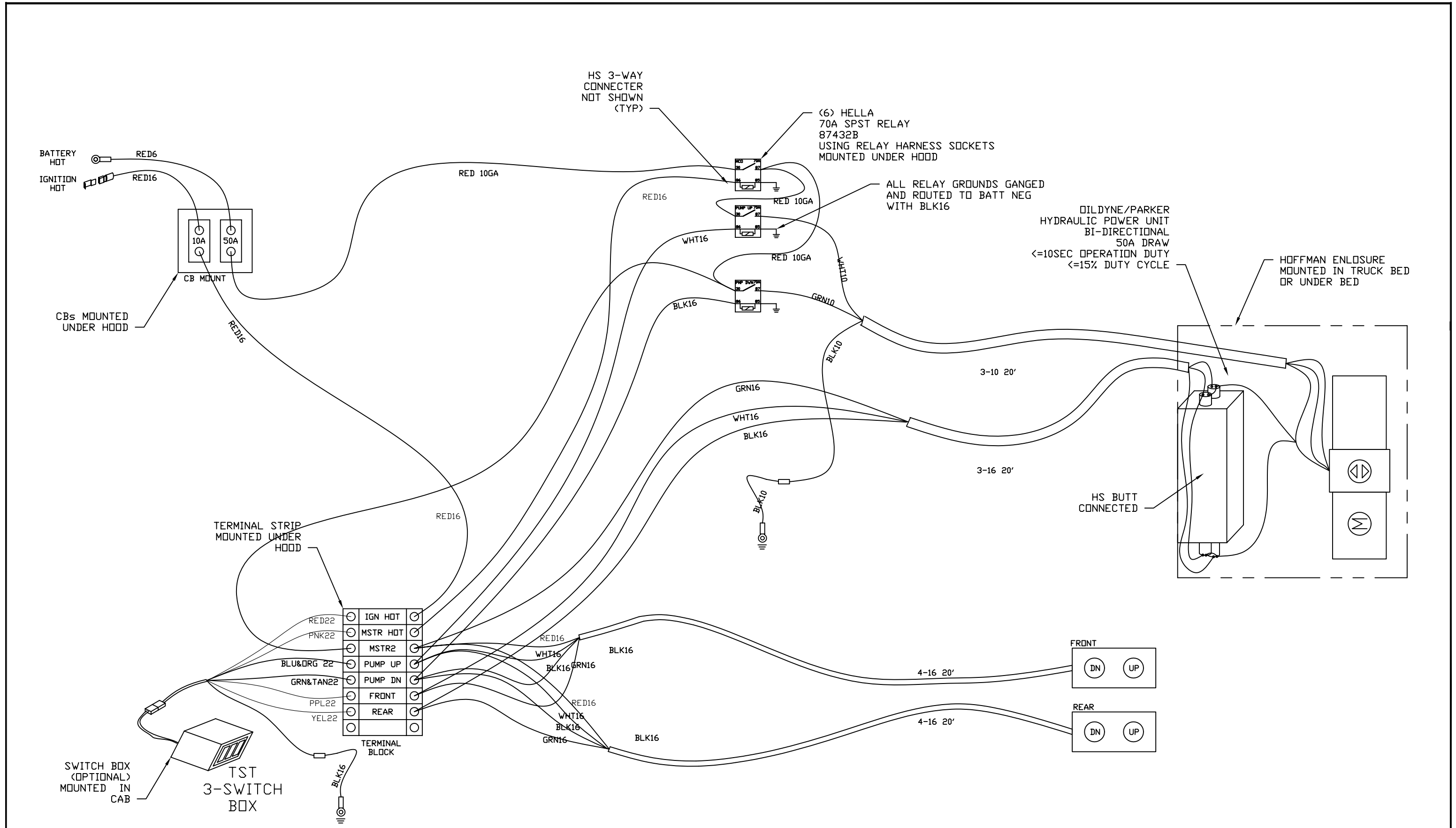
- A) Connect hydraulic power unit to cylinder.  
B) Operate cylinder through complete cycle to purge air and fill with clean hydraulic oil.  
C) Operate cylinder to full extension and retraction and maintain at 3300 PSI for 15 seconds at each extent. While maintaining pressure at each extent, visually 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.

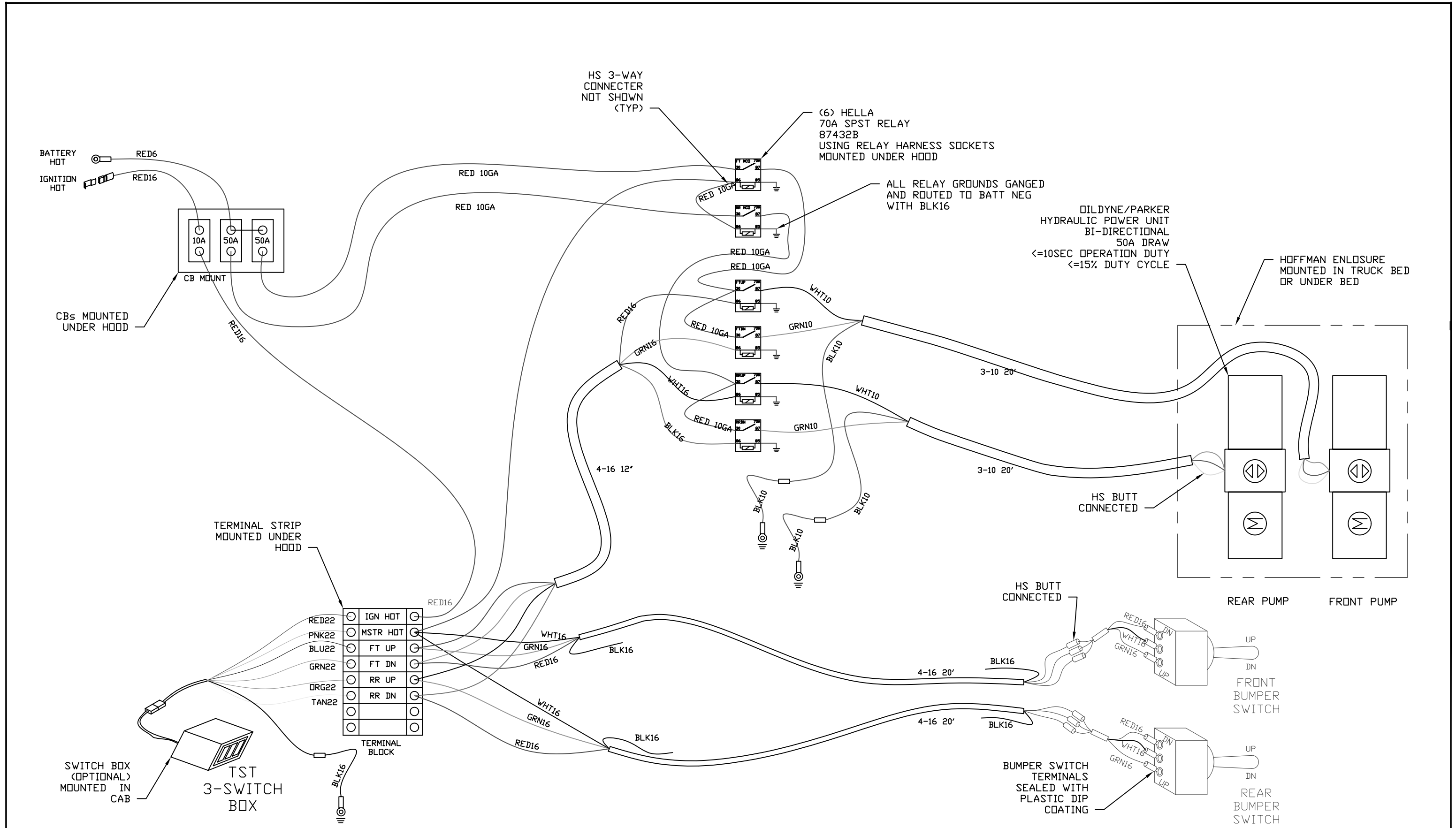
**FOR CYLINDERS GREATER THAN Ø4.5", DO NOT ALLOW CYLINDER TO BOTTOM DURING TESTING. BLOCK ROD AGAINST GLAND WITH PIN AND 1" BLOCKS.**

	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 .00" 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





NOTES:  
ALL GROUNDS ROUTED TO BATTERY NEG  
ALL HEAT SHRINK TERMINALS

B		11/13/08	CORRECTED PER MDS	WAK	
A		8/08	CHANGED FROM JUNCTION BOX	WAK	
REV	DATE	DESCRIPTION		BY	APP
TOLERANCES: (UNLESS SPECIFIED) DIMENSIONS: AS SHOWN FRACTIONAL: 1/32" FRACTIONAL: 1/16" X: .063 XX: .030 XXX OR .000: .005 DRILL SIZES: .015 ANGULAR: 1° SURF FINISH: .025 MICRO THREADS: .002 AND .001		TITLE: RW-1013 RW-1013 ELECTRICAL LAYOUT DIAGRAM SINGLE PUMP- RELAY SYSTEM		DRAWN BY: WAK	APPD BY: WAK
DATE: 9/29/06		DRAWING NUMBER: 501801A		REV: B	



NOTES:  
ALL GROUNDS ROUTED TO BATTERY NEG  
ALL HEAT SHRINK TERMINALS

REV		DATE		DESCRIPTION				BY	APP
TOLERANCES: (UNLESS SPECIFIED) DIMENSIONS: DECIMALS FRACTIONAL: 1/32" FRACTIONAL: 1/16" X: .063 XX: .030 XXX OR .XXXX: .005 DRILL SIZES: .015 ANGULAR: 1° SURF FINISH: 325 MICRO THREADS: 2A AND 2B (SEE DRAWING NOTES FOR 2A AND 2B)									
RW-1013				TITLE: RW-1013 ELECTRICAL LAYOUT DIAGRAM RELAY SYSTEM					
				DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512					
DRAWN BY:		APPD BY:		DATE:			DRAWING NUMBER:	REV:	
WAK				9/29/06			501750A	#	

	WHEEL MOD KIT,'07-10 GM HD PICKUP / '07-12 SUBURBANS, W/RIMS & TPMS							
	TITLE:							
	DRAWING #:	509029	BY:	BJF	DATE:	3-22-12	REV:	#
RW-1013/15	DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512							
REV:	DATE:	DESCRIPTION:					BY:	
-	-	-					-	
-	-	-					-	

## 2007-2010 GM Pickup & 2007-2012 Suburban Wheel Adapter Kit

### Description

Diversified Metal Fabricator's 509050 Wheel Adapter Kit allows for the use of aftermarket 19.5" rims on 2007-2010 GM 2500HD and 3500HD SRW pickups and 2007-2012 GM Suburbans for use on rail.

### Kit Contents

PART #				DESCRIPTION	QTY.
509029				WHEEL MOD KIT,'07-10 GM HD PICKUP / '07-12 SUBURBANS, W/RIMS & TPMS	EA.
	10833			TPMS SENSOR KIT,'07-12 GM (Truck Set)	1
		600617		WIRING ENCLOSURE BOX, 4.7" X 2.2" X 3.3"	1
		10836		TPMS SENSOR KIT, '07-12 GM (per wheel)	5
			10838	TPMS ADAPTER WASHER-GM	1
			10839	TPMS ADAPTER GROMETT-GM	1
			10837	TPMS SENSOR,GM '07-12, 20158	1
	10859			WHEEL, ACCURIDE 28680/50180, W/DECAL	5
		10827		WHEEL, ACCURIDE 28680/50180	1
		10831		DECAL, '05 GM WHEEL ADAPTER	1
	509014			WHEEL ADPT, '00-10 GM C25/3500 W/STEERING STOPS	1
		10824		WHEEL ADAPTER, STL, 05 GM	4
			10822	SPCR,WHEEL ADAPTER,05 C2500	1
			10825	LUGNUT, SPLIT-FLANGE, M20	8
			10826	STUD, WHEEL, 20MM, E-11706	8
		500913		STEERING STOP KIT, TRUCK SET, '00-'10 GM HD PICKUP	1
			500912	STEERING STOP, '00-'10 GM HD PICKUP	2
			20716	FLAT WASHER, 5/8", GR8	2
			605017	LOCKNUT, M16, TYPE C	2
		551002		WHEEL SPACER, 05-11GM ADAPTER, 3/16"	2

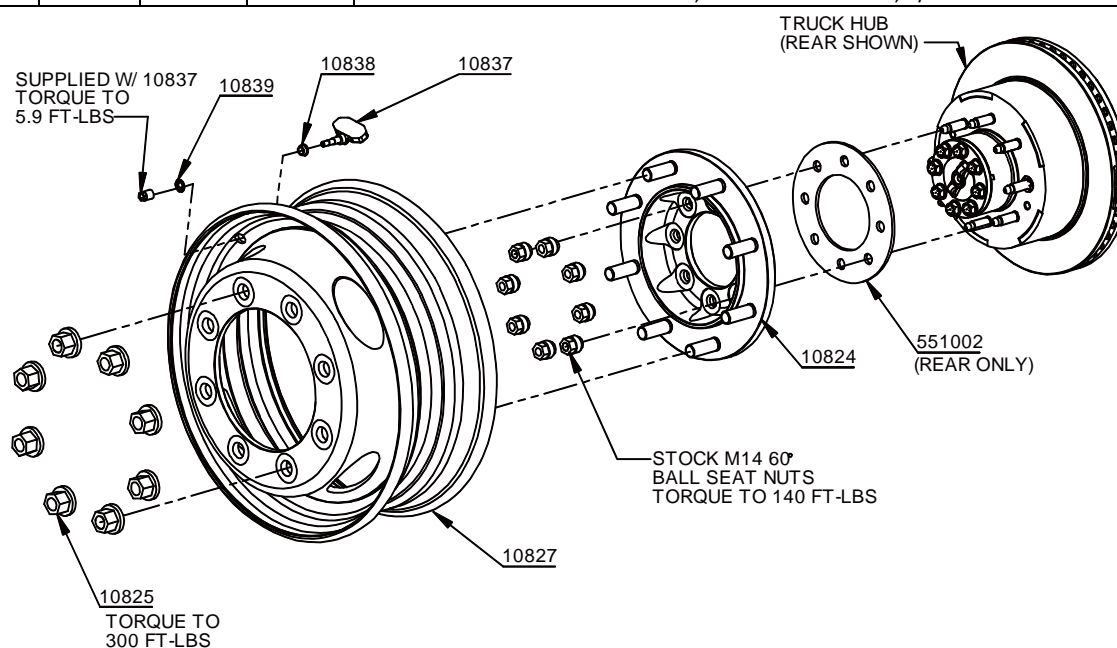


Figure 1 – Installation/Exploded Parts Diagram

## Recommended Tires

### Mud/Snow/All position

Goodyear G622	245/70R19.5
Michelin XDS2	245/70R19.5

### Steer/Highway

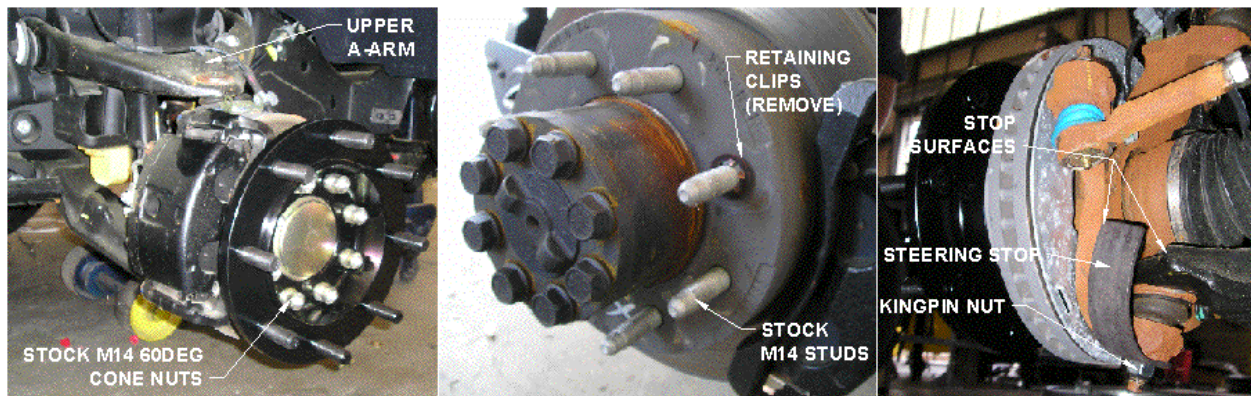
Goodyear G647	245/70R19.5
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## Installation

### Warning!

- Never use anti-seize on studs or lug nuts.
- Hand torque all fasteners to the provided specifications using a torque wrench.
- Improper installation or failure to perform a thorough check for clearances once this unit is installed may lead to damage to the chassis, wheels/tires, Railgear or personnel.

1. Install TPMS sensors into 19.5" rims as shown in Figure 1
2. Install and Inflate 19.5" Tires
  - a. Mount and balance tires.
  - b. Inflate tires to a cold pressure of 85 psi.
3. Remove Stock Wheels & Tires
  - a. Lift the vehicle and properly support using jack-stands.
  - b. Remove the stock wheels and tires, retaining the stock lug nuts for reuse.
4. Install Steering Stops as shown in Figure 2
  - a. Remove "Lower Kingpin Nut" from each side
  - b. Install Steering Stop on each side using provided M16 Type C nut.
  - c. Actuate steering to its extents in both directions and verify that the Steering Stops are contacting stop surfaces.
5. Install Adapters, 19.5" Wheels & Tires as shown in Figure 2
  - a. Remove and discard the factory lug retaining clips.
  - b. Mount the Wheel Adapters using the stock lug nuts. Torque as specified in Figure 1.
  - c. Mount the 19.5" rims with 19.5" tires to the Wheel Adapter using the provided M20 Split Flange Nuts. Torque as specified in Figure 1.



**Figure 2 - Wheel Adapter Details**

6. Clearance Check(s)
  - a. Verify that neither the rims nor tires contact any frame or suspension components in any combination of steering positions and axle droop/jounce conditions.
  - b. Verify that all brake, ABS sensor and other wires or hoses are clear in all steering and suspension positions. Restrain if necessary.
7. Relocate TPMS Receiver Module
  - a. Remove nuts from the main rear seat mounting studs. (If applicable)
  - b. Carefully lift and remove the rear seat. (If applicable)
  - c. Remove the trim panel on the driver's side B-Pillar (C-Pillar on crew cab models).
  - d. The TPMS Receiver Module will be located as shown in Figure 3.



**Figure 3 – Original TPMS Receiver Location**

- e. Detach the wiring connectors from the TPMS Receiver and carefully remove it.
- f. Carefully pull back the insulation along the rearmost cab wall.
- g. Reroute the TPMS Receiver wiring through the lowest portion of the driver's side rear vent as shown in Figure 4.
- h. Drill a small hole in the side of the provided enclosure and securely mount it to the underside of the bed on the driver's side just behind the cab as shown in Figure 4.
- i. Reconnect the appropriate wires and seal the enclosure using a bead of silicone and the provided hardware.
- j. Replace interior insulation and trim ensuring that no wires are pinched or routed in a manner that might cause them to be damaged.
- k. Replace the rear seat and tighten the lower mounting bolts. (If applicable)





**Figure 4 – Mounting Location**

NOTE: The following steps must be performed at a dealer as modification of these settings requires a software update specific to your vehicle that must come directly from GM.

8. Re-calibrating Speedometer
  - a. The speedometer calibration is limited to stock tire sizes.
  - b. As the tires we recommend are not a stock size for this vehicle, the stock LT265/60R20 tire setting should be selected as it is the most comparable in size.
9. Program Tire Pressure Monitoring System
  - a. The TPMS system must be reprogrammed to correspond with the correct pressure settings for use with these wheel modifications.
  - b. Ensure that the dealer sets the TPMS for a nominal pressure of 85 psi.
10. Re-establish sensor positions
  - a. Ensure that the dealer has re-established the sensor locations.
  - b. This step may also be performed by referring to the vehicle's owner's manual.


### **Testing**

1. It is the responsibility of the installer to certify that the truck complies with all applicable State and Federal regulations.
2. In particular, the regulations and test procedures outlined in FMVSS Standard 138 must be performed in order to ensure compliance.

### **Inspection & Maintenance**

1. Visually inspect wheels & tires both prior to and after use on rail (look for damage, loose hardware, etc.)
2. Check the fastener torque 50 miles after wheel/tire change and every 2000 miles or 6 months.



	TITLE: WHEEL MOD KIT, '11GM HD PICKUP W/ RIMS & TPMS			
	DRAWING #:	509033	BY: WAK	DATE: 3-15-11
RW-1013/15	DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512			
REV:	DATE:	DESCRIPTION:		BY:
A	3-22-12	Reformatted/Corrected		BJF
-	-	-		-

## 2011+ GM HD Pickup Wheel Adapter Kit

### Description

Diversified Metal Fabricator's 509033 Wheel Adapter Kit allows for the use of aftermarket 19.5" rims on 2011+ GM 2500HD and 3500HD SRW trucks for use on rail. This kit is not compatible with 2011 Suburban/Yukon's which continue to use DMF Wheel Adapter kit # 509029.

### Kit Contents

PART #	DESCRIPTION	QTY.
509033	WHEEL MOD KIT, '11 GM HD PICKUP W/ RIMS & TPMS	EA.
10833	TPMS SENSOR KIT, 07-12 GM (Truck Set)	1
600617	WIRING ENCLOSURE BOX, 4.7" X 2.2" X 3.3"	1
10836	TPMS SENSOR KIT, 07-12 GM (per wheel)	5
10838	TPMS ADAPTER WASHER-GM	1
10839	TPMS ADAPTER GROMETT-GM	1
10837	TPMS SENSOR, GM 07-12, 20158	1
10859	WHEEL, ACCURIDE 28680/50180, W/DECAL	5
10827	WHEEL, ACCURIDE 28680/50180	1
10831	DECAL, '05 GM WHEEL ADAPTER	1
509034	WHEEL ADPT, 11C25/3500, W/STEERING STOPS	1
10818	WHEEL ADAPTER, STL, '11 GM C/K 25/3500	4
10819	DETAIL, WHEEL ADAPTER, '11 GM C/K25/3500	1
10825	LUGNUT, SPLIT-FLANGE, M20	8
10826	STUD, WHEEL, 20MM, E-11706	8
500915	'11 GM HD PICKUP, 1013/15 STEERING STOP KIT, TRUCK SET	1
500937	STEERING STOP, 11GM25HD, DS	1
500938	STEERING STOP, 11GM25HD, PS	1
20716	FLAT WASHER, 5/8", GR8	2
605017	LOCKNUT, M16, TYPE C	2

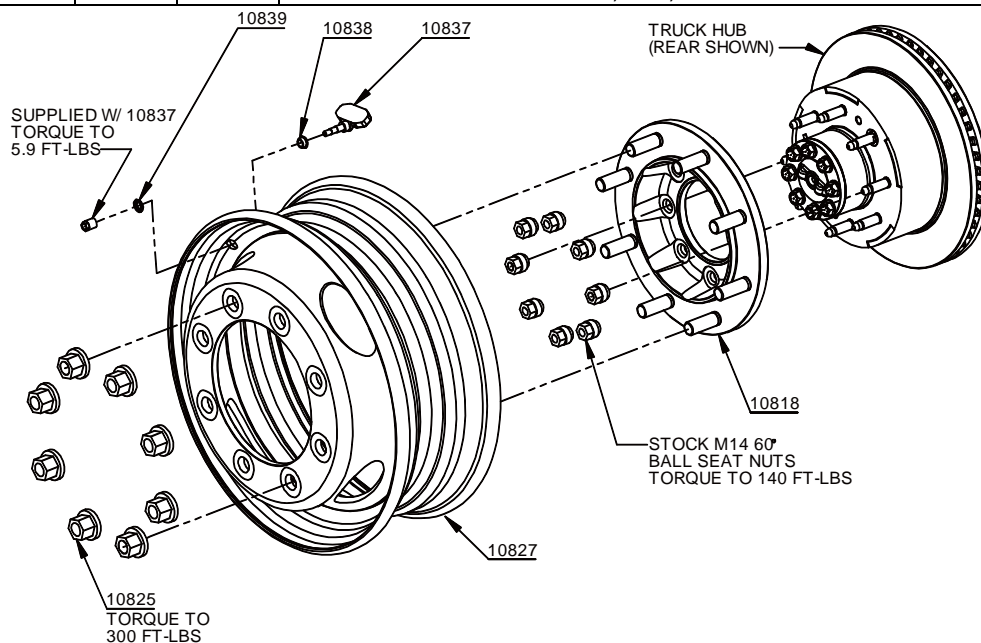


Figure 1 – Installation/Exploded Parts Diagram

## Recommended Tires

### Mud/Snow/All position

Goodyear G622 245/70R19.5

Michelin XDS2 245/70R19.5

### Steer/Highway

Goodyear G647 245/70R19.5

## Installation

### Warning!

- Never use anti-seize on studs or lug nuts.
- Hand torque all fasteners to the provided specifications using a torque wrench.
- Improper installation or failure to perform a thorough check for clearances once this unit is installed may lead to damage to the chassis, wheels/tires, Railgear or personnel.

1. Install TPMS sensors into 19.5" rims as shown in Figure 1
2. Install and Inflate 19.5" Tires
  - a. Mount and balance tires.
  - b. Inflate tires to a cold pressure of 85 psi.
3. Remove Stock Wheels & Tires
  - a. Lift the vehicle and properly support using jack-stands.
  - b. Remove the stock wheels and tires, retaining the stock lug nuts for reuse.
4. Install Steering Stops as shown in Figure 2
  - a. Remove "Lower Kingpin Nut" from each side
  - b. Install Steering Stop on each side using provided M16 Type C nut.
  - c. Actuate steering to its extents in both directions and verify that the Steering Stops are contacting stop surfaces.
5. Install Adapters, 19.5" Wheels & Tires as shown in Figure 2
  - a. Remove and discard the factory lug retaining clips.
  - b. Mount the Wheel Adapters using the stock lug nuts. Torque as specified in Figure 1.
  - c. Mount the 19.5" rims with 19.5" tires to the Wheel Adapter using the provided M20 Split Flange Nuts. Torque as specified in Figure 1.



Figure 2 – Wheel Adapter Details

6. Clearance Check(s)
  - a. Verify that neither the rims nor tires contact any frame or suspension components in any combination of steering positions and axle droop/jounce conditions.
  - b. Verify that all brake, ABS sensor and other wires or hoses are clear in all steering and suspension positions. Restrain if necessary.
7. Relocate TPMS Receiver Module
  - a. Remove nuts from the main rear seat mounting studs. (If applicable)
  - b. Carefully lift and remove the rear seat. (If applicable)
  - c. Remove the trim panel on the driver's side B-Pillar (C-Pillar on crew cab models).
  - d. The TPMS Receiver Module will be located as shown in Figure 3.



**Figure 3 – Original TPMS Receiver Location**

- e. Detach the wiring connectors from the TPMS Receiver and carefully remove it.
- f. Carefully pull back the insulation along the rearmost cab wall.
- g. Reroute the TPMS Receiver wiring through the lowest portion of the driver's side rear vent as shown in Figure 4.
- h. Drill a small hole in the side of the provided enclosure and securely mount it to the underside of the bed on the driver's side just behind the cab as shown in Figure 4.
- i. Reconnect the appropriate wires and seal the enclosure using a bead of silicone and the provided hardware.
- j. Replace interior insulation and trim ensuring that no wires are pinched or routed in a manner that might cause them to be damaged.
- k. Replace the rear seat and tighten the lower mounting bolts. (If applicable)



**Figure 4 – Mounting Location**

NOTE: The following steps must be performed at a dealer as modification of these settings requires a software update specific to your vehicle that must come directly from GM.


8. Re-calibrate Speedometer
  - a. The speedometer calibration is limited to stock tire sizes.
  - b. As the tires we recommend are not a stock size for this vehicle, the stock LT265/60R20 tire setting should be selected as it is the most comparable in size.
9. Program Tire Pressure Monitoring System
  - a. The TPMS system must be reprogrammed to correspond with the correct pressure settings for use with these wheel modifications.
  - b. Ensure that the dealer sets the TPMS for a nominal pressure of 85 psi.
10. Re-establish sensor positions
  - a. Ensure that the dealer has re-established the sensor locations.
  - b. This step may also be performed by referring to the vehicle's owner's manual.

### **Testing**

1. It is the responsibility of the installer to certify that the truck complies with all applicable State and Federal regulations.
2. In particular, the regulations and test procedures outlined in FMVSS Standard 138 must be performed in order to ensure compliance.

### **Inspection & Maintenance**

1. Visually inspect wheels & tires both prior to and after use on rail (look for damage, loose hardware, etc.)
2. Check the fastener torque 50 miles after wheel/tire change and every 2000 miles or 6 months.

	TITLE: WHEEL MOD KIT, 2010-2016 F-2/350 4X2, W/RIMS			
	DRAWING #:	509048	BY: BJF	DATE: 3-23-12
RW-1013/15	DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512			
REV:	DATE:	DESCRIPTION:		BY:
A	11/8/17	ADDED MODEL YEAR END DATE		BJF
-	-	-		-

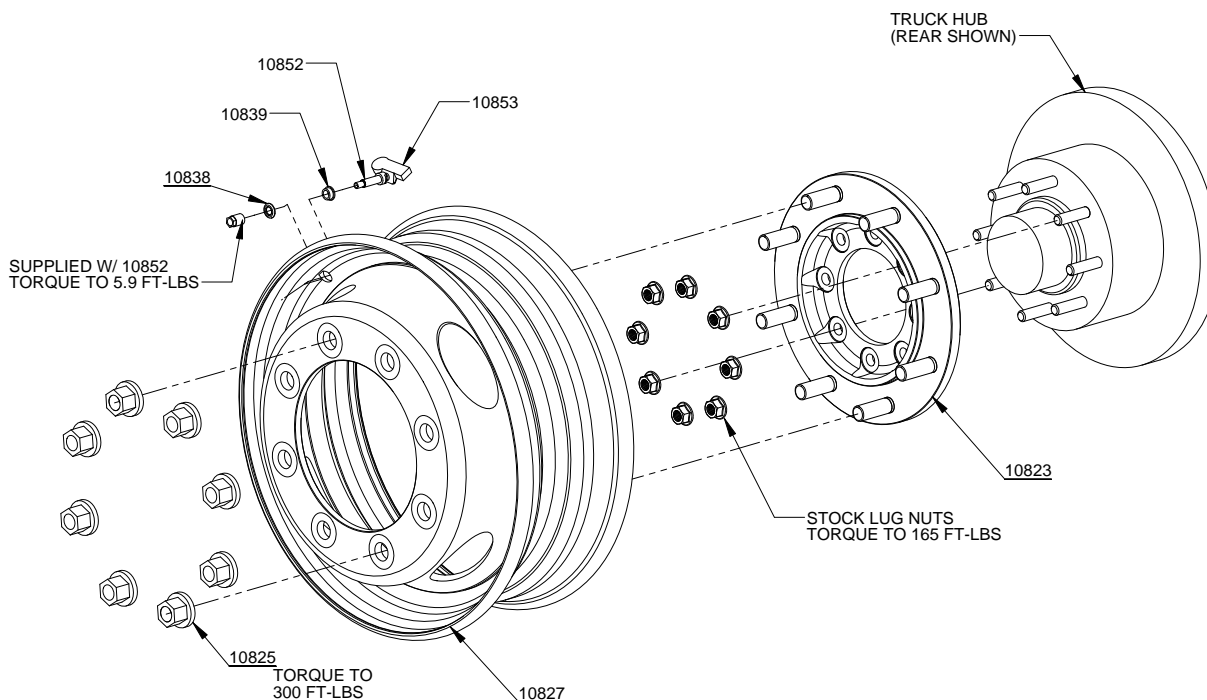
## 2010-2016 Ford F-2/350 4x2 Wheel Adapter Kit

### Description

Diversified Metal Fabricator's 509048 Wheel Adapter Kit allows for the use of aftermarket 19.5" rims on 2010-2016 Ford F-2/350 4x2 vehicles for use on rail.

### Kit Contents

PART #				DESCRIPTION	QTY.
509048				WHEEL MOD KIT, 2010+ F-2/350 4X2, W/RIMS & TPMS	EA.
	10851			TPMS SENSOR KIT, '10-12 F-2/350 (Truck Set)	1
		10857		TPMS SENSOR KIT, '10-12 F-2/350 (PER WHEEL)	5
			10838	TPMS ADAPTER WASHER-GM	1
			10839	TPMS ADAPTER GROMET-GM	1
			10852	DILL VALVE STEM VS-925A	1
			10853	TPMS SENSOR, '10-12 FORD	1
	10861			WHEEL, ACCURIDE 28680/50180, W/DECAL, F-2/350 00-12	5
		10827		WHEEL, ACCURIDE 28680/50180	1
		10832		DECAL, '05-'12 FORD WHEEL ADAPTER	1
	509040			WHEEL ADPT, '05-12 FORD F-2/350 4X2, W/STEERING STOPS	1
		10823		WHEEL ADAPTER, STL, 05-12 F-2/350	4
			10821	SPCR,WHEEL ADAPTER,05-12 F2/350	1
			10825	LUGNUT, SPLIT-FLANGE, M20	8
			10826	STUD, WHEEL, 20MM, E-11706	8
		515060		STEERING STOP KIT, '00-'12 FORD F-2/350 4X2, RW-1013/15	1
			515025	STEERING STOP,DS,'00-12 F-2/350 4X2	1
			515027	STEERING STOP,PS,'00-12 F-2/350 4X2	1



**Figure 1 – Installation/Exploded Parts Diagram**



## Recommended Tires

### Mud/Snow/All position

Goodyear G622	225/70R19.5
Michelin XDS2	225/70R19.5

### Steer/Highway

Goodyear G647	225/70R19.5
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## Installation

### Warning!

- Never use anti-seize on studs or lug nuts.
- Hand-torque all fasteners to the provided specifications using a torque wrench.
- Improper installation or failure to perform a thorough check for clearances once this unit is installed may lead to damage to the chassis, wheels/tires, or personnel.

1. Install TPMS sensor into 19.5" rims as shown in Figure 1
2. Install and Inflate 19.5" Tires
  - a. Mount and balance tires.
  - b. Inflate tires to a cold pressure of 85 psi.
3. Remove Stock Wheels & Tires
  - a. Lift the vehicle and properly support using jack-stands.
  - b. Remove the stock wheels and tires, retaining the stock lug nuts for reuse.
4. Install Steering Stops
  - a. Install Steering Stops.
  - b. Actuate steering to its extents in both directions and verify that the Steering Stops are contacting stop surfaces.
5. Install Adapters, 19.5" Wheels & Tires as shown in Figure 2
  - a. Remove and discard the factory lug retaining clips.
  - b. Mount the Wheel Adapters using the stock lug nuts. Torque as specified in Figure 1.
  - c. Mount the 19.5" rims with 19.5" tires to the Wheel Adapter using the provided M20 Split Flange Nuts. Torque as specified in Figure 1.



**Figure 2 – Wheel Adapter Details**

6. Clearance Check(s)
  - a. Verify that neither the rims nor tires contact any frame or suspension components in any combination of steering positions and axle droop/jounce conditions.
  - b. Verify that all brake, ABS sensor and other wires or hoses are clear in all steering and suspension positions. Restrain if necessary.

NOTE: The following steps must be performed at a dealer as modification of these settings requires a software update specific to your vehicle.

7. Re-calibrating Speedometer
  - a. The speedometer calibration is limited to stock tire sizes.
  - b. As the tires we recommend are not a stock size for this vehicle, the stock LT265/60R20 tire setting should be selected as it is the most comparable in size.
8. Program Tire Pressure Monitoring System
  - a. The TPMS system must be reprogrammed to correspond with the correct pressure settings for use with these wheel modifications.
  - b. Ensure that the dealer sets the TPMS for a nominal pressure of 85 psi.
9. Re-establish sensor positions
  - a. Ensure that the dealer has re-established the sensor locations.
  - b. This step may also be performed by referring to the vehicle's owner's manual.

### **Testing**


1. It is the responsibility of the installer to certify that the truck complies with all applicable State and Federal regulations.
2. In particular, the regulations and test procedures outlined in FMVSS Standard 138 must be performed in order to ensure compliance.

### **Inspection & Maintenance**

1. Visually inspect wheels & tires both prior to and after use on rail (look for damage, loose hardware, etc.)
2. Check the fastener torque 50 miles after wheel/tire change and every 2000 miles or 6 months.

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	TITLE: WHEEL MOD KIT, '10-16 F-2/350 4X4, W/RIMS & TPMS			
	DRAWING #:	509049	BY: BJF	DATE: 3-23-12
RW-1013/15	DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512			
REV:	DATE:	DESCRIPTION:		BY:
A	11/8/17	ADDED MODEL YEAR END DATE		BJF
-	-	-		-

## 2010-2016 Ford F-2/350 4x4 Wheel Adapter Kit

### Description

Diversified Metal Fabricator's 509049 Wheel Adapter Kit allows for the use of aftermarket 19.5" rims on 2010-2016 Ford F-2/350 4x4 vehicles for use on rail.

### Kit Contents

PART #				DESCRIPTION	QTY.
509049				WHEEL MOD KIT, 2010+ F-2/350 4X4, W/RIMS & TPMS	EA.
	10851			TPMS SENSOR KIT, '10-12 F-2/350 (Truck Set)	1
		10857		TPMS SENSOR KIT, '10-12 F-2/350 (PER WHEEL)	5
			10838	TPMS ADAPTER WASHER-GM	1
			10839	TPMS ADAPTER GROMET-GM	1
			10852	DILL VALVE STEM VS-925A	1
			10853	TPMS SENSOR, '10-12 FORD	1
	10861			WHEEL, ACCURIDE 28680/50180, W/DECAL, F-2/350 00-12	5
		10827		WHEEL, ACCURIDE 28680/50180	1
		10832		DECAL, '05-'12 FORD WHEEL ADAPTER	1
	509041			WHEEL ADPT, '05-12 FORD F-2/350 4X4, W/STEERING STOPS	1
		10823		WHEEL ADAPTER, STL, 05-12 F-2/350	4
			10821	SPCR, WHEEL ADAPTER, 05-12 F2/350	1
			10825	LUGNUT, SPLIT-FLANGE, M20	8
			10826	STUD, WHEEL, 20MM, E-11706	8
		515062		STEERING STOP KIT, '05-'12 FORD F-2/350 4X4, RW-1013/15	1
			515021	STEERING STOP, '05-'12 F-2/350 4X4	2

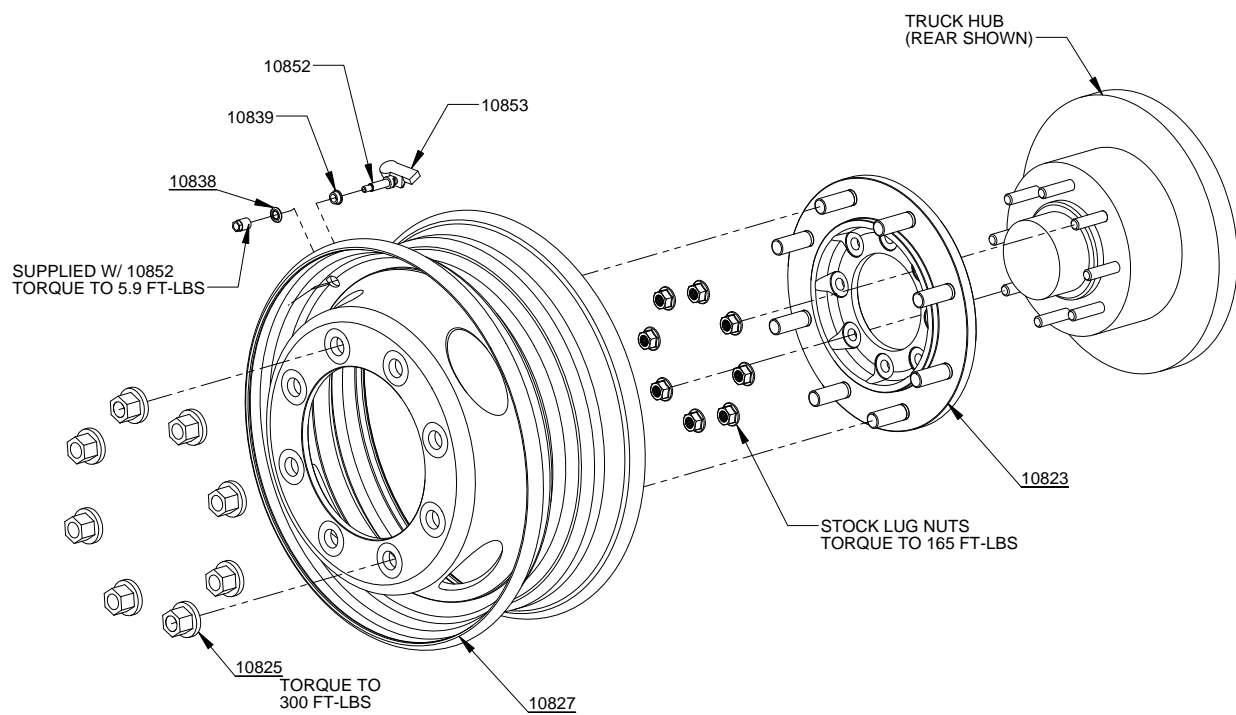


Figure 1 – Installation/Exploded Parts Diagram

## Recommended Tires

### Mud/Snow/All position

Goodyear G622	225/70R19.5
Michelin XDS2	225/70R19.5

### Steer/Highway

Goodyear G647	225/70R19.5
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## Installation

### Warning!

- Never use anti-seize on studs or lug nuts.
- Hand-torque all fasteners to the provided specifications using a torque wrench.
- Improper installation or failure to perform a thorough check for clearances once this unit is installed may lead to damage to the chassis, wheels/tires, or personnel.

1. Install TPMS sensor into 19.5" rims as shown in Figure 1
2. Install and Inflate 19.5" Tires
  - a. Mount and balance tires.
  - b. Inflate tires to a cold pressure of 85 psi.
3. Remove Stock Wheels & Tires
  - a. Lift the vehicle and properly support using jack-stands.
  - b. Remove the stock wheels and tires, retaining the stock lug nuts for reuse.
4. Install Steering Stops as shown in Figure 2
  - a. Remove "Lower Brake Housing Bolt" from each side
  - b. Install Steering Stops as shown, re-using the stock bolt.
  - c. Actuate steering to its extents in both directions and verify that the Steering Stops are contacting stop surfaces.

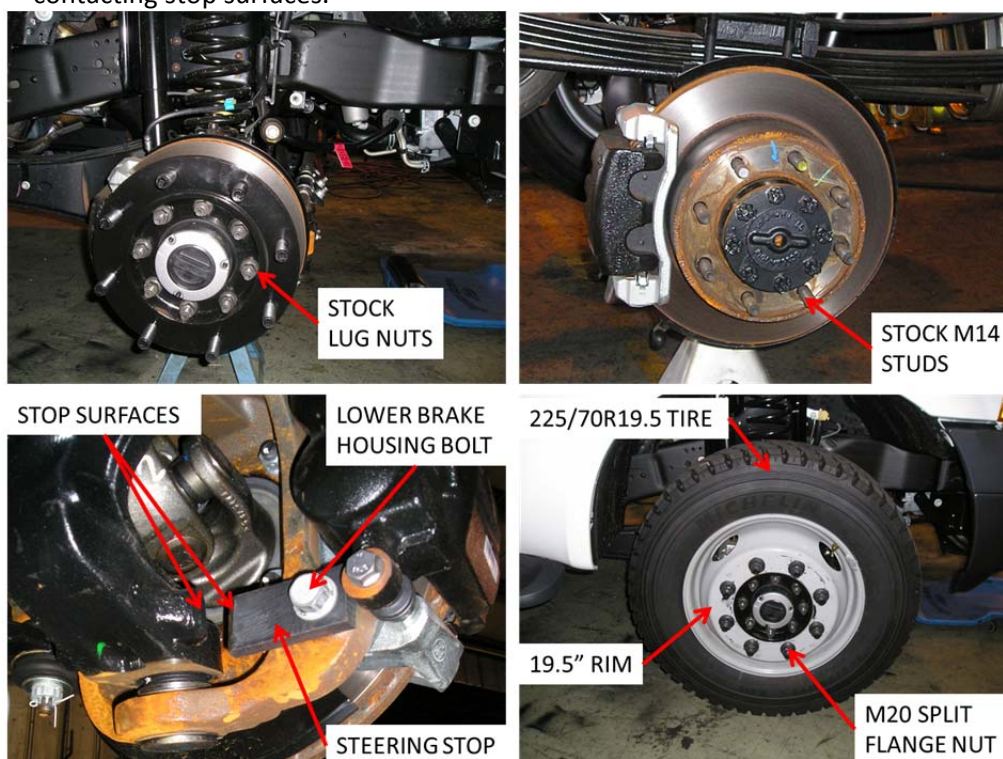


Figure 2 – Wheel Adapter Details

5. Install Adapters, 19.5" Wheels & Tires as shown in Figure 2
  - a. Remove and discard the factory lug retaining clips.
  - b. Mount the Wheel Adapters using the stock lug nuts. Torque as specified in Figure 1.
  - c. Mount the 19.5" rims with 19.5" tires to the Wheel Adapter using the provided M20 Split Flange Nuts. Torque as specified in Figure 1.
6. Clearance Check(s)
  - a. Verify that neither the rims nor tires contact any frame or suspension components in any combination of steering positions and axle droop/jounce conditions.
  - b. Verify that all brake, ABS sensor and other wires or hoses are clear in all steering and suspension positions. Restrain if necessary.

**NOTE:** The following steps must be performed at a dealer as modification of these settings requires a software update specific to your vehicle.

7. Re-calibrating Speedometer
  - a. The speedometer calibration is limited to stock tire sizes.
  - b. As the tires we recommend are not a stock size for this vehicle, the stock LT265/60R20 tire setting should be selected as it is the most comparable in size.
8. Program Tire Pressure Monitoring System
  - a. The TPMS system must be reprogrammed to correspond with the correct pressure settings for use with these wheel modifications.
  - b. Ensure that the dealer sets the TPMS for a nominal pressure of 85 psi.
9. Re-establish sensor positions
  - a. Ensure that the dealer has re-established the sensor locations.
  - b. This step may also be performed by referring to the vehicle's owner's manual.

## **Testing**

1. It is the responsibility of the installer to certify that the truck complies with all applicable State and Federal regulations.
2. In particular, the regulations and test procedures outlined in FMVSS Standard 138 must be performed in order to ensure compliance.

## **Inspection & Maintenance**

1. Visually inspect wheels & tires both prior to and after use on rail (look for damage, loose hardware, etc.)
2. Check the fastener torque 50 miles after wheel/tire change and every 2000 miles or 6 months.

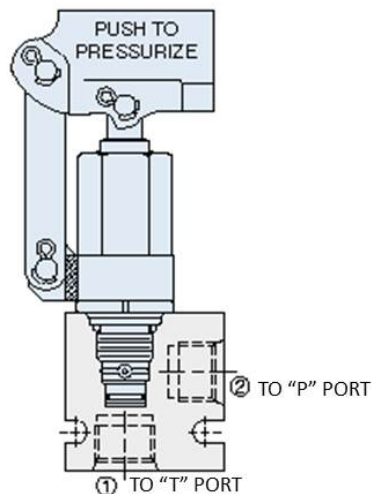
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## 5.6 4Runner Addendum

### 5.6.1 Prime Emergency Hand Pump

The emergency hand pump must be primed and tested after initial installation. It must be re-primed and tested after any components of the hydraulic system are removed or replaced. Failure to do so may render the hand pump inoperable. The following procedure is one method of priming that DMF has found to be quick and effective.

Loosen the hose connected to emergency hand pump inlet port (port 1 as shown in figure below) slightly, such that air can bleed from the line. Activate the hydraulic pump and cycle the Railgear cylinders. There is sufficient back pressure in the tank return line to force air out of the hand pump inlet line. When oil begins to escape from the connection stop activation of the cylinders, and re-tighten. Check operation of the emergency hand pump. You may have to cycle the hand pump several times before the pump will work throughout its full range.



Emergency Hand Pump Assembly

### 5.6.2 Emergency Pump Operations

The emergency pump is provided to allow a malfunctioning vehicle to be removed from the rail in the event of an electrical fault or pump failure. The emergency pump switch (located near the hand pump) must be held while pumping to position the valves. The Emergency Pump Switch is held up to enable flow to the front Railgear & down for the rear Railgear.

Note: The emergency pump is only intended to stow the Railgear. It is not designed or intended to deploy the Railgear.

#### To Stow Railgear with Emergency Hand Pump

1. Ensure that Railgear is clear
2. Remove rail position pins (if equipped)
3. Hold Emergency Pump Switch UP to select the front Railgear
4. Pump Emergency Hand Pump until Front Railgear is in highway position
5. Insert Front Highway Position Pins (if equipped)
6. Hold Emergency Hand Pump Switch Down to select the rear Railgear
7. Pump Emergency Hand Pump until Rear Railgear is in highway position
8. Insert Rear Highway Position Pins (if equipped)

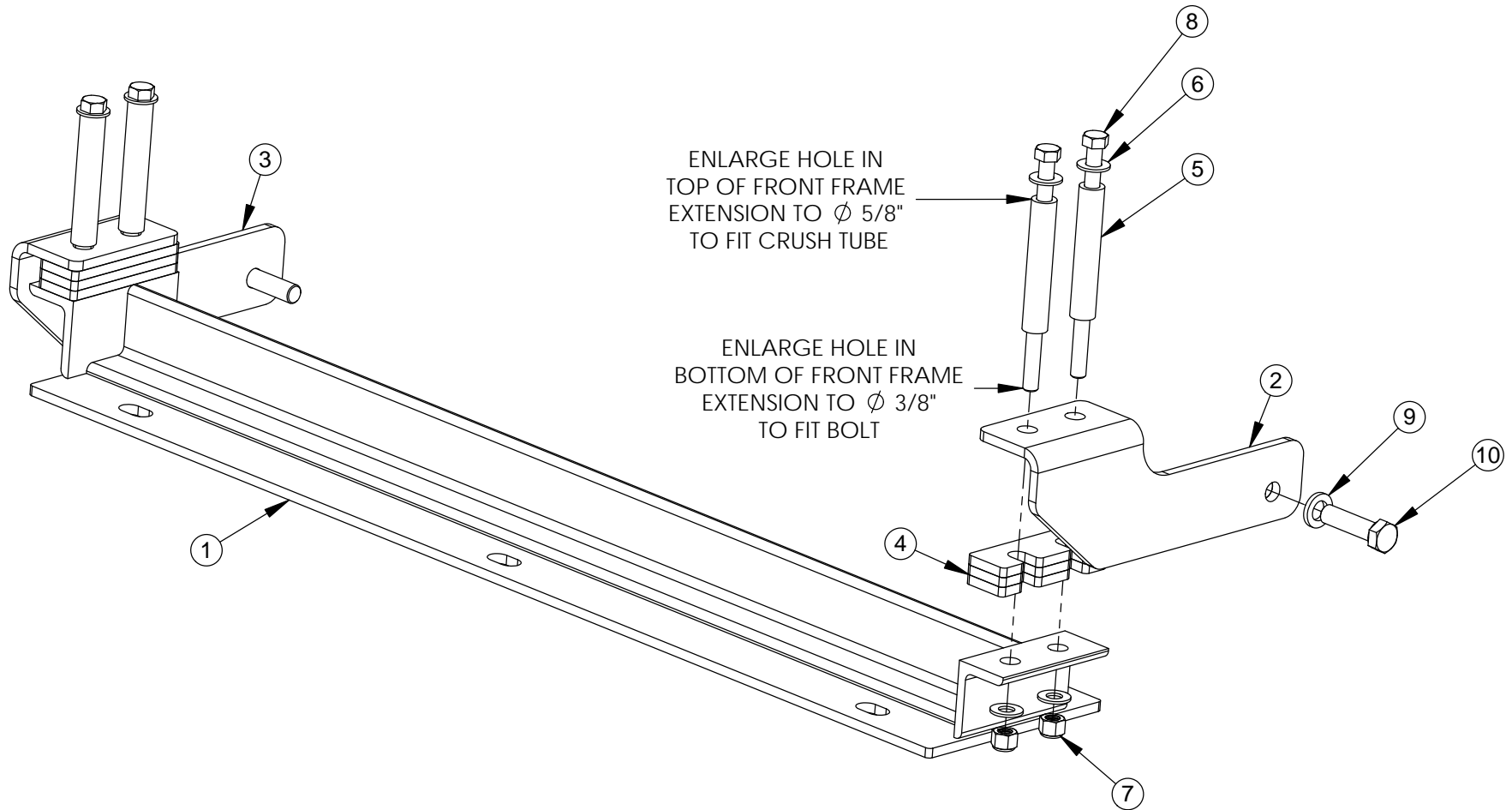
**Safety Notes**


- When raising gear and holding the pins, careful of pinch points!
- Do not drive vehicle at normal highway speeds if Railgear is not restrained by the safety pins or chained up!
- If Railgear is chained up, and not fully in highway position, be aware of your ground clearance!

A

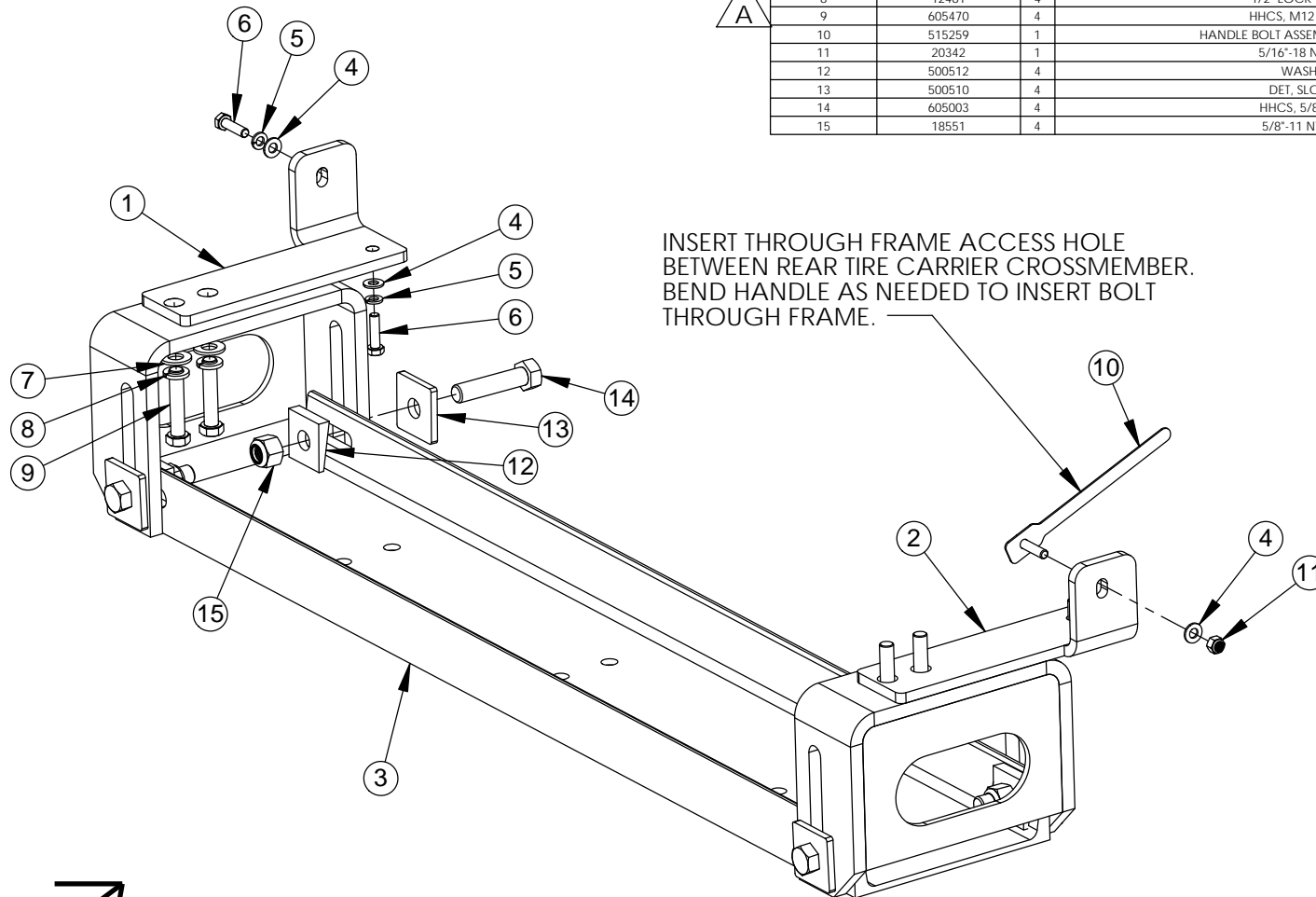
B

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	500428	1	FRONT BRACKET WELDMENT, '14 4RUNNER 4X4
2	500434	1	SUPPORT GUSSET LH, FRONT BRACKET, '14 4RUNNER 4X4
3	500435	1	SUPPORT GUSSET RH, FRONT BRACKET, '14 4RUNNER 4X4
4	500437	6	FRONT FRAME SHIM, 1/4", '14 4RUNNER 4X4
5	500433	4	FRONT EXTENSION CRUSH TUBE, '14 TOYOTA 4RUNNER
6	818508	8	FLAT WASHER, 3/8", GR8
7	605077	4	3/8"-16 NYLOCK NUT, GR8
8	605310	4	HHCS 3/8-16 UNC X 6", GRADE 8, FULL THREAD
9	12481	2	1/2" LOCK WASHER, GRADE 8
10	605312	2	HHCS, M12 X 1.25 X 45MM, 8.8




B	3/2/2015	605312 WAS 605311		JDI	
A	11/18/14	818508 WAS 605079		DJJ	
REV	DATE	DESCRIPTION		BY	APP
TOLERANCES: (UNLESS SPECIFIED)		TITLE: FRONT FRAME MOUNTING KIT, '14 4RUNNER 4X4			
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>(SEE SHARP CORNERS (LESS 1.40" DIA))</small>					
RW-1013		DIVERSIFIED METAL FABRICATORS,INC. (404)875-1512			
DRAWN BY: JDI		APPD BY: -		DATE: 11/21/13	
				DRAWING NUMBER: 500436	
				REV: B	

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	515251	1	REAR FRAME BRACKET, DS, '14 TOYOTA 4RUNNER
2	515254	1	REAR FRAME BRACKET, PS, '14 TOYOTA 4RUNNER
3	515270	1	DETAIL, REAR BRACKET CHANNEL, '14 TOYOTA 4RUNNER 4X4
4	605115	4	5/16" FLAT WASHER, GR8
5	800109	3	5/16" LOCK WASHER, GRADE 8
6	605313	3	HHCS, M8 X 1.25 X 30MM, 8.8
7	500691	4	1/2" FLAT WASHER, GR8
8	12481	4	1/2" LOCK WASHER, GRADE 8
9	605470	4	HHCS, M12 X 1.25 X 60MM, 8.8
10	515259	1	HANDLE BOLT ASSEMBLY, '14 TOYOTA 4RUNNER
11	20342	1	5/16"-18 NYLOCK NUT: GR8
12	500512	4	WASHER, BEVEL, 5/8
13	500510	4	DET. SLOT FLAT BAR, 5/8
14	605003	4	HHCS, 5/8-11 X 2-3/4", GR8
15	18551	4	5/8"-11 NYLOCK NUT: GR8

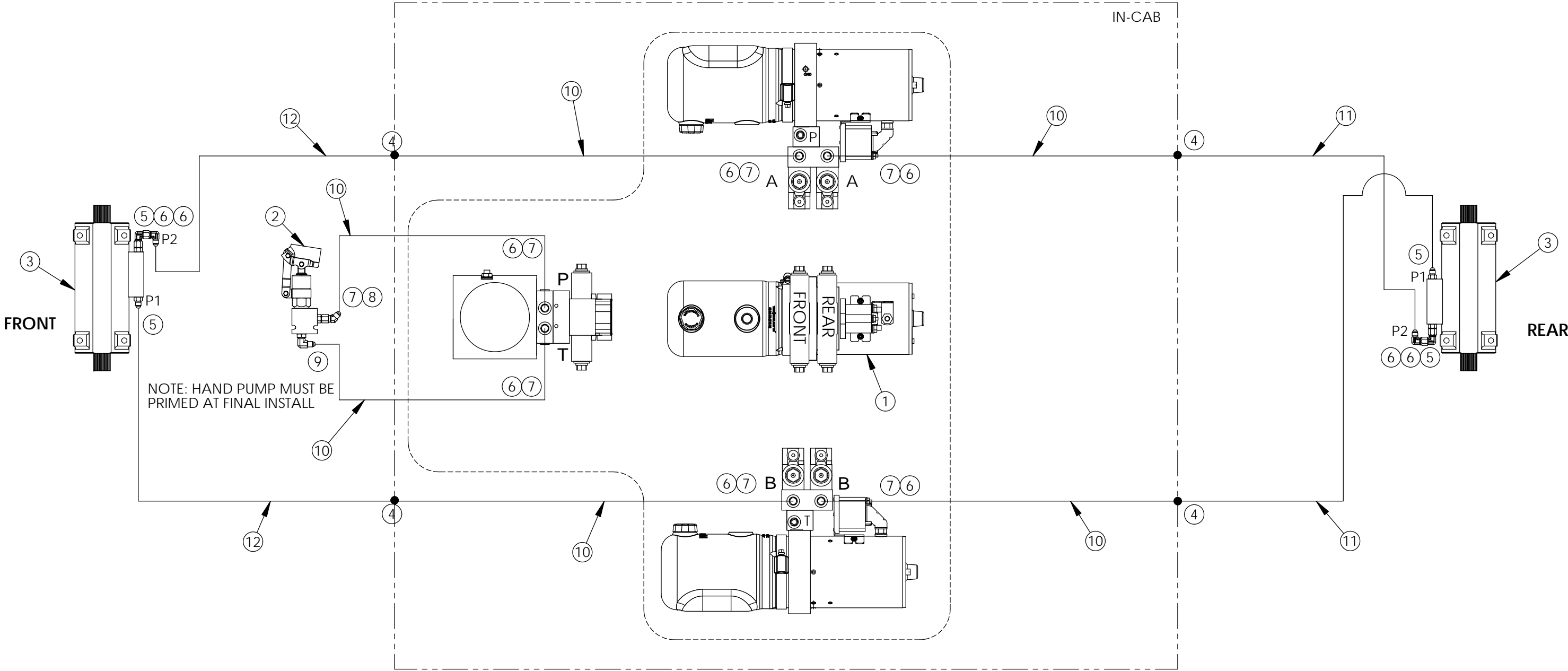


FRONT OF VEHICLE

A		3/2/2015		605470 WAS 605312		JDI							
REV		DATE		DESCRIPTION		BY		APP					
TOLERANCES: (UNLESS SPECIFIED)				RW-1013		TITLE: REAR FRAME MOUNTING KIT, '14 4RUNNER 4X4							
FRAC. MACH: ± 1/32"						DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512							
FRAC. OTHER: ± 1/16"													
X ± .063													
.XX ± .030													
.XXX ± .005													
DRILL SIZES: ± .015													
ANGULAR: ± 1°													
SURF FINISH: 125 MICRO													
THREADS: 2A AND 2B													
JDI				APPD BY: -		DATE: 11/21/13				DRAWING NUMBER: 500438		REV: A	



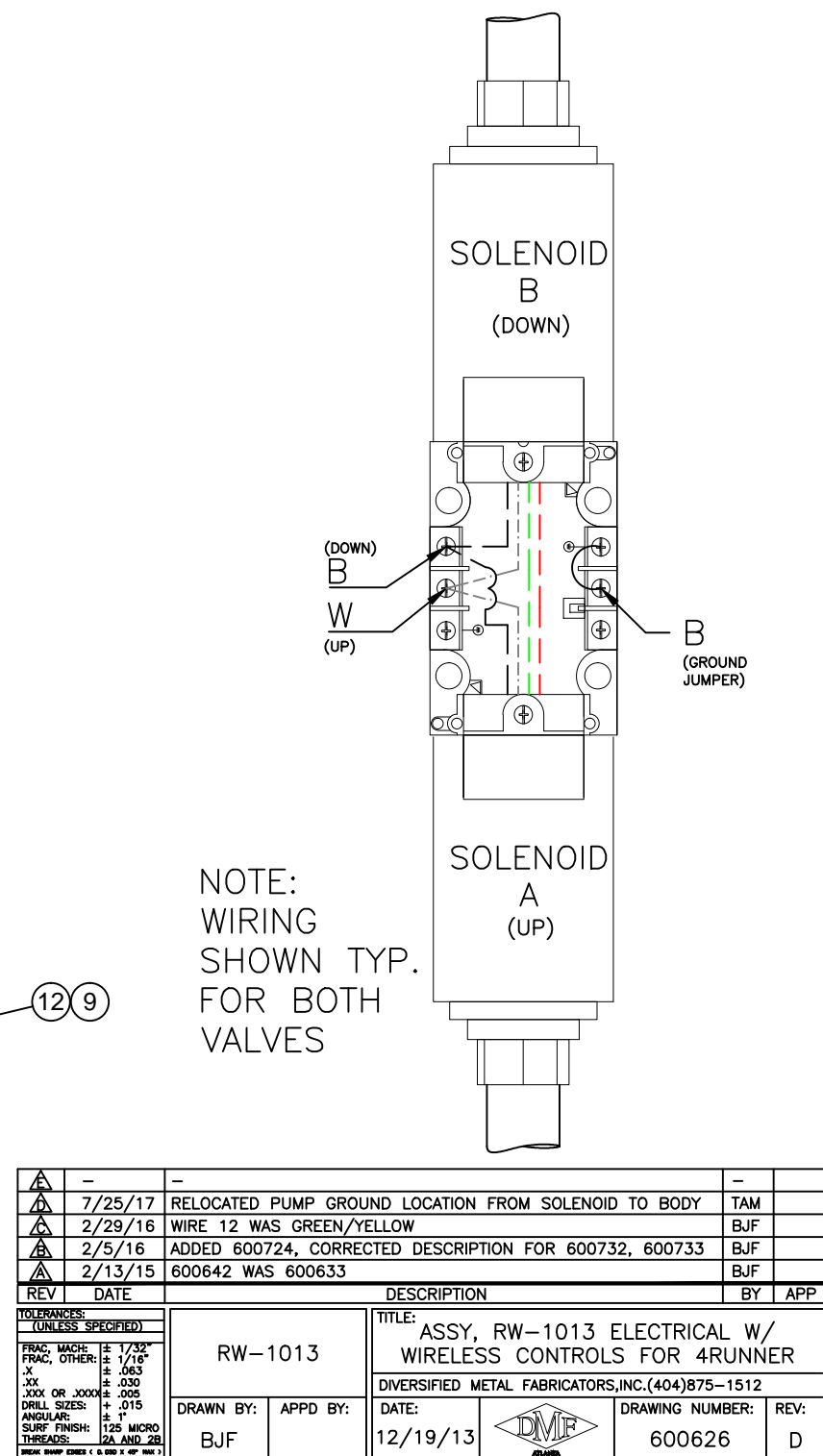
ITEM	PART NO.	QTY	DESCRIPTION
1	600634	1	HYD. PUMP, W/#10 CAVITY HAND PM (M3528-MAS-10-2-HP) & WIRELESS HARNESS
2	600625	REF	EMERGENCY HAND PUMP W/HANDLE
3	500724	REF	ACTUATOR W/LOCKING VALVES
4	605325	4	#04 MJIC X #04 MJIC BULKHEAD
5	605324	4	#04 MJIC X #04 MAORB, STRAIGHT
6	605048	4	#04 MJIC X #04 FJIC SWIVEL, 90 DEGREE
7	600511	6	#04 MJIC X #06 MAORB, STRAIGHT
8	605131	1	#04 MJIC X #04 FJIC X 45 DEGREE
9	18952	1	#04 MJIC X #06 MAORB X 90 DEGREE
10	605326	6	HOSE ASSY. - 1/4" X 22"
11	810642	2	HOSE ASSY. - 1/4" X 62"
12	605327	2	HOSE ASSY. - 1/4" X 252"
13	501814	1	HYD. PUMP/ HAND PUMP MOUNTING KIT, '14 4RUNNER (NOT SHOWN)



NOTE: ALL HOSE SUPPLIED ARE FOR INSIDE RIGHT REAR MOUNTED PUMP

B	7/14/2017	18952 WAS 241006	BJF	
A	7/24/2014	ADDED HAND PUMP NOTE	JDI	
REV	DATE	DESCRIPTION	BY	APP
TOLERANCES: (UNLESS SPECIFIED)		TITLE:		
FRACTIONAL: DECIMALS: ANGULAR: SURF FINISH: TOLERANCES:		RW-1013		
FRACTIONAL: DECIMALS: ANGULAR: SURF FINISH: TOLERANCES:		ASSEMBLY, RW-1013 HYDRAULIC SYSTEM, '14 TOYOTA 4RUNNER		
FRACTIONAL: DECIMALS: ANGULAR: SURF FINISH: TOLERANCES:		DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512		
FRACTIONAL: DECIMALS: ANGULAR: SURF FINISH: TOLERANCES:		DRAWN BY:	APPD BY:	DATE:
FRACTIONAL: DECIMALS: ANGULAR: SURF FINISH: TOLERANCES:		JDI	-	12/9/13
FRACTIONAL: DECIMALS: ANGULAR: SURF FINISH: TOLERANCES:		DRAWING NUMBER:		REV:
FRACTIONAL: DECIMALS: ANGULAR: SURF FINISH: TOLERANCES:		501813		B

ITEM	PART NO.	QTY	DESCRIPTION
A	1 600634	REF	PUMP, M3528 W/ EMERGENCY PUMP & HARNESS
	2 600642	1	CERVIS WIRELESS KIT FOR RAILGEAR, 4-BUTTON
	3 600627	1	PUMP COVER & TERMINAL STRIP HARNESS
	4 600631	1	BACKUP PENDANT FOR UP/DOWN CONTROL, 6'
	5 600629	1	ENGINE BAY HARNESS, 4RUNNER WIRELESS
	6 600630	1	HAND PUMP SWITCH & HARNESS, 4RUNNER
	7 605189	1	10AMP MINI ATO FUSE
	8 600727	1	150AMP CIRCUIT BREAKER (CB-185-150F)
	9 605096	2	STRAIN RELIEF, .450-.560, 1/2"
	10 500764	1	ROCKER SWITCH, 2 POS LATCHED W/ RED LED
A	11 600732	1	4 GA X 2.5' BATTERY CABLE W/ TERMINALS
	12 600733	1	4 GA X 20' BATTERY CABLE W/ TERMINALS
	13 18681	1	#10 HEAT SHRINK RING TERM, 16 GA WIRE
	14 605188	1	MINI ATO FUSE HOLDER ADD ON CIRCUIT, 10 AMP
	15 WIRE16GA GXL GREEN	3'	16GA WIRE, GXL, GREEN
	16 605331	3	QUICK DISCONNECT TERM FEMALE, 1/4", 16GA, HS
	17 605332	3	#12 X 1" SELF TAPPING SCREW
	18 600724	1	4 GA X 2' BATTERY CABLE W/ TERMINALS



**DMF Limited Warranty Policy****RW-1013 Railgear**

**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 manufacturer to be free of defects in material and workmanship, under normal use and service, for a period of **TWO CALENDAR YEARS**. **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.



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