# **IMPORTANT SAFETY INFORMATION**

# **A**WARNING

#### To prevent SERIOUS INJURY or DEATH:

- ONLY specially trained personnel, using the proper procedures and tools, shall service tires.
- ALWAYS read and fully understand all procedures before tire/wheel servicing.
- ALWAYS STAND CLEAR of trajectory zone.
- ONLY assemble a tire and rim after you have positively identified and correctly matched the tire and rim diameter
- ALWAYS use a tire cage or other approved restraining devices when inflating tires.
- NEVER exceed the recommended inflation pressure on the sidewall of the tire you are inflating.



Your employer is responsible for providing proper procedures and training for tire technicians. See Occupational Safety and Health Administration (OSHA), 29 CFR 1910.177, Servicing of Single Piece and Multi-Piece Rim Wheels.

Additional information go to www.titan-intl.com or call 1 (800) 872-2327

# **1. Personal Protective Equipment**

ALWAYS wear adequate protective eyewear (or face shield), protective footwear, and ear protection.



# 2. For all tires

- ALWAYS follow the blocking, jacking, or cribbing of the vehicle/equipment guidance provided by the vehicle/ equipment manufacturer.
- ONLY use properly diluted tire lubricant (nonflammable vegetable or soap-based). NEVER use concentrated tire lubricant or it may not completely evaporate and residue could cause tire to slip. NEVER use petroleum based lubricants, silicone or antifreeze.
- NEVER use starter fluid, ether, gasoline, or other flammable materials and/or accelerants to lubricate the beads of a tire or there may be an explosive separation of the tire/wheel during servicing or during use.
- NEVER inflate over the maximum psi as indicated on each tire or the manufacturer's guidance.
- When seating tire beads, NEVER exceed the maximum psi for the tire or 40 psi for any multi-piece rim or 35 psi for single piece rim.
- NEVER stand, lean, or reach over the tire rim/wheel assembly in the tire cage or other approved restraining devices during inflation.

# 3. Single Piece Rims (Drop Center Rims)

# 3.1 Terminology

- 1. Rim Size (Nominal Bead Seat Diameter)
- 2. Rim Width
- 3. Rim Inside Dia.
- 4. Bead Seat Area
- 5. Flange
- 6. Flange Height
- 7. Valve Hole (Location and size can vary)



# 3. Single Piece Rims (Drop Center Rims)

### 3.2 Demounting

#### **Tools Required**

Cap and core removal tools, hydraulic bead unseating tool, two tire irons (36" if ON vehicle or 18" if OFF vehicle), wire and diluted tire lubricant.



 After the first section of the bead is over the rim flange, use one tire iron to pry the next section over the flange. Continue prying tire over rim flange until the entire tire bead is on the outside of the rim flange.
 NOTE: DO NOT attempt to pry too large a section of the

NOTE: DO NOT attempt to pry too large a section of the bead over the rim flange at one time. Leave one tool in position and place the second about five (5) inches away. Repeat in successive steps until the tire bead is completely unseated. Avoid extremely hard prying, which will damage the tire bead.

7. For tube-type tires, pull the tube out of the casing, starting at the bottom.

**If OFF vehicle:** bring tire and rim upright position before pulling tube out of the tire.

If only the tube requires repair or replacement, the tube can be removed, repaired, and replaced in the tire without removing the tire completely from the wheel. Before reinstalling the tube, thoroughly inspect the inside of the tire for damage or other foreign material. Remove any remaining fluid from inside the tire.

8. To completely remove the tire from the rim:

#### If ON vehicle:

Insert tire irons under the inside bead at the side of the tire. Pry the inside bead over the rim flange. Before starting, check the bead area on the opposite side of the tire is down in the well of the rim.

### If OFF vehicle:

Turn assembly over so the narrow ledge is closer to the ground and lubricate the second tire bead and rim flange. Before starting, check the bead area on the opposite side of the tire is down in the well of the rim and insert the tire irons under the opposite side of the bead.

### 3.3 Mounting

# **WARNING**

To prevent SERIOUS INJURY or DEATH:

- ALWAYS check the tire matches the rim diameter designation. NEVER mount a tire that is too large or too small for the rim. Rims of different diameters and tapers CANNOT be interchanged.
- · ALWAYS remove water and foreign material from tire.
- INSPECT rim for damage, pitting from corrosion, cracks or if bent out of shape. If damage is found, DO NOT use. Mark or tag as unserviceable and remove from service area.
- INSPECT tubes and tires for excessive wear, cracks, tears, punctures, blisters, or other damage. DO NOT use if damage is found. Replace with good tube or tire.

#### **Tools Required**

Two tire irons (36" if ON vehicle or 18" if OFF vehicle), diluted tire lubricant, wire brush, locking pliers, rubber mallet, valve retrieval tool (tube-type tires), extension hose with in-line gauge and clip-on air chuck, air/water inflation gauge, tire cage or other approved restraining devices.

1. Use a wire brush to clean and inspect rim for fatigue cracks.

If damage is found, DO NOT use. Mark or tag as unserviceable and remove from service area. Replace any cracked, badly worn, damaged and severely rusted rims or wheels. Do not attempt to rework, weld, heat, or braze any rim base or wheel components under any circumstances.

Coat the rim with paint or a rust inhibitor if necessary. Follow procedures and safety precautions of the paint manufacturer.

 Thoroughly lubricate both tire beads and rim flanges with diluted tire mounting lubricant.

#### 3. If ON vehicle:

Before placing tire on rim, check valve hole is at the bottom of wheel. Check directional tread tires are mounted for correct rotation direction. To put the tire on the wheel, place the inner bead over the flange at the top. Check bead is not "hung up" on bead seat; instead the bead is in the rim well, while the tire irons and/or rubber mallet are used to work the first bead over the rim.

#### If OFF vehicle:

Lay the rim on the floor with the narrow ledge on the top. Check directional tread tires are mounted for correct rotation direction. Push the bottom bead over the rim flange as far as possible. Use 18" tire irons to work the first tire bead completely over the rim flange, taking small bites and being careful not to damage the bead.

4. For tubeless tires, skip to step 7. For tube type tires:

#### If OFF vehicle:

If ON vehicle: With the first bead on the rim, pull the tire toward the outside of the rim as far as possible to make room for the tube. Be sure valve is at the bottom of the wheel. Align the stem with the valve hole and starting at the bottom, insert tube into tire. Place the valve in valve hole and screw the rim nut in place. The tube should be partially inflated and areas contacting the rim should be re-lubricated to prevent localized stretching Check tube is inside rim before proceeding.

#### Partially inflate the tube and insert it into the tire casing with the valve located near the valve hole in the rim. Attach a valve retrieval tool to the valve and thread the tool through the valve hole. **NOTE:** You may want to use a block to raise the tire to make it easier to insert the tube.

 Starting opposite the valve, use the tire irons to lift the outer bead up and over the rim flange, then down into the rim well. Be careful not to pinch the tube.

If OFF vehicle, locking pliers may be used to prevent tire slipping off the back of the rim.

6. Centering of the tire and rim assembly is extremely important to prevent broken beads.

If ON vehicle, with the valve stem at the bottom, lower the jack until the tire is centered on the rim.

 Place a tire cage or other approved restraining devices over the rim and tire. Using an extension hose with an in-line air gauge and clip-on chuck (with valve core removed), inflate the tire to seat the beads.



NEVER inflate over the maximum psi as indicated on each tire or the manufacturer's guidance. When seating tire beads, NEVER exceed the maximum psi for the tire or 35 psi for single piece rim.

Check for concentric centering of tire on rim. For tubeless tires, successful mounting depends on how well the shape of the tire has been maintained. If the beads are in or near their molded position, they can be seated by inflating the tire, through the valve. Where the beads have been squeezed together, the use of an inflator ring (either horizontally or vertically) will be required to provide a seal between the tire bead and rim.

If assembly is incorrect, – STOP – DEFLATE – CORRECT THE ASSEMBLY – repeat procedure.

- If ON vehicle: raise vehicle and rotate wheel assembly so valve at the top (12 o'clock position).
   If the tire is tube-type, completely deflate by removing the valve core housing to remove buckles and uneven stresses from the tube and flap before re-inflation.
- 9. If assembly is correct, re-insert the valve core (for tube-type tires) and continue to inflate to recommended pressure
- 10. Remove tire cage or other approved restraining devices.

# 4. Three Piece Rims

# 4.1 Terminology

- 1. Rim Size (Nominal Bead Seat Diameter)
- 2. Rim Width
- 3. Rim Inside Dia.
- 4. Bead Seat Area
- 5. Flange-Fixed
- 6. Flange Height
- 7. Valve Hole (Location and size can vary)
- 8. Flange-Removable (Side Ring)
- 9. Lock Ring
- 10. O-Ring (For tubeless application only)
- 11. 28° Mounting Bevel (utilized for demountable application only)
- 12. Rim Stop Plate (Used for demountable application only; size, shape and location can vary.)
- 13. O-Ring Groove
- 14. Lock Ring Groove
- 15. Gutter Portion of Rim



# 4.2 Demounting

### **Tools Required**

One (1) straight tire iron, two (2) gooseneck tire irons, hydraulic bead unseating tool, diluted tire lubricant, wire and valve core removal tool.

1.	If OFF vehicle: place the assembly on block on the floor with loose side flange side up.
2.	Drive the goose-necked end of two gooseneck tire iron tools between the tire and side flange about five (5) inches apart.
3.	Pry both tools down and out. Leave one tool in position and place the second about five (5) inches away. Repeat in successive steps until the tire bead is completely unseated
4.	After the tire bead is unseated, stand on side flange and tire sidewall to depress the side flange down along the rim base. Pry the lock ring loose, starting at the split then remove the lock ring.
5.	Hold the side flange down with hooked end of gooseneck tire iron to remove the "O" ring from ring groove. Cut and discard the "O" ring and replace with a new "O" ring.
6.	Remove the side flange.
7.	Turn tire and rim over and unseat second bead by inserting both gooseneck tire iron tools between tire and fixed rim flange as in step 3. Repeat steps 2 and 3 until the tire bead is completely broken loose from the rim on the fixed flange side. Lift rim base out of tire.

# 4.3 Mounting

# **A**WARNING

#### To prevent SERIOUS INJURY or DEATH:

- ALWAYS check the tire matches the rim diameter designation. NEVER mount a tire that is too large or too small for the rim. Rims of different diameters and tapers CANNOT be interchanged..
- ALWAYS remove water and foreign material from tire.
- INSPECT rim for damage, pitting from corrosion, cracks or if bent out of shape. If damage is found, DO NOT use. Mark or tag as unserviceable and remove from service area.
- INSPECT tubes and tires for excessive wear, cracks, tears, punctures, blisters, or other damage. DO NOT use if damage is found and replace with good tube or tire.

#### **Tools Required**

Two tire irons (36" if ON vehicle or 18" if OFF vehicle), diluted tire lubricant, wire brush, locking pliers, rubber mallet, valve retrieval tool (tube-type tires), extension hose with in-line gauge and clip-on air chuck, air/water inflation gauge, tire cage or other approved restraining devices.

- Use a wire brush to clean the rim base and all components thoroughly. Clean all dirt and rust from inter-locking faces of multi-piece rim components, particularly the gutter sections that hold the lock ring and "O" ring in place.
- 2. Inspect rim base and wheel components for cracks, wear, corrosion and damage.



- If damage is found, DO NOT use. Mark or tag as unserviceable and remove from service area.
- Inspect all wheel components to verify the components meet the manufacturer's standards.
- Replace any cracked, badly worn, damaged and severely rusted parts and rims.
- Do not attempt to rework, weld, heat, or braze any rim base or wheel components under any circumstances.

Verify the replacement parts are the correct size, type and manufacturer for the wheel to be assembled.

- 3. Coat the rim with paint or a rust inhibitor if necessary. Follow procedures and safety precautions of the paint manufacturer.
- Inspect tire for wear, cracks, tears, punctures and other damage. Tires with excessive or uneven wear, cracks, tears, punctures, blisters or other damage may explode during inflation or service.

If damage is found, DO NOT use. Mark or tag as unserviceable and remove from service area. Tire should be destroyed and replaced with good tire of correct size, type and manufacturer for assembly, machine, and application. If concerned about the condition of the rim base, wheel components, or tire - STOP - contact the manufacturer or distributor for assistance.

- Install valve on rim. Follow valve manufacturer's recommendations and installation instructions.
- IF OFF vehicle: place rim base on blocks with fixed flange side down.
- Lubricate both bead seats with diluted tire lubricant. Place tire over rim base.
- Double check the parts and rim base are all compatible. Place side flange over rim base and push straight down with hands as far as possible. Make sure side flange does not bind on rim base.



# 5. Five Piece Rims

### 5.1 Terminology

- 1. Rim Size (Bead Seat Diameter)
- 2. Rim Width
- 3. Rim Inside Dia.
- 4. Back Flange Portion of Rim Base
- 5. Center Band Portion of Rim Base
- 6. Gutter Band Portion of Rim Base
- 7. Rim Base (Entire Shaded Area)
- 8. Bead Seat Band (Removable, Gutter Side only)
- 9. Lock Ring
- 10. O-Ring
- 11. Flange, Inner (Removable)
- 12. Flange, Outer (Removable) \*Note: Inner and Outer Flanges are identical
- 13. 28° Mounting Bevel (Utilized for demountable application only)
- 14. Valve Hole (Location, size and configuration can vary)
- 15. O-Ring Groove

- Knurl (Located on Back Flange Portion of Rim Base and Bead Seat Band tire mating surfaces)
- Lock Ring Groove (size and shape can vary depending on style of lock ring)
- Pry Bar Pocket [not shown] (continuous gap entire circumference on some items)



#### Crimped on Style Driver

- 1. Lock Ring
- 2. Crimped on driver
- 3. Notch in gutter portion of rim
- 4. Notch in bead seat band

3

a

#### Loose Style Driver

- 1. Gutter Portion of Rim Base
- 28° Mounting Bevel
- Rim Stop Plates (location, style and size can vary)



#### **Demountable Type Rims**

- Driver Pocket (welded on gutter portion of rim base)
   Driver Pocket (welded on
- 2. Driver Pocket (welded on bead seat band)
- Driver Key See Outboard Driver Keys.



#### Valve Hole Styles



# 5.1.1 Driver Keys

Driver Keys are used on rims in high torque and/or low inflation pressure applications to help prevent circumferential movement of the rim components. Look for an "M" or "L" near the end of the style designation (part number).



# 5.1.2 Titan "W" Series Rims

ALWAYS check part numbers carefully before rim assembly. Titan's "W" series lock rings are NOT INTERCHANGEABLE with other types.

Correct Assembly:	Examples of Improper Assembly:		
"W" style lock ring with grooves as- sembled with "W" style rim base.	DO NOT USE a "W" lock ring with old rim base or an older lock ring with "W" style rim base. Both will have poor fit and a gap between lock ring and gutter. ALWAYS reassemble using proper components.		
"W" Style Lock F	Ring	"W" Style Rim Base	
A "W" appears after th number, which is stan the 45 degree face ne lock ring split (e.g. LR a 49" rim). A circumferential groo the ring a unique app	he part nped on ar the 49W for ove gives earance.	There are two types of rim bas- es: older versions contain a "T" in the part number and newer versions contains a "W." A caution is stamped on the faces of the "W" style rim base to only use with a "W" style	

This lock ring can only be used with the new "W" style gutters.



lock ring.







# **Bead Seat Bands**

There are two types of bead seat bands: older versions contain an "H" in the part number and newer versions contain an "R." The R and H Bead Seats are interchangeable.

OLD	NEW
BB49HTG	BB49RTG
BB39HTL	BB28RTL

# 5.2 Demounting

### **Tools Required**

If ON vehicle: Lifting device or boom truck, hydraulic bead unseating tool, gooseneck tire iron, straight tire iron, wire and valve core removal tool.

If OFF vehicle: Hydraulic bead unseating tool, two (2) straight tire irons, valve core removal tool, wire and a screwdriver.

If ON vehicle		lf C	)FF vehicle
1.	Jack, crib and block the vehicle/equipment per the manufacturer's instructions.	1.	Place the assembly gutter side up on blocks.

If ON vehicle		If OFF vehicle	
2.	Always completely deflate tire (and both tires of a dual assembly) by removing valve core(s) from valve(s). Check the valve stem by running a piece of wire through the stem to make sure it is not plugged.	2. Always completely deflate tire by removing valve core from valve. Check the valve stem by running a piece of wire through the stem to make sure it is not plugged.	
3.	Place the hook of the hy- draulic demounting tool into one of the pry bar pockets. A continuous lip is provided on some bases. Adjust the ram adjusting screw to enable the tool to be perpendic- ular to the wheel when under pressure.	<ol> <li>Remove the lock ring, using two tire irons.</li> <li>NOTE: If this is not pos- sible, the tire bead may be unseated as shown in step 4 with the lock ring and "O" ring in place. These items must be removed before removal of bead seat bands and flanges in step 7.</li> </ol>	
4.	Apply pressure and depress the flange about 3/4." If necessary, release the pressure to readjust the tool. Place the end of the gooseneck tire iron between the flange and the lip of the bead seat band and release the pressure. Then place the hook of the hydraulic demounting tool under the lip of the bead seat band and continue the procedure around the rim; then slowly apply pressure until the tire bead is COMPLETELY unseated.	<ol> <li>Remove the "O" ring by prying the bead seat band back and inserting a pry bar or screwdriver under the "O" ring and pulling it from the groove. ALWAYS cut and discard the "O" ring and replace with a new "O" ring.</li> </ol>	
5.	Remove Driver Key if present – see Driver Key	5. Place hook of the hydraulic demounting tool into one of the pry bar pockets. A continuous lip is provided on some bases. Adjust the ram adjusting screw to enable the tool to remain vertical when under pressure. In some cases, the pressure foot may have to be removed to ensure a good hold. If necessary, release pressure and readjust the ram adjusting screw. Depress flange about 1/2"-34" and place a nut or similar object between the flange and the lip of the bead seat band by laying it on the rim flange and sliding it into position with a screwdriver.	
6.	Remove the lock ring with a pry bar, starting near the split and working around the ring.	<ul> <li>Release the pressure and move about 2 feet around the rim or to the next pocket for the second bite. Continue the proce- dure until the tire bead is unseated.</li> <li>Do not use tool in the vicinity of the butt weld area of the bead seat band, the flanges, or rim base.</li> </ul>	

lf C	If ON vehicle		If OFF vehicle	
7.	Remove the "O" ring by prying the bead seat band back and inserting a pry bar or screwdriver under the "O" ring and pulling it from the groove. ALWAYS cut and discard the "O" ring and replace with a new "O" ring.	7.	Remove bead seat band using hoist or pry bars.	
8.	Use a gooseneck tire iron under the flange to pry the bead seat band loose, with assistance of lifting device, carefully lower the bead seat band to the ground and roll it out of the way.	8.	Remove outer flange using a hoist or pry bars.	
9.	With assistance or a lifting device, remove the outer flange, then carefully lower it to the ground and roll it out of the way.	9.	Turn assembly over and repeat tire bead unseating procedure on the back- side. (Steps 4 & 5)	
10.	To unseat the inner tire bead, use either the hy- draulic demounting tool as used on the outer bead or a shorty ram between the frame of the vehicle and the back flange.	10.	Lift rim base from tire using hoist.	
11.	Remove the tire using a boom truck and sling or a tire handler. Remove the inner flange to complete the disassembly.	11.	Remove inner flange. <b>NOTE:</b> You may want to use a more powerful hydraulic demounting tool with a longer stroke. Use caution to avoid bending the flange or breaking the butt weld. Follow proce- dure outlined in step 5.	

# 5.3 Mounting



To prevent SERIOUS INJURY or DEATH:

- ALWAYS check the tire matches the rim diameter designation. NEVER mount a tire that is too large or too small for the rim. Rims of different diameters and tapers CANNOT be interchanged.
- ALWAYS remove water and foreign material from tire.
- INSPECT rim for damage, pitting from corrosion, cracks or if bent out of shape. If damage is found, DO NOT use. Mark or tag as unserviceable and remove from service area.

#### **Tools Required**

Lifting device or boom truck, One (1) straight tire iron, two (2) gooseneck tire irons, approved tire lubricant, rubber mallet, extension hose with in-line gauge and clip-on air chuck, air/water inflation gauge, tire cage or other approved restraining devices.

 Use a wire brush to clean the rim base and all components thoroughly. Clean all dirt and rust from inter-locking faces of multi-piece rim components, particularly the gutter sections that hold the lock ring and "O" ring in place.

Inspect rim base and wheel components for cracks, wear, corrosion and damage.



2.

· If damage is found, DO NOT use. Mark or tag as unserviceable and remove from service area.

- Inspect all wheel components to verify the components meet the manufacturer's standards.
- Replace any cracked, badly worn, damaged and severely rusted parts and rims.
- Do not attempt to rework, weld, heat, or braze any rim base or wheel components under any circumstances.

Verify the replacement parts are the correct size, type and manufacturer for the wheel to be assembled.

lf C	If ON vehicle		If OFF vehicle	
3.	Position the outer flange on the rim base with the help of the boom.	3.	Place rim base on blocks (4" to 6" high) on floor, gutter side up. Place inner flange on rim base and lubricate tire beads. Place tire on rim using tire han- dler or hoist with sling.	
4.	Place the bead seat band on the rim base with the help of the boom. Be sure driver pocket on bead seat band lines up with pocket on rim base.	4.	Depress the tire so the lower tire bead is driven onto the back 5° Bead Seat taper on the rim. This will expose more of the gutter at the upper side of the rim base.	
5.	Use the boom to hold the rim components out of the way. Place a new, lubricated "O" ring into the "O" ring groove, then lubricate the entire "O" ring area with diluted tire lubricant. Snap "O" ring into place by placing in groove on one side, stretching like rubber band and seating on opposite side.	5.	Place the outer flange over the rim base on the tire.	
6.	Start the lock ring in the lock ring groove and push or walk it into place.When a driver key is used, make sure the gap in the lock ring is at least 6" away from the driver key.	6.	Place the bead seat band on the rim base. If present, driver pockets must be aligned. Due to limited clearance between bead seats and rim base, bead seat band will bind if cocked slightly. Band should slide freely over base.	
7.	Check components (lock rings, bead seat and flanges) to make sure the parts are correctly assembled. NOTE: Lock rings should be fully seated in gutter around the circumfer- ence. Insert Driver Key – see Driver Key section	7.	Place a new, lubricated "O" ring into the "O" ring groove, then lubricate the entire "O" ring area with diluted tire lubricant. Snap "O" ring into place by placing in groove on one side, stretching like rubber band and seating on onposite side	

If ON vehicle	If OFF vehicle	
	<ol> <li>Start the lock ring in the lock ring groove and push or walk it into place.</li> <li>When a driver key is used, make sure the gap in the lock ring is at least 6" away from the driver key.</li> </ol>	
	9. Insert Driver Key as required in pockets.	

#### For ON and OFF vehicle

Place rim and tire in a tire cage or other approved restraining devices during tire inflation. Use a clip-on chuck with an in-line pressure gauge and enough hose so you can stay away from the potential trajectory danger zone.

WITH VALVE CORE REMOVED: Inflate to approximately 3 psi and check for proper engagement of all components.

If assembly is correct, install valve core and inflate to recommended pressure.

If assembly is incorrect, STOP – DEFLATE – CORRECT THE ASSEMBLY - AND REPEAT PROCEDURE.



Never attempt to align or seat side flange, lock ring or other components by inflation, hammering, welding, heating or brazing.



Never inflate beyond manufacturer's recommended tire pressure.

Then remove tire cage or other approved restraining devices.



#### 6. **Additional Resources**

Occupational Safety and Health Administration (OSHA), https://www.osha.gov/

- 29 CFR 1910.177, Servicing of Single Piece and Multi-Piece **Rim Wheels**
- Demounting and Mounting Procedures for Tube-type Truck and Bus Tires Chart - Tire Chart (OSHA 3402)
- Demounting and Mounting Procedures for Tubeless Truck and Bus Tires Chart - Tire Chart (OSHA 3401)
- Multi-Piece Rim Matching Chart Tire Chart (OSHA 3403 2011)
- Servicing Multi-Piece and Single Piece Rim Wheels 29 CFR 1910.177 Manual - Tire Chart (OSHA 3421 - 2014)

U.S. Tire Manufacturers Association, https://www.ustires.org/ publications

- · Care and Service of Commercial Truck and Bus Tires
- Demounting and Mounting Procedures for Passenger and Light Truck Tires Wall Chart

Tire Industry Association, https://www.tireindustry.org

- · Basic Earthmover Tire Service (ETS) Training Kit
- Basic Farm Tire Service Training Kit
- OTR Tire Mount/Demount Training Program