

# SERVICE GUIDE

CPB-317

## AGRICULTURAL TRACK

Caterpillar Challenger 65,70,75,85,95  
(Cat Legacy Tillage)



**REMOVAL  
INSTALLATION  
INSPECTION  
ALIGNMENT**



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## Introduction

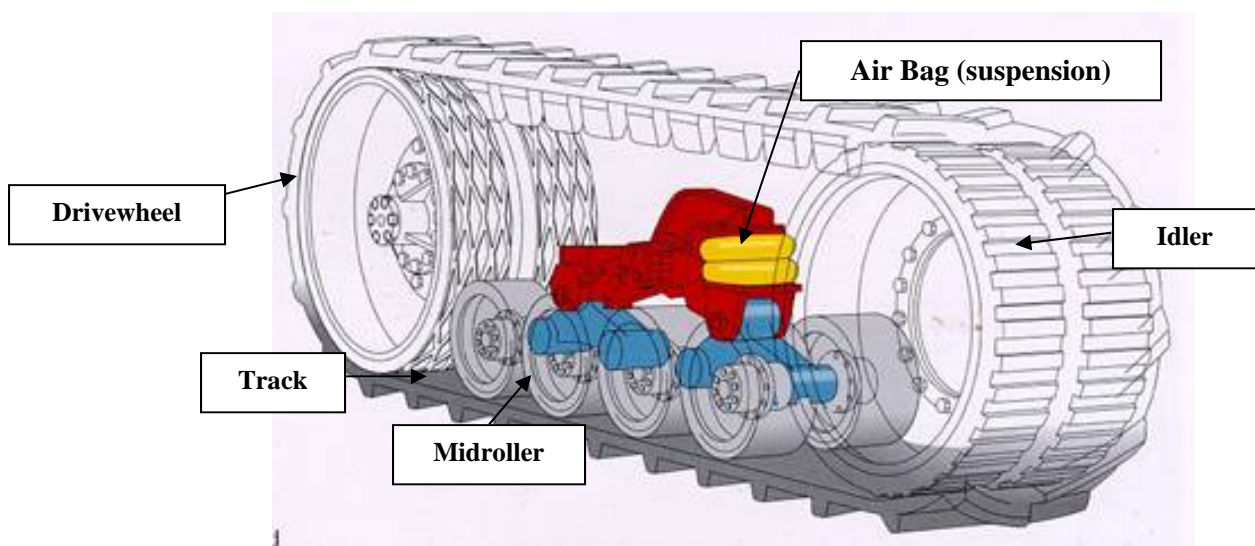
This service guide is intended for use for distributors and dealers, and provides the basic information needed for track installation and service. This guide is for use with the Challenger Legacy Tillage tractor only.

**Whenever tracks are changed or replaced, they always must be checked for alignment in order to maximize overall track life and prevent early guide lug failure.**

**Note:** When servicing track machines, follow all manufacturers recommended safety precautions.

## Track Terminology

Several terms are used throughout this document related to track undercarriage. Some of the most common are listed below. Familiarize yourself with these terms before reading further instructions, or working on any Challenger Tillage tracked machine.



**Challenger Legacy Tillage Tractor Track System**

## Tooling Required

Table 1 lists required tooling for installation and alignment of Camso track. **Bold** Items are available from Camso. Refer to Camso literature CPB-0330 “Agricultural Track Technical Literature and Tooling List” for a list of tools available from Camso specific to tracked machines.

Safety Glasses & Steel Toed Shoes <b>Camso CST- 0200 Detensioning Kit</b> Pilot Pins (for idler installation) Air Impact Socket Set (up to 1 ½") 7/8", 1 1/16", and 1 3/8" Combination Wrench Small / Large small pry bars Infrared Thermometer Gun Torque Wrench (850 ft-lb capacity) Penetrating Oil 7/8" 12 PT Socket (for Idler)	(4) [15 Ton Minimum] Support Stands 1" Air Impact Wrench (with min.450 ft-lb capacity) Several large wood blocks (2) Lifting Eyes Air / Hydraulic Jack (min 10 Ton Capacity and 12" stroke) Optional – Soap solution (Track installation) Oil Suction Gun Compressed Air Thread Lock 5 gallon oil catch pail
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**Table 1. Tooling List**

## Time Estimates - Removal, Installation and Alignment

The time to change a track depends to a great degree on the skill of the technician and the tools available. Table 2 lists average times for removal, installation, and alignment. These times assume a technician of average skills, with the correct tools, and working on firm and level ground. The process of changing alignment shims requires more time than other track machines. As experience is gained, less time will be required to arrive at a correct shim pack. The assumptions below are that the alignment will take at least 1 iteration to obtain the correct alignment on each side.

Note: If inspection reveals parts that must be replaced, total time will be significantly longer than shown.

Tractor Series	Track Removal, Inspection, and Installation		Track Alignment		Total
	Per track (man-hrs)	Machine (man-hrs)	Per track (man-hrs)	Machine (man-hrs)	Total time (man-hrs)
<b>1986-1993 (1 pc Shims)</b>	<b>2.5</b>	<b>5</b>	<b>3</b>	<b>6</b>	<b>11</b>
<b>Late 1993-up (Split Shims)</b>	<b>2</b>	<b>4</b>	<b>1.5</b>	<b>3</b>	<b>7</b>

**Table 2. Estimated man-hours required**

## Tractor Preparation

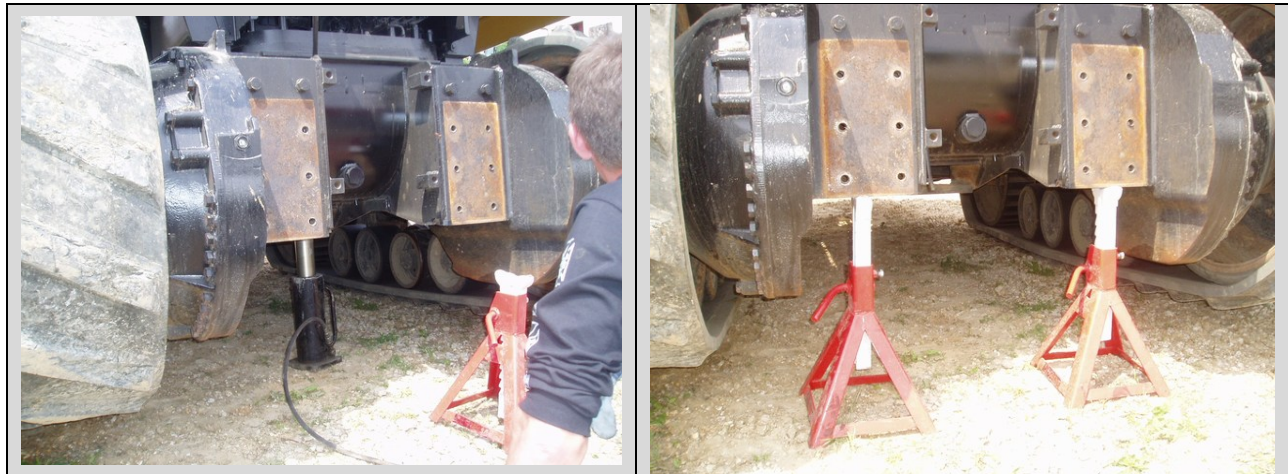
1. If possible, always move the tractor to a flat, firm surface. The machine can then be safely raised and will be more stable during track removal and installation. A hard surface also makes it easier to slide the track out from under the machine, and allows use of a forklift if available.
2. Disconnect any implements from the hitch or drawbar. Never work on a tractor with an implement attached or in the air, as this creates an unstable condition.
3. Always thoroughly clean the tractor before working on it. Dirt and debris makes access to bolts difficult and work unpleasant.

### Important

Record new track serial numbers in the operators guide in the tractor, on the warranty certificate, in the product registration card, and for your records. Guide lugs or edge strips can be damaged!

## Track Removal

### *Raise the Tractor*



**Step 1 and 2. Raising and supporting the rear of the machine**

1. Using the hydraulic jack, position it at the rear of the machine under the drawbar support or at the base of the hitch arms. **Raise the tractor at least 8" above the ground in order to provide clearance for the guide lugs to slide out from under the midrollers.**
2. Position 2 jack stands as far apart as possible (for stability) on the drawbar support or hitch arms.



3. Using a long stroke hydraulic jack, also raise up the front end approximately 8”.
4. Place 2 tall jack stands under the frame rails to firmly stabilize the tractor. Then slightly lower the jack to allow the stands to fully support the machine.

## Track Detensioning

Remove from the toolbox and inspect the CST-0200 Camso Detensioning Hose Kit. This detensioning hose kit connects to the 2 tension cylinders through the implement valve and uses the tractor hydraulics to detension the tracks.



Hydraulic Hoses – short one connects 2 tension cylinders. Long one connects T adapter to the implement hydraulic valve

Quick Coupler Adapter – installed in RH tension cylinder

Reducers –  
 1 set used on 65,65B and 75 (spring only) tension cylinders  
 1 set used on later (nitrogen charged) tension cylinders

“T” Adapter - install in LH tension cylinder

There are 2 different methods for detensioning the track, depending on the vintage of Challenger tractor. Earlier machines from 1986-1993 had a MECHANICAL SPRING ONLY tensioning system. Later systems use a MECHANICAL SPRING + NITROGEN CHARGE combination. The method used to detension each is different.

## Track Detensioning—Mechanical Spring Only

(Challenger 65,65B (S/N 7YC), 75(S/N 4CJ)

Early models can be identified by the small crossover hose that leads from the front to the back of the tension cylinder. This hose connects both ends of the tension cylinder to allow for air pressure equalization and for internal lubrication using residual oil from tensioning/detensioning. There may be some low residual air pressure in the tensioning system. Only disconnect the FRONT of the hose. Vent any trapped air/oil in the system by SLOWLY loosening the fittings and allowing any pressure to dissipate.

### NOTICE

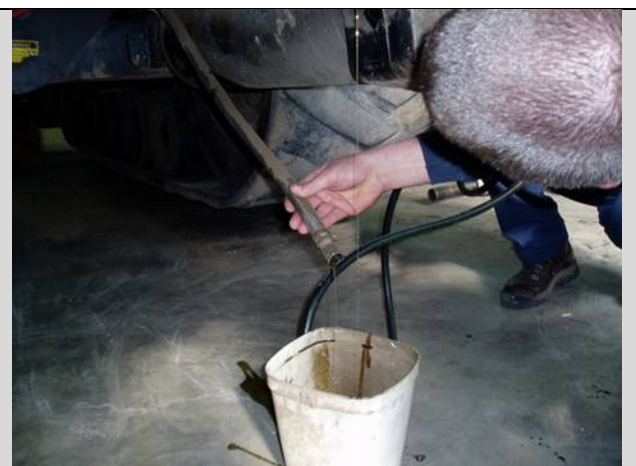
**Use care and loosen fittings SLOWLY when loosening crossover hoses or breathers on tensioners. Loosen hose attached to elbow fitting first to relieve any residual pressure. Oil will be under a low level of pressure and could spray out. Have a bucket ready to direct oil into it to avoid oil loss.**

#### Procedure

1. Loosen fitting SLOWLY to allow pressure to relieve. Once the oil is drained, leave the REAR section of the hose connected to the tensioner and leave it in the oil bucket, as some oil may come out of it during the detensioning process (Illustration A/B).
2. Loosen locknut on ORFS fitting and then remove elbow by backing it out of the tension cylinder. Be careful to not lose the rubber O-ring seal.
3. Repeat for opposite side.



**Illustration A**  
SLOWLY Loosen this hose fitting



**Illustration B**  
Capture Oil in bucket

4. Install adapter fitting into each tension cylinder. Kit contains 2 adapters – select the correct one needed for the machine. Make sure adapter has O-Ring installed (Illustration C).

5. Install single end detensioning hose into RH tension cylinder, and T fitting into LH tension cylinder (Illustration D) Then jump to Step 6.



**Illustration C**  
**INSTALL RH Adapter and hose**



**Illustration D**  
**Install adapter and T fitting**

### ***Track Detensioning—Mechanical Spring & Nitrogen Charge*** **(CHALLENGER C series, D Series, E Series)**



**Illustration A**  
**Removal of breather guard**



**Illustration B**  
**SLOWLY Remove Breather**

#### **Procedure**

1. Locate and remove the (2) tension cylinder breather guard bolts (LH and RH side) using a 9/16" socket (Illustration A).
2. SLOWLY loosen and remove the 2 breathers using a 1 3/8" open end wrench (Illustration B). **If breather is plugged, some level of air/oil pressure may exist inside the tensioner, so use care and unscrew slowly to allow pressure to bleed off. Have an oil catch basin ready**





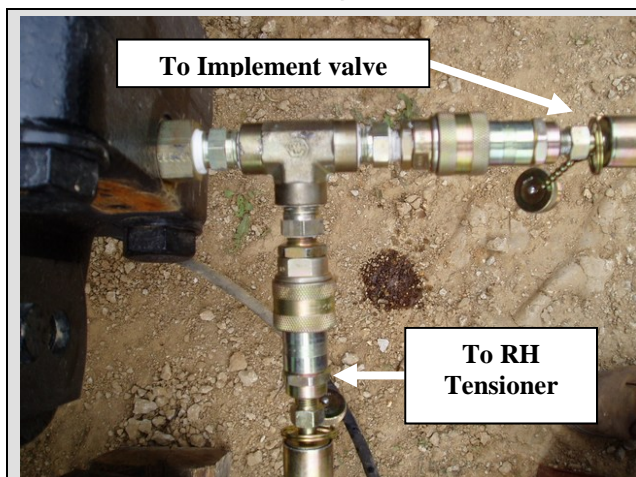
**Illustration C**  
Install Adapter and Hose (RH SIDE)



**Illustration D**  
Install adapter and T fitting (LH SIDE)

3. Install the correct adapter in the breather location. Kit has 2 adapters – select the correct one needed for the machine (Illustration C).
4. Install the detensioning hose onto the RH tension cylinder adapter (Illustration D)
5. Install the “T” fitting into LH tension cylinder. Attach opposite end of crossover hose from RH side into LH side quick connect. (Illustration D).

### ***Final Detensioning***



**Correct Connections (Top View – LH Side)**



**Opposite end connection to Implement Valve**

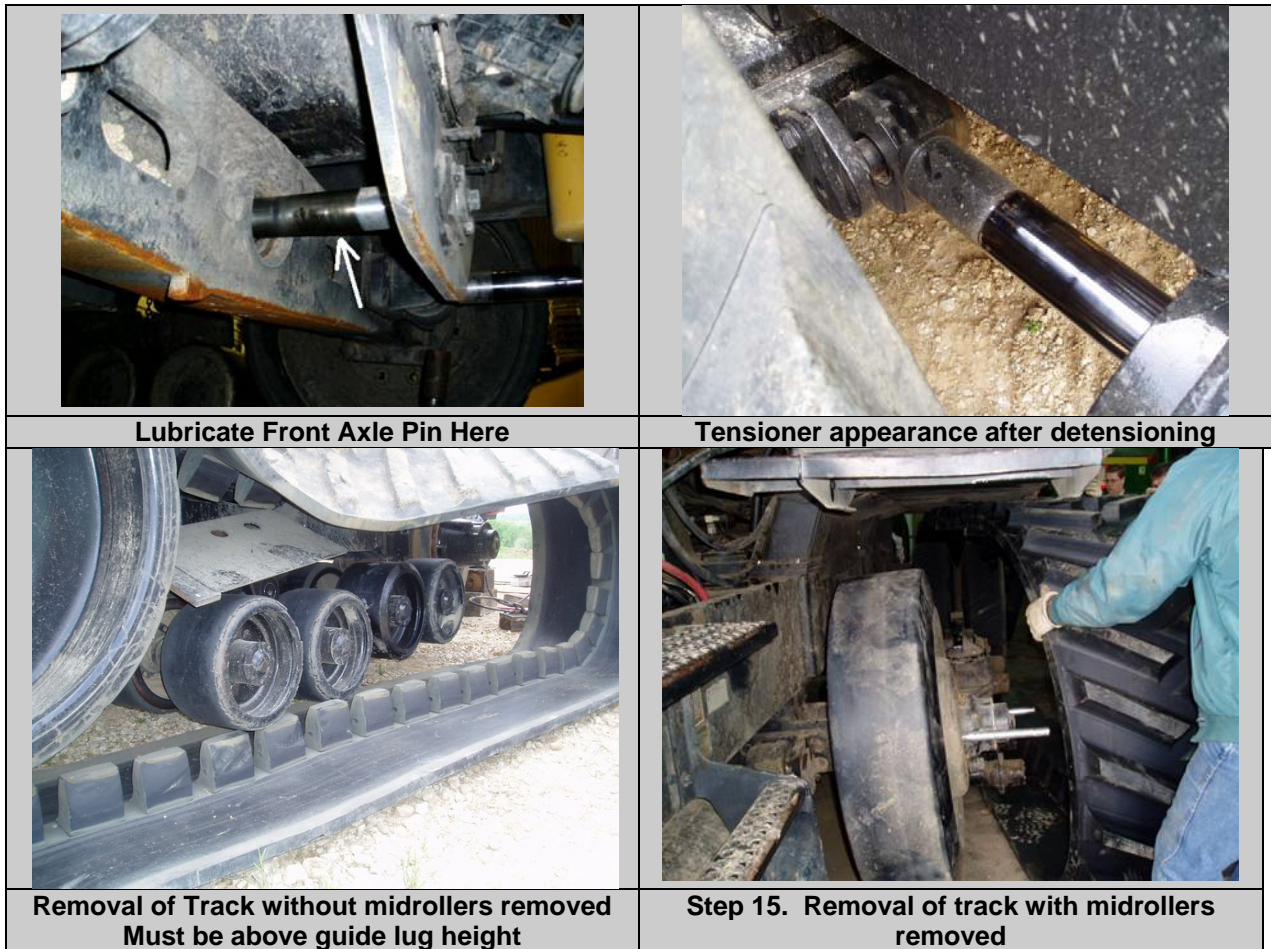
6. Use the short hose to connect the LH and RH tensioners together. Then use the long hose to connect to the machine implement control valve at the rear of the machine.
7. Check front axle area (both front and rear) for material, rocks, or debris. Lubricate the back side of the front axle pin with oil, soap, or grease(see Illustration below)

8. **Making sure the tractor is out of gear and in neutral, depress the clutch**, and start the machine and run at idle. Move the correct implement valve lever to extend the tension cylinders. The tension cylinders should extend and the front axle should move back. Make sure that both sides extend all the way back.

NOTE: If detensioning an early model machine with a crossover hose on the cylinder, make sure the rear section of the hose is in an oil bucket during detensioning to allow for catching of any residual oil.

**Make sure the front axle pin is free of debris, and is lubricated before attempting to detension track. Failure to clean and lubricate pin may cause damage to the axle, pin, or saddle.**

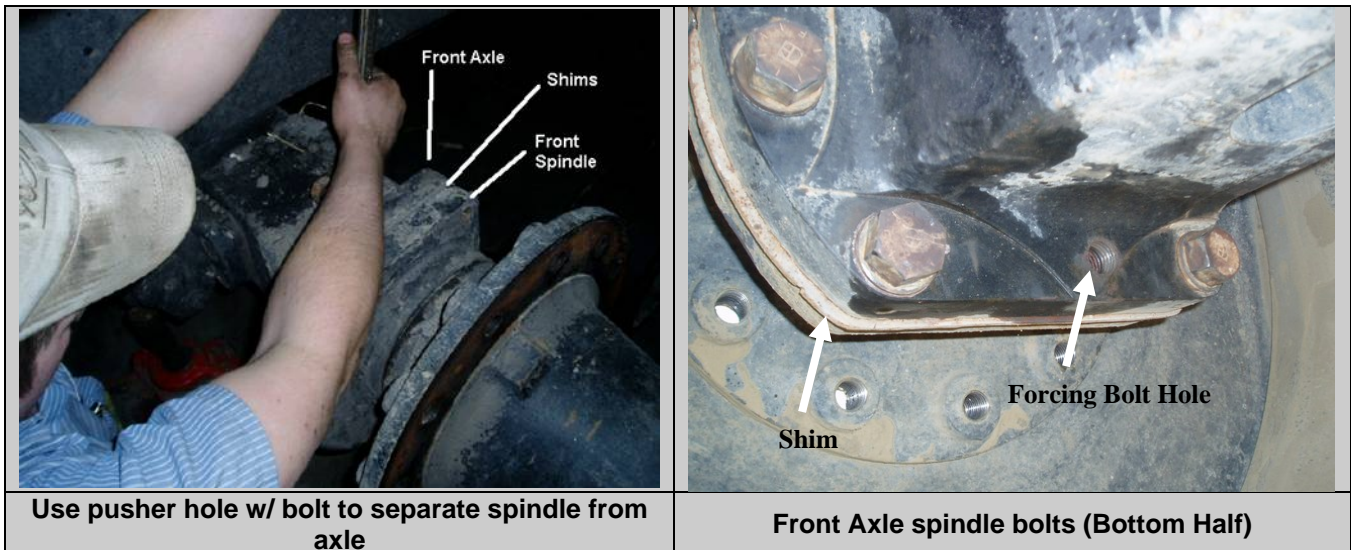
9. Once full extension is reached, move implement lever to the hold position and then stop the engine.



## Track Removal

1. Remove the outside front idler bolts and spacer plates (1 ½" socket).
2. Remove the outside front idler. Use pilot pins to support inner idler during removal.
3. Release air from air suspension bag on midroller assembly in order to take the pressure off the midrollers and allow track to slide out from underneath. You may want to hold up the midroller assembly using a chain or strap to assist in track removal.
4. Using a boom truck or forklift, carefully slide the track off the inner front idler, out from underneath the midrollers (see above illustration), and then out of the drivewheel groove and off the machine. Note: By letting the air out of the air suspension bag and using a come-along, additional clearance with the guide lugs can be made which can simplify the track removal.
5. Remove the 2 smaller bolts holding the inner idler, and then remove the inner idler wheel.
6. Clear all debris and mud off the hub, axle, etc if any remains.

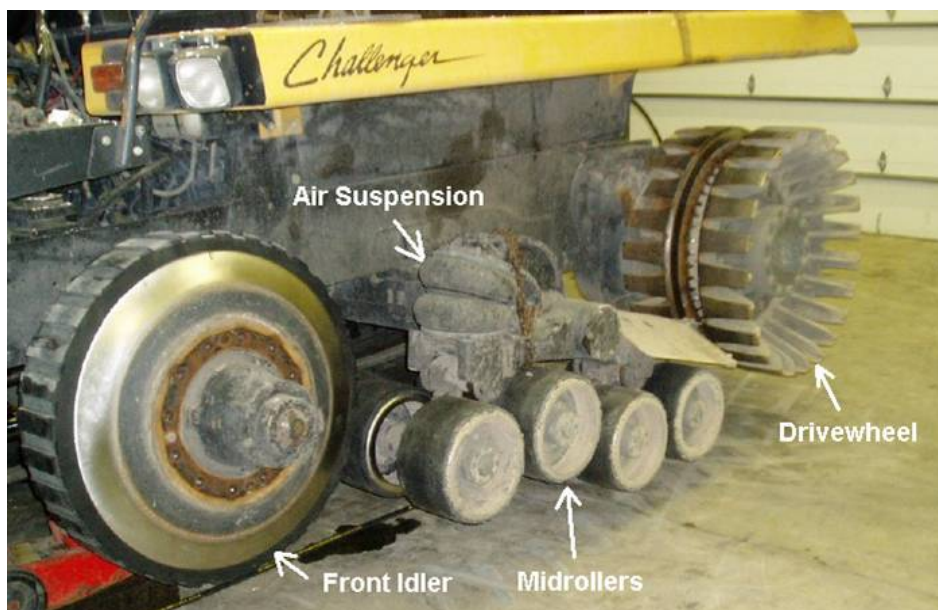
## Undercarriage Inspection



Since the front idler spindle usually needs to be realigned/re-shimmed, we recommend that while you can easily get to this area you should:

- Loosen all the front axle spindle bolts and “break loose” the assembly to make sure the spindle can separate and shims can be removed (use 15/16” combination wrench as area is tight – or ½” drive impact wrench) You may need to use the forcing bolt holes (see illustration above)

By loosening / cleaning up this area, it will make it much easier to make shim changes later once the track is installed on the machine.



Areas of the undercarriage to inspect for wear or damage. Cast Slotted Drivewheel shown.

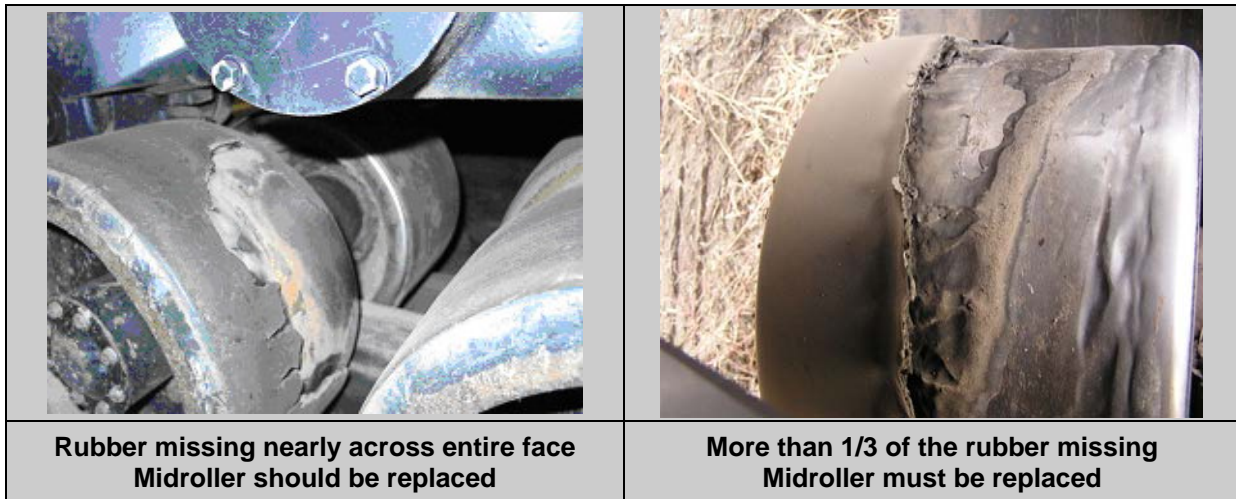
## Front Idler - Inspect



### Air filled front idler (1986-1992)

If equipped with a pneumatic front idler, inspect the inside and outside sidewalls for signs of cracking or fatigue. Non-gel filled idler life is around 3000-4000h. Also check for proper air pressure (90 psi). Replace idler if any sidewall damage or fatigue is seen.

## Midrollers



Check the rubber condition on the rollers. Replace any midrollers that have the following conditions:

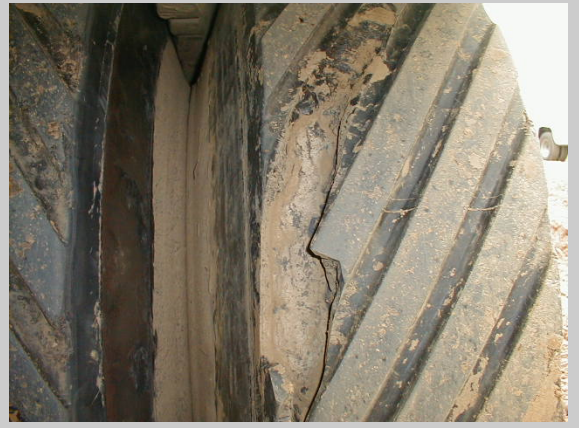
- More than 1/3 of the total rubber is missing from the midroller
- All or nearly all of the rubber is missing at any point around the midroller face
- Any flat spots are seen that may indicate the roller has stopped turning at some point
- Rubber is worn down to the point that dirt will stick to the rubber causing build-up

When replacing midrollers, always replace in **sets on the same axle** to avoid excess loading on the new midroller.

## Drivewheel



**Drivewheel rubber damage – torn + chunking  
Wheel should be replaced**



**Drivewheel Damage – OK to run  
Wheel may soon need to be replaced**

Check the condition of the drivewheel rubber. If the edges of the grooves are rounded, or the groove depth is less than ¼" depth, the wheel may need to be replaced.

If equipped with a cast slotted drivewheel (toothed drivewheel with no rubber coating) inspect the teeth for signs of wear or damage and clean any stuck rocks out if found.

## Front Tensioner Bushings



**Tensioner Bushing (Axle End)**



**Tensioner Bushing (Frame End)**

Check the condition of the front bushings, both in the frame and also at the end of the tensioner rod. If these have not been lubricated, they may be severely worn, broke, or missing. When tensioned, pin should be in the center of the bushing. If off-center, bushing must be replaced.

### **Important**

**Worn tensioner bushings will cause damage to the tension cylinder, and also if broken while in service, will lower track tension and could cause drivewheel to track slippage.**

# Track Installation

The track installation is straightforward and is basically the reverse order of the track removal. The table below list the correct bolt torques to be used.

Location	Torque
Front Spindle Bolts (Axle to spindle)	Standard Torque
Front Idler Bolts	52 ft-lbs (1 <sup>st</sup> Pass in a criss-cross pattern) 848 ft-lbs (Final Pass in a criss-cross pattern)

1. Reinstall the inside front idler using 2 positioning bolts. Use of a pilot pin will greatly simplify installation.



2. Use a forklift or boom truck to gently position the track over the drivewheel, under the midroller, and up and over the inside front idler. **Care is needed or else track damage can occur with the forks**
3. Reinstall the outside front idler. Torque the bolts in a criss-cross sequence in 2 passes using proper torques (see above table)
4. Reconnect the detensioning hose if removed earlier.
5. Start the machine. And move the #1 lever to retract and allow the tension cylinders to tighten the track. Leave the handle in this position for at least 30 seconds after the track appears to be fully tensioned to allow as much oil as possible to return back to the sump.
6. Shut down the tractor and move the #1 implement lever to the float position (full forward) briefly and back to neutral to relieve any possible pressure remaining in the lines.
7. Disconnect the detensioning hose from the rear of the machine and the “T” fitting, as well as the short hose between the 2 tension cylinders. Leave the fittings in place for now until alignment is completed.

**NOTE : At this point, you should now skip to the “Alignment” Section, as you may need to detension and install shims during the alignment process. Once the alignment is correct, return here and then proceed to Step 8.**

### ***Final Removal of Detensioning Fittings and Excess Oil***



8. Slowly remove the “T” fittings and straight fittings from the tensioner breather hole. Do this slowly and have a 5 gallon bucket ready to catch any oil that will leak out of the cylinder. There may be some residual pressure so make sure to use care and slowly remove the fitting
9. Using a suction gun, siphon approximately 1 Qt of oil out of the front of each of the tension cylinders. If this step is skipped, major amounts of oil seepage through the breather (or in the case of the early machines, too much oil will remain in the system).
10. Clean and then reinstall breather. (If installing on an earlier non breather machine, remove the rear section of the hose from the oil bucket and reinstall in the front port of the tension cylinder. Then skip to step 12.)
11. Reinstall breather guard.
12. Remove the tractor from the jack stands
13. Refill the air suspension (if deflated). Correct pressure is 65-90 psi. Recommended general pressure is 75 psi.



## Alignment

It is very important once a track is installed to check the alignment. Tracks must be aligned in order to maximize guide lug life, reduce rolling resistance, and prolong midroller life. **Failure to align the machine may result in failure of the track in a short amount of hours, and damage to the rolling stock.**

### ***Check Alignment***

1. Road the tractor for approx 1 mile out and back (10-15 minutes) in high gear (10 Forward) at full throttle. Try to do this on a level surface.
2. Stop the machine, then immediately get out with the infrared heat gun.
3. Check temperatures on the inboard and outboard surfaces of the guide lugs on the LH track. Record the values, then compute the difference between them. For example, if the inboard side was 120F, and the outboard side 80F, the difference would be 40F (hot to the inboard side)
4. Repeat the temperature check for the RH track.

#### **Important**

**A track requires alignment if the temperature difference is greater than approximately 15-20F. Failure to align a misaligned track may result in rapid and non warrantable guide lug wear and damage to the midrollers, drivewheels, and idlers**

## Adjusting Track Alignment

The Challenger Tillage tractor requires significant amounts of time to adjust the alignment. The track tension must be released, the machine jacked up, the front spindle loosened or removed, old shims removed and new shims installed, and then a recheck of the alignment.

### Step 1 – Detension the Track

Please refer to the earlier sections for the correct procedure to detension tracks.

### Step 2 – Remove shims and determine existing shim angles

#### Challenger 65,65B(7YC), 65C (4KK1-499), 75 (4CJ), 75C(4KK1-499)

The earlier Challenger Tillage tractors listed above are equipped with single piece shims. In order to get the correct alignment, you will need a selection of these shims to choose from. For a pre-assembled kit of a selection of shims needed, order Camso Shim Kit CST-0400.

Shim removal is laborious with the earlier non split shim models, and requires the following steps:

- a. Removal of track
- b. Removal of inside and outside front idlers
- c. Removal of front spindle

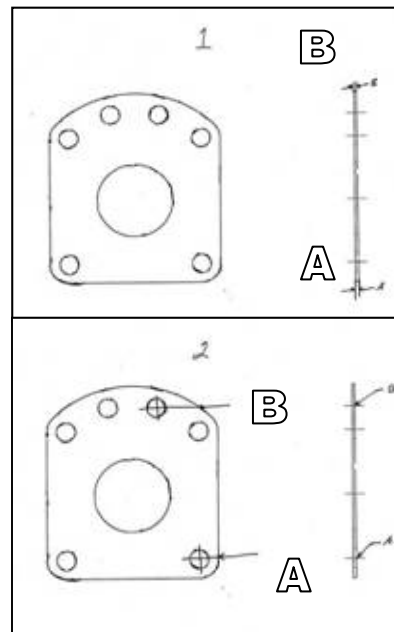
Once the front spindle is removed, use the following tables to determine the existing shims angles installed. If no part number is visible, you can determine the angle by thickness. If more than one shim is installed, then add up the total shim angles to get the total shim angle.

Part Number	Angle	A (mm)	B (mm)
8R-3589	0	3.5	3.5
8R-6632	0.2	3.87	3
8R-3601	0.275	4.01	2.82
8R-0747	0.915	5.21	1.24
8R-3003	0.65	4.71	1.89

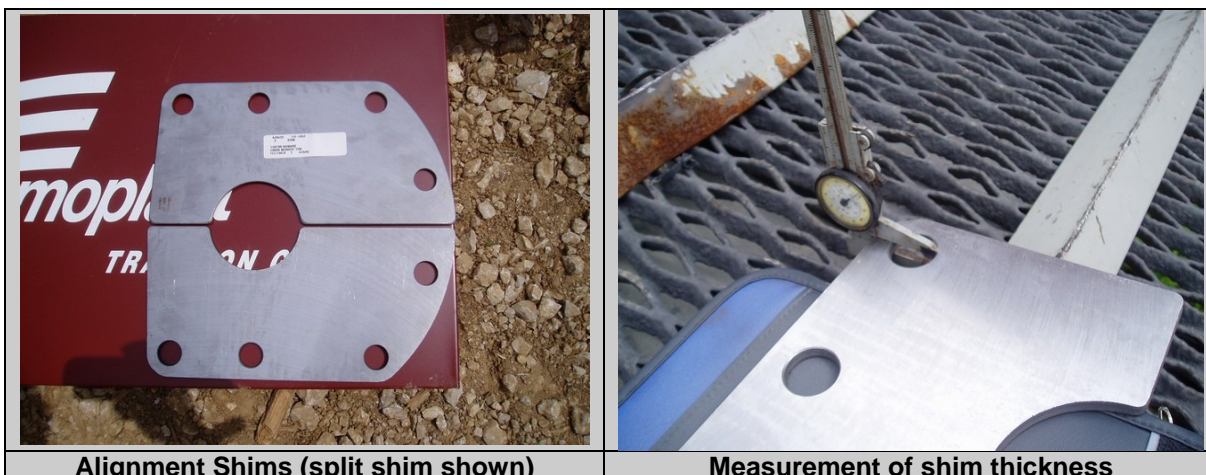
Table 1. Shim Angle (using End Thickness)

Part Number	Angle	(A-B) mm
4E-5059	0.31	1.06
112-3762	0.55	1.89
111-1560	0.63	2.16
4E-5058	0.97	3.33

Table 2. Shim Angle (using hole thickness)



#### Challenger 65C (4KK500-up), 70C, 75C(4KK500-up), 85C, All D Series , All E Series



Alignment Shims (split shim shown)

Measurement of shim thickness

These machines are equipped with “split shims”. The bolts that hold these in place are on the inside of the flange, and are accessible without removing the front idler and hub. The shim is split into an upper and lower half. You can remove half the bolts (upper and lower) at a time, and then can remove each half of the shim. For a pre-assembled kit of a selection of shims needed, order Camso Shim Kit CST-0500.

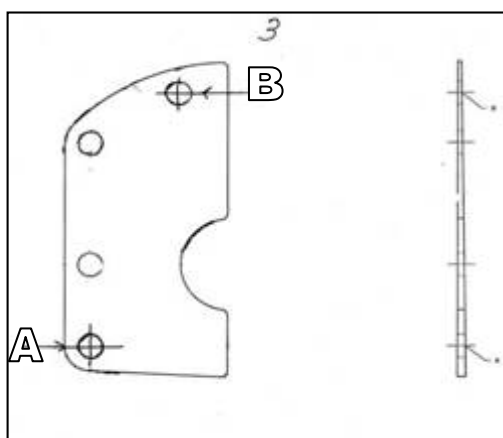
Note that with split shims you do not need to completely remove the spindle.

Use the following table to determine the existing shims angles installed. If no part number is visible, you can determine the angle by thickness. If more than one shim is installed, then add up the total shim angles.

NOTE: Measure the shim thickness as shown in the picture above. Measure how **thick** the shim is on each end, and subtract the difference, to determine the correct shim part number and angle from the table.

Part Number	Angle	(A-B) mm
195-7533	0	0
195-7531	0.1	0.44
110-6352	0.2	0.92
110-6353	0.3	1.38
110-6354	0.4	1.84
110-6355	0.5	2.3
110-6356	0.6	2.76
110-6357	0.7	3.22
110-6358	0.8	3.68
112-3761	0.9	4.14

Table 3. Shim Angle(using hole thickness)



### Step 3 – Calculate new shim angle needed

Using the temperature differentials recorded earlier during the alignment check, you now can calculate what shim angle will be needed to achieve better alignment. Use the following table to estimate first the amount of CHANGE that will be needed depending on the temperature differential.

Left Side				Right Side			
Outer Idler Hottest Temp Difference	Increase Angle	Inner Idler Hottest Temp Difference	Decrease Angle	Outer Idler Hottest Temp Difference	Increase Angle	Inner Idler Hottest Temp Difference	Decrease Angle
10F	0.05	10F	0.05	10F	0.07	10F	0.05
20F	0.1	20F	0.1	20F	0.13	20F	0.1
40F	0.17	40F	0.17	40F	0.23	40F	0.17
60F	0.25	60F	0.25	60F	0.33	60F	0.25
80F	0.31	80F	0.31	80F	0.44	80F	0.31
100F	0.36	100F	0.36	100F	0.54	100F	0.36
120F	0.41	120F	0.41	120F	0.63	120F	0.41
140F	0.45	140F	0.45	140F	0.73	140F	0.45

**Table 4. Estimated change in shim angle from current setting**

The final shim angle will be:

$$\text{New Shim Angle} = \text{Current shim angle} \pm \text{Change needed in shim angle}$$

The following example will illustrate how to use the above tables to calculate the correct angle.

**Example:** A Challenger 75E with new tracks is rubbing the guide lugs hard to the outside on the RH track. After 15 minutes of roading, the temperature measured on the inside of the drivewheel or guide lug was 100F, and on the outside of drivewheel or guide lug it was 160F. Upon disassembly, the shim was removed and since there was no part number found, it was measured at the front and the rear holes and was found to have measurements be 8.6mm and 6 mm.

**Solution:** The difference in measurements A and B is (8.6-6), or 2.6mm. Looking at Table 3, the closest (A-B) dimension is 2.76, so we deduce that we have a 0.6 degree shim (110-6356).

Now, using Table 4, we know we have the RH track with the outer idler hottest by (160-100) = 60F temperature differential. This would indicate we need to increase the angle by 0.33 degrees. We could just add a 0.3 deg shim to the current shim, but stacking shims is not usually recommended, so we should instead calculate the new shim angle. The new angle needed is 0.6+0.33= 0.93 degrees. The closest shim angle to try would be 0.9 degrees (112-3761). This new split shim should be installed in place of the earlier 110-6356 split shim. Make sure to then recheck alignment.

### Important Shim Installation Rules

1. Do not stack shims unless necessary. It is preferable to use the correct shim rather than stacking 2 smaller angle shims to achieve best results.
2. Never stack more than 2 shims on top of each other.

### Step 4 – Install New Shims



**It is possible to use of a hydraulic jack to CAREFULLY separate the spindle from the front axle with loose bolts – never do this while track is tensioned! (LATER SPLIT SHIM VERSION ONLY)**

Once the correct shim pack is determined, install the new shims and then reassemble the undercarriage in reverse order and re-tension the track.

### Step 5 – Recheck Alignment

The alignment should now be rechecked by running the machine for 10-15 min in gear 10F. Then check temperature differential once again. The temperature should have been reduced to below the spec, but sometimes still may require another iteration or more to get to within 15-20F differential. Refer to the correct “Checking Alignment” procedure.

## Product Information

After alignment and installation is completed, make sure to provide the customer the following documents:

- **Warranty Certificate** - Also make sure to record track serial numbers on the warranty certificate for future reference.
- **Track Operational Guidelines Brochure** - Take a few minutes to review the information in the brochure, and to discuss the warranty period.
- **Product Registration Card** - also assist the customer in finding the serial numbers on the track and in filling out the product registration card.

## Summary

Installation and adjustment of tracks is straightforward and not complicated once you know the proper procedures. As you gain experience, you will find more efficient ways to accomplish the work in a shorter period of time.

For additional information on the maintenance of the undercarriage, and on the extended procedures for servicing and rebuilding these areas, refer to the OEM service manual (this may be available from the local OEM dealer)

Title	OEM Part Number
<i>Cat 65/75/85/95 Disassembly &amp; Assembly Manual</i>	<i>SEN1789</i>

**Note:** OEM manuals are available in a complete set (including all machines Camso manufactures tracks for) by ordering the “OEM Track Installation Literature Kit“(P/N CPB-0300) from Camso.

Email any suggestions for improvements, clarifications, or errors, to [ag.productsupport@camso.co](mailto:ag.productsupport@camso.co).

For questions or technical support, please contact the Camso Customer Service desk through email, [ag.productsupport@camso.co](mailto:ag.productsupport@camso.co) or by calling toll free 1-844-226-7624 or 317-671-7327.

