



MARLIN CRAWLER RCLT HD INSTALLATION

FOREWORD

This guide shows how to install a Heavy Duty Rock Crawling Long Travel Independent Front Suspension (IFS) System and Integrated Heavy Duty MarRack Steering with many industry-first features into a 2003+ Lexus GX, 2003+ Toyota 4Runner, 2005-2023 Toyota Tacoma, and 2006+ Toyota FJ Cruiser.

This installer can be used in the following two ways:

- The **experienced technician** can refer to the photos and major headings for fast and accurate step-by-step instructions. Important specifications are printed in bold type, right at the point where they will be needed. Following every step will guarantee that the job is done correctly.
- The **new technician** will find the details of how to perform each step particularly helpful. By studying the photos and carefully following the instructions, a new technician can readily install or service this Marlin Crawler product.

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1543 N. Maple Ave • Fresno, CA 93703



Installer version: **1.10** (8/28/2023)



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MarlinCrawler.com/RCLTHD/instructions

HOW TO USE THIS INSTALLER

The procedures are presented in a step-by-step format:

- The task heading tells *what* to do.
- The photo or illustration shows *what* and *where* to do it.

The detailed text tells *how* to perform the task and gives other information such as specifications, tips, and warnings.

GENERAL REPAIR INSTRUCTIONS

1. Use fender, seat, and floor covers to keep vehicle clean and prevent damage.
2. During disassembly, keep parts in order to facilitate reassembly.
3. Check hose connections to ensure they are secure and correct.
4. Carefully observe all specifications for bolt tightening torques. Always use an accurate torque wrench.
5. Care must be taken when jacking up and supporting the vehicle.
 - a. If the vehicle is to be jacked up only at the front end, be sure to block the rear wheels to ensure safety.
 - b. After the vehicle is jacked up, be sure to support it on stands.

INSTALLATION OVERVIEW

Rock Crawling Long Travel Heavy Duty (RCLT HD) is a replacement Heavy Duty IFS with integrated Heavy Duty MarRack Steering System comprised of many patented features (pat. no. 11066099, 11667327, and others pending). This installation process is more time consuming than traditional Long Travel IFS installation due to modifications required to install the oversized MarRack rack and pinion steering as well as fitting factory components onto replacement Heavy Duty Knuckles.

The installation process is divided into the following four sections:

PRE 2: Power Steering System Flush
PRE 3: Remove Factory Components

SECTION 1: HD Steering Installation
SECTION 2: HD IFS Installation

Estimated Installation Time: 2 to 5 days



Ensure you have all proper parts and equipment before proceeding

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PRE 1: CHECKLIST

Part	SKU / Spec	Qty	Pg	Image
RCLT HD UCA Pair	MCSU-1811200L/R	1	25	
RCLT HD LCA Pair	MCSU-1813200L/R	1	27	
MarRack Bushing	MCSU-1814102	1	10	
MarRack Cutting Jig	MCJI-14101	1	12	
MarRack Line Adapter	MCSU-1814106	1	10	
[2010+ SUV] Sub Frame Top Enforcement	MCSU-181417	1	14	
UCA Compression Sleeve	MCSU-715111	4	26	
LCA Front Comp. Sleeve, Late	MCSU-71521112	2	28	
LCA Rear Comp. Sleeve, Late	MCSU-71521212	2	29	
Oversized Bushing, Short	MCSU-715211	6	28	
Misalignment Spacer	MCBE-4121 9/16" Max-Angle	4	36	
Misalignment Spacer	MCBE-4123 5/8" Short	4	39	
Tie Rod End	MCSU-1814202	2	39	
Washer, UCA	MCSU-1811906	8	33	
UCA Caster Spacer	MCSU-1811902	4	36	
Brake Hose Clip	MCBR-1313	4	40	
Limit Strap, 8"	MCSU-1819111	2	38	
Limit Strap Frame Mount	MCSU-181913	2	38	
Grease Zerk	MCHT-951	8	26 28	
Bolt, LH MarRack & LH Diff	M14x2.00x200	1	15 22	
Bolt, Main Shock	1/2"-20 x 4.25"	2	37	
Bolt, Limit Strap	1/2"-20 x 1.25"	2	38 39	
Bolt, Tie Rod End	5/8"-18 x 4.25"	2	39	
Washer, Flat	M14	4	15 21	
Washer, Flat	9/16"	4	36 38	
Nut, Flanged Crimp-lock	M14x2.00	2	15 22	
Nut, Flanged S.S. 12-point	9/16"	2	36 38	
Required components not included with RCLT HD				
200-series Land Cruiser Rack	44200-60170	1	9	
Long Travel Coil-over	8" stroke or equivalent	2	35	

Part	SKU / Spec	Qty	Pg	Image
RCLT HD Knuckle Pair	MCSU-1812100L/R	1	23	
MarRack Frame Insert	MCSU-1814103	1	13	
MarRack Sector Shaft Extension	MCSU-1814104	1	19	
MarRack ITR Boot Clamp	MCHT-961	1	22	
[2010+ SUV] Cutting Jig	MCJI-14102	1	14	
[2010+ SUV] MarRack Frame Insert	MCSU-1814103	1	14	
LCA Front Comp. Sleeve, Early	MCSU-71521111	2	28	
LCA Rear Comp. Sleeve, Early	MCSU-71521211	2	29	
UCA Bushing	MCSU-71511	8	26	
Oversized Bushing, Long	MCSU-715212	2	28	
Misalignment Spacer	MCBE-4122 5/8" Max-Angle	4	35	
Mini Marlink	MCSU-18142011	2	39	
Tie Rod End Jam Nut	MCSU-18142021	2	39	
Washer, LCA Shims, LCA	MCSU-1813906 - MCSU-1813916	42	33	
Steel Braided Brake Hose	MCBR-415	2	40	
Brake Hose Frame Mount	MCBR-1314	2	35	
Limit Strap Adjustable Clevis	MCSU-181912	2	38	
Low Profile Bump Stop	MCSU-761	2	34	
Bolt, Cutting Jig	M8x1.25x10	1	12	
Bolt, RH MarRack	M14x2.00x180	1	15 22	
Bolt, Upper Knuckle	9/16"-18 x 5.00"	2	36 38	
Bolt, Lower Knuckle	5/8"-18 x 4.75"	2	35	
Washer, Flat	1/2"	8	36 38	
Washer, Flat	5/8"	8	35 39	
Nut, Flanged Crimp-lock	1/2"	4	38 39	
Nut, Flanged Crimp-lock	5/8"	4	35 39	
Required components not included with RCLT HD				
LT Axles	Replacement inner bars or Full Set	-	37	
New or used Knuckle Components		-	24	



PRE 2: POWER STEERING SYSTEM FLUSH

It is **CRITICAL** that any metal debris or residue be flushed from steering system prior to replacing steering rack. For this reason, we do not offer a pre-assembled MarRack because it is impossible to handle product warranty without a supervised system flush. **PLEASE BE AWARE** that the company through which your Land Cruiser steering rack was obtained may not accept a leaking warranty claim because metal was allowed to circulate through new internal seals. Further, because the Land Cruiser rack is modified into a MarRack, there is little chance for replacement.

Therefore, we **STRONGLY ADVISE** all vehicles flush their power steering system. For high mileage applications, this would be a great time to replace your power steering pump as well.

Because of the oversized MarRack and unique RCLT HD steering geometry, no Pump upgrades are required with RCLT HD. A power steering cooler (factory or aftermarket) is recommended for system performance, dependability and longevity.



Fig 1

NOTE: Only begin when the vehicle is ready for full RCLT HD installation.

1. DRAIN POWER STEERING RESERVOIR

Locate power steering reservoir and siphon out fluid.



Fig 2

2. DISCONNECT UPPER RETURN HOSE FOR DRAINAGE

Disconnect upper return hose from reservoir return feed circled in Figure 2 and route it down into a drain pan as shown in Figure 3.

3. PLUG UPPER RETURN FEED LINE

Insert a rubber cap over barbed end of the reservoir's exposed upper return feed line.

TIP: The factory Toyota rubber plug from a new 200-series Steering Rack's Low Pressure Return Line works great for this as circled in Figure 2.

4. LIFT FRONT OF VEHICLE

Lift vehicle so that the front tires are off the ground and freely able to turn to full steering lock in both directions.



Fig 3



Fig 4

5. CYCLE 2-liters NEW FLUID THROUGH SYSTEM

Fill reservoir with new power steering fluid and slowly cycle steering wheel to full steering lock in both directions several times.

As the steering wheel is rotated, fluid will gravity-feed through steering pump, steering rack, reservoir return line, and down into drain pan.

Continue until **2 liters** of new fluid has been added to the reservoir.

6. CYCLE REMAINING FLUID OUT OF SYSTEM

Slowly cycle steering wheel additional times until reservoir becomes empty and no more fluid comes out of the return line.



Fig 5

7. RECONNECT RETURN HOSE TO RESERVOIR

Leave reservoir empty and do NOT start engine until RCLT HD installation is complete.

If you need to start engine prior to beginning RCLT HD installation, see “**Bleed Power Steering System**” on Page 41.

The power steering system is now flushed and ready to be upgraded.

PRE 3: REMOVE FACTORY COMPONENTS

Remove factory components including IFS, Differential Assembly, and Steering Rack. It is **STRONGLY** advised to follow the FSM instructions to **fix steering wheel with seat belt** as described in Step 1.a of the “REMOVE FACTORY STEERING RACK” section of Appendix A1.



Fig 6

1. REMOVE IFS COMPONENTS

See Appendix A1

2. REMOVE FRONT DIFFERENTIAL CARRIER ASSEMBLY

See Appendix A1

3. REMOVE FACTORY STEERING RACK

See Appendix A1

Figure 6 shows a 2011 Tacoma prepared for RCLT HD installation. See Appendix A2 for more pictures.

The vehicle is now ready for RCLT HD Installation.



SECTION 1: HD STEERING INSTALLATION

Protected by US patent law, the Marlin Crawler MarRack is an IFS steering system upgrade that positions a steering rack forward from the factory rack location. Installing a HD MarRack Steering Rack is broken down into the following steps:

Step 1: MarRack Preparation

Step 2: Frame Preparation

Step 3: Steering Preparation

Step 4: Install MarRack

TOOLS REQUIRED

- 12mm Allen Head Socket
- 21mm Hand Wrench
- Medium to Large sized Hammer
- Flat Chisel or Punch
- #4 Easy-Out or Screw Extractor (Tacoma only)
- 1¼" Hole Saw with ¼" pilot drill
- 39/64" Transfer Punch (19/32" OK)
- 19/32" Drill Bit
- Torque Wrench

ADDITIONAL EQUIPMENT

- Bench Vice (preferred but optional)
- Press (preferred but optional)
- Hammer & Chisel (optional: Blow Torch)
- Cutting Torch (Acetylene or Plasma)
- Welder (MIG preferred)
- Hand-held Drill
- Anti-seize thread lubricant

PARTS REFERENCE



2008+ Land Cruiser Rack
Toyota SKU 44200-60170



MCSU-1814102
MarRack Bushing



MCSU-1814103
MarRack Frame Insert



MCSU-1814104
MarRack Sector
Shaft Extension



MCSU-1814106
MarRack Line Adapter



MCJI-14101
MarRack Cutting Jig



1 x M8x1.25x10mm
Cutting Jig Bolt



1 x M14x2.00x180mm
Class 12.9, Cap-head



1 x M14x2.00x200mm
Class 12.9, Cap-head



2 x M14x2.00
Flanged Crimp-lock



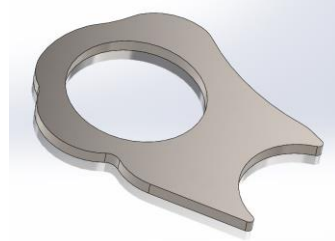
4x M14 Flat Washers



MCHT-961
MarRack ITR Boot Clamp



[2010+ SUV Kits]
MCJI-14102
Cutting Jig



[2010+ SUV Kits]
MCSU-181417
Sub Frame Enforcement



[2010+ SUV Kits]
MCSU-1814103
Extra MarRack Frame Insert

Step 1 of 4: MarRack Preparation

The MarRack is so large that it physically cannot fit into a mid-size truck or SUV frame. Because of this, it is *NOT* compatible with stock steering geometry and requires new IFS geometry in order to operate safely. This step prepares the MarRack in such a way that makes our patented installation possible.



Fig 7

1. REMOVE CENTER MOUNT ASSEMBLY

Remove the center mount assembly.

Scan QR code for our optional
HD Center Mount Upgrade Kit:



2. REMOVE LH RACK RUBBER BUSHINGS & SLEEVES

Using a Hand or Air Chisel, remove top & bottom bushings of the pinion side mount by wedging chisel under sleeve flange as shown in Figure 8. Work around diameter until bushing & sleeve comes out.

TIP: Once one half is out, the other half will come out easier.

Scan QR code to view an
Air Chisel video demo:



Alternative Torch Method:

Use a Blow Torch to heat up the mount until top & bottom rubber bushings are burnt out (Fig 9) then hammer out sleeves (Fig 10).

Scan QR code to view a
Blow Torch video demo:



Fig 8

TIP: Place a wet towel over rack body and spray with water to limit heat-soak. Wipe away smoke marks from the aluminum housing.



Pinion side

Fig 9



Fig 10



Fig 11

3. INSTALL LH MARRACK BUSHING

Align top scribe mark of MarRack Bushing **MCSU-1814102** to be parallel to the rack with **off-set hole towards the rack input**, and press it into the empty bushing boss until it bottoms-out as shown in Figure 11.

TIP: Apply a small amount of grease or oil to limit galling.

TIP: Use a marker to add scribe marks at the bottom of the MarRack Bushing to help position prior to pressing.

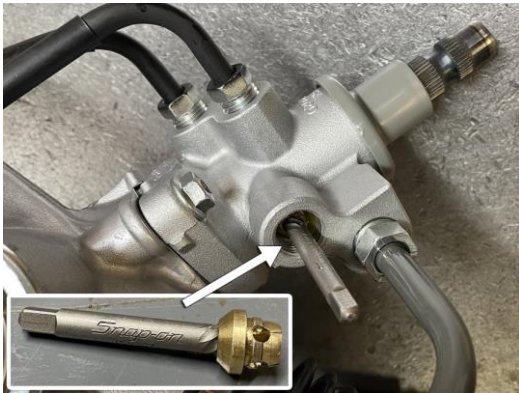


Fig 12

4. [TACOMA & 2010+ SUV] O-RING CONVERSION

NOTE: Only applies to 2005-23 Tacoma and 2010+ 4Runner & FJ C.

Use a #4 Easy-Out or Thread Extractor to remove brass insert from MarRack high pressure input by hammering extractor into insert and using pliers to slowly rotate CCW while wiggling the insert out. Ensure no brass parts or the fitting's inner steel detent ball are left in the rack.

NOTE: We advise not using a high speed device to limit debris falling into rack.



Fig 13

Test-fit MarRack Line Adapter **MCSU-1814106** onto vehicle high pressure line with factory o-ring.

IMPORTANT: Ensure adapter installs flush as shown in Figure 13. Fitment is **very** important prior to tightening line on Page 21 Step 3.



Fig 14

Thread a spare M8x1.25 bolt into the larger end of the MarRack Line Adapter and lightly tap on the head of the bolt until the Line Adapter bottoms out into the MarRack. Remove bolt.

NOTE: It has been reported that some aftermarket racks use a slightly smaller diameter inside the rack. In such case, you may have to use a lathe to slightly turn-down the Line Adapter's minor OD to fit. *Match the minor outer diameter with that of the removed insert.*

TIP: Place tape across ports to prevent debris for entering rack.



5. REMOVE BOTH TIE ROD ENDS

Remove both Tie Rod Ends (TRE) from rack. Remove LH jam nut.

6. REMOVE LH BOOT CLAMPS

Using pliers, remove both boot clamps from the left-side boot.

NOTICE: Be careful not to damage steering rack boot.

7. REMOVE LH STEERING RACK BOOT

Remove left side steering rack boot.

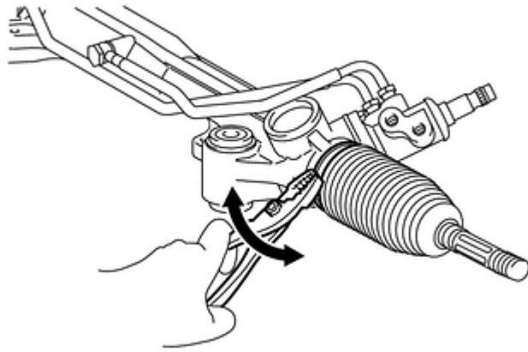


Fig 15

8. REMOVE LH STEERING RACK END SUB-ASSEMBLY

Place MarRack Bushing area into a bench vice, using a towel and/or metal plate on both sides to prevent surface damage as shown in Figure 17, remove Inner Tie Rod (ITR) assembly.

TIP: Feel free to rotate the steering rack input as needed. The rack will be re-centered later. The ITR thread is a standard right-hand thread and can sometimes be difficult to remove.

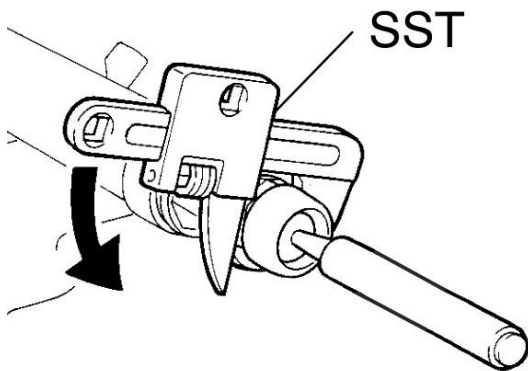


Fig 16

Figure 17 shows left-side ITR removed from steering rack.

The below figures show different methods for ITR removal or installation as shown during various processes of this guide.

From left to right: Toyota Special Service Tool (SST) 09922-10010 across the 47.5mm flats, an 18" or longer pipe wrench across the 55mm OD ITR body, and an 18" or longer adjustable wrench across the 47.5mm flats.



Fig 17



Fig 18



Fig 19

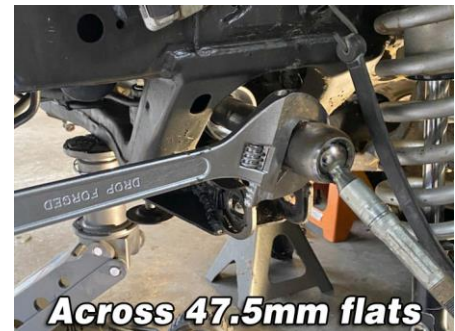


Fig 20

The MarRack is now prepared for installation.



Step 2 of 4: Frame Preparation

This step requires Frame Insert(s) to be installed and clearancing of the top left-hand side of the sub-frame assembly. These modifications do not interfere with or modify factory steering, differential, or suspension attachment points or functionality.

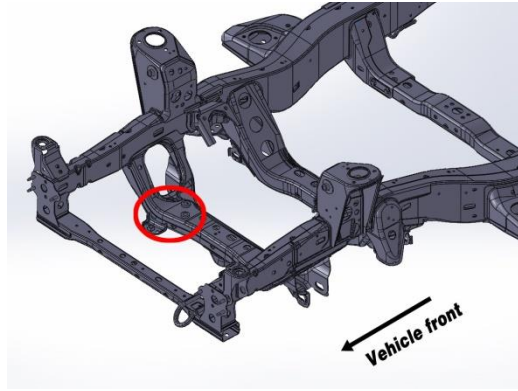


Fig 21

1. CUT LOWER HOLE FOR RH SIDE FRAME INSERT

Figure 21 shows approximate location where Frame Insert **MCSU-1814103** will be installed from the *bottom-side*.

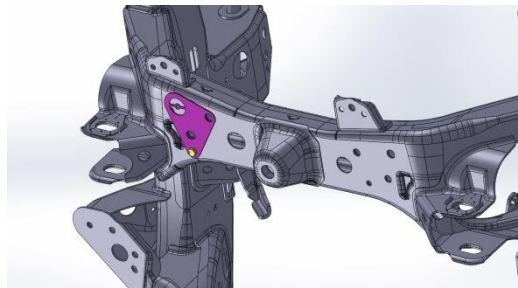


Fig 22

Position **MCJI-14101** Cutting Jig as shown, centered about the right-side Differential Bracket and original Steering Rack bolt holes. Install the M8x1.25x10 bolt into the existing threaded frame hole to hold the jig in place.

TIP: For additional positioning, insert RH differential bracket bolt upside-down through differential bracket bolt hole as shown in Figure 24.

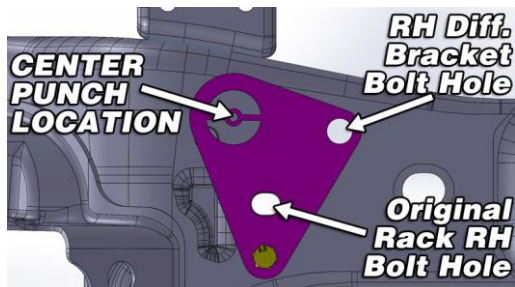


Fig 23

Use a Punch to mark the drill-start location as labeled in Figure 23 as **CENTER PUNCH LOCATION**. Remove Cutting Jig and drill a 1/4" pilot hole.

Using a 1 1/4" Hole Saw with 1/4" pilot drill, drill a 1 1/4" hole through the **BOTTOM FACE ONLY** of the frame.

Depending on application, the cut will pass through a neighboring threaded hole at about 8PM from the center-punch location. Allowing the Hole Saw to cut without excessive upward pressure helps prevent jamming.



Fig 24

After the 1 1/4" hole is cut, reposition Cutting Jig to verify proper placement of the hole as shown in Figure 24.

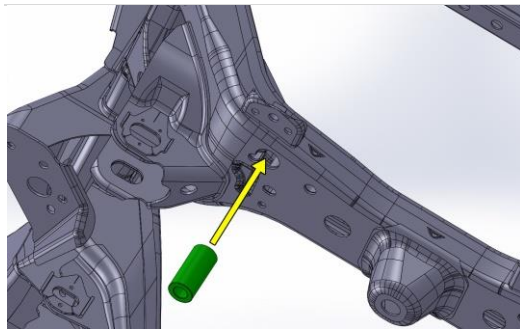


Fig 25

2. CUT UPPER HOLE FOR RH FRAME INSERT

Insert MarRack Frame Insert **MCSU-1814103** up through the 1¼" hole as shown as the green component in Figure 25.

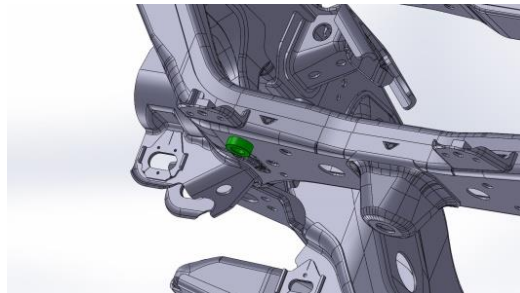


Fig 26

Figure 26 shows the final MarRack Frame Insert position.

Figure 27 below further illustrates installation.



Fig 27

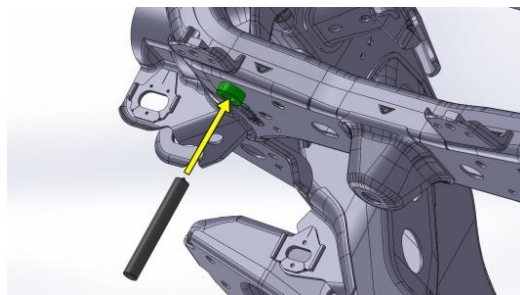


Fig 28

With the Frame Insert fully inserted into the frame, insert a 39/64" (or 19/32") Transfer Punch vertically up through the Frame Insert as shown in Figure 28.

Hammer transfer punch to mark upper hole drill-start location.

Remove Transfer Punch and Frame Insert, and drill a 19/32" hole through the top of the frame.

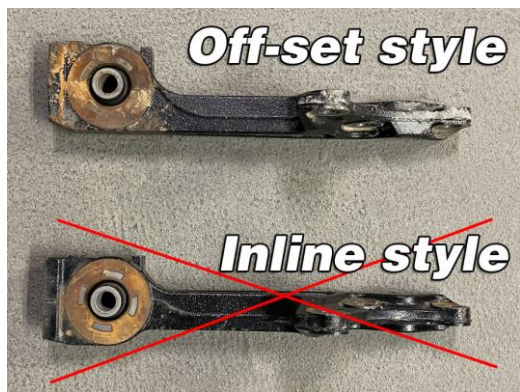


Fig 29

3. [2010+ SUV] LH DIFFERENTIAL BRACKET CONVERSION

NOTE: Step 3(a/b/c) is **ONLY** for 2010 MY and newer 4Runner, FJ Cruiser, and Lexus GX460.

Starting in late 2009, SUV models use a LH differential bracket with no off-set. In order to mount the MarRack, this bracket must be converted to an **off-set bracket** found on 2003-2009 SUV & 2005-2023 Tacoma.

Figure 29 shows the needed off-set bracket (top) and 2010+ SUV inline bracket (bottom). **Off-set bracket Toyota SKU: 52380-04061.**



Fig 30

NOTE: This page is **ONLY** for 2010 MY and newer 4Runner, FJ Cruiser, and Lexus GX460.

3a. [2010+ SUV] REMOVE LH DIFFERENTIAL FRAME INSERT

Using a Plasma Cutter or Cutting Torch, cut weld above LH Differential Mount Frame Insert and lift insert out the top of the sub frame assembly.



Fig 31



Fig 32

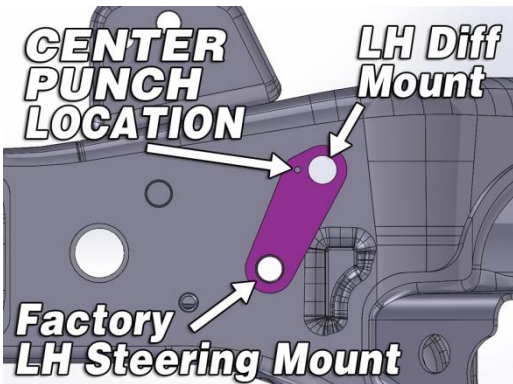


Fig 33

3b. [2010+ SUV] DRILL LOWER PILOT HOLE

Using Cutting Jig **MCJI-14102**, center punch and drill a 19/32" hole from the bottom of the frame as shown in Figure 33.

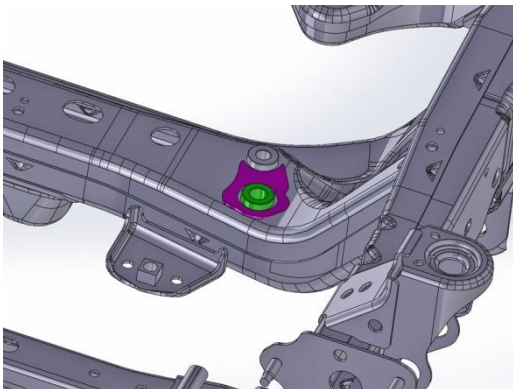


Fig 34

3c. [2010+ SUV] TEMPORARILY MOUNT NEW FRAME INSERT

Using the second MarRack Frame Insert **MCSU-1814103** and Upper Sub Frame Top Enforcement **MCSU-181417** included with specific kits, cut away extra frame material on the top side of the frame until the Frame Insert is centered above the lower hole drilled in (b) above.

NOTE: Leave components loose in the frame for now.

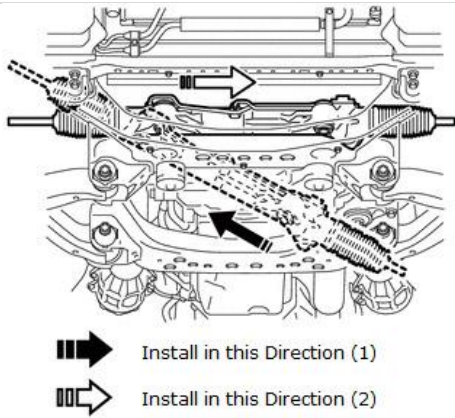


Fig 35

4. INSERT MARRACK INTO VEHICLE

Use procedure shown in Figure 35 to insert MarRack into vehicle.

NOTE: Because the MarRack is so large, this is only possible with both RH TRE and LH ITR removed (see page 11).

TIP: Rotate lengthwise to help guide into position.



Fig 36

Special Note for 8 cylinder applications:

Non VVT-i applications (2003-04 MY 4Runner):

Custom ¼"-thick engine mount raiser plates are recommended under both engine mounts. Figure 36 shows a MarRack installed in a 2003 V8 4Runner *without* raising the engine resulting in about 1/8" clearance. Engine raiser plates recommended.

VVT-i applications (2005-09 MY 4Runner/GX470):

Starting in late 2004, oil pan clearance is increased resulting in more than ¼" above MarRack as shown in Figure 37, which is a MarRack installed in a 2006 V8 4Runner *without* raising the engine. Engine mount spacers *not* required.



Fig 37

NOTE: Customers have reported high mileage V8 Engine Mounts sag up to half an inch! If you're going to make engine mount plates, it's a good time to inspect your mounts. **Toyota SKU 12361-50190** for all V8 applications.

5. CLEARANCE TOP LH SIDE OF SUB-FRAME

Insert the shorter 180mm M14 bolt through new RH Frame Insert (A) and longer 200mm M14 bolt through existing LH differential frame mount bolt hole (B) as shown in Figure 38.

NOTE: There will be a gap under the MarRack Bushing in the area circled.

NOTE: Depending on straightness of drilled holes, minor slotting may be required for the RH bolt to line up with the RH MarRack mount.

M14 nuts may be used so the bolts don't fall out, but **DO NOT TIGHTEN.**

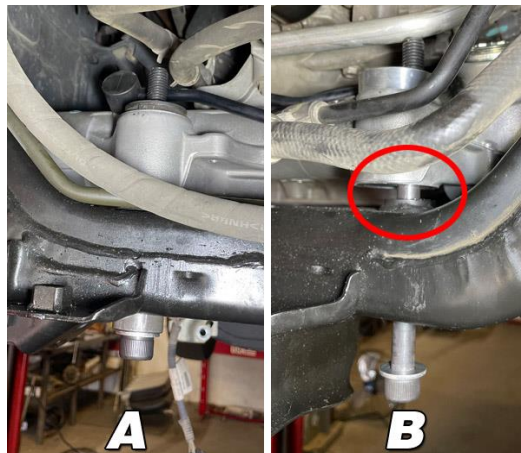


Fig 38



Fig 39

Use a marking pen to trace area under the MarRack where the housing is contacting the frame as circled in Figures 39 and 40.

Remove MarRack.

Figure 41 shows where the MarRack is contacting the frame.



Fig 40



Fig 41



Fig 42

Using a Plasma Cutter (Figure 42), Cutting Torch, or compact 90° right-angle drill with Hole Saw (Figure 43, 12-volt drill), cut out approximately 1.25-inch diameter hole.

Paint area of cut to prevent rust.

Figure 45 shows resulting frame bolt hole identification.



Fig 43



Fig 44

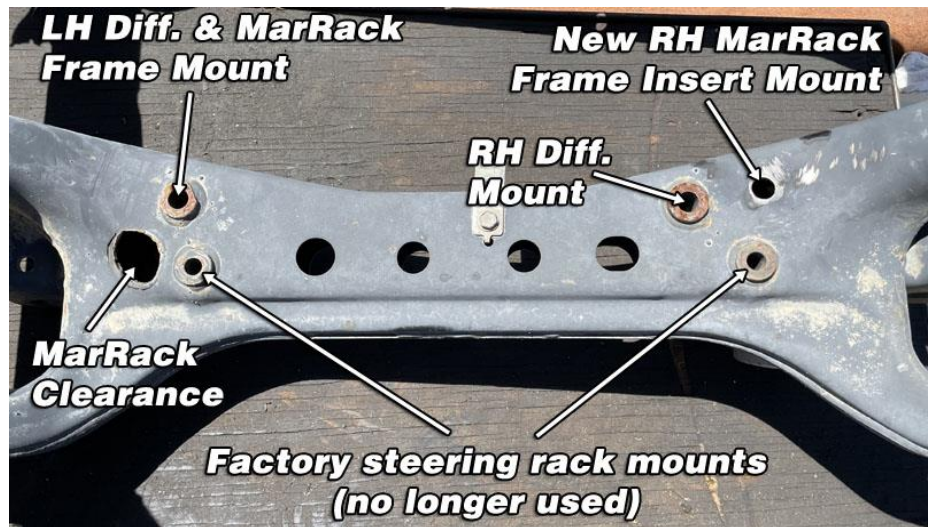


Fig 45



6. REINSTALL MARRACK

Reinstall MarRack with both M14 bolts and Frame Insert(s) as shown in Figure 48.

Verify MarRack fully rests properly atop sub-frame assembly without rack body interfering with frame, as shown in Figures 46 & 47. Figure 48 shows a MarRack mounted under a 4.0L V6 with no interference.

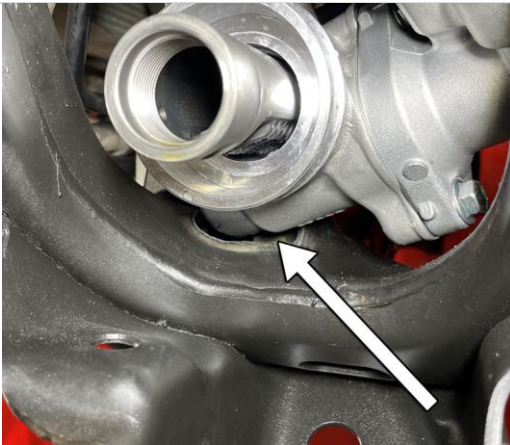


Fig 46



Fig 47



Fig 48

7. WELD FRAME INSERT(S) TO FRAME

Ensuring MarRack mounts flush without frame interference, torque RH M14 bolt with M14 nut to **80 lb-ft** and weld RH Frame Insert to bottom of frame.

For 2010+ SUV applications: Install **off-set differential bracket** below frame and torque LH bolt to **80 lb-ft**. Tac-weld Upper Sub Frame Top Enforcement plate and LH MarRack Frame Insert into position.

Remove hardware and finish weld. Spray paint to prevent rust.

Figure 50 illustrates installation of RH insert, utilizing factory-style pinch connection. For 2010+ SUVs, the LH weld and pinch orientation is flipped.



Fig 49

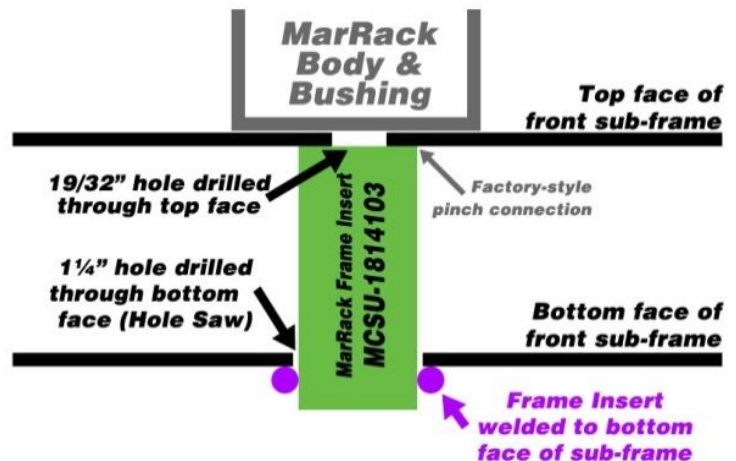


Fig 50

Frame Preparation is now complete.



Step 3 of 4: Steering Preparation

Toyota uses a variety of Sector Shaft designs on Toyota and Lexus 4WD models. These range from full- (Figure 51) to partial-bellows (Figure 52). The Sector Shaft may need to be modified to prevent frame interference. On some applications, the MarRack side of the u-joint must also be shortened. Professional welder recommended.

For more detailed info with video, please scan the QR code at right to view Owner's Club thread: ***Steering Sector Shaft Clearance Notes and Tips***



Fig 51



Fig 52

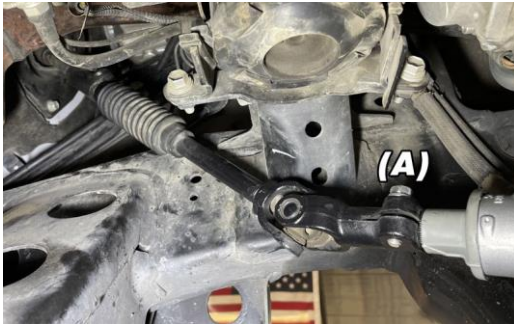


Fig 53

1. TEST FIT ORIGINAL SECTOR SHAFT

With the MarRack loose in the frame, loosely install steering sector shaft to both MarRack input and steering column shaft coupler.

TIP: Hammer a flat-head chisel into both upper & lower sector shaft splined slot-openings to widen pinch fit for ease of maneuverability.

Loosely install factory input bolt (A) as shown in Figure 53.

Re-insert LH M14x200 bolt through the MarRack.

Pivot the MarRack into position and *test-fit* RH M14x180 bolt.

2. INSPECT FRAME INTERFERENCE

Figure 54 shows the two possible areas of interference:

- a. U-Joint-to-engine mount bracket (left circle)
- b. Bellows-to-frame (right circle)

Mark areas of interference.

Remove sector shaft.

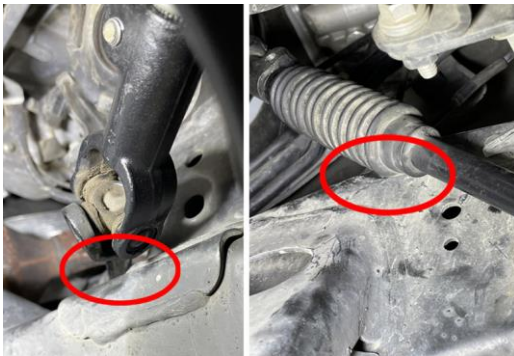


Fig 54

3. MEASURE ORIGINAL SECTOR SHAFT LENGTH

Carefully note length of original Sector Shaft.

Total Length: _____

MarRack end to U-Joint Center: _____

U-Joint Center to Steering Column end: _____



Fig 55

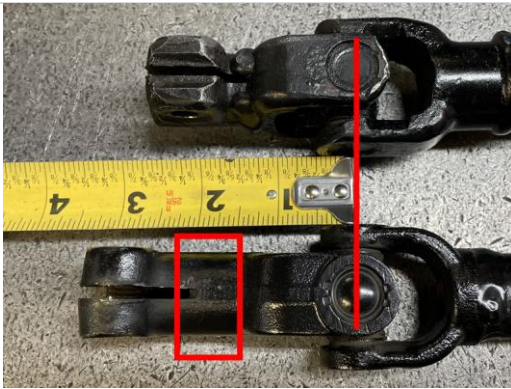


Fig 56

4. [FEW APPLICATIONS] MODIFY FOR U-JOINT INTERFERENCE

On applications with Sector Shaft-to-Engine Mount interference, shorten MarRack-side of U-Joint by removing material shown in the square-area of Figure 56.

The amount to remove is approximately **3/4" inch**.

TIP: Place a wet rag around U-Joint during welding to limit heat soak and try to retain original alignment of shaft.

Paint welded area to prevent rust.



Fig 57

Figure 57 shows completed modification where weld has gone around the perimeter except for the pinch-slot. This allows for the factory bolt to tighten the splines and properly pinch the MarRack input shaft. The before-and-after inner splines do not need to line up as the MarRack input splines only protrude about 1/3" beyond the bolt hole.

5. [MOST APPLICATIONS] MODIFY FOR BELLOW INTERFERENCE

The MarRack Sector Shaft Extension **MCSU-1814104** has been carefully designed to have the same OD as the bellow ID and on partial-bellow applications the same ID as the shaft OD.



Fig 58

For partial-bellow shafts, cut as shown in Figure 58, inserting the MarRack Sector Shaft Extension over U-Joint-side shaft and into remaining bellows of Steering Column-side as shown in Figure 59.



Fig 59

For full-bellow shafts, remove only bellows that contact frame in Figure 54, inserting MarRack Sector Shaft Extension into both inner diameters of each side's remaining bellows as shown in Figure 60.



Fig 60

NOTE: Try to maintain original alignment of steering column splined end with U-Joint orientation.



Fig 61

OPTIONAL: You may choose to entirely remove the bellows, resulting in an extremely strong sector shaft comprising of the entire MarRack Sector Shaft Extension. Ensure shaft is as straight as possible.

6. CONFIRM CLEARANCE OF MODIFIED SECTOR SHAFT

Reinstall modified sector shaft to MarRack and reinsert both M14 frame bolts so that the MarRack is properly positioned in the frame.

Verify clearance of the same areas identified in Figure 54 and circled in Figure 62.



Fig 62



Fig 63

OPTIONAL: If additional clearance is needed beneath the driver side engine mount, we recommend cutting into the bottom of the mount and inserting a piece of 2.00" x 120-wall OD tubing or similar, as shown in Figure 63. Applications where this may be particularly useful are 2003-04 V8 4Runners and 2010+ FJ Cruisers.

Please scan QR code for additional images, examples, tips, and video:



Fig 64

7. VERIFY TOTAL LENGTH

Remove upper Steering Column shaft coupler and adjust slip-fit of Sector Shaft components until there is 0.50 to 1.00" gap between Steering Column and Sector Shaft ends.

Mark location of all components in preparation to weld.

8. WELD SECTOR SHAFT

Remove sector shaft from vehicle and weld both ends of MarRack Sector Shaft Extension.

NOTE: Try to retain as much straightness as possible.

TIP: Place a wet rag around the U-Joint during welding to limit heat soak.

Hammer a flat-head chisel into the slot-opening to ensure shaft slides easily over MarRack input after welding.

Paint welds and MarRack Sector Shaft Extension.



Fig 65

Figure 66 shows two completed MarRack Sector Shafts.

Top: U-Joint shortened, Bellows eliminated.

Bottom: U-Joint original, Bellows retained.



Fig 66

For reference sake, note length of final Sector Shaft.

Total Length: _____

MarRack end to U-Joint Center: _____

U-Joint Center to Steering Column end: _____

Steering preparation is now complete.



Step 4 of 4: Install MarRack

Because the MarRack is too large for a mid-size frame, it may only be final-mounted concurrent with sector shaft. This adds extra safety because it is physically impossible for the sector shaft to fall off the vehicle without first the rack falling off.

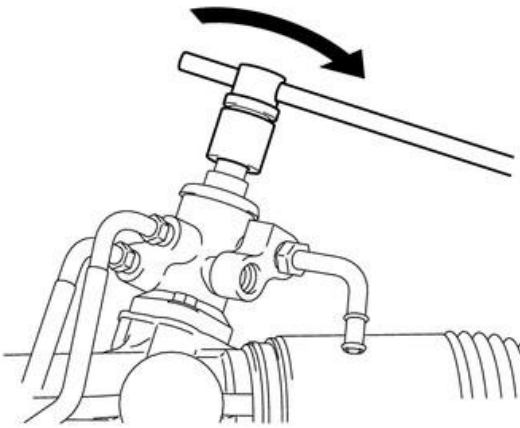


Fig 67

1. CENTER MARRACK

Rotate MarRack input in one direction all the way until rack stops. Using a marking pen, mark a spline of the input for reference.

Slowly rotate in the opposite direction, counting each rotation of input until rack stops in the other direction.

TIP: The rack will have a maximum range of approximately 3.25 turns.

Divide number of rotations in half and rotate input back to center location. This should be approximately 1.6 turns.

2. MOUNT MARRACK

Ensure steering wheel is very close to straight.

Concurrently install MarRack with Sector Shaft by loosely inserting the Sector Shaft over MarRack input and upper Steering Column coupler while *at-the-same-time* inserting LH M14x200 bolt through the MarRack and pivoting it into place to fit RH M14x180 bolt.

Double-check steering wheel is still close to straight.

Hand-tighten Sector Shaft, Column Coupler, both MarRack bolts.



Fig 68

3. CONNECT POWER STEERING LINES

Connect vehicle high pressure line to MarRack high pressure inlet (A) and vehicle return hose to new MarRack low pressure outlet line (B) as shown in Figure 69.

IMPORTANT: Before tightening high pressure inlet (A), ensure sufficient threads are engaged with rack. **DO NOT** tighten if fitting is bound, crooked, or not seated against MarRack Line Adapter to prevent stripping threads or breaking the rack. Final fitment will look like Figure 70.

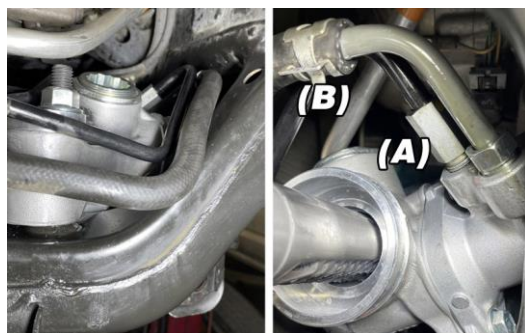


Fig 69



Fig 70

Torque (both fittings): 32 lb-ft

Depending on application, hose (B) may need to be trimmed back for an improved fit.

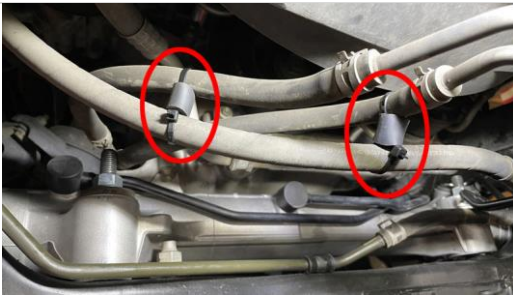


Fig 71

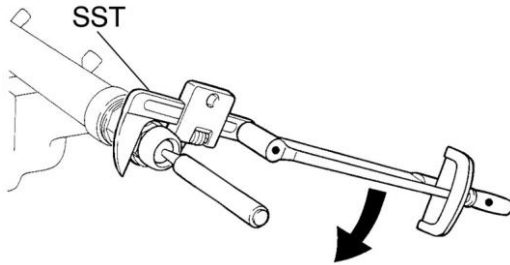


Fig 72



Fig 73



Fig 74

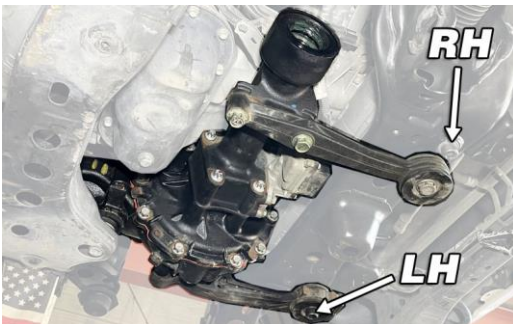


Fig 75

MarRack installation is now complete.

4. DRESS ROUTING OF STEERING LINES

Depending on application, some or all line brackets are no longer used.

Carefully bend hard-lines away from direct contact with objects. Use zip-ties and rubber hose to space lines from one-another to prevent wear.

5. REINSTALL LH INNER TIE ROD, BOOT, AND CLAMPS

TIP: Turn steering wheel to the left to extend rack for accessibility.

IMPORTANT:

Do not scratch inner rack, only attach tool to ITR body.
Toyota recommends NO thread lock.

When using SST, attach torque wrench as shown and torque to **81 lb-ft**. If torquing direct to ITR, torque to **108 lb-ft**. Because the MarRack Bushing is mounted solid to the frame, there is no need to support the rack. Simply torque as shown. If you cannot use a torque wrench, then imagine how tight a lug nut is and torque by hand about +20% more than that.

Reinstall LH ITR boot.

Install inner boot clamp using MarRack ITR Boot Clamp **MCHT-961**.

Reinstall outer factory boot clamp.

Reinstall TRE nut as shown in Figure 74 to protect ITR outer threads.

6. REINSTALL FRONT DIFFERENTIAL AND DRIVE LINE

Reinstall front differential and drive line as per FSM instructions contained in Appendix A3. The LH M14 MarRack bolt is also used for LH front differential frame bracket as shown in Figure 75 as **LH**.

Some 2010+ SUV applications may have to shorten Differential RH M14 factory bolt by ½" to prevent interference with MarRack.

Torque M14 MarRack (M12 Allen socket & M21 wrench) and M8 Sector Shaft hardware as specified below.

	Lubricated*
MarRack LH M14x200	111 lb-ft
Differential RH M14	76
MarRack RH M14x180	111
Pinion-to-frame M12 Allen	48
Sector Shaft M8	20
Upper Coupler 2x M8	20
Drive Line Bolts	49

* We recommend lubricating all threads with anti-seize.
All torque figures are in pounds per square foot.



SECTION 2: HD IFS INSTALLATION

Installing the RCLT HD IFS system is broken down into the following steps:

Step 1: HD Knuckle Preparation

Step 2: HD UCA Preparation

Step 3: HD LCA Preparation

Step 4: Axle Set Preparation

Step 5: Install RCLT HD

Step 1 of 5: HD Knuckle Preparation

RCLT HD Knuckles are comprised of heavy duty ¼" plate steel and one-piece double-shear steering-hub-caliper solid steel lower sections cut from billet *larger than two dual case adapters*. The steering arms are longer than factory for increased steering power and reduced driver fatigue, with unique geometry designed in tandem with the MarRack. Preparing RCLT HD Heavy Duty Knuckles may be done in two ways: With all new parts or by transferring and reusing parts from your factory knuckles.

TOOLS REQUIRED

- 17mm Hand Wrench
- 17mm Crows Foot
- Torque Wrench

ADDITIONAL EQUIPMENT

- Multi-purpose (MP) Grease
- Shop Press (optional)
- Flat round metal object for inner oil seal installation
- Anti-seize thread lubricant

PARTS REFERENCE



MCSU-1812100(L/R)
LH & RH Heavy Duty
RCLT HD Knuckles



Method 1.1: New Parts
2x Wheel Bearing
43570-04011



Method 1.1: New Parts
2x Wheel Hub
43502-04080



Method 1.1: New Parts
2x Inner Oil Seal
90316-A0001



Method 1.1: New Parts
2x O-Ring
90301-A0005



Method 1.1: New Parts
2x Outer Oil Seal
90312-96001



Method 1.1: New Parts
8x Wheel Bearing Bolt
90119-A0167



Method 1.2: Used Parts

Seal Orientation Reference

Axle Outer CV > Inner Oil Seal > Knuckle > O-Ring > Wheel Bearing > Outer Oil Seal > Wheel Hub > Wheel
90316-A0001 90301-A0005 90312-96001



Fig 76

1.1. ASSEMBLE HD KNUCKLES USING NEW PARTS

Refer to Appendix A4 for the following:

- Install Outer Oil Seals onto Wheel Bearing Assemblies
- Press Wheel Hubs onto Wheel Bearing Assemblies
- Install new O-Rings onto back of Wheel Bearing Assemblies
- Add a light amount of grease to bearing bores of both HD Knuckles
- Install Wheel Hub Assemblies onto new Heavy Duty Knuckles

Torque: 44 lb-ft lubricated (use crowfoot wrench)



Fig 77

1.2. ASSEMBLE HD KNUCKLES REUSING EXISTING PARTS

Loosen wheel bearing bolts and remove hub assemblies from factory knuckles. Remove inner oil seals from backside of factory knuckles.

Inspect for semi-soft & malleable condition of o-rings and seals. Replace damaged parts. Apply grease to rubber contact faces.

Use a wire brush or sandpaper to ensure surface rust is removed from brake rotor mount surface as well as backside of existing rotors.

Install hub assemblies onto Heavy Duty Knuckles

Torque: 44 lb-ft lubricated (use crowfoot wrench)



Fig 78

2. INSTALL INNER OIL SEAL

Use a flat round metal object that fits within inner diameter of oil seal and resting on shoulder indicated by the arrows of Figure, press or hammer until seal is fully seated onto backside of LH Heavy Duty Knuckle.

Repeat to RH Heavy Duty Knuckle.

Heavy Duty Knuckles are now prepared for installation.

From here, installation is similar to typical Long Travel Kits.





Step 2 of 5: HD UCA Preparation

RCLT HD Upper Control Arms (UCA) have a ¼"-thick extra-wide inner brace that occupies much of the interior boxing from frame-to-knuckle mount. Thick ¼"-walled frame bushing sleeves with four 190-degree wraps per arm ensure dependable connection to frame. Once knuckle is installed, the outer mount transforms into a strong double-rung design. Careful design maximizes down-travel and clearance for external shock reservoir line while offering a $\pm 1^\circ$ caster adjustability.

Preparing a RCLT HD UCA is a simple process of installing grease Zerks, bushings, and compression sleeves.

TOOLS REQUIRED

- Dead Blow Hammer or Rubber Mallet
- 5/16" Socket or Wrench
- Torque Wrench

ADDITIONAL EQUIPMENT

- Water-resistant Grease (Marine or Silicone-Teflon)

PARTS REFERENCE



MCSU-1811200(L/R)
LH & RH Heavy Duty
Upper Control Arm



MCSU-715111
4x Compression Sleeve



MCSU-71511
8x Urethane Bushing



MCHT-951
4x Straight Grease Zerk



Fig 79

1. INSTALL GREASE ZERKS

Using a 5/16" socket or wrench, install two grease Zerks.

Torque: 30 in-lbs lubricated



Fig 80

2. INSTALL BUSHINGS

Apply water-resistant grease to both the inner diameter of each UCA bushing sleeve and minor outer diameter of each bushing, and push bushings in by hand.



Fig 81

3. INSTALL COMPRESSION SLEEVES

Apply water-resistant grease to both inner diameter of each bushing and outer diameter of each compression sleeve and lightly tap sleeves into their corresponding bushing assembly.

Repeat to RH Heavy Duty UCA.

Heavy Duty Upper Control Arms are now prepared for installation.



Step 3 of 5: HD LCA Preparation

Comprised of more than a half-dozen patented features, RCLT HD Lower Control Arms (LCA) are the most advanced long travel control arms available. Their robust design increases vehicle approach angle and ground clearance while protecting axle and shock equipment. Oversized and ¼"-wall frame bushing sleeves with matching oversized bushings increase bushing and washer service intervals while allowing for 33% greater impact absorption.

Preparing a RCLT HD LCA is similar to UCA with exception of application-specific compression sleeves.

TOOLS REQUIRED

- Dead Blow Hammer or Rubber Mallet
- 5/16" Socket or Wrench
- Torque Wrench

ADDITIONAL EQUIPMENT

- Water-resistant Grease (Marine or Silicone-Teflon)

PARTS REFERENCE



MCSU-1813200(L/R)
LH & RH Heavy Duty
RCLT HD Lower Control Arm



MCSU-7152111
2x Front Compression
Sleeve, Early



MCSU-7152112
2x Front Compression
Sleeve, Late



MCSU-7152121
2x Rear Compression
Sleeve, Early



MCSU-7152122
2x Rear Compression
Sleeve, Late



MCSU-715211
6x Oversized Bushing,
Short



MCSU-715212
2x Oversized Bushing,
Long



MCHT-951
4x 1/4"-28 Straight
Grease Zerk



Fig 82

1. INSTALL GREASE ZERKS

Using a 5/16" socket or wrench, install two grease Zerks.

Torque: 30 in-lbs lubricated



Fig 83

2. INSTALL BUSHINGS

Apply water-resistant grease to both inner diameter of each LCA oversized bushing sleeve and minor outer diameter of each oversized bushing, and push bushings into each LCA by hand.

NOTE: Match Zerk offset of the wider sleeve with the Short and Long bushings so grease will properly enter between the bushings.



Fig 84

3. INSTALL FRONT COMPRESSION SLEEVE

For IFS Type III frames, select thick wall front compression sleeve **MCSU-71521111** as shown in Figure 84, apply water-resistant grease and install.

For IFS Type IV frames, select thin wall front compression sleeve **MCSU-71521112** as shown in Figure 85, apply water-resistant grease and install.

See Appendix A6 for frame identification. If unsure, test fit sleeves onto original alignment hardware referenced in Appendix A5.



Fig 85

Application		
4Runner	2003-2009 (Type III)	Thick Wall (Fig 84)
	2010+ (Type IV)	Thin Wall (Fig 85)
GX470	All (Type III)	Thick Wall (Fig 84)
GX460	All (Type IV)	Thin Wall (Fig 85)
Tacoma	2005-2015 (Type III)	Thick Wall (Fig 84)
	2016-2023 (Type IV)	Thin Wall (Fig 85)
FJ Cruiser	2006-2009 (Type III)	Thick Wall (Fig 84)
	2010-2014 (Type IV)	Thin Wall (Fig 85)



4. INSTALL REAR COMPRESSION SLEEVE

For IFS Type III frames, select thick wall front compression sleeve **MCSU-71521211** as shown in Figure 86, apply water-resistant grease and install.

For IFS Type IV frames, select thin wall front compression sleeve **MCSU-71521212** as shown in Figure 87, apply water-resistant grease and install.

See Appendix A6 for frame identification. If unsure, test fit sleeves onto original alignment hardware referenced in Appendix A5.



Fig 86



Fig 87



Fig 88

Application		
4Runner	2003-2009 (Type III)	Thick Wall (Fig 86)
	2010+ (Type IV)	Thin Wall (Fig 87)
GX470	All (Type III)	Thick Wall (Fig 86)
GX460	All (Type IV)	Thin Wall (Fig 87)
Tacoma	2005-2015 (Type III)	Thick Wall (Fig 86)
	2016-2023 (Type IV)	Thin Wall (Fig 87)
FJ Cruiser	2006-2009 (Type III)	Thick Wall (Fig 86)
	2010-2014 (Type IV)	Thin Wall (Fig 87)

Repeat to RH Heavy Duty LCA.

Heavy Duty Lower Control Arms are now prepared for installation.





Step 4 of 5: Axle Set Preparation

This step is only required for those replacing factory inner shafts with longer aftermarket Long Travel Chromoly shaft/bar.

TOOLS REQUIRED

- Tin Snips or Side Cutters
- CV Boot Clamp Bander or Pinch Pliers

ADDITIONAL EQUIPMENT

- Molybdenum CV Joint Grease

PARTS REFERENCE



2x +2.75" LT Inner Axle Shaft (not included)



2x Inner CV Boot (not included)



2x Outer CV Boot (not included)



Fig 89

1. DISASSEMBLE LH FACTORY AXLE

Remove inner boot bands and slide inner boot up shaft. Slide inner slip joint off tri-pod assembly. Remove tri-pod c-clip and race assembly.

Remove outer boot bands and slide both boots off shaft.



Fig 90

2. REMOVE LH INNER AXLE SHAFT

Using a long metal post, insert factory inner axle shaft into post as shown in Figure 90. Lower outer CV joint onto the top of post and lifting together in unison, quickly lower and smash the assembly down onto a metal or wood plate.

A sufficiently strong lowering force will cause the inner shaft inertia to overcome the clamp force of the outer CV inner c-clip resulting in the inner shaft dislodging from outer CV joint.



Fig 91

3. REBUILD LH AXLE

Clean parts, and using +2.75" or +3.50" longer inner Chromoly shaft, rebuild assembly using new CV boots, clamps, and CV grease.

Repeat to RH axle.



Step 5 of 5: Install RCLT HD

Everything is now ready for RCLT HD to be installed!

UPDATE SUMMER 2022: Our HD Knuckles now use Toyota's larger **M14 caliper hardware** found on 2015 and newer SUV applications. Therefore, 2014 and older SUV and all Tacoma applications will need to order **four** Toyota **90105-14198** caliper bolts and upgrade existing caliper through-holes using 9/16" drill. Each caliper flange has a lot of surface area and drilling one size up has no impact to safety or brake performance. (Optionally, you may choose to upgrade to larger 2015+ 4Runner/GX460 M14 calipers with matching 2010+ 4Runner/GX460 rotors for an OEM "Big Brake" setup.)

TOOLS REQUIRED

- Dead Blow Hammer or Soft Mallet
- M10, M17, M19 Sockets and Hand Wrenches
- M35 Socket (or similar for outer CV nut)
- 9/16", 3/4", 13/16", 15/16" Sockets
- 11/16" twelve-point Socket
- 13/32" Drill Bit (optional)
- Pry Bar
- Side or Wire Cutter

ADDITIONAL EQUIPMENT

- Grease Gun with 90-degree fitting
- Water-resistant Grease (Marine or Silicone-Teflon)
- Multi-purpose (MP) Grease
- Anti-seize thread lubricant
- Hand Drill (optional)
- Floor Jack
- Zip ties
- 9/16" drill for 2003-2014 SUV & all Tacoma applications (see paragraph above)

PARTS REFERENCE



2x Assembled
LH & RH Heavy Duty
RCLT HD Knuckle



2x Assembled
LH & RH Heavy Duty
RCLT HD UCA



2x Assembled
LH & RH Heavy Duty
RCLT HD LCA



1x Assembled Axle Set
(not included)

RCV shaft/bar reference:
2.75:D11935, 3.50:D10959



2x Long Travel Coil Over
(not included)



MCSU-761
2x Low Profile Bump Stop



2x 2" OD Air Bump
(optional) (not included)



2x 2" OD Pinch Mount
(optional) (not included)



MCBE-4121
4x 9/16" Max-Angle
Misalignment Spacer



MCBE-4122
4x 5/8" Max-Angle
Misalignment Spacer



MCBE-4123
4x 5/8" Short
Misalignment Spacer



MCSU-1811906
8x UCA Bushing Washer



2x MCSU-1813906 (A)
2x MCSU-1813907 (B)
2x MCSU-1813908 (C)
2x MCSU-1813909 (D)
4x MCSU-1813910 (E)
4x MCSU-1813911 (F)
LCA Bushing Washer



4x MCSU-1813912 (G)
4x MCSU-1813913 (H)
4x MCSU-1813914 (I)
4x MCSU-1813915 (J)
6x MCSU-1813916 (K)
LCA Bushing Shim



MCSU-1811902
4x Caster Spacer



MCSU-18142011
2x Mini Marlink



MCSU-1814202
2x 7/8" Tie Rod End



MCSU-18142021
2x Tie Rod End Jam Nut



MCSU-1819111
2x 8" Limit Strap



MCSU-181912
2x Adjustable Clevis



MCSU-181913
2x Limit Strap Frame Mount



MCBR-415
2x Steel Braided Brake Hose



2x Brake Hose Frame Mount (optional)



4x Brake Hose Clip



4x 5/8" Flanged Crimp Nut



4x 1/2" Flanged Crimp Nut



2x 9/16" Stainless Steel 12-point Flanged Nut



2x Limit Strap Bolt 1/2"-20 x 1.25"



2x Lower Knuckle Bolt 5/8"-18 x 4.75"



2x Tie Rod End Bolt 5/8"-18 x 4.25"



2x Upper Knuckle Bolt 9/16"-18 x 5.00"



2x Shock Bolt 1/2"-20 x 4.25"



8x 5/8" Flat Washer



4x 9/16" Flat Washer



8x 1/2" Flat Washer



Fig 92

1. INSTALL LH UPPER CONTROL ARM

The left-hand upper control arm is shown in Figure 92, with top rounded “Uniball Support” plate facing upwards and straight leg orientated towards rear of vehicle as shown installed in Figure 93.

IMPORTANT: Apply thin layer of water-resistant grease onto side faces of all bushings.

Install long factory M14 shock tower bolt with supplied **MCSU-1811906** UCA Bushing Washers, two on each side as shown.

TORQUE: 64 lb-ft lubricated



Fig 93

2. GREASE LH UPPER CONTROL ARM

Grease both UCA Zerks with 90° fitting and water-resistant grease.



Fig 94

3. SELECT LOWER CONTROL ARM BUSHING WASHER HARDWARE

An appealing benefit of RCLT HD vs a Solid Axle Swap is its design to be transferrable and compatible with both Type III & IV frames. Washers ship labeled. See Appendix A6 for frame type info.

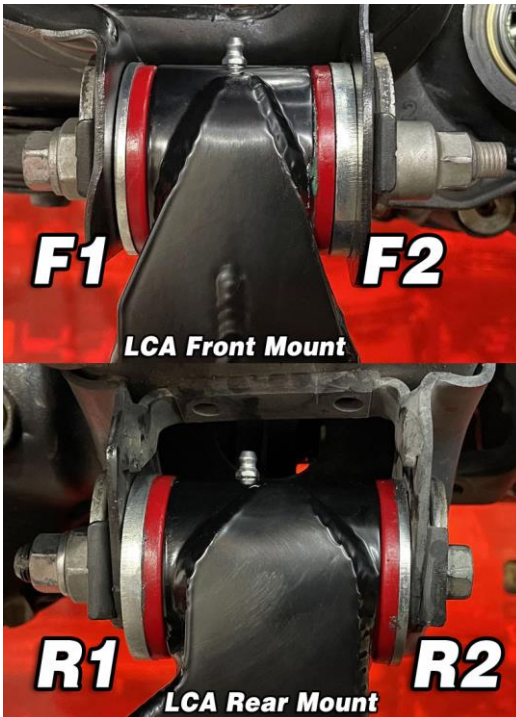


Fig 95

Frame Type	Application	F1	F2	R1	R2
IFS Type III	2003-09 4Runner	(A)	(B)	(C)	(D)
	2003-09 GX470				
	2005-15 Tacoma				
	2006-09 FJ Cruiser				
IFS Type IV	2010+ 4Runner	(E)	(E)	(F)	(F)
	2010+ GX460				
	2010+ FJ Cruiser				
	2016-23 Tacoma				

Figure 95 shows installation onto a 2011 Tacoma, whereby the bushing washers installed are: **Front 1: (A), Front 2: (B), Rear 1: (C), Rear 2: (D)**

Included are extra washers **G/H/I/J/K** at half-thickness to each of the above should the installation require alternate fitment.

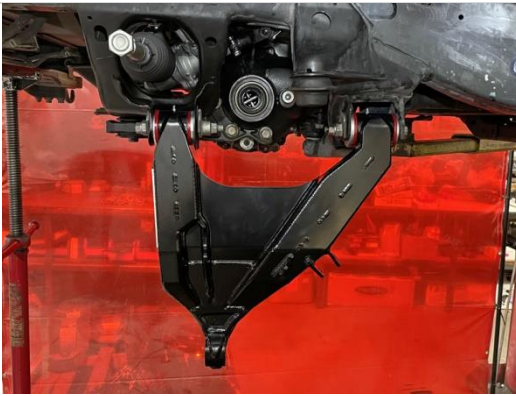


Fig 96

4. MOUNT LH LOWER CONTROL ARM

Apply water-resistant grease on all four bushing sides, hand-tighten with washers selected above. See Appendix A5 for hardware orientation.

5. CHECK FOR LCA-TO-REAR FRAME MOUNT INTERFERENCE

Lift LCA, check rear frame mount interference at Figure 97's green square. Trim if needed. *Issue only seen on Type III SUV frames.*

6. GREASE LH LOWER CONTROL ARM

Grease both LCA Zerks with 90° fitting and water-resistant grease.

7. BUMP STOP CONSIDERATION

To maximize ground clearance, an RCLT LCA extends horizontally off the frame which constrains bump stop spacing. **New Summer 2023:** LCA bump stop surface area has been doubled for more mounting options.

Option A: OEM BUMP STOPS

Reuse factory stops in original location. Significantly limits up-travel. Allows vehicle to be driven on 35" tires with likely no trimming.

Option B: DuroBumps BUMP STOPS (Figure 98, P/N: DBF17T)

Premium, USA-made dual-durometer stops installed in original location. Provides smooth, progressive dampening with less-harsh bottoming out. Much better than stock, but also limits up-travel.

Option C: Low Profile BUMP STOPS (P/N: MCSU-761)

Low Profile bump stops provide maximum up-travel with OEM frame brackets. *Only intended for slow-speed use.* To install, run 3/8-16" tap through factory hole and thread in, or use a 13/32" drill to open factory bolt hole and use supplied lock-nut.

Option D: Hydro BUMP STOPS (advanced)

Modify or remove OEM bump stop frame bracket and mount a pinch mount bracket with Hydro Bump assembly in place of OEM bump stop to dial-in *as little or as much* suspension up-travel as desired.

For more information and many custom bump stop installation example pictures, please scan the below QR code to view Owner's Club forum thread "**Custom Bump Stop Installation Examples**"

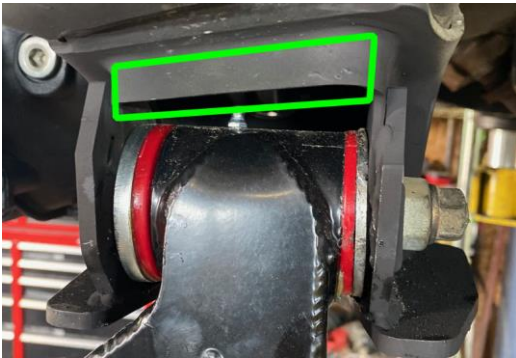


Fig 97



Fig 98



Fig 99





Fig 100

8. INSTALL LH COIL OVER ASSEMBLY

Torque upper hardware to frame shock tower using mfg specifications (typically 33 lb-ft lubricated for aftermarket 3/8" G8 hardware).

If applicable, mount remote reservoir with hose running below UCA as shown in Figure 100.



Fig 101

9. INSTALL LCA "MAX-ANGLE" MISALIGNMENT SPACERS

Insert two 5/8" inner diameter "Max-Angle" Misalignment Spacers **MCBE-4122** to LH LCA uniball.



Fig 102

10. MOUNT LH HD KNUCKLE

Using one 5/8"-18 x 4.75" Lower Knuckle Bolt, two 5/8" Flat Washers, and one 5/8" Flanged Crimp Nut, mount LH HD Knuckle to LH LCA as shown in Figure 102, with hardware oriented as shown in Figure 103.

Bolt Head → Washer → Knuckle-Uniball-Knuckle → Washer → Nut



Fig 103



Fig 104

Figure 104 shows close-up of hardware orientation, with bolt inserted from front of the vehicle and nut with exposed bolt threads visible on brake caliper side.

TORQUE: 180 lb-ft lubricated



Fig 105

11. PREPARE UPPER KNUCKLE HARDWARE

RCLT HD has an extra $\pm 1^\circ$ caster adjustability in the UCA due to the following: (1) The UCA frame mount slopes rearward causing lost caster with lift, and (2) Zero caster is ideal for slow speed traction. Because the former requires an increase in caster and the later a decrease, the ability for the installer to choose a setting was incorporated. Additionally, the hardware may be staggered to correct frame cross-caster issues.

Lift Amount	UCA Setting	Expected Caster	
		Tacoma	SUV
Less than 3"	Less Caster	2.0° to 2.5°	3.0° to 3.5°
	Middle Position	2.5° to 3.0°	3.5° to 4.0°
	More Caster	3.0° to 3.5°	4.0° to 4.5°
3" to 5"	Less Caster	1.5° to 2.0°	2.5° to 3.0°
	Middle Position	2.0° to 2.5°	3.0° to 3.5°
	More Caster	2.5° to 3.0°	3.5° to 4.0°
5" or greater	Less Caster	1.0° to 1.5°	2.0° to 2.5°
	Middle Position	1.5° to 2.0°	2.5° to 3.0°
	More Caster	2.0° to 2.5°	3.0° to 3.5°

If unsure, use **Middle Position** which is neutral, as if the feature did not exist, and use **Appendix A9** for *easy* reconfiguration later.

Using one 9/16"-18 x 5.00" Upper Knuckle Bolt, two 9/16" Flat Washers, two Caster Spacers **MCSU-1811902**, one 9/16" SS 12-point Flanged Nut, prepare hardware with "Max-Angle" 9/16" Misalignment Spacers **MCBE-4121** as shown in Figure 105.

Apply anti-seize to the end of the Upper Knuckle Bolt.

Bolt Head → Washer → UCA
 → Caster Spacer-Uniball-Caster Spacer
 → UCA → Washer → Nut

12. PREPARE SHOCK BOLT HARDWARE

Gather one 1/2"-20 x 4.25" Shock Bolt, two 1/2" Flat Washers, one 1/2" Flanged Crimp Nut. Apply anti-seize to end of Shock Bolt.

13. GREASE INNER OIL SEAL AND HUB SPLINES

Apply MP grease to inner oil seal and hub splines.



Fig 106



Fig 107

14. INSERT LH AXLE ASSEMBLY INTO LH DIFFERENTIAL SIDE GEAR

Raise and insert axle assembly parallel into differential side gear. Use a soft mallet dead-blow hammer for encouragement.

TIP: Apply MP grease to axle c-clip so it does not move, with opening of clip positioned as shown in Figure 108. With clip positioned down, gravity and grease will keep clip in groove making installation easier.



Fig 108



Fig 109

15. INSERT LH HD KNUCKLE OVER END OF AXLE

Grab a couple zip ties.

Swing HD Knuckle Assembly up while simultaneously directing outer CV joint down and into position to engage axle hub splines.

16. SUPPORT LH HD KNUCKLE ASSEMBLY

Perform the following numbered sequence matched to Figure 110:

1. Zip tie Knuckle to UCA
2. Install axle nut and *firmly* hand tighten
3. Install Shock Bolt Hardware by lifting assembly into position of shock lower eyelet, tilting coilover forward to align bolt holes.

Shock Bolt Hardware assembly order:

Bolt Head → Washer → LCA → Shock → LCA → Washer → Nut

TORQUE: 90 lb-ft lubricated

The assembly is now fully supported by the coil over and zip tie(s).

NOTE: This process is only necessary prior to fitting limit straps. Servicing RCLT HD is simplified once limit straps are installed.

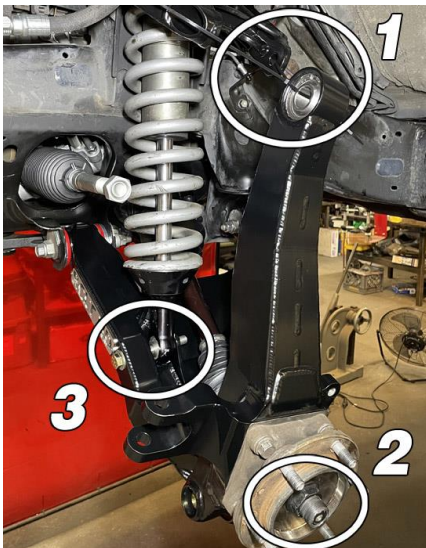


Fig 110



Fig 111

17. LOWER VEHICLE INTO POSITION FOR LH UCA

Place padded jack or jackstand under bottom-end of LCA and slowly lower vehicle. If using a shop lift, lower until both rear tires return to ground as shown in Figure 111.

As vehicle is lowered, the coil over will begin to compress allowing LCA to raise HD Knuckle into alignment for UCA.

Continue slowly lowering vehicle (or raise LCA using jack) until Knuckle may be tilted inward into alignment with UCA.

Cut and discard zip tie(s).

Install two 9/16" "Max-Angle" Misalignment Spacers used in Step 11 (**MCBE-4121**) as shown in Figure 112.



Fig 112

18. INSTALL LH UPPER KNUCKLE HARDWARE

Install Upper Knuckle Hardware prepared in Step 11.

TORQUE: 130 lb-ft lubricated

19. TORQUE LH AXLE NUT

TORQUE: 130 lb-ft lubricated



Fig 113

20. INSTALL LH LIMIT STRAP ASSEMBLY

New Summer 2023: Now using shorter 8" Limit Strap (former: 11") with redesigned upright position closer to center of arm.

Assemble Limit Strap and mount using the following 1/2" hardware:

Bolt Head → Washer → LCA → Limit Strap → Washer → Nut

Lightly tighten nut so bottom Limit Strap mount is able to barely rotate.

IMPORTANT: Unthread nuts of clevis so that **clevis is at full length**.

Slowly raise vehicle (or lower LCA using jack) while rotating Hub Assembly until Hub no longer rotates by hand due to CV bind.

Firmly raise and reach limit strap up and into position in a straight line between bump stop and shock tower. Finish-weld to frame and paint.



Fig 114



Fig 115

21. INSTALL LH MINI MARLINK

Lower vehicle a few inches (or raise LCA using jack) and loosely install a Mini Marlink **MCSU-18142011** along with Tie Rod End Jam Nut **MCSU-18142021** and 7/8" Tie Rod End **MCSU-1814202**, applying anti-seize to both MarRack ITR and TRE threads. Both sides are right-handed threads.

NOTE: The M22 and 7/8" threads are very similar in diameter. Flip Marlink around if component does not go on easily.

Install TRE to Knuckle using one 5/8"-18 x 4.25" Tie Rod End Bolt, two 5/8" Flat Washers, one 5/8" Flanged Crimp Nut, and two 5/8" Short Misalignment Spacers **MCBE-4123** as shown in Figure 115.

TRE Hardware assembly order:

Bolt Head ↓ Washer ↓ Knuckle ↓ TRE ↓ Knuckle ↓ Washer ↓ Nut

TORQUE: 170 lb-ft lubricated



Fig 116

22. SET LH LIMIT STRAP TENSION

With Limit Strap slack, thread a jam nut a few inches down clevis threads.

Lower vehicle (or raise LCA using jack) while inspecting the following:

1. Knuckle-to-Coil interference (circled in Figure 116)
2. Hub Assembly freely rotates without binding CV joint assembly

Continue lowering until Limit Strap is in full tension. Repeat process, adjusting position of jam nut until no components bind. With Limit Strap in full tension, tighten lower limit strap hardware shown in Figure 117.

TORQUE: 90 lb-ft lubricated

SPECIAL NOTE REGARDING LIMIT STRAPS:

The Limit Straps supplied will naturally stretch approximately 0.67" (*one inch for every foot*) while breaking in. Some installers choose to prematurely tighten clevis jam nuts and leave vehicle on jack stands overnight with straps in full tension, then repeat Step 22 the following day with straps broken-in. **INSTALLERS:** This is a process you may consider advising your customers to perform at home.



Fig 117



23. LH FINISHING TOUCH

Install axle nut adjusting cap, cotter pin, and hub grease cap.

Unplug ABS sensor from harness, add light grease to sensor outer o-ring, install into Knuckle on Caliper side using factory bolt.

Torque: 10 lb-ft

Install Brake Rotor & Caliper with M14 hardware.

Torque: 111 lb-ft lubricated

For M12 applications, see top paragraph on page 31

Aftermarket *Big Brake Kit* (BBK) issues: See Appendix A12

Connect Stainless Steel Brake Hose **MCBR-415** to upper Hard Line.

Torque: 11 lb-ft

Connect Stainless Steel Brake Hose to lower Hard Line.

Torque: 11 lb-ft

Connect lower Hard Line to Caliper.

Torque: 11 lb-ft

Bleed Brake Caliper.

Remove factory brackets from ABS sensor harness and route behind UCA rear mount and alongside Brake Hose with zip ties.

TIP: Slide factory rubber harness protectors down and position near brake hose mounts for protection.

TIP: Route harness **behind caliper hard line** to keep away from rotating axle as shown by the Red line in Figure 119.

Plug ABS harness into ABS sensor.

Repeat steps 1 through 23 to RH side of vehicle.



Fig 118

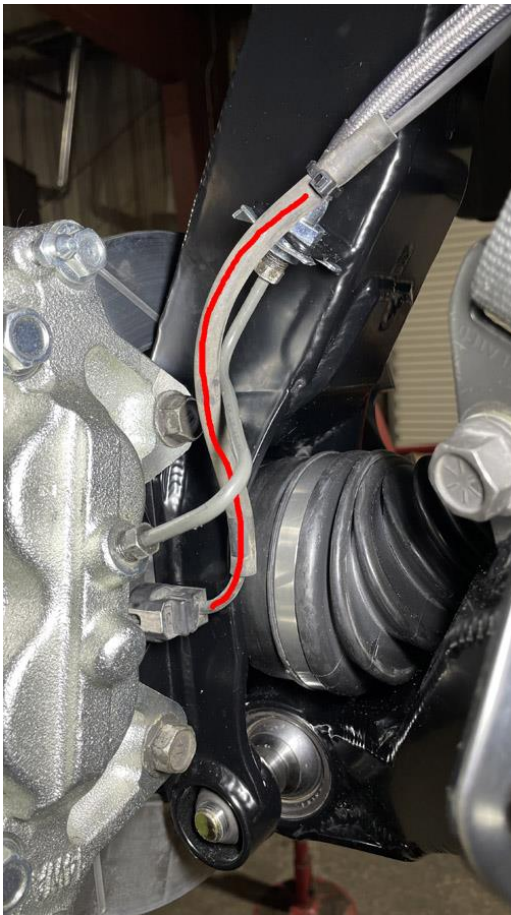


Fig 119

RCLT HD installation is complete.



FINAL STEPS

BLEED POWER STEERING SYSTEM

1. Install front tires and keep tires suspended off ground.
2. Fill Power Steering Reservoir to Cold line with new fluid.
3. Rotate steering wheel slowly several times to full steering lock in both directions. Add fluid to reservoir as needed.
4. Start engine and let it idle for a few minutes. Check for leaks.
5. Turn steering wheel to left or right full lock position and hold for 2 to 3 seconds, then turn wheel to opposite lock and hold for 2 to 3 seconds. Repeat this step several times.
6. Stop engine and check fluid level.
7. Lower vehicle to ground.

PERFORM TEMPORARY SELF ALIGNMENT

1. With properly functioning brakes, position LCA alignment eccentrics in their middle position and tighten.
TORQUE: IFS Type III frames: 75 lb-ft lubricated
IFS Type IV frames: 104 lb-ft lubricated
2. On flat ground, roll vehicle forward and rearward a few times while turning steering wheel to settle suspension.
3. Set Toe
 - a. Measure half tire diameter off ground and scribe marks on inner sidewalls in front and behind axle at matching distances near side lugs. Repeat on opposing inner sidewall at matching distances.
 - b. Measure distance across from both forward inner sidewall marks.
 - c. Measure distance across from both rearward inner sidewall marks.
 - d. Subtract value of (b) from value of (c). A positive number indicates toe-in. Adjust Inner Tie Rods on both sides equally until this value is between 0.00 and 0.25 inches. Leave jam nuts loose.
4. Center Steering Wheel
 - a. Position steering wheel straight and roll vehicle forward.
 - b. If vehicle drifts right, then equidistantly Lengthen LH ITR & Shorten RH ITR.
 - c. If vehicle drifts left, then equidistantly Shorten LH ITR & Lengthen RH ITR.
 - d. Test drive vehicle, note position of steering wheel, repeat as necessary.
5. Tighten all Inner Tie Rod and Mini Marlink Hardware.
The vehicle is now ready to be driven to an alignment shop.

ALIGNMENT SPECS

In our experience of combined Daily Driving and Rock Crawling lifted vehicles with 35" to 40" tires, we recommend:

Camber: 0°

Caster: 2 to 3° positive

Toe: Factory (typically 1mm toe-in)





BREAK-IN PROCEDURE

See Limit Strap break-in procedure discussed on the bottom of Page 39.

Double-check torque of *ALL* steering hardware, from MarRack mounts to Steering Sector Shaft.

Double-check all torque figures listed in **Appendix A7** in the following order:

- (1) After driving around town for a few days
- (2) Before and after your first wheeling trip

ROUTINE MAINTENANCE

Depending on climate and frequency of use, **torque specs** as well as **control arm bushing grease** should be double-checked every six months.

Print **Page 50** and carry with vehicle for bolt torque inspection and trail repair notes.

CLOSING NOTES

Thank you very much for installing RCLT HD. We confidently believe it will change the industry's opinion about reliably off-roading IFS. RCLT HD is the only Heavy Duty IFS + integrated steering replacement proven strong enough for the grueling King Of The Hammers competition (Class 4600, V8 4Runner) and has over 55,000 miles of city/highway/off-road testing with 40" tires and *zero* IFS, steering, axle, or differential failures (3.5L V6 Tacoma, as of August 2023).

Please tag **#RCLTHD** in your photos and let us know how RCLT HD has improved the way you off-road your late-model Toyota or Lexus!

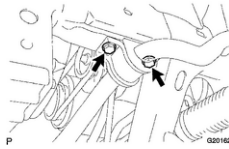
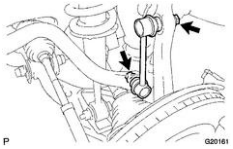


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1543 N. Maple Ave • Fresno, CA 93703 • (559) 25-CRAWL



APPENDIX

A1. Removal of factory IFS, Differential, and Steering Assemblies



REMOVE STABILIZER ARM

1. REMOVE FRONT STABILIZER LINK ASSEMBLY LH AND RH

- (a) Remove the 2 nuts and front stabilizer link assembly LH and RH.

HINT: If the ball joint turns together with the nut, use a 6 mm hexagon wrench to hold the stud.

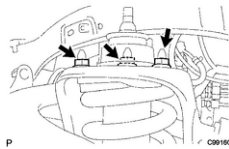
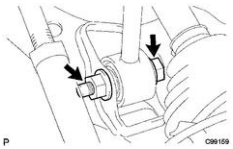
2. REMOVE FRONT NO. 1 STABILIZER BRACKET LH AND RH

- (a) Remove the 2 bolts and front No. 1 stabilizer bracket LH.

3. REMOVE FRONT NO. 1 STABILIZER BAR BUSH

- (a) Remove the 2 front No. 1 stabilizer bar bushes.

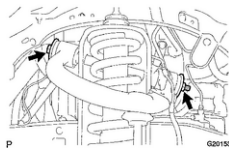
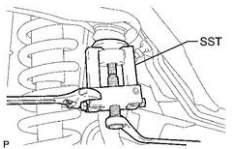
4. REMOVE FRONT STABILIZER BAR



REMOVE FRONT SHOCK ABSORBER WITH COIL SPRING

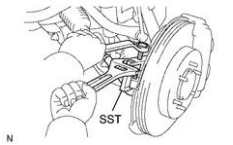
NOTICE: Perform this procedure with the vehicle jacked up so that the shock absorbers are extended.

- (a) Remove the bolt, nut and washer.
(d) Remove the 3 nuts on the top of the front shock absorber with coil spring.
(c) Remove the front shock absorber with coil spring.



REMOVE UPPER CONTROL ARM

- (a) Support the front suspension lower arm with a jack.
(b) Remove ball joint clip and nut.
(c) Using SST, disconnect the upper ball joint from the steering knuckle. SST: 09628-62011
(d) Remove the bolt and disconnect the wheel speed sensor wiring bracket.
(e) Remove the bolt, 2 washers and nut.
(f) Remove the front suspension upper arm assembly.



REMOVE STEERING KNUCKLE

1. SEPARATE TIE ROD END SUB-ASSEMBLY

- (a) Remove the cotter pin and nut.
(b) Using SST, separate the tie rod end from the steering knuckle. SST: 09628-62011

2. REMOVE FRONT FLEXIBLE HOSE

- (a) Remove the 2 clips.
(b) Disconnect the brake tube from the front flexible hose with a union nut wrench while holding the front flexible hose with a wrench and remove the front flexible hose.
(c) Place a rubber stopper over the upper hard line to prevent fluid from running out.
HINT: Use a container to catch any stray brake fluid.

3. REMOVE DISC BRAKE CYLINDER ASSEMBLY

- (a) Using a union nut wrench, disconnect the brake tube from the disc brake cylinder assembly.
HINT: Use a container to catch brake fluid as it drains out.
(b) Remove the 2 bolts and disc brake cylinder assembly.
HINT: Rest cylinder assembly in an upright position to prevent fluid from draining out.

4. REMOVE FRONT DISC

5. REMOVE FRONT AXLE HUB GREASE CAP

- (a) Using a screwdriver and a hammer, remove the front axle hub grease cap.
NOTICE: Do not damage the axle hub.

6. REMOVE FRONT AXLE HUB NUT

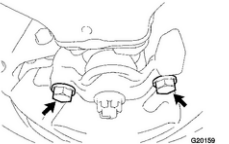
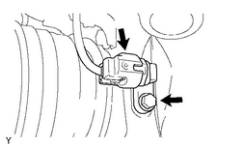
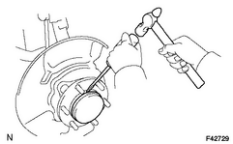
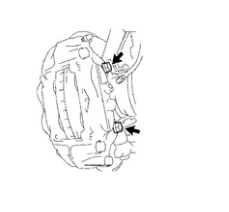
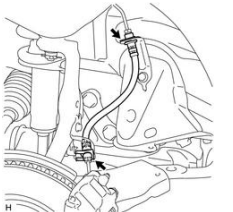
- (a) Remove the cotter pin and lock cap.
(b) Remove the front axle hub nut.

7. REMOVE FRONT SPEED SENSOR

- (a) Remove the bolt and front speed sensor. There is no need to disconnect the sensor plug.

8. REMOVE STEERING KNUCKLE

- (a) Remove the 2 bolts and disconnect the lower ball joint attachment from the steering knuckle.
(b) Remove steering knuckle.



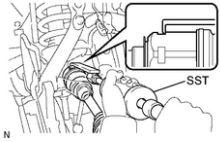


REMOVE LOWER CONTROL ARM

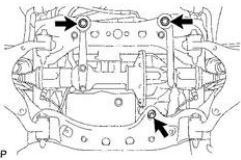


- (a) Remove the nut, camber adjust cam, camber adjust cam assembly, bolt, toe adjust cam sub-assembly, and toe adjust plate.
- (b) Remove lower control arm from vehicle.

REMOVE FRONT DIFFERENTIAL CARRIER ASSEMBLY

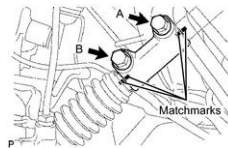


- 1. DRAIN DIFFERENTIAL OIL
- 2. REMOVE FRONT DRIVE SHAFT ASSEMBLY
 - (a) Using SST, remove the front drive shaft. SST: 09520-01010
 - NOTICE: Keep the drive shaft level while handling it.

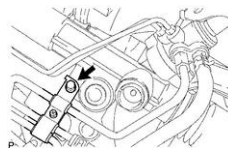
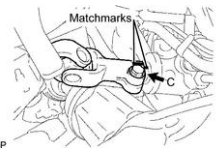


- 3. REMOVE FRONT DIFFERENTIAL CARRIER ASSEMBLY
 - (a) Remove the bolt and separate the front differential breather tube bracket.
 - (b) Support the front differential with a jack.
 - (c) Remove the front differential mount nut.
 - (d) Remove the 2 front mounting bolts and 2 nuts.
 - (e) Disconnect the actuator hose and connector.
 - (f) Lower the jack and remove the front differential assembly.
- 4. REMOVE ALSO THE ENGINE UNDER COVER ASSEMBLY FORWARD RH FRAME BRACKET

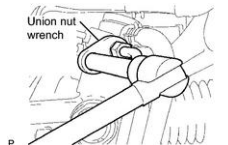
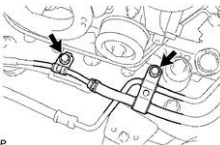
REMOVE FACTORY STEERING RACK



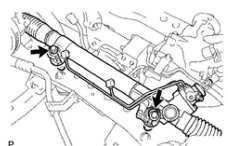
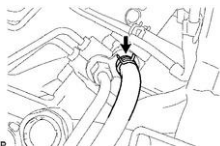
- 1. REMOVE STEERING INTERMEDIATE SHAFT
 - (a) Fix the steering wheel with the seat belt in order to prevent it from rotating.
 - HINT: The operation is effective for preventing any damage to the steering column spiral cable.
 - (b) Place matchmarks on the steering sliding yoke and steering intermediate shaft.
 - (c) Remove bolts A and B from the steering sliding yoke.
 - (d) Slide the steering sliding yoke up and separate it from the steering intermediate shaft.
 - (e) Pull down the steering sliding yoke from the steering intermediate shaft to remove it.
 - (f) Place matchmarks on the steering intermediate shaft and power steering link.
 - (g) Remove bolt C from the steering intermediate shaft.
 - (h) Slide the steering intermediate shaft up and remove it from the power steering link.



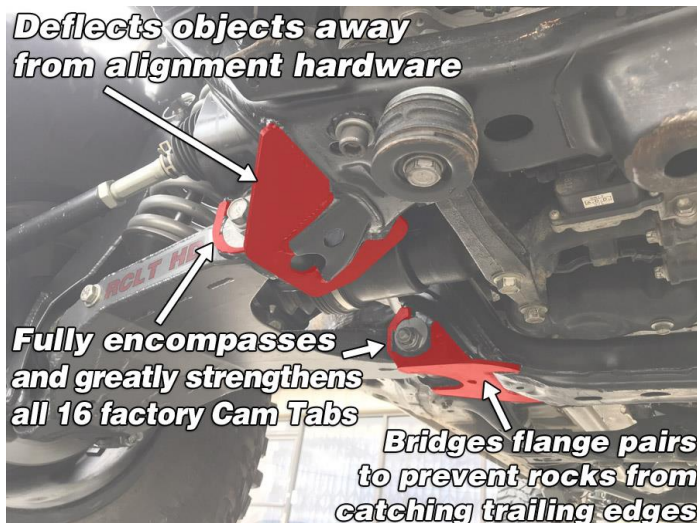
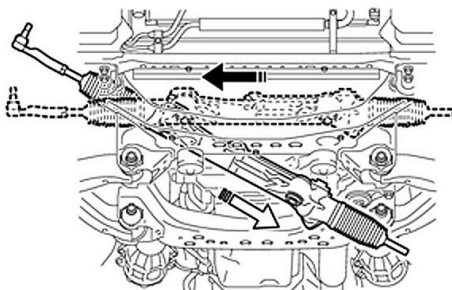
- 2. DISCONNECT TIE ROD END SUB-ASSEMBLY LH
 - (a) Remove the left hand tie rod assembly and lock nut
- 3. DISCONNECT PRESSURE FEED TUBE ASSEMBLY
 - (a) Disconnect the pressure feed tube from the steering link and frame.
 - (c) Using a union nut wrench, loosen the flare nut and separate the pressure feed tube.
 - NOTICE: Do not damage the pressure feed tube.
 - (d) Disengage the clip and disconnect the return hose.



- 4. REMOVE POWER STEERING LINK
 - (a) Remove the 2 bolts and 2 nuts.
 - (b) Pull the power steering gear assembly out of the vehicle in the order shown in the illustration.



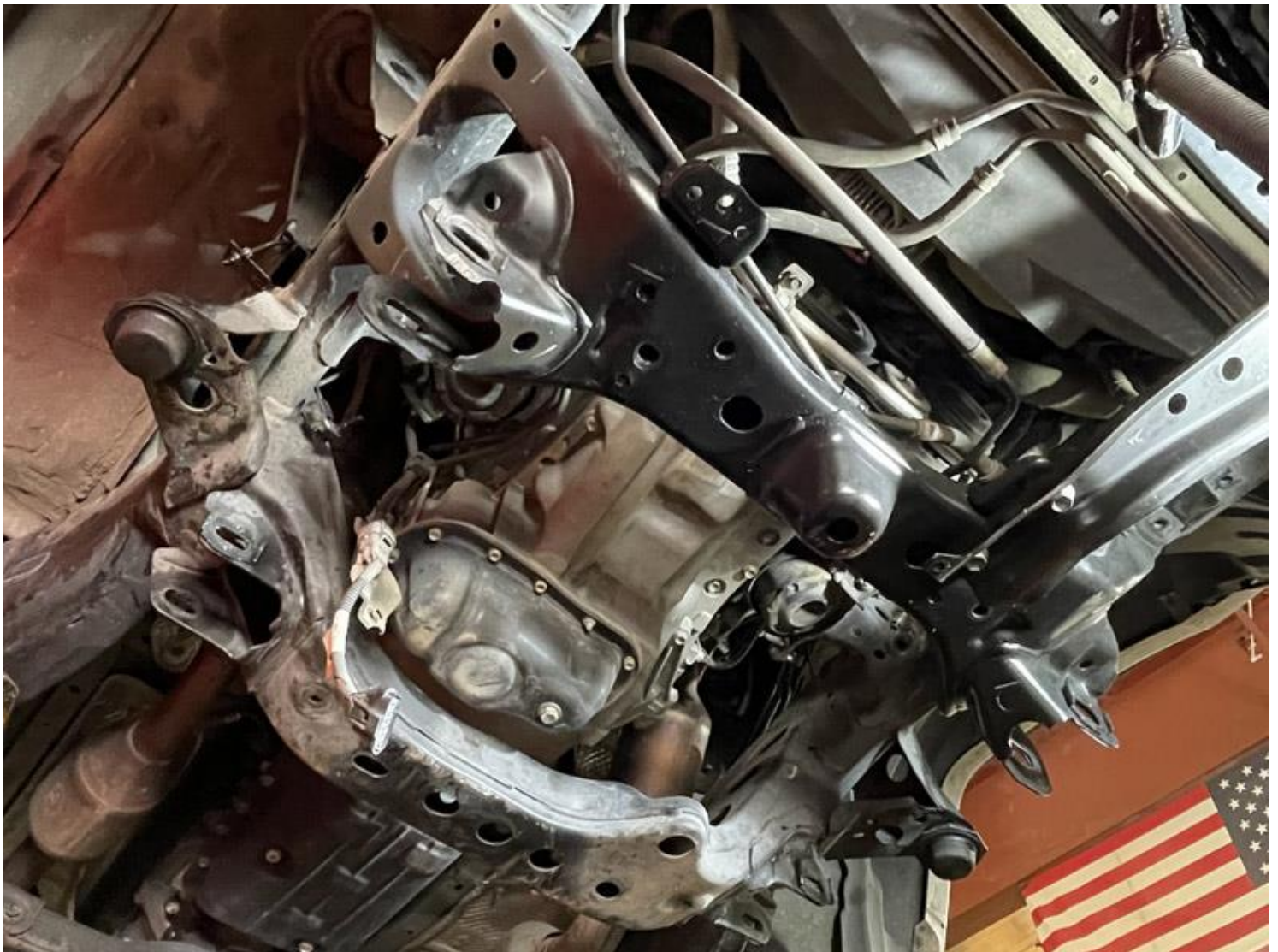
With all parts removed, this is a *great* time to consider upgrading your frame mounts using our **Heavy Duty LCA Frame Brace Kit**
See MarlinCrawler.com/armor/axles for details





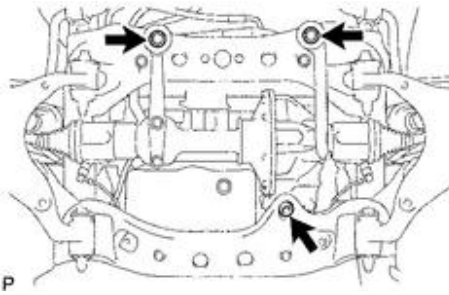
A2. Vehicle Preparation

Below is a 2011 4.0L Tacoma prepared for installation of RCLT HD, with factory IFS, Differential, and Steering Assemblies removed. Note additional removal of the engine under cover forward RH frame bracket.





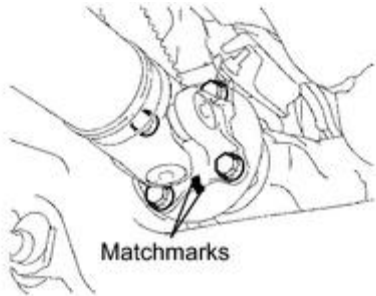
A3. Installation of Factory Differential Carrier Assembly



INSTALL FRONT DIFFERENTIAL CARRIER ASSEMBLY

1. INSTALL FRONT DIFFERENTIAL

- Support the front differential with a jack
- Connect actuator hose and connector, if applicable
- Install the 2 front mounting bolts and nuts.
 -Torque the RH factory bolt to 76 lb-ft lubricated (or 101 lb-ft dry)
 - Torque the new LH M14 MarRack bolt to 111 lb-ft lubricated (or 148 lb-ft dry)
- Install the pinion mount bolt.
 - Torque: 64 lb-ft dry (or 49 lb-ft lubricated)
- Install the front differential breather tube bracket with the bolt
- Lower the jack.



2. INSTALL FRONT PROPELLER SHAFT

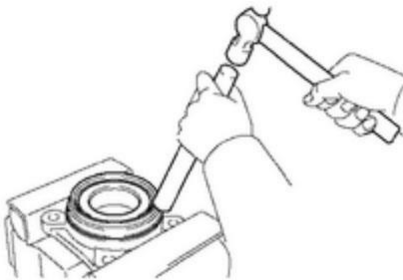
- Align the matchmarks on the yoke and differential flange.
- Install the propeller shaft with the 4 bolts, 4 nuts and 4 washers.
 - Torque: 65 lb-ft dry (or 49 lb-ft lubricated)
- Align the matchmarks on the yoke and transfer flange.
- Install the propeller shaft with the 4 nuts and 4 washers.
 - Torque: 65 lb-ft dry (or 49 lb-ft lubricated)

A4. Reassemble Knuckle

KNUCKLE REASSEMBLY

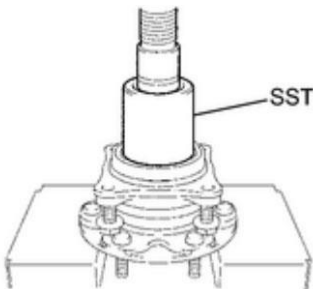
1. INSTALL FRONT AXLE HUB OIL SEAL

- Using a brass bar and a hammer, install a new front axle hub oil seal.
 - NOTICE: Do not damage the oil seal.



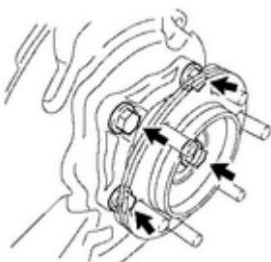
2. INSTALL FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY

- Using SST and a press, install a new bearing onto the front axle hub.
 - SST: 09649-17010



3. INSTALL FRONT AXLE HUB

- Apply MP grease to a new O-ring.
- Install the new O-ring onto the axle hub.
- Install the dust cover and axle hub onto the steering knuckle with the 4 bolts.
 - Torque: 59 lb-ft dry (or 44 lb-ft lubricated)

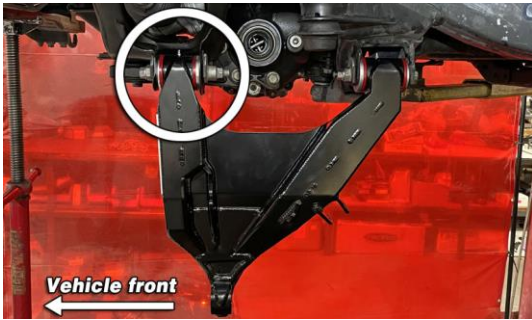


Seal Orientation Reference

CV > Inner Oil Seal > Knuckle > O-Ring > Wheel Bearing > Outer Oil Seal > Wheel Hub > Wheel
 90316-A0001 90301-A0005 90312-96001



A5. LCA Frame Mount Hardware Detail



The following concerns the Front LCA Mount

Step 1: Front Eccentric Sleeve

Insert Front Eccentric Sleeve through *front* flange, then *rearward* through LCA, then through *rear* flange in upright orientation shown.



Marlin Crawler SKU Reference		
4Runner	2003-2009 2010+	MCSU-7511 MCSU-7517
GX470 GX460	2003-2009 2010+	MCSU-7511 MCSU-7517
Tacoma	2005-2015 2016-2023	MCSU-7511 MCSU-7517
FJ Cruiser	2006-2009 2010-2014	MCSU-7511 MCSU-7517

Step 2: Front Cam Bolt

Insert Front Cam Bolt through center of Front Eccentric Sleeve.



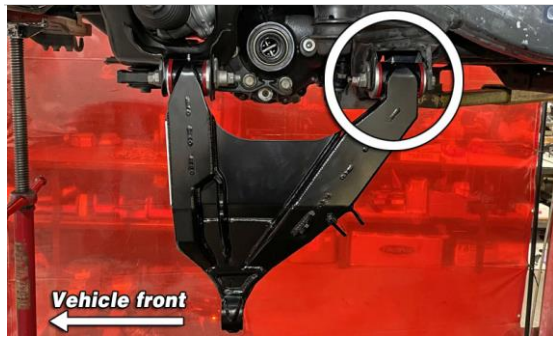
Marlin Crawler SKU Reference		
4Runner	2003-2009 2010+	MCSU-7510 MCSU-7516
GX470 GX460	2003-2009 2010+	MCSU-7510 MCSU-7516
Tacoma	2005-2015 2016-2023	MCSU-7510 MCSU-7516
FJ Cruiser	2006-2009 2010-2014	MCSU-7510 MCSU-7516

Step 3: Front Eccentric Nut

Install Front Eccentric Nut over end of Front Cam Bolt in upright orientation shown, and thread Front Cam Bolt through Front Eccentric Nut.



Marlin Crawler SKU Reference		
4Runner	2003-2009 2010+	MCSU-7512 MCSU-7518
GX470 GX460	2003-2009 2010+	MCSU-7512 MCSU-7518
Tacoma	2005-2015 2016-2023	MCSU-7512 MCSU-7518
FJ Cruiser	2006-2009 2010-2014	MCSU-7512 MCSU-7518



The following concerns the Rear LCA Mount

Step 1: Rear Eccentric Bolt

Insert Rear Eccentric Bolt in opposite direction as Front Eccentric Sleeve, passing through *rear* flange, then *forward* through LCA, then through *front* flange in upright orientation shown.



Marlin Crawler SKU Reference		
4Runner	2003-2009 2010+	MCSU-7513 MCSU-7518
GX470 GX460	2003-2009 2010+	MCSU-7513 MCSU-7518
Tacoma	2005-2015 2016-2023	MCSU-7513 MCSU-7518
FJ Cruiser	2006-2009 2010-2014	MCSU-7513 MCSU-7518

Step 2: Rear Eccentric Sleeve

Insert Rear Eccentric Sleeve over end of Rear Eccentric Bolt.



Marlin Crawler SKU Reference		
4Runner	2003-2009 2010+	MCSU-7514 MCSU-75110
GX470 GX460	2003-2009 2010+	MCSU-7514 MCSU-75110
Tacoma	2005-2015 2016-2023	MCSU-7514 MCSU-75110
FJ Cruiser	2006-2009 2010-2014	MCSU-7514 MCSU-75110

Step 3: Rear Nut

Install Rear Nut over end of Rear Eccentric Bolt.



Marlin Crawler SKU Reference		
4Runner	2003-2009 2010+	MCSU-7515 MCSU-75111
GX470 GX460	2003-2009 2010+	MCSU-7515 MCSU-75111
Tacoma	2005-2015 2016-2023	MCSU-7515 MCSU-75111
FJ Cruiser	2006-2009 2010-2014	MCSU-7515 MCSU-75111



A6. North American IFS Types for Toyota Mid-size Pickups and SUVs

	IFS Type I 1986-1995	IFS Type II 1995-2004	IFS Type III 2003-2015	IFS Type IV 2010+
RCLT HD Compatible:	No	No	YES	YES
Applications:	1986-95 Hilux 1986-95 4Runner	1995-04 Tacoma 1996-02 4Runner	2003-09 4Runner 2003-09 GX470 2005-15 Tacoma 2006-09 FJ Cruiser	2010+ 4Runner 2010+ GX460 2010-14 FJ Cruiser 2016-23 Tacoma
Spring Type:	Torsion Bar	Coil over	Coil over	Coil over
Differential:	Standard	Standard	Clamshell	Clamshell
R&P Size:	7.5"	7.5"	8.0"	8.0"
Rotation:	Standard	Reverse	Reverse	Reverse
Source:	1979 2WD Pickup	Land Cruiser Prado 90-series	Land Cruiser (V8) Prado 120-series	Land Cruiser (V8) Prado 120-series
Steering:	Gear Box	Rack & Pinion	Rack & Pinion	Rack & Pinion
Location:	In front of axle	Behind axle	In front of axle	In front of axle
Outer CV:	Bell OD: 93mm Splines: 26	Bell OD: 94.5mm Splines: 26 or 30	Bell OD: 106mm Splines: 30	Bell OD: 106mm Splines: 30
Inner Shaft:	OD: 23.75mm	OD: 29mm	OD: 32.5mm	OD: 32.5mm
Hubs:	Manual or Automatic	Manual or Non-selectable	Non-selectable	Non-selectable
Brake Rotor:	OD: 289 to 291mm Thick: 20 to 25mm	OD: 296 to 319mm Thick: 22mm	OD: 319 to 338mm Thick: 28mm	OD: 319 to 338mm Thick: 28 to 32mm
LCA Design:	Hilux	Land Cruiser Prado 90-series	Land Cruiser Prado 120-series	Land Cruiser Prado 150-series
Bump stops:	2 per side	2 per side	1 per side	1 per side

Marlin Crawler's Take

Type I: The first 4WD IFS offered in the States left a lot to be desired. The use of a torsion bar limited lift options and resulted in a squeaky off-road experience. While it used a traditional and robust steering box, the idler arm and small tie rods were prone to failure. Small axle shafts with no HD Rock Crawling upgrade options, and a small front R&P lifted from a 1979 2WD pickup.

Largest recommended Rock Crawling tire size: 32".

Type II: The Prado 90-series was a major upgrade for IFS 4WD Toyotas. Designed by Toyota's commercial truck division Hino Motors, this IFS features easy to change coil overs, axles with available HD aftermarket upgrades, improved reverse-rotation high-pinion R&P, and a steering rack mounted favorably behind the axle for improved forward-direction strength, it had potential.

Largest recommended Rock Crawling tire size: 33".

Type III: The Prado 120-series IFS essentially doubled the strength of Type II in every category except steering. The differential became larger and adopted an improved clamshell design which orientates assembly bolts perpendicular to the pinion resulting in much greater pinion deflection resistance. The R&P is the same used in the larger 8cyl 100-series Land Cruiser and proven reliable with 40" tires. Heavy Duty aftermarket axle options include inboard & outboard 35-spline Dana-60-sized CV joints that include a manufacture guarantee to not fail with tire sizes up to 40" in diameter.

Largest recommended Rock Crawling tire size: 35" *with proper attention to steering & knuckle strength.*

Type IV: The Prado 150-series IFS further builds upon the Type III by featuring larger and stronger lower control arm mounting hardware. In some SUV applications, the brake rotors are 6% larger and 28% thicker, and calipers have 28% more piston area with 36% stronger knuckle mount hardware. Steering strength unfortunately remains the major weak-link of the mid-size Toyota IFS.

Largest recommended Rock Crawling tire size: 35" *with proper attention to steering & knuckle strength.*



A7. RCLT HD HARDWARE SPECS

Item	Size (G8 or C10.9)	Bolt Head Socket	Nut Socket/Wrench	Torque (Lubricated)
Upper Knuckle Bolt	9/16"-18	13/16"	11/16" 12-point	130 lb-ft
Lower Knuckle Bolt	5/8"-18	15/16"	15/16"	180
Tie Rod End Bolt	5/8"-18	15/16"	15/16"	170
Mini Marlink Outer Jam Nut	7/8"-14	-	1 1/4"	45
Mini Marlink Inner Jam Nut	M22x1.25	-	M30	45
Main Shock Lower Bolt	1/2"-20	3/4"	3/4"	90
Limit Strap Lower Bolt	1/2"-20	3/4"	3/4"	90
MarRack LH Bolt	M14x2.00	M12 Allen	M21	111
MarRack RH Bolt	M14x2.00	M12 Allen	M21	111
MarRack ITR-to-rack	M28x1.50	-	-	-
Factory hardware				
UCA to Frame	M14x1.25	M19	M19	64 lb-ft
Brake Caliper Bolt	M14x1.50	M19	-	111
	<i>Older kits: M12x1.25 SKU 90105-12272</i>	<i>M17</i>		<i>60</i>
Outer CV Axle Nut	M28x1.50**	-	M35**	130

All torque figures are in pound-foot. Not recommended to torque fastener dry.

** Some outer CVs use a smaller thread & nut. RCV shafts use M28.

A8. SIMPLE "One bolt" AXLE REPAIR

To R&R an axle shaft:

1. Remove Tire
2. Remove nut from outer CV
3. Remove Lower Knuckle Bolt
4. Swing Knuckle Out & Replace shaft

A9. SIMPLE UCA ±1° CASTER ADJUST WITHOUT REMOVING TIRE

To reconfigure UCA ±1° caster feature:

1. On level ground, raise front end until bottom of tire is barely touching ground
2. Remove Upper Knuckle 12-point SS Flanged Nut
3. Try to move Upper Knuckle Bolt by hand
 - a. If bolt does not freely move, then slightly raise or lower vehicle
When load on tire is neutral, the bolt will freely move
4. Remove Upper Knuckle Bolt just enough to get both Caster Spacers out
5. Reposition Caster Spacers based on Page 36
6. Push Upper Knuckle Bolt back through and retorque Nut to 130 lb-ft

Finished and ready to realign vehicle



Scan QR code for
video demonstration



A10. BODY MOUNT AND FENDER CLEARANCING NOTES

A powerful patented feature of RCLT HD is that it moves the front hub forward two inches for an improved Rock Crawling approach angle similar to a Solid Axle Swap (SAS) and **significantly** better than any other near bolt-on Long Travel IFS. This has a negative effect to clearance in front of tire and positive effect behind tire. The following table may be used as a guideline. Wheel offset and tire width may affect results:

Tire Size	Estimated tire-to-body mount frame bracket clearance at steering-lock & full compression	Body Mount Frame Bracket Trimming Required	Fender and/or Bumper Trimming Required
33"	+1.875"	No	No
35"	+0.875"	No	Yes
37"	-0.125"	No, but expect slight rubbing	Yes
40"	-1.500"	Yes	Yes



While 35" tires easily clear all frame parts at full steering-lock and suspension compression, likely the rear trailing edge of the front bumper will need to be trimmed as well as the fender in front of the tire.



Stuffing 40" tires on a late-model IFS is NOT easy and requires extensive inner fender wall modification. At full compression and steering-lock, RCLT HD enables 40" tires to clear unmodified body mounts in their factory location, needing only 1.5" of clearancing to the frame bracket.

A11. COIL SPRING RATES

Due to use preferences from Rock Crawling, Baja, Sand, Mud, Snow, & Overlanding, there is no *one-spring-rate-fits-all* solution and a vehicle may change spring rates a few times during tuning. The goal for Rock Crawling is to have the F&R suspension complement one another, whereby front spring rate is not too high that it causes the rear suspension to be over-worked. Keep in mind that leaf springs are a progressive rate spring unlike commonly used coils.

The following is a *work-in-progress* and only intended as a suggestion. Values will be adjusted upon customer feedback.

Use Case	Empty Vehicle Weight	Rear Suspension	Suggested Spring Rate
Rock Crawling	4,500 lbs	Coil	500 lb-ft
		Leaf	500 or 550
	4,500 to 5,250	Coil	550
		Leaf	550 or 600
	5,250 to 6,000	Coil	600
		Leaf	600
	6,000+	Coil	600
		Leaf	650
Baja / Sand	4,500 lbs	any	550 lb-ft
	4,500 to 5,500	any	600 to 650
	5,500+	any	650



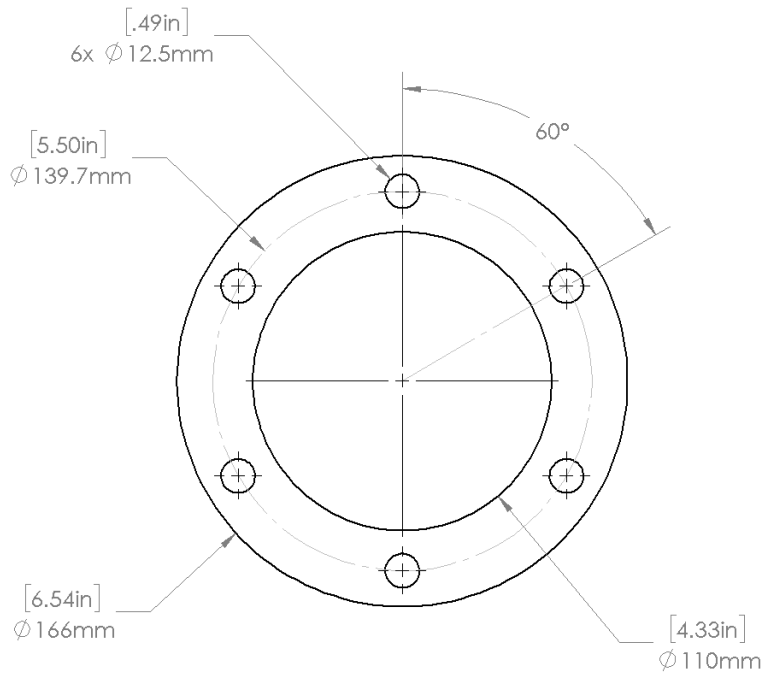
A12. BRAKE ROTOR INTERFERENCE TROUBLESHOOTING

In order to maximize steering strength, RCLT HD's Heavy Duty Knuckles have oversized steering arms positioned as close to the brake rotor as possible. As a result, clearance between Knuckle and Rotor is reduced. RCLT HD is compatible with the largest and thickest factory brake rotors and matching calipers found on 2010+ 4Runner & Lexus GX460.

Factory Rotors: Ensure surface rust & debris has been removed from the mating surfaces between Rotor and Wheel Hub. This hub-centric connection must be clean so that your rotor mounts flush. Test-fitting a rotor onto the knuckle using only one lug nuts may cause rotor misalignment. Use 3 lug nuts spaced 120° for test-fitting. You may find the rotor interferes with the knuckle until it is tightened to the wheel hub, which indicates rust or debris between rotor and wheel hub faces.

Aftermarket Rotors: If oversized aftermarket brakes are used, such as two-piece Wilwood or Brembo rotors, we cannot guarantee their compatibility with RCLT HD's oversized Knuckle design. Aftermarket rotors may nevertheless be used by inserting a thin spacer between rotor and wheel hub.

Should your build require a thin spacer behind the rotor, below is a template you may use or to provide to a laser cutter. Ensure your caliper pads can float enough and there is spacing within the caliper body for the new rotor position.

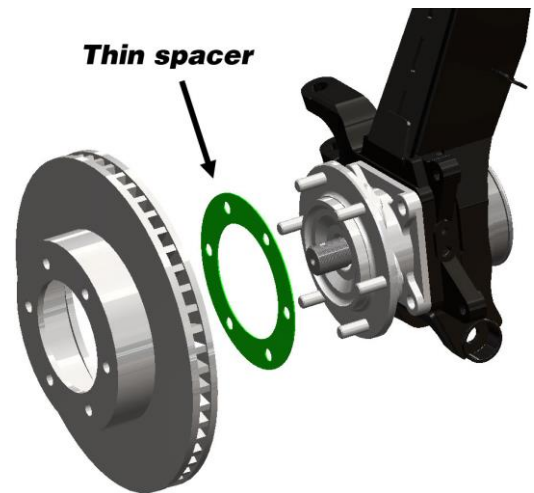


Download DXF file via QR code

Filename: *rotor-spacer.dxf*
Filesize: 24 KB

Stainless Steel Sheetmetal Chart	
GAUGE	THICKNESS
20	0.0375"
18	0.0500"
16	0.0625" (1/16")
14	0.0703"
12	0.1094" (7/64")
11	0.1250" (1/8")

We recommend 20 or 16-gauge S.S., stacked as needed



In one scenario, a customer had 20-gauge stainless steel spacers laser cut & stacked as needed until oversized aftermarket rotors fit. **FREE OPTION:** Another customer installed oversized aftermarket rotors onto RCLT HD Knuckles by cutting the center section out of the discarded factory knuckle backing plates removed in Appendix A1, drilling new holes to match the wheel stud bolt pattern, and then inserted as a M0.5 (0.0197") spacer between each RCLT HD Knuckle and Rotor.

For more details and install info of various aftermarket Big Brake Kits, please scan the QR code to view forum thread, "Big brake kit":





A13. HIGH SPEED USE TIPS

In testing with high-speed applications, we have come up with the following tips to help your RCLT HD operate at its best.

- **Upper Limit Strap Mount Consideration**

The extra weight of our HD components place more stress on limit strap mounts. Our LCA mount is very strong, however, we recommend switching to a Chromoly Adjustable Clevis Shank or to a solid upper strap mount.



Chromoly Adj. Clevis Shank, Kar Tek SKU **KTKSCLV4130**



Solid Mount, Kar Tek SKU **KTK916DST**

- **Slightly Limit Down Travel**

To maximize ground clearance, spacing is limited around the outer CV boot at full down-travel. This is not a problem for Rock Crawling, but if you plan to get airborne at high speeds then you may wish to limit down travel to prevent premature failure to your outer CV boots.

- **Add a second Bump Stop to each side**

Note: This is only if you plan to repeatedly launch your vehicle

Many Toyota 4WD IFS designs prior to Type III/IV use two bump stops per lower control arm for a total of four. Beginning in 2003, Toyota switched to only one bump stop per lower control arm.

As such, the forces delivered by the lone bump stop may cause the lower control arm to contort and twist under severe loading. Due to this, it would be beneficial to add a second bump stop to each lower control arm along the top face of the front leading 'arm' as shown below in the location of the red arrow, between MarRack Tie Rod and axle shaft assemblies.

