



## EMF REBUILDABLE UPPER & LOWER BALL JOINTS

US/CDN PATENTS US8764336B2, CA2784185C, US10330143B2 US/CDN PATENT PENDING CA2922209A, US20190085893A1, CA3016975CA

**WHEEL ALIGNMENT & TIRE ROTATION MANDATORY AFTER INSTALL  
(CASTER SET TO 4.0-5.0 DEGREES AND 0.15-0.2 TOE IN FOR 2000-2013 VEHICLES – CASTER SET TO 5.0-6.5 AND 0.15-0.25 TOE IN FOR 2013.5+ VEHICLES)**

**CAUTION:** PROPER SERVICE AND REPAIR PROCEDURES ARE ESSENTIAL FOR SAFE AND RELIABLE INSTALLATION OF CHASSIS PARTS AND REQUIRE EXPERIENCE AND TOOLS SPECIFICALLY DESIGNED FOR THE PURPOSE. THESE PARTS MUST BE INSTALLED BY A QUALIFIED MECHANIC, OTHERWISE IT MAY RESULT IN AN UNSAFE VEHICLE AND/OR PERSONAL INJURY MAY RESULT. EMF IS NOT RESPONSIBLE FOR ANY INJURY OR DEATH.

**WARNING:** BEFORE ATTEMPTING TO REMOVE THE STUD FROM THE STEERING KNUCKLE, MAKE SURE THE STUD OF THE OLD BALL JOINT WAS FIRMLY SEATED IN THE TAPERED HOLE OF THE STEERING KNUCKLE. IF THE BALL JOINT WAS LOOSE OR IF ANY OUT-OF-ROUNDNESS, DEFORMATION OR DAMAGE IS OBSERVED, **THE STEERING KNUCKLE MUST BE REPLACED.** IF, AFTER REMOVAL OF OLD BALL JOINTS, ANY CRACKS ARE FOUND, **THE STEERING KNUCKLE MUST BE REPLACED.** FAILURE TO REPLACE A DAMAGED OR WORN STEERING KNUCKLE MAY CAUSE THE LOSS OF STEERING ABILITY SINCE THE BALL JOINT STUD MAY BREAK AND CAUSE THE WHEEL TO SEPARATE FROM THE VEHICLE.

### **INSTALLATION INSTRUCTIONS**

- (RECOMMENDED TO DO ONE SIDE AT A TIME) REMOVE OLD BALL JOINTS, CLEAN AND INSPECT THE STEERING KNUCKLE. IF ANY CRACKS ARE OBSERVED, PLEASE READ WARNING ABOVE. IF KNUCKLE LOOKS GOOD, THEN PROCEED.
- CLEAN STEERING KNUCKLE TAPER (WHERE THE BALL JOINT PIN GOES INTO). INSERT NEW BALL JOINT STUD INTO STEERING KNUCKLE BY HAND AND CHECK THE FIT OF THE STUD TAPER TO THE KNUCKLE. THE STUD SHOULD SEAT FIRMLY WITHOUT ANY ROCKING. ONLY THE THREADS OF THE STUD SHOULD EXTEND THROUGH THE STEERING KNUCKLE. IF THE PARTS DO NOT MEET THESE REQUIREMENTS, EITHER THE STEERING KNUCKLE IS WORN AND NEEDS REPLACEMENT OR INCORRECT PARTS ARE BEING USED.
- PLACE THE UPPER BALL JOINT INSTALL CUP ON TOP OF THE UPPER BALL JOINT CAP (THIS PREVENTS DAMAGE WHEN BEING PRESSED INTO THE KNUCKLE). (PIC BELOW) **MAKE SURE SET SCREW/GREASE FITTING IS TOWARDS THE FRONT OF THE VEHICLE WHEN PRESSING IN SO IT CAN BE EASILY ACCESSED WHEN YOU NEED TO GREASE OR TIGHTEN THE JOINT.**



(UPPER INSTALL CUP POSITION)

- USING A SUITABLE PRESS TOOL, INSTALL UPPER BALL JOINT INTO KNUCKLE SQUARELY UNTIL THE SHOULDER OF THE BALL JOINT MEETS THE KNUCKLE. **NEVER EXERT PRESS FORCE ON COVER PLATE.** REMOVE THE UPPER BALL JOINT INSTALL CUP AND SET ASIDE.
- **IF YOU HAVE REGULAR SIZE AND THE BALL JOINT FALLS INTO THE HOLE, YOU NEED THE OVERSIZED BODY BALL JOINTS!** YOUR KNUCKLE HOLES WERE STRETCHED ALONG THE WAY (FREQUENT CHANGES, USING A KNURLED BODY BALL JOINT PREVIOUSLY OR INSTALLING INCORRECTLY) AND NOW REQUIRE A LARGER DIAMETER BALL JOINT TO FIT OR REPLACEMENT OF THE KNUCKLE.
- **REMOVE LOWER BALL JOINT BOOT BEFORE INSTALLING TO PREVENT DAMAGE TO THE BOOT.** INSTALL THE LOWER BALL JOINT USING THE INSTALL WASHER PROVIDED IN THE KIT. **THIS INSTALL WASHER IS MANDATORY TO PREVENT DAMAGE TO THE LOWER BALL JOINT RING WHEN PRESSING THE BALL JOINT INTO THE KNUCKLE.** (PIC ON PAGE 2)

- **MAKE SURE SET SCREW/GREASE FITTING IS TOWARDS THE FRONT OF THE VEHICLE WHEN PRESSING IN SO IT CAN BE EASILY ACCESSED WHEN YOU NEED TO GREASE OR TIGHTEN THE JOINT AND IT WON'T HIT THE AXLE.**



(LOWER INSTALL WASHER POSITION)

- USING A SUITABLE PRESS TOOL, INSTALL LOWER BALL JOINT INTO KNUCKLE SQUARELY UNTIL THE SHOULDER OF THE BALL JOINT MEETS THE KNUCKLE. REMOVE THE INSTALL WASHER AND SET ASIDE.
- THOROUGHLY CLEAN THE TAPERED HOLES ON THE STEERING KNUCKLE BEFORE ASSEMBLY OF THE STUDS WITH THE KNUCKLE.
- POSITION THE STEERING KNUCKLE ON THE BALL STUDS.
- USING THE INSTALL NUT (NON-NYLOCK), INSTALL AND TIGHTEN THE LOWER BALL STUD TO 47 Nm (35 FT LBS) TORQUE
- USING THE INSTALL NUT (NON-NYLOCK), INSTALL AND TIGHTEN THE UPPER BALL STUD TO 122 Nm (90 FT LBS) TORQUE
- RE-TORQUE THE LOWER BALL STUD NUT TO 190-217 Nm (140-160 FT LBS) TORQUE
- REMOVE THE UPPER INSTALL NUT WITH A WRENCH OR RATCHET. **AN IMPACT WILL BREAK THE SEATED PIN LOOSE FROM THE STEERING KNUCKLE AND ALLOW IT TO SPIN**, SO DON'T DO IT, OK?! PUT THE INSTALL NUT ASIDE, YOU WON'T NEED IT ANYMORE UNLESS YOU USED AN IMPACT AND THEN YOU WILL HAVE TO DO IT ALL OVER AGAIN.
- **USING A WRENCH OR RATCHET**, INSTALL THE UPPER BALL JOINT NYLOCK NUT AND TORQUE TO THE PREVIOUS 122 Nm (90 FT LBS) TORQUE.
- **USING A WRENCH OR RATCHET**, REMOVE THE LOWER INSTALL NUT. THIS IS MY LAST TIME EXPLAINING HOW USING AN IMPACT WILL BREAK THE SEATED PIN LOOSE FROM THE KNUCKLE ALLOWING IT TO SPIN.
- **USING A WRENCH OR RATCHET**, INSTALL THE LOWER BALL JOINT NYLOCK INSTALL NUT AND TORQUE TO 190-217 Nm (140-160 FT LBS)
- MOVE THE KNUCKLE BACK AND FORTH TO ENSURE THERE IS NO BINDING. IT SHOULD MOVE FREELY. IF THE KNUCKLE BINDS UP ON 2009 OR NEWER TRUCKS, LOOK FOR CONTACT POINTS BETWEEN THE KNUCKLE AND BALL JOINT FACES. AS TRUCKS GET OLDER AND BALL JOINTS ARE CHANGED, THE TAPERED HOLES IN THE KNUCKLES WEAR, ALLOWING THE KNUCKLES TO SIT HIGHER ON THE PINS AND CHANGING CLEARANCES. SOMETIMES BOOTS NEED TO BE MODIFIED. ALSO, WE FOUND SPINDLE KNUCKLES ON THE DRIVER SIDE, MAINLY IN 2006 MODELS BUT UP TO 2008, HAVE MISALIGNED UPPER TAPERED HOLES. YOU WILL NOTICE THIS INSTANTLY AS THE KNUCKLE WILL BE STIFF TO ROTATE FROM SIDE TO SIDE. WE DO OFFER A SOLUTION FOR THE UPPER BALL JOINT CALLED A STIFFY PIN. IF YOU NEED ONE, GIVE US A CALL. OTHERWISE, YOU CAN ALSO REPLACE THE WHOLE KNUCKLE.
- IF ALL IS GOOD, INSTALL THE ¼-28 GREASE FITTINGS INTO THE BALL JOINTS USING AN 8MM WRENCH OR SOCKET.
- GREASE THE LOWER BALL JOINT FIRST UNTIL THE GREASE GUN STARTS TO BECOME FIRM. THEN GREASE THE UPPER BALL JOINTS UNTIL THE GREASE GUN BECOMES FIRM. THEN GREASE THAT LOWER BALL JOINT ONE MORE TIME UNTIL THE GREASE GUN BECOMES FIRM.
- ROTATE THE KNUCKLE SIDE TO SIDE TO DISTRIBUTE THE GREASE INSIDE THE BALL JOINTS. THE KNUCKLE SHOULD GO FROM STIFF AND HARD TO MOVE, TO EASIER TO MOVE SIDE TO SIDE FREELY.
- NOW YOU WANT TO REPEAT THE STEP ABOVE AGAIN BY GREASING THE LOWER BALL JOINT FIRST AS MANY PUMPS AS YOU CAN GET, FOLLOWED BY GREASING THE UPPER WITH AS MANY PUMPS AGAIN. IF YOU CAN'T GET ANY MORE IN, THAT'S OK!
- CYCLE THE KNUCKLE BACK AND FORTH AGAIN GOING FROM STIFF AND HARD TO MOVE TO EASIER TO MOVE SIDE TO SIDE.
- IF THE KNUCKLE FEELS TOO STIFF, THEN DEPRESS THE GREASE FITTING TO LET A LITTLE PRESSURE OUT AND IT SHOULD FREE UP AGAIN.
- IF EVERYTHING FEELS GOOD, PROCEED TO INSTALL THE OTHER SIDE USING THE SAME PROCESS AND THEN THE FUN PART OF RE-ASSEMBLY OF THE AXLE BEGINS.

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#### TROUBLESHOOTING

IF YOU ARE HAVING TROUBLE SEATING THE PIN, MAKE SURE THE TAPERED HOLE AND PIN ARE CLEAN. TORQUE THE NON-NYLOCK INSTALL NUT UP TO 120 FT LBS OF TORQUE FOR INSTALL (IF PIN WON'T SEAT) AND THEN REMOVE WITH A WRENCH OR RATCHET **NOT AN IMPACT**. THEN, USING A WRENCH OR RATCHET, INSTALL THE NYLOCK NUT AND TORQUE TO 70 FT LBS.

CHECK OUT OUR YOUTUBE VIDEOS! [YOUTUBE.COM/USER/EMFEVO](https://www.youtube.com/user/emfevo) **TECH SUPPORT LINE (TEXT ONLY PLEASE) 403-999-0592**  
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