



Subject: Steering System Inspection			
Field change Program: Service Bulletin	Bulletin Number: 3129	Revision: A	Date: 01/21/2020
Coach Section: 11- Steering	P/N: 11-07-1084		Type: Service Information

Application:

Coach Model	Model Year	VIN
J4500	All coaches beginning with MY 2013, VIN: 66554	

⚠ WARNING

Read this entire procedure before beginning work.

Use Safe Shop Practices at All Times.

To avoid personal injury:

- a. Proper Personal Protective Equipment (PPE) must be worn. Safety glasses and protective gloves are required for working with DEF Fluid.*
- b. Turn the main battery disconnect switch to the OFF position.*
- c. Ensure that both the front and the rear wheels are chocked.*
- d. Position the ENGINE RUN and ENGINE START switches on the engine compartment remote control box to the OFF position.*
- e. Allow enough time for components to cool down prior to working in the engine compartment.*

1.0 Description

This service information bulletin outlines the necessary steps to inspect the power steering system for proper operation. It also lists the necessary steps to replace the power steering seals if needed.

2.0 Material Requirements

See Section 5.0.

3.0 Special Tools

Power steering system analyzer with hose, MCI P/N: T20-1256.

Thrust Pad, MCI P/N: T20-1257

Extraction tool, MCI P/N: 20-141.



Power steering system analyzer with hose



Thrust Pad

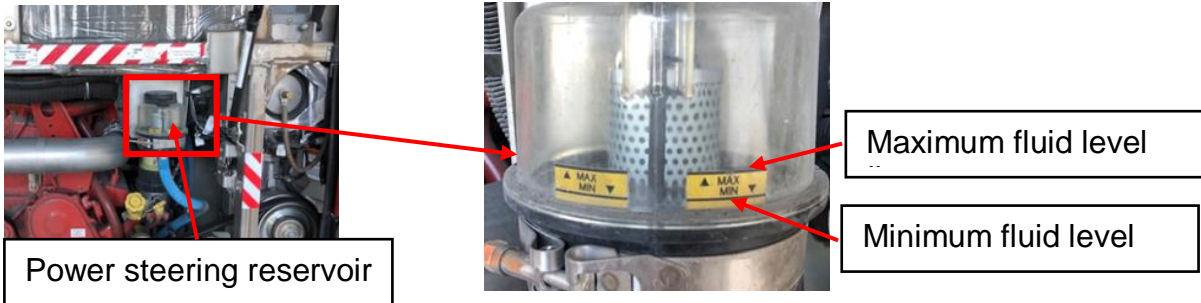


Extraction tool

3.0 Steering system inspection

3.1 Visual Inspection

Start the engine and run at idle speed (700 rpm). Check the power steering reservoir and ensure that the fluid level is between minimum and maximum lines as shown below.



Start at the power steering pump, inspect the lines from the pump to the bulkhead fitting, then inspect the lines from the bulkhead to the center tunnel. Then inspect the lines from the front bulkhead to the steering gearbox.

If a leak is observed in any of the lines or fittings, refer to the MCI maintenance manual for troubleshooting and corrective action.

Inspect the steering gear for any signs of fluid leakage. If fluid leakage is observed proceed to **Section 5.0**. Otherwise, continue to next section.

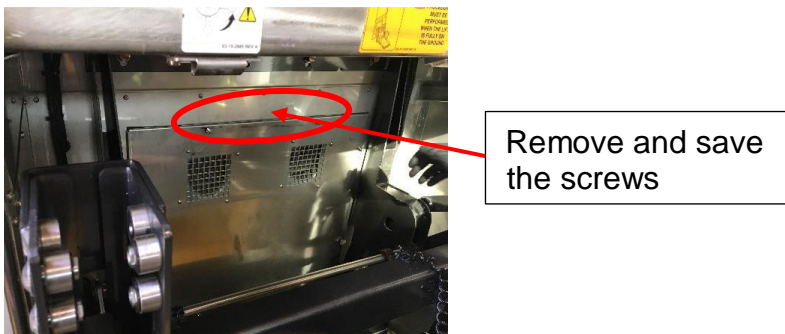
3.2 Steering gear inspection for flow rate and pressure

3.2.1 Removing engine access panel

Open the wheelchair lift compartment door and extend the wheelchair lift, if present.



Remove and save the eight bolts on the engine access panel. Remove and save the panel.



3.2.2 Installing power steering analyzer tool

If the coach is equipped with a dampener tube, remove the lower fitting of the dampener tube and attach it to the hose of the tool.

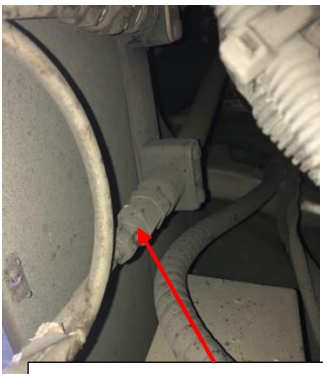


Lower fitting of dampener tube



Hose of the tool

Install the dampener end of the line to the analyzer line of the tool.



Dampening End of the line



Analyzer line

If the coach is equipped with a dampening canister assembly, remove the fitting on the supply line from the power steering pump. Attach the power steering pump supply line to the hose of the tool.

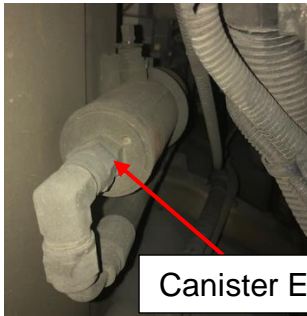


Power steering pump supply line



Hose of the tool

Install canister end of the supply line to the analyzer line on the tool.



Canister End



Analyzer line

3.2.4 Bleeding the system for testing.

Start the engine and run at idle speed (700 rpm). Rotate the steering wheel all the way to the LH and RH three times, holding the steering wheel in the end position for no more than five seconds. When finished, move the steering wheel to the straight-ahead position.

3.2.5 Checking Pressure and Flow

Run coach at idle until the power steering fluid reaches 50±3° C or 122±6° F.

Once the temperature is reached, position the steering wheel in straight-ahead position and record pressure and flow.

To check flow rate, slowly close the shut-off valve on the tool and confirm the flow is above 13 LPM (3.4 GPM).

To check pressure, close and open the valve completely 3 times.

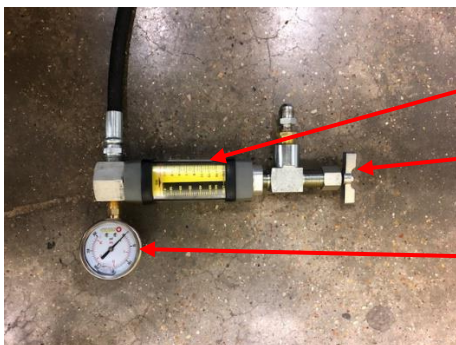
See if the pressure is between 100 Bar (1450 PSI) and 120 BAR (1740 PSI).

NOTICE

CAUTIONS

Do not hold the valve closed as it will damage the pump and/or gear.

If either flow rate is observed below 13 LPM (3.4 GPM) or the pressure is not between 100 Bar (1450 PSI) and 120 BAR (1740 PSI), replace the power steering pump (refer to the MCI Maintenance manual for instruction).



Flow Rate

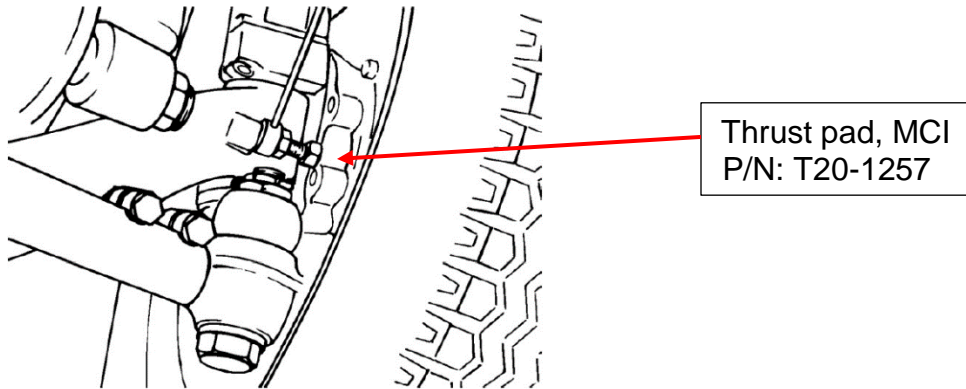
Shut off Valve

Pressure

3.3 Internal gear leakage

Fully open the shut-off valve.

Insert the thrust pad tool, MCI P/N: T20-1257, between the lock stops as shown below and hold it in place.



Record flow rate and pressure readings on the power system analyzer tool while rotating the steering wheel in clockwise direction.



Repeat the test in the opposite direction. Hold thrust pad tool, MCI P/N: T20-1257, in the same way on the opposite side. Record the flow rate and pressure readings on the power steering system analyzer tool.



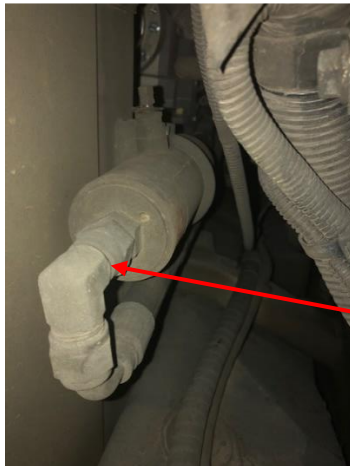
If either flow rate is observed above 16 LPM (4.22 GPM) or the pressure is above 180bar (2610 PSI), replace the steering gear (refer to the MCI Maintenance manual for instruction).



4.0 Removing Tool

Remove the tool from the dampener tube/ dampener canister.

Re-install the power steering hose to the dampener and torque the fitting to 60-65 Ft-Lbs.



Torque to 60-65 Ft-Lbs

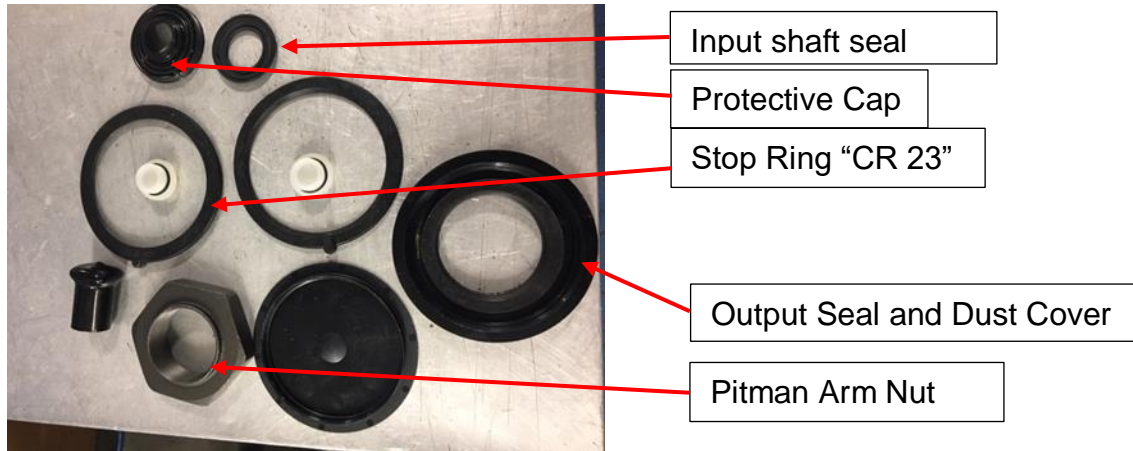
Install the engine access panel using the existing 8 bolts.



5.0 Steering Gear Box Seal Replacement

5.1 Material requirements

ITEM	PART NO	QTY	U/M	DESCRIPTION
1	T11-1115	1	EA	Gasket and Seal kit, ZF



5.2 Special tools

Renolit CX-FO 20 grease.

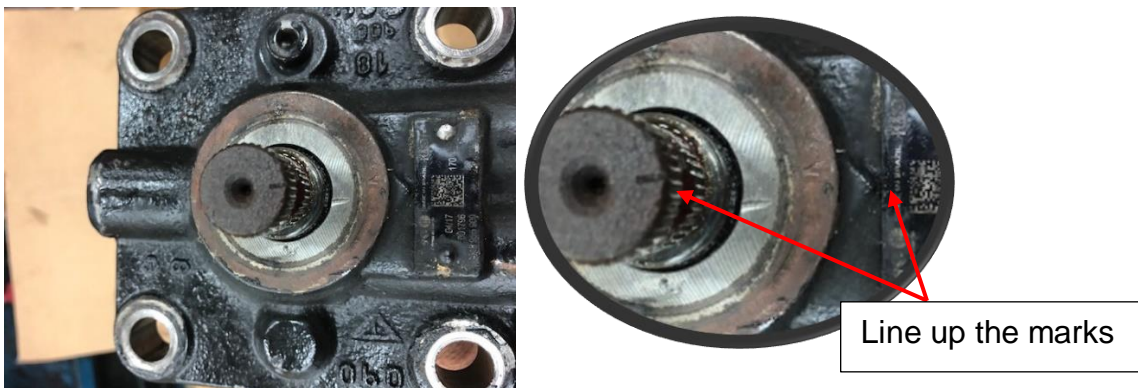
Spectron FO20 grease.

5.3 Steering gearbox removal

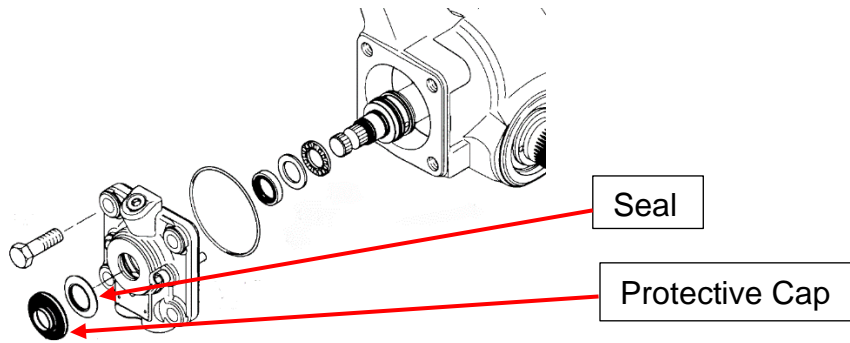
Refer to the Maintenance Manual to remove the steering gear from the coach.

5.4 Input shaft disassembly

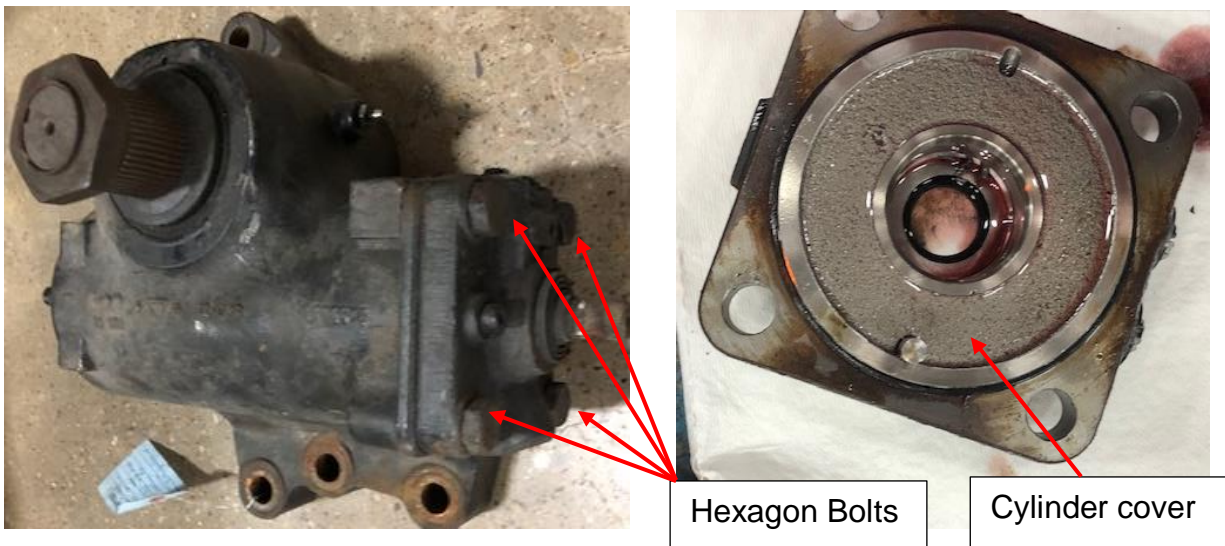
Rotate steering gear to position marks on the steering gear cylinder in straight line.



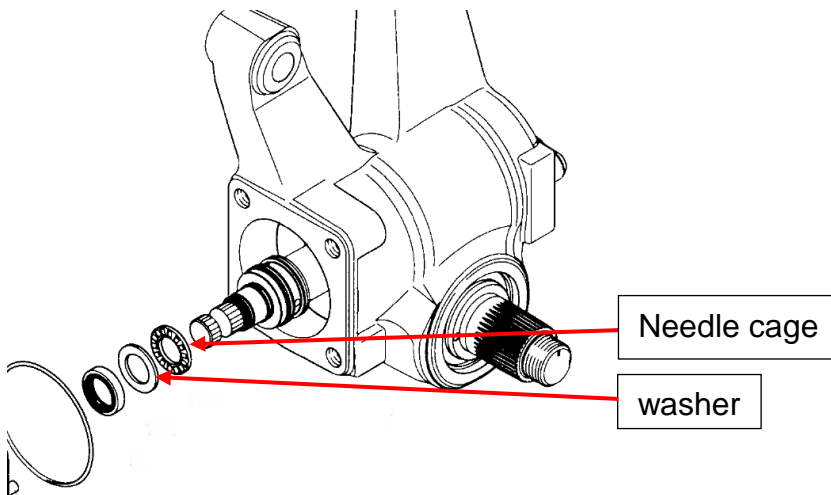
Remove and discard protective cap and seal.



Remove and save 4 hexagon bolts. Save the cylinder cover.



Remove and save the needle cage and washer on the cylinder cover.

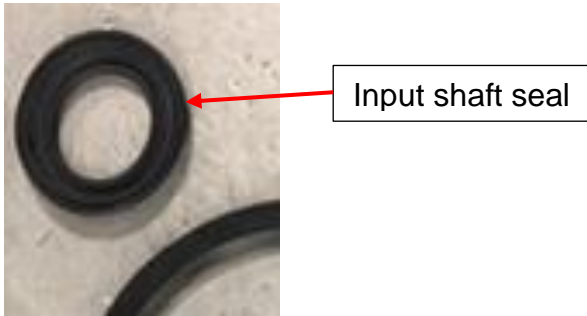


5.5 Input shaft assembly

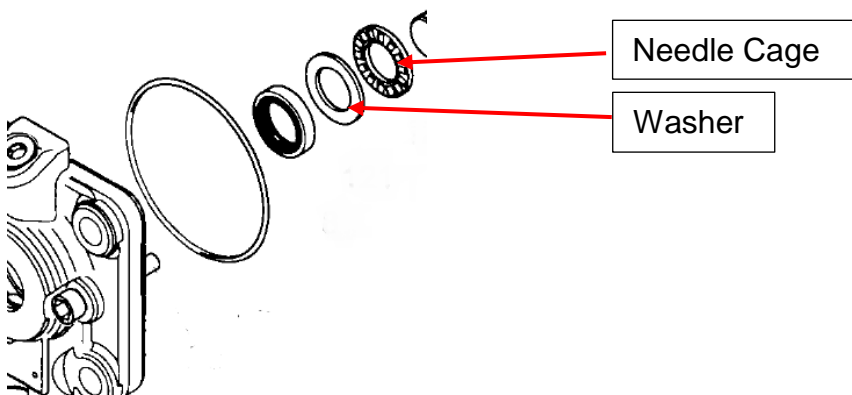
Clean all components thoroughly.

Check each component for wear and oil before reassembly.

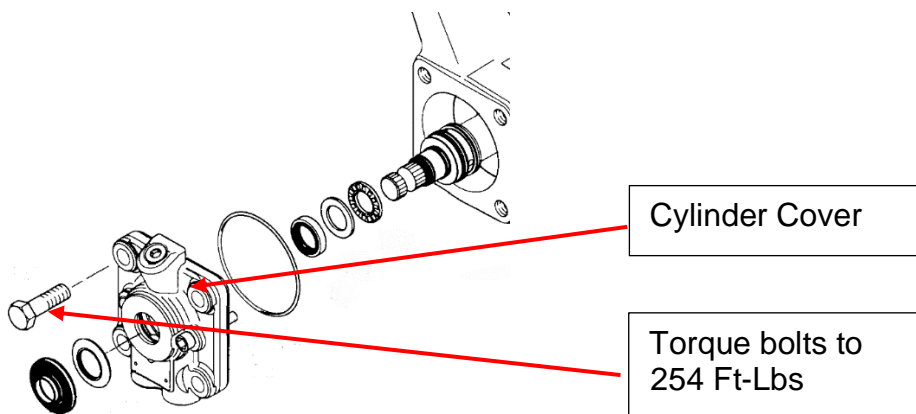
Grease the new input seal, part of kit T11-1115, using Renolit CX-FO 20 grease.



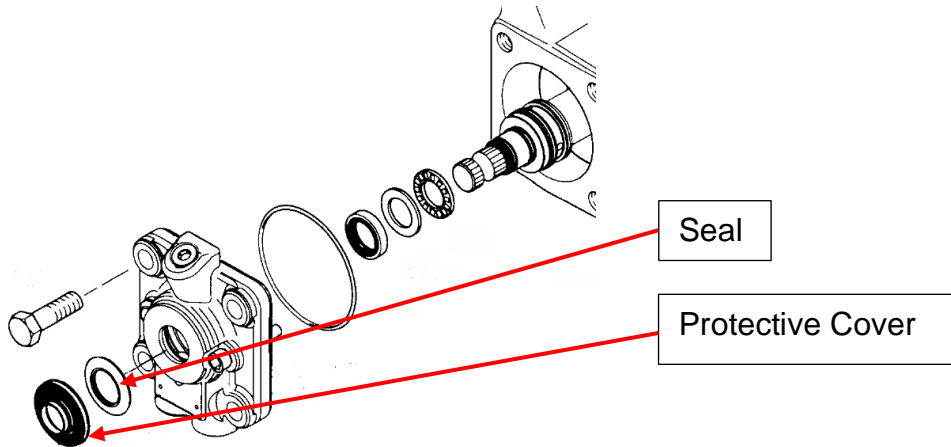
Slightly grease needle cage and the washer with Vaseline and insert them into the cylinder cover.



Using existing bolts, install the cylinder cover to the steering gear. Torque the bolts to 254 Ft-Lbs.

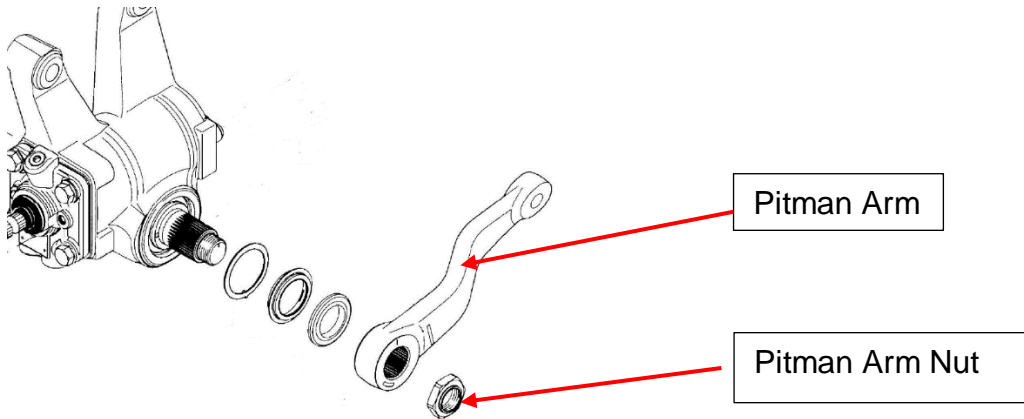


Install new seal and protective cover form kit, MCI P/N: T11-1115.

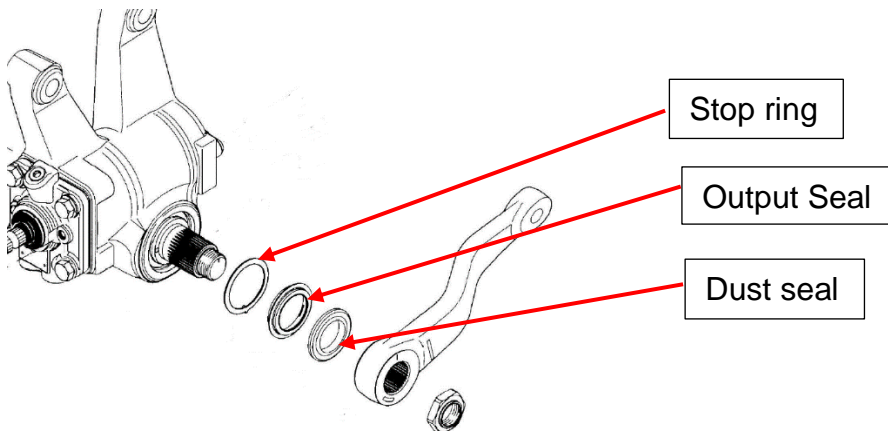


5.6 Output shaft seal removal

Remove and discard the pitman arm nut using extraction tool, MCI P/N: 20-141. Save pitman arm.



Remove and discard the dust seal, stop ring, and output seal.

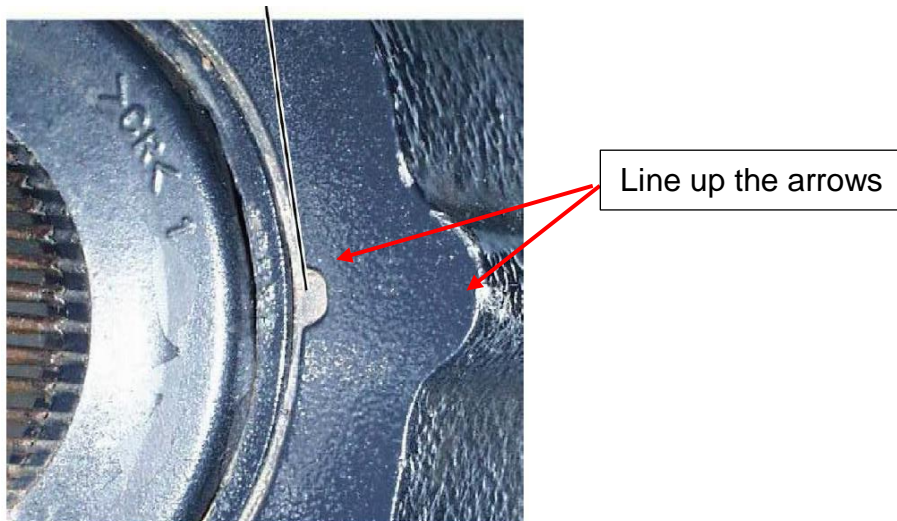


5.7 Output shaft seal installation.

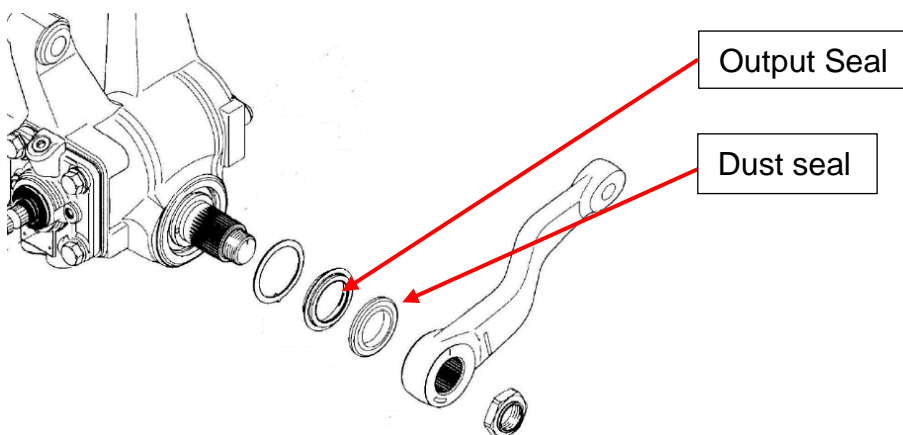
Grease the dust seal and output seal, part of kit T11-1115, using Spectron FO20 grease.



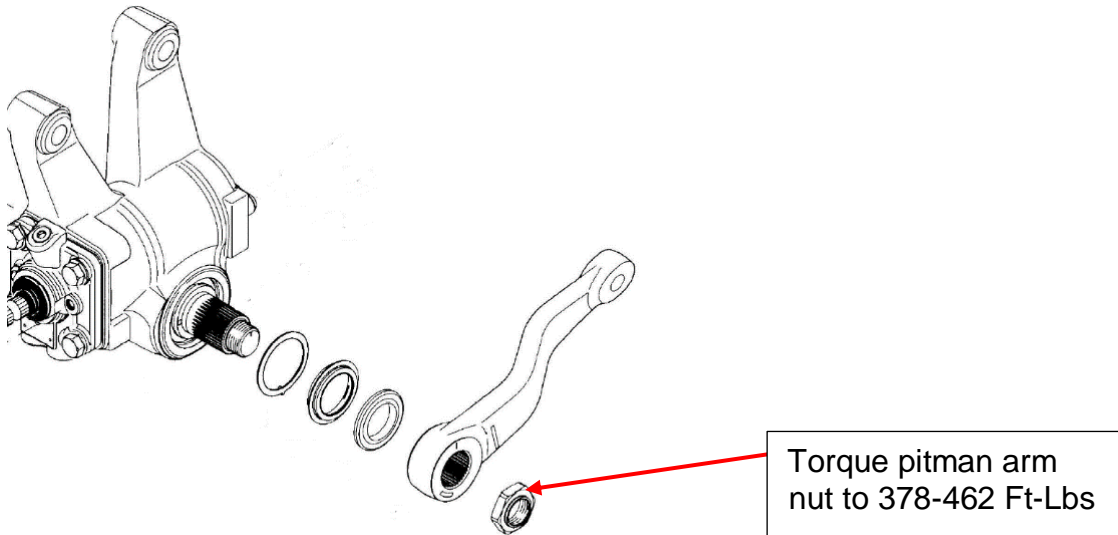
Line up the housing as shown below, and insert the stop ring into housing.



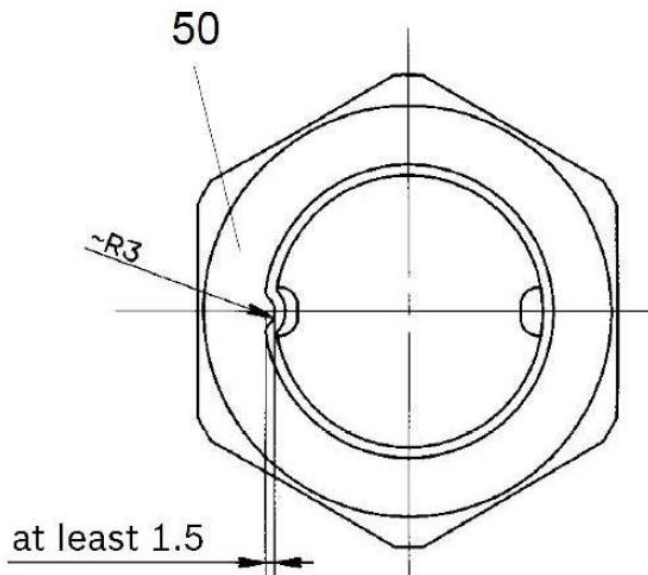
Install dust seal and output shaft and press it into the housing until the stop ring is level with housing.



Install the pitman arm onto the shaft using new pitman arm nut, part of kit T11-1115, and torque the nut to 378-462 ft/lbs.



Once the nut is torqued, secure nut with punch as shown in illustration below.

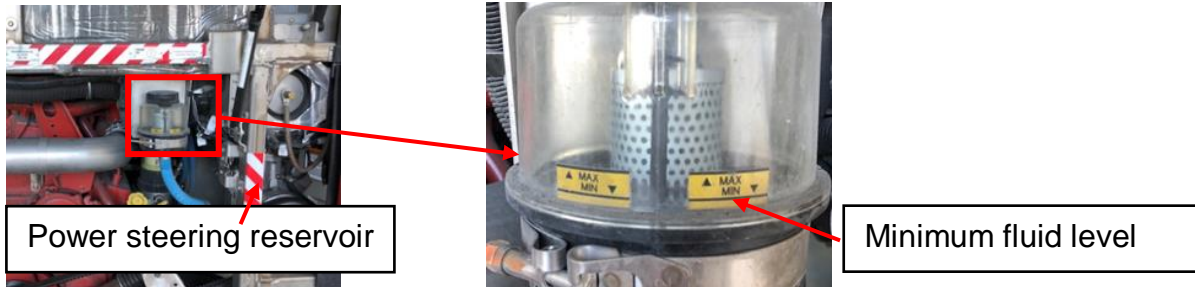


5.8 Steering gear installation

Refer to the Maintenance Manual for steering gear removal and installation.

5.9 Bleeding the system

Check the power steering reservoir for fluid level. If the fluid is below the required level, add fluid to reach the required level.



Start coach and let idle.

Bleed system by turning steering wheel to lock each way 10 times.

Test drive the coach, and after test drive re-check the steering fluid and add as needed.

5.10 Verify

Check for leakage on all the power steering hoses. If no leak is found procedure is completed.

If a leak is found, retorque the fittings on the leaking hoses and clean surrounding area to remove oil.

End of the procedure