



Date	Group	No.	Release	Page
3.2017	642	001	01	1(37)

Static Steering, Repair GU

FSB 642-001, Static Steering, Repair

(March 2017)

Certain GU trucks equipped with forward steer axles (18,000 lb rated front axles) and built from 2012, may experience issues with static steering while sitting still. There is not enough ability with a single steering gear to overcome certain turning frictions. To repair this issue, an assist steering gear and different power steering pump are added to these trucks. On trucks built after 2012 the additional ports for the assist steering gear hydraulic lines are not present on the existing steering gear. Therefore, the existing steering gear is replaced with a new one in this repair procedure. Follow the repair procedure outlined in this Field Service Bulletin (FSB).

Note: This bulletin does not apply to MACK Trucks Australia.

Required Parts

Static Steering, Repair Parts			
Item #	Description	Part Number	Qty
1	STEERING ROD, CT-AF ASSIST	20923573	1
2	HEXAGON SCREW, M16 * 100	993909	1
3	FLANGE LOCK NUT, M16 * 18.3	990954	1
4	WASHER, 17 * 30 * 6	994882	2
5	SPLIT PIN	25092079	2
6	CLAMP	25089705	2
7	FLANGE SCREW	25087147	2
8	NUT RETAINER, FLANGE	20706309	2
9	HOSE ASSEMBLY, POWER STEERING	20924991	1
10	HOSE ASSEMBLY, POWER STEERING	20924988	1
11	STEERING GEAR, SD110, 180 BAR	20897097	1
12	STEERING GEAR, ASSIST	20897099	1
13	ELBOW NIPPLE, 12.7XM16X1.5	20469515	1
14	FITTING	25102426	1
15	NIPPLE, M16*3/4-16 SAE JIC37	8397884	1
16	ELBOW NIPPLE, 12.7XM16X1.5	20469515	2
17	HEXAGON NUT, M20*18	990973	3
18	HEXAGON SCREW, M20*140	992482	1
19	WASHER, 21*36*5.8	994884	7
20	HEXAGON SCREW, M20*70	992935	1
21	HEXAGON SCREW, M20*130	992481	2
22	PITMAN ARM	25109405	1
23	TANDEM PUMP, 25LMIN/25CC/REV-200E	21745619	1
24	SPINDLE ARM	25110366	1
25	FLANGE SCREW, SPECIAL	1079490	2
26	CASTLE NUT	10506	1

Decommissioning the Truck for Repair

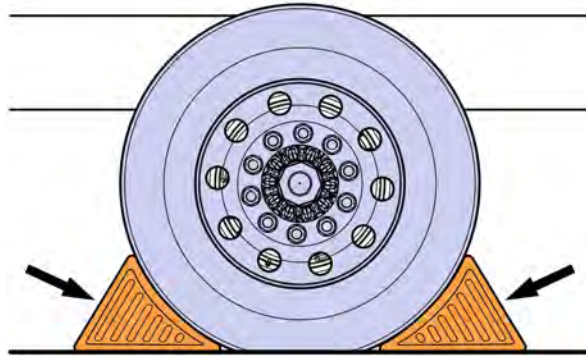
You must read and understand the precautions and guidelines in Service Information, group 60, "General Safety Practices, Steering, Front Axle, & Suspension" before performing this procedure. If you are not properly trained and certified in this procedure, ask your supervisor for training before you perform it.

NOTE: Information is subject to change without notice. Illustrations are used for reference only and can differ slightly from the actual vehicle being serviced. However, key components addressed in this information are represented as accurately as possible.

DANGER

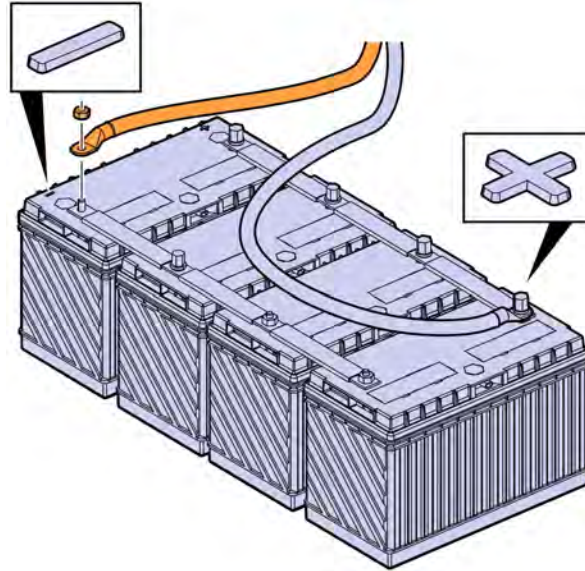
Do not attempt to repair or service this vehicle without having sufficient training, the correct service literature and the proper tools. Failure to follow this could make the vehicle unsafe and lead to serious personal injury or death.

- 1 Park the vehicle on a level surface.
- 2 Apply the parking brake.
- 3 Place the transmission in neutral or park.
- 4 Install the wheel chocks on the rear wheels.



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- 5 Disconnect the cable from the battery's negative terminal.

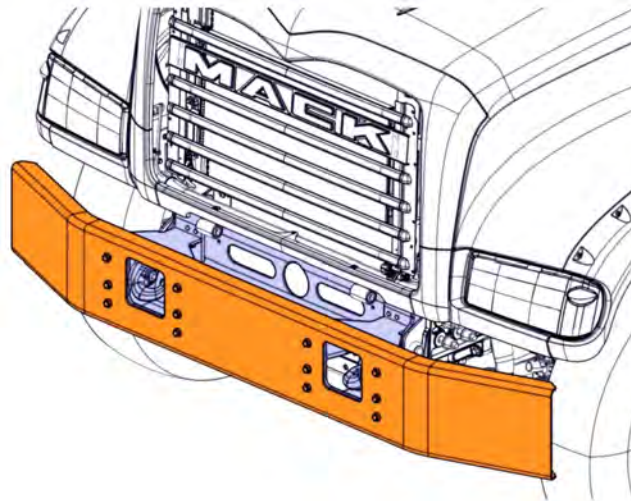


W3086747

- 6 Using either coolant extractor (part number 88870007) or drain hose (part number 9996049), drain the cooling system.

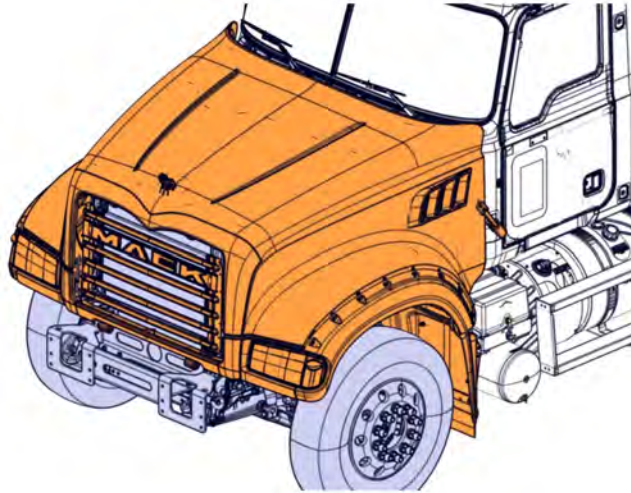
Static Steering, Repair Procedure

- 1 With assistance, remove the bumper assembly.



W7113455

- 2 With assistance, remove the hood assembly.



W7113456

- 3 Using a jack, lift the front left and right sides of the truck by the frame and support the frame with jack stands.
- 4 With all of the weight removed from the drive axles, lift and support the drive axle assembly.

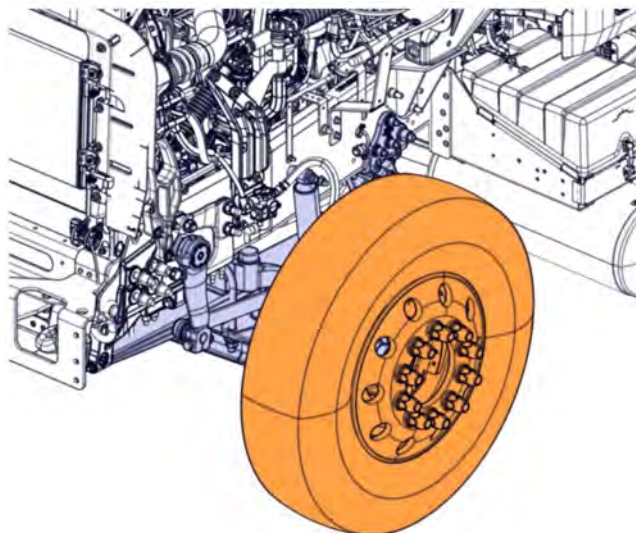


DANGER

Position a suitable jack under the axle housing pinion to prevent the axle from rolling over.

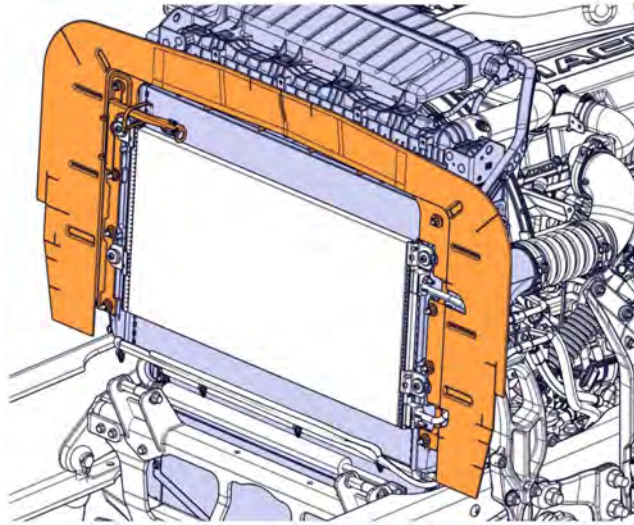
- 5 Remove the front wheels.

Note: left side shown.



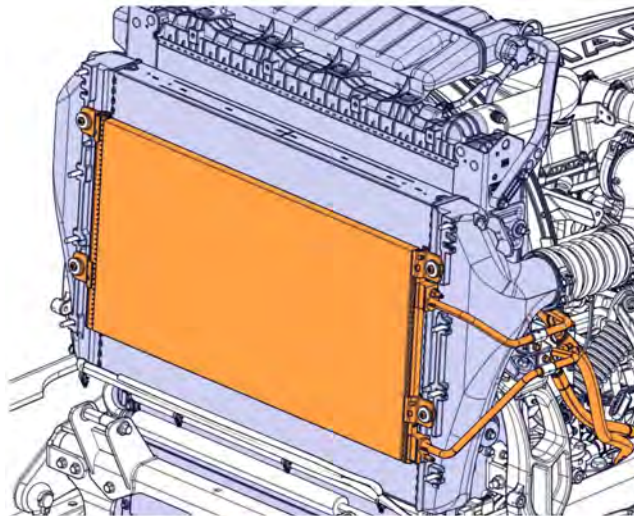
W7113457

- 6 Remove the recirculation shield or cut the shield at the condenser high and low pressure pipes to allow condenser removal without reclaiming refrigerant.



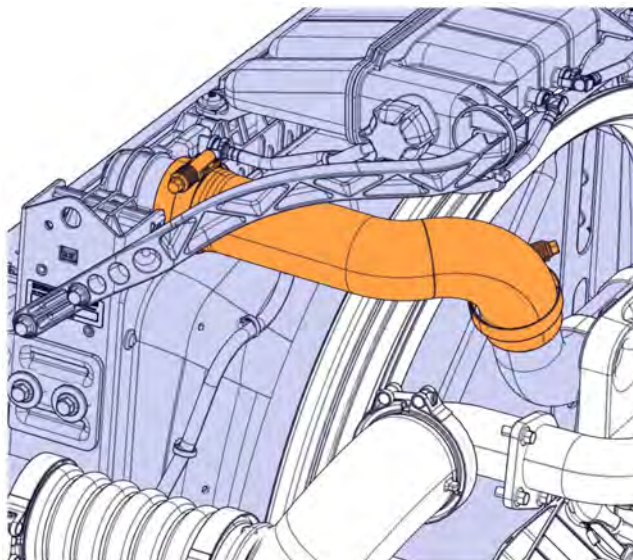
W6120675

- 7 Without disconnecting the condenser piping, position the condenser out of the way and secure until it is reinstalled.



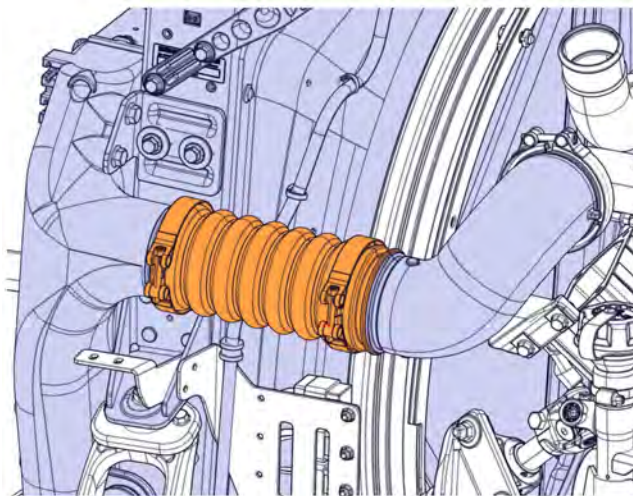
W6120676

8 Remove the upper hose as shown.



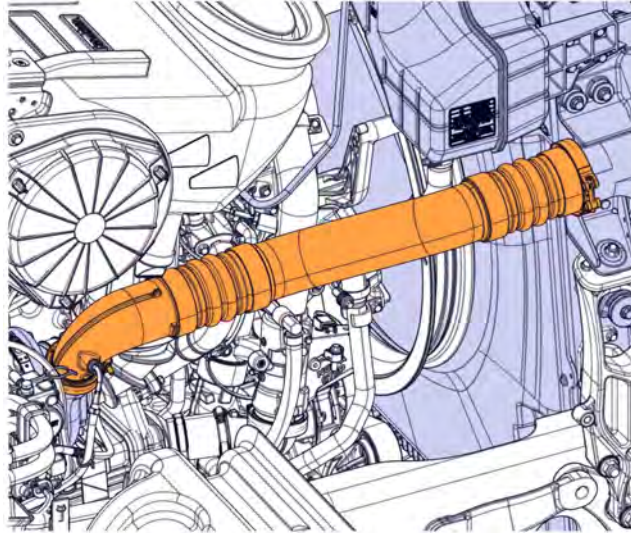
W6120677

9 Remove the left side charge air pipe.



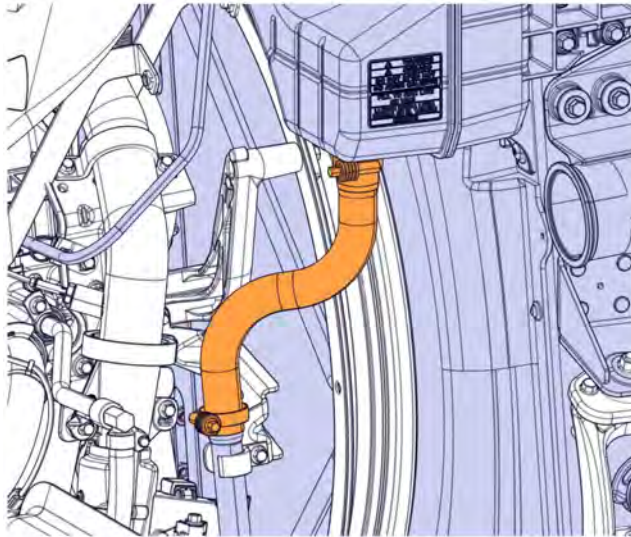
W6120678

10 Remove the right side charge air pipe.



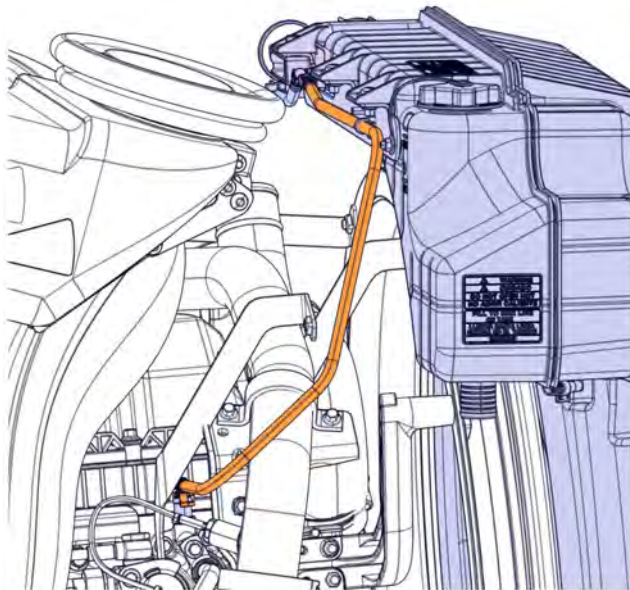
W6120679

11 Remove the static fill hose.



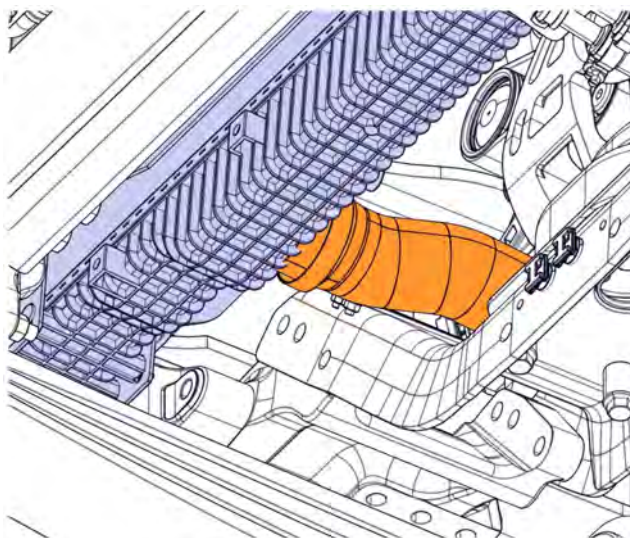
W6120680

12 Disconnect the de-aeration hose.



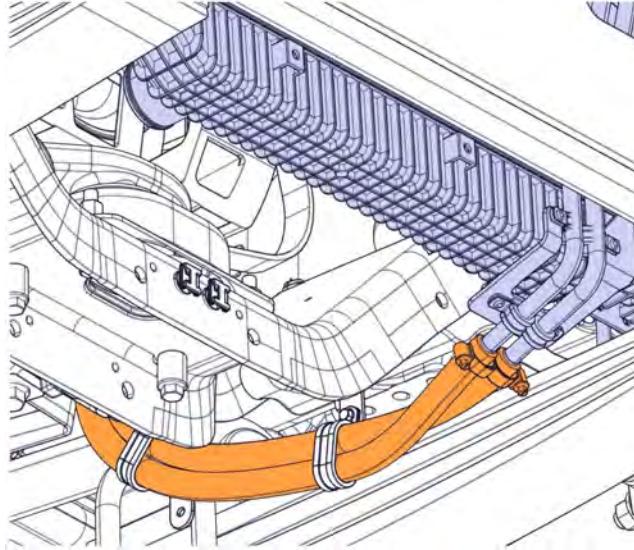
W6120681

13 Using a drip pan, remove the lower radiator hose.



W6120682

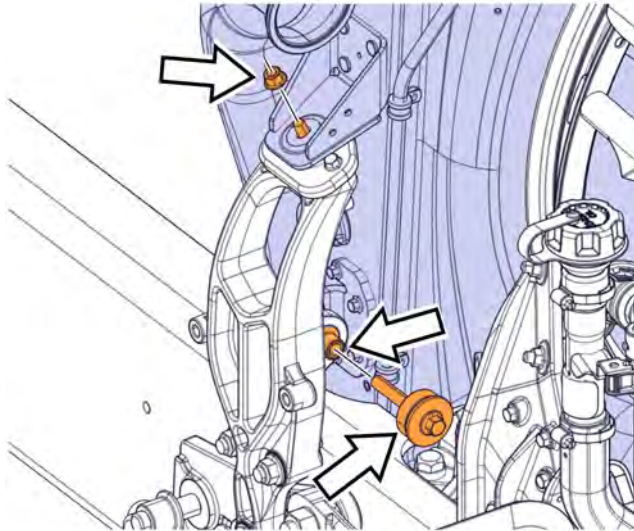
14 Using a drip pan, remove the power steering cooler hoses.



W6120683

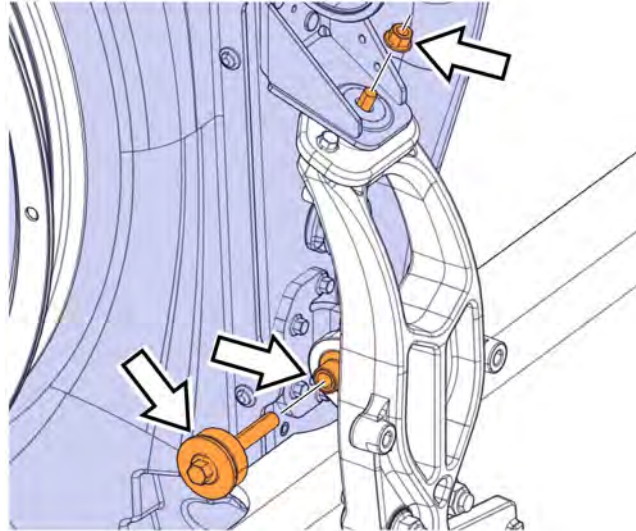
15 Attach a lifting tool to the cooling package and secure until removal.

16 Remove the left side cooling package hardware as shown in the figure below.



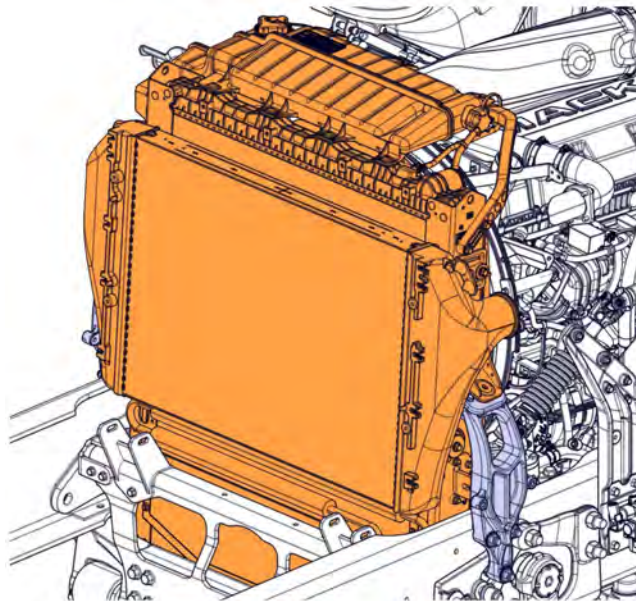
W6120684

17 Remove the right side cooling package hardware as shown.



W6120685

18 Using the lifting tool and assistance, remove the cooling package.

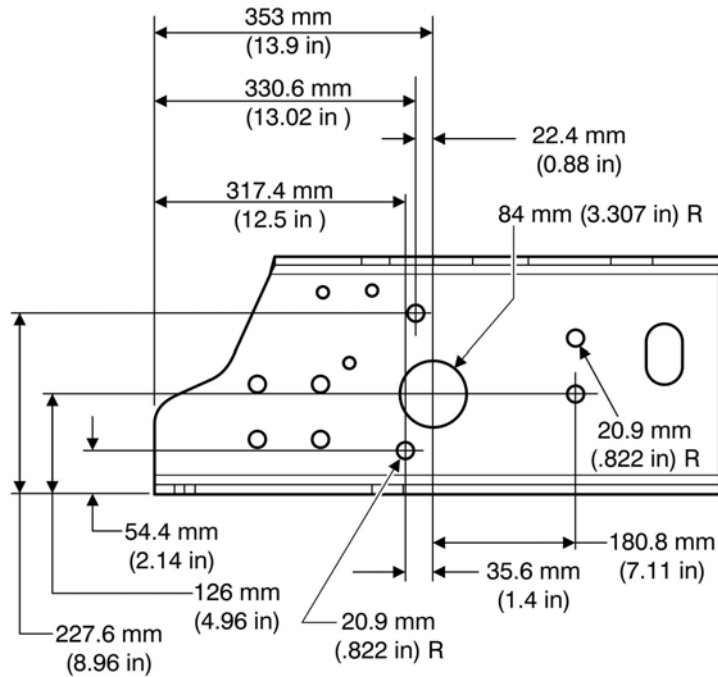


W6120686

19 Using the measurements in the figure below, mark, cut, and drill holes in the frame as shown to install the assist steering gear.

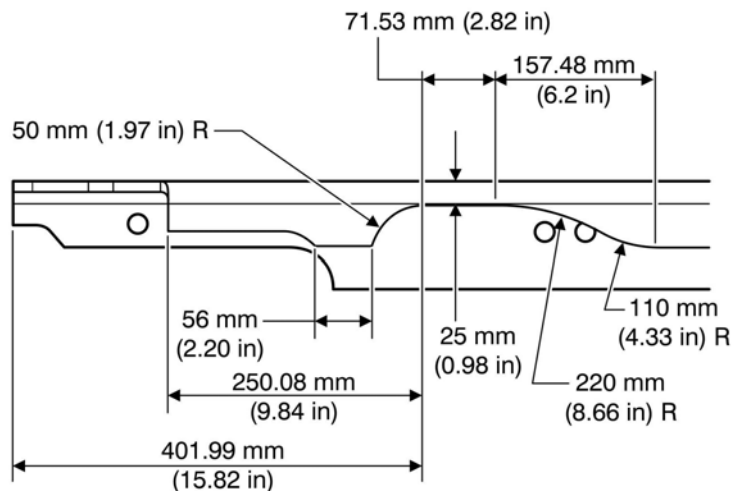
Note: The view in the figure below is from the inside of the frame rail.

Note: All cuts and holes in the frame must be ground smooth in the horizontal line of the frame with no edges to prevent stress risers.



W6120687

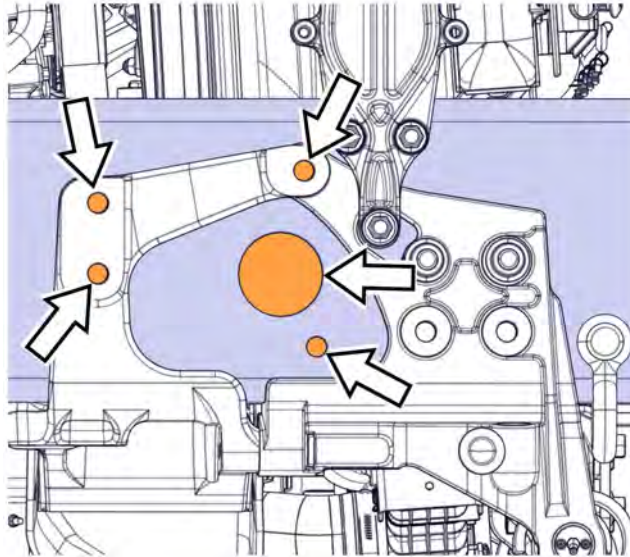
20 Using the measurement in the figure below, cut and shape the upper rail flange as shown.



W6120688

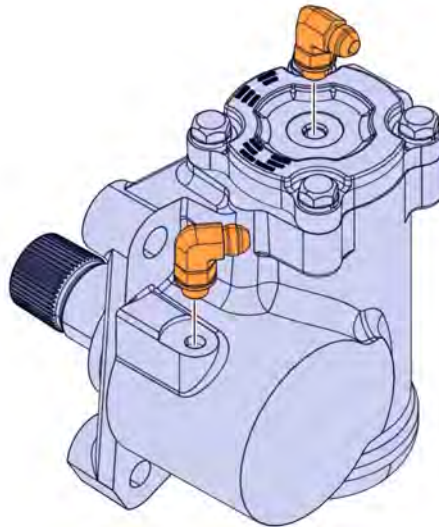
21 Use the image below as a reference for mount locations.

Note: The view shown below is from outside of the frame rail.



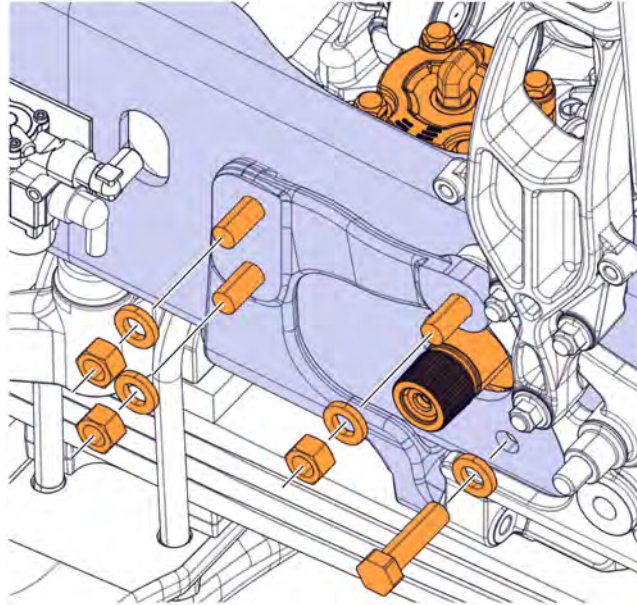
W6120690

22 Install the assist steering gear fittings as shown.



W6120693

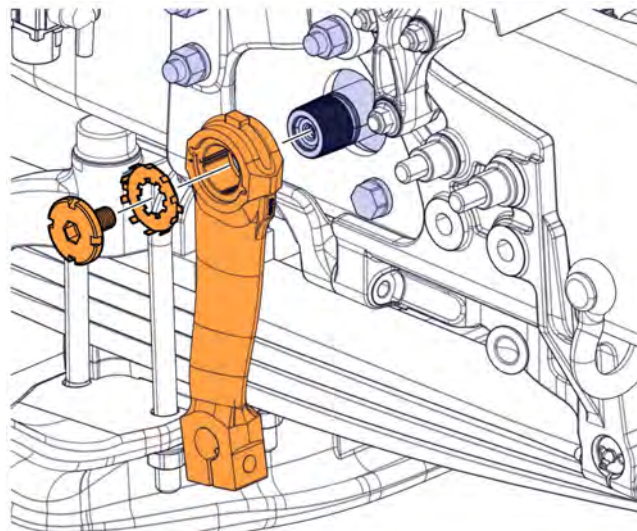
23 Install assist steering gear.



W6120695

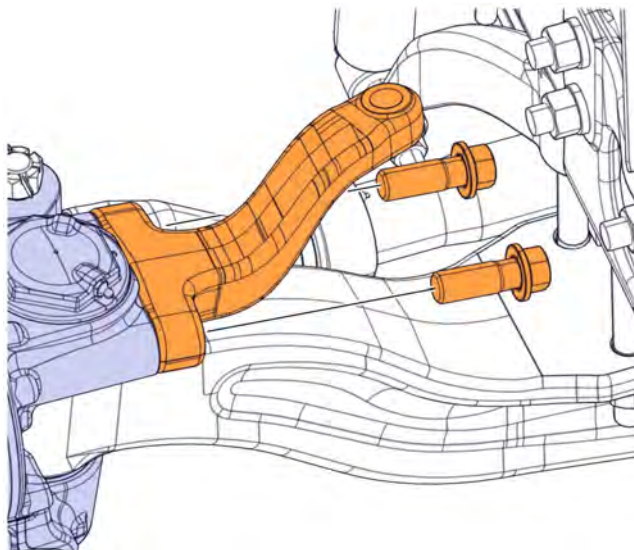
24 Install the assist steering gear pitman arm.

Note: Use alignment marks when installing pitman arm.



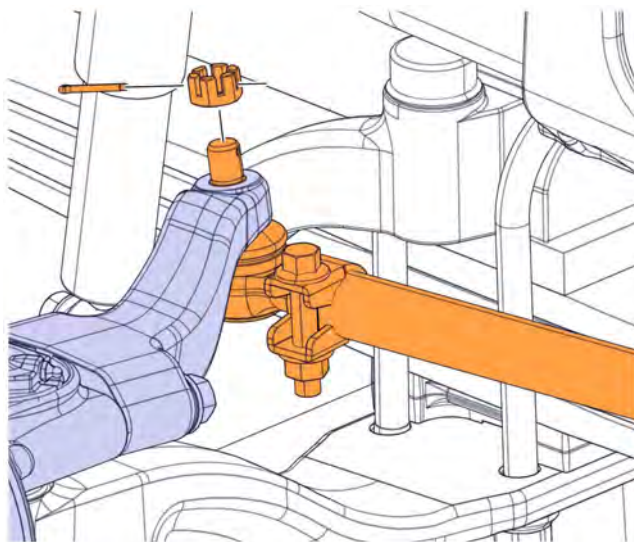
W6120700

- 25 Install the spindle arm and fasteners as shown.
- 26 Tighten the fasteners to 750 ± 75 Nm (553 ± 55 ft-lb)



W6120697

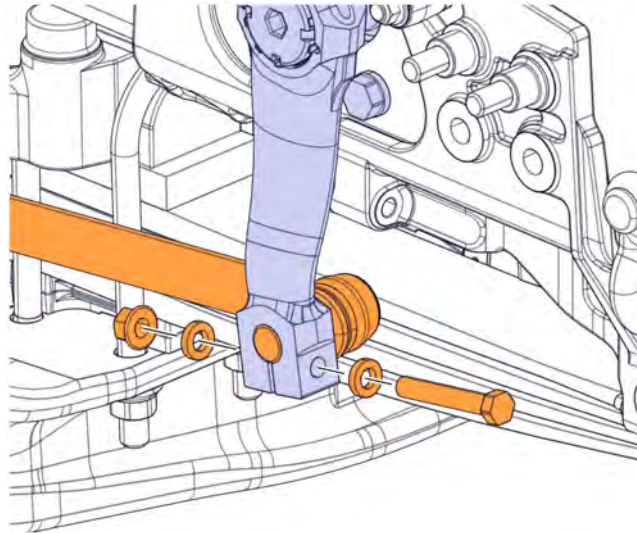
- 27 Position the assist steering gear draglink rod at the steering knuckle and pitman arm as shown as shown.
- 28 Install the castle nut.
- 29 Tighten the castle nut to 200 Nm (147 ft-lb) minimum.
- 30 Turn the castle nut **CLOCKWISE** until the next castle nut slot aligns with the hole in the draglink rod ball socket.
- 31 Install the split pin.



W6120704

32 Install the pinch bolt fastener, nut, and flat washers on the pitman arm.

33 Tighten the fasteners to 275 ± 20 Nm (202 ± 14 ft-lb).

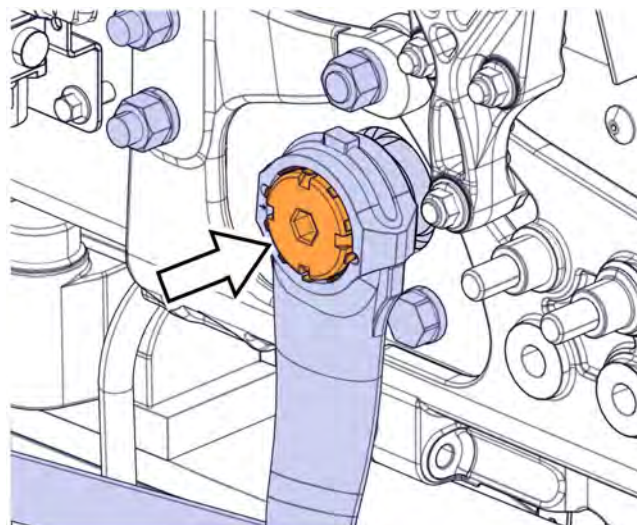


W6120707

34 If applicable, locate the grease fittings, and lubricate the draglink rod.

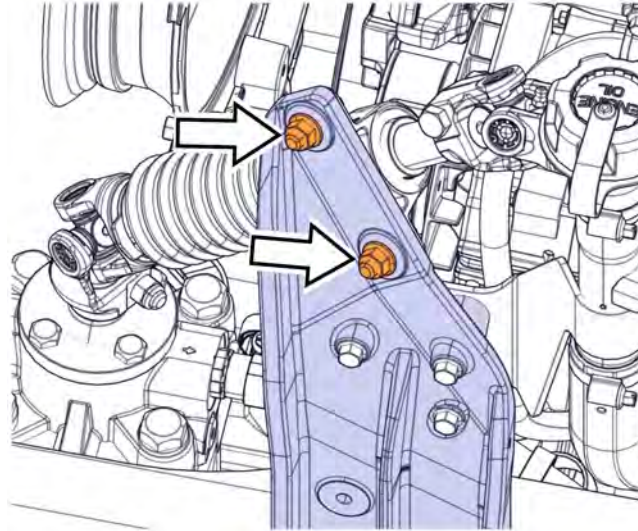
35 Tighten the assist steering gear pitman arm bolt to 475 Nm (350 ft-lb).

Note: Continue to tighten until the notches align with the locking tabs, then bend the locking tabs into the notches.



W6120708

36 Remove the steering shaft support bearing fasteners.



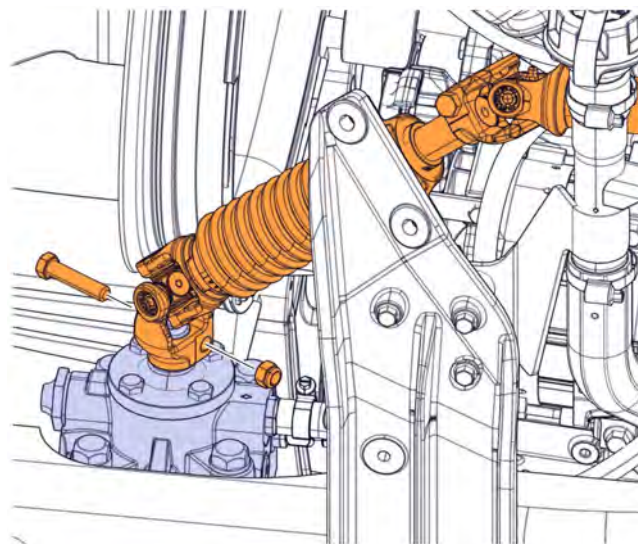
W6120709

37 Remove the pinch bolt and nut. Remove the steering shaft from the steering gear and position out of the way.



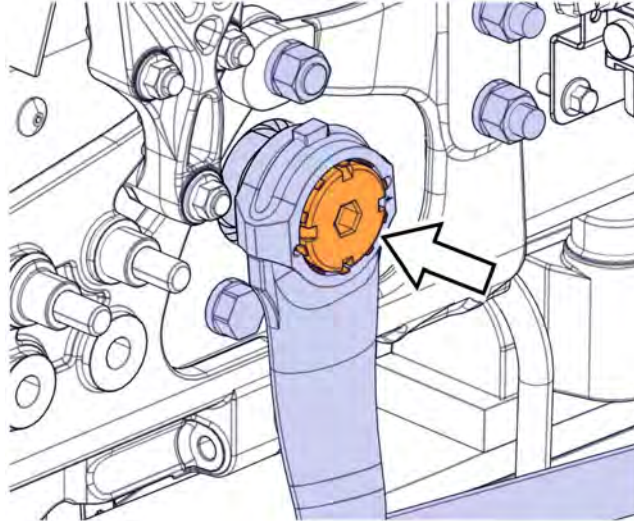
CAUTION

Do not allow the steering gear shaft to rotate a full revolution after or damage may occur to other steering components.



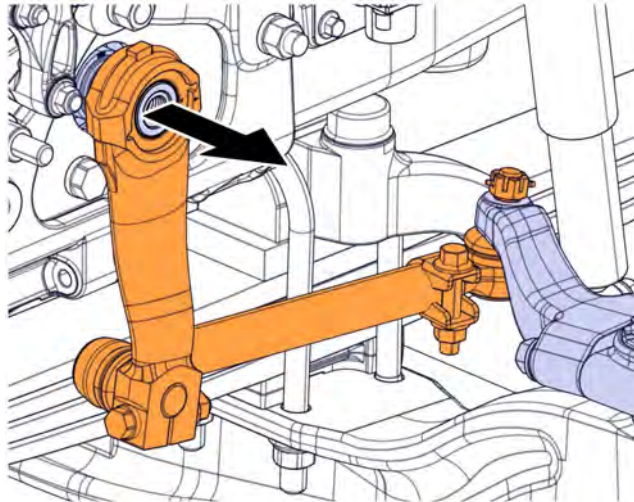
W6120711

38 Remove the main steering gear pitman arm fastener and lock tab.



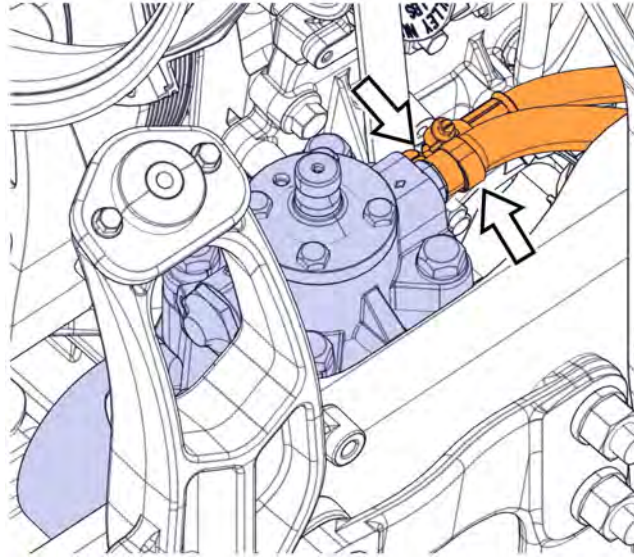
W6120712

39 Using pitman arm puller tool (part number 3596372K), remove the pitman arm from the steering gear with the draglink rod attached.



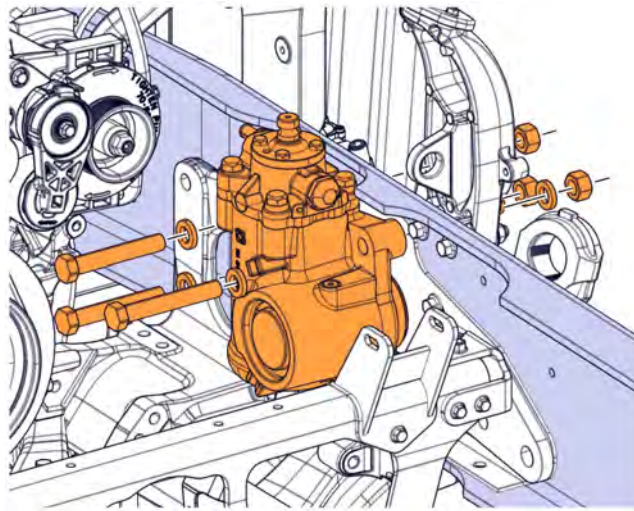
W6120713

40 With a drain pan under the steering gear to capture hydraulic fluid, remove hydraulic supply and return lines from the steering gear.



W6120714

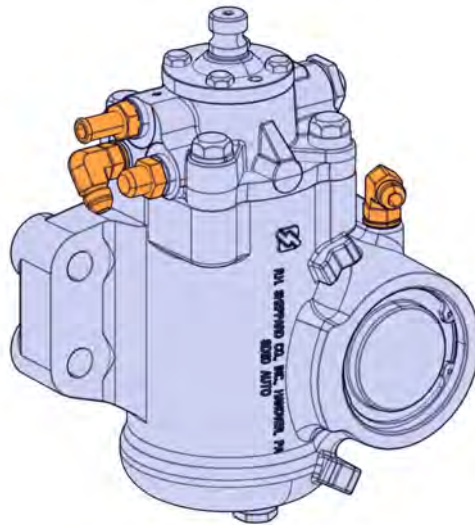
41 With assistance and a suitable lifting device, remove the fasteners securing the steering gear and remove the steering gear.



W6120715

42 Remove the existing fittings from the steering gear and transfer them to the replacement steering gear.

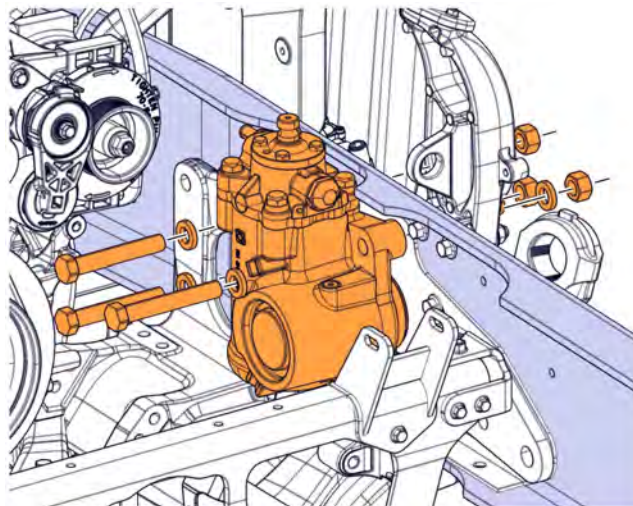
Note: Record the position of the fittings for transfer to the replacement steering gear.



W6120716

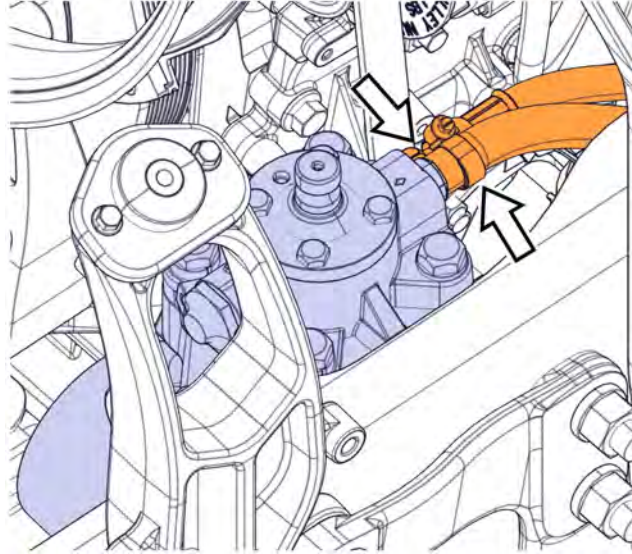
43 With assistance and a suitable lifting device, position the steering gear on the frame rail and install the fasteners.

44 Tighten the fasteners to 450 ± 40 Nm (331 ± 29 ft-lb)



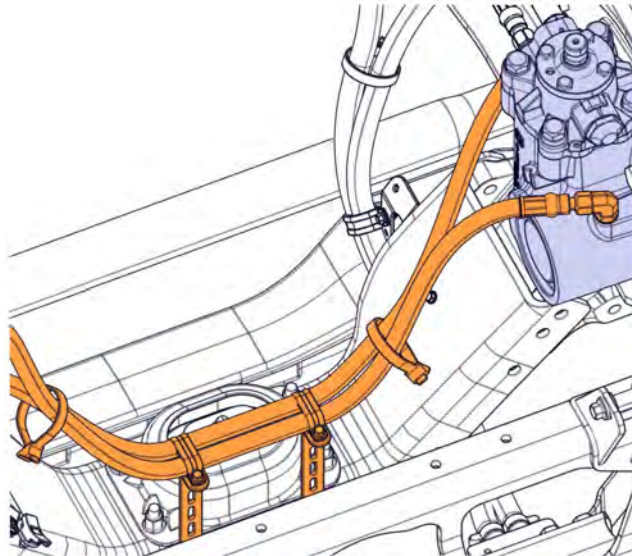
W6120715

45 Install the feed and return lines to the steering gear.



W6120714

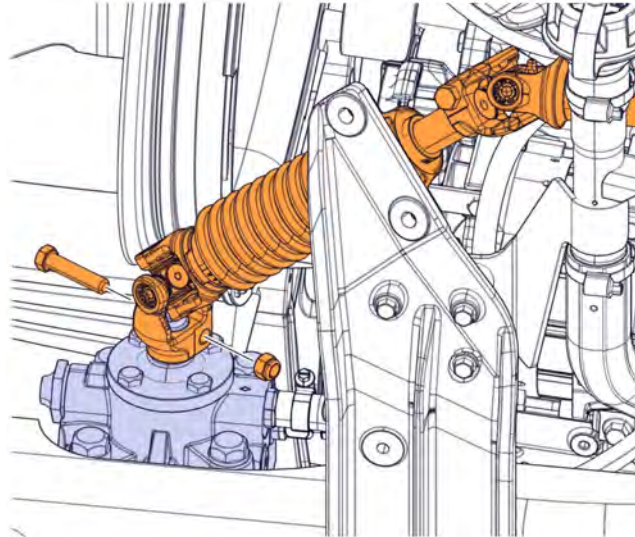
46 Install the assist steering hoses and clamps as shown.



W6120717

Part Number	Location
20924988	Back of the steering gear to the front of the assist gear.
20924991	Front of the steering gear to the top of the assist gear.

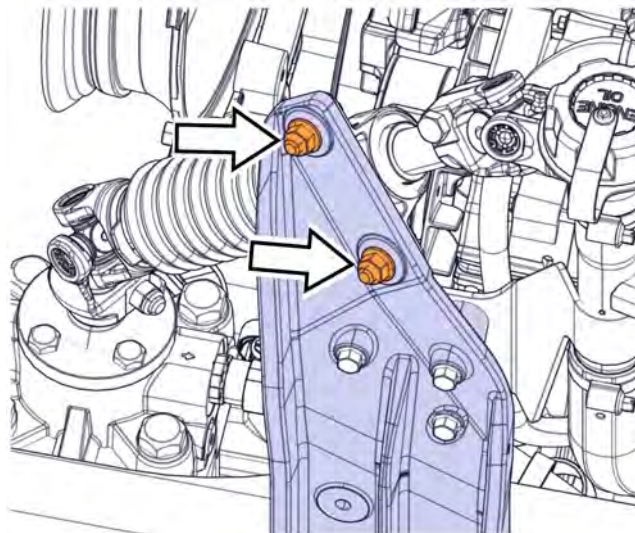
47 Install the pinch bolt to the steering gear shaft and tighten to 65 ± 75 Nm (48 ± 55 ft-lb).



W6120711

48 Install and secure the steering shaft support bearing.

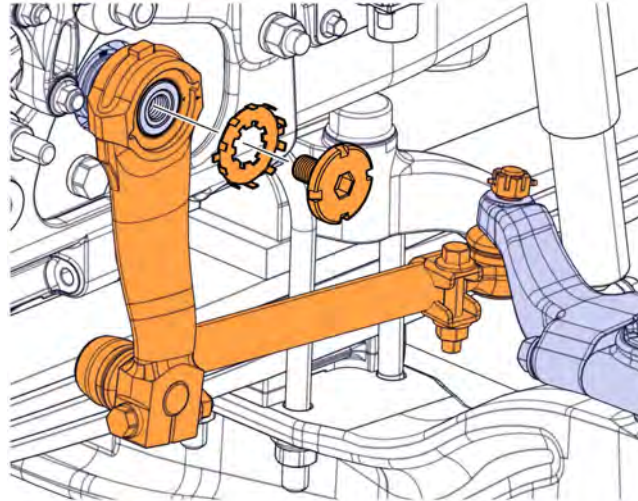
49 Tighten the fasteners to 48 ± 8 Nm (35 ± 5 ft-lb).



W6120709

50 Position the pitman arm on steering gear.

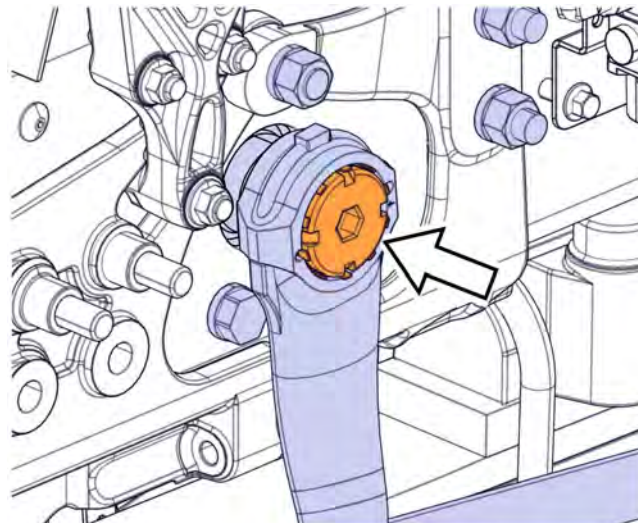
51 Install the pitman arm fastener and lock tab.



W6120718

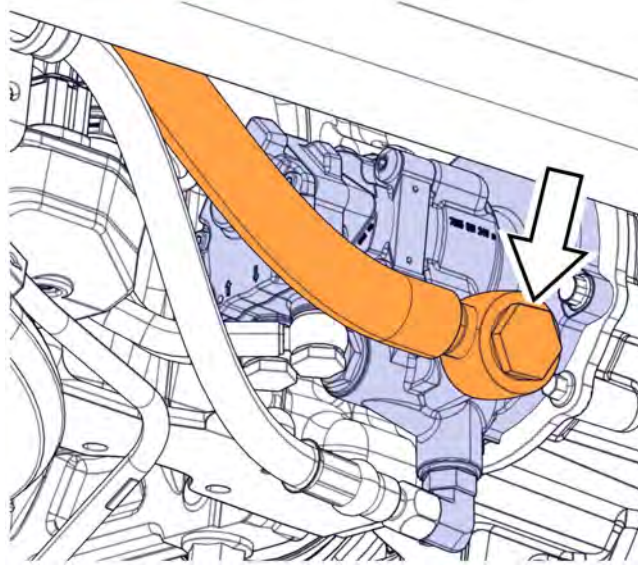
52 Tighten the assist steering gear pitman arm bolt to 475 Nm (350 ft-lb).

Note: Continue to tighten until the notches align with the locking tabs, then bend the locking tabs into the notches.



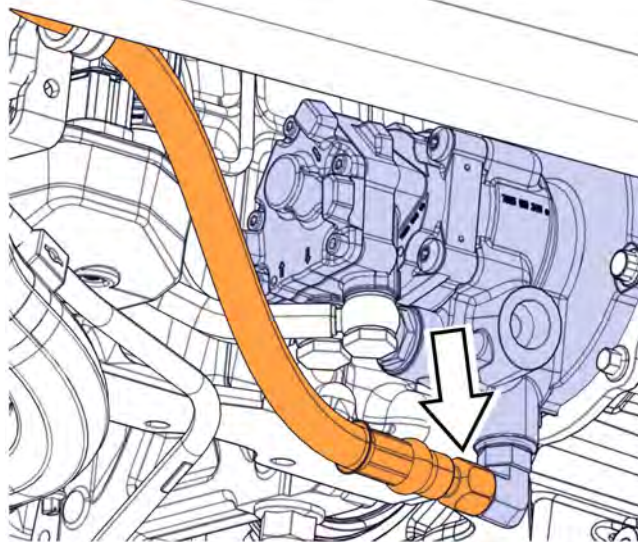
W6120712

53 With a drain pan under the power steering pump to capture hydraulic fluid, remove power steering pump supply hose.



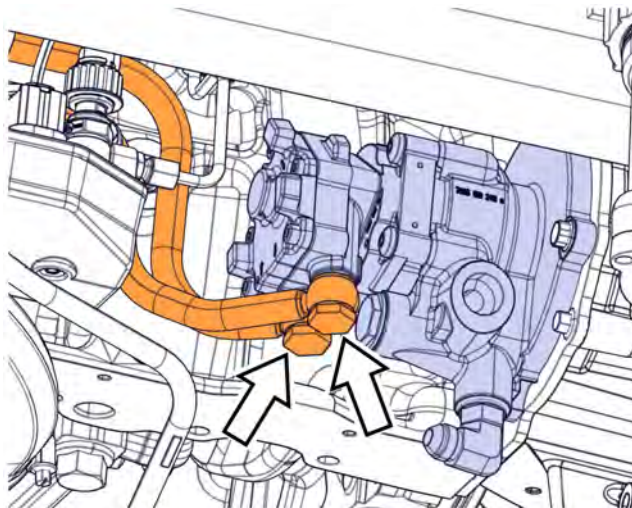
W6120719

54 Remove steering pump pressure hose.



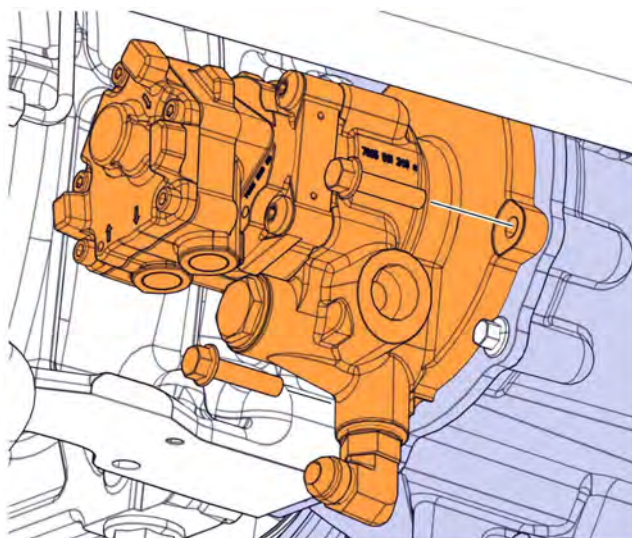
W6120720

55 Remove fuel lines from the tandem pump.



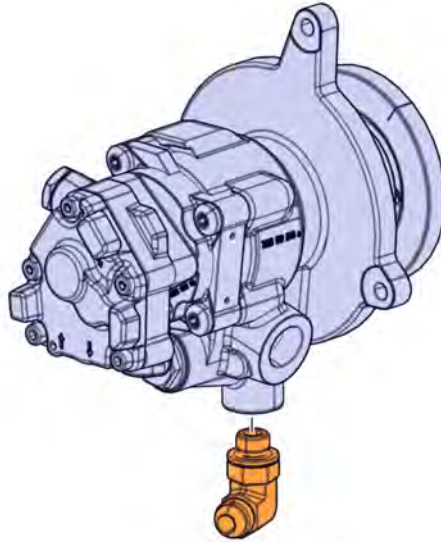
W6120721

56 Remove the tandem pump assembly.



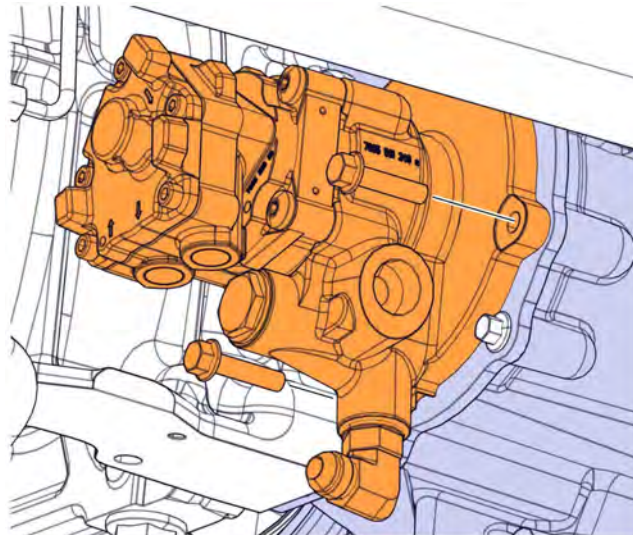
W6120722

- 57 Remove the fitting from the removed pump and transfer it to the replacement pump.
Tighten the fitting to 57 ± 5 Nm (42 ± 3 ft-lb).



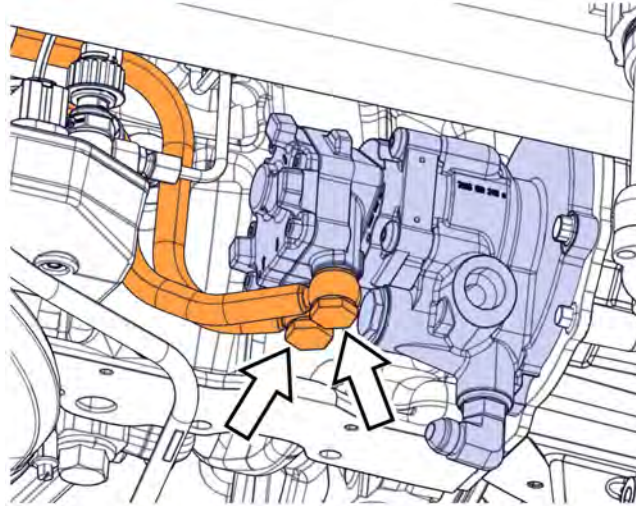
W6120723

- 58 Install the replacement power steering pump assembly and tighten the fasteners to specification.



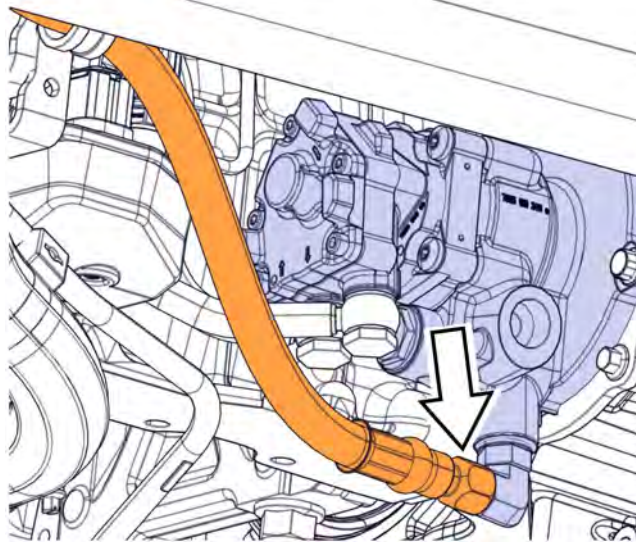
W6120722

59 Using new sealing washers, install the fuel lines to the tandem pump.



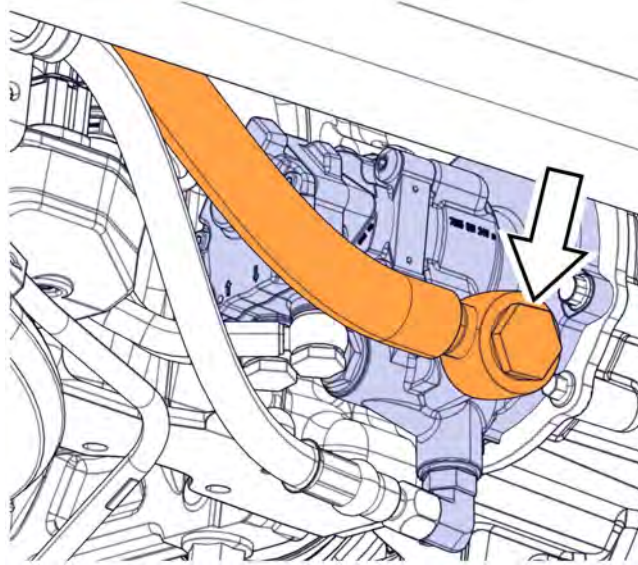
W6120721

60 Install the power steering pump pressure hose.



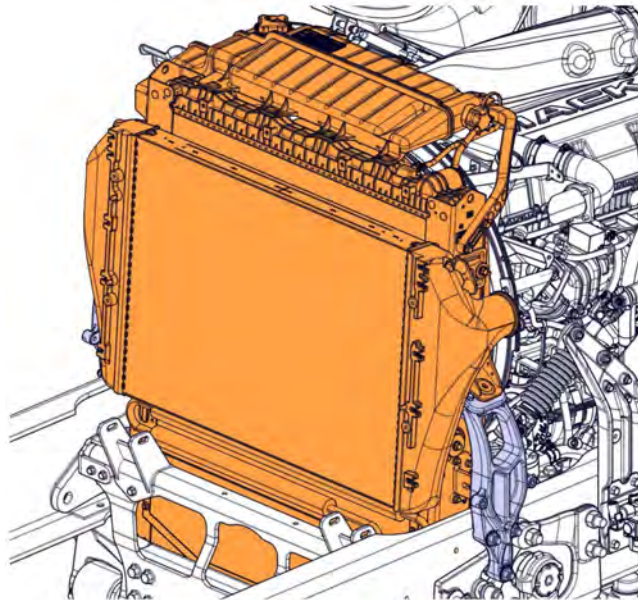
W6120720

61 Using new sealing washers, install the power steering pump supply hose. Tighten the bolt to 80 ± 10 Nm (59 ± 3 ft-lb).



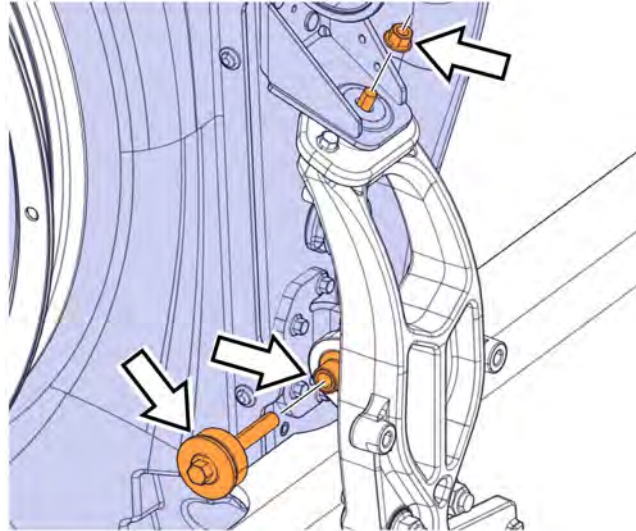
W6120719

62 Using a suitable lifting tool and assistance, install the cooling package.



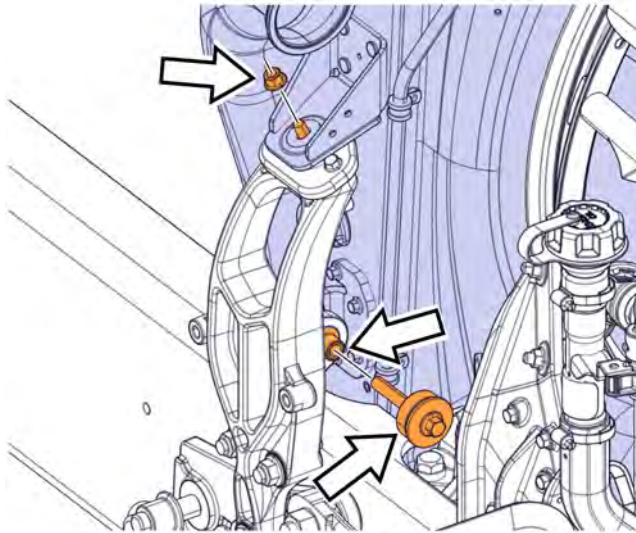
W6120686

63 Install the right side cooling package hardware as shown.



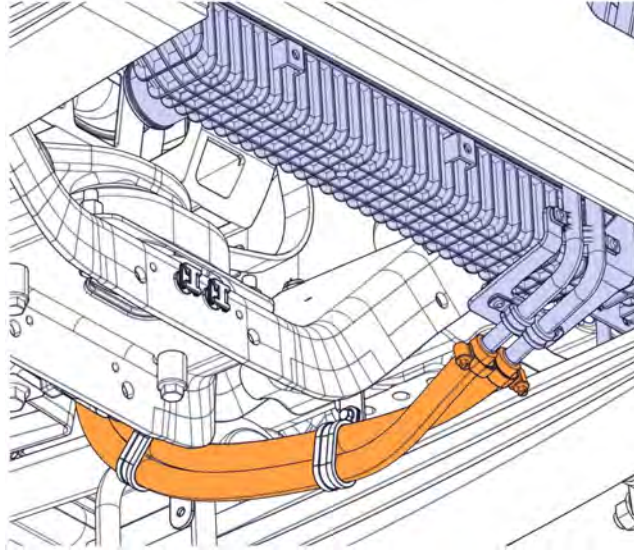
W6120685

64 Install the left side cooling package hardware as shown.



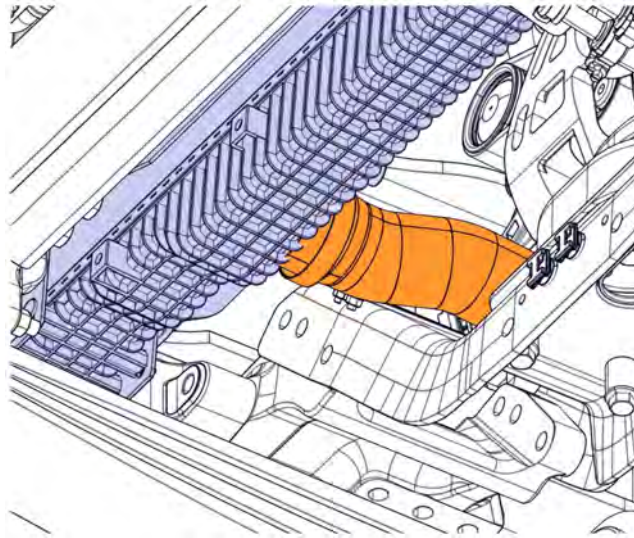
W6120684

65 Install the power steering cooler hoses.



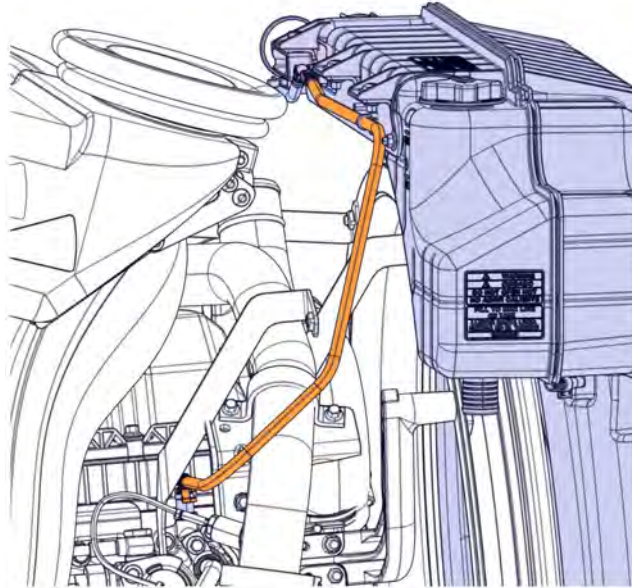
W6120683

66 Install the lower radiator hose.



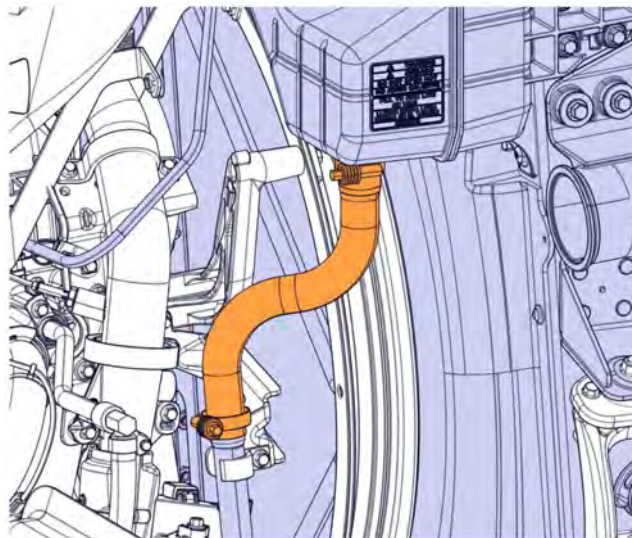
W6120682

67 Install the de-aeration hose.



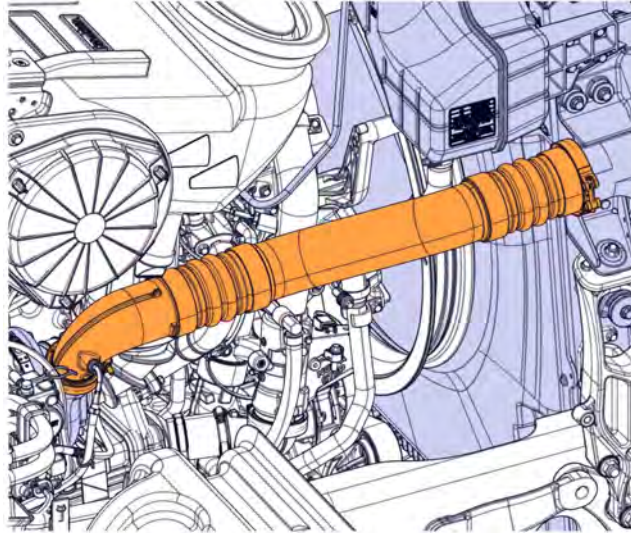
W6120681

68 Install the static fill hose.



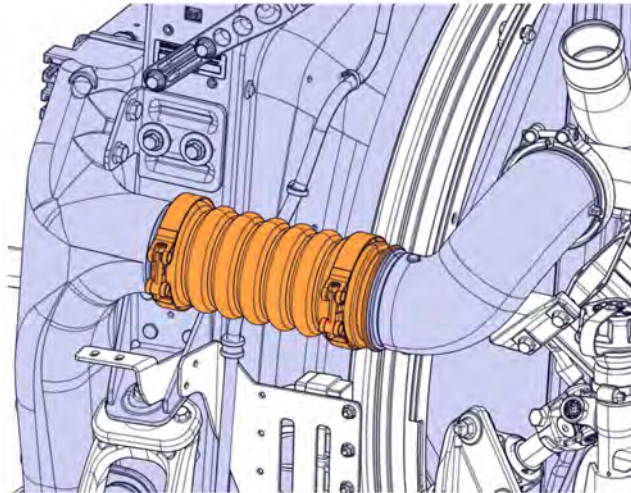
W6120680

69 Install the right side charge air pipe.



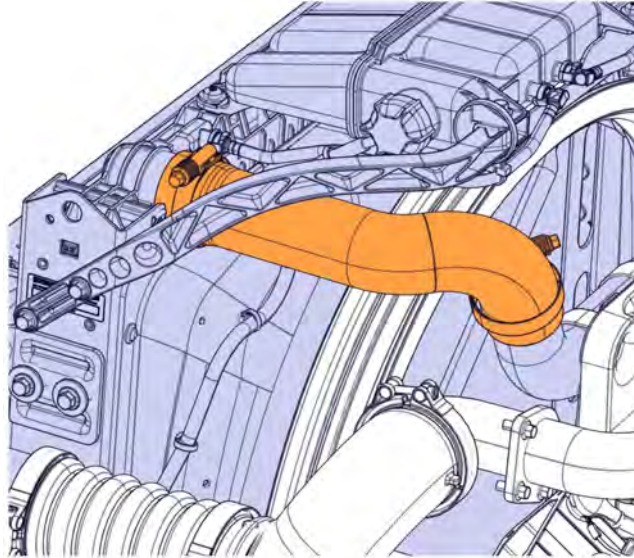
W6120679

70 Install the left side charge air hose.



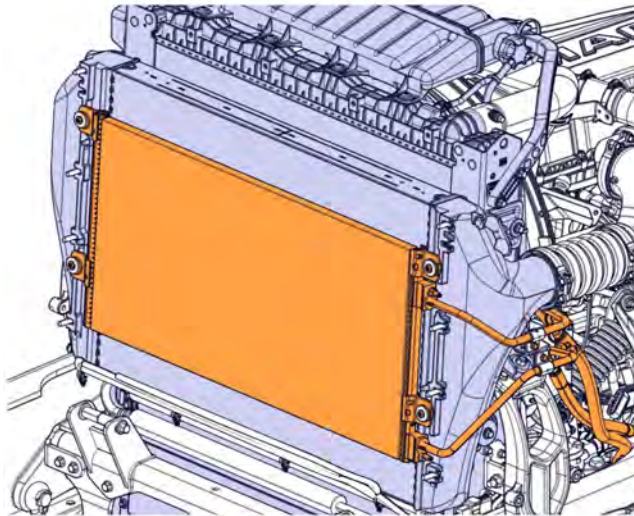
W6120678

71 Install the upper radiator hose.



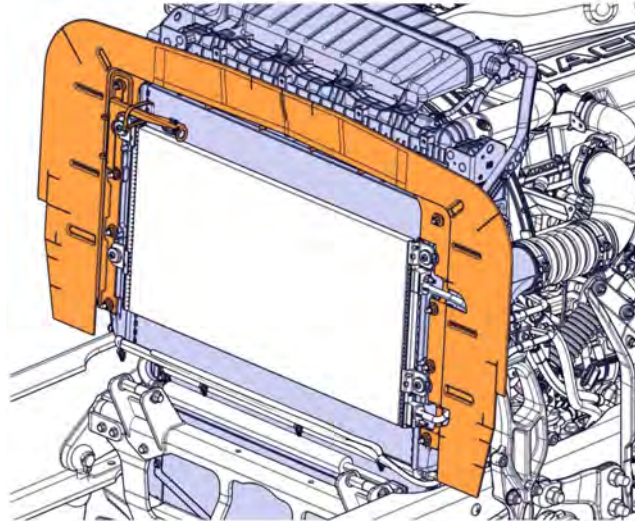
W6120677

72 Install the condenser.



W6120676

73 If applicable, install the recirculation shield.



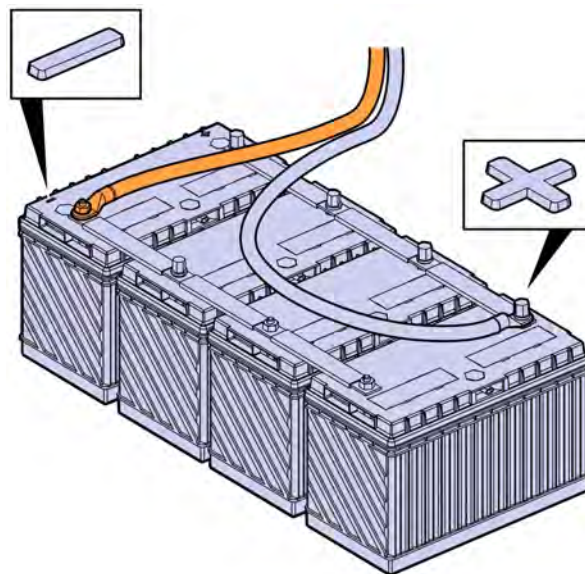
W6120675

74 Using the approved coolant and coolant extractor (part number 88870007), fill the cooling system to the proper levels.

75 Fill power steering system with oil to the proper levels.

76 Prime the fuel system.

77 Connect the cable to the battery's negative terminal.



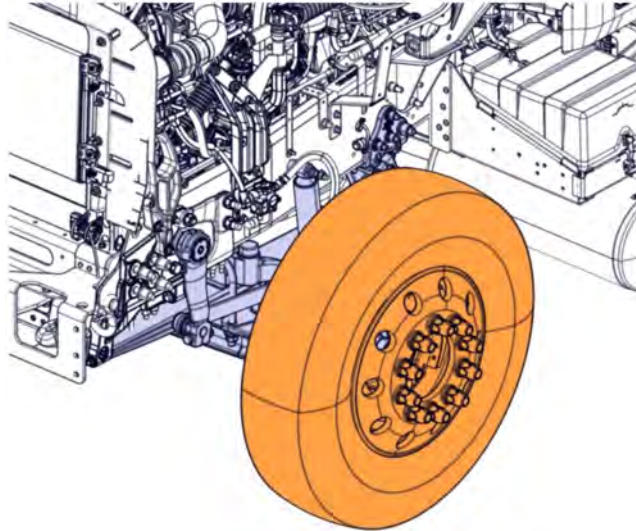
W3086758

78 Bleed the air from steering system in accordance with UCHP operation code 6422-05-03-01.

79 Install the left and right steer axle wheels.

Note: Left side shown.

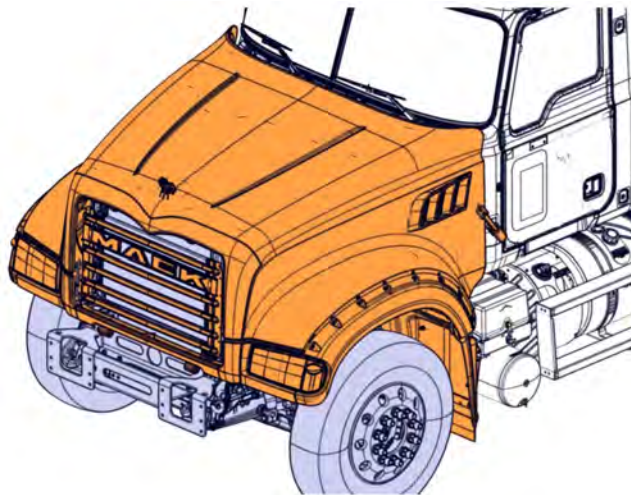
80 Tighten the wheel nuts to 610 Nm (450 ft-lb).



W7113457

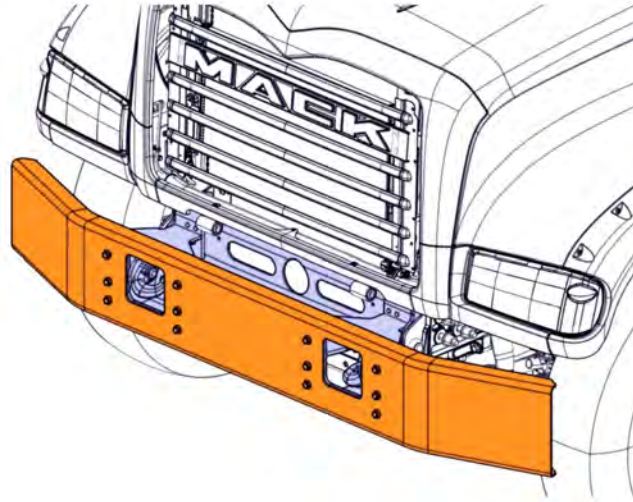
81 Lift the vehicle with a jack, remove the jack stands and lower vehicle.

82 Using the appropriate lifting and assistance, install the hood.



W7113456

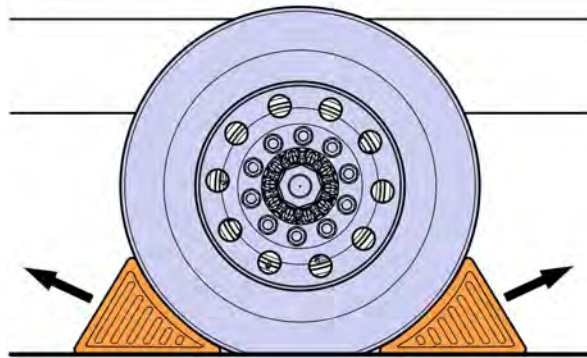
83 With assistance, install the bumper assembly.



W7113455

Commissioning the Truck for Operation

1 Remove the wheel chocks from the rear wheels.



W7086759

2 Test drive the vehicle for proper operation. After the test drive, re-check the fluid levels.

Reimbursement

This repair may be eligible for reimbursement if a product failure was experienced within time and mileage limits of the applicable Warranty coverage. Reimbursement is obtained via the normal claim handling process.	UCHP Reimbursement
Claim Type (used only when uploading from the Dealer Bus. Sys.)	01
Labor Code	
Primary Labor Code (Static Steering, Repair)	6422-18-02-01 7.3 hrs.
Causal Part	20897099

MACK Trucks North America reserves the right to make any changes in design or to make additions to or upon its products without incurring any obligations to install the same on vehicles previously built.