PREVOST

Instruction Sheet IS-19040C

POWER STEERING PUMP DISCHARGE HOSE REPLACEMENT (PRESSURE HOSE)

Revision: C
11-21-2019

Details added in the procedure

NOTICE

Use this instruction sheet for the replacement of the following hoses

Part number	Applicable to the following models
161335 P *160039*	*XLII Entertainer* *X3-45 coaches & X3-45 Commuter* *X3-45 VIP motorhomes* *X3-45 VIP commercial use*
163491 P *163492 P*	*H3-45 VIP motorhomes, H3-45 coaches* *H3-41*
The kits featured is this instruction sheet are necessary at time of first installation as the new replacement hoses have a greater diameter than the former hoses installed , thus it is necessary to use new split block #504189 included.	

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BILL OF MATERIAL

KITS FOR X3 SERIES

Kit #160122 **(X3 Series, up to vehicle D-5387 included)** includes the following parts:

Part No.	Description	Qty
160006	HOSE, PRESSURE 11690 mm (460 inches), dia. 22 mm	1
1600100	FLANGE, POWER STEERING HOSE (wall mount split block half)	2
500107	SCREW, TC HEX Z050 1/4-20x2	3
501031	SEAL, JIC 37° #8	1
504189	CLAMP, SPLIT BLOCK 22 mm/19 mm PA GROUP 3	13
504728	RETAINER PLATE T3	3
FI-19040	FEUILLE D'INSTRUCTION	1
IS-19040	INSTRUCTION SHEET	1

Kit #160127 **(X3 Series, starting from vehicle D-5388)** includes the following parts:

Part No.	Description	Qty
160006	HOSE, PRESSURE 11690 mm (460 inches), dia. 22 mm	1
500107	SCREW, TC HEX Z050 1/4-20x2	3
501031	SEAL, JIC 37° #8	1
504189	CLAMP, SPLIT BLOCK 22 mm/19 mm PA GROUP 3	13
504728	RETAINER PLATE T3	3
FI-19040	FEUILLE D'INSTRUCTION	1
IS-19040	INSTRUCTION SHEET	1

KITS FOR H3 SERIES

Kit #160203 **(H3-45 & H3-45 VIP Series)** includes the following parts:

Part No.	Description	Qty
160108	HOSE, PRESSURE H3-45 12490 mm (491 inches), dia. 22 mm	1
170758	BRACKET	1
5001730	SCREW, CAP HEXF N500 M6-1 X 16 G 10.9	1
5001833	WASHER, BELLEVILLE SPR SS 301 6.65X17.4X1.27(M6,1/4	1
501031	SEAL JIC 37 #8	1
504189	SPLIT BLOC 22/19 PA GROUP 3	11
504204	CLAMP P SS PA 36-51 ID	1
FI-19040	FEUILLE D'INSTRUCTION	1
IS-19040	INSTRUCTION SHEET	1

Kit #160130 **(H3-41)** includes the following parts:

Part No.	Description	Qty
160010	HOSE, PRESSURE H3-41 11246 mm (442 inches), dia. 22 mm	1
170758	BRACKET	1
5001730	SCREW, CAP HEXF N500 M6-1 X 16 G 10.9	1
5001833	WASHER, BELLEVILLE SPR SS 301 6.65X17.4X1.27(M6,1/4	1
501031	SEAL JIC 37 #8	1
504189	CLAMP, SPLIT BLOCK 22 mm/19 mm PA GROUP 3,	9
504204	CLAMP P SS PA 36-51 ID	1
FI-19040	FEUILLE D'INSTRUCTION	1
IS-19040	INSTRUCTION SHEET	1

NOTE
Material can be obtained through regular channels.

PERSONNAL PROTECTIVE EQUIPMENT

Wear your personal protective equipment, including but not limited to the followings:

Safety shoes

Safety goggles

General purpose gloves

LIST OF TOOLS TO BE USED

RIGHT ANGLE DRILL 	**3/8-INCH MAGNETIC HEX HEAD DRIVER** 
CUTTING PLIERS 	**RATCHET AND SOCKET SET – METRIC/SAE** 
LARGE FLAT SCREW DRIVER 	**TORQUE WRENCH** 
OPEN END WRENCH SET 13/16, 7/8 	**7/8" TORQUE WRENCH CROWFOOT ADAPTER** 
PHILLIPS BIT 	

OTHER MATERIALS

Description		
NYLON TIE, 3/16 x 13” or similar		QTY:2
#8 JIC 37° CAP		QTY:2
#8 JIC 37° PLUG		QTY:1
#8 JIC 37° MALE/MALE UNION, STRAIGHT		QTY:1
LOCTITE 262, RED		
OIL DRAIN PAN		
AUTOMATIC TRANSMISSION FLUID (ATF), DEXRON-IIIF, G, H or DEXRON-VI		As required

PROCEDURE – X3 SERIES

DANGER

Park vehicle safely, apply parking brake, stop the engine. Prior to working on the vehicle, set the ignition switch to the OFF position and trip the main circuit breakers equipped with a trip button. On Commuter type vehicles, set the battery master switch (master cut-out) to the OFF position.

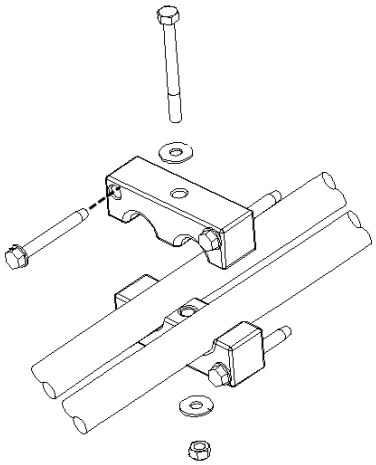
Lock out & Tag out (LOTO) must be performed during set-up, maintenance or repair activities. Refer to your local procedure for detailed information regarding the control of hazardous energy.

WALL MOUNT SPLIT BLOCK - 2x p/n #1600100

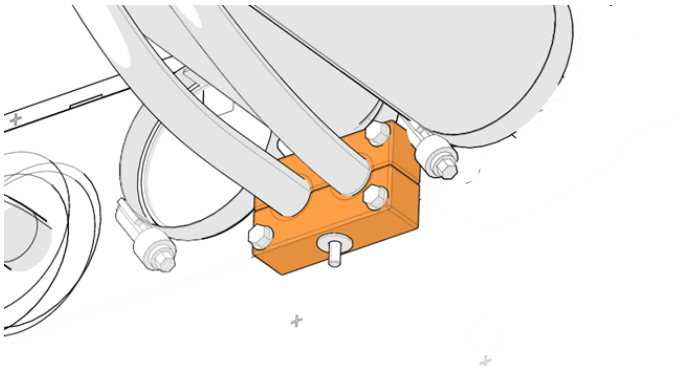
X3 Series, up to vehicle D-5387 included.

One (1) split block designed to be mounted on a partition wall is installed on the vehicle. Replace with the wall mount split block included in the kit and fasten using existing hardware.

Take note that the new wall mount split block has two (2) 22 mm (7/8″) passage holes. The power steering pump return hose has a diameter of 19 mm. You need to add a couple of industrial cloth tape layers around the return hose to make sure it is properly clamped in this split block.



WALL MOUNT SPLIT BLOCK



WALL MOUNT SPLIT BLOCK IN LAST COMPARTMENT
PARTITION WALL (WHEEL WELL IS ON THE OTHER SIDE)

- 

- Torque: 8 lbf-ft (11 Nm)

1. Turn off the engine.

2. Open three baggage compartment doors on curbside (see image).

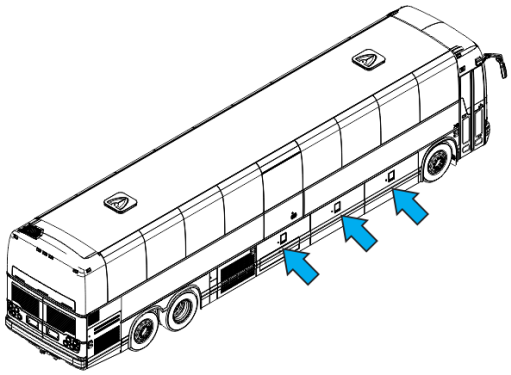


FIGURE 1

3. Open the front electrical & service compartment (see image).

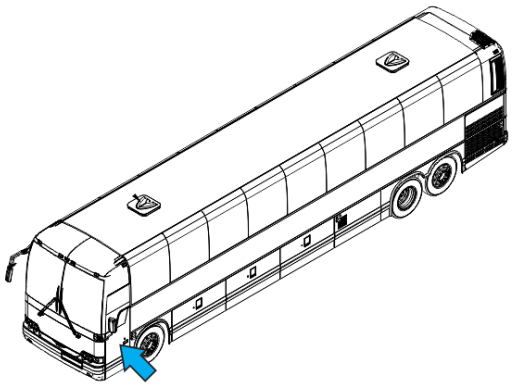


FIGURE 2: FRONT ELECTRICAL & SERVICE COMPARTMENT

4. To prevent skin burns, make sure that steering fluid has sufficiently cooled before starting the next steps.
5. Have a suitable container to collect the steering fluid under the steering gear.

6. **Identification of the discharge hose** (pressure) on the vehicle.

   - In the spare wheel compartment, it is wrapped in a yellow sheath and is connected to the top of the steering box (fig. 3).

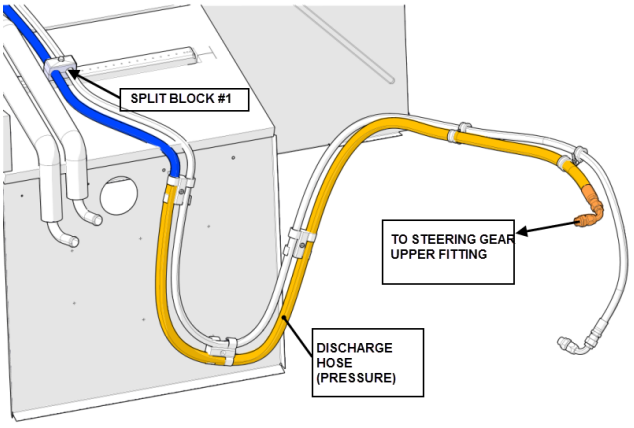


FIGURE 3

   - In the rear wheel well, it is located on curbside. It is connected to a hard section (steel pipe) from the steering pump (fig. 4). Search above the rear R.H. side air spring of the drive axle

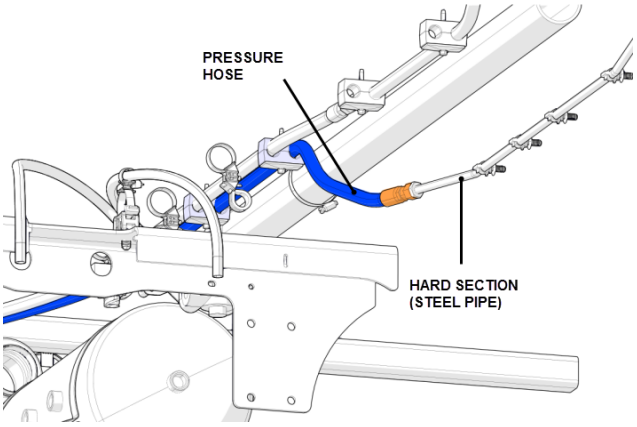


FIGURE 4

7. In the spare wheel compartment, separate the hose from the five (5) securing elements identified and remove the split block.

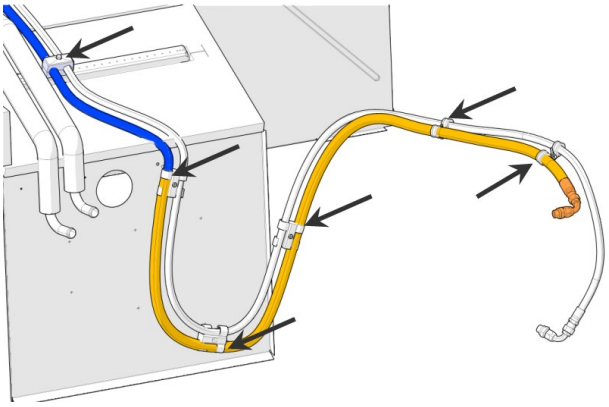


FIGURE 5 : TWO (2) P-CLAMPS, THREE (3) HOSE GUIDES, ONE (1) SPLIT BLOCK

8. While following the discharge hose from the spare wheel compartment and proceeding one after the other, remove and discard all split blocks identified in figure 8. Save the hardware for reuse.

Note that split blocks 11, 12 & 13 are located at the top of the rear wheel well.

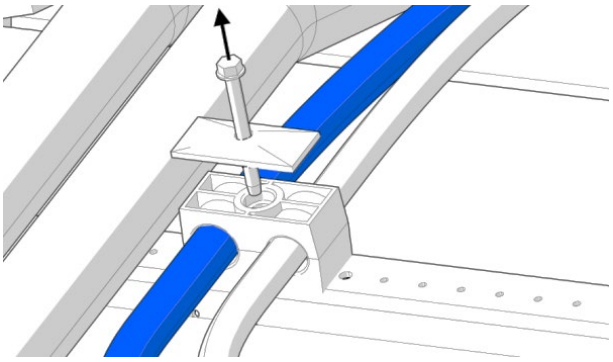


FIGURE 6 : SPLIT BLOCK #1 IN THE SPARE WHEEL COMPARTMENT

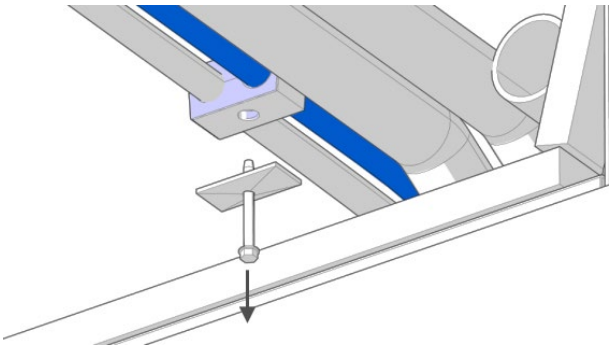


FIGURE 7 : OTHER TYPICAL SPLIT BLOCKS AT THE CEILING OF THE BAGGAGE COMPARTMENTS (9 LOCATIONS)

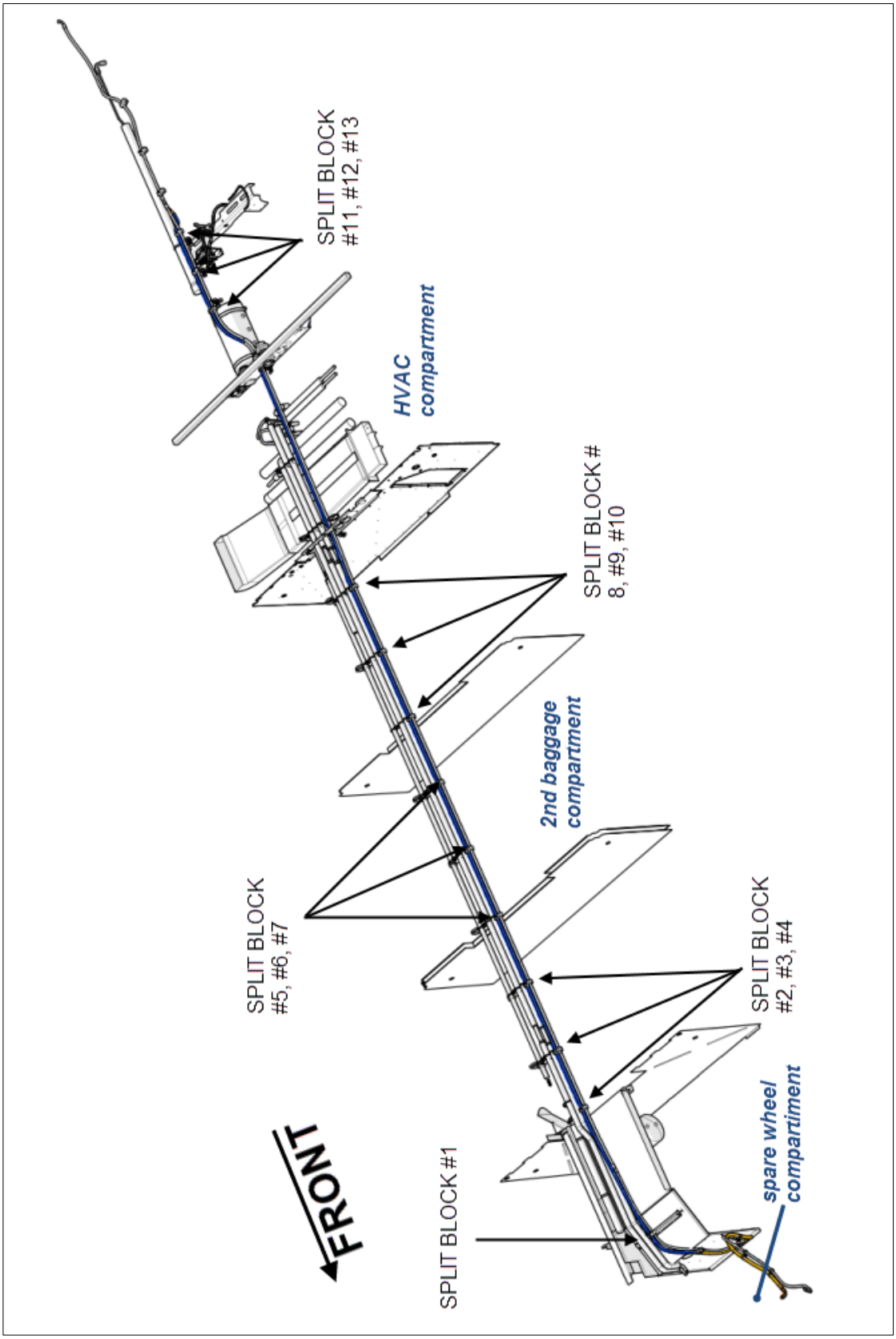


FIGURE 8 : POWER STEERING PUMP DISCHARGE HOSE (PRESSURE)

9. In the front service compartment, place a container under the steering gear to collect the steering fluid that may drip.

FIGURE 9

10. Locate the straight fitting of the discharge hose (pressure) at the top of the steering gear.

11. Disconnect the discharge hose (pressure) straight fitting while holding the elbow fitting.

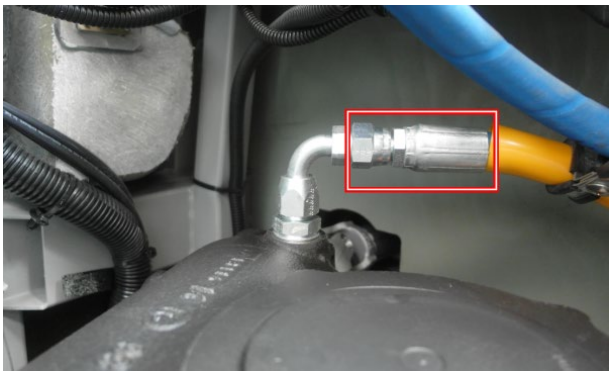


FIGURE 10

- 13/16
- 7/8

12. Drain the fluid dripping from the hose in the container.

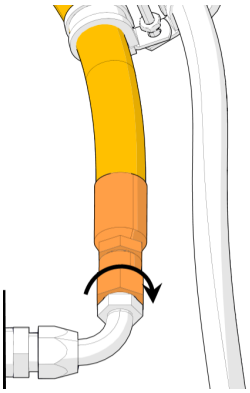


FIGURE 11

13. Place a #8 JIC 37° cap on the steering gear elbow fitting in order to avoid intrusion of dirt.

- 7/8

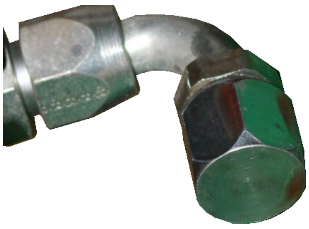


FIGURE 12

14. Place a #8 JIC 37° plug into the discharge hose at the steering box to keep any residual fluid in the hose from dripping in the service compartment or on maintainers while removing the old hose.

    ➢ 13/16

FIGURE 13

15. Lift the vehicle in order to gain access to the rear wheel well. Always use safety stands when working under the vehicle.

16. Locate the discharge hose (pressure) on curbside of the rear wheel well. It connects to a hard section (steel pipe) which is from the steering pump (fig.14).

Unscrew the fitting while holding the hard section (steel pipe) with a wrench.

    ➢ 13/16

    ➢ 7/8

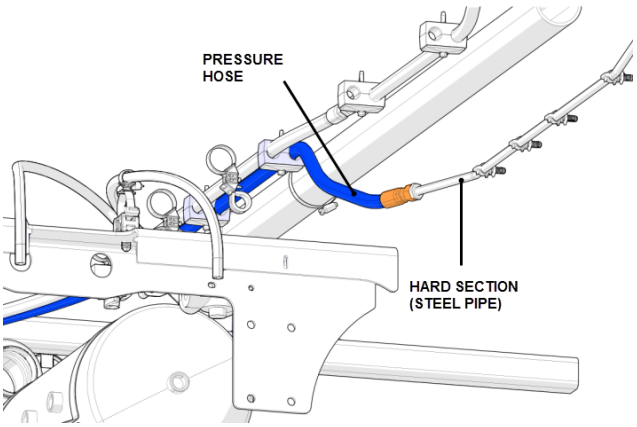


FIGURE 14

17. Collect any fluid dripping. Cap the hard section (steel pipe) from the power steering pump using one #8 JIC 37° cap.

    ➢ 7/8

18. In the rear wheel well, join the old and new hose together with a male-male JIC 37 ° #8 union fitting. This will help guide the new hose in place while removing the old hose.

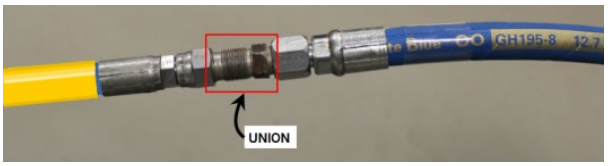


FIGURE 15

19. In the rear wheel well, cut the nylon tie located around the rubber boot (cuff-end bellows) where the power steering hose passes through the bulkhead between the wheel well and the HVAC compartment.

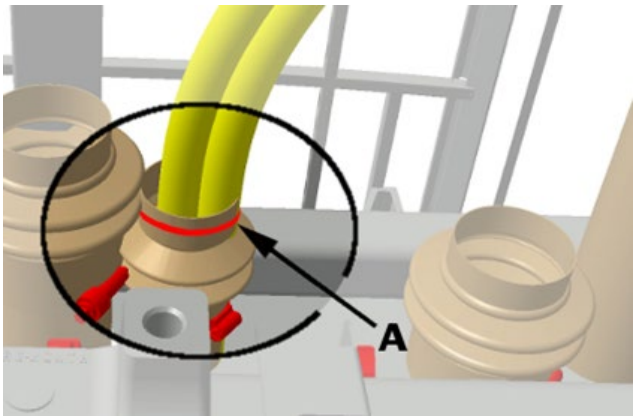


FIGURE 16 : CUFF-END BELLOWS AND NYLON TIE (item A)

20. Begin to remove the old hose by pulling from the spare wheel compartment while a colleague helps feed the new hose at the rear wheel well.

21. Help the colleague in guiding the new hose in the baggage compartments, while he continues to remove the existing pipe.

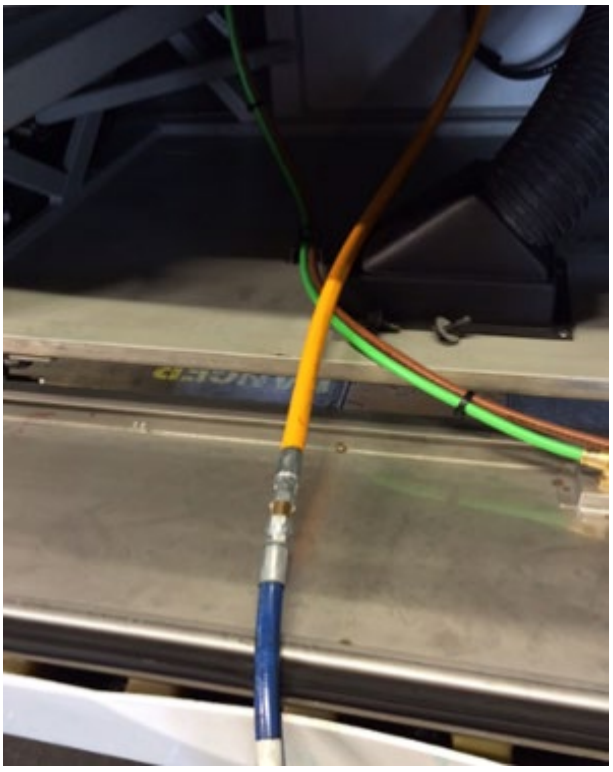


FIGURE 17

CONNECTION TO THE HARD SECTION

22. Inspect the sealing surfaces. Clean and dry the fitting.

23. Place seal #501031 on the fitting of the rigid section.

24. Apply red Loctite on the JIC 37° fitting threads only. Take care not to put Loctite on the conical part (flare) of the fitting or inside the hose.

25. Tighten the fitting by hand, then with a **7/8 crowfoot** and 13/16 open wrench, tighten the fitting.

    - 13/16
    - Torque wrench & 7/8 crowfoot
    - Torque: 57 lbf-ft

26. Add a **torque seal** mark across the fitting once properly tighten.

27. In the rear wheel well, add a nylon tie around the rubber boot (cuff-end bellows) where the power steering hose passes through the bulkhead.

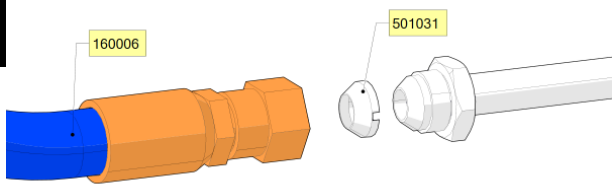


FIGURE 18

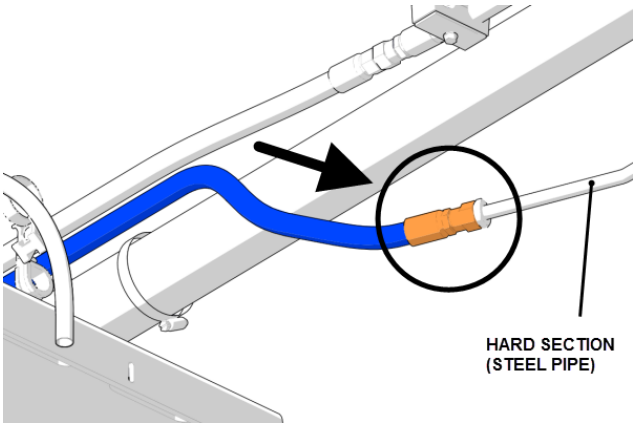


FIGURE 19

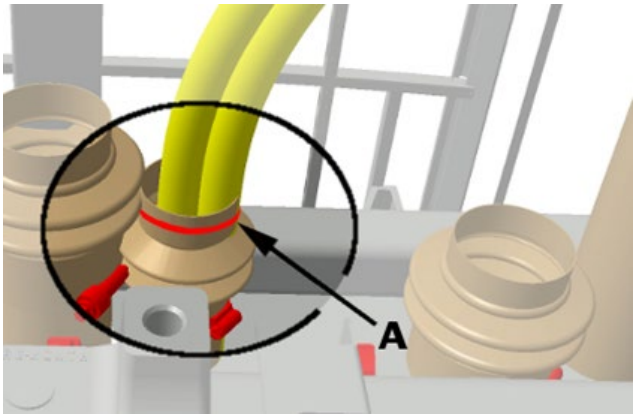


FIGURE 20 : CUFF-END BELLOWS AND NYLON TIE (item A)

CONNECTION TO THE STEERING GEAR

28. Inspect the sealing surfaces. Clean and dry the fitting.

29. Apply red Loctite on the JIC 37° fitting threads only. Take care not to put Loctite on the conical part (flare) of the fitting or inside the hose.

30. Tighten the fitting by hand, then with a **7/8 crowfoot** and 13/16 open wrench, tighten the fitting.

    - 13/16
    - Torque wrench & 7/8 crowfoot
    - Torque: 57 lbf-ft

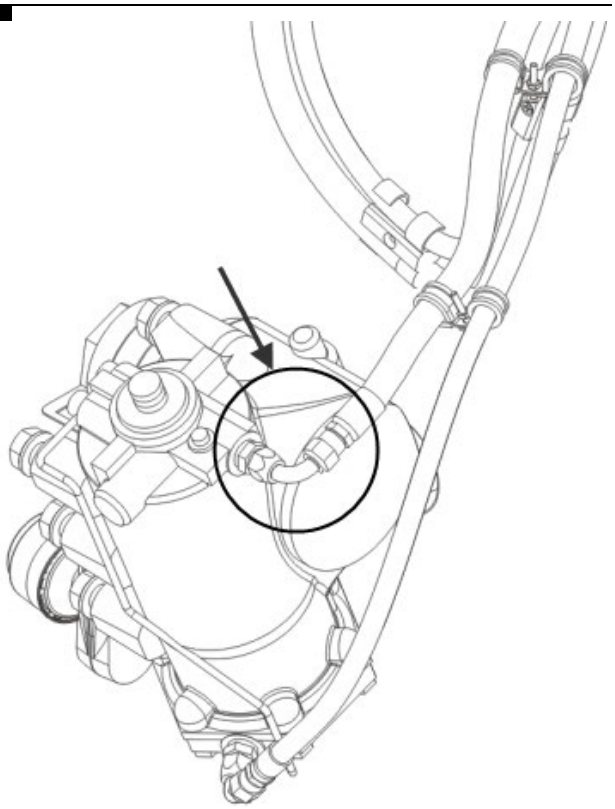


FIGURE 21

31. Add a **torque seal** mark across the fitting once properly tighten.

32. From the spare wheel compartment, pull on the hose to stretch and move 'slack' in this compartment.

33. Install the split blocks #504189 (figure 8 & 22).

    Reuse the retainer plates and existing screws **except** for the split blocks located in the rear wheel well as the existing hardware is very likely to be corroded. For these split blocks, use the hardware included with the kit.

Note: make sure that the new pressure hose is placed in the 22 mm (7/8") diameter bore. The new hose must be placed the closest to the vehicle side, i.e. curbside.

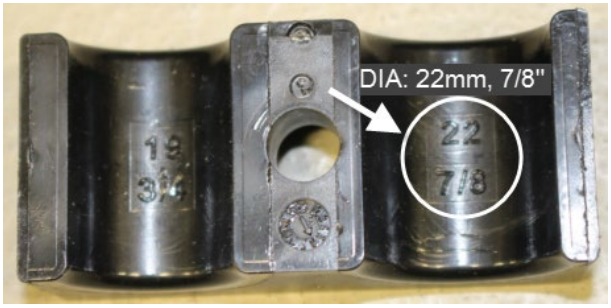


FIGURE 22

- Torque: 8 lbf-ft (11 Nm)

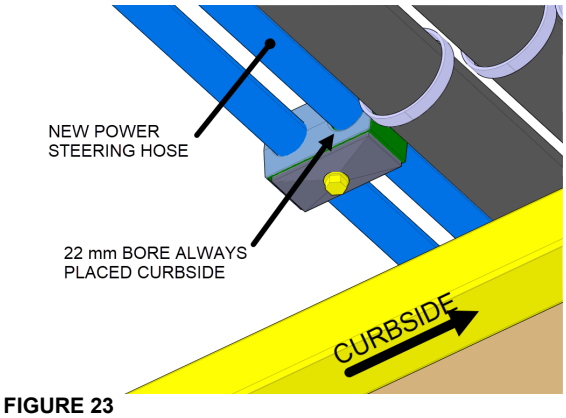


FIGURE 23

34. In the compartment spare wheel, secure the discharge hose (pressure) as previously arranged.

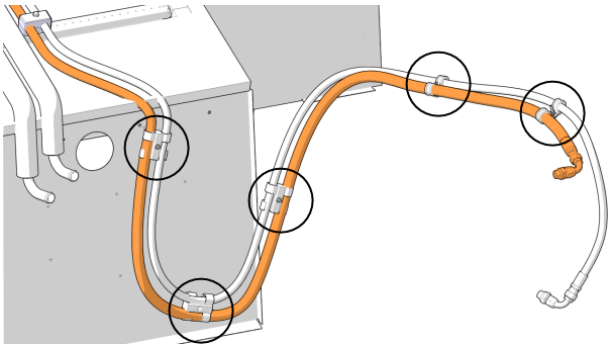


FIGURE 24 : TWO (2) P-CLAMPS, THREE (3) HOSE GUIDES

FLUID FILLING AND BLEEDING

35. In the engine compartment, on engine curbside, remove the tank cover and place the nut on the spring to maintain normal pressure on the filter in the tank.

36. Fill the tank with Automatic Transmission Fluid (ATF) up to 2 inches from the top of the tank (only to prevent spills).

37. Start the engine and have it run at idling speed to fill the steering system with fluid. During this operation, the fluid level in the tank will drop. Therefore, to avoid any suction of air, the fluid tank has to be topped up constantly.

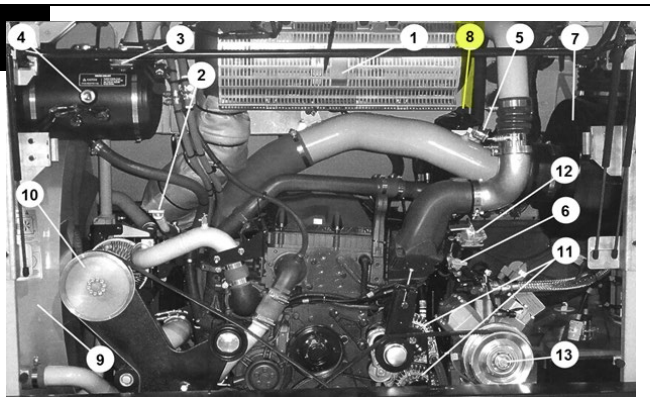


FIGURE 25: POWER STEERING FLUID TANK, ITEM 8 ON PICTURE ABOVE

FIGURE 26: POWER STEERING FLUID TANK

BLEEDING

38. FOR STEERING GEAR VERSIONS WITH AUTOMATIC BLEEDING …

Steering gear versions with automatic bleeding do not have any bleed screws. These steering gears automatically bleed any air remaining within the steering system. Proceed as follows :

a) Lift the front of the vehicle from **under the axle** so that the wheels are not on the ground and can be turned with the steering wheel. Always place safety stands when working under the vehicle.

b) Start the engine and have it run at idling speed for 2-3 minutes. Ask a colleague to turn the wheel from one knuckle stop to the other until the effort needed is constant, so the air will be evacuated by the steering fluid reservoir. Monitor the fluid level in the tank.

c) After bleeding, fill the tank up to 1" from the top of the tank. Check the fluid level with the dipstick.

39. STEERING GEAR WITH BLEEDER/BLEEDER SCREW

Refer to paragraph **5.4.3 Bleeding** of RB Robert Bosch Servocom Service Manual (8090) available on the Technical Publications site.

https://techpub.prevostcar.com/en/download?id=352&type=publications

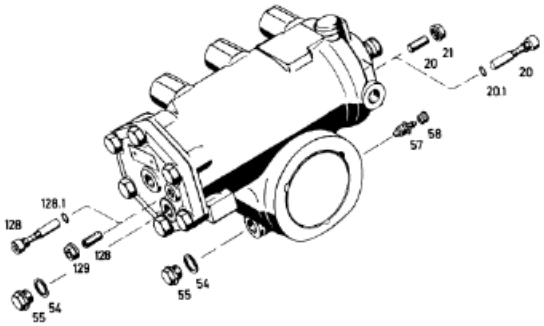


FIGURE 27 : BLEEDER (item 57) & BLEED SCREWS

40. Inspect the connections to make sure that there are no leaks at the fittings.
41. Close all compartment doors. Close the front service compartment door.
42. Check the good operation of the system by performing a test drive.

PROCEDURE – H3 SERIES

DANGER

Park vehicle safely, apply parking brake, stop the engine. Prior to working on the vehicle, set the ignition switch to the OFF position and trip the main circuit breakers equipped with a trip button. On Commuter type vehicles, set the battery master switch (master cut-out) to the OFF position.

Lock out & Tag out (LOTO) must be performed during set-up, maintenance or repair activities. Refer to your local procedure for detailed information regarding the control of hazardous energy.

1. Turn off the engine.
2. Open three baggage compartment doors on curbside.
3. Open the front electrical & service compartment.

4. To prevent skin burns, make sure that steering fluid has sufficiently cooled before starting the next steps.
5. Have a suitable container to collect the steering fluid under the steering gear.

6. **Identification of the discharge hose** (pressure) on the vehicle.
   - In the spare wheel compartment, it is connected to the top of the steering box (fig. 28).

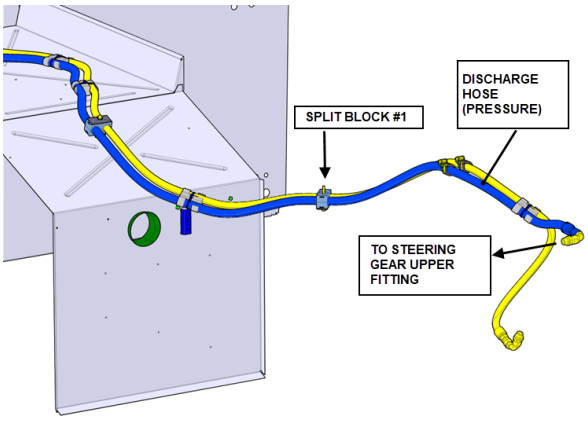


FIGURE 28

   - In the rear wheel well, it is located on the curbside. It is connected to a hard section (steel pipe) from the steering pump (fig. 29). Search above the transmission.

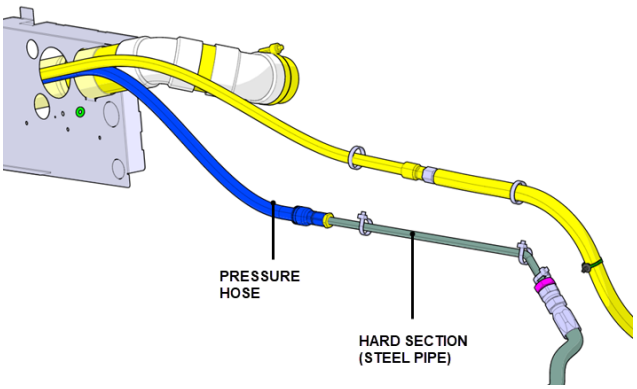


FIGURE 29

7. In the spare wheel compartment, separate the hose from the securing elements identified and remove the split block.

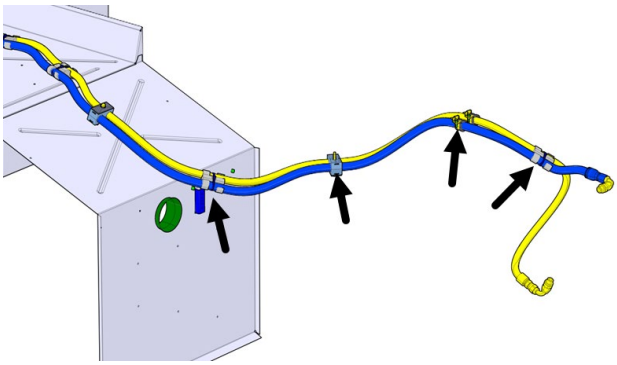


FIGURE 30 :

8. In the front service compartment, place a container under the steering gear to collect the steering fluid that may drip.

FIGURE 31

9. Locate the straight fitting of the discharge hose (pressure) at the top of the steering gear.

10. Disconnect the discharge hose (pressure) straight fitting while holding the elbow fitting.

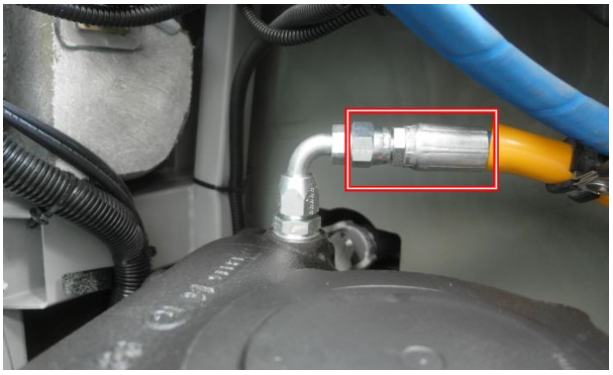


FIGURE 32

- 13/16
- 7/8

11. Drain the fluid dripping from the hose in the container.

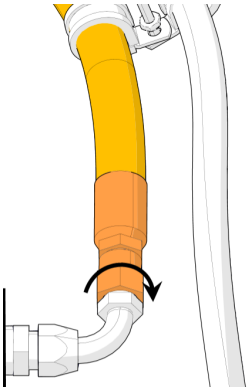


FIGURE 33

12. Place a #8 JIC 37° cap on the steering gear elbow fitting in order to avoid intrusion of dirt.

    ➢ 7/8

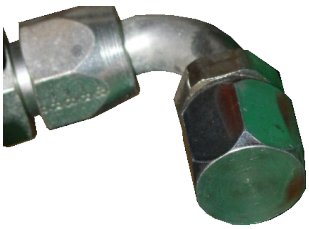


FIGURE 34

13. Place a #8 JIC 37° plug into the discharge hose at the steering box to keep any residual fluid in the hose from dripping in the service compartment or on maintainer while removing the old hose.

    ➢ 13/16

FIGURE 35

14. Lift the vehicle in order to gain access to the rear wheel well. Always use safety stands when working under the vehicle.

15. Locate the discharge hose (pressure) on curbside of the rear wheel well. It is connected to a hard section (steel pipe) which is from the steering pump (fig.36).

    Unscrew the fitting while holding the hard section (metal pipe) with a wrench.

    ➢ 13/16

    ➢ 7/8

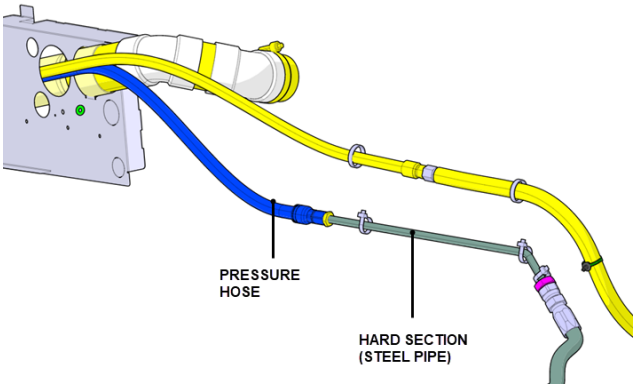


FIGURE 36

16. Collect any fluid dripping. Cap the hard section (steel pipe) from the power steering pump using one #8 JIC 37° cap.

    ➢ 7/8

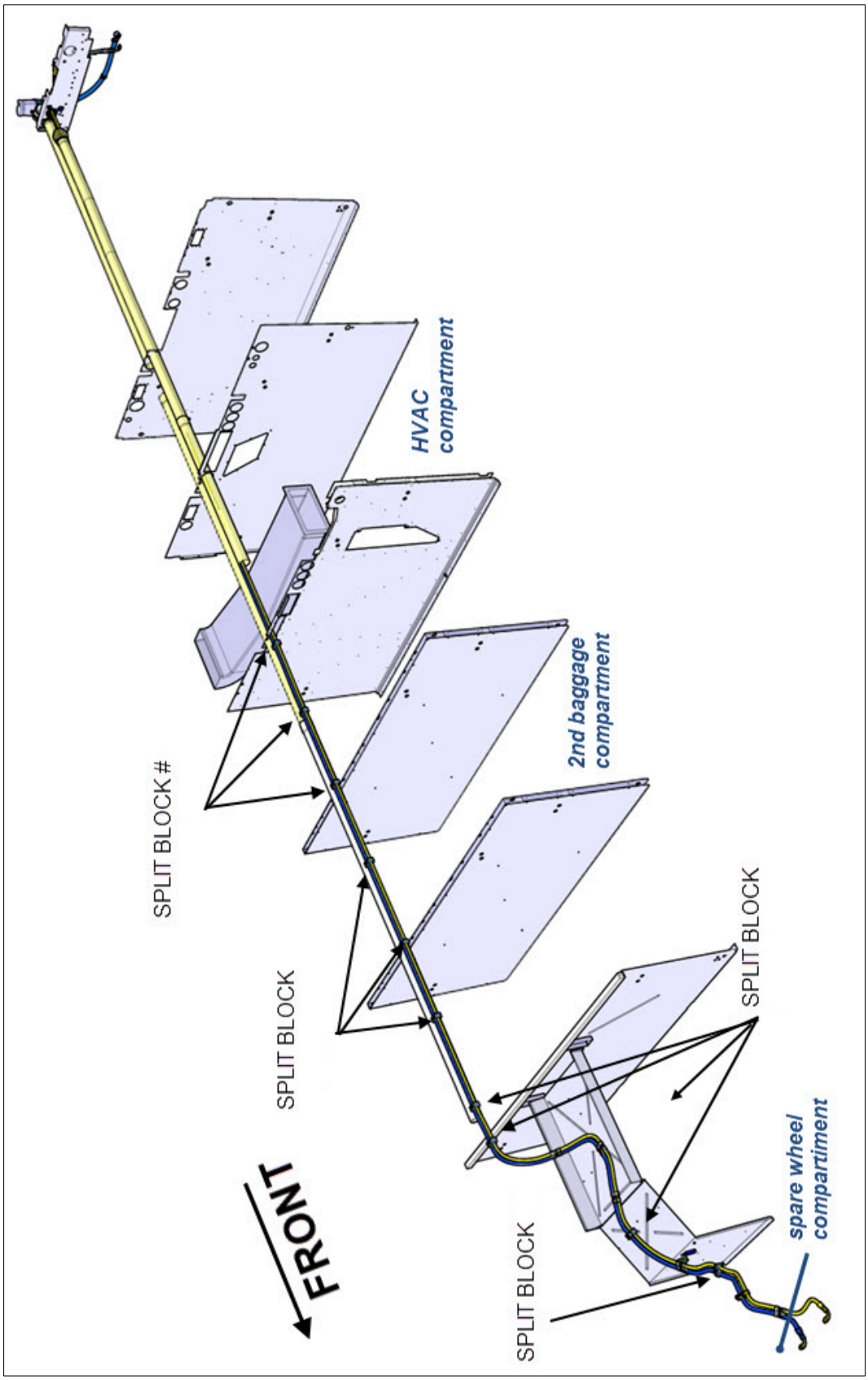


FIGURE 37 : POWER STEERING PUMP DISCHARGE HOSE (PRESSURE) H3-45 SHOWN

17. While following the discharge hose from the spare wheel compartment and proceeding one after the other, remove and discard all split blocks identified in figure 37. Save the hardware for reuse.

H3-41: 9 split blocks

H3-45: 11 split blocks

H3-45 VIP: 11 split blocks

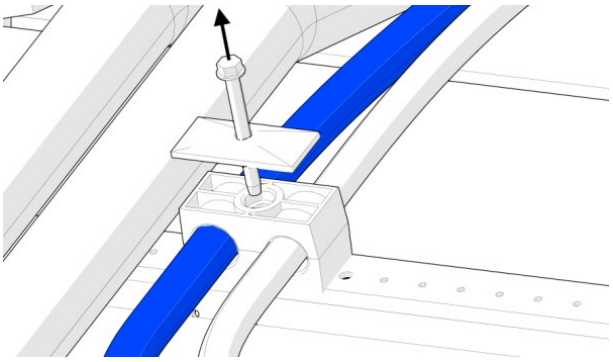


FIGURE 38 : SPLIT BLOCK #2 IN THE SPARE WHEEL COMPARTMENT

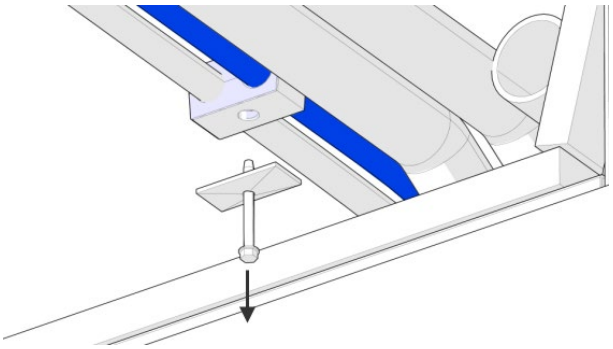


FIGURE 39 : OTHER TYPICAL SPLIT BLOCK AT THE CEILING OF THE BAGGAGE COMPARTMENTS

18. In the rear wheel well, join the old and new hose together with a male-male JIC 37 ° #8 union fitting. This will help guide the new hose in place while removing the old hose.

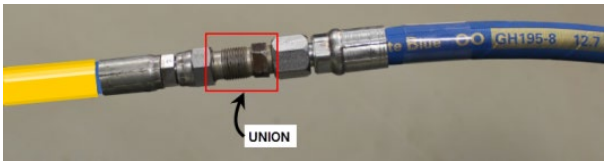


FIGURE 40

19. Begin to remove the old hose by pulling from the spare wheel compartment while a colleague helps feed the new hose at the rear wheel well.

20. Help the colleague in guiding the new hose in the baggage compartments, while he continues to remove the existing pipe.

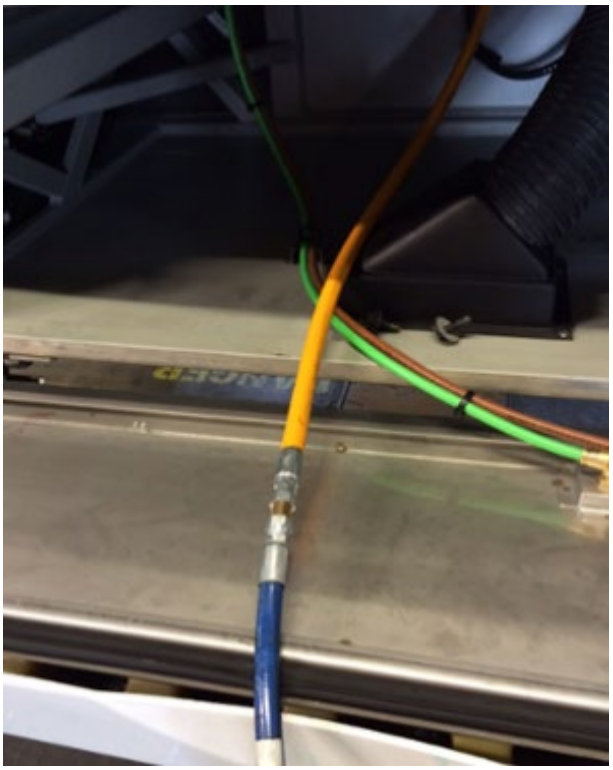


FIGURE 41

CONNECTION TO THE HARD SECTION

21. Inspect the sealing surfaces. Clean and dry the fitting.
22. Place seal #501031 on the fitting of the rigid section.
23. Apply red Loctite on the JIC fitting threads only. Take care not to put Loctite on the conical part (flare) of the fitting or inside the hose.
24. Tighten the fitting by hand, then with a **7/8 crowfoot** and 13/16 open wrench, tighten the fitting.

    - 13/16
    - Torque wrench & 7/8 crowfoot
    - Torque: 57 lbf-ft

25. Add a **torque seal** mark across the fitting once properly tighten.

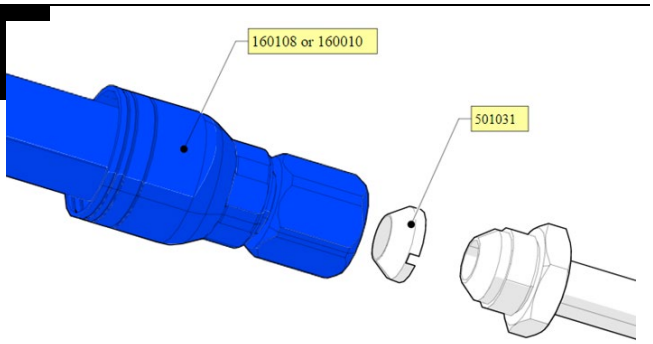


FIGURE 42

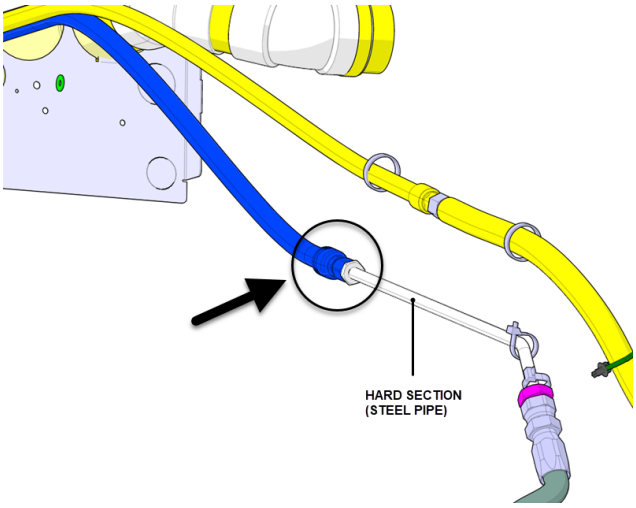


FIGURE 43

P CLAMP INSTALLATION

26. On the bulkhead located above the transmission, proceed to the installation of the P clamp #504204.

Install this P clamp in order to ***prevent rubbing of the three (3) hoses on the flared steel tube****.*

27. Install bracket #170758 using the existing bolt shown on the image.
28. Secure the P clamp using the included hardware:
    - Bolt #5001730
    - Washer #5001833
    - 

FIGURE 44 : FLARED STEEL TUBE

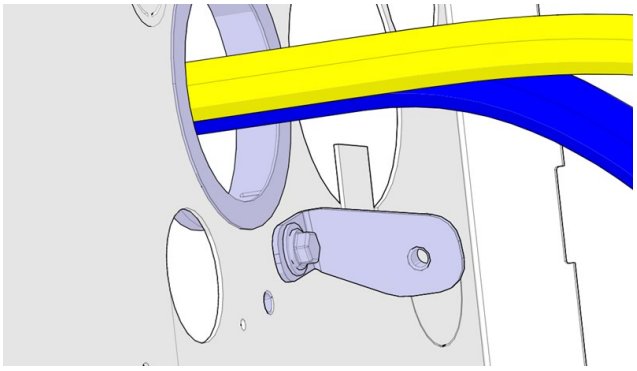


FIGURE 45

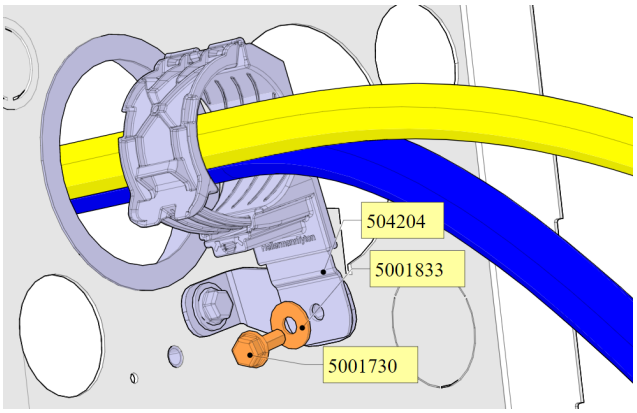


FIGURE 46

CONNECTION TO THE STEERING GEAR

29. Inspect the sealing surfaces. Clean and dry the fitting.

30. Apply red Loctite on the JIC fitting threads only. Take care not to put Loctite on the conical part (flare) of the fitting or inside the hose.

31. Tighten the fitting by hand, then with a **7/8 crowfoot** and 13/16 open wrench, tighten the fitting.

    - 13/16
    - Torque wrench & 7/8 crowfoot
    - Torque: 57 lbf-ft

32. Add a **torque seal** mark across the fitting once properly tighten.

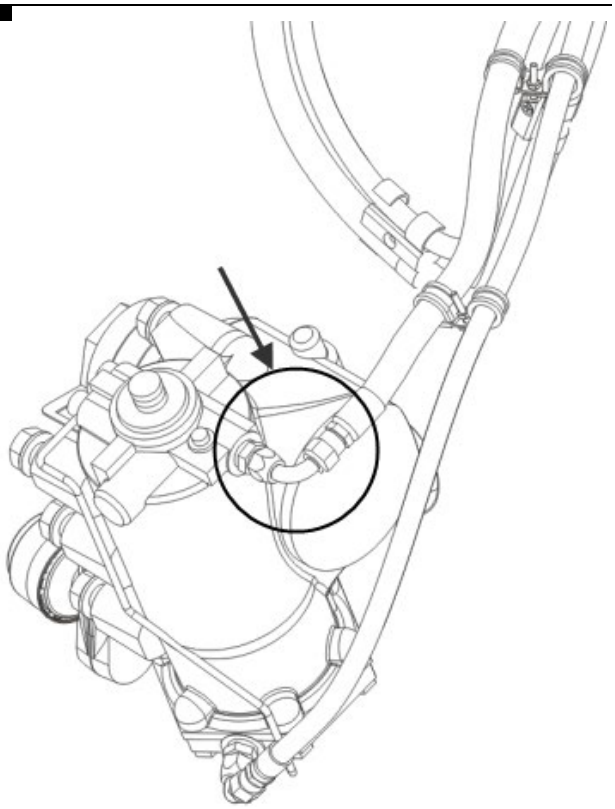


FIGURE 47

33. From the spare wheel compartment, pull on the hose to stretch and move 'slack' in this compartment.

34. Install the new split blocks #504189 (figure 37 & 48).

    Reuse the retainer plates and existing screws.

Note: make sure that the new pressure hose is placed in the 22 mm (7/8") diameter bore. The new hose must be placed the closest to the vehicle side, i.e. curbside.

- Torque: 8 lbf-ft (11 Nm)

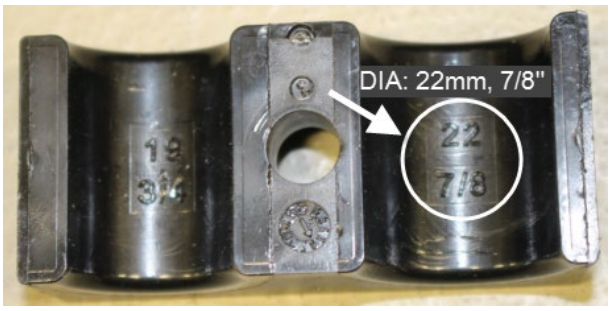


FIGURE 48

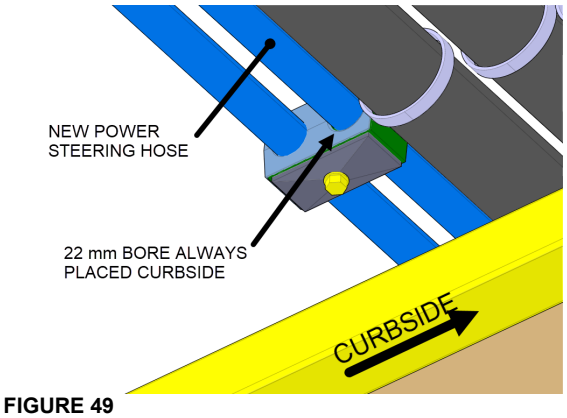


FIGURE 49

35. In the compartment spare wheel, secure the discharge hose (pressure) as previously arranged.

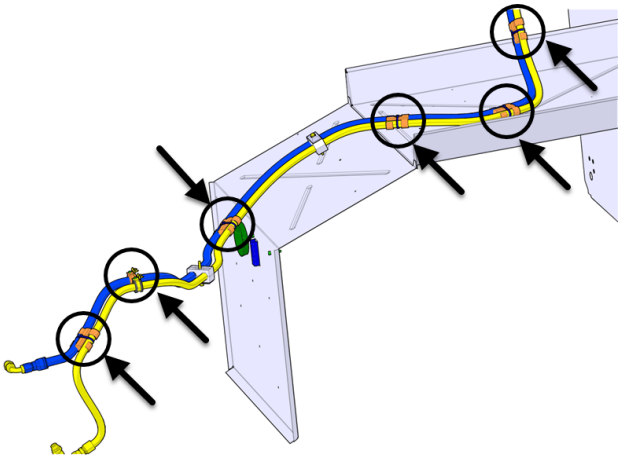


FIGURE 50

FLUID FILLING AND BLEEDING

36. Remove the tank cover and place the nut on the spring to maintain normal pressure on the filter in the tank.

37. Fill the tank with Automatic Transmission Fluid (ATF) up to 2 inches from the top of the tank (only to prevent spills).

38. Start the engine and have it run at idling speed to fill the steering system with fluid. During this operation, the fluid level in the tank will quickly drop. Therefore, to avoid any suction of air, the fluid tank has to be topped up constantly.

FIGURE 51

BLEEDING

39. FOR STEERING GEAR VERSIONS WITH AUTOMATIC BLEEDING …

Steering gear versions with automatic bleeding do not have any bleed screws. These steering gears automatically bleed any air remaining within the steering system. Proceed as follows :

a) Lift the front of the vehicle from **under the axle** so that the wheels are not on the ground and can be turned with the steering wheel. Always place safety stands when working under the vehicle.

b) Start the engine and have it run at idling speed for 2-3 minutes. Ask a colleague to turn the wheel from one knuckle stop to the other until the effort needed is constant, so the air will be evacuated by the steering fluid reservoir. Monitor the fluid level in the tank.

c) After bleeding, fill the tank up to 1" from the top of the tank. Check the fluid level with the dipstick.

40. STEERING GEAR WITH BLEEDER/BLEEDER SCREW

Refer to paragraph **5.4.3 Bleeding** of RB Robert Bosch Servocom Service Manual (8090) available on the Technical Publications site.

https://techpub.prevostcar.com/en/download?id=352&type=publications

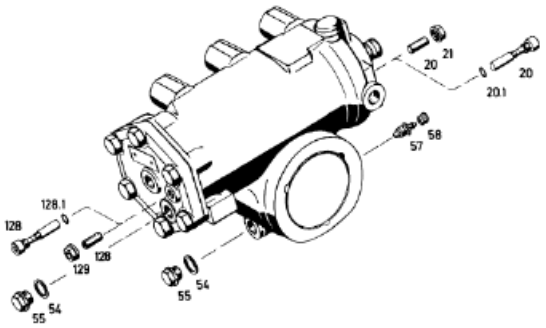


FIGURE 52 : BLEEDER (item 57) & BLEED SCREWS

41. Inspect the connections to make sure that there are no leaks at the fittings.
42. Close all compartment doors. Close the front service compartment door.
43. Check the good operation of the system by performing a test drive.

PARTS / WASTE DISPOSAL

Discard waste according to applicable environmental regulations (Municipal/State[Prov.]/ Federal)