PREVOST

# *Instruction Sheet* IS-04019A

## CLUTCH AND RADIATOR FAN TRANSFER MECHANISM MOUNTING BASE REPLACEMENT

### PART A: VEHICLES EQUIPPED WITH 3-INCH AIR BELLOWS

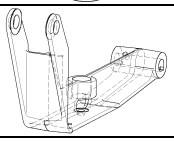
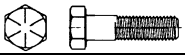
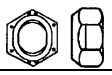
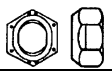
**REV A: 500177 (3X) added to kit 052788 (do not use screws supplied with 550879).**

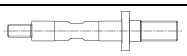
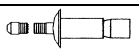
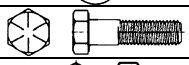
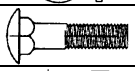
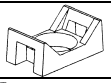
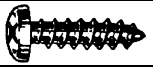
### APPLICATION

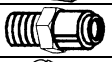
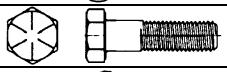
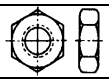
| Model | VIN  |
|---|---|
| XLII-45 Coaches<br>XLII MTH W0 & WE<br>Model Year : 2004 - 2005 | From 2PCY3349741028165 up to 2PCW3349651028392 incl. |

### MATERIAL

Kit #052788 includes the following parts:

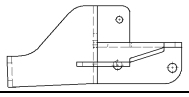
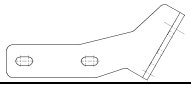
| Part No. | Description | Identification | Qty |
|---|---|---|---|
| 052571 | Mounting Base, Radiator Fan Transfer Mechanism (500 HP Fan Drive) | | 1 |
| 052584 | Pulley, Gearbox | | 1 |
| 5060073 | Belt POLY V 12PK | | 2 |
| 550839 | Clutch, Fan 500HP | | 1 |
| 052596 | Plate, Support | | 1 |
| 052492 | Plate, Reinforcement Clutch Support | | 1 |
| 052673 | Roller, Idler Assembly |  | 1 |
| 052624 | Arm, Belt Tensioner |  | 1 |
| 052704 | Pipe, Engine to Radiator Water Pump | | 1 |
| 983296 | Screw, Cap Hexagonal Head, ZP M20X90 G10.9 |  | 1 |
| 5001252 | Nut, Hexagonal Stover M20-2.5 |  | 1 |
| 971083 | Nut, Hexagonal Stover M10-1.5 |  | 5 |

| | | | |
|---|---|---|---|
| 052670 | Pivot, Belt Tensioner Arm |  | 1 |
| 502617 | Nut, Hexagonal Nylon Insert, CP M10-1.5 |  | 1 |
| 507293 | Bushing, Nylon 5/8 X 11/16 X 11/32 X 15/16 |  | 4 |
| 504487 | Rivet SS 3/16 X 7/16 |  | 2 |
| 504637 | Tie, Black Cable |  | 4 |
| 509815 | Wire Clamp, Quick Mounting (Fir Tree Base) |  | 4 |
| 052688 | Attachment, Spring | | 1 |
| 502247 | Spring, Compression 1¼ x 2½ x 1/8 |  | 1 |
| 502903 | Screw, TC FL Phillips 10-24X1¼ |  | 1 |
| 502525 | Washer, Flat NP 31 / 64X3 / 4X.031 |  | 2 |
| 500270 | Washer, Flat SS .406 X 1 X .063 |  | 1 |
| 500897 | Washer, Flat 7/16 X 1 X 5/64 |  | 4 |
| 5001316 | Screw, Cap Hexagonal Head, SS M10X45 |  | 1 |
| 502567 | Nut, Hexagonal SS M10-1.5 |  | 1 |
| 500449 | Washer, Flat SS 5/8 X 1½ |  | 2 |
| 502588 | Nut, Hexagonal ZP M16-2 |  | 1 |
| 500802 | Washer, Split-Lock ZP 16.2 x27.4 x 3.5 |  | 1 |
| 5001208 | Bolt, Carriage ZP M8X30 |  | 3 |
| 502543 | Nut, Hexagonal ZP M8-1¼ |  | 3 |
| 502889 | Washer, Split-Lock 5/16 X ½ X 5/64 |  | 3 |
| 500874 | Washer, Flat ZP 21/64 X 43/64 X 1/16 |  | 3 |
| 052667 | Hose, 1524 mm long | | 1 |
| 142013 | Bracket, Air Pressure Regulator | | 1 |
| 500948 | Screw, Thread cutting Hex Head ZP ¼-20 X 1 |  | 2 |
| 504013 | Mount, Cable Tie |  | 4 |
| 500642 | Screw, Tapping Binding Head, Phillips ZP #10 X ¾ |  | 4 |
| 550879 | Sleeve, Coupling | | 1 |
| 500177 | Screw cap hex ZP 1/4-20X1 G8 | | 3 |

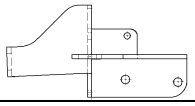
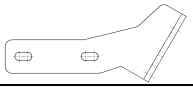
| | | | |
|---|---|---|---|
| 501027 | Connector, Male Tube ¼ FL X ¼ NPT |  | 1 |
| 501808 | Elbow, Male 45° ¼ tube 45° FL X 1/8 NPT |  | 1 |
| 501036 | Elbow, Male 90° ¼ tube 45° FL X 1/8 NPT |  | 1 |
| 501894 | Tee, Male Branch ¼ NPT |  | 1 |
| 641332 | Connector, Male ¼ tube X 1/8 NPT/push-in tube |  | 1 |
| 641371 | Elbow, Male ¼ tube X ¼ NPT/push-in tube |  | 1 |
| 502926 | Screw, Cap Hexagonal Head 3/8-16 X 7/8 LG |  | 1 |
| 630062 | Isolator, Rubber Vibration |  | 2 |
| 503402 | Tube, Black ¼ (1 X 5 feet long) | | 5 |
| 550186 | Key | | 1 |
| 550840 | Bellows, Air 4 inch diameter | | 1 |
| 640488 | Valve, Air Pressure Check | | 1 |
| 641472 | Regulator, Air Pressure | | 1 |
| 500734 | Nut, Hexagonal Jam ZP ¾-16 |  | 1 |
| IS-04019A | Instruction Sheet | | 1 |
| FI-04019A | Feuille d'instructions | | 1 |

## In addition to kit #052788, you must order the following parts:

**XLII-45 COACHES**

| Part No | Description | Identification | Qty |
|---|---|---|---|
| 052708 | Bracket, Attachment Air Bellows Engine Side |  | 1 |
| 052644 | Bracket, Attachment Air Bellows Gearbox Side |  | 1 |
| 550840 | Bellows, Air 4 inch diameter | | 1 |

**XLII-40 MTH & ENTERTAINER**

| Part No | Description | Identification | Qty |
|---|---|---|---|
| 052706 | Bracket, Attachment Air Bellows Engine Side |  | 1 |
| 052645 | Bracket, Attachment Air Bellows Gearbox Side |  | 1 |
| 550840 | Bellows, Air 4 inch diameter | | 1 |

| NOTE |
| --- |
| *Material can be obtained through regular channels.* |

## PROCEDURE

| ⚠ WARNING ⚠ |
| --- |
| **Park vehicle safely, apply parking brake, stop engine and set battery master switch(es) to the OFF position prior to working on the vehicle.** |

1. Locate the belt tensioner air pressure regulator then turn pressure releasing valve counterclockwise to release the pressure from the air bellows. Make sure all applicable safety precautions regarding engine shutdown were taken.
2. Remove belts from gearbox and fan clutch pulleys.
3. Unfasten the bolts fixing gearbox onto mounting base then remove gearbox.
4. Remove fan drive pulley from gearbox.
5. Unfasten the bolts fixing the 3-inch air bellows attachment brackets which are located near the gearbox, and then remove the attachment brackets.
6. Remove air bellows from belt tensioner arm.
7. Unfasten the bolts fixing the fan to the clutch in order to facilitate removal of mounting base.
8. Disconnect the clutch power cable connector, note wire color coding;
   - Brown wire – Pin A
   - Blue wire – Pin B
   - Yellow and green wire – Pin C
9. Unfasten the bolts fixing the clutch onto the mounting base then remove the clutch.

| ⚠ WARNING ⚠ |
| --- |
| **If possible so as to render the job less difficult, use a loading tripod such as a gin to adequately support the radiator fan transfer mechanism mounting base while removing the supporting legs fixing bolts.** |

10. Before removing the bolts fixing the mounting base supporting legs, drain cooling system as per the following procedure:

### DRAINING COOLING SYSTEM

To drain the engine and related components:

- Stop engine and allow engine to cool. Close both heater line shutoff valves.

**XL2-40, XL2-45 & 45E MTH**: One valve is located in the engine compartment, under the radiator fan gearbox (Fig. 1), another valve is located in the engine compartment behind splash guard panel at rear of vehicle (behind L.H. side tag axle wheel) (Fig. 2).

| NOTE |
| --- |
| *Refer to section 22 of Maintenance Manual under "Preheating System" for information about preheater access and heater line shutoff valve.* |

**⚠ WARNING ⚠**

**Before proceeding with the following steps, make sure the coolant has cooled down. The sudden release of pressure from a heated cooling system can result in loss of coolant and possible personal injury (scalding) from the hot liquid.**

- Unscrew the surge tank pressure cap counterclockwise, ¼ turn to let air enter the system and permit the coolant to drain completely from system.
- Open the water pump housing inlet line drain plug (Fig. 5).
- To drain the driver's heater core:
  - Locate the normally open water solenoid valve located on the ceiling of the spare wheel compartment, disconnect its wiring connector, and then connect a 24-volt external power source, using jumper cables, to close the valve.
  - Loosen hose clamp, install an appropriate container to recover coolant, and disconnect silicone hose from water solenoid valve.
  - From inside of vehicle, remove the finishing panels. Open the purge valve located inside the HVAC unit, on the driver's side to ensure an efficient draining.
- To drain the central heating system:
  - Open the last L.H. side baggage compartment door, and then pull the black release button located on the L.H. side in order to unlock and open the evaporator compartment door.
  - Open drain cock in bottom of heater core, and then open purge valve located on top of heater core in order to allow air to enter while draining.
  - Clean filter.
- Open drain cock at bottom of thermostat housing to drain the coolant trapped above the thermostats (1, Fig. 4).
- Open the radiator drain cock.
- Open engine drain cock (2, Fig. 4).
- Remove the transmission oil cooler. Drain, flush and inspect. Refer to Section 7, "TRANSMISSION" of Maintenance Manual for oil cooler maintenance or preventive replacement.

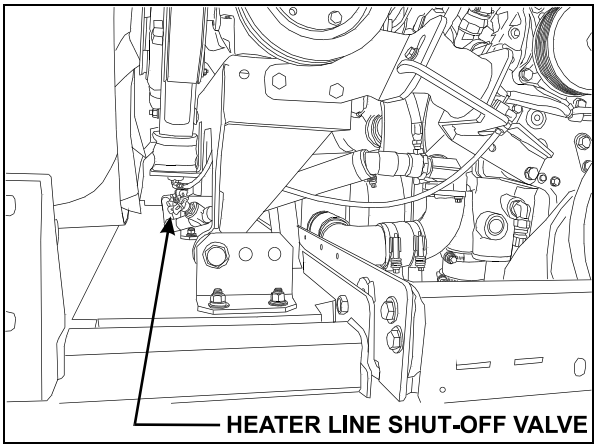



**FIGURE 1: ENGINE COMPARTMENT** 05078T

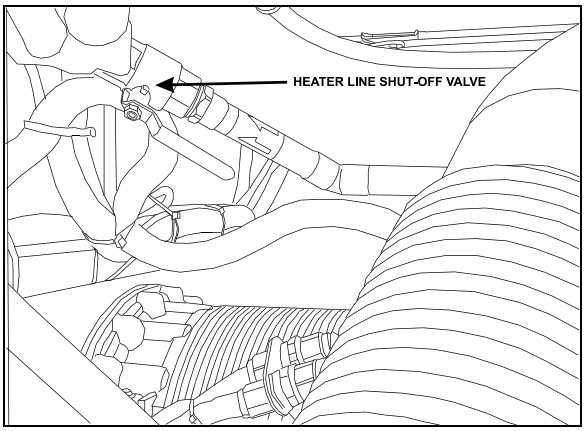



**FIGURE 2: HEATER LINE SHUT-OFF VALVES**

**XL2-45 COACHES:** Both valves are located in the engine compartment, behind splash guard panel at rear of vehicle (behind L.H. side tag axle wheel) (Fig. 3).

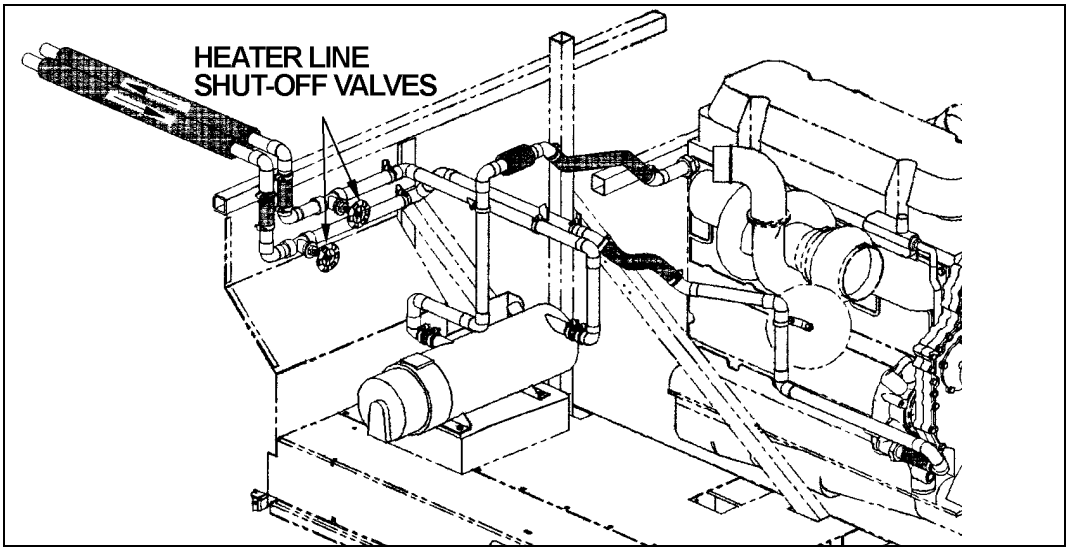



**FIGURE 3: COACHES SHUT-OFF VALVES (TYP.)**

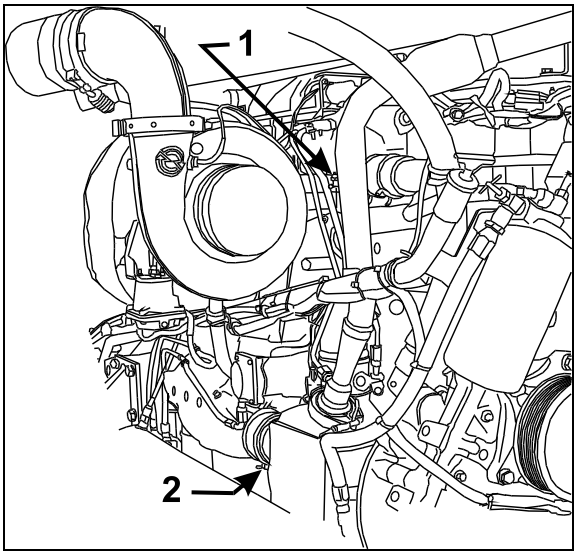



**FIGURE 4: ENGINE COOLANT DRAIN COCKS** 05088

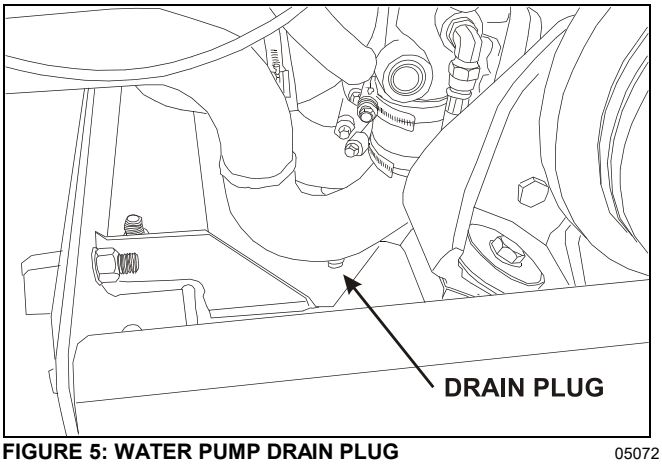



**FIGURE 5: WATER PUMP DRAIN PLUG** 05072

| ⚠ CAUTION ⚠ |
|---|
| **If freezing weather is anticipated and the engine is not protected with antifreeze, drain the cooling system completely when vehicle is not in use. Trapped water in the cylinder block, radiator or other components may freeze and expand resulting in damages. Leave the drain plugs open until the cooling system can be filled with coolant fluid. Do not run engine with cooling system empty.** |

To drain the entire system, do the previous steps while maintaining the shutoff valves in the open position; then follow the procedure under *"Draining Heating System"* in Section 22 of Maintenance Manual.

11. Remove the bolts fixing the mounting base supporting legs.
12. Using the gin, lift and remove mounting base from engine compartment.

| *NOTE* |
|---|
| *Clean radiator fan transfer mechanism mounting base location as required.* |

13. Install and secure the new mounting base (052571) onto a workbench then install the belt tensioner arm pivot (052670) on the new mounting base using flat washer (500802) and hexagonal nut (502588).
14. Install the belt tensioner arm (052624) on its pivot making sure the nylon bushings (507293) and two flat washers (500449) are properly inserted then secure the belt tensioner arm using flat washer (500270) and nut (502617). Screw former belt tensioner arm grease fitting into the new belt tensioner arm then grease the pivot.

| *NOTE* |
|---|
| *If needed, the 2 flat washers (500449) will be used later for pulley alignment.* |

15. Install idler roller assembly (052673) on the belt tensioner arm and secure using cap screw (983296) and nut (5001252). Fix also spring attachment (052688) onto belt tensioner arm using rivets (504487).
16. Install a 4-inch diameter air bellows (550840), and then fix it onto the belt tensioner arm using its flat washer, split-lock washer and cap screw (502926). Apply some Teflon paste on 90° elbow (501036) threads then screw elbow in the base of the air bellows.
17. Install compression spring (502247) between mounting base and belt tensioner arm. Secure compression spring onto its attachment using the thread cutting screw (502903) (Refer to figure 11).
18. Install stop screw (5001316) onto the mounting base and secure it using the hexagonal nut (502567) and Stover nut (971083), insert a flat washer (502525) on each side of the mounting base. Adjust stop screw position as per indications in figure 11.
19. Install support plate (052596) onto fan clutch (550839) and secure using 2 flat washers (500897) and 2 nuts (971083). Install reinforcement plate (052492) onto support plate and secure fan clutch using the other 2 flat washers (500897) and nuts (971083) (Refer to figure 9).
20. Install support plate and fan clutch assembly onto the mounting base and secure using 3 carriage bolts (5001208), flat washers (500874), split-lock washers (502889) and nuts (502543) (Refer to figure 8).
21. Route clutch power cable along the mounting base as per figures 8 and 11. Fix power cable connector onto support plate and mounting base using 2 nylon cable ties (504637). Drill 7-mm holes in order to install quick mounting wire clamps (509815) so as to secure cable.

| ⚠ CAUTION ⚠ |
| --- |
| **Make sure that enough play exists and that the cable does not run into the clutch or mounting base during clutch operation.** |

22. Insert the 2 rubber vibration isolators (630062) into the mounting base supporting legs then insert the 2 bushings inside the isolators.
23. Using the gin, lift the mounting base assembly in order to install it in the engine compartment.
24. Use the gin to safely support the fan transfer mechanism mounting base while inserting the supporting legs fixing bolts. Install washers and tighten nuts.
25. Fix gearbox onto new mounting base using split-lock washers and bolts.
26. Install pulley (052584) onto gearbox. Fix pulley coupling sleeve (550879) to mounting flange using key (550186) and 3 supplied 500177 screws (do not use the three 1 3/8" screws supplied with the coupling sleeve) referring to plays indicated in figure 12.
27. Install engine to radiator water pump pipe (052704) (Refer to figure 10).

Fill cooling system as per the following procedure:

## FILLING COOLING SYSTEM

If only the engine and related components were drained, maintain the two heater line shutoff valves in their closed position, then proceed as follows:

- Close all drain cocks. Refer to draining procedure for the location of draining points.
- Refill cooling system from the surge tank filler cap inlet with a recommended ethylene glycol-based antifreeze and water solution of the required concentration. Add Detroit Diesel selected product cooling system inhibitors (if required).

| *NOTE* |
| --- |
| *The coolant level should remain within two inches of the surge tank filler neck.* |

| *NOTE* |
| --- |
| *Make sure the purge line at top of thermostat housing is properly connected and not obstructed. The purge line (thermostat housing dome to radiator top tank) is required to ensure complete engine fill and proper purging of air in the system.* |

- Install the filler and pressure caps, then start the engine and run it at fast idle until reaching normal operating temperature. Check for leaks.

| *NOTE* |
| --- |
| *If for any reason, the coolant level drops below the surge tank level probe, the Check Engine light will flash.* |

- Stop engine and allow cooling.
- Open the two heater line shutoff valves, check the coolant level in the surge tank, and then add as required.

| ⚠ CAUTION ⚠ |
| --- |
| **Never pour cold coolant into a hot engine. The sudden change in temperature may crack the cylinder head or block.** |

If the entire system has been drained, redo the previous steps while maintaining the two heater line shutoff valves in the "Open" position. With engine running, activate the driver's and central heating systems to permit coolant circulation. If the vehicle is equipped with a windshield upper section defroster, momentarily pinch the hose located between the recirculating pump suction and the defroster outlet connector to ensure windshield upper section defroster complete filling. Complete the procedure by bleeding the heater cores as explained in Section 22 of Maintenance Manual, under *"9.4 Bleeding Heating System".*

28. Fasten the attachment brackets fixing bolts in order to install the new 4-inch air bellows (550840) located near gearbox. Fasten bolts according to tightening torques indicated in figure 6.

29. Reinstall 45° elbow (501808). Apply some Teflon paste onto fitting threads.

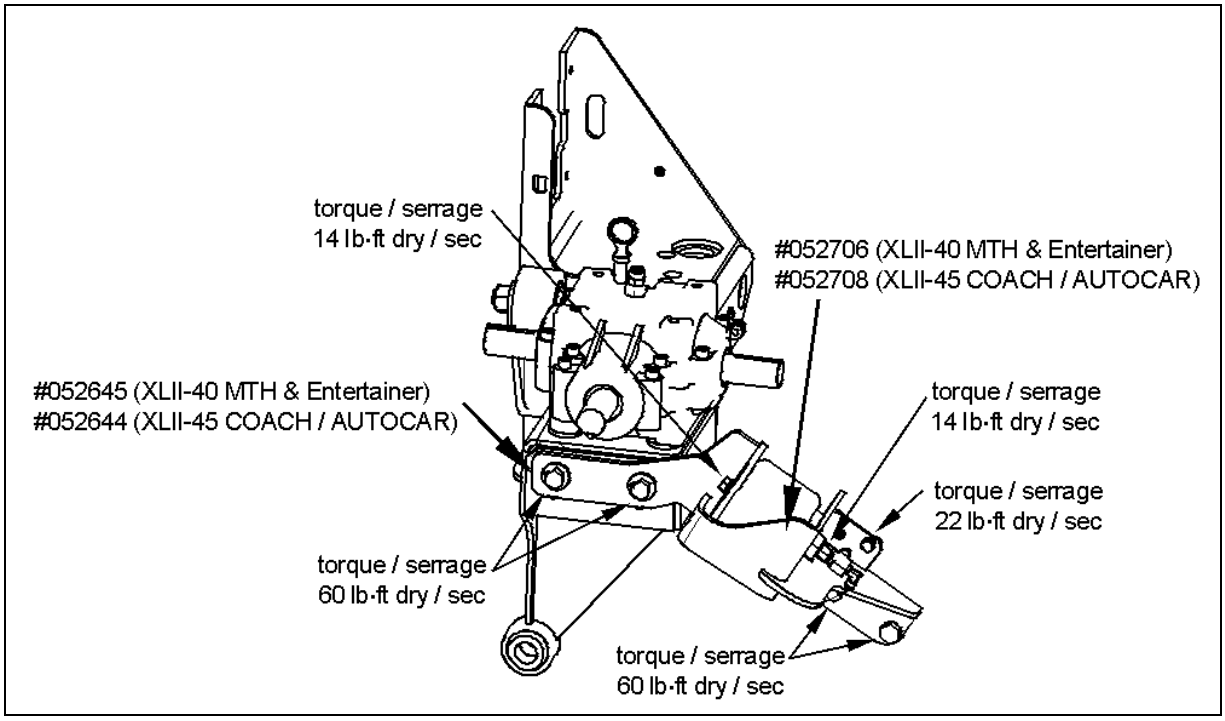



**FIGURE 6**

30. Reapply the pressure to the air bellows. Check if the gap (Refer to figure 7) between the bellows upper attachment bracket and the stopper is correct.

31. If proper gap cannot be obtained, release pressure from air bellows. Unfasten the gearbox side attachment bracket fixing bolts, adjust attachment bracket position then retighten bolts. Reapply the pressure to the air bellows and check the gap again, correct as necessary.

32. Use a straight edge to properly align fan clutch pulley with gearbox pulley. Install belt (5060073) over fan transfer mechanism pulleys, slightly unfasten gearbox fixing bolts in order to pivot the gearbox and properly align belt on the pulleys (Refer to figure 12). Retighten fixing bolts.

33. Fix the fan onto the clutch using the supplied bolts.

**⚠ CAUTION ⚠**

**Verify that play around fan blades is even and that blades do not touch the shroud when the clutch is in 1st or 2nd speed. Adjust the play by lifting or lowering the clutch.**

34. Fix bracket (142013) of 2nd air pressure regulator (641472) using two thread cutting screws (500948). Install bracket near 1st air pressure regulator onto rear cap structure horizontal tubing.

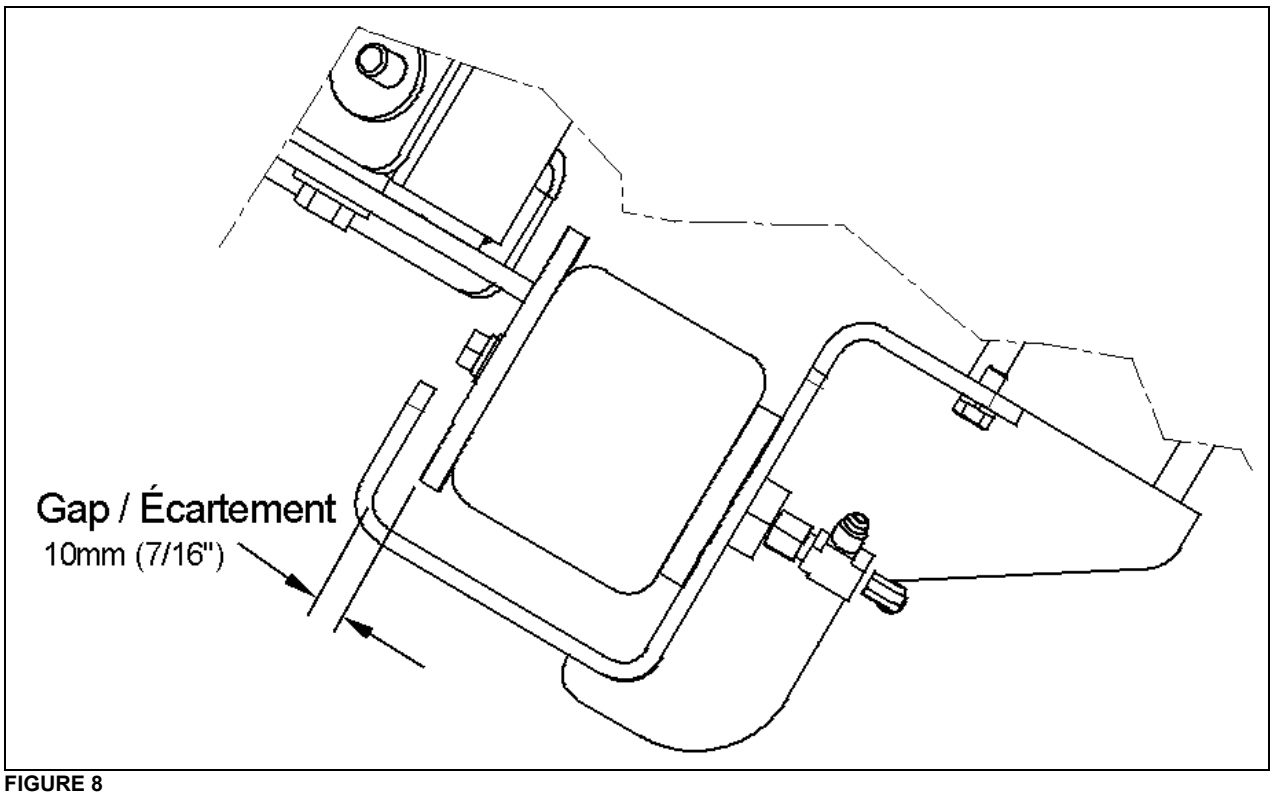



**FIGURE 8**

35. Fix air pressure regulator onto bracket using nut (500734).
36. Unscrew existing air pressure regulator inlet fitting. Apply some Teflon paste then install a male branch T-fitting (501894) on existing regulator air inlet. Apply some Teflon paste then screw 90° male elbow push-in tube fitting (641371) into the T-fitting on the fan transfer mechanism side. Reinstall the pressure releasing valve fitting on the other side of the male branch T-fitting.
37. Depending on the chosen location for 2nd regulator, cut the appropriate length of air tubing (503402), apply some Teflon paste on the push-in tube male connector (641332) then screw it into the 2nd regulator air inlet port. Connect two push-in tube male fittings using air tubing. Apply some Teflon paste onto the air pressure check valve (640488) then fasten it to the 2nd regulator.
38. Apply some Teflon paste on male tube connector (501027) then screw it into the 2nd regulator air outlet, use hose (052667) to connect 4-inch air bellows with 2nd regulator air outlet.
39. Fix black air tubing using cable tie mounts (504013), tapping screws (500642) and nylon cable ties (504637). Fix hose (052667) using clamps and nylon cable ties (504637).
40. Reinstall belts on engine pulleys.
41. Turn belt tensioner pressure releasing valve clockwise (counterclockwise for H series vehicles) to reapply the pressure on the belts. Set 2nd regulator pressure to 35 lb/in$^2$.
42. Check operation of radiator fan transfer mechanism in 1st and 2nd speed.

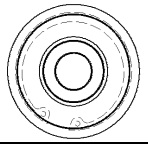
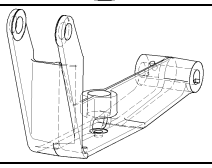
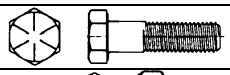
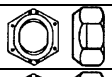
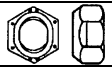
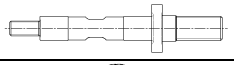
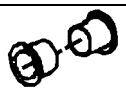
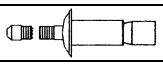
## PART B: VEHICLES EQUIPPED WITH 4-INCH AIR BELLOWS

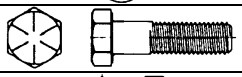
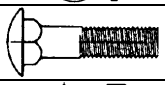
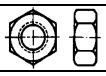
## APPLICATION

| Model | VIN   |
|---|---|
| XLII-45 Coaches<br>XLII MTH W0 & WE<br>Model Year : 2005 - 2006 | From 2PCX33492510283̲9̲3 up to2PCW33490610288̲0̲9 incl. |

## MATERIAL

Kit #052705 includes the following parts:

| Part No. | Description | Identification | Qty |
|---|---|---|---|
| 052571 | Mounting Base, Radiator Fan Transfer Mechanism (500 HP Fan Drive) | | 1 |
| 052584 | Pulley, Gearbox | | 1 |
| 5060073 | Belt POLY V 12PK | | 2 |
| 550839 | Clutch, Fan 500HP | | 1 |
| 052596 | Plate, Support | | 1 |
| 052492 | Plate, Reinforcement Clutch Support | | 1 |
| 052673 | Roller, Idler Assembly |  | 1 |
| 052624 | Arm, Belt Tensioner |  | 1 |
| 052704 | Pipe, Radiator to Engine Water Pump | | 1 |
| 983296 | Screw, Cap Hexagonal Head ZP M20X90 G10.9 |  | 1 |
| 5001252 | Nut, Hexagonal Stover M20-2.5 |  | 1 |
| 971083 | Nut, Hexagonal Stover M10-1.5 |  | 5 |
| 052670 | Pivot, Belt Tensioner Arm |  | 1 |
| 502617 | Nut, Hex. Nylon Insert CP M10-1.5 |  | 1 |
| 507293 | Bushing, Nylon 5/8 X 11/16 X 11/32 X 15/16 |  | 4 |
| 504487 | Rivet, SS 3/16 X 7/16 |  | 2 |

| | | | |
|---|---|---|---|
| 504637 | Tie, Black Cable (368 mm) |  | 4 |
| 509815 | Wire Clamp, Quick Mounting (Fir Tree Base) |  | 4 |
| 052688 | Attachment, Spring | | 1 |
| 502247 | Spring, Compression 1¼ x 2½ x 1/8 |  | 1 |
| 502903 | Screw, TC FL Phillips 10-24X1¼ |  | 1 |
| 502525 | Washer, Flat NP 31 / 64X3 / 4X.031 |  | 2 |
| 500270 | Washer, Flat SS .406 X 1 X .063 |  | 1 |
| 500897 | Washer, Flat .438 X 1 X .083 |  | 4 |
| 5001316 | Screw, Cap Hexagonal Head SS M10X45 |  | 1 |
| 502567 | Nut, Hexagonal SS M10-1.5 |  | 1 |
| 500449 | Washer, Flat SS 5/8 X 1½ |  | 2 |
| 502588 | Nut, Hexagonal ZP M16-2 |  | 1 |
| 500802 | Washer, Split-Lock ZP 16.2 x27.4 x 3.5 |  | 1 |
| 5001208 | Bolt, Carriage ZP M8X30 |  | 3 |
| 502543 | Nut, Hexagonal ZP M8-1¼ |  | 3 |
| 502889 | Washer, Split-Lock 5/16 X ½ X 5/64 |  | 3 |
| 500874 | Washer, Flat ZP 21/64 X 43/64 X 1/16 |  | 3 |
| 630062 | Isolator, Rubber Vibration |  | 2 |
| IS-04019 | Instruction Sheet | | 1 |
| FI-04019 | Feuille d'instructions | | 1 |

## PROCEDURE

**⚠ WARNING ⚠**

**Park vehicle safely, apply parking brake, stop engine and set battery master switch(es) to the OFF position prior to working on the vehicle.**

1. Locate the belt tensioner air pressure regulator then turn pressure releasing valve counterclockwise to release the pressure from the air bellows. Make sure all applicable safety precautions regarding engine shutdown were taken.
2. Remove the belts from gearbox and fan clutch.

3. Unfasten the bolts fixing gearbox onto mounting base then remove gearbox.
4. Remove fan drive pulley from gearbox.
5. Remove the bolts fixing the 4-inch air bellows attachment brackets which are located near the gearbox, and then put the attachment brackets aside.
6. Unfasten the fitting from the belt tensioner arm air bellows, remove and put air bellows aside.
7. Unfasten the bolts fixing the fan to the clutch in order to facilitate removal of mounting base.
8. Disconnect the clutch power cable connector, note wire color coding;
    - Brown wire – Pin A
    - Blue wire – Pin B
    - Yellow and green wire – Pin C
9. Unfasten the bolts fixing the clutch onto the mounting base then remove the clutch.

| ⚠ WARNING ⚠ |
| --- |
| **If possible so as to render the job less difficult, use a loading tripod such as a gin to adequately support the radiator fan transfer mechanism mounting base while removing the supporting legs fixing bolts.** |

10. Before removing the bolts fixing the mounting base supporting legs, drain cooling system as per the following procedure:

## DRAINING COOLING SYSTEM

To drain the engine and related components:

- Stop engine and allow engine to cool. Close both heater line shutoff valves.

**XL2-40, XL2-45 & 45E MTH**: One valve is located in the engine compartment, under the radiator fan gearbox (Fig. 1), another valve is located in the engine compartment behind splash guard panel at rear of vehicle (behind L.H. side tag axle wheel) (Fig. 2).

| *NOTE* |
| --- |
| *Refer to section 22 of Maintenance Manual under "Preheating System" for information about preheater access and heater line shutoff valve.* |

| ⚠ WARNING ⚠ |
| --- |
| **Before proceeding with the following steps, make sure the coolant has cooled down. The sudden release of pressure from a heated cooling system can result in loss of coolant and possible personal injury (scalding) from the hot liquid.** |

- Unscrew the surge tank pressure cap counterclockwise, ¼ turn to let air enter the system and permit the coolant to drain completely from system.
- Open the water pump housing inlet line drain plug (Fig.5).
- To drain the driver's heater core:
    - Locate the normally open water solenoid valve located on the ceiling of the spare wheel compartment, disconnect its wiring connector, and then connect a 24-volt external power source, using jumper cables, to close the valve.
    - Loosen hose clamp, install an appropriate container to recover coolant, and disconnect silicone hose from water solenoid valve.

- From inside of vehicle, remove the finishing panels. Open the purge valve located inside the HVAC unit, on the driver's side to ensure an efficient draining.

o To drain the central heating system:

- Open the last L.H. side baggage compartment door, and then pull the black release button located on the L.H. side in order to unlock and open the evaporator compartment door.
- Open drain cock in bottom of heater core, and then open purge valve located on top of heater core in order to allow air to enter while draining.
- Clean filter.

o Open drain cock at bottom of thermostat housing to drain the coolant trapped above the thermostats (1, Fig. 4).

o Open the radiator drain cock.

o Open engine drain cock (2, Fig. 4).

o Remove the transmission oil cooler. Drain, flush and inspect. Refer to Section 7, "TRANSMISSION" of Maintenance Manual for oil cooler maintenance or preventive replacement.

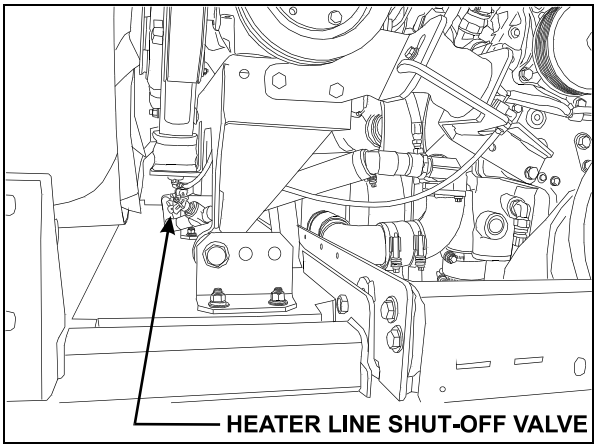



**FIGURE 1: ENGINE COMPARTMENT** 05078T

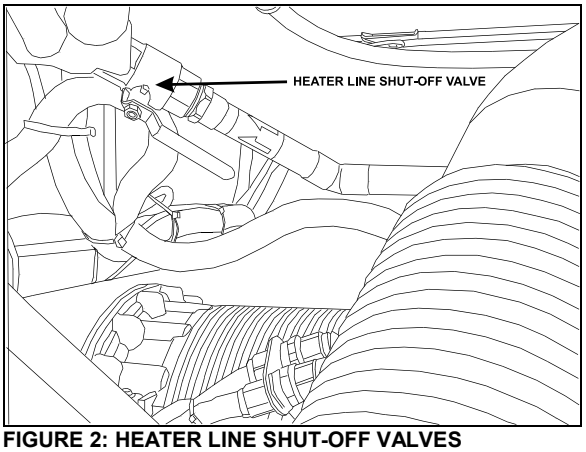



**FIGURE 2: HEATER LINE SHUT-OFF VALVES**

**XL2-45 COACHES:** Both valves are located in the engine compartment, behind splash guard panel at rear of vehicle (behind L.H. side tag axle wheel) (Fig. 3).

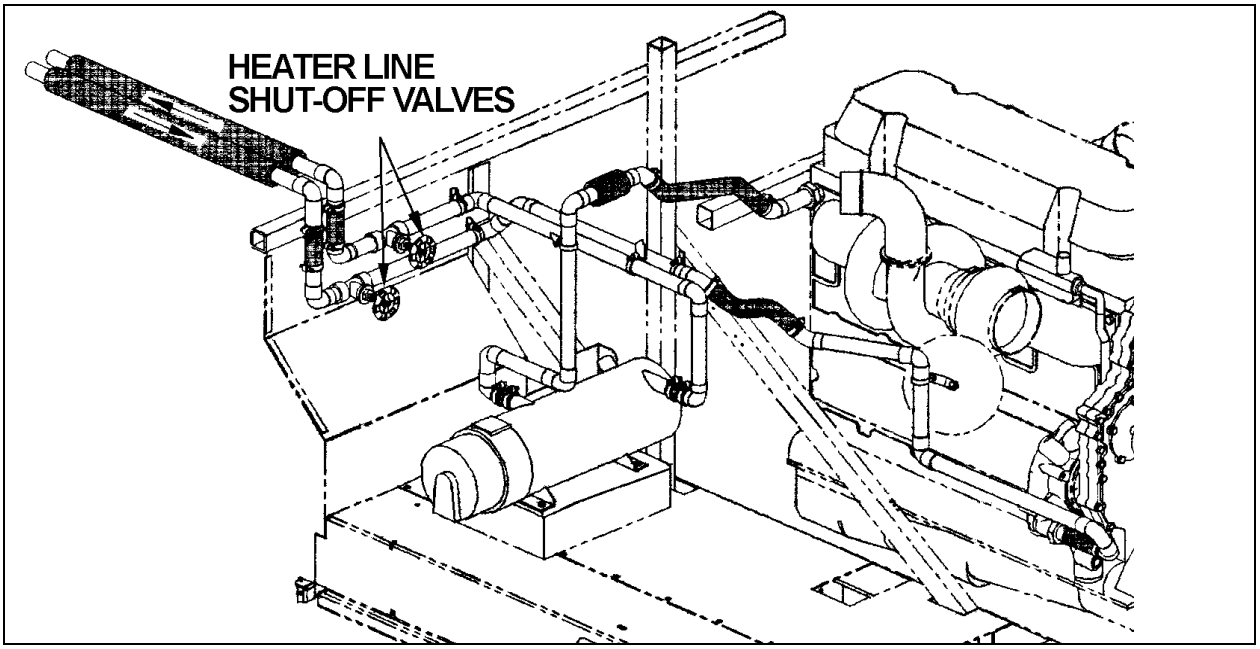



**FIGURE 3: COACHES SHUT-OFF VALVES (TYP.)**

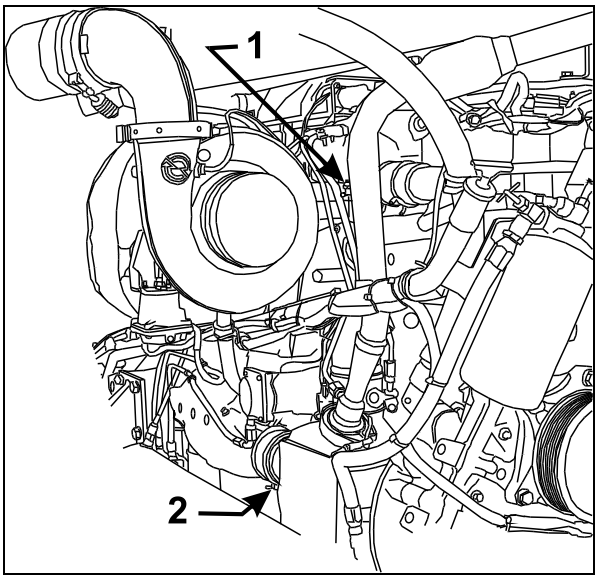



**FIGURE 4: ENGINE COOLANT DRAIN COCKS** 05088

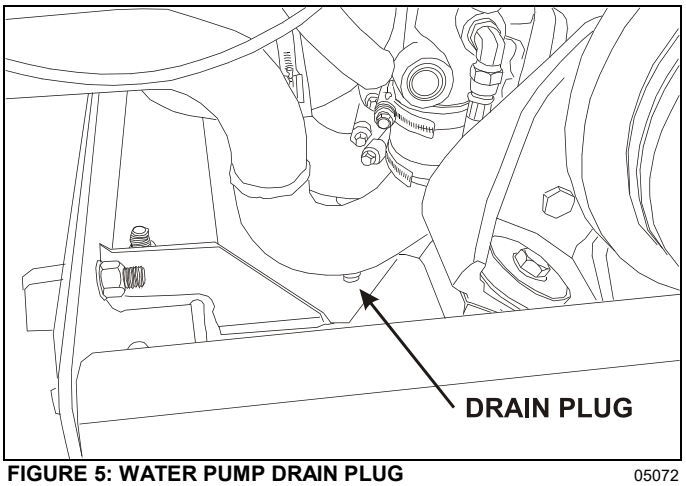



**FIGURE 5: WATER PUMP DRAIN PLUG** 05072

| ⚠ CAUTION ⚠ |
|---|
| **If freezing weather is anticipated and the engine is not protected with antifreeze, drain the cooling system completely when vehicle is not in use. Trapped water in the cylinder block, radiator or other components may freeze and expand resulting in damages. Leave the drain plugs open until the cooling system can be filled with coolant fluid. Do not run engine with cooling system empty.** |

To drain the entire system, do the previous steps while maintaining the shutoff valves in the open position; then follow the procedure under *"Draining Heating System"* in Section 22 of Maintenance Manual.

11. Remove engine to radiator water pump pipe.
12. Remove bolts fixing the mounting base supporting legs.
13. Using the gin, lift and remove mounting base from engine compartment.

| *NOTE* |
|---|
| *Clean radiator fan transfer mechanism mounting base location as required.* |

14. Remove the bushings inside 2 rubber vibration isolators then remove the isolators from the mounting base supporting legs. Set parts aside.
15. Install and secure the new mounting base (052571) onto a workbench then install the belt tensioner arm pivot (052670) on the new mounting base using flat washer (500802) and hexagonal nut (502588).
16. Install the belt tensioner arm (052624) on its pivot making sure the nylon bushings (507293) and flat washers (500449) are properly inserted then secure the belt tensioner arm using the flat washer (500270) and nut (502617). Remove grease fitting from former belt tensioner arm and install on new belt tensioner arm. Grease the pivot.

| *NOTE* |
|---|
| *If needed, the 2 flat washers (500449) will be used later for pulley alignment.* |

17. Install idler roller assembly (052673) onto the belt tensioner arm and secure it using cap screw (983296) and nut (5001252). Also fix spring attachment (052688) onto the belt tensioner arm using rivets (504487).
18. Reinstall 4-inch diameter air bellows onto the belt tensioner arm and then fix it using its flat washer, split-lock washer and cap screw. Apply some Teflon paste on 90° elbow threads then screw elbow in the base of the air bellows.

19. Install compression spring (502247) between mounting base and belt tensioner arm. Secure compression spring onto its attachment using the thread cutting screw (502903) (Refer to figure 11).
20. Install stop screw (5001316) onto the mounting base and secure it using the hexagonal nut (502567) and Stover nut (971083), insert a flat washer (502525) on each side of the mounting base. Adjust stop screw position as per indications in figure 11.
21. Install support plate (052596) onto fan clutch (550839) and secure using 2 flat washers (500897) and 2 nuts (971083). Install reinforcement plate (052492) onto support plate and secure fan clutch using the other 2 flat washers (500897) and nuts (971083) (Refer to figure 9).
22. Install support plate and fan clutch assembly onto the mounting base and secure using 3 carriage bolts (5001208), flat washers (500874), split-lock washers (502889) and nuts (502543) (Refer to figure 8).

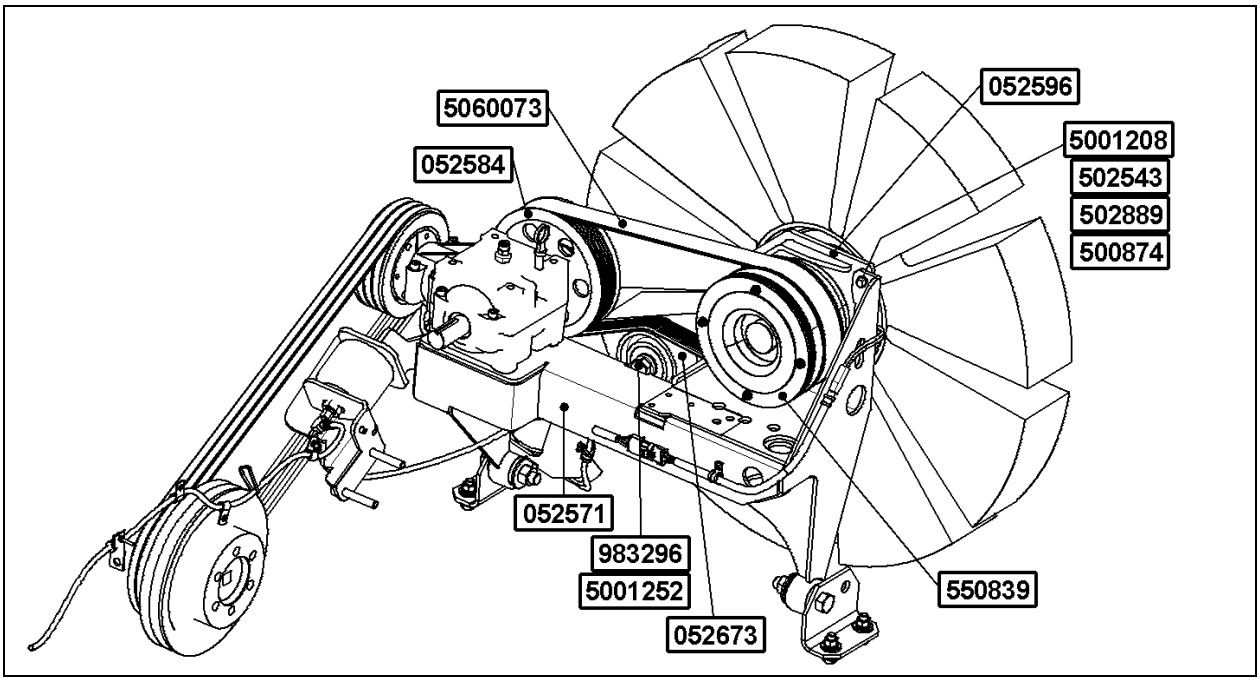



**FIGURE 8**

23. Route clutch power cable along the mounting base as per figures 8 and 11. Fix power cable connector onto support plate and mounting base using 2 nylon cable ties (504637). Drill 7-mm holes in order to install quick mounting wire clamps (509815) so as to secure cable.

**⚠ CAUTION ⚠**

**Make sure that enough play exists and that the cable does not run into the clutch or mounting base during clutch operation.**

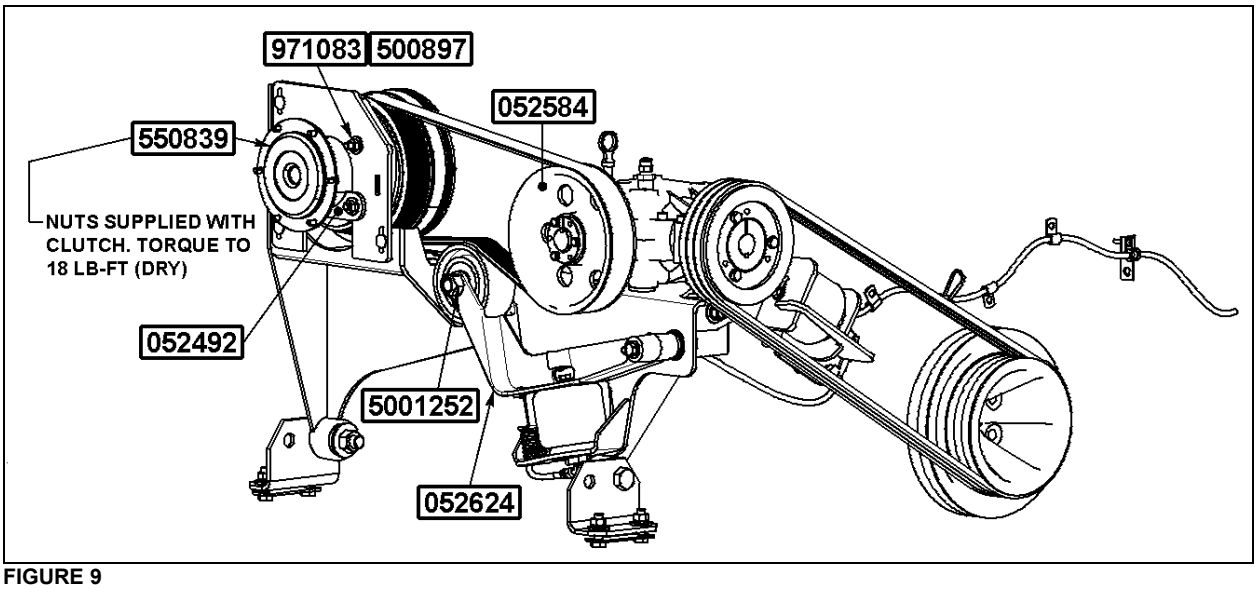



**FIGURE 9**

24. Insert the 2 rubber vibration isolators (630062) into the mounting base supporting legs then insert the 2 bushings inside the isolators.

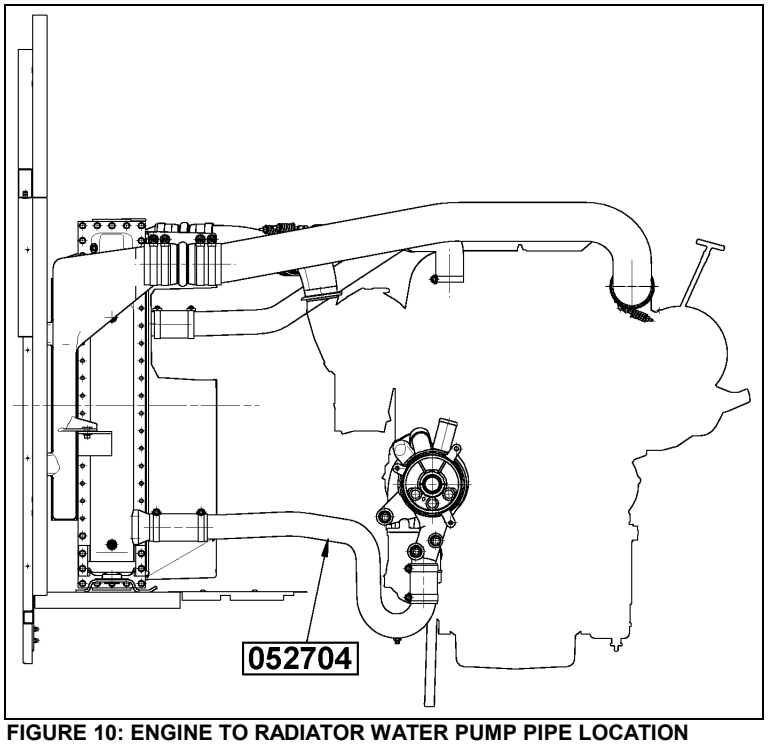



**FIGURE 10: ENGINE TO RADIATOR WATER PUMP PIPE LOCATION**

25. Using the gin, lift the mounting base assembly in order to install it in the engine compartment.
26. Use the gin to safely support the fan transfer mechanism mounting base while inserting the supporting legs fixing bolts. Install washers and tighten nuts.
27. Fix gearbox onto new mounting base using split-lock washers and bolts.
28. Install pulley (052584) onto gearbox. Fix pulley coupling sleeve to mounting flange using key and 3 screws supplied with sleeve referring to plays indicated in figure 12.
29. Install engine to radiator water pump pipe (052704) (Refer to figure 10).

Fill cooling system as per the following procedure:

## FILLING COOLING SYSTEM

If only the engine and related components were drained, maintain the two heater line shutoff valves in their closed position, then proceed as follows:

- Close all drain cocks. Refer to draining procedure for the location of draining points.
- Refill cooling system from the surge tank filler cap inlet with a recommended ethylene glycol-based antifreeze and water solution of the required concentration. Add Detroit Diesel selected product cooling system inhibitors (if required).

| *NOTE* |
| --- |
| *The coolant level should remain within two inches of the surge tank filler neck.* |

| *NOTE* |
| --- |
| *Make sure the purge line at top of thermostat housing is properly connected and not obstructed. The purge line (thermostat housing dome to radiator top tank) is required to ensure complete engine fill and proper purging of air in the system.* |

- Install the filler and pressure caps, then start the engine and run it at fast idle until reaching normal operating temperature. Check for leaks.

| *NOTE* |
| --- |
| *If for any reason, the coolant level drops below the surge tank level probe, the Check Engine light will flash.* |

- Stop engine and allow cooling.
- Open the two heater line shutoff valves, check the coolant level in the surge tank, and then add as required.

| ⚠ CAUTION ⚠ |
| --- |
| **Never pour cold coolant into a hot engine. The sudden change in temperature may crack the cylinder head or block.** |

If the entire system has been drained, redo the previous steps while maintaining the two heater line shutoff valves in the "Open" position. With engine running, activate the driver's and central heating systems to permit coolant circulation. If the vehicle is equipped with a windshield upper section defroster, momentarily pinch the hose located between the recirculating pump suction and the defroster outlet connector to ensure windshield upper section defroster complete filling. Complete the procedure by bleeding the heater cores as explained in Section 22 of Maintenance Manual, under *"9.4 Bleeding Heating System".*

30. Fasten the attachment brackets fixing bolts of the 4-inch air bellows located near gearbox.

31. Use a straight edge to properly align fan clutch pulley with gearbox pulley. Install belt (5060073) over fan transfer mechanism pulleys, slightly unfasten gearbox fixing bolts in order to pivot the gearbox and properly align belt on the pulleys (Refer to figure 12). Retighten fixing bolts.

32. Fix the fan onto the clutch using the supplied bolts.

| ⚠ CAUTION ⚠ |
| --- |
| **Verify that play around fan blades is even and that blades do not touch the shroud when the clutch is in 1st or 2nd speed. Adjust the play by lifting or lowering the clutch.** |

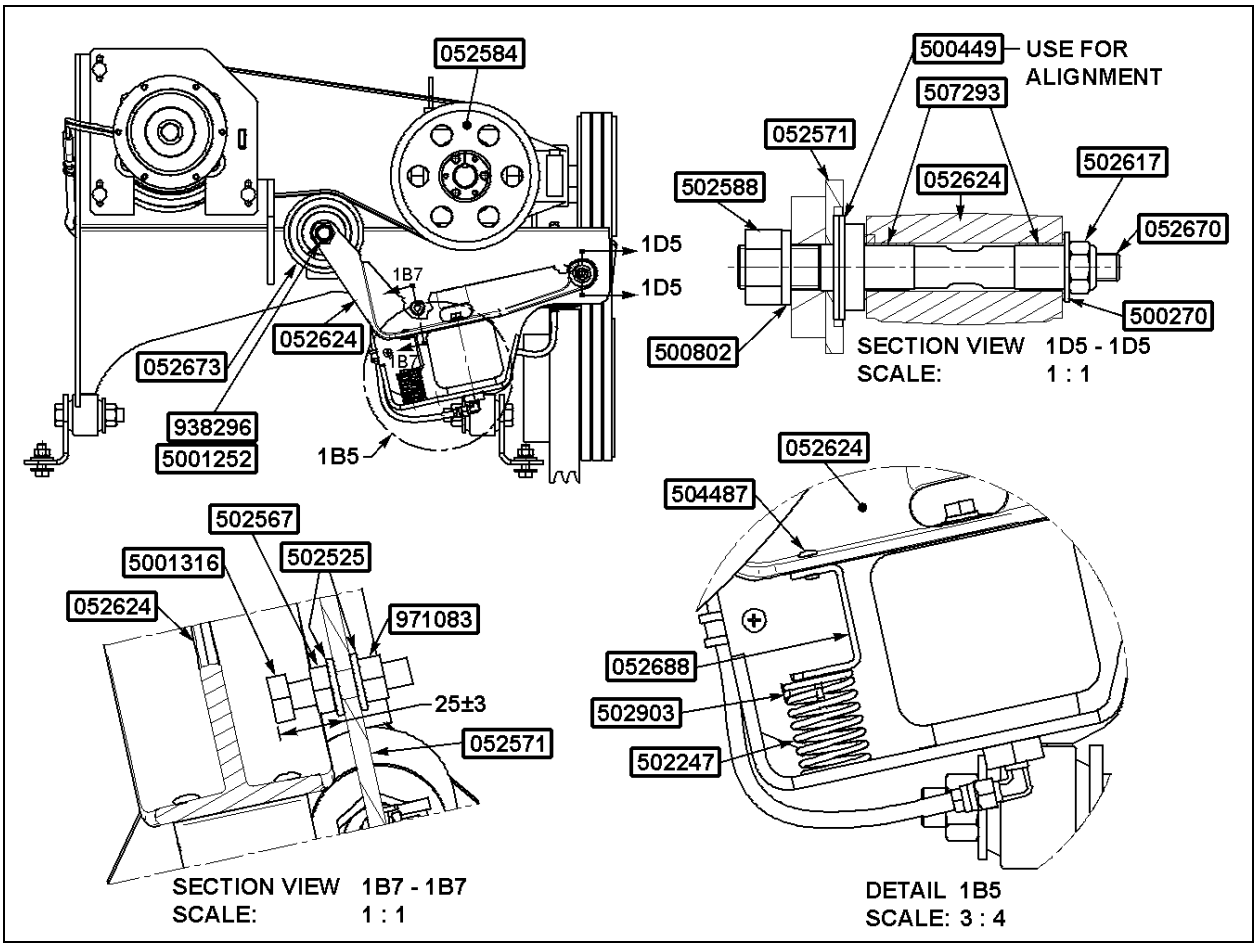



**FIGURE 11**

33. Reinstall belts on engine pulleys.
34. Turn belt tensioner pressure releasing valve clockwise to reapply the pressure on the belts. Set regulator pressure to 35 lb/in$^2$.
35. Check operation of radiator fan transfer mechanism in 1$^{st}$ and 2$^{nd}$ speed.

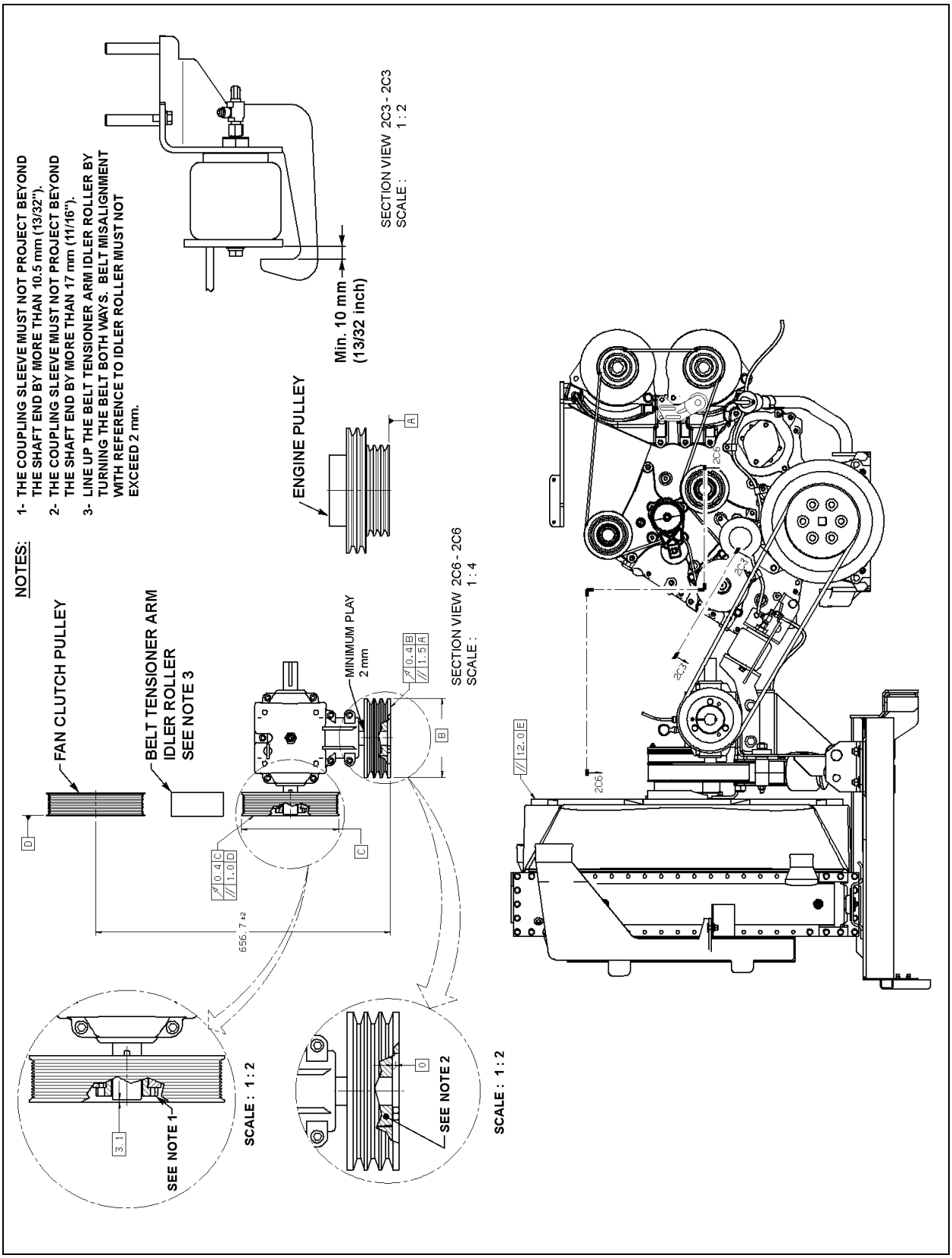

NOTES:
1- THE COUPLING SLEEVE MUST NOT PROJECT BEYOND THE SHAFT END BY MORE THAN 10.5 mm (13/32").
2- THE COUPLING SLEEVE MUST NOT PROJECT BEYOND THE SHAFT END BY MORE THAN 17 mm (11/16").
3- LINE UP THE BELT TENSIONER ARM IDLER ROLLER BY TURNING THE BELT BOTH WAYS. BELT MISALIGNMENT WITH REFERENCE TO IDLER ROLLER MUST NOT EXCEED 2 mm.
FAN CLUTCH PULLEY
BELT TENSIONER ARM IDLER ROLLER SEE NOTE 3
ENGINE PULLEY
Min. 10 mm (13/32 inch)
MINIMUM PLAY 2 mm
656.7 ±2
SECTION VIEW 2C3 - 2C3 SCALE : 1 : 2
SECTION VIEW 2C6 - 2C6 SCALE : 1 : 4
SEE NOTE 1
SCALE : 1 : 2
SEE NOTE 2
SCALE : 1 : 2
2C6
2C3

**FIGURE 12**