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## INSTALLATION INSTRUCTIONS

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### Radiator Kit 299878 1200 kW Standby Generator Set

These instructions are intended to finalize assembly of the radiator kit to the generator set. The generator set was fully assembled prior to testing and then partially disassembled for shipping. The partial disassembly may vary from the instructions given due to manufacturing procedures. The illustrations and parts list include all components contained in the radiator kit. The written procedures only provide instructions for radiator components requiring final assembly.



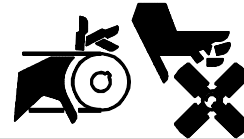
#### **Accidental starting.**

#### **Can cause severe injury or death.**

Disconnect battery cables before working on generator set (negative lead first and reconnect it last).

**Accidental starting can cause severe injury or death.** Turn generator master switch to OFF position, disconnect power to battery charger, and remove battery cables (remove negative lead first and reconnect it last) to disable generator set before working on any equipment connected to generator. The generator set can be started by automatic transfer switch or remote start/stop switch unless these precautions are followed.

#### **⚠ WARNING**



#### **Rotating parts.**

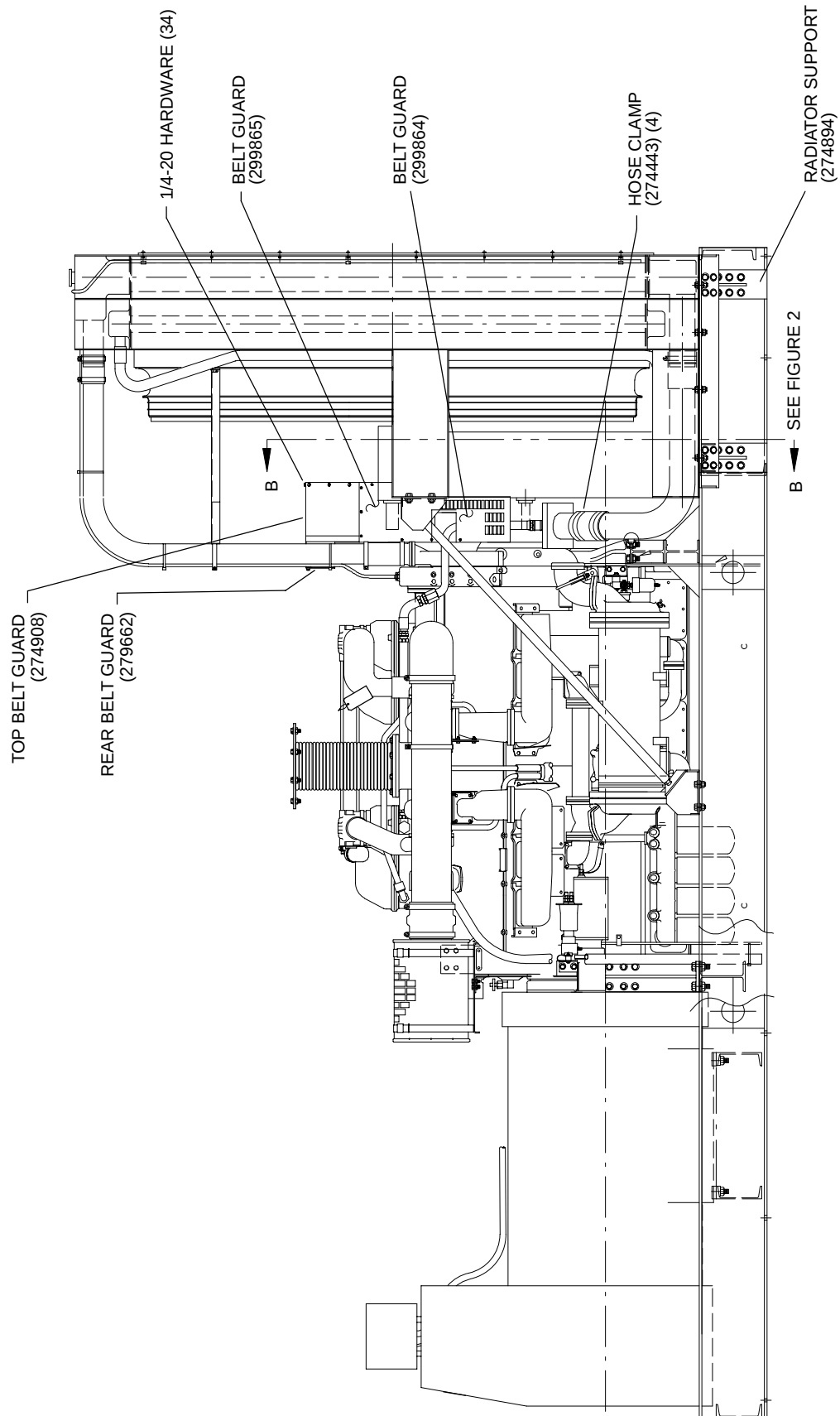
#### **Can cause severe injury or death.**

Do not operate generator set without all guards, screens, or covers in place.

**Exposed moving parts can cause severe injury or death.** Keep hands, feet, hair, and clothing away from belts and pulleys when unit is running. Replace guards, covers, and screens before operating generator set.

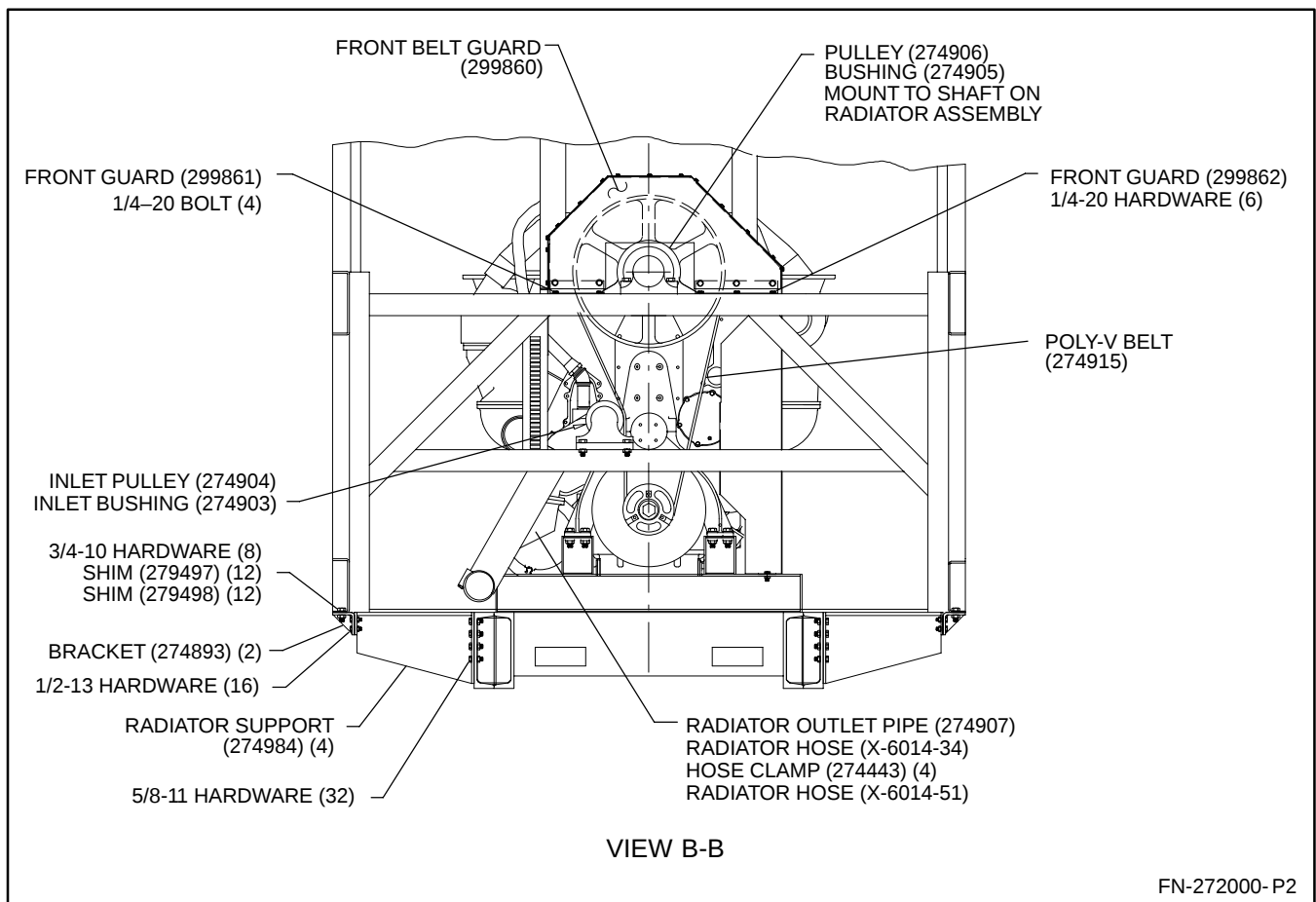
### INSTALLATION

1. Move generator master switch to OFF position. Disconnect battery cables, negative lead first.
2. Install four radiator supports (274894) to skid using 32 5/8-11 bolts, 5/8-in. split lock washers, and 5/8-in. nuts (see Figure 1).
3. Install idler bushing (274903) and idler pulley (274904) (see Figure 2). Lubricate fan shaft and idler shaft. See page 8, Figure 6, under "Lubrication Procedure" for further information.



FN-272000-P1

**Figure 1. Radiator Kit Installation—Right View**



**Figure 2. Radiator Kit Installation—Front View (View B-B)**

4. Mount two radiator support brackets (274893) to radiator supports using 16 1/2-in. split lock washers, and 1/2-in. nuts (see Figure 2).

**NOTE**

Radiator must be securely supported while performing steps 5 through 7.

5. Install radiator assembly (A-299851) on skid and secure to radiator supports (299857) using four 5/8-11-in. bolts, 5/8-in. split lock washers, and 5/8-11 nuts (see Figure 2). DO NOT tighten hardware at this time. Use 7-gauge (0.179-in.) (279497) and 16-gauge (0.06-in.) shims (279498) as necessary to vertically align pulley/radiator assembly.
6. Adjust radiator supports (299857) so that radiator is in vertical alignment. Tighten bolts.

**NOTE**

During the transporting and handling process, the generator set may be exposed to many stresses.

As a result, it is recommended that the radiator and its supports be checked for proper alignment before the generator set is put into service. After confirming that all components are properly aligned, check that the appropriate hardware is correctly tightened.

7. Attach one end of lower radiator hose (X-6014-51) to radiator outlet and the other end to radiator outlet pipe (274907) using two hose clamps (274443). Attach one end of radiator hose (X-6014-34) to radiator outlet pipe (274907) and the other end to engine inlet pipe using two hose clamps (274443) as shown in Figure 2.
8. Install one radiator hose (X-6014-41) on each end of radiator inlet pipe (274897) using two hose clamps (274824). Repeat procedure for second radiator inlet pipe (see Figure 3). Install hose assemblies on engine outlet and radiator inlet connections with four hose clamps (274824).

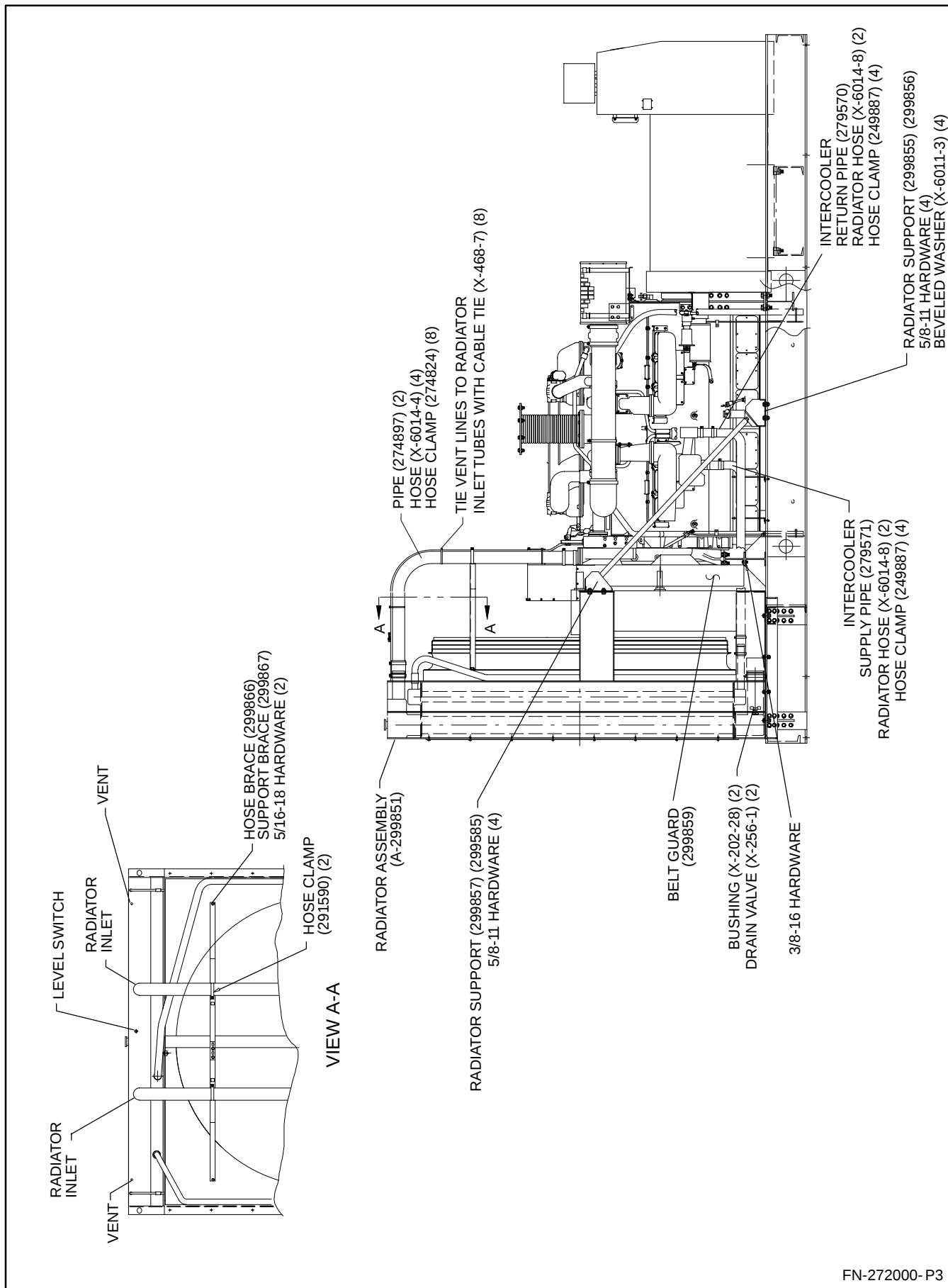
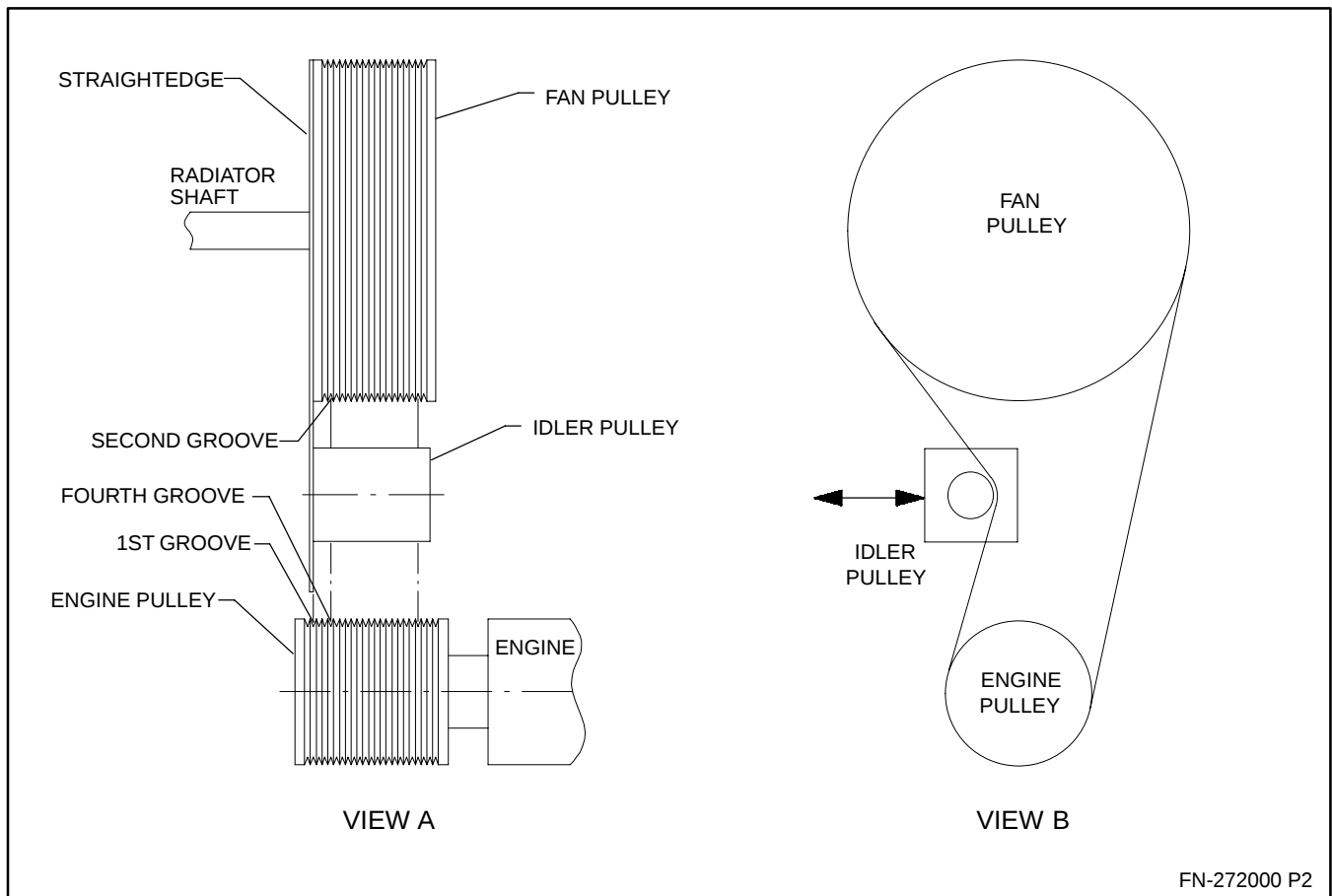


Figure 3. Radiator Kit Installation—Left View

9. Connect upper radiator hose brace (299866) and upper radiator support brace (299867) to radiator using two 5/16-18 bolts, 5/16-in. plain washers, and 5/16-18 lock nuts (see Figure 3, View A-A). Secure upper radiator pipes to upper radiator braces with two hose clamps (291590).
10. Install radiator hose (X-6014-8) on each end of intercooler supply pipe (279571) and attach to lower radiator and engine using four hose clamps (249887) (see Figure 3).
11. Install radiator hose (X-6014-8) on each end of intercooler return pipe (279570), connecting to lower radiator and engine using four hose clamps (249887).
12. Attach vent lines to upper radiator inlet tubes using eight cable ties (X-468-7).
13. Attach wiring harness connector to radiator level switch at top of radiator. Secure wiring harness with cable ties (X-468-7).
14. Install poly-V belt (274915) and align pulleys as follows:
  - 14.a. Adjust idler pulley. Verify that the pulley is adjusted to the center of the adjustment range. Loosen entire pulley mounting brackets. Fit belt on pulleys and take up slack in belt by moving entire pulley mounting brackets. Tighten hardware and remove belt (see Figure 2).
  - 14.b. Align pulleys. Place straightedge along face of fan pulley. The edge of the straightedge should be flush with the face of the idler pulley. Slide the straight edge down and align the face of the fan and idler pulleys with the center of the first groove of the engine pulley (see Figure 4, View A). Adjust pulleys as necessary and tighten all hardware. Recheck alignment after tightening hardware.
  - 14.c. After all pulleys are aligned, apply Loctite® 271 to fan pulley bolts and tighten to the following specifications:  
Tighten 3/8-16 hardware to 28 ft. lbs. (38 Nm)  
Tighten 1/2-13 hardware to 68 ft. lbs. (92 Nm)



**Figure 4. Fan Belt/Pulley Alignment**

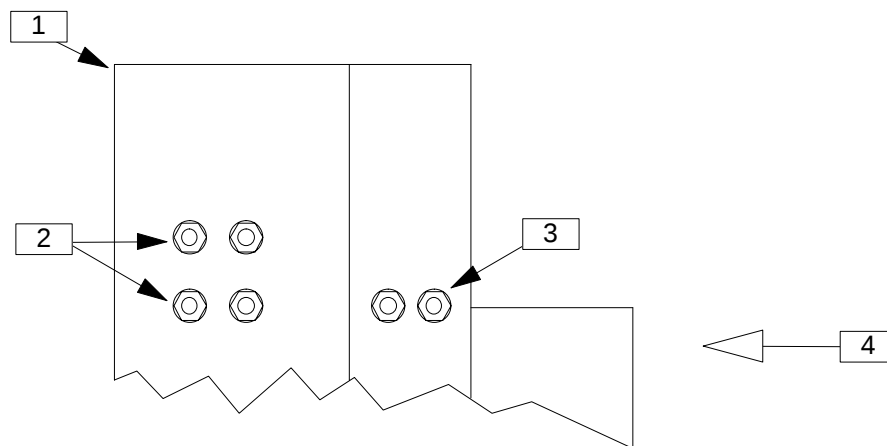
- 14.d. Assemble belt to pulleys. The belt should start in the fourth groove of the engine pulley (see Figure 4, View A). After the belt has been assembled on the pulleys, take up the slack by adjusting the idler pulley. Recheck belt alignment. Place a belt tension gauge on belt and tighten to 500 lbs. (227 kg) of tension. Tighten idler pulley hardware.
15. Install right side front guard (299861) using four 1/4-20 bolts, 1/4-in. split lock washers, and 1/4-20-in. plain washers.
16. Install left side front guard (299862) using six 1/4-20 bolts, 1/4-in. split lock washers, and 1/4-in. plain washers.
17. Install upper left side belt guard (299859), bottom right belt guard (299864), top right belt guard (299865), and front belt guard (299860). Use 3/4, 1/4-20 bolts, 1/4-in. split lock washers, and 1/4-in. plain washers.
18. Loosen expansion joint nuts. The radiator assembly has expansion joints that require correct loosening of the nuts to permit differential thermal expansion of the radiator tank. The 12 expansion joint nuts are tightened for shipment, but must be loosened one full turn before putting the generator into service (see Figure 5).
19. Close all coolant drain pet cocks and fill with coolant. Refer to Operation Manual for cooling system capacity and coolant specifications.
20. Reconnect generator set battery cables, negative lead last.
21. Consult Installation Guide, Prestart Checklist, and any information regarding generator set installation and initial start-up.

**NOTE**

If upon starting the generator set there is radiator and/or fan misalignment, immediately stop the generator set and correct the interference. This practice should be considered a normal routine during the start-up procedure.

There is a total of 12 expansion joint nuts (6 on each side of the radiator). Loosen each nut one full turn.

**NOTE:** This procedure is only required on generator sets using a Young radiator.



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- |                                                   |                                                  |
|---------------------------------------------------|--------------------------------------------------|
| 1. Top Front of Radiator                          | 3. Expansion Joint Nuts for Rear Tank, Left Side |
| 2. Expansion Joint Nuts for Front Tank, Left Side | 4. Air Flow                                      |

**Figure 5. Expansion Joint Nuts, Top Left Side of Radiator (Typical)**

## SCHEDULED MAINTENANCE

Refer to the generator operation manual and engine operation manual for specific periodic service regarding the generator set.

The fan shaft and shaft bearing on this radiator kit must be lubricated regularly to avoid bearing damage. Lubrication of the bearings is required every 200 hours of operation when the generator set is operated in ambient temperatures less than 85°F (29°C). Lubricate the bearings every 100 hours of operation if the generator set is operated in ambient temperatures of greater than 85°F (29°C), or if the generator set is run in a dusty or humid environment. Lubricate the bearings at the specified interval according to the following procedure.

### NOTE

It may be convenient to remember to lubricate the radiator fan shaft and idler shaft bearings whenever the engine oil is changed.



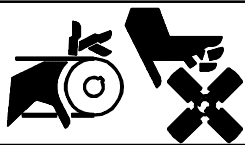
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## LUBRICATION PROCEDURE

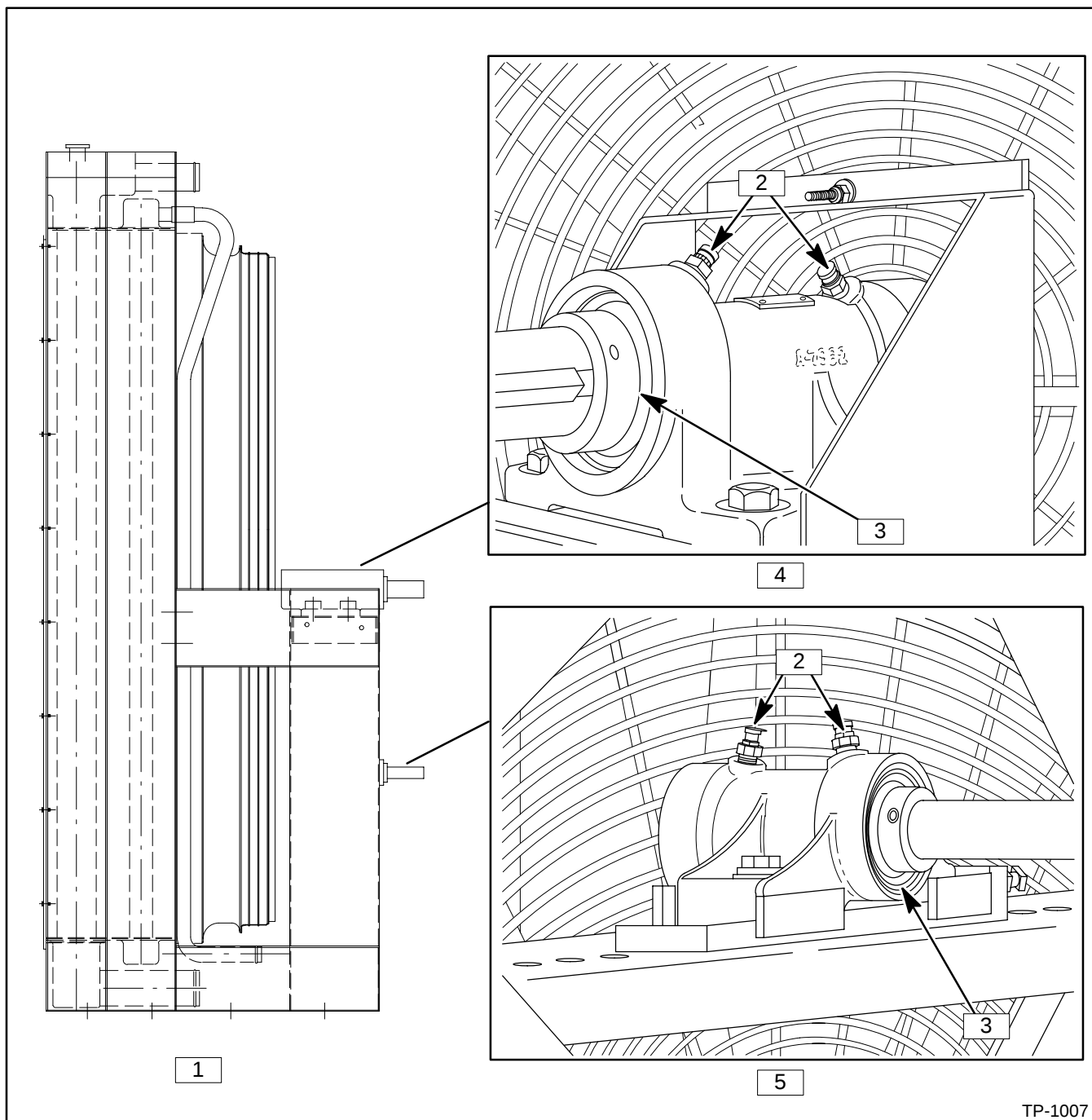
The fan shaft and idler shaft bearings should be lubricated with a lithium-complex base, multi-purpose grease with anti-rust, anti-foam, extreme pressure additives and a minimum dropping point of 400°F (204°C). Use Mobil Mobilith AW2 NLG1, Grade 2 or equivalent.

1. Move generator master switch to OFF position. Allow generator set to cool.
2. Remove generator set battery cables, negative lead first.
3. Remove belt guards to expose fan shaft and idler shaft bearings.
4. Using a grease gun filled with specified grease, inject grease into the two bearings on the fan shaft block and the two bearings on the idler shaft block (see Figure 6). Inject grease until a 0.125-0.250 in. (3-6 mm) grease column shows at the bearing pressure relief port.

### NOTE

The fan shaft and idler shaft bearings are equipped with pressure relief ports to prevent damage if the bearings are overlubricated.

5. Use a rag to remove excess grease from bearing relief ports.
6. Inspect fan drive belt for damage or wear; replace if necessary. Check fan belt tension using a poly-V belt tension gauge and adjust if necessary. Proper tension for a new belt is 500 lbs. (227 kg) and for a used belt is 250-300 lbs. (113-136 kg).
7. Reinstall belt guards using original hardware.
8. Reconnect generator set battery(ies), negative lead last. Move generator master switch to RUN position to start generator set.
9. Listen for noise (squeal) from fan belt, indicating a slipping belt. If fan belt is slipping, stop and disable the generator set. Readjust belt tension to eliminate slippage.
10. Reconnect generator set battery(ies), negative lead last. Move generator master switch to normal operating position (RUN or AUTO).



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1. Radiator Assembly
2. Grease Fittings
3. Pressure Relief Port

4. Fan Shaft Grease Fittings
5. Idler Shaft Grease Fittings

**Figure 6. Radiator Fan Bearings and Pressure Relief Ports**

| Parts List                                              |      |             |
|---------------------------------------------------------|------|-------------|
| <b>Kit PA-299878</b>                                    |      |             |
| <b>* Radiator Kit Components Requiring Installation</b> |      |             |
| Description                                             | Qty. | Part Number |
| Radiator Assembly *                                     | 1    | A-299851    |
| Nut, 3/8-16 elastic stop hex                            | 2    | X-101-13    |
| Bushing, 1/2 to 3/8 in. NPT reducer                     | 2    | X-202-28    |
| Nipple, 1 1/2 NPTF x 4.00 in. pipe                      | 1    | X-205-7     |
| Elbow, 45°, 1 1/2 in. NPT pipe                          | 1    | X-225-3     |
| Washer, 0.438 x 1.00 x 0.083 plain                      | 2    | X-25-1      |
| Valve, 3/8 in. NPTF drain                               | 2    | X-256-1     |
| Clamp, 4.06 to 5.00 in. x 0.56 in. hose *               | 4    | X-426-7     |
| Tie, cable *                                            | 8    | X-468-7     |
| Washer, beveled                                         | 4    | X-6011-3    |
| Hose, 4.50 in. ID x 5.00 in. wire inserted radiator *   | 1    | X-6014-34   |
| Hose, 3.50 in. ID x 5.00 in. wire inserted radiator *   | 4    | X-6014-41   |
| Hose, 4.50 in. ID x 10.00 in. wire inserted radiator *  | 1    | X-6014-51   |
| Hose, 2.00 in. ID x 8.00 in. wire inserted radiator *   | 4    | X-6014-8    |
| Clamp, 2.12 in. ID insulated                            | 2    | X-672-18    |
| Clamp, 0.44 in. ID insulated                            | 3    | X-672-7     |
| Plug, 1/4 in. NPTF pipe                                 | 1    | X-75-41     |
| Plug, 3/4 in. NPTF pipe                                 | 1    | X-75-6      |
| Clamp, hose *                                           | 8    | 249887      |
| Switch Assembly                                         | 1    | 273469      |
| Tube, inlet                                             | 1    | 274265      |
| Gasket, inlet                                           | 1    | 274300      |
| Clamp, 4.81–5.12 in. x 0.75 in. hose *                  | 4    | 274443      |
| Clamp, 3.68–4.00 in. x 0.75 in. hose *                  | 8    | 274824      |
| Bracket, radiator support *                             | 2    | 274893      |
| Support, radiator *                                     | 4    | 274894      |
| Pipe *                                                  | 2    | 274897      |
| Bushing, idler *                                        | 1    | 274903      |
| Pulley, idler *                                         | 1    | 274904      |
| Bushing, pulley                                         | 1    | 274905      |
| Pulley                                                  | 1    | 274906      |
| Pipe, radiator outlet *                                 | 1    | 274907      |
| Guard, belt                                             | 1    | 274908      |
| Bracket, mounting                                       | 2    | 274913      |
| Belt, poly-V *                                          | 1    | 274915      |

| Parts List                                              |      |             |
|---------------------------------------------------------|------|-------------|
| <b>Kit PA-299878, continued</b>                         |      |             |
| <b>* Radiator Kit Components Requiring Installation</b> |      |             |
| Description                                             | Qty. | Part Number |
| Shim, 7 gauge (0.179 in.) *                             | 12   | 279497      |
| Shim, 16 gauge (0.06 in.) *                             | 12   | 279498      |
| Bracket, mounting                                       | 2    | 279499      |
| Gasket, pressure sensitive                              | 1    | 279557      |
| Cover, pressure sensitive                               | 1    | 279558      |
| Pipe, intercooler return *                              | 1    | 279570      |
| Pipe, intercooler supply *                              | 1    | 279571      |
| Guard, belt                                             | 1    | 279662      |
| Decal, caution                                          | 1    | 279748      |
| Clamp, hose *                                           | 2    | 291590      |
| Support, radiator (lower right)                         | 1    | 299855      |
| Support, radiator (lower left)                          | 1    | 299856      |
| Support, radiator (upper right) *                       | 1    | 299857      |
| Support, radiator (upper left) *                        | 1    | 299858      |
| Guard, belt (left) *                                    | 1    | 299859      |
| Guard, belt (front) *                                   | 1    | 299860      |
| Guard, front (right) *                                  | 1    | 299861      |
| Guard, front (left) *                                   | 1    | 299862      |
| Brace, radiator                                         | 1    | 299863      |
| Guard, belt (right) *                                   | 1    | 299864      |
| Guard, belt (right) *                                   | 1    | 299865      |
| Brace, radiator hose *                                  | 1    | 299866      |
| Brace, radiator support *                               | 1    | 299867      |

| Hardware List                                                                           |      |
|-----------------------------------------------------------------------------------------|------|
| <b>** Bolt lengths may vary.<br/>Use appropriate length bolts to match application.</b> |      |
| Description                                                                             | Qty. |
| Bolt, 5/8-11 x ** hex                                                                   | 36   |
| Washer, 5/8 in. split lock                                                              | 36   |
| Nut, 5/8-11 hex                                                                         | 36   |
| Bolt, 1/2-13 x ** hex                                                                   | 16   |
| Washer, 1/2 in. split lock                                                              | 16   |
| Nut, 1/2-13 hex                                                                         | 16   |
| Bolt, 5/16-18 x ** hex                                                                  | 2    |
| Washer, 5/16 in. plain                                                                  | 2    |
| Nut, 5/16-18 hex                                                                        | 2    |
| Bolt, 1/4-20 x ** hex                                                                   | 44   |
| Washer, 1/4 in. split lock                                                              | 44   |
| Washer, 1/4 in. plain                                                                   | 44   |