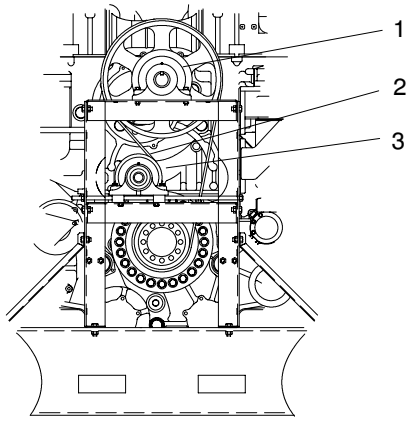
SERVICE BULLETIN

Original Issue Date: **5/00**
Model: **1250–2000 kW (Detroit Diesel Series 4000 Engine)**
Market: **Industrial**
Subject: **Fan Pulley Alignment with Pillow Block Idler Pulley Design**

Introduction

Use this service bulletin when aligning the fan pulley and engine drive pulley with the pillow block idler pulley design; see Figure 1. Perform the alignment procedure at initial startup or when reassembling the generator set after component replacement. Failure to perform this procedure may cause generator set cooling system problems and/or premature pulley belt failure.



1. Fan shaft pillow block
2. Idler pulley
3. Idler pulley shaft pillow block

Figure 1 Pillow Block Design

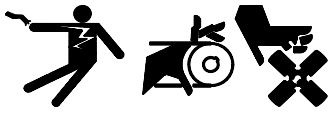
Required Tools:

- Straight edge (machinist's ruler), 610 mm (24 in.)
- Belt tension gauge (Kent-Moore BT-3384 or equivalent)

Observe the following safety precautions while performing the fan pulley alignment procedure.

Safety Precautions

⚠ WARNING

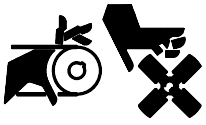


Accidental starting.
Can cause severe injury or death.

Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or connected equipment, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

⚠ WARNING



Rotating parts.
Can cause severe injury or death.

Operate the generator set only when all guards, screens, and covers are in place.

Routing	Service Manager	Sales Manager	Parts Manager	Technician No. 1	Technician No. 2	Technician No. 3	Return This to
Initial Here							

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

Alignment Procedure

1. Remove the generator set from service.

1.1 Place the generator set master switch in the OFF position.

1.2 Disconnect the power to the battery charger and block heater, if equipped.

1.3 Disconnect the generator set engine starting battery(ies), negative (–) lead first.

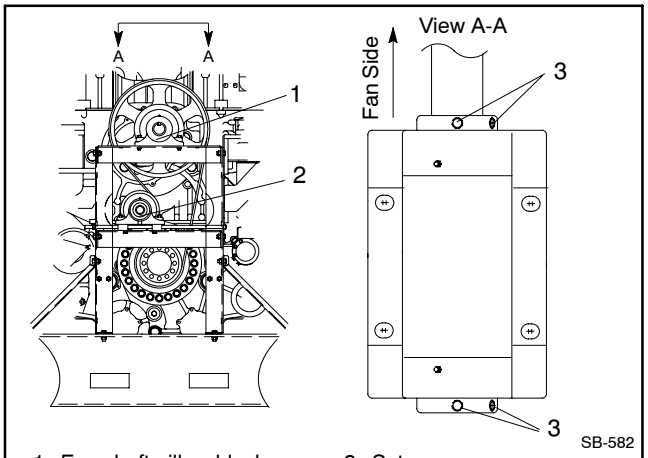
2. Align the fan pulley.

2.1 Remove the belt guards, as necessary, to access the poly-V belt and pulleys, if not already removed.

2.2 Align fan pulley with the engine drive pulley. The second groove of engine drive pulley must align with first groove of the fan pulley. See Figure 3.

2.2.1 Place a straight edge (machinist's ruler) on the left side, as viewed from the radiator end, of the fan shaft along the face of the engine drive pulley and adjust the fan shaft so that the measurement between the straight edge and the first groove of the fan pulley is 13.5 mm (0.53 in.).

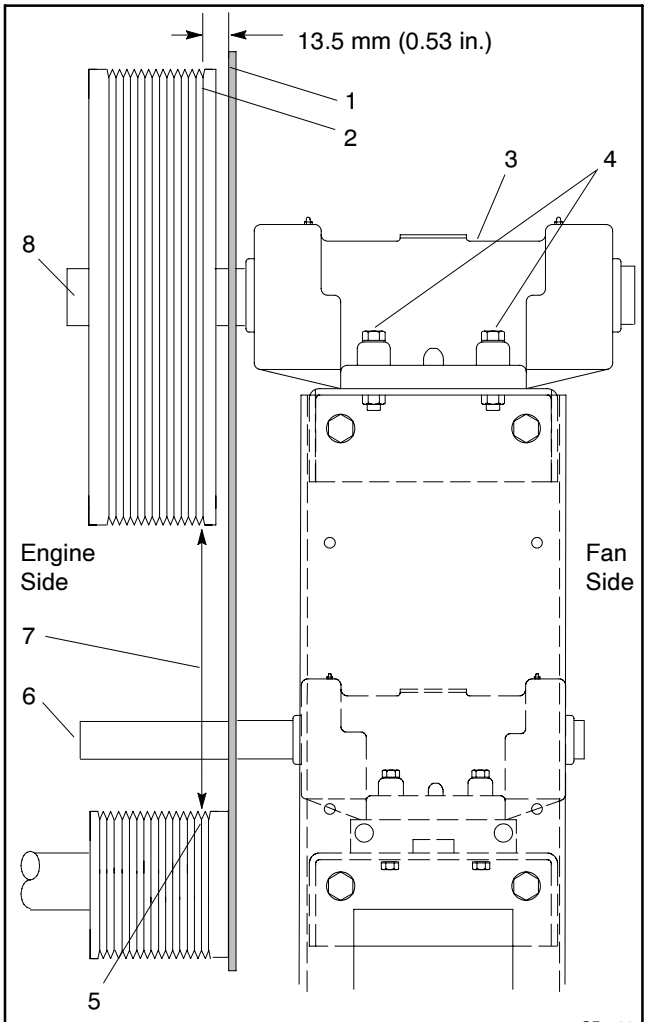
Adjust the front-to-back pulley alignment by loosening the fan shaft set screws. See Figure 2.



1. Fan shaft pillow block
2. Idler pulley shaft pillow block
3. Set screws

Figure 2 Fan Shaft Set Screws

Adjust the left-to-right pulley alignment by loosening the fan shaft pillow block mounting hardware. See Figure 3.



1. Straight edge (machinist's ruler)
2. Fan pulley **(use first groove for item 7)**
3. Fan shaft pillow block
4. Fan shaft pillow block mounting hardware
5. Engine drive pulley **(use second groove for item 7)**
6. Idler pulley shaft
7. Groove alignment (align first groove of fan pulley with second groove of engine drive pulley)
8. Fan shaft

Figure 3 Pulley Alignment, Side View

2.2.2 Repeat step a procedure using the straight edge on the right side, as viewed from the radiator end, of the fan shaft.

The pulley alignment measurement on both the left and the right side of the fan pulley must be 13.5 mm (0.53 in.) as viewed from the radiator end. Adjust the fan shaft pillow block as required so that both the left and right measurements are 13.5 mm (0.53 in.).

2.2.3 Make sure the fan shaft pillow block mounting hardware is tight. Hold the bolts while tightening the nuts. Torque mounting hardware to 325 Nm (240 ft. lb.).

2.2.4 Verify the pulley alignment by measuring the distance from the straight edge to the first groove on the fan pulley and from the straight edge to the second groove on the engine drive pulley. Measure the distance on both the left and right sides of the fan shaft.

The measurement from the straight edge to the first groove on the fan pulley and the measurement from the straight edge to the second groove on the engine drive pulley **must** be 13.5 mm (0.53 in.) on both sides.

If the measurements are not 13.5 mm (0.53 in.), adjust the fan shaft as required to achieve the 13.5 mm (0.53 in.) measurement.

Note: The fan pulley and the engine drive pulley must be parallel with the grooves aligned.

2.3 Verify that the idler pulley shaft set screws are torqued to 19 Nm (14 ft. lb.).

2.4 Verify that the fan shaft set screws are torqued to 33 Nm (24 ft. lb.). See Figure 2.

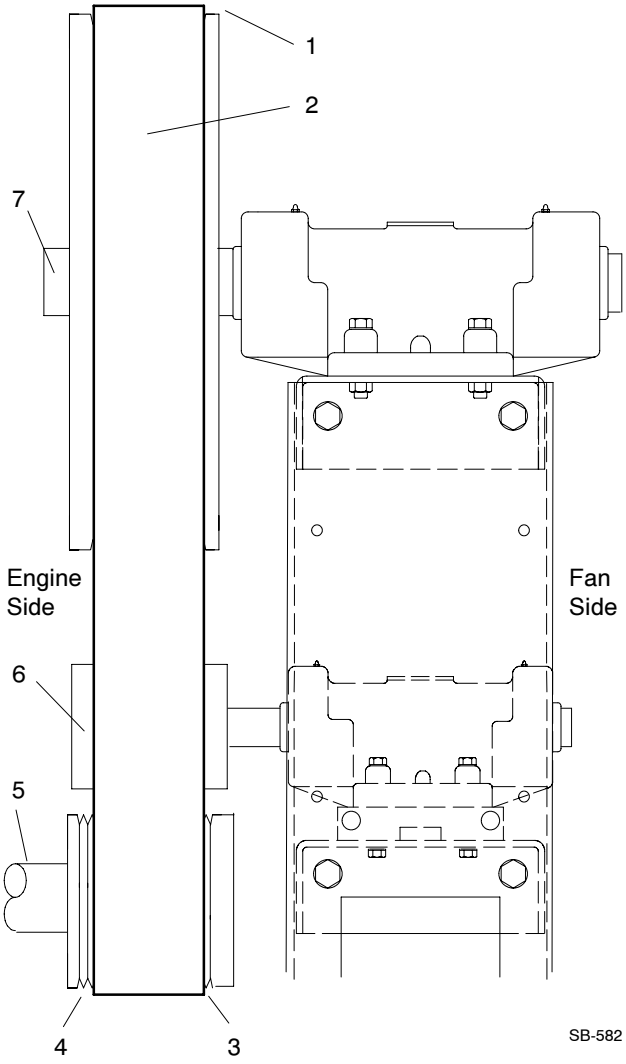
2.5 Recheck the alignment of the fan and engine pulleys as described in step 2.2.

2.6 Inspect the fan drive belt for damage or wear. Replace the belt if it is damaged or worn.

2.7 Install the poly-V belt. Align the poly-V belt with the second groove on the engine drive pulley and the first groove on the fan pulley from the fan side. See Figure 3 and Figure 4.

Note: The engine drive pulley will have two open grooves on the *engine side.*

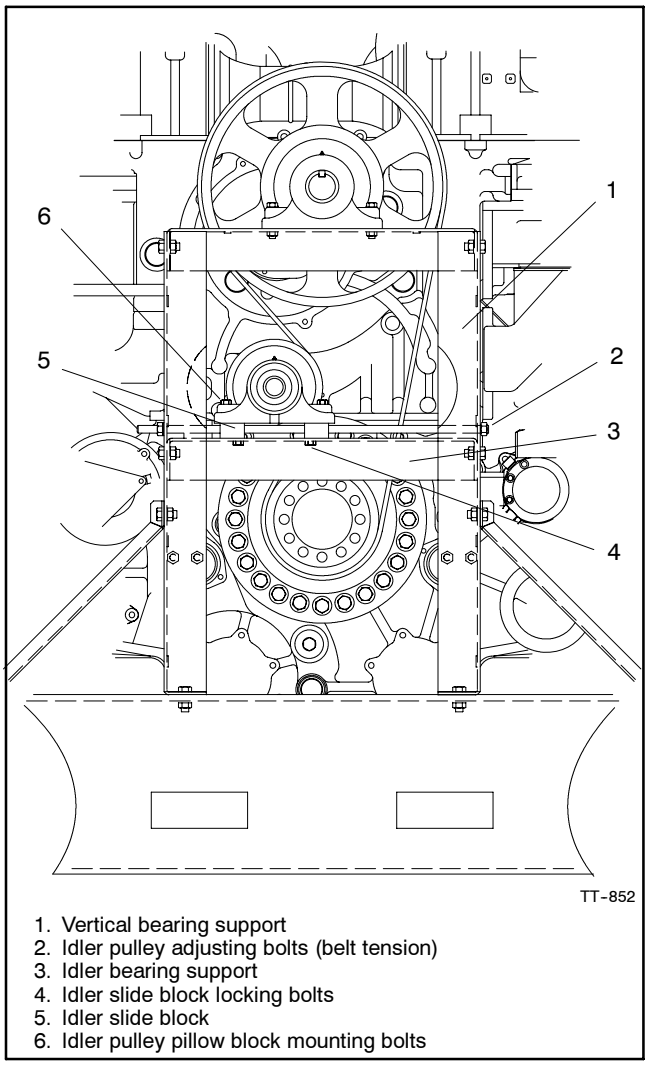
2.8 Center the idler pulley on the poly-V belt.



1. Fan pulley (use first groove for poly-V belt)
2. Poly-V belt
3. Engine drive pulley (use second groove for poly-V belt)
4. Engine drive pulley with two grooves open
5. Engine drive shaft
6. Idler pulley
7. Fan shaft

Figure 4 Belt Installation

2.9 Verify that the idler pulley pillow block to idler slide block mounting bolts (top side) are torqued to 92 Nm (68 ft. lb.) See Figure 5.



1. Vertical bearing support
2. Idler pulley adjusting bolts (belt tension)
3. Idler bearing support
4. Idler slide block locking bolts
5. Idler slide block
6. Idler pulley pillow block mounting bolts

Figure 5 Idler Pulley Pillow Block Mounting on Fan-Bearing Support, Rear View

2.10 Loosen the idler slide block to idler bearing support locking bolts (underside).

2.11 Adjust the idler pulley by turning the two adjusting bolts located on the side of the vertical fan bearing support.

2.12 Verify that the fan belt is seated in the second groove on the engine drive pulley and the first groove on the fan pulley from the fan side.

2.13 Check the fan belt tension using a poly-V (serpentine) belt tension gauge. See Figure 6 for belt tension specifications. Adjust the belt tension by turning the two idler pulley adjusting bolts. See Figure 5 for location.

Generator Set Model	New Belt, N (lbf.)	Used Belt*, N (lbf.)
1250-2000 kW	2450-2890 (550-650)	1650-1910 (370-430)
* A belt is considered used after 50 hours of service.		

Figure 6 Poly-V Belt Tension Specifications

2.14 Tighten the idler slide block to idler bearing support locking bolts (underside) after reaching the specified belt tension. Torque bolts to 92 Nm (68 ft. lb.).

2.15 Reinstall the belt guards using the original hardware.

3. Restore the generator set to service.

3.1 Reconnect the generator set engine starting battery(ies), negative (-) lead last.

3.2 Move the generator set master switch to the RUN position to start the generator set.

3.3 Listen for a squeaking or squealing noise from the fan belt, which indicates a slipping belt. Stop the generator set.

If the fan belt slips, disconnect the engine starting battery(ies). Increase the belt tension to eliminate slippage using procedure starting with step 2.10.

3.4 Reconnect the power to the battery charger and block heater, if equipped.