



BLACKBIRD INSTALLATION SUPPLEMENT



FOR PRE-07 EMISSION FREIGHTLINER M2
MBE900



**BLACKBIRD INSTALLATION SUPPLEMENT FOR PRE-07 EMISSION FREIGHTLINER
M2 MBE900**

Parts Included in Installation Kit

Before beginning installation, check the parts kit thoroughly against the parts inventory list, and make sure that every necessary part is in hand. If parts are missing or you have questions regarding the parts and components, contact Raven Product Support (207-721-1044) before beginning installation.

Parts	Description
Wiring Manual	
Installation Supplement	MBE900
Owner's Manual	Including Warrantee Registration
Generator Bracket	With tensioner and idlers
Bracket mounting block	
Fasteners	(2) M10-1.5 x 120mm Gr. 10.9
	(1) M10-1.5 x 30mm with flat washer
Upper bracket fastener	(1) M10-1.5 x 50mm with flat washer
Spacer	(1) 1"
Lower bracket fasteners	(2) M14-2.0 x 90mm
Spacers	(2) 1 3/8"
Generator belt	NAPA 25-060815 or equivalent
Generator mounting bolts	(4) 3/8-16 x 3/4" flat head socket
Generator Temporary alignment stud	3/8-16 x 1 1/2"
Clutch	3" 6-groove electric
Clutch key	3/16" x 1 3/4"
Clutch bolt (1)	7/16"-20 x 2 1/4" w/ lock washer
Clutch electrical harness	16' red/black
Crankshaft Pulley	11" diameter
Pulley bolts	(6) M10-1.5 x 90mm w/flat washers
Fan Spacer	
Fasteners	(4) M8-1.25 x 35mm with flat washers



General Instructions

This document supplements the Blackbird Large Diesel Wiring Manual with information specific to the Pre-2007 emission MBE900 engine in the Freightliner M2 chassis. Installation cannot be completed without the Large Diesel Wiring Manual. Contact Raven Product Support (207-721-1044) if more documentation is needed.

This installation provides for full 5kW output from an engine idle of 750 RPM to governed high RPM. Between 750 RPM and governed engine RPM the generator output will be unaffected by changes in engine speed. Below 750 engine RPM output voltage will sag as electrical load is increased.

- All installation steps in this supplement and the Large Diesel Wiring Manual must be completed before operating the system.
- Use Loctite 262 on all engine and bracket mounted bolts.
- All hoses and wires moved or relocated during installation must be secured to prevent chafing and exposure to hot surfaces. At no time should wiring be secured to fuel or exhaust system components.
- All fasteners must be checked and re-torqued after 2 hours of engine operation.

	Torque-Ft-lbs.		
Grade	5	8	8.8
Bolt Size			
1/4	9	12	
5/16	18	27	
3/8	35	40	
7/16	55	60	
1/2	80	90	
5/8	150	180	
8mm			19
10mm			41
12mm			69
14mm			104

Preparing for Installation

Figure 1 provides an overview of the Raven bracket and drive components to be installed and their mounting locations. We suggest you take a minute before proceeding to review the steps below to familiarize yourself with the parts and their mounting locations.

1. Disconnect all battery negative terminals.
2. Remove the air filter housing for easier access.
3. Disconnect the upper radiator braces at the radiator end. Swing braces outboard to allow radiator shroud access.
4. Remove the four bolts securing the radiator fan shroud.
5. Insert protective cardboard between the shroud and the radiator
6. Disconnect the actuator tube from the fan clutch.
7. Remove and discard the four bolts holding the fan and clutch assembly.
8. Remove the fan and shroud from the engine compartment as one unit. The actuator tube remains in place and the shroud slides over it.
9. Remove the air conditioning line support bracket from the front of the engine. This is the location of the upper bracket bolt.
10. Reposition the radiator overflow tube higher by rotating its cushion clamp.



Installing the Bracket

The generator bracket mounts on two forward motor mount yoke bolts, one engine bolt, and utilizes the two upper OEM generator bolts. (See **Figures 1, 2,3**)

11. Locate, remove, and discard the driver's side lower and passenger's side upper motor mount yoke bolts from the engine.
12. Remove and discard the two upper bolts securing the OEM alternator. Save the flatwashers for reuse.
13. Install the supplied bracket mounting block over the OEM alternator and secure with supplied M10 x 120mm bolts and OEM flat washers. Do not fully tighten at this time. See **Figure 3**.
14. Place the generator bracket in position and stabilize it with the bolt into the mounting block on the OEM alternator.
15. Install the two 14mm bolts in the lower bracket holes using the two supplied 1 3/8" spacers behind the bracket plate, and the OEM flatwashers under the bolt heads. Finger tighten.
16. Insert the upper bracket bolt and flatwasher in the threaded boss left by the air conditioning line bracket with the 1" spacer behind the plate. Include modified air conditioning bracket.
17. Once all fasteners are in place and finger tight, torque the lower bracket passenger's side bolt first, Driver's side second, the mounting block alternator and bracket bolts and finally the upper bracket bolt.

Installing the Crankshaft Pulley

18. Assure that the inside of the harmonic damper is clean and install the crankshaft pulley using the 6 supplied bolts and flatwashers. Torque the bolts in an opposing pattern.

Installing the Generator, Clutch, and Belt

19. Before mounting the Generator, bench-fit the clutch and key to the shaft ensuring a slip-fit. Dress as necessary.
20. Ensure that the generator electrical junction box cover is securely in place. Insert the temporary alignment stud in one of the Generator mounting holes. Position the generator behind the bracket with the junction box at approximately 12 o'clock. Slip the generator into the bracket. Assure that the large generator mating ring is seated fully in the large bracket hole. Install four 3/8 16 X 3/4" flat head generator bolts. Do Not Loctite!
21. Loop The generator drive belt over the generator shaft and install the electric clutch on the generator (assure proper alignment of the key with keyway *and* cutout in the center hub.) Engage the coil retaining standoff on the bracket with the oval hole in the clutch flange. Fasten with the 7/16" clutch bolt and lockwasher.
22. Install the Raven belt according to **Figure 4**. Assure that the belt is seated correctly on all pulleys and idlers.



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Final Assembly:

23. Slide the fan and shroud back in position, routing the fan actuator tube up through the hole in the shroud.
24. Remount the fan using the supplied spacer and bolts, and re-attach the actuator tube to the fan clutch.
25. Remove the cardboard from the radiator and secure the shroud.
26. Reconnect the upper radiator braces (have an assistant lift on the hood to bring radiator back into position).
27. Reinstall the air cleaner housing, rerouting hoses as necessary. Resecure the air conditioning lines in positions that guard against heat and chafing.

This completes the vehicle-specific installation. Refer to the Large Diesel Wiring Manual for wiring, run up, and troubleshooting instructions.

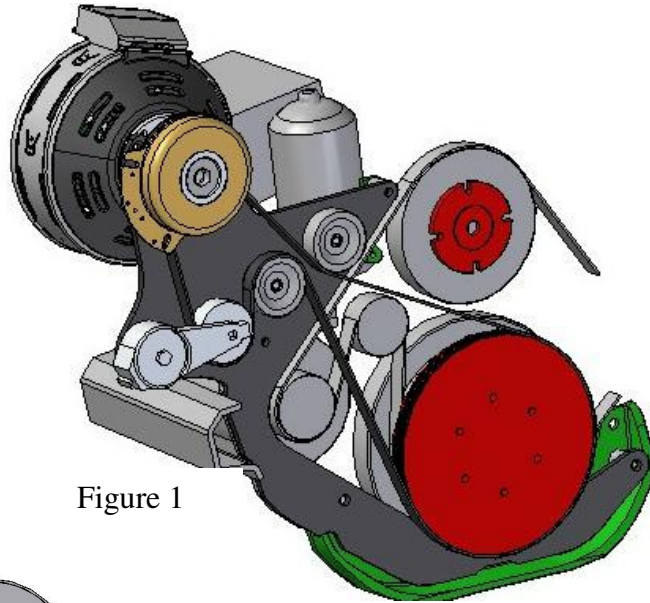


Figure 1

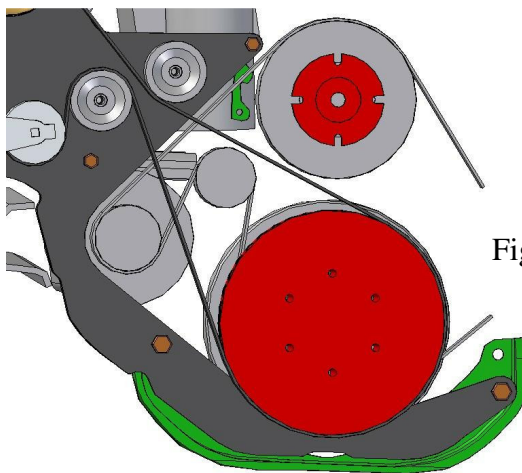


Figure 2



**BLACKBIRD INSTALLATION SUPPLEMENT FOR PRE-07 EMISSION FREIGHTLINER
M2 MBE900**

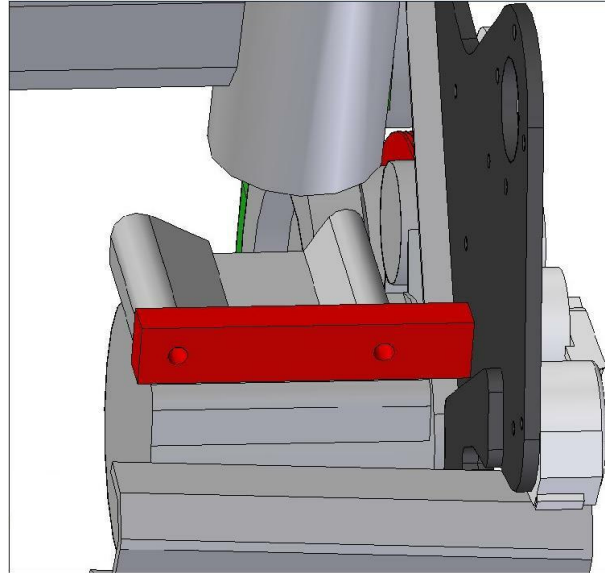


Figure 3

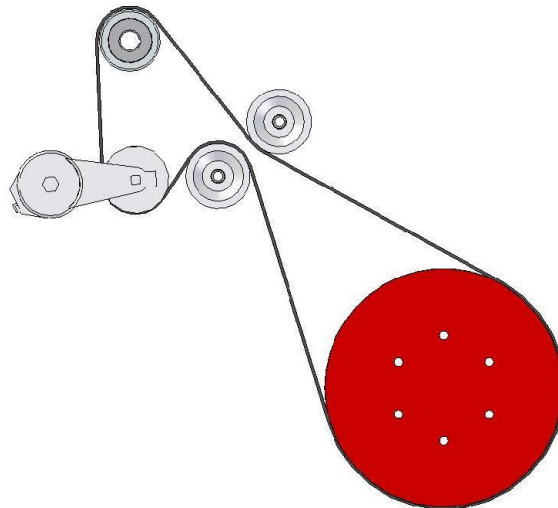


Figure 4