



BLACKBIRD INSTALLATION SUPPLEMENT



FOR 2008-105 FORD 6.4 LITER DIESEL
F-SERIES VERSION 3/10



Blackbird Installation Supplement for Ford 6.4 Liter Diesel - Version 3/10

Parts		
	Blackbird Wiring Manual	
	Installation Supplement 6.4 liter Diesel	
	Owner's Manual	Includes Warrantee Registration
	Generator Bracket	With idlers and tensioner
	Engine Bracket Standoffs	(2) 1 3/4" diameter x 6"
	Fasteners	(4) 5/8" 11 x 1 1/4" w/ flat washers
	Upper brace block	Mounts over OEM secondary alternator or bosses
		(2) M10 x 100 mm w/ flat washers (dual alternator)
		(2) M10 x 45mm w/ flat washers (single alternator)
		(1) M10 x 30mm w/ flat washer
	Engine bracket	
	Bracket spacers	(2) 1" x 3", 2 hole
	Spacer fasteners	(3) M12 x 60mm bolt w/ flatwasher
	Stator Standoff	(1) M12 x 65mm stud
	Crankshaft Pulley	8"
	Fasteners	(3) M10 x 45mm with flat washers
	Pulley spacer	
	Fasteners	(3) M10 x 60 socket head
	Cooling Fan Spacer	Male/female reverse thread
	Generator Belt	NAPA 25-060975 or equivalent
	Generator mounting bolts	(4) 3/8-16 x 3/4" flat head socket
	Generator Temporary Alignment Stud	3/8-16 x 1 1/4"
	Generator Clutch	3" 6-groove electric
	Clutch Key	3/16" x 1 3/4"
	Clutch bolt (1)	7/16"-20 x 2 1/4" Grade w/ lock washer
	Power post with battery post adapter	
	Fasteners	(2) #10 x 1" self drilling
	Oil fill relocater block	Aluminum w/ gasket
	Fasteners	(4) M6 x 25 socket head
	Drain hose extension assembly	1/2" x 2" hose and coupling
	Air intake hose	Blue silicon
	Air conditioning hard tube	
	Fastener	(1) M8 X 45mm bolt w/ flatwasher and nut
	Seals	O-ring and gasket
	Air Conditioning Condenser Line	Replacement for OEM
	Sensor wire harness extension	
	Heater hose chafe guard	1 1/4 x 8" w/ tie-wrap
	Fan plug support bracket	Notched aluminum plate
	Fasteners	(2) 4", (1) 8" tie-wrap
	Electrical: Mechanical installers- forward these parts to the electrical department	
	Clutch Harness	Red/black
	Soft Start Module	



General Instructions

This document supplements the Blackbird Wiring Manual with information specific to the 2008 F-Series truck with the 6.4 liter diesel engine. Contact Raven (207-721-1044) if more documentation is needed.

This installation requires a minimum engine RPM of 1200 to deliver the full 5kW output of the system. Beyond 1200 RPM generator output will be unaffected by changes in engine speed. Arrangements must be made for the engine to high idle when the generator is engaged.

	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

- All installation steps must be completed before operating the system.
- Use Loctite 262 on all engine and bracket mounted bolts, except as noted.
- Refer to torque chart for torque specifications
- 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.

Care must be taken that any grounding straps, battery cables and battery feeds are reconnected in an appropriate manner if moved during installation.

Special Tools

Helpful	NAPA Part #
Ford fan clutch wrench	3473
Fan pulley holder	3900
Doorpanel removal tool (for christmas-tree connectors)	3786-72
Required	
Ford tubing release tool	OTC6593

Preparing for Installation

1. Be careful of the corners of the hood-ouch!
2. Discharge air conditioning system
3. Disconnect all battery terminals and remove the passenger-side battery for relocation.
4. Drain the radiator
5. Disconnect the fuel cooler from the driver's side of the radiator module and swing it aside. Do not drain.
6. Remove the charge air cooler from the front of the radiator module.
7. Disconnect the power steering fluid cooler and swing it aside. Do not drain.
8. Disconnect the air conditioning hoses from the condenser. **Figure 11**
9. Remove the radiator support cross beam.
10. Remove the passenger's side charge air cooler pipe



11. Remove two power steering reservoir bolts, pull the reservoir up and away from the fan shroud.
Do not drain.
12. Disconnect the upper radiator hose and expansion tank hose from the radiator.
13. Remove the four fan shroud assembly bolts from the radiator.
14. Disconnect the hoses from the transmission cooler at the two in-line couplings.
15. Disconnect the lower radiator hose and remove the radiator.
16. Unplug the fan harness from the fan.
17. Remove the two bolts connecting the upper and lower fan shroud, and remove the upper shroud.
18. Remove the fan (turn the nut to the *right* to loosen).
19. Remove the lower shroud and fan stator. Note that the fuel cooler circulating pump mounts to the lower shroud with two bolts.
20. Remove and discard the two lower engine-to-stator standoff studs.
21. Remove the passenger-side battery tray/washer bottle assembly. Trim the tray parallel to the washer bottle and reinstall the bottle using the upper OEM bolt. See **Figure 4**
22. Remove the air filter and intake hose assembly. There are three prongs on the bottom in tight rubber grommets. These must be pulled free for removal.
23. Remove and discard the air filter housing mounting bracket.
24. Disconnect the upper air conditioning condenser hose/tube at the in-line flange fitting, and return for core refund.
25. Unplug the sensor harness from the remaining condenser line and extend the harness using the supplied cable reconnect.
26. Install the supplied hard tube on the condenser line and route it from the firewall forward along the inner fender. Secure to washer bottle support with a cable tie. **Figure 12 & 13**
27. Remove and set aside the passenger-side negative battery cable.
28. Mount the supplied power post on the body frame behind the passenger-side headlight and below the rubber hood stop. **Figure 5.**

Installing the Lower Bracket and Generator Bracket **Figures 1, 2, & 3**

29. Install supplied M12 x 65mm stud in the upper of two threaded holes in the driver-side engine block.
30. Install the lower bracket plate using the supplied standoff and two spacers. Torque fasteners. Install the two cylindrical bracket standoffs in the holes on the bracket. **Figure 2.**
31. Check that the front of the harmonic damper is clean and, using the supplied bolts, install the Raven crankshaft pulley spacer on the damper, and the pulley on the spacer.
32. **Dual alternator trucks:** Remove two outboard bolts from the secondary (upper) alternator. Install the supplied upper brace block on the alternator using the supplied M10 x 100mm bolts and washers. **Single alternator trucks:** install the block on the threaded alternator bosses using the M10 x 45mm bolts. Leave finger tight until generator bracket is torqued in place.
33. Install the generator bracket on the lower bracket with two 5/8 x 1¼ bolts and the generator brace block with one M10 x 30mm. Note that **single and dual alternator trucks** use different bolt holes in the bracket for the M10 bolt. Torque fastenings, alternator block last.



Mounting the Generator

34. Before mounting the Generator, bench-fit the clutch and key to the Generator shaft. Dress as necessary for a slip fit.
35. Ensure that the Generator electrical junction box cover is securely in place. Insert the 3/8" temporary alignment stud finger tight in one threaded hole of the Generator bearing plate (shaft end.) Orient the electrical box at the 2 o'clock position, and lower the generator into the bracket inserting the temporary alignment stud into one of the four countersunk fastener holes. Assure that the large Generator alignment ring machined into the bearing plate is seated fully in the bracket slot. Do not apply any undue force or pressure to the electrical junction box.
36. Secure the Generator to the bracket using the 4 flat head bolts provided. Torque the 4 bolts to 25 ft. lbs. Do not loctite these bolts!
37. Install the electric clutch on the generator shaft insuring that the key aligns with the shaft keyway and the cutout in the outer hub. Do not Loctite this bolt.
38. Install the generator belt according to **Figure 1**

Re-assembly

39. Separate the fan control wire from the fan stator.
40. Position the fan stator over the two upper mounting studs and note where trimming will be necessary for belt and idler clearance. The lower mounting boss will be removed entirely. Trim the stator as required. **Figure 6**
41. Position the lower fan shroud and reattach the fuel cooling pump.
42. Install the trimmed fan stator.
43. Install the supplied fan spacer and fan.
44. Bolt the upper fan shroud to the lower shroud.
45. Reconnect the power steering reservoir to the upper shroud.
46. Widen the fan harness hole in the upper shroud to allow the connector to pass through. Make a hole in the shroud from the top for future access to the harness lock. **Figure 7**
47. Slide the supplied aluminum fan plug support bracket into the original grooves which held the plug.
48. Attach the fan plug to the bracket by drilling through the holes in the bracket into the flanges on the fan plug. Secure with two 4" tie wraps or pop rivets. Use the 8" wrap to secure plug assembly to the shroud.
49. Reinstall the radiator, leaving the upper hoses off for the present. Reconnect the transmission cooling lines.
50. Reconnect the fan shroud to the radiator.
51. Install the charge air pipe.
52. Reinstall the radiator support cross beam.
53. Remount the power steering cooler on the radiator.
54. Reinstall the charge air cooler.
55. Remount the fuel cooler.
56. Connect the upper radiator hoses.
57. Connect the OEM positive battery cable and its 4 smaller cables to the power post installed in **Step 28**. Route the cables under the generator and between the inner fender and the support beam.

- Take care that the cables are protected from sharp edges or abrasion. The cross-cable to the driver-side battery can be unclipped and repositioned as necessary. **Figure 5**
58. Locate the heater hoses behind the air filter housing location. Tie the lower hose back against the upper hose. Use supplied chafe guard as necessary. **Figure 8**
 59. Carefully bend the transmission dipstick tube back about two inches to make room for the air filter neck and to assist **step 59**.
 60. Remove the engine oil fill housing and reposition it rearward using the supplied relocation assembly, gasket, and bolts. Use OEM bolts to reinstall the oil fill housing. **Figure 9**
 61. Extend and reconnect the oil fill drain hose using the supplied hose and coupling.
 62. Install the supplied AC condenser line at the condenser and the hard tube. **Figures 5, 11, 13**
 63. Modify the air filter housing by trimming the air intake duct according to **Figure 10**. This will allow proper clearances for the air intake elbow and the engine air intake.
 64. Set the housing in place behind the generator.
 65. Install the supplied intake elbow between the air filter housing and the engine. Assure no contact between the generator and the housing.
 66. Refill radiator and top off the transmission fluid.

Note: Wiring the generator junction box may be most easily done before **Step 63**

This completes the vehicle specific instructions. Refer to the Blackbird Wiring Manual for wiring, run up, and troubleshooting instructions.

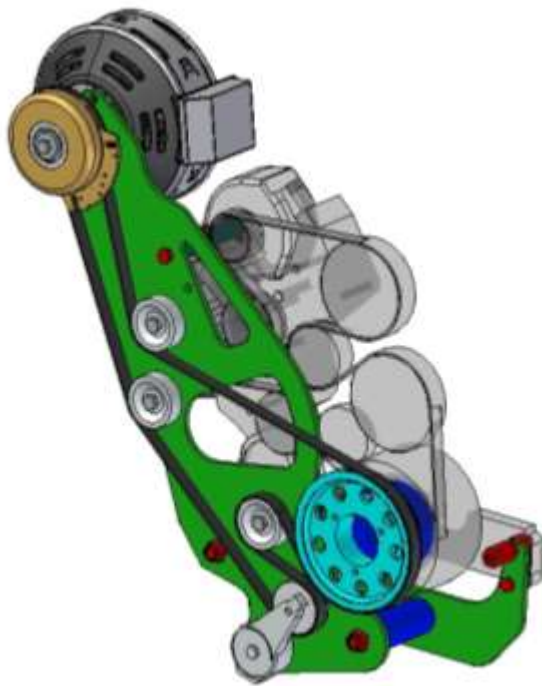


Figure 1

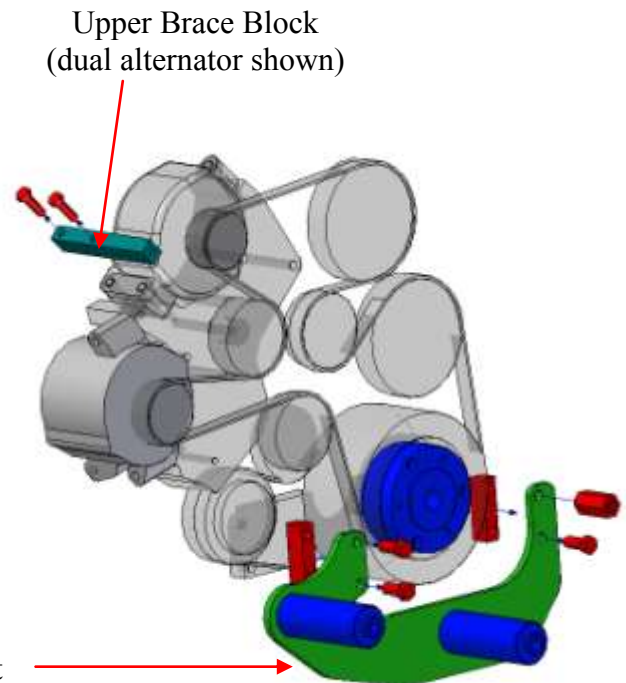


Figure 2

Lower Bracket

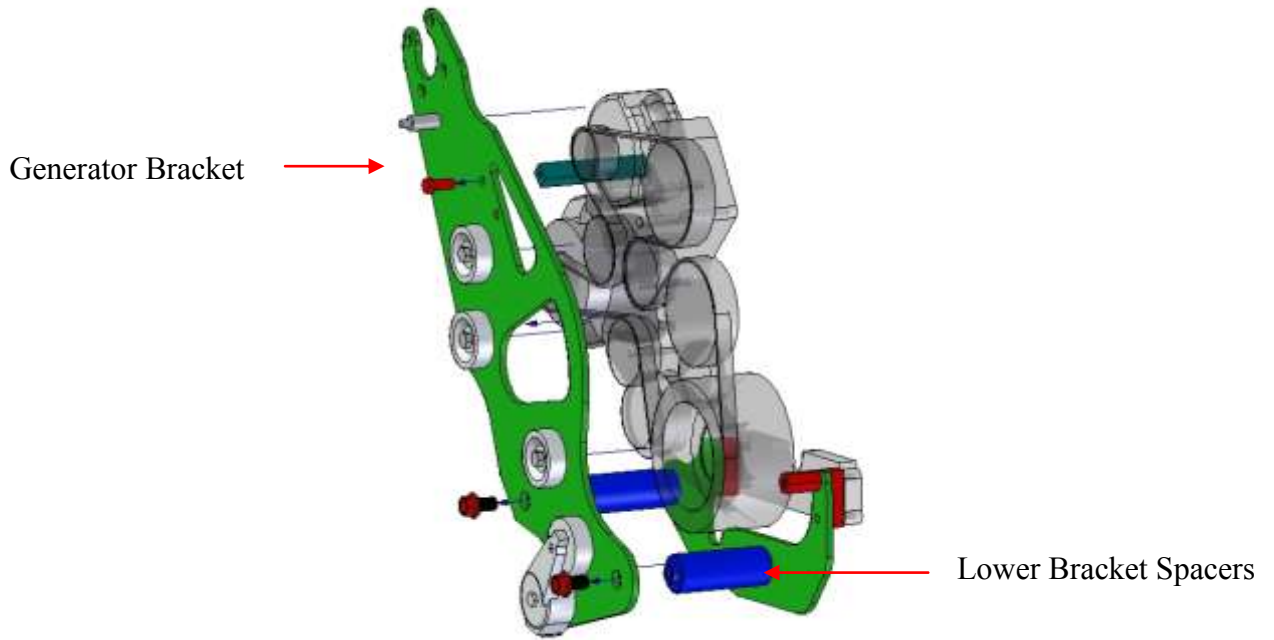


Figure 3



Figure 4

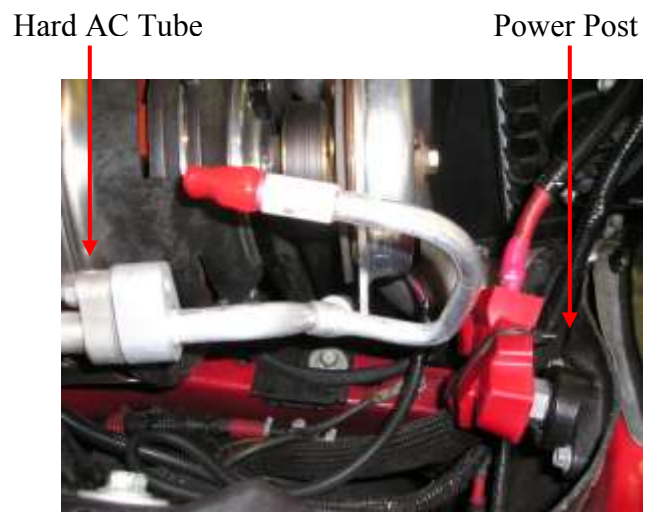


Figure 5



Figure 6



Figure 7



Figure 8



Figure 9



Figure 10



Figure 11

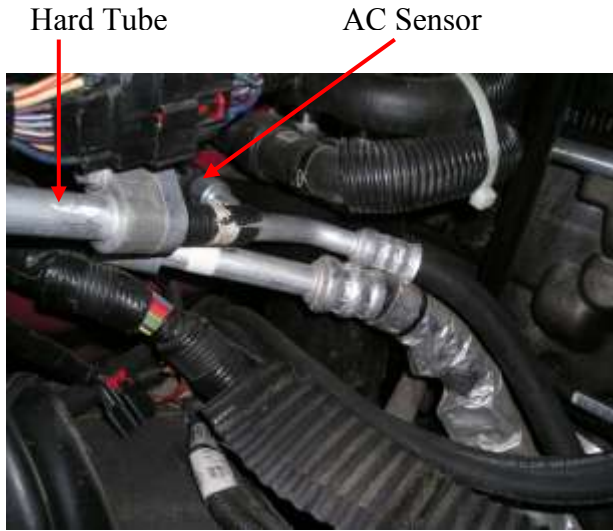


Figure 12



Figure 13



Battery Relocation:

Optional Battery Relocation Kit – Parts

Battery box	Ford OEM
Box cover	Ford OEM
Fasteners	(2) ¼-20 x 1” bolt w/ flat washers and nuts
Frame mounting plate	3/8” steel
Standoffs	(2) 1 1/2” diameter x 1 5/8”
	(1) rectangular
Fasteners: Plate to frame	(1) M10 x 25 flathead
	(2) M10 x 80mm
	(1) M10 x 35mm
	(03) M10 lock washers
	(3) M10 nuts
	(3) M10 x 30mm fender washers
	(3) M10 flat washers
Box to plate	(2) M8 x 15mm bolts
	(2) M8 flatwashers
	(4) M10 x 25mm flange head bolts
Cable	36” Red #2, terminal x 3/8” eye

Procedure

The relocation plate is bolted to the frame rail under the passenger side door as shown in the diagrams. The bolts use existing frame rail holes and the wheel strut brace. The Ford battery box and support cables mount to the plate. Install the battery. The OEM negative battery cable can be reused if attached to a bell housing bolt at the rear of the engine. The mid-cable body ground fixture can be piggy-backed on a similar fixture on the frame rail. The positive will reach the starter post from the relocated battery. Shield these cables from heat.

Install the battery box cover and lift the box up to the mounting bolts on the adapter plate.

Note: 2011 6.7 diesel battery relocation is driver’s side, same location.

