Bullet Proof Procedure

Thursday, November 3, 2016 10:32 AM

Tools

- 1/4 inch ratchet (and air/electric)
- 3/8 inch ratchet (and air/electric)
- 1/2 inch ratchet (and air/electric)
- Socket extensions
- Socket swivels
- Full socket set
- Hex socket set (10mm, 12mm mainly)
- Torx socket set (t30, 2" long t40, t45 mainly)
- Pipe wrenches
- Hammer
- Pry bar

Specialty Tools

- Fuel/Transmission line quick disconnect tool
- Ford 6.0 head lift bracket
- Cherry Picker
- Ford 6.0 Glow plug harness tool
- Ford 6.0 Fan clutch removal tool
- Ford 6.0 injector wire removal tool
- Crow foot socket
- Ford 6.0 IPR Socket
- Ford 6.0 head bolt remover tool
- Ford 6.0 oil filter cap socket

Fluids

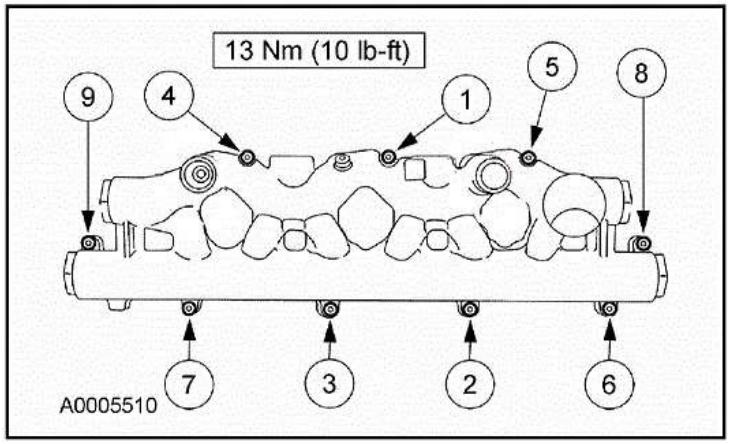
- 4 Gallons Engine Oil
- 4 Gallons Engine Coolant
- 10 gallons distilled water
- Transmission Oil
- Fuel Filters
- Engine Oil Filter

Prep

1. Create head lifting bracket, follow the steps on the forum linked
2. Set up overhead winch in the garage
3. Create top side creeper, or figure out some way to lay across the top

Procedure

1. Disconnect and remove both battery's
2. Remove grill and the hood
3. Drain engine oil and remove oil filter, store in 5 gallon bucket
4. Drain engine coolant from radiator and from engine block, store in two 5 gallon buckets
5. Remove wire loom on cowl
6. Removing degas bottle
7. Remove the entire air intake from turbo
8. Remove the driver side battery tray
9. Disconnect and remove the hot and cold side intercooler piping
10. Disconnect and remove the FICM and FICM pedestal
11. Remove the Radiator
    1. Disconnect and remove the upper radiator hose, making sure no fluid in it
    2. Disconnect and remove the lower radiator hose, making sure no fluid is in it
    3. Disconnect the transmission cooler lines from the radiator, use the quick disconnect tool (may skip)
    4. Disconnect the upper radiator supports
    5. Disconnect the fan shroud from the radiator
        i. One bolt on each side of the radiator
    6. Remove the Positive cable from the front of the radiator. This allows the radiator to swing forward and up to give clearance for the fan shroud to be lifted out.
    7. Lift radiator out (may skip)
12. Remove the fan
    1. Remove two upper fan shroud mounting bolts that are secured to intake
    2. Use fan clutch removal tool to break the nut loose
    3. After loose, spin the fan to remove it and the shroud together.
    4. Remove the two lower fan shroud mounting bolts
13. Remove the serpentine belt
14. Disconnect and remove the alternator
15. Remove the evaporator cover
16. Disconnect and remove the EGR valve
17. Disconnect fuel lines from fuel filter bowl, use zip ties to prevent nuts from sliding down the line
18. Remove the oil/fuel filter housing
19. Remove the oil filter standpipe
20. Remove the turbo
    1. Disconnect the vgt sensor
    2. Remove the oil feed line to turbo
    3. Disconnect the turbo downpipe
    4. Disconnect the turbo up pipe
        i. The factory orientation of the clamp is easily reached from behind
    5. Remove the rear turbo mounting bolt (use a 6" extension and 10m socket)
    6. Remove the side and front turbo mounting bolts
    7. Verify the down and up pipe are clear of turbo
    8. Use prybar to lift turbo up and off of the pedestal
    9. Remove the oil drain tube
    10. Remove the turbo pedestal
21. Reposition the main wire loom to the front of the engine
22. Remove the injector wire loom
23. Remove the intake and EGR
    1. Disconnect the ECT sensor
    2. Disconnect the IAT2 sensor
    3. Disconnect the EOT sensor
    4. Disconnect the EOP sensor
    5. Disconnect the heater hose tube
    6. Disconnect the EGR exhaust inlet clamp
    7. Disconnect the EGR coolant inlet hose
    8. Remove fuel line mounting bolt
    9. Disconnect MAP sensor hose
    10. Using a prybar, pull the downpipe inward to gain access to the rear left intake bolt
    11. Remove the rest of the intake bolts
    12. Lift the intake up and out



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INSTALLATION METHOD FOR HEAD STUD KITS

Part Number: 250-4202 Application: Ford 6.0L Powerstroke Diesel

1. Always verify the part number for your application with the part number on the side of box and the part number on the instruction sheet. This will help ensure you have the correct installation procedure for your specific application before installing any components.
2. Clean and inspect all hardware prior to installation. Look for obvious defects or shipping damages, plus proper fit, length and dimension.
3. To ensure proper thread engagement and accurate torque readings, clean ALL threads in the block. Chase if necessary with a Thread Chaser.
4. If the cylinder head studs protrude into a water jacket, lubricate the block threads of the studs with ARP THREAD SEALER.
5. Screw studs into the block "HAND TIGHT ONLY".
   NOTE: LOCTITE MAY BE USED IF A PERMANENT MOUNTING OF THE STUDS IS PREFERRED. THE FASTENERS, HOWEVER, MUST BE TORQUED PRIOR TO THE LOCTITE SETTING UP.
6. Install the cylinder head(s) and check for binding or misalignment.
7. Lubricate the stud threads, nuts and washers with ARP ULTRA-TORQUE FASTENER ASSEMBLY LUBRICANT. Then install the washers and the nuts onto the studs and tighten them hand tight. **ARP recommends using the ARP ULTRA-TORQUE FASTENER ASSEMBLY LUBRICANT that is provided with each kit as opposed to motor oil. This is due to higher friction on the studs as well as inconsistencies in the clamping force of the fasteners when motor oil or other low quality lubricants are used.**

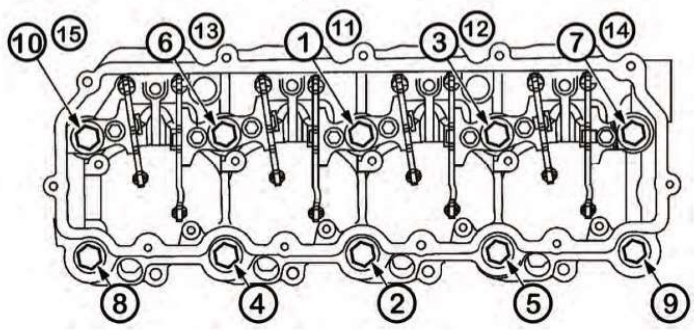
PRELOAD (TORQUE) RECOMMENDATIONS

8. Following the manufacturers recommended torque sequence tighten the nuts **in three equal steps to** the following specifications **with ARP ULTRA-TORQUE FASTENER ASSEMBLY LUBRICANT.**

M14 studs (1-10) 210 ft lbs **OEM bolts (11-15) 23 ft lbs**

Note: ARP Ultra-Torque Fastener Assembly Lubricant has been specifically designed to reduce tension preload scatter and eliminate the need to cycle high performance engine fasteners before final installation. ARP Ultra-Torque far surpasses all requirements offered by previous ARP lubricants in terms of fastener preload repeatability and performance lubricating properties. For more information on ARP Ultra-Torque visit our website at www.arp-bolts.com or call 1 800-826-3045.

Bolt Torque Sequence



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Start installing the bolts with the second bolt from the rear on the top. The hole diameter is smaller, therefore allowing alignment of the remaining bolts.

NOTE:
When installing the exhaust manifolds, use only prevailing torque hex flange bolts with an interference fit.

NOTE:
Apply anti-seize lubricant to the bolt threads prior to installing the bolts.

Install the LH exhaust manifold and bolts. Tighten the bolts in the sequence shown.

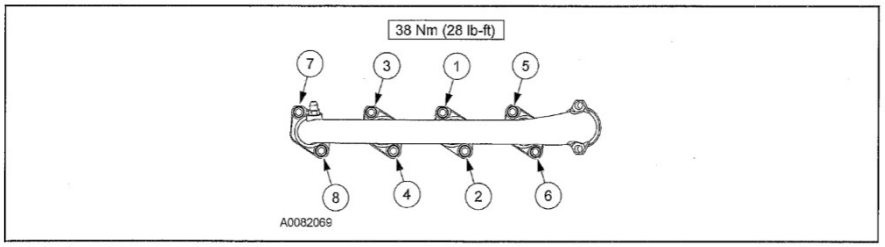
38 Nm (28 lb-ft)

7. Disconnect the EGR coolant inlet hose
8. Remove fuel line mounting bolt
9. Disconnect MAP sensor hose
10. Using a prybar, pull the downpipe inward to gain access to the rear left intake bolt
11. Remove the rest of the intake bolts
12. Lift the intake up and out

24. Removing the oil cooler
    1. Remove the entire oil cooler assembly as a whole
    2. Drain and clean the High pressure oil reservoir
    3. Discard the oil screen and plug with rag
25. Disconnect and remove glow plug control module
26. Disconnect glow plug wire loom from left and right side (DO NOT pull on wires, use screwdriver or tool to pop loose)
27. Remove up pipe heat shield
28. Remove oil dipstick
29. Remove EBP tube and sensor
30. Disconnect the up pipe from the exhaust manifold
31. Remove fuel line banjo bolts from the front of the engine
32. Disconnect ICP sensor from passenger valve cover
33. Remove valve cover
34. Removing the head
    1. Remove Stand Pipes
    2. Remove dummy Plugs
    3. Remove all the screws holding down the oil rail
    4. Lift oil rail off of the injectors and allow to drain
    5. Disconnect injector plugs using special tool
    6. Remove the upper head bolts
    7. Install head lifting tool, and connect to the engine lift
    8. Remove the rest of the head bolts
        i. In order to remove the driver side rear head bolt you must either:
        ii. Dent the firewall to allow room to pull the bolt out
        iii. Or lift the bolt up and partially out, just enough to clear the block and gasket, using a zip tie to prevent the bolt from falling back down
    9. Remove the rockers
    10. Remove pushrods, and valve bridges
    11. Remove the engine head with the engine lift, do not forget to disconnect ground wire
35. Sending the head off
    1. Unbolt the injector hold down with the 2" long t40 bit
    2. Pull out injector and the hold down in one piece, verify that copper washer came with it
    3. Remove glow plugs
    4. Make sure to remove the rear fuel plugs (the new heads will not include these)
    5. Remove exhaust manifold
    6. Separate the head from the rocker box
    7. Send head off to machine shop
36. Removing, updating, and installing STC fitting in the HPOP
    1. Unplug the IPR sensor
    2. Using the IPR socket, remove the IPR sensor
    3. Unbolt and remove the HPOP cover
    4. Remove the two bolts on the STC fitting holding it to the branch tube
    5. Remove the two bolts on the right side of the HPOP and one on the left side
    6. Remove the entire HPOP with the STC fitting attached
    7. Place the HPOP in a vice, padded with a rag
    8. Remove the old STC fitting from the HPOP
    9. Lubricate the new STC fitting
    10. Thread the new STC fitting into the HPOP five full turns
    11. Attach the plastic aligning device, and tighten down the locking nut to 49 ft/lbs with a 15/16 crow foot wrench
    12. Remove and discard holding tool
    13. Install new o rings for the branch tube, the pump inlet, and the HPOP gasket
    14. Hand tighten all 5 bolts at first, then tighten HPOP bolts to 23 ft/lbs and the branch tube adapter bolts to 124 in/lbs
    15. Clean the HPOP cover
    16. Replace the gasket on the HPOP cover
    17. Place a dot of RTV on the block where it meats with the rear main cover
    18. Reinstall the HPOP cover, torque the bolts down to 8 ft/lbs
    19. Replace the screen and o rings on the IPR sensor and clean the valve with break clean
    20. Install the IPR regulator and tighten to 37 ft/lbs
    21. Reconnect the IPR wiring
37. Prepping the block
    1. Clean block surface with brake clean
    2. Remove old gasket from block surface
    3. Use shop vac to clean out water jackets on block
    4. Use a thread chaser to clean the head bolt holes
    5. Verify that the crank is in the 6'o clock position, otherwise you could bend the pushrods
    6. Verify a clean, smooth, flat, dry gasket surface
    7. Verify that the water jackets, and cylinder are clean and dry
    8. Replace old head locating dowels with new ones
    9. Place new OEM Ford head gaskets onto the block
38. Prepping the head
    1. Install rocker box with new gasket
    2. Install exhaust manifold with new gasket
        i. Torque the exhaust manifold to 28 ft/lbs following the torque sequence
    3. Verify the new heads have a rear fuel rail plug installed
    4. Reinstall injectors with all new o rings and brass washer on the tip.
        i. Apply clean oil to injector o rings
        ii. Torque injectors to 28 ft/lbs
    5. Install glow plugs
        i. Torque glow plugs to 14 ft/lbs
39. Installing the head
    1. On the driver's side head insert the rear studs in advance, use a zip tie to prevent them from slipping blow the head surface
    2. Using the Head lifting tool, lower the head onto the block making sure not to scratch the gasket or head/block surface
    3. Before the head has been fully seated, reconnect the ground wire
    4. Install the upper head bolts and the studs hand tight, as well install the nuts on the lower studs hand tight
    5. Install pushrods, valve bridges and rockers
    6. Tighten rockers to 23 ft/lbs
    7. Apply ARP assembly lube to the head studs and torque down following the correct sequence
    8. Clip the injector connection into the head
    9. Set oil rail onto injectors, making sure the nipples are straight and are pushed into the injectors properly

Apply anti-seize lubricant to the bolt threads prior to installing the bolts.

Install the LH exhaust manifold and bolts. Tighten the bolts in the sequence shown.



Links

Lifting Bracket

6.0 Cylinder Head Lifting Bracket

Head

2003 6.0 Liter Ford Powerstroke - Teardown For Head Removal - In Chassis
2003 6 0 Liter Ford Powerstroke - Cylinder Head Removal - In Chassis
2003 6.0 Liter Ford Powerstroke - Head Gasket Torque - Part I
2003 6 0 Liter Ford Powerstroke Head Gasket Torque Part II
6.0 Powerstroke head removal cab on. tips and tricks
6.0 Liter Ford Powerstroke - RH Head Installation
6.0 Liter Ford Powerstroke - LH Head Installation

HPOP

6.0 Liter Ford Powerstroke - High Pressure Oil Pump & Revised STC Fitting Part 1
6.0 Liter Ford Powerstroke - High Pressure Oil Pump & STC Fitting Part 2

Radiator

Ford 6.0 powerstroke diesel radiator removal and install

Turbo

Ford F250 6.0 Powerstroke Turbo Removal

Injectors

6.0 DIESEL FORD POWERSTROKE INJECTOR REMOVAL AND INSTALLATION TIPS AND TRICK

Fan/Water Pump

Water pump or Fan clutch on the ford 6.0 Powerstroke diesel (Bulletproof used)

EGR/Oil Cooler

Bulletproof EGR cooler with Ford oil cooler. 6.0 Powerstroke
Oil cooler and EGR cooler tips
OIL COOLER REMOVL ON THE FORD 6.0 POWERSTROKE DIESEL
2003-2007 F-250 F-350 6.0L aFe Bladerunner Oil Cooler Install

Shops

- Morley Performance
  - For hot tanking
- UFC Heads
  - Remanufactured heads
  - O-ringed
  - 1950 + 700 core + 250 shipping. Gross $2900. Net $2200
- Southeast cylinder head
  - Remanufactured heads
  - 1650 + 600 core + 180 shipping. Gross $2430. Net $1830
- Southeast cylinder head (with o-ring)
  - Remanufactured heads
  - O-rigned
  - 1950 + 700 core + 400 for o-ring + 180 shipping. Gross $2830. Net $2230.

10. Torque oil rail down to 10 ft/lbs following the correct sequence
11. Install stand pipes and dummy plugs, torque both down to 60 ft/lbs

40. Install the valve covers
    1. Torque valve cover down to 70 in/lbs
41. Connect ICP sensor to the passenger valve cover
42. Install the new 6.0 banjo bolts on the front of each head
    1. Torque banjo bolts down to 28 ft/lbs
43. Reconnect the up pipe to the exhaust manifolds, torque to 20 ft/lbs
44. Install the EBP tube and sensor, torque to 22 ft/lbs
45. Install oil dipstick
46. Install the up pipe heat shield
47. Reconnect the glow plug wire loom
48. Install the glow plug control module, torque to 71 in/lbs
49. Installing the oil cooler
    1. Remove EGR coolant supply cover
    2. Remove the oil filter base
    3. Remove the two nuts on top of the oil cooler and the two bolts on the bottom
    4. Set the unit on 2x4's and use a hammer to pound the oil cooler out of the housing
    5. Install new gaskets on the new oil cooler and on the oil cooler housing
    6. Put a little oil on the surface to make the oil cooler and oil cooler housing slide together easier
    7. Push the housing onto the cooler
    8. Clean out bolt holes on the block
    9. Install the new Filter screen
    10. Install the housing (with the cooler attached) to the engine
        i. Tighten the housing to 16 ft/lbs
    11. Install a new gasket on the oil filter base
    12. Install the oil filter base
        i. Tight the left 4 bolts to 89 in/lbs
        ii. Tighten the right 5 bolts to 16 ft/lbs
    13. Install a new gasket on the EGR supply port cover
    14. Install the EGR supply port cover
        i. Tighten the supply port cover to 89 in/lbs
50. Installing the EGR delete
    1. Remove EGR from the intake
    2. Install the new gaskets onto the EGR delete and mount to the intake, torque to 10 ft/lbs
    3. Slide the hose and hose clamps onto the coolant branch tube of the delete
51. Unbolt the exhaust up pipe and remove
52. Install the new exhaust up pipe
53. Install the intake with the EGR delete
    1. Install the intake gaskets onto the block
    2. Install new o rigs on the front cover
    3. Torque the intake to 8 ft/lbs
    4. Reconnect MAP sensor
    5. Reconnect fuel line
    6. Install heater hose tube, torque to 10 ft/lbs
    7. Connect the ECT sensor
    8. Connect the IAT2 sensor
    9. Connect the EOT sensor
    10. Connect the EOP sensor
54. Install injector wire loom
55. Install turbo
    1. Install turbo pedestal, torque to 23 ft/lbs
    2. Install turbo oil drain tube
    3. Place turbo on pedestal and drain tube
    4. Install rear mounting bolt, torque to 28 ft/lbs
    5. Attach the turbo feed line, torque to 10 ft/lbs
    6. Install the front mounting bolts, torque to 28ft/lbs
    7. Install the exhaust inlet pipe
        i. Loosening of the exhaust manifolds my help with alignment
    8. Install the exhaust outlet pipe
        i. Loosening of the exhaust down pipe may help with alignment
    9. Connect vgt sensor
56. Connect oil filter stand pipe, torque to 27 in/lbs
57. Connect oil/fuel filter housing, torque to 11 ft/lbs
58. Reconnect fuel lines, torque the head supply lines to 19 ft/lbs, torque the supply and return lines to 38 ft/lbs
59. Install EGR block off plate
60. Install evaporator cover
61. Install alternator, torque to 35 ft/lbs
62. Install serpentine belt
63. Install fan
    1. Spin on fan, torque to 98 ft/lbs
    2. Attach fan should to block
64. Install radiator
    1. Place radiator onto the lower brackets (may skip)
    2. Install the shroud
    3. Install the upper mounting brackets, torque to 9 ft/lbs
    4. Install lower and upper radiator hose
    5. Connect transmission cooler lines (may skip)
65. Install FICM mounting bracket, torque to 71 in/lbs
66. Install FICM, torque to 10 ft/lbs
67. Install the hot and cold side intercooler piping
68. Install the driver side battery tray
69. Install air intake
70. Install degas bottle, torque to 89 in/lbs
71. Install batteries
72. Fill with oil and new oil filter
73. Fill with coolant and new coolant filter
74. Top off transmission fluid
75. Install batteries
76. Install upper cowl wire loom
77. Install hood and bumper