INSTRUCTIONS

-J00804 REV. 12-21-98

Kit Numbers 29933-97A, 29934-97A

SCREAMIN' EAGLE ELECTRONIC FUEL INJECTION (EFI) STAGE 2 KIT

General

This kit is designed for installation on Harley-Davidson Evolution motorcycles equipped with EFI.

Installation of this kit by an authorized Harley-Davidson dealer will not impact your limited vehicle warranty. See your dealer for more details.

Kit 29934-97A, for 1997 and later models, contains a high performance air cleaner kit, a cartridge for the Scanalyzer (Part No. HD-41325) that allows recalibration of the 1997 Electronic Control Module (ECM), two replacement injectors, and a cam.

Kit 29933-97A, for 1996 and earlier models, contains a high performance air cleaner kit, a Scanalyzer cartridge, a new, replacement ECM that can be recalibrated (the 1996 and earlier ECM, Part No. 32423-95, cannot be recalibrated), two replacement injectors, and a cam.

⚠CAUTION

The components contained in these kits are designed to perform with this kit only. Any other combination of components is not confirmed to be legal for street use.

⚠CAUTION

Improper installation of this kit may result in severe engine damage. Follow the procedures listed in this Instruction Sheet and in the appropriate Service Manual. If the procedures are not within your capabilities, or if you do not have the correct tools, have your Harley-Davidson dealer perform the installation.

⚠CAUTION

This engine related performance part is intended for High Performance or Racing applications and is not legal for sale or use on pollution controlled motor vehicles. This kit may reduce or void the limited vehicle warranty. Engine related performance parts are intended for the experienced rider only.

See Service Parts page for kit contents.

NOTE

A Service Manual for your motorcycle is available at your Harley-Davidson Dealership. REFER TO THE SERVICE MANUAL FOR DETAILED EXPLANATION OF THE PROCEDURES OUTLINED BELOW.

INSTALLATION

NOTE

The installation procedure is divided into five parts:

1) Replacing ECM (1996 and earlier models ONLY)
2) Calibrating the ECM
3) Replacing stock cam
4) Replacing stock fuel injectors
5) Replacing stock air cleaner

1) REPLACING ECM (1996 and earlier models ONLY)

NOTE

The ECM may be calibrated while installed on the motorcycle or it may be connected and resting on right side footboard while calibration is being performed.

1. Refer to the REMOVAL/REPLACEMENT section 9C in the 1995 - 1996 FLT Service Manual, Part No. 99483-96A.
2. Install ECM in accordance with the installation procedure given in the Service Manual.

2) CALIBRATING THE ECM

1. See Figure 1. Push data link connector up to disengage from T-stud.
2. Remove rubber protective plug from open end of data link connector.
3. Plug the Scanalyzer (HD-41325) into the data link connector.
4. Turn the Ignition Switch to ON.
5. Insert the calibration cartridge from kit into the Scanalyzer.

NOTE

The ECM must be in original factory calibration in order to accept a Stage I, Stage II, Stage III calibration. Any new or used Stage I, Stage II, or Stage III cartridge may be used to return an ECM to original factory calibration from Stage I or Stage II. Only a Stage III cartridge may be used to remove a Stage III calibration.

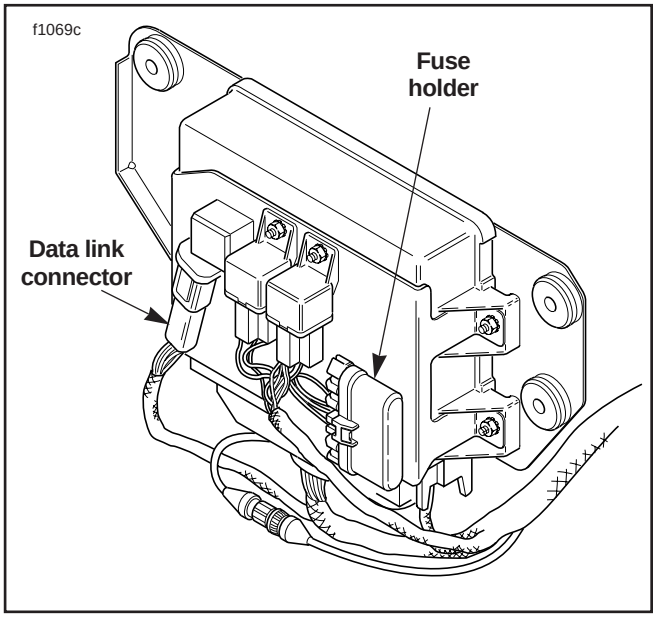


Figure 1. Data Link Connector

6. Follow the flowchart on page 5 to recalibrate the ECM.

7. After returning to the main menu at the bottom of the flowchart, turn ignition OFF, and remove calibration cartridge.

NOTE

The cartidge is designed to only allow one calibration. You can return to factory calibration, but you will not be allowed to change back (reflash) to P & A calibration.

NOTE

The product information label contained in this kit is required in the state of California only. This label is required to aid in passing the California Smog Check Program. Place the information label on the right side of the frame directly beneath the VIN sticker. Do not place the label over other product information labels. Do not place the label on motorcycles other than those specified in the instruction sheet.

3) REPLACING CAM

Disassembly

1. Before beginning the installation of this kit, read the instructions in Section 3, ENGINE, GEARCASE COVER AND TIMING GEARS, of the applicable Service Manual. Refer to the Service Manual for detailed explanation of the procedures outlined below.

⚠WARNING

Gasoline can be extremely flammable and highly explosive. Do not smoke or allow open flame or sparks when refueling or servicing the fuel system. Inadequate safety precautions may result in personal injury.

⚠WARNING

To avoid accidental start-up of motorcycle, and possible personal injury, disconnect the battery cables (negative cable first) before performing any of the following procedures. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion resulting in personal injury.

2. Disconnect the battery cables, negative cable first.

3. Remove the three rocker covers at each cylinder.

4. Remove push rods and push rod covers.

5. Remove bolts holding tappet guides to the gearcase.

6. Bend a small length of wire or paper clip into a U-shape. Insert ends into tappets and tilt guide and tappets out together.

7. Drill out rivets and remove ignition timer outer cover.

8. Remove two ignition sensor cover screws, sensor cover and gasket.

9. Remove sensor plate screws and lockwashers.

10. Disconnect sensor plate wires at connection so sensor plate may be moved aside.

11. Remove rotor screw and rotor.

12. Remove gearcase cover screws.

13. Remove gearcase cover using Universal Puller, HD-33418, and an early-style timing cover with timing cover screws. Remove gear case cover gasket.

14. Remove camshaft, spacing washer (if equipped), and thrust washer.

Inspection

1. Inspect camshaft bushing in gearcase cover for pitting, scuffing, or grooving. Determine bushing wear. If damaged or exceeds wear limits (see **Engine Specifications Section** in appropriate Service Manual), install new bushing.

2. Check needle bearing for damage. Replace if necessary.

Assembly

NOTE

Install new gasket wherever gaskets were removed during disassembly. Replace camshaft oil seal in gearcase cover.

1. Install camshaft omitting cam gear end spacer for the purpose of checking gear mesh. Rotate engine by hand and slide camshaft back and forth with fingers inserted through tappet guide hole in gear case. Mesh is correct when no play between gears can be felt and camshaft can be moved back and forth along shaft axis with slight drag. If gear mesh is unsatisfactory, check Service Manual for proper selection of pinion gear size to obtain proper tooth clearance for best operation.

2. Establish camshaft end play as follows:

   - Install camshaft with thrust washer and spacing washer.
   - The spacing washer has been eliminated on most 1988 and later models. If camshaft does not have spacing washer, purchase and install Spacer, H-D Part No. 25555-84.
   - Breather, cam, and pinion gears have timing marks which must be aligned. Position new cover gasket and secure cover with at least four screws.
   - Measure camshaft end play between camshaft and thrust washer using thickness gauge, through tappet guide hole in gearcase. End play should be 0.001-0.016 in.
   - If measurement is under or over tolerance, remove cover and replace spacing washer with one to give suitable clearance. Camshaft spacing washers are available in 0.005 increments from 0.045 in. to 0.095 in. thick.

3. Secure cover using all cover screws. Tighten screws to 90-120 **in-lbs**. After securing cover, pour about 1/4 pint of engine oil through tappet guide hole over gears to provide initial lubrication.

4. Install tappet guide and tappets.

5. Assemble remainder of gearcase and ignition timer. See **Ignition System Section** in appropriate Service Manual.

NOTE

This camshaft was designed so that it could replace a stock camshaft without the possibility of valves contacting pistons. However, some 1985-1986 engines did not have valve notches in piston and certain police engines have milled heads. These engines must be checked for valve-to-piston clearance. We recommend that this inspection or any subsequent piston modification be performed by a Harley-Davidson Dealer.

NOTE

Put clay about 1/8 in thick on piston in area where valves would contact pistons. Assemble heads and valve train, and turn engine by hanc. Remove heads and measure clay at its thinnest point. If thickness is less than 0.080 in, notches should be cut into piston crown to obtain 0.080 in. clearance. Depth of notches must not exceed 0.135 in.

6. Rotate engine crank shaft so either cylinder has both valves closed. Install rocker covers, pushrods, and pushrod covers at the cylinder where the valves are closed. Tighten bolts alternately in small increments to allow oil in tappets to bleed off and to avoid damaging push rods. Consult service manual for proper torque specifications.

7. Repeat Step 6 at second cylinder.

4) REPLACING FUEL INJECTORS

1. Perform all steps as listed in the FUEL TANK, Partial Removal procedure in the FLT Service Manual to gain access to the injectors.

2. Depress wire form and use rocking motion to detach electrical connectors from fuel injectors.

3. Remove TORX sleeve bolt from retainer plate at top of induction module. Remove retainer plate.

⚠CAUTION

Injector removal without use of the special tool (HD-41320) may result in damage to the plastic construction.

4. Remove fuel injectors from throttle body bore with special tool (HD-41320).

5. Apply a thin coat of clean engine oil to new injector O-rings.

6. Loosely install injectors into throttle body bore. Injectors are directional so use retainer plate as a template.

7. Install retainer plate while aligning injectors as required to fit. Snap injectors into throttle body bore.

8. Install TORX sleeve bolt to secure retainer plate at top of induction module.

NOTE

Fuel pressure regulator bracket bolt at bottom of induction module threads into TORX sleeve bolt topside.

9. Tighten TORX sleeve bolt to 35 **in-lbs** (3.9 Nm).

10. Install electrical connectors on fuel injectors. Injector cables are tagged F(ront) and R(ear) to ensure correct assembly.

11. Perform all steps as listed in the FUEL TANK, Installation (After Partial Removal) procedure in the FLT Service Manual.

5) REPLACING AIR CLEANER

Removing Stock Air Cleaner

NOTE

Refer to the applicable Service Manual and check the warm-slow idle speed adjustment before removing stock backplate.

1. Remove stock backplate following the instructions given in the appropriate Service Manual.

2. See Service Parts Illustration. Retain stock air cleaner cover and buttonhead screw and washer.

Installing High Performance Air Cleaner

1. See Service Parts Illustration. Locate banjo bolts (10) included with kit. Place one washer (11) over each banjo bolt. Insert bolts through holes in mounting bracket (15). Place a second washer over each bolt. Place manifold breather (16) over bolts with hose fitting toward rear of motorcycle. Install remaining washers over the ends of bolts.

NOTE

When installing banjo bolts in the next step, apply Loctite 243 (blue, HD P/N 99642-97, not included) to threads.

3. Apply Loctite 243 (blue) to banjo bolts and, holding assembly together, insert banjo bolts into tapped holes in cylinder heads. Tighten each bolt a little at a time, until assembly is held loosely in place.

4. Place O-ring (5) on hose fitting (7) and install hose fitting in backplate's (14) 0.390 in. diameter hole.

NOTE

Because of limited space behind backplate, it is necessary to install the hose fitting and hose before installing backplate on induction module. To assure a leak-tight connection, the fitting must be pushed firmly against the O-ring while the hose is pushed onto the fitting. The hose must touch the rear of the backplate. Install and tighten hose clamp (4) with hose and fitting firmly held against opposite sides of backplate.

5. Place hose (12) on hose fitting and install a hose clamp (4). Hold the hose and fitting firmly in place against the backplate and tighten the hose clamp.

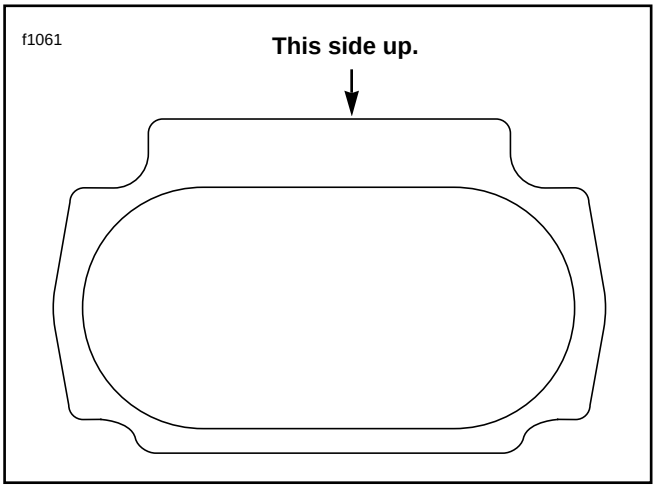


Figure 2. Gasket, Backplate-To-Induction Module

6. See Figure 2. Peel protective strip off gasket and place adhesive side against backplate with wider edge at top of air inlet. Position gasket carefully before firmly pressing into place.

7. Connect hose (12) to breather manifold (16) and secure with clamp (4).

8. Place a 1/4 in. inside diameter (ID) washer (17) on 1/4-20 screw (2). Insert screw (from front side) through upper hole in backplate (14) and through small hole in bracket (15). Secure screw with washer (17) and locknut (3). Do not tighten locknut at this time.

9. Start two short 5/16-18 screws (1) to fasten backplate to face of throttle body. Use the holes at the upper rear and lower front locations.

10. Start two 1/4-20 screws (2) to fasten backplate to face of throttle body. Use the holes at the upper front and lower rear locations.

11. Tighten screws securing backplate to face of throttle body to 3-5 ft-lbs (4-7 Nm).

12. Tighten banjo bolts securing backplate bracket to cylinder heads to 10-12 ft-lbs (14-16 Nm).

13. Tighten 1/4-20 screw (2) and locknut (3) that secure backplate to bracket to 8-10 ft-lbs.

14. Place the air cleaner element (8) on the backplate, with the rubber portion against the backplate. Install the nylon flat washers (13) and lock nuts (3).

15. Apply Loctite 243 (blue) to button head screw threads and, placing the air cleaner cover in position, install the button head screw and washer.

⚠WARNING

Always connect the positive battery cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion resulting in personal injury.

16. Connect battery cables, positive cable first.

Checking Idle Speed

1. Plug Scanalyzer into data link connector and install data monitor cartridge into Scanalyzer.

2. Perform Idle Speed Adjustments under AIR CLEANER ASSEMBLY section of FLT Service Manual, ***but remove 5 amp ECM fuse for 15 minutes to allow ECM to discharge its memory, instead of the five minutes given in the Service Manual.***

NOTE

Failure to remove ECM fuse for 15 minutes as described above may result in erratic idle speeds.

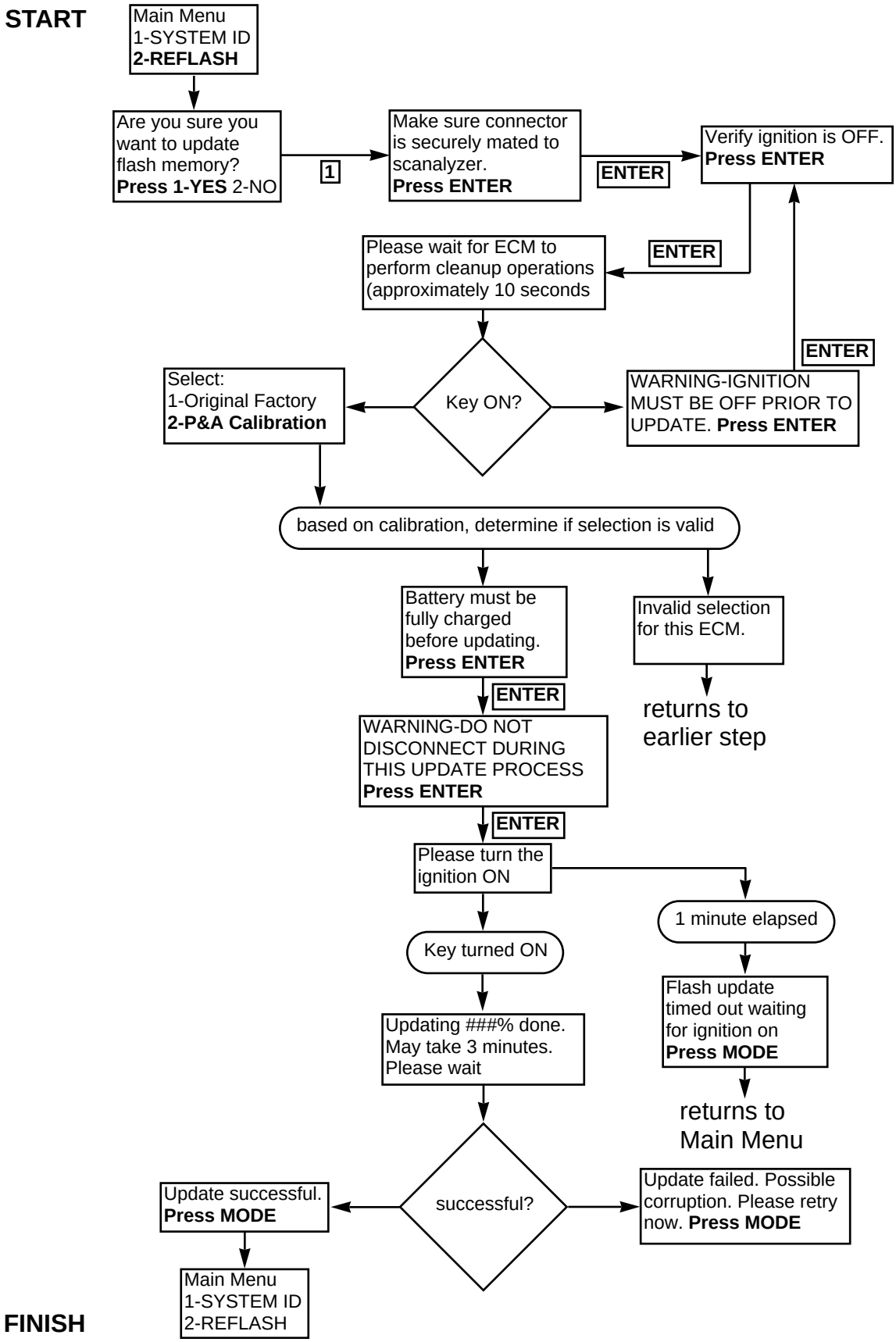
Air Cleaner Maintenance

1. Remove air cleaner cover and inspect element every 5000 miles, or more often under dusty conditions.

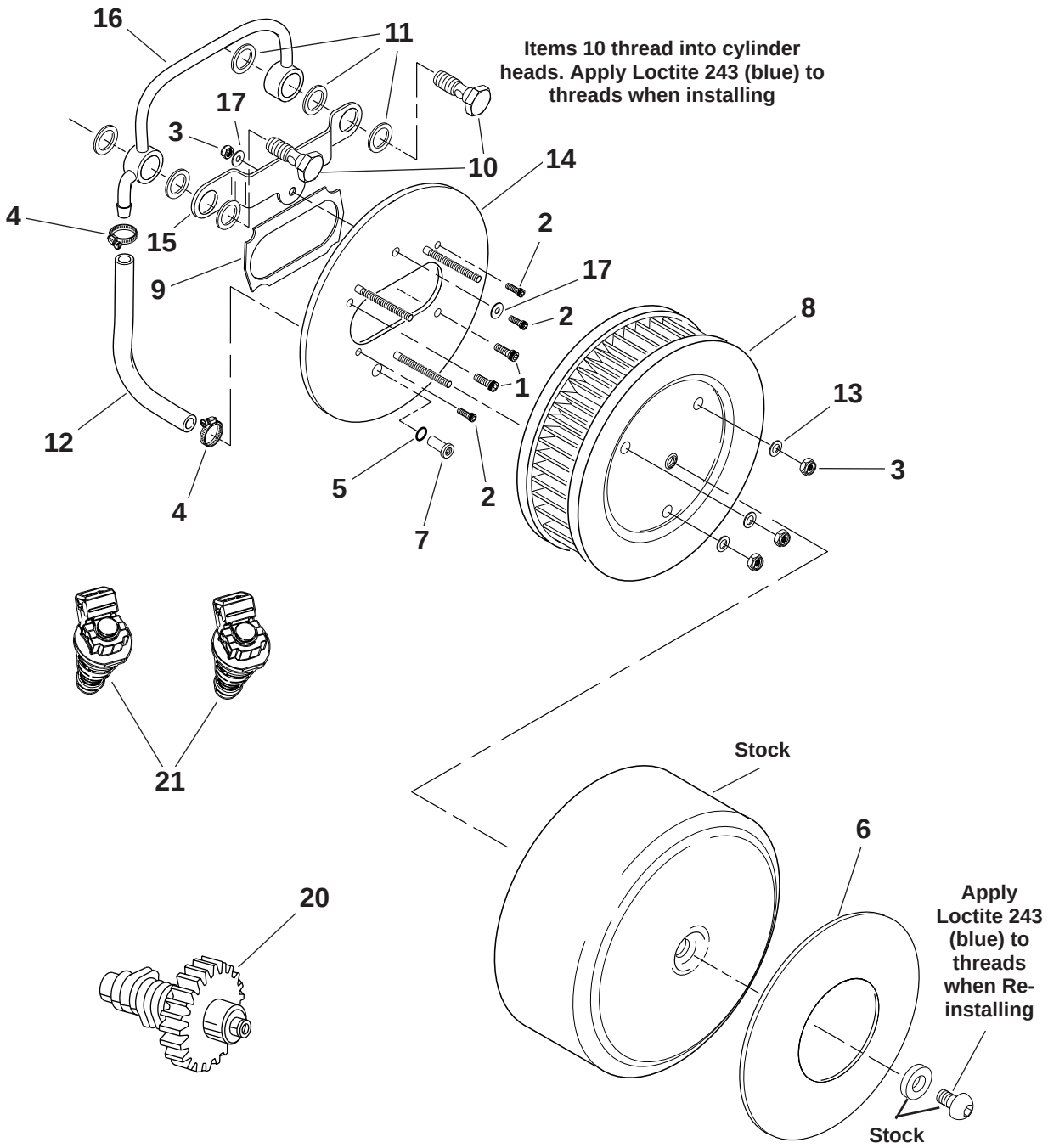
2. To clean element, remove and wash by rolling it, on edge, in a shallow pan containing enough Air Cleaner/Degreaser, Part No. 99883-88T to cover no more than 3/4 the depth of filter pleats. Do not let dirty solution get inside element.

3. Remove element from cleaner/degreaser and allow five minutes for cleaner to dissolve dirt. From the inside out, rinse the element with cold water. Shake and allow to air dry. Do not dry with compressed air.

4. Re-oil element using Air Cleaner Oil, Part No.99882-88T. Apply along the full length of each pleat and allow to set until the element is a uniform color. Allow excess oil to drain. Install element and cover.


START
Main Menu
1-SYSTEM ID
2-REFLASH
Are you sure you want to update flash memory?
Press 1-YES 2-NO
1
Make sure connector is securely mated to scanalyzer.
Press ENTER
ENTER
Verify ignition is OFF.
Press ENTER
Please wait for ECM to perform cleanup operations (approximately 10 seconds
ENTER
Key ON?
Select:
1-Original Factory
2-P&A Calibration
WARNING-IGNITION MUST BE OFF PRIOR TO UPDATE. Press ENTER
ENTER
based on calibration, determine if selection is valid
Battery must be fully charged before updating.
Press ENTER
ENTER
Invalid selection for this ECM.
returns to earlier step
WARNING-DO NOT DISCONNECT DURING THIS UPDATE PROCESS
Press ENTER
ENTER
Please turn the ignition ON
Key turned ON
1 minute elapsed
Flash update timed out waiting for ignition on
Press MODE
returns to Main Menu
Updating ###% done.
May take 3 minutes.
Please wait
successful?
Update successful.
Press MODE
Update failed. Possible corruption. Please retry now. Press MODE
Main Menu
1-SYSTEM ID
2-REFLASH
FINISH

sp29933



Item	Description	Part No.
1	Screws, 5/16-18 x 5/8 in. (2)	3647
2	Screws, 1/4-20 x 5/8 in. (3)	3594
3	Locknuts, 1/4-20 x 1/2 in. (4)	7671
4	Hose clamps (2)	9946
5	O-ring	11110
6	Insert, air cleaner	29029-85
7	Hose fitting	29034-85
8	Filter element	29055-89
9	Gasket	29095-95
10	Banjo bolts (2)	45571-97
11	Washers (6)	45596-93

Item	Description	Part No.
12	Hose	63534-90
13	Nylon washers (3)	91725-83
14	Backplate	29362-97
15	Bracket	29363-97
16	Breather manifold	27900-97
17	Washers, 1/4 in. ID (2)	6736
18	ECM (not shown), for kit 29933-97 ONLY	32423-97
19	Cartridge (not shown) ECM calibration	32636-97
20	Cam	25536-97
21	Injectors (2)	27135-97
22	Label, “EFI Stage 2” (not shown)	not sold