



MOTORSPORT EEC-IV EFI EXTENDER INSTALLATION INSTRUCTIONS

IS-M-12650-A50
7/06/93
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FORD MOTOR COMPANY SPECIAL VEHICLE OPERATIONS.

INTRODUCTION:

Ford Motorsport has developed a revolutionary product engineered to enhance the operation of a stock EEC-IV engine control system. The Extender is designed to operate with any year Mass Air EFI 5.0L Mustang produced including those that have the SVO Mass Air Conversion Kit installed (Part Numbers: M-9000-B50 or M-9000-A51). The Extender is the first true "bolt on" electronic device that will allow the user to go past the EEC-IV engine RPM limit and set a new engine RPM limit. The new engine RPM limit is based on the users requirements. The Extender will also allow the adjustment of the Air/Fuel ratio to compensate for various engine configurations from street driven vehicles to all out competition race cars. The Extender is engineered to eliminate the tedious calibration task required on other competitive products.

EXTENDER ADVANTAGES:

The EEC-IV Extender engine control system is engineered to control any 5.0L EFI Mass Air Mustang from a stock engine that is driven on the street to the serious race prepared engine. The advantages of Electronic Fuel Injection over carburetors is now being realized by anyone that drives or races. The combination of drivability and increased power potential makes EFI the only engine management system suited for the high performance needs of today's drivers and racers. As automobile enthusiasts push their vehicles to the limit, the stock electronics are only operational to a preset point. Most users do not have access to change this set point in a stock EEC-IV engine control system, so they must try to work around the limitations. Trying to work around a stock control system has been tedious, cumbersome and very frustrating, until now. The EEC-IV Extender allows a user with little or no electronics experience to push the stock electronic controls to the limit without sacrificing drivability or function. The Extender will allow the user to set an engine RPM limit where ever he/she pleases. The Extender will also allow the adjustment of the Air/Fuel ratio, this adjustment was designed into the Extender to compensate for a variety of engine combinations. The Extender is designed to work with a production or larger Mass Air Meters such as the SVO 77 mm (PN: M-12K579-A32). A good rule to keep in mind is: if it works with EEC-IV then it will work with the Extender.

EXTENDER LIMITATIONS:

1. Although the Extender sounds like a dream come true, it does have its limitations. Over all Spark advance is fixed at the factory setting, so changing the total spark advance must be done by advancing/retarding the distributor.

CAUTION: Always double check the base spark advance with a high quality timing light, incorrect spark advance can damage an engine. Refer to the Mustang Shop Manual for the procedure to set the base spark timing.

2. The Extender will work fine with a super charged or turbo charged engine, however the Extender will not perform boost spark retard.
3. When using the Extender with a Nitrous Oxide Injected engine, the overall spark advance must be retarded when the Nitrous Oxide is operational. The Extender will not retard spark automatically on the Nitrous Oxide injected applications.



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VEHICLE REQUIREMENTS:

1986 - 1987 5.0L EFI Mustang with the SVO Mass Air Conversion Kit.

1988 5.0L EFI Mustang with the SVO Mass Air Conversion Kit (except California).

1988 5.0L EFI Mass Air Mustang (California).

1989 - 1993 5.0L EFI Mass Air Mustang (all).

All of the above vehicles must have the stock EEC-IV wiring harness installed in the vehicle. If the wiring harness is not of stock configuration, a new wiring harness may have to be installed for reliable EEC-IV and Extender operation.

CAUTIONS:

1. When operating the EEC-IV Extender with a boosted engine be sure to have the proper spark retard for the engine. If you are unfamiliar with this, consult a trained professional.
2. When operating the EEC-IV Extender with Nitrous Oxide be sure to have the proper spark retard for the engine. If you are unfamiliar with this, consult a trained professional.
3. Be careful with the EEC-IV and Extender connectors. Improper connections will result in unreliable operation of both EEC-IV and the Extender.
4. Any adjustment to the RPM Limit or Air/ Fuel Ratio must be made with the ignition switch in the off position.
5. If your vehicle sputters at high RPM it is likely caused by the stock ignition not providing enough energy. You will need to replace it with a Motorsport Ignition Kit: Ignition Control Module, (PN: M-12199-8351), Ignition Coil, (PN: M-12029-A351), Ignition Wiring Harness, (PN: M-12074-8351), or "CD" Conversion Module, (PN: M-12199-A50).
6. It may be necessary to install a Motorsport High Flow Fuel Pump (PN: M-9407-A50).
7. If the engine cannot be richened to the desired Air/fuel ratio other limitations may be present (i.e. Injectors, fuel lines etc.) If larger injectors are required, be sure that the air meter matches the injector size.

PARTS INCLUDED IN KIT:

Check the contents of the kit as received and make sure all of the components are supplied. (See Figure 1). If any parts are missing or damaged please return the kit to your SVO dealer for a replacement.

1. Extender Module
2. Extender Wiring harness adapter
3. Installation Instructions

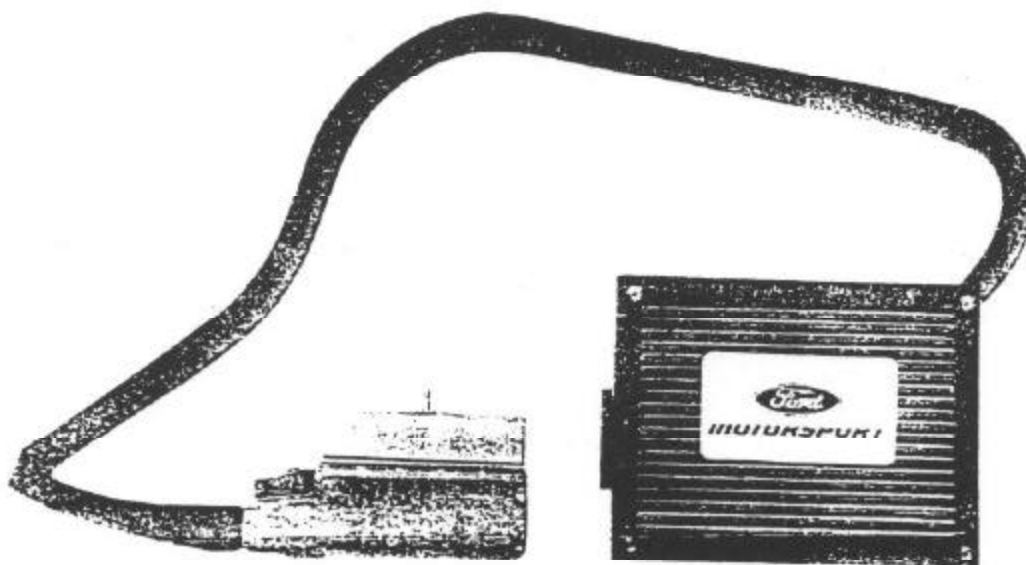


Figure 1 Kit Parts

TOOLS REQUIRED FOR INSTALLATION:

Phillips Screwdriver.
Small Flat-head Screwdriver.
10mm Wrench, Socket, or Nut-Driver.

INSTALLATION INSTRUCTIONS:

STEP 1: Disconnect the battery. (Negative cable first).

STEP 2: Locate and Disconnect EEC-IV module. in the passenger's side kick panel. Remove the kick panel and insulation. With a 10mm Nut-Driver/socket disconnect the factory wiring harness connector from the EEC-IV module. The module should be left in it's factory location, there is no need to remove it.

STEP 3: Use a 10mm Nut-Driver/socket to attach the Extender Wiring Harness Adapter connectors. Carefully, line-up the Adapter connector for the EEC-IV module, the module is slotted for the key-ways on the connector. Make certain that the connector is straight while tightening the attaching bolt. Damage to the terminal pin or the attaching threads can happen, if cross-threaded. The stop tabs on the connector will contact the module when the connector is fully seated.
DO NOT OVERTIGHTEN!!

STEP 4: Attach the Adapter connector to the EEC harness the same way. **DO NOT OVERTIGHTEN!!**
 The Extender Wiring Harness should then be tucked up into the kick panel and the kick panel replaced. Allow room for part of the harness that connects to the Extender Module, to pass under the kick panel.
NOTE: Minor modifications to the insulation may be required.

STEP 5: Carefully, line-up the Adapter connector for the Extender Module, the module is slotted for the key-ways on the connector. Make certain that the connector 'snaps' together. Place the Extender Module under the passenger seat, after adjustments have been made.

STEP 6: Set the new engine speed limit (see table 1 Page 5).
NOTE: To set the extender the ignition switch must be in the "OFF" position. The extender values will not be implemented with the ignition on, or the car running. Make sure that the adjustment pointer is inline with the desired setting. (See Figure 2).

STEP 7: Set the new Air / Fuel Ratio for the engine (see table 2 page 6).

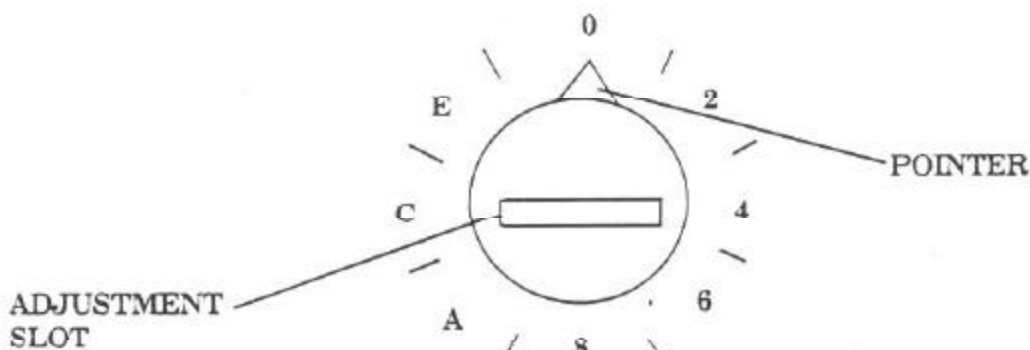


Figure 2. Setting Adjustment



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EXTENDER ADJUSTMENT GUIDE

TABLE 1

RPM LIMITER:

This adjustment sets the Engine's RPM limit. Select the appropriate engine speed limit from the table below and set the REV LIMIT switch to the proper setting. Please consult a certified professional if you are unfamiliar with how high the engine is capable of performing. CAUTION: Be sure not to operate the engine at a higher speed than recommended, operation of an engine above its rated limit will cause serious damage.

<u>Switch Position</u>	<u>Engine Speed (RPM)</u>
0	6500
1	6700
2	6900
3	7100
4	7300
5	7500
6	7700
7	7900
8	8100
9	8300
A	8500
B	8700
C	8900
D	9100
E	9300
F	13000



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TABLE 2

AIR RATIO:

This adjustment sets the Air to Fuel Ratio. Select the desired Air to Fuel ratio from the table below and set the AIR/FUEL switch to the proper position. CAUTION: Do not operate an engine too lean, (the higher the Air to Fuel ratio, the leaner the fuel mixture) this will cause an engine to operate at higher temperatures and could cause serious damage to the engine. Please consult a certified professional if you are unfamiliar with what the engine needs.

<u>Switch Position</u>	<u>AIR/FUEL RATIO</u>
0	9.50 to 1
1	10.00 to 1
2	10.50 to 1
3	11.00 to 1
4	11.25 to 1
5	11.50 to 1
6	11.75 to 1
7	12.00 to 1
8	12.25 to 1
9	12.50 to 1
A	12.75 to 1
B	13.00 to 1
C	13.25 to 1
D	13.50 to 1
E	13.75 to 1
F	14.00 to 1

RICH

LEAN