

MAZDA

CAUTION: DO NOT crank engine before replacement PCM is programmed to immobilizer system or PCM will be severely damaged. If test procedures require replacement of PCM on a vehicle equipped with immobilizer system, vehicle must be sent to authorized Mazda dealer to have replacement PCM programmed.

PROGRAMMING POWERTRAIN CONTROL MODULE

NOTE: Before performing PCM programming procedure, check for any applicable Technical Service Bulletins (TSBs) that may apply to vehicle application.

Description

Flash Electronically Erasable Programmable Read Only Memory (EEPROM) is contained in an Integrated Circuit (IC) inside of Powertrain Control Module (PCM). The EEPROM contains the vehicle strategy and any calibration information specific to vehicle. The IC is reprogrammable and at times it may become necessary to reprogram or reflash the entire contents. This is usually due to an after production strategy change or the Flash Vehicle Identification (VID) Block has been previously reprogrammed and has reached its limit. The VID block can be tailored to accommodate various hardware changes made since vehicle production. This procedure can only be performed using Ford's Service Bay Technical System (SBTS) or equivalent.

A replacement PCM will have a label stating PROGRAMMING REQUIRED. This indicates that it is necessary to retrieve VID data from the original PCM before removing PCM from vehicle. This procedure can be performed using New Generation Star (007-00500) scan tool or equivalent. See **FLASH VEHICLE IDENTIFICATION BLOCK PROCEDURE**. If original PCM is damaged, nonfunctional or incapable of communicating, it will be necessary to manually reprogram VID block. This procedure can only be performed by contacting the "AS BUILT" data center for programming information.

Flash Vehicle Identification Block Procedure

NOTE: If using a generic scan tool, follow scan tool manufacturer's instructions to perform this procedure.

1. To perform this procedure NGS scan tool, Ford Service Function (FSF) card and NGS Flash Cable (007-00531) must be used. Plug flash cable into scan tool. Plug other end of flash cable into Data Link Connector (DLC). From the scan tool main menu, select SERVICE BAY FUNCTIONS, POWERTRAIN CONTROL MODULE and then PROGRAMMABLE MODULE INSTALLATION.
2. Scan tool display should show 2 selections. The first is selection is for old PCM information to be retrieved and stored. The second selection is for restoring new PCM with information that has been retrieved from the old PCM. Follow scan tool display instructions or refer to instruction sheet included with FSF card. If Flash Vehicle Identification (VID) Block has been reprogrammed previously, scan tool will display a message indicating the need to reflash entire Integrated Circuit (IC). This procedure can only be performed using Ford's Worldwide Diagnostic System (WDS).

KEY REPLACEMENT OR ADDITION

Customer Supplied 2 Or More Valid Keys

1. Cut new transponder equipped key(s). Using first key, turn ignition switch to ON position, then LOCK position 5 times. DO NOT leave key in either position for more than one second. Turn first key to ON position. SECURITY light should illuminate. Turn first key to LOCK position and remove from ignition. SECURITY light should go out.
2. Using second key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn second key to LOCK position and remove key.
3. Repeat step 2 with first key. Repeat step 2 with third key. Repeat step 2 with each new or valid key, up to 8 keys total. Waiting 30 seconds will cause program to quit automatically.

Customer Supplied Only One Or No Valid Keys

1. Cut new transponder equipped key(s). Using new key, turn ignition switch to ON position, then LOCK position 5 times. DO NOT leave key in either position for more than one second. Turn new key to ON position. SECURITY light should be flashing at 300-millisecond interval. Turn new key to LOCK position and wait about 5 minutes until SECURITY light flashing has decreased to 1.2-second interval.
2. Input code word. See **INPUTTING CODE WORD**. SECURITY light should stop flashing and stay illuminated. Start engine with new key. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn new key to LOCK position and remove key.
3. Using new second key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn new second key to LOCK position and remove key.
4. Repeat step 3 with new third key. Repeat step 3 with each new key, up to 8 keys total. Waiting 30 seconds will cause program to quit automatically.

STEERING LOCK REPLACEMENT

NOTE: When replacing steering lock, coil and keys should be replaced as a set.

Customer Supplied 2 Or More Valid Keys

1. Remove old steering lock. See STEERING LOCK under REMOVAL & INSTALLATION in appropriate IMMOBILIZER SYSTEMS article. Connect new steering lock to ignition switch connector. Connect old steering lock to coil connector.
 2. Insert valid first key into old steering lock. Insert new key into new steering lock. Turn new key to ON position, then LOCK position 5 times. DO NOT leave key in either position for more than one second. Turn new key to ON position. SECURITY light should illuminate. Turn new key to LOCK position. SECURITY light should go out.
 3. Remove valid first key from old steering lock. Place valid second key into old steering lock. Using new key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn new key to LOCK position.
 4. Disconnect coil connector from old steering lock and reconnect into new steering lock. Using new key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn new key to LOCK position and remove key.
 5. Repeat step 4 with each new key. Waiting 30 seconds will cause program to quit automatically.
- Complete installation of steering lock

Customer Supplied Only One Or No Valid Keys

1. Replace steering lock, see STEERING LOCK under REMOVAL & INSTALLATION in appropriate IMMOBILIZER SYSTEMS article. Using new key, turn ignition switch to ON position, then LOCK position 5 times. DO NOT leave key in either position for more than one second. Turn new key to ON position. SECURITY light should be flashing at a 300-millisecond interval. Turn new key to LOCK position and wait about 5 minutes until SECURITY light flashing has decreased to a 1.2-second interval.
2. Input code word. See **INPUTTING CODE WORD**. SECURITY light should stop flashing and stay illuminated. Start engine with new key. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn new key to LOCK position and remove key.
3. Using new second key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn new second key to LOCK position and remove key.
4. Repeat step 3 with new third key. Waiting 30 seconds will cause program to quit automatically.

IMMOBILIZER UNIT

NOTE: When customer does not supply any valid keys, PCM must also be replaced.

Customer Supplied Only One Or No Valid Keys

1. Cut new transponder equipped key(s). Using first new key, turn ignition switch to ON position, then LOCK position 5 times. DO NOT leave key in either position for more than one second. Turn first new key to ON position. SECURITY light should be flashing at a 300-millisecond interval. Turn first new key to LOCK position and wait about 5 minutes until SECURITY light flashing has decreased to a 1.2-second interval.
2. Input code word. See **INPUTTING CODE WORD**. SECURITY light should stop flashing and stay illuminated. Start engine with first new key. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn first new key to LOCK position and remove from ignition.
3. Using second new key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn second new key to LOCK position and remove key.
4. Repeat step 3 with valid key or new third key. Repeat step 3 with each new key, up to 8 keys total. Waiting 30 seconds will cause program to quit automatically.

Customer Supplied Two Or More Valid Keys

1. Cut new transponder equipped key(s). Using first valid key, turn ignition switch to ON position, then LOCK position 5 times. DO NOT leave key in either position for more than one second. Turn first valid key to ON position. SECURITY light should illuminate. Turn first valid key to LOCK position and remove key from ignition. SECURITY light should go out.
2. Using second valid key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn second new key to LOCK position and remove key.
3. Repeat step 2 with new third key. Repeat step 2 with each new key, up to 8 keys total. Waiting 30 seconds will cause program to quit automatically.

POWERTRAIN CONTROL MODULE

NOTE: When customer does not supply any valid keys, immobilizer unit must also

be replaced.

Customer Supplied 2 Or More Valid Keys

1. Cut new transponder equipped key(s), if necessary. After PCM is replaced. Using valid first key, turn ignition switch to ON position. SECURITY light should illuminate for 1-2 seconds. Turn valid key to LOCK position.
2. Using valid first key, turn ignition switch to ON position, then LOCK position 6 times. DO NOT leave key in either position for more than one second. Ensure sixth turning is done within one second. Remove valid first key.
3. Using valid second key, turn ignition switch to ON position. SECURITY light should illuminate for 1-2 seconds. Turn valid second key to LOCK position and remove key.
4. Using valid first key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn valid first key to LOCK position and remove key.
5. Repeat step 4 with additional valid key or new third key. Repeat step 4 with each new key, up to 8 keys total. Waiting 30 seconds will cause program to quit automatically.

Customer Supplied Only One Valid Key

1. Cut new transponder equipped key(s), if necessary. After PCM has been replaced. Using new first key, turn ignition switch to ON position. SECURITY light should illuminate for 1-2 seconds. Turn new first key to LOCK position.
2. Using valid key, turn ignition switch to ON position, then LOCK position 6 times. DO NOT leave key in either position for more than one second. Ensure sixth turning is done within one second. SECURITY light should be flashing at a 300-millisecond interval. Wait about 5 minutes until SECURITY light flashing has decreased to a 1.2-second interval.
3. Input code word. See **INPUTTING CODE WORD**. SECURITY light should stop flashing and stay illuminated. Using valid key, turn ignition switch to ON position. SECURITY light should illuminate for 1-2 seconds. Turn valid key to LOCK position and remove key.
4. Using new second key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn new second key to LOCK position and remove key.
5. Repeat step 4 with each new key, up to 8 keys total. Wait 30 seconds, program will quit automatically. After reprogramming is complete, clear DTCs with New Generation Star (NGS) tester.

IMMOBILIZER UNIT & POWERTRAIN CONTROL MODULE

NOTE: Keys may be new or valid. If errors occur during reprogramming in steps 1 or 2, start over from step 1. If errors occur during step 3, go to **REPROGRAM ERROR RECOVERY**.

1. Cut new transponder equipped key(s), if necessary. After replacing immobilizer unit and PCM. Using first key, turn ignition switch to ON position. SECURITY light should illuminate and then go out. Turn first key to LOCK position and remove key. SECURITY light should flash repeatedly in single pulses.
2. Using second key, turn ignition switch to ON position. SECURITY light should illuminate and then go out. Turn second key to LOCK position and remove key. SECURITY light should flash in double pulses repeatedly.
3. Using third key, turn ignition switch to ON position. SECURITY light should illuminate and then go

out. Turn third key to LOCK position and remove key. SECURITY light should flash repeatedly in triple pulses.

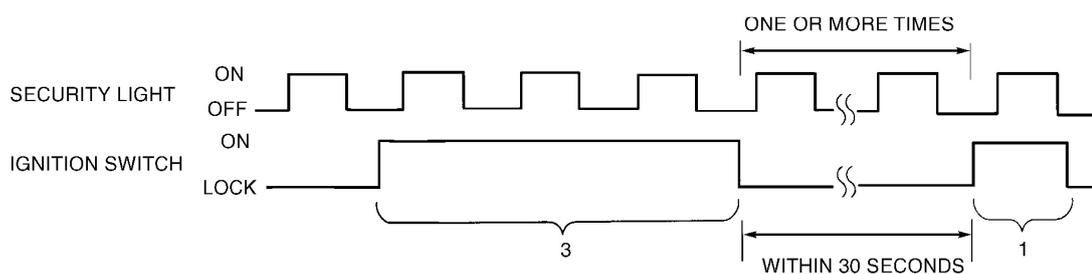
- Repeat step 3 with each new key, up to 8 keys total. Waiting 30 seconds will cause program to quit automatically. After reprogramming is complete, clear DTCs with NGS tester.

REPROGRAM ERROR RECOVERY

- Using first key, start engine. After SECURITY light illuminates for 1-2 seconds, turn first key to LOCK position. Using first key, turn ignition switch to ON position, then LOCK position 5 times. DO NOT leave key in either position for more than one second.
- Using first key, turn ignition switch to ON position. SECURITY light should illuminate. Turn first key to LOCK position and remove key. SECURITY light should go out.
- Using second key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn second key to LOCK position and remove key.
- Repeat step 3 with first key. Repeat step 3 with third key, then with each new key, up to 8 keys total. Waiting seconds will cause program to quit automatically. After reprogramming is complete, clear DTCs with NGS tester.

INPUTTING CODE WORD

- Code word is comprised of 8 digits from 1-9. The code word is part of immobilizer unit. To obtain code word call manufacturer with immobilizer unit serial number.
- The immobilizer unit code word is input to PCM by cycling ignition key and counting number of SECURITY light flashes. Wait about 5 minutes until SECURITY light flashing has decreased to 1.2-second interval. Input code word with SECURITY light sequence. See [Fig. 3](#).
- Turn ignition switch to ON position for length of time required for SECURITY light to flash the same number of times that coincides with first code word digit. Turn ignition switch to LOCK position for at least one flash, but for less than 30 seconds. Repeat procedure for each code word digit. When code word is registered correctly, SECURITY light will stop flashing and stay illuminated. Continue immobilizer system reprogram procedure.



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Fig. 3: Inputting Immobilizer Systems Code Word (Example: 31)
 Courtesy of MAZDA MOTORS CORP.