ARTICLE BEGINNING

GENERAL INFORMATION
2001 Import Computer Relearn Procedures

INTRODUCTION

BODY CONTROLS

Vehicles equipped with body, air conditioning, anti-lock brake or memory computers may require a computer relearn procedure after components are replaced or the vehicle battery is disconnected. Vehicle computers memorize and store vehicle information and operation selections. When the vehicle battery is disconnected, vehicle computer memory may be lost, requiring relearning or resetting. Depending on the vehicle and how it is equipped, the following memories may exist:

* Seat position.
* Tilt/telescoping steering wheel position.
* Mirror position.
* Radio presets and anti-theft code.
* Clock.
* Remote keyless entry custom features.
* Door key lock entry custom features.
* Power window or sunroof operation.

These do not affect vehicle operation. For systems that do not affect operation, see appropriate article for relearn procedures. Other computer relearn procedures are required for vehicle or system operation. These may include:

* Initial control unit programming.
* Traction control yaw sensor initializing.
* Multiplex communication.
* Anti-theft system or engine immobilizer system passwords.

ENGINE CONTROLS

Vehicles equipped with powertrain control computers may require a computer relearn procedure after the vehicle battery is disconnected. Vehicle computers memorize and store vehicle operation patterns for optimum driveability and performance. When the vehicle battery is disconnected, this memory is lost, which may result in a driveability problem. Depending on the vehicle and how it is equipped, the following driveability problems may exist:

* Rough or unstable idle.
* Hesitation or stumble.
* Rich or lean running.
* Poor fuel mileage.
* Harsh or poor transmission/transaxle shift quality.

Default data is used until NEW data from each key start is stored. As the computer restores its memory from each new key start, driveability is restored.

Driveability problems may occur during the computer relearn stage. To accelerate computer relearn process after battery removal and installation, specified computer relearn procedures should be performed. See appropriate procedures for specified manufacturer.

ACURA

ALL MODELS

After disconnecting battery or replacing ECM/PCM, drive vehicle to enable ECM/PCM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM/PCM completes relearn function.

INTEGRA, 3.5RL & 3.2TL

ECM/PCM Reset Procedure

Using Honda PGM Tester or OBD-II scan tool, clear ECM/PCM memory. Follow manufacturer's instructions. To reset ECM/PCM without scan tool, turn ignition off. Remove BACK UP or CLOCK/RADIO (7.5-amp) fuse from underhood fuse/relay box for 10 seconds.

NOTE: If no DTCs exist and SCS is connected, MIL will stay illuminated with ignition on.
Final Procedure
This procedure must be performed after any trouble shooting.

Remove Service Check Connector (SCS) connector, if connected. Perform ECM/PCM reset procedure. Turn ignition off. Disconnect scan tool.

Known-Good ECM/PCM Substitution
On models equipped with engine immobilizer system, acquire key cut from non-immobilizer key blank. Remove ECM/PCM from test vehicle. Install a known-good ECM/PCM from donor vehicle into test vehicle. Tape donor vehicle's ignition key head-to-head to test vehicle's temporary key. ECM/PCM will temporarily recognize code from donor vehicle's key and allow test vehicle to be started.

ECM/PCM Replacement
ECM/PCM is part of engine immobilizer system. Replacement ECM/PCM must have immobilizer code rewritten, using Honda PGM Tester.

To perform rewrite procedure requires the vehicle, all master keys, all valet keys and a Honda PGM Tester with an immobilizer program card. Any key not learned during rewrite will not start vehicle.

Follow Honda PGM Tester instructions. For more information, see appropriate IMMOBILIZER SYSTEMS article in ACCESSORIES & EQUIPMENT.

AUDI

ALL MODELS

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.

A4 1.8L TURBO & A6

NOTE: On A4 1.8L turbo and A6 models, it is necessary to generate a readiness code if PCM memory is cleared or PCM is disconnected from battery voltage.

1.8L Turbo Readiness Code
VAG 1551 scan tool is necessary for clearing codes. Follow manufacturer's instructions for clearing codes. After clearing codes, it is necessary to generate a PCM readiness code. A readiness code resets specific values to zero. Follow scan tool manufacturer's instructions for generating a readiness code.

NOTE: On A4 1.8L turbo and A6 models, it is necessary to adapt the throttle valve control module to ECM if ECM memory is cleared or ECM is disconnected from battery voltage. Turn ignition on (engine off) for 10 seconds.

PCM CODING (ALL MODELS)

NOTE: VAG 1551 scan tool is necessary to perform PCM coding.

If Powertrain Control Module (PCM) is replaced it is necessary to code new PCM. If new PCM is not properly coded, the following problems may occur:

* Driveability problems (i.e. harsh shifting).
* Increased fuel consumption.
* Increased exhaust emissions.
* Reduction in transmission life.
* Malfunctions not present are stored in PCM memory.
* Not all PCM functions are carried out (i.e. EVAP system operation).

Following manufacturer's instructions, connect VAG 1551 scan tool to vehicle. Following manufacturer's instructions, access PCM coding information using VAG 1551 scan tool. For PCM coding options, see appropriate ECM CODING OPTIONS table.

As an example, a properly coded PCM for an A4 model with EGR system, All Wheel Drive (AWD), and Automatic Transmission (A/T) would look like 01251 on the VAG 1551 scan tool.

NOTE: After coding PCM and starting engine for first time, allow engine to idle for several minutes so PCM can go through a learn function. Idle speed may be erratic while PCM is learning.

ECM CODING OPTIONS (A4 1.8L TURBO)

<table>
<thead>
<tr>
<th>Application/Code</th>
<th>Option</th>
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### BMW

#### ALL MODELS

**NOTE:** When DME control unit is disconnected or its power supply interrupted, all stored intermittent DTCs as well as substitute values are cleared/lost. Current hard DTCs cannot be cleared.

After disconnecting battery or replacing DME control unit, drive vehicle to enable DME control unit to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until DME control unit completes relearn function. System Readiness Test (SRT) information not available from manufacturer.

**COMPONENT ACTIVATION**

Use BMW MoDIC (hand-held scan tester), BMW Service Tester

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<th>Country/Emissions</th>
<th>USA Equipped EVAP Leak Detection Pump</th>
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(Sun 2013 Engine Analyzer) and applicable BMW diagnostic software to activate components. Select DRIVE COMPONENTS MODE (D300). Detailed information on this mode is displayed on screen.

POWER WINDOW CALIBRATION

Power windows will require calibration to establish upper and lower stop points is battery is disconnected. Turn ignition on. Lower window(s) to stop and hold switch for 5 seconds. Raise window(s) to stop and hold switch for 5 seconds. Turn ignition off.

HONDA

ALL MODELS

After disconnecting battery or replacing ECM/PCM, drive vehicle to enable ECM/PCM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM/PCM completes relearn function.

ECM/PCM Reset Procedure

Using Honda PGM Tester or OBD-II scan tool, clear ECM/PCM memory. Follow manufacturer’s instructions. On all models except Passport, ECM/PCM may reset without scan tool. Turn ignition off. Remove BACK UP or CLOCK/RADIO (7.5-amp) fuse from underhood fuse/relay box for 10 seconds.

NOTE: If no DTCs exist and SCS is connected, MIL will stay illuminated with ignition on.

Final Procedure

This procedure must be performed after any trouble shooting. Remove Service Check Connector (SCS) connector, if connected. Perform ECM/PCM reset procedure. Turn ignition off. Disconnect scan tool.

ACCORD, CR-V, ODYSSEY & S2000

Known-Good ECM/PCM Substitution

On models equipped with engine immobilizer system, acquire key cut from non-immobilizer key blank. Remove ECM/PCM from test vehicle. Install known-good ECM/PCM from donor vehicle into test vehicle. Tape donor vehicle’s ignition key head-to-head to test vehicles temporary key. ECM/PCM will recognize code from donor vehicle's key and allow test vehicle to be started.

ECM/PCM Replacement

ECM/PCM is part of immobilizer system. Replacement ECM/PCM must have immobilizer code rewritten, using Honda PGM Tester. To perform rewrite procedure requires the vehicle, all keys, and all valet keys and a Honda PGM Tester with an immobilizer program card. Any key not learned during rewrite will not start vehicle. Follow Honda PGM Tester instructions. For more information, see appropriate IMMOBILIZER SYSTEMS article in ACCESSORIES & EQUIPMENT.

HYUNDAI

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.

INFINITI

ECM PROGRAMMING

ECM is a part of Nissan Anti-Theft System (NATS). Replacement ECM must have immobilizer code rewritten, using CONSULT tester. To perform rewrite procedure requires the vehicle, all keys and a CONSULT tester with a NATS Program Card (E960U). Any key not learned during rewrite procedure, will not start vehicle. Follow CONSULT tester instructions.

ISUZU

ALL MODELS

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.
JAGUAR

KEY TRANSPONDER MODULE (KTM) SYNCHRONIZATION

If ECM or KTM is replaced, synchronization must be performed or vehicle will not start. Load latest software in Jaguar Portable Diagnostic Unit (1051 for XK8, 1055 for V8 XJ Series). Access diagnostics. Select VEHICLE SETUP. Select INITIALIZE IMMOBILIZATION to synchronize the ECM and KTM.

ECM RELEARN PROCEDURE

Except S-Type

CAUTION: DO NOT exceed engine speeds or time durations listed.

Start engine and allow to reach operating temperature. Press A/C button to turn climate control system off. Apply parking brake. Apply brakes and shift transmission to DRIVE. Allow engine to idle for 2 minutes. Gradually raise engine speed to 950 RPM and hold for 45 seconds. Raise engine speed to 1200 RPM and hold for 45 seconds. Raise engine speed to 1500 RPM and hold for 30 seconds. Allow engine to return to idle. Place shifter in PARK. Turn engine off.

S-Type

Start engine and allow to reach operating temperature with transmission in Park. Ensure all accessories are off. Apply parking brake. Apply brakes and shift transmission to DRIVE. Allow engine to idle for 2 minutes. Perform road test. Allow engine to return to idle. Place shifter in PARK. Turn engine off.

POWER WINDOW CALIBRATION (XK8)

Power windows will require calibration to establish upper and lower stop points is battery is disconnected. Turn ignition on. Lower window(s) to stop and hold switch for 5 seconds. Raise window(s) to stop and hold switch for 5 seconds. Turn ignition off.

RADIO SECURITY CODE

Radio will require anti-theft security code to be entered if battery is disconnected. Turn radio on. Radio should display CODE. Using preset buttons, enter code number from security card. A "beep" will sound when correct code is entered. If code is incorrectly entered after 3 successive attempts, radio must be left on for one hour before it will accept code entry.

TCM DRIVEABILITY COMPUTER RELEARN PROCEDURE

Manufacturer does not provide a specific computer relearn procedure for obtaining proper driveability. If vehicle battery was disconnected or TCM was replaced, driving the vehicle will enable the TCM to perform a computer relearn procedure for obtaining proper driveability. Inform customer that driveability may differ from what they are accustomed to until the TCM completes the computer relearn procedure.

KIA

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.

LAND ROVER

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.

LEXUS

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.
IGNITION KEY REGISTRATION (IMMOBILIZER EQUIPPED)

NOTE: This procedure MUST be performed only when NEW Engine Control Module (ECM) is installed. A new ECM is in automatic registration mode, and up to 3 ignition key identification codes may be registered in ECM at one time. In automatic registration mode, the last ignition key to be registered becomes the sub-key.

1) Ensure SECURITY indicator light is flashing. SECURITY indicator light is located on center of instrument panel, just above the air outlets above radio.
2) Insert ignition key into ignition lock cylinder. Note that SECURITY indicator light should now remain on steady.
3) Once ignition key registration is under way, SECURITY indicator light should turn off. After ignition key registration is complete, SECURITY indicator light should come on steady. Remove ignition key.
4) The SECURITY indicator light should flash when ignition key is removed from ignition lock cylinder if registration is complete and system is operating normally. If ignition key registration was not completed with ECM in automatic registration mode, a code 2-1 will be displayed by SECURITY indicator light. When inserting an ignition key that is already registered, code 2-2 will be displayed by indicator light.
5) If programming additional ignition keys, repeat process starting with step 1). If additional ignition keys do not need programming, procedure is complete. SECURITY indicator light should go off once last ignition key (sub-key) is registered.
6) To complete automatic registration mode, depress and release brake pedal at least 5 times within 15 seconds, or request automatic registration mode completion by using Toyota scan tool connected to Data Link Connector (DLC) No. 3.

MAZDA

IMMOBILIZER SYSTEM (626)

NOTE: A valid key must be available when replacing PCM or immobilizer unit, or both components must be replaced. When replacing an immobilizer system component, all working keys need to be reprogrammed into system. Replacing PCM or immobilizer unit will erase previously programmed keys.

Key Replacement Or Addition (Customer Supplied 2 Or More Valid Keys)
1) Cut new transponder equipped key(s). Using 1st key, turn ignition to ON position, then to LOCK position 5 times. Turn 1st key to ON position. SECURITY light should illuminate. Turn 1st key to LOCK position. SECURITY light should go out.
2) Using 2nd key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn 2nd key to LOCK position and remove key.
3) Repeat step 2) with 1st key. Repeat step 2) with new key. Repeat step 2) with each new or valid key, up to 8 keys total. Wait 30 seconds, program will quit automatically.

Key Replacement Or Addition (Customer Supplied Only One Or No Valid Keys)
1) Cut new transponder equipped key(s). Using new key, turn ignition to ON position, then to LOCK position 5 times. Turn new key to ON position. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn new key to LOCK position and remove key.
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 2nd key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn new 2nd key to LOCK position and remove key.
4) Repeat step 3) with valid key or new 3rd key. Repeat step 3) with each new key, up to 8 keys total. Wait 30 seconds, program will quit automatically.

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

Immobilizer Unit (Customer Supplied At Least One Valid Key)
1) Cut new transponder equipped key(s). Replace immobilizer unit. Using valid key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn valid key to
LOCK position and remove key.

2) Using new key or valid 2nd key, turn ignition to ON position, then to LOCK position 5 times. Turn new key or valid 2nd key to LOCK position and 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. Start engine with new key or valid 2nd key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn new key or valid 2nd key to LOCK position and remove key.

4) Using original valid key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn original valid key to LOCK position and remove key.

5) Repeat step 4) with additional valid key or new 3rd key. Repeat step 3) with each new key, up to 8 keys total. Wait 30 seconds, program will quit automatically.

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

PCM (Customer Supplied 2 Or More Valid Keys)
1) Cut new transponder equipped key(s), if necessary. Replace PCM. Using valid 1st key, turn ignition to ON position. SECURITY light should illuminate for 1-2 seconds. Turn valid 1st key to LOCK position.

2) Using valid 1st key, turn ignition to ON position, then to LOCK position 6 times. Ensure 6th turning is done within one second. Remove valid 1st key.

3) Using valid 2nd key, turn ignition to ON position. SECURITY light should illuminate for 1-2 seconds. Turn valid 2nd key to LOCK position and remove key.

4) Using valid 1st key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn valid 1st key to LOCK position and remove key.

5) Repeat step 4) with additional valid key or new 3rd key. Repeat step 4) with each new key, up to 8 keys total. Wait 30 seconds, program will quit automatically.

PCM (Customer Supplied Only One Valid Key)
1) Cut new transponder equipped key(s), if necessary. Replace PCM. Using new 1st key, turn ignition to ON position. SECURITY light should illuminate for 1-2 seconds. Turn new 1st key to LOCK position.

2) Using new 2nd key, turn ignition to ON position, then LOCK position 6 times. Ensure 6th 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 new 2nd key, turn ignition to ON position. SECURITY light should illuminate for 1-2 seconds. Turn new 2nd key to LOCK position and remove key.

4) Using valid 1st key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn valid 1st key to LOCK position and remove key.

5) Repeat step 4) with additional valid key or new 3rd key. Repeat step 4) with each new key, up to 8 keys total. Wait 30 seconds, program will quit automatically.

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.

Immobilizer Unit & PCM
1) Cut new transponder equipped key(s), if necessary. Replace immobilizer unit and PCM. Using 1st key, turn ignition to ON position. SECURITY light should illuminate and then go out. Turn 1st key to LOCK position and remove key. SECURITY light should flash in single pulses repeatedly.

2) Using 2nd key, turn ignition to ON position. SECURITY light should illuminate and then go out. Turn 2nd key to LOCK position and remove key. SECURITY light should flash in double pulses repeatedly.

3) Using 3rd key, turn ignition to ON position. SECURITY light should illuminate and then go out. Turn 3rd key to LOCK position and remove key. SECURITY light should flash in triple pulses repeatedly.

4) Repeat step 3) 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.

Reprogram Error Recovery
1) Using 1st key, start engine. After SECURITY light
illuminates for 1-2 seconds, turn 1st key to LOCK position. Using 1st key, turn ignition to ON position, then LOCK position 5 times.

2) Using 1st key, turn ignition to ON position. SECURITY light should illuminate. Turn 1st key to LOCK position and remove key. SECURITY light should go out.

3) Using 2nd key, start engine. SECURITY light should illuminate for 1-2 seconds and engine should continue to run. Turn 2nd key to LOCK position and remove key.

4) Repeat step 3) with 1st key. Repeat step 3) with 3rd key. Repeat step 3) with each new key, up to 8 keys total. Wait 30 seconds, program will quit automatically. After reprogramming is complete, clear DTCs with NGS tester.

Inputting Code Word
1) Code word is comprised of 8 digits from 1-9. The code word is part of immobilizer unit from manufacturer. To obtain code word, call manufacturer with immobilizer unit serial number.

2) The immobilizer unit code word is input into PCM by cycling ignition key and counting number of SECURITY light flashes. Wait about 5 minutes until SECURITY light flashing has decreased to a 1.2 second interval. Input code word with SECURITY light sequence.

3) Turn ignition to ON position for number of flashes of first code word digit. Turn ignition to LOCK position for at least one flash and 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.

MERCEDES-BENZ
ECM VERSION CODING

NOTE: Hand Held Tester (HHT) is necessary for performing version coding.

The Engine Control Module (ECM) has a version coding feature. Coding must be performed when a new ECM is installed. Version coding can be performed automatically or manually using Hand Held Tester (HHT).

Automatic Coding
Before removing Engine Control Module (ECM), using HHT, read and store existing version code. After installation of new module, download previous version code using HHT.

Manual Coding
If version code number cannot be read, vehicle equipment and version must be determined. A corresponding code number must be obtained from spare parts microfiche and manually entered with HHT. The following version data must be obtained for coding:

* Vehicle model
* Engine
* Transmission
* Non-catalytic converter
* Country version
* 19 MPH (30 km/h) limitation

ENABLING CODE FUNCTION FOR RADIO

NOTE: Code must be obtained from customer. When vehicle is shipped new, a CODE CARD is included with the owner's manual.

NOTE: Audio 10 models are identified by similar controls on each side of display and a cassette player above display.

Audio 10 Models (CLK, E & SLK Class)
After reconnecting radio, turn ignition on. CODE will be displayed. Enter code number using right side control knob. After selecting correct code, press right side control knob to confirm. Radio will turn on if code entered is correct.

If wrong code is entered, CODE will be displayed on radio. If wrong code is entered 3 times, WAIT will be displayed and code entry is denied for 10 minutes. If wrong code is entered 9 times, WAIT will be displayed and code entry is denied for 60 minutes. Radio and ignition switch must remain on during the waiting period.

NOTE: Audio 30 models are identified by station controls on right side of display and no cassette or CD player in unit.

Audio 30 Models (CLK, E & SLK Class)
After reconnecting radio, turn ignition on. CODE will be displayed. Enter code number using station select buttons on right side of display. After selecting correct code, press one of left side arrow buttons to confirm. Radio will turn on if code entered is correct.

If wrong code is entered, CODE will be displayed on radio. If wrong code is entered 3 times, WAIT will be displayed and code entry is denied for 10 minutes. If wrong code is entered 9 times, WAIT will be displayed and code entry is denied for 60 minutes. Radio and ignition switch must remain on during the waiting period.

Becker Radio (CL, S & SL Class)
Turn ignition on. Turn radio on. Press buttons No. 1 and No. 6 or buttons No. 1 and RDS (classic) simultaneously within 8 seconds after switching radio on. CODE will be displayed on radio. Enter customer supplied code number using station number keys on radio. Confirm correct code is displayed by pressing TUNE/AUTO button. Radio will turn on if correct code is entered.

Panasonic Exquisite Radio (CL, S & SL Class)
Turn ignition on. Turn radio on. Press buttons No. 1 and No. 6 simultaneously longer than 3 seconds. CODE will be displayed on radio. Enter customer supplied code number using station number keys on radio. Confirm correct code is displayed by pressing TUNE/AUTO button. Radio will turn on if correct code is entered.

Radio With Navigation Control Module (CL, S & SL Class)
Turn ignition on. Turn navigation control unit on. Press buttons No. 1 and No. 6 simultaneously within 8 minutes after switching unit on. CODE will be displayed. Enter customer supplied code number using station number keys on radio.Confirm correct code is displayed by pressing cursor keys or SCAN button. Unit will turn on if correct code is entered.

Radio With 4-Digit Fixed Code (CL, S & SL Class)
Turn ignition on. Turn radio on. CODE will be displayed. Enter customer supplied code number using station number keys on radio. Confirm correct code by pressing SEEK button. Unit will turn on if correct code is entered.

If wrong code is entered 3 times, code entry is denied for 15 minutes. If wrong code is entered 9 times, code entry is denied for 24 hours. Radio and ignition switch must remain on during the waiting period.

Turn ignition on. Turn navigation control unit or radio on. CODE will be displayed. Enter customer supplied code number using station number keys on radio. On radios, confirm correct code by pressing TUNE, AUTO/SEEK or SC button. On navigation control unit, confirm correct code by pressing ENTER button. Unit will turn on if correct code is entered.

If wrong code is entered, CODE will be displayed on radio. If wrong code is entered 3 times, WAIT will be displayed and code entry is denied for 10 minutes. If wrong code is entered 9 times, WAIT will be displayed and code entry is denied for 30 minutes. Radio and ignition switch must remain on during the waiting period.

Radio (ML Class)
Turn ignition on. Turn radio on. CODE will be displayed. Enter customer supplied code number using station number keys on radio. Confirm correct code by pressing seek forward or seek back buttons. Unit will turn on if correct code is entered.

If wrong code is entered, CODE will be displayed on radio and code will need to be researched and entered again. If wrong code is entered 3 times, code entry is denied for 10 minutes. If wrong code is entered 9 times, code entry is denied for 60 minutes. Radio and ignition switch must remain on during the waiting period.

PROGRAMMING SUPPLEMENTAL RESTRAINT SYSTEM (SRS) CONTROL MODULE

CAUTION: When programming control module, avoid interrupting control module voltage supply. Damage to control module may result. Control module parameters can only be set once. DO NOT connect Hand-Held Tester (HHT) to Data Link Connector (DLC) with ignition on. Damage to HHT may result.

NOTE: Hand-Held Tester (6511 0001 99) is necessary to set control
After replacing control module, when ignition is turned on, SRS warning light will continuously blink or stay on, indicating that control module parameters need to be programmed. Turn ignition off. Connect HHT to DLC. DLC is located in right rear corner of engine compartment. It may be necessary to use Adapter (140 589 1463 00) to connect HHT to DLC. Follow HHT prompts to program replacement control module. Currently all control modules are programmed with the same parameters. After control module parameters are set, SRS warning light will go out.

**MITSUBISHI**

**ECM**

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.

**RADIO SECURITY CODE**

Radio will require anti-theft security code to be entered if battery is disconnected. Turn radio on. Radio should display "code?". Using first 4 preset buttons, enter code number from customer supplied security card. Each preset button applies to code number digit. For example, No. 1 button sets the first digit of code number. Cycle button until desired number appears. Once code is entered, press TAPE or CD (as applicable) button. A "beep" will sound when correct code is entered. If code is incorrectly entered after 3 successive attempts, radio must be left on for one hour before it will accept code entry.

**NISSAN**

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.

**ECM PROGRAMMING**

ECM is a part of Nissan Anti-Theft System (NATS). Replacement ECM must have immobilizer code rewritten, using CONSULT. To perform rewrite procedure requires the vehicle, all keys and a CONSULT tester with a NATS Program Card (E960U). Any key not learned during rewrite will not start vehicle. Follow CONSULT tester instructions.

**PORSCHE**

**ALL MODELS**

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.

**BOXSTER**

**NOTE:** Ensure all codes are correct before entering. Codes cannot be changed.

Alarm/Drive Block Control Unit Programming

1) If control unit requires replacement, new control unit must be coded. It will be necessary to obtain immobilizer (drive block) code and teaching code from Porsche Cars North America (PCNA) prior to replacement. To obtain codes, complete code request form (Technical Bulletin, Boxster bulletin group 9, number 9801) from nearest Porsche dealer. Proof of ownership (valid title or registration) is required. Original transponders can be reused, but require recoding to new control unit.

2) Install control unit. Connect Porsche System Tester 2 and turn on. Select BOXSTER and begin control unit search sequence. Select ALARM SYSTEM, 4 TEACHING FUNCTIONS AND IMMOBILIZER. Enter 16-digit immobilizer code obtained from PCNA and press ENTER. Confirm code entry by pressing F7.

**SAAB**

After disconnecting battery or replacing ECM, drive vehicle
to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.

**SUBARU**

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.

**SUZUKI**

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.

**TOYOTA**

IGNITION KEY REGISTRATION (IMMOBILIZER EQUIPPED)

**NOTE:** This procedure MUST be performed only when a NEW Engine Control Module (ECM) is installed. A new ECM is in automatic registration mode, and up to 3 ignition key identification codes may be registered in ECM at one time. In automatic registration mode, the last ignition key to be registered becomes the sub-key.

**NOTE:** On Avalon and Camry models without engine immobilizer systems, new ECM must be programmed to non-immobilizer setting. See NON-IMMOBILIZER PROGRAMMING (AVALON & CAMRY).

1) Ensure SECURITY indicator light is flashing. SECURITY indicator light is located on center of instrument panel, just above the air outlets above radio.

2) Insert ignition key into ignition lock cylinder. Note that SECURITY indicator light should now remain on steady.

3) Once ignition key registration is under way, SECURITY indicator light should turn off. After ignition key registration is complete, SECURITY indicator light should come on steady. Remove ignition key.

4) SECURITY indicator light should flash when ignition key is removed from ignition lock cylinder if registration is complete and system is operating normally. If ignition key registration was not completed with ECM in automatic registration mode, code 2-1 will be displayed by SECURITY indicator light. When inserting an ignition key that is already registered, a code 2-2 will be displayed by indicator light.

5) If programming additional ignition keys, repeat process starting with step 1). If additional ignition keys do not need programming, procedure is complete. SECURITY indicator light should go off once last ignition key (sub-key) is registered.

6) To complete automatic registration mode, depress and release brake pedal at least 5 times within 15 seconds, or request automatic registration mode completion by using Toyota scan tool connected to Data Link Connector (DLC) No. 3.

**NON-IMMOBILIZER PROGRAMMING (AVALON & CAMRY)**

Ensure vehicle is not equipped with engine immobilizer system. Install new ECM. Turn ignition on for more than 2 seconds. Turn ignition to ACC or LOCK. Repeat ignition on/off cycle 4 times. Ensure ignition stays on more than 2 seconds on fourth time or vehicle will not start and ECM is permanently damaged. When ignition is on for more than 2 seconds the fourth time, "without engine immobilizer" code will be registered in ECM.

**VOLKSWAGEN**

ALL MODELS

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.

**BEETLE**

**NOTE:** Do not turn ignition off during ECM programming procedure.
ECM Programming (1.9L Engine)

Prior to removing original ECM, print out ECM identification. Connect Scan Tool (VAG 1551/1552) using Adapter cable (VAG 1551/3) to data link connector. Turn ignition on. Press 0 and 1 buttons to select ADDRESS WORD 01: ENGINE ELECTRONICS. Print out ECM identification by pressing PRINT button. Press right arrow button. Press 0 and 6 buttons to select FUNCTION 06: END OUTPUT. Press "Q" button to enter input. Turn ignition off.

Remove original ECM and install new ECM. Connect scan tool (VAG 1551/1552). Turn ignition on. Press 0 and 1 buttons to select ADDRESS WORD 01: ENGINE ELECTRONICS. Press right arrow button. Press 0 and 7 buttons to select FUNCTION 07: CODE CONTROL MODULE. Press "Q" button to enter input. Enter appropriate code for vehicle. See ECM CODES (BEETLE 1.9L) table. Turn ignition off, then on. Clear DTCs.

ECM CODES (BEETLE 1.9L)

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/T w/ABS</td>
<td>00001</td>
</tr>
<tr>
<td>M/T w/AS</td>
<td>00002</td>
</tr>
<tr>
<td>A/T w/o ABS</td>
<td>00004</td>
</tr>
</tbody>
</table>

ECM Programming (2.0L Engine)

Prior to removing original ECM, print out ECM identification. Connect Scan Tool (VAG 1551/1552) to data link connector. Turn ignition on. Press 0 and 1 buttons to select ADDRESS WORD 01: ENGINE ELECTRONICS. Print out ECM identification by pressing PRINT button. Press right arrow button. Press 0 and 6 buttons to select FUNCTION 06: END OUTPUT. Press "Q" button to enter input. Turn ignition off.

Remove original ECM and install new ECM. Connect scan tool (VAG 1551/1552). Turn ignition on. Press 0 and 1 buttons to select ADDRESS WORD 01: ENGINE ELECTRONICS. Press right arrow button. Press 0 and 7 buttons to select FUNCTION 07: CODE CONTROL MODULE. Press "Q" button to enter input. Enter appropriate code for vehicle. See ECM CODES (BEETLE 2.0L) table. If code entered is incorrect, scan tool will display function is not recognized and problems will result. If code is correct, press right arrow button. Press 0 and 6 buttons to select FUNCTION 06: END OUTPUT. Press "Q" button to enter input. Turn ignition off. Perform ECM To TCM matching. See ECM TO TCM MATCHING (2.0L ENGINE).

ECM CODES (BEETLE 2.0L)

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>M/T w/ABS</td>
<td>00000</td>
</tr>
<tr>
<td>A/T w/ABS</td>
<td>00001</td>
</tr>
<tr>
<td>M/T w/o ABS</td>
<td>00040</td>
</tr>
<tr>
<td>A/T w/o ABS</td>
<td>00041</td>
</tr>
</tbody>
</table>

NOTE: Perform ECM To TCM matching if battery is disconnected or if TCM is disconnected or replaced.

ECM To TCM Matching (2.0L Engine)

Ensure no DTCs exist. Battery is fully charged and cruise control is operating properly (if equipped). Turn all accessories off. Connect Scan Tool (VAG 1551/1552) to data link connector. Turn ignition on. Press 0 and 1 buttons to select ADDRESS WORD 01: ENGINE ELECTRONICS. Press right arrow button.

Press 0 and 4 buttons to select FUNCTION 04: BASIC SETTING. Press "Q" button to enter input. Press 0, 6 and 0 buttons to select DISPLAY GROUP 60. Press "Q" button to enter input. Scan tool should display SYSTEM IN BASIC SETTING 60, followed by four zones numbered 1 through 4. Operate throttle through full range while observing scan tool. ECM stores these values in memory. If values are not as specified, check TCM. See appropriate SYSTEM & COMPONENT TESTING article in ENGINE PERFORMANCE.

If BASIC SETTING is interrupted, check throttle cable adjustment and throttle plate for deposits to ensure throttle is able to return to fully closed position. If throttle is okay, check TCM. See appropriate SYSTEM & COMPONENT TESTING article in ENGINE PERFORMANCE. After procedure is complete (minimum of 30 seconds), press right arrow button. Press 0 and 6 buttons to select FUNCTION 06: END OUTPUT. Press "Q" button to enter input. Turn ignition off.
NOTE: If appropriate code is not displayed or ECM has been replaced, ECM must be coded. Do not turn ignition off during ECM programming procedure.

ECM Programming (2.0L Engine)
1) Connect Scan Tool (VAG 1551/1552) to data link connector. Turn ignition on. Press 0 and 1 buttons to select ENGINE ELECTRONICS. Press "Q" to confirm input. Press 1 and 1 buttons to select LOGIN PROCEDURE FUNCTION 11. Press "Q" to confirm input. Press 0, 1, 2, 8 and 3 to input LOG-IN CODE. Press "Q" to confirm input. Press 0 and 7 buttons to select CODE CONTROL MODULE. Press "Q" to confirm input.

2) Enter appropriate vehicle code, 00000 for manual transmission equipped Golf or Jetta, 00001 for automatic transmission equipped Golf or Jetta, 00002 for manual transmission equipped Cabrio, 00003 for automatic transmission equipped Cabrio. Press right arrow button. Press 0 and 6 buttons to select END OUTPUT. Press "Q" to confirm input. Turn ignition off.

ECM Programming (2.8L VR6 Engine)
1) Connect Scan Tool (VAG 1551/1552) to data link connector. Turn ignition on. Press 0 and 1 buttons to select ENGINE ELECTRONICS. Press "Q" to confirm input. Press 1 and 1 buttons to select LOGIN PROCEDURE FUNCTION 11. Press "Q" to confirm input. Press 0, 1, 2, 8 and 3 to input log-in code. Press "Q" to confirm input. Press 0 and 7 buttons to select CODE CONTROL MODULE. Press "Q" to confirm input.

2) Enter appropriate vehicle code, 00000 for manual transmission equipped Golf or Jetta, 00001 for automatic transmission equipped Golf or Jetta. Press right arrow button. Press 0 and 6 buttons to select END OUTPUT. Press "Q" to confirm input. Turn ignition off.

PASSAT
NOTE: If appropriate code is not displayed or ECM has been replaced, ECM must be coded.

ECM Programming (2.8L V6 Engine)
1) Connect Scan Tool (VAG 1551/1552) to data link connector. Turn ignition on. Press 0 and 1 buttons to select ENGINE ELECTRONICS. Press 1 and 1 buttons to select LOGIN PROCEDURE FUNCTION 11. Press "Q" to confirm input. Press 0, 1, 2, 8 and 3 to input log-in code. Press "Q" to confirm input. Press 0 and 7 buttons to select CODE CONTROL MODULE. Press "Q" to confirm input.

2) Enter appropriate vehicle code, 00000 for manual transmission equipped Golf or Jetta, 00001 for automatic transmission equipped Golf or Jetta. Press right arrow button. Press 0 and 6 buttons to select END OUTPUT. Press "Q" to confirm input. Turn ignition off.

VOLVO
ALL MODELS

ECM Programming
When replacing Transmission Module (TM) or Engine Control Module (ECM), use Volvo System Tester to clear DTCs and reset adaptive functions. Follow manufacturer's instructions and tester prompts.

After disconnecting battery or replacing ECM, drive vehicle to enable ECM to relearn driveability. Inform your customer that they may experience driveability different from what they are accustomed to until ECM completes relearn function.

RADIO SECURITY CODE
Radio will require anti-theft security code to be entered if battery is disconnected. Turn radio on. Radio should display "CODE". Using first 4 preset buttons, enter code number from customer supplied security card. Each preset button applies to code number digit. For example, No. 1 button sets the first digit of code number. Cycle button until desired number appears. A "beep" will sound when correct code is entered. If code is incorrectly entered after 3 successive attempts, radio must be left on for one hour before it will accept code entry.