

Programming and Setup

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Diagnostic Information and Procedures

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Control Module References

Reference Information

- [Data Link References](#)
- [Diagnostic System Check - Vehicle](#)
- [Diagnostic Trouble Code \(DTC\) List - Vehicle](#)
- [Symptoms - Vehicle](#)

Control Module/Scan Tool Information	Schematic	Repair Instruction	Programming and Setup
Electronic Brake Control Module Scan Tool Information	Antilock Brake System Schematics	Electronic Brake Control Module Replacement	Electronic Brake Control Module Programming and Setup
K20 Engine Control Module: Scan Tool Information	Engine Controls Schematics	Engine Control Module Replacement	K20 Engine Control Module: Programming and Setup
Inflatable Restraint Sensing and Diagnostic Module Scan Tool Information	SIR Schematics	Airbag Sensing and Diagnostic Module Replacement	Inflatable Restraint Sensing and Diagnostic Module Programming and Setup
Instrument Cluster Scan Tool Information	Instrument Cluster Schematics	Instrument Cluster Replacement	Instrument Cluster Programming and Setup
Keyless Entry Control Module Scan Tool Information	Remote Function Schematics	Remote Control Door Lock Receiver Antenna Replacement	Keyless Entry Control Module Programming and Setup
Transmission Control Module Scan Tool Information	Automatic Transmission Controls Schematics	Transmission Control Module Replacement	Transmission Control Module Programming and Setup
K103 Fuel Injector Control Module	Engine Controls Schematics	â€”	Fuel Injector Control Module Programming and Setup
K43 Power Steering Control Module	Power Steering Schematics	â€”	Power Steering Control Module Programming and Setup

Repair Instructions

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K17 Electronic Brake Control Module: Programming and Setup

The following service procedures require either a programming or a setup event performed for a complete repair.

Electronic Brake Control Module Replacement

If the electronic brake control module (EBCM) needs to be replaced, the following procedures must be performed:

1. Connect a scan tool to the vehicle and access SPS. Refer to [Service Programming System \(SPS\)](#).
2. Perform the SPS function Electronic Brake Control Module - Programming and follow the on-screen instructions.
3. Clear DTCs after completing the programming procedure.

Electronic Brake Control Module Reprogramming

If the EBCM needs to be reprogrammed, the following procedures must be performed:

1. Connect a scan tool to the vehicle and access SPS. Refer to [Service Programming System \(SPS\)](#).
2. Perform the SPS function Electronic Brake Control Module – Programming and follow the on-screen instructions.
3. Clear DTCs after completing the programming procedure.

Setup for Component Replacement

The replacement of some components will require a setup procedure for complete repair.

If any of the following components are replaced, the corresponding procedure must be performed.

Steering Angle Sensor

Calibrate the steering angle sensor. Refer to [Steering Wheel Angle Sensor Centering](#).

Multi-Axis Acceleration Sensor

Calibrate the multi-axis acceleration sensor.

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K20 Engine Control Module: Programming and Setup

Special Tools

EL-49642 SPS Programming Support Tool

For equivalent regional tools, refer to [Special Tools](#).

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector (DLC). If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.
- Note the engine oil life remaining percentage.
- If over 14k GVW, program the engine serial number with the scan tool.

Replace and Program Control Module

To program a replacement K20 Engine Control Module (ECM), perform the following procedure:

1. Install *EL-49642* SPS programming support tool.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. Before removing the old control module, perform the SPS function Prepare Control Module for Removal, if available.
4. Note:

The Prepare Control Module for Removal function can only be performed when communication with the old control module is still possible.

5. Replace the ECM.
6. Perform one of the following SPS Programming functions:
7. Note:

If both controller options below are listed, select K20/K71 Engine and Transmission Control Modules.

8.
 - K20/K71 Engine and Transmission Control Modules and follow the on-screen instructions.
 - K20 Engine Control Module and follow on-screen instructions.
9. Clear the DTCs after completing the Programming procedure.
10. If equipped, perform the SPS function Immobilizer Learn and follow the on-screen instructions. Refer to [Immobilizer System Component Programming](#).

11. Perform the following SPS function:

12.

1. Setup

2. Note:

If both controller options below are listed, select K20 Engine Control Module.

3.

- K20/K71 Engine and Transmission Control Modules and follow the on-screen instructions.
- K20 Engine Control Module and follow on-screen instructions.

4. Configuration “If applicable

13. If equipped, perform the Fuel Pressure Regulator Learn via GDS2, Engine Control Module, Configuration/Reset Functions, Learn Functions.

14. Clear DTCs.

Reprogram Control Module

To reprogram an existing K20 Engine Control Module, perform the following procedure:

1. Install *EL-49642* SPS programming support tool.

2. Access the Service Programming System (SPS) and follow the on-screen instructions.

3. Perform one of the following SPS Programming functions:

4.

◦ Note:

If both controller options below are listed, select K20/K71 Engine and Transmission Control Modules.

- K20/K71 Engine and Transmission Control Modules and follow the on-screen instructions.
- K20 Engine Control Module and follow on-screen instructions.

5. Clear DTCs after completing the Programming procedure.

6. Note:

If vehicle fails to start during Configuration and Setup, perform the SPS Function Immobilizer Learn and follow the on-screen instructions.

7. Perform the following SPS function:

8.

1. Setup

2. Note:

If both controller options below are listed, select K20 Engine Control Module.

3.

- K20/K71 Engine and Transmission Control Modules and follow the on-screen instructions.
- K20 Engine Control Module and follow on-screen instructions.

4. Configuration “If applicable

9. If equipped, perform the Fuel Pressure Regulator Learn via GDS2, Engine Control Module, Configuration/Reset Functions, Learn Functions.

10. Clear DTCs.

Unsuccessful Programming Recovery

If programming a control module is not successful, perform the following procedure:

1. Verify the control module, data link connector and programming tool connections are secure and the tool software is up to date.
2. Ignition >> On / Vehicle >> In Service Mode
3. Perform one of the following SPS Programming functions:
4. Note:

If both controller options below are listed, select K20/K71 Engine and Transmission Control Modules.

5.
 - K20/K71 Engine and Transmission Control Modules and follow the on-screen instructions.
 - K20 Engine Control Module and follow on-screen instructions.
6. Verify the control module programming is successful.
7.
 - **If the programming is not successful**
8.
 1. Ignition/Vehicle >> Off- For greater than 1> min
 2. Ignition >> On / Vehicle >> In Service Mode
 3. Perform one of the following SPS Programming functions:
 4. Note:

If both controller options below are listed, select K20/K71 Engine and Transmission Control Modules.
 5.
 - K20/K71 Engine and Transmission Control Modules and follow the on-screen instructions.
 - K20 Engine Control Module and follow on-screen instructions.
 6.
 - If the programming is not successful Replace the appropriate component: K20 Engine Control Module or K71 Transmission Control Module
 7.
 - If the programming is successful
 8. All OK.
9.
 - **If the programming is successful**
10. All OK. .

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[Control Module References](#) for control module replacement, programming and setup.

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K33 HVAC Control Module: Programming and Setup

Diagnostic Instructions

- Perform the Diagnostic System Check prior to using this diagnostic procedure: [Diagnostic System Check - Vehicle](#)
- Review the description of Strategy Based Diagnosis: [Strategy Based Diagnosis](#)

Note :

- Do NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Verify the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply.
- Turn Off or disable systems that may put a load on the vehicle's battery. For example, interior lights, daytime running lights, HVAC, and radio.
- During the programming procedure, follow the Service Programming System (SPS) prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to No.

Programming an Existing or New Control Module

This control module does not require SPS programming or any setup procedures.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: [Diagnostic Repair Verification](#)

For control module replacement, programming, and setup refer to: [Control Module References](#)

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K36 Inflatable Restraint Sensing and Diagnostic Module: Programming and Setup

Important:

The air bag indicator light may remain ON after the body control module (BCM), or inflatable restraint sensing and diagnostic module (SDM) is replaced, and during the programming procedure for the BCM until after the procedure is completed. When installing a new SDM, there may be several DTCs set prior to programming. Once programmed, these DTCs should be in history and can be cleared.

1. Ignition ON, program the SDM. Refer to [Service Programming System \(SPS\)](#).
2. In the Inflatable Restraint Sensing and Diagnostic Module, Configuration / Reset Functions menu, select Setup SDM Part Number in BCM. Follow the scan tool on screen instructions.
3. In the Inflatable Restraint Sensing and Diagnostic Module, Configuration / Reset Functions menu, select Configure New Module. Follow the scan tool on screen instructions. If during this procedure a fault is detected, the SDM will not allow this procedure to complete. Repair any existing DTCs, then use the scan tool to command the Configuration / Reset Function again.
4. Cycle the ignition from OFF to ON. Verify no DTCs are set. If any DTCs are set, refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#).

Note:

GMNA Regions: When SPS failure message E4489 occurs during programming or calibration, do not call TCSC immediately. Record at which point the failure occurred before it displayed the E4489 message. When this occurs, proceed to GDS2. Download the appropriate vehicle configuration and select the Inflatable Restraint Sensing and Diagnostic Module. Under Identification Information, look at parameters: Software Module 1 Identifier and Software Module 2 Identifier. If either of these are populated with a value of 1 or more, replace the Inflatable Restraint Sensing and Diagnostic Module. Record these parameter values on the back of the job card.

Non GMNA Regions: When SPS displays message indicating that programming may fail and the programming event fails at 0%, replace the Inflatable Restraint Sensing and Diagnostic Module. Verify no other DTCs or issues exist with the module prior to replacement. Record all DTCs and relevant information on the back of the job card.

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K43 Power Steering Control Module: Programming and Setup

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

The internal steering wheel angle sensor does not require a centering often. Centering of the internal steering wheel angle sensor might be required after certain service procedures are performed. Some of these procedures are as follows:

- Power Steering Control module replacement
- Steering column replacement
- Collision or other physical damage to steering or suspension components

Certain steering symptoms can be corrected by performing the steering wheel angle sensor centering procedures such as:

- Poor, or uneven return to center
- Poor, or uneven on center feel

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

1. Using the steering wheel, align and center the front wheels forward.
2. Apply the parking brake, and set the transmission in Park if equipped with an automatic transmission.
3. Turn ON the ignition, with the engine OFF.
4. Access the Service Programming System (SPS) and follow the on-screen instructions. Refer to [Service Programming System \(SPS\)](#)
5. On the SPS Supported Controllers screen, select Power Steering Control Module - Programming and follow the on-screen instructions.
6. On the SPS Supported Controllers screen, select Power Steering Control Module - Configuration & Setup and follow the on-screen instructions.
7. Clear DTCs.
8. Turn OFF the ignition.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.
3.
 - **If the control module cannot be reprogrammed**
4.
 1. Ignition OFF for one minute, ignition ON.
 2. Verify the control module can be reprogrammed.
 3.
 - If the control module cannot be reprogrammed, replace the control module.
 4.
 - If the control module can be reprogrammed.
5. All OK.
5.
 - **If the control module can be reprogrammed**
6. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[Control Module References](#) for Control Module replacement, programming and setup.

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Communication Interface Module Programming and Setup

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programming. If a battery maintainer is not available, connect a fully charged 12V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

- Before beginning any programming first determine which Generation of the K73 Telematics Communication Interface Control Module you are working with. One way to accomplish this is by using a scan tool. The K73 Telematics Communication Interface Control Module Generation will be listed under the Selected Vehicle Configuration section, in addition the Generation (9 or 10) can be determined from the Module ID data table. Additional programming steps may be necessary depending on the generation of the module.
- It is critical to use the service replacement Communication Interface Module only in the vehicle for which it was ordered.
- Failure to perform the following procedures will result in a red LED, DTC(s) being set, and limited or incomplete OnStar® services.
- An OnStar® button press to the OnStar® call center is required to complete the procedure.
- To fully activate an OnStar® module, both the setup and activation request procedures must be completed on all vehicles with and without an active OnStar® subscription to insure the unit has been setup properly for the vehicle it has been installed into and also to update the OnStar® with the correct unit information.
- If the vehicle is equipped with RPO VV4 the K73 Telematics Communication Interface Control Module WiFi Enable (Gen 10 only) Programming step must be performed AFTER the Programming and Service Activation step. Failure to complete this step in the proper sequence will result in WiFi being disabled.
- To initialize the Turn-by-Turn feature, the vehicle must first be driven in open sky condition at speeds greater than 10 mph (16 kph) or more for a minimum of 5 miles (8 km), and perform at least 2 left and 2 right 90 degree turns coming to complete stops prior to each turn.
- On vehicles up fitted with TTY capabilities, it is necessary to perform a power cycle of the OnStar® Interface Module (OTIM), and toggle the TTY mode after completing the Communication Interface Module installation and setup procedures.

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. In the SPS Supported Controllers screen, select K73 Telematics Communication Interface Control Module Programming and Service Activation and follow the on-screen instructions.
3. Clear DTCs.
4. After Control Module Programming and Service Activation, if the vehicle is equipped with RPO VV4, on the Supported Controllers screen select K73 Telematics Communication Interface Control Module WiFi Enable (Gen 10 only) Programming and follow the on-screen instructions.

5. Note:

The WiFi Enable step must be performed AFTER the Programming and Service Activation step, or WiFi will not function. If Programming and Service Activation step is performed after the WiFi Enable step, WiFi will be disabled.

6. Press the OnStar® Blue Button to call OnStar® and have the system activated. If the customer refused OnStar® services (terms and conditions) and the vehicle is equipped with RPO VV4 have the OnStar® consultant turn off the WiFi demo message that occurs after every ignition on event.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.
3.
 - **If the control module cannot be reprogrammed**
4.
 1. Ignition OFF for one minute, ignition ON.
 2. Verify the control module can be reprogrammed.
 3.
 - If the control module cannot be reprogrammed, replace the control module.
 4.
 - If the control module can be reprogrammed.
 5. All OK.
5.
 - **If the control module can be reprogrammed**
6. All OK.

Related Part Information

Part Name	Catalog Name	Part Code
Communication Interface Module	MODULE KIT,COMN INTERFACE (W/ M/TEL XCVR)	8774Y
Communication Interface Module	MODULE PKG,COMN INTERFACE (W/M/TEL XCVR)	8774Z
Communication Interface Module	MODULE,COMN INTERFACE (W/MOBILE TEL XCVR)	8775A
Communication Interface Module	MODULE,COMN INTERFACE (W/MOBILE TEL XCVR)	8775B
Communication Interface Module	MODULE,COMN INTERFACE	8778A
Communication Interface Module	MODULE PKG,COMN INTERFACE (W/DIGITAL RDO RCVR)	8804Z
Communication Interface Module	MODULE,COMN INTERFACE (W/DIGITAL RDO RCVR)	8805A

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Electronic Brake Control Module Programming and Setup

The following service procedures require either a programming or a setup event performed for a complete repair.

Electronic Brake Control Module Replacement

If the electronic brake control module (EBCM) needs to be replaced, the following procedures must be performed:

1. Connect a scan tool to the vehicle and access SPS. Refer to [Service Programming System \(SPS\)](#).
2. Perform the SPS function Electronic Brake Control Module - Programming and follow the on-screen instructions.
3. Clear DTCs after completing the programming procedure.

Electronic Brake Control Module Reprogramming

If the EBCM needs to be reprogrammed, the following procedures must be performed:

1. Connect a scan tool to the vehicle and access SPS. Refer to [Service Programming System \(SPS\)](#).
2. Perform the SPS function Electronic Brake Control Module – Programming and follow the on-screen instructions.
3. Clear DTCs after completing the programming procedure.

Setup for Component Replacement

The replacement of some components will require a setup procedure for complete repair.

If any of the following components are replaced, the corresponding procedure must be performed.

Steering Angle Sensor

Calibrate the steering angle sensor. Refer to [Steering Wheel Angle Sensor Centering](#).

Multi-Axis Acceleration Sensor

Calibrate the multi-axis acceleration sensor.

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Fuel Injector Control Module Programming and Setup

The fuel injector control module (FICM) must be programmed with the proper calibration software. The module stores and utilizes this information, however if it is not properly configured with the correct calibration software, the FICM will not control all of the vehicle features properly.

Ensure that the following conditions exist in order to prepare for FICM programming:

1. The battery is fully charged.
2. The MDI data link connectors are secure.
3. The scan tool is loaded with the most current software version.
4. All disconnected modules and devices are reconnected securely.
5. This entire procedure has been reviewed before proceeding.

Do not reprogram the FICM unless directed by a service procedure or a service bulletin.

Fuel Injector Control Module Programming

To program and setup an existing or new replacement FICM, perform the following procedure:

1. Access the Service Programming System (SPS) and follow the on-screen instructions. Refer to [Service Programming System \(SPS\)](#).
2. On the SPS Supported Controllers screen, select FICM Fuel Injector Control Module "Programming and follow the on-screen instructions.

If the FICM fails to accept the program, verify all scan tool and FICM connections are secure.

Note:

After programming is completed, perform the following to avoid future misdiagnosis:

1. Turn the ignition OFF for 10 seconds.
2. Open and close the door.
3. Connect the scan tool to the data link connector.
4. Ignition ON, engine OFF.
5. Clear all DTCs from all modules.

Related Part Information

Part Name	Catalog Name	Part Code
Fuel Injector Control Module	MODULE,F/INJR CONT	8995A

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Inflatable Restraint Sensing and Diagnostic Module Programming and Setup

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply to maintain system voltage that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.
- The air bag indicator light may remain ON after the body control module (BCM), or Inflatable Restraint Sensing and Diagnostic Module is replaced, and during the programming procedure for the BCM until after the procedure is completed. When installing a new Inflatable Restraint Sensing and Diagnostic Module, there may be several DTCs set prior to programming. Once programmed, these DTCs should be in history and can be cleared.
- Failure to complete the following Setup procedure may cause DTC B1001 to be set in the Inflatable Restraint Sensing and Diagnostic Module.

Replace and Program Control Module or Reprogram Control Module

To program a replacement control module, perform the following procedure:

If "K36 Inflatable Restraint Sensing and Diagnostic Module - Programming and Setup" is shown

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, select K36 Inflatable Restraint Sensing and Diagnostic Module - Programming and Setup and follow the on-screen instructions.
3. At the end of programming, choose the "Clear All DTCs" function on the SPS screen.

If "K36 Inflatable Restraint Sensing and Diagnostic Module - Programming and Setup" is not shown

1. Access the Service Programming System (SPS) and follow the on-screen instructions.
2. On the SPS Supported Controllers screen, select K36 Inflatable Restraint Sensing and Diagnostic Module - Programming and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select K36 Inflatable Restraint Sensing and Diagnostic Module - Setup and follow the on-screen instructions.
4. At the end of programming, choose the "Clear All DTCs" function on the SPS screen.

Unsuccessful Programming Recovery

Note:

GMNA Regions: When SPS failure message E4489 occurs during programming or calibration, do not call TCSC immediately. Record at which point the failure occurred before it displayed the E4489 message. When this occurs, proceed to GDS2. Download the appropriate vehicle configuration and select the Inflatable Restraint Sensing and Diagnostic Module. Under Identification Information, look at parameters: Software Module 1 Identifier and Software Module 2 Identifier. If either of these are populated with a value of 1 or more, replace the Inflatable Restraint

Sensing and Diagnostic Module. Record these parameter values on the back of the job card.

Non GMNA Regions: When SPS displays message indicating that programming may fail and the programming event fails at 0%, replace the Inflatable Restraint Sensing and Diagnostic Module. Verify no other DTCs or issues exist with the module prior to replacement. Record all DTCs and relevant information on the back of the job card.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.
3.
 - **If the control module cannot be reprogrammed**
4.
 1. Ignition OFF for one minute, ignition ON.
 2. Verify the control module can be reprogrammed.
 3.
 - If the control module cannot be reprogrammed, replace the control module.
 4.
 - If the control module can be reprogrammed.
5. All OK.
5.
 - **If the control module can be reprogrammed**
6. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[Control Module References](#) for Control Module replacement, programming and setup

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Instrument Cluster Programming and Setup

The instrument cluster does not need programming procedure such as the SPS.

If the instrument cluster is replaced as new one, the following procedures must be performed depending on odometer value of vehicle:

Odometer Programming

This procedure is needed when odometer value is higher than 100â€%km.

After replacing the instrument cluster, odometer value should be moved into new instrument cluster. On the scan tool select Odometer Programming. Follow the scan tool on screen instructions.

Odometer Reset

This procedure is needed when odometer value is lower than 100â€%km and new instrument cluster is not use odometer value stored in replaced instrument cluster.

On the scan tool select Odometer Reset. Follow the scan tool on screen instructions.

Related Part Information

Part Name	Catalog Name	Part Code
Instrument Cluster	CLUSTER,INST(W/PAD)	0025A
Instrument Cluster	CLUSTER,INST (W/HSG)	0030A
Instrument Cluster	CLUSTER KIT,INST	0049Z
Instrument Cluster	CLUSTER,INST	0050A
Instrument Cluster	CLUSTER,INST	0050B
Instrument Cluster	CLUSTER PKG,INST	0051A
Instrument Cluster	CLUSTER,INST	SJ490
Instrument Cluster	CLUSTER PKG,INST	SJ533

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Keyless Entry Control Module Programming and Setup

Keyless entry control module does not need programming procedure such as the SPS. If the keyless entry control module is replaced as new one, key transmitter(s) should be programmed newly. On the scan tool select Key Learn. Follow the scan tool on screen instructions. Refer to [Remote Control Door Lock Transmitter Programming](#).

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Mobile Telephone Control Module Programming and Setup

The following service procedures require either a programming or a setup event performed for a complete repair. Do not reprogram the mobile telephone control module, unless directed by a service procedure, or a service bulletin.

Mobile Telephone Control Module Replacement and/or Programming

If the mobile telephone control module needs to be replaced and/or reprogrammed, the following procedures must be performed:

1. Connect a scan tool to the vehicle and access SPS. Refer to [Service Programming System \(SPS\)](#).
2. Perform the SPS function Mobile Telephone Control Module Programming and follow the on-screen instructions.
3. Perform the SPS function Onstar Activation and follow the on-screen instructions.
4. Clear DTCs after completing the programming procedure.

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Passenger Presence System Programming and Setup

Diagnostic Instructions

- Perform the Diagnostic System Check prior to using this diagnostic procedure: [Diagnostic System Check - Vehicle](#)
- Review the description of Strategy Based Diagnosis: [Strategy Based Diagnosis](#)

Programming an Existing or New Control Module

This control module does not require SPS programming but does require the following setup procedures after a new control module is installed:
[Passenger Presence System Rezeroing](#)

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Power Steering Control Module Programming and Setup

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12V jumper or booster pack disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

The internal steering wheel angle sensor does not require a centering often. Centering of the internal steering wheel angle sensor might be required after certain service procedures are performed. Some of these procedures are as follows:

- Power Steering Control module replacement
- Steering column replacement
- Collision or other physical damage to steering or suspension components

Certain steering symptoms can be corrected by performing the steering wheel angle sensor centering procedures such as:

- Poor, or uneven return to center
- Poor, or uneven on center feel

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:

1. Using the steering wheel, align and center the front wheels forward.
2. Apply the parking brake, and set the transmission in Park if equipped with an automatic transmission.
3. Turn ON the ignition, with the engine OFF.
4. Access the Service Programming System (SPS) and follow the on-screen instructions. Refer to [Service Programming System \(SPS\)](#)
5. On the SPS Supported Controllers screen, select Power Steering Control Module - Programming and follow the on-screen instructions.
6. On the SPS Supported Controllers screen, select Power Steering Control Module - Configuration & Setup and follow the on-screen instructions.
7. Clear DTCs.
8. Turn OFF the ignition.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
2. Verify the control module can be reprogrammed.
3.
 - **If the control module cannot be reprogrammed**
4.
 1. Ignition OFF for one minute, ignition ON.
 2. Verify the control module can be reprogrammed.
 3.
 - If the control module cannot be reprogrammed, replace the control module.
 4.
 - If the control module can be reprogrammed.
5. All OK.
5.
 - **If the control module can be reprogrammed**
6. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[Control Module References](#) for Control Module replacement, programming and setup.

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Radio Programming and Setup

Special Tools

EL-49642 SPS Programming Support Tool

Note:

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the ECU is not properly configured with the correct calibration software, the ECU will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during programming, programming failure or ECU damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. Install the *EL-49642* SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

- During radio programming you may be required to select multiple calibrations dependant upon vehicle equipment. Have the vehicle build/RPO information available during the following procedure to ensure the correct calibrations are selected.
- The XM satellite radio (if equipped) is integrated into the radio. If XM was activated in the previous radio, the replacement radio will require no additional activation steps. Customer subscription information is transferred to the replacement radio when a replacement radio is ordered.

Replace and Program ECU or Reprogram ECU

To program a replacement or an existing ECU, perform the following procedure:

1. Install *EL-49642* SPS Programming Support Tool.
2. Access the Service Programming System (SPS) and follow the on-screen instructions.
3. On the SPS Supported Controllers screen, select Radio Programming and follow the on-screen instructions.
4. At the end of programming, choose the "Clear All DTCs" function on the SPS screen.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. DO NOT turn the ignition OFF. Ensure that all ECU, DLC and programming tool connections are secure and the TIS terminal operating software is up to date.
2. Attempt to reprogram the ECU.
3. If the ECU can still not be programmed, turn the ignition OFF for at least one minute.
4. Turn the ignition ON and attempt to reprogram the ECU. The ECU should program.
5.
 - If the ECU still cannot be programmed, replace the ECU.

Related Part Information

Part Name	Catalog Name	Part Code
Radio	RADIO,	0009A
Radio	RADIO,AM	0010A
Radio	RADIO,AM	0011A
Radio	RADIO,AM & CLK	0020A
Radio	RADIO,AM & T/PLYR	0030A
Radio	RADIO,AM/FM	0040A
Radio	RADIO,AM/FM	0041A
Radio	RADIO,RECEIVER	0045A
Radio	RADIO,RECEIVER & NAV	0047A
Radio	RADIO,AM/FM & CLK	0050A
Radio	RADIO,AM/FM STEREO	0060A
Radio	RADIO PKG,AM/FM STEREO	0061A
Radio	RADIO,AM/FM/LW STEREO	0062A
Radio	RADIO PKG,AM/FM STEREO & NAVN	0064Z
Radio	RADIO,AM/FM STEREO & NAVN	0065A
Radio	RADIO PKG,AM/FM STEREO & CLK	0069Y
Radio	RADIO,AM/FM STEREO & CLK	0070A
Radio	RADIO,AM/FM STEREO & CLK	0070B
Radio	RADIO,AM/FM STEREO & T/PLYR	0080A
Radio	RADIO,AM/FM STEREO & T/PLYR	0081A
Radio	RADIO,AM/FM STEREO & T/PLYR & MOBILE TEL	0082A
Radio	RADIO,AM/FM STEREO & T/PLYR & TEL & VEH LOC	0082B
Radio	RADIO,AM/FM/LW STEREO & T/PLYR	0083A
Radio	RADIO,AM/FM/LW STEREO & T/PLYR & MOBILE TEL	0083E
Radio	RADIO,AM/FM STEREO & CLK & T/PLYR	0089Y
Radio	RADIO,AM/FM STEREO & CLK & T/PLYR	0090A
Radio	RADIO,AM/FM STEREO & CLK & T/PLYR	0090B
Radio	RADIO,AM/FM STEREO & CD PLYR	0091Z
Radio	RADIO,AM/FM STEREO & AUDIO DISC PLYR	0092A
Radio	RADIO,AM/FM STEREO & AUDIO DISC PLYR & M/TEL	0092B
Radio	RADIO,AM/FM STEREO & AUDIO DISC PLYR & T/PLYR	0092C
Radio	RADIO,AM/FM STEREO & CD PLYR & T/PLYR & MOBILE TEL	0092D
Radio	RADIO,AM/FM STEREO & CD PLYR & T/PLYR	0092E
Radio	RADIO,AM/FM STEREO & CD PLYR & T/PLYR & TEL & VEH LOC	0092F
Radio	RADIO,AM/FM STEREO & CD PLYR & M/TEL & NAVN	0092G
Radio	RADIO,AM/FM STRO & CD PLYR & TEL & NAVN & COMN CTR CALL	0092H
Radio	RADIO,AM/FM STEREO & AUDIO DISC PLYR & NAVN	0092J
Radio	RADIO PKG,AM/FM STEREO & AUDIO PLYR & NAVN	0092K
Radio	RADIO,AM/FM STEREO & AUDIO DISC PLYR & MP3 PLYR	0092L
Radio	RADIO,AM/FM STEREO & AUDIO DISC PLYR & MP3 PLYR&HARD DR	0092M
Radio	RADIO,AM/FM STEREO & AUDIO DISC PLYR & MP3 PLYR & TP PL	0092N
Radio	RADIO PKG,AM/FM STEREO & AUDIO PLYR & MP3 PLYR	0092P
Radio	RADIO,AM/FM STEREO & AUDIO DISC PLYR & NAVN & MP3	0092Q
Radio	RADIO,AM/FM/LW STEREO & AUDIO DISC PLYR	0093A
Radio	RADIO,AM/FM/LW STEREO & CD PLYR & T/PLYR	0093E
Radio	RADIO,AM/FM/LW STEREO & CD PLYR & MOBILE TEL	0093J
Radio	RADIO,AM/FM/LW STEREO & CD PLYR & NAVIGATION SYS	0093L
Radio	RADIO,AM/FM/LW STEREO & CD PLYR & T/PLYR & MOBILE TEL	0093N
Radio	RADIO PKG,AM/FM STEREO & CLK & AUDIO PLYR	0094Y
Radio	RADIO PKG,AM/FM STEREO & CLK & AUDIO/VIDEO DISC PLYR	0094Z
Radio	RADIO,AM/FM STEREO & CLK & AUDIO DISC PLYR	0095A

Part Name	Catalog Name	Part Code
Radio	RADIO,AM/FM STEREO & CLK & CD PLYR	0095B
Radio	RADIO,AM/FM STEREO & CLK & AUDIO DISC PLYR & INFO SYS	0095C
Radio	RADIO,AM/FM STEREO & CLK & AUDIO/VIDEO DISC PLYR	0095D
Radio	RADIO,AM/FM STEREO & CLK & AUDIO/VIDEO DISC PLYR	0095E
Radio	RADIO,AM/FM STEREO & CLK & AUD CD PLYR & INFO SYS	0095F
Radio	RADIO,AM/FM STEREO & AUDIO DISC & MP3 PLYR & INFO SYS	0095G
Radio	RADIO,AM/FM STEREO & CLK & MP3 PLYR & AUX IN & USB	0095H
Radio	RADIO,AM/FM STEREO (W/ M/ FUNC)(W/O CALN & OPERG SYS)	0095J
Radio	RADIO,STEREO & CLK & AUD DSC PLR (W/O CALN & OPG SYS)	0095K
Radio	RADIO,AM/FM STEREO & CLK & CD PLYR & MP3 & TEL & AUX IN	0095L
Radio	RADIO PKG,AM/FM STEREO & CLK & AUDIO PLYR & INFO SYS	0095Y
Radio	RADIO PKG,CB	0099A
Radio	RADIO,AM/FM/CB STEREO	0100A
Radio	RADIO,AM/FM/CB STEREO & CLK & T/PLYR	0110A
Radio	RADIO,AM/FM STEREO & CLK & CD PLYR & T/PLYR	0110Y
Radio	RADIO,AM/FM STEREO & CLK & T/PLYR & CD PLYR	0111A
Radio	RADIO,AM/FM STEREO & CLK & CD PLYR & T/PLYR	0111B
Radio	RADIO,AM/FM STEREO & VIDEO DISC PLYR & NAVN	0111C
Radio	RADIO,AM/FM STEREO & VIDEO DISC PLYR & NAVN	0111D
Radio	RADIO,AM/FM STEREO & VIDEO DISC PLYR & NAVN&MP3&HARD DR	0112A
Radio	RADIO,AM/FM STEREO & VIDEO DISC PLYR & MP3 PLR & HARD D	0112B
Radio	RADIO,MOBILE	7700T
Radio	RADIO,	SG070
Radio	RADIO PKG,SATELLITE DIGITAL	SJ024
Radio	RADIO PKG,CB 40 CHAN	SS031
Radio	RADIO PKG,(DEALER RTN ONLY)	SS422
Radio	RADIO PKG,SATELLITE DIGITAL	SJ070
Radio	RADIO PKG,NAVIGATION	SJ074
Radio	RADIO PKG,	SS039
Radio	RADIO PKG,INSTL	SS076

1. DIAGNOSTIC OVERVIEW, STARTING POINT, AND PROGRAMMING

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Service Programming System (SPS)

For step-by-step control module programming instructions, please refer to the techline information system (TIS) terminal.

Review the information below to ensure proper programming protocol.

Note:

- DO NOT program a control module unless you are directed by a service procedure or you are directed by a General Motors service bulletin. Programming a control module at any other time will not permanently correct a customers concern.
- It is essential that the TIS terminal, MDI/MDI2, and/or Scan Tool, is equipped with the latest software before performing service programming.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required, install a battery maintainer or power supply that provides a steady and stable voltage. Do not use a battery charger, as charging voltage will often fluctuate when connected to the vehicle. This may interrupt programing. If a battery maintainer is not available, connect a fully charged 12V jumper or booster pack disconnected from the AC voltage supply.
- Some modules will require additional programming/setup events to be performed before or after programming.
- Some vehicles may require the use of a CAndi or MDI/MDI2 module for programming.
- Review the appropriate service information for these procedures.
- DTCs may set during programming. Clear DTCs after programming is complete.
- Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.

Ensure the following conditions are met before programming a control module:

1. Vehicle system voltage:
 2.
 - There is not a charging system concern. All charging system concerns must be repaired before programming a control module.
 - Battery voltage is greater than 12volts but less than 16volts. The battery must be fully charged before programming the control module.
 - Turn OFF or disable any system that may put a load on the vehicles battery, such as the following components:
 - - Interior lights
 - Exterior lights including daytime running lights (DRL) Applying the parking brake, on most vehicles, disables the DRL system
 - Heating, ventilation, and air conditioning (HVAC) systems
 - Engine cooling fans
 - Radio, etc.
3. The ignition switch must be in the proper position. SPS prompts you to turn ON the ignition, with the engine OFF. DO NOT change the position of the ignition switch during the programming procedure, unless instructed to do so.
4. Make certain all tool connections are secure, including the following components and circuits:
 5.
 - Scan Tool
 -

- The RS-232 communication cable port
- The connection at the data link connector (DLC)
- The voltage supply circuits
- MDI/MDI2
-
- The USB, Ethernet or Wireless communication port
- The connection at the data link connector (DLC)

6. DO NOT disturb the tool harnesses while programming. If an interruption occurs during the programming procedure, programming failure or control module damage may occur.

In the event of an interrupted or unsuccessful programming event, perform the following steps:

1. DO NOT turn the ignition OFF. Ensure that all control module and DLC connections are secure and the TIS terminal operating software is up to date.
2. Attempt to reprogram the control module.
3. If the control module can still not be programmed, turn the ignition OFF for at least one minute.
4. Turn the ignition ON and attempt to reprogram the control module. The control module should program.
5.
 - If the control module still cannot be programmed, replace the control module.

After successfully programming the control module, ensure that all post programming procedures are performed; refer to [Control Module References](#) for the appropriate control module Programming and Setup document for any required procedures.

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Transmission Control Module Programming and Setup (JF405E)

The following service procedures require either a programming or a setup event performed for a complete repair.

Transmission Control Module (TCM) Replacement

If the TCM is replaced, TCM programming must be performed. Refer to [Service Programming System \(SPS\)](#).

TCM Reprogramming

If the TCM is reprogrammed, TCM reprogramming must be performed. Refer to [Service Programming System \(SPS\)](#).

Ensure the following conditions exist in order to prepare for TCM programming or reprogramming:

- The battery is fully charged.
- The ignition switch is in the RUN position.
- The Techline equipment cable connection at the data link connector (DLC) is secure.

Program the TCM using the latest software matching the vehicle. Refer to up-to-date Techline equipment user instructions.

If the TCM fails to program, proceed as follows:

- Ensure the TCM connection is good.
- Inspect the Techline equipment for the latest software version.
- Attempt to program the TCM. If the TCM still cannot be programmed properly, replace the TCM.

Related Part Information

Part Name	Catalog Name	Part Code
Transmission Control Module	MODULE KIT,TRANS CONT	0299Z
Transmission Control Module	MODULE,TRANS CONT	0300A
Transmission Control Module	MODULE,TRANS CONT	0300B
Transmission Control Module	MODULE,TRANS CONT(W/O CALN)	0300C
Transmission Control Module	MODULE,TRANS CONT(W/O CALN & OPERG SYS)	0300D
Transmission Control Module	MODULE,TRANS CONT(W/O BOOT PRGM)	0300E
Transmission Control Module	MODULE,TRANS CONT(W/O BOOT PRGM & CALN)	0300F
Transmission Control Module	MODULE,TRANS CONT(W/O BOOT PRGM & CALN & OPERG SYS)	0300G
Transmission Control Module	MODULE,TRANS CONT (SERV)	0300J
Transmission Control Module	MODULE KIT,TRANS CONT (M/TRNS)	0369Z
Transmission Control Module	MODULE,TRANS CONT (M/TRNS)	0370A
Transmission Control Module	MODULE,TRANS CONT	SS325
Transmission Control Module	MODULE PKG,TRANS CONT	SS341

Special Tools and Equipment

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1. DIAGNOSTIC OVERVIEW, STARTING POINT, AND PROGRAMMING
2. PROGRAMMING AND SETUP
3. SPECIAL TOOLS AND EQUIPMENT
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Special Tools

Illustration	Tool Number/ Description
	EL-49642 EL-50113 SPS Programming Support Tool
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