Component Procedures: Cruise Control

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Component Procedures: Cruise Control

Parts and Labor (itype_189)

Parts

Qualifier	Part #	Name	Price	Note
Cruise Control > Set/Resume ?	96720F2110	With Stop/start	133.92	Order By Vehicle Descripti?
Cruise Control > Set/Resume ?	96720F2130	Without Stop/start	142.26	Order By Vehicle Descripti?
Cruise Control > Set/Resume ?	96720F2010	With Auto Cruise	142.26	Order By Vehicle Descripti?
Cruise Control > Set/Resume ?	96720F2000	Without Auto Cruise	142.26	Order By Vehicle Descripti?
Sonar System	99110F2100	Sonar Sensor	1642.29	

Labor

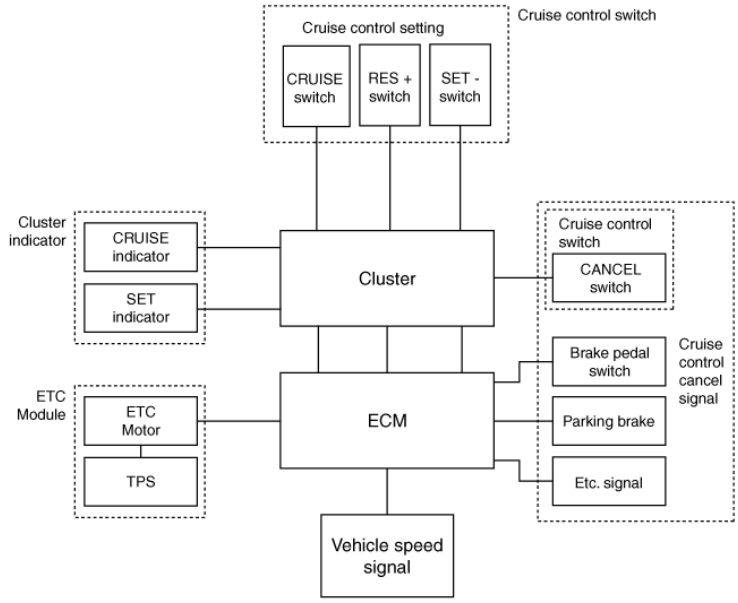
Operation	Qualifier Path	Skill	Std Hrs	Wty Hrs
Remove & Replace	Cruise Control > Sensor, R&R > Adaptive Cruis?	B	1.7	0.0
Remove & Replace	Cruise Control > Switch, R&R > Each	B	0.3	0.0
Calibrate	Cruise Control > Sensor, Calibrate	B	1.5	0.0

Cruise Control System - Description and Operation (Article 44054)

- Cruise Control

Cruise Control System - Schematic Diagrams (Article 44055)

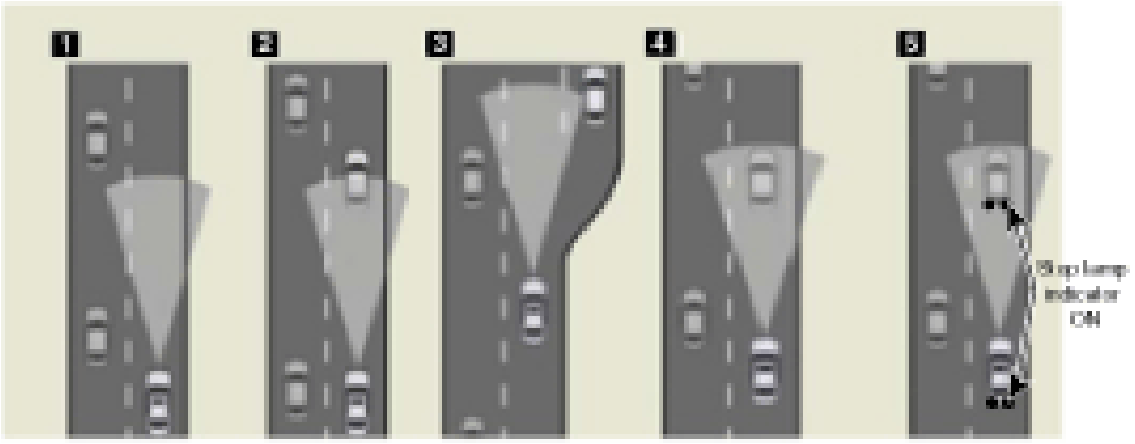
- System Block Diagram



Component Parts and Function Outline
Component part Function
Vehicle-speed sensor, ESP/ABS Control Module Converts vehicle speed to pulse.
ECM Receives signals from sensor and control switches.
Cruise control indicator Illuminate when CRUISE main switch is ON (Built into cluster)
Cruise Control switch es CRUISE switch Switch for automatic speed control power supply.
RES+ switch Controls automatic speed control functions by Resume/Accel switch (Set/Coast switch)
SET- switch
Cancel switch es Cancel switch Sends cancel signals to ECM.
Brake-pedal switch
Transaxle range switch (A/T)
ETC motor Regulates the throttle valve to the set opening by ECM.

Smart Cruise Control System - Description and Operation (Article 44069)

- Description
- Cruise speed control : The vehicle maintains the selected speed if there are not vehicles ahead.
- Retardation control : The vehicle decelerates if a vehicle ahead is detected.
- Following distance control : The vehicle maintains the selected following distance.
- Acceleration control : The vehicle accelerates to the selected speed if a vehicle ahead is not detected.

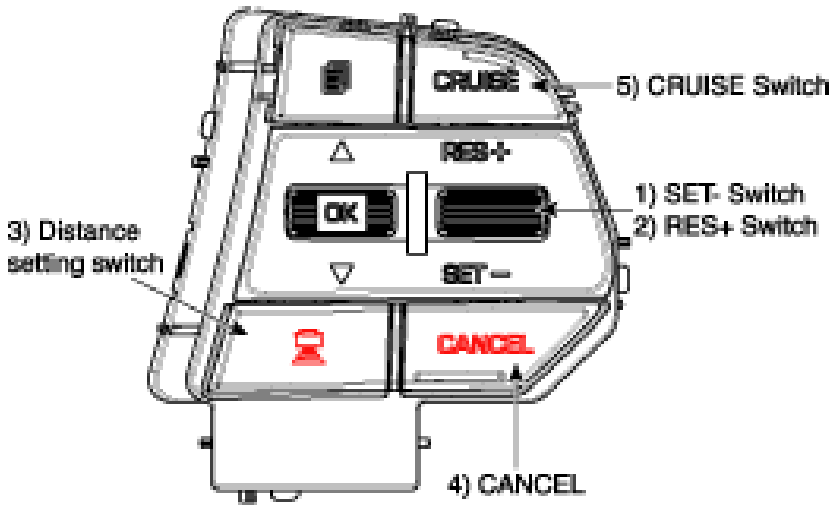


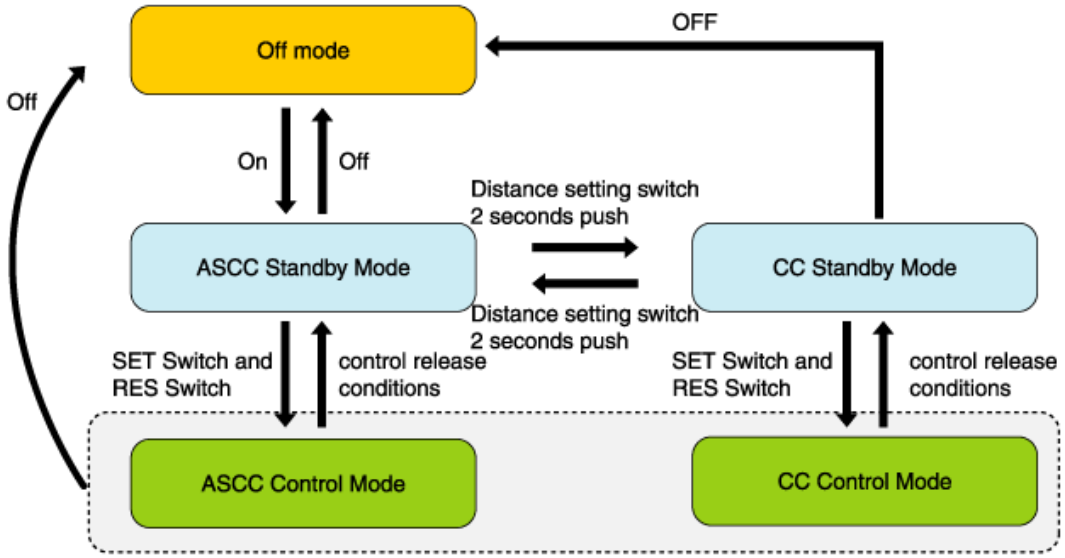
- Control on curves The sensor may not detect a vehicle ahead or may detect a vehicle on other lanes because the detection range of the sensor is limited. On curves, if the vehicle equipped the SCC is driving at high speed, the vehicle can slip outside. Therefore reduce the speed on curves even there is not a vehicle ahead. (There is no brake control by SCC.) While the vehicle follows a vehicle ahead on straight road, if the vehicle ahead enters on curve, the vehicle equipped the SCC may accelerate to follow the vehicle ahead. On curves, if a vehicle ahead followed is out of range, the vehicle does not accelerate to the set speed and maintain the following speed to prevent from accelerating and decelerating repeatedly. (If the vehicle equipped the SCC changes the lane or apply the accelerator pedal, the vehicle will accelerate.)
- The sensor may not detect a vehicle ahead or may detect a vehicle on other lanes because the detection range of the sensor is limited.
- On curves, if the vehicle equipped the SCC is driving at high speed, the vehicle can slip outside. Therefore reduce the speed on curves even there is not a vehicle ahead. (There is no brake control by SCC.)
- While the vehicle follows a vehicle ahead on straight road, if the vehicle ahead enters on curve, the vehicle equipped the SCC may accelerate to follow the vehicle ahead.
- On curves, if a vehicle ahead followed is out of range, the vehicle does not accelerate to the set speed and maintain the following speed to prevent from accelerating and decelerating repeatedly. (If the vehicle equipped the SCC changes the lane or apply the accelerator pedal, the vehicle will accelerate.)
- Warning alarm If the vehicle equipped the SCC decelerates because a vehicle ahead decelerates or moves into your lane, the warning will operate. In case that the vehicle equipped with SCC is able to decelerate properly by the system – No warning In case that the vehicle equipped with SCC is not able to decelerate properly by the system Indicator in the cluster will blink and the warning buzzer will sound. (The warning and deceleration by the system will go on until the brake pedal is applied.) If the vehicle ahead (vehicle speed: less than 30km/h) disappears to the next lane during following distance control, the warning chime will sound and a message will appear. Adjust your vehicle speed for vehicles or objects that can suddenly appear in front of you.
- In case that the vehicle equipped with SCC is able to decelerate properly by the system – No warning
- In case that the vehicle equipped with SCC is not able to decelerate properly by the system Indicator in the cluster will blink and the warning buzzer will sound. (The warning and deceleration by the system will go on until the brake pedal is applied.)
- Indicator in the cluster will blink and the warning buzzer will sound. (The warning and deceleration by the system will go on until the brake pedal is applied.)
- If the vehicle ahead (vehicle speed: less than 30km/h) disappears to the next lane during following distance control, the warning chime will sound and a message will appear. Adjust your vehicle speed for vehicles or

objects that can suddenly appear in front of you.
- Accelerating by driver Even the vehicle is being decelerated by the SCC system, the vehicle can be accelerated by applying the accelerator pedal. If the vehicle is accelerated above the set speed, the indicator in the cluster will blink. Smart cruise control operating conditions. Vehicle speed at approximately 0-160km/h (0-99.4mph) Transmission in D or Sports mode "ESP OFF" switch OFF "ESP OFF" switch OFF "CRUISE" switch ON (CRUISE indicator ON) Under the above conditions, activate the cruise system using the "SET/–" or "RES/+" switch. • Smart cruise control disabling conditions "CRUISE" switch OFF "CANCLE" switch ON Brake pedal applied Driver’s door opened Vehicle speed at more than approximately 170km/h (105mph) Transmission in N or P or R ESP/ TCS / ABS operating An accelerator pedal applied for more than 5min ESP OFF" switch ON (ESP OFF indicator ON) Parking brake applied System failure (The warning indicator ON) Crack, damage or wrong installation of smart cruise control unit cover (The warning indicator ON)
Smart cruise control operating conditions. Vehicle speed at approximately 0-160km/h (0-99.4mph) Transmission in D or Sports mode "ESP OFF" switch OFF "ESP OFF" switch OFF "CRUISE" switch ON (CRUISE indicator ON) Under the above conditions, activate the cruise system using the "SET/–" or "RES/+" switch. • Smart cruise control disabling conditions "CRUISE" switch OFF "CANCLE" switch ON Brake pedal applied Driver’s door opened Vehicle speed at more than approximately 170km/h (105mph) Transmission in N or P or R ESP/ TCS / ABS operating An accelerator pedal applied for more than 5min ESP OFF" switch ON (ESP OFF indicator ON) Parking brake applied System failure (The warning indicator ON) Crack, damage or wrong installation of smart cruise control unit cover (The warning indicator ON)

NOTICE

- Smart cruise control operating conditions.





- Vehicle speed at approximately 0-160km/h (0-99.4mph)
- Transmission in D or Sports mode
- "ESP OFF" switch OFF
- "CRUISE" switch ON (CRUISE indicator ON)
- "CRUISE" switch OFF
- "CANCLE" switch ON
- Brake pedal applied
- Driver’s door opened
- Vehicle speed at more than approximately 170km/h (105mph)
- Transmission in N or P or R
- ESP/ TCS / ABS operating
- An accelerator pedal applied for more than 5min
- ESP OFF" switch ON (ESP OFF indicator ON)
- Parking brake applied
- System failure (The warning indicator ON)
- Crack, damage or wrong installation of smart cruise control unit cover (The warning indicator ON)
- Function of cruise control The driver may choose to only use the cruise control mode (speed control function) by doing as follows: With the smart cruise control system on (the cruise indicator light will be on but the system will not be activated), push the distance to distance switch for more than 2 seconds. "Smart cruise control (SCC) mode" and "Cruise control (CC) mode" can be selected.The speed control of the cruise control mode is the same as that of the smart cruise control mode. When using the cruise control mode, the driver must manually access the distance to other vehicles as the system will not automatically brake to slow down for other vehicles.

Cruise Main Switch (CRUISE)

Set / Coast Switch (SET/–)

If the vehicle speed is above the set speed by applying the accelerator pedal, the vehicle speed will be the set speed.

- If the vehicle speed is above the set speed by applying the accelerator pedal, the vehicle speed will be the set speed.

Resume / Accel Switch (RES/+)

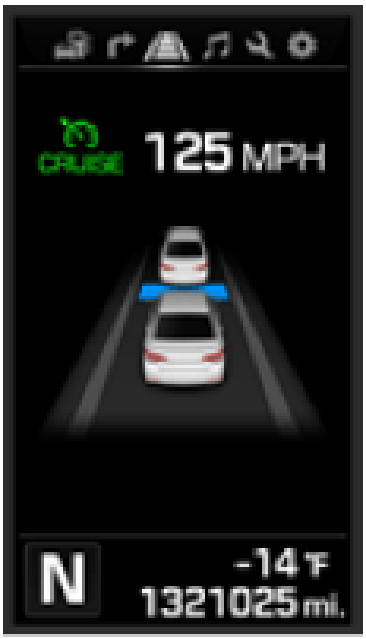
Cancel Switch (CANCEL)

Following distance control switch

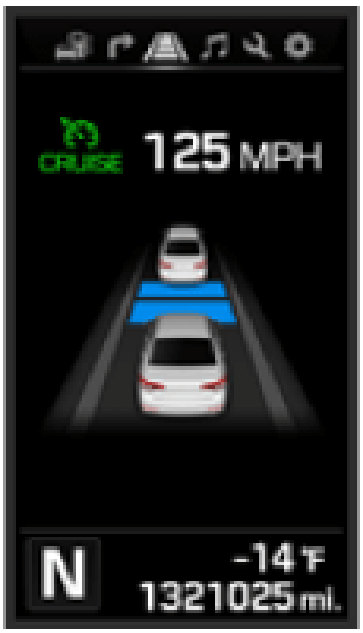
Display in the cluster

Display Description

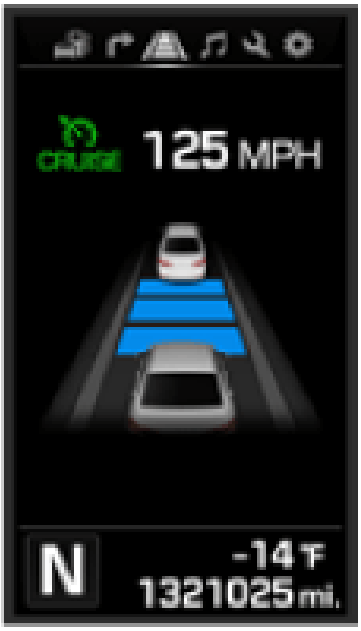
Distance 1 - with a vehicle ahead



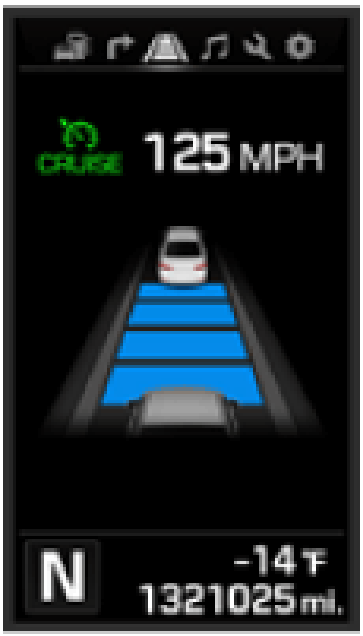
Distance 2 - with a vehicle ahead



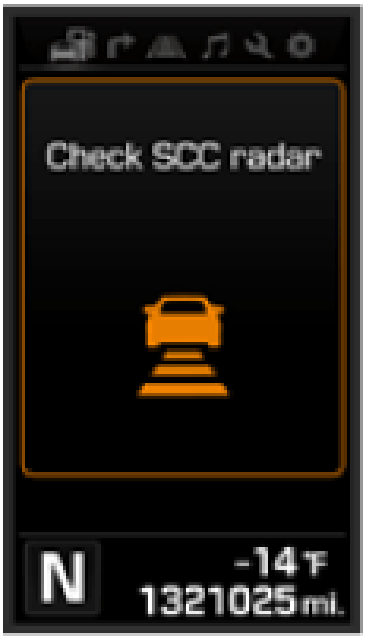
Distance 3 - with a vehicle ahead



Distance 4 - with a vehicle ahead

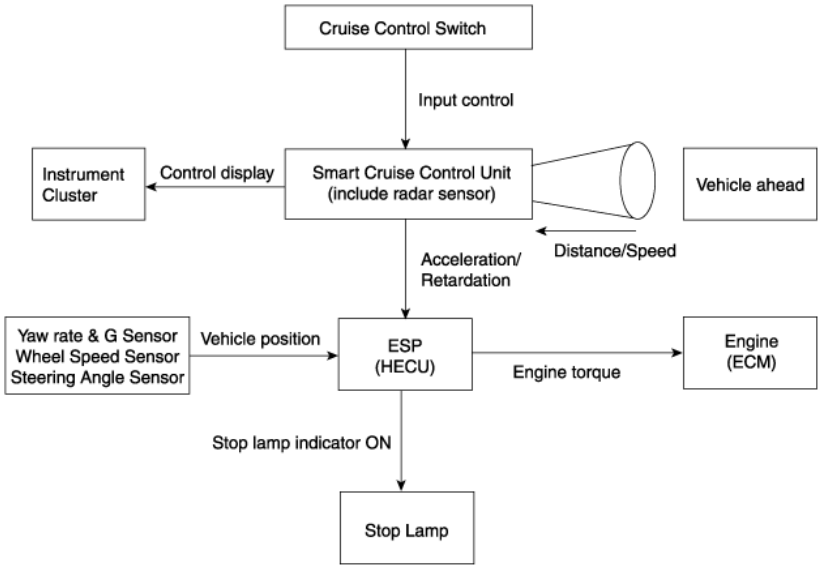


SCC system malfunction



Smart Cruise Control System - Schematic Diagrams (Article 44065)

- Trouble Symptom Charts



Component Parts and Function Outline
Component part Function
Cruise Control Switch Input the set speed and distance to the SCC ECU.
Instrument Cluster Display various information inputted from SCC.
Smart Cruise Control Unit Recognize and track the vehicle ahead. Calculate the target speed and distance
Request the acceleration and retardation to ESP
VDC (HECU) Automatic braking and request the engine torque control to the engine (ECM) Request the EPB torque control to the Electronic Parking Brake (EPB) Request the stop lamp indicator ON
Engine (ECM) Control the engine torque
Stop lamp Stop lamp indicator ON

Vehicle Speed System - Service Tips (Article 42677)

Vehicle Speed System **Service Tips (1)**

Circuit Description

1. ESC module receives the vehicle speed signal from the front & rear wheel sensors and sends it to the ECM(PCM) and MICOM of the instrument cluster through CAN communication.
2. The MICOM in the instrument cluster uses the received vehicle speed data to indicate the current speed by controlling the speedometer. It also converts the speed data into a pulse wave and sends it to A/V & navigation head unit, audio.

■ **Vehicle Speed Signal Functions**

1. ECM(PCM): It compares the vehicle speed from an ESC module with engine revolutions (RPM) and determines the optimum fuel injection, ignition timing and driving transmission gear shift.
2. Instrument Cluster :
   1) Vehicle speed data received from ESC is send to the components ■ (A/V & navigation head unit, audio) through the instrument cluster (No. 12) wiring.
   2) Also the vehicle speed data improve driver's comfort by communicating the components ■ (Network for data transfer between multimedia devices) through the M-CAN (

■ Components (wiring connect)

A/V & navigation head unit/audio: DMB control.

■ Components (M-CAN)

① A/V & navigation head unit

② Audio

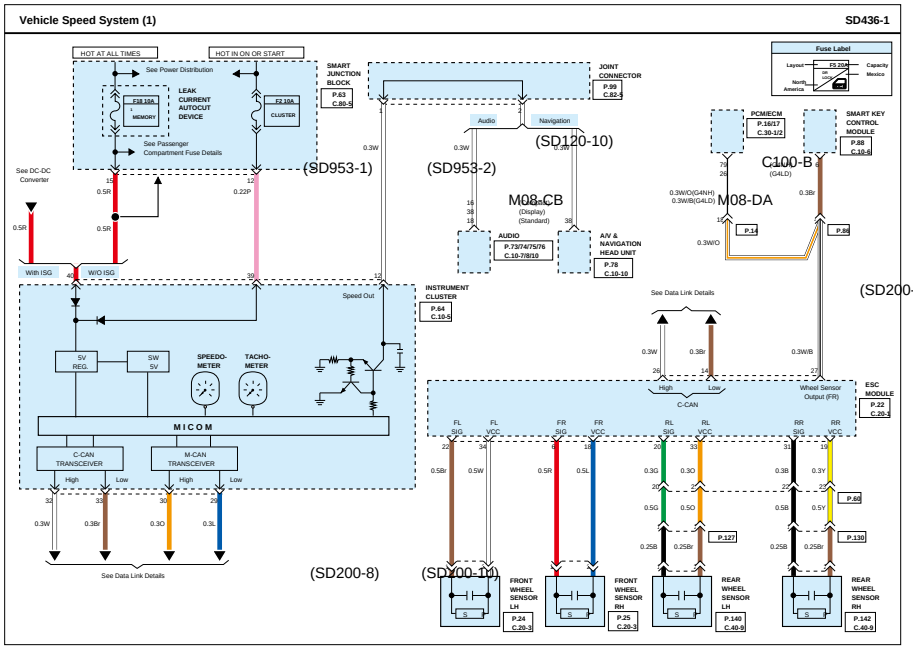
③ AMP

④ Data link connector

■ **Inspection**

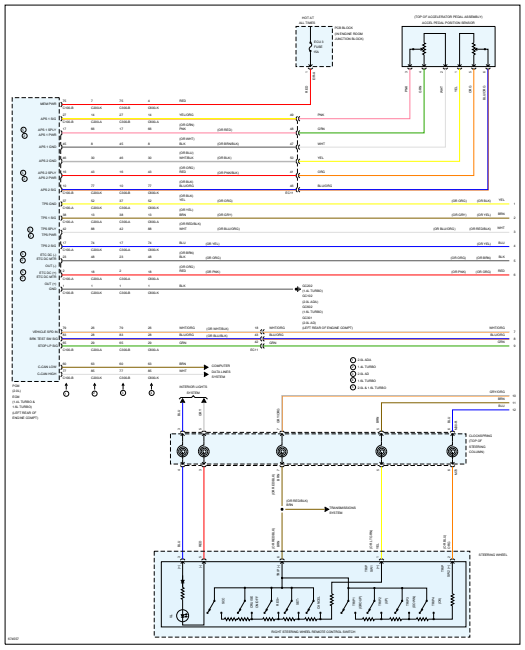
1. Sinc e th e vehicl e spee d dat a ar e transferre d throug h th e CA N communication protocol, check the operation of the communication line.
2. The pulse signal converted by the MICOM of the instrument cluster can be checked by the instrument cluster terminal (

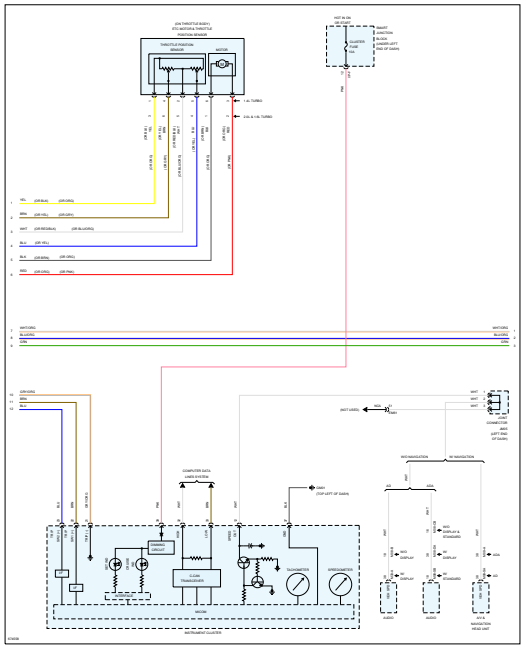
Vehicle Speed System - Schematic Diagrams (Article 42674)

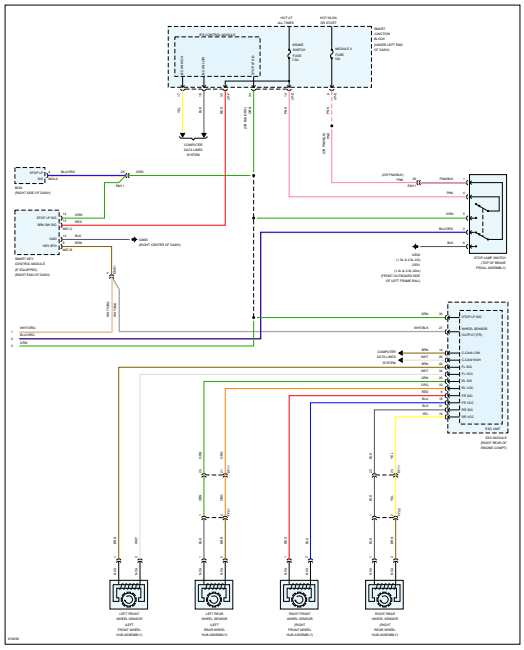


Cruise Control (Article 12554)

Cruise Control







Smart Cruise Control System - General Safety Information and Caution (Article 44064)

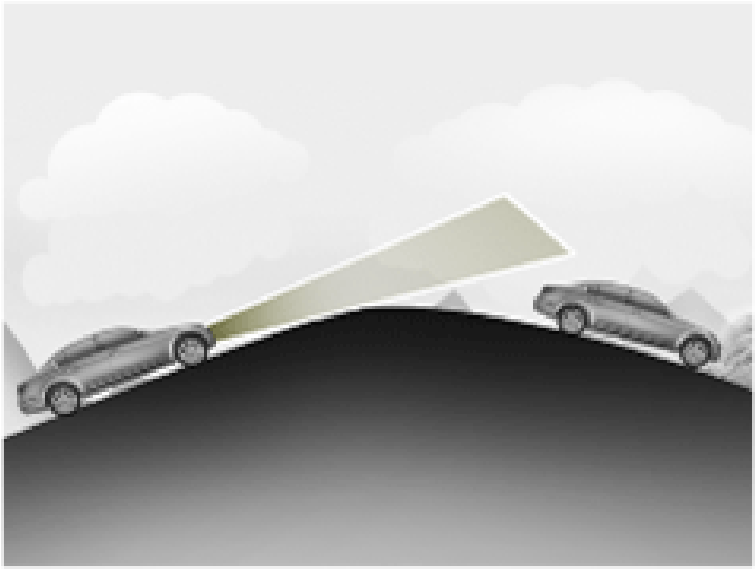
- General Safety Information and Caution

The smart cruise control system may have limits to detect distance to the vehicle ahead due to road and traffic conditions. On curves or inclines/declines On curves or inclines/declines, the smart cruise control system may not detect a moving vehicle in your lane, and then your vehicle may accelerate to the set speed directly. Also, the vehicle speed may slow down abruptly when the vehicle ahead is recognized. Select the appropriate set speed on curves or inclines/declines and control the vehicle speed by applying the brake pedal if necessary. Your vehicle speed can be reduced due to a vehicle in the adjacent lane. Apply the accelerator pedal and select the appropriate set speed. Check to be sure that the road conditions permit. Lane changing A vehicle which moves into your lane from an adjacent lane cannot be recognized by the sensor until it is in the sensor's detection range. Be always cautious because a vehicle which suddenly moves into your lane can be recognized late by the sensor. If the vehicle which moves into your lane is slower than your vehicle, the speed may decrease to maintain the distance to the vehicle ahead. If the vehicle which moves into your lane is faster than your vehicle, your vehicle will maintain the selected speed even the vehicle is in the sensor's detection range. Vehicle recognition Even though a vehicle is in the same lane, a vehicle which is out of the sensor’s detection range cannot be recognized by the sensor. 1) Small vehicle such as motorcycle, bicycle and cultivator 2) A vehicle offset to one side 3) A slow-moving vehicle or sudden-decelerating vehicle 4) A stopped vehicle 5) A vehicle with small rear profile such as trailer with no loads In this following situation, the front vehicle can’t be recognized correctly so control the vehicle speed by applying the brake pedal or accelerator pedal if necessary. 1) When the vehicle is pointing upwards due to overloading in the trunk 2) While making turns by steering 3) When driving to one side of the lane 4) When driving on narrow lanes or on curves If the smart cruise control is left on (CRUISE indicator light ON), the smart cruise control can be switched on accidentally. Keep the smart cruise control system off (CRUISE indicator light OFF) when the smart cruise control is not in use, to avoid inadvertently setting a speed. Observe a regulation speed on road when setting the cruise speed. Use the smart cruise control system only when traveling on open highways in good weather. Do not use the smart cruise control when it may not be safe to keep the car at a constant speed, for instance, driving in heavy or varying traffic, or on slippery (rainy, icy or snow-covered) or winding roads or over 6% up-hill or down-hill roads. Pay particular attention to the driving conditions whenever using the smart cruise control system. The vehicle cannot be stopped by using the smart cruise control system. If emergency stop is necessary, you should apply the brakes. Keep the safety distance according to road conditions and vehicle speed. If the following distance is too close at a high speed driving, it is dangerous. The smart cruise control system can not recognize a stopped vehicle, pedestrians or an oncoming vehicle. Always look ahead cautiously to prevent unexpected and sudden situations from occurring. The smart cruise control system is not a substitute for safe driving practices but a supplementary function only. It is the responsibility of the driver to always check the speed and the distance to the vehicle ahead. In front of you, vehicles moving with a frequent lane change may cause a delay in the system's reaction or may cause the system to react to a vehicle actually in adjacent lane. Always look ahead cautiously to prevent unexpected and sudden situations from occurring. Your vehicle may accelerate when a vehicle ahead of you

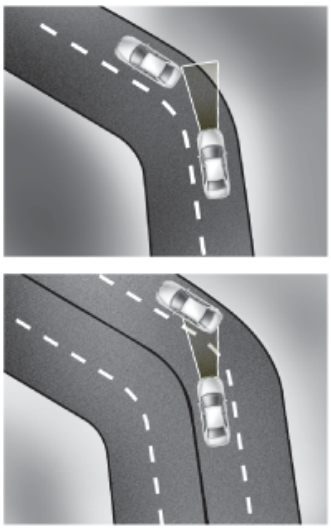
disappears. When you are warned that the vehicle ahead of you is not detected, drive with caution. When vehicles are at a standstill and the vehicle in front of you changes to the next lane, be careful when your vehicle starts to move because it may not recognize the stopped vehicle in front of you. Always look out for pedestrians when your vehicle is maintaining a distance with the vehicle ahead. Always be cautious for vehicles with higher height or vehicles carrying loads that sticks out to the back of the vehicle.

CAUTION

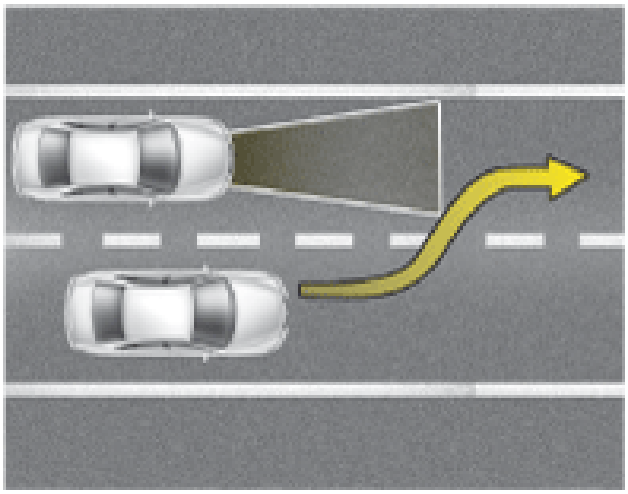
- The smart cruise control system may have limits to detect distance to the vehicle ahead due to road and traffic conditions.
- On curves or inclines/declines
- On curves or inclines/declines, the smart cruise control system may not detect a moving vehicle in your lane, and then your vehicle may accelerate to the set speed directly. Also, the vehicle speed may slow down abruptly when the vehicle ahead is recognized. Select the appropriate set speed on curves or inclines/declines and control the vehicle speed by applying the brake pedal if necessary.



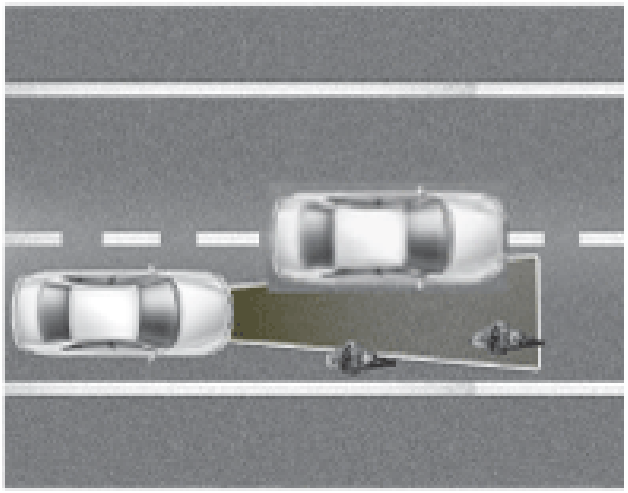
- Your vehicle speed can be reduced due to a vehicle in the adjacent lane. Apply the accelerator pedal and select the appropriate set speed. Check to be sure that the road conditions permit.



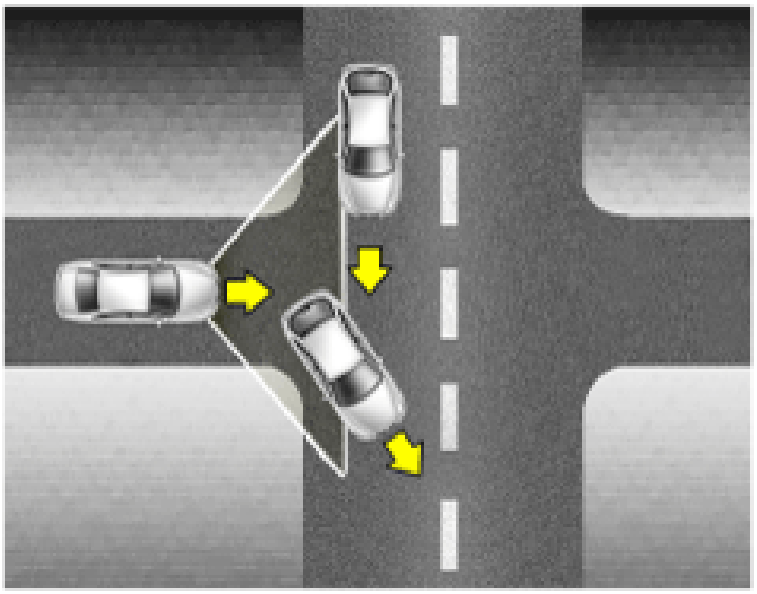
- Lane changing
- A vehicle which moves into your lane from an adjacent lane cannot be recognized by the sensor until it is in the sensor's detection range.
- Be always cautious because a vehicle which suddenly moves into your lane can be recognized late by the sensor.
- If the vehicle which moves into your lane is slower than your vehicle, the speed may decrease to maintain the distance to the vehicle ahead.
- If the vehicle which moves into your lane is faster than your vehicle, your vehicle will maintain the selected speed even the vehicle is in the sensor's detection range.



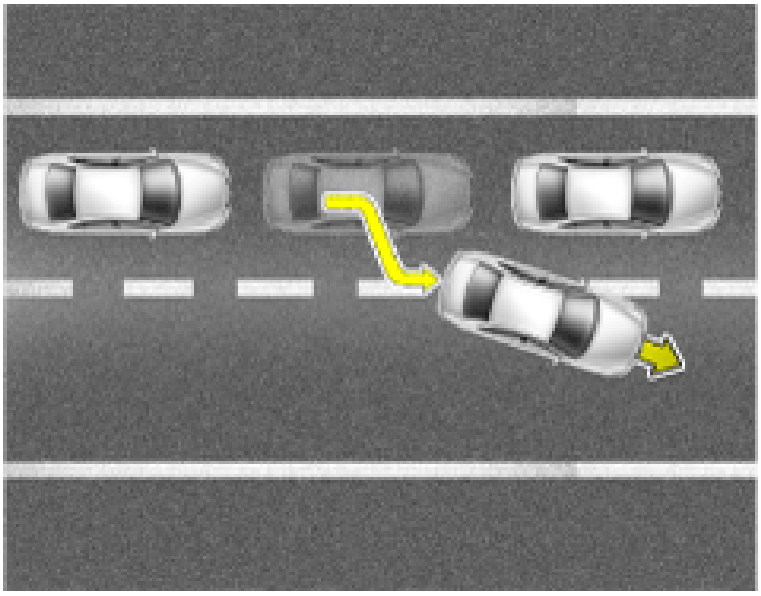
- Vehicle recognition
- Even though a vehicle is in the same lane, a vehicle which is out of the sensor’s detection range cannot be recognized by the sensor. 1) Small vehicle such as motorcycle, bicycle and cultivator 2) A vehicle offset to one side 3) A slow-moving vehicle or sudden-decelerating vehicle 4) A stopped vehicle 5) A vehicle with small rear profile such as trailer with no loads



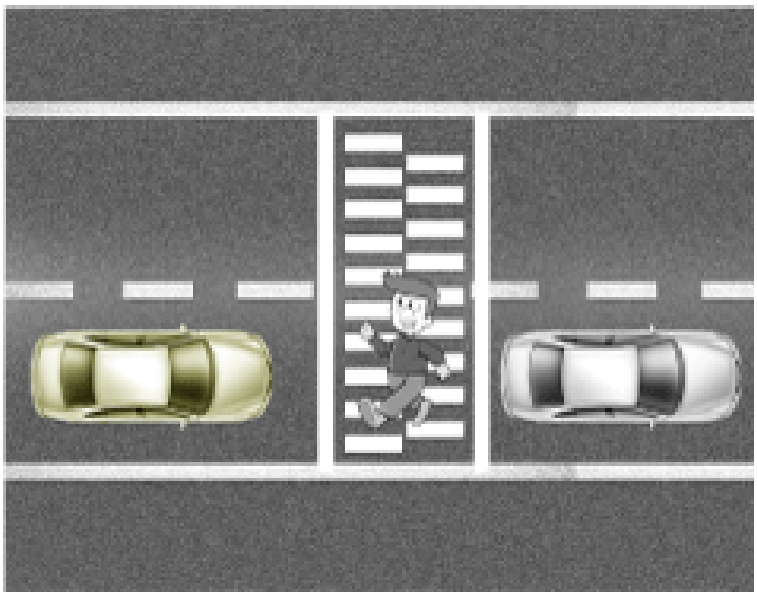
- In this following situation, the front vehicle can’t be recognized correctly so control the vehicle speed by applying the brake pedal or accelerator pedal if necessary. 1) When the vehicle is pointing upwards due to overloading in the trunk 2) While making turns by steering 3) When driving to one side of the lane 4) When driving on narrow lanes or on curves
- If the smart cruise control is left on (CRUISE indicator light ON), the smart cruise control can be switched on accidentally. Keep the smart cruise control system off (CRUISE indicator light OFF) when the smart cruise control is not in use, to avoid inadvertently setting a speed.
- Observe a regulation speed on road when setting the cruise speed.
- Use the smart cruise control system only when traveling on open highways in good weather. Do not use the smart cruise control when it may not be safe to keep the car at a constant speed, for instance, driving in heavy or varying traffic, or on slippery (rainy, icy or snow-covered) or winding roads or over 6% up-hill or down-hill roads.
- Pay particular attention to the driving conditions whenever using the smart cruise control system.
- The vehicle cannot be stopped by using the smart cruise control system. If emergency stop is necessary, you should apply the brakes.
- Keep the safety distance according to road conditions and vehicle speed. If the following distance is too close at a high speed driving, it is dangerous.
- The smart cruise control system can not recognize a stopped vehicle, pedestrians or an oncoming vehicle. Always look ahead cautiously to prevent unexpected and sudden situations from occurring.
- The smart cruise control system is not a substitute for safe driving practices but a supplementary function only. It is the responsibility of the driver to always check the speed and the distance to the vehicle ahead.
- In front of you, vehicles moving with a frequent lane change may cause a delay in the system's reaction or may cause the system to react to a vehicle actually in adjacent lane. Always look ahead cautiously to prevent unexpected and sudden situations from occurring.
- Your vehicle may accelerate when a vehicle ahead of you disappears. When you are warned that the vehicle ahead of you is not detected, drive with caution.



- When vehicles are at a standstill and the vehicle in front of you changes to the next lane, be careful when your vehicle starts to move because it may not recognize the stopped vehicle in front of you.



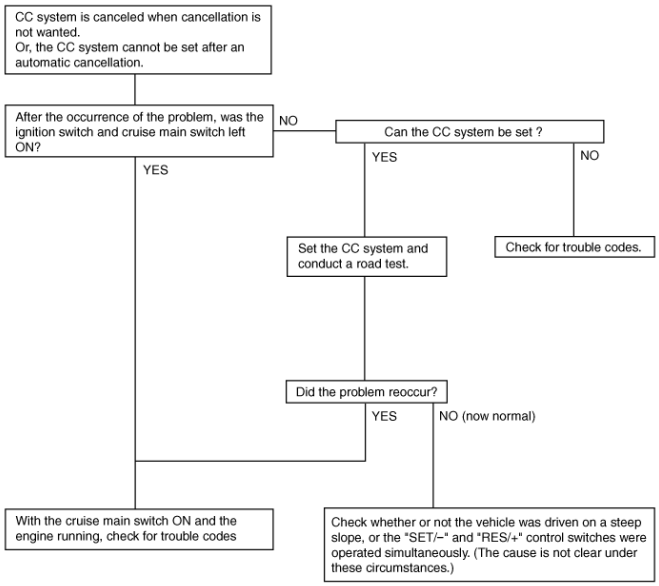
- Always look out for pedestrians when your vehicle is maintaining a distance with the vehicle ahead.



- Always be cautious for vehicles with higher height or vehicles carrying loads that sticks out to the back of the vehicle.

Cruise Control System - Troubleshooting (Article 44059)

- Trouble Symptom Charts
Trouble Symptom 1



CC : Cruise Control
ECM : Engine Control Module

Trouble Symptom 2

Trouble symptom Probable cause Remedy

The set vehicle speed varies greatly upward or downward "Surging" (repeated alternating acceleration and deceleration) occurs after setting Malfunction of the vehicle speed sensor circuit Repair the vehicle speed sensor system, or replace the part

Malfunction of ECM Check input and output signals at ECM

Trouble Symptom 3

The CC system is not canceled when the brake pedal is depressed Damaged or disconnected wiring of the brake pedal switch Repair the harness or replace the brake pedal switch

Malfunction of the ECM signals Check input and output signals at ECM

Trouble Symptom 4

The CC system is not canceled when the shift lever is moved to the "N" position (It is canceled, however, when the brake pedal is depressed) Damaged or disconnected wiring of inhibitor switch input circuit Repair the harness or repair or replace the inhibitor switch

Improper adjustment of inhibitor switch

Trouble Symptom 5

Cannot decelerate (coast) by using the "SET/–" switch Temporary damaged or disconnected wiring of "SET/–" switch input circuit Repair the harness or replace the "SET/–" switch

Trouble Symptom 6

Cannot accelerate or resume speed by using the "RES/+" switch Damaged or disconnected wiring, or short circuit, or "RES/+" switch input circuit Repair the harness or replace the "RES/+" switch

Trouble Symptom 7

CC system can be set while driving at a vehicle speed of less than 40km/h (25mph), or there is no automatic cancellation at that speed Malfunction of the vehicle-speed sensor circuit Repair the vehicle speed sensor system, or replace the part

Trouble Symptom 8

The cruise main switch indicator lamp does not illuminate (although CC system is normal) Damaged or disconnected bulb of cruise main switch indicator lamp Repair the harness or replace the part.

Harness damaged or disconnected